

Electrical Sector Solutions

Volume 4: Circuit Protection

EATON

Powering Business Worldwide

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These catalog pages do not purport to cover all details or variations in equipment, nor to provide for every possible contingency to be met in connection with installation, operation or maintenance. Should further information be desired or should particular problems arise which are not covered sufficiently for the purchaser's purposes, the matter should be referred to the local Eaton Products Distributor or Sales Office. The contents of this catalog shall not become part of or modify any prior or existing agreement, commitment or relationship. The sales contract contains the entire obligation of Eaton's Electrical Sector. The warranty contained in the contract between the parties is the sole warranty of Eaton. Any statements contained herein do not create new warranties or modify the existing warranty.



Powering Business Worldwide

Eaton is a global leader in power distribution, power quality, control and automation, and monitoring products.

At Eaton, we believe a reliable, efficient and safe power system is the foundation of every successful enterprise. Through innovative technologies, cutting-edge products and our highly skilled services team, we empower businesses around the world to achieve a powerful advantage.

In addition, Eaton is committed to creating and maintaining powerful customer relationships built on a foundation of excellence. From the products we manufacture to our dedicated customer service and support, we know what's important to you.

Solutions

Eaton takes the complexity out of power systems management with a holistic and strategic approach, leveraging our industry-leading technology, solutions and services. We focus on the following three areas in all we do:

- Reliability—maintain the appropriate level of power continuity without disruption or unexpected downtime
- Efficiency—minimize energy usage, operating costs, equipment footprint and environmental impact
- Safety—identify and mitigate electrical hazards to protect what you value most

Using the Eaton Catalog Library

As we grow, it becomes increasingly difficult to include all products in one or two comprehensive catalogs. Knowing that each user has their specific needs, we have created a library of catalogs for our products that when complete, will contain 15 volumes. Since the volumes will continuously be a work in progress and updated, each volume will stand alone. Refer to our volume directory, MZ08100001E, for a quick glance of where to look for the products you need. The 15 volumes include:

- Volume 1—Residential and Light Commercial (CA08100002E)
- Volume 2—Commercial Distribution (CA08100003E)
- Volume 3—Power Distribution and Control Assemblies (CA08100004E)
- Volume 4—Circuit Protection (CA08100005E)
- Volume 5—Motor Control and Protection (CA08100006E)
- Volume 6—Solid-State Motor Control (CA08100007E)
- Volume 7—Logic Control, Operator Interface and Connectivity Solutions (CA08100008E)
- Volume 8—Sensing Solutions (CA08100010E)
- Volume 9—Original Equipment Manufacturer (CA08100011E)
- Volume 10—Enclosed Control (CA08100012E)
- Volume 11—Vehicle and Commercial Controls (CA08100013E)
- Volume 12—Aftermarket, Renewal Parts and Life Extension Solutions (CA08100014E)
- Volume 13—Counters, Timers and Tachometers (CA08100015E)—Available in electronic format only
- Volume 14—Fuses (CA08100016E)—Available in electronic format only
- Volume 15—Solar Inverters and Electrical Balance of System (CA08100018E)

These volumes are not all-inclusive of every product, but they are meant to be an overview of our product lines. For our full range of product solutions and additional product information, consult Eaton.com/electrical and other catalogs and product guides in our literature library. These references include:

- The Consulting Application Guide (CA08104001E)
- The Eaton Power Quality Product Guide (COR01FYA)

If you don't have the volume that contains the product or information that you are looking for, not to worry. You can access every volume of the catalog library at Eaton.com/electrical in the Literature Library.

By installing our Automatic Tab Updater (ATU), you can be sure you always have the most recent version of each volume and tab.

Icons



Green Leaf

Eaton Green Solutions are products, systems or solutions that represent Eaton benchmarks for environmental performance. The green leaf symbol is our promise that the solution has been reviewed and documented as offering exceptional, industry-leading environmental benefits to customers, consumers and our communities. Though all of Eaton's products and solutions are designed to meet or exceed applicable government standards related to protecting the environment, our products with the Green Leaf designation further provide "exceptional environmental benefit."



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Drawings Online

When you see the Drawings Online icon, go to Eaton.com/electrical and find the products page. There you will find a tab that includes helpful product drawings and illustrations.

Contact Us

If you need additional help, you can find contact information under the Customer Care heading of Eaton.com/electrical.

Miniature Circuit Breakers and Supplementary Protectors

Miniature Circuit Breakers and Supplementary Protectors



| | |
|---|------------------|
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| Bolt-On Arc Fault Circuit Interrupter Types QBAF, QBCAF | V4-T1-14 |
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1.1

Miniature Circuit Breakers and Supplementary Protectors

Industrial Circuit Breakers

1

Miniature Circuit Breakers and Supplementary Protectors



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Description

Quick Reference

QUICKLAG

Quick Reference

Eaton's QUICKLAG Industrial Circuit Breakers ① Plug-In, Bolt-On, Cable-In/Cable-Out

| Circuit Breaker Type | Circuit Breaker Type Code | Continuous Ampere Rating at 40°C | Number of Poles | Vac | | Federal Spec. W-C-375b | Interrupting Ratings rms Symmetrical Amperes | | | | | | Page Number |
|----------------------|---------------------------|----------------------------------|-----------------|---------|--------------|------------------------|--|---------|--------|----------------|------|------|-------------|
| | | | | Vac | Vdc | | Vac Ratings | | | Vdc Ratings ②③ | | | |
| | | | | | | | 120 | 120/240 | 240 | 24-48 | 62.5 | 80 | |
| HQP | P | 10-70 | 1 | 120/240 | 24, 48, 62.5 | 10a, 11a, 12a | — | 10,000 | — | 5000 | ④ | — | V4-T1-6 |
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| QPGFT | P, GF | 15-50 | 2 | 120/240 | — | 10a, 11a, 12a | — | 10,000 | — | — | — | — | V4-T1-9 |

Notes

① QUICKLAG circuit breakers are suitable for application in relative humidity 0-95% noncondensing.

② Two-pole DC interrupting ratings based on two poles connected in series. Not UL® listed.

③ Breakers at DC ratings are not UL listed.

④ 62.5 Vac interrupting rating is 3800 AIC 10-50A and 2500 AIC 55-100A continuous.

Circuit Breaker Type Codes: **P** Plug-In; **B** Bolt-On; **C** Cable-In/Cable-Out; **GF** Ground Fault, 5 mA; **GFEP** Ground Fault, 30 mA.

For Types GHBS, GBHS and BABRP solenoid-operated, remote-controlled circuit breakers, see **Pages V4-T1-30 to V4-T1-35**.

Eaton's QUICKLAG Industrial Circuit Breakers ① Plug-In, Bolt-On, Cable-In/Cable-Out, continued

| Circuit Breaker Type | Circuit Breaker Type Code | Continuous Ampere Rating at 40°C | Number of Poles | Vac | | Federal Spec. W-C-375b | Interrupting Ratings rms Symmetrical Amperes | | | | | | Page Number |
|----------------------|---------------------------|----------------------------------|-----------------|---------|--------------|------------------------|--|---------|--------|----------------|------|------|-------------|
| | | | | Vac | Vdc | | Vac Ratings | | | Vdc Ratings ②③ | | | |
| | | | | | | | 120 | 120/240 | 240 | 24-48 | 62.5 | 80 | |
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| QBHW | B | 15-125 | 2 | 120/240 | 24, 48, 80 | 14a | — | 22,000 | — | 5000 | 5000 | 5000 | V4-T1-12 |
| QBHW | B | 15-100 | 2, 3 | 240 | — | 14b | — | — | 22,000 | — | — | — | V4-T1-12 |
| HBAX | B | 15-70 | 1 | 120/240 | 24, 48, 62.5 | — | — | 42,000 | — | 5000 | ④ | — | V4-T1-13 |
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| QCD | C | 10-100 | 2, 3 | 240 | 24, 48, 62.5 | — | — | 10,000 | — | 3000 | 3000 | — | V4-T1-22 |
| QCF | C | 10-60 | 1, 2 | 120/240 | 24, 48, 62.5 | — | 10,000 | 10,000 | — | 3000 | 3000 | — | V4-T1-41 |

Notes

① QUICKLAG circuit breakers are suitable for application in relative humidity 0-95% noncondensing.

② Two-pole DC interrupting ratings based on two poles connected in series. Not UL listed.

③ Breakers at DC ratings are not UL listed.

④ 62.5 Vac interrupting rating is 3800 AIC 10-50A and 2500 AIC 55-100A continuous.

Circuit Breaker Type Codes: **P** Plug-In; **B** Bolt-On; **C** Cable-In/Cable-Out; **GF** Ground Fault, 5 mA; **GFEP** Ground Fault, 30 mA.

For Types GHBS, GBHS and BABRP solenoid-operated, remote-controlled circuit breakers, see **Pages V4-T1-30 to V4-T1-35**.

Eaton's QUICKLAG Industrial Circuit Breakers ① Plug-In, Bolt-On, Cable-In/Cable-Out, continued

| Circuit Breaker Type | Circuit Breaker Type Code | Continuous Ampere Rating at 40°C | Number of Poles | Vac | | | Federal Spec. W-C-375b | Interrupting Ratings rms Symmetrical Amperes | | | | | | Page Number |
|----------------------|---------------------------|----------------------------------|-----------------|---------|--------------|-----|------------------------|--|--------|-------|---------------|------|----------|-------------|
| | | | | Vac | Vdc | Vdc | | Vac Ratings | | | Vdc Ratings ② | | | |
| | | | | | | | 120 | 120/240 | 240 | 24–48 | 62.5 | 80 | | |
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| QCR | C | 15–20 | 1, 2 | 120/240 | 24, 48, 62.5 | — | 22,000 | — | — | 3000 | 3000 | — | V4-T1-26 | |
| QCR | C | 15–30 | 2, 3 | 240 | 24, 48, 62.5 | — | — | 10,000 | — | 3000 | 3000 | — | V4-T1-26 | |
| QCHW | C | 15–70 | 1 | 120/240 | 24, 48, 62.5 | 14a | — | 22,000 | — | 5000 | ④ | — | V4-T1-21 | |
| QCHW | C | 15–100 | 2 | 120/240 | 24, 48, 80 | 14a | — | 22,000 | — | 5000 | 5000 | 5000 | V4-T1-21 | |
| QCHW | C | 15–100 | 2, 3 | 240 | — | 14b | — | — | 22,000 | — | — | — | V4-T1-21 | |
| QHCX | C | 15–70 | 1 | 120/240 | 24, 48, 62.5 | — | — | 42,000 | — | 5000 | ④ | — | V4-T1-21 | |
| QHCX | C | 15–100 | 2 | 120/240 | 24, 48, 80 | — | — | 42,000 | — | 5000 | 5000 | 5000 | V4-T1-21 | |
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| QHCW | C | 15–30 | 2 | 120/240 | 24, 48, 80 | 15a | — | 65,000 | — | 5000 | 5000 | 5000 | V4-T1-21 | |
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| QCHGFT | C, GF | 15–30 | 2 | 120/240 | — | — | — | 22,000 | — | — | — | — | V4-T1-28 | |
| QCGFEP | C, GFEP | 15–40 | 1 | 120 | — | — | 10,000 | — | — | — | — | — | V4-T1-28 | |
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| QCHGFEP | C, GFEP | 15–30 | 1 | 120 | — | — | 22,000 | — | — | — | — | — | V4-T1-28 | |
| QCHGFEP | C, GFEP | 15–30 | 2 | 120/240 | — | — | — | 22,000 | — | — | — | — | V4-T1-28 | |

Notes

① QUICKLAG circuit breakers are suitable for application in relative humidity 0–95% noncondensing.

② Two-pole DC interrupting ratings based on two poles connected in series. Not UL listed.

③ 62.5 Vac interrupting rating is 3800 AIC 10–50A and 2500 AIC 55–100A continuous.

Circuit Breaker Type Codes: **P** Plug-In; **B** Bolt-On; **C** Cable-In/Cable-Out; **GF** Ground Fault, 5 mA; **GFEP** Ground Fault, 30 mA.

For Types GHBS, GBHS and BABRP solenoid-operated, remote-controlled circuit breakers, see **Pages V4-T1-30 to V4-T1-35**.

QUICKLAG Type HQP Single-Pole



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QUICKLAG Plug-On Types HQP, QPHW, QHPX, QHPW

Product Description

- All products 15–100A are HACR rated
- Switching duty rated for 120 Vac fluorescent light applications

Standards and Certifications

- Built and listed to UL 489
- All products UL and CSA® listed



Product Selection

QUICKLAG Type HQP
Single-Pole



QUICKLAG Type: HQP 10,000A Interrupting Capacity Thermal-Magnetic Breakers

| Continuous Ampere Rating at 40°C | Single-Pole 120/240 Vac | Two-Pole 120/240 Vac | Two-Pole 240 Vac | Three-Pole 240 Vac |
|--|----------------------------|-------------------------|---------------------|-----------------------|
| | Catalog Number | Catalog Number | Catalog Number | Catalog Number |
| 10 | HQP1010 | HQP2010 | — | HQP3010H ③ |
| 15 | HQP1015 ①② | HQP2015 | HQP2015H | HQP3015H |
| 20 | HQP1020 ①② | HQP2020 | HQP2020H | HQP3020H |
| 25 | HQP1025 | HQP2025 | HQP2025H | HQP3025H |
| 30 | HQP1030 | HQP2030 | HQP2030H | HQP3030H |
| 35 | HQP1035 | HQP2035 | HQP2035H | HQP3035H |
| 40 | HQP1040 | HQP2040 | HQP2040H | HQP3040H |
| 45 | HQP1045 | HQP2045 | HQP2045H | HQP3045H |
| 50 | HQP1050 | HQP2050 | HQP2050H | HQP3050H |
| 55 | HQP1055 | HQP2055 | HQP2055H | HQP3055H |
| 60 | HQP1060 | HQP2060 | HQP2060H | HQP3060H |
| 70 | HQP1070 | HQP2070 | HQP2070H | HQP3070H |
| 80 | — | HQP2080 | HQP2080H | HQP3080H |
| 90 | — | HQP2090 | HQP2090H | HQP3090H |
| 100 | HQP1100 | HQP2100 | HQP2100H | HQP3100H |
| 110 | — | HQP2110 | — | — |
| 125 | — | HQP2125 | — | — |
| 150 | — | HQP2150 | — | — |

QUICKLAG Type: HQP Non-Automatic Switches

| Continuous Ampere Rating at 40°C | Single-Pole 120/240 Vac | Two-Pole 120/240 Vac | Two-Pole 240 Vac | Three-Pole 240 Vac |
|--|----------------------------|-------------------------|---------------------|-----------------------|
| | Catalog Number | Catalog Number | Catalog Number | Catalog Number |
| 50 | HQP1050N | — | HQP2050N | HQP3050N |
| 60 | HQP1060N | — | HQP2060N | HQP3060N |
| 100 | HQP1100N | — | HQP2100N | HQP3100N |

QUICKLAG Type: QPHW 22,000A Interrupting Capacity Thermal-Magnetic Breakers

| Continuous Ampere Rating at 40°C | Single-Pole 120/240 Vac | Two-Pole 120/240 Vac | Two-Pole 240 Vac | Three-Pole 240 Vac |
|--|----------------------------|-------------------------|---------------------|-----------------------|
| | Catalog Number | Catalog Number | Catalog Number | Catalog Number |
| 15 | QPHW1015 ① | QPHW2015 | QPHW2015H | QPHW3015H |
| 20 | QPHW1020 ① | QPHW2020 | QPHW2020H | QPHW3020H |
| 25 | QPHW1025 | QPHW2025 | QPHW2025H | QPHW3025H |
| 30 | QPHW1030 | QPHW2030 | QPHW2030H | QPHW3030H |
| 35 | QPHW1035 | QPHW2035 | QPHW2035H | QPHW3035H |
| 40 | QPHW1040 | QPHW2040 | QPHW2040H | QPHW3040H |
| 45 | QPHW1045 | QPHW2045 | QPHW2045H | QPHW3045H |
| 50 | QPHW1050 | QPHW2050 | QPHW2050H | QPHW3050H |
| 55 | QPHW1055 | QPHW2055 | QPHW2055H | QPHW3055H |
| 60 | QPHW1060 | QPHW2060 | QPHW2060H | QPHW3060H |
| 70 | QPHW1070 | QPHW2070 | QPHW2070H | QPHW3070H |
| 80 | — | QPHW2080 | QPHW2080H | QPHW3080H |
| 90 | — | QPHW2090 | QPHW2090H | QPHW3090H |
| 100 | — | QPHW2100 | QPHW2100H | QPHW3100H |
| 110 | — | QPHW2110 | — | — |
| 125 | — | QPHW2125 | — | — |

Notes

- ① Switching duty rated for 120 Vac fluorescent light applications.
- ② For special low-magnetic breaker, order **HQP1015L1** or **HQP1020L1**.
- ③ Not UL listed.

QUICKLAG Type: QHPX 42,000A Interrupting Capacity Thermal-Magnetic Breakers

| Continuous Ampere Rating at 40°C | Single-Pole 120/240 Vac Catalog Number | Two-Pole 120/240 Vac Catalog Number | Two-Pole 240 Vac Catalog Number | Three-Pole 240 Vac Catalog Number |
|----------------------------------|--|---|---------------------------------------|---|
| 15 | QHPX1015 ① | QHPX2015 | — | QHPX3015H |
| 20 | QHPX1020 ① | QHPX2020 | — | QHPX3020H |
| 25 | QHPX1025 | QHPX2025 | — | QHPX3025H |
| 30 | QHPX1030 | QHPX2030 | — | QHPX3030H |
| 35 | QHPX1035 | QHPX2035 | — | QHPX3035H |
| 40 | QHPX1040 | QHPX2040 | — | QHPX3040H |
| 45 | QHPX1045 | QHPX2045 | — | QHPX3045H |
| 50 | QHPX1050 | QHPX2050 | — | QHPX3050H |
| 55 | QHPX1055 | QHPX2055 | — | QHPX3055H |
| 60 | QHPX1060 | QHPX2060 | — | QHPX3060H |
| 70 | QHPX1070 | QHPX2070 | — | QHPX3070H |
| 80 | — | QHPX2080 | — | QHPX3080H |
| 90 | — | QHPX2090 | — | QHPX3090H |
| 100 | — | QHPX2100 | — | QHPX3100H |

QUICKLAG Type: QHPW 65,000A Interrupting Capacity Thermal-Magnetic Breakers

| Continuous Ampere Rating at 40°C | Single-Pole 120/240 Vac Catalog Number | Two-Pole 120/240 Vac Catalog Number | Two-Pole 240 Vac Catalog Number | Three-Pole 240 Vac Catalog Number |
|----------------------------------|--|---|---------------------------------------|---|
| 15 | QHPW1015 ① | QHPW2015 | — | QHPW3015H |
| 20 | QHPW1020 ① | QHPW2020 | — | QHPW3020H |
| 25 | QHPW1025 | QHPW2025 | — | — |
| 30 | QHPW1030 | QHPW2030 | — | — |

Dimensions

Approximate Dimensions in Inches (mm)

Shipping Data

| Number of Poles | Carton Quantity | Approximate Weight Lbs (kg) | Dimensions |
|-----------------|-----------------|-----------------------------|---|
| 1 | 24 | 9.00 (4.1) | 12.50 x 7.50 x 5.00 (317.5 x 190.5 x 127.0) |
| 2 | 12 | 9.00 (4.1) | 12.50 x 7.50 x 5.00 (317.5 x 190.5 x 127.0) |
| 3 | 8 | 9.00 (4.1) | 12.50 x 7.50 x 5.00 (317.5 x 190.5 x 127.0) |

Note

① Switching duty rated for 120 Vac fluorescent light applications.

QUICKLAG Type QPGFT Single-Pole Ground Fault Circuit Breaker



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| Bolt-On Arc Fault Circuit Interrupter Types QBAF, QBCAF | V4-T1-14 |
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| Special Application Breakers, Types HQP, BA, QC | V4-T1-39 |

QUICKLAG Plug-On Ground Fault and Equipment Protectors, Types QPGFT, QPHGFT, QPGFEP, QPHGFEP

Product Description

QUICKLAG Ground Fault Circuit Breakers, Class A GFCI

- 5 mA trip sensitivity

QUICKLAG Ground Fault Equipment Protectors

- 30 mA trip sensitivity

Standards and Certifications

- Built and listed to UL 489

QUICKLAG Ground Fault Circuit Breakers, Class A GFCI

- Built and tested to UL 943

QUICKLAG Ground Fault Equipment Protectors

- Built and listed to UL 1053



Product Selection

QUICKLAG Type QPGFT Single-Pole



Ground Fault Circuit Breakers—5 mA Sensitivity QUICKLAG Type: QPGFT 10,000A Interrupting Capacity Thermal-Magnetic Breakers

| Continuous Ampere Rating at 40°C | Single-Pole 120 Vac Catalog Number | Two-Pole 120/240 Vac Catalog Number |
|----------------------------------|------------------------------------|-------------------------------------|
| 15 | QPGFT1015 | QPGFT2015 |
| 20 | QPGFT1020 | QPGFT2020 |
| 25 | QPGFT1025 | QPGFT2025 |
| 30 | QPGFT1030 | QPGFT2030 |
| 40 | QPGFT1040 | QPGFT2040 |
| 50 | — | QPGFT2050 |

Ground Fault Circuit Breakers—5 mA Sensitivity QUICKLAG Type: QPHGF 22,000A Interrupting Capacity Thermal-Magnetic Breakers

| Continuous Ampere Rating at 40°C | Single-Pole 120 Vac Catalog Number | Two-Pole 120/240 Vac Catalog Number |
|----------------------------------|------------------------------------|-------------------------------------|
| 15 | QPHGF1015 | QPHGF2015 |
| 20 | QPHGF1020 | QPHGF2020 |
| 25 | QPHGF1025 | QPHGF2025 |
| 30 | QPHGF1030 | QPHGF2030 |

Ground Fault Equipment Breakers—30 mA Sensitivity QUICKLAG Type: QPGFEP 10,000 Interrupting Capacity Thermal-Magnetic Breakers

| Continuous Ampere Rating at 40°C | Single-Pole 120 Vac Catalog Number | Two-Pole 120/240 Vac Catalog Number |
|----------------------------------|------------------------------------|-------------------------------------|
| 15 | QPGFEP1015 | QPGFEP2015 |
| 20 | QPGFEP1020 | QPGFEP2020 |
| 25 | QPGFEP1025 | QPGFEP2025 |
| 30 | QPGFEP1030 | QPGFEP2030 |
| 40 | QPGFEP1040 | QPGFEP2040 |
| 50 | — | QPGFEP2050 |

Ground Fault Equipment Breakers—30 mA Sensitivity QUICKLAG Type: QPHGFEP 22,000A Interrupting Capacity Thermal-Magnetic Breakers

| Continuous Ampere Rating at 40°C | Single-Pole 120 Vac Catalog Number | Two-Pole 120/240 Vac Catalog Number |
|----------------------------------|------------------------------------|-------------------------------------|
| 15 | QPHGFEP1015 | QPHGFEP2015 |
| 20 | QPHGFEP1020 | QPHGFEP2020 |
| 25 | QPHGFEP1025 | QPHGFEP2025 |
| 30 | QPHGFEP1030 | QPHGFEP2030 |

Special Application Ground Fault Circuit Protectors—5 mA Sensitivity QUICKLAG Type: QPGFT 10,000A Interrupting Capacity with Bell Alarm (W1) or Auxiliary Switch (W2)

| Continuous Ampere Rating at 40°C | Single-Pole | Two-Pole |
|--|---------------------------|-------------------------------|
| | 120 Vac Catalog Number | 120/240 Vac Catalog Number |
| 15 | QPGFT1015W1 | QPGFT2015W1 |
| 20 | QPGFT1020W1 | QPGFT2020W1 |
| 25 | QPGFT1025W1 | QPGFT2025W1 |
| 30 | QPGFT1030W1 | QPGFT2030W1 |
| 40 | — | QPGFT2040W1 |
| 50 | — | QPGFT2050W1 |
| 15 | QPGFT1015W2 | — |
| 20 | QPGFT1020W2 | — |
| 25 | QPGFT1025W2 | — |
| 30 | QPGFT1030W2 | — |

Special Application Ground Fault Circuit Protectors—30 mA Sensitivity QUICKLAG Type: QPGFEP 10,000A Interrupting Capacity with Bell Alarm (W1) or Auxiliary Switch (W2)

| Continuous Ampere Rating at 40°C | Single-Pole | Two-Pole |
|--|---------------------------|-------------------------------|
| | 120 Vac Catalog Number | 120/240 Vac Catalog Number |
| 15 | QPGFEP1015W1 | QPGFEP2015W1 |
| 20 | QPGFEP1020W1 | QPGFEP2020W1 |
| 25 | QPGFEP1025W1 | QPGFEP2025W1 |
| 30 | QPGFEP1030W1 | QPGFEP2030W1 |
| 40 | — | QPGFEP2040W1 |
| 50 | — | QPGFEP2050W1 |
| 15 | QPGFEP1015W2 | — |
| 20 | QPGFEP1020W2 | — |
| 25 | QPGFEP1025W2 | — |
| 30 | QPGFEP1030W2 | — |

Wiring Diagram

Bell Alarm and Auxiliary Contact Schematic



Single-throw double-pole contacts are UL and CSA listed for 5A at 250 Vac.
 Bell Alarm (W1)—contacts change state when breaker trips.
 Auxiliary Switch (W2)—contacts change state when breaker is opened (or tripped) or closed.
 14-inch (355.6 mm) long 18 AWG pigtail wire leads provided.

Dimensions

Approximate Dimensions in Inches (mm)

Shipping Data

| Number of Poles | Carton Quantity | Approximate Weight Lbs (kg) | Dimensions |
|-----------------|-----------------|-----------------------------|---|
| 1 | 24 | 11.00 (5.0) | 12.50 x 6.50 x 5.00 (317.5 x 165.1 x 127.0) |
| 2 | 5 | 5.00 (2.3) | 15.50 x 6.00 x 4.50 (393.7 x 152.4 x 114.3) |

Note

Shipped individually or in carton quantities.

QUICKLAG Type BAB Single-Pole



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| Special Application Breakers, Types HQP, BA, QC | V4-T1-39 |

Bolt-On Types BAB, QBHW, HBAX, HBAW

Product Description

- All products 15–100A are HACR rated
- Switching duty rated for 120 Vac fluorescent light applications

Standards and Certifications

- Built and listed to UL 489
- All products UL and CSA listed



Product Selection

QUICKLAG Type BAB
Single-Pole



QUICKLAG Type: BA 10,000A Interrupting Capacity Thermal-Magnetic Breakers

| Continuous Ampere Rating at 40°C | Single-Pole 120/240 Vac Catalog Number | Two-Pole 120/240 Vac Catalog Number | Two-Pole 240 Vac Catalog Number | Three-Pole 240 Vac Catalog Number |
|----------------------------------|--|---|---------------------------------------|---|
| 10 | BAB1010 | BAB2010 | BAB2010H ③ | BAB3010H ③ |
| 15 | BAB1015 ①② | BAB2015 | BAB2015H | BAB3015H |
| 20 | BAB1020 ①② | BAB2020 | BAB2020H | BAB3020H |
| 25 | BAB1025 | BAB2025 | BAB2025H | BAB3025H |
| 30 | BAB1030 | BAB2030 | BAB2030H | BAB3030H |
| 35 | BAB1035 | BAB2035 | BAB2035H | BAB3035H |
| 40 | BAB1040 | BAB2040 | BAB2040H | BAB3040H |
| 45 | BAB1045 | BAB2045 | BAB2045H | BAB3045H |
| 50 | BAB1050 | BAB2050 | BAB2050H | BAB3050H |
| 55 | BAB1055 | BAB2055 | BAB2055H | BAB3055H |
| 60 | BAB1060 | BAB2060 | BAB2060H | BAB3060H |
| 70 | BAB1070 | BAB2070 | BAB2070H | BAB3070H |
| 80 | — | BAB2080 | BAB2080H | BAB3080H |
| 90 | — | BAB2090 | BAB2090H | BAB3090H |
| 100 | BAB1100 | BAB2100 | BAB2100H | BAB3100H |
| 110 | — | BAB2110 | — | — |
| 125 | — | BAB2125 | — | — |

QUICKLAG Type: BA Non-Automatic Switches

| Continuous Ampere Rating at 40°C | Single-Pole 120/240 Vac Catalog Number | Two-Pole 120/240 Vac Catalog Number | Two-Pole 240 Vac Catalog Number | Three-Pole 240 Vac Catalog Number |
|----------------------------------|--|---|---------------------------------------|---|
| 50 | BAB1050N | — | BAB2050N | BAB3050N |
| 60 | BAB1060N | — | BAB2060N | BAB3060N |
| 100 | BAB1100N | — | BAB2100N | BAB3100N |

QUICKLAG Type: QBHW 22,000A Interrupting Capacity Thermal-Magnetic Breakers

| Continuous Ampere Rating at 40°C | Single-Pole 120/240 Vac Catalog Number | Two-Pole 120/240 Vac Catalog Number | Two-Pole 240 Vac Catalog Number | Three-Pole 240 Vac Catalog Number |
|----------------------------------|--|---|---------------------------------------|---|
| 15 | QBHW1015 ① | QBHW2015 | QBHW2015H | QBHW3015H |
| 20 | QBHW1020 ① | QBHW2020 | QBHW2020H | QBHW3020H |
| 25 | QBHW1025 | QBHW2025 | QBHW2025H | QBHW3025H |
| 30 | QBHW1030 | QBHW2030 | QBHW2030H | QBHW3030H |
| 35 | QBHW1035 | QBHW2035 | QBHW2035H | QBHW3035H |
| 40 | QBHW1040 | QBHW2040 | QBHW2040H | QBHW3040H |
| 45 | QBHW1045 | QBHW2045 | QBHW2045H | QBHW3045H |
| 50 | QBHW1050 | QBHW2050 | QBHW2050H | QBHW3050H |
| 55 | QBHW1055 | QBHW2055 | QBHW2055H | QBHW3055H |
| 60 | QBHW1060 | QBHW2060 | QBHW2060H | QBHW3060H |
| 70 | QBHW1070 | QBHW2070 | QBHW2070H | QBHW3070H |
| 80 | — | QBHW2080 | QBHW2080H | QBHW3080H |
| 90 | — | QBHW2090 | QBHW2090H | QBHW3090H |
| 100 | — | QBHW2100 | QBHW2100H | QBHW3100H |
| 110 | — | QBHW2110 | — | — |
| 125 | — | QBHW2125 | — | — |

Notes

- ① Switching duty rated for 120 Vac fluorescent light applications.
- ② For special low-magnetic breaker, order **BAB1015L1** or **BAB1020L1**.
- ③ Not UL listed.

QUICKLAG Type: HBAX 42,000A Interrupting Capacity Thermal-Magnetic Breakers

| Continuous Ampere Rating at 40°C | Single-Pole 120/240 Vac Catalog Number | Two-Pole 120/240 Vac Catalog Number | Two-Pole 240 Vac Catalog Number | Three-Pole 240 Vac Catalog Number |
|----------------------------------|--|---|---------------------------------------|---|
| 15 | HBAX1015 ① | HBAX2015 | — | HBAX3015H |
| 20 | HBAX1020 ① | HBAX2020 | — | HBAX3020H |
| 25 | HBAX1025 | HBAX2025 | — | HBAX3025H |
| 30 | HBAX1030 | HBAX2030 | — | HBAX3030H |
| 35 | HBAX1035 | HBAX2035 | — | HBAX3035H |
| 40 | HBAX1040 | HBAX2040 | — | HBAX3040H |
| 45 | HBAX1045 | HBAX2045 | — | HBAX3045H |
| 50 | HBAX1050 | HBAX2050 | — | HBAX3050H |
| 55 | HBAX1055 | HBAX2055 | — | HBAX3055H |
| 60 | HBAX1060 | HBAX2060 | — | HBAX3060H |
| 70 | HBAX1070 | HBAX2070 | — | HBAX3070H |
| 80 | — | HBAX2080 | — | HBAX3080H |
| 80 | — | HBAX2080 | — | HBAX3080H |
| 90 | — | HBAX2090 | — | HBAX3090H |
| 100 | — | HBAX2100 | — | HBAX3100H |

QUICKLAG Type: HBAW 65,000A Interrupting Capacity Thermal-Magnetic Breakers

| Continuous Ampere Rating at 40°C | Single-Pole 120/240 Vac Catalog Number | Two-Pole 120/240 Vac Catalog Number | Two-Pole 240 Vac Catalog Number | Three-Pole 240 Vac Catalog Number |
|----------------------------------|--|---|---------------------------------------|---|
| 15 | HBAW1015 ① | HBAW2015 | — | HBAW3015H |
| 20 | HBAW1020 ① | HBAW2020 | — | HBAW3020H |
| 25 | HBAW1025 | HBAW2025 | — | — |
| 30 | HBAW1030 | HBAW2030 | — | — |

Dimensions

Approximate Dimensions in Inches (mm)

Shipping Data

| Number of Poles | Carton Quantity | Approximate Weight Lbs (kg) | Dimensions |
|-----------------|-----------------|-----------------------------|---|
| 1 | 24 | 9.00 (4.1) | 12.50 x 7.50 x 5.00 (317.5 x 190.5 x 127.0) |
| 2 | 12 | 9.00 (4.1) | 12.50 x 7.50 x 5.00 (317.5 x 190.5 x 127.0) |
| 3 | 8 | 9.00 (4.1) | 12.50 x 7.50 x 5.00 (317.5 x 190.5 x 127.0) |

Note

① Switching duty rated for 120 Vac fluorescent light applications.

Bolt-On Arc Fault Circuit Interrupter QUICKLAG Types QBAF, QBCAF



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| Cable-In/Cable-Out, 1/2-Inch Wide, Types QCR, QCF, QCRH, QCFH | V4-T1-23 |
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| Solenoid-Operated, Remote-Controlled Latching Types BABRP, BABRSP, BRRP and CLRP | V4-T1-30 |
| Solenoid Operator—Remote Controlled Latching for Type GHBS, GBHS and GHQRSP Breakers | V4-T1-33 |
| International Rated Types HQP, BA, QC, GFMB, GFXBC | V4-T1-36 |
| Special Application Breakers, Types HQP, BA, QC | V4-T1-39 |

Bolt-On Arc Fault Circuit Interrupter Types QBAF, QBCAF

Product Description

- All products HACR rated

Features, Benefits and Functions

- 10 and 22 kAIC rating at 120V and 120/240V
- Single-pole AFCI
- HID ratings for HID (High Intensity Discharge) lighting
- All models are HACR rated

Standards and Certifications

- Built and listed to UL 489
- UL File E7819 for QBAF



Product Selection

QBACAF and QBAF Type AFCIs

Effective immediately, Eaton AFCIs are available for use in Sumter panels with a 22 kAIC rating. This higher rated breaker will allow us to win jobs where AFCIs are specified at higher than 10 kAIC. This breaker provides standard thermal-

magnetic protection of branch circuits. This product will have the same form, fit and function of the current bolt-on AFCI (QBACAF and QBAF Type). Product scope is below. These breakers are in Bid Manager™ for Pow-R-Line 1a, Pow-R-Line 1a-LX,

Pow-R-Line 3a and Pow-R-Line 4a panelboards. For series rated combinations, continue to use the less expensive 10 kAIC QBACAF and QBAF offerings.

Breakers can also be ordered from Vista.

QBHCAF

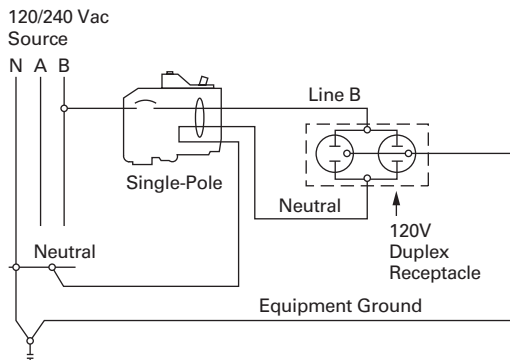


1-Inch (25.4 mm) Wide Bolt-On Arc Fault Circuit Interrupter

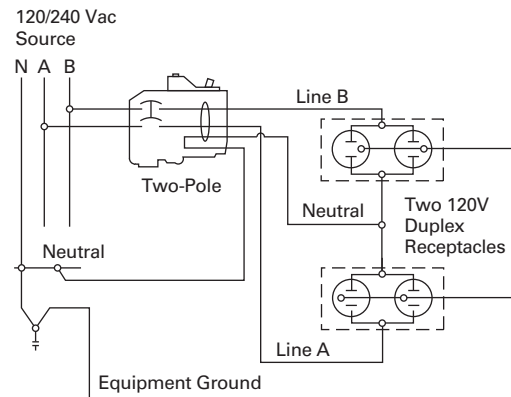
| Poles | kAIC Rating | Ampere Rating | Configuration | Catalog Number |
|-------------------------------------|-------------|---------------|------------------|-------------------|
| Type QBACAF Combination AFCI | | | | |
| Single-pole | 10 kAIC | 15 | Combination AFCI | QB1015CAF |
| | | 20 | Combination AFCI | QB1020CAF |
| | 22 kAIC | 15 | Combination AFCI | QBH1015CAF |
| | | 20 | Combination AFCI | QBH1020CAF |

Wiring Diagrams

Single-Pole 120V Load Application Sourced by 120/240 Vac



Single-Pole Shared Neutral with Multi-Duplex Receptacle Application



1

QUICKLAG Type QBGFT Single-Pole Ground Fault Circuit Breaker



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Bolt-On Ground Fault and Equipment Protectors, Types QBGFT, QBHGFT, QBGFEP, QBHGFEP

Product Description

QUICKLAG Ground Fault Circuit Breakers, Class A GFCI

- 5 mA trip sensitivity

QUICKLAG Ground Fault Equipment Protectors

- 30 mA trip sensitivity

Standards and Certifications

- Built and tested to UL 489

QUICKLAG Ground Fault Circuit Breakers, Class A GFCI

- Built and tested to UL 943

QUICKLAG Ground Fault Equipment Protectors

- Built and tested to UL 1053



Product Selection

QUICKLAG Type QBGFT Single-Pole



Ground Fault Circuit Breakers—5 mA Sensitivity QUICKLAG Type: QBGFT 10,000A Interrupting Capacity Thermal-Magnetic Breakers

| Continuous Ampere Rating at 40°C | Single-Pole | Two-Pole |
|----------------------------------|---------------------------|-------------------------------|
| | 120 Vac Catalog Number | 120/240 Vac Catalog Number |
| 15 | QB1015GF | QBGFT2015 |
| 20 | QB1020GF | QBGFT2020 |
| 25 | QB1025GF | QBGFT2025 |
| 30 | QB1030GF | QBGFT2030 |
| 40 | QB1040GF | QBGFT2040 |
| 50 | — | QBGFT2050 |

Ground Fault Circuit Breakers—5 mA Sensitivity QUICKLAG Type: QBHGF 22,000A Interrupting Capacity Thermal-Magnetic Breakers

| Continuous Ampere Rating at 40°C | Single-Pole | Two-Pole |
|----------------------------------|---------------------------|-------------------------------|
| | 120 Vac Catalog Number | 120/240 Vac Catalog Number |
| 15 | QBH1015GF | QBHGF2015 |
| 20 | QBH1020GF | QBHGF2020 |
| 25 | QBH1025GF | QBHGF2025 |
| 30 | QBH1030GF | QBHGF2030 |

Ground Fault Equipment Breakers—30 mA Sensitivity QUICKLAG Type: QBGFEP 10,000A Interrupting Capacity Thermal-Magnetic Breakers

| Continuous Ampere Rating at 40°C | Single-Pole | Two-Pole |
|----------------------------------|---------------------------|-------------------------------|
| | 120 Vac Catalog Number | 120/240 Vac Catalog Number |
| 15 | QB1015EP | QBGFEP2015 |
| 20 | QB1020EP | QBGFEP2020 |
| 25 | QB1025EP | QBGFEP2025 |
| 30 | QB1030EP | QBGFEP2030 |
| 40 | QB1040EP | QBGFEP2040 |
| 50 | — | QBGFEP2050 |

Ground Fault Equipment Breakers—30 mA Sensitivity QUICKLAG Type: QBHGFEP 22,000A Interrupting Capacity Thermal-Magnetic Breakers

| Continuous Ampere Rating at 40°C | Single-Pole | Two-Pole |
|----------------------------------|---------------------------|-------------------------------|
| | 120 Vac Catalog Number | 120/240 Vac Catalog Number |
| 15 | QBH1015EP | QBHGFEP2015 |
| 20 | QBH1020EP | QBHGFEP2020 |
| 25 | QBH1025EP | QBHGFEP2025 |
| 30 | QBH1030EP | QBHGFEP2030 |

Special Application Ground Fault Circuit Protectors—5 mA Sensitivity QUICKLAG Type: QBGFT 10,000A Interrupting Capacity with Bell Alarm (W1) or Auxiliary Switch (W2)

| Continuous Ampere Rating at 40°C | Single-Pole | Two-Pole |
|----------------------------------|---------------------------|-------------------------------|
| | 120 Vac Catalog Number | 120/240 Vac Catalog Number |
| 15 | QBGFT1015W1 | QBGFT2015W1 |
| 20 | QBGFT1020W1 | QBGFT2020W1 |
| 25 | QBGFT1025W1 | QBGFT2025W1 |
| 30 | QBGFT1030W1 | QBGFT2030W1 |
| 40 | — | QBGFT2040W1 |
| 50 | — | QBGFT2050W1 |
| 15 | QBGFT1015W2 | — |
| 20 | QBGFT1020W2 | — |
| 25 | QBGFT1025W2 | — |
| 30 | QBGFT1030W2 | — |

Special Application Ground Fault Circuit Protectors—30 mA Sensitivity QUICKLAG Type: QBGFEP 10,000A Interrupting Capacity with Bell Alarm (W1) or Auxiliary Switch (W2)

| Continuous Ampere Rating at 40°C | Single-Pole | Two-Pole |
|----------------------------------|---------------------------|-------------------------------|
| | 120 Vac Catalog Number | 120/240 Vac Catalog Number |
| 15 | QBGFEP1015W1 | QBGFEP2015W1 |
| 20 | QBGFEP1020W1 | QBGFEP2020W1 |
| 25 | QBGFEP1025W1 | QBGFEP2025W1 |
| 30 | QBGFEP1030W1 | QBGFEP2030W1 |
| 40 | — | QBGFEP2040W1 |
| 50 | — | QBGFEP2050W1 |
| 15 | QBGFEP1015W2 | — |
| 20 | QBGFEP1020W2 | — |
| 25 | QBGFEP1025W2 | — |
| 30 | QBGFEP1030W2 | — |

Wiring Diagram

Bell Alarm and Auxiliary Contact Schematic



Single-throw double-pole contacts are UL and CSA listed for 5A at 250 Vac.
 Bell Alarm (W1)—contacts change state when breaker trips.
 Auxiliary Switch (W2)—contacts change state when breaker is opened (or tripped) or closed.
 14-inch (355.6 mm) long 18 AWG pigtail wire leads provided.

Dimensions

Approximate Dimensions in Inches (mm)

Shipping Data

| Number of Poles | Approximate Weight Lbs (kg) | Dimensions |
|-----------------|-----------------------------|---|
| 1 | 11.00 (5.0) | 12.50 x 6.50 x 5.00 (317.5 x 165.1 x 127.0) |
| 2 | 5.00 (2.3) | 15.50 x 6.00 x 4.50 (393.7 x 152.4 x 114.3) |

Note

Shipped individually or in carton quantities.

QUICKLAG Type QC Single-Pole



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| Solenoid Operator—Remote Controlled Latching for Type GHBS, GBHS and GHQRSP Breakers | V4-T1-33 |
| International Rated Types HQP, BA, QC, GFMB, GFXBC | V4-T1-36 |
| Special Application Breakers, Types HQP, BA, QC | V4-T1-39 |

Cable-In/Cable-Out Types QC, QCD, QCHW, QHCX, QHCW

Product Description

- All products 10–100A are HACR rated
- Switching duty rated for 120 Vac fluorescent light applications only

Standards and Certifications

- Built and listed to UL 489
- All products UL and CSA listed



Product Selection

QUICKLAG
Type QC Single-Pole

QUICKLAG Type: QC 10,000A Interrupting Capacity Thermal-Magnetic Breakers

| Continuous Ampere Rating at 40°C | Single-Pole 120/240 Vac | Two-Pole 120/240 Vac | Two-Pole 240 Vac | Three-Pole 240 Vac | Four-Pole 240 Vac |
|--|----------------------------|-------------------------|----------------------|-----------------------|----------------------|
| | Catalog Number | Catalog Number | Catalog Number | Catalog Number | Catalog Number |
| 5 | QC1005 ^① | QC2005 ^① | — | — | — |
| 10 | QC1010 | QC2010 | QC2010H ^① | QC3010H ^① | — |
| 15 | QC1015 ^② | QC2015 | QC2015H | QC3015H | QC4015H |
| 20 | QC1020 ^② | QC2020 | QC2020H | QC3020H | QC4020H |
| 25 | QC1025 | QC2025 | QC2025H | QC3025H | QC4025H |
| 30 | QC1030 | QC2030 | QC2030H | QC3030H | QC4030H |
| 35 | QC1035 | QC2035 | QC2035H | QC3035H | QC4035H |
| 40 | QC1040 | QC2040 | QC2040H | QC3040H | QC4040H |
| 45 | QC1045 | QC2045 | QC2045H | QC3045H | QC4045H |
| 50 | QC1050 | QC2050 | QC2050H | QC3050H | QC4050H |
| 55 | QC1055 | QC2055 | QC2055H | QC3055H | QC4055H |
| 60 | QC1060 | QC2060 | QC2060H | QC3060H | QC4060H |
| 70 | QC1070 | QC2070 | QC2070H | QC3070H | QC4070H |
| 70 | — | QC2080 | QC2080H | QC3080H | QC4080H |
| 90 | — | QC2090 | QC2090H | QC3090H | QC4090H |
| 100 | QC1100 | QC2100 | QC2100H | QC3100H | QC4100H |

QUICKLAG Type: QC Non-Automatic Switches

| Continuous Ampere Rating at 40°C | Single-Pole 120/240 Vac | Two-Pole 120/240 Vac | Two-Pole 240 Vac | Three-Pole 240 Vac | Four-Pole 240 Vac |
|--|----------------------------|-------------------------|---------------------|-----------------------|----------------------|
| | Catalog Number | Catalog Number | Catalog Number | Catalog Number | Catalog Number |
| 50 | QC1050N | — | QC2050N | QC3050N | — |
| 60 | QC1060N | — | QC2060N | QC3060N | — |
| 100 | QC1100N | — | QC2100N | QC3100N | — |

Notes

① Not UL listed.

② Switching duty rated for 120 Vac fluorescent light applications only.

For special low-magnetic breaker, order **QC1015L1** or **QC1020L1**. Non-automatic switches, see **Page V4-T1-41**.

QUICKLAG Type: QCHW 22,000A Interrupting Capacity Thermal-Magnetic Breakers

| Continuous Ampere Rating at 40°C | Single-Pole 120/240 Vac Catalog Number | Two-Pole 120/240 Vac Catalog Number | Two-Pole 240 Vac Catalog Number | Three-Pole 240 Vac Catalog Number | Four-Pole 240 Vac Catalog Number |
|----------------------------------|--|-------------------------------------|---------------------------------|-----------------------------------|----------------------------------|
| 15 | QCHW1015 ① | QCHW2015 | QCHW2015H | QCHW3015H | QCHW4015H |
| 20 | QCHW1020 ① | QCHW2020 | QCHW2020H | QCHW3020H | QCHW4020H |
| 25 | QCHW1025 | QCHW2025 | QCHW2025H | QCHW3025H | QCHW4025H |
| 30 | QCHW1030 | QCHW2030 | QCHW2030H | QCHW3030H | QCHW4030H |
| 35 | QCHW1035 | QCHW2035 | QCHW2035H | QCHW3035H | QCHW4035H |
| 40 | QCHW1040 | QCHW2040 | QCHW2040H | QCHW3040H | QCHW4040H |
| 45 | QCHW1045 | QCHW2045 | QCHW2045H | QCHW3045H | QCHW4045H |
| 50 | QCHW1050 | QCHW2050 | QCHW2050H | QCHW3050H | QCHW4050H |
| 55 | QCHW1055 | QCHW2055 | QCHW2055H | QCHW3055H | QCHW4055H |
| 60 | QCHW1060 | QCHW2060 | QCHW2060H | QCHW3060H | QCHW4060H |
| 70 | QCHW1070 | QCHW2070 | QCHW2070H | QCHW3070H | QCHW4070H |
| 70 | — | QCHW2080 | QCHW2080H | QCHW3080H | QCHW4080H |
| 90 | — | QCHW2090 | QCHW2090H | QCHW3090H | QCHW4090H |
| 100 | — | QCHW2100 | QCHW2100H | QCHW3100H | QCHW4100H |

QUICKLAG Type: QHCX 42,000A Interrupting Capacity Thermal-Magnetic Breakers

| Continuous Ampere Rating at 40°C | Single-Pole 120/240 Vac Catalog Number | Two-Pole 120/240 Vac Catalog Number | Two-Pole 240 Vac Catalog Number | Three-Pole 240 Vac Catalog Number | Four-Pole 240 Vac Catalog Number |
|----------------------------------|--|-------------------------------------|---------------------------------|-----------------------------------|----------------------------------|
| 15 | QHCX1015 ① | QHCX2015 | — | QHCX3015H | — |
| 20 | QHCX1020 ① | QHCX2020 | — | QHCX3020H | — |
| 25 | QHCX1025 | QHCX2025 | — | QHCX3025H | — |
| 30 | QHCX1030 | QHCX2030 | — | QHCX3030H | — |
| 35 | QHCX1035 | QHCX2035 | — | QHCX3035H | — |
| 40 | QHCX1040 | QHCX2040 | — | QHCX3040H | — |
| 45 | QHCX1045 | QHCX2045 | — | QHCX3045H | — |
| 50 | QHCX1050 | QHCX2050 | — | QHCX3050H | — |
| 55 | QHCX1055 | QHCX2055 | — | QHCX3055H | — |
| 60 | QHCX1060 | QHCX2060 | — | QHCX3060H | — |
| 70 | QHCX1070 | QHCX2070 | — | QHCX3070H | — |
| 70 | — | QHCX2080 | — | QHCX3080H | — |
| 90 | — | QHCX2090 | — | QHCX3090H | — |
| 100 | — | QHCX2100 | — | QHCX3100H | — |

QUICKLAG Type: QHCW 65,000A Interrupting Capacity Thermal-Magnetic Breakers

| Continuous Ampere Rating at 40°C | Single-Pole 120/240 Vac Catalog Number | Two-Pole 120/240 Vac Catalog Number | Two-Pole 240 Vac Catalog Number | Three-Pole 240 Vac Catalog Number | Four-Pole 240 Vac Catalog Number |
|----------------------------------|--|-------------------------------------|---------------------------------|-----------------------------------|----------------------------------|
| 15 | QHCW1015 ① | QHCW2015 | — | QHCW3015H | — |
| 20 | QHCW1020 ① | QHCW2020 | — | QHCW3020H | — |
| 25 | QHCW1025 | QHCW2025 | — | — | — |
| 30 | QHCW1030 | QHCW2030 | — | — | — |

Notes

① Switching duty rated for 120 Vac fluorescent light applications only.

Non-automatic switches, see **Page V4-T1-41**.

1.1

Miniature Circuit Breakers and Supplementary Protectors

Industrial Circuit Breakers

1

QUICKLAG Type QCD Miniature Circuit Breakers

QCD breakers are used primarily in HVAC and industrial applications.

- Single-, two- and three-pole options
- Modular construction
- DIN mounted (symmetrical rail 35 x 7.5 DIN/EN 50 022)
- QCD same profile as Type QCR
- Flexible power feed connection: wire size, position
- Same breaker size for entire rating range
- Field mountable accessories: finger shroud proof, quick connect terminals
- Other accessories: jumper unit

QUICKLAG Type QCD Miniature Circuit Breaker



QUICKLAG Type QCD 10,000A Interrupting Capacity Thermal-Magnetic Breakers

| Continuous Ampere Rating at 40°C | Single-Pole 120/240 Vac Catalog Number | Two-Pole 120/240 Vac Catalog Number | Two-Pole 240 Vac Catalog Number | Three-Pole 240 Vac Catalog Number |
|----------------------------------|--|-------------------------------------|---------------------------------|-----------------------------------|
| 10 | QCD1010 | QCD2010 | — | — |
| 15 | QCD1015 | QCD2015 | QCD2015H | QCD3015H |
| 20 | QCD1020 | QCD2020 | QCD2020H | QCD3020H |
| 25 | QCD1025 | QCD2025 | QCD2025H | QCD3025H |
| 30 | QCD1030 | QCD2030 | QCD2030H | QCD3030H |
| 35 | QCD1035 | QCD2035 | QCD2035H | QCD3035H |
| 40 | QCD1040 | QCD2040 | QCD2040H | QCD3040H |
| 45 | QCD1045 | QCD2045 | QCD2045H | QCD3045H |
| 50 | QCD1050 | QCD2050 | QCD2050H | QCD3050H |
| 55 | QCD1055 | QCD2055 | QCD2055H | QCD3055H |
| 60 | QCD1060 | QCD2060 | QCD2060H | QCD3060H |
| 70 | — | QCD2070 | QCD2070H | QCD3070H |
| 80 | — | QCD2080 | QCD2080H | QCD3080H |
| 90 | — | QCD2090 | QCD2090H | QCD3090H |
| 100 | — | QCD2090 | QCD2090H | QCD3100H |
| | — | QCD2100 | QCD2100H | — |

QUICKLAG Type QCD Non-Automatic Switches

| Continuous Ampere Rating at 40°C | Single-Pole 120/240 Vac Catalog Number | Two-Pole 120/240 Vac Catalog Number | Two-Pole 240 Vac Catalog Number | Three-Pole 240 Vac Catalog Number |
|----------------------------------|--|-------------------------------------|---------------------------------|-----------------------------------|
| 60 | — | — | QCD2060NA | — |
| 100 | — | — | — | — |

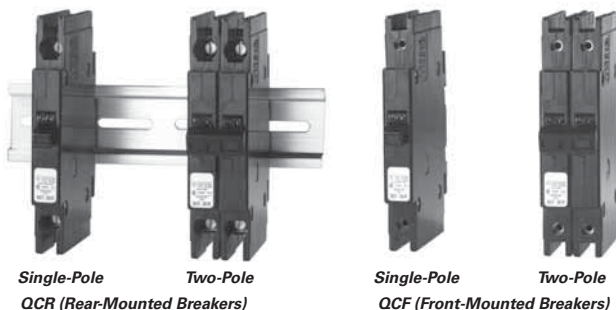
Dimensions

Approximate Dimensions in Inches (mm)

Shipping Data

| Number of Poles | Carton Quantity | Approximate Weight Lbs (kg) | Dimensions |
|-----------------|-----------------|-----------------------------|---|
| 1 | 24 | 9.00 (4.1) | 12.50 x 7.50 x 5.00 (317.5 x 190.5 x 127.0) |
| 2 | 12 | 9.00 (4.1) | 12.50 x 7.50 x 5.00 (317.5 x 190.5 x 127.0) |
| 3 | 8 | 9.00 (4.1) | 12.50 x 7.50 x 5.00 (317.5 x 190.5 x 127.0) |

Cable-In/Cable-Out, 1/2-Inch Wide, Types QCR, QCF, QCRH, QCFH



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| Bolt-On Types BAB, QBHW, HBAX, HBAW | V4-T1-11 |
| Bolt-On Arc Fault Circuit Interrupter Types QBAF, QBCAF | V4-T1-14 |
| Bolt-On Ground Fault and Equipment Protectors, Types QBGFT, QBHGFT, QBGFEP, QBHGFEP | V4-T1-16 |
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| Solenoid Operator—Remote Controlled Latching for Type GHBS, GBHS and GHQRSP Breakers | V4-T1-36 |
| International Rated Types HQP, BA, QC, GFMB, GFXBC | V4-T1-39 |
| Special Application Breakers, Types HQP, BA, QC | V4-T1-39 |

Cable-In/Cable-Out, 1/2-Inch Wide, Types QCR, QCF, QCRH, QCFH

Product Description

Eaton Type QCR circuit breakers have as a standard feature provisions for 35 mm DIN rail rear mounting with a spring-loaded release. Optional clips for individual mounting are available as a separate accessory.

Type QCF have two threaded steel inserts to facilitate front mounting with #6–32 steel screws. The clamp type terminals are accessible from the rear of the breaker so that cables can be accessed without removal of the breaker from the front cover.

Application Description

QCR and QCF circuit breakers are only 1/2-inch (12.7 mm) wide per pole and are excellent for general purpose industrial applications where space savings is required.

Features, Benefits and Functions

- 1/2-inch (12.7 mm) wide per pole
- Cable-in/cable-out
- Black cases with black handles
- Three position handle: ON, Tripped (center), OFF
- Thermal-magnetic protection

Standards and Certifications

- Built and listed to UL 489
- UL File No. E7819
- CSA File No. LR48907
- Type QCR and QCF circuit breakers are UL listed circuit breakers that are suitable for use as branch circuit protectors
- All ratings 15–60A are HACR rated



Product Selection

Cable-In/Cable-Out,
1/2-Inch Wide



QCR Breaker Catalog Numbers ^{①②③④}

| Continuous Ampere Rating at 40°C | Single-Pole 120/240 Vac | Two-Pole 120/240 Vac | Two-Pole 240 Vac ^⑤ | Three-Pole |
|---|----------------------------|-------------------------|----------------------------------|----------------|
| | Catalog Number | Catalog Number | Catalog Number | Catalog Number |
| QCR Breaker 10 kAIC Interrupting Ratings | | | | |
| 10 | QCR1010 | QCR2010 | — | — |
| | QCR1010T | QCR2010T | — | — |
| | — | QCR2010P | — | — |
| 15 | QCR1015 ^⑥ | QCR2015 | QCR2015H | QCR3015H |
| | QCR1015T ^⑥ | QCR2015T | QCR2015HT | QCR3015HT |
| | — | QCR2015P | — | — |
| 20 | QCR1020 ^⑥ | QCR2020 | QCR2020H | QCR3020H |
| | QCR1020T ^⑥ | QCR2020T | QCR2020HT | QCR3020HT |
| | — | QCR2020P | — | — |
| 25 | QCR1025 | QCR2025 | QCR2025H | QCR3025H |
| | QCR1025T | QCR2025T | QCR2025HT | QCR3025HT |
| | — | QCR2025P | — | — |
| 30 | QCR1030 | QCR2030 | QCR2030H | QCR3030H |
| | QCR1030T | QCR2030T | QCR2030HT | QCR3030HT |
| | — | QCR2030P | — | — |
| 35 | QCR1035 | QCR2035 | — | — |
| | — | QCR2035P | — | — |
| 40 | QCR1040 | QCR2040 | — | — |
| | — | QCR2040P | — | — |
| 45 | QCR1045 | QCR2045 | — | — |
| | — | QCR2045P | — | — |
| 50 | QCR1050 | QCR2050 | — | — |
| | — | QCR2050P | — | — |
| 55 | QCR1055 | QCR2055 | — | — |
| | — | QCR2055P | — | — |
| 60 ^⑦ | QCR1060 | QCR2060 | — | — |
| | — | QCR2060P | — | — |
| QCR Breaker 22 kAIC Interrupting Ratings | | | | |
| 15 | QCRH1015 ^⑥ | QCRH2015 | — | — |
| | QCRH1015T ^⑥ | QCRH2015T | — | — |
| 20 | QCRH1020 ^⑥ | QCRH2020 | — | — |
| | QCRH1020T ^⑥ | QCRH2020T | — | — |

Notes

- ① Standard breaker terminals are box type lugs.
- ② Breakers with **T** Catalog Number Suffix are suitable for line and load side ring terminal connection (#10–32 plus/minus terminal screw provided).
- ③ Breakers with **P** Catalog Number Suffix are suitable for terminating two 10 AWG Quick-Connect Type Terminals per phase on breaker load side.
- ④ Breakers with Shunt Trip (extra pole required on breaker right-hand side) are available on single-, two- and three-pole. Contact the Customer Support Center at 1-800-356-1243.
- ⑤ Breakers with **H** Catalog Suffix have 240 Vac construction.
- ⑥ All 15 and 20A single-pole breakers are SWD (Switching Duty) rated for fluorescent lighting applications.
- ⑦ 60/75°C Cu/Al wire on all ratings except 60A, which requires Cu only conductor.

Cable-In/Cable-Out,
1/2-Inch Wide



QCF Breaker Catalog Numbers ^{①②③}

| Continuous Ampere Rating at 40°C | Single-Pole 120/240 Vac | Two-Pole 120/240 Vac | Two-Pole 240 Vac ^④ | Three-Pole |
|---|----------------------------|-------------------------|----------------------------------|----------------|
| | Catalog Number | Catalog Number | Catalog Number | Catalog Number |
| QCF Breaker 10 kAIC Interrupting Ratings | | | | |
| 10 | QCF1010 | QCF2010 | — | — |
| | QCF1010T | QCF2010T | — | — |
| 15 | QCF1015 ^⑤ | QCF2015 | QCF2015H | QCF3015H |
| | QCF1015T ^⑤ | QCF2015T | QCF2015HT | QCF3015HT |
| 20 | QCF1020 ^⑤ | QCF2020 | QCF2020H | QCF3020H |
| | QCF1020T ^⑤ | QCF2020T | QCF2020HT | QCF3020HT |
| 25 | QCF1025 | QCF2025 | QCF2025H | QCF3025H |
| | QCF1025T | QCF2025T | QCF2025HT | QCF3025HT |
| 30 | QCF1030 | QCF2030 | QCF2030H | QCF3030H |
| | QCF1030T | QCF2030T | QCF2030HT | QCF3030HT |
| 35 | QCF1035 | QCF2035 | — | — |
| 40 | QCF1040 | QCF2040 | — | — |
| 45 | QCF1045 | QCF2045 | — | — |
| 50 | QCF1050 | QCF2050 | — | — |
| 55 | QCF1055 | QCF2055 | — | — |
| 60 ^⑥ | QCF1060 | QCF2060 | — | — |
| QCF Breaker 22 kAIC Interrupting Ratings | | | | |
| 15 | QCFH1015 ^⑤ | QCFH2015 | — | — |
| | QCFH1015T ^⑤ | QCFH2015T | — | — |
| 20 | QCFH1020 ^⑤ | QCFH2020 | — | — |
| | QCFH1020T ^⑤ | QCFH2020T | — | — |

Notes

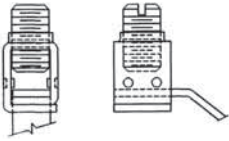
- ① Standard breaker terminals are box type lugs.
- ② Breakers with **T** Catalog Number Suffix are suitable for line and load side ring terminal connection (#10–32 plus/minus terminal screw provided).
- ③ Breakers with Shunt Trip Attachment (extra pole required on breaker right-hand side) are available. Contact the Customer Support Center.
- ④ Breakers with **H** Catalog Suffix have 240 Vac construction.
- ⑤ All 15 and 20A single-pole breakers are SWD (Switching Duty) rated for fluorescent lighting applications.
- ⑥ 60/75°C Cu/Al wire on all ratings except 60A, which requires Cu only conductor.

QCR and QCF Options and Accessories

QCR and QCF Standard Box Terminals

Factory-installed line and load side breaker terminal to accommodate 14 AWG to 4 AWG wire.

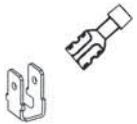
Standard Box Terminals



QCR Quick-Connect Terminals

Factory-installed two-prong quick-connect terminal on breaker load side suitable for terminating two 10 AWG wire with insulated slip-on terminals as shown. Line side terminal is the standard type.

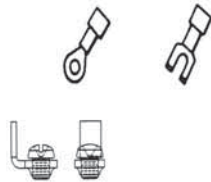
Catalog Suffix "P"



QCR and QCF Ring or Spade Lug Terminals (10 to 30A Ratings Only)

Factory-installed line and load side terminals each equipped with a #10–32 screw suitable for terminating one 10 AWG wire with insulated ring or spade type terminal as shown.

Catalog Suffix "T"



Available QCR and QCF Breaker Accessories

| Description | Catalog Number |
|--|-----------------|
| Steel mounting clip mounts QCR breaker if individual mounting is required. Quantity two required for single- and two-pole and four required for three-pole breakers. | QCRMTGFT |
| Removable padlock device for single-pole QCR or QCF breaker. | QCRFPL1P |
| Removable padlock device for multi-pole QCR or QCF breaker. | QCRFPLMP |
| Padlock bracket assembly for QCR or QCF single- or multi-pole breakers (OFF only). | QCRFLOFF |
| Padlock bracket for QCR, lock-off only. | QCRPLOFF |

Technical Data and Specifications

- Single-, two- and three-pole
- 10 kAIC at 120/240 Vac, 10–60A
- 22 kAIC at 120/240 Vac, 15–20A
- 10 kAIC at 240 Vac, 10–30A
- 3 kAIC at 62.5 Vdc (single-pole)
- 3 kAIC at 130 Vdc (two poles in series)
- Normal operating environment:
 - 0–40°C
 - 5–95% humidity (noncondensing)

QUICKLAG Type QCGFT Single-Pole Ground Fault Circuit Breaker



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| Bolt-On Arc Fault Circuit Interrupter Types QBAF, QBCAF | V4-T1-14 |
| Bolt-On Ground Fault and Equipment Protectors, Types QBGFT, QBHGFT, QBGFEP, QBHGFEP | V4-T1-16 |
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Cable-In/Cable-Out Ground Fault and Equipment Protectors, Types QCGFT, QCHGFT, QCGFEP, QCHGFEP

Product Description

QUICKLAG Ground Fault Circuit Breakers, Class A GFCI

- 5 mA trip sensitivity

QUICKLAG Ground Fault Equipment Protectors

- 30 mA trip sensitivity

Standards and Certifications

QUICKLAG Ground Fault Circuit Breakers, Class A GFCI

- Built and tested to UL 943

QUICKLAG Ground Fault Equipment Protectors

- Built and tested to UL 1053



Product Selection

QUICKLAG Type QCGFT Single-Pole Ground Fault Circuit Breaker



Breaker Catalog Numbers

| Continuous Ampere Rating at 40°C | Single-Pole 120 Vac Catalog Number | Two-Pole 120/240 Vac Catalog Number |
|--|------------------------------------|-------------------------------------|
| Ground Fault Circuit Breakers—5 mA Sensitivity | | |
| QUICKLAG Type: QCGFT 10,000A Interrupting Capacity Thermal-Magnetic Breakers | | |
| 15 | QCGFT1015 | QCGFT2015 |
| 20 | QCGFT1020 | QCGFT2020 |
| 25 | QCGFT1025 | QCGFT2025 |
| 30 | QCGFT1030 | QCGFT2030 |
| 40 | QCGFT1040 | QCGFT2040 |
| 50 | — | QCGFT2050 |
| QUICKLAG Type: QCHGFT 22,000A Interrupting Capacity Thermal-Magnetic Breakers | | |
| 15 | QCHGFT1015 | QCHGFT2015 |
| 20 | QCHGFT1020 | QCHGFT2020 |
| 25 | QCHGFT1025 | QCHGFT2025 |
| 30 | QCHGFT1030 | QCHGFT2030 |
| Ground Fault Equipment Protectors—30 mA Sensitivity | | |
| QUICKLAG Type: QCGFEP 10,000A Interrupting Capacity Thermal-Magnetic Breakers | | |
| 15 | QCGFEP1015 | QCGFEP2015 |
| 20 | QCGFEP1020 | QCGFEP2020 |
| 25 | QCGFEP1025 | QCGFEP2025 |
| 30 | QCGFEP1030 | QCGFEP2030 |
| 40 | QCGFEP1040 | QCGFEP2040 |
| 50 | — | QCGFEP2050 |
| QUICKLAG Type: QCHGFEP 22,000A Interrupting Capacity Thermal-Magnetic Breakers | | |
| 15 | QCHGFEP1015 | QCHGFEP2015 |
| 20 | QCHGFEP1020 | QCHGFEP2020 |
| 25 | QCHGFEP1025 | QCHGFEP2025 |
| 30 | QCHGFEP1030 | QCHGFEP2030 |
| Special Application Ground Fault Circuit Protector—5 mA Sensitivity | | |
| QUICKLAG Type: QCGFT 10,000A Interrupting Capacity with Bell Alarm (W1) or Auxiliary Switch (W2) | | |
| 15 | QCGFT1015W1 | QCGFT2015W1 |
| 20 | QCGFT1020W1 | QCGFT2020W1 |
| 25 | QCGFT1025W1 | QCGFT2025W1 |
| 30 | QCGFT1030W1 | QCGFT2030W1 |
| 40 | — | QCGFT2040W1 |
| 50 | — | QCGFT2050W1 |
| 15 | QCGFT1015W2 | — |
| 20 | QCGFT1020W2 | — |
| 25 | QCGFT1025W2 | — |
| 30 | QCGFT1030W2 | — |
| Special Application Ground Fault Equipment Protectors—30 mA Sensitivity | | |
| QUICKLAG Type: QCGFEP 10,000A Interrupting Capacity with Bell Alarm (W1) or Auxiliary Switch (W2) | | |
| 15 | QCGFEP1015W1 | QCGFEP2015W1 |
| 20 | QCGFEP1020W1 | QCGFEP2020W1 |
| 25 | QCGFEP1025W1 | QCGFEP2025W1 |
| 30 | QCGFEP1030W1 | QCGFEP2030W1 |
| 40 | — | QCGFEP2040W1 |
| 50 | — | QCGFEP2050W1 |
| 15 | QCGFEP1015W2 | — |
| 20 | QCGFEP1020W2 | — |
| 25 | QCGFEP1025W2 | — |
| 30 | QCGFEP1030W2 | — |

Wiring Diagram

Bell Alarm and Auxiliary Contact Schematic



Single-throw double-pole contacts are UL and CSA listed for 5A at 250 Vac.
 Bell Alarm (W1)—contacts change state when breaker trips.
 Auxiliary Switch (W2)—contacts change state when breaker is opened (or tripped) or closed.
 14-inch (355.6 mm) long 18 AWG pigtail wire leads provided.

Dimensions

Approximate Dimensions in Inches (mm)

Shipping Data

| Number of Poles | Carton Quantity | Approximate Weight Lbs (kg) | Dimensions |
|-----------------|-----------------|-----------------------------|---|
| 1 | 20 | 11.00 (5.0) | 12.50 x 6.50 x 5.00 (317.5 x 165.1 x 127.0) |
| 2 | 5 | 5.00 (2.3) | 15.50 x 6.00 x 4.50 (393.7 x 152.4 x 114.3) |

**BABRP and BABRSP Breakers—
Single- and Two-Pole**



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Solenoid-Operated, Remote-Controlled Latching Types BABRP, BABRSP, BRRP and CLRP

Product Description

The BABRP and BABRSP are bolt-on branch circuit breakers designed for use in panelboards. The BRRP is a plug-on branch circuit breaker designed for use in load-centers not manufactured with breakers with a 1-inch wide format and are listed on the “Compatibility list for Classified Applications”—Pub. 26271. In addition to providing conventional branch circuit protection, they include a unique solenoid-operated mechanism that provides for efficient breaker pulse-on and pulse-off operation when used with a suitable controller like Eaton’s Pow-R-Command™ lighting control system. These breakers can also be controlled by pushbutton or a PLC unit.

Application Description

Eaton’s BABRP, BABRSP, BRRP and CLRP breakers are remotely operated molded case circuit breakers ideally suited for lighting control applications or energy management applications.

Features, Benefits and Functions

- Bolt-on line-side terminal (BABRP, BABRSP—Type BA)
- Plug-on line-side terminal (BRRP—Type BR, CLRP—Type CL)
- Cable connected load-side terminal
- Four-position control terminal
- Bi-metal assembly for thermal overload protection
- Fast-acting short-circuit protection
- Arc-chute assembly for fast-acting arc extinction
- Three-position handle: OFF, TRIP (Center), ON
- Handle permits manual switching when control power is lost
- Mechanical trip indicator
- 15 and 20A breakers SWD (switching duty) rated
- HID ratings for HID (high intensity discharge) lighting
- All models HACR rated
- Status feedback of control circuit (BABRSP)
- Series rated (BABRP, BABRSP only)
 - BRRP series rated same as BR breakers
 - BABRP, BABRSP same as BA breakers

Product Selection

QUICKLAG Type QCGFT Single-Pole Ground Fault Circuit Breaker



BABRP UL 489 and CSA 22.2 Interrupting Ratings

| Number of Poles | Ampere Rating ^① | Interrupting Capacity (Symmetrical Amperes) | | | Catalog Number |
|-----------------|----------------------------|---|---------|---------|------------------|
| | | Vac (50/60 Hz) 120 | 120/240 | 277/480 | |
| 1 | 15 | 10,000 | — | — | BABRP1015 |
| | 20 | 10,000 | — | — | BABRP1020 |
| | 25 | 10,000 | — | — | BABRP1025 |
| | 30 | 10,000 | — | — | BABRP1030 |
| 2 | 15 | — | 10,000 | — | BABRP2015 |
| | 20 | — | 10,000 | — | BABRP2020 |
| | 25 | — | 10,000 | — | BABRP2025 |
| | 30 | — | 10,000 | — | BABRP2030 |

BABRP and BABRSP Wire Harness

| Description | Catalog Number |
|---|------------------|
| This 60-inch (1524.0 mm) wire pigtail provides a connection from a single BABRP's control plug to a customer's pushbutton, relay or PLC. Each box contains 12 pigtails. Wires are 22 AWG, 600V. Order in multiples of 12. | SLBKRPTL1 |

BABRSP UL 489 and CSA 22.2 Interrupting Ratings

| Number of Poles | Ampere Rating ^① | Interrupting Capacity (Symmetrical Amperes) | | | Catalog Number |
|-----------------|----------------------------|---|---------|---------|-------------------|
| | | Vac (50/60 Hz) 120 | 120/240 | 277/480 | |
| 1 | 15 | 10,000 | — | — | BABRSP1015 |
| | 20 | 10,000 | — | — | BABRSP1020 |
| | 25 | 10,000 | — | — | BABRSP1025 |
| | 30 | 10,000 | — | — | BABRSP1030 |
| 2 | 15 | — | 10,000 | — | BABRSP2015 |
| | 20 | — | 10,000 | — | BABRSP2020 |
| | 25 | — | 10,000 | — | BABRSP2025 |
| | 30 | — | 10,000 | — | BABRSP2030 |

BRRP UL 489 and CSA 22.2 Interrupting Ratings

| Number of Poles | Ampere Rating | Interrupting Capacity (Symmetrical Amperes) | | Catalog Number |
|-----------------|---------------|---|---------|----------------|
| | | Vac (50/60 Hz) 120 | 120/240 | |
| 1 | 15 | 10,000 | — | BRRP115 |
| | 20 | 10,000 | — | BRRP120 |
| | 25 | 10,000 | — | BRRP125 |
| | 30 | 10,000 | — | BRRP130 |
| 2 | 15 | — | 10,000 | BRRP215 |
| | 20 | — | 10,000 | BRRP220 |
| | 25 | — | 10,000 | BRRP225 |
| | 30 | — | 10,000 | BRRP230 |

CLRP UL 489 and CSA 22.2 Interrupting Ratings

| Number of Poles | Ampere Rating | Interrupting Capacity (Symmetrical Amperes) | | Catalog Number |
|-----------------|---------------|---|---------|----------------|
| | | Vac (50/60 Hz) 120 | 120/240 | |
| 1 | 15 | 10,000 | — | CLRP115 |
| | 20 | 10,000 | — | CLRP120 |
| | 25 | 10,000 | — | CLRP125 |
| | 30 | 10,000 | — | CLRP130 |
| 2 | 15 | — | 10,000 | CLRP215 |
| | 20 | — | 10,000 | CLRP220 |
| | 25 | — | 10,000 | CLRP225 |
| | 30 | — | 10,000 | CLRP230 |

Note

^① Continuous current rating at 40°C.

Technical Data and Specifications

Solenoid Operating Data

- Power requirements: 24 Vac/dc (20.4V minimum–30V maximum)
- Controlled signal: +AC/DC 8 ms minimum with zero cross, 300 ms maximum
- AC: 1.3 cycles minimum, 18 cycles or 300 ms maximum
- DC: 8 ms minimum, 300 ms maximum
- Maximum duty cycle of 6 OPEN/CLOSE cycles per minute
- Current draw: open 1A, close 3/4A
- Blue wire: power input (see power requirements)
- Black wire: remote opening
- Red wire: remote closing
- Yellow wire: feedback status from power input, maximum 0.50A draw (BABRSP only)

Operation

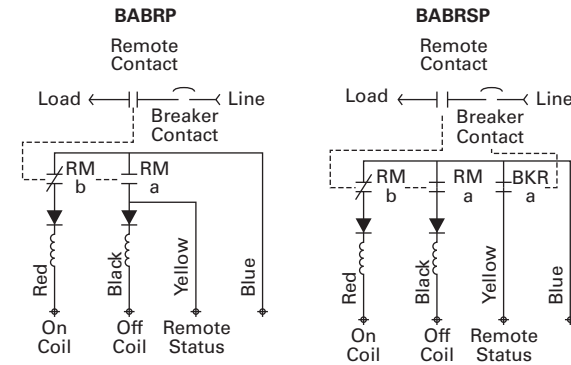
- Tripping system—the BABRP, BABRSP, BRRP and CLRP circuit breakers have a permanent trip unit that contains a factory preset thermal (overload) trip element in each pole
- Operating mechanism—the BABRP, BABRSP, BRRP and CLRP circuit breakers have an over-center toggle mechanism that provides quick-make, quick-break operation. The operating mechanism is trip free. An internal cross-bar provides a common tripping of all multi-pole circuit breakers

Operating/Application Data

- Ambient temperature: 0 to 40°C
- Nominal pulse magnitude: 24 Vac/dc
- Frequency: 50/60 Hz
- Maximum breaker cycling: 6 operations per minute
- Tolerance: +10% to –15% of nominal voltage
- Humidity: 0 to 95% noncondensing

Wiring Diagrams

Control Circuit for the BABRP and BABRSP



GHBS and GHQRSP



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| Wiring Diagrams | V4-T1-35 |
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Solenoid Operator—Remote-Controlled Latching for Type GHBS, GBHS and GHQRSP Breakers

Product Description

Eaton's GHBS, GBHS and GHQRSP circuit breakers are bolt-on branch circuit breakers designed for use in 277/480 Vac panelboards. In addition to providing conventional branch circuit protection, they include a unique solenoid-operated mechanism that provides for efficient breaker pulse-on and pulse-off operation when used with a suitable controller like Eaton's Pow-R-Command lighting control system.

Features, Benefits and Functions

- Bolt-on line-side terminal
- Cable-connected load-side terminal
- Status switch—remote status and breaker status available from internal auxiliary switches
- Bi-metal assembly for thermal overload protection
- Fast-acting short-circuit protection
- Arc-runner and arc-chute assembly for fast-acting arc extinction
- Three-position breaker handle: OFF, TRIP (Center), ON
- Visual indication of the remotely operated contact's position (open, closed or trip)
- Remote override handle permits manual switching when control power is lost
- 15 and 20A breakers SWD (switching duty) rated.
- 15 and 20A breakers HID rated for HID (High intensity discharge) lighting
- All models HACR rated
- Series rated with various Eaton main circuit breakers

Product Selection

GHQ UL 489 Interrupting Ratings

| Number of Poles | Ampere Rating ^① | Interrupting Capacity (Symmetrical Amperes) | | | | Catalog Number |
|-----------------|----------------------------|---|---------|--------|----------|----------------|
| | | Vac (50/60 Hz) | | | | |
| | | 120 | 120/240 | 277 | 480Y/277 | |
| 1 | 15 | 65,000 | 65,000 | 14,000 | 14,000 | |
| 1 | 20 | 65,000 | 65,000 | 14,000 | 14,000 | |
| 1 | 30 | 65,000 | 65,000 | 14,000 | 14,000 | |
| 2 | 15 | 65,000 | 65,000 | 14,000 | 14,000 | |
| 2 | 20 | 65,000 | 65,000 | 14,000 | 14,000 | |
| 2 | 30 | 65,000 | 65,000 | 14,000 | 14,000 | |

GHBS—Single-Pole



GHBS UL 489 Interrupting Ratings

| Number of Poles | Ampere Rating ^① | Interrupting Capacity (Symmetrical Amperes) | | | Catalog Number |
|-----------------|----------------------------|---|--------|---------|----------------|
| | | Vac (50/60 Hz) | | | |
| | | 120 | 240 | 277/480 | |
| 1 | 15 | 65,000 | — | 14,000 | GHBS1015D |
| | 20 | 65,000 | — | 14,000 | GHBS1020D |
| | 30 | 65,000 | — | 14,000 | GHBS1030D |
| 2 | 15 | — | 65,000 | 14,000 | GHBS2015D |
| | 20 | — | 65,000 | 14,000 | GHBS2020D |
| | 30 | — | 65,000 | 14,000 | GHBS2030D |

GBHS CSA 22.2 Interrupting Ratings (Not UL Listed)

| Number of Poles | Ampere Rating ^① | Interrupting Capacity (Symmetrical Amperes) | | Catalog Number |
|-----------------|----------------------------|---|--|----------------|
| | | Vac (50/60 Hz) | | |
| | | 347/600 | | |
| 1 | 15 | 10,000 | | GBHS1015D |
| | 20 | 10,000 | | GBHS1020D |
| 2 | 15 | 10,000 | | GBHS2015D |
| | 20 | 10,000 | | GBHS2020D |

GHQRSP UL 489 and CSA 22.2 Interrupting Ratings

| Number of Poles | Ampere Rating ^① | Interrupting Capacity (Symmetrical Amperes) | | | | Catalog Number ^② |
|-----------------|----------------------------|---|---------|--------|----------|-----------------------------|
| | | Vac (50/60 Hz) | | | | |
| | | 120 | 120/240 | 277 | 480Y/277 | |
| 1 | 15 | 65,000 | 65,000 | 14,000 | 14,000 | GHQRSP1015 |
| | 20 | 65,000 | 65,000 | 14,000 | 14,000 | GHQRSP1020 |
| | 30 | 65,000 | 65,000 | 14,000 | 14,000 | GHQRSP1030 |
| 2 | 15 | 65,000 | 65,000 | 14,000 | 14,000 | GHQRSP2015 |
| | 20 | 65,000 | 65,000 | 14,000 | 14,000 | GHQRSP2020 |
| | 30 | 65,000 | 65,000 | 14,000 | 14,000 | GHQRSP2030 |

Notes

① Continuous current rating at 40°C.

② All UL listed circuit breakers are HID (high intensity discharge) rated.

Technical Data and Specifications

Solenoid Operating Data

- Power requirements: 24 Vac/dc (20.4V minimum–30V maximum)
- Controlled signal: +AC/DC 8 ms minimum with zero cross, 300 ms maximum
- AC: 1.3 cycles minimum, 18 cycles or 300 ms maximum
- DC: 8 ms minimum, 300 ms maximum
- Maximum duty cycle of 6 OPEN/CLOSE cycles per minute
- Current draw: open 1A, close 3/4A
- Blue wire: power input (see power requirements)
- Black wire: remote opening

- Red wire: remote closing
- Yellow wire: feedback status from power input, maximum 0.50A draw

Operation

Mechanism manually operated by external handle allowing ON, OFF and RESET operation. Handle assumes a center TRIP position after performing protective response.

Operating/Application Data

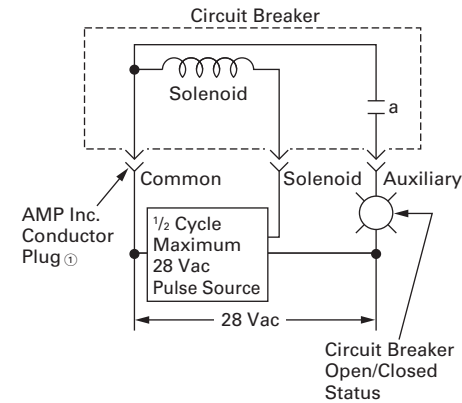
- Ambient temperature: 0–40°C
- Frequency: 48–62 Hz
- Humidity: 0–95% noncondensing

Terminal Type

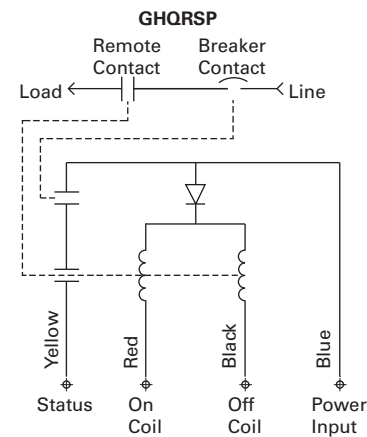
| Circuit Breaker Type | Circuit Breaker Amperes | Screw Head Type | Terminal Type | Range |
|----------------------|-------------------------|-----------------|---------------|------------|
| GHQRSP | 15–20 | Slotted | Clamp | #14–#4 AWG |

Wiring Diagrams

Typical Single-Pole Circuit Breaker Schematic Diagram for GBHS and GBHS Breakers



Typical Single-Pole Circuit Breaker Schematic Diagram for GHQRSP Breakers



Dimensions

Approximate Dimensions in Inches (mm)

Dimensions per Pole

| Circuit Breaker Type | Width | Height ^② | Length ^③ |
|----------------------|-------------|---------------------|---------------------|
| GHQRSP | 1.00 (25.4) | 4.63 (117.6) | 2.81 (71.4) |

Notes

- ① Purchase separate AMP Inc. conductor plug #640426-3.
- ② Excluding line terminal.
- ③ Excluding handle.

International Rated



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| Bolt-On Arc Fault Circuit Interrupter Types QBAF, QBCAF | V4-T1-14 |
| Bolt-On Ground Fault and Equipment Protectors, Types QBGFT, QBHGFT, QBGFEP, QBHGFEP | V4-T1-16 |
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International Rated Types HQP, BA, QC, GFMB, GFXBC

Product Description

QUICKLAG International Circuit Breakers

- Bolt-on Type BA

QUICKLAG International Ground Fault Circuit Breakers

- Plug-on Type GFMB
- Cable-in/cable-out Type GFXBC

Standards and Certifications

QUICKLAG International Circuit Breakers

- Built and test certified to BS3871, Pt. 1
- 50/60 Hz, 40°C

QUICKLAG International Ground Fault Circuit Breakers

- Built and test certified to BS3871, Pt. 1; BS3871, Section 31-C; BS4293
- 50/60 Hz, 40°C; 30 mA sensitivity

Product Selection

BAB



Breaker Catalog Numbers

| Continuous Ampere Rating at 40°C | Single-Pole | Two-Pole | Three-Pole |
|---|-------------------------------|-------------------------------|-------------------------------|
| | 240/415 Vac Catalog Number | 240/415 Vac Catalog Number | 240/415 Vac Catalog Number |
| 3000A Interrupting Capacity (M3) Bolt-On Thermal-Magnetic Circuit Breakers | | | |
| 10 | BAB1010E | BAB2010E | BAB3010E |
| 15 | BAB1015E | BAB2015E | BAB3015E |
| 16 | — | — | — |
| 20 | BAB1020E | BAB2020E | BAB3020E |
| 25 | BAB1025E | BAB2025E | BAB3025E |
| 30 | BAB1030E | BAB2030E | BAB3030E |
| 32 | — | — | — |
| 40 | BAB1040E | BAB2040E | BAB3040E |
| 50 | BAB1050E | BAB2050E | BAB3050E |
| 60 | BAB1060E | BAB2060E | BAB3060E |
| 70 | BAB1070E | BAB2070E | BAB3070E |
| 90 | — | BAB2090E | BAB3090E |
| 100 | — | BAB2100E | BAB3100E |
| 6000A Interrupting Capacity (M6) Bolt-On Thermal-Magnetic Circuit Breakers | | | |
| 15 | BAB1015HE | BAB2015HE | BAB3015HE |
| 20 | BAB1020HE | BAB2020HE | BAB3020HE |
| 25 | BAB1025HE | BAB2025HE | BAB3025HE |
| 30 | BAB1030HE | BAB2030HE | BAB3030HE |
| 40 | BAB1040HE | BAB2040HE | BAB3040HE |
| 50 | BAB1050HE | BAB2050HE | BAB3050HE |
| 60 | BAB1060HE | BAB2060HE | BAB3060HE |
| 70 | BAB1070HE | BAB2070HE | BAB3070HE |
| 90 | — | BAB2090HE | BAB3090HE |
| 100 | — | BAB2100HE | BAB3100HE |

Breaker Catalog Numbers—Ground Fault Single-Pole 30 mA Sensitivity

| Continuous Ampere Rating at 40°C | 240/415 Vac Catalog Number |
|--|---|
| | 3000A Interrupting Capacity (M3) Plug-On Thermal-Magnetic Circuit Breakers |
| 10 | GFMB110B2 |
| 15 | GFMB115B2 |
| 16 | GFMB116B2 |
| 20 | GFMB120B2 |
| 25 | GFMB125B2 |
| 30 | GFMB130B2 |
| 32 | GFMB132B2 |
| 40 | GFMB140B2 |

Note

For other 240/415V applications, please contact the Customer Support Center at 1-800-356-1243.

Technical Data and Specifications

Interrupting Ratings

| Ratings | Suffix E | Suffix HE |
|--|------------|------------|
| International Circuit Breakers | | |
| NEMA® 120/240 Vac | 10,000 AIC | 10,000 AIC |
| BS3871 220/380, 240/415 Vac | 3000 AIC | 6000 AIC |
| International Ground Fault Circuit Breakers | | |
| BS3871 220/380, 240/415 Vac | 3000 AIC | |

Dimensions

Approximate Dimensions in Inches (mm)

Shipping Data

| Miniature Circuit Breaker | Number of Poles | Standard Carton Quantity | Approximate Carton Weight Lbs (kg) | Approximate Standard Carton |
|------------------------------|-----------------|--------------------------|------------------------------------|---|
| QUICKLAG Type B | 1 | 24 | 9.00 (4.1) | 12.50 x 7.50 x 5.00 (317.5 x 190.5 x 127.0) |
| | 2 | 12 | 9.00 (4.1) | 12.50 x 7.50 x 5.00 (317.5 x 190.5 x 127.0) |
| | 3 | 8 | 9.00 (4.1) | 12.50 x 7.50 x 5.00 (317.5 x 190.5 x 127.0) |
| QUICKLAG Ground Fault | | | | |
| Type P—All | 1 | 20 | 11.00 (5.0) | 12.50 x 6.50 x 5.00 (317.5 x 165.1 x 127.0) |
| Types B and C—All | 1 | 20 | 11.00 (5.0) | 12.50 x 7.00 x 5.50 (317.5 x 177.8 x 139.7) |
| Types P and B—All | 2 | 5 | 5.00 (2.3) | 12.50 x 6.00 x 4.50 (317.5 x 152.4 x 114.3) |

QUICKLAG Type P Switching Neutral



Contents

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| Bolt-On Types BAB, QBHW, HBAX, HBAW | V4-T1-11 |
| Bolt-On Arc Fault Circuit Interrupter Types QBAF, QBCAF | V4-T1-14 |
| Bolt-On Ground Fault and Equipment Protectors, Types QBGFT, QBHGFT, QBGFEP, QBHGFEP | V4-T1-16 |
| Cable-In/Cable-Out Types QC, QCD, QCHW, QHCX, QHCW | V4-T1-19 |
| Cable-In/Cable-Out, 1/2-Inch Wide, Types QCR, QCF, QCRH, QCFH | V4-T1-23 |
| Cable-In/Cable-Out Ground Fault and Equipment Protectors, Types QCGFT, QCHGFT, QCGFEP, QCHGFEP | V4-T1-27 |
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Special Application Breakers, Types HQP, BA, QC

Product Description

Breakers

- Plug-on Type HQP: 10–30A, single- and two-pole, 10 kAIC
- Bolt-on Type BA: 10–30A, single- and two-pole, 10 kAIC
- Cable-in Type QC: 10–30A, single- and two-pole, 10 kAIC

Switching neutral QUICKLAG breakers available in single- and two-pole configurations, plus neutral pole for applications in accordance with NEC® 514.5, 240.22 and 380.2. A single-pole device takes two pole spaces, and a two-pole device takes three pole spaces.

QUICKLAG HID (High Intensity Discharge) Breakers

- Plug-on Type HQP: 15–60A, single- and two-pole, 10 kAIC
- Bolt-on Type BA: 15–60A, single- and two-pole, 10 kAIC
- Cable-in Type QC: 15–60A, single- and two-pole, 10 kAIC

Breakers designed specifically for use with high intensity discharge (HID) lighting applications. (UL listed as standard lighting breakers.)

Molded Case Switches—Non-automatic QUICKLAG Molded Case Switch

- Plug-on Type HQP: 50, 60, 100A, single-, two- and three-pole
- Bolt-on Type BA: 50, 60, 100A, single-, two- and three-pole
- Cable-in Type QC: 50, 60, 100A, single-, two- and three-pole

Standards and Certifications

- All products UL and CSA listed



Product Selection

QUICKLAG Type P
Switching Neutral

Breaker Catalog Numbers

| Continuous Ampere Rating at 40°C | Single-Pole 120/240 Vac Catalog Number | Two-Pole 120/240 Vac Catalog Number | Two-Pole 240 Vac Catalog Number | Three-Pole 240 Vac Catalog Number |
|--|--|---|---------------------------------------|---|
| QUICKLAG Type: HQP Switching Neutral Thermal-Magnetic Breakers | | | | |
| 10 | HQP2010B | HQP3010B | — | — |
| 15 | HQP2015B | HQP3015B | — | — |
| 20 | HQP2020B | HQP3020B | — | — |
| 25 | HQP2025B | HQP3025B | — | — |
| 30 | HQP2030B | HQP3030B | — | — |
| QUICKLAG Type: BA Switching Neutral Thermal-Magnetic Breakers | | | | |
| 10 | BAB2010C | BAB3010C | — | — |
| 15 | BAB2015C | BAB3015C | — | — |
| 20 | BAB2020C | BAB3020C | — | — |
| 25 | BAB2025C | BAB3025C | — | — |
| 30 | BAB2030C | BAB3030C | — | — |
| QUICKLAG Type: QC Switching Neutral Thermal-Magnetic Breakers | | | | |
| 10 | QC2010B | QC3010B | — | — |
| 15 | QC2015B | QC3015B | — | — |
| 20 | QC2020B | QC3020B | — | — |
| 25 | QC2025B | QC3025B | — | — |
| 30 | QC2030B | QC3030B | — | — |
| QUICKLAG Type: HQP HID (High Intensity Discharge) Thermal-Magnetic Breakers | | | | |
| 15 | HQP1015D | HQP2015D | — | — |
| 20 | HQP1020D | HQP2020D | — | — |
| 25 | HQP1025D | HQP2025D | — | — |
| 30 | HQP1030D | HQP2030D | — | — |
| 35 | HQP1035D | HQP2035D | — | — |
| 40 | HQP1040D | HQP2040D | — | — |
| 50 | HQP1050D | HQP2050D | — | — |
| 60 | HQP1060D | HQP2060D | — | — |
| QUICKLAG Type: BA HID (High Intensity Discharge) Thermal-Magnetic Breakers | | | | |
| 15 | BAB1015D | BAB2015D | — | — |
| 20 | BAB1020D | BAB2020D | — | — |
| 25 | BAB1025D | BAB2025D | — | — |
| 30 | BAB1030D | BAB2030D | — | — |
| 35 | BAB1035D | BAB2035D | — | — |
| 40 | BAB1040D | BAB2040D | — | — |
| 50 | BAB1050D | BAB2050D | — | — |
| 60 | BAB1060D | BAB2060D | — | — |
| QUICKLAG Type: QC HID (High Intensity Discharge) Thermal-Magnetic Breakers | | | | |
| 15 | QC1015D | QC2015D | — | — |
| 20 | QC1020D | QC2020D | — | — |
| 25 | QC1025D | QC2025D | — | — |
| 30 | QC1030D | QC2030D | — | — |
| 35 | QC1035D | QC2035D | — | — |
| 40 | QC1040D | QC2040D | — | — |
| 50 | QC1050D | QC2050D | — | — |
| 60 | QC1060D | QC2060D | — | — |



Breaker Catalog Numbers, continued

| Continuous Ampere Rating at 40°C | Single-Pole 120/240 Vac Catalog Number | Two-Pole 120/240 Vac Catalog Number | Two-Pole 240 Vac Catalog Number | Three-Pole 240 Vac Catalog Number |
|--|--|---|---------------------------------------|---|
| QUICKLAG Type: HQP Non-Automatic Switches | | | | |
| 50 | HQP1050N | — | HQP2050N | HQP3050N |
| 60 | HQP1060N | — | HQP2060N | HQP3060N |
| 100 | HQP1100N | — | HQP2100N | HQP3100N |
| QUICKLAG Type: BA Non-Automatic Switches | | | | |
| 50 | BAB1050N | — | BAB2050N | BAB3050N |
| 60 | BAB1060N | — | BAB2060N | BAB3060N |
| 100 | BAB1100N | — | BAB2100N | BAB3100N |
| QUICKLAG Type: QC Non-Automatic Switches | | | | |
| 50 | QC1050N | — | QC2050N | QC3050N |
| 60 | QC1060N | — | QC2060N | QC3060N |
| 100 | QC1100N | — | QC2100N | QC3100N |
| QUICKLAG Type: QCD Non-Automatic Switches | | | | |
| 60 | — | — | QCD2060NA | — |
| 100 | — | — | — | — |




1

Accessories ①

Handle Locks: Non-Padlockable ②

| | Description | Order in Multiples of | Catalog Number |
|---|---|-----------------------|----------------|
|  <p>QL1NPL</p> | QUICKLAG Type P, B, C—single-pole | 10 | QL1NPL |
|  <p>QL23NPL</p> | QUICKLAG Type P, B, C—two- and three-pole | 10 | QL23NPL |

Handle Locks: Padlockable ②







| | Description | Order in Multiples of | Catalog Number |
|---|--|-----------------------|-------------------|
|  <p>QL1PL</p> | QUICKLAG Type P, B, C—single-pole | 10 | QL1PL |
|  <p>QL123PL</p> | QUICKLAG Type P, B and ground fault—single-, two- and three-pole | 10 | QL123PL |
|  <p>QC123PL</p> | QUICKLAG Type C—single-, two- and three-pole | 10 | QC123PL |
| | QUICKLAG Type P, B—single-, two- and three-pole (off only) | 10 | QL123PLOFF |
| | QUICKLAG Type C—single-, two- and three-pole (off only) | 10 | QC123PLOFF |

Notes

① See **Page V4-T1-26** for QCR and QCF accessories.

② Can lock in ON or OFF position.

Mounting Hardware

| | Description | Order in Multiples of | Catalog Number |
|---|--|-----------------------|----------------|
|  | QUICKLAG Type C face mounting clip | 24 | QCFLIP |
|  | QUICKLAG Type C face mounting plate—single-pole | 10 | QC1FP |
|  | QUICKLAG Type C face mounting plate—two-pole | 10 | QC2FP |
|  | QUICKLAG Type C face mounting plate—three-pole | 10 | QC3FP |
| | QUICKLAG Type C face mounting plate and lock-off (off only)—two-pole ① | 10 | QC2FPLOFF |
| | QUICKLAG Type C face mounting plate and lock-off (off only)—three-pole | 10 | QC3FPLOFF |
|  | QUICKLAG Type C base mounting clamp | 10 | QCBCLIP |
|  | QUICKLAG Type mounting plate—six poles total | 10 | QC6BP |

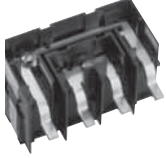
Note

① Suitable for ground fault breakers.

Mounting Hardware, continued

| Description | Order in Multiples of | Catalog Number |
|--|-----------------------|----------------|
| QUICKLAG Type C base mounting plate—six poles total—heavy-duty screw-secured | 10 | QC6BPS |
| QUICKLAG Type C (QCD) 2-way jumper unit with cover | 10 | QCDJ2 |
| QUICKLAG Type C (QCD) 4-way jumper unit with cover | 10 | QCDJ4 |
| QUICKLAG Type C (QCD) 6-way jumper unit with cover | 10 | QCDJ6 |
| QUICKLAG Type C (QCD) 2-way jumper unit, no cover | 10 | QCDJ2T |
| QUICKLAG Type C (QCD) 4-way jumper unit, no cover | 10 | QCDJ4T |
| QUICKLAG Type C (QCD) 6-way jumper unit, no cover | 10 | QCDJ6T |
| QUICKLAG Type QCD Finger protection attachment | 10 | QCDFP |
| QUICKLAG Type QCD 4-prong Quick Connect | 10 | QCQUICK |
| QUICKLAG Type C DIN rail adapter | 6 | QCDINADAPT |

QCDJ4



QCDINADAPT



QCDRING



Dummy Breakers

| Description | Order in Multiples of | Catalog Number |
|--------------------------------------|-----------------------|----------------|
| QUICKLAG Type P | 1 | HQP1000 |
| QUICKLAG Type B | 1 | BAB1000 |
| QUICKLAG Type C | 1 | QC1000 |
| QUICKLAG Type C clear choice breaker | 4 | QC30SAMPLE |

QCRSPACER



Miscellaneous

| Description | Order in Multiples of | Catalog Number |
|------------------------|-----------------------|----------------|
| QUICKLAG Type C Spacer | 1 | QCRSPACER |

QL1HT



Handle Tie

| Description | Order in Multiples of | Catalog Number |
|---------------------------------|-----------------------|----------------|
| QUICKLAG handle tie—single-pole | 100 | QL1HT |

Factory Modifications and Installed Terminals

Factory Modifications ^①

| Type of Modification | Breaker Type | Catalog Suffix |
|--|---|-------------------------------|
| Shunt trip (requires one extra pole space on right side) 120, 208, 240 Vac Draws 2.6A at 120V, draws 11A at 24 Vdc | QUICKLAG Types P, B and C | S |
| Shunt trip (requires one extra pole space on right side) 24, 48 Vac/dc Draws 2.6A at 120V, draws 11A at 24 Vdc | QUICKLAG Types P, B and C | S1 |
| Special calibration (50°C) (no UL) | QUICKLAG Types P, B and C | V |
| Shock testing | QUICKLAG Types P, B and C | L |
| Freeze testing | QUICKLAG Types P, B and C | Y |
| Moisture-fungus treatment | QUICKLAG Types P, B, C and ground fault | F |
| Marine duty | QUICKLAG Types P, B, C | H08 |
| Naval duty | QUICKLAG Types P, B, C | H09 |
| 400 Hz calibration | QUICKLAG Types P, B, C | G |
| Specific DC ratings (breaker marked with a max. Vdc rating) | QUICKLAG Types P, B, C | Q thru Q9 ^② |

Spare Terminal Hardware Screws (Lugs not Included)

| Terminal Type | Description | Order in Multiples of | Catalog Number |
|---------------|--|-----------------------|-----------------|
| 1 | QUICKLAG terminal screw | 10 | QLD TSA |
| 2 | QUICKLAG terminal screw | 10 | QLD TSB |
| 3 | QUICKLAG terminal screw | 10 | QLD TSC |
| 5 | QUICKLAG binding head terminal screw and clamp | 10 | QLB HTSE |
| 6 and 7 | QUICKLAG terminal screw | 10 | QLL NTSG |

Notes

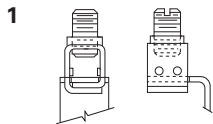
^① Contact Eaton for factory modifications available for QCR and QCF breakers.

^② Q = 32 Vdc; Q1 = 32–40 Vdc; Q2 = 37.5 Vdc; Q3 = 45 Vdc; Q4 = 48 Vdc; Q5 = 50 Vdc; Q6 = 62.5 Vdc; Q7 = 75 Vdc (2P); Q8 = 80 Vdc (2P); Q9 = 125 Vdc (QCR 2P); Q10 = 62.5 Vdc (QCR 1P).

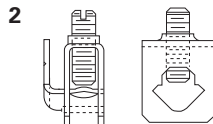
Technical Data and Specifications

Factory-Installed Breaker Terminals

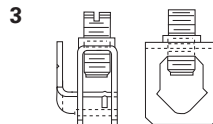
| Breaker Type | Continuous Ampere Rating | Standard Line Terminal | | | Standard Load Terminal | | | Optional Terminals | |
|--|--------------------------|---|-----------|------------------|--------------------------|-----------|------------------|--------------------|------------|
| | | Terminal Type | Wire Type | Wire Range (AWG) | Terminal Type | Wire Type | Wire Range (AWG) | Line | Load |
| QUICKLAG Type P HQF, QPHW, QHPX, QHPW | 10–30 | Plug-on female clips that mate with the bus stabs | | | 1 | Cu/Al | 14–4 | N/A | 3 |
| | 35–50 | | | | 2 | Cu/Al | 14–4 | N/A | 3 |
| | 55–125 | | | | 3 | Cu/Al | 8–1/0 | N/A | — |
| QUICKLAG ground fault QPGFT, QPGFEP, QPHGFT, QPHGFEP | 10–40 | Plug-on female clips that mate with the bus stabs | | | 1 (single-pole) | Cu/Al | 14–4 | N/A | 3 |
| | 10–40 | | | | 1 | Cu/Al | — | N/A | 3 |
| | 10–30 | | | | 1 | Cu | 14–8 | N/A | — |
| QUICKLAG Type B BAB, QBHW, HBAX, HBAW | 10–40 | Extended tangs that bolt directly to the bus | | | 1 (single- and two-pole) | Cu/Al | 14–4 | N/A | 3 |
| | 35–50 | | | | 2 (three-pole) | Cu/Al | 14–4 | N/A | 3 |
| | 55–125 | | | | 3 | Cu/Al | 8–1/0 | N/A | — |
| QUICKLAG ground fault QBGFT, QBGFEP, QBHGFT, QBHGFEP | 10–40 | Extended tangs that bolt directly to the bus | | | 1 (single-pole) | Cu/Al | 14–4 | N/A | N/A |
| | 10–40 | | | | 1 | Cu/Al | 14–8 | N/A | N/A |
| | 10–30 | | | | 1 | Cu | 14–8 | N/A | N/A |
| QUICKLAG Type C QC, QCHW, QHCX, QHCW | 10–20 | 5 | Cu/Al | TBD | 5 | Cu/Al | 14–10 | 6, 7 | 6, 7, 8 |
| | 25–60 | 6 | Cu/Al | TBD | 2 | Cu/Al | 14–4 | 5, 7 | 5, 6, 7, 8 |
| | 70–100 | 7 | Cu/Al | TBD | 3 | Cu/Al | 8–1/0 | 5 | 5, 7, 8 |
| QUICKLAG QCR, QCF | 10–55 | 1 | Cu/Al | TBD | 1 | Cu/Al | 14–4 | N/A | N/A |
| | 60 | 1 | Cu | TBD | 1 | Cu | 14–4 | N/A | N/A |
| QUICKLAG ground fault QCGFT, QCGFEP, QCHGFT, QCHGFEP | 10–20 | 6 | Cu/Al | TBD | 14–8 | Cu/Al | 14–4 | 6, 7 | 5 |
| | 25–50 | 6 | Cu/Al | TBD | 1 | Cu/Al | 14–4 | 5, 7 | 5 |
| | 10–30 | 6 | — | — | — | — | — | — | — |
| QUICKLAG QCD | 10–60 | 9 | Cu/Al | 14–4 | 9 | Cu/Al | 14–4 | See Accessories | |
| | 70–100 | 10 | Cu | 4–1/0 | 10 | Cu | 4–1/0 | See Accessories | |



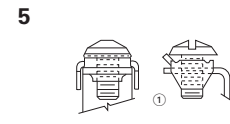
Steel Box Lug



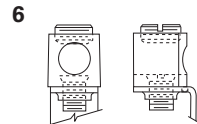
Steel Box Lug



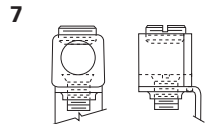
Steel Box Lug



Steel Ring Type



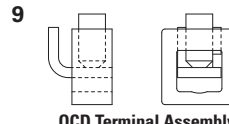
Aluminum Box Lug



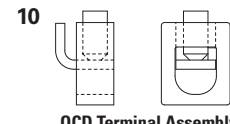
Aluminum Box Lug



4-Prong Quick Connect



QCD Terminal Assembly
10–60A



QCD Terminal Assembly
70–100A

Dimensions

Approximate Dimensions in Inches (mm)

Shipping Data

| Miniature Circuit Breaker | Number of Poles | Standard Carton Quantity | Approximate Carton Weight Lbs (kg) | Approximate Standard Carton |
|----------------------------------|-----------------|--------------------------|------------------------------------|---|
| QUICKLAG Types B, P, C—all | 1 | 24 | 9.00 (4.1) | 12.50 x 7.50 x 5.00 (317.5 x 190.5 x 127.0) |
| QUICKLAG Types B, P, C—all | 2 | 12 | 9.00 (4.1) | 12.50 x 7.50 x 5.00 (317.5 x 190.5 x 127.0) |
| QUICKLAG Types B, P, C—all | 3 | 8 | 9.00 (4.1) | 12.50 x 7.50 x 5.00 (317.5 x 190.5 x 127.0) |
| QUICKLAG ground fault Type P—all | 1 | 20 | 11.00 (5.0) | 12.50 x 6.50 x 5.00 (317.5 x 165.1 x 127.0) |
| Types B and C—all | 1 | 20 | 11.00 (5.0) | 12.50 x 7.00 x 5.50 (317.5 x 177.8 x 139.7) |
| Types P and B—all | 2 | 5 | 5.00 (2.3) | 12.50 x 6.00 x 4.50 (317.5 x 152.4 x 114.3) |

Note

① Clamp on line side only.

FAZ-NA and FAZ-NA-L Circuit Breakers



Optimum and Efficient Protection for Every Application

Contents

Description

FAZ-NA and FAZ-NA-L Circuit Breakers

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| Product Selection | V4-T1-49 |
| Accessories | V4-T1-62 |
| Technical Data and Specifications | V4-T1-66 |
| Dimensions | V4-T1-72 |

FAZ-NA and FAZ-NA-L Circuit Breakers

Product Overview

Optimum product quality, tested reliability and safety stand for best protection of personnel, installations and plant. Eaton's FAZ-NA and FAZ-NA-L DIN rail mountable circuit breakers are designed for use in branch service applications.

Powerful Offering for Machine and System Builders

FAZ-NA and FAZ-NA-L are available with B, C and D characteristics in accordance with UL® 489, CSA® C22.2 No.5; UL 1077, CSA C22.2 No.235 and IEC 60947-2. These devices are CE marked.

Application Description

Feeder and branch circuit protection for:

- Convenience receptacle circuits (internal/external)
- Motor control circuits
- Load circuits leaving the equipment (external)
- HACR internal/external equipment (heating, air conditioning, refrigeration)
- PLC I/O points
- Computers
- Power supplies
- Control instrumentation
- Relays
- UPS
- Power conditioners

Features

- Complete range of UL 489 listed DIN rail mounted miniature circuit breakers up to 63A current rating
- Two distinct UL 489 FAZ-NA offerings available to provide the best solution for the application—FAZ-NA at 277/480 Vac and FAZ-NA-L at 240 Vac
- Standard ratings of 10 kAIC available at both 240 Vac and 277/480 Vac
- Select amperages available at 14 kAIC for both the 240 Vac and 277/480 Vac offerings and 10 kAIC up to 125 Vdc per pole
- Current limiting design provides fast short-circuit interruption that reduces the let-through energy, which can damage the circuit
- Suitable for branch circuit device protection
- Thermal-magnetic overcurrent protection
 - Three levels of short-circuit protection, categorized by B, C and D curves
- Trip-free design—breaker can not be defeated by holding the handle in the ON position
- Captive screws cannot be lost
- SWD (switching duty)—suitable for switching fluorescent lighting loads ($I_n \leq 20A$)
- Fulfill UL 489, CSA C22.2 No.5 and also IEC 60947-2 Standard
- For use in applications for which UL 1077 or CSA C22.2 No.235 are also allowed
- Field-installable shunt trip and auxiliary switch subsequent mounting
- Separate version for ring-tongue connection (Type FAZ-RT), terminal screws can be removed (on both sides)
- Module width of only 17.7 mm (per pole)
- Contact Position Indicator (red/green)
- Easy installation on DIN rail
- Possibility for sealing the toggle in ON or OFF position
- Single-, two-, three- and four-pole configurations

Device Printing on Front and Side Installation options

These branch circuit breakers are available in two terminal configurations: standard box terminals that accept multiple conductors and ring-tongue terminals, ideally suited to demanding requirements of the semi-conductor industry. All breakers mount on standard 35 mm DIN rail. Bus connectors and feeder terminal facilitate mounting and wiring of multiple miniature circuit breaker arrays in control panel assemblies. These circuit breakers can also be reverse feed.

1.2

Miniature Circuit Breakers and Supplementary Protectors

UL 489 DIN Rail Miniature Circuit Breakers

1

Standards and Certifications

FAZ-NA

FAZ-NA complies with the latest national and international standards.

- UL 489
 - Standard for molded case circuit breakers (MCCB) for feeder and branch circuit protection
 - Products meet the requirements of the National Electrical Code® (NEC®)

- CSA C22.2 No.5
 - Standard for molded case circuit breakers (MCCB) for feeder and branch circuit protection (corresponds closely to UL 489 Standard)
 - Products meet the requirements of the Canadian Electrical Code (CEC)

- RoHS compliant
- VDE compliant
- ABS compliant



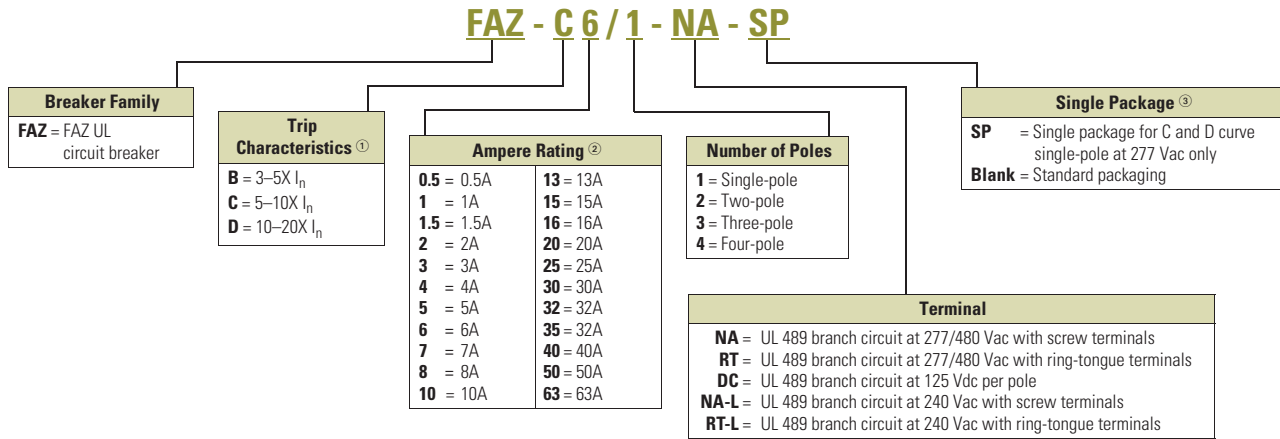
FAZ-NA-L

FAZ-NA-L 0.5–63A at 240 Vac comply with the following standards.

- UL 489 listed
- CSA C22.2 No. 5-02
- IEC rated
- RoHS compliant
- CCC compliant
- OVE compliant
- EAC compliant
- ABS compliant
- VDE compliant



Catalog Number Selection



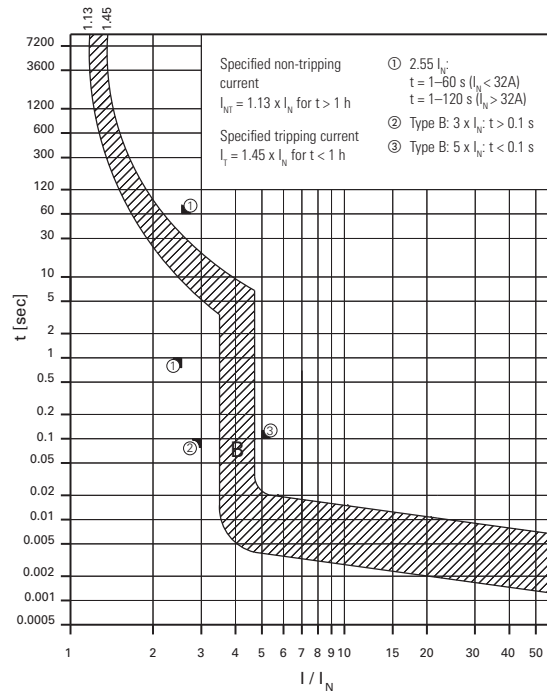
Notes

- ① I_n = Rated current for instantaneous trip characteristics.
- ② B curve starts at 1 ampere.
- ③ Single package only available for 277 Vac offering—not an option for 240 Vac line.

Product Selection

FAZ-NA B Curve 277/480 Vac Rated Offering

- UL approved (UL 489) and CSA Certified (CSA C22.2 No.5-02) as branch circuit breakers
- Interrupting capacity: 10 kA UL/CSA; 15 kA IEC 60947-2
- Current limiting device
- UL file number E235139



Single-Pole



Two-Pole



Three-Pole



Four-Pole



FAZ-NA UL 489 Circuit Breakers at 277/480 Vac— 10 kAIC, 14 kAIC B Curve (15–25A)

| Amps | Single-Pole ① Catalog Number | Two-Pole Catalog Number | Three-Pole Catalog Number | Four-Pole Catalog Number |
|--|------------------------------------|-------------------------------|---------------------------------|--------------------------------|
| B Curve (3–5X I_N Current Rating) | | | | |
| 1 | FAZ-B1/1-NA | FAZ-B1/2-NA | FAZ-B1/3-NA | FAZ-B1/4-NA |
| 1.5 | FAZ-B1.5/1-NA | FAZ-B1.5/2-NA | FAZ-B1.5/3-NA | FAZ-B1.5/4-NA |
| 2 | FAZ-B2/1-NA | FAZ-B2/2-NA | FAZ-B2/3-NA | FAZ-B2/4-NA |
| 3 | FAZ-B3/1-NA | FAZ-B3/2-NA | FAZ-B3/3-NA | FAZ-B3/4-NA |
| 4 | FAZ-B4/1-NA | FAZ-B4/2-NA | FAZ-B4/3-NA | FAZ-B4/4-NA |
| 5 | FAZ-B5/1-NA | FAZ-B5/2-NA | FAZ-B5/3-NA | FAZ-B5/4-NA |
| 6 | FAZ-B6/1-NA | FAZ-B6/2-NA | FAZ-B6/3-NA | FAZ-B6/4-NA |
| 7 | FAZ-B7/1-NA | FAZ-B7/2-NA | FAZ-B7/3-NA | FAZ-B7/4-NA |
| 8 | FAZ-B8/1-NA | FAZ-B8/2-NA | FAZ-B8/3-NA | FAZ-B8/4-NA |
| 10 | FAZ-B10/1-NA | FAZ-B10/2-NA | FAZ-B10/3-NA | FAZ-B10/4-NA |
| 13 | FAZ-B13/1-NA | FAZ-B13/2-NA | FAZ-B13/3-NA | FAZ-B13/4-NA |
| 15 | FAZ-B15/1-NA | FAZ-B15/2-NA | FAZ-B15/3-NA | FAZ-B15/4-NA |
| 16 | FAZ-B16/1-NA | FAZ-B16/2-NA | FAZ-B16/3-NA | FAZ-B16/4-NA |
| 20 | FAZ-B20/1-NA | FAZ-B20/2-NA | FAZ-B20/3-NA | FAZ-B20/4-NA |
| 25 | FAZ-B25/1-NA | FAZ-B25/2-NA | FAZ-B25/3-NA | FAZ-B25/4-NA |
| 30 | FAZ-B30/1-NA | FAZ-B30/2-NA | FAZ-B30/3-NA | FAZ-B30/4-NA |
| 32 | FAZ-B32/1-NA | FAZ-B32/2-NA | FAZ-B32/3-NA | FAZ-B32/4-NA |

Note

① Two-piece order. Quantities of two per box.

1.2

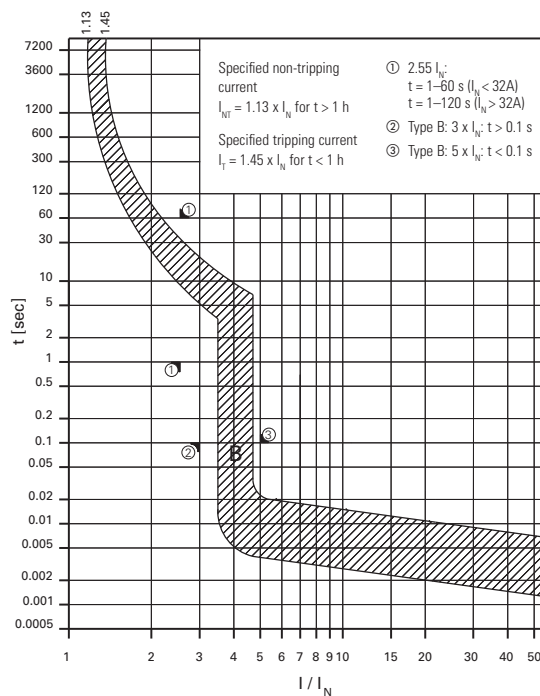
Miniature Circuit Breakers and Supplementary Protectors

UL 489 DIN Rail Miniature Circuit Breakers

1

FAZ-NA B Curve 277/480 Vac Rated Offering

- UL approved (UL 489) and CSA Certified (CSA C22.2 No.5-02) as branch circuit breakers
- Interrupting capacity: 10 kA UL/CSA; 15 kA IEC 60947-2
- Current limiting device
- UL file number E235139



Single-Pole



Two-Pole



Three-Pole



Four-Pole



FAZ-RT UL 489 Circuit Breakers with Ring-Tongue Terminals at 277/480 Vac— 10 kAIC, 14 kAIC B Curve (15–25A)

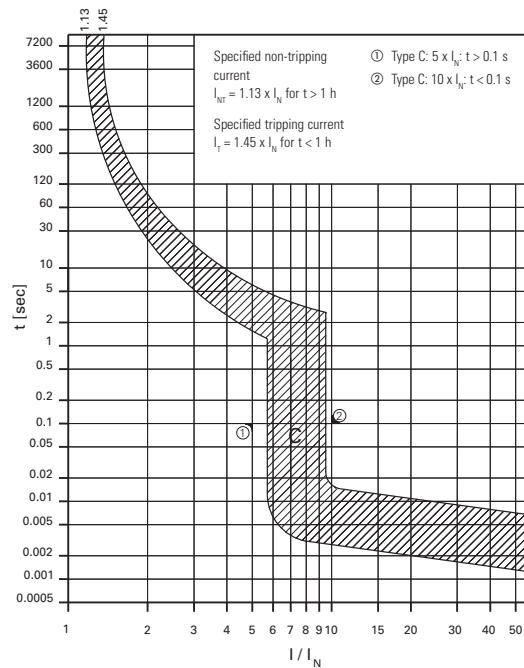
| Amps | Single-Pole ① Catalog Number | Two-Pole Catalog Number | Three-Pole Catalog Number | Four-Pole Catalog Number |
|--|---------------------------------|----------------------------|------------------------------|-----------------------------|
| B Curve with Ring-Tongue Terminals (3–5X I_N Current Rating) | | | | |
| 1 | FAZ-B1/1-RT | FAZ-B1/2-RT | FAZ-B1/3-RT | FAZ-B1/4-RT |
| 1.5 | FAZ-B1.5/1-RT | FAZ-B1.5/2-RT | FAZ-B1.5/3-RT | FAZ-B1.5/4-RT |
| 2 | FAZ-B2/1-RT | FAZ-B2/2-RT | FAZ-B2/3-RT | FAZ-B2/4-RT |
| 3 | FAZ-B3/1-RT | FAZ-B3/2-RT | FAZ-B3/3-RT | FAZ-B3/4-RT |
| 4 | FAZ-B4/1-RT | FAZ-B4/2-RT | FAZ-B4/3-RT | FAZ-B4/4-RT |
| 5 | FAZ-B5/1-RT | FAZ-B5/2-RT | FAZ-B5/3-RT | FAZ-B5/4-RT |
| 6 | FAZ-B6/1-RT | FAZ-B6/2-RT | FAZ-B6/3-RT | FAZ-B6/4-RT |
| 7 | FAZ-B7/1-RT | FAZ-B7/2-RT | FAZ-B7/3-RT | FAZ-B7/4-RT |
| 8 | FAZ-B8/1-RT | FAZ-B8/2-RT | FAZ-B8/3-RT | FAZ-B8/4-RT |
| 10 | FAZ-B10/1-RT | FAZ-B10/2-RT | FAZ-B10/3-RT | FAZ-B10/4-RT |
| 13 | FAZ-B13/1-RT | FAZ-B13/2-RT | FAZ-B13/3-RT | FAZ-B13/4-RT |
| 15 | FAZ-B15/1-RT | FAZ-B15/2-RT | FAZ-B15/3-RT | FAZ-B15/4-RT |
| 16 | FAZ-B16/1-RT | FAZ-B16/2-RT | FAZ-B16/3-RT | FAZ-B16/4-RT |
| 20 | FAZ-B20/1-RT | FAZ-B20/2-RT | FAZ-B20/3-RT | FAZ-B20/4-RT |
| 25 | FAZ-B25/1-RT | FAZ-B25/2-RT | FAZ-B25/3-RT | FAZ-B25/4-RT |
| 30 | FAZ-B30/1-RT | FAZ-B30/2-RT | FAZ-B30/3-RT | FAZ-B30/4-RT |
| 32 | FAZ-B32/1-RT | FAZ-B32/2-RT | FAZ-B32/3-RT | FAZ-B32/4-RT |

Note

① Two-piece order. Quantities of two per box.

FAZ-NA C Curve 277/480 Vac Rated Offering

- UL approved (UL 489) and CSA Certified (CSA C22.2 No.5-02) as branch circuit breakers
- Interrupting capacity: 10 kA UL/CSA; 15 kA IEC 60947-2
- Current limiting device
- UL file number E235139



Single-Pole



Two-Pole



Three-Pole



Four-Pole



FAZ-NA UL 489 Circuit Breakers at 277/480 Vac— 10 kAIC, 14 kAIC C Curve (15–25A)

| Amps | Single-Pole ① Catalog Number | Two-Pole Catalog Number | Three-Pole Catalog Number | Four-Pole Catalog Number |
|---|------------------------------------|-------------------------------|---------------------------------|--------------------------------|
| C Curve (5–10X I_n Current Rating) | | | | |
| 0.5 | FAZ-C0.5/1-NA-SP | FAZ-C0.5/2-NA | FAZ-C0.5/3-NA | FAZ-C0.5/4-NA |
| 1 | FAZ-C1/1-NA-SP | FAZ-C1/2-NA | FAZ-C1/3-NA | FAZ-C1/4-NA |
| 1.5 | FAZ-C1.5/1-NA-SP | FAZ-C1.5/2-NA | FAZ-C1.5/3-NA | FAZ-C1.5/4-NA |
| 2 | FAZ-C2/1-NA-SP | FAZ-C2/2-NA | FAZ-C2/3-NA | FAZ-C2/4-NA |
| 3 | FAZ-C3/1-NA-SP | FAZ-C3/2-NA | FAZ-C3/3-NA | FAZ-C3/4-NA |
| 4 | FAZ-C4/1-NA-SP | FAZ-C4/2-NA | FAZ-C4/3-NA | FAZ-C4/4-NA |
| 5 | FAZ-C5/1-NA-SP | FAZ-C5/2-NA | FAZ-C5/3-NA | FAZ-C5/4-NA |
| 6 | FAZ-C6/1-NA-SP | FAZ-C6/2-NA | FAZ-C6/3-NA | FAZ-C6/4-NA |
| 7 | FAZ-C7/1-NA-SP | FAZ-C7/2-NA | FAZ-C7/3-NA | FAZ-C7/4-NA |
| 8 | FAZ-C8/1-NA-SP | FAZ-C8/2-NA | FAZ-C8/3-NA | FAZ-C8/4-NA |
| 10 | FAZ-C10/1-NA-SP | FAZ-C10/2-NA | FAZ-C10/3-NA | FAZ-C10/4-NA |
| 13 | FAZ-C13/1-NA-SP | FAZ-C13/2-NA | FAZ-C13/3-NA | FAZ-C13/4-NA |
| 15 | FAZ-C15/1-NA-SP | FAZ-C15/2-NA | FAZ-C15/3-NA | FAZ-C15/4-NA |
| 16 | FAZ-C16/1-NA-SP | FAZ-C16/2-NA | FAZ-C16/3-NA | FAZ-C16/4-NA |
| 20 | FAZ-C20/1-NA-SP | FAZ-C20/2-NA | FAZ-C20/3-NA | FAZ-C20/4-NA |
| 25 | FAZ-C25/1-NA-SP | FAZ-C25/2-NA | FAZ-C25/3-NA | FAZ-C25/4-NA |
| 30 | FAZ-C30/1-NA-SP | FAZ-C30/2-NA | FAZ-C30/3-NA | FAZ-C30/4-NA |
| 32 | FAZ-C32/1-NA-SP | FAZ-C32/2-NA | FAZ-C32/3-NA | FAZ-C32/4-NA |

Note

① Option for single packaging on single-pole C and D curves only; add suffix SP when ordering.

1.2

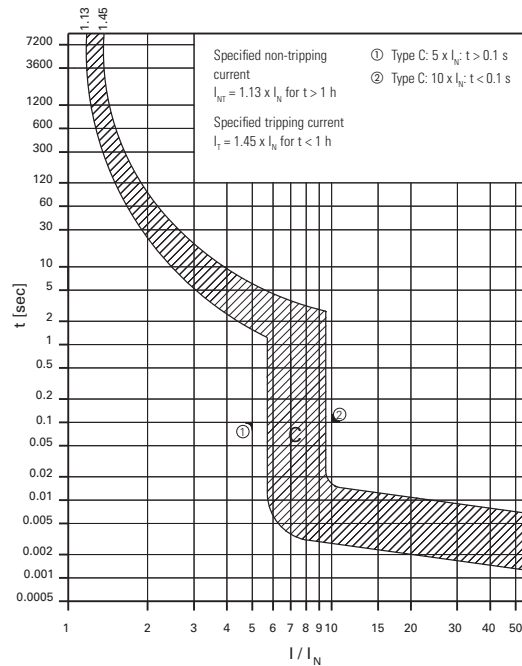
Miniature Circuit Breakers and Supplementary Protectors

UL 489 DIN Rail Miniature Circuit Breakers

1

FAZ-NA C Curve 277/480 Vac Rated Offering

- UL approved (UL 489) and CSA Certified (CSA C22.2 No.5-02) as branch circuit breakers
- Interrupting capacity: 10 kA UL/CSA; 15 kA IEC 60947-2
- Current limiting device
- UL file number E235139



Single-Pole



Two-Pole



Three-Pole



Four-Pole



FAZ-RT UL 489 Circuit Breakers with Ring-Tongue Terminals at 277/480 Vac—10 kAIC, 14 kAIC C Curve (15–25A)

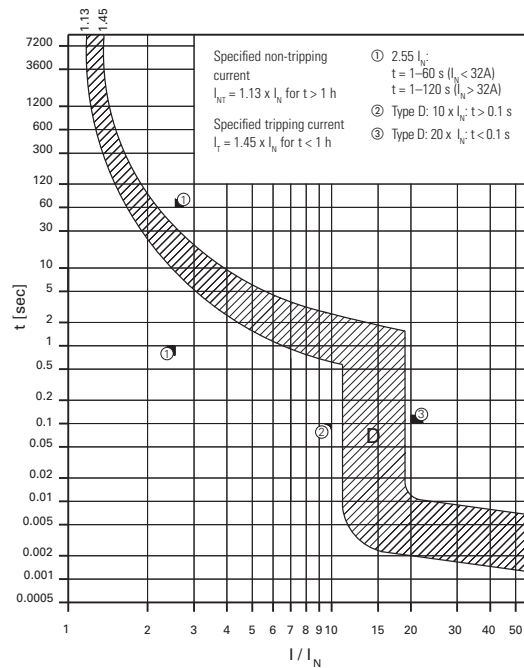
| Amps | Single-Pole ^① Catalog Number | Two-Pole Catalog Number | Three-Pole Catalog Number | Four-Pole Catalog Number |
|--|--|----------------------------|------------------------------|-----------------------------|
| C Curve with Ring-Tongue Terminals (5–10X I_N Current Rating) | | | | |
| 0.5 | FAZ-C0.5/1-RT-SP | FAZ-C0.5/2-RT | FAZ-C0.5/3-RT | FAZ-C0.5/4-RT |
| 1 | FAZ-C1/1-RT-SP | FAZ-C1/2-RT | FAZ-C1/3-RT | FAZ-C1/4-RT |
| 1.5 | FAZ-C1.5/1-RT-SP | FAZ-C1.5/2-RT | FAZ-C1.5/3-RT | FAZ-C1.5/4-RT |
| 2 | FAZ-C2/1-RT-SP | FAZ-C2/2-RT | FAZ-C2/3-RT | FAZ-C2/4-RT |
| 3 | FAZ-C3/1-RT-SP | FAZ-C3/2-RT | FAZ-C3/3-RT | FAZ-C3/4-RT |
| 4 | FAZ-C4/1-RT-SP | FAZ-C4/2-RT | FAZ-C4/3-RT | FAZ-C4/4-RT |
| 5 | FAZ-C5/1-RT-SP | FAZ-C5/2-RT | FAZ-C5/3-RT | FAZ-C5/4-RT |
| 6 | FAZ-C6/1-RT-SP | FAZ-C6/2-RT | FAZ-C6/3-RT | FAZ-C6/4-RT |
| 7 | FAZ-C7/1-RT-SP | FAZ-C7/2-RT | FAZ-C7/3-RT | FAZ-C7/4-RT |
| 8 | FAZ-C8/1-RT-SP | FAZ-C8/2-RT | FAZ-C8/3-RT | FAZ-C8/4-RT |
| 10 | FAZ-C10/1-RT-SP | FAZ-C10/2-RT | FAZ-C10/3-RT | FAZ-C10/4-RT |
| 13 | FAZ-C13/1-RT-SP | FAZ-C13/2-RT | FAZ-C13/3-RT | FAZ-C13/4-RT |
| 15 | FAZ-C15/1-RT-SP | FAZ-C15/2-RT | FAZ-C15/3-RT | FAZ-C15/4-RT |
| 16 | FAZ-C16/1-RT-SP | FAZ-C16/2-RT | FAZ-C16/3-RT | FAZ-C16/4-RT |
| 20 | FAZ-C20/1-RT-SP | FAZ-C20/2-RT | FAZ-C20/3-RT | FAZ-C20/4-RT |
| 25 | FAZ-C25/1-RT-SP | FAZ-C25/2-RT | FAZ-C25/3-RT | FAZ-C25/4-RT |
| 30 | FAZ-C30/1-RT-SP | FAZ-C30/2-RT | FAZ-C30/3-RT | FAZ-C30/4-RT |
| 32 | FAZ-C32/1-RT-SP | FAZ-C32/2-RT | FAZ-C32/3-RT | FAZ-C32/4-RT |

Note

^① Option for single packaging on single-pole C and D curves only.

FAZ-NA D Curve 277/480 Vac Rated Offering

- UL approved (UL 489) and CSA Certified (CSA C22.2 No.5-02) as branch circuit breakers
- Interrupting capacity: 10 kA UL/CSA; 15 kA IEC 60947-2
- Current limiting device
- UL file number E235139



Single-Pole



Two-Pole



Three-Pole



Four-Pole



FAZ-NA UL 489 Circuit Breakers at 277/480 Vac— 10 kAIC, 14 kAIC D Curve (13–20A)

| Amps | Single-Pole ① Catalog Number | Two-Pole Catalog Number | Three-Pole Catalog Number | Four-Pole Catalog Number |
|--|------------------------------------|-------------------------------|---------------------------------|--------------------------------|
| D Curve (10–20X I_n Current Rating) | | | | |
| 0.5 | FAZ-D0.5/1-NA-SP | FAZ-D0.5/2-NA | FAZ-D0.5/3-NA | FAZ-D0.5/4-NA |
| 1 | FAZ-D1/1-NA-SP | FAZ-D1/2-NA | FAZ-D1/3-NA | FAZ-D1/4-NA |
| 1.5 | FAZ-D1.5/1-NA-SP | FAZ-D1.5/2-NA | FAZ-D1.5/3-NA | FAZ-D1.5/4-NA |
| 2 | FAZ-D2/1-NA-SP | FAZ-D2/2-NA | FAZ-D2/3-NA | FAZ-D2/4-NA |
| 3 | FAZ-D3/1-NA-SP | FAZ-D3/2-NA | FAZ-D3/3-NA | FAZ-D3/4-NA |
| 4 | FAZ-D4/1-NA-SP | FAZ-D4/2-NA | FAZ-D4/3-NA | FAZ-D4/4-NA |
| 5 | FAZ-D5/1-NA-SP | FAZ-D5/2-NA | FAZ-D5/3-NA | FAZ-D5/4-NA |
| 6 | FAZ-D6/1-NA-SP | FAZ-D6/2-NA | FAZ-D6/3-NA | FAZ-D6/4-NA |
| 7 | FAZ-D7/1-NA-SP | FAZ-D7/2-NA | FAZ-D7/3-NA | FAZ-D7/4-NA |
| 8 | FAZ-D8/1-NA-SP | FAZ-D8/2-NA | FAZ-D8/3-NA | FAZ-D8/4-NA |
| 10 | FAZ-D10/1-NA-SP | FAZ-D10/2-NA | FAZ-D10/3-NA | FAZ-D10/4-NA |
| 13 | FAZ-D13/1-NA-SP | FAZ-D13/2-NA | FAZ-D13/3-NA | FAZ-D13/4-NA |
| 15 | FAZ-D15/1-NA-SP | FAZ-D15/2-NA | FAZ-D15/3-NA | FAZ-D15/4-NA |
| 16 | FAZ-D16/1-NA-SP | FAZ-D16/2-NA | FAZ-D16/3-NA | FAZ-D16/4-NA |
| 20 | FAZ-D20/1-NA-SP | FAZ-D20/2-NA | FAZ-D20/3-NA | FAZ-D20/4-NA |
| 25 | FAZ-D25/1-NA-SP | FAZ-D25/2-NA | FAZ-D25/3-NA | FAZ-D25/4-NA |
| 30 | FAZ-D30/1-NA-SP | FAZ-D30/2-NA | FAZ-D30/3-NA | FAZ-D30/4-NA |
| 32 | FAZ-D32/1-NA-SP | FAZ-D32/2-NA | FAZ-D32/3-NA | FAZ-D32/4-NA |

Note

① Option for single packaging on single-pole C and D curves only.

1.2

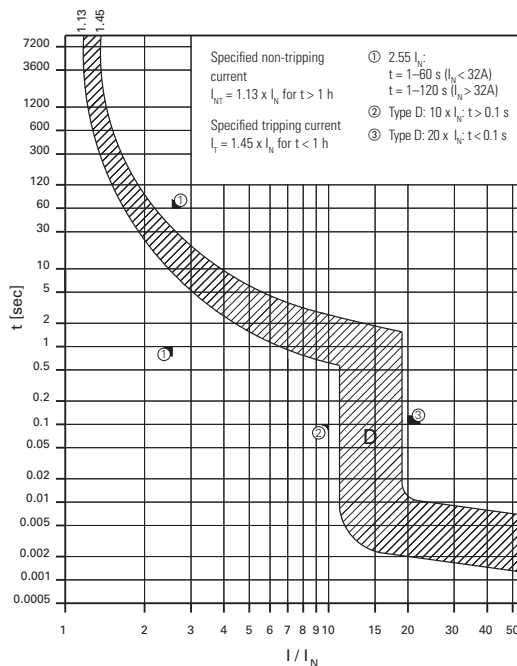
Miniature Circuit Breakers and Supplementary Protectors

UL 489 DIN Rail Miniature Circuit Breakers

1

FAZ-NA D Curve 277/480 Vac Rated Offering

- UL approved (UL 489) and CSA Certified (CSA C22.2 No.5-02) as branch circuit breakers
- Interrupting capacity: 10 kA UL/CSA; 15 kA IEC 60947-2
- Current limiting device
- UL file number E235139



Single-Pole



Two-Pole



Three-Pole



Four-Pole



FAZ-RT UL 489 Circuit Breakers with Ring-Tongue Terminals at 277/480 Vac— 10 kAIC, 14 kAIC D Curve (13–20A)

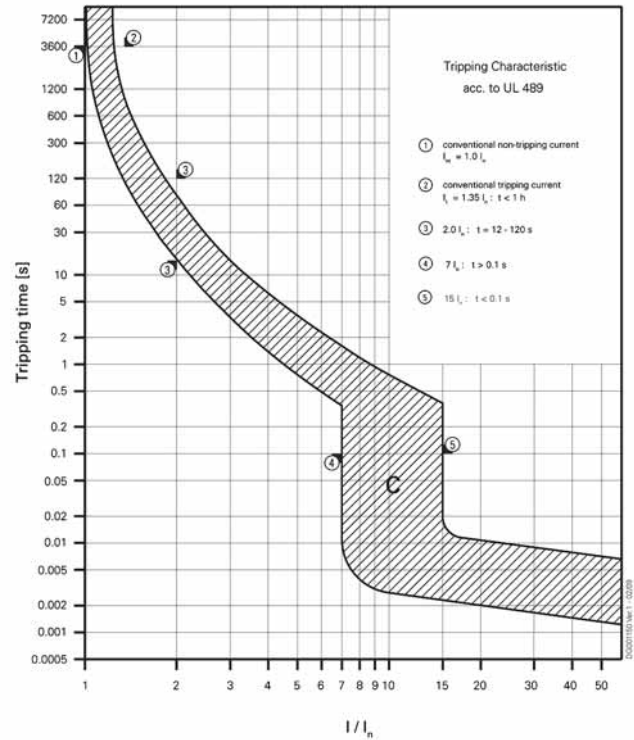
| Amps | Single-Pole Catalog Number | Two-Pole Catalog Number | Three-Pole Catalog Number | Four-Pole Catalog Number |
|---|----------------------------------|-------------------------------|---------------------------------|--------------------------------|
| D Curve with Ring-Tongue Terminals (10–20X I_N Current Rating) | | | | |
| 0.5 | FAZ-D0.5/1-RT-SP | FAZ-D0.5/2-RT | FAZ-D0.5/3-RT | FAZ-D0.5/4-RT |
| 1 | FAZ-D1/1-RT-SP | FAZ-D1/2-RT | FAZ-D1/3-RT | FAZ-D1/4-RT |
| 1.5 | FAZ-D1.5/1-RT-SP | FAZ-D1.5/2-RT | FAZ-D1.5/3-RT | FAZ-D1.5/4-RT |
| 2 | FAZ-D2/1-RT-SP | FAZ-D2/2-RT | FAZ-D2/3-RT | FAZ-D2/4-RT |
| 3 | FAZ-D3/1-RT-SP | FAZ-D3/2-RT | FAZ-D3/3-RT | FAZ-D3/4-RT |
| 4 | FAZ-D4/1-RT-SP | FAZ-D4/2-RT | FAZ-D4/3-RT | FAZ-D4/4-RT |
| 5 | FAZ-D5/1-RT-SP | FAZ-D5/2-RT | FAZ-D5/3-RT | FAZ-D5/4-RT |
| 6 | FAZ-D6/1-RT-SP | FAZ-D6/2-RT | FAZ-D6/3-RT | FAZ-D6/4-RT |
| 7 | FAZ-D7/1-RT-SP | FAZ-D7/2-RT | FAZ-D7/3-RT | FAZ-D7/4-RT |
| 8 | FAZ-D8/1-RT-SP | FAZ-D8/2-RT | FAZ-D8/3-RT | FAZ-D8/4-RT |
| 10 | FAZ-D10/1-RT-SP | FAZ-D10/2-RT | FAZ-D10/3-RT | FAZ-D10/4-RT |
| 13 | FAZ-D13/1-RT-SP | FAZ-D13/2-RT | FAZ-D13/3-RT | FAZ-D13/4-RT |
| 15 | FAZ-D15/1-RT-SP | FAZ-D15/2-RT | FAZ-D15/3-RT | FAZ-D15/4-RT |
| 16 | FAZ-D16/1-RT-SP | FAZ-D16/2-RT | FAZ-D16/3-RT | FAZ-D16/4-RT |
| 20 | FAZ-D20/1-RT-SP | FAZ-D20/2-RT | FAZ-D20/3-RT | FAZ-D20/4-RT |
| 25 | FAZ-D25/1-RT-SP | FAZ-D25/2-RT | FAZ-D25/3-RT | FAZ-D25/4-RT |
| 30 | FAZ-D30/1-RT-SP | FAZ-D30/2-RT | FAZ-D30/3-RT | FAZ-D30/4-RT |
| 32 | FAZ-D32/1-RT-SP | FAZ-D32/2-RT | FAZ-D32/3-RT | FAZ-D32/4-RT |

Note

① Option for single packaging on single-pole C and D curves only.

FAZ-NA-DC C Curve at 125 Vdc per Pole Offering

- UL approved (UL 489) and CSA Certified (CSA C22.2 No.5-02) as Branch Circuit Breakers
- Interrupting capacity: 10 kA at 125 Vdc UL/CSA, 10 kA at 250 Vdc
- 125 Vdc for one-pole, 250 Vdc for two-pole in series
- Current limiting device
- Polarity (+/-) sensitive and not for use on photovoltaic string application
- UL file number E235139



Single-Pole



Two-Pole



FAZ-NA-DC UL 489 Circuit Breakers—10 kAIC at 125 Vdc Per Pole

| Amps | Single-Pole Catalog Number | Two-Pole Catalog Number |
|--|----------------------------------|-------------------------------|
| C Curve (5–10X I_n Current Rating) | | |
| 2 | FAZ-C2/1-NA-DC-SP | FAZ-C2/2-NA-DC |
| 3 | FAZ-C3/1-NA-DC-SP | FAZ-C3/2-NA-DC |
| 4 | FAZ-C4/1-NA-DC-SP | FAZ-C4/2-NA-DC |
| 5 | FAZ-C5/1-NA-DC-SP | FAZ-C5/2-NA-DC |
| 6 | FAZ-C6/1-NA-DC-SP | FAZ-C6/2-NA-DC |
| 7 | FAZ-C7/1-NA-DC-SP | FAZ-C7/2-NA-DC |
| 8 | FAZ-C8/1-NA-DC-SP | FAZ-C8/2-NA-DC |
| 10 | FAZ-C10/1-NA-DC-SP | FAZ-C10/2-NA-DC |
| 13 | FAZ-C13/1-NA-DC-SP | FAZ-C13/2-NA-DC |
| 15 | FAZ-C15/1-NA-DC-SP | FAZ-C15/2-NA-DC |
| 16 | FAZ-C16/1-NA-DC-SP | FAZ-C16/2-NA-DC |
| 20 | FAZ-C20/1-NA-DC-SP | FAZ-C20/2-NA-DC |
| 25 | FAZ-C25/1-NA-DC-SP | FAZ-C25/2-NA-DC |
| 30 | FAZ-C30/1-NA-DC-SP | FAZ-C30/2-NA-DC |
| 32 | FAZ-C32/1-NA-DC-SP | FAZ-C32/2-NA-DC |
| 35 | FAZ-C35/1-NA-DC-SP | FAZ-C35/2-NA-DC |
| 40 | FAZ-C40/1-NA-DC-SP | FAZ-C40/2-NA-DC |

Note

① Option for single packaging on single-pole C curves only; add suffix SP when ordering.

1.2

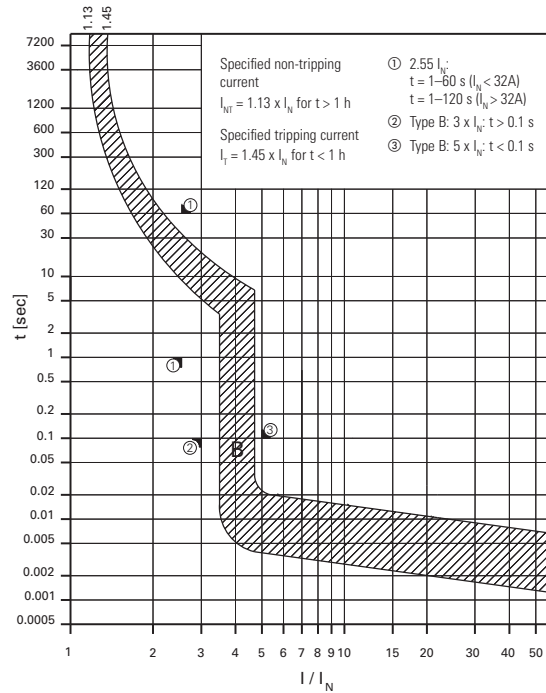
Miniature Circuit Breakers and Supplementary Protectors

UL 489 DIN Rail Miniature Circuit Breakers

1

FAZ-NA-L UL 489 Circuit Breakers at 240 Vac—10 kAIC B Curve

- UL approved (UL 489) and CSA Certified (CSA C22.2 No.5-02) as branch circuit breakers
- Interrupting capacity: 10 kA UL/CSA; 15 kA IEC 60947-2
- 48 Vdc for single-pole
- Current limiting device
- UL file number E235139



Single-Pole



Two-Pole



Three-Pole



Four-Pole



FAZ-NA-L UL 489 Circuit Breakers at 240 Vac— 10 kAIC, 14 kAIC B Curve (15–25A)

| Amps | Single-Pole ① Catalog Number | Two-Pole Catalog Number | Three-Pole Catalog Number | Four-Pole Catalog Number |
|--|---------------------------------|----------------------------|------------------------------|-----------------------------|
| B Curve (3–5X I_N Current Rating) | | | | |
| 1 | FAZ-B1/1-NA-L | FAZ-B1/2-NA-L | FAZ-B1/3-NA-L | FAZ-B1/4-NA-L |
| 1.5 | FAZ-B1.5/1-NA-L | FAZ-B1.5/2-NA-L | FAZ-B1.5/3-NA-L | FAZ-B1.5/4-NA-L |
| 2 | FAZ-B2/1-NA-L | FAZ-B2/2-NA-L | FAZ-B2/3-NA-L | FAZ-B2/4-NA-L |
| 3 | FAZ-B3/1-NA-L | FAZ-B3/2-NA-L | FAZ-B3/3-NA-L | FAZ-B3/4-NA-L |
| 4 | FAZ-B4/1-NA-L | FAZ-B4/2-NA-L | FAZ-B4/3-NA-L | FAZ-B4/4-NA-L |
| 5 | FAZ-B5/1-NA-L | FAZ-B5/2-NA-L | FAZ-B5/3-NA-L | FAZ-B5/4-NA-L |
| 6 | FAZ-B6/1-NA-L | FAZ-B6/2-NA-L | FAZ-B6/3-NA-L | FAZ-B6/4-NA-L |
| 7 | FAZ-B7/1-NA-L | FAZ-B7/2-NA-L | FAZ-B7/3-NA-L | FAZ-B7/4-NA-L |
| 8 | FAZ-B8/1-NA-L | FAZ-B8/2-NA-L | FAZ-B8/3-NA-L | FAZ-B8/4-NA-L |
| 10 | FAZ-B10/1-NA-L | FAZ-B10/2-NA-L | FAZ-B10/3-NA-L | FAZ-B10/4-NA-L |
| 13 | FAZ-B13/1-NA-L | FAZ-B13/2-NA-L | FAZ-B13/3-NA-L | FAZ-B13/4-NA-L |
| 15 | FAZ-B15/1-NA-L | FAZ-B15/2-NA-L | FAZ-B15/3-NA-L | FAZ-B15/4-NA-L |
| 16 | FAZ-B16/1-NA-L | FAZ-B16/2-NA-L | FAZ-B16/3-NA-L | FAZ-B16/4-NA-L |
| 20 | FAZ-B20/1-NA-L | FAZ-B20/2-NA-L | FAZ-B20/3-NA-L | FAZ-B20/4-NA-L |
| 25 | FAZ-B25/1-NA-L | FAZ-B25/2-NA-L | FAZ-B25/3-NA-L | FAZ-B25/4-NA-L |
| 30 | FAZ-B30/1-NA-L | FAZ-B30/2-NA-L | FAZ-B30/3-NA-L | FAZ-B30/4-NA-L |
| 32 | FAZ-B32/1-NA-L | FAZ-B32/2-NA-L | FAZ-B32/3-NA-L | FAZ-B32/4-NA-L |
| 35 ② | FAZ-B35/1-NA | FAZ-B35/2-NA | FAZ-B35/3-NA | FAZ-B35/4-NA |
| 40 ② | FAZ-B40/1-NA | FAZ-B40/2-NA | FAZ-B40/3-NA | FAZ-B40/4-NA |
| 50 | FAZ-B50/1-NA | FAZ-B50/2-NA | FAZ-B50/3-NA | FAZ-B50/4-NA |
| 63 | FAZ-B63/1-NA | FAZ-B63/2-NA | FAZ-B63/3-NA | FAZ-B63/4-NA |

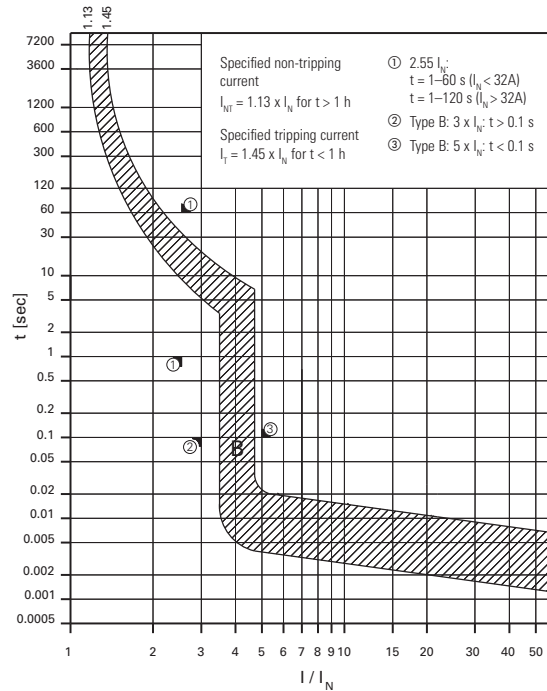
Notes

① Two-piece order. Quantities of two per box.

② 35A and 40A at 240 Vac were available prior to the creation of the FAZ-NA-L offering so the catalog numbers at these amperages exclude the “L” suffix.

FAZ-NA-L UL 489 Circuit Breakers at 240 Vac—10 kAIC B Curve

- UL approved (UL 489) and CSA Certified (CSA C22.2 No.5-02) as branch circuit breakers
- Interrupting capacity: 10 kA UL/CSA; 15 kA IEC 60947-2
- 48 Vdc for single-pole
- Current limiting device
- UL file number E235139



Single-Pole



Two-Pole



Three-Pole



Four-Pole



FAZ-RT-L UL 489 Circuit Breakers with Ring-Tongue Terminals at 240 Vac— 10 kAIC, 14 kAIC B Curve (15–25A)

| Amps | Single-Pole ① Catalog Number | Two-Pole Catalog Number | Three-Pole Catalog Number | Four-Pole Catalog Number |
|---|------------------------------------|-------------------------------|---------------------------------|--------------------------------|
| B Curve with Ring-Tongue Terminals (3–5X I_N Current Rating) | | | | |
| 1 | FAZ-B1/1-RT-L | FAZ-B1/2-RT-L | FAZ-B1/3-RT-L | FAZ-B1/4-RT-L |
| 1.5 | FAZ-B1.5/1-RT-L | FAZ-B1.5/2-RT-L | FAZ-B1.5/3-RT-L | FAZ-B1.5/4-RT-L |
| 2 | FAZ-B2/1-RT-L | FAZ-B2/2-RT-L | FAZ-B2/3-RT-L | FAZ-B2/4-RT-L |
| 3 | FAZ-B3/1-RT-L | FAZ-B3/2-RT-L | FAZ-B3/3-RT-L | FAZ-B3/4-RT-L |
| 4 | FAZ-B4/1-RT-L | FAZ-B4/2-RT-L | FAZ-B4/3-RT-L | FAZ-B4/4-RT-L |
| 5 | FAZ-B5/1-RT-L | FAZ-B5/2-RT-L | FAZ-B5/3-RT-L | FAZ-B5/4-RT-L |
| 6 | FAZ-B6/1-RT-L | FAZ-B6/2-RT-L | FAZ-B6/3-RT-L | FAZ-B6/4-RT-L |
| 7 | FAZ-B7/1-RT-L | FAZ-B7/2-RT-L | FAZ-B7/3-RT-L | FAZ-B7/4-RT-L |
| 8 | FAZ-B8/1-RT-L | FAZ-B8/2-RT-L | FAZ-B8/3-RT-L | FAZ-B8/4-RT-L |
| 10 | FAZ-B10/1-RT-L | FAZ-B10/2-RT-L | FAZ-B10/3-RT-L | FAZ-B10/4-RT-L |
| 13 | FAZ-B13/1-RT-L | FAZ-B13/2-RT-L | FAZ-B13/3-RT-L | FAZ-B13/4-RT-L |
| 15 | FAZ-B15/1-RT-L | FAZ-B15/2-RT-L | FAZ-B15/3-RT-L | FAZ-B15/4-RT-L |
| 16 | FAZ-B16/1-RT-L | FAZ-B16/2-RT-L | FAZ-B16/3-RT-L | FAZ-B16/4-RT-L |
| 20 | FAZ-B20/1-RT-L | FAZ-B20/2-RT-L | FAZ-B20/3-RT-L | FAZ-B20/4-RT-L |
| 25 | FAZ-B25/1-RT-L | FAZ-B25/2-RT-L | FAZ-B25/3-RT-L | FAZ-B25/4-RT-L |
| 30 | FAZ-B30/1-RT-L | FAZ-B30/2-RT-L | FAZ-B30/3-RT-L | FAZ-B30/4-RT-L |
| 32 | FAZ-B32/1-RT-L | FAZ-B32/2-RT-L | FAZ-B32/3-RT-L | FAZ-B32/4-RT-L |
| 35 ② | FAZ-B35/1-RT | FAZ-B35/2-RT | FAZ-B35/3-RT | FAZ-B35/4-RT |
| 40 ② | FAZ-B40/1-RT | FAZ-B40/2-RT | FAZ-B40/3-RT | FAZ-B40/4-RT |
| 50 | FAZ-B50/1-RT | FAZ-B50/2-RT | FAZ-B50/3-RT | FAZ-B50/4-RT |
| 63 | FAZ-B63/1-RT | FAZ-B63/2-RT | FAZ-B63/3-RT | FAZ-B63/4-RT |

Notes

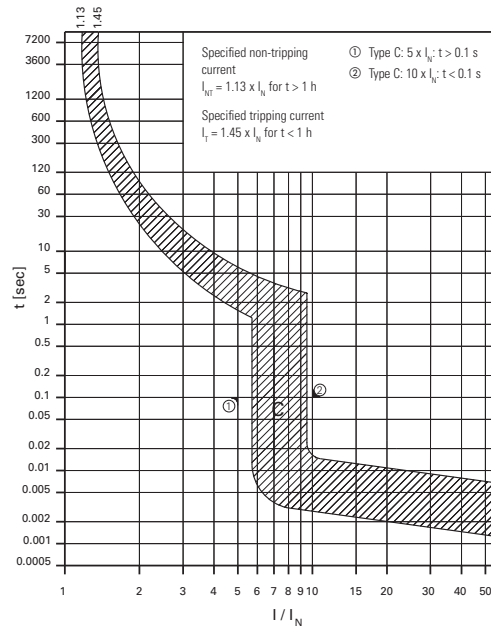
① Two-piece order. Quantities of two per box.

② 35A and 40A at 240 Vac were available prior to the creation of the FAZ-NA-L offering so the catalog numbers at these amperages exclude the “L” suffix.

1

FAZ-NA-L UL 489 Circuit Breakers at 240 Vac—10 kAIC C Curve

- UL approved (UL 489) and CSA Certified (CSA C22.2 No.5-02) as branch circuit breakers
- Interrupting capacity: 10 kA UL/CSA; 15 kA IEC 60947-2
- 48 Vdc for single-pole
- Current limiting device
- UL file number E235139



Single-Pole



Two-Pole



Three-Pole



Four-Pole



FAZ-NA-L UL 489 Circuit Breakers at 240 Vac—10 kAIC, 14 kAIC C Curve (15–25A)

| Amps | Single-Pole ① Catalog Number | Two-Pole Catalog Number | Three-Pole Catalog Number | Four-Pole Catalog Number |
|---|------------------------------------|-------------------------------|---------------------------------|--------------------------------|
| C Curve (5–10X I_N Current Rating) | | | | |
| 0.5 | FAZ-C0.5/1-NA-L | FAZ-C0.5/2-NA-L | FAZ-C0.5/3-NA-L | FAZ-C0.5/4-NA-L |
| 1 | FAZ-C1/1-NA-L | FAZ-C1/2-NA-L | FAZ-C1/3-NA-L | FAZ-C1/4-NA-L |
| 1.5 | FAZ-C1.5/1-NA-L | FAZ-C1.5/2-NA-L | FAZ-C1.5/3-NA-L | FAZ-C1.5/4-NA-L |
| 2 | FAZ-C2/1-NA-L | FAZ-C2/2-NA-L | FAZ-C2/3-NA-L | FAZ-C2/4-NA-L |
| 3 | FAZ-C3/1-NA-L | FAZ-C3/2-NA-L | FAZ-C3/3-NA-L | FAZ-C3/4-NA-L |
| 4 | FAZ-C4/1-NA-L | FAZ-C4/2-NA-L | FAZ-C4/3-NA-L | FAZ-C4/4-NA-L |
| 5 | FAZ-C5/1-NA-L | FAZ-C5/2-NA-L | FAZ-C5/3-NA-L | FAZ-C5/4-NA-L |
| 6 | FAZ-C6/1-NA-L | FAZ-C6/2-NA-L | FAZ-C6/3-NA-L | FAZ-C6/4-NA-L |
| 7 | FAZ-C7/1-NA-L | FAZ-C7/2-NA-L | FAZ-C7/3-NA-L | FAZ-C7/4-NA-L |
| 8 | FAZ-C8/1-NA-L | FAZ-C8/2-NA-L | FAZ-C8/3-NA-L | FAZ-C8/4-NA-L |
| 10 | FAZ-C10/1-NA-L | FAZ-C10/2-NA-L | FAZ-C10/3-NA-L | FAZ-C10/4-NA-L |
| 13 | FAZ-C13/1-NA-L | FAZ-C13/2-NA-L | FAZ-C13/3-NA-L | FAZ-C13/4-NA-L |
| 15 | FAZ-C15/1-NA-L | FAZ-C15/2-NA-L | FAZ-C15/3-NA-L | FAZ-C15/4-NA-L |
| 16 | FAZ-C16/1-NA-L | FAZ-C16/2-NA-L | FAZ-C16/3-NA-L | FAZ-C16/4-NA-L |
| 20 | FAZ-C20/1-NA-L | FAZ-C20/2-NA-L | FAZ-C20/3-NA-L | FAZ-C20/4-NA-L |
| 25 | FAZ-C25/1-NA-L | FAZ-C25/2-NA-L | FAZ-C25/3-NA-L | FAZ-C25/4-NA-L |
| 30 | FAZ-C30/1-NA-L | FAZ-C30/2-NA-L | FAZ-C30/3-NA-L | FAZ-C30/4-NA-L |
| 32 | FAZ-C32/1-NA-L | FAZ-C32/2-NA-L | FAZ-C32/3-NA-L | FAZ-C32/4-NA-L |
| 35 ② | FAZ-C35/1-NA-SP | FAZ-C35/2-NA | FAZ-C35/3-NA | FAZ-C35/4-NA |
| 40 ② | FAZ-C40/1-NA-SP | FAZ-C40/2-NA | FAZ-C40/3-NA | FAZ-C40/4-NA |
| 50 | FAZ-C50/1-NA | FAZ-C50/2-NA | FAZ-C50/3-NA | FAZ-C50/4-NA |
| 63 | FAZ-C63/1-NA | FAZ-C63/2-NA | FAZ-C63/3-NA | FAZ-C63/4-NA |

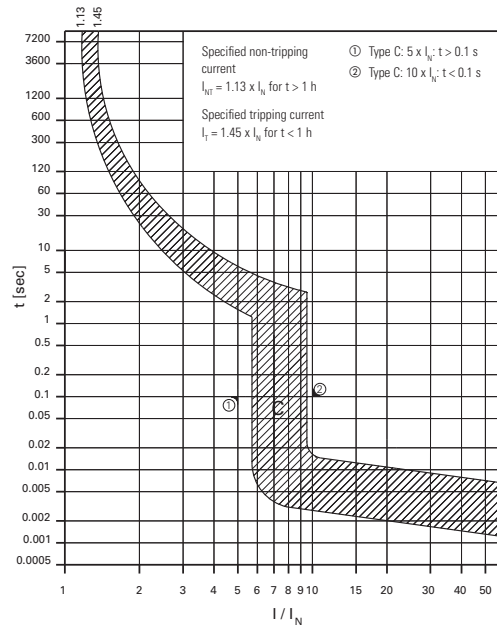
Notes

① Two-piece order. Quantities of two per box.

② 35A and 40A at 240 Vac were available prior to the creation of the FAZ-NA-L offering so the catalog numbers at these amperages exclude the “L” suffix.

FAZ-NA-L UL 489 Circuit Breakers at 240 Vac—10 kAIC C Curve

- UL approved (UL 489) and CSA Certified (CSA C22.2 No.5-02) as branch circuit breakers
- Interrupting capacity: 10 kA UL/CSA; 15 kA IEC 60947-2
- 48 Vdc for single-pole
- Current limiting device
- UL file number E235139



Single-Pole



Two-Pole



Three-Pole



Four-Pole



FAZ-RT-L UL 489 Circuit Breakers with Ring-Tongue Terminals at 240 Vac— 10 kAIC, 14 kAIC C Curve (15–25A)

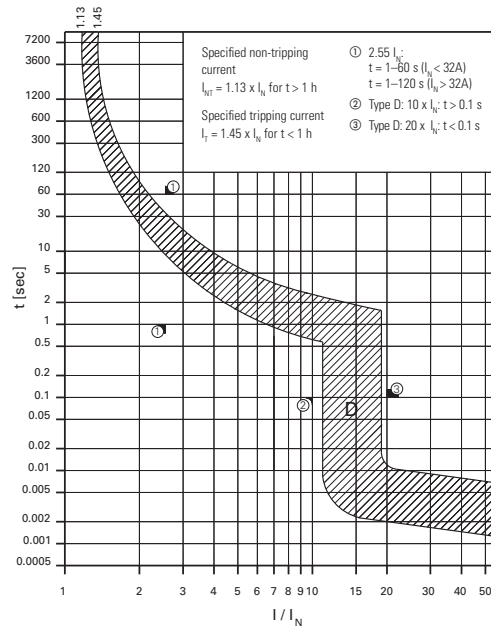
| Amps | Single-Pole Catalog Number ① | Two-Pole Catalog Number | Three-Pole Catalog Number | Four-Pole Catalog Number |
|--|------------------------------------|-------------------------------|---------------------------------|--------------------------------|
| C Curve with Ring-Tongue Terminals (5–10X I_N Current Rating) | | | | |
| 0.5 | FAZ-C0.5/1-RT-L | FAZ-C0.5/2-RT-L | FAZ-C0.5/3-RT-L | FAZ-C0.5/4-RT-L |
| 1 | FAZ-C1/1-RT-L | FAZ-C1/2-RT-L | FAZ-C1/3-RT-L | FAZ-C1/4-RT-L |
| 1.5 | FAZ-C1.5/1-RT-L | FAZ-C1.5/2-RT-L | FAZ-C1.5/3-RT-L | FAZ-C1.5/4-RT-L |
| 2 | FAZ-C2/1-RT-L | FAZ-C2/2-RT-L | FAZ-C2/3-RT-L | FAZ-C2/4-RT-L |
| 3 | FAZ-C3/1-RT-L | FAZ-C3/2-RT-L | FAZ-C3/3-RT-L | FAZ-C3/4-RT-L |
| 4 | FAZ-C4/1-RT-L | FAZ-C4/2-RT-L | FAZ-C4/3-RT-L | FAZ-C4/4-RT-L |
| 5 | FAZ-C5/1-RT-L | FAZ-C5/2-RT-L | FAZ-C5/3-RT-L | FAZ-C5/4-RT-L |
| 6 | FAZ-C6/1-RT-L | FAZ-C6/2-RT-L | FAZ-C6/3-RT-L | FAZ-C6/4-RT-L |
| 7 | FAZ-C7/1-RT-L | FAZ-C7/2-RT-L | FAZ-C7/3-RT-L | FAZ-C7/4-RT-L |
| 8 | FAZ-C8/1-RT-L | FAZ-C8/2-RT-L | FAZ-C8/3-RT-L | FAZ-C8/4-RT-L |
| 10 | FAZ-C10/1-RT-L | FAZ-C10/2-RT-L | FAZ-C10/3-RT-L | FAZ-C10/4-RT-L |
| 13 | FAZ-C13/1-RT-L | FAZ-C13/2-RT-L | FAZ-C13/3-RT-L | FAZ-C13/4-RT-L |
| 15 | FAZ-C15/1-RT-L | FAZ-C15/2-RT-L | FAZ-C15/3-RT-L | FAZ-C15/4-RT-L |
| 16 | FAZ-C16/1-RT-L | FAZ-C16/2-RT-L | FAZ-C16/3-RT-L | FAZ-C16/4-RT-L |
| 20 | FAZ-C20/1-RT-L | FAZ-C20/2-RT-L | FAZ-C20/3-RT-L | FAZ-C20/4-RT-L |
| 25 | FAZ-C25/1-RT-L | FAZ-C25/2-RT-L | FAZ-C25/3-RT-L | FAZ-C25/4-RT-L |
| 30 | FAZ-C30/1-RT-L | FAZ-C30/2-RT-L | FAZ-C30/3-RT-L | FAZ-C30/4-RT-L |
| 32 | FAZ-C32/1-RT-L | FAZ-C32/2-RT-L | FAZ-C32/3-RT-L | FAZ-C32/4-RT-L |
| 35 ② | FAZ-C35/1-RT-SP | FAZ-C35/2-RT | FAZ-C35/3-RT | FAZ-C35/4-RT |
| 40 ② | FAZ-C40/1-RT-SP | FAZ-C40/2-RT | FAZ-C40/3-RT | FAZ-C40/4-RT |
| 50 | FAZ-C50/1-RT | FAZ-C50/2-RT | FAZ-C50/3-RT | FAZ-C50/4-RT |
| 63 | FAZ-C63/1-RT | FAZ-C63/2-RT | FAZ-C63/3-RT | FAZ-C63/4-RT |

Notes

- ① Two-piece order. Quantities of two per box.
- ② 35A and 40A at 240 Vac were available prior to the creation of the FAZ-NA-L offering so the catalog numbers at these amperages exclude the "L" suffix.

1 FAZ-NA-L UL 489 Circuit Breakers at 240 Vac—10 kAIC D Curve

- UL approved (UL 489) and CSA Certified (CSA C22.2 No.5-02) as branch circuit breakers
- Interrupting capacity: 10 kA UL/CSA; 15 kA IEC 60947-2
- 48 Vdc for single-pole
- Current limiting device
- UL file number E235139



Single-Pole



Two-Pole



Three-Pole



Four-Pole



FAZ-NA-L UL 489 Circuit Breakers at 240 Vac—10 kAIC, 14 kAIC D Curve (13–20A)

| Amps | Single-Pole ① Catalog Number | Two-Pole Catalog Number | Three-Pole Catalog Number | Four-Pole Catalog Number |
|--|---------------------------------|----------------------------|------------------------------|-----------------------------|
| D Curve (10–20X I_N Current Rating) | | | | |
| 0.5 | FAZ-D0.5/1-NA-L | FAZ-D0.5/2-NA-L | FAZ-D0.5/3-NA-L | FAZ-D0.5/4-NA-L |
| 1 | FAZ-D1/1-NA-L | FAZ-D1/2-NA-L | FAZ-D1/3-NA-L | FAZ-D1/4-NA-L |
| 1.5 | FAZ-D1.5/1-NA-L | FAZ-D1.5/2-NA-L | FAZ-D1.5/3-NA-L | FAZ-D1.5/4-NA-L |
| 2 | FAZ-D2/1-NA-L | FAZ-D2/2-NA-L | FAZ-D2/3-NA-L | FAZ-D2/4-NA-L |
| 3 | FAZ-D3/1-NA-L | FAZ-D3/2-NA-L | FAZ-D3/3-NA-L | FAZ-D3/4-NA-L |
| 4 | FAZ-D4/1-NA-L | FAZ-D4/2-NA-L | FAZ-D4/3-NA-L | FAZ-D4/4-NA-L |
| 5 | FAZ-D5/1-NA-L | FAZ-D5/2-NA-L | FAZ-D5/3-NA-L | FAZ-D5/4-NA-L |
| 6 | FAZ-D6/1-NA-L | FAZ-D6/2-NA-L | FAZ-D6/3-NA-L | FAZ-D6/4-NA-L |
| 7 | FAZ-D7/1-NA-L | FAZ-D7/2-NA-L | FAZ-D7/3-NA-L | FAZ-D7/4-NA-L |
| 8 | FAZ-D8/1-NA-L | FAZ-D8/2-NA-L | FAZ-D8/3-NA-L | FAZ-D8/4-NA-L |
| 10 | FAZ-D10/1-NA-L | FAZ-D10/2-NA-L | FAZ-D10/3-NA-L | FAZ-D10/4-NA-L |
| 13 | FAZ-D13/1-NA-L | FAZ-D13/2-NA-L | FAZ-D13/3-NA-L | FAZ-D13/4-NA-L |
| 15 | FAZ-D15/1-NA-L | FAZ-D15/2-NA-L | FAZ-D15/3-NA-L | FAZ-D15/4-NA-L |
| 16 | FAZ-D16/1-NA-L | FAZ-D16/2-NA-L | FAZ-D16/3-NA-L | FAZ-D16/4-NA-L |
| 20 | FAZ-D20/1-NA-L | FAZ-D20/2-NA-L | FAZ-D20/3-NA-L | FAZ-D20/4-NA-L |
| 25 | FAZ-D25/1-NA-L | FAZ-D25/2-NA-L | FAZ-D25/3-NA-L | FAZ-D25/4-NA-L |
| 30 | FAZ-D30/1-NA-L | FAZ-D30/2-NA-L | FAZ-D30/3-NA-L | FAZ-D30/4-NA-L |
| 32 | FAZ-D32/1-NA-L | FAZ-D32/2-NA-L | FAZ-D32/3-NA-L | FAZ-D32/4-NA-L |
| 35 ② | FAZ-D35/1-NA-SP | FAZ-D35/2-NA | FAZ-D35/3-NA | FAZ-D35/4-NA |
| 40 ② | FAZ-D40/1-NA-SP | FAZ-D40/2-NA | FAZ-D40/3-NA | FAZ-D40/4-NA |

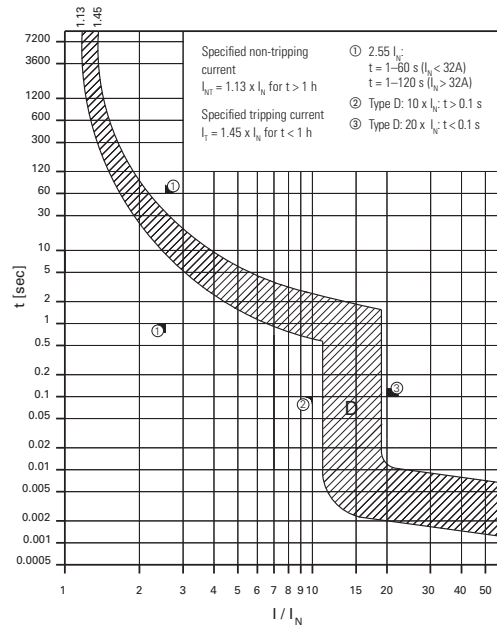
Notes

① Two-piece order. Quantities of two per box.

② 35A and 40A at 240 Vac were available prior to the creation of the FAZ-NA-L offering so the catalog numbers at these amperages exclude the “L” suffix.

FAZ-NA-L UL 489 Circuit Breakers at 240 Vac—10 kAIC D Curve

- UL approved (UL 489) and CSA Certified (CSA C22.2 No. 5-02) as branch circuit breakers
- Interrupting capacity: 10 kA UL/CSA; 15 kA IEC 60947-2
- 48 Vdc for single-pole
- Current limiting device
- UL file number E235139



Single-Pole



Two-Pole



Three-Pole



Four-Pole



FAZ-RT-L UL 489 Circuit Breakers with Ring-Tongue Terminals at 240 Vac— 10 kAIC, 14 kAIC D Curve (13–20A)




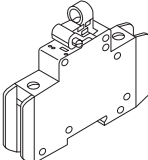
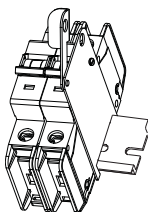
| Amps | Single-Pole ① Catalog Number | Two-Pole Catalog Number | Three-Pole Catalog Number | Four-Pole Catalog Number |
|---|---------------------------------|----------------------------|------------------------------|-----------------------------|
| D Curve with Ring-Tongue Terminals (10–20X I_n Current Rating) | | | | |
| 0.5 | FAZ-D0.5/1-RT-L | FAZ-D0.5/2-RT-L | FAZ-D0.5/3-RT-L | FAZ-D0.5/4-RT-L |
| 1 | FAZ-D1/1-RT-L | FAZ-D1/2-RT-L | FAZ-D1/3-RT-L | FAZ-D1/4-RT-L |
| 1.5 | FAZ-D1.5/1-RT-L | FAZ-D1.5/2-RT-L | FAZ-D1.5/3-RT-L | FAZ-D1.5/4-RT-L |
| 2 | FAZ-D2/1-RT-L | FAZ-D2/2-RT-L | FAZ-D2/3-RT-L | FAZ-D2/4-RT-L |
| 3 | FAZ-D3/1-RT-L | FAZ-D3/2-RT-L | FAZ-D3/3-RT-L | FAZ-D3/4-RT-L |
| 4 | FAZ-D4/1-RT-L | FAZ-D4/2-RT-L | FAZ-D4/3-RT-L | FAZ-D4/4-RT-L |
| 5 | FAZ-D5/1-RT-L | FAZ-D5/2-RT-L | FAZ-D5/3-RT-L | FAZ-D5/4-RT-L |
| 6 | FAZ-D6/1-RT-L | FAZ-D6/2-RT-L | FAZ-D6/3-RT-L | FAZ-D6/4-RT-L |
| 7 | FAZ-D7/1-RT-L | FAZ-D7/2-RT-L | FAZ-D7/3-RT-L | FAZ-D7/4-RT-L |
| 8 | FAZ-D8/1-RT-L | FAZ-D8/2-RT-L | FAZ-D8/3-RT-L | FAZ-D8/4-RT-L |
| 10 | FAZ-D10/1-RT-L | FAZ-D10/2-RT-L | FAZ-D10/3-RT-L | FAZ-D10/4-RT-L |
| 13 | FAZ-D13/1-RT-L | FAZ-D13/2-RT-L | FAZ-D13/3-RT-L | FAZ-D13/4-RT-L |
| 15 | FAZ-D15/1-RT-L | FAZ-D15/2-RT-L | FAZ-D15/3-RT-L | FAZ-D15/4-RT-L |
| 16 | FAZ-D16/1-RT-L | FAZ-D16/2-RT-L | FAZ-D16/3-RT-L | FAZ-D16/4-RT-L |
| 20 | FAZ-D20/1-RT-L | FAZ-D20/2-RT-L | FAZ-D20/3-RT-L | FAZ-D20/4-RT-L |
| 25 | FAZ-D25/1-RT-L | FAZ-D25/2-RT-L | FAZ-D25/3-RT-L | FAZ-D25/4-RT-L |
| 30 | FAZ-D30/1-RT-L | FAZ-D30/2-RT-L | FAZ-D30/3-RT-L | FAZ-D30/4-RT-L |
| 32 | FAZ-D32/1-RT-L | FAZ-D32/2-RT-L | FAZ-D32/3-RT-L | FAZ-D32/4-RT-L |
| 35 ② | FAZ-D35/1-RT-SP | FAZ-D35/2-RT | FAZ-D35/3-RT | FAZ-D35/4-RT |
| 40 ② | FAZ-D40/1-RT-SP | FAZ-D40/2-RT | FAZ-D40/3-RT | FAZ-D40/4-RT |

Notes



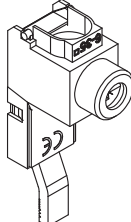
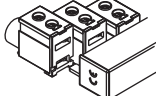
- ① Two-piece order. Quantities of two per box.
- ② 35A and 40A at 240 Vac were available prior to the creation of the FAZ-NA-L offering so the catalog numbers at these amperages exclude the "L" suffix.

Accessories

FAZ-NA and FAZ-NA-L UL 489 Breakers

| | Description | Catalog Number |
|---|---|---|
| Contact  | Two-pole contact or auxiliary contact/trip indicating contact | Z-NHK ① |
| Auxiliary Contact  | Auxiliary contact | Z-IHK-NA |
| Shunt Trip  | Shunt trip 110–415 Vac Shunt trip 12–110 Vac | FAZ-XAA-NA110-415VAC FAZ-XAA-NA12-110VAC |
| Padlock Hasp  | Padlock hasp | Z-IS/SPE-1TE |
| Lockoff Device  | UL lockoff device | FAZPLOFF |

FAZ-NA and FAZ-NA-L UL 489 Breakers, continued

| | Description | Catalog Number |
|---|--|-----------------------------|
| Busbar  | Busbar—single-pole, 6 terminals ②③④⑤ | Z-SV/UL-16/1P-1TE/6 |
| | Busbar—single-pole, 12 terminals ②③④⑤ | Z-SV/UL-16/1P-1TE/12 |
| | Busbar—single-pole, 18 terminals ②③④⑤ | Z-SV/UL-16/1P-1TE/18 |
| | Busbar—two-pole, 6 terminals ②③④⑤ | Z-SV/UL-16/2P-2TE/6 |
| | Busbar—two-pole, 12 terminals ②③④⑤ | Z-SV/UL-16/2P-2TE/12 |
| | Busbar—two-pole, 18 terminals ②③④⑤ | Z-SV/UL-16/2P-2TE/18 |
| | Busbar—three-pole, 6 terminals ②③④⑤ | Z-SV/UL-16/3P-3TE/6 |
| | Busbar—three-pole, 12 terminals ②③④⑤ | Z-SV/UL-16/3P-3TE/12 |
| | Busbar—three-pole, 18 terminals ②③④⑤ | Z-SV/UL-16/3P-3TE/18 |
| Busbar Shroud  | Three-pole busbar shroud | ZV-BS-UL |
| Extension Terminal  | Extension terminal—35 mm ² (10–1/0 AWG) | Z-EK/35/UL |
| Bus Connector  | Bus connector—conductors up to 50 mm ² (–1/0 AWG) | Z-EB/50/UL |

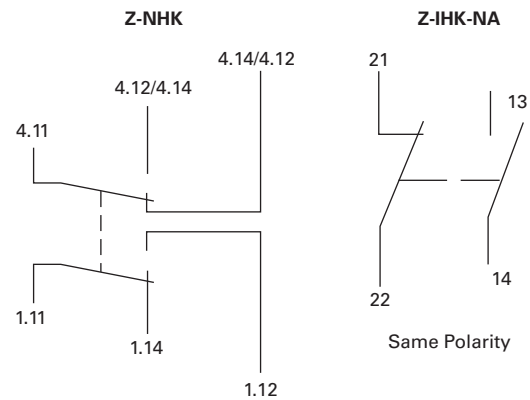
Notes

- ① Voltage of FAZ-NA circuit breaker is limited to 300V with this auxiliary contact installed.
- ② Do not cut commoning link.
- ③ A maximum of three commoning links may be used in conjunction. Each breaker connected to the commoning link must have the same number of poles for proper use.
- ④ Not for use with ring-tongue circuit breakers.
- ⑤ Bus may be center fed for high current capacity.

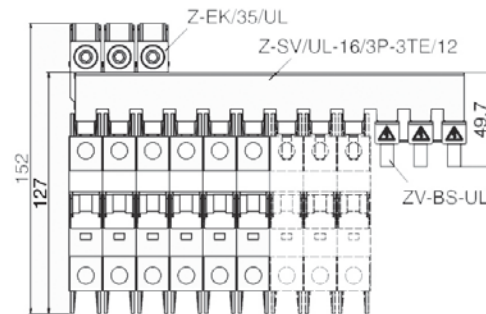
Tripping Signal Switch Z-NHK, Z-IHK-NA

- Design according to IEC/EN 60947-5-1, IEC/EN 62019
- Field installable
- The specified minimum voltages are per contact—take into account particularly in case of series connection
- Self-cleaning contacts
- Contact material and design particularly suitable for extra low voltage
- Z-NHK: the function of one of the two change-over contacts can be switched from “auxiliary switch” to “tripping signal switch”
- Tripping signal contact transmits message of electric tripping, not mechanical switch-off
- Test key for contact function “electrical tripping”
- Z-IHK-NA: will allow for > 480Y/277 Vac rating

Connection Diagram



Busbar Connection Example



1.2

Miniature Circuit Breakers and Supplementary Protectors

UL 489 DIN Rail Miniature Circuit Breakers

1

Z-NHK

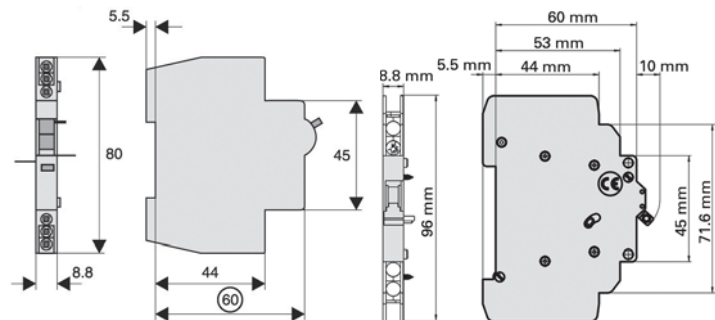


Z-IHK-NA



Contact and Auxiliary Contact

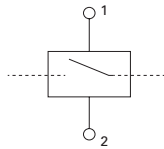
| Description | Z-NHK | Z-IHK-NA |
|--|---|---|
| Electrical | | |
| Contact function | 2CO | 1NO + 1NC |
| Rated voltage | 230V | 250V |
| Frequency | 50/60 Hz | 50/60 Hz |
| Rated current | 2A | 6A |
| Rated thermal current I_{th} | 2A | 6A |
| Utilization category AC13 Rated operational current I_b | 3A/250 Vac | 3A/250 Vac |
| Utilization category AC15 Rated operational current I_b | 2A/250 Vac | 2A/250 Vac |
| Utilization category DC12 Rated operational current I_b | 0.5A/110 Vdc | 0.5A/110 Vdc 0.25A/220 Vdc |
| Rated insulation voltage U_i | 250 Vac | 250 Vac |
| Minimum operational voltage per contact U_{min} | 5 Vdc | 5 Vdc |
| Minimum operational current I_{min} | 10 mA DC | 10 mA AC/DC |
| Rated peak withstand voltage U_{imp} (1.2/50 μ) | 2.5 kV | 4 kV |
| Conditional short-circuit current I_k with backup fuse 6A | 1 kA | 1 kA |
| Max. backup fuse, overload and short circuit | 6A gL | — |
| Mechanical | | |
| Tripping indicator "electrical tripping" | Blue/white | — |
| Frame size | 45 mm | 45 mm |
| Device height | 80 mm | 80 mm |
| Device width | 8.8 mm (0.5MU) | 8.8 mm (0.5MU) |
| Mounting | Onto switching device | — |
| Degree of protection, built-in | IP40 | IP40 |
| Terminal protection | Finger and hand touch safe According to BGV A3, ÖVE-EN 6 | Finger and hand touch safe According to BGV A3, ÖVE-EN 6 |
| Terminals | Lift terminals | Lift terminals |
| Terminal capacity | 20–14 AWG | 0.5–2.5 mm ² |
| Terminal screws | M3 (Posidrive Z0) | M3 (Posidrive Z0) |
| Fastening torque of terminal screws | 7 lb-in | Max. 1.2 Nm |



Shunt trip release FAZ-XAA-NA

- Remote release for subsequent mounting onto FAZ-NA/RT
- Additional installation of standard auxiliary switch is possible
- Position indicator red–green

Connection Diagram



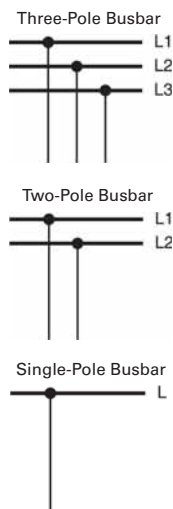
Shunt Trip Release FAZ-XAA-NA

| Description | FAZ-XAA-NA12-110VAC | FAZ-XAA-NA110-415VAC |
|--|--|-----------------------------|
| Electrical | | |
| Can be mounted onto | FAZ-NA / FAZ-NA-DC / FAZ-RT | FAZ-NA / FAZ-NA-DC / FAZ-RT |
| Operational voltage range | 12–110 Vac 12–60 Vdc | 110–415 Vac 110–230 Vdc |
| Frequency | 50/60 Hz | 50/60 Hz |
| Mechanical | | |
| Frame size | 45 mm | 45 mm |
| Device height | 105 mm | 105 mm |
| Device width | 17.5 mm | 17.5 mm |
| Mounting | Quick fastening with two lock-in positions on EN 50022 | |
| Degree of protection, built-in | IP40 | IP40 |
| Terminal protection | Finger and hand touch safe according to BGV A3, ÖVE-EN 6 | |
| Terminals | Open mouthed/lift | Open mouthed/lift |
| Terminal capacity One and two wires | 18–10 AWG | 18–10 AWG |

Busbar block UL 489 (pin)

- Tested according to UL 489
- Do not cut
- Extension terminal 35 mm² Z-EK/35/UL for copper conductors
- Incoming terminal 50 mm² Z-EB/50/UL
- For covering of not used pins, use busbar tag shrouds ZV-BS-UL

Connection Diagrams



Busbar Block UL 489 (Pin)

| Description | UL 489 | IEC/EN 60947-2 |
|---|-----------------------|---------------------------|
| Electrical | | |
| Rated operational voltage | 480/277 Vac 96 Vdc | — |
| Rated frequency | 50/60 Hz | — |
| Rated voltage | 480 Vac | 690 Vac |
| Overtoltage category | — | III |
| Rated impulse withstand voltage U_{imp} | — | 9.5 kV |
| Rated current | 80A at 40°C | 80A at 30°C |
| Rated conditional short-circuit current AC with 350A gG | — | 15 kA |
| Short-circuit current | 10 kA | — |
| Mechanical | | |
| Busbar cross section | — | 16 mm ² Cu |
| Flame class according to UL 94 | V0 | — |
| Pollution degree | — | 2 |
| Comparative tracking index | — | CTI 600 |
| Minimum clearance (internal/external) | — | > 9.5/25.4 mm |
| Minimum creepage distance (internal/external) | — | > 12.7/50.8 mm |
| Resistance to climatic conditions | — | According to DIN/EN 60068 |

1

Technical Data and Specifications

Trip Curve Chart

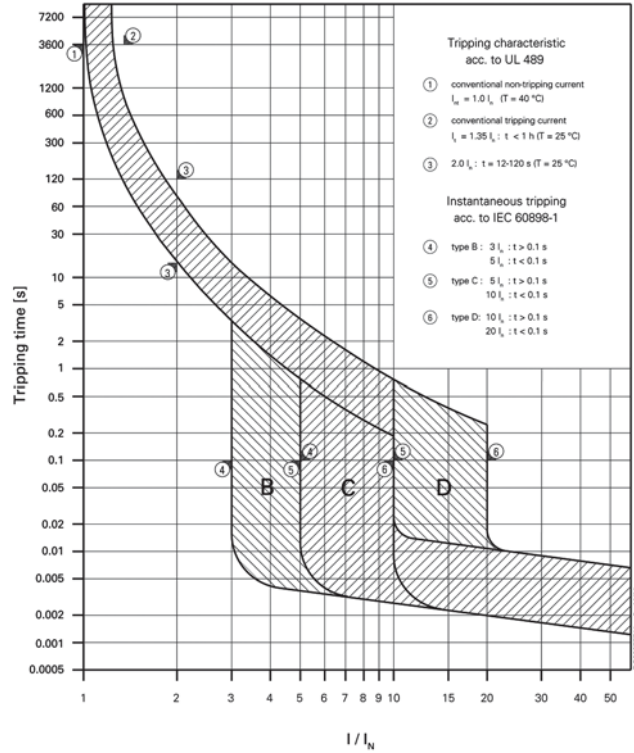
Eaton FAZ-NA and FAZ-NA-L branch circuit breakers are available with "B," "C" and "D" tripping characteristics. B-curve devices are suitable for applications where low levels of inrush current are expected.

C-curve devices are suitable for applications where medium levels of inrush current are expected. Applications include small transformers, lighting, pilot devices, control circuits and coils. C-curve devices provide a medium magnetic trip point.

D-curve devices are suitable for applications where high levels of inrush current are expected. The high magnetic trip point prevents nuisance tripping in high inductive applications such as motors, transformers and power supplies.

Eaton FAZ-NA and FAZ-NA-L devices are current limiting, which means they interrupt fault currents within one half cycle of the fault. Current limiting devices offer superior protection by reducing peak let-through current and energy.

Tripping Characteristics

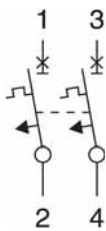


Connection Diagrams

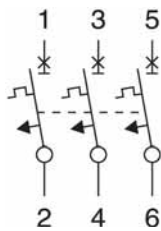
Single-Pole



Two-Pole



Three-Pole



UL 489 Miniature Circuit Breakers Technical Data

| Description | FAZ-NA | FAZ-NA-DC | FAZ-NA-L |
|-----------------------------|--|--|--|
| Electrical | | | |
| Design according to | UL 489, CSA C22.2 No.5, IEC 60947-2 | UL 489, CSA C22.2 No.5, IEC 60947-2 | UL 489, CSA C22.2 No.5, IEC 60947-2 |
| Rated voltage | Single-pole: 277 Vac 2-, 3- or 4-pole: 277/480 Vac | 125 Vdc per pole 250 Vdc with 2-poles in connected series | Single-pole: 240 Vac 2-, 3- or 4-pole: 240 Vac |
| | Single-pole: 48 Vdc per pole 2-pole in series: 96 Vdc | — | Single-pole: 48 Vdc per pole 2-pole in series: 96 Vdc |
| Rated current | B: 1–32 A C & D: 0.5–32 A | C: 2–40 A | B: 1–63 A C: 0.5–63 A D: 0.5–40 A |
| Characteristic | B, C, D | C | B, C, D |
| Current interrupting rating | B curve—10 kA: 1–13 A, 30–32 A C curve—10 kA: 0.5–13 A, 30–32 A B & C curve—14 kA: 15–25 A D curve—10 kA: 0.5–10 A, 25–32 A D curve—14 kA: 13–20 A | 10 kA | B curve—10 kA: 1–13 A, 30–32 A C curve—10 kA: 0.5–13 A, 30–32 A B & C curve—14 kA: 15–25 A D curve—10 kA: 0.5–10 A, 25–32 A D curve—14 kA: 13–20 A |
| Rated frequency | 50/60 Hz | 50/60 Hz | 50/60 Hz |
| Endurance | ≥ 20,000 operations | ≥ 20,000 operations | ≥ 20,000 operations |
| Line voltage connection | Suitable for reverse feed | Suitable for reverse feed | Suitable for reverse feed |
| Mechanical | | | |
| Frame size | 45 mm | 45 mm | 45 mm |
| Device height | 105 mm | 105 mm | 105 mm |
| Device width | 17.7 mm per pole | 17.7 mm per pole | 17.7 mm per pole |
| Terminal protection | Finger and hand touch safe according to BGV A3, OVE-EN 6 | Finger and hand touch safe according to BGV A3, OVE-EN 6 | Finger and hand touch safe according to BGV A3, OVE-EN 6 |
| Mounting | Quick fastening with two lock-in positions on IEC/EN 60715 | Quick fastening with two lock-in positions on IEC/EN 60715 | Quick fastening with two lock-in positions on IEC/EN 60715 |
| Upper and lower terminals | Open mouth/lift terminals | Open mouth/lift terminals | Open mouth/lift terminals |
| Terminal capacity | One wire: AWG 18–6 Two wires: AWG 18–10 | One wire: AWG 18–6 Two wires: AWG 18–10 | One wire: AWG 18–6 Two wires: AWG 18–10 |
| Terminal fastening torque | AWG 18–21: 21 lb-in AWG 10–8: 25 lb-in AWG 6: 36 lb-in | AWG 18–21: 21 lb-in AWG 10–8: 25 lb-in AWG 6: 36 lb-in | AWG 18–21: 21 lb-in AWG 10–8: 25 lb-in AWG 6: 36 lb-in |
| Mounting | Independent of position | Independent of position | Independent of position |
| Calibration temperature | | | |
| UL 489, CSA C22.2 No.5 | 40°C | 40°C | 40°C |
| IEC 60947-2 | 30°C | 30°C | 30°C |

1.2

Miniature Circuit Breakers and Supplementary Protectors

UL 489 DIN Rail Miniature Circuit Breakers

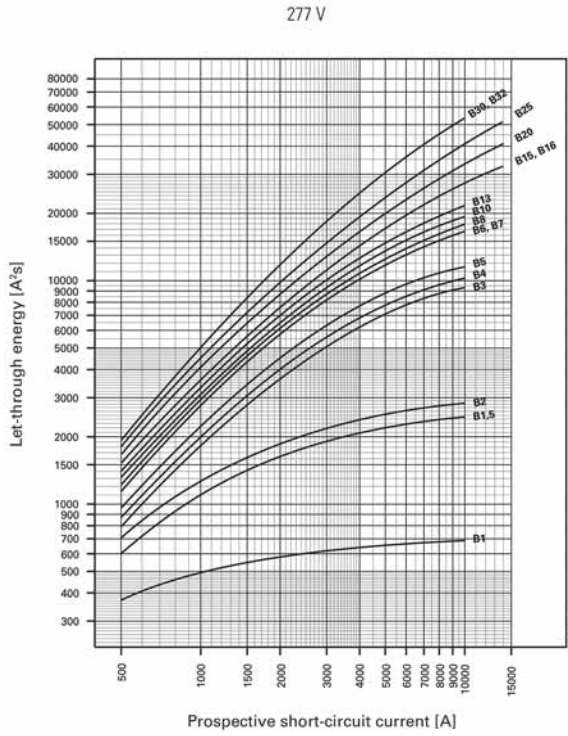
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Power Loss at I_n

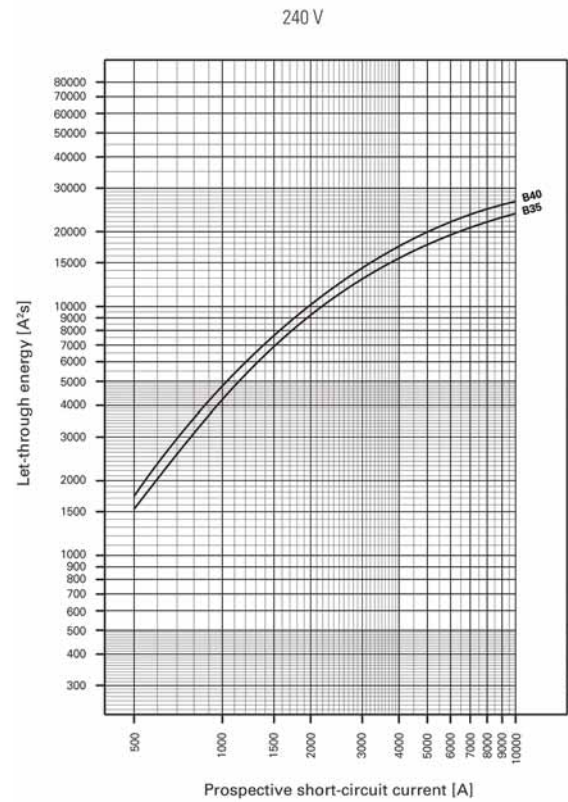
| I_n [A] | Characteristic B | | | Characteristic C | | | Characteristic D | | |
|-----------|----------------------|-------------------|---------------------|----------------------|-------------------|---------------------|----------------------|-------------------|---------------------|
| | Single-Pole P [W] | Two-Pole P [W] | Three-Pole P [W] | Single-Pole P [W] | Two-Pole P [W] | Three-Pole P [W] | Single-Pole P [W] | Two-Pole P [W] | Three-Pole P [W] |
| 0.5 | — | — | — | 1.6 | 3.2 | 4.7 | 1.6 | 3.2 | 4.8 |
| 1.0 | 1.1 | 2.2 | 3.4 | 1.1 | 2.2 | 3.4 | 0.8 | 1.5 | 2.3 |
| 1.5 | 2.2 | 4.4 | 6.6 | 1.3 | 2.6 | 3.9 | 1.0 | 2.1 | 3.1 |
| 2.0 | 1.4 | 2.8 | 4.3 | 1.4 | 2.8 | 4.3 | 1.0 | 2.1 | 3.1 |
| 3.0 | 2.1 | 4.2 | 6.4 | 1.2 | 2.4 | 3.6 | 1.2 | 2.4 | 3.6 |
| 4.0 | 1.4 | 2.9 | 4.3 | 1.4 | 2.9 | 4.3 | 1.4 | 2.9 | 4.3 |
| 5.0 | 1.8 | 3.7 | 5.5 | 1.9 | 3.7 | 5.6 | 1.5 | 2.9 | 4.4 |
| 6.0 | 1.7 | 3.5 | 5.2 | 1.2 | 2.3 | 3.5 | 1.2 | 2.3 | 3.5 |
| 7.0 | 2.0 | 4.0 | 6.0 | 1.4 | 2.8 | 4.3 | 1.4 | 2.8 | 4.3 |
| 8.0 | 2.0 | 3.9 | 5.9 | 1.4 | 2.8 | 4.2 | 1.2 | 2.4 | 3.7 |
| 10.0 | 1.8 | 3.6 | 5.3 | 1.8 | 3.6 | 5.3 | 1.5 | 3.0 | 4.5 |
| 13.0 | 2.4 | 4.7 | 7.1 | 2.4 | 4.7 | 7.1 | 2.0 | 4.1 | 6.1 |
| 15.0 | 1.9 | 3.8 | 5.6 | 1.9 | 3.8 | 5.6 | 1.5 | 3.1 | 4.6 |
| 16.0 | 2.1 | 4.3 | 6.4 | 2.1 | 4.3 | 6.4 | 1.7 | 3.5 | 5.2 |
| 20.0 | 2.9 | 5.8 | 8.7 | 2.9 | 5.8 | 8.7 | 1.8 | 3.7 | 5.5 |
| 25.0 | 3.1 | 6.2 | 9.3 | 3.1 | 6.2 | 9.3 | 2.6 | 5.1 | 7.7 |
| 30.0 | 3.0 | 6.0 | 9.0 | 3.0 | 6.0 | 9.0 | 2.7 | 5.4 | 8.1 |
| 32.0 | 3.4 | 6.8 | 10.2 | 3.4 | 6.8 | 10.2 | 3.1 | 6.2 | 9.3 |
| 35.0 | 4.0 | 8.1 | 12.1 | 3.7 | 7.4 | 11.0 | 3.8 | 7.6 | 11.3 |
| 40.0 | 4.0 | 8.1 | 12.1 | 4.0 | 8.1 | 12.1 | 3.9 | 7.8 | 11.6 |

Let-Through Energy

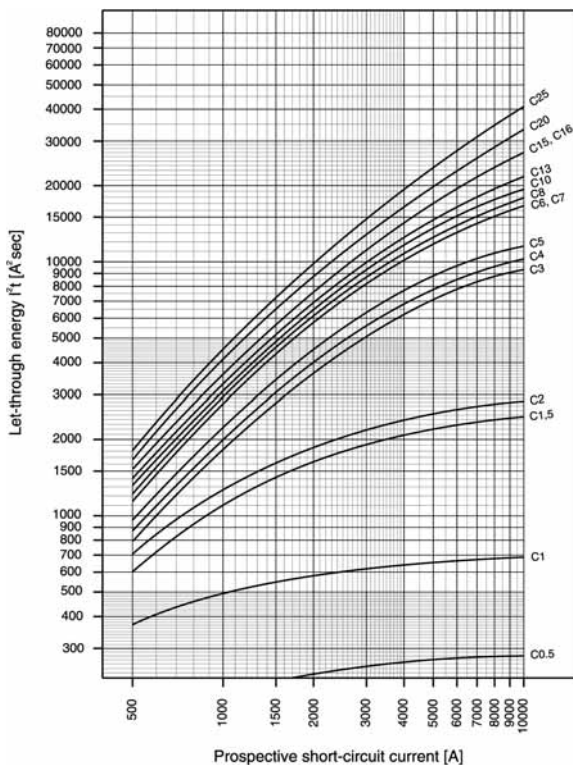
Characteristic B (1–32A), 277V



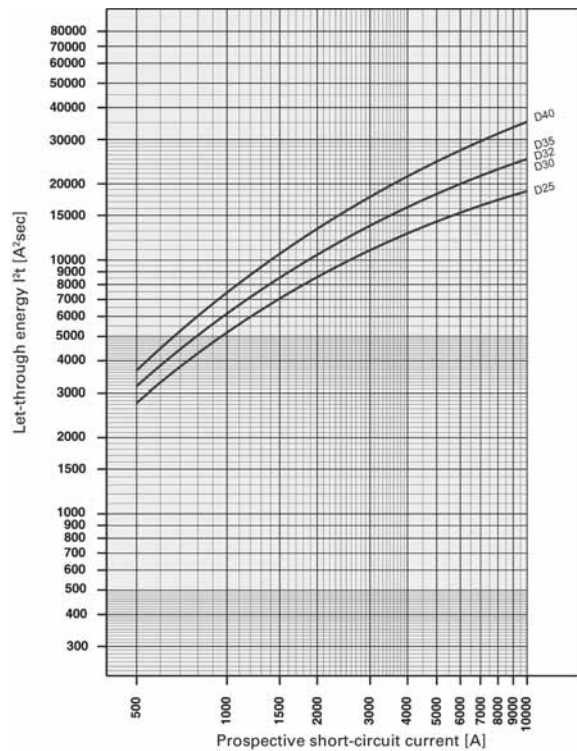
Characteristic B (35–63A), 240V



Characteristic C (0.5–32A), 277V



Characteristic C (35–63A), 240V



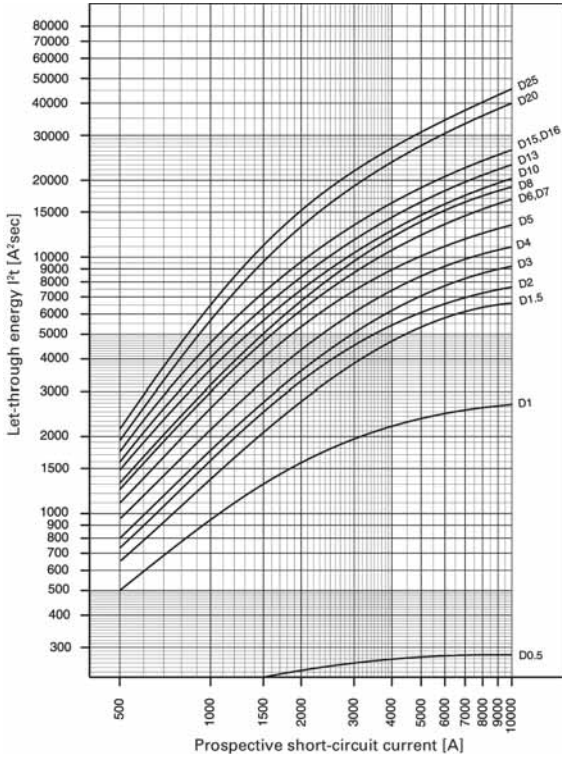
1.2

Miniature Circuit Breakers and Supplementary Protectors

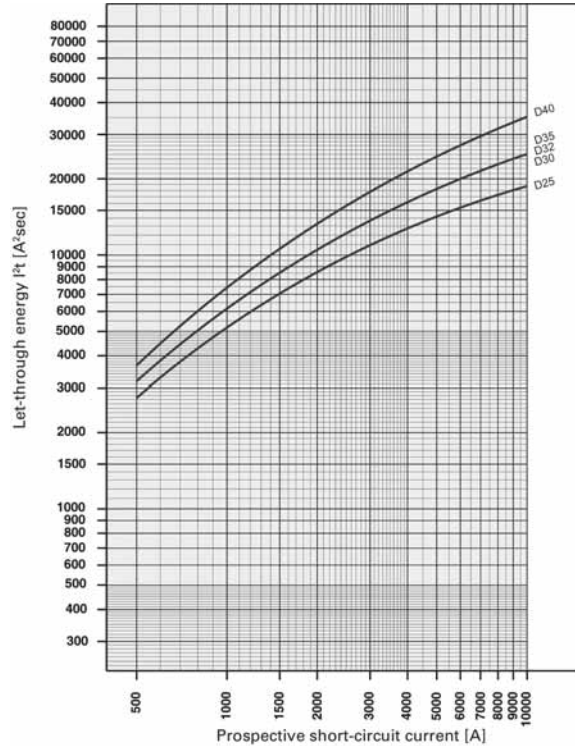
UL 489 DIN Rail Miniature Circuit Breakers

1

Characteristic D (0.5–32A), 277V

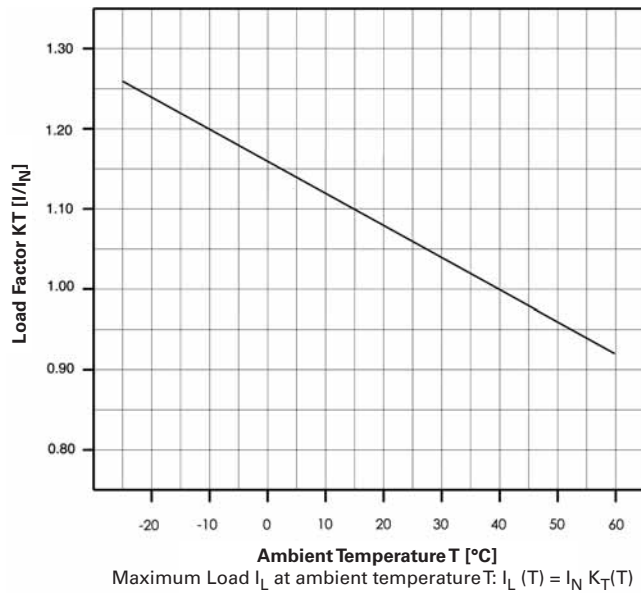


Characteristic D (35–63A), 240V

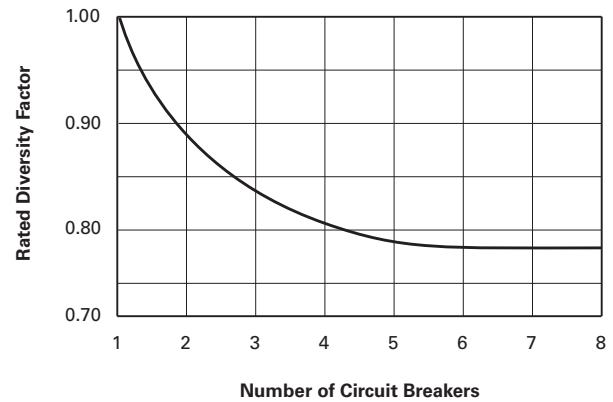


Influence of Ambient Temperature T on Load Carrying Capacity

| Device Market Current Rating I_n (A) at 40°C | I_n (A) at Higher Ambient Temperature | | | | | | | |
|--|---|------|------|------|------|------|------|------|
| | 15°C | 20°C | 25°C | 30°C | 40°C | 50°C | 55°C | 60°C |
| 0.5 | 0.6 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 |
| 1.0 | 1.1 | 1.1 | 1.1 | 1.0 | 1.0 | 1.0 | 0.9 | 0.9 |
| 1.5 | 1.7 | 1.6 | 1.6 | 1.6 | 1.5 | 1.4 | 1.4 | 1.4 |
| 2.0 | 2.2 | 2.2 | 2.1 | 2.1 | 2.0 | 1.9 | 1.9 | 1.8 |
| 3.0 | 3.3 | 3.2 | 3.2 | 3.1 | 3.0 | 2.9 | 2.9 | 2.8 |
| 4.0 | 4.4 | 4.3 | 4.2 | 4.2 | 4.0 | 3.8 | 3.8 | 3.7 |
| 5.0 | 5.5 | 5.4 | 5.3 | 5.2 | 5.0 | 4.8 | 4.7 | 4.6 |
| 6.0 | 6.6 | 6.5 | 6.4 | 6.2 | 6.0 | 5.8 | 5.6 | 5.5 |
| 7.0 | 7.7 | 7.6 | 7.4 | 7.3 | 7.0 | 6.7 | 6.6 | 6.4 |
| 8.0 | 8.8 | 8.6 | 8.5 | 8.3 | 8.0 | 7.7 | 7.5 | 7.4 |
| 10.0 | 11.0 | 10.8 | 10.6 | 10.4 | 10.0 | 9.6 | 9.4 | 9.2 |
| 13.0 | 14.3 | 14.0 | 13.8 | 13.5 | 13.0 | 12.5 | 12.5 | 12.0 |
| 15.0 | 16.5 | 16.2 | 15.9 | 15.6 | 15.0 | 14.4 | 14.1 | 13.8 |
| 16.0 | 17.6 | 17.3 | 17.0 | 16.6 | 16.0 | 15.4 | 15.0 | 14.7 |
| 20.0 | 22.0 | 21.6 | 21.2 | 20.8 | 20.0 | 19.2 | 18.8 | 18.4 |
| 25.0 | 27.5 | 27.0 | 26.5 | 26.0 | 25.0 | 24.0 | 23.3 | 23.0 |
| 30.0 | 33.0 | 32.4 | 31.8 | 31.2 | 30.0 | 28.8 | 28.2 | 27.6 |
| 32.0 | 35.2 | 34.6 | 33.9 | 33.3 | 32.0 | 30.7 | 30.1 | 29.4 |
| 40.0 | 44.0 | 43.2 | 42.4 | 41.6 | 40.0 | 38.4 | 37.6 | 36.8 |



Load Carrying Capacity of Adjoining Miniature Circuit Breakers



1.2

Miniature Circuit Breakers and Supplementary Protectors

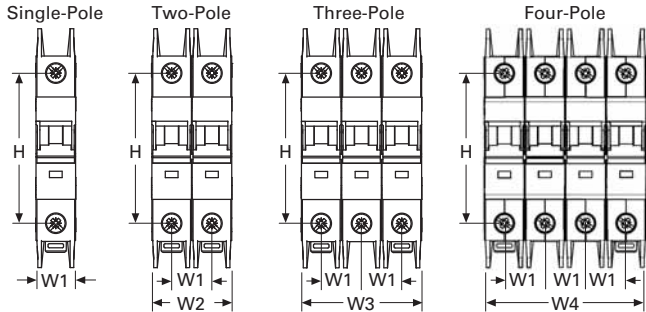
UL 489 DIN Rail Miniature Circuit Breakers

1

Dimensions

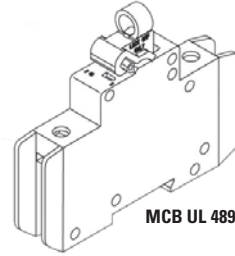
Approximate Dimensions in Inches (mm)

Miniature Circuit Breakers

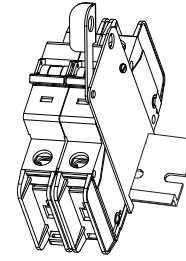


| H | W1 | W2 | W3 | W4 |
|-----------------|----------------|----------------|----------------|----------------|
| 4.13 (105.0) | 0.70 (17.7) | 1.39 (35.3) | 2.09 (53.1) | 2.79 (70.8) |

Lockout Attachment—Z-IS/SPE-1TE

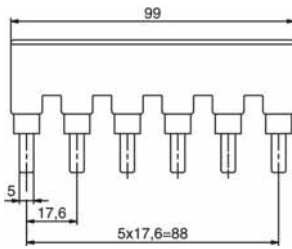


UL Lockoff Device—FAZPLOFF

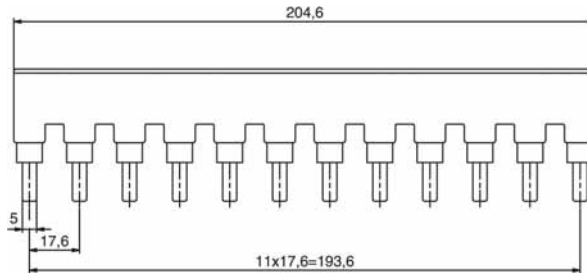


Accessories

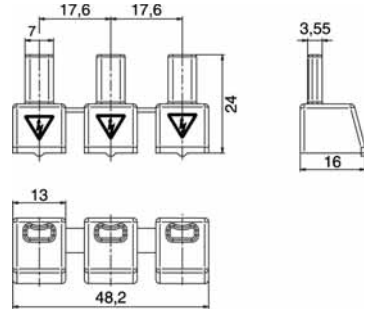
Z-SV/UL-16/6



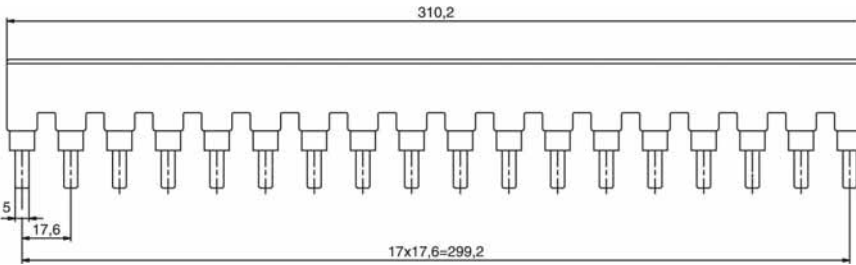
Z-SV/UL-18...12



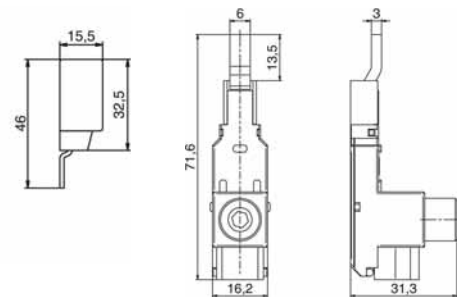
ZV-BS-UL



Z-SV/UL-16.../18



Z-EK/35/UL



Z-EK/35/UL

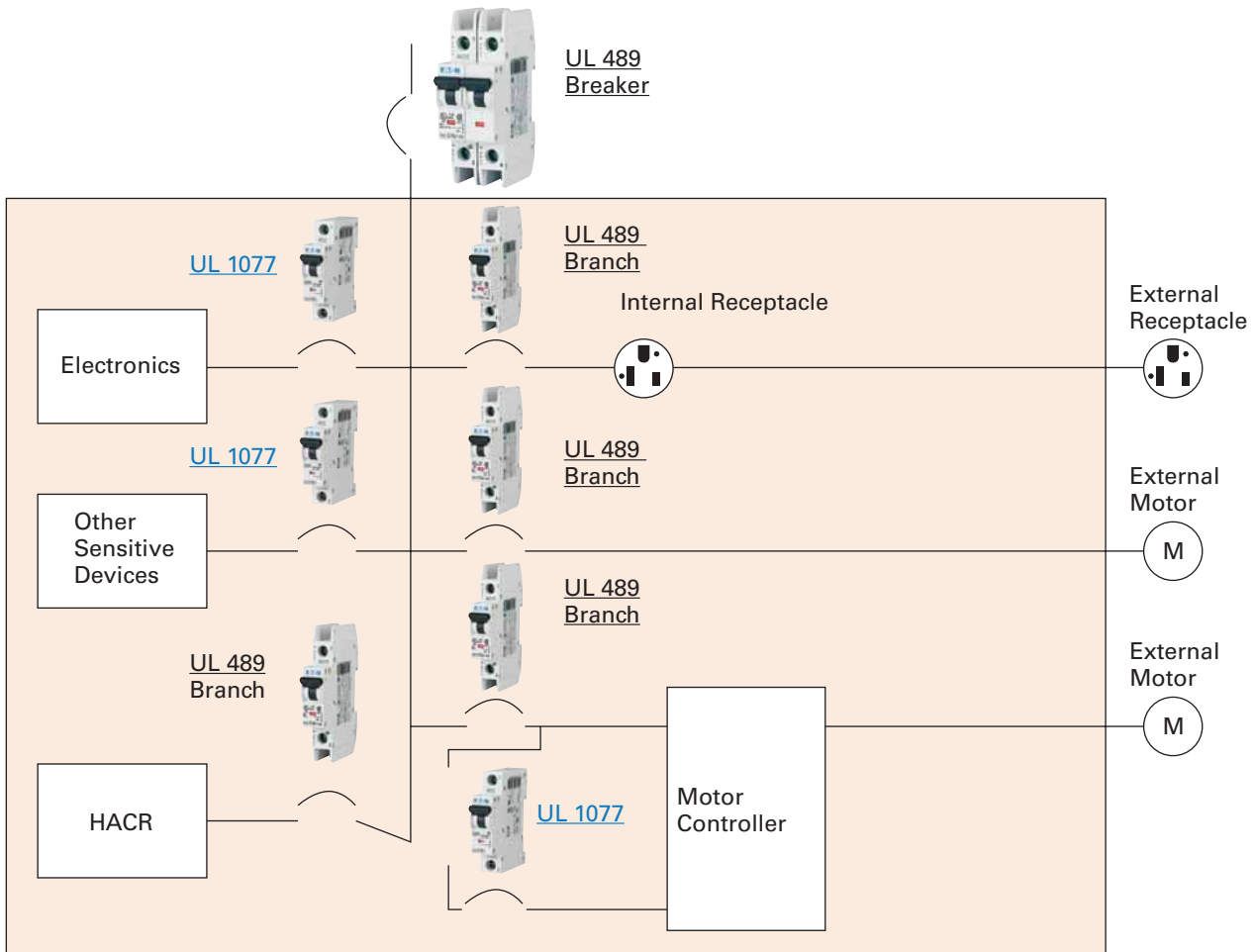
| Description | UL 489 | IEC/EN 60947-2 |
|-------------|-----------------------|---------------------------|
| U_e | 480 Vac/96 Vdc | 240/415 Vac |
| f | 50/60 Hz | 50/60 Hz |
| U_{imp} | — | 9.5 kV |
| I_e | 80A at 40°C | 80A at 30°C |
| | 10–1/0 AWG 60/75°C Cu | 2.5–35 mm ² Cu |
| | 0.56 in | 14 mm |

Z-EB/50/UL

| Description | UL 489 | IEC/EN 60947-2 |
|-------------|----------------------|---------------------------|
| U_e | 480 Vac/96 Vdc | 240/415 Vac |
| f | 50/60 Hz | 50/60 Hz |
| U_{imp} | — | 9.5 kV |
| I_e | 115A at 40°C | 160A at 30°C |
| | #1–14 AWG 60/75°C Cu | 1.5–50 mm ² Cu |
| | 0.56 in | 14 mm |

Application Guidelines

Example of UL 489 and UL 1077 Application



Example of UL 489 and UL 1077 Application

UL 489 circuit breakers

Used for branch circuit protection, internal/external receptacles, external motors and HACR equipment (heating, air conditioning and refrigeration).

UL 1077 supplementary protectors

Used for overcurrent protection within appliances or electrical equipment, where branch circuit protection is already provided or not required.

Note: UL 489 devices can be used in place of UL 1077; UL 1077 devices cannot be used in place of UL 489.

FAZ Circuit Breakers



Optimum and Efficient Protection for Every Application

Contents

Description

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| FAZ Circuit Breakers | V4-T1-74 |
| Catalog Number Selection | V4-T1-75 |
| Standards and Certifications | V4-T1-75 |
| Product Selection | V4-T1-76 |
| Accessories | V4-T1-82 |
| Technical Data and Specifications | V4-T1-85 |
| Dimensions | V4-T1-92 |

FAZ Circuit Breakers

Product Overview

Optimum product quality, tested reliability and safety stand for best protection of personnel, installations and plant. Eaton’s FAZ DIN rail mountable circuit breaker is designed for use in control panel applications.

Powerful offering for machine and system builders

The FAZ is available with B, C, D, K, S, and Z characteristics in accordance with UL 1077, CSA C22.2 No.235 and IEC 60947-2. These devices are CE marked.

Application Description

- Supplementary protection
- Control circuits
- Lighting
- Business equipment
- Appliances

Features

- Complete range of UL 1077 recognized DIN rail mounted miniature circuit breakers up to 63A current rating
- Standard ratings of 10 kAIC up to 277/480 Vac
- Current limiting design provides fast short-circuit interruption that reduces the let-through energy, which can damage the circuit
- Suitable for supplementary protection
- Thermal-magnetic overcurrent protection
 - Six levels of short-circuit protection, categorized by B, C, D, K, S, and Z curves
- Trip-free design—breaker can not be defeated by holding the handle in the ON position
- Captive screws cannot be lost
- Fulfill UL 1077, CSA C22.2 No.235 and also IEC 60947-2 Standard
- Field-installable shunt trip and auxiliary switch subsequent mounting
- Module width of only 17.7 mm (per pole)
- Contact position indicator (red/green)
- Easy installation on DIN rail
- Possibility for sealing the toggle in ON or OFF position

Discover These Advanced Features

Breakers install on standard DIN rail

Available in one-, two-, three-, four-pole, 1+N and 3+N models

Color-coded indicator provides breaker status for easy troubleshooting



Captive Posidrive terminal screws with finger and back-of-hand protection (IP20)

Trip-free design; breaker cannot be defeated by holding the handle in the ON position

Breaker information printed on the front of the device for quick identification

Standards and Certifications

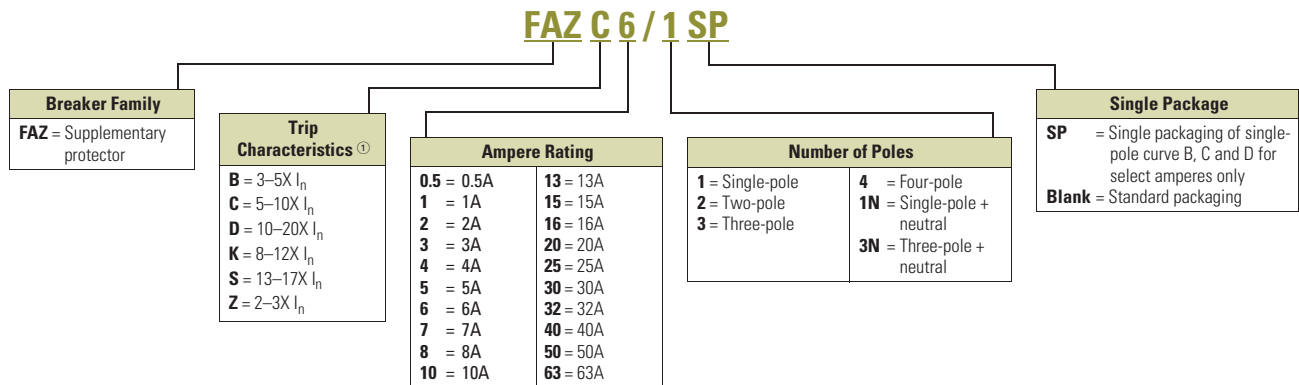
FAZ complies with the latest national and international standards.

- UL 1077, CSA C22.2 No. 235
- Apply to supplementary protectors intended for use as overcurrent, or overvoltage or undervoltage protection within an appliance or other electrical equipment where branch circuit protection is already provided, or is not required

- RoHS compliant
- VDE compliant
 - Devices with B, C, and D curves are VDE compliant
- CCC
 - Devices with B, C, and D curves are CCC compliant
- ABS compliant



Catalog Number Selection



Note

① I_n = Rated current for instantaneous trip characteristics.

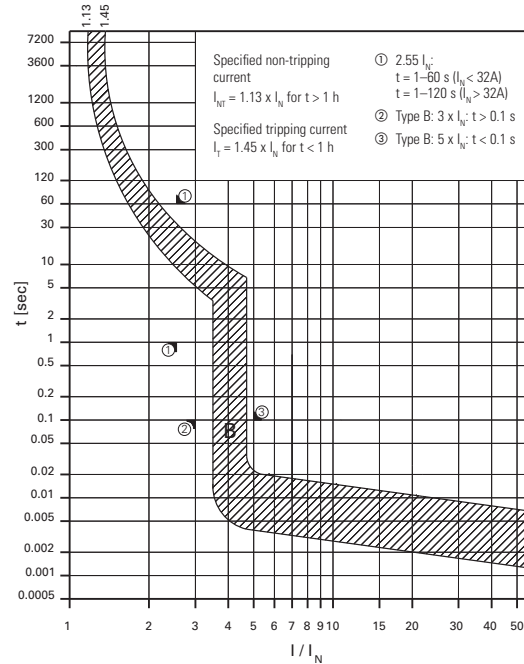
1

Product Selection

FAZ B curve (3–5X I_n current rating)

- Designed for resistive or slightly inductive loads
- Response time of instantaneous trip: 3–5X I_n current rating
- UL recognized and CSA Certified as supplementary protectors
- For international and domestic use (conform to IEC 60947-2)
- UL file number 177451

Suitable for applications where protection against low-level short-circuit faults in control wiring is desired. Instantaneous trip is 3–5X continuous rating of device (I_n). Applications include PLC wiring, business equipment, lighting, appliances and some motors. Low magnetic trip point.



Single-Pole



Two-Pole



Three-Pole



B Curve (3–5X I_n Current Rating)— Designed for Resistive or Slightly Inductive Loads ①

| Amperes | Single-Pole ② Catalog Number | Two-Pole Catalog Number | Three-Pole Catalog Number |
|---------|------------------------------------|-------------------------------|---------------------------------|
| 1 | FAZ-B1/1-SP | FAZ-B1/2 | FAZ-B1/3 |
| 2 | FAZ-B2/1-SP | FAZ-B2/2 | FAZ-B2/3 |
| 3 | FAZ-B3/1-SP | FAZ-B3/2 | FAZ-B3/3 |
| 4 | FAZ-B4/1-SP | FAZ-B4/2 | FAZ-B4/3 |
| 5 | FAZ-B5/1-SP | FAZ-B5/2 | FAZ-B5/3 |
| 6 | FAZ-B6/1-SP | FAZ-B6/2 | FAZ-B6/3 |
| 7 | FAZ-B7/1-SP | FAZ-B7/2 | FAZ-B7/3 |
| 8 | FAZ-B8/1-SP | FAZ-B8/2 | FAZ-B8/3 |
| 10 | FAZ-B10/1-SP | FAZ-B10/2 | FAZ-B10/3 |
| 12 | FAZ-B12/1-SP | FAZ-B12/2 | FAZ-B12/3 |
| 13 | FAZ-B13/1-SP | FAZ-B13/2 | FAZ-B13/3 |
| 15 | FAZ-B15/1-SP | FAZ-B15/2 | FAZ-B15/3 |
| 16 | FAZ-B16/1-SP | FAZ-B16/2 | FAZ-B16/3 |
| 20 | FAZ-B20/1-SP | FAZ-B20/2 | FAZ-B20/3 |
| 25 | FAZ-B25/1-SP | FAZ-B25/2 | FAZ-B25/3 |
| 30 | FAZ-B30/1-SP | FAZ-B30/2 | FAZ-B30/3 |
| 32 | FAZ-B32/1-SP | FAZ-B32/2 | FAZ-B32/3 |
| 40 | FAZ-B40/1-SP | FAZ-B40/2 | FAZ-B40/3 |
| 50 | FAZ-B50/1-SP | FAZ-B50/2 | FAZ-B50/3 |
| 63 | FAZ-B63/1-SP | FAZ-B63/2 | FAZ-B63/3 |

Notes

- ① In North America, these switches are UL recognized and CSA Certified as supplementary protection devices. Per the intent of NEC (National Electrical Code), Article 240, and CEC (Canadian Electrical Code), Part 1 C22.1, supplementary breakers cannot be used as a substitute for the branch circuit protective device. They can be used to provide overcurrent protection within an appliance or other electrical equipment where branch circuit overcurrent protection is already provided, or is not required.
- ② Option for single packaging on single-pole B, C and D curves only; add suffix SP when ordering.

Four-Pole



Single-Pole + Neutral



Three-Pole + Neutral



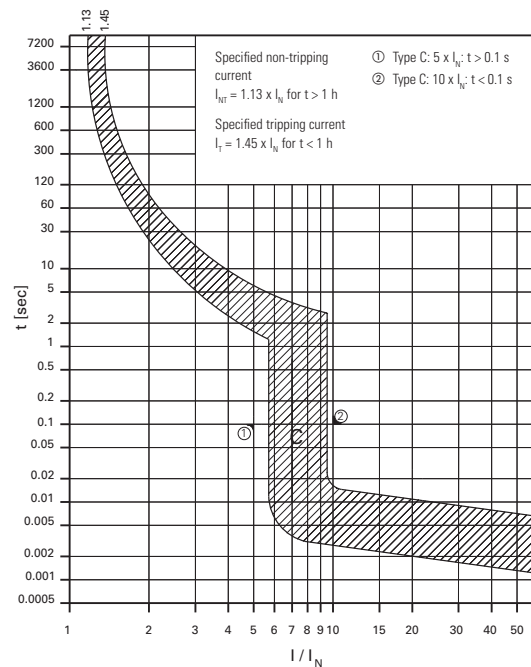
B Curve (3–5X I_n Current Rating)— Designed for Resistive or Slightly Inductive Loads, continued ①

| Amperes | Four-Pole Catalog Number | Single-Pole + Neutral Catalog Number | Three-Pole + Neutral Catalog Number |
|---------|--------------------------------|---|--|
| 1 | FAZ-B1/4 | FAZ-B1/1N | FAZ-B1/3N |
| 2 | FAZ-B2/4 | FAZ-B2/1N | FAZ-B2/3N |
| 3 | FAZ-B3/4 | FAZ-B3/1N | FAZ-B3/3N |
| 4 | FAZ-B4/4 | FAZ-B4/1N | FAZ-B4/3N |
| 5 | FAZ-B5/4 | FAZ-B5/1N | FAZ-B5/3N |
| 6 | FAZ-B6/4 | FAZ-B6/1N | FAZ-B6/3N |
| 7 | FAZ-B7/4 | FAZ-B7/1N | FAZ-B7/3N |
| 8 | FAZ-B8/4 | FAZ-B8/1N | FAZ-B8/3N |
| 10 | FAZ-B10/4 | FAZ-B10/1N | FAZ-B10/3N |
| 12 | FAZ-B12/4 | FAZ-B12/1N | FAZ-B12/3N |
| 13 | FAZ-B13/4 | FAZ-B13/1N | FAZ-B13/3N |
| 15 | FAZ-B15/4 | FAZ-B15/1N | FAZ-B15/3N |
| 16 | FAZ-B16/4 | FAZ-B16/1N | FAZ-B16/3N |
| 20 | FAZ-B20/4 | FAZ-B20/1N | FAZ-B20/3N |
| 25 | FAZ-B25/4 | FAZ-B25/1N | FAZ-B25/3N |
| 30 | FAZ-B30/4 | FAZ-B30/1N | FAZ-B30/3N |
| 32 | FAZ-B32/4 | FAZ-B32/1N | FAZ-B32/3N |
| 40 | FAZ-B40/4 | FAZ-B40/1N | FAZ-B40/3N |
| 50 | FAZ-B50/4 | FAZ-B50/1N | FAZ-B50/3N |
| 63 | FAZ-B63/4 | FAZ-B63/1N | FAZ-B63/3N |

FAZ C curve (5–10X I_n current rating)

- Designed for inductive loads
- Response time of instantaneous trip: 5–10X I_n current rating
- UL recognized and CSA Certified as supplementary protectors
- For international and domestic use (conform to IEC 60947-2)
- UL file number 177451

Suitable for applications where medium levels of inrush current are expected. Instantaneous trip is 5–10X rating of device (I_n). Applications include small transformers, lighting, pilot devices, control circuits and coils. Medium magnetic trip point.



Single-Pole



Two-Pole



Three-Pole



C Curve (5–10X I_n Current Rating) – Designed Inductive Loads ①

| Amperes | Single-Pole ② Catalog Number | Two-Pole Catalog Number | Three-Pole Catalog Number |
|---------|---------------------------------|----------------------------|------------------------------|
| 0.5 | FAZ-C0.5/1-SP | FAZ-C0.5/2 | FAZ-C0.5/3 |
| 1 | FAZ-C1/1-SP | FAZ-C1/2 | FAZ-C1/3 |
| 1.6 | FAZ-C1.6/1-SP | FAZ-C1.6/2 | FAZ-C1.6/3 |
| 2 | FAZ-C2/1-SP | FAZ-C2/2 | FAZ-C2/3 |
| 3 | FAZ-C3/1-SP | FAZ-C3/2 | FAZ-C3/3 |
| 4 | FAZ-C4/1-SP | FAZ-C4/2 | FAZ-C4/3 |
| 5 | FAZ-C5/1-SP | FAZ-C5/2 | FAZ-C5/3 |
| 6 | FAZ-C6/1-SP | FAZ-C6/2 | FAZ-C6/3 |
| 7 | FAZ-C7/1-SP | FAZ-C7/2 | FAZ-C7/3 |
| 8 | FAZ-C8/1-SP | FAZ-C8/2 | FAZ-C8/3 |
| 10 | FAZ-C10/1-SP | FAZ-C10/2 | FAZ-C10/3 |
| 13 | FAZ-C13/1-SP | FAZ-C13/2 | FAZ-C13/3 |
| 15 | FAZ-C15/1-SP | FAZ-C15/2 | FAZ-C15/3 |
| 16 | FAZ-C16/1-SP | FAZ-C16/2 | FAZ-C16/3 |
| 20 | FAZ-C20/1-SP | FAZ-C20/2 | FAZ-C20/3 |
| 25 | FAZ-C25/1-SP | FAZ-C25/2 | FAZ-C25/3 |
| 30 | FAZ-C30/1-SP | FAZ-C30/2 | FAZ-C30/3 |
| 32 | FAZ-C32/1-SP | FAZ-C32/2 | FAZ-C32/3 |
| 40 | FAZ-C40/1-SP | FAZ-C40/2 | FAZ-C40/3 |
| 50 | FAZ-C50/1-SP | FAZ-C50/2 | FAZ-C50/3 |
| 63 | FAZ-C63/1-SP | FAZ-C63/2 | FAZ-C63/3 |

Notes

- ① In North America, these switches are UL recognized and CSA Certified as supplementary protection devices. Per the intent of NEC (National Electrical Code), Article 240, and CEC (Canadian Electrical Code), Part 1 C22.1, supplementary breakers cannot be used as a substitute for the branch circuit protective device. They can be used to provide overcurrent protection within an appliance or other electrical equipment where branch circuit overcurrent protection is already provided, or is not required.
- ② Option for single packaging on single-pole B, C and D curves only; add suffix SP when ordering.

Four-Pole



Single-Pole + Neutral



Three-Pole + Neutral



C Curve (5–10X I_n Current Rating) – Designed Inductive Loads, continued ①

| Amperes | Four-Pole Catalog Number | Single-Pole + Neutral Catalog Number | Three-Pole + Neutral Catalog Number |
|---------|-----------------------------|---|--|
| 0.5 | FAZ-C0.5/4 | FAZ-C0.5/1N | FAZ-C0.5/3N |
| 1 | FAZ-C1/4 | FAZ-C1/1N | FAZ-C1/3N |
| 1.6 | FAZ-C1.6/4 | FAZ-C1.6/1N | FAZ-C1.6/3N |
| 2 | FAZ-C2/4 | FAZ-C2/1N | FAZ-C2/3N |
| 3 | FAZ-C3/4 | FAZ-C3/1N | FAZ-C3/3N |
| 4 | FAZ-C4/4 | FAZ-C4/1N | FAZ-C4/3N |
| 5 | FAZ-C5/4 | FAZ-C5/1N | FAZ-C5/3N |
| 6 | FAZ-C6/4 | FAZ-C6/1N | FAZ-C6/3N |
| 7 | FAZ-C7/4 | FAZ-C7/1N | FAZ-C7/3N |
| 8 | FAZ-C8/4 | FAZ-C8/1N | FAZ-C8/3N |
| 10 | FAZ-C10/4 | FAZ-C10/1N | FAZ-C10/3N |
| 13 | FAZ-C13/4 | FAZ-C13/1N | FAZ-C13/3N |
| 15 | FAZ-C15/4 | FAZ-C15/1N | FAZ-C15/3N |
| 16 | FAZ-C16/4 | FAZ-C16/1N | FAZ-C16/3N |
| 20 | FAZ-C20/4 | FAZ-C20/1N | FAZ-C20/3N |
| 25 | FAZ-C25/4 | FAZ-C25/1N | FAZ-C25/3N |
| 32 | FAZ-C32/4 | FAZ-C32/1N | FAZ-C32/3N |
| 40 | FAZ-C40/4 | FAZ-C40/1N | FAZ-C40/3N |
| 50 | FAZ-C50/4 | FAZ-C50/1N | FAZ-C50/3N |
| 63 | FAZ-C63/4 | FAZ-C63/1N | FAZ-C63/3N |

1.3

Miniature Circuit Breakers and Supplementary Protectors

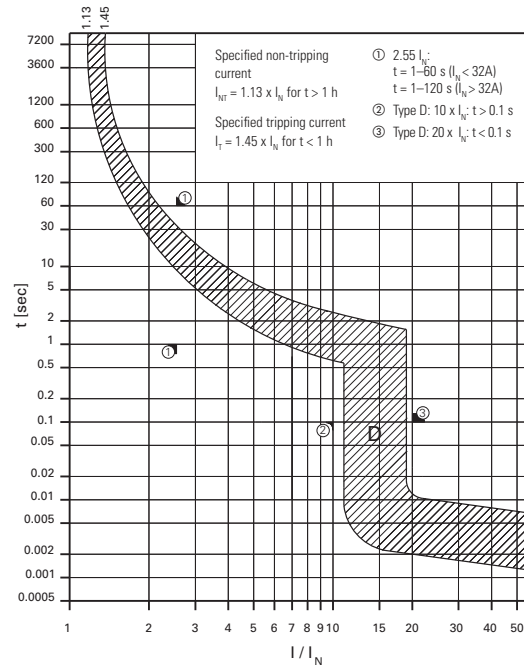
UL 1077 DIN Rail Supplementary Protectors

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FAZ D curve (10–20X I_n current rating)

- Designed for highly inductive loads
- Response time of instantaneous trip: 10–20X I_n current rating
- UL recognized and CSA Certified as supplementary protectors
- For international and domestic use (conform to IEC 60947-2)
- UL file number 177451

Suitable for applications where high levels of inrush current are expected. Instantaneous trip is 10–20X rating of device (I_n). The high magnetic trip point prevents nuisance tripping in high inductive applications such as motors, transformers and power supplies.



Single-Pole



Two-Pole



Three-Pole



D Curve (10–20X I_n Current Rating)— Designed for Inductive Loads ①

| Amperes | Single-Pole ② Catalog Number | Two-Pole Catalog Number | Three-Pole Catalog Number |
|---------|------------------------------------|-------------------------------|---------------------------------|
| 0.5 | FAZ-D0.5/1-SP | FAZ-D0.5/2 | FAZ-D0.5/3 |
| 1 | FAZ-D1/1-SP | FAZ-D1/2 | FAZ-D1/3 |
| 2 | FAZ-D2/1-SP | FAZ-D2/2 | FAZ-D2/3 |
| 3 | FAZ-D3/1-SP | FAZ-D3/2 | FAZ-D3/3 |
| 4 | FAZ-D4/1-SP | FAZ-D4/2 | FAZ-D4/3 |
| 5 | FAZ-D5/1-SP | FAZ-D5/2 | FAZ-D5/3 |
| 6 | FAZ-D6/1-SP | FAZ-D6/2 | FAZ-D6/3 |
| 7 | FAZ-D7/1-SP | FAZ-D7/2 | FAZ-D7/3 |
| 8 | FAZ-D8/1-SP | FAZ-D8/2 | FAZ-D8/3 |
| 10 | FAZ-D10/1-SP | FAZ-D10/2 | FAZ-D10/3 |
| 13 | FAZ-D13/1-SP | FAZ-D13/2 | FAZ-D13/3 |
| 15 | FAZ-D15/1-SP | FAZ-D15/2 | FAZ-D15/3 |
| 16 | FAZ-D16/1-SP | FAZ-D16/2 | FAZ-D16/3 |
| 20 | FAZ-D20/1-SP | FAZ-D20/2 | FAZ-D20/3 |
| 25 | FAZ-D25/1-SP | FAZ-D25/2 | FAZ-D25/3 |
| 30 | FAZ-D30/1-SP | FAZ-D30/2 | FAZ-D30/3 |
| 32 | FAZ-D32/1-SP | FAZ-D32/2 | FAZ-D32/3 |
| 40 | FAZ-D40/1-SP | FAZ-D40/2 | FAZ-D40/3 |
| 50 ③ | FAZ-D50/1-SP | FAZ-D50/2 | FAZ-D50/3 |
| 63 ③ | FAZ-D63/1-SP | FAZ-D63/2 | FAZ-D63/3 |

Notes

- ① In North America, these switches are UL recognized and CSA Certified as supplementary protection devices. Per the intent of NEC (National Electrical Code), Article 240, and CEC (Canadian Electrical Code), Part 1 C22.1, supplementary breakers cannot be used as a substitute for the branch circuit protective device. They can be used to provide overcurrent protection within an appliance or other electrical equipment where branch circuit overcurrent protection is already provided, or is not required.
- ② Option for single packaging on single-pole B, C and D curves only; add suffix SP when ordering.
- ③ IEC 60947-2 only.

Four-Pole



Single-Pole + Neutral



Three-Pole + Neutral



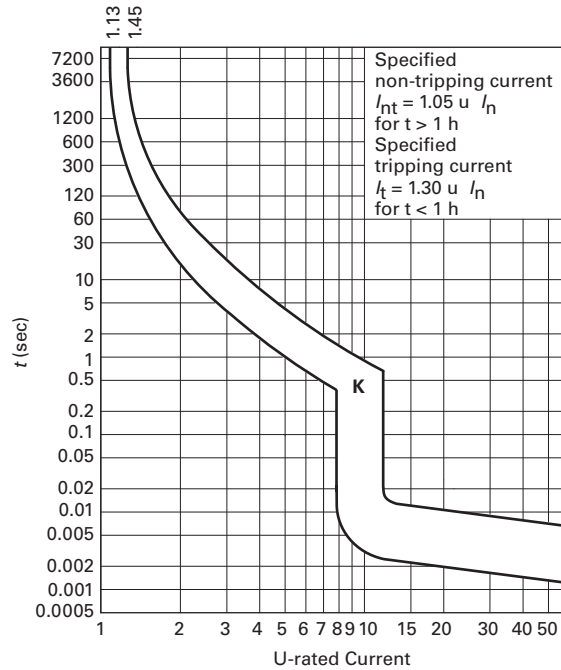
D Curve (10–20X I_n Current Rating)— Designed for Inductive Loads, continued ①

| Amperes | Four-Pole Catalog Number | Single-Pole + Neutral Catalog Number | Three-Pole + Neutral Catalog Number |
|---------|--------------------------------|---|--|
| 0.5 | FAZ-D0.5/4 | FAZ-D0.5/1N | FAZ-D0.5/3N |
| 1 | FAZ-D1/4 | FAZ-D1/1N | FAZ-D1/3N |
| 2 | FAZ-D2/4 | FAZ-D2/1N | FAZ-D2/3N |
| 3 | FAZ-D3/4 | FAZ-D3/1N | FAZ-D3/3N |
| 4 | FAZ-D4/4 | FAZ-D4/1N | FAZ-D4/3N |
| 5 | FAZ-D5/4 | FAZ-D5/1N | FAZ-D5/3N |
| 6 | FAZ-D6/4 | FAZ-D6/1N | FAZ-D6/3N |
| 7 | FAZ-D7/4 | FAZ-D7/1N | FAZ-D7/3N |
| 8 | FAZ-D8/4 | FAZ-D8/1N | FAZ-D8/3N |
| 10 | FAZ-D10/4 | FAZ-D10/1N | FAZ-D10/3N |
| 13 | FAZ-D13/4 | FAZ-D13/1N | FAZ-D13/3N |
| 15 | FAZ-D15/4 | FAZ-D15/1N | FAZ-D15/3N |
| 16 | FAZ-D16/4 | FAZ-D16/1N | FAZ-D16/3N |
| 20 | FAZ-D20/4 | FAZ-D20/1N | FAZ-D20/3N |
| 25 | FAZ-D25/4 | FAZ-D25/1N | FAZ-D25/3N |
| 30 | FAZ-D30/4 | FAZ-D30/1N | FAZ-D30/3N |
| 32 | FAZ-D32/4 | FAZ-D32/1N | FAZ-D32/3N |
| 40 | FAZ-D40/4 | FAZ-D40/1N | FAZ-D40/3N |
| 50 ③ | FAZ-D50/4 | FAZ-D50/1N | FAZ-D50/3N |
| 63 ③ | FAZ-D63/4 | FAZ-D63/1N | FAZ-D63/3N |

FAZ K curve (8–12X I_n current rating)

- Designed for motors, transformers and upstream electronics
- Response time of instantaneous trip: 8–12X I_n current rating
- UL recognized and CSA Certified as supplementary protectors
- For international and domestic use (conform to IEC 60947-2)
- UL file number 177451

Suitable for applications where medium levels of inrush current are expected. Instantaneous trip is 8–12X rating of device (I_n). Applications include small transformers, lighting, pilot devices, control circuits and coils. Medium magnetic trip point.



Single-Pole



Two-Pole



Three-Pole



K Curve (8–12X I_n Current Rating) – Designed for Inductive Loads ^{①②}

| Amperes | Single-Pole ^③ Catalog Number | Two-Pole Catalog Number | Three-Pole Catalog Number |
|---------|--|----------------------------|------------------------------|
| 0.5 | FAZ-K0.5/1 | FAZ-K0.5/2 | FAZ-K0.5/3 |
| 1 | FAZ-K1/1 | FAZ-K1/2 | FAZ-K1/3 |
| 1.6 | FAZ-K1.6/1 | FAZ-K1.6/2 | FAZ-K1.6/3 |
| 2 | FAZ-K2/1 | FAZ-K2/2 | FAZ-K2/3 |
| 3 | FAZ-K3/1 | FAZ-K3/2 | FAZ-K3/3 |
| 4 | FAZ-K4/1 | FAZ-K4/2 | FAZ-K4/3 |
| 6 | FAZ-K6/1 | FAZ-K6/2 | FAZ-K6/3 |
| 8 | FAZ-K8/1 | FAZ-K8/2 | FAZ-K8/3 |
| 10 | FAZ-K10/1 | FAZ-K10/2 | FAZ-K10/3 |
| 13 | FAZ-K13/1 | FAZ-K13/2 | FAZ-K13/3 |
| 16 | FAZ-K16/1 | FAZ-K16/2 | FAZ-K16/3 |
| 20 | FAZ-K20/1 | FAZ-K20/2 | FAZ-K20/3 |
| 25 | FAZ-K25/1 | FAZ-K25/2 | FAZ-K25/3 |
| 32 | FAZ-K32/1 | FAZ-K32/2 | FAZ-K32/3 |
| 40 | FAZ-K40/1 | FAZ-K40/2 | FAZ-K40/3 |
| 50 | FAZ-K50/1 | FAZ-K50/2 | FAZ-K50/3 |
| 63 | FAZ-K63/1 | FAZ-K63/2 | FAZ-K63/3 |

Four-Pole



Single-Pole + Neutral



Three-Pole + Neutral



K Curve (8–12X I_n Current Rating) – Designed for Inductive Loads, continued ^{①②}

| Amperes | Four-Pole ^③ Catalog Number | Single-Pole + Neutral Catalog Number | Three-Pole + Neutral Catalog Number |
|---------|--|---|--|
| 0.5 | FAZ-K0.5/4 | FAZ-K0.5/1N | FAZ-K0.5/3N |
| 1 | FAZ-K1/4 | FAZ-K1/1N | FAZ-K1/3N |
| 1.6 | FAZ-K1.6/4 | FAZ-K1.6/1N | FAZ-K1.6/3N |
| 2 | FAZ-K2/4 | FAZ-K2/1N | FAZ-K2/3N |
| 3 | FAZ-K3/4 | FAZ-K3/1N | FAZ-K3/3N |
| 4 | FAZ-K4/4 | FAZ-K4/1N | FAZ-K4/3N |
| 6 | FAZ-K6/4 | FAZ-K6/1N | FAZ-K6/3N |
| 8 | FAZ-K8/4 | FAZ-K8/1N | FAZ-K8/3N |
| 10 | FAZ-K10/4 | FAZ-K10/1N | FAZ-K10/3N |
| 13 | FAZ-K13/4 | FAZ-K13/1N | FAZ-K13/3N |
| 16 | FAZ-K16/4 | FAZ-K16/1N | FAZ-K16/3N |
| 20 | FAZ-K20/4 | FAZ-K20/1N | FAZ-K20/3N |
| 25 | FAZ-K25/4 | FAZ-K25/1N | FAZ-K25/3N |
| 32 | FAZ-K32/4 | FAZ-K32/1N | FAZ-K32/3N |
| 40 | FAZ-K40/4 | FAZ-K40/1N | FAZ-K40/3N |
| 50 | FAZ-K50/4 | FAZ-K50/1N | FAZ-K50/3N |
| 63 | FAZ-K63/4 | FAZ-K63/1N | FAZ-K63/3N |

Notes

- ① In North America, these switches are UL recognized and CSA Certified as supplementary protection devices. Per the intent of NEC (National Electrical Code), Article 240, and CEC (Canadian Electrical Code), Part 1 C22.1, supplementary breakers cannot be used as a substitute for the branch circuit protective device. They can be used to provide overcurrent protection within an appliance or other electrical equipment where branch circuit overcurrent protection is already provided, or is not required.
- ② These breakers are available by special order and may result in additional delivery time.
- ③ Two-piece box order, quantities of 2.

1.3

Miniature Circuit Breakers and Supplementary Protectors

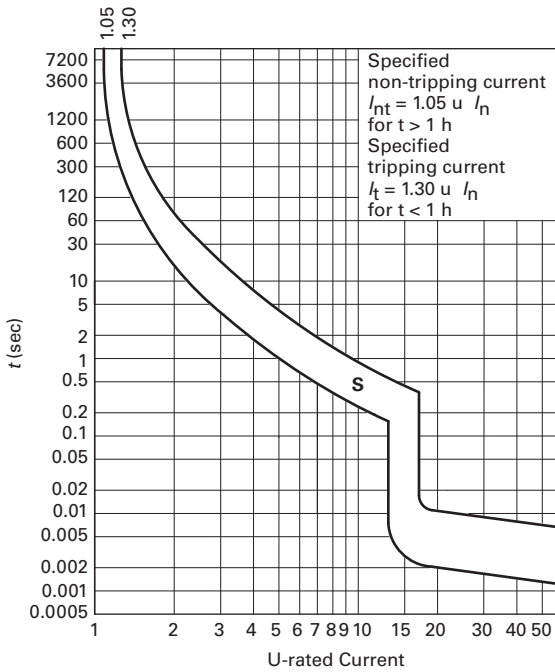
UL 1077 DIN Rail Supplementary Protectors

1

FAZ S curve (13–17X I_n current rating)

- Designed for control circuits with high inrush
- Response time of instantaneous trip: 13–17X I_n current rating
- UL recognized and CSA Certified as supplementary protectors
- For international and domestic use (conform to IEC 60947-2)
- UL file number 177451

Suitable for applications where high levels of inrush current are expected. Instantaneous trip is 13–17X rating of device (I_n). The high magnetic trip point prevents nuisance tripping in high inductive applications such as motors, transformers and power supplies.



Single-Pole



Two-Pole



S Curve (13–17X I_n Current Rating) — Designed for Inductive Loads ①②

| Amperes | Single-Pole ③ Catalog Number | Two-Pole Catalog Number |
|---------|---------------------------------|----------------------------|
| 1 | FAZ-S1/1 | FAZ-S1/2 |
| 2 | FAZ-S2/1 | FAZ-S2/2 |
| 3 | FAZ-S3/1 | FAZ-S3/2 |
| 4 | FAZ-S4/1 | FAZ-S4/2 |
| 6 | FAZ-S6/1 | FAZ-S6/2 |
| 10 | FAZ-S10/1 | FAZ-S10/2 |
| 16 | FAZ-S16/1 | FAZ-S16/2 |
| 20 | FAZ-S20/1 | FAZ-S20/2 |
| 25 | FAZ-S25/1 | FAZ-S25/2 |
| 32 | FAZ-S32/1 | FAZ-S32/2 |
| 40 | FAZ-S40/1 | FAZ-S40/2 |

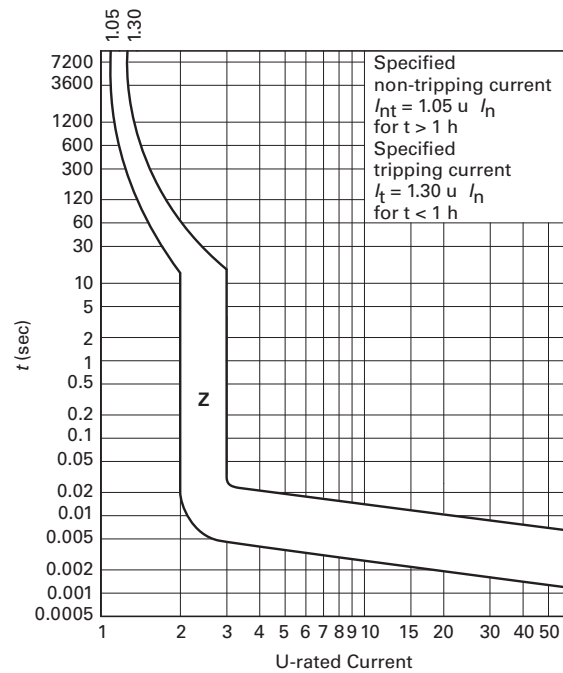
Notes

- ① In North America, these switches are UL recognized and CSA Certified as supplementary protection devices. Per the intent of NEC (National Electrical Code), Article 240, and CEC (Canadian Electrical Code), Part 1 C22.1, supplementary breakers cannot be used as a substitute for the branch circuit protective device. They can be used to provide overcurrent protection within an appliance or other electrical equipment where branch circuit overcurrent protection is already provided, or is not required.
- ② These breakers are available by special order and may result in additional delivery time.
- ③ Two-piece box order, quantities of 2.

FAZ Z curve (2–3X I_n current rating)

- Designed for protection of electronic devices
- Response time of instantaneous trip: 2–3X I_n current rating
- UL recognized and CSA Certified as supplementary protectors
- For international and domestic use (conform to IEC 60947-2)

Suitable for applications where low levels of inrush current are expected. Instantaneous trip is 2–3X rating of device (I_n). Applications include small transformers, lighting, pilot devices, control circuits and coils. Medium magnetic trip point.



Single-Pole



Z Curve (2–3X I_n Current Rating)— Designed for Inductive Loads ①②

| Amperes | Single-Pole ③ Catalog Number | Two-Pole Catalog Number |
|---------|---------------------------------|----------------------------|
| 0.5 | FAZ-Z0.5/1 | FAZ-Z0.5/2 |
| 1 | FAZ-Z1/1 | FAZ-Z1/2 |
| 1.6 | FAZ-Z1.6/1 | FAZ-Z1.6/2 |
| 2 | FAZ-Z2/1 | FAZ-Z2/2 |
| 3 | FAZ-Z3/1 | FAZ-Z3/2 |
| 4 | FAZ-Z4/1 | FAZ-Z4/2 |
| 6 | FAZ-Z6/1 | FAZ-Z6/2 |
| 8 | FAZ-Z8/1 | FAZ-Z8/2 |
| 10 | FAZ-Z10/1 | FAZ-Z10/2 |
| 13 | FAZ-Z13/1 | FAZ-Z13/2 |
| 16 | FAZ-Z16/1 | FAZ-Z16/2 |
| 20 | FAZ-Z20/1 | FAZ-Z20/2 |
| 25 | FAZ-Z25/1 | FAZ-Z25/2 |
| 32 | FAZ-Z32/1 | FAZ-Z32/2 |
| 40 | FAZ-Z40/1 | FAZ-Z40/2 |
| 50 | FAZ-Z50/1 | FAZ-Z50/2 |
| 63 | FAZ-Z63/1 | FAZ-Z63/2 |

Two-Pole



Three-Pole



Z Curve (2–3X I_n Current Rating)— Designed for Inductive Loads, continued ①②

| Amperes | Three-Pole Catalog Number | Four-Pole Catalog Number |
|---------|------------------------------|-----------------------------|
| 0.5 | FAZ-Z0.5/3 | FAZ-Z0.5/4 |
| 1 | FAZ-Z1/3 | FAZ-Z1/4 |
| 1.6 | FAZ-Z1.6/3 | FAZ-Z1.6/4 |
| 2 | FAZ-Z2/3 | FAZ-Z2/4 |
| 3 | FAZ-Z3/3 | FAZ-Z3/4 |
| 4 | FAZ-Z4/3 | FAZ-Z4/4 |
| 6 | FAZ-Z6/3 | FAZ-Z6/4 |
| 8 | FAZ-Z8/3 | FAZ-Z8/4 |
| 10 | FAZ-Z10/3 | FAZ-Z10/4 |
| 13 | FAZ-Z13/3 | FAZ-Z13/4 |
| 16 | FAZ-Z16/3 | FAZ-Z16/4 |
| 20 | FAZ-Z20/3 | FAZ-Z20/4 |
| 25 | FAZ-Z25/3 | FAZ-Z25/4 |
| 32 | FAZ-Z32/3 | FAZ-Z32/4 |
| 40 | FAZ-Z40/3 | FAZ-Z40/4 |
| 50 | FAZ-Z50/3 | FAZ-Z50/4 |
| 63 | FAZ-Z63/3 | FAZ-Z63/4 |

Four-Pole


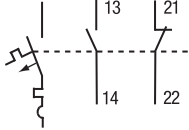


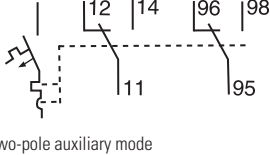
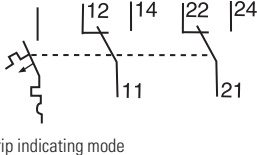






Notes

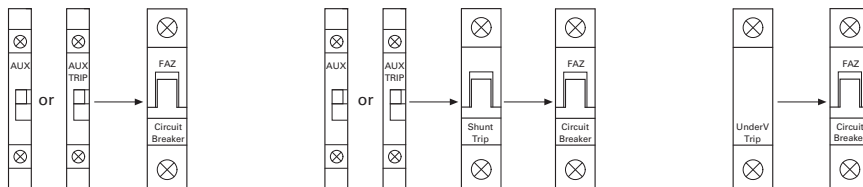
- ① In North America, these switches are UL recognized and CSA Certified as supplementary protection devices. Per the intent of NEC (National Electrical Code), Article 240, and CEC (Canadian Electrical Code), Part 1 C22.1, supplementary breakers cannot be used as a substitute for the branch circuit protective device. They can be used to provide overcurrent protection within an appliance or other electrical equipment where branch circuit overcurrent protection is already provided, or is not required.
- ② These breakers are available by special order and may result in additional delivery time.
- ③ Two-piece box order, quantities of 2.

Accessories

FAZ Auxiliary Contacts and Voltage Trips

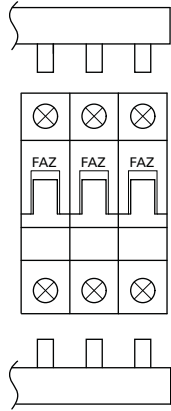
| | Circuit Diagram | Description | Rated Operational Voltage | Catalog Number |
|---|---|---|---------------------------|-----------------------------|
| Standard Auxiliary Contacts | | | | |
|  |  | <ul style="list-style-type: none"> 1NO/1NC Installs on left side of FAZ or shunt trip Max. one per FAZ (1077) device Switches when FAZ is tripped electrically or manually | 230 Vac | FAZ-XHIN11 |
| |  | <ul style="list-style-type: none"> 1 changeover contact Installs on left side of FAZ or shunt trip Max. one per FAZ (1077) device Switches when FAZ is tripped electrically or manually | 230 Vac | FAZ-XHINW1 |
| Auxiliary/Trip Indicating Contact | | | | |
|  |  | <ul style="list-style-type: none"> Small selector screw changes mode Two Form C (changeover) contacts Installs on left side of FAZ or shunt trip Auxiliary contacts switch when FAZ is tripped electrically or manually Trip indicating contact switches only when FAZ is tripped electrically | 230 Vac | FAZ-XAM002 |
| |  | | | |
| Undervoltage Trip | | | | |
|  |  | <ul style="list-style-type: none"> Prevents FAZ from operating unless voltage is present | 115 Vac | FAZ-XUA(115VAC) |
| | | <ul style="list-style-type: none"> Installs on left side of FAZ | 230 Vac | FAZ-XUA(230VAC) |
| | | <ul style="list-style-type: none"> Includes test button | 400 Vac | FAZ-XUA(400VAC) |
| Shunt Trip | | | | |
|  |  | <ul style="list-style-type: none"> Allows remote trip of FAZ | 12–110 Vac | FAZ-XAA-C-12-110VAC |
| | | <ul style="list-style-type: none"> Installs on left side of FAZ | 12–60 Vdc | |
| | | | 110–415 Vac | FAZ-XAA-C-110-415VAC |
| | | | 110–230 Vdc | |

Allowable Combinations of Accessories



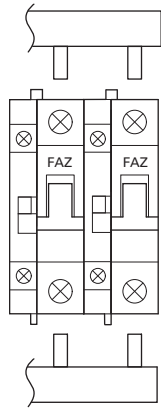
Busbar System

| Description | Rated Operational Current | Number of Poles per Device | Number of Terminals | Catalog Number ^① |
|--|---------------------------|----------------------------|---------------------|-----------------------------|
| Without Auxiliary Contacts | | | | |
| For connecting FAZ supplementary protectors without auxiliary contacts. May be fed from line or load side. | 80A | 1 | 57 | BB-UL-18/1P-1M/57 |
| | | 2 | 56 | BB-UL-18/2P-2M/56 |
| | | 3 | 57 | BB-UL-18/3P-3M/57 |
| | 100A | 1 | 57 | BB-UL-25/1P-1M/57 |
| | | 2 | 56 | BB-UL-25/2P-2M/56 |
| | | 3 | 57 | BB-UL-25/3P-3M/57 |



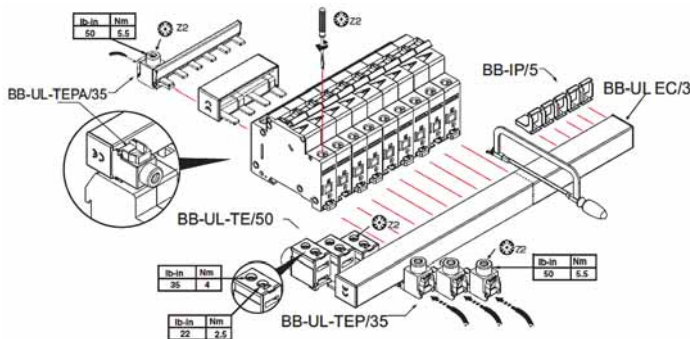
Auxiliary/Trip Indicating Contacts

| | | | | |
|---|------|---|----|-------------------------------|
| For connecting FAZ supplementary protectors with auxiliary contacts. May be fed from line or load side. | 80A | 1 | 37 | BB-UL-18/1P-1,5M/37 |
| | | 2 | 46 | BB-UL-18/2P+AS-2,5M/46 |
| | | 3 | 48 | BB-UL-18/3P+AS-3,5M/48 |
| | 100A | 1 | 37 | BB-UL-25/1P-1,5M/37 |
| | | 2 | 46 | BB-UL-25/2P+AS-2,5M/46 |
| | | 3 | 48 | BB-UL-25/3P+AS-3,5M/48 |



Note

① Bus may be center fed for high current capacity.



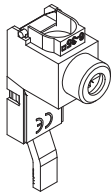
1.3

Miniature Circuit Breakers and Supplementary Protectors

UL 1077 DIN Rail Supplementary Protectors

1

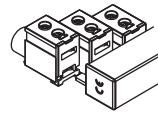
Incoming Terminal



Pin Type Incoming Supply Terminals

| Description | Catalog Number |
|---|---------------------|
| <ul style="list-style-type: none"> Accommodates conductors from 6–35 mm²/#10–2 AWG 4–5.5 Nm/35–50 lb-in Two- and three-pole | BB-UL-TEP/35 |

Incoming Terminal



Bus Incoming Supply Terminals

| Description | Catalog Number |
|---|--------------------|
| <ul style="list-style-type: none"> 50 mm² #14–1 AWG 75 Deg wire 115 A/Y, 480V UL 160 A/Y 690V IEC | BB-UL-TE/50 |

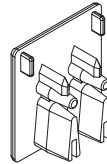
Incoming Terminal



Pin Type Incoming Supply Terminals—Single-Phase Only

| Description | Catalog Number |
|--|----------------------|
| <ul style="list-style-type: none"> Accommodates conductors from 6–35 mm²/#10–2 AWG 4–5.5 Nm/35–50 lb-in | BB-UL-TEPA/35 |

Fork Connector



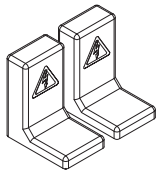
Busbar End Cap

| Description | Poles | Catalog Number |
|--|---------|-------------------|
| <ul style="list-style-type: none"> Install after cutting busbar | 2 and 3 | BB-EV-EC/3 |
| <ul style="list-style-type: none"> Protects end of busbar | 1 | BB-UL-EC/1 |

Protective Accessories

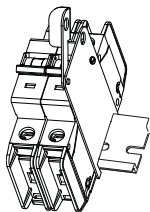
| Description | Catalog Number |
|-------------------------------|----------------|
| For covering unused terminals | BB-IP/5 |

Busbar Terminal Cover



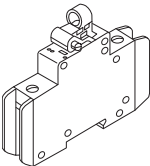
Lockoff Device

| | |
|-------------------|-----------------|
| UL lockoff device | FAZPLOFF |
|-------------------|-----------------|



Padlock Hasp

| | |
|---|---------------------|
| <ul style="list-style-type: none"> Prevents reactivation of the device during maintenance Holds one padlock | Z-IS/SPE-1TE |
|---|---------------------|



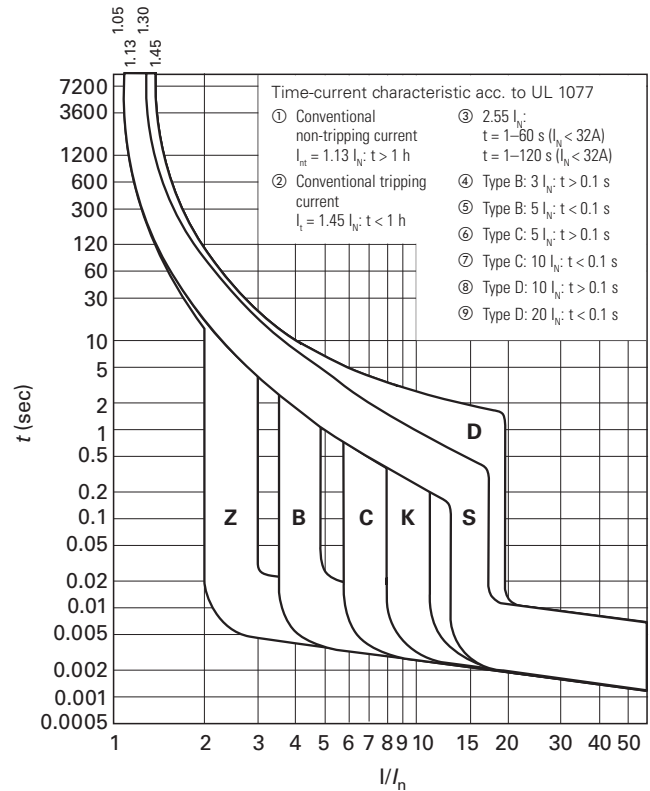
Technical Data and Specifications

Trip Curves Chart

Eaton FAZ supplementary protectors are available with six different tripping characteristics, including Type B, C, D, K, S and Z. Definitions for each trip curve are contained on the ordering pages and can be used to determine the optimal characteristic for your application. For example, low-level short-circuit faults in control wiring, such as PLCs, are best protected by devices with Type B trip characteristics (3–5X continuous rating of the device (I_n)).

Even though not required by NEC or CEC for supplementary protectors, Eaton's FAZ devices are current limiting, which means that they interrupt fault currents within one half cycle. Current limiting devices offer superior protection by reducing peak let-through current and energy.

Tripping Characteristics



1.3

Miniature Circuit Breakers and Supplementary Protectors

UL 1077 DIN Rail Supplementary Protectors

1

FAZ Miniature Circuit Breakers Technical Data

| Description | B Curve | C Curve | D Curve |
|--|---|---|---|
| Electrical | | | |
| Approvals | UR (UL 1077), CSA (CSA 22.2 No. 235), CE | | |
| Standards | IEC/EN 60947-2 | | |
| Short-circuit trip response | 3–5 I_n | 5–10 I_n | 10–20 I_n |
| Supplementary Protectors—UL/CSA | | | |
| Current range | 1–63A | 0.5–63A | 0.5–40A |
| Maximum voltage ratings—UL/CSA | | | |
| Single-pole, single-pole + neutral | 277 Vac 48 Vdc | 277 Vac 48 Vdc | 277 Vac 48 Vdc |
| Two-, three-pole, four-pole and three-pole + neutral | 480Y/277 Vac | 480Y/277 Vac | 480Y/277 Vac |
| Two poles in series | 96 Vdc | 96 Vdc | 96 Vdc |
| Thermal tripping characteristics | | | |
| Single-pole | 1.35 x I_n @ 40°C | 1.35 x I_n @ 40°C | 1.35 x I_n @ 40°C |
| Multi-pole | 1.45 x I_n @ 40°C | 1.45 x I_n @ 40°C | 1.45 x I_n @ 40°C |
| Short-circuit ratings (at max. voltage) | | | |
| Single-pole | 10 kA (5 kA for 40–63A device) | 10 kA (5 kA for 40–63A device) | 5 kA |
| Two-, three-pole | 10 kA (5 kA for 40–63A device) | 10 kA (5 kA for 40–63A device) | 5 kA |
| Single-pole | 10 kA @ 48 Vdc | 10 kA @ 48 Vdc | 10 kA @ 48 Vdc |
| Two poles in series | 10 kA @ 96 Vdc | 10 kA @ 96 Vdc | 10 kA @ 96 Vdc |
| Miniature Circuit Breaker—IEC | | | |
| Current range | 1–63A | 0.5–63A | 0.5–63A |
| Maximum voltage ratings—IEC 68898-1 | | | |
| Single-pole | 230 Vac | 230 Vac | 230 Vac |
| Two-, three-pole | 230/400 Vac | 230/400 Vac | 230/400 Vac |
| Maximum voltage ratings—IEC 60947-2 | | | |
| Single-pole | 240 Vac 48 Vdc | 240 Vac 48 Vdc | 240 Vac 48 Vdc |
| Two-, three-pole | 240/415 Vac | 240/415 Vac | 240/415 Vac |
| Two poles in series | 96 Vdc | 96 Vdc | 96 Vdc |
| Thermal tripping characteristics | | | |
| Single-pole | > 1 hour @ 1.05 x I_n | > 1 hour @ 1.05 x I_n | > 1 hour @ 1.05 x I_n |
| Multi-pole | < 1 hour @ 1.3 x I_n | < 1 hour @ 1.3 x I_n | < 1 hour @ 1.3 x I_n |
| Interrupt ratings (at max. voltage) | | | |
| IEC 60947-2 | 15 kA | 15 kA | 15 kA (10 kA for 50 and 63A) |
| IEC 60898 | 10 kA | 10 kA | 10 kA (50 and 63A not available) |
| Operational switching capacity | 7.5 kA | 7.5 kA | 7.5 kA |
| Max. backup fuse [gL/gG] | 125A | 125A | 125A |
| Rated impulse withstand— U_{imp} | 4000 Vac | 4000 Vac | 4000 Vac |
| Rated insulation voltage— U_i | 440 Vac | 440 Vac | 440 Vac |
| Environmental/General | | | |
| Selectivity class | 3 | 3 | 3 |
| Lifespan (operations) | > 10,000 (1 operation = ON/OFF) | > 10,000 (1 operation = ON/OFF) | > 10,000 (1 operation = ON/OFF) |
| Shock (IEC 68-2-22) | 10g–120 ms | 10g–120 ms | 10g–120 ms |
| Operating temperature range | –40 to +167°F (–40 to +75°C) | –40 to +167°F (–40 to +75°C) | –40 to +167°F (–40 to +75°C) |
| Shipment and short-term storage | –40 to +185°F (–40 to +85°C) | –40 to +185°F (–40 to +85°C) | –40 to +185°F (–40 to +85°C) |
| Housing material | Nylon | Nylon | Nylon |
| Mechanical | | | |
| Standard front dimension | 80 mm | | |
| Device height | 80 mm | | |
| Terminal protection | Finger and back-of-hand proof to IEC 536 | | |
| Mounting width per pole | 17.5 mm | | |
| Mounting | IEC/EN 60715 top-hat rail | | |
| Degree of protection | IP20 | | |
| Terminals top and bottom | Twin-purpose terminals | | |
| Supply connection | Line or load side | | |
| Terminal capacity [mm ²] | 1 x 25 (AWG 4–18)/2 x 10 (AWG 8–18) | 1 x 25 (AWG 4–18)/2 x 10 (AWG 8–18) | 1 x 25 (AWG 4–18)/2 x 10 (AWG 8–18) |
| Torque | 2.4 Nm | 2.4 Nm | 2.4 Nm |
| Imperial torque | 21 lb-in (AWG 18–12), 25 lb-in (AWG 10–8), 36 lb-in (AWG 6–4) | 21 lb-in (AWG 18–12), 25 lb-in (AWG 10–8), 36 lb-in (AWG 6–4) | 21 lb-in (AWG 18–12), 25 lb-in (AWG 10–8), 36 lb-in (AWG 6–4) |
| Thickness of busbar material | 0.8–2 mm | | |
| Mounting position | As required | | |

FAZ Miniature Circuit Breakers Technical Data, continued

| Description | K Curve | S Curve | Z Curve |
|--|---|---|---|
| Electrical | | | |
| Approvals | UR (UL 1077), CSA (CSA 22.2 No. 235), CE | | |
| Standards | IEC/EN 60947-2, E177451, 204453 | | |
| Short-circuit trip response | 8–12 I_n | 13–17 I_n | 2–3 I_n |
| Supplementary Protectors—UL/CSA | | | |
| Current range | 0.5–63A | 0.5–40A | 1–63A |
| Maximum voltage ratings—UL/CSA | | | |
| Single-pole, single-pole + neutral | 277 Vac 48 Vdc | 277 Vac 48 Vdc | 277 Vac 48 Vdc |
| Two-, three-, four-pole and three-pole + neutral | 480Y/277 Vac | 480Y/277 Vac | 480Y/277 Vac |
| Two poles in series | 96 Vdc | 96 Vdc | 96 Vdc |
| Thermal tripping characteristics | | | |
| Single-pole | 1.35 x I_n @ 40°C | 1.35 x I_n @ 40°C | 1.35 x I_n @ 40°C |
| Multi-pole | 1.45 x I_n @ 40°C | 1.45 x I_n @ 40°C | 1.45 x I_n @ 40°C |
| Short-circuit ratings (at max. voltage) | | | |
| Single-pole | 5 kA @ 277 Vac | 5 kA @ 277 Vac | 5 kA @ 277 Vac |
| Single-pole + neutral | 5 kA @ 277 Vac | 5 kA @ 277 Vac | 5 kA @ 277 Vac |
| Two-, three-, four-pole | 5 kA @ 480Y/277 Vac | 5 kA @ 480Y/277 Vac | 5 kA @ 480Y/277 Vac |
| Two poles in series | — | — | — |
| Miniature Circuit Breaker—IEC | | | |
| Current range | 0.5–63A | 0.5–40A | 1–63A |
| Maximum voltage ratings—IEC 60947-2 | | | |
| Single-pole, single-pole + neutral | 240 Vac | 240 Vac | 240 Vac |
| Two-, three-, four-pole, three-pole + neutral | 240/415 Vac | 240/415 Vac | 240/415 Vac |
| Thermal tripping characteristics | | | |
| Single-pole | > 1 Hour @ 1.05 x I_n | > 1 Hour @ 1.05 x I_n | > 1 Hour @ 1.05 x I_n |
| Multi-pole | < 1 Hour @ 1.3 x I_n | < 1 Hour @ 1.3 x I_n | < 1 Hour @ 1.3 x I_n |
| Interrupt ratings (at max. voltage) | | | |
| IEC 60947-2 | 15 kA | 10 kA | 10 kA |
| Operational switching capacity | 7.5 kA | 7.5 kA | 7.5 kA |
| Max. backup fuse [gL/gG] | 125A | 125A | 125A |
| Rated impulse withstand— U_{imp} | 4000 Vac | 4000 Vac | 4000 Vac |
| Rated insulation voltage— U_i | 440 Vac | 440 Vac | 440 Vac |
| Environmental/General | | | |
| Selectivity class | 3 | 3 | 3 |
| Lifespan (operations) | > 10,000 (1 operation = ON/OFF) | > 10,000 (1 operation = ON/OFF) | > 10,000 (1 operation = ON/OFF) |
| Shock (IEC 68-2-22) | 10g–120 ms | 10g–120 ms | 10g–120 ms |
| Operating temperature range | –40 to +167°F (–40 to +75°C) | –40 to +167°F (–40 to +75°C) | –40 to +167°F (–40 to +75°C) |
| Shipment and short-term storage | –40 to +185°F (–40 to +85°C) | –40 to +185°F (–40 to +85°C) | –40 to +185°F (–40 to +85°C) |
| Housing material | Nylon | Nylon | Nylon |
| Mechanical | | | |
| Standard front dimension | | | |
| Device height | 80 mm | 80 mm | 80 mm |
| Terminal protection | Finger and back-of-hand proof to IEC 536 | Finger and back-of-hand proof to IEC 536 | Finger and back-of-hand proof to IEC 536 |
| Mounting width per pole | 17.7 mm | 17.7 mm | 17.7 mm |
| Mounting | IEC/EN 60715 top-hat rail | IEC/EN 60715 top-hat rail | IEC/EN 60715 top-hat rail |
| Degree of protection | IP20 | IP20 | IP20 |
| Terminals top and bottom | Twin-purpose terminals | Twin-purpose terminals | Twin-purpose terminals |
| Supply connection | Line or load side | Line or load side | Line or load side |
| Terminal capacity [mm ²] | 1 x 25 (AWG 4–18) / 2 x 10 (AWG 8–18) | 1 x 25 (AWG 4–18) / 2 x 10 (AWG 8–18) | 1 x 25 (AWG 4–18) / 2 x 10 (AWG 8–18) |
| Torque | 2.4 Nm | 2.4 Nm | 2.4 Nm |
| Imperial torque | 21 lb-in (AWG 18–12), 25 lb-in (AWG 10–8), 36 lb-in (AWG 6–4) | 21 lb-in (AWG 18–12), 25 lb-in (AWG 10–8), 36 lb-in (AWG 6–4) | 21 lb-in (AWG 18–12), 25 lb-in (AWG 10–8), 36 lb-in (AWG 6–4) |
| Thickness of busbar material | 0.8–2 mm | 0.8–2 mm | 0.8–2 mm |
| Mounting position | As required | As required | As required |

1.3

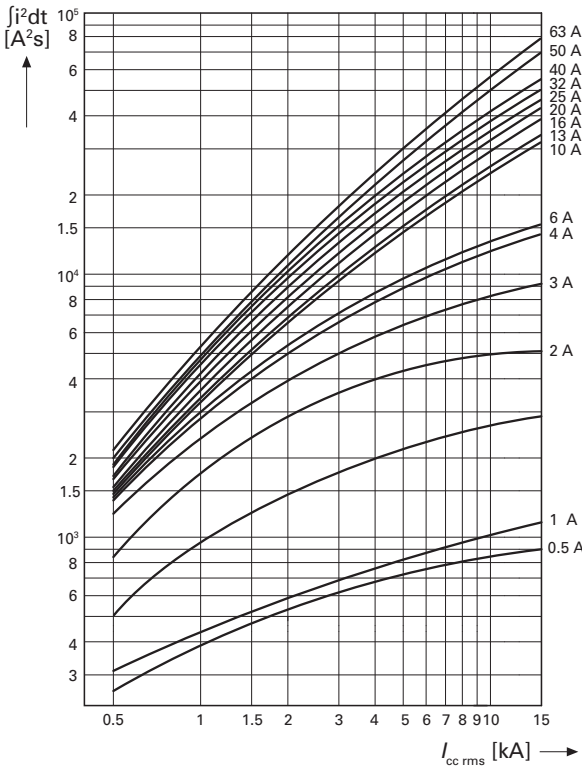
Miniature Circuit Breakers and Supplementary Protectors

UL 1077 DIN Rail Supplementary Protectors

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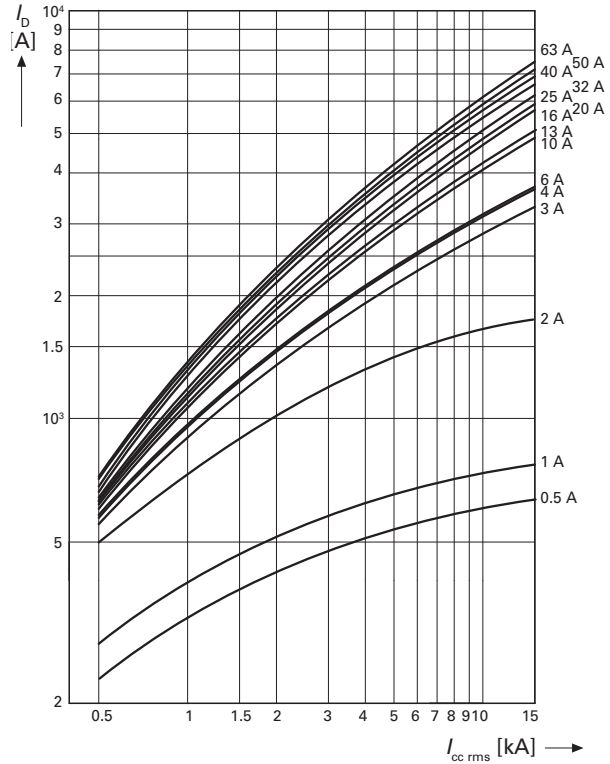
Let-Through Energy I^2t

Characteristic B and C

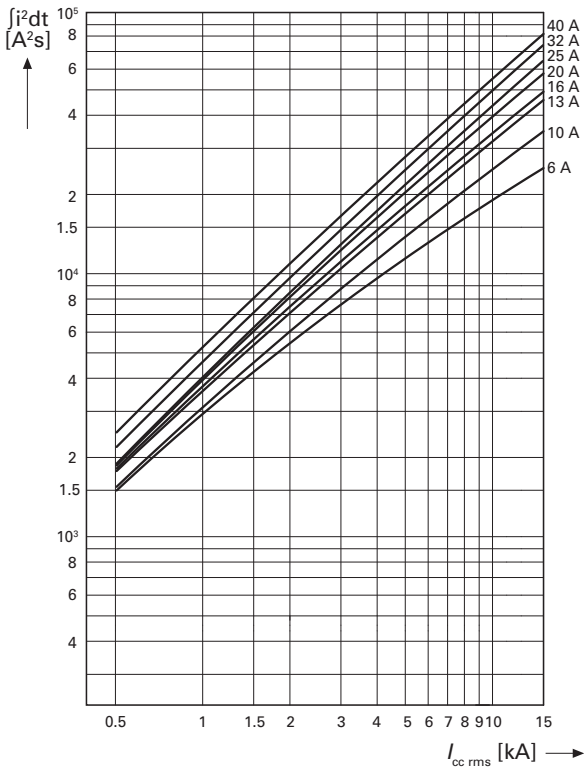


Let-Through Energy I_D

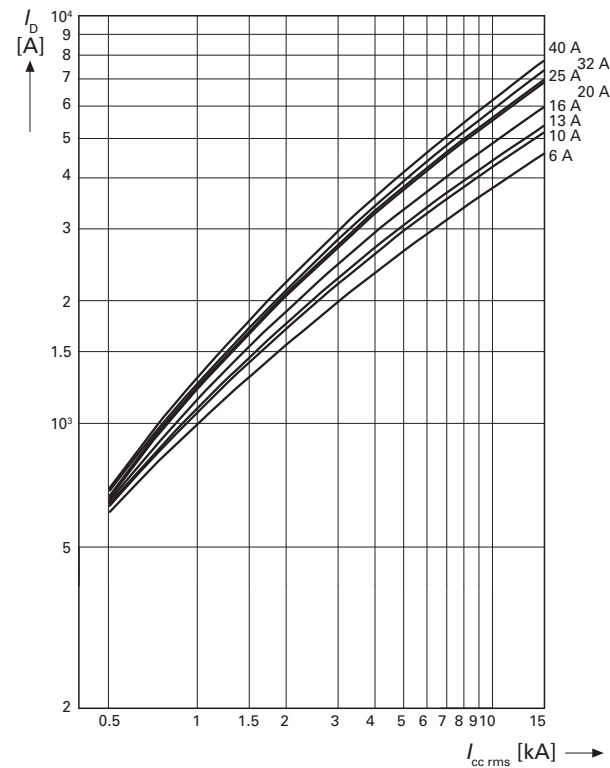
Characteristic B and C



Characteristic D

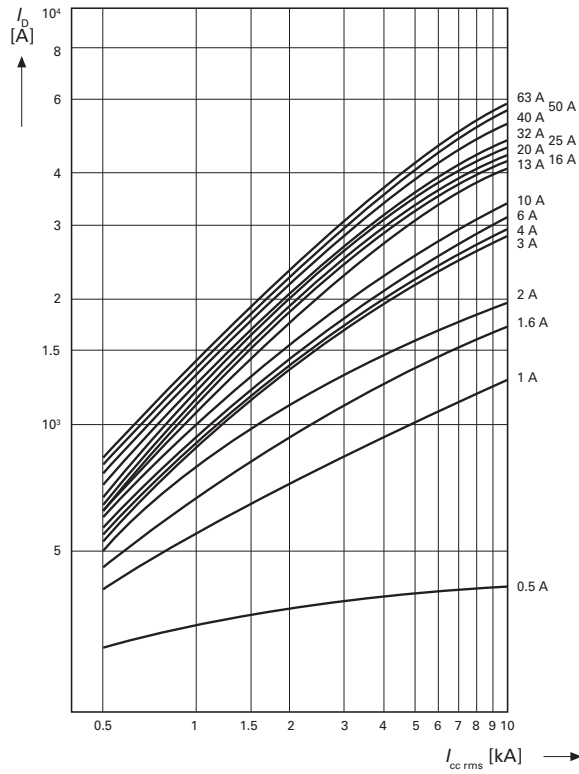


Characteristic D

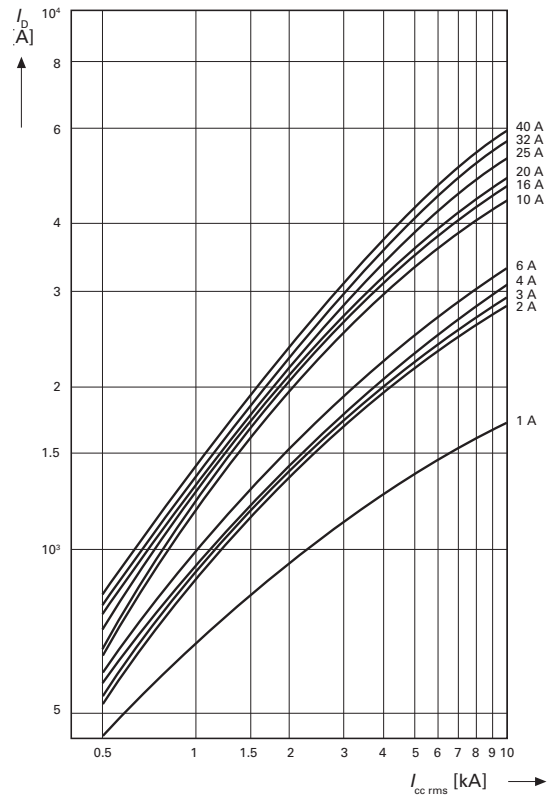


Let-Through Energy I^2t

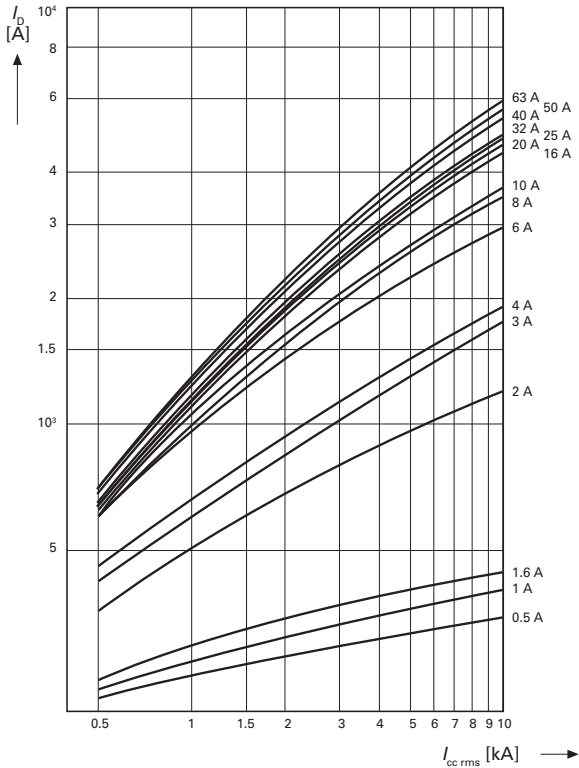
Characteristic K



Characteristic S



Characteristic Z



1.3

Miniature Circuit Breakers and Supplementary Protectors

UL 1077 DIN Rail Supplementary Protectors

1

Influence of the Ambient Temperature on the Thermal Tripping Behavior

Corrected values of the rated current dependent on the ambient temperature

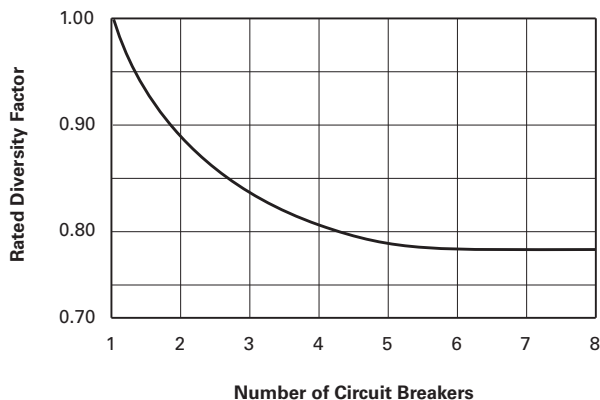
| I_n (A) | Ambient Temperature T | | | | | | | | | | | | | | | | |
|-----------|-----------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| | -40°C | -30°C | -20°C | -10°C | 0°C | 10°C | 20°C | 30°C | 35°C | 40°C | 45°C | 50°C | 55°C | 60°C | 65°C | 70°C | 75°C |
| 0.16 | 0.20 | 0.20 | 0.19 | 0.19 | 0.18 | 0.17 | 0.17 | 0.16 | 0.16 | 0.15 | 0.15 | 0.15 | 0.14 | 0.14 | 0.14 | 0.14 | 0.13 |
| 0.25 | 0.32 | 0.31 | 0.30 | 0.29 | 0.28 | 0.27 | 0.26 | 0.25 | 0.25 | 0.24 | 0.24 | 0.23 | 0.23 | 0.22 | 0.22 | 0.21 | 0.21 |
| 0.50 | 0.64 | 0.62 | 0.60 | 0.58 | 0.56 | 0.54 | 0.52 | 0.50 | 0.49 | 0.48 | 0.47 | 0.46 | 0.45 | 0.44 | 0.43 | 0.42 | 0.41 |
| 0.75 | 0.96 | 0.93 | 0.90 | 0.87 | 0.84 | 0.81 | 0.78 | 0.75 | 0.74 | 0.73 | 0.71 | 0.69 | 0.68 | 0.66 | 0.65 | 0.64 | 0.62 |
| 1.00 | 1.30 | 1.20 | 1.20 | 1.20 | 1.10 | 1.10 | 1.00 | 1.00 | 0.99 | 0.97 | 0.95 | 0.93 | 0.90 | 0.89 | 0.87 | 0.85 | 0.83 |
| 1.50 | 1.90 | 1.90 | 1.80 | 1.70 | 1.70 | 1.60 | 1.60 | 1.50 | 1.50 | 1.50 | 1.40 | 1.40 | 1.40 | 1.30 | 1.30 | 1.30 | 1.20 |
| 1.60 | 2.00 | 2.00 | 1.90 | 1.90 | 1.80 | 1.70 | 1.70 | 1.60 | 1.60 | 1.50 | 1.50 | 1.50 | 1.40 | 1.40 | 1.40 | 1.40 | 1.30 |
| 2.00 | 2.60 | 2.50 | 2.40 | 2.30 | 2.20 | 2.20 | 2.10 | 2.00 | 2.00 | 1.90 | 1.90 | 1.90 | 1.80 | 1.80 | 1.70 | 1.70 | 1.70 |
| 2.50 | 3.20 | 3.10 | 3.00 | 2.90 | 2.80 | 2.70 | 2.60 | 2.50 | 2.50 | 2.40 | 2.40 | 2.30 | 2.30 | 2.20 | 2.20 | 2.10 | 2.10 |
| 3.00 | 3.80 | 3.70 | 3.60 | 3.50 | 3.40 | 3.30 | 3.10 | 3.00 | 3.00 | 2.90 | 2.80 | 2.80 | 2.70 | 2.70 | 2.60 | 2.50 | 2.50 |
| 3.50 | 4.50 | 4.40 | 4.20 | 4.10 | 3.90 | 3.80 | 3.70 | 3.50 | 3.40 | 3.40 | 3.30 | 3.20 | 3.20 | 3.10 | 3.00 | 3.00 | 2.90 |
| 4.00 | 5.10 | 5.00 | 4.80 | 4.70 | 4.50 | 4.30 | 4.20 | 4.00 | 3.90 | 3.90 | 3.80 | 3.70 | 3.60 | 3.50 | 3.50 | 3.40 | 3.30 |
| 5.00 | 6.40 | 6.20 | 6.00 | 5.80 | 5.60 | 5.40 | 5.20 | 5.00 | 4.90 | 4.80 | 4.70 | 4.60 | 4.50 | 4.40 | 4.30 | 4.20 | 4.10 |
| 6.00 | 7.70 | 7.50 | 7.20 | 7.00 | 6.70 | 6.50 | 6.30 | 6.00 | 5.90 | 5.80 | 5.70 | 5.60 | 5.40 | 5.30 | 5.20 | 5.10 | 5.00 |
| 7.00 | 9.00 | 8.70 | 8.40 | 8.20 | 7.80 | 7.60 | 7.40 | 7.00 | 6.90 | 6.80 | 6.70 | 6.50 | 6.30 | 6.20 | 6.10 | 6.00 | 5.80 |
| 8.00 | 10.20 | 9.90 | 9.60 | 9.30 | 9.00 | 8.70 | 8.40 | 8.00 | 7.90 | 7.70 | 7.60 | 7.40 | 7.20 | 7.10 | 6.90 | 6.80 | 6.60 |
| 10.00 | 13.00 | 12.00 | 12.00 | 12.00 | 11.00 | 11.00 | 10.00 | 10.00 | 9.90 | 9.70 | 9.50 | 9.30 | 9.00 | 8.90 | 8.70 | 8.50 | 8.30 |
| 12.00 | 15.00 | 15.00 | 14.00 | 14.00 | 13.00 | 13.00 | 13.00 | 12.00 | 12.00 | 12.00 | 11.00 | 11.00 | 11.00 | 11.00 | 10.00 | 10.00 | 10.00 |
| 13.00 | 17.00 | 16.00 | 16.00 | 15.00 | 15.00 | 14.00 | 14.00 | 13.00 | 13.00 | 13.00 | 12.00 | 12.00 | 12.00 | 12.00 | 11.00 | 11.00 | 11.00 |
| 15.00 | 19.00 | 19.00 | 18.00 | 17.00 | 17.00 | 16.00 | 16.00 | 15.00 | 15.00 | 15.00 | 14.00 | 14.00 | 14.00 | 13.00 | 13.00 | 13.00 | 12.00 |
| 16.00 | 20.00 | 20.00 | 19.00 | 19.00 | 18.00 | 17.00 | 17.00 | 16.00 | 16.00 | 15.00 | 15.00 | 15.00 | 14.00 | 14.00 | 14.00 | 14.00 | 13.00 |
| 20.00 | 26.00 | 25.00 | 24.00 | 23.00 | 22.00 | 22.00 | 21.00 | 20.00 | 20.00 | 19.00 | 19.00 | 19.00 | 18.00 | 18.00 | 17.00 | 17.00 | 17.00 |
| 25.00 | 32.00 | 31.00 | 30.00 | 29.00 | 28.00 | 27.00 | 26.00 | 25.00 | 25.00 | 24.00 | 24.00 | 23.00 | 23.00 | 22.00 | 22.00 | 21.00 | 21.00 |
| 32.00 | 41.00 | 40.00 | 38.00 | 37.00 | 36.00 | 35.00 | 33.00 | 32.00 | 32.00 | 31.00 | 30.00 | 30.00 | 29.00 | 28.00 | 28.00 | 27.00 | 26.00 |
| 35.00 | 45.00 | 43.00 | 41.00 | 41.00 | 38.00 | 38.00 | 36.00 | 35.00 | 35.00 | 34.00 | 33.00 | 32.00 | 32.00 | 32.00 | 30.00 | 29.00 | 29.00 |
| 40.00 | 51.00 | 50.00 | 48.00 | 47.00 | 45.00 | 43.00 | 42.00 | 40.00 | 39.00 | 39.00 | 38.00 | 37.00 | 36.00 | 35.00 | 35.00 | 34.00 | 33.00 |
| 50.00 | 64.00 | 62.00 | 60.00 | 58.00 | 56.00 | 54.00 | 52.00 | 50.00 | 49.00 | 48.00 | 47.00 | 46.00 | 45.00 | 44.00 | 43.00 | 42.00 | 41.00 |
| 63.00 | 81.00 | 78.00 | 76.00 | 73.00 | 71.00 | 68.00 | 66.00 | 63.00 | 62.00 | 61.00 | 60.00 | 58.00 | 57.00 | 56.00 | 55.00 | 53.00 | 52.00 |

Influence of the Mains Frequency

Influence of the mains frequency on the tripping behavior I_{MA} of the instantaneous release

| $I_{MA}(f)/I_{MA}(50\text{ Hz})$ [%] | Mains Frequency f [Hz] | | | | | | |
|--------------------------------------|------------------------|-----|-----|-----|-----|-----|-----|
| | 16 2/3 | 50 | 60 | 100 | 200 | 300 | 400 |
| | 91 | 100 | 101 | 106 | 115 | 134 | 141 |

Load Carrying Capacity of Adjoining Miniature Circuit Breakers



Accessories Technical Data

| Description | FAZ-XHIN FAZ-XAM002 | FAZ-XAA-C | FAZ-XUA |
|--|--|--|--|
| Electrical | | | |
| Contact function | 1A + 1B 2 C/O | — | — |
| Rated operational voltage U_n | 250 Vac | — | 115 Vac 230 Vac 400 Vac |
| Voltage range | — | 12–110 Vac 12–60 Vdc | — |
| Voltage range | — | 110–415 Vac 110–230 Vdc | — |
| Closing threshold [x U_n] | — | — | 0.8 |
| Tripping threshold [x U_n] | — | — | 0.5 |
| Rated frequency f | 50/60 Hz | 50/60 Hz | 50/60 Hz |
| General use (UL/CSA) AC—230/240 Vac DC—110/120 Vdc | 2/2A 0.5/0.5A | — — | — — |
| Pilot duty | A600/Q600 | — | — |
| Conventional free air thermal current I_{th} | 4A | — | — |
| Rated operational current AC-13 I_g AC-15 I_g DC-13 I_g | 3A (250 Vac) 2A (250 Vac) 0.5A (110 Vdc) | — — — | — — — |
| Rated insulation voltage U_i | 250 Vac | — | — |
| Minimum operating voltage per contract U_{min} | 5 Vdc | — | — |
| Rated impulse withstand voltage (1.2/50 μ) U_{imp} | 2.5 kV | — | — |
| Rated conditional short-circuit current with 6A backup fuse I_{SC} | 1 kA | — | — |
| Max. admissible backup fuse | 4A gL | — | — |
| Mechanical | | | |
| Standard front dimension | 45 mm | 45 mm | 45 mm |
| Device height | 80 mm | 80 mm | 80 mm |
| Mounting width | 8.8 mm | 17.6 mm | 17.8 mm |
| Mounting | On MCB | IEC/EN 60715 top-hat rail | IEC/EN 60715 top-hat rail |
| Degree of protection enclosed | IP40 | IP40 | IP40 |
| Terminal protection | Protection against electric shock to IEC 536 | Protection against electric shock to IEC 536 | Protection against electric shock to IEC 536 |
| Terminals | Lift terminals | Twin-purpose terminals | Twin-purpose terminals |
| Terminal capacity Solid Flexible | 0.5–2.5 mm ² 0.5–2.5 mm ² | 1–2.5 mm ² 1–2.5 mm ² | 2 x (1–2.5) mm ² 2 x (1–2.5) mm ² |
| Tightening torque of terminal screws | 0.8–1.0 Nm (7–9 lb-in) | 2.4 Nm (21 lb-in) | 0.8 Nm (7 lb-in) |

1.3

Miniature Circuit Breakers and Supplementary Protectors

UL 1077 DIN Rail Supplementary Protectors

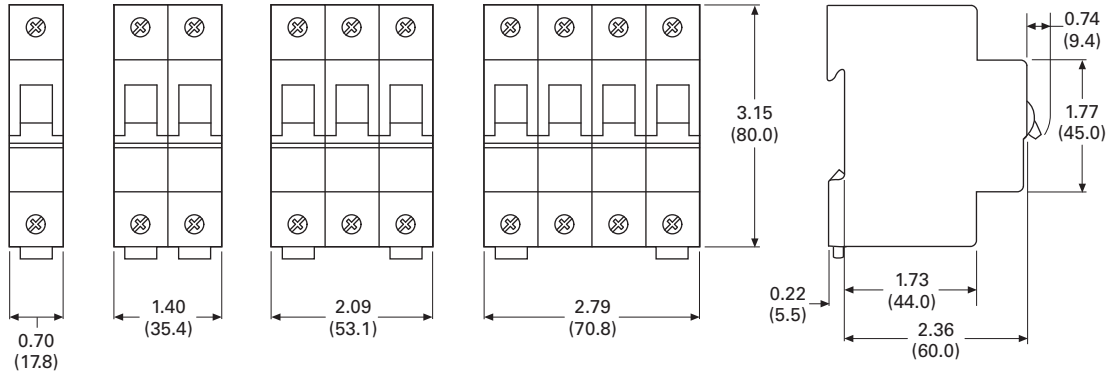
1

Dimensions

Approximate Dimensions in Inches (mm)

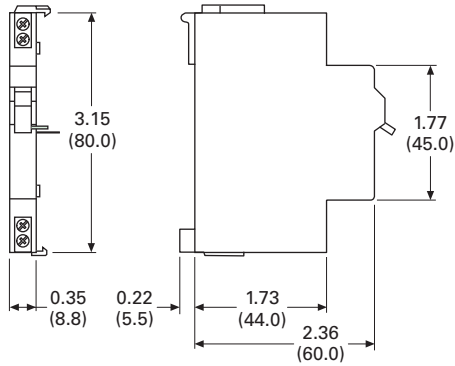
Miniature Circuit Breakers

FAZ

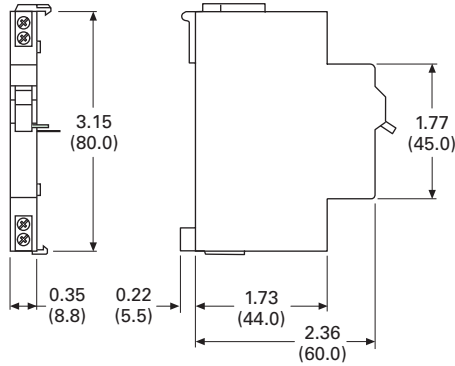


Auxiliary Contacts

FAZ-XHI11 and FAZ-XH1NW1

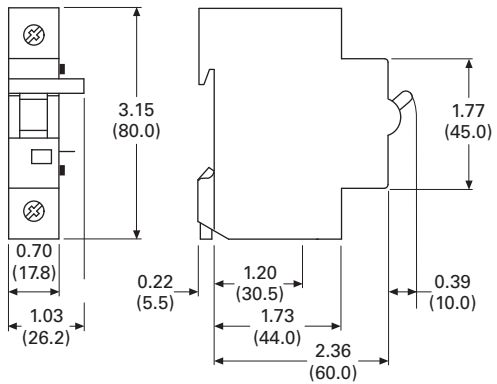


FAZ-XAM002



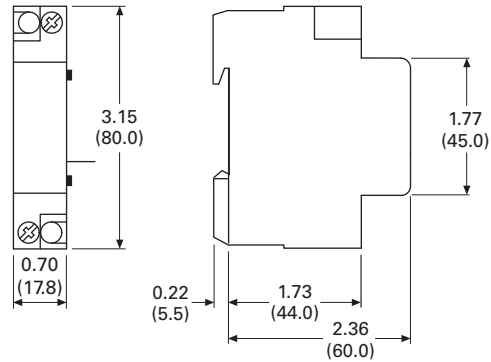
Shunt Releases

FAZ-XAA



Undervoltage Releases

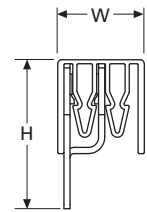
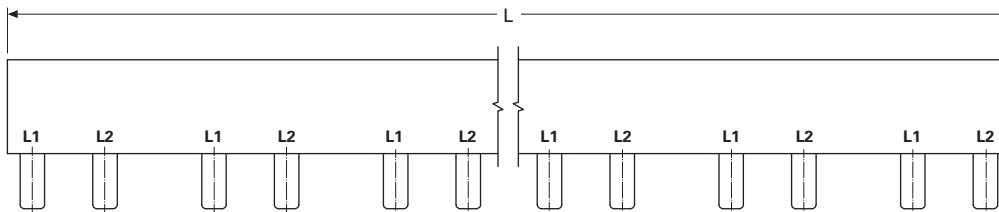
FAZ-XUA



Approximate Dimensions in Inches (mm)

Busbar and Accessory Weights and Dimensions

| Unit Weight (kg) | Length | Width | Height | Catalog Number |
|------------------|----------------|-------------|-------------|-------------------------------|
| 0.29 | 39.72 (1009.0) | 0.59 (15.0) | 0.59 (15.0) | BB-UL-18/1P-1M/57 |
| 0.64 | 39.02 (991.0) | 0.87 (22.0) | 1.46 (37.0) | BB-UL-18/2P-2M/56 |
| 0.83 | 39.72 (1009.0) | 0.87 (22.0) | 1.46 (37.0) | BB-UL-18/3P-3M/57 |
| 0.26 | 38.78 (985.0) | 0.59 (15.0) | 0.59 (15.0) | BB-UL-18/1P-1.5M/37 |
| 0.63 | 39.72 (1009.0) | 0.87 (22.0) | 1.46 (37.0) | BB-UL-18/2P+AS-2.5M/46 |
| 0.79 | 38.66 (982.0) | 0.87 (22.0) | 1.46 (37.0) | BB-UL-18/3P+AS-3.5M/48 |
| 0.36 | 39.72 (1009.0) | 0.59 (15.0) | 0.59 (15.0) | BB-UL-25/1P-1M/57 |
| 0.79 | 39.02 (991.0) | 0.87 (22.0) | 1.46 (37.0) | BB-UL-25/2P-2M/56 |
| 1.04 | 39.72 (1009.0) | 0.87 (22.0) | 1.46 (37.0) | BB-UL-25/3P-3M/57 |
| 0.31 | 38.78 (985.0) | 0.59 (15.0) | 0.59 (15.0) | BB-UL-25/1P-1.5M/37 |
| 0.73 | 39.72 (1009.0) | 0.87 (22.0) | 1.46 (37.0) | BB-UL-25/2P+AS-2.5M/46 |
| 0.97 | 38.66 (982.0) | 0.87 (22.0) | 1.46 (37.0) | BB-UL-25/3P+AS-3.5M/48 |
| 0.03 | 2.36 (60.0) | 0.67 (17.0) | 1.14 (29.0) | BB-UL-TEP/35 |
| 0.03 | 1.42 (36.0) | 0.67 (17.0) | 1.14 (29.0) | BB-UL-TEPA/35 |
| 0.03 | 1.57 (40.0) | 0.71 (18.0) | 1.18 (30.0) | BB-UL-TE/50 |
| 0.003 | 3.35 (85.0) | 0.47 (12.0) | 0.94 (24.0) | BB-IP/5 |
| 0.001 | 0.55 (14.0) | 0.20 (5.0) | 0.39 (10.0) | BB-EV-EC/3 |
| 0.001 | 0.94 (24.0) | 0.87 (22.0) | 0.39 (10.0) | BB-UL-EC/1 |



UL 1053 DIN Rail RCCB



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| Product Selection | V4-T1-95 |
| Accessories | V4-T1-96 |
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| Dimensions | V4-T1-98 |
| UL 1053 DIN Rail RCCB 208Y/120 Vac | V4-T1-100 |

UL 1053 DIN Rail RCCB 480/277 Vac

Product Overview

Optimum product quality, tested reliability and safety stand for best protection of installations and plant. Eaton’s UL 1053 Residual Current Circuit Breaker (RCCB) is designed for use in residual current applications.

Application Description

- Motor control circuits
- HVAC internal/external equipment
- PLCs
- HMIs
- Equipment protection
- European housing

Features

- Wide range of compact RCCB types serving as fault-current and additional protection according to UL 1053 and IEC/EN 61008 standards, suitable for worldwide use
- Type A or Type G/A (with delay) protection available
- Comprehensive range of accessories
- Real contact position indicator
- Fault current tripping indicator
- Transparent designation plate
- Trip-free design—RCCB can not be defeated by holding the handle in the ON position
- Captive screws cannot be lost

Standards and Certifications

- UL 1053
- IEC/EN 61008
- CSA
- ÖVE
- CE Marked



Product Selection

UL 1053 RCCB 480Y/277V Type A

Two-Pole



Conditionally Surge Current–Proof 250A, Sensitive to Residual Pulsating DC, Type A

Two-Pole

| Amperes | GF Sensitivity (mA) | Catalog Number ^① | Designation |
|---------|---------------------|-----------------------------|---------------------|
| 25 | 30 | 167113 | FRCmM-25/2/003-A-NA |
| | 300 | 167116 | FRCmM-25/2/03-A-NA |
| 40 | 30 | 167114 | FRCmM-40/2/003-A-NA |
| | 300 | 167117 | FRCmM-40/2/03-A-NA |
| 63 | 30 | 167115 | FRCmM-63/2/003-A-NA |
| | 300 | 167118 | FRCmM-63/2/03-A-NA |

Four-Pole



Conditionally Surge Current–Proof 250A, Sensitive to Residual Pulsating DC, Type A

Four-Pole

| Amperes | GF Sensitivity (mA) | Catalog Number ^① | Designation |
|---------|---------------------|-----------------------------|---------------------|
| 25 | 30 | 167125 | FRCmM-25/4/003-A-NA |
| | 300 | 167104 | FRCmM-25/4/03-A-NA |
| 40 | 30 | 167102 | FRCmM-40/4/003-A-NA |
| | 300 | 167105 | FRCmM-40/4/03-A-NA |
| 63 | 30 | 167103 | FRCmM-63/4/003-A-NA |
| | 300 | 167106 | FRCmM-63/4/03-A-NA |

UL 1053 RCCB 480Y/277V Type G/A

Type G/A has a 10 ms delay.

Two-Pole



Surge Current–Proof 3 kA, Sensitive to Residual Pulsating DC, Type G/A (ÖVE E 8601)

Two-Pole

| Amperes | GF Sensitivity (mA) | Catalog Number ^① | Designation |
|---------|---------------------|-----------------------------|-----------------------|
| 25 | 30 | 167119 | FRCmM-25/2/003-G/A-NA |
| | 300 | 167122 | FRCmM-25/2/03-G/A-NA |
| 40 | 30 | 167120 | FRCmM-40/2/003-G/A-NA |
| | 300 | 167123 | FRCmM-40/2/03-G/A-NA |
| 63 | 30 | 167121 | FRCmM-63/2/003-G/A-NA |
| | 300 | 167124 | FRCmM-63/2/03-G/A-NA |

Four-Pole



Surge Current–Proof 3 kA, Sensitive to Residual Pulsating DC, Type G/A (ÖVE E 8601)

Four-Pole

| Amperes | GF Sensitivity (mA) | Catalog Number ^① | Designation |
|---------|---------------------|-----------------------------|-----------------------|
| 25 | 30 | 167107 | FRCmM-25/4/003-G/A-NA |
| | 300 | 167110 | FRCmM-25/4/03-G/A-NA |
| 40 | 30 | 167108 | FRCmM-40/4/003-G/A-NA |
| | 300 | 167111 | FRCmM-40/4/03-G/A-NA |
| 63 | 30 | 167109 | FRCmM-63/4/003-G/A-NA |
| | 300 | 167112 | FRCmM-63/4/03-G/A-NA |

Note

^① Has no thermal element; must be paired with FAZ-NA or FAZ per application.

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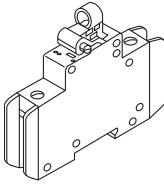
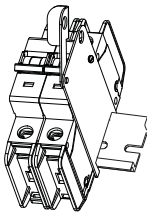
Miniature Circuit Breakers and Supplementary Protectors

UL 1053 DIN Rail RCCB

1

Accessories

UL 1053 DIN Rail RCCB 480/277 Vac

| | Description | Catalog Number | | Description | Catalog Number |
|---|---|----------------|--|-------------------|---------------------|
| Contact  | Two-pole contact or auxiliary contact / trip indicating contact | Z-NHK ① | Padlock Hasp  | Padlock hasp | Z-IS/SPE-1TE |
| | | | Lockoff Device  | UL lockoff device | FAZPLOFF |

Note

① Voltage of FAZ-NA circuit breaker is limited to 300V with this auxiliary contact installed.

Technical Data and Specifications

- Residual current devices
- Has no thermal protection; must be paired with FAZ-NA or FAZ per application
- Captive screw terminals
- Universal tripping signal switch, also suitable for Z-A; can be mounted subsequently
- Auxiliary switch Z-HK can be mounted subsequently
- Red-green contact position indicator
- White-blue tripping indicator
- Delayed types recommended for use with standard fluorescent tubes with or without electronic ballast (30mA-RCD: 30 units per phase conductor, 100mA-RCD: 90 units per phase conductor)
- The device functions irrespective of the position of installation
- Tripping is line voltage-independent. Consequently, the RCD is suitable for “fault current/residual current protection” and “additional protection” within the meaning of the applicable installation rules
- Reverse-feed permitted
- The four-pole device can also be used for two-pole connection. For this purpose, use terminals 5-6 and N-N
- The test key “T” must be pressed every month. The system operator must be informed of this obligation and responsibility in a way that can be proven (self-adhesive RCD-label enclosed)
- Pressing the test key “T” serves the only purpose of function testing the residual current device (RCD). This test does not make earthing resistance measurement (RE) or proper checking of the earth conductor condition redundant, which must be performed separately
- **Type -A:** Protects against special forms of residual pulsating DC that have not been smoothed
- **Type -G/A:** Additionally protects against special forms of residual pulsating DC that have not been smoothed

UL 1053 DIN Rail RCCB Technical Data

| Description | Specification |
|--|--|
| Electrical According to IEC/EN 61008 | |
| Design according to | IEC/EN 61008 ÖVE E 8601 |
| Current test marks as printed onto the device | |
| Tripping Type G | 10 ms delay |
| Rated voltage U_n | 230/400V, 50 Hz |
| Rated tripping current $I_{\Delta n}$ | 30, 300 mA |
| Sensitivity | AC and pulsating DC |
| Rated insulation voltage U_i | 440V |
| Rated impulse withstand voltage U_{imp} | 4 kV |
| Rated short-circuit capacity I_{nc} | 10 kA |
| Maximum backup fuse | Overload protection Short-circuit protection |
| $I_n = 25-40A$ | 25A gG/gL 63A gG/gL |
| $I_n = 63A$ | 40A gG/gL 63A gG/gL |
| Rated breaking capacity I_m bzw. Rated fault breaking capacity $I_{\Delta m}$ | |
| $I_n = 25-40A$ | 500A |
| $I_n = 63A$ | 630A |
| Voltage range of test button | Two-pole 184–250V~ Four-pole 184–440V~ |
| Endurance | Electrical >4000 operating cycles Mechanical >20,000 operating cycles |
| Overvoltage category | III |

UL 1053 DIN Rail RCCB Technical Data, continued

| Description | Specification |
|--|--|
| Electrical According to UL 1053 | |
| Design according to | UL 1053 |
| Current test marks as printed onto the device | |
| Tripping Type G | 8 ms delay |
| Rated voltage U_n | 480Y/277V, 60 Hz |
| Pickup current | 22, 200 mA |
| Sensitivity | AC and pulsating DC |
| Overvoltage tested | 530V |
| Rated impulse withstand voltage U_{imp} | 4 kV |
| Rated short-circuit capacity I_{nc} | 5 kA according to CSA |
| Maximum backup fuse | Overload protection Short-circuit protection |
| $I_n = 25-40A$ | 25A gG/gL 63A gG/gL |
| $I_n = 63A$ | 40A gG/gL 63A gG/gL |
| Rated breaking capacity I_m or Rated fault breaking capacity $I_{\Delta m}$ | |
| $I_n = 25-40A$ | 500A |
| $I_n = 63A$ | 630A |
| Voltage range of test button | Two-pole 184–305V~ Four-pole 184–528V~ |
| Endurance | Electrical >4000 operating cycles Mechanical >20,000 operating cycles |
| Mechanical | |
| Frame size | 45.0 mm |
| Device height | 80.0 mm |
| Device width | 35 mm (2TE), 70 mm (4TE) |
| Device width | Quick fastening with two lock-in positions on DIN rail IEC/EN 60715 |
| Degree of protection, built-in | IP40 |
| Degree of protection in moisture-proof enclosure | IP54 |
| Upper and lower terminals | Lift terminals |
| Terminal protection | Finger and hand touch safe BGV A3, ÖVE-EN 6 |
| Terminal capacity | 1.5–35 mm ² single-wire 2 x 16 mm ² multi-wire |
| Busbar material thickness | 0.8–2 mm |
| Tripping temperature | –25°C to +60°C |
| Resistance to climatic conditions | According to IEC 61008 |
| Humidity | 5–95% |

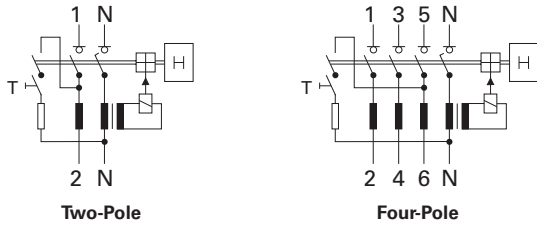
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Miniature Circuit Breakers and Supplementary Protectors

UL 1053 DIN Rail RCCB

1

Connection Diagram



Impact of Ambient Temperature on the Maximum Permanent Current Allowed (A)

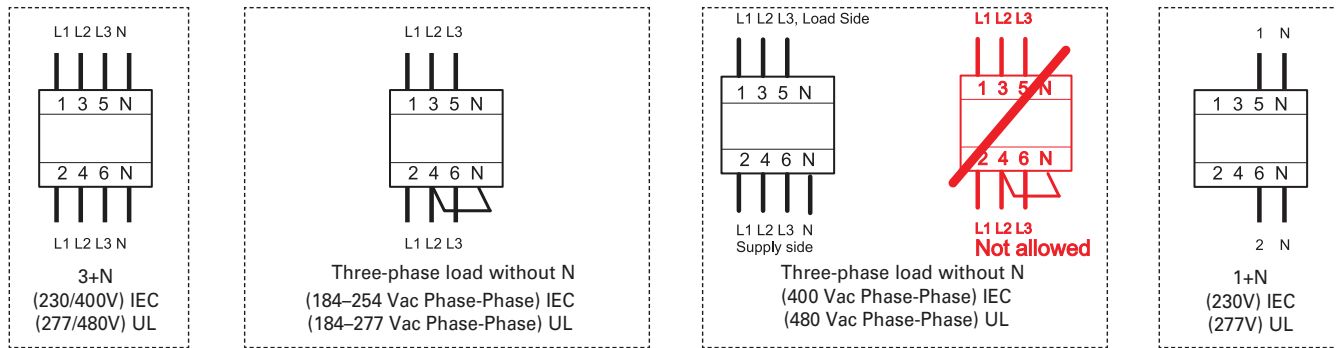
| Tripping Temperature | 16A | | 25A | | 40A | | 63A | |
|----------------------|----------|-----------|----------|-----------|----------|-----------|----------|-----------|
| | Two-Pole | Four-Pole | Two-Pole | Four-Pole | Two-Pole | Four-Pole | Two-Pole | Four-Pole |
| 40°C | 16 | 16 | 25 | 25 | 40 | 40 | 63 | 63 |
| 45°C | 14 | 14 | 21 | 22 | 37 | 37 | 59 | 59 |
| 50°C | 11 | 11 | 18 | 19 | 33 | 34 | 55 | 55 |
| 55°C | 9 | 9 | 14 | 16 | 30 | 31 | 50 | 50 |
| 60°C | ① | — | — | — | 26 | 27 | 45 | 45 |

Notes

① Do not use.

Please make sure that these values are not exceeded and that any upstream overload protection switches off in time.

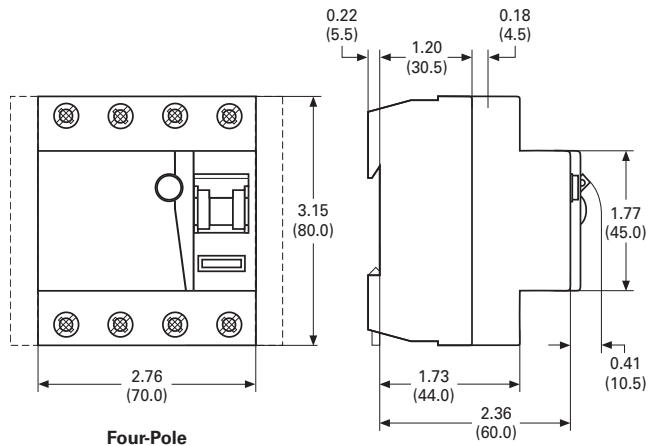
Correct Connection



Dimensions

Approximate Dimensions in Inches (mm)

UL 1053 DIN Rail RCCB



Accessories Technical Data

| Description | Z-NHK |
|--|---|
| Electrical | |
| Contact function | 2CO |
| Rated voltage | 230V |
| Frequency | 50/60 Hz |
| Rated current | 2A |
| Rated thermal current I_{th} | 2A |
| Utilization category AC13 Rated operational current I_e | 3A/250 Vac |
| Utilization category AC15 Rated operational current I_e | 2A/250 Vac |
| Utilization category DC12 Rated operational current I_e | 0.5A/110 Vdc |
| Rated insulation voltage U_i | 250 Vac |
| Minimum operational voltage per contact U_{min} | 5 Vdc |
| Minimum operational current I_{min} | 10 mA DC |
| Rated peak withstand voltage U_{imp} (1.2/50 μ) | 2.5 kV |
| Conditional short-circuit current I_k with backup fuse 6A | 1 kA |
| Maximum backup fuse, overload and short circuit | 6A gL |
| Mechanical | |
| Tripping indicator "electrical tripping" | Blue/white |
| Frame size | 45 mm |
| Device height | 80 mm |
| Device width | 8.8 mm (0.5MU) |
| Mounting | Onto switching device |
| Degree of protection, built-in | IP40 |
| Terminal protection | Finger and hand touch safe According to BGV A3, ÖVE-EN 6 |
| Terminals | Lift terminals |
| Terminal capacity | 20–14 AWG |
| Terminal screws | M3 (Posidrive Z0) |
| Fastening torque of terminal screws | 7 lb-in maximum |

UL 1053 DIN Rail RCCB



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| UL 1053 DIN Rail RCCB 480/277 Vac. | V4-T1-94 |
| UL 1053 DIN Rail RCCB 208Y/120 Vac | |
| Product Selection | V4-T1-101 |
| Accessories | V4-T1-102 |
| Technical Data and Specifications | V4-T1-103 |
| Dimensions | V4-T1-104 |

UL 1053 DIN Rail RCCB 208Y/120 Vac

Product Overview

Optimum product quality, tested reliability and safety stand for best protection of installations and plant. Eaton’s UL 1053 Residual Current Circuit Breaker (RCCB) is designed for use in residual current applications.

Application Description

- Motor control circuits
- HVAC internal/external equipment
- PLCs
- HMIs
- Equipment protection

Features

- Wide range of compact RCD type serving as fault-current and additional protection according to UL 1053 and IEC/EN 61008 standards, suitable for worldwide use in the 110V range of applications
- Type A or Type G/A (with delay) protection available
- Comprehensive range of accessories
- Real contact position indicator
- Fault current tripping indicator
- Transparent designation plate
- Trip-free design—RCCB can not be defeated by holding the handle in the ON position
- Captive screws cannot be lost

Standards and Certifications

- UL 1053
- IEC/EN 61008



Product Selection

UL 1053 RCCB 208Y/120 Vac Type A

Four-Pole



Conditionally Surge Current–Proof 250A, Sensitive to Residual Pulsating DC, Type A

Four-Pole

| Amperes | GF Sensitivity (mA) | Catalog Number ^① | Designation |
|---------|---------------------|-----------------------------|-------------------------|
| 25 | 30 | 167699 | FRCmM-25/4/003-A-NA-110 |
| | 300 | 167702 | FRCmM-25/4/03-A-NA-110 |
| 40 | 30 | 167700 | FRCmM-40/4/003-A-NA-110 |
| | 300 | 167703 | FRCmM-40/4/03-A-NA-110 |
| 63 | 30 | 167701 | FRCmM-63/4/003-A-NA-110 |
| | 300 | 167704 | FRCmM-63/4/03-A-NA-110 |

UL 1053 RCCB 208Y/120 Vac Type G/A

Type G/A has a 10 ms delay.

Two-Pole



Surge Current–Proof 3 kA, Sensitive to Residual Pulsating DC, Type G/A (ÖVE E 8601)

Two-Pole

| Amperes | GF Sensitivity (mA) | Catalog Number ^① | Designation |
|---------|---------------------|-----------------------------|---------------------------|
| 25 | 30 | 167693 | FRCmM-25/2/003-G/A-NA-110 |
| | 300 | 167696 | FRCmM-25/2/03-G/A-NA-110 |
| 40 | 30 | 167694 | FRCmM-40/2/003-G/A-NA-110 |
| | 300 | 167697 | FRCmM-40/2/03-G/A-NA-110 |
| 63 | 30 | 167695 | FRCmM-63/2/003-G/A-NA-110 |
| | 300 | 167698 | FRCmM-63/2/03-G/A-NA-110 |

Four-Pole



Surge Current–Proof 3 kA, Sensitive to Residual Pulsating DC, Type G/A (ÖVE E 8601)

Four-Pole

| Amperes | GF Sensitivity (mA) | Catalog Number ^① | Designation |
|---------|---------------------|-----------------------------|---------------------------|
| 25 | 30 | 167705 | FRCmM-25/4/003-G/A-NA-110 |
| | 300 | 167708 | FRCmM-25/4/03-G/A-NA-110 |
| 40 | 30 | 167706 | FRCmM-40/4/003-G/A-NA-110 |
| | 300 | 167709 | FRCmM-40/4/03-G/A-NA-110 |
| 63 | 30 | 167707 | FRCmM-63/4/003-G/A-NA-110 |
| | 300 | 167710 | FRCmM-63/4/03-G/A-NA-110 |

Note

^① Has no thermal element; must be paired with FAZ-NA or FAZ per application.

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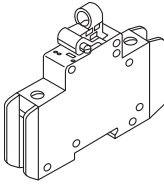
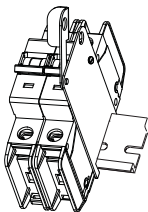
Miniature Circuit Breakers and Supplementary Protectors

UL 1053 DIN Rail RCCB

1

Accessories

UL 1053 DIN Rail RCCB 208Y/120 Vac

| | Description | Catalog Number | | Description | Catalog Number |
|---|---|----------------|---|-------------------|---------------------|
| Contact | Two-pole contact or auxiliary contact / trip indicating contact | Z-NHK ① | Padlock Hasp | Padlock hasp | Z-IS/SPE-1TE |
|  | | |  | | |
| | | | Lockoff Device | UL lockoff device | FAZPLOFF |
| | | |  | | |

Note

① Voltage of FAZ-NA circuit breaker is limited to 300V with this auxiliary contact installed.

Technical Data and Specifications

- Residual current devices
- Has no thermal protection; must be paired with FAZ-NA or FAZ per application
- Captive screw terminals
- Universal tripping signal switch, also suitable for Z-A; can be mounted subsequently
- Auxiliary switch Z-HK can be mounted subsequently
- Red-green contact position indicator
- White-blue tripping indicator
- Delayed types recommended for use with standard fluorescent tubes with or without electronic ballast (30mA-RCD: 30 units per phase conductor, 100mA-RCD: 90 units per phase conductor)
- The device functions irrespective of the position of installation
- Tripping is line voltage-independent. Consequently, the RCD is suitable for “fault current/residual current protection” and “additional protection” within the meaning of the applicable installation rules
- Reverse-feed permitted
- The four-pole device can also be used for two-pole connection. For this purpose, use terminals 5-6 and N-N
- The test key “T” must be pressed every month. The system operator must be informed of this obligation and responsibility in a way that can be proven (self-adhesive RCD-label enclosed)
- Pressing the test key “T” serves the only purpose of function testing the residual current device (RCD). This test does not make earthing resistance measurement (RE) or proper checking of the earth conductor condition redundant, which must be performed separately
- **Type -A:** Protects against special forms of residual pulsating DC that have not been smoothed
- **Type -G/A:** Additionally protects against special forms of residual pulsating DC that have not been smoothed

UL 1053 DIN Rail RCCB Technical Data

| Description | Specification |
|--|--|
| Electrical According to IEC/EN 61008 | |
| Design according to | IEC/EN 61008 ÖVE E 8601 |
| Current test marks as printed onto the device | |
| Tripping Type G | 10 ms delay |
| Rated voltage U_n | 230/400V, 50 Hz |
| Rated tripping current $I_{\Delta n}$ | 30, 300 mA |
| Sensitivity | AC and pulsating DC |
| Rated insulation voltage U_i | 440V |
| Rated impulse withstand voltage U_{imp} | 4 kV |
| Rated short-circuit capacity I_{nc} | 10 kA |
| Maximum backup fuse | Overload protection Short-circuit protection |
| $I_n = 25-40A$ | 25A gG/gL 63A gG/gL |
| $I_n = 63A$ | 40A gG/gL 63A gG/gL |
| Rated breaking capacity I_m bzw. Rated fault breaking capacity $I_{\Delta m}$ | |
| $I_n = 25-40A$ | 500A |
| $I_n = 63A$ | 630A |
| Voltage range of test button | Two-pole 100–132V~ Four-pole 100–230V~ |
| Endurance | Electrical >4000 operating cycles Mechanical >20,000 operating cycles |
| Overvoltage category | III |

UL 1053 DIN Rail RCCB Technical Data, continued

| Description | Specification |
|--|--|
| Electrical According to UL1053 | |
| Design according to | UL 1053 |
| Current test marks as printed onto the device | |
| Tripping Type G | 8 ms delay |
| Rated voltage U_n | 208Y/120V, 60 Hz |
| Pickup current | 22, 200 mA |
| Sensitivity | AC and pulsating DC |
| Overvoltage tested | 530V |
| Rated impulse withstand voltage U_{imp} | 4 kV |
| Rated short-circuit capacity I_{nc} | 5 kA according to CSA |
| Maximum backup fuse | Overload protection Short-circuit protection |
| $I_n = 25-40A$ | 25A gG/gL 63A gG/gL |
| $I_n = 63A$ | 40A gG/gL 63A gG/gL |
| Rated breaking capacity I_m or Rated fault breaking capacity $I_{\Delta m}$ | |
| $I_n = 25-40A$ | 500A |
| $I_n = 63A$ | 630A |
| Voltage range of test button | Two-pole 100–121V~ Four-pole 100–210V~ |
| Endurance | Electrical >4000 operating cycles Mechanical >20,000 operating cycles |
| Mechanical | |
| Frame size | 45.0 mm |
| Device height | 80.0 mm |
| Device width | 35 mm (2TE), 70 mm (4TE) |
| Device width | Quick fastening with two lock-in positions on DIN rail IEC/EN 60715 |
| Degree of protection, built-in | IP40 |
| Degree of protection in moisture-proof enclosure | IP54 |
| Upper and lower terminals | Lift terminals |
| Terminal protection | Finger and hand touch safe BGV A3, ÖVE-EN 6 |
| Terminal capacity | 1.5–35 mm ² single-wire 2 x 16 mm ² multi-wire |
| Busbar material thickness | 0.8–2 mm |
| Tripping temperature | –25°C to +60°C |
| Resistance to climatic conditions | According to IEC 61008 |
| Humidity | 5–95% |

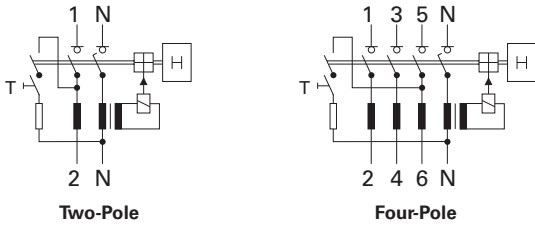
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Miniature Circuit Breakers and Supplementary Protectors

UL 1053 DIN Rail RCCB

1

Connection Diagram



Impact of Ambient Temperature on the Maximum Permanent Current Allowed (A)

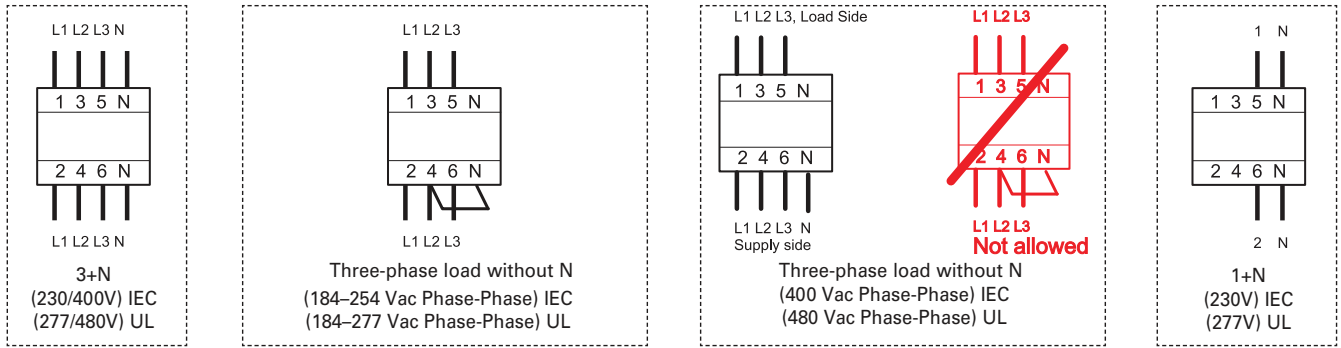
| Tripping Temperature | 16A | | 25A | | 40A | | 63A | |
|----------------------|----------|-----------|----------|-----------|----------|-----------|----------|-----------|
| | Two-Pole | Four-Pole | Two-Pole | Four-Pole | Two-Pole | Four-Pole | Two-Pole | Four-Pole |
| 40°C | 16 | 16 | 25 | 25 | 40 | 40 | 63 | 63 |
| 45°C | 14 | 14 | 21 | 22 | 37 | 37 | 59 | 59 |
| 50°C | 11 | 11 | 18 | 19 | 33 | 34 | 55 | 55 |
| 55°C | 9 | 9 | 14 | 16 | 30 | 31 | 50 | 50 |
| 60°C | ① | — | — | — | 26 | 27 | 45 | 45 |

Notes

① Do not use.

Please make sure that these values are not exceeded and that any upstream overload protection switches off in time.

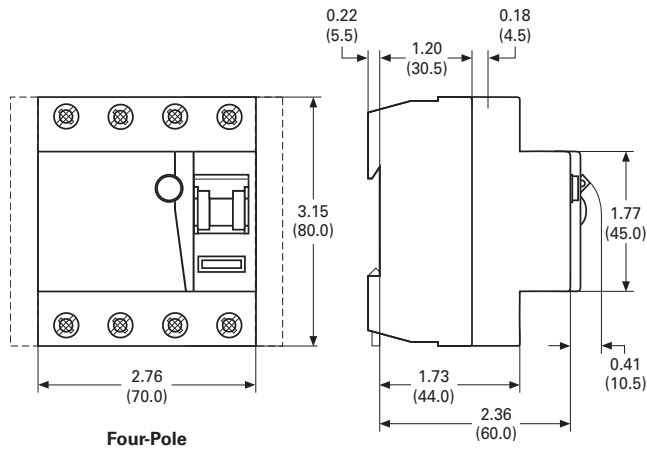
Correct Connection



Dimensions

Approximate Dimensions in Inches (mm)

UL 1053 DIN Rail RCCB



Accessories Technical Data

| Description | Z-NHK | Z-IHK-NA |
|--|---|---|
| Electrical | | |
| Contact function | 2CO | 1NO + 1NC |
| Rated voltage | 230V | 250V |
| Frequency | 50/60 Hz | 50/60 Hz |
| Rated current | 2A | 6A |
| Rated thermal current I_{th} | 2A | 6A |
| Utilization category AC13 Rated operational current I_e | 3A/250 Vac | 3A/250 Vac |
| Utilization category AC15 Rated operational current I_e | 2A/250 Vac | 2A/250 Vac |
| Utilization category DC12 Rated operational current I_e | 0.5A/110 Vdc | 0.5A/110 Vdc 0.25A/220 Vdc |
| Rated insulation voltage U_i | 250 Vac | 250 Vac |
| Minimum operational voltage per contact U_{min} | 5 Vdc | 5 Vdc |
| Minimum operational current I_{min} | 10 mA DC | 10 mA AC/DC |
| Rated peak withstand voltage U_{imp} (1.2/50 μ) | 2.5 kV | 4 kV |
| Conditional short-circuit current I_k with backup fuse 6A | 1 kA | 1 kA |
| Maximum backup fuse, overload and short circuit | 6A gL | — |
| Mechanical | | |
| Tripping indicator "electrical tripping" | Blue/white | — |
| Frame size | 45 mm | 45 mm |
| Device height | 80 mm | 80 mm |
| Device width | 8.8 mm (0.5MU) | 8.8 mm (0.5MU) |
| Mounting | Onto switching device | — |
| Degree of protection, built-in | IP40 | IP40 |
| Terminal protection | Finger and hand touch safe According to BGV A3, ÖVE-EN 6 | Finger and hand touch safe According to BGV A3, ÖVE-EN 6 |
| Terminals | Lift terminals | Lift terminals |
| Terminal capacity | 20–14 AWG | 0.5–2.5 mm ² |
| Terminal screws | M3 (Posidrive Z0) | M3 (Posidrive Z0) |
| Fastening torque of terminal screws | 7 lb-in maximum | 1.2 Nm |

Power Defense Molded Case Circuit Breakers



Series G Circuit Breakers



| | | |
|------------|---|-----------|
| 2.1 | Introduction | |
| | Product Overview | V4-T2-2 |
| 2.2 | Power Defense Molded Case Circuit Breakers | |
| | Power Defense Introduction | V4-T2-4 |
| | Power Defense Technical Data | V4-T2-12 |
| | Frame Size 1 (15–125 A) | V4-T2-22 |
| | Frame Size 2 (15–225 A) | V4-T2-29 |
| | Frame Size 3 (45–600 A) | V4-T2-42 |
| | Frame Size 4 (300–800 A) | V4-T2-57 |
| | Frame Size 5 (320–1200 A) | V4-T2-70 |
| | Frame Size 6 (700–2500 A) | V4-T2-79 |
| | Motor Circuit Protectors (3–600 A) | V4-T2-87 |
| | Motor Protection Circuit Breakers (15–600 A) | V4-T2-98 |
| | Special Applications | V4-T2-104 |
| 2.3 | Series G® Molded Case Circuit Breakers | |
| | Product Overview | V4-T2-106 |
| | EG-Frame (15–125 Amperes) | V4-T2-117 |
| | JG-Frame (63–250 Amperes) | V4-T2-131 |
| | LG-Frame (250–630 Amperes) | V4-T2-149 |
| | NG-Frame (320–1200 Amperes) | V4-T2-167 |
| | RG-Frame (800–2500 Amperes) | V4-T2-176 |
| | Motor Circuit Protectors (MCP) | V4-T2-187 |
| | Motor Protector Circuit Breakers (MPCB) | V4-T2-191 |
| | 30 mA Ground Fault (Earth Leakage) Module | V4-T2-194 |
| | Current Limiting Circuit Breaker Module | V4-T2-198 |
| | High Instantaneous Circuit Breaker for Selective Coordination | V4-T2-203 |
| | Special Features and Accessories | V4-T2-206 |
| | Motor Operators | V4-T2-214 |
| | Plug-In Blocks | V4-T2-216 |
| | Drawout Cassette | V4-T2-217 |
| 2.4 | Series C® Molded Case Circuit Breakers | |
| | Product Overview | V4-T2-218 |
| | G-Frame (15–100 Amperes) | V4-T2-223 |
| | F-Frame (10–225 Amperes) | V4-T2-237 |
| | J-Frame (70–250 Amperes) | V4-T2-255 |
| | K-Frame (70–400 Amperes) | V4-T2-263 |
| | L-Frame (125–600 Amperes) | V4-T2-287 |
| | M-Frame (300–800 Amperes) | V4-T2-313 |
| | N-Frame (400–1200 Amperes) | V4-T2-324 |
| | R-Frame (800–2500 Amperes) | V4-T2-339 |
| | Motor Circuit Protectors (MCP) | V4-T2-358 |
| | Motor Protection Circuit Breakers (MPCB) | V4-T2-369 |
| | Type ELC Current Limiter Attachment (Size 0–4) | V4-T2-371 |
| | Current Limiting Circuit Breaker Module | V4-T2-372 |
| | Internal Accessories | V4-T2-375 |
| | External Accessories | V4-T2-408 |
| 2.5 | Specialty Breakers | |
| | Engine Generator Circuit Breakers | V4-T2-435 |
| | Direct Current Circuit Breakers | V4-T2-441 |
| | PVGard™ Solar Circuit Breakers | V4-T2-455 |
| | E ² Mining Service Breakers | V4-T2-468 |
| 2.6 | Handle Mechanisms | |
| | Handle Mechanisms—Series G | V4-T2-494 |
| | Handle Mechanisms—Series C | V4-T2-506 |



Series G E-Frame and Series C F-Frame Molded Case Circuit Breakers



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| Series G | V4-T2-106 |
| Series C | V4-T2-218 |
| Specialty Breakers | V4-T2-435 |



Product Overview

Series G vs. Series C

Eaton's Electrical Sector, under the Eaton brand, offers the widest variety of molded case circuit breakers available today. Designed for electrical and machinery OEMs serving a range of industries and applications, these proven designs incorporate the latest in innovation with the high reliability that has been our hallmark since the advent of the circuit breaker in the 1920s.

The Series C family ranges from 15–2500 amperes, and includes thermal-magnetic breakers, electronic trip breakers, molded case switches, motor circuit protectors, and specially designed breakers for engine generator, DC and mining applications.

The new Series G line features an average 35% size reduction, common field-installable internal accessories, and advanced trip unit functionality that eliminates the need for rating plugs. These breakers meet the requirements of UL®, CSA®, IEC, CCC and CE, allowing the OEM to standardize on a design that meets the needs of their global customer base.

Application Description

Eaton molded case circuit breakers cover the widest range of applications in the industry:

- Electrical OEMs
- Machinery OEMs
- Navy breakers:
 - UL 489 Supplement SB
 - MIL-C-17588
 - MIL-C-17361
 - ABS/NVR
- Mining breakers up to 1100 Vac
- Earth leakage
- DC breakers 125–750 Vdc
- Engine generator breakers 15–1200 amperes
- Current limiting breakers

Typical Applications

Machine Tool Control Panels and Motor Control Centers

Designed for these equipment requirements, including new world-class accessories.

Panelboards

As both main and branch circuit protection devices.

Feeder Pillars

In distribution systems to provide main and branch circuit protection.

Switchgear

In distribution systems to provide main and branch circuit protection up to 2500 amperes (RG-Frame).

Busbar Trunking Tap-Offs

In busbar trunking tap-offs to provide circuit protection.

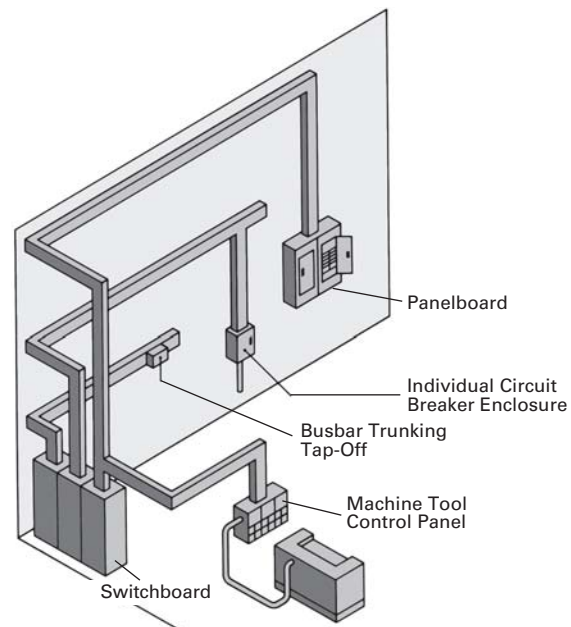
Individual Enclosures

Completely assembled in enclosures to meet specific customer requirements.

Additional Applications

Special versions of each Eaton frame are available to provide safe equipment control and protection in mining and other applications. Contact your Eaton agent or distributor for additional information.

Typical Eaton Applications



Eaton Molded Case Circuit Breakers in Assemblies

Applications

| Frame | Ampere Range | Panelboards | | | | | | | | Switchboards | | | Motor Control Centers | | | Enclosed Control | Bus Plugs | Enclosed Breaker | |
|-----------------|--------------|-------------|----|-------|-------|----|----|---|----|--------------|----|-------|-----------------------|---------|---------|------------------|-----------|------------------|----|
| | | 1A | 2A | 1A-LX | 2A-LX | 3A | 3E | 4 | 4B | 4D | 5P | PRL-C | PRL-i | PRL-C/i | Freedom | | | | // |
| Series G | | | | | | | | | | | | | | | | | | | |
| EG | 15–160 ① | — | — | — | — | — | ■ | — | — | — | — | — | — | — | ■ | ■ | ■ | — | — |
| JG | 20–250 | — | — | — | — | — | — | — | — | ■ | — | — | — | — | — | — | — | — | — |
| LG | 100–630 ② | ■ | ■ | — | — | ■ | ■ | ■ | ■ | ■ | — | ■ | — | ■ | — | — | — | — | ■ |
| NG | 400–1600 | — | — | — | — | — | — | — | ■ | ■ | — | ■ | ■ | ■ | ■ | ■ | — | — | ■ |
| RG | 800–2500 ③ | — | — | — | — | — | — | — | — | — | — | ■ | — | ■ | ■ | ■ | — | — | — |
| Series C | | | | | | | | | | | | | | | | | | | |
| FD/ED | 15–225 | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | — | ■ | ■ | ■ | ■ | ■ |
| JD | 70–250 | ■ | ■ | — | — | ■ | — | ■ | ■ | ■ | ■ | ■ | ■ | — | ■ | ■ | ■ | ■ | ■ |
| KD | 70–400 | ■ | ■ | — | — | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ |
| LD | 400–600 | — | — | — | — | ■ | — | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ |
| MDL | 300–800 | — | — | — | — | — | — | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ |
| ND | 400–1200 | — | — | — | — | — | — | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ |
| RD | 800–2500 | — | — | — | — | — | — | — | — | — | ■ | ■ | — | ■ | ■ | — | — | — | — |

Notes

- ① 125 amperes is the maximum UL and CSA rating for EG.
- ② 600 amperes is the maximum UL and CSA rating for LG.
- ③ 1200 amperes is the maximum UL and CSA rating for NG.

Power Defense Molded Case Circuit Breakers

2



Product Description

Eaton's globally accepted Power Defense™ molded case circuit breaker (MCCB) can:

- Connect to your network or the cloud with built-in communication capability
- Generate the data to help optimize your facility's performance
- Mitigate arc flash to keep your employees, customers and end users safe

The Power Defense MCCB portfolio is globally adaptive to your footprint no matter the application or project requirement. All frames have the availability of global certifications including IEC, CCC, UL® and CSA®. Eaton's best-in-class support enables you to order readily available product for on-time delivery, across the globe.

Application Description

Power Xpert Release Electronic Trip Units

Simpler communications.
Better protection.
Easier energy metering

Embedded in the Power Defense portfolio, Power Xpert® Release (PXR) electronic trip units for global low-voltage commercial and industrial applications are Eaton's latest innovation in circuit protection technology.

They are designed to help you simplify your communications, enhance your protection and support your energy metering.

- Unique Eaton trip unit platform enables you to easily change set points, test and configure circuit breakers, and meter energy and power information
- Enhanced, easy-to-use interface allows you to view and adjust the trip unit settings
- Intuitive interface provides simple scroll-through visibility for critical performance metrics such as metering, battery life, zone selective interlock settings and circuit breaker health

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| Motor Circuit Protectors (3–600 A) | V4-T2-87 |
| Motor Protection Circuit Breakers (15–600 A) | V4-T2-98 |
| Special Applications | V4-T2-104 |

Features and Benefits

Trip Unit Configurations

Thermal-Magnetic

- Available with adjustable magnetic settings, and for IEC markets, adjustable thermal settings. For NEMA markets, fixed magnetic and fixed thermal settings are options. Four-pole options with 0%, 60% and 100% protection are available

PXR 10

- All of the advantages of an electronic trip unit in a simpler interface, which leads to easy setup. This trip unit is available with LSI protection and includes programmable settings so that it can be tailored for the specific application

PXR 20

- A fully adjustable trip unit with LSI and LSIG protection capabilities. This trip unit offers more advanced features than ever before at this level, including current metering, programmable relays, and optional embedded communications to enable seamless integration into control and communication systems
- The PXR 20 also offers cutting-edge safety features like the Arcflash Reduction Maintenance System™ and zone selective interlocking with new testing and status indication features, and cause of trip indication

PXR 20D

- Offers the same level of functionality as the PXR 20, but with a programmable interface that allows for additional flexibility in protection parameters and integration into inter-connected power distribution systems. The protection and safety functions can be programmed not only from the onboard LCD screen, but also through communications, making your system setup and commissioning easier and future-proofed

PXR 25

- Offers more functionality than ever before in a molded case circuit breaker trip unit. 1% accuracy for energy readings, coupled with the option for multiple communication protocols and embedded programmable relays, making this the ultimate example of an intelligent node in a power distribution system
- Leverage the capabilities of this product to eliminate meters and other components from the system, making the power distribution system cost-effective and smaller, with increased intelligence and connectivity

Each breaker frame section indicates the full range of trip units available for the frame. The wide range of trip unit options, coupled with field-replaceable trip units, enables compatibility with global requirements and allows upgrade from the most basic protective device to a high-end, intelligent node in a power system.

Trip Unit Features**Breaker Health Feature and Programmable Alarms***Less Costly Downtime*

By enabling you to perform predictive and preventive maintenance on your power distribution system prior to component failure, the breaker health feature and programmable alarms will help you avoid costly downtime.

- Communicates circuit breaker status at customer determined levels to prompt for breaker maintenance or inspection
- Provides real-time evaluation of breaker condition by tracking and analyzing diagnostic details including breaker operations, short-circuit fault levels, operational time, internal temperature and overloads

Zone Selective Interlocking*Reduction in Arc Flash Energy*

The zone selective interlocking (ZSI) feature communicates when a phase or ground fault is present.

- The breaker closest to the fault will override any customer-defined delay setting and open instantaneously to clear the fault, allowing line-side breakers to remain closed and online
- The PXR trip unit displays when the ZSI system is engaged, communicating, and helping to keep you and your employees safe—so you no longer have to just trust that the ZSI is operational, unlike with other MCCB offerings
- ZSI is also a proven solution for reducing arc flash incident energy when a fault is present

Arcflash Reduction Maintenance System*Better Safety and Productivity*

For added protection, the Power Defense portfolio offers Eaton's patented Arcflash Reduction Maintenance System to reduce arc flash incident energy. This innovative safety feature can help you:

- Decrease personal protection equipment (PPE) requirements to enhance productivity
- Enhance the safety of your personnel

Enhanced Ground Fault Protection and Coordination*Easier Phase or Ground Fault Detection and Warning*

Expanded protection of ground fault increases coordination capabilities and provides ability to turn protection off.

- ON/OFF feature simplifies system testing
- Ground fault trip units combine trip, alarm, and OFF in every unit, with programmable relays for alarm or pre-alarm functionality
- Expanded time profile selections include I²t and flat response profiles for more coordination options

Power Xpert Protection Manager*Simpler Operation, Reduced Maintenance*

Once installed, your Power Xpert Release trip unit continues to provide cost savings and advanced functionality through the Power Xpert Protection Manager (PXPM) interface. This intuitive user interface allows for simple trip unit set up and programming, real-time reporting of power and energy metering, as well as the ability to check critical performance metrics, to meet your application needs while decreasing maintenance and in-field testing time. The testing features and functionality, which can be run through a personal computer, offers savings through labor hour reduction and avoiding the need for expensive proprietary testing kits.

- Ultimate control and data are at your fingertips:
 - Set point Configuration: Allows direct-to-trip unit or offline set up, including duplication of settings between units
 - Control Mode: Capture waveforms, reset TU or set the date/time
 - Test Mode: Run secondary injection and create test reports
 - Real-Time Data: Provides information regarding all status and metered data direction from the trip unit
 - Event Summaries: Stores up to 200 events, detailed information on the most recent (10) trip and (10) alarm events, and time adjustments to the real-time clock
 - Reports: Allows for the formatting and printing of real time data and of performed secondary injection tests

Breaker Frame Overview

Power Defense molded case circuit breakers include six frames, PD-1 through PD-6, providing flexibility to meet protection needs up to 2500 A.

PD-1—Compact frame covering range of 15 A through 125 A with fixed thermal-magnetic trip unit, and with current limiting options. Additionally, motor circuit protectors covering a range from 3 A through 100 A with adjustable magnetic settings of 3x to 11x.

PD-2—Standard frame covering a range of 15 A through 225 A with trip unit options, from a fixed thermal-magnetic to the most advanced Power Xpert™ Release (PXR) electronic units. PD-2 also has current limiting options available. Additionally, motor protection circuit breakers ranging from 15 A through 200 A with PXR electronic trip units, as well as motor circuit protectors ranging from 3 A through 150 A with adjustable magnetic settings from 3x to 10x.

PD-3—Covers a range of 45 A through 600 A with field-installable trip units, including fixed thermal/adjustable magnetic and all PXR electronic trip unit options in two frame options: 400 A and 600 A. PD-3 also has 100% UL ratings and current limiting options. Additionally, motor protection circuit breakers ranging from 45 A through 600 A with PXR electronic trip units, as well as motor circuit protectors ranging from 70 A through 600 A with adjustable magnetic settings from 5x to 10x.

PD-4—Covers a range of 300 A through 800 A with field-installable trip units, including fixed thermal/adjustable magnetic, and all PXR electronic trip unit options (PXR 10, PXR 20, PXR 20D and PXR 25), and 100% UL rating options.

PD-5—Covers a range of 320 A through 1200 A with field-installable PXR electronic trip units, PXR 20, PXR 20D and PXR 25, as well as 100% UL rating options.

PD-6—Covers a range of 700 A through 2500 A with field-installable PXR electronic trip units, PXR 20, PXR 20D and PXR 25, as well as 100% UL rating options.

Interrupting Ratings

The Power Defense molded case circuit breaker line is a global product, with interrupting ratings across a broad range of voltages. These interrupting ratings are optimized for power distribution and meet the broadest range of application needs. See each frame for the specific interrupting levels.

Modular Accessories

The Power Defense molded case circuit breakers feature new, modular accessories that are designed to make customization of the breaker for the unique requirements of the application easier than ever before. A common line of auxiliary switch and bell alarms allow for interchangeability between the different Power Defense breaker frames, enabling the final configuration of the breaker at the point of use and minimizing the amount of inventory required. Compact, modular shunt trips and under voltage releases have been designed to be easily installed and removed as the project or application dictates.

Some of the most common accessories and their function are described below.

Internal Accessories

Auxiliary Switches—Provide circuit breaker primary contact status information. The auxiliary switch is used for remote indication and interlock system verification. These switches mount internal to the breaker in the right side accessory cavity.

Alarm Switches—Used for remote indication of automatic trip operation. The switch automatically resets when the circuit breaker is reset. These switches mount internal to the breaker in the right side accessory cavity.

Shunt Trip—Provides capability to trip the breaker by remote control. Shunt trips are designed to be applied at specific AC or DC voltages. These devices are installed internal to the breaker in the left side accessory cavity.

Undervoltage Release

(UVR)—Monitors a voltage, typically of a line voltage, and trips the circuit breaker when the voltage falls below 70% of the nominal voltage designated for the UVR. These devices are installed internal to the breaker in the left side accessory cavity.

External Accessories

Terminals—Multiple cable terminal options are available for each frame, providing alternatives to connect primary power and loads to the circuit breaker. Additionally, control wire terminals provide a means to tap off control power. Multi-wire terminals on the load side of the breaker can also be used to distribute the load from the circuit breaker to multiple devices without the use of separate distribution terminal blocks.

Terminal Shields—Provide protection against accidental contact with live terminations, as well as clearance between circuit breaker poles or adjacent circuit breakers, and are required for some terminal applications.

Interphase Barriers—Offer additional electrical clearance between circuit breaker poles for special termination applications.

Operating Mechanisms—Manually operated mechanisms designed to open, close and reset circuit breakers. These are available in three basic configurations—flange mounted, through-the-door and direct (close-coupled)—to provide a variety of options for different applications.

Remote/Electrical Operators—A motor driven, stored energy operator that enables a user to locally or remotely switch the breaker between the OFF, ON and TRIP positions, including reset switching. These operators mount on the front cover of the circuit breaker, within the trim line of the circuit breaker, and are designed to be applied at specific AC or DC voltages.

Locking Devices—Offer the capability to lock the breaker handle in the OFF or ON position (trip-free operation allows the breaker to trip when locked in the ON position). Power Defense offers three primary types, including handle blocks, padlockable hasps, and provisions for Kirk trapped key locks (Kirk lock must be purchased separately).

Walking Beam Interlock—Provides a mechanical interlock between two adjacent circuit breakers of the same frame size and pole configuration, preventing both breakers from being switched ON at the same time. To install a walking beam interlock, the circuit breakers must be ordered with the factory modification to accept the interlock.

Plug-In Adapters—Provide a rear connection and mounting base to simplify installation and front removal of circuit breakers. Plug-in adapters are available for frames PD-1, PD-2 and PD-3.

Drawout Configurations—Provide a robust system to remove or exchange breakers and is typically used in critical power operations. It provides a rear connection and cell, and provides indication of the circuit breaker position. Drawout configurations are available for frames PD-3, PD-4 and PD-5.

Standards and Certifications

Power Defense circuit breakers meet applicable:

- UL 489
- CSA, C22.2 No. 5-02
- IEC 60947-2
- GB 14048.2-2008



Catalog Numbering System Overview

Breakers

Power Defense breakers are configured using a 20-digit catalog number that can be divided into two sections:

- Base breaker catalog number = digits 1–14
- Factory modifications = digits 15–20

Product may be ordered using the base breaker catalog number (*14 digits*) only. However, if factory modifications are required, including installation of accessories, the full breaker catalog number plus factory modifications (*20 digits*) for a configured breaker must be used.

Note that most of the accessories for Power Defense molded case circuit breakers are field installable. When field installing accessories, the best practice to follow is to order a base breaker with the 14-digit catalog number, and order the accessories separate for field installation.

A configured breaker (*20 digits*) catalog number should only be used when it is necessary to have a factory modification of the circuit breaker.

Base Breaker Catalog Number (14 digits)

The catalog number has fixed positions for each breaker characteristic. The fixed format allows a customer to determine the performance characteristics of the product by parsing the catalog number. The format of the Power Defense breaker catalog number is as follows:

| Catalog Number Digits | PD (1, 2) | G (3) | 3 (4) | 3 (5) | F (6) | 0400 (7–10) | TFA (11–13) | J (14) |
|-----------------------|---------------|------------------------------|------------|-------|---------------------|---------------------------|----------------|-----------|
| Meaning | Power Defense | Certifications and standards | Frame size | Poles | Interrupting rating | Continuous current rating | Trip unit type | Terminals |

Certifications and Standards (Digit 3)

The certifications and standards selection (*digit 3*) denotes the global standards and certifications met by the product, and, as such, indicates the respective markings found on the product. Defined values and their meaning are as follows:

| Value | Meaning | Marks on Product |
|-------|------------------------------------|------------------|
| G | Global ratings | UL, CSA, CE, CCC |
| F | Global ratings with 100% UL rating | UL, CSA, CE, CCC |
| D | Rated to 240 V | UL, CSA |
| J | UL and CSA | UL, CSA |
| C | IEC and GB | CE, CCC |
| E | IEC only | CE |

Poles (Digit 5)

The poles selection (*digit 5*) is mostly self-explanatory, with the exception of 4-pole breakers, which may use the values 4 (100% protected neutral pole), 0 (no protection on neutral pole), or 6 (60% protected neutral pole).

Other selections are self-explanatory, and further defined in each frame-specific section relative to the specific frame or product type.

Configured Breaker Catalog Number (20 digits)

For breakers with factory modifications, product must be ordered using the complete 20-digit configured breaker catalog number. This 20-digit number includes the base breaker catalog number plus an additional 6 digits to denote the factory modifications.

Factory modifications on Power Defense catalog numbers are also based on fixed positions within digits 15–20 of the catalog number. Digits 15–16 are always used for indicating accessories, 17–18 for tripping accessories and 19–20 for other accessories or modifications. When not used, the modification code digits default to the letter **N**.

Example

An example of a full catalog number with modification codes would be as follows:

| Catalog Number Digits | PDG33F0400TFAJ (1–14) | CC (15, 16) | SP (17, 18) | WB (19, 20) |
|-----------------------|-----------------------------|--|--|------------------------------------|
| Meaning | Base breaker catalog number | Indicating accessories (auxiliary and/or alarm switches) | Tripping accessories (shunt trip or UVR) | Other accessories or modifications |

Indicating Accessories (Digits 15, 16)

The two digits used for indicating accessories (*digits 15, 16*) denote the type of accessory(-ies) installed, the type of termination of those accessories, and the configuration.

Digit 15 specifically designates the accessory type and termination, as shown below (note that not all frames offer all the options shown).

| Type | Accessory Terminations | Digit 15 Selection |
|-----------------------|------------------------|--------------------|
| Auxiliary switch only | Pigtail (30-inch) | A |
| | Pigtail (3-meter) | D |
| | Screw terminal | X |
| | Spring cage clamp | U |
| Alarm switch only | Pigtail (30-inch) | B |
| | Pigtail (3-meter) | E |
| | Screw terminal | Y |
| | Spring cage clamp | V |
| Auxiliary and alarm | Pigtail (30-inch) | C |
| | Pigtail (3-meter) | F |
| | Screw terminal | Z |
| | Spring cage clamp | W |

Tripping Accessories (Digits 17, 18)

The two digits used for tripping accessories (*digits 17, 18*) denote the type of accessory installed, the type of termination, and the nominal voltage rating of the accessory. Digit 17 specifically designates the type of accessory and type of termination, as shown below.

| Type | Accessory Terminations | Digit 17 Selection |
|-----------------------|------------------------|--------------------|
| Shunt trip | Pigtail (30-inch) | S |
| | Pigtail (3-meter) | R |
| | Screw terminal | T |
| Under voltage release | Pigtail (30-inch) | U |
| | Pigtail (3-meter) | W |
| | Screw terminal | V |

Digit 16 determines the configuration of the switches, such as Form A (normally open or NO), Form B (normally closed or NC), or Form C (change-over or CO, or NO/NC).

Digit 18 designates the nominal voltage rating of the shunt trip or UVR, for which options available vary by frame and are detailed in each frame section of the catalog.

Other Accessories (Digits 19, 20)

Other factory-installed accessories and factory modifications available (*digits 19, 20*) are detailed on a frame-by-frame basis in the respective section of the catalog.

Trip Units and Accessories for Field Installation or Replacement

Power Defense circuit breakers are designed to have field-installable accessories, and for frame sizes 3, 4, 5 and 6, field installable and replaceable trip units. As such, breaker frames, trip units and accessories may be purchased separately for field configuration. Trip units and accessories also have designated catalog numbers for identification and ordering purposes.

Breaker frames are configured using the base breaker catalog number (*14 digits*), as detailed in each section.

In general, when ordering accessory or trip unit field installation kits, the format of the catalog number begins with a description of the frame or frames for which it is applicable (e.g., PDG3), followed by a separator digit (X), and ending with a descriptive section, as follows:

Trip Units and Accessories

| Catalog Number Example | PDG3 | X | Descriptive Section |
|------------------------|--|-----------------|--|
| Meaning | Power Defense Global Standards Frame 3 | Separator digit | May include voltage, functionality or other description of accessory or trip unit. |

Trip Units

Trip units may be ordered installed as part of a base or configured breaker, with (*digits 11–13*) denoting the functionality and features included. Additionally, trip units may be ordered separately, using the trip unit designated catalog numbers. Below, it is explained how separate trip unit catalog numbers are set up, as well as their relationship with their designation in digits 11–13 of the breaker catalog number for the same trip unit.

Thermal-Magnetic Trip Units (TMTU)

Power Defense TMTUs are available in frame sizes 1 through 4, covering a continuous current range of 15 A through 800 A.

Thermal (overload)

settings—Functionality and configurations are available based on the standard to which the breaker is certified, with all trip units carrying UL and CSA certifications (PDG, PDF, etc) having a fixed thermal setting.

Magnetic (short circuit)

settings—For frame sizes 1 and 2 that include UL and CSA certifications, magnetic settings are fixed. For frame sizes 3 and 4, the trip unit includes an adjustment for the short circuit protection setting of the trip unit, with the range dependent on the frame.

2.2

Molded Case Circuit Breakers

Power Defense Molded Case Circuit Breakers

2

When ordered individually, thermal-magnetic trip unit catalog numbers include a Descriptive Section to denote the tripping characteristics of the unit, the pole configuration and continuous current rating.

The information in the description, TFA30400, is also used in the base breaker catalog number.

Example

An individual TMTU catalog number takes the form of:

| Catalog Number | PDG3 | X | TFA | 3 | 0400 |
|--------------------|--------------------------|-----------------|------------------------------------|-------|---------------------------|
| Description | Power Defense Frame Size | Separator digit | Trip unit tripping characteristics | Poles | Continuous current rating |

Specific to TMTUs, the trip unit characteristics used in the base breaker catalog number denote the thermal and magnetic tripping characteristics of the unit.

Thermal-magnetic trip units (or breakers) may also be ordered calibrated to 50 °C ambient temperature by using a V in the trip unit type designator. Breakers with 50 °C calibrated trip units do not carry a UL Listing.

TM trip unit tripping characteristics options:

| Configured Breaker Digit | Separate TM Trip Unit Digit | Designator | Option | Meaning |
|--------------------------|-----------------------------|----------------|----------|----------------------------------|
| 11 | 6 | Trip unit type | T | Thermal-magnetic trip unit |
| | | | V | 50 °C thermal-magnetic trip unit |
| 12 | 7 | Thermal type | F | Fixed |
| | | | A | Adjustable |
| 13 | 8 | Magnetic type | F | Fixed |
| | | | A | Adjustable |

Note: IEC rated circuit thermal-magnetic trip units that are included with PDC or PDE breakers are typically fully adjustable (thermal and magnetic). Please consult with the product line for additional details.

Power Xpert Release (PXR) Electronic Trip Units (ETUs)

PXR ETUs are available in frame sizes 2 through 6, covering a continuous current range of 15 A through 2500 A.

When ordered individually, PXR trip unit catalog numbers also include a Descriptive Section denoting the functionality and configuration of the trip unit.

Sections of the PXR ETU catalog number are also used in the Base Breaker that is outfitted with the same trip unit.

Power Xpert Release (PXR) Electronic Trip Units (ETUs)

| Catalog Number | PDG3 | X | PXR | 3 | 0400 | P2M |
|--------------------|--------------------------|-----------------|---------|-------|-----------------------------------|-------------------------|
| Description | Power Defense Frame Size | Separator digit | PXR ETU | Poles | Maximum continuous current rating | Trip unit functionality |

The three digit code at the end of the trip unit catalog number, or digits 11–13 for a base catalog number, denote the trip unit type, protection features and options included with the trip unit.

Example

Trip unit features and options:

| Configured Breaker Digit | Separate PXR Trip Unit Digit | Designator | Option | Meaning |
|--------------------------|------------------------------|----------------------------------|----------|------------------------------|
| 11 | 14 | Trip unit type | B | PXR 10 Basic ETU |
| | | | E | PXR 20 |
| | | | D | PXR 20D |
| | | | P | PXR 25 |
| 12 | 15 | Protection type | 2 | LSI |
| | | | 3 | LSIG |
| | | | 4 | LSI with ARMS (ALSI) |
| | | | 5 | LSIG with ARMS (ALSIG) |
| | | | 8 | LSI Motor (MLSI) |
| | | | 9 | LSIG Motor (MLSIG) |
| 13 | 16 | Options included | N | None |
| | | | R | Programmable relays |
| | | | M | Modbus and relays |
| | | | Z | ZSI and relays |
| | | | C | CAM Link and relays |
| | | | W | Modbus, ZSI, and relays |
| | | | X | CAM Link, ZSI, and relays |
| | | | D | Modbus, CAM Link, and relays |
| | Y | Modbus, CAM Link, ZSI and relays | | |

Each frame section provides details on which options are available for the frame and includes a table similar to the one below, denoting the options that may be combined by following horizontal lines and selecting the one item per section, such as E2Z or P3W below.

Power Xpert Release (PXR) Trip Unit Options

| Trip Unit Type (Character 11) | | Protection Type (Character 12) | | | | Available Configured Options (Character 13) | | | | | | | |
|-------------------------------|----------|--------------------------------|----------|---------------|----------------|---|---------------|------------|------------|-------------------|-------------------|----------------|--|
| PXR | ETU | LSI | LSIG | LSI with ARMS | LSIG with ARMS | Relays | Relays Modbus | Relays ZSI | Relays CAM | Relays Modbus ZSI | Relays Modbus CAM | Relays ZSI CAM | |
| PXR 10 | B | 2 | — | — | — | N | — | — | — | — | — | — | |
| PXR 20 | E | 2 | — | — | — | N | R | M | Z | C | W | X | |
| | | — | 3 | 4 | 5 | — | R | M | Z | C | W | X | |
| PXR 20D | D | 2 | 3 | 4 | 5 | — | — | M | — | — | W | — | |
| PXR 25 | P | 2 | 3 | 4 | 5 | — | — | M | — | — | W | — | |

Accessories

Power Defense accessory catalog numbers also follow a format with a frame description, separator digit (X) and descriptive section, similar to trip units.

Accessory catalog numbering format:

| Catalog Number Example | PDG3 | X | ST130ACDCS |
|------------------------|--|-----------------|---|
| Meaning | Power Defense Global Standards Frame 3 | Separator digit | Descriptive section. May include voltage, functionality, or other description of accessory. |

In cases where an accessory is used on multiple frames, multiple frames may be listed in the Frame Description, such as “PDG34” for some rotary handles. Accessory catalog numbers are listed with descriptions in each frame section.

Technical Data

Technical Data—Frame Sizes 1 and 2

2



**Frame Size 1—125 A,
1-, 2-, 3- and 4-Pole**



**Frame Size 2—225 A,
1-, 2-, 3- and 4-Pole**

| Description | Unit | Frame Size 1—125 A, 1-, 2-, 3- and 4-Pole | | | | | | | | Frame Size 2—225 A, 1-, 2-, 3- and 4-Pole | | | | | | |
|---|---|--|------------------------------|------|-----|-----|----------------|----------------|-----|--|------------------------------|---------|---------|-------|-------|--|
| | | C | F | G | K | M | N ^① | P ^① | F | G | K | M | N | P | | |
| Interrupting rating / breaking capacity | 50–60 Hz | kA | | | | | | | | | | | | | | |
| NEMA UL/CSA | 240 Vac | | 25 | 35 | 65 | 85 | 100 | 150 | 200 | 35 | 65 | 85 | 100 | 150 | 200 | |
| | 480 Vac (277 Vac for 1 pole) | | 18 | 25 | 35 | 50 | 65 | 85 | 100 | 25 | 35 | 50 | 65 | 85 | 100 | |
| | 600 Vac (347 Vac for 1 pole) ^{②③} | | 10 | 14 | 18 | 22 | 25 | 30 | 35 | 14 | 18 | 22 | 25 | 30/25 | 35/25 | |
| | 125 Vdc ^④ | | 10 | 22 | 22 | 35 | 42 | 42 | 42 | 10 | 10 | 10 | 22 | 22 | 22 | |
| | 250 Vdc ^④ | | 10 | 22 | 22 | 35 | 42 | 42 | 42 | 10 | 10 | 10 | 22 | 22 | 22 | |
| IEC 60947-2 | 220–240 Vac | <i>I_{cu}</i> | 25 | 35 | 55 | 85 | 100 | 150 | 200 | 35 | 55 | 85 | 100 | 150 | 200 | |
| | | <i>I_{cs}</i> | 25 | 35 | 55 | 85 | 100 | 100 | 150 | 35 | 55 | 85 | 100 | 100 | 150 | |
| | 380–415 Vac | <i>I_{cu}</i> | 20 | 25 | 36 | 50 | 70 | 70 | 100 | 25 | 36 | 50 | 70 | 70 | 100 | |
| | | <i>I_{cs}</i> | 20 | 25 | 36 | 50 | 50 | 70 | 100 | 25 | 36 | 50 | 53 | 70 | 70 | |
| | 440 Vac | <i>I_{cu}</i> | — | — | — | — | — | — | — | 25 | 30 | 35 | 50 | 70 | 100 | |
| | | <i>I_{cs}</i> | — | — | — | — | — | — | — | 20 | 22.5 | 35 | 40 | 50 | 65 | |
| | 480 Vac | <i>I_{cu}</i> | — | — | — | — | — | — | — | 20 | 25 | 35 | 50 | 65 | 65 | |
| | | <i>I_{cs}</i> | — | — | — | — | — | — | — | 20 | 20 | 22.5 | 30 | 40 | 40 | |
| | 525 Vac ^② | <i>I_{cu}</i> | — | — | — | — | — | — | — | 18 | 20 | 30/25 | 30/25 | 30/25 | 35/25 | |
| | | <i>I_{cs}</i> | — | — | — | — | — | — | — | 15/13 | 15/13 | 15/13 | 15/13 | 15/13 | 18/13 | |
| | 660–690 Vac | <i>I_{cu}</i> | — | — | — | — | — | — | — | — | 8 | 10 | 10 | 10 | 10 | |
| | | <i>I_{cs}</i> | — | — | — | — | — | — | — | — | 4 | 5 | 5 | 5 | 5 | |
| | 125 Vdc ^④ | <i>I_{cu}</i> | 10 | 22 | 22 | 35 | 42 | 42 | 42 | 10 | 10 | 10 | 22 | 22 | 22 | |
| | | <i>I_{cs}</i> | 10 | 22 | 22 | 35 | 42 | 42 | 42 | 10 | 10 | 10 | 22 | 22 | 22 | |
| | 250 Vdc ^④ | <i>I_{cu}</i> | 10 | 22 | 22 | 35 | 42 | 42 | 42 | 10 | 10 | 10 | 22 | 22 | 22 | |
| | | <i>I_{cs}</i> | 10 | 22 | 22 | 35 | 42 | 42 | 42 | 10 | 10 | 10 | 22 | 22 | 22 | |
| Rated short circuit making capacity (I _{cm}) | 220–240 Vac | | 52.5 | 73.5 | 121 | 187 | 220 | 330 | 440 | 73.5 | 121 | 187 | 220 | 330 | 440 | |
| | 380–415 Vac | | 42 | 53 | 76 | 105 | 154 | 154 | 220 | 52.5 | 75.6 | 105 | 154 | 154 | 220 | |
| | 440 Vac | | — | — | — | — | — | — | — | 52.5 | 63 | 73.5 | 105 | 154 | 220 | |
| | 480 Vac | | — | — | — | — | — | — | — | 42 | 52.5 | 73.5 | 105 | 143 | 143 | |
| | 525 Vac | | — | — | — | — | — | — | — | 37.8 | 42 | 63/52.5 | 63/52.5 | 73.5 | 73.5 | |
| | 660–690 Vac | | — | — | — | — | — | — | — | — | 16.8 | 21 | 21 | 21 | 21 | |
| Withstand/threshold of the frame | <i>I_{cw}</i> | kA | — | | | | | | | | 1.8 | | | | | |
| Trip unit | | | No | | | | | | | | No | | | | | |
| Interchangeable | | | No | | | | | | | | No | | | | | |
| Thermal-magnetic (T) | | | Fixed-Fixed | | | | | | | | Fixed-Fixed | | | | | |
| Motor circuit protector (M) | | | Adjustable Mag Only (3 pole) | | | | | | | | Adjustable Mag Only (3 pole) | | | | | |
| Electronics | | | | | | | | | | | | | | | | |
| Basic—PXR 10 (B) | | | | | | | | | | | LSI, MLSI | | | | | |
| Standard—PXR 20 (E) | | | | | | | | | | | LSI, LSIG | | | | | |
| Ammeter—PXR 20D (D) | | | | | | | | | | | LSI, LSIG | | | | | |
| Energy / programmable—PXR 25 (P) | | | | | | | | | | | LSI, LSIG, MLSI, MLSIG | | | | | |

Note

- ① N and P ratings not available for 1 pole breakers.
- ② First listed interrupting rating applies to thermal-magnetic breakers; the second rating applies to electronic breakers.
- ③ PDG1 breakers are rated for use in 347Y/600 Vac systems.
- ④ 125 Vdc ratings are for single-pole breakers. 250 Vdc require two poles in series.

Technical Data—Frame Sizes 1 and 2, continued



**Frame Size 1—125 A,
1-, 2-, 3- and 4-Pole**



**Frame Size 2—225 A,
1-, 2-, 3- and 4-Pole**

| Description | Unit | | |
|---|-----------------------|----------------------------------|----------------------------------|
| UL File Number | | E7819 | E7819 |
| UL 100% rated breaker | | — | — |
| Amperage range | Thermal-magnetic | A | 15–125 |
| | Electronics | | — |
| Selectivity category | | A | A |
| Reference standard | | UL/CSA/IEC/CCC | UL/CSA/IEC/CCC |
| Rated insulation voltage U _i , according to IEC 60947–2 | Main conducting paths | V | 500 |
| | Auxiliary circuits | V | 500 |
| Rated impulse withstand voltage U _{imp} | Main conducting paths | kV | 6 |
| | Auxiliary circuits | | 4 |
| Rated operational voltage U _e (AC) | IEC/CCC | Vac | 415 |
| | UL/CSA | Vac | 600/347 |
| Rated operational voltage U _e (DC) | IEC/CCC | Vdc | 250 |
| | UL/CSA | Vdc | 250 |
| Permissible ambient temperature range (for storage and operation) | °C | –20 to +70 | –20 to +70 |
| Product complies with IEC 60–068 | Shock | Yes | Yes |
| Permissible load for various ambient temperatures close to the circuit breaker, related to the rated current of the circuit breaker | | | |
| Thermal Magnetic Breakers | 40 °C | 100% | 100% |
| | 45 °C | 98% | 100% |
| | 50 °C | 96% | 100% |
| | 55 °C | 93% | 98% |
| | 60 °C | 91% | 95% |
| | 70 °C | 86% | 90% |
| PXR Electronic Breakers (including motor protection circuit breakers) | 40 °C | — | 100% |
| | 45 °C | — | 100% |
| | 50 °C | — | 100% |
| | 55 °C | — | 98% |
| | 60 °C | — | 92% |
| | 70 °C | — | 80% |
| Altitude derating factor | | See Special Applications Section | See Special Applications Section |
| 400 Hz derating factor | | — | See Special Applications Section |
| Endurance (operating cycles) no-load (mechanical endurance) | | 10,000 | 20,000 |
| Endurance (operating cycles) with load (electrical endurance) at 415 V | | 125 A: 4000; 100 A: 6000 | 10,000 |
| Maximum switching frequency (per minute) | | 125 A: 5; 100 A: 6 | 2 |

2.2

Molded Case Circuit Breakers

Power Defense Molded Case Circuit Breakers

Technical Data—Frame Sizes 1 and 2, continued

2

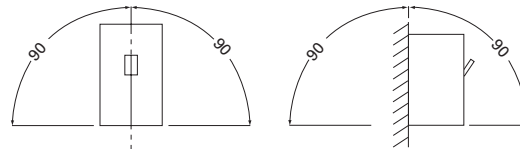


**Frame Size 1—125 A,
1-, 2-, 3- and 4-Pole**



**Frame Size 2—225 A,
1-, 2-, 3- and 4-Pole**

| Description | | Unit | Frame Size 1—125 A, 1-, 2-, 3- and 4-Pole | Frame Size 2—225 A, 1-, 2-, 3- and 4-Pole |
|--|------------------|-----------|--|--|
| Dimensions (H x W x D) | 1-pole | inch (mm) | 5.5 x 1.0 x 3.0 (139.7 x 25.4 x 76.2) | 6.0 x 1.4 x 3.5 (152.4 x 35.1 x 88.9) |
| | 2-pole | | 5.5 x 2.0 x 3.0 (139.7 x 50.8 x 76.2) | 6.0 x 2.8 x 3.5 (152.4 x 71.1 x 88.9) |
| | 3-pole | | 5.5 x 3.0 x 3.0 (139.7 x 76.2 x 76.2) | 6.0 x 4.1 x 3.5 (152.4 x 104.6 x 88.9) |
| | 4-pole | | 5.5 x 4.0 x 3.0 (139.7 x 101.6 x 76.2) | 6.0 x 5.5 x 3.5 (152.4 x 139.5 x 88.9) |
| Pole to pole distance | | inch (mm) | 1.000 (24.40) | 1.375 (34.93) |
| Approximate weight | | lb (kg) | | |
| Breaker | 3-pole / 4-pole | | 2.29 (1.04) / 2.84 (1.29) | 4.21 (1.82) / 5.69 (2.46) |
| Breaker with Plug-in | 3-pole / 4-pole | | — | 6.00 (2.72) / 8.09 (3.67) |
| Power loss per circuit breaker at maximum rated current in fixed breaker (3P)—for plant protection | W | | 31 | 48 (TMTU); 38 (ETU) |
| Suitable for reverse-feed applications | | | Yes (except MCP) | Yes (except MCP) |
| Blow out dimension | | Inch (mm) | 3.75 (95.3) | 1.00 (25.4) |
| Required spacing between circuit breakers | | Inch (mm) | 0 | 0 |
| Installation methods | Fixed | | Yes | Yes |
| | Plug-in | | Yes | Yes |
| | Drawout | | — | — |
| | DIN rail | | Yes | Yes ① |
| IP Protection | With accessories | | IP30 | IP2X with finger protection |
| Pollution degree | | | III | III |
| Overtoltage category | | | III | III |
| Annex H IT capability | at 415 V | | Yes | Yes |
| Permissible mounting positions | | | | |



Note

① Consult with product line for availability.

Technical Data—Frame Sizes 3 and 4



**Frame Size 3—400 A,
2-, 3- and 4-Pole**



**Frame Size 3—600 A,
2-, 3- and 4-Pole**



**Frame Size 4—800 A,
2-, 3- and 4-Pole**

| Description | Unit | Frame Size 3—400 A, 2-, 3- and 4-Pole | | | | | | Frame Size 3—600 A, 2-, 3- and 4-Pole | | | | | | Frame Size 4—800 A, 2-, 3- and 4-Pole | | | |
|---|----------------------|--|------|------|------|------|-----|--|------|------|------|------|-----|--|------|------|-----|
| | | F | G | K | M | N | P | F | G | K | M | N | P | G | K | M | |
| Interrupting rating / breaking capacity | 50–60 Hz | kA | | | | | | | | | | | | | | | |
| NEMA UL/CSA | 240 Vac | 35 | 65 | 85 | 100 | 150 | 200 | 35 | 65 | 85 | 100 | 150 | 200 | 65 | 85 | 100 | |
| | 480 Vac | 25 | 35 | 50 | 65 | 85 | 100 | 25 | 35 | 50 | 65 | 85 | 100 | 35 | 50 | 65 | |
| | 600 Vac | 14 | 18 | 25 | 35 | 50 | 65 | 14 | 18 | 25 | 35 | 50 | 65 | 18 | 25 | 35 | |
| | 125 Vdc | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | |
| | 250 Vdc ^① | 22 | 22 | 22 | 42 | 42 | 42 | 22 | 22 | 22 | 42 | 42 | 42 | 22 | 22 | 25 | |
| IEC 60947-2 | 220–240 Vac | I_{cu} | 35 | 55 | 85 | 100 | 150 | 200 | 35 | 55 | 85 | 100 | 150 | 200 | 55 | 85 | 100 |
| | | I_{cs} | 35 | 55 | 85 | 100 | 100 | 150 | 35 | 55 | 85 | 100 | 100 | 150 | 55 | 85 | 100 |
| | 380–415 Vac | I_{cu} | 25 | 36 | 50 | 70 | 70 | 100 | 25 | 36 | 50 | 70 | 70 | 100 | 36 | 50 | 70 |
| | | I_{cs} | 25 | 36 | 50 | 53 | 70 | 70 | 25 | 36 | 50 | 53 | 70 | 70 | 36 | 50 | 53 |
| | 440 Vac | I_{cu} | 25 | 30 | 35 | 50 | 70 | 100 | 25 | 30 | 35 | 50 | 70 | 100 | 30 | 35 | 50 |
| | | I_{cs} | 20 | 22.5 | 35 | 40 | 50 | 50 | 20 | 22.5 | 35 | 40 | 50 | 50 | 22.5 | 35 | 40 |
| | 480 Vac | I_{cu} | 20 | 25 | 35 | 50 | 65 | 85 | 20 | 25 | 35 | 50 | 65 | 85 | 25 | 35 | 50 |
| | | I_{cs} | 20 | 20 | 22.5 | 30 | 40 | 40 | 20 | 20 | 22.5 | 30 | 40 | 40 | 20 | 22.5 | 30 |
| | 525 Vac | I_{cu} | 18 | 20 | 25 | 30 | 35 | 40 | 18 | 20 | 25 | 30 | 35 | 40 | 20 | 25 | 30 |
| | | I_{cs} | 5 | 7.5 | 10 | 15 | 25 | 25 | 5 | 7.5 | 10 | 15 | 25 | 25 | 16.5 | 20 | 25 |
| | 660–690 Vac | I_{cu} | — | 8 | 10 | 15 | 20 | 20 | — | 8 | 10 | 15 | 20 | 20 | 8 | 10 | 15 |
| | | I_{cs} | — | 4 | 5 | 7.5 | 10 | 10 | — | 4 | 5 | 7.5 | 10 | 10 | 4 | 5 | 7.5 |
| | 125 Vdc | I_{cu} | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| | | I_{cs} | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| | 250 Vdc ^① | I_{cu} | 22 | 22 | 22 | 42 | 42 | 42 | 22 | 22 | 22 | 42 | 42 | 42 | 22 | 22 | 25 |
| | | I_{cs} | 10 | 10 | 10 | 22 | 22 | 22 | 22 | 22 | 22 | 42 | 42 | 42 | 22 | 22 | 25 |
| Rated short circuit making capacity (I _{cm}) | 220–240 Vac | 73.5 | 121 | 187 | 220 | 330 | 440 | 73.5 | 121 | 187 | 220 | 330 | 440 | 121 | 187 | 220 | |
| | 380–415 Vac | 52.5 | 75.6 | 105 | 154 | 154 | 220 | 52.5 | 75.6 | 105 | 154 | 154 | 220 | 75.6 | 105 | 154 | |
| | 440 Vac | 52.5 | 63 | 73.5 | 105 | 154 | 220 | 52.5 | 63 | 73.5 | 105 | 154 | 220 | 63 | 73.5 | 105 | |
| | 480 Vac | 42 | 52.5 | 73.5 | 105 | 143 | 187 | 42 | 52.5 | 73.5 | 105 | 143 | 187 | 52.5 | 73.5 | 105 | |
| | 525 Vac | 37.8 | 42 | 52.5 | 63 | 73.5 | 84 | 37.8 | 42 | 52.5 | 63 | 73.5 | 84 | 42 | 52.5 | 63 | |
| | 660–690 Vac | — | 16.8 | 21 | 31.5 | 42 | 42 | — | 16.8 | 21 | 31.5 | 42 | 42 | 16.8 | 21 | 31.5 | |
| Withstand/threshold of the frame | I_{cw} | kA | | | | | | | | | | | | | | | |
| Trip unit | | | | | | | | | | | | | | | | | |
| Interchangeable | | Yes | | | | | | Yes | | | | | | Yes | | | |
| Thermal-magnetic (T) | | Fixed-Adjustable | | | | | | Fixed-Adjustable | | | | | | Fixed-Adjustable | | | |
| Motor circuit protector (M) | | Adjustable Mag Only (3 pole) | | | | | | Adjustable Mag Only (3 pole) | | | | | | — | | | |
| Adjustable Magnetic only (3-pole)—PXR 10 (B) | | LSI, MLSI | | | | | | LSI, MLSI | | | | | | LSI | | | |
| Standard—PXR 20 (E) | | LSI, LSIG, ALSI, ALSIG | | | | | | LSI, LSIG, ALSI, ALSIG | | | | | | LSI, LSIG, ALSI, ALSIG | | | |
| Ammeter—PXR 20D (D) | | LSI, LSIG, ALSI, ALSIG | | | | | | LSI, LSIG, ALSI, ALSIG | | | | | | LSI, LSIG, ALSI, ALSIG | | | |
| Energy / programmable—PXR 25 (P) | | LSI, LSIG, ALSI, ALSIG, MLSI, MLSIG | | | | | | LSI, LSIG, ALSI, ALSIG, MLSI, MLSIG | | | | | | LSI, LSIG, ALSI, ALSIG | | | |

Note

^① 2P in series.

Technical Data—Frame Sizes 3 and 4, continued



**Frame Size 3—400 A,
2-, 3- and 4-Pole**



**Frame Size 3—600 A,
2-, 3- and 4-Pole**



**Frame Size 4—800 A,
2-, 3- and 4-Pole**

| Description | | Unit | Frame Size 3—400 A, 2-, 3- and 4-Pole | Frame Size 3—600 A, 2-, 3- and 4-Pole | Frame Size 4—800 A, 2-, 3- and 4-Pole |
|---|-----------------------|-------|--|--|--|
| UL File Number | | | E7819 | E7819 | E7819 |
| UL 100% rated breaker | | | Yes (ETU) | Yes (TMTU and ETU) | Yes (ETU) |
| Amperage range | Thermal-magnetic | A | 100–400 | 250–600 | 300–800 |
| | Electronics | | 45–400 | 90–600 | 320–800 |
| Selectivity category | | | A | A | A |
| Reference standard | | | UL/CSA/IEC/CCC | UL/CSA/IEC/CCC | UL/CSA/IEC/CCC |
| Rated insulation voltage U_i , according to IEC 60947–2 | Main conducting paths | V | 800 | 800 (TMTU); 690 (ETU) | 800 (TMTU); 690 (ETU) |
| | Auxiliary circuits | V | 690 | 690 | 690 |
| Rated impulse withstand voltage U_{imp} | Main conducting paths | kV | 8 (TMTU); 6 (ETU) | 8 (TMTU); 6 (ETU) | 8 (TMTU); 6 (ETU) |
| | Auxiliary circuits | | 4 | 4 | 4 |
| Rated operational voltage U_e (AC) | IEC/CCC | Vac | 690 | 690 | 690 |
| | UL/CSA | Vac | 600 | 600 | 600 |
| Rated operational voltage U_e (DC) | IEC/CCC | Vdc | 250 | 250 | 250 |
| | UL/CSA | Vdc | 250 | 250 | 250 |
| Permissible ambient temperature range (for storage and operation) | | °C | –20 to +70 | –20 to +70 | –20 to +70 |
| Product complies with IEC 60– Shock 068 | | | Yes | Yes | Yes |
| Permissible load for various ambient temperatures close to the circuit breaker, related to the rated current of the circuit breaker | | | | | |
| Thermal Magnetic Breakers | | 40 °C | 100% | 100% | 100% |
| | | 45 °C | 95.5% | 95.5% | 97% |
| | | 50 °C | 91% | 91% | 94% |
| | | 55 °C | 86% | 86% | 91% |
| | | 60 °C | 82% | 82% | 88% |
| | | 70 °C | 70% | 70% | 80% |
| PXR Electronic Breakers (including motor protection circuit breakers) | | 40 °C | 100% | 100% | 100% |
| | | 45 °C | 100% | 100% | 100% |
| | | 50 °C | 100% | 100% | 100% |
| | | 55 °C | 86% | 86% | 91% |
| | | 60 °C | 82% | 82% | 88% |
| | | 70 °C | 70% | 70% | 80% |
| Altitude derating factor | | | See Special Applications Section | See Special Applications Section | See Special Applications Section |
| 400 Hz derating factor | | | See Special Applications Section | See Special Applications Section | See Special Applications Section |
| Endurance (operating cycles) no-load (mechanical endurance) | | | 15,000 | 15,000 | 10,000 |
| Endurance (operating cycles) with load (electrical endurance) at 415 V | | | 5000 | 5000 | 3000 |
| Maximum switching frequency (per minute) | | | 1 | 1 | 1 |

Technical Data—Frame Sizes 3 and 4, continued

| Description | | Unit | Frame Size 3—400 A, 2-, 3- and 4-Pole | Frame Size 3—600 A, 2-, 3- and 4-Pole | Frame Size 4—800 A, 2-, 3- and 4-Pole |
|---|----------------------|------------------|---|---|--|
| Dimensions (H x W x D) | 1-pole | inch (mm) | — | — | — |
| | 2-pole | | 10.1 x 5.5 x 4.3 (257.1 x 138.9 x 109.1) | 10.1 x 5.5 x 4.3 (257.1 x 138.9 x 109.1) | 16.0 x 8.3 x 4.4 (406.4 x 209.6 x 111.2) |
| | 3-pole | | 10.1 x 5.5 x 4.3 (257.1 x 138.9 x 109.1) | 10.1 x 5.5 x 4.3 (257.1 x 138.9 x 109.1) | 16.0 x 8.3 x 4.4 (406.4 x 209.6 x 111.2) |
| | 4-pole | | 10.1 x 7.2 x 4.3 (257.1 x 182.9 x 109.1) | 10.1 x 7.2 x 4.3 (257.1 x 182.9 x 109.1) | 16.0 x 11.0 x 4.4 (406.4 x 279.4 x 111.2) |
| Pole to pole distance | inch (mm) | 1.719 (43.66) | 1.719 (43.66) | 2.750 (69.85) | |
| Approximate weight | lb (kg) | | | | |
| Breaker | 3-pole / 4-pole | | 11.02 (5.00) 13.77 (6.25) | 12.79 (5.80) 17.42 (7.90) | 30.00 (13.60) 39.90 (18.08) |
| | Breaker with Plug-in | 3-pole / 4-pole | 18.07 (8.20) 20.82 (9.44) | 19.84 (9.01) 26.87 (12.19) | — |
| Power loss per circuit breaker at maximum rated current I_n fixed breaker (3P)—for plant protection | W | | 70 (TMTU); 64 (ETU) | 130 (TMTU); 110 (ETU) | 291 (TMTU); 270 (ETU) |
| Suitable for reverse-feed applications | | | Yes | Yes | Yes |
| Blow out dimension | Inch (mm) | | 1.00 (25.4) | 1.00 (25.4) | 2.36 (60.0) |
| Required spacing between circuit breakers | Inch (mm) | | 0 | 0 | 0 |
| Installation methods | Fixed | | Yes | Yes | Yes |
| | Plug-in | | Yes | Yes | — |
| | Drawout | | Yes ^① | Yes ^① | Yes ^① |
| | DIN rail | | — | — | — |
| IP Protection | With accessories | | IP2X with Finger Protection | IP2X with Finger Protection | IP2X Protection |
| Pollution degree | | | III | III | III |
| Overtoltage category | | | III | III | III |
| Annex H IT capability at 415 V | | | Yes | Yes | Yes |
| Permissible mounting positions | | | | | |

Note

① Consult with product line for availability.

2.2

Molded Case Circuit Breakers

Power Defense Molded Case Circuit Breakers

Technical Data—Frame Sizes 5 and 6

2



Frame Size 5—800, 1200, 1600 (IEC)
2-, 3- and 4-Pole



Frame Size 6—1600, 2000, 2500
2-, 3- and 4-Pole

| Description | Unit | Frame Size 5—800, 1200, 1600 (IEC) 2-, 3- and 4-Pole | | | | | Frame Size 6—1600, 2000, 2500 2-, 3- and 4-Pole | | | |
|---|---------------------------------|---|------------------------|------|------|----------------|--|------------------------|------|------|
| | | K | M | N | P | T ^① | M | N | P | |
| Interrupting rating / breaking capacity | 50–60 Hz | kA | | | | | | | | |
| NEMA UL/CSA | 240 Vac | | 85 | 100 | 150 | 200 | 200 | 125 | 150 | 200 |
| | 480 Vac (277 Vac for 1 pole) | | 50 | 65 | 85 | 100 | 150 | 65 | 85 | 100 |
| | 600 Vac (347 Vac for 1 pole) | | 25 | 35 | 50 | 65 | 65 | 35 | 50 | 65 |
| | 125 Vdc | | — | — | — | — | — | — | — | — |
| | 250 Vdc | | — | — | — | — | — | — | — | — |
| IEC 60947-2 | 220–240 Vac | I_{cu} | 85 | 100 | 150 | 200 | — | 135 | 150 | 200 |
| | | I_{cs} | 85 | 100 | 100 | 150 | — | 100 | 100 | 100 |
| | 380–415 Vac | I_{cu} | 50 | 70 | 70 | 100 | — | 70 | 70 | 100 |
| | | I_{cs} | 50 | 53 | 50 | 50 | — | 50 | 50 | 50 |
| | 440 Vac | I_{cu} | 35 | 50 | 70 | 100 | — | 50 | 70 | 100 |
| | | I_{cs} | 35 | 40 | 50 | 50 | — | 40 | 50 | 50 |
| | 480 Vac | I_{cu} | 35 | 50 | 65 | 85 | — | 50 | 65 | 85 |
| | | I_{cs} | 22.5 | 30 | 40 | 40 | — | 30 | 40 | 40 |
| | 525 Vac | I_{cu} | 25 | 30 | 35 | 40 | — | 30 | 35 | 40 |
| | | I_{cs} | 20 | 25 | 25 | 25 | — | 25 | 25 | 25 |
| | 660–690 Vac | I_{cu} | 10 | 15 | 20 | 35 | — | 15 | 20 | 35 |
| | | I_{cs} | 5 | 7.5 | 10 | 18 | — | 7.5 | 13 | 18 |
| | 125 Vdc | I_{cu} | — | — | — | — | — | — | — | — |
| | | I_{cs} | — | — | — | — | — | — | — | — |
| | 250 Vdc | I_{cu} | — | — | — | — | — | — | — | — |
| | | I_{cs} | — | — | — | — | — | — | — | — |
| Rated short circuit making capacity (I _{cm}) | 220–240 Vac | | 187 | 220 | 330 | 440 | — | 297 | 330 | 440 |
| | 380–415 Vac | | 105 | 154 | 154 | 220 | — | 154 | 154 | 220 |
| | 440 Vac | | 73.5 | 105 | 154 | 220 | — | 105 | 154 | 220 |
| | 480 Vac | | 73.5 | 105 | 143 | 187 | — | 105 | 143 | 187 |
| | 525 Vac | | 52.5 | 63 | 73.5 | 84 | — | 63 | 73.5 | 84 |
| | 660–690 Vac | | 21 | 31.5 | 42 | 73.5 | — | 31.5 | 42 | 73.5 |
| Withstand/threshold of the frame | I_{cw} | kA | 14 | | | | | 20 | | |
| Trip unit | | | | | | | | | | |
| Interchangeable | | | Yes | | | | | Yes | | |
| Thermal-magnetic (T) | | | — | | | | | — | | |
| Motor circuit protector (M) | | | — | | | | | — | | |
| Electronics | | | | | | | | | | |
| Basic—PXR 10 (B) | | | — | | | | | — | | |
| Standard—PXR 20 (E) | | | LSI, LSIG, ALSI, ALSIG | | | | | LSI, LSIG, ALSI, ALSIG | | |
| Ammeter—PXR 20D (D) | | | LSI, LSIG, ALSI, ALSIG | | | | | LSI, LSIG, ALSI, ALSIG | | |
| Energy / programmable—PXR 25 (P) | | | LSI, LSIG, ALSI, ALSIG | | | | | LSI, LSIG, ALSI, ALSIG | | |

Note

① PDJ (UL/CSA only), 3-pole only; 800 A.

Technical Data—Frame Sizes 5 and 6, continued



**Frame Size 5—800, 1200, 1600 (IEC)
2-, 3- and 4-Pole**



**Frame Size 6—1600, 2000, 2500
2-, 3- and 4-Pole**

| Description | | Unit | Frame Size 5—800, 1200, 1600 (IEC) 2-, 3- and 4-Pole | Frame Size 6—1600, 2000, 2500 2-, 3- and 4-Pole |
|--|-----------------------|-------|---|--|
| UL File Number | | | E7819 | E7819 |
| UL 100% rated breaker | | | Yes | Yes (up to 2000 A) |
| Amperage range | Thermal-magnetic | A | — | — |
| | Electronics | | 320–1200 (1600 IEC) | 700–2500 |
| Selectivity category | | | A | A |
| Reference standard | | | UL/CSA/IEC/CCC | UL/CSA/IEC/CCC |
| Rated insulation voltage U, according to IEC 60947–2 | Main conducting paths | V | 690 (ETU) | 690 (ETU) |
| | Auxiliary circuits | V | 690 | 690 |
| Rated impulse withstand voltage U _{imp} | Main conducting paths | kV | 6 (ETU) | 6 (ETU) |
| | Auxiliary circuits | | 4 | 4 |
| Rated operational voltage U _e (AC) | IEC/CCC | Vac | 690 | 690 |
| | UL/CSA | Vac | 600 | 600 |
| Rated operational voltage U _e (DC) | IEC/CCC | Vdc | — | — |
| | UL/CSA | Vdc | — | — |
| Permissible ambient temperature range (for storage and operation) | | °C | –20 to +70 | –20 to +70 |
| Product complies with IEC 60–068 | | Shock | Yes | Yes |
| Permissible load for various ambient temperatures close to the circuit breaker, related to the rated current of the circuit breaker | | | | |
| Thermal Magnetic Breakers | | 40 °C | — | — |
| | | 45 °C | — | — |
| | | 50 °C | — | — |
| | | 55 °C | — | — |
| | | 60 °C | — | — |
| | | 70 °C | — | — |
| PXR Electronic Breakers (including motor protection circuit breakers) | | 40 °C | 100% | 100% |
| | | 45 °C | 95.5% | 95.5% |
| | | 50 °C | 91% | 91% |
| | | 55 °C | 85% | 85% |
| | | 60 °C | 81% | 81% |
| | | 70 °C | 70% | 70% |
| Altitude derating factor | | | See Special Applications Section | See Special Applications Section |
| 400 Hz derating factor | | | See Special Applications Section | See Special Applications Section |
| Endurance (operating cycles) no-load (mechanical endurance) | | | 3000 | 3000 |
| Endurance (operating cycles) with load (electrical endurance) at 415 V | | | 500 | 500 |
| Maximum switching frequency (per minute) | | | 1 | 1 |

Technical Data—Frame Sizes 5 and 6, continued

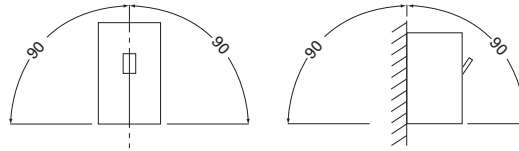


**Frame Size 5—800, 1200, 1600 (IEC)
2-, 3- and 4-Pole**



**Frame Size 6—1600, 2000, 2500
2-, 3- and 4-Pole**

| Description | | Unit | Frame Size 5—800, 1200, 1600 (IEC) 2-, 3- and 4-Pole | Frame Size 6—1600, 2000, 2500 2-, 3- and 4-Pole |
|--|------------------|-----------|---|--|
| Dimensions (H x W x D) | 1-pole | inch (mm) | — | — |
| | 2-pole | | 16.0 x 8.3 x 5.5 (406.4 x 209.5 x 139.7) | 16.0 x 15.5 x 9.8 (406.4 x 393.7 x 247.65) |
| | 3-pole | | 16.0 x 8.3 x 5.5 (406.4 x 209.5 x 139.7) | 16.0 x 15.5 x 9.8 (406.4 x 393.7 x 247.65) |
| | 4-pole | | 16.0 x 11.1 x 5.5 (406.4 x 282.7 x 139.7) | 16.0 x 20.0 x 9.8 (406.4 x 508 x 247.65) |
| Pole to pole distance | | inch (mm) | 2.750 (69.85) | 4.500 (114.30) |
| Approximate weight | | lb (kg) | | |
| Breaker | 3-pole / 4-pole | | 46.80 (21.30) / 58.00 (26.31) | 135.00 (61.23) / 182.00 (82.55) |
| Breaker with Plug-in | 3-pole / 4-pole | | — | — |
| Power loss per circuit breaker at maximum rated current in fixed breaker (3P)—for plant protection | | W | 87 (800 A) 195 (1200 A and 1600 A) | 220 (1600 A); 270 (2000 A); 400 (2500 A) |
| Suitable for reverse-feed applications | | | Yes | Yes |
| Blow out dimension | | Inch (mm) | 13.125 (333.38) | 2.625 (66.68) |
| Required spacing between circuit breakers | | Inch (mm) | 0 | 0 |
| Installation methods | Fixed | | Yes | Yes |
| | Plug-in | | — | — |
| | Drawout | | Yes ① | — |
| | DIN rail | | — | — |
| IP Protection | With accessories | | IP2X Protection | IP2X Protection |
| Pollution degree | | | III | III |
| Overvoltage category | | | III | III |
| Annex H IT capability | at 415 V | | Yes | Yes |



Note

① Consult with product line for availability.

Power Defense Accessories

| | PDG1 | PDG2 | PDG3 | PDG4 | PDG5 | PDG6 |
|---|-----------------------|-----------------------|-----------------------|-----------------------|----------------|----------------|
| Auxiliary switches | | | | | | |
| Rated thermal current I_{th} | 5 A | 4 A | 4 A | 4 A | 6 A | 6 A |
| Rated operational voltage (AC) | 125 V / 250 V / 600 V | 230 V / 500 V / 600 V | 230 V / 500 V / 600 V | 230 V / 500 V / 600 V | 600 V | 600 V |
| Rated operational current (AC) | 5 A / 5 A / 2 A | 4 A / 1 A / 0.6 A | 4 A / 1 A / 0.6 A | 4 A / 1 A / 0.6 A | 6 A | 6 A |
| Rated operational voltage (DC) | 125 V | 220 V | 220 V | 220 V | 125 V / 250 V | 125 V / 250 V |
| Rated operational current (DC) | 1 A | 0.3 A | 0.3 A | 0.3 A | 0.5 A / 0.25 A | 0.5 A / 0.25 A |
| Backup fuse ^① | 4 A | 4 A | 4 A | 4 A | 4 A | 4 A |
| Undervoltage releases | | | | | | |
| Response voltage | | | | | | |
| Drop (breaker tripped) U_s | 0.35-0.70 | 0.35-0.70 | 0.35-0.70 | 0.35-0.70 | 0.35-0.70 | 0.35-0.70 |
| Pickup (breaker may be switched on) U_s | 0.85-1.1 | 0.85-1.1 | 0.85-1.1 | 0.85-1.1 | 0.85-1.1 | 0.85-1.1 |
| Power consumption in continuous operation: | | | | | | |
| 50/60 Hz 24 Vac | ≤ 4.3 W | ≤ 3 W | ≤ 3 W | ≤ 3 W | ≤ 11 W | ≤ 9.6 W |
| 50/60 Hz 110-130 Vac | ≤ 4.3 W | ≤ 3 W | ≤ 3 W | ≤ 3 W | ≤ 11 W | ≤ 9.6 W |
| 50/60 Hz 208-240 Vac | ≤ 4.3 W | ≤ 3 W | ≤ 3 W | ≤ 3 W | ≤ 11 W | ≤ 9.6 W |
| 50/60 Hz 380-440 Vac | ≤ 4.3 W | ≤ 3 W | ≤ 3 W | ≤ 3 W | ≤ 11 W | ≤ 9.6 W |
| 50/60 Hz 480-525 Vac | ≤ 4.3 W | ≤ 3 W | ≤ 3 W | ≤ 3 W | ≤ 11 W | ≤ 9.6 W |
| 50/60 Hz 600 Vac | ≤ 4.3 W | ≤ 3 W | ≤ 3 W | ≤ 3 W | ≤ 6.25 W | ≤ 7.5 W |
| 12 Vdc | ≤ 4.3 W | ≤ 3 W | ≤ 3 W | ≤ 3 W | ≤ 6.25 W | ≤ 7.5 W |
| 24 Vdc | ≤ 4.3 W | ≤ 3 W | ≤ 3 W | ≤ 3 W | ≤ 6.25 W | ≤ 7.5 W |
| 48 Vdc | ≤ 4.3 W | ≤ 3 W | ≤ 3 W | ≤ 3 W | ≤ 6.25 W | ≤ 7.5 W |
| 60 Vdc | ≤ 4.3 W | ≤ 3 W | ≤ 3 W | ≤ 3 W | ≤ 6.25 W | ≤ 7.5 W |
| 125 Vdc | ≤ 4.3 W | ≤ 3 W | ≤ 3 W | ≤ 3 W | ≤ 6.25 W | ≤ 7.5 W |
| 250 Vdc | ≤ 4.3 W | ≤ 3 W | ≤ 3 W | ≤ 3 W | ≤ 6.25 W | ≤ 7.5 W |
| Maximum opening time (ms) | ≤ 50 | ≤ 20 | ≤ 20 | ≤ 20 | ≤ 46 | ≤ 77 |
| Shunt trips | | | | | | |
| Shunt trips ("f" releases) response voltage | | | | | | |
| Pickup (breaker tripped) U_s | 0.7-1.1 | 0.7-1.1 | 0.7-1.1 | 0.7-1.1 | 0.7-1.1 | 0.7-1.1 |
| Power consumption in (short time) at: | | | | | | |
| 50/60 Hz 24 Vac/24 Vdc | 41 / 120 | ≤ 3 W | ≤ 3 W | ≤ 3 W | 475/610 | 612/396 |
| 50/60 Hz 110-130 Vac/125 Vdc | 572 / 121 | ≤ 3 W | ≤ 3 W | ≤ 3 W | 100/150 | 1896/475 |
| 50/60 Hz 208-240 Vac/250 Vdc | 2280 / N/A | ≤ 3 W | ≤ 3 W | ≤ 3 W | 432/55 | 1896/475 |
| 50/60 Hz 380-440 Vac | 572 | ≤ 3 W | ≤ 3 W | ≤ 3 W | 110 | 2156 |
| 50/60 Hz 480-525 Vac | 840 | ≤ 3 W | ≤ 3 W | ≤ 3 W | 32 | 289 |
| 50/60 Hz 600 Vac | 1080 | ≤ 3 W | ≤ 3 W | ≤ 3 W | 42 | 384 |
| 12 Vdc | 201 | ≤ 3 W | ≤ 3 W | ≤ 3 W | 145 | — |
| 48 Vdc | 475 | ≤ 3 W | ≤ 3 W | ≤ 3 W | 67 | 403 |
| 60 Vdc | 720 | ≤ 3 W | ≤ 3 W | ≤ 3 W | 102 | 666 |
| Maximum load duration | | | | | | |
| Maximum opening time (ms) | ≤ 50 | <20 | <20 | <20 | <30 | <62 |

Note

^① Proper system design should size the backup fuse to the rated current going through the auxiliary switch.

Power Defense Molded Case Circuit Breakers—Frame Size 1

2



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| Dimensions and Weights | V4-T2-28 |
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| Frame Size 3 (45–600 A) | V4-T2-42 |
| Frame Size 4 (300–800 A) | V4-T2-57 |
| Frame Size 5 (320–1200 A) | V4-T2-70 |
| Frame Size 6 (700–2500 A) | V4-T2-79 |
| Motor Circuit Protectors (3–600 A) | V4-T2-87 |
| Motor Protection Circuit Breakers (15–600 A) | V4-T2-98 |
| Special Applications | V4-T2-104 |

Power Defense Molded Case Circuit Breakers—Frame Size 1

Product Description

Frame Size 1 covers a range of 15 A through 125 A with fixed-fixed thermal-magnetic trip units. PD-1 is available in 1-, 2-, 3- and 4-pole configurations, with the 4-pole configuration available with no protection on the neutral pole, or fully protected.

Application Description

Frame Size 1 can be used to meet a wide range of circuit protection and power distribution needs, including current limiting applications. PD-1 is a cable-in / cable-out MCCB.

Features and Benefits

Frame Size 1 breakers are available in multiple ratings from 15 A through 125 A. They are of a modular design with field installable accessories and terminals, which may also be factory installed.

Standards and Certifications

Power Defense breakers are designed and tested to meet stringent requirements for:

- UL
- CSA
- IEC (CE)
- CB (CCC)



Catalog Number / Product Selection**Power Defense—Frame Size 1 (15–125 A)**

Frame Size 1 covers a range of 15 A through 125 A using thermal-magnetic trip units. It is available in configurations of single-pole, 2-pole, 3-pole and 4-pole.

Interrupting Ratings (2-, 3- and 4-Pole)

| Catalog Designator | C | | F | | G | | K | | M ^① | | N ^{①②} | | P ^{①②} | |
|----------------------|----------|----------|----------|----------|----------|----------|----------|----------|----------------|----------|-----------------|----------|-----------------|----------|
| ANSI (UL/CSA) | kA rms | | kA rms | | kA rms | | kA rms | | kA rms | | kA rms | | kA rms | |
| 240 Vac | 25 | | 35 | | 65 | | 85 | | 100 | | 150 | | 200 | |
| 480 Vac | 18 | | 25 | | 35 | | 50 | | 65 | | 85 | | 100 | |
| 347/600 Vac | 10 | | 14 | | 18 | | 22 | | 25 | | 30 | | 35 | |
| 250 Vdc ^③ | 10 | | 22 | | 22 | | 35 | | 35 | | 42 | | 42 | |
| IEC | I_{cu} | I_{cs} | I_{cu} | I_{cs} | I_{cu} | I_{cs} | I_{cu} | I_{cs} | I_{cu} | I_{cs} | I_{cu} | I_{cs} | I_{cu} | I_{cs} |
| 240 Vac | 25 | 25 | 35 | 35 | 55 | 55 | 85 | 85 | 100 | 100 | 150 | 150 | 200 | 200 |
| 380–415 Vac | 20 | 20 | 25 | 25 | 36 | 36 | 50 | 50 | 70 | 50 | 70 | 70 | 100 | 100 |
| 250 Vdc ^③ | 10 | 10 | 22 | 22 | 22 | 22 | 35 | 35 | 35 | 35 | 42 | 42 | 42 | 42 |

Interrupting Ratings (Single-Pole)

| Catalog Designator | C | | F | | G | | K | | M ^① | |
|--------------------|----------|----------|----------|----------|----------|----------|----------|----------|----------------|----------|
| ANSI (UL/CSA) | kA rms | | kA rms | | kA rms | | kA rms | | kA rms | |
| 120 Vac | 35 | | — | | 100 | | — | | 200 | |
| 240 Vac | 25 | | 35 | | 65 | | 85 | | 100 | |
| 277 Vac | 18 | | 25 | | 35 | | 50 | | 65 | |
| 347 Vac | 10 | | 14 | | 18 | | 22 | | 25 | |
| 125 Vdc | 10 | | 22 | | 22 | | 35 | | 35 | |
| IEC | I_{cu} | I_{cs} | I_{cu} | I_{cs} | I_{cu} | I_{cs} | I_{cu} | I_{cs} | I_{cu} | I_{cs} |
| 240 Vac | 25 | 25 | 35 | 35 | 55 | 55 | 85 | 85 | 100 | 100 |
| 125 Vdc | 10 | 10 | 22 | 22 | 22 | 22 | 35 | 35 | 35 | 35 |

Notes

- ① UL current limiting.
- ② Available in 3- and 4-pole configurations only.
- ③ Must use 2 poles in series for 250 Vdc.

2.2

Molded Case Circuit Breakers

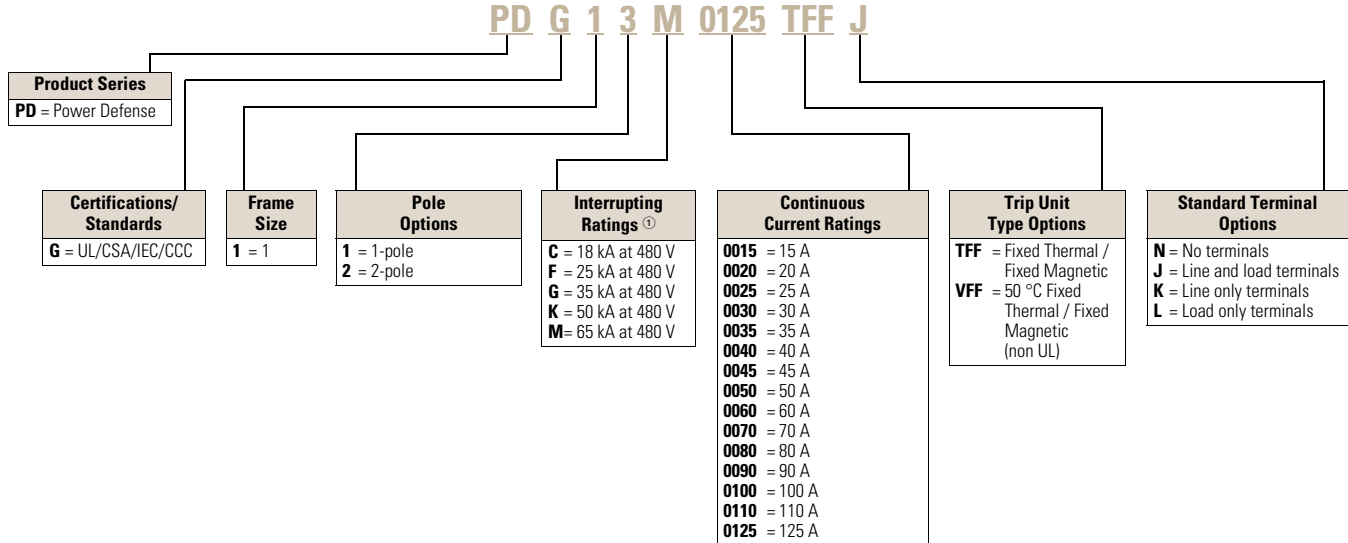
Power Defense Molded Case Circuit Breakers

2

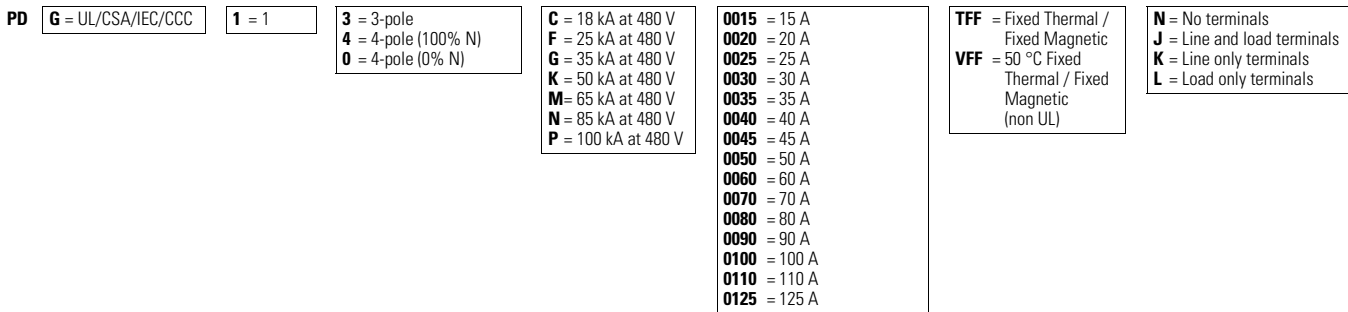
Power Defense—Frame Size 1 (15–125 A)

This information is presented as a tool to develop catalog numbers for selecting Power Defense circuit breakers and trip units.

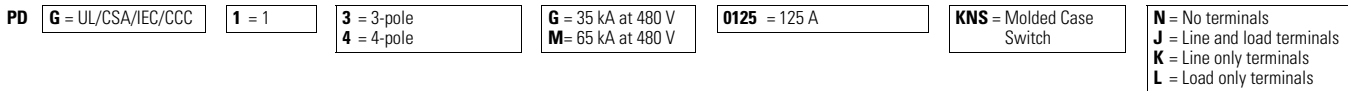
Molded Case Circuit Breakers (Single- and Two-Pole) with Thermal-Magnetic Trip Units—Globally Rated



Molded Case Circuit Breakers (Three- and Four-Pole) with Thermal-Magnetic Trip Units—Globally Rated



Molded Case Switches—Globally Rated



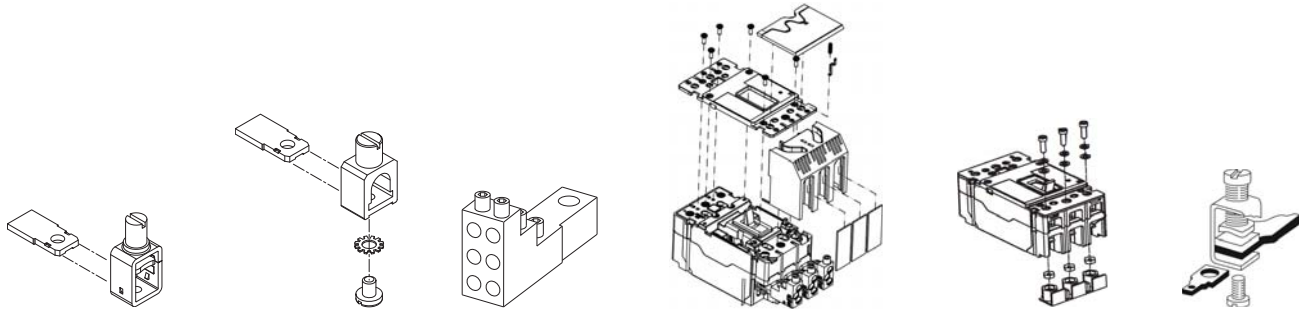
Note

① Ratings at 277 Vac for single-pole.

Terminals—Frame Size 1

Catalog numbers shown are for a single side of a 3-pole breaker.
 For 2- and 4-pole options, replace the **X3** with **X2** or **X4**, respectively.
 Example: PDG1**X3**T125 becomes PDG1**X2**T125 for two-pole.

Terminal Types



| | | | | | |
|------------|-------------|---------------|---------------|-------------|-------|
| PDG1X3T125 | PDG1X3TA125 | PDG1X3TA1256W | PDG1X3TA1253W | PDG1X3TS125 | GCWTK |
|------------|-------------|---------------|---------------|-------------|-------|

Note: Pictures are for reference only.

Terminals

| Maximum Breaker Amperes | Terminal Body Type | Wire Type | Wire Class | Number of Conductors per Phase | AWG Range per Conductor | Metric (mm ²) Range per Conductor | 3-Pole Catalog Number | Included Accessories | Digit 14 Designation | | | | |
|------------------------------------|--------------------|-----------|------------|--------------------------------|-------------------------|---|-----------------------|----------------------|----------------------|-----------|-----------|---------------------|--|
| | | | | | | | | | Line and Load | Line Only | Load Only | Standard on Amperes | |
| Standard Terminals | | | | | | | | | | | | | |
| 125 | Steel | Al or Cu | B, C | 1 | 14-3/0 | 2.08-85 | PDG1X3T125 | — | J | K | L | 15-125 | |
| Alternate Terminals | | | | | | | | | | | | | |
| 125 | Aluminum | Cu/Al | B, C | 1 | 14-1/0 | 2.08-53.5 | PDG1X3TA125 | — | T | U | V | 15-125 | |
| Multi-wire Terminals | | | | | | | | | | | | | |
| 125 | Aluminum | Cu | B, C | 6 | 14-2 | 2.08-33.6 | PDG1X3TA1256W | Terminal shield | — | — | G | 15-125 | |
| 125 | Aluminum | Cu | B, C | 3 | 14-6 | 2.08-13.3 | PDG1X3TA1253W | Terminal shield | — | — | H | 15-125 | |
| End Cap Kit/Screw Terminals | | | | | | | | | | | | | |
| — | — | — | — | — | — | — | PDG1X3TS125 | — | S | D | E | 15-125 | |

Note: Wire capacity is based on standard imperial wire sizes; metric sizes provided in table are a direct conversion to demonstrate maximum capacity, not to denote metric wire sizes.

Control Wire Tabs

| Use | Package Quantity | Catalog Number |
|----------|------------------|----------------|
| 15-125 A | 12 | GCWTK |

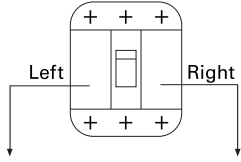
Note: Control wire tabs can be installed with terminals listed above.

Accessories

Internal Accessory Configurations—Frame Size 1

2

3- and 4-Pole Circuit Breakers



Tripping Accessory Options

None



Qty: 1



Qty: 1

Indicating Accessory Options

None

1 Make/1 Break Alarm Switch

2 Make/2 Break Alarm Switch

1A/1B Auxiliary Switch

2A/2B Auxiliary Switch

1A/1B Alarm, 1A/1B Auxiliary Combination

Alarm and Auxiliary Switches

Alarm and auxiliary switches are plug-and-play accessories designed to be field installable. However, Eaton also offers the service of field installation in our factories.

Breaker catalog numbers with alarm and auxiliary switch combinations require a complete 20-digit catalog number, adding the alarm and auxiliary switch functionality in digits 15–16 and adhering to the following conditions and tables:

- Digit 15 denotes the type of accessory(-ies) installed and the terminal types
- Digit 16 denotes number of switches installed
- If no other accessories are selected, use NNNN for the final 4 digits of the catalog number

Alarm and Auxiliary Switch—Field Installation Kits ①

| | Auxiliary Switch | Catalog Number | | |
|--------------|--------------------|----------------|--------------------|--------------------|
| | Three-Pole | None | 1NO/1NC (1 Form C) | 2NO/2NC (2 Form C) |
| Alarm Switch | None | — | AUX1A1BPK | AUX2A2BPK |
| | 1NO/1NC (1 Form C) | ALM1M1BEPK | AUXALRMEPK | — |
| | 2NO/2NC (2 Form C) | ALM2M2BEPK | — | — |

Alarm and Auxiliary Switch Factory Installation (Digits 15–16) ①

| | Auxiliary Switch | Breaker Catalog Number (Digit 15–16 Suffix) | | |
|--------------|--------------------|---|--------------------|--------------------|
| | Three-Pole | None | 1NO/1NC (1 Form C) | 2NO/2NC (2 Form C) |
| Alarm Switch | None | NN | AC | A1 |
| | 1NO/1NC (1 Form C) | BC | CC | — |
| | 2NO/2NC (2 Form C) | B1 | — | — |

Note

① All options come with pigtail terminations.

Tripping Accessories—Frame Size 1**Shunt Trips**

| Pigtail (29 in / 0.75 m) Voltage | Breaker Catalog Number Digit 17-18 Suffix | Catalog Number |
|-------------------------------------|--|----------------|
| 12 Vdc | SH | SNT012CPK |
| 24 Vac/Vdc | SN | SNT024CPK |
| 48–60 Vdc | — | SNT4860CPK |
| 110–125 Vdc | — | SNT125DPK |
| 250 Vdc | — | SNT250DPK |
| 48–60 Vac | — | SNT4860CPK |
| 110–240 Vac | — | SNT120CPK |
| 380–600 Vac | — | SNT480CPK |

Undervoltage Releases

| Pigtail (29 in / 0.75 m) Voltage | Breaker Catalog Number Digit 17-18 Suffix | Catalog Number |
|-------------------------------------|--|----------------|
| 24 Vdc | UG | UVR024DPK |
| 48 Vdc | UJ | UVR048DPK |
| 60 Vdc | UK | UVR048DPK |
| 125 Vdc | — | UVR125DPK |
| 250 Vdc | UM | UVR250DPK |
| 24 Vac | UF | UVR024APK |
| 48 Vac | — | UVR048APK |
| 60 Vac | — | UVR048APK |
| 125 Vac | — | UVR120APK |
| 240 Vac | UB | UVR240APK |
| 480 Vac | — | UVR480APK |
| 525 Vac | UD | UVR600APK |
| 600 Vac | UE | UVR600APK |

Handle Mechanisms—Frame Size 1**Universal Direct Rotary Handle Mechanism**

| Description | NEMA 1/3R/12 Black Handle Catalog Number | NEMA 1/3R/12 Red Handle Catalog Number |
|-------------------|--|--|
| With interlock | EHMCCBI | EHMCCRI |
| Without interlock | EHMCCB | EHMCCR |

Variable Depth Rotary Handle Mechanism

| Description | Catalog Number |
|--|----------------|
| Standard lockable handle with mechanism (black and grey) NEMA 1/3R/12 | PDG1XHMS |
| Standard lockable handle with mechanism (red and yellow) NEMA 1/3R/12 | PDG1XHME |
| Mechanism only | EHMVDB |
| 12-in (307 mm) standard handle mechanism shaft | PDG12XHMS307 |
| 20-in (507 mm) standard handle mechanism shaft | PDG12XHMS507 |
| Standard, NFPA79, handle mechanism shaft handle | PDG12XH79S |
| Emergency, NFPA79, handle mechanism shaft handle | PDG12XH79E |

Flex Shaft Handle Mechanism

| Cable Length (ft) | Metal Handle, NEMA 1/3R/12 Catalog Number | High Performance Handle, NEMA 1/3R/12 Catalog Number | Metal Handle, NEMA 4/4X Catalog Number | High Performance Handle, NEMA 4/4X Catalog Number |
|-------------------|---|--|--|---|
| 2 | PDG1XFS02 | PDG1XFS02HP | PDG1XFS02X | PDG1XFS02HPX |
| 3 | PDG1XFS03 | PDG1XFS03HP | PDG1XFS03X | PDG1XFS03HPX |
| 4 | PDG1XFS04 | PDG1XFS04HP | PDG1XFS04X | PDG1XFS04HPX |
| 5 | PDG1XFS05 | PDG1XFS05HP | PDG1XFS05X | PDG1XFS05HPX |
| 6 | PDG1XFS06 | PDG1XFS06HP | PDG1XFS06X | PDG1XFS06HPX |
| 7 | PDG1XFS07 | PDG1XFS07HP | PDG1XFS07X | PDG1XFS07HPX |
| 8 | PDG1XFS08 | PDG1XFS08HP | PDG1XFS08X | PDG1XFS08HPX |
| 9 | PDG1XFS09 | PDG1XFS09HP | PDG1XFS09X | PDG1XFS09HPX |
| 10 | PDG1XFS10 | PDG1XFS10HP | PDG1XFS10X | PDG1XFS10HPX |

Flex Shaft Handle Auxiliary Switch

| Description | Catalog Number |
|--------------------|----------------|
| 1A/1B, Early Break | AUX1EBFSEG |

Accessories—Frame Size 1**External Accessories**

| Description | Fit Type | Catalog Number |
|---|-----------------|---------------------|
| Padlockable handle block | On handle | PDG1XPHB |
| Padlockable handle block, OFF only | Top | PDG1XPHB0FF |
| Padlockable handle lock, Snap-on | Center | PDG1XPLKSNAP |
| Padlockable handle lock hasp | Top | PDG1XPLKT |
| Padlockable handle lock hasp, OFF only | Top | PDG1XPLKTOFF |
| | Right | PDG1XPLKROFF |
| Walking beam interlock | Three-pole | PDG1XWBI3P |
| | Four-pole | PDG1XWBI4P |
| Kirk keylock provision kit ① | Top | PDG1XKLKPTFF |
| Slide bar interlock | Field | EF5BI |
| Electrical operator | 110–240 Vac/Vdc | MOPEG240C |
| | 24/48 Vdc | MOPEG48D |
| Plug-in adapter, breaker and base | Three-pole | PAD3E |
| | Four-pole | PAD4E |
| Plug-in block interlock replacement kit | Field | PIILEG |
| Wohner bus bar adapter | Field top | EG-BUS-T |
| | Field bottom | EG-BUS-B |

DIN Rail Mounting

| Description | Catalog Number |
|---|---------------------|
| DIN rail adapter; single-pole | PDG1XDIN1P |
| Din rail adapter; two-, three- or four-pole | PDG1XDIN234P |
| DIN rail adapter; three- or four-pole | PDG1XDIN34P |
| Metal DIN rail adapter, three-pole | PDG1XDINM3P |

Base Mounting Hardware

| Description | Catalog Number |
|---------------------------------|-------------------|
| Single-pole metric | 8703C80G11 |
| Two-, three-, four-pole metric | 8703C80G08 |
| Single-pole English | 8703C80G12 |
| Two-, three-, four-pole English | BMHE |

Note: Base mounting hardware is included with a circuit breaker or molded case switch.

Dimensions and Weights—Frame Size 1**Approximate Dimensions in Inches (mm)**

| Number of Poles | Width | Height | Depth |
|-----------------|-------------|-------------|-------------|
| 1 | 1.0 (25.4) | 5.5 (139.7) | 2.99 (76.0) |
| 2 | 2.0 (50.8) | 5.5 (139.7) | 2.99 (76.0) |
| 3 | 3.0 (76.2) | 5.5 (139.7) | 2.99 (76.0) |
| 4 | 4.0 (101.6) | 5.5 (139.7) | 2.99 (76.0) |

Approximate Shipping Weight in lb (kg)

| Breaker Type | 1-Pole | 2-Pole | 3-Pole | 4-Pole |
|--------------|-------------|-------------|------------|-------------|
| PDG1 125 A | 0.85 (0.39) | 1.57 (0.71) | 2.3 (1.04) | 2.84 (1.29) |

Note

① Provision only. For use with Type FF Kirk keylock (sold separately).

Power Defense Molded Case Circuit Breakers—Frame Size 2



Contents

| Description | Page |
|--|------------------|
| Power Defense Molded Case Circuit Breakers | |
| Frame Size 1 (15–125 A) | V4-T2-22 |
| Frame Size 2 (15–225 A) | |
| Catalog Number / Product Selection | V4-T2-30 |
| Accessories | V4-T2-35 |
| Dimensions and Weights | V4-T2-41 |
| Frame Size 3 (45–600 A) | V4-T2-42 |
| Frame Size 4 (300–800 A) | V4-T2-57 |
| Frame Size 5 (320–1200 A) | V4-T2-70 |
| Frame Size 6 (700–2500 A) | V4-T2-79 |
| Motor Circuit Protectors (3–600 A) | V4-T2-87 |
| Motor Protection Circuit Breakers (15–600 A) | V4-T2-98 |
| Special Applications | V4-T2-104 |

Power Defense Molded Case Circuit Breakers—Frame Size 2

Product Description

Frame Size 2 covers a range of 15 A through 225 A with a complete offering of trip units, including PXR electronic trip units and fixed-fixed thermal-magnetic trip units.

Application Description

Frame Size 2 can be used to meet a wide range of circuit protection and power distribution needs, including ground fault protection and current limiting options. PXR trip units in PD-2 provide all levels of protection, including energy metering with multiple communication schemes, breaker health indication, and zone selective interlocking with visual indication.

Features and Benefits

Frame Size 2 breakers are available in multiple ratings from 15 A through 225 A. They are configured with a trip unit from the factory. Accessories are modular in design to allow for field installation or factory configuration. PXR trip units are available with advanced features to provide customers unparalleled situational awareness of their electrical system.

Standards and Certifications

Power Defense breakers are designed and tested to meet stringent requirements for:

- UL
- CSA
- IEC (CE)
- CB (CCC)



Catalog Number / Product Selection

2

Power Defense—Frame Size 2 (15–225 A)

Frame Size 2 covers a range of 15 A through 225 A using electronic trip units or thermal-magnetic trip units. It is available in configurations of single-pole, 2-pole, 3-pole and 4-pole.

Interrupting Ratings (2-, 3- and 4-Pole)

| Catalog Designator | F | | G ^① | | K ^① | | M ^① | | N ^① | | P ^① | |
|----------------------|----------|----------------------|----------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|
| ANSI (UL/CSA) | kA rms | | kA rms | | kA rms | | kA rms | | kA rms | | kA rms | |
| 240 Vac | 35 | | 65 | | 85 | | 100 | | 150 | | 200 | |
| 480 Vac | 25 | | 35 | | 50 | | 65 | | 85 | | 100 | |
| 600 Vac | 14 | | 18 | | 22 | | 25 | | 30 / 25 ^③ | | 35 / 25 ^③ | |
| 250 Vdc ^② | 10 | | 10 | | 10 | | 22 | | 22 | | 22 | |
| IEC | I_{cu} | I_{cs} | I_{cu} | I_{cs} | I_{cu} | I_{cs} | I_{cu} | I_{cs} | I_{cu} | I_{cs} | I_{cu} | I_{cs} |
| 240 Vac | 35 | 35 | 55 | 55 | 85 | 85 | 100 | 100 | 150 | 100 | 200 | 150 |
| 380–415 Vac | 25 | 25 | 36 | 36 | 50 | 50 | 70 | 53 | 70 | 70 | 100 | 70 |
| 440 Vac | 25 | 20 | 30 | 22.5 | 35 | 35 | 50 | 40 | 70 | 50 | 100 | 65 |
| 480 Vac | 20 | 20 | 25 | 20 | 35 | 22.5 | 50 | 30 | 65 | 40 | 65 | 40 |
| 525 Vac | 18 | 15 / 13 ^③ | 20 | 15 / 13 ^③ | 30 / 25 ^③ | 15 / 13 ^③ | 30 / 25 ^③ | 15 / 13 ^③ | 30 / 25 ^③ | 15 / 13 ^③ | 35 / 25 ^③ | 18 / 13 ^③ |
| 660–690 Vac | — | — | 8 | 4 | 10 | 5 | 10 | 5 | 10 | 5 | 10 | 5 |
| 250 Vdc ^② | 10 | 10 | 10 | 10 | 10 | 10 | 22 | 22 | 22 | 22 | 22 | 22 |

Interrupting Ratings (Single-Pole)

| Catalog Designator | F | | G ^① | | K ^① | | M ^① | | N ^① | | P ^① | |
|--------------------|----------|----------|----------------|----------|----------------|----------|----------------|----------|----------------|----------|----------------|----------|
| ANSI (UL/CSA) | kA rms | | kA rms | | kA rms | | kA rms | | kA rms | | kA rms | |
| 240 Vac | 35 | | 65 | | 85 | | 100 | | 150 | | 200 | |
| 277 Vac | 25 | | 35 | | 50 | | 65 | | 85 | | 100 | |
| 347 Vac | 14 | | 18 | | 22 | | 25 | | 30 | | 35 | |
| 125 Vdc | 10 | | 10 | | 10 | | 22 | | 22 | | 22 | |
| IEC | I_{cu} | I_{cs} | I_{cu} | I_{cs} | I_{cu} | I_{cs} | I_{cu} | I_{cs} | I_{cu} | I_{cs} | I_{cu} | I_{cs} |
| 240 Vac | 35 | 35 | 55 | 55 | 85 | 85 | 100 | 100 | 150 | 100 | 200 | 150 |
| 125 Vdc | 10 | 10 | 10 | 10 | 10 | 10 | 22 | 22 | 22 | 22 | 22 | 22 |

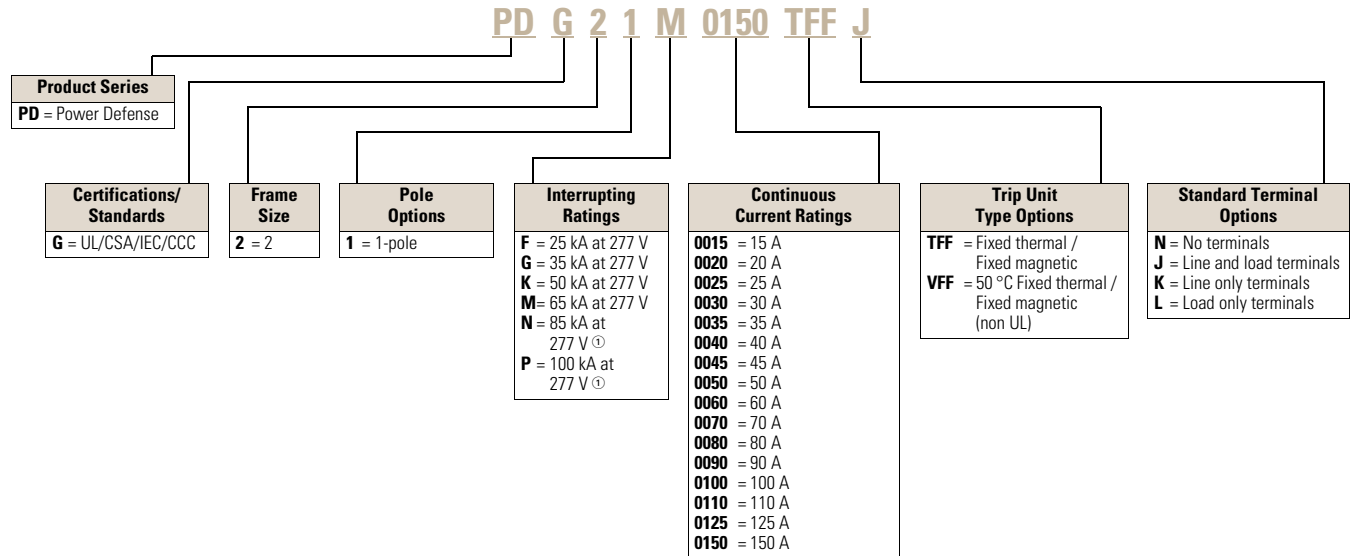
Notes

- ① UL current limiting.
- ② DC ratings available in thermal-magnetic breakers only. 250 Vdc is achieved using 2-poles in series.
- ③ First rating listed is for thermal-magnetic breakers, second rating is for breakers with PXR electronic trip units.

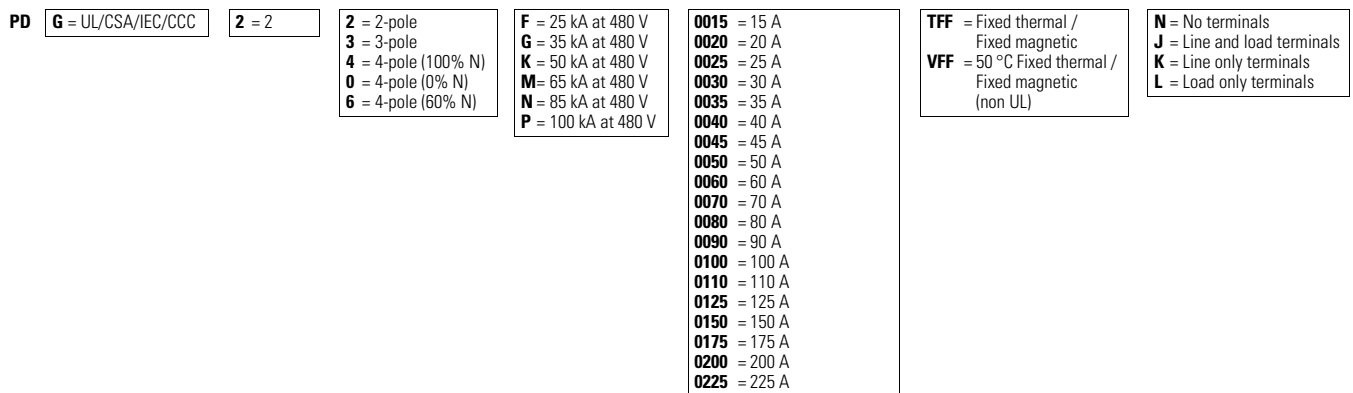
Power Defense—Frame Size 2 (15–225 A)

This information is presented as a tool to develop catalog numbers for selecting Power Defense circuit breakers and trip units.

Molded Case Circuit Breakers (Single-Pole) with Thermal-Magnetic Trip Units (TMTU)—Globally Rated



Molded Case Circuit Breakers (Two-, Three- and Four-Pole) with Thermal-Magnetic Trip Units—Globally Rated



Note

① N and P ratings available for 15–30 A on single-pole breakers.

2.2

Molded Case Circuit Breakers

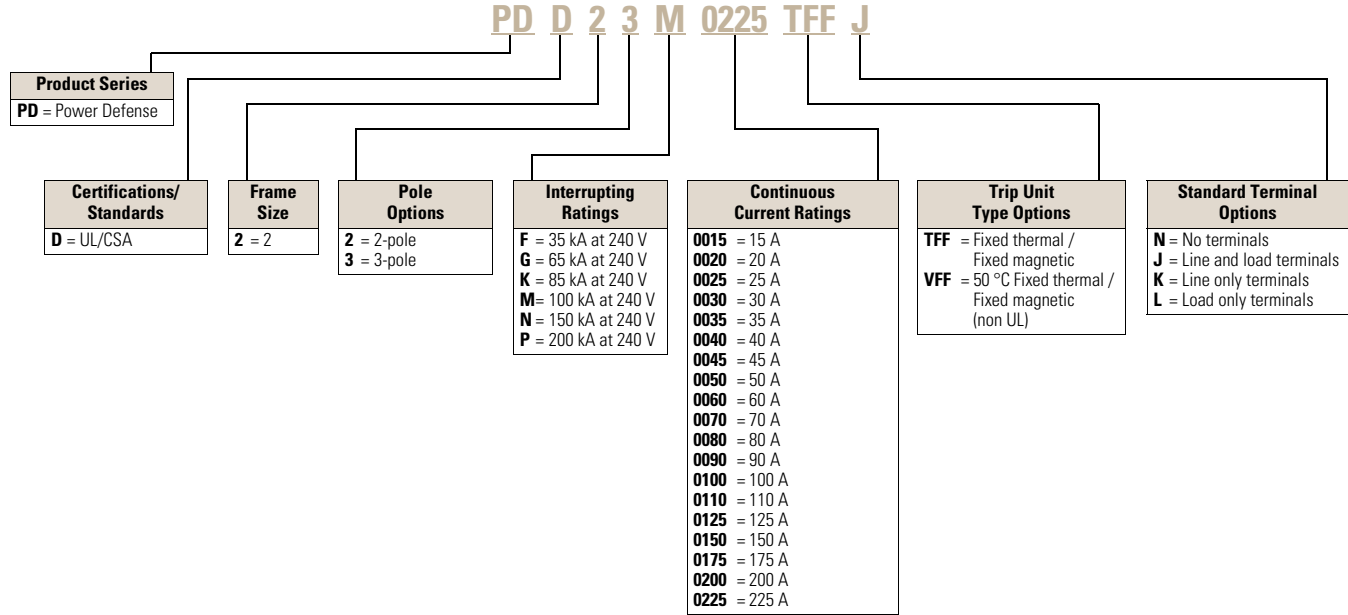
Power Defense Molded Case Circuit Breakers

Power Defense—Frame Size 2 (15–225 A)

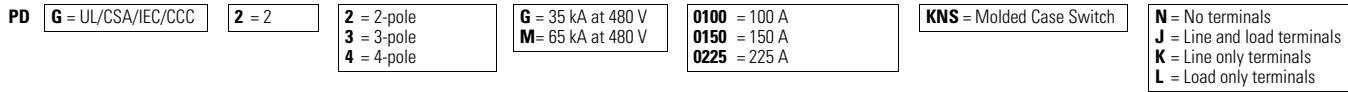
This information is presented as a tool to develop catalog numbers for selecting Power Defense circuit breakers and trip units.

2

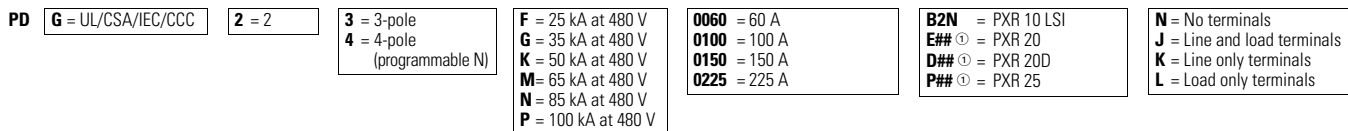
Molded Case Circuit Breakers with TMTU—UL/CSA Rated to 240 Vac



Molded Case Switches—Globally Rated



Molded Case Circuit Breakers with Power Xpert Release Electronic Trip Units (ETU)—Globally Rated



Note

① See tables and descriptions on **Page V4-T2-33** for protection type (#₍₁₎) and available configured options (#₍₂₎).

Power Xpert Release (PXR) Trip Unit Options—Frame Size 2

Power Xpert Release (PXR) Trip Unit Options

| PXR | ETU | #(1)—Protection Type | | #(2)—Available Configured Options | | | | | | | | |
|---------|-----|----------------------|------|-----------------------------------|---------------|------------|------------|-------------------|-------------------|-----------------------|---|---|
| | | LSI | LSIG | Relays | Relays Modbus | Relays ZSI | Relays CAM | Relays Modbus ZSI | Relays Modbus CAM | Relays Modbus ZSI CAM | | |
| PXR 10 | B | 2 | — | N | — | — | — | — | — | — | — | — |
| PXR 20 | E | 2 | — | N | R | M | Z | C | W | X | — | — |
| | | — | 3 | — | R | M | Z | C | W | X | — | — |
| PXR 20D | D | 2 | 3 | — | — | M | — | — | W | — | D | Y |
| PXR 25 | P | 2 | 3 | — | — | M | — | — | W | — | D | Y |

Description of PXR Configured Options

Relays ①—Form A contacts (rated for 240 Vac, 1 A)

- 2 available if Modbus RTU is not used; 1 available when used in conjunction with Modbus RTU
- Interface: 3 wires (ALM1, ALM2, ALM Common)
- Programmable to indicate breaker conditions
- Available as field-installable option if not pre-configured (catalog number **PDG2XRELAYS**) ②

Modbus ①—Modbus RTU directly from breaker

- Interface: 3 wires (MODBA, MODBB, MODBG)
- No additional modules required
- Available as field-installable option if not pre-configured (catalog number **PDG2XMODRTUREL**) ②

ZSI—Zone Selective Interlocking

- Includes ability to turn ON and OFF
- Interface: 3 wires (Zin, Zout, Zcomm)
- No additional modules required

CAM—CAM Link Connection (requires a CAM module per breaker)

- Interface: 5 wires (refer to CAM IL for details)
- Communications Adapter Modules available for Modbus TCP and PROFIBUS

Auxiliary Power

- Connection included with all PXR 20, 20D and 25 trip units
- Required for communications, relays and metering accuracy
- 24 Vdc, 0.5 A
- Interface: 2 wires (Aux +24 V, Aux 0 V)

Available Continuous Current (I_r) Settings on PXR Electronic Trip Units

| Option | Setting | Catalog Number Selection and Maximum Setting (I _n) | | | |
|-----------------|---------------------|--|---------------|---------------|---------------|
| | | 0060 60 A | 0100 100 A | 0150 150 A | 0225 225 A |
| PXR 10, PXR 20 | 1 | 15 A | 32 A | 50 A | 80 A |
| | 2 | 16 A | 35 A | 60 A | 90 A |
| | 3 | 20 A | 40 A | 63 A | 100 A |
| | 4 | 25 A | 50 A | 70 A | 110 A |
| | 5 | 30 A | 60 A | 80 A | 125 A |
| | 6 | 35 A | 63 A | 90 A | 150 A |
| | 7 | 40 A | 70 A | 100 A | 160 A |
| | 8 | 45 A | 80 A | 110 A | 175 A |
| | 9 | 50 A | 90 A | 125 A | 200 A |
| | 10 = I _n | 60 A | 100 A | 150 A | 225 A |
| PXR 20D, PXR 25 | | Programmable from minimum to maximum values in 1 A increments. | | | |

Notes

- ① Relays and/or Modbus RTU in PD-2 uses accessory pocket, therefore UVR and shunt trip use is not possible.
- ② PD-2 can only be equipped with one field-installable communication option (PDG2XMODRTUREL or PDG2XRELAYS).

2.2

Molded Case Circuit Breakers

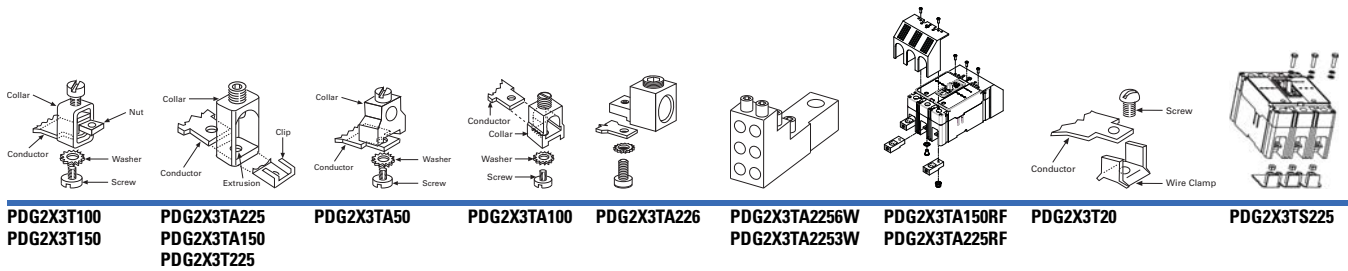
Power Defense Molded Case Circuit Breakers

2

Terminals—Frame Size 2

Catalog numbers shown are for a single side of a 3-pole breaker.
For 2- and 4-pole options, replace the **X3** with **X2** or **X4**, respectively.
Example: PDG**2X3**T100 becomes PDG**2X2**T100 for 2-pole

Terminal Types



Note: Pictures are for reference only.

Terminals

| Maximum Breaker Amperes | Breaker Frame ① | Terminal Body Type | Wire Type | Wire Class | Number of Conductors per Phase | AWG/kcmil Range per Conductor | Metric (mm ²) Range per Conductor | 3-Pole Catalog Number | Included Accessories | Digit 14 Designation | | | |
|-------------------------------------|-----------------|--------------------|-----------|------------|--------------------------------|-------------------------------|---|-----------------------|----------------------|----------------------|-----------|-----------|---------------------|
| | | | | | | | | | | Line and Load | Line Only | Load Only | Standard on Amperes |
| Standard Terminals | | | | | | | | | | | | | |
| 100 | 15–100 | Steel | Cu/Al | B, C | 1 | 14–1/0 | 2.08–53.5 | PDG2X3T100 ② | | J | K | L | 15–100 |
| 225 | 60–225 | Aluminum | Cu/Al | B, C | 1 | 4–4/0 | 21.2–107 | PDG2X3TA225 | | J | K | L | 110–225 |
| Alternate Terminals | | | | | | | | | | | | | |
| 50 | 15–50 | Aluminum | Cu/Al | B, C | 1 | 14–4 | 2.08–21.2 | PDG2X3TA50 | | T | U | V | 15–50 |
| 100 | 60–100 | Aluminum | Cu/Al | B, C | 1 | 14–1/0 | 2.08–53.5 | PDG2X3TA100 | | T | U | V | 60–100 |
| 150 | 60–150 | Aluminum | Cu/Al | B, C | 1 | 14–4/0 | 2.08–107 | PDG2X3TA150 | | T | U | V | 60–150 |
| 225 | 175–225 | Aluminum | Cu/Al | B, C | 1 | 6–300 | 13.3–152 | PDG2X3TA225K | Terminal shield | T | U | V | 60–225 |
| Non-standard Terminals | | | | | | | | | | | | | |
| 100 | 15–100 | Steel | Cu/Al | B, C | 1 | 14–1/0 | 2.08–53.5 | PDG2X3T100 ② | | W | Y | Z | 15–100 |
| 150 | 60–150 | Stainless Steel | Cu | B, C | 1 | 4–4/0 | 21.2–107 | PDG2X3T150 | | W | Y | Z | 110–150 |
| 225 | 60–225 | Copper | Cu | B, C | 1 | 4–4/0 | 21.2–107 | PDG2X3T225 | | W | Y | Z | 175–225 |
| Multi-wire Terminals | | | | | | | | | | | | | |
| 225 | 150–225 | Aluminum | Cu/Al | B, C | 6 | 14–6 | 2.08–13.3 | PDG2X3TA2256W | Terminal shield | — | — | G | 15–225 |
| 225 | 150–225 | Aluminum | Cu/Al | B, C | 3 | 14–2 | 2.08–33.6 | PDG2X3TA2253W | Terminal shield | — | — | H | 15–225 |
| Rear Fed Terminals ③ | | | | | | | | | | | | | |
| 150 | 60–150 | Aluminum | Cu/Al | B, C | 1 | 14–4/0 | 2.08–107 | PDG2X3TA150RF | Terminal shield | — | — | — | 15–150 |
| 225 | 60–225 | Aluminum | Cu/Al | B, C | 1 | 6–300 | 13.3–152 | PDG2X3TA225RF | Terminal shield | — | — | — | 175–225 |
| Box Terminal | | | | | | | | | | | | | |
| 20 | 15–20 | Steel | Cu/Al | B, C | 1 | 14–10 | 2.08–5.26 | PDG2X3T20 | | — | — | — | 15–20 |
| Rear Connectors | | | | | | | | | | | | | |
| 225 | — | — | — | — | — | — | — | PDG2X3TA225RC | | R | — | — | 15–25 |
| End Cap Kits/Screw Terminals | | | | | | | | | | | | | |
| 225 | — | — | — | — | — | — | — | PDG2X3TS225 | | S | D | E | 15–25 |

Note: Wire capacity is based on standard imperial wire sizes; metric sizes provided in table are a direct conversion to demonstrate maximum capacity, not to denote metric wire sizes.

Notes

① The “Breaker Range” column provides information on the ampere ratings for which the terminal may be used (field installation); in some cases the range is limited by proper fit of the terminal onto the breaker conductor.

The column “Factory Config. Ampere Rating” provides information on what terminal is used during factory configuration per Digit 14 of the breaker catalog number. The two may not match.

② Factory standard terminals and non-aluminum terminals for 100 A and below are the same terminals.

③ Breaker loses UL when fitted with rear-fed terminals or rear connectors.

Control Wire Tabs

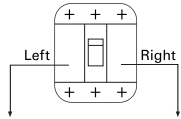
| Use | Package Qty. | Catalog Number |
|-----------|--------------|----------------|
| 15–150 A | 12 | FCWTK |
| 175–225 A | 12 | FCWTK225 |

Accessories

Internal Accessory Configurations—Frame Size 2

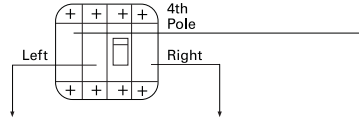
Thermal-Magnetic Circuit Breakers

3-Pole Circuit Breakers



| Tripping Accessory Options | Alarm (2 Spaces) Options | Aux (2 Spaces) Options |
|----------------------------------|--|--|
| None | None | None |
| Shunt Trip | 1NO (1 space) 1NC (1 space) 1NO/1NC (2 spaces) | 1NO (1 space) 1NC (1 space) 1NO/1NC (2 spaces) |
| | 2NO (2 spaces) | 2NO (2 spaces) |
| UVR | 2NC (2 spaces) | 2NC (2 spaces) |
| | | |

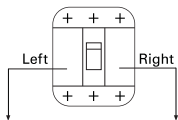
4-Pole Circuit Breakers



| Tripping Accessory Options | Alarm (2 Spaces) Options | Aux (4 Spaces) Options |
|----------------------------------|--|--|
| None | None | None |
| Shunt Trip | 1NO (1 space) 1NC (1 space) 1NO/1NC (2 spaces) | 1NO (1 space) 1NC (1 space) 1NO/1NC (2 spaces) |
| | 2NO (2 spaces) | 2NO (2 spaces) |
| UVR | 2NC (2 spaces) | 2NC (2 spaces) 2CO (4 spaces) 4NO (4 spaces) 4NC (4 spaces) |
| | | |

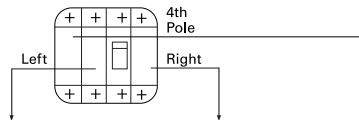
Electronic Circuit Breakers

3-Pole Circuit Breakers



| Tripping Accessory Options | Alarm Options | Aux Options |
|--|------------------|----------------|
| None | None | 1NO/1NC ① |
| Shunt Trip | | |
| | | |
| UVR | | |
| | | |
| Bell alarm (1NO/1NC—Form C) | | |
| Qty: 1 Programmable relay with Modbus RTU | | |
| Qty: 2 Programmable relays | | |

4-Pole Circuit Breakers



| Tripping Accessory Options | Alarm Options | Aux (2 Spaces) Options |
|--|------------------|--|
| None | None | 1NO/1NC ① |
| Shunt Trip | | 1NO/1NC ① + 1NO (1 space) 1NO/1NC ① + 1NC (1 space) 1NO/1NC ① + 1NO/1NC (2 spaces) 1NO/1NC ① + 2NO (2 spaces) |
| | | 1NO/1NC ① + 2NC (2 spaces) |
| UVR | | |
| | | |
| Bell alarm (1NO/1NC—Form C) | | |
| Qty: 1 Programmable relay with Modbus RTU | | |
| Qty: 2 Programmable relays | | |

Note

① Qty: 1 1NO/1NC (Form C) auxiliary contact is automatically factory installed for all Frame 2 Power Defense breakers with electronic trip units.

2.2

Molded Case Circuit Breakers

Power Defense Molded Case Circuit Breakers

2

Alarm and Auxiliary Contact Blocks—Frame Size 2

Power Defense breakers have designated positions for alarm and auxiliary switches in the right-pole accessory cavity. For Frame 2, the two left-most positions are used for alarm switches, and the two right-most locations are used for auxiliary switches.

Power Defense breakers have secondary covers for ease of field installation of accessories, including alarm and auxiliary switches.

Power Defense alarm and auxiliary switches are available in contact blocks, in Form A (NO), Form B (NC) and Form C (NO-NC) types. Form A and Form B contacts take one position in the breaker accessory cavity, and Form C contacts take two positions in the cavity. Identical contact blocks are used for the alarm and auxiliary switch functions.

Frame 2 breakers with electronic trip units are automatically configured with a factory-installed Form C auxiliary contact block because the right-pole accessory cavity is not available for field modification. Trip position can also be communicated via communications and the PXR programmable relays.

Pigtail (29 in / 0.75 m) Contact Blocks for Alarm and Auxiliary Switch Functionality

| Catalog Number | PDGXA | PDGXAB | PDGXAC |
|----------------|-------------|-------------|----------------|
| Type | Form A / NO | Form B / NC | Form C / NO-NC |

Screw Terminal Contact Blocks for Alarm and Auxiliary Switch Functionality

| Catalog Number | PDGXA | PDGXXB | PDGXA + PDGXXB |
|----------------|-------------|-------------|--|
| Type | Form A / NO | Form B / NC | For NO-NC, use two separate contact blocks |

Push-In Clamp Contact Blocks for Alarm and Auxiliary Switch Functionality

| Catalog Number | PDGXUA | PDGXUB | PDGXUC |
|----------------|-------------|-------------|----------------|
| Type | Form A / NO | Form B / NC | Form C / NO-NC |

Pigtail (118 in / 3.0 m) Contact Blocks for Alarm and Auxiliary Switch Functionality

| Catalog Number | PDGXDA | PDGXDB | PDGXDC |
|----------------|-------------|-------------|----------------|
| Type | Form A / NO | Form B / NC | Form C / NO-NC |

Alarm Switch for Use with PXR Electronic Trip Units ^①

| Catalog Number | PDG2XALMBC | PDG2XALMEC |
|----------------|----------------|----------------|
| Type | Form C / NO-NC | Form C / NO-NC |
| Termination | 0.75 m pigtail | 3.0 m pigtail |

Note

^① Frame 2 breakers with electronic trip units do not allow access to the right accessory pocket but are automatically configured with a factory installed Form C / NO-NC auxiliary switch. These alarm switches can be field or factory installed in the left accessory pocket in place of a shunt trip or UVR.

Factory Installation of Alarm and Auxiliary Switches—Frame Size 2

Alarm and auxiliary switches are plug-and-play accessories designed to be field installable. However, Eaton also offers installation service in our factories.

Breaker catalog numbers with alarm and auxiliary switch combinations require a complete 20-digit catalog number, adding the alarm and auxiliary switch functionality in digits 15–16 and adhering to the following conditions and tables:

- Digit 15 denotes the type of accessory(-ies) installed and the terminal types

- Switches may be requested for alarm only, auxiliary only or a combination of the two
- Digit 16 denotes the number and type (NO, NC) of switches installed
- For Eaton factory installation, the same type of terminals (i.e. all pigtail 0.75 m, all screw, etc.) and same style of contact block (i.e., all 1NO/1NC, all 2NC, etc.) must be used in a factory configuration
- If no other accessories are selected, use NNNN for the final 4 digits of the catalog number
- Frame 2 breakers with electronic trip units do not allow access to the right accessory pocket but are automatically configured with a factory installed 1NO/1NC auxiliary switch. A bell alarm accessory is available for separate installation in the left accessory pocket.

Note: Though factory configuration options are limited, combinations of auxiliary switches and alarms using differing terminals and contact block styles are still available through field installation. Please see full auxiliary switch and alarm catalog numbers to order.

Pigtails—29 in / 0.75 m (A, B, C)

| Alarm Switch | | Auxiliary Switch | | | | | | | | |
|--------------|----------------------|------------------|-----|-----|---------|-----|-----|-----------|-----|-----|
| | | Three-Pole | | | | | | Four-Pole | | |
| | | None | 1NO | 1NC | 1NO/1NC | 2NO | 2NC | 2NO/2NC | 4NO | 4NC |
| None | None | NN | AA | AB | AC | AD | AE | A1 | A2 | A3 |
| | 1NO | BA | CA | — | — | — | — | — | — | — |
| | 1NC | BB | — | CB | — | — | — | — | — | — |
| | 1NO/1NC ^① | BC | — | — | CC | — | — | C1 | — | — |
| | 2NO | BD | — | — | — | CD | — | — | C2 | — |
| | 2NC | BE | — | — | — | — | CE | — | — | C3 |

Screw Terminals (X, Y, Z)

| Alarm Switch | | Auxiliary Switch | | | | | | | | |
|--------------|---------|------------------|-----|-----|---------|-----|-----|-----------|-----|-----|
| | | Three-Pole | | | | | | Four-Pole | | |
| | | None | 1NO | 1NC | 1NO/1NC | 2NO | 2NC | 2NO/2NC | 4NO | 4NC |
| None | None | NN | XA | XB | XC | XD | XE | X1 | X2 | X3 |
| | 1NO | YA | ZA | — | — | — | — | — | — | — |
| | 1NC | YB | — | ZB | — | — | — | — | — | — |
| | 1NO/1NC | YC | — | — | ZC | — | — | Z1 | — | — |
| | 2NO | YD | — | — | — | ZD | — | — | Z2 | — |
| | 2NC | YE | — | — | — | — | ZE | — | — | Z3 |

Push-In Clamps (U, V, W)

| Alarm Switch | | Auxiliary Switch | | | | | | | | |
|--------------|---------|------------------|-----|-----|---------|-----|-----|-----------|-----|-----|
| | | Three-Pole | | | | | | Four-Pole | | |
| | | None | 1NO | 1NC | 1NO/1NC | 2NO | 2NC | 2NO/2NC | 4NO | 4NC |
| None | None | NN | UA | UB | UC | UD | UE | U1 | U2 | U3 |
| | 1NO | VA | WA | — | — | — | — | — | — | — |
| | 1NC | VB | — | WB | — | — | — | — | — | — |
| | 1NO/1NC | VC | — | — | WC | — | — | W1 | — | — |
| | 2NO | VD | — | — | — | WD | — | — | W2 | — |
| | 2NC | VE | — | — | — | — | WE | — | — | W3 |

Note

^① Single-pole breakers can be equipped with a 1NO/1NC alarm switch that must be factory installed; use suffix **BC** in digits 15–16. No other internal accessories are available for single-pole breakers.

2.2

Molded Case Circuit Breakers

Power Defense Molded Case Circuit Breakers

2

Pigtails—118 in / 3.0 m (D, E, F)

| | Alarm Switch | Auxiliary Switch Three-Pole | | | | | | Four-Pole | | |
|--|--------------|--------------------------------|-----|-----|---------|-----|-----|-----------|-----|-----|
| | | None | 1NO | 1NC | 1NO/1NC | 2NO | 2NC | 2NO/2NC | 4NO | 4NC |
| | None | NN | DA | DB | DC | DD | DE | D1 | D2 | D3 |
| | 1NO | EA | FA | — | — | — | — | — | — | — |
| | 1NC | EB | — | FB | — | — | — | — | — | — |
| | 1NO/1NC | EC | — | — | FC | — | — | F1 | — | — |
| | 2NO | ED | — | — | — | FD | — | — | F2 | — |
| | 2NC | EE | — | — | — | — | FE | — | — | F3 |

Factory Installation of Alarm Switch for Use with PXR Electronic Trip Units

Pigtails—29 in / 0.75 m

| Auxiliary switch | | Auxiliary Switch Three-Pole | |
|------------------|---------|--------------------------------|-----------------|
| | | None | 1NO/1NC |
| Auxiliary switch | None | NN [Ⓢ] | AC [Ⓢ] |
| | 1NO/1NC | — | CC |

Pigtails—118 in / 3.0 m

| Alarm switch | | Auxiliary Switch Three-Pole | |
|--------------|---------|--------------------------------|---------|
| | | None | 1NO/1NC |
| Alarm switch | None | NN [Ⓢ] | DC |
| | 1NO/1NC | — | FC |

Tripping Accessories—Frame Size 2

Power Defense breakers have designated positions for shunt trips and undervoltage releases (UVRs) in the left pole accessory cavity. Each breaker has space for one tripping accessory only.

Power Defense breaker have secondary covers for ease of field installation of tripping accessories.

Shunt Trips

| Voltage | Screw Terminals | Pigtail (29 in / 0.75 m) | Pigtail (118 in / 3.0 m) |
|---------------------|-----------------|--------------------------|--------------------------|
| 12 Vdc | PDG2XST12DCT | PDG2XST12DCS | PDG2XST12DCR |
| 48 Vdc | PDG2XST48DCT | PDG2XST48DCS | PDG2XST48DCR |
| 60 Vdc | PDG2XST60DCT | PDG2XST60DCS | PDG2XST60DCR |
| 24 Vac/Vdc | PDG2XST24ACDCT | PDG2XST24ACDCS | PDG2XST24ACDCR |
| 110-130 Vac/125 Vdc | PDG2XST130ACDCT | PDG2XST130ACDCS | PDG2XST130ACDCR |
| 200-240 Vac/250 Vdc | PDG2XST250ACDCT | PDG2XST250ACDCS | PDG2XST250ACDCR |
| 380-440 Vac | PDG2XST440ACT | PDG2XST440ACS | PDG2XST440ACR |
| 480-525 Vac | PDG2XST525ACT | PDG2XST525ACS | PDG2XST525ACR |
| 600 Vac | PDG2XST600ACT | PDG2XST600ACS | PDG2XST600ACR |

Undervoltage Releases (UVRs)

| Voltage | Screw Terminals | Pigtail (29 in / 0.75 m) | Pigtail (118 in / 3.0 m) |
|---------|-----------------|--------------------------|--------------------------|
| 12 Vdc | PDG2XUV12DCV | PDG2XUV12DCU | PDG2XUV12DCW |
| 24 Vdc | PDG2XUV24DCV | PDG2XUV24DCU | PDG2XUV24DCW |
| 48 Vdc | PDG2XUV48DCV | PDG2XUV48DCU | PDG2XUV48DCW |
| 60 Vdc | PDG2XUV60DCV | PDG2XUV60DCU | PDG2XUV60DCW |
| 125 Vdc | PDG2XUV125DCV | PDG2XUV125DCU | PDG2XUV125DCW |
| 250 Vdc | PDG2XUV250DCV | PDG2XUV250DCU | PDG2XUV250DCW |
| 24 Vac | PDG2XUV24ACV | PDG2XUV24ACU | PDG2XUV24ACW |
| 130 Vac | PDG2XUV130ACV | PDG2XUV130ACU | PDG2XUV130ACW |
| 240 Vac | PDG2XUV240ACV | PDG2XUV240ACU | PDG2XUV240ACW |
| 440 Vac | PDG2XUV440ACV | PDG2XUV440ACU | PDG2XUV440ACW |
| 525 Vac | PDG2XUV525ACV | PDG2XUV525ACU | PDG2XUV525ACW |
| 600 Vac | PDG2XUV600ACV | PDG2XUV600ACU | PDG2XUV600ACW |

Note

[Ⓢ] 1NO/1NC (AC) is always included in breakers with PXR trip units; no selection or selection of **NN** in Digits 15–16 will result in AC.

Factory Installed Tripping Accessories—Frame Size 2

Shunt trips and under voltage releases (UVRs) are plug-and-play accessories designed to be field installable. However, Eaton also offers the service of installation in our factories.

Breaker catalog numbers with shunt trips or UVRs require a complete 20-digit catalog number, adding the tripping accessory functionality in digits 17 and 18 and adhering to the following conditions and tables.

- Digit 17 denotes the type of accessory installed and the terminal type
- Digit 18 denotes the voltage of the accessory
- If no accessories are selected, use NNNN for the final 4 digits of the catalog number
- Each breaker has space for one shunt trip or UVR tripping accessory only

Shunt Trips

| Voltage | Screw Terminals | Pigtail (29 in / 0.75 m) | Pigtail (118 in / 3.0 m) |
|---------------------|-----------------|--------------------------|--------------------------|
| 12 Vdc | TH | SH | RH |
| 48 Vdc | TJ | SJ | RJ |
| 60 Vdc | TK | SK | RK |
| 24 Vac/Vdc | TN | SN | RN |
| 110–130 Vac/125 Vdc | TP | SP | RP |
| 200–240 Vac/250 Vdc | TR | SR | RR |
| 380–440 Vac | TC | SC | RC |
| 480–525 Vac | TD | SD | RD |
| 600 Vac | TE | SE | RE |

Undervoltage Releases (UVRs)

| Voltage | Screw Terminals | Pigtail (29 in / 0.75 m) | Pigtail (118 in / 3.0 m) |
|---------|-----------------|--------------------------|--------------------------|
| 12 Vdc | VH | UH | WH |
| 24 Vdc | VG | UG | WG |
| 48 Vdc | VJ | UJ | WJ |
| 60 Vdc | VK | UK | WK |
| 125 Vdc | VL | UL | WL |
| 250 Vdc | VM | UM | WM |
| 24 Vac | VF | UF | WF |
| 130 Vac | VA | UA | WA |
| 240 Vac | VB | UB | WB |
| 440 Vac | VC | UC | WC |
| 525 Vac | VD | UD | WD |
| 600 Vac | VE | UE | WE |

Note: Use suffix **US** for 18 Vdc when using Time Delay UVR.

Handle Mechanisms—Frame Size 2**Direct Rotary Handle Mechanism**

| Description | NEMA 1/3R/12 Catalog Number | Factory Installed Digits 19–20 |
|---|-----------------------------|--------------------------------|
| Standard lockable handle | PDG2XHMCS | HA |
| Standard handle with door interlock | PDG2XHMCSN | HB |
| Standard handle with mech padlock | PDG2XHMCSP | HC |
| Standard handle with mech keylock | PDG2XHMCSK | HD |
| Standard handle with door interlock and mech padlock | PDG2XHMCSNP | HE |
| Standard handle with door interlock and mech keylock | PDG2XHMCSNK | HF |
| Emergency lockable handle | PDG2XHMCE | H1 |
| Emergency handle with door interlock | PDG2XHMCEH | H2 |
| Emergency handle with mech padlock | PDG2XHMCEP | H3 |
| Emergency handle with mech keylock | PDG2XHMCEK | H4 |
| Emergency handle with door interlock and mech padlock | PDG2XHMCEHP | H5 |
| Emergency handle with door interlock and mech keylock | PDG2XHMCEHK | H6 |

Variable Depth Rotary Handle Mechanism

| Description | NEMA 1/3R/12 Catalog Number | Factory Installed Digits 19–20 |
|--|-----------------------------|--------------------------------|
| Standard lockable handle | PDG2XHMDS | DA |
| Standard handle with mech padlock | PDG2XHMDSH | DC |
| Standard handle with mech keylock | PDG2XHMDSK | DD |
| Emergency lockable handle | PDG2XHMDE | D1 |
| Emergency handle with mech padlock | PDG2XHMDEH | D3 |
| Emergency handle with mech keylock | PDG2XHMDEK | D4 |
| 12 in (307 mm) standard handle mechanism shaft | PDG12XHMS307 | — |
| 20 in (507 mm) standard handle mechanism shaft | PDG12XHMS507 | — |
| Standard, NFPA79, handle mech shaft handle | PDG12XHM79S | — |
| Emergency, NFPA79, handle mech shaft handle | PDG12XHM79E | — |

Flex Shaft Handle Mechanism

| Cable Length (ft) | Metal Handle, NEMA 1/3R/12 Catalog Number | High Performance Handle, NEMA 1/3R/12 Catalog Number | Metal Handle, NEMA 4/4X Catalog Number | High Performance Handle, NEMA 4/4X Catalog Number |
|-------------------|---|--|--|---|
| 2 | PDG2XFS02 | PDG2XFS02HP | PDG2XFS02X | PDG2XFS02HPX |
| 3 | PDG2XFS03 | PDG2XFS03HP | PDG2XFS03X | PDG2XFS03HPX |
| 4 | PDG2XFS04 | PDG2XFS04HP | PDG2XFS04X | PDG2XFS04HPX |
| 5 | PDG2XFS05 | PDG2XFS05HP | PDG2XFS05X | PDG2XFS05HPX |
| 6 | PDG2XFS06 | PDG2XFS06HP | PDG2XFS06X | PDG2XFS06HPX |
| 7 | PDG2XFS07 | PDG2XFS07HP | PDG2XFS07X | PDG2XFS07HPX |
| 8 | PDG2XFS08 | PDG2XFS08HP | PDG2XFS08X | PDG2XFS08HPX |
| 9 | PDG2XFS09 | PDG2XFS09HP | PDG2XFS09X | PDG2XFS09HPX |
| 10 | PDG2XFS10 | PDG2XFS10HP | PDG2XFS10X | PDG2XFS10HPX |

Accessories—Frame Size 2**External Accessories**

| Description | Fit Type | Catalog Number | Factory Installed Digits 19–20 |
|--|-----------------------------|-----------------|--------------------------------|
| Padlockable hasp | Top | PDG2XPLKT | L4 |
| | Left side | PDG2XPLKS | L5 |
| | Right side | PDG2XPLKS | L6 |
| | Snap on | PDG2XPLKSNAP | L0 |
| Padlockable hasp OFF only | Top | PDG2XPLKTOFF | L1 |
| | Left side | PDG2XPLKLOFF | L2 |
| | Right side | PDG2XPLKROFF | L3 |
| Padlockable handle block | On handle | PDG2XPHB | — |
| Kirk lock provision ① | Top | PDG2XKLKPTFF | L7 |
| Walking beam interlock ②③ | Two-, three-, and four-pole | PDG2XWB1234P | — |
| Electrical operator | 24 Vdc | PDG2XR0P24DC | RG |
| | 48 Vdc | PDG2XR0P48DC | RJ |
| | 60 Vdc | PDG2XR0P60DC | RK |
| | 125 Vdc | PDG2XR0P125DC | RL |
| | 250 Vdc | PDG2XR0P250DC | RM |
| | 110–130 Vac | PDG2XR0P130AC | RA |
| | 200–240 Vac | PDG2XR0P240AC | RB |
| 380–440 Vac | PDG2XR0P440AC | RC | |
| Plug-in breaker base only | Three-pole | PDG2XP1BB3P225A | — |
| | Four-pole | PDG2XP1BB4P225A | — |
| Plug-in breaker parts kit | Three-pole | PDG2XP1BK3P225A | — |
| | Four-pole | PDG2XP1BK4P225A | — |
| Terminal covers | Three-pole | PDG2XTC3P | — |
| | Four-pole | PDG2XTC4P | — |
| Interphase barriers | Three-pole | PDG2XIB3P | — |
| | Four-pole | PDG2XIB4P | — |
| Finger protection | Three-pole | PDG2XFP3P | — |
| | Four-pole | PDG2XFP4P | — |
| 60A–100 A residual current neutral sensor | Cable type | PDG2XNCTD0100 | — |
| 150A–225 A residual current neutral sensor | Cable type | PDG2XNCTD0225 | — |
| 60A–100 A residual current neutral sensor | Bus bar type | PDG2XNCTB0100 | — |
| 150A–225 A residual current neutral sensor | Bus bar type | PDG2XNCTB0225 | — |
| Service entrance barrier kit | Three-pole | PRLSEBPD2 | — |

Base Mounting Hardware

| Description | Catalog Number |
|---------------------------|----------------|
| Single-pole metric | 4218B80G09 |
| Two-pole metric | 4218B80G11 |
| Three-, four-pole metric | BMH1M |
| Single-pole English | 624B375G01 |
| Two-pole English | 4218B80G01 |
| Three-, four-pole English | BMH1 |

Note: Base mounting hardware is included with a circuit breaker or molded case switch.

Dimensions and Weights—Frame Size 2**Approximate Dimensions in Inches (mm)**

| Number of Poles | Width | Height | Depth |
|-----------------|--------------|--------------|-------------|
| 1 | 1.38 (35.1) | 6.00 (152.4) | 3.50 (88.9) |
| 2 | 2.75 (69.9) | 6.00 (152.4) | 3.50 (88.9) |
| 3 | 4.12 (104.6) | 6.00 (152.4) | 3.50 (88.9) |
| 4 | 5.49 (139.5) | 6.00 (152.4) | 3.50 (88.9) |

Approximate Shipping Weight in lb (kg)

| Breaker Type | 1-Pole | 2-Pole | 3-Pole | 4-Pole |
|--------------|-------------|-------------|-------------|-------------|
| PDG2 225 A | 2.00 (0.91) | 3.00 (1.36) | 4.21 (1.82) | 5.69 (2.46) |

Notes

- ① Provision only. For use with Type FF Kirk keylock (sold separately).
- ② Breaker must be ordered with walking beam interlock ready modification from plant (factory suffix **WB**).
- ③ Requires two breakers.

Power Defense Molded Case Circuit Breakers—Frame Size 3

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Power Defense Molded Case Circuit Breakers—Frame Size 3

Product Description

Frame Size 3 covers a range of 45 A through 600 A with a complete offering of trip units, including PXR electronic trip units and fixed-adjustable thermal-magnetic trip units. PD-3 is available in two versions, with 400 A and 600 A constructions to optimize performance in multiple applications.

Application Description

Frame Size 3 can be used to meet a wide range of circuit protection and power distribution needs, including ground fault protection, current limiting, 100% UL ratings, and high instantaneous settings for selective coordination. PXR trip units in PD-3 provide all levels of protection, including energy metering with multiple communication schemes, breaker health indication, and arc flash reduction options.

Features and Benefits

Frame Size 3 breakers are modular and available as complete breakers from the factory, or as modular components, including frames, trip units, accessories and terminals to provide flexibility for customers. PXR trip units are available with advanced features to provide customers unparalleled situational awareness of their electrical system.

Standards and Certifications

Power Defense breakers are designed and tested to meet stringent requirements for:

- UL
- CSA
- IEC (CE)
- CB (CCC)



Catalog Number / Product Selection

Power Defense—Frame Size 3 (45–600 A)

Frame Size 3 covers a range of 45 A through 600 A using electronic trip units, and 100 A through 600 A using thermal-magnetic trip units. It is available in configurations of 2-pole, 3-pole and 4-pole, with the 2-pole being in the same physical size of a 3-pole variant. Frame 3 has two unique constructions: one for 400 A and a second one for 600 A. The 600 A construction provides a unique capability to be used at 400 A and below in critical coordination applications where a high level fixed instantaneous is required. This is accomplished by using a letter **H** in the 7th digit of the catalog number, as shown below.

Interrupting Ratings

| Catalog Designator | F | | G | | K | | M ^① | | N ^① | | P ^① | |
|--------------------------|-----------------|----------------------|-----------------|----------------------|-----------------|----------------------|-----------------|----------------------|-----------------|----------------------|-----------------|----------------------|
| ANSI (UL/CSA) | kA rms | | kA rms | | kA rms | | kA rms | | kA rms | | kA rms | |
| 240 Vac | 35 | | 65 | | 85 | | 100 | | 150 | | 200 | |
| 480 Vac | 25 | | 35 | | 50 | | 65 | | 85 | | 100 | |
| 600 Vac | 14 | | 18 | | 25 | | 35 | | 50 | | 65 | |
| 125/250 Vdc ^② | 22 | | 22 | | 22 | | 42 | | 42 | | 42 | |
| IEC | I _{cu} | I _{cs} | I _{cu} | I _{cs} | I _{cu} | I _{cs} | I _{cu} | I _{cs} | I _{cu} | I _{cs} | I _{cu} | I _{cs} |
| 240 Vac | 35 | 35 | 55 | 55 | 85 | 85 | 100 | 100 | 150 | 100 | 200 | 150 |
| 380–415 Vac | 25 | 25 | 36 | 36 | 50 | 50 | 70 | 53 | 70 | 70 | 100 | 70 |
| 440 Vac | 25 | 20 | 30 | 22.5 | 35 | 35 | 50 | 40 | 70 | 50 | 100 | 50 |
| 480 Vac | 20 | 20 | 25 | 20 | 35 | 22.5 | 50 | 30 | 65 | 40 | 85 | 40 |
| 525 Vac | 18 | 5 | 20 | 7.5 | 25 | 10 | 30 | 15 | 35 | 25 | 40 | 25 |
| 660–690 Vac | — | — | 8 | 4 | 10 | 5 | 15 | 7.5 | 20 | 10 | 20 | 10 |
| 125/250 Vdc ^② | 22 | 10 / 22 ^③ | 22 | 10 / 22 ^③ | 22 | 10 / 22 ^③ | 42 | 22 / 42 ^③ | 42 | 22 / 42 ^③ | 42 | 22 / 42 ^③ |

Notes

- ① UL current limiting.
- ② DC ratings available in thermal-magnetic breakers only. 250 Vdc is achieved using two poles in series.
- ③ First rating listed is for 400 A frame, second rating is for 600 A frame.

2.2

Molded Case Circuit Breakers

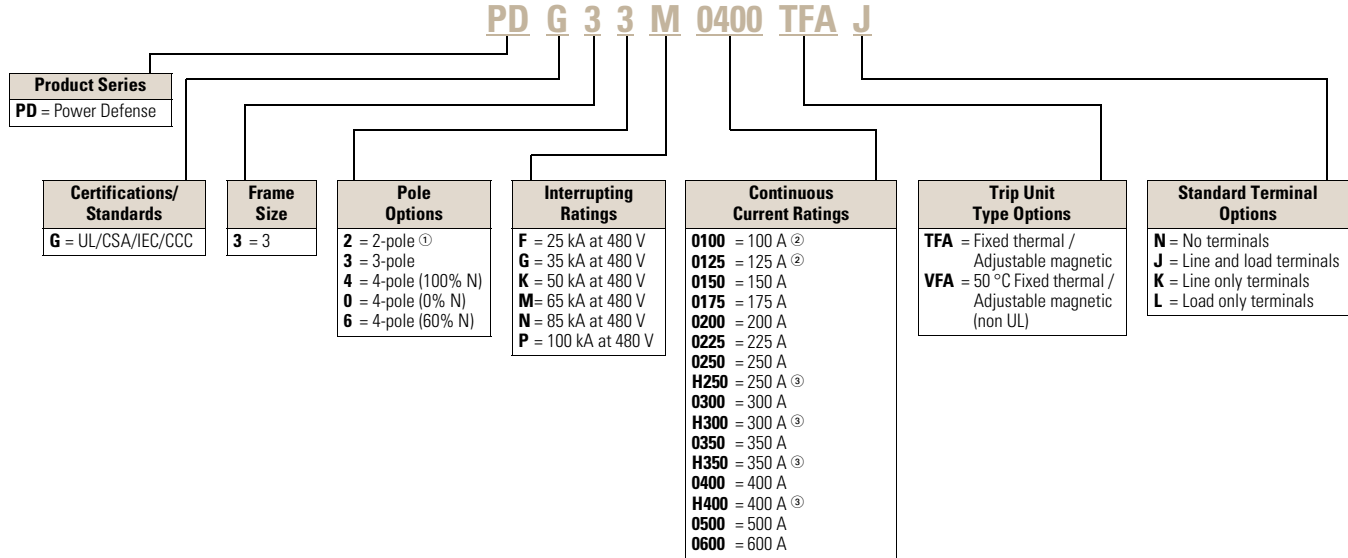
Power Defense Molded Case Circuit Breakers

2

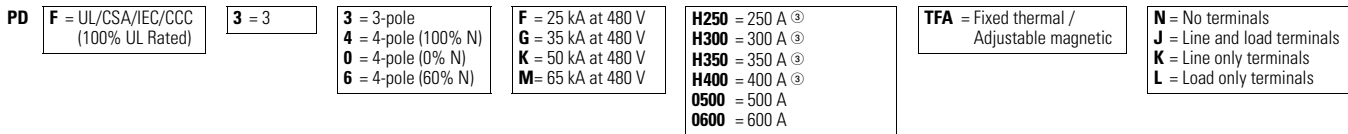
Molded Case Circuit Breaker

This information is presented as a tool to develop catalog numbers for selecting Power Defense circuit breakers and trip units.

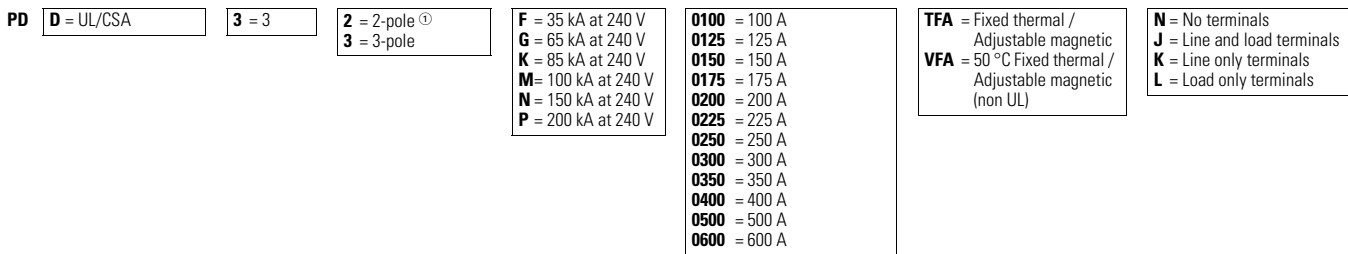
Molded Case Circuit Breaker with Thermal-Magnetic Trip Units (TMTU)—Globally Rated



Molded Case Circuit Breakers with TMTU—Globally Rated (100% UL Rated)



Molded Case Circuit Breakers with TMTU—UL/CSA Rated to 240 Vac



Molded Case Switches ④—Globally Rated



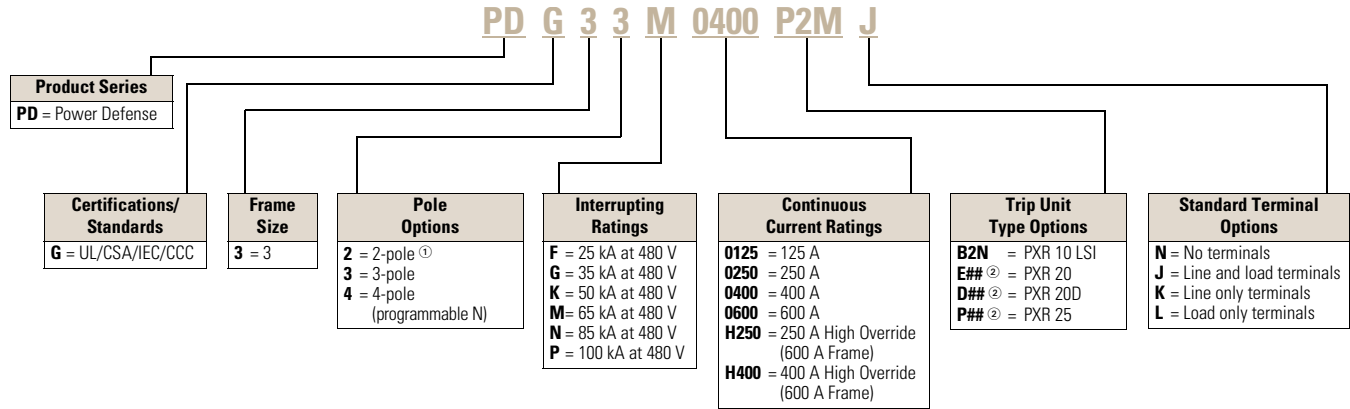
Notes

- ① All PD-3 2-pole breakers are physically the same size as a 3-pole frame with the outer poles used for electrical connections.
- ② Not available in 4-pole 60% neutral protection.
- ③ High override (600 A frame).
- ④ Molded case switches may open above 4000 A for the 400 A frame, and above 6300 A for the 600 A frame.

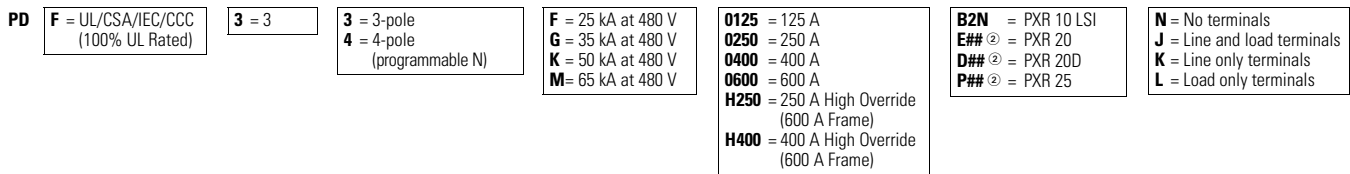
Molded Case Circuit Breakers with Power Xpert Release (PXR) Electronic Trip Units (ETU)

This information is presented as a tool to develop catalog numbers for selecting Power Defense circuit breakers and trip units.

Molded Case Circuit Breakers with PXR ETU—Globally Rated



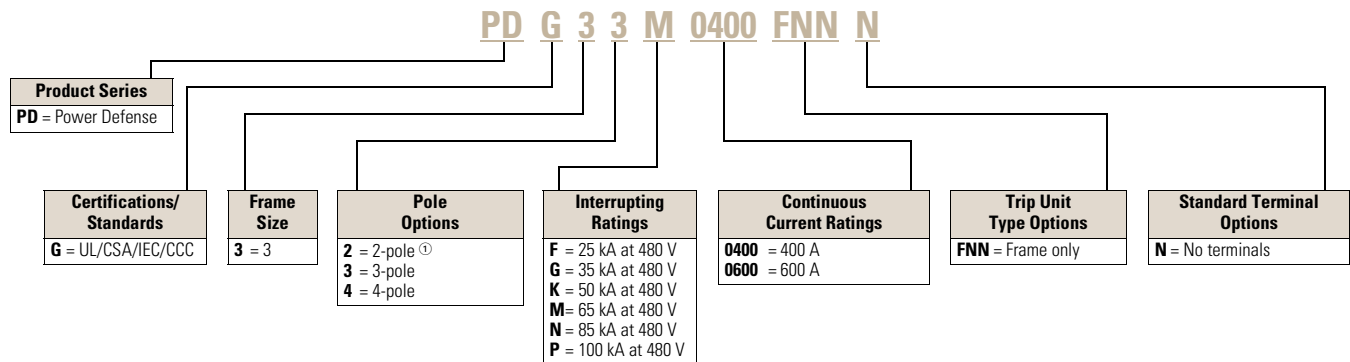
Molded Case Circuit Breakers with PXR ETU—Globally Rated (100% UL Rated)



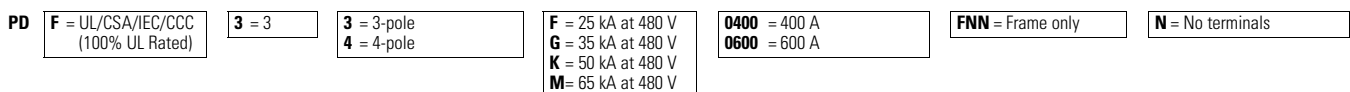
Globally Rated Frame Only

PD-3 thermal-magnetic and electronic breakers may also be purchased as separate frames, trip units, terminals and accessories for field configuration of a final breaker. Each Frame Only device is marked with interrupting ratings and a maximum continuous current rating; each trip unit is also marked with a maximum continuous current rating, which must not exceed that of the frame. Additionally, 100% UL Rated frames are marked as such on the Frame Only device.

Frame Only—Globally Rated



Frame Only—Globally Rated (100% UL Rated)



Notes

- ① All PD-3 2-pole breakers are physically the same size as a 3-pole frame with the outer poles used for electrical connections.
- ② See PXR Trip Unit Options table on [Page V4-T2-47](#) for protection type (#₍₁₎) and available configured options (#₍₂₎).

2.2

Molded Case Circuit Breakers

Power Defense Molded Case Circuit Breakers

2

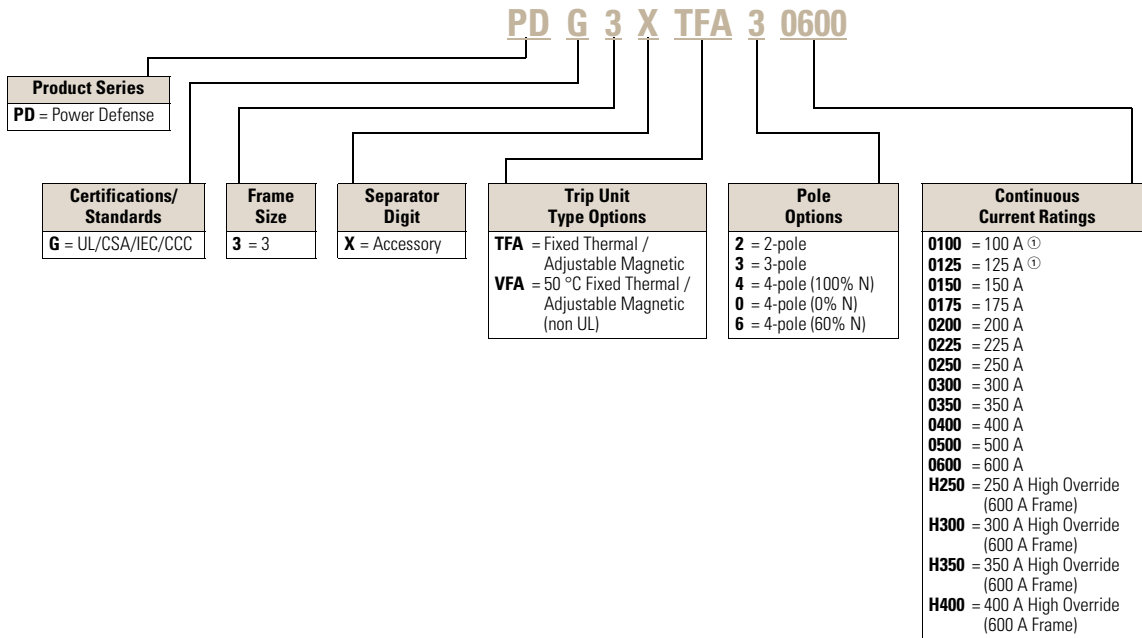
Trip Units

PD-3 thermal-magnetic and electronic breakers may also be purchased as separate frames, trip units, terminals and accessories for field configuration of a final breaker. The 400 A frame must use trip units of ratings 0100–0400, while the 600 A frame must use trip units of ratings 0500, 0600 or designated by **H**, such as *H250*. Additionally, for 2-pole breakers using electronic trip units, 3-pole trip units are used. PDG designated trip units are for use with PDG and PDF breaker frames. The 100% rating for PDF (100% UL Rated) is marked on the frame, not the trip unit.

Trip Units Only

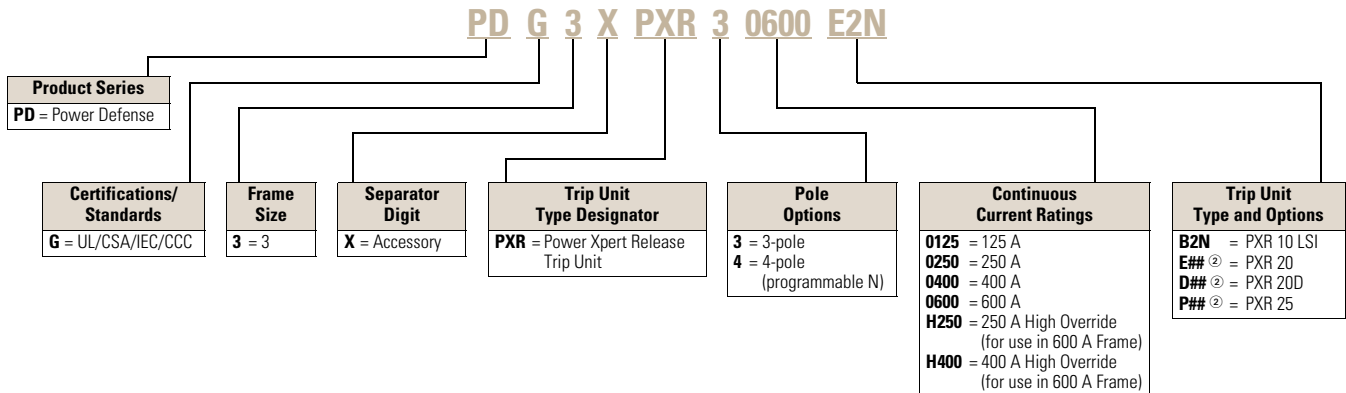
This information is presented as a tool to develop catalog numbers for selecting Power Defense circuit breakers and trip units.

Thermal-Magnetic Trip Units



Power Xpert Release (PXR) Electronic Trip Units

Power Xpert Release (PXR) Electronic Trip Units



Notes

- ① Not available in 4-pole 60% neutral protection.
- ② See tables and descriptions on **Page V4-T2-47** for protection type (#₁) and available configured options (#₂).

Power Xpert Release (PXR) Trip Unit Options—Frame Size 3

Power Xpert Release (PXR) Trip Unit Options

| PXR | ETU | #(1)—Protection Type | | | | #(2)—Available Configured Options | | | | | | | |
|---------|-----|----------------------|------|---------------|----------------|-----------------------------------|---------------|------------|------------|-------------------|-------------------|-----------------------|---|
| | | LSI | LSIG | LSI with ARMS | LSIG with ARMS | Relays | Relays Modbus | Relays ZSI | Relays CAM | Relays Modbus ZSI | Relays Modbus CAM | Relays Modbus ZSI CAM | |
| PXR 10 | B | 2 | — | — | — | N | — | — | — | — | — | — | — |
| PXR 20 | E | 2 | — | — | — | N | R | M | Z | C | W | X | — |
| | | — | 3 | 4 | 5 | — | R | M | Z | C | W | X | — |
| PXR 20D | D | 2 | 3 | 4 | 5 | — | — | M | — | — | W | — | D |
| PXR 25 | P | 2 | 3 | 4 | 5 | — | — | M | — | — | W | — | D |

Descriptions of PXR Configured Options

Relays—2 Form A contacts (rated for 240 Vac, 1 A)

- Interface: 3 wires (ALM1, ALM2, ALM Common)
- Programmable to indicate breaker conditions

Modbus—Modbus RTU directly from breaker

- Interface: 3 wires (MODBA, MODBB, MODBG)
- No additional modules required

ZSI—Zone Selective Interlocking

- Interface: 3 wires (Zin, Zout, Zcomm)
- Includes ability to turn ON and OFF, and indicate signals

CAM—CAM Link connection (requires a CAM module per breaker)

- Interface: 5 wires (refer to CAM IL for details)
- Communications Adapter Modules available for Modbus TCP and PROFIBUS

ARMS—Arcflash Reduction Maintenance System, or Maintenance Mode

- Available as trip unit Protection Type 4 or 5
- Interface: Switch and LED on face of trip unit (self-powered) and two wires for remote switch enable option (24 Vdc required)
- A programmable relay will be factory defaulted to remote indication of ARMS

Auxiliary Power

- Connection included with all PXR 20, 20D, and 25 trip units
- Required for communications, relays, and metering accuracy
- 24 Vdc, 0.5 A
- Interface: 2 wires Aux +24 V, Aux 0 V)

Available Continuous Current (I_c) Settings on PXR Electronic Trip Units

| Option | Setting | Catalog Number Selection and Maximum Setting (I _n) | | | |
|----------------|---------------------|--|--------------------|--------------------|---------------|
| | | 0125 125 A | 0250/H250 250 A | 0400/H400 400 A | 0600 600 A |
| PXR 10, PXR 20 | 1 | 45 A | 90 A | 160 A | 250 A |
| | 2 | 50 A | 100 A | 175 A | 275 A |
| | 3 | 60 A | 110 A | 200 A | 300 A |
| | 4 | 63 A | 125 A | 225 A | 320 A |
| | 5 | 70 A | 150 A | 250 A | 350 A |
| | 6 | 80 A | 160 A | 275 A | 400 A |
| | 7 | 90 A | 175 A | 300 A | 450 A |
| | 8 | 100 A | 200 A | 320 A | 500 A |
| | 9 | 110 A | 225 A | 350 A | 550 A |
| | 10 = I _n | 125 A | 250 A | 400 A | 600 A |

PXR 20D, PXR 25 Programmable from minimum to maximum values in 1 A increments.

2.2

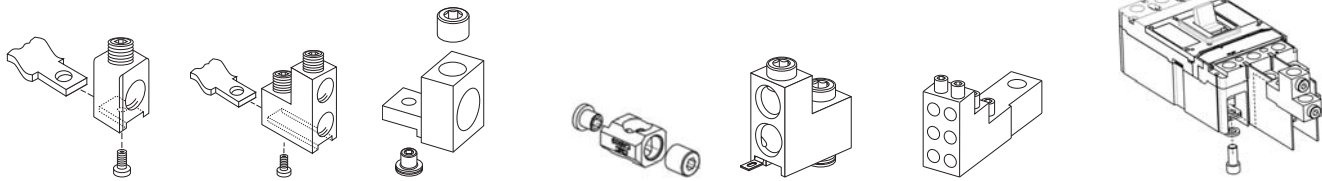
Molded Case Circuit Breakers

Power Defense Molded Case Circuit Breakers

Terminals—Frame Size 3

Catalog numbers shown are for a single side of a 3-pole breaker.
For 2- and 4-pole options, replace the **X3** with **X2** or **X4**, respectively.
Example: PDG3**X3**TA300 becomes PDG3**X2**TA300 for two-pole.

Terminal Types



| | | | | | | |
|---|---|---|-----------------------------|---|--|--|
| PDG3X3TA300 PDG3X3TA350 PDG3X3T300 PDG3X3T350 PDG3X3TA350SW | PDG3X3TA400 PDG3X3TA400SW PDG3X3T400 PDG3X3TA400CW PDG3X3T400CW PDG3X3TA401CW PDG3X3TA401 | PDG3X3TA402 PDG3X3T402 PDG3X3TA401H PDG3X3T401H PDG3X3TA401HCW PDG3X3T401HCW | PDG3X3TA400H PDG3X3T400H | PDG3X3TA630 PDG3X3T630 PDG3X3TA630SW PDG3X3TA630CW PDG3X3T630CW | PDG3X3TA4003W PDG3X3TA4006W PDG3X3TA6006W PDG3X3TA6006WSW | PDG3X3TA400RF PDG3X3TA400HRF PDG3X3TA630RF |
|---|---|---|-----------------------------|---|--|--|

Note: Pictures are for reference only.

Terminals

| Maximum Breaker Amperes | Breaker Frame | Terminal Body Type | Wire Type | Wire Class | Number of Conductors per Phase | AWG / kcmil Range per Conductor | Metric (mm ²) Range per Conductor | 3-Pole Catalog Number | Included Accessories | Digit 14 Designation | | | Factory Config. Ampere Range |
|------------------------------------|---------------|--------------------|-----------|------------------|--------------------------------|---------------------------------|---|-----------------------|----------------------|----------------------|-----------|-----------|------------------------------|
| | | | | | | | | | | Line and Load | Line Only | Load Only | |
| Standard Terminals | | | | | | | | | | | | | |
| 300 | 400 | Aluminum | Cu/Al | B, C | 1 | 3–350 | 26.7–177 | PDG3X3TA300 | — | J | K | L | 100–225 |
| 350 | 400 | Aluminum | Cu/Al | B, C | 1 | 250–500 | 127–253 | PDG3X3TA350 | — | J | K | L | 250–350 |
| 400 | 400 | Aluminum | Cu/Al | B, C | 2 | 3/0–250 | 85–127 | PDG3X3TA400 | Terminal shield | J | K | L | 400 |
| 400 | 600 | Aluminum | Cu/Al | B, C | 1 | 500–750 | 253–380 | PDG3X3TA401H | Terminal shield | J | K | L | H250–H400 |
| 630 | 600 | Aluminum | Cu/Al | B, C | 2 | 2–500 | 33.6–253 | PDG3X3TA630 | Terminal shield | J | K | L | 450–600 |
| Optional Aluminum Terminals | | | | | | | | | | | | | |
| 400 | 400 | Aluminum | Cu/Al | B, C | 1 | 500–750 | 253–380 | PDG3X3TA402 | Terminal shield | T | U | V | 100–400 |
| 400 | 400 | Aluminum | Cu/Al | B, C | 2 | 2/0–250 (2) and 2/0–500 (1) | 67.4–127 (2) and 67.4–253 (1) | PDG3X3TA401 | Terminal shield | — | — | — | — |
| 400 | 600 | Aluminum | Cu/Al | B, C | 1 | 3–500 | 26.7–253 | PDG3X3TA400H | — | T | U | V | H250–H400 |
| Optional Copper Terminals | | | | | | | | | | | | | |
| 300 | 400 | Copper | Cu | B, C | 1 | 3–350 | 26.7–177 | PDG3X3T300 | — | W | Y | Z | 100–225 |
| 350 | 400 | Copper | Cu | B, C | 1 | 250–500 | 127–253 | PDG3X3T350 | — | W | Y | Z | 250–350 |
| 400 | 400 | Copper | Cu | B, C | 2 | 3/0–250 | 85–127 | PDG3X3T400 | Terminal shield | W | Y | Z | 400 |
| 400 | 400 | Copper | Cu/Al | B, C | 1 | Al: 500–750 Cu: 500 Only | — | PDG3X3T402 | Terminal shield | — | — | — | — |
| 400 | 600 | Copper | Cu | B, C | 1 | 3–500 | 26.7–253 | PDG3X3T400H | — | — | — | — | — |
| 400 | 600 | Copper | Cu | B, C | 1 | 500–750 | 253–380 | PDG3X3T401H | Terminal shield | W | Y | Z | H250–H400 |
| 630 | 600 | Copper | Cu | B, C | 2 | 2–500 | 33.6–253 | PDG3X3T630 | Terminal shield | W | Y | Z | 450–600 |
| Strandable Terminals | | | | | | | | | | | | | |
| 400 | 400 | Aluminum | Cu/Al | B, C | 2 | 3/0–250 | 85–127 | PDG3X3TA400SW | — | A | B | C | 100–400 |
| | | | | D, G, H, I, K, M | | 3/0–4/0 | 85–107 | | | | | | |
| 350 | 400 | Aluminum | Cu/Al | B, C | 6 | 250–500 | 127–253 | PDG3X3TA350SW | — | — | — | — | — |
| | | | | D, G, H, I, K, M | | 250–350 | 127–177 | | | | | | |
| 630 | 600 | Aluminum | Cu/Al | B, C | 2 | 2–500 | 33.6–253 | PDG3X3TA630SW | — | A | B | C | H250–600 |
| | | | | D, G, H, I, K, M | | 2–350 | 33.6–177 | | | | | | |

Terminals—Frame Size 3**Terminals, continued**

| Maximum Breaker Amperes | Breaker Frame | Terminal Body Type | Wire Type | Wire Class | Number of Conductors per Phase | AWG / kcmil Range per Conductor | Metric (mm ²) Range per Conductor | 3-Pole Catalog Number | Included Accessories | Digit 14 Designation | | | Factory Config. Ampere Range |
|--|---------------|--------------------|-----------|-----------------------------|--------------------------------|---------------------------------|---|-----------------------------|----------------------|----------------------|-----------|-----------|------------------------------|
| | | | | | | | | | | Line and Load | Line Only | Load Only | |
| Control Wire Aluminum Terminals | | | | | | | | | | | | | |
| 400 | 400 | Aluminum | Cu/Al | B, C | 2 | 3/0–250 | 85–127 | PDG3X3TA400CW | Terminal shield | 1 | 2 | 3 | 100–400 |
| 400 | 400 | Aluminum | Cu/Al | B, C | 2 | 2/0–250 (2) or 2/0–500 (1) | 67.4–127 (2) or 67.4–253 (1) | PDG3X3TA401CW | Terminal shield | 4 | 5 | 6 | 100–400 |
| 400 | 600 | Aluminum | Cu/Al | B, C | 1 | 500–750 | 253–380 | PDG3X3TA401HCW | Terminal shield | 1 | 2 | 3 | H250–H400 |
| 630 | 600 | Aluminum | Cu/Al | B, C | 2 | 2–500 | 33.6–253 | PDG3X3TA630CW | Terminal shield | 1 | 2 | 3 | 450–600 |
| Control Wire Copper Terminals | | | | | | | | | | | | | |
| 400 | 400 | Copper | Cu | B, C | 2 | 3/0–250 | 85–127 | PDG3X3T400CW | Terminal shield | 7 | 8 | 9 | 100–400 |
| 400 | 600 | Copper | Cu | B, C | 1 | 500–750 | 253–380 | PDG3X3T401HCW | Terminal shield | 7 | 8 | 9 | H250–H400 |
| 630 | 600 | Copper | Cu | B, C | 2 | 2–500 | 33.6–253 | PDG3X3T630CW | Terminal shield | 7 | 8 | 9 | 450–600 |
| Multi-wire Terminals | | | | | | | | | | | | | |
| 400 | 400 | Aluminum | Cu/Al | B, C | 4 | 12–2/0 | 3.31–67.4 | PDG3X3TA4003W | Terminal shield | — | — | H | 100–400 |
| 400 | 400 | Aluminum | Cu/Al | B, C | 6 | 14–3 | 2.08–26.7 | PDG3X3TA4006W | Terminal shield | — | — | G | 100–400 |
| 600 | 600 | Aluminum | Cu/Al | B, C | 6 | 14–1/0 | 2.08–53.5 | PDG3X3TA6006W | Terminal shield | — | — | G | H250–600 |
| StrandAble Multi-wire Terminals | | | | | | | | | | | | | |
| 600 | 400 | Aluminum | Cu/Al | B, C D, G, H, I, K, M | 6 | 12–2/0 8–1/0 | — | PDG3X3TA6006WSW | Terminal shield | — | — | — | — |
| Rear-fed Terminals | | | | | | | | | | | | | |
| 400 | 400 | Aluminum | Cu/Al | B, C | 1 | 250–500 | 127–253 | PDG3X3TA400RF ^① | Interphase barriers | — | — | — | — |
| 400 | 600 | Aluminum | Cu/Al | B, C | 1 | 2–500 | 33.6–253 | PDG3X3TA400HRF ^① | Interphase barriers | — | — | — | — |
| 630 | 600 | Aluminum | Cu/Al | B, C | 2 | 2–500 | 33.6–253 | PDG3X3TA630RF ^① | Interphase barriers | — | — | — | — |
| Rear Connectors | | | | | | | | | | | | | |
| 400 | — | — | — | — | — | — | — | PDG3X3TA400RC | — | R | — | — | 100–400 |
| 630 | — | — | — | — | — | — | — | PDG3X3TA630RC | — | R | — | — | 250–600 |
| End Cap Kits/Screw Terminals | | | | | | | | | | | | | |
| 400 | — | — | — | — | — | — | — | PDG3X3TS400 | — | S | D | E | 100–400 |
| 600 | — | — | — | — | — | — | — | PDG3X3TS600 | — | S | D | E | 250–600 |

Note: Wire capacity is based on standard imperial wire sizes; metric sizes provided in table are a direct conversion to demonstrate maximum capacity, not to denote metric wire sizes.

Control Wire Tabs

| Use | Package Qty. | Catalog Number |
|-----------|--------------|----------------|
| 100–400 A | 12 | KCWTK |

Note

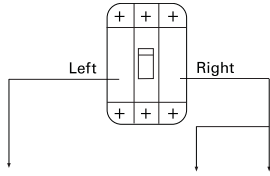
① Terminals not UL Listed.



Accessories

2

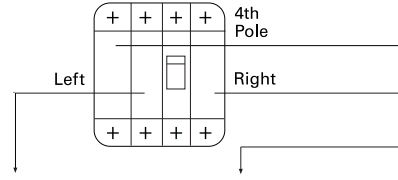
Internal Accessory Configurations—Frame Size 3



3-Pole Circuit Breakers



| Tripping Accessory Options | Alarm Options (2 Spaces) ^① | Aux Options (2 Spaces) |
|---|--|---------------------------|
| Shunt Trip  | None | None |
| | 1NO (1 space) | 1NO (1 space) |
| | 1NC (1 space) | 1NC (1 space) |
| | 1NO/1NC (2 spaces) | 1NO/1NC (2 spaces) |
| UVR  | 2NO (2 spaces) | 2NO (2 spaces) |
| | 2NC (2 spaces) | 2NC (2 spaces) |

4-Pole Circuit Breakers



| Tripping Accessory Options | Alarm Options (2 Spaces) ^① | Aux Options (4 Spaces) ^② |
|---|--|--|
| Shunt Trip  | None | None |
| | 1NO (1 space) | 1NO (1 space) |
| | 1NC (1 space) | 1NC (1 space) |
| | 1NO/1NC (2 spaces) | 1NO/1NC (2 spaces) |
| UVR  | 2NO (2 spaces) | 2NO (2 spaces) |
| | 2NC (2 spaces) | 2NC (2 spaces) |
| | | 2NO/2NC (4 spaces) |
| | | 4NO (4 spaces) |
| | | 4NC (4 spaces) |

Notes

- ① Frame 3 Power Defense breakers with electronic trip units AND communication only have access to one alarm space. Breakers with thermal-magnetic trip units or electronic trip units without communication have access to two alarm spaces.
- ② Neutral pole includes two additional auxiliary spaces.

Alarm and Auxiliary Contact Blocks—Frame Size 3

Power Defense breakers have designated positions for alarm and auxiliary switches in the right pole accessory cavity. For Frame 3, the two left-most positions are used for alarm switches, and the two right-most locations are used for auxiliary switches.

Power Defense breakers have secondary covers for ease of field installation of accessories, including alarm and auxiliary switches.

Power Defense alarm and auxiliary switches are available in contact blocks, in Form A (NO), Form B (NC), and Form C (NO-NC) types. Form A and Form B contacts take one position in the breaker accessory cavity, and Form C contacts take two positions in the cavity. Identical contact blocks are used for the alarm and auxiliary switch functions.

Electronic breakers with communications options (Modbus RTU or CAM Link) lose one alarm switch position, but are also able to provide trip position via communications and the PXR programmable relays.

Contact Blocks**Pigtail (29 in / 0.75 m) Contact Blocks for Alarm and Auxiliary Switch Functionality**

| Catalog Number | PDGXAA | PDGXAB | PDGXAC |
|----------------|-------------|-------------|----------------|
| Type | Form A / NO | Form B / NC | Form C / NO-NC |

Screw Terminal Contact Blocks for Alarm and Auxiliary Switch Functionality

| Catalog Number | PDGXXA | PDGXXB | PDGXXA + PDGXXB |
|----------------|-------------|-------------|--|
| Type | Form A / NO | Form B / NC | For NO-NC, use two separate contact blocks |

Push-In Clamp Contact Blocks for Alarm and Auxiliary Switch Functionality

| Catalog Number | PDGXUA | PDGXUB | PDGXUC |
|----------------|-------------|-------------|----------------|
| Type | Form A / NO | Form B / NC | Form C / NO-NC |

Pigtail (118 in / 3.0 m) Contact Blocks for Alarm and Auxiliary Switch Functionality

| Catalog Number | PDGXDA | PDGXDB | PDGXDC |
|----------------|-------------|-------------|----------------|
| Type | Form A / NO | Form B / NC | Form C / NO-NC |

2.2

Molded Case Circuit Breakers

Power Defense Molded Case Circuit Breakers

2

Factory Installation of Alarm and Auxiliary Switches—Frame Size 3

Alarm and auxiliary switches are plug-and-play accessories designed to be field installable. However, Eaton also offers installation service in our factories.

Breaker catalog numbers with alarm and auxiliary switch combinations require a complete 20-digit catalog number, adding the alarm and

auxiliary switch functionality in digits 15–16 and adhering to the following conditions and tables:

- Digit 15 denotes the type of accessory(-ies) installed and the terminal types
- Switches may be requested for alarm only, auxiliary only or a combination of the two

- For Eaton factory installation, the same type of terminals (i.e., all pigtail 0.75 m, all screw, etc.) must be used. If a combination of alarm and auxiliary switches is selected, they must be the same type (i.e., all 1NC, all 1NO/1NC, etc.)
- Digit 16 denotes number and type (NO, NC) of switches installed

- If no other accessories are selected, use NNNN for the final 4 digits of the catalog number
- Electronic breakers with communications lose one alarm switch position in order to provide trip status via communications. They do not lose an auxiliary position for this purpose.

Pigtails—29 in / 0.75 m (A, B, C)

| Alarm Switch | None | Auxiliary Switch Three-Pole | | | | | Four-Pole | | | |
|--------------|------|--------------------------------|-----|-----|---------|-----|-----------|---------|-----|-----|
| | | None | 1NO | 1NC | 1NO/1NC | 2NO | 2NC | 2NO/2NC | 4NO | 4NC |
| None | NN | AA | AB | AC | AD | AE | A1 | A2 | A3 | |
| 1NO | BA | CA | — | — | — | — | — | — | — | |
| 1NC | BB | — | CB | — | — | — | — | — | — | |
| 1NO/1NC | BC | — | — | CC | — | — | C1 | — | — | |
| 2NO | BD | — | — | — | CD | — | — | C2 | — | |
| 2NC | BE | — | — | — | — | CE | — | — | C3 | |

Screw Terminals (X, Y, Z)

| Alarm Switch | None | Auxiliary Switch Three-Pole | | | | | Four-Pole | | | |
|--------------|------|--------------------------------|-----|-----|---------|-----|-----------|---------|-----|-----|
| | | None | 1NO | 1NC | 1NO/1NC | 2NO | 2NC | 2NO/2NC | 4NO | 4NC |
| None | NN | XA | XB | XC | XD | XE | X1 | X2 | X3 | |
| 1NO | YA | ZA | — | — | — | — | — | — | — | |
| 1NC | YB | — | ZB | — | — | — | — | — | — | |
| 1NO/1NC | YC | — | — | ZC | — | — | Z1 | — | — | |
| 2NO | YD | — | — | — | ZD | — | — | Z2 | — | |
| 2NC | YE | — | — | — | — | ZE | — | — | Z3 | |

Push-In Clamps (U, V, W)

| Alarm Switch | None | Auxiliary Switch Three-Pole | | | | | Four-Pole | | | |
|--------------|------|--------------------------------|-----|-----|---------|-----|-----------|---------|-----|-----|
| | | None | 1NO | 1NC | 1NO/1NC | 2NO | 2NC | 2NO/2NC | 4NO | 4NC |
| None | NN | UA | UB | UC | UD | UE | U1 | U2 | U3 | |
| 1NO | VA | WA | — | — | — | — | — | — | — | |
| 1NC | VB | — | WB | — | — | — | — | — | — | |
| 1NO/1NC | VC | — | — | WC | — | — | W1 | — | — | |
| 2NO | VD | — | — | — | WD | — | — | W2 | — | |
| 2NC | VE | — | — | — | — | WE | — | — | W3 | |

Factory Installation of Alarm and Auxiliary Switches—Frame Size 3**Pigtails—118 in / 3.0 m (D, E, F)**

| Alarm Switch | | Auxiliary Switch Three-Pole | | | | | | Four-Pole | | |
|--------------|---------|--------------------------------|-----|-----|---------|-----|-----|-----------|-----|-----|
| | | None | 1NO | 1NC | 1NO/1NC | 2NO | 2NC | 2NO/2NC | 4NO | 4NC |
| Alarm Switch | None | NN | DA | DB | DC | DD | DE | D1 | D2 | D3 |
| | 1NO | EA | FA | — | — | — | — | — | — | — |
| | 1NC | EB | — | FB | — | — | — | — | — | — |
| | 1NO/1NC | EC | — | — | FC | — | — | F1 | — | — |
| | 2NO | ED | — | — | — | FD | — | — | F2 | — |
| | 2NC | EE | — | — | — | — | FE | — | — | F3 |

For PXR Trip Units with Communication [Ⓢ]

| Alarm Switch | | Auxiliary Switch Three-Pole | | | | | | Four-Pole | | |
|--------------|------|--------------------------------|-----|-----|---------|-----|-----|-----------|-----|-----|
| | | None | 1NO | 1NC | 1NO/1NC | 2NO | 2NC | 2NO/2NC | 4NO | 4NC |
| Alarm Switch | None | NN | AA | AB | AC | AD | AE | A1 | A2 | A3 |
| | 1NO | BA | CA | — | CF | CG | — | CP | CQ | — |
| | 1NC | BB | — | CB | CH | — | CI | CR | — | CS |

Tripping Accessories—Frame Size 3

Power Defense breakers have designated positions for shunt trips and undervoltage releases (UVRs) in the left pole accessory cavity. Each breaker has space for one tripping accessory only.

Power Defense breakers have secondary covers for ease of field installation of tripping accessories.

Shunt Trips

| Voltage | Screw Terminals | Pigtail (29 in / 0.75 m) | Pigtail (118 in / 3.0 m) |
|---------------------|-----------------|--------------------------|--------------------------|
| 12 Vdc | PDG3XST12DCT | PDG3XST12DCS | PDG3XST12DCR |
| 48 Vdc | PDG3XST48DCT | PDG3XST48DCS | PDG3XST48DCR |
| 60 Vdc | PDG3XST60DCT | PDG3XST60DCS | PDG3XST60DCR |
| 24 Vac/Vdc | PDG3XST24ACDCT | PDG3XST24ACDCS | PDG3XST24ACDCR |
| 110–130 Vac/125 Vdc | PDG3XST130ACDCT | PDG3XST130ACDCS | PDG3XST130ACDCR |
| 200–240 Vac/250 Vdc | PDG3XST250ACDCT | PDG3XST250ACDCS | PDG3XST250ACDCR |
| 380–440 Vac | PDG3XST440ACT | PDG3XST440ACS | PDG3XST440ACR |
| 480–525 Vac | PDG3XST525ACT | PDG3XST525ACS | PDG3XST525ACR |
| 600 Vac | PDG3XST600ACT | PDG3XST600ACS | PDG3XST600ACR |

Undervoltage Releases (UVRs)

| Voltage | Screw Terminals | Pigtail (29 in / 0.75 m) | Pigtail (118 in / 3.0 m) |
|---------|-----------------|--------------------------|--------------------------|
| 12 Vdc | PDG3XUV12DCV | PDG3XUV12DCU | PDG3XUV12DCW |
| 24 Vdc | PDG3XUV24DCV | PDG3XUV24DCU | PDG3XUV24DCW |
| 48 Vdc | PDG3XUV48DCV | PDG3XUV48DCU | PDG3XUV48DCW |
| 60 Vdc | PDG3XUV60DCV | PDG3XUV60DCU | PDG3XUV60DCW |
| 125 Vdc | PDG3XUV125DCV | PDG3XUV125DCU | PDG3XUV125DCW |
| 250 Vdc | PDG3XUV250DCV | PDG3XUV250DCU | PDG3XUV250DCW |
| 24 Vac | PDG3XUV24ACV | PDG3XUV24ACU | PDG3XUV24ACW |
| 130 Vac | PDG3XUV130ACV | PDG3XUV130ACU | PDG3XUV130ACW |
| 240 Vac | PDG3XUV240ACV | PDG3XUV240ACU | PDG3XUV240ACW |
| 440 Vac | PDG3XUV440ACV | PDG3XUV440ACU | PDG3XUV440ACW |
| 525 Vac | PDG3XUV525ACV | PDG3XUV525ACU | PDG3XUV525ACW |
| 600 Vac | PDG3XUV600ACV | PDG3XUV600ACU | PDG3XUV600ACW |

Note: Use PDG3XUV18DCW when using Time Delay UVR.

Note

[Ⓢ] All options shown have 29 in/0.75 m pigtail termination. For alternate termination options, contact the product line.

Factory Installed Tripping Accessories—Frame Size 3

Shunt trips and undervoltage releases (UVRs) are plug-and-play accessories designed to be field installable. However, Eaton also offers the service of installation in our factories.

Breaker catalog numbers with shunt trips or UVRs require a complete 20-digit catalog number, adding the tripping accessory functionality in digits 17 and 18 and adhering to the following conditions and tables.

- Digit 17 denotes the type of accessory installed and the terminal type
- Digit 18 denotes the voltage of the accessory

- If no additional accessories are selected, use NN for digits 15-16 and 19-20 of the catalog number
- Each breaker has space for one shunt trip or UVR tripping accessory only

Shunt Trips

| Voltage | Screw Terminals | Pigtail (29 in / 0.75 m) | Pigtail (118 in / 3.0 m) |
|---------------------|-----------------|--------------------------|--------------------------|
| 12 Vdc | TH | SH | RH |
| 48 Vdc | TJ | SJ | RJ |
| 60 Vdc | TK | SK | RK |
| 24 Vac/Vdc | TN | SN | RN |
| 110–130 Vac/125 Vdc | TP | SP | RP |
| 200–240 Vac/250 Vdc | TR | SR | RR |
| 380–440 Vac | TC | SC | RC |
| 480–525 Vac | TD | SD | RD |
| 600 Vac | TE | SE | RE |

Undervoltage Releases (UVRs)

| Voltage | Screw Terminals | Pigtail (29 in / 0.75 m) | Pigtail (118 in / 3.0 m) |
|---------|-----------------|--------------------------|--------------------------|
| 12 Vdc | VH | UH | WH |
| 24 Vdc | VG | UG | WG |
| 48 Vdc | VJ | UJ | WJ |
| 60 Vdc | VK | UK | WK |
| 125 Vdc | VL | UL | WL |
| 250 Vdc | VM | UM | WM |
| 24 Vac | VF | UF | WF |
| 130 Vac | VA | UA | WA |
| 240 Vac | VB | UB | WB |
| 440 Vac | VC | UC | WC |
| 525 Vac | VD | UD | WD |
| 600 Vac | VE | UE | WE |

Note: Use suffix **US** for 18 Vdc when using Time Delay UVR.

Handle Mechanisms—Frame Size 3**Direct Rotary Handle Mechanism**

| Description | NEMA 1/3R/12 Catalog Number | Factory Installed Digits 19–20 |
|---|--------------------------------|-----------------------------------|
| Standard lockable handle | PDG3XHMCS | HA |
| Standard handle with door interlock | PDG3XHMCSN | HB |
| Standard handle with mechanical padlock | PDG3XHMCS P | HC |
| Standard handle with mechanical keylock | PDG3XHMCSK | HD |
| Standard handle with door interlock and mechanical padlock | PDG3XHMCSNP | HE |
| Standard handle with door interlock and mechanical keylock | PDG3XHMCSNK | HF |
| Emergency lockable handle | PDG3XHMCE | H1 |
| Emergency handle with door interlock | PDG3XHMCE N | H2 |
| Emergency handle with mechanical padlock | PDG3XHMCEP | H3 |
| Emergency handle with mechanical keylock | PDG3XHMCEK | H4 |
| Emergency handle with door interlock and mechanical padlock | PDG3XHMCE NP | H5 |
| Emergency handle with door interlock and mechanical keylock | PDG3XHMCE NK | H6 |

Variable Depth Rotary Handle Mechanism

| Description | NEMA 1/3R/12 Catalog Number | Factory Installed Digits 19–20 |
|---|--------------------------------|-----------------------------------|
| Standard lockable handle | PDG3XHMD S | DA |
| Standard handle with mechanical padlock | PDG3XHMD SP | DC |
| Standard handle with mechanical keylock | PDG3XHMD SK | DD |
| Emergency lockable handle | PDG3XHMD E | D1 |
| Emergency handle with mechanical padlock | PDG3XHMD EP | D3 |
| Emergency handle with mechanical keylock | PDG3XHMD EK | D4 |
| 9 in (245 mm) standard handle mechanical shaft | PDG34XHMS245 | — |
| 17 in (445 mm) standard handle mechanical shaft | PDG34XHMS445 | — |
| Standard, NFPA79, handle with mechanical shaft | PDG34XHM79S | — |
| Emergency, NFPA79, handle with mechanical shaft | PDG34XHM79E | — |

Flex Shaft Handle Mechanism

| Cable Length (ft) | Metal Handle, NEMA 1/3R/12 Catalog Number | High Performance Handle, NEMA 1/3R/12 Catalog Number | Metal Handle, NEMA 4/4X Catalog Number | High Performance Handle, NEMA 4/4X Catalog Number |
|-------------------|---|--|--|---|
| 2 | PDG3XFS02 | PDG3XFS02HP | PDG3XFS02X | PDG3XFS02HPX |
| 3 | PDG3XFS03 | PDG3XFS03HP | PDG3XFS03X | PDG3XFS03HPX |
| 4 | PDG3XFS04 | PDG3XFS04HP | PDG3XFS04X | PDG3XFS04HPX |
| 5 | PDG3XFS05 | PDG3XFS05HP | PDG3XFS05X | PDG3XFS05HPX |
| 6 | PDG3XFS06 | PDG3XFS06HP | PDG3XFS06X | PDG3XFS06HPX |
| 7 | PDG3XFS07 | PDG3XFS07HP | PDG3XFS07X | PDG3XFS07HPX |
| 8 | PDG3XFS08 | PDG3XFS08HP | PDG3XFS08X | PDG3XFS08HPX |
| 9 | PDG3XFS09 | PDG3XFS09HP | PDG3XFS09X | PDG3XFS09HPX |
| 10 | PDG3XFS10 | PDG3XFS10HP | PDG3XFS10X | PDG3XFS10HPX |

Accessories—Frame Size 3**External Accessories**

| Description | Fit Type | Catalog Number | Factory Installed Digits 19–20 |
|--|---|----------------|--------------------------------|
| Padlockable hasp | Top | PDG3XPLKT | L4 |
| Padlockable hasp, OFF only | Top | PDG3XPLKTOFF | L1 |
| Padlockable handle block | On handle | PDG3XPHB | — |
| Kirk lock provision—left side, Type F ① | Left side | PDG3XKLKPSF | L8 |
| Kirk lock provision—right side, Type F ① | Right side | | L9 |
| Kirk lock provision—left/right side, Type FF ① | Left/right side | PDG3XKLKPSFF | — |
| Walking beam interlock ②③ | 400 A frame, two-, three- and four-pole | PDG3XWBI234P | — |
| | 600 A frame, two- and three-pole | PDG3XWBI23P | — |
| | 600 A frame, four-pole | PDG3XWBI4P | — |
| Electrical operator | 24 Vdc | PDG3XROP24DC | RG |
| | 48 Vdc | PDG3XROP48DC | RJ |
| | 60 Vdc | PDG3XROP60DC | RK |
| | 125 Vdc | PDG3XROP125DC | RL |
| | 250 Vdc | PDG3XROP250DC | RM |
| | 110–130 Vac | PDG3XROP130AC | RA |
| | 200–240 Vac | PDG3XROP240AC | RB |
| 380–440 Vac | PDG3XROP440AC | RC | |
| Plug-in breaker base only | Three-pole, 400 A | PDG3XPBB3P400A | — |
| | Three-pole, 600 A | PDG3XPBB3P600A | — |
| | Four-pole, 400 A | PDG3XPBB4P400A | — |
| | Four-pole, 600 A | PDG3XPBB4P600A | — |
| Plug-in breaker parts kit | Three-pole, 400 A | PDG3XPBK3P400A | — |
| | Three-pole, 600 A | PDG3XPBK3P600A | — |
| | Four-pole, 400 A | PDG3XPBK4P400A | — |
| | Four-pole, 600 A | PDG3XPBK4P600A | — |
| Terminal covers ④ | Three-pole (400 A frame) | PDG3XTC3P0400 | — |
| | Four-pole (400 A frame) | PDG3XTC4P0400 | — |
| | Three-pole | PDG3XTC3P | — |
| | Four-pole | PDG3XTC4P | — |
| Interphase barriers | Three-pole | PDG3XIB3P | — |
| | Four-pole | PDG3XIB4P | — |
| Finger protection | Three-pole | PDG3XFP3P | — |
| | Four-pole | PDG3XFP4P | — |
| Neutral CTs for ground fault (PXR) | Bus bar type | PDG3XNCTB0600 | — |
| Service entrance barrier kit | Three-pole | PRLSEBPD3 | — |

Base Mounting Hardware

| Description | Catalog Number |
|---|----------------|
| Two-, three-, four-pole metric (400 A) | BMH3M |
| Two-, three-, four-pole English (400 A) | BMH3 |
| Two-, three-, four-pole metric (600 A) | 66A4560G03 |

Note: Base mounting hardware is included with a circuit breaker or molded case switch.

Dimensions and Weights—Frame Size 3**Approximate Dimensions in Inches (mm)**

| Number of Poles | Width | Height | Depth |
|-----------------|--------------|---------------|--------------|
| 2 | 5.47 (138.9) | 10.13 (257.1) | 4.30 (109.1) |
| 3 | 5.47 (138.9) | 10.13 (257.1) | 4.30 (109.1) |
| 4 | 7.22 (182.9) | 10.13 (257.1) | 4.30 (109.1) |

Approximate Shipping Weight in lb (kg)

| Breaker Type | 2-Pole | 3-Pole | 4-Pole |
|--------------|--------------|--------------|--------------|
| PDG3 400 A | 8.05 (3.65) | 11.02 (5.0) | 13.77 (6.25) |
| PDG3 600 A | 10.43 (4.73) | 12.36 (5.61) | 16.27 (7.39) |

Notes

- ① Provision only. Kirk keylock sold separately.
- ② Breaker must be ordered with walking beam interlock ready modification from plant (factory suffix **WB** in digits 19-20).
- ③ Requires two breakers.
- ④ PDG3 with 0400 or below rating ship from the factory with the 400 A frame terminal cover, but can be fitted with either in the field. 600 A frames, including H250, H400, etc ship with the standard terminal cover.

Power Defense Molded Case Circuit Breakers—Frame Size 4



Contents

Description**Page**

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| Power Defense Molded Case Circuit Breakers | |
| Frame Size 1 (15–125 A) | V4-T2-22 |
| Frame Size 2 (15–225 A) | V4-T2-29 |
| Frame Size 3 (45–600 A) | V4-T2-42 |
| Frame Size 4 (300–800 A) | |
| Catalog Number / Product Selection | V4-T2-58 |
| Accessories | V4-T2-63 |
| Dimensions and Weights | V4-T2-69 |
| Frame Size 5 (320–1200 A) | V4-T2-70 |
| Frame Size 6 (700–2500 A) | V4-T2-79 |
| Motor Circuit Protectors (3–600 A) | V4-T2-87 |
| Motor Protection Circuit Breakers (15–600 A) | V4-T2-98 |
| Special Applications | V4-T2-104 |

Power Defense Molded Case Circuit Breakers—Frame Size 4

Product Description

Frame Size 4 covers a range of 300 A through 800 A with a complete offering of trip units, including PXR electronic trip units and fixed-adjustable thermal-magnetic trip units. PD-4 is available in a single 800 A frame.

Application Description

Frame Size 4 can be used to meet a wide range of circuit protection and power distribution needs, including ground fault protection and 100% UL ratings. PXR trip units in PD-4 provide all levels of protection, including energy metering with multiple communication schemes, breaker health indication and arc flash reduction options.

Features and Benefits

Frame Size 4 breakers are modular and available as complete breakers from the factory or as modular components, including frames, trip units, accessories and terminals to provide flexibility for customers. PXR trip units are available with advanced features to provide customers unparalleled situational awareness of their electrical system.

Standards and Certifications

Power Defense breakers are designed and tested to meet stringent requirements for:

- UL
- CSA
- IEC (CE)
- CB (CCC)



2.2

Molded Case Circuit Breakers

Power Defense Molded Case Circuit Breakers

Catalog Number / Product Selection

2

Power Defense—Frame Size 4 (300–800 A)

Frame Size 4 covers a range of 320 A through 800 A using electronic trip units, and 300 A through 800 A using thermal-magnetic trip units. It is available in configurations of 2-pole, 3-pole and 4-pole, with the 2-pole being in the same physical size of a 3-pole variant.

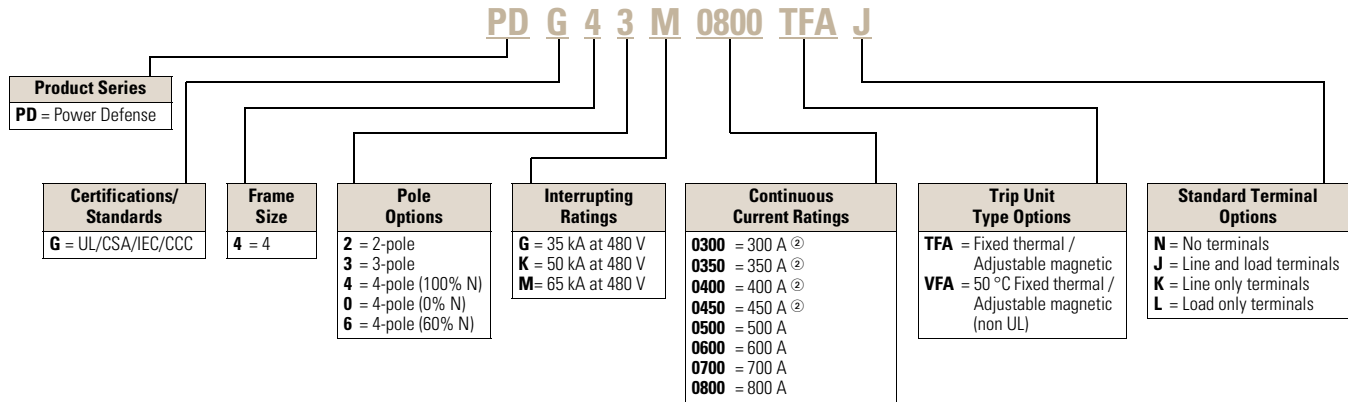
Interrupting Ratings

| | G | | K | | M | |
|---------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|
| ANSI (UL/CSA) | kA rms | | kA rms | | kA rms | |
| 240 Vac | 65 | | 85 | | 100 | |
| 480 Vac | 35 | | 50 | | 65 | |
| 600 Vac | 18 | | 25 | | 35 | |
| 125/250 Vdc ① | 22 | | 22 | | 25 | |
| IEC | I _{cu} | I _{cs} | I _{cu} | I _{cs} | I _{cu} | I _{cs} |
| 240 Vac | 55 | 55 | 85 | 85 | 100 | 100 |
| 380–415 Vac | 36 | 36 | 50 | 50 | 70 | 53 |
| 440 Vac | 30 | 22.5 | 35 | 35 | 50 | 40 |
| 480 Vac | 25 | 20 | 35 | 22.5 | 50 | 30 |
| 525 Vac | 20 | 16.5 | 25 | 20 | 30 | 25 |
| 660–690 Vac | 8 | 4 | 10 | 5 | 15 | 7.5 |
| 125/250 Vdc ① | 22 | 22 | 22 | 22 | 25 | 25 |

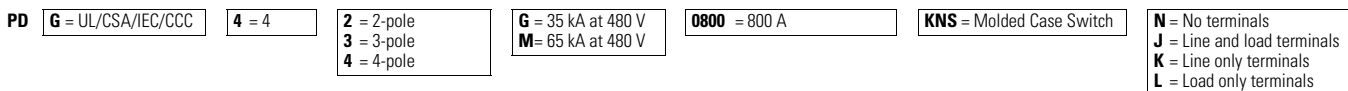
Power Defense—Frame Size 4 (300–800 A)

This information is presented as a tool to develop catalog numbers for selecting Power Defense circuit breakers and trip units.

Molded Case Circuit Breakers with Thermal-Magnetic Trip Units (TMTU)—Globally Rated



Molded Case Switches—Globally Rated



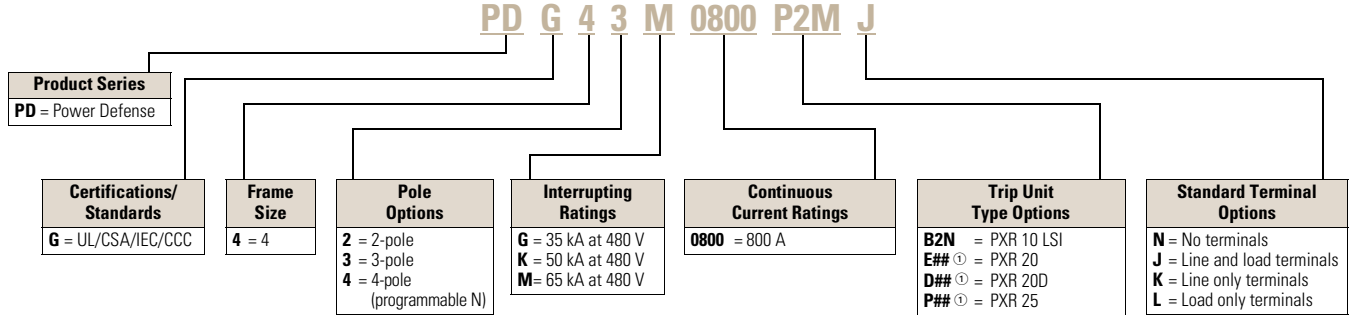
Notes

- ① DC ratings available in thermal-magnetic breakers only. 250 Vdc is achieved using 2 poles in series.
- ② Not available in 4-pole 60% neutral protection.

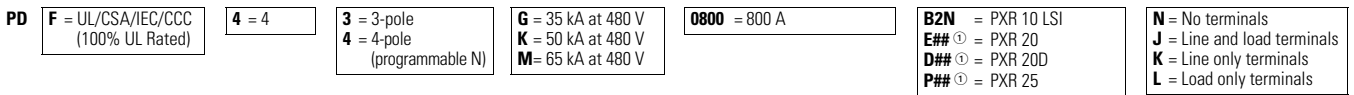
Molded Case Circuit Breakers with Power Xpert Release (PXR) Electronic Trip Units (ETU)

This information is presented as a tool to develop catalog numbers for selecting Power Defense circuit breakers and trip units.

Molded Case Circuit Breakers with PXR ETU—Globally Rated



Molded Case Circuit Breakers with PXR ETU—Globally Rated (100% UL Rated)

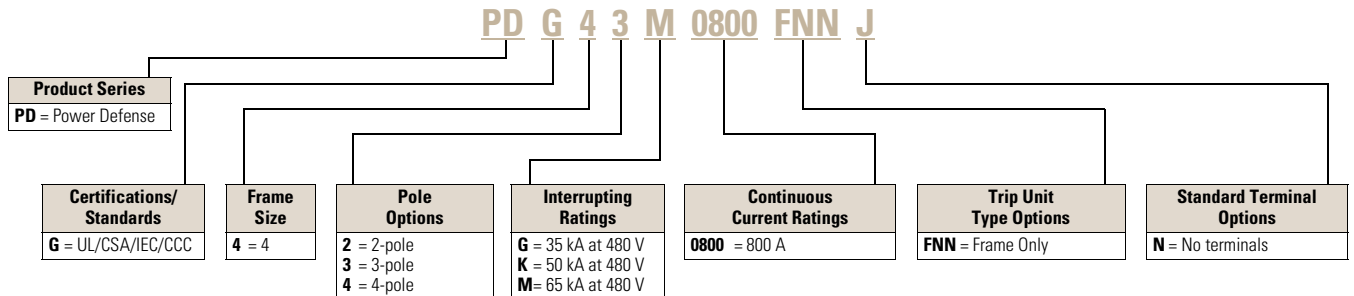


Globally Rated Frame Only

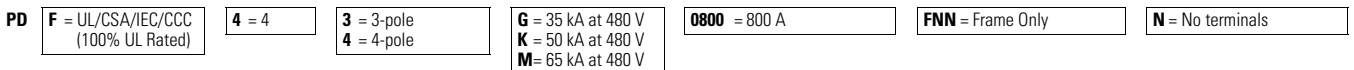
PD-4 thermal-magnetic and electronic breakers may also be purchased as separate frames, trip units, terminals and accessories for field configuration of a final breaker. Each Frame Only device is marked with interrupting ratings and a maximum continuous current rating; each trip unit is also marked with a maximum continuous current rating, which must not exceed that of the frame. Additionally, 100% UL Rated frames are marked as such on the Frame Only device.

This information is presented as a tool to develop catalog numbers for selecting Power Defense circuit breakers and trip units.

Frame Only—Globally Rated



Frame Only—Globally Rated (100% UL Rated)



Note

① See tables and descriptions on Page V4-T2-61 for protection type (#₁) and available configured options (#₂).

2.2

Molded Case Circuit Breakers

Power Defense Molded Case Circuit Breakers

2

Trip Units

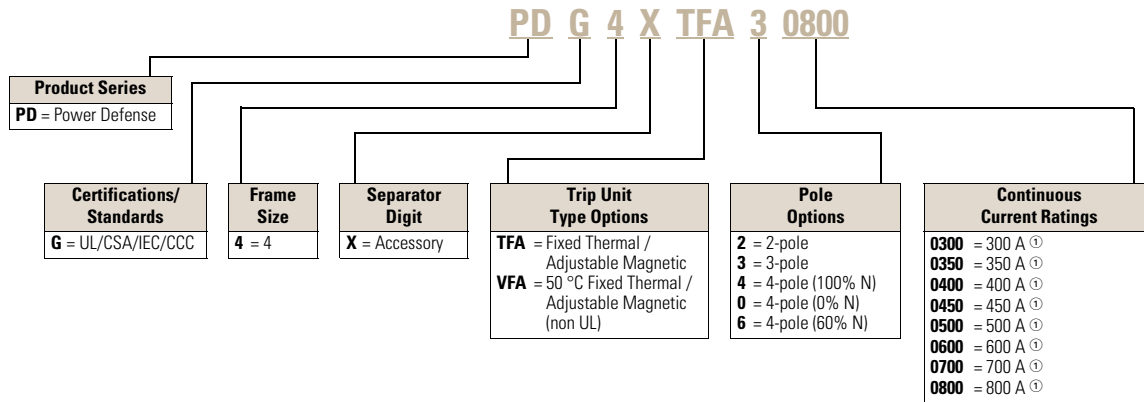
PD-4 thermal-magnetic and electronic breakers may also be purchased as separate frames, trip units, terminals and accessories for field configuration of a final breaker. For two-pole breakers using electronic trip units, three-pole trip units are used.

PDG designated trip units are for use with PDG and PDF breaker frames. The 100% rating for PDF (100% UL Rated) is marked on the frame, not the trip unit.

Trip Units Only

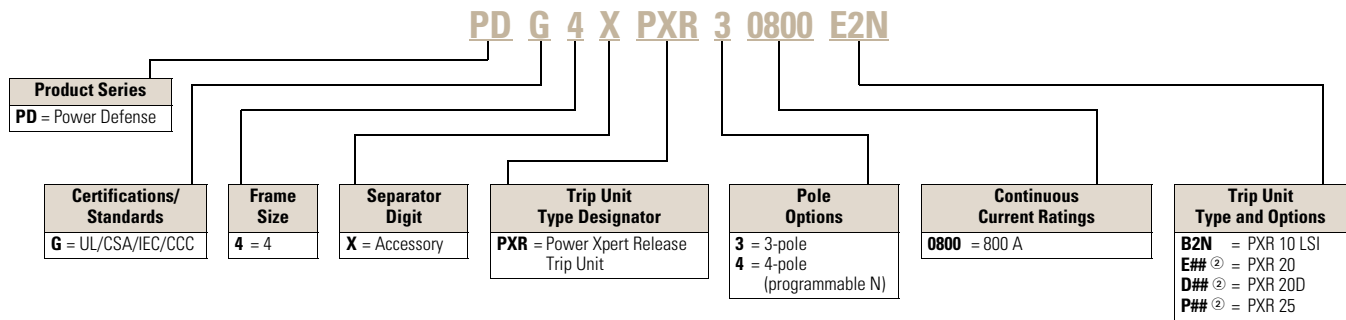
This information is presented as a tool to develop catalog numbers for selecting Power Defense circuit breakers and trip units.

Thermal-Magnetic Trip Units



Power Xpert Release (PXR) Electronic Trip Units

Power Xpert Release (PXR) Electronic Trip Units



Notes

- ① Not available in 4-pole 60% neutral protection.
- ② See tables and descriptions on **Page V4-T2-61** for protection type (#₁) and available configured options (#₂).

Power Xpert Release (PXR) Trip Unit Options—Frame Size 4

Power Xpert Release (PXR) Trip Unit Options

| PXR | ETU | #(1)—Protection Type | | | | #(2)—Available Configured Options | | | | | | | |
|---------|-----|----------------------|------|---------------|----------------|-----------------------------------|---------------|------------|------------|-------------------|-------------------|-----------------------|---|
| | | LSI | LSIG | LSI with ARMS | LSIG with ARMS | Relays | Relays Modbus | Relays ZSI | Relays CAM | Relays Modbus ZSI | Relays Modbus CAM | Relays Modbus ZSI CAM | |
| PXR 10 | B | 2 | — | — | — | N | — | — | — | — | — | — | — |
| PXR 20 | E | 2 | — | — | — | N | R | M | Z | C | W | X | — |
| | | — | 3 | 4 | 5 | — | R | M | Z | C | W | X | — |
| PXR 20D | D | 2 | 3 | 4 | 5 | — | — | M | — | — | W | — | D |
| PXR 25 | P | 2 | 3 | 4 | 5 | — | — | M | — | — | W | — | D |

Descriptions of PXR Configured Options

Relays—2 Form A contacts (rated for 240 Vac, 1 A)

- Interface: 3 wires (ALM1, ALM2, ALM Common)
- Programmable to indicate breaker conditions

Modbus—Modbus RTU directly from breaker

- Interface: 3 wires (MODBA, MODBB, MODBG)
- No additional modules required

ZSI—Zone Selective Interlocking

- Interface: 3 wires (Zin, Zout, Zcomm)
- Includes ability to turn ON and OFF, and indicate signals

CAM—CAM Link connection (requires a CAM module per breaker)

- Interface: 5 wires (refer to CAM IL for details)
- Communications Adapter Modules available for Modbus TCP and PROFIBUS

ARMS—Arcflash Reduction Maintenance System, or Maintenance Mode

- Available as trip unit Protection Type 4 or 5
- Interface: Switch and LED on face of trip unit and two wires for remote switch enable option (24 Vdc required)
- A programmable relay will be factory defaulted to remote indication of ARMS

Auxiliary Power

- Connection included with all PXR 20, 20D, and 25 trip units
- Required for communications, relays, and metering accuracy
- 24 Vdc, 0.5 A
- Interface: 2 wires (Aux +24 V, Aux 0 V)

Available Continuous Current (I_r) Settings on PXR Electronic Trip Units

| Option | Setting | Catalog Number Selection and Maximum Setting (I _n) | |
|-----------------|---------------------|---|--|
| | | 800 A | |
| PXR 10, PXR 20 | 1 | 320 A | |
| | 2 | 350 A | |
| | 3 | 400 A | |
| | 4 | 450 A | |
| | 5 | 500 A | |
| | 6 | 550 A | |
| | 7 | 600 A | |
| | 8 | 630 A | |
| | 9 | 700 A | |
| | 10 = I _n | 800 A | |
| PXR 20D, PXR 25 | | Programmable from minimum to maximum values in 10 A increments. | |

2.2

Molded Case Circuit Breakers

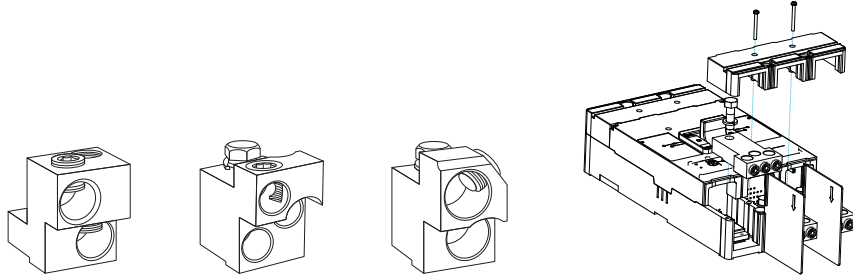
Power Defense Molded Case Circuit Breakers

2

Terminals—Frame Size 4

Catalog numbers shown are for a single side of a 3-pole breaker. For Frame Size 4, terminals are also available in single-pole kits; these are not available in 2-pole or 4-pole configurations, unless otherwise noted. For single terminals, replace **X3** with **X1** on the catalog number. Example: PDG4**X3**TA800 becomes PDG4**X1**TA800 for a single unit.

Terminal Types



| | | | |
|--|---|--|---------------|
| PDG4X3TA700 PDG4X3T600 PDG4X3TA700CW | PDG4X3TA800 PDG4X3TA800SW PDG4X3TA800CW | PDG4X3TA801 PDG4X3T800 PDG4X3TA801CW | PDG4X3TA800RF |
|--|---|--|---------------|

Note: Pictures are for reference only.

Terminals

| Maximum Breaker Amperes | Terminal Body Type | Wire Type | Wire Class | Number of Conductors per Phase | AWG / kcmil Range per Conductor | Metric (mm ²) Range per Conductor | 3-Pole Catalog Number | Included Accessories | Digit 14 Designation | | | Factory Config. Ampere Range |
|-------------------------------------|--------------------|-----------|-----------------------------|--------------------------------|---------------------------------|---|--------------------------|----------------------|----------------------|-----------|-----------|------------------------------|
| | | | | | | | | | Line and Load | Line Only | Load Only | |
| Standard Terminals | | | | | | | | | | | | |
| 700 | Aluminum | Cu/Al | B, C | 2 | 1–500 | 42.4–253 | PDG4X3TA700 | — | J | K | L | 300–700 |
| 800 | Aluminum | Cu/Al | B, C | 3 | 3/0–400 | 85–203 | PDG4X3TA800 | — | J | K | L | 800 |
| Alternate Terminals | | | | | | | | | | | | |
| 800 | Aluminum | Cu/Al | B, C | 2 | 500–750 | 253–380 | PDG4X3TA801 | — | T | U | V | 300–800 |
| Non-Aluminum Terminals | | | | | | | | | | | | |
| 600 | Aluminum | Cu | B, C | 2 | 2/0–500 | 67.4–238 | PDG4X3T600 | — | W | Y | Z | 300–600 |
| 800 | Aluminum | Cu | B, C | 3 | 3/0–300 | 85–152 | PDG4X3T800 | — | W | Y | Z | 700–800 |
| Strandable Terminals | | | | | | | | | | | | |
| 800 | Aluminum | Cu/Al | B, C D, G, H, I, K, M | 3 | 3/0–400 3/0–300 | 85–203 85–152 | PDG4X3TA800SW | — | A | B | C | 300–800 |
| Control Wire Terminals | | | | | | | | | | | | |
| 700 | Aluminum | Cu/Al | B, C | 2 | 1–500 | 42.4–253 | PDG4X3TA700CW | — | 1 | 2 | 3 | 300–700 |
| 800 | Aluminum | Cu/Al | B, C | 3 | 3/0–400 | 85–203 | PDG4X3TA800CW | — | 1 | 2 | 3 | 800 |
| 800 | Aluminum | Cu/Al | B, C | 2 | 500–750 | 253–380 | PDG4X3TA801CW | — | 4 | 5 | 6 | 300–800 |
| Rear Fed Terminals | | | | | | | | | | | | |
| 800 | Aluminum | Cu/Al | B, C | 3 | 3/0–300 | 85–152 | PDG4X3TA800RF | Interphase barriers | — | — | — | 300–800 |
| Rear Connectors | | | | | | | | | | | | |
| 800 | — | — | — | — | — | — | PDG4X3TA800RC | — | R | — | — | 300–800 |
| End Cap Kits/Screw Terminals | | | | | | | | | | | | |
| 800 | — | — | — | — | — | — | PDG4X3TS800 ^① | — | S | D | E | 300–800 |

Notes

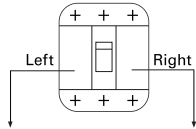
Wire capacity is based on standard imperial wire sizes; metric sizes provided in table are a direct conversion to demonstrate maximum capacity, not to denote metric wire sizes.



^① End cap kits are available in 3-pole and 4-pole configurations only. For 4-pole, use catalog number **PDG4X4TS800**.

Accessories

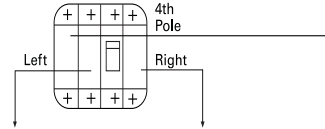
Internal Accessory Configurations—Frame Size 4



3-Pole Circuit Breakers



| Tripping Accessory Options | Alarm Options (1–2 spaces) ^① | Aux Options (4 spaces) |
|---|---|------------------------|
| None | None | None |
| Shunt Trip | 1NO (1 space) | 1NO (1 space) |
|  | 1NC (1 space) | 1NC (1 space) |
| | 1NO/1NC (2 spaces) | 1NO/1NC (2 spaces) |
| | 2NO (2 spaces) | 2NO (2 spaces) |
| UVR | 2NC (2 spaces) | 2NC (2 spaces) |
|  | | 2CO (4 spaces) |
| | | 4NO (4 spaces) |
| | | 4NC (4 spaces) |

4-Pole Circuit Breakers



| Tripping Accessory Options | Alarm Options (1–2 spaces) ^① | Aux Options (6 spaces) |
|---|---|------------------------|
| None | None | None |
| Shunt Trip | 1NO (1 space) | 1NO (1 space) |
|  | 1NC (1 space) | 1NC (1 space) |
| | 1NO/1NC (2 spaces) | 1NO/1NC (2 spaces) |
| | 2NO (2 spaces) | 2NO (2 spaces) |
| UVR | 2NC (2 spaces) | 2NC (2 spaces) |
|  | | 2CO (4 spaces) |
| | | 4NO (4 spaces) |
| | | 4NC (4 spaces) |
| | | 3CO (6 spaces) |
| | | 6NO (6 spaces) |
| | | 6NC (6 spaces) |

Note

^① Frame 4 Power Defense breakers with electronic trip units and communication only have access to one alarm space. Breakers with thermal-magnetic trip units or electronic trip units without communication, have access to two alarm spaces.

Alarm and Auxiliary Contact Blocks—Frame Size 4

Power Defense breakers have designated positions for alarm and auxiliary switches in the right pole accessory cavity. For Frame 4, the two left-most positions are used for alarm switches, and the two right-most locations are used for auxiliary switches.

Power Defense breakers have secondary covers for ease of field installation of accessories, including alarm and auxiliary switches.

Power Defense alarm and auxiliary switches are available in contact blocks, in Form A (NO), Form B (NC), and Form C (NO-NC) types. Form A and Form B contacts take one position in the breaker accessory cavity, and Form C contacts take two positions in the cavity. Identical contact blocks are used for the alarm and auxiliary switch functions.

Electronic breakers with communications options (Modbus RTU or CAM Link) lose one alarm switch position, but are also able to provide trip position via communications and the PXR programmable relays.

Contact Blocks

Pigtail (29 in / 0.75 m) Contact Blocks for Alarm and Auxiliary Switch Functionality

| Catalog Number | PDGXAA | PDGXAB | PDGXAC |
|----------------|-------------|-------------|----------------|
| Type | Form A / NO | Form B / NC | Form C / NO-NC |

Screw Terminal Contact Blocks for Alarm and Auxiliary Switch Functionality

| Catalog Number | PDGXXA | PDGXXB | PDGXXA + PDGXXB |
|----------------|-------------|-------------|--|
| Type | Form A / NO | Form B / NC | For NO-NC, use two separate contact blocks |

Push-In Clamp Contact Blocks for Alarm and Auxiliary Switch Functionality

| Catalog Number | PDGXUA | PDGXUB | PDGXUC |
|----------------|-------------|-------------|----------------|
| Type | Form A / NO | Form B / NC | Form C / NO-NC |

Pigtail (118 in / 3.0 m) Contact Blocks for Alarm and Auxiliary Switch Functionality

| Catalog Number | PDGXDA | PDGXDB | PDGXDC |
|----------------|-------------|-------------|----------------|
| Type | Form A / NO | Form B / NC | Form C / NO-NC |

Factory Installation of Alarm and Auxiliary Switches—Frame Size 4

Alarm and auxiliary switches are plug-and-play accessories designed to be field installable. However, Eaton also offers installation service in our factories.

Breaker catalog numbers with alarm and auxiliary switch combinations require a complete 20-digit catalog number, adding the alarm and

auxiliary switch functionality in digits 15–16 and adhering to the following conditions and tables:

- Digit 15 denotes the type of accessory(-ies) installed and the terminal types
- Switches may be requested for alarm only, auxiliary only or a combination of the two

- For Eaton factory installation, the same type of terminals (i.e., all pigtail 0.75 m, all screw, etc.) must be used. If a combination of alarm and auxiliary switches is selected, they must be the same type (i.e., all 1NC, all 1NO/1NC, etc.)
- Digit 16 denotes number and type (NO, NC) of switches installed
- If no other accessories are selected, use NNNN for the final 4 digits of the catalog number
- Electronic breakers with communications lose one alarm switch position in order to provide trip status via communications. They do not lose an auxiliary position for this purpose.

Pigtails—29 in / 0.75 m (A, B, C)

| Alarm Switch | None | Auxiliary Switch Three-Pole | | | | | | | | Four-Pole | | | |
|--------------|------|--------------------------------|-----|-----|---------|-----|-----|---------|-----|-----------|---------|-----|-----|
| | | None | 1NO | 1NC | 1NO/1NC | 2NO | 2NC | 2NO/2NC | 4NO | 4NC | 3NO/3NC | 6NO | 6NC |
| None | NN | AA | AB | AC | AD | AE | A1 | A2 | A3 | A4 | A5 | A6 | |
| 1NO | BA | CA | — | — | — | — | — | — | — | — | — | — | |
| 1NC | BB | — | CB | — | — | — | — | — | — | — | — | — | |
| 1NO/1NC | BC | — | — | CC | — | — | C1 | — | — | C4 | — | — | |
| 2NO | BD | — | — | — | CD | — | — | C2 | — | — | C5 | — | |
| 2NC | BE | — | — | — | — | CE | — | — | C3 | — | — | C6 | |

Screw Terminals (X, Y, Z)

| Alarm Switch | None | Auxiliary Switch Three-Pole | | | | | | | | Four-Pole | | | |
|--------------|------|--------------------------------|-----|-----|---------|-----|-----|---------|-----|-----------|---------|-----|-----|
| | | None | 1NO | 1NC | 1NO/1NC | 2NO | 2NC | 2NO/2NC | 4NO | 4NC | 3NO/3NC | 6NO | 6NC |
| None | NN | XA | XB | XC | XD | XE | X1 | X2 | X3 | X4 | X5 | X6 | |
| 1NO | YA | ZA | — | — | — | — | — | — | — | — | — | — | |
| 1NC | YB | — | ZB | — | — | — | — | — | — | — | — | — | |
| 1NO/1NC | YC | — | — | ZC | — | — | Z1 | — | — | Z4 | — | — | |
| 2NO | YD | — | — | — | ZD | — | — | Z2 | — | — | Z5 | — | |
| 2NC | YE | — | — | — | — | ZE | — | — | Z3 | — | — | Z6 | |

Push-In Clamps (U, V, W)

| Alarm Switch | None | Auxiliary Switch Three-Pole | | | | | | | | Four-Pole | | | |
|--------------|------|--------------------------------|-----|-----|---------|-----|-----|---------|-----|-----------|---------|-----|-----|
| | | None | 1NO | 1NC | 1NO/1NC | 2NO | 2NC | 2NO/2NC | 4NO | 4NC | 3NO/3NC | 6NO | 6NC |
| None | NN | DA | DB | DC | DD | DE | D1 | D2 | D3 | D4 | D5 | D6 | |
| 1NO | EA | FA | — | — | — | — | — | — | — | — | — | — | |
| 1NC | EB | — | FB | — | — | — | — | — | — | — | — | — | |
| 1NO/1NC | EC | — | — | FC | — | — | F1 | — | — | F4 | — | — | |
| 2NO | ED | — | — | — | FD | — | — | F2 | — | — | F5 | — | |
| 2NC | EE | — | — | — | — | FE | — | — | F3 | — | — | F6 | |

2.2

Molded Case Circuit Breakers

Power Defense Molded Case Circuit Breakers

2

Factory Installation of Alarm and Auxiliary Switches—Frame Size 4

Pigtails—118 in / 3.0 m (D, E, F)

| Alarm Switch | None | Auxiliary Switch Three-Pole | | | | | | | | Four-Pole | | | |
|--------------|---------|--------------------------------|-----|-----|---------|-----|-----|---------|-----|-----------|---------|-----|-----|
| | | None | 1NO | 1NC | 1NO/1NC | 2NO | 2NC | 2NO/2NC | 4NO | 4NC | 3NO/3NC | 6NO | 6NC |
| | None | NN | UA | UB | UC | UD | UE | U1 | U2 | U3 | U4 | U5 | U6 |
| | 1NO | VA | WA | — | — | — | — | — | — | — | — | — | — |
| | 1NC | VB | — | WB | — | — | — | — | — | — | — | — | — |
| | 1NO/1NC | VC | — | — | WC | — | — | W1 | — | — | W4 | — | — |
| | 2NO | VD | — | — | — | WD | — | — | W2 | — | — | W5 | — |
| | 2NC | VE | — | — | — | — | WE | — | — | W3 | — | — | W6 |

Pigtails—29 in / 0.75 m (A, B, C)

| Alarm Switch | None | Auxiliary Switch Three-Pole | | | | | | | | Four-Pole | | | |
|--------------|------|--------------------------------|-----|-----|---------|-----|-----|---------|-----|-----------|---------|-----|-----|
| | | None | 1NO | 1NC | 1NO/1NC | 2NO | 2NC | 2NO/2NC | 4NO | 4NC | 3NO/3NC | 6NO | 6NC |
| | None | NN | AA | AB | AC | AD | AE | A1 | A2 | A3 | A4 | A5 | A6 |
| | 1NO | BA | CA | — | CF | CG | — | CP | CQ | — | CT | CU | — |
| | 1NC | BB | — | CB | CH | — | CJ | CR | — | CS | CV | — | CW |

Tripping Accessories—Frame Size 4

Power Defense breakers have designated positions for shunt trips and undervoltage releases (UVRs) in the left pole accessory cavity. Each breaker has space for one tripping accessory only.

Power Defense breakers have secondary covers for ease of field installation of tripping accessories.

Shunt Trips

| Voltage | Screw Terminals | Pigtail (29 in / 0.75 m) | Pigtail (118 in / 3.0 m) |
|---------------------|-----------------|--------------------------|--------------------------|
| 12 Vdc | PDG4XST12DCT | PDG4XST12DCS | PDG4XST12DCR |
| 48 Vdc | PDG4XST48DCT | PDG4XST48DCS | PDG4XST48DCR |
| 60 Vdc | PDG4XST60DCT | PDG4XST60DCS | PDG4XST60DCR |
| 24 Vac/Vdc | PDG4XST24ACDCT | PDG4XST24ACDCS | PDG4XST24ACDCR |
| 110–130 Vac/125 Vdc | PDG4XST130ACDCT | PDG4XST130ACDCS | PDG4XST130ACDCR |
| 200–240 Vac/250 Vdc | PDG4XST250ACDCT | PDG4XST250ACDCS | PDG4XST250ACDCR |
| 380–440 Vac | PDG4XST440ACT | PDG4XST440ACS | PDG4XST440ACR |
| 480–525 Vac | PDG4XST525ACT | PDG4XST525ACS | PDG4XST525ACR |
| 600 Vac | PDG4XST600ACT | PDG4XST600ACS | PDG4XST600ACR |

Undervoltage Releases (UVRs)

| Voltage | Screw Terminals | Pigtail (29 in / 0.75 m) | Pigtail (118 in / 3.0 m) |
|---------|-----------------|--------------------------|--------------------------|
| 12 Vdc | PDG4XUV12DCV | PDG4XUV12DCU | PDG4XUV12DCW |
| 24 Vdc | PDG4XUV24DCV | PDG4XUV24DCU | PDG4XUV24DCW |
| 48 Vdc | PDG4XUV48DCV | PDG4XUV48DCU | PDG4XUV48DCW |
| 60 Vdc | PDG4XUV60DCV | PDG4XUV60DCU | PDG4XUV60DCW |
| 125 Vdc | PDG4XUV125DCV | PDG4XUV125DCU | PDG4XUV125DCW |
| 250 Vdc | PDG4XUV250DCV | PDG4XUV250DCU | PDG4XUV250DCW |
| 24 Vac | PDG4XUV24ACV | PDG4XUV24ACU | PDG4XUV24ACW |
| 130 Vac | PDG4XUV130ACV | PDG4XUV130ACU | PDG4XUV130ACW |
| 240 Vac | PDG4XUV240ACV | PDG4XUV240ACU | PDG4XUV240ACW |
| 440 Vac | PDG4XUV440ACV | PDG4XUV440ACU | PDG4XUV440ACW |
| 525 Vac | PDG4XUV525ACV | PDG4XUV525ACU | PDG4XUV525ACW |
| 600 Vac | PDG4XUV600ACV | PDG4XUV600ACU | PDG4XUV600ACW |

Note: Use PDG4XUV18DCW when using Time Delay UVR.

Factory Installed Tripping Accessories—Frame Size 4

Shunt trips and undervoltage releases (UVRs) are plug-and-play accessories designed to be field installable. However, Eaton also offers the service of installation in our factories.

Breaker catalog numbers with shunt trips or UVRs require a complete 20-digit catalog number, adding the tripping accessory functionality in digits 17 and 18 and adhering to the following conditions and tables.

- Digit 17 denotes the type of accessory installed and the terminal type
- Digit 18 denotes the voltage of the accessory
- If no additional accessories are selected, use NN for digits 15-16 and 19-20 of the catalog number
- Each breaker has space for one shunt trip or UVR tripping accessory only

Shunt Trips

| Voltage | Screw Terminals | Pigtail (29 in / 0.75 m) | Pigtail (118 in / 3.0 m) |
|---------------------|-----------------|--------------------------|--------------------------|
| 12 Vdc | TH | SH | RH |
| 48 Vdc | TJ | SJ | RJ |
| 60 Vdc | TK | SK | RK |
| 24 Vac/Vdc | TN | SN | RN |
| 110–130 Vac/125 Vdc | TP | SP | RP |
| 200–240 Vac/250 Vdc | TR | SR | RR |
| 380–440 Vac | TC | SC | RC |
| 480–525 Vac | TD | SD | RD |
| 600 Vac | TE | SE | RE |

Undervoltage Releases (UVRs)

| Voltage | Screw Terminals | Pigtail (29 in / 0.75 m) | Pigtail (118 in / 3.0 m) |
|---------|-----------------|--------------------------|--------------------------|
| 12 Vdc | VH | UH | WH |
| 24 Vdc | VG | UG | WG |
| 48 Vdc | VJ | UJ | WJ |
| 60 Vdc | VK | UK | WK |
| 125 Vdc | VL | UL | WL |
| 250 Vdc | VM | UM | WM |
| 24 Vac | VF | UF | WF |
| 130 Vac | VA | UA | WA |
| 240 Vac | VB | UB | WB |
| 440 Vac | VC | UC | WC |
| 525 Vac | VD | UD | WD |
| 600 Vac | VE | UE | WE |

Note: Use suffix **US** for 18 Vdc when using Time Delay UVR.

Handle Mechanisms—Frame Size 4

2

Direct Rotary Handle Mechanism

| Description | NEMA 1/3R/12 Catalog Number | Factory Installed Digits 19–20 |
|---|-----------------------------|--------------------------------|
| Standard lockable handle | PDG4XHMCS | HA |
| Standard handle with door interlock | PDG4XHMCSN | HB |
| Standard handle with mech padlock | PDG4XHMCSP | HC |
| Standard handle with mech keylock | PDG4XHMCSK | HD |
| Standard handle with door interlock and mech padlock | PDG4XHMCSNP | HE |
| Standard handle with door interlock and mech keylock | PDG4XHMCSNK | HF |
| Emergency Lockable handle | PDG4XHMCE | H1 |
| Emergency handle with door interlock | PDG4XHMCEH | H2 |
| Emergency handle with mech padlock | PDG4XHMCEP | H3 |
| Emergency handle with mech keylock | PDG4XHMCEK | H4 |
| Emergency handle with door interlock and mech padlock | PDG4XHMCEHP | H5 |
| Emergency handle with door interlock and mech keylock | PDG4XHMCEHK | H6 |

Variable Depth Rotary Handle Mechanism

| Description | NEMA 1/3R/12 Catalog Number | Factory Installed Digits 19–20 |
|--|-----------------------------|--------------------------------|
| Standard Lockable handle | PDG4XHMDS | DA |
| Standard handle with mech padlock | PDG4XHMDSP | DC |
| Standard handle with mech keylock | PDG4XHMDSK | DD |
| Emergency lockable handle | PDG4XHMDDE | D1 |
| Emergency handle with mech padlock | PDG4XHMDDEP | D3 |
| Emergency handle with mech keylock | PDG4XHMDDEK | D4 |
| 9 in (245 mm) standard handle mechanism shaft | PDG34XHMS245 | — |
| 17 in (445 mm) standard handle mechanism shaft | PDG34XHMS445 | — |
| Standard, NFPA79, handle mech shaft handle | PDG34XHM79S | — |
| Emergency, NFPA79, handle mech shaft handle | PDG34XHM79E | — |

Flex Shaft Handle Mechanism

| Cable Length (ft) | Metal Handle, NEMA 1/3R/12 Catalog Number | High Performance Handle, NEMA 1/3R/12 Catalog Number | Metal Handle, NEMA 4/4X Catalog Number | High Performance Handle, NEMA 4/4X Catalog Number |
|-------------------|---|--|--|---|
| 4 | PDG4XFS04 | PDG4XFS04HP | PDG4XFS04X | PDG4XFS04HPX |
| 5 | PDG4XFS05 | PDG4XFS05HP | PDG4XFS05X | PDG4XFS05HPX |
| 6 | PDG4XFS06 | PDG4XFS06HP | PDG4XFS06X | PDG4XFS06HPX |
| 10 | PDG4XFS10 | PDG4XFS10HP | PDG4XFS10X | PDG4XFS10HPX |

Accessories—Frame Size 4**External Accessories**

| Description | Fit Type | Catalog Number | Factory Installed Digits 19–20 |
|--|--|----------------------|--------------------------------|
| Padlockable hasp | Top | PDG4XPLKT | L4 |
| Padlockable hasp, OFF only | Top | PDG4XPLKTOFF | L1 |
| Padlockable handle block | On handle | PDG4XPHB | — |
| Kirk lock provision—left side ¹ | Left side | PDG4XKLKPSF | L8 |
| Kirk lock provision—right side ¹ | Right side | | L9 |
| Walking beam interlock ² ³ | 400 A Frame, two-, three-, and four-pole | PDG4XWBI234P | — |
| | 600 A Frame, two- and three-pole | PDG4XWBI23P | — |
| | 600 A Frame, four-pole | PDG4XWBI4P | — |
| Electrical operator | 24 Vdc | PDG4XR0P24DC | RG |
| | 48 Vdc | PDG4XR0P48DC | RJ |
| | 60 Vdc | PDG4XR0P60DC | RK |
| | 125 Vdc | PDG4XR0P125DC | RL |
| | 250 Vdc | PDG4XR0P250DC | RM |
| | 110–130 Vac | PDG4XR0P130AC | RA |
| | 200–240 Vac | PDG4XR0P240AC | RB |
| | 380–440 Vac | PDG4XR0P440AC | RC |
| Terminal covers | Three-pole | PDG4XTC3P | — |
| | Four-pole | PDG4XTC4P | — |
| Interphase barriers | Three-pole | PDG4XIB3P | — |
| | Four-pole | PDG4XIB4P | — |
| Neutral CTs for ground fault (PXR) | Bus bar Type | PDG4XNCTB0600 | — |
| Service entrance barrier kit | Three-pole | PRLSEBPD4 | — |

Base Mounting Hardware

| Description | Catalog Number |
|---------------------------------|----------------|
| Two-, three-, four-pole metric | BMH4M |
| Two-, three-, four-pole English | BMH4 |

Note: Base mounting hardware is included with a circuit breaker or molded case switch.

Dimensions and Weights—Frame Size 4**Approximate Dimensions in Inches (mm)**

| Number of Poles | Width | Height | Depth |
|-----------------|--------------|------------|--------------|
| 2 | 8.25 (209.6) | 16 (406.4) | 4.38 (111.2) |
| 3 | 8.25 (209.6) | 16 (406.4) | 4.38 (111.2) |
| 4 | 11.0 (279.4) | 16 (406.4) | 4.38 (111.2) |

Approximate Shipping Weight in lb (kg)

| Breaker Type | 2-Pole | 3-Pole | 4-Pole |
|--------------|-----------|-----------|--------------|
| PDG4 800 A | 30 (13.6) | 30 (13.6) | 39.9 (18.08) |

Notes

- ¹ Provision only. For use with Type F Kirk keylock (sold separately).
- ² Breaker must be ordered with walking beam interlock ready modification from plant (factory suffix **WB**).
- ³ Requires two breakers.

Power Defense Molded Case Circuit Breakers—Frame Size 5



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| Frame Size 5 (320–1200 A) | |
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| Accessories | V4-T2-76 |
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| Motor Protection Circuit Breakers (15–600 A) | V4-T2-98 |
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Power Defense Molded Case Circuit Breakers—Frame Size 5

Product Description

Frame Size 5 covers a global range of 320 A through 1200 A with a complete offering of advanced PXR electronic trip units. It includes two frame sizes of 800 A and 1200 A. Additionally, PD-5 has a 1600 A IEC (CE) and GB (CCC) frame that covers 800 A through 1600 A.

Application Description

Frame Size 5 can be used to meet a wide range of circuit protection and power distribution needs, including ground fault protection, 100% UL ratings, high interrupting capacity and high instantaneous settings for selective coordination. PXR trip units in PD-5 provide all levels of protection, including energy metering with multiple communication schemes, breaker health indication and arc flash reduction options.

Features and Benefits

Frame Size 5 breakers are modular and available as complete breakers from the factory or as modular components, including frames, trip units, accessories and terminals to provide flexibility for customers. PXR trip units are available with advanced features to provide customers unparalleled situational awareness of their electrical system.

Standards and Certifications

Power Defense breakers are designed and tested to meet stringent requirements for:

- UL
- CSA
- IEC (CE)
- CB (CCC)



Catalog Number / Product Selection

Power Defense—Frame Size 5 (320–1200 A) for UL/CSA and 320–1600 A for IEC/CCC)

Frame Size 5 covers a range of 320 A through 1200 A using electronic trip units. It is available in configurations of 2-pole, 3-pole and 4-pole, with the 2-pole being in the same physical size of a 3-pole variant. Additionally, an IEC / CCC option is available for 1600 A, with selectable ratings from 800 A through 1600 A.

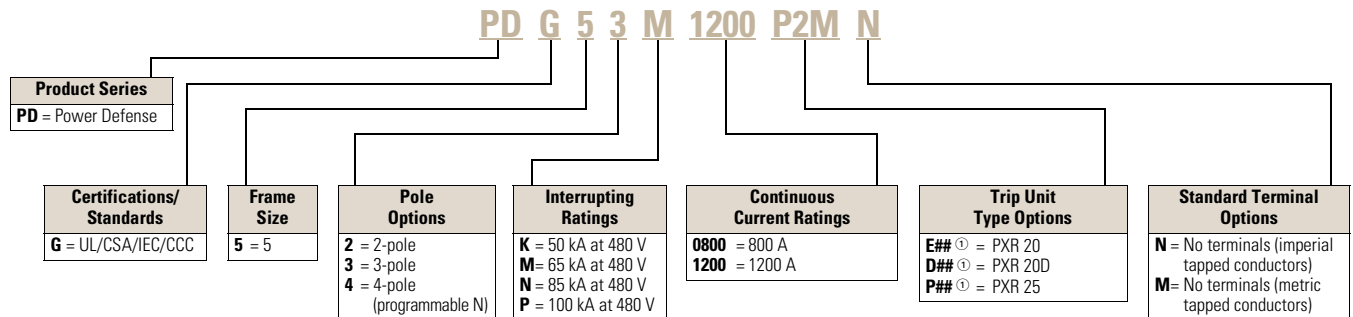
Interrupting Ratings

| | K | | M | | N | | P | | T | |
|---------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|
| ANSI (UL/CSA) | kA rms | | kA rms | | kA rms | | kA rms | | kA rms | |
| 240 Vac | 85 | | 100 | | 150 | | 200 | | 200 | |
| 480 Vac | 50 | | 65 | | 85 | | 100 | | 150 | |
| 600 Vac | 25 | | 35 | | 50 | | 65 | | 65 | |
| IEC | I _{cu} | I _{cs} | I _{cu} | I _{cs} | I _{cu} | I _{cs} | I _{cu} | I _{cs} | I _{cu} | I _{cs} |
| 240 Vac | 85 | 85 | 100 | 100 | 150 | 100 | 200 | 150 | — | — |
| 380–415 Vac | 50 | 50 | 70 | 53 | 70 | 50 | 100 | 50 | — | — |
| 440 Vac | 35 | 35 | 50 | 40 | 70 | 50 | 100 | 50 | — | — |
| 480 Vac | 35 | 22.5 | 50 | 30 | 65 | 40 | 85 | 40 | — | — |
| 525 Vac | 25 | 20 | 30 | 25 | 35 | 25 | 40 | 25 | — | — |
| 660–690 Vac | 10 | 5 | 15 | 7.5 | 20 | 10 | 35 | 18 | — | — |

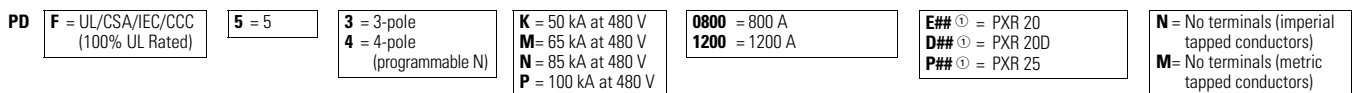
Molded Case Circuit Breakers with Power Xpert Release (PXR) Electronic Trip Units (ETU)

This information is presented as a tool to develop catalog numbers for selecting Power Defense circuit breakers and trip units.

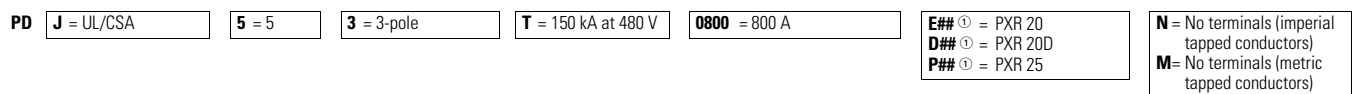
Molded Case Circuit Breakers with PXR ETU—Globally Rated



Molded Case Circuit Breakers with PXR ETU—Globally Rated (100% UL Rated)



Molded Case Circuit Breakers with PXR ETU (150 kA at 480 V)—UL/CSA Rated



Note

① See tables and descriptions on **Page V4-T2-74** for protection type (#₁) and available configured options (#₂).

2.2

Molded Case Circuit Breakers

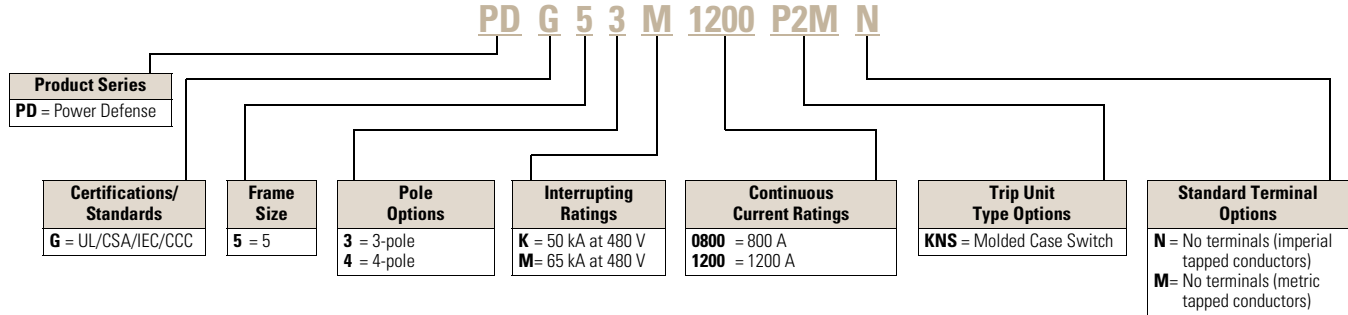
Power Defense Molded Case Circuit Breakers

2

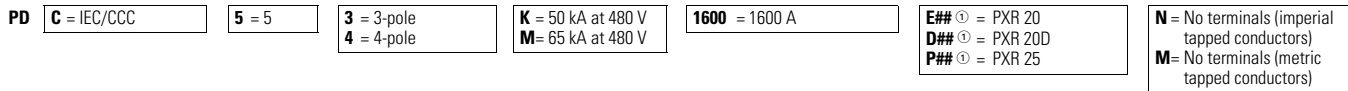
Molded Case Circuit Breakers with Power Xpert Release (PXR) Electronic Trip Units (ETU)

This information is presented as a tool to develop catalog numbers for selecting Power Defense circuit breakers and trip units.

Molded Case Switches—Globally Rated



Molded Case Circuit Breakers—IEC/CCC Rated (only available as a complete breaker)

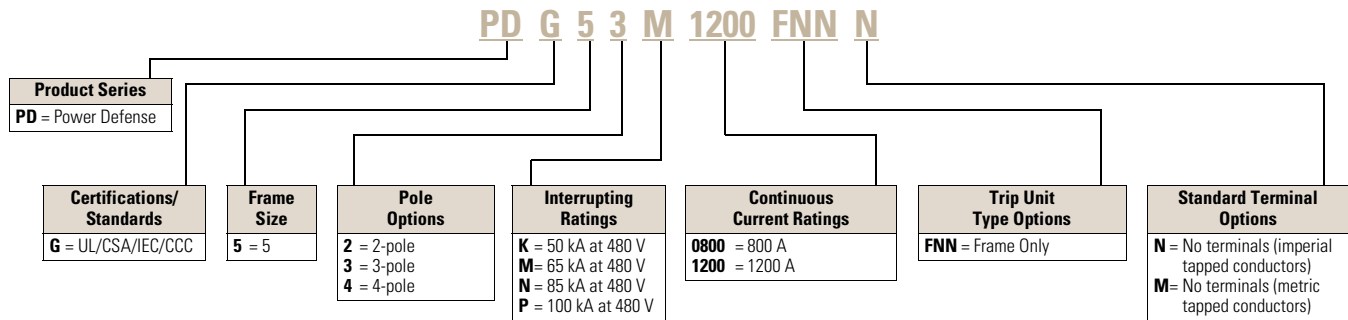


Globally Rated Frame Only

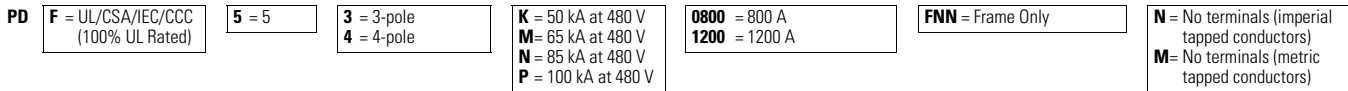
PD-5 electronic breakers may also be purchased as separate frames, trip units, terminals, and accessories for field configuration of a final breaker. Each Frame Only device is marked with interrupting ratings and a maximum continuous current rating; each trip unit is also marked with a maximum continuous current rating, which must not exceed that of the frame. Additionally, 100% UL Rated frames are marked as such on the Frame Only device.

This information is presented as a tool to develop catalog numbers for selecting Power Defense circuit breakers and trip units.

Frame Only—Globally Rated



Frame Only—Globally Rated (100% UL Rated)



Note

① See tables and descriptions on Page V4-T2-74 for protection type (#₁) and available configured options (#₂).

Trip Units

PD-5 electronic breakers may also be purchased as separate frames, trip units, terminals, and accessories for field configuration of a final breaker. Each frame rating (800 A, 1200 A, and 1600 A—IEC only) must use trip units of the same rating. Additionally, for two-pole breakers, three-pole trip units are used.

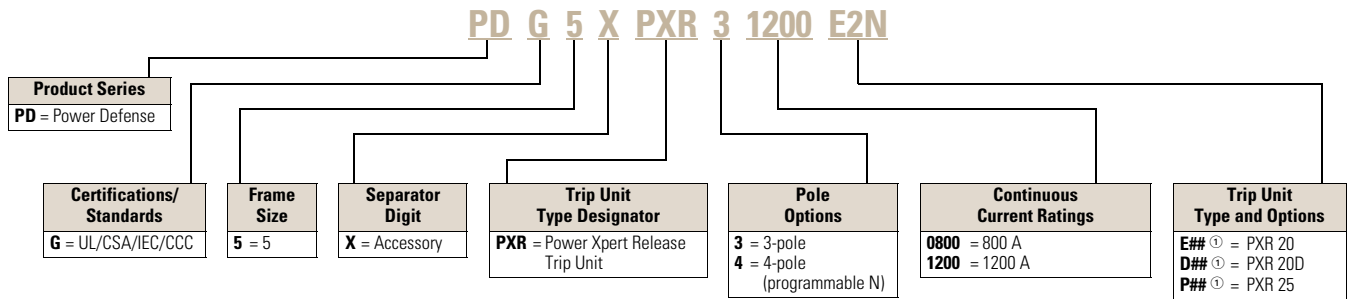
PDG designated trip units are for use with PDG and PDF breaker frames. The 100% rating for PDF (100% UL Rated) is marked on the frame, not the trip unit.

Trip Units Only

This information is presented as a tool to develop catalog numbers for selecting Power Defense circuit breakers and trip units.

Power Xpert Release (PXR) Electronic Trip Units

Power Xpert Release (PXR) Electronic Trip Units



Note

① See tables and descriptions on **Page V4-T2-74** for protection type (#₁) and available configured options (#₂).

Power Xpert Release (PXR) Trip Unit Options—Frame Size 5

Power Xpert Release (PXR) Trip Unit Options

| PXR | ETU | #(1)—Protection Type | | | | #(2)—Available Configured Options | | | | | | | | |
|---------|-----|----------------------|------|---------------|----------------|-----------------------------------|---------------|------------|------------|-------------------|-------------------|-----------------------|---|---|
| | | LSI | LSIG | LSI with ARMS | LSIG with ARMS | Relays | Relays Modbus | Relays ZSI | Relays CAM | Relays Modbus ZSI | Relays Modbus CAM | Relays Modbus ZSI CAM | | |
| PXR 20 | E | 2 | — | — | — | N | R | M | Z | C | W | X | — | — |
| | | — | 3 | 4 | 5 | — | R | M | Z | C | W | X | — | — |
| PXR 20D | D | 2 | 3 | 4 | 5 | — | — | M | — | — | W | — | D | Y |
| PXR 25 | P | 2 | 3 | 4 | 5 | — | — | M | — | — | W | — | D | Y |

Descriptions of PXR Configured Options

Relays—3 Form A contacts (rated for 240 Vac, 1 A)

- Interface: 3 wires (ALM1, ALM2, ALM Common)
- Programmable to indicate breaker conditions
- Available as field-installable option if not pre-configured (catalog number **PDG56XRELAYS**)

Modbus—Modbus RTU directly from breaker

- Interface: 3 wires (MODBA, MODBB, MODBG)
- No additional modules required
- Available as field-installable option if not pre-configured (catalog number **PDG56XMODRTU**)

ZSI—Zone Selective Interlocking

- Interface: 3 wires (Zin, Zout, Zcomm)
- Includes ability to turn ON and OFF, and indicate signals

CAM—CAM Link connection (requires a CAM module per breaker)

- Interface: 5 wires (refer to CAM IL for details)
- Communications Adapter Modules available for Modbus TCP and PROFIBUS

ARMS—Arcflash Reduction Maintenance System, or Maintenance Mode

- Available as trip unit Protection Type 4 or 5
- Interface: Switch and LED on face of trip unit and two wires for remote switch enable option (24 Vdc required)
- A programmable relay will be factory defaulted to remote indication of ARMS

Auxiliary Power

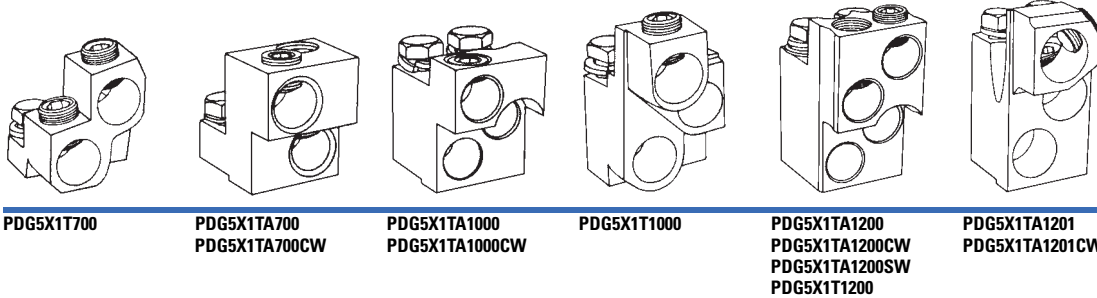
- Connection included with all PXR 20, 20D, and 25 trip units
- Required for communications, relays, and metering accuracy
- 24 Vdc, 0.5 A
- Interface: 2 wires (Aux + 24 V, Aux 0 V)

Available Continuous Current (I_r) Settings on PXR Electronic Trip Units

| Option | Setting | Catalog Number Selection and Maximum Setting (I _n) | | |
|-----------------|---------------------|---|----------------|------------------------------|
| | | 0800 800 A | 1200 1200 A | 1600 1600 A (IEC only) |
| PXR 20 | 1 | 320 A | 500 A | 800 A |
| | 2 | 350 A | 550 A | 900 A |
| | 3 | 400 A | 600 A | 1000 A |
| | 4 | 450 A | 630 A | 1100 A |
| | 5 | 500 A | 700 A | 1200 A |
| | 6 | 550 A | 800 A | 1250 A |
| | 7 | 600 A | 900 A | 1300 A |
| | 8 | 630 A | 1000 A | 1400 A |
| | 9 | 700 A | 1100 A | 1500 A |
| | 10 = I _n | 800 A | 1200 A | 1600 A |
| PXR 20D, PXR 25 | | Programmable from minimum to maximum values in 10 A increments. | | |

Terminals—Frame Size 5

Terminals for Frame 5 are available as single terminals only, unless otherwise specified. To configure both line and load of a 3-pole breaker, order quantity 6 terminals.

Terminal Types

Note: Pictures are for reference only.

Terminals

| Maximum Breaker Amperes | Terminal Body Type | Wire Type | Wire Class | Number of Conductors per Phase | AWG / kcmil Range per Conductor | Metric (mm ²) Range per Conductor | 3-Pole Catalog Number ^① | Hardware Included |
|---|--------------------|-----------|--------------------------|--------------------------------|---------------------------------|---|------------------------------------|-------------------|
| Aluminum Terminal Options | | | | | | | | |
| 700 | Aluminum | Cu/Al | B, C | 3 | 1–500 | 42.4–253 | PDG5X1TA700 | Imperial |
| 1000 | Aluminum | Cu/Al | B, C | 3 | 3/0–400 | 85–203 | PDG5X1TA1000 | Imperial |
| 1200 | Aluminum | Cu/Al | B, C | 4 | 4/0–500 | 107–253 | PDG5X1TA1200 | Imperial |
| 1200 | Aluminum | Cu/Al | B, C | 2 | 4/0–500 | 107–253 | PDG5X1TA1201 | Imperial |
| Copper Terminal Options | | | | | | | | |
| 700 | Copper | Cu | B, C | 2 | 2/0–500 | 67.4–253 | PDG5X1T700 | Imperial |
| 1000 | Copper | Cu | B, C | 3 | 3/0–400 | 85–203 | PDG5X1T1000 | Imperial |
| 1200 | Copper | Cu | B, C | 4 | 4/0–500 | 107–253 | PDG5X1T1200 | Imperial |
| StrandAble Terminal Options | | | | | | | | |
| 1200 | Aluminum | Cu/Al | B, C D, G, H, I, K, M | 4 | 4/0–500 4/0–350 | 107–253 107–177 | PDG5X1TA1200SW | Imperial |
| Control Wire Terminal Options | | | | | | | | |
| 700 | Aluminum | Cu/Al | B, C | 2 | 1–500 | 42.4–253 | PDG5X1TA700CW | Imperial |
| 1000 | Aluminum | Cu/Al | B, C | 3 | 3/0–400 | 85–203 | PDG5X1TA1000CW | Imperial |
| 1200 | Aluminum | Cu/Al | B, C | 4 | 1–500 | 42.4–253 | PDG5X1TA1200CW | Imperial |
| 1200 | Aluminum | Cu/Al | B, C | 3 | 4/0–500 | 107–253 | PDG5X1TA1201CW | Imperial |
| Conductor Extensions ^{②③} | | | | | | | | |
| 1200 | — | — | — | — | — | — | 5104A24G01 | Imperial 2-pole |
| 1200 | — | — | — | — | — | — | 5104A24G02 | Imperial 3-pole |
| 1200 | — | — | — | — | — | — | 5104A24G05 | Imperial 4-pole |
| 1200 | — | — | — | — | — | — | 5104A24G03 | Metric 2-pole |
| 1200 | — | — | — | — | — | — | 5104A24G04 | Metric 3-pole |
| 1200 | — | — | — | — | — | — | 5104A24G06 | Metric 4-pole |

Note: Wire capacity is based on standard imperial wire sizes; metric sizes provided in table are a direct conversion to demonstrate maximum capacity, not to denote metric wire sizes.

Notes

- ① Add M at end for metric hardware.
- ② Included with 100% rated breaker.
- ③ Kits include conductors for both sides of the breaker (e.g., 6 conductors for a 3-pole breaker). Order quantity 1 per breaker.



Accessories

2

Internal Accessory Configurations—Frame Size 5

3- and 4-Pole Circuit Breakers

Tripping Accessory Options

| | Left Pole | Right Pole |
|---|---|--|
| None | None | Bell Alarm Options ① |
| Shunt Trip | Bell Alarm Options ① Auxiliary Switch Options ① Alarm and Auxiliary Combination Options ① | Auxiliary Switch Options ① Bell and Auxiliary Combination Options ① |
|  | | |
| UVR | | |
|  | | |

Indicating Accessories—Frame Size 5

Alarms and Auxiliary Switches

| Alarm Switch | | Auxiliary Switch | | | | |
|--------------|----------|------------------|-----------|--------------|--------------|-----------|
| | | None | None | 1 Form C | 2 Form C | 3 Form C |
| None | Left | — | — | PDG5X1AC | PDG5X2AC | PDG5XL3AC |
| | | Right | — | PDG5X1AC | PDG5X2AC | PDG5XR3AC |
| | 1 Form C | Left | PDG5XL1AC | PDG5XL1AC1BC | PDG5XL2AC1BC | — |
| | | Right | PDG5XB1AC | PDG5XR1AC1BC | PDG5XR2AC1BC | — |
| | 2 Form C | Left | PDG5XL2AC | PDG5XL1AC2BC | — | — |
| | | Right | PDG5XB2AC | PDG5XR1AC2BC | — | — |

Alarm and Auxiliary Switches for Breakers with Communicating Trip Units ②

| Alarm Switch | | Auxiliary Switch | | | |
|--------------|----------|------------------|------------|---------------|------------|
| | | None | None | 1 Form C | 2 Form C |
| None | Left | — | — | — | — |
| | | Right | PDG5XRCBSM | PDG5XRC1AC | PDG5XRC2AC |
| | 1 Form C | Left | — | — | — |
| | | Right | PDG5XRC1BC | PDG5XRC1AC1BC | — |
| 2 Form C | Left | — | — | — | |
| | Right | PDG5XRC2BC | — | — | |

Notes

- ① See Indicating Accessories tables for options.
- ② All electronic trip units configured with communication will automatically include a communication indicator in the right pole. Up to two additional Form C contacts are available for external indication in the right pole.

Factory Installed Indicating Accessories—Frame Size 5^①**Alarms and Auxiliary Switches**

| | | Auxiliary Switch | | | | |
|---------------------|-----------------|------------------|------|----------|----------|----------|
| | | None | None | 1 Form C | 2 Form C | 3 Form C |
| Alarm Switch | None | Left | — | — | — | A4 |
| | | Right | NN | AC | A1 | — |
| | 1 Form C | Left | — | — | — | — |
| | | Right | BC | CC | C1 | — |
| | 2 Form C | Left | — | — | — | — |
| | | Right | B1 | CX | — | — |

Alarm and Auxiliary Switches for Breakers with Communicating Trip Units^②

| | | Auxiliary Switch | | | |
|---------------------|-----------------|------------------|------|----------|----------|
| | | None | None | 1 Form C | 2 Form C |
| Alarm Switch | None | Left | — | — | — |
| | | Right | NN | AC | A1 |
| | 1 Form C | Left | — | — | — |
| | | Right | BC | CC | — |
| | 2 Form C | Left | — | — | — |
| | | Right | B1 | — | — |

Tripping Accessories—Frame Size 5**Shunt Trips**

| Voltage | Pigtail (29 in / 0.75 m) | Factory Installed Catalog Number (Digit 17–18) |
|-------------|--------------------------|--|
| 48–60 Vdc | PDG5XST60DCS | SK |
| 110–125 Vdc | PDG5XST125DCS | SL |
| 220–250 Vdc | PDG5XST250DCS | SM |
| 24 Vac/Vdc | PDG5XST24ACDCS | SN |
| 48–60 Vac | PDG5XST60ACS | ST |
| 110–240 Vac | PDG5XST240ACS | SA or SB |
| 380–440 Vac | PDG5XST440ACS | SC |
| 480–600 Vac | PDG5XST600ACS | SD or SE |

Undervoltage Releases (UVRs)

| Voltage | Pigtail (29 in / 0.75 m) | Factory Installed Catalog Number (Digit 17–18) |
|-------------|--------------------------|--|
| 12 Vdc | PDG5XUV12DCU | UH |
| 24 Vdc | PDG5XUV24DCU | UG |
| 48–60 Vdc | PDG5XUV60DCU | UJ or UK |
| 125 Vdc | PDG5XUV125DCU | UL |
| 250 Vdc | PDG5XUV250DCU | UM |
| 12 Vac | PDG5XUV12ACU | UU |
| 24 Vac | PDG5XUV24ACU | UF |
| 48–60 Vac | PDG5XUV60ACU | UT |
| 110–127 Vac | PDG5XUV120ACU | UA |
| 208–240 Vac | PDG5XUV240ACU | UB |
| 380–500 Vac | PDG5XUV480ACU | UC or UV |

Note: Use PDG5XUV18DCU (Suffix US) when using Time Delay UVR.

Notes

- ① Factory installation of indicating accessories available for the right pole only. Left pole accessories may be field installed.
- ② All electronic trip units configured with communication will automatically include a Communication Indicator in the right pole. Up to two additional Form C contacts are available for external indication in the right pole.

Handle Mechanisms—Size 5**Variable Depth Rotary Handle Mechanism**

| Description | NEMA 1/3R/12 Catalog Number | Factory Installed Digits 19–20 |
|--|--------------------------------|-----------------------------------|
| Standard lockable handle | PDG5XHMDS | DA |
| Emergency lockable handle | PDG5XHMDE | D1 |
| 12 in (305 mm) Standard handle mechanism shaft | PDG56XHMS305 | — |

Flex Shaft Handle Mechanism

| Cable Length (ft) | Metal Handle, NEMA 1/3R/12 Catalog Number | High Performance Handle, NEMA 1/3R/12 Catalog Number | Metal Handle, NEMA 4/4X Catalog Number | High Performance Handle, NEMA 4/4X Catalog Number |
|-------------------|---|--|--|---|
| 4 ft | PDG5XFS04 | PDG5XFS04HP | PDG5XFS04X | PDG5XFS04HPX |
| 5 ft | PDG5XFS05 | PDG5XFS05HP | PDG5XFS05X | PDG5XFS05HPX |
| 6 ft | PDG5XFS06 | PDG5XFS06HP | PDG5XFS06X | PDG5XFS06HPX |
| 10 ft | PDG5XFS10 | PDG5XFS10HP | PDG5XFS10X | PDG5XFS10HPX |

External Accessories—Frame Size 5**External Accessories**

| Description | Fit Type | Catalog Number | Factory Installed Digits 19–20 |
|---|----------------------------|----------------|--------------------------------------|
| Padlockable hasp | Left-side | PDG5XPLKS | L5 |
| | Right-side | | L6 |
| Padlockable hasp | Top | PDG5XPLKT | L4 |
| Padlockable hasp, OFF only | Top | PDG5XPLKTOFF | L1 |
| Non-padlockable Handle Block | Field | PDG5XHBN | — |
| Kirk key interlock kit ^① | Left-side | PDG5XKLKPSF | L8 |
| | Right-side | | L9 |
| Walking beam interlock ^{②③} | Two-, three-, or four-pole | PDG5XWBI234P | WB ^④ |
| Electrical operator | 24 Vdc | EOP5T21 | MG |
| | 48 Vdc | EOP5T22 | MJ |
| | 125 Vdc | EOP5T26 | ML |
| | 120 Vac | EOP5T07 | MA |
| | 208 Vac | EOP5T09 | MY |
| | 240 Vac | EOP5T11 | MB |
| Neutral CTs for Ground Fault (PXR) | Bus bar type | EOP5T15 | MD |
| | | PDG5XNCTB1200 | — |
| Interphase barriers | Three-pole | PDG5XIB3P | — |
| | Four-pole | PDG5XIB4P | — |
| Terminal covers | Three-pole | PDG5XTC3P | — |
| Service entrance barrier kit | Three-pole | PRLSEBPD5 | — |

Base Mounting Hardware

| Description | Catalog Number |
|---------------------------------|----------------|
| Two-, three-, four-pole metric | BMH5M |
| Two-, three-, four-pole English | BMH5 |

Note: Base mounting hardware is included with a circuit breaker or molded case switch.

Dimensions and Weights—Frame Size 5**Approximate Dimensions in Inches (mm)**

| Number of Poles | Width | Height | Depth |
|-----------------|---------------|------------|--------------|
| 2 | 8.25 (209.5) | 16 (406.4) | 5.50 (139.7) |
| 3 | 8.25 (209.5) | 16 (406.4) | 5.50 (139.7) |
| 4 | 11.13 (282.7) | 16 (406.4) | 5.50 (139.7) |

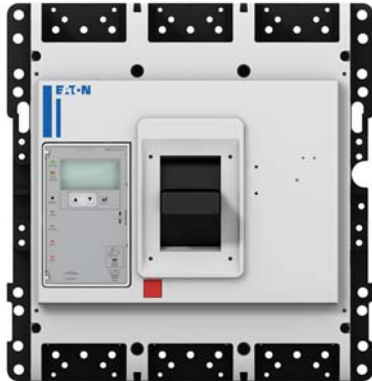
Approximate Shipping Weight in lb (kg)

| Breaker Type | 2-Pole | 3-Pole | 4-Pole |
|------------------------------|--------------|--------------|------------|
| PDG5 800, 1200 and 1600 A | 46.8 (21.30) | 46.8 (21.30) | 58 (26.31) |

Notes

- ① Provision only. For use with Type F Kirk keylock (sold separately).
- ② Breaker must be ordered with walking beam interlock ready modification from plant (factory suffix "WB").
- ③ Requires two breakers.
- ④ Modification code for walking beam denotes modification to the breaker; accessory must be ordered separate.

Power Defense Molded Case Circuit Breakers—Frame Size 6



Contents

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| Frame Size 1 (15–125 A) | V4-T2-22 |
| Frame Size 2 (15–225 A) | V4-T2-29 |
| Frame Size 3 (45–600 A) | V4-T2-42 |
| Frame Size 4 (300–800 A) | V4-T2-57 |
| Frame Size 5 (320–1200 A) | V4-T2-70 |
| Frame Size 6 (700–2500 A) | |
| Catalog Number / Product Selection | V4-T2-80 |
| Accessories | V4-T2-84 |
| Dimensions and Weights | V4-T2-86 |
| Motor Circuit Protectors (3–600 A) | V4-T2-87 |
| Motor Protection Circuit Breakers (15–600 A) | V4-T2-98 |
| Special Applications | V4-T2-104 |

Power Defense Molded Case Circuit Breakers—Frame Size 6

Product Description

Frame Size 6 covers a range of 700 A through 2500 A with a complete offering of advanced PXR electronic trip units. It includes three frame sizes of 1600 A, 2000 A and 2500 A.

Application Description

Frame Size 6 can be used to meet a wide range of circuit protection and power distribution needs, including ground fault protection and 100% UL ratings. PXR trip units in PD-6 provide all levels of protection, including energy metering with multiple communication schemes, breaker health indication and arc flash reduction options.

Features and Benefits

Frame Size 6 breakers are modular and available as complete breakers from the factory or as modular components, including frames, trip units, accessories and terminals to provide flexibility for customers. PXR trip units are available with advanced features to provide customers unparalleled situational awareness of their electrical system.

Standards and Certifications

Power Defense breakers are designed and tested to meet stringent requirements for:

- UL
- CSA
- IEC (CE)
- CB (CCC)



Catalog Number / Product Selection

2

Power Defense—Frame Size 6 (700–2500 A)

Frame Size 6 covers a range of 700 A through 2500 A using electronic trip units. It is available in configurations of 2-pole, 3-pole and 4-pole, with the 2-pole being in the same physical size of a 3-pole variant.

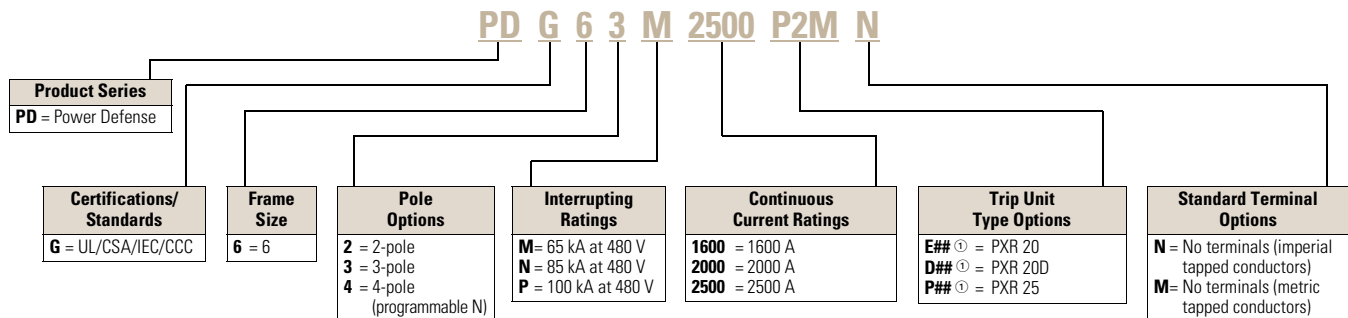
Interrupting Ratings

| | M | | N | | P | |
|---------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|
| ANSI (UL/CSA) | kA rms | | kA rms | | kA rms | |
| 240 Vac | 125 | | 150 | | 200 | |
| 480 Vac | 65 | | 85 | | 100 | |
| 600 Vac | 35 | | 50 | | 65 | |
| IEC | I _{cu} | I _{cs} | I _{cu} | I _{cs} | I _{cu} | I _{cs} |
| 240 Vac | 135 | 100 | 150 | 100 | 200 | 100 |
| 380–415 Vac | 70 | 50 | 70 | 50 | 100 | 50 |
| 440 Vac | 50 | 40 | 70 | 50 | 100 | 50 |
| 480 Vac | 50 | 30 | 65 | 40 | 85 | 40 |
| 525 Vac | 30 | 25 | 35 | 25 | 40 | 25 |
| 660–690 Vac | 15 | 7.5 | 20 | 13 | 35 | 18 |

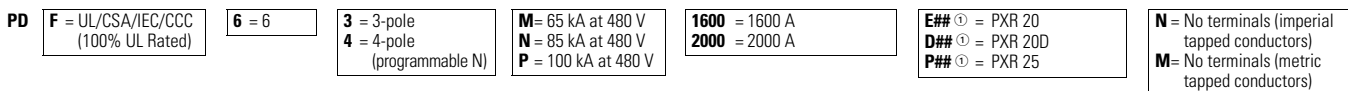
Molded Case Circuit Breakers with Power Xpert Release (PXR) Electronic Trip Units (ETU)

This information is presented as a tool to develop catalog numbers for selecting Power Defense circuit breakers and trip units.

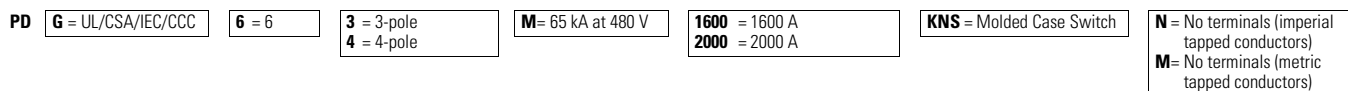
Molded Case Circuit Breakers with PXR ETU—Globally Rated



Molded Case Circuit Breakers with PXR ETU—Globally Rated (100% UL Rated)



Molded Case Switches—Globally Rated



Note

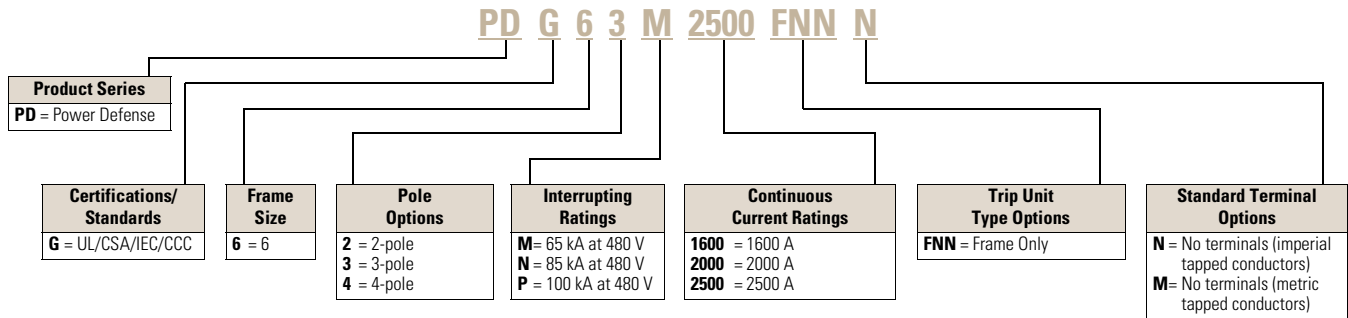
① See tables and descriptions on **Page V4-T2-82** for protection type (#₁) and available configured options (#₂).

Globally Rated Frame Only

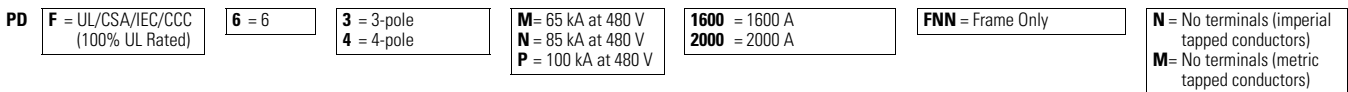
PD-6 electronic breakers may also be purchased as separate frames, trip units, terminals, and accessories for field configuration of a final breaker. Each Frame Only device is marked with interrupting ratings and a maximum continuous current rating; each trip unit is also marked with a maximum continuous current rating, which must not exceed that of the frame. Additionally, 100% UL Rated frames are marked as such on the Frame Only device.

This information is presented as a tool to develop catalog numbers for selecting Power Defense circuit breakers and trip units.

Frame Only—Globally Rated



Frame Only—Globally Rated (100% UL Rated)



Trip Units

PD-6 electronic breakers may also be purchased as separate frames, trip units, terminals, and accessories for field configuration of a final breaker. Each frame rating (1600 A, 2000 A, and 2500 A) must use trip units of the same rating. Additionally, for two-pole breakers, three-pole trip units are used.

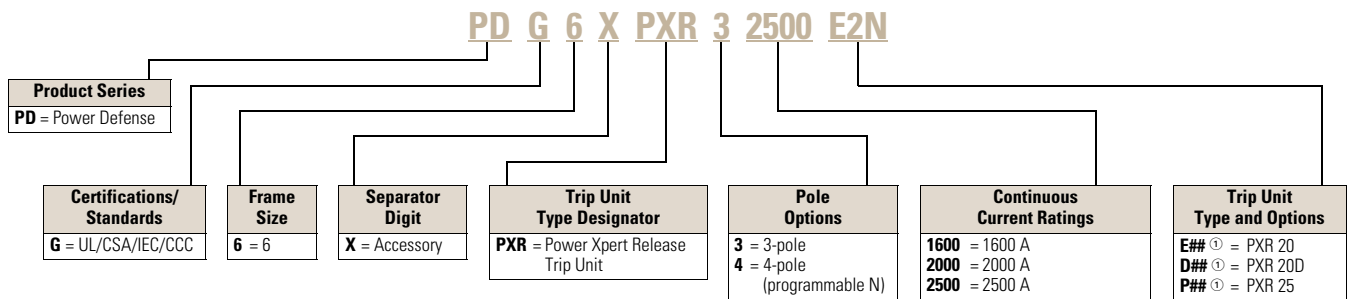
PDG designated trip units are for use with PDG and PDF breaker frames. The 100% rating for PDF (100% UL Rated) is marked on the frame, not the trip unit.

Trip Units Only

This information is presented as a tool to develop catalog numbers for selecting Power Defense circuit breakers and trip units.

Power Xpert Release (PXR) Electronic Trip Units

Power Xpert Release (PXR) Electronic Trip Units



Note

① See PXR Trip Unit Options table on Page V4-T2-82 for protection type (#₁₁) and available configured options (#₁₂).

Globally Rated Frame Only

Power Xpert Release (PXR) Trip Unit Options

2

| PXR | ETU | #(1)—Protection Type | | | | #(2)—Available Configured Options | | | | | | | |
|---------|-----|----------------------|------|---------------|----------------|-----------------------------------|---------------|--------|--------|---------------|---------|---------------|---------------|
| | | LSI | LSIG | LSI with ARMS | LSIG with ARMS | Relays | Relays Modbus | Relays | Relays | Relays Modbus | Relays | Relays Modbus | Relays Modbus |
| | | | | | | | | ZSI | CAM | ZSI | ZSI CAM | CAM | ZSI CAM |
| PXR 20 | E | 2 | — | — | — | N | R | M | Z | C | W | X | — |
| | | — | 3 | 4 | 5 | — | R | M | Z | C | W | X | — |
| PXR 20D | D | 2 | 3 | 4 | 5 | — | — | M | — | — | W | — | D Y |
| PXR 25 | P | 2 | 3 | 4 | 5 | — | — | M | — | — | W | — | D Y |

Descriptions of PXR Configured Options

Relays—3 Form A contacts (rated for 240 Vac, 1 A)

- Interface: 3 wires (ALM1, ALM2, ALM Common)
- Programmable to indicate breaker conditions
- Available as field-installable option if not pre-configured (catalog number **PDG56XRELAYS**)

Modbus—Modbus RTU directly from breaker

- Interface: 3 wires (MODBA, MODBB, MODBG)
- No additional modules required
- Available as field-installable option if not pre-configured (catalog number **PDG56XMODRTU**)

ZSI—Zone Selective Interlocking

- Interface: 3 wires (Zin, Zout, Zcomm)
- Includes ability to turn ON and OFF, and indicate signals

CAM—CAM Link connection (requires a CAM module per breaker)

- Interface: 5 wires (refer to CAM IL for details)
- Communications Adapter Modules available for Modbus TCP and PROFIBUS

ARMS—Arcflash Reduction Maintenance System, or Maintenance Mode

- Available as trip unit Protection Type 4 or 5
- Interface: Switch and LED on face of trip unit and two wires for remote switch enable option (24 Vdc required)
- A programmable relay will be factory defaulted to remote indication of ARMS

Auxiliary Power

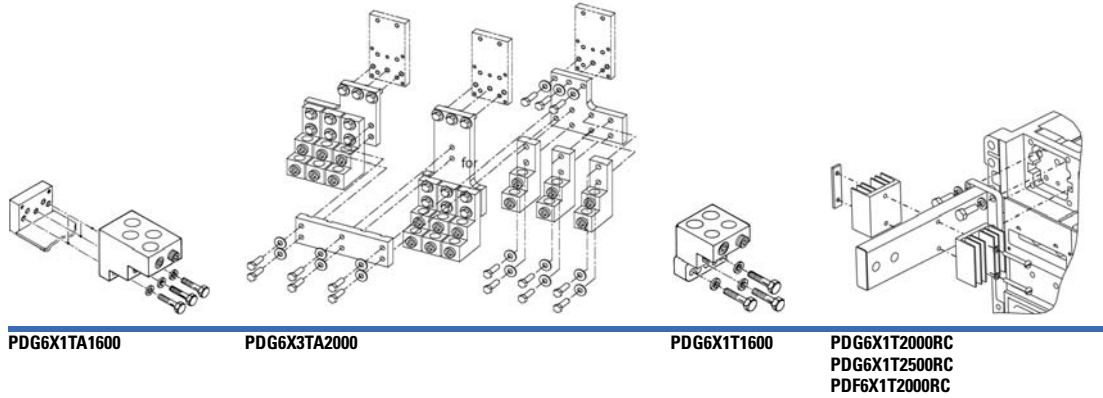
- Connection included with all PXR 20, 20D, and 25 trip units
- Required for communications, relays, and metering accuracy
- 24 Vdc, 0.5 A
- Interface: 2 wires (Aux + 24 V, Aux 0 V)

Available Continuous Current (I_r) Settings on PXR Electronic Trip Units

| Option | Setting | Catalog Number Selection and Maximum Setting (I _n) | | |
|-----------------|---------------------|---|----------------|----------------|
| | | 1600 1600 A | 2000 2000 A | 2500 2500 A |
| PXR 20 | 1 | 700 A | 1000 A | 1600 A |
| | 2 | 800 A | 1100 A | 1700 A |
| | 3 | 900 A | 1200 A | 1800 A |
| | 4 | 1000 A | 1250 A | 1900 A |
| | 5 | 1100 A | 1400 A | 2000 A |
| | 6 | 1200 A | 1600 A | 2100 A |
| | 7 | 1250 A | 1700 A | 2200 A |
| | 8 | 1400 A | 1800 A | 2300 A |
| | 9 | 1500 A | 1900 A | 2400 A |
| | 10 = I _n | 1600 A | 2000 A | 2500 A |
| PXR 20D, PXR 25 | | Programmable from minimum to maximum values in 10 A increments. | | |

Terminals—Frame Size 6

Terminals for Frame 6 are available as single terminals only, unless otherwise specified. To configure both line and load of a 3-pole breaker, order quantity 6 terminals.

Terminal Types

Note: Pictures are for reference only.

Terminals

| Maximum Breaker Amperes | Terminal Body Type | Wire Type | Wire Class | Number of Conductors per Phase | AWG / kcmil Range per Conductor | Metric (mm ²) Range per Conductor | 3-Pole Catalog Number ^① | Hardware Included |
|-------------------------------------|--------------------|-----------|------------|--------------------------------|---------------------------------|---|------------------------------------|-------------------------|
| Aluminum Terminal Options | | | | | | | | |
| 1600 | Aluminum | Cu/Al | B, C | 4 | 500–1000 | 253–507 | PDG6X1TA1600 | Imperial |
| 2000 | Aluminum | Cu/Al | B, C | 6 | 2–600 | 33.6–304 | PDG6X3TA2000 ^② | Imperial bus connection |
| Copper Terminal Options | | | | | | | | |
| 1600 | Copper | Cu | B, C | 4 | 1–600 | 42.4–304 | PDG6X1T1600 | Imperial |
| Rear Connectors ^③ | | | | | | | | |
| 2000 | Copper | | | | | | PDG6X1T2000RC | Imperial |
| 2000 | Copper | | | | | | PDF6X1T2000RC ^④ | Imperial |
| 2500 | Copper | | | | | | PDG6X1T2500RC | Imperial |

Note: Wire capacity is based on standard imperial wire sizes; metric sizes provided in table are a direct conversion to demonstrate maximum capacity, not to denote metric wire sizes.

Notes

- ① Add **M** at end for metric hardware.
- ② Only available for 3-pole breaker; order quantity 1 per breaker side, or quantity 2 per breaker.
- ③ Kit includes one conductor and hardware; order quantity 6 for both sides of a 3-pole breaker.
- ④ Included with 100% rated breaker.

Accessories

Internal Accessory Configurations—Frame Size 6

All Frame 6 accessories are installed in an internal pocket to the right of the breaker handle.

2

Internal Accessory

| Accessory Slot 1 Options | Accessory Slot 2 Options |
|--------------------------|--------------------------|
| None | None |
| 2 Form C | 2 Form C |

| Lower Accessory Slot 1 Options | Lower Accessory Slot 2 Options | Lower Accessory Slot 3 Options |
|--------------------------------|--------------------------------|--------------------------------|
| None | None | None |
| Shunt trip | Shunt trip | UVR |
| Alarm switch | UVR | Alarm switch |
| — | Alarm switch | — |

Indicating Accessories—Frame Size 6

Indicating Accessories ^{①②}

| | Alarm Switch | Auxiliary Switch |
|----------|--------------|------------------|
| 1 Form C | PDG6X1BC | — |
| 2 Form C | PDG6X2BC | PDG6X2AC |
| 4 Form C | — | PDG6X4AC |

Factory Installed Indicating Accessories

| Alarm switch | None | Auxiliary | | |
|--------------|----------|-----------|----------|----------|
| | | None | 2 Form C | 4 Form C |
| | None | NN | A1 | A7 |
| | 1 Form C | BC | C1 | C9 |
| | 2 Form C | B1 | CY | CZ |

Tripping Accessories—Frame Size 6**Shunt Trips**

| Voltage | Pigtail (29 in / 0.75 m) | Factory Installed Catalog Number (Digit 17–18) |
|----------------|---------------------------------|---|
| 48–60 Vdc | PDG6XST60DCS | SK |
| 110–125 Vdc | PDG6XST125DCS | SL |
| 220–250 Vdc | PDG6XST250DCS | SM |
| 24 Vac/Vdc | PDG6XST24ACDCS | SN |
| 48–60 Vac | PDG6XST60ACS | ST |
| 110–240 Vac | PDG6XST240ACS | SA or SB |
| 380–440 Vac | PDG6XST440ACS | SC |
| 480–600 Vac | PDG6XST600ACS | SD or SE |

Undervoltage Releases (UVRs)

| Voltage | Pigtail (29 in / 0.75 m) | Factory Installed Catalog Number (Digit 17–18) |
|----------------|---------------------------------|---|
| 12 Vdc | PDG6XUV12DCU | UH |
| 24 Vdc | PDG6XUV24DCU | UG |
| 48–60 Vdc | PDG6XUV60DCU | UJ or UK |
| 120 Vdc | PDG6XUV120DCU | UL |
| 250 Vdc | PDG6XUV250DCU | UM |
| 12 Vac | PDG6XUV12ACU | UU |
| 24 Vac | PDG6XUV24ACU | UF |
| 48–60 Vac | PDG6XUV60ACU | UT |
| 110–127 Vac | PDG6XUV120ACU | UA |
| 208–240 Vac | PDG6XUV240ACU | UB |
| 380–500 Vac | PDG6XUV480ACU | UC or UV |

Notes

- ① All PDG6 indicating accessories come with 29 in/0.75 m pigtails.
- ② All PDG6 indicating accessories are installed in the accessory pocket to the right of the breaker handle.

Handle Mechanisms—Size 6**Variable Depth Rotary Handle Mechanism**

| Description | NEMA 1/3R/12 Catalog Number | Factory Installed Digits 19–20 |
|--|--------------------------------|-----------------------------------|
| Standard lockable handle | PDG6XHMDS | DA |
| Emergency lockable handle | PDG6XHMDE | D1 |
| 12 in (305 mm) standard handle mechanism shaft | PDG56XHMS305 | — |

Flex Shaft Handle Mechanism

| Cable Length (ft) | Metal Handle, NEMA 1/3R/12 Catalog Number | High Performance Handle, NEMA 1/3R/12 Catalog Number | Metal Handle, NEMA 4/4X Catalog Number | High Performance Handle, NEMA 4/4X Catalog Number |
|-------------------|---|--|--|---|
| 4 ft | PDG6XFS04 | PDG6XFS04HP | PDG6XFS04X | PDG6XFS04HPX |
| 5 ft | PDG6XFS05 | PDG6XFS05HP | PDG6XFS05X | PDG6XFS05HPX |
| 6 ft | PDG6XFS06 | PDG6XFS06HP | PDG6XFS06X | PDG6XFS06HPX |

External Accessories—Frame Size 6**External Accessories**

| Description | Fit Type | Catalog Number | Factory Installed Digits 19–20 |
|--------------------------------------|--------------------|----------------|--------------------------------------|
| Padlockable hasp | Right | PDG6XPLKR | L6 |
| Padlockable hasp, OFF only | Right | PDG6XPLKROFF | L3 |
| Kirk key interlock kit ^① | Right | PDG6XKLKPRF | L9 |
| Walking beam interlock ^{②③} | Two- or three-pole | PDG6XWBI23P | WB ^④ |
| Electrical operator | 48 Vdc | EOP6T21K | MJ |
| | 120 Vac | EOP6T08K | MA |
| | 240 Vac | EOP6T11K | MB |
| Neutral CTs for ground fault (PXR) | Bus bar type | PDG6XNCTB2500 | — |

Dimensions and Weights—Frame Size 6**Approximate Dimensions in Inches (mm)**

| Number of Poles | Width | Height | Depth |
|-----------------|--------------|------------|--------------|
| 2 | 15.5 (393.7) | 16 (406.4) | 9.75 (247.7) |
| 3 | 15.5 (393.7) | 16 (406.4) | 9.75 (247.7) |
| 4 | 20 (508.0) | 16 (406.4) | 9.75 (247.7) |

Approximate Shipping Weight in lb (kg)

| Breaker Type | 2-Pole | 3-Pole | 4-Pole |
|----------------------|------------|------------|------------|
| PDG6 1600 and 2000 A | 102 (46.3) | 102 (46.3) | 135 (61.2) |
| PDG6 2500 A | 135 (61.2) | 135 (61.2) | 182 (82.6) |

Notes

- ^① Provision only. For use with Type F Kirk keylock (sold separately).
- ^② Breaker must be ordered with walking beam interlock ready modification from plant (factory suffix "WB").
- ^③ Requires two breakers.
- ^④ Modification code for Walking Beam denotes modification to the breaker; accessory must be ordered separate.

Motor Circuit Protectors (3–600 A)

Power Defense Molded Case Circuit Breakers—Motor Circuit Protectors

Product Description

Motor circuit protectors (MCPs) are instantaneous-only devices available in ratings from 3 A to 600 A. Power Defense MCPs are available in Frame Sizes 1, 2 and 3, and are designated by the trip unit digits in the catalog number (Digits 11–13), always use M as Digit 11. Digit 12 designates the calibration (S = Standard, H = High, L = Low), and always use A as Digit 13 to indicate an adjustable instantaneous setting.

Application Description

MCPs are designed to be used in combination with motor starters. Power Defense MCPs are typically used in combination with motor starters, usually NEMA sizes 0 through 6. Each MCP device is calibrated at a minimum for six trip settings to provide flexibility in its application. Typical motor full load currents and NEMA starter sizes are provided for each device and setting, only as a guide for selecting MCPs; actual motor characteristics and design parameters must be used to determine the adequate device and setting to be used in the application.

Features and Benefits

Power Defense MCPs are of a modular design, with field-installable accessories and terminals. Accessories and terminals for MCPs are common with the accessories used for the equivalent frame size molded case circuit breaker. Accessories may be field or factory installed. For factory installation, follow the same catalog numbering guidelines provided for the respective equivalent circuit breaker frame.

Standards and Certifications

MCPs are UL Recognized Components (UL File E7819) and comply with the applicable requirements of the UL 489 standard. Eaton MCPs are also UL Listed in combination with Eaton motor starters under various UL file number; reference UL's website for additional information.

MCPs are also designed to comply with CSA Standard C22.2 No. 5, IEC 60947-2 (Annex O), and GB 14048.2. As such, they carry the following markings:

- UL
- CSA
- IEC (CE)
- CB (CCC)



Frame Size 1 Product Selection

PDG1 MCPs cover a continuous current range of 3 A through 100 A, with trip calibration settings from 9 A through 1100 A. All devices are a 3-pole configuration and have a single interrupting capacity as an IEC 60947-2 (Annex O) instantaneous trip circuit breaker.

PDG1 MCPs include six trip settings, corresponding to 3x through 11x of the continuous amperage rating of the device, and each corresponding to 13x the minimum FLA value shown in the table below.

Where a 13x setting is required for an intermediate FLA value, alternate CAM settings and/or MCP ratings should be used.

A High Calibration MCP for the 100 A device is also available for special applications where the ampere rating of the disconnecting means cannot be less than 115% of the motor full load ampere rating, and includes settings corresponding to 5x to 15x of the continuous ampere rating of the device.

All catalog numbers shown include standard line and load steel terminals (Digit 14 = J). For aluminum terminals, use T in Digit 14 of the catalog number.

Terminal catalog numbers listed in the table are for one side of the MCP; order 2 sets for line and load if ordering separate.

Ratings

Maximum Application Voltage (UL and CSA)

- 600Y/347 Vac
- 480 Vac
- 250 Vdc

Note: For DC applications, actual trip levels are approximately 40% higher than values shown.

IEC Instantaneous Circuit Breaker (ICB) Interrupting Capacity (kA)

| | I _{cu} | I _{cs} |
|---------|-----------------|-----------------|
| 240 Vac | 5 | 5 |
| 415 Vac | 5 | 5 |
| 690 Vac | 3 | 1.5 |

PDG1 Motor Circuit Protectors—Standard Calibration

| MCP Catalog Number | Continuous Amperes | CAM Setting | MCP Trip Setting (Mult) | MCP Trip Setting (Amps) | Typical NEMA Starter Size | Typical Motor Full Load Current Amperes | Terminal Kit Catalog Numbers | |
|--------------------|--------------------|-------------|-------------------------|-------------------------|---------------------------|---|------------------------------|------------------------|
| | | | | | | | Included (Dig 14 = J) | Optional (Dig 14 = T) |
| PDG13M0003MSAJ | 3 | A | 3x | 9 | 0 | 0.69–0.91 | PDG1X3T125 (Steel) | PDG1X3TA125 (Aluminum) |
| | | B | 5x | 15 | | 1.1–1.3 | | |
| | | C | 7x | 21 | | 1.6–1.7 | | |
| | | D | 9x | 27 | | 2.0–2.2 | | |
| | | E | 10x | 30 | | 2.3–2.5 | | |
| | | F | 11x | 33 | | 2.6–2.8 | | |
| PDG13M0007MSAJ | 7 | A | 3x | 21 | 0 | 1.5–2.0 | PDG1X3T125 (Steel) | PDG1X3TA125 (Aluminum) |
| | | B | 5x | 35 | | 2.6–3.1 | | |
| | | C | 7x | 49 | | 3.7–3.9 | | |
| | | D | 9x | 63 | | 4.8–5.2 | | |
| | | E | 10x | 70 | | 5.3–5.7 | | |
| | | F | 11x | 77 | | 5.8–6.1 | | |
| PDG13M0015MSAJ | 15 | A | 3x | 45 | 0 | 3.4–4.5 | PDG1X3T125 (Steel) | PDG1X3TA125 (Aluminum) |
| | | B | 5x | 75 | | 5.7–6.8 | | |
| | | C | 7x | 105 | | 8.0–9.1 | | |
| | | D | 9x | 135 | | 10.4–11.4 | | |
| | | E | 10x | 150 | | 11.5–12.6 | | |
| | | F | 11x | 165 | | 12.7–13.0 | | |
| PDG13M0030MSAJ | 30 | A | 3x | 90 | 1 | 3.9–9.1 | PDG1X3T125 (Steel) | PDG1X3TA125 (Aluminum) |
| | | B | 5x | 150 | | 11.5–13.7 | | |
| | | C | 7x | 210 | | 16.1–18.3 | | |
| | | D | 9x | 270 | | 20.7–22.9 | | |
| | | E | 10x | 300 | | 23.0–25.2 | | |
| | | F | 11x | 330 | | 25.3–26.1 | | |
| PDG13M0050MSAJ | 50 | A | 3x | 150 | 2 | 11.5–15.2 | PDG1X3T125 (Steel) | PDG1X3TA125 (Aluminum) |
| | | B | 5x | 250 | | 19.2–22.9 | | |
| | | C | 7x | 350 | | 26.9–30.6 | | |
| | | D | 9x | 450 | | 34.6–38.3 | | |
| | | E | 10x | 500 | | 38.4–42.1 | | |
| | | F | 11x | 550 | | 42.2–43.5 | | |

PDG1 Motor Circuit Protectors—Standard Calibration, continued

| MCP Catalog Number | Continuous Amperes | CAM Setting | MCP Trip Setting (Mult) | MCP Trip Setting (Amps) | Typical NEMA Starter Size | Typical Motor Full Load Current Amperes | Terminal Kit Catalog Numbers | |
|--------------------|--------------------|-------------|-------------------------|-------------------------|---------------------------|---|------------------------------|---------------------------|
| | | | | | | | Included (Dig 14 = J) | Optional (Dig 14 = T) |
| PDG13M0070MSAJ | 70 | A | 3x | 210 | 2 | 16.1–30.6 | PDG1X3T125 (Steel) | PDG1X3TA125 (Aluminum) |
| | | B | 5x | 350 | | 26.9–32.2 | | |
| | | C | 7x | 490 | | 37.6–42.9 | | |
| | | D | 9x | 630 | | 48.4–53.7 | | |
| | | E | 10x | 700 | | 53.8–59.1 | | |
| | | F | 11x | 770 | | 59.2–60.9 | | |
| PDG13M0100MSAJ | 100 | A | 3x | 300 | 3 | 23–30.6 | PDG1X3T125 (Steel) | PDG1X3TA125 (Aluminum) |
| | | B | 5x | 500 | | 38.4–46.0 | | |
| | | C | 7x | 700 | | 53.8–61.4 | | |
| | | D | 9x | 900 | | 69.2–76.8 | | |
| | | E | 10x | 1000 | | 76.9–84.5 | | |
| | | F | 11x | 1100 | | 84.6–87.0 | | |

PDG1 Motor Circuit Protectors—High Calibration

| MCP Catalog Number | Continuous Amperes | CAM Setting | MCP Trip Setting (Mult) | MCP Trip Setting (Amps) | Typical NEMA Starter Size | Typical Motor Full Load Current Amperes | Terminal Kit Catalog Numbers | |
|--------------------|--------------------|-------------|-------------------------|-------------------------|---------------------------|---|------------------------------|---------------------------|
| | | | | | | | Included (Dig 14 = J) | Optional (Dig 14 = T) |
| PDG13M0100MHAJ | 100 | A | 5x | 500 | 3 | 38.4–46.0 | PDG1X3T125 (Steel) | PDG1X3TA125 (Aluminum) |
| | | B | 7.5x | 750 | | 57.6–65.2 | | |
| | | C | 10x | 1000 | | 76.9–84.5 | | |
| | | D | 12.5x | 1250 | | ① | | |
| | | E | 13.75x | 1375 | | ① | | |
| | | F | 15x | 1500 | | ① | | |

Note

① Settings above 85 A are for special applications. NEC Article 430.110(a) requires the ampere rating of the disconnecting means to be not less than 115% of the motor full load ampere rating

Frame Size 2 Product Selection

PDG2 MCPs cover a continuous current range of 3 A through 150 A, with trip calibration settings from 9 A through 2500 A. All devices are a 3-pole configuration and have a single interrupting capacity as an IEC 60947-2 (Annex O) instantaneous circuit breaker.

PDG2 MCPs include eight trip settings, corresponding to 3x through 10x of the continuous amperage rating of the device, and each corresponding to 13x the minimum FLA value shown in the table below.

Where a 13x setting is required for an intermediate FLA value, alternate dial settings and/or MCP ratings should be used.

A High Calibration MCP for the 150 A device is also available for special applications where the ampere rating of the disconnecting means cannot be less than 115% of the motor full load ampere rating.

Additionally, four Low Calibration devices are available for low magnetic protection special applications.

All catalog numbers shown include standard line and load terminals (Digit 14 = J). For optional terminals, use T, W or other options in Digit 14 as described in the Frame Size 2 circuit breaker section of the catalog.

Terminal catalog numbers listed in the table are for one side of the MCP; order 2 sets for line and load if ordering separate.

Ratings

Maximum Application Voltage (UL and CSA)

- 600 Vac
- 250 Vdc

Note: For DC applications, actual trip levels are approximately 40% higher than values shown.

IEC Instantaneous Circuit Breaker (ICB) Interrupting Capacity (kA)

| | I _{cu} | I _{cs} |
|---------|-----------------|-----------------|
| 240 Vac | 5 | 5 |
| 415 Vac | 5 | 5 |
| 690 Vac | 3 | 1.5 |

PDG2 Motor Circuit Protectors—Standard Calibration

| MCP Catalog Number | Continuous Amperes | CAM Setting | MCP Trip Setting (Mult) | MCP Trip Setting (Amps) | Typical NEMA Starter Size | Typical Motor Full Load Current Amperes | Terminal Kit Catalog Numbers | | |
|--------------------|--------------------|-------------|-------------------------|-------------------------|---------------------------|---|------------------------------|-----------------------|--------------------------------|
| | | | | | | | Included (Dig 14 = J) | Optional (Dig 14 = T) | Optional (Dig 14 = W) |
| PDG23M0003MSAJ | 3 | A | 3.0 | 9 | 0 | 0.69–0.91 | PDG2X3T100 (Steel) | PDG2X3TA50 (Aluminum) | PDG2X3T100 (Steel) (Same as J) |
| | | B | 4.0 | 12 | | 0.92–1.0 | | | |
| | | C | 5.0 | 15 | | 1.1–1.2 | | | |
| | | D | 6.0 | 18 | | 1.3–1.5 | | | |
| | | E | 7.0 | 21 | | 1.6–1.7 | | | |
| | | F | 8.0 | 24 | | 1.8–1.9 | | | |
| | | G | 9.0 | 27 | | 2.0–2.2 | | | |
| | | H | 10.0 | 30 | | 2.3–2.5 | | | |
| PDG23M0007MSAJ | 7 | A | 3.0 | 21 | 0 | 1.50–2 | PDG2X3T100 (Steel) | PDG2X3TA50 (Aluminum) | PDG2X3T100 (Steel) (Same as J) |
| | | B | 4.0 | 28 | | 2.10–2.5 | | | |
| | | C | 5.0 | 35 | | 2.6–3.1 | | | |
| | | D | 6.0 | 42 | | 3.2–3.6 | | | |
| | | E | 7.0 | 49 | | 3.7–3.9 | | | |
| | | F | 8.0 | 56 | | 4.3–4.7 | | | |
| | | G | 9.0 | 63 | | 4.8–5.2 | | | |
| | | H | 10.0 | 70 | | 5.3–5.7 | | | |
| PDG23M0015MSAJ | 15 | A | 3.0 | 45 | 0 | 3.40–4.5 | PDG2X3T100 (Steel) | PDG2X3TA50 (Aluminum) | PDG2X3T100 (Steel) (Same as J) |
| | | B | 4.0 | 60 | | 4.60–5.6 | | | |
| | | C | 5.0 | 75 | | 5.7–6.8 | | | |
| | | D | 6.0 | 90 | | 6.9–7.9 | | | |
| | | E | 7.0 | 105 | | 8.0–9.1 | | | |
| | | F | 8.0 | 120 | | 9.2–10.3 | | | |
| | | G | 9.0 | 135 | | 10.4–11.4 | | | |
| | | H | 10.0 | 150 | | 11.5–12.6 | | | |
| PDG23M0030MSAJ | 30 | A | 3.0 | 90 | 1 | 6.90–9.1 | PDG2X3T100 (Steel) | PDG2X3TA50 (Aluminum) | PDG2X3T100 (Steel) (Same as J) |
| | | B | 4.0 | 120 | | 9.20–11.4 | | | |
| | | C | 5.0 | 150 | | 11.5–13.7 | | | |
| | | D | 6.0 | 180 | | 13.8–16.0 | | | |
| | | E | 7.0 | 210 | | 16.1–18.3 | | | |
| | | F | 8.0 | 240 | | 18.4–20.6 | | | |
| | | G | 9.0 | 270 | | 20.7–22.9 | | | |
| | | H | 10.0 | 300 | | 23.0–25.2 | | | |

PDG2 Motor Circuit Protectors—Standard Calibration, continued

| MCP Catalog Number | Continuous Amperes | CAM Setting | MCP Trip Setting (Mult) | MCP Trip Setting (Amps) | Typical NEMA Starter Size | Typical Motor Full Load Current Amperes | Terminal Kit Catalog Numbers | | |
|--------------------|--------------------|-------------|-------------------------|-------------------------|---------------------------|---|------------------------------|---------------------------|--------------------------------------|
| | | | | | | | Included (Dig 14 = J) | Optional (Dig 14 = T) | Optional (Dig 14 = W) |
| PDG23M0050MSAJ | 50 | A | 3.0 | 150 | 2 | 11.50–15.2 | PDG2X3T100 (Steel) | PDG2X3TA50 (Aluminum) | PDG2X3T100 (Steel) (Same as J) |
| | | B | 4.0 | 200 | | 15.30–19.1 | | | |
| | | C | 5.0 | 250 | | 19.2–22.9 | | | |
| | | D | 6.0 | 300 | | 23.0–26.8 | | | |
| | | E | 7.0 | 350 | | 26.9–30.6 | | | |
| | | F | 8.0 | 400 | | 30.7–34.5 | | | |
| | | G | 9.0 | 450 | | 34.6–38.3 | | | |
| | | H | 10.0 | 500 | | 38.4–42.1 | | | |
| PDG23M0070MSAJ | 70 | A | 3.0 | 210 | 2 | 16.10–21.4 | PDG2X3T100 (Steel) | PDG2X3TA100 (Aluminum) | PDG2X3T100 (Steel) (Same as J) |
| | | B | 4.0 | 280 | | 21.50–26.8 | | | |
| | | C | 5.0 | 350 | | 26.9–32.2 | | | |
| | | D | 6.0 | 420 | | 32.3–37.5 | | | |
| | | E | 7.0 | 490 | | 37.6–42.9 | | | |
| | | F | 8.0 | 560 | | 43.0–48.3 | | | |
| | | G | 9.0 | 630 | | 48.4–53.7 | | | |
| | | H | 10.0 | 700 | | 53.8–59.1 | | | |
| PDG23M0100MSAJ | 100 | A | 3.0 | 300 | 3 | 23.00–30.6 | PDG2X3T100 (Steel) | PDG2X3TA100 (Aluminum) | PDG2X3T100 (Steel) (Same as J) |
| | | B | 4.0 | 400 | | 30.70–38.3 | | | |
| | | C | 5.0 | 500 | | 38.4–46.0 | | | |
| | | D | 6.0 | 600 | | 46.1–53.7 | | | |
| | | E | 7.0 | 700 | | 53.8–61.4 | | | |
| | | F | 8.0 | 800 | | 61.5–69.1 | | | |
| | | G | 9.0 | 900 | | 69.2–76.8 | | | |
| | | H | 10.0 | 1000 | | 76.9–84.5 | | | |
| PDG23M0150MSAJ | 150 | A | 3.0 | 450 | 4 | 34.60–46 | PDG2X3TA225 (Aluminum) | PDG2X3TA150 (Aluminum) | PDG2X3T150 (St. Steel) |
| | | B | 4.0 | 600 | | 46.10–57.5 | | | |
| | | C | 5.0 | 750 | | 57.6–69.1 | | | |
| | | D | 6.0 | 900 | | 69.2–80.6 | | | |
| | | E | 7.0 | 1050 | | 80.7–92.2 | | | |
| | | F | 8.0 | 1200 | | 92.3–103.7 | | | |
| | | G | 9.0 | 1350 | | 103.8–115.2 | | | |
| | | H | 10.0 | 1500 | | 115.3–126.7 | | | |

PDG2 Motor Circuit Protectors—High Calibration

| MCP Catalog Number | Continuous Amperes | CAM Setting | MCP Trip Setting (Mult) | MCP Trip Setting (Amps) | Typical NEMA Starter Size | Typical Motor Full Load Current Amperes | Terminal Kit Catalog Numbers | | |
|--------------------|--------------------|-------------|-------------------------|-------------------------|---------------------------|---|------------------------------|---------------------------|---------------------------|
| | | | | | | | Included (Dig 14 = J) | Optional (Dig 14 = T) | Optional (Dig 14 = W) |
| PDG23M0150MH AJ | 150 | A | 5.0 | 750 | 4 | 57.0–75.0 | PDG2X3TA225 (Aluminum) | PDG2X3TA150 (Aluminum) | PDG2X3T150 (St. Steel) |
| | | B | 6.7 | 1000 | | 76.0–95.0 | | | |
| | | C | 8.3 | 1250 | | 96.0–114.0 | | | |
| | | D | 10.0 | 1500 | | 115.0–130.7 | | | |
| | | E | 11.7 | 1750 | | ① | | | |
| | | F | 13.3 | 2000 | | ① | | | |
| | | G | 15.0 | 2250 | | ① | | | |
| | | H | 16.7 | 2500 | | ① | | | |

Note

① Settings above 130 A are for special applications. NEC Article 430.110(a) requires the ampere rating of the disconnecting means to be not less than 115% of the motor full load ampere rating

PDG2 Motor Circuit Protectors—Special Low Calibration

| MCP Catalog Number | Continuous Amperes | CAM Setting | MCP Trip Setting (Mult) | MCP Trip Setting (Amps) | Terminal Kit Catalog Numbers | | |
|--------------------|--------------------|-------------|-------------------------|-------------------------|------------------------------|---------------------------|--------------------------------------|
| | | | | | Included (Dig 14 = J) | Optional (Dig 14 = T) | Optional (Dig 14 = W) |
| PDG23M0025MLAJ | 25 | A | 1.6 | 40 | PDG2X3T100 (Steel) | PDG2X3TA50 (Aluminum) | PDG2X3T100 (Steel) (Same as J) |
| | | B | 1.7 | 43 | | | |
| | | C | 1.8 | 46 | | | |
| | | D | 2.0 | 49 | | | |
| | | E | 2.1 | 52 | | | |
| | | F | 2.2 | 55 | | | |
| | | G | 2.3 | 58 | | | |
| | | H | 2.4 | 60 | | | |
| PDG23M0050MLAJ | 50 | A | 1.6 | 80 | PDG2X3T100 (Steel) | PDG2X3TA50 (Aluminum) | PDG2X3T100 (Steel) (Same as J) |
| | | B | 1.7 | 87 | | | |
| | | C | 1.9 | 93 | | | |
| | | D | 2.0 | 98 | | | |
| | | E | 2.1 | 103 | | | |
| | | F | 2.2 | 109 | | | |
| | | G | 2.3 | 115 | | | |
| | | H | 2.4 | 120 | | | |
| PDG23M0070MLAJ | 70 | A | 1.6 | 115 | PDG2X3T100 (Steel) | PDG2X3TA100 (Aluminum) | PDG2X3T100 (Steel) (Same as J) |
| | | B | 1.7 | 122 | | | |
| | | C | 1.9 | 130 | | | |
| | | D | 2.0 | 139 | | | |
| | | E | 2.1 | 145 | | | |
| | | F | 2.2 | 153 | | | |
| | | G | 2.3 | 160 | | | |
| | | H | 2.4 | 170 | | | |
| PDG23M0100MLAJ | 100 | A | 1.6 | 160 | PDG2X3T100 (Steel) | PDG2X3TA100 (Aluminum) | PDG2X3T100 (Steel) (Same as J) |
| | | B | 1.7 | 174 | | | |
| | | C | 1.9 | 185 | | | |
| | | D | 2.0 | 196 | | | |
| | | E | 2.1 | 207 | | | |
| | | F | 2.2 | 218 | | | |
| | | G | 2.3 | 229 | | | |
| | | H | 2.4 | 240 | | | |

400 A Frame Size 3 Product Selection

PDG3 400 A Frame MCPs cover a continuous current range of 70 A through 400 A, with trip calibration settings from 350 A through 4500 A. All devices are a 3-pole configuration in a 400 A frame and have a single interrupting capacity as an IEC 60947-2 (Annex O) instantaneous circuit breaker.

PDG3 MCPs include nine trip settings, corresponding to 5x through 10x of the continuous amperage rating of the device and each corresponding to 13x the minimum FLA value shown in the table below.

Where a 13x setting is required for an intermediate FLA value, alternate dial settings and/or MCP ratings should be used.

A High Calibration MCP for the 400 A frame device is also available for special applications where the ampere rating of the disconnecting means cannot be less than 115% of the motor full load ampere rating.

All catalog numbers shown include standard aluminum line and load terminals (Digit 14 = J). For optional terminals, use T (aluminum), W (copper) or other options in Digit 14 as described in the Frame Size 3 circuit breaker section of the catalog.

Terminal catalog numbers listed in the table are for one side of the MCP; order 2 sets for line and load if ordering separate.

Ratings

Maximum Application Voltage (UL and CSA)

- 600 Vac
- 250 Vdc

Note: For DC applications, actual trip levels are approximately 40% higher than values shown.

IEC Instantaneous Circuit Breaker (ICB) Interrupting Capacity (kA)

| | I _{cu} | I _{cs} |
|---------|-----------------|-----------------|
| 240 Vac | 100 | 100 |
| 415 Vac | 70 | 53 |
| 690 Vac | 15 | 7.5 |
| 250 Vdc | 22 | 22 |

PDG3 400 A Frame Motor Circuit Protectors—Standard Calibration

| MCP Catalog Number | Continuous Amperes | CAM Setting | MCP Trip Setting (Mult) | MCP Trip Setting (Amps) | Typical NEMA Starter Size | Typical Motor Full Load Current Amperes | Terminal Kit Catalog Numbers | | |
|--------------------|--------------------|-------------|-------------------------|-------------------------|---------------------------|---|------------------------------|---------------------------|------------------------|
| | | | | | | | Included (Dig 14 = J) | Optional (Dig 14 = T) | Optional (Dig 14 = W) |
| PDG33M0070MSAJ | 70 | A | 5.0 | 350 | 4 | 27.0–30.7 | PDG3X3TA300 (Aluminum) | PDG3X3TA402 (Aluminum) | PDG3X3T300 (Copper) |
| | | B | 5.7 | 400 | | 30.8–33.8 | | | |
| | | C | 6.3 | 440 | | 33.9–36.9 | | | |
| | | D | 6.9 | 480 | 5 | 37.0–40.3 | | | |
| | | E | 7.5 | 525 | | 40.4–43.8 | | | |
| | | F | 8.1 | 570 | | 43.9–46.9 | | | |
| | | G | 8.7 | 610 | | 47.0–50.7 | | | |
| | | H | 9.4 | 660 | | 50.8–53.8 | | | |
| | | I | 10.0 | 700 | | 53.9–57.2 | | | |
| PDG33M0100MSAJ | 100 | A | 5.0 | 500 | 5 | 38.5–43.4 | PDG3X3TA300 (Aluminum) | PDG3X3TA402 (Aluminum) | PDG3X3T300 (Copper) |
| | | B | 5.7 | 565 | | 43.5–48.0 | | | |
| | | C | 6.3 | 626 | | 48.1–53.0 | | | |
| | | D | 6.9 | 690 | | 53.1–57.6 | | | |
| | | E | 7.5 | 750 | | 57.7–62.3 | | | |
| | | F | 8.1 | 810 | | 62.4–67.3 | | | |
| | | G | 8.8 | 875 | | 67.4–71.9 | | | |
| | | H | 9.4 | 935 | | 72.0–76.9 | | | |
| | | I | 10.0 | 1000 | | 77.0–81.6 | | | |
| PDG33M0125MSAJ | 125 | A | 5.0 | 625 | 5 | 48.1–53.8 | PDG3X3TA300 (Aluminum) | PDG3X3TA402 (Aluminum) | PDG3X3T300 (Copper) |
| | | B | 5.6 | 700 | | 53.9–59.9 | | | |
| | | C | 6.2 | 780 | | 60.0–66.1 | | | |
| | | D | 6.9 | 860 | | 66.2–72.3 | | | |
| | | E | 7.5 | 940 | | 72.4–78.4 | | | |
| | | F | 8.2 | 1020 | | 78.5–83.8 | | | |
| | | G | 8.7 | 1090 | | 83.9–89.9 | | | |
| | | H | 9.4 | 1170 | | 90.0–96.1 | | | |
| | | I | 10.0 | 1250 | | 96.2–102.0 | | | |

PDG3 400 A Frame Motor Circuit Protectors—Standard Calibration, continued

| MCP Catalog Number | Continuous Amperes | CAM Setting | MCP Trip Setting (Mult) | MCP Trip Setting (Amps) | Typical NEMA Starter Size | Typical Motor Full Load Current Amperes | Terminal Kit Catalog Numbers | | |
|--------------------|--------------------|-------------|-------------------------|-------------------------|---------------------------|---|------------------------------|---------------------------|------------------------|
| | | | | | | | Included (Dig 14 = J) | Optional (Dig 14 = T) | Optional (Dig 14 = W) |
| PDG33M0150MSAJ | 150 | A | 5.0 | 750 | 5 | 57.7–64.6 | PDG3X3TA300 (Aluminum) | PDG3X3TA402 (Aluminum) | PDG3X3T300 (Copper) |
| | | B | 5.6 | 840 | | 64.7–71.9 | | | |
| | | C | 6.2 | 935 | | 72.0–79.2 | | | |
| | | D | 6.9 | 1030 | | 79.3–86.5 | | | |
| | | E | 7.5 | 1125 | | 86.6–93.8 | | | |
| | | F | 8.1 | 1220 | | 93.9–101.1 | | | |
| | | G | 8.8 | 1315 | | 101.2–108.4 | | | |
| | | H | 9.4 | 1410 | | 108.5–115.3 | | | |
| | | I | 10.0 | 1500 | | 115.4–122.4 | | | |
| PDG33M0175MSAJ | 175 | A | 5.0 | 875 | 5 | 67.4–75.3 | PDG3X3TA300 (Aluminum) | PDG3X3TA402 (Aluminum) | PDG3X3T300 (Copper) |
| | | B | 5.6 | 980 | | 75.4–83.8 | | | |
| | | C | 6.2 | 1090 | | 83.9–92.3 | | | |
| | | D | 6.9 | 1200 | | 92.4–100.7 | | | |
| | | E | 7.5 | 1310 | | 100.8–109.2 | | | |
| | | F | 8.1 | 1420 | | 109.3–117.6 | | | |
| | | G | 8.7 | 1530 | | 117.7–126.1 | | | |
| | | H | 9.4 | 1640 | | 126.2–134.6 | | | |
| | | I | 10.0 | 1750 | | 134.7–142.8 | | | |
| PDG33M0200MSAJ | 200 | A | 5.0 | 1000 | 5 | 77.0–86.5 | PDG3X3TA300 (Aluminum) | PDG3X3TA402 (Aluminum) | PDG3X3T300 (Copper) |
| | | B | 5.6 | 1125 | | 86.6–96.1 | | | |
| | | C | 6.3 | 1250 | | 96.2–105.7 | | | |
| | | D | 6.9 | 1375 | | 105.8–115.3 | | | |
| | | E | 7.5 | 1500 | | 115.4–124.9 | | | |
| | | F | 8.1 | 1625 | | 125.0–134.6 | | | |
| | | G | 8.8 | 1750 | | 134.7–144.2 | | | |
| | | H | 9.4 | 1875 | | 144.3–153.8 | | | |
| | | I | 10.0 | 2000 | | 153.9–163.3 | | | |
| PDG33M0225MSAJ | 225 | A | 5.0 | 1125 | 5 | 86.6–97.3 | PDG3X3TA300 (Aluminum) | PDG3X3TA402 (Aluminum) | PDG3X3T300 (Copper) |
| | | B | 5.6 | 1265 | | 97.4–108.4 | | | |
| | | C | 6.3 | 1410 | | 108.5–118.8 | | | |
| | | D | 6.9 | 1545 | | 118.9–129.9 | | | |
| | | E | 7.5 | 1690 | | 130.0–140.7 | | | |
| | | F | 8.1 | 1830 | | 140.8–151.5 | | | |
| | | G | 8.8 | 1970 | | 151.6–162.3 | | | |
| | | H | 9.4 | 2110 | | 162.4–173.0 | | | |
| | | I | 10.0 | 2250 | | 173.1–183.6 | | | |
| PDG33M0250MSAJ | 250 | A | 5.0 | 1250 | 5 | 96.2–108.0 | PDG3X3TA350 (Aluminum) | PDG3X3TA402 (Aluminum) | PDG3X3T350 (Copper) |
| | | B | 5.6 | 1405 | | 108.1–119.9 | | | |
| | | C | 6.2 | 1560 | | 120.0–132.3 | | | |
| | | D | 6.9 | 1720 | | 132.4–144.2 | | | |
| | | E | 7.5 | 1875 | | 144.3–156.1 | | | |
| | | F | 8.1 | 2030 | | 156.2–168.0 | | | |
| | | G | 8.7 | 2185 | | 168.1–179.9 | | | |
| | | H | 9.4 | 2340 | | 180.0–192.3 | | | |
| | | I | 10.0 | 2500 | | 192.4–204.0 | | | |

PDG3 400 A Frame Motor Circuit Protectors—Standard Calibration, continued

| MCP Catalog Number | Continuous Amperes | CAM Setting | MCP Trip Setting (Mult) | MCP Trip Setting (Amps) | Typical NEMA Starter Size | Typical Motor Full Load Current Amperes | Terminal Kit Catalog Numbers | | |
|--------------------|--------------------|-------------|-------------------------|-------------------------|---------------------------|---|------------------------------|---------------------------|------------------------|
| | | | | | | | Included (Dig 14 = J) | Optional (Dig 14 = T) | Optional (Dig 14 = W) |
| PDG33M0300MSAJ | 300 | A | 5.0 | 1500 | 5 | 115.4–129.9 | PDG3X3TA350 (Aluminum) | PDG3X3TA402 (Aluminum) | PDG3X3T350 (Copper) |
| | | B | 5.6 | 1690 | | 130.0–144.2 | | | |
| | | C | 6.3 | 1875 | | 144.3–158.4 | | | |
| | | D | 6.9 | 2060 | | 158.5–173.0 | | | |
| | | E | 7.5 | 2250 | | 173.1–187.6 | | | |
| | | F | 8.1 | 2440 | | 187.7–201.9 | | | |
| | | G | 8.8 | 2625 | | 202.0–216.1 | | | |
| | | H | 9.4 | 2810 | | 216.2–230.7 | | | |
| | | I | 10.0 | 3000 | | 230.8–244.9 | | | |
| PDG33M0350MSAJ | 350 | A | 5.0 | 1750 | 5 | 134.7–151.5 | PDG3X3TA350 (Aluminum) | PDG3X3TA402 (Aluminum) | PDG3X3T350 (Copper) |
| | | B | 5.6 | 1970 | | 151.6–168.4 | | | |
| | | C | 6.3 | 2190 | | 168.5–185.3 | | | |
| | | D | 6.9 | 2410 | | 185.4–201.9 | | | |
| | | E | 7.5 | 2625 | | 202.0–218.8 | | | |
| | | F | 8.1 | 2845 | | 218.9–235.7 | | | |
| | | G | 8.8 | 3065 | | 235.8–252.6 | | | |
| | | H | 9.4 | 3285 | | 252.7–269.2 | | | |
| | | I | 10.0 | 3500 | | 269.3–285.7 | | | |
| PDG33M0400MSAJ | 400 | A | 5.0 | 2000 | 5 | 153.9–173.0 | PDG3X3T400 (Aluminum) | PDG3X3TA402 (Aluminum) | PDG3X3T400 (Copper) |
| | | B | 5.6 | 2250 | | 173.1–192.3 | | | |
| | | C | 6.3 | 2500 | | 192.4–211.5 | | | |
| | | D | 6.9 | 2750 | | 211.6–230.7 | | | |
| | | E | 7.5 | 3000 | | 230.8–249.9 | | | |
| | | F | 8.1 | 3250 | | 250.0–269.2 | | | |
| | | G | 8.8 | 3500 | | 269.3–288.4 | | | |
| | | H | 9.4 | 3750 | | 288.5–307.6 | | | |
| | | I | 10.0 | 4000 | | 307.7–326.9 | | | |

PDG3 400 A Frame Motor Circuit Protectors—High Calibration

| MCP Catalog Number | Continuous Amperes | CAM Setting | MCP Trip Setting (Mult) | MCP Trip Setting (Amps) | Typical NEMA Starter Size | Typical Motor Full Load Current Amperes | Terminal Kit Catalog Numbers | | |
|--------------------|--------------------|-------------|-------------------------|-------------------------|---------------------------|---|------------------------------|---------------------------|------------------------|
| | | | | | | | Included (Dig 14 = J) | Optional (Dig 14 = T) | Optional (Dig 14 = W) |
| PDG33M0400MHAJ | 400 | A | 5.6 | 2250 | 5 | 173.1–194.5 | PDG3X3T400 (Aluminum) | PDG3X3TA402 (Aluminum) | PDG3X3T400 (Copper) |
| | | B | 6.3 | 2530 | | 194.6–216.1 | | | |
| | | C | 7.0 | 2810 | | 216.2–237.6 | | | |
| | | D | 7.7 | 3090 | | 237.7–259.5 | | | |
| | | E | 8.4 | 3375 | | 259.6–281.1 | | | |
| | | F | 9.1 | 3655 | | 281.2–302.6 | | | |
| | | G | 9.8 | 3935 | | 302.7–324.1 | | | |
| | | H | 10.5 | 4215 | | 324.2–346.1 | | | |
| | | I | 11.3 | 4500 | | 346.2–368.1 | | | |

600 A Frame Size 3 Product Selection

PDG3 600 A MCPs cover a continuous current range of 250 A through 600 A, with trip calibration settings from 1250 A through 6000 A. All devices are a 3-pole configuration in a 600 A frame and have a single interrupting capacity as an IEC 60947-2 (Annex O) instantaneous circuit breaker.

PDG3 MCPs include nine trip settings, corresponding to 5x through 10x of the

continuous amperage rating of the device, and each corresponding to 13x the minimum FLA value shown in the table below. Where a 13x setting is required for an intermediate FLA value alternate dial settings and/or MCP ratings should be used.

All catalog numbers shown include standard line and load terminals (Digit 14 = J). For optional terminals, use T (aluminum) W (copper) or

other options in Digit 14 as described in the Frame Size 3 circuit breaker section of the catalog.

Terminal catalog numbers listed in the table are for one side of the MCP; order 2 sets for line and load if ordering separate.

Ratings

Maximum Application Voltage (UL and CSA)

- 600 Vac
- 250 Vdc

Note: For DC applications, actual trip levels are approximately 40% higher than values shown.

IEC Instantaneous Circuit Breaker (ICB) Interrupting Capacity (kA)

| | I _{CU} | I _{CS} |
|---------|-----------------|-----------------|
| 240 Vac | 100 | 100 |
| 415 Vac | 70 | 53 |
| 690 Vac | 25 | 13 |
| 250 Vdc | 42 | 42 |

PDG3 600 A Frame Motor Circuit Protectors—Standard Calibration

| MCP Catalog Number | Continuous Amperes | CAM Setting | MCP Trip Setting (Mult) | MCP Trip Setting (Amps) | Typical NEMA Starter Size | Typical Motor Full Load Current Amperes | Terminal Kit Catalog Numbers | | |
|--------------------|--------------------|-------------|-------------------------|-------------------------|---------------------------|---|------------------------------|----------------------------|-------------------------|
| | | | | | | | Included (Dig 14 = J) | Optional (Dig 14 = T) | Optional (Dig 14 = W) |
| PDG33MH250MSAJ | 250 | A | 5.0 | 1250 | 6 | 96.2–108.0 | PDG3X3TA401H (Aluminum) | PDG3X3TA400H (Aluminum) | PDG3X3T401H (Copper) |
| | | B | 5.6 | 1405 | | 108.1–119.9 | | | |
| | | C | 6.2 | 1560 | | 120.0–132.2 | | | |
| | | D | 6.9 | 1720 | | 132.3–144.1 | | | |
| | | E | 7.5 | 1875 | | 144.2–156.1 | | | |
| | | F | 8.1 | 2030 | | 156.2–168.0 | | | |
| | | G | 8.7 | 2185 | | 168.1–179.9 | | | |
| | | H | 9.4 | 2340 | | 180.0–192.2 | | | |
| | | I | 10.0 | 2500 | | 192.3–204.0 | | | |
| PDG33MH300MSAJ | 300 | A | 5.0 | 1500 | 6 | 115.4–129.9 | PDG3X3TA401H (Aluminum) | PDG3X3TA400H (Aluminum) | PDG3X3T401H (Copper) |
| | | B | 5.6 | 1690 | | 130.0–144.1 | | | |
| | | C | 6.3 | 1875 | | 144.2–158.4 | | | |
| | | D | 6.9 | 2060 | | 158.5–173.0 | | | |
| | | E | 7.5 | 2250 | | 173.1–187.6 | | | |
| | | F | 8.1 | 2440 | | 187.7–201.8 | | | |
| | | G | 8.8 | 2625 | | 201.9–216.1 | | | |
| | | H | 9.4 | 2810 | | 216.2–230.7 | | | |
| | | I | 10.0 | 3000 | | 230.8–244.9 | | | |
| PDG33MH350MSAJ | 350 | A | 5.0 | 1750 | 6 | 134.6–151.4 | PDG3X3TA401H (Aluminum) | PDG3X3TA400H (Aluminum) | PDG3X3T401H (Copper) |
| | | B | 5.6 | 1970 | | 151.5–168.4 | | | |
| | | C | 6.3 | 2190 | | 168.5–185.3 | | | |
| | | D | 6.9 | 2410 | | 185.4–201.8 | | | |
| | | E | 7.5 | 2625 | | 201.9–218.7 | | | |
| | | F | 8.1 | 2845 | | 218.8–235.7 | | | |
| | | G | 8.8 | 3065 | | 235.8–252.6 | | | |
| | | H | 9.4 | 3285 | | 252.7–269.1 | | | |
| | | I | 10.0 | 3500 | | 269.2–285.7 | | | |
| PDG33MH400MSAJ | 400 | A | 5.0 | 2000 | 6 | 153.8–173.0 | PDG3X3TA401H (Aluminum) | PDG3X3TA400H (Aluminum) | PDG3X3T401H (Copper) |
| | | B | 5.6 | 2250 | | 173.1–192.2 | | | |
| | | C | 6.3 | 2500 | | 192.3–211.4 | | | |
| | | D | 6.9 | 2750 | | 211.5–230.7 | | | |
| | | E | 7.5 | 3000 | | 230.8–249.9 | | | |
| | | F | 8.1 | 3250 | | 250.0–269.1 | | | |
| | | G | 8.8 | 3500 | | 269.2–288.4 | | | |
| | | H | 9.4 | 3750 | | 288.5–307.6 | | | |
| | | I | 10.0 | 4000 | | 307.7–326.9 | | | |

PDG3 600 A Frame Motor Circuit Protectors—Standard Calibration, continued

| MCP Catalog Number | Continuous Amperes | CAM Setting | MCP Trip Setting (Mult) | MCP Trip Setting (Amps) | Typical NEMA Starter Size | Typical Motor Full Load Current Amperes | Terminal Kit Catalog Numbers | | Optional (Dig 14 = W) |
|--------------------|--------------------|-------------|-------------------------|-------------------------|---------------------------|---|------------------------------|-----------------------|------------------------|
| | | | | | | | Included (Dig 14 = J) | Optional (Dig 14 = T) | |
| PDG33M0450MSAJ | 450 | A | 5.0 | 2250 | 6 | 173.1–194.5 | PDG3X3TA630 (Aluminum) | — | PDG3X3T630 (Copper) |
| | | B | 5.6 | 2530 | | 194.6–216.1 | | | |
| | | C | 6.2 | 2810 | | 216.2–237.6 | | | |
| | | D | 6.9 | 3090 | | 237.7–259.5 | | | |
| | | E | 7.5 | 3375 | | 259.6–281.4 | | | |
| | | F | 8.1 | 3660 | | 281.5–303.0 | | | |
| | | G | 8.8 | 3940 | | 303.1–324.5 | | | |
| | | H | 9.4 | 4220 | | 324.6–346.1 | | | |
| | | I | 10.0 | 4500 | | 346.2–368.1 | | | |
| PDG33M0500MSAJ | 500 | A | 5.0 | 2500 | 6 | 192.3–216.1 | PDG3X3TA630 (Aluminum) | — | PDG3X3T630 (Copper) |
| | | B | 5.6 | 2810 | | 216.2–240.3 | | | |
| | | C | 6.3 | 3125 | | 240.4–264.5 | | | |
| | | D | 6.9 | 3440 | | 264.6–288.4 | | | |
| | | E | 7.5 | 3750 | | 288.5–313.7 | | | |
| | | F | 8.2 | 4080 | | 313.8–336.4 | | | |
| | | G | 8.8 | 4375 | | 336.5–359.1 | | | |
| | | H | 9.3 | 4670 | | 359.2–384.5 | | | |
| | | I | 10.0 | 5000 | | 384.6–408.2 | | | |
| PDG33M0600MSAJ | 600 | A | 5.0 | 3000 | 6 | 230.8–259.5 | PDG3X3TA630 (Aluminum) | — | PDG3X3T630 (Copper) |
| | | B | 5.6 | 3375 | | 259.6–289.1 | | | |
| | | C | 6.3 | 3760 | | 289.2–316.8 | | | |
| | | D | 6.9 | 4120 | | 316.9–346.1 | | | |
| | | E | 7.5 | 4500 | | 346.2–375.3 | | | |
| | | F | 8.1 | 4880 | | 375.4–403.7 | | | |
| | | G | 8.8 | 5250 | | 403.8–433.0 | | | |
| | | H | 9.4 | 5630 | | 433.1–461.4 | | | |
| | | I | 10.0 | 6000 | | 461.5–507.7 | | | |

Note: 800 and 1200 A, 600 Vac maximum motor circuit protectors are available as Series C HMCP product.

Additional Information**Terminals**

Available terminal configuration for MCPs follow the same guidelines as presented for each circuit breaker frame. Additional terminals, including control wire, StrandAble and other options are presented in each Power Defense circuit breaker frame size section.

Accessories

MCPs and MCCBs for each frame use a common set of accessories. Available accessories are presented in each corresponding Power Defense circuit breaker frame section (i.e., PDG1 accessories are found in the Frame Size 1 section, PDG2 accessories in the Frame Size 2 section and PDG3 in the Frame Size 3 section).

Weights and Dimensions

MCPs have the same dimensions and weight as the 3-pole version of the respective circuit breaker, shown in each frame section.

**Product selector and technical data**

Scan the QR code for additional assistance in selecting a breaker or to obtain data sheets and 2D or 3D drawings.

You can also visit our website at eaton.com/PowerDefense.

Motor Protection Circuit Breakers (15–600 A)

Power Defense Molded Case Circuit Breakers—Motor Protection Circuit Breakers

Product Description

Power Defense motor protection circuit breakers (MPCBs) use Power Xpert Release (PXR) electronic trip units to provide branch protection and motor protection in a combined device, eliminating the need for a separate overload relay. Motor protection PXR units build upon the features available in standard PXR trip units and add motor protection application specific functionality and features. MPCBs are available in Power Defense Frame Sizes 2 and 3, and share accessories and catalog numbering convention with the respective molded case circuit breaker frames.

Application Description

MPCBs meet requirements for motor branch protection, including disconnecting means, branch circuit short-circuit protection and overload protection. MPCBs can be used with a contactor to eliminate the need for overload relay and still create manual motor control. Typical branch motor starter applications are protected by three components consisting of: breaker, contactor and overload relay, or fuse, contactor and overload relay. The MPCB application-specific protection eliminates the need for motor overload relay and reduces the traditional three-component starter assembly down to two elements—the MPCB and the contactor.

Features and Benefits

PXR motor protection electronic trip units provide motor protection basic and advanced functionality in PXR 10 and PXR 25, respectively. Features include phase unbalance protection, phase loss protection, over/under voltage protection, cold/hot start (thermal memory) protection, programmable high load alarms, programmable relays for multiple functions to include pre-detection trip relay, Class 5/10/15/20/30 protection, energy metering, communications, cause-of-trip indication, events logging, breaker health monitoring, harmonics, ground fault alarm and protection, and more.

ZSI allows the MPCB to interface with upstream feeder or branch circuit breakers for coordination and reduction of arc flash for some applications.

Standards and Certifications

MPCBs provide:

- UL 489 branch circuit protection
- UL 508 and CSA C22.2 No. 14 motor protection, and meet IEC 60947-2 and 50947-4 requirements

Power Defense MPCBs meet:

- UL 489
- CSA
- C22.2 No. 5-02
- IEC 60947-2
- GB 14048.2-2008



Catalog Number / Product Selection**Power Defense MPCB—Frame Size 2 (15–200 A)**

Frame Size 2 covers a range of 15 A through 200 A using PXR 10 and PXR 25 electronic trip units. It is available in 3-pole configurations.

Interrupting Ratings

| Catalog Designator | F | | G | | K | | M | | N | | P | |
|--------------------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| ANSI | kA rms | | kA rms | | kA rms | | kA rms | | kA rms | | kA rms | |
| 240 Vac | 35 | | 65 | | 85 | | 100 | | 150 | | 200 | |
| 480 Vac | 25 | | 35 | | 50 | | 65 | | 85 | | 100 | |
| 600 Vac | 14 | | 18 | | 22 | | 25 | | 25 | | 25 | |
| 250 Vdc | — | | — | | — | | — | | — | | — | |
| IEC | I_{cu} | I_{cs} | I_{cu} | I_{cs} | I_{cu} | I_{cs} | I_{cu} | I_{cs} | I_{cu} | I_{cs} | I_{cu} | I_{cs} |
| 240 Vac | 35 | 35 | 55 | 55 | 85 | 85 | 100 | 100 | 150 | 100 | 200 | 150 |
| 380–415 Vac | 25 | 25 | 36 | 36 | 50 | 50 | 70 | 53 | 70 | 70 | 100 | 70 |
| 440 Vac | 25 | 20 | 30 | 22.5 | 35 | 35 | 50 | 40 | 70 | 50 | 100 | 65 |
| 480 Vac | 20 | 20 | 25 | 20 | 35 | 22.5 | 50 | 30 | 65 | 40 | 65 | 40 |
| 525 Vac | 18 | 13 | 20 | 13 | 25 | 13 | 25 | 13 | 25 | 13 | 25 | 13 |
| 660–690 Vac | — | — | 8 | 4 | 10 | 5 | 10 | 5 | 10 | 5 | 10 | 5 |
| 250 Vdc | — | — | — | — | — | — | — | — | — | — | — | — |

Power Defense MPCB—Frame Size 3 (45–600 A)

Frame Size 3 covers a range of 45 A through 600 A using PXR 10 and PXR 25 electronic trip units. It is available in 3-pole configurations. Frame 3 has two specific constructions, one each for 400 A and 600 A. The 600 A construction provides a unique capability to be used at 400A and below in applications requiring higher fixed instantaneous levels. This is accomplished by using a letter H in the 7th digit of the catalog number.

Interrupting Ratings

| Catalog Designator | F | | G | | K | | M | | N | | P | |
|--------------------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| ANSI (UL/CSA) | kA rms | | kA rms | | kA rms | | kA rms | | kA rms | | kA rms | |
| 240 Vac | 35 | | 65 | | 85 | | 100 | | 150 | | 200 | |
| 480 Vac | 25 | | 35 | | 50 | | 65 | | 85 | | 100 | |
| 600 Vac | 14 | | 18 | | 25 | | 35 | | 50 | | 65 | |
| 125/250 Vdc | — | | — | | — | | — | | — | | — | |
| IEC | I_{cu} | I_{cs} | I_{cu} | I_{cs} | I_{cu} | I_{cs} | I_{cu} | I_{cs} | I_{cu} | I_{cs} | I_{cu} | I_{cs} |
| 240 Vac | 35 | 35 | 55 | 55 | 85 | 85 | 100 | 100 | 150 | 100 | 200 | 150 |
| 380–415 Vac | 25 | 25 | 36 | 36 | 50 | 50 | 70 | 53 | 70 | 70 | 100 | 70 |
| 440 Vac | 25 | 20 | 30 | 22.5 | 35 | 35 | 50 | 40 | 70 | 50 | 100 | 50 |
| 480 Vac | 20 | 20 | 25 | 20 | 35 | 22.5 | 50 | 30 | 65 | 40 | 85 | 40 |
| 525 Vac | 18 | 5 | 20 | 7.5 | 25 | 10 | 30 | 15 | 35 | 25 | 40 | 25 |
| 660–690 Vac | — | — | 8 | 4 | 10 | 5 | 15 | 7.5 | 20 | 10 | 20 | 10 |
| 125/250 Vdc | — | — | — | — | — | — | — | — | — | — | — | — |

2.2

Molded Case Circuit Breakers

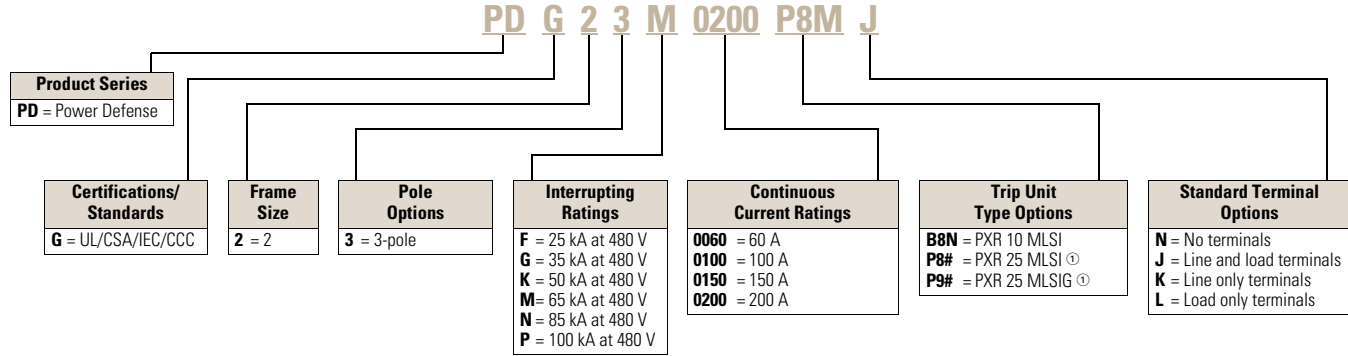
Power Defense Molded Case Circuit Breakers

2

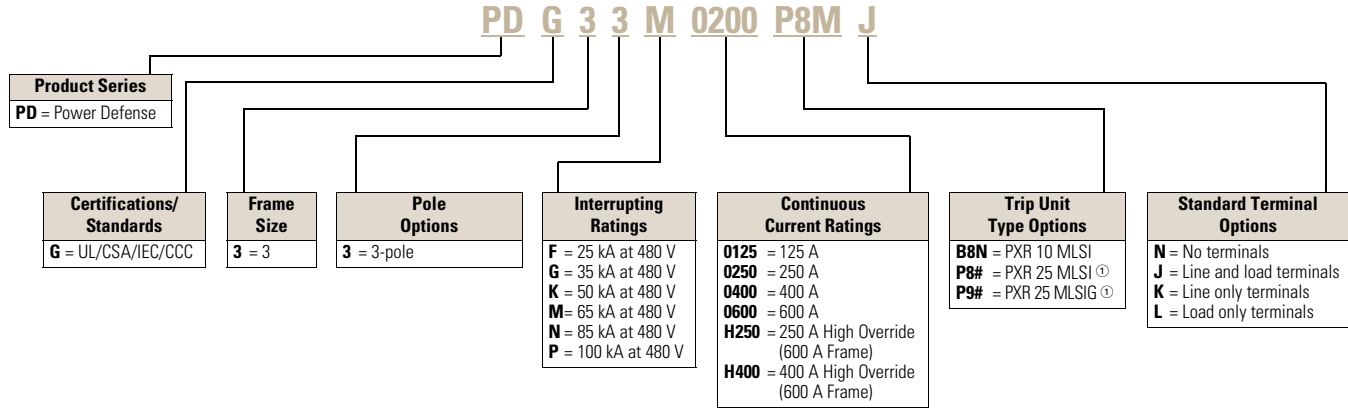
MPCB with Power Xpert (PXR) Electronic Trip Units (ETU)

This information is presented as a tool to develop catalog numbers for selecting Power Defense circuit breakers and trip units.

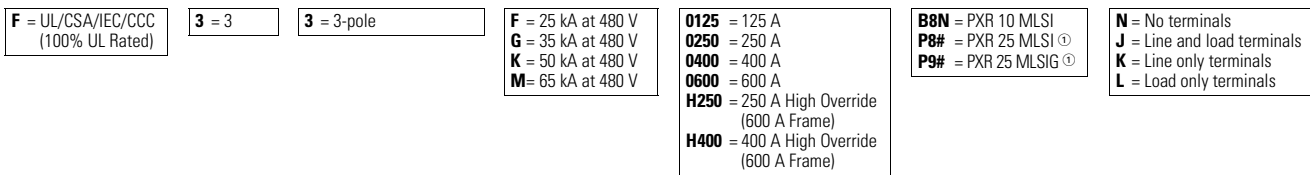
Frame Size 2 MPCB with PXR ETU—Globally Rated



Frame Size 3 MPCB with PXR ETU—Globally Rated



Frame Size 3 MPCB with PXR ETU—Globally Rated (100% UL Rated)



Note

See "Power Xpert Release (PXR) Trip Unit Options" table on the next page for # (Available Configured Options).

Power Xpert Release (PXR) Trip Unit Options

| | PXR | ETU | #(1)—Protection Type | | #(2)—Available Configured Options | | | |
|--------|-----|-----|----------------------|------|-----------------------------------|-------------------|-------------------|-----------------------|
| | | | LSI | LSIG | Relays Modbus | Relays Modbus ZSI | Relays Modbus CAM | Relays Modbus ZSI CAM |
| PXR 10 | B | 8 | — | N | — | — | — | — |
| PXR 25 | P | 8 | 9 | — | M | W | D | Y |

Descriptions of PXR Configured Options

Relays—2 Form A contacts (rated for 240 Vac, 1 A)

- Interface: 3 wires (ALM1, ALM2, ALM Common)
- Programmable to indicate breaker conditions
- Field installable for PD-2

Note: PD-2 includes 1 relay when used in conjunction with Modbus RTU.

Modbus—Modbus RTU directly from the breaker

- Interface: 3 wires (MODBA, MODBB, MODBG)
- No additional modules required
- Field installable for PD-2

ZSI—Zone Selective Interlocking output

- Interface: 2 wires (Zout, Zcomm)
- Includes ability to turn ON and OFF, and indicate signals

CAM—CAM Link connection (requires a CAM module per breaker)

- Interface: 5 wires (refer to CAM IL for details)
- Communications Adapter Modules available for Modbus TCP and PROFIBUS

Auxiliary Power

- Connection included with all PXR 25 trip units
- Required for communications, relays, and metering accuracy
- 24 Vdc, 0.5 A
- Interface: 2 wires Aux +24 V, Aux 0 V)

Available Settings and Features on PXR Motor Protection Electronic Trip Units

| Option | Setting | Full Load Amperes (I _e) Current Settings PD-2 | | | | Full Load Amperes (I _e) Current Settings PD-3 | | | |
|--------|---------|---|---------------|---------------|---------------|---|--------------------|--------------------|---------------|
| | | 0060 60 A | 0100 100 A | 0150 150 A | 0200 200 A | 0125 125 A | 0250/H250 250 A | 0400/H400 400 A | 0600 600 A |
| PXR 10 | 1 | 15 A | 32 A | 50 A | 70 A | 45 A | 90 A | 160 A | 250 A |
| | 2 | 16 A | 35 A | 60 A | 80 A | 50 A | 100 A | 175 A | 275 A |
| | 3 | 20 A | 40 A | 63 A | 90 A | 60 A | 110 A | 200 A | 300 A |
| | 4 | 25 A | 50 A | 70 A | 100 A | 63 A | 125 A | 225 A | 320 A |
| | 5 | 30 A | 60 A | 80 A | 110 A | 70 A | 150 A | 250 A | 350 A |
| | 6 | 35 A | 63 A | 90 A | 125 A | 80 A | 160 A | 275 A | 400 A |
| | 7 | 40 A | 70 A | 100 A | 150 A | 90 A | 175 A | 300 A | 450 A |
| | 8 | 45 A | 80 A | 110 A | 160 A | 100 A | 200 A | 320 A | 500 A |
| | 9 | 50 A | 90 A | 125 A | 175 A | 110 A | 225 A | 350 A | 550 A |
| | 10 | 60 A | 100 A | 150 A | 200 A | 125 A | 250 A | 400 A | 600 A |

PXR 25 Programmable from minimum to maximum values in 1 A increments.

Trip Profile (Trip Class and Phase Unbalance)

PXR 10—Dial 2

| Setting | Dial Label | Trip Class | Phase Unbalance |
|---------|------------|------------|-----------------|
| 1 | A | 5 | OFF |
| 2 | B | 10 | OFF |
| 3 | C | 15 | OFF |
| 4 | D | 20 | OFF |
| 5 | E | 30 | OFF |
| 6 | F | 5 | ON |
| 7 | G | 10 | ON |
| 8 | H | 15 | ON |
| 9 | J | 20 | ON |
| 10 | K | 30 | ON |

PXR 10—Phase Unbalance Settings Programmable by PXPM

- Pickup Level: 5 to 35% of load
- Trip Time: 1 to 300 seconds
- Action taken: MPCB will trip at selected protection settings

PXR 25—Programmable

Trip Class

- Trip Class: 5–30 in increments of 0.1

Phase Unbalance

- Pickup Level: 5 to 35% of load
- Trip Time: 1 to 300 seconds
- Action taken: MPCB will trip at selected protection settings

Phase Loss

- Pickup Level: Fixed at 75% of load
- Trip Time: 1 to 240 seconds
- Action taken: May be set to trip or alarm

Short Delay / Instantaneous Settings

MPCBs with PXR 10 include a combined Short Delay and Instantaneous trip dial. The short delay time may be programmed to trip instantaneously or with a delay for coordination or to avoid nuisance tripping. Breakers with PXR 25 trip units include independent adjustments for short delay and instantaneous settings.

PXR 10—Dial 3 Programmable

| Setting | I_{sd} ($\times I_e$) | t_{sd} (sec) |
|---------|---------------------------|---|
| 1 | 3 | Default to INST; programmable via USB and PXPM to INST, 0.150 or 0.300. |
| 2 | 4 | INST / 0.150 / 0.300 |
| 3 | 5 | |
| 4 | 6 | |
| 5 | 7 | |
| 6 | 8 | |
| 7 | 10 | |
| 8 | 11 [Ⓢ] | |
| 9 | 12 [Ⓢ] | |
| 10 | 13 [Ⓢ] | |

Note

[Ⓢ] If setting value exceeds the fixed magnetic override of the device, the setting defaults to the magnetic override value (please verify these values in the time current curves or PXR user manual).

PXR 25—Programmable

Short delay pickup— I_{sd} ($\times I_e$)

- 3x–13x: Programmable in increments of 0.1x

Short delay time— t_{sd} (sec)

- 0.05–0.50: Programmable in increments of 0.01 sec
- Fixed (flat) response

Instantaneous pickup— I_i ($\times I_n$)

- 3x–Maximum: Programmable in increments of 0.1x
- Maximum is determined by frame fixed magnetic override level

Ground Fault Protection Settings

MPCBs with PXR 25 include an option to add ground fault protection. Ground fault protection includes the ability to trip and/or alarm on a determined ground fault condition.

Phase Unbalance

- Pickup Level: 5 to 35% of load
- Trip Time: 1 to 300 seconds
- Action taken: May be set to trip or alarm

Phase Loss

- Pickup Level: Fixed at 75% of load
- Trip Time: 1 to 240 seconds
- Action taken: May be set to trip or alarm

Metering and Communications Capabilities

PXR 25 motor protection trip units include the same advanced metering functions as the MCCB PXR 25, including:

- Energy metering to 1% accuracy
- Current metering to 0.5% accuracy
- Multiple communications options, including standard Modbus RTU
- Load alarm at two programmable levels between 50% to 120%
- Programmable relays for remote indication

Advanced Motor Protection Settings

MPCBs with PXR 25 trip units also include additional application specific motor protection features. These features may be set to trip the breaker, alarm (indication via programmable relays), or disabled.

Over Voltage

- Pickup Level: 180 to 720 V
- Trip Time: 1 to 300 seconds

Under Voltage

- Pickup Level: 60 to 670 V
- Trip Time: 1 to 300 seconds

Voltage Unbalance (between phase-to-phase readings)

- Pickup Level: 5% to 25% difference
- Trip Time: 1 to 300 seconds

Phase Rotation

- Configuration: ABC or CBA sequence
- Time: Fixed at 200 ms

Reverse Power

- Pickup Level: 1–65,500 kW
- Trip Time: 1 to 300 seconds

Total Harmonic Distortion

- Line-to-line and line-to-neutral voltage
- Each phase and neutral current
- 1st through 29th at 60 Hz / 1st through 35th at 50 Hz

Additional Information**Terminals**

Available terminal configuration for MPCBs follow the same guidelines as presented for each circuit breaker frame. Additional terminals, including control wire, StrandAble and other options are presented in each Power Defense circuit breaker frame size section.

Accessories

MPCBs and MCCBs for each frame use a common set of accessories. Available accessories are presented in each corresponding Power Defense circuit breaker frame section (i.e., PDG2 accessories are found in the Frame Size 2 section and PDG3 in the Frame Size 3 section). All Frame Size 2 MPCBs are automatically configured with 1 Form C auxiliary switch.

Weights and Dimensions

MPCBs have the same dimensions and weight as the 3-pole version of the respective circuit breaker, shown in each frame section.

**Product selector and technical data**

Scan the QR code for additional assistance in selecting a breaker or to obtain data sheets and 2D or 3D drawings. You can also visit our website at eaton.com/PowerDefense.

Special Applications

Extreme Temperature Applications

The Technical Data section of this catalog (**Pages V4-T2-12–V4-T2-20**) presents permissible loads for each breaker type at ambient temperatures ranging from 40 °C through 70 °C. The tables are presented as an aid in selecting breakers appropriate for the application.

Per industry standards, breakers are calibrated to perform at an ambient temperature of 40 °C. Thermal-magnetic breakers are temperature sensitive, and at temperatures above 40 °C will carry less current than their continuous current rating. This high temperature condition promotes nuisance tripping and can create unacceptable temperature conditions inside the breaker and at the terminals. To prevent these issues, the ambient temperature load derating values presented in the technical data section must be followed. Additionally, special 50 °C calibrated breakers are available—note that these do not carry a UL Listing.

Electronic breakers are insensitive to ambient temperature within a certain range and are not likely to nuisance trip. However, if the ambient temperature significantly exceeds 40 °C the electronic circuitry or other internal components could become damaged. Power Defense electronic breakers are designed with circuitry to initiate a tripping operation to provide self-protection to the electronic components in the event the internal temperature reaches to an unsafe level.

In addition to ambient temperature, other factors must be taken into account in the application of circuit breakers in system designs. These include altitude, power factor, cable size and type, load types, and others. Additional details on these can be found in Eaton's *Consulting Application Guide*.

100% Rated Breakers

Molded case circuit breakers are designed to carry rated current in open air at the calibrated temperature for an indefinite period of time without tripping. Molded case circuit breakers are typically applied in an enclosure, therefore the National Electrical Code (Article 220.10b) requires that all overcurrent protection devices be loaded to a maximum of 80% of their continuous current rating, unless specifically listed for 100% applications. Breakers listed for 100% applications specifically outline, on the nameplates, a minimum size enclosure, the minimum ventilation (if needed), and the minimum conductor size for application at 100% rating.

Power Defense circuit breakers are available in 100% rated configurations, as presented in each section of the catalog. Power Defense breakers rated for 100% use the designator PDF in Digits 1–3 of the catalog number.

It is important to understand that using 100% rated breakers is not always the best choice for every system design. Consideration should be given to any present or future factors that could affect the overall system design, and an understanding of NEC Article 210.20a in application of these products.

50 °C Calibrated Breakers

Special non-UL listed calibrations are available for 50 °C ambient temperatures for breakers equipped with thermal-magnetic trip units, and for separate thermal-magnetic trip units. Breakers equipped with electronic trip units can operate reliably in ambient temperatures of 50 °C, and do not require specific calibration.

For this application on thermal-magnetic breakers, the trip unit digits (11–13) of the Power Defense circuit breaker catalog number are changed, from TFF and TFA to VFF and VFA, respectively. Details for these are provided within each frame section.

Freeze-Tested Circuit Breakers

Power Defense circuit breakers may be ordered with freeze testing for applications in extreme cold conditions. This option uses special lubrication and mechanical operation is verified at –40 °C.

For this application, add suffix **J2** to digits 19–20 on a Power Defense catalog number to order.

Fungus/Moisture Treated Breakers

Molded case circuit breakers are suited for operation in 0% to 95% noncondensing humidity environments. As is the case with all electrical equipment, application in a condition or environment above this humidity level should be avoided. Breakers applied in these environments should be protected by the proper NEMA rated enclosure (or of appropriate IP rating), and maintained dry. If such operating conditions cannot be met, special treatment of the circuit breaker should be considered to minimize the possibility of operational problems.

All Eaton circuit breaker cases are molded from a glass-polyester material, which does not support the growth of fungus. Any parts that are susceptible to the growth of fungus will require special treatment for application in these types of conditions.

For this application, add suffix **J1** to digits 19–20 on a Power Defense catalog number to order.

High Altitude Applications

Low-voltage circuit breakers must be progressively derated for voltage and current carrying capacity at altitudes above approximately 6000 ft. The thinner air at higher altitudes reduces cooling and dielectric characteristics compared to denser air found at lower altitudes.

Please consult the product line, Technical Resources Center, or Eaton's *Consulting Application Guide* for specific de-rating details.

400 Hz Applications

Some specialty equipment requires 400–415 Hz power systems. Due to the increased resistance in these systems, circuit breakers typically require de-rating. Additionally, cable and bus sizes used at 400–415 Hz are not based on standard National Electrical Code tables for 60 Hz applications, and larger cross sections are necessary.

Eaton's Power Defense molded case circuit breakers may be used for overcurrent protection on these systems. Please consult with the product line or Technical Resources Center for specific information to order breakers and terminals for use on 400–415 Hz systems.

Breakers labeled for use in 400 Hz systems are not recognized by UL, therefore do not carry a UL Listing.

Reverse Fed Applications

All Power Defense molded case circuit breakers shipped complete from Eaton's factory are capable of being reverse fed, with the power source feeding the lower side (typically considered the load side) of the circuit breaker. UL specifies parameters for circuit breakers to be applied in reverse-feed applications, which are met by Power Defense circuit breakers. This typically includes a factory seal and no "Line" or "Load" markings. All Frame Sizes 1 and 2 (PDG1 and PDG2) circuit breakers are always shipped in this configuration.

Breakers that ship as frames only (available in Frame Sizes 3–6), for field installation of trip units, are marked for standard application, with the line side marked at the top and the load side at the bottom, and meet UL requirement for standard applications.

An Eaton facility authorized to modify MCCBs under UL File E7819 may convert a standard circuit breaker of this type to a reverse-feed capable device per UL parameters following specific procedures.

Frame Sizes 1 and 2 always ship complete from the factory and are always reverse-feed capable. Frame Sizes 3, 4, 5 and 6 may ship as complete circuit breakers, or as separate frames and trip units if ordered separately.

Motor Circuit Protector devices are not capable of being reverse fed.

Series G, 15–2500 Amperes for UL, CSA and IEC Applications

2



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Product Overview

Series G, 15–2500 Amperes for UL, CSA and IEC Applications

Eaton Series G molded case circuit breakers provide increased performance in considerably less space than standard circuit breakers or comparable fusible devices.

The “G” signifies global applications: Series G circuit breakers are marked with UL, CSA, CE, IEC and KEMA KEUR listings. Other advantages include:

- Field-fit accessories
- Common accessories through 630 amperes
- Electronic trip units from 20 to 2500 amperes
- UL-listed and IEC-rated, 30 mA ground fault/earth leakage modules
- Built-in ground fault protection down to 20 amperes

The EG, JG and LG frames are designed around space-saving footprints. The NG and RG use the proven Eaton Series C ND and RD designs.

The Series G family includes five frame sizes in ratings from 15 to 2500 amperes. Series G offers a choice of several interrupting capacities up to 200 kA at 480 volts AC (200 kA at 240 volts AC).

Series G molded case circuit breakers are also available in direct current options. Please see Specialty Breakers **Section 2.6** for more details.

Standard calibration is 40 °C. For applications in high ambient temperature conditions, 50 °C factory calibration is available on thermal-magnetic breakers (not UL).

The Most Logically Designed Contact Assembly

The flexibility and outstanding performance characteristics of Eaton circuit breakers are made possible by the best contact designs in circuit breaker history. Our technology creates a high-speed “blow-open” action using the electromechanical forces produced by high-level fault currents.

Eaton circuit breakers are operated by a toggle-type mechanism that is mechanically trip-free from the handle so that the contacts cannot be held closed against short circuit currents. Tripping due to overload or short circuits is clearly indicated by the position on the handle. This remarkably fast and dependable contact action is designed to enhance safety.

Thorough In-Plant Testing

The quality, dependability and reliability of every Eaton Circuit Breaker is ensured by a thorough program of in-plant testing. Two calibration tests are conducted on every pole of every circuit breaker to verify the trip mechanism, operating mechanism, continuity and accuracy.

Current Limiting Characteristics

Circuit breakers are current limiting because of their high repulsion contact arrangement and use of state-of-the-art arc extinguishing technology.

Eaton offers one of the most complete lines of current limiting breakers in the industry. The industrial breakers are available in current limiting versions with interrupting capacities up to 200 kA at 480 V without fuses in the same physical size as standard and high interrupting capacity breakers.

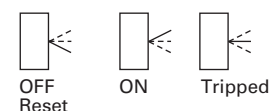
Operating Mechanisms

Eaton circuit breakers have a toggle handle operating mechanism, which also serves as a switching position indicator. The indicator shows the positions of: ON, OFF and TRIPPED.

The toggle handle snaps into the TRIPPED position if the breaker is tripped by one of its overcurrent, short circuit, shunt or undervoltage releases. Before the circuit breaker can be reclosed following a trip-out, the toggle handle must be brought beyond the OFF position (RESET). The circuit breaker can then be reclosed.

As an additional switching position indicator for EG- to RG-Frame circuit breakers, there are two windows on the right and on the left of the toggle handle, in which the switching state is indicated by means of the colors red, green and white corresponding to the ON, OFF and TRIPPED positions respectively.

Positions of the Toggle Handle Drive



Standards and Certifications

Eaton Series G circuit breakers meet applicable UL 489 and IEC 60947-2 standards.

Molded case circuit breakers from Eaton are designed to conform with the following international standards:

- Australian Standard AS 2184 and AS 3947-2 molded case circuit breakers
- British Standards Institution Standard EN60947.2
- International Electromechanical Commission Recommendations IEC 60947.2 circuit breakers
- CE
- Japanese T-Mark standard molded case circuit breakers
- National Electrical Manufacturers Association Standards Publication No. AB1-1993 molded case circuit breakers
- South African Bureau of Standards, Standard SANS 156, Standard Specification for molded case circuit breakers
- Swiss Electro-Technical Association Standard SEV 947.2, Safety Regulations for circuit breakers
- Union Technique de l'Electricite Standard NF C 63-120, low voltage switchgear and control gear circuit breaker requirements
- Verband Deutscher Elektrotechnike (Association of German Electrical Engineers) Standard VDE 0660, low voltage switchgear and control gear, circuit breakers

Global Third-Party Certification

Certification marks ensure product compliance with the total standard via the third party witnessing of tests by globally recognized independent certification organizations.

KEMA is a highly recognized, independent international organization that offers certification and inspection facilities for equipment in many industries. The KEMA-KEUR mark is the highest certification an electrical product can receive from KEMA. Our IEC 60947-2 molded case circuit breakers are KEMA tested and certified. These breakers are also listed in accordance with UL 489, as well as CSA C22.2 No. 5-02.

KEMA, UL and CSA provide ongoing follow-up testing and inspections to ensure that Eaton molded case circuit breakers continue to meet their exacting standards.

ISO Certification

Eaton circuit breakers are manufactured in ISO® certified facilities.

Product Selection Overview

Electronic Trip Units (Digitrip RMS Trip Units)—Multi-Function Electronic Trip Units for All Applications

2

True rms Sensing

Digitrip RMS trip units use Eaton's microprocessor-based intelligence to provide true rms sensing, permitting increased accuracy and reliable system protection. True rms sensing is not susceptible to nuisance tripping when waveforms containing high harmonic currents are present.

Digitrip RMS 310+

Digitrip RMS 310+ electronic trip units are available with Eaton Series G circuit breakers JG, LG, NG and RG, as well as Series C FD, KD, LD and MDL circuit breakers.

Digitrip 310+ trip units are equipped with an integrated I_r switch that allows users to modify the continuous current rating of the breaker without having to replace a rating plug. This provides further flexibility for coordination in systems. The trip units may be used in 50 Hz or 60 Hz applications. The Digitrip 310+ offers true rms sensing, is front adjustable and has an optional local display of current and cause of trip.

Curve Shaping

When selectively coordinated systems are called for, Digitrip RMS 310+ will provide a cost-effective solution for a variety of applications.

The standard Digitrip RMS 310+ includes an adjustable short time pickup setting encompassing an I^2t ramp function that provides the basic LS curve shaping function.

Digitrip 310+ trip units also include selectable long time delay (t_{LD}) and pickup settings (I_r). A rating plug is not required.

The optional Digitrip RMS 310+ LSI and LSI G provide additional flat response short time delay adjustments and an instantaneous setting to provide LSI curve shaping capability.

Digitrip RMS 310+ LSG and LSI G units are available with ground fault pickup and flat response ground fault delay. Ground fault alarm options are available with trip and no trip functionality as a means to notify users of a ground fault condition with the option to maintain the breaker online.

Digitrip RMS 310+ trip units can effectively coordinate with both sophisticated upstream power breakers as well as downstream thermal-magnetic breakers, making Digitrip RMS 310+ trip units the cost-effective reliable choice for selectively coordinated systems.

Thermal Memory

All Digitrip RMS trip units incorporate a long delay. Thermal memory prevents the system from cumulative overheating due to repeated overcurrent events that may occur in quick succession.

Field Testing

A field test kit is available for Digitrip RMS 310+ trip units.

Arcflash Reduction Maintenance Mode (ARMS)

ARMS is an available feature on KD, LG, LD, MDL, NG and RG frames with 310+ electronic trip units. This feature increases worker safety by providing an accelerated instantaneous trip unit to reduce arc flash. Additionally, LG, NG and RG frames with the ARMS feature include a fully adjustable instantaneous setting.

Digitrip RMS 610 and 910

Digitrip RMS 610 and 910 trip units are available with Eaton R-Frame circuit breakers 800 through 2500 amperes. Digitrip 610 and 910 trip units provide unparalleled system protection with the added convenience of a local display.

Curve Shaping

Digitrip RMS 610 and 910 trip units are available with up to nine curve shaping choices achieved by adjusting up to seven switches on the front of the unit for optimum system coordination. Maximum curve shaping flexibility is provided by dependent long and short delay adjustments that are long delay pickup (I_r) based, depicted on the front of the unit by the blue portion of the time-current curve.

Additional coordination capability can be provided by utilizing the short delay and ground fault zone selective interlocking features available on these trip units.

System Diagnostics

Digitrip RMS 610 and 910 models of trip units provide long delay, short delay, instantaneous, and ground fault cause of trip LEDs on the front of the unit. Their display shows a magnitude of trip information, as well as remote signal contacts, for improved system alarming.

System Monitoring

Digitrip 610 and 910 trip units have the capability to monitor phase currents, as well as neutral or ground currents. This information is displayed on a large digital display mounted on the unit.

Digitrip RMS 910 trip units can also provide the user with power and energy monitoring capability. Peak power demand, present power demand, and total energy, as well as forward and reverse energy can be monitored with this unit.

Digitrip RMS 910 trip units have the additional capability of monitoring line-to-line voltage, as well as system power factor. Both parameters are displayed in the digital display window and are supported by LEDs to indicate which parameter is being displayed.

Harmonics Monitoring

Digitrip RMS 910 trip units are capable of displaying values of current harmonics in the digital display window. Percentage of harmonic content can be monitored for each phase, up to the 27th harmonic. Additionally, a total harmonic distortion value can be calculated and displayed.

Communications

Digitrip RMS 910 units have built-in communications options to allow all protection, monitoring, and control information to be transmitted back to a central location via the Eaton PowerNet™ system.

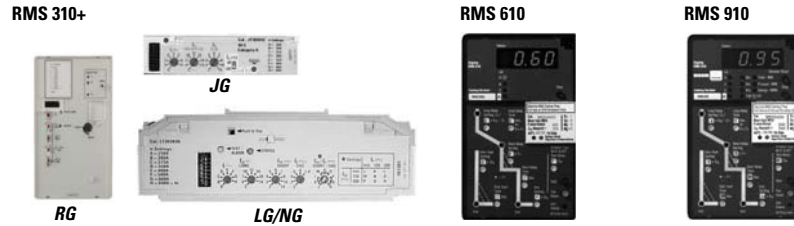
Field Testing

Integral field testing capability is provided on all 610 and 910 trip units. No additional test set is needed to perform both trip and no trip field testing.

Product Selection Guide

Electronic Trip Units

Digitrip—RMS 310+, 610 and 910



| Breaker Type | | RMS 310+ | RMS 610 | RMS 910 |
|------------------------------|--|-----------------------------|-------------------------|----------------------------------|
| Series G frame(s) | | JG-, LG-, NG- and RG-Frames | RG-Frame | RG-Frame |
| Ampere rating | | 20–2500 A | 800–2500 A | 800–2500 A |
| Interrupting rating at 415 V | | 35, 70, 100 kA | 70, 100 kA | 70, 100 kA |
| Trip Unit Sensing | | | | |
| rms sensing | | Yes | Yes | Yes |
| Protection and Coordination | | | | |
| Protection | Ordering options | LS, LSG | LSI, LSIG | LI, LS, LSI, LIG, LSG, LSIG |
| | Fixed rating plug (I_n) ^① | Yes | Yes | Yes |
| | Overtemperature trip | Yes | Yes | Yes |
| Long delay | Adjustable I_r switch | Yes | Yes | No |
| | Long delay setting | VAR/frame | VAR/frame | 0.5–1.0 x (I_n) |
| | Long delay time I^2t at 6x | 10 seconds ^② | 10 seconds ^② | 2–24 seconds |
| | Long delay thermal memory | Yes | Yes | Yes |
| | High load alarm | 1.05 I_r | 1.05 I_r | 0.85 x I_r |
| Short delay | Short delay setting | VAR/frame ^④ | VAR/frame ^④ | 200–600% S1 and S2 x (I_r) |
| | Short delay time I^2t | 100 ms | No | 100, 300, 500 ms |
| | Short delay time flat | No | 1–300 ms | 100–500 ms |
| | Short delay time ZSI | No | Yes | Yes |
| Instantaneous | Independent adjustable Inst. setting | No | Yes ^⑤ | Yes |
| | Instantaneous setting | No | VAR/frame | 200–600% M1 and M2 x (I_n) |
| | Discriminator | No | No | Yes ^⑥ |
| | Instantaneous override | Yes | Yes | Yes |
| Ground fault | Ground fault setting | VAR/Frame ^⑦ | VAR/Frame ^⑦ | 25–100% x (I_n) ^⑦ |
| | Ground fault delay I^2t at 0.62x | No | No | 100, 300, 500 ms |
| | Ground fault delay flat | 1–300 ms | 1–300 ms | 100–500 ms |
| | Ground fault ZSI | No | Yes | Yes |
| | Ground fault thermal memory | No | No | Yes |

Notes

I_n = Rating plug rating.

I_r = Long delay setting.

① 310+ trip units have selectable settings instead of a rating plug.

② 310+ trip units have adjustable long delay times of 2–24 seconds, except NG 310+ for 800 A frame, for which it is 2–14 seconds.

③ 310+ details are included by frame in **Pages V4-T2-146** (JG), **V4-T2-164** (LG), **V4-T2-174** (NG), and **V4-T2-185** (RG).

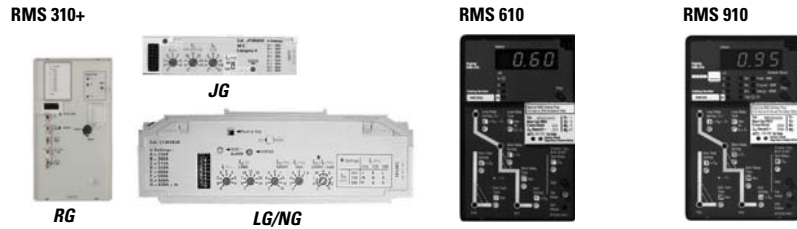
④ JG/LG: 2X–14X (I_n); NG: 2X–8X (I_n); RG: 2X–9X (I_n); 2500 ampere RG-Frame 2X–6X% x (I_n).

⑤ LG, NG and RG ALSI and ALSIG 310+ trip units include an independently adjustable Instantaneous (I_i) setting.

⑥ LS, LSG only.

⑦ Not to exceed 1200 amperes.

Digitrip—RMS 310+, 610 and 910, continued



| | LS, LSG | LSI, LSIG | LSI, LSIG, LSIG (A) | LSI (A), LSIG |
|-------------------------------|-----------------------|-----------------------|---------------------|---------------|
| System Diagnostics | | | | |
| Cause of trip LEDs | Yes ^{①②} | Yes ^{①②} | Yes | Yes |
| Magnitude of trip information | No | No | Yes | Yes |
| Remote signal contacts | No | No | Yes | Yes |
| System Monitoring | | | | |
| Digital display | Yes ^③ | Yes ^③ | Yes | Yes |
| Current | Yes ^③ | Yes ^③ | Yes | Yes |
| Voltage | No | No | No | Yes |
| Power and energy | No | No | No | Yes |
| Power quality—harmonics | No | No | No | Yes |
| Power factor | No | No | No | Yes |
| System Communications | | | | |
| PowerNet | No | No | No | Yes |
| Field Testing | | | | |
| Testing method | Test set ^④ | Test set ^④ | Integral | Integral |

Notes

- ① Using cause of trip module (catalog number **TRIP-LED**).
- ② RG 310+ trip units include integrated cause of trip LEDs.
- ③ Using ammeter or remote ammeter/cause of trip display (catalog number **DIGIVIEW** and **DIGIVIEWR06**).
- ④ Test kit available for field testing 310+ trip units (catalog number **MTST230V**).

Technical Data and Specifications

Ratings

Frames EG, JG and LG

EG



JG



LG



| Maximum rated current (amperes) | | 125, 160 ① | | | | | | | | 250 | | | | | | 400, 630 ② | | | | | | |
|---|--------------------|-----------------------|---------|---------|------|---------|------|---------|------|-------------------------------|---------|---------|------|------|------|-------------------------------|------|------|------|------|------|-----|
| Breaker type ③ | | B | B | E | S | S | H | H | C | E | S | H | C | U | X | E | S | H | C | U | X | |
| Number of poles | | 1 | 2, 3, 4 | 2, 3, 4 | 1 | 2, 3, 4 | 1 | 2, 3, 4 | 3, 4 | 2, 3, 4 | 2, 3, 4 | 2, 3, 4 | 3, 4 | 3, 4 | 3, 4 | 3, 4 | 3, 4 | 3, 4 | 3, 4 | 3, 4 | 3, 4 | |
| Breaker Capacity (kA rms) Vac 50–60 Hz | | | | | | | | | | | | | | | | | | | | | | |
| NEMA®, UL, CSA | 240 Vac | 25 | 25 | 35 | 85 | 85 | 100 | 100 | 200 | 65 | 85 | 100 | 200 | 200 | 200 | 65 | 85 | 100 | 200 | 200 | 200 | |
| | 480 Vac | — | 18 | 25 | — | 35 | — | 65 | 100 | 25 | 35 | 65 | 100 | 150 | 200 | 35 | 50 | 65 | 100 | 150 | 200 | |
| | 600 Vac ④ | — | — | 18 | — | 22 | — | 25 | 35 | 18 | 18 | 25 | 35 | 50 | 50 | 18 | 25 | 35 | 50 | 65 | 65 | |
| | 125/250 Vdc ⑤ | 10 ⑥ | 10 | 10 | 35 ⑥ | 35 | 42 ⑥ | 42 | 42 | 10 | 22 | 22 | 42 | 50 | 50 | 22 | 22 | 42 | 42 | 50 | 50 | |
| IEC 60947-2 | 220–240 Vac | <i>I_{CU}</i> | 25 | 25 | 35 | 85 | 85 | 100 | 100 | 200 | 65 | 85 | 100 | 200 | 200 | 200 | 65 | 85 | 100 | 200 | 200 | 200 |
| | | <i>I_{CS}</i> | 25 | 25 | 35 | 43 | 43 | 50 | 50 | 200 | 65 | 85 | 100 | 200 | 200 | 200 | 65 | 85 | 100 | 200 | 200 | 200 |
| | 380–415 Vac | <i>I_{CU}</i> | — | 18 | 25 | — | 40 | — | 70 | 100 | 25 | 40 | 70 | 100 | 150 | 200 | 35 | 50 | 70 | 100 | 150 | 200 |
| | | <i>I_{CS}</i> | — | 18 | 25 | — | 30 | — | 35 | 100 | 25 | 40 | 70 | 100 | 150 | 200 | 35 | 50 | 53 | 100 | 150 | 200 |
| | 660–690 Vac | <i>I_{CU}</i> | — | — | — | — | — | — | — | — | 12 | 12 | 14 | 16 | 18 | 18 | 12 | 20 | 25 | 30 | 35 | 35 |
| | | <i>I_{CS}</i> | — | — | — | — | — | — | — | — | 6 | 6 | 7 | 12 | 14 | 14 | 6 | 10 | 13 | 15 | 18 | 18 |
| | 125/250 Vdc ⑤ | <i>I_{CU}</i> | 10 ⑥ | 10 | 10 | 35 ⑥ | 35 | 42 ⑥ | 42 | 42 | 10 | 22 | 22 | 42 | 50 | 50 | 22 | 22 | 42 | 42 | 50 | 50 |
| | | <i>I_{CS}</i> | 10 ⑥ | 10 | 10 | 35 ⑥ | 35 | 42 ⑥ | 42 | 42 | 10 | 22 | 22 | 42 | 50 | 50 | 22 | 22 | 42 | 42 | 50 | 50 |
| Ampere range | | 15–160 A ① | | | | | | | | 20–250 A | | | | | | 100–630 A ② | | | | | | |
| Trip Units | | FT-FM | | | | | | | | FT-AM | | | | | | FT-AM | | | | | | |
| F = Fixed | | AT-FM | | | | | | | | AT-AM | | | | | | AT-AM | | | | | | |
| A = Adjustable | | | | | | | | | | Electronic (Digitrip RMS 310) | | | | | | Electronic (Digitrip RMS 310) | | | | | | |
| T = Thermal | | | | | | | | | | | | | | | | | | | | | | |
| M = Magnetic | | | | | | | | | | | | | | | | | | | | | | |
| Interchangeable | | — | — | — | — | — | — | — | — | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | |
| Built-in | | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | |
| Thermal magnetic | Fixed thermal | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | |
| | Adjustable thermal | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | |
| | Magnetic | Fixed | | | | | | | | Adjustable | | | | | | Adjustable | | | | | | |
| Electronic RMS ⑦ | LS | — | — | — | — | — | — | — | — | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | |
| | LSI | — | — | — | — | — | — | — | — | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | |
| | LSG | — | — | — | — | — | — | — | — | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | |
| | LSIG | — | — | — | — | — | — | — | — | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | ■ | |
| | ALSI | — | — | — | — | — | — | — | — | — | — | — | — | — | — | ■ | ■ | ■ | ■ | ■ | ■ | |
| | ALSIG | — | — | — | — | — | — | — | — | — | — | — | — | — | — | ■ | ■ | ■ | ■ | ■ | ■ | |
| Utilization category | | A | A | A | A | A | A | A | A | A | A | A | A | A | A | A | A | A | A | A | A | |

Notes

- ① 125 amperes is the maximum UL and CSA rating for the EG.
- ② 630 amperes is not a UL or CSA listed rating. 600 amperes is the maximum UL and CSA listed rating for the LG.
- ③ Breaker type C, U and X are current limiting per UL 489.
- ④ EG breaker rated 600/347 Vac.
- ⑤ Two poles in series.
- ⑥ 125 Vdc only for single-pole breakers.
- ⑦ Not suitable for DC application. Four-pole ground fault not available.

2.3

Molded Case Circuit Breakers

Series G

Frames NG and RG

NG



RG



| | | | | | | | | | |
|--|-----------------|-----------------------------------|-----------------|-----------------|-------------------|---|------------------|------------------|-----------------|
| Maximum rated current (amperes) | | 800, 1200 | 800, 1200 | 800, 1200 | 1600 ^① | 800 | 1600, 2000, 2500 | 1600, 2000, 2500 | |
| Breaker type | | S | H | C ^② | S | U | H | C ^② | |
| Number of poles | | 2, 3, 4 | 2, 3, 4 | 2, 3, 4 | 3 | 3 | 3, 4 | 3, 4 | |
| Breaker Capacity (kA rms) AC 50–60 Hz | | | | | | | | | |
| NEMA, UL, CSA | 240 Vac | 85 | 100 | 200 | — | 200 | 125 | 200 | |
| | 480 Vac | 50 | 65 | 100 | — | 150 | 65 | 100 | |
| | 600 Vac | 25 | 35 | 65 | — | 65 | 50 | 65 | |
| IEC 60947-2 | 220–240 Vac | I_{cu} | 85 | 100 | 200 | 85 | — | 135 | 200 |
| | | I_{cs} | 85 | 100 | 100 | 85 | — | 100 | 100 |
| | 380–415 Vac | I_{cu} | 50 | 70 | 100 | 50 | — | 70 | 100 |
| | | I_{cs} | 50 | 50 | 50 | 50 | — | 50 | 50 |
| | 660–690 Vac | I_{cu} | 20 ^③ | 25 ^③ | 35 | 20 ^③ | — | 25 ^③ | 35 ^③ |
| | | I_{cs} | 10 | 13 | 18 | 10 | — | 13 | 18 |
| 250 Vdc | I_{cu} | — | — | — | — | — | — | — | |
| | I_{cs} | — | — | — | — | — | — | — | |
| Ampere range | | 400–1200 A | 400–1200 A | 400–1200 A | 1600 A | 800 A | 800–2500 A | 800–2500 A | |
| Trip units | | Electronic (Digitrip RMS 310+) | | | | Electronic (Digitrip RMS 310+ and 910) | | | |
| | Interchangeable | — | — | — | — | — | ■ ^⑤ | ■ ^⑤ | |
| | Built-in | ■ | ■ | ■ | ■ | ■ | ■ | ■ | |
| Electronic ^④ | LI | — | — | — | — | — | ■ ^⑥ | ■ ^⑥ | |
| | LS | ■ | ■ | ■ | ■ | ■ | ■ | ■ | |
| | LSI | ■ | ■ | ■ | ■ | ■ | ■ | ■ | |
| | LIG | — | — | — | — | — | ■ ^⑥ | ■ ^⑥ | |
| | LSG | ■ | ■ | ■ | ■ | ■ | ■ | ■ | |
| | LSIG | ■ | ■ | ■ | ■ | ■ | ■ | ■ | |
| | ALSI | ■ | ■ | ■ | ■ | — | ■ | ■ | |
| | ALSIG | ■ | ■ | ■ | ■ | — | ■ | ■ | |
| Utilization category | | A | A | A | A | A | A | A | |

Notes

- ① NG 1600 ampere frame is not UL or CSA listed.
- ② Not KEMA-KEUR listed.
- ③ IEC 60947-2 H.5 Annex H is not KEMA-KEUR tested.
- ④ Not suitable for DC application. Four-pole ground fault not available.
- ⑤ RG 310+ are interchangeable with the exception of: FROM not ground fault equipped TO ground fault equipped
- ⑥ Available only on Digitrip 910 trip units.

General Specifications

All Series G Frames

| | EG | | JG | | LG | | NG | | RG | |
|---|--------------------|--|----------------|--|-------------------------|--|--------------------------------|--|--------------------|--|
| Maximum rated current I_n depending on the version | 160 A ^① | | 250 A | | 400, 630 A ^② | | 800, 1200, 1600 A ^③ | | 1600, 2000, 2500 A | |
| Rated insulation voltage U, according to IEC 60947-2 | | | | | | | | | | |
| Main conducting paths | 500 Vac | | 750 Vac | | 750 Vac | | 750 Vac | | 750 Vac | |
| Auxiliary circuits | 500 Vac | | 690 Vac | | 690 Vac | | 690 Vac | | 690 Vac | |
| Rated impulse withstand voltage U_{imp} | | | | | | | | | | |
| Main conducting paths | 6 kV | | 8 kV | | 8 kV | | 8 kV | | 8 kV | |
| Auxiliary circuits | 4 kV | | 4 kV | | 4 kV | | 4 kV | | 4 kV | |
| Rated operational voltage U_e | | | | | | | | | | |
| IEC | 415 Vac | | 690 Vac | | 690 Vac | | 690 Vac | | 690 Vac | |
| NEMA | 600Y/347 Vac | | 600 Vac | | 600 Vac | | 600 Vac | | 600 Vac | |
| UL and CSA listed | Yes ^① | | Yes | | Yes ^② | | Yes ^③ | | Yes | |
| Permissible ambient temperature | -20 ° to 70 °C | | -20 ° to 70 °C | | -20 ° to 70 °C | | -20 ° to 70 °C | | -20 ° to 70 °C | |
| Permissible load for various ambient temperatures close to the circuit breaker, related to the rated current of the circuit breaker | ④ ⑤ | | ④ ⑤ | | ④ ⑤ | | — | | — | |
| Circuit breakers for plant protection | | | | | | | | | | |
| At 40 °C | 100% | | 100% | | 100% | | 100% | | 100% | |
| At 50 °C | 96% | | 92% | | 96% | | 91% | | 91% | |
| At 55 °C | 93% | | 87% | | 94% | | 86% | | 85% | |
| At 60 °C | 91% | | 83% | | 92% | | 82% | | 81% | |
| At 70 °C | 86% | | 73% | | 88% | | 70% | | 70% | |
| Circuit breakers for motor protection | | | | | | | | | | |
| At 40 °C | — | | 100% | | 100% | | — | | — | |
| At 50 °C | — | | 100% | | 100% | | — | | — | |
| At 55 °C | — | | 100% | | 100% | | — | | — | |
| At 60 °C | — | | 100% | | 100% | | — | | — | |
| At 70 °C | — | | 90% | | 90% | | — | | — | |
| Circuit breakers for starter combinations and isolating circuit breakers | | | | | | | | | | |
| At 40 °C | 100% | | 100% | | 100% | | 100% | | 100% | |
| At 50 °C | 100% | | 100% | | 100% | | 91% | | 91% | |
| At 55 °C | 96% | | 96% | | 95% | | 85% | | 85% | |
| At 60 °C | 91% | | 82% | | 90% | | 81% | | 81% | |
| At 70 °C | 86% | | 88% | | 84% | | — | | — | |
| Rated short-circuit breaking capacity (DC) Not for circuit breakers for motor protection (Time constant $t = 10$ rms) | | | | | | | | | | |
| Two conducting paths in series For EG to LG up to 250 Vdc | 42 kA max. | | 42 kA max. | | 42 kA max. | | ⑥ | | ⑥ | |
| NEMA (time constant $t = 8$ rms) Two conducting paths in series 250 Vdc | 42 kA max. | | 42 kA max. | | 42 kA max. | | ⑥ | | ⑥ | |

Notes

- ① 125 amperes is the maximum UL and CSA rating for the EG.
- ② 630 amperes is not a UL or CSA listed rating. 600 amperes is the maximum UL and CSA rating for the LG.
- ③ 1200 amperes is the maximum UL and CSA rating for the NG.
- ④ Thermal overload release set to the lower value.
- ⑤ Thermal overload release set to the upper value.
- ⑥ Not suitable for DC switching.

2.3

Molded Case Circuit Breakers

Series G

All Series G Frames, continued

2

| | EG | JG | LG | NG | RG | |
|--|--|-------------------------------|-------------------------------|-------------------------------|-------------------------------|--------------------|
| Main switch characteristics according to IEC 60947-2 in combination with lockable rotary drives | Yes | Yes | Yes | Yes | Yes | |
| Rated short circuit breaking capacity according to IEC 60947-2 (at AC 50/60 Hz) | For rated short circuit breaking capacity, see Page V4-T2-111 . | | | | | |
| Endurance (operating cycles) | 10,000 | 10,000 | 8,000 | 3,000 | 3,000 | |
| Maximum switching frequency | 300 1/h | 240 1/h | 240 1/h | 60 1/h | 60 1/h | |
| Conductor cross sections and terminal types for main conductors | Box terminals | Box terminals | Box terminals | Flat bar terminals | Flat bar terminals | Flat bar terminals |
| Solid or stranded | 2.5 to 95 mm ² | 50 to 150 mm ² | 95 to 240 mm ² | — | — | — |
| Finely stranded with end sleeve | 2.5 to 50/70 mm ² | 35 to 120 mm ² | 70 to 150 mm ² | — | — | — |
| Busbar | — | — | — | 600 A | Optional | Optional |
| Tightening torque for box terminals | 5.6 Nm | 20 Nm | 42 Nm | 31 Nm | 31 Nm | — |
| Tightening torque for busbar connection pieces | 5.6 Nm | 15 Nm | 30 Nm | 6 Nm | 50 Nm | 20 Nm |
| Conductor cross sections for auxiliary circuits with terminal connection or terminal strip | | | | | | |
| Solid | 0.75 to 2.5 mm ² | 0.75 to 2.5 mm ² | 0.75 to 2.5 mm ² | Up to 2x4 mm ² | Up to 2x4 mm ² | |
| Finely stranded with end sleeve | 0.75 to 2.5 mm ² | 0.75 to 2.5 mm ² | 0.75 to 2.5 mm ² | Up to 2x2.5 mm ² | Up to 2x2.5 mm ² | |
| With brought-out cable ends | — | 0.82 (AWG 18) mm ² | 0.82 (AWG 18) mm ² | 0.82 (AWG 18) mm ² | 0.82 (AWG 18) mm ² | |
| Tightening torque for fitting screws | — | 0.8 to 1.4 Nm | 0.8 to 1.4 Nm | 0.8 to 1.4 Nm | 0.8 to 1.4 Nm | |
| Power loss per circuit breaker at maximum rated current I _n (the power losses of the undervoltage releases ("r" releases) must be observed if necessary) at three-phase symmetrical load) | | | | | | |
| | | | 400 A: | 600 A: | | |
| For plant protection | 40 W | 45 W | 65 W | 120 W | 87/210 W | 220/270/400 W |
| As isolating circuit breaker | 40 W | 45 W | 65 W | 120 W | 87/210 W | 220/270/400 W |
| For starter combinations | 40 W | 45 W | 65 W | 120 W | — | — |
| For motor protection | — | 45 W | 65 W | 120 W | — | — |
| Permissible mounting position | | | | | | |
| Arc spacing— suitable for reverse-feed applications | Yes (except HMCPE) | Yes | Yes | Yes | Yes | |
| Auxiliary Switches | | | | | | |
| Rated thermal current I _{th} | 6A | 6A | 6A | 6A | 6A | |
| Rated making capacity | 20 A | 20 A | 20 A | 20 A | 20 A | |
| | AC-14 | AC-14 | AC-14 | AC-15 | AC-15 | |
| Rated operational voltage | 230/400/600 V | 230/400/600 V | 230/400/600 V | 600 V | 600 V | |
| Rated operational current | 6/3/0.25 A | 6/3/0.25 A | 6/3/0.25 A | 6A | 6A | |
| | | | | DC-13 | DC-13 | |
| Rated operational voltage | 125/250V | 125/250V | 125/250V | 125/250V | 125/250V | |
| Rated operational current | 0.5/0.15 A | 0.5/0.15 A | 0.5/0.15 A | 0.5/0.25 A | 0.5/0.25 A | |
| Backup fuse | 6/4/4 A | (4) 6/4/4 A | (4) 6/4/4 A | (4) 6/4/4 A | (4) 6/4/4 A | |
| Miniature circuit breaker | 6/4 A | 6/4 A | 6/4 A | 6/4 A | 6/4 A | |

All Series G Frames, continued

| | EG | JG | LG | NG | RG |
|---|-----------------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| Releases | | | | | |
| Undervoltage releases ("r" releases) | | | | | |
| Response voltage: | | | | | |
| Drop (breaker tripped) U_s | 35–70% | 35–70% | 35–70% | 35–70% | 35–70% |
| Pickup (breaker may be switched on) U_s | 85–110% | 85–110% | 85–110% | 85–110% | 85–110% |
| Power consumption in continuous operation at: | | | | | |
| 50/60 Hz 12 Vac | — | — | — | 1.9 VA | 2.9 VA |
| 50/60 Hz 24 Vac | 0.72 VA | 3.9 VA | 3.9 VA | 2.4 VA | 3.1 VA |
| 50/60 Hz 48–60 Vac | 1.15–1.78 VA | 2.5–3.8 VA | 2.5–3.8 VA | 2.3–4.1 VA | 3.4–6.0 VA |
| 50/60 Hz 110–127 Vac | 0.96–1.25 VA | 1.8–2.4 VA | 1.8–2.4 VA | 3.4–4.2 VA | 3.3–3.8 VA |
| 50/60 Hz 208–240 Vac | 1.28–1.68 VA | 2.7–3.8 VA | 2.7–3.8 VA | 4.8–6.5 VA | 4.2–7.2 VA |
| 50/60 Hz 380–500 Vac | 2.2–3.9 VA | 3.4–5.8 VA | 3.4–5.8 VA | 6.8–12.0 VA | 3.8–10.0 VA |
| 50/60 Hz 525–600 Vac | 3.4–4.3 VA | 3.4–4.3 VA | 3.4–4.3 VA | — | — |
| 12 Vdc | — | — | — | 2.6W | 3.4W |
| 24 Vdc | 0.70 W | 3.1W | 3.1W | 3.6W | 4.3W |
| 48–60 Vdc | 1.12–1.76W | 2.0–3.1W | 2.0–3.1W | 3.5–5.5W | 4.8–7.2W |
| 110–125 Vdc | 0.94–1.21W | 1.6–2.2W | 1.6–2.2W | 2.9–3.6W | 3.3–3.8W |
| 220–250 Vdc | 1.45–1.86W | 3.1–4W | 3.1–4W | 4.8–6.3W | 6.6–7.5W |
| Maximum opening time | 50 ms | 50 ms | 50 ms | 62 ms | 62 ms |
| Shunt Trips | | | | | |
| Shunt trips ("f" releases) | | | | | |
| Response voltage: | | | | | |
| Pickup (breaker tripped) U_s | 70–110% | 70–110% | 70–110% | 70–110% | 70–110% |
| Power consumption in (short time) at: | | | | | |
| 50/60 Hz 24 Vac | 10–41 VA | 87–405 VA | 87–405 VA | 98–475 VA | 612 VA |
| 50/60 Hz 48–60 Vac | 139–210 VA | 710–1105 VA | 710–1105 VA | 24–50 VA | 403–666 VA |
| 50/60 Hz 48–127 Vac | — | — | — | — | — |
| 50/60 Hz 110–240 Vac | 83–360 VA | 66–432 VA | 66–432 VA | 67–432 VA | 396–1896 VA |
| 50/60 Hz 380–440 Vac | — | 127–188 VA | 127–188 VA | 76–110 VA | 1596–2156 VA |
| 50/60 Hz 380–600 Vac | 418–1080 VA | — | — | — | — |
| 50/60 Hz 480–600 Vac | — | 34–60 VA | 34–60 VA | 19–42 VA | 230–384 VA |
| 12–24 Vdc | 29–120 W | 164–631 W | 164–631 W | 145–610 W | 396 W |
| 48–60 Vdc | 475–720 W | 830–1580 W | 830–1580 W | 67–102 W | 341–528 W |
| 110–125 Vdc | 99–121 W | 112–150 W | 112–150 W | 121–150 W | 264–350 W |
| 220–250 Vdc | — | 40–58W | 40–58 W | 46–55 W | 374–475 W |
| Maximum load duration | Interrupts automatically | Interrupts automatically | Interrupts automatically | Interrupts automatically | Interrupts automatically |
| Maximum opening time | 50 ms | 50 ms | 50 ms | 62 ms | 62 ms |
| Molded Case Switch (with High Magnetic Trip) | | | | | |
| Unfused kAIC at 480 Vac (415 Vac) | 65 (70) | 65 (70) | 65 (70) | 65 (70) | 65 (70) |
| Self-protected, will trip above | 1250 for EG125; 1600 for EG160 | 2500 | 4000/6300 | 12,500 | 20,000 |



2.3

Molded Case Circuit Breakers

Series G

Dimensions and Weights

Approximate Dimensions in Inches (mm)

2

Series G—Frame EG, JG and LG

| | EG | | | JG | | | LG | | |
|--------------------|--------------|--------------|-------------|--------------|--------------|-------------|---------------|--------------|--------------|
| | H | W | D | H | W | D | H | W | D |
| Single-pole | 5.50 (139.7) | 1.00 (25.4) | 2.99 (76.0) | — | — | — | — | — | — |
| Two-pole | 5.50 (139.7) | 2.00 (50.8) | 2.99 (76.0) | 7.00 (177.8) | 4.13 (105.0) | 3.57 (87.4) | — | — | — |
| Three-pole | 5.50 (139.7) | 3.00 (76.2) | 2.99 (76.0) | 7.00 (177.8) | 4.13 (105.0) | 3.57 (87.4) | 10.13 (258.0) | 5.48 (140.0) | 4.09 (104.0) |
| Four-pole | 5.50 (139.7) | 4.00 (101.6) | 2.99 (76.0) | 7.00 (177.8) | 5.34 (135.6) | 3.57 (87.4) | 10.13 (258.0) | 7.22 (183.0) | 4.09 (104.0) |

Series G—Frame NG and RG

| | NG | | | RG | | |
|--------------------|---------------|---------------|--------------|---------------|---------------|--------------|
| | H | W | D | H | W | D |
| Single-pole | — | — | — | — | — | — |
| Two-pole | — | — | — | — | — | — |
| Three-pole | 16.00 (406.0) | 8.25 (210.0) | 5.50 (140.0) | 16.00 (406.0) | 15.50 (394.0) | 9.75 (229.0) |
| Four-pole | 16.00 (406.0) | 11.13 (280.0) | 5.50 (140.0) | 16.00 (406.0) | 20.00 (508.0) | 9.75 (229.0) |

Approximate Shipping Weight in Lbs (kg)

Series G—Frame EG, JG and LG

| | EG | JG | LG | NG | RG |
|--------------------|-------------|------------------------------------|--------------------------------------|-------------|--------------|
| Single-pole | 0.85 (0.39) | — | — | — | — |
| Two-pole | 1.57 (0.71) | 11.3 (5.13) | — | — | — |
| Three-pole | 2.28 (1.04) | 5.06 (2.30) T/M 5.31 (2.41) ETU | 12.36 (5.61) T/M 13.04 (5.92) ETU | 46.8 (21.3) | 103.0 (47.0) |
| Four-pole | 2.85 (1.29) | 6.76 (3.07) T/M 7.12 (3.23) ETU | 16.27 (7.39) T/M 16.92 (7.68) ETU | 62.0 (28.3) | 118.4 (54.0) |

EG-Frame (15–125 Amperes)**EG-Frame (15–125 Amperes)****Product Description**

EG breaker is HACR rated.

Contents**Description****Page**

| | |
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| EG-Frame (15–125 Amperes) | |
| Catalog Number Selection | V4-T2-118 |
| Product Selection | V4-T2-119 |
| Accessories | V4-T2-128 |
| Technical Data and Specifications | V4-T2-129 |
| Dimensions and Weights. | V4-T2-129 |
| JG-Frame (63–250 Amperes) | V4-T2-131 |
| LG-Frame (250–630 Amperes) | V4-T2-149 |
| NG-Frame (320–1200 Amperes) | V4-T2-167 |
| RG-Frame (800–2500 Amperes) | V4-T2-176 |
| Motor Circuit Protectors (MCP) | V4-T2-187 |
| Motor Protector Circuit Breakers (MPCB). | V4-T2-191 |
| 30 mA Ground Fault (Earth Leakage) Module. | V4-T2-194 |
| Current Limiting Circuit Breaker Module | V4-T2-198 |
| High Instantaneous Circuit Breaker for | |
| Selective Coordination | V4-T2-203 |
| Special Features and Accessories. | V4-T2-206 |
| Motor Operators | V4-T2-214 |
| Plug-In Blocks | V4-T2-216 |
| Drawout Cassette | V4-T2-217 |

2.3

Molded Case Circuit Breakers

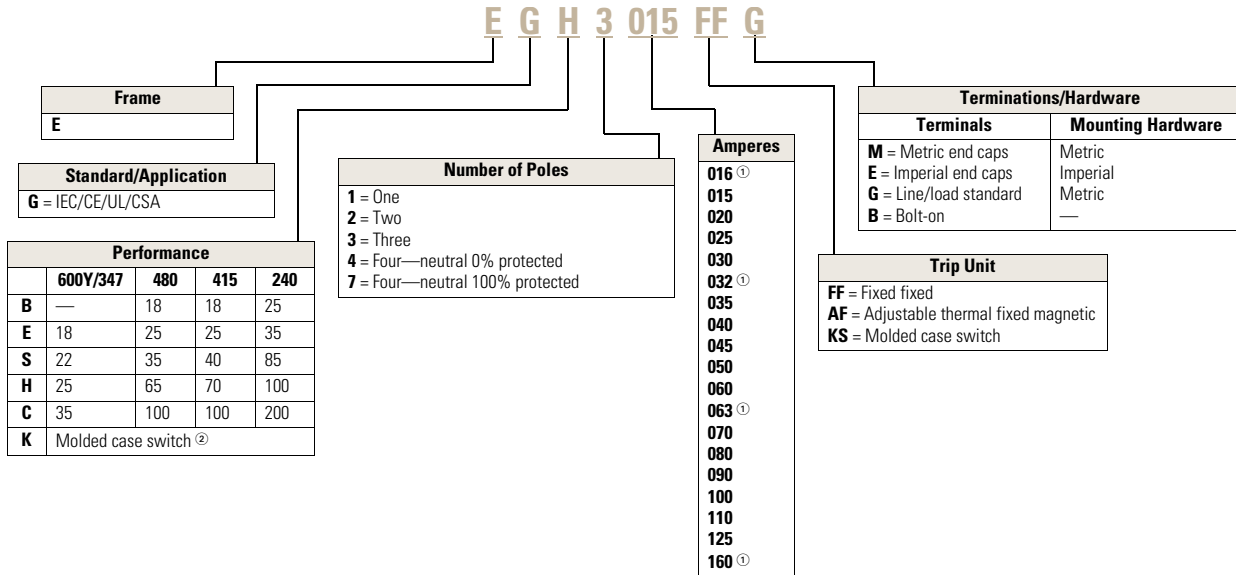
Series G

2

Catalog Number Selection

This information is presented only as an aid to understanding catalog numbers. It is not to be used to build catalog numbers for circuit breakers or trip units.

Series G—EG-Frame (15–125 Amperes)



Notes

- ^① Cannot be UL rated.
- ^② Available only as 125 and 160 A sizes.

Product Selection

Complete Breaker (Includes Frame, Trip Unit, Standard Terminals and Mounting Hardware) IC Rating at 415/480 Volts

EG-Frame



EG-Frame—18/18

| Maximum Continuous Amps at 40 °C ① | Single-Pole | Two-Pole | Three-Pole | Adjustable ② Thermal, Fixed Magnetic | Four-Pole ③ | Adjustable ② Thermal, Fixed Magnetic |
|------------------------------------|--|--|--|--|--|--|
| | Fixed Thermal, Fixed Magnetic Catalog Number | Fixed Thermal, Fixed Magnetic Catalog Number | Fixed Thermal, Fixed Magnetic Catalog Number | Fixed Thermal, Fixed Magnetic Catalog Number | Fixed Thermal, Fixed Magnetic Catalog Number | Fixed Thermal, Fixed Magnetic Catalog Number |
| 15 | EGB1015FFG | EGB2015FFG | EGB3015FFG | — | EGB4015FFG | — |
| 16 | EGB1016FFG | EGB2016FFG | EGB3016FFG | — | EGB4016FFG | — |
| 20 | EGB1020FFG | EGB2020FFG | EGB3020FFG | — | EGB4020FFG | EGB4020AFG |
| 25 | EGB1025FFG | EGB2025FFG | EGB3025FFG | EGB3025AFG | EGB4025FFG | EGB4025AFG |
| 30 | EGB1030FFG | EGB2030FFG | EGB3030FFG | — | EGB4030FFG | — |
| 32 | EGB1032FFG | EGB2032FFG | EGB3032FFG | EGB3032AFG | EGB4032FFG | EGB4032AFG |
| 35 | EGB1035FFG | EGB2035FFG | EGB3035FFG | — | EGB4035FFG | — |
| 40 | EGB1040FFG | EGB2040FFG | EGB3040FFG | EGB3040AFG | EGB4040FFG | EGB4040AFG |
| 45 | EGB1045FFG | EGB2045FFG | EGB3045FFG | — | EGB4045FFG | — |
| 50 | EGB1050FFG | EGB2050FFG | EGB3050FFG | EGB3050AFG | EGB4050FFG | EGB4050AFG |
| 60 | EGB1060FFG | EGB2060FFG | EGB3060FFG | — | EGB4060FFG | — |
| 63 | EGB1063FFG | EGB2063FFG | EGB3063FFG | EGB3063AFG | EGB4063FFG | EGB4063AFG |
| 70 | EGB1070FFG | EGB2070FFG | EGB3070FFG | — | EGB4070FFG | — |
| 80 | EGB1080FFG | EGB2080FFG | EGB3080FFG | EGB3080AFG | EGB4080FFG | EGB4080AFG |
| 90 | EGB1090FFG | EGB2090FFG | EGB3090FFG | — | EGB4090FFG | — |
| 100 | EGB1100FFG | EGB2100FFG | EGB3100FFG | EGB3100AFG | EGB4100FFG | EGB4100AFG |
| 110 | EGB1110FFG | EGB2110FFG | EGB3110FFG | — | EGB4110FFG | — |
| 125 | EGB1125FFG | EGB2125FFG | EGB3125FFG | EGB3125AFG | EGB4125FFG | EGB4125AFG |
| 160 | — | — | EGB3160FFG | EGB3160AFG | EGB4160FFG | EGB4160AFG |

Notes

① 16, 32, 63 and 160 A are not UL listed ratings.

② Adjustable thermal are not UL listed.

③ Change the fourth digit to 7 for 100% neutral protection. Neutral is on the LH side.

2.3

Molded Case Circuit Breakers

Series G

EG-Frame—25/25 Single-Pole Unavailable

2

EG-Frame

EG-Frame—25/25



| Maximum Continuous Amps at 40 °C ^① | Two-Pole | Three-Pole | Adjustable ^② Thermal, Fixed Magnetic Catalog Number | Four-Pole ^③ | Adjustable ^② Thermal, Fixed Magnetic Catalog Number |
|---|--|--|--|--|--|
| | Fixed Thermal, Fixed Magnetic Catalog Number | Fixed Thermal, Fixed Magnetic Catalog Number | | Fixed Thermal, Fixed Magnetic Catalog Number | |
| 15 | EGE2015FFG | EGE3015FFG | — | EGE4015FFG | — |
| 16 | EGE2016FFG | EGE3016FFG | — | EGE4016FFG | — |
| 20 | EGE2020FFG | EGE3020FFG | — | EGE4020FFG | EGE4020AFG |
| 25 | EGE2025FFG | EGE3025FFG | EGE3025AFG | EGE4025FFG | EGE4025AFG |
| 30 | EGE2030FFG | EGE3030FFG | — | EGE4030FFG | — |
| 32 | EGE2032FFG | EGE3032FFG | EGE3032AFG | EGE4032FFG | EGE4032AFG |
| 35 | EGE2035FFG | EGE3035FFG | — | EGE4035FFG | — |
| 40 | EGE2040FFG | EGE3040FFG | EGE3040AFG | EGE4040FFG | EGE4040AFG |
| 45 | EGE2045FFG | EGE3045FFG | EGE3050AFG | EGE4045FFG | — |
| 50 | EGE2050FFG | EGE3050FFG | — | EGE4050FFG | EGE4050AFG |
| 60 | EGE2060FFG | EGE3060FFG | — | EGE4060FFG | — |
| 63 | EGE2063FFG | EGE3063FFG | EGE3063AFG | EGE4063FFG | EGE4063AFG |
| 70 | EGE2070FFG | EGE3070FFG | — | EGE4070FFG | — |
| 80 | EGE2080FFG | EGE3080FFG | EGE3080AFG | EGE4080FFG | EGE4080AFG |
| 90 | EGE2090FFG | EGE3090FFG | — | EGE4090FFG | — |
| 100 | EGE2100FFG | EGE3100FFG | EGE3100AFG | EGE4100FFG | EGE4100AFG |
| 125 | EGE2125FFG | EGE3125FFG | EGE3125AFG | EGE4125FFG | EGE4125AFG |
| 160 | — | EGE3160FFG | EGE3160AFG | EGE4160FFG | EGE4160AFG |

Notes

- ① 16, 32, 63 and 160 A are not UL listed ratings.
- ② Adjustable thermal are not UL listed.
- ③ Change the fourth digit to 7 for 100% neutral protection. Neutral is on the LH side.

EG-Frame



EG-Frame—40/35

| Maximum Continuous Amps at 40 °C ^① | Single-Pole | Two-Pole | Three-Pole | Adjustable Thermal, Fixed Magnetic ^② Catalog Number | Four-Pole ^③ | Adjustable ^② Thermal, Fixed Magnetic Catalog Number |
|---|---|---|---|---|---|--|
| | Fixed Thermal, Fixed Magnetic Catalog Number | Fixed Thermal, Fixed Magnetic Catalog Number | Fixed Thermal, Fixed Magnetic Catalog Number | | Fixed Thermal, Fixed Magnetic Catalog Number | |
| 15 | EGS1015FFG | EGS2015FFG | EGS3015FFG | — | EGS4015FFG | — |
| 16 | EGS1016FFG | EGS2016FFG | EGS3016FFG | — | EGS4016FFG | — |
| 20 | EGS1020FFG | EGS2020FFG | EGS3020FFG | — | EGS4020FFG | EGS4020AFG |
| 25 | EGS1025FFG | EGS2025FFG | EGS3025FFG | EGS3025AFG | EGS4025FFG | EGS4025AFG |
| 30 | EGS1030FFG | EGS2030FFG | EGS3030FFG | — | EGS4030FFG | — |
| 32 | EGS1032FFG | EGS2032FFG | EGS3032FFG | EGS3032AFG | EGS4032FFG | EGS4032AFG |
| 35 | EGS1035FFG | EGS2035FFG | EGS3035FFG | — | EGS4035FFG | — |
| 40 | EGS1040FFG | EGS2040FFG | EGS3040FFG | EGS3040AFG | EGS4040FFG | EGS4040AFG |
| 45 | EGS1045FFG | EGS2045FFG | EGS3045FFG | — | EGS4045FFG | — |
| 50 | EGS1050FFG | EGS2050FFG | EGS3050FFG | EGS3050AFG | EGS4050FFG | EGS4050AFG |
| 60 | EGS1060FFG | EGS2060FFG | EGS3060FFG | — | EGS4060FFG | — |
| 63 | EGS1063FFG | EGS2063FFG | EGS3063FFG | EGS3063AFG | EGS4063FFG | EGS4063AFG |
| 70 | EGS1070FFG | EGS2070FFG | EGS3070FFG | — | EGS4070FFG | — |
| 80 | EGS1080FFG | EGS2080FFG | EGS3080FFG | EGS3080AFG | EGS4080FFG | EGS4080AFG |
| 90 | EGS1090FFG | EGS2090FFG | EGS3090FFG | — | EGS4090FFG | — |
| 100 | EGS1100FFG | EGS2100FFG | EGS3100FFG | EGS3100AFG | EGS4100FFG | EGS4100AFG |
| 125 | EGS1125FFG | EGS2125FFG | EGS3125FFG | EGS3125AFG | EGS4125FFG | EGS4125AFG |
| 160 | — | — | EGS3160FFG | EGS3160AFG | EGS4160FFG | EGS4160AFG |

Notes

- ^① 16, 32, 63 and 160 A are not UL listed ratings.
^② Adjustable thermal are not UL listed.
^③ Change the fourth digit to 7 for 100% neutral protection. Neutral is on the LH side.

EG-Frame



EG-Frame—70/65

| Maximum Continuous Amps at 40 °C ^① | Single-Pole | Two-Pole | Three-Pole | Adjustable ^② Thermal, Fixed Magnetic Catalog Number | Four-Pole ^③ | Adjustable ^② Thermal, Fixed Magnetic Catalog Number |
|---|--|--|--|--|--|--|
| | Fixed Thermal, Fixed Magnetic Catalog Number | Fixed Thermal, Fixed Magnetic Catalog Number | Fixed Thermal, Fixed Magnetic Catalog Number | | Fixed Thermal, Fixed Magnetic Catalog Number | |
| 15 | EGH1015FFG | EGH2015FFG | EGH3015FFG | — | EGH4015FFG | — |
| 16 | EGH1016FFG | EGH2016FFG | EGH3016FFG | — | EGH4016FFG | — |
| 20 | EGH1020FFG | EGH2020FFG | EGH3020FFG | EGH3020AFG | EGH4020FFG | EGH4020AFG |
| 25 | EGH1025FFG | EGH2025FFG | EGH3025FFG | EGH3025AFG | EGH4025FFG | EGH4025AFG |
| 30 | EGH1030FFG | EGH2030FFG | EGH3030FFG | — | EGH4030FFG | — |
| 32 | EGH1032FFG | EGH2032FFG | EGH3032FFG | EGH3032AFG | EGH4032FFG | EGH4032AFG |
| 35 | EGH1035FFG | EGH2035FFG | EGH3035FFG | — | EGH4035FFG | — |
| 40 | EGH1040FFG | EGH2040FFG | EGH3040FFG | EGH3040AFG | EGH4040FFG | EGH4040AFG |
| 45 | EGH1045FFG | EGH2045FFG | EGH3045FFG | — | EGH4045FFG | EGH4050AFG |
| 50 | EGH1050FFG | EGH2050FFG | EGH3050FFG | EGH3050AFG | EGH4050FFG | — |
| 60 | EGH1060FFG | EGH2060FFG | EGH3060FFG | — | EGH4060FFG | — |
| 63 | EGH1063FFG | EGH2063FFG | EGH3063FFG | EGH3063AFG | EGH4063FFG | EGH4063AFG |
| 70 | EGH1070FFG | EGH2070FFG | EGH3070FFG | — | EGH4070FFG | — |
| 80 | EGH1080FFG | EGH2080FFG | EGH3080FFG | EGH3080AFG | EGH4080FFG | EGH4080AFG |
| 90 | EGH1090FFG | EGH2090FFG | EGH3090FFG | — | EGH4090FFG | — |
| 100 | EGH1100FFG | EGH2100FFG | EGH3100FFG | EGH3100AFG | EGH4100FFG | EGH4100AFG |
| 125 | EGH1125FFG | EGH2125FFG | EGH3125FFG | EGH3125AFG | EGH4125FFG | EGH4125AFG |

Notes

- ① 16, 32, 63A are not UL listed ratings.
- ② Adjustable thermal are not UL listed.
- ③ Change the fourth digit to 7 for 100% neutral protection. Neutral is on the LH side.

EG-Frame—100/100 Current Limiting (Single-Pole and Two-Pole Unavailable)

EG-Frame



EG-Frame — 100/100

| Maximum Continuous Amps at 40 °C ^① | Three-Pole | | Four-Pole 0% Protected Neutral ^③ | |
|---|--|--|--|--|
| | Fixed Thermal, Fixed Magnetic Catalog Number | Adjustable ^② Thermal, Fixed Magnetic Catalog Number | Fixed Thermal, Fixed Magnetic Catalog Number | Adjustable ^② Thermal, Fixed Magnetic Catalog Number |
| 15 | EGC3015FFG | — | EGC7015FFG | — |
| 16 | EGC3016FFG | — | EGC7016FFG | — |
| 20 | EGC3020FFG | EGC3020AFG | EGC7020FFG | EGC7020AFG |
| 25 | EGC3025FFG | EGC3025AFG | EGC7025FFG | EGC7025AFG |
| 30 | EGC3030FFG | — | EGC7030FFG | — |
| 32 | EGC3032FFG | EGC3032AFG | EGC7032FFG | EGC7032AFG |
| 35 | EGC3035FFG | — | EGC7035FFG | — |
| 40 | EGC3040FFG | EGC3040AFG | EGC7040FFG | EGC7040AFG |
| 45 | EGC3045FFG | — | EGC7045FFG | — |
| 50 | EGC3050FFG | EGC3050AFG | EGC7050FFG | EGC7050AFG |
| 60 | EGC3060FFG | — | EGC7060FFG | — |
| 63 | EGC3063FFG | EGC3063AFG | EGC7063FFG | EGC7063AFG |
| 70 | EGC3070FFG | — | EGC7070FFG | — |
| 80 | EGC3080FFG | EGC3080AFG | EGC7080FFG | EGC7080AFG |
| 90 | EGC3090FFG | — | EGC7090FFG | — |
| 100 | EGC3100FFG | EGC3100AFG | EGC7100FFG | EGC7100AFG |
| 125 | EGC3125FFG | EGC3125AFG | EGC7125FFG | EGC7125AFG |

Molded Case Switches ^④

Catalog Number

EGK3125KSG

EGK7125KSG

EGK3160KSG

EGK7160KSG

Notes

- ① 16, 32, 63A are not UL listed ratings.
- ② Adjustable thermal is not UL listed.
- ③ Change the fourth digit to 7 for 100% neutral protection. Neutral is on LH side.
- ④ Molded case switches may open above 1250 A.

2.3

Molded Case Circuit Breakers

Series G

EG Bolt-On Complete Breaker (Includes Frame, Trip Unit and Mounting Hardware)

2

EG-Frame

EG-Frame—18 kAIC at 480 Vac



| Maximum Continuous Amps at 40 °C | Single-Pole Fixed Thermal, Fixed Magnetic Catalog Number ① | Two-Pole Fixed Thermal, Fixed Magnetic Catalog Number ② | Three-Pole Fixed Thermal, Fixed Magnetic Catalog Number ③ |
|----------------------------------|--|---|---|
| 15 | EGB1015FFB | EGB2015FFB | EGB3015FFB |
| 20 | EGB1020FFB | EGB2020FFB | EGB3020FFB |
| 25 | EGB1025FFB | EGB2025FFB | EGB3025FFB |
| 30 | EGB1030FFB | EGB2030FFB | EGB3030FFB |
| 35 | EGB1035FFB | EGB2035FFB | EGB3035FFB |
| 40 | EGB1040FFB | EGB2040FFB | EGB3040FFB |
| 45 | EGB1045FFB | EGB2045FFB | EGB3045FFB |
| 50 | EGB1050FFB | EGB2050FFB | EGB3050FFB |
| 60 | EGB1060FFB | EGB2060FFB | EGB3060FFB |
| 70 | EGB1070FFB | EGB2070FFB | EGB3070FFB |
| 80 | EGB1080FFB | EGB2080FFB | EGB3080FFB |
| 90 | EGB1090FFB | EGB2090FFB | EGB3090FFB |
| 100 | EGB1100FFB | EGB2100FFB | EGB3100FFB |
| 110 | EGB1110FFB | EGB2110FFB | EGB3110FFB |
| 125 | EGB1125FFB | EGB2125FFB | EGB3125FFB |

EG-Frame

EG-Frame—35 kAIC at 480 Vac



| Maximum Continuous Amps at 40 °C | Single-Pole Fixed Thermal, Fixed Magnetic Catalog Number ① | Two-Pole Fixed Thermal, Fixed Magnetic Catalog Number ② | Three-Pole Fixed Thermal, Fixed Magnetic Catalog Number ③ |
|----------------------------------|--|---|---|
| 15 | EGS1015FFB | EGS2015FFB | EGS3015FFB |
| 20 | EGS1020FFB | EGS2020FFB | EGS3020FFB |
| 25 | EGS1025FFB | EGS2025FFB | EGS3025FFB |
| 30 | EGS1030FFB | EGS2030FFB | EGS3030FFB |
| 35 | EGS1035FFB | EGS2035FFB | EGS3035FFB |
| 40 | EGS1040FFB | EGS2040FFB | EGS3040FFB |
| 45 | EGS1045FFB | EGS2045FFB | EGS3045FFB |
| 50 | EGS1050FFB | EGS2050FFB | EGS3050FFB |
| 60 | EGS1060FFB | EGS2060FFB | EGS3060FFB |
| 70 | EGS1070FFB | EGS2070FFB | EGS3070FFB |
| 80 | EGS1080FFB | EGS2080FFB | EGS3080FFB |
| 90 | EGS1090FFB | EGS2090FFB | EGS3090FFB |
| 100 | EGS1100FFB | EGS2100FFB | EGS3100FFB |
| 110 | EGS1110FFB | EGS2110FFB | EGS3110FFB |
| 125 | EGS1125FFB | EGS2125FFB | EGS3125FFB |

Notes

- ① For bulk pack 24, add suffix BP24 and order quantities of 24.
- ② For bulk pack 12, add suffix BP12 and order quantities of 12.
- ③ For bulk pack 8, add suffix BP8 and order quantities of 8.

EG-Frame



EG-Frame—65 kAIC at 480 Vac

| Maximum Continuous Amps at 40 °C | Single-Pole Fixed Thermal, Fixed Magnetic Catalog Number ^① | Two-Pole Fixed Thermal, Fixed Magnetic Catalog Number ^② | Three-Pole Fixed Thermal, Fixed Magnetic Catalog Number ^③ |
|----------------------------------|---|--|--|
| 15 | EGH1015FFB | EGH2015FFB | EGH3015FFB |
| 20 | EGH1020FFB | EGH2020FFB | EGH3020FFB |
| 25 | EGH1025FFB | EGH2025FFB | EGH3025FFB |
| 30 | EGH1030FFB | EGH2030FFB | EGH3030FFB |
| 35 | EGH1035FFB | EGH2035FFB | EGH3035FFB |
| 40 | EGH1040FFB | EGH2040FFB | EGH3040FFB |
| 45 | EGH1045FFB | EGH2045FFB | EGH3045FFB |
| 50 | EGH1050FFB | EGH2050FFB | EGH3050FFB |
| 60 | EGH1060FFB | EGH2060FFB | EGH3060FFB |
| 70 | EGH1070FFB | EGH2070FFB | EGH3070FFB |
| 80 | EGH1080FFB | EGH2080FFB | EGH3080FFB |
| 90 | EGH1090FFB | EGH2090FFB | EGH3090FFB |
| 100 | EGH1100FFB | EGH2100FFB | EGH3100FFB |
| 110 | EGH1110FFB | EGH2110FFB | EGH3110FFB |
| 125 | EGH1125FFB | EGH2125FFB | EGH3125FFB |

Load Terminals

| Maximum Breaker Amps | Terminal, Body Material | Wire Type | Metric Wire Range mm ² | AWG Wire Range | (Package of Three Terminals) Catalog Number |
|---|-------------------------|-----------|-----------------------------------|----------------|---|
| Standard Cu/Al Pressure Type Terminals | | | | | |
| 15–50 | Aluminum | Cu/Al | 2.5–50 | #14–1/0 | 3TA125EF |
| 60–125 | Aluminum | Cu/Al | 16–70 | #6–3/0 | 3TA150EF |

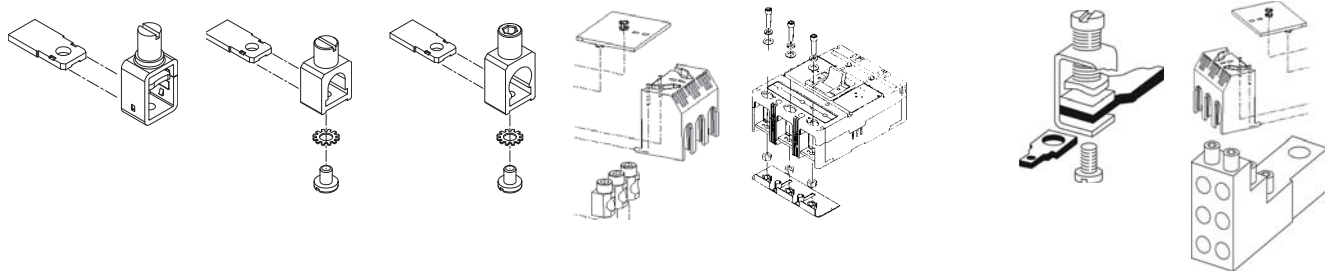
Notes

- ① For bulk pack 24, add suffix BP24 and order quantities of 24.
 ② For bulk pack 12, add suffix BP12 and order quantities of 12.
 ③ For bulk pack 8, add suffix BP8 and order quantities of 8.

Accessories Selection Guide and Ordering Information

2

EG-Frame



| | | | | | | |
|---------|----------|----------|-----------|--|---------------------------------------|-------------------------|
| 3T125EF | 3TA125EF | 3TA150EF | 3TA160EFK | EF2RTWK, Two-Pole–Metric EF3RTWK, Three-Pole–Metric EF4RTWK, Four-Pole–Metric EF2RTDK, Two-Pole–Imperial EF3RTDK, Three-Pole–Imperial EF4RTDK, Four-Pole–Imperial | Control Wire Terminal Kit GCWTK | Multiwire Connectors |
|---------|----------|----------|-----------|--|---------------------------------------|-------------------------|

Line and Load Terminals

| Maximum Breaker Amps | Terminal Body Material | Wire Type | Metric Wire Range mm ² | AWG Wire Range | (Package of Three Terminals) Catalog Number |
|---|------------------------------|-----------|--------------------------------------|-------------------|--|
| Standard Cu/Al Pressure Type Terminals | | | | | |
| 125 | Steel | Al | 4–6 | #14-3/0 | 3T125EF ① |
| 125 | Steel | Cu | 2.5–95 | #14-3/0 | 3T125EF ① |
| 125 | Aluminum | Cu/Al | 2.5–50 | #14-1/0 | 3TA125EF |
| 160 | Aluminum | Cu/Al | 16–70 | #6-3/0 | 3TA150EF |
| 160 | Aluminum | Cu/Al | 35–120 | #3-250 | 3TA160EFK |
| 160 | Aluminum | Cu/Al | 35–120 | #3-250 | 4TA160EFK ② |

EG-Frame circuit breakers and molded case switches have line and load terminals as standard equipment.

Insert collar enclosing conductor as shown. Locate nut on top of conductor and tighten securely with screw and washer.

Caution: Collar must surround conductor.

Insert collar enclosing conductor and center on extrusion. Tighten securely with screw and washer. Endcap kits are used on the E-Frame breaker line side to connect busbar or similar electrical connections. Includes hardware.

Notes

- ① Standard line and load terminals.
- ② Four-pole kit with four terminals.

Control Wire Terminal Kit

| | Catalog Number |
|-----------------------------------|----------------|
| Control wire terminal kit | 5652B38G01 |
| Package of 12—priced individually | |

For use with steel or stainless steel standard line and load terminals only.

Interphase Barriers

| | Catalog Number |
|-----------------------------------|----------------|
| Interphase barriers | EIPBK |
| Package of 12—priced individually | |

The interphase barrier is available for extended insulation between circuit breaker poles. Specify quantity when ordering.

Base Mounting Hardware—DIN Rail Mounting

| | Catalog Number |
|--------------------------------------|----------------|
| DIN rail adapter—single-pole | EF1DIN |
| DIN rail adapter—two-pole | EGDIN |
| DIN rail adapter—three- or four-pole | EF34DIN |
| Metal DIN rail adapter—three-pole | EGDDIN |

Metric base mounting hardware is included with a circuit breaker or molded case switch. (Included with breaker.) If required separately, order S/N 8703C80G08.

Note: English mounting hardware kit can be supplied separate. Catalog number is **BMHE #6-32** x 3 inches for two-, three- and four-pole. Single-pole mounting hardware metric order **8703C80G11**. English hardware **8703C80G12**. Both sold in quantities of 100.

Terminal Shields

The terminal shield is available for line terminal areas in three- and four-pole circuit breakers. Special terminal shields are also available for use when an electrical (solenoid) operator is mounted on the circuit breaker. The standard style number by pole for each terminal shield is for a package of 10 and is priced per each package. Special terminal shields are packaged individually.

Terminal Shields—IP30 Protection

| Number of Poles | Catalog Number |
|-----------------|----------------|
| 3 | EFTS3K |
| 4 | EFTS4K |

Terminal End Covers (Gas Barrier)

The terminal end cover is available for three-pole circuit breakers only. Two conductor opening sizes are available. Specify quantity (one per circuit breaker) when ordering.

Terminal End Covers

| Conductor Opening Diameter Inches (mm) | Catalog Number |
|--|----------------|
| 6.35 (0.25) | EEC3K |
| 10.41 (0.41) | EEC4K |

Multiwire Connectors

Field-installed multiwire connectors for the load side (OFF) end terminals. They are used to distribute the load from the circuit breaker to multiple devices without the use of separate distribution terminal blocks.

Multiwire lug kits include mounting hardware, terminal shield insulators and tin-plated aluminum connectors to replace three mechanical load lugs. UL listed as used on the load side (OFF) end.

EG-Frame Multiwire Connectors Ordering Information (Package of 3) ^①

| Maximum Amperes | Wires per Terminal | Wire Size Range AWG Cu | Kit Catalog Number |
|-----------------|--------------------|------------------------|--------------------|
| 125 | 3 | 14-2 | 3TA125E3K |
| 125 | 6 | 14-6 | 3TA125E6K |

Note

^① For four-pole kit, change "3" at beginning of catalog number to "4."

Accessories

2

Allowable Accessory Combinations

Different combinations of accessories can be supplied, depending on the types of accessories and the number of poles in the circuit breaker.

EG-Frame Accessories

| Description | Reference Page | Single-Pole | | | Two-Pole | | | Three-Pole | | | Four-Pole | | | Neutral |
|---|----------------|-------------|------|-------|----------|--------|-------|------------|--------|-------|-----------|--------|-------|---------|
| | | Center | Left | Right | Left | Center | Right | Left | Center | Right | Left | Center | Right | |
| Internal Accessories (Only one internal accessory per pole) | | | | | | | | | | | | | | |
| Alarm lockout (Make/Break) | V4-T2-211 | — | — | ■ | — | — | ■ | — | — | ■ | — | — | ■ | — |
| Alarm lockout (2Make/2Break) | V4-T2-211 | — | — | ■ | — | — | ■ | — | — | ■ | — | — | ■ | — |
| Auxiliary switch (1A, 1B) | V4-T2-211 | — | — | ■ | — | — | ■ | — | — | ■ | — | — | ■ | — |
| Auxiliary switch (2A, 2B) | V4-T2-211 | — | — | ■ | — | — | ■ | — | — | ■ | — | — | ■ | — |
| Auxiliary switch and alarm switch combination | V4-T2-211 | — | — | ■ | — | — | ■ | — | — | ■ | — | — | ■ | — |
| Shunt trip—standard | V4-T2-211 | — | — | — | ■ | — | — | ■ | — | — | — | — | — | — |
| Undervoltage release mechanism | V4-T2-212 | — | — | — | ■ | — | — | ■ | — | — | — | — | — | — |
| External Accessories | | | | | | | | | | | | | | |
| End cap kit | V4-T2-127 | — | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● |
| Control wire terminal kit | V4-T2-127 | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● |
| Multiwire connectors | V4-T2-127 | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● |
| Base mounting hardware | V4-T2-127 | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● |
| Terminal shields | V4-T2-127 | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● |
| Terminal end covers | V4-T2-127 | — | — | — | ● | ● | ● | — | — | — | — | — | — | — |
| Interphase barriers | V4-T2-127 | — | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● |
| Non-padlockable handle block | V4-T2-209 | ■ | ■ | — | — | ■ | — | — | — | ■ | — | — | — | — |
| Snap-on padlockable handle lock hasp | V4-T2-209 | ■ | ■ | — | — | ■ | — | — | — | ■ | — | — | — | — |
| Padlockable handle lock hasp | V4-T2-209 | — | — | ■ | □ | — | □ | □ | — | □ | — | □ | — | — |
| Walking beam interlock—requires two breakers | V4-T2-209 | — | — | — | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● |
| Plug-in adapters | V4-T2-209 | — | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● |
| Electrical operator | V4-T2-209 | — | — | — | ● | ● | ● | — | — | — | — | — | — | — |
| Handle mechanisms | V4-T2-494 | — | — | — | ● | ● | ● | — | — | — | — | — | — | — |
| Modifications (Refer to Eaton) | | | | | | | | | | | | | | |
| Moisture fungus treatment | V4-T2-207 | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● |
| Freeze-tested circuit breakers | — | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● |
| Marine/naval application, UL 489 Supplement SA and SB | — | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● |

Legend

- Applicable in indicated pole position
- May be mounted on left or right pole—not both
- Accessory available/modification available

Technical Data and Specifications

UL 489/IEC 60947-2 Interrupting Capacity (Symmetrical Amperes) (kA) Ratings

| Circuit Breaker Type | Number of Poles | Volts AC (50/60 Hz) | | | | | | | | | | Volts DC ^① | | | | | |
|----------------------|-----------------|---------------------|-----------------|-----------------|-----|-----|-----------------|-----------------|-----|----------|-----------------|-----------------------|-----------------|-----------------|-----------------|-------------------|----|
| | | 220–240 | | | | | 380–415 | | | | | 690 ^② | | 125 | | 250 ^{③④} | |
| | | 120 | I _{CU} | I _{CS} | 277 | 347 | I _{CU} | I _{CS} | 480 | 600Y/347 | I _{CU} | I _{CS} | I _{CU} | I _{CS} | I _{CU} | I _{CS} | |
| EGB125 | 1 | 35 | 25 | 25 | 18 | — | — | — | — | — | — | — | — | 10 | 10 | — | — |
| | 2, 3, 4 | — | 25 | 25 | — | — | 18 | 18 | 18 | — | — | — | — | — | — | 10 | 10 |
| EGE125 | 2, 3, 4 | — | 35 | 35 | — | — | 25 | 25 | 25 | 18 | — | — | — | — | — | 10 | 10 |
| | 1 | 100 | 85 | 43 | 35 | 22 | — | — | — | — | — | — | — | 35 | 35 | — | — |
| EGS125 | 2, 3, 4 | — | 85 | 43 | — | — | 40 | 30 | 35 | 22 | — | — | — | — | — | 35 | 35 |
| | 1 | 200 | 100 | 50 | 65 | 25 | — | — | — | — | — | — | — | 42 | 42 | — | — |
| EGH125 | 2, 3, 4 | — | 100 | 50 | — | — | 70 | 35 | 65 | 25 | — | — | — | — | — | 42 | 42 |
| | 3, 4 | — | 200 | 200 | — | — | 100 | 100 | 100 | 35 | — | — | — | — | — | 42 | 42 |
| EGC125 ^⑤ | 3, 4 | — | 200 | 200 | — | — | 100 | 100 | 100 | 35 | — | — | — | — | — | 42 | 42 |
| | 3, 4 | — | 25 | 25 | — | — | 18 | 18 | 18 | — | — | — | — | — | — | 10 | 10 |
| EGB160 ^② | 3, 4 | — | 25 | 25 | — | — | 18 | 18 | 18 | — | — | — | — | — | — | 10 | 10 |
| | 3, 4 | — | 35 | 35 | — | — | 25 | 25 | 25 | 18 | — | — | — | — | — | 10 | 10 |
| EGE160 ^② | 3, 4 | — | 35 | 35 | — | — | 25 | 25 | 25 | 18 | — | — | — | — | — | 10 | 10 |
| | 3, 4 | — | 85 | 43 | — | — | 40 | 30 | 35 | 22 | — | — | — | — | — | 35 | 35 |

UL 489 Current Limiting Data

| Frame | Circuit | I _p (kA) | I ² T (10 ⁶ A ² S) |
|-------|--------------|---------------------|---|
| EGC | 240 V/200 kA | 24.5 | 0.6310 |
| EGC | 480 V/100 kA | 24.5 | 0.6310 |
| EGC | 600 Y/35 kA | 20.0 | 1.392 |

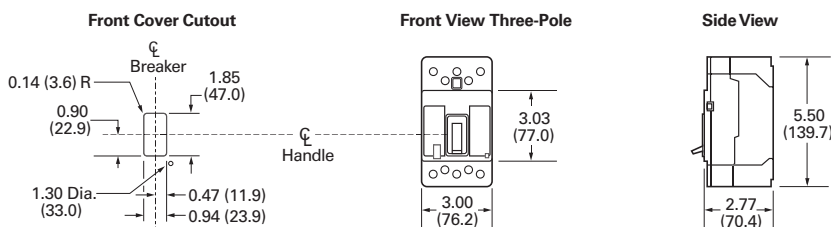
Dimensions and Weights

Approximate Dimensions in Inches (mm)

EG-Frame

| Number of Poles | Width | Height | Depth |
|-----------------|--------------|--------------|-------------|
| 1 | 1.00 (25.4) | 5.50 (139.7) | 2.99 (75.9) |
| 2 | 2.00 (50.8) | 5.50 (139.7) | 2.99 (75.9) |
| 3 | 3.00 (76.2) | 5.50 (139.7) | 2.99 (75.9) |
| 4 | 4.00 (101.6) | 5.50 (139.7) | 2.99 (75.9) |

EG-Frame



Approximate Shipping Weight in Lbs (kg)

EG-Frame

| EG Breaker Type | Number of Poles | | | |
|-----------------|-----------------|------------|------------|------------|
| | 1 | 2 | 3 | 4 |
| EGB125 | 1.5 (0.68) | 2.0 (0.91) | 3.0 (1.36) | 4.9 (1.82) |

Notes

- ① DC ratings apply to substantially non-inductive circuits.
- ② IEC only.
- ③ Two-pole circuit breaker, or two poles of three-pole circuit breaker.
- ④ Time constant is 3 milliseconds minimum at 10 kA and 8 milliseconds minimum at 42 kA.
- ⑤ Current limiting per UL 489.

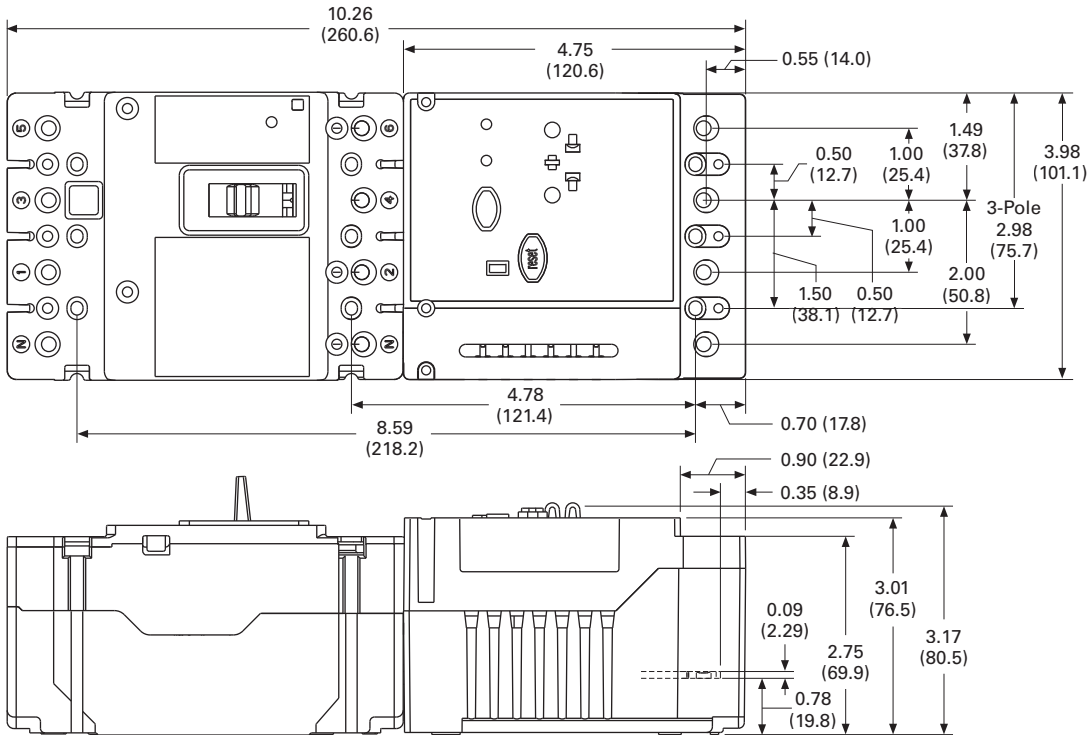
2.3

Molded Case Circuit Breakers

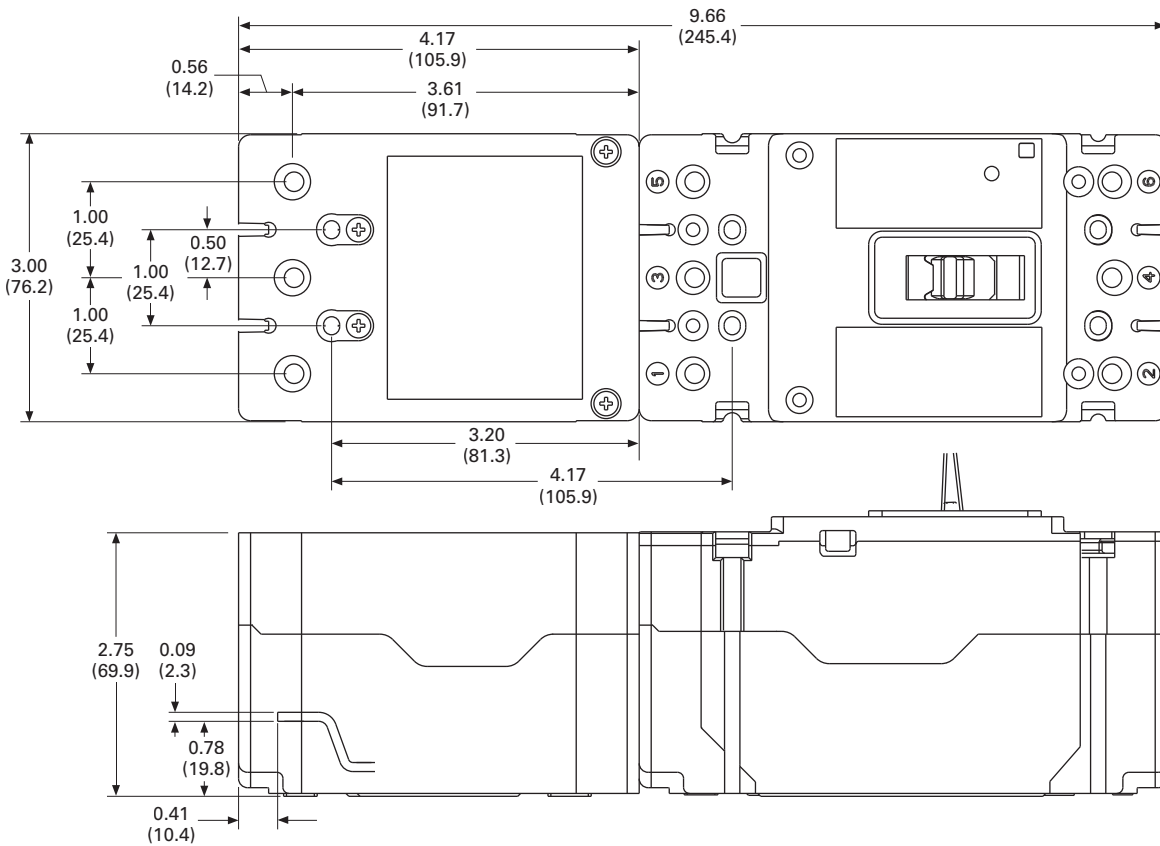
Series G

EG-Frame With Earth Leakage Module

2



EG-Frame With Current Limiter Module



JG-Frame (63–250 Amperes)**JG-Frame (63–250 Amperes)****Product Description**

JG breaker is HACR rated.

Contents

| Description | Page |
|--|------------------|
| EG-Frame (15–125 Amperes) | V4-T2-117 |
| JG-Frame (63–250 Amperes) Catalog Number Selection | V4-T2-132 |
| Product Selection | V4-T2-133 |
| Accessories | V4-T2-144 |
| Technical Data and Specifications | V4-T2-145 |
| Dimensions and Weights | V4-T2-147 |
| LG-Frame (250–630 Amperes) | V4-T2-149 |
| NG-Frame (320–1200 Amperes) | V4-T2-167 |
| RG-Frame (800–2500 Amperes) | V4-T2-176 |
| Motor Circuit Protectors (MCP) | V4-T2-187 |
| Motor Protector Circuit Breakers (MPCB) | V4-T2-191 |
| 30 mA Ground Fault (Earth Leakage) Module | V4-T2-194 |
| Current Limiting Circuit Breaker Module | V4-T2-198 |
| High Instantaneous Circuit Breaker for Selective Coordination | V4-T2-203 |
| Special Features and Accessories | V4-T2-206 |
| Motor Operators | V4-T2-214 |
| Plug-In Blocks | V4-T2-216 |
| Drawout Cassette | V4-T2-217 |

2.3

Molded Case Circuit Breakers

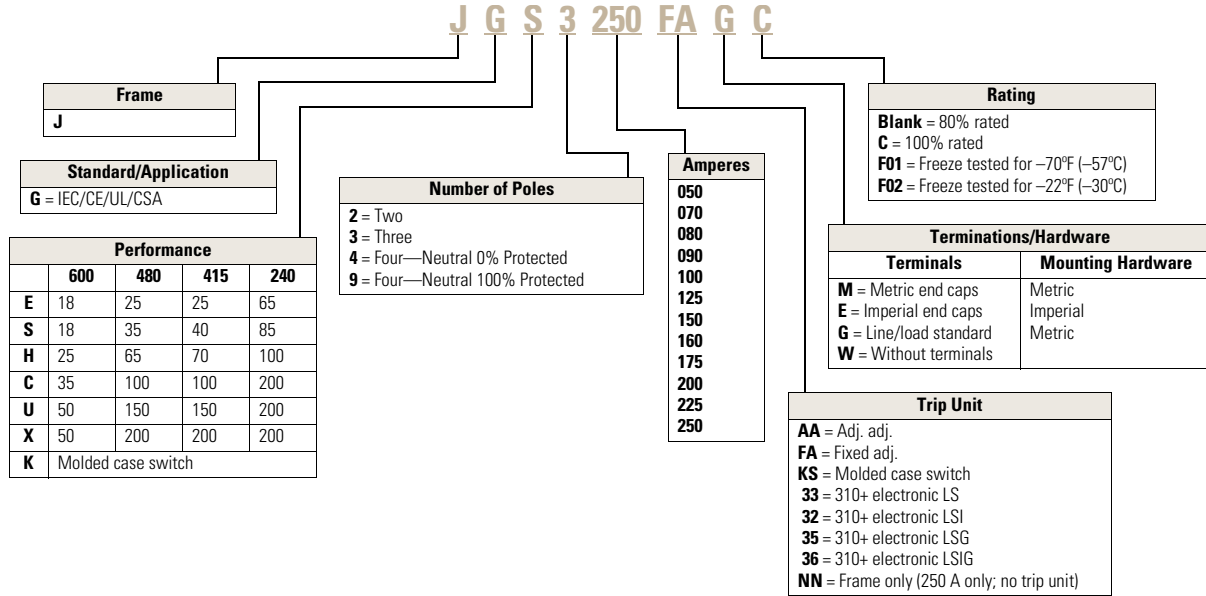
Series G

Catalog Number Selection

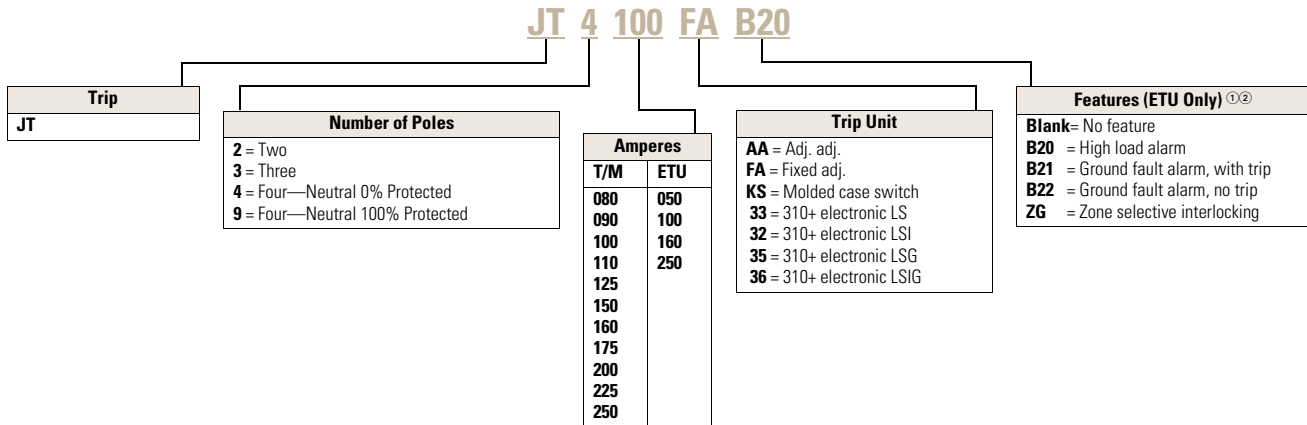
This information is presented only as an aid to understanding catalog numbers. It is not to be used to build catalog numbers for circuit breakers or trip units.

2

Series G—JG-Frame (63–250 Amperes)



Trip Unit



Notes

- ① Bxx features cannot be combined with other Bxx features.
- ② B21 and B22 available with LSG and LSIG trip units.

Product Selection

Complete Breaker (Includes Frame, Trip Unit, Standard Terminals and Mounting Hardware)—IC Rating at 415/480 Volts

JG-Frame



JG-Frame—IEC/CE/UL/CSA—25/25

| Maximum Continuous Amperes | Magnetic Range | Two-Pole | Three-Pole | Adjustable Thermal, Adjustable Magnetic ^① | Four-Pole 0% ^② | Adjustable Thermal, Adjustable Magnetic ^① |
|----------------------------|----------------|--|--|--|--|--|
| | | Fixed Thermal, Adjustable Magnetic Catalog Number | Fixed Thermal, Adjustable Magnetic Catalog Number | | Fixed Thermal, Adjustable Magnetic Catalog Number | |
| 70 | 350–700 | JGE2070FAG | JGE3070FAG | — | JGE4070FAG | — |
| 90 | 450–900 | JGE2090FAG | JGE3090FAG | — | JGE4090FAG | — |
| 100 | 500–1000 | JGE2100FAG | JGE3100FAG | JGE3100AAG | JGE4100FAG | JGE4100AAG |
| 125 | 625–1250 | JGE2125FAG | JGE3125FAG | JGE3125AAG | JGE4125FAG | JGE4125AAG |
| 150 | 750–1550 | JGE2150FAG | JGE3150FAG | — | JGE4150FAG | — |
| 160 | 800–1600 | — | — | JGE3160AAG | — | JGE4160AAG |
| 175 | 875–1750 | JGE2175FAG | JGE3175FAG | — | JGE4175FAG | — |
| 200 | 1000–2000 | JGE2200FAG | JGE3200FAG | JGE3200AAG | JGE4200FAG | JGE4200AAG |
| 225 | 1125–2250 | JGE2225FAG | JGE3225FAG | — | JGE4225FAG | — |
| 250 | 1250–2500 | JGE2250FAG | JGE3250FAG | JGE3250AAG | JGE4250FAG | JGE4250AAG |

JG-Frame



JG-Frame—IEC/CE/UL/CSA—40/35, Two-Pole

| Maximum Continuous Amperes | Magnetic Range | Two-Pole | Three-Pole | Adjustable Thermal, Adjustable Magnetic ^① | Four-Pole 0% ^② | Adjustable Thermal, Adjustable Magnetic ^① |
|----------------------------|----------------|--|--|--|--|--|
| | | Fixed Thermal, Adjustable Magnetic Catalog Number | Fixed Thermal, Adjustable Magnetic Catalog Number | | Fixed Thermal, Adjustable Magnetic Catalog Number | |
| 70 | 350–700 | JGS2070FAG | JGS3070FAG | — | JGS4070FAG | — |
| 90 | 450–900 | JGS2090FAG | JGS3090FAG | — | JGS4090FAG | — |
| 100 | 500–1000 | JGS2100FAG | JGS3100FAG | JGS3100AAG | JGS4100FAG | JGS4100AAG |
| 125 | 625–1250 | JGS2125FAG | JGS3125FAG | JGS3125AAG | JGS4125FAG | JGS4125AAG |
| 150 | 750–1550 | JGS2150FAG | JGS3150FAG | — | JGS4150FAG | — |
| 160 | 800–1600 | — | — | JGS3160AAG | — | JGS4160AAG |
| 175 | 875–1750 | JGS2175FAG | JGS3175FAG | — | JGS4175FAG | — |
| 200 | 1000–2000 | JGS2200FAG | JGS3200FAG | JGS3200AAG | JGS4200FAG | JGS4200AAG |
| 225 | 1125–2250 | JGS2225FAG | JGS3225FAG | — | JGS4225FAG | — |
| 250 | 1250–2500 | JGS2250FAG | JGS3250FAG | JGS3250AAG | JGS4250FAG | JGS4250AAG |

Notes

- ^① EC-EN 60947-2 only. Adjustment is 0.8 and 1.0.
^② 9 for 0–100% neutral protection. Neutral is on LH side.

JG-Frame



JG-Frame—IEC/CE/UL/CSA—70/65

| Maximum Continuous Amperes | Magnetic Range | Two-Pole Fixed Thermal, Adjustable Magnetic Catalog Number | Three-Pole Fixed Thermal, Adjustable Magnetic Catalog Number | Adjustable Thermal, Fixed Magnetic ^① Catalog Number | Four-Pole 0% ^② Fixed Thermal, Adjustable Magnetic Catalog Number | Adjustable Thermal, Fixed Magnetic ^① Catalog Number |
|----------------------------|----------------|--|--|--|---|--|
| 70 | 350–700 | JGH2070FAG | JGH3070FAG | — | JGH4070FAG | — |
| 90 | 450–900 | JGH2090FAG | JGH3090FAG | — | JGH4090FAG | — |
| 100 | 500–1000 | JGH2100FAG | JGH3100FAG | JGH3100AAG | JGH4100FAG | JGH4100AAG |
| 125 | 625–1250 | JGH2125FAG | JGH3125FAG | JGH3125AAG | JGH4125FAG | JGH4125AAG |
| 150 | 750–1550 | JGH2150FAG | JGH3150FAG | — | JGH4150FAG | — |
| 160 | 800–1600 | — | — | JGH3160AAG | — | JGH4160AAG |
| 175 | 875–1750 | JGH2175FAG | JGH3175FAG | — | JGH4175FAG | — |
| 200 | 1000–2000 | JGH2200FAG | JGH3200FAG | JGH3200AAG | JGH4200FAG | JGH4200AAG |
| 225 | 1125–2250 | JGH2225FAG | JGH3225FAG | — | JGH4225FAG | — |
| 250 | 1250–2500 | JGH2250FAG | JGH3250FAG | JGH3250AAG | JGH4250FAG | JGH4250AAG |

Notes

^① EC-EN 60947-2 only. Adjustment is 0.8 and 1.0.

^② 9 for 0–100% neutral protection. Neutral is on LH side.

Two-Pole not available in IEC/CE/UL/CSA 100/100, 150/150

JG-Frame



JG-Frame—IEC/CE/UL/CSA—100/100, Current Limiting

| Maximum Continuous Amperes | Magnetic Range | Three-Pole | | Four-Pole 0% ^② | |
|----------------------------|----------------|---|---|---|---|
| | | Fixed Thermal, Adjustable Magnetic Catalog Number | Adjustable Thermal, Adjustable Magnetic ^① Catalog Number | Fixed Thermal, Adjustable Magnetic Catalog Number | Adjustable Thermal, Adjustable Magnetic ^① Catalog Number |
| 70 | 350–700 | JGC3070FAG | — | JGC4070FAG | — |
| 80 | 400–800 | — | JGC3080AAG | — | JGC4080AAG |
| 90 | 450–900 | JGC3090FAG | — | JGC4090FAG | — |
| 100 | 500–1000 | JGC3100FAG | JGC3100AAG | JGC4100FAG | JGC4100AAG |
| 125 | 625–1250 | JGC3125FAG | JGC3125AAG | JGC4125FAG | JGC4125AAG |
| 150 | 750–1550 | JGC3150FAG | — | JGC4150FAG | — |
| 160 | 800–1600 | — | JGC3160AAG | — | JGC4160AAG |
| 175 | 875–1750 | JGC3175FAG | — | JGC4175FAG | — |
| 200 | 1000–2000 | JGC3200FAG | JGC3200AAG | JGC4200FAG | JGC4200AAG |
| 225 | 1125–2250 | JGC3225FAG | — | JGC4225FAG | — |
| 250 | 1250–2500 | JGC3250FAG | JGC3250AAG | JGC4250FAG | JGC4250AAG |

JG-Frame



JG-Frame—IEC/CE/UL/CSA—150/150, Current Limiting

| Maximum Continuous Amperes | Magnetic Range | Three-Pole | | Four-Pole 0% ^② | |
|----------------------------|----------------|---|---|---|---|
| | | Fixed Thermal, Adjustable Magnetic Catalog Number | Adjustable Thermal, Adjustable Magnetic ^① Catalog Number | Fixed Thermal, Adjustable Magnetic Catalog Number | Adjustable Thermal, Adjustable Magnetic ^① Catalog Number |
| 70 | 350–700 | JGU3070FAG | — | JGU4070FAG | — |
| 80 | 400–800 | — | JGU3080AAG | — | JGU4080AAG |
| 90 | 450–900 | JGU3090FAG | — | JGU4090FAG | — |
| 100 | 500–1000 | JGU3100FAG | JGU3100AAG | JGU4100FAG | JGU4100AAG |
| 125 | 625–1250 | JGU3125FAG | JGU3125AAG | JGU4125FAG | JGU4125AAG |
| 150 | 750–1550 | JGU3150FAG | — | JGU4150FAG | — |
| 160 | 800–1600 | — | JGU3160AAG | — | JGU4160AAG |
| 175 | 875–1750 | JGU3175FAG | — | JGU4175FAG | — |
| 200 | 1000–2000 | JGU3200FAG | JGU3200AAG | JGU4200FAG | JGU4200AAG |
| 225 | 1125–2250 | JGU3225FAG | — | JGU4225FAG | — |
| 250 | 1250–2500 | JGU3250FAG | JGU3250AAG | JGU4250FAG | JGU4250AAG |

Notes

- ① EC-EN 60947-2 only. Adjustment is 0.8 and 1.0.
 ② 9 for 0–100% neutral protection. Neutral is on LH side.

2.3

Molded Case Circuit Breakers

Series G

Two-Pole not available in IEC/CE/UL/CSA 200/200

2

JG-Frame



JG-Frame—IEC/CE/UL/CSA 200/200, Current Limiting

| Maximum Continuous Amperes | Magnetic Range | Three-Pole | | Four-Pole ^② | |
|----------------------------|----------------|---|---|---|---|
| | | Fixed Thermal, Adjustable Magnetic Catalog Number | Adjustable Thermal, Adjustable Magnetic ^① Catalog Number | Fixed Thermal, Adjustable Magnetic Catalog Number | Adjustable Thermal, Adjustable Magnetic ^① Catalog Number |
| 70 | 350–700 | JGX3070FAG | — | JGX4070FAG | — |
| 80 | 400–800 | — | JGX3080AAG | — | JGX4080AAG |
| 90 | 450–900 | JGX3090FAG | — | JGX4090FAG | — |
| 100 | 500–1000 | JGX3100FAG | JGX3100AAG | JGX4100FAG | JGX4100AAG |
| 125 | 625–1250 | JGX3125FAG | JGX3125AAG | JGX4125FAG | JGX4125AAG |
| 150 | 750–1550 | JGX3150FAG | — | JGX4150FAG | — |
| 160 | 800–1600 | — | JGX3160AAG | — | JGX4160AAG |
| 175 | 875–1750 | JGX3175FAG | — | JGX4175FAG | — |
| 200 | 1000–2000 | JGX3200FAG | JGX3200AAG | JGX4200FAG | JGX4200AAG |
| 225 | 1125–2250 | JGX3225FAG | — | JGX4225FAG | — |
| 250 | 1250–2500 | JGX3250FAG | JGX3250AAG | JGX4250FAG | JGX4250AAG |

Molded Case Switches ^③

Catalog Number

JGK3250KSG

JGK7250KSG

Notes

- ① EC-EN 60947-2 only. Adjustment is 0.8 and 1.0.
- ② 9 for 0–100% neutral protection. Neutral is on LH side.
- ③ Molded case switches will trip above 2500 amperes.

Frame—IC Rating at 415/480 Volts

| Maximum Amperes | Two-Pole Catalog Number | Three-Pole Catalog Number | Four-Pole 0% Catalog Number |
|---|-------------------------|---------------------------|-----------------------------|
| 25/25 | | | |
| 250 | JGE2250NN | JGE3250NN | JGE4250NN |
| 40/35 | | | |
| 250 | JGS2250NN | JGS3250NN | JGS4250NN |
| 70/65 | | | |
| 250 | JGH2250NN | JGH3250NN | JGH4250NN |
| 100/100 Current Limiting Per UL 489 | | | |
| 250 | — | JGC3250NN | JGC4250NN |
| 150/150 Current Limiting Per UL 489 | | | |
| 250 | — | JGU3250NN | JGU4250NN |
| 200/200 Current Limiting Per UL 489 | | | |
| 250 | — | JGX3250NN | JGX4250NN |
| 25/25 100% Rated Per UL 489 ^② | | | |
| 250 | — | JGE3250NNC | — |
| 40/35 100% Rated Per UL 489 ^② | | | |
| 250 | — | JGS3250NNC | — |
| 70/65 100% Rated Per UL 489 ^② | | | |
| 250 | — | JGH3250NNC | — |

Thermal-Magnetic Trip Unit

| Ampere Rating | Range | Catalog Number | | Range | Catalog Number | | Catalog Number |
|---------------|-----------|----------------|----------|-----------------------|----------------|----------|-----------------------|
| 70 | 350–700 | JT2070FA | JT3070FA | — | — | JT4070FA | — |
| 80 | 400–800 | — | JT3080FA | JT3080AA ^③ | 64–100 | — | JT4080AA ^③ |
| 90 | 450–900 | JT2090FA | JT3090FA | — | — | JT4090FA | — |
| 100 | 500–1000 | JT2100FA | JT3100FA | JT3100AA ^③ | 80–100 | JT4100FA | JT4100AA ^③ |
| 125 | 625–1250 | JT2125FA | JT3125FA | JT3125AA ^③ | 100–125 | JT4125FA | JT4125AA ^③ |
| 150 | 750–1550 | JT2150FA | JT3150FA | — | — | JT4150FA | — |
| 160 | 800–1600 | — | — | JT3160AA ^③ | 128–160 | — | JT4160AA ^③ |
| 175 | 875–1750 | JT2175FA | JT3175FA | — | — | JT4175FA | — |
| 200 | 1000–2000 | JT2200FA | JT3200FA | JT3200AA ^③ | 160–200 | JT4200FA | JT4200AA ^③ |
| 225 | 1125–2250 | JT2225FA | JT3225FA | — | — | JT4225FA | — |
| 250 | 1250–2500 | JT2250FA | JT3250FA | JT3250AA ^③ | 200–250 | JT4250FA | JT4250AA ^③ |

Notes

- ① Standard line and load terminals.
- ② Components—100% rated frame.
- ③ Adjustable thermal trip units are typically used in IEC markets and are not UL or CSA listed.

310+ Electronic Trip UnitsSee 310+ adjustability specifications on **Page V4-T2-146**.

2

JG 310+ Electronic Trip Units

| Ampere Rating | LS Catalog Number | LSI Catalog Number | LSG Catalog Number | LSIG Catalog Number | Neutral CT for LSG and LSIG ^① Catalog Number |
|--------------------------------|-------------------|--------------------|--------------------|---------------------|---|
| Three-Pole | | | | | |
| 50 | JT305033 | JT305032 | JT305035 | JT305036 | JGFCT050 |
| 100 | JT310033 | JT310032 | JT310035 | JT310036 | JGFCT100 |
| 160 | JT316033 | JT316032 | JT316035 | JT316036 | JGFCT160 |
| 250 | JT325033 | JT325032 | JT325035 | JT325036 | JGFCT250 |
| Four-Pole ^{②③} | | | | | |
| 50 | JT405033 | JT405032 | JT405035 | JT405036 | — |
| 100 | JT410033 | JT410032 | JT410035 | JT410036 | — |
| 160 | JT416033 | JT416032 | JT416035 | JT416036 | — |
| 250 | JT425033 | JT425032 | JT425035 | JT425036 | — |

310+ Electronic Trip Unit Accessories

| Description | Catalog Number |
|--|----------------|
| Electronic portable test kit | MTST230V |
| Trip unit tamper protection wire seal | 5108A03H01 |
| External neutral sensor (250 A) | JGFCT250 |
| External neutral sensor (160 A) | JGFCT160 |
| External neutral sensor (100 A) | JGFCT100 |
| External neutral sensor (80 A) | JGFCT050 |
| Breaker-mount cause-of-trip indication | TRIP-LED |
| Breaker-mount ammeter module | DIGIVIEW |
| Remote-mount ammeter module | DIGIVIEWR06 |

Notes

- ① For use on a three-pole breaker used in a four-wire system if ground fault protection for the neutral is required.
- ② Neutral protection 4 = 0%, 7 = 100% electronic trip unit neutral protection is not adjustable.
- ③ Four-pole breakers with LSG and LSIG trip units are only available with 0% neutral protection.

Complete Breaker with 310+ Electronic Trip UnitsSee 310+ adjustability specifications on **Page V4-T2-146**.**IEC/UL/CSA—25/25**

| Ampere Rating | LS Catalog Number | LSI Catalog Number | LSG Catalog Number | LSIG Catalog Number | Neutral CT for LSG and LSIG ^① Catalog Number |
|-------------------------------|-------------------|--------------------|--------------------|---------------------|---|
| Three-Pole | | | | | |
| 50 | JGE305033G | JGE305032G | JGE305035G | JGE305036G | JGFCT050 |
| 100 | JGE310033G | JGE310032G | JGE310035G | JGE310036G | JGFCT100 |
| 160 | JGE316033G | JGE316032G | JGE316035G | JGE316036G | JGFCT160 |
| 250 | JGE325033G | JGE325032G | JGE325035G | JGE325036G | JGFCT250 |
| Four-Pole ^② | | | | | |
| 50 | JGE405033G | JGE405032G | JGE405035G | JGE405036G | — |
| 100 | JGE410033G | JGE410032G | JGE410035G | JGE410036G | — |
| 160 | JGE416033G | JGE416032G | JGE416035G | JGE416036G | — |
| 250 | JGE425033G | JGE425032G | JGE425035G | JGE425036G | — |

IEC/UL/CSA—40/35

| Ampere Rating | LS Catalog Number | LSI Catalog Number | LSG Catalog Number | LSIG Catalog Number | Neutral CT for LSG and LSIG ^① Catalog Number |
|--------------------------------|-------------------|--------------------|--------------------|---------------------|---|
| Three-Pole | | | | | |
| 50 | JGS305033G | JGS305032G | JGS305035G | JGS305036G | JGFCT050 |
| 100 | JGS310033G | JGS310032G | JGS310035G | JGS310036G | JGFCT100 |
| 160 | JGS316033G | JGS316032G | JGS316035G | JGS316036G | JGFCT160 |
| 250 | JGS325033G | JGS325032G | JGS325035G | JGS325036G | JGFCT250 |
| Four-Pole ^{②③} | | | | | |
| 50 | JGS405033G | JGS405032G | JGS405035G | JGS405036G | — |
| 100 | JGS410033G | JGS410032G | JGS410035G | JGS410036G | — |
| 160 | JGS416033G | JGS416032G | JGS416035G | JGS416036G | — |
| 250 | JGS425033G | JGS425032G | JGS425035G | JGS425036G | — |

IEC/UL/CSA—70/65

| Ampere Rating | LS Catalog Number | LSI Catalog Number | LSG Catalog Number | LSIG Catalog Number | Neutral CT for LSG and LSIG ^① Catalog Number |
|-------------------------------|-------------------|--------------------|--------------------|---------------------|---|
| Three-Pole | | | | | |
| 50 | JGH305033G | JGH305032G | JGH305035G | JGH305036G | JGFCT050 |
| 100 | JGH310033G | JGH310032G | JGH310035G | JGH310036G | JGFCT100 |
| 160 | JGH316033G | JGH316032G | JGH316035G | JGH316036G | JGFCT160 |
| 250 | JGH325033G | JGH325032G | JGH325035G | JGH325036G | JGFCT250 |
| Four-Pole ^② | | | | | |
| 50 | JGH405033G | JGH405032G | JGH405035G | JGH405036G | — |
| 100 | JGH410033G | JGH410032G | JGH410035G | JGH410036G | — |
| 160 | JGH416033G | JGH416032G | JGH416035G | JGH416036G | — |
| 250 | JGH425033G | JGH425032G | JGH425035G | JGH425036G | — |

Notes^① Required for four-wire systems if neutral protection is required.^② Neutral protection 4 = 0%, 7 = 100% electronic trip unit neutral protection is not adjustable.^③ Four-pole breakers with LSG and LSIG trip units are only available with 0% neutral protection.

IEC/UL/CSA—100/100, Current Limiting Per UL 489

| Ampere Rating | LS Catalog Number | LSI Catalog Number | LSG Catalog Number | LSIG Catalog Number | Neutral CT for LSG and LSIG ^① Catalog Number |
|-------------------------------|-------------------------|--------------------------|--------------------------|---------------------------|--|
| Three-Pole | | | | | |
| 50 | JGC305033G | JGC305032G | JGC305035G | JGC305036G | JGFCT050 |
| 100 | JGC310033G | JGC310032G | JGC310035G | JGC310036G | JGFCT100 |
| 160 | JGC316033G | JGC316032G | JGC316035G | JGC316036G | JGFCT160 |
| 250 | JGC335033G | JGC325032G | JGC325035G | JGC325036G | JGFCT250 |
| Four-Pole ^② | | | | | |
| 50 | JGC405033G | JGC405032G | JGC405035G | JGC405036G | — |
| 100 | JGC410033G | JGC410032G | JGC410035G | JGC410036G | — |
| 160 | JGC416033G | JGC416032G | JGC416035G | JGC416036G | — |
| 250 | JGC435033G | JGC425032G | JGC425035G | JGC425036G | — |

IEC/UL/CSA—150/150, Current Limiting Per UL 489

| Ampere Rating | LS Catalog Number | LSI Catalog Number | LSG Catalog Number | LSIG Catalog Number | Neutral CT for LSG and LSIG ^① Catalog Number |
|--------------------------------|-------------------------|--------------------------|--------------------------|---------------------------|--|
| Three-Pole | | | | | |
| 50 | JGU305033G | JGU305032G | JGU305035G | JGU305036G | JGFCT050 |
| 100 | JGU310033G | JGU310032G | JGU310035G | JGU310036G | JGFCT100 |
| 160 | JGU316033G | JGU316032G | JGU316035G | JGU316036G | JGFCT160 |
| 250 | JGU335033G | JGU325032G | JGU325035G | JGU325036G | JGFCT250 |
| Four-Pole ^{②③} | | | | | |
| 50 | JGU405033G | JGU405032G | JGU405035G | JGU405036G | — |
| 100 | JGU410033G | JGU410032G | JGU410035G | JGU410036G | — |
| 160 | JGU416033G | JGU416032G | JGU416035G | JGU416036G | — |
| 250 | JGU435033G | JGU425032G | JGU425035G | JGU425036G | — |

IEC/UL/CSA—200/200, Current Limiting Per UL 489

| Ampere Rating | LS Catalog Number | LSI Catalog Number | LSG Catalog Number | LSIG Catalog Number | Neutral CT for LSG and LSIG ^① Catalog Number |
|-------------------------------|-------------------------|--------------------------|--------------------------|---------------------------|--|
| Three-Pole | | | | | |
| 50 | JGX305033G | JGX305032G | JGX305035G | JGX305036G | JGFCT050 |
| 100 | JGX310033G | JGX310032G | JGX310035G | JGX310036G | JGFCT100 |
| 160 | JGX316033G | JGX316032G | JGX316035G | JGX316036G | JGFCT160 |
| 250 | JGX325033G | JGX325032G | JGX325035G | JGX325036G | JGFCT250 |
| Four-Pole ^② | | | | | |
| 50 | JGX405033G | JGX405032G | JGX405035G | JGX405036G | — |
| 100 | JGX410033G | JGX410032G | JGX410035G | JGX410036G | — |
| 160 | JGX416033G | JGX416032G | JGX416035G | JGX416036G | — |
| 250 | JGX425033G | JGX425032G | JGX425035G | JGX425036G | — |

Notes

- ① Required for four-wire systems if neutral protection is required.
 ② Neutral protection 4 = 0%, 7 = 100% electronic trip unit neutral protection is not adjustable.
 ③ Four-pole breakers with LSG and LSIG trip units are only available with 0% neutral protection.

JG 100% Rated Circuit Breaker—Thermal-Magnetic Trip Unit**Complete Breaker (Includes Frame, Trip Unit, Standard Terminals and Mounting Hardware)—IC Rating at 415/480 Volts****JG-Frame****JG-Frame—IEC/CE/UL/CSA—25/25**

| Maximum Continuous Amperes | Magnetic Range | Three-Pole |
|----------------------------|----------------|---|
| | | Fixed Thermal, Adjustable Magnetic Catalog Number |
| 70 | 350–700 | JGE3070FAGC |
| 90 | 450–900 | JGE3090FAGC |
| 100 | 500–1000 | JGE3100FAGC |
| 125 | 625–1250 | JGE3125FAGC |
| 150 | 750–1550 | JGE3150FAGC |
| 160 | 800–1600 | — |
| 175 | 875–1750 | JGE3175FAGC |
| 200 | 1000–2000 | JGE3200FAGC |
| 225 | 1125–2250 | JGE3225FAGC |
| 250 | 1250–2500 | JGE3250FAGC |

JG-Frame—IEC/CE/UL/CSA—70/65

| Maximum Continuous Amperes | Magnetic Range | Three-Pole |
|----------------------------|----------------|---|
| | | Fixed Thermal, Adjustable Magnetic Catalog Number |
| 70 | 350–700 | JGH3070FAGC |
| 90 | 450–900 | JGH3090FAGC |
| 100 | 500–1000 | JGH3100FAGC |
| 125 | 625–1250 | JGH3125FAGC |
| 150 | 750–1550 | JGH3150FAGC |
| 160 | 800–1600 | — |
| 175 | 875–1750 | JGH3175FAGC |
| 200 | 1000–2000 | JGH3200FAGC |
| 225 | 1125–2250 | JGH3225FAGC |
| 250 | 1250–2500 | JGH3250FAGC |

JG-Frame—IEC/CE/UL/CSA—40/35

| Maximum Continuous Amperes | Magnetic Range | Three-Pole |
|----------------------------|----------------|---|
| | | Fixed Thermal, Adjustable Magnetic Catalog Number |
| 70 | 350–700 | JGS3070FAGC |
| 90 | 450–900 | JGS3090FAGC |
| 100 | 500–1000 | JGS3100FAGC |
| 125 | 625–1250 | JGS3125FAGC |
| 150 | 750–1550 | JGS3150FAGC |
| 160 | 800–1600 | — |
| 175 | 875–1750 | JGS3175FAGC |
| 200 | 1000–2000 | JGS3200FAGC |
| 225 | 1125–2250 | JGS3225FAGC |
| 250 | 1250–2500 | JGS3250FAGC |

2.3

Molded Case Circuit Breakers

Series G

JG 100% Rated 310+ Electronic Trip Unit Circuit Breaker

See 310+ adjustability specifications on **Page V4-T2-146**.

2

IEC/UL/CSA—25/25

| Ampere Rating | LS Catalog Number | LSI Catalog Number | LSG Catalog Number | LSIG Catalog Number | Neutral CT for LSG and LSIG ^① Catalog Number |
|---------------|-------------------------|--------------------------|--------------------------|---------------------------|--|
| 50 | JGE305033GC | JGE305032GC | JGE305035GC | JGE305036GC | JGFCT050 |
| 100 | JGE310033GC | JGE310032GC | JGE310035GC | JGE310036GC | JGFCT100 |
| 160 | JGE316033GC | JGE316032GC | JGE316035GC | JGE316036GC | JGFCT160 |
| 250 | JGE325033GC | JGE325032GC | JGE325035GC | JGE325036GC | JGFCT250 |

IEC/UL/CSA—40/35

| Ampere Rating | LS Catalog Number | LSI Catalog Number | LSG Catalog Number | LSIG Catalog Number | Neutral CT for LSG and LSIG ^① Catalog Number |
|---------------|-------------------------|--------------------------|--------------------------|---------------------------|--|
| 50 | JGS305033GC | JGS305032GC | JGS305035GC | JGS305036GC | JGFCT050 |
| 100 | JGS310033GC | JGS310032GC | JGS310035GC | JGS310036GC | JGFCT100 |
| 160 | JGS316033GC | JGS316032GC | JGS316035GC | JGS316036GC | JGFCT160 |
| 250 | JGS325033GC | JGS325032GC | JGS325035GC | JGS325036GC | JGFCT250 |

IEC/UL/CSA—70/65

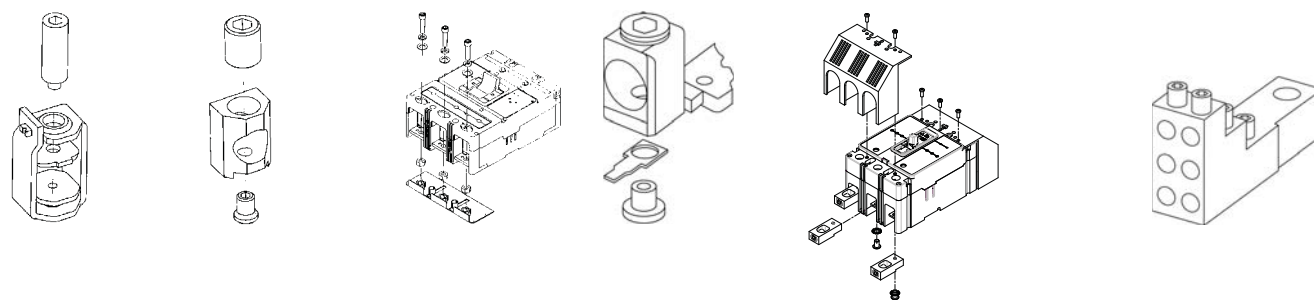
| Ampere Rating | LS Catalog Number | LSI Catalog Number | LSG Catalog Number | LSIG Catalog Number | Neutral CT for LSG and LSIG ^① Catalog Number |
|---------------|-------------------------|--------------------------|--------------------------|---------------------------|--|
| 50 | JGH305033GC | JGH305032GC | JGH305035GC | JGH305036GC | JGFCT050 |
| 100 | JGH310033GC | JGH310032GC | JGH310035GC | JGH310036GC | JGFCT100 |
| 160 | JGH316033GC | JGH316032GC | JGH316035GC | JGH316036GC | JGFCT160 |
| 250 | JGH325033GC | JGH325032GC | JGH325035GC | JGH325036GC | JGFCT250 |

Note

^① Required for four-wire systems if neutral protection is required.

Accessories Selection Guide and Ordering Information

JG-Frame



| | | | | | |
|--------|---------|------------|---------------------------|--------------------|----------------------|
| T250FJ | TA250FJ | Endcap Kit | Control Wire Terminal Kit | Rear Fed Terminals | Multiwire Connectors |
|--------|---------|------------|---------------------------|--------------------|----------------------|

Load and Line Terminals

| Maximum Breaker Amperes | Terminal Body Material | Wire Type | Metric Wire Range mm ² | AWG Wire Range/ Number of Conductors | Catalog Number |
|---|------------------------|-----------|-----------------------------------|--------------------------------------|----------------|
| Standard Pressure Type Terminals | | | | | |
| 250 | Stainless steel | Cu | 25–185 | #4–350 (1) | T250FJ ① |
| 250 | Aluminum | Cu/Al | 10–185 | #8–350 (1) | TA250FJ ①② |

JG-Frame circuit breakers include aluminum terminals TA250FJ as standard. When optional stainless steel only terminals are required, order by catalog number.

Endcap Kits

| Number of Poles | Catalog Number | |
|-----------------|----------------|----------|
| | Metric | Imperial |
| 3 | FJ3RTWK | FJ3RTDK |
| 4 | FJ4RTWK | FJ4RTDK |

Endcap kits are used on J250-Frame breaker to connect busbar or similar electrical connections. Includes hardware.

Control Wire Terminal Kit

| Description | Catalog Number |
|-------------------------------------|----------------|
| Package of 14 (priced individually) | FJCWTK |

For use with aluminum or copper terminals only.

Rear Fed Terminals

| Maximum Amperes | Wire Size Range AWG Cu | Catalog Number |
|-----------------|------------------------|----------------|
| 250 | #4–350 kcmil | TA250JGRF |
| | | 3TA250JGRF |

Rear fed terminals allow the cable to connect to the breaker from the back instead of the top. Terminal shields or interphase barriers are included with each rear fed terminal kit (depending on frame size). When catalog number starts with a 3, it indicates a kit with three terminals in each kit. Catalog number beginning with a TA indicates one terminal.

Base Mounting Hardware

Base mounting hardware is included with a circuit breaker or molded case switch. (Included with breaker.) If required separately, order 66A2546G02.

Terminal Shields IP30

| Location | Number of Poles | Catalog Number |
|--------------|-----------------|----------------|
| Line or Load | 2, 3 | FJTS3K |
| | 4 | FJTS4K |

Interphase Barriers

| Number of Poles | Catalog Number |
|-----------------|----------------|
| 3 | FJIPBK ③ |
| 4 | FJIPBK4 ③ |

Multiwire Connectors

Field-installed multiwire connectors for the load side (OFF) end terminals are used to distribute the load from the circuit breaker to multiple devices without the use of separate distribution terminal blocks.

Multiwire lug kits include terminal shield, mounting hardware, insulators and tin-plated aluminum connectors to replace three mechanical load lugs. UL listed as used on the load side (OFF) end.

JG-Frame Multiwire Connectors Ordering Information (Package of 3)

| Maximum Amperes | Wires per Terminal | Wire Size Range AWG Cu | Kit Catalog Number |
|-----------------|--------------------|------------------------|--------------------|
| 250 | 3 | 14–2 | 3TA250FJ3 |
| 250 | 6 | 14–6 | 3TA250FJ6 |

Notes

- ① Individually packed.
- ② Standard line and load.
- ③ Individually priced.

Accessories

2

Allowable Accessory Combinations

Different combinations of accessories can be supplied, depending on the types of accessories and the number of poles in the circuit breaker.

JG-Frame Accessories

| Description | Reference Page | Two- and Three-Pole | | | Four-Pole | | | |
|--|----------------|---------------------|--------|-------|-----------|--------|-------|---------|
| | | Left | Center | Right | Left | Center | Right | Neutral |
| Internal Accessories (Only one internal accessory per pole) | | | | | | | | |
| Alarm lockout (Make/Break) | V4-T2-211 | — | — | ■ | — | — | ■ | — |
| Auxiliary switch (1A, 1B) | V4-T2-211 | — | — | ■ | — | — | ■ | — |
| Auxiliary switch (2A, 2B) | V4-T2-211 | — | — | ■ | — | — | ■ | — |
| Auxiliary switch and alarm switch combination | V4-T2-211 | — | — | ■ | — | — | ■ | — |
| Shunt trip—standard | V4-T2-211 | ■ | — | — | ■ | — | — | — |
| Undervoltage release mechanism | V4-T2-212 | ■ | — | — | ■ | — | — | — |
| External Accessories | | | | | | | | |
| End cap kit | V4-T2-143 | ● | ● | ● | ● | ● | ● | ● |
| Control wire terminal kit | V4-T2-143 | ● | ● | ● | ● | ● | ● | ● |
| Rear fed terminals | V4-T2-143 | ● | ● | ● | ● | ● | ● | ● |
| Multiwire connectors | V4-T2-143 | ● | ● | ● | ● | ● | ● | ● |
| Base mounting hardware | V4-T2-143 | ● | ● | ● | ● | ● | ● | ● |
| Interphase barriers | V4-T2-143 | ● | ● | ● | ● | ● | ● | ● |
| Padlockable handle block | V4-T2-209 | — | ■ | — | — | ■ | — | — |
| Padlockable handle lock hasp | V4-T2-209 | □ | — | □ | □ | — | □ | — |
| Key interlock kit | V4-T2-209 | □ | — | □ | □ | — | □ | — |
| Sliding bar interlock—requires two breakers | V4-T2-209 | ● | ● | ● | — | — | — | — |
| Electrical operator | V4-T2-209 | ● | ● | ● | ● | ● | ● | ● |
| Plug-in adapters | V4-T2-209 | ● | ● | ● | ● | ● | ● | ● |
| Handle mechanisms | V4-T2-494 | ● | ● | ● | ● | ● | ● | ● |
| Earth leakage/ground fault protector | V4-T2-194 | ● | ● | ● | ● | ● | ● | ● |
| Drawout cassette | V4-T2-217 | ● | ● | ● | ● | ● | ● | ● |
| Digitrip 310+ test kit | V4-T2-138 | ● | ● | ● | ● | ● | ● | ● |
| Ammeter/cause of trip display | V4-T2-208 | ● | ● | ● | ● | ● | ● | ● |
| Cause of trip LED module | V4-T2-208 | ● | ● | ● | ● | ● | ● | ● |
| Modifications (Refer to Eaton) | | | | | | | | |
| Moisture fungus treatment | V4-T2-207 | ● | ● | ● | ● | ● | ● | ● |
| Freeze-tested circuit breakers | — | ● | ● | ● | ● | ● | ● | ● |
| Marine/naval application, UL 489 supplement SA and SB | ① | ● | ● | ● | ● | ● | ● | ● |

Legend

- Applicable in indicated pole position
- May be mounted on left or right pole—not both
- Accessory available/modification available

Note

① Contact Eaton.

Technical Data and Specifications

UL 489/IEC 60947-2 Interrupting Capacity (Symmetrical Amperes) (kA) Ratings

| Circuit Breaker Type | Number of Poles | Volts AC (50/60 Hz) | | | | | | | | Volts DC ^① |
|----------------------|-----------------|---------------------|-----------------|-----------------|-----------------|-----|-----|------------------|-----------------|-----------------------|
| | | 220–240 | | 380–415 | | 480 | 600 | 690 ^② | | 250 ^{②③} |
| | | I _{cu} | I _{cs} | I _{cu} | I _{cs} | | | I _{cu} | I _{cs} | |
| JGE250 | 2, 3, 4 | 65 | 65 | 25 | 25 | 25 | 18 | 12 | 6 | 10 |
| JGS250 | 2, 3, 4 | 85 | 85 | 40 | 40 | 35 | 18 | 12 | 6 | 22 |
| JGH250 | 2, 3, 4 | 100 | 100 | 70 | 70 | 65 | 25 | 14 | 7 | 22 |
| JGC250 ^④ | 3, 4 | 200 | 200 | 100 | 100 | 100 | 35 | 16 | 12 | 42 |
| JGU250 ^④ | 3, 4 | 200 | 200 | 150 | 150 | 150 | 50 | 18 | 14 | 50 |
| JGX250 ^④ | 3, 4 | 200 | 200 | 200 | 200 | 200 | 50 | 18 | 14 | 50 |

UL 489 Current Limiting Data

| Frame | Circuit | I _p (kA) | I ² T (10 ⁶ A ² S) |
|-------|--------------|---------------------|---|
| JGC | 240 V/200 kA | 45.1 | 1.820 |
| JGC | 480 V/100 kA | 45.1 | 1.820 |
| JGC | 600 V/35 kA | 32.8 | 2.140 |
| JGU | 240 V/200 kA | 45.1 | 1.820 |
| JGU | 480 V/150 kA | 45.1 | 1.820 |
| JGU | 600 V/50 kA | 32.8 | 2.140 |
| JGX | 240 V/200 kA | 45.1 | 1.820 |
| JGX | 480 V/200 kA | 45.1 | 1.820 |
| JGX | 600 V/50 kA | 32.8 | 2.140 |

JG 310+ Specifications

| Description | Specification |
|---|--------------------------|
| Trip Unit Type | Digitrip RMS 310+ |
| Breaker Type | |
| Frame designation | JG |
| Frames available | 50 A, 100 A, 160 A 250 A |
| Continuous current range (A) | 20–250A |
| Ground fault pickup (A) | 10–250A |
| Interrupting capacities at 480 Vac (kAIC) | 35, 65, 100, 150, 200 |
| 100% rated | Yes |
| Protection | |
| Ordering options | LS, LSI, LSG, LSIG |
| Arcflash reduction maintenance system (or maintenance mode) | No |
| Interchangeable trip unit | Yes |
| High load alarm (suffix B20) ^⑤ | Yes |
| Ground fault alarm with trip (suffix B21) ^⑤ | Yes |
| Ground fault alarm, no trip (suffix B22) ^⑤ | Yes |
| Zone selective interlocking (suffix ZG) | LSI, LSIG |
| Cause of trip indication | Yes |
| Thru-cover accessories | Yes |

Notes

- ① DC ratings apply to substantially non-inductive circuits.
- ② Two-pole circuit breaker, or two poles of three-pole circuit breaker.
- ③ Time constant is 3 milliseconds minimum at 10 kA and 8 milliseconds minimum at 22 kA.
- ④ Current limiting per UL 489.
- ⑤ B2x suffixes cannot be combined with B2x suffixes.

JG 310+ Adjustability Specifications

2

| 310+ Settings | | JG Frame | | | |
|---|--------------|----------|----------|----------|----------|
| | | 50 A | 100 A | 160 A | 250 A |
| I_r = continuous current or long delay pickup (amperes) (All 310+) | I_r | | | | |
| | A | 20 | 40 | 63 | 100 |
| | B | 20 | 45 | 80 | 125 |
| | C | 25 | 50 | 90 | 150 |
| | D | 30 | 63 | 100 | 160 |
| | E | 32 | 70 | 110 | 175 |
| | F | 40 | 80 | 125 | 200 |
| | G | 45 | 90 | 150 | 225 |
| | H (= I_n) | 50 | 100 | 160 | 250 |
| t_r = long delay time (seconds) (All 310+) | Position 1 | 2 | 2 | 2 | 2 |
| | Position 2 | 4 | 4 | 4 | 4 |
| | Position 3 | 7 | 7 | 7 | 7 |
| | Position 4 | 10 | 10 | 10 | 10 |
| | Position 5 | 12 | 12 | 12 | 12 |
| | Position 6 | 15 | 15 | 15 | 15 |
| | Position 7 | 20 | 20 | 20 | 20 |
| | Position 8 | 24 | 24 | 24 | 24 |
| I_{sd} (x I_r) = short delay pickup (All 310+) | Position 1 | 2x | 2x | 2x | 2x |
| | Position 2 | 3x | 3x | 3x | 3x |
| | Position 3 | 4x | 4x | 4x | 4x |
| | Position 4 | 5x | 5x | 5x | 5x |
| | Position 5 | 6x | 6x | 6x | 6x |
| | Position 6 | 7x | 7x | 7x | 7x |
| | Position 7 | 8x | 8x | 8x | 8x |
| | Position 8 | 10x | 10x | 10x | 10x |
| | Position 9 | 14x | 14x | 14x | 14x |
| t_{sd} = short delay time I^2t (milliseconds) (LS, LSG) | Fixed | 67 at10x | 67 at10x | 67 at10x | 67 at10x |
| | | | | | |
| t_{sd} = short delay time flat (milliseconds) (LSI, LSIG) | Position 1 | Inst | Inst | Inst | Inst |
| | Position 2 | 120 | 120 | 120 | 120 |
| | Position 3 | 300 | 300 | 300 | 300 |
| I_g = ground fault pickup (amperes) (LSG, LSIG) | Position 1 | 10 | 20 | 32 | 50 |
| | Position 2 | 15 | 30 | 48 | 75 |
| | Position 3 | 20 | 40 | 64 | 100 |
| | Position 4 | 30 | 60 | 96 | 150 |
| | Position 5 | 40 | 80 | 128 | 200 |
| | Position 6 | 50 | 100 | 160 | 250 |
| t_g = ground fault delay time (milliseconds) (LSG, LSIG) | Position 1 | Inst | Inst | Inst | Inst |
| | Position 2 | 120 | 120 | 120 | 120 |
| | Position 3 | 300 | 300 | 300 | 300 |
| Independently Adjustable Instantaneous (I_i) setting ^① | | N/A | | | |
| Maintenance Mode pickup ($2.5 \times I_n$) (amperes) ^② | | N/A | | | |

Notes

① Not available for JG. Independently adjustable I_i setting available in LG, NG and RG ALSI and ALSIG trip units.

② Maintenance Mode not available for JG frames. It is available for KD, LD, MDL, LG, NG, and RG.

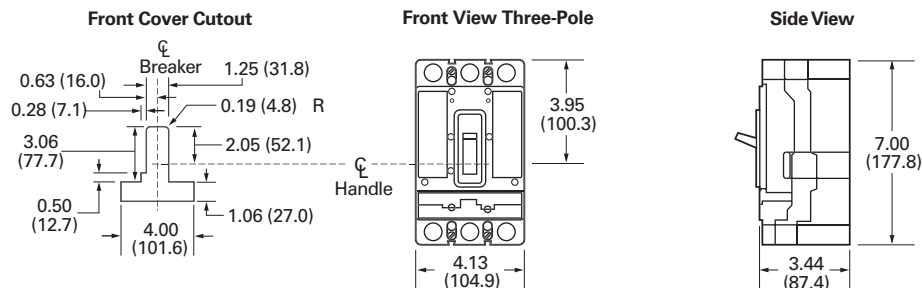
Dimensions and Weights

Approximate Dimensions in Inches (mm)

JG-Frame

| Number of Poles | Width | Height | Depth |
|-----------------|--------------|--------------|-------------|
| 2, 3 | 4.13 (104.9) | 7.00 (177.8) | 3.57 (90.7) |
| 4 | 5.34 (135.6) | 7.00 (177.8) | 3.57 (90.7) |

JG-Frame



Approximate Shipping Weight in Lbs (kg)

JG-Frame

| Breaker Type | Number of Poles | |
|--------------|-----------------|-------------|
| | 2, 3 | 4 |
| JGC | 6.00 (2.70) | 8.00 (3.60) |
| JGE | 6.00 (2.70) | 8.00 (3.60) |
| JGH | 6.00 (2.70) | 8.00 (3.60) |
| JGS | 6.00 (2.70) | 8.00 (3.60) |
| JGU | 6.00 (2.70) | 8.00 (3.60) |
| JGX | 6.00 (2.70) | 8.00 (3.60) |

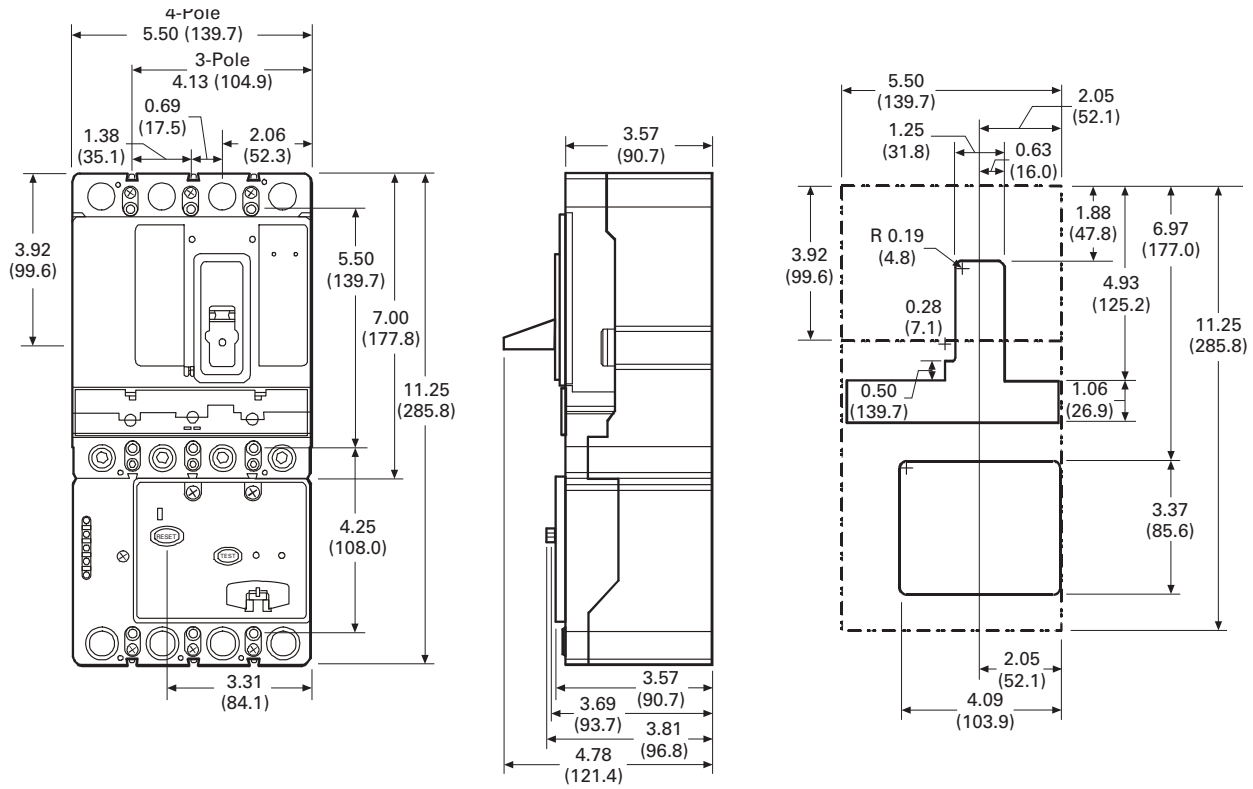
2.3

Molded Case Circuit Breakers

Series G

JG-Frame With Earth Leakage Module

2



LG-Frame (250–630 Amperes)**LG-Frame (250–630 Amperes)****Product Description**

LG breaker is HACR rated.

Contents**Description**

| | Page |
|---|------------------|
| EG-Frame (15–125 Amperes) | V4-T2-117 |
| JG-Frame (63–250 Amperes) | V4-T2-131 |
| LG-Frame (250–630 Amperes) | |
| Catalog Number Selection | V4-T2-150 |
| Product Selection | V4-T2-151 |
| Accessories | V4-T2-162 |
| Technical Data and Specifications | V4-T2-163 |
| Dimensions and Weights. | V4-T2-165 |
| NG-Frame (320–1200 Amperes) | V4-T2-167 |
| RG-Frame (800–2500 Amperes) | V4-T2-176 |
| Motor Circuit Protectors (MCP) | V4-T2-187 |
| Motor Protector Circuit Breakers (MPCB). | V4-T2-191 |
| 30 mA Ground Fault (Earth Leakage) Module | V4-T2-194 |
| Current Limiting Circuit Breaker Module | V4-T2-198 |
| High Instantaneous Circuit Breaker for | |
| Selective Coordination | V4-T2-203 |
| Special Features and Accessories. | V4-T2-206 |
| Motor Operators | V4-T2-214 |
| Plug-In Blocks | V4-T2-216 |
| Drawout Cassette | V4-T2-217 |

2.3

Molded Case Circuit Breakers

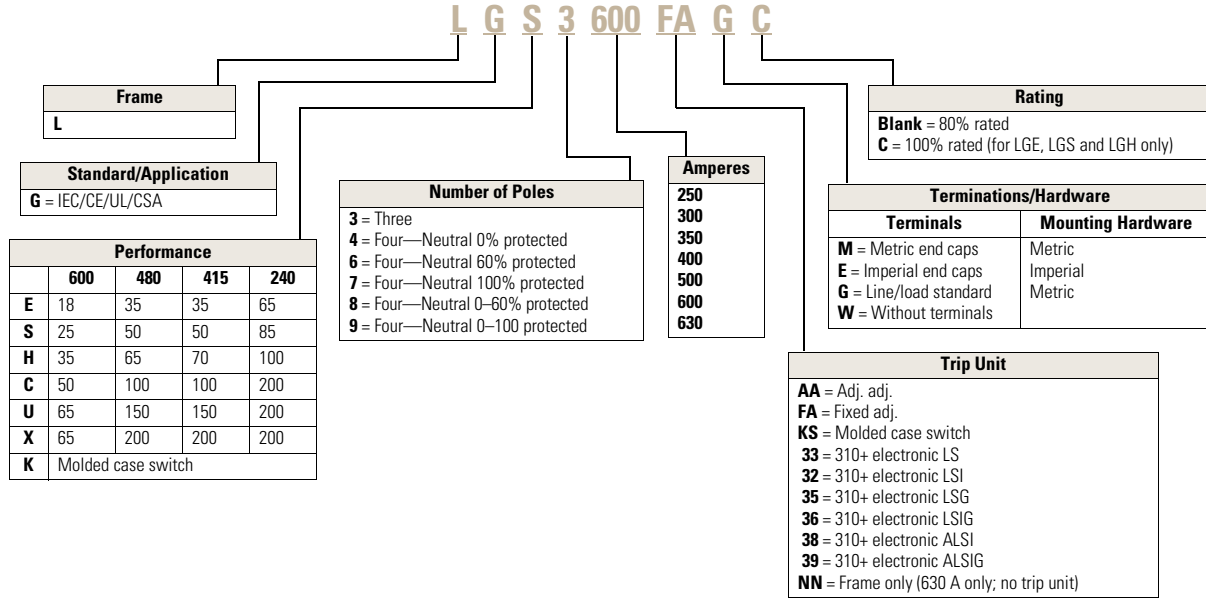
Series G

Catalog Number Selection

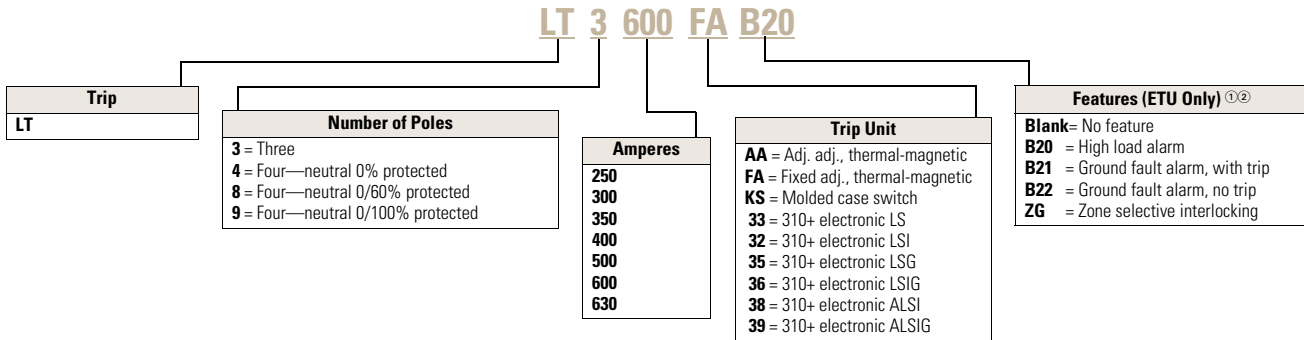
This information is presented only as an aid to understanding catalog numbers. It is not to be used to build catalog numbers for circuit breakers or trip units.

2

Series G—LG-Frame (250–630 Amperes)



Trip Unit



Notes

- ① Bxx features cannot be combined with other Bxx features.
- ② B21 and B22 available with LSG and LSIG trip units.

Product Selection

Complete Breaker (Includes Frame, Trip Unit, Standard Terminals and Mounting Hardware)

LG-Frame


LG-Frame—630 Amperes (600 Amperes UL, CSA)
 IC Rating: 35 kAIC at 415 and 480 Vac ^①

| Ampere Rating | Three-Pole ^② | | Four-Pole (0%) ^③ | |
|------------------|--|---|--|---|
| | Fixed Thermal, Adjustable Magnetic Catalog Number | Adjustable Thermal, Adjustable Magnetic ^{④⑤} Catalog Number | Fixed Thermal, Adjustable Magnetic Catalog Number | Adjustable Thermal, Adjustable Magnetic ^{④⑤} Catalog Number |
| 250 | LGE3250FAG | LGE3250AAG | LGE4250FAG | LGE4250AAG |
| 300 | LGE3300FAG | — | LGE4300FAG | — |
| 320 | — | LGE3320AAG | — | LGE4320AAG |
| 350 | LGE3350FAG | — | LGE4350FAG | — |
| 400 | LGE3400FAG | LGE3400AAG | LGE4400FAG | LGE4400AAG |
| 500 | LGE3500FAG | LGE3500AAG | LGE4500FAG | LGE4500AAG |
| 600 | LGE3600FAG | — | LGE4600FAG | — |
| 630 ^④ | — | LGE3630AAG | — | LGE4630AAG |

LG-Frame


LG-Frame—630 Amperes (600 Amperes UL, CSA)
 IC Rating: 50 kAIC at 415 and 480 Vac ^①

| Ampere Rating | Three-Pole ^② | | Four-Pole (0%) ^③ | |
|------------------|--|---|--|---|
| | Fixed Thermal, Adjustable Magnetic Catalog Number | Adjustable Thermal, Adjustable Magnetic ^{④⑤} Catalog Number | Fixed Thermal, Adjustable Magnetic Catalog Number | Adjustable Thermal, Adjustable Magnetic ^{④⑤} Catalog Number |
| 250 | LGS3250FAG | LGS3250AAG | LGS4250FAG | LGS4250AAG |
| 300 | LGS3300FAG | — | LGS4300FAG | — |
| 320 | — | LGS3320AAG | — | LGS4320AAG |
| 350 | LGS3350FAG | — | LGS4350FAG | — |
| 400 | LGS3400FAG | LGS3400AAG | LGS4400FAG | LGS4400AAG |
| 500 | LGS3500FAG | LGS3500AAG | LGS4500FAG | LGS4500AAG |
| 600 | LGS3600FAG | — | LGS4600FAG | — |
| 630 ^④ | — | LGS3630AAG | — | LGS4630AAG |

LG-Frame


LG-Frame—630 Amperes (600 Amperes UL, CSA)
 IC Rating: 70 kAIC at 415, 65 kAIC at 480 Vac ^①

| Ampere Rating | Three-Pole ^② | | Four-Pole (0%) ^③ | |
|------------------|--|---|--|---|
| | Fixed Thermal, Adjustable Magnetic Catalog Number | Adjustable Thermal, Adjustable Magnetic ^{④⑤} Catalog Number | Fixed Thermal, Adjustable Magnetic Catalog Number | Adjustable Thermal, Adjustable Magnetic ^{④⑤} Catalog Number |
| 250 | LGH3250FAG | LGH3250AAG | LGH4250FAG | LGH4250AAG |
| 300 | LGH3300FAG | — | LGH4300FAG | — |
| 320 | — | LGH3320AAG | — | LGH4320AAG |
| 350 | LGH3350FAG | — | LGH4350FAG | — |
| 400 | LGH3400FAG | LGH3400AAG | LGH4400FAG | LGH4400AAG |
| 500 | LGH3500FAG | LGH3500AAG | LGH4500FAG | LGH4500AAG |
| 600 | LGH3600FAG | — | LGH4600FAG | — |
| 630 ^④ | — | LGH3630AAG | — | LGH4630AAG |

Notes

- ① Replace suffix "G" with "W" for no line and load terminals.
- ② For two-pole applications, use two outer poles.
- ③ Neutral protection is indicated by the fourth character: 4 = 0%, 7 = 100%, 8 = adjustable 0–60% and 9 = 0–100%. Neutral is on LH side.
- ④ 320/630 amperes is not a UL or CSA listed rating. 600 amperes is the maximum UL and CSA rating for the LG.
- ⑤ Adjustable thermal units are typically used in IEC markets and are not UL or CSA listed.

2.3

Molded Case Circuit Breakers

Series G

Complete Breaker (Includes Frame, Trip Unit, Standard Terminals and Mounting Hardware)

2

LG-Frame



LG-Frame—630 Amperes (600 Amperes UL, CSA), Current Limiting Per UL 489
IC Rating: 100 kAIC at 415 and 480 Vac ①

| Ampere Rating | Three-Pole ② | | Four-Pole (0%) ③ | |
|---------------|------------------------------------|--|------------------------------------|--|
| | Fixed Thermal, Adjustable Magnetic | Adjustable Thermal, Adjustable Magnetic ④⑤ | Fixed Thermal, Adjustable Magnetic | Adjustable Thermal, Adjustable Magnetic ④⑤ |
| | Catalog Number | Catalog Number | Catalog Number | Catalog Number |
| 250 | LGC3250FAG | LGC3250AAG | LGC4250FAG | LGC4250AAG |
| 300 | LGC3300FAG | — | LGC4300FAG | — |
| 320 | — | LGC3320AAG | — | LGC4320AAG |
| 350 | LGC3350FAG | — | LGC4350FAG | — |
| 400 | LGC3400FAG | LGC3400AAG | LGC4400FAG | LGC4400AAG |
| 500 | LGC3500FAG | LGC3500AAG | LGC4500FAG | LGC4500AAG |
| 600 | LGC3600FAG | — | LGC4600FAG | — |
| 630 ④ | — | LGC3630AAG | — | LGC4630AAG |

LG-Frame



LG-Frame—630 Amperes (600 Amperes UL, CSA), Current Limiting Per UL 489
IC Rating: 150 kAIC at 415 and 480 Vac ①

| Ampere Rating | Three-Pole ② | | Four-Pole (0%) ③ | |
|---------------|------------------------------------|--|------------------------------------|--|
| | Fixed Thermal, Adjustable Magnetic | Adjustable Thermal, Adjustable Magnetic ④⑤ | Fixed Thermal, Adjustable Magnetic | Adjustable Thermal, Adjustable Magnetic ④⑤ |
| | Catalog Number | Catalog Number | Catalog Number | Catalog Number |
| 250 | LGU3250FAG | LGU3250AAG | LGU4250FAG | LGU4250AAG |
| 300 | LGU3300FAG | — | LGU4300FAG | — |
| 320 | — | LGU3320AAG | — | LGU4320AAG |
| 350 | LGU3350FAG | — | LGU4350FAG | — |
| 400 | LGU3400FAG | LGU3400AAG | LGU4400FAG | LGU4400AAG |
| 500 | LGU3500FAG | LGU3500AAG | LGU4500FAG | LGU4500AAG |
| 600 | LGU3600FAG | — | LGU4600FAG | — |
| 630 ④ | — | LGU3630AAG | — | LGU4630AAG |

LG-Frame



LG-Frame—630 Amperes (600 Amperes UL, CSA), Current Limiting Per UL 489
IC Rating: 200 kAIC at 415 and 480 Vac ①

| Ampere Rating | Three-Pole ② | | Four-Pole (0%) ③ | |
|---------------|------------------------------------|--|------------------------------------|--|
| | Fixed Thermal, Adjustable Magnetic | Adjustable Thermal, Adjustable Magnetic ④⑤ | Fixed Thermal, Adjustable Magnetic | Adjustable Thermal, Adjustable Magnetic ④⑤ |
| | Catalog Number | Catalog Number | Catalog Number | Catalog Number |
| 250 | LGX3250FAG | LGX3250AAG | LGX4250FAG | LGX4250AAG |
| 300 | LGX3300FAG | — | LGX4300FAG | — |
| 320 | — | LGX3320AAG | — | LGX4320AAG |
| 350 | LGX3350FAG | — | LGX4350FAG | — |
| 400 | LGX3400FAG | LGX3400AAG | LGX4400FAG | LGX4400AAG |
| 500 | LGX3500FAG | LGX3500AAG | LGX4500FAG | LGX4500AAG |
| 600 | LGX3600FAG | — | LGX4600FAG | — |
| 630 ④ | — | LGX3630AAG | — | LGX4630AAG |

Notes

- ① Replace suffix "G" with "W" for no line and load terminals.
- ② For two-pole applications, use two outer poles.
- ③ Neutral protection is indicated by the fourth character: 4 = 0%, 7 = 100%, 8 = adjustable 0–60% and 9 = 0–100%. Neutral is on LH side.
- ④ 320/630 amperes is not a UL or CSA listed rating. 600 amperes is the maximum UL and CSA rating for the LG.
- ⑤ Adjustable thermal units are typically used in IEC markets and are not UL or CSA listed.

Molded Case Switches ^①

| Ampere Rating | Number of Poles | Catalog Number |
|------------------|-----------------|----------------|
| 400 | 3 ^② | LGK3400KSG |
| | 4 | LGK4400KSG |
| 630 ^③ | 3 ^② | LGK3630KSG |
| | 4 | LGK4630KSG |

Frame—IC Rating at 415/480 Volts

| Maximum Amperes ^③ | Three-Pole ^② Catalog Number | Four-Pole 0% Catalog Number |
|--|---|--------------------------------|
| 35/35 | | |
| 630 ^③ | LGE3630NN | LGE4630NN |
| | LGE3630NNWC | — |
| 50/50 | | |
| 630 ^③ | LGS3630NN | LGS4630NN |
| | LGS3630NNWC | — |
| 70/53 | | |
| 630 ^③ | LGH3630NN | LGH4630NN |
| | LGH3630NNWC | — |
| 100/100 Current Limiting Per UL 489 | | |
| 630 | LGC3630NN | LGC4630NN |
| 150/150 Current Limiting Per UL 489 | | |
| 630 | LGU3630NN | LGU4630NN |
| 200/200 Current Limiting | | |
| 630 | LGX3630NN | LGX4630NN |

Thermal-Magnetic Trip Unit

| Ampere Rating | Three-Pole ^② Fixed Thermal, Adjustable Magnetic Catalog Number | Adjustable Thermal, Adjustable Magnetic ^④ Catalog Number | Four-Pole (0%) ^⑤ Fixed Thermal, Adjustable Magnetic Catalog Number | Adjustable Thermal, Adjustable Magnetic ^④ Catalog Number |
|---------------|--|---|--|---|
| | 250 | LT3250FA | LT3250AA | LT4250FA |
| 300 | LT3300FA | — | LT4300FA | — |
| 320 | — | LT3320AA | — | LT4320AA |
| 350 | LT3350FA | — | LT4350FA | — |
| 400 | LT3400FA | LT3400AA | LT4400FA | LT4400AA |
| 500 | LT3500FA | LT3500AA | LT4500FA | LT4500AA |
| 600 | LT3600FA | — | LT4600FA | — |
| 630 | — | LT3630AA | — | LT4630AA |

Notes

^① Molded case switches will trip above 6300 amperes.

^② For two-pole applications, use two outer poles.

^③ 630 amperes is not a UL or CSA listed rating. 600 amperes is the maximum UL and CSA rating for the LG.

^④ Adjustable thermal, adjustable magnetic trip units are typically used in IEC markets and are not UL or CSA listed.

^⑤ Neutral protection is indicated by the third character: 4 = 0%, 7 = 100%, 8 = adjustable 0–60% and 9 = 0–100%.

^⑥ 100% rated frame.

Digitrip 310+ Electronic Trip UnitsSee 310+ adjustability specifications on **Page V4-T2-164**.

| Ampere Rating | LS Catalog Number | LSI Catalog Number | LSG Catalog Number | LSIG Catalog Number | Neutral CT for LSG and LSIG ^① Catalog Number |
|--------------------------------|-------------------|--------------------|--------------------|---------------------|---|
| Three-Pole | | | | | |
| 250 | LT325033 | LT325032 | LT325035 | LT325036 | LGFACT250 |
| 400 | LT340033 | LT340032 | LT340035 | LT340036 | LGFACT400 |
| 600 | LT360033 | LT360032 | LT360035 | LT360036 | LGFACT600 |
| 630 ^② | LT363033 | LT363032 | LT363035 | LT363036 | LGFACT600 |
| Four-Pole ^{③④} | | | | | |
| 250 | LT425033 | LT425032 | LT425035 | LT425036 | — |
| 400 | LT440033 | LT440032 | LT440035 | LT440036 | — |
| 600 | LT460033 | LT460032 | LT460035 | LT460036 | — |
| 630 ^② | LT463033 | LT463032 | LT463035 | LT463036 | — |

310+ Electronic Trip Unit Accessories

| Description | Catalog Number |
|--|----------------|
| Electronic portable test kit | MTST230V |
| Trip unit tamper protection wire seal | 5108A03H01 |
| External neutral sensor (630 A) | LGFACT630 |
| External neutral sensor (600 A) | LGFACT600 |
| External neutral sensor (400 A) | LGFACT400 |
| External neutral sensor (250 A) | LGFACT250 |
| Breaker-mount cause-of-trip indication | TRIP-LED |
| Breaker-mount ammeter module | DIGIVIEW |
| Remote-mount ammeter module | DIGIVIEWR06 |

Notes

- ① Required for four-wire systems if neutral protection is desired.
- ② 630 amperes is not a UL or CSA listed rating. 600 amperes is the maximum UL and CSA listed rating for the LG.
- ③ Neutral protection: 4= 0%, 6 = 60%, 7 = 100%. Electronic trip unit neutral protection is not adjustable.
- ④ Four-pole LSG and LSIG trip units are only available with 0% neutral protection.

IC Rating at 415/480 V**Complete LG Breakers with Electronic Trip Unit (Includes Frame, Trip Unit, Standard Terminals and Mounting Hardware) ①**See 310+ adjustability specifications on **Page V4-T2-164**.**IC Rating: 35 kAIC at 415 and 480 Vac**

| Ampere Rating | LS Catalog Number | LSI Catalog Number | LSG Catalog Number | LSIG Catalog Number | Neutral CT for LSG and LSIG ② Catalog Number |
|---------------------|-------------------------|--------------------------|--------------------------|---------------------------|---|
| Three-Pole ③ | | | | | |
| 250 | LGE325033G | LGE325032G | LGE325035G | LGE325036G | LGFACT250 |
| 400 | LGE340033G | LGE340032G | LGE340035G | LGE340036G | LGFACT400 |
| 600 | LGE360033G | LGE360032G | LGE360035G | LGE360036G | LGFACT600 |
| 630 ④ | LGE363033G | LGE363032G | LGE363035G | LGE363036G | LGFACT600 |
| Four-Pole ⑤ | | | | | |
| 250 | LGE425033G | LGE425032G | LGE425035G | LGE425036G | — |
| 400 | LGE440033G | LGE440032G | LGE440035G | LGE440036G | — |
| 600 | LGE460033G | LGE460032G | LGE460035G | LGE460036G | — |
| 630 ④ | LGE463033G | LGE463032G | LGE463035G | LGE463036G | — |

IC Rating: 50 kAIC at 415 and 480 Vac

| Ampere Rating | LS Catalog Number | LSI Catalog Number | LSG Catalog Number | LSIG Catalog Number | Neutral CT for LSG and LSIG ② Catalog Number |
|---------------------|-------------------------|--------------------------|--------------------------|---------------------------|---|
| Three-Pole ③ | | | | | |
| 250 | LGS325033G | LGS325032G | LGS325035G | LGS325036G | LGFACT250 |
| 400 | LGS340033G | LGS340032G | LGS340035G | LGS340036G | LGFACT400 |
| 600 | LGS360033G | LGS360032G | LGS360035G | LGS360036G | LGFACT600 |
| 630 ④ | LGS363033G | LGS363032G | LGS363035G | LGS363036G | LGFACT600 |
| Four-Pole ⑤⑥ | | | | | |
| 250 | LGS425033G | LGS425032G | LGS425035G | LGS425036G | — |
| 400 | LGS440033G | LGS440032G | LGS440035G | LGS440036G | — |
| 600 | LGS460033G | LGS460032G | LGS460035G | LGS460036G | — |
| 630 ④ | LGS463033G | LGS463032G | LGS463035G | LGS463036G | — |

IC Rating: 70 kAIC at 415 Vac, 65 kAIC at 480 Vac

| Ampere Rating | LS Catalog Number | LSI Catalog Number | LSG Catalog Number | LSIG Catalog Number | Neutral CT for LSG and LSIG ② Catalog Number |
|---------------------|-------------------------|--------------------------|--------------------------|---------------------------|---|
| Three-Pole ③ | | | | | |
| 250 | LGH325033G | LGH325032G | LGH325035G | LGH325036G | LGFACT250 |
| 400 | LGH340033G | LGH340032G | LGH340035G | LGH340036G | LGFACT400 |
| 600 | LGH360033G | LGH360032G | LGH360035G | LGH360036G | LGFACT600 |
| 630 ④ | LGH363033G | LGH363032G | LGH363035G | LGH363036G | LGFACT600 |
| Four-Pole ⑤⑥ | | | | | |
| 250 | LGH425033G | LGH425032G | LGH425035G | LGH425036G | — |
| 400 | LGH440033G | LGH440032G | LGH440035G | LGH440036G | — |
| 600 | LGH460033G | LGH460032G | LGH460035G | LGH460036G | — |
| 630 ④ | LGH463033G | LGH463032G | LGH463035G | LGH463036G | — |

Notes

- ① Replace suffix "G" with "W" for no line and load terminals.
- ② Required for four-wire systems if neutral protection is desired.
- ③ For two-pole applications, use two outer poles.
- ④ 630 amperes is not a UL or CSA listed rating. 600 amperes is the maximum UL and CSA listed rating for the LG.
- ⑤ Neutral protection: 4= 0%, 6 = 60%, 7 = 100%. Electronic trip unit neutral protection is not adjustable.
- ⑥ Four-pole breakers with LSG and LSIG trip units are only available with 0% neutral protection.

IC Rating at 415/480 V**Complete LG Breakers with Electronic Trip Unit (Includes Frame, Trip Unit, Standard Terminals and Mounting Hardware)**^①See 310+ adjustability specifications on **Page V4-T2-164**.**IC Rating: 100 kAIC at 415 Vac and 480 Vac, Current Limiting Per UL 489**

| Ampere Rating | LS Catalog Number | LSI Catalog Number | LSG Catalog Number | LSIG Catalog Number | Neutral CT for LSG and LSIG ^② Catalog Number |
|--------------------------------|----------------------|-----------------------|-----------------------|------------------------|---|
| Three-Pole ^③ | | | | | |
| 250 | LGC325033G | LGC325032G | LGC325035G | LGC325036G | LGFACT250 |
| 400 | LGC340033G | LGC340032G | LGC340035G | LGC340036G | LGFACT400 |
| 600 | LGC360033G | LGC360032G | LGC360035G | LGC360036G | LGFACT600 |
| 630 ^④ | LGC363033G | LGC363032G | LGC363035G | LGC363036G | LGFACT600 |
| Four-Pole ^{⑤⑥} | | | | | |
| 250 | LGC425033G | LGC425032G | LGC425035G | LGC425036G | — |
| 400 | LGC440033G | LGC440032G | LGC440035G | LGC440036G | — |
| 600 | LGC460033G | LGC460032G | LGC460035G | LGC460036G | — |
| 630 ^④ | LGC463033G | LGC463032G | LGC463035G | LGC463036G | — |

IC Rating: 150 kAIC at 415 Vac and 480 Vac, Current Limiting Per UL 489

| Ampere Rating | LS Catalog Number | LSI Catalog Number | LSG Catalog Number | LSIG Catalog Number | Neutral CT for LSG and LSIG ^② Catalog Number |
|--------------------------------|----------------------|-----------------------|-----------------------|------------------------|---|
| Three-Pole ^③ | | | | | |
| 250 | LGU325033G | LGU325032G | LGU325035G | LGU325036G | LGFACT250 |
| 400 | LGU340033G | LGU340032G | LGU340035G | LGU340036G | LGFACT400 |
| 600 | LGU360033G | LGU360032G | LGU360035G | LGU360036G | LGFACT600 |
| 630 ^④ | LGU363033G | LGU363032G | LGU363035G | LGU363036G | LGFACT600 |
| Four-Pole ^⑤ | | | | | |
| 250 | LGU425033G | LGU425032G | LGU425035G | LGU425036G | — |
| 400 | LGU440033G | LGU440032G | LGU440035G | LGU440036G | — |
| 600 | LGU460033G | LGU460032G | LGU460035G | LGU460036G | — |
| 630 ^④ | LGU463033G | LGU463032G | LGU463035G | LGU463036G | — |

IC Rating: 200 kAIC at 415 Vac and 480 Vac, Current Limiting Per UL 489

| Ampere Rating | LS Catalog Number | LSI Catalog Number | LSG Catalog Number | LSIG Catalog Number | Neutral CT for LSG and LSIG ^② Catalog Number |
|--------------------------------|----------------------|-----------------------|-----------------------|------------------------|---|
| Three-Pole ^③ | | | | | |
| 250 | LGX325033G | LGX325032G | LGX325035G | LGX325036G | LGFACT250 |
| 400 | LGX340033G | LGX340032G | LGX340035G | LGX340036G | LGFACT400 |
| 600 | LGX360033G | LGX360032G | LGX360035G | LGX360036G | LGFACT600 |
| 630 ^④ | LGX363033G | LGX363032G | LGX363035G | LGX363036G | LGFACT600 |
| Four-Pole ^⑤ | | | | | |
| 250 | LGX425033G | LGX425032G | LGX425035G | LGX425036G | — |
| 400 | LGX440033G | LGX440032G | LGX440035G | LGX440036G | — |
| 600 | LGX460033G | LGX460032G | LGX460035G | LGX460036G | — |
| 630 ^④ | LGX463033G | LGX463032G | LGX463035G | LGX463036G | — |

Notes

- ① Replace suffix "G" with "W" for no line and load terminals.
- ② Required for four-wire systems if neutral protection is desired.
- ③ For two-pole applications, use two outer poles.
- ④ 630 amperes is not a UL or CSA listed rating. 600 amperes is the maximum UL and CSA listed rating for the LG.
- ⑤ Neutral protection: 4= 0%, 6 = 60%, 7 = 100%. Electronic trip unit neutral protection is not adjustable.
- ⑥ Four-pole breakers with LSG and LSIG trip units are only available with 0% neutral protection.

LG 100% Rated Circuit Breaker—Thermal-Magnetic Trip Unit**Complete Breaker (Includes Frame, Trip Unit, Standard Terminals and Mounting Hardware)****LG-Frame****LG-Frame—630 Amperes (600 Amperes UL, CSA) IC Rating: 35 kAIC at 415 and 480 Vac ^①**

| Ampere Rating | Three-Pole ^② Fixed Thermal, Adjustable Magnetic Catalog Number |
|------------------|--|
| 250 | LGE3250FAGC |
| 300 | LGE3300FAGC |
| 320 | — |
| 350 | LGE3350FAGC |
| 400 | LGE3400FAGC |
| 500 | LGE3500FAGC |
| 600 | LGE3600FAGC |
| 630 ^④ | — |

LG-Frame—630 Amperes (600 Amperes UL, CSA) IC Rating: 50 kAIC at 415 and 480 Vac ^①

| Ampere Rating | Three-Pole ^② Fixed Thermal, Adjustable Magnetic Catalog Number |
|------------------|--|
| 250 | LGS3250FAGC |
| 300 | LGS3300FAGC |
| 320 | — |
| 350 | LGS3350FAGC |
| 400 | LGS3400FAGC |
| 500 | LGS3500FAGC |
| 600 | LGS3600FAGC |
| 630 ^④ | — |

LG-Frame—630 Amperes (600 Amperes UL, CSA) IC Rating: 70 kAIC at 415, 65 kAIC at 480 Vac ^①

| Ampere Rating | Three-Pole ^② Fixed Thermal, Adjustable Magnetic Catalog Number |
|------------------|--|
| 250 | LGH3250FAGC |
| 300 | LGH3300FAGC |
| 320 | — |
| 350 | LGH3350FAGC |
| 400 | LGH3400FAGC |
| 500 | LGH3500FAGC |
| 600 | LGH3600FAGC |
| 630 ^④ | — |

Notes

- ^① Replace suffix "G" with "W" for no line and load terminals.
^② For two-pole applications, use two outer poles.

LG 100% Rated Electronic Breaker Per UL 489See 310+ adjustability specifications on **Page V4-T2-164**.

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IEC/UL/CSA 35 kAIC at 415 and 480 Vac

| Ampere Rating | LS Catalog Number | LSI Catalog Number | LSG Catalog Number | LSIG Catalog Number | Neutral CT for LSG and LSIG ^① Catalog Number |
|------------------|-------------------------|--------------------------|--------------------------|---------------------------|--|
| 250 | LGE325033GC | LGE325032GC | LGE325035GC | LGE325036GC | LGFACT250 |
| 400 | LGE340033GC | LGE340032GC | LGE340035GC | LGE340036GC | LGFACT400 |
| 600 | LGE360033GC | LGE360032GC | LGE360035GC | LGE360036GC | LGFACT600 |
| 630 ^② | LGE363033GC | LGE363032GC | LGE363035GC | LGE363036GC | LGFACT600 |

IEC/UL/CSA 50 kAIC at 415 and 480 Vac

| Ampere Rating | LS Catalog Number | LSI Catalog Number | LSG Catalog Number | LSIG Catalog Number | Neutral CT for LSG and LSIG ^① Catalog Number |
|------------------|-------------------------|--------------------------|--------------------------|---------------------------|--|
| 250 | LGS325033GC | LGS325032GC | LGS325035GC | LGS325036GC | LGFACT250 |
| 400 | LGS340033GC | LGS340032GC | LGS340035GC | LGS340036GC | LGFACT400 |
| 600 | LGS360033GC | LGS360032GC | LGS360035GC | LGS360036GC | LGFACT600 |
| 630 ^② | LGS363033GC | LGS363032GC | LGS363035GC | LGS363036GC | LGFACT600 |

IEC/UL/CSA 70 kAIC at 415 and 480 Vac

| Ampere Rating | LS Catalog Number | LSI Catalog Number | LSG Catalog Number | LSIG Catalog Number | Neutral CT for LSG and LSIG ^① Catalog Number |
|------------------|-------------------------|--------------------------|--------------------------|---------------------------|--|
| 250 | LGH325033GC | LGH325032GC | LGH325035GC | LGH325036GC | LGFACT250 |
| 400 | LGH340033GC | LGH340032GC | LGH340035GC | LGH340036GC | LGFACT400 |
| 600 | LGH360033GC | LGH360032GC | LGH360035GC | LGH360036GC | LGFACT600 |
| 630 ^② | LGH363033GC | LGH363032GC | LGH363035GC | LGH363036GC | LGFACT600 |

Notes^① Required for four-wire systems if neutral protection is required.^② 630 amperes is not a UL or CSA listed rating. 600 amperes is the maximum UL and CSA listed rating for the LG.

LG Electronic Breaker with Arcflash Reduction Maintenance System

See 310+ adjustability specifications on **Page V4-T2-164**.

Series G LG circuit breakers are available with the Arcflash Reduction Maintenance System™ integrated into the electronic trip units helping to improve safety by providing a

simple and reliable method to reduce fault clearing time. The Arcflash Reduction Maintenance System unit utilizes a separate analog trip circuit that provides faster

interruption times than the standard (digital) “instantaneous” protection. Work locations downstream of a circuit breaker with an Arcflash Reduction

Maintenance System unit can have a significantly lower incident energy level, reducing arc flash potential to the system.

LG with Arcflash Reduction Maintenance System**LG Electronic Breaker with Arcflash Reduction Maintenance System**

| Ampere Rating | ALSI Catalog Number | ALSIG Catalog Number | Neutral CT for LSG and LSIG ① Catalog Number |
|--|---------------------|----------------------|--|
| IEC/UL/CSA 35 kAIC at 415 and 480 Vac | | | |
| 250 | LGE325038G | LGE365039G | LGFACT250 |
| 400 | LGE340038G | LGE340039G | LGFACT400 |
| 600 | LGE360038G | LGE360039G | LGFACT600 |
| 630 | LGE363038G | LGE363039G | LGFACT600 |
| IEC/UL/CSA 50 kAIC at 415 and 480 Vac | | | |
| 250 | LGS325038G | LGS365039G | LGFACT250 |
| 400 | LGS340038G | LGS340039G | LGFACT400 |
| 600 | LGS360038G | LGS360039G | LGFACT600 |
| 630 | LGS363038G | LGS363039G | LGFACT600 |
| IEC/UL/CSA 70 kAIC at 415 and 480 Vac | | | |
| 250 | LGH325038G | LGH365039G | LGFACT250 |
| 400 | LGH340038G | LGH340039G | LGFACT400 |
| 600 | LGH360038G | LGH360039G | LGFACT600 |
| 630 | LGH363038G | LGH363039G | LGFACT600 |
| IEC/UL/CSA 100 kAIC at 415 and 480 Vac, Current Limiting Per UL 489 | | | |
| 250 | LGC325038G | LGC365039G | LGFACT250 |
| 400 | LGC340038G | LGC340039G | LGFACT400 |
| 600 | LGC360038G | LGC360039G | LGFACT600 |
| 630 | LGC363038G | LGC363039G | LGFACT600 |
| IEC/UL/CSA 150 kAIC at 415 and 480 Vac, Current Limiting Per UL 489 | | | |
| 250 | LGU325038G | LGU365039G | LGFACT250 |
| 400 | LGU340038G | LGU340039G | LGFACT400 |
| 600 | LGU360038G | LGU360039G | LGFACT600 |
| 630 | LGU363038G | LGU363039G | LGFACT600 |
| IEC/UL/CSA 200 kAIC at 415 and 480 Vac, Current Limiting Per UL 489 | | | |
| 250 | LGX325038G | LGX365039G | LGFACT250 |
| 400 | LGX340038G | LGX340039G | LGFACT400 |
| 600 | LGX360038G | LGX360039G | LGFACT600 |
| 630 | LGX363038G | LGX363039G | LGFACT600 |

LG Electronic Trip Units with Arcflash Reduction Maintenance System

| Ampere Rating | ALSI Catalog Number | ALSIG Catalog Number | Neutral CT for LSG and LSIG ① Catalog Number |
|---------------|---------------------|----------------------|--|
| 250 | LT325038 | LT325039 | LGFACT250 |
| 400 | LT340038 | LT340039 | LGFACT400 |
| 600 | LT360038 | LT360039 | LGFACT600 |
| 630 | LT363038 | LT363039 | LGFACT600 |

Note

① Required for four-wire systems if neutral protection is required.

Accessories Selection Guide and Ordering Information

2

Line and Load Terminals

| Maximum Breaker Amperes | Terminal Body Material | Wire Type | AWG Wire Range/ Number of Conductors | Metric Wire Range (mm ²) | Number of Terminals Included | Catalog Number |
|-------------------------|------------------------|-----------|---|--------------------------------------|------------------------------|------------------------|
| 400 | Aluminum | Cu/Al | 500–750 (1) | 240–380 (1) | 3 | 3TA631LK ^① |
| 400 | Aluminum | Cu/Al | 500–750 (1) | 240–380 (1) | 4 | 4TA631LK ^① |
| 400 | Copper | Cu | 500–750 (1) | 240–380 (1) | 3 | 3T631LK ^① |
| 400 | Copper | Cu | 500–750 (1) | 240–380 (1) | 4 | 4T631LK ^① |
| 630 | Aluminum | Cu/Al | 2–500 (2) | 35–240 (2) | 1 | TA632L |
| 630 | Aluminum | Cu/Al | 2–500 (2) | 35–240 (2) | 3 | 3TA632LK ^{①②} |
| 630 | Aluminum | Cu/Al | 2–500 (2) | 35–240 (2) | 4 | 4TA632LK ^{①②} |
| 630 | Copper | Cu | 2–500 (2) | 35–240 (2) | 3 | 3T632LK ^① |
| 630 | Copper | Cu | 2–500 (2) | 35–240 (2) | 4 | 4T632LK ^① |
| 400 | Aluminum | Cu/Al | 3–500 (1) | 35–240 (1) | 1 | TA350LK ^② |
| 400 | Copper | Cu | 3–500 (1) | 35–240 (1) | 1 | T350LK |

Base Mounting Hardware

Base mounting hardware is included with a circuit breaker or molded case switch. (Included with breaker.) If required separately, order 66A4560G03.

Terminal Covers

| Description | Catalog Number |
|--|----------------|
| Three-pole terminal cover ^③ | LTS3K |
| Four-pole terminal cover ^③ | LTS4K |

End Cap Kits (MIO Metric Nuts)

| Number of Poles | Catalog Number |
|-----------------|----------------|
| 3 | L3RTWK |
| 4 | L4RTWK |

Control Wire Terminal Kit

| Description | Terminal Body Type | Catalog Number |
|----------------|--------------------|----------------|
| Three-pole kit | Aluminum | 3TA632LKW |
| Four-pole kit | Aluminum | 4TA632LKW |
| Three-pole kit | Copper | 3T632LKW |
| Four-pole kit | Copper | 4T632LKW |

Terminal Spreaders

| Number of Poles | Catalog Number |
|-----------------|----------------|
| 3 | LGTEW3 |
| 4 | LGTEW4 |

Terminal Extensions

| Number of Poles | Catalog Number |
|-----------------|----------------|
| 3 | LGTES3 |
| 4 | LGTES4 |

Handle Extension

| Description | Catalog Number |
|------------------|----------------|
| Handle extension | HEXLG |

Interphase Barrier

| Package of 2 | Catalog Number |
|--------------------|----------------|
| Interphase barrier | IPB3 |

Rear Fed Terminals

| Maximum Amperes | Wire Size Range AWG Cu | Catalog Number |
|-----------------|------------------------|----------------|
| 400 | 2–500 kcmil | TA350LKRF |
| 400 | 2–500 kcmil | 3TA350LKRF |
| 630 | 2–500 (2) kcmil | TA632LKRF |
| 630 | 2–500 (2) kcmil | 3TA632LKRF |

Rear fed terminals allow the cable to connect to the breaker from the back instead of the top. Terminal shields or interphase barriers are included with each rear fed terminal kit (depending on frame size). When catalog number starts with a 3, it indicates a kit with three terminals in each kit. Catalog number beginning with a TA indicates one terminal.

Multiwire Connectors

Field-installed multiwire connectors for the load side (OFF) end terminals are used to distribute the load from the circuit breaker to multiple devices without the use of separate distribution terminal blocks.

Multiwire lug kits include terminal shield, mounting hardware, insulators and tin-plated aluminum connectors to replace three mechanical load lugs. UL listed as used on the load side (OFF) end.

LG-Frame Multiwire Connectors Ordering Information (Package of 3)

| Maximum Amperes | Wires per Terminal | Wire Size Range AWG Cu | Kit Catalog Number |
|-----------------|--------------------|------------------------|--------------------|
| 600 | 6 | 14–1/0 | 3TA600L6K |

Notes

- ① Includes LTS3K (three-pole) or LTS4K (four-pole) terminal covers.
- ② Standard terminal included with complete breaker.
- ③ Included in TA631L, T631L, TA632L kits listed above.

StrandAble Multiwire Terminals

Field-installed multiwire terminals are UL listed for nearly any class of rigid or fine strand wire without the use of additional fittings.

Used on the load side of circuit breaker to distribute the load to multiple devices without the use of a power distribution block.

StrandAble multiwire terminals are available in three-pole kits that include the necessary hardware and shielding.

3TA600L6SWK

LG Frame StrandAble Multiwire Terminals (Three-Pole Kits)

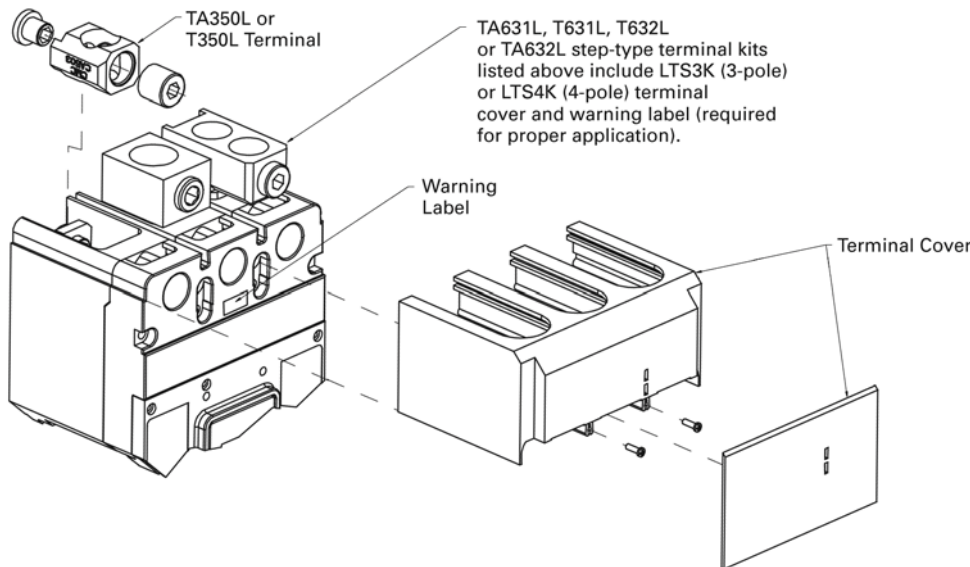


| Maximum Amperage | Wire Class | Wire Range | Shield Included | Catalog Number |
|------------------|------------------|------------|--------------------|---------------------|
| 600 | B and C | (6) 12–2/0 | Interphase barrier | 3TA600L6SWKI |
| 600 | D, G, H, I, K, M | (6) 8–1/0 | Interphase barrier | |
| 600 | B and C | (6) 12–2/0 | Terminal shield | 3TA600L6SWKS |
| 600 | D, G, H, I, K, M | (6) 8–1/0 | Terminal shield | |

Terminals and Terminal Cover

Terminals and Terminal Cover for the LG Breaker—Includes LTS3K (Three-Pole) or LTS4K (Four-Pole) Terminal Covers

Note: Extended terminal covers add 2.13 inches (54.0 mm) to breaker length.



Accessories

2

Base Mounting Hardware

Base mounting hardware is included with a circuit breaker or molded case switch. (Included with breaker.) If required separately, order 66A4560G03.

Allowable Accessory Combinations

Different combinations of accessories can be supplied, depending on the types of accessories and the number of poles in the circuit breaker.

LG-Frame Accessories

| Description | Reference Page | Three-Pole | | | Four-Pole | | | Neu. |
|--|----------------|------------|--------|-------|-----------|--------|-------|------|
| | | Left | Center | Right | Left | Center | Right | |
| Internal Accessories (Only One Internal Accessory Per Pole) | | | | | | | | |
| Alarm lockout (Make/Break) | V4-T2-211 | | | ■ | | | ■ | |
| Auxiliary switch (1A, 1B) | V4-T2-211 | | | ■ | | | ■ | |
| Auxiliary switch (2A, 2B) | V4-T2-211 | | | ■ | | | ■ | |
| Auxiliary switch and alarm switch combination | V4-T2-211 | | | ■ | | | ■ | |
| Shunt trip—standard | V4-T2-211 | ■ | | | ■ | | | |
| Undervoltage release mechanism | V4-T2-212 | ■ | | | ■ | | | |
| External Accessories | | | | | | | | |
| End cap kit | V4-T2-160 | ● | | | ● | | | |
| Handle extension | V4-T2-160 | ● | | | ● | | | |
| Terminal cover | V4-T2-160 | ● | | | ● | | | |
| Rear fed terminals | V4-T2-160 | ● | ● | ● | ● | ● | ● | ● |
| Multewire connectors | V4-T2-160 | ● | ● | ● | ● | ● | ● | ● |
| Padlockable handle block | V4-T2-209 | | ■ | | | ■ | | |
| Padlockable handle lock hasp | V4-T2-209 | □ | | □ | □ | | □ | |
| Key interlock kit | V4-T2-209 | □ | | □ | □ | | □ | |
| Sliding bar interlock—requires two breakers | V4-T2-209 | ● | ● | ● | ● | ● | ● | ● |
| Electrical operator | V4-T2-209 | ● | ● | ● | ● | ● | ● | ● |
| Plug-in adapters | V4-T2-209 | ● | ● | ● | ● | ● | ● | ● |
| Rear connecting studs | V4-T2-209 | ● | ● | ● | ● | ● | ● | ● |
| Handle mechanisms | V4-T2-494 | ● | ● | ● | ● | ● | ● | ● |
| Earth leakage/ground fault protector | V4-T2-194 | ● | ● | ● | ● | ● | ● | ● |
| Drawout cassette | V4-T2-217 | ● | ● | ● | ● | ● | ● | ● |
| Digitrip 310+ test kit | V4-T2-154 | ● | ● | ● | ● | ● | ● | ● |
| Ammeter/cause of trip display | V4-T2-208 | ● | ● | ● | ● | ● | ● | ● |
| Cause of trip LED module | V4-T2-208 | ● | ● | ● | ● | ● | ● | ● |
| Modifications (Refer to Eaton) | | | | | | | | |
| Moisture fungus treatment | V4-T2-207 | ● | ● | ● | ● | ● | ● | ● |
| Freeze-tested circuit breakers | — | ● | ● | ● | ● | ● | ● | ● |
| Marine/naval application, UL 489 Supplement SA and SB | ① | ● | ● | ● | ● | ● | ● | ● |

Legend

- Applicable in indicated pole position
- May be mounted on left or right pole—not both
- Accessory available/modification available

Note

① Contact Eaton.

Technical Data and Specifications

Interrupting Capacity Ratings

UL 489/IEC 60947-2 Interrupting Capacity Ratings

| Circuit Breaker Type | Number of Poles | Interrupting Capacity (kA rms Symmetrical Amperes) (kA) | | | | | | | | Volts DC ^① | |
|----------------------|-----------------|---|-----|---------|-----|-----|-----|-----|-----|-----------------------|-----|
| | | Volts AC (50/60 Hz) | | | | | | | | 250 ^{②③} | |
| | | 240–240 | | 380–415 | | 480 | 600 | 690 | lcs | lcs | lcs |
| LGE630 | 3, 4 | 65 | 65 | 35 | 35 | 35 | 18 | 12 | 6 | 22 | 22 |
| LGS630 | 3, 4 | 85 | 85 | 50 | 50 | 50 | 25 | 20 | 10 | 22 | 22 |
| LGH630 | 3, 4 | 100 | 100 | 70 | 70 | 65 | 35 | 25 | 13 | 42 | 42 |
| LGC630 ^④ | 3, 4 | 200 | 200 | 100 | 100 | 100 | 50 | 30 | 15 | 42 | 42 |
| LGU630 ^④ | 3, 4 | 200 | 200 | 150 | 150 | 150 | 65 | 35 | 18 | 50 | 50 |
| LGX630 ^④ | 3, 4 | 200 ^⑤ | 200 | 200 | 200 | 200 | 65 | 35 | 18 | 50 | 50 |

UL 489 Current Limiting Data

| Frame | Circuit | I _p (kA) | I ² T (10 ⁶ A ² S) |
|-------|--------------|---------------------|---|
| LGC | 240 V/200 kA | 56.4 | 5.873 |
| LGC | 480 V/100 kA | 56.4 | 5.873 |
| LGC | 600 V/50 kA | 56.4 | 6.690 |
| LGU | 240 V/200 kA | 77.7 | 7.320 |
| LGU | 480 V/150 kA | 77.7 | 7.320 |
| LGU | 600 V/65 kA | 50.6 | 6.690 |
| LGX | 240 V/200 kA | 77.7 | 7.320 |
| LGX | 480 V/200 kA | 77.7 | 7.320 |
| LGX | 600 V/65 kA | 50.6 | 6.690 |

LG 310+ Specifications

| Description | Specification |
|---|---------------------------------|
| Trip Unit Type | Digitrip RMS 310+ |
| Breaker Type | |
| Frame designation | LG |
| Frames available | 250 A, 400 A, 600 A |
| Continuous current range (A) | 100–600 A |
| Ground fault pickup (A) | 50–600 A |
| Interrupting capacities at 480 Vac (kAIC) | 35, 65, 100, 150, 200 |
| 100% rated | Yes |
| Protection | |
| Ordering options | LS, LSI, LSG, LSIG, ALSI, ALSIG |
| Arcflash reduction maintenance system (or maintenance mode) | Yes |
| Interchangeable trip unit | Yes |
| High load alarm (suffix B20) ^⑤ | Yes |
| Ground fault alarm with trip (suffix B21) ^⑤ | Yes |
| Ground fault alarm, no trip (suffix B22) ^⑤ | Yes |
| Zone selective interlocking (suffix ZG) | LSI, LSIG, ALSI, ALSIG |
| Cause of trip indication | Yes |
| Thru-cover accessories | Yes |

Notes

- ① DC rating apply to substantially non-inductive circuits.
- ② Two-pole circuit breaker, or two poles of three-pole circuits.
- ③ Time constant is 3 milliseconds minimum at 10 kA and 8 milliseconds minimum at –kA.
- ④ Current limiting per UL 489.
- ⑤ B2x suffixes cannot be combined with B2x suffixes.

2.3

Molded Case Circuit Breakers

Series G

LG 310+ Adjustability Specifications

2

| 310+ Settings | | LG Frame | | |
|---|--|--------------------------------------|--------------------------------------|--------------------------------------|
| | | 250 A | 400 A | 600 A |
| I_r = continuous current or long delay pickup (amperes) (All 310+) | I_r | | | |
| | A | 100 | 160 | 250 |
| | B | 125 | 200 | 300 |
| | C | 150 | 225 | 315 |
| | D | 160 | 250 | 350 |
| | E | 175 | 300 | 400 |
| | F | 200 | 315 | 450 |
| | G | 225 | 350 | 500 |
| | H (= I_n) | 250 | 400 | 600 |
| t_r = long delay time (seconds) (All 310+) | Position 1 | 2 | 2 | 2 |
| | Position 2 | 4 | 4 | 4 |
| | Position 3 | 7 | 7 | 7 |
| | Position 4 | 10 | 10 | 10 |
| | Position 5 | 12 | 12 | 12 |
| | Position 6 | 15 | 15 | 15 |
| | Position 7 | 20 | 20 | 20 |
| | Position 8 | 24 | 24 | 24 |
| | I_{sd} (x I_r) = short delay pickup (All 310+) | Position 1 | 2x | 2x |
| Position 2 | | 3x | 3x | 3x |
| Position 3 | | 4x | 4x | 4x |
| Position 4 | | 5x | 5x | 5x |
| Position 5 | | 6x | 6x | 6x |
| Position 6 | | 7x | 7x | 7x |
| Position 7 | | 8x | 8x | 8x |
| Position 8 | | 10x | 10x | 10x |
| Position 9 | | 12x | 12x | 12x |
| t_{sd} = short delay time I^2t (milliseconds) (LS, LSG) | Fixed | 67 at10x | 67 at10x | 67 at10x |
| t_{sd} = short delay time flat (milliseconds) ① (LSI, LSIG, ALSI, ALSIG) | Position 1 | Inst | Inst | Inst |
| | Position 2 | 120 | 120 | 120 |
| | Position 3 | 300 | 300 | 300 |
| I_g = ground fault pickup (amperes) (LSG, LSIG, ALSIG) | Position 1 | 50 | 80 | 120 |
| | Position 2 | 75 | 120 | 180 |
| | Position 3 | 100 | 160 | 240 |
| | Position 4 | 150 | 240 | 360 |
| | Position 5 | 200 | 320 | 480 |
| | Position 6 | 250 | 400 | 600 |
| t_g = ground fault delay time (milliseconds) (LSG, LSIG, ALSIG) | Position 1 | Inst | Inst | Inst |
| | Position 2 | 120 | 120 | 120 |
| | Position 3 | 300 | 300 | 300 |
| Independently Adjustable Instantaneous (I_i) setting (ALSI, ALSIG) | Yes | 2.5x, 4x, 6x, 7x, 8x, 10x, 12x | 2.5x, 4x, 6x, 7x, 8x, 10x, 12x | 2.5x, 4x, 6x, 7x, 8x, 10x, 12x |
| Maintenance Mode (remote) pickup ($2.5 \times I_n$) ② (ALSI, ALSIG) | Fixed | 2.5x | | |

Notes

① 50 ms for ALSI and ALSIG trip units.

② Maintenance Mode is enabled remotely using a 24 Vdc circuit.

Dimensions and Weights

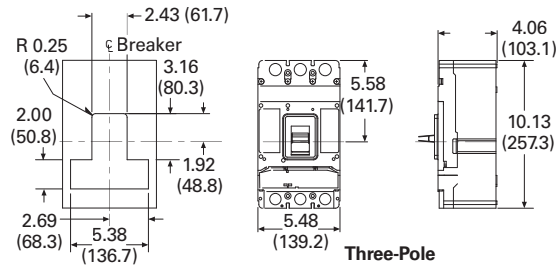
Approximate Dimensions in Inches (mm)

LG-Frame

| Number of Poles | Width | Height | Depth |
|-----------------|--------------|---------------|--------------|
| 2, 3 | 5.48 (139.2) | 10.13 (257.3) | 4.09 (103.9) |
| 4 | 7.22 (183.4) | 10.13 (257.3) | 4.09 (103.9) |

LG-Frame

Note: TA631L, T631L, T632L, TA632L terminals add 1.19 inches (30.2 mm) to line or load side of LG. LTS3K or LTS4K terminal covers add 2.13 inches (54.1 mm) to line or load side of LG.



Approximate Shipping Weight in Lbs (kg)

LG-Frame

| Breaker Type | Two- and Three-Pole | Four-Pole |
|------------------------------|---------------------|-----------|
| LGE, LGS, LGH, LGC, LGU, LGX | 16 (7.3) | 20 (9.1) |

Notes

- ① DC rating apply to substantially non-inductive circuits.
- ② Two-pole circuit breaker, or two poles of three-pole circuits.
- ③ Time constant is 3 milliseconds minimum at 10 kA and 8 milliseconds minimum at -kA.
- ④ Three-poles in series. 750 Vdc ratings available (four-pole in series, not UL listed). Contact Eaton.
- ⑤ IEC rating is 300 kA at 240 Vac.
- ⑥ Current limiting per UL 489.

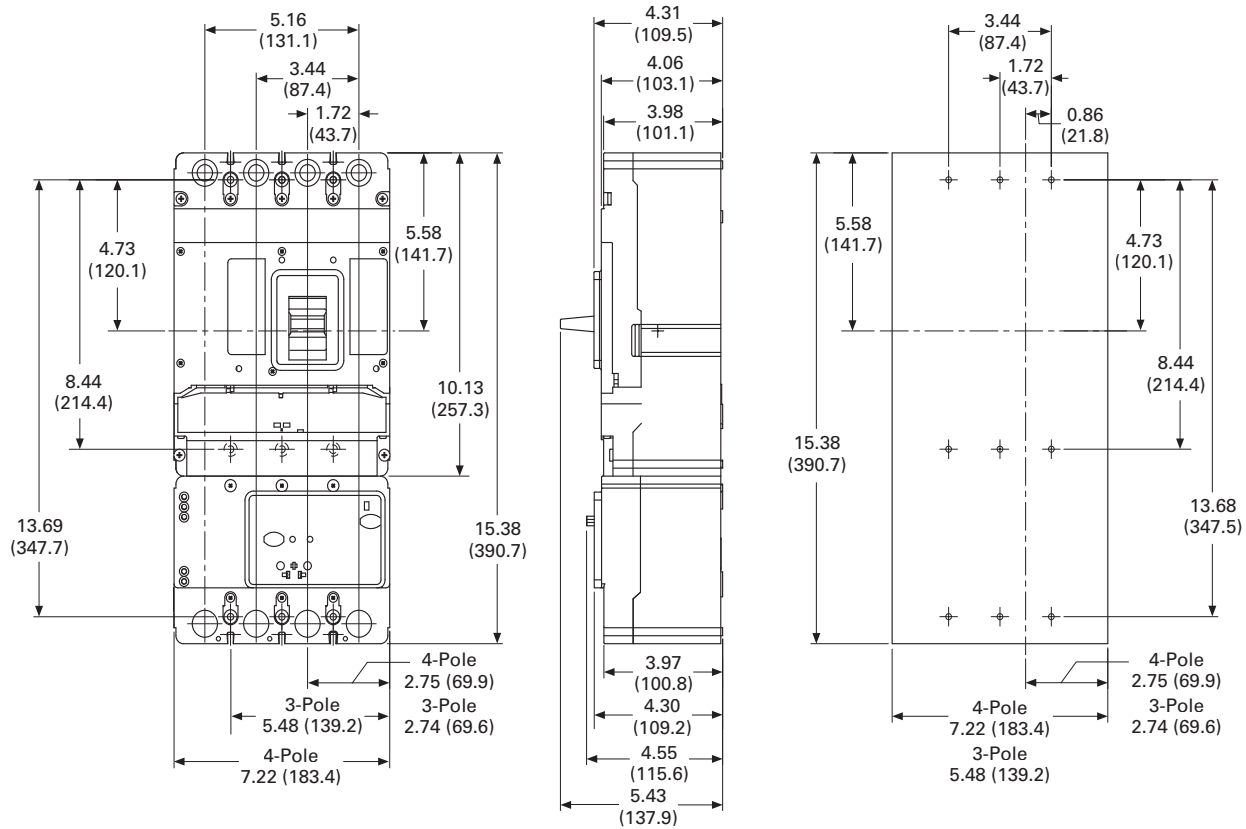
2.3

Molded Case Circuit Breakers

Series G

LG-Frame With Earth Leakage Module

2



NG-Frame (1200 Ampere)**Contents**

| Description | Page |
|---|-------------|
| EG-Frame (15–125 Amperes) | V4-T2-117 |
| JG-Frame (63–250 Amperes) | V4-T2-131 |
| LG-Frame (250–630 Amperes) | V4-T2-149 |
| NG-Frame (320–1200 Amperes) | |
| Catalog Number Selection | V4-T2-168 |
| Product Selection Guide and Ordering Information | V4-T2-169 |
| Accessories | V4-T2-172 |
| Technical Data and Specifications | V4-T2-173 |
| Dimensions and Weights | V4-T2-175 |
| RG-Frame (800–2500 Amperes) | V4-T2-176 |
| Motor Circuit Protectors (MCP) | V4-T2-187 |
| Motor Protector Circuit Breakers (MPCB) | V4-T2-191 |
| 30 mA Ground Fault (Earth Leakage) Module | V4-T2-194 |
| Current Limiting Circuit Breaker Module | V4-T2-198 |
| High Instantaneous Circuit Breaker for Selective Coordination | V4-T2-203 |
| Special Features and Accessories | V4-T2-206 |
| Motor Operators | V4-T2-214 |
| Plug-In Blocks | V4-T2-216 |
| Drawout Cassette | V4-T2-217 |

NG-Frame (320–1200 Amperes)**Product Description**

- All Eaton NG-Frame circuit breakers are suitable for reverse feed use
- All NG-Frame circuit breakers are HACR rated

2.3

Molded Case Circuit Breakers

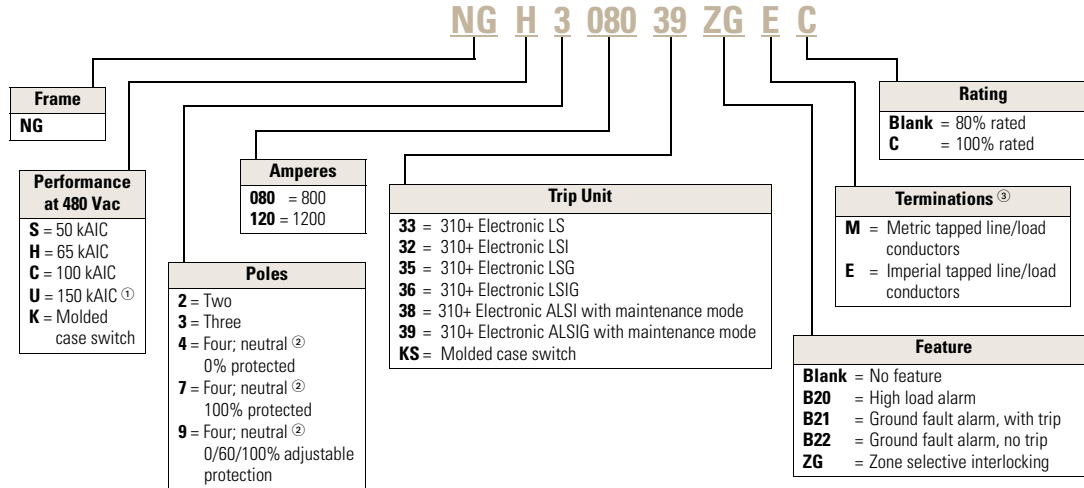
Series G

Catalog Number Selection

This information is presented only as an aid to understanding catalog numbers. It is not to be used to build catalog numbers for circuit breakers or trip units.

2

NG Circuit Breaker with 310+ Electronic Trip Unit



Notes

- ^① 800 A only.
 - ^② Neutral inn left pole on GN; right pole on NG.
 - ^③ Breakers do not ship with lugs.
- Trip units are factory installable only.

Product Selection Guide and Ordering Information

Type NGS Standard Interrupting Capacity— U_g Max. 690 Vac, 50 kA I_{cu} at 480 Vac or 415 Vac

See 310+ adjustability specifications on Page V4-T2-174.

| Maximum Continuous Ampere Rating at 40 °C ^{①②} | Number of Poles | Circuit Breaker Frame Including Digitrip Electronic Trip Unit with Imperial Tapped Conductors | | | | | | Neutral CT for LSG and LSIG ^③ |
|---|-----------------|---|------------|-------------------------|-------------------------|------------|-------------------------|--|
| | | LS | LSI | LSG | LSIG | ALSI | ALSIG | |
| 800 | 2 | NGS208033E | NGS208032E | NGS208035E | NGS208036E | — | — | — |
| | 3 | NGS308033E | NGS308032E | NGS308035E | NGS308036E | NGS308038E | NGS308039E | NGFCT120 |
| | 4 | NGS408033E | NGS408032E | NGS408035E ^④ | NGS408036E ^④ | NGS408038E | NGS408039E ^④ | — |
| | 4 ^⑤ | NGS708033E | NGS708032E | — | — | NGS708038E | — | — |
| | 4 ^⑥ | NGS908033E | NGS908032E | — | — | NGS908038E | — | — |
| 1200 ^⑥ | 2 | NGS212033E | NGS212032E | NGS212035E | NGS212036E | — | — | — |
| | 3 | NGS312033E | NGS312032E | NGS312035E | NGS312036E | NGS312038E | NGS312039E | NGFCT120 |
| | 4 | NGS412033E | NGS412032E | NGS412035E ^④ | NGS412036E ^④ | — | NGS412039E ^④ | — |
| | 4 ^⑤ | NGS712033E | NGS712032E | — | — | NGS712038E | — | — |
| | 4 ^⑥ | NGS912033E | NGS912032E | — | — | NGS912038E | — | — |

Molded Case Switches ^{⑦⑧⑨⑩} U_g Maximum 690 Vac

| Ampere Rating | Three-Pole | Catalog Number | Four-Pole | Catalog Number |
|---------------|---|----------------|---|----------------|
| 800 | MCS with Imperial line and load terminals | NGK3080KSE | MCS with Imperial line and load terminals | NGK4080KSE |
| 1200 | MCS with Imperial line and load terminals | NGK3120KSE | MCS with Imperial line and load terminals | NGK4120KSE |
| 1250 | MCS with Imperial line and load terminals | NGK3125KSE | MCS with Imperial line and load terminals | NGK43125KSE |

Notes

- ① For AC use only.
- ② NG MCCBs are suitable for 40 °C or 50 °C applications. Order suffix V3 to eliminate standard 40 °C labeling.
- ③ Required for four-wire systems if neutral protection is desired. Sold separately.
- ④ Neutral 0% protected. NG, neutral in right pole; GN, neutral in left pole.
- ⑤ Neutral 100% protected (denoted by 7 in digit four); no neutral protection available with LSG or LSIG trip units.
- ⑥ Neutral 0%/60%/100% adjustable protection (denoted by 9 in digit four).
- ⑦ Non-UL listed NG 1250 with 1250 ampere trip unit is also available.
- ⑧ For AC use only. Molded case switch will trip above 14,000 amperes.
- ⑨ For two-pole applications, use outer poles of three-pole molded case switch.
- ⑩ Add "M" to above catalog numbers for metric tapped line/load conductors.

2.3

Molded Case Circuit Breakers

Series G

Type NGH High Interrupting Capacity— U_e Max. 690 Vac, 65 kA I_{cu} at 480 Vac or 415 Vac

See 310+ adjustability specifications on **Page V4-T2-174**.

2

| Maximum Continuous Ampere Rating at 40 °C ^{①②} | Number of Poles | Circuit Breaker Frame Including Digitrip Electronic Trip Unit | | | | | | Neutral CT for LSG and LSIG ^③ |
|---|-----------------|---|------------|-------------------------|-------------------------|------------|-------------------------|--|
| | | LS | LSI | LSG | LSIG | ALSI | ALSIG | |
| 800 | 2 | NGH208033E | NGH208032E | NGH208035E | NGH208036E | — | — | — |
| | 3 | NGH308033E | NGH308032E | NGH308035E | NGH308036E | NGH308038E | NGH308039E | NGFCT120 |
| | 4 | NGH408033E | NGH408032E | NGH408035E ^④ | NGH408036E ^④ | NGH408038E | NGH408039E ^④ | — |
| | 4 ^⑤ | NGH708033E | NGH708032E | — | — | NGH708038E | — | — |
| | 4 ^⑥ | NGH908033E | NGH908032E | — | — | NGH908038E | — | — |
| 1200 | 2 | NGH212033E | NGH212032E | NGH212035E | NGH212036E | — | — | — |
| | 3 | NGH312033E | NGH312032E | NGH312035E | NGH312036E | NGH312038E | NGH312039E | NGFCT120 |
| | 4 | NGH412033E | NGH412032E | NGH412035E ^④ | NGH412036E ^④ | — | NGH412039E ^④ | — |
| | 4 ^⑤ | NGH712033E | NGH712032E | — | — | NGH712038E | — | — |
| | 4 ^⑥ | NGH912033E | NGH912032E | — | — | NGH912038E | — | — |

Type NGC Very High Capacity— U_e Max. 690 Vac, 100 kA I_{cu} at 480 Vac or 415 Vac

See 310+ adjustability specifications on **Page V4-T2-174**.

| Maximum Continuous Ampere Rating at 40 °C ^{①②} | Number of Poles | Circuit Breaker Frame Including Digitrip Electronic Trip Unit | | | | | | Neutral CT for LSG and LSIG ^③ |
|---|-----------------|---|------------|-------------------------|-------------------------|------------|-------------------------|--|
| | | LS | LSI | LSG | LSIG | ALSI | ALSIG | |
| 800 | 2 | NGC208033E | NGC208032E | NGC208035E | NGC208036E | — | — | — |
| | 3 | NGC308033E | NGC308032E | NGC308035E | NGC308036E | NGC308038E | NGC308039E | NGFCT120 |
| | 4 | NGC408033E | NGC408032E | NGC408035E ^④ | NGC408036E ^④ | NGC408038E | NGC408039E ^④ | — |
| | 4 ^⑤ | NGC708033E | NGC708032E | — | — | NGC708038E | — | — |
| | 4 ^⑥ | NGC908033E | NGC908032E | — | — | NGC908038E | — | — |
| 1200 | 2 | NGC212033E | NGC212032E | NGC212035E | NGC212036E | — | — | — |
| | 3 | NGC312033E | NGC312032E | NGC312035E | NGC312036E | NGC312038E | NGC312039E | NGFCT120 |
| | 4 | NGC412033E | NGC412032E | NGC412035E ^④ | NGC412036E ^④ | — | NGC412039E ^④ | — |
| | 4 ^⑤ | NGC712033E | NGC712032E | — | — | NGC712038E | — | — |
| | 4 ^⑥ | NGC912033E | NGC912032E | — | — | NGC912038E | — | — |

Type NGU Ultra High Capacity— U_e Max. 600 Vac, 150 kA at 480 Vac

See 310+ adjustability specifications on **Page V4-T2-174**.

| Maximum Continuous Ampere Rating at 40 °C ^{①②} | Number of Poles | Circuit Breaker Frame Including Digitrip Electronic Trip Unit | | | | | | Neutral CT for LSG and LSIG ^③ |
|---|-----------------|---|------------|------------|------------|------------|------------|--|
| | | LS | LSI | LSG | LSIG | ALSI | ALSIG | |
| 800 | 3 | NGU308033E | NGU308032E | NGU308035E | NGU308036E | NGU308038E | NGU308039E | NGFCT120 |

Notes

- ① For AC use only.
- ② NG MCCBs are suitable for 40 °C or 50 °C applications. Order suffix V3 to eliminate standard 40 °C labeling.
- ③ Required for four-wire systems if neutral protection is desired. Sold separately.
- ④ Neutral 0% protected. NG, neutral in right pole; GN, neutral in left pole.
- ⑤ Neutral 100% protected (denoted by 7 in digit four); no neutral protection available with LSG or LSIG trip units.
- ⑥ Neutral 0%/60%/100% adjustable protection (denoted by 9 in digit four).

Accessories Selection Guide and Ordering Information

Line and Load Terminals

N-Frame circuit breakers do not include terminals as standard. When copper or Cu/Al terminals are required, order by catalog number.

Line and Load Terminals

| Maximum Breaker Amperes | Terminal Body Material | Wire Type | AWG Wire (Number of Conductors) | AWG Wire Catalog Number ^① | Metric Wire Range mm ² | Metric Catalog Number ^① |
|--|------------------------|-----------|---------------------------------|--------------------------------------|-----------------------------------|------------------------------------|
| Standard Cu/Al Pressure Terminals | | | | | | |
| 700 | Aluminum | Cu/Al | 1–500 (2) | TA700NB1 | 50–240 | TA700NB1M |
| 1000 | Aluminum | Cu/Al | 3/0–400 (3) | TA1000NB1 | 95–185 | TA1000NB1M |
| 1200 | Aluminum | Cu/Al | 4/0–500 (4) | TA1200NB1 | 120–240 | TA1200NB1M |
| 1200 | Aluminum | Cu/Al | 500–750 (3) | TA1201NB1 | 300–400 | TA1201NB1M |
| Optional Copper and Cu/Al Pressure Type Terminals | | | | | | |
| 700 | Copper | Cu | 2/0–500 (2) | T700NB1 | 70–240 | T700NB1M |
| 1000 | Copper | Cu | 3/0–500 (3) | T1000NB1 | 95–240 | T1000NB1M |
| 1200 | Copper | Cu | 3/0–400 (4) | T1200NB3 | 95–185 | T1200NB3M |

310+ Electronic Trip Unit Accessories

| Description | Catalog Number |
|---|--------------------|
| Electronic portable test kit | MTST230V |
| Trip unit tamper protection wire seal | 5108A03H01 |
| External neutral sensor (1200 A) ^② | NGFCT120 |
| External neutral sensor (800 A) ^② | NGFCT120 |
| Breaker-mount cause-of-trip indication | TRIP-LED |
| Breaker-mount ammeter module | DIGIVIEW |
| Remote-mount ammeter module | DIGIVIEWR06 |

Base Mounting Hardware

Base mounting hardware is included with a circuit breaker or molded case switch.

Base Mounting Hardware ^③

| Number of Poles | Description | Catalog Number |
|----------------------|--|----------------|
| Three- and four-pole | Imperial hardware: 0.3125–18 x 1.25 pan-head steel screws and lock washers | BMH5 |
| Three- and four-pole | Metric hardware: M8 pan-head steel screws and lock washers | BMH5M |

Terminal Shield

Terminal Shield

| Description | Catalog Number |
|----------------------------|----------------|
| Three-pole terminal shield | NTS3K |

Conductor Extension Kit

Conductor Extension Kit ^④

| Description | Catalog Number |
|------------------------------|-------------------|
| Three-pole both ends Metric | 5104A24G04 |
| Three-pole both ends English | 5104A24G02 |

Keeper Nut

Not required on NG-Frame. Terminals are threaded.

Handle Extension

Included with breaker. Additional handle extensions are available.

Handle Extension

| Description | Catalog Number |
|-------------------------|----------------|
| Single handle extension | HEX5 |

Interphase Barriers

The interphase barriers provide additional electrical clearance between circuit breaker poles for special termination applications. Barriers are high dielectric insulating plates that are installed in the molded slots between the terminals. (Field installation only.)

Interphase Barriers

| Description | Catalog Number |
|----------------------------------|----------------|
| Interphase barriers ^④ | IPB5 |

Notes

- ^① Single terminals individually packed.
- ^② Required for four-wire systems if neutral protection is desired. Sold separately.
- ^③ Metric hardware included with breaker.
- ^④ Included as standard on 100% rated 1200 A breakers only.

Accessories

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Allowable Accessory Combinations

Different combinations of accessories can be supplied, depending on the types of accessories and the number of poles in the circuit breaker.

NG-Frame Accessories

| Description | Reference Page | Three-Pole | | | Four-Pole | | | |
|--|----------------|------------|--------|-------|-----------|--------|-------|------|
| | | Left | Center | Right | Left | Center | Right | Neu. |
| Internal Accessories (Only One Internal Accessory Per Pole) | | | | | | | | |
| Alarm lockout (Make/Break) | V4-T2-211 | ● | | ■ | ● | | ■ | |
| Auxiliary switch (1A, 1B) | V4-T2-211 | ● | | ■ | ● | | ■ | |
| Auxiliary switch (2A, 2B) | V4-T2-211 | ● | | ■ | ● | | ■ | |
| Auxiliary switch and alarm switch combination | V4-T2-211 | ● | | ■ | ● | | ■ | |
| Shunt trip—standard | V4-T2-211 | ■ | | | ■ | | | |
| Undervoltage release mechanism | V4-T2-212 | ■ | | | ■ | | | |
| External Accessories | | | | | | | | |
| Base mounting hardware | V4-T2-171 | ● | ● | ● | ● | ● | ● | ● |
| Interphase barriers | V4-T2-171 | ● | ● | ● | ● | ● | ● | ● |
| Non-padlockable handle block | V4-T2-209 | | ■ | | | ■ | | |
| Padlockable handle lock hasp | V4-T2-209 | □ | | □ | □ | | □ | |
| Key interlock kit | V4-T2-209 | □ | | □ | □ | | □ | |
| Sliding bar interlock—requires two breakers | V4-T2-209 | ● | ● | ● | | | | |
| Electrical operator | V4-T2-209 | ● | ● | ● | ● | ● | ● | ● |
| Plug-in adapters | V4-T2-216 | ● | ● | ● | ● | ● | ● | ● |
| Rear connecting studs | V4-T2-209 | ● | ● | ● | ● | ● | ● | ● |
| Handle mechanisms | V4-T2-494 | ● | ● | ● | ● | ● | ● | ● |
| Drawout cassette | V4-T2-217 | ● | ● | ● | ● | ● | ● | ● |
| Handle extension | V4-T2-171 | ● | ● | ● | ● | ● | ● | ● |
| Ammeter/cause of trip display | V4-T2-208 | ● | ● | ● | ● | ● | ● | ● |
| Cause of trip LED module | V4-T2-208 | ● | ● | ● | ● | ● | ● | ● |
| Digitrip 310+ test kit | V4-T2-208 | ● | ● | ● | ● | ● | ● | ● |
| Modifications (Refer to Eaton) | | | | | | | | |
| Moisture fungus treatment | V4-T2-207 | ● | ● | ● | ● | ● | ● | ● |
| Freeze-tested circuit breakers | — | ● | ● | ● | ● | ● | ● | ● |
| Marine/Naval application, UL 489 Supplement SA and SB | ① | ● | ● | ● | ● | ● | ● | ● |

Legend

- Applicable in indicated pole position
- May be mounted on left or right pole—not both
- Accessory available/modification available

Note

① Contact Eaton.

Technical Data and Specifications

Interrupting Capacity Ratings

UL 489/IEC 60947-2 Interrupting Capacity Ratings ^①

| Circuit Breaker Type | Number of Poles | Interrupting Capacity (kA Symmetrical Amperes) | | | | | | | | |
|----------------------|-----------------|--|-----------------|-----------------|-----------------|-----------------|-----|-----|-----------------|-----------------|
| | | Volts AC (50/60 Hz) | | | | | | | | |
| | | 220–240 | | 380–415 | | 690 | | | | |
| | | 240 (UL) | I _{cu} | I _{cs} | I _{cu} | I _{cs} | 480 | 600 | I _{cu} | I _{cs} |
| NGS ^① | 2, 3, 4 | 65 | 85 | 85 | 50 | 50 | 50 | 25 | 20 | 10 |
| NGH | 2, 3, 4 | 100 | 100 | 100 | 70 | 50 | 65 | 35 | 25 | 13 |
| NGC | 2, 3, 4 | 200 | 200 | 100 | 100 | 50 | 100 | 65 | 35 | 18 |
| NGU | 3, 4 | 200 | — | — | — | — | 150 | 65 | — | — |

NG-Frame Digitrip Specifications

NG 310+ Specifications

| Description | Specification |
|---|---------------------------------|
| Trip Unit Type | Digitrip RMS 310+ |
| Breaker Type | |
| Frame designation | NG |
| Frames available | 800 A, 1200 A |
| Continuous current range (A) | 320–1200A |
| Ground fault pickup (A) | 160–1200A |
| Interrupting capacities at 480 Vac (kAIC) | 35, 65, 100, 150 |
| 100% rated | Yes |
| Protection | |
| Ordering options | LS, LSI, LSG, LSIG, ALSI, ALSIG |
| Arcflash reduction maintenance system (or maintenance mode) | Yes |
| Interchangeable trip unit | No |
| High load alarm (suffix B20) ^② | Yes |
| Ground fault alarm with trip (suffix B21) ^② | Yes |
| Ground fault alarm, no trip (suffix B22) ^② | Yes |
| Zone selective interlocking (suffix ZG) | LSI, LSIG, ALSI, ALSIG |
| Cause of trip indication | Yes |
| Thru-cover accessories | No |

Notes

^① 1600 amperes is not a UL or CSA listed rating. 1200 amperes is the maximum UL and CSA rating for NG.

^② B2x suffixes cannot be combined with B2x suffixes.

NG 310+ Adjustability Specifications

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| 310+ Settings | NG Frame | | |
|---|--------------|-----------------------------------|-----------------------------------|
| | 800 A | 1200 A | |
| I_r = continuous current or long delay pickup (amperes) (All 310+) | I_r | | |
| | A | 320 | 500 |
| | B | 400 | 600 |
| | C | 450 | 630 |
| | D | 500 | 700 |
| | E | 600 | 800 |
| | F | 630 | 900 |
| | G | 700 | 1000 |
| | H (= I_n) | 800 | 1200 |
| t_r = long delay time (seconds) (All 310+) | Position 1 | 2 | 2 |
| | Position 2 | 4 | 4 |
| | Position 3 | 6 | 7 |
| | Position 4 | 8 | 10 |
| | Position 5 | 10 | 12 |
| | Position 6 | 12 | 15 |
| | Position 7 | 14 | 20 |
| | Position 8 | 14 | 24 |
| I_{sd} (x I_r) = short delay pickup (All 310+) | Position 1 | 2x | 2x |
| | Position 2 | 3x | 3x |
| | Position 3 | 4x | 4x |
| | Position 4 | 5x | 5x |
| | Position 5 | 6x | 6x |
| | Position 6 | 7x | 7x |
| | Position 7 | 8x | 8x |
| | Position 8 | 9x | 9x |
| | Position 9 | 9x | 9x |
| t_{sd} = short delay time I^2t (milliseconds) (LS, LSG) | Fixed | 67 at10x | 67 at10x |
| t_{sd} = short delay time flat (milliseconds) (LSI, LSIG, ALSI, ALSIG) ① | Position 1 | Inst | Inst |
| | Position 2 | 120 | 120 |
| | Position 3 | 300 | 300 |
| I_g = ground fault pickup (amperes) (LSG, LSIG, ALSIG) | Position 1 | 160 | 240 |
| | Position 2 | 240 | 360 |
| | Position 3 | 320 | 480 |
| | Position 4 | 480 | 720 |
| | Position 5 | 640 | 960 |
| | Position 6 | 800 | 1200 |
| t_g = ground fault delay time (milliseconds) (LSG, LSIG, ALSIG) | Position 1 | Inst | Inst |
| | Position 2 | 120 | 120 |
| | Position 3 | 300 | 300 |
| Independently Adjustable Instantaneous (I_i) setting (ALSI, ALSIG) | Yes | 2.5x, 4x, 6x, 7x, 8x, 10x, 18x | 2.5x, 4x, 6x, 7x, 8x, 10x, 12x |
| Maintenance Mode (remote) pickup ($2.5 \times I_n$) (ALSI, ALSIG) ② | Fixed | 2.5x | 2.5x |

Notes

① 50 ms for ALSI and ALSIG trip units.

② Maintenance Mode is enabled remotely using a 24 Vdc circuit.

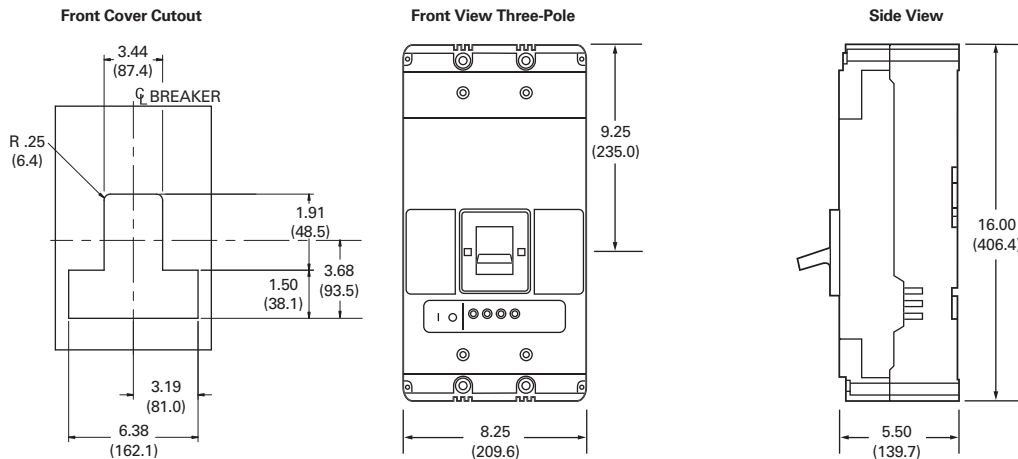
Dimensions and Weights

Approximate Dimensions in Inches (mm)

NG-Frame

| Number of Poles | Width | Height | Depth |
|-----------------|---------------|---------------|--------------|
| 3 | 8.25 (209.6) | 16.00 (406.4) | 5.50 (139.7) |
| 4 | 11.13 (282.6) | 16.00 (406.4) | 5.50 (139.7) |

NG-Frame



Approximate Shipping Weight in Lbs (kg)

NG-Frame

| Breaker Type | Complete Breaker | |
|---------------|------------------|-----------|
| | Three-Pole | Four-Pole |
| NGS, NGH, NGC | 45 (20.4) | 58 (26.3) |

RG-Frame (800–2500 Amperes)

2



Contents

| <i>Description</i> | <i>Page</i> |
|---|------------------|
| EG-Frame (15–125 Amperes) | V4-T2-117 |
| JG-Frame (63–250 Amperes) | V4-T2-131 |
| LG-Frame (250–630 Amperes) | V4-T2-149 |
| NG-Frame (320–1200 Amperes) | V4-T2-167 |
| RG-Frame (800–2500 Amperes) | |
| Catalog Number Selection | V4-T2-177 |
| Product Selection | V4-T2-178 |
| Accessories | V4-T2-183 |
| Technical Data and Specifications | V4-T2-184 |
| Dimensions and Weights | V4-T2-186 |
| Motor Circuit Protectors (MCP) | V4-T2-187 |
| Motor Protector Circuit Breakers (MPCB) | V4-T2-191 |
| 30 mA Ground Fault (Earth Leakage) Module | V4-T2-194 |
| Current Limiting Circuit Breaker Module | V4-T2-198 |
| High Instantaneous Circuit Breaker for | |
| Selective Coordination | V4-T2-203 |
| Special Features and Accessories | V4-T2-206 |
| Motor Operators | V4-T2-214 |
| Plug-In Blocks | V4-T2-216 |
| Drawout Cassette | V4-T2-217 |

RG-Frame (800–2500 Amperes)

Product Description

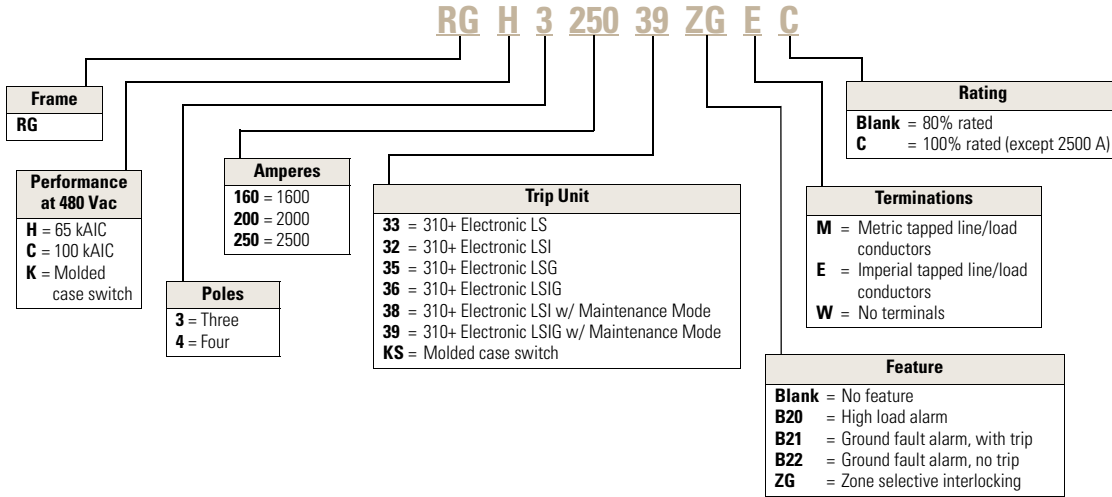
- Eaton's RG-Frame circuit breakers are available as frame (which includes trip unit), rating plug and terminals
- All R-Frame circuit breakers are suitable for reverse feed use

Catalog Number Selection

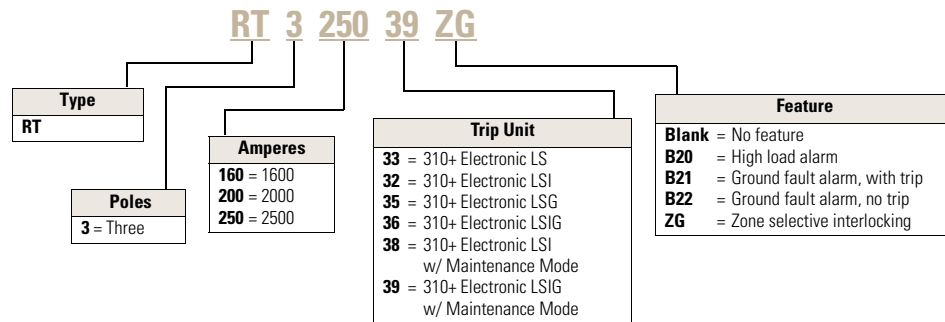
This information is presented only as an aid to understanding catalog numbers. It is not to be used to build catalog numbers for circuit breakers or trip units.

70 kA at 415 Vac and 65 kA at 480 Vac

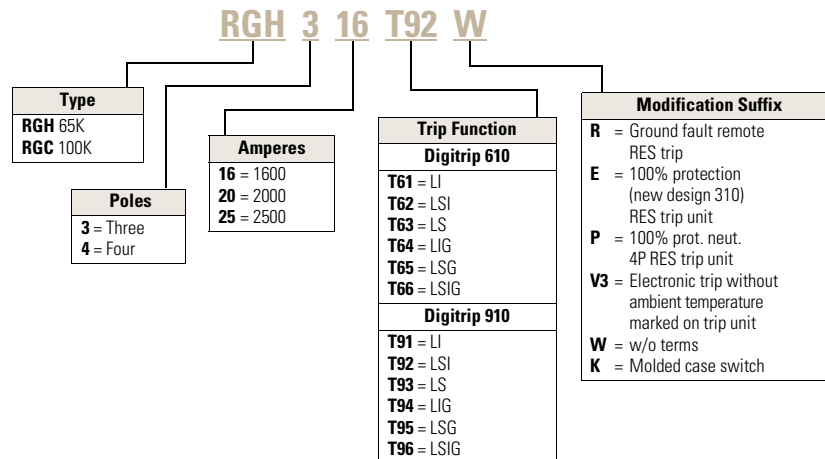
RG Circuit Breaker With 310+ Electronic Trip Unit



RG 310+ Electronic Trip Unit



RG Circuit Breaker with OPTIM 610 and 910 Electronic Trip Unit



Product Selection

70 kA at 415 Vac and 65 kA at 480 Vac

Type RGH with Digitrip 310+ High Interrupting Capacity— U_e Maximum 690 Vac, 70 kA I_{cu} at 415 Vac

See 310+ adjustability specifications on Page V4-T2-185.

| Maximum Continuous Ampere Rating at 40 °C ① | Number of Poles | Circuit Breaker Frame Including Digitrip RMS 310+ Electronic Trip Unit with Adjustable Rating Plugs—Catalog Number ② | | | | | | Neutral CT for LSG and LSIG ④ |
|---|-----------------|--|------------|------------|------------|------------|------------|-------------------------------|
| | | LS | LSI | LSG ③ | LSIG ③ | ALSI | ALSIG | |
| 1600 ① | 3 | RGH316033E | RGH316032E | RGH316035E | RGH316036E | RGH316038E | RGH316039E | RGFCT160A |
| 2000 | 3 | RGH320033E | RGH320032E | RGH320035E | RGH320036E | RGH320038E | RGH320039E | RGFCT200A |
| 2500 | 3 | RGH325033E | RGH325032E | RGH325035E | RGH325036E | RGH325038E | RGH325039E | RGFCT250A |

100 kA at Both 415 Vac and 480 Vac

Type RGH with Digitrip 310+ High Interrupting Capacity— U_e Maximum 690 Vac, 70 kA I_{cu} at 415 Vac

See 310+ adjustability specifications on Page V4-T2-185.

| Maximum Continuous Ampere Rating at 40 °C ① | Number of Poles | Circuit Breaker Frame Including Digitrip RMS 310+ Electronic Trip Unit with Adjustable Rating Plugs—Catalog Number ② | | | | | |
|---|-----------------|--|------------|--------|---------|------------|----------|
| | | LS | LSI | LSG ③⑤ | LSIG ③⑤ | ALSI | ALSIG ③⑤ |
| 1600 ① | 4 ⑥ | RGH416033E | RGH416032E | — | — | RGH416038E | — |
| 2000 | 4 ⑥ | RGH420033E | RGH420032E | — | — | RGH420038E | — |
| 2500 | 4 ⑥ | RGH425033E | RGH425032E | — | — | RGH425038E | — |

Notes

① For SCR application, use 2000 ampere frame.

② Order terminals separately. Mounting hardware not included.

③ Ground fault equipped trip units available with remote indicating panel. Add "R" to catalog number, for example, "RGH316035RW."

④ Required for four-wire systems if neutral protection is desired. Sold separately.

⑤ No neutral protection available on four-pole breakers with LSG or LSIG trip units.

⑥ Unprotected left pole neutral. Add "P" to catalog number for 100% protected left pole neutral, add "E" for 60% protected, for example, "RGH416033PW," "RGH416033EW."

RG MCCBs have English threading on line and load conductors. Use suffix "M" for metric threading.

100 kA at Both 415 Vac and 480 Vac**Type RGC with Digitrip 310+ Very High Interrupting Capacity— U_e Maximum 690 Vac, 100 kA I_{cu} at 415 Vac**See 310+ adjustability specifications on **Page V4-T2-185**.

| Maximum Continuous Ampere Rating at 40 °C ① | Number of Poles | Circuit Breaker Frame Including Digitrip RMS 310+ Electronic Trip Unit with Adjustable Rating Plugs—Catalog Number ② | | | | | | Neutral CT for LSG and LSIG ④ |
|---|-----------------|--|------------|------------|------------|------------|------------|-------------------------------|
| | | LS | LSI | LSG ③ | LSIG ③ | ALSI | ALSIG | |
| 1600 ① | 3 | RGC316033E | RGC316032E | RGC316035E | RGC316036E | RGC316038E | RGC316039E | RGFCT160A |
| 2000 | 3 | RGC320033E | RGC320032E | RGC320035E | RGC320036E | RGC320038E | RGC320039E | RGFCT200A |
| 2500 | 3 | RGC325033E | RGC325032E | RGC325035E | RGC325036E | RGC325038E | RGC325039E | RGFCT250A |

Type RGC with Digitrip 310+ Very High Interrupting Capacity— U_e Maximum 690 Vac, 100 kA I_{cu} at 415 Vac, continuedSee 310+ adjustability specifications on **Page V4-T2-185**.

| Maximum Continuous Ampere Rating at 40 °C ① | Number of Poles | Circuit Breaker Frame Including Digitrip RMS 310+ Electronic Trip Unit with Adjustable Rating Plugs—Catalog Number ② | | | | | |
|---|-----------------|--|------------|--------|---------|------------|----------|
| | | LS | LSI | LSG ③⑤ | LSIG ③⑤ | ALSI | ALSIG ③⑤ |
| 1600 ① | 4 ⑥ | RGC416033E | RGC416032E | — | — | RGC416038E | — |
| 2000 | 4 ⑥ | RGC420033E | RGC420032E | — | — | RGC420038E | — |
| 2500 | 4 ⑥ | RGC425033E | RGC425032E | — | — | RGC425038E | — |

Molded Case Switches ⑦

| Ampere Rating | Number of Poles | Catalog Number |
|---------------|-----------------|----------------|
| 1600 | 3 | RGK3160KSE |
| 2000 | 3 | RGK3200KSE |
| 1600 | 4 | RGK4160KSE |
| 2000 | 4 | RGK4200KSE |

Notes

- ① For SCR application, use 2000 ampere frame.
 ② Order terminals separately. Mounting hardware not included.
 ③ Ground fault equipped trip units available with remote indicating panel. Add "R" to catalog number, for example, "RGH316035RW."
 ④ Required for four-wire systems if neutral protection is desired. Sold separately.
 ⑤ No neutral protection available on four-pole breakers with LSG or LSIG trip units.
 ⑥ Unprotected left pole neutral. Add "P" to catalog number for 100% protected left pole neutral, add "E" for 60% protected, for example, "RGH416033PW," "RGH416033EW."
 ⑦ Molded case switch will trip above 17,500 amperes.

RG MCCBs have English threading on line and load conductors. Use suffix "M" for metric threading.

2.3

Molded Case Circuit Breakers

Series G

2

Type RG with Digitrip 610 and 910

Circuit Breaker Frame Including Digitrip RMS 610 and 910 Electronic Trip Unit with Rating Plugs
Order as Individual Component—Catalog Number ①

| Maximum Continuous Ampere Rating at 40 °C | Number of Poles | Circuit Breaker Frame Including Digitrip RMS 610 and 910 Electronic Trip Unit with Rating Plugs Order as Individual Component—Catalog Number ① | | | | | | Digitrip RMS Interchangeable Rating Plug (Order as Individual Component) | |
|---|-----------------|---|----------------------|--------------------------|-----------------------------|-----------------------------|-----------------------------|--|----------------|
| | | LI | LS | LSI | LIG | LSG | LSIG | Ampere Rating | Catalog Number |
| Long Delay Pickup | | 0.5–1.0 x I _n | 0.5–1.0 _n | 0.5–1.0 x I _n | 0.5–1.0 x I _n | 0.5–1.0 x I _n | 0.5–1.0 x I _n | | |
| Long Delay Time | | 2–24 Seconds | 2–24 Seconds | 2–24 Seconds | 2–24 Seconds | 2–24 Seconds | 2–24 Seconds | | |
| Short Time Range | | 2–6 x I _r | 2–6 x I _r | 2–6 x I _r | 2–6 x I _r | 2–6 x I _r | 2–6 x I _r | | |
| Short Time Delay | | — | 100–500 ms | 100–500 ms | — | 100–500 ms | 100–500 ms | | |
| Instantaneous | | 2–6 x M1 and M2 | — | 2–6 x M1 and M2 | 2–6 x M1 and M2 | — | 2–6 x M1 and M2 | | |
| Ground Fault Pickup | | — | — | — | 0.25–1.0 x I _n ② | 0.25–1.0 x I _n ② | 0.25–1.0 x I _n ② | | |
| Ground Fault Delay | | — | — | — | 100–500 ms | 100–500 ms | 100–500 ms | | |

Type RGH with Digitrip 610 High Interrupting Capacity—U_e Max. 690 Vac, 70 kA I_{cu} at 415 Vac

| Rating | Poles | LI | LS | LSI | LIG | LSG | LSIG | Ampere Rating | Catalog Number |
|-----------------------------|-------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|----------------|
| 1600 | 3 | RGH316T61WP44 | RGH316T63WP44 | RGH316T62WP44 | RGH316T64WP44 | RGH316T65WP44 | RGH316T66WP44 | 800 | RP6R16A080 |
| | | | | | | | | 1000 | RP6R16A100 |
| | | | | | | | | 1200 | RP6R16A120 |
| | | | | | | | | 1250 | RP6R16A125 |
| | | | | | | | | 1600 | RP6R16A160 |
| Includes 1600 A rating plug | | | | | | | | | |
| 2000 | 3 | RGH320T61WP49 | RGH320T63WP49 | RGH320T62WP49 | RGH320T64WP49 | RGH320T65WP49 | RGH320T66WP49 | 1000 | RP6R20A100 |
| | | | | | | | | 1200 | RP6R20A120 |
| | | | | | | | | 1250 | RP6R20A125 |
| | | | | | | | | 1600 | RP6R20A160 |
| | | | | | | | | 2000 | RP6R20A200 |
| Includes 2000 A rating plug | | | | | | | | | |
| 2500 | 3 | RGH325T61WP53 | RGH325T63WP53 | RGH325T62WP53 | RGH325T64WP53 | RGH325T65WP53 | RGH325T66WP53 | 1600 | RP6R25A160 |
| | | | | | | | | 2000 | RP6R25A200 |
| | | | | | | | | 2500 | RP6R25A250 |

Type RGC with Digitrip 610 Very High Interrupting Capacity—U_e Max. 690 Vac, 100 kA I_{cu} at 415 Vac

| Rating | Poles | LI | LS | LSI | LIG | LSG | LSIG | Ampere Rating | Catalog Number |
|-----------------------------|-------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|----------------|
| 1600 | 3 | RGC316T61WP44 | RGC316T63WP44 | RGC316T62WP44 | RGC316T64WP44 | RGC316T65WP44 | RGC316T66WP44 | 800 | RP6R16A080 |
| | | | | | | | | 1000 | RP6R16A100 |
| | | | | | | | | 1200 | RP6R16A120 |
| | | | | | | | | 1250 | RP6R16A125 |
| | | | | | | | | 1600 | RP6R16A160 |
| Includes 1600 A rating plug | | | | | | | | | |
| 2000 | 3 | RGC320T61WP49 | RGC320T63WP49 | RGC320T62WP49 | RGC320T64WP49 | RGC320T65WP49 | RGC320T66WP49 | 1000 | RP6R20A100 |
| | | | | | | | | 1200 | RP6R20A120 |
| | | | | | | | | 1250 | RP6R20A125 |
| | | | | | | | | 1600 | RP6R20A160 |
| | | | | | | | | 2000 | RP6R20A200 |
| Includes 2000 A rating plug | | | | | | | | | |
| 2500 | 3 | RGC325T61WP53 | RGC325T63WP53 | RGC325T62WP53 | RGC325T64WP53 | RGC325T65WP53 | RGC325T66WP53 | 1600 | RP6R25A160 |
| | | | | | | | | 2000 | RP6R25A200 |
| | | | | | | | | 2500 | RP6R25A250 |

Notes

① Order terminals separately. Mounting hardware not included.

② Not to exceed 1200 ampere ground fault pickup.

RG MCCBs have metric threading on line and load conductors. Use RD MCCBs if imperial threading is required.

Type RG with Digitrip 610 and 910, continued

| | | Circuit Breaker Frame Including Digitrip RMS 610 and 910 Electronic Trip Unit with Rating Plugs Order as Individual Component—Catalog Number ① | | | | | | Digitrip RMS Interchangeable Rating Plug (Order as Individual Component) | | | |
|--|-----------------|---|---------------|-----------------|--------------------|--------------------|--------------------|--|---------------|----------------|--|
| Maximum Continuous Ampere Rating at 40 °C | Number of Poles | L – Adjustable Long Delay Pickup (I_L) with Adjustable Long Delay Time S – Adjustable Short Delay Pickup with Adjustable Short Delay Time (I^2t or Flat Response) I – Adjustable Instantaneous Pickup G – Adjustable Ground Fault Pickup with Adjustable Ground Fault Time Delay (I^2t or Flat Response) | | | | | | Fixed Rating Plug | Ampere Rating | Catalog Number | |
| | | LI | LS | LSI | LIG | LSG | LSIG | | | | |
| Long Delay Pickup | | 0.5–1.0 x I_n | 0.5–1.0 $_n$ | 0.5–1.0 x I_n | 0.5–1.0 x I_n | 0.5–1.0 x I_n | 0.5–1.0 x I_n | | | | |
| Long Delay Time | | 2–24 Seconds | 2–24 Seconds | 2–24 Seconds | 2–24 Seconds | 2–24 Seconds | 2–24 Seconds | | | | |
| Short Time Range | | 2–6 x I_r | 2–6 x I_r | 2–6 x I_r | 2–6 x I_r | 2–6 x I_r | 2–6 x I_r | | | | |
| Short Time Delay | | — | 100–500 ms | — | — | 100–500 ms | 100–500 ms | | | | |
| Instantaneous | | 2–6 x M1 and M2 | — | 2–6 x M1 and M2 | 2–6 x M1 and M2 | — | 2–6 x M1 and M2 | | | | |
| Ground Fault Pickup | | — | — | — | 0.25–1.0 x I_n ② | 0.25–1.0 x I_n ② | 0.25–1.0 x I_n ② | | | | |
| Ground Fault Delay | | — | — | — | 100–500 ms | 100–500 ms | 100–500 ms | | | | |
| Type RGH with Digitrip 910 High Interrupting Capacity—U_e Max. 690 Vac, 70 kA I_{cu} at 415 Vac | | | | | | | | | | | |
| 1600 | 3 | RGH316T91WP44 | RGH316T93WP44 | RGH316T92WP44 | RGH316T94WP44 | RGH316T95WP44 | RGH316T96WP44 | 800 | RP6R16A080 | | |
| | | | | | | | | 1000 | RP6R16A100 | | |
| | | | | | | | | 1200 | RP6R16A120 | | |
| | | | | | | | | 1250 | RP6R16A125 | | |
| | | Includes 1600 A rating plug | | | | | | | 1600 | RP6R16A160 | |
| 2000 | 3 | RGH320T91WP49 | RGH320T93WP49 | RGH320T92WP49 | RGH320T94WP49 | RGH320T95WP49 | RGH320T96WP49 | 1000 | RP6R20A100 | | |
| | | | | | | | | 1200 | RP6R20A120 | | |
| | | | | | | | | 1250 | RP6R20A125 | | |
| | | | | | | | | 1600 | RP6R20A160 | | |
| | | Includes 2000 A rating plug | | | | | | | 2000 | RP6R20A200 | |
| 2500 | 3 | RGH325T91WP53 | RGH325T93WP53 | RGH325T92WP53 | RGH325T94WP53 | RGH325T95WP53 | RGH325T96WP53 | 1600 | RP6R25A160 | | |
| | | | | | | | | 2000 | RP6R25A200 | | |
| | | | | | | | | 2500 | RP6R25A250 | | |
| | | Includes 2500 A rating plug | | | | | | | | | |
| Type RGC with Digitrip 910 Very High Interrupting Capacity—U_e Max. 690 Vac, 100 kA I_{cu} at 415 Vac | | | | | | | | | | | |
| 1600 | 3 | RGC316T91WP44 | RGC316T93WP44 | RGC316T92WP44 | RGC316T94WP44 | RGC316T95WP44 | RGC316T96WP44 | 800 | RP6R16A080 | | |
| | | | | | | | | 1000 | RP6R16A100 | | |
| | | | | | | | | 1200 | RP6R16A120 | | |
| | | | | | | | | 1250 | RP6R16A125 | | |
| | | Includes 1600 A rating plug | | | | | | | 1600 | RP6R16A160 | |
| 2000 | 3 | RGC320T91WP49 | RGC320T93WP49 | RGC320T92WP49 | RGC320T94WP49 | RGC320T95WP49 | RGC320T96WP49 | 1000 | RP6R20A100 | | |
| | | | | | | | | 1200 | RP6R20A120 | | |
| | | | | | | | | 1250 | RP6R20A125 | | |
| | | | | | | | | 1600 | RP6R20A160 | | |
| | | Includes 2000 A rating plug | | | | | | | 2000 | RP6R20A200 | |
| 2500 | 3 | RGC325T91WP53 | RGC325T93WP53 | RGC325T92WP53 | RGC325T94WP53 | RGC325T95WP53 | RGC325T96WP53 | 1600 | RP6R25A160 | | |
| | | | | | | | | 2000 | RP6R25A200 | | |
| | | | | | | | | 2500 | RP6R25A250 | | |
| | | Includes 2500 A rating plug | | | | | | | | | |

Notes

① Order terminals separately. Mounting hardware not included.

② Not to exceed 1200 ampere ground fault pickup.

RG MCCBs have metric threading on line and load conductors. Use RD MCCBs if imperial threading is required.

Accessories Selection Guide and Ordering Information

2

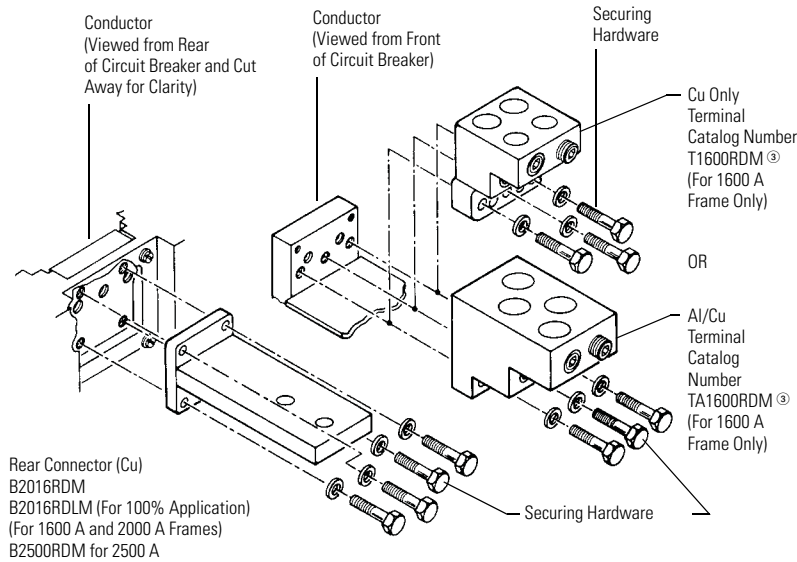
Line and Load Terminals

R-Frame circuit breakers use Cu/Al terminals as standard and copper only terminals as an option. Specify if factory installation is required. Must have terminals for 100% rated and or freeze testing requirements.

Line and Load Terminals

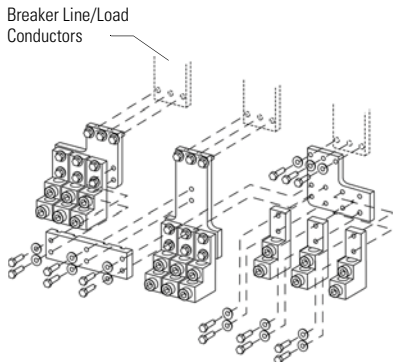
| Maximum Breaker Amperes | Terminal Body Material | Wire Type | Hardware | AWG/kcmil Wire Range/ Number of Conductors | Metric Wire Range mm ² | Catalog Number |
|-------------------------|------------------------|-----------|----------|--|-----------------------------------|--------------------|
| Wire Terminals | | | | | | |
| 1600 | Aluminum | Cu/Al | Metric | 500–1000 (4) | 300–500 | TA1600RDM ① |
| 1600 | Copper | Cu | Metric | 1–600 (4) | 50–300 | T1600RDM ① |
| 2000 | Aluminum | Cu/Al | Metric | 2–600 (6) | 35–300 | TA2000RDM ② |
| Rear Connectors | | | | | | |
| 2000 | Copper | — | Metric | — | — | B2016RDM ① |
| 2000 | Copper | — | Metric | — | — | B2016RDLM ① |
| 2500 | Copper | — | Metric | — | — | B2500RDM ① |

RG Rear Connector Exploded View



TA2000RD Wire Terminal

Note: Order one TA2000RDM kit per three poles. Catalog number includes bus connection, terminals and hardware for either line side or load side of three-pole breaker.



Base Mounting Hardware

Supplied by customer.

Handle Extension

Included with breaker. Additional handle extensions are available.

Handle Extension

| Description | Catalog Number |
|-------------------------|----------------|
| Single handle extension | HEX6 |

Wire Seal

The wire seal can be used to secure the cover on the trip unit to prevent adjustments after settings are confirmed.

Wire Seal

| Description | Catalog Number |
|-------------|-------------------|
| Wire seal | 5108A03H01 |

Notes

- ① Order one per pole—single terminals individually packed.
- ② Order one TA2000RD kit per three poles. Catalog number includes bus connection, terminals and hardware for either line side or load side of three-pole breaker.
- ③ For use with 2500 A Frame. Do not order separately unless for replacement purposes. Included in breaker carton when 2500 A frame is ordered.

RG MCCBs have metric threading on line and load conductors. Use RD MCCBs if imperial threading is required.

Accessories

Allowable Accessory Combinations

Different combinations of accessories can be supplied, depending on the types of accessories and the number of poles in the circuit breaker.

RG-Frame Accessories

| Description | Reference Page | Three-Pole | | | Four-Pole | | | |
|--|----------------|------------|--------|-------|-----------|--------|-------|---------|
| | | Left | Center | Right | Left | Center | Right | Neutral |
| Internal Accessories (Only One Internal Accessory Per Pole) | | | | | | | | |
| Alarm lockout (Make/Break) | V4-T2-211 | | | ■ | | | ■ | |
| Auxiliary switch (1A, 1B) | V4-T2-211 | | | ■ | | | ■ | |
| Auxiliary switch (2A, 2B) | V4-T2-211 | | | ■ | | | ■ | |
| Auxiliary switch and alarm switch combination | V4-T2-211 | | | ■ | | | ■ | |
| Shunt trip—standard | V4-T2-211 | | | ● | | | ● | |
| Undervoltage release mechanism | V4-T2-212 | | | ● | | | ● | |
| External Accessories | | | | | | | | |
| Base mounting hardware | V4-T2-182 | ● | ● | ● | ● | ● | ● | ● |
| Padlockable handle lock hasp | V4-T2-209 | □ | | □ | □ | | □ | |
| Key interlock kit | V4-T2-209 | □ | | □ | □ | | □ | |
| Electrical operator | V4-T2-209 | ● | ● | ● | ● | ● | ● | ● |
| Handle mechanisms | V4-T2-494 | ● | ● | ● | ● | ● | ● | ● |
| Handle extension | V4-T2-182 | ● | ● | ● | ● | ● | ● | ● |
| Digitrip 310+ test kit | V4-T2-208 | ● | ● | ● | ● | ● | ● | ● |
| Modifications (Refer to Eaton) | | | | | | | | |
| Moisture fungus treatment | V4-T2-207 | ● | ● | ● | ● | ● | ● | ● |
| Freeze-tested circuit breakers | — | ● | ● | ● | ● | ● | ● | ● |
| Marine/naval application, UL 489 Supplement SA and SB | ① | ● | ● | ● | ● | ● | ● | ● |

Legend

- Applicable in indicated pole position
- May be mounted on left or right pole—not both
- Accessory available/modification available

310+ Electronic Trip Unit Accessories

| Description | Catalog Number |
|--|----------------|
| Electronic portable test kit | MTST230V |
| Trip unit tamper protection wire seal | 5108A03H01 |
| External neutral sensor (2500 A) ② | RGFCT250A |
| External neutral sensor (2000 A) ② | RGFCT200A |
| External neutral sensor (1600 A) ② | RGFCT160A |
| Breaker-mount cause-of-trip indication ③ | — |
| Breaker-mount ammeter module | DIGIVIEW |
| Remote-mount ammeter module | DIGIEWR06 |

Notes

- ① Contact Eaton.
- ② Required for four-wire systems if neutral protection is desired. Sold separately.
- ③ Cause-of-trip indication LEDs integrated in RG 310+ trip units.

Technical Data and Specifications

2

UL 489/CSA Interrupting Capacity Ratings ^①

| Circuit Breaker Type | Number of Poles | Interrupting Capacity (kA Symmetrical Amperes) | | | |
|----------------------|-----------------|--|-----|-----|-----|
| | | Volts AC (50/60 Hz) | | | |
| | | 240 | 277 | 480 | 600 |
| RGH | 3, 4 | 125 | — | 65 | 50 |
| RGC | 3, 4 | 200 | — | 100 | 65 |

IEC 947-2 Interrupting Capacity Ratings ^①

| Circuit Breaker Type | Number of Poles | Interrupting Capacity (kA Symmetrical Amperes) | | |
|----------------------|-----------------|--|-----|-----|
| | | Volts AC (50/60 Hz) | | |
| | | 240 | 415 | 690 |
| RGH | 3, 4 | | | |
| I_{cu} | | 135 | 70 | 25 |
| I_{cs} | | 100 | 50 | 13 |
| RGC | 3, 4 | | | |
| I_{cu} | | 200 | 100 | 35 |
| I_{cs} | | 100 | 50 | 18 |

RG 310+ Specifications

| Description | Specification |
|---|---------------------------------|
| Trip Unit Type | Digitrip RMS 310+ |
| Breaker Type | |
| Frame designation | RG |
| Frames available | 1600 A, 2000 A, 2500 A |
| Continuous current range (A) | 800–2500 A |
| Ground fault pickup (A) | 200–1200 A |
| Interrupting capacities at 480 Vac (kAIC) | 65, 100 |
| 100% rated | Yes |
| Protection | |
| Ordering options | LS, LSI, LSG, LSIG, ALSI, ALSIG |
| Arcflash reduction maintenance system (or maintenance mode) | Yes |
| Interchangeable trip unit | Yes |
| High load alarm (suffix B20) ^② | Yes |
| Ground fault alarm with trip (suffix B21) ^② | Yes |
| Ground fault alarm, no trip (suffix B22) ^② | Yes |
| Zone selective interlocking (suffix ZG) | LSI, LSIG, ALSI, ALSIG |
| Cause of trip indication | Yes |
| Thru-cover accessories | No |

Notes

^① Utilization Category A circuit breakers.

^② B2x suffixes cannot be combined with B2x suffixes.

See **Page V4-T2-176** for trip unit specifications.

RG 310+ Adjustability Specifications

| 310+ Settings | | RG Frame | | |
|---|--------------|------------------------------|-----------------------------|---------------------|
| | | 1600 A | 2000 A | 2500 A |
| I_r = continuous current or long delay pickup (amperes) (All 310+) | I_r | | | |
| | A | 800 | 1000 | 1600 |
| | B | 900 | 1200 | 1700 |
| | C | 1000 | 1400 | 1800 |
| | D | 1100 | 1600 | 2000 |
| | E | 1200 | 1700 | 2100 |
| | F | 1400 | 1800 | 2200 |
| | G | 1500 | 1900 | 2400 |
| | H (= I_n) | 1600 | 2000 | 2500 |
| t_r = long delay time (seconds) (All 310+) | Position 1 | 2 | 2 | 2 |
| | Position 2 | 4 | 4 | 4 |
| | Position 3 | 7 | 7 | 7 |
| | Position 4 | 10 | 10 | 10 |
| | Position 5 | 12 | 12 | 12 |
| | Position 6 | 15 | 15 | 15 |
| | Position 7 | 20 | 20 | 20 |
| | Position 8 | 24 | 24 | 24 |
| I_{sd} ($\times I_r$) = short delay pickup (All 310+) | Position 1 | 2x | 2x | 2x |
| | Position 2 | 3x | 3x | 2x |
| | Position 3 | 4x | 4x | 2x |
| | Position 4 | 5x | 5x | 3x |
| | Position 5 | 6x | 6x | 4x |
| | Position 6 | 7x | 7x | 5x |
| | Position 7 | 8x | 8x | 6x |
| | Position 8 | 8x | 8x | 6x |
| | Position 9 | 9x | 9x | 6x |
| t_{sd} = short delay time I^2t (milliseconds) (LS, LSG) | Fixed | 67 at10x | 67 at10x | 67 at10x |
| | | | | |
| t_{sd} = short delay time flat (milliseconds) (LSI, LSIG, ALSI, ALSIG) ① | Position 1 | Inst | Inst | Inst |
| | Position 2 | 120 | 120 | 120 |
| | Position 3 | 300 | 300 | 300 |
| | | | | |
| I_g = ground fault pickup (amperes) (LSG, LSIG, ALSIG) | Position 1 | 200 | 200 | 200 |
| | Position 2 | 400 | 400 | 400 |
| | Position 3 | 600 | 600 | 600 |
| | Position 4 | 800 | 800 | 800 |
| | Position 5 | 1000 | 1000 | 1000 |
| | Position 6 | 1200 | 1200 | 1200 |
| t_g = ground fault delay time (milliseconds) (LSG, LSIG, ALSIG) | Position 1 | Inst | Inst | Inst |
| | Position 2 | 120 | 120 | 120 |
| | Position 3 | 300 | 300 | 300 |
| Independently Adjustable Instantaneous (I_i) setting (ALSI, ALSIG) | Yes | 2.5x, 4x, 6x, 7x, 8x, 11x | 2.5x, 4x, 6x, 7x, 8x, 9x | 2.5x, 4x, 6x, 7x |
| Maintenance Mode (remote) pickup ($2.5 \times I_n$) (ALSI, ALSIG) ② | Fixed | 2.5x | 2.5x | 2.5x |

Notes

- ① 50 ms for ALSI and ALSIG trip units.
- ② Maintenance Mode is enabled remotely using a 24 Vdc circuit.

2.3

Molded Case Circuit Breakers

Series G

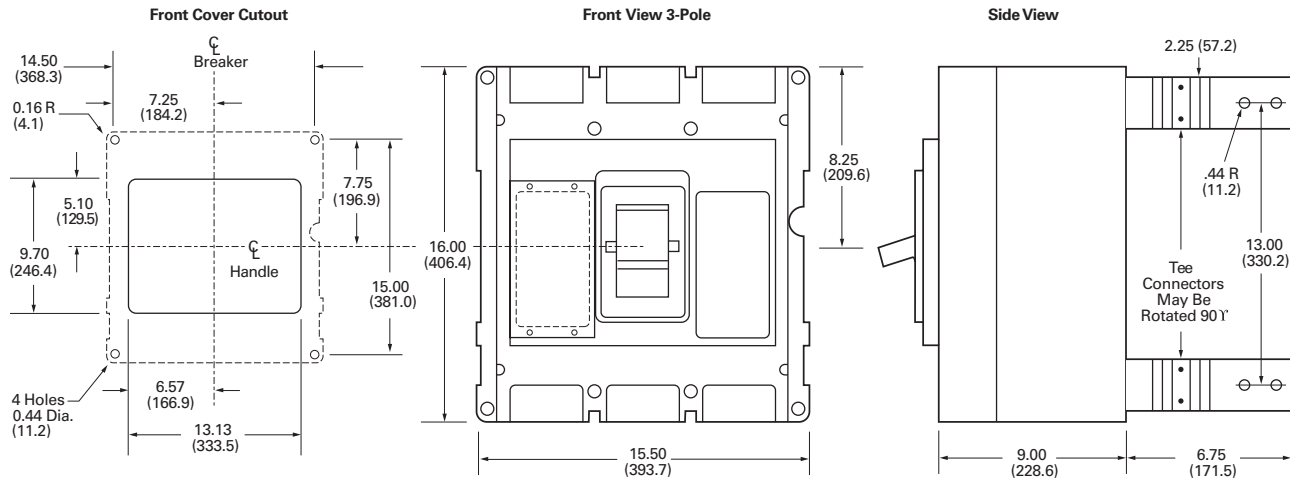
Dimensions and Weights

Approximate Dimensions in Inches (mm)

2

RG-Frame

| Number of Poles | Width | Height | Depth |
|-----------------|---------------|---------------|--------------|
| 3 | 15.50 (393.7) | 16.00 (406.4) | 9.75 (247.7) |
| 4 | 20.00 (508.0) | 16.00 (406.4) | 9.75 (247.7) |



Approximate Shipping Weight in Lbs (kg)

RG-Frame

| Breaker Type | Complete Breaker | |
|---------------------|----------------------------|------------|
| | Number of Poles Three-Pole | Four-Pole |
| 1600 Amperes | | |
| RGH, RGC | 102 (46.3) | 135 (61.2) |
| 2000 Amperes | | |
| RGH, RGC | 102 (46.3) | 135 (61.2) |
| 2500 Amperes | | |
| RGH, RGC | 135 (61.2) | 182 (82.6) |

Motor Circuit 480 Vac, Protectors



Motor Circuit Protectors (MCP)

Contents

| <i>Description</i> | <i>Page</i> |
|---|------------------|
| EG-Frame (15–125 Amperes) | V4-T2-117 |
| JG-Frame (63–250 Amperes) | V4-T2-131 |
| LG-Frame (250–630 Amperes) | V4-T2-149 |
| NG-Frame (320–1200 Amperes) | V4-T2-167 |
| RG-Frame (800–2500 Amperes) | V4-T2-176 |
| Motor Circuit Protectors (MCP) Product Selection Guide and Ordering Information | V4-T2-188 |
| Motor Protector Circuit Breakers (MPCB). | V4-T2-191 |
| 30 mA Ground Fault (Earth Leakage) Module. | V4-T2-194 |
| Current Limiting Circuit Breaker Module | V4-T2-198 |
| High Instantaneous Circuit Breaker for Selective Coordination | V4-T2-203 |
| Special Features and Accessories. | V4-T2-206 |
| Motor Operators | V4-T2-214 |
| Plug-In Blocks | V4-T2-216 |
| Drawout Cassette | V4-T2-217 |

Product Selection Guide and Ordering Information

2

EG-Frame—480 Vac, 600Y/347 Vac Maximum ^①

| Continuous Amperes | Cam Setting | Motor Full Load Current Amperes ^② | MCP Trip Setting ^③ | MCP Catalog Number |
|--------------------|-------------|--|-------------------------------|--------------------|
| 3 | A | 0.69–0.91 | 9 | HMCPE003A0C |
| | B | 1.1–1.3 | 15 | |
| | C | 1.6–1.7 | 21 | |
| | D | 2.0–2.2 | 27 | |
| | E | 2.3–2.5 | 30 | |
| | F | 2.6–2.8 | 33 | |
| 7 | A | 1.5–2.0 | 21 | HMCPE007C0C |
| | B | 2.6–3.1 | 35 | |
| | C | 3.7–3.9 | 49 | |
| | D | 4.8–5.2 | 63 | |
| | E | 5.3–5.7 | 70 | |
| | F | 5.8–6.1 | 77 | |
| 15 | A | 3.4–4.5 | 45 | HMCPE015E0C |
| | B | 5.7–6.8 | 75 | |
| | C | 8.0–9.1 | 105 | |
| | D | 10.4–11.4 | 135 | |
| | E | 11.5–12.6 | 150 | |
| | F | 12.7–13.0 | 165 | |
| 30 | A | 3.9–9.1 | 90 | HMCPE030H1C |
| | B | 11.5–13.7 | 150 | |
| | C | 16.1–18.3 | 210 | |
| | D | 20.7–22.9 | 270 | |
| | E | 23.0–25.2 | 300 | |
| | F | 25.3–26.1 | 330 | |

Notes

- ① UL listed for use with Eaton Motor Starters.
- ② Motor FLA ranges are typical. The corresponding trip setting is at 13 times the minimum FLA value shown. Where a 13 times setting is required for an intermediate FLA value, alternate cam settings and/or MCP ratings should be used.
- ③ For DC applications, actual trip levels are approximately 40% higher than values shown.

EG-Frame—480 Vac, 600Y/347 Vac Maximum, continued ^①

| Continuous Amperes | Cam Setting | Motor Full Load Current Amperes ^② | MCP Trip Setting ^③ | MCP Catalog Number |
|--------------------|-------------|--|-------------------------------|--------------------|
| 50 | A | 11.5–15.2 | 150 | HMCPE050K2C |
| | B | 19.2–22.9 | 250 | |
| | C | 26.9–30.6 | 350 | |
| | D | 34.6–38.3 | 450 | |
| | E | 38.4–42.1 | 500 | |
| | F | 42.2–43.5 | 550 | |
| 70 | A | 16.1–30.6 | 210 | HMCPE070M2C |
| | B | 26.9–32.2 | 350 | |
| | C | 37.6–42.9 | 490 | |
| | D | 48.4–53.7 | 630 | |
| | E | 53.8–59.1 | 700 | |
| | F | 59.2–60.9 | 770 | |
| 100 | A | 23.0–30.6 | 300 | HMCPE100R3C |
| | B | 38.4–46.0 | 500 | |
| | C | 53.8–61.4 | 700 | |
| | D | 69.2–76.8 | 900 | |
| | E | 76.9–84.5 | 1000 | |
| | F | 84.6–87.0 | 1100 | |
| 100 | A | 38.4–46.0 | 500 | HMCPE100T3C |
| | B | 57.6–65.2 | 750 | |
| | C | 76.9–84.5 | 1000 | |
| | D | ④ | 1250 | |
| | E | ④ | 1375 | |
| | F | ④ | 1500 | |

JG-Frame—600 Vac Maximum, 250 Vdc Maximum ^①

| Continuous Amperes | MCP Trip Range (Amperes) | MCP Catalog Number |
|--------------------|--------------------------|--------------------|
| 250 | 500–1000 | HMCPJ250D5L |
| | 625–1250 | HMCPJ250F5L |
| | 750–1500 | HMCPJ250G5L |
| | 875–1750 | HMCPJ250J5L |
| | 1000–2000 | HMCPJ250K5L |
| | 1125–2250 | HMCPJ250L5L |
| | 1250–2500 | HMCPJ250W5L |

Notes

- ^① UL listed for use with Eaton Motor Starters.
- ^② Motor FLA ranges are typical. The corresponding trip setting is at 13 times the minimum FLA value shown. Where a 13 times setting is required for an intermediate FLA value, alternate cam settings and/or MCP ratings should be used.
- ^③ For DC applications, actual trip levels are approximately 40% higher than values shown.
- ^④ Settings above 10 x I_n are for special applications. Where the ampere rating of the disconnecting means cannot be less than 115% of the motor full load ampere rating.

LG-Frame—600 Vac Maximum, 250 Vdc Maximum ^①

2

| Continuous Amperes | MCP Trip Range (Amperes) | MCP Catalog Number |
|--------------------|--------------------------|--------------------|
| 600 | 1250–2500 | HMCPL600L6G |
| | 1500–3000 | HMCPL600N6G |
| | 1750–3500 | HMCPL600R6G |
| | 2000–4000 | HMCPL600X6G |
| | 2250–4500 | HMCPL600Y6G |
| | 2500–5000 | HMCPL600P6G |
| | 3000–6000 | HMCPL600M6G |

Notes

^① UL listed for use with Eaton Motor Starters.

800 and 1200 ampere, 600 Vac maximum motor circuit protectors are available as Series C HMCP product.

Series G Motor Protector Circuit Breakers (MPCB)



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| Motor Protector Circuit Breakers (MPCB) | |
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| Technical Data and Specifications | V4-T2-193 |
| 30 mA Ground Fault (Earth Leakage) Module | V4-T2-194 |
| Current Limiting Circuit Breaker Module | V4-T2-198 |
| High Instantaneous Circuit Breaker for | |
| Selective Coordination | V4-T2-203 |
| Special Features and Accessories | V4-T2-206 |
| Motor Operators | V4-T2-214 |
| Plug-In Blocks | V4-T2-216 |
| Drawout Cassette | V4-T2-217 |

Motor Protector Circuit Breakers (MPCB)

Product Description

- Eliminates need for separate overload relay

Application Description

- Can be used with contactor to eliminate need for overload relay and still create manual motor control
- Meets requirement for motor branch protection, including:
 - Disconnecting means
 - Branch circuit short circuit protection
 - Overload protection

Features and Benefits

- Phase unbalance protection
- Phase loss protection
- Hot trip/cold trip
- High load alarm
- Pre-detection trip relay option
- Class 10, 15, 20, 30 protection

Standards and Certifications

- IEC 60947-2
- UL 489 100% rated
- UL 508
- CSA C22.2



Product Selection

2

JGMP Catalog Numbers

| Continuous Amperes | 35 kAIC Catalog Number | 65 kAIC Catalog Number |
|--------------------|------------------------------|------------------------------|
| 50 | JGMPS050G | JGMPH050G |
| 100 | JGMPS100G | JGMPH100G |
| 160 | JGMPS160G | JGMPH160G |
| 250 | JGMPS250G | JGMPH250G |

JGMP FLA Ie Dial Setting

| Continuous Amperes | A | B | C | D | E | F | G | H |
|--------------------|-----|-----|-----|-----|-----|-----|-----|-----|
| 50 | 20 | 20 | 25 | 30 | 32 | 40 | 45 | 50 |
| 100 | 40 | 45 | 50 | 63 | 70 | 80 | 90 | 100 |
| 160 | 63 | 80 | 90 | 100 | 110 | 125 | 150 | 160 |
| 250 | 100 | 125 | 150 | 160 | 175 | 200 | 225 | 250 |

LGMP Catalog Numbers

| Continuous Amperes | 50 kAIC Catalog Number | 65 kAIC Catalog Number |
|--------------------|------------------------------|------------------------------|
| 250 | LGMP250G | LGMPH250G |
| 400 | LGMP400G | LGMPH400G |
| 600 | LGMP600G | LGMPH600G |
| 630 ① | LGMP630G | LGMPH630G |

LGMP FLA Ie Dial Setting

| Continuous Amperes | A | B | C | D | E | F | G | H |
|--------------------|-----|-----|-----|-----|-----|-----|-----|-----|
| 250 | 100 | 125 | 150 | 160 | 175 | 200 | 225 | 250 |
| 400 | 160 | 200 | 225 | 250 | 300 | 315 | 350 | 400 |
| 600 | 250 | 300 | 315 | 350 | 400 | 450 | 500 | 600 |
| 630 ① | 250 | 300 | 315 | 350 | 400 | 500 | 600 | 630 |

Notes

① 630 amperes is not a UL listed rating. 600 amperes is the maximum UL or CSA for LG breaker.

For pre-trip alarm option, order Style Number 5721B31G02.

For additional breaker solutions, see **Page V4-T2-369**.

Technical Data and Specifications

JGMPS and JGMPH Rating and Ampere Range

| Breaker Capacity (kA rms) AC 50–60 Hz | | | Maximum Rated Current—250 A | |
|---------------------------------------|-------------|-----------------|-----------------------------|--------|
| | | | Breaker Type | |
| | | | JGMPS | JGMPH |
| IEC 60947-2 | 220–240 Vac | I _{cu} | 85 | 100 |
| | | I _{cs} | 85 | 100 |
| | 380–415 Vac | I _{cu} | 40 | 70 |
| | | I _{cs} | 40 | 70 |
| | 660–690 Vac | I _{cu} | 12 | 14 |
| | | I _{cs} | 6 | 7 |
| NEMA UL 489 | 240 Vac | | 85 | 100 |
| | 480 Vac | | 35 | 65 |
| | 600 Vac | | 25 | 35 |
| Number of poles | | | 3 | 3 |
| Ampere range | | | 50–250 | 50–250 |

LGMPs and LGMPH Rating and Ampere Range

| Breaker Capacity (kA rms) AC 50–60 Hz | | | Maximum Rated Current—630 A ^① | |
|---------------------------------------|-------------|-----------------|--|----------------------|
| | | | Breaker Type | |
| | | | LGMPs | LGMPH |
| IEC 60947-2 | 220–240 Vac | I _{cu} | 85 | 100 |
| | | I _{cs} | 85 | 100 |
| | 380–415 Vac | I _{cu} | 50 | 70 |
| | | I _{cs} | 50 | 53 |
| | 660–690 Vac | I _{cu} | 20 | 25 |
| | | I _{cs} | 10 | 13 |
| NEMA UL 489 | 240 Vac | | 85 | 100 |
| | 480 Vac | | 50 | 65 |
| | 600 Vac | | 25 | 35 |
| Number of poles | | | 3 | 3 |
| Ampere range | | | 250–630 ^① | 250–630 ^① |

Notes

① 630 amperes is not a UL listed rating. 600 amperes is the maximum UL or CSA for LG breaker.

For pre-trip alarm option, order Style Number 5721B31G02.

30 mA Ground Fault (Earth Leakage) Modules



**Clockwise from Left:
JG, LG, EG MCCBs Shown with
Ground Fault (Earth Leakage) Module**

30 mA Ground Fault (Earth Leakage) Module

Product Description

Eaton offers three- and four-pole 30 mA ground fault (earth leakage) protection modules for Series G E-, J- and L-frame molded case circuit breakers (MCCBs). Separate UL listed and IEC rated devices are available for each frame.

The modules are bottom mounted and are available for each frame circuits up to:

- EG: 125 amperes
- JG: 150 (UL), 160 (IEC) or 250 amperes
- LG: 400, 600 (UL) or 630 (IEC) amperes

The module is completely self contained, including a current sensor, relay and power supply inside the device. Current pickup settings are selectable from 0.03 to 10 amperes for all devices, except for the UL listed module, for which settings are selectable from 0.03 to 30 amperes. Time delays are also selectable from Instantaneous to 1.0 second for pickup settings of 0.10 amperes and above. The current pickup setting of 0.03 amperes defaults to an Instantaneous time setting regardless of the time dial's position.

Two alarm contacts are included with each device, which can be wired externally for remote indication. Both of these are also indicated by an LED on the front of the device:

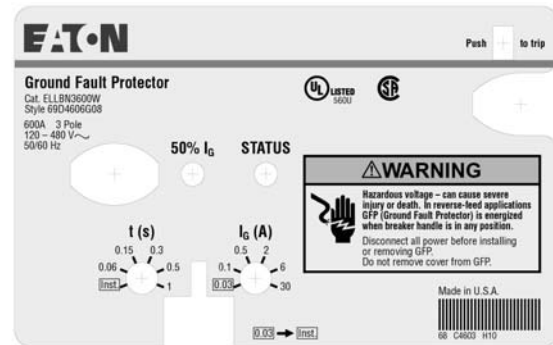
1. 50% pre-trip: alarms when the earth leakage current reaches 50% of the set pickup setting value.
2. 100% after trip: alarms when the breaker reaches the set pickup setting value and the breaker trips.

Contents

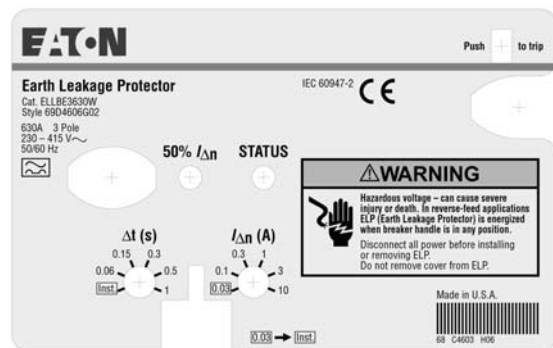
Description

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| LG-Frame (250–630 Amperes) | V4-T2-149 |
| NG-Frame (320–1200 Amperes) | V4-T2-167 |
| RG-Frame (800–2500 Amperes) | V4-T2-176 |
| Motor Circuit Protectors (MCP) | V4-T2-187 |
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UL-Rated LG-Frame Earth Leakage Module Faceplate



IEC-Rated LG-Frame Earth Leakage Module Faceplate



Product Selection

EG-Frame


EG-Frame Ground Fault Modules, UL-Rated (Bottom Mounted, 120–480 Vac, 50/60 Hz) ①

| Ampere Rating | Number of Poles | Catalog Number |
|---------------|-----------------|----------------|
| 125 | 3 | ELEBN3125G |
| 125 | 4 | ELEBN4125G |

EG-Frame Earth Leakage Modules, IEC-Rated (Bottom Mounted, 230–415 Vac, 50/60 Hz)

| Ampere Rating | Number of Poles | Catalog Number |
|---------------|-----------------|----------------|
| 125 | 3 | ELEBE3125G |
| 125 | 4 | ELEBE4125G |

JG-Frame


JG-Frame Ground Fault Modules, UL-Rated (Bottom Mounted, 120–480 Vac, 50/60 Hz)

| Ampere Rating | Number of Poles | Catalog Number |
|---------------|-----------------|----------------|
| 150 | 3 | ELJBN3150W |
| 150 | 4 | ELJBN4150W |
| 250 | 3 | ELJBN3250W |
| 250 | 4 | ELJBN4250W |

JG-Frame Earth Leakage Modules, IEC-Rated (Bottom Mounted, 230–415 Vac, 50/60 Hz)

| Ampere Rating | Number of Poles | Catalog Number |
|---------------|-----------------|----------------|
| 160 | 3 | ELJBE3160W |
| 160 | 4 | ELJBE4160W |
| 250 | 3 | ELJBE3250W |
| 250 | 4 | ELJBE4250W |

Note

① Shunt trip and undervoltage release cannot be used in an EG breaker connected to an earth leakage module.

LG-Frame


LG-Frame Ground Fault Modules, UL-Rated (Bottom Mounted, 120–480 Vac, 50/60 Hz)

| Ampere Rating | Number of Poles | Catalog Number |
|---------------|-----------------|----------------|
| 400 | 3 | ELLBN3400W |
| 400 | 4 | ELLBN4400W |
| 600 | 3 | ELLBN3600W |
| 600 | 4 | ELLBN4600W |

LG-Frame Earth Leakage Modules, IEC-Rated (Bottom Mounted, 230–415 Vac, 50/60 Hz)

| Ampere Rating | Number of Poles | Catalog Number |
|---------------|-----------------|----------------|
| 400 | 3 | ELLBE3400W |
| 400 | 4 | ELLBE4400W |
| 630 | 3 | ELLBE3630W |
| 630 | 4 | ELLBE4630W |

2.3

Molded Case Circuit Breakers

Series G

Dimensions

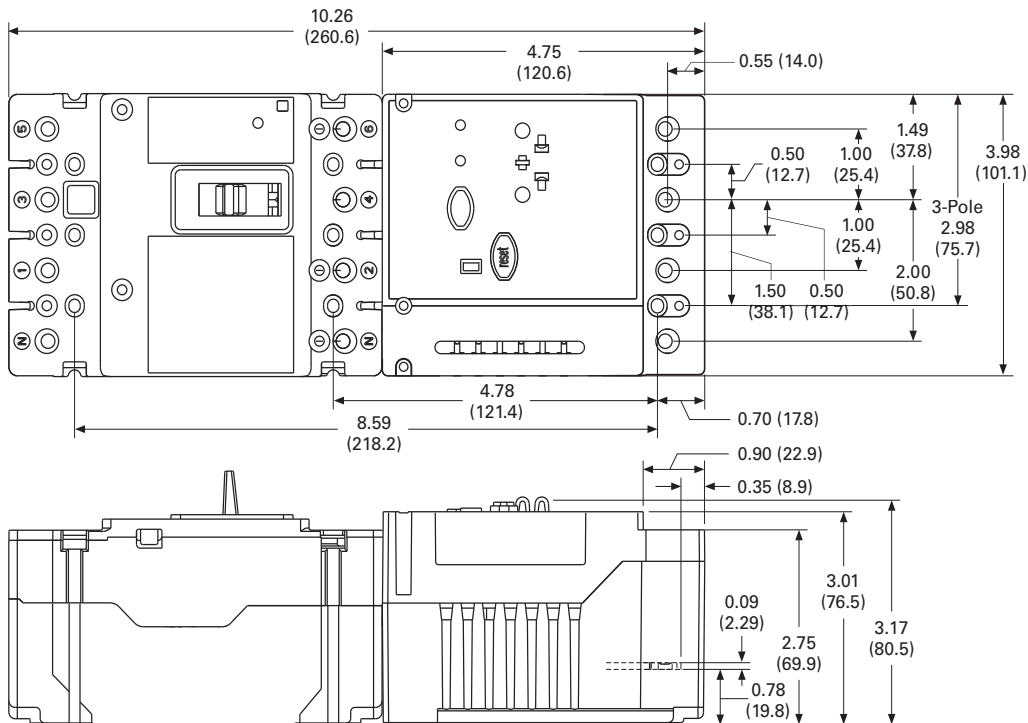
Approximate Dimensions in Inches (mm)

2

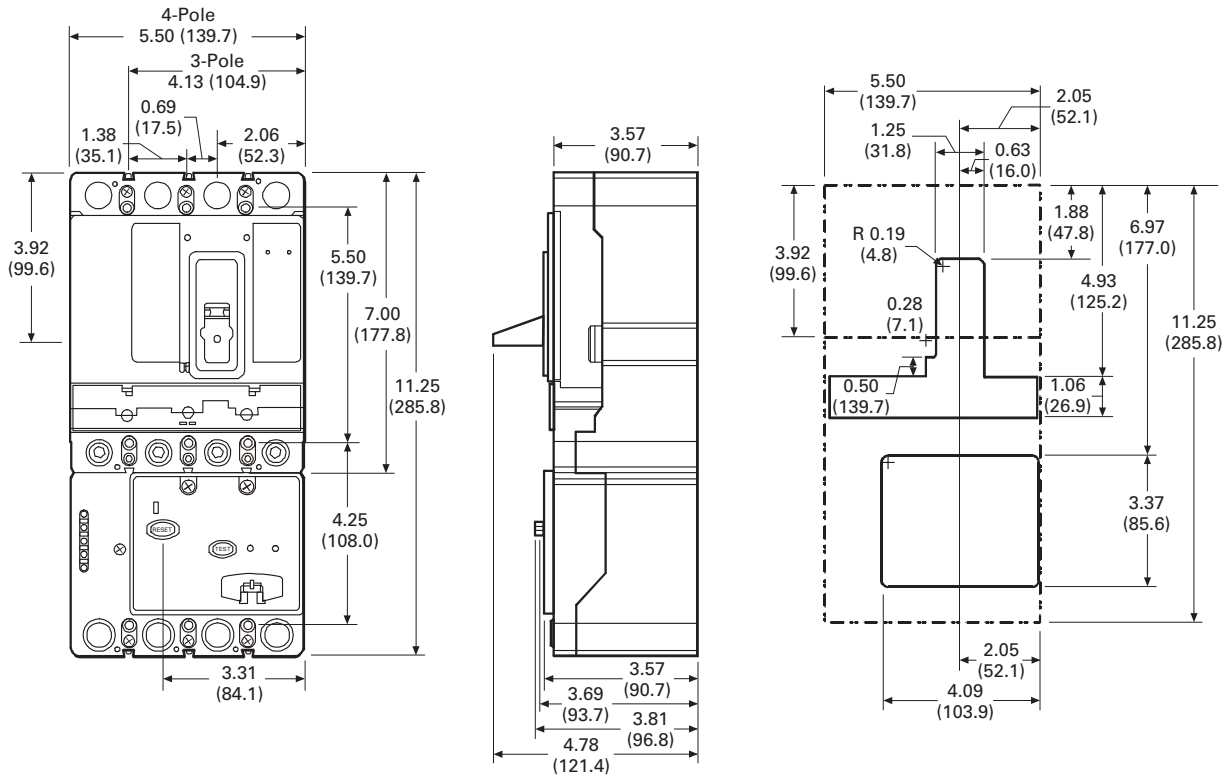
Assembled Breaker and Earth Leakage Module

| Frame | Height | Width | Depth |
|-------------------|---------------|--------------|--------------|
| Three-Pole | | | |
| EG | 10.25 (260.3) | 3.00 (76.2) | 2.98 (75.8) |
| JG | 11.25 (285.8) | 4.13 (104.9) | 3.57 (90.7) |
| LG | 15.38 (390.7) | 5.48 (139.2) | 4.06 (103.1) |
| Four-Pole | | | |
| EG | 10.25 (260.3) | 4.00 (101.6) | 2.98 (75.8) |
| JG | 11.25 (285.8) | 5.50 (139.7) | 3.57 (90.7) |
| LG | 15.38 (390.7) | 7.23 (183.6) | 4.06 (103.1) |

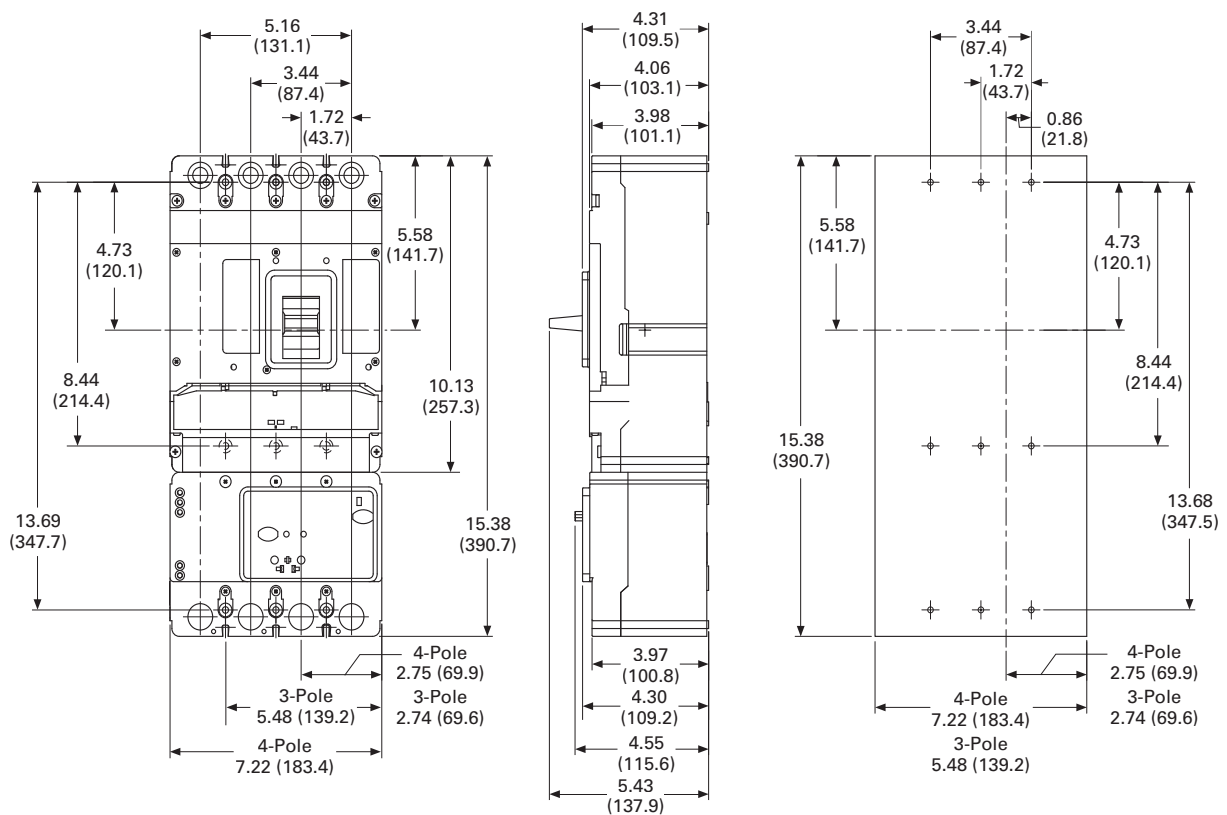
EG-Frame With Earth Leakage Module



JG-Frame With Earth Leakage Module



LG-Frame With Earth Leakage Module



Current Limiting Circuit Breaker Modules



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| Motor Circuit Protectors (MCP) | V4-T2-187 |
| Motor Protector Circuit Breakers (MPCB) | V4-T2-191 |
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Current Limiting Circuit Breaker Module

Product Overview

Power demand continues to grow in new and existing facilities. To meet increased demand, larger utility supplies, spot networks and large facility transformers are installed. The increased capacity of the electrical source results in increased fault currents in excess of 100 kA short-circuit protection. Eaton manufactures non-fused current limiting modules with interrupting capacities up to 200 kA at 600 Vac or 70 kA at 690 Vac. Unlike fused current limiters with a one-time use, a current limiter module provides an automatic reset of the module after a short-circuit event. Resetting the molded-case circuit breaker is the only action required to restore critical power to the system; there is no time wasted with sourcing the correct replacement fuses or module to bring system back online.

Product Description

The current limiting breaker modules use a unique contact design to enhance the system protection similar to that of the circuit breaker. When high short-circuit current is flowing through the contacts of these modules, the design results in very high interrupting capacities and improved current limiting characteristics.

Application Description

High-performance breakers are most commonly applied when very high fault levels are available and with applications where the current limiting capability is used upstream of the final load to limit current. Typical loads include lighting, power distribution, and motor control applications.

Features and Benefits

Superior system protection:

- Auto reset improves system uptime and eliminates the need for finding replacement parts
- No fuses to replace, reducing the overall cost of ownership and the waste created by fuses
- Overloads, by using inverse time current tripping characteristics of the molded-case circuit breaker
- Low-level short circuits, by using instantaneous and/or short-time delay tripping characteristics of the molded-case circuit breaker
- High-level short circuits, by using ultra-high-speed, blow-apart contacts of the current limiting module in series with the circuit breaker contacts
- Let-through currents, by improved opening speed of the contacts, the resultant rapid rise of arc voltage introduces impedance into the system

Standards and Certifications

- IEC 60947-2
- UL 489
- CSA C22.2



Product Selection

Series G High Performance Family Offering

| Type | Product | Amperes | 480 Vac (UL) | | 415 Vac (IEC) | | 690 Vac (IEC) | |
|-------------------------|--------------|---------|--------------|------------------|-----------------|-----------------|-----------------|----|
| | | | 600 Vac (UL) | I _{cu} | I _{cs} | I _{cu} | I _{cs} | |
| EGC 3P thermal-magnetic | Breaker only | 15–125 | 100 | 35 ^① | 100 | 100 | — | — |
| | With limiter | 15–100 | 150 | 100 ^① | 150 | 150 | — | — |
| JG 3P thermal-magnetic | Breaker only | 70–250 | 200 | 50 | 200 | 200 | 18 | 14 |
| | With limiter | 70–225 | 200 | 200 | 200 | 150 | 70 | 18 |
| JG 3P electronic | Breaker only | 20–250 | 200 | 50 | 200 | 200 | 18 | 14 |
| | With limiter | 100–250 | 200 | 200 | 200 | 150 | 70 | 18 |
| LG 3P thermal-magnetic | Breaker only | 250–600 | 200 | 65 | 200 | 200 | 35 | 18 |
| LG3P electronic | Breaker only | 100–600 | 200 | 65 | 200 | 200 | 35 | 18 |

EG-Frame



EG IC Rating—150 kAIC at 415 and 480 Vac

| UL Listed (NEMA/IEC Rated) Base Molded Case Circuit Breaker | Breaker with Line Side Mounted Current Limiter | Breaker with Load Side Mounted Current Limiter | Line and Load Terminations Included ^② | Interphase Barrier Included for Limiter |
|---|--|--|--|---|
| EGC3015FFG | EGC3015FFGQ01 | EGC3015FFGQ02 | T125EF | EIPBSK |
| EGC3016FFG | EGC3016FFGQ01 | EGC3016FFGQ02 | T125EF | EIPBSK |
| EGC3020FFG | EGC3020FFGQ01 | EGC3020FFGQ02 | T125EF | EIPBSK |
| EGC3025FFG | EGC3025FFGQ01 | EGC3025FFGQ02 | T125EF | EIPBSK |
| EGC3030FFG | EGC3030FFGQ01 | EGC3030FFGQ02 | T125EF | EIPBSK |
| EGC3032FFG | EGC3032FFGQ01 | EGC3032FFGQ02 | T125EF | EIPBSK |
| EGC3035FFG | EGC3035FFGQ01 | EGC3035FFGQ02 | T125EF | EIPBSK |
| EGC3040FFG | EGC3040FFGQ01 | EGC3040FFGQ02 | T125EF | EIPBSK |
| EGC3045FFG | EGC3045FFGQ01 | EGC3045FFGQ02 | T125EF | EIPBSK |
| EGC3050FFG | EGC3050FFGQ01 | EGC3050FFGQ02 | T125EF | EIPBSK |
| EGC3060FFG | EGC3060FFGQ01 | EGC3060FFGQ02 | T125EF | EIPBSK |
| EGC3063FFG | EGC3063FFGQ01 | EGC3063FFGQ02 | T125EF | EIPBSK |
| EGC3070FFG | EGC3070FFGQ01 | EGC3070FFGQ02 | T125EF | EIPBSK |
| EGC3080FFG | EGC3080FFGQ01 | EGC3080FFGQ02 | T125EF | EIPBSK |
| EGC3090FFG | EGC3090FFGQ01 | EGC3090FFGQ02 | T125EF | EIPBSK |
| EGC3100FFG | EGC3100FFGQ01 | EGC3100FFGQ02 | T125EF | EIPBSK |

Notes

① 600Y/347V.

② Two interphase barriers included on line end mounted limiter; (2) line end of limiter. Four interphase barriers included on load end mounted limiter; (2) line end of breaker (2) load end of limiter.

Technical Data and Specifications

2

UL 489 Current Limiting Data

| Frame | Circuit | I_p (kA) | I^2T ($10^6 A^2S$) |
|---------|--------------|------------|------------------------|
| EGC...Q | 240 V/150 kA | 21.80 | 0.277 |
| EGC...Q | 480 V/150 kA | 21.80 | 0.277 |
| EGC...Q | 600 V/100 kA | 22.60 | 0.387 |

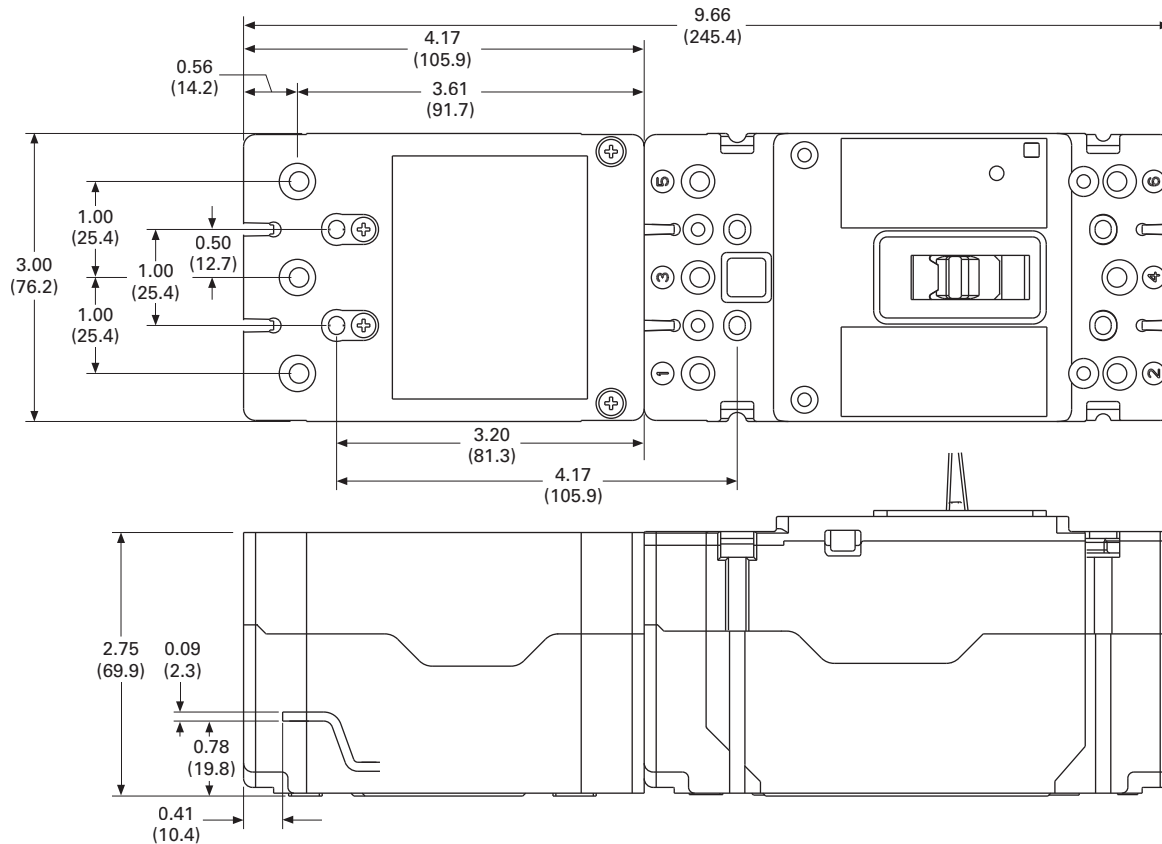
Dimensions and Weights

Approximate Dimensions in Inches (mm)

Assembled Breaker and Current Limiting Module

| Frame | Height | Width | Depth | Weight in lbs (kg) |
|-------|--------------|-------------|-------------|--------------------|
| EG | 9.66 (245.7) | 3.00 (76.2) | 2.98 (75.8) | 2.91 (1.32) |
| HMCP | 9.66 (245.7) | 3.00 (76.2) | 2.98 (75.8) | 4.18 (1.90) |

EG-Frame With Current Limiter Module



JG Frame



JG IC Rating—200 kAIC at 600 Vac and 70 kAIC at 690 Vac

| Ampere Rating | Magnetic Range | UL Listed, IEC Rated Breaker With Line Side Mounted Current Limiter ^① | UL Listed, IEC Rated Breaker With Load Side Mounted Current Limiter ^② | IEC Rated Breaker With Line Side Mounted Current Limiter ^① | IEC Rated Breaker With Load Side Mounted Current Limiter ^② |
|-----------------------------|----------------|--|--|---|---|
| | | Fixed Thermal, Adjustable Magnetic | Adjustable Thermal, Adjustable Magnetic | | |
| 70 | 350–700 | JGH3070FAGQ01 | JGH3070FAGQ02 | — | — |
| 90 | 450–900 | JGH3090FAGQ01 | JGH3090FAGQ02 | — | — |
| 100 | 500–1000 | JGH3100FAGQ01 | JGH3100FAGQ02 | JGH3100AAGQ01 | JGH3100AAGQ02 |
| 125 | 625–1250 | JGH3125FAGQ01 | JGH3125FAGQ02 | JGH3125AAGQ01 | JGH3125AAGQ02 |
| 150 | 750–1550 | JGH3150FAGQ01 | JGH3150FAGQ02 | — | — |
| 160 | 800–1600 | — | — | JGH3160AAGQ01 | JGH3160AAGQ02 |
| 175 | 875–1750 | JGH3175FAGQ01 | JGH3175FAGQ02 | — | — |
| 200 | 1000–2000 | JGH3200FAGQ01 | JGH3200FAGQ02 | JGH3200AAGQ01 | JGH3200AAGQ02 |
| 225 | 1125–2250 | JGH3225FAGQ01 | JGH3225FAGQ02 | — | — |
| Electronic Trip LS | | | | | |
| 250 | — | JGH325033GQ01 | JGH325033GQ02 | — | — |
| Electronic Trip LSI | | | | | |
| 250 | — | JGH325032GQ01 | JGH325032GQ02 | — | — |
| Electronic Trip LSG | | | | | |
| 250 | — | JGH325035GQ01 | JGH325035GQ02 | — | — |
| Electronic Trip LSIG | | | | | |
| 250 | — | JGH325036GQ01 | JGH325036GQ02 | — | — |

Series G HMCP

| Ampere Rating | Motor Circuit Protector with Line Side Mounted Current Limiter | Breaker with Load Side Mounted Current Limiter |
|---------------|--|--|
| 250 | HMCPJ250D5LQ01 | HMCPJ250D5LQ02 |
| 250 | HMCPJ250F5LQ01 | HMCPJ250F5LQ02 |
| 250 | HMCPJ250G5LQ01 | HMCPJ250G5LQ02 |
| 250 | HMCPJ250J5LQ01 | HMCPJ250J5LQ02 |
| 250 | HMCPJ250K5LQ01 | HMCPJ250K5LQ02 |
| 250 | HMCPJ250L5LQ01 | HMCPJ250L5LQ02 |

Line and Load Terminals

| Maximum Breaker Amperes | Terminal Body Material | Wire Type | Metric Wire Range mm ² | AWG Wire Range/ Number of Conductors | Catalog Number |
|---|------------------------|-----------|-----------------------------------|--------------------------------------|----------------------|
| Standard Pressure Type Terminals | | | | | |
| 250 | Aluminum | Cu/Al | 10–185 | #8–350 (1) | TA250FJ ^③ |

Notes

- ① Two interphase barriers provided, mounted on line end of limiter, catalog number **FJIPBK**.
- ② Four interphase barriers provided, (2) line end of breaker, (2) load end of limiter.
- ③ Line and load terminals included with products listed above.

Technical Data and Specifications

2

UL 489 Current Limiting Data

| Frame | Circuit | I_p (kA) | I^2T ($10^6 A^2S$) |
|---------|--------------|------------|------------------------|
| JGH...Q | 240 V/200 kA | 48.60 | 2.47 |
| JGH...Q | 480 V/200 kA | 48.60 | 2.47 |
| JGH...Q | 600 V/200 kA | 48.60 | 2.47 |

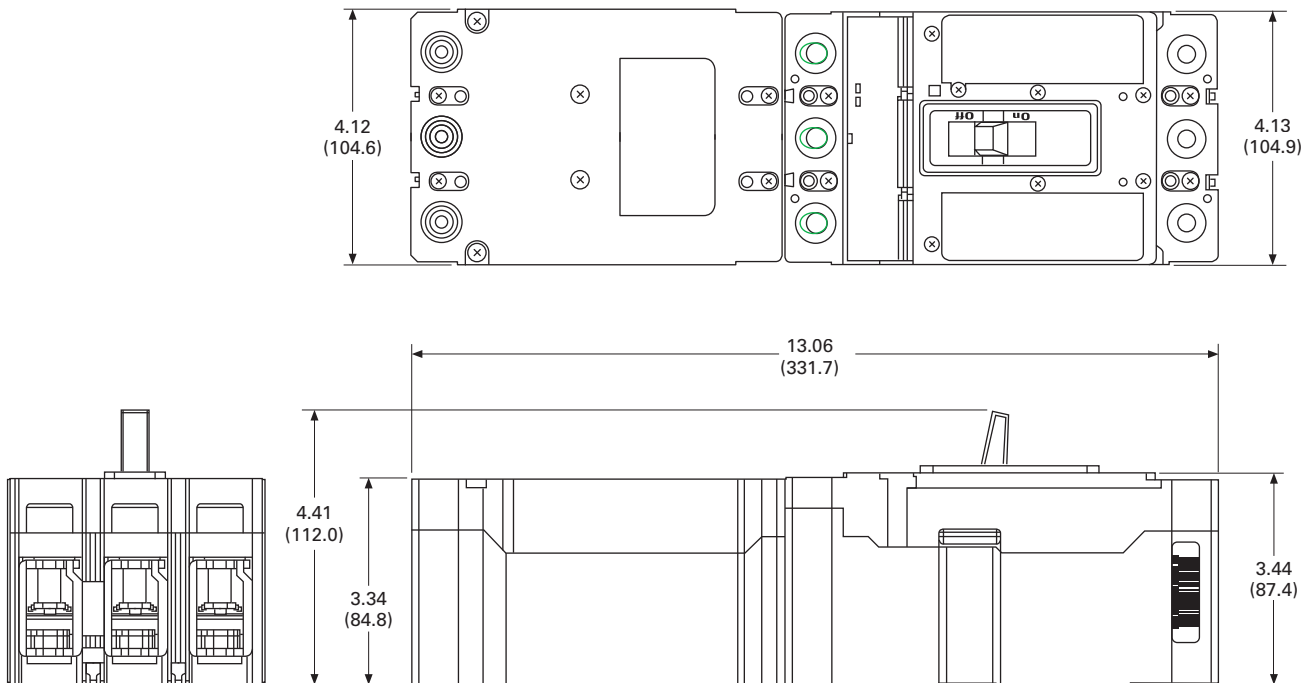
Dimensions and Weights

Approximate Dimensions in Inches (mm)

Assembled Breaker and Current Limiting Module

| Frame | Height | Width | Depth | Weight in lbs (kg) |
|--------------|---------------|--------------|-------------|--------------------|
| JG + limiter | 13.06 (331.7) | 4.13 (104.9) | 3.44 (87.4) | 9.87 (4.48) |
| HMCP | 13.06 (331.7) | 4.13 (104.9) | 3.44 (87.4) | 9.87 (4.48) |

JG-Frame With Current Limiter Module



High Instantaneous Circuit Breaker for Selective Coordination**Contents**

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| LG-Frame (250–630 Amperes) | V4-T2-149 |
| NG-Frame (320–1200 Amperes) | V4-T2-167 |
| RG-Frame (800–2500 Amperes) | V4-T2-176 |
| Motor Circuit Protectors (MCP) | V4-T2-187 |
| Motor Protector Circuit Breakers (MPCB). | V4-T2-191 |
| 30 mA Ground Fault (Earth Leakage) Module | V4-T2-194 |
| Current Limiting Circuit Breaker Module | V4-T2-198 |
| High Instantaneous Circuit Breaker for Selective Coordination | |
| Product Selection | V4-T2-204 |
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| Dimensions | V4-T2-205 |
| Special Features and Accessories | V4-T2-206 |
| Motor Operators | V4-T2-214 |
| Plug-In Blocks | V4-T2-216 |
| Drawout Cassette | V4-T2-217 |

High Instantaneous Circuit Breaker for Selective Coordination**Product Description**

Eaton's Electrical Sector introduces new high-magnetic withstand molded case circuit breakers, specifically designed for critical operations and selective coordination requirements. The high-magnetic withstand LHH and NHH frames continue the legacy of circuit breaker innovation for which Eaton is recognized throughout the world. The LHH and NHH breakers are equipped with 125 to 400 ampere trip units with high-magnetic capability. This design enables the breakers to withstand up to 90 times rated current before opening under short-circuit conditions.

The LHH and NHH circuit breakers incorporate a higher level of instantaneous pickup, thus allowing for higher current levels of selective coordination. Standard molded case circuit breakers typically are furnished with a magnetic pickup or electronic instantaneous adjustment or instantaneous override set at 10 times (10x) the continuous trip rating.

Features, Benefits and Functions

Eaton's new LHH and NHH molded case circuit breakers are furnished with a higher level of magnetic pickup or electronic instantaneous settings as indicated in table on **Page V4-T2-205**. These higher levels of magnetic pickup and electronic instantaneous values in turn allow the system designer to obtain selective coordination at fault current levels up to these higher ratings. Greater values of selective coordination are available based on manufacturer tested combinations using the LHH and NHH as line-side breakers and standard breakers as load-side devices. Refer to IA01200002E to determine the maximum fault values that selective coordination achieves. When the line-side and load-side molded case circuit breaker trip ratings are chosen to coordinate in the overload range, they also can be selectively coordinated in the fault range up to the values listed in the table on **Page V4-T2-205** or IA01200002E. For overcurrents protected by circuit breakers on the load-side of the LHH or NHH, only the effected load-side

circuit breaker will open, while the line-side LHH and/or NHH circuit breakers remain closed, thus providing continuity of power to the other critical loads supplied by the LHH or NHH circuit breakers.

Benefits of Using the LHH and NHH Molded Case Circuit Breakers

Customer expectations and codes are driving product development to protect customers' critical operations. NEC® 2005 and 2008 requires circuits with elevators, emergency systems, legally required standby systems, health care essential systems and critical operation power systems to be selectively coordinated. Simply stated, only the closest protective device directly protecting the circuit having an overcurrent (overload or fault) condition should open.

All other overcurrent protective devices within these systems shall remain closed. Similarly, backup power system designs of a critical nature that are not code mandated may also require overcurrent protective devices to be selectively coordinated as much as practicable to provide a higher level of uptime.

Product Selection

LHH



LHH and NHH Catalog Numbers

| Ampere Rating | Thermal-Magnetic Trip Unit | | LSI Electronic Trip Unit |
|---------------|----------------------------|---------------|--------------------------|
| | LHH Frame | NHH Frame | |
| 125 | LHH3125FFG | — | |
| 150 | LHH3150FFG | NHH3150T52X15 | |
| 175 | LHH3175FFG | NHH3175T52X15 | |
| 200 | LHH3200FFG | NHH3200T52X15 | |
| 225 | LHH3225FFG | NHH3225T52X15 | |
| 250 | LHH3250FFG | NHH3250T52X15 | |
| 300 | LHH3300FFG | NHH3300T52X15 | |
| 350 | LHH3350FFG | NHH3350T52X15 | |
| 400 | LHH3400FFG | — | |

2 Proven Technology and Performance

The LHH is based on the Series G L-Frame circuit breaker, sharing the same small footprint and field-fit accessories as the L-Frame breaker. The NHH is based on the Series G N-Frame circuit breaker and shares the same footprint and accessories as the N-Frame breaker. NHH accessories must be factory installed.

The LHH incorporates a thermal-magnetic trip unit with fixed thermal and fixed magnetic settings. The NHH has an OPTIM™ electronic trip unit with LSI adjustment capabilities. The instantaneous setting is adjustable from 1000–4000 A or may be turned off to default to the frame override of 14,000 A. A hand-held OPTIMizer must be used with the NHH to adjust short-time delay and instantaneous, however, the long delay pickup is fixed and cannot be adjusted.

The LHH and NHH breakers are available in Eaton's panelboards and switchboards.

Standards and Certifications

- UL
- CSA



Technical Data and Specifications

- Three-pole
- 65 kAIC at 480 Vac
- 125–400 ampere LHH
- 150–350 ampere NHH
- Trip units:
- LHH—thermal-magnetic
- NHH—LSI electronic trip unit
- No rating plugs required
- Factory-sealed breakers
- LHH uses same internal and external accessories as standard Series G L-Frame circuit breaker
- NHH uses same internal and external accessories as standard Series G N-Frame circuit breaker

LHH and NHH Electrical Characteristics

Short-Circuit Current Ratings (kA rms) AC 50–60 Hz

| Description | Breaker Type | |
|------------------------------|--------------|-----------|
| | LHH | NHH |
| Max. rated current (amperes) | 400 | 350 |
| NEMA UL 489 | | |
| 240 Vac | 100 | 100 |
| 480 Vac | 65 | 65 |
| 600 Vac | 35 | 35 |
| 250 Vac | 42 | — |
| IEC 60947-2 | | |
| 220 Vac | 100 | 100 |
| 415 Vac | 70 | 70 |
| 690 Vac | 25 | 25 |
| 125/250 Vdc | 22 | — |
| Number of poles | 3 | 3 |
| Ampere range | 125–400 A | 150–350 A |

Continuous Current Ratings

| Continuous Current Rating (I _c) | Magnetic Trip Point | Continuous Current Multiplier | Instantaneous Trip Point | Continuous Current Multiplier | Short Delay Pickup |
|---|---------------------|-------------------------------|--------------------------|-------------------------------|--------------------|
| 125 A | 2500 A | 20x | — | — | — |
| 150 A | 2500 A | 16x | 14,000 A | 93x | 225–1200 A |
| 175 A | 4000 A | 22x | 14,000 A | 80x | 260–1400 A |
| 200 A | 4000 A | 20x | 14,000 A | 70x | 300–1600 A |
| 225 A | 6000 A | 26x | 14,000 A | 62x | 338–1800 A |
| 250 A | 6000 A | 24x | 14,000 A | 56x | 375–2000 A |
| 300 A | 6000 A | 20x | 14,000 A | 47x | 450–2400 A |
| 350 A | 6000 A | 17x | 14,000 A | 40x | 525–2800 A |
| 400 A | 6000 A | 15x | — | — | — |

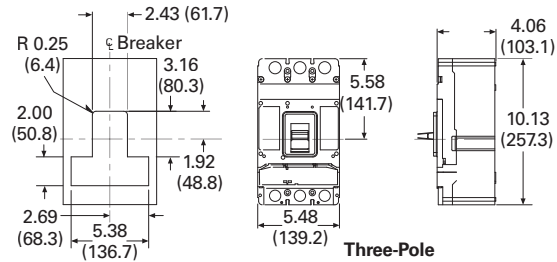
Dimensions

Approximate Dimensions in Inches (mm)

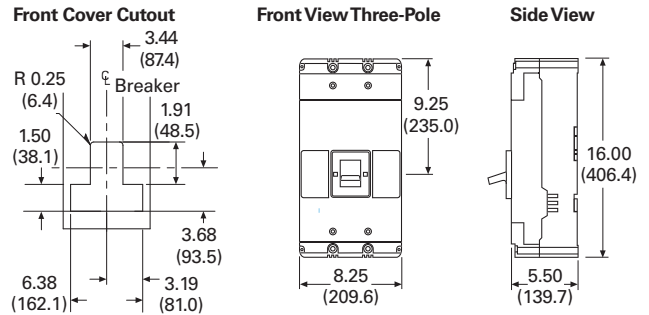
Dimensions

| Description | Height | Width | Depth | Weight in Lbs (kg) |
|-------------|---------------|--------------|--------------|--------------------|
| LHH | 10.13 (257.3) | 5.48 (139.2) | 4.09 (103.9) | 12.36 (5.6) |
| NHH | 16.00 (406.4) | 8.25 (209.5) | 5.50 (139.7) | 46.80 (21.2) |

L-Frame



N-Frame



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| Motor Protector Circuit Breakers (MPCB) | V4-T2-191 |
| 30 mA Ground Fault (Earth Leakage) Module | V4-T2-194 |
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Special Features and Accessories

Eaton’s molded case circuit breakers are designed to provide circuit protection for low voltage distribution systems. They are described by NEMA as, “... a device for closing and interrupting a circuit between separable contacts under both normal and abnormal conditions,” and furthermore as, “... a breaker assembled as an integral unit in a supporting and enclosing housing of insulating material.” The National Electrical Code (NEC) describes them as, “A device designed to open and close a circuit by non-automatic means, and to open the circuit automatically on a predetermined overload of current, without injury to itself when properly applied within its rating.”

So designed, Eaton circuit breakers protect conductors against overloads and conductors and connected apparatus, such as motors and motor starters, against short circuits.

In low voltage distribution systems, there are many varied applications of molded case circuit breakers. Eaton offers the most comprehensive family of molded case circuit breakers in the industry.

This section of circuit breakers includes:

- Thermal-magnetic trip breakers
- Electronic rms trip breakers
- Molded case switches
- Motor circuit protectors
- Current limiting breakers
- Special application breakers

Modified Breakers

Eaton breakers can be ordered with internal accessories installed. These modified breakers will be subject to an addition charge.

Special Calibration

Special non-UL listed calibrations are available for certain ambient temperatures other than 40 °C and for frequencies other than 50/60 Hz or DC. Reduced interrupting ratings will apply for 400 Hz applications.

- Add suffix H01 to breaker catalog number for 400 Hz rating

50 °C Calibration

Note: Breakers equipped with electronic trip units can operate reliably in ambient temperatures of 50 °C. Add suffix “V3” to NG MCCBs to remove standard 40 °C labeling.

Add suffix “V” to catalog number for complete thermal magnetic breaker when ordering listed ampere ratings for breakers to be used in 50 °C ambients. 50 °C ambient MCCBs are not UL listed.

Contact Eaton for availability.

Calibrations and Treatment

| Description | Frame | | | | |
|---------------------------|-------|----|----|----|----|
| | EG | JG | LG | NG | RG |
| Special calibration | ■ | ■ | ■ | ■ | ■ |
| Moisture-fungus treatment | ■ | ■ | ■ | ■ | ■ |

Moisture-Fungus Treatment

All Eaton circuit breaker cases are molded from glass-polyester, which does not support the growth of fungus. Any parts that are susceptible to the growth of fungus will require special treatment.

Order by description.

- Add suffix J01 to breaker catalog number

Freeze-Tested Circuit Breakers

The circuit breakers may be ordered with freeze testing. This option uses special lubrication and mechanical operation is verified at -40°C .

- Add suffix F01 to catalog number -57°F , F02 -30°F

Marine Applications

E- to R-Framed circuit breakers can be supplied to meet the following marine specifications:

- U.S. Coast Guard CFR 46; ABS—American Bureau of Shipping; IEEE 45; DNV; and Lloyds

These specifications generally require molded case circuit breakers to be supplied with 50°C ambient, and plug-in adapter kits. When plug-in adapter kits are used, no terminals need be supplied (switchboard applications).

Circuit breakers can also be supplied to meet UL 489 Supplement SA (Marine use) and UL 489 Supplement SB (Naval Use).

UL 489 Supplement SA applies to vessels over 65 feet (19.8m) in length.

Requirements include 40°C ambient calibration, special labeling, and no use of aluminum conductors or terminals. (No 50°C .)

- Add suffix H08

Or you can choose to add 50°C ambient but then there is no "UL" mark.

- Add suffix VH08

UL 489 Supplement SB requires partial 50°C ambient calibration, vibration testing, special nameplating and no use of aluminum conductors or terminals. Eaton chooses to always fully calibrate to 50°C ambient. ("Naval" labeled per UL but no "UL" mark due to 50°C label.)

- Add suffix VH09

Certified Test Reports

Eaton breakers can be ordered with certified test reports at the time of order entry. Test report documents the thermal and magnetic or electronic tripping characteristics of the individual breaker. Breaker and test report must be ordered together. Add suffix 12 to breaker catalog number and enter separate line item on order for certified test report.

Standards and Certifications

Molded case circuit breakers are designed to conform with the following standards:

- Underwriters Laboratories Inc., Standard UL 489, molded case circuit breakers and circuit breaker enclosures
- National Electrical Manufacturers Association (NEMA) Standards Publication No. AB1-1993, molded case circuit breakers
- Australian Standard AS 2184, molded case circuit breakers
- British Standards Institution Standard BS 4752: Part 1, switchgear and control gear Part 1: circuit breakers
- Canadian Standards Association (CSA) Standard C22.2 No. 5, service entrance and branch circuit breakers
- International Electrotechnical Commission Recommendations IEC 60947-2, circuit breakers
- Japanese T-Mark Standard molded case circuit breakers
- South African Bureau of Standards, Standard SABS 156, Standard Specification for molded case circuit breakers
- Swiss Electro-Technical Association Standard SEV 157-1, safety regulations for circuit breakers
- Union Technique de l'Electricite Standard NF C 63-120, low voltage switchgear and control gear circuit breaker requirements
- Verband Deutscher Elektrotechniker (Association of German Electrical Engineers) Standard VDE 0660, low voltage switchgear and control gear, circuit breakers

Conformance with these standards satisfies most local and international codes, assuming user acceptability and simplified application.

Molded case circuit breakers equal or exceed Federal Specification Classification W-C-375b requirements for the particular class associated with the circuit breaker frame being considered.

Open breakers do not have service entrance ratings. Service entrance rating is part of the enclosure.



Internal Accessories

2

Alarm Lockout

The alarm switches operate when the circuit breaker is tripped by a short circuit or overcurrent, but also when it is tripped by a shunt trip or undervoltage release.

Auxiliary Switches

Auxiliary switches are used for signaling and control purposes. The various functions of the auxiliary switches (changeover) are shown on **Page V4-T2-210**.

Shunt Trips

The shunt trip is used for remote tripping.

The coil of the shunt trip is rated only for short-time operation.

It is not permissible with the circuit breaker open to apply a continuous opening command to the shunt trip in order to prevent the breaker from closing. This means that interlocking circuits with continuous commands may not be set up with shunt trips.

Undervoltage Releases

The circuit breaker cannot be closed until the undervoltage release is energized. If the release is not energized, the circuit breaker can only perform an idle switching operation.

Frequent idle switching actions should be avoided as they shorten the endurance of the circuit breaker.

Digitrip 310+ Electronic Trip Unit Accessories

Cause of Trip Display/Remote Mount Cause of Trip Display

The Cause of Trip Display can be field-installed on any Digitrip RMS 310+ trip unit. The device provides breaker information through an LCD screen, such as cause of trip, phrase current, ground current and low loads. The display is ideal for troubleshooting common trips such as ground fault, long delay, and instantaneous/short delay. The DIGIVIEW version will provide a local display at the breaker without additional wiring by connecting directly onto the trip unit. The DIGIVIEWR06 version has a 6 foot cable that allows users to mount the display on the outside of an enclosure door and connect to the trip unit that is contained inside the enclosure.

The DIGIVIEWR06 is NEMA 3R rated.

Cause of Trip Display/Remote Mount Cause of Trip Display

Catalog Number

DIGIVIEW

DIGIVIEWR06

Cause of Trip LED Module

The Cause of Trip LED Module can be field-installed on any Digitrip RMS 310+ trip unit. The device provides a cause of trip indication via LED. The Cause of Trip LED Module connects directly onto the trip unit. When the breaker trips, the module indicates the cause of trip (long delay, short delay, instantaneous and ground) via LED indication. The module is reset after the breaker is reset.

Cause of Trip LED Module

Catalog Number

TRIP-LED

Electronic Portable Test Kit

The electronic portable test kit provides a means to complete field tests using secondary injection on all 310+ trip units. The same test kit is also capable of secondary injection testing on Magnum and Series NRX low voltage power circuit breakers' 520 and 1150 trip units.

Electronic Portable Test Kit

Catalog Number

MTST230V

Wire Seal

The wire seal can be used to secure the cover of the trip unit to prevent adjustments after settings are confirmed.

Wire Seal

Catalog Number

5108A03H01

External Accessories and Test Kit

External Accessories

| Description | Fit Type | Frame | | | | |
|---|--------------|-----------|-----------|-----------|----------|----------|
| | | EG | JG | LG | NG | RG |
| Non-padlockable handle block | Field | EFHB | — | — | LKD4 | — |
| Padlockable handle block | Field | EFPHB | — | — | — | — |
| Padlockable handle block off-only | Field | EFPHBOFF | FJPHBOFF | LBHPOFF | — | — |
| Padlockable handle lock hasp | Field | EFPLK | FJPHL | LPHL | PLK5 | HLK6 |
| Padlockable handle lock hasp off-only | Field | EFPHLOFF | FJPHLOFF | LPHLOFF | PLK550FF | HLK60FF |
| Kirk key interlock kit ^{①②} | Field | — | KYKJG | KYKLG | KYK4 | KYK6 |
| Castell key interlock kit ^{②③} | Field | — | CTKJG | CTKLG | CTK4 | CTK6 |
| Slide bar interlock ^④ | Field | EFSBI | FJSBI | LGSBI | SBK5 | — |
| Walking beam interlock ^④ | Three-pole | EG3WBI | JG3WBI | LG3WBI | WBL5 | WBL6 |
| | Four-pole | EG4WBI | JG4WBI | LG4WBI | WBL5 | — |
| Electrical operator ^⑤ | 120 Vac | MOPEG240C | MOPJG120C | MOPLG120C | EOP5T07 | EOP6T08K |
| | 240 Vac | MOPEG240C | MOPJG240C | MOPLG240C | EOP5T11 | EOP6T11K |
| | 24 Vdc | MOPEG48D | MOPJG24D | MOPLG24D | EOP5T21 | — |
| | 48 Vdc | MOPEG48D | — | — | EOP5T22 | EOP6T21K |
| | 125 Vdc | MOPEG120C | MOPJG120C | MOPLG120C | EOP5T26 | — |
| | 220 Vdc | — | MOPJG240C | MOPLG240C | — | — |
| | 250 Vdc | — | MOPJG240C | MOPLG240C | — | — |
| Plug-in adapters | Three-pole | PAD3E | PAD3J | PAD3L | PAD53 | — |
| | Four-pole | PAD4E | PAD4J | PAD4L | — | — |
| Wohner busbar adapter | Field top | EG-BUS-T | JG-BUS-TB | LG-BUS-TB | — | — |
| | Field bottom | EG-BUS-B | JG-BUS-TB | LG-BUS-TB | — | — |

Series G MCCB Frames EG, JG, and LG to mount to the SASY 60 mm Wohner Classic System

- UL file # E197132
- Compact design
- UL508 tested and certified using Wohner system with Eaton breakers
- No line side wiring required
- Up to 630 A MCCB
- Reverse feed possible

Wohner Busbar Adapter**Wohner Busbar Adapters**

| Breaker Frame | Busbar Adapter | Connection Point |
|---------------|----------------|------------------|
| EG | EG-BUS-T | Top |
| EG | EG-BUS-B | Bottom |
| JG | JG-BUS-TB | Top or bottom |
| LG | LG-BUS-TB | Top or bottom |

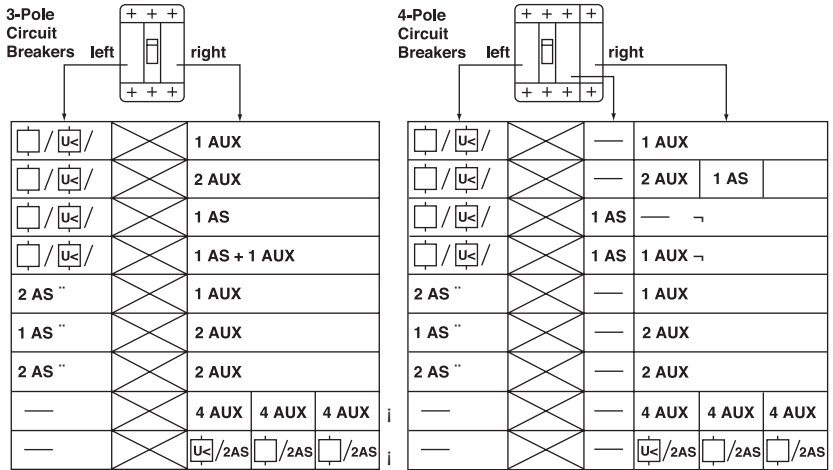
Notes

- ① Provision only.
- ② See **Page V4-T2-420** for bolt projection dimensions.
- ③ Castell bolt mounting hole must be 10 mm.
- ④ Requires two breakers.
- ⑤ Contact Eaton for availability of operators for EG- and NG-Frames before December 2004.

Accessory Configurations for EG–RG Circuit Breakers

2

Internal Accessory Configurations



□ / U_C / = Shunt Trip or Undervoltage Release

AUX = Auxiliary Switch

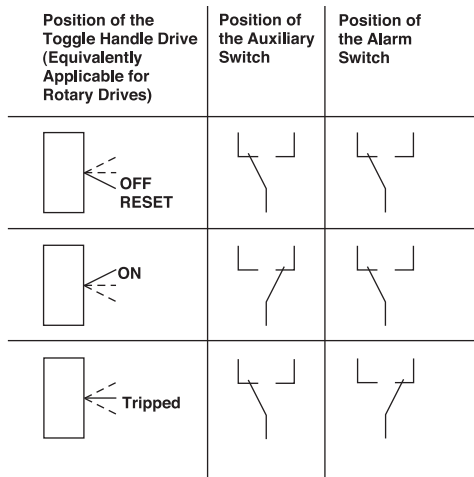
AS = Alarm Switch

" = For N-Frame Circuit Breakers Only

≠ = For R-Frame Circuit Breakers Only

¬ = For N and R-Frame Circuit Breakers Only

Contact Making by the Auxiliary and Alarm Switches as a Function of the Switching Position of the Circuit Breaker



Accessories

Field Fit Kit Catalog Numbers

Alarm Lockout

| Description | Pole Location | Frame | | |
|----------------|---------------|---------------|---------|---------|
| | | EG, JG and LG | NG | RG ① |
| Make/Break | Left | — | A1L5LPK | — |
| | Right | ALM1M1BEPK ② | A1L5RPK | A1L6RPK |
| 2 Make/2 Break | Left | — | A2L5LPK | — |
| | Right | ALM2M2BEPK ③ | A2L5RPK | A2L6RPK |

| Description | Pole Location | For Use in Frame | Contact Type | Catalog Number |
|-----------------|---------------|------------------|--------------|----------------|
| Make/Break | Right | EG | Silver | ALM1M1BEPK |
| 2 Make/ 2 Break | Right | EG | Silver | ALM2M2BEPK |
| Make/Break | Right | JG and LG | Silver | ALM1M1BJPK |
| 2 Make/ 2 Break | Right | JG and LG | Silver | ALM2M2BJPK |
| Make/Break | Right | EG | Gold | ALM1M1BEEPK |
| 2 Make/ 2 Break | Right | EG | Gold | ALM2M2BEEPK |
| Make/Break | Right | JG and LG | Gold | ALM1M1BEJPK |
| 2 Make/ 2 Break | Right | JG and LG | Gold | ALM2M2BEJPK |

Auxiliary Switch

| Description | Pole Location | Frame | | |
|-------------|---------------|---------------|---------|---------|
| | | EG, JG and LG | NG | RG ① |
| 1A, 1B | Left | — | A1X5PK | — |
| | Right | AUX1A1BPK | A1X5PK | — |
| 2A, 2B | Left | — | A2X5PK | — |
| | Right | AUX2A2BPK | A2X5PK | A2X6RPK |
| 3A, 3B | Left | — | A3X5LPK | — |
| | Right | — | A3X5RPK | — |
| 4A, 4B | Left | — | — | — |
| | Right | — | — | A4X6RPK |

| Description | Pole Location | For Use in Frame | Contact Type | Catalog Number |
|-------------|---------------|------------------|--------------|----------------|
| 1A, 1B | Right | EG/JG/LG | Silver | AUX1A1BPK |
| 2A, 2B | Right | EG/JG/LG | Silver | AUX2A2BPK |
| 1A, 1B | Right | EG/JG/LG | Gold | AUX1E1BPK |
| 2A, 2B | Right | EG/JG/LG | Gold | AUX2E2BPK |

Auxiliary Switch/Alarm Lockout

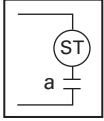
| Description | Pole Location | Frame | | |
|-------------|---------------|---------------|----------|------|
| | | EG, JG and LG | NG | RG ① |
| — | Left | — | AA115LPK | — |
| | Right | AUXALRMEPK ④ | AA115RPK | — |

| Description | Pole Location | For Use in Frame | Contact Type | Catalog Number |
|---------------|---------------|------------------|--------------|----------------|
| 1A/1B & 1M/1B | Right | EG | Silver | AUXALRMEPK |
| 1A/1B & 1M/1B | Right | JG and LG | Silver | AUXALRMJPK |
| 1A/1B & 1M/1B | Right | EG | Gold | AUXALRMEEPK |
| 1A/1B & 1M/1B | Right | JG and LG | Gold | AUXALRMEJPK |

Notes

- ① All accessories mount in the RH cavity which will accept one each of shunt trip, UVR, auxiliary switch and alarm switch.
- ② Part number for JG and LG is ALM1M1BJPK.
- ③ Part number for JG and LG is ALM2M2BJPK.
- ④ Part number for JG and LG is AUXALRMJPK.

Shunt Trip—Standard



Shunt Trip—Standard

| Description | Pole Location | Frame | | |
|----------------------------|---------------|----------------------------|-----------|-----------------|
| | | EG, JG and LG ^① | NG | RG ^② |
| 48–60 Vac | Left | SNT4860CPK | SNT5LP05K | — |
| | Right | — | — | SNT6P05K |
| 110–240 Vac | Left | SNT120CPK | SNT5LP11K | — |
| | Right | — | — | SNT6P11K |
| 380–600 Vac | Left | SNT480CPK ^③ | — | — |
| | Right | — | — | — |
| 220–250 Vdc or 380–440 Vac | — | — | SNT5LP14K | SNT6P14K |
| 480–600 Vac | — | — | SNT5LP18K | SNT6P18K |
| 12 Vdc | Left | SNT012CPK | — | — |
| | Right | — | — | — |
| 24 Vac/dc | Left | SNT024CPK | SNT5LP03K | — |
| | Right | — | — | SNT6P03K |
| 48–60 Vdc | Left | SNT4860CPK | SNT5LP23K | — |
| | Right | — | — | SNT6P23K |
| 110–125 Vdc | Left | SNT125DPK | SNT5LP26K | — |
| | Right | — | — | SNT6P26K |
| 250 Vdc | Left | SNT250DPK | — | — |
| | Right | — | — | — |

Shunt Trip—Low Energy

| Description | Pole Location | Frame | | |
|-------------|---------------|---------------|---------|-----------------|
| | | EG, JG and LG | NG | RG ^② |
| — | Left | — | LST5LPK | — |
| — | Right | — | — | LST6RPK |

Undervoltage Release Mechanism

| Description | Pole Location | Frame | | |
|-------------|---------------|----------------------------|------------------------|------------------------|
| | | EG, JG and LG ^① | NG | RG ^② |
| 110–127 Vac | Left | UVR120APK | UVH5LP08K | — |
| | Right | — | — | UVH6RP08K |
| 208–240 Vac | Left | UVR240APK | UVH5LP11K | — |
| | Right | — | — | UVH6RP11K |
| 24 Vdc | Left | UVR024DPK | UVH5LP21K ^④ | — |
| | Right | — | — | UVH6RP21K ^④ |
| 24 Vac | Left | UVR024APK | UVH5LP21K ^④ | — |
| | Right | — | — | UVH6RP21K ^④ |
| 48–60 Vdc | Left | UVR048DPK | UVH5LP23K | — |
| | Right | — | — | UVH6RP23K |
| 48–60 Vac | Left | UVR048APK | UVH5LP05K | — |
| | Right | — | — | UVH6RP05K |
| 120 Vdc | Left | UVR125DPK | UVH5LP26K | — |
| | Right | — | — | UVH6RP26K |
| 220–250 Vdc | Left | UVR250DPK | UVH5LP28K | — |
| | Right | — | — | UVH6RP28K |
| 380–500 Vac | Left | UVR480APK | UVH5LP29K | — |
| | Right | — | — | UVH6RP29K |
| 525–600 Vac | Left | UVR600APK | — | — |
| | Right | — | — | — |
| 12 Vdc | Left | — | UVH5LP20K | — |
| | Right | — | — | UVH6RP20K |
| 12 Vac | Left | — | UVH5LP02K | — |
| | Right | — | — | UVH6RP02K |

Notes

- ① LH cavity not available for EG frame with earth leakage module.
 ② All accessories mount in the RH cavity which will accept one each of shunt trip, UVR, auxiliary switch and alarm switch.
 ③ 380–600 Vdc, 50/60 Hz.
 ④ 24 Vdc only use UVH5LP03K (NG) UVH6RP03K (RG) for 24 Vac.

Technical Data and Specifications

Note: Gold-plated contacts are well suited for switching low voltages and currents. Lead wires on accessories containing gold-plated contacts are marked with a yellow stripe.

Series G Gold Contact Accessory Switch Electrical Ratings

| Max. Voltage (Ue) | Frequency | Max. Current (I _n) | Dielectric Withstand Voltage (UI) |
|-------------------|-----------|--------------------------------|-----------------------------------|
| 125 V | 50/60 Hz | 0.1 A | 2200 V |
| 30 V | DC | 0.25 A | 2200 V |
| 5 V | DC | 5 mA | 2200 V |

Series G Silver Contact Accessory Switch Electrical Ratings

| Max. Voltage (Ue) | Frequency | Max. Current (I _n) | Dielectric Withstand Voltage (UI) |
|-------------------|-----------|--------------------------------|-----------------------------------|
| 600 V | 50/60 Hz | 2 A | 2200 V |
| 125/250 V | 50/60 Hz | 5 A | 2200 V |
| 125 V | DC | 1 A | 2200 V |

Series GJ Frame: Terminal Extension Kits

| | Extension Orientation | | | |
|------------|-----------------------|-------------|----------|----------|
| | Edgewise | Right Angle | Spreader | Straight |
| Three-pole | FJTEE3 | FJTER3 | FJTEW3 | FJTES3 |
| Four-pole | FJTEE4 | FJTER4 | FJTEW4 | FJTES4 |

Series G Motor Operators

2



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| NG-Frame (320–1200 Amperes) | V4-T2-167 |
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| Motor Circuit Protectors (MCP) | V4-T2-187 |
| Motor Protector Circuit Breakers (MPCB) | V4-T2-191 |
| 30 mA Ground Fault (Earth Leakage) Module | V4-T2-194 |
| Current Limiting Circuit Breaker Module | V4-T2-198 |
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Motor Operators

Product Description

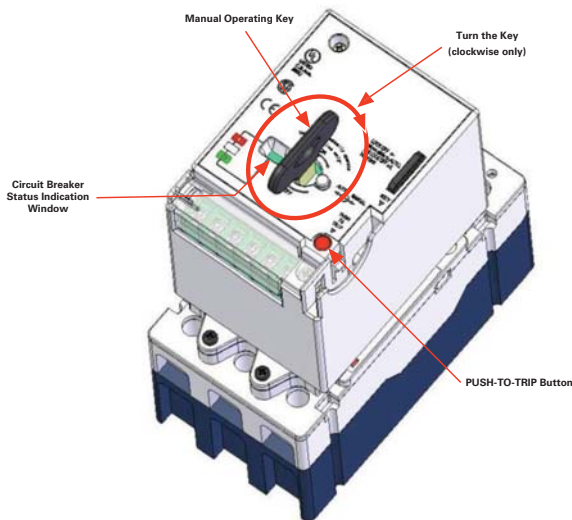
Eaton’s motor operator mechanism enables local and remote ON, OFF and reset switching of a circuit breaker. The motor operator is mounted on the circuit breaker cover within the dimensions of the circuit breaker.

The robust motor operators offer various voltages to maximize customer flexibility. Standard load transfer switching can be accomplished through the use of two circuit breakers fitted with motor operators and a mechanical interlock.

Features, Benefits and Functions

The motor operator provides special features for ease of customer use and status indication.

- The motor operator allows the circuit breaker to be opened, closed or reset remotely
- The motor operator contains a motor connected to a cam drive mechanism. The cam drives a slide mechanism to operate the circuit breaker handle
- Internal limit switches and relays are used to control motor operation to prevent overdriving the circuit breaker handle and motor overload conditions
- A key is provided to manually operate the circuit breaker
- A special pull-out locking mechanism provides a method for padlocking the circuit breaker handle in the OFF position
- The locking device will accept three padlock shackles with a maximum diameter of 1/4-inch (6.4 mm) each
- The cover provides visual status of the circuit breaker: ON, OFF or TRIPPED. A PUSH-TO-TRIP button allows the user to manually trip the breaker



Standards and Certifications

The motor operators are UL and CSA listed, and CE marked.



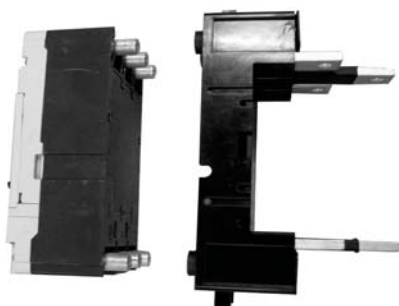
Product Selection

Motor Operators

| Frame | Voltage | Frequency | Inrush Current | Catalog Number |
|------------------|-------------|-----------|----------------|------------------|
| Series G E-Frame | 100–240 Vac | 50/60 Hz | 1A | MOPEG240C |
| | 100–220 Vdc | DC | 1A | MOPEG240C |
| | 24/48 Vdc | DC | 3A | MOPEG48D |
| Series C F-Frame | 208–240 Vac | 50/60 Hz | 1A | MOPFD240C |
| | 110–127 Vac | 50/60 Hz | 1A | MOPFD120C |
| | 220–250 Vdc | DC | 1A | MOPFD240C |
| | 110–125 Vdc | DC | 1A | MOPFD120C |
| Series G J-Frame | 24 Vdc | DC | 3A | MOPFD24D |
| | 208–240 Vac | 50/60 Hz | 1A | MOPJG240C |
| | 110–127 Vac | 50/60 Hz | 1A | MOPJG120C |
| | 220–250 Vdc | DC | 1A | MOPJG240C |
| Series G L-Frame | 110–125 Vdc | DC | 1A | MOPJG120C |
| | 24 Vdc | DC | 3A | MOPJG24D |
| | 208–240 Vac | 50/60 Hz | 2A | MOPLG240C |
| | 110–127 Vac | 50/60 Hz | 2A | MOPLG120C |
| Series G L-Frame | 220–250 Vdc | DC | 2A | MOPLG240C |
| | 110–125 Vdc | DC | 2A | MOPLG120C |
| | 24 Vdc | DC | 6A | MOPLG24D |

LG Breaker with Plug-In Block

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| LG-Frame (250–630 Amperes) | V4-T2-149 |
| NG-Frame (320–1200 Amperes) | V4-T2-167 |
| RG-Frame (800–2500 Amperes) | V4-T2-176 |
| Motor Circuit Protectors (MCP) | V4-T2-187 |
| Motor Protector Circuit Breakers (MPCB) | V4-T2-191 |
| 30 mA Ground Fault (Earth Leakage) Module | V4-T2-194 |
| Current Limiting Circuit Breaker Module | V4-T2-198 |
| High Instantaneous Circuit Breaker for Selective Coordination | V4-T2-203 |
| Special Features and Accessories | V4-T2-206 |
| Motor Operators | V4-T2-214 |
| Plug-In Blocks | |
| Drawout Cassette | V4-T2-217 |

Plug-In Blocks

Product Description

Plug-in adapters simplify installation and front removal of circuit breakers. Plug-ins are available for rear connection applications on three- and four-pole circuit breakers. Trip on drawout interlock kits are included. Stabs for EG, JG and LG plug-ins rotate 90° for flexible installation. Use terminal shields for IP30 protection.

Product Selection

Plug-In Blocks

| Breaker Frame | Number of Poles | Catalog Number |
|---|-----------------|----------------|
| EG-, JG- and LG-Frame Plug-In Blocks | | |
| EG | 3 | PAD3E |
| EG | 4 | PAD4E |
| JG | 3 | PAD3J |
| JG | 4 | PAD4J |
| LG | 4 | PAD4L |
| Trip-On Drawout Interlock Kit ^① | | |
| EG | 3, 4 | PIILEG |
| JG | 3, 4 | PIILJG |
| LG | 3, 4 | PIILLG |
| Terminal Shields IP30 | | |
| EG | 3 | EFTS3K |
| EG | 4 | EFTS4K |
| JG | 3 | FJTS3K |
| JG | 4 | FJTS4K |
| LG | 3 | LTS3K |
| LG | 4 | LTS4K |

Note

^① Included with plug-in block. Trips the breaker when breaker is removed from plug-in block.

Drawout Cassettes



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| JG-Frame (63–250 Amperes) | V4-T2-131 |
| LG-Frame (250–630 Amperes) | V4-T2-149 |
| NG-Frame (320–1200 Amperes) | V4-T2-167 |
| RG-Frame (800–2500 Amperes) | V4-T2-176 |
| Motor Circuit Protectors (MCP) | V4-T2-187 |
| Motor Protector Circuit Breakers (MPCB). | V4-T2-191 |
| 30 mA Ground Fault (Earth Leakage) Module | V4-T2-194 |
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| Drawout Cassette | |

Drawout Cassette

Product Description

The drawout cassette is available for use with JG, LG and NG, three- and four-pole breakers. The cassettes consist of two separate components: the movable mechanism, which attaches to the breaker, and the stationary mechanism, which houses in the cassette. For the JG, LG and NG drawout cassettes, all necessary parts for installation are included in the one catalog number.

Features

Features of the drawout cassettes for the JG, LG and NG include:

- Trip on drawout—breaker will trip if it is in the ON position when withdrawn from the cassette
- Secondary terminal block—the drawout cassettes include a secondary terminal block for easier access when wiring low voltage accessories, including shunts and undervoltage releases

The drawout mechanism has three primary positions:

- Connected—the breaker is fully connected to the primary stabs and secondary contacts
- Disconnected—both the primary stabs and the secondary contacts are disconnected
- Withdraw—the breaker can be removed from the cassette

Product Selection

JG Drawout Cassette



LG Drawout Cassette



JG, LG and NG Drawout Cassettes

| Breaker Frame | Number of Poles | Catalog Number |
|---------------|-----------------|----------------|
| JG | 3 | JG3DOM |
| | 4 | JG4DOM |
| LG | 3 | LG3DOM |
| | 4 | LG4DOM |
| NG | 3 | NG3DOM |
| | 4 | NG4DOM |

Molded Case Circuit Breaker Product Family

2



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| Standards and Certifications | V4-T2-219 |
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| G-Frame (15–100 Amperes) | V4-T2-223 |
| F-Frame (10–225 Amperes) | V4-T2-237 |
| J-Frame (70–250 Amperes) | V4-T2-255 |
| K-Frame (70–400 Amperes) | V4-T2-263 |
| L-Frame (125–600 Amperes) | V4-T2-287 |
| M-Frame (300–800 Amperes) | V4-T2-313 |
| N-Frame (400–1200 Amperes) | V4-T2-324 |
| R-Frame (800–2500 Amperes) | V4-T2-339 |
| Motor Circuit Protectors (MCP) | V4-T2-358 |
| Motor Protection Circuit Breakers (MPCB) | V4-T2-369 |
| Type ELC Current Limiter Attachment (Size 0–4) | V4-T2-371 |
| Current Limiting Circuit Breaker Module | V4-T2-372 |
| Internal Accessories | V4-T2-375 |
| External Accessories | V4-T2-408 |



Product Overview

Eaton’s molded case circuit breakers are designed to provide circuit protection for low voltage distribution systems. They are described by NEMA as, “... a device for closing and interrupting a circuit between separable contacts under both normal and abnormal conditions,” and furthermore as, “... a breaker assembled as an integral unit in a supporting and enclosing housing of insulating material.” The National Electrical Code (NEC) describes them as, “A device designed to open and close a circuit by non-automatic means, and to open the circuit automatically on a predetermined overload of current, without injury to itself when properly applied within its rating.”

So designed, Eaton circuit breakers protect conductors against overloads and conductors and connected apparatus, such as motors and motor starters, against short circuits.

In low voltage distribution systems, there are many varied applications of molded case circuit breakers.

Eaton offers the most comprehensive family of molded case circuit breakers in the industry.

This section of circuit breakers includes:

- Thermal-magnetic trip breakers
- Electronic rms trip breakers
- Molded case switches
- Motor circuit protectors
- Current limiting breakers
- Special application breakers

Modified Breakers

Eaton breakers can be ordered with internal accessories installed. These modified breakers will be subject to an addition charge.

Special Calibration

Special non-UL-listed calibrations are available for certain ambient temperatures other than 40 °C and for frequencies other than 50/60 Hz or DC. Reduced interrupting ratings will apply for 400 Hz applications.

50 °C Calibration

Add suffix **V** to catalog Number for complete breaker, listed above, when ordering listed ampere ratings for breakers to be used in 50 °C ambients. (No UL label.)

Moisture-Fungus Treatment

All circuit breaker cases are molded from glass-polyester which does not support the growth of fungus. Any parts which are susceptible to the growth of fungus will require special treatment.

Freeze-Tested Circuit Breakers

The circuit breakers may be ordered with freeze testing. This option uses special lubrication and mechanical operation is verified at –40 °C.

Marine Applications

E- to R-Framed circuit breakers can be supplied to meet the following marine specifications:

- U.S. Coast Guard CFR 46; ABS—American Bureau of Shipping; IEEE 45; DNV; Lloyds; and ABS/NVR

These specifications generally require molded case circuit breakers to be supplied with 50 °C ambient, and plug-in adapter kits. When plug-in adapter kits are used, no terminals need be supplied (switchboard applications).

Circuit breakers can also be supplied to meet UL 489 Supplement SA (Marine use) and UL 489 Supplement SB (Naval Use).

UL 489 Supplement SA applies to vessels over 65 feet (19.8 m) in length. Requirements include 40 °C ambient calibration, special labeling, and no use of aluminum conductors or terminals. (No 50 °C.)

- Suffix H08

Or you can choose to add 50 °C ambient but then there is no “UL” mark.

- Suffix VH08

UL 489 Supplement SB requires partial 50 °C ambient calibration, vibration testing, special nameplating and no use of aluminum conductors or terminals. Eaton chooses to always fully calibrate to 50 °C ambient. (“Naval” labeled per UL, and UL now allows 50 °C label here.)

- Suffix VH09

Certified Test Reports

Eaton breakers can be ordered with certified test reports at the time of order entry. Test report documents the thermal and magnetic or electronic tripping characteristics of the individual breaker. Breaker and test report must be ordered together. Add suffix 12 to breaker catalog number and enter separate line item on order for certified test report.

Standards and Certifications

Molded case circuit breakers are designed to conform with the following standards:

- Underwriters Laboratories Inc., Standard UL 489, molded case circuit breakers and circuit breaker enclosures
- National Electrical Manufacturers Association (NEMA) Standards Publication No. AB1-1993, molded case circuit breakers
- Australian Standard AS 2184, molded case circuit breakers
- British Standards Institution Standard BS 4752: Part 1, switchgear and control gear Part 1: circuit breakers
- Canadian Standards Association (CSA) Standard C22.2 No. 5, service entrance and branch circuit breakers
- International Electrotechnical Commission Recommendations IEC 60947-2, circuit breakers
- Japanese T-Mark Standard molded case circuit breakers
- South African Bureau of Standards, Standard SABS 156, Standard Specification for molded case circuit breakers
- Swiss Electro-Technical Association Standard SEV 157-1, safety regulations for circuit breakers
- Union Technique de l'Electricite Standard NF C 63-120, low voltage switchgear and control gear circuit breaker requirements
- Verband Deutscher Elektrotechniker (Association of German Electrical Engineers) Standard VDE 0660, low voltage switchgear and control gear, circuit breakers

Conformance with these standards satisfies most local and international codes, assuming user acceptability and simplified application.

Molded case circuit breakers equal or exceed Federal Specification Classification W-C-375b requirements for the particular class associated with the circuit breaker frame being considered.

Open breakers do not have service entrance ratings. Service entrance rating is part of the enclosure.



Quick Reference

Industrial Circuit Breakers

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G-Frame

| Circuit Breaker Type | Continuous Ampere Rating at 40 °C | No. of Poles | Volts | | Type of Trip ^① | Federal Specification W-C-375b | UL Listed Interrupting Ratings (rms Symmetrical Amperes) | | | | | | | Page Number | |
|----------------------|-----------------------------------|--------------|----------|---------|---------------------------|--------------------------------|--|---------|-----|-----|----------------------|-----|------------------|-------------|-----------|
| | | | AC | DC | | | AC (kA) | | | | DC (kA) ^② | | | | |
| | | | | | | | 120 | 120/240 | 240 | 277 | 480 | 600 | 125 ^③ | 250 | |
| GHB | 15–100 | 1 | 120 | 125 | N.I.T.U. | 11a | 65 | — | — | — | — | — | 14 | — | V4-T2-228 |
| GHB | 15–100 | 2, 3 | 240 | 125/250 | N.I.T.U. | 11a10b, 11b | — | — | 65 | — | — | — | — | 14 | V4-T2-228 |
| GHB | 15–100 | 1 | 277 | 125 | N.I.T.U. | 12b, 14b | — | — | — | 14 | — | — | 14 | — | V4-T2-228 |
| GHB | 15–100 | 2, 3 | 480Y/277 | 125/250 | N.I.T.U. | 15b | — | — | — | 14 | 14 | — | — | 14 | V4-T2-228 |
| HGHB | 15–30 | 1 | 277 | 125 | N.I.T.U. | 12c, 13a, 13b | 65 | — | — | 25 | — | — | 14 | — | V4-T2-228 |
| GHBS | 15–30 | 1, 2 | 480Y/277 | — | — | — | 65 | 65 | — | 14 | — | — | — | — | V4-T1-34 |
| GBHS | 15–20 | 1, 2 | 600Y/347 | — | N.I.T.U. | — | — | — | — | — | — | 10 | — | — | V4-T1-34 |
| GDB | 15–50 | 2 | 480 | 125/250 | N.I.T.U. | — | — | — | — | 14 | — | — | — | 10 | V4-T2-226 |
| GDB | 15–100 | 3 | 480 | 250 | N.I.T.U. | — | — | — | — | 14 | — | — | — | 10 | V4-T2-226 |
| GD | 15–50 | 2 | 480 | 125/250 | N.I.T.U. | 13b | — | — | 65 | — | 14 | — | — | 10 | V4-T2-225 |
| GD | 15–100 | 3 | 480 | 250 | N.I.T.U. | 13b | — | — | 65 | — | 22 | — | — | 10 | V4-T2-225 |
| GHC | 15–100 | 1 | 120 | 125 | N.I.T.U. | 12c, 13a | 65 | — | — | — | — | — | 14 | — | V4-T2-233 |
| GHC | 15–100 | 2, 3 | 240 | 125/250 | N.I.T.U. | 13b | — | — | 65 | — | — | — | — | 1 | V4-T2-233 |
| GHC | 15–100 | 1 | 277 | 125 | N.I.T.U. | 12c, 13a | — | — | — | 14 | — | — | 14 | — | V4-T2-233 |
| GHC | 15–100 | 2, 3 | 480Y/277 | 125/250 | N.I.T.U. | 13b | — | — | — | 14 | 14 | — | — | 14 | V4-T2-233 |
| HGHC | 15–30 | 1 | 277 | 125 | N.I.T.U. | — | 65 | — | — | 25 | — | — | 14 | — | V4-T2-233 |

Notes

- ① N.I.T.U. is non-interchangeable trip unit and I.T.U. is interchangeable trip unit.
- ② Two-pole circuit breaker, or two poles of three-pole circuit breaker at 250 Vdc.
- ③ Single-pole breakers can be applied in DC systems up to 70 A.

F-Frame

| Circuit Breaker Type | Continuous Ampere Rating at 40 °C | No. of Poles | Volts | | Type of Trip ^① | Federal Specification W-C-375b | UL Listed Interrupting Ratings (rms Symmetrical Amperes) | | | | | | | | Page Number |
|----------------------|-----------------------------------|--------------|-------|-----|---------------------------|--------------------------------|--|---------|-----|-----|----------------------|-----|-----|-----|-------------|
| | | | AC | DC | | | AC (kA) | | | | DC (kA) ^② | | | | |
| | | | | | | | 120 | 120/240 | 240 | 277 | 480 | 600 | 125 | 250 | |
| EDB | 100–225 | 2, 3 | 240 | 125 | N.I.T.U. | — | — | — | 22 | — | — | — | 10 | — | V4-T2-237 |
| EDS | 100–225 | 2, 3 | 240 | 125 | N.I.T.U. | — | — | — | 42 | — | — | — | 10 | — | V4-T2-237 |
| ED | 15–225 | 2, 3 | 240 | 125 | N.I.T.U. | 12b | — | — | 65 | — | — | — | 10 | — | V4-T2-237 |
| EDH | 100–225 | 2, 3 | 240 | 125 | N.I.T.U. | 14b | — | — | 100 | — | — | — | 10 | — | V4-T2-237 |
| EDC | 100–225 | 2, 3 | 240 | 125 | N.I.T.U. | 1 | — | — | 200 | — | — | — | 10 | — | V4-T2-237 |
| EHD | 15–100 | 1 | 277 | 125 | N.I.T.U. | 13a | — | — | — | 14 | — | — | 10 | — | V4-T2-237 |
| EHD | 15–100 | 2, 3 | 480 | 250 | N.I.T.U. | 13b | — | — | 18 | — | 14 | — | — | 10 | V4-T2-237 |
| FDB | 15–150 | 2, 3 | 600 | 250 | N.I.T.U. | 18a | — | — | 18 | — | 14 | 14 | — | 10 | V4-T2-237 |
| FDB | 15–150 | 4 | 600 | 250 | N.I.T.U. | ③ | — | — | 18 | — | 14 | 14 | — | 10 | V4-T2-237 |
| FD | 15–150 | 1 | 277 | 125 | N.I.T.U. | 13a | — | — | — | 35 | — | — | 10 | — | V4-T2-237 |
| FD | 15–225 | 2, 3 | 600 | 250 | N.I.T.U. | 22a | — | — | 65 | — | 35 | 18 | — | 10 | V4-T2-237 |
| FD | 15–225 | 4 | 600 | 250 | N.I.T.U. | ③ | — | — | 65 | — | 35 | 18 | — | 10 | V4-T2-237 |
| FDE | 15–225 | 3 | 600 | — | N.I.T.U. | — | — | — | 65 | — | 35 | 18 | — | — | V4-T2-237 |
| HFD | 15–150 | 1 | 277 | 125 | N.I.T.U. | 13a | — | — | — | 65 | — | — | 10 | — | V4-T2-237 |
| HFD | 15–225 | 2,3 | 600 | 250 | N.I.T.U. | 22a | — | — | 100 | — | 65 | 25 | — | 22 | V4-T2-237 |
| HFD | 15–225 | 4 | 600 | 250 | N.I.T.U. | ③ | — | — | 100 | — | 65 | 25 | — | 22 | V4-T2-237 |
| HFDE | 15–225 | 3 | 600 | — | N.I.T.U. | — | — | — | 100 | — | 65 | 25 | — | — | V4-T2-237 |
| FDC ^④ | 15–225 | 2, 3 | 600 | 250 | N.I.T.U. | 24a | — | — | 200 | — | 100 | 35 | — | 22 | V4-T2-237 |
| FDC ^④ | 15–225 | 4 | 600 | 250 | N.I.T.U. | ③ | — | — | 200 | — | 100 | 35 | — | 22 | V4-T2-237 |
| FDCE ^{④⑤} | 15–225 | 3 | 600 | — | N.I.T.U. | — | — | — | 200 | — | 100 | 25 | — | — | V4-T2-237 |

Notes

- ① N.I.T.U. is non-interchangeable trip unit and I.T.U. is interchangeable trip unit.
 ② Two-pole circuit breaker, or two poles of three-pole circuit breaker at 250 Vdc.
 ③ Not defined in W-C-375b.
 ④ Current limiting.
 ⑤ Check with Eaton for availability.

2.4

Molded Case Circuit Breakers

Series C

2

J-Frame

| Circuit Breaker Type | Continuous Ampere Rating at 40 °C | No. of Poles | Volts | | Type of Trip ① | Federal Specification W-C-375b | UL Listed Interrupting Ratings (rms Symmetrical Amperes) | | | | | | | | Page Number |
|----------------------|-----------------------------------|--------------|-------|-----|----------------|--------------------------------|--|---------|-----|-----|-----------|-----|-----|-----|-------------|
| | | | AC | DC | | | AC (kA) | | | | DC (kA) ② | | | | |
| | | | | | | | 120 | 120/240 | 240 | 277 | 480 | 600 | 125 | 250 | |
| JDB | 70–250 | 2, 3 | 600 | 250 | N.I.T.U. | 22a | — | — | 65 | — | 35 | 18 | — | 10 | V4-T2-258 |
| JD | 70–250 | 2, 3, 4 | 600 | 250 | I.T.U. | 22a | — | — | 65 | — | 35 | 18 | — | 10 | V4-T2-257 |
| HJD | 70–250 | 2, 3, 4 | 600 | 250 | I.T.U. | 22a | — | — | 100 | — | 65 | 25 | — | 22 | V4-T2-257 |
| JDC ③ | 70–250 | 2, 3, 4 | 600 | 250 | I.T.U. | 22a | — | — | 200 | — | 100 | 35 | — | 22 | V4-T2-257 |

K-Frame

| Circuit Breaker Type | Continuous Ampere Rating at 40 °C | No. of Poles | Volts | | Type of Trip ① | Federal Specification W-C-375b | UL Listed Interrupting Ratings (rms Symmetrical Amperes) | | | | | | | | Page Number |
|----------------------|-----------------------------------|--------------|-------|-----|----------------|--------------------------------|--|---------|-----|-----|-----------|-----|-----|-----|--|
| | | | AC | DC | | | AC (kA) | | | | DC (kA) ② | | | | |
| | | | | | | | 120 | 120/240 | 240 | 277 | 480 | 600 | 125 | 250 | |
| DK | 250–400 | 2, 3 | 240 | 250 | N.I.T.U. | 14b | — | — | 65 | — | — | — | — | 10 | V4-T2-269 |
| KDB | 100–400 | 2, 3 | 600 | 250 | N.I.T.U. | 23a | — | — | 65 | — | 35 | 25 | — | 10 | V4-T2-269 |
| KD | 100–400 | 2, 3, 4 | 600 | 250 | I.T.U. | 23a | — | — | 65 | — | 35 | 25 | — | 10 | V4-T2-266, V4-T2-267, V4-T2-271, V4-T2-274 |
| CKD | 100–400 | 2, 3, 4 | 600 | 250 | I.T.U. | 23a | — | — | 65 | — | 35 | 25 | — | — | V4-T2-268, V4-T2-277, V4-T2-279 |
| HKD | 100–400 | 2, 3, 4 | 600 | 250 | I.T.U. | 23a | — | — | 100 | — | 65 | 35 | — | 22 | V4-T2-266, V4-T2-267, V4-T2-271, V4-T2-274 |
| CHKD | 100–400 | 2, 3, 4 | 600 | 250 | I.T.U. | 23a | — | — | 100 | — | 65 | 35 | — | — | V4-T2-268, V4-T2-277, V4-T2-279 |
| KDC ③ | 100–400 | 2, 3, 4 | 600 | 250 | I.T.U. | 23a | — | — | 200 | — | 100 | 65 | — | 22 | V4-T2-266, V4-T2-267, V4-T2-271, V4-T2-274 |

L-Frame

| Circuit Breaker Type | Continuous Ampere Rating at 40 °C | No. of Poles | Volts | | Type of Trip ① | Federal Specification W-C-375b | UL Listed Interrupting Ratings (rms Symmetrical Amperes) | | | | | | | | Page Number |
|----------------------|-----------------------------------|--------------|-------|-----|----------------|--------------------------------|--|---------|-----|-----|-----------|-----|-----|-----|---------------------------------|
| | | | AC | DC | | | AC (kA) | | | | DC (kA) ② | | | | |
| | | | | | | | 120 | 120/240 | 240 | 277 | 480 | 600 | 125 | 250 | |
| LDB | 300–600 | 2, 3 | 600 | 250 | N.I.T.U. | 23a | — | — | 65 | — | 35 | 25 | — | 22 | V4-T2-292 |
| LD | 300–600 | 2, 3, 4 | 600 | 250 | I.T.U. | 23a | — | — | 65 | — | 35 | 25 | — | 22 | V4-T2-290, V4-T2-291, V4-T2-296 |
| CLD | 300–600 | 2, 3, 4 | 600 | 250 | I.T.U. | 23a | — | — | 65 | — | 35 | 25 | — | — | V4-T2-292, V4-T2-302 |
| HLD | 300–600 | 2, 3, 4 | 600 | 250 | I.T.U. | 23a | — | — | 100 | — | 65 | 35 | — | 25 | V4-T2-290, V4-T2-291, V4-T2-296 |
| CHLD | 300–600 | 2, 3, 4 | 600 | 250 | I.T.U. | 23a | — | — | 100 | — | 65 | 35 | — | — | V4-T2-292, V4-T2-302 |
| LDC ③ | 300–600 | 2, 3, 4 | 600 | 250 | I.T.U. | 23a | — | — | 200 | — | 100 | 50 | — | 30 | V4-T2-290, V4-T2-291, V4-T2-298 |
| CLDC ③ | 300–600 | 2, 3, 4 | 600 | 250 | I.T.U. | 23a | — | — | 200 | — | 100 | 50 | — | 30 | V4-T2-292, V4-T2-304 |

M-Frame

| Circuit Breaker Type | Continuous Ampere Rating at 40 °C | No. of Poles | Volts | | Type of Trip ① | Federal Specification W-C-375b | UL Listed Interrupting Ratings (rms Symmetrical Amperes) | | | | | | | | Page Number |
|----------------------|-----------------------------------|--------------|-------|-----|----------------|--------------------------------|--|---------|-----|-----|-----------|-----|-----|-----|----------------------|
| | | | AC | DC | | | AC (kA) | | | | DC (kA) ② | | | | |
| | | | | | | | 120 | 120/240 | 240 | 277 | 480 | 600 | 125 | 250 | |
| MDL | 300–800 | 2, 3 | 600 | 250 | I.T.U. | 23a | — | — | 65 | — | 50 | 25 | — | 22 | V4-T2-315, V4-T2-317 |
| CMDL | 300–800 | 2, 3 | 600 | 250 | I.T.U. | 23a | — | — | 65 | — | 50 | 25 | — | — | V4-T2-317 |
| HMDL | 300–800 | 2, 3 | 600 | 250 | I.T.U. | 23a | — | — | 100 | — | 65 | 35 | — | 25 | V4-T2-315, V4-T2-317 |
| CHMDL | 300–800 | 2, 3 | 600 | 250 | I.T.U. | 23a | — | — | 100 | — | 65 | 35 | — | — | V4-T2-317 |

Notes

① N.I.T.U. is non-interchangeable trip unit and I.T.U. is interchangeable trip unit.

② Two-pole circuit breaker, or two poles of three-pole circuit breaker at 250 Vdc.

③ Current limiting.

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| Catalog Number Selection | V4-T2-224 |
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| J-Frame (70–250 Amperes) | V4-T2-255 |
| K-Frame (70–400 Amperes) | V4-T2-263 |
| L-Frame (125–600 Amperes) | V4-T2-287 |
| M-Frame (300–800 Amperes) | V4-T2-313 |
| N-Frame (400–1200 Amperes) | V4-T2-324 |
| R-Frame (800–2500 Amperes) | V4-T2-339 |
| Motor Circuit Protectors (MCP) | V4-T2-358 |
| Motor Protection Circuit Breakers (MPCB) | V4-T2-369 |
| Type ELC Current Limiter Attachment (Size 0–4) | V4-T2-371 |
| Current Limiting Circuit Breaker Module | V4-T2-372 |
| Internal Accessories | V4-T2-375 |
| External Accessories | V4-T2-408 |

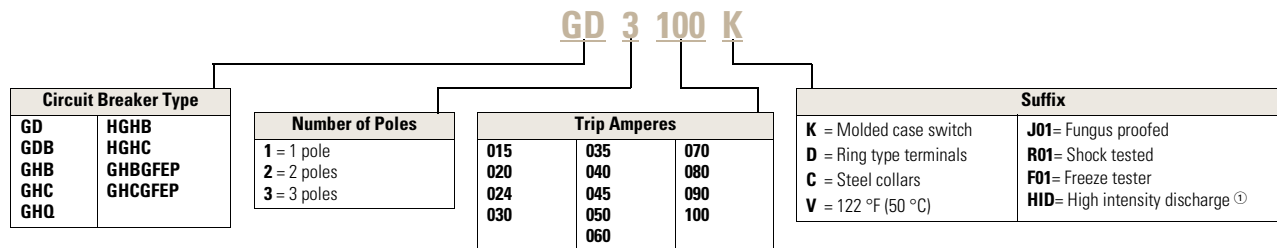
G-Frame (15–100 Amperes)**Product Description**

- All two- and three-pole circuit breakers are of the common trip type. On all three-phase delta (240 V) Grounded B phase applications, refer to Eaton
- Single-pole circuit breakers, 15 and 20 amperes. Switching duty rated (SWD) for fluorescent lighting applications
- All G-Frame circuit breakers are suitable for reverse feed use
- HACR rated

Catalog Number Selection

This information is presented only as an aid to understanding catalog numbers. It is not to be used to build catalog numbers for circuit breakers or trip units.

Circuit Breaker/Frame



Technical Data and Specifications

UL 489 Interrupting Capacity Ratings

| Circuit Breaker Type | Number of Poles | Interrupting Capacity (kA Symmetrical Amperes) | | | | | | |
|----------------------|-----------------|--|-----|-----|-----|----------|----------|--------|
| | | Volts AC (50/60 Hz) | | | | | Volts DC | |
| | | 120 | 240 | 277 | 480 | 480Y/277 | 125 ② | 250 ③④ |
| GDB | 2, 3 | — | — | — | 14 | — | — | 10 |
| GD | 2 | — | 65 | — | 14 | — | — | 10 |
| GD | 3 | — | 65 | — | 22 | — | — | 10 |
| GHQ | — | 65 | — | 14 | — | — | — | — |
| GHB | 1 | 65 | — | 14 | — | — | 14 | — |
| GHB | 2, 3 | — | 65 | — | — | 14 | 14 | — |
| HGHB | 1 | 65 | — | 25 | — | — | 14 | — |
| GHC | 1 | 65 | — | 14 | — | — | 14 | — |
| GHC | 2, 3 | — | 65 | — | — | 14 | 14 | — |
| HGHC | 1 | 65 | — | 25 | — | — | 14 | — |

Terminal Types

For line and load-side. Terminals are UL listed as suitable for wire type and size given below.

Terminal Types

| Circuit Breaker Amperes | Terminal Type Material | Screw Head Type | Wire Type | AWG Wire Range | Metric Wire Range (mm ²) ⑤ |
|------------------------------|--------------------------|-----------------|-----------|----------------|--|
| Standard | | | | | |
| 15–20 | Clamp (plated steel) | Slotted | Cu/Al | 14–10 | 2.5–4 |
| 25–100 | Pressure (aluminum body) | Slotted | Cu/Al | 10–1/0 | 4–50 |
| Optional—GD, GHB, GHC | | | | | |
| 15–100 | Pressure (steel body) | Slotted | Cu | 14–3 | — |

Notes

- ① HID suffix only applies to the GHB and GHC single-pole, 15–20 A circuit breakers.
- ② Single-pole breakers can be applied in DC systems up to 70 A.
- ③ Time constant is 8 milliseconds minimum.
- ④ Two poles of three-pole circuit breaker.
- ⑤ Not UL listed sizes.

Typical G-Frame Circuit Breaker



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| K-Frame (70–400 Amperes) | V4-T2-263 |
| L-Frame (125–600 Amperes) | V4-T2-287 |
| M-Frame (300–800 Amperes) | V4-T2-313 |
| N-Frame (400–1200 Amperes) | V4-T2-324 |
| R-Frame (800–2500 Amperes) | V4-T2-339 |
| Motor Circuit Protectors (MCP) | V4-T2-358 |
| Motor Protection Circuit Breakers (MPCB) | V4-T2-369 |
| Type ELC Current Limiter Attachment (Size 0–4) | V4-T2-371 |
| Current Limiting Circuit Breaker Module | V4-T2-372 |
| Internal Accessories | V4-T2-375 |
| External Accessories | V4-T2-408 |

Type GD Thermal-Magnetic Circuit Breakers with Non-Interchangeable Trip Units (15–100 Amperes)

Product Description

- Cable in, cable out
- Includes mounting hardware and BMHE

Standards and Certifications

- UL/CSA



Product Selection

Type GD Thermal-Magnetic Circuit Breakers with Non-Interchangeable Trip Units

| Maximum Continuous Ampere Rating at 40 °C | 480 Vac Maximum, 250 Vdc | | Includes Binding Head Screws and Clamps 10–32 x 0.312 |
|---|----------------------------------|---------------------------|---|
| | 14 kAIC at 480 Vac | 22 kAIC at 480 Vac | |
| | Includes Line and Load Terminals | | |
| | Two-Pole Catalog Number | Three-Pole Catalog Number | Three-Pole Catalog Number |
| 15 | GD2015 | GD3015 | GD3015D |
| 20 | GD2020 | GD3020 | GD3020D |
| 25 | GD2025 | GD3025 | GD3025D |
| 30 | GD2030 | GD3030 | GD3030D |
| 35 | GD2035 | GD3035 | GD3035D |
| 40 | GD2040 | GD3040 | GD3040D |
| 45 | GD2045 | GD3045 | GD3045D |
| 50 | GD2050 | GD3050 | GD3050D |
| 60 | — | GD3060 | GD3060D |
| 70 | — | GD3070 | GD3070D |
| 80 | — | GD3080 | GD3080D |
| 90 | — | GD3090 | GD3090D |
| 100 | — | GD3100 | GD3100D |

Type GDB Thermal-Magnetic Circuit Breakers with Non-Interchangeable Trip Units

| Maximum Continuous Ampere Rating at 40 °C | 480 Vac Maximum, 250 Vdc 14 kAIC at 480 Vac Includes Line and Load Terminals | |
|---|--|---------------------------|
| | Two-Pole Catalog Number | Three-Pole Catalog Number |
| 15 | GDB2015 | GDB3015 |
| 20 | GDB2020 | GDB3020 |
| 25 | GDB2025 | GDB3025 |
| 30 | GDB2030 | GDB3030 |
| 35 | GDB2035 | GDB3035 |
| 40 | GDB2040 | GDB3040 |
| 45 | GDB2045 | GDB3045 |
| 50 | GDB2050 | GDB3050 |
| 60 | — | GDB3060 |
| 70 | — | GDB3070 |
| 80 | — | GDB3080 |
| 90 | — | GDB3090 |
| 100 | — | GDB3100 |

Type GD Molded Case Switches

Type GD Molded Case Switches—Three-Pole

| Maximum Continuous Ampere Rating at 40 °C | 480 Vac Maximum, 250 Vdc |
|---|---|
| | Catalog Number (Includes Line and Load Terminals) |
| 60 | GD3060K |
| 60 | GD3060KC ① |
| 100 | GD3100K |
| 100 | GD3100KD ② |

Notes

① Includes line and load steel terminals.

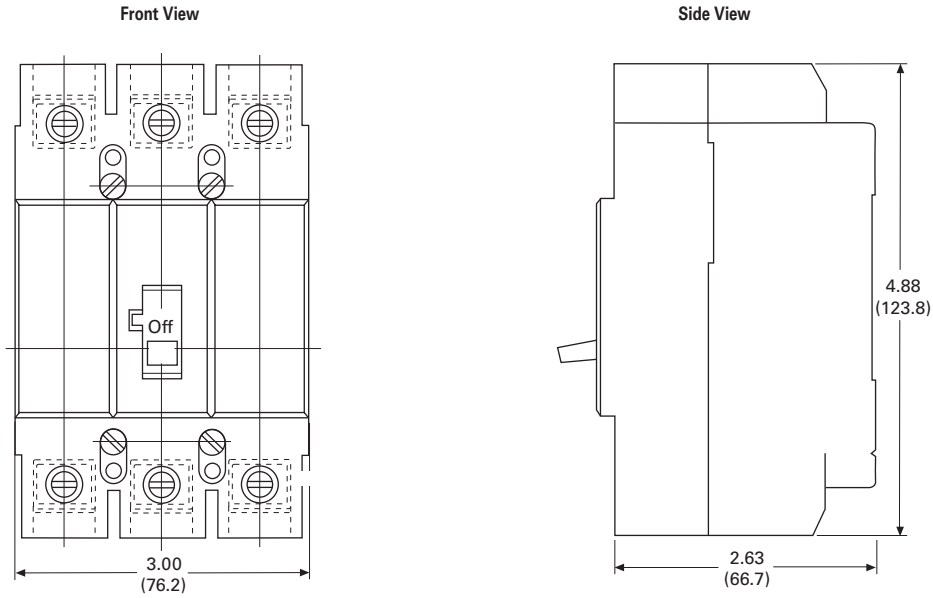
② Includes binding head screws and clamps 10–32 x 0.312.

Molded case switches may open above 1300 amperes.

Dimensions

Approximate Dimensions in Inches (mm)

GD-Frame, Three-Pole



Typical GHB

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| J-Frame (70–250 Amperes) | V4-T2-255 |
| K-Frame (70–400 Amperes) | V4-T2-263 |
| L-Frame (125–600 Amperes) | V4-T2-287 |
| M-Frame (300–800 Amperes) | V4-T2-313 |
| N-Frame (400–1200 Amperes) | V4-T2-324 |
| R-Frame (800–2500 Amperes) | V4-T2-339 |
| Motor Circuit Protectors (MCP) | V4-T2-358 |
| Motor Protection Circuit Breakers (MPCB) | V4-T2-369 |
| Type ELC Current Limiter Attachment (Size 0–4) | V4-T2-371 |
| Current Limiting Circuit Breaker Module | V4-T2-372 |
| Internal Accessories | V4-T2-375 |
| External Accessories | V4-T2-408 |

Types GHB and HGHB Bolt-On Panelboard Circuit Breakers (15–100 Amperes)

Standards and Certifications

These breakers meet the requirements of Federal Specification W-C-375b as follows:

- Type GHB, 120 and 240 V:
 - Single-pole: Class 11a
 - Two-, three-pole: Classes 10b, 11b, 12b, 14b, 15b
 - UL/CSA
- Type GHB, 277 and 480Y/277V:
 - Single-pole: Classes 12c, 13a
 - Two-, three-pole: Class 13b
 - Type HGHB 277V
 - Type GHQ 277V



Product Selection

Typical GHB


Type GHB Thermal-Magnetic Circuit Breakers with Non-Interchangeable Trip Units ^①

| Continuous Ampere Rating at 40 °C | 277/480 Vac Maximum, 125 Vdc Maximum ^② | 277/480 Vac Maximum, 125/250 Vdc Maximum | 277/480 Vac Maximum, 125/250 Vdc Maximum ^③ |
|-----------------------------------|---|--|---|
| | Single-Pole Catalog Number | Two-Pole Catalog Number | Three-Pole Catalog Number |
| 15 | GHB1015 ^{④⑤} | GHB2015 ^④ | GHB3015 ^④ |
| 20 | GHB1020 ^{④⑤} | GHB2020 ^④ | GHB3020 ^④ |
| 25 | GHB1025 | GHB2025 | GHB3025 |
| 30 | GHB1030 | GHB2030 | GHB3030 |
| 35 | GHB1035 | GHB2035 | GHB3035 |
| 40 | GHB1040 | GHB2040 | GHB3040 |
| 45 | GHB1045 | GHB2045 | GHB3045 |
| 50 | GHB1050 | GHB2050 | GHB3050 |
| 60 | GHB1060 | GHB2060 | GHB3060 |
| 70 | GHB1070 | GHB2070 | GHB3070 |
| 80 | GHB1080 | GHB2080 | GHB3080 |
| 90 | GHB1090 | GHB2090 | GHB3090 |
| 100 | GHB1100 | GHB2100 | GHB3100 |

Type HGHB Thermal-Magnetic Circuit Breakers with Non-Interchangeable Trip Units

| Continuous Ampere Rating at 40 °C | 277 Vac Maximum, 125 Vdc Maximum |
|-----------------------------------|----------------------------------|
| | Single-Pole Catalog Number |
| 15 | HGHB1015 ^⑥ |
| 20 | HGHB1020 ^⑥ |
| 25 | HGHB1025 |
| 30 | HGHB1030 |

Notes

- ① 480Y/277 V, circuit breakers (Type GHB) not suitable for three-phase delta (480 V).
- ② Single-pole breakers can be applied in DC systems from 15 through 70 amperes; 80 through 100 amperes devices are not suitable for DC application.
- ③ Use two outside poles.
- ④ Uses 0.190 (4.83) –32 screw type clamp terminals.
- ⑤ Add suffix HID for High Intensity Discharge (HID) applications. 15 and 20 ampere, single-pole are SWD rated.
- ⑥ 15 and 20 ampere, single-pole are SWD rated.

2.4

Molded Case Circuit Breakers

Series C

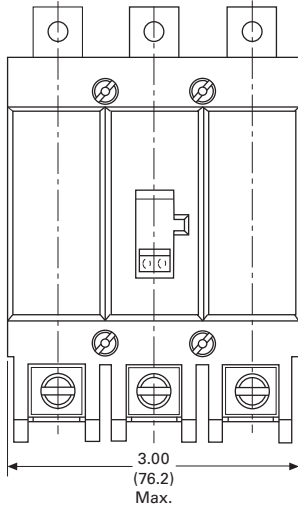
Dimensions

Approximate Dimensions in Inches (mm)

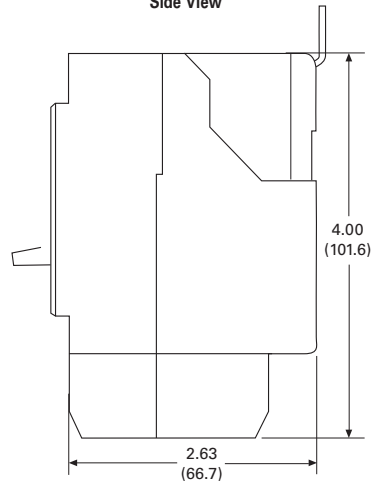
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GDB-Frame, Three-Pole

Front View



Side View



Single-Phase (requires two poles)



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| J-Frame (70–250 Amperes) | V4-T2-255 |
| K-Frame (70–400 Amperes) | V4-T2-263 |
| L-Frame (125–600 Amperes) | V4-T2-287 |
| M-Frame (300–800 Amperes) | V4-T2-313 |
| N-Frame (400–1200 Amperes) | V4-T2-324 |
| R-Frame (800–2500 Amperes) | V4-T2-339 |
| Motor Circuit Protectors (MCP) | V4-T2-358 |
| Motor Protection Circuit Breakers (MPCB) | V4-T2-369 |
| Type ELC Current Limiter Attachment (Size 0–4) | V4-T2-371 |
| Current Limiting Circuit Breaker Module | V4-T2-372 |
| Internal Accessories | V4-T2-375 |
| External Accessories | V4-T2-408 |

Type GHBGFEP Bolt-On Panelboard 30 mA Industrial Ground Fault Circuit Protectors (15–100 Amperes)

Product Description

- 15–60 amperes, 277 V, 50/60 Hz
- Operational voltage 240 V to 305 V

Standards and Certifications

These circuit breakers meet the requirements of UL 489 and UL 1053.



Product Selection

Type GHBGFEP Bolt-On Panelboard 30 mA Industrial Ground Fault Circuit Protectors with Non-Interchangeable Trip Units

| Continuous Ampere Rating at 40 °C | Single-Phase (Requires Two Poles) 277 Vac, 30 mA | |
|-----------------------------------|---|----------------|
| | | Catalog Number |
| 15 | | GHBGFEP1015 |
| 20 | | GHBGFEP1020 |
| 30 | | GHBGFEP1030 |
| 40 | | GHBGFEP1040 |
| 50 | | GHBGFEP1050 |
| 60 | | GHBGFEP1060 |

Technical Data and Specifications

Interrupting Capacity Ratings

| Circuit Breaker Type | Number of Poles | Interrupting Capacity (Symmetrical Amperes) 277 Vac (50/60 Hz) |
|----------------------|-----------------|---|
| GHBGFEP | 1 | 14,000 |

2.4

Molded Case Circuit Breakers

Series C

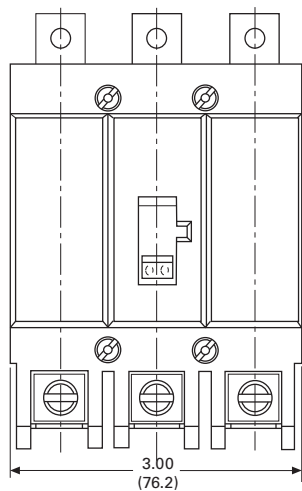
Dimensions

Approximate Dimensions in Inches (mm)

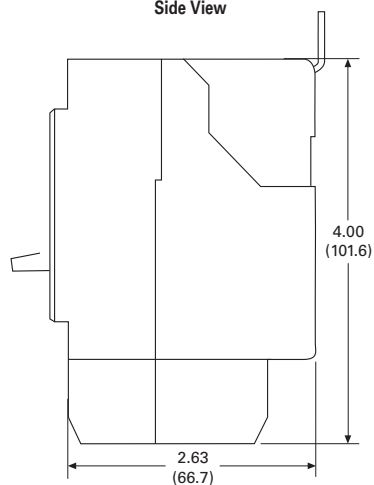
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GHB-Frame, Three-Pole

Front View



Side View



Typical GHC



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| J-Frame (70–250 Amperes) | V4-T2-255 |
| K-Frame (70–400 Amperes) | V4-T2-263 |
| L-Frame (125–600 Amperes) | V4-T2-287 |
| M-Frame (300–800 Amperes) | V4-T2-313 |
| N-Frame (400–1200 Amperes) | V4-T2-324 |
| R-Frame (800–2500 Amperes) | V4-T2-339 |
| Motor Circuit Protectors (MCP) | V4-T2-358 |
| Motor Protection Circuit Breakers (MPCB) | V4-T2-369 |
| Type ELC Current Limiter Attachment (Size 0–4) | V4-T2-371 |
| Current Limiting Circuit Breaker Module | V4-T2-372 |
| Internal Accessories | V4-T2-375 |
| External Accessories | V4-T2-408 |

Types GHC and HGHC Circuit Breakers (15–100 Amperes)

Product Description

- 15–100 amperes
- 120, 240, 277, 480Y/277V, 50/60 Hz, 125, 125/250 Vdc
- Single-, two- and three-pole
- Cable in, cable out
- Does not include mounting hardware

Standards and Certifications

These breakers meet the requirements of Federal Specification W-C-37b as follows:

- Type GHC, 277 and 480Y/277V:
 - Single-pole: Classes 12c, 13a
 - Two-, three-pole: Class 13b
- UL/CSA



Product Selection

2

Type GHC Thermal-Magnetic Circuit Breakers with Non-Interchangeable Trip Units

| Continuous Ampere Rating at 40 °C | 277 Vac Maximum, 125 Vdc Maximum ^① | 480Y/277 Vac Maximum, 125/250 Vdc Maximum | 480Y/277 Vac Maximum, 125/250 Vdc Maximum ^② |
|---|--|--|---|
| | Single-Pole Catalog Number | Two-Pole Catalog Number | Three-Pole Catalog Number |
| 15 | GHC1015 ^{③④} | GHC2015 ^③ | GHC3015 ^③ |
| 20 | GHC1020 ^{③④} | GHC2020 ^③ | GHC3020 ^③ |
| 25 | GHC1025 | GHC2025 | GHC3025 |
| 30 | GHC1030 | GHC2030 | GHC3030 |
| 35 | GHC1035 | GHC2035 | GHC3035 |
| 40 | GHC1040 | GHC2040 | GHC3040 |
| 45 | GHC1045 | GHC2045 | GHC3045 |
| 50 | GHC1050 | GHC2050 | GHC3050 |
| 60 | GHC1060 | GHC2060 | GHC3060 |
| 70 | GHC1070 | GHC2070 | GHC3070 |
| 80 | GHC1080 | GHC2080 | GHC3080 |
| 90 | GHC1090 | GHC2090 | GHC3090 |
| 100 | GHC1100 | GHC2100 | GHC3100 |

Type HGHC Thermal-Magnetic Circuit Breakers with Non-Interchangeable Trip Units

| Continuous Ampere Rating at 40 °C | 277 Vac Maximum, 125 Vdc Maximum |
|---|----------------------------------|
| | Single-Pole Catalog Number |
| 15 | HGHC1015 ^⑤ |
| 20 | HGHC1020 ^⑤ |
| 25 | HGHC1025 |
| 30 | HGHC1030 |

Notes

- ① 15 through 70 ampere circuit breakers only.
- ② Single-pole breakers can be applied in DC systems from 15 through 70 ampere; 80 through 100 ampere devices are not suitable for DC application.
- ③ Uses 0.190–32 screw type clamp terminals.
- ④ Add suffix HID for High Intensity Discharge (HID) applications. 15 and 20 ampere, single-pole are SWD rated.
- ⑤ 15 and 20 ampere, single-pole are SWD rated.

Single-Phase (requires two-pole spaces)



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| K-Frame (70–400 Amperes) | V4-T2-263 |
| L-Frame (125–600 Amperes) | V4-T2-287 |
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| R-Frame (800–2500 Amperes) | V4-T2-339 |
| Motor Circuit Protectors (MCP) | V4-T2-358 |
| Motor Protection Circuit Breakers (MPCB) | V4-T2-369 |
| Type ELC Current Limiter Attachment (Size 0–4) | V4-T2-371 |
| Current Limiting Circuit Breaker Module | V4-T2-372 |
| Internal Accessories | V4-T2-375 |
| External Accessories | V4-T2-408 |

Type GHCGFEP Cable-In/Cable-Out 30 mA Industrial Ground Fault Circuit Protectors (15–100 Amperes)

Product Description

- 15–60 amperes, 277 V, 50/60 Hz
- Operational voltage 240–305 V

Standards and Certifications

These circuit breakers meet the requirements of UL 489 and UL 1053.



Product Selection

Type GHCGFEP 30 mA Industrial Ground Fault Circuit Protectors with Non-Interchangeable Trip Units

| Continuous Ampere Rating at 40 °C | Single-Phase (Requires Two Poles) 277V, 30 mA | |
|-----------------------------------|---|----------------|
| | | Catalog Number |
| 15 | | GHCGFEP1015 |
| 20 | | GHCGFEP1020 |
| 30 | | GHCGFEP1030 |
| 40 | | GHCGFEP1040 |
| 50 | | GHCGFEP1050 |
| 60 | | GHCGFEP1060 |

Technical Data and Specifications

Interrupting Capacity Ratings

| Circuit Breaker Type | Number of Poles | Interrupting Capacity (Symmetrical Amperes) | |
|----------------------|-----------------|---|--|
| | | 277 Vac (50/60 Hz) | |
| GHCGFEP | 1 | 14,000 | |

Special Purpose Circuit Breakers

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| K-Frame (70–400 Amperes) | V4-T2-263 |
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| R-Frame (800–2500 Amperes) | V4-T2-339 |
| Motor Circuit Protectors (MCP) | V4-T2-358 |
| Motor Protection Circuit Breakers (MPCB) | V4-T2-369 |
| Type ELC Current Limiter Attachment (Size 0–4) | V4-T2-371 |
| Current Limiting Circuit Breaker Module | V4-T2-372 |
| Internal Accessories | V4-T2-375 |
| External Accessories | V4-T2-408 |

Special Purpose GHC Circuit Breakers (15–100 Amperes)

Product Description

Eaton’s Type GHC circuit breakers have binding head screw-type terminals on line and load side. These circuit breakers with screw-type terminals (0.190–32) will be marked “Special purpose breaker not for general use.” To order this special breaker, use the catalog number from the tables on this page.

Product Selection

Type GHC Thermal-Magnetic Circuit Breakers with Non-Interchangeable Trip Units

| Continuous Ampere Rating at 40 °C | 277 Vac Maximum, 125 Vdc Maximum ① | 480Y/277 Vac Maximum, 125/250 Vdc Maximum | 480Y/277 Vac Maximum, 125/250 Vdc Maximum ② |
|---|---------------------------------------|--|--|
| | Single-Pole Catalog Number | Two-Pole Catalog Number | Three-Pole Catalog Number |
| 25 | GHC1025D | GHC2025D | GHC3025D |
| 30 | GHC1030D | GHC2030D | GHC3030D |
| 35 | GHC1035D | GHC2035D | GHC3035D |
| 40 | GHC1040D | GHC2040D | GHC3040D |
| 45 | GHC1045D | GHC2045D | GHC3045D |
| 50 | GHC1050D | GHC2050D | GHC3050D |
| 60 | GHC1060D | GHC2060D | GHC3060D |
| 70 | GHC1070D | GHC2070D | GHC3070D |
| 80 | GHC1080D | GHC2080D | GHC3080D |
| 90 | GHC1090D | GHC2090D | GHC3090D |
| 100 | GHC1100D | GHC2100D | GHC3100D |

Type GHB and GHC Thermal-Magnetic Circuit Breakers with Non-Interchangeable Trip Units for HID Lighting Applications

| Type | Continuous Ampere Rating at 40 °C | 277 Vac Maximum Single-Pole Catalog Number |
|----------|---|---|
| Cable-in | 15 | GHC1015HID |
| | 20 | GHC1020HID |
| Bolt-on | 15 | GHB1015HID |
| | 20 | GHB1020HID |

Notes

- ① Single-pole breakers can be applied in DC systems from 15 through 70 amperes; 80 through 100 amperes devices are not suitable for DC application.
- ② Use two outside poles.

Typical F-Frame Breaker
F-Frame Breaker with Electronic Trip Unit



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| Product Selection | V4-T2-240 |
| Accessories | V4-T2-251 |
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| Dimensions and Weights | V4-T2-254 |
| J-Frame (70–250 Amperes) | V4-T2-255 |
| K-Frame (70–400 Amperes) | V4-T2-263 |
| L-Frame (125–600 Amperes) | V4-T2-287 |
| M-Frame (300–800 Amperes) | V4-T2-313 |
| N-Frame (400–1200 Amperes) | V4-T2-324 |
| R-Frame (800–2500 Amperes) | V4-T2-339 |
| Motor Circuit Protectors (MCP) | V4-T2-358 |
| Motor Protection Circuit Breakers (MPCB) | V4-T2-369 |
| Type ELC Current Limiter Attachment (Size 0–4) | V4-T2-371 |
| Current Limiting Circuit Breaker Module | V4-T2-372 |
| Internal Accessories | V4-T2-375 |
| External Accessories | V4-T2-408 |

F-Frame (10–225 Amperes)

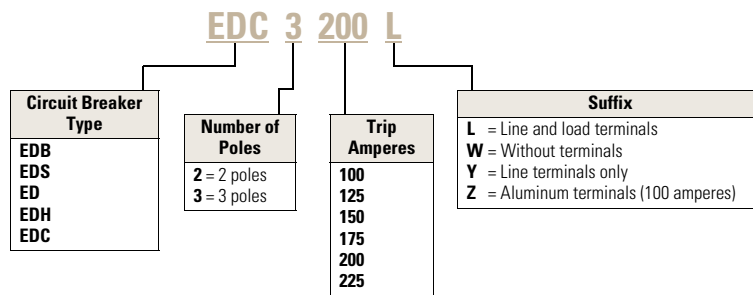
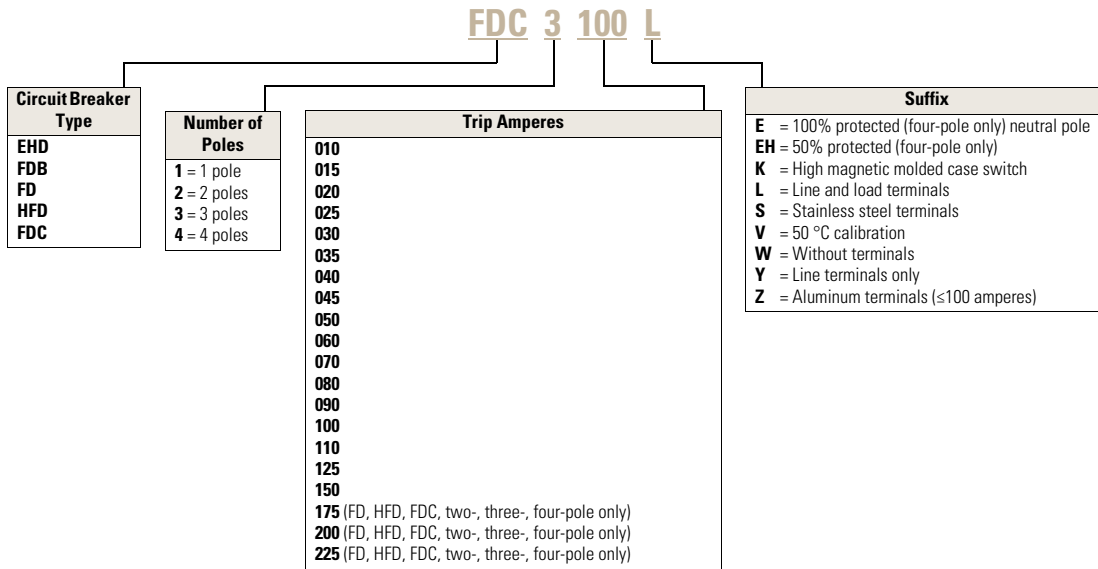
Product Description

- All Eaton's F-Frame circuit breakers are HACR rated
- All circuit breakers 10 through 30 amperes are suitable for HID (high intensity discharge) use
- All F-Frame circuit breakers are suitable for reverse feed use

Catalog Number Selection

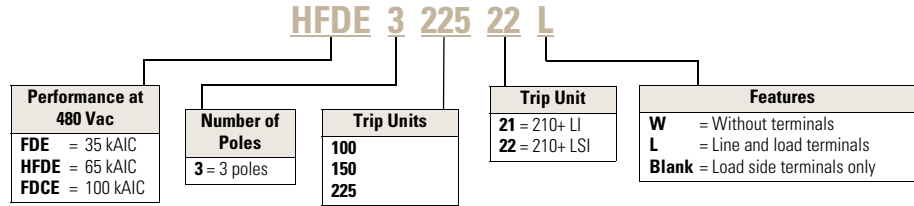
This information is presented only as an aid to understanding catalog numbers. It is not to be used to build catalog numbers for circuit breakers or trip units.

FD-Frame Circuit Breakers with Thermal-Magnetic Trip Unit Technology

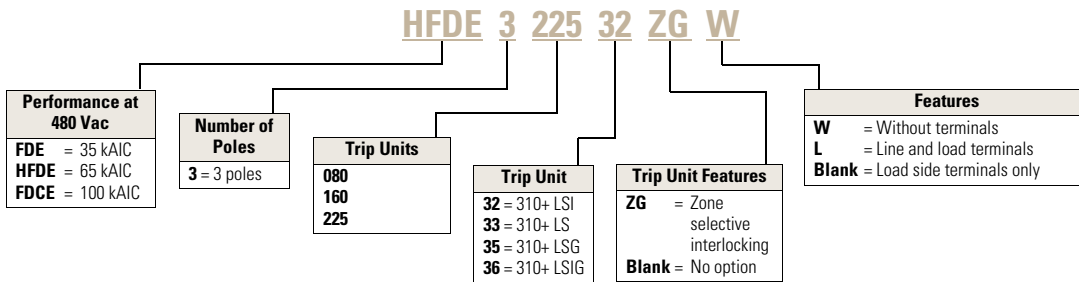


This information is presented only as an aid to understanding catalog numbers. It is not to be used to build catalog numbers for circuit breakers or trip units.

FD-Frame Circuit Breakers with 210+ Electronic Trip Unit Technology



FD-Frame Circuit Breakers with 310+ Electronic Trip Unit Technology



Product Selection

2

Type ED Thermal-Magnetic Circuit Breakers with Non-Interchangeable Trip Units Suitable for Reverse Feed

| Maximum Continuous Ampere Rating at 40 °C | 240 Vac Maximum, 125 Vdc (Includes Terminals on Load End Only) 65 kAIC at 240 Vac | |
|--|---|---------------------------------|
| | Two-Pole Catalog Number | Three-Pole Catalog Number |
| 15 | ED2015 | ED3015 |
| 20 | ED2020 | ED3020 |
| 25 | ED2025 | ED3025 |
| 30 | ED2030 | ED3030 |
| 35 | ED2035 | ED3035 |
| 40 | ED2040 | ED3040 |
| 50 | ED2050 | ED3050 |
| 60 | ED2060 | ED3060 |
| 100 | ED2100 | ED3100 |
| 125 | ED2125 | ED3125 |
| 150 | ED2150 | ED3150 |
| 175 | ED2175 | ED3175 |
| 200 | ED2200 | ED3200 |
| 225 | ED2225 | ED3225 |

Type EDH Thermal-Magnetic Circuit Breakers with Non-Interchangeable Trip Units Suitable for Reverse Feed

| Maximum Continuous Ampere Rating at 40 °C | 240 Vac Maximum, 125 Vdc (Includes Terminals on Load End Only) 100 kAIC at 240 Vac | |
|--|--|---------------------------------|
| | Two-Pole Catalog Number | Three-Pole Catalog Number |
| 15 | — | — |
| 20 | — | — |
| 25 | — | — |
| 30 | — | — |
| 35 | — | — |
| 40 | — | — |
| 50 | — | — |
| 60 | — | — |
| 100 | EDH2100 | EDH3100 |
| 125 | EDH2125 | EDH3125 |
| 150 | EDH2150 | EDH3150 |
| 175 | EDH2175 | EDH3175 |
| 200 | EDH2200 | EDH3200 |
| 225 | EDH2225 | EDH3225 |

Type EDC Thermal-Magnetic Circuit Breakers with Non-Interchangeable Trip Units Suitable for Reverse Feed

| Maximum Continuous Ampere Rating at 40 °C | 240 Vac Maximum, 125 Vdc (Includes Terminals on Load End Only) 200 kAIC at 240 Vac | |
|--|--|---------------------------------|
| | Two-Pole Catalog Number | Three-Pole Catalog Number |
| 15 | — | — |
| 20 | — | — |
| 25 | — | — |
| 30 | — | — |
| 35 | — | — |
| 40 | — | — |
| 50 | — | — |
| 60 | — | — |
| 100 | EDC2100 | EDC3100 |
| 125 | EDC2125 | EDC3125 |
| 150 | EDC2150 | EDC3150 |
| 175 | EDC2175 | EDC3175 |
| 200 | EDC2200 | EDC3200 |
| 225 | EDC2225 | EDC3225 |

Type EDB Thermal-Magnetic Circuit Breakers with Non-Interchangeable Trip Units Suitable for Reverse Feed

| Maximum Continuous Ampere Rating at 40 °C | 240 Vac Maximum, 125 Vdc (Includes Terminals on Load End Only) 22 kAIC at 240 Vac | |
|--|---|---------------------------------|
| | Two-Pole Catalog Number | Three-Pole Catalog Number |
| 100 | EDB2100 | EDB3100 |
| 110 | EDB2110 | EDB3110 |
| 125 | EDB2125 | EDB3125 |
| 150 | EDB2150 | EDB3150 |
| 175 | EDB2175 | EDB3175 |
| 200 | EDB2200 | EDB3200 |
| 225 | EDB2225 | EDB3225 |

Type EDS Thermal-Magnetic Circuit Breakers with Non-Interchangeable Trip Units Suitable for Reverse Feed

| Maximum Continuous Ampere Rating at 40 °C | 240 Vac Maximum, 125 Vdc (Includes Terminals on Load End Only) 42 kAIC at 240 Vac | |
|--|---|---------------------------------|
| | Two-Pole Catalog Number | Three-Pole Catalog Number |
| 100 | EDS2100 | EDS3100 |
| 110 | EDS2110 | EDS3110 |
| 125 | EDS2125 | EDS3125 |
| 150 | EDS2150 | EDS3150 |
| 175 | EDS2175 | EDS3175 |
| 200 | EDS2200 | EDS3200 |
| 225 | EDS2225 | EDS3225 |

Type EHD Thermal-Magnetic Circuit Breakers with Non-Interchangeable Trip Units (Includes Terminals on Load End Only)

| Maximum Continuous Ampere Rating at 40 °C | 277 Vac Maximum, 125 Vdc 14 kAIC at 277 Vac Single-Pole | 480 Vac Maximum, 250 Vdc 14 kAIC at 480 Vac Two-Pole | Three-Pole |
|--|---|--|-------------------|
| | Catalog Number | Catalog Number | Catalog Number |
| 10 ① | EHD1010 | EHD2010 | EHD3010 |
| 15 | EHD1015 ② | EHD2015 | EHD3015 |
| 20 | EHD1020 ② | EHD2020 | EHD3020 |
| 25 | EHD1025 | EHD2025 | EHD3025 |
| 30 | EHD1030 | EHD2030 | EHD3030 |
| 35 | EHD1035 | EHD2035 | EHD3035 |
| 40 | EHD1040 | EHD2040 | EHD3040 |
| 45 | EHD1045 | EHD2045 | EHD3045 |
| 50 | EHD1050 | EHD2050 | EHD3050 |
| 60 | EHD1060 | EHD2060 | EHD3060 |
| 70 | EHD1070 | EHD2070 | EHD3070 |
| 80 | EHD1080 | EHD2080 | EHD3080 |
| 90 | EHD1090 | EHD2090 | EHD3090 |
| 100 | EHD1100 | EHD2100 | EHD3100 |

Notes

- ① Not UL listed. 5 kAIC interrupting rating.
- ② UL listed for SWD applications, see NEC Article 240.83(d).

**Type FDB Thermal-Magnetic Circuit Breakers with Non-Interchangeable Trip Units
(Includes Terminals on Load End Only)**

| Maximum Continuous Ampere Rating at 40 °C | 600 Vac Maximum, 250 Vdc 14 kAIC at 600 Vac | | |
|--|--|---------------------------------|--------------------------------|
| | Two-Pole Catalog Number | Three-Pole Catalog Number | Four-Pole Catalog Number |
| 10 ① | FDB2010 | FDB3010 | FDB4010 |
| 15 | FDB2015 | FDB3015 | FDB4015 |
| 20 | FDB2020 | FDB3020 | FDB4020 |
| 25 | FDB2025 | FDB3025 | FDB4025 |
| 30 | FDB2030 | FDB3030 | FDB4030 |
| 35 | FDB2035 | FDB3035 | FDB4035 |
| 40 | FDB2040 | FDB3040 | FDB4040 |
| 45 | FDB2045 | FDB3045 | FDB4045 |
| 50 | FDB2050 | FDB3050 | FDB4050 |
| 60 | FDB2060 | FDB3060 | FDB4060 |
| 70 | FDB2070 | FDB3070 | FDB4070 |
| 80 | FDB2080 | FDB3080 | FDB4080 |
| 90 | FDB2090 | FDB3090 | FDB4090 |
| 100 | FDB2100 | FDB3100 | FDB4100 |
| 110 | FDB2110 | FDB3110 | FDB4110 |
| 125 | FDB2125 | FDB3125 | FDB4125 |
| 150 | FDB2150 | FDB3150 | FDB4150 |

Notes

- ① Not UL listed. 5 kAIC interrupting rating.
- ② UL listed for SWD applications, see NEC Article 240.83(d).

**Type FD Thermal-Magnetic Circuit Breakers with Non-Interchangeable Trip Units
(Includes Terminals on Load End Only)**

2

| Maximum Continuous Ampere Rating at 40 °C | 277 Vac Maximum, 125 Vdc 35 kAIC at 277 Vac | 600 Vac Maximum, 250 Vdc 35 kAIC at 480 Vac | | |
|--|--|--|---------------------------------|--------------------------------|
| | Single-Pole Catalog Number | Two-Pole Catalog Number | Three-Pole Catalog Number | Four-Pole Catalog Number |
| 10 ① | FD1010 | — | — | — |
| 15 | FD1015 ② | FD2015 | FD3015 | FD4015 |
| 20 | FD1020 ② | FD2020 | FD3020 | FD4020 |
| 25 | FD1025 | FD2025 | FD3025 | FD4025 |
| 30 | FD1030 | FD2030 | FD3030 | FD4030 |
| 35 | FD1035 | FD2035 | FD3035 | FD4035 |
| 40 | FD1040 | FD2040 | FD3040 | FD4040 |
| 45 | FD1045 | FD2045 | FD3045 | FD4045 |
| 50 | FD1050 | FD2050 | FD3050 | FD4050 |
| 60 | FD1060 | FD2060 | FD3060 | FD4060 |
| 70 | FD1070 | FD2070 | FD3070 | FD4070 |
| 80 | FD1080 | FD2080 | FD3080 | FD4080 |
| 90 | FD1090 | FD2090 | FD3090 | FD4090 |
| 100 | FD1100 | FD2100 | FD3100 | FD4100 |
| 110 | FD1110 | FD2110 | FD3110 | FD4110 |
| 125 | FD1125 | FD2125 | FD3125 | FD4125 |
| 150 | FD1150 | FD2150 | FD3150 | FD4150 |
| 175 | — | FD2175 | FD3175 | FD4175 |
| 200 | — | FD2200 | FD3200 | FD4200 |
| 225 | — | FD2225 | FD3225 | FD4225 |

Notes

① Not UL listed. 5 kAIC interrupting rating.

② UL listed for SWD applications, see NEC Article 240.83(d).

**Type HFD Thermal-Magnetic Circuit Breakers with Non-Interchangeable Trip Units
(Includes Terminals on Load End Only)**

| Maximum Continuous Ampere Rating at 40 °C | 277 Vac Maximum, 125 Vdc 65 kAIC at 277 Vac | 600 Vac Maximum, 250 Vdc 65 kAIC at 480 Vac | | |
|--|--|--|---------------------------------|--------------------------------|
| | Single-Pole Catalog Number | Two-Pole Catalog Number | Three-Pole Catalog Number | Four-Pole Catalog Number |
| 15 | HFD1015 ^① | HFD2015 | HFD3015 | HFD4015 |
| 20 | HFD1020 ^① | HFD2020 | HFD3020 | HFD4020 |
| 25 | HFD1025 | HFD2025 | HFD3025 | HFD4025 |
| 30 | HFD1030 | HFD2030 | HFD3030 | HFD4030 |
| 35 | HFD1035 | HFD2035 | HFD3035 | HFD4035 |
| 40 | HFD1040 | HFD2040 | HFD3040 | HFD4040 |
| 45 | HFD1045 | HFD2045 | HFD3045 | HFD4045 |
| 50 | HFD1050 | HFD2050 | HFD3050 | HFD4050 |
| 60 | HFD1060 | HFD2060 | HFD3060 | HFD4060 |
| 70 | HFD1070 | HFD2070 | HFD3070 | HFD4070 |
| 80 | HFD1080 | HFD2080 | HFD3080 | HFD4080 |
| 90 | HFD1090 | HFD2090 | HFD3090 | HFD4090 |
| 100 | HFD1100 | HFD2100 | HFD3100 | HFD4100 |
| 110 | HFD1110 | HFD2110 | HFD3110 | HFD4110 |
| 125 | HFD1125 | HFD2125 | HFD3125 | HFD4125 |
| 150 | HFD1150 | HFD2150 | HFD3150 | HFD4150 |
| 175 | — | HFD2175 | HFD3175 | HFD4175 |
| 200 | — | HFD2200 | HFD3200 | HFD4200 |
| 225 | — | HFD2225 | HFD3225 | HFD4225 |

Note

^① UL listed for SWD applications, see NEC Article 240.83(d).

2.4

Molded Case Circuit Breakers

Series C

Type FDC Thermal-Magnetic Circuit Breakers with Non-Interchangeable Trip Units (Includes Terminals on Load End Only)

2

| Maximum Continuous Ampere Rating at 40 °C | 600 Vac Maximum, 250 Vdc 100 kAIC at 480 Vac | | |
|--|---|---------------------------------|--------------------------------|
| | Two-Pole Catalog Number | Three-Pole Catalog Number | Four-Pole Catalog Number |
| 15 | FDC2015 | FDC3015 | FDC4015 |
| 20 | FDC2020 | FDC3020 | FDC4020 |
| 25 | FDC2025 | FDC3025 | FDC4025 |
| 30 | FDC2030 | FDC3030 | FDC4030 |
| 35 | FDC2035 | FDC3035 | FDC4035 |
| 40 | FDC2040 | FDC3040 | FDC4040 |
| 45 | FDC2045 | FDC3045 | FDC4045 |
| 50 | FDC2050 | FDC3050 | FDC4050 |
| 60 | FDC2060 | FDC3060 | FDC4060 |
| 70 | FDC2070 | FDC3070 | FDC4070 |
| 80 | FDC2080 | FDC3080 | FDC4080 |
| 90 | FDC2090 | FDC3090 | FDC4090 |
| 100 | FDC2100 | FDC3100 | FDC4100 |
| 110 | FDC2110 | FDC3110 | FDC4110 |
| 125 | FDC2125 | FDC3125 | FDC4125 |
| 150 | FDC215 | FDC3150 | FDC4150 |
| 175 | FDC2175 | FDC3175 | FDC4175 |
| 200 | FDC2200 | FDC3200 | FDC4200 |
| 225 | FDC2225 | FDC3225 | FDC4225 |

Types FDE, HFDE and FDCE 310+ Electronic Circuit Breakers with Non-Interchangeable Trip UnitsSee 310+ adjustability specifications on **Page V4-T2-253**.

| Maximum Ampere Rating | Digitrip RMS 310+ Trip Unit Only | | LSG Adjustable Short Time Pickup with I ² t Short Delay and Ground Fault Protection | LSIG Independently Adjustable Short Time Pickup and Ground Fault Protection | Neutral CT for LSG and LSIG Catalog Number |
|---|---|---|---|--|---|
| | Standard LS Adjustable Short Time Pickup with I ² t Short Delay Ramp Catalog Number | Optional LSI Independently Adjustable Short Time Pickup and Delay | | | |
| 35 kAIC at 480 Vac / 18 kAIC at 600 Vac | | | | | |
| 80 | FDE308033 | FDE308032 | FDE308035 | FDE308036 | CTF080 |
| 160 | FDE316033 | FDE316032 | FDE316035 | FDE316036 | CTF160 |
| 225 | FDE322533 | FDE322532 | FDE322535 | FDE322536 | CTF225 |
| 65 kAIC at 480 Vac / 25 kAIC at 600 Vac | | | | | |
| 80 | HFDE308033 | HFDE308032 | HFDE308035 | HFDE308036 | CTF080 |
| 160 | HFDE316033 | HFDE316032 | HFDE316035 | HFDE316036 | CTF160 |
| 225 | HFDE322533 | HFDE322532 | HFDE322535 | HFDE322536 | CTF225 |
| 100 kAIC at 480 Vac / 25 kAIC at 600 Vac | | | | | |
| 80 | FDCE308033 | FDCE308032 | FDCE308035 | FDCE308036 | CTF080 |
| 160 | FDCE316033 | FDCE316032 | FDCE316035 | FDCE316036 | CTF160 |
| 225 | FDCE322533 | FDCE322532 | FDCE322535 | FDCE322536 | CTF225 |

Types FDE, HFDE, and FDCE 210+ Electronic Circuit Breakers with Non-Interchangeable Trip Units

| Maximum Ampere Rating | Digitrip RMS 210+ Trip Unit Only | |
|---|--|---|
| | Standard LI Adjustable Instantaneous Catalog Number | Optional LSI Adjustable Short Time Pickup and Delay Catalog Number |
| 35 kAIC at 480 Vac / 18 kAIC at 600 Vac | | |
| 100 | FDE310021 | FDE310022 |
| 150 | FDE315021 | ① |
| 225 | FDE322521 | FDE322522 |
| 65 kAIC at 480 Vac / 25 kAIC at 600 Vac | | |
| 100 | HFDE310021 | HFDE310022 |
| 150 | HFDE315021 | ① |
| 225 | HFDE322521 | HFDE322522 |
| 100 kAIC at 480 Vac / 25 kAIC at 600 Vac ② | | |
| 100 | FDCE310021 | FDCE310022 |
| 150 | FDCE315021 | ① |
| 225 | FDCE322521 | FDCE322522 |

210+ Trip Electronic Trip Units Amperage Settings

| Circuit Breaker Type | Frame | Ratings |
|----------------------------|-------|-----------------------------------|
| FDE, HFDE, FDCE | 225 | 100, 110, 125, 150, 175, 200, 225 |
| FDE, HFDE, FDCE | 150 | 70, 80, 90, 100, 110, 125, 150 |
| FDE, HFDE, FDCE | 100 | 40, 50, 60, 70, 80, 90, 100 |

FDE 310+ Electronic Breaker with Zone Selective Interlocking

| Ampere Rating | LSI w/ZSI Catalog Number | LSIG w/ZSI Catalog Number |
|---|-----------------------------|------------------------------|
| 35 kAIC at 480 Vac / 18 kAIC at 600 Vac | | |
| 80 | FDE308032ZG | FDE308036ZG |
| 160 | FDE316032ZG | FDE316036ZG |
| 225 | FDE322532ZG | FDE322536ZG |
| 65 kAIC at 480 Vac / 25 kAIC at 600 Vac | | |
| 80 | HFDE308032ZG | HFDE308036ZG |
| 160 | HFDE316032ZG | HFDE316036ZG |
| 225 | HFDE322532ZG | HFDE322536ZG |
| 100 kAIC at 480 Vac / 25 kAIC at 600 Vac | | |
| 80 | FDCE308032ZG | FDCE308036ZG |
| 160 | FDCE316032ZG | FDCE316036ZG |
| 225 | FDCE322532ZG | FDCE322536ZG |

Digitrip 310+ Electronic Trip Units Amperage Settings

| Circuit Breaker Type | Frame | Ratings |
|----------------------------|-------|--|
| FDE, HFDE, FDCE | 225 | 100, 110, 125, 150, 160, 175, 200, 225 |
| FDE, HFDE, FDCE | 160 | 60, 70, 80, 90, 100, 125, 150, 160 |
| FDE, HFDE, FDCE | 80 | 15, 20, 30, 40, 50, 60, 70, 80 |

Notes

① For 210+ trip unit, 150 A not available with LSI trip unit; entire range is covered by 100 A and 225 A frames.

② Contact the product line for availability.

Molded Case Switches

Eaton's molded case switches are used as compact switches in applications requiring high current switching capabilities. Molded case switches are constructed of circuit breaker

components and are of the high instantaneous automatic type. Molded case switches are listed in accordance with Underwriters Laboratories Standard UL 489.

Molded Case Switches

| Maximum Continuous Ampere Rating at 40 °C | Complete Circuit Breaker with Load Side Terminals Only | | |
|--|---|---|----------|
| | 480 Vac Maximum, 250 Vdc Catalog Number | 600 Vac Maximum, 250 Vdc Catalog Number | |
| Two-Pole | | | |
| 100 | EHD2100K | FD2100K | HFD2100K |
| 150 | — | FD2150K | HFD2150K |
| 225 | — | FD2225K | HFD2225K |
| Three-Pole | | | |
| 100 | EHD3100K | FD3100K | HFD3100K |
| 150 | — | FD3150K | HFD3150K |
| 225 | — | FD3225K | HFD3225K |
| Four-Pole | | | |
| 100 | — | FD4100K | HFD4100K |
| 150 | — | FD4150K | HFD4150K |
| 225 | — | FD4225K | HFD4225K |

Note

Molded case switches will open above 1800 amperes.

Accessories Selection Guide and Ordering Information

Line and Load Terminals

Line and load terminals provide wire connecting capabilities for specific ranges of continuous current ratings and wire types. Except as noted, terminals comply with Underwriters Laboratories Standards UL 486A and UL 486B. Unless otherwise specified, F-Frame circuit breakers are factory equipped with load terminals only.

Ordering Information

F-Frame circuit breakers and molded case switches have load terminals only as standard equipment. When standard line-end terminals (same as standard load-end terminals) are required, add Suffix **L** to the circuit breaker catalog number. When non-standard or optional line and/or load terminals are required, order by style number. Specify if factory installation is required.

Line and Load Terminals

| Maximum Breaker Amperes | Terminal Body Material | Wire Type | AWG Wire Range | Metric Wire Range mm ² | Package of Three Terminals Catalog Number |
|---|------------------------|-----------|----------------|-----------------------------------|---|
| Standard Pressure Type Terminals | | | | | |
| 20 (EHD) | Steel | Cu/Al | 14–10 | 2.5–4 | 3T20FB ② |
| 100 | Steel | Cu/Al | 14–1/0 | 2.5–50 | 3T100FB |
| 225 | Aluminum | Cu/Al | 4–4/0 | 25–95 | 3TA225FD |
| Optional Pressure Terminals | | | | | |
| 50 | Aluminum | Cu/Al | 14–4 | 2.5–25 | 3TA50FB ② |
| 100 | Aluminum | Cu/Al | 14–1/0 | 2.5–50 | 3TA100FD |
| 200 | Stainless steel | Cu | 4–4/0 | 25–95 | 3T150FB |
| 225 | Copper | Cu | 4–4/0 | 25–95 | 3T225FD |
| 225 | Aluminum | Cu/Al | 6–300 kcmil | 16–150 | 3TA225FDK3 ③ |
| 225 | Aluminum | Cu/Al | 6–300 kcmil | 16–150 | 3TA225FDK ③④ |

Notes

- ① Use on FDE, HFDE and FDCE electronic trip only.
- ② Not for use with ED, EDH, EDC breakers.
- ③ Includes terminal shield kit. Adds approximately 3 inches (76.2) to breaker height. Available for use on three-pole breaker only.
- ④ Replacement use only.

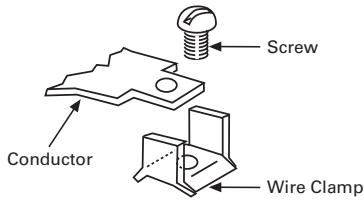
2.4

Molded Case Circuit Breakers

Series C

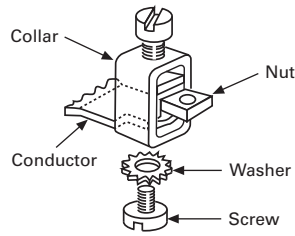
Line and Load Terminals

2



3T20FB

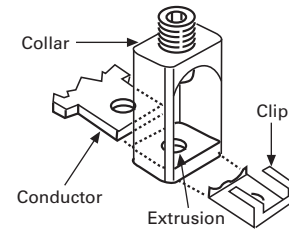
Assemble wire clamp to bottom of conductor as shown.



3T100FB, 3T150FB

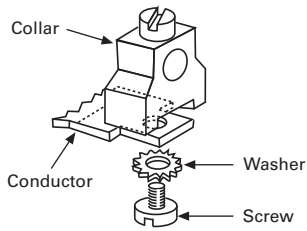
Insert collar enclosing conductor as shown. Locate nut on top of conductor and tighten securely with screw and washer.

Caution: Collar must surround conductor.



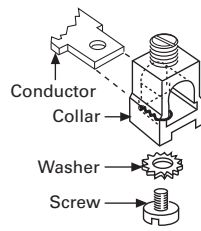
3TA225FD

Insert collar enclosing conductor and center on extrusion on collar. Install clip with legs on top of conductor and snap end around bottom of collar.



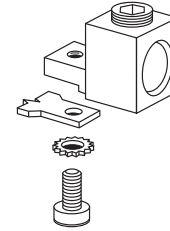
3TA50FB

Assemble collar on top of conductor as shown. Tighten securely with screw and washer.



3TA100FD

Collar slides onto conductor and is held in position by a screw and lockwasher.



3TA225FDK3 (Up to 150 mm²)

Assemble collar on top of conductor as shown. Tighten securely with screw and washer. Terminal shield must be used with this collar.

Note: For 185 mm², use 3TA225FDK1. Same illustration for 3TA225FDK

Accessories

Different combinations of accessories can be supplied, depending on the types of accessories and the number of poles in the circuit breaker.

Allowable Accessory Combinations

FD Frame Accessories

| Description | Reference Page | Single-Pole | | | Two-Pole | | Three-Pole ^① | | | Four-Pole | | | |
|--|----------------|-------------|------|-------|----------|-------|-------------------------|--------|-------|-----------|--------|-------|---------|
| | | Center | Left | Right | Left | Right | Left | Center | Right | Left | Center | Right | Neutral |
| Internal Accessories (Only one internal accessory per pole) | | | | | | | | | | | | | |
| Alarm lockout switch (make only) | V4-T2-377 | ■ | | | | | | | | | | | |
| Alarm lockout (Make/Break) | V4-T2-377 | | | ■ | □ | | □ | ■ | | | | | |
| Alarm lockout (2Make/2Break) | V4-T2-377 | | | ■ | □ | | □ | ■ | | | | | |
| Auxiliary switch (1A, 1B) | V4-T2-379 | | | ■ | ■ | | ■ | ■ | | | | | ■ |
| Auxiliary switch (2A, 2B) | V4-T2-379 | | | ■ | ■ | | ■ | ■ | | | | | ■ |
| Auxiliary switch and alarm switch combination | V4-T2-381 | | | ■ | □ | | □ | ■ | | | | | |
| Shunt trip—standard | V4-T2-383 | | | ■ | ■ | | ■ | ■ | | | | | ■ |
| Shunt trip—low energy | V4-T2-387 | | | ■ | ■ | | ■ | ■ | | | | | |
| Undervoltage release mechanism | V4-T2-389 | | | ■ | ■ | | ■ | ■ | | | | | |
| External Accessories | | | | | | | | | | | | | |
| End cap kit | V4-T2-412 | | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● |
| Keeper nut | V4-T2-412 | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● |
| Control wire terminal kit | V4-T2-413 | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● |
| Multewire connectors | V4-T2-414 | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● |
| Rear fed terminals | V4-T2-414 | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● |
| Base mounting hardware | V4-T2-414 | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● |
| Terminal shields | V4-T2-416 | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● |
| Terminal end covers | V4-T2-417 | | | | ● | ● | ● | | | | | | |
| Interphase barriers | V4-T2-417 | | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● |
| Non-padlockable handle block | V4-T2-418 | ■ | ■ | | | | ■ | | | ■ | | | |
| Snap-on padlockable handle lock hasp | V4-T2-418 | ■ | ■ | | | | ■ | | | ■ | | | |
| Padlockable handle lock hasp | V4-T2-419 | | | ■ | | | □ | | □ | | | □ | |
| Cylinder lock | V4-T2-419 | | | | | | ■ | | | | | | |
| Key interlock kit | V4-T2-420 | | | | | | □ | | □ | | | □ | |
| Sliding bar interlock—requires two breakers | V4-T2-421 | | | | | | ● | ● | ● | | | | |
| Walking beam interlock—requires two breakers | V4-T2-421 | | | | | | ● | ● | ● | ● | ● | ● | ● |
| Electrical (solenoid and motor) operators | V4-T2-422 | | | | | | ● | ● | ● | ● | ● | ● | ● |
| Plug-in adapters | V4-T2-423 | | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● |
| Rear connecting studs | V4-T2-425 | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● |
| Panelboard connecting straps | V4-T2-426 | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● |
| Handle mechanisms | V4-T2-506 | | | | | | ● | ● | ● | | | | |
| LFD current limiter | V4-T2-428 | | | | | | ● | ● | ● | | | | |
| IQ Energy Sentinel | V4-T2-428 | | ● | ● | ● | ● | ● | | | | | | |
| Cause of trip display | V4-T2-429 | | | | | | ● | | | ● | | | |
| Remote mount cause of trip display | V4-T2-429 | | | | | | ● | | | ● | | | |
| Cause of trip LED | V4-T2-429 | | | | | | ● | | | ● | | | |
| Modifications (Refer to Eaton) | | | | | | | | | | | | | |
| Special calibration | — | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● |
| Moisture fungus treatment | V4-T2-218 | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● |
| Freeze-tested circuit breakers | — | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● |
| Marine/naval application | — | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● | ● |

Legend

- Applicable in indicated pole position
- May be mounted on left or right pole—not both
- Accessory available/modification available

Note

- ① Internal accessories are listed with Underwriters Laboratories (UL) for factory installation. They are not listed with UL for field installation.

Technical Data and Specifications

2

UL 489 Interrupting Capacity Ratings

| Circuit Breaker Type | Number of Poles | Interrupting Capacity (kA Symmetrical Amperes) | | | | Volts DC ^① | |
|----------------------|-----------------|--|-----|-----|-----|-----------------------|-------------------|
| | | Volts AC (50/60 Hz) | | | | 125 | 250 ^{②③} |
| | | 240 | 277 | 480 | 600 | | |
| EDB | 2, 3 | 22 | — | — | — | 10 | — |
| EDS | 2, 3 | 42 | — | — | — | 10 | — |
| ED | 2, 3 | 65 | — | — | — | 10 | — |
| EDH | 2, 3 | 100 | — | — | — | 10 | — |
| EDC | 2, 3 | 200 | — | — | — | 10 | — |
| EHD | 1 | — | 4 | — | — | 10 | — |
| | 2, 3 | 18 | — | 14 | — | — | 10 |
| FDB | 2, 3, 4 | 18 | — | 14 | 14 | — | 10 |
| FD | 1 | — | 35 | — | — | 10 | — |
| | 2, 3, 4 | 65 | — | 35 | 18 | — | 10 |
| FDE ^④ | 3 | 65 | — | 35 | 18 | — | — |
| HFD | 1 | — | 65 | — | — | 10 | — |
| | 2, 3, 4 | 100 | — | 65 | 25 | — | 22 |
| HFDE ^④ | 3 | 100 | — | 65 | 25 | — | — |
| FDC ^⑤ | 2, 3, 4 | 200 | — | 100 | 35 | — | 22 |
| FDCE ^{④⑤⑥} | 3 | 200 | — | 100 | 25 | — | — |

IEC 157-1 (P1) Interrupting Capacity Ratings (P1)

| Circuit Breaker Type | Number of Poles | Interrupting Capacity (kA Symmetrical Amperes) | | | | Volts DC ^① | |
|----------------------|-----------------|--|----------|-----|-----|-----------------------|-------------------|
| | | Volts AC (50/60 Hz) | | | | 125 | 250 ^{②③} |
| | | 220, 240 | 380, 415 | 440 | 500 | | |
| EDB | 2, 3 | 22 | — | — | — | 10 | — |
| EDS | 2, 3 | 42 | — | — | — | 10 | — |
| ED | 2, 3 | 65 | — | — | — | 10 | — |
| EDH | 2, 3 | 100 | — | — | — | 10 | — |
| EDC | 2, 3 | 200 | — | — | — | 10 | — |
| EHD | 1 | — | 14 | — | — | 10 | — |
| | 2, 3 | 18 | — | 14 | — | — | 10 |
| FDB | 2, 3, 4 | 18 | 14 | 14 | 14 | — | 10 |
| FD | 1 | 35 | — | — | — | 10 | — |
| | 2, 3, 4 | 65 | 35 | 35 | 18 | — | 10 |
| HFD | 1 | 65 | — | — | — | 10 | — |
| | 2, 3, 4 | 100 | 65 | 65 | 25 | — | 22 |
| FDC | 2, 3, 4 | 200 | 100 | 100 | 35 | — | 22 |

210+ and 310+ Electronic Trip Unit Accessories

| Description | 210+ | 310+ | Catalog number |
|--|------|------|----------------|
| Electronic portable test kit | ■ | ■ | MTST230V |
| Trip unit tamper protection wire seal | ■ | ■ | 5108A03H01 |
| External neutral sensor (80 A) ^⑦ | | ■ | CTF080 |
| External neutral sensor (160 A) ^⑦ | | ■ | CTF160 |
| External neutral sensor (225 A) ^⑦ | | ■ | CTF225 |
| Compact external neutral sensor (80 A) ^⑦ | | ■ | CTFD080 |
| Compact external neutral sensor (160 A) ^⑦ | | ■ | CTFD160 |
| Compact external neutral sensor (225 A) ^⑦ | | ■ | CTFD225 |
| Breaker-mount cause-of-trip indication | | ■ | TRIP-LED |
| Breaker-mount ammeter module | | ■ | DIGIVIEW |
| Remote-mount ammeter module | | ■ | DIGIEWR06 |

UL 489 Current Limiting Data

| Frame | Circuit | I _p (kA) | I ² T (10 ⁶ A ² S) |
|-------|--------------|---------------------|---|
| FDC | 240 V/200 kA | 41.4 | 1.41 |
| FDC | 480 V/100 kA | 38.9 | 2.50 |
| FDC | 600 V/35 kA | 29.0 | 3.00 |

Notes

- ① DC ratings apply to substantially non-inductive circuits.
- ② Two-pole circuit breaker, or two poles of three-pole circuit breaker.
- ③ Time constant is 3 milliseconds minimum at 10 kA and 8 milliseconds minimum at 22 kA.
- ④ Electronics available on three-pole only, no DC rating for FDE, HFDE, FDCE.
- ⑤ Current limiting.
- ⑥ Check with Eaton for availability.
- ⑦ Neutral sensor required for four-wire systems if neutral protection is desired; sold separately.

FDE 210+ and 310+ Specifications

| Description | Digitrip RMS 210+ | Digitrip RMS 310+ |
|--|---------------------|--------------------|
| Breaker type | | |
| Frame designation | FD | FD |
| Frames available | 100 A, 150 A, 225 A | 80 A, 160 A, 225 A |
| Continuous current range (A) | 40–225 A | 15–225 A |
| Ground fault pickup (A) | N/A | 16–225 A |
| Interrupting capacities at 480 Vac (kAIC) | 35, 65, 100 | 35, 65, 100 |
| Protection | | |
| Ordering options | LI, LSI | LS, LSI, LSG, LSIG |
| Arcflash Reduction Maintenance System™ (or Maintenance Mode) | No | No |
| Interchangeable trip unit | No | No |
| High load alarm (suffix B20) | No | No |
| Ground fault alarm with trip (suffix B21) | No | No |
| Ground fault alarm, no trip (suffix B22) | No | No |
| Zone selective interlocking (suffix ZG) | No | LSI, LSIG |
| Cause of trip indication | No | Yes |
| Thru-cover accessories | No | No |
| Test kit available | Yes | Yes |

FDE 210+ Adjustability Specifications

| 210+ settings | | FD Frame | | |
|--|---|-------------|-------|-------------|
| | | 100 A | 150 A | 225 A |
| I_r = continuous current or long delay pickup (amperes) (all 210+) | I_r | | | |
| | A | 40 | 70 | 100 |
| | B | 50 | 80 | 110 |
| | C | 60 | 90 | 125 |
| | D | 70 | 100 | 150 |
| | E | 80 | 110 | 175 |
| | F | 90 | 125 | 200 |
| | G (= I_n) | 100 | 150 | 225 |
| | I_i (x I_n) = Instantaneous pickup (210+ LI version) | I_i | 100 | 150 |
| J–2x | | 200 | 300 | 450 |
| K–2.5x | | 250 | 375 | 565 |
| L–3x | | 300 | 450 | 675 |
| M–3.5x | | 350 | 525 | 790 |
| N–4x | | 400 | 600 | 900 |
| O–5x | | 500 | 750 | 1125 |
| P–6x | | 600 | 900 | 1350 |
| Q–8x | | 800 | 1200 | 1800 |
| R–10x | | 1000 | 1500 | 2250 |
| S–12x ① | | 1200 | 1800 | 2400 |
| Fixed instantaneous override (all 210+) | | | 2400 | 2400 |
| "Isd (x Ir) / tsd = SD profile" ② (210+ LSI version) | I_{sd} / t_{sd} | 100 | 150 | 225 |
| | J | 2x / 150 | N/A | 2x / 150 |
| | K | 2x / 300 | N/A | 2x / 300 |
| | L | 2x / I^2t | N/A | 2x / I^2t |
| | M | 4x / Inst | N/A | 4x / Inst |
| | N | 4x / 150 | N/A | 4x / 150 |
| | O | 4x / I^2t | N/A | 4x / I^2t |
| | P | 6x / Inst | N/A | 6x / Inst |
| | Q | 6x / 300 | N/A | 6x / 300 |
| | R | 10x / 150 | N/A | 10x / 150 |
| | S | 10x / 300 | N/A | 10x / 300 |

FDE 310+ Adjustability Specifications

| 310+ Settings | | FD Frame | | |
|--|--|------------|----------|----------|
| | | 80 A | 160 A | 225 A |
| I_r = continuous current or long delay pickup (amperes) (All 310+) | I_r | | | |
| | A | 15 | 60 | 100 |
| | B | 20 | 70 | 110 |
| | C | 30 | 80 | 125 |
| | D | 40 | 90 | 150 |
| | E | 50 | 100 | 160 |
| | F | 60 | 125 | 175 |
| | G | 70 | 150 | 200 |
| | H (= I_n) | 80 | 160 | 225 |
| t_r = long delay time (seconds) (All 310+) | Position 1 | 2 | 2 | 2 |
| | Position 2 | 4 | 4 | 4 |
| | Position 3 | 7 | 7 | 7 |
| | Position 4 | 10 | 10 | 10 |
| | Position 5 | 12 | 12 | 12 |
| | Position 6 | 15 | 15 | 15 |
| | Position 7 | 20 | 20 | 20 |
| | Position 8 | 24 | 24 | 24 |
| | I_{sd} (x I_r) = short delay pickup (All 310+) | Position 1 | 2x | 2x |
| Position 2 | | 3x | 3x | 3x |
| Position 3 | | 4x | 4x | 4x |
| Position 4 | | 5x | 5x | 5x |
| Position 5 | | 6x | 6x | 6x |
| Position 6 | | 7x | 7x | 7x |
| Position 7 | | 8x | 8x | 8x |
| Position 8 | | 10x | 10x | 10x |
| Position 9 | | 12x | 12x | 12x |
| t_{sd} = short delay time I^2t (milliseconds) (LS, LSG) | Fixed | 67 at10x | 67 at10x | 67 at10x |
| | Position 1 | Inst | Inst | Inst |
| | Position 2 | 120 | 120 | 120 |
| t_{sd} = short delay time flat (milliseconds) (LSI, LSIG) | Position 3 | 300 | 300 | 300 |
| | Position 1 | 16 | 32 | 45 |
| | Position 2 | 24 | 48 | 67 |
| I_g = ground fault pickup (amperes) (LSG, LSIG) | Position 3 | 32 | 64 | 90 |
| | Position 4 | 48 | 96 | 135 |
| | Position 5 | 64 | 128 | 180 |
| | Position 6 | 80 | 160 | 225 |
| | Position 1 | Inst | Inst | Inst |
| | Position 2 | 120 | 120 | 120 |
| t_g = ground fault delay time (milliseconds) (LSG, LSIG) | Position 3 | 300 | 300 | 300 |
| | Independently Adjustable Instantaneous (I_i) setting ① | | | |
| Maintenance Mode pickup ($2.5 \times I_n$) (amperes) ② | | | | |

Notes

- ① Not available for FD. Independently adjustable I_i setting available in LG, NG and RG ALSI and ALSIG trip units.
- ② Maintenance Mode not available for FD frames. It is available for KD, LD, MDL, LG, NG and RG.

2.4

Molded Case Circuit Breakers

Series C

Dimensions and Weights

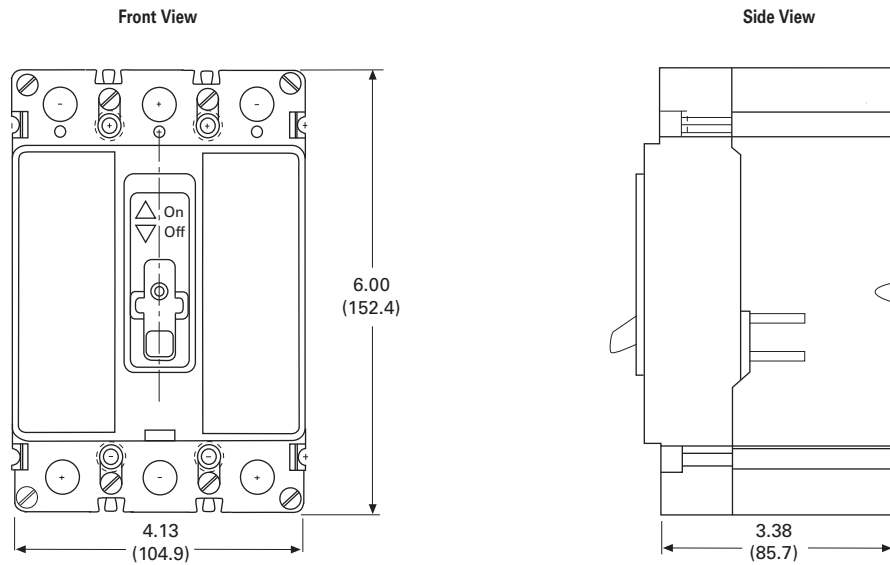
Approximate Dimensions in Inches (mm)

2

FD Frame

| Number of Poles | Width | Height | Depth |
|-----------------|--------------|--------------|-------------|
| 1 | 1.38 (35.1) | 6.00 (152.4) | 3.38 (86.0) |
| 2 | 2.75 (70.0) | 6.00 (152.4) | 3.38 (86.0) |
| 3 | 4.13 (105.0) | 6.00 (152.4) | 3.38 (86.0) |
| 4 | 5.50 (139.7) | 6.00 (152.4) | 3.38 (86.0) |

FD Frame, Three-Pole



Approximate Shipping Weight Lbs (kg)

FD Frame

| Breaker Type | Number of Poles | | | |
|------------------------|-----------------|---------|-----------|---------|
| | 1 | 2 | 3 | 4 |
| ED, EDB, EDS, EDH, EDC | — | 3 (1.4) | 4.5 (2.0) | — |
| EHD, FDB, FD, HFD, FDC | 2 (0.9) | 3 (1.4) | 4.5 (2.0) | 6 (2.7) |
| FDE, HFDE, FDCE | — | — | 4.5 (2.0) | — |

Typical J-Frame Breaker



Contents

| <i>Description</i> | <i>Page</i> |
|--|------------------|
| Product Overview | V4-T2-218 |
| Standards and Certifications | V4-T2-219 |
| Quick Reference | V4-T2-220 |
| G-Frame (15–100 Amperes) | V4-T2-223 |
| F-Frame (10–225 Amperes) | V4-T2-237 |
| J-Frame (70–250 Amperes) | |
| Catalog Number Selection | V4-T2-256 |
| Product Selection | V4-T2-257 |
| Accessories | V4-T2-260 |
| Technical Data and Specifications | V4-T2-261 |
| Dimensions and Weights | V4-T2-262 |
| K-Frame (70–400 Amperes) | V4-T2-263 |
| L-Frame (125–600 Amperes) | V4-T2-287 |
| M-Frame (300–800 Amperes) | V4-T2-313 |
| N-Frame (400–1200 Amperes) | V4-T2-324 |
| R-Frame (800–2500 Amperes) | V4-T2-339 |
| Motor Circuit Protectors (MCP) | V4-T2-358 |
| Motor Protection Circuit Breakers (MPCB) | V4-T2-369 |
| Type ELC Current Limiter Attachment (Size 0–4) | V4-T2-371 |
| Current Limiting Circuit Breaker Module | V4-T2-372 |
| Internal Accessories | V4-T2-375 |
| External Accessories | V4-T2-408 |

J-Frame (70–250 Amperes)

Product Description

- All Eaton's J-Frame circuit breakers are HACR rated
- J-Frame circuit breakers are available as individual components (frame, trip unit, terminals), or factory assembled complete breakers
- J-Frame circuit breakers with non-interchangeable trip units are suitable for reverse feed use

2.4

Molded Case Circuit Breakers

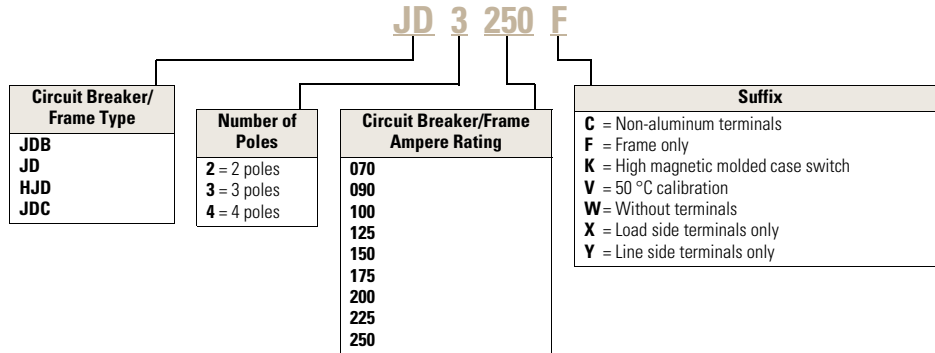
Series C

Catalog Number Selection

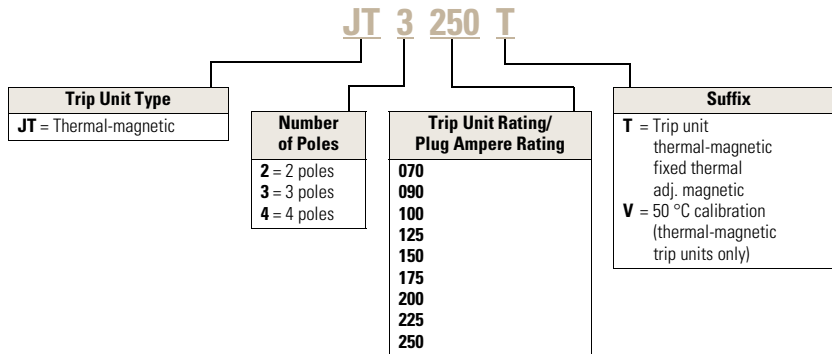
This information is presented only as an aid to understanding catalog numbers. It is not to be used to build catalog numbers for circuit breakers or trip units.

2

Circuit Breaker/Frame



Trip Unit



Product Selection

Types JD, HJD and JDC Thermal-Magnetic Circuit Breakers with Interchangeable Trip Units

| Maximum Continuous Ampere Rating at 40 °C | Standard Interrupting Capacity 600 Vac Rated 35 kAIC at 480 Vac Factory Assembled Circuit Consisting of Frame, Trip Unit and Terminals ① | High Interrupting Capacity 600 Vac Rated 65 kAIC at 480 Vac Factory Assembled Circuit Consisting of Frame, Trip Unit and Terminals ① | Ultra High Interrupting Capacity Current Limiting 600 Vac Rated 100 kAIC at 480 Vac Factory Assembled Circuit Consisting of Frame, Trip Unit and Terminals ① | Thermal-Magnetic Trip Unit Only ① | Standard Terminals Only |
|---|--|--|---|--------------------------------------|---|
| | Catalog Number | Catalog Number | Catalog Number | Catalog Number | See Page V4-T2-259 for Optional Terminals Catalog Number |
| Two-Pole | | | | | |
| 70 | JD2070 | HJD2070 | JDC2070 | JT2070T | TA250KB ② |
| 90 | JD2090 | HJD2090 | JDC2090 | JT2090T | |
| 100 | JD2100 | HJD2100 | JDC2100 | JT2100T | |
| 125 | JD2125 | HJD2125 | JDC2125 | JT2125T | |
| 150 | JD2150 | HJD2150 | JDC2150 | JT2150T | |
| 175 | JD2175 | HJD2175 | JDC2175 | JT2175T | |
| 200 | JD2200 | HJD2200 | JDC2200 | JT2200T | |
| 225 | JD2225 | HJD2225 | JDC2225 | JT2225T | |
| 250 | JD2250 | HJD2250 | JDC2250 | JT2250T | |
| Three-Pole | | | | | |
| 70 | JD3070 | HJD3070 | JDC3070 | JT3070T | TA250KB ② |
| 90 | JD3090 | HJD3090 | JDC3090 | JT3090T | |
| 100 | JD3100 | HJD3100 | JDC3100 | JT3100T | |
| 125 | JD3125 | HJD3125 | JDC3125 | JT3125T | |
| 150 | JD3150 | HJD3150 | JDC3150 | JT3150T | |
| 175 | JD3175 | HJD3175 | JDC3175 | JT3175T | |
| 200 | JD3200 | HJD3200 | JDC3200 | JT3200T | |
| 225 | JD3225 | HJD3225 | JDC3225 | JT3225T | |
| 250 | JD3250 | HJD3250 | JDC3250 | JT3250T | |
| Four-Pole ③④ | | | | | |
| 125 | JD4125 | HJD4125 | JDC4125 | JT3125T | TA250KB ② |
| 150 | JD4150 | HJD4150 | JDC4150 | JT3150T | |
| 175 | JD4175 | HJD4175 | JDC4175 | JT3175T | |
| 200 | JD4200 | HJD4200 | JDC4200 | JT3200T | |
| 225 | JD4225 | HJD4225 | JDC4225 | JT3225T | |
| 250 | JD4250 | HJD4250 | JDC4250 | JT3250T | |

Notes

- ① Magnetic trip adjustable 5–10 times continuous ampere rating.
- ② Individually packed.
- ③ Fully rated neutral pole with no protection.
- ④ Neutral is in right pole.

Types JD, HJD and JDC Thermal-Magnetic Circuit Breakers – Frame Only

| Standard Interrupting Capacity 600 Vac Rated 35 kAIC at 480 Vac Catalog Number | High Interrupting Capacity 600 Vac Rated 65 kAIC at 480 Vac Catalog Number | Ultra High Interrupting Capacity Current Limiting 600 Vac Rated 100 kAIC at 480 Vac Catalog Number |
|---|---|---|
| Two-Pole | | |
| JD2250F | HJD2250F | JDC2250F |
| Three-Pole | | |
| JD3250F | HJD3250F | JDC3250F |
| Four-Pole | | |
| JD4250F | HJD4250F | JDC4250F |

Type JDB Thermal-Magnetic Circuit Breakers with Non-Interchangeable Thermal-Magnetic Trip Units Suitable for Reverse Feed Application

| Maximum Continuous Ampere Rating at 40 °C | 600 Vac Rated, 250 Vdc Complete Circuit Breaker | |
|---|---|--|
| | Without Line and Load Terminals Catalog Number | With Standard Line and Load Terminals Only Catalog Number |
| Two-Pole | | |
| 70 | JDB2070W | JDB2070 |
| 90 | JDB2090W | JDB2090 |
| 100 | JDB2100W | JDB2100 |
| 125 | JDB2125W | JDB2125 |
| 150 | JDB2150W | JDB2150 |
| 175 | JDB2175W | JDB2175 |
| 200 | JDB2200W | JDB2200 |
| 225 | JDB2225W | JDB2225 |
| 250 | JDB2250W | JDB2250 |
| Three-Pole | | |
| 70 | JDB3070W | JDB3070 |
| 90 | JDB3090W | JDB3090 |
| 100 | JDB3100W | JDB3100 |
| 125 | JDB3125W | JDB3125 |
| 150 | JDB3150W | JDB3150 |
| 175 | JDB3175W | JDB3175 |
| 200 | JDB3200W | JDB3200 |
| 225 | JDB3225W | JDB3225 |
| 250 | JDB3250W | JDB3250 |

Molded Case Switches

Eaton's molded case switches are used as compact switches in applications requiring high current switching capabilities. Molded case switches are constructed of circuit breaker

components and are of the high instantaneous automatic type. Molded case switches are listed in accordance with Underwriters Laboratories Standard UL 489.

Molded Case Switches

| Maximum Continuous Ampere Rating at 40 °C | 600 Vac Maximum, 250 Vdc Complete Circuit Breaker Only Without Line and Load Terminals | | Standard Terminals Only |
|---|--|---|---|
| | Catalog Number | Suitable for Reverse Feed Use Catalog Number | See Page V4-T2-259 for Optional Terminals Catalog Number |
| Two-Pole | | | |
| 250 | JD2250KW | JDB2250KW | TA250KB ① |
| | HJD2250KW | HJDB2250KW | — |
| Three-Pole | | | |
| 250 | JD3250KW | JDB3250KW | TA250KB ① |
| | HJD3250KW | HJDB3250KW | — |
| Four-Pole | | | |
| 250 | JD4250KW | JDB4250KW | TA250KB ① |
| | HJD4250KW | HJDB4250KW | — |

Notes

① Individually packed.

Molded case switches may open above 2500 amperes.

Accessories Selection Guide and Ordering Information

Line and Load Terminals

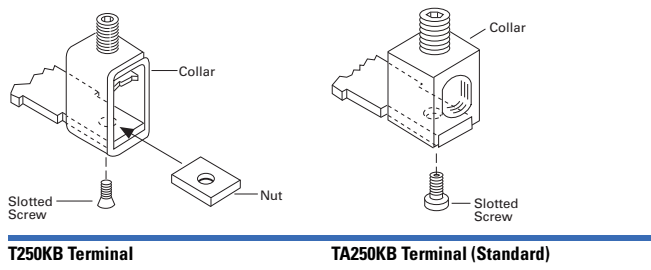
Eaton’s line and load terminals provide wire connecting capabilities for specific ranges of continuous current ratings and wire types. All terminals comply with Underwriters Laboratories Standards UL 486A and UL 486B and CSA Standard C22.2 No. 65, or Electrical Bulletin 1165.

Unless otherwise specified, J-Frame circuit breaker line and load terminals are shipped separately for field installation.

The bottom of the standard TA250KB terminal contains a recess that is positioned over the J-Frame circuit breaker terminal conductor.

Ordering Information

J-Frame circuit breakers use Cu/Al terminals as standard. When optional copper-only terminals are required, order by catalog number. Specify if factory installation is required.



Line and Load Terminals

| Maximum Breaker Amperes | Terminal Body Material | Wire Type | AWG Wire Range/ No. Conductors | Metric Wire Range mm ² | Catalog Number |
|--|------------------------|-----------|--------------------------------|-----------------------------------|----------------|
| Standard Cu/Al Pressure Terminals | | | | | |
| 250 | Aluminum | Cu/Al | 4–350 kcmil | 25–185 | TA250KB |
| Optional Cu Pressure Terminals | | | | | |
| 250 | Stainless Steel | Cu | 4–350 kcmil | 25–185 | T250KB |

Accessories

2

Allowable Accessory Combinations

Different combinations of accessories can be supplied, depending on the types of accessories and the number of poles in the circuit breaker.

JD Frame Accessories

| Description | Reference Page | Two-, Three-Pole | | | Four-Pole | | | Neutral |
|--|----------------|------------------|--------|-------|-----------|--------|-------|---------|
| | | Left | Center | Right | Left | Center | Right | |
| Internal Accessories (Only One Internal Accessory Per Pole) | | | | | | | | |
| Alarm lockout (Make/Break) | V4-T2-377 | ☐ | | ☐ | ☐ | | ☐ | |
| Auxiliary switch (1A, 1B) | V4-T2-379 | ■ | | ■ | ■ | | ■ | |
| Auxiliary switch (2A, 2B) | V4-T2-379 | ■ | | ■ | ■ | | ■ | |
| Auxiliary switch and alarm switch combination | V4-T2-381 | ☐ | | ☐ | ☐ | | ☐ | |
| Shunt trip—standard | V4-T2-384 | ■ | | ■ | ■ | | ■ | |
| Shunt trip—low energy | V4-T2-387 | ■ | | ■ | ■ | | ■ | |
| Undervoltage release mechanism | V4-T2-391 | ■ | | ■ | ■ | | ■ | |
| External Accessories | | | | | | | | |
| End cap kit | V4-T2-412 | ● | ● | ● | ● | ● | ● | ● |
| Plug nut | V4-T2-413 | ● | ● | ● | ● | ● | ● | ● |
| Control wire terminal kit | V4-T2-413 | ● | ● | ● | ● | ● | ● | ● |
| Multiwire connectors | V4-T2-414 | ● | ● | ● | ● | ● | ● | ● |
| Base mounting hardware | V4-T2-415 | ● | ● | ● | ● | ● | ● | ● |
| Terminal shields | V4-T2-416 | ● | ● | ● | ● | ● | ● | ● |
| Interphase barriers | V4-T2-417 | ● | ● | ● | ● | ● | ● | ● |
| Non-padlockable handle block | V4-T2-418 | | ■ | | | ■ | | |
| Padlockable handle block | V4-T2-418 | | ■ | | | ■ | | |
| Padlockable handle lock hasp | V4-T2-419 | ☐ | | ☐ | ☐ | | ☐ | |
| Cylinder lock | V4-T2-419 | ☐ | | ☐ | | | | |
| Key interlock kit | V4-T2-420 | ☐ | | ☐ | ☐ | | ☐ | |
| Sliding bar interlock—requires two breakers | V4-T2-421 | ● | ● | ● | | | | |
| Electrical (solenoid) operator | V4-T2-423 | ● | ● | ● | ● | ● | ● | ● |
| Plug-in adapters | V4-T2-423 | ● | ● | ● | ● | ● | ● | ● |
| Rear connecting studs | V4-T2-425 | ● | ● | ● | ● | ● | ● | ● |
| Panelboard connecting straps | V4-T2-426 | ● | ● | ● | ● | ● | ● | ● |
| Handle mechanisms | V4-T2-506 | ● | ● | ● | ● | ● | ● | ● |
| Handle extension | V4-T2-521 | ● | ● | ● | ● | ● | ● | ● |
| IQ Energy Sentinel | V4-T2-428 | ● | ● | ● | | | | |
| Modifications (Refer to Eaton) | | | | | | | | |
| Special calibration | — | ● | ● | ● | ● | ● | ● | ● |
| Moisture fungus treatment | V4-T2-218 | ● | ● | ● | ● | ● | ● | ● |
| Freeze-tested circuit breakers | — | ● | ● | ● | ● | ● | ● | ● |
| Marine/naval application | — | ● | ● | ● | ● | ● | ● | ● |

Legend

- Applicable in indicated pole position
- ☐ May be mounted on left or right pole—not both
- Accessory available/modification available

Technical Data and Specifications

UL 489 Interrupting Capacity Ratings

| Circuit Breaker Type | Number of Poles | Interrupting Capacity (kA Symmetrical Amperes) | | | | |
|----------------------|-----------------|--|-----|-----|----------|-------------------|
| | | Volts AC (50/60 Hz) | | | Volts DC | |
| | | 240 | 480 | 600 | 125 | 250 ^{①②} |
| JDB | 2, 3 | 65 | 35 | 18 | — | 10 |
| JD | 2, 3, 4 | 65 | 35 | 18 | — | 10 |
| HJD | 2, 3, 4 | 100 | 65 | 25 | — | 22 |
| JDC ^③ | 2, 3, 4 | 200 | 100 | 35 | — | 22 |

IEC 157-1 (P1) Interrupting Capacity Ratings

| Circuit Breaker Type | Number of Poles | Interrupting Capacity (kA Symmetrical Amperes) | | | | | |
|----------------------|-----------------|--|-----|-----|----------|-----|-------------------|
| | | Volts AC (50/60 Hz) | | | Volts DC | | |
| | | 240 | 380 | 415 | 600 | 125 | 250 ^{①②} |
| JD | 2, 3, 4 | 65 | 35 | 35 | — | — | 10 |
| HJD | 2, 3, 4 | 100 | 65 | 65 | — | — | 22 |
| JDC | 2, 3, 4 | 200 | 100 | 100 | — | — | 22 |

UL 489 Current Limiting Data

| Frame | Circuit | I_p (kA) | I^2T ($10^6 A^2S$) |
|-------|--------------|------------|------------------------|
| JDC | 240 V/200 kA | 42.6 | 1.36 |
| JDC | 480 V/100 kA | 40.0 | 3.00 |
| JDC | 600 V/35 kA | 31.9 | 3.10 |

Notes

- ① Two-pole circuit breaker or two outside poles of three-pole circuit breaker.
- ② Time constant is 3 milliseconds minimum at 10 kA and 8 milliseconds minimum at 22 kA.
- ③ Current limiting.

2.4

Molded Case Circuit Breakers

Series C

Dimensions and Weights

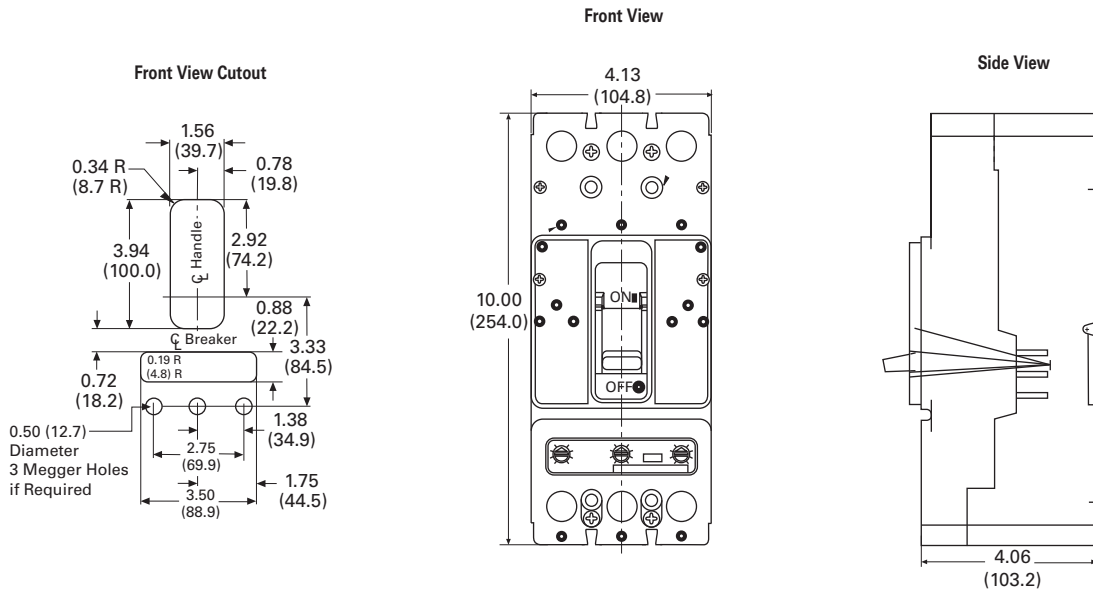
Approximate Dimensions in Inches (mm)

2

JD Frame

| Number of Poles | Width | Height | Depth |
|-----------------|--------------|---------------|--------------|
| 2, 3 | 4.13 (105.0) | 10.00 (254.0) | 4.06 (104.1) |
| 4 | 5.50 (139.7) | 10.00 (254.0) | 4.06 (104.1) |

JD-Frame, Three-Pole



Approximate Shipping Weight in Lbs (kg)

JD Frame

| Breaker Type | Complete Breaker | | | Frame Only | | | Trip Unit | | |
|--------------|------------------|-------------|-------------|-------------|-------------|-------------|------------|------------|------------|
| | Two-Pole | Three-Pole | Four-Pole | Two-Pole | Three-Pole | Four-Pole | Two-Pole | Three-Pole | Four-Pole |
| JDB | 11.25 (5.1) | 12.50 (5.7) | — | — | — | — | — | — | — |
| JD | 11.25 (5.1) | 12.50 (5.7) | 13.25 (6.0) | 9.00 (4.1) | 10.00 (4.5) | 10.50 (4.8) | 2.00 (0.9) | 2.00 (0.9) | 2.25 (1.0) |
| HJD | 11.25 (5.1) | 12.50 (5.7) | 13.25 (6.0) | 9.00 (4.1) | 10.00 (4.5) | 10.50 (4.8) | 2.00 (0.9) | 2.00 (0.9) | 2.25 (1.0) |
| JDC | 12.25 (5.6) | 13.50 (6.1) | 14.25 (6.5) | 10.00 (4.5) | 11.00 (5.0) | 11.50 (5.2) | 2.00 (0.9) | 2.00 (0.9) | 2.25 (1.0) |

Typical K-Frame Circuit Breaker



Contents

| <i>Description</i> | <i>Page</i> |
|--|------------------|
| Product Overview | V4-T2-218 |
| Standards and Certifications | V4-T2-219 |
| Quick Reference | V4-T2-220 |
| G-Frame (15–100 Amperes) | V4-T2-223 |
| F-Frame (10–225 Amperes) | V4-T2-237 |
| J-Frame (70–250 Amperes) | V4-T2-255 |
| K-Frame (70–400 Amperes) | |
| Catalog Number Selection | V4-T2-264 |
| Product Selection | V4-T2-266 |
| Accessories | V4-T2-282 |
| Technical Data and Specifications | V4-T2-283 |
| Dimensions and Weights | V4-T2-286 |
| L-Frame (125–600 Amperes) | V4-T2-287 |
| M-Frame (300–800 Amperes) | V4-T2-313 |
| N-Frame (400–1200 Amperes) | V4-T2-324 |
| R-Frame (800–2500 Amperes) | V4-T2-339 |
| Motor Circuit Protectors (MCP) | V4-T2-358 |
| Motor Protection Circuit Breakers (MPCB) | V4-T2-369 |
| Type ELC Current Limiter Attachment (Size 0–4) | V4-T2-371 |
| Current Limiting Circuit Breaker Module | V4-T2-372 |
| Internal Accessories | V4-T2-375 |
| External Accessories | V4-T2-408 |

K-Frame (70–400 Amperes)

Product Description

- All Eaton K-Frame circuit breakers are HACR rated
- K-Frame circuit breakers are available as individual components (frame, trip unit, terminals), or factory assembled complete breakers
- K-Frame circuit breakers with non-interchangeable trip units are suitable for reverse feed use

2.4

Molded Case Circuit Breakers

Series C

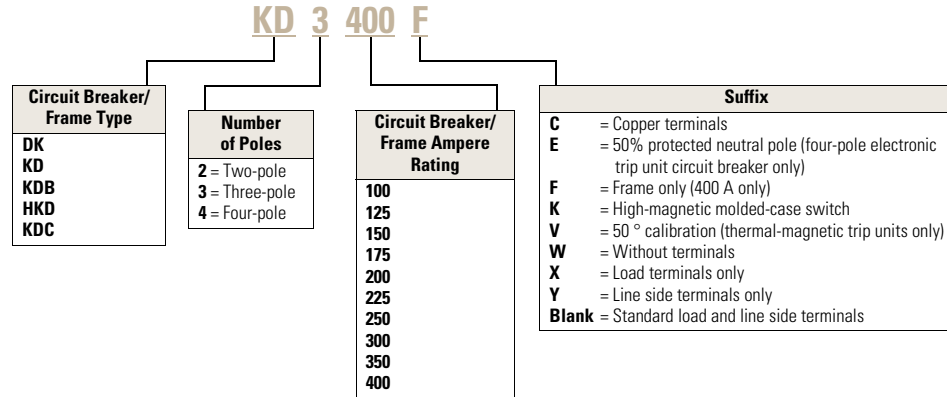
2

Catalog Number Selection

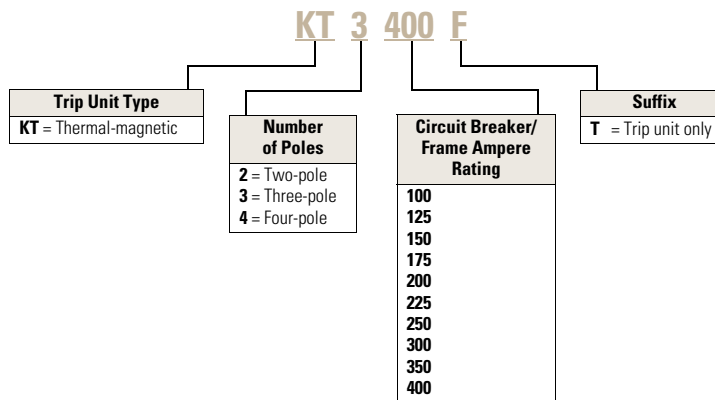
This information is presented only as an aid to understanding catalog numbers. It is not to be used to build catalog numbers for circuit breakers or trip units.

K-Frame with Thermal-Magnetic Trip Unit Technology

Thermal-Magnetic Breakers and Frames ①



Thermal-Magnetic Trip Unit ①



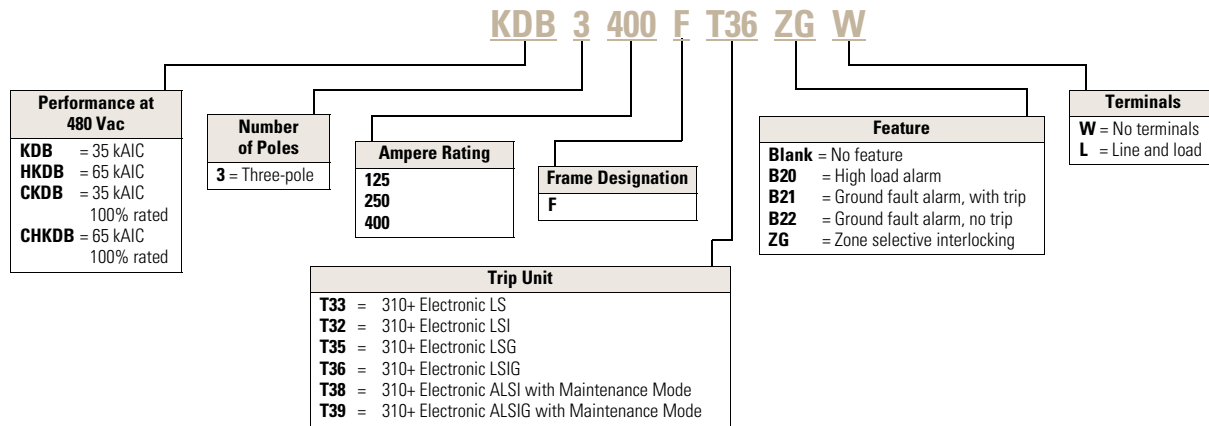
Notes

① Frames are the same for thermal-magnetic or 310+ electronic trip units, e.g., **KD3400F** or **HKD3400F**.

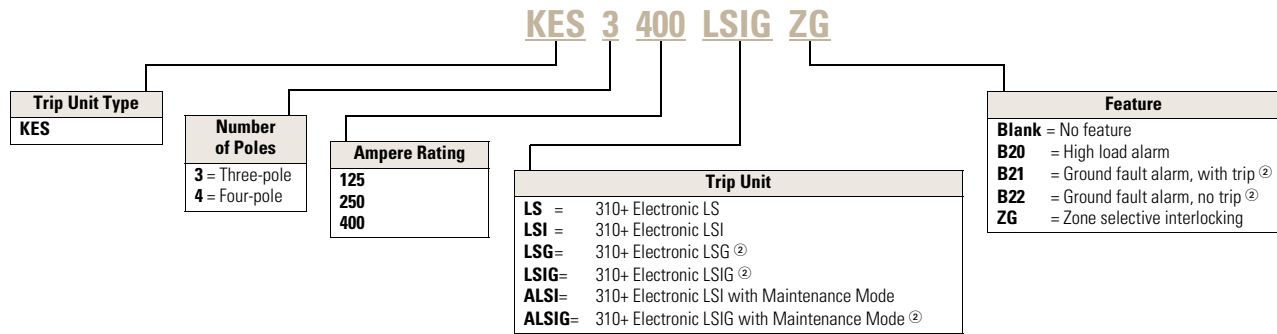
Ampere rating available with electronic trip unit only.

K-Frame with 310+ Electronic Trip Unit Technology ①

310+ Circuit Breakers ②

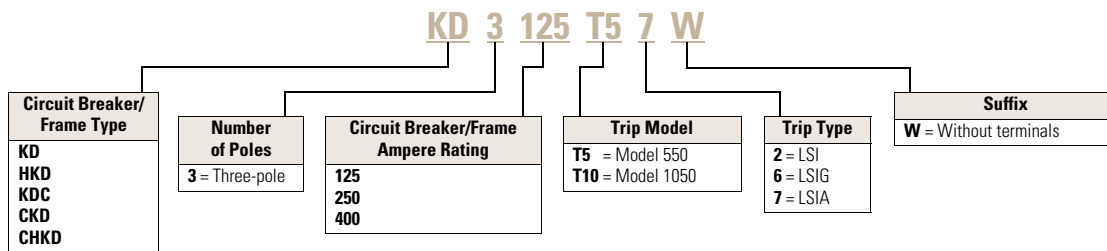


310+ Electronic Trip Units ③



K-Frame with OPTIM Trip Unit Technology

OPTIM Circuit Breakers



Notes

- ① Cannot combine 'B2X' suffixes with 'B2X' suffixes.
- ② Not available in four-pole configurations.
- ③ Frames are the same for thermal-magnetic or 310+ electronic trip units, e.g., **KD3400F**, **HKD3400F**, etc.

Product Selection

2

Types KD, HKD and KDC Thermal-Magnetic Circuit Breakers with Interchangeable Trip Units

| Maximum Continuous Ampere Rating at 40 °C | Standard Interrupting Capacity 600 Vac Rated 35 kAIC at 480 Vac Factory Assembled Circuit Consisting of Frame, Trip Unit and Terminals ① | High Interrupting Capacity 600 Vac Rated 65 kAIC at 480 Vac Factory Assembled Circuit Consisting of Frame, Trip Unit and Terminals ① | Ultra High Interrupting Capacity Current Limiting 600 Vac Rated 100 kAIC at 480 Vac Factory Assembled Circuit Consisting of Frame, Trip Unit and Terminals ① | Thermal-Magnetic Trip Unit Only ① | Standard Terminals Only |
|---|---|---|---|---|---|
| | Catalog Number | Catalog Number | Catalog Number | For Use with Standard or High or Ultra High Interrupting Frames Catalog Number | See Page V4-T2-281 for Optional Terminals Catalog Number |
| Two-Pole | | | | | |
| 100 | KD2100 | HKD2100 | KDC2100 | KT2100T | TA300K ② |
| 125 | KD2125 | HKD2125 | KDC2125 | KT2125T | TA300K ② |
| 150 | KD2150 | HKD2150 | KDC2150 | KT2150T | TA300K ② |
| 175 | KD2175 | HKD2175 | KDC2175 | KT2175T | TA300K ② |
| 200 | KD2200 | HKD2200 | KDC2200 | KT2200T | TA300K ② |
| 225 | KD2225 | HKD2225 | KDC2225 | KT2225T | TA300K ② |
| 250 | KD2250 | HKD2250 | KDC2250 | KT2250T | TA350K ② |
| 300 | KD2300 | HKD2300 | KDC2300 | KT2300T | TA350K ② |
| 350 | KD2350 | HKD2350 | KDC2350 | KT2350T | TA350K ② |
| 400 | KD2400 | HKD2400 | KDC2400 | KT2400T | 2TA400K ③ |
| Three-Pole | | | | | |
| 100 | KD3100 | HKD3100 | KDC3100 | KT3100T | TA300K ② |
| 125 | KD3125 | HKD3125 | KDC3125 | KT3125T | TA300K ② |
| 150 | KD3150 | HKD3150 | KDC3150 | KT3150T | TA300K ② |
| 175 | KD3175 | HKD3175 | KDC3175 | KT3175T | TA300K ② |
| 200 | KD3200 | HKD3200 | KDC3200 | KT3200T | TA300K ② |
| 225 | KD3225 | HKD3225 | KDC3225 | KT3225T | TA300K ② |
| 250 | KD3250 | HKD3250 | KDC3250 | KT3250T | TA350K ② |
| 300 | KD3300 | HKD3300 | KDC3300 | KT3300T | TA350K ② |
| 350 | KD3350 | HKD3350 | KDC3350 | KT3350T | TA350K ② |
| 400 | KD3400 | HKD3400 | KDC3400 | KT3400T | 3TA400K ③ |
| Four-Pole | | | | | |
| 100 | KD4100 | HKD4100 | KDC4100 | KT3100T | TA300K ② |
| 125 | KD4125 | HKD4125 | KDC4125 | KT3125T | TA300K ② |
| 175 | KD4175 | HKD4175 | KDC4175 | KT3175T | TA300K ② |
| 200 | KD4200 | HKD4200 | KDC4200 | KT3200T | TA300K ② |
| 225 | KD4225 | HKD4225 | KDC4225 | KT3225T | TA300K ② |
| 250 | KD4250 | HKD4250 | KDC4250 | KT3250T | TA350K ② |
| 300 | KD4300 | HKD4300 | KDC4300 | KT3300T | TA350K ② |
| 350 | KD4350 | HKD4350 | KDC4350 | KT3350T | TA350K ② |
| 400 | KD4400 | HKD4400 | KDC4400 | KT3400T | 4TA400K ③ |

Notes

- ① Magnetic trip adjustable 5–10 times continuous ampere rating.
- ② Individually packed.
- ③ 2TA400K, 3TA400K and 4TA400K terminal kits contain one terminal for each pole and one terminal cover.

Types KD, HKD and KDC Thermal-Magnetic Circuit Breakers—Frame Only

| Standard Interrupting Capacity 600 Vac Rated 35 kAIC at 480 Vac | High Interrupting Capacity 600 Vac Rated 65 kAIC at 480 Vac | Ultra High Interrupting Capacity Current Limiting 600 Vac Rated 100 kAIC at 480 Vac |
|---|---|--|
| Catalog Number | Catalog Number | Catalog Number |
| Two-Pole | | |
| KD2400F | HKD2400F | KDC2400F |
| Three-Pole | | |
| KD3400F | HKD3400F | KDC3400F |
| Four-Pole | | |
| KD4400F | HKD4400F | KDC4400F |

Types KD, HKD and KDC Electronic Circuit Breakers with Interchangeable 310+ Trip Units

Order as individual components: breaker frame, trip unit and terminals. See 310+ adjustability specifications on [Page V4-T2-284](#).

Types KD, HKD and KDC Electronic Circuit Breakers with Interchangeable 310+ Trip Units—Three-Pole

| Max. Cont. Ampere Rating at 40 °C | Circuit Breaker Frame Only | | | Digitrip RMS 310+ Trip Unit Only ^① | | | | Neutral CT for LSG and LSI ^{②③} | Terminal Information |
|---|---|---|---|---|------------|------------|-------------|---|------------------------------------|
| | Standard Interrupting Capacity 600 Vac Rated 35 kAIC at 480 Vac Catalog Number | High Interrupting Capacity 600 Vac Rated 65 kAIC at 480 Vac Catalog Number | Ultra High Interrupting Capacity Current Limiting 600 Vac Rated 100 kAIC at 480 Vac | Standard | Options | | | | |
| | | | | LS | LSI | LSG | LSIG | | |
| 125 | KD3400F | HKD3400F | KDC3400F | KES3125LS | KES3125LSI | KES3125LSG | KES3125LSIG | LGFT125 | See Page V4-T2-281 |
| 250 | KD3400F | HKD3400F | KDC3400F | KES3250LS | KES3250LSI | KES3250LSG | KES3250LSIG | LGFT250 | |
| 400 | KD3400F | HKD3400F | KDC3400F | KES3400LS | KES3400LSI | KES3400LSG | KES3400LSIG | LGFT400 | |

Types KD, HKD and KDC Electronic Circuit Breakers with Interchangeable 310+ Trip Units—Four-Pole ^{④⑤}

| Max. Cont. Ampere Rating at 40 °C | Circuit Breaker Frame Only | | | Digitrip RMS 310+ Trip Unit Only ^① | | | | Neutral CT for LSG and LSI ^{②③} | Terminal Information |
|---|---|---|---|---|------------|-----|------|---|------------------------------------|
| | Standard Interrupting Capacity 600 Vac Rated 35 kAIC at 480 Vac Catalog Number | High Interrupting Capacity 600 Vac Rated 65 kAIC at 480 Vac Catalog Number | Ultra High Interrupting Capacity Current Limiting 600 Vac Rated 100 kAIC at 480 Vac | Standard | Options | | | | |
| | | | | LS | LSI | LSG | LSIG | | |
| 125 | KD4400F | HKD4400F | KDC4400F | KES4125LS | KES4125LSI | — | — | — | See Page V4-T2-281 |
| 250 | KD4400F | HKD4400F | KDC4400F | KES4250LS | KES4250LSI | — | — | — | |
| 400 | KD4400F | HKD4400F | KDC4400F | KES4400LS | KES4400LSI | — | — | — | |

Notes

- ① For AC use only.
- ② Required for four-wire systems if neutral protection is desired.
- ③ Included with LSG and LSI trip units.
- ④ Trip unit includes protected neutral pole. Use corresponding three-pole trip unit if protected neutral pole is not required.
- ⑤ Fully rated neutral pole protection is standard. For 50% rated protection on neutral pole, add Suffix E to four-pole trip unit catalog number.

2.4

Molded Case Circuit Breakers

Series C

Type KDB with Digitrip 310+ Non-Interchangeable Trip Unit Suitable for Reverse Feed

See 310+ adjustability specifications on [Page V4-T2-284](#).

2

| Factory Assembled Circuit Breaker Consisting of Frame and Trip Unit Less Terminals ^① | | | | | | | |
|---|-----------------|---|--|--|--|---|----------------------|
| Maximum Continuous Ampere Rating at 40 °C | Number of Poles | Standard LS | Optional LSI | LSG | LSIG | Neutral CT for LSG and LSIG ^{②③} | Terminal Information |
| | | Adjustable Short Time Pickup with I ² t Short Delay Ramp Catalog Number | Independently Adjustable Short Time Pickup and Delay | Adjustable Short Time Pickup with I ² t Short Delay and Ground Fault Protection | Independently Adjustable Short Time Pickup and Ground Fault Protection | | |
| 125 | 3 | KDB3125FT33W | KDB3125FT32W | KDB3125FT35W | KDB3125FT36W | LGFACT125 | See Page V4-T2-282 |
| 250 | 3 | KDB3250FT33W | KDB3250FT32W | KDB3250FT35W | KDB3250FT36W | LGFACT250 | |
| 400 | 3 | KDB3400FT33W | KDB3400FT32W | KDB3400FT35W | KDB3400FT36W | LGFACT400 | |

Type HKDB with Digitrip 310+ Non-Interchangeable Trip Unit Suitable for Reverse Feed

See 310+ adjustability specifications on [Page V4-T2-284](#).

| Factory Assembled Circuit Breaker Consisting of Frame and Trip Unit Less Terminals ^① | | | | | | | |
|---|-----------------|---|--|--|--|---|----------------------|
| Maximum Continuous Ampere Rating at 40 °C | Number of Poles | Standard LS | Optional LSI | LSG | LSIG | Neutral CT for LSG and LSIG ^{②③} | Terminal Information |
| | | Adjustable Short Time Pickup with I ² t Short Delay Ramp Catalog Number | Independently Adjustable Short Time Pickup and Delay | Adjustable Short Time Pickup with I ² t Short Delay and Ground Fault Protection | Independently Adjustable Short Time Pickup and Ground Fault Protection | | |
| 125 | 3 | HKDB3125FT33W | HKDB3125FT32W | HKDB3125FT35W | HKDB3125FT36W | LGFACT125 | See Page V4-T2-282 |
| 250 | 3 | HKDB3250FT33W | HKDB3250FT32W | HKDB3250FT35W | HKDB3250FT36W | LGFACT250 | |
| 400 | 3 | HKDB3400FT33W | HKDB3400FT32W | HKDB3400FT35W | HKDB3400FT36W | LGFACT400 | |

100% Rated Types CKD and CHKD Electronic Circuit Breakers

The NEC allows the breaker to be rated at 100% of its frame size in an assembly, provided that 90 °C wire is applied at the 75 °C ampacity. All 100% rated circuit breakers have electronic trip units.

100% Rated Types CKD and CHKD Electronic Circuit Breakers—Three-Pole

See 310+ adjustability specifications on [Page V4-T2-284](#).

| Maximum Continuous Ampere Rating at 40 °C | Circuit Breaker Frame Only | | Digitrip RMS 310+ Trip Unit Only | | Adjustable Short Time Pickup with I ² t Short Delay and Ground Fault Protection | Independently Adjustable Short Time Pickup and Delay and Ground Fault Protection | Neutral CT for LSG and LSIG ^{②③} | Terminal Information |
|---|--------------------------------------|----------------------------|---|--|--|--|---|----------------------|
| | Standard Interrupting Capacity | High Interrupting Capacity | Standard | Options | | | | |
| | 35 kAIC at 480 Vac Catalog Number | 65 kAIC at 480 Vac | Adjustable Short Time Pickup with I ² t Short Delay Ramp | Independently Adjustable Short Time Pickup and Delay | | | | |
| 125 | CKD3400F | CHKD3400F | KES3125LS | KES3125LSI | KES3125LSG | KES3125LSIG | LGFACT125 | See Page V4-T2-281 |
| 250 | CKD3400F | CHKD3400F | KES3250LS | KES3250LSI | KES3250LSG | KES3250LSIG | LGFACT250 | |
| 400 | CKD3400F | CHKD3400F | KES3400LS | KES3400LSI | KES3400LSG | KES3400LSIG | LGFACT400 | |

Notes

- ① For AC use only.
- ② Required for four-wire systems if neutral protection is desired.
- ③ Included with LSG and LSIG trip units.

Types DK and KDB Thermal-Magnetic Circuit Breakers with Non-Interchangeable Trip Units

Suitable for reverse feed application.

Types DK and KDB Thermal-Magnetic Circuit Breakers with Non-Interchangeable Trip Units

| Maximum Continuous Ampere Rating at 40 °C | 240 Vac Rated, 250 Vdc Complete Circuit Breaker | | | 600 Vac Rated, 250 Vdc Complete Circuit Breaker | |
|---|---|--|--|---|---|
| | Without Line and Load Terminals Catalog Number | With Line Terminals Only Catalog Number | With Standard Line and Load Terminals Only Catalog Number | Without Line and Load Terminals Catalog Number | With Standard Line and Load Terminals Catalog Number |
| Two-Pole | | | | | |
| 100 | — | — | — | KDB2100W | KDB2100 |
| 125 | — | — | — | KDB2125W | KDB2125 |
| 150 | — | — | — | KDB2150W | KDB2150 |
| 175 | — | — | — | KDB2175W | KDB2175 |
| 200 | — | — | — | KDB2200W | KDB2200 |
| 225 | — | — | — | KDB2225W | KDB2225 |
| 250 | DK2250W | DK2250Y | DK2250 | KDB2250W | KDB2250 |
| 300 | DK2300W | DK2300Y | DK2300 | KDB2300W | KDB2300 |
| 350 | DK2350W | DK2350Y | DK2350 | KDB2350W | KDB2350 |
| 400 | DK2400W | DK2400Y | DK2400 | KDB2400W | KDB2400 |
| Three-Pole | | | | | |
| 100 | — | — | — | KDB3100W | KDB3100 |
| 125 | — | — | — | KDB3125W | KDB3125 |
| 150 | — | — | — | KDB3150W | KDB3150 |
| 175 | — | — | — | KDB3175W | KDB3175 |
| 200 | — | — | — | KDB3200W | KDB3200 |
| 225 | — | — | — | KDB3225W | KDB3225 |
| 250 | DK3250W | DK3250Y | DK3250 | KDB3250W | KDB3250 |
| 300 | DK3300W | DK3300Y | DK3300 | KDB3300W | KDB3300 |
| 350 | DK3350W | DK3350Y | DK3350 | KDB3350W | KDB3350 |
| 400 | DK3400W | DK3400Y | DK3400 | KDB3400W | KDB3400 |

Molded Case Switches

Eaton’s molded case switches are used as compact switches in applications requiring high current switching capabilities. Molded case switches are constructed of circuit breaker

components and are of the high instantaneous automatic type. Molded case switches are listed in accordance with Underwriters Laboratories Standard UL 489.

Molded Case Switches

| Maximum Continuous Ampere Rating at 40 °C | 240 Vac Maximum, 250 Vdc | 600 Vac Maximum, 250 Vdc | 600 Vac Maximum, 250 Vdc |
|---|--|--|---|
| | Complete Circuit Breaker with Standard Line and Load Terminals Catalog Number | Complete Circuit Breaker with Standard Line and Load Terminals Catalog Number | Complete Circuit Breaker with Standard Line and Load Terminals. Suitable for Reverse Feed Use Catalog Number |
| Two-Pole | | | |
| 400 | DK2400K | KD2400K | KDB2400K |
| | — | HKD2400K | HKDB2400K |
| Three-Pole | | | |
| 400 | DK3400K | KD3400K | KDB3400K |
| | — | HKD3400K | HKDB3400K |
| Four-Pole | | | |
| 400 | — | KD4400K | KDB4400K |
| | — | HKD4400K | HKDB4400K |

Note

Molded case switches may open above 4000 amperes.

Digitrip OPTIM 550 Electronic Circuit Breakers with Interchangeable Rating Plug

Order as individual components: breaker frame (which includes trip unit), rating plug, terminals.

Digitrip OPTIM 550 Electronic Circuit Breakers with Interchangeable Rating Plug

| Maximum Continuous Ampere Rating at 40 °C | Circuit Breaker Frame Only | | | Digitrip OPTIM Rating Plug Only | |
|---|----------------------------|------------------------|------------------------|---------------------------------|-------------------------------------|
| | LSI Catalog Number | LSIG Catalog Number | LSIA Catalog Number | Ampere Rating | Fixed Rating Plug Catalog Number |
| Three-Pole Standard Interrupting Capacity 600 Vac Rated 35 kAIC at 480 Vac | | | | | |
| 125 | KD3125T52W | KD3125T56W | KD3125T57W | 70 | ORPK125A70 |
| | | | | 90 | ORPK125A90 |
| | | | | 100 | ORPK125A100 |
| | | | | 110 | ORPK125A110 |
| | | | | 125 | ORPK125A125 |
| 250 | KD3250T52W | KD3250T56W | KD3250T57W | 125 | ORPK025A125 |
| | | | | 150 | ORPK025A150 |
| | | | | 175 | ORPK025A175 |
| | | | | 200 | ORPK025A200 |
| | | | | 225 | ORPK025A225 |
| | | | | 250 | ORPK025A250 |
| 400 | KD3400T52W | KD3400T56W | KD3400T57W | 200 | ORPK40A200 |
| | | | | 225 | ORPK40A225 |
| | | | | 250 | ORPK40A250 |
| | | | | 300 | ORPK40A300 |
| | | | | 350 | ORPK40A350 |
| | | | | 400 | ORPK40A400 |

Notes

① Long delay I⁴t response selection limits short delay time to flat response.

② Zone interlocking, PowerNet, or both features can be added at the factory by adding suffixes **ZG**, **PN** or **ZGP** respectively to above catalog number.

Digitrip OPTIM 550 Electronic Circuit Breakers with Interchangeable Rating Plug, continued

| Maximum Continuous Ampere Rating at 40 °C | Circuit Breaker Frame Only | | | Digitrip OPTIM Rating Plug Only | |
|---|---|---------------------|---------------------|---------------------------------|----------------------------------|
| | LSI Catalog Number | LSIG Catalog Number | LSIA Catalog Number | Ampere Rating | Fixed Rating Plug Catalog Number |
| | L – Adjustable Long Delay Pickup (I _t) with Adjustable Long Delay Time (I ² t or I ⁴ t Response) ^① S – Adjustable Short Delay Pickup with Adjustable Short Delay Time (I ² t or Flat Response) I – Adjustable Instantaneous Pickup G – Adjustable Ground Fault Pickup with Adjustable Ground Fault Time (I ² t or Flat Response) A – Adjustable Ground Fault Alarm with Adjustable Ground Fault Time (I ² t or Flat Response) OPTIM 550 ^② | | | | |
| Three-Pole High Interrupting Capacity 600 Vac Rated 65 kAIC at 480 Vac | | | | | |
| 125 | HKD3125T52W | HKD3125T56W | HKD3125T57W | 70 | ORPK125A70 |
| | | | | 90 | ORPK125A90 |
| | | | | 100 | ORPK125A100 |
| | | | | 110 | ORPK125A110 |
| | | | | 125 | ORPK125A125 |
| 250 | HKD3250T52W | HKD3250T56W | HKD3250T57W | 125 | ORPK025A125 |
| | | | | 150 | ORPK025A150 |
| | | | | 175 | ORPK025A175 |
| | | | | 200 | ORPK025A200 |
| | | | | 225 | ORPK025A225 |
| | | | | 250 | ORPK025A250 |
| 400 | HKD3400T52W | HKD3400T56W | HKD3400T57W | 200 | ORPK40A200 |
| | | | | 225 | ORPK40A225 |
| | | | | 250 | ORPK40A250 |
| | | | | 300 | ORPK40A300 |
| | | | | 350 | ORPK40A350 |
| | | | | 400 | ORPK40A400 |

Notes

- ① Long delay I⁴t response selection limits short delay time to flat response.
- ② Zone interlocking, PowerNet, or both features can be added at the factory by adding suffixes **ZG**, **PN** or **ZGP** respectively to above catalog number.

Digitrip OPTIM 550 Electronic Circuit Breakers with Interchangeable Rating Plug, continued

| Maximum Continuous Ampere Rating at 40 °C | Circuit Breaker Frame Only | | | Digitrip OPTIM Rating Plug Only | |
|---|---|---------------------|---------------------|---------------------------------|----------------------------------|
| | LSI Catalog Number | LSIG Catalog Number | LSIA Catalog Number | Ampere Rating | Fixed Rating Plug Catalog Number |
| | L – Adjustable Long Delay Pickup (I ₁) with Adjustable Long Delay Time (I ² t or I ⁴ t Response) ① S – Adjustable Short Delay Pickup with Adjustable Short Delay Time (I ² t or Flat Response) I – Adjustable Instantaneous Pickup G – Adjustable Ground Fault Pickup with Adjustable Ground Fault Time (I ² t or Flat Response) A – Adjustable Ground Fault Alarm with Adjustable Ground Fault Time (I ² t or Flat Response) OPTIM 550 ② | | | | |
| Three-Pole Ultra High Interrupting Capacity Current Limiting 600 Vac Rated 100 kAIC at 480 Vac | | | | | |
| 125 | KDC3125T52W | KDC3125T56W | KDC3125T57W | 70 | ORPK125A70 |
| | | | | 90 | ORPK125A90 |
| | | | | 100 | ORPK125A100 |
| | | | | 110 | ORPK125A110 |
| | | | | 125 | ORPK125A125 |
| 250 | KDC3250T52W | KDC3250T56W | KDC3250T57W | 125 | ORPK025A125 |
| | | | | 150 | ORPK025A150 |
| | | | | 175 | ORPK025A175 |
| | | | | 200 | ORPK025A200 |
| | | | | 225 | ORPK025A225 |
| 400 | KDC3400T52W | KDC3400T56W | KDC3400T57W | 250 | ORPK025A250 |
| | | | | 200 | ORPK40A200 |
| | | | | 225 | ORPK40A225 |
| | | | | 250 | ORPK40A250 |
| | | | | 300 | ORPK40A300 |
| | | | | 350 | ORPK40A350 |
| | | | | 400 | ORPK40A400 |

Notes

① Long delay I⁴t response selection limits short delay time to flat response.

② Zone interlocking, PowerNet, or both features can be added at the factory by adding suffixes **ZG**, **PN** or **ZGP** respectively to above catalog number.

2.4

Molded Case Circuit Breakers

Series C

Digitrip OPTIM 1050 Electronic Circuit Breakers with Interchangeable Rating Plug

Order as individual components: breaker frame (which includes trip unit), rating plug, terminals.

2

Digitrip OPTIM 1050 Electronic Circuit Breakers with Interchangeable Rating Plug

| Maximum Continuous Ampere Rating at 40 °C | Circuit Breaker Frame Only | | Digitrip OPTIM Rating Plug Only | |
|---|----------------------------|---------------------|---------------------------------|----------------------------------|
| | LSIG Catalog Number | LSIA Catalog Number | Ampere Rating | Fixed Rating Plug Catalog Number |
| Three-Pole Standard Interrupting Capacity 600 Vac Rated 35 kAIC at 480 Vac | | | | |
| 125 | KD3125T106W | KD3125T107W | 70 | ORPK125A70 |
| | | | 90 | ORPK125A90 |
| | | | 100 | ORPK125A100 |
| | | | 110 | ORPK125A110 |
| | | | 125 | ORPK125A125 |
| 250 | KD3250T106W | KD3250T107W | 125 | ORPK025A125 |
| | | | 150 | ORPK025A150 |
| | | | 175 | ORPK025A175 |
| | | | 200 | ORPK025A200 |
| | | | 225 | ORPK025A225 |
| | | | 250 | ORPK025A250 |
| 400 | KD3400T106W | KD3400T107W | 200 | ORPK40A200 |
| | | | 225 | ORPK40A22 |
| | | | 250 | ORPK40A250 |
| | | | 300 | ORPK40A300 |
| | | | 350 | ORPK40A350 |
| | | | 400 | ORPK40A400 |

Notes

- ① Long delay I⁴t response selection limits short delay time to flat response.
- ② Factory sealed.

Digitrip OPTIM 1050 Electronic Circuit Breakers with Interchangeable Rating Plug, continued

| Maximum Continuous Ampere Rating at 40 °C | Circuit Breaker Frame Only | | Digitrip OPTIM Rating Plug Only | |
|---|----------------------------|---------------------------|---------------------------------|--|
| | LSIG Catalog Number | LSIA Catalog Number | Ampere Rating | Fixed Rating Plug Catalog Number |
| Three-Pole High Interrupting Capacity 600 Vac Rated 65 kAIC at 480 Vac | | | | |
| 125 | HKD3125T106W | HKD3125T107W | 70 | ORPK125A70 |
| | | | 90 | ORPK125A90 |
| | | | 100 | ORPK125A100 |
| | | | 110 | ORPK125A110 |
| | | | 125 | ORPK125A125 |
| 250 | HKD3250T106W | HKD3250T107W | 125 | ORPK025A125 |
| | | | 150 | ORPK025A150 |
| | | | 175 | ORPK025A175 |
| | | | 200 | ORPK025A200 |
| | | | 225 | ORPK025A225 |
| 400 | HKD3400T106W | HKD3400T107W | 250 | ORPK025A250 |
| | | | 200 | ORPK40A200 |
| | | | 225 | ORPK40A225 |
| | | | 250 | ORPK40A250 |
| | | | 300 | ORPK40A300 |
| | | | 350 | ORPK40A350 |
| | | | 400 | ORPK40A400 |

Notes

- ① Long delay I⁴t response selection limits short delay time to flat response.
 ② Factory sealed.

Digitrip OPTIM 1050 Electronic Circuit Breakers with Interchangeable Rating Plug, continued

| Maximum Continuous Ampere Rating at 40 °C | Circuit Breaker Frame Only | | Digitrip OPTIM Rating Plug Only | |
|---|---|---------------------|---------------------------------|----------------------------------|
| | LSIG Catalog Number | LSIA Catalog Number | Ampere Rating | Fixed Rating Plug Catalog Number |
| | L – Adjustable Long Delay Pickup (I_r) with Adjustable Long Delay Time (I²t or I⁴t Response) ① S – Adjustable Short Delay Pickup with Adjustable Short Delay Time (I²t or Flat Response) I – Adjustable Instantaneous Pickup G – Adjustable Ground Fault Pickup with Adjustable Ground Fault Time (I²t or Flat Response) A – Adjustable Ground Fault Alarm with Adjustable Ground Fault Time (I²t or Flat Response) OPTIM 1050 ② | | | |
| Three-Pole Ultra High Interrupting Capacity Current Limiting 600 Vac Rated 100 kAIC at 480 Vac | | | | |
| 125 | KDC3125T106W | KDC3125T107W | 70 | ORPK125A70 |
| | | | 90 | ORPK125A90 |
| | | | 100 | ORPK125A100 |
| | | | 110 | ORPK125A110 |
| | | | 125 | ORPK125A125 |
| 250 | KDC3250T106W | KDC3250T107W | 125 | ORPK025A125 |
| | | | 150 | ORPK025A150 |
| | | | 175 | ORPK025A175 |
| | | | 200 | ORPK025A200 |
| | | | 225 | ORPK025A225 |
| 400 | KDC3400T106W | KDC3400T107W | 250 | ORPK025A250 |
| | | | 200 | ORPK40A200 |
| | | | 225 | ORPK40A225 |
| | | | 250 | ORPK40A250 |
| | | | 300 | ORPK40A300 |
| | | | 350 | ORPK40A350 |
| | | | 400 | ORPK40A400 |

Notes

- ① Long delay I⁴t response selection limits short delay time to flat response.
- ② Factory sealed.

100% Rated Digitrip OPTIM 550 Electronic Circuit Breakers with Interchangeable Rating Plug

Order as individual components: breaker frame (which includes trip unit), rating plug, terminals.

100% Rated Digitrip OPTIM 550 Electronic Circuit Breakers with Interchangeable Rating Plug

| Maximum Continuous Ampere Rating at 40 °C | Circuit Breaker Frame Only | | | Digitrip OPTIM Rating Plug Only | |
|---|----------------------------|---------------------|---------------------|---------------------------------|----------------------------------|
| | LSI Catalog Number | LSIG Catalog Number | LSIA Catalog Number | Ampere Rating | Fixed Rating Plug Catalog Number |
| OPTIM 550 ② | | | | | |
| Three-Pole Standard Interrupting Capacity 600 Vac Rated 35 kAIC at 480 Vac | | | | | |
| 125 | CKD3125T52W | CKD3125T56W | CKD3125T57W | 70 | ORPK125A70 |
| | | | | 90 | ORPK125A90 |
| | | | | 100 | ORPK125A100 |
| | | | | 110 | ORPK125A110 |
| | | | | 125 | ORPK125A125 |
| 250 | CKD3250T52W | CKD3250T56W | CKD3250T57W | 125 | ORPK025A125 |
| | | | | 150 | ORPK025A150 |
| | | | | 175 | ORPK025A175 |
| | | | | 200 | ORPK025A200 |
| | | | | 225 | ORPK025A225 |
| | | | | 250 | ORPK025A250 |
| 400 | CKD3400T52W | CKD3400T56W | CKD3400T57W | 200 | ORPK40A200 |
| | | | | 225 | ORPK40A225 |
| | | | | 250 | ORPK40A250 |
| | | | | 300 | ORPK40A300 |
| | | | | 350 | ORPK40A350 |
| | | | | 400 | ORPK40A400 |

Notes

① Long delay I⁴t response selection limits short delay time to flat response.

② Zone interlocking, PowerNet, or both features can be added at the factory by adding suffixes **ZG**, **PN** or **ZGP** respectively to above catalog number (refer to **Page V4-T2-395**).

100% Rated Digitrip OPTIM 550 Electronic Circuit Breakers with Interchangeable Rating Plug, continued

| Maximum Continuous Ampere Rating at 40 °C | Circuit Breaker Frame Only | | | Digitrip OPTIM Rating Plug Only | |
|---|----------------------------|---------------------|---------------------|---------------------------------|----------------------------------|
| | LSI Catalog Number | LSIG Catalog Number | LSIA Catalog Number | Ampere Rating | Fixed Rating Plug Catalog Number |
| L – Adjustable Long Delay Pickup (I_L) with Adjustable Long Delay Time (I^2t or I^4t Response) ^① S – Adjustable Short Delay Pickup with Adjustable Short Delay Time (I^2t or Flat Response) I – Adjustable Instantaneous Pickup G – Adjustable Ground Fault Pickup with Adjustable Ground Fault Time (I^2t or Flat Response) A – Adjustable Ground Fault Alarm with Adjustable Ground Fault Time (I^2t or Flat Response) OPTIM 550 ^② | | | | | |
| Three-Pole High Interrupting Capacity 600 Vac Rated 65 kAIC at 480 Vac | | | | | |
| 125 | CHKD3125T52W | CHKD3125T56W | CHKD3125T57W | 70 | ORPK125A70 |
| | | | | 90 | ORPK125A90 |
| | | | | 100 | ORPK125A100 |
| | | | | 110 | ORPK125A110 |
| | | | | 125 | ORPK125A125 |
| 250 | CHKD3250T52W | CHKD3250T56W | CHKD3250T57W | 125 | ORPK025A125 |
| | | | | 150 | ORPK025A150 |
| | | | | 175 | ORPK025A175 |
| | | | | 200 | ORPK025A200 |
| | | | | 225 | ORPK025A225 |
| 400 | CHKD3400T52W | CHKD3400T56W | CHKD3400T57W | 250 | ORPK025A250 |
| | | | | 200 | ORPK40A200 |
| | | | | 225 | ORPK40A225 |
| | | | | 250 | ORPK40A250 |
| | | | | 300 | ORPK40A300 |
| | | | | 350 | ORPK40A350 |
| | | | | 400 | ORPK40A400 |

Notes

- ① Long delay I^4t response selection limits short delay time to flat response.
- ② Zone interlocking, PowerNet, or both features can be added at the factory by adding suffixes **ZG**, **PN** or **ZGP** respectively to above catalog number.

100% Rated Digitrip OPTIM 1050 Electronic Circuit Breakers with Interchangeable Rating Plug

Order as individual components: breaker frame (which includes trip unit), rating plug, terminals.

100% Rated Digitrip OPTIM 1050 Electronic Circuit Breakers with Interchangeable Rating Plug

| Maximum Continuous Ampere Rating at 40 °C | Circuit Breaker Frame Only | | Digitrip OPTIM Rating Plug Only | |
|---|--|---------------------------|---------------------------------|--|
| | LSIG Catalog Number | LSIA Catalog Number | Ampere Rating | Fixed Rating Plug Catalog Number |
| | L – Adjustable Long Delay Pickup (I_L) with Adjustable Long Delay Time (I^2t or I^4t Response) ^① S – Adjustable Short Delay Pickup with Adjustable Short Delay Time (I^2t or Flat Response) I – Adjustable Instantaneous Pickup G – Adjustable Ground Fault Pickup with Adjustable Ground Fault Time (I^2t or Flat Response) A – Adjustable Ground Fault Alarm with Adjustable Ground Fault Time (I^2t or Flat Response) OPTIM 1050 ^② | | | |
| Three-Pole Standard Interrupting Capacity 600 Vac Rated 35 kAIC at 480 Vac | | | | |
| 125 | CKD3125T106W | CKD3125T107W | 70 | ORPK125A70 |
| | | | 90 | ORPK125A90 |
| | | | 100 | ORPK125A100 |
| | | | 110 | ORPK125A110 |
| | | | 125 | ORPK125A125 |
| 250 | CKD3250T106W | CKD3250T107W | 125 | ORPK025A125 |
| | | | 150 | ORPK025A150 |
| | | | 175 | ORPK025A175 |
| | | | 200 | ORPK025A200 |
| | | | 225 | ORPK025A225 |
| 400 | CKD3400T106W | CKD3400T107W | 250 | ORPK025A250 |
| | | | 200 | ORPK40A200 |
| | | | 225 | ORPK40A225 |
| | | | 250 | ORPK40A250 |
| | | | 300 | ORPK40A300 |
| | | | 350 | ORPK40A350 |
| | | | 400 | ORPK40A400 |

Notes^① Long delay I^4t response selection limits short delay time to flat response.^② Factory sealed.

100% Rated Digitrip OPTIM 1050 Electronic Circuit Breakers with Interchangeable Rating Plug, continued

| Maximum Continuous Ampere Rating at 40 °C | Circuit Breaker Frame Only | | Digitrip OPTIM Rating Plug Only | |
|---|---|---------------------|---------------------------------|----------------------------------|
| | LSIG Catalog Number | LSIA Catalog Number | Ampere Rating | Fixed Rating Plug Catalog Number |
| | OPTIM 1050 ^② L – Adjustable Long Delay Pickup (I_L) with Adjustable Long Delay Time (I^2t or I^4t Response) ^① S – Adjustable Short Delay Pickup with Adjustable Short Delay Time (I^2t or Flat Response) I – Adjustable Instantaneous Pickup G – Adjustable Ground Fault Pickup with Adjustable Ground Fault Time (I^2t or Flat Response) A – Adjustable Ground Fault Alarm with Adjustable Ground Fault Time (I^2t or Flat Response) | | | |
| Three-Pole High Interrupting Capacity 600 Vac Rated 65 kAIC at 480 Vac | | | | |
| 125 | CHKD3125T106W | CHKD3125T107W | 70 | ORPK125A70 |
| | | | 90 | ORPK125A90 |
| | | | 100 | ORPK125A100 |
| | | | 110 | ORPK125A110 |
| | | | 125 | ORPK125A125 |
| 250 | CHKD3250T106W | CHKD3250T107W | 125 | ORPK025A125 |
| | | | 150 | ORPK025A150 |
| | | | 175 | ORPK025A175 |
| | | | 200 | ORPK025A200 |
| | | | 225 | ORPK025A225 |
| | | | 250 | ORPK025A250 |
| 400 | CHKD3400T106W | CHKD3400T107W | 200 | ORPK40A200 |
| | | | 225 | ORPK40A225 |
| | | | 250 | ORPK40A250 |
| | | | 300 | ORPK40A300 |
| | | | 350 | ORPK40A350 |
| | | | 400 | ORPK40A400 |

Notes

- ① Long delay I^4t response selection limits short delay time to flat response.
- ② Factory sealed.

Accessories Selection Guide and Ordering Guide

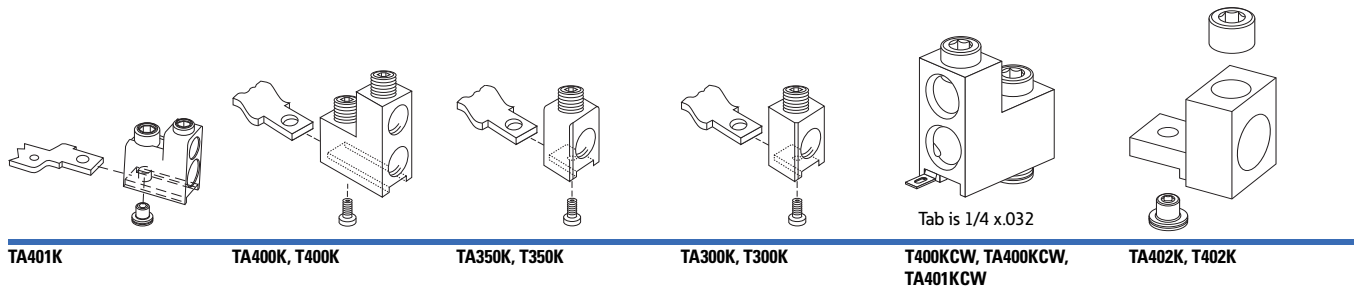
Line and Load Terminals

Eaton’s line and load terminals provide wire connecting capabilities for specific ranges of continuous current ratings and wire types. All terminals comply with Underwriters Laboratories Standards

UL 486A and UL 486B and CSA Standard C22.2 No. 65, or Electrical Bulletin 1165. Unless otherwise specified, K-Frame circuit breaker line and load terminals are shipped separately for field installation.

Ordering Information

K-Frame circuit breakers use Cu/Al terminals as standard. When optional copper or Cu/Al terminals are required, order by catalog number. Specify if factory installation is required.



Line and Load Terminals

| Maximum Breaker Amperes | Terminal Body Material | Wire Type | AWG Wire Range/No. Conductors | Metric Wire Range mm ² | Terminal | Terminals with Control Wire Termination |
|--|------------------------|-----------|----------------------------------|-----------------------------------|-------------------|---|
| | | | | | Catalog Number | Catalog Number |
| Standard Cu/Al Pressure Terminals | | | | | | |
| 225 | Aluminum | Cu/Al | 3–350 (1) | 35–185 | TA300K ① | — |
| 400 | Aluminum | Cu/Al | 250–500 (1) | 120–240 | TA350K ① | — |
| 400 | Aluminum | Cu/Al | 3/0–250 (2) | 95–120 | 2TA400K ②③ | 2TA400KCW ②③ |
| 400 | Aluminum | Cu/Al | 3/0–250 (2) | 95–120 | 3TA400K ②④ | 3TA400KCW ②④ |
| 400 | Aluminum | Cu/Al | 3/0–250 (2) | 95–120 | 4TA400K ⑤⑥ | 4TA400KCW ⑤⑥ |
| Optional Copper and Cu/Al Pressure Type Terminals | | | | | | |
| 225 | Copper | Cu | 3–350 (1) | 35–185 | T300K ① | — |
| 400 | Copper | Cu | 250–500 (1) | 120–240 | T350K ① | — |
| 400 | Copper | Cu | 3/0–250 (2) | 95–120 | 2T400K ③ | 2T400KCW ②③ |
| | | | | | 3T400K ④ | 3T400KCW ②④ |
| | | | | | 4T400K ⑤ | 4T400KCW ⑤⑥ |
| 400 | Aluminum | Cu/Al | 2/0–250 (2) or 2/0–500 (1) | 70–120 | 2TA401K ②③ | 2TA401KCW ②③ |
| | | | | 70–240 | 3TA401K ②④ | 3TA401KCW ②④ |
| | | | | 70–240 | 4TA401K ⑤⑥ | 4TA401KCW ⑤⑥ |
| 400 | Aluminum | Cu/Al | 500–750 (1) | 300–400 | 2TA402K ②③ | — |
| | | | | | 3TA402K ②④ | — |
| | | | | | 4TA402K ⑤⑥ | — |
| 400 | Copper | Cu | 500–750 (1) | — | 2T402K ②③ | — |
| | | | | | 3T402K ②④ | — |
| | | | | | 4T402K ⑤⑥ | — |

Notes

- ① Individually packed.
- ② Terminal kits contain one terminal for each pole and one terminal cover.
- ③ Two-pole kit.
- ④ Three-pole kit.
- ⑤ Four-pole kit.
- ⑥ Terminal kits contain one terminal for each pole and three interphase barriers.

Accessories

Allowable Accessory Combinations

Different combinations of accessories can be supplied, depending on the types of accessories and the number of poles in the circuit breaker.

KD Frame Accessories

| Description | Reference Page | Two-Pole ^① | | Three-Pole | | | Four-Pole | | | Neutral |
|--|----------------|-----------------------|-------|------------|--------|-------|-----------|--------|-------|---------|
| | | Left | Right | Left | Center | Right | Left | Center | Right | |
| Internal Accessories (Only One Internal Accessory Per Pole) | | | | | | | | | | |
| Alarm lockout (Make/Break) | V4-T2-378 | | ■ | □ | | □ | | ■ | | |
| Alarm lockout (2Make/2Break) | V4-T2-378 | | | □ | | □ | | ■ | | |
| Auxiliary switch (1A, 1B) | V4-T2-380 | | ■ | ■ | | ■ | | ■ | | ■ |
| Auxiliary switch (2A, 2B) | V4-T2-380 | | | ■ | | ■ | | ■ | | ■ |
| Auxiliary switch (3A, 3B) | V4-T2-380 | | | ■ | | ■ | | ■ | | ■ |
| Auxiliary switch and alarm switch combination | V4-T2-381 | | | □ | | □ | | □ | | □ |
| Shunt trip—standard ^② | V4-T2-384 | | ■ | ■ | | ■ | | ■ | | ■ |
| Shunt trip—low energy ^② | V4-T2-387 | | | ■ | | ■ | | ■ | | |
| Undervoltage release mechanism ^② | V4-T2-392 | | ■ | ■ | | ■ | | ■ | | |
| PowerNet or zone interlock kit (OPTIM 550) | V4-T2-395 | | | | | ■ | | | | |
| External Accessories | | | | | | | | | | |
| End cap kit | V4-T2-412 | ● | ● | ● | ● | ● | ● | ● | ● | ● |
| Keeper nut | V4-T2-412 | ● | ● | ● | ● | ● | ● | ● | ● | ● |
| Control wire terminal kit | V4-T2-413 | ● | ● | ● | ● | ● | ● | ● | ● | ● |
| Terminal adapter | V4-T2-413 | ● | ● | ● | ● | ● | ● | ● | ● | ● |
| Multiwire connectors | V4-T2-414 | ● | ● | ● | ● | ● | ● | ● | ● | ● |
| Rear fed terminals | V4-T2-414 | ● | ● | ● | ● | ● | ● | ● | ● | ● |
| Base mounting hardware | V4-T2-415 | ● | ● | ● | ● | ● | ● | ● | ● | ● |
| Terminal shields | V4-T2-417 | ● | ● | ● | ● | ● | ● | ● | ● | ● |
| Interphase barriers | V4-T2-417 | ● | ● | ● | ● | ● | ● | ● | ● | ● |
| Non-padlockable handle block | V4-T2-418 | ■ | | | ■ | | | ■ | | |
| Padlockable handle block | V4-T2-418 | | | | ■ | | | | | |
| Padlockable handle lock hasp | V4-T2-419 | | ■ | □ | | □ | | □ | | □ |
| Cylinder lock | V4-T2-419 | □ | □ | □ | | □ | | | | |
| Key Interlock kit | V4-T2-420 | ■ | □ | □ | | □ | | □ | | □ |
| Sliding bar interlock—requires two breakers | V4-T2-421 | | | ● | ● | ● | | | | |
| Walking beam interlock—requires two breakers | V4-T2-421 | | | ● | ● | ● | | ● | ● | ● |
| Electrical (solenoid) operator | V4-T2-422 | | | ● | ● | ● | | ● | ● | ● |
| Plug-in adapters | V4-T2-423 | ● | ● | ● | ● | ● | | ● | ● | ● |
| Rear connecting studs | V4-T2-425 | ● | ● | ● | ● | ● | | ● | ● | ● |
| Panelboard connecting straps | V4-T2-426 | ● | ● | ● | ● | ● | | ● | ● | ● |
| Handle mechanisms | V4-T2-506 | ● | ● | ● | ● | ● | | ● | ● | ● |
| Handle extension | V4-T2-521 | ● | ● | ● | ● | ● | | ● | ● | ● |
| IQ Energy Sentinel | V4-T2-428 | | | ● | ● | ● | | ● | ● | ● |
| Solid-state (electronic) portable test kit | V4-T2-428 | ● | ● | ● | ● | ● | | ● | ● | ● |
| OPTIM System Components Three Poles | | | | | | | | | | |
| Breaker interface module (BIM) | V4-T2-429 | | | | | | | | | |
| Digitrip OPTIMizer | V4-T2-429 | | | | | | | | | |
| Auxiliary power module | V4-T2-429 | | | | | | | | | |
| Modifications (Refer to Eaton) | | | | | | | | | | |
| Special calibration | — | ● | ● | ● | ● | ● | | ● | ● | ● |
| Moisture fungus treatment | V4-T2-218 | ● | ● | ● | ● | ● | | ● | ● | ● |
| Freeze-tested circuit breakers | — | ● | ● | ● | ● | ● | | ● | ● | ● |
| Marine/naval application | — | ● | ● | ● | ● | ● | | ● | ● | ● |

Legend

- Applicable in indicated pole position
- May be mounted on left or right pole—not both
- Accessory available/modification available

Notes

- ① Two-pole breaker supplied in three-pole frame. Current carrying parts omitted from center pole.
- ② Shunt trip and UVR cannot be mounted in right poles on KES or OPTIM trip units. Standard internal accessories cannot be mounted in right pole on any K-Frame OPTIM trip units. Special OPTIM ground fault and zone interlock accessories are available for field installation in the right pole of K-Frame 550 OPTIM trip units. Factory installed 2a/2b and bell/aux are available for factory installation. K-Frame breakers equipped with OPTIM 1050 trip units include aux-bell alarm in the right pole.

310+ Electronic Trip Unit Accessories

| Description | Catalog Number |
|--|--------------------------|
| Electronic portable test kit | MTST230V ^② |
| Trip unit tamper protection wire seal | 5108A03H01 |
| External neutral sensor, 400 A | LGFACT400 ^③ |
| External neutral sensor, 250 A | LGFACT250 ^③ |
| External neutral sensor, 125 A | LGFACT125 ^③ |
| Breaker-mount cause-of-trip indication | TRIP-LED |
| Breaker-mount ammeter module | DIGIVIEW |
| Remote-mount ammeter module | DIGIVIEWR06 ^④ |

Technical Data and Specifications

NEMA/UL 489/CSA Interrupting Capacity Ratings

| Circuit Breaker Type | Number of Poles | Interrupting Capacity (kA Symmetrical Amperes) | | | | | Volts DC 250 ^{⑤⑥} |
|----------------------|-----------------|--|-----|-----|-----|----|----------------------------|
| | | Volts AC (50/60 Hz) | | | | | |
| | | 240 | 277 | 480 | 600 | | |
| DK | 2, 3 | 65 | — | — | — | 10 | |
| KDB | 2, 3, 4 | 65 | — | 35 | 25 | 10 | |
| KD | 2, 3, 4 | 65 | — | 35 | 25 | 10 | |
| HKD, HKDB | 2, 3, 4 | 100 | — | 65 | 35 | 22 | |
| KDC ^⑦ | 2, 3, 4 | 200 | — | 100 | 65 | 22 | |
| CKD | 3 | 65 | — | 35 | 25 | — | |
| CHKD | 3 | 100 | — | 65 | 35 | — | |

IEC 157-1 (P1) Interrupting Capacity Ratings

| Circuit Breaker Type | Number of Poles | Interrupting Capacity (kA Symmetrical Amperes) | | | | | Volts DC 250 ^{⑤⑥} |
|----------------------|-----------------|--|-----|-----|-----|-----|----------------------------|
| | | Volts AC (50/60 Hz) | | | | | |
| | | 240 | 380 | 415 | 440 | 500 | |
| DK | 2, 3 | 65 | — | — | — | 10 | |
| KDB | 2, 3, 4 | 65 | 40 | 40 | — | 10 | |
| KD | 2, 3, 4 | 65 | 40 | 40 | — | 10 | |
| HKD, HKDB | 2, 3, 4 | 100 | 65 | 65 | — | 22 | |
| KDC | 2, 3, 4 | 200 | 100 | 100 | — | 22 | |

UL 489 Current Limiting Data

| Frame | Circuit | I _p (kA) | I ² T (10 ⁶ A ² S) |
|-------|--------------|---------------------|---|
| KDC | 240 V/200 kA | 56.00 | 2.30 |
| KDC | 480 V/100 kA | 53.30 | 5.60 |
| KDC | 600 V/50 kA | 43.40 | 5.40 |

Notes

- ① Two-pole breaker supplied in three-pole frame. Current carrying parts omitted from center pole.
- ② MTST230V applies to 100–230 Vac.
- ③ Included with all LD LSG and LSIG trip units and breakers.
- ④ Includes 6 ft cable for remote mounting; NEMA 3R rated.
- ⑤ Two-pole circuit breaker or two outside poles of three-pole circuit breaker.
- ⑥ Time constant is 3 milliseconds minimum at 10 kA and 8 milliseconds minimum at 22 kA.
- ⑦ Current limiting.

310+ Specifications

| Trip Unit Type | Digitrip RMS 310+ |
|---|---------------------------------|
| Breaker Type | |
| Frame | K |
| Frames available | 125 A, 250 A, 400 A |
| Continuous current range (A) | 55–400 A |
| Ground fault pickup (A) | 50–400 A |
| Interrupting capacities at 480 Vac (kAIC) | 35, 65, 100 |
| 100% rated | Yes |
| Protection | |
| Ordering options | LS, LSI, LSG, LSIG, ALSI, ALSIG |
| Arcflash Reduction Maintenance System | Remote enabled on ALSI, ALSIG |
| Interchangeable trip unit | Yes |
| High load alarm, trip (suffix B20) ① | Yes |
| Ground fault alarm with trip (suffix B21) ① | LSG, LSIG, ALSIG |
| Ground fault alarm, no trip (suffix B22) | LSG, LSIG, ALSIG |
| Zone selective interlock (suffix ZG) ① | LSI, LSIG, ALSI, ALSIG |
| Cause of trip indication | Yes (via TRIP-LED or DIGVIEW) |
| Thru-cover accessories | No |

310+ Adjustability Specifications

| 310+ Settings | K-Frame | | | |
|---|--------------------------------------|---------|-------|------|
| | 125A | 250 A | 400 A | |
| $I_r \setminus I_n$ | | | | |
| $I_r =$ continuous current or long delay pickup (amperes) (All 310+) | A (=I _r) | 55 | 100 | 160 |
| | B (=I _r) | 60 | 125 | 200 |
| | C (=I _r) | 70 | 150 | 225 |
| | D (=I _r) | 80 | 160 | 250 |
| | E (=I _r) | 90 | 175 | 300 |
| | F (=I _r) | 100 | 200 | 315 |
| | G (=I _r) | 110 | 225 | 350 |
| | H (=I _r =I _n) | 125 | 250 | 400 |
| $t_r =$ long delay time (seconds) (All 310+) | 2 | 2 | 2 | 2 |
| | 4 | 4 | 4 | 4 |
| | 7 | 7 | 7 | 7 |
| | 10 | 10 | 10 | 10 |
| | 12 | 12 | 12 | 12 |
| | 15 | 15 | 15 | 15 |
| | 20 | 20 | 20 | 20 |
| | 24 | 24 | 24 | 24 |
| $I_{sd} (x I_r) =$ short delay pickup (amperes) (All 310+) | Position 1 | 2 | 2x | 2x |
| | Position 2 | 3 | 3x | 3x |
| | Position 3 | 4 | 4x | 4x |
| | Position 4 | 5 | 5x | 5x |
| | Position 5 | 6 | 6x | 6x |
| | Position 6 | 7 | 7x | 7x |
| | Position 7 | 8 | 8x | 8x |
| | Position 8 | 10 | 10x | 10x |
| | Position 9 | 12 | 12x | 12x |
| $t_{sd} =$ short delay time I ² t (milliseconds) (LS and LSG) | Fixed | 67 @10x | | |
| $t_{sd} =$ short delay time flat (milliseconds) (LSI, LSIG, ALSI, ALSIG) | Position 1 | Inst | | |
| | Position 2 | 120 | | |
| | Position 3 | 300 | | |
| $I_g (x I_n) =$ ground fault pickup (amperes) (LSG, LSIG, ALSIG) | Position 1 | 25 | 50 | 80 |
| | Position 2 | 37.5 | 75 | 120 |
| | Position 3 | 50 | 100 | 160 |
| | Position 4 | 75 | 150 | 240 |
| | Position 5 | 100 | 200 | 320 |
| | Position 6 | 125 | 250 | 400 |
| $t_g =$ ground fault delay time (milliseconds) (LSG, LSIG, ALSIG) | Position 1 | Inst | | |
| | Position 2 | 120 | | |
| | Position 3 | 300 | | |
| Independently adjustable Instantaneous (I _i) setting ② | | | | |
| Maintenance Mode pickup (2.5 x I _n) (amperes) (310+ with Maintenance Mode—ALSI and ALSIG) | Fixed | 312 | 625 | 1000 |

Notes

① B2x suffixes cannot be combined with B2x suffixes.

② Not available for KD. Independently adjustable I_i setting available in LG, NG and RG ALSI and ALSIG trip units.

Specifications

| Trip Unit Type | Digitrip OPTIM 550 | Digitrip OPTIM 1050 |
|--|--------------------------|--------------------------|
| rms sensing | Yes | Yes |
| Breaker Type | | |
| Frame | K | K |
| Ampere range | 125–400 A | 125–400 A |
| Interrupting rating at 480 volts | 35, 65, 100 (kA) | 35, 65, 100 (kA) |
| Protection | | |
| Ordering options | LSI, LSI(A), LSIG | LSI(A), LSIG |
| Fixed rated plug (I_n) | Yes | Yes |
| Overtemperature trip | Yes | Yes |
| Long Delay Protection (L) | | |
| Adjustable rating plug (I_n) | No | No |
| Long delay pickup | 0.4–1.0 x (I_n) | 0.4–1.0 x (I_n) |
| Long delay time I^2t | 2–24 seconds | 2–24 seconds |
| Long delay time I^4t | 1–5 seconds | 1–5 seconds |
| Long delay thermal memory | Yes | Yes |
| High load alarm | 0.5–1.0 x I_r | 0.5–1.0 x I_r |
| Short Delay Protection (S) | | |
| Short delay pickup | 150–800% x (I_r) | 150–800% x (I_r) |
| Short delay time I^2t | 100–500 ms | 100–500 ms |
| Short delay time flat | 100–500 ms | 100–500 ms |
| Short delay time zone selective interlocking | Yes ^① | Yes |
| Instantaneous Protection (I) | | |
| Instantaneous pickup | 200–800% x (I_n) | 200–800% x (I_n) |
| Discriminator | Yes | Yes |
| Instantaneous override | Yes | Yes |
| Ground Fault Protection (G) | | |
| Ground fault alarm | 20–100% x (I_g) | 20–100% x (I_g) |
| Ground fault pickup | 20–100% x (I_g) | 20–100% x (I_g) |
| Ground fault delay I^2t | 100–500 ms | 100–500 ms |
| Ground fault delay flat | 100–500 ms | 100–500 ms |
| Ground fault zone selective interlocking | Yes ^① | Yes |
| Ground fault thermal memory | Yes | Yes |
| System Diagnostics | | |
| Status LEDs | Yes | Yes |
| Cause of trip LEDs | Yes | Yes |
| Magnitude of trip information | Yes | Yes |
| Remote signal contact—ground alarm | Yes ^① | Yes |
| Local auxiliary and bell alarm contact | Optional | Included |
| System Monitoring | | |
| Digital display | Yes ^② | Yes ^② |
| Current | Yes | Yes |
| Power and energy | No | Yes |
| Power quality—harmonics | No | Yes |
| Power factor | No | Yes |
| Communications | | |
| PowerNet | Yes ^③ | Yes |
| Testing | | |
| Testing method | OPTIMizer, BIM, PowerNet | OPTIMizer, BIM, PowerNet |

Legend

BIM = Breaker Interface Module
(A) = GF Alarm
 I_g = Sensor Rating
 I_n = Rating Plug
 I_r = Long Delay Pickup Setting

Notes

- ① Zone interlock kit.
- ② By OPTIMizer/BIM.
- ③ Eaton's PowerNet kit.

2.4

Molded Case Circuit Breakers

Series C

Dimensions and Weights

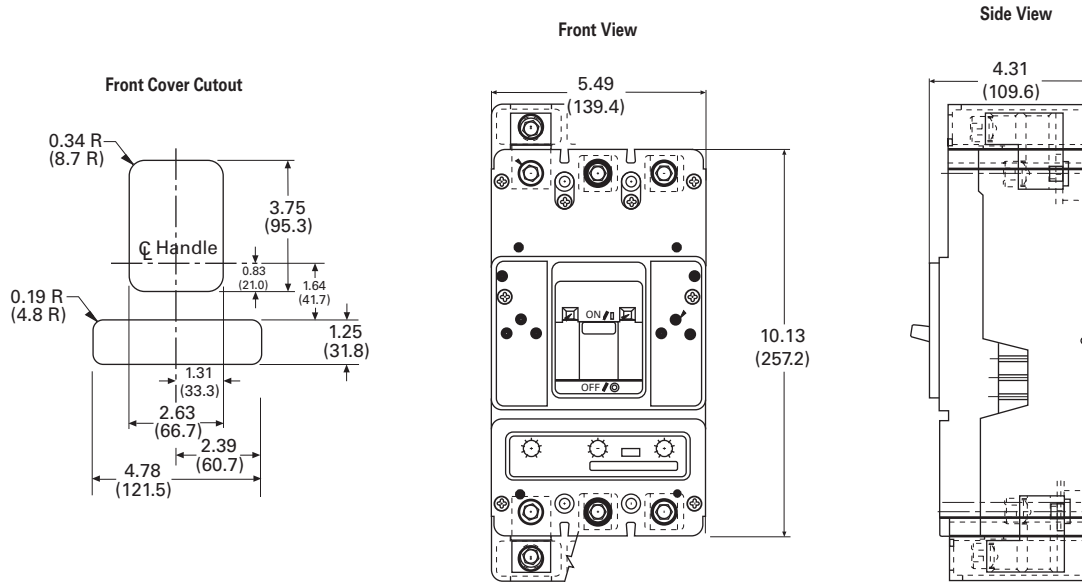
Approximate Dimensions in Inches (mm)

2

KD Frame

| Number of Poles | Width | Height | Depth |
|-----------------|--------------|---------------|--------------|
| 2, 3 | 5.50 (149.7) | 10.13 (257.3) | 4.10 (104.1) |
| 4 | 7.22 (183.4) | 10.13 (257.3) | 4.10 (104.1) |

KD-Frame, Two- and Three-Pole



Approximate Shipping Weight, Lbs (kg)

KD Frame

| Breaker Type | Complete Breaker | | Frame Only | | Trip Unit ① | |
|--------------|------------------|------------|------------|------------|-------------|------------|
| | Two-Pole | Three-Pole | Two-Pole | Three-Pole | Two-Pole | Three-Pole |
| DK | 10.0 (4.5) | 11.5 (5.2) | — | — | — | — |
| KDB | 10.0 (4.5) | 11.5 (5.2) | — | — | — | — |
| KD | 10.0 (4.5) | 11.5 (5.2) | 7.5 (3.4) | 8.5 (3.9) | 1.5 (0.7) | 1.5 (0.7) |
| HKD, HKDB | 10.0 (4.5) | 11.5 (5.2) | 7.5 (3.4) | 8.5 (3.9) | 1.5 (0.7) | 1.5 (0.7) |
| KDC | 10.0 (4.5) | 11.5 (5.2) | 7.5 (3.4) | 8.5 (3.9) | 1.5 (0.7) | 1.5 (0.7) |

Note

① Weights shown are for thermal-magnetic trip units. Three-pole electronic trip units weigh 2.5 lbs (1.1 kg).

Typical L-Frame Circuit Breaker



Contents

Description

| | <i>Page</i> |
|--|------------------|
| Product Overview | V4-T2-218 |
| Standards and Certifications | V4-T2-219 |
| Quick Reference | V4-T2-220 |
| G-Frame (15–100 Amperes) | V4-T2-223 |
| F-Frame (10–225 Amperes) | V4-T2-237 |
| J-Frame (70–250 Amperes) | V4-T2-255 |
| K-Frame (70–400 Amperes) | V4-T2-263 |
| L-Frame (125–600 Amperes) | |
| Catalog Number Selection | V4-T2-288 |
| Product Selection | V4-T2-290 |
| Accessories | V4-T2-306 |
| Technical Data and Specifications | V4-T2-308 |
| Dimensions and Weights | V4-T2-312 |
| M-Frame (300–800 Amperes) | V4-T2-313 |
| N-Frame (400–1200 Amperes) | V4-T2-324 |
| R-Frame (800–2500 Amperes) | V4-T2-339 |
| Motor Circuit Protectors (MCP) | V4-T2-358 |
| Motor Protection Circuit Breakers (MPCB) | V4-T2-369 |
| Type ELC Current Limiter Attachment (Size 0–4) | V4-T2-371 |
| Current Limiting Circuit Breaker Module | V4-T2-372 |
| Internal Accessories | V4-T2-375 |
| External Accessories | V4-T2-408 |

L-Frame (125–600 Amperes)

Product Description

- All Eaton L-Frame circuit breakers are HACR rated
- L-Frame circuit breakers are available as individual components (frame, trip unit, terminals), or factory assembled complete breakers
- L-Frame circuit breakers with non-interchangeable trip units are suitable for reverse feed use

Standards and Certifications

- CE marked

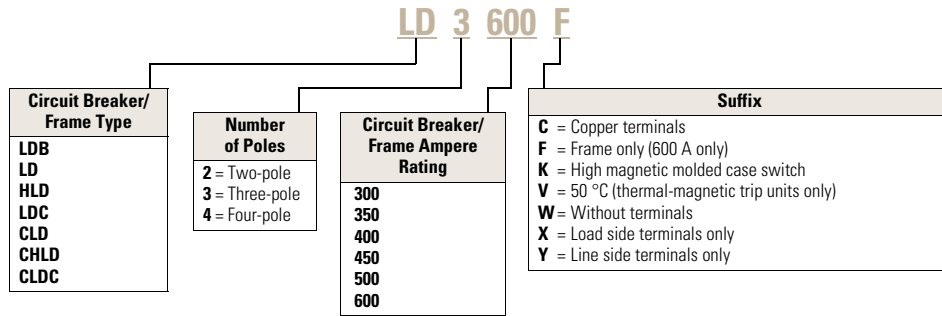


Catalog Number Selection

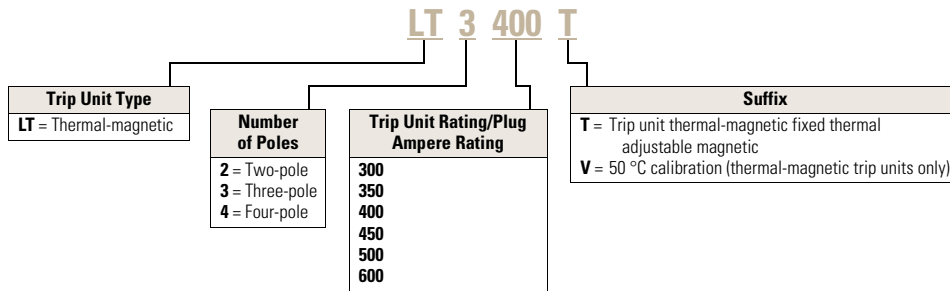
This information is presented only as an aid to understanding catalog numbers. It is not to be used to build catalog numbers for circuit breakers or trip units.

LD-Frame with Thermal-Magnetic Trip Unit Technology

Thermal-Magnetic Breakers and Frame ①



Thermal-Magnetic Trip Unit ①

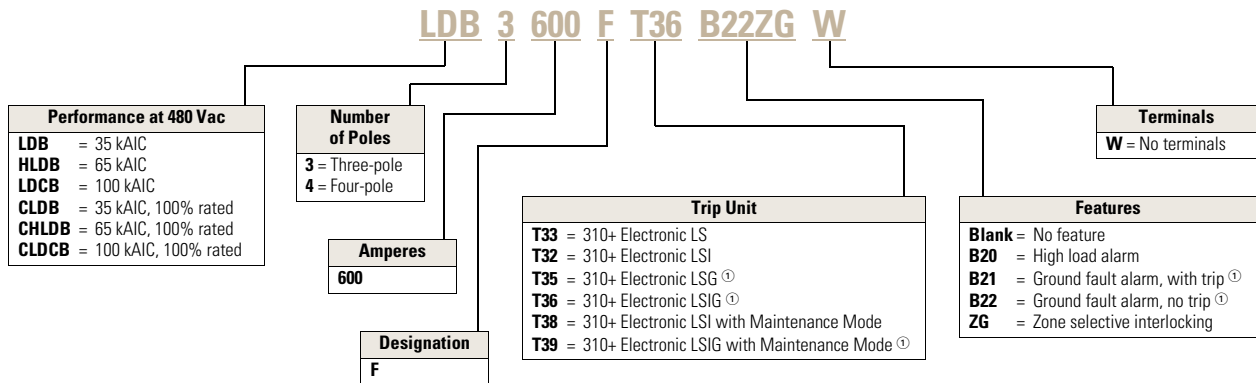


Note

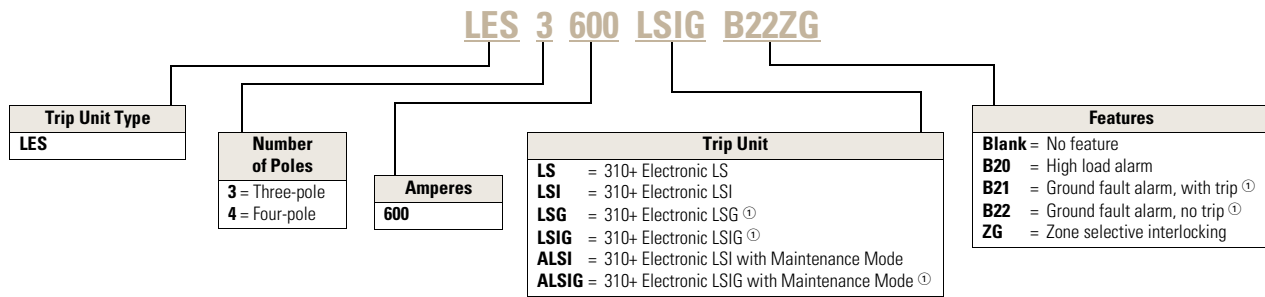
① Frames are the same for thermal-magnetic or 310+ electronic trip units, e.g., **LD3600F**, **HLD3600F**, etc.

LD-Frame with 310+ Electronic Trip Unit Technology

310+ Circuit Breakers

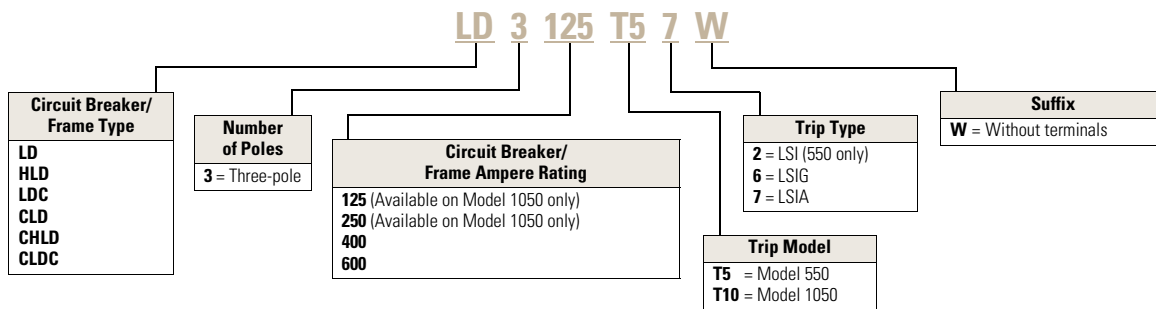


310+ Electronic Trip Units ②



LD-Frame with OPTIM Electronic Trip Unit Technology

OPTIM Circuit Breakers



Notes

- ① Not available in four-pole configurations.
- ② Frames are the same for thermal-magnetic or 310+ electronic trip units, e.g., **LD3600F**, **HLD3600F**, etc.

Product Selection

2

Types LD, HLD and LDC Thermal-Magnetic Circuit Breakers with Interchangeable Trip Units

| Maximum Continuous Ampere Rating at 40 °C ① | Standard Interrupting Capacity 600 Vac Rated 35 kAIC at 480 Vac | High Interrupting Capacity 600 Vac Rated 65 kAIC at 480 Vac | Ultra High Interrupting Capacity Current Limiting 600 Vac Rated 100 kAIC at 480 Vac | Thermal-Magnetic Trip Unit Only | Standard Terminals Only |
|---|--|--|---|---|---|
| | Factory Assembled Circuit Consisting of Frame, Trip Unit and Terminals Catalog Number | Factory Assembled Circuit Consisting of Frame, Trip Unit and Terminals Catalog Number | Factory Assembled Circuit Consisting of Frame, Trip Unit and Terminals Catalog Number | For Use with Standard or High or Ultra High Interrupting Frames Catalog Number | See Page V4-T2-305 for Optional Terminals Catalog Number |
| Two-Pole | | | | | |
| 300 | LD2300 | HLD2300 | LDC2300 | LT2300T | TA602LD ② |
| 350 | LD2350 | HLD2350 | LDC2350 | LT2350T | TA602LD ② |
| 400 | LD2400 | HLD2400 | LDC2400 | LT2400T | TA602LD ② |
| 450 | LD2450 | HLD2450 | LDC2450 | LT2450T | TA602LD ② |
| 500 | LD2500 | HLD2500 | LDC2500 | LT2500T | TA602LD ② |
| 600 | LD2600 | HLD2600 | LDC2600 | LT2600T | 2TA603LDK ③ |
| Three-Pole | | | | | |
| 300 | LD3300 | HLD3300 | LDC3300 | LT3300T | TA602LD ② |
| 350 | LD3350 | HLD3350 | LDC3350 | LT3350T | TA602LD ② |
| 400 | LD3400 | HLD3400 | LDC3400 | LT3400T | TA602LD ② |
| 450 | LD3450 | HLD3450 | LDC3450 | LT3450T | TA602LD ② |
| 500 | LD3500 | HLD3500 | LDC3500 | LT3500T | TA602LD ② |
| 600 | LD3600 | HLD3600 | LDC3600 | LT3600T | 3TA603LDK ③ |
| Four-Pole ④ | | | | | |
| 300 | LD4300 | HLD4300 | LDC4300 | LT4300T | TA602LD ② |
| 350 | LD4350 | HLD4350 | LDC4350 | LT4350T | TA602LD ② |
| 400 | LD4400 | HLD4400 | LDC4400 | LT4400T | TA602LD ② |
| 450 | LD4450 | HLD4450 | LDC4450 | LT4450T | TA602LD ② |
| 500 | LD4500 | HLD4500 | LDC4500 | LT4500T | TA602LD ② |
| 600 | LD4600 | HLD4600 | LDC4600 | LT4600T | 4TA603LDK ③ |

Types LD, HLD and LDC Thermal-Magnetic Circuit Breakers—Frame Only

| Standard Interrupting Capacity 600 Vac Rated 35 kAIC at 480 Vac Catalog Number | High Interrupting Capacity 600 Vac Rated 65 kAIC at 480 Vac Catalog Number | Ultra High Interrupting Capacity Current Limiting 600 Vac Rated 100 kAIC at 480 Vac Catalog Number |
|--|---|---|
| Two-Pole | | |
| LD2600F | HLD2600F | LDC2600F |
| Three-Pole | | |
| LD3600F | HLD3600F | LDC3600F |
| Four-Pole | | |
| LD4600F | HLD4600F | LDC4600F |

Notes

- ① Magnetic trip range 5–10 times continuous ampere rating.
- ② Individually packed.
- ③ Terminal kits contain one terminal for each pole and one terminal cover.
- ④ Neutral is in right pole.

Types LD, HLD and LDC Electronic Circuit Breakers with Interchangeable Trip Units

Order as individual components: breaker frame, trip unit and terminals. See 310+ adjustability specifications on **Page V4-T2-284**.

Types LD, HLD and LDC Electronic Circuit Breakers with Interchangeable 310+ Trip Units

| Maximum Continuous Ampere Rating at 40 °C | Circuit Breaker Frame Only | | | Digitrip RMS 310+ Trip Unit Only ① | | | | Neutral CT for LSG and LSI ②③ | Terminal Information |
|---|---|---|--|--|--|--|--|-------------------------------|----------------------|
| | Standard Interrupting Capacity 600 Vac Rated 35 kAIC at 480 Vac | High Interrupting Capacity 600 Vac Rated 65 kAIC at 480 Vac | Ultra High Interrupting Capacity Current Limiting 600 Vac Rated 100 kAIC at 480 Vac | Standard LS | Optional LSI | LSG | LSIG | | |
| | Adjustable Short Time Pickup with I ² t Short Delay Ramp | Independently Adjustable Short Time Pickup and Delay | Adjustable Short Time Pickup with I ² t Short Delay and Ground Fault Protection | Adjustable Short Time Pickup with I ² t Short Delay | Independently Adjustable Short Time Pickup and Ground Fault Protection | Adjustable Short Time Pickup with I ² t Short Delay and Ground Fault Protection | Independently Adjustable Short Time Pickup and Ground Fault Protection | | |
| | Catalog Number | Catalog Number | Catalog Number | Catalog Number | Catalog Number | Catalog Number | Catalog Number | Catalog Number | Catalog Number |
| Three-Pole | | | | | | | | | |
| 600 | LD3600F | HLD3600F | LDC3600F | LES3600LS | LES3600LSI | LES3600LSG | LES3600LSIG | LGFACT600 | See Page V4-T2-282 |
| Four-Pole ④ | | | | | | | | | |
| 600 | LD4600F | HLD4600F | LDC4600F | LES4600LS | LES4600LSI | — | — | — | See Page V4-T2-282 |

Types LDB, HLDB and LDCB Electronic Circuit Breakers with Non-Interchangeable 310+ Electronic Trip Units Suitable for Reverse Feed

See 310+ adjustability specifications on **Page V4-T2-284**.

Circuit Breaker Frame Including Digitrip RMS 310+ Electronic Trip Unit Less Terminals
Types LDB, HLDB and LDCB with Digitrip 310+ Non-Interchangeable Trip Units

| Maximum Continuous Ampere Rating at 40 °C | Number of Poles | Factory Assembled Circuit Breaker Consisting of Frame and Trip Unit Less Terminals ① | | | | Neutral CT for LSG and LSI ②③ | Terminal Information |
|---|-----------------|--|--|--|--|-------------------------------|----------------------|
| | | Standard LS | Optional LSI | LSG | LSIG | | |
| | | Adjustable Short Time Pickup with I ² t Short Delay Ramp | Independently Adjustable Short Time Pickup and Delay | Adjustable Short Time Pickup with I ² t Short Delay and Ground Fault Protection | Independently Adjustable Short Time Pickup and Ground Fault Protection | | |
| | | Catalog Number | Catalog Number | Catalog Number | Catalog Number | Catalog Number | Catalog Number |
| 600 | 3 | LDB3600FT33W | LDB3600FT32W | LDB3600FT35W | LDB3600FT36W | LGFACT600 | See Page V4-T2-282 |
| 600 | 3 | HLDB3600FT33W | HLDB3600FT32W | HLDB3600FT35W | HLDB3600FT36W | | |
| 600 | 3 | LDCB3600FT33W | LDCB3600FT32W | LDCB3600FT35W | LDCB3600FT36W | | |

100% Rated Types CLD, CHLD and CLDC Electronic Circuit Breakers with Interchangeable Trip Units

The NEC allows the breaker to be rated at 100% of its frame size in an assembly, provided that 90 °C wire is applied at the 75 °C ampacity. All 100% rated circuit breakers have electronic trip units. Order as individual components: breaker frame, trip unit and terminals. See 310+ adjustability specifications on **Page V4-T2-284**.

100% Rated Types CLD, CHLD and CLDC Electronic Circuit Breakers with 310+ Interchangeable Trip Units

| Maximum Continuous Ampere Rating at 40 °C | Circuit Breaker Frame Only | | | Digitrip RMS 310+ Trip Unit Only | | | | Neutral CT for LSG and LSI ②③ | Terminal Information |
|---|---|---|--|--|--|--|--|-------------------------------|----------------------|
| | Standard Interrupting Capacity 600 Vac Rated 35 kAIC at 480 Vac | High Interrupting Capacity 600 Vac Rated 65 kAIC at 480 Vac | Ultra High Interrupting Capacity Current Limiting 600 Vac Rated 100 kAIC at 480 Vac | Standard LS | Optional LSI | LSG | LSIG | | |
| | Adjustable Short Time Pickup with I ² t Short Delay Ramp | Independently Adjustable Short Time Pickup and Delay | Adjustable Short Time Pickup with I ² t Short Delay and Ground Fault Protection | Adjustable Short Time Pickup with I ² t Short Delay | Independently Adjustable Short Time Pickup and Delay | Adjustable Short Time Pickup with I ² t Short Delay and Ground Fault Protection | Independently Adjustable Short Time Pickup and Ground Fault Protection | | |
| | Catalog Number | Catalog Number | Catalog Number | Catalog Number | Catalog Number | Catalog Number | Catalog Number | Catalog Number | Catalog Number |
| Three-Pole | | | | | | | | | |
| 600 | CLD3600F | CHLD3600F | CLDC3600F | LES3600LS | LES3600LSI | LES3600LSG | LES3600LSIG | LGFACT600 | See Page V4-T2-282 |

Notes

- ① For AC use only.
- ② Required for four-wire systems if neutral protection is desired.
- ③ Included with LSG and LSI trip units.
- ④ Neutral is in right pole.

Type LDB Thermal-Magnetic Circuit Breakers with Non-Interchangeable Trip Units ^①

| Maximum Continuous Ampere Rating | 600 Vac Rated, 250 Vdc Complete Circuit Breaker | |
|----------------------------------|---|--|
| | Without Line and Load Terminals Catalog Number | With Standard Line and Load Terminals Only Catalog Number |
| Two-Pole | | |
| 300 | LDB2300W | LDB2300 |
| 350 | LDB2350W | LDB2350 |
| 400 | LDB2400W | LDB2400 |
| 450 | LDB2450W | LDB2450 |
| 500 | LDB2500W | LDB2500 |
| 600 | LDB2600W | LDB2600 |
| Three-Pole | | |
| 300 | LDB3300W | LDB3300 |
| 350 | LDB3350W | LDB3350 |
| 400 | LDB3400W | LDB3400 |
| 450 | LDB3450W | LDB3450 |
| 500 | LDB3500W | LDB3500 |
| 600 | LDB3600W | LDB3600 |

Molded Case Switches

Eaton's molded case switches are used as compact switches in applications requiring high current switching capabilities. Molded case switches are constructed of circuit breaker

components and are of the high instantaneous automatic type. Molded case switches are listed in accordance with Underwriters Laboratories Standard UL 489.

Molded Case Switches

| Maximum Continuous Ampere Rating at 40 °C | 600 Vac Maximum, 250 Vdc Circuit Breaker Only without Line and Load Terminals | |
|---|---|--|
| | Catalog Number | Standard Terminals Only See Page V4-T2-305 for Optional Terminals Catalog Number |
| Two-Pole | | |
| 600 | LD2600WK | 2TA603LDK |
| 600 | LDB2600WK ^① | 2TA603LDK |
| 600 | HLD2600WK | 2TA603LDK |
| Three-Pole | | |
| 600 | LD3600WK | 3TA603LDK |
| 600 | LDB3600WK ^① | 3TA603LDK |
| 600 | HLD3600WK | 3TA603LDK |
| Four-Pole | | |
| 600 | LD4600WK | 4TA603LDK |
| 600 | LDB4600WK ^① | 4TA603LDK |
| 600 | HLD4600WK | 4TA603LDK |

Notes

^① Factory sealed—suitable for reverse feed application.

Molded case switch will trip above 6000 amperes.

Digitrip OPTIM Electronic Circuit Breaker with Interchangeable Rating Plug

Order as individual components: Breaker Frame (which includes Trip Unit), Rating Plug, Terminals.

Digitrip OPTIM 550 Electronic Circuit Breaker with Interchangeable Rating Plug

| Maximum Continuous Ampere Rating at 40 °C | Circuit Breaker Frame Only | | | Digitrip OPTIM Rating Plug Only | |
|---|----------------------------|---------------------------|---------------------------|---------------------------------|--|
| | LSI Catalog Number | LSIG Catalog Number | LSIA Catalog Number | Ampere Rating | Fixed Rating Plug Catalog Number |
| Three-Pole Standard Interrupting Capacity 600 Vac Rated 35 kAIC at 480 Vac | | | | | |
| 125 | LD3125T52W | LD3125T56W | LD3125T57W | — | ORPL125A070 |
| | | | | — | ORPL125A090 |
| | | | | — | ORPL125A100 |
| | | | | — | ORPL125A110 |
| | | | | — | ORPL125A125 |
| 250 | LD3250T52W | LD3250T56W | LD3250T57W | — | ORPL025A125 |
| | | | | — | ORPL025A150 |
| | | | | — | ORPL025A175 |
| | | | | — | ORPL025A200 |
| | | | | — | ORPL025A225 |
| 400 | LD3400T52W | LD3400T56W | LD3400T57W | 200 | ORPL40A200 |
| | | | | 225 | ORPL40A225 |
| | | | | 250 | ORPL40A250 |
| | | | | 300 | ORPL40A300 |
| | | | | 350 | ORPL40A350 |
| 600 | LD3600T52W | LD3600T56W | LD3600T57W | 400 | ORPL40A400 |
| | | | | 300 | ORPL60A300 |
| | | | | 350 | ORPL60A350 |
| | | | | 400 | ORPL60A400 |
| | | | | 500 | ORPL60A500 |
| 600 | ORPL60A600 | | | | |

Notes① Long delay I⁴t response selection limits short delay time to flat response.② Zone interlocking, PowerNet, or both features can be added at the factory by adding suffixes **ZG**, **PN** or **ZGP** respectively to above catalog number.

Digitrip OPTIM 550 Electronic Circuit Breaker with Interchangeable Rating Plug, continued

| Maximum Continuous Ampere Rating at 40 °C | Circuit Breaker Frame Only | | | Digitrip OPTIM Rating Plug Only | |
|---|---|---------------------|---------------------|---------------------------------|----------------------------------|
| | LSI Catalog Number | LSIG Catalog Number | LSIA Catalog Number | Ampere Rating | Fixed Rating Plug Catalog Number |
| | L – Adjustable Long Delay Pickup (I ₁) with Adjustable Long Delay Time (I ² t or I ⁴ t Response) ^① S – Adjustable Short Delay Pickup with Adjustable Short Delay Time (I ² t or Flat Response) I – Adjustable Instantaneous Pickup G – Adjustable Ground Fault Pickup with Adjustable Ground Fault Time (I ² t or Flat Response) A – Adjustable Ground Fault Alarm with Adjustable Ground Fault Time (I ² t or Flat Response) OPTIM 550 ^② | | | | |
| Three-Pole High Interrupting Capacity 600 Vac Rated 65 kAIC at 480 Vac | | | | | |
| 125 | HLD3125T52W | HLD3125T56W | HLD3125T57W | 70 | ORPL125A070 |
| | | | | 90 | ORPL125A090 |
| | | | | 100 | ORPL125A100 |
| | | | | 110 | ORPL125A110 |
| | | | | 125 | ORPL125A125 |
| 250 | HLD3250T52W | HLD3250T56W | HLD3250T57W | 125 | ORPL025A125 |
| | | | | 150 | ORPL025A150 |
| | | | | 175 | ORPL025A175 |
| | | | | 200 | ORPL025A200 |
| | | | | 225 | ORPL025A225 |
| 400 | HLD3400T52W | HLD3400T56W | HLD3400T57W | 250 | ORPL025A250 |
| | | | | 200 | ORPL40A200 |
| | | | | 225 | ORPL40A225 |
| | | | | 250 | ORPL40A250 |
| | | | | 300 | ORPL40A300 |
| 600 | HLD3600T52W | HLD3600T56W | HLD3600T57W | 350 | ORPL40A350 |
| | | | | 400 | ORPL40A400 |
| | | | | 300 | ORPL60A300 |
| | | | | 350 | ORPL60A350 |
| | | | | 400 | ORPL60A400 |
| | | | | 500 | ORPL60A500 |
| | | | | 600 | ORPL60A600 |

Notes

① Long delay I⁴t response selection limits short delay time to flat response.

② Zone interlocking, PowerNet, or both features can be added at the factory by adding suffixes **ZG**, **PN** or **ZGP** respectively to above catalog number.

Digitrip OPTIM 550 Electronic Circuit Breaker with Interchangeable Rating Plug, continued

| Maximum Continuous Ampere Rating at 40 °C | Circuit Breaker Frame Only | | | Digitrip OPTIM Rating Plug Only | |
|---|---|---------------------------|---------------------------|---------------------------------|--|
| | LSI Catalog Number | LSIG Catalog Number | LSIA Catalog Number | Ampere Rating | Fixed Rating Plug Catalog Number |
| | L – Adjustable Long Delay Pickup (I_t) with Adjustable Long Delay Time (I^2t or I^4t Response) ^① S – Adjustable Short Delay Pickup with Adjustable Short Delay Time (I^2t or Flat Response) I – Adjustable Instantaneous Pickup G – Adjustable Ground Fault Pickup with Adjustable Ground Fault Time (I^2t or Flat Response) A – Adjustable Ground Fault Alarm with Adjustable Ground Fault Time (I^2t or Flat Response) | | | | |
| | OPTIM 550 ^② | | | | |
| Three-Pole Ultra High Interrupting Capacity Current Limiting 600 Vac Rated 100 kAIC at 480 Vac | | | | | |
| 125 | LDC3125T52W | LDC3125T56W | LDC3125T57W | — | ORPL125A070 |
| | | | | — | ORPL125A090 |
| | | | | — | ORPL125A100 |
| | | | | — | ORPL125A110 |
| | | | | — | ORPL125A125 |
| 250 | LDC3250T52W | LDC3250T56W | LDC3250T57W | — | ORPL025A125 |
| | | | | — | ORPL025A150 |
| | | | | — | ORPL025A175 |
| | | | | — | ORPL025A200 |
| | | | | — | ORPL025A225 |
| 400 | LDC3400T52W | LDC3400T56W | LDC3400T57W | 200 | ORPL40A200 |
| | | | | 225 | ORPL40A225 |
| | | | | 250 | ORPL40A250 |
| | | | | 300 | ORPL40A300 |
| | | | | 350 | ORPL40A350 |
| 600 | LDC3600T52W | LDC3600T56W | LDC3600T57W | 400 | ORPL40A400 |
| | | | | 300 | ORPL60A300 |
| | | | | 350 | ORPL60A350 |
| | | | | 400 | ORPL60A400 |
| | | | | 500 | ORPL60A500 |
| | | | | 600 | ORPL60A600 |

Notes

^① Long delay I^4t response selection limits short delay time to flat response.

^② Zone interlocking, PowerNet, or both features can be added at the factory by adding suffixes **ZG**, **PN** or **ZGP** respectively to above catalog number.

Digitrip OPTIM Electronic Circuit Breaker with Interchangeable Rating Plug

Order as individual components: Breaker Frame (which includes Trip Unit), Rating Plug, Terminals.

2

Digitrip OPTIM 1050 Electronic Circuit Breaker with Interchangeable Rating Plug

Circuit Breaker Frame Only

L – Adjustable Long Delay Pickup (I_L) with Adjustable Long Delay Time (I^2t or I^4t Response) ①

S – Adjustable Short Delay Pickup with Adjustable Short Delay Time (I^2t or Flat Response)

I – Adjustable Instantaneous Pickup

G – Adjustable Ground Fault Pickup with Adjustable Ground Fault Time (I^2t or Flat Response)

A – Adjustable Ground Fault Alarm with Adjustable Ground Fault Time (I^2t or Flat Response)

OPTIM 1050 ②③

Digitrip OPTIM Rating Plug Only

Maximum
Continuous
Ampere
Rating
at 40 °C

LSIG

Catalog
Number

LSIA

Catalog
Number

Ampere
Rating

Fixed Rating Plug
Catalog
Number

Three-Pole Standard Interrupting Capacity 600 Vac Rated 35 kAIC at 480 Vac

| Maximum Continuous Ampere Rating at 40 °C | LSIG Catalog Number | LSIA Catalog Number | Ampere Rating | Fixed Rating Plug Catalog Number |
|---|---------------------------|---------------------------|------------------|--|
| 125 | LD3125T106W | LD3125T107W | 70 | ORPL125A070 |
| | | | 90 | ORPL125A090 |
| | | | 100 | ORPL125A100 |
| | | | 110 | ORPL125A110 |
| | | | 125 | ORPL125A125 |
| 250 | LD3250T106W | LD3250T107W | 125 | ORPL025A125 |
| | | | 150 | ORPL025A150 |
| | | | 175 | ORPL025A175 |
| | | | 200 | ORPL025A200 |
| | | | 225 | ORPL025A225 |
| | | | 250 | ORPL025A250 |
| 400 | LD3400T106W | LD3400T107W | 200 | ORPL40A200 |
| | | | 225 | ORPL40A225 |
| | | | 250 | ORPL40A250 |
| | | | 300 | ORPL40A300 |
| | | | 350 | ORPL40A350 |
| | | | 400 | ORPL40A400 |
| | | | 600 | ORPL60A600 |
| 600 | LD3600T106W | LD3600T107W | 300 | ORPL60A300 |
| | | | 350 | ORPL60A350 |
| | | | 400 | ORPL60A400 |
| | | | 500 | ORPL60A500 |
| | | | 600 | ORPL60A600 |

Notes

① Long delay I^4t response selection limits short delay time to flat response.

② One Form C auxiliary switch and one Form C bell alarm switch supplied with breaker as standard.

③ Factory sealed.

Digitrip OPTIM 1050 Electronic Circuit Breaker with Interchangeable Rating Plug, continued

| Maximum Continuous Ampere Rating at 40 °C | Circuit Breaker Frame Only | | Digitrip OPTIM Rating Plug Only | |
|---|----------------------------|---------------------------|---------------------------------|--|
| | LSIG Catalog Number | LSIA Catalog Number | Ampere Rating | Fixed Rating Plug Catalog Number |
| Three-Pole High Interrupting Capacity 600 Vac Rated 65 kAIC at 480 Vac | | | | |
| 125 | HLD3125T106W | HLD3125T107W | 70 | ORPL125A070 |
| | | | 90 | ORPL125A090 |
| | | | 100 | ORPL125A100 |
| | | | 110 | ORPL125A110 |
| | | | 125 | ORPL125A125 |
| 250 | HLD3250T106W | HLD3250T107W | 125 | ORPL025A125 |
| | | | 150 | ORPL025A150 |
| | | | 175 | ORPL025A175 |
| | | | 200 | ORPL025A200 |
| | | | 225 | ORPL025A225 |
| 400 | HLD3400T106W | HLD3400T107W | 250 | ORPL025A250 |
| | | | 200 | ORPL40A200 |
| | | | 225 | ORPL40A225 |
| | | | 250 | ORPL40A250 |
| | | | 300 | ORPL40A300 |
| 600 | HLD3600T106W | HLD3600T107W | 350 | ORPL40A350 |
| | | | 400 | ORPL40A400 |
| | | | 300 | ORPL60A300 |
| | | | 350 | ORPL60A350 |
| | | | 400 | ORPL60A400 |
| | | | 500 | ORPL60A500 |
| | | | 600 | ORPL60A600 |

Notes

- ① Long delay I⁴t response selection limits short delay time to flat response.
 ② One Form C auxiliary switch and one Form C bell alarm switch supplied with breaker as standard.
 ③ Factory sealed.

Digitrip OPTIM 1050 Electronic Circuit Breaker with Interchangeable Rating Plug, continued

| Maximum Continuous Ampere Rating at 40 °C | Circuit Breaker Frame Only | | Digitrip OPTIM Rating Plug Only | |
|---|--|---------------------|---------------------------------|----------------------------------|
| | LSIG Catalog Number | LSIA Catalog Number | Ampere Rating | Fixed Rating Plug Catalog Number |
| | OPTIM 1050 ^{②③} L – Adjustable Long Delay Pickup (I_L) with Adjustable Long Delay Time (I^2t or I^4t Response) ^① S – Adjustable Short Delay Pickup with Adjustable Short Delay Time (I^2t or Flat Response) I – Adjustable Instantaneous Pickup G – Adjustable Ground Fault Pickup with Adjustable Ground Fault Time (I^2t or Flat Response) A – Adjustable Ground Fault Alarm with Adjustable Ground Fault Time (I^2t or Flat Response) | | | |
| Three-Pole Ultra High Interrupting Capacity Current Limiting 600 Vac Rated 100 kAIC at 480 Vac | | | | |
| 125 | LDC3125T106W | LDC3125T107W | 70 | ORPL125A070 |
| | | | 90 | ORPL125A090 |
| | | | 100 | ORPL125A100 |
| | | | 110 | ORPL125A110 |
| | | | 125 | ORPL125A125 |
| 250 | LDC3250T106W | LDC3250T107W | 125 | ORPL025A125 |
| | | | 150 | ORPL025A150 |
| | | | 175 | ORPL025A175 |
| | | | 200 | ORPL025A200 |
| | | | 225 | ORPL025A225 |
| 400 | LDC3400T106W | LDC3400T107W | 250 | ORPL025A250 |
| | | | 200 | ORPL40A200 |
| | | | 225 | ORPL40A225 |
| | | | 250 | ORPL40A250 |
| | | | 300 | ORPL40A300 |
| 600 | LDC3600T106W | LDC3600T107W | 350 | ORPL40A350 |
| | | | 400 | ORPL40A400 |
| | | | 300 | ORPL60A300 |
| | | | 350 | ORPL60A350 |
| | | | 400 | ORPL60A400 |
| | | | 500 | ORPL60A500 |
| | | | 600 | ORPL60A600 |

Notes

- ① Long delay I^4t response selection limits short delay time to flat response.
- ② One Form C auxiliary switch and one Form C bell alarm switch supplied with breaker as standard.
- ③ Factory sealed.

100% Rated Digitrip OPTIM Circuit Breakers with Interchangeable Rating Plug

Order as individual components: Breaker Frame (which includes Trip Unit), Rating Plug, Terminals.

100% Rated Digitrip OPTIM 550 Circuit Breakers with Interchangeable Rating Plug**Circuit Breaker Frame Only****L** – Adjustable Long Delay Pickup (I_L) with Adjustable Long Delay Time (I^2t or I^4t Response) ①**S** – Adjustable Short Delay Pickup with Adjustable Short Delay Time (I^2t or Flat Response)**I** – Adjustable Instantaneous Pickup**G** – Adjustable Ground Fault Pickup with Adjustable Ground Fault Time (I^2t or Flat Response)**A** – Adjustable Ground Fault Alarm with Adjustable Ground Fault Time (I^2t or Flat Response)

OPTIM 550 ②

Digitrip OPTIM Rating Plug Only

| Maximum Continuous Ampere Rating at 40 °C | Circuit Breaker Frame Only | | | Digitrip OPTIM Rating Plug Only | |
|---|----------------------------|---------------------|---------------------|---------------------------------|----------------------------------|
| | LSI Catalog Number | LSIG Catalog Number | LSIA Catalog Number | Ampere Rating | Fixed Rating Plug Catalog Number |
| Three-Pole Standard Interrupting Capacity 600 Vac Rated 35 kAIC at 480 Vac | | | | | |
| 125 | CLD3125T52W | CLD3125T56W | CLD3125T57W | 70 | ORPL125A070 |
| | | | | 90 | ORPL125A090 |
| | | | | 100 | ORPL125A100 |
| | | | | 110 | ORPL125A110 |
| | | | | 125 | ORPL125A125 |
| 250 | CLD3250T52W | CLD3250T56W | CLD3250T57W | 125 | ORPL025A125 |
| | | | | 150 | ORPL025A150 |
| | | | | 175 | ORPL025A175 |
| | | | | 200 | ORPL025A200 |
| | | | | 225 | ORPL025A225 |
| | | | | 250 | ORPL025A250 |
| 400 | CLD3400T52W | CLD3400T56W | CLD3400T57W | 200 | ORPL40A200 |
| | | | | 225 | ORPL40A225 |
| | | | | 250 | ORPL40A250 |
| | | | | 300 | ORPL40A300 |
| | | | | 350 | ORPL40A350 |
| | | | | 400 | ORPL40A400 |
| 600 | CLD3600T52W | CLD3600T56W | CLD3600T57W | 300 | ORPL60A300 |
| | | | | 350 | ORPL60A350 |
| | | | | 400 | ORPL60A400 |
| | | | | 500 | ORPL60A500 |
| | | | | 600 | ORPL60A600 |

Notes① Long delay I^4t response selection limits short delay time to flat response.② Zone interlocking, PowerNet, or both features can be added at the factory by adding suffixes **ZG**, **PN** or **ZGP** respectively to above catalog number.

100% Rated Digitrip OPTIM 550 Circuit Breakers with Interchangeable Rating Plug, continued

| Maximum Continuous Ampere Rating at 40 °C | Circuit Breaker Frame Only | | | Digitrip OPTIM Rating Plug Only | |
|---|---|---------------------|---------------------|---------------------------------|----------------------------------|
| | LSI Catalog Number | LSIG Catalog Number | LSIA Catalog Number | Ampere Rating | Fixed Rating Plug Catalog Number |
| | L – Adjustable Long Delay Pickup (I_L) with Adjustable Long Delay Time (I^2t or I^4t Response) ① S – Adjustable Short Delay Pickup with Adjustable Short Delay Time (I^2t or Flat Response) I – Adjustable Instantaneous Pickup G – Adjustable Ground Fault Pickup with Adjustable Ground Fault Time (I^2t or Flat Response) A – Adjustable Ground Fault Alarm with Adjustable Ground Fault Time (I^2t or Flat Response) OPTIM 550 ② | | | | |
| Three-Pole High Interrupting Capacity 600 Vac Rated 65 kAIC at 480 Vac | | | | | |
| 125 | CHLD3125T52W | CHLD3125T56W | CHLD3125T57W | 70 | ORPL125A070 |
| | | | | 90 | ORPL125A090 |
| | | | | 100 | ORPL125A100 |
| | | | | 110 | ORPL125A125 |
| | | | | 125 | ORPL125A125 |
| 250 | CHLD3250T52W | CHLD3250T56W | CHLD3250T57W | 125 | ORPL025A125 |
| | | | | 150 | ORPL025A150 |
| | | | | 175 | ORPL025A175 |
| | | | | 200 | ORPL025A200 |
| | | | | 225 | ORPL025A225 |
| | | | | 250 | ORPL025A250 |
| 400 | CHLD3400T52W | CHLD3400T56W | CHLD3400T57W | 200 | ORPL40A200 |
| | | | | 225 | ORPL40A225 |
| | | | | 250 | ORPL40A250 |
| | | | | 350 | ORPL40A350 |
| | | | | 400 | ORPL40A400 |
| 600 | CHLD3600T52W | CHLD3600T56W | CHLD3600T57W | 300 | ORPL60A300 |
| | | | | 350 | ORPL60A350 |
| | | | | 400 | ORPL60A400 |
| | | | | 500 | ORPL60A500 |
| | | | | 500 | ORPL60A500 |
| | | | | 600 | ORPL60A600 |

Notes

- ① Long delay I^4t response selection limits short delay time to flat response.
- ② Zone interlocking, PowerNet, or both features can be added at the factory by adding suffixes **ZG**, **PN** or **ZGP** respectively to above catalog number.

100% Rated Digitrip OPTIM 550 Circuit Breakers with Interchangeable Rating Plug, continued

| Maximum Continuous Ampere Rating at 40 °C | Circuit Breaker Frame Only | | | Digitrip OPTIM Rating Plug Only | |
|---|----------------------------|---------------------|---------------------|---------------------------------|----------------------------------|
| | LSI Catalog Number | LSIG Catalog Number | LSIA Catalog Number | Ampere Rating | Fixed Rating Plug Catalog Number |
| L – Adjustable Long Delay Pickup (I ₁) with Adjustable Long Delay Time (I ² t or I ⁴ t Response) ^① S – Adjustable Short Delay Pickup with Adjustable Short Delay Time (I ² t or Flat Response) I – Adjustable Instantaneous Pickup G – Adjustable Ground Fault Pickup with Adjustable Ground Fault Time (I ² t or Flat Response) A – Adjustable Ground Fault Alarm with Adjustable Ground Fault Time (I ² t or Flat Response) OPTIM 550 ^② | | | | | |
| Three-Pole Ultra High Interrupting Capacity Current Limiting 600 Vac Rated 100 kAIC at 480 Vac | | | | | |
| 125 | CLDC3125T52W | CLDC3125T56W | CLDC3125T57W | 70 | ORPL125A070 |
| | | | | 90 | ORPL125A090 |
| | | | | 100 | ORPL125A100 |
| | | | | 110 | ORPL125A110 |
| | | | | 125 | ORPL125A125 |
| 250 | CLDC3250T52W | CLDC3250T56W | CLDC3250T57W | 125 | ORPL025A125 |
| | | | | 150 | ORPL025A150 |
| | | | | 175 | ORPL025A175 |
| | | | | 200 | ORPL025A200 |
| | | | | 225 | ORPL025A225 |
| 400 | CLDC3400T52W | CLDC3400T56W | CLDC3400T57W | 200 | ORPL40A200 |
| | | | | 225 | ORPL40A225 |
| | | | | 250 | ORPL40A250 |
| | | | | 300 | ORPL40A300 |
| | | | | 350 | ORPL40A350 |
| 600 | CLDC3600T52W | CLDC3600T56W | CLDC3600T57W | 400 | ORPL60A400 |
| | | | | 500 | ORPL60A500 |
| | | | | 600 | ORPL60A600 |

Notes

- ① Long delay I⁴t response selection limits short delay time to flat response.
- ② Zone interlocking, PowerNet, or both features can be added at the factory by adding suffixes **ZG**, **PN** or **ZGP** respectively to above catalog number.

100% Rated Digitrip OPTIM 1050 Circuit Breakers with Interchangeable Rating Plug

Circuit Breaker Frame Only

- L – Adjustable Long Delay Pickup (I_l) with Adjustable Long Delay Time (I²t or I⁴t Response) ①
- S – Adjustable Short Delay Pickup with Adjustable Short Delay Time (I²t or Flat Response)
- I – Adjustable Instantaneous Pickup
- G – Adjustable Ground Fault Pickup with Adjustable Ground Fault Time (I²t or Flat Response)
- A – Adjustable Ground Fault Alarm with Adjustable Ground Fault Time (I²t or Flat Response)

Digitrip OPTIM Rating Plug Only

Maximum
Continuous
Ampere
Rating
at 40 °C

LSIG

Catalog
Number

LSIA

Catalog
Number

Ampere
Rating

Fixed Rating Plug

Catalog
Number

| Maximum Continuous Ampere Rating at 40 °C | LSIG Catalog Number | LSIA Catalog Number | Ampere Rating | Fixed Rating Plug Catalog Number |
|---|---------------------|---------------------|---------------|----------------------------------|
| Three-Pole Standard Interrupting Capacity 600 Vac Rated 35 kAIC at 480 Vac | | | | |
| 125 | CLD3125T106W | CLD3125T107W | 70 | ORPL125A070 |
| | | | 90 | ORPL125A090 |
| | | | 100 | ORPL125A100 |
| | | | 110 | ORPL125A110 |
| | | | 125 | ORPL125A125 |
| 250 | CLD3250T106W | CLD3250T107W | 125 | ORPL025A125 |
| | | | 150 | ORPL025A150 |
| | | | 175 | ORPL025A175 |
| | | | 200 | ORPL025A200 |
| | | | 225 | ORPL025A225 |
| | | | 250 | ORPL025A250 |
| 400 | CLD3400T106W | CLD3400T107W | 200 | ORPL40A200 |
| | | | 225 | ORPL40A225 |
| | | | 250 | ORPL40A250 |
| | | | 300 | ORPL40A300 |
| | | | 350 | ORPL40A350 |
| | | | 400 | ORPL40A400 |
| | | | 600 | ORPL60A600 |
| 600 | CLD3600T106W | CLD3600T107W | 300 | ORPL60A300 |
| | | | 350 | ORPL60A350 |
| | | | 400 | ORPL60A400 |
| | | | 500 | ORPL60A500 |
| | | | 600 | ORPL60A600 |

Notes

- ① Long delay I⁴t response selection limits short delay time to flat response.
- ② One Form C auxiliary switch and one Form C bell alarm switch supplied with breaker as standard.
- ③ Factory sealed.

100% Rated Digitrip OPTIM 1050 Circuit Breakers with Interchangeable Rating Plug, continued

| Maximum Continuous Ampere Rating at 40 °C | Circuit Breaker Frame Only | | Digitrip OPTIM Rating Plug Only | |
|---|--|---------------------------|---------------------------------|--|
| | LSIG Catalog Number | LSIA Catalog Number | Ampere Rating | Fixed Rating Plug Catalog Number |
| | OPTIM 1050 ^{②③} | | | |
| | L – Adjustable Long Delay Pickup (I_L) with Adjustable Long Delay Time (I^2t or I^4t Response) ^① | | | |
| | S – Adjustable Short Delay Pickup with Adjustable Short Delay Time (I^2t or Flat Response) | | | |
| | I – Adjustable Instantaneous Pickup | | | |
| | G – Adjustable Ground Fault Pickup with Adjustable Ground Fault Time (I^2t or Flat Response) | | | |
| | A – Adjustable Ground Fault Alarm with Adjustable Ground Fault Time (I^2t or Flat Response) | | | |
| Three-Pole High Interrupting Capacity 600 Vac Rated 65 kAIC at 480 Vac | | | | |
| 125 | CHLD3125T106W | CHLD3125T107W | 70 | ORPL125A070 |
| | | | 90 | ORPL125A090 |
| | | | 100 | ORPL125A100 |
| | | | 110 | ORPL125A110 |
| | | | 125 | ORPL125A125 |
| 250 | CHLD3250T106W | CHLD3250T107W | 125 | ORPL025A125 |
| | | | 150 | ORPL025A150 |
| | | | 175 | ORPL025A175 |
| | | | 200 | ORPL025A200 |
| | | | 225 | ORPL025A225 |
| | | | 250 | ORPL025A250 |
| 400 | CHLD3400T106W | CHLD3400T107W | 200 | ORPL40A200 |
| | | | 225 | ORPL40A225 |
| | | | 250 | ORPL40A250 |
| | | | 300 | ORPL40A300 |
| | | | 350 | ORPL40A350 |
| | | | 400 | ORPL40A400 |
| | | | 600 | ORPL60A600 |
| 600 | CHLD3600T106W | CHLD3600T107W | 300 | ORPL60A300 |
| | | | 350 | ORPL60A350 |
| | | | 400 | ORPL60A400 |
| | | | 500 | ORPL60A500 |
| | | | 600 | ORPL60A600 |

Notes

- ① Long delay I^4t response selection limits short delay time to flat response.
 ② One Form C auxiliary switch and one Form C bell alarm switch supplied with breaker as standard.
 ③ Factory sealed.

100% Rated Digitrip OPTIM 1050 Electronic Circuit Breaker with Interchangeable Rating Plug, continued

| Maximum Continuous Ampere Rating at 40 °C | Circuit Breaker Frame Only | | Digitrip OPTIM Rating Plug Only | |
|---|---|---------------------|---------------------------------|----------------------------------|
| | LSIG Catalog Number | LSIA Catalog Number | Ampere Rating | Fixed Rating Plug Catalog Number |
| | OPTIM 1050 ^{②③} | | | |
| | L – Adjustable Long Delay Pickup (I_L) with Adjustable Long Delay Time (I^2t or I^4t Response) ^① | | | |
| | S – Adjustable Short Delay Pickup with Adjustable Short Delay Time (I^2t or Flat Response) | | | |
| | I – Adjustable Instantaneous Pickup | | | |
| | G – Adjustable Ground Fault Pickup with Adjustable Ground Fault Time (I^2t or Flat Response) | | | |
| | A – Adjustable Ground Fault Alarm with Adjustable Ground Fault Time (I^2t or Flat Response) | | | |
| Three-Pole Ultra High Interrupting Capacity Current Limiting 600 Vac Rated 100 kAIC at 480 Vac | | | | |
| 125 | CLDC3125T106W | CLDC3125T107W | 70 | ORPL125A070 |
| | | | 90 | ORPL125A090 |
| | | | 100 | ORPL125A100 |
| | | | 110 | ORPL125A110 |
| | | | 125 | ORPL125A125 |
| 250 | CLDC3250T106W | CLDC3250T107W | 125 | ORPL025A125 |
| | | | 150 | ORPL025A150 |
| | | | 175 | ORPL025A175 |
| | | | 200 | ORPL025A200 |
| | | | 225 | ORPL025A225 |
| 400 | CLDC3400T106W | CLDC3400T107W | 250 | ORPL025A250 |
| | | | 200 | ORPL40A200 |
| | | | 225 | ORPL40A225 |
| | | | 250 | ORPL40A250 |
| | | | 300 | ORPL40A300 |
| 600 | CLDC3600T106W | CLDC3600T107W | 350 | ORPL40A350 |
| | | | 400 | ORPL40A400 |
| | | | 300 | ORPL60A300 |
| | | | 350 | ORPL60A350 |
| | | | 400 | ORPL60A400 |
| | | | 500 | ORPL60A500 |
| | | | 600 | ORPL60A600 |

Notes

- ① Long delay I^4t response selection limits short delay time to flat response.
- ② One Form C auxiliary switch and one Form C bell alarm switch supplied with breaker as standard.
- ③ Factory sealed.

Accessories Selection Guide and Ordering Information

Line and Load Terminals

Eaton’s line and load terminals provide wire connecting capabilities for specific ranges of continuous current ratings and wire types. All terminals comply with Underwriters Laboratories Standards UL 486A and UL 486B and CSA Standard C22.2 No. 65M. Unless otherwise specified,

L-Frame circuit breaker line and load terminals are shipped separately for field installation.

The wire connecting terminal is secured with two pan-head, slotted screws and lockwashers that can be checked for the correct torque loading or retightened from the front of the circuit

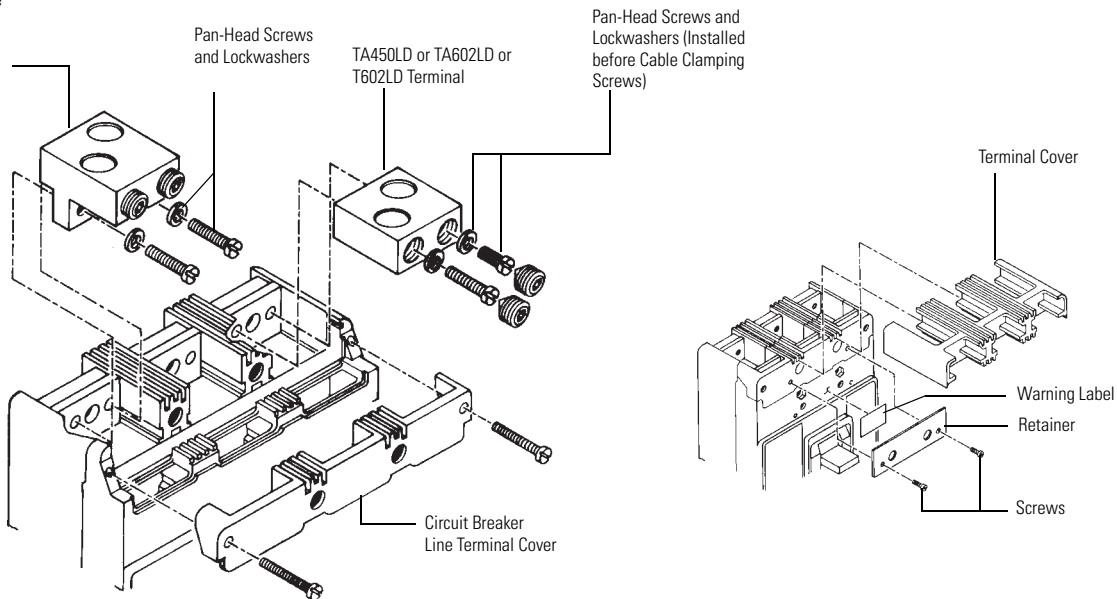
breaker before installation of the conductors. (Applies to all styles.) The circuit breaker line/load terminal conductors are positioned in the conducting holes in the wire connecting terminal and are secured with recessed socket screws that are tightened to the correct torque loading from the front of the circuit breaker.

Ordering Information

L-Frame circuit breakers use Cu/Al terminals as standard. When optional copper terminals are required, order by catalog Number. Specify if factory installation is required.

Terminals

TA401LD or TA603LD Terminal (Step-Type Terminal Requires Terminal Cover and Warning Label. See Inset.)



Line and Load Terminals

| Maximum Breaker Amperes | Terminal Body Material | Wire Type | AWG Wire Range/Number of Conductors | Metric Wire Range mm ² | Terminal Poles | Catalog Number | Terminals with Control Wire Termination Catalog Number |
|--|------------------------|-----------|-------------------------------------|-----------------------------------|------------------|------------------|--|
| Standard Cu/Al Pressure Terminals | | | | | | | |
| 400 | Aluminum | Cu/Al | 4/0–600 (1) | 120–300 | Two-pole kit ① | 2TA401LDK | — |
| 400 | Aluminum | Cu/Al | 4/0–600 (1) | 120–300 | Three-pole kit ① | 3TA401LDK | — |
| 400 | Aluminum | Cu/Al | 4/0–600 (1) | 120–300 | Four-pole kit ① | 4TA401LDK | — |
| 450 | Aluminum | Cu/Al | 4–4/0 (2) | 25–95 | ② | TA450LD | — |
| 500 | Aluminum | Cu/Al | 3/0–350 (2) | 95–150 | ② | TA602LD | TA602LDCW |
| 600 | Aluminum | Cu/Al | 400–500 (2) | 185–240 | Two-pole kit ① | 2TA603LDK | 2TA603LDKCW |
| 600 | Aluminum | Cu/Al | 400–500 (2) | 185–240 | Three-pole kit ① | 3TA603LDK | 3TA603LDKCW |
| 600 | Aluminum | Cu/Al | 400–500 (2) | 185–240 | Four-pole kit ① | 4TA603LDK | 4TA603LDKCW |
| Optional Copper and Cu/Al Pressure Type Terminals | | | | | | | |
| 600 | Copper | Cu | 250–350 (2) | 120–250 | ② | T602LD | T602LDCW |

Notes

- ① Terminal kits contain one terminal for each pole and one terminal cover.
- ② Individually packed.

Accessories

2

Allowable Accessory Combinations

Different combinations of accessories can be supplied, depending on the types of accessories and the number of poles in the circuit breaker.

LD Frame Accessories

| Description | Reference Page | Two-Pole ^① , Three-Pole | | | Four-Pole | | | Neutral ^② |
|---|----------------|------------------------------------|--------|-------|-----------|--------|-------|----------------------|
| | | Left | Center | Right | Left | Center | Right | |
| Internal Accessories (Only One Internal Accessory Per Pole) ^③ | | | | | | | | |
| Alarm lockout (Make/Break) | V4-T2-378 | ■ | | ■ | ■ | | | ■ |
| Alarm lockout (2Make/2Break) | V4-T2-378 | ■ | | ■ | ■ | | | ■ |
| Auxiliary switch (1A, 1B) | V4-T2-380 | ■ | | ■ | ■ | | | ■ |
| Auxiliary switch (2A, 2B) | V4-T2-380 | ■ | | ■ | ■ | | | ■ |
| Auxiliary switch (3A, 3B) | V4-T2-380 | ■ | | ■ | ■ | | | ■ |
| Auxiliary switch (1A, 1B) and alarm switch combination | V4-T2-382 | ■ | | ■ | ■ | | | ■ |
| Auxiliary switch (2A, 2B) and alarm switch combination | V4-T2-382 | ■ | | ■ | ■ | | | ■ |
| Shunt trip—standard ^④ | V4-T2-384 | ■ | | ■ | ■ | | | ■ |
| Shunt trip—low energy ^④ | V4-T2-387 | ■ | | ■ | ■ | | | ■ |
| Undervoltage release mechanism ^④ | V4-T2-393 | ■ | | ■ | ■ | | | ■ |
| Eaton PowerNet communications kit (OPTIM 550) | V4-T2-395 | | | ■ | | | | |
| External Accessories | | | | | | | | |
| End cap kit | V4-T2-412 | ● | ● | ● | ● | ● | ● | ● |
| Control wire terminal kit | V4-T2-413 | ● | ● | ● | ● | ● | ● | ● |
| Base mounting hardware | V4-T2-415 | ● | ● | ● | ● | ● | ● | ● |
| Terminal shields | V4-T2-417 | ● | ● | ● | ● | ● | ● | ● |
| Interphase barriers | V4-T2-417 | ● | ● | ● | ● | ● | ● | ● |
| Non-padlockable handle block | V4-T2-418 | | ■ | | | ■ | | |
| Padlockable handle lock hasp | V4-T2-419 | □ | | □ | □ | | □ | |
| Key interlock kit | V4-T2-420 | □ | | □ | □ | | □ | |
| Sliding bar interlock—requires two breakers | V4-T2-421 | ● | ● | ● | | | | |
| Walking beam interlock—requires two breakers | V4-T2-421 | ● | ● | ● | ● | ● | ● | ● |
| Electrical (motor) operator | V4-T2-422 | ● | ● | ● | ● | ● | ● | ● |
| Plug-in adapters | V4-T2-424 | ● | ● | ● | ● | ● | ● | ● |
| Rear connecting studs | V4-T2-425 | ● | ● | ● | ● | ● | ● | ● |
| Panelboard connecting straps | V4-T2-426 | ● | ● | ● | ● | ● | ● | ● |
| Handle mechanisms | V4-T2-506 | ● | ● | ● | ● | ● | ● | ● |
| Handle extension | V4-T2-521 | ● | ● | ● | ● | ● | ● | ● |
| Solid-state (electronic) portable test kit | V4-T2-428 | ● | ● | ● | ● | ● | ● | ● |

Legend

- Applicable in indicated pole position
- May be mounted on left or right pole—not both
- Accessory available/modification available

Notes

- ① Two-pole breaker supplied in three-pole frame. Current carrying parts omitted from center pole.
- ② Refer to Eaton for appropriate neutral pole accessory combinations.
- ③ OPTIM model 1050 is factory sealed and does not have the right pole space available for accessories.
- ④ Shunt trip and UVR cannot be mounted in right poles on LES or OPTIM trip units. Standard non-tripping internal accessories can be mounted in the left or right poles of LES and 550 OPTIM trip units.

LD Frame Accessories, continued

| Description | Reference Page | Two-Pole ^① , Three-Pole | | | Four-Pole | | | Neutral ^② |
|--|----------------|------------------------------------|--------|-------|-----------|--------|-------|----------------------|
| | | Left | Center | Right | Left | Center | Right | |
| OPTIM System Components Three Poles | | | | | | | | |
| Ground fault alarm unit | V4-T2-428 | | | | | | | |
| Potential transformer module | V4-T2-428 | | | | | | | |
| Breaker interface module (BIM) | V4-T2-429 | | | | | | | |
| Digitrip OPTIMizer | V4-T2-429 | | | | | | | |
| Auxiliary power module | V4-T2-429 | | | | | | | |
| Modifications (Refer to Eaton) | | | | | | | | |
| Special calibration | — | ● | ● | ● | ● | ● | ● | ● |
| Moisture fungus treatment | V4-T2-218 | ● | ● | ● | ● | ● | ● | ● |
| Freeze-tested circuit breakers | — | ● | ● | ● | ● | ● | ● | ● |
| Marine/naval application | — | ● | ● | ● | ● | ● | ● | ● |

Legend

- Applicable in indicated pole position
- May be mounted on left or right pole—not both
- Accessory available/modification available

310+ Electronic Trip Unit Accessories

| Description | Catalog Number |
|--|--------------------------|
| Electronic portable test kit | MTST230V ^③ |
| Trip unit tamper protection wire seal | 5108A03H01 |
| External neutral sensor | LGFACT600 ^④ |
| Breaker-mount cause-of-trip indication | TRIP-LED |
| Breaker-mount ammeter module | DIGIVIEW |
| Remote-mount ammeter module | DIGIVIEWR06 ^⑤ |

Notes

- ① Two-pole breaker supplied in three-pole frame. Current carrying parts omitted from center pole.
- ② Refer to Eaton for appropriate neutral pole accessory combinations.
- ③ MTST230V applies to 100–230 Vac.
- ④ Included with all LD LSG and LSG trip units and breakers.
- ⑤ Includes 6 ft cable for remote mounting; NEMA 3R rated.

Technical Data and Specifications

2

UL 489 Interrupting Capacity Ratings ^①

| Circuit Breaker Type | Number of Poles | Interrupting Capacity (kA rms Symmetrical Amperes) | | | | | |
|------------------------|-----------------|--|-----|-----|-----|----------|-------------------|
| | | Volts AC (50/60 Hz) | | | | Volts DC | |
| | | 240 | 277 | 480 | 600 | 125 | 250 ^{②③} |
| LDB | 2, 3 | 65 | — | 35 | 25 | — | 22 |
| LD | 2, 3, 4 | 65 | — | 35 | 25 | — | 22 |
| CLD ^④ | 2, 3, 4 | 65 | — | 35 | 25 | — | — |
| HLD, HLDB | 2, 3, 4 | 100 | — | 65 | 35 | — | 25 |
| CHLD ^④ | 2, 3, 4 | 100 | — | 65 | 35 | — | — |
| LDC, LDCB ^⑤ | 2, 3, 4 | 200 | — | 100 | 50 | — | 30 |
| CLDC ^{④⑤} | 2, 3, 4 | 200 | — | 100 | 50 | — | — |

IEC 947-2 Interrupting Capacity Ratings ^①

| Circuit Breaker Type | Number of Poles | Interrupting Capacity (kA Symmetrical Amperes) | | | | | | | |
|----------------------|-----------------|--|----------|----------|----------|----------|----------|-------------------|----------|
| | | Volts AC (50/60 Hz) | | | | Volts DC | | | |
| | | 240 | | 415 | | 690 | | 250 ^{②③} | |
| | | I_{cu} | I_{cs} | I_{cu} | I_{cs} | I_{cu} | I_{cs} | I_{cu} | I_{cs} |
| LDB | 2, 3 | 85 | 85 | 45 | 45 | 20 | 10 | 20 | 10 |
| LD | 2, 3, 4 | 85 | 85 | 45 | 45 | 20 | 10 | 20 | 10 |
| CLD ^④ | 2, 3, 4 | 85 | 85 | 45 | 45 | 20 | 10 | — | — |
| HLD, HLDB | 2, 3, 4 | 100 | 100 | 70 | 70 | 25 | 13 | 20 | 10 |
| CHLD ^④ | 2, 3, 4 | 100 | 100 | 70 | 70 | 25 | 13 | — | — |
| LDC, LDCB | 2, 3, 4 | 200 | 100 | 100 | 75 | 35 | 18 | 20 | 10 |
| CLDC ^④ | 2, 3, 4 | 200 | 100 | 100 | 75 | 35 | 18 | — | — |

UL 489 Current Limiting Data

| Frame | Circuit | I_p (kA) | I^2T ($10^6 A^2S$) |
|-------|--------------|------------|------------------------|
| LDC | 240 V/200 kA | 64.80 | 6.80 |
| LDC | 480 V/100 kA | 66.90 | 9.33 |
| LDC | 600 V/50 kA | 54.30 | 8.92 |

Notes

- ① Utilization Category A circuit breakers.
- ② L/R = 8 milliseconds minimum.
- ③ Two-pole circuit breaker or two poles of three-pole circuit breaker. Incorporating thermal-magnetic trip unit only.
- ④ 100% rated breakers.
- ⑤ Current limiting.

310+ Specifications

| Description | Specification |
|---|---------------------------------|
| Trip Unit Type | Digitrip RMS 310+ |
| Breaker Type | |
| Frame designation | LD |
| Frames available | 600 A |
| Continuous current range (A) | 250–600 A |
| Ground fault pickup (A) | 120–600 A |
| Interrupting capacities at 480 Vac (kAIC) | 35, 65, 100 |
| 100% rated | Yes |
| Protection | |
| Ordering options | LS, LSI, LSG, LSIG, ALSI, ALSIG |
| Arcflash Reduction Maintenance System (or Maintenance Mode) | Remote enabled on ALSI, ALSIG |
| Interchangeable trip unit | Yes |
| High load alarm (suffix B20) ① | Yes |
| Ground fault alarm with trip (suffix B21) ① | LSG, LSIG, ALSIG |
| Ground fault alarm, no trip (suffix B22) ① | LSG, LSIG, ALSIG |
| Zone selective interlocking (suffix ZG) | LSI, LSIG, ALSI, ALSIG |
| Cause of trip indication | Yes (via TRIP-LED or DIGIVIEW) |
| Thru-cover accessories | No |

310+ Adjustability Specifications

| Description | LD Frame Specification | |
|--|------------------------|---------|
| 310+ settings | 600 A | |
| I_r = continuous current or long delay pickup (amperes) (All 310+) | I_r | |
| | A | 250 |
| | B | 300 |
| | C | 315 |
| | D | 350 |
| | E | 400 |
| | F | 450 |
| | G | 500 |
| | H (= I_n) | 600 |
| t_r = long delay time (seconds) (All 310+) | 2 | 2 |
| | 4 | 4 |
| | 7 | 7 |
| | 10 | 10 |
| | 12 | 12 |
| | 15 | 15 |
| | 20 | 20 |
| | 24 | 24 |
| I_{sd} (x I_r) = short delay pickup (All 310+) | Position 1 | 2x |
| | Position 2 | 3x |
| | Position 3 | 4x |
| | Position 4 | 5x |
| | Position 5 | 6x |
| | Position 6 | 7x |
| | Position 7 | 8x |
| | Position 8 | 8x |
| | Position 9 | 8x |
| t_{sd} = short delay time I^2t (milliseconds) (LS and LSG) | Fixed | 67 @10x |
| t_{sd} = short delay time flat (milliseconds) (LSI, LSIG, ALSI, ALSIG) | Position 1 | Inst |
| | Position 2 | 120 |
| | Position 3 | 300 |
| I_g (x I_n) = ground fault pickup (amperes) (LSG, LSIG, ALSIG) | Position 1 | 120 |
| | Position 2 | 180 |
| | Position 3 | 240 |
| | Position 4 | 360 |
| | Position 5 | 480 |
| | Position 6 | 600 |
| t_g = ground fault delay time (milliseconds) (LSG, LSIG, ALSIG) | Position 1 | Inst |
| | Position 2 | 120 |
| | Position 3 | 300 |
| Independently adjustable Instantaneous (Ii) setting | ② | |
| Maintenance Mode pickup (2.5 x I_n) (amperes) (310+ with Maintenance Mode—ALSI and ALSIG) | Fixed | 1500 |

Notes

- ① B2x suffixes cannot be combined with B2x suffixes.
- ② Not available for LD. Independently adjustable Ii setting available in LG, NG, and RG ALSI and ALSIG trip units.

Digitrip OPTIM Specifications

| Trip Unit Type | Digitrip OPTIM 550 | Digitrip OPTIM 1050 |
|--|----------------------|----------------------|
| rms sensing | Yes | Yes |
| Breaker Type | | |
| Frame | L | L |
| Ampere range | 200–600 A | 200–600 A |
| Interrupting rating at 480 volts | 35, 65, 100 (kA) | 35, 65, 100 (kA) |
| Protection | | |
| Ordering options | LSI, LSI(A), LSIG | LSI(A), LSIG |
| Fixed rated plug (I_n) | Yes | Yes |
| Overtemperature trip | Yes | Yes |
| Long Delay Protection (L) | | |
| Adjustable rating plug (I_n) | No | No |
| Long delay pickup | 0.4–1.0 x (I_n) | 0.4–1.0 x (I_n) |
| Long delay time I^2t | 2–24 seconds | 2–24 seconds |
| Long delay time I^4t | 1–5 seconds | 1–5 seconds |
| Long delay thermal memory | Yes | Yes |
| High load alarm | 0.5–1.0 x I_r | 0.5–1.0 x I_r |
| Short Delay Protection (S) | | |
| Short delay pickup | 150–800% x (I_r) | 150–800% x (I_r) |
| Short delay time I^2t | 100–500 ms | 100–500 ms |
| Short delay time flat | 100–500 ms | 100–500 ms |
| Short delay time zone selective interlocking | Yes ^① | Yes |
| Instantaneous Protection (I) | | |
| Instantaneous pickup | 200–800% x (I_n) | 200–800% x (I_n) |
| Discriminator | Yes | Yes |
| Instantaneous override | Yes | Yes |
| Ground Fault Protection (G) | | |
| Ground fault alarm | 20–100% x (I_s) | 20–100% x (I_s) |
| Ground fault pickup | 20–100% x (I_s) | 20–100% x (I_s) |
| Ground fault delay I^2t | 100–500 ms | 100–500 ms |
| Ground fault delay flat | 100–500 ms | 100–500 ms |
| Ground fault zone selective interlocking | Yes ^① | Yes |
| Ground fault thermal memory | Yes | Yes |

Legend

BIM = Breaker Interface Module
(A) = GF Alarm
 I_s = Sensor Rating
 I_n = Rating Plug
 I_r = Long Delay Pickup Setting

Note

① Zone interlock kit.

Digitrip OPTIM Specifications, continued

| Trip Unit Type | Digitrip OPTIM 550 | Digitrip OPTIM 1050 |
|--|---------------------------|----------------------------|
| System Diagnostics | | |
| Status LEDs | Yes | Yes |
| Cause of trip LEDs | Yes | Yes |
| Magnitude of trip information | Yes | Yes |
| Remote signal contact—ground alarm | Yes ^① | Yes |
| Local auxiliary and bell alarm contact | Optional | Included |
| System Monitoring | | |
| Digital display | Yes ^② | Yes ^② |
| Current | Yes | Yes |
| Power and energy | No | Yes |
| Power quality—harmonics | No | Yes |
| Power factor | No | Yes |
| Communications | | |
| PowerNet | Yes ^③ | Yes |
| Testing | | |
| Testing method | OPTIMizer, BIM, PowerNet | OPTIMizer, BIM, PowerNet |

Legend

BIM = Breaker Interface Module
 (A) = GF Alarm
 I_s = Sensor Rating
 I_n = Rating Plug
 I_r = Long Delay Pickup Setting

Notes

- ① Zone interlock kit.
 ② By OPTIMizer/BIM.
 ③ Eaton's PowerNet kit.

2.4

Molded Case Circuit Breakers

Series C

Dimensions and Weights

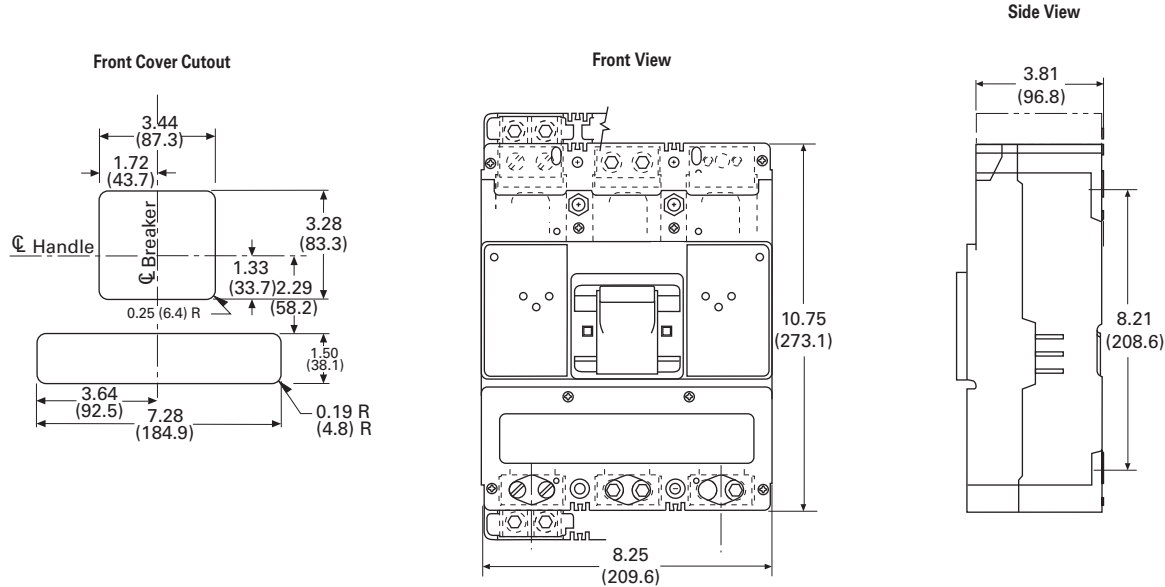
Dimensions in Inches (mm)

2

LD Frame

| Number of Poles | Width | Height | Depth |
|-----------------|---------------|---------------|--------------|
| 2, 3 | 8.25 (209.6) | 10.75 (273.1) | 4.06 (103.1) |
| 4 | 11.00 (279.4) | 10.75 (273.1) | 4.06 (103.1) |

LD-Frame, Two- and Three-Pole



Approximate Shipping Weight, Lbs (kg)

LD Frame

| Breaker Type | Complete Breaker | | | Frame Only | | | Trip Unit | | |
|--------------|------------------|------------|-----------|------------|------------|-----------|-----------|------------|-----------|
| | Two-Pole | Three-Pole | Four-Pole | Two-Pole | Three-Pole | Four-Pole | Two-Pole | Three-Pole | Four-Pole |
| LD, HLD, LDC | 18 (8.2) | 20 (9.1) | 25 (11.3) | 14 (6.4) | 15 (6.8) | 20 (9.1) | 3 (1.4) | 4 (1.8) | 5 (2.3) |
| LDB | 18 (8.2) | 20 (9.1) | 25 (11.3) | — | — | — | — | — | — |

Typical M-Frame Circuit Breaker



Contents

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| Standards and Certifications | V4-T2-219 |
| Quick Reference | V4-T2-220 |
| G-Frame (15–100 Amperes) | V4-T2-223 |
| F-Frame (10–225 Amperes) | V4-T2-237 |
| J-Frame (70–250 Amperes) | V4-T2-255 |
| K-Frame (70–400 Amperes) | V4-T2-263 |
| L-Frame (125–600 Amperes) | V4-T2-287 |
| M-Frame (300–800 Amperes) | |
| Catalog Number Selection | V4-T2-314 |
| Product Selection | V4-T2-315 |
| Accessories | V4-T2-320 |
| Technical Data and Specifications | V4-T2-321 |
| Dimensions and Weights | V4-T2-323 |
| Motor Circuit Protectors (MCP) | V4-T2-358 |
| N-Frame (400–1200 Amperes) | V4-T2-324 |
| R-Frame (800–2500 Amperes) | V4-T2-339 |
| Motor Protection Circuit Breakers (MPCB) | V4-T2-369 |
| Type ELC Current Limiter Attachment (Size 0–4) | V4-T2-371 |
| Current Limiting Circuit Breaker Module | V4-T2-372 |
| Internal Accessories | V4-T2-375 |
| External Accessories | V4-T2-408 |

M-Frame (300–800 Amperes)

Product Description

- All Eaton M-Frame circuit breakers are HACR rated
- MDL-Frame circuit breakers are available as individual components (frame, trip unit, terminals), or factory assembled complete breakers
- MDLB, HMDLB-Frame circuit breakers with non-interchangeable trip units are suitable for reverse feed use

Standards and Certifications

- CE marked



2.4

Molded Case Circuit Breakers

Series C

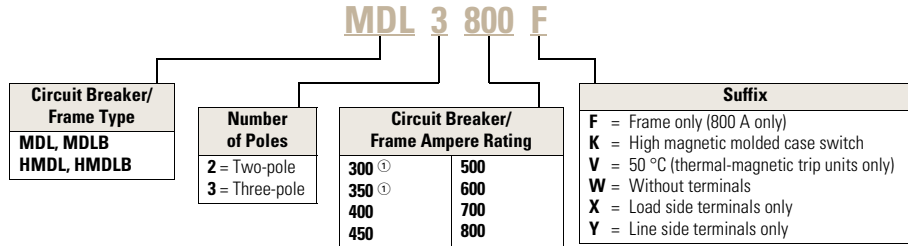
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Catalog Number Selection

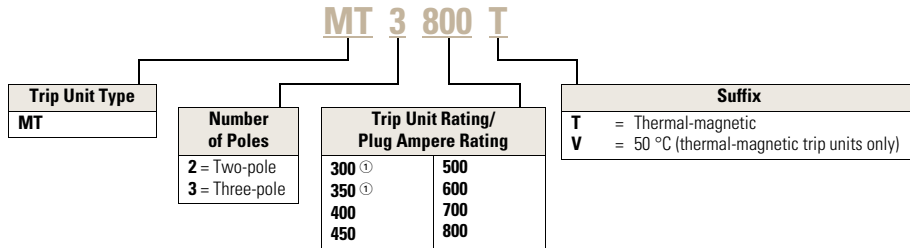
This information is presented only as an aid to understanding catalog numbers. It is not to be used to build catalog numbers for circuit breakers or trip units.

MDL Frame with Thermal-Magnetic Trip Unit Technology

Thermal-Magnetic Breakers and Frame ①

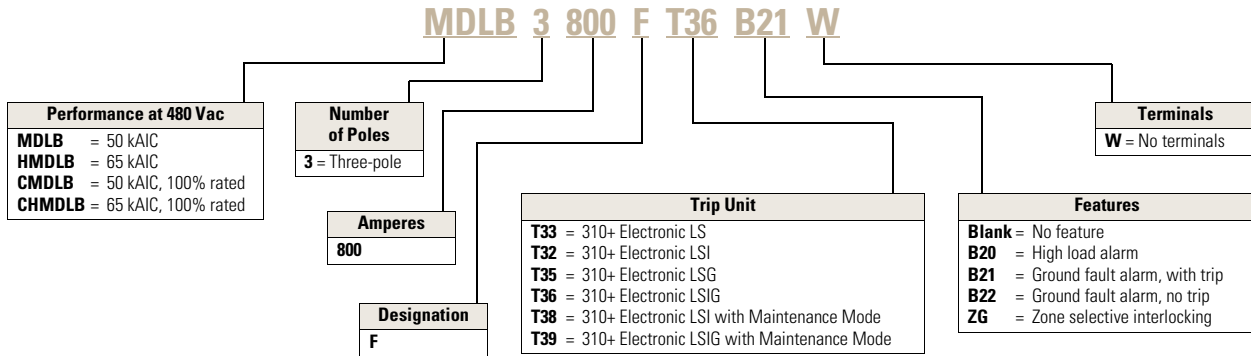


Thermal-Magnetic Trip Unit ①

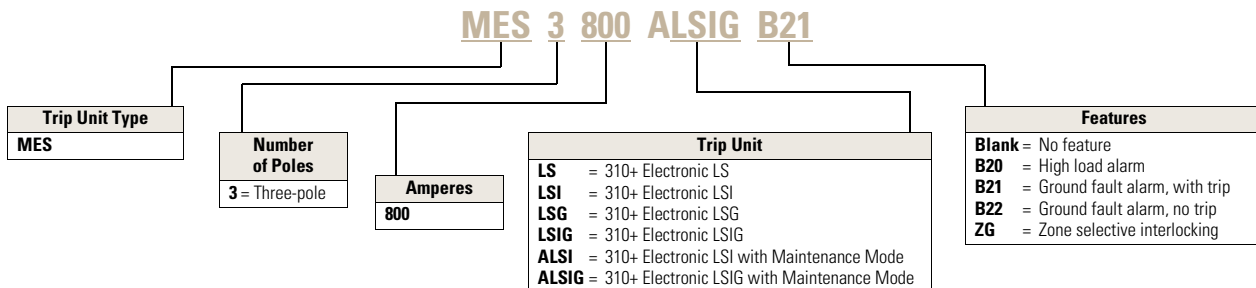


MDL Frame with 310+ Electronic Trip Unit Technology

310+ Circuit Breaker



310+ Electronic Trip Unit ①



Note

① Frames are the same for thermal-magnetic or 310+ electronic trip units, e.g., MDL3800F, HMDL3800F, etc.

Product Selection

Types MDL and HMDL Thermal-Magnetic Circuit Breakers with Interchangeable Trip Units—Two-Pole

| Maximum Continuous Ampere Rating at 40 °C | Standard Interrupting Capacity 600 Vac Rated 50 kAIC at 480 Vac | | High Interrupting Capacity 600 Vac Rated 65 kAIC at 480 Vac | | Thermal-Magnetic Trip Unit Only | Standard Terminals Only ^① See Page V4-T2-319 for Optional Terminals Catalog Number |
|---|--|---------------------------|--|---------------------------|--|---|
| | Factory Assembled Circuit Consisting of Frame, Trip Unit and Terminals | | Factory Assembled Circuit Consisting of Frame, Trip Unit and Terminals | | For Use with Standard or High or Ultra High Interrupting Frames Magnetic Trip Range is 5–10 Up Through 600 A; 4–8 on 700 and 800 A x Continuous Ampere Rating Catalog Number | |
| | Catalog Number | Frame Only Catalog Number | Catalog Number | Frame Only Catalog Number | | |
| 300 | MDL2300 | MDL2800F | HMDL2300 | HMDL2800F | MT2300T | TA700MA1 |
| 350 | MDL2350 | | HMDL2350 | | MT2350T | TA700MA1 |
| 400 | MDL2400 | | HMDL2400 | | MT2400T | TA700MA1 |
| 450 | MDL2450 | | HMDL2450 | | MT2450T | TA700MA1 |
| 500 | MDL2500 | | HMDL2500 | | MT2500T | TA700MA1 |
| 600 | MDL2600 | | HMDL2600 | | MT2600T | TA700MA1 |
| 700 | MDL2700 | | HMDL2700 | | MT2700T | TA700MA1 |
| 800 | MDL2800 | | HMDL2800 | | MT2800T | TA800MA2 |

Types MDL and HMDL Thermal-Magnetic Circuit Breakers with Interchangeable Trip Units—Three-Pole

| Maximum Continuous Ampere Rating at 40 °C | Standard Interrupting Capacity 600 Vac Rated 50 kAIC at 480 Vac | | High Interrupting Capacity 600 Vac Rated 65 kAIC at 480 Vac | | Thermal-Magnetic Trip Unit Only | Standard Terminals Only ^① See Page V4-T2-319 for Optional Terminals Catalog Number |
|---|--|---------------------------|--|---------------------------|--|---|
| | Factory Assembled Circuit Consisting of Frame, Trip Unit and Terminals | | Factory Assembled Circuit Consisting of Frame, Trip Unit and Terminals | | For Use with Standard or High or Ultra High Interrupting Frames Magnetic Trip Range is 5–10 Up Through 600 A; 4–8 on 700 and 800 A x Continuous Ampere Rating Catalog Number | |
| | Catalog Number | Frame Only Catalog Number | Catalog Number | Frame Only Catalog Number | | |
| 300 | MDL3300 | MDL3800F | HMDL3300 | HMDL3800F | MT3300T | TA700MA1 |
| 350 | MDL3350 | | HMDL3350 | | MT3400T | TA700MA1 |
| 400 | MDL3400 | | HMDL3400 | | MT3400T | TA700MA1 |
| 450 | MDL3450 | | HMDL3450 | | MT3450T | TA700MA1 |
| 500 | MDL3500 | | HMDL3500 | | MT3500T | TA700MA1 |
| 600 | MDL3600 | | HMDL3600 | | MT3600T | TA700MA1 |
| 700 | MDL3700 | | HMDL3700 | | MT3700T | TA700MA1 |
| 800 | MDL3800 | | HMDL3800 | | MT3800T | TA800MA2 |

Note

^① Two terminals are required per pole.

Types MDLB and HMDLB Thermal-Magnetic Circuit Breakers with Non-Interchangeable Trip Units—Two-Pole ^①

| Maximum Continuous Ampere Rating at 40 °C | Standard Interrupting Capacity | High Interrupting Capacity | Standard Terminals Only ^② |
|---|--|--|---|
| | 600 Vac Rated 50 kAIC at 480 Vac Factory Assembled Circuit Consisting of Frame, Trip Unit and Terminals Catalog Number | 600 Vac Rated 65 kAIC at 480 Vac Factory Assembled Circuit Consisting of Frame, Trip Unit and Terminals Catalog Number | See Page V4-T2-319 for Optional Terminals Catalog Number |
| 300 | MDLB2300 | HMDLB2300 | TA700MA1 |
| 350 | MDLB2350 | HMDLB2350 | TA700MA1 |
| 400 | MDLB2400 | HMDLB2400 | TA700MA1 |
| 450 | MDLB2450 | HMDLB2450 | TA700MA1 |
| 500 | MDLB2500 | HMDLB2500 | TA700MA1 |
| 600 | MDLB2600 | HMDLB2600 | TA700MA1 |
| 700 | MDLB2700 | HMDLB2700 | TA700MA1 |
| 800 | MDLB2800 | HMDLB2800 | TA800MA2 |

Types MDLB and HMDLB Thermal-Magnetic Circuit Breakers with Non-Interchangeable Trip Units—Three-Pole ^①

| Maximum Continuous Ampere Rating at 40 °C | Standard Interrupting Capacity | High Interrupting Capacity | Standard Terminals Only ^② |
|---|--|--|---|
| | 600 Vac Rated 50 kAIC at 480 Vac Factory Assembled Circuit Consisting of Frame, Trip Unit and Terminals Catalog Number | 600 Vac Rated 65 kAIC at 480 Vac Factory Assembled Circuit Consisting of Frame, Trip Unit and Terminals Catalog Number | See Page V4-T2-319 for Optional Terminals Catalog Number |
| 300 | MDLB3300 | HMDLB3300 | TA700MA1 |
| 350 | MDLB3350 | HMDLB3350 | TA700MA1 |
| 400 | MDLB3400 | HMDLB3400 | TA700MA1 |
| 450 | MDLB3450 | HMDLB3450 | TA700MA1 |
| 500 | MDLB3500 | HMDLB3500 | TA700MA1 |
| 600 | MDLB3600 | HMDLB3600 | TA700MA1 |
| 700 | MDLB3700 | HMDLB3700 | TA700MA1 |
| 800 | MDLB3800 | HMDLB3800 | TA800MA2 |

Notes

① Factory sealed for reverse feed application.

② Two terminals are required per pole.

Types MDL and HMDL Electronic Circuit Breakers with Interchangeable Trip Units

Order as Individual Components: breaker frame, trip unit and terminals.
See 310+ adjustability specifications on **Page V4-T2-322**.

Types MDL and HMDL Electronic Circuit Breakers with Interchangeable 310+ Trip Units—Three-Pole

| Maximum Continuous Ampere Rating at 40 °C | Circuit Breaker Frame Only | | Digitrip RMS 310+ Trip Unit Only ① | | | | Neutral CT for LSG and LSIG ②③ | Terminal Information |
|---|---|---|---|--|--|--|--------------------------------|----------------------|
| | Standard Interrupting Capacity 600 Vac Rated 50 kAIC at 480 Vac | High Interrupting Capacity 600 Vac Rated 65 kAIC at 480 Vac | Standard LS | Optional LSI | LSG | LSIG | | |
| | | | Adjustable Short Time Pickup with I ² t Short Delay Ramp | Independently Adjustable Short Time Pickup and Delay | Adjustable Short Time Pickup with I ² t Short Delay and Ground Fault Protection | Independently Adjustable Short Time Pickup and Ground Fault Protection | | |
| Catalog Number | Catalog Number | Catalog Number | Catalog Number | | | Catalog Number | | |
| 800 | MDL3800F | HMDL3800F | MES3800LS | MES3800LSI | MES3800LSG | MES3800LSIG | LGFACT600 | See Page V4-T2-320 |

Types MDLB and HMDLB Electronic Circuit Breakers with Non-Interchangeable 310+ Trip Units ④

| Maximum Continuous Ampere Rating at 40 °C | Factory-Assembled Circuit Breaker Consisting of Frame and Trip Unit Less Terminals | | | | | Neutral CT for LSG and LSIG ②③ |
|---|--|--|--|--|----------------|--------------------------------|
| | LS | LSI | LSG | LSIG | | |
| | Adjustable Short Time Pickup with I ² t Short Delay Ramp | Independently Adjustable Short Time Pickup and Delay | Adjustable Short Time Pickup with I ² t Short Delay and Ground Fault Protection | Independently Adjustable Short Time Pickup and Ground Fault Protection | Catalog Number | |
| Catalog Number | | | | | Catalog Number | |
| Three-Pole Standard Interrupting Capacity 600 Vac Rated 50 kAIC at 480 Vac | | | | | | |
| 800 | MDLB3800FT33W | MDLB3800FT32W | MDLB3800FT35W | MDLB3800FT36W | | LGFACT600 |
| Three-Pole High Interrupting Capacity 600 Vac Rated 65 kAIC at 480 Vac | | | | | | |
| 800 | HMDLB3800FT33W | HMDLB3800FT32W | HMDLB3800FT35W | HMDLB3800FT36W | | LGFACT600 |

100% Rated Types CMDL and CHMDL Electronic Circuit Breakers with Interchangeable Trip Units

The NEC allows the breaker to be rated at 100% of its frame size in an assembly, provided that 90 °C wire is applied at the 75 °C ampacity. All 100% rated circuit breakers have electronic trip units. Order as individual components: breaker frame, trip unit and terminals. See 310+ adjustability specifications on **Page V4-T2-322**.

100% Rated Types CMDL and CHMDL Electronic Circuit Breakers with Interchangeable 310+ Trip Units—Three-Pole

| Maximum Continuous Ampere Rating at 40 °C | Circuit Breaker Frame Only | | Digitrip RMS 310+ Trip Unit Only ① | | | | Neutral CT for LSG and LSIG ②③ | Terminal Information |
|---|---|---|---|--|--|--|--------------------------------|----------------------|
| | Standard Interrupting Capacity 600 Vac Rated 50 kAIC at 480 Vac | High Interrupting Capacity 600 Vac Rated 65 kAIC at 480 Vac | Standard LS | Options LSI | LSG | LSIG | | |
| | | | Adjustable Short Time Pickup with I ² t Short Delay Ramp | Independently Adjustable Short Time Pickup and Delay | Adjustable Short Time Pickup with I ² t Short Delay and Ground Fault Protection | Independently Adjustable Short Time Pickup and Ground Fault Protection | | |
| Catalog Number | Catalog Number | Catalog Number | Catalog Number | | | Catalog Number | | |
| 800 | CMDL3800F | CHMDL3800F | MES3800LS | MES3800LSI | MES3800LSG | MES3800LSIG | LGFACT600 | See Page V4-T2-320 |

Notes

- ① For AC use only.
- ② Required for four-wire systems if neutral protection is desired.
- ③ Included with LSG and LSIG trip units or breakers.
- ④ Factory sealed, suitable for reverse feed application. CMDLB and CHMDLB are also available.

Molded Case Switches

Eaton's molded case switches are used as compact switches in applications requiring high current switching capabilities. Molded case switches are constructed of circuit breaker

components and are of the high instantaneous automatic type. Molded case switches are listed in accordance with Underwriters Laboratories Standard UL 489.

Molded Case Switches

| Maximum Continuous Ampere Rating at 40 °C | 600 Vac Maximum, 250 Vdc Circuit Breaker Only without Line and Load Terminals Catalog Number |
|--|---|
| Two-Pole | |
| 800 | MDL2800WK |
| | MDLB2800WK ① |
| | HMDL2800WK |
| Three-Pole | |
| 800 | MDL3800WK |
| | MDLB3800WK ① |
| | HMDL3800WK |

Notes

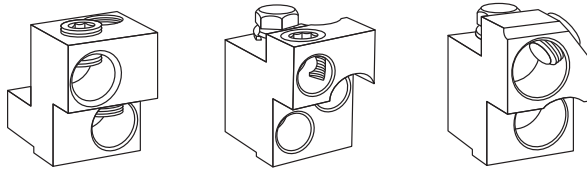
① MDLB and HMDLB are suitable for reverse feed applications.

Molded case switch may trip above 6000 amperes.

Accessories Selection Guide and Ordering Information

Line and Load Terminals

M-Frame circuit breakers use Cu/Al terminals as standard. When optional copper or Cu/Al terminals are required, order by catalog number. Specify if factory installation is required.



TA700MA1

TA800MA2

TA801MA

Line and Load Terminals

| Maximum Breaker Amperes | Terminal Body Material | Wire Type | AWG Wire Range/No. Conductors | Terminal Catalog Number | Terminals with Control Wire Termination Catalog Number |
|--|------------------------|-----------|-------------------------------|-------------------------|--|
| Standard Cu/Al Pressure Terminals | | | | | |
| 700 | Aluminum | Cu/Al | 1–500 kcmil (2) | TA700MA1 | TA700MA1CWT |
| 800 std. | Aluminum | Cu/Al | 3/0–400 kcmil (3) | TA800MA2 | TA800MA2CWT |
| 800 | Aluminum | Cu/Al | 500–750 kcmil (2) | TA801MA | TA801MACWT |
| Optional Copper and Cu/Al Pressure Type Terminals | | | | | |
| 600 | Copper | Cu | 2/0–500 kcmil (2) | T600MA1 | — |
| 800 | Copper | Cu | 3/0–300 kcmil (3) | T800MA1 | — |

Accessories

2

Allowable Accessory Combinations

Different combinations of accessories can be supplied, depending on the types of accessories and the number of poles in the circuit breaker.

MD Frame Accessories

| Description | Reference Page | Two-Pole ^① | | Three-Pole | | |
|--|----------------|-----------------------|-------|------------|--------|-------|
| | | Left | Right | Left | Center | Right |
| Internal Accessories (Only One Internal Accessory Per Pole) | | | | | | |
| Alarm lockout (Make/Break) | V4-T2-378 | ■ | ■ | ■ | | ■ |
| Alarm lockout (2Make/2Break) | V4-T2-378 | ■ | ■ | ■ | | ■ |
| Auxiliary switch (1A, 1B) | V4-T2-380 | ■ | ■ | ■ | | ■ |
| Auxiliary switch (2A, 2B) | V4-T2-380 | ■ | ■ | ■ | | ■ |
| Auxiliary switch (3A, 3B) | V4-T2-380 | ■ | ■ | ■ | | ■ |
| Auxiliary switch (1A, 1B) and alarm switch combination | V4-T2-382 | ■ | ■ | ■ | | ■ |
| Auxiliary switch (2A, 2B) and alarm switch combination | V4-T2-382 | ■ | ■ | ■ | | ■ |
| Shunt trip—standard ^② | V4-T2-385 | ■ | ■ | ■ | | ■ |
| Shunt trip—low energy ^② | V4-T2-387 | ■ | ■ | ■ | | ■ |
| Undervoltage release mechanism ^② | V4-T2-393 | ■ | ■ | ■ | | ■ |
| External Accessories | | | | | | |
| Rear fed terminals | V4-T2-414 | ● | ● | ● | ● | ● |
| Base mounting hardware | V4-T2-415 | | | | ● | |
| Terminal shields | V4-T2-417 | | | | ● | |
| Interphase barriers | V4-T2-417 | | | | ● | |
| Non-padlockable handle block | V4-T2-418 | | | | ■ | |
| Padlockable handle lock hasp | V4-T2-419 | □ | | □ | | □ |
| Key interlock kit | V4-T2-420 | □ | | □ | | □ |
| Sliding bar interlock—requires two breakers | V4-T2-421 | ● | ● | ● | ● | ● |
| Walking beam interlock—requires two breakers | V4-T2-421 | ● | ● | ● | ● | ● |
| Electrical (motor) operator | V4-T2-422 | ● | ● | ● | ● | ● |
| Plug-in adapters | V4-T2-424 | ● | ● | ● | ● | ● |
| Rear connecting studs | V4-T2-425 | ● | ● | ● | ● | ● |
| Panelboard connecting straps | V4-T2-426 | ● | ● | ● | ● | ● |
| Handle mechanisms | V4-T2-506 | ● | ● | ● | ● | ● |
| Handle extension | V4-T2-521 | ● | ● | ● | ● | ● |
| Solid-state (electronic) portable test kit | V4-T2-428 | ● | ● | ● | ● | ● |
| Modifications (Refer to Eaton) | | | | | | |
| Special calibration | — | ● | ● | ● | ● | ● |
| Moisture fungus treatment | V4-T2-218 | ● | ● | ● | ● | ● |
| Freeze-tested circuit breakers | — | ● | ● | ● | ● | ● |
| Marine/naval application | — | ● | ● | ● | ● | ● |

Legend

- Applicable in indicated pole position
- May be mounted on left or right pole—not both
- Accessory available/modification available

Notes

- ① Two-pole breaker supplied in three-pole frame. Current carrying parts omitted from center pole.
 ② Shunt trip and UVR cannot be mounted in right poles on MES trip units.

310+ Electronic Trip Unit Accessories

| Description | Catalog Number |
|--|--------------------------|
| Electronic portable test kit | MTST230V ^① |
| Trip unit tamper protection wire seal | 5108A03H01 |
| External neutral sensor | LGFACT600 ^② |
| Breaker-mount cause-of-trip indication | TRIP-LED |
| Breaker-mount ammeter module | DIGIVIEW |
| Remote-mount ammeter module | DIGIVIEWR06 ^③ |

Technical Data and Specifications

UL 489/CSA Interrupting Capacity Ratings ^④

| Circuit Breaker Type | Number of Poles | Interrupting Capacity (kA Symmetrical Amperes) | | | Volts DC ^{⑤⑥} |
|----------------------|-----------------|--|-----|-----|------------------------|
| | | Volts AC (50/60 Hz) | | | |
| | | 240 | 480 | 600 | 250 |
| MDL, MDLB | 2, 3 | 65 | 50 | 25 | 22 |
| CMDL | 2, 3 | 65 | 50 | 25 | — |
| HMDL, HMDLB | 2, 3 | 100 | 65 | 35 | 25 |
| CHMDL | 2, 3 | 100 | 65 | 35 | — |

IEC 947-2 Interrupting Capacity Ratings ^④

| Circuit Breaker Type | Number of Poles | Interrupting Capacity rms (kA Symmetrical Amperes) $I_{cu} \neq I_{cs}$ | | | Volts DC ^{⑤⑥} |
|----------------------|-----------------|---|-------|-------|------------------------|
| | | Volts AC (50/60 Hz) | | | |
| | | 240 | 415 | 690 | 250 |
| MDL, MDLB | 2, 3 | 65/65 | 50/50 | 20/10 | 20/10 |
| CMDL | 2, 3 | 65/65 | 50/50 | 20/10 | — |
| HMDL, HMDLB | 2, 3 | 100/100 | 70/50 | 25/13 | 20/10 |
| CHMDL | 2, 3 | 100/100 | 70/50 | 25/13 | — |

Notes

- ① MTST230V applies to 100–230 Vac.
- ② Included with all LD LSG and LSIG trip units and breakers.
- ③ Includes 6 ft cable for remote mounting; NEMA 3R rated.
- ④ Utilization Category A circuit breakers.
- ⑤ Two-pole or two poles of three-pole circuit breaker. Thermal-magnetic trip units only. MDL, HMDL breakers with electronic trip unit are not DC rated.
- ⑥ Time constant is 3 milliseconds minimum at 10 kA and 8 milliseconds at 22 kA.

310+ Specifications

| Description | Specification |
|---|---------------------------------|
| Trip Unit Type | Digitrip RMS 310+ |
| Breaker Type | |
| Frame designation | MDL |
| Frames available | 800 A |
| Continuous current range (A) | 320–800 A |
| Ground fault pickup (A) | 160–800 A |
| Interrupting capacities at 480 Vac (kAIC) | 50, 65 |
| 100% rated | Yes |
| Protection | |
| Ordering options | LS, LSI, LSG, LSIG, ALSI, ALSIG |
| Arcflash Reduction Maintenance System (or Maintenance Mode) | Remote enabled on ALSI, ALSIG |
| Interchangeable trip unit | Yes |
| High load alarm (suffix B20) ① | Yes |
| Ground fault alarm with trip (suffix B21) ① | LSG, LSIG, ALSIG |
| Ground fault alarm, no trip (suffix B22) ① | LSG, LSIG, ALSIG |
| Zone selective interlocking (suffix ZG) | LSI, LSIG, ALSI, ALSIG |
| Cause of trip indication | Yes (via TRIP-LED or DIGIVIEW) |
| Thru-cover accessories | No |

310+ Adjustability Specifications

| Description | MDL Frame Specification | |
|--|-------------------------|---------|
| 310+ settings | 800 A | |
| I_r = continuous current or long delay pickup (amperes) (All 310+) | I_r | |
| | A | 320 |
| | B | 400 |
| | C | 450 |
| | D | 500 |
| | E | 600 |
| | F | 630 |
| | G | 700 |
| | H (= I_n) | 800 |
| t_r = long delay time (seconds) (All 310+) | 2 | 2 |
| | 4 | 4 |
| | 7 | 7 |
| | 10 | 10 |
| | 12 | 12 |
| | 15 | 15 |
| | 20 | 20 |
| | 24 | 24 |
| I_{sd} (x I_r) = short delay pickup (All 310+) | Position 1 | 2x |
| | Position 2 | 3x |
| | Position 3 | 4x |
| | Position 4 | 5x |
| | Position 5 | 6x |
| | Position 6 | 7x |
| | Position 7 | 8x |
| | Position 8 | 8x |
| | Position 9 | 8x |
| t_{sd} = short delay time I^2t (milliseconds) (LS and LSG) | Fixed | 67 @10x |
| t_{sd} = short delay time flat (milliseconds) (LSI, LSIG, ALSI, ALSIG) | Position 1 | Inst |
| | Position 2 | 120 |
| | Position 3 | 300 |
| I_g (x I_n) = ground fault pickup (amperes) (310+ w/ ground fault) | Position 1 | 160 |
| | Position 2 | 240 |
| | Position 3 | 320 |
| | Position 4 | 480 |
| | Position 5 | 640 |
| | Position 6 | 800 |
| t_g = ground fault delay time (milliseconds) (LSG, LSIG, ALSIG) | Position 1 | Inst |
| | Position 2 | 120 |
| | Position 3 | 300 |
| Independently adjustable Instantaneous (Ii) setting | ② | |
| Maintenance Mode pickup (2.5 x I_n) (amperes) (310+ with Maintenance Mode—ALSI and ALSIG) | Fixed | 2000 |

Notes

- ① B2x suffixes cannot be combined with B2x suffixes.
- ② Not available for MDL. Independently adjustable Ii setting available in LG, NG, and RG ALSI and ALSIG trip units.

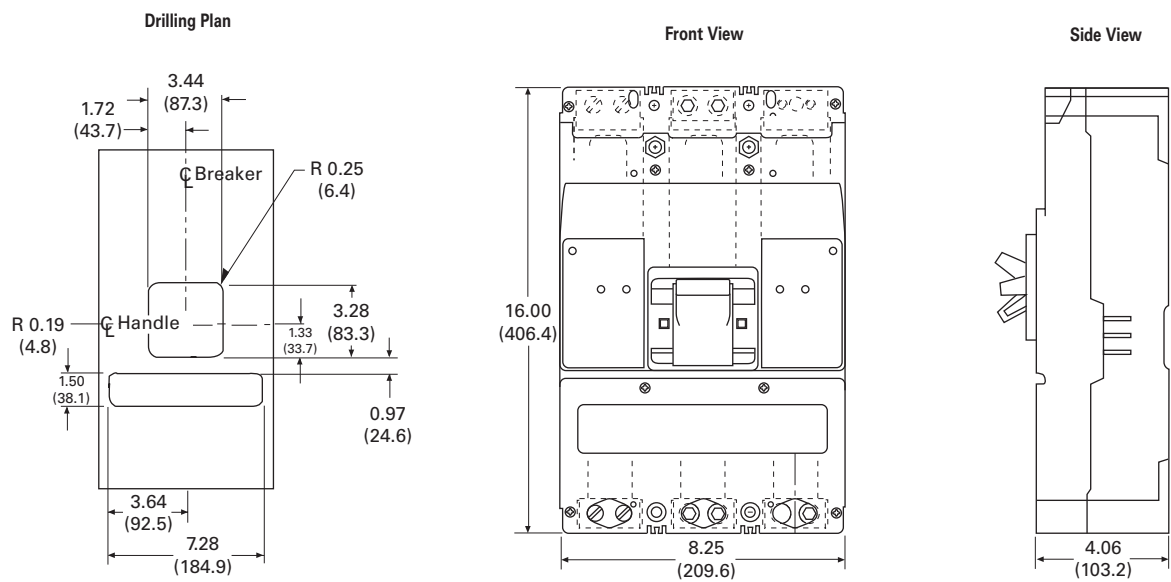
Dimensions and Weights

Dimensions in Inches (mm)

MD Frame

| Number of Poles | Width | Height | Depth |
|-----------------|--------------|---------------|--------------|
| 2, 3 | 8.25 (209.6) | 16.00 (406.4) | 4.06 (103.1) |

MDL-Frame, Two- and Three-Pole



Approximate Shipping Weight, Lbs (kg)

MD Frame

| Breaker Type | Complete Breaker | | Frame Only | | Trip Unit ① | |
|------------------------|------------------|-------------|-------------|-------------|-------------|------------|
| | Two-Pole | Three-Pole | Two-Pole | Three-Pole | Two-Pole | Three-Pole |
| MDL, HMDL (T/M T.U.) | 26.5 (12.0) | 29.0 (13.2) | 24.5 (11.1) | 26.0 (11.8) | 2.5 (1.1) | 3.0 (1.4) |
| MDL, HMDL (Elec. T.U.) | — | 30.0 (13.6) | — | 26.0 (11.8) | — | 4.0 (1.8) |

Note

① Thermal-magnetic only.

Typical N-Frame Breaker

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Contents

| <i>Description</i> | <i>Page</i> |
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| Quick Reference | V4-T2-220 |
| G-Frame (15–100 Amperes) | V4-T2-223 |
| F-Frame (10–225 Amperes) | V4-T2-237 |
| J-Frame (70–250 Amperes) | V4-T2-255 |
| K-Frame (70–400 Amperes) | V4-T2-263 |
| L-Frame (125–600 Amperes) | V4-T2-287 |
| M-Frame (300–800 Amperes) | V4-T2-313 |
| N-Frame (400–1200 Amperes) | |
| Catalog Number Selection | V4-T2-325 |
| Product Selection | V4-T2-326 |
| Accessories | V4-T2-334 |
| Technical Data and Specifications | V4-T2-335 |
| Dimensions and Weights | V4-T2-338 |
| R-Frame (800–2500 Amperes) | V4-T2-339 |
| Motor Circuit Protectors (MCP) | V4-T2-358 |
| Motor Protection Circuit Breakers (MPCB) | V4-T2-369 |
| Type ELC Current Limiter Attachment (Size 0–4) | V4-T2-371 |
| Current Limiting Circuit Breaker Module | V4-T2-372 |
| Internal Accessories | V4-T2-375 |
| External Accessories | V4-T2-408 |

N-Frame (400–1200 Amperes)

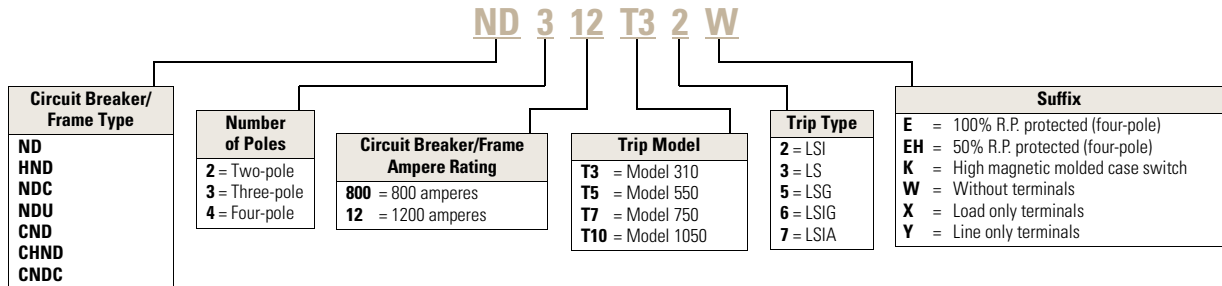
Product Description

- All Eaton N-Frame circuit breakers are suitable for reverse feed use
- All N-Frame circuit breakers are HACR rated

Catalog Number Selection

This information is presented only as an aid to understanding catalog numbers. It is not to be used to build catalog numbers for circuit breakers or trip units.

Circuit Breaker/Frame



2.4

Molded Case Circuit Breakers

Series C

Product Selection

2

Digitrip OPTIM Electronic Circuit Breakers with Interchangeable Rating Plugs

Order as individual components: breaker frame (which includes trip unit), rating plug, terminals.

Digitrip OPTIM 550 Electronic Circuit Breakers with Interchangeable Rating Plugs

| Maximum Continuous Ampere Rating at 40 °C | Circuit Breaker Frame Only | | | Digitrip OPTIM Rating Plug Only | |
|---|----------------------------|---------------------|---------------------|---|----------------------------------|
| | LSI Catalog Number | LSIG Catalog Number | LSIA Catalog Number | Ampere Rating | Fixed Rating Plug Catalog Number |
| L – Adjustable Long Delay Pickup (I _r) with Adjustable Long Delay Time (I ² t or I ⁴ t Response) ^① S – Adjustable Short Delay Pickup with Adjustable Short Delay Time (I ² t or Flat Response) I – Adjustable Instantaneous Pickup G – Adjustable Ground Fault Pickup with Adjustable Ground Fault Time Delay (I ² t or Flat Response) A – Adjustable Ground Fault Alarm with Adjustable Ground Fault Time Delay (I ² t or Flat Response) OPTIM 550 ^② | | | | | |
| Three-Pole Standard Interrupting Capacity 600 Vac Rated 50 kAIC at 480 Vac | | | | | |
| 800 | ND3800T52W | ND3800T56W | ND3800T57W | 400 | ORPN80A400 |
| | | | | 450 | ORPN80A450 |
| | | | | 500 | ORPN80A500 |
| | | | | 550 | ORPN80A550 |
| | | | | 600 | ORPN80A600 |
| | | | | 700 | ORPN80A700 |
| 1200 | ND312T52W | ND312T56W | ND312T57W | 600 | ORPN12A600 |
| | | | | 700 | ORPN12A700 |
| | | | | 800 | ORPN12A800 |
| | | | | 1000 | ORPN12A100 |
| | | | | 1200 | ORPN12A120 |
| | | | | Three-Pole High Interrupting Capacity 600 Vac Rated 65 kAIC at 480 Vac | |
| 800 | HND3800T52W | HND3800T56W | HND3800T57W | 400 | ORPN80A400 |
| | | | | 450 | ORPN80A450 |
| | | | | 500 | ORPN80A500 |
| | | | | 550 | ORPN80A550 |
| | | | | 600 | ORPN80A600 |
| | | | | 700 | ORPN80A700 |
| 1200 | HND312T52W | HND312T56W | HND312T57W | 600 | ORPN12A600 |
| | | | | 700 | ORPN12A700 |
| | | | | 800 | ORPN12A800 |
| | | | | 1000 | ORPN12A100 |
| | | | | 1200 | ORPN12A120 |

Notes

^① Long delay I⁴t response selection limits short delay time to flat response.

^② Zone interlocking, PowerNet, or both features can be added at the factory by adding suffixes **ZG**, **PN** or **ZGP** respectively to above catalog number.

Digitrip OPTIM 550 Electronic Circuit Breakers with Interchangeable Rating Plugs, continued

| Maximum Continuous Ampere Rating at 40 °C | Circuit Breaker Frame Only | | | Digitrip OPTIM Rating Plug Only | |
|--|---|---------------------------|---------------------------|---------------------------------|---|
| | LSI Catalog Number | LSIG Catalog Number | LSIA Catalog Number | Ampere Rating | Fixed Rating Plug Catalog Number |
| | L – Adjustable Long Delay Pickup (I ₁) with Adjustable Long Delay Time (I ² t or I ⁴ t Response) ^① S – Adjustable Short Delay Pickup with Adjustable Short Delay Time (I ² t or Flat Response) I – Adjustable Instantaneous Pickup G – Adjustable Ground Fault Pickup with Adjustable Ground Fault Time Delay (I ² t or Flat Response) A – Adjustable Ground Fault Alarm with Adjustable Ground Fault Time Delay (I ² t or Flat Response) OPTIM 550 ^② | | | | |
| Three-Pole Ultra High Interrupting Capacity 600 Vac Rated 100 kAIC at 480 Vac | | | | | |
| 800 | NDC3800T52W | NDC3800T56W | NDC3800T57W | 400 | ORPN80A400 |
| | | | | 450 | ORPN80A450 |
| | | | | 500 | ORPN80A500 |
| | | | | 550 | ORPN80A550 |
| | | | | 600 | ORPN80A600 |
| | | | | 700 | ORPN80A700 |
| | | | | 800 | ORPN80A800 |
| 1200 | NDC312T52W | NDC312T56W | NDC312T57W | 600 | ORPN12A600 |
| | | | | 700 | ORPN12A700 |
| | | | | 800 | ORPN12A800 |
| | | | | 1000 | ORPN12A100 |
| | | | | 1200 | ORPN12A120 |

Notes

- ^① Long delay I⁴t response selection limits short delay time to flat response.
^② Zone interlocking, PowerNet, or both features can be added at the factory by adding suffixes **ZG**, **PN** or **ZGP** respectively to above catalog number.

Digitrip OPTIM 1050 Electronic Circuit Breakers with Interchangeable Rating Plugs

| Maximum Continuous Ampere Rating at 40 °C | Circuit Breaker Frame Only | | Digitrip OPTIM Rating Plug Only | |
|--|--|---------------------------|---------------------------------|---|
| | LSIG Catalog Number | LSIA Catalog Number | Ampere Rating | Fixed Rating Plug Catalog Number |
| | L– Adjustable Long Delay Pickup (I_L) with Adjustable Long Delay Time (I^2t or I^4t Response) ① S– Adjustable Short Delay Pickup with Adjustable Short Delay Time (I^2t or Flat Response) I– Adjustable Instantaneous Pickup G– Adjustable Ground Fault Pickup with Adjustable Ground Fault Time Delay (I^2t or Flat Response) A– Adjustable Ground Fault Alarm with Adjustable Ground Fault Time Delay (I^2t or Flat Response) OPTIM 1050 ②③ | | | |
| Three-Pole Standard Interrupting Capacity 600 Vac Rated 50 kAIC at 480 Vac | | | | |
| 800 | ND3800T106W | ND3800T107W | 400 | ORPN80A400 |
| | | | 450 | ORPN80A450 |
| | | | 500 | ORPN80A500 |
| | | | 550 | ORPN80A550 |
| | | | 600 | ORPN80A600 |
| | | | 700 | ORPN80A700 |
| | | | 800 | ORPN80A800 |
| 1200 | ND312T106W | ND312T107W | 600 | ORPN12A600 |
| | | | 700 | ORPN12A700 |
| | | | 800 | ORPN12A800 |
| | | | 1000 | ORPN12A100 |
| | | | 1200 | ORPN12A120 |
| Three-Pole High Interrupting Capacity 600 Vac Rated 65 kAIC at 480 Vac | | | | |
| 800 | HND3800T106W | HND3800T107W | 400 | ORPN80A400 |
| | | | 450 | ORPN80A450 |
| | | | 500 | ORPN80A500 |
| | | | 550 | ORPN80A550 |
| | | | 600 | ORPN80A600 |
| | | | 700 | ORPN80A700 |
| | | | 800 | ORPN80A800 |
| 1200 | HND312T106W | HND312T107W | 600 | ORPN12A600 |
| | | | 700 | ORPN12A700 |
| | | | 800 | ORPN12A800 |
| | | | 1000 | ORPN12A100 |
| | | | 1200 | ORPN12A120 |
| Three-Pole Ultra High Interrupting Capacity 600 Vac Rated 100 kAIC at 480 Vac | | | | |
| 800 | NDC3800T106W | NDC3800T107W | 400 | ORPN80A400 |
| | | | 450 | ORPN80A450 |
| | | | 500 | ORPN80A500 |
| | | | 550 | ORPN80A550 |
| | | | 600 | ORPN80A600 |
| | | | 700 | ORPN80A700 |
| | | | 800 | ORPN80A800 |
| 1200 | NDC312T106W | NDC312T107W | 600 | ORPN12A600 |
| | | | 700 | ORPN12A700 |
| | | | 800 | ORPN12A800 |
| | | | 1000 | ORPN12A100 |
| | | | 1200 | ORPN12A120 |

Notes

- ① Long delay I^4t response selection limits short delay time to flat response.
 ② One Form C auxiliary switch and one Form C bell (trip) alarm switch supplied with breaker as standard.
 ③ Factory sealed.

100% Rated Digitrip OPTIM Circuit Breakers with Interchangeable Rating Plugs

Order as individual components: breaker frame (which includes trip unit), rating plug, terminals.

100% Rated Digitrip OPTIM 550 Circuit Breakers with Interchangeable Rating Plugs

| Maximum Continuous Ampere Rating at 40 °C | Circuit Breaker Frame Only | | | Digitrip OPTIM Rating Plug Only | |
|---|----------------------------|----------------|----------------|---------------------------------|----------------------------------|
| | LSI | LSIG | LSIA | Ampere Rating | Fixed Rating Plug Catalog Number |
| | Catalog Number | Catalog Number | Catalog Number | | |
| Three-Pole Standard Interrupting Capacity 600 Vac Rated 50 kAIC at 480 Vac | | | | | |
| 800 | CND3800T52W | CND3800T56W | CND3800T57W | 400 | ORPN80A400 |
| | | | | 450 | ORPN80A450 |
| | | | | 500 | ORPN80A500 |
| | | | | 550 | ORPN80A550 |
| | | | | 600 | ORPN80A600 |
| | | | | 700 | ORPN80A700 |
| | | | | 800 | ORPN80A800 |
| 1200 ^③ | CND312T52W | CND312T56W | CND312T57W | 600 | ORPN12A600 |
| | | | | 700 | ORPN12A700 |
| | | | | 800 | ORPN12A800 |
| | | | | 1000 | ORPN12A100 |
| | | | | 1200 | ORPN12A120 |
| Three-Pole High Interrupting Capacity 600 Vac Rated 65 kAIC at 480 Vac | | | | | |
| 800 | CHND3800T52W | CHND3800T56W | CHND3800T57W | 400 | ORPN80A400 |
| | | | | 450 | ORPN80A450 |
| | | | | 500 | ORPN80A500 |
| | | | | 550 | ORPN80A550 |
| | | | | 600 | ORPN80A600 |
| | | | | 700 | ORPN80A700 |
| | | | | 800 | ORPN80A800 |
| 1200 ^③ | CHND312T52W | CHND312T56W | CHND312T57W | 600 | ORPN12A600 |
| | | | | 700 | ORPN12A700 |
| | | | | 800 | ORPN12A800 |
| | | | | 1000 | ORPN12A100 |
| | | | | 1200 | ORPN12A120 |

Notes

- ① Long delay I⁴t response selection limits short delay time to flat response.
- ② Zone interlocking, PowerNet, or both features can be added at the factory by adding suffixes **ZG**, **PN** or **ZGP** respectively to above catalog number.
- ③ Includes conductor extension kit, which increases breaker length 3.75 on each end. Terminal ordered separate.

100% Rated Digitrip OPTIM 550 Circuit Breakers with Interchangeable Rating Plugs, continued

| Maximum Continuous Ampere Rating at 40 °C | Circuit Breaker Frame Only | | | Digitrip OPTIM Rating Plug Only | |
|--|--|---------------------|---------------------|---------------------------------|----------------------------------|
| | LSI Catalog Number | LSIG Catalog Number | LSIA Catalog Number | Ampere Rating | Fixed Rating Plug Catalog Number |
| | OPTIM 550 ^② L – Adjustable Long Delay Pickup (I _l) with Adjustable Long Delay Time (I ² t or I ⁴ t Response) ^① S – Adjustable Short Delay Pickup with Adjustable Short Delay Time (I ² t or Flat Response) I – Adjustable Instantaneous Pickup G – Adjustable Ground Fault Pickup with Adjustable Ground Fault Time Delay (I ² t or Flat Response) A – Adjustable Ground Fault Alarm with Adjustable Ground Fault Time Delay (I ² t or Flat Response) | | | | |
| Three-Pole Ultra High Interrupting Capacity 600 Vac Rated 100 kAIC at 480 Vac | | | | | |
| 800 | CNDC3800T52W | CNDC3800T56W | CNDC3800T57W | 400 | ORPN80A400 |
| | | | | 450 | ORPN80A450 |
| | | | | 500 | ORPN80A500 |
| | | | | 550 | ORPN80A550 |
| | | | | 600 | ORPN80A600 |
| | | | | 700 | ORPN80A700 |
| | | | | 800 | ORPN80A800 |
| 1200 ^③ | CNDC312T52W | CNDC312T56W | CNDC312T57W | 600 | ORPN12A600 |
| | | | | 700 | ORPN12A700 |
| | | | | 800 | ORPN12A800 |
| | | | | 1000 | ORPN12A100 |
| | | | | 1200 | ORPN12A120 |

Notes

- ① Long delay I⁴t response selection limits short delay time to flat response.
- ② Zone interlocking, PowerNet, or both features can be added at the factory by adding suffixes **ZG**, **PN** or **ZGP** respectively to above catalog number.
- ③ Includes conductor extension kit, which increases breaker length 3.75 on each end. Terminal ordered separate.

100% Rated Digitrip OPTIM 1050 Circuit Breakers with Interchangeable Rating Plugs

| Maximum Continuous Ampere Rating at 40 °C | Circuit Breaker Frame Only | | Digitrip OPTIM Rating Plug Only | |
|---|---|---------------------------|---------------------------------|---|
| | LSIG Catalog Number | LSIA Catalog Number | Ampere Rating | Fixed Rating Plug Catalog Number |
| | OPTIM 1050 ②③ | | | |
| | L – Adjustable Long Delay Pickup (I_L) with Adjustable Long Delay Time (I^2t or I^4t Response) ① | | | |
| | S – Adjustable Short Delay Pickup with Adjustable Short Delay Time (I^2t or Flat Response) | | | |
| | I – Adjustable Instantaneous Pickup | | | |
| | G – Adjustable Ground Fault Pickup with Adjustable Ground Fault Time Delay (I^2t or Flat Response) | | | |
| | A – Adjustable Ground Fault Alarm with Adjustable Ground Fault Time Delay (I^2t or Flat Response) | | | |
| Three-Pole Standard Interrupting Capacity 600 Vac Rated 50 kAIC at 480 Vac | | | | |
| 800 | CND3800T106W | CND3800T107W | 400 | ORPN80A400 |
| | | | 450 | ORPN80A450 |
| | | | 500 | ORPN80A500 |
| | | | 550 | ORPN80A550 |
| | | | 600 | ORPN80A600 |
| | | | 700 | ORPN80A700 |
| | | | 800 | ORPN80A800 |
| 1200 | CND312T106W | CND312T107W | 600 | ORPN12A600 |
| | | | 700 | ORPN12A700 |
| | | | 800 | ORPN12A800 |
| | | | 1000 | ORPN12A100 |
| | | | 1200 | ORPN12A120 |
| Three-Pole High Interrupting Capacity 600 Vac Rated 65 kAIC at 480 Vac | | | | |
| 800 | CHND3800T106W | CHND3800T107W | 400 | ORPN80A400 |
| | | | 450 | ORPN80A450 |
| | | | 550 | ORPN80A550 |
| | | | 600 | ORPN80A600 |
| | | | 700 | ORPN80A700 |
| | | | 800 | ORPN80A800 |
| 1200 | CHND312T106W | CHND312T107W | 600 | ORPN12A600 |
| | | | 700 | ORPN12A700 |
| | | | 800 | ORPN12A800 |
| | | | 1000 | ORPN12A100 |
| | | | 1200 | ORPN12A120 |

Notes

- ① Long delay I^4t response selection limits short delay time to flat response.
 ② One Form C auxiliary switch one Form C bell (trip) alarm switch supplied with breaker as standard.
 ③ Factory sealed.

100% Rated Digitrip OPTIM 1050 Circuit Breakers with Interchangeable Rating Plugs, continued

| Maximum Continuous Ampere Rating at 40 °C | Circuit Breaker Frame Only | | Digitrip OPTIM Rating Plug Only | |
|--|--|---------------------|---------------------------------|----------------------------------|
| | LSIG Catalog Number | LSIA Catalog Number | Ampere Rating | Fixed Rating Plug Catalog Number |
| | OPTIM 1050 ^{②③} L – Adjustable Long Delay Pickup (I_L) with Adjustable Long Delay Time (I^2t or I^4t Response) ^① S – Adjustable Short Delay Pickup with Adjustable Short Delay Time (I^2t or Flat Response) I – Adjustable Instantaneous Pickup G – Adjustable Ground Fault Pickup with Adjustable Ground Fault Time Delay (I^2t or Flat Response) A – Adjustable Ground Fault Alarm with Adjustable Ground Fault Time Delay (I^2t or Flat Response) | | | |
| Three-Pole Ultra High Interrupting Capacity 600 Vac Rated 100 kAIC at 480 Vac | | | | |
| 800 | CND3800T106W | CND3800T107W | 400 | ORPN80A400 |
| | | | 450 | ORPN80A450 |
| | | | 500 | ORPN80A500 |
| | | | 550 | ORPN80A550 |
| | | | 600 | ORPN80A600 |
| | | | 700 | ORPN80A700 |
| | | | 800 | ORPN80A800 |
| 1200 | CND312T106W ^④ | CND312T107W | 600 | ORPN12A600 |
| | | | 700 | ORPN12A700 |
| | | | 800 | ORPN12A800 |
| | | | 1000 | ORPN12A100 |
| | | | 1200 | ORPN12A120 |

Type ND Molded Case Switches

Type ND High Instantaneous (K)

| Continuous Ampere Rating at 40 °C | Three-Pole Catalog Number | Four-Pole ^⑤ Catalog Number |
|-----------------------------------|---------------------------|---------------------------------------|
| 800 | ND3800WK | ND4800WK |
| | HND3800WK | HND4800WK |
| 1200 | ND312WK | ND412WK |
| | HND312WK | HND412WK |

Notes

- ① Long delay I^4t response selection limits short delay time to flat response.
- ② One Form C auxiliary switch one Form C bell (trip) alarm switch supplied with breaker as standard.
- ③ Factory sealed.
- ④ Includes conductor extension kit, which increases breaker length 3.75 on each end. Terminal ordered separate.
- ⑤ Neutral is in right pole.

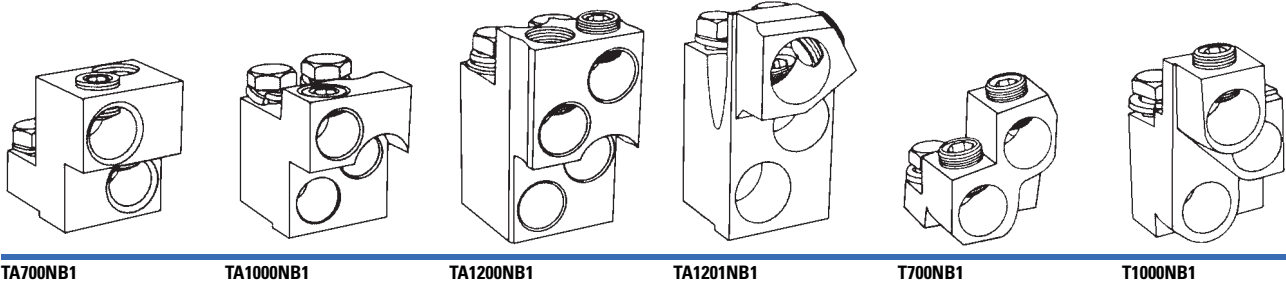
Molded case switch will trip above 14,000 amperes.

For UL listed, series tested molded case switch application data, refer to Eaton.

Accessories Selection Guide and Ordering Information

Line and Load Terminals—Ordering Information

N-Frame circuit breakers use Cu/Al terminals as standard. When optional copper or Cu/Al terminals are required, order by catalog number. Specify if factory installation is required.



Line and Load Terminals

| Maximum Breaker Amperes | Terminal Body Material | Wire Type | AWG Wire Range/ No. Conductors | Metric Wire Range mm ² | Catalog Number |
|--|------------------------|-----------|-----------------------------------|-----------------------------------|--------------------|
| Standard Cu/Al Pressure Terminals | | | | | |
| 700 | Aluminum | Cu/Al | 1–500 kcmil (2) | 50–240 | TA700NB1 |
| 1000 | Aluminum | Cu/Al | 3/0–400 kcmil (3) | 95–185 | TA1000NB1 ① |
| 1200 | Aluminum | Cu/Al | 4/0–500 kcmil (4) | 120–240 | TA1200NB1 ① |
| 1200 | Aluminum | Cu/Al | 500–750 kcmil (3) | 300–400 | TA1201NB1 ② |
| Optional Copper and Cu/Al Pressure Type Terminals | | | | | |
| 700 | Copper | Cu | 2/0–500 kcmil (2) | 70–240 | T700NB1 |
| 1000 | Copper | Cu | 3/0–500 kcmil (3) | 95–240 | T1000NB1 |
| 1200 | Copper | Cu | 3/0–400 kcmil (4) | 95–185 | T1200NB3 |

Notes

① Terminal rating is AL9CU.

② Terminal rating is AL7CU.

Accessories

Allowable Accessory Combinations

Different combinations of accessories can be supplied, depending on the types of accessories and the number of poles in the circuit breaker.

ND Frame Accessories

| Description | Reference Page | Three-Pole | | | Four-Pole | | | Neutral |
|--|----------------|------------|--------|-------|-----------|--------|-------|---------|
| | | Left | Center | Right | Left | Center | Right | |
| Internal Accessories (Only One Internal Accessory Per Pole) ① | | | | | | | | |
| Alarm lockout (1Make/Break) | V4-T2-378 | ■ | | ■ | ■ | | ■ | |
| Alarm lockout (2Make/2Break) | V4-T2-378 | ■ | | ■ | ■ | | ■ | |
| Auxiliary switch (1A, 1B) | V4-T2-380 | ■ | | ■ | ■ | | ■ | |
| Auxiliary switch (2A, 2B) | V4-T2-380 | ■ | | ■ | ■ | | ■ | |
| Auxiliary switch (3A, 3B) | V4-T2-380 | ■ | | ■ | ■ | | ■ | |
| Auxiliary switch (1A, 1B) and alarm switch combination | V4-T2-382 | ■ | | ■ | ■ | | ■ | |
| Auxiliary switch (2A, 2B) and alarm switch combination | V4-T2-382 | ■ | | ■ | ■ | | ■ | |
| Shunt trip—standard | V4-T2-386 | ■ | | | ■ | | | |
| Shunt trip—low energy | V4-T2-387 | ■ | | | ■ | | | |
| Undervoltage release mechanism | V4-T2-394 | ■ | | | ■ | | | |
| Eaton PowerNet communications kit (OPTIM 550) | V4-T2-395 | | | ■ | | | | |
| External Accessories | | | | | | | | |
| Base mounting hardware | V4-T2-415 | ● | ● | ● | ● | ● | ● | ● |
| Interphase barriers | V4-T2-417 | ● | ● | ● | ● | ● | ● | ● |
| Terminal shield | V4-T2-417 | ■ | ■ | ■ | | | | |
| Non-padlockable handle block | V4-T2-418 | | ■ | | | ■ | | |
| Padlockable handle lock hasp | V4-T2-419 | □ | | □ | □ | | □ | |
| Key interlock kit | V4-T2-420 | □ | | □ | □ | | □ | |
| Sliding bar interlock—requires two breakers | V4-T2-421 | ● | ● | ● | | | | |
| Walking beam interlock—requires two breakers | V4-T2-421 | ● | ● | ● | ● | ● | ● | ● |
| Electrical (motor) operator | V4-T2-423 | ● | ● | ● | ● | ● | ● | ● |
| Plug-in adapters | V4-T2-424 | ● | ● | ● | ● | ● | ● | ● |
| Rear connecting studs | V4-T2-425 | ● | ● | ● | ● | ● | ● | ● |
| Panelboard connecting straps | V4-T2-426 | ● | ● | ● | ● | ● | ● | ● |
| Handle mechanisms | V4-T2-506 | ● | ● | ● | ● | ● | ● | ● |
| Handle extension | V4-T2-521 | ● | ● | ● | ● | ● | ● | ● |
| Solid-state (electronic) portable test kit | V4-T2-429 | ● | ● | ● | ● | ● | ● | ● |
| OPTIM System Components Three Poles | | | | | | | | |
| Ground fault alarm unit | V4-T2-428 | | | | | | | |
| Potential transformer module | V4-T2-428 | | | | | | | |
| Breaker interface module (BIM) | V4-T2-429 | | | | | | | |
| Digitrip OPTIMizer | V4-T2-429 | | | | | | | |
| Auxiliary power module | V4-T2-429 | | | | | | | |
| Modifications (Refer to Eaton) | | | | | | | | |
| Special calibration | — | ● | ● | ● | ● | ● | ● | ● |
| Moisture fungus treatment | V4-T2-218 | ● | ● | ● | ● | ● | ● | ● |
| Freeze-tested circuit breakers | — | ● | ● | ● | ● | ● | ● | ● |
| Marine/naval application | — | ● | ● | ● | ● | ● | ● | ● |

Legend

- Applicable in indicated pole position
- May be mounted on left or right pole—not both
- Accessory available/modification available

Note

① OPTIM 550 and 1050 are factory sealed and do not have the right pole available for accessories.

Technical Data and Specifications

UL 489 Interrupting Capacity Ratings ^①

| Circuit Breaker Type | Number of Poles | Interrupting Capacity (kA Symmetrical Amperes) | | | |
|----------------------|-----------------|--|-----|-----|-----------------|
| | | Volts AC (50/60 Hz) | | | |
| | | 240 | 277 | 480 | 600 |
| ND | 2, 3, 4 | 65 | — | 50 | 25 |
| CND ^② | 2, 3, 4 | 65 | — | 50 | 25 |
| HND | 2, 3, 4 | 100 | — | 65 | 35 |
| CHND ^② | 2, 3, 4 | 100 | — | 65 | 35 |
| NDC | 2, 3, 4 | 200 | — | 100 | 65 |
| CNDC ^② | 2, 3, 4 | 200 | — | 100 | 65 |
| NDU ^③ | 3 | 300 ^④ | — | 150 | 75 ^⑤ |

IEC 947-2 Interrupting Capacity Ratings ^①

| Circuit Breaker Type | Number of Poles | Interrupting Capacity (kA Symmetrical Amperes) | | |
|--------------------------|-----------------|--|-----|-----|
| | | Volts AC (50/60 Hz) | | |
| | | 240 | 415 | 690 |
| ND | | | | |
| I_{CU} | 2, 3, 4 | 85 | 50 | 20 |
| I_{CS} | 2, 3, 4 | 85 | 50 | 10 |
| CND ^② | | | | |
| I_{CU} | 2, 3, 4 | 85 | 50 | 20 |
| I_{CS} | 2, 3, 4 | 85 | 50 | 10 |
| HND | | | | |
| I_{CU} | 2, 3, 4 | 100 | 70 | 25 |
| I_{CS} | 2, 3, 4 | 100 | 50 | 13 |
| CHND ^② | | | | |
| I_{CU} | 2, 3, 4 | 100 | 70 | 25 |
| I_{CS} | 2, 3, 4 | 100 | 50 | 13 |
| NDC | | | | |
| I_{CU} | 2, 3, 4 | 200 | 100 | 35 |
| I_{CS} | 2, 3, 4 | 100 | 50 | 18 |
| CNDC ^② | | | | |
| I_{CU} | 2, 3, 4 | 200 | 100 | 35 |
| I_{CS} | 2, 3, 4 | 100 | 50 | 18 |

Notes

- ① Utilization Category A circuit breakers.
- ② 100% rated breakers.
- ③ 800 amperes maximum rating.
- ④ Successfully tested at 300 kAIC, although UL recognizes maximum of 200 kAIC at 240 Vac.
- ⑤ Successfully tested at 75 kAIC, although UL recognizes maximum of 65 kAIC at 600 Vac.

N-Frame Digitrip

| Trip Unit Type | Digitrip OPTIM 550 | Digitrip OPTIM 1050 |
|--|--------------------------|--------------------------|
| rms sensing | Yes | Yes |
| Breaker Type | | |
| Frame | N | N |
| Ampere range | 400–1200 A | 400–1200 A |
| Interrupting rating at 480 volts | 50, 65, 100 (kA) | 50, 65, 100 (kA) |
| Protection | | |
| Ordering options | LSI, LSIG, LSI(A) | LSI(A), LISG |
| Fixed rated plug (I_n) | Yes | Yes |
| Overtemperature trip | Yes | Yes |
| Long Delay Protection (L) | | |
| Adjustable rating plug (I_n) | No | No |
| Long delay pickup | $0.4-1.0 \times (I_n)$ | $0.4-1.0 \times (I_n)$ |
| Long delay time I^2t | 2–24 seconds | 2–24 seconds |
| Long delay time I^4t | 1–5 seconds | 1–5 seconds |
| Long delay thermal memory | Yes | Yes |
| High load alarm | No | $0.5-1.0 \times I_r$ |
| Short Delay Protection (S) | | |
| Short delay pickup | $150-800\% \times (I_r)$ | $150-800\% \times (I_r)$ |
| Short delay time I^2t | 100–500 ms | 100–500 ms |
| Short delay time flat | 100–500 ms | 100–500 ms |
| Short delay time zone selective interlocking | Yes | Yes |
| Instantaneous Protection (I) | | |
| Instantaneous pickup | $200-800\% \times (I_n)$ | $200-800\% \times (I_n)$ |
| Discriminator | Yes | Yes |
| Instantaneous override | Yes | Yes |
| Ground Fault Protection (G) | | |
| Ground fault alarm | $20-100\% \times (I_s)$ | $20-100\% \times (I_s)$ |
| Ground fault pickup | $20-100\% \times (I_s)$ | $20-100\% \times (I_s)$ |
| Ground fault delay I^2t | 100–500 ms | 100–500 ms |
| Ground fault delay flat | 100–500 ms | 100–500 ms |
| Ground fault zone selective interlocking | Yes ^① | Yes |
| Ground fault thermal memory | Yes | Yes |
| System Diagnostics | | |
| Status LEDs | Yes | Yes |
| Cause of trip LEDs | Yes | Yes |
| Magnitude of trip information | Yes | Yes |
| Remote signal contact—ground alarm | Yes ^① | Yes |
| Local auxiliary and bell alarm contact | Optional | Included |

Legend

BIM = Breaker Interface Module
 (A) = GF Alarm
 I_s = Sensor Rating
 I_n = Rating Plug
 I_r = Long Delay Pickup Setting

Note

^① Zone interlock kit.

N-Frame Digitrip, continued

| Trip Unit Type | Digitrip OPTIM 550 | Digitrip OPTIM 1050 |
|--------------------------|-----------------------------|-----------------------------|
| System Monitoring | | |
| Digital display | Yes ^① | Yes ^① |
| Current | Yes | Yes |
| Power and energy | No | Yes |
| Power quality—harmonics | No | Yes |
| Power factor | No | Yes |
| Communications | | |
| Eaton PowerNet | No ^② | Yes |
| Testing | | |
| Testing method | OPTIMizer, BIM, PowerNet | OPTIMizer, BIM, PowerNet |

Legend

BIM = Breaker Interface Module
 (A) = GF Alarm
 I_s = Sensor Rating
 I_n = Rating Plug
 I_r = Long Delay Pickup Setting

Notes

- ^① By OPTIMizer/BIM.
^② Eaton's PowerNet kit.

2.4

Molded Case Circuit Breakers

Series C

Dimensions and Weights

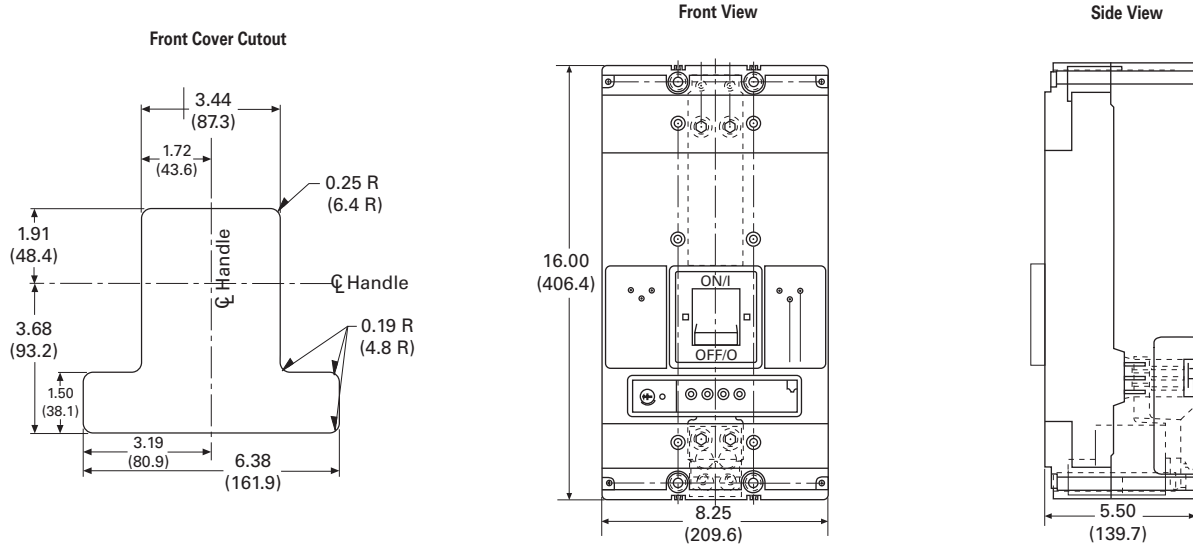
Approximate Dimensions in Inches (mm)

2

ND Frame

| Number of Poles | Width | Height | Depth |
|-----------------|---------------|---------------|--------------|
| 2, 3 | 8.25 (209.6) | 16.00 (406.4) | 5.50 (139.7) |
| 4 | 11.13 (282.6) | 16.00 (406.4) | 5.50 (139.7) |

ND-Frame, Two- and Three-Pole



Approximate Shipping Weight in Lbs (kg)

ND Frame

| Breaker Type | Complete Breaker | | |
|-------------------|------------------|------------|-----------|
| | Two-Pole | Three-Pole | Four-Pole |
| ND, HND, NDC, NDU | 37 (16.8) | 45 (20.4) | 58 (26.3) |

Typical R-Frame Breaker



Contents

| <i>Description</i> | <i>Page</i> |
|--|------------------|
| Product Overview | V4-T2-218 |
| Standards and Certifications | V4-T2-219 |
| Quick Reference | V4-T2-220 |
| G-Frame (15–100 Amperes) | V4-T2-223 |
| F-Frame (10–225 Amperes) | V4-T2-237 |
| J-Frame (70–250 Amperes) | V4-T2-255 |
| K-Frame (70–400 Amperes) | V4-T2-263 |
| L-Frame (125–600 Amperes) | V4-T2-287 |
| M-Frame (300–800 Amperes) | V4-T2-313 |
| N-Frame (400–1200 Amperes) | V4-T2-324 |
| R-Frame (800–2500 Amperes) | |
| Catalog Number Selection | V4-T2-340 |
| Product Selection | V4-T2-341 |
| Accessories | V4-T2-353 |
| Technical Data and Specifications | V4-T2-354 |
| Dimensions and Weights | V4-T2-357 |
| Motor Circuit Protectors (MCP) | V4-T2-358 |
| Motor Protection Circuit Breakers (MPCB) | V4-T2-369 |
| Type ELC Current Limiter Attachment (Size 0–4) | V4-T2-371 |
| Current Limiting Circuit Breaker Module | V4-T2-372 |
| Internal Accessories | V4-T2-375 |
| External Accessories | V4-T2-408 |

R-Frame (800–2500 Amperes)

Product Description

- Eaton R-Frame circuit breakers are available as frame (which includes trip unit), rating plug and terminals
- All R-Frame circuit breakers are suitable for reverse feed use

2.4

Molded Case Circuit Breakers

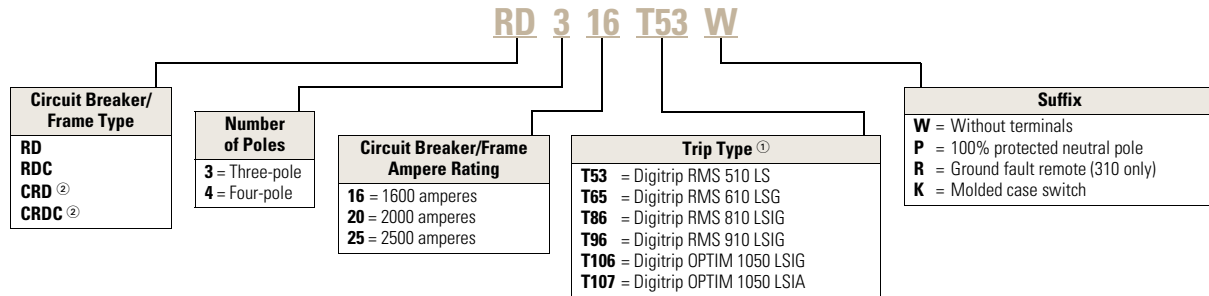
Series C

Catalog Number Selection

This information is presented only as an aid to understanding catalog numbers. It is not to be used to build catalog numbers for circuit breakers or trip units.

2

Circuit Breaker/Frame



Notes

- ① For complete list of available trip types, refer to **Pages V4-T2-341 to V4-T2-350**.
- ② No four-pole for CRD and CRDC.

Product Selection

Digitrip RMS 510 Electronic Circuit Breakers with Interchangeable Rating Plugs

Order as individual components: breaker frame (which includes trip unit) and rating plug.

Digitrip RMS 510 Electronic Circuit Breakers with Interchangeable Rating Plugs

| Maximum Continuous Ampere Rating at 40 °C | Circuit Breaker Frame Only | | | | | | Digitrip Rating Plug Only | |
|---|---|------------|------------|------------|------------|------------|-------------------------------|--|
| | L – Adjustable Long Delay Pickup (I_L) with Adjustable Long Delay Time S – Adjustable Short Delay Pickup with Adjustable Short Delay Time (I^2t or Flat Response) I – Adjustable Instantaneous Pickup G – Adjustable Ground Fault Pickup with Adjustable Ground Fault Time Delay (I^2t or Flat Response) | | | | | | Rated Current (I_n) | Fixed Rating Plug Catalog Number |
| | LI | LS | LSI | LIG | LSG | LSIG | | |
| Catalog Number | | | | | | | | |
| Three-Pole Standard Interrupting Capacity 600 Vac Rated 65 kAIC at 480 Vac | | | | | | | | |
| 1600 | RD316T51W | RD316T53W | RD316T52W | RD316T54W | RD316T55W | RD316T56W | 800 | RP6R16A080 |
| | | | | | | | 1000 | RP6R16A100 |
| | | | | | | | 1200 | RP6R16A120 |
| | | | | | | | 1600 | RP6R16A160 |
| 2000 | RD320T51W | RD320T53W | RD320T52W | RD320T54W | RD320T55W | RD320T56W | 1000 | RP6R20A100 |
| | | | | | | | 1200 | RP6R20A120 |
| | | | | | | | 1600 | RP6R20A160 |
| | | | | | | | 2000 | RP6R20A200 |
| 2500 | RD325T51W | RD325T53W | RD325T52W | RD325T54W | RD325T55W | RD325T56W | 1600 | RP6R25A160 |
| | | | | | | | 2000 | RP6R25A200 |
| | | | | | | | 2500 | RP6R25A250 |
| Three-Pole High Interrupting Capacity 600 Vac Rated 100 kAIC at 480 Vac | | | | | | | | |
| 1600 | RDC316T51W | RDC316T53W | RDC316T52W | RDC316T54W | RDC316T55W | RDC316T56W | 800 | RP6R16A080 |
| | | | | | | | 1000 | RP6R16A100 |
| | | | | | | | 1200 | RP6R16A120 |
| | | | | | | | 1600 | RP6R16A160 |
| 2000 | RDC320T51W | RDC320T53W | RDC320T52W | RDC320T54W | RDC320T55W | RDC320T56W | 1000 | RP6R20A100 |
| | | | | | | | 1200 | RP6R20A120 |
| | | | | | | | 1600 | RP6R20A160 |
| | | | | | | | 2000 | RP6R20A200 |
| 2500 | RDC325T51W | RDC325T53W | RDC325T52W | RDC325T54W | RDC325T55W | RDC325T56W | 1600 | RP6R25A160 |
| | | | | | | | 2000 | RP6R25A200 |
| | | | | | | | 2500 | RP6R25A250 |

2.4

Molded Case Circuit Breakers

Series C

100% Rated Digitrip RMS 510 Circuit Breakers

The NEC allows the breaker to be rated at 100% of its frame size in an assembly, provided that 90 °C wire is applied at 75 °C ampacity. Order as individual components: breaker frame (which includes trip unit) and rating plug.

2

100% Rated Digitrip RMS 510 Circuit Breakers

| Maximum Continuous Ampere Rating at 40 °C | Circuit Breaker Frame Only | | | | | | Digitrip Rating Plug Only | |
|---|----------------------------|-------------|-------------|-------------|-------------|-------------|---------------------------------|----------------------------------|
| | L LI | S LS | I LSI | G LIG | | | Rated Current (I _n) | Fixed Rating Plug Catalog Number |
| Three-Pole Standard Interrupting Capacity 600 Vac Rated 65 kAIC at 480 Vac | | | | | | | | |
| 1600 | CRD316T51W | CRD316T53W | CRD316T52W | CRD316T54W | CRD316T55W | CRD316T56W | 800 | RP6R16A080 |
| | | | | | | | 1000 | RP6R16A100 |
| | | | | | | | 1200 | RP6R16A120 |
| | | | | | | | 1600 | RP6R16A160 |
| 2000 ^① | CRD320T51W | CRD320T53W | CRD320T52W | CRD320T54W | CRD320T55W | CRD320T56W | 1000 | RP6R20A100 |
| | | | | | | | 1200 | RP6R20A120 |
| | | | | | | | 1600 | RP6R20A160 |
| | | | | | | | 2000 | RP6R20A200 |
| Three-Pole High Interrupting Capacity 600 Vac Rated 100 kAIC at 480 Vac | | | | | | | | |
| 1600 | — | CRDC316T53W | CRDC316T52W | CRDC316T54W | CRDC316T55W | CRDC316T56W | 800 | RP6R16A080 |
| | | | | | | | 1000 | RP6R16A100 |
| | | | | | | | 1200 | RP6R16A120 |
| | | | | | | | 1600 | RP6R16A160 |
| 2000 ^① | CRDC320T51W | CRDC320T53W | CRDC320T52W | CRDC320T54W | CRDC320T55W | CRDC320T56W | 1000 | RP6R20A100 |
| | | | | | | | 1200 | RP6R20A120 |
| | | | | | | | 1600 | RP6R20A160 |
| | | | | | | | 2000 | RP6R20A200 |

Note

① Includes B2016RDL rear connectors.

Digitrip RMS 610 Electronic Circuit Breakers with Interchangeable Rating Plugs

Order as individual components: breaker frame (which includes trip unit) and rating plug.

Digitrip RMS 610 Electronic Circuit Breakers with Interchangeable Rating Plugs

| Maximum Continuous Ampere Rating at 40 °C | Circuit Breaker Frame Only | | | | | | Digitrip Rating Plug Only | | | | | |
|---|---|------------|------------|------------|------------|------------|-------------------------------|--|-----|-----|------|----------------|
| | L – Adjustable Long Delay Pickup (I_L) with Adjustable Long Delay Time | | | | | | Rated Current (I_n) | Fixed Rating Plug Catalog Number | | | | |
| | S – Adjustable Short Delay Pickup with Adjustable Short Delay Time (I^2t or Flat Response) | | | | | | | | | | | |
| I – Adjustable Instantaneous Pickup | | | | | | LI | LS | LSI | LIG | LSG | LSIG | |
| G – Adjustable Ground Fault Pickup with Adjustable Ground Fault Time Delay (I^2t or Flat Response) | | | | | | | | | | | | Catalog Number |
| Three-Pole Standard Interrupting Capacity 600 Vac Rated 65 kAIC at 480 Vac | | | | | | | | | | | | |
| 1600 | RD316T61W | RD316T63W | RD316T62W | RD316T64W | RD316T65W | RD316T66W | 800 | RP6R16A080 | | | | |
| | | | | | | | 1000 | RP6R16A100 | | | | |
| | | | | | | | 1200 | RP6R16A120 | | | | |
| | | | | | | | 1600 | RP6R16A160 | | | | |
| 2000 | RD320T61W | RD320T63W | RD320T62W | RD320T64W | RD320T65W | RD320T66W | 1000 | RP6R20A100 | | | | |
| | | | | | | | 1200 | RP6R20A120 | | | | |
| | | | | | | | 1600 | RP6R20A160 | | | | |
| | | | | | | | 2000 | RP6R20A200 | | | | |
| 2500 | RD325T61W | RD325T63W | RD325T62W | RD325T64W | RD325T65W | RD325T66W | 1600 | RP6R25A160 | | | | |
| | | | | | | | 2000 | RP6R25A200 | | | | |
| | | | | | | | 2500 | RP6R25A250 | | | | |
| Three-Pole High Interrupting Capacity 600 Vac Rated 100 kAIC at 480 Vac | | | | | | | | | | | | |
| 1600 | RDC316T61W | RDC316T63W | RDC316T62W | RDC316T64W | RDC316T65W | RDC316T66W | 800 | RP6R16A080 | | | | |
| | | | | | | | 1000 | RP6R16A100 | | | | |
| | | | | | | | 1200 | RP6R16A120 | | | | |
| | | | | | | | 1600 | RP6R16A160 | | | | |
| 2000 | RDC320T61W | RDC320T63W | RDC320T62W | RDC320T64W | RDC320T65W | RDC320T66W | 1000 | RP6R20A100 | | | | |
| | | | | | | | 1200 | RP6R20A120 | | | | |
| | | | | | | | 1600 | RP6R20A160 | | | | |
| | | | | | | | 2000 | RP6R20A200 | | | | |
| 2500 | RDC325T61W | RDC325T63W | RDC325T62W | RDC325T64W | RDC325T65W | RDC325T66W | 1600 | RP6R25A160 | | | | |
| | | | | | | | 2000 | RP6R25A200 | | | | |
| | | | | | | | 2500 | RP6R25A250 | | | | |

2.4

Molded Case Circuit Breakers

Series C

2

100% Rated Digitrip RMS 610 Circuit Breakers

The NEC allows the breaker to be rated at 100% of its frame size in an assembly, provided that 90 °C wire is applied at 75 °C ampacity. Order as individual components: breaker frame (which includes trip unit) and rating plug.

100% Rated Digitrip RMS 610 Circuit Breakers

| Maximum Continuous Ampere Rating at 40 °C | Circuit Breaker Frame Only | | | | | | Digitrip Rating Plug Only | |
|---|---|-------------|-------------|-------------|-------------|-------------|---------------------------------|----------------------------------|
| | LI | LS | LSI | LIG | LSG | LSIG | Rated Current (I _n) | Fixed Rating Plug Catalog Number |
| | L – Adjustable Long Delay Pickup (I_l) with Adjustable Long Delay Time S – Adjustable Short Delay Pickup with Adjustable Short Delay Time (I²t or Flat Response) I – Adjustable Instantaneous Pickup G – Adjustable Ground Fault Pickup with Adjustable Ground Fault Time Delay (I²t or Flat Response) | | | | | | | |
| | Catalog Number | | | | | | | |
| Three-Pole Standard Interrupting Capacity 600 Vac Rated 65 kAIC at 480 Vac | | | | | | | | |
| 1600 | CRD316T61W | CRD316T63W | CRD316T62W | CRD316T64W | CRD316T65W | CRD316T66W | 800 | RP6R16A080 |
| | | | | | | | 1000 | RP6R16A100 |
| | | | | | | | 1200 | RP6R16A120 |
| | | | | | | | 1600 | RP6R16A160 |
| 2000 ^① | CRD320T61W | CRD320T63W | CRD320T62W | CRD320T64W | CRD320T65W | CRD320T66W | 1000 | RP6R20A100 |
| | | | | | | | 1200 | RP6R20A120 |
| | | | | | | | 1600 | RP6R20A160 |
| | | | | | | | 2000 | RP6R20A200 |
| Three-Pole High Interrupting Capacity 600 Vac Rated 100 kAIC at 480 Vac | | | | | | | | |
| 1600 | CRDC316T61W | CRDC316T63W | CRDC316T62W | CRDC316T64W | CRDC316T65W | CRDC316T66W | 800 | RP6R16A080 |
| | | | | | | | 1000 | RP6R16A100 |
| | | | | | | | 1200 | RP6R16A120 |
| | | | | | | | 1600 | RP6R16A160 |
| 2000 ^① | CRDC320T61W | CRDC320T63W | CRDC320T62W | CRDC320T64W | CRDC320T65W | CRDC320T66W | 1000 | RP6R20A100 |
| | | | | | | | 1200 | RP6R20A120 |
| | | | | | | | 1600 | RP6R20A160 |
| | | | | | | | 2000 | RP6R20A200 |

Note

^① Includes B2016RDL rear connectors.

Digitrip RMS 810 Electronic Circuit Breakers with Interchangeable Rating Plugs

Order as individual components: breaker frame (which includes trip unit) and rating plug.

Digitrip RMS 810 Electronic Circuit Breakers with Interchangeable Rating Plugs

| Maximum Continuous Ampere Rating at 40 °C | Circuit Breaker Frame Only | | | | | | Digitrip Rating Plug Only | |
|---|--|------------|------------|------------|------------|------------|---------------------------------------|--|
| | LI | LS | LSI | LIG | LSG | LSIG | Rated Current (I _n) | Fixed Rating Plug Catalog Number |
| | L – Adjustable Long Delay Pickup (I _p) with Adjustable Long Delay Time | | | | | | | |
| | S – Adjustable Short Delay Pickup with Adjustable Short Delay Time (I ² t or Flat Response) | | | | | | | |
| | I – Adjustable Instantaneous Pickup | | | | | | | |
| | G – Adjustable Ground Fault Pickup with Adjustable Ground Fault Time Delay (I ² t or Flat Response) | | | | | | | |
| | LI | LS | LSI | LIG | LSG | LSIG | | |
| | Catalog Number | | | | | | | |
| Three-Pole Standard Interrupting Capacity 600 Vac Rated 65 kAIC at 480 Vac | | | | | | | | |
| 1600 | RD316T81W | RD316T83W | RD316T82W | RD316T84W | RD316T85W | RD316T86W | 800 | RP6R16A080 |
| | | | | | | | 1000 | RP6R16A100 |
| | | | | | | | 1200 | RP6R16A120 |
| | | | | | | | 1600 | RP6R16A160 |
| 2000 | RD320T81W | RD320T83W | RD320T82W | RD320T84W | RD320T85W | RD320T86W | 1000 | RP6R20A100 |
| | | | | | | | 1200 | RP6R20A120 |
| | | | | | | | 1600 | RP6R20A160 |
| | | | | | | | 2000 | RP6R20A200 |
| 2500 | RD325T81W | RD325T83W | RD325T82W | RD325T84W | RD325T85W | RD325T86W | 1600 | RP6R25A160 |
| | | | | | | | 2000 | RP6R25A200 |
| | | | | | | | 2500 | RP6R25A250 |
| Three-Pole High Interrupting Capacity 600 Vac Rated 100 kAIC at 480 Vac | | | | | | | | |
| 1600 | RDC316T81W | RDC316T83W | RDC316T82W | RDC316T84W | RDC316T85W | RDC316T86W | 800 | RP6R16A080 |
| | | | | | | | 1000 | RP6R16A100 |
| | | | | | | | 1200 | RP6R16A120 |
| | | | | | | | 1600 | RP6R16A160 |
| 2000 | RDC320T81W | RDC320T83W | RDC320T82W | RDC320T84W | RDC320T85W | RDC320T86W | 1000 | RP6R20A100 |
| | | | | | | | 1200 | RP6R20A120 |
| | | | | | | | 1600 | RP6R20A160 |
| | | | | | | | 2000 | RP6R20A200 |
| 2500 | RDC325T81W | RDC325T83W | RDC325T82W | RDC325T84W | RDC325T85W | RDC325T86W | 1600 | RP6R25A160 |
| | | | | | | | 2000 | RP6R25A200 |
| | | | | | | | 2500 | RP6R25A250 |

2.4

Molded Case Circuit Breakers

Series C

100% Rated Digitrip RMS 810 Circuit Breakers

The NEC allows the breaker to be rated at 100% of its frame size in an assembly, provided that 90 °C wire is applied at 75 °C ampacity. Order as individual components: breaker frame (which includes trip unit) and rating plug.

2

100% Rated Digitrip RMS 810 Circuit Breakers

| Maximum Continuous Ampere Rating at 40 °C | Circuit Breaker Frame Only | | | | | | Digitrip Rating Plug Only | |
|---|----------------------------|-------------|-------------|-------------|-------------|-------------|---------------------------------|----------------------------------|
| | L LI Catalog Number | S LS | I LSI | G LIG | LSG | LSIG | Rated Current (I _n) | Fixed Rating Plug Catalog Number |
| Three-Pole Standard Interrupting Capacity 600 Vac Rated 65 kAIC at 480 Vac | | | | | | | | |
| 1600 | CRD316T81W | CRD316T83W | CRD316T82W | CRD316T84W | CRD316T85W | CRD316T86W | 800 | RP6R16A080 |
| | | | | | | | 1000 | RP6R16A100 |
| | | | | | | | 1200 | RP6R16A120 |
| | | | | | | | 1600 | RP6R16A160 |
| 2000 [Ⓢ] | CRD320T81W | CRD320T83W | CRD320T82W | CRD320T84W | CRD320T85W | CRD320T86W | 1000 | RP6R20A100 |
| | | | | | | | 1200 | RP6R20A120 |
| | | | | | | | 1600 | RP6R20A160 |
| | | | | | | | 2000 | RP6R20A200 |
| Three-Pole High Interrupting Capacity 600 Vac Rated 100 kAIC at 480 Vac | | | | | | | | |
| 1600 | CRDC316T81W | CRDC316T83W | CRDC316T82W | CRDC316T84W | CRDC316T85W | CRDC316T86W | 800 | RP6R16A080 |
| | | | | | | | 1000 | RP6R16A100 |
| | | | | | | | 1200 | RP6R16A120 |
| | | | | | | | 1600 | RP6R16A160 |
| 2000 [Ⓢ] | CRDC320T81W | CRDC320T83W | CRDC320T82W | CRDC320T84W | CRDC320T85W | CRDC320T86W | 1000 | RP6R20A100 |
| | | | | | | | 1200 | RP6R20A120 |
| | | | | | | | 1600 | RP6R20A160 |
| | | | | | | | 2000 | RP6R20A200 |

Note

[Ⓢ] Includes B2016RDL rear connectors.

Digitrip RMS 910 Electronic Circuit Breakers with Interchangeable Rating Plugs

Order as individual components: breaker frame (which includes trip unit) and rating plug.

Digitrip RMS 910 Electronic Circuit Breakers with Interchangeable Rating Plugs

| Maximum Continuous Ampere Rating at 40 °C | Circuit Breaker Frame Only | | | | | | Digitrip Rating Plug Only | |
|---|---|------------|------------|------------|------------|------------|-------------------------------|--|
| | L – Adjustable Long Delay Pickup (I_L) with Adjustable Long Delay Time | | | | | | Rated Current (I_n) | Fixed Rating Plug Catalog Number |
| | S – Adjustable Short Delay Pickup with Adjustable Short Delay Time (I^2t or Flat Response) | | | | | | | |
| I – Adjustable Instantaneous Pickup | | | | | | LSIG | | |
| G – Adjustable Ground Fault Pickup with Adjustable Ground Fault Time Delay (I^2t or Flat Response) | | | | | | | | LSIG |
| | LI | LS | LSI | LIG | LSG | | | |
| | Catalog Number | | | | | | | |
| Three-Pole Standard Interrupting Capacity 600 Vac Rated 65 kAIC at 480 Vac | | | | | | | | |
| 1600 | RD316T91W | RD316T93W | RD316T92W | RD316T94W | RD316T95W | RD316T96W | 800 | RP6R16A080 |
| | | | | | | | 1000 | RP6R16A100 |
| | | | | | | | 1200 | RP6R16A120 |
| | | | | | | | 1600 | RP6R16A160 |
| 2000 | RD320T91W | RD320T93W | RD320T92W | RD320T94W | RD320T95W | RD320T96W | 1000 | RP6R20A100 |
| | | | | | | | 1200 | RP6R20A120 |
| | | | | | | | 1600 | RP6R20A160 |
| | | | | | | | 2000 | RP6R20A200 |
| 2500 | RD325T91W | RD325T93W | RD325T92W | RD325T94W | RD325T95W | RD325T96W | 1600 | RP6R25A160 |
| | | | | | | | 2000 | RP6R25A200 |
| | | | | | | | 2500 | RP6R25A250 |
| Three-Pole High Interrupting Capacity 600 Vac Rated 100 kAIC at 480 Vac | | | | | | | | |
| 1600 | RDC316T91W | RDC316T93W | RDC316T92W | RDC316T94W | RDC316T95W | RDC316T96W | 800 | RP6R16A080 |
| | | | | | | | 1000 | RP6R16A100 |
| | | | | | | | 1200 | RP6R16A120 |
| | | | | | | | 1600 | RP6R16A160 |
| 2000 | RDC320T91W | RDC320T93W | RDC320T92W | RDC320T94W | RDC320T95W | RDC320T96W | 1000 | RP6R20A100 |
| | | | | | | | 1200 | RP6R20A120 |
| | | | | | | | 1600 | RP6R20A160 |
| | | | | | | | 2000 | RP6R20A200 |
| 2500 | RDC325T91W | RDC325T93W | RDC325T92W | RDC325T94W | RDC325T95W | RDC325T96W | 1600 | RP6R25A160 |
| | | | | | | | 2000 | RP6R25A200 |
| | | | | | | | 2500 | RP6R25A250 |

2.4

Molded Case Circuit Breakers

Series C

2

100% Rated Digitrip RMS 910 Circuit Breakers

The NEC allows the breaker to be rated at 100% of its frame size in an assembly, provided that 90 °C wire is applied at 75 °C ampacity. Order as individual components: breaker frame (which includes trip unit) and rating plug.

100% Rated Digitrip RMS 910 Circuit Breakers

| Maximum Continuous Ampere Rating at 40 °C | Circuit Breaker Frame Only | | | | | | Digitrip Rating Plug Only | |
|---|---|-------------|-------------|-------------|-------------|-------------|---------------------------------|----------------------------------|
| | LI | LS | LSI | LIG | LSG | LSIG | Rated Current (I _n) | Fixed Rating Plug Catalog Number |
| | L – Adjustable Long Delay Pickup (I ₁) with Adjustable Long Delay Time S – Adjustable Short Delay Pickup with Adjustable Short Delay Time (I ² t or Flat Response) I – Adjustable Instantaneous Pickup G – Adjustable Ground Fault Pickup with Adjustable Ground Fault Time Delay (I ² t or Flat Response) | | | | | | | |
| | LI LS LSI LIG LSG LSIG | | | | | | | |
| | Catalog Number | | | | | | | |
| Three-Pole Standard Interrupting Capacity 600 Vac Rated 65 kAIC at 480 Vac | | | | | | | | |
| 1600 | CRD316T91W | CRD316T93W | CRD316T92W | CRD316T94W | CRD316T95W | CRD316T96W | 800 | RP6R16A080 |
| | | | | | | | 1000 | RP6R16A100 |
| | | | | | | | 1200 | RP6R16A120 |
| | | | | | | | 1600 | RP6R16A160 |
| 2000 [Ⓢ] | CRD320T91W | CRD320T93W | CRD320T92W | CRD320T94W | CRD320T95W | CRD320T96W | 1000 | RP6R20A100 |
| | | | | | | | 1200 | RP6R20A120 |
| | | | | | | | 1600 | RP6R20A160 |
| | | | | | | | 2000 | RP6R20A200 |
| Three-Pole High Interrupting Capacity 600 Vac Rated 100 kAIC at 480 Vac | | | | | | | | |
| 1600 | CRDC316T91W | CRDC316T93W | CRDC316T92W | CRDC316T94W | CRDC316T95W | CRDC316T96W | 800 | RP6R16A080 |
| | | | | | | | 1000 | RP6R16A100 |
| | | | | | | | 1000 | RP6R16A100 |
| | | | | | | | 1200 | RP6R16A120 |
| 2000 [Ⓢ] | CRDC320T91W | CRDC320T93W | CRDC320T92W | CRDC320T94W | CRDC320T95W | CRDC320T96W | 1000 | RP6R20A100 |
| | | | | | | | 1200 | RP6R20A120 |
| | | | | | | | 1600 | RP6R20A160 |
| | | | | | | | 2000 | RP6R20A200 |

Note

[Ⓢ] Includes B2016RDL rear connectors.

Digitrip OPTIM Electronic Circuit Breakers with Interchangeable Rating Plugs

Order as individual components: breaker frame (which includes trip unit) and rating plug.

Digitrip OPTIM Electronic Circuit Breakers with Interchangeable Rating Plugs

| Maximum Continuous Ampere Rating at 40 °C | Circuit Breaker Frame Only | | Digitrip OPTIM Rating Plug Only | |
|---|--------------------------------|--------------------------------|---------------------------------|---|
| | LSIA 1050 Catalog Number | LSIG 1050 Catalog Number | Ampere Rating | Fixed Rating Plug Catalog Number |
| Three-Pole Standard Interrupting Capacity 600 Vac Rated 65 kAIC at 480 Vac | | | | |
| 1600 | RD316T107W | RD316T106W | 800 | ORPR16A080 |
| | | | 1000 | ORPR16A100 |
| | | | 1200 | ORPR16A120 |
| | | | 1600 | ORPR16A160 |
| 2000 | RD320T107W | RD320T106W | 1000 | ORPR20A100 |
| | | | 1200 | ORPR20A120 |
| | | | 1600 | ORPR20A160 |
| | | | 2000 | ORPR20A200 |
| 2500 | RD325T107W | RD325T106W | 1600 | ORPR25A160 |
| | | | 2000 | ORPR25A200 |
| | | | 2500 | ORPR25A250 |
| Three-Pole High Interrupting Capacity 600 Vac Rated 100 kAIC at 480 Vac | | | | |
| 1600 | RDC316T107W | RDC316T106W | 800 | ORPR16A080 |
| | | | 1000 | ORPR16A100 |
| | | | 1200 | ORPR16A120 |
| | | | 1600 | ORPR16A160 |
| 2000 | RDC320T107W | RDC320T106W | 1000 | ORPR20A100 |
| | | | 1200 | ORPR20A120 |
| | | | 1600 | ORPR20A160 |
| | | | 2000 | ORPR20A200 |
| 2500 | RDC325T107W | RDC325T106W | 1600 | ORPR25A160 |
| | | | 2000 | ORPR25A200 |
| | | | 2500 | ORPR25A250 |

2.4

Molded Case Circuit Breakers

Series C

100% Rated 600 Volts AC Digitrip OPTIM Circuit Breakers with Interchangeable Rating Plugs

Order as individual components: breaker frame (which includes trip unit) and rating plug.

2

100% Rated 600 Volts AC Digitrip OPTIM Circuit Breakers with Interchangeable Rating Plugs

| Maximum Continuous Ampere Rating at 40 °C | Circuit Breaker Frame Only | | Digitrip OPTIM Rating Plug Only | |
|---|--------------------------------|--------------------------------|---------------------------------|---|
| | LSIA 1050 Catalog Number | LSIG 1050 Catalog Number | Ampere Rating | Fixed Rating Plug Catalog Number |
| Three-Pole Standard Interrupting Capacity 600 Vac Rated 65 kAIC at 480 Vac | | | | |
| 1600 | CRD316T107W | CRD316T106W | 800 | ORPR16A080 |
| | | | 1000 | ORPR16A100 |
| | | | 1200 | ORPR16A120 |
| | | | 1600 | ORPR16A160 |
| 2000 ^① | CRD320T107W | CRD320T106W | 1000 | ORPR20A100 |
| | | | 1200 | ORPR20A120 |
| | | | 1600 | ORPR20A160 |
| | | | 2000 | ORPR20A200 |
| Three-Pole High Interrupting Capacity 600 Vac Rated 100 kAIC at 480 Vac | | | | |
| 1600 | CRDC316T107W | CRDC316T106W | 800 | ORPR16A080 |
| | | | 1000 | ORPR16A100 |
| | | | 1200 | ORPR16A120 |
| | | | 1600 | ORPR16A160 |
| 2000 ^① | CRDC320T107W | CRDC320T106W | 1000 | ORPR20A100 |
| | | | 1200 | ORPR20A120 |
| | | | 1600 | ORPR20A160 |
| | | | 2000 | ORPR20A200 |

Molded Case Switches

Refer to Eaton for UL listed, series tested Molded Case Switch application data.

Type RD—High Instantaneous (K)

| Continuous Ampere Rating at 40 °C | Complete without Terminals | |
|--|---------------------------------|--------------------------------|
| | Three-Pole Catalog Number | Four-Pole Catalog Number |
| 1600 | RD316WK | RD416WK |
| 2000 | RD320WK | RD420WK |

Notes

^① Includes B2016RDL rear connectors.

Molded case switch may trip above 17,500 amperes.

Accessories Selection Guide and Ordering Information

Line and Load Terminals

Line and load terminals provide wire connecting capabilities for specific ranges of continuous current ratings and wire types. All terminals comply with Underwriters Laboratories Standards UL 486A and UL 486B and CSA C22.2 No. 65M. Unless otherwise specified, R-Frame circuit breaker line load terminals are shipped separately for field installation.

Ordering Information

R-Frame circuit breakers have Cu/Al terminals as standard and Cu only terminals as an option. Specify if factory installation is required.

Line and Load Terminals

| Maximum Breaker Amperes | Terminal Body Material | Wire Type | Hardware | AWG/kcmil Wire Range/ No. Conductors | Metric Wire Range mm ² | Catalog Number |
|-------------------------|------------------------|-----------|----------|--------------------------------------|-----------------------------------|------------------------------|
| Wire Terminals | | | | | | |
| 1600 | Aluminum | Cu/Al | English | 500–1000 (4) | 300–500 | TA1600RD |
| 1600 | Copper | Cu | English | 1–600 (4) | 50–300 | T1600RD |
| 2000 | Aluminum | Cu/Al | English | 2–600 (6) | 35–300 | TA2000RD ^① |
| Rear Connectors | | | | | | |
| 2000 | Copper | — | English | — | — | B2016RD |
| 2000 | Copper | — | English | — | — | B2016RDL ^② |
| 2500 | Copper | — | English | — | — | B2500RD ^③ |

Notes

- ① Catalog Number includes bus connection, terminals and hardware for either line side or load side of three-pole breaker.
- ② For use with 100% rated 1600 A and 2000 A frame. Do not order separately unless for replacement purposes. Included in breaker carton when 100% rated device is ordered.
- ③ For use with 2500 A frame. Do not order separately unless for replacement purposes. Included in breaker carton when 2500 A breaker is ordered.

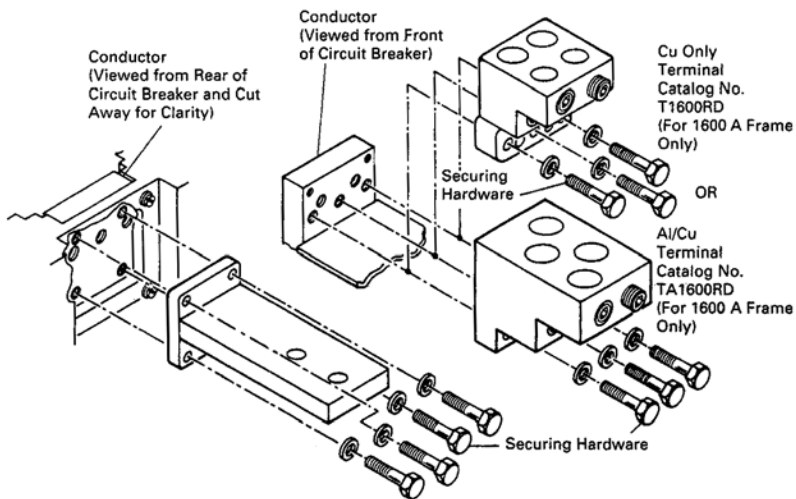
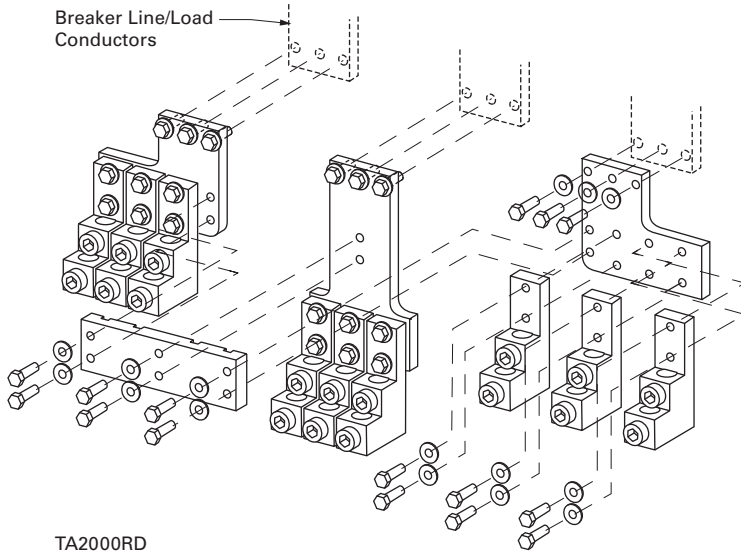
2.4

Molded Case Circuit Breakers

Series C

Mounting Hardware

2



Accessories

Allowable Accessory Combinations

Different combinations of accessories can be supplied, depending on the types of accessories and the number of poles in the circuit breaker.

RD Frame Accessories

| Description | Reference Page | Three-Pole Left | Center | Right | Four-Pole Left | Center | Right | Neu. |
|--|----------------|--------------------|--------|-------|-------------------|--------|-------|------|
| Internal Accessories ^① | | | | | | | | |
| Alarm lockout (Make/Break) | V4-T2-378 | | | ■ | | | ■ | |
| Alarm lockout (2Make/2Break) | V4-T2-378 | | | ■ | | | ■ | |
| Auxiliary switch (2A, 2B) | V4-T2-378 | | | ■ | | | ■ | |
| Auxiliary switch (4A, 4B) | V4-T2-378 | | | ■ | | | ■ | |
| Shunt trip—standard | V4-T2-386 | | | ■ | | | ■ | |
| Shunt trip—low energy | V4-T2-387 | | | ■ | | | ■ | |
| Undervoltage release mechanism | V4-T2-394 | | | ■ | | | ■ | |
| Accessory terminal block ^② | V4-T2-395 | | | ■ | | | | ■ |
| External Accessories | | | | | | | | |
| Base mounting hardware | V4-T2-415 | | | | | | | |
| Padlockable handle lock hasp | V4-T2-418 | | ● | | | ● | | |
| Key interlock kit | V4-T2-420 | ■ | ■ | ■ | | ■ | | |
| Walking beam interlock | V4-T2-421 | | | | | | | |
| Electrical (motor) operator | V4-T2-423 | ■ | ■ | ■ | | ■ | | |
| Handle mechanisms | V4-T2-506 | ■ | ■ | ■ | | ■ | | |
| Handle extension ^③ | V4-T2-521 | | ■ | | | ■ | | |
| OPTIM System Components | | | | | | | | |
| Breaker interface module (BIM) | V4-T2-429 | ● | ● | ● | | | | |
| Digitrip OPTIMizer | V4-T2-429 | ● | ● | ● | | | | |
| Auxiliary power module | V4-T2-429 | ● | ● | ● | | | | |
| Modifications (Refer to Eaton) | | | | | | | | |
| Special calibration | — | ● | ● | ● | ● | ● | ● | ● |
| Moisture fungus treatment | V4-T2-218 | ● | ● | ● | ● | ● | ● | ● |
| Freeze-tested circuit breakers | — | ● | ● | ● | ● | ● | ● | ● |
| Marine/naval application | — | ● | ● | ● | ● | ● | ● | ● |

Legend

- Applicable in indicated pole position
- Accessory available/modification available

Notes

- ① All accessories mount in the RH cavity which will accept one each shunt trip, UVR, auxiliary switch and alarm switch.
- ② Mounts outside breaker.
- ③ Included with breaker.

Technical Data and Specifications

2

UL 489/CSA Interrupting Capacity Ratings ^①

| Circuit Breaker Type | Number of Poles | Interrupting Capacity (kA Symmetrical Amperes) | | | |
|----------------------|-----------------|--|-----|-----|-----|
| | | Volts AC (50/60 Hz) | | | |
| | | 240 | 277 | 480 | 600 |
| RD | 3, 4 | 125 | — | 65 | 50 |
| CRD ^② | 3 | 125 | — | 65 | 50 |
| RDC | 3, 4 | 200 | — | 100 | 65 |
| CRDC ^② | 3 | 200 | — | 100 | 65 |

IEC 947-2 Interrupting Capacity Ratings ^①

| Circuit Breaker Type | Number of Poles | Interrupting Capacity (kA Symmetrical Amperes) | | |
|----------------------|-----------------|--|-----|-----|
| | | Volts AC (50/60 Hz) | | |
| | | 240 | 415 | 690 |
| RD | | | | |
| I_{cu} | 3, 4 | 135 | 70 | 25 |
| I_{cs} | 3, 4 | 100 | 50 | 13 |
| RDC | | | | |
| I_{cu} | 3, 4 | 200 | 100 | 35 |
| I_{cs} | 3, 4 | 100 | 50 | 18 |

Notes

^① Utilization Category A circuit breakers.

^② 100% rated breakers.

See **Page V4-T2-355** for Trip Unit Specifications.

Specifications**R-Frame Digitrip**

| Trip Unit Type | Digitrip RMS 510 | Digitrip RMS 610 | Digitrip RMS 810 | Digitrip RMS 910 | Digitrip OPTIM 1050 |
|--|-----------------------------------|-----------------------------------|-----------------------------------|-----------------------------------|------------------------------------|
| rms sensing | Yes | Yes | Yes | Yes | Yes |
| Breaker Type | | | | | |
| Frame | R | R | R | R | R |
| Ampere range | 800–2500 A | 800–2500 A | 800–2500 A | 800–2500 A | 800–2500 A |
| Interrupting rating at 480 volts | 65, 100 (kA) | 65, 100 (kA) | 65, 100 (kA) | 65, 100 (kA) | 65, 100 (kA) |
| Protection | | | | | |
| Ordering options | LI, LS, LSI, LIG, LSG, LSIG | LI, LS, LSI, LIG, LSG, LSIG | LI, LS, LSI, LIG, LSG, LSIG | LI, LS, LSI, LIG, LSG, LSIG | LSI(A), LISG |
| Fixed rated plug (I_n) | Yes | Yes | Yes | Yes | Yes |
| Overtemperature trip | Yes | Yes | Yes | Yes | Yes |
| Long Delay Protection (L) | | | | | |
| Adjustable rating plug (I_n) | No | No | No | No | No |
| Long delay pickup | 0.5–1.0 x (I_n) | 0.5–1.0 x (I_n) | 0.5–1.0 x (I_n) | 0.5–1.0 x (I_n) | 0.4–1.0 x (I_n) |
| Long delay time I^2t | 2–24 seconds | 2–24 seconds | 2–24 seconds | 2–24 seconds | 2–24 seconds |
| Long delay time I^4t | No | No | No | No | 1–5 Seconds |
| Long delay thermal memory | Yes | Yes | Yes | Yes | Yes |
| High load alarm | No | 0.85 x I_r | 0.85 x I_r | 0.85 x I_r | 0.5–1.0 x I_r |
| Short Delay Protection (S) | | | | | |
| Short delay pickup | 200–600% S1 and S2 x (I_r) | 200–600% S1 and S2 x (I_r) | 200–600% S1 and S2 x (I_r) | 200–600% S1 and S2 x (I_r) | 150–800% x (I_r) ^{①②} |
| Short delay time I^2t | 100–500 ms | 100–500 ms | 100–500 ms | 100–500 ms | 100–500 ms |
| Short delay time flat | 100–500 ms | 100–500 ms | 100–500 ms | 100–500 ms | 100–500 ms |
| Short delay time zone selective interlocking | Yes | Yes | Yes | Yes | Yes |
| Instantaneous Protection (I) | | | | | |
| Instantaneous pickup | 200–600% M1 and M2 x (I_n) | 200–600% M1 and M2 x (I_n) | 200–600% M1 and M2 x (I_n) | 200–600% M1 and M2 x (I_n) | 200–800% x (I_n) ^② |
| Discriminator | Yes ^③ | Yes ^③ | Yes ^③ | Yes ^③ | Yes |
| Instantaneous override | Yes | Yes | Yes | Yes | Yes |
| Ground Fault Protection (G) | | | | | |
| Ground fault alarm ^④ | No | No | No | No | 25–100% x (I_n) |
| Ground fault pickup ^④ | 25–100% x (I_g) | 25–100% x (I_g) | 25–100% x (I_g) | 25–100% x (I_g) | 25–100% x (I_n) |
| Ground fault delay I^2t | 100–500 ms | 100–500 ms | 100–500 ms | 100–500 ms | 100–500 ms |
| Ground fault delay flat | 100–500 ms | 100–500 ms | 100–500 ms | 100–500 ms | 100–500 ms |
| Ground fault zone selective interlocking | Yes | Yes | Yes | Yes | Yes |
| Ground fault thermal memory | Yes | Yes | Yes | Yes | Yes |

Legend

BIM = Breaker Interface Module
(A) = GF Alarm
 I_s = Sensor Rating
 I_n = Rating Plug
 I_r = Long Delay Pickup Setting x I_n

Notes

- ① Except 2500 ampere frame is 200–600%.
② Varies by frame.
③ LS/LSG only.
④ Not to exceed 1200 amperes.

R-Frame Digitrip, continued

| Trip Unit Type | Digitrip RMS 510 | Digitrip RMS 610 | Digitrip RMS 810 | Digitrip RMS 910 | Digitrip OPTIM 1050 |
|-------------------------------|---------------------|---------------------|-----------------------------------|---------------------|-----------------------------|
| System Diagnostics | | | | | |
| Status LEDs | Yes | Yes | Yes | Yes | Yes |
| Cause of trip LEDs | Yes | Yes | Yes | Yes | Yes |
| Magnitude of trip information | No | Yes | Yes | Yes | Yes |
| Remote signal contacts | No | Yes | Yes | Yes | Yes |
| System Monitoring | | | | | |
| Digital display | No | Yes | Yes | Yes | Yes ^① |
| Current | No | Yes | Yes | Yes | Yes |
| Voltage | No | No | No | Yes | No |
| Power and energy | No | No | Yes | Yes | Yes |
| Power quality—harmonics | No | No | No | Yes | Yes |
| Power factor | No | No | Yes (over Eaton PowerNet only) | Yes | Yes |
| Communications | | | | | |
| Eaton PowerNet | No | No | Yes | Yes | Yes |
| Testing | | | | | |
| Testing method | Integral | Integral | Integral | Integral | OPTIMizer, BIM, PowerNet |

Legend

BIM = Breaker Interface Module
 (A) = GF Alarm
 I_s = Sensor Rating
 I_n = Rating Plug
 I_r = Long Delay Pickup Setting x I_n

Note

^① By OPTIMizer/BIM.

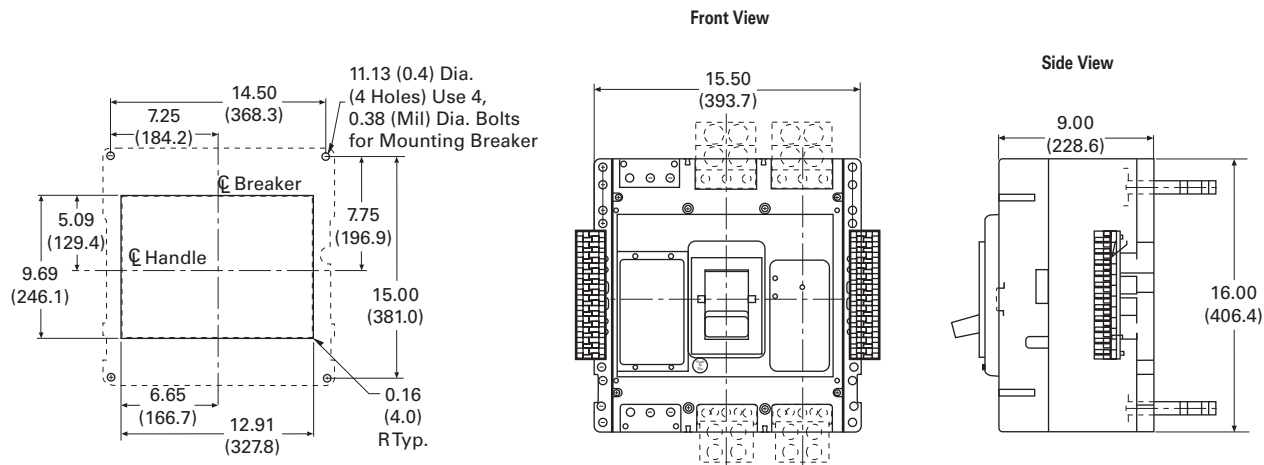
Dimensions and Weights

Dimensions in Inches (mm)

RD Frame

| Number of Poles | Width | Height | Depth |
|-----------------|---------------|---------------|--------------|
| 3 | 15.50 (393.7) | 16.00 (406.4) | 9.75 (247.7) |
| 4 | 20.00 (508.0) | 16.00 (406.4) | 9.75 (247.7) |

RD-Frame, Three-Pole, 1600 and 2000 Amperes



Approximate Shipping Weight in Lbs (kg)

RD Frame

| Breaker Type | Complete Breaker | |
|---|------------------|------------|
| | Three-Pole | Four-Pole |
| 1600 Amperes | | |
| RD, CRD [Ⓢ] , RDC, CRDC [Ⓢ] | 102 (46.3) | 135 (61.2) |
| 2000 Amperes | | |
| RD, RDC | 102 (46.3) | 135 (61.2) |
| CRD, CRDC | 130 (59.0) | 175 (79.4) |
| 2500 Amperes | | |
| RD, RDC | 135 (61.2) | 182 (82.6) |

Note

[Ⓢ] No four-pole for CRD and CRDC.

Motor Circuit Protectors



Contents

| <i>Description</i> | <i>Page</i> |
|--|------------------|
| Product Overview | V4-T2-218 |
| Standards and Certifications | V4-T2-219 |
| Quick Reference | V4-T2-220 |
| G-Frame (15–100 Amperes) | V4-T2-223 |
| F-Frame (10–225 Amperes) | V4-T2-237 |
| J-Frame (70–250 Amperes) | V4-T2-255 |
| K-Frame (70–400 Amperes) | V4-T2-263 |
| L-Frame (125–600 Amperes) | V4-T2-287 |
| M-Frame (300–800 Amperes) | V4-T2-313 |
| N-Frame (400–1200 Amperes) | V4-T2-324 |
| R-Frame (800–2500 Amperes) | V4-T2-339 |
| Motor Circuit Protectors (MCP) | |
| Catalog Number Selection | V4-T2-359 |
| Product Selection | V4-T2-360 |
| Accessories | V4-T2-361 |
| Motor Protection Circuit Breakers (MPCB) | V4-T2-369 |
| Type ELC Current Limiter Attachment (Size 0–4) | V4-T2-371 |
| Current Limiting Circuit Breaker Module | V4-T2-372 |
| Internal Accessories | V4-T2-375 |
| External Accessories | V4-T2-408 |

Motor Circuit Protectors (MCP)

Product Description

Designated as Eaton’s Types GMCP and HMCP, the instantaneous-only motor circuit protector (MCP) is available in ratings from 3 A to 1200 A for motor starter sizes 0 through 8.

An innovative design of internal components allows higher MCP-starter combination interrupting ratings. The MCP is marked to permit proper electrical application within the assigned equipment ratings.

Standards and Certifications

The MCP is designed to comply with the applicable requirements of Underwriters Laboratories Standard UL 489, Canadian Standards Association Standard C22.2 No. 5.1, and International Electrotechnical Commission Recommendations IEC 157-1.

The MCP is a recognized component (UL File E7819) and complies with the applicable requirements of Underwriters Laboratories Standard UL 489. It is also designed to comply with the applicable requirements of Canadian Standards Association Standard C22.2 No. 5.1, International Electrotechnical Commission Recommendations IEC 157-1, and nameplates bear the CE marking.

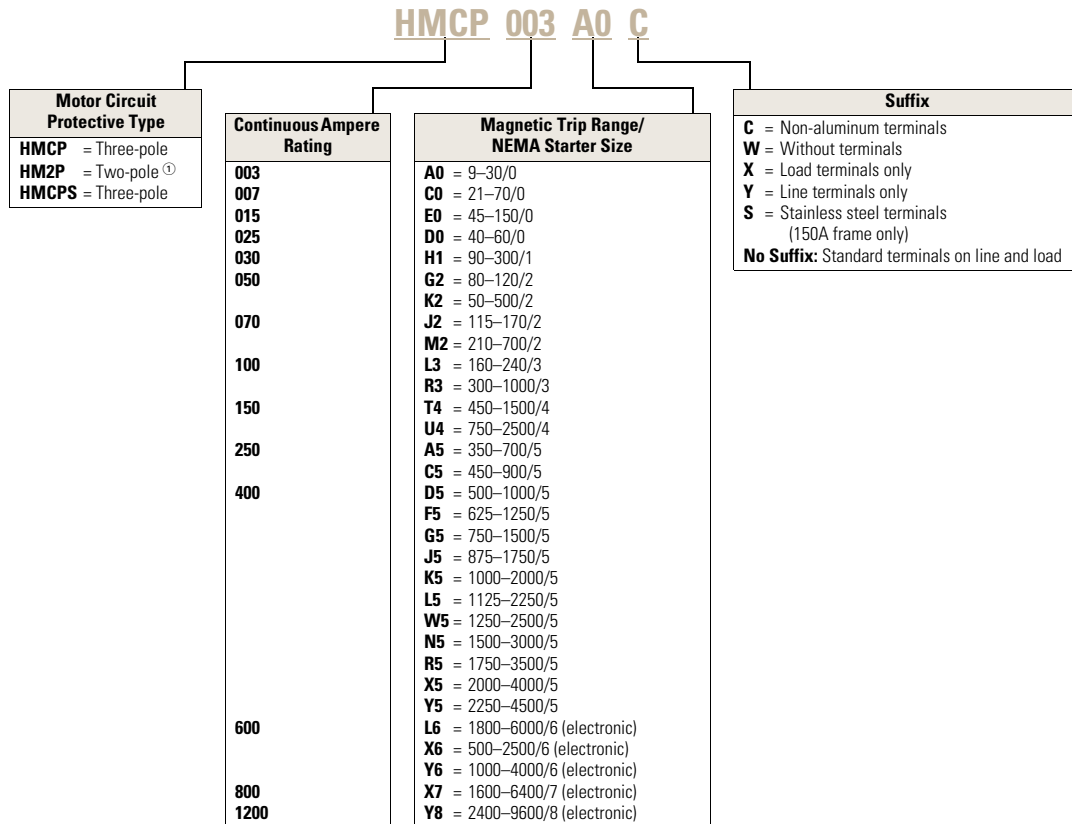


Note: Interrupting ratings are dependent on starter it is used with.

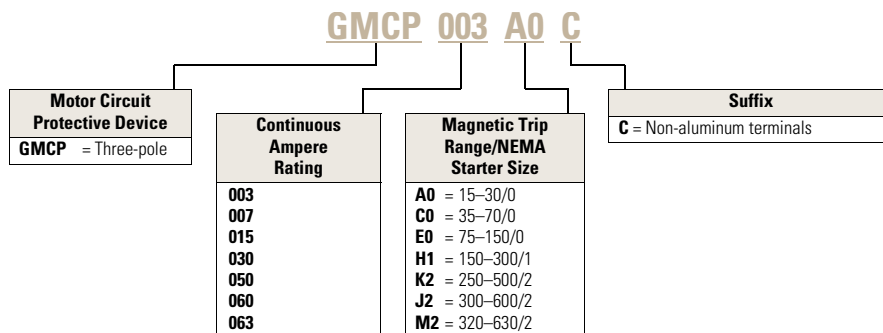
Catalog Number Selection

This information is presented only as an aid to understanding catalog numbers. It is not to be used to build catalog numbers for circuit breakers or trip units.

Motor Circuit Protector



Motor Circuit Protector



Note

① On J- and K-Frame HMCPs only.

Product Selection

G-Frame

480 Vac Maximum, 600Y/347 Vac

| NEMA Starter Size | Continuous Amperes | Cam Setting | Motor Full Load Current Amperes (FLA) ^① | MCP Trip Setting | MCP Catalog Number |
|-------------------|--------------------|-------------|--|------------------|--------------------|
| 0 | 3 | A | 1.1–1.2 | 15 | GMCP003A0C |
| | | B | 1.3–1.5 | 18 | |
| | | C | 1.6–1.7 | 21 | |
| | | D | 1.8–1.9 | 24 | |
| | | E | 2.0–2.2 | 27 | |
| | | F | 2.3–2.5 | 30 | |
| 0 | 7 | A | 2.6–3.1 | 35 | GMCP007C0C |
| | | B | 3.2–3.6 | 42 | |
| | | C | 3.7–3.9 | 49 | |
| | | D | 4.3–4.7 | 56 | |
| | | E | 4.8–5.2 | 63 | |
| | | F | 5.3–5.7 | 70 | |
| 0 | 15 | A | 5.7–6.8 | 75 | GMCP015E0C |
| | | B | 6.9–7.9 | 90 | |
| | | C | 8.0–9.1 | 105 | |
| | | D | 9.2–10.3 | 120 | |
| | | E | 10.4–11.4 | 135 | |
| | | F | 11.5–12.6 | 150 | |
| 1 | 30 | A | 11.5–13.7 | 150 | GMCP030H1C |
| | | B | 13.8–16.0 | 180 | |
| | | C | 16.1–18.3 | 210 | |
| | | D | 18.4–20.6 | 240 | |
| | | E | 20.7–22.9 | 270 | |
| | | F | 23.0–25.2 | 300 | |
| 2 | 50 | A | 19.3–22.9 | 250 | GMCP050K2C |
| | | B | 23.0–26.8 | 300 | |
| | | C | 26.9–30.6 | 350 | |
| | | D | 30.7–34.5 | 400 | |
| | | E | 34.6–38.3 | 450 | |
| | | F | 38.4–42.1 | 500 | |
| 3 | 60 | A | 23.1–27.5 | 300 | GMCP060J2C |
| | | B | 27.7–32.2 | 360 | |
| | | C | 32.3–36.7 | 420 | |
| | | D | 36.9–41.4 | 480 | |
| | | E | 41.5–46.0 | 540 | |
| | | F | 46.2–50.5 | 600 | |
| 3 | 63 | A | 24.2–32.1 | 320 | GMCP063M2C |
| | | B | 29.1–34.8 | 380 | |
| | | D | 38.8–46.4 | 500 | |
| | | E | 43.6–48.9 | 570 | |
| | | F | 48.5–53.7 | 630 | |

Notes

^① Motor FLA ranges are typical. The corresponding trip setting is at 13 x the minimum FLA value shown. Where a 13 x setting is required for an intermediate FLA value, alternate Cam settings and/or MCP ratings should be used.

All GMCP 3–63A come with line and load steel body terminals for Cu only wire. Refer to **Page V4-T2-224** under Optional Terminal Types.

UL recognized and CSA approved.

Accessories

Modifications for GMCP

Internal accessories must be factory installed.

Internal Accessories ^①

| Type Accessory | Electrical Ratings | | | Contact Arrangement | Factory Suffix | Style Number |
|--|--------------------|-----------|---------|---------------------|----------------|--------------|
| | Volts | Frequency | Amperes | | | |
| Shunt trip ^② | 120 | 50/60 Hz | 1.1 | — | S5 | 1373D62G18 |
| Shunt trip ^② | 240 | 50/60 Hz | 2.1 | — | S6 | 1373D62G19 |
| Auxiliary switch ^③ | 240 | 50/60 Hz | 6.0 | 1A/1B | A3 | 1288C74G03 |
| Auxiliary switch ^③ | 240 | 50/60 Hz | 6.0 | 2A/2B | A6 | 1288C73G03 |
| Alarm switch ^③ | 240 | 50/60 Hz | 6.0 | Make/Break | B3 | 1288C75G03 |
| Auxiliary switch/alarm switch combination ^③ | 240 | 50/60 Hz | 6.0 | 1A/1B Make/Break | B13 | 1288C76G09 |

External Mounted Accessories



| Description | Number Units in Package | Style Number |
|-------------------------------|-------------------------|--------------|
| Lock dog (non-padlockable) | 1 | 1294C01H01 |
| Mounting hardware | 1 | 624B375G23 |
| DIN rail adapter ^④ | 10 | 1225C79G02 |

Modifications for HMCP

See Internal Accessories starting on **Page V4-T2-375**.

Handle Mechanisms for Series C Frames

Kits Only (Kit Includes Shaft, Mechanism and Handle)—GMCP-Frame

| Description | Rating Type | | GMCP-Frame Catalog Number |
|---|-------------|----|---------------------------|
| | NEMA | IP | |
|  S01 Blue Handle S01 blue handle, 12-inch shaft | 1/3R/12 | 54 | GMHMVD12B / 68C6039G05 |
| | 4/4X | 65 | GMHMVD12BX / 68C6039G07 |
|  S01 Red Handle S01 red handle, 12-inch shaft | 1/3R/12 | 54 | GMHMVD12R / 68C6039G06 |
| | 4/4X | 65 | GMHMVD12RX / 68C6039G08 |

Direct (Close-Coupled) Handle Mechanisms

G Direct ^⑤

| Frame | Black Handle | | Yellow Handle | |
|-------|-------------------------------|----------------------------------|-------------------------------|----------------------------------|
| | With Shroud Catalog Number | Without Shroud Catalog Number | With Shroud Catalog Number | Without Shroud Catalog Number |
| GMCP | HRGMC1S | HRGMC10 | HRGMC3S | HRGMC30 |

Notes

- ① Only one accessory may be installed in GMCP.
- ② LH only.
- ③ RH only.
- ④ For use with standard 35 mm DIN rail such as, 35 x 7.5 or 15 mm per DIN EN50022.
- ⑤ Suitable for use on two- or three-pole G-Frame.

No UVR available on GMCP.

2.4

Molded Case Circuit Breakers

Series C

F-Frame

2

600 Vac Maximum, 250 Vdc Maximum

| NEMA Starter Size | Cont. Amps | Cam Setting | Motor Full Load Current Amperes (FLA) ^① | MCP Trip Setting ^② | MCP Catalog Number |
|-------------------|------------|-------------|--|-------------------------------|--------------------|
| 0 | 3 | A | 0.69–0.91 | 9 | HMCP003A0C |
| | | B | 0.92–1.0 | 12 | |
| | | C | 1.1–1.2 | 15 | |
| | | D | 1.3–1.5 | 18 | |
| | | E | 1.6–1.7 | 21 | |
| | | F | 1.8–1.9 | 24 | |
| | | G | 2.0–2.2 | 27 | |
| | | H | 2.3–2.5 | 30 | |
| 0 | 7 | A | 1.5–2.0 | 21 | HMCP007C0C |
| | | B | 2.1–2.5 | 28 | |
| | | C | 2.6–3.1 | 35 | |
| | | D | 3.2–3.6 | 42 | |
| | | E | 3.7–3.9 | 49 | |
| | | F | 4.3–4.7 | 56 | |
| | | G | 4.8–5.2 | 63 | |
| | | H | 5.3–5.7 | 70 | |
| 0 | 15 | A | 3.4–4.5 | 45 | HMCP015E0C |
| | | B | 4.6–5.6 | 60 | |
| | | C | 5.7–6.8 | 75 | |
| | | D | 6.9–7.9 | 90 | |
| | | E | 8.0–9.1 | 105 | |
| | | F | 9.2–10.3 | 120 | |
| | | G | 10.4–11.4 | 135 | |
| | | H | 11.5–12.6 | 150 | |
| 1 | 30 | A | 6.9–9.1 | 90 | HMCP030H1C |
| | | B | 9.2–11.4 | 120 | |
| | | C | 11.5–13.7 | 150 | |
| | | D | 13.8–16.0 | 180 | |
| | | E | 16.1–18.3 | 210 | |
| | | F | 18.4–20.6 | 240 | |
| | | G | 20.7–22.9 | 270 | |
| | | H | 23.0–25.2 | 300 | |
| 2 | 50 | A | 11.5–15.2 | 150 | HMCP050K2C |
| | | B | 15.3–19.1 | 200 | |
| | | C | 19.2–22.9 | 250 | |
| | | D | 23.0–26.8 | 300 | |
| | | E | 26.9–30.6 | 350 | |
| | | F | 30.7–4.5 | 400 | |
| | | G | 34.6–38.3 | 450 | |
| | | H | 38.4–42.1 | 500 | |

600 Vac Maximum, 250 Vdc Maximum, continued

| NEMA Starter Size | Cont. Amps | Cam Setting | Motor Full Load Current Amperes (FLA) ^① | MCP Trip Setting ^② | MCP Catalog Number |
|-------------------|------------|-------------|--|-------------------------------|--------------------|
| 2 | 70 | A | 16.1–21.4 | 210 | HMCP070M2C |
| | | B | 21.5–26.8 | 280 | |
| | | C | 26.9–32.2 | 350 | |
| | | D | 32.3–37.5 | 420 | |
| | | E | 37.6–42.9 | 490 | |
| | | F | 43.0–48.3 | 560 | |
| | | G | 48.4–53.7 | 630 | |
| | | H | 53.8–59.1 | 700 | |
| 3 | 100 | A | 23.0–30.6 | 300 | HMCP100R3C |
| | | B | 30.7–38.3 | 400 | |
| | | C | 38.4–46.0 | 500 | |
| | | D | 46.1–53.7 | 600 | |
| | | E | 53.8–61.4 | 700 | |
| | | F | 61.5–69.1 | 800 | |
| | | G | 69.2–76.8 | 900 | |
| | | H | 76.9–84.5 | 1000 | |
| 4 | 150 | A | 34.6–46.0 | 450 | HMCP150T4C |
| | | B | 46.1–57.5 | 600 | |
| | | C | 57.6–69.1 | 750 | |
| | | D | 69.2–80.6 | 900 | |
| | | D | 69.2–80.6 | 900 | |
| | | E | 80.7–92.2 | 1050 | |
| | | F | 92.3–103.7 | 1200 | |
| | | G | 103.8–115.2 | 1350 | |
| 4 | 150 | A | 57.0–75.0 | 750 | HMCP150U4C |
| | | B | 76.0–95.0 | 1000 | |
| | | C | 96.0–114.0 | 1250 | |
| | | D | 115.0–130.7 | 1500 | |
| | | E | ^③ | 1750 | |
| | | F | ^③ | 2000 | |
| | | G | ^③ | 2250 | |
| | | H | ^③ | 2500 | |

Notes

- ① Motor FLA ranges are typical. The corresponding trip setting is at 13 x the minimum FLA value shown. Where a 13 x setting is required for an intermediate FLA value, alternate Cam settings and/or MCP ratings should be used.
- ② For DC applications, actual trip levels are approximately 40% higher than values shown.
- ③ Settings above 130 amperes are for special applications. NEC Article 430.110(a) requires the ampere rating of the disconnecting means to be not less than 115% of the motor full load ampere rating.

HMCP 3–100 A come with line and load steel body terminals, 3T100FB. HMCP 150A come with line and load steel body terminals, 3T150FB.

Special Low Magnetic Protection Application MCP**600 Vac Maximum, 250 Vdc Maximum**

| Cont. Amps | Cam Setting | MCP Trip Setting ^① | MCP Catalog Number |
|-------------------|--------------------|--------------------------------------|---------------------------|
| 25 | A | 40 | HMCP025D0C |
| | B | 43 | |
| | D | 49 | |
| | E | 52 | |
| | F | 55 | |
| | G | 58 | |
| | H | 60 | |
| | 50 | A | |
| B | | 87 | |
| C | | 93 | |
| D | | 98 | |
| E | | 103 | |
| F | | 109 | |
| G | | 115 | |
| H | | 120 | |
| 70 | A | 115 | HMCP070J2C |
| | B | 122 | |
| | C | 130 | |
| | D | 139 | |
| | E | 145 | |
| | F | 153 | |
| | G | 160 | |
| | H | 170 | |
| 100 | A | 160 | HMCP100L3C |
| | B | 174 | |
| | C | 185 | |
| | D | 196 | |
| | E | 207 | |
| | F | 218 | |
| | G | 229 | |
| | H | 240 | |

Notes

^① For DC applications, actual trip levels are approximately 40% higher than values shown.

HMCP 25–100 A come with line and load steel body terminals, 3T100FB.

2.4

Molded Case Circuit Breakers

Series C

MCPs for Application with Motor Starters Equipped with Electronic Overload Relays

2

600 Vac Maximum, 250 Vdc Maximum

| NEMA Starter Size | Cont. Amps | Cam Setting | Motor Full Load Current Amperes (FLA) ① | MCP Trip Setting ② | MCP Catalog Number |
|-------------------|------------|-------------|---|--------------------|--------------------|
| 0 | 3 | A | 0.69–0.91 | 9 | HMCP5003A0C |
| | | B | 0.92–1.0 | 12 | |
| | | C | 1.1–1.2 | 15 | |
| | | D | 1.3–1.5 | 18 | |
| | | E | 1.6–1.7 | 21 | |
| | | F | 1.8–1.9 | 24 | |
| | | G | 2.0–2.2 | 27 | |
| | | H | 2.3–2.5 | 30 | |
| 0 | 7 | A | 1.5–2.0 | 21 | HMCP5007C0C |
| | | B | 2.1–2.5 | 28 | |
| | | C | 2.6–3.1 | 35 | |
| | | D | 3.2–3.6 | 42 | |
| | | E | 3.7–3.9 | 49 | |
| | | F | 4.3–4.7 | 56 | |
| | | G | 4.8–5.2 | 63 | |
| | | H | 5.3–5.7 | 70 | |
| 0 | 15 | A | 3.4–4.5 | 45 | HMCP5015E0C |
| | | B | 4.6–5.6 | 60 | |
| | | C | 5.7–6.8 | 75 | |
| | | D | 6.9–7.9 | 90 | |
| | | E | 8.0–9.1 | 105 | |
| | | F | 9.2–10.3 | 120 | |
| | | G | 10.4–11.4 | 135 | |
| | | H | 11.5–12.6 | 150 | |
| 1 | 30 | A | 6.9–9.1 | 90 | HMCP5030H1C |
| | | B | 9.2–11.4 | 120 | |
| | | C | 11.5–13.7 | 150 | |
| | | D | 13.8–16.0 | 180 | |
| | | E | 16.1–18.3 | 210 | |
| | | F | 18.4–20.6 | 240 | |
| | | G | 20.7–22.9 | 270 | |
| | | H | 23.0–25.2 | 300 | |
| 2 | 50 | A | 11.5–15.2 | 150 | HMCP5050K2C |
| | | B | 15.3–19.1 | 200 | |
| | | C | 19.2–22.9 | 250 | |
| | | D | 23.0–26.8 | 300 | |
| | | E | 26.9–30.6 | 350 | |
| | | F | 30.7–34.5 | 400 | |
| | | G | 34.6–38.3 | 450 | |
| | | H | 38.4–42.1 | 500 | |

600 Vac Maximum, 250 Vdc Maximum, continued

| NEMA Starter Size | Cont. Amps | Cam Setting | Motor Full Load Current Amperes (FLA) ① | MCP Trip Setting ② | MCP Catalog Number |
|-------------------|------------|-------------|---|--------------------|--------------------|
| 3 | 100 | A | 23.0–30.6 | 300 | HMCP5100R3C |
| | | B | 30.7–38.3 | 400 | |
| | | C | 38.4–46.0 | 500 | |
| | | D | 46.1–53.7 | 600 | |
| | | E | 53.8–61.4 | 700 | |
| | | F | 61.5–69.1 | 800 | |
| | | G | 69.2–76.8 | 900 | |
| | | H | 76.9–84.5 | 1000 | |
| 4 | 150 | A | 34.6–46.0 | 450 | HMCP5150T4C |
| | | B | 46.1–57.5 | 600 | |
| | | C | 57.6–69.1 | 750 | |
| | | D | 69.2–80.6 | 900 | |
| | | E | 80.7–92.2 | 1050 | |
| | | F | 92.3–103.7 | 1200 | |
| | | G | 103.8–115.2 | 1350 | |
| | | H | 115.3–126.7 | 1500 | |
| 4 | 150 | A | 57.0–75.0 | 750 | HMCP5150U4C |
| | | B | 76.0–95.0 | 1000 | |
| | | C | 96.0–114.0 | 1250 | |
| | | D | 115.0–130.7 | 1500 | |
| | | E | ③ | 1750 | |
| | | F | ③ | 2000 | |
| | | G | ③ | 2250 | |
| | | H | ③ | 2500 | |

Notes

- ① Motor FLA ranges are typical. The corresponding trip setting is at 13 x the minimum FLA value shown. Where a 13 x setting is required for an intermediate FLA value, alternate cam settings and/or MCP ratings should be used.
- ② For DC applications, actual trip levels are approximately 40% higher than values shown.
- ③ Settings above 130A are for special applications. NEC Article 430.110(a) requires the ampere rating of the disconnecting means to be not less than 115% of the motor full load ampere rating.

HMCP 25–100 A come with line and load steel body terminals, 3T100FB.

HMCP 3–100 A come with line and load steel body terminals, 3T100FB. HMCP 150A come with line and load steel body terminals, 3T150FB.

J-Frame**600 Vac Maximum, 250 Vdc Maximum**

| NEMA Starter Size | Cont. Amps | Cam Setting | Motor Full Load Current Amperes (FLA) ^① | MCP Trip Setting ^② | MCP Catalog Number ^③ |
|-------------------|------------|-------------|--|-------------------------------|---------------------------------|
| 4 | 250 | A | 27.0–30.7 | 350 | HMCP250A5C |
| | | B | 30.8–33.8 | 400 | |
| | | C | 33.9–36.9 | 440 | |
| 5 | 250 | D | 37.0–40.3 | 480 | |
| | | E | 40.4–43.8 | 525 | |
| | | F | 43.9–46.9 | 570 | |
| | | G | 47.0–50.7 | 610 | |
| | | H | 47.0–50.7 | 660 | |
| | | I | 47.0–50.7 | 700 | |
| 5 | 250 | A | 34.7–38.8 | 450 | HMCP250C5C |
| | | B | 38.9–43.4 | 505 | |
| | | C | 43.5–47.6 | 565 | |
| | | D | 47.7–52.2 | 620 | |
| | | E | 52.3–56.5 | 680 | |
| | | F | 56.6–60.7 | 735 | |
| | | G | 60.8–64.9 | 790 | |
| | | H | 65.0–69.2 | 845 | |
| | | I | 69.3–73.5 | 900 | |
| 5 | 250 | A | 38.5–43.4 | 500 | HMCP250D5C |
| | | B | 43.5–48.0 | 565 | |
| | | C | 48.1–53.0 | 625 | |
| | | D | 53.1–57.6 | 690 | |
| | | E | 57.7–62.3 | 750 | |
| | | F | 62.4–67.3 | 810 | |
| | | G | 67.4–71.9 | 875 | |
| | | H | 72.0–76.9 | 935 | |
| | | I | 77.0–81.6 | 1000 | |
| 5 | 250 | A | 48.1–53.8 | 625 | HMCP250F5C |
| | | B | 53.9–59.9 | 700 | |
| | | C | 60.0–66.1 | 780 | |
| | | D | 66.2–72.3 | 860 | |
| | | E | 72.4–78.4 | 940 | |
| | | F | 78.5–83.8 | 1020 | |
| | | G | 83.9–89.9 | 1090 | |
| | | H | 90.0–96.1 | 1170 | |
| | | I | 96.2–102.0 | 1250 | |
| 5 | 250 | A | 57.7–64.6 | 750 | HMCP250G5C |
| | | B | 64.7–71.9 | 840 | |
| | | C | 72.0–79.2 | 935 | |
| | | D | 79.3–86.5 | 1030 | |
| | | E | 86.6–93.8 | 1125 | |
| | | F | 93.9–101.1 | 1220 | |
| | | G | 101.2–108.4 | 1315 | |
| | | H | 108.5–115.3 | 1410 | |
| | | I | 115.4–122.4 | 1500 | |

600 Vac Maximum, 250 Vdc Maximum, continued

| NEMA Starter Size | Cont. Amps | Cam Setting | Motor Full Load Current Amperes (FLA) ^① | MCP Trip Setting ^② | MCP Catalog Number ^③ | |
|-------------------|-------------|-------------|--|-------------------------------|---------------------------------|-------------------|
| 5 | 250 | A | 67.4–75.3 | 875 | HMCP250J5C | |
| | | B | 75.4–83.8 | 980 | | |
| | | C | 83.9–92.3 | 1090 | | |
| | | D | 92.4–100.7 | 1200 | | |
| | | E | 100.8–109.2 | 1310 | | |
| | | F | 109.3–117.6 | 1420 | | |
| 5 | 250 | G | 117.7–126.1 | 1530 | | |
| | | H | 126.2–134.6 | 1640 | | |
| | | I | 134.7–142.8 | 1750 | | |
| | | A | 77.0–86.6 | 1000 | | HMCP250K5C |
| | | B | 86.6–96.1 | 1125 | | |
| | | C | 96.2–105.7 | 1250 | | |
| D | 105.8–115.3 | 1375 | | | | |
| E | 115.4–124.9 | 1500 | | | | |
| F | 125.0–134.6 | 1625 | | | | |
| 5 | 250 | G | 134.7–144.2 | 1750 | | |
| | | H | 144.3–153.8 | 1875 | | |
| | | I | 153.9–163.3 | 2000 | | |
| | | A | 86.6–97.3 | 1125 | | HMCP250L5C |
| | | B | 97.4–108.4 | 1265 | | |
| | | C | 108.5–118.8 | 1410 | | |
| D | 118.9–129.9 | 1545 | | | | |
| E | 130.0–140.7 | 1690 | | | | |
| F | 140.8–151.5 | 1830 | | | | |
| 5 | 250 | G | 151.6–162.3 | 1970 | | |
| | | H | 162.4–173.0 | 2110 | | |
| | | I | 173.1–183.6 | 2250 | | |
| | | A | 96.2–108.0 | 1250 | | HMCP250W5C |
| | | B | 108.1–119.9 | 1405 | | |
| | | C | 120.0–132.3 | 1560 | | |
| D | 132.4–144.2 | 1720 | | | | |
| E | 144.3–156.1 | 1875 | | | | |
| F | 156.2–168.0 | 2030 | | | | |
| 5 | 250 | G | 168.1–179.9 | 2185 | | |
| | | H | 180.0–192.3 | 2340 | | |
| | | I | 192.4–204.0 | 2500 | | |

Notes

^① Motor FLA ranges are typical. The corresponding trip setting is at 13 times the minimum FLA value shown. Where a 13 times setting is required for an intermediate FLA value, alternate cam settings and/or MCP ratings should be used.

^② For DC applications, actual trip levels are approximately 40% higher than values shown.

^③ Three-pole catalog numbers shown. Two-pole catalog numbers begin with **HM2P** in place of **HMCP**.

All HMCP and HM2P 250A come with line and load steel body terminals, T250KB. (With suffix "C," without "C" comes with TA250KB.)

K-Frame

2

600 Vac Maximum, 250 Vdc Maximum

| NEMA Starter Size | Cont. Amps | Cam Setting | Motor Full Load Current Amperes (FLA) ^① | MCP Trip Setting ^② | MCP Catalog Number ^③ |
|-------------------|------------|-------------|--|-------------------------------|---------------------------------|
| 4 | 400 | A | 27.0–30.7 | 350 | HMCP400A5C |
| | | B | 30.8–33.8 | 400 | |
| | | C | 33.9–36.9 | 440 | |
| 5 | 400 | D | 37.0–40.3 | 480 | HMCP400A5C |
| | | E | 40.4–43.8 | 525 | |
| | | F | 43.9–46.9 | 570 | |
| | | G | 47.0–50.7 | 610 | |
| | | H | 50.8–53.8 | 660 | |
| | | I | 53.9–57.2 | 700 | |
| 5 | 400 | A | 38.5–43.4 | 500 | HMCP400D5C |
| | | B | 43.5–48.0 | 565 | |
| | | C | 48.1–53.0 | 626 | |
| | | D | 53.1–57.6 | 690 | |
| | | E | 57.7–62.3 | 750 | |
| | | F | 62.4–67.3 | 810 | |
| | | G | 67.4–71.9 | 875 | |
| | | H | 72.0–76.9 | 935 | |
| | | I | 77.0–81.6 | 1000 | |
| 5 | 400 | A | 48.1–53.8 | 625 | HMCP400F5C |
| | | B | 53.9–59.9 | 700 | |
| | | C | 60.0–66.1 | 780 | |
| | | D | 66.2–72.3 | 860 | |
| | | E | 72.4–78.4 | 940 | |
| | | F | 78.5–83.8 | 1020 | |
| | | G | 83.9–89.9 | 1090 | |
| | | H | 90.0–96.1 | 1170 | |
| | | I | 96.2–102.0 | 1250 | |
| 5 | 400 | A | 57.7–64.6 | 750 | HMCP400G5C |
| | | B | 64.7–71.9 | 840 | |
| | | C | 72.0–79.2 | 935 | |
| | | D | 79.3–86.5 | 1030 | |
| | | E | 86.6–93.8 | 1125 | |
| | | F | 93.9–101.1 | 1220 | |
| | | G | 101.2–108.4 | 1315 | |
| | | H | 108.5–115.3 | 1410 | |
| | | I | 115.4–122.4 | 1500 | |
| 5 | 400 | A | 67.4–75.3 | 875 | HMCP400J5C |
| | | B | 75.4–83.8 | 980 | |
| | | C | 83.9–92.3 | 1090 | |
| | | D | 92.4–100.7 | 1200 | |
| | | E | 100.8–109.2 | 1310 | |
| | | F | 109.3–117.6 | 1420 | |
| | | G | 117.7–126.1 | 1530 | |
| | | H | 126.2–134.6 | 1640 | |
| | | I | 134.7–142.8 | 1750 | |

600 Vac Maximum, 250 Vdc Maximum, continued

| NEMA Starter Size | Cont. Amps | Cam Setting | Motor Full Load Current Amperes (FLA) ^① | MCP Trip Setting ^② | MCP Catalog Number ^③ |
|-------------------|------------|-------------|--|-------------------------------|---------------------------------|
| 5 | 400 | A | 77.0–86.5 | 1000 | HMCP400K5C |
| | | B | 86.6–96.1 | 1125 | |
| | | C | 96.2–105.7 | 1250 | |
| | | D | 105.8–115.3 | 1375 | |
| | | E | 115.4–124.9 | 1500 | |
| | | F | 125.0–134.6 | 1625 | |
| 5 | 400 | A | 86.6–97.3 | 1125 | HMCP400L5C |
| | | B | 97.4–108.4 | 1265 | |
| | | C | 108.5–118.8 | 1410 | |
| | | D | 118.9–129.9 | 1545 | |
| | | E | 130.0–140.7 | 1690 | |
| | | F | 140.8–151.5 | 1830 | |
| | | G | 151.6–162.3 | 1970 | |
| | | H | 162.4–173.0 | 2110 | |
| | | I | 173.1–183.6 | 2250 | |
| 5 | 400 | A | 96.2–108.0 | 1250 | HMCP400W5C |
| | | B | 108.1–119.9 | 1405 | |
| | | C | 120.0–132.3 | 1560 | |
| | | D | 132.4–144.2 | 1720 | |
| | | E | 144.3–156.1 | 1875 | |
| | | F | 156.2–168.0 | 2030 | |
| | | G | 168.1–179.9 | 2185 | |
| | | H | 180.0–192.3 | 2340 | |
| | | I | 192.4–204.0 | 2500 | |
| 5 | 400 | A | 115.4–129.9 | 1500 | HMCP400N5C |
| | | B | 130.0–144.2 | 1690 | |
| | | C | 144.3–158.4 | 1875 | |
| | | D | 158.5–173.0 | 2060 | |
| | | E | 173.1–187.6 | 2250 | |
| | | F | 187.7–201.9 | 2440 | |
| | | G | 202.0–216.1 | 2625 | |
| | | H | 216.2–230.7 | 2810 | |
| | | I | 230.8–244.9 | 3000 | |

Notes

- ① Motor FLA ranges are typical. The corresponding trip setting is at 13 x the minimum FLA value shown. Where a 13 x setting is required for an intermediate FLA value, alternate cam settings and/or MCP ratings should be used.
- ② For DC applications, actual trip levels are approximately 40% higher than values shown.
- ③ Three-pole catalog numbers shown. Two-pole catalog numbers begin with **HM2P** in place of **HMCP**.

All HMCP and HM2P 400 A come with aluminum body terminals, 3TA400K. Catalog numbers with suffix "C" as shown above come with copper body terminals 3T400K.

600 Vac Maximum, 250 Vdc Maximum, continued

| NEMA Starter Size | Cont. Amps | Cam Setting | Motor Full Load Current Amperes (FLA) ① | MCP Trip Setting ② | MCP Catalog Number ③ |
|-------------------|------------|-------------|---|--------------------|----------------------|
| 5 | 400 | A | 134.7–151.5 | 1750 | HMCP400R5C |
| | | B | 151.6–168.4 | 1970 | |
| | | C | 168.5–185.3 | 2190 | |
| | | D | 185.4–201.9 | 2410 | |
| | | E | 202.0–218.8 | 2625 | |
| | | F | 218.9–235.7 | 2845 | |
| | | G | 235.8–252.6 | 3065 | |
| | | H | 252.7–269.2 | 3285 | |
| | | I | 269.3–285.7 | 3500 | |
| 5 | 400 | A | 153.9–173.0 | 2000 | HMCP400X5C |
| | | B | 173.1–192.3 | 2250 | |
| | | C | 192.4–211.5 | 2500 | |
| | | D | 211.6–230.7 | 2750 | |
| | | E | 230.8–249.9 | 3000 | |
| | | F | 250.0–269.2 | 3250 | |
| | | G | 269.3–288.4 | 3500 | |
| | | H | 288.5–307.6 | 3750 | |
| | | I | 307.7–326.9 | 4000 | |
| 5 | 400 | A | 173.1–194.5 | 2250 | HMCP400Y5C |
| | | B | 194.6–216.1 | 2530 | |
| | | C | 216.2–237.6 | 2810 | |
| | | D | 237.7–259.5 | 3090 | |
| | | E | 259.6–281.1 | 3375 | |
| | | F | 281.2–302.6 | 3655 | |
| | | G | 302.7–324.1 | 3935 | |
| | | H | 324.2–346.1 | 4215 | |
| | | I | 346.2–368.1 | 4500 | |

L-Frame

600 Vac Maximum ④

| NEMA Starter Size | Cont. Amps | Cam Setting | Motor Full Load Current Amperes (FLA) ① | MCP Trip Setting | MCP Catalog Number |
|-------------------|------------|-------------|---|------------------|--------------------|
| 6 | 600 | A | 138.5–184.5 | 1800 | HMCP600L6W |
| | | B | 184.6–230.7 | 2400 | |
| | | C | 230.8–276.8 | 3000 | |
| | | D | 276.9–323.0 | 3600 | |
| | | E | 323.1–369.1 | 4200 | |
| | | F | 369.2–415.3 | 4800 | |
| | | G | 415.4–461.4 | 5400 | |
| | | H | 461.5–507.7 | 6000 | |
| 6 | 600 | A | 38.5–46.1 | 500 | HMCP600X6W |
| | | B | 46.2–61.4 | 600 | |
| | | C | 61.5–76.8 | 800 | |
| | | D | 76.9–96.1 | 1000 | |
| | | E | 96.2–115.3 | 1250 | |
| | | F | 115.4–153.7 | 1500 | |
| | | G | 153.8–192.2 | 2000 | |
| | | H | 192.3–230.7 | 2500 | |
| 6 | 600 | A | 76.9–96.1 | 1000 | HMCP600Y6W |
| | | B | 96.2–115.3 | 1250 | |
| | | C | 115.4–153.7 | 1500 | |
| | | D | 153.8–192.2 | 2000 | |
| | | E | 192.3–230.7 | 2500 | |
| | | F | 230.8–269.1 | 3000 | |
| | | G | 269.2–307.6 | 3500 | |
| | | H | 307.7–346.1 | 4000 | |

Notes

① Motor FLA ranges are typical. The corresponding trip setting is at 13 x the minimum FLA value shown. Where a 13 x setting is required for an intermediate FLA value, alternate cam settings and/or MCP ratings should be used.

② For DC applications, actual trip levels are approximately 40% higher than values shown.

③ Three-pole catalog numbers shown. Two-pole catalog numbers begin with **HM2P** in place of **HMCP**.

④ Equipped with electronic trip device.

All HMCP and HM2P 400 A come with aluminum body terminals, 3TA400K. Catalog numbers with suffix "C" as shown above come with copper body terminals 3T400K.

All HMCP 600 A come without terminals. For terminals, see **Page V4-T2-319**.

2.4

Molded Case Circuit Breakers

Series C

N-Frame

2

600 Vac Maximum ^①

| NEMA Starter Size | Cont. Amps | Cam Setting | Motor Full Load Current Amperes (FLA) ^② | MCP Trip Setting | MCP Catalog Number |
|-------------------|------------|-------------|--|------------------|--------------------|
| 7 | 800 | A | 123.1–184.5 | 1600 | HMCP800X7W |
| | | B | 184.6–246.1 | 2400 | |
| | | C | 246.2–307.6 | 3200 | |
| | | D | 307.7–369.1 | 4000 | |
| | | E | 369.2–430.7 | 4800 | |
| | | F | 430.8–492.2 | 5600 | |
| | | G | 492.3–553.7 | 6400 | |
| 8 | 1200 | A | 184.6–276.8 | 2400 | HMCP12Y8W |
| | | B | 276.9–369.1 | 3600 | |
| | | C | 369.2–461.4 | 4800 | |
| | | D | 461.5–553.7 | 6000 | |
| | | E | 553.8–646.1 | 7200 | |
| | | F | 646.2–738.4 | 8400 | |
| | | G | 738.5–830.7 | 9600 | |

Notes

- ① Equipped with electronic trip device.
- ② Motor FLA ranges are typical. The corresponding trip setting is at 13X the minimum FLA value shown. Where a 13X setting is required for an intermediate FLA value, alternate cam settings and/or MCP ratings should be used.

Motor Protection Circuit Breakers



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Motor Protection Circuit Breakers (MPCB)

Product Description

Motor protection circuit breakers (MPCBs) provide UL 489 branch circuit protection, UL 508 and CSA C22.2 No. 14 motor protection, and meet IEC 60947-2 and 50947-4 requirements. Typical branch motor loads are protected by three-component starters, consisting of breaker, contactor and overload relay, or fuse, contactor and overload relay. The MPCB application-specific protection eliminates the need for motor overload relay found in the traditional three-component starter assembly. The branch motor load protection is simplified to an MPCB and contactor, reducing both space requirements and heat generation in customer panels. Protection is provided by application-specific electronic trip units.

The electronic trip unit provides typical motor overload relay functionality and short-circuit protection against potential phase-to-phase or phase-to-ground faults.

- Disconnecting means
- Branch circuit short-circuit protection
- Overload protection
 - Class 5, 10, 15 and 20
- Phase unbalance protection
 - FDMP breaker trips when there is a 40% difference between any phase compared to the calculated three-phase average

- Phase loss protection
 - Active when the maximum phase current is greater than 50% of FLA setting
 - Breaker will trip when minimum phase current is 25% or less than the maximum phase current
 - Time delay of 1 or 2 seconds before breaker trips
- Thermal memory to prevent immediate restart after overload trip to allow motor to cool down

The MPCB is based on the Series C F-Frame. Accessories for standard Series C breakers apply to the MPCB. Unlike Motor Circuit Protectors (MCPs), MPCBs are UL 489 listed with 35 kA and 65 kA interruption ratings.

Product Selection

2

FDMP and HFDMP

| Continuous Amperes | 35 kA Without Phase Unbalance, Class 10 Motor Protection Only | 35 kA With Phase Unbalance and Adjustable Motor Class Protection | 65 kA Without Phase Unbalance, Class 10 Motor Protection Only | 65 kA With Phase Unbalance and Adjustable Motor Class Protection |
|--------------------|---|--|---|--|
| 80 | FDMP3080L | FDMP3080JL | HFDMP3080L | HFDMP3080JL |
| 100 | FDMP3100L | FDMP3100JL | HFDMP3100L | HFDMP3100JL |
| 160 | FDMP3160L | FDMP3160JL | HFDMP3160L | HFDMP3160JL |
| 205 | FDMP3205L | FDMP3205JL | HFDMP3205L | HFDMP3205JL |

FLA Ie Dial Setting

| Continuous Amperes | A | B | C | D | E | F | G | H |
|--------------------|-----|-----|-----|-----|-----|---|---|---|
| 80 | 40 | 50 | 60 | 70 | 80 | — | — | — |
| 100 | 80 | — | 90 | — | 100 | — | — | — |
| 160 | 100 | 115 | 130 | 145 | 160 | — | — | — |
| 205 | 160 | 170 | 180 | 195 | 205 | — | — | — |

Technical Data and Specifications

Specifications

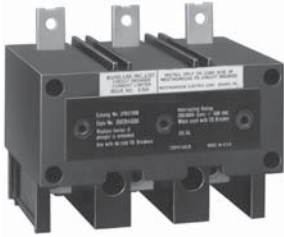
| Feature | FDMP | HFDMP |
|--|---|---|
| Interruption rating at 240 V | 65 kA | 100 kA |
| Interruption rating at 480 V | 35 kA | 65 kA |
| Interruption rating at 600 V | 18 kA | 25 kA |
| Icu/lcs at 240 V | 65 kA/33 kA ① | 100 kA/50 kA ① |
| Icu/lcs at 415 V | 35 kA/18 kA ① | 65 kA/33 kA ① |
| 100% rated | No | No |
| FLA range (A) | 40–205 | 40–205 |
| Motor class protection | 5, 10, 15, 20 | 5, 10, 15, 20 |
| Phase unbalance protection (current)—active for phase current >0.5 FLA setting | □40% delta (single-phase); (three-phase avg.) for 5 seconds | □40% delta (single-phase); (three-phase avg.) for 5 seconds |
| Phase loss protection (current)—active for phase current >0.5 FLA setting | Min. phase □0.25 max. phase for 1 second | Min. phase □0.25 max. phase for 1 second |
| Thermal memory protection | Yes | Yes |
| High load indicator | — | — |
| Pre-detection relays | — | — |
| Internal accessories | Factory installed Aux. alarm, shunt trip, UVR | Factory installed Aux. alarm, shunt trip, UVR |

Notes

① IEC ratings available only on FWMP and HFWMP.

For additional breaker solutions, see **Page V4-T2-191**.

Type ELC Current Limiter Attachment



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Type ELC Current Limiter Attachment (Size 0–4)

Product Description

Eaton’s Type ELC current limiter attachment for the MCP is designed to provide increased interrupting capacity. The combination may be used for the application up to 200,000 A symmetrical at 600 Vac, making the MCP suitable for use in network distribution systems or other applications where unusually high fault currents are available. The current limiter connects to the load end of the MCP and is provided with terminals suitable for copper or aluminum conductors. (See table at right.)

Limiters are coordinated with the MCP so that normal fault currents are interrupted automatically by the MCP without any damage to the limiter. Only the rare very high fault is opened by the limiter. Faults that are interrupted by the limiter also magnetically trip the MCP, opening all three poles, preventing single-phase operation.

Each of the three poles of the Type ELC limiter is equipped with an indicator that extends when a fault is interrupted by the limiter.

Product Selection

Type ELC Current Limiter Attachment



ELC Current Limiter Attachment

| MCP Rating (Amperes) | Catalog Number |
|----------------------|----------------|
| 3 | ELC3003R |
| 7 | ELC3007R |
| 15 | ELC3015R |
| 30 | ELC3030R |
| 50 | ELC3050R |
| 100 | ELC3100R |
| 150 | ELC3150R |

Technical Data and Specifications

Type ELC Current Limiter Terminal Wire Sizes ①

| Type ELC Current Limiter Maximum Amperes | Wire Range AWG | Metric (mm ²) |
|--|-------------------|---------------------------|
| Standard Aluminum Terminals | | |
| 50 | 14–2 | 2.5–35 |
| 100 | 1–4/0 | 50–95 |
| 150 | 1–4/0 | 50–95 |
| Non-Standard Terminals (Steel) | | |
| 50 | 14–2 ^② | 2.5–35 |
| 100 | — | — |
| 150 | — | — |

Notes

- ① Terminal wire connectors are UL listed for standard stranded wire sizes as defined in UL 486A or UL 486B.
 - ② Optional on special order for copper cable only.
- All HMCP 800 A and 1200 A come without terminals. For terminals, see **Page V4-T2-319**.

Current Limiting Circuit Breaker Module

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Current Limiting Circuit Breaker Module

Product Overview

Power demand continues to grow in new and existing facilities. To meet increased demand, larger utility supplies, spot networks and large facility transformers are installed. The increased capacity of the electrical source results in increased fault currents in excess of 100 kA short-circuit protection. Eaton manufactures non-fused current limiting modules with interrupting capacities up to 200 kA at 600 Vac. Unlike fused current limiters with a one-time use, a current limiter module provides an automatic reset of the module after a short-circuit event. Resetting the molded-case circuit breaker is the only action required to restore critical power to the system; there is no time wasted with sourcing the correct replacement fuses or module to bring the system back online.

Product Description

The current limiting breaker modules use a unique contact design to enhance the system protection similar to that of the circuit breaker. When high short-circuit current is flowing through the contacts of these modules, the design results in very high interrupting capacities and improved current limiting characteristics.

Application Description

High-performance breakers are most commonly applied when very high fault levels are available and with applications where the current limiting capability is used upstream of the final load to limit current. Typical loads include lighting, power distribution, and motor control applications.

Features and Benefits

Superior system protection:

- Auto reset improves system uptime and eliminates the need for finding replacement parts
- No fuses to replace, reducing the overall cost of ownership and the waste created by fuses
- Overloads, by using inverse time current tripping characteristics of the molded-case circuit breaker
- Low-level short circuits, by using instantaneous and/or short-time delay tripping characteristics of the molded-case circuit breaker
- High-level short circuits, by using ultra-high-speed, blow-apart contacts of the current limiting module in series with the circuit breaker contacts
- Let-through currents, by improved opening speed of the contacts, the resultant rapid rise of arc voltage introduces impedance into the system

Standards and Certifications

- UL 489
- CSA C22.2



Product Selection

Series C High Performance Ratings

| Type | Product | Amperes | 480 Vac (UL) | 600 Vac (UL) |
|-------------------------|--------------|---------|--------------|--------------|
| FDC 3P thermal-magnetic | Breaker only | 15–225 | 100 | 35 |
| | With limiter | 40–200 | 200 | 200 |

FD Frame

FD IC Rating—200 kAIC at 600 Vac ^①

| Ampere Rating | Breaker with Line Side Mounted Current Limiter ^② | Breaker with Load Side Mounted Current Limiter ^③ |
|-------------------------|---|---|
| Thermal-Magnetic | | |
| 40 | FDC3040Q01 | FDC3040YQ02 |
| 45 | FDC3045Q01 | FDC3045YQ02 |
| 50 | FDC3050Q01 | FDC3050YQ02 |
| 60 | FDC3060Q01 | FDC3060YQ02 |
| 70 | FDC3070Q01 | FDC3070YQ02 |
| 80 | FDC3080Q01 | FDC3080YQ02 |
| 90 | FDC3090Q01 | FDC3090YQ02 |
| 100 | FDC3100Q01 | FDC3100YQ02 |
| 110 | FDC3110Q01 | FDC3110YQ02 |
| 125 | FDC3125Q01 | FDC3125YQ02 |
| 150 | FDC3150Q01 | FDC3150YQ02 |
| 175 | FDC3175Q01 | FDC3175YQ02 |
| 200 | FDC3200Q01 | FDC3200YQ02 |

Limiter Terminals

| Maximum Breaker Amperes | Terminal Body Material | Wire Type | Metric Wire Range mm ² | AWG Wire Range/ Number of Conductors | Catalog Number |
|---|------------------------|-----------|-----------------------------------|--------------------------------------|----------------------|
| Standard Pressure Type Terminals | | | | | |
| 250 | Aluminum | Cu/Al | 10–185 | #8–350 (1) | TA250FJ ^④ |

Breaker Load Terminals (For Line Mounted Limiters Only)

| Maximum Breaker Amperes | Terminal Body Material | Wire Type | AWG Wire Range | Metric Wire Range mm ² | Package of Three Terminals Catalog Number |
|---|------------------------|-----------|----------------|-----------------------------------|---|
| Standard Pressure Type Terminals | | | | | |
| 100 | Steel | Cu/Al | 14–1/0 | 2.5–50 | 3T100FB |
| 225 | Aluminum | Cu/Al | 4–4/0 | 25–95 | 3TA225FD |

Notes

- ^① Line and load terminal included.
^② Two interphase barriers provided, mounted on line end of limiter, catalog number **FJ1PBK**.
^③ Four interphase barriers provided, (2) line end of breaker, (2) load end of limiter.
^④ Load side breaker terminations included for units configured with line mounted limiters.

Technical Data and Specifications

2

UL 489 Current Limiting Data

| Frame | Circuit | I _p (kA) | I ² T (10 ⁶ A ² S) |
|-------|--------------|---------------------|---|
| LDC | 240 V/200 kA | 64.80 | 6.80 |
| LDC | 480 V/100 kA | 66.90 | 9.33 |
| LDC | 600 V/50 kA | 54.30 | 8.92 |

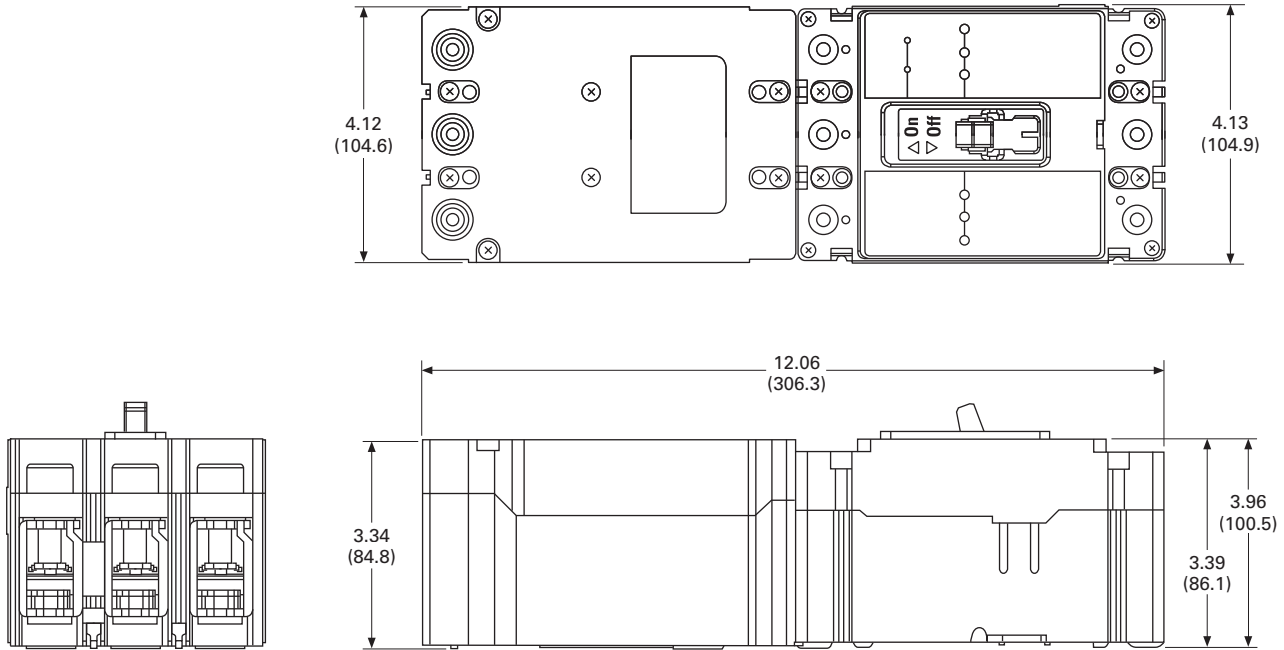
Dimensions and Weights

Approximate Dimensions in Inches (mm)

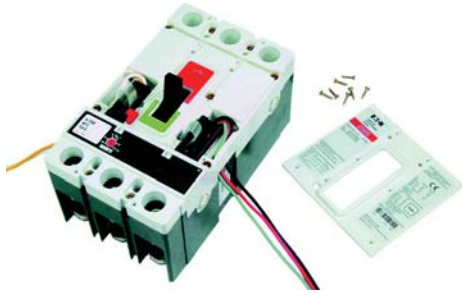
Assembled Breaker and Current Limiting Module

| Frame | Height | Width | Depth | Weight in lbs (kg) |
|--------------|---------------|--------------|-------------|--------------------|
| FD + limiter | 12.06 (306.3) | 4.13 (104.9) | 3.39 (86.1) | 8.50 (3.86) |

FD-Frame With Current Limiter Module



Series C Internal Accessories



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Internal Accessories

Product Overview

Alarm Switch

For remote indication of automatic trip operation. Does not function with manual switching; however, it will operate when either a shunt trip or undervoltage release is operated. A “make” contact closes and a “break” contact opens when the alarm/lockout switch operates. The switch automatically resets when the circuit breaker is reset.

Auxiliary Switch

The auxiliary switch provides circuit breaker contact status information by monitoring the position of the molded cross bar that contains the moving contact arms. The auxiliary switch is used for remote indication and interlock system verification, and consists of one or two SPDT switches housed in a plug-in module. Each SPDT switch has one “a” and one “b” contact. When the circuit breaker contacts are open, the “a” contact is open and the “b” contact is closed.

Auxiliary Switch and Alarm Switch Combination

Each catalog number listed in tables on **Pages V4-T2-380** and **V4-T2-381** includes one auxiliary switch and one alarm switch. In an auxiliary switch ASL switch combination, the auxiliary switch is always mounted on the side of the plug-in module next to the center pole of the circuit breaker.

Shunt Trip

The shunt trip provides remote controlled tripping of the circuit breaker. The shunt trip consists of an intermittent rated solenoid with a tripping plunger and a cutoff switch assembled to a plug-in module. When required for ground fault protection applications, certain AC rated shunt trips, as noted in the electrical rating table, are suitable for operation at 55 percent of rated voltage.

Select shunt trip catalog number for the voltage within the indicated voltage range. Shunt trip coils are designed to be applied at specific AC or DC voltages within the voltage range shown. Electrical ratings are also shown on applicable circuit breaker accessory nameplates.

Low Energy Shunt Trip

Low energy shunt trip devices are designed to operate from low energy output signals from dedicated current sensors typically applied in ground fault protection schemes. However, with a proper control voltage source, they may be applied in place of conventional trip devices for special applications. Flux paths surrounding permanent magnets used in the shunt trip assembly hold a charged spring poised in readiness to operate the circuit breaker trip mechanism.

When a 100 microfarad capacitor charged to 28 Vdc is discharged through the shunt trip coil, the resultant flux opposes the permanent magnet flux field, which releases the stored energy in the spring to trip the circuit breaker. As the circuit breaker resets, the shunt trip reset arm is actuated by the circuit breaker handle, resetting the shunt trip. The plug-in module is mounted in retaining slots in the top of the trip unit. Coil is intermittent-rated only. Cutoff provisions required in control circuit.

Undervoltage Release Mechanism

The undervoltage release mechanism monitors a voltage (typically a line voltage) and trips the circuit breaker when the voltage falls to between 70 and 35 percent of the solenoid coil rating.

The undervoltage release mechanism consists of a continuous rated solenoid with a plunger and tripping lever mounted in a plug-in module. The tab on the tripping lever resets the undervoltage release mechanism when normal voltage has been restored and the circuit breaker handle is moved to the reset (or OFF) position. With less than pickup voltage applied to the undervoltage release mechanism, the circuit breaker contacts will not touch when a closing operation is attempted.

Note: Undervoltage release mechanism accessories are not designed for, and should not be used as, circuit interlocks.

Accessory Terminal Block (R-Frame)

(For fixed-mounted configuration.)

Internal accessory wiring leads are normally supplied with pigtail leads (18 AWG) that exit from the right side of the circuit breaker. Where specified, fixed-mounted accessory terminal blocks are available. A maximum of one 24-point terminal block can be installed on the right side of the circuit breaker for the internal accessories.

For convenience in determining the appropriate number of terminal block points required, refer to **Page V4-T2-376**.

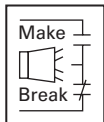
PowerNet and Zone Interlock Kits (OPTIM 550 only) K-, L- and N-Frames

Eaton's PowerNet Communications Kit can be ordered to add PowerNet communications to an existing OPTIM 550 breaker in the field. An 18-inch (457.2 mm) wiring pigtail is routed to the rear of the breaker: two wires for PowerNet and two wires for 24 Vdc (45 mA load). It is recommended that the power supply be an "isolated high quality" unit.

Product Selection

Alarm Switch

Alarm Switch



G-Frame Alarm Switch (RH Only) ①

| Electrical Ratings | | | Contact Arrangement | Factory Suffix | Catalog Number ②③④ |
|--|-----------|---------|--------------------------|----------------|--------------------|
| Volts | Frequency | Amperes | | | |
| Alarm Switch | | | | | |
| 240 | 50/60 Hz | 6 | 1 Make/1 Break | B3 | 1288C75G03 |
| Alarm Switch Auxiliary Switches Combination | | | | | |
| 240 | 50/60 Hz | 6 | 1 Make/1 Break and 1A/1B | B13 | 1288C76G09 |

F-Frame Alarm Switch ①

| Number of Contacts (Make and Break) | Mounting Location (Pole) | Factory Mounted Connection Type and Location | | | Factory Installation Kit ⑤ | | |
|-------------------------------------|--------------------------|--|----------------------|-----------------------------|----------------------------|------------------------------|-------------------------------|
| | | 18-Inch (457.2 mm) Pigtail Leads | | | Terminal Block Same Side | Pigtail Leads Catalog Number | Terminal Block Catalog Number |
| | | Same Side Suffix Number | Rear ⑥ Suffix Number | Opposite Side Suffix Number | | | |
| 1 | Left ⑦ | B01 | B02 | B03 | B04 | A1L1LPK | A1L1LTK |
| | Right | B05 | B06 | B07 | B08 | A1L1RPK | A1L1RTK |
| 2 | Left ⑦ | B09 | B10 | — | B11 | A2L1LPK | A2L1LTK |
| | Right | B12 | B13 | — | B14 | A2L1RPK | A2L1RTK |
| 1 | Single-pole | B15 ⑧ | — | — | — | — | — |

F-Frame HMCP Alarm Switch ①

| Number of Contacts (Make and Break) | Mounting Location (Pole) | Factory Mounted Connection Type and Location | | | Factory Installation Kit ⑤ | | |
|-------------------------------------|--------------------------|--|----------------------|-----------------------------|----------------------------|------------------------------|-------------------------------|
| | | 18-Inch (457.2 mm) Pigtail Leads | | | Terminal Block Same Side | Pigtail Leads Catalog Number | Terminal Block Catalog Number |
| | | Same Side Suffix Number | Rear ⑥ Suffix Number | Opposite Side Suffix Number | | | |
| 1 | Left ⑦ | B01 | B02 | B03 | B04 | MA1L1LPK | MA1L1LTK |
| | Right | B05 | B06 | B07 | B08 | MA1L1RPK | MA1L1RTK |
| 2 | Left ⑦ | B09 | B10 | — | B11 | MA2L1LPK | MA2L1LTK |
| | Right | B12 | B13 | — | B14 | MA2L1RPK | MA2L1RTK |

J-Frame and HMCP (J) Alarm Switch

| Number of Contacts (Make and Break) | Mounting Location (Pole) | Factory Mounted Connection Type and Location | | | Field Mounted Field Installation Kits ⑨ | | |
|-------------------------------------|--------------------------|--|----------------------|-----------------------------|---|------------------------------|-------------------------------|
| | | 18-Inch (457.2 mm) Pigtail Leads | | | Terminal Block Same Side | Pigtail Leads Catalog Number | Terminal Block Catalog Number |
| | | Same Side Suffix Number | Rear ⑦ Suffix Number | Opposite Side Suffix Number | | | |
| 1 | Left ⑧ | B01 | B02 | B03 | B04 | A1L2LPK | A1L2LTK |
| | Right | B05 | B06 | B07 | B08 | A1L2RPK | A1L2RTK ⑨ |

Notes

- ① F-Frame circuit breakers are factory sealed. Underwriters Laboratories requires that internal accessories be installed at the factory. Internal accessories are UL listed for factory installation under E7819. Where local codes and standards permit and UL listing is not required, internal accessories can be field installed; however, this is not recommended for FDE breakers. Accessory installation should be done before the circuit breaker is mounted and connected.
- ② Includes 24-inch (609.6 mm) external pigtail leads, 18 AWG (16–0.010).
- ③ A maximum of two internal accessories may be mounted in a three-pole circuit breaker.
- ④ Suitable for mounting in right pole only of two- or three-pole breaker.
- ⑤ Not listed with Underwriters Laboratories; for field installation.
- ⑥ Standard pigtail lead exit location.
- ⑦ Standard mounting location.
- ⑧ Factory installation only. Leads exit load end of circuit breaker.
- ⑨ Listed with Underwriters Laboratories; for field installation on interchangeable trip unit breakers under E64983.
- ⑩ Standard mounting location—leads exit rear of breaker.

K-Frame and HMCP (K) Alarm Switch

| Number of Sets of Contacts (1M and 1B) | Mounting Location (Pole) | Factory Mounted Connection Type and Location 18-Inch (457.2 mm) Pigtail Leads | | | Terminal Block Same Side Suffix Number | Field Mounted Field Installation Kits ^① | |
|--|--------------------------|---|---------------------------------|-----------------------------|--|--|-------------------------------|
| | | Same Side Suffix Number | Rear ^② Suffix Number | Opposite Side Suffix Number | | Pigtail Leads Catalog Number | Terminal Block Catalog Number |
| | | 1 | Left ^③ | B01 | | B02 | B03 |
| | Right ^④ | B05 | B06 | B07 | B08 | A1L3RPK | A1L3RTK |
| 2 | Left ^③ | B09 | B10 | — | B11 | A2L3LPK | A2L3LTK |
| | Right ^④ | B12 | B13 | — | B14 | A2L3RPK | A2L3RTK |

L-, HMCP (L) and (M) Frames and Alarm Switch

| Number of Sets of Contacts (1M and 1B) | Mounting Location (Pole) | Factory Mounted Connection Type and Location 18-Inch (457.2 mm) Pigtail Leads | | | Terminal Block Same Side Suffix Number | Field Mounted Field Installation Kits ^① | |
|--|--------------------------|---|---------------------------------|-----------------------------|--|--|-------------------------------|
| | | Same Side Suffix Number | Rear ^② Suffix Number | Opposite Side Suffix Number | | Pigtail Leads Catalog Number | Terminal Block Catalog Number |
| | | 1 | Left ^③ | B01 | | B02 | B03 |
| | Right | B05 | B06 | B07 | B08 | A1L4RPK | A1L4RTK |
| 2 | Left ^③ | B09 | B10 | — | B11 | A2L4LPK | A2L4LTK |
| | Right | B12 | B13 | — | B14 | A2L4RPK | A2L4RTK |

N-Frame and HMCP (N) Alarm Switch

| Number of Sets of Contacts (1M and 1B) | Mounting Location (Pole) | Factory Mounted Connection Type and Location 18-Inch (457.2 mm) Pigtail Leads | | | Terminal Block Same Side Suffix Number | Field Mounted Field Installation Kits ^⑤ | |
|--|--------------------------|---|---------------------------------|-----------------------------|--|--|-------------------------------|
| | | Same Side Suffix Number | Rear ^② Suffix Number | Opposite Side Suffix Number | | Pigtail Leads Catalog Number | Terminal Block Catalog Number |
| | | 1 | Left | B01 | | B02 | B03 |
| | Right ^③ | B05 | B06 | B07 | B08 | A1L5RPK | A1L5RTK |
| 2 | Left | B09 | B10 | — | B11 | A2L5LPK | A2L5LTK |
| | Right ^③ | B12 | B13 | — | B14 | A2L5RPK | A2L5RTK |

R-Frame Alarm Switch (RH Only)

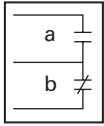
| Number of Contacts (Make and Break) | Factory Mounted Connection Type and Location 18-Inch (457.2 mm) Pigtail Leads Suffix Number ^⑥ | Field Mounted Field Installation Kits ^⑤ Pigtail Leads Catalog Number ^⑥ |
|-------------------------------------|--|--|
| | 1 | B05 |
| 2 | B12 | A2L6RPK |

Notes

- ① Listed with Underwriters Laboratories; for field installation on interchangeable trip unit breakers under E64983.
- ② Standard mounting location.
- ③ Standard mounting location—leads exit rear of breaker.
- ④ Breakers with K-Frame OPTIM 550 can only accept accessories in left pole.
- ⑤ Listed with Underwriters Laboratories for field installation under E64983.
- ⑥ A maximum of three ASL plug-in modules may be installed in a circuit breaker.

Auxiliary Switch

Auxiliary Switch



G-Frame Auxiliary Switch (RH Only)

| Electrical Ratings | | | Contact Arrangement | Factory Suffix | Catalog Number ^{①②} |
|--------------------|-----------|---------|---------------------|----------------|------------------------------|
| Volts | Frequency | Amperes | | | |
| 240 | 50/60 Hz | 6 | 1a/1b | A3 | 1288C74G03 |
| 240 | 50/60 Hz | 6 | 2a/2b | A6 | 1288C73G03 |

F-Frame and HMCP (F) Auxiliary Switch

| Number of Contacts A and B | Mounting Location (Pole) | Factory Mounted Connection Type and Location 18-Inch (457.2 mm) Pigtail Leads | | | | Factory Installation Kit ^④ | |
|----------------------------|-------------------------------|---|---------------------------------|-----------------------------|--|---------------------------------------|-------------------------------|
| | | Same Side Suffix Number | Rear ^③ Suffix Number | Opposite Side Suffix Number | Terminal Block Same Side Suffix Number | Pigtail Leads Catalog Number | Terminal Block Catalog Number |
| | | 1 | Left ^⑤ | A01 | A02 | A03 | A04 |
| | Left ^⑤ | A15 ^⑦ | A16 ^⑦ | A17 ^⑦ | — | E1X1PK | — |
| | Right or Neutral ^⑥ | A05 | A06 | A07 | A08 | A1X1PK | A1X1RTK ^⑧ |
| | Right or Neutral ^⑥ | A18 ^⑦ | A19 ^⑦ | A20 ^⑦ | — | — | — |
| 2 | Left ^⑤ | A09 | A10 | — | A11 | A2X1LPK | A2X1LTK |
| | Left ^⑤ | A21 ^⑦ | A22 ^⑦ | — | — | E2X1LPK | — |
| | Right or Neutral ^⑥ | A12 | A13 | — | A14 | A2X1RPK | A2X1RTK ^⑧ |
| | Right or Neutral ^⑥ | A23 ^⑦ | A24 ^⑦ | — | — | E2X1RPK | — |

F-Frame with Electronic Trip Unit Auxiliary Switch ^⑨

| Number of Contacts A and B | Mounting Location (Pole) | Factory Mounted Connection Type and Location 18-Inch (457.2 mm) Pigtail Leads | | | | Factory Installation Kit ^④ | |
|----------------------------|--------------------------|---|---------------------------------|-----------------------------|--|---------------------------------------|-------------------------------|
| | | Same Side Suffix Number | Rear ^③ Suffix Number | Opposite Side Suffix Number | Terminal Block Same Side Suffix Number | Pigtail Leads Catalog Number | Terminal Block Catalog Number |
| | | Trip Unit Type 310+ | | | | | |
| 1 | Right | A30 | A31 | A32 | — | — | — |
| Trip Unit Type 210+ | | | | | | | |
| 1 | Right | A33 | A34 | A35 | — | — | — |

J-Frame and HMCP (J) Auxiliary Switch

| Number of Contacts A and B | Mounting Location (Pole) | Factory Mounted Connection Type and Location 18-Inch (457.2 mm) Pigtail Leads | | | | Field Mounted Factory Installation Kit ^⑩ | |
|----------------------------|--------------------------|---|---------------------------------|-----------------------------|--|---|-------------------------------|
| | | Same Side Suffix Number | Rear ^③ Suffix Number | Opposite Side Suffix Number | Terminal Block Same Side Suffix Number | Pigtail Leads Catalog Number | Terminal Block Catalog Number |
| | | 1 | Left | A01 | A02 | A03 | A04 |
| | Right ^⑩ | A05 | A06 | A07 | A08 | A1X2PK | A1X2RTK ^⑩ |
| 2 | Left | A09 | A10 | — | A11 | A2X2PK | A2X2LTK |
| | Right ^⑩ | A12 | A13 | — | A14 | A2X2PK | A2X2RTK ^⑩ |

Notes

- ① Includes 24-inch external pigtail leads, 18 AWG (16–0.010).
- ② A maximum of two internal accessories may be mounted in a three-pole circuit breaker. Suitable for mounting in right pole only of two- or three-pole breaker.
- ③ Standard pigtail lead exit location.
- ④ Not listed with Underwriters Laboratories; for field installation.
- ⑤ Pigtail wire size: 18 AWG (0.82 mm²).
- ⑥ Not for use on F-Frame with electronic trip unit.
- ⑦ 125 volts (max.), 50/60 Hz switch for use in electronic circuit of 100 micro amperes and 15 Vdc minimum.
- ⑧ Not for use on four-pole circuit breakers.
- ⑨ Only for use on three-pole F-Frame breakers with electronic trip unit. Installation auxiliary switch for FD electronic breakers on right pole must be performed at breaker factory.
- ⑩ Listed with Underwriters Laboratories for field installation or interchangeable trip unit breakers under E64983.
- ⑪ Standard mounting location—leads exit rear of breaker.

K-Frame and HMCP (K) Auxiliary Switch

| Number of Contacts A and B | Mounting Location (Pole) | Factory Mounted Connection Type and Location 18-Inch (457.2 mm) Pigtail Leads | | | Terminal Block | Field Mounted Factory Installation Kit ① | | |
|----------------------------|--------------------------|---|----------------------|-----------------------------|----------------|--|----------------|----------------|
| | | Same Side Suffix Number | Rear ② Suffix Number | Opposite Side Suffix Number | | Same Side Suffix Number | Pigtail Leads | Terminal Block |
| | | | | | | | Catalog Number | Catalog Number |
| 1 | Left | A01 | A02 | A03 | A04 | A1X3PK | A1X3LTK | |
| | Right ②③ | A05 | A06 | A07 | A08 | A1X3PK | A1X3RTK ④ | |
| 2 | Left | A09 | A10 | — | A11 | A2X3PK | A2X3LTK | |
| | Right ②③ | A12 | A13 | — | A14 | A2X3PK | A2X3RTK ④ | |
| | Right | A21 | A22 | — | — | 1482D28G10 ⑥⑦ | — | |
| 3 | Left | A18 | — | — | A15 | A3X3LPK | A3X3LTK | |
| | Right ③ | A17 | — | — | A16 | A3X3RPK | A3X3RTK ④ | |

L-, HMCP (L) and (M) Frames and Auxiliary Switch

| Number of Contacts A and B | Mounting Location (Pole) | Factory Mounted Connection Type and Location 18-Inch (457.2 mm) Pigtail Leads | | | Terminal Block | Field Mounted Factory Installation Kit ① | | |
|----------------------------|--------------------------|---|----------------------|-----------------------------|----------------|--|----------------|----------------|
| | | Same Side Suffix Number | Rear ② Suffix Number | Opposite Side Suffix Number | | Same Side Suffix Number | Pigtail Leads | Terminal Block |
| | | | | | | | Catalog Number | Catalog Number |
| 1 | Left | A01 | A02 | A03 | A04 | A1X4PK | A1X4LTK | |
| | Right ② | A05 | A06 | A07 | A08 | A1X4PK | A1X4RTK ④ | |
| 2 | Left | A09 | A10 | — | A11 | A2X4PK | A2X4LTK | |
| | Right ② | A12 | A13 | — | A14 | A2X4PK | A2X4RTK ④ | |
| 3 | Left | A18 | — | — | A15 | A3X4PK | A3X4LTK | |
| | Right ② | A17 | — | — | A16 | A3X4PK | A3X4RTK ④ | |

N-Frame and HMCP (N) Auxiliary Switch

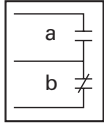
| Number of Contacts A and B | Mounting Location (Pole) | Factory Mounted Connection Type and Location 18-Inch (457.2 mm) Pigtail Leads | | | Terminal Block | Field Mounted Factory Installation Kit ① | | |
|----------------------------|--------------------------|---|----------------------|-----------------------------|----------------|--|----------------|----------------|
| | | Same Side Suffix Number | Rear ② Suffix Number | Opposite Side Suffix Number | | Same Side Suffix Number | Pigtail Leads | Terminal Block |
| | | | | | | | Catalog Number | Catalog Number |
| 1 | Left | A01 | A02 | A03 | A04 | A1X5PK | A1X5LTK | |
| | Right ② | A05 | A06 | A07 | A08 | A1X5PK | A1X5RTK ④ | |
| 2 | Left | A09 | A10 | — | A11 | A2X5PK | A2X5LTK | |
| | Right ② | A12 | A13 | — | A14 | A2X5PK | A2X5RTK ④ | |
| 3 | Left | A18 | — | — | A15 | A3X5LPK | A3X5LTK | |
| | Right ② | A17 | — | — | A16 | A3X5RPK | A3X5RTK ④ | |

R-Frame Auxiliary Switch (RH Only)

| Number of Contacts A and B | Factory Mounted Connection Type and Location 18-Inch (457.2 mm) Pigtail Leads Suffix Number ⑤ | Field Mounted Field Installation Kits ① Pigtail Leads Catalog Number ⑤ |
|----------------------------|---|--|
| | 2 | A12 |
| 4 | A19 | A4X6RPK |

Notes

- ① Listed with Underwriters Laboratories for field installation under E64983.
- ② Standard mounting location—leads exit rear of breaker.
- ③ Breakers with K-Frame OPTIM 550 can only accept accessories in left pole.
- ④ Not for use on four-pole circuit breakers.
- ⑤ A maximum of two auxiliary switches (any combination of 2a/2b or 4a/4b plug-in modules may be installed in a circuit breaker).
- ⑥ This option is not field installable.
- ⑦ Available on the OPTIM 550 only. Communications are not available with this option.

Auxiliary Switch and Alarm Switch Combination**Auxiliary Switch and Alarm Switch Combination****F-Frame Auxiliary Switch and Alarm Switch Combination** ①

| Mounting Location (Pole) | Factory Mounted Connection Type and Location | | | Factory Installation Kit ② | |
|--------------------------|--|---------------|----------------|----------------------------|----------------|
| | 18-Inch (457 mm) Pigtail Leads | | | Terminal Block | Pigtail Leads |
| | Same Side | Rear ③ | Terminal Block | Same Side | Terminal Block |
| | Suffix Number | Suffix Number | Suffix Number | Catalog Number | Catalog Number |
| Left ③ | C01 | C02 | C03 | AAL1LPK | AAL1LTK |
| Right | C04 | C05 | C06 | AAL1RPK | AAL1RTK ④ |

F-Frame HMCP Auxiliary Switch and Alarm Switch Combination

| Mounting Location (Pole) | Factory Mounted Connection Type and Location | | | Factory Installation Kit ② | |
|--------------------------|--|---------------|---------------|----------------------------|----------------|
| | 18-Inch (457 mm) Pigtail Leads | | | Terminal Block | Pigtail Leads |
| | Same Side | Rear ③ | Same Side | Same Side | Terminal Block |
| | Suffix Number | Suffix Number | Suffix Number | Catalog Number | Catalog Number |
| Left ④ | C01 | C02 | C03 | MAAL1LPK | MAAL1LTK |
| Right | C04 | C05 | C06 | MAAL1RPK | MAAL1RPK |

J-Frame and HMCP (J) Auxiliary Switch and Alarm Switch Combination

| Number of Sets of Contacts (1A and 1B) (1M–1B) | Mounting Location (Pole) | Factory Mounted Connection Type and Location | | | Terminal Block | Field Mounted Field Installation Kits ⑤ | |
|--|--------------------------|--|---------------|---------------|----------------|---|----------------|
| | | 18-Inch (457 mm) Pigtail Leads | | | Same Side | Pigtail Leads | Terminal Block |
| | | Same Side | Rear ⑥ | Opposite Side | Same Side | Same Side | Catalog Number |
| | | Suffix Number | Suffix Number | Suffix Number | Suffix Number | Catalog Number | Catalog Number |
| 1 | Left | C01 | C02 | — | C03 | AAL2LPK | AAL2LTK |
| | Right ④ | C04 | C05 | — | C06 | AAL2RPK | AAL2RTK ④ |

K-Frame and HMCP (K) Auxiliary Switch and Alarm Switch Combination

| Number of Sets of Contacts (1A and 1B) (1M–1B) | Mounting Location (Pole) | Factory Mounted Connection Type and Location | | | Terminal Block | Field Mounted Field Installation Kits ⑤ | |
|--|--------------------------|--|---------------|---------------|----------------|---|----------------|
| | | 18-Inch (457 mm) Pigtail Leads | | | Same Side | Pigtail Leads | Terminal Block |
| | | Same Side | Rear ⑥ | Opposite Side | Same Side | Same Side | Catalog Number |
| | | Suffix Number | Suffix Number | Suffix Number | Suffix Number | Catalog Number | Catalog Number |
| 1 | Left | C01 | C02 | — | C03 | AAL3LPK | AAL3LTK |
| | Right ⑥⑦ | C04 | C05 | — | C06 | AAL3RPK ⑧ | AAL3RTK |
| | Right | C07 | C08 | — | — | 1482D28G09 ⑧⑨ | — |

Notes

- ① Auxiliary switch and alarm switch combination options (Cxx) are not available on FDE 310+ with LSG or LSIG trip units due to exit wire limitations. To obtain both features, order a left mounting alarm switch (B01-B04 or B09-B11), and right mounting auxiliary switch (A30-A32).
- ② Not listed with Underwriters Laboratories for field installation.
- ③ Standard mounting location.
- ④ Not for use on four-pole circuit breakers.
- ⑤ Listed with Underwriters Laboratories for field installation of interchangeable trip unit breakers under E64983.
- ⑥ Standard mounting location—leads exit rear of breaker.
- ⑦ Breakers with K-Frame OPTIM 550 can only accept accessories in left pole.
- ⑧ Will not install on OPTIM Trip (RH).
- ⑨ Available on the OPTIM 550 only. Communications are not available with this option.
- ⑩ This option is not field installable.

L-, HMCP (L) and (M) Frames and Auxiliary Switch and Alarm Switch Combination

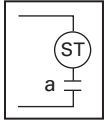
| Number of Sets of Contacts | Mounting Location (Pole) | Factory Mounted Connection Type and Location 18-Inch (457 mm) Pigtail Leads | | | Terminal Block Same Side Suffix Number | Field Mounted Field Installation Kits ^① | |
|----------------------------|--------------------------|---|---------------------------------|-----------------------------|--|--|-------------------------------|
| | | Same Side Suffix Number | Rear ^② Suffix Number | Opposite Side Suffix Number | | Pigtail Leads Catalog Number | Terminal Block Catalog Number |
| | | 1A, 1B and 1 Make/1 Break | Left | C01 | | C02 | — |
| | Right ^② | C04 | C05 | — | C06 | AA114RPK | AA114RTK ^③ |
| 2A, 2B and 1 Make/1 Break | Left | C07 | C08 | — | C12 | AA214LPK | AA214LTK |
| | Right ^② | C10 | C11 | — | C13 | AA214RPK | AA214RTK ^③ |
| 3A, 3B and 1 Make/1 Break | Left | C14 | — | — | — | AA314LPK | — |
| | Right ^② | C15 | — | — | — | AA314RPK | — |

N-Frame and HMCP (N) Auxiliary Switch and Alarm Switch Combination

| Number of Sets of Contacts | Mounting Location (Pole) | Factory Mounted Connection Type and Location 18-Inch (457 mm) Pigtail Leads | | | Terminal Block Same Side Suffix Number | Field Mounted Field Installation Kits ^① | |
|----------------------------|--------------------------|---|---------------------------------|-----------------------------|--|--|-------------------------------|
| | | Same Side Suffix Number | Rear ^② Suffix Number | Opposite Side Suffix Number | | Pigtail Leads Catalog Number | Terminal Block Catalog Number |
| | | 1A, 1B and 1 Make/1 Break | Left | C01 | | C02 | — |
| | Right ^② | C04 | C05 | — | C06 | AA115RPK | AA115RTK ^③ |
| 2A, 2B and 1 Make/1 Break | Left | C07 | C08 | — | C12 | AA215LPK | AA215LTK |
| | Right ^② | C10 | C11 | — | C13 | AA215RPK | AA215RTK ^③ |

Notes

- ① Listed with Underwriters Laboratories for field installation under E64983.
 ② Standard mounting location—leads exit rear of breaker.
 ③ Not for use on four-pole circuit breaker.

Shunt Trip**Shunt Trip****G-Frame Shunt Trip (LH Three-Pole Only)**

| Electrical Ratings | | | | |
|--------------------|-----------|---------|---------------|-------------------|
| Volts | Frequency | Amperes | Suffix Number | Catalog Number |
| 120 | 50/60 Hz | 1.1 | S1 | 1373D62G01 |
| 240 | 50/60 Hz | 2.1 | S2 | 1373D62G02 |
| 12 | DC | 2.8 | S3 | 1373D62G15 |
| 24 | DC | 5.7 | S4 | 1373D62G16 |
| 24 | 60 Hz | — | S7 | 1373D62G20 |

F-Frame and HMCP (F) Shunt Trip

| Voltage Rating (AC Frequency = 50/60 Hz) | Factory Mounted Connection Type and Location | | | Factory Installation Kit ^① | | |
|---|---|-------------------|---------------|---------------------------------------|------------------|-------------------------------|
| | 18-Inch (457.2 mm) Pigtail Leads ^② | | | Terminal Block | Pigtail Leads | Terminal Block |
| | Same Side | Rear ^③ | Opposite Side | Same Side | | |
| | Suffix Number | Suffix Number | Suffix Number | Suffix Number | Catalog Number | Catalog Number |
| Left-Pole Mounting AC/DC Ratings | | | | | | |
| 12–24 Vac or Vdc | S01 | S02 | S03 | S04 | SNT1LP03K | SNT1LT03K |
| 48–127 Vac or 48–60 Vdc ^④ | S05 | S06 | S07 | S08 | SNT1LP08K | SNT1LT08K |
| 208–380 Vac or 110–127 Vdc | S09 | S10 | S11 | S12 | SNT1LP12K | SNT1LT12K |
| 415–600 Vac or 220–250 Vdc | S13 | S14 | S15 | S16 | SNT1LP18K | SNT1LT18K |
| Right- or Neutral-Pole Mounting AC/DC Ratings ^⑤ | | | | | | |
| 12–24 Vac or Vdc | S17 | S18 | S19 | S20 | SNT1RP03K | SNT1RT03K ^⑥ |
| 48–127 Vac or 48–60 Vdc ^④ | S21 | S22 | S23 | S24 | SNT1RP08K | SNT1RT08K ^⑥ |
| 208–380 Vac or 110–127 Vdc | S25 | S26 | S27 | S28 | SNT1RP12K | SNT1RT12K ^⑥ |
| 415–600 Vac or 220–250 Vdc | S29 | S30 | S31 | S32 | SNT1RP18K | SNT1RT18K ^⑥ |

Notes

^① Not listed with Underwriters Laboratories, for field installation.

^② Pigtail wire size: 18 AWG (0.82 mm²).

^③ Standard pigtail lead exit location.

^④ 120 Vac marked suitable for ground fault protection devices.

^⑤ Standard mounting location.

^⑥ Not for use on four-pole circuit breakers.

G-Frame circuit breakers are factory sealed. Underwriters Laboratories requires that internal accessories be installed at the factory.

Internal accessories are UL listed for factory installation under E7819.

Where local codes and standards permit and UL listing is not required, internal accessories can be field installed.

Accessory installation should be done before the circuit breaker is mounted and connected.

2.4

Molded Case Circuit Breakers

Series C

2

J-Frame and HMCP (J) Shunt Trip

| Voltage Rating (AC Frequency = 50/60 Hz) | Factory Mounted Connection Type and Location 18-Inch (457.2 mm) Pigtail Leads | | | Terminal Block Same Side Suffix Number | Field Mounted Field Installation Kits ^① | |
|--|---|-------------------|------------------|---|---|-----------------------|
| | Same Side | Rear ^② | Opposite Side | | Pigtail Leads | Terminal Block |
| | Suffix Number | Suffix Number | Suffix Number | | Catalog Number | Catalog Number |
| Left-Pole Mounting AC/DC Ratings ^② | | | | | | |
| 12–24 Vac or Vdc | S41 | S42 | S43 | S44 | SNT2P04K | SNT2T04K |
| 48–60 Vac or Vdc | S49 | S50 | S51 | S52 | SNT2P06K | SNT2T06K |
| 110–240 Vac or 110–125 Vdc ^③ | S09 | S10 | S11 | S12 | SNT2P11K | SNT2T11K |
| 380–440 Vac or 220–250 Vdc | S13 | S14 | S15 | S16 | SNT2P14K | SNT2T14K |
| 480–600 Vac | S17 | S18 | S19 | S20 | SNT2P18K | SNT2T18K |
| Right- or Neutral-Pole Mounting AC/DC Ratings | | | | | | |
| 12–24 Vac or Vdc | S45 | S46 | S47 | S48 | SNT2P04K | SNT2T04K ^④ |
| 48–60 Vac or Vdc | S53 | S54 | S55 | S56 | SNT2P06K | SNT2T06K ^④ |
| 110–240 Vac or 110–125 Vdc ^③ | S29 | S30 | S31 | S32 | SNT2P11K | SNT2T11K ^④ |
| 380–440 Vac or 220–250 Vdc | S33 | S34 | S35 | S36 | SNT2P14K | SNT2T14K ^④ |
| 480–600 Vac | S37 | S38 | S39 | S40 | SNT2P18K | SNT2T18K ^④ |

K-Frame and HMCP (K) Shunt Trip

| Voltage Rating (AC Frequency = 50/60 Hz) | Factory Mounted Connection Type and Location 18-Inch (457.2 mm) Pigtail Leads | | | Terminal Block Same Side Suffix Number | Field Mounted Field Installation Kits ^① | |
|--|---|-------------------|------------------|---|---|-----------------------|
| | Same Side | Rear ^② | Opposite Side | | Pigtail Leads | Terminal Block |
| | Suffix Number | Suffix Number | Suffix Number | | Catalog Number | Catalog Number |
| Left-Pole Mounting AC/DC Ratings ^② | | | | | | |
| 12–24 Vac or Vdc | S41 | S42 | S43 | S44 | SNT3P04K | SNT3T04K |
| 48–60 Vac or Vdc | S49 | S50 | S51 | S52 | SNT3P06K | SNT3T06K |
| 110–240 Vac or 110–125 Vdc ^③ | S09 | S10 | S11 | S12 | SNT3P11K | SNT3T11K |
| 380–440 Vac or 220–250 Vdc | S13 | S14 | S15 | S16 | SNT3P14K | SNT3T14K |
| 480–600 Vac | S17 | S18 | S19 | S20 | SNT3P18K | SNT3T18K |
| Right- or Neutral-Pole Mounting AC/DC Ratings ^{⑤⑥} | | | | | | |
| 12–24 Vac or Vdc | S45 | S46 | S47 | S48 | SNT3P04K | SNT3T04K ^④ |
| 48–60 Vac or Vdc | S53 | S54 | S55 | S56 | SNT3P06K | SNT3T06K ^④ |
| 110–240 Vac or 110–125 Vdc ^③ | S29 | S30 | S31 | S32 | SNT3P11K | SNT3T11K ^④ |
| 380–440 Vac or 220–250 Vdc | S33 | S34 | S35 | S36 | SNT3P14K | SNT3T14K ^④ |
| 480–600 Vac | S37 | S38 | S39 | S40 | SNT3P18K | SNT3T18K ^④ |

Notes

- ① Listed with Underwriters Laboratories for field installation under E64983.
- ② Standard mounting location—leads exit rear of breaker.
- ③ Suitable for use with Class 1 ground fault sensing element.
- ④ Not for use on four-pole circuit breakers.
- ⑤ For use with KT (thermal-magnetic) trip units only.
- ⑥ Breakers with K-Frame OPTIM 550 can only accept accessories in left pole.

L-, HMCP (L) and (M) Frames and Shunt Trip

| Voltage Rating (AC Frequency = 50/60 Hz) | Factory Mounted Connection Type and Location 18-Inch (457.2 mm) Pigtail Leads | | | | Field Mounted Field Installation Kits ^① | |
|---|---|-------------------|------------------|-----------------------------|---|-------------------|
| | Same Side | Rear ^② | Opposite Side | Terminal Block Same Side | Pigtail Leads | Terminal Block |
| | Suffix Number | Suffix Number | Suffix Number | Suffix Number | Catalog Number | Catalog Number |
| Left-Pole Mounting AC/DC Ratings ^② | | | | | | |
| 12–24 Vac or Vdc | S01 | S02 | S03 | S04 | SNT4LP03K | SNT4LT03K |
| 48–60 Vac | S05 | S06 | S07 | S08 | SNT4LP05K | SNT4LT05K |
| 48–60 Vdc | S85 | S86 | S87 | — | SNT4LP23K | SNT4LT23K |
| 110–240 Vac | S09 | S10 | S11 | S12 | SNT4LP11K | SNT4LT11K |
| 110–125 Vdc | S41 | S42 | S43 | S44 | SNT4LP26K | SNT4LT26K |
| 380–440 Vac or 220–250 Vdc | S13 | S14 | S15 | S16 | SNT4LP14K | SNT4LT14K |
| 480–600 Vac | S17 | S18 | S19 | S20 | SNT4LP18K | SNT4LT18K |
| Right-Pole Mounting AC/DC Ratings ^③ | | | | | | |
| 12–24 Vac or Vdc | S21 | S22 | S23 | S24 | SNT4RP03K | SNT4RT03K |
| 48–60 Vac | S25 | S26 | S27 | S28 | SNT4RP05K | SNT4RT05K |
| 48–60 Vdc | S88 | S89 | S90 | — | SNT4RP23K | SNT4RT23K |
| 110–240 Vac | S29 | S30 | S31 | S32 | SNT4RP11K | SNT4RT11K |
| 110–125 Vdc | S45 | S46 | S47 | S48 | SNT4RP26K | SNT4RT26K |
| 380–440 Vac or 220–250 Vdc | S33 | S34 | S35 | S36 | SNT4RP14K | SNT4RT14K |
| 480–600 Vac | S37 | S38 | S39 | S40 | SNT4RP18K | SNT4RT18K |

Notes

^① Listed with Underwriters Laboratories, for field installation under E64983.

^② Standard mounting location—leads exit rear of breaker.

^③ For use with LT (thermal-magnetic) three-pole trip units only.

N-Frame and HMCP (N) Shunt Trip

| Voltage Rating (AC Frequency = 50/60 Hz) | Factory Mounted Connection Type and Location 18-Inch (457.2 mm) Pigtail Leads | | | Field Mounted Field Installation Kits ① | | |
|---|---|------------------|------------------|--|-------------------|-------------------|
| | Same Side | Rear ② | Opposite Side | Terminal Block Same Side | Pigtail Leads | Terminal Block |
| | Suffix Number | Suffix Number | Suffix Number | Suffix Number | Catalog Number | Catalog Number |
| Left-Pole Mounting AC/DC Ratings ② | | | | | | |
| 9–24 Vac or Vdc | S01 | S02 | S03 | S04 | SNT5LP03K | SNT5LT03K |
| 48–60 Vac | S05 | S06 | S07 | S08 | SNT5LP05K | SNT5LT05K |
| 110–240 Vac ③ | S09 | S10 | S11 | S12 | SNT5LP11K | SNT5LT11K |
| 110–125 Vdc | S41 | S42 | S43 | S44 | SNT5LP26K | SNT5LT26K |
| 380–440 Vac or 220–250 Vdc | S13 | S14 | S15 | S16 | SNT5LP14K | SNT5LT14K |
| 480–600 Vac | S17 | S18 | S19 | S20 | SNT5LP18K | SNT5LT18K |
| 48–60 Vdc | S21 | S22 | S23 | S24 | SNT5LP23K | SNT5LT23K |

R-Frame Shunt Trip (RH Only)

| Voltage Rating (AC Frequency = 50/60 Hz) | Factory Mounted Connection Type and Location 18-Inch (457.2 mm) Pigtail Leads | Field Mounted Field Installation Kits ① |
|---|---|--|
| | Suffix Number ④ | Pigtail Leads Catalog Number ④ |
| 24 Vac or Vdc | S21 | SNT6P03K |
| 48–60 Vac | S25 | SNT6P05K |
| 110–240 Vac | S29 | SNT6P11K |
| 380–440 Vac or 220–250 Vdc | S33 | SNT6P14K |
| 480–600 Vac | S37 | SNT6P18K |
| 48–60 Vdc | S88 | SNT6P23K |
| 110–125 Vdc | S45 | SNT6P26K |

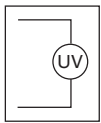
Notes

- ① Listed with Underwriters Laboratories for field installation under E64983.
 ② Standard mounting location—leads exit rear of breaker.
 ③ Supply voltages suitable for use with Class 1 GFP devices. Marking label included with accessory kits.
 ④ A maximum of two shunt trip plug-in modules may be installed in a circuit breaker.

Low Energy Shunt Trip Ordering Information

Select shunt trip catalog number for the voltage within the indicated voltage range. Shunt trip coils are designed to be applied at specific AC or DC voltages within the voltage range shown. Electrical ratings are also shown on applicable circuit breaker accessory nameplates.

Low Energy Shunt Trip



F-, J-, K-, L-, M-, N- and R-Frames and HMCPs Low Energy Shunt Trip ^①

| Mounting Positions (Pole) | Factory Mounted Connection Type and Location 18-Inch (457.2 mm) Pigtail Leads | | | Field Mounted Field Installation Kits ^② Terminal Block | | |
|---------------------------|---|-------------------|---------------|---|----------------------|----------------------|
| | Same Side | Rear ^③ | Opposite Side | Same Side | Pigtail Leads | Terminal Block |
| | Suffix Number | Suffix Number | Suffix Number | Suffix Number | Catalog Number | Catalog Number |
| F-Frame | | | | | | |
| Left | N01 | N02 | N03 | N04 | LST1LPK ^④ | LST1LTK ^④ |
| Right ^③ | N05 | N06 | N07 | N08 | LST1RPK ^④ | LST1RTK ^④ |
| J-Frame | | | | | | |
| Left | N01 | N02 | N03 | — | LST2LPK | — |
| Right ^③ | N05 | N06 | N07 | — | LST2RPK | — |
| K-Frame | | | | | | |
| Left ^③ | N01 | N02 | N03 | — | LST3LPK | — |
| Right ^{⑤⑥} | N05 | N06 | N07 | — | LST3RPK | — |
| L- and M-Frames | | | | | | |
| Left | N01 | N02 | N03 | — | LST4LPK | — |
| Right | N05 | N06 | N07 | — | LST4RPK | — |
| N-Frame | | | | | | |
| Left ^③ | N01 | N02 | N03 | — | LST5LPK | — |
| R-Frame | | | | | | |
| Right | N01 | — | — | — | LST6RPK | — |

Notes

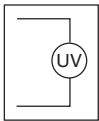
- ① Cutoff provisions required in control circuit.
- ② Listed with Underwriters Laboratories for field installation under E64983.
- ③ Standard mounting location—leads exit rear of breaker.
- ④ For F-Frame HMCP, add an "M" to beginning of catalog number. Field Installation Kit referenced for factory use only, not UL listed for field installation.
- ⑤ For use with thermal-magnetic trip units only.
- ⑥ Breakers with K-Frame OPTIM 550 can only accept accessories in left pole.

Undervoltage Release Mechanism Ordering Information

2

Select handle reset undervoltage release mechanism catalog number for the voltage within the indicated voltage range. Undervoltage release mechanism coils are designed to be applied at specific AC or DC voltages within the voltage range shown on applicable circuit breaker accessory nameplates.

Undervoltage Release Mechanism



G-Frame Undervoltage Release Mechanism (LH Three-Pole Only)

Electrical Ratings

| Volts (AC Only) | Frequency (Hz) | Amperes | Style Numbers ^{①②③} | Factory Suffix |
|-----------------|----------------|---------|------------------------------|----------------|
| 120 | 50/60 | 0.05 | 1373D62G03 | T1 |
| 24 | 50/60 | 0.22 | 1373D62G04 | T2 |
| 48 | 50/60 | 0.11 | 1373D62G05 | T3 |
| 60 | 50/60 | 0.10 | 1373D62G06 | T4 |
| 110 | 50 | 0.049 | 1373D62G07 | T5 |
| 208 | 60 | 0.026 | 1373D62G08 | T6 |
| 220 | 50 | 0.025 | 1373D62G09 | T7 |
| 240 | 50/60 | 0.024 | 1373D62G10 | T8 |
| 380 | 50 | 0.015 | 1373D62G11 | T9 |
| 415 | 50 | 0.013 | 1373D62G12 | T10 |
| 440 | 50 | 0.012 | 1373D62G13 | T11 |
| 480 | 60 | 0.01 | 1373D62G14 | T12 |

Notes

- ① Includes 24-inch (609.6 mm) external pigtail leads, 18 AWG (16–0.010).
- ② A maximum of two internal accessories may be mounted in a three-pole circuit breaker.
- ③ Suitable for mounting in left pole only of three-pole breaker.

G-Frame circuit breakers are factory sealed. Underwriters Laboratories requires that internal accessories be installed at the factory.

Internal accessories are UL listed for factory installation under E7819.

Where local codes and standards permit and UL listing is not required, internal accessories can be field installed. Accessory installation should be done before the circuit breaker is mounted and connected.

F-Frame Factory Mounted (For F-Frame Breaker and F-Frame HMCP) Undervoltage Release Mechanism

| Voltage Rating (AC Freq. = 50/60 Hz) | Connection Type and Location 18-Inch Pigtail Leads | | | Terminal Block Same Side Suffix Number |
|---|---|---------------------------------------|-----------------------------------|---|
| | Same Side Suffix Number | Rear ^① Suffix Number | Opposite Side Suffix Number | |
| | | | | |
| Left-Pole Mounting AC Ratings | | | | |
| 12 Vac | U01 | U02 | U03 | U04 |
| 24 Vac | U05 | U06 | U07 | U08 |
| 48 Vac | U37 | U38 | U39 | U40 |
| 60 Vac | U97 | U98 | U99 | U100 |
| 110–127 Vac | U13 | U14 | U15 | U16 |
| 208–240 Vac | U17 | U18 | U19 | U20 |
| 380–480 Vac | U21 | U22 | U23 | U24 |
| 525–600 Vac | U25 | U26 | U27 | U28 |
| Right-Pole Mounting AC Ratings ^{②③} | | | | |
| 12 Vac | U49 | U50 | U51 | U52 |
| 24 Vac | U53 | U54 | U55 | U56 |
| 48 Vac | U85 | U86 | U87 | U88 |
| 60 Vac | U101 | U102 | U103 | U104 |
| 110–127 Vac | U61 | U62 | U63 | U64 |
| 208–240 Vac | U65 | U66 | U67 | U68 |
| 380–480 Vac | U69 | U70 | U71 | U72 |
| 525–600 Vac | U73 | U74 | U75 | U76 |
| Left-Pole Mounting DC Ratings | | | | |
| 12 Vdc | U29 | U30 | U31 | U32 |
| 24 Vdc | U33 | U34 | U35 | U36 |
| 48 Vdc | U37 | U38 | U39 | U40 |
| 60 Vdc | U97 | U98 | U99 | U100 |
| 110–127 Vdc | U41 | U42 | U43 | U44 |
| 220–250 Vdc | U45 | U46 | U47 | U48 |
| Right-Pole Mounting DC Ratings ^{②③} | | | | |
| 12 Vdc | U77 | U78 | U79 | U80 |
| 24 Vdc | U81 | U82 | U83 | U84 |
| 48 Vdc | U85 | U86 | U87 | U88 |
| 60 Vdc | U101 | U102 | U103 | U104 |
| 110–127 Vdc | U89 | U90 | U91 | U92 |
| 220–250 Vdc | U93 | U94 | U95 | U96 |

Notes

- ① Standard pigtail lead exit location.
- ② Standard mounting location.
- ③ Not for use on right pole of four-pole circuit breaker.

F-Frame circuit breakers are factory sealed. Underwriters Laboratories requires that internal accessories be installed at the factory.

Internal accessories are UL listed for factory installation under E7819.

Where local codes and standards permit and UL listing is not required, internal accessories can be field installed. Accessory installation should be done before the circuit breaker is mounted and connected.

F-Frame Field Mounted Undervoltage Release Mechanism

| Voltage Rating (AC Freq. = 50/60 Hz) | F-Frame Breaker Factory Installation Kits ^① | | F-Frame Breaker HMCP | |
|---|---|-------------------|----------------------|-------------------|
| | Pigtail Leads | Terminal Block | Pigtail Leads | Terminal Block |
| | Catalog Number | Catalog Number | Catalog Number | Catalog Number |
| Left-Pole Mounting AC Ratings | | | | |
| 12 Vac | UVH1LP02K | UVH1LT02K | MUVH1LP02K | MUVH1LT02K |
| 24 Vac | UVH1LP03K | UVH1LT03K | MUVH1LP03K | MUVH1LT03K |
| 48 Vac | UVH1LP22K | UVH1LT22K | MUVH1LP22K | MUVH1LT22K |
| 60 Vac | UVH1LP24K | UVH1LT24K | MUVH1LP24K | MUVH1LT24K |
| 110–127 Vac | UVH1LP08K | UVH1LT08K | MUVH1LP08K | MUVH1LT08K |
| 208–240 Vac | UVH1LP11K | UVH1LT11K | MUVH1LP11K | MUVH1LT11K |
| 380–480 Vac | UVH1LP15K | UVH1LT15K | MUVH1LP15K | MUVH1LT15K |
| 525–600 Vac | UVH1LP18K | UVH1LT18K | MUVH1LP18K | MUVH1LT18K |
| Right-Pole Mounting AC Ratings ^{②③} | | | | |
| 12 Vac | UVH1RP02K | UVH1RT02K | MUVH1RP02K | MUVH1RT02K |
| 24 Vac | UVH1RP03K | UVH1RT03K | MUVH1RP03K | MUVH1RT03K |
| 48 Vac | UVH1RP22K | UVH1RT22K | MUVH1RP22K | MUVH1RT22K |
| 60 Vac | UVH1RP24K | UVH1RT24K | MUVH1RP24K | MUVH1RT24K |
| 110–127 Vac | UVH1RP08K | UVH1RT08K | MUVH1RP08K | MUVH1RT08K |
| 208–240 Vac | UVH1RP11K | UVH1RT11K | MUVH1RP11K | MUVH1RT11K |
| 380–480 Vac | UVH1RP15K | UVH1RT15K | MUVH1RP15K | MUVH1RT15K |
| 525–600 Vac | UVH1RP18K | UVH1RT18K | MUVH1RP18K | MUVH1RT18K |
| Left-Pole Mounting DC Ratings | | | | |
| 12 Vdc | UVH1LP20K | UVH1LT20K | MUVH1LP20K | MUVH1LT20K |
| 24 Vdc | UVH1LP21K | UVH1LT21K | MUVH1LP21K | MUVH1LT21K |
| 48 Vdc | UVH1LP22K | UVH1LT22K | MUVH1LP22K | MUVH1LT22K |
| 60 Vdc | UVH1LP24K | UVH1LT24K | MUVH1LP24K | MUVH1LT24K |
| 110–127 Vdc | UVH1LP26K | UVH1LT26K | MUVH1LP26K | MUVH1LT26K |
| 220–250 Vdc | UVH1LP28K | UVH1LT28K | MUVH1LP28K | MUVH1LT28K |
| Right-Pole Mounting DC Ratings ^{②③} | | | | |
| 12 Vdc | UVH1RP20K | UVH1RT20K | MUVH1RP20K | MUVH1RT20K |
| 24 Vdc | UVH1RP21K | UVH1RT21K | MUVH1RP21K | MUVH1RT21K |
| 48 Vdc | UVH1RP22K | UVH1RT22K | MUVH1RP22K | MUVH1RT22K |
| 60 Vdc | UVH1RP22K | UVH1RT22K | MUVH1RP22K | MUVH1RT22K |
| 110–127 Vdc | UVH1RP26K | UVH1RT26K | MUVH1RP26K | MUVH1RT26K |
| 220–250 Vdc | UVH1RP28K | UVH1RT28K | MUVH1RP28K | MUVH1RT28K |

Notes

- ① Not listed with Underwriters Laboratories, for field installation.
- ② Standard mounting location.
- ③ Not for use on right pole of four-pole circuit breaker.

J-Frame and HMCP (J) Undervoltage Release Mechanism

| Voltage Rating (AC Freq. = 50/60 Hz) | Factory Mounted Connection Type and Location | | | Field Mounted Field Installation Kits ^② | | |
|--|---|---------------------------------------|-----------------------------------|---|------------------------------------|--|
| | 18-Inch (457.2 mm) Pigtail Leads | | | Terminal Block ^① | Pigtail Leads Catalog Number | Terminal Block ^③ Catalog Number |
| | Same Side Suffix Number | Rear ^② Suffix Number | Opposite Side Suffix Number | Same Side Suffix Number | | |
| Left-Pole Mounting AC Ratings ^④ | | | | | | |
| 12 Vac | U05 | U06 | U07 | U08 | UVH2LP02K | UVH2LT02K |
| 24 Vac | U09 | U10 | U11 | U12 | UVH2LP03K | UVH2LT03K |
| 48–60 Vac | U13 | U14 | U15 | U16 | UVH2LP05K | UVH2LT05K |
| 110–127 Vac | U17 | U18 | U19 | U20 | UVH2LP08K | UVH2LT08K |
| 208–240 Vac | U21 | U22 | U23 | U24 | UVH2LP11K | UVH2LT11K |
| 380–480 Vac | U25 | U26 | U27 | U28 | UVH2LP15K | UVH2LT15K |
| Right-Pole Mounting AC Ratings ^③ | | | | | | |
| 12 Vac | U37 | U38 | U39 | U40 | UVH2RP02K | UVH2RT02K |
| 24 Vac | U41 | U42 | U43 | U44 | UVH2RP03K | UVH2RT03K |
| 48–60 Vac | U45 | U46 | U47 | U48 | UVH2RP05K | UVH2RT05K |
| 110–127 Vac | U49 | U50 | U51 | U52 | UVH2RP08K | UVH2RT08K |
| 208–240 Vac | U53 | U54 | U55 | U56 | UVH2RP11K | UVH2RT11K |
| 380–480 Vac | U57 | U58 | U59 | U60 | UVH2RP15K | UVH2RT15K |
| Left-Pole Mounting DC Ratings ^④ | | | | | | |
| 12 Vdc | T01 | T02 | T03 | T04 | UVH2LP20K | UVH2LT20K |
| 24 Vdc | T05 | T06 | T07 | T08 | UVH2LP21K | UVH2LT21K |
| 48–60 Vdc | T09 | T10 | T11 | T12 | UVH2LP23K | UVH2LT23K |
| 110–127 Vdc | T13 | T14 | T15 | T16 | UVH2LP26K | UVH2LT26K |
| 220–250 Vdc | T17 | T18 | T19 | T20 | UVH2LP28K | UVH2LT28K |
| Right-Pole Mounting DC Ratings ^③ | | | | | | |
| 12 Vdc | T21 | T22 | T23 | T24 | UVH2RP20K | UVH2RT20K |
| 24 Vdc | T25 | T26 | T27 | T28 | UVH2RP21K | UVH2RT21K |
| 48–60 Vdc | T29 | T30 | T31 | T32 | UVH2RP23K | UVH2RT23K |
| 110–127 Vdc | T33 | T34 | T35 | T36 | UVH2RP26K | UVH2RT26K |
| 220–250 Vdc | T37 | T38 | T39 | T40 | UVH2RP28K | UVH2RT28K |

Notes

- ^① For electrical rating data for manual, automatic and electrical reset undervoltage release mechanisms, refer to Eaton.
^② Listed with Underwriters Laboratories for field installation under E64983.
^③ Not for use on right pole of four-pole circuit breakers.
^④ Standard mounting location—leads exit rear of breaker.

K-Frame and HMCP (K) Undervoltage Release Mechanism

| Voltage Rating (AC Freq. = 50/60 Hz) | Factory Mounted Connection Type and Location | | | | Field Mounted Field Installation Kits ① | |
|---|---|----------------------------|-----------------------------------|-------------------------------|--|-------------------------------------|
| | 18-Inch (457.2 mm) Pigtail Leads | | | Terminal Block | Pigtail Leads Catalog Number | Terminal Block Catalog Number |
| | Same Side Suffix Number | Rear ② Suffix Number | Opposite Side Suffix Number | Same Side Suffix Number | | |
| Left-Pole Mounting AC Ratings ② | | | | | | |
| 12 Vac | U05 | U06 | U07 | U08 | UVH3LP02K | UVH3LT02K |
| 24 Vac | U09 | U10 | U11 | U12 | UVH3LP03K | UVH3LT03K |
| 48–60 Vac | U13 | U14 | U15 | U16 | UVH3LP05K | UVH3LT05K |
| 110–127 Vac | U17 | U18 | U19 | U20 | UVH3LP08K | UVH3LT08K |
| 208–240 Vac | U21 | U22 | U23 | U24 | UVH3LP11K | UVH3LT11K |
| 380–480 Vac | U25 | U26 | U27 | U28 | UVH3LP15K | UVH3LT15K |
| Right-Pole Mounting AC Ratings ③④⑤ | | | | | | |
| 12 Vac | U37 | U38 | U39 | U40 | UVH3RP02K | UVH3RT02K |
| 24 Vac | U41 | U42 | U43 | U44 | UVH3RP03K | UVH3RT03K |
| 48–60 Vac | U45 | U46 | U47 | U48 | UVH3RP05K | UVH3RT05K |
| 110–127 Vac | U49 | U50 | U51 | U52 | UVH3RP08K | UVH3RT08K |
| 208–240 Vac | U53 | U54 | U55 | U56 | UVH3RP11K | UVH3RT11K |
| 380–480 Vac | U57 | U58 | U59 | U60 | UVH3RP15K | UVH3RT15K |
| Left-Pole Mounting DC Ratings ② | | | | | | |
| 12 Vdc | T01 | T02 | T03 | T04 | UVH3LP20K | UVH3LT20K |
| 24 Vdc | T05 | T06 | T07 | T08 | UVH3LP21K | UVH3LT21K |
| 48–60 Vdc | T09 | T10 | T11 | T12 | UVH3LP23K | UVH3LT23K |
| 110–127 Vdc | T13 | T14 | T15 | T16 | UVH3LP26K | UVH3LT26K |
| 220–250 Vdc | T17 | T18 | T19 | T20 | UVH3LP28K | UVH3LT28K |
| Right-Pole Mounting DC Ratings ③④⑤ | | | | | | |
| 12 Vdc | T21 | T22 | T23 | T24 | UVH3RP20K | UVH3RT20K |
| 24 Vdc | T25 | T26 | T27 | T28 | UVH3RP21K | UVH3RT21K |
| 48–60 Vdc | T29 | T30 | T31 | T32 | UVH3RP23K | UVH3RT23K |
| 110–127 Vdc | T33 | T34 | T35 | T36 | UVH3RP26K | UVH3RT26K |
| 220–250 Vdc | T37 | T38 | T39 | T40 | UVH3RP28K | UVH3RT28K |

Notes

- ① Listed with Underwriters Laboratories, for field installation under E64983.
 ② Standard mounting location—leads exit rear of breaker.
 ③ For use with KT (thermal-magnetic) trip units only.
 ④ Not for use on right pole of four-pole circuit breaker.
 ⑤ Breakers with K-Frame OPTIM 550 can only accept accessories in left pole.

L-, HMCP (L) and (M)-Frames and Undervoltage Release Mechanism

| Voltage Rating (AC Freq. = 50/60 Hz) | Factory Mounted Connection Type and Location | | | | Field Mounted Field Installation Kits ^① | |
|---|---|---------------------------------------|-----------------------------------|-------------------------------|---|-------------------------------------|
| | 18-Inch (457.2 mm) Pigtail Leads | | | Terminal Block | Pigtail Leads Catalog Number | Terminal Block Catalog Number |
| | Same Side Suffix Number | Rear ^② Suffix Number | Opposite Side Suffix Number | Same Side Suffix Number | | |
| Left-Pole Mounting AC Ratings ^② | | | | | | |
| 12 Vac | U05 | U06 | U07 | U08 | UVH4LP02K | UVH4LT02K |
| 24 Vac | U09 | U10 | U11 | U12 | UVH4LP03K | UVH4LT03K |
| 48–60 Vac | U13 | U14 | U15 | U16 | UVH4LP05K | UVH4LT05K |
| 110–127 Vac | U17 | U18 | U19 | U20 | UVH4LP08K | UVH4LT08K |
| 208–240 Vac | U21 | U22 | U23 | U24 | UVH4LP11K | UVH4LT11K |
| 380–480 Vac | U25 | U26 | U27 | U28 | UVH4LP15K | UVH4LT15K |
| Right-Pole Mounting AC Ratings ^{③④} | | | | | | |
| 12 Vac | U37 | U38 | U39 | U40 | UVH4RP02K | UVH4RT02K |
| 24 Vac | U41 | U42 | U43 | U44 | UVH4RP03K | UVH4RT03K |
| 48–60 Vac | U45 | U46 | U47 | U48 | UVH4RP05K | UVH4RT05K |
| 110–127 Vac | U49 | U50 | U51 | U52 | UVH4RP08K | UVH4RT08K |
| 208–240 Vac | U53 | U54 | U55 | U56 | UVH4RP11K | UVH4RT11K |
| 380–480 Vac | U57 | U58 | U59 | U60 | UVH4RP15K | UVH4RT15K |
| Left-Pole Mounting DC Ratings ^② | | | | | | |
| 12 Vdc | T01 | T02 | T03 | T04 | UVH4LP20K | UVH4LT20K |
| 24 Vdc | T05 | T06 | T07 | T08 | UVH4LP21K | UVH4LT21K |
| 48–60 Vdc | T09 | T10 | T11 | T12 | UVH4LP23K | UVH4LT23K |
| 110–127 Vdc | T13 | T14 | T15 | T16 | UVH4LP26K | UVH4LT26K |
| 220–250 Vdc | T17 | T18 | T19 | T20 | UVH4LP28K | UVH4LT28K |
| Right-Pole Mounting DC Ratings ^{③④} | | | | | | |
| 12 Vdc | T21 | T22 | T23 | T24 | UVH4RP20K | UVH4RT20K |
| 24 Vdc | T25 | T26 | T27 | T28 | UVH4RP21K | UVH4RT21K |
| 48–60 Vdc | T29 | T30 | T31 | T32 | UVH4RP23K | UVH4RT23K |
| 110–127 Vdc | T33 | T34 | T35 | T36 | UVH4RP26K | UVH4RT26K |
| 220–250 Vdc | T37 | T38 | T39 | T40 | UVH4RP28K | UVH4RT28K |

Notes

- ① Listed with Underwriters Laboratories for field installation under E64983.
 ② Standard mounting location—leads exit rear of breaker.
 ③ For use with LT (thermal-magnetic) trip units only.
 ④ Not for use on right pole of four-pole circuit breaker.

N-Frame and HMCP (N) Undervoltage Release Mechanism

| Voltage Rating (AC Freq. = 50/60 Hz) | Factory Mounted Connection Type and Location 18-Inch (457.2 mm) Pigtail Leads | | | | Field Mounted Field Installation Kits ① | |
|---|---|---------------|---------------|---------------|--|----------------|
| | Terminal Block | | | Same Side | Pigtail Leads | Terminal Block |
| | Same Side | Rear ② | Opposite Side | | | |
| | Suffix Number | Suffix Number | Suffix Number | Suffix Number | Catalog Number | Catalog Number |
| Left-Pole Mounting AC Ratings ② | | | | | | |
| 12 Vac | U05 | U06 | U07 | U08 | UVH5LP02K | UVH5LT02K |
| 24 Vac | U09 | U10 | U11 | U12 | UVH5LP03K | UVH5LT03K |
| 48–60 Vac | U13 | U14 | U15 | U16 | UVH5LP05K | UVH5LT05K |
| 110–127 Vac | U17 | U18 | U19 | U20 | UVH5LP08K | UVH5LT08K |
| 208–240 Vac | U21 | U22 | U23 | U24 | UVH5LP11K | UVH5LT11K |
| 380–480 Vac | U25 | U26 | U27 | U28 | UVH5LP29K | UVH5LT29K |
| Left-Pole Mounting DC Ratings ② | | | | | | |
| 12 Vdc | T01 | T02 | T03 | T04 | UVH5LP20K | UVH5LT20K |
| 24 Vdc | T05 | T06 | T07 | T08 | UVH5LP21K | UVH5LT21K |
| 48–60 Vdc | T09 | T10 | T11 | T12 | UVH5LP23K | UVH5LT23K |
| 110–127 Vdc | T13 | T14 | T15 | T16 | UVH5LP26K | UVH5LT26K |
| 220–250 Vdc | T17 | T18 | T19 | T20 | UVH5LP28K | UVH5LT28K |

R-Frame Undervoltage Release Mechanism (RH only)

| Voltage Rating (AC Frequency = 50/60 Hz) | Factory Mounted Connection Type and Location 18-Inch (457.2 mm) Pigtail Leads | Field Mounted Field Installation Kits ③ |
|---|---|--|
| | Suffix Number ④ | Pigtail Leads Catalog Number ④ |
| | 12 Vac | U37 |
| 24 Vac | U41 | UVH6RP03K |
| 48–60 Vac | U45 | UVH6RP05K |
| 110–127 Vac | U49 | UVH6RP08K |
| 208–240 Vac | U53 | UVH6RP11K |
| 380–500 Vac | U57 | UVH6RP29K |
| 12 Vdc | T21 | UVH6RP20K |
| 24 Vdc | T25 | UVH6RP21K |
| 48–60 Vdc | T29 | UVH6RP23K |
| 110–125 Vdc | T33 | UVH6RP26K |
| 220–250 Vdc | T37 | UVH6RP28K |

Notes

- ① Listed with Underwriters Laboratories for field installation under E64983.
 ② Standard mounting location—leads exit rear of breaker.
 ③ Endurance: 500 electrical operations plus 2500 mechanical operations.
 ④ Pigtail wire size: 18 AWG (0.82 mm²). Leads are orange and brown.

Accessory Terminal Block (R-Frame)**Accessory Terminal Block (R-Frame)****R-Frame Accessory Terminal Block** ^①

| Factory Installed Suffix Number | Field Mounted Catalog Number |
|---------------------------------------|------------------------------------|
|---------------------------------------|------------------------------------|

| | |
|-----|-------|
| Q01 | TBRDK |
|-----|-------|

Number of Control Wires for Each Internally Mounted Accessory

| Type of Accessory | Number of Contacts per Single Accessory | Required Number of Wires |
|-----------------------------------|--|-----------------------------|
| Auxiliary switch | 2a/2b 4a/4b | 6 12 |
| Alarm (Signal)/ Lockout switch | 1m/1b 2m/2b | 6 12 |
| Shunt trip | N/A | 2 |
| Low energy shunt | N/A | 2 |
| Undervoltage release mechanism | N/A | 2 |

**PowerNet and Zone Interlock Kits (OPTIM 550 Only)
K-, L- and N-Frames****PowerNet and Zone
Interlock Kits****PowerNet Interlock Kit** ^②

| Circuit Breaker | Factory Install Suffix | Catalog Number |
|--------------------|---------------------------|-------------------|
| K-Frame | PN | ICK550K |
| L-Frame | PN | ICK550L |
| N-Frame | PN | ICK550N |

Zone Interlock/Ground Kit ^{②③}

| Circuit Breaker | Factory Install Suffix | Catalog Number |
|--------------------|---------------------------|-------------------|
| K-Frame | ZG | ZGK550K |
| L-Frame | ZG | ZGK550L |
| N-Frame | ZG | ZGK550N |

PowerNet and Zone Interlock/Ground Kit ^{②③}

| Circuit Breaker | Factory Install Suffix | Catalog Number |
|--------------------|---------------------------|-------------------|
| K-Frame | ZGP | ZGPK550K |
| L-Frame | ZGP | ZGPK550L |
| N-Frame | ZGP | ZGPK550N |

Notes

- ① One 24-point accessory terminal block provided with circuit breaker when ordered factory installed or shipped from warehouse as separate item when ordered for field installation. See Digitrip RMS master connection diagram (IL 29C714).
- ② Installation of these kits restrict any other attachments from being installed in the RH pole.
- ③ Includes a ground fault alarm signal that can drive the ground fault alarm unit (catalog number GFAU).

Technical Data and Specifications

2

Alarm Switch

F-Frame Electrical Rating Data ^{①②}

| Maximum Voltage | Frequency | Maximum Current Amperes | Dielectric Withstand Voltage |
|-------------------------------------|-----------|-------------------------|------------------------------|
| Multi-Pole Circuit Breakers | | | |
| 600 | 50/60 Hz | 6 | 2500 |
| 125 | DC | 0.50 ^③ | 2500 |
| 250 | DC | 0.25 ^③ | 2500 |
| Single-Pole Circuit Breakers | | | |
| 125/250 | 50/60 Hz | 6 ^③ | 2000 |
| 28 | DC | 3 ^③ | 2000 |
| 28 | DC | 5 ^④ | 2000 |

J-Frame Electrical Rating Data ^{⑤⑥}

| Maximum Voltage | Frequency | Maximum Current Amperes | Dielectric Withstand Voltage |
|-----------------|-----------|-------------------------|------------------------------|
| 600 | 50/60 Hz | 6 | 2500 |
| 125 | DC | 0.50 ^③ | 2500 |
| 250 | DC | 0.25 ^③ | 2500 |

K-Frame Electrical Rating Data ^{⑥⑦}

| Maximum Voltage | Frequency | Maximum Current Amperes | Dielectric Withstand Voltage |
|-----------------|-----------|-------------------------|------------------------------|
| 600 | 50/60 Hz | 6 | 2500 |
| 125 | DC | 0.50 ^③ | 2500 |
| 250 | DC | 0.25 ^③ | 2500 |

L- and M-Frames Electrical Rating Data ^{⑥⑦}

| Maximum Voltage | Frequency | Maximum Current Amperes | Dielectric Withstand Voltage |
|-----------------|-----------|-------------------------|------------------------------|
| 600 | 50/60 Hz | 6 | 2500 |
| 125 | DC | 0.50 ^③ | 2500 |
| 250 | DC | 0.25 ^③ | 2500 |

N-Frame Electrical Rating Data ^⑧

| Maximum Voltage | Frequency | Maximum Current Amperes | Dielectric Withstand Voltage |
|-----------------|-----------|-------------------------|------------------------------|
| 600 | 50/60 Hz | 6 | 2500 |
| 125 | DC | 0.50 ^③ | 2500 |
| 250 | DC | 0.25 ^③ | 2500 |

R-Frame Electrical Rating Data ^{⑨⑩}

| Maximum Voltage | Frequency | Maximum Current Amperes | Dielectric Withstand Voltage |
|-----------------|-----------|-------------------------|------------------------------|
| 600 | 50/60 Hz | 6 | 2500 |
| 125 | DC | 0.50 ^③ | 2500 |
| 250 | DC | 0.25 ^③ | 2500 |

Auxiliary Switch

F-Frame Electrical Rating Data ^{①②}

| Maximum Voltage | Frequency | Maximum Current Amperes | Dielectric Withstand Voltage |
|------------------|-----------|-------------------------|------------------------------|
| 125 ^③ | 50/60 Hz | 1 | 2500 |
| 600 | 50/60 Hz | 6 | 2500 |
| 125 | DC | 0.50 ^④ | 2500 |
| 250 | DC | 0.25 ^④ | 2500 |

J-Frame Electrical Rating Data ^{①②}

| Maximum Voltage | Frequency | Maximum Current Amperes | Dielectric Withstand Voltage |
|-----------------|-----------|-------------------------|------------------------------|
| 600 | 50/60 Hz | 6 | 2500 |
| 125 | DC | 0.50 ^④ | 2500 |
| 250 | DC | 0.25 ^④ | 2500 |

K-Frame Electrical Rating Data ^{②⑤}

| Maximum Voltage | Frequency | Maximum Current Amperes | Dielectric Withstand Voltage |
|-----------------|-----------|-------------------------|------------------------------|
| 600 | 50/60 Hz | 6 | 2500 |
| 125 | DC | 0.50 ^④ | 2500 |
| 250 | DC | 0.25 ^④ | 2500 |

L- and M-Frames Electrical Rating Data ^②

| Maximum Voltage | Frequency | Maximum Current Amperes | Dielectric Withstand Voltage |
|-----------------|-----------|-------------------------|------------------------------|
| 600 | 50/60 Hz | 6 | 2500 |
| 125 | DC | 0.50 ^④ | 2500 |
| 250 | DC | 0.25 ^④ | 2500 |

N-Frame Electrical Rating Data ^{②⑥}

| Maximum Voltage | Frequency | Maximum Current Amperes | Dielectric Withstand Voltage |
|-----------------|-----------|-------------------------|------------------------------|
| 600 | 50/60 Hz | 6 | 2500 |
| 125 | DC | 0.50 ^④ | 2500 |
| 250 | DC | 0.25 ^④ | 2500 |

R-Frame Electrical Rating Data ^{⑦⑧}

| Maximum Voltage | Frequency | Maximum Current Amperes |
|-----------------|-----------|-------------------------|
| 600 | 50/60 Hz | 6 |
| 125 | DC | 0.50 ^④ |
| 250 | DC | 0.25 ^④ |

Notes

- ① Endurance: 6000 electrical operations plus 4000 mechanical operations.
- ② Endurance: 6000 electrical operations plus 2000 mechanical operations.
- ③ Non-inductive load.
- ④ Inductive (L/R = 0.026).
- ⑤ Endurance: 6000 electrical operations plus 2000 mechanical operations.
- ⑥ Pigtail wire size: 18 AWG (0.82 mm²).
- ⑦ Endurance: 5000 electrical operations plus 1000 mechanical operations.
- ⑧ Endurance: 3000 electrical operations plus 1000 mechanical operations.
- ⑨ Endurance: 500 electrical operations plus 2500 mechanical operations.
- ⑩ Pigtail wire size: 18 AWG (0.82 mm²). Leads are red, black and blue.

Auxiliary Switch and Alarm Switch Combination**F-Frame Electrical Rating Data** ^{①②}

| Maximum Voltage | Frequency | Maximum Current Amperes | Dielectric Withstand Voltage |
|-----------------|-----------|-------------------------|------------------------------|
| 600 | 50/60 Hz | 6 | 2500 |
| 125 | DC | 0.50 ^③ | 2200 |
| 250 | DC | 0.25 ^③ | 2200 |

J-Frame Electrical Rating Data ^{②⑤}

| Maximum Voltage | Frequency | Maximum Current Amperes | Dielectric Withstand Voltage |
|-----------------|-----------|-------------------------|------------------------------|
| 600 | 50/60 Hz | 6 | 2500 |
| 125 | DC | 0.50 ^③ | 2500 |
| 250 | DC | 0.25 ^③ | 2500 |

K-Frame Electrical Rating Data ^{②⑦}

| Maximum Voltage | Frequency | Maximum Current Amperes | Dielectric Withstand Voltage |
|-----------------|-----------|-------------------------|------------------------------|
| 600 | 50/60 Hz | 6 | 2500 |
| 125 | DC | 0.50 ^③ | 2500 |
| 250 | DC | 0.25 ^③ | 2500 |

L- and M-Frames Electrical Rating Data ^{②⑦}

| Maximum Voltage | Frequency | Maximum Current Amperes | Dielectric Withstand Voltage |
|-----------------|-----------|-------------------------|------------------------------|
| 600 | 50/60 Hz | 6 | 2500 |
| 125 | DC | 0.50 ^③ | 2500 |
| 250 | DC | 0.25 ^③ | 2500 |

N-Frame Electrical Rating Data ^{②⑧}

| Maximum Voltage | Frequency | Maximum Current Amperes | Dielectric Withstand Voltage |
|-----------------|-----------|-------------------------|------------------------------|
| 600 | 50/60 Hz | 6 | 2500 |
| 125 | DC | 0.50 ^③ | 2500 |
| 250 | DC | 0.25 ^③ | 2500 |

Notes

- ① Endurance: 6000 electrical operations plus 4000 mechanical operations.
- ② Pigtail wire size: 18 AWG (0.82 mm²).
- ③ Non-inductive load.
- ④ Endurance: 6000 electrical operations plus 2000 mechanical operations.
- ⑤ Endurance: 5000 electrical operations plus 1000 mechanical operations.
- ⑥ Endurance: 3000 electrical operations plus 1000 mechanical operations.

Shunt Trip**F-Frame and HMCP Shunt Trip Electrical Rating Data** ①②③

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| Catalog Number | Application Ratings | | Electrical Operating Ratings | | | | | One Minute Dielectric Withstand Voltage (V) | | |
|------------------------|---------------------|----------------|------------------------------|-------------------------------|--------------------|------------------------------|-------------------------------|---|------|-----|
| | Voltage (V) | Frequency (Hz) | Supply Voltage (V) | Minimum Operating Voltage (V) | I _p (A) | I _{rms} at 0.25 (A) | I _{rms} at 0.33s (A) | | VA | |
| SNT1LP03K or SNT1LT03K | 12–24 | 50/60 | 9 | 6.3 | 6.1 | 4.3 | 40 | 1048 | | |
| | | | 12 | | 8.5 | | | | 6 | 75 |
| | | | 24 | | 17 | | | | 12 | 300 |
| | 12–24 | DC | 12 | 9 | 8 | 100 | | | | |
| | | | 24 | | | | 16 | | 400 | |
| | | | 24 | | | | 16 | | 400 | |
| SNT1LP08K or SNT1LT08K | 48–127 | 50/60 | 48 | 33.6 | 2.7 | 1.9 | 92 | 1254 | | |
| | | | 60 | | 3.4 | | | | 2.4 | 140 |
| | | | 110 | | 6.2 | | | | 4.4 | 480 |
| | | | 120 | | 6.8 | | | | 4.8 | 570 |
| | | | 127 | | 7.2 | | | | 5.1 | 640 |
| | 48–60 | DC | 48 | 33.6 | 2.1 | 100 | | | | |
| | | | 60 | | | | 2.6 | | 160 | |
| | | | 60 | | | | 2.6 | | 160 | |
| | | | 60 | | | | 2.6 | | 160 | |
| SNT1LP12K or SNT1LT12K | 208–380 | 50/60 | 208 | 146 | 1.2 | 0.25 | 180 | 1760 | | |
| | | | 220 | | 1.3 | | | | 0.27 | 200 |
| | | | 240 | | 1.4 | | | | 0.29 | 240 |
| | | | 380 | | 2.3 | | | | 0.31 | 610 |
| | 110–125 | DC | 110 | 77 | 0.5 | 55 | | | | |
| | | | 120 | | | | 0.55 | | 66 | |
| | | | 120 | | | | 0.55 | | 66 | |
| | | | 125 | | | | 0.57 | | 71 | |
| | | | 125 | | | | 0.57 | | 71 | |
| SNT1LP18K or SNT1LT18K | 415–600 | 50/60 | 400 | 280 | 1.1 | 0.77 | 310 | 2200 | | |
| | | | 415 | | 1.1 | | | | 0.8 | 330 |
| | | | 440 | | 1.2 | | | | 0.85 | 380 |
| | | | 480 | | 1.3 | | | | 0.93 | 450 |
| | | | 525 | | 1.4 | | | | 1.02 | 530 |
| | | | 550 | | 1.5 | | | | 1.06 | 590 |
| | | | 600 | | 1.6 | | | | 1.16 | 700 |
| | 220–250 | DC | 220 | 154 | 0.48 | 110 | | | | |
| | | | 250 | | | | 0.55 | | 140 | |
| | | | 250 | | | | 0.55 | | 140 | |
| | | | 250 | | | | 0.55 | | 140 | |

Notes

- ① Average unlatching time: 6 milliseconds.
- ② Average circuit breaker contact total opening time: 18 milliseconds.
- ③ Endurance: 6000 electrical operations plus 4000 mechanical operations.

J-Frame and HMCP (J) Shunt Trip Electrical Rating Data ^{①②③}

| Catalog Number | Application Ratings | | Electrical Operating Ratings | | | | | | One Minute Dielectric Withstand Voltage (V) | |
|----------------------|---------------------|----------------|------------------------------|-------------------------------|--------------------|------------------------------|-------------------------------|------|---|------|
| | Voltage (V) | Frequency (Hz) | Supply Voltage (V) | Minimum Operating Voltage (V) | I _p (A) | I _{rms} at 0.25 (A) | I _{rms} at 0.33s (A) | VA | | |
| SNT2P04K or SNT2T04K | 12–24 | 50/60 | 12 | 9 | 17.7 | 12.6 | 164 | 1048 | | |
| | | | 24 | | 38.3 | | | | 27.4 | 631 |
| | 12–24 | DC | 12 | 9 | 7.3 | 87 | 405 | | | |
| | | | 24 | | 16.9 | | | | | |
| SNT2P06K or SNT2T06K | 48–60 | 50/60 | 48 | 36 | 24.4 | 17.3 | 830 | 1120 | | |
| | | | 60 | | 30.1 | | | | 21.3 | 1280 |
| | 48–60 | DC | 48 | 36 | 14.8 | 710 | 1105 | | | |
| | | | 60 | | 18.4 | | | | | |
| SNT2P11K or SNT2T11K | 110–240 | 50/60 | 110 | 60 | 0.9 | 0.6 | 66 | 1480 | | |
| | | | 120 | | 1 | | | | 0.7 | 84 |
| | | | 127 | | 1.1 | | | | 0.8 | 102 |
| | | | 208 | | 2.4 | | | | 1.7 | 354 |
| | | | 220 | | 2.6 | | | | 1.8 | 396 |
| | | | 240 | | 2.6 | | | | 1.8 | 432 |
| | 110–125 | DC | 110 | 60 | 1 | 112 | 138 | 150 | | |
| | | | 120 | | 1.1 | | | | | |
| | | | 125 | | 1.2 | | | | | |
| | | | | | | | | | | |
| SNT2P14K or SNT2T14K | 380–440 | 50/60 | 380 | 285 | 0.34 | 0.25 | 127 | 1880 | | |
| | | | 400 | | 0.38 | | | | 0.27 | 150 |
| | | | 415 | | 0.4 | | | | 0.29 | 163 |
| | | | 440 | | 0.44 | | | | 0.31 | 188 |
| | 220–250 | DC | 220 | 165 | 0.19 | 40 | 58 | | | |
| | | | 250 | | 0.22 | | | | | |
| SNT2P18K or SNT2T18K | 480–600 | 50/60 | 480 | 360 | 0.13 | 0.07 | 34 | 2200 | | |
| | | | 525 | | 0.13 | | | | 0.08 | 42 |
| | | | 550 | | 0.13 | | | | 0.09 | 50 |
| | | | 600 | | 0.14 | | | | 0.1 | 60 |

Notes

- ① Average unlatching time: 6 milliseconds.
 ② Average circuit breaker contact total opening time: 18 milliseconds.
 ③ Endurance: 6000 electrical operations plus 2000 mechanical operations.

K-Frame and HMCP (K) Shunt Trip Electrical Rating Data ^{①②③}

| Catalog Number | Application Ratings | | Electrical Operating Ratings | | | | | One Minute Dielectric Withstand Voltage (V) | | | |
|----------------------|---------------------|----------------|------------------------------|-------------------------------|--------------------|------------------------------|-------------------------------|---|------|------|------|
| | Voltage (V) | Frequency (Hz) | Supply Voltage (V) | Minimum Operating Voltage (V) | I _p (A) | I _{rms} at 0.25 (A) | I _{rms} at 0.33s (A) | | VA | | |
| SNT3P04K or SNT3T04K | 12–24 | 50/60 | 12 | 9 | 17.7 | 12.6 | 164 | 1048 | | | |
| | | | 24 | | 38.3 | | | | 27.4 | 631 | |
| | 12–24 | DC | 12 | 9 | | | 7.3 | | 87 | | |
| | | | 24 | | | | | | | 16.9 | 405 |
| SNT3P06K or SNT3T06K | 48–60 | 50/60 | 48 | 36 | 24.4 | 17.3 | 830 | 1120 | | | |
| | | | 60 | | 30.1 | | | | 21.3 | 1280 | |
| | 48–60 | DC | 48 | 36 | | | 14.8 | | 710 | | |
| | | | 60 | | | | | | | 18.4 | 1105 |
| SNT3P11K or SNT3T11K | 110–240 | 50/60 | 110 | 60 | 1.3 | 0.9 | 100 | 1480 | | | |
| | | | 120 | | 1.4 | | | | 1 | 120 | |
| | | | 127 | | 1.5 | | | | 1.1 | 140 | |
| | | | 208 | | 2.8 | | | | 2 | 420 | |
| | | | 220 | | 3 | | | | 2.1 | 470 | |
| | | | 240 | | 3.2 | | | | 2.3 | 550 | |
| | 110–125 | DC | 110 | 82 | | | 1 | | 110 | | |
| | | | 120 | | | | | | | 1.1 | 130 |
| | | | 125 | | | | | | | 1.2 | 140 |
| | | | | | | | | | | | |
| SNT3P14K or SNT3T14K | 380–440 | 50/60 | 380 | 285 | 0.37 | 0.25 | 95 | 1880 | | | |
| | | | 400 | | 0.39 | | | | 0.27 | 108 | |
| | | | 415 | | 0.42 | | | | 0.29 | 120 | |
| | | | 440 | | 0.44 | | | | 0.31 | 136 | |
| | 220–250 | DC | 220 | 165 | | | 0.19 | | 41 | | |
| | | | 250 | | | | | | | 0.22 | 54 |
| SNT3P18K or SNT3T18K | 480–600 | 50/60 | 480 | 360 | 0.11 | 0.08 | 40 | 2200 | | | |
| | | | 525 | | 0.13 | | | | 0.09 | 50 | |
| | | | 550 | | 0.13 | | | | 0.09 | 50 | |
| | | | 600 | | 0.16 | | | | 0.12 | 70 | |

Notes

- ① Approximate unlatching time: 6 milliseconds.
 ② Approximate total circuit breaker contact opening time: 8 milliseconds.
 ③ Endurance: 5000 electrical operations plus 1000 mechanical operations.

L-Frame and HMCP (L) and M-Frame Shunt Trip Electrical Rating Data ^{①②③}

| Catalog Number | Application Ratings | | Electrical Operating Ratings | | | | | | One Minute Dielectric Withstand Voltage (V) | | |
|----------------------|---------------------|----------------|------------------------------|-------------------------------|--------------------|------------------------------|-------------------------------|------|---|------|-----|
| | Voltage (V) | Frequency (Hz) | Supply Voltage (V) | Minimum Operating Voltage (V) | I _p (A) | I _{rms} at 0.25 (A) | I _{rms} at 0.33s (A) | VA | | | |
| SNT4P03K or SNT4T03K | 12–24 | 50/60 | 9 | 6.3 | 7.2 | 5.1 | 46 | 1048 | | | |
| | | | 12 | | 11.6 | | | | 8.2 | 98 | |
| | | | 24 | | 28.6 | | | | 20.2 | 485 | |
| | 12–24 | DC | 9 | 6.3 | 7.2 | 5.1 | 46 | 1048 | | | |
| | | | 12 | | | | | | 11.6 | 8.2 | 98 |
| | | | 24 | | | | | | 28.6 | 20.2 | 485 |
| SNT4P05K SNT4T05K | 48–60 | 50/60 | 48 | 34 | 0.72 | 0.51 | 82 | 1120 | | | |
| | | | 60 | | 1.2 | | | | 0.84 | 126 | |
| SNT4P11K or SNT4T11K | 110–240 | 50/60 | 110 | 77 | 0.89 | 0.63 | 69 | 1480 | | | |
| | | | 120 | | 1.03 | | | | 0.73 | 88 | |
| | | | 127 | | 1.1 | | | | 0.8 | 102 | |
| | | | 208 | | 2.3 | | | | 1.6 | 333 | |
| | | | 220 | | 2.4 | | | | 1.7 | 374 | |
| | | | 240 | | 2.6 | | | | 1.8 | 432 | |
| SNT4P14K or SNT4T14K | 380–440 | 50/60 | 380 | 266 | 0.3 | 0.21 | 80 | 1880 | | | |
| | | | 400 | | 0.34 | | | | 0.24 | 96 | |
| | | | 415 | | 0.35 | | | | 0.25 | 104 | |
| | | | 440 | | 0.38 | | | | 0.27 | 119 | |
| | 220–250 | DC | 220 | 154 | 0.34 | 0.21 | 80 | 1880 | | | |
| | | | 250 | | | | | | 0.34 | 0.27 | 119 |
| SNT4P18K or SNT4T18K | 480–600 | 50/60 | 480 | 336 | 0.07 | 0.05 | 24 | 2200 | | | |
| | | | 525 | | 0.08 | | | | 0.06 | 32 | |
| | | | 550 | | 0.09 | | | | 0.07 | 39 | |
| | | | 600 | | 0.11 | | | | 0.08 | 48 | |
| SNT4P23K SNT4T23K | 48–60 | DC | 48 | 34 | 0.76 | 0.51 | 82 | 1120 | | | |
| | | | 60 | | | | | | 0.95 | 0.84 | 126 |
| SNT4P26K or SNT4T26K | 110–125 | DC | 110 | 77 | 0.42 | 0.63 | 69 | 1480 | | | |
| | | | 120 | | | | | | 0.43 | 0.73 | 88 |
| | | | 125 | | | | | | 0.44 | 0.8 | 102 |

Notes

- ① Approximate unlatching time: 6 milliseconds.
 ② Approximate total circuit breaker contact opening time: 18 milliseconds.
 ③ Endurance: 5000 electrical operations plus 1000 mechanical operations.

N-Frame and HMCP (N) Shunt Trip Electrical Rating Data ^{①②③}

| Catalog Number | Application Ratings | | Electrical Operating Ratings | | | | | One Minute Dielectric Withstand Voltage (V) | | |
|------------------------|---------------------|----------------|------------------------------|-------------------------------|--------------------|------------------------------|-------------------------------|---|------|-----|
| | Voltage (V) | Frequency (Hz) | Supply Voltage (V) | Minimum Operating Voltage (V) | I _p (A) | I _{rms} at 0.25 (A) | I _{rms} at 0.33s (A) | | VA | |
| SNT5LP03K or SNT5LT03K | 9–24 | 50/60 | 9 | 6.3 | 7.2 | 5.1 | 46 | 1048 | | |
| | | | 12 | | 11.6 | | | | 8.2 | 98 |
| | | | 24 | | 28 | | | | 19.8 | 475 |
| | 9–24 | DC | 9 | 7.2 | 8.8 | 79 | 145 | | | |
| | | | 12 | | | | | | 12.1 | 610 |
| | | | 24 | | | | | | 25.4 | 610 |
| SNT5LP05K SNT5LT05K | 48–60 | 50/60 | 48 | 34 | 2.4 | 1.7 | 82 | 1120 | | |
| | | | 60 | | 3 | | 126 | | | |
| SNT5LP11K or SNT5LT11K | 110–240 | 50/60 | 110 | 77 | 0.86 | 0.61 | 67 | 1480 | | |
| | | | 120 | | 0.98 | | 83 | | | |
| | | | 127 | | 1.1 | | 95 | | | |
| | | | 208 | | 2.3 | | 333 | | | |
| | | | 220 | | 2.4 | | 374 | | | |
| | | | 240 | | 2.6 | | 432 | | | |
| | | | SNT5LP14K or SNT5LT14K | | 380–440 | | 50/60 | | 380 | 266 |
| 400 | 0.31 | 88 | | | | | | | | |
| 415 | 0.33 | 95 | | | | | | | | |
| 440 | 0.35 | 110 | | | | | | | | |
| 220–250 | DC | 220 | | 154 | 0.21 | 46 | | | | |
| | | 250 | | | 0.22 | | 55 | | | |
| SNT5LP18K or SNT5LT18K | 480–600 | 50/60 | 480 | 336 | 0.06 | 0.04 | 19 | 2200 | | |
| | | | 525 | | 0.08 | | 32 | | | |
| | | | 550 | | 0.08 | | 33 | | | |
| | | | 600 | | 0.1 | | 42 | | | |
| SNT5LP23K SNT5LT23K | 48–60 | DC | 48 | 34 | 1.4 | 67 | 1120 | | | |
| | | | 60 | | 1.7 | | 102 | | | |
| SNT5LP26K or SNT5LT26K | 110–125 | DC | 110 | 77 | 1.1 | 121 | 1250 | | | |
| | | | 120 | | 1.2 | | 144 | | | |
| | | | 125 | | 1.2 | | 150 | | | |

Notes

- ① Approximate unlatching time: 6 milliseconds.
- ② Approximate total circuit breaker contact opening time: 18 milliseconds.
- ③ Endurance: 3000 electrical operations plus 1000 mechanical operations.

R-Frame Shunt Trip Electrical Rating Data ^{①②③④⑤⑥}

| Catalog Number | Application Ratings | | Electrical Operating Ratings | | | | | | |
|----------------|---------------------|----------------|------------------------------|-------------------------------|--------------------|------------------------------|-------------------------------|------|---|
| | Voltage (V) | Frequency (Hz) | Supply Voltage (V) | Minimum Operating Voltage (V) | I _p (A) | I _{rms} at 0.25 (A) | I _{rms} at 0.33s (A) | VA | One Minute Dielectric Withstand Voltage (V) |
| SNT6P03K | 24 | 50/60 | 24 | 16.8 | 36.1 | | 25.5 | 612 | 1050 |
| | 24 | DC | 24 | 16.8 | | | | | |
| SNT6P05K | 48–60 | 50/60 | 48 | 34 | 11.9 | | 8.4 | 403 | 1120 |
| | | | 60 | | 15.7 | | 11.1 | 666 | |
| SNT6P11K | 110–240 | 50/60 | 110 | 60 | 5.09 | | 3.6 | 396 | 1480 |
| | | | 120 | | 5.66 | | 4 | 480 | |
| | | | 127 | | 5.94 | | 4.2 | 533 | |
| | | | 208 | | 10.2 | | 7.2 | 1498 | |
| | | | 220 | | 10.5 | | 7.4 | 1628 | |
| | | | 240 | | 11.2 | | 7.9 | 1896 | |
| SNT6P14K | 380–440 | 50/60 | 380 | 266 | 5.94 | | 4.2 | 1596 | 2200 |
| | | | 400 | | 6.23 | | 4.4 | 1760 | |
| | | | 415 | | 6.51 | | 4.6 | 1909 | |
| | | | 440 | | 6.93 | | 4.9 | 2156 | |
| | 220–250 | DC | 220 | 154 | | | 1.7 | 374 | 1500 |
| | | | 250 | | | | 1.9 | 475 | |
| SNT6P18K | 480–600 | 50/60 | 480 | 336 | 0.68 | | 0.48 | 230 | 2200 |
| | | | 525 | | 0.78 | | 0.55 | 289 | |
| | | | 550 | | 0.79 | | 0.56 | 308 | |
| | | | 600 | | 0.91 | | 0.64 | 384 | |
| SNT6P23K | 48–60 | DC | 48 | 34 | | | 7.1 | 341 | 1120 |
| | | | 60 | | | | 8.8 | 258 | |
| SNT6P26K | 110–125 | DC | 110 | 77 | | | 2.4 | 264 | 1250 |
| | | | 120 | | | | 2.6 | 312 | |
| | | | 125 | | | | 2.8 | 350 | |

Notes

- ① Approximate unlatching time of 6 milliseconds.
- ② Average circuit breaker contact total opening time approximately 62 milliseconds, at rated voltage.
- ③ Endurance: 500 electrical operations and 2500 mechanical operations.
- ④ Shunt trip can be operated up to a maximum of six times per minute.
- ⑤ Maximum operating voltage—110% of maximum voltage range rating.
- ⑥ Pigtail wire size: 18 AWG (0.82 mm²). Leads are yellow and white.

Undervoltage Release Mechanism

2

F-Frame Electrical Rating Data ^①

| 50/60 Hz | | | | | DC | | | | |
|----------------|-----------------|---------|----------------|-----|----------------|-----------------|---------|----------------|-----|
| Supply Voltage | Dropout Voltage | | Pickup Voltage | VA | Supply Voltage | Dropout Voltage | | Pickup Voltage | VA |
| | Minimum | Maximum | Maximum | | | Minimum | Maximum | Maximum | |
| 12 | 4.2 | 6.3 | 7.6 | 1.3 | 12 | 4.2 | 8.4 | 10.2 | 2.8 |
| 12 | 4.2 | 6.3 | 7.6 | 2.5 | 12 | 4.2 | 8.4 | 10.2 | 2.8 |
| 24 | 8.4 | 16.8 | 20.4 | 1.4 | 24 | 8.4 | 16.8 | 20.4 | 1.6 |
| 48 | 21.0 | 33.6 | 40.8 | 1.2 | 48 | 21.0 | 33.6 | 40.8 | 1.3 |
| 60 | 21.0 | 33.6 | 40.8 | 1.9 | 60 | 21.0 | 33.6 | 40.8 | 2.0 |
| 110 | 44.5 | 77.0 | 93.5 | 1.3 | 110 | 44.5 | 77.0 | 93.5 | 1.5 |
| 120 | 44.5 | 77.0 | 93.5 | 1.5 | 120 | 44.5 | 77.0 | 93.5 | 1.7 |
| 127 | 44.5 | 77.0 | 93.5 | 1.7 | 125 | 44.5 | 77.0 | 93.5 | 1.9 |
| 208 | 84.0 | 145.6 | 176.8 | 2.2 | 220 | 87.5 | 154.0 | 187.0 | 2.6 |
| 220 | 84.0 | 145.6 | 176.8 | 2.4 | 250 | 87.5 | 154.0 | 187.0 | 3.4 |
| 240 | 84.0 | 145.6 | 176.8 | 2.9 | — | — | — | — | — |
| 380 | 168.0 | 266.0 | 323.0 | 2.9 | — | — | — | — | — |
| 415 | 168.0 | 266.0 | 323.0 | 3.5 | — | — | — | — | — |
| 440 | 168.0 | 266.0 | 323.0 | 3.9 | — | — | — | — | — |
| 480 | 168.0 | 266.0 | 323.0 | 4.6 | — | — | — | — | — |
| 525 | 210.0 | 367.0 | 446.0 | 4.3 | — | — | — | — | — |
| 550 | 210.0 | 367.0 | 446.0 | 4.8 | — | — | — | — | — |
| 600 | 210.0 | 367.0 | 446.0 | 5.8 | — | — | — | — | — |

J-Frame Electrical Rating Data ^{②③}

| 50/60 Hz | | | | | DC | | | | |
|----------------|-----------------|---------|----------------|-----|----------------|-----------------|---------|----------------|-----|
| Supply Voltage | Dropout Voltage | | Pickup Voltage | VA | Supply Voltage | Dropout Voltage | | Pickup Voltage | VA |
| | Minimum | Maximum | Maximum | | | Minimum | Maximum | Maximum | |
| 12 | 4.2 | 8.4 | 10.2 | 1.9 | 12 | 4.2 | 8.4 | 10.2 | 1.6 |
| 24 | 8.4 | 16.8 | 20.4 | 3.9 | 24 | 8.4 | 16.8 | 20.4 | 3.1 |
| 48 | 21.0 | 33.6 | 40.8 | 2.5 | 48 | 21.0 | 33.6 | 40.8 | 2.0 |
| 60 | 21.0 | 33.6 | 40.8 | 3.8 | 60 | 21.0 | 33.6 | 40.8 | 3.1 |
| 110 | 44.5 | 77.0 | 93.5 | 1.8 | 110 | 44.5 | 77.0 | 93.5 | 1.6 |
| 120 | 44.5 | 77.0 | 93.5 | 2.1 | 120 | 44.5 | 77.0 | 93.5 | 1.9 |
| 127 | 44.5 | 77.0 | 93.5 | 2.4 | 125 | 44.5 | 77.0 | 93.5 | 2.2 |
| 208 | 84.0 | 145.6 | 176.8 | 2.7 | 220 | 87.5 | 154.0 | 187.0 | 3.1 |
| 220 | 84.0 | 145.6 | 176.8 | 3.1 | 250 | 87.5 | 154.0 | 187.0 | 4.0 |
| 240 | 84.0 | 145.6 | 176.8 | 3.8 | — | — | — | — | — |
| 380 | 168.0 | 266.0 | 323.0 | 3.4 | — | — | — | — | — |
| 415 | 168.0 | 266.0 | 323.0 | 4.0 | — | — | — | — | — |
| 440 | 168.0 | 266.0 | 323.0 | 4.6 | — | — | — | — | — |
| 480 | 168.0 | 266.0 | 323.0 | 5.4 | — | — | — | — | — |

Notes

① Endurance: 6000 electrical operations plus 4000 mechanical operations.

② Endurance: 6000 electrical operations plus 2000 mechanical operations.

③ For electrical rating data for manual, automatic and electrical reset undervoltage release mechanisms, refer to Eaton.

K-Frame Electrical Rating Data ^①

| 50/60 Hz | | | | | DC | | | | |
|----------------|-----------------|---------|----------------|-----|----------------|-----------------|---------|----------------|-----|
| Supply Voltage | Dropout Voltage | | Pickup Voltage | VA | Supply Voltage | Dropout Voltage | | Pickup Voltage | VA |
| | Minimum | Maximum | Maximum | | | Minimum | Maximum | Maximum | |
| 12 | 4.2 | 8.4 | 10.2 | 1.9 | 12 | 4.2 | 8.4 | 10.2 | 1.6 |
| 24 | 8.4 | 16.8 | 20.4 | 3.9 | 24 | 8.4 | 16.8 | 20.4 | 3.1 |
| 48 | 21.0 | 33.6 | 40.8 | 2.5 | 48 | 21.0 | 33.6 | 40.8 | 2.0 |
| 60 | 21.0 | 33.6 | 40.8 | 3.8 | 60 | 21.0 | 33.6 | 40.8 | 3.1 |
| 110 | 44.5 | 77.0 | 93.5 | 1.8 | 110 | 44.5 | 77.0 | 93.5 | 1.6 |
| 120 | 44.5 | 77.0 | 93.5 | 2.1 | 120 | 44.5 | 77.0 | 93.5 | 1.9 |
| 127 | 44.5 | 77.0 | 93.5 | 2.4 | 125 | 44.5 | 77.0 | 93.5 | 2.2 |
| 208 | 84.0 | 145.6 | 176.8 | 2.7 | 220 | 87.5 | 154.0 | 187.0 | 3.1 |
| 220 | 84.0 | 145.6 | 176.8 | 3.1 | 250 | 87.5 | 154.0 | 187.0 | 4.0 |
| 240 | 84.0 | 145.6 | 176.8 | 3.8 | — | — | — | — | — |
| 380 | 168.0 | 266.0 | 323.0 | 3.4 | — | — | — | — | — |
| 415 | 168.0 | 266.0 | 323.0 | 4.0 | — | — | — | — | — |
| 440 | 168.0 | 266.0 | 323.0 | 4.6 | — | — | — | — | — |
| 480 | 168.0 | 266.0 | 323.0 | 5.4 | — | — | — | — | — |

L- and M-Frames Electrical Rating Data ^①

| 50/60 Hz | | | | | DC | | | | |
|----------------|-----------------|---------|----------------|-----|----------------|-----------------|---------|----------------|-----|
| Supply Voltage | Dropout Voltage | | Pickup Voltage | VA | Supply Voltage | Dropout Voltage | | Pickup Voltage | VA |
| | Minimum | Maximum | Maximum | | | Minimum | Maximum | Maximum | |
| 12 | 4.2 | 8.4 | 10.2 | 1.9 | 12 | 4.2 | 8.4 | 10.2 | 1.6 |
| 24 | 8.4 | 16.8 | 20.4 | 3.9 | 24 | 8.4 | 16.8 | 20.4 | 3.1 |
| 48 | 21.0 | 33.6 | 40.8 | 2.5 | 48 | 21.0 | 33.6 | 40.8 | 2.0 |
| 60 | 21.0 | 33.6 | 40.8 | 3.8 | 60 | 21.0 | 33.6 | 40.8 | 3.1 |
| 110 | 44.5 | 77.0 | 93.5 | 1.8 | 110 | 44.5 | 77.0 | 93.5 | 1.6 |
| 120 | 44.5 | 77.0 | 93.5 | 2.1 | 120 | 44.5 | 77.0 | 93.5 | 1.9 |
| 127 | 44.5 | 77.0 | 93.5 | 2.4 | 125 | 44.5 | 77.0 | 93.5 | 2.2 |
| 208 | 84.0 | 145.6 | 176.8 | 2.7 | 220 | 87.5 | 154.0 | 187.0 | 3.1 |
| 220 | 84.0 | 145.6 | 176.8 | 3.1 | 250 | 87.5 | 154.0 | 187.0 | 4.0 |
| 240 | 84.0 | 145.6 | 176.8 | 3.8 | — | — | — | — | — |
| 380 | 168.0 | 266.0 | 323.0 | 3.4 | — | — | — | — | — |
| 415 | 168.0 | 266.0 | 323.0 | 4.0 | — | — | — | — | — |
| 440 | 168.0 | 266.0 | 323.0 | 4.6 | — | — | — | — | — |
| 480 | 168.0 | 266.0 | 323.0 | 5.4 | — | — | — | — | — |

Note

^① Endurance: 5000 electrical operations plus 1000 mechanical operations.

2.4

Molded Case Circuit Breakers

Series C

2

N-Frame Electrical Rating Data ^①

| 50/60 Hz | | | | | DC | | | | |
|----------------|-----------------|---------|----------------|-----|----------------|-----------------|---------|----------------|-----|
| Supply Voltage | Dropout Voltage | | Pickup Voltage | VA | Supply Voltage | Dropout Voltage | | Pickup Voltage | VA |
| | Minimum | Maximum | Maximum | | | Minimum | Maximum | Maximum | |
| 12 | 4.2 | 8.4 | 10.2 | 1.9 | 12 | 4.2 | 8.4 | 10.2 | 1.6 |
| 24 | 8.4 | 16.8 | 20.4 | 3.9 | 24 | 8.4 | 16.8 | 20.4 | 3.1 |
| 48 | 21.0 | 33.6 | 40.8 | 2.5 | 48 | 21.0 | 33.6 | 40.8 | 2.0 |
| 60 | 21.0 | 33.6 | 40.8 | 3.8 | 60 | 21.0 | 33.6 | 40.8 | 3.1 |
| 110 | 44.5 | 77.0 | 93.5 | 1.8 | 110 | 44.5 | 77.0 | 93.5 | 1.6 |
| 120 | 44.5 | 77.0 | 93.5 | 2.1 | 120 | 44.5 | 77.0 | 93.5 | 1.9 |
| 127 | 44.5 | 77.0 | 93.5 | 2.4 | 125 | 44.5 | 77.0 | 93.5 | 2.2 |
| 208 | 84.0 | 145.6 | 176.8 | 2.7 | 220 | 87.5 | 154.0 | 187.0 | 3.1 |
| 220 | 84.0 | 145.6 | 176.8 | 3.1 | 220 | 87.5 | 154.0 | 187.0 | — |
| 240 | 84.0 | 145.6 | 176.8 | 3.8 | 250 | — | — | — | 4.0 |
| 380 | 175.0 | 266.0 | 323.0 | 3.4 | — | — | — | — | — |
| 415 | 175.0 | 266.0 | 323.0 | 4.0 | — | — | — | — | — |
| 480 | 175.0 | 266.0 | 323.0 | 4.6 | — | — | — | — | — |
| 500 | 175.0 | 266.0 | 323.0 | 5.4 | — | — | — | — | — |

Note

^① Endurance: 3000 electrical operations plus 1000 mechanical operations.

R-Frame AC Undervoltage Release Mechanism (Handle Reset) Ratings ^{①②}

| Catalog Suffix | Application Ratings Voltage (V) | Electrical Operating Ratings | | | Approximate Operating Time (ms) | | | | Maximum Circuit Breaker Contact Opening | Dielectric Withstand Voltage (V) ^⑤ |
|----------------|------------------------------------|------------------------------|---------------------|-------|---------------------------------|------|-----------------------------------|--|---|---|
| | | Supply Voltage (V) | Dropout Voltage (V) | | Pickup Voltage (V) Max. | VA | Minimum UVR Response ^③ | Initiation Circuit Breaker Contact Separation ^④ | | |
| 02/02K | 12 | 12 | 4.2 | 8.4 | 10.2 | 2.3 | 5 | 46 | 77 | 1024 |
| 03/03K | 24 | 24 | 8.4 | 16.8 | 20.4 | 3.1 | 5 | 46 | 77 | 1048 |
| 05/05K | 48–60 | 48 | 21.0 | 33.5 | 40.8 | 3.4 | 5 | 46 | 77 | 1120 |
| | | 60 | 21.0 | 33.5 | 40.8 | 6.0 | 5 | 46 | 77 | 1120 |
| 08/08K | 110–127 | 110 | 44.5 | 77.0 | 93.5 | 3.3 | 5 | 46 | 77 | 1254 |
| | | 120 | 44.5 | 77.0 | 93.5 | 3.6 | 5 | 46 | 77 | 1254 |
| | | 127 | 44.5 | 77.0 | 93.5 | 3.8 | 5 | 46 | 77 | 1254 |
| 11/11K | 208–240 | 208 | 84.0 | 145.6 | 176.8 | 4.2 | 5 | 46 | 77 | 1480 |
| | | 220 | 84.0 | 145.6 | 176.8 | 6.6 | 5 | 46 | 77 | 1480 |
| | | 240 | 84.0 | 145.6 | 176.8 | 7.2 | 5 | 46 | 77 | 1480 |
| 29/29K | 380–500 | 380 | 168.0 | 266.0 | 323.0 | 3.8 | 5 | 46 | 77 | 2000 |
| | | 415 | 168.0 | 266.0 | 323.0 | 8.3 | 5 | 46 | 77 | 2000 |
| | | 440 | 168.0 | 266.0 | 323.0 | 8.8 | 5 | 46 | 77 | 2000 |
| | | 480 | 168.0 | 266.0 | 323.0 | 9.6 | 5 | 46 | 77 | 2000 |
| | | 500 | 168.0 | 266.0 | 323.0 | 10.0 | 5 | 46 | 77 | 2000 |

R-Frame DC Undervoltage Release Mechanism (Handle Reset) Ratings ^{①②}

| Catalog Suffix | Application Ratings Voltage (V) | Electrical Operating Ratings | | | Approximate Operating Time (ms) | | | | Maximum Circuit Breaker Contact Opening | Dielectric Withstand Voltage (V) ^⑤ |
|----------------|------------------------------------|------------------------------|---------------------|-------|---------------------------------|-----|-----------------------------------|--|---|---|
| | | Supply Voltage (V) | Dropout Voltage (V) | | Pickup Voltage (V) Max. | VA | Minimum UVR Response ^③ | Initiation Circuit Breaker Contact Separation ^④ | | |
| 20/20K | 12 | 12 | 4.2 | 8.4 | 10.2 | 3.4 | 5 | 46 | 77 | 1024 |
| 21/21K | 24 | 24 | 8.4 | 16.8 | 20.4 | 4.3 | 5 | 46 | 77 | 1048 |
| 23/23K | 48–60 | 48 | 21.0 | 33.5 | 40.8 | 4.8 | 5 | 46 | 77 | 1120 |
| | | 60 | 21.0 | 33.5 | 40.8 | 7.2 | 5 | 46 | 77 | 1120 |
| 26/26K | 110–127 | 110 | 43.8 | 77.0 | 93.5 | 3.3 | 5 | 46 | 77 | 1250 |
| | | 120 | 43.8 | 77.0 | 93.5 | 3.6 | 5 | 46 | 77 | 1250 |
| | | 125 | 43.8 | 77.0 | 93.5 | 3.8 | 5 | 46 | 77 | 1250 |
| 28/28K | 220–250 | 220 | 87.5 | 154.0 | 187.0 | 6.6 | 5 | 46 | 77 | 1500 |
| | | 250 | 87.5 | 154.0 | 187.0 | 7.5 | 5 | 46 | 77 | 1500 |

Notes

- ① Endurance: 500 electrical operations plus 2500 mechanical operations.
 ② Pigtail wire size: 18 AWG (0.82 mm²). Leads are orange and brown.
 ③ UVR will override a momentary voltage dip up to the response time shown.
 ④ Unlatching occurs 1 millisecond before circuit breaker contacts begin to separate.
 ⑤ For 1 minute.

Series C External Accessories

2



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External Accessories

Product Overview

End Cap Kit

The end cap kit slides onto the line or load conductor of the circuit breaker and acts as a threaded adapter for the conductor to accept a ring terminal or other bolt-on connector. The end cap kit is available with English and metric thread sizes. (Field installation only.) Listed per UL File E7819.

Keeper Nut

The keeper nut slides onto the line or load conductor of the circuit breaker and acts as a threaded adapter for the conductor to accept a ring terminal or other bolt-on connector. The keeper nut is available with English and metric thread sizes. Screws and washers are supplied by customer. (Field installation only.) Listed per UL File E7819.

L-, M-, N-Frames

Not required. Terminals are threaded.

J-Frame Plug Nut

The plug nut is used in applications where screw-connected ring-type terminals are preferred to connect cables to circuit breaker conductors. The plug nut is press-fit into the opening in the circuit breaker terminal conductor. Screws and washers are supplied by customer.

Terminal Adapter**Control Wire Terminal Kit**

The control wire terminal kit provides a means to tap off control power from a main disconnect, using the provided male end of a quick disconnect.

For use with steel or stainless steel terminals only.

Note: Terminal Kits contain one terminal for each pole and one terminal cover.

Multiwire Connectors

Eaton's field-installed multiwire connectors for the load side (OFF) end terminals are used to distribute the load from the circuit breaker to multiple devices without the use of separate distribution terminal blocks.

Multiwire lug kits include mounting hardware, insulators and tin-plated aluminum connectors to replace three mechanical load lugs. UL listed as used on the load side (OFF) end.

Terminal Shields

Terminal shields provide protection against accidental contact with live line side terminations. Terminal shields are fabricated from high dielectric insulating material and fasten over the front terminal access openings. Small openings in the shields provide limited access to the terminals for tightening connectors. (Field installation only.)

Rear Fed Terminals.

Rear fed terminals allow the cable to connect to the breaker from the back instead of the top. Terminal shields or interphase barriers are included with each rear fed terminal kit (depending on frame size). When catalog number starts with a 3, it indicates a kit with three terminals in each kit. Catalog number beginning with a TA indicates one terminal.

Terminal End Covers

The terminal end covers are designed for use in motor control center applications where, because of confined spaces, line side conductors are normally custom fitted. The molded end covers are made of high dielectric glass-polyester and slide over the line ends of the circuit breaker. Close fitting conductor openings are molded into the end covers. The end cover and circuit breaker case fit together to form terminal compartments that isolate discharged ionizing gases during circuit breaker tripping. Terminal end covers are available with two conductor opening diameters, 0.25-inch (6.4 mm) and 0.41-inch (10.4 mm), and are listed per UL File E7819. (Field installation only.)

Interphase Barriers

The interphase barriers provide additional electrical clearance between circuit breaker poles for special termination applications. The barriers are high dielectric insulating plates that are installed in the molded slots between the terminals. (Field installation only.) Two per package.

Base Mounting Plate

Suitable for mounting six single-pole circuit breakers.

DIN Rail Adapter

For use with standard 35 mm DIN rail such as, 35 x 7.5 or 35 x 15 mm per DIN EN50022.

Adapter mounting screws included are for use with two- and three-pole circuit breakers. Adapters for single-pole circuit breakers clip into the base molding.

Key Operated Attachment**Lock Dog (Non-Padlockable)****Non-Padlockable Handle Block**

The non-padlockable handle block secures the circuit breaker handle in either the ON or OFF position. (Trip-free operation allows the circuit breaker to trip when the

handle block holds the circuit breaker handle in the ON position.) The device is positioned over the circuit breaker handle and secured by a setscrew to deter accidental operation of the circuit breaker handle. Listed per UL File E7819. (Field installation only.)

Padlockable Handle**Padlockable Handle Lock**

The device is positioned in the cover opening to prevent handle movement. Will accommodate one 5/16-inch (8 mm) padlock.

Snap-on Padlockable Handle Lock Hasp

The snap-on padlockable handle lock allows the handle to be locked in the OFF or ON position. (Trip-free operation allows the circuit breaker to trip when the handle lock holds the circuit breaker handle in the ON position.) This device was designed for use on the single-pole circuit breaker, but may be used on one-, two-, three- and four-pole styles. The handle lock snaps onto the escutcheon area of the handle with an optional retaining screw for added secureness. The handle lock will accommodate one padlock with a 1/4-inch (6.4 mm) shackle. Listed per UL File E7819. (Field installation only.)

Padlockable Handle Lock Hasp

The padlockable handle lock hasp allows the handle to be locked in the ON or OFF position. (Trip-free operation allows the circuit breaker to trip when the handle lock holds the circuit breaker handle in the ON position.) The hasp mounts on the circuit breaker cover within the trimline. The cover is predrilled on both sides of the operating handle so that the hasp can be mounted on either side of the handle. The hasp will accommodate up to three padlocks with 1/4-inch (6.4 mm) shackles, one per circuit breaker. Listed per UL File E7819. (Field installation only.)

Cylinder Lock

The cylinder lock internally blocks the trip bar in the tripped position to prevent the circuit breaker from being switched to ON. The cylinder lock is factory installed in the left pole only of the circuit breaker cover. Other internally mounted accessories cannot be installed in the same pole as the cylinder lock. (Factory installation only.)

Key Interlock Kit (Lock Not Included)

The key interlock is used to externally lock the circuit breaker handle in the OFF position. When the key interlock is locked, an extended deadbolt blocks movement of the circuit breaker handle. Uniquely coded keys are removable only with the deadbolt extended. Each coded key controls a group of circuit breakers for a given specific customer installation.

The key interlock assembly is Underwriters Laboratories listed for field installation under UL File E7819 and consists of a mounting kit and a purchaser supplied deadbolt lock. The mounting kit comprises a mounting plate, which is secured to the circuit breaker cover in either the left- or right-pole position, key interlock mounting screws, and a wire seal. Specific mounting kits are required for individual key interlock types.

Sliding Bar Interlock

The sliding bar interlock provides mechanical interlocking between two adjacent three-pole circuit breakers. It is installed on the enclosure cover between the circuit breakers. When the sliding bar interlock handle is moved from one side to the other, a bar extends to alternately block movement of the circuit breaker handles and prevents both circuit breakers from being switched to ON at the same time. Sliding bar interlocks are not UL listed. (Field installation only.)

Walking Beam Interlock

The walking beam Interlock provides mechanical interlocking between two adjacent circuit breakers of the same pole configuration. The walking beam interlock mounts on a bracket behind and between the circuit breakers. A plunger on each end of the beam is inserted through an access hole in the back plate and base of each circuit breaker. The walking beam interlock prevents both circuit breakers from being switched ON at the same time. If a walking beam interlock is installed, the wiring troughs in the back of the circuit breaker case are blocked by the plungers and cannot be used for cross wiring. Factory modified circuit breakers are required for this application. UL File E38116.

Electrical Operator

The electrical (solenoid) operator is a single solenoid mechanism that enables local and remote circuit breaker ON, OFF, and reset switching. The electrical operator is mounted on the circuit breaker cover within the trimline of the circuit breaker. The electrical operator uses a unique bi-stable latch that allows the device to operate using one solenoid. The accessory provides high-speed switching with a maximum operating time of 5 cycles (80 mS), making it suitable for generator synchronizing applications.

Means are provided for remote electrical operation and for local manual operation. A special slide includes provisions for padlocking the circuit breaker handle in the OFF position. The slide will accept three padlock shackles with a maximum diameter of 1/4-inch (6.4 mm) each. An interlock electrically disconnects the solenoid when the electrical operator cover is removed. The rating data tables provide electrical rating data for the electrical (solenoid) operator.

The electrical (motor) operator allows the circuit's breaker to be opened, closed or reset remotely. It also has a lock-off capability and provisions for manual operation.

The electrical (motor) operator contains a reversible motor connected to a ball screw. The ball screw drives the circuit breaker handle. Limit switches and relays are used to control the motor.

Plug-In Adapters

Plug-in adapters simplify installation and front removal of circuit breakers. Individual line and load plug-in adapters are available for rear connection applications on two-, three-, and four-pole circuit breakers. Common mounting plates for line- and load-end adapters are available.

One plug-in adapter kit is required for line-end and one for load-end.

Plug-in adapters are UL approved unless otherwise noted.

Rear Connecting Studs

Rear connecting studs are available in several sizes to accommodate specific fixed-mounted circuit breaker applications.

Each rear connecting stud assembly consists of one stud and one tube. To maintain proper clearances between poles, select alternate long and short stud assemblies for circuit breakers with more than one pole. One assembly is required for line-end and one for load-end of each pole. Tubes must be ordered separately. Connecting studs are available only with English thread sizes.

Note: Not UL listed.

Panelboard Connecting Straps

Panelboard connecting straps are used to connect the circuit breaker terminals to the panelboard bus. The panelboard connecting straps are available with various ratings for outside and center poles. (Field installation only.)

Panelboard connecting straps are available to meet the needs of most standard panelboard applications. Style numbers for mounting brackets for CDP panelboard installations are also included.

Note: Not UL listed. Refer to panelboard manufacturer for compatibility.

Type LFD Current Limiter

The LFD current limiter is an accessory that bolts to the load end of a standard FDB or FD thermal-magnetic circuit breaker, providing 200,000 A interrupting capacity at up to 600 Vac. LFD current limiters for thermal-magnetic and electronic circuit breakers are listed with Underwriters Laboratories under File E47239.

Ground Fault Alarm Unit

The ground fault alarm unit is a remotely mounted device with a combination indicating light/test button that will light when the breaker trips or alarms on ground fault. The ground fault alarm unit requires a separate 120 Vac power source to power the light and the internal relay, which has 1NO and 1NC contacts for remote indication. The ground fault alarm unit can be panel mounted for ordering with an optional face mounting bracket. For use on Digitrip 310 only, K- through N-Frame.

IQ Energy Sentinel

The IQ Energy Sentinel is a highly accurate, microprocessor-based, breaker-mounted device designed to monitor power and energy readings. It represents an alternative to watt meters, watt-hour meters, and watt demand meters. Key advantages include savings in space, lower installation costs, and remote monitoring capability.

The IQ Energy Sentinel mounts on the load side of a Series C F-Frame (150 ampere) circuit breaker. It can be applied on three-phase, four-wire systems, or single-phase, three-wire systems with voltage connected through Phases A and C.

For more information, see Descriptive Bulletin 8178.

Potential Transformer Module

The potential transformer module is required for the Digitrip OPTIM 1050 to provide a voltage input to allow the trip unit to monitor power and energy as well as power factor. The potential transformer module is a 6 VA transformer with a primary voltage input of up to 600 volt line to line. Three 0.1 ampere fuses are provided on the primary of the transformer and can be used for isolation purposes during dielectric testing. The device is normally panel mounted and can feed up to 16 OPTIM trip units.

Solid-State (Electronic) Portable Test Kit

The solid-state (electronic) portable test kit provides verification of performance of all ratings of Digitrip 310 electronic trip units installed in circuit breakers while in service under varying load and/or phase imbalance. The test kit operates on 120-volt, 50/60 Hz power; it includes complete instructions and test times for testing long time, short time/instantaneous operation and optional ground fault operation of the circuit breaker.

Breaker Interface Module (BIM)

The Breaker Interface Module (BIM) is a panel mounted user interface device that is mounted on the front of an electrical assembly or at a remote location. The BIM is used to access, configure, test and display information for OPTIM trip units and other devices. The BIM consists of four display windows, eight function buttons, 18 LEDs, and a graphical time/current curve to provide breaker status, operational information, protection status and energy monitoring. A 24 Vdc power supply is required to provide power to the BIM. This is supplied by the switchboard builder to Eaton's specifications. The BIM is a member of Eaton's PowerNet family of communicating devices that connects OPTIM trip units, Digitrip RMS 810/910 trip units and energy sentinels as a subnetwork system. The BIM can also be connected to a main network via a PONI module to PowerNet software.

Digitrip OPTIMizer

The Digitrip OPTIMizer is a hand-held programmer that is used to access, configure, test and display information from OPTIM trip units. The OPTIMizer plugs into the front of an OPTIM trip unit via an eight-pin telephone jack and is powered by a nine-volt battery or the auxiliary power module. One highlighted feature is the "Copy" and "Download" commands.

Setting up multiple OPTIM trips can be finished in minutes and with no errors. An Auxiliary Power Module connection provides a trip test when control power is not present at the breaker. The OPTIMizer is supplied as a standard package to include the programmer, the eight-pin connection cord, battery and carrying case. The auxiliary power module is optional.

Auxiliary Power Module

The auxiliary power module is a power supply requiring 120 Vac input at 50 or 60 Hz that provides a 32 Vdc output. The auxiliary power module provides control power for testing an OPTIM trip unit when other means of control power is not available or for continuous OPTIMizer operation versus temporary with a battery. The auxiliary power module connects into the top of the Digitrip OPTIMizer via a keyed receptacle. The main application for the auxiliary power module would be for the testing of a standalone non-communicating OPTIM breaker that ordinarily would not have control power.

Cause of Trip Display/Remote Mount Cause of Trip Display

The Cause of Trip Display can be field-installed on any Digitrip RMS 310+ trip unit. The device provides breaker information through an LCD screen, such as cause of trip, phrase current, ground current and low loads. The display is ideal for troubleshooting common trips such as ground fault, long delay, and instantaneous/short delay. The DIGIVIEW version will provide a local display at the breaker without additional wiring by connecting directly onto the trip unit. The DIGIVIEWR06 version has a 6 foot cable that allows users to mount the display on the outside of an enclosure door and connect to the trip unit that is contained inside the enclosure.

Cause of Trip LED Module

The Cause of Trip LED Module can be field-installed on any Digitrip RMS 310+ trip unit. The device provides a cause of trip indication via LED. The Cause of Trip LED Module connects directly onto the trip unit. When the breaker trips, the module indicates the cause of trip (long delay, short delay, instantaneous and ground) via LED indication. The module is reset after the breaker is reset.

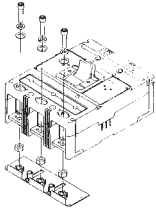
Note: The OPTIMizer can work off of 32 Vdc control power, although 24 Vdc is the standard on OPTIM breakers.

Product Selection

2

Termination Hardware—End Cap Kit

End Cap Kit

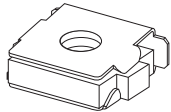


End Cap Kit

| Thread Type | Thread Size | Catalog Number |
|----------------------------------|-------------|----------------|
| Two-Pole F-Frame (225A) | | |
| Imperial | 10–32 | KPEK12 |
| Metric | M–5 | KPEKM12 |
| Three-Pole F-Frame (225A) | | |
| Imperial | 10–32 | KPEK1 |
| Metric | M–5 | KPEKM1 |
| Four-Pole F-Frame (225A) | | |
| Imperial | 10–32 | KPEK14 |
| Metric | M–5 | KPEKM14 |
| Three-Pole J-Frame | | |
| Imperial | 0.312–18 | KPEK2 |
| Metric | M–8 | KPEKM2 |
| Four-Pole J-Frame | | |
| Imperial | 0.312–18 | KPEK24 |
| Metric | M–8 | KPEKM24 |
| Three-Pole K-Frame | | |
| Imperial | 0.312–18 | KPEK3 |
| Metric | M–8 | KPEKM3 |
| Four-Pole K-Frame | | |
| Imperial | 0.312–18 | KPEK34 |
| Metric | M–8 | KPEKM34 |
| Three-Pole L-Frame | | |
| Imperial | 0.312–18 | KPEK4 |
| Metric | M–8 | KPEKM4 |
| Four-Pole L-Frame | | |
| Imperial | 0.312–18 | KPEK44 |
| Metric | M–8 | KPEKM44 |

Termination Hardware—Keeper Nut

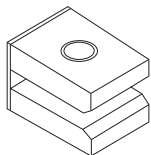
F-Frame Keeper Nut



F-Frame Keeper Nut

| Thread Type | Thread Size | Catalog Number Package of 12 (Priced Individually) |
|-------------|-------------|--|
| Imperial | 10–32 | KPR1A |
| Metric | M–5 | KPR1AM |

K-Frame Keeper Nut

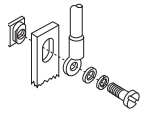


K-Frame Keeper Nut

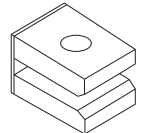
| Thread Type | Thread Size | Line/Load End | Catalog Number Package of 3 |
|-------------|-------------|---------------|--------------------------------|
| Imperial | 0.375–16 | Line | KPR3A |
| | | Load | KPR3B |
| Metric | M–8 | Line | KPR3AM |
| | | Load | KPR3BM |

Note

L-, M-, N-Frames not required. Terminals are threaded.

Termination Hardware**J-Frame Plug Nut****J-Frame Plug Nut**

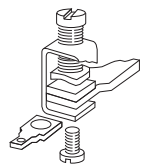
| Thread Type | Thread Size | Catalog Number Package of 6 |
|-------------|-------------|--------------------------------|
| Imperial | 0.250–20 | PLN2 |
| Metric | M–6 | PLN2M |

K-Frame Terminal Adapter**K-Frame Terminal Adapter** ①

| Line/Load End | Catalog Number |
|---------------|----------------|
| Line and load | TAD3 |

F-Frame Ordering Information

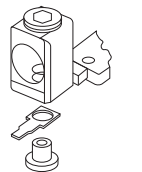
Terminals must be ordered separately. Priced individually.

F-Frame Kit**F-Frame Control Wire Terminal Kit** ②

| Description | Maximum Amperes | Catalog Number |
|--|-----------------|----------------|
| Package of 12 control wire terminal tangs. | 150 | FCWTK |
| | 225 | FCWTK225 |

J- and K-Frame Ordering Information

Terminals must be ordered separately. Priced individually.

J- and K-Frame Kit**J- and K-Frame Control Wire Terminal Kit**

| Description | Catalog Number |
|--|----------------|
| Package of 12 control wire terminal tangs. | KCWTK |

L-Frame Control Wire Terminal Kit

| AWG Wire Range/Number Conductors | Metric Wire Range mm ² | Catalog Number |
|----------------------------------|-----------------------------------|----------------|
| Al/Cu 3/0–350 kcmil (2) | 95–150 | TA602LDCW ③ |
| Cu 250–350 kcmil (2) | 120–250 | T602LDCW ③ |
| Al/Cu 400–500 kcmil (2) | 185–240 | 2TA603LDCW ④⑤ |
| Al/Cu 400–500 kcmil (2) | 185–240 | 3TA603LDCW ④⑥ |
| Al/Cu 400–500 kcmil (2) | 185–240 | 4TA603LDCW ④⑦ |

Notes

- ① K-Frame terminal adapter for use in replacing LB/DA breakers.
- ② Not for use with T250KB terminals.
- ③ Individually packed.
- ④ Terminal kits contain one terminal for each pole and one terminal cover.
- ⑤ Two-pole kit.
- ⑥ Three-pole kit.
- ⑦ Four-pole kit.

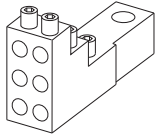
Termination Hardware

2

G-Frame Control Wire Terminal

| Description | Catalog Number | Catalog Number |
|-----------------------------------|----------------|----------------|
| Control wire terminal (kit of 12) | 5652B38G01 | GCWTK |

Multiwire Connectors



Multiwire Connectors Ordering Information (Package of 3)

| Maximum Amperes | Wires per Terminal | Wire Size Range AWG Cu | Kit Catalog Number ^① |
|-----------------------------|--------------------|------------------------|---------------------------------|
| G-Frame ^② | | | |
| 100 | 3 | 14–2 | 3TA100G3K |
| | 6 | 14–6 | 3TA100G6K |
| F-Frame | | | |
| 225 | 3 | 14–2 | 3TA150F3K |
| | 6 | 14–6 | 3TA150F6K |
| J-Frame | | | |
| 250 | 3 | 14–2 | 3TA250J3K |
| | 6 | 14–6 | 3TA250J6K |
| K-Frame | | | |
| 400 | 3 | 14–2/0 | 3TA400K3K |
| | 6 | 14–3 | 3TA400K6K |

Rear Fed Terminals

| Frame | Maximum Amperes | Wire Size Range AWG Cu | Catalog Number ^① |
|-------|-----------------|------------------------|-----------------------------|
| FD | 150 | 14–4/0 | TA150FDRF |
| | 150 | 14–4/0 | 3TA150FDRF |
| | 225 | 6–300 kcmil | TA225FDRF |
| | 225 | 6–300 kcmil | 3TA225FDRF |
| KD | 400 | 250–500 kcmil | TA350KRF |
| | 400 | 250–500 kcmil | 3TA350KRF |
| MDL | 800 | 3/0 MAX (3) | TA800MDLRF |
| | 800 | 3/0 MAX (3) | 3TA800MDLRF |

Base Mounting Hardware

Ordering Information

Hardware for surface mounting of circuit breakers is supplied only on request. Hardware consists of mounting screws and lockwashers. Order hardware for circuit breaker pole configurations as required.

Mounting Hardware

| Screw Length in Inches (mm) | Catalog Number |
|--------------------------------------|----------------|
| G-Frame | |
| 0.138–32 x 2.63 (3.5 x 66.7 mm) Std. | 624B375G23 |
| 0.138–32 x 3.00 (3.5 x 76.2 mm) | 8703C80G05 |

Notes

- ^① When catalog number starts with a 3, it indicates a kit with three terminals in each kit. Catalog number beginning with a TA indicates one terminal.
- ^② GD breakers require special tapping for multiwire lugs, as described in the IL or use with standard aluminum collars.

Imperial Thread Mounting Hardware

| Number of Poles | Description | Type of Mounting | Catalog Number |
|----------------------|---|------------------|-------------------|
| F-Frame | | | |
| 1 | 0.164-32 x 3.188-inch pan-head steel screws, lockwashers and clamps | Individual | 624B375G01 |
| | | Group ① | 624B375G02 |
| 2 | 0.164-32 x 1.5-inch pan-head steel screws and lockwashers | Individual | 4218B80G01 |
| 3, 4 | 0.164-32 x 1.5-inch pan-head steel screws and lockwashers | Individual | BMH1 |
| J-Frame | | | |
| 2, 3, 4 | 0.250-20 x 2.75 inch pan-head steel screws and lockwashers | Individual | BMH2 |
| K-Frame | | | |
| 2, 3, 4 | 0.250-20 x 1.5 inch pan-head steel screws and lockwashers | Individual | BMH3 |
| L-Frame | | | |
| 2, 3, 4 | 0.250-20 x 1.5 inch filister-head steel screws and lockwashers and flat washers | Individual | BMH4 |
| M-Frame | | | |
| 2, 3 | 0.3125-18 x 1.25 inch filister-head steel screws and lockwashers and flat washers | Individual | BMH5 |
| N-Frame | | | |
| 2, 3, 4 | 0.3125-18 x 1.25 inch pan-head steel screws and lockwashers | Individual | BMH5 |
| R-Frame | | | |
| Supplied by customer | | | |

Metric Thread Mounting Hardware

| Number of Poles | Description | Type of Mounting | Catalog Number |
|----------------------|---|------------------|-------------------|
| F-Frame | | | |
| 1 | M4-0.7 x 80 mm pan-head steel screws, lockwashers, and clamps | Individual | 4218B80G09 |
| | | Group ① | 4218B80G10 |
| 2 | M4-0.7 x 38 mm pan-head steel screws and lockwashers | Individual | 4218B80G11 |
| 3, 4 | M4-0.7 x 38 mm pan-head steel screws and lockwashers | Individual | BMH1M |
| J-Frame | | | |
| 2, 3, 4 | M6-0.7 x 70 mm pan-head steel screws and lockwashers | Individual | BMH2M |
| K-Frame | | | |
| 2, 3, 4 | M6-0.7 x 38 mm pan-head steel screws and lockwashers | Individual | BMH3M |
| L-Frame | | | |
| 2, 3 | — | Individual | BMH4M |
| M-Frame | | | |
| 2, 3 | — | Individual | BMH4M |
| N-Frame | | | |
| 2, 3 | — | Individual | BMH5M |
| R-Frame | | | |
| Supplied by customer | | | |

Note

① One set of hardware for two circuit breakers.

Terminal Shields

2

G-Frame Terminal Shield

| Number Units in Package | Catalog Number |
|-------------------------|----------------|
| 10 | GTSK3 |

F-Frame



F-Frame Terminal Shield

| Number of Poles | Location | Standard (Package of 10) (Priced Individually) | Special—For Use When Electrical Operator is Mounted on Circuit Breaker |
|-----------------|----------|---|---|
| | | Catalog Number | Catalog Number |
| 1 | Line | 625B229G06 | — |
| 2 | Line | 625B229G07 | — |
| 3 | Line | 625B229G08 | 4210B95G01 |
| 4 | Line | 625B229G09 | 4210B95G02 |

J-Frame



J-Frame Terminal Shield

| Number of Poles | Location | Catalog Number (Package of 10) |
|-----------------|----------|-----------------------------------|
| 2, 3 | Line End | 1266C07G01 |
| 4 | Line End | 6631C01G01 |
| 2, 3 | Load End | 6641C16G01 |
| 4 | Load End | 6641C16G02 |

K-Frame



K-Frame Terminal Shield

| Number of Poles | Location | Catalog Number (Package of 10) |
|-----------------|----------|--------------------------------|
| 2, 3 | Line | TS33LN |
| 4 | Line | TS34LN |
| 3 | Load | TS33LD |

L-Frame Terminal Shield

| Catalog Number (Package of 1) |
|-------------------------------|
| 314C420G05 |

M-Frame Terminal Shield

| Catalog Number (Package of 1) |
|-------------------------------|
| 208B966G01 |

N-Frame Terminal Shield

| Catalog Number (Package of 1) |
|-------------------------------|
| NTS3K |

Terminal End Covers

Ordering Information

The terminal end cover is available for three-pole circuit breakers only. Two conductor opening sizes are available. Specify quantity (one per circuit breaker) when ordering.

F-Frame



F-Frame Terminal End Covers

| Conductor Opening Diameter in Inches (mm) | Catalog Number |
|---|----------------|
| 0.25 (6.35 mm) | TEC1 |
| 0.41 (10.41 mm) | TEC2 |

Interphase Barriers

Ordering Information

Two per package.

Interphase Barrier



Interphase Barriers

| Frame | Catalog Number |
|-------|----------------|
| F | IPB1 |
| J, K | IPB3 |
| L | IPB4 |
| M | IPB4 |
| N | IPB5 |

Base Mounting Plate

Base Mounting Plate



Base Mounting Plate G-Frame GD/GHC

| Number of Units in Package | Catalog Number |
|----------------------------|----------------|
| 1 | 207B513G01 |

DIN Rail Adapter

DIN Rail Adapter



DIN Rail Adapter G-Frame GD/GHC

| Number of Poles | Number of Units in Package | Catalog Number |
|-----------------|----------------------------|----------------|
| 1, 2 | 10 | 1225C79G01 |
| 3 | 10 | 1225C79G02 ① |

All Metal DIN Rail Adapter G-Frame GD/GHC

| Number of Poles | Number of Units in Package | Catalog Number |
|-----------------|----------------------------|----------------|
| 3 | 1 | EGGDIN |

Key Operated Attachment

Key Operated Attachment



Key Operated Attachment G-Frame GD/GHC

| Number of Units in Package | Catalog Number |
|----------------------------|----------------|
| 10 | GKOA |

Note

① For use on three-pole breakers only.

2

Lock Dog (Non-Padlockable)

Lock Dog (Non-Padlockable)



Lock Dog (Non-Padlockable) G-Frame GD/GHC/GHB/GMCP

| Number of Units in Package | Catalog Number |
|----------------------------|----------------|
| 1 | 1294C01H01 |

Handle Ties

Handle Tie—Series C, F-Frame

| Number of Poles | Number of Units in Package | Catalog Number |
|-----------------|----------------------------|----------------|
| 2 | 10 | HTBFD2P |
| 3 | 10 | HTBFD3P |

Handle Tie—Series C, G-Frame

| Number of Poles | Number of Units in Package | Catalog Number |
|-----------------|----------------------------|----------------|
| 2 | 10 | HTBGD2P |
| 3 | 10 | HTBGD3P |

Non-Padlockable Handle Block

Non-Padlockable Handle Block



Non-Padlockable Handle Block

| Frame | Catalog Number |
|---------|----------------|
| F | LKD1 |
| J, K | LKD3 |
| L, M, N | LKD4 |

Padlockable Handle

Padlockable Handle



Padlockable G-Frame GD/GHC/GHB

| Number of Units in Package | Catalog Number ^① |
|----------------------------|-----------------------------|
| 10 | 1223C77G03 |
| 10 | 1223C77G05 ^② |
| 10 | 1223C77G06 ^② |

Padlockable Handle Lock

Padlockable Handle Lock



Padlockable Handle Lock

| Frame | Catalog Number |
|-------|----------------|
| G | GPHBOFF |
| J, K | PHB3 |

Snap-On Padlockable Handle Lock Hasp

Snap-On Padlockable Handle Lock Hasp



Snap-On Padlockable Handle Lock Hasp

| Frame | Catalog Number |
|-------|----------------|
| F | PHL1 |

Notes

- ① Accepts 0.285 Lock Shank.
- ② Padlockable in the OFF position only.

Padlockable Handle Lock Hasp**Padlockable Handle Lock Hasp****Padlockable Handle Lock Hasp**

| Description | Catalog Number |
|-------------------------------------|-------------------|
| F-Frame | |
| Single-pole breakers | PHL1 |
| Two-, three- and four-pole breakers | PLK1 |
| For left side mounting | PLK1LOFF |
| For right side mounting | PLK1ROFF |
| J, K-Frames | |
| Two-, three- and four-pole breakers | PLK3 |
| For left side mounting | PLK3LOFF ① |
| For right side mounting | PLK3ROFF ① |
| L-Frame (Side Mounted) | |
| Lock ON or OFF | HLK4 |
| Lock OFF only (left-hand mount) | HLK4LOFF ① |
| L-Frame (Top Mounted) | |
| Lock ON or OFF | HLK4S |
| Lock OFF only | HLK4SOFF ① |
| M-Frame | |
| Lock ON or OFF | HLK4 |
| Lock OFF only (left-hand mount) | HLK4LOFF ① |
| M-Frame (Vertical Mounting) | |
| Lock ON/OFF | HLK4S |
| Lock OFF only | HLK4SOFF |
| N-Frame | |
| Side mounted | PLK5 |
| Top mounted (ON/OFF) | PLK5S |
| Top mounted (OFF only) | PLK5SOFF ① |
| R-Frame | |
| Lock ON/OFF | HLK6 |
| Lock OFF only | HLK6OFF ① |

Cylinder Lock**Cylinder Lock****Cylinder Lock**

| Frame | Catalog Number |
|---------|----------------------|
| F, J, K | Order by description |

Note

- ① For padlockable handle lock hasp to padlock handle in OFF position only, order either catalog number.

Key Interlock Kit**Ordering Information**

Key interlock kits contain the necessary interface and hardware to install a trapped key interlock from one of the listed manufacturers. Key interlocks are not installed or supplied as part of the breaker, and must be obtained separately from the lock manufacturer or through the manufacturer of the equipment on which the breaker will be installed. Select the mounting kit catalog number to match the type of lock used.

Key Interlock Kit**Key Interlock Kit (Trapped Key Interlock)**

| Lock Manufacturer | Lock Type | Bolt Projection in Withdrawn Position in Inches (mm) | Kit Catalog Number |
|-------------------------|-----------|--|--------------------|
| F-Frame | | | |
| Superior | B-4003-1 | 0.38 (9.5) | KYK1 |
| Kirk® | F | 0.38 (9.5) | KYK1 |
| Castell ① | K or QK | 0.38 (9.5) | CTK1 |
| J, K-Frames | | | |
| Superior | B-4003-1 | 0.38 (9.5) | KYK3 |
| Kirk | F | 0.38 (9.5) | KYK3 |
| Castell ① | K or QK | 0.38 (9.5) | CTK3 |
| L-, M-, N-Frames | | | |
| Superior | B-4003-1 | 0.38 (9.5) | KYK4 |
| Kirk | F | 0.38 (9.5) | KYK4 |
| Castell ① | K or QK | 0.38 (9.5) | CTK4 |
| R-Frame | | | |
| Superior | B-4003-1 | 1.0 (25.4) | KYK6 |
| Kirk | F | 1.0 (25.4) | KYK6 |
| Castell ① | K or QK | 1.0 (25.4) | CTK6 |
| JG-Frame | | | |
| Superior | B-4003-1 | 0.38 (9.5) | KYKJG |
| Kirk | F | 0.38 (9.5) | KYKJG |
| Castell ① | K or QK | 0.38 (9.5) | CTKJG |
| LG-Frame | | | |
| Superior | B-4003-1 | 0.38 (9.5) | KYKLG |
| Kirk | F | 0.38 (9.5) | KYKLG |
| Castell ① | K or QK | 0.38 (9.5) | CTKLG |

Note

① When ordering Castell Interlock, it is necessary for customer to specify that the mounting bolt holes must be 10 mm in diameter

Sliding Bar Interlock**Ordering Information**

The sliding bar interlock is available for mounting between two adjacent three-pole circuit breakers with circuit breakers centerline

spacing as indicated in table and enclosure front panel thickness of 1/8 or 3/16 inch (3.2 or 4.8 mm). (For field installation only.)

Sliding Bar Interlock**Sliding Bar Interlock**

| Frame | Centerline Spacing in Inches (mm) | Catalog Number |
|-------|-----------------------------------|----------------|
| F | 4.19 (106.4) | SBK1 |
| J | 4.38 (111.3) | SBK2 |
| K | 5.75 (146.0) | SBK3 |
| L, M | 8.50 (215.9) | SBK4 |
| N | 8.50 (215.9) | SBK5 |

Walking Beam Interlock**Ordering Information**

The walking beam interlock is available for mounting between two adjacent circuit breakers spaced 1/4-inch (6.4 mm) apart and having the same pole configuration. The two circuit breakers must be factory modified to accept the walking beam interlock assembly (suitable for use with either two-, three- or four-pole circuit breakers).

With properly modified circuit breakers, the walking beam interlock is suitable for field installation. Order circuit breakers specifying modification for walking beam (20% price adder) and select walking beam interlock from table below. Circuit breakers and walking beam interlock are boxed and shipped separately.

Walking Beam Interlock**Walking Beam Interlock**

| Frame | Catalog Number |
|-------|----------------|
| F | WBL1 |
| K | WBL3 |
| L, M | WBL4A |
| N | WBL5 |
| R ① | WBL6 |

Note

① Three-pole only.

Electrical Operator

2

F-Frame Electrical (Solenoid) Operator

| Voltage | Frequency | Terminal Block | 18-Inch (457.2 mm) Pigtail Lead |
|---------|-----------|----------------|---------------------------------|
| | | Catalog Number | Catalog Number |
| 120 | AC | EOP1T07 | EOP1P07 |
| 240 | AC | EOP1T11 | EOP1P11 |

F-Frame Electrical (Motor) Operator ^①

| Voltage | Frequency | 18-Inch (457.2 mm) Pigtail Lead |
|---------|-------------|---------------------------------|
| | | Catalog Number |
| 120 | 50/60 Hz AC | MOPFD120C |
| 24 | DC | MOPFD24D |
| 125 | DC | MOPFD120C |
| 208–240 | 50/60 Hz | MOPFD240C |
| 220–250 | DC | MOPFD240C |

J-Frame Electrical (Solenoid) Operator

| Operating Voltage | Frequency | Terminal Block |
|-------------------|-------------|----------------|
| | | Catalog Number |
| 120 | 50/60 Hz AC | EOP2T07 |
| 240 | 50/60 Hz AC | EOP2T11 |

K-Frame Electrical (Solenoid) Operator

| Operating Voltage | Frequency | Terminal Block |
|-------------------|-------------|----------------|
| | | Catalog Number |
| 120 | 50/60 Hz AC | EOP3MT07 |
| 240 | 50/60 Hz AC | EOP3MT11 |

K-Frame Electrical (Solenoid) Operator Base Mounting Kit

| Frame | Catalog Number |
|-------|----------------|
| K | BBMK3 |

L- and M-Frame Electrical (Motor) Operator (310 and OPTIM)

| Operating Voltage | Frequency | Terminal Block |
|-------------------|-----------|----------------|
| | | Catalog Number |
| 120 | 50/60 Hz | EOP4MT07 |
| 208 | 50/60 Hz | EOP4MT11 |
| 240 | 50/60 Hz | EOP4MT11A |
| 480 | 50/60 Hz | EOP4MT15 |
| 125 | DC | EOP4MT26 |
| 24 | DC | EOP4MT21 |

Note

^① Motor operators MOP1P07, MOP1P03DC, MOP1P05DC and MOP1P07DC are replaced by MOPFD motor operators listed in table.

N-Frame Electrical (Motor) Operator

| Operating Voltage | Frequency | Pigtail Leads |
|-------------------|-----------|----------------|
| | | Catalog Number |
| 120 | 50/60 Hz | EOP5T07 |
| 208 | 50/60 Hz | EOP5T09 |
| 240 | 50/60 Hz | EOP5T11 |
| 480 | 50/60 Hz | EOP5T15 |
| 24 | DC | EOP5T21 |
| 48 | DC | EOP5T22 |
| 125 | DC | EOP5T26 |

R-Frame Electrical (Motor) Operator

| Operating Voltage | Frequency | Factory-Installed Terminal Block |
|-------------------|-----------|----------------------------------|
| | | Catalog Number |
| 120 | 50/60 Hz | EOP6T08K |
| 240 | 50/60 Hz | EOP6T11K |
| 48 | DC | EOP6T21K |

Plug-In Adapters**F-Frame Ordering Information (Flat Bar Type)**

| Continuous Current Rating (Amperes) | Two-Pole Catalog Number | Three-Pole Catalog Number | Four-Pole Catalog Number |
|-------------------------------------|-------------------------|---------------------------|--------------------------------|
| 100–225 | 1480D13G01 | 1480D13G02 | 1480D13G07 ^① |
| Mounting plate | 176C511H01 | 507C047H01 | — |

J-Frame Ordering Information (Flat Bar Type)

| Continuous Current Rating (Amperes) | Terminal End | Two-Pole Catalog Number | Three-Pole Catalog Number | Four-Pole Catalog Number |
|-------------------------------------|-----------------------|-------------------------|---------------------------|--------------------------|
| 250 | Line | 1260C86G05 | 1260C86G06 | 1231C67G01 |
| | Load | 1260C86G07 | 1260C86G08 | 1231C67G02 |
| | One line and one load | 506C144G27 | 506C144G28 | — |
| Mounting plate | — | ^② | PMP23 | — |

K-Frame Ordering Information (Flat Bar Type)—600 Vac Maximum

| Continuous Current Rating (Amperes) | Two-Pole Catalog Number | Three-Pole Catalog Number | Four-Pole Catalog Number |
|-------------------------------------|-------------------------|---------------------------|--------------------------|
| 400 | PAD32 | PAD33 | — |
| Mounting plate | ^② | PMP33 | — |

Notes

^① 100 ampere maximum.

^② Use three-pole mounting plate for two-pole circuit breaker.

L-Frame (Threaded Stud Type)

| Continuous Current Rating (Amperes) | Two-Pole Catalog Number | Three-Pole Catalog Number | Four-Pole Catalog Number |
|-------------------------------------|-------------------------|---------------------------|--------------------------|
| 600 (threaded stud type) | 506C059G03 | 506C059G04 | PAD44 |
| 600 (flat bar type) | 1288C19G01 | 1288C19G02 | 6636C55H01 |
| Mounting plate | 504C824H01 | 504C824H01 | — |

M-Frame (Flat Bar Type)—600 Vac Maximum

| Continuous Current Rating (Amperes) | Two-Pole Catalog Number | Three-Pole Catalog Number |
|-------------------------------------|-------------------------|---------------------------|
| 800 | 2614D53G05 | 2614D53G06 |
| Mounting plate | 1290C73H01 | 1290C73H01 |

N-Frame (Flat Bar Type)

| Continuous Current Rating (Amperes) | Two-Pole Catalog Number | Three-Pole Catalog Number |
|-------------------------------------|-------------------------|---------------------------|
| 1200 | 2614D53G03 | 2614D53G04 |
| Mounting plate | 1290C73H01 | 1290C73H01 |

Plug-In Adapters

| Frame | Number of Poles | Standard Certification | Catalog Number |
|-------|-----------------|------------------------|----------------|
| FD | 3 | IEC | PAD3F |
| FD | 4 | IEC | PAD4F |
| JD | 3 | IEC | PAD3JD |
| KD | 3 | IEC | PAD3K |
| LD | 3 | IEC | PAD3LD |
| LD | 4 | IEC | PAD4LD |

Rear Connecting Studs**F-Frame** ^①

| Stud Ampere Rating | Stud Catalog Number | Tube Catalog Number |
|---|---------------------|---------------------|
| For 15 to 100 Ampere Circuit Breakers | | |
| 100 A short | 451D874G01 | 32B9446H20 |
| 100 A short | 451D874G01 | 32B9446H21 |
| 100 A short | 451D874G01 | 32B9446H22 |
| 100 A short | 451D874G01 | 32B9446H23 |
| 100 A long | 451D874G02 | 32B9446H24 |
| 100 A long | 451D874G02 | 32B9446H25 |
| 100 A long | 451D874G02 | 32B9446H26 |
| 100 A long | 451D874G02 | 32B9446H27 |
| For 110 to 225 Ampere Circuit Breakers | | |
| 225A short | 374D883G01 | 374D883H06 |
| 225A short | 374D883G01 | 374D883H07 |
| 225A short | 374D883G01 | 374D883H08 |
| 225A short | 374D883G01 | 374D883H09 |
| 225A long | 374D883G02 | 374D883H10 |
| 225A long | 374D883G02 | 374D883H11 |
| 225A long | 374D883G02 | 374D883H12 |
| 225A long | 374D883G02 | 374D883H13 |

J-Frame ^①

| Stud Ampere Rating | Stud Catalog Number | Tube Catalog Number |
|--------------------|---------------------|---------------------|
| 250A short | 5010D23G01 | 456D983H05 |
| 250A short | 5010D23G01 | 456D983H06 |
| 250A short | 5010D23G01 | 456D983H07 |
| 250A long | 5010D23G02 | 5010D23H05 |
| 250A long | 5010D23G02 | 5010D23H06 |
| 250A long | 5010D23G02 | 5010D23H07 |

K-Frame ^①

| Stud Ampere Rating | Stud Catalog Number | Standard Tube Catalog Number |
|--------------------|---------------------|------------------------------|
| 400 A short | 6642C14G02 | 313C909H17 |
| 400 A short | 6642C14G04 | 313C909H18 |
| 400 A short | 6642C14G06 | 313C909H19 |
| 400 A long | 6642C14G03 | 313C909H20 |
| 400 A long | 6642C14G05 | 313C909H21 |
| 400 A long | 6642C14G07 | 313C909H22 |

L-Frame Ordering Information

| Stud Catalog Number |
|---------------------|
| 314C960G07 |
| 314C960G08 |
| 314C960G09 |

M-Frame Ordering Information ^①

| Stud Ampere Rating | Stud Catalog Number |
|--------------------|---------------------|
| 225 | 314C960G01 |
| 400 | 314C960G04 |
| 400 | 314C960G05 |
| 400 | 314C960G06 |
| 600 | 314C960G07 |
| 600 | 314C960G08 |
| 600 | 314C960G09 |
| 800 | 314C960G10 |
| 800 | 314C960G11 |
| 800 | 314C960G12 |

N-Frame Ordering Information ^①

| Stud Ampere Rating | Stud Catalog Number |
|--------------------|---------------------|
| 800 | 623B222G01 |
| 800 | 623B222G02 |
| 800 | 623B222G03 |
| 1200 | 373B375G04 |
| 1200 | 373B375G03 |

Note

^① Not UL listed.

Panelboard Connecting Straps

2

F-Frame Panelboard Connecting Straps

| Bus Spacing in Inches (mm) | Continuous Current Rating (Amperes) | Pole Connector Type | |
|----------------------------|-------------------------------------|-----------------------|------------------------|
| | | Center Catalog Number | Outside Catalog Number |
| 2.75 (69.9) | 50 | 673B142G02 | 673B142G09 |
| 2.75 (69.9) | 100 | 673B142G02 | 673B142G10 |
| 2.75 (69.9) | 150 | 673B142G04 | 673B142G03 |
| 3.50 (88.9) | 50 | 1253C72G01 | 1253C72G03 |
| 3.50 (88.9) | 100 | 1253C73G03 | 1253C73G06 |
| 3.50 (88.9) | 150 | 1253C73G01 | 1253C73G05 |

F-Frame Mounting Bracket

| Number of Poles | Catalog Number |
|-----------------|----------------|
| 2 | 624B600H02 |
| 3 | 624B600H01 |

J-Frame Panelboard Connecting Straps

| Bus Spacing in Inches (mm) | Continuous Current Rating (Amperes) | Pole Connector Type | |
|----------------------------|-------------------------------------|-----------------------|------------------------|
| | | Center Catalog Number | Outside Catalog Number |
| 3.50 (88.9) | 250 | 2600D26G01 | 2600D26G02 |

K-Frame Panelboard Connecting Straps

| Bus Spacing in Inches (mm) | Continuous Current Rating (Amperes) | Pole Connector Type | |
|----------------------------|-------------------------------------|-----------------------|------------------------|
| | | Center Catalog Number | Outside Catalog Number |
| 3.50 (88.9) | 400 | 4212B78G02 | 4212B77G01 |

K-Frame Mounting Bracket

| Number of Poles | Catalog Number |
|-----------------|----------------|
| 2, 3 | 208B264H01 |

L-Frame Panelboard Connecting Straps

| Continuous Current Rating (Amperes) | Pole Connector Type | |
|--|-----------------------------|------------------------------|
| | Center Catalog Number | Outside Catalog Number |
| 600 | 624B609G01 | 506C052G01 |

L-Frame Mounting Bracket

| Number of Poles | Catalog Number |
|-----------------|-------------------|
| 2, 3 | 208B297H01 |

M-Frame Panelboard Connecting Straps

| Bus Spacing in Inches (mm) | Continuous Current Rating (Amperes) | Pole Connector Type | |
|-------------------------------------|--|---------------------|-------------------|
| | | Connector Type | Catalog Number |
| 3.50 (88.9) | 800 | Short | 314C996G01 |
| | | Medium | 314C996G02 |
| | | Long | 314C996G03 |

M-Frame Mounting Bracket

| Catalog Number |
|-------------------|
| 315C270H01 |

N-Frame Panelboard Connecting Straps

| Bus Spacing in Inches (mm) | Continuous Current Rating (Amperes) | Pole Connector Type | |
|-------------------------------------|--|---------------------|-------------------|
| | | Connector Type | Catalog Number |
| 3.50 (88.9) | 1200 | Short | 505C606G04 |
| | | Medium | 505C606G05 |
| | | Long | 505C606G06 |

N-Frame Mounting Bracket (Four Required)

| Catalog Number |
|-------------------|
| 315C270H01 |

Type LFD Current Limiter

The LFD current limiter is an accessory that bolts to the load end of a standard FDB or FD thermal-magnetic and electronic circuit breaker, providing 200,000 A

interrupting capacity at up to 600 Vac. LFD current limiters for thermal-magnetic circuit breakers are listed with Underwriters Laboratories under File E47239.

Type LFD Current Limiter



Type LFD Current Limiter

| Circuit Breaker Rating Amperes | Catalog Number |
|--------------------------------|----------------|
| 15–70 | LFD3070R |
| 80–160 | LFD3150R |

Ground Fault Alarm Unit

The ground fault alarm unit is a remotely mounted device with a combination indicating light/test button that will light when the breaker trips or alarms on ground fault. The ground fault alarm unit requires a separate 120 Vac power source to power the

light and the internal relay, which has 1NO and 1NC contacts for remote indication. The ground fault alarm unit can be panel mounted for ordering with an optional face mounting bracket. For use on Digitrip 310 only, K- through N-Frame.

Ground Fault Alarm Unit



GF Alarm Unit

| Description | Catalog Number |
|-------------------------|----------------|
| Ground fault alarm unit | GFAU |
| Face mounting bracket | 1264C67G01 |

IQ Energy Sentinel

The IQ Energy Sentinel is a highly accurate, microprocessor-based, breaker-mounted device designed to monitor power and energy readings. It represents an alternative to watt meters, watt-hour meters, and watt demand meters. Key advantages include savings in space, lower installation costs, and remote monitoring capability.

The IQ Energy Sentinel mounts on the load side of a Series C F-Frame (150 ampere) circuit breaker. It can be applied on three-phase, four-wire systems, or single-phase, three-wire systems with voltage connected through Phases A and C.

For more information, see Descriptive Bulletin 8178.

Potential Transformer Module

The potential transformer module is required for the Digitrip OPTIM 1050 to provide a voltage input to allow the trip unit to monitor power and energy as well as power factor. The potential transformer module is a 6 VA transformer with a primary voltage input of up to 600 volt

line to line. Three 0.1 ampere fuses are provided on the primary of the transformer and can be used for isolation purposes during dielectric testing. The device is normally panel mounted and can feed up to 16 OPTIM trip units.

Potential Transformer Module



Potential Transformer Module

| Description | Catalog Number |
|------------------------------|----------------|
| Potential transformer module | DOPTMLN |

Solid-State (Electronic) Portable Test Kit

The solid-state (electronic) portable test kit provides verification of performance of all ratings of Digitrip 310 electronic trip units installed in circuit breakers while in service under varying load and/or phase imbalance. The test kit operates on 120-volt,

50/60 Hz power; it includes complete instructions and test times for testing long time, short time/ instantaneous operation and optional ground fault operation of the circuit breaker.

Portable Test Kit

| Description | Catalog Number |
|--|----------------|
| Solid-state (electronic) portable test kit | STK2 |

Breaker Interface Module (BIM)

The Breaker Interface Module (BIM) is a panel mounted user interface device that is mounted on the front of an electrical assembly or at a remote location. The BIM is used to access, configure, test and display information for OPTIM trip units and other devices. The BIM consists of four display windows, eight function buttons, 18 LEDs, and a graphical time/current curve to provide breaker status, operational information, protection status and energy monitoring. A 24

Vdc power supply is required to provide power to the BIM. This is supplied by the switchboard builder to Eaton's specifications. The BIM is a member of Eaton's PowerNet family of communicating devices that connects OPTIM trip units, Digitrip RMS 810/910 trip units and energy sentinels as a subnetwork system. The BIM can also be connected to a main network via a PONI module to PowerNet software.

Breaker Interface Module (BIM)**Breaker Interface Module (BIM)****Catalog Number****BIMII****Digitrip OPTIMizer**

The Digitrip OPTIMizer is a hand-held programmer that is used to access, configure, test and display information from OPTIM trip units. The OPTIMizer plugs into the front of an OPTIM trip unit via an eight-pin telephone jack and is powered by a nine-volt battery or the auxiliary power module. One highlighted feature is the "Copy" and "Download" commands.

Setting up multiple OPTIM trips can be finished in minutes and with no errors. An Auxiliary Power Module connection provides a trip test when control power is not present at the breaker. The OPTIMizer is supplied as a standard package to include

the programmer, the eight-pin connection cord, battery and carrying case. The auxiliary power module is optional.

Note: 24 Vdc Power Supply

A 24 Vdc power supply is required for all Digitrip OPTIM trip units that are required to communicate either on the main Eaton PowerNet network or as a subnetwork to a BIM. The breaker's load is 45 mA of current. Typically one power supply is required per switchboard and can provide control power to a BIM and the OPTIM trip units. The 24 Vdc power supply should be an "isolated high quality" power supply with a "CE" label, and is normally provided by the switchboard manufacturer to Eaton's recommendations.

Digitrip OPTIMizer**Digitrip OPTIMizer****Catalog Number****OPTIMizer—standard package****Auxiliary Power Module**

The auxiliary power module is a power supply requiring 120 Vac input at 50 or 60 Hz that provides a 32 Vdc output. The auxiliary power module provides control power for testing an OPTIM trip unit when other means of control power is not available or for continuous OPTIMizer operation versus temporary with a battery. The auxiliary

power module connects into the top of the Digitrip OPTIMizer via a keyed receptacle. The main application for the auxiliary power module would be for the testing of a standalone non-communicating OPTIM breaker that ordinarily would not have control power.

Auxiliary Power Module**Auxiliary Power Module****Catalog Number****PRTBAPMDV****Cause of Trip Display/Remote Mount Cause of Trip Display**

The Cause of Trip Display can be field-installed on any Digitrip RMS 310+ trip unit. The device provides breaker information through an LCD screen, such as cause of trip, phrase current, ground current and low loads. The display is ideal for troubleshooting common trips such as ground fault, long delay, and instantaneous/short delay.

The DIGIVIEW version will provide a local display at the breaker without additional wiring by connecting directly onto the trip unit. The DIGIVIEWR06 version has a 6 foot cable that allows users to mount the display on the outside of an enclosure door and connect to the trip unit that is contained inside the enclosure.

Cause of Trip Display/Remote Mount Cause of Trip Display**Catalog Number****DIGIVIEW****DIGIVIEWR06****Cause of Trip LED Module**

The Cause of Trip LED Module can be field-installed on any Digitrip RMS 310+ trip unit. The device provides a cause of trip indication via LED. The Cause of Trip LED Module connects directly onto the trip unit. When the

breaker trips, the module indicates the cause of trip (long delay, short delay, instantaneous and ground) via LED indication. The module is reset after the breaker is reset.

Cause of Trip LED Module**Catalog Number****TRIP-LED**

Accessories

2

Flex Shaft Accessories (F- through R-Frame)

NEMA 12 Safety Door Hardware for Flex Shaft and C371 ^①

| Handle Length in Inches (mm) | Catalog Number ^② |
|---------------------------------|--------------------------------|
| 4 (101.6) | C361KJ4 |
| 6 (152.4) | C361KJ6 |
| Roller Latch ^③ | C361KR |

Series C Rotary Accessories

As an option, an auxiliary switch is offered so that the control panel builder may electrically indicate the status of the breaker.

This accessory would be mounted on the mechanism and comes with 24-inch (609.6 mm) pigtail leads.

Series C Auxiliary Switch

| Catalog Number |
|-------------------|
| 5108A61G01 |

Wire Seal

The wire seal can be used to secure the cover on the trip unit to prevent adjustments after settings are confirmed.

Wire Seal

| Description | Catalog Number |
|-------------|-------------------|
| Wire seal | 5108A03H01 |

Notes

- ^① Customer: Consult with box manufacturer for correct door hardware and any adapters required for assembly.
- ^② The 1/4-inch x 1/2-inch (6.35 x 12.7 mm) standard mill rectangular locking bar is not supplied with these kits.
- ^③ Third roller latch for use with 4- or 6-inch (101.6 or 152.4 mm) handle when 3 point latching is required.

Technical Data and Specifications

Electrical Operator

F-Frame Electrical (Solenoid) Operator Rating Data ^{①②}

| Voltage ^③ | Frequency | Inrush Current Amperes | Maximum Operating Time | Fuse Amperes ^④ |
|----------------------|-------------|------------------------|------------------------|---------------------------|
| 120 | 50/60 Hz AC | 10 | 5 cycles (80 ms) | 3 |
| 240 | 50/60 Hz AC | 5 | 5 cycles (80 ms) | 2 |

F-Frame Electrical (Motor) Operator Rating Data ^{②③⑥⑦}

| Voltage ^③ | Frequency | Inrush Current Amperes |
|----------------------|-----------|------------------------|
| 120 | AC | 2 |
| 24 | DC | 5 |
| 48 | DC | 3 |
| 125 | DC | 2 |

J-Frame Electrical (Solenoid) Operator Rating Data ^{①⑥⑧⑨}

| Voltage ^③ | Inrush Current Amperes | Fuse Amperes |
|----------------------|------------------------|--------------|
| 120 | 30 | 6 |
| 240 | 16 | 4 |

K-Frame Electrical (Solenoid) Operator Rating Data ^{①⑥⑧⑨}

| Operating Voltage ^③ | Inrush Current Amperes | Fuse Amperes |
|--------------------------------|------------------------|--------------|
| 120 | 30 | 6 |
| 240 | 16 | 4 |

L- and M-Frame Electrical (Motor) Operator Rating Data

^{①⑥⑧⑩}

| Operating Voltage ^③ | Inrush Current Amperes |
|--------------------------------|------------------------|
| 120 AC | 31 |
| 208 AC | 13 |
| 240 AC | 12 |
| 125 DC | 21 |
| 24 DC | 50 |

N-Frame Electrical (Motor) Operator Rating Data ^{①⑥⑩⑫}

| Operating Voltage ^③ | Frequency | Inrush Current Amperes | Fuse Amperes |
|--------------------------------|-----------|------------------------|--------------|
| 120 | 50/60 Hz | 31 | 6 |
| 208 | 50/60 Hz | 21 | — |
| 240 | 50/60 Hz | 19 | 4 |
| 480 | 50/60 Hz | — | — |
| 24 | DC | 50 | — |
| 48 | DC | 80 | — |
| 125 | DC | 21 | — |

R-Frame Electrical (Motor) Operator Rating Data ^{③④⑫⑬}

| Operating Voltage ^⑦ | Frequency | Motor Inrush Current Amperes |
|--------------------------------|-----------|------------------------------|
| 120 | 50/60 Hz | 40 |
| 240 | 50/60 Hz | 27 |
| 48 | DC | 53 |
| 24 | DC | 58 |

Notes

- ① UL listed under UL File E64983.
 - ② The electrical operator design is endurance tested for 8000 electrical operations.
 - ③ Tolerance: +10%, -15% of nominal voltage.
 - ④ Use current-limiting type fuse where required.
 - ⑤ UL listed under UL File E64124.
 - ⑥ Frequency: 50/60 Hz.
 - ⑦ Maximum operating time: 3 seconds max. Operator is an intermittent duty device. The safe duty cycle (OFF to ON to OFF) should not exceed one per minute.
 - ⑧ The electrical operator design has been endurance tested for 6000 electrical operations.
 - ⑨ Maximum operating time: 5 cycles (80 ms).
 - ⑩ Maximum operating time: 12 cycles.
 - ⑪ The electrical operator design has been endurance tested for 2,500 electrical operations.
 - ⑫ Maximum operating time: 12 cycles max. Operator is an intermittent duty device. The safe duty cycle (OFF to ON to OFF) should not exceed one per minute.
 - ⑬ Operator is an intermittent duty service. The safe duty cycle (OFF to ON to OFF) should not exceed one per minute.
 - ⑭ Electric Operating time at rated voltage; (a) To turn breaker ON—1/2 second max. (b) To turn breaker OFF—1/2 second max.
 - ⑮ Motor operating temperature; Class "A" temperature limits apply.
 - ⑯ A minimum 1 kVA power source is recommended for motor operation.
 - ⑰ Applied voltage should be no less than 85% or no more than 110% of rated voltage.
- For OPTIM trip, OPEOPCK kit required.

Dimensions

Approximate Dimensions in Inches (mm)

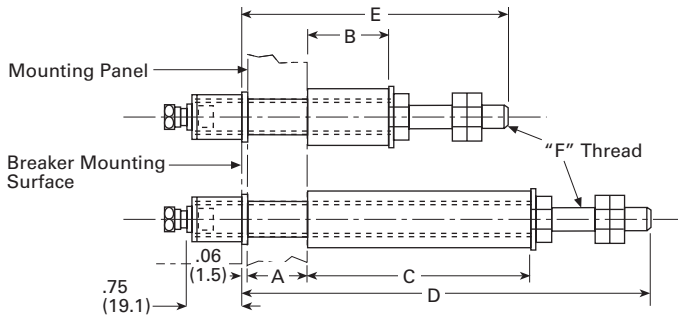
2

Rear Connecting Studs

F-Frame ^①

| Stud Ampere Rating | Stud Catalog Number | Panel Thickness | | Tube Length | | Tube Catalog Number | Dimensions | | |
|---|---------------------------|--------------------------|--|-------------|--------------|---------------------------|--------------|--------------|----------------|
| | | A | | B | C | | D | E | F |
| For 15 to 100 Ampere Circuit Breakers | | | | | | | | | |
| 100 A short | 451D874G01 | 1.00 (25.4) | | 1.06 (26.9) | — | 32B9446H20 | — | 3.63 (92.1) | 0.31 (7.9)–18 |
| 100 A short | 451D874G01 | 0.69–0.94 (17.5 to 23.8) | | 1.38 (34.9) | — | 32B9446H21 | — | 3.63 (92.1) | 0.31 (7.9)–18 |
| 100 A short | 451D874G01 | 0.38–0.63 (9.5 to 15.9) | | 1.69 (42.9) | — | 32B9446H22 | — | 3.63 (92.1) | 0.31 (7.9)–18 |
| 100 A short | 451D874G01 | 0.25–0.31 (6.4 to 7.9) | | 2.00 (50.8) | — | 32B9446H23 | — | 3.63 (92.1) | 0.31 (7.9)–18 |
| 100 A long | 451D874G02 | 1.00 (25.4) | | — | 3.44 (87.3) | 32B9446H24 | 6.13 (155.6) | — | 0.31 (7.9)–18 |
| 100 A long | 451D874G02 | 0.69–0.94 (17.5 to 23.8) | | — | 3.75 (95.2) | 32B9446H25 | 6.13 (155.6) | — | 0.31 (7.9)–18 |
| 100 A long | 451D874G02 | 0.38–0.63 (9.5 to 15.9) | | — | 4.06 (103.1) | 32B9446H26 | 6.13 (155.6) | — | 0.31 (7.9)–18 |
| 100 A long | 451D874G02 | 0.25–0.31 (6.4 to 7.9) | | — | 4.38 (111.3) | 32B9446H27 | 6.13 (155.6) | — | 0.31 (7.9)–18 |
| For 110 to 225 Ampere Circuit Breakers | | | | | | | | | |
| 225A short | 374D883G01 | 1.00 (25.4) | | 1.06 (26.9) | — | 374D883H06 | — | 4.25 (108.0) | 0.44 (11.1)–14 |
| 225A short | 374D883G01 | 0.69–0.94 (17.5 to 23.8) | | 1.38 (34.9) | — | 374D883H07 | — | 4.25 (108.0) | 0.44 (11.1)–14 |
| 225A short | 374D883G01 | 0.38–0.63 (9.5 to 15.9) | | 1.69 (42.9) | — | 374D883H08 | — | 4.25 (108.0) | 0.44 (11.1)–14 |
| 225A short | 374D883G01 | 0.25–0.31 (6.4 to 7.9) | | 2.00 (50.8) | — | 374D883H09 | — | 4.25 (108.0) | 0.44 (11.1)–14 |
| 225A long | 374D883G02 | 1.00 (25.4) | | — | 3.44 (87.3) | 374D883H10 | 7.50 (190.5) | — | 0.44 (11.1)–14 |
| 225A long | 374D883G02 | 0.69–0.94 (17.5 to 23.8) | | — | 3.75 (95.2) | 374D883H11 | 7.50 (190.5) | — | 0.44 (11.1)–14 |
| 225A long | 374D883G02 | 0.38–0.63 (9.5 to 15.9) | | — | 4.06 (103.1) | 374D883H12 | 7.50 (190.5) | — | 0.44 (11.1)–14 |
| 225A long | 374D883G02 | 0.25–0.31 (6.4 to 7.9) | | — | 4.38 (111.3) | 374D883H13 | 7.50 (190.5) | — | 0.44 (11.1)–14 |

F-Frame



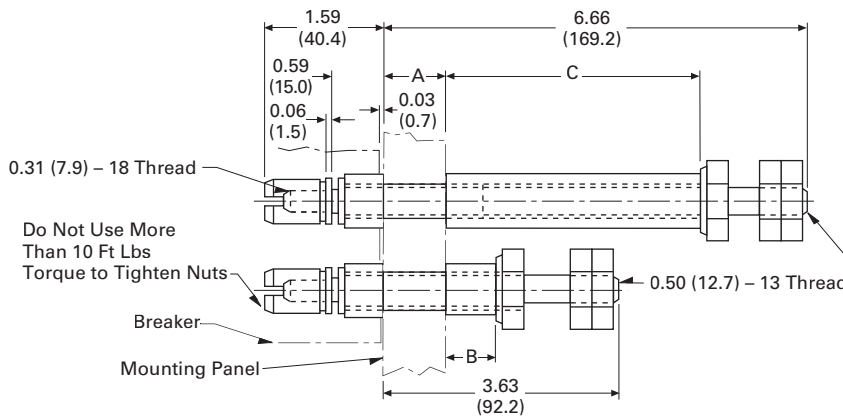
Note

^① Not UL listed.

Approximate Dimensions in Inches (mm)

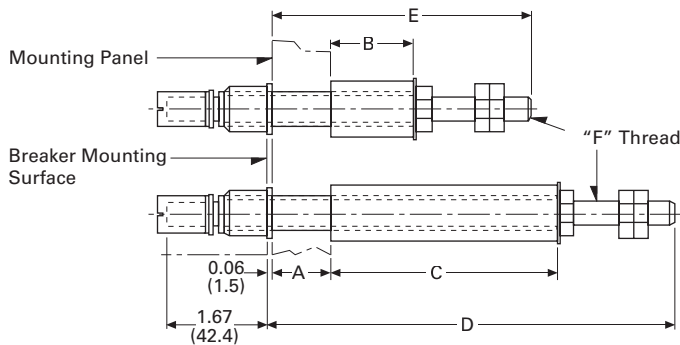
J-Frame

| Stud Ampere Rating | Stud Catalog Number | Panel Thickness | | Tube Length | | Tube Catalog Number |
|--------------------|---------------------|-----------------------|--|-------------|--------------|---------------------|
| | | A | | B | C | |
| 250A short | 5010D23G01 | 0.75–1.00 (19.1–25.4) | | 0.84 (21.4) | — | 456D983H05 |
| 250A short | 5010D23G01 | 0.50–0.75 (12.7–19.1) | | 1.09 (27.7) | — | 456D983H06 |
| 250A short | 5010D23G01 | 0.25–0.50 (6.4–12.7) | | 1.03 (26.2) | — | 456D983H07 |
| 250A long | 5010D23G02 | 0.75–1.00 (19.1–25.4) | | — | 3.88 (98.6) | 5010D23H05 |
| 250A long | 5010D23G02 | 0.50–0.75 (12.7–19.1) | | — | 4.13 (104.9) | 5010D23H06 |
| 250A long | 5010D23G02 | 0.25–0.50 (6.4–12.7) | | — | 4.38 (111.3) | 5010D23H07 |



K-Frame ①

| Stud Ampere Rating | Stud Catalog Number | Panel Thickness | | Tube Length | | Standard Tube Catalog Number | Dimensions | | |
|--------------------|---------------------|-----------------------|--|--------------|--------------|------------------------------|--------------|-------------|----------------------|
| | | A | | B | C | | D | E | F |
| 400 A short | 6642C14G02 | 0.75–1 (19.1–25.4) | | 0.84 (21.3) | — | 313C909H17 | — | 3.66 (93.0) | 0.75–16 (19.1–406.4) |
| 400 A short | 6642C14G04 | 0.50–0.75 (12.7–18.4) | | 1.09 (27.69) | — | 313C909H18 | — | — | — |
| 400 A short | 6642C14G06 | 0.25–0.5 (6.35–12.7) | | 1.03 (26.16) | — | 313C909H19 | — | — | — |
| 400 A long | 6642C14G03 | 0.75–1 (19.1–25.4) | | — | 3.78 (96.0) | 313C909H20 | — | — | — |
| 400 A long | 6642C14G05 | 0.50–0.75 (12.7–18.4) | | — | 4.03 (102.4) | 313C909H21 | 6.58 (167.1) | — | — |
| 400 A long | 6642C14G07 | 0.25–0.5 (6.35–12.7) | | — | 4.28 (108.7) | 313C909H22 | — | — | — |



Note

① Not UL listed.

2.4

Molded Case Circuit Breakers

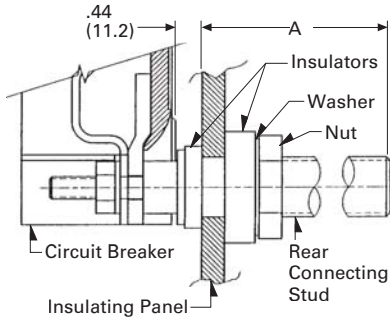
Series C

Approximate Dimensions in Inches (mm)

2

L-Frame

| Stud Length (A) | Stud Catalog Number |
|-----------------|---------------------|
| 5.47 (138.9) | 314C960G07 |
| 7.97 (202.4) | 314C960G08 |
| 10.47 (265.9) | 314C960G09 |



M-Frame

| Stud Ampere Rating | Diameter and Thread | Extension Back of Breaker | Stud Catalog Number |
|--------------------|---------------------|---------------------------|---------------------|
| 225 | 0.50 (12.7)–13 | 3.66 (93.0) | 314C960G01 |
| 400 | 0.75 (19.1)–16 | 5.91 (150.1) | 314C960G04 |
| 400 | 0.75 (19.1)–16 | 8.41 (213.6) | 314C960G05 |
| 400 | 0.75 (19.1)–16 | 10.91 (277.0) | 314C960G06 |
| 600 | 1.00 (25.4)–12 | 5.91 (150.1) | 314C960G07 |
| 600 | 1.00 (25.4)–12 | 8.41 (213.6) | 314C960G08 |
| 600 | 1.00 (25.4)–12 | 10.91 (277.0) | 314C960G09 |
| 800 | 1.13 (28.7)–12 | 5.91 (150.1) | 314C960G10 |
| 800 | 1.13 (28.7)–12 | 8.41 (213.6) | 314C960G11 |
| 800 | 1.13 (28.7)–12 | 10.91 (277.0) | 314C960G12 |

N-Frame

| Stud Ampere Rating | Diameter and Thread | Extension Back of Breaker | Stud Catalog Number |
|--------------------|---------------------|---------------------------|---------------------|
| 800 | 1.13 (28.7)–12 | 5.5 (139.7) | 623B222G01 |
| 800 | 1.13 (28.7)–12 | 8.0 (203.2) | 623B222G02 |
| 800 | 1.13 (28.7)–12 | 10.5 (266.7) | 623B222G03 |
| 1200 | 1.25 (31.8)–12 | 5.5 (139.7) | 373B375G04 |
| 1200 | 1.25 (31.8)–12 | 10.5 (266.7) | 373B375G03 |

Engine Generator Circuit Breakers



Engine Generator Circuit Breakers

Product Description

Eaton's engine generator molded case circuit breakers are designed specifically for application on diesel engine powered standby generators where high interrupting circuit breakers are not required. The JG through NG breakers are equipped with a special trip unit, that includes standard thermal (overload) protection and special low magnetic pickup range (FG includes a fixed thermal-magnetic pickup). The standard thermal trip unit provides overload protection for conductors per the National Electrical Code®. The low magnetic pickup range is approximately two to five times the continuous rating and provides closer low-level short-circuit protection when applied on generators that have very low short-circuit capacity. This combination allows the user to customize the breaker to the generator output.

Application Description

Engine generator circuit breakers are suitable for reverse feed application.

Contents

Description

| | <i>Page</i> |
|--|-------------|
| Engine Generator Circuit Breakers | |
| Catalog Number Selection | V4-T2-436 |
| Product Selection | V4-T2-437 |
| Accessories Selection Guide and Ordering Information | V4-T2-439 |
| Options and Accessories | V4-T2-439 |
| Technical Data and Specifications | V4-T2-440 |
| Dimensions and Weights | V4-T2-440 |
| Direct Current Circuit Breakers | V4-T2-441 |
| PVGard Solar Circuit Breakers—600 Vdc Per-Pole and 1000 Vdc Poles-in-Series | V4-T2-455 |
| E ² Mining Service Circuit Breakers | V4-T2-468 |



Standards and Certifications

Engine generator molded case circuit breakers are designed to conform with the following standards:

- Underwriters Laboratories Standard UL 489, Molded Case Circuit Breakers and Circuit Breaker Enclosures File E7819
- Canadian Standards Association Standard C22.2 No. 5, Service Entrance and Branch Circuit Breakers
- International Electrotechnical Commission Recommendations IEC 947-2, Circuit Breakers



Conformance with these standards satisfies most local and international codes, assuming user acceptability and simplified application.

2.5

Molded Case Circuit Breakers

Specialty Breakers

2

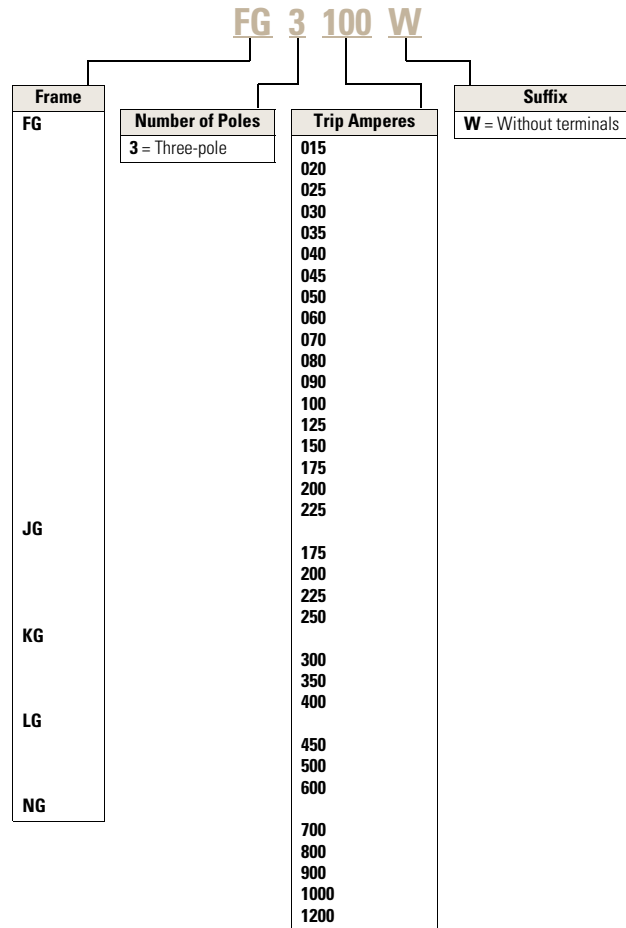
Catalog Number Selection

This information is presented only as an aid to understanding catalog numbers. It is not to be used to build catalog numbers for circuit breakers.

- FG breakers include both line and load side terminals

- JG, KG, LG and NG breakers with **W** catalog number suffix do not include any terminals
- JG, KG, LG and NG breakers without **W** catalog number suffix include both line and load terminals
- Contact Eaton for additional ratings and internal/external accessories
- Reverse feed

Circuit Breakers FG, JG, KG, LG and NG



Product Selection

The following table lists FG through NG engine generator breakers with the maximum generator kVA and kW rating. Engine generator breakers are applied at 115% of the

generator full load current rating (FLA). The maximum kW rating is based on three-phase generators at 80% power factor.

Thermal-Magnetic

| Magnetic Pickup Range | Maximum Generator Rating 60 Hz | | | | 600 Vac | | Engine Generator Breaker ^③ |
|-----------------------|--------------------------------|-----------------|--------------------------|-----------------|------------------|-----------------|---------------------------------------|
| | 240 Vac kVA ^① | kW ^② | 480 Vac kVA ^① | kW ^② | kVA ^① | kW ^② | Catalog Number |
| Fixed | 5 | 4 | 11 | 9 | 14 | 11 | FG3015 ^④ |
| Fixed | 7 | 6 | 14 | 12 | 18 | 14 | FG3020 ^④ |
| Fixed | 9 | 7 | 18 | 14 | 23 | 18 | FG3025 ^④ |
| Fixed | 11 | 9 | 22 | 17 | 27 | 22 | FG3030 ^④ |
| Fixed | 13 | 10 | 25 | 20 | 32 | 25 | FG3035 ^④ |
| Fixed | 14 | 12 | 29 | 23 | 36 | 29 | FG3040 ^④ |
| Fixed | 16 | 13 | 32 | 26 | 41 | 32 | FG3045 ^④ |
| Fixed | 18 | 14 | 36 | 29 | 45 | 36 | FG3050 ^④ |
| Fixed | 22 | 17 | 43 | 35 | 54 | 43 | FG3060 ^④ |
| Fixed | 25 | 20 | 51 | 40 | 63 | 51 | FG3070 ^④ |
| Fixed | 29 | 23 | 58 | 46 | 72 | 58 | FG3080 ^④ |
| Fixed | 32 | 26 | 65 | 52 | 81 | 65 | FG3090 ^④ |
| Fixed | 36 | 29 | 72 | 58 | 90 | 72 | FG3100 ^④ |
| Fixed | 40 | 32 | 79 | 64 | 99 | 79 | FG3110 ^④ |
| Fixed | 45 | 36 | 90 | 72 | 113 | 90 | FG3125 ^④ |
| Fixed | 54 | 43 | 108 | 87 | 135 | 108 | FG3150 ^④ |
| Fixed | 63 | 51 | 126 | 101 | 158 | 126 | FG3175 ^④ |
| Fixed | 72 | 58 | 144 | 116 | 181 | 144 | FG3200 ^④ |
| Fixed | 81 | 65 | 162 | 130 | 203 | 162 | FG3225 ^④ |
| 350–700 | 63 | 51 | 126 | 101 | 158 | 126 | JG3175W ^⑤ |
| 350–700 | 63 | 51 | 126 | 101 | 158 | 126 | JG3175 ^④ |
| 350–700 | 72 | 58 | 144 | 116 | 181 | 144 | JG3200W ^⑤ |
| 350–700 | 72 | 58 | 144 | 116 | 181 | 144 | JG3200 ^④ |
| 350–700 | 81 | 65 | 162 | 130 | 203 | 162 | JG3225W ^⑤ |
| 350–700 | 81 | 65 | 162 | 130 | 203 | 162 | JG3225 ^④ |
| 350–700 | 90 | 72 | 181 | 144 | 226 | 181 | JG3250W ^⑤ |
| 350–700 | 90 | 72 | 181 | 144 | 226 | 181 | JG3250 ^④ |
| 500–1000 | 108 | 87 | 217 | 173 | 271 | 217 | KG3300W ^⑤ |
| 500–1000 | 108 | 87 | 217 | 173 | 271 | 217 | KG3300 ^④ |
| 500–1000 | 126 | 101 | 253 | 202 | 316 | 253 | KG3350W ^⑤ |
| 500–1000 | 126 | 101 | 253 | 202 | 316 | 253 | KG3350 ^④ |
| 1000–2000 | 144 | 116 | 289 | 231 | 361 | 289 | KG3400 ^④ |

Notes

- ① Breaker continuous current is based on 115% of the generator full load ampere rating.
- ② Based on three-phase generators at 80% power factor.
- ③ FG, JG, KG include thermal-magnetic trip units, LG and NG include electronic trip units.
- ④ Breaker includes line and load terminals.
- ⑤ Without terminals.

The following catalog numbers have center tap studs for dual voltage applications: JG3070CT, JG3100CT, JG3125CT, KG3175CT, LG3300CTW.

Electronic

2

| Magnetic Pickup Range | Maximum Generator Rating 60 Hz | | 480 Vac | | 600 Vac | | Engine Generator Breaker ^③ |
|-----------------------|--------------------------------|-----------------|------------------|-----------------|------------------|-----------------|---------------------------------------|
| | 240 Vac kVA ^① | kW ^② | kVA ^① | kW ^② | kVA ^① | kW ^② | Catalog Number |
| 500–2500 | 162 | 130 | 325 | 260 | 406 | 325 | LG3450 ^④ |
| 500–2500 | 181 | 144 | 361 | 289 | 451 | 361 | LG3500 ^④ |
| 500–2500 | 217 | 173 | 433 | 347 | 542 | 433 | LG3600 ^④ |
| 500–2500 | 253 | 202 | 505 | 404 | 632 | 505 | NG3700 ^④ |
| 500–2500 | 289 | 231 | 578 | 462 | 722 | 578 | NG3800 ^④ |
| 1250–5000 | 325 | 260 | 650 | 520 | 812 | 650 | NG3900 ^④ |
| 1250–5000 | 361 | 289 | 722 | 578 | 903 | 722 | NG31000 ^④ |
| 1250–5000 | 433 | 347 | 867 | 693 | 1083 | 867 | NG31200 ^④ |

Notes

- ① Breaker continuous current is based on 115% of the generator full load ampere rating.
- ② Based on three-phase generators at 80% power factor.
- ③ FG, JG, KG include thermal-magnetic trip units, LG and NG include electronic trip units.
- ④ Breaker includes line and load terminals.

The following catalog numbers have center tap studs for dual voltage applications: JG3070CT, JG3100CT, JG3125CT, KG3175CT, LG3300CTW.

Accessories Selection Guide and Ordering Information

Enclosures

Type 1 General Purpose

- Surface or flush mounting
- 15–1200 ampere range
- 600 Vac, 500 Vdc

Type 1 enclosed breakers are designed for use in commercial buildings, apartment buildings and other areas where a general purpose enclosure is applicable. The breaker is front operable and is capable of being padlocked in either the ON or OFF position. Ratings through 1200 amperes are listed with Underwriters Laboratories as approved for service entrance application. Both surface and flush mounted enclosures are available.

Type 3R Rainproof Surface Mounting

- Interchangeable hubs (through 400 amperes)
- 15–1200 ampere range
- 600 Vac, 500 Vdc

This general purpose outdoor service center employs a circuit breaker inside a weatherproof sheet steel breaker enclosure to serve

as a main disconnect and protective device for feeder circuits. Ratings through 1200 amperes are listed by Underwriters Laboratories as suitable for service entrance application.

Type 12 Dustproof Surface Mounting

- No knockouts or other openings
- 15–1200 ampere range
- 600 Vac, 500 Vdc

The Type 12 enclosure is designed in line with specifications for special industry applications where unusually severe conditions involving oil, coolant, dust and other foreign materials exist in the operating atmosphere. The handle padlocks in the OFF position and the cover is interlocked with the handle mechanism to prevent opening the cover with the circuit breaker in the ON position. Ratings through 1200 amperes are listed by Underwriters Laboratories as suitable for service entrance application.

Enclosure Selection Data

| Breaker Frame Amperes | Enclosure Type Class | Catalog Number |
|-----------------------|----------------------|----------------|
| FG 15–225 | Type 1 | SFDN225 |
| | Type 3R | RFDN225 |
| | Type 12 | JFDN225 |
| JG 175–250 | Type 1 | SJDN250 |
| | Type 3R | RJDN250 |
| | Type 12 | JJDN250 |
| KG 300–400 | Type 1 | SKDN400 |
| | Type 3R | RKDN400 |
| | Type 12 | JKDN400 |
| LG 450–600 | Type 1 | SLDN600 |
| | Type 3R | RLDN600 |
| | Type 12 | JLDN600 |
| NG 700–1200 | Type 1 | SNDN1200 |
| | Type 3R | RNDN1200 |
| | Type 12 | JNDN1200 |

Options and Accessories

Standard Terminals

| Breaker Frame | Max. Amp Rating | AWG Wire Range | Metric Wire Range mm ² | Catalog Number |
|---------------|-----------------|-------------------|-----------------------------------|----------------|
| FG | 100 | 14–1/0 | 2.5–50 | 3T100FB ① |
| FG | 150 | 4–4/0 | 25–95 | 3TA225FD ① |
| JG | 250 | 4–350 kcmil | 25–185 | TA250KB |
| KG | 350 | 250–500 kcmil | 120–240 | TA350K |
| KG | 400 | 3/0–250 kcmil (2) | 95–120 | 3TA400K ① |
| LG | 600 | 250–500 kcmil (2) | 120–240 | 3TA603LDK |
| NG | 700 | 1–500 kcmil (2) | 50–300 | TA700NB1 |
| NG | 1000 | 3/0–400 kcmil (3) | 95–185 | TA1000NB1 |
| NG | 1200 | 4/0–500 kcmil (4) | 120–300 | TA1200NB1 |

Neutral Kits, Insulated and Groundable

| Max. Enclosure Rating (Amperes) | Main Lug Number Size Cu/Al | Ground Lug Size Cu/Al | Catalog Number |
|---------------------------------|--|-----------------------|----------------|
| 100 | (1) 14–1/0 | (1) 14–1/0 | INK100 |
| 250 | (1) 6–350 kcmil | (1) 4–300 kcmil | INK250 |
| 400 | (1) 4–750 kcmil or (2) 1/0–250 kcmil | (1) 4–300 kcmil | INK400 |
| 600 | (2) 250–500 kcmil | (1) 4–300 kcmil | INK600 |
| 1200 | (3) 1/0 to 750 kcmil or (4) 1/0 to 750 kcmil | (1) 6–250 kcmil | INK1200 |

Internal Accessories

Auxiliary Switch ②

| Breaker Frame | Factory Mounted | 1A-1B | | 2A-2B | |
|---------------|-----------------|--------------------------|-----------------|--------------------------|-----------------|
| | | Field Kit Catalog Number | Factory Mounted | Field Kit Catalog Number | Factory Mounted |
| FG ③ | A06 | A1X1PK | A13 | A2X1RPK | A13 |
| JG | A06 | A1X2PK | A13 | A2X2PK | A13 |
| KG | A06 | A1X3PK | A13 | A2X3PK | A13 |
| LG | A06 | A1X4PK | A13 | A2X4PK | A13 |
| NG | A06 | A1X5PK | A13 | A2X5PK | A13 |

Shunt Trip ②

| Breaker Frame | Rating | Factory Mounted | Field Kit Catalog Number |
|---------------|-----------|-----------------|--------------------------|
| FG ③ | 12–24 Vdc | S02 | SNT1LP03K |
| JG | 12–24 Vdc | S42 | SNT2P04K |
| KG | 12–24 Vdc | S42 | SNT3P04K |
| LG | 12–24 Vdc | S02 | SNT4LP03K |
| NG | 12–24 Vdc | S02 | SNT5LP03K |

Notes

- ① Package of three terminals.
- ② Other accessories are available. Same as standard frame breakers.
- ③ Field installation on the FG Frame is not UL listed.

Technical Data and Specifications

UL 489 Interrupting Capacity Ratings

| Volts AC (50/60 Hz) | Interrupting Capacity (Symmetrical Amperes) |
|---------------------|---|
| 240 | 18,000 |
| 480 | 14,000 |
| 600 | 10,000 |

IEC 947-2 Interrupting Capacity Ratings

| Volts AC (50/60 Hz) | Interrupting Capacity (Symmetrical Amperes) |
|---------------------|--|
| 220, 240 | 18,000/9,000 |
| 380, 415 | 14,000/7,000 |
| 660, 690 | 18,000/9,000 14,000/7,000 10,000/5,000 |

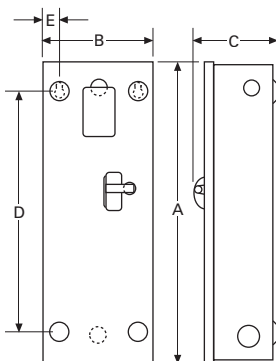
Dimensions and Weights

Approximate Dimensions in Inches (mm)

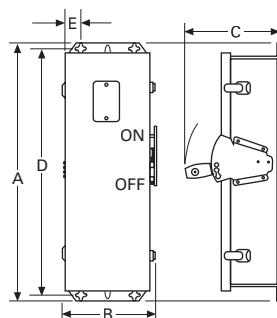
Enclosure Selection Data

| Breaker Frame Amperes | Enclosure Type Class | A | B | C | D | E | Approx. Weight Lbs (kg) | Conduit Sizes, Inches | Catalog Number |
|-----------------------|----------------------|----------------|---------------|---------------|----------------|-------------|-------------------------|--|----------------|
| FG 15–225 | Type 1 | 23.25 (590.6) | 8.41 (213.6) | 6.28 (159.5) | 18.75 (476.3) | 1.20 (30.5) | 15 (7) | 0.25, 0.50, 0.75, 1, 1.25, 1.50, 2, 2.50 | SFDN225 |
| | Type 3R | 25.66 (651.8) | 8.84 (224.7) | 9.31 (236.5) | 24.28 (616.7) | 1.70 (43.2) | 19 (9) | 0.25, 0.50, 0.75, 1, 1.25, 1.50, 2, 2.50 | RFDN225 |
| | Type 12 | 25.66 (651.8) | 8.84 (224.7) | 9.31 (236.5) | 24.28 (616.7) | 1.70 (43.2) | 18 (8) | — | JFDN225 |
| JG 175–250 | Type 1 | 34.70 (881.4) | 10.92 (277.4) | 7.20 (182.9) | 30.00 (762.0) | 1.88 (47.8) | 31 (14) | 0.25, 0.50, 2, 2.50, 3 | SJDN250 |
| | Type 3R | 37.50 (952.5) | 11.56 (293.6) | 10.22 (259.6) | 35.77 (908.6) | 1.94 (49.3) | 40 (18) | 0.25, 0.50, 2, 2.50, 3 | RJDN250 |
| | Type 12 | 37.53 (953.3) | 11.56 (293.6) | 10.22 (259.6) | 35.77 (908.6) | 1.94 (49.3) | 37 (17) | — | JJDN250 |
| KG 300–400 | Type 1 | 38.81 (985.8) | 11.06 (280.9) | 10.94 (277.9) | 34.00 (863.6) | 2.28 (57.9) | 53 (24) | 0.25, 0.50, 0.75, 1.50, 2, 2.50, 3, 3.50 | SKDN400 |
| | Type 3R | 41.69 (1058.9) | 11.75 (298.5) | 14.06 (357.1) | 39.90 (1013.5) | 1.97 (50.0) | 60 (27) | 0.25, 0.50, 0.75, 2.50, 3, 3.50 | RKDN400 |
| | Type 12 | 41.69 (1058.9) | 11.75 (298.5) | 14.06 (357.1) | 39.90 (1013.5) | 1.97 (50.0) | 53 (24) | — | JKDN400 |
| LG 450–600 | Type 1 | 45.88 (1165.4) | 14.31 (363.5) | 12.38 (314.5) | 46.56 (1182.6) | 1.91 (48.5) | 81 (37) | 0.25, 0.50, 0.75, 3, 3.50, 4 | SLDN600 |
| | Type 3R | 48.31 (1227.1) | 14.91 (378.7) | 15.50 (393.7) | 46.56 (1182.6) | 1.92 (48.8) | 84 (38) | 0.25, 0.50, 0.75, 3, 3.50, 4 | RLDN600 |
| | Type 12 | 48.31 (1227.1) | 14.91 (378.7) | 15.50 (393.7) | 46.56 (1182.6) | 1.92 (48.8) | 81 (37) | — | JLDN600 |
| NG 700–1200 | Type 1 | 61.22 (1555.0) | 21.44 (544.6) | 15.41 (391.4) | 61.84 (1570.7) | 1.97 (50.0) | 178 (81) | — | SNDN1200 |
| | Type 3R | 63.59 (1615.2) | 22.00 (558.8) | 17.63 (447.8) | 61.84 (1570.7) | 1.97 (50.0) | 175 (79) | — | RNDN1200 |
| | Type 12 | 63.59 (1615.2) | 22.00 (558.8) | 17.63 (447.8) | 61.84 (1570.7) | 1.97 (50.0) | 170 (77) | — | JNDN1200 |

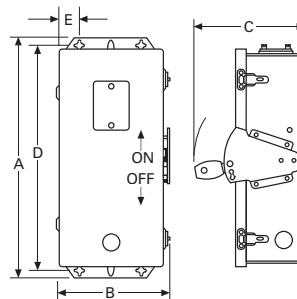
Type 1 Surface Mounted



Type 3R Rainproof



Type 12, 12K Dustproof



Direct Current Circuit Breakers



Direct Current Circuit Breakers

Product Description

DC (direct current) systems and applications are becoming commonplace as alternative energy sources have expanded and the number of DC devices and data centers using DC power has swelled.

Eaton offers molded case circuit breakers and switches to meet circuit protection and switching requirements for a host of different DC end user requirements. Applications include UPS battery supply circuits, solar systems and electric vehicle charging, as well as commercial and industrial distribution.

Current ratings are available from 15 to 3000 A, with a full scale of voltage and interrupting ratings to address needs ranging from standard to the highest performance. Optional internal accessories provide remote tripping and indication of breaker status.

The DC breaker family is UL 489 listed and exceeds the requirements in UL 489 Supplement SC for UPS applications. Eaton breakers may be applied in both ungrounded and select grounded applications, with poles connected in series to operate at the maximum voltages shown on **Page V4-T2-442**. To use DC circuit breakers on 600 V grounded systems, three poles in series must be connected on the ungrounded leg.

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| Direct Current Circuit Breakers | |
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All DC breakers use the same internal and external accessories as their corresponding Series C and Series G AC frame equivalents, except for the NBDC breaker, which uses the same internal and external accessories as the standard NB frame.

The HFDDC through HMDLDC and EG to RG DC breakers use the same internal and external accessories as their corresponding Series C and Series G AC Frame equivalents. NBDC uses the same internal and external accessories as standard NB breakers.

Many of the Eaton AC molded case circuit breakers carry 250 Vdc ratings for ungrounded systems. Refer to **Pages V4-T2-111** and **V4-T2-220** for these interrupting tables.

Quick Reference Direct Current Circuit Breakers

UL 489 Interrupting Capacity Ratings

Interrupting Capacity (kA)
Volts DC ^①

| Circuit Breaker Type | Maximum Amperes | Interrupting Capacity (kA) | | | | | | | | |
|----------------------|-----------------|----------------------------|-----------------|------------------|-----------------|-----|-----|-----------------|------------------|-----------------|
| | | 125 | Poles in Series | 250 ^② | Poles in Series | 500 | 600 | Poles in Series | 750 ^② | Poles in Series |
| EGEDC | 100 | 10 | 1 | 35 | 2 | 35 | — | 3 | — | — |
| EGSDC | 100 | 35 | 1 | 42 | 2 | 50 | — | 3 | — | — |
| EGHDC | 100 | 42 | 1 | 50 | 2 | 65 | — | 3 | — | — |
| HFDDC | 225 | 42 | 1 | 50 | 2 | — | 42 | 3 | 42 | 4 |
| JGEDC | 250 | 35 | 1 | 35 | 2 | — | 35 | 3 | — | — |
| JGSDC | 250 | 42 | 1 | 42 | 2 | — | 50 | 3 | — | — |
| JGHDC | 250 | 50 | 1 | 50 | 2 | — | 65 | 3 | — | — |
| HJDDC | 250 | 42 | 1 | 50 | 2 | — | 42 | 3 | — | — |
| HKDDC | 400 | 42 | 1 | 50 | 2 | — | 42 | 3 | — | — |
| LGEDC | 600 | 22 | 1 | 22 | 2 | — | 35 | 3 | — | — |
| LGSDC | 600 | 22 | 1 | 22 | 2 | — | 50 | 3 | — | — |
| LGHDC | 600 | 50 | 1 | 50 | 2 | — | 65 | 3 | — | — |
| HLDDC | 600 | 42 | 1 | 50 | 2 | — | 35 | 3 | — | — |
| HLDDC ^③ | 1200 | 42 | 1 | 50 | 2 | — | — | — | — | — |
| HMDLDC | 800 | 42 | 1 | 50 | 2 | — | 35 | 3 | — | — |
| NBDC | 1200 | 42 | 1 | 50 | 2 | — | 50 | 3 | — | — |
| RGHDC | 3000 | 42 | 1 | 50 | 2 | — | 65 | 3 | — | — |

IEC 60947-2 Interrupting Capacity Ratings

| Circuit Breaker Type | Maximum Amperes | 125 Volts DC | | Poles in Series | 250 Volts DC | | Poles in Series | 600 Volts DC | | Poles in Series |
|----------------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|
| | | I _{cu} | I _{cs} | | I _{cu} | I _{cs} | | I _{cu} | I _{cs} | |
| EGEDC | 100 | 10 | 10 | 1 | 10 | 10 | 2 | — | — | — |
| EGSDC | 100 | 35 | 35 | 1 | 35 | 35 | 2 | — | — | — |
| EGHDC | 100 | 42 | 42 | 1 | 42 | 42 | 2 | — | — | — |
| JGEDC | 250 | 22 | 22 | 1 | 22 | 22 | 2 | — | — | — |
| JGSDC | 250 | 22 | 22 | 1 | 22 | 22 | 2 | — | — | — |
| JGHDC | 250 | 42 | 42 | 1 | 42 | 42 | 2 | — | — | — |
| HJDDC | 250 | — | — | — | — | — | — | 20 | 10 | 3 |
| LGEDC | 600 | 22 | 22 | 1 | 22 | 22 | 2 | — | — | — |
| LGSDC | 600 | 22 | 22 | 1 | 22 | 22 | 2 | — | — | — |
| LGHDC | 600 | 42 | 42 | 1 | 42 | 42 | 2 | — | — | — |
| HLDDC | 600 | — | — | — | — | — | — | 20 | 10 | 3 |
| HMDLDC | 800 | — | — | — | — | — | — | 20 | 10 | 3 |

Notes

^① DC ratings apply to substantially non-inductive circuits. Time constants per UL 489.

^② EGEDC through HMDLDC have been tested up to 300 Vdc to allow for battery charging voltages. 750 Vdc is common in transportation applications. HFDDC, four-pole 750 Vdc is available up to 150 A maximum. 300 Vdc and 750 Vdc are not UL 489 listed voltage ratings.

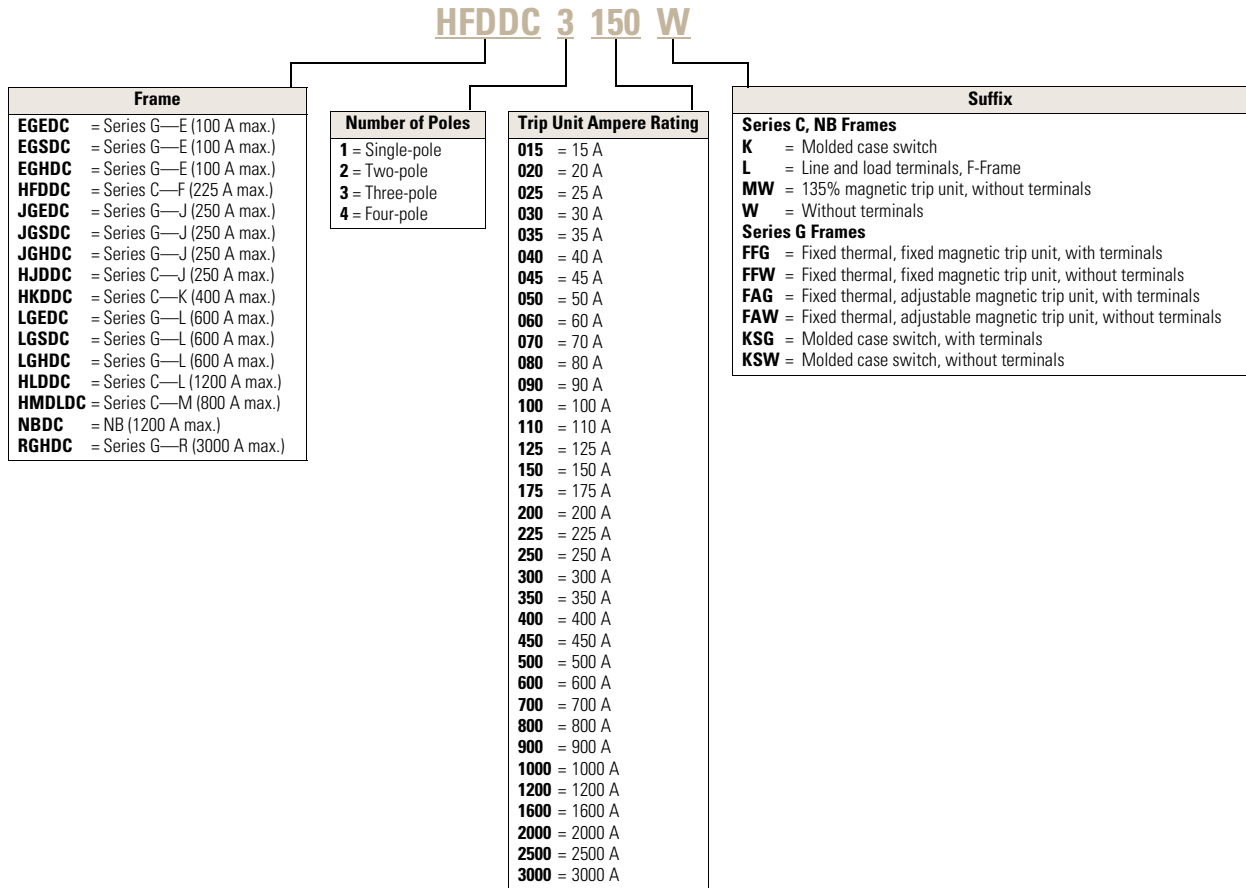
^③ Four-pole frame with two-poles connected in parallel.

See Page V4-T2-453 for series connection diagrams. Use NEC rated cable to connect/short poles in series as shown.

Catalog Number Selection

This information is presented only as an aid to understanding catalog numbers. It is not to be used to build catalog numbers for circuit breakers or trip units.

DC Circuit Breaker



Product Selection

2

**Type EGEDC DC Circuit Breakers—
Three-Pole High Interrupting Capacity 35 kAIC at 500 Vdc**

| Maximum Continuous Ampere Rating at 40 °C | Complete Circuit Breaker with Terminals Catalog Number | Complete Circuit Breaker without Terminals Catalog Number |
|---|---|--|
| 25 | EGEDC3025FFG | EGEDC3025FFW |
| 30 | EGEDC3030FFG | EGEDC3030FFW |
| 35 | EGEDC3035FFG | EGEDC3035FFW |
| 40 | EGEDC3040FFG | EGEDC3040FFW |
| 45 | EGEDC3045FFG | EGEDC3045FFW |
| 50 | EGEDC3050FFG | EGEDC3050FFW |
| 60 | EGEDC3060FFG | EGEDC3060FFW |
| 70 | EGEDC3070FFG | EGEDC3070FFW |
| 80 | EGEDC3080FFG | EGEDC3080FFW |
| 90 | EGEDC3090FFG | EGEDC3090FFW |
| 100 | EGEDC3100FFG | EGEDC3100FFW |

**Type EGSDC DC Circuit Breakers—
Three-Pole High Interrupting Capacity 50 kAIC at 500 Vdc**

| Maximum Continuous Ampere Rating at 40 °C | Complete Circuit Breaker with Terminals Catalog Number | Complete Circuit Breaker without Terminals Catalog Number |
|---|---|--|
| 25 | EGSDC3025FFG | EGSDC3025FFW |
| 30 | EGSDC3030FFG | EGSDC3030FFW |
| 35 | EGSDC3035FFG | EGSDC3035FFW |
| 40 | EGSDC3040FFG | EGSDC3040FFW |
| 45 | EGSDC3045FFG | EGSDC3045FFW |
| 50 | EGSDC3050FFG | EGSDC3050FFW |
| 60 | EGSDC3060FFG | EGSDC3060FFW |
| 70 | EGSDC3070FFG | EGSDC3070FFW |
| 80 | EGSDC3080FFG | EGSDC3080FFW |
| 90 | EGSDC3090FFG | EGSDC3090FFW |
| 100 | EGSDC3100FFG | EGSDC3100FFW |

**Type EGHDC DC Circuit Breakers—
Three-Pole High Interrupting Capacity 65 kAIC at 500 Vdc**

| Maximum Continuous Ampere Rating at 40 °C | Complete Circuit Breaker with Terminals Catalog Number | Complete Circuit Breaker without Terminals Catalog Number |
|---|---|--|
| 25 | EGHDC3025FFG | EGHDC3025FFW |
| 30 | EGHDC3030FFG | EGHDC3030FFW |
| 35 | EGHDC3035FFG | EGHDC3035FFW |
| 40 | EGHDC3040FFG | EGHDC3040FFW |
| 45 | EGHDC3045FFG | EGHDC3045FFW |
| 50 | EGHDC3050FFG | EGHDC3050FFW |
| 60 | EGHDC3060FFG | EGHDC3060FFW |
| 70 | EGHDC3070FFG | EGHDC3070FFW |
| 80 | EGHDC3080FFG | EGHDC3080FFW |
| 90 | EGHDC3090FFG | EGHDC3090FFW |
| 100 | EGHDC3100FFG | EGHDC3100FFW |

HFDDC


**Type HFDDC DC Circuit Breakers—
Three-Pole High Interrupting Capacity 42 kAIC at 600 Vdc**

| Maximum Continuous Ampere Rating at 40 °C | Complete Circuit Breaker with Line and Load Terminals ^① | | | |
|--|--|-------------------------------|---------------------------------|--------------------------------|
| | Single-Pole Catalog Number | Two-Pole Catalog Number | Three-Pole Catalog Number | Four-Pole Catalog Number |
| 15 | HFDDC1015L | HFDDC2015L | HFDDC3015L | HFDDC4015L |
| 20 | HFDDC1020L | HFDDC2020L | HFDDC3020L | HFDDC4020L |
| 25 | HFDDC1025L | HFDDC2025L | HFDDC3025L | HFDDC4025L |
| 30 | HFDDC1030L | HFDDC2030L | HFDDC3030L | HFDDC4030L |
| 35 | HFDDC1035L | HFDDC2035L | HFDDC3035L | HFDDC4035L |
| 40 | HFDDC1040L | HFDDC2040L | HFDDC3040L | HFDDC4040L |
| 45 | HFDDC1045L | HFDDC2045L | HFDDC3045L | HFDDC4045L |
| 50 | HFDDC1050L | HFDDC2050L | HFDDC3050L | HFDDC4050L |
| 60 | HFDDC1060L | HFDDC2060L | HFDDC3060L | HFDDC4060L |
| 70 | HFDDC1070L | HFDDC2070L | HFDDC3070L | HFDDC4070L |
| 80 | HFDDC1080L | HFDDC2080L | HFDDC3080L | HFDDC4080L |
| 90 | HFDDC1090L | HFDDC2090L | HFDDC3090L | HFDDC4090L |
| 100 | HFDDC1100L | HFDDC2100L | HFDDC3100L | HFDDC4100L |
| 110 | HFDDC1110L | HFDDC2110L | HFDDC3110L | HFDDC4110L |
| 125 | HFDDC1125L | HFDDC2125L | HFDDC3125L | HFDDC4125L |
| 150 | HFDDC1150L | HFDDC2150L | HFDDC3150L | HFDDC4150L |
| 175 | — | HFDDC2175L | HFDDC3175L | — |
| 200 | — | HFDDC2200L | HFDDC3200L | — |
| 225 | — | HFDDC2225L | HFDDC3225L | — |

**Type JGEDC DC Circuit Breakers—
Three-Pole High Interrupting Capacity 35 kAIC at 600 Vdc**

| Maximum Continuous Ampere Rating at 40 °C | Complete Breaker Catalog Number | Circuit Breaker Frame Only ^② Catalog Number | Thermal-Magnetic Trip Unit Catalog Number | Standard Terminals Catalog Number |
|--|--|---|--|--|
| 70 | JGEDC3070FAG | JGEDC3250NN | JT3070FA | T250FJ |
| 90 | JGEDC3090FAG | JGEDC3250NN | JT3090FA | T250FJ |
| 100 | JGEDC3100FAG | JGEDC3250NN | JT3100FA | T250FJ |
| 125 | JGEDC3125FAG | JGEDC3250NN | JT3125FA | T250FJ |
| 150 | JGEDC3150FAG | JGEDC3250NN | JT3150FA | T250FJ |
| 175 | JGEDC3175FAG | JGEDC3250NN | JT3175FA | T250FJ |
| 200 | JGEDC3200FAG | JGEDC3250NN | JT3200FA | T250FJ |
| 225 | JGEDC3225FAG | JGEDC3250NN | JT3225FA | T250FJ |
| 250 | JGEDC3250FAG | JGEDC3250NN | JT3250FA | T250FJ |

Notes

① For breaker without terminals, replace "L" with "W" at end of catalog number.

② For complete breaker, order individual frame, trip unit and terminals for field installation.

Type JGSDC DC Circuit Breakers— Three-Pole High Interrupting Capacity 50 kAIC at 600 Vdc

| Maximum Continuous Ampere Rating at 40 °C | Complete Breaker Catalog Number | Circuit Breaker Frame Only ^① Catalog Number | Thermal-Magnetic Trip Unit Catalog Number | Standard Terminals Catalog Number |
|---|---------------------------------|--|---|-----------------------------------|
| 70 | JGSDC3070FAG | JGSDC3250NN | JT3070FA | T250FJ |
| 90 | JGSDC3090FAG | JGSDC3250NN | JT3090FA | T250FJ |
| 100 | JGSDC3100FAG | JGSDC3250NN | JT3100FA | T250FJ |
| 125 | JGSDC3125FAG | JGSDC3250NN | JT3125FA | T250FJ |
| 150 | JGSDC3150FAG | JGSDC3250NN | JT3150FA | T250FJ |
| 175 | JGSDC3175FAG | JGSDC3250NN | JT3175FA | T250FJ |
| 200 | JGSDC3200FAG | JGSDC3250NN | JT3200FA | T250FJ |
| 225 | JGSDC3225FAG | JGSDC3250NN | JT3225FA | T250FJ |
| 250 | JGSDC3250FAG | JGSDC3250NN | JT3250FA | T250FJ |

JGHDC3250NN



Type JGHDC DC Circuit Breakers— Three-Pole High Interrupting Capacity 65 kAIC at 600 Vdc

| Maximum Continuous Ampere Rating at 40 °C | Complete Breaker Catalog Number | Circuit Breaker Frame Only ^① Catalog Number | Thermal-Magnetic Trip Unit Catalog Number | Standard Terminals Catalog Number |
|---|---------------------------------|--|---|-----------------------------------|
| 70 | JGHDC3070FAG | JGHDC3250NN | JT3070FA | T250FJ |
| 90 | JGHDC3090FAG | JGHDC3250NN | JT3090FA | T250FJ |
| 100 | JGHDC3100FAG | JGHDC3250NN | JT3100FA | T250FJ |
| 125 | JGHDC3125FAG | JGHDC3250NN | JT3125FA | T250FJ |
| 150 | JGHDC3150FAG | JGHDC3250NN | JT3150FA | T250FJ |
| 175 | JGHDC3175FAG | JGHDC3250NN | JT3175FA | T250FJ |
| 200 | JGHDC3200FAG | JGHDC3250NN | JT3200FA | T250FJ |
| 225 | JGHDC3225FAG | JGHDC3250NN | JT3225FA | T250FJ |
| 250 | JGHDC3250FAG | JGHDC3250NN | JT3250FA | T250FJ |

HJDDC3250



Type HJDDC DC Circuit Breakers— Three-Pole High Interrupting Capacity 42 kAIC at 600 Vdc

| Maximum Continuous Ampere Rating at 40 °C | Circuit Breaker Frame Only ^① Catalog Number | Thermal-Magnetic Trip Unit Catalog Number | Standard Terminals Catalog Number |
|---|--|---|-----------------------------------|
| 70 | HJDDC3250F | JT3070T | TA250KB |
| 90 | HJDDC3250F | JT3090T | TA250KB |
| 100 | HJDDC3250F | JT3100T | TA250KB |
| 125 | HJDDC3250F | JT3125T | TA250KB |
| 150 | HJDDC3250F | JT3150T | TA250KB |
| 175 | HJDDC3250F | JT3175T | TA250KB |
| 200 | HJDDC3250F | JT3200T | TA250KB |
| 225 | HJDDC3250F | JT3225T | TA250KB |
| 250 | HJDDC3250F | JT3250T | TA250KB |

Note

^① For complete breaker, order individual frame, trip unit and terminals for field installation.

HKDDC3400


**Type HKDDC DC Circuit Breakers—
Three-Pole High Interrupting Capacity 42 kAIC at 600 Vdc**

| Maximum Continuous Ampere Rating at 40 °C | Circuit Breaker Frame Only ^① Catalog Number | Thermal-Magnetic Trip Unit Catalog Number | Standard Terminals Catalog Number |
|---|---|--|--------------------------------------|
| 100 | HKDDC3400F | KT3100T | TA300K |
| 125 | HKDDC3400F | KT3125T | TA300K |
| 150 | HKDDC3400F | KT3150T | TA300K |
| 175 | HKDDC3400F | KT3175T | TA300K |
| 200 | HKDDC3400F | KT3200T | TA300K |
| 225 | HKDDC3400F | KT3225T | TA300K |
| 250 | HKDDC3400F | KT3250T | TA350K |
| 300 | HKDDC3400F | KT3300T | TA350K |
| 350 | HKDDC3400F | KT3350T | TA350K |
| 400 | HKDDC3400F | KT3400T | 3TA400K ^② |

LGEDC3630NN


**Type LGEDC DC Circuit Breakers—
Three-Pole High Interrupting Capacity 35 kAIC at 600 Vdc**

| Maximum Continuous Ampere Rating at 40 °C | Complete Breaker Catalog Number | Circuit Breaker Frame Only ^① Catalog Number | Thermal-Magnetic Trip Unit Catalog Number | Standard Terminals Catalog Number |
|---|------------------------------------|---|--|--------------------------------------|
| 250 | LGEDC3250FAG | LGEDC3630NN | LT3250FA | TA350LK |
| 300 | LGEDC3300FAG | LGEDC3630NN | LT3300FA | TA350LK |
| 350 | LGEDC3350FAG | LGEDC3630NN | LT3350FA | TA350LK |
| 400 | LGEDC3400FAG | LGEDC3630NN | LT3400FA | TA350LK |
| 500 | LGEDC3500FAG | LGEDC3630NN | LT4500FA | 3TA632LK ^② |
| 600 | LGEDC3600FAG | LGEDC3630NN | LT3600FA | 3TA632LK ^② |

**Type LGSDC DC Circuit Breakers—
Three-Pole High Interrupting Capacity 50 kAIC at 600 Vdc**

| Maximum Continuous Ampere Rating at 40 °C | Complete Breaker Catalog Number | Circuit Breaker Frame Only ^① Catalog Number | Thermal-Magnetic Trip Unit Catalog Number | Standard Terminals Catalog Number |
|---|------------------------------------|---|--|--------------------------------------|
| 250 | LGSDC3250FAG | LGSDC3630NN | LT3250FA | TA350LK |
| 300 | LGSDC3300FAG | LGSDC3630NN | LT3300FA | TA350LK |
| 350 | LGSDC3350FAG | LGSDC3630NN | LT3350FA | TA350LK |
| 400 | LGSDC3400FAG | LGSDC3630NN | LT3400FA | TA350LK |
| 500 | LGSDC3500FAG | LGSDC3630NN | LT4500FA | 3TA632LK ^② |
| 600 | LGSDC3600FAG | LGSDC3630NN | LT3600FA | 3TA632LK ^② |

Notes

- ① For complete breaker, order individual frame, trip unit and terminals for field installation.
② Three-pole kit.

Type LGHDC DC Circuit Breakers— Three-Pole High Interrupting Capacity 65 kAIC at 600 Vdc

| Maximum Continuous Ampere Rating at 40 °C | Complete Breaker Catalog Number | Circuit Breaker Frame Only ^① Catalog Number | Thermal-Magnetic Trip Unit Catalog Number | Standard Terminals Catalog Number |
|---|---------------------------------|--|---|-----------------------------------|
| 250 | LGHDC3250FAG | LGHDC3630NN | LT3250FA | TA350LK |
| 300 | LGHDC3300FAG | LGHDC3630NN | LT3300FA | TA350LK |
| 350 | LGHDC3350FAG | LGHDC3630NN | LT3350FA | TA350LK |
| 400 | LGHDC3400FAG | LGHDC3630NN | LT3400FA | TA350LK |
| 500 | LGHDC3500FAG | LGHDC3630NN | LT4500FA | 3TA632LK ^② |
| 600 | LGHDC3600FAG | LGHDC3630NN | LT3600FA | 3TA632LK ^② |

HLDDC



Type HLDDC DC Circuit Breakers— Three-Pole High Interrupting Capacity 35 kAIC at 600 Vdc

| Maximum Continuous Ampere Rating at 40 °C | Circuit Breaker Frame Only ^① Catalog Number | Thermal-Magnetic Trip Unit Catalog Number | Standard Terminals Catalog Number |
|---|--|---|-----------------------------------|
| 300 | HLDDC3600F | LT3300T | TA602LD |
| 350 | HLDDC3600F | LT3350T | TA602LD |
| 400 | HLDDC3600F | LT3400T | TA602LD |
| 450 | HLDDC3600F | LT3450T | TA602LD |
| 500 | HLDDC3600F | LT3500T | TA602LD |
| 600 | HLDDC3600F | LT3600T | 3TA603LDK ^② |

Type HLDDC DC Circuit Breakers— Two-Pole High Interrupting Capacity 50 kAIC at 250 Vdc ^{③④}

| Maximum Continuous Ampere Rating at 40 °C | Complete Breaker Catalog Number |
|---|---------------------------------|
| 600 | HLDDC20600 |
| 700 | HLDDC20700 |
| 800 | HLDDC20800 |
| 900 | HLDDC20900 |
| 1000 | HLDDC21000 |
| 1200 | HLDDC21200 |

Notes

- ^① For complete breaker, order individual frame, trip unit and terminals for field installation.
- ^② Three-pole kit.
- ^③ Includes breaker frame, trip unit and terminals.
- ^④ Four-pole breaker with two poles wired in parallel.

HMDLDC3800F


**Type HMDLDC DC Circuit Breakers—
Three-Pole High Interrupting Capacity 35 kAIC at 600 Vdc**

| Maximum Continuous Ampere Rating at 40 °C | Circuit Breaker Frame Only ^① Catalog Number | Thermal-Magnetic Trip Unit Catalog Number | Standard Terminals Catalog Number |
|---|---|--|--------------------------------------|
| 300 | HMDLDC3800F | MT3300T | TA700MA1 |
| 350 | HMDLDC3800F | MT3350T | TA700MA1 |
| 400 | HMDLDC3800F | MT3400T | TA700MA1 |
| 450 | HMDLDC3800F | MT3450T | TA700MA1 |
| 500 | HMDLDC3800F | MT3500T | TA700MA1 |
| 600 | HMDLDC3800F | MT3600T | TA700MA1 |
| 700 | HMDLDC3800F | MT3700T | TA700MA1 |
| 800 | HMDLDC3800F | MT3800T | TA800MA2 |

**Type NBDC DC Circuit Breakers—
Three-Pole High Interrupting Capacity 50 kAIC at 600 Vdc**

| Maximum Continuous Ampere Rating at 40 °C | Complete Circuit Breaker Factory Assembled without Terminals ^② Catalog Number | Includes Magnetic Trip Unit Calibrated at 135% | Standard Terminals Catalog Number |
|---|---|--|--------------------------------------|
| 700 | NBDC3700MW | Included | TA1000NB1 |
| 800 | NBDC3800MW | Included | TA1000NB1 |
| 900 | NBDC3900MW | Included | TA1000NB1 |
| 1000 | NBDC31000MW | Included | TA1000NB1 |
| 1200 | NBDC31200MW | Included | TA1200NB1 |

RGHDC3300FFWM


**Type RGHDC DC Circuit Breakers—
Three-Pole High Interrupting Capacity 65 kAIC at 600 Vdc**

| Maximum Continuous Ampere Rating at 40 °C | Complete Circuit Breaker Factory Assembled ^② | | Includes Magnetic Trip Unit Calibrated at 135% |
|---|---|--|--|
| | Imperial Termination Threading Catalog Number | Metric Termination Threading Catalog Number | |
| 1600 | RGHDC3160FFWE | RGHDC3160FFWM | Included |
| 2000 | RGHDC3200FFWE | RGHDC3200FFWM | Included |
| 2500 | RGHDC3250FFWE | RGHDC3250FFWM | Included |
| 3000 | RGHDC3300FFWE | RGHDC3300FFWM | Included |

Notes

^① Includes frame and trip unit. Order terminals or connectors separately.

^② Six rear connectors included as standard that match terminal threading.

DC Breaker Terminal Wire Ranges

| Breaker Frame | Maximum Breaker Ampacity | Terminal Body Material | Wire Type | AWG Wire Range/ Number of Conductors | Metric Wire Range mm ² | Number of Terminals Included | Standard Terminal Catalog Number |
|---------------------|--------------------------|------------------------|-----------|---|-----------------------------------|------------------------------|----------------------------------|
| EGEDC, EGSDC, EGHDC | 100 | Aluminum | Cu/Al | 14–1/0 | 2.5–50 | 3 | 3TA125EF |
| HFDDC | 20 | Steel | Cu/Al | 14–10 (1) | 2.5–4 (1) | 3 | 3T20FB |
| | 100 | Steel | Cu/Al | 14–1/0 (1) | 2.5–50 (1) | 3 | 3T100FB |
| | 225 | Aluminum | Cu/Al | 4–4/0 (1) | 25–95 (1) | 3 | 3TA225FD |
| | 250 | Stainless steel | Cu | 4–350 (1) | 25–185 (1) | 1 | T250FJ |
| HJDDC | 250 | Aluminum | Cu/Al | 4–350 kcmil (1) | 25–185 (1) | 1 | TA250KB |
| HKDDC | 225 | Aluminum | Cu/Al | 3–350 kcmil (1) | 35–185 (1) | 1 | TA300K |
| | 350 | Aluminum | Cu/Al | 250–500 kcmil (1) | 120–240 (1) | 1 | TA350K |
| | 400 | Aluminum | Cu/Al | 3/0–250 kcmil (2) | 95–120 (1) | 3 | 3TA400K |
| LGEDC, LGSDC, LGHDC | 400 | Aluminum | Cu/Al | 2–500 (1) | 35–240 (1) | 1 | TA350LK |
| | 630 | Aluminum | Cu/Al | 2–500 kcmil (2) | 35–240 (2) | 1 | TA632L |
| | 630 | Aluminum | Cu/Al | 2–500 kcmil (2) | 35–240 (2) | 3 | 3TA632LK |
| HLDDC | 500 | Aluminum | Cu/Al | 3/0–350 kcmil (2) | 95–150 (2) | 1 | TA602LD |
| | 600 | Aluminum | Cu/Al | 400–500 kcmil (2) | 185–240 (2) | 3 | 3TA603LDK |
| HMDLDC | 600 | Aluminum | Cu/Al | 1–500 kcmil (2) | — | 1 | TA700MA1 |
| | 800 | Aluminum | Cu/Al | 3/0–400 kcmil (3) | — | 1 | TA800MA2 |
| NBDC | 700 | Aluminum | Cu/Al | 3/0–400 kcmil (3) | 95–185 (3) | 1 | TA1000NB1 |
| | 800 | Aluminum | Cu/Al | 3/0–400 kcmil (3) | 95–185 (3) | 1 | TA1000NB1 |
| | 900 | Aluminum | Cu/Al | 3/0–400 kcmil (3) | 95–185 (3) | 1 | TA1000NB1 |
| | 1000 | Aluminum | Cu/Al | 3/0–400 kcmil (3) | 95–185 (3) | 1 | TA1000NB1 |
| | 1200 | Aluminum | Cu/Al | 4/0–500 kcmil (4) | 120–240 (4) | 1 | TA1200NB1 |

Note: RGHDC breakers include six rear connectors as standard.

Molded Case Switches

Eaton's DC molded case switches are used in applications requiring a compact, high-capacity disconnect. They are UL 489 listed and have automatic high instantaneous current protection. These devices do not provide overload protection.

Molded Case Switches

| Maximum Continuous Ampere Rating at 40 °C | Interrupting Capacity (Volts DC) | Poles in Series | With Line and Load Terminals | Without Line and Load Terminals |
|---|----------------------------------|-----------------|------------------------------|---------------------------------|
| | | | Catalog Number | Catalog Number |
| 600 Vdc Maximum | | | | |
| 100 | 42 | 3 | HFDDC3100KL | HFDDC3100KW |
| 150 | 42 | 3 | HFDDC3150KL | HFDDC3150KW |
| 225 | 42 | 3 | HFDDC3225KL | HFDDC3225KW |
| 250 | 65 | 3 | JGKDC3250KSG | JGKDC3250KSW |
| 250 | 42 | 3 | HJDDC3250K | HJDDC3250KW |
| | 35 | 3 | HKDDC3400K | HKDDC3400KW |
| 400 | 65 | 3 | LGKDC3400KSG | LGKDC3400KSW |
| | 65 | 3 | LGKDC3630KSG | LGKDC3630KSW |
| 600 | 35 | 3 | HLDDC3600K | HLDDC3600WK |
| | 35 | 3 | HMDLDC3800K | HMDLDC3800WK |
| 500 Vdc Maximum | | | | |
| 100 | 65 | 3 | EGK3100KSG | EGK3100KSW |
| 250 Vdc Maximum | | | | |
| 100 | 50 | 2 | HFDDC2100KL | HFDDC2100KW |
| 150 | 50 | 2 | HFDDC2150KL | HFDDC2150KW |
| 225 | 50 | 2 | HFDDC2225KL | HFDDC2225KW |
| 1200 | 50 | ① | HLDDC21200K ① | HLDDC21200WK ① |

Note

① Four-pole frame with two-pole connected in parallel.

Accessories

Internal Accessories

| Description | Factory Installation (HFDDC) | Field Installation Kits | | | | | | | | |
|----------------------------|------------------------------|-------------------------|---------------------|---------------------|---------------------|-----------|-----------|-----------|------------|-------------|
| | | HFDDC ① | EGEDC, EGSDC, EGHDC | JGEDC, JGSDC, JGHDC | LGEDC, LGSDC, LGHDC | HJDDC | HKDDC | HLDDC | HMDLDC | NBDC |
| Right-Pole Mounting | | | | | | | | | | |
| Auxiliary switch | | | | | | | | | | |
| 1A-1B | A06 | A1X1PK | AUX1A1BPK | AUX1A1BPK | A1X2PK | A1X3PK | A1X4PK | A1X4PK | 4980D16G05 | — |
| 2A-2B | A13 | A2X1RPK | AUX2A2BPK | AUX2A2BPK | A2X2PK | A2X3PK | A2X4PK | A2X4PK | 4980D16G06 | A2X6RPK |
| Alarm switch | | | | | | | | | | |
| 1 make/1 break | B06 | A1L1RPK | ALM1M1BEPK | ALM1M1BJPK | A1L2RPK | A1L3RPK | A1L4RPK | A1L4RPK | — | A1L6RPK |
| Auxiliary and alarm combo | | | | | | | | | | |
| 1A-1B, 1 make/1 break | C05 | AAL1RPK | AUXALRMEPK | AUXALRMJPK | AAL2RPK | AAL3RPK | AA114RPK | AA114RPK | — | — |
| Left-Pole Mounting | | | | | | | | | | |
| Shunt trip | | | | | | | | | | |
| 12 Vdc | S02 | SNT1LP03K | SNT012CPK | SNT012CPK | SNT2P04K | SNT3P04K | SNT4LP03K | SNT4LP03K | 2606D58G14 | — |
| 24 Vdc | S02 | SNT1LP03K | SNT024CPK | SNT024CPK | SNT2P04K | SNT3P04K | SNT4LP03K | SNT4LP03K | 2606D58G13 | SNT6P03K ② |
| 48 Vdc | S06 | SNT1LP08K | SNT4860CPK | SNT4860CPK | SNT2P06K | SNT3P06K | SNT4LP23K | SNT4LP23K | 2606D58G12 | SNT6P23K ② |
| 60 Vdc | S06 | SNT1LP08K | SNT4860CPK | SNT4860CPK | SNT2P06K | SNT3P06K | SNT4LP23K | SNT4LP23K | 2606D58G11 | SNT6P23K ② |
| 125 Vdc | S10 | SNT1LP12K | SNT120CPK | SNT120CPK | SNT2P11K | SNT3P11K | SNT4LP26K | SNT4LP26K | 2606D58G10 | SNT6P23K ② |
| 250 Vdc | S14 | SNT1LP18K | — | — | SNT2P14K | SNT3P14K | SNT4LP14K | SNT4LP14K | 2606D58G09 | SNT6P14K |
| 120 Vac | S06 | SNT1LP12K | SNT120CPK | SNT120CPK | SNT2P11K | SNT3P11K | SNT4LP11K | SNT4LP11K | 2060D58G05 | SNT6P11K ② |
| Undervoltage release | | | | | | | | | | |
| 12 Vdc | U30 | UVH1LP20K | UVR012DPK | UVR012DPK | UVH2LP20K | UVH3LP20K | UVH4LP20K | UVH4LP20K | 372D032G06 | UVH6RP20K ② |
| 24 Vdc | U34 | UVH1LP21K | UVR024DPK | UVR024DPK | UVH2LP21K | UVH3LP21K | UVH4LP21K | UVH4LP21K | 372D032G07 | UVH6RP21K ② |
| 48 Vdc | U38 | UVH1LP22K | UVR048DPK | UVR048DPK | UVH2LP22K | UVH3LP22K | UVH4LP22K | UVH4LP22K | 372D032G08 | UVH6RP23K ② |
| 125 Vdc | U42 | UVH1LP26K | UVR125DPK | UVR125DPK | UVH2LP26K | UVH3LP26K | UVH4LP26K | UVH4LP26K | 372D032G09 | UVH6RP26K ② |
| 250 Vdc | U46 | UVH1LP28K | UVR250DPK | UVR250DPK | UVH2LP28K | UVH3LP28K | UVH4LP28K | UVH4LP28K | 372D032G10 | UVH6RP28K ② |
| 120 Vac | U14 | UVH1LP08K | UVR120APK | UVR120APK | UVH2LP08K | UVH3LP08K | UVH4LP08K | UVH4LP08K | 373D632G05 | UVH6RP08K ② |

Notes

① F-Frame circuit breakers are factory sealed. Underwriters Laboratories requires that internal accessories be installed at the factory. Internal accessories are UL listed for factory installation under E7819. Where local codes and standards permit and UL listing is not required, internal accessories can be field installed. Accessory installation should be done before the circuit breaker is mounted and connected.

② Right-pole mounted.

One accessory can be mounted per pole, per breaker. Factory installation of accessories is available. Contact Eaton for assistance with part number configuration.

Jumpers

Jumpers must be ordered separately. Priced individually.

2

HFDDC Frame

| Description | Maximum Amperes | Catalog Number |
|-------------------------------|-----------------|----------------------|
| Single copper jumper | 60 | DC1F060 ^① |
| | 100 | DC1F100 ^① |
| | 125 | DC1F125 ^① |
| | 225 | DC1F225 ^① |
| Package of 2 aluminum jumpers | 100 | DC2FD100A |
| Package of 3 aluminum jumpers | 100 | DC3FD100A |

JGEDC, JGSDC, JGHDC Frames

| Description | Maximum Amperes | Catalog Number |
|--------------------------------|-----------------|-------------------------|
| Single aluminum jumper | 250 | DC1JG250A ^① |
| Package of 2 aluminum jumpers | 250 | DC2JG250A ^① |
| Package of 20 aluminum jumpers | 250 | DC20JG250A ^① |

HKDDC Frame

| Description | Maximum Amperes | Catalog Number |
|-------------------------------|-----------------|------------------------|
| Single copper jumper | 400 | DC1K400 ^① |
| Package of 2 aluminum jumpers | 400 | DC2KD400A ^① |
| Package of 3 aluminum jumpers | 400 | DC3KD400A ^① |

LGEDC, LGSDC, LGHDC Frames

| Description | Maximum Amperes | Catalog Number |
|--------------------------------|-----------------|----------------|
| Package of 2 aluminum jumpers | 400 | DC2LG400A |
| Package of 3 aluminum jumpers | 400 | DC3LG400A |
| Package of 30 aluminum jumpers | 400 | DC30LG400A |

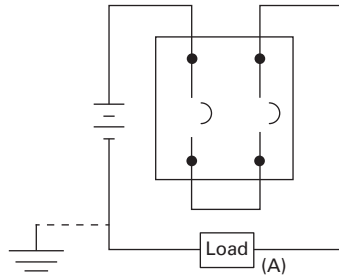
Note

- ^① Not UL Listed; Non UL listed jumpers used in a UL application may need to be qualified by the OEM in their assembly. This may take place with UL or another certified testing agency.

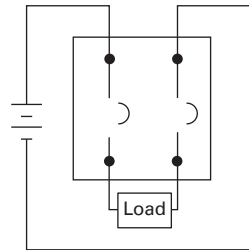
Wiring Diagrams

Series Connection Diagrams for DC Application ①②

250 Vdc Maximum—Two Poles in Series

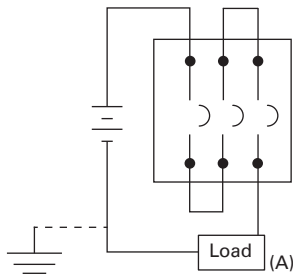


Suitable for use on ungrounded systems, or grounded systems that have one end of load (A) connected to grounded terminal, opposite poles in series connection.

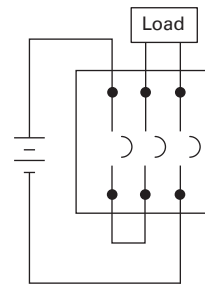


Suitable for use on ungrounded systems only.

500 Vdc or 600 Vdc Maximum—Three Poles in Series

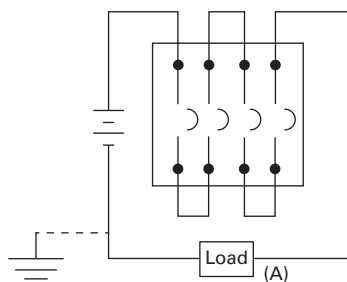


Suitable for use on ungrounded systems, or grounded systems that have one end of load (A) connected to grounded terminal, opposite poles in series connection.

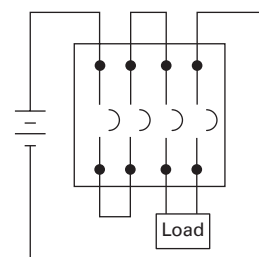


Suitable for use on ungrounded systems only.

750 Vdc Maximum—Four Poles in Series



Suitable for use on ungrounded systems, or grounded systems that have one end of load (A) connected to grounded terminal, opposite poles in series connection.



Suitable for use on ungrounded systems only.

Notes

- ① Poles in series connection is customer supplied. Use rated cable per NEC.
- ② For grounded systems, all poles in series must be connected on non-grounded terminal, with load connected to grounded terminal.

Dimensions

Approximate Dimensions in Inches (mm)

2**DC Breaker Dimensions**

| Frame | Number of Poles | Width | Height | Depth |
|---------------------|-----------------|---------------|---------------|--------------|
| EGEDC, EGSDC, EGHDC | 3 | 3.00 (76.2) | 5.50 (139.7) | 2.99 (75.9) |
| HFDDC | 1 | 1.38 (35.1) | 6.00 (152.4) | 3.38 (86.0) |
| | 2 | 2.75 (70.0) | 6.00 (152.4) | 3.38 (86.0) |
| | 3 | 4.13 (105.0) | 6.00 (152.4) | 3.38 (86.0) |
| | 4 | 5.50 (139.7) | 6.00 (152.4) | 3.38 (86.0) |
| JGEDC, JGSDC, JGHDC | 3 | 4.13 (104.9) | 7.00 (177.8) | 3.57 (90.7) |
| HJDDC | 2, 3 | 4.13 (105.0) | 10.00 (254.0) | 4.06 (103.1) |
| HKDDC | 2, 3 | 5.50 (139.7) | 10.13 (257.3) | 4.10 (104.1) |
| LGEDC, LGSDC, LGHDC | 3 | 5.48 (139.2) | 10.13 (257.3) | 4.09 (103.9) |
| 600 A Max. HLDDC | 2, 3 | 8.25 (209.6) | 10.75 (273.1) | 4.06 (103.1) |
| 1200 A Max. HLDDC | 4 | 11.00 (279.4) | 10.75 (273.1) | 4.06 (103.1) |
| HMDLDC | 2, 3 | 8.25 (209.6) | 16.00 (406.4) | 4.06 (103.1) |
| NBDC | 3 | 8.25 (209.6) | 16.00 (406.4) | 5.50 (139.7) |
| RGHDC | 3 | 15.50 (393.7) | 16.00 (406.4) | 9.75 (247.7) |

PVGard Solar Photovoltaic Circuit Breakers



600 Vdc Per-Pole

1000 Vdc Poles-in-Series

Contents

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| PVGard Solar Circuit Breakers—600 Vdc Per-Pole and 1000 Vdc Poles-in-Series | |
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| E ² Mining Service Circuit Breakers | V4-T2-468 |

PVGard Solar Circuit Breakers—600 Vdc Per-Pole and 1000 Vdc Poles-in-Series

Product Overview

- Two PVGard lineups
 - 600 Vdc per-pole breaker and switch. Each pole rated 600 Vdc
 - 1000 Vdc poles-in-series breaker and switch. Requires poles in series connection
- Both options UL 489B listed for solar photovoltaic circuit protection
- 50 °C calibration
- Offers both 100% and 80% rated breakers
- Handle bi-directional current flow

Product Description

Photovoltaic (PV) systems convert the energy of the sun into electrical power that is fed directly into the electric grid. Within the balance of system (BOS), direct current (DC) circuit breakers protect the wiring connected from the PV modules to the combiner or the inverter, while also behaving as a disconnect.

Eaton is a global leader in circuit protection and brings this expertise to bear in the photovoltaic market. PVGard solar circuit breakers are part of a product family that combines a disconnect with circuit protection in a single, compact, resettable device to protect and isolate DC circuits as needed in photovoltaic systems. PVGard breakers can replace fuses, fuse holders and disconnects in combiner box and inverter applications—saving space, streamlining design, purchasing and receiving, and reducing spare parts requirements.

There are two PVGard lineups to choose from: the industry-exclusive, 600 Vdc per-pole breakers and switches designed for residential and light commercial applications and 1000 Vdc poles-in-series breakers and switches for commercial and utility scale applications.

PVGard 600 Vdc Per-Pole Lineup

Only Eaton can offer this breakthrough breaker that will save significant space, time and cost. As a single-circuit-per-pole device, it allows space savings of up to 66% when compared to traditional poles-in-series disconnects, switches and breakers. In addition, it eliminates the need for jumpers for poles-in-series connection—saving on installation time, labor and even inventory.

PVGard 1000 Vdc Poles-in-Series Lineup

This 1000 Vdc poles-in-series lineup provides reliable and safe disconnect means and overcurrent protection in a single, compact device for commercial and utility scale PV systems. This solution does not require jumpers with the breaker/switch to be a UL 489B listed device, providing reliability and flexibility in design without limitation on implementation of the breaker/switch. If needed, cost-effective Eaton jumpers can be included.

Application Description

Photovoltaic (PV) systems convert the energy of the sun into electrical power that is fed directly into the electric grid. PVGuard circuit breakers are used to protect the wiring from the modules to the combiner box or inverter from overcurrents, and to provide an isolation mechanism.

Eaton offers a complete line of UL 489 Listed multi-purpose 600 Vdc poles-in-series breakers and switches, as well as protection for the AC side of the inverter. Refer to **Page V4-T2-441** for 600 Vdc breakers and **Page V4-T2-108** for AC breaker selection.

Features

PVGard breakers are uniquely designed with these features:

- Meets the higher voltage and lower fault current levels of solar systems
- Tested to extreme ambient conditions from -40°C to $+90^{\circ}\text{C}$
- Full complement of accessories for status, signalling, and on/off operation remotely
- Can handle bi-directional flow of current
- Can be applied in grounded, ungrounded or bi-polar systems
- Meets and exceeds the standards of UL 489B for photovoltaic molded case circuit breakers and molded case switches
- Available both standard (80%-rated) and 100%-rated breakers
- 50°C calibration
- Ability to open on signal from DC arc or ground fault detector
- Wide range of current ratings increases options for matching incoming strings
- Eliminates fuse stocking costs and matching issues

Designed specifically for high- and low-temperature demands of PV installations, PVGuard circuit breakers undergo extreme ambient cycling tests, and carry a robust operating temperature range. Trip units calibrate at 100% and 80% of nameplate current in a 50°C ambient, ensuring continuous operation in higher temperature environments typical to solar.

Rigorous third-party testing includes limited and standard fault current tests, electrical and mechanical endurance, dielectric voltage withstand and temperature tests. Eaton's PVGuard products are stand-alone devices without requiring jumpers to be UL 489B listed devices.

PVGard breakers are available with a full complement of accessories to provide string status, enable remote trip, on/off operation, and can be customized to site requirements.

Standards and Certifications

- Designed to meet UL 489B for solar photovoltaic circuit protection
- UL File E350638, Category Control Number DIUR



Product Selection

Catalog number includes breaker frame and trip unit. Order terminals separately. See **Page V4-T2-461**.
For complete internal and external accessories, see accessory section of each frame.

JG PVS Frame**JG PVS Frame, 250 A Maximum, 600 Vdc Per Pole, 1.2 kA** ^①

| Current Rating Amperes | Number Poles/ 600 Vdc Circuits | Trip Unit | 80% Rated Catalog Number | 100% Rated Catalog Number |
|------------------------|-----------------------------------|-------------------------------|-----------------------------|------------------------------|
| 90 | 3 | Fixed thermal, fixed magnetic | JGPVS3090W | CJGPVS3090W |
| 100 | 3 | Fixed thermal, fixed magnetic | JGPVS3100W | CJGPVS3100W |
| 125 | 3 | Fixed thermal, fixed magnetic | JGPVS3125W | CJGPVS3125W |
| 150 | 3 | Fixed thermal, fixed magnetic | JGPVS3150W | CJGPVS3150W |
| 175 | 3 | Fixed thermal, fixed magnetic | JGPVS3175W | CJGPVS3175W |
| 200 | 3 | Fixed thermal, fixed magnetic | JGPVS3200W | CJGPVS3200W |
| 225 | 3 | Fixed thermal, fixed magnetic | JGPVS3225W | CJGPVS3225W |
| 250 | 3 | Fixed thermal, fixed magnetic | JGPVS3250W | CJGPVS3250W |

KD PVS Frame**KD PVS Frame, 400 A Maximum, 600 Vdc Per Pole, 3 kA** ^①

| Current Rating Amperes | Number Poles/ 600 Vdc Circuits | Trip Unit | 80% Rated Catalog Number | 100% Rated Catalog Number |
|------------------------|-----------------------------------|-------------------------------|-----------------------------|------------------------------|
| 100 | 3 | Fixed thermal, fixed magnetic | KDPVS3100W | CKDPVS3100W |
| 125 | 3 | Fixed thermal, fixed magnetic | KDPVS3125W | CKDPVS3125W |
| 150 | 3 | Fixed thermal, fixed magnetic | KDPVS3150W | CKDPVS3150W |
| 175 | 3 | Fixed thermal, fixed magnetic | KDPVS3175W | CKDPVS3175W |
| 200 | 3 | Fixed thermal, fixed magnetic | KDPVS3200W | CKDPVS3200W |
| 225 | 3 | Fixed thermal, fixed magnetic | KDPVS3225W | CKDPVS3225W |
| 250 | 3 | Fixed thermal, fixed magnetic | KDPVS3250W | CKDPVS3250W |
| 300 | 3 | Fixed thermal, fixed magnetic | KDPVS3300W | CKDPVS3300W |
| 350 | 3 | Fixed thermal, fixed magnetic | KDPVS3350W | CKDPVS3350W |
| 400 | 3 | Fixed thermal, fixed magnetic | KDPVS3400W | CKDPVS3400W |

Note

^① Terminals not included with frames.

2.5

Molded Case Circuit Breakers

Specialty Breakers

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Catalog number includes breaker frame and trip unit. Order terminals separately. See **Page V4-T2-461**.

FD PV Frame

FD PV Frame, 100 A Maximum, 1000 Vdc, 3 kA ^①



| Current Rating Amperes | Poles in Series | Trip Unit | 80% Rated Catalog Number | 100% Rated Catalog Number |
|------------------------|-----------------|-------------------------------|--------------------------|---------------------------|
| 30 | 4 | Fixed thermal, fixed magnetic | FDPV4030W | CFDPV4030W |
| 40 | 4 | Fixed thermal, fixed magnetic | FDPV4040W | CFDPV4040W |
| 50 | 4 | Fixed thermal, fixed magnetic | FDPV4050W | CFDPV4050W |
| 60 | 4 | Fixed thermal, fixed magnetic | FDPV4060W | CFDPV4060W |
| 70 | 4 | Fixed thermal, fixed magnetic | FDPV4070W | CFDPV4070W |
| 80 | 4 | Fixed thermal, fixed magnetic | FDPV4080W | CFDPV4080W |
| 90 | 4 | Fixed thermal, fixed magnetic | FDPV4090W | CFDPV4090W |
| 100 | 4 | Fixed thermal, fixed magnetic | FDPV4100W | CFDPV4100W |

KD PV Frame

KD PV Frame, 350 A Maximum, 1000 Vdc, 5 kA ^①



| Current Rating Amperes | Poles in Series | Trip Unit | 80% Rated Catalog Number | 100% Rated Catalog Number |
|------------------------|-----------------|-------------------------------|--------------------------|---------------------------|
| 125 | 4 | Fixed thermal, fixed magnetic | KDPV4125W | CKDPV4125W |
| 150 | 4 | Fixed thermal, fixed magnetic | KDPV4150W | CKDPV4150W |
| 175 | 4 | Fixed thermal, fixed magnetic | KDPV4175W | CKDPV4175W |
| 200 | 4 | Fixed thermal, fixed magnetic | KDPV4200W | CKDPV4200W |
| 225 | 4 | Fixed thermal, fixed magnetic | KDPV4225W | CKDPV4225W |
| 250 | 4 | Fixed thermal, fixed magnetic | KDPV4250W | CKDPV4250W |
| 300 | 4 | Fixed thermal, fixed magnetic | KDPV4300W | CKDPV4300W |
| 350 | 4 | Fixed thermal, fixed magnetic | KDPV4350W | CKDPV4350W |

LG PV Frame

LG PV Frame, 400 A Maximum, 1000 Vdc, 5 kA ^①



| Current Rating Amperes | Poles in Series | Trip Unit | 80% Rated Catalog Number | 100% Rated Catalog Number |
|------------------------|-----------------|-------------------------------|--------------------------|---------------------------|
| 250 | 4 | Fixed thermal, fixed magnetic | LGPV4250W | CLGPV4250W |
| 300 | 4 | Fixed thermal, fixed magnetic | LGPV4300W | CLGPV4300W |
| 350 | 4 | Fixed thermal, fixed magnetic | LGPV4350W | CLGPV4350W |
| 400 | 4 | Fixed thermal, fixed magnetic | LGPV4400W | CLGPV4400W |

MDL PV Frame

MDL PV Frame, 600 A Maximum, 1000 Vdc, 7.5 kA ^①



| Current Rating Amperes | Poles in Series | Trip Unit | 80% Rated Catalog Number | 100% Rated Catalog Number |
|------------------------|-----------------|-------------------------------|--------------------------|---------------------------|
| 300 | 3 | Fixed thermal, fixed magnetic | MDLPV3300W | CMDLPV3300W |
| 350 | 3 | Fixed thermal, fixed magnetic | MDLPV3350W | CMDLPV3350W |
| 400 | 3 | Fixed thermal, fixed magnetic | MDLPV3400W | CMDLPV3400W |
| 450 | 3 | Fixed thermal, fixed magnetic | MDLPV3450W | CMDLPV3450W |
| 500 | 3 | Fixed thermal, fixed magnetic | MDLPV3500W | CMDLPV3500W |
| 600 | 3 | Fixed thermal, fixed magnetic | MDLPV3600W | CMDLPV3600W |

Note

^① Terminals not included with frames.

Accessories

Available Accessories

- Auxiliary switch
- Shunt trip
- Electrical operator
- Alarm lockout
- Undervoltage release
- Terminals
- Lock-off devices
- End cap kits
- Rotary handle mechanisms
- Flexible shaft handle mechanisms

Optional modifications

- Freeze testing

For complete internal and external accessories, see the accessory section of each frame.

External Accessories

| Description | Frame | Catalog Number |
|---|-----------------|----------------------------|
| Imperial Base Mounting Hardware | | |
| 0.164-32 x 1.5-inch pan-head steel screws and lockwashers | FD PV | BMH1 |
| 0.250-20 x 1.5 inch pan-head steel screws and lockwashers | KD PV KD PVS | BMH3 |
| — | JG PVS | N/A |
| — | LG PV | N/A |
| 0.3125-18 x 1.25 inch filister-head steel screws and lockwashers and flat washers | MDL PV | BMH5 |
| Metric Base Mounting Hardware | | |
| M4-0.7 x 38 mm pan-head steel screws and lockwashers | FD PV | BMH1M |
| M6-0.7 x 38 mm pan-head steel screws and lockwashers | KD PV KD PVS | BMH3M |
| — | JG PVS | Included ^① |
| — | LG PV | Included ^① |
| M8-1.25 x 35 mm pan-head steel screws and lockwashers | MDL PV | BMH5M |
| Interphase Barriers | | |
| | FD PV | IPB1 |
| | KD PV KD PVS | IPB3 |
| | JG PVS | FJIPBK ^② |
| | LG PV | IPB3 |
| | MDL PV | IPB4 |
| Non-Padlockable Handle Block | | |
| | FD PV | LKD1 |
| | KD PV KD PVS | LKD3 |
| | JG PVS | N/A |
| | LG PV | N/A |
| | MDL PV | LKD4 |
| Padlockable Handle Lock Hasp ^③ | | |
| | FD PV | PLK1 |
| | KD PV KD PVS | PLK3 |
| | JG PVS | FJPHL |
| | LG PV | LPHL |
| | MDL PV | HLK4 |

Factory Modifications—Freeze Testing to –40°C ^④

| Frame | Modification Code |
|--|-------------------|
| FD PV | F01 |
| JG PVS | F01 |
| KD PV and KD PVS | F01 |
| LG PV | F01 |
| MDL PV | F01 |
| Special calibration—contact Eaton for availability | |

Molded Case Switches

Eaton's DC molded case switches (MCS) are used in applications requiring a compact, high capacity disconnect. PVGuard 1000 Vdc

MCS are UL 489B listed and have automatic instantaneous current protection. These devices do not provide overload protection.

Molded Case Switches

| Maximum Continuous Ampere Rating at 50 °C | Interrupting Capacity Vdc | Poles in Series | Catalog Number |
|---|---------------------------|-----------------|---------------------|
| 1000 Vdc Maximum | | | |
| 100 | 3000 | 4 | FDPV4100KW |
| 200 | 5000 | 4 | KDPV4200KW |
| 250 | 5000 | 4 | KDPV4250KW |
| 350 | 5000 | 4 | KDPV4350KW |
| 400 | 5000 | 4 | LGPV4400KSW |
| 600 | 7500 | 3 | MDLPV3600KSW |

Notes

- ① Base mounting hardware is included with a circuit breaker or a molded case switch (included with breaker). If required separately, order 66A2546G02.
- ② Individually priced.
- ③ Locks in ON and OFF position.
- ④ Add 20% to list price.

Internal Accessories—Right Pole Mounting

| | FD PV ① | | JG PVS | | KD PV KD PVS | | LG PV | | MDL PV | |
|----------------------------------|---------------------------|--------------------------|---------------------------|--------------------------|---------------------------|--------------------------|---------------------------|--------------------------|---------------------------|--------------------------|
| | Factory Modification Code | Field Kit Catalog Number | Factory Modification Code | Field Kit Catalog Number | Factory Modification Code | Field Kit Catalog Number | Factory Modification Code | Field Kit Catalog Number | Factory Modification Code | Field Kit Catalog Number |
| Auxiliary Switch | | | | | | | | | | |
| 1A-1B | A06 | A1X1PK | A1 | AUX1A1BPK | A06 | A1X3PK | A1 | AUX1A1BPK | A06 | A1X4PK |
| 2A-2B | A13 | A2X1RPK | A2 | AUX2A2BPK | A13 | A2X3PK | A2 | AUX2A2BPK | A13 | A2X4PK |
| Alarm Switch | | | | | | | | | | |
| 1 make/1 break | B06 | A1L1RPK | B1 | ALM1M1BJPKL | B06 | A1L3RPK | B1 | ALM1M1BJPK | B06 | A1L4RPK |
| Auxiliary and Alarm Combo | | | | | | | | | | |
| 1A-1B, 1 make/1 break | C05 | AAL1RPK | B2w | AUXALRMJPK | C05 | AAL3RPK | B2 | AUXALRMJPK | C05 | AA114RPK |

Internal Accessories—Left Pole Mounting

| | FD PV ① | | JG PVS | | KD PV KD PVS | | LG PV | | MDL PV | |
|-----------------------------|---------------------------|--------------------------|---------------------------|--------------------------|---------------------------|--------------------------|---------------------------|--------------------------|---------------------------|--------------------------|
| | Factory Modification Code | Field Kit Catalog Number | Factory Modification Code | Field Kit Catalog Number | Factory Modification Code | Field Kit Catalog Number | Factory Modification Code | Field Kit Catalog Number | Factory Modification Code | Field Kit Catalog Number |
| Shunt Trip | | | | | | | | | | |
| 12 Vdc | S02 | SNT1LP03K | S4 | SNT012CPK | S42 | SNT3P04K | S4 | SNT012CPK | S02 | SNT4LP03K |
| 24 Vdc | S02 | SNT1LP03K | S6 | SNT024CPK | S42 | SNT3P04K | S6 | SNT024CPK | S02 | SNT4LP03K |
| 48 Vdc | S06 | SNT1LP08K | S7 | SNT4860CPK | S50 | SNT3P06K | S7 | SNT4860CPK | S86 | SNT4LP23K |
| 60 Vdc | S06 | SNT1LP08K | S7 | SNT4860CPK | S50 | SNT3P06K | S7 | SNT4860CPK | S86 | SNT4LP23K |
| 125 Vdc | S10 | SNT1LP12K | S5 | SNT125DPK | S10 | SNT3P11K | S2 | SNT120CPK | S42 | SNT4LP26K |
| 250 Vdc | S14 | SNT1LP18K | — | — | S14 | SNT3P14K | — | — | S14 | SNT4LP14K |
| 120 Vac | S10 | SNT1LP12K | S2 | SNT120CPK | S10 | SNT3P11K | S2 | SNT120CPK | S10 | SNT4LP11K |
| Undervoltage Release | | | | | | | | | | |
| 12 Vdc | U30 | UVH1LP20K | — | — | T02 | UVH3LP20K | U1 | UVR012DPK | T02 | UVH4LP20K |
| 24 Vdc | U34 | UVH1LP21K | U2 | UVR024CPK | T02 | UVH3LP21K | U2 | UVR024DPK | T06 | UVH4LP21K |
| 48 Vdc | U38 | UVH1LP22K | U4 | UVR048DPK | T10 | UVH3LP22K | U4 | UVR048DPK | T10 | UVH4LP22K |
| 60 Vdc | — | — | U4 | UVR048DPK | — | — | — | — | — | — |
| 125 Vdc | U42 | UVH1LP26K | U6 | UVR125DPK | T14 | UVH3LP26K | U6 | UVR125DPK | T14 | UVH4LP26K |
| 250 Vdc | U46 | UVH1LP28K | U8 | UVR250DPK | T18 | UVH3LP28K | U8 | UVR250DPK | T18 | UVH4LP28K |
| 120 Vac | U14 | UVH1LP08K | U5 | UVR120APK | U18 | UVH3LP08K | U5 | UVR120APK | U18 | UVH4LP08K |

Notes

① Underwriters Laboratories requires that internal accessories for the FD PV be installed at the factory. Internal accessories are UL listed for factory installation under E7819. Where local codes and standards permit and UL listing is not required, internal accessories can be field installed. Accessory installation should be done before the circuit breaker is mounted and connected.

One accessory can be mounted per pole, per breaker.

PVGuard Solar Circuit Breaker Terminal Offering

| Breaker Frame | Maximum Breaker Ampacity | Terminal Body Material | Wire Type | AWG Wire Range/ Number of Conductors | Metric Wire Range mm ² | Number of Terminals Included | Standard Terminal Catalog Number | Comments |
|-----------------|--------------------------|------------------------|-----------|---|-----------------------------------|------------------------------|----------------------------------|--|
| FD PV | 50 | Steel | Cu/Al | 14–4 (1) | 2.5–25 (1) | 3 | 3TA50FB | |
| | 100 | Aluminum | Cu/Al | 6–300 kcmil (1) | 16–150 (1) | 3 | 3TA225FDK3 | Includes 3P terminal cover |
| | 100 | Aluminum | Cu/Al | 6–300 kcmil (1) | 16–150 (1) | 3 | 3TA225FDK | Includes 3P terminal cover Replacement use only |
| | 100 | Copper | Cu | 4–4/0 (1) | 25–95 (1) | 3 | 3T225FD | |
| JG PVS | 250 | Aluminum | Cu/Al | #8–350 kcmil (1) | — | — | TA250FJ | |
| | 250 | Aluminum | Cu/Al | (2) 2/0–(2) 4/0 | — | ① | 3TA251FJK1 | |
| | 250 | Aluminum | Cu/Al | (2) 2/0–(2) 4/0 | — | ② | 3TA251FJK2 | |
| | 250 | Copper | Cu | #4–350 kcmil (1) | — | — | T250FJ | |
| KD PV KD PVS | 225 | Aluminum | Cu/Al | 3–350 kcmil (1) | 35–185 (1) | 1 | TA300K | |
| | 250 | Aluminum | Cu/Al | 250–500 kcmil (1) | 120–240 (1) | 1 | TA350K | |
| | 250 | Aluminum | Cu/Al | 3/0–250 kcmil (2) | 95–120 (1) | 4 | 4TA400K | Contains interphase barriers |
| | 250 | Aluminum | Cu/Al | 2/0–250 kcmil (2) or 2/0–500 kcmil (1) | 70–240 (2) | 4 | 4TA401K | |
| | 300 | Aluminum | Cu/Al | 3/0–250 kcmil (2) | 95–120 (2) | 4 | 4TA401K | Contains interphase barriers |
| | 350 | Aluminum | Cu/Al | 3/0–250 kcmil (2) | 95–120 (2) | 4 | 4TA401K | Contains interphase barriers |
| | 225 | Copper | Cu | 3–350 kcmil (1) | 35–185 (1) | 1 | T300K | |
| | 250 | Copper | Cu | 250–500 kcmil (1) | 120–240 (1) | 1 | T350K | |
| | 250 | Copper | Cu | 3/0–250 kcmil (2) | 95–120 (1) | 4 | 4T400K | Contains interphase barriers |
| | 300 | Copper | Cu | 3/0–250 kcmil (2) | 95–120 (2) | 4 | 4TA401K | Contains interphase barriers |
| LG PV | 400 | Aluminum | Cu/Al | 2–500 kcmil (2) | 35–240 (2) | 4 | 4TA632LK | Includes 4P terminal cover |
| | 250 | Copper | Cu | 2–500 kcmil (1) | 35–240 (1) | 1 | T350LK | |
| | 400 | Copper | Cu | 2–500 kcmil (2) | 35–240 (2) | 4 | 4T632LK | Includes 4P terminal cover |
| MDL PV | 300 | Aluminum | Cu/Al | 1–500 kcmil (2) | — | 1 | TA700MA1 | |
| | 600 | Aluminum | Cu/Al | 3/0–400 kcmil (3) | — | 1 | TA800MA2 | |

Endcap Kits

| Breaker Frame | Number of Poles | Thread Type | Thread Size | Catalog Number |
|---------------|-----------------|-------------|-------------|----------------|
| FD PV | 4 | Imperial | 10–32 | KPEK14 |
| | 4 | Metric | M–5 | KPEKM14 |
| JG PVS | 3 | Imperial | — | FJ3RTDK |
| | 3 | Metric | — | FJ3RTWK |
| KD PV | 4 | Imperial | 0.312–18 | KPEK34 |
| | 4 | Metric | M–8 | KPEKM34 |
| KD PVS | 3 | Imperial | — | KPEK3 |
| | 3 | Metric | — | KPEKM3 |
| LG PV | 4 | Imperial | — | N/A |
| | 4 | Metric | M-10 | L4RTWK |
| MDL PV | 3 | Imperial | — | — |
| | 3 | Metric | — | — |

Notes

① Three terminals with terminal shield as a kit.

② Three terminals with two interphase barriers as a kit.

Jumpers

Jumpers must be ordered separately. Priced individually.

2

FD PV Frame

| Description | Maximum Amperes | Catalog Number |
|-------------------------------|-----------------|----------------------|
| Single copper jumper | 60 | DC1F060 ^① |
| | 100 | DC1F100 ^① |
| | 125 | DC1F125 ^① |
| | 225 | DC1F225 ^① |
| Package of 2 aluminum jumpers | 100 | DC2FD100A |
| Package of 3 aluminum jumpers | 100 | DC3FD100A |

JG PVM, JG PVMD Frames

| Description | Maximum Amperes | Catalog Number |
|--------------------------------|-----------------|-------------------------|
| Single aluminum jumper | 250 | DC1JG250A ^① |
| Package of 2 aluminum jumpers | 250 | DC2JG250A ^① |
| Package of 20 aluminum jumpers | 250 | DC20JG250A ^① |

KD PV, KD PVM, KD PVMD Frames

| Description | Maximum Amperes | Catalog Number |
|-------------------------------|-----------------|------------------------|
| Single copper jumper | 400 | DC1K400 ^① |
| Package of 2 aluminum jumpers | 400 | DC2KD400A ^① |
| Package of 3 aluminum jumpers | 400 | DC3KD400A ^① |

LG PV Frame

| Description | Maximum Amperes | Catalog Number |
|--------------------------------|-----------------|----------------|
| Package of 2 aluminum jumpers | 400 | DC2LG400A |
| Package of 3 aluminum jumpers | 400 | DC3LG400A |
| Package of 30 aluminum jumpers | 400 | DC30LG400A |

Note

^① Not UL Listed; Non UL listed jumpers used in a UL application may need to be qualified by the OEM in their assembly. This may take place with UL or another certified testing agency.

Technical Data and Specifications

- Thermal-magnetic circuit breakers
- Designed to meet UL 489B for solar photovoltaic circuit protection
- 100% rated of the continuous current rating
- 50 °C calibrated
- Can be applied in grounded, ungrounded or bi-polar systems
- Ability to open on signal from DC arc or ground fault detector
- Two PVGard lineups
 - UL File EE350638, Category Control Number DIUR
 - 600 Vdc per-pole breaker and switch
 - Each pole rated 600 Vdc
 - 1000 Vdc poles-in-series breaker and switch
 - Requires poles in series connection

**Quick Reference PVGard Solar Circuit Breakers
600 Vdc Per-Pole****PVGard 600 Vdc Current Ratings by Frame
UL 489B Interrupting Capacity (kA) 600 Vdc Per-Pole**

| Circuit Breaker Type | Minimum Amperes | Maximum Amperes | kA Rating |
|----------------------|-----------------|-----------------|-----------|
| JG PVS | 90 | 250 | 1.2 |
| KD PVS | 100 | 400 | 3 |

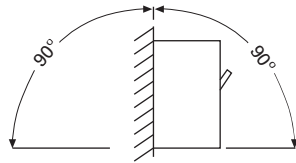
**Quick Reference PVGard Solar Circuit Breakers
1000 Vdc Poles-in-Series****PVGard 1000 Vdc Current Ratings by Frame
UL 489B Interrupting Capacity (kA) 1000 Vdc**

| Circuit Breaker Type | Minimum Amperes | Maximum Amperes | kA Rating | Poles in Series |
|----------------------|-----------------|-----------------|-----------|-----------------|
| FD PV | 30 | 100 | 3 | 4 |
| KD PV | 125 | 350 | 5 | 4 |
| LG PV | 250 | 400 | 5 | 4 |
| MDL PV | 300 | 600 | 7.5 | 3 |

PVGuard 600 Vdc Per-Pole Solar PV Circuit Breakers (100% and 80% Rated Frames)

| | JG PVS | KD PVS |
|---|------------------------|------------------------|
| Number of 600 Vdc circuits | 3 | 3 |
| Maximum voltage rating | 600 Vdc | 600 Vdc |
| Ampere range | 90–250 A | 100–400 A |
| Interrupting capacity at 600 Vdc | 1.2 kA | 3 kA |
| Time constant | 1 ms | 1 ms |
| Trip unit type | Thermal-magnetic | Thermal-magnetic |
| Rated impulse withstand voltage | | |
| Main conducting paths | 8 kV | 8 kV |
| Auxiliary circuits | 4 kV | 4 kV |
| Endurance | | |
| Mechanical operations | 10,000 | 6000 |
| Electrical operations | 400 | 400 |
| Maximum switching frequency | 240 per hour | 240 per hour |
| Third-party certification | UL 489B | UL 489B |
| Environment | | |
| Design ambient temperature | 50 °C | 50 °C |
| Maximum current at 60 °C, as % of rated current | 93% | 93% |
| Maximum current at 70 °C, as % of rated current | 85% | 85% |
| Operating temperature range | –20 °C to +50 °C | –20 °C to +50 °C |
| Storage temperature range | –20 °C to +70 °C | –20 °C to +70 °C |
| Suitable for freeze temperatures to –40 °C | Option | Option |
| Relative humidity | 0 to 95% noncondensing | 0 to 95% noncondensing |
| Suitable for reverse-feed applications | Yes | Yes |

Mounting—permissible mounting position



Connection diagrams

Terminations

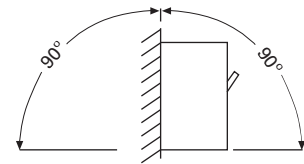
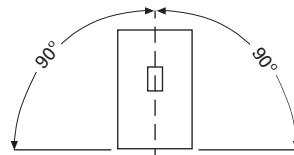
| | | |
|---------------------------|--|---|
| Al/Cu wire | TA250FJ: (1) #8–350 kcmil | TA300K: (1) #3–350 kcmil |
| | 3TA251FJK1: (2) 2/0–(2) 4/0 ^② | TA350K: (1) 250–500 kcmil |
| | 3TA251FJK2: (2) 2/0–(2) 4/0 ^③ | TA403K: (2) 1/0–400 kcmil |
| Cu wire | T250FJ: (1) #4–350 kcmil | 3TA402K: (1) 500–750 kcmil ^④ |
| | T300K: (1) #3–350 kcmil | |
| Dimensions in inches (mm) | | |
| Height | 7.00 (177.8) | 10.13 (257.3) |
| Width | 4.13 (104.9) | 5.50 (139.7) |
| Depth | 3.57 (90.7) | 4.10 (104.1) |
| Weight in lbs | 6.6 | 11.42 |

Notes

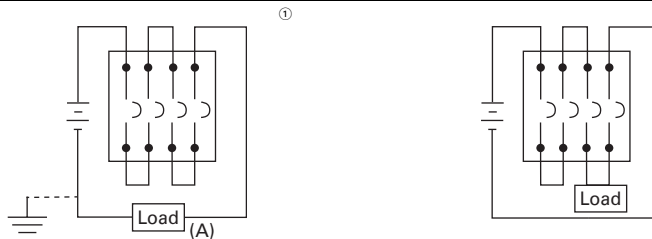
- ① Three terminals with terminal shield as a kit.
- ② Three terminals with two interphase barriers as a kit.
- ③ Not UL 489B recognized size for maximum of 400 A breaker.

PVGuard 1000 Vdc Solar PV Circuit Breakers (100% and 80% Rated Frames)

| | FD PV | KD PV | LG PV | MDL PV |
|---|------------------------|------------------------|------------------------|------------------------|
| Number of poles | 4 | 4 | 4 | 3 |
| Maximum voltage rating | 1000 Vdc | 1000 Vdc | 1000 Vdc | 1000 Vdc |
| Maximum current rating | 100 A | 350 A | 400 A | 600 A |
| Interrupting capacity at 1000 Vdc | 3 kA | 5 kA | 5 kA | 7.5 kA |
| Time constant | 1 ms | 1 ms | 1 ms | 1 ms |
| Ampere range | 15–100 A | 125–350 A | 250–400 A | 300–600 A |
| Trip unit type | Thermal-magnetic | Thermal-magnetic | Thermal-magnetic | Thermal-magnetic |
| Rated impulse withstand voltage | | | | |
| Main conducting paths | 8 kV | 8 kV | 8 kV | 8 kV |
| Auxiliary circuits | 4 kV | 4 kV | 4 kV | 4 kV |
| Endurance | | | | |
| Mechanical operations | 10,000 | 10,000 | 8000 | 8000 |
| Electrical operations | 1000 | 400 | 400 | 400 |
| Maximum switching frequency | 300 per hour | 240 per hour | 240 per hour | 240 per hour |
| Third-party certification | UL 489B | UL 489B | UL 489B | UL 489B |
| Environment | | | | |
| Design ambient temperature | 50 °C | 50 °C | 50 °C | 50 °C |
| Maximum current at 60 °C, as % of rated current | 91% | 91% | 93% | 93% |
| Maximum current at 70 °C, as % of rated current | 88% | 88% | 88% | 88% |
| Operating temperature range | –20 °C to +50 °C | –20 °C to +50 °C | –20 °C to +50 °C | –20 °C to +50 °C |
| Storage temperature range | –20 °C to +70 °C | –20 °C to +70 °C | –20 °C to +70 °C | –20 °C to +70 °C |
| Suitable for freeze temperatures to –40 °C | Option | Option | Option | Option |
| Relative humidity | 0 to 95% noncondensing | 0 to 95% noncondensing | 0 to 95% noncondensing | 0 to 95% noncondensing |
| Suitable for reverse-feed applications | Yes | Yes | Yes | Yes |
| Mounting—permissible mounting position | | | | |



Connection diagrams



Terminations

| | | | | |
|---------------------------|--------------|-------------------|------------------|-------------------|
| Al/Cu wire | #6–300 kcmil | (2) 3/0–250 kcmil | (2) #2–500 kcmil | (3) 3/0–400 kcmil |
| Cu wire | #4–4/0 | (2) 3/0–250 kcmil | (2) #2–500 kcmil | (3) 3/0–300 kcmil |
| Dimensions in inches (mm) | | | | |
| Height | 6.00 (152.4) | 10.13 (257.3) | 10.13 (257.3) | 16.00 (406.4) |
| Width | 5.50 (139.7) | 7.22 (183.4) | 7.22 (183.4) | 8.25 (209.5) |
| Depth | 3.38 (85.9) | 4.09 (103.9) | 4.09 (103.9) | 4.06 (103.1) |
| Weight in lbs | 6 | 20 | 20 | 29 |

Notes

- ① Suitable for use on ungrounded systems, or grounded systems that have one end of load (A) connected to grounded terminal, opposite poles in series connection.
 ② Suitable for use on ungrounded systems only.

Dimensions

Approximate Dimensions in Inches (mm)

2

PVGard Solar Circuit Breakers—600 Vdc Per-Pole

| Frame | Number of Circuits in a Frame | Width | Height | Depth |
|--------|-------------------------------|--------------|---------------|--------------|
| JG PVS | 3 | 4.13 (104.9) | 7.00 (177.8) | 3.44 (87.4) |
| KD PVS | 3 | 5.49 (139.4) | 10.13 (257.2) | 4.31 (109.6) |

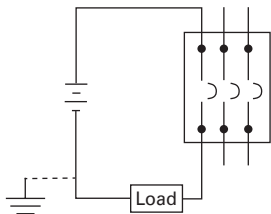
PVGard Solar Circuit Breakers—1000 Vdc Poles-in-Series

| Frame | Number of Poles | Width | Height | Depth |
|--------|-----------------|--------------|---------------|--------------|
| FD PV | 4 | 5.50 (139.7) | 6.00 (152.4) | 3.38 (86.0) |
| KD PV | 4 | 7.22 (183.4) | 10.13 (257.3) | 4.09 (103.9) |
| LG PV | 4 | 7.22 (183.4) | 10.13 (257.3) | 4.09 (103.9) |
| MDL PV | 3 | 8.25 (209.6) | 16.00 (406.4) | 4.06 (103.1) |

Wiring Diagrams

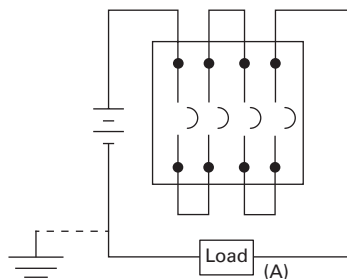
Series Connection Diagrams for DC Application ①②

JF PVS, KD PVS—600 Vdc Per-Pole

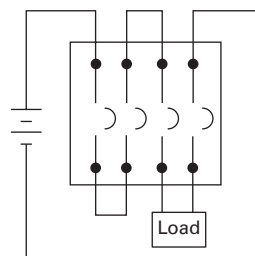


Suitable for grounded or ungrounded systems.
Suitable for quantity (3) 600 Vdc circuits.

FD PV, KD PV, LG PV—1000 Vdc Maximum—Four Poles-in-Series

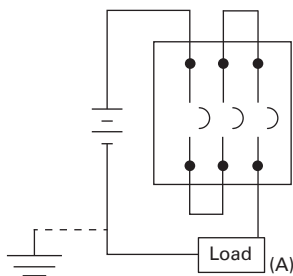


Suitable for use on ungrounded systems, or grounded systems that have one end of load (A) connected to grounded terminal, opposite poles in series connection.

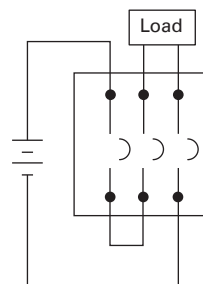


Suitable for use on ungrounded systems only.

MDL PV—1000 Vdc Maximum—Three Poles in Series



Suitable for use on ungrounded systems, or grounded systems that have one end of load (A) connected to grounded terminal, opposite poles in series connection.



Suitable for use on ungrounded systems only.

Notes

- ① Poles in series connection is customer supplied. Use rated cable per NEC.
- ② For grounded systems, all poles in series must be connected on non-grounded terminal, with load connected to grounded terminal.

E² Mining Service Breakers

2



E² Mining Service Breakers

Product Overview

State-of-the-art E² mining service breakers incorporate the rigid specifications and testing procedures developed by a focus group led by engineers from several large coal companies and Eaton design engineers. Additionally, the performance of these breakers was proven and verified during hundreds of hours of field testing in harsh mine environments.

E² mining breakers are available in 600 Vac, I000Y/577 Vac and 1200 Vac. Interchangeable trip units can be used on either 600 or 1000 Vac frames.

The E² mining breaker family is designed especially for trailing cable application per MSHA 30 CFR 75. Field interchangeable electronic rms sensing trip units are available from 150 to 2000 amperes with instantaneous pickup settings conforming to the code of Federal Regulations 30 CFR 75.601-2. Electromechanical trip units are also available with a wide range of magnetic pickup ranges.

E² electronic trip units are the first to provide the mining industry with true rms sensing, made possible by the custom ASIC microprocessor in each electronic trip unit.

E² breakers are designed to be physically and electrically interchangeable with Classic Mining Service Breakers and supersede Series C[®] Mining Service Breakers. The table to the right outlines direct replacements.

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Description

| | <i>Page</i> |
|---|------------------|
| Engine Generator Circuit Breakers | V4-T2-435 |
| Direct Current Circuit Breakers | V4-T2-441 |
| PVGard Solar Circuit Breakers—600 Vdc Per-Pole and 1000 Vdc Poles-in-Series | V4-T2-455 |
| E ² Mining Service Breakers | |
| Catalog Number Selection | V4-T2-470 |
| Product Selection | V4-T2-474 |
| Accessories | V4-T2-485 |
| Dimensions | V4-T2-488 |

600 Vac Mining Breaker Replacement Chart

| Classic | Series C | E ² |
|---------|------------------|------------------|
| FBM | FDBM | E ² F |
| HFBM | FDM | E ² F |
| | HFDM (mag. only) | E ² F |
| — | JDM | E ² J |
| KAM | KDM | E ² K |
| KAMH | KDM | E ² K |
| LAM | LDM | E ² L |
| LAMH | LDM | E ² L |
| LCM | LDM | E ² L |
| LCMH | LDM | E ² L |
| MAM | — | E ² M |
| MAMH | — | E ² M |
| MCM | — | E ² M |
| MCMH | — | E ² M |
| NBM | — | E ² N |
| NBMH | — | E ² N |
| NCM | — | E ² N |
| NCMH | — | E ² N |

1000 Vac Mining Breaker Replacement Chart

| Classic | Series C | E ² M |
|---------|----------|---------------------|
| HFM | — | E ² FM |
| — | JDCM | E ² JM |
| HKAM | KDCM | E ² KM |
| HLAM | LDCM | E ² LM |
| HLCM | LDCM | E ² LM |
| HMAM | — | E ² MM |
| HMCM | — | E ² MM |
| HNBM | — | E ² NM |
| HNBMH | — | E ² NM |
| HNCM | — | E ² NM |
| HLCLM | — | E ² NM |
| HPBM | — | E ² RM ① |

Additional Information on Mining Breakers

| Source | Description |
|----------------------|---|
| TD01217001E | E ² Mining Circuit Breaker Dimensional Data |
| BR01217001E | E ² Mining Circuit Breaker Brochure |
| TC01217001E | E ² Mining Circuit Breaker Time Current Curves |
| www.eaton.com/mining | Mining and Metals |

Note

① E²R/E²RM is a new frame physically different than the HPBM. See DS29-170MS.

Eaton's mining service circuit breakers provide short-circuit protection as specified in the code of Federal Regulations 30 CFR 75.601-2.

E² 225/400 A K frame and 400/600 A L frame electronic trip units feature specifically designed instantaneous pickup settings to conform exactly with the code of Federal Regulations 30 CFR 75.601-2. Electromechanical trip units are also available with a wide range of magnetic pickup ranges.

The tables below list the conductor size maximum allowable circuit breaker instantaneous setting and the E² breaker that meets that setting.

Interrupting Capacity Rating

| Circuit Breaker Type | Interrupting Capacity (Symmetrical kA) | | | | | Vdc ^① 250 |
|--------------------------------|--|-----|-----|-----------|------|-------------------------|
| | Vac (50/60 Hz) | | | | | |
| | 240 | 480 | 600 | 1000Y/577 | 1200 | |
| E ² F | 65 | 35 | 18 | — | — | 10 |
| E ² J | 65 | 35 | 18 | — | — | 10 |
| E ² K | 65 | 35 | 25 | — | — | 10 |
| E ² LME | 100 | 65 | 35 | — | — | 42 |
| E ² L | 65 | 35 | 25 | — | — | 22 |
| E ² M | 65 | 35 | 25 | — | — | 22 |
| E ² N | 65 | 50 | 25 | — | — | — |
| E ² R | 125 | 65 | 50 | — | — | — |
| E ² FM | 65 | 25 | 18 | 10 | — | 10 |
| E ² JM | 65 | 35 | 18 | 10 | — | 22 |
| E ² KM | 65 | 35 | 25 | 14 | — | 10 |
| E ² LMZ | 100 | 65 | 35 | 10 | — | 42 |
| E ² LM | — | 35 | 25 | 18 | — | 22 |
| E ² MM | — | 35 | 25 | 18 | — | 22 |
| E ² NM ^② | — | 50 | 25 | 25 | — | — |
| E ² RM | — | 65 | 50 | 25 | — | — |
| E ² KW | — | — | — | 10 | 10 | — |
| E ² LW | — | — | — | 10 | 10 | — |
| E ² MW | — | — | — | 12 | 12 | — |

Trailing Cable Setting Per 30 CFR 75

| Conductor Size | Maximum Breaker Instantaneous Setting | Maximum Ampere 75 °C Insulated Conductor | E ² /E ² M/E ² W Instantaneous Only | Setting |
|----------------|---------------------------------------|--|--|---------|
| 14 | 50 | 15 | E ² K 150 A | A |
| 12 | 75 | 20 | E ² K 150 A | B |
| 10 | 150 | 30 | E ² K 150 A | C |
| 8 | 200 | 50 | E ² K 225 A | A |
| 6 | 300 | 65 | E ² K 225 A | B |
| 4 | 500 | 85 | E ² K 225 A / E2L 400 A | C/A |
| 3 | 600 | 100 | E ² K 225 A / E2L 400 A | D/B |
| 2 | 800 | 115 | E ² K 225 A / E2L 400 A | E/C |
| 1 | 1000 | 130 | E ² K 225 A / E2L 400 A | F/D |
| 1/0 | 1250 | 150 | E ² K 225 A / E2L 400 A | G/E |
| 2/0 | 1500 | 175 | E ² K 225 A / E2L 400 A | H/F |
| 3/0 | 2000 | 200 | E ² L 400 A | G |
| 4/0 | 2500 | 230 | E ² L 400 A | H |
| 250 | 2500 | 255 | E ² L 400 A | H |
| 300 | 2500 | 285 | E ² L 400 A | H |
| 350 | 2500 | 310 | E ² L 400 A | H |
| 400 | 2500 | 335 | E ² L 400 A | H |
| 500 | 2500 | 380 | E ² L 400 A | H |

Auxiliary Switch Electrical Rating Data

| Maximum Voltage | Frequency | Maximum Current Amperes |
|-----------------|-----------|---------------------------|
| 600 | 50/60 Hz | 6.0 |
| 125 | DC | 0.5 (non-inductive load) |
| 250 | DC | 0.25 (non-inductive load) |

Alarm (Signal/Lockout Switch) Electrical Rating Data

| Maximum Voltage | Frequency | Maximum Current Amperes |
|-----------------|-----------|---------------------------|
| 600 | 50/60 Hz | 6.0 |
| 125 | DC | 0.5 (non-inductive load) |
| 250 | DC | 0.25 (non-inductive load) |

Notes

- ① Two poles in series. DC rating applies to breakers with thermal-magnetic trip unit. Breakers with electronic trip units are not DC rated.
- ② Series rated for application with Eaton's E²KM and E²LM breakers.

2.5

Molded Case Circuit Breakers

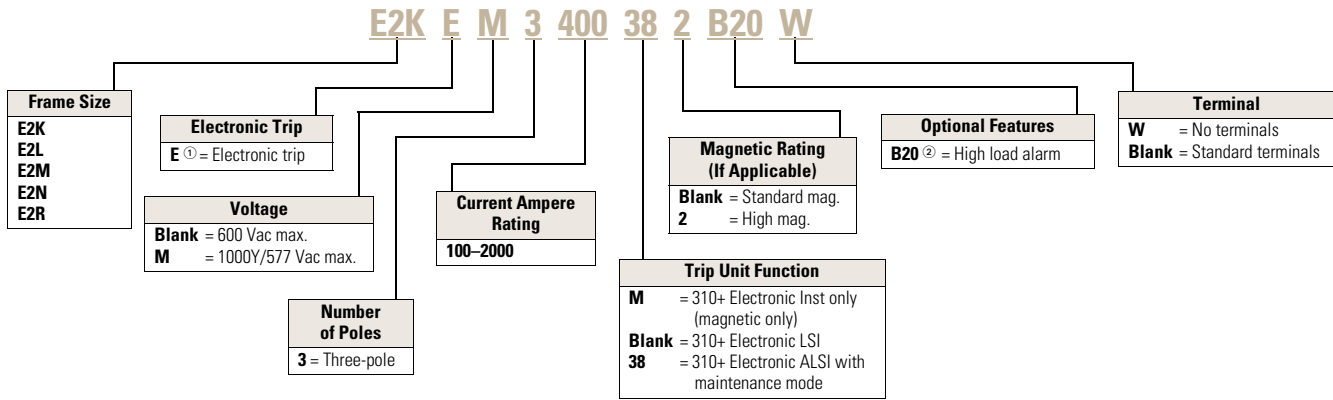
Specialty Breakers

Catalog Number Selection

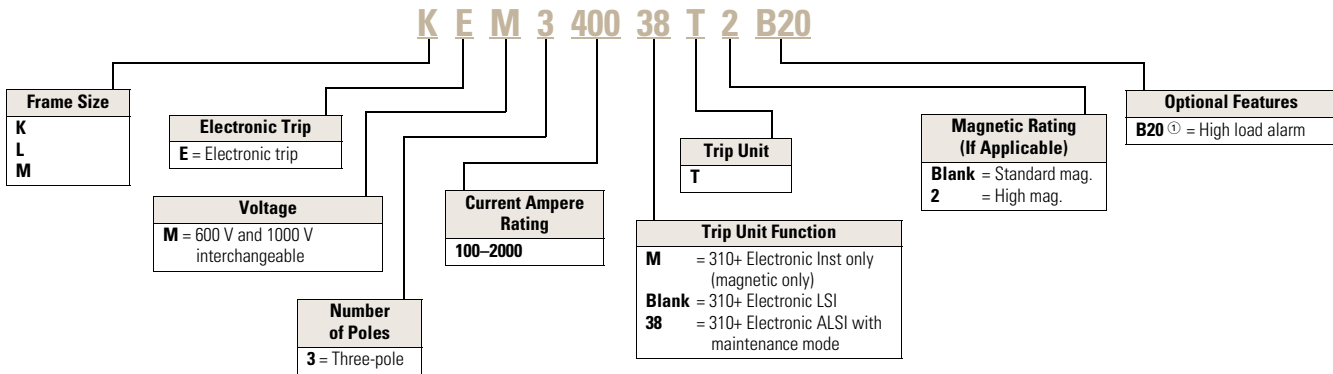
This information is presented only as an aid to understanding catalog numbers. It is not to be used to build catalog numbers for circuit breakers or trip units.

2

E² Mining Service Breaker with 310+ Electronic Trip Unit Technology



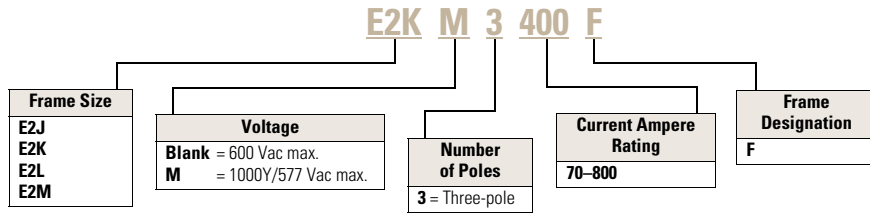
E² Mining Service 310+ Electronic Trip Unit



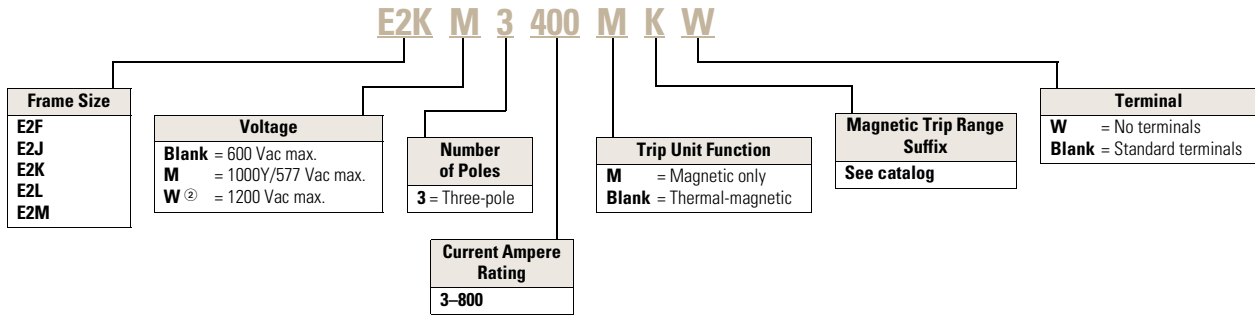
Notes

- ① All N- and R-Frame breakers equipped with 310+ Electronic Trip Unit. No "E" suffix required.
- ② Not available with instantaneous only.

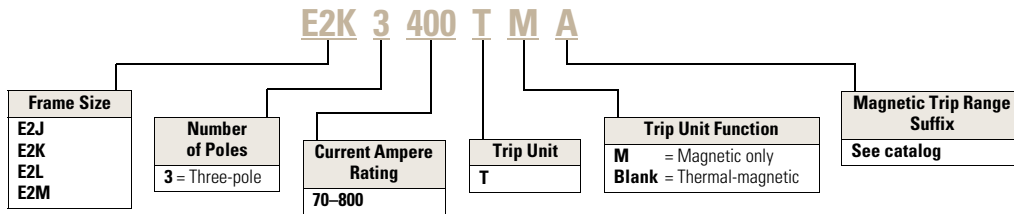
E² Mining Service Breaker Frame Only ①



E² Mining Service Breaker with Thermal-Magnetic Trip Unit ①



E² Mining Service Thermal-Magnetic Trip Unit ①



Notes

- ① Does not apply to E2LME/LMZ.
- ② Only available in K-, L- and M-Frames.

Undervoltage Release Mechanism Electrical Rating Data

2

| Breaker Type | Supply Voltage | Dropout Voltage | | Pickup Voltage Maximum | VA |
|---|----------------|-----------------|---------|---------------------------|------|
| | | Minimum | Maximum | | |
| E ² F/E ² FM | 110 Vac | 44.5 | 77 | 93.5 | 1.3 |
| | 120 Vac | | | | 1.5 |
| | 127 Vac | | | | 1.7 |
| | 110 Vdc | | | | 1.5 |
| | 120 Vdc | | | | 1.7 |
| | 125 Vdc | | | | 1.9 |
| E ² J/E ² JM | 110 Vac | 44.5 | 77 | 93.5 | 1.8 |
| | 120 Vac | | | | 2.1 |
| | 127 Vac | | | | 2.4 |
| | 110 Vdc | | | | 1.6 |
| | 120 Vdc | | | | 1.9 |
| | 125 Vdc | | | | 2.2 |
| E ² K/E ² KM/E ² KW | 110 Vac | 44.5 | 77 | 93.5 | 1.8 |
| | 120 Vac | | | | 2.1 |
| | 127 Vac | | | | 2.4 |
| | 110 Vdc | | | | 1.6 |
| | 120 Vdc | | | | 1.9 |
| | 125 Vdc | | | | 2.2 |
| E ² LME/E ² LMZ | 110 Vac | 44.5 | 77 | 93.5 | 0.96 |
| | 120 Vac | | | | 1.13 |
| | 127 Vac | | | | 1.25 |
| | 110 Vdc | 43.8 | 77 | 93.5 | 0.94 |
| | 120 Vdc | | | | 1.12 |
| | 125 Vdc | | | | 1.21 |
| E ² L/E ² LM/E ² LW/E ² M/ E ² MM/E ² MW | 110 Vac | 44.5 | 77 | 93.5 | 1.8 |
| | 120 Vac | | | | 2.1 |
| | 127 Vac | | | | 2.4 |
| | 110 Vdc | | | | 1.6 |
| | 120 Vdc | | | | 1.9 |
| | 125 Vdc | | | | 2.2 |
| E ² N/E ² NM | 110 Vac | 44.5 | 77 | 93.5 | 1.8 |
| | 120 Vac | | | | 2.1 |
| | 127 Vac | | | | 2.4 |
| | 110 Vdc | | | | 1.6 |
| | 120 Vdc | | | | 1.9 |
| | 125 Vdc | | | | 2.2 |
| E ² R/E ² RM | 110 Vac | 44.5 | 77 | 93.5 | 3.3 |
| | 120 Vac | | | | 3.6 |
| | 127 Vac | | | | 3.8 |
| | 110 Vdc | 43.8 | 77 | 93.5 | 3.3 |
| | 120 Vdc | | | | 3.6 |
| | 125 Vdc | | | | 3.8 |

Shunt Trip Electrical Rating Data

| Breaker Type | Supply Voltage | Operating Voltage | | |
|--|------------------------------------|-------------------|------|-----|
| | | Minimum | VA | |
| E ² F/E ² FM | 48 Vac | 33.6 | 92 | |
| | 60 Vac | | 140 | |
| | 110 Vac | | 480 | |
| | 120 Vac | | 570 | |
| | 127 Vac | | 640 | |
| | 208 Vac | 146 | 180 | |
| | 220 Vac | | 200 | |
| | 230 Vac | | 240 | |
| | 48 Vdc | | 33.6 | 100 |
| | 60 Vdc | | | 160 |
| | 110 Vdc | 77 | | 55 |
| | 120 Vdc | | | 66 |
| | 125 Vdc | | | 71 |
| | | | | |
| | E ² J/E ² JM | 110 Vac | 60.5 | 66 |
| 120 Vac | | 84 | | |
| 127 Vac | | 102 | | |
| 110 Vdc | | 77 | 112 | |
| 120 Vdc | | | 138 | |
| 125 Vdc | 150 | | | |
| E ² K/E ² KM/E ² KW | 110 Vac | 60 | 100 | |
| | 120 Vac | | 120 | |
| | 127 Vac | | 140 | |
| | 110 Vdc | 77 | 110 | |
| | 120 Vdc | | 130 | |
| | 125 Vdc | | 140 | |
| | 24 Vac | | 41 | |
| | 48 Vac | 18 | 139 | |
| | 60 Vac | | 210 | |
| E ² LME/E ² LMZ | 110 Vac | 60 | 83 | |
| | 120 Vac | | 92 | |
| | 127 Vac | | 117 | |
| | 24 Vdc | | 120 | |
| | 48 Vdc | 18 | 475 | |
| | 60 Vdc | | 720 | |
| | 110 Vdc | | 82 | 99 |
| | 120 Vdc | 120 | | |
| | 125 Vdc | 121 | | |

| Breaker Type | Supply Voltage | Operating Voltage | |
|---|----------------|-------------------|------|
| | | Minimum | VA |
| E ² L/E ² LM/E ² LW/E ² M/ E ² MM/E ² MW | 48 Vac | 34 | 830 |
| | 60 Vac | | 1280 |
| | 110 Vac | | 100 |
| | 120 Vac | | 120 |
| | 127 Vac | | 140 |
| | 48 Vdc | 34 | 710 |
| | 60 Vdc | | 1105 |
| | 110 Vdc | | 77 |
| | 120 Vdc | 130 | |
| | 125 Vdc | 140 | |
| | | | |
| E ² N/E ² NM | 110 Vac | 60 | 100 |
| | 120 Vac | | 120 |
| | 127 Vac | | 140 |
| | 110 Vdc | 77 | 110 |
| 120 Vdc | | 130 | |
| 125 Vdc | | 140 | |
| E ² R/E ² RM | 110 Vac | 60.5 | 330 |
| | 120 Vac | | 390 |
| | 127 Vac | | 430 |
| | 110 Vdc | 77 | 370 |
| 120 Vdc | | 440 | |
| 125 Vdc | | 480 | |

Product Selection

3 A–150 A

E²F/E²FM

2

E²F/E²FMSealed Breakers with Non-Interchangeable Trip Unit—Include Line/Load Terminals, Non-Electronic Trip Units ^①

| Maximum Continuous Ampere Rating at 40 °C | Magnetic Trip Range | Trip Unit Only Catalog Number | 600 Vac Maximum 250 Vdc 35 kA at 480 Vac Three-Pole | 1000Y/ 577 Vac Maximum 250 Vdc 10 kA at 1000 Vac Three-Pole |
|--|------------------------|----------------------------------|--|--|
| | | | Complete Breaker Catalog Number | Complete Breaker Catalog Number |
| Thermal-Magnetic | | | | |
| 15 | — | — | E2F3015 | — |
| 20 | — | — | E2F3020 | E2FM3020 |
| 25 | — | — | E2F3025 | E2FM3025 |
| 30 | — | — | E2F3030 | — |
| 35 | — | — | E2F3035 | — |
| 40 | — | — | E2F3040 | E2FM3040 |
| 45 | — | — | E2F3045 | — |
| 50 | — | — | E2F3050 | E2FM3050 |
| 60 | — | — | E2F3060 | E2FM3060 |
| 70 | — | — | E2F3070 | E2FM3070 |
| 80 | — | — | E2F3080 | E2FM3080 |
| 90 | — | — | E2F3090 | E2FM3090 |
| 100 | — | — | E2F3100 | E2FM3100 |
| 125 | — | — | E2F3125 | E2FM3125 |
| 150 | — | — | E2F3150 | E2FM3150 |
| Magnetic Only | | | | |
| 3 | 9–30 | — | E2F003AM | — |
| 7 | 21–70 | — | E2F007CM | — |
| 15 | 45–150 | — | E2F015EM | — |
| 30 | 90–300 | — | E2F030HM | — |
| | 50–150 | — | E2F030EM | — |
| 50 | 150–500 | — | E2F050KM | E2FM050KM |
| | 66–190 | — | E2F050YM | E2FM050YM |
| 70 | 210–700 | — | E2F070MM | E2FM070MM |
| | 150–500 | — | E2F100KM | E2FM100KM |
| 100 | 300–1000 | — | E2F100RM | E2FM100RM |
| | 450–1500 | — | E2F150TM | E2FM150TM |
| 150 | 750–2500 | — | E2F150UM | E2FM150UM |

Note^① For two-pole application, use outer poles.

70 A–250 A

E²J/E²JME²J/E²JM

Circuit Breakers with Interchangeable Non-Electronic Trip Units

| Maximum Continuous Ampere Rating at 40 °C | Magnetic Trip Range | Trip Unit Only Catalog Number | 600 Vac Maximum 250 Vdc 35 kA at 480 Vac Three-Pole ① | 1000V/ 577 Vac Maximum 250 Vdc 10 kA at 1000 Vac Three-Pole ② |
|---|---------------------|-------------------------------|--|--|
| | | | Complete Breaker Catalog Number | Complete Breaker Catalog Number |
| Thermal-Magnetic | | | | |
| 70 | 300–650 | E2J3070T | E2J3070W | E2JM3070W |
| 90 | 450–900 | E2J3090T | E2J3090W | E2JM3090W |
| 100 | 500–1000 | E2J3100T | E2J3100W | E2JM3100W |
| 125 | 625–1250 | E2J3125T | E2J3125W | E2JM3125W |
| 150 | 750–1500 | E2J3150T | E2J3150W | E2JM3150W |
| 175 | 875–1750 | E2J3175T | E2J3175W | E2JM3175W |
| 200 | 1000–2000 | E2J3200T | E2J3200W | E2JM3200W |
| 225 | 300–650 | E2J3225TA | E2J3225AW | E2JM3225AW |
| | 500–1000 | E2J3225TD | E2J3225DW | E2JM3225DW |
| | 1125–2250 | E2J3225T | E2J3225W | E2JM3225W |
| 250 | 1250–2500 | E2J3250T | E2J3250W | E2JM3250W |
| Magnetic Only | | | | |
| 250 | 300–650 | E2J3250TMA | E2J3250MAW | E2JM3250MAW |
| | 450–900 | E2J3250TMC | E2J3250MCW | E2JM250MCW |
| | 500–1000 | E2J3250TMD | E2J3250MDW | E2JM3250MDW |
| | 625–1250 | E2J3250TMF | E2J3250MFW | E2JM3250MFW |
| | 750–1500 | E2J3250TMG | E2J3250MGW | E2JM3250MGW |
| | 875–1750 | E2J3250TMJ | E2J3250MJW | E2JM3250MJW |
| | 1000–2000 | E2J3250TMK | E2J3250MKW | E2JM3250MKW |
| | 1125–2250 | E2J3250TML | E2J3250MLW | E2JM3250MLW |
| | 1250–2500 | E2J3250TM | E2J3250MW | E2JM3250MW |

Notes

- ① Frame only: **E2J3250F**.
 ② Frame only: **E2JM3250F**.

100 A–400 A

E²K/E²KM/E²KW

2

E²K/E²KM

Circuit Breakers with Interchangeable Non-Electronic Trip Units

| Maximum Continuous Ampere Rating at 40 °C | Magnetic Trip Range | Trip Unit Only Catalog Number | 600 Vac Maximum 250 Vdc 35 kA at 480 Vac Three-Pole ^① | 1000V/ 577 Vac Maximum 250 Vdc 14 kA at 1000 Vac Three-Pole ^② | 1200 Vac Maximum 10 kA at 1200 Vac Three-Pole ^{③④} |
|---|---------------------|-------------------------------|---|---|---|
| Thermal-Magnetic | | | | | |
| 100 | 500–1000 | E2K3100T | E2K3100W | E2KM3100W | E2KW3100W |
| 125 | 625–1250 | E2K3125T | E2K3125W | E2KM3125W | E2KW3125W |
| 150 | 750–1500 | E2K3150T | E2K3150W | E2KM3150W | E2KW3150W |
| 175 | 875–1750 | E2K3175T | E2K3175W | E2KM3175W | E2KW3175W |
| 200 | 1000–2000 | E2K3200T | E2K3200W | E2KM3200W | E2KW3200W |
| 225 | 300–650 | E2K3225TA | E2K3225AW | E2KM3225AW | E2KW3225AW |
| | 500–1000 | E2K3225TD | E2K3225DW | E2KM3225DW | E2KW3225DW |
| | 1125–2250 | E2K3225T | E2K3225W | E2KM3225W | E2KW3225W |
| 250 | 1250–2500 | E2K3250T | E2K3250W | E2KM3250W | E2KW3250W |
| 300 | 1500–3000 | E2K3300T | E2K3300W | E2KM3300W | E2KW3300W |
| 320 | 1600–3200 | — | — | — | E2KW3320W |
| 350 | 1750–3500 | E2K3350T | E2K3350W | E2KM3350W | E2KW3350W |
| 400 | 2000–4000 | E2K3400T | E2K3400W | E2KM3400W | — |
| Magnetic Only | | | | | |
| 400 | 300–650 | E2K3400TMA | E2K3400MAW | E2KM3250MAW | E2KW3250MAW |
| | 500–1000 | E2K3400TMD | E2K3400MDW | E2KM3400MDW | E2KW3350MDW |
| | 625–1250 | E2K3400TMF | E2K3400MFW | E2KM3400MFW | E2KW3350MFW |
| | 750–1500 | E2K3400TMG | E2K3400MGW | E2KM3400MGW | E2KW3350MGW |
| | 875–1750 | E2K3400TMJ | E2K3400MJW | E2KM3400MJW | E2KW3350MJW |
| | 1000–2000 | E2K3400TMK | E2K3400MKW | E2KM3400MKW | E2KW3350MKW |
| | 1125–2250 | E2K3400TML | E2K3400MLW | E2KM3400MLW | E2KW3350MLW |
| | 1250–2500 | E2K3400TMW | E2K3400MWW | E2KM3400MWW | E2KW3350MWW |
| | 1500–3000 | E2K3400TMN | E2K3400MNW | E2KM3400MNW | E2KW3350MNW |
| | 1600–3200 | — | — | — | E2KW3350MVW |
| | 1750–3500 | E2K3400TMR | E2K3400MRW | E2KM3400MRW | E2KW3350MRW |
| | 2000–4000 | E2K3400TM | E2K3400MW | E2KM3400MW | — |

Notes

- ① Frame only: **E2K3400F**.
- ② Frame only: **E2KM3400F**.
- ③ 1200 V breakers are sold as “complete breakers” only.
- ④ Maximum continuous ampere rating at 50 °C.

Please see TD01217001E for detailed dimensions.

100 A–400 A

E²KE/E²KEME²KM

Circuit Breakers with Interchangeable Electronic Trip Units

| Maximum Continuous Ampere Rating at 40 °C | Magnetic Trip Range | Trip Unit Only Catalog Number | 600 Vac Maximum 250 Vdc 35 kA at 480 Vac Three-Pole ^① Complete Breaker Catalog Number | 1000V/ 577 Vac Maximum 250 Vdc 14 kA at 1000 Vac Three-Pole ^② Complete Breaker Catalog Number |
|--|---------------------|-------------------------------|---|---|
| 310+ Electronic Instantaneous Only | | | | |
| 150 | 50–800 | KEM3150TM | E2KE3150MW | E2KEM3150MW |
| 225 | 200–1500 | KEM3225TM | E2KE3225MW | E2KEM3225MW |
| | 500–2500 | KEM3225TM2 | E2KE3225M2W | E2KEM3225M2W |
| 400 | 200–1500 | KEM3400TM | E2KE3400MW | E2KEM3400MW |
| | 500–2500 | KEM3400TM2 | E2KE3400M2W | E2KEM3400M2W |
| 310+ Electronic LSI ^③ | | | | |
| 100 | 50–800 | KEM3100T | E2KE3100W | E2KEM3100W |
| 125 | 50–800 | KEM3125T | E2KE3125W | E2KEM3125W |
| 150 | 50–800 | KEM3150T | E2KE3150W | E2KEM3150W |
| 200 | 200–1500 | KEM3200T | E2KE3200W | E2KEM3200W |
| 225 | 200–1500 | KEM3225T | E2KE3225W | E2KEM3225 |
| | 500–2500 | KEM3225T2 | E2KE32252W | E2KEM32252W |
| 400 | 200–1500 | KEM3400T | E2KE3400W | E2KEM3400W |
| | 500–2500 | KEM3400T2 | E2KE34002W | E2KEM34002W |
| 310+ Electronic ALSI with Maintenance Mode ^③ | | | | |
| 100 | 50–800 | KEM310038T | E2KE310038W | E2KEM310038W |
| 125 | 50–800 | KEM312538T | E2KE312538W | E2KEM312538W |
| 150 | 50–800 | KEM315038T | E2KE315038W | E2KEM315038W |
| 200 | 200–1500 | KEM320038T | E2KE320038W | E2KEM320038W |
| 225 | 200–1500 | KEM322538T | E2KE322538W | E2KEM322538 |
| | 500–2500 | KEM322538T2 | E2KE3225238W | E2KEM3225238W |
| 400 | 200–1500 | KEM340038T | E2KE340038W | E2KEM340038W |
| | 500–2500 | KEM340038T2 | E2KE3400238W | E2KEM3400238W |

Notes^① Frame only: **E2K3400F**.^② Frame only: **E2KM3400F**.^③ For High Load Alarm option (B20): **E2KE340038B20W, KEM3400TB20**.

Please see TD01217001E for detailed dimensions.

160 A–400 A

E²LME/E²LMZ (Series G)

2

Circuit Breakers

| Maximum Continuous Ampere Rating at 40 °C | Magnetic Trip Range | Trip Unit Only Catalog Number | 600 Vac Maximum 250 Vdc 35 kA at 480 Vac Three-Pole ① | 1000V/ 577 Vac Maximum 250 Vdc 14 kA at 1000 Vac Three-Pole ② |
|--|------------------------|----------------------------------|--|--|
| | | | Complete Breaker Catalog Number | Complete Breaker Catalog Number |
| Magnetic Only | | | | |
| 400 | 3600–4400 | LT3400KM | E2LME3400KMW | E2LMZ3400KMW |
| Interchangeable Electronic Trip Unit | | | | |
| 160 | 320–1920 | LT340031M | E2LME340031W | E2LMZ340031W |
| 200 | 400–2400 | LT340031M | E2LME340031W | E2LMZ340031W |
| 225 | 450–2700 | LT340031M | E2LME340031W | E2LMZ340031W |
| 250 | 500–3000 | LT340031M | E2LME340031W | E2LMZ340031W |
| 300 | 600–3600 | LT340031M | E2LME340031W | E2LMZ340031W |
| 315 | 630–3780 | LT340031M | E2LME340031W | E2LMZ340031W |
| 350 | 700–4200 | LT340031M | E2LME340031W | E2LMZ340031W |
| 400 | 800–4800 | LT340031M | E2LME340031W | E2LMZ340031W |

Notes① Frame only: **E2LME3400NN**.② Frame only: **E2LMZ3400NN**.

Please see TD01217001E for detailed dimensions.

300 A–600 A

E²L/E²LM/E²LW

Circuit Breakers with Interchangeable Non-Electronic Trip Units

| Maximum Continuous Ampere Rating at 40 °C | Magnetic Trip Range | Trip Unit Only Catalog Number | 600 Vac Maximum 250 Vdc 35 kA at 480 Vac Three-Pole ① | 1000Y/ 577 Vac Maximum 250 Vdc 18 kA at 1000 Vac Three-Pole ② | 1200 Vac Maximum 10 kA at 1200 Vac Three-Pole ③ |
|--|------------------------|----------------------------------|--|--|---|
| | | | Complete Breaker Catalog Number | Complete Breaker Catalog Number | Complete Breaker Catalog Number |
| Thermal-Magnetic | | | | | |
| 300 | 1500–3000 | E2L3300T | E2L3300W | E2LM3300W | E2LW3300W |
| 320 | 2250–4500 | E2L3450T | E2L3450W | E2LM3450W | E2LW3320W |
| 350 | 1600–3200 | — | — | — | E2LW3350W |
| 400 | 1750–3500 | E2L3350T | E2L3350W | E2LM3350W | E2LW3400W |
| 450 | 2000–4000 | E2L3400T | E2L3400W | E2LM3400W | E2LW3450W |
| 500 | 2500–5000 | E2L3500T | E2L3500W | E2LM3500W | — |
| 600 | 3000–6000 | E2L3600T | E2L3600W | E2LM3600W | — |
| | 1125–2250 | E2L3600TL ④ | — | — | — |
| Magnetic Only | | | | | |
| 450 | 1600–3200 | — | — | — | E2LW3450MVW |
| | 1125–2250 | — | — | — | E2LW3450MLW |
| | 1500–3000 | — | — | — | E2LW3450MNW |
| | 1750–3500 | — | — | — | E2LW3450MRW |
| | 2000–4000 | — | — | — | E2LW3450MXW |
| | 2250–4500 | — | — | — | E2LW3450MYW |
| 600 | 1125–2250 | E2L3600TML | E2L3600MLW | E2LM3600MLW | — |
| | 1500–3000 | E2L3600TMN | E2L3600MNW | E2LM3600MNW | — |
| | 1750–3500 | E2L3600TMR | E2L3600MRW | E2LM3600MRW | — |
| | 2000–4000 | E2L3600TMX | E2L3600MXW | E2LM3600MXW | — |
| | 2250–4500 | E2L3600TMY | E2L3600MYW | E2LM3600MYW | — |
| | 2500–5000 | E2L3600TMP | E2L3600MPW | E2LM3600MPW | — |
| | 3000–6000 | E2L3600TM | E2L3600MW | E2LM3600MW | — |

Notes① Frame only: **E2L3600F**.② Frame only: **E2LM3600F**.

③ Maximum continuous ampere rating at 50 °C.

④ 600 A thermal 1125–2250 T.A.

Please see TD01217001E for detailed dimensions.

300 A–600 A

E²LE/E²LEM

2

E²LM

Circuit Breakers with Interchangeable Electronic Trip Units

| Maximum Continuous Ampere Rating at 40 °C | Magnetic Trip Range | Trip Unit Only Catalog Number | 600 Vac Maximum 250 Vdc 35 kA at 480 Vac Three-Pole ① | 1000Y/ 577 Vac Maximum 250 Vdc 18 kA at 1000 Vac Three-Pole ② |
|---|------------------------|----------------------------------|--|--|
| | | | Complete Breaker Catalog Number | Complete Breaker Catalog Number |
| 310+ Electronic Instantaneous Only | | | | |
| 400 | 500–2500 | LEM3400TM | E2LE3400MW | E2LEM3400MW |
| | 1000–4000 | LEM3400TM2 | E2LE3400M2W | E2LEM3400M2W |
| 600 | 500–2500 | LEM3600TM | E2LE3600MW | E2LEM3600MW |
| | 2500–5000 | LEM3600TM2 | E2LE3600M2W | E2LEM3600M2W |
| 310+ Electronic LSI ③ | | | | |
| 300 | 500–2500 | LEM3300T | E2LE3300W | E2LEM3300W |
| 350 | 500–2500 | LEM3350T | E2LE3350W | E2LEM3350W |
| 400 | 500–2500 | LEM3400T | E2LE3400W | E2LEM3400W |
| | 1000–4000 | LEM3400T2 | E2LE34002W | E2LEM34002W |
| 600 | 500–2500 | LEM3600T | E2LE3600W | E2LEM3600W |
| | 2500–5000 | LEM3600T2 | E2LE36002W | E2LEM36002W |
| 310+ Electronic ALSI with Maintenance Mode ③ | | | | |
| 300 | 500–2500 | LEM330038T | E2LE330038W | E2LEM330038W |
| 350 | 500–2500 | LEM335038T | E2LE335038W | E2LEM335038W |
| 400 | 500–2500 | LEM340038T | E2LE340038W | E2LEM340038W |
| | 1000–4000 | LEM340038T2 | E2LE3400238W | E2LEM3400238W |
| 600 | 500–2500 | LEM360038T | E2LE360038W | E2LEM360038W |
| | 2500–5000 | LEM360038T2 | E2LE3600238W | E2LEM3600238W |

Notes① Frame only: **E2L3600F**.② Frame only: **E2LM3600F**.③ For High Load Alarm option (B20): **E2LE360038B20W, LEM3600TB20**.

Please see TD01217001E for detailed dimensions.

300 A— 800 A

*E²M/E²MM/E²MW**E²M/E²MM/E²MW*

Circuit Breakers with Interchangeable Non-Electronic Trip Units

| Maximum Continuous Ampere Rating at 40 °C | Magnetic Trip Range | Trip Unit Only Catalog Number | 600 Vac Maximum 250 Vdc 35 kA at 480 Vac Three-Pole ^① Complete Breaker Catalog Number | 1000Y/ 577 Vac Maximum 250 Vdc 18 kA at 1000 Vac Three-Pole ^② Complete Breaker Catalog Number | 1200 Vac Maximum 12 kA at 1200 Vac Three-Pole ^{③④} Complete Breaker Catalog Number |
|---|---------------------|-------------------------------|---|---|--|
| Thermal-Magnetic | | | | | |
| 400 | 1000–2000 | — | — | — | E2MW3400W |
| 500 | 1250–2500 | — | — | — | E2MW3500W |
| 600 | 1500–3000 | E2M3600TN | E2M3600W | E2MM3600W | E2MW3600W |
| 630 | 1600–3200 | — | — | — | E2MW3630W |
| 800 | 2000–4000 | E2M3800TX | E2M3800W | E2MM3800W | E2MW3800W |
| Magnetic Only | | | | | |
| 800 | 1500–3000 | E2M3800TMN | E2M3800MNW | E2MM3800MNW | E2MW3800MNW |
| | 1600–3200 | — | — | — | E2MW3800MVW |
| | 2000–4000 | E2M3800TMX | E2M3800MXW | E2MM3800MXW | E2MW3800MXW |
| | 2500–5000 | E2M3800TMP | E2M3800MPW | E2MM3800MPW | — |
| | 3000–6000 | E2M3800TMW | E2M3800MWW | E2MM3800MWW | — |

Notes

- ① Frame only: **E2M3800F**.
- ② Frame only: **E2MM3800F**.
- ③ 1200 V breakers are sold as “complete breakers” only.
- ④ Maximum continuous ampere rating at 50 °C.

Please see TD01217001E for detailed dimensions.

2.5

Molded Case Circuit Breakers

Specialty Breakers

800 A

E²ME/E²MEM

2

E²MN



Circuit Breakers with Interchangeable Electronic Trip Units

| Maximum Continuous Ampere Rating at 40 °C | Magnetic Trip Range | Trip Unit Only Catalog Number | 600 Vac Maximum 250 Vdc 35 kA at 480 Vac Three-Pole ① | 1000Y/ 577 Vac Maximum 250 Vdc 18 kA at 1000 Vac Three-Pole ② |
|---|---------------------|-------------------------------|--|--|
| | | | Complete Breaker Catalog Number | Complete Breaker Catalog Number |
| 310+ Electronic Instantaneous Only | | | | |
| 800 | 500–2500 | MEM3800TM | E2ME3800MW | E2MEM3800MW |
| | 1000–4000 | MEM3800TM2 | E2ME3800M2W | E2MEM3800M2W |
| 310+ Electronic LSI ③ | | | | |
| 800 | 500–2500 | MEM3800T | E2ME3800W | E2MEM3800W |
| | 1000–4000 | MEM3800T2 | E2ME38002W | E2MEM38002W |
| 310+ Electronic ALSI with Maintenance Mode ③ | | | | |
| 800 | 500–2500 | MEM380038T | E2ME380038W | E2MEM380038W |
| | 1000–4000 | MEM380038T2 | E2ME3800382W | E2MEM3800382W |

Notes

- ① Frame only: **E2M3800F**.
- ② Frame only: **E2MM3800F**.
- ③ For High Load Alarm option (B20): **E2ME380038B20W, MEM3800TB20**.

Please see TD01217001E for detailed dimensions.

400 A–1200 A

*E²N/E²NM**E²NM*

Circuit Breakers with Interchangeable Electronic Trip Units

| Maximum Continuous Ampere Rating at 40 °C | Magnetic Trip Range | Trip Unit Only Catalog Number | 600 Vac Maximum 250 Vdc 35 kA at 480 Vac Three-Pole | 1000Y/ 577 Vac Maximum 250 Vdc 18 kA at 1000 Vac Three-Pole |
|--|------------------------|----------------------------------|--|--|
| | | | Complete Breaker Catalog Number | Complete Breaker Catalog Number |
| 310+ Electronic Instantaneous Only | | | | |
| 800 | 500–2500 | — | E2N3800MW | E2NM3800MW |
| 1200 | 1250–5000 | — | E2N312MW | E2NM312MW |
| 310+ Electronic LSI ^① | | | | |
| 400 | 500–2500 | — | E2N3400W | E2NM3400W |
| 500 | 500–2500 | — | E2N3500W | E2NM3500W |
| 600 | 500–2500 | — | E2N3600W | E2NM3600W |
| 700 | 500–2500 | — | E2N3700W | E2NM3700W |
| 800 | 500–2500 | — | E2N3800W | E2NM3800W |
| 900 | 1250–5000 | — | E2N3900W | E2NM3900W |
| 1000 | 1250–5000 | — | E2N310W | E2NM310W |
| 1200 | 1250–5000 | — | E2N312W | E2NM312W |
| 310+ Electronic ALSI with Maintenance Mode ^① | | | | |
| 400 | 500–2500 | — | E2N340038W | E2NM340038W |
| 500 | 500–2500 | — | E2N350038W | E2NM350038W |
| 600 | 500–2500 | — | E2N360038W | E2NM360038W |
| 700 | 500–2500 | — | E2N370038W | E2NM370038W |
| 800 | 500–2500 | — | E2N380038W | E2NM380038W |
| 900 | 1250–5000 | — | E2N390038W | E2NM390038W |
| 1000 | 1250–5000 | — | E2N31038W | E2NM31038W |
| 1200 | 1250–5000 | — | E2N31238W | E2NM31238W |

Notes

^① For High Load Alarm option (B20): **E2N380038B20W**.

Please see TD01217001E for detailed dimensions.

2.5

Molded Case Circuit Breakers

Specialty Breakers

1600 A–2000 A

E²R/E²RM

2

E²RM

Circuit Breakers with Electronic Trip Units



| Maximum Continuous Ampere Rating at 40 °C | Magnetic Trip Range | Trip Unit Only Catalog Number | 600 Vac Maximum 250 Vdc 35 kA at 480 Vac Three-Pole | 1000Y/ 577 Vac Maximum 250 Vdc 18 kA at 1000 Vac Three-Pole |
|--|------------------------|----------------------------------|--|--|
| | | | Complete Breaker Catalog Number | Complete Breaker Catalog Number |
| 310+ Electronic LSI ^① | | | | |
| 1600 | 2–8 x I _n | — | E2R316W | E2RM316W |
| 2000 | 2–8 x I _n | — | E2R320W | E2RM320W |
| 310+ Electronic ALSI with Maintenance Mode ^① | | | | |
| 1600 | 2–8 x I _n | — | E2R31638W | E2RM31638W |
| 2000 | 2–8 x I _n | — | E2R32038W | E2RM32038W |

Notes

^① For High Load Alarm option (B20): **E2R1638B20W**.

Please see TD01217001E for detailed dimensions.

Accessories

Line and Load Terminals

| Breaker Type | Maximum Breaker Amperes | Wire Type | AWG Wire Range (No. Conductors) | Catalog Number |
|--|-------------------------|-----------|---------------------------------|-----------------------------------|
| E ² F/E ² FM | 100 | Cu/Al | #14–1/0 (1) | 3T100FB (package of three) |
| | 150 | Cu | #4–4/0 (1) | 3T150FB (package of three) |
| E ² J/E ² JM | 250 | Cu | #4–350 (1) | T250KB |
| E ² K/E ² KM/E ² KW | 225 | Cu | #3–350 (1) | T300K |
| | 350 | Cu | 250–500 (1) | T350K |
| | 400 | Cu | 2/0–250 (2) | 3T400K (three-pole kit) |
| E ² LME/E ² LMZ | 400 | Cu/Al | 500–750 (1) | 3TA631LK |
| E ² L/E ² LM/E ² LW | 400 | Cu/Al | 4/0–600 (1) | 3TA401LDK (three-pole kit) |
| | 600 | Cu | 250–350 (2) | T602LD |
| E ² M/E ² MM/E ² MW | 600 | Cu | (2) 2/0–500 kcmil | T600MA1 |
| | 600 | Cu/Al | (2) 1–500 kcmil | TA700MA1 |
| | 800 std. | Cu/Al | (3) 3/0–400 kcmil | TA800MA2 |
| | 800 | Cu/Al | (2) 500–750 kcmil | TA801MA |
| | 800 | Cu | (3) 3/0–300 kcmil | T800MA1 |
| E ² N/E ² NM | 700 | Cu | 2/0–500 (2) | T700NB1 |
| | 1000 | Cu | 3/0–500 (3) | T1000NB1 |
| | 1200 | Cu | 3/0–400 (4) | T1200NB3 |
| | 1600 | Cu/Al | 500–1000 (4) | TA1600RD |
| | 2000 | Cu/Al | 2–600 (6) | TA2000RD |

End Cap Terminals—For Use with Ring Type Terminals

| Breaker Type | Maximum Breaker Amperes | Catalog Number | Metric Catalog Number | Imperial |
|--|-------------------------|----------------|-----------------------|----------|
| E ² F/E ² FM | 150 | KPEK1 | KPEMK1 | — |
| E ² J/E ² JM | 250 | KPEK2 | KPEMK2 | — |
| E ² K/E ² KM/E ² KW | 400 | KPEK3 | KPEMK3 | — |
| E ² LME/E ² LMZ | 400 | — | L3RTWK | — |
| E ² L/E ² LM/E ² LW | 600 | KPEK4 | KPEMK4 | — |

External Accessories

Padlockable Handle Lock Hasp

| Breaker Type | Catalog Number |
|--|----------------|
| E ² F/E ² FM | PLK1 |
| E ² J/E ² JM | PLK3 |
| E ² K/E ² KM/E ² KW | PLK3 |
| E ² LME/E ² LMZ | LPHL |
| E ² L/E ² LM/E ² LW | HLK4 |
| E ² M/E ² MM/E ² MW | HLK4 |
| E ² N/E ² NM | PLK5 |
| E ² R/E ² RM | HLK6 |

Internal Accessories

2

Undervoltage Release ①

| Breaker Type | UVR Type | Voltage Rating | Mounting Location | Catalog Number | Factory Modification Code |
|---|--------------------------------|----------------|-------------------|-------------------------------------|---------------------------|
| E ² F/E ² FM | Handle reset | 208–240 Vac | Left pole | UVH1LP11K (thermal/magnetic only) ② | U18 |
| | Handle reset | 110–127 Vdc | Left pole | UVH1LP26K (thermal/magnetic only) ② | U42 |
| E ² J/E ² JM | Handle reset | 110–127 Vac | Left pole | UVH2LP08K ② | U18 |
| | Handle reset | 208–240 Vac | Left pole | UVH2LP11K ② | U22 |
| | Handle reset | 110–125 Vdc | Left pole | UVH2LP26K ② | T14 |
| E ² K/E ² KM/E ² KW | 120 volt handle reset with LED | 120 Vac | Left pole | UVM3LP08K ②③ | U66 |
| | 120 volt handle reset with LED | 120 Vac | Left pole | UVM3LP08KT ②④ | U68 |
| | Handle reset | 110–127 Vac | Left pole | UVH3LP08K ② | U18 |
| | Handle reset | 208–240 Vac | Left pole | UVH3LP11K ② | U22 |
| | Handle reset | 110–125 Vdc | Left pole | UVH3LP26K ② | T14 |
| E ² LME/E ² LMZ | Handle reset | 110–127 Vac | Left pole | UVR120APK | U5 |
| | Handle reset | 110–125 Vdc | Left pole | UVR125DPK | U6 |
| E ² L/E ² LM/E ² LW/E ² M/E ² MM/ E ² MW | 120 volt handle reset with LED | 120 Vac | Left pole | UVM4LP08K ②③ | U66 |
| | 120 volt handle reset with LED | 120 Vac | Left pole | UVM4LP08KT ②④ | U68 |
| | Handle reset | 110–127 Vac | Left pole | UVH4LP08K ② | U18 |
| | Handle reset | 208–240 Vac | Left pole | UVH4LP11K ② | U22 |
| | Handle reset | 110–125 Vdc | Left pole | UVH4LP26K ② | T14 |
| E ² N/E ² NM | 120 volt handle reset with LED | 120 Vac | Left pole | UVM5LP08K ③ | U66 |
| | 120 volt handle reset with LED | 120 Vac | Left pole | UVM5LT08K ④ | U68 |
| | Handle reset | 110–127 Vac | Left pole | UVH5LP08K ② | U18 |
| | Handle reset | 208–240 Vac | Left pole | UVH5LP11K ② | U22 |
| | Handle reset | 110–125 Vdc | Left pole | UVH5LP26K ② | T14 |
| E ² R/E ² RM | 120 volt handle reset with LED | 120 Vac | Right pole | UVM6RP08K ③⑤ | U58 |
| | Handle reset | 110–127 Vac | Right pole | UVH6RP08K ⑤ | U49 |
| | Handle reset | 208–240 Vac | Right pole | UVH6RP11K ⑤ | U53 |
| | Handle reset | 110–125 Vdc | Right pole | UVH6RP26K ⑤ | T33 |

Notes

- ① Contact Eaton for internal accessory voltage ratings not listed.
- ② LH (RH also available).
- ③ Pigtail leads.
- ④ Terminal blocks.
- ⑤ RH only.

Shunt Trip ①

| Breaker Type | Voltage Rating | Mounting Location | Catalog Number | Factory Modification Code |
|---|----------------------------|-------------------|--------------------|---------------------------|
| E ² F/E ² FM | 48–127 Vac or 48–60 Vdc | Left pole | SNT1LP08K ② | S06 |
| | 208–230 Vac or 110–127 Vdc | Left pole | SNT1LP12K ② | S10 |
| E ² J/E ² JM | 110–240 Vac or 110–125 Vdc | Left pole | SNT2P11K ③ | S10 |
| E ² K/E ² KM/E ² KW | 110–240 Vac or 110–125 Vdc | Left pole | SNT3P11K ③ | S10 |
| E2LME/E2LMZ | 24 Vac/Vdc | Left pole | SNT024CPK | S6 |
| | 48–60 Vac/Vdc | Left pole | SNT4860CPK | S7 |
| | 110–240 Vac/Vdc | Left pole | SNT120CPK | S2 |
| E ² L/E ² LM/E ² LW/E ² M/ E ² MM/E ² MW | 48–60 Vac | Left pole | SNT4LP05K ② | S06 |
| | 48–60 Vdc | Left pole | SNT4LP23K ② | S86 |
| | 110–240 Vac | Left pole | SNT4LP11K ② | S10 |
| | 110–125 Vdc | Left pole | SNT4LP26K ② | S42 |
| E ² N/E ² NM | 110–240 Vac | Left pole | SNT5LP11K ② | S10 |
| | 110–125 Vdc | Left pole | SNT5LP26K ② | S42 |
| E ² R/E ² RM | 110–240 Vac | Right pole | SNT6P11K ④ | S29 |
| | 110–125 Vdc | Right pole | SNT6P26K ④ | S45 |

Auxiliary Switch

| Breaker Type | Number of Sets of Contacts (1A and 1B) | Mounting Location | Catalog Number | Factory Modification Code |
|---|--|-------------------|------------------|---------------------------|
| E ² F/E ² FM | 1 | Right | A1X1PK | A06 |
| | 2 | Right | A2X1RPK | A13 |
| E ² J/E ² JM | 1 | Right | A1X2PK | A06 |
| | 2 | Right | A2X2PK | A13 |
| E ² K/E ² KM/E ² KW | 1 | Right | A1X3PK | A06 |
| | 2 | Right | A2X3PK | A13 |
| E ² LME/E ² LMZ | 1 | Right | AUX1A1BPK | A1 |
| | 2 | Right | AUX2A2BPK | A2 |
| E ² L/E ² LM/E ² LW/E ² M/ E ² MM/E ² MW | 1 | Right | A1X4PK | A06 |
| | 2 | Right | A2X4PK | A13 |
| E ² N/E ² NM | 1 | Right | A1X5PK | A06 |
| | 2 | Right | A2X5PK | A13 |
| E ² R/E ² RM | 2 | Right | A2X6RPK | A12 |
| | 4 | Right | A4X6RPK | A19 |

Alarm (Signal/Lockout Switch)

| Breaker Type | Number of Sets of Contacts (Make and Break) | Mounting Location | Catalog Number | Factory Modification Code |
|---|---|-------------------|------------------------|---------------------------|
| E ² F/E ² FM | 1 | Right | A1L1LPK/A1L1RPK | B06 |
| | 2 | Right | A2L1LPK/A2L1RPK | B13 |
| E ² J/E ² JM | 1 | Right | A1L2LPK/A1L2RPK | B06 |
| E ² K/E ² KM/E ² KW | 1 | Right | A1L3LPK/A1L3RPK | B06 |
| | 2 | Right | A2L3LPK/A2L3RPK | B13 |
| E ² LME/E ² LMZ | 1 | Right | ALM1M1BJPK | B1 |
| | 2 | Right | ALM2M2BJPK | B3 |
| E ² L/E ² LM/E ² LW/E ² M/ E ² MM/E ² MW | 1 | Right | A1L4LPK/A1L4RPK | B06 |
| | 2 | Right | A2L4LPK/A2L4RPK | B13 |
| E ² N/E ² NM | 1 | Right | A1L5LPK/A1L5RPK | B06 |
| | 2 | Right | A2L5LPK/A2L5RPK | B13 |
| E ² R/E ² RM | 1 | Right | A1L6RPK | B05 |
| | 2 | Right | A2L6RPK | B12 |

Notes

- ① Contact Eaton for internal accessory voltage ratings not listed.
- ② LH (RH also available).
- ③ LH or RH.
- ④ RH only.

2.5

Molded Case Circuit Breakers

Specialty Breakers

Dimensions

Approximate Dimensions in Inches (mm)

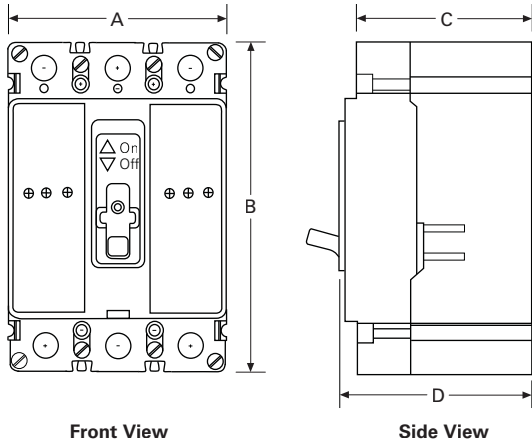
2

Please see TD01217001E for detailed dimensions.

3 A–150 A

E²F/E²FM

Sealed Breakers with Non-Interchangeable Trip Unit—
Include Line/Load Terminals Non-Electronic Trip Units

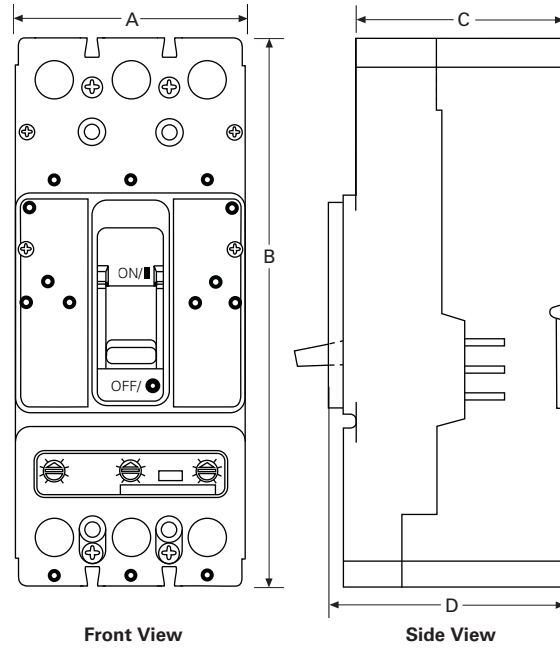


| Description | Dimensions in Inches (mm) |
|-------------|---------------------------|
| A | 4.13 (104.9) |
| B | 6.00 (152.4) |
| C | 3.38 (85.9) |
| D | 3.50 (88.9) |

70 A–250 A

E²J/E²JM

Circuit Breakers with Interchangeable Non-Electronic
Trip Units



| Description | Dimensions in Inches (mm) |
|-------------|---------------------------|
| A | 4.13 (104.9) |
| B | 10.00 (254.0) |
| C | 4.06 (103.1) |
| D | 4.31 (109.5) |

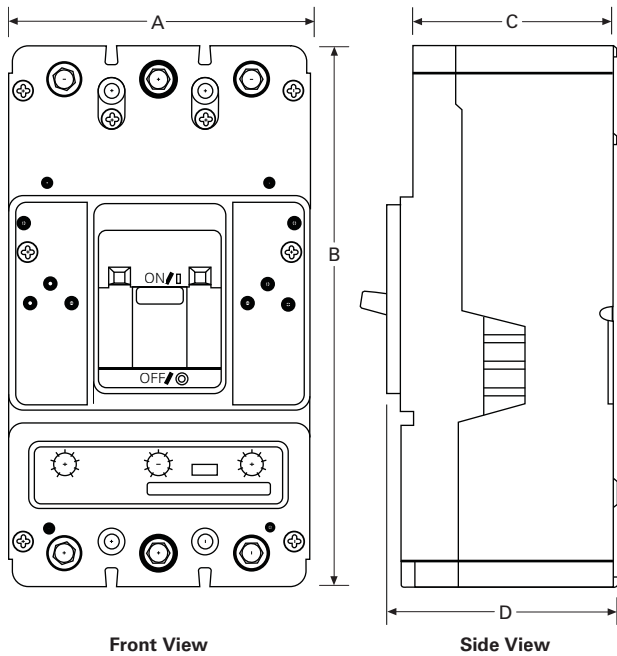
Approximate Dimensions in Inches (mm)

Please see TD01217001E for detailed dimensions.

100 A–400 A

E²K/E²KM/E²KW

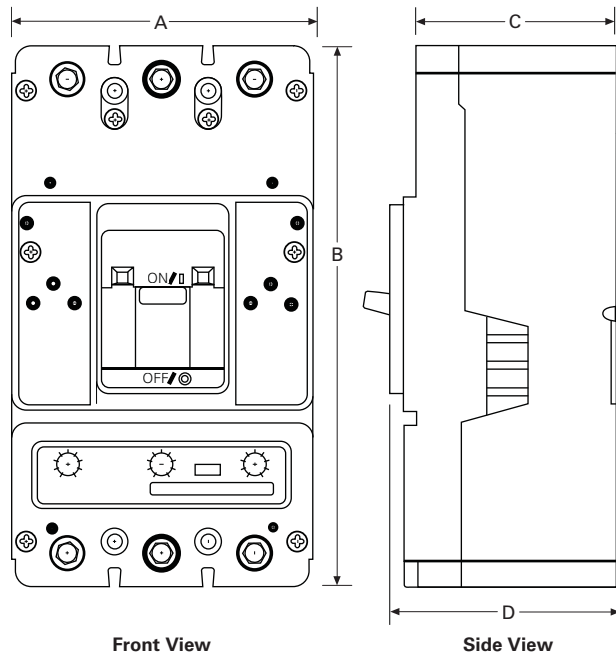
Circuit Breakers with Interchangeable Non-Electronic Trip Units



100 A–400 A

E²KE/E²KEM

Circuit Breakers with Interchangeable Electronic Trip Units



| Description | Dimensions in Inches (mm) |
|-------------|---------------------------|
| A | 5.49 (139.4) |
| B | 10.13 (257.3) |
| C | 4.06 (103.1) |
| D | 4.31 (109.5) |

| Description | Dimensions in Inches (mm) |
|-------------|---------------------------|
| A | 5.49 (139.4) |
| B | 10.13 (257.3) |
| C | 4.06 (103.1) |
| D | 4.31 (109.5) |

2.5

Molded Case Circuit Breakers

Specialty Breakers

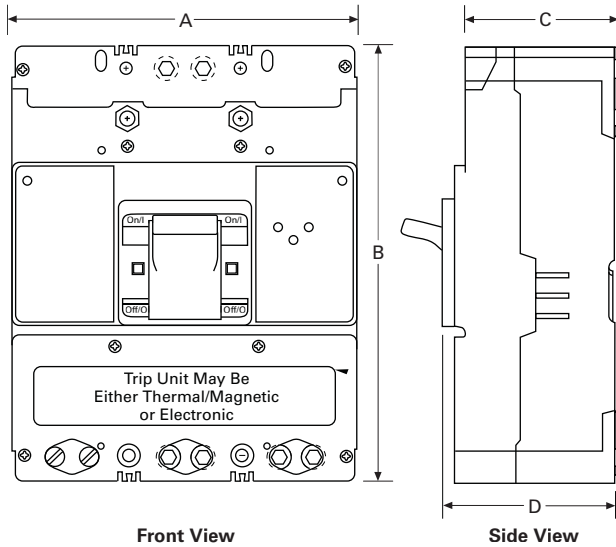
Approximate Dimensions in Inches (mm)

Please see TD01217001E for detailed dimensions.

2

160 A–400 A

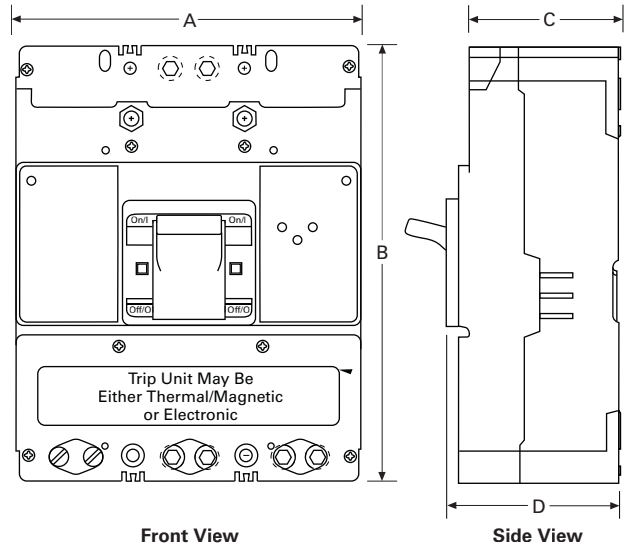
E²LME/E²LMZ Circuit Breakers



| Description | Dimensions in Inches (mm) |
|-------------|---------------------------|
| A | 5.48 (139.2) |
| B | 10.13 (257.3) |
| C | 4.00 (101.6) |
| D | 4.22 (107.1) |

300 A–600 A

E²L/E²LM/E²LW Circuit Breakers with Interchangeable Electronic Trip Units



| Description | Dimensions in Inches (mm) |
|-------------|---------------------------|
| A | 8.25 (209.6) |
| B | 10.75 (273.1) |
| C | 4.06 (103.1) |
| D | 4.38 (111.3) |

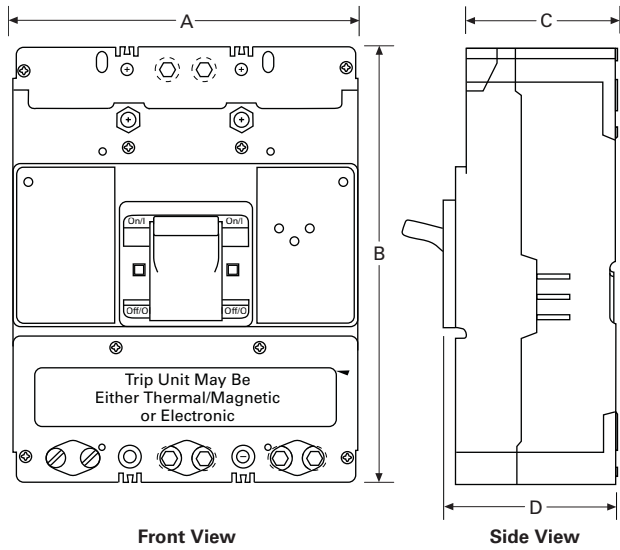
Approximate Dimensions in Inches (mm)

Please see TD01217001E for detailed dimensions.

300 A–600 A

E²LE/E²LEM

Circuit Breakers with Interchangeable Electronic Trip Units

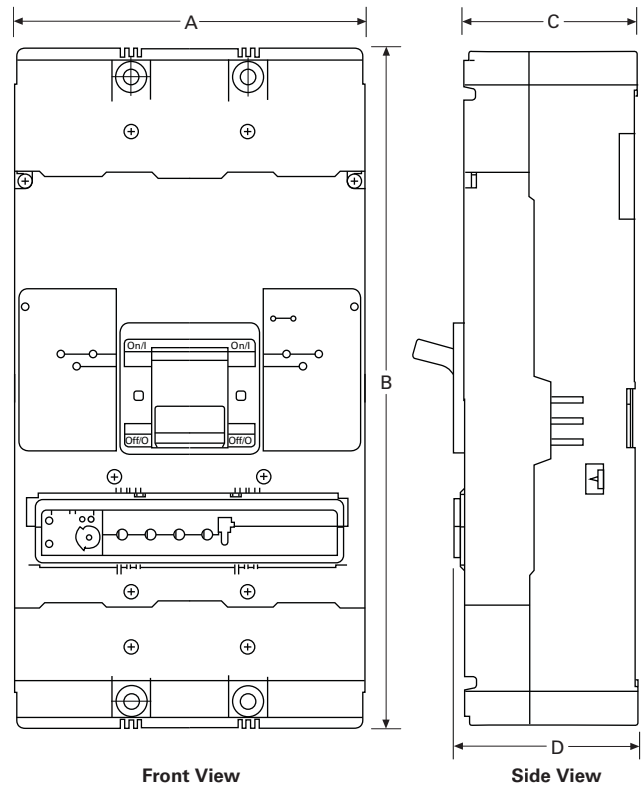


| Description | Dimensions in Inches (mm) |
|-------------|---------------------------|
| A | 8.25 (209.6) |
| B | 10.75 (273.1) |
| C | 4.06 (103.1) |
| D | 4.38 (111.3) |

300 A–800 A

E²M/E²MM/E²MW

Circuit Breakers with Interchangeable Non-Electronic Trip Units



| Description | Dimensions in Inches (mm) |
|-------------|---------------------------|
| A | 8.25 (209.6) |
| B | 16.00 (406.4) |
| C | 4.06 (103.1) |
| D | 4.38 (111.3) |

2.5

Molded Case Circuit Breakers

Specialty Breakers

Approximate Dimensions in Inches (mm)

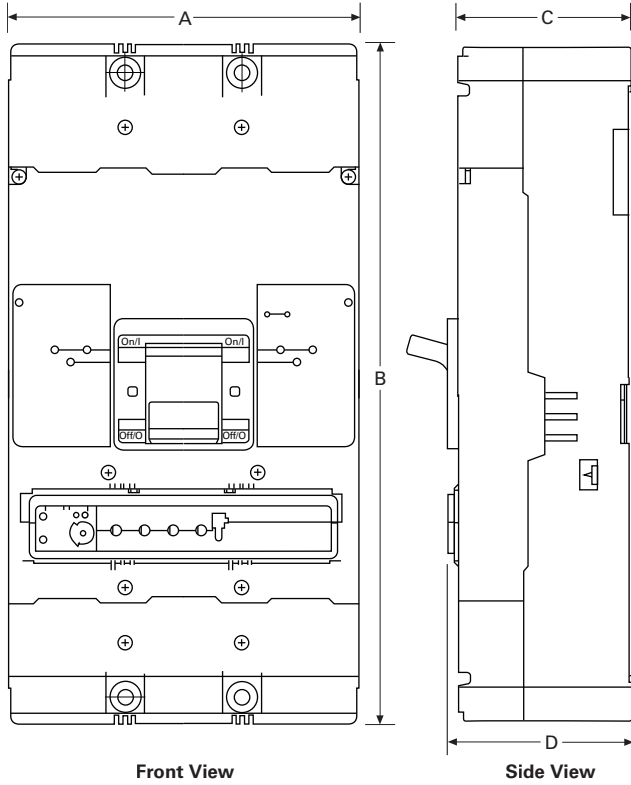
Please see TD01217001E for detailed dimensions.

2

800 A

E²ME/E²MEM

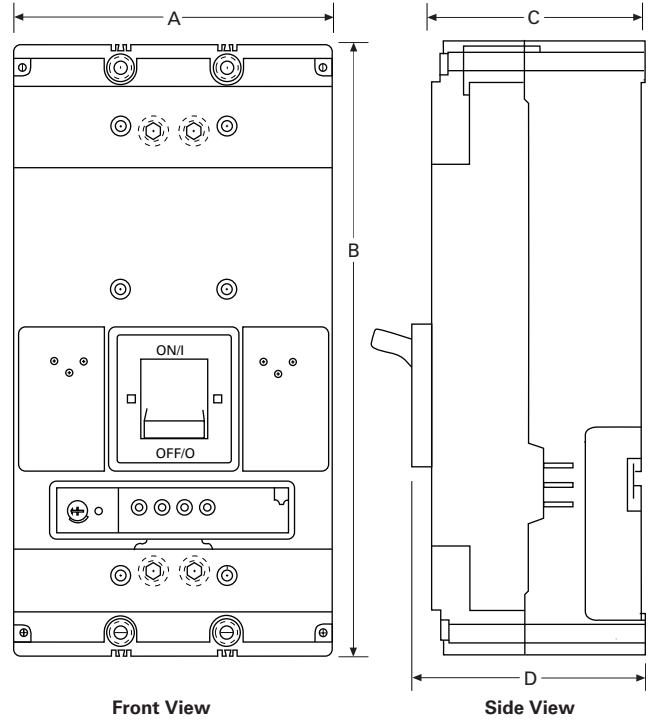
Circuit Breakers with Interchangeable Electronic Trip Units



400 A–1200 A

E²N/E²NM

Circuit Breakers with Interchangeable Electronic Trip Units



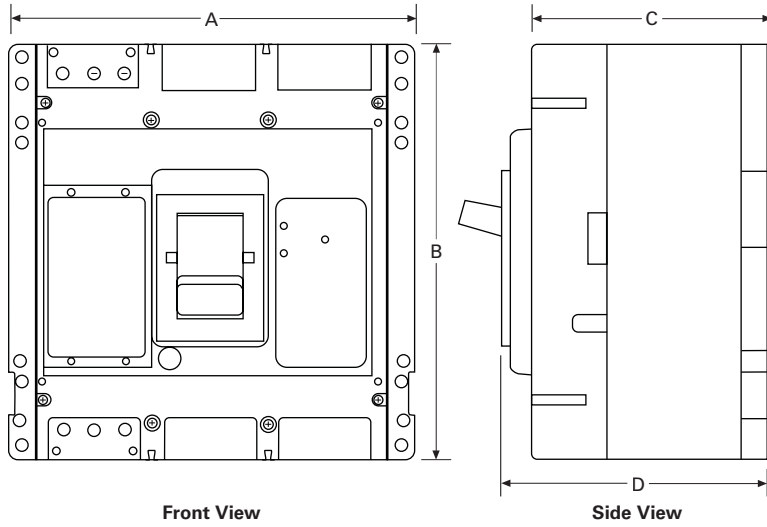
| Description | Dimensions in Inches (mm) |
|-------------|---------------------------|
| A | 8.25 (209.6) |
| B | 16.00 (406.4) |
| C | 4.06 (103.1) |
| D | 4.38 (111.3) |

| Description | Dimensions in Inches (mm) |
|-------------|---------------------------|
| A | 8.25 (209.6) |
| B | 16.00 (406.4) |
| C | 5.50 (139.7) |
| D | 6.00 (152.4) |

Approximate Dimensions in Inches (mm)
 Please see TD01217001E for detailed dimensions.

1600 A–2000 A

E²R/ E²RM
Circuit Breakers with Electronic Trip Units



| Description | Dimensions in Inches (mm) |
|-------------|---------------------------|
| A | 15.50 (393.7) |
| B | 16.00 (406.4) |
| C | 9.00 (228.6) |
| D | 10.00 (254.0) |

Handle Mechanisms



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| Flex Shaft. | V4-T2-503 |
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| Direct (Close-Coupled) Handle Mechanisms . . . | V4-T2-516 |
| Flex Shaft. | V4-T2-518 |
| Handle Extension | V4-T2-521 |

Handle Mechanisms—Series G

Product Overview

Handle mechanisms are used to operate molded case circuit breakers, molded case switches and motor circuit protectors. They are available in three basic configurations—Flange Mounted, Through-the-Door and Direct (Close-Coupled)—providing safe, dependable operation and ease of installation.

Through-the-Door

- High-Performance Rotary
- Universal Rotary

Direct (Close-Coupled)

- Universal Direct

Flange Mounted

- Flex Shaft™

Handle mechanisms are used on enclosed circuit breakers, control panels and motor control centers in many different applications. Eaton has a handle mechanism for virtually any need.

Handle Mechanisms



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| Direct (Close-Coupled) Handle Mechanisms | V4-T2-502 |
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| Handle Mechanisms—Series C | |
| High-Performance Rotary Handle Mechanisms | V4-T2-508 |
| Series C Rotary | V4-T2-512 |
| Universal Rotary | V4-T2-514 |
| Direct (Close-Coupled) Handle Mechanisms | V4-T2-516 |
| Flex Shaft | V4-T2-518 |
| Handle Extension | V4-T2-521 |

High-Performance Rotary Handle Mechanisms

Product Description

The high-performance rotary handle mechanism uses a simple, yet robust design to make installation and operation easy. The external handle's key functional components are all metallic, ensuring reliability. The metal-on-metal interface between the handle and shaft prevents contaminant buildup that could impede operation, while UV and chemical agent resistant materials protect the handle from heat and fading in direct sunlight, as well as chemicals that may be introduced in harsh environments.

In addition to its robust design features, the handle mechanism has stand-off support that allows for easy operation with a gloved hand. With a shallow profile, the handle can easily be used in applications where an internal or double door is required.

The high-performance external handle can accept padlocks or multi-hasps locks. The door is interlocked when padlocked and cannot be bypassed.

Features

- NEMA Type 1/3R/12 (IP54) and NEMA Type 4/4X (IP65) ratings
- Black/Blue or Red/Yellow external handle colors
- Three shaft lengths—6, 12 and 24 inches, which can be cut to size to match enclosure depth
- Conveniently packaged as kit containing handle, shaft and mechanism
- Replacement parts are available separately
- Metallic functional components ensure reliability
- Metal-on-metal interface between handle and shaft
- UV and chemical agent-resistant materials protect the handle
- Shallow profile
- Compatible with both Series C and Series G molded case circuit breakers and molded case switch platforms
- Same handle can be used on multiple frame sizes, reducing the number of parts needed
- Red and yellow handles to designate emergency disconnecting means
- All handle mechanisms can accept padlocks or multi-hasps locks for added flexibility
- Fast, easy installation (see video on website for step-by-step instructions)

Standards and Certifications

The mechanisms for EG, JG and LG breakers have an internal handle that can be operated independent of door position, and locked-out to meet one of the key NFPA requirements (NFPA® 79) and UL 508A disconnect requirements.

- NEMA 1/3R/12, IP54
- NEMA 4/4X, IP65







Product Selection

Handle Mechanisms for Series G Frames

2

Kits Only (Kit Includes Shaft, Mechanism and Handle)—EG-, JG- and LG-Frame





| Description | Rating Type | | EG-Frame Catalog Number | JG-Frame Catalog Number | LG-Frame Catalog Number | |
|---|--|---------|-------------------------------|-------------------------------|-------------------------------|-------------------------|
| | NEMA | IP | | | | |
| S01 Blue Handle  | S01 blue handle, 6-inch shaft | 1/3R/12 | 54 | EGHMVD06B0 / 68C6040G25 | JGHMVD06B0 / 68C6041G13 | — |
| | | 4/4X | 65 | EGHMVD06BX0 / 68C6040G28 | JGHMVD06BX0 / 68C6041G16 | — |
| | S01 blue handle, 12-inch shaft | 1/3R/12 | 54 | EGHMVD12B0 / 68C6040G26 | JGHMVD12B0 / 68C6041G14 | — |
| | | 4/4X | 65 | EGHMVD12BX0 / 68C6040G29 | JGHMVD12BX0 / 68C6041G17 | — |
| | S01 blue handle, 24-inch shaft ^① | 1/3R/12 | 54 | EGHMVD24B0 / 68C6040G27 | JGHMVD24B0 / 68C6041G15 | — |
| | | 4/4X | 65 | EGHMVD24BX0 / 68C6040G30 | JGHMVD24BX0 / 68C6041G18 | — |
| S01 Red Handle  | S01 red handle, 6-inch shaft | 1/3R/12 | 54 | EGHMVD06R0 / 68C6040G31 | JGHMVD06R0 / 68C6041G19 | — |
| | | 4/4X | 65 | EGHMVD06RX0 / 68C6040G34 | JGHMVD06RX0 / 68C6041G22 | — |
| | S01 red handle, 12-inch shaft | 1/3R/12 | 54 | EGHMVD12R0 / 68C6040G32 | JGHMVD12R0 / 68C6041G20 | — |
| | | 4/4X | 65 | EGHMVD12RX0 / 68C6040G35 | JGHMVD12RX0 / 68C6041G23 | — |
| | S01 red handle, 24-inch shaft ^① | 1/3R/12 | 54 | EGHMVD24R0 / 68C6040G33 | JGHMVD24R0 / 68C6041G21 | — |
| | | 4/4X | 65 | EGHMVD24RX0 / 68C6040G36 | JGHMVD24RX0 / 68C6041G24 | — |
| S2 Blue Handle  | S2 blue handle, 6-inch shaft | 1/3R/12 | 54 | EGHMVD06B / 68C6040G13 | JGHMVD06B / 68C6041G01 | LGHMVD06B / 68C6042G01 |
| | | 4/4X | 65 | EGHMVD06BX / 68C6040G16 | JGHMVD06BX / 68C6041G04 | LGHMVD06BX / 68C6042G04 |
| | S2 blue handle, 12-inch shaft | 1/3R/12 | 54 | EGHMVD12B / 68C6040G14 | JGHMVD12B / 68C6041G02 | LGHMVD12B / 68C6042G02 |
| | | 4/4X | 65 | EGHMVD12BX / 68C6040G17 | JGHMVD12BX / 68C6041G05 | LGHMVD12BX / 68C6042G05 |
| | S2 blue handle, 24-inch shaft ^① | 1/3R/12 | 54 | EGHMVD24B / 68C6040G15 | JGHMVD24B / 68C6041G03 | LGHMVD24B / 68C6042G03 |
| | | 4/4X | 65 | EGHMVD24BX / 68C6040G18 | JGHMVD24BX / 68C6041G06 | LGHMVD24BX / 68C6042G06 |
| S2 Red Handle  | S2 red handle, 6-inch shaft | 1/3R/12 | 54 | EGHMVD06R / 68C6040G19 | JGHMVD06R / 68C6041G07 | LGHMVD06R / 68C6042G07 |
| | | 4/4X | 65 | EGHMVD06RX / 68C6040G22 | JGHMVD06RX / 68C6041G10 | LGHMVD06RX / 68C6042G10 |
| | S2 red handle, 12-inch shaft | 1/3R/12 | 54 | EGHMVD12R / 68C6040G20 | JGHMVD12R / 68C6041G08 | LGHMVD12R / 68C6042G08 |
| | | 4/4X | 65 | EGHMVD12RX / 68C6040G23 | JGHMVD12RX / 68C6041G11 | LGHMVD12RX / 68C6042G11 |
| | S2 red handle, 24-inch shaft ^① | 1/3R/12 | 54 | EGHMVD24R / 68C6040G21 | JGHMVD24R / 68C6041G09 | LGHMVD24R / 68C6042G09 |
| | | 4/4X | 65 | EGHMVD24RX / 68C6040G24 | JGHMVD24RX / 68C6041G12 | LGHMVD24RX / 68C6042G12 |

Notes

^① 24-inch handle comes with support bracket.

Shaft guide (68C6048G49) is optional and can be used with any high-performance handle listed above for greater alignment tolerance.

Handle Mechanisms for Series G Frames**Kits Only (Kit Includes Shaft, Mechanism and Handle)—NG- and RG-Frame**

| | Description | Rating Type | | NG-Frame | RG-Frame |
|---|----------------------------------|-------------|----|---------------------------------|--------------------------------|
| | | NEMA | IP | Catalog Number | Catalog Number |
| S3 Blue Handle  | S3 blue handle, 10-inch shaft | 1/3R/12 | 54 | NGHMVD08B / 68C6043G01 | — |
| | | 4/4X | 65 | NGHMVD08BX / 68C6043G03 | — |
| S3 Red Handle  | S3 red handle, 10-inch shaft | 1/3R/12 | 54 | NGHMVD08R / 68C6043G02 | — |
| | | 4/4X | 65 | NGHMVD08RX / 68C6043G04 | — |
| S4 Blue Handle  | S4 blue handle, 10-inch shaft | 1/3R/12 | 54 | NGHMVD08BT / 68C6043G05 | RGHMVD08B / 68C6044G01 |
| | | 4/4X | 65 | NGHMVD08BTX / 68C6043G07 | RGHMVD08BX / 68C6044G03 |
| S4 Red Handle  | S4 red handle, 10-inch shaft | 1/3R/12 | 54 | NGHMVD08RT / 68C6043G06 | RGHMVD08R / 68C6044G02 |
| | | 4/4X | 65 | NGHMVD08RTX / 68C6043G08 | RGHMVD08RX / 68C6044G04 |

Note

Shaft guide (68C6048G49) is optional and can be used with any high-performance handle listed above for greater alignment tolerance.

2.6

Molded Case Circuit Breakers

Handle Mechanisms

Separate Components for Series G Frames

2

Series G Components—Shafts and Mechanisms

| Frame | Shaft Width | Shaft Length | | | | Mechanism Only |
|-------|-------------|--------------|------------|------------|----------------------|----------------|
| | | 6-Inch | 10-Inch | 12-Inch | 24-Inch ^① | |
| EG | 8 mm | 66A6010G95 | — | 66A6010G96 | 66A6010G97 | 1498D66G17 |
| JG | 8 mm | 66A6010G95 | — | 66A6010G96 | 66A6010G98 | 69D6025G17 |
| LG | 8 mm | 66A6010G95 | — | 66A6010G96 | 66A6010G99 | 69D6051G30 |
| NG | 12 mm | — | 66A6013H01 | — | — | 69D9101G30 |
| RG | 12 mm | — | 66A6013H01 | — | — | 69D9101G31 |

Series G Components—Handles Only

| Frame | Rating Type | | Handles Only | | | | | | | |
|-------|-------------|----|-------------------|-------------------|------------------|------------------|------------------|------------------|------------------|------------------|
| | NEMA | IP | S01 Blue/Black | S01 Red/Yellow | S2 Blue/Black | S2 Red/Yellow | S3 Blue/Black | S3 Red/Yellow | S4 Blue/Black | S4 Red/Yellow |
| EG | 1/3R/12 | 54 | 68C6048G41 | 68C6048G42 | 68C6048G01 | 68C6048G02 | — | — | — | — |
| | 4/4X | 65 | 68C6048G43 | 68C6048G44 | 68C6048G03 | 68C6048G04 | — | — | — | — |
| JG | 1/3R/12 | 54 | 68C6048G41 | 68C6048G42 | 68C6048G01 | 68C6048G02 | — | — | — | — |
| | 4/4X | 65 | 68C6048G43 | 68C6048G44 | 68C6048G03 | 68C6048G04 | — | — | — | — |
| LG | 1/3R/12 | 54 | — | — | 68C6048G01 | 68C6048G02 | 68C6048G05 | 68C6048G06 | — | — |
| | 4/4X | 65 | — | — | 68C6048G03 | 68C6048G04 | 68C6048G07 | 68C6048G08 | — | — |
| NG | 1/3R/12 | 54 | — | — | — | — | 68C6048G05 | 68C6048G06 | 68C6048G09 | 68C6048G10 |
| | 4/4X | 65 | — | — | — | — | 68C6048G07 | 68C6048G08 | 68C6048G11 | 68C6048G12 |
| RG | 1/3R/12 | 54 | — | — | — | — | — | — | 68C6048G09 | 68C6048G10 |
| | 4/4X | 65 | — | — | — | — | — | — | 68C6048G11 | 68C6048G12 |

Series G Components—Optional Caps

As an alternative to blue or red, a black, replaceable cap is available.

| | | | Catalog Number |
|-----|------------|------------------|----------------|
| S01 | 66A6032H01 | Black handle cap | HPHC0DGX |
| S2 | 66A6032H02 | Black handle cap | HPHC2DGX |
| S3 | 66A6032H03 | Black handle cap | HPHC3DGX |

Series G Replacement Hardware

This kit provides replacement parts for Series G high performance handle only.

| | Catalog Number |
|---|----------------|
| High-performance handle replacement parts kit | 66A6029G01 |

Notes

① 24-inch handle comes with support bracket.

Shaft guide (68C6048G49) is optional and can be used with any high-performance handle listed above for greater alignment tolerance.

Dimensions

Approximate Dimensions in mm (Inches)

High-Performance Rotary Handle Mechanisms

| Handle Type | Front Operation Direction of Operation | Door Drilling |
|-------------|---|---------------|
| Type S01 | | |
| Type S2 | | |
| Type S3 | | |
| Type S4 | | |

Handle Mechanisms

2



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| Flex Shaft. | V4-T2-503 |
| Handle Mechanisms—Series C | |
| High-Performance Rotary Handle Mechanisms.. | V4-T2-508 |
| Series C Rotary | V4-T2-512 |
| Universal Rotary | V4-T2-514 |
| Direct (Close-Coupled) Handle Mechanisms . . . | V4-T2-516 |
| Flex Shaft. | V4-T2-518 |
| Handle Extension | V4-T2-521 |

Universal Rotary

Product Description

Eaton’s Universal Rotary is suitable for use with Type 1 or 12 enclosure types. All rotary handle mechanisms include a handle “lock off” to prevent turning the breaker ON while in the OFF position, and indicate ON/OFF/Tripped/Reset positions. The Universal Rotary has the added feature of international markings for ON (I) and OFF (O). The Universal Rotary is made of molded material.

The Universal Rotary mechanisms for EG-, JG- and LG-Frame MCCBs can be operated by hand with the door open or “locked off” to prevent operation with the door open.

Standards and Certifications

Universal Rotary is UL listed and meets CSA requirements. Universal Rotary also meets IEC 60947-1 and IEC 60947-2 for international compliance. Rotary UL File Number is E64983.



Features

Features Comparison of Series C Rotary and Universal Rotary Handle Mechanism

| Rotary | Number of Poles | NEMA Enclosure Type | | | | Handle Lock-Off ② | Handle Indication: ON/OFF TRIPPED/RESET | International Markings ON (I) OFF (O) | Handle Material | Available Handle Colors | Handle Rotation | Shaft Lengths (Inches) |
|------------------|-----------------|---------------------|----|----|--------|-------------------|---|---------------------------------------|-----------------|-------------------------|-----------------|------------------------|
| | | 1 | 3R | 12 | 4/4X ① | | | | | | | |
| Series C rotary | — | ■ | ■ | ■ | ■ | ■ | ■ | ■ | Metal | Black | 45 deg. | 6, 12, 16, 24 |
| Universal rotary | — | ■ | — | ■ | — | ■ | ■ | ■ | Molded plastic | Yellow/Red/Black | 90 deg. | 6, 12, 24 |

Notes

- ① Type 4/4X application requires special handle. See “Ordering Information.”
- ② All rotary handle mechanisms include a handle “Lock Off” to prevent turning the breaker ON while in the OFF position.

Product Selection

Universal Rotary



Universal Rotary Through-the-Door Handle Mechanisms

| Handle Color | UL Rating | Shaft Length in Inches (mm) | Complete Catalog Number ^① |
|-----------------|-----------|-----------------------------|--------------------------------------|
| EG-Frame | | | |
| Black | 1, 12 | 6.00 (152.4) | EHMVD06B |
| | | 12.00 (304.8) | EHMVD12B |
| | | 24.00 (609.6) | EHMVD24B |
| Red | 1, 12 | 6.00 (152.4) | EHMVD06R |
| | | 12.00 (304.8) | EHMVD12R |
| | | 24.00 (609.6) | EHMVD24R |
| JG-Frame | | | |
| Black | 1, 12 | 6.00 (152.4) | FJHMVD06B |
| | | 12.00 (304.8) | FJHMVD12B |
| | | 24.00 (609.6) | FJHMVD24B |
| Red | 1, 12 | 6.00 (152.4) | FJHMVD06R |
| | | 12.00 (304.8) | FJHMVD12R |
| | | 24.00 (609.6) | FJHMVD24R |
| LG-Frame | | | |
| Black | 1, 12 | 6.00 (152.4) | KLHMVD06B |
| | | 12.00 (304.8) | KLHMVD12B |
| | | 24.00 (609.6) | KLHMVD24B |
| Red | 1, 12 | 6.00 (152.4) | KLHMVD06R |
| | | 12.00 (304.8) | KLHMVD12R |
| | | 24.00 (609.6) | KLHMVD24R |
| NG-Frame | | | |
| Black | 1 | 6.00 (152.4) | HMVD5B |
| RG-Frame | | | |
| Black | 1 | 9.00 (228.6) | HMVD6B |

Series G Rotary



Series G Rotary Ordering Information

| Shaft Length Inches (mm) | Complete Catalog Number ^② | Separate Catalog Number | | Shaft ^⑤ | Catalog Number | |
|----------------------------|--------------------------------------|------------------------------|--------------------------------|--------------------|------------------------|------------------------|
| | | Standard Handle ^③ | Breaker Mechanism ^④ | | IEC IP65 ^{⑥⑦} | IEC IP66 ^{⑥⑦} |
| N-Frame (ND and NG) | | | | | | |
| 6.00 (152.4) | HM5R06 | 6648C22G21 | 6648C23G08 | 4217B37G08 | WHM5R06 | WHM5R06X |
| 12.00 (304.8) | HM5R12 | 6648C22G21 | 6648C23G08 | 4217B37G05 | WHM5R12 | WHM5R12X |
| 16.00 (406.4) | HM5R16 | 6648C22G21 | 6648C23G08 | 4217B37G06 | WHM5R16 | WHM5R16X |
| 24.00 (609.6) | HM5R24 | 6648C22G21 | 6648C23G08 | 4217B37G07 | WHM5R24 | WHM5R24X |

Notes

- ① Complete catalog number includes handle, mechanism, shaft and mounting hardware.
- ② Complete catalog number includes the standard handle, mechanism, shaft and support brace/bracket.
- ③ Handle is designed suitable for NEMA Types 1, 3R and 12 enclosures. Use style number **6648C22G03** for Type 4/4X handle or add **X** Suffix to complete catalog number. Handle is cast aluminum.
- ④ Breaker mechanism includes a shaft support bracket and its parts. Shaft is .50-inch (12.7 mm).
- ⑤ Longer shafts, 16-inch (406.4 mm) and 24-inch (609.6 mm), include an adjustable support extension.
- ⑥ IEC handle mechanism supplied with metric thread mounting hardware.
- ⑦ Complete catalog number includes a handle, mechanism and shaft.

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Molded Case Circuit Breakers

Handle Mechanisms

Handle Mechanisms

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Direct (Close-Coupled) Handle Mechanisms

Product Description

Direct (close-coupled) handle mechanisms mount directly to the circuit breaker. They are used in shallow enclosures where the standard variable depth Through-the-door type mechanism is not practical or cannot be used.

The Universal Direct handle mechanisms are rated Type 1 and Type 12.

The Universal Direct handle mechanism is available as standard with a door interlock to prevent opening the enclosure while the circuit breaker is in the ON position. It is also available without a door interlock.

Application Description

Direct (close-coupled) handle mechanisms are typically used for applications where high volume, standardized enclosures are being fabricated.

Standards and Certifications

The Universal Direct handle mechanism is UL listed, IEC 60947-1 and IEC 60947-2 compliant, and meets CSA requirements.



Product Selection

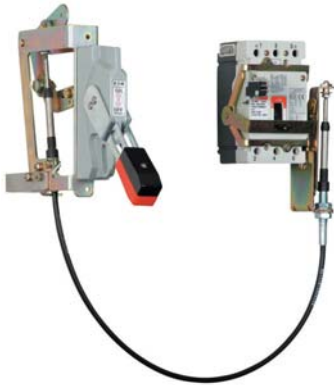
Universal Direct (EG-LG)



Universal Direct Handle Mechanisms

| Frame | Black Handle Color | | Red Handle Color | |
|-------|-------------------------------------|--|-------------------------------------|--|
| | With Interlock Catalog Number | Without Interlock Catalog Number | With Interlock Catalog Number | Without Interlock Catalog Number |
| EG | EHMCCBI | EHMCCB | EHMCCRI | EHMCCR |
| JG | JHMCCBI | JHMCCB | JHMCCRI | JHMCCR |
| LG | LHMCCBI | LHMCCB | LHMCCRI | LHMCCR |

Handle Mechanisms



Flex Shaft

Product Description

Flange-Mounted Handle Mechanisms

Flange-mounted handle mechanisms mount on the flange of an enclosure door. The Flex Shaft is an extra heavy-duty mechanism that includes a flexible shaft in various lengths, 3 feet (0.9m) through 10 feet (3m) for use with various size enclosures.

The Flex Shaft handle will accept up to three padlock shackles, each with a maximum diameter of 3/8 inches (9.5 mm). It can be used with Type 12 fabricated enclosures. An optional handle is available for Flex Shaft that is suitable for use with Type 4 environments.

Flex Shaft comes preset from the factory, requiring only minor field adjustments on installation, which takes about 10 minutes—a significant time savings compared to installation of other types of flange handle mechanisms. The Flex Shaft mechanism also takes up less interior enclosure space than competitive designs, and the handle fits standard flange cutouts. Flex Shaft handle can be remotely mounted from breaker, where an operator can use it by “funneling” the cable through conduit.

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Standards and Certifications

Flex Shaft is UL listed under File E64983 and meets CSA requirements.



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Molded Case Circuit Breakers

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Product Selection

Note: Type 4X handle mechanisms are available. Add Suffix X to the complete Catalog Number.

Note: When selecting the length of shaft, ensure minimum bending radius of 4 inches (101.6 mm) is maintained to operate properly.

Note: The standard method of shipment includes the mechanism preset at the factory; however, minor field adjustments may be required.

Flex Shaft



Flex Shaft Flange-Mounted Handle Mechanisms ①②

| Breaker Frame | Flexible Shaft Length in Feet (m) | | | | |
|---------------|-----------------------------------|---------------------------|---------------------------|---------------------------|---------------------------|
| | 2 (0.6) Catalog Number | 3 (0.9) Catalog Number | 4 (1.2) Catalog Number | 5 (1.3) Catalog Number | 6 (1.8) Catalog Number |
| EG | EHMFS02 | EHMFS03 | EHMFS04 | EHMFS05 | EHMFS06 |
| JG | N/A | JHMFS03 | JHMFS04 | JHMFS05 | JHMFS06 |
| LG | N/A | — | LHMFS04 | — | — |
| NG | N/A | N/A | F5S04C | F5S05C | F5S06C |
| RG | N/A | N/A | F6S04 | F6S05 | F6S06 |

| Breaker Frame | Flexible Shaft Length in Feet (m) | | | |
|---------------|-----------------------------------|---------------------------|---------------------------|----------------------------|
| | 7 (2.1) Catalog Number | 8 (2.4) Catalog Number | 9 (2.7) Catalog Number | 10 (3.1) Catalog Number |
| EG | EHMFS07 | EHMFS08 | EHMFS09 | EHMFS10 |
| JG | JHMFS07 | JHMFS08 | JHMFS09 | JHMFS10 |
| LG | LHMFS07 | — | — | LHMFS10 |
| NG | N/A | N/A | N/A | F5S10C |
| RG | N/A | N/A | N/A | N/A |

High-Performance Flex Shaft



High-Performance Flex Shaft Flange Mounted Handle Mechanism ①②

| Breaker Frame | Flexible Shaft Length in Feet (m) | | | | |
|---------------|-----------------------------------|---------------------------|---------------------------|---------------------------|---------------------------|
| | 2 (0.6) Catalog Number | 3 (0.9) Catalog Number | 4 (1.2) Catalog Number | 5 (1.3) Catalog Number | 6 (1.8) Catalog Number |
| EG | EGFS02HP | EGFS03HP | EGFS04HP | EGFS05HP | EGFS06HP |
| JG | N/A | JGFS03HP | JGFS04HP | JGFS05HP | JGFS06HP |
| LG | N/A | N/A | LGFS04HP | N/A | N/A |
| NG | N/A | N/A | F5S04HP | F5S05HP | F5S06HP |
| RG | N/A | N/A | F6S04HP | F6S05HP | F6S06HP |

| Breaker Frame | Flexible Shaft Length in Feet (m) | | | |
|---------------|-----------------------------------|---------------------------|---------------------------|----------------------------|
| | 7 (2.1) Catalog Number | 8 (2.4) Catalog Number | 9 (2.7) Catalog Number | 10 (3.1) Catalog Number |
| EG | EGFS07HP | EGFS08HP | EGFS09HP | EGFS10HP |
| JG | JGFS07HP | JGFS08HP | JGFS09HP | JGFS10HP |
| LG | LGFS07HP | N/A | N/A | LGFS10HP |
| NG | N/A | N/A | N/A | F5S10HP |
| RG | N/A | N/A | N/A | N/A |

Notes

- ① Three-pole only for EG-; three- and four-pole for JG- and LG-Frame.
- ② EG-, JG- and LG-Frame can be left- or right-hand mounted.

Accessories

Handle Auxiliary Switch—Early Break Design, 1A–1B Contact for Flex Shaft

| Breaker Frame | Catalog Number |
|---------------|----------------|
| EG | AUX1EBFSEG |
| JG | AUX1EBFSJG |
| LG | AUX1EBFSLG |

Auxiliary contact changes state prior to parting of breaker contacts to allow for shutdown of equipment. Contacts mounted on breaker mechanism customer supplied wiring.

Type 12 Safety Door Hardware for Flex Shaft (E- through R-Frame) ^①

| Catalog Number ^② |
|-----------------------------|
| C361KJ4 |
| C361KJ6 |
| C361KR |

Dimensions

Type 12 Safety Door Hardware for Flex Shaft (E- through R-Frame) ^①

| Catalog Number ^② | Handle Length in Inches (mm) |
|-----------------------------|------------------------------|
| C361KJ4 | 4.00 (101.6) |
| C361KJ6 | 6.00 (152.4) |
| C361KR | Roller latch ^③ |

Notes

- ① Customer: Consult with box manufacturer for correct door hardware and any adapters required for assembly.
- ② The 1/4-inch x 1/2-inch (6.35 x 12.7 mm) standard mill rectangular locking bar is not supplied with these kits.
- ③ Third roller latch for use with 4.00- or 6.00-inch (101.6 or 152.4 mm) handle when three-point latching is required.

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| Handle Extension | V4-T2-521 |

Handle Mechanisms—Series C

Product Overview

Handle mechanisms are used to operate molded case circuit breakers, molded case switches and motor circuit protectors. They are available in three basic configurations—Flange Mounted, Through-the-Door and Direct (Close-Coupled)—providing safe, dependable operation and ease of installation.

Through-the-Door

- High-Performance Rotary
- Series C Rotary
- Universal Rotary

Direct (Close-Coupled)

- Universal Direct
- Euro IEC
- G Direct

Flange Mounted

- Flex Shaft
- C371

Handle mechanisms are used on enclosed circuit breakers, control panels and motor control centers in many different applications. Eaton has a handle mechanism for virtually any need.

Through-the-Door Handle Mechanisms

Eaton's through-the-door handle mechanisms mount on the front of an enclosure or cabinet door and externally operate the circuit breaker via a variable depth shaft or a linear operator (Type MC). Each rotary type handle mechanism includes a handle, base operating mechanism and shaft that can be cut to various lengths.

Series C Rotary and Universal Rotary handle mechanisms are for use with molded case circuit breakers (G, F, J, K, L, MDL), molded case switches and motor circuit protectors.

Type 4/4X handles are similar to standard handles except they include an internal neoprene gasket. Type 4/4X handle style number is 6648C22G03. Due to gasketing effect between the handle and the housing, the handle may not indicate a tripped position.

Universal Rotary F-Frame**Direct (Close-Coupled) Handle Mechanisms**

Direct (close-coupled) handle mechanisms mount directly to the circuit breaker. They are used in shallow enclosures where the standard variable depth Through-the-door type mechanism is not practical or cannot be used. They are typically for applications where high volume, standardized enclosures are being fabricated.

The Euro IEC Direct handle mechanism can be used on F- through R-Frames.

The G Direct is available with a black or the yellow handle, and with or without a shroud. It is suitable for use with NEMA 1 enclosures. It is for use only with the G-Frame (GD, GC, GHC, GMCP).

An escutcheon ring and interlock clip are provided as standard. The standard design includes a lock-off feature.

Flange-Mounted Handle Mechanisms

Flange-mounted handle mechanisms mount on the flange of an enclosure door. The Flex Shaft is an extra heavy-duty mechanism that includes a flexible shaft in various lengths, 3 feet (0.9m) through 10 feet (3m) for use with various size enclosures.

The Flex Shaft handle will accept up to three padlock shackles, each with a maximum diameter of 3/8-inch (9.5 mm). Can be used with NEMA 1, 3R and 12 fabricated enclosures. An optional handle is available for Flex Shaft that is suitable for use with NEMA 4 and 4X environments. Flex Shaft comes preset from the factory, requiring only minor field adjustments on installation, which takes about 10 minutes—a significant time savings compared to installation of other types of flange handle mechanisms. The Flex Shaft mechanism also takes up less interior enclosure space than competitive designs and the handle fits standard flange cutouts. Flex Shaft handle can be remotely mounted from breaker, where an operator can use it by “funneling” the cable through conduit.

The Type C371 circuit breaker operating mechanisms are designed for installation in control enclosures where main or branch circuit protective devices are required. All circuit breaker mechanisms are suitable for right-hand mounting.

Auxiliary contacts are not available for mounting on operating mechanisms. Where required, have them installed in circuit breaker.

Handle Extension

Handle extension is not included with J, K, L, M and N-Frame breakers. It must be purchased separately.

Standards and Certifications

Type C371 is UL Listed under File E62635.

Flex Shaft is UL Listed under File E64983 and meets CSA requirements.

Series C Rotary and Universal Rotary, are UL Listed and meet CSA requirements. Universal Rotary also meets IEC 60947-1 and IEC 60947-2 for international compliance. Rotary UL File Number is E64983.

The Universal Direct handle mechanism is UL 489 Listed, IEC 60947-1 and IEC 60947-2, and meets CSA requirements. The Euro IEC Direct handle mechanism is IEC-240-1. G Direct is UL Listed and meets CSA requirements.



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| Flex Shaft | V4-T2-518 |
| Handle Extension | V4-T2-521 |

High-Performance Rotary Handle Mechanisms

Product Description

The high-performance rotary handle mechanism uses a simple, yet robust design to make installation and operation easy. The external handle's key functional components are all metallic, ensuring reliability. The metal-on-metal interface between the handle and shaft prevents contaminant buildup that could impede operation, while UV and chemical agent resistant materials protect the handle from heat and fading in direct sunlight, as well as chemicals that may be introduced in harsh environments.

In addition to its robust design features, the handle mechanism has stand-off support that allows for easy operation with a gloved hand. With a shallow profile, the handle can easily be used in applications where an internal or double door is required.

The high-performance external handle can accept padlocks or multi-hasps locks. The door is interlocked when padlocked and cannot be bypassed.

Features

- NEMA Type 1/3R/12 (IP54) and NEMA Type 4/4X (IP65) ratings
- Black/Blue or Red/Yellow external handle colors
- Three shaft lengths—6, 12 and 24 inches, which can be cut to size to match enclosure depth
- Conveniently packaged as kit containing handle, shaft and mechanism
- Replacement parts are available separately
- Metallic functional components ensure reliability
- Metal-on-metal interface between handle and shaft
- UV and chemical agent-resistant materials protect the handle
- Shallow profile
- Compatible with both Series C and Series G molded case circuit breakers and molded case switch platforms
- Same handle can be used on multiple frames sizes reducing the number of parts needed
- Red and yellow handles to designate emergency disconnecting means
- All handle mechanisms can accept padlocks or multi-hasps locks for added flexibility
- Fast, easy installation (see video on website for step-by-step instructions)



Standards and Certifications

The mechanisms for EG, JG and LG breakers have an internal handle that can be operated independent of door position, and locked-out to meet one of the key NFPA requirements (NFPA® 79) and UL 508A disconnect requirements.

- NEMA 1/3R/12, IP54
- NEMA 4/4X, IP65



Product Selection**Handle Mechanisms for Series C Frames****Kits Only (Kit Includes Shaft, Mechanism and Handle)—GC/GD- and GMCP-Frame**

| | Description | Rating Type | | GC/GD-Frame | GMCP-Frame |
|---|-----------------------------------|-------------|----|--------------------------------|--------------------------------|
| | | NEMA | IP | Catalog Number | Catalog Number |
| S01 Blue Handle  | S01 blue handle, 12-inch shaft | 1/3R/12 | 54 | GCHMVD12B / 68C6039G01 | GMHMVD12B / 68C6039G05 |
| | | 4/4X | 65 | GCHMVD12BX / 68C6039G03 | GMHMVD12BX / 68C6039G07 |
| S01 Red Handle  | S01 red handle, 12-inch shaft | 1/3R/12 | 54 | GCHMVD12R / 68C6039G02 | GMHMVD12R / 68C6039G06 |
| | | 4/4X | 65 | GCHMVD12RX / 68C6039G04 | GMHMVD12RX / 68C6039G08 |

Separate Components for Series C Frames**Series C Components—Shaft and Mechanism**

| Frame | Shaft Width | Shaft Length | | | Mechanism Only |
|-------|-------------|-------------------|-------------------|-------------------|----------------------------|
| | | 6-Inch | 10-Inch | 12-Inch | |
| GC/GD | 6 mm | — | — | 66A6013H02 | GCHMVD / 2A92095G15 |
| GMCP | 6 mm | — | — | 66A6013H02 | GMHMVD / 2A92095G16 |
| GD | 8 mm | 66A6010G95 | — | 66A6010G96 | 1498D34G90 |
| FD | 8 mm | 66A6010G95 | — | 66A6010G96 | 1498D34G91 |
| JD | 10 mm | 66A6012G15 | — | 66A6012G16 | 1498D34G92 |
| KD | 10 mm | 66A6012G15 | — | 66A6012G16 | 1498D34G93 |
| LD | 10 mm | 66A6012G15 | — | 66A6012G16 | 1498D34G94 |
| MDL | 10 mm | 66A6012G15 | — | 66A6012G16 | 1498D34G95 |
| ND | 12 mm | — | 66A6013H01 | — | 69D9101G30 |
| RD | 12 mm | — | 66A6013H01 | — | 69D9101G31 |

Note

Shaft guide (68C6048G49) is optional and can be used with any high-performance handle listed above for greater alignment tolerance.

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Molded Case Circuit Breakers

Handle Mechanisms

Series C Components—Handles Only

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| Frame | Rating Type | | Handles Only | | | | | | | |
|-------|-------------|----|-------------------|-------------------|------------------|------------------|------------------|------------------|------------------|------------------|
| | NEMA | IP | S01 Blue/Black | S01 Red/Yellow | S2 Blue/Black | S2 Red/Yellow | S3 Blue/Black | S3 Red/Yellow | S4 Blue/Black | S4 Red/Yellow |
| GC/GD | 1/3R/12 | 54 | 68C6048G41 | 68C6048G42 | — | — | — | — | — | — |
| | 4/4X | 65 | 68C6048G43 | 68C6048G44 | — | — | — | — | — | — |
| GMCP | 1/3R/12 | 54 | 68C6048G41 | 68C6048G42 | — | — | — | — | — | — |
| | 4/4X | 65 | 68C6048G43 | 68C6048G44 | — | — | — | — | — | — |
| GD | 1/3R/12 | 54 | 68C6048G41 | 68C6048G42 | 68C6048G01 | 68C6048G02 | — | — | — | — |
| | 4/4X | 65 | 68C6048G43 | 68C6048G44 | 68C6048G03 | 68C6048G04 | — | — | — | — |
| FD | 1/3R/12 | 54 | 68C6048G41 | 68C6048G42 | 68C6048G01 | 68C6048G02 | — | — | — | — |
| | 4/4X | 65 | 68C6048G43 | 68C6048G44 | 68C6048G03 | 68C6048G04 | — | — | — | — |
| JD | 1/3R/12 | 54 | — | — | 68C6048G01 | 68C6048G02 | — | — | — | — |
| | 4/4X | 65 | — | — | 68C6048G03 | 68C6048G04 | — | — | — | — |
| KD | 1/3R/12 | 54 | — | — | 68C6048G01 | 68C6048G02 | — | — | — | — |
| | 4/4X | 65 | — | — | 68C6048G03 | 68C6048G04 | — | — | — | — |
| LD | 1/3R/12 | 54 | — | — | 68C6048G01 | 68C6048G02 | 68C6048G05 | 68C6048G06 | — | — |
| | 4/4X | 65 | — | — | 68C6048G03 | 68C6048G04 | 68C6048G07 | 68C6048G08 | — | — |
| MDL | 1/3R/12 | 54 | — | — | 68C6048G01 | 68C6048G02 | 68C6048G05 | 68C6048G06 | — | — |
| | 4/4X | 65 | — | — | 68C6048G03 | 68C6048G04 | 68C6048G07 | 68C6048G08 | — | — |
| ND | 1/3R/12 | 54 | — | — | — | — | 68C6048G05 | 68C6048G06 | 68C6048G09 | 68C6048G10 |
| | 4/4X | 65 | — | — | — | — | 68C6048G07 | 68C6048G08 | 68C6048G11 | 68C6048G12 |
| RD | 1/3R/12 | 54 | — | — | — | — | — | — | 68C6048G09 | 68C6048G10 |
| | 4/4X | 65 | — | — | — | — | — | — | 68C6048G11 | 68C6048G12 |

Note

Shaft guide (68C6048G49) is optional and can be used with any high-performance handle listed above for greater alignment tolerance.

Dimensions

Approximate Dimensions in mm (Inches)

High-Performance Rotary Handle Mechanisms

| Handle Type | Front Operation Direction of Operation | Door Drilling |
|-------------|---|---------------|
| Type S01 | | |
| Type S2 | | |
| Type S3 | | |
| Type S4 | | |

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Series C Rotary

Product Description

Eaton’s through-the-door handle mechanisms mount on the front of an enclosure or a cabinet door and externally operate the circuit breaker via a variable depth shaft or a linear operator (Type MC). Each rotary type handle mechanism includes a handle, a base operating mechanism and a shaft that can be cut to various lengths.

Series C Rotary handle mechanisms are used with molded case circuit breakers (F, J, K, L, MDL), molded case switches and motor circuit protectors.

These rotary handles are robust and durable, made entirely of metal parts. It also has a lock-out tag-out level at the tip of the handle for padlocking.

NEMA Type 4/4X handles are similar to standard handles except they include an internal neoprene gasket. NEMA Type 4/4X handle style number is 6648C22G03. Due to gasketing effect between the handle and the housing, the handle may not indicate a tripped position.

Standards and Certifications

Series C Rotary is UL listed and meets CSA requirements.



Features

Features Comparison of Series C Rotary and Universal Rotary Handle Mechanism

| Rotary | Number of Poles | NEMA Enclosure Type | | | | Handle Lock-Off ② | Handle Indication: ON/OFF TRIPPED/RESET | International Markings ON (I) OFF (O) | Handle Material | Available Handle Colors | Handle Rotation | Shaft Lengths (Inches) |
|------------------|-----------------|---------------------|----|----|--------|-------------------|---|---------------------------------------|-----------------|-------------------------|-----------------|------------------------|
| | | 1 | 3R | 12 | 4/4X ① | | | | | | | |
| Series C rotary | — | ■ | ■ | ■ | ■ | ■ | ■ | ■ | Metal | Black | 45 deg. | 6, 12, 16, 24 |
| Universal rotary | — | ■ | — | ■ | — | ■ | ■ | ■ | Molded plastic | Yellow/Red/Black | 90 deg. | 6, 12, 24 |

Notes

- ① Type 4/4X application requires special handle. See “Ordering Information.”
- ② All rotary handle mechanisms include a handle “Lock Off” to prevent turning the breaker ON while in the OFF position.

Product Selection

Through-the-Door Handle Mechanisms

Series C Rotary



Series C Rotary Ordering Information

| Shaft Length Inches (mm) | Complete Catalog Number ^① | Separate Catalog Number | | Shaft ^④ | Catalog Number | |
|-----------------------------|--------------------------------------|------------------------------|--------------------------------|--------------------|------------------------|------------------------|
| | | Standard Handle ^② | Breaker Mechanism ^③ | | IEC IP65 ^{⑤⑥} | IEC IP66 ^{⑤⑥} |
| F-Frame | | | | | | |
| 6.00 (152.4) | HM1R06 | 6648C22G25 | 6648C23G11 | 4217B37G08 | WHM1R06 | WHM1R06X |
| 12.00 (304.8) | HM1R12 | 6648C22G25 | 6648C23G11 | 4217B37G05 | WHM1R12 | WHM1R12X |
| 16.00 (406.4) | HM1R16 | 6648C22G25 | 6648C23G11 | 4217B37G06 | WHM1R16 | WHM1R16X |
| 24.00 (609.6) | HM1R24 | 6648C22G25 | 6648C23G11 | 4217B37G07 | WHM1R24 | WHM1R24X |
| J-Frame | | | | | | |
| 6.00 (152.4) | HM2R06 | 6648C22G01 | 6648C23G21 | 4217B37G08 | WHM2R06 | WHM2R06X |
| 12.00 (304.8) | HM2R12 | 6648C22G01 | 6648C23G21 | 4217B37G05 | WHM2R12 | WHM2R12X |
| 16.00 (406.4) | HM2R16 | 6648C22G01 | 6648C23G21 | 4217B37G06 | WHM2R16 | WHM2R16X |
| 24.00 (609.6) | HM2R24 | 6648C22G01 | 6648C23G21 | 4217B37G07 | WHM2R24 | WHM2R24X |
| K-Frame | | | | | | |
| 6.00 (152.4) | HM3R06 | 6648C22G01 | 6648C23G25 | 4217B37G08 | WHM3R06 | WHM3R06X |
| 12.00 (304.8) | HM3R12 | 6648C22G01 | 6648C23G25 | 4217B37G05 | WHM3R12 | WHM3R12X |
| 16.00 (406.4) | HM3R16 | 6648C22G01 | 6648C23G25 | 4217B37G06 | WHM3R16 | WHM3R16X |
| 24.00 (609.6) | HM3R24 | 6648C22G01 | 6648C23G25 | 4217B37G07 | WHM3R24 | WHM3R24X |
| L- and MDL-Frame | | | | | | |
| 6.00 (152.4) | HM4R06 | 6648C22G11 | 6648C23G19 | 4217B37G08 | WHM4R06 | WHM4R06X |
| 12.00 (304.8) | HM4R12 | 6648C22G11 | 6648C23G19 | 4217B37G05 | WHM4R12 | WHM4R12X |
| 16.00 (406.4) | HM4R16 | 6648C22G11 | 6648C23G19 | 4217B37G06 | WHM4R16 | WHM4R16X |
| 24.00 (609.6) | HM4R24 | 6648C22G11 | 6648C23G19 | 4217B37G07 | WHM4R24 | WHM4R24X |
| MD/MDS | | | | | | |
| 6.00 (152.4) | HM7R06 | 6648C22G21 | 6648C23G17 | 4217B37G08 | — | — |
| 12.00 (304.8) | HM7R12 | 6648C22G21 | 6648C23G17 | 4217B37G05 | — | — |
| 16.00 (406.4) | HM7R16 | 6648C22G21 | 6648C23G17 | 4217B37G06 | — | — |
| 24.00 (609.6) | HM7R24 | 6648C22G21 | 6648C23G17 | 4217B37G07 | — | — |
| N-Frame (ND and NG) | | | | | | |
| 6.00 (152.4) | HM5R06 | 6648C22G21 | 6648C23G08 | 4217B37G08 | WHM5R06 | WHM5R06X |
| 12.00 (304.8) | HM5R12 | 6648C22G21 | 6648C23G08 | 4217B37G05 | WHM5R12 | WHM5R12X |
| 16.00 (406.4) | HM5R16 | 6648C22G21 | 6648C23G08 | 4217B37G06 | WHM5R16 | WHM5R16X |
| 24.00 (609.6) | HM5R24 | 6648C22G21 | 6648C23G08 | 4217B37G07 | WHM5R24 | WHM5R24X |

Notes

- ① Complete catalog number includes the standard handle, mechanism, shaft and support brace/bracket.
- ② Handle is designed suitable for NEMA Types 1, 3R and 12 enclosures. Use style number **6648C22G03** for Type 4/4X handle or add **X** Suffix to complete catalog number. Handle is cast aluminum.
- ③ Breaker mechanism includes a shaft support bracket and its parts. Shaft is .50-inch (12.7 mm).
- ④ Longer shafts, 16-inch (406.4 mm) and 24-inch (609.6 mm), include an adjustable support extension.
- ⑤ IEC handle mechanism supplied with metric thread mounting hardware.
- ⑥ Complete catalog number includes a handle, mechanism and shaft.

Handle Mechanisms



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Universal Rotary

Product Description

Eaton’s Universal Rotary is suitable for use with Type 1 or 12 enclosure types. All rotary handle mechanisms include a handle “lock off” to prevent turning the breaker ON while in the OFF position, and indicate ON/OFF/Tripped/Reset positions. The Universal Rotary has the added feature of international markings for ON (I) and OFF (O). The Universal Rotary is made of molded material.

The Universal Rotary mechanisms for EG-, JG- and LG-Frame MCCBs can be operated by hand with the door open or “locked off” to prevent operation with the door open.

Standards and Certifications

Universal Rotary is UL listed and meets CSA requirements. Universal Rotary also meets IEC 60947-1 and IEC 60947-2 for international compliance. Rotary UL File Number is E64983.



Features

Features Comparison of Series C Rotary and Universal Rotary Handle Mechanism

| Rotary | Number of Poles | NEMA Enclosure Type | | | | Handle Lock-Off ② | Handle Indication: ON/OFF TRIPPED/RESET | International Markings ON (I) OFF (O) | Handle Material | Available Handle Colors | Handle Rotation | Shaft Lengths (Inches) |
|------------------|-----------------|---------------------|----|----|--------|-------------------|---|---------------------------------------|-----------------|-------------------------|-----------------|------------------------|
| | | 1 | 3R | 12 | 4/4X ① | | | | | | | |
| Series C rotary | — | ■ | ■ | ■ | ■ | ■ | ■ | ■ | Metal | Black | 45 deg. | 6, 12, 16, 24 |
| Universal rotary | — | ■ | — | ■ | — | ■ | ■ | ■ | Molded plastic | Yellow/Red/Black | 90 deg. | 6, 12, 24 |

Notes

- ① Type 4/4X application requires special handle. See “Ordering Information.”
- ② All rotary handle mechanisms include a handle “Lock Off” to prevent turning the breaker ON while in the OFF position.

Product Selection

Universal Rotary F-Frame

Universal Rotary
F-Frame

Series C Universal Rotary ①

| Handle Color | Shaft Length in Inches (mm) | Complete Catalog Number |
|----------------|-----------------------------|-------------------------|
| G-Frame | | |
| Black | 6.00 (152.4) | GHMVD06B |
| | 12.00 (304.8) | GHMVD12B |
| Red | 6.00 (152.4) | GHMVD06R |
| | 12.00 (304.8) | GHMVD12R |
| F-Frame | | |
| Black | 6.00 (152.4) | FHMVD06B |
| | 12.00 (304.8) | FHMVD12B |
| Red | 6.00 (152.4) | FHMVD06R |
| | 12.00 (304.8) | FHMVD12R |
| | 24.00 (609.6) | FHMVD24R |
| J-Frame | | |
| Black | 6.00 (152.4) | JHMVD06B |
| | 12.00 (304.8) | JHMVD12B |
| Red | 6.00 (152.4) | JHMVD06R |
| | 12.00 (304.8) | JHMVD12R |
| K-Frame | | |
| Black | 6.00 (152.4) | KHMVD06B |
| | 12.00 (304.8) | KHMVD12B |
| Red | 6.00 (152.4) | KHMVD06R |
| | 12.00 (304.8) | KHMVD12R |
| L-Frame | | |
| Black | 6.00 (152.4) | LHMVD06B |
| | 12.00 (304.8) | LHMVD12B |
| Red | 6.00 (152.4) | LHMVD06R |
| | 12.00 (304.8) | LHMVD12R |

Note

① Only available as complete handle mechanism. Parts not sold separately.

Handle Mechanisms

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Direct (Close-Coupled) Handle Mechanisms

Product Description

Direct (close-coupled) handle mechanisms mount directly to the circuit breaker.

They are used in shallow enclosures where the standard variable depth Through-the-door type mechanism is not practical or cannot be used.

The Universal Direct handle mechanisms are rated Type 1 and Type 12.

The Universal Direct handle mechanism is available as standard with a door interlock to prevent opening the enclosure while the circuit breaker is in the ON position. It is also available without a door interlock.

Application Description

Direct (close-coupled) handle mechanisms are typically used for applications where high volume, standardized enclosures are being fabricated.

Standards and Certifications

The Universal Direct handle mechanism is IEC 60947-1 and IEC 60947-2 compliant.

Product Selection**Direct (Close-Coupled) Handle Mechanisms****Euro IEC Direct**

| Frame | Black Handle Catalog Number |
|---------|-----------------------------------|
| F | HMCC1B |
| J | HMCC2B |
| K | HMCC3B |
| L and M | HMCC4B |
| N | HMVD5B |
| R | HMVD6B |

G Direct ^①

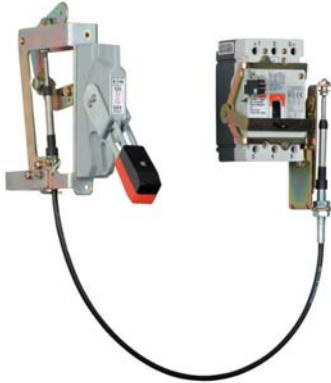
| Frame | Black Handle | | Yellow Handle | |
|--------|----------------------------------|-------------------------------------|----------------------------------|-------------------------------------|
| | With Shroud Catalog Number | Without Shroud Catalog Number | With Shroud Catalog Number | Without Shroud Catalog Number |
| GD/GHC | HRGCC1S | HRGCC10 | HRGCC3S | HRGCC30 |
| GMCP | HRGMC1S | HRGMC10 | HRGMC3S | HRGMC30 |

Note

^① Suitable for use on two- or three-pole G-Frame.

Handle Mechanisms

2



Flex Shaft

Product Description

Flange-Mounted Handle Mechanisms

Flange-mounted handle mechanisms mount on the flange of an enclosure door. The Flex Shaft is an extra heavy-duty mechanism that includes a flexible shaft in various lengths, 3 feet (0.9m) through 10 feet (3m) for use with various size enclosures.

The Flex Shaft handle will accept up to three padlock shackles, each with a maximum diameter of 3/8 inches (9.5 mm). It can be used with Type 12 fabricated enclosures. An optional handle is available for Flex Shaft that is suitable for use with Type 4 environments.

Flex Shaft comes preset from the factory, requiring only minor field adjustments on installation, which takes about 10 minutes—a significant time savings compared to installation of other types of flange handle mechanisms. The Flex Shaft mechanism also takes up less interior enclosure space than competitive designs, and the handle fits standard flange cutouts. Flex Shaft handle can be remotely mounted from breaker, where an operator can use it by “funneling” the cable through conduit.

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Standards and Certifications

Flex Shaft is UL listed under File E64983 and meets CSA requirements.



Product Selection

Handle Mechanisms

Flex Shaft ^{①②}

| Breaker Frame | Flexible Shaft Length in Feet (m) | | | | | | | |
|----------------|-----------------------------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|
| | 3 (0.9) | 4 (1.2) | 5 (1.5) | 6 (1.8) | 7 (2.1) | 8 (2.4) | 9 (2.7) | 10 (3.0) |
| | Catalog Number | Catalog Number | Catalog Number | Catalog Number | Catalog Number | Catalog Number | Catalog Number | Catalog Number |
| G ^① | F0S03C | F0S04C | F0S05C | F0S06C | — | — | — | — |
| F | F1S03C | F1S04C | F1S05C | F1S06C | F1S07C | F1S08C | F1S09C | F1S10C |
| F (dual) | F1S03CD | F1S04CD | F1S05CD | F1S06CD | F1S07CD | F1S08CD | F1S09CD | F1S10CD |
| J | F2S03C | F2S04C | F2S05C | F2S06C | F2S07C | F2S08C | F2S09C | F2S10C |
| K | F3S03C | F3S04C | F3S05C | F3S06C | F3S07C | F3S08C | F3S09C | F3S10C |
| L and MDL | — | F4S04C | F4S05C | F4S06C | — | — | — | F4S10C |
| N | — | F5S04C | F5S05C | F5S06C | — | — | — | F5S10C |
| R | — | F6S04 | F6S05 | F6S06 | — | — | — | — |
| MD, MDS (old) | — | F7S04 | F7S05 | F7S06 | — | — | — | F7S10C |

High Performance Flex Shaft ^{①②}

| Breaker Frame | Flexible Shaft Length in Feet (m) | | | | | | | |
|---------------|-----------------------------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|
| | 3 (0.9) | 4 (1.2) | 5 (1.3) | 6 (1.8) | 7 (2.1) | 8 (2.4) | 9 (2.7) | 10 (3.1) |
| | Catalog Number | Catalog Number | Catalog Number | Catalog Number | Catalog Number | Catalog Number | Catalog Number | Catalog Number |
| G | F0S03HP | F0S04HP | F0S05HP | F0S06HP | N/A | N/A | N/A | N/A |
| F | F1S03HP | F1S04HP | F1S05HP | F1S06HP | F1S07HP | F1S08HP | F1S09HP | F1S10HP |
| F (dual) | F1S03HPD | F1S04HPD | F1S05HPD | F1S06HPD | F1S07HPD | F1S08HPD | F1S09HPD | F1S10HPD |
| J | F2S03HP | F2S04HP | F2S05HP | F2S06HP | F2S07HP | F2S08HP | F2S09HP | F2S10HP |
| K | F3S03HP | F3S04HP | F3S05HP | F3S06HP | F3S07HP | F3S08HP | F3S09HP | F3S10HP |
| L and MDL | N/A | F4S04HP | F4S05HP | F4S06HP | N/A | N/A | N/A | F4S10HP |
| N | N/A | F5S04HP | F5S05HP | F5S06HP | N/A | N/A | N/A | F5S10HP |
| R | N/A | F6S04HP | F6S05HP | F6S06HP | N/A | N/A | N/A | N/A |

Flange-Mounted Handle Mechanisms

Type C371

| Circuit Breaker or Motor Circuit Protector | Frame Size | Variable Depth Mounting Range Min./Max. ^{②③} | Operating Mechanism Only ^④ | Operating Mechanism w/ 4-Inch Handle | |
|--|------------|---|---------------------------------------|---|---|
| | | | Catalog Number | For NEMA 1-12 Enclosure Catalog Number | For NEMA 4/4X Enclosure Catalog Number |
| HMCP and Series C—EHD, FDB, FD, FDC, HFD, ED | 150 | 6.50–16 (165.1–406.4) | C371E | C371E1 | C371E2 |
| HMCP and Series C—HJD, JD, JDB, JDC | 250 | 6.50–16.63 (165.1–422.4) | C371F | C371F5 | C371F6 |
| HMCP and Series C—DK, HKD, KD, KDB | 400 | 6.50–16.63 (165.1–422.4) | C371F | C371F5 | C371F6 |
| Series C—HLD, LD, LDC | 600 | 8.50–22 (215.9–558.8) | C371G | C371G5 | C371G6 |
| Series C MD, MDS—(No MDL) | 800 | 8.75–22 (222.3–558.8) | C371K | C371K5 | C371K6 |
| Series C—HND, ND, NDC | 1200 | 9.75–22 (247.7–558.8) | C371K | C371K5 | C371K6 |

Notes

^① Suitable for GC/GD MCCB; not suitable for GMCP.

^② For increased maximum allowable depth, see connecting rods on **Page V4-T2-520**.

^③ Dimensions shown are from panel flange surface.

^④ Does not include handle.

Type 4/4X handle mechanisms are available. Add Suffix **X** to complete catalog number. Add Suffix **I** to complete catalog number for IEC handle. Original narrow handle design (No C Suffix) is available. Remove C from catalog number.

When selecting the length of shaft, ensure minimum bending radius of 4 inches (101.6 mm) (5 inches, 12.7 mm for L-, N- and R-Frames) is maintained to operate properly. The standard method of shipment includes the mechanism preset at the factory; however, minor field adjustments may be required.

Dual breakers operator available on F-Frame only. Only the F, J and K can mount LH and RH all other RH only.

2.6

Molded Case Circuit Breakers

Handle Mechanisms

Approximate Dimensions in Inches (mm)

2

Handle Only

| Circuit Breaker Frame Size (Amperes) | NEMA Enclosure Type | Operating Handle Length | Catalog Number |
|--------------------------------------|---------------------|-------------------------|----------------|
| 150 | 1/3R/3/12 | 4.00 (101.6) | C371H1 |
| | 4/4X | 4.00 (101.6) | C371H2 |
| | 1/3R/3/12 | 6.00 (152.4) | C371H3 |
| | 4/4X | 6.00 (152.4) | C371H4 |
| 250–1200 | 1/3R/3/12 | 4.00 (101.6) | C371H5 |
| | 4/4X | 4.00 (101.6) | C371H6 |
| | 1/3R/3/12 | 6.00 (152.4) | C371H7 |
| | 4/4X | 6.00 (152.4) | C371H8 |

Channel Support Kit (Rod Not Supplied)

For use to prevent bending of the operating handle mounting surface. This is especially useful when the operating handle is mounted on a channel in a multi-door enclosure.

| Amperes | Catalog Number |
|----------|----------------|
| 600–1200 | C371CS6 |

Connecting Rods ^①

| Application | Catalog Number |
|--|----------------|
| Disconnect switches (30, 60, 100, 200 A sizes) | C371CS1 |
| Circuit breakers (150, 250, 400 A sizes) | C371CS1 |
| Circuit breakers (600, 800, 1200 A sizes) | C371CS2 |

Note

① Increase maximum allowable depth by 5 inches (127 mm).

Handle Extension



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Handle Extension

Product Description

- Suitable for use on two- or three-pole G-Frame
- Not included with J, K, L, M and N-Frame breakers; it must be purchased separately
- Included with R-Frame breakers

Product Selection

Handle Extension



Handle Extension ①②

| Frame | Style Number |
|-------|--------------|
| J, K | HEX3 |
| L, M | HEX4 |
| N | HEX5 |
| R | HEX6 |

Notes

- ① Handle extension is not included with J, K, L, M and N-Frame breakers. It must be purchased separately.
- ② Handle extension is included with breaker with R-Frame breakers.

Power Breakers, Contactors and Fuses

Power Breakers, Contactors
and Fuses Family



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3.1

Power Breakers, Contactors and Fuses

Power Circuit Breakers

Power Circuit Breaker



3

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Low Voltage Power Circuit Breakers

Product Overview

Magnum Low Voltage Power Circuit Breakers for Global Application

Magnum® low voltage power circuit breakers enable comprehensive solutions to meet and exceed the unique and wide-ranging requirements of today's global power distribution systems. This powerful circuit breaker offering is designed for ultimate custom configuration and application flexibility, with the needs of the power distribution equipment user and the electrical equipment manufacturer in mind.

Four Product Families

Magnum consists of four product families; each provides specific ratings, features and approvals to optimize performance when applied in power distribution equipment and custom enclosures.

Magnum DS Low Voltage Power Circuit Breakers for ANSI Rated Switchgear Applications

- Up to 635 Vac
- 200 to 5000 A continuous
- 42 to 200 kA interrupting



Magnum DS Low Voltage Power Circuit Breaker Family ANSI Rated for Switchgear Applications

Magnum IEC Air Circuit Breakers for IEC Rated Switchboards

- Up to 690 Vac
- 200 to 6300 A continuous
- 40 to 105 kA I_{cu}/I_{cs}



Magnum IEC Low Voltage Air Circuit Breaker Family

Magnum SB Low Voltage Insulated Case Circuit Breakers for Switchboard Applications

- Up to 635 Vac
- 200 to 5000 A continuous
- 50 to 150 kA interrupting



Magnum SB Low Voltage Insulated Case Circuit Breaker Family UL Rated for Switchboard Applications

Magnum DC Switches for Direct Current Applications

- Up to 1000 Vdc
- 800 to 3200 A continuous
- 50 to 65 kA withstand rating



Magnum DC Switch Family

Features, Benefits and Functions

- **200 kA interruption ratings** with current limiting performance and low current let-through to reduce damaging energy to downstream equipment at high fault levels
- **Withstand ratings up to 100 kA** to maximize system coordination and selectivity
- **Four physical frame sizes** (Narrow, Standard, Double Narrow and Double) to promote breaker application in compact modular enclosures and improve enclosure density
- **Continuous current ratings from 800 to 6300A** with 100% rating at 104 °F (40 °C) and no derating on most ratings up to 122 °F (50 °C)
- **Fixed breaker mounting configurations** with horizontal and optional vertical and front connected terminal connections
- **Drawout breaker mounting configurations** with cassette and optional safety shutters
- **Three- and four-pole breaker configurations**
- **Through-the-door design** for human interface with the breaker compartment door closed
- **DC rated switches** for direct current applications
- **Two-step stored energy mechanism** for manually and electrical operated breakers
- **Digitrip™ RMS Trip Unit family protection** with four models each providing increasing levels of protection and feature options for coordination, information and diagnostics:
 - Microprocessor-based rms sensing
 - Basic to programmable overcurrent protection and alarms
 - Local display for information, status and diagnostics
 - Ampere, voltage and power metering
 - Power quality, harmonics and waveform capture
 - Communications with translators to common protocols
 - Zone selective interlocking for improved coordination
 - Integral Arcflash Reduction Maintenance System™
 - Breaker health monitoring
- **Field-installable accessories** (UL® listed) common across the breaker frames and designed to be easily installed in the field to service or modify the breaker at the point of use
- **Secondary terminal contacts** mounted at the top front of the breaker and away from the primary voltage areas for improved safety and access. Finger-safe terminal blocks accommodate ring-tongue or spade type terminals as standard
- **Arcflash Reduction Maintenance System**
Eaton's patented Arcflash Reduction Maintenance System technology provides maintenance staff with improved safety of downstream maintenance locations using a simple and reliable method to reduce fault clearing times and energy during an arc flash event (radiation, sound, pressure, temperature). Arcflash Reduction Maintenance System uses a separate analog trip circuit, providing faster signal processing and interruption times than the standard (digital) "instantaneous" protection. The Arcflash Reduction Maintenance System function is activated either directly on the circuit breaker through a local switch or remotely through communications or a digital input



Through-the-Door Design for Human Interface with the Breaker Compartment Door Closed



High Technology Microprocessor-Based Digitrip RMS 1150+ Trip Units are Available With Advanced Features Like Programmable Overcurrent Settings, Power Metering, Power Quality and Communications

3.1 Power Breakers, Contactors and Fuses

Power Circuit Breakers

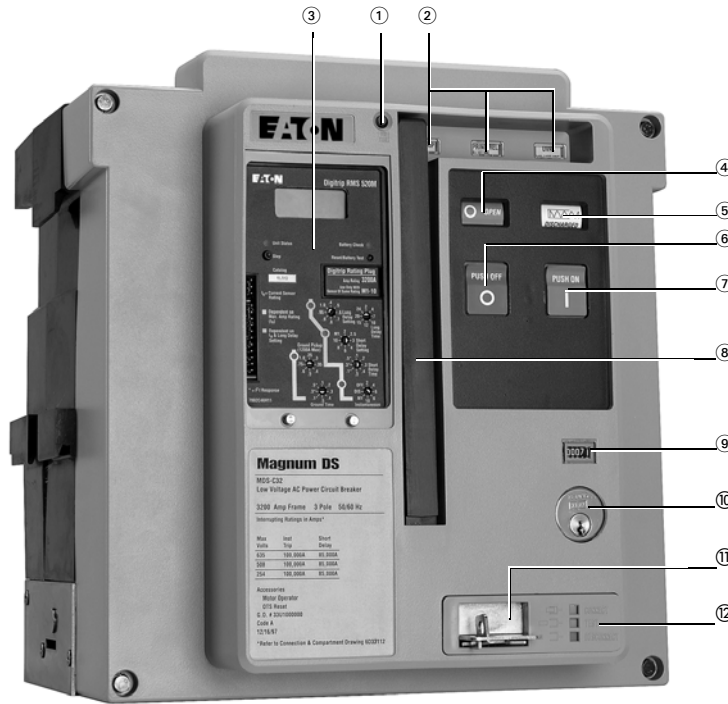
3

Breaker Features on Front Cover

The controls and indicators are functionally grouped on the breaker faceplate to optimize the human interface, visibility and ease of use. For maximum safety, a modern, through-the-door design permits access to the breaker levering system, trip unit, controls and indicators with the door closed.

- ① Red Mechanical Trip Flag Pop-out Indicator (Optional)—Interlocked Indicator Requiring Manual Reset is also Available
- ② Accessory Viewing Windows for:
 - Shunt Trip Attachment (STA)
 - Spring Release Device (SR)
 - Undervoltage Release (UVR) Device or Second STA
- ③ Digitrip RMS Trip Unit (Model 520M Shown) Protected by Clear Cover
- ④ Contact Status Indicators:
 - OPEN—Green
 - CLOSED—Red
- ⑤ Spring Status Indicators:
 - Charged—Yellow
 - Discharged—White
- ⑥ Push OFF (Open) Pushbutton—Red
- ⑦ Push ON (Close) Pushbutton—Green
- ⑧ Manual Spring Charging Handle for Manually Charging the Stored Energy Springs
- ⑨ Mechanical Operations Counter (Optional)
- ⑩ Key Off Lock (Optional)
- ⑪ Padlockable Levering Device Shutter for Drawout Breakers
- ⑫ Color-Coded Position Indicator for Drawout Breakers:
 - CONNECT—Red
 - TEST—Yellow
 - DISCONNECT—Green

Magnum DS Drawout Breaker



Accessory Viewing Windows Visibly Confirm the Breaker Shunt Trip, Spring Release, and UVR Installation and Their Control Voltage Rating



Through-the-Door Design for Human Interface with the Breaker Compartment Door Closed, for Example, Manually Charging the Stored Energy Springs



Drawout Breaker Levering Can be Accomplished With the Compartment Door Closed Without the Need for a Special Levering Tool

Breaker Internal Features

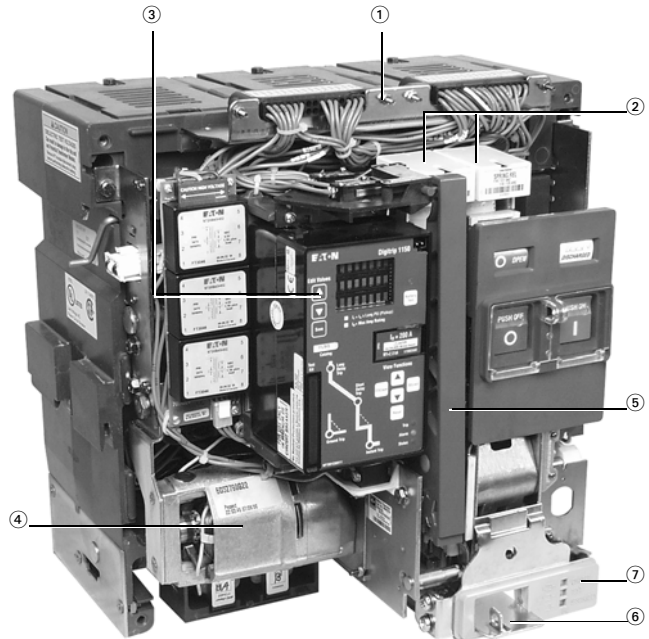
Magnum is designed for ease of access for inspection, modification and maintenance at the point of use. The breaker front cover is easily removed with four captive bolts, revealing the modular internal breaker features.

- ① Secondary Terminal Points for Internal Breaker Wiring Connections
- ② Breaker Accessory Mounting Deck with Three Positions for Mounting:
 - Shunt Trip Attachment (STA)
 - Spring Release Device (SR)
 - Undervoltage Release (UVR) Device or Second STA
- ③ Digitrip RMS Trip Unit (Model 1150+ Shown)
- ④ Spring Charging Motor (Optional) for Electrically Charging the Stored Energy Springs
- ⑤ Manual Spring Charging Handle for Manually Charging the Stored Energy Springs

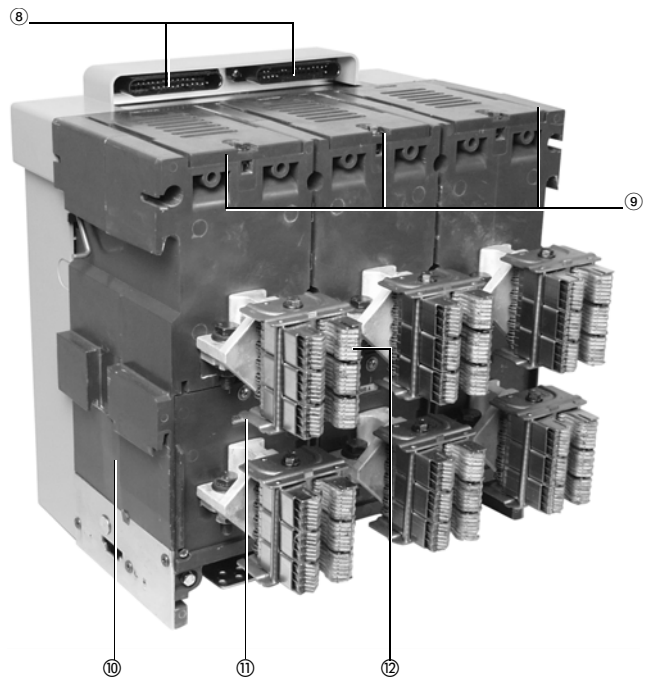
- ⑥ Padlockable Levering Device Shutter for Drawout Breakers
- ⑦ Color-Coded Position Indicator for Drawout Breakers:
 - CONNECT—Red
 - TEST—Yellow
 - DISCONNECT—Green
- ⑧ Secondary Contact Blocks for Connection to External Cell Control Wiring
- ⑨ Removable Arc Chute Covers for Easy Access to Breaker Main Contacts
- ⑩ Primary Finger Cluster Disconnecting Contacts for Drawout Breaker are Mounted on the Breaker Element (Not in the Breaker Compartment) for Ease of Access for Inspection and Maintenance

Note: Some competitors mount the primary finger clusters inside the cell, requiring shutdown of the switchgear for inspection and maintenance.

- ⑪ Current Sensor Viewing Windows to View and Confirm Breaker Sensor Rating
- ⑫ Rigid Frame Housing (Thermoset Composite Resin) Providing Increased Strength and Durability



Magnum Drawout Breaker Front View With Front Cover Removed Showing Easy Access to the Breaker Internal Devices



Magnum Drawout Breaker Rear View Showing Primary Disconnecting Finger Clusters Mounted on the Breaker for Ease of Inspection

3.1

Power Breakers, Contactors and Fuses

Power Circuit Breakers

3

Magnum DS, MDSX and MDSL Circuit Breakers



Magnum DS Low Voltage Power Circuit Breakers

Product Description

Magnum DS is a true UL 1066 listed low voltage power circuit breaker family, designed for the highest performance requirements of switchgear and specialty enclosure applications.

- Magnum DS low voltage power circuit breakers have interruption ratings up to 200 kA at 480 Vac, and short-time withstand ratings up to 100 kA at 635 Vac with continuous current ratings up to 5000 A to maximize system coordination and selectivity
- Magnum MDSX current limiting power circuit breakers have 200 kA interruption ratings at 480 Vac with continuous current ratings up to 5000 A
- Magnum MDSL current limiting power circuit breakers have 200 kA interruption ratings at 600 Vac with continuous current ratings up to 2000 A



The Magnum MDSL current limiting power circuit breakers have integral current limiters to provide interruption ratings of 200 kA at 600 Vac.



The Magnum MDSX current limiting power circuit breakers have fast opening contacts to provide interruption ratings up to 200 kA at 480 Vac without fuses.

Contents

| <i>Description</i> | <i>Page</i> |
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| Magnum DS Low Voltage Power Circuit Breakers Catalog Number Selection | V4-T3-7 |
| Technical Data and Specifications | V4-T3-10 |
| Magnum MDSL Current Limiting Power Circuit Breaker | V4-T3-12 |
| Magnum SB Low Voltage Insulated Case Circuit Breakers | V4-T3-15 |
| Magnum IEC Rated Air Circuit Breakers | V4-T3-23 |
| Magnum DC (Direct Current) Low Voltage Switches | V4-T3-33 |
| Series NRX Low Voltage Power Circuit Breakers with PXR | V4-T3-35 |
| Series NRX Low Voltage Power Circuit Breakers with Digitrip | V4-T3-47 |
| Medium Voltage Circuit Breakers | V4-T3-55 |

Standards and Certifications

UL and ANSI Test Certifications

Magnum DS meets or exceeds the applicable ANSI, NEMA®, UL and CSA® standards, including:

- ANSI C37.13 (Low Voltage AC Power Circuit Breakers Used in Enclosures)
- ANSI C37.16 (Preferred Ratings, Related Requirements, and Application Recommendations for Low Voltage Power Circuit Breakers and AC Power Circuit Breakers)
- ANSI C37.17 (Trip Devices for AC and General Purpose DC Low Voltage Power Circuit Breakers)
- ANSI C37.50 (Test Procedures for Low Voltage AC Power Circuit Breakers Used in Enclosures)
- UL 1066 (Standard for Low Voltage AC and DC Power Circuit Breakers Used in Enclosures)
- NEMA SG3 (This standard adopts ANSI C37.16 in its entirety)

Comprehensive Enclosure Solutions

Magnum DS has proven performance in Eaton manufactured switchgear with the following test certifications:

- UL 1558 (Certified Magnum DS Low Voltage Metal-Enclosed Switchgear)
- UL 1008 Standard for Transfer Switch Equipment
- UL, CSA 22.2.31 Low Voltage Assemblies

Approvals and Marks

- UL listed: Magnum DS Breaker UL File No. E52096 and Cassette UL File No. E204565
- ABS (American Bureau of Shipping) Type Listed Certificate Number 04-HS422844A-DUB
- Additional Magnum DS approvals and certificates can be found on www.eaton.com



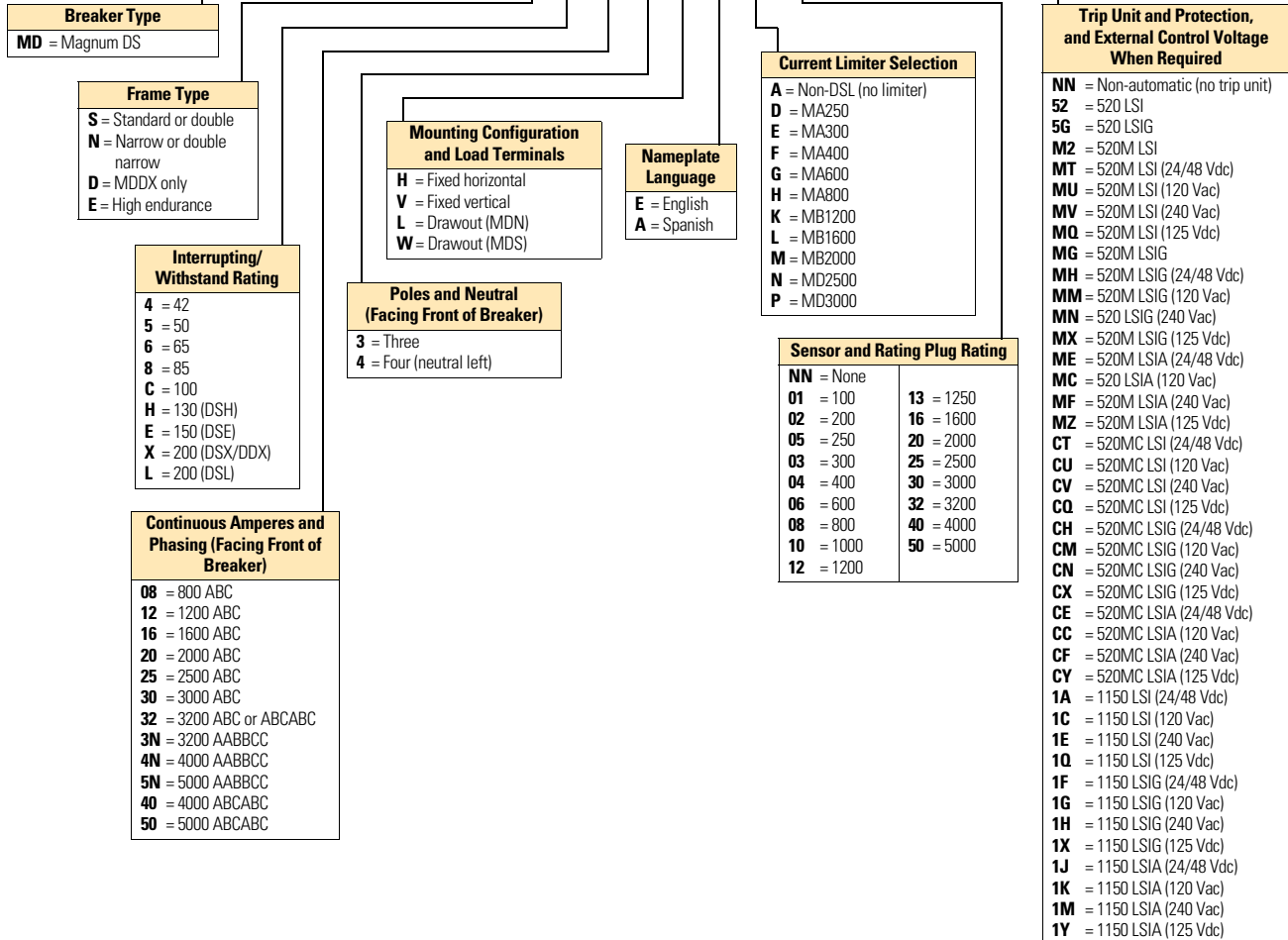
Product Selection

Contact Eaton for pricing.

Catalog Number Selection

Magnum DS ANSI Breaker Product Family

MD S 4 12 3 V E A 06 MU



3.1

Power Breakers, Contactors and Fuses

Power Circuit Breakers

Magnum DS ANSI Breaker Product Family, continued

3

A W C H N E H K L A X

Shunt Trip (ST)

N = None
A = 110–127 Vac/Vdc
R = 208–240 Vac/Vdc
C = 24 Vdc
H = 48 Vdc
B = 110–127 Vac/Vdc (100% duty)
S = 220–250 Vac/Vdc (100% duty)
D = 24 Vdc (100% duty)
K = 48 Vdc (100% duty)
J = 60 Vdc (100% duty)
6 = 60 Vdc

Motor Operator

M = Manual operated
N = 110–125 Vac (5-sec)
W = 110–125 Vdc (5-sec)
T = 220–250 Vdc (5-sec)
P = 208–277 Vac (5-sec)
L = 24 Vdc (5-sec)
K = 48 Vdc (5-sec)
S = 60 Vdc (5-sec)
1 = 110–125 Vac (3-sec)
2 = 220–250 Vac (3-sec)
4 = 24 Vdc (3-sec)
8 = 48 Vdc (3-sec)
5 = 110–125 Vdc (3-sec)
9 = 220–250 Vdc (3-sec)

Spring Release Device (SRD)

N = None
A = 110–127 Vac/Vdc
R = 208–240 Vac/Vdc
C = 24 Vdc
H = 48 Vdc
S = 60 Vdc

Undervoltage Release (UVR) or 2nd Shunt Trip (ST)

N = None
A = UVR (110–127 Vac)
R = UVR (208–240 Vac)
C = UVR (24 Vdc)
H = UVR (48 Vdc)
D = UVR (60 Vdc)
E = UVR (110–125 Vdc)
F = UVR (220–250 Vdc)
G = UVR (32 Vdc)
X = UVR (380–415 Vac)
J = UVR (480 Vac)
K = UVR (600 Vac)
1 = 2nd ST (110–127 Vac/Vdc)
2 = 2nd ST (208–250 Vac/Vdc)
3 = 2nd ST (24 Vdc)
4 = 2nd ST (48 Vdc)
6 = 2nd ST (60 Vdc)
B = 2nd ST (110–127 Vac/Vdc 100% duty)
O = 2nd ST (220–250 Vac/Vdc 100% duty)
I = 2nd ST (24 Vdc 100% duty)
Q = 2nd ST (48 Vdc 100% duty)
9 = 2nd ST (60 Vdc 100% duty)

Auxiliary Switch

N = None
2 = 2A/2B
4 = 4A/4B
6 = 6A/6B

Bell Alarms Switch (OTS) with 2a/2b Contacts and/or Mechanical Trip Indicator

| | Mech. Trip Indicator | Mech. Interlock for Manual Reset | OTS Switch with Two Form C Contacts |
|----------|----------------------|----------------------------------|-------------------------------------|
| E | No | — | No |
| N | Yes | No | No |
| Y | Yes | No | Yes |
| M | Yes | Yes | No |
| L | Yes | Yes | Yes |
| F | Yes | No | Yes with 24 V reset |
| G | Yes | No | Yes with 120 V reset |
| H | Yes | No | Yes with 240 V reset |
| I | Yes | Yes | Yes with 24 V reset |
| J | Yes | Yes | Yes with 120 V reset |
| K | Yes | Yes | Yes with 240 V reset |

Padlock Provisions for Blocking Close and/or Open ACB Manual Pushbuttons

N = None
M = Metal (block close and open)
P = Plastic (block close and open)
C = Metal (block close only)
H = Plastic (block close only)
S = Metal swbd lock-off (block close, depress open)

Operations Counter and/or Keylock Provisions

| | Counter | Keylock Provisions |
|----------|------------|----------------------|
| N | No counter | No locks |
| K | No counter | Kirk lock |
| C | No counter | Castell lock |
| R | No counter | Ronis lock |
| S | No counter | CES lock |
| A | Counter | No lock |
| Y | Counter | Kirk lock |
| L | Counter | Castell lock |
| H | Counter | Ronis lock indicator |
| E | Counter | CES lock |

Latch Check Switch/Trip Unit Metering Voltage Connection for Digitrip 1150 Trip Unit

| | Latch Check Switch | 1150 Voltage Connection |
|----------|--------------------|-------------------------|
| N | None | Upper terminals |
| M | None | Lower terminals |
| L | LCS wired to SRD | Upper terminals |
| Y | LCS Wired to SRD | Lower terminals |
| C | LCS Wired External | Upper terminals |
| D | LCS Wired External | Lower terminals |

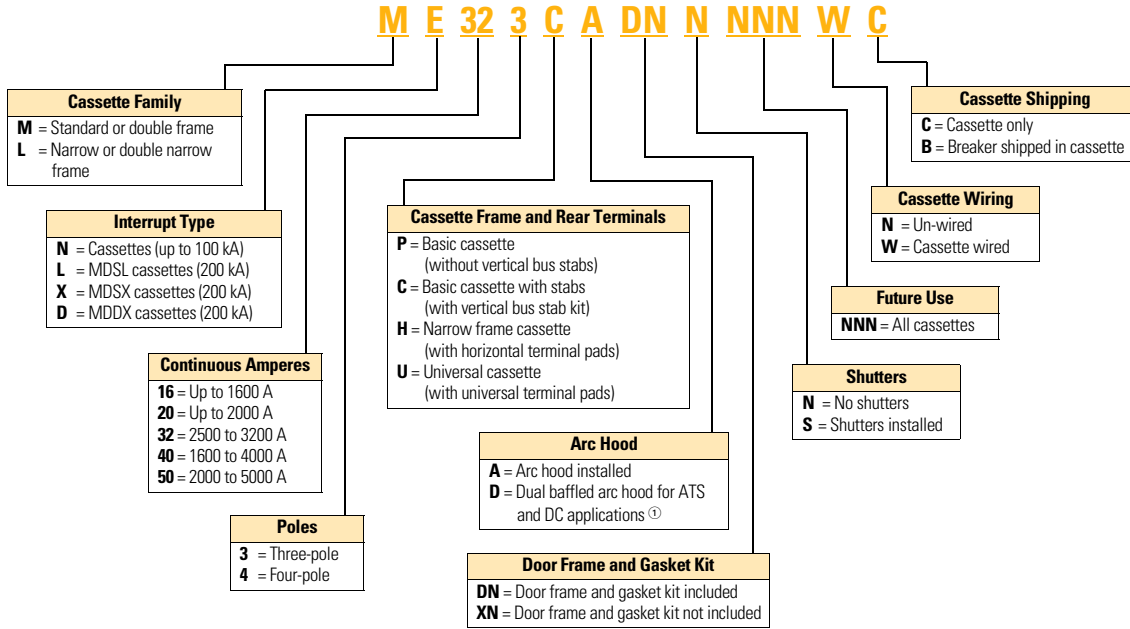
Breaker Shipping Options and Instructions

A = Fixed breaker alone with door kit
B = Fixed breaker alone with door kit and pre-wired
F = Fixed breaker alone without door kit
A = Drawout breaker alone without door frame kit
C = Drawout breaker in cassette (un-wired)
P = Drawout breaker in cassette (shutters)
S = Drawout breaker in cassette (shutters)
W = Drawout breaker in cassette (pre-wired and shutters)
 Double frame drawout breakers ship without cassette drawout. ACBs ship in narrow and universal cassettes only.

Frame Use

X = All breakers

Cassette Magnum DS ANSI Breaker Product Family



Note

① The arc hood option 'D' is recommended for use for ATS applications as well as on Magnum ANSI DC breakers, 'DAS' and 'DBS' configurations.

3.1

Power Breakers, Contactors and Fuses

Power Circuit Breakers

Technical Data and Specifications

Magnum DS Switchgear Class UL 1066 Low Voltage Power Circuit Breakers

3

| Frame Amperes | Breaker Type Catalog Position 1–6 | Frame Type | rms Symmetrical Current Ratings kA 50/60 Hz ① | | | | Short-Time Withstand Rating | Fixed Internal Instantaneous Trip | Available Current Sensor and Rating Plugs for Digitrip RMS Trip Unit (Establishes Breaker I _n Rating) |
|---------------|-----------------------------------|------------|---|--------------------------------|--------------------------------|--------------------------------|-----------------------------|--|--|
| | | | Interruption Rating at 254 Vac | Interruption Rating at 508 Vac | Interruption Rating at 635 Vac | Interruption Rating at 635 Vac | | | |
| 800 | MDN-408 | Narrow | 42 | 42 | 42 | 42 | — | 200, 250, 300, 400, 600, 800 | |
| | MDN-508 | Narrow | 50 | 50 | 50 | 50 | — | | |
| | MDN-608 | Narrow | 65 | 65 | 65 | 65 | — | | |
| | MDN-C08 | Narrow | 100 | 100 | 65 | 20 | 18 x I _n | | |
| | MDS-408 | Standard | 42 | 42 | 42 | 42 | — | | |
| | MDS-508 | Standard | 50 | 50 | 50 | 50 | — | | |
| | MDS-608 | Standard | 65 | 65 | 65 | 65 | — | | |
| | MDS-808 | Standard | 85 | 85 | 85 | 85 | — | | |
| | MDS-C08 | Standard | 100 | 100 | 100 | 85 | 85 | | |
| | MDS-H08 | Standard | 130 | 130 | 130 | 85 | 85 | | |
| | MDS-L08 ② | Standard | 200 | 200 | 200 | — | — | | |
| MDS-X08 ③ | Standard | 200 | 200 | 65 | 30 | 30 | | | |
| 1200 | MDN-412 | Narrow | 42 | 42 | 42 | 42 | — | 200, 250, 300, 400, 600, 800, 1000, 1200 | |
| | MDN-512 | Narrow | 50 | 50 | 50 | 50 | — | | |
| | MDN-612 | Narrow | 65 | 65 | 65 | 65 | — | | |
| | MDN-C12 | Narrow | 100 | 100 | 65 | 25 | 18 x I _n | | |
| | MDS-X12 | Standard | 200 | 200 | 65 | 30 | 30 | | |
| | MDS-512 | Standard | 50 | 50 | 50 | 50 | — | | |
| | MDS-612 | Standard | 65 | 65 | 65 | 65 | — | | |
| | MDS-812 | Standard | 85 | 85 | 85 | 85 | — | | |
| | MDS-C12 | Standard | 100 | 100 | 100 | 85 | — | | |
| | MDS-H12 | Standard | 130 | 130 | 130 | 85 | 85 | | |
| 1600 | MDN-416 | Narrow | 42 | 42 | 42 | 42 | — | 200, 250, 300, 400, 600, 800, 1000, 1200, 1600 | |
| | MDN-516 | Narrow | 50 | 50 | 50 | 50 | — | | |
| | MDN-616 | Narrow | 65 | 65 | 65 | 65 | — | | |
| | MDN-C16 | Narrow | 100 | 100 | 65 | 30 | 18 x I _n | | |
| | MDS-516 | Standard | 50 | 50 | 50 | 50 | — | | |
| | MDS-616 | Standard | 65 | 65 | 65 | 65 | — | | |
| | MDS-816 | Standard | 85 | 85 | 85 | 85 | — | | |
| | MDS-C16 | Standard | 100 | 100 | 100 | 85 | 85 | | |
| | MDS-H16 | Standard | 130 | 130 | 130 | 85 | 85 | | |
| | MDS-L16 ② | Standard | 200 | 200 | 200 | — | — | | |
| MDS-X16 ③ | Standard | 200 | 200 | 65 | 30 | 30 | | | |
| 2000 | MDN-620 | Narrow | 65 | 65 | 65 | 65 | — | 200, 250, 300, 400, 600, 800, 1000, 1200, 1600, 2000 | |
| | MDN-C20 | Narrow | 100 | 100 | 65 | 35 | 18 x I _n | | |
| | MDS-620 | Standard | 65 | 65 | 65 | 65 | — | | |
| | MDS-820 | Standard | 85 | 85 | 85 | 85 | — | | |
| | MDS-C20 | Standard | 100 | 100 | 100 | 85 | 85 | | |
| | MDS-H20 | Standard | 130 | 130 | 130 | 85 | 85 | | |
| | MDS-L20 ② | Standard | 200 | 200 | 200 | — | — | | |
| | MDS-X20 ③ | Standard | 200 | 200 | 65 | 30 | 30 | | |

Notes

- ① Interrupting ratings shown based on breaker equipped with integral Digitrip RMS trip unit. Interruption ratings for non-automatic breakers are equal to the published short-time withstand rating. These interruption ratings are based on the standard duty cycle consisting of an open operation, a 15-second interval and a close-open operation, in succession, with delayed tripping in case of short-delay devices. The standard duty cycle for short-time ratings consists of maintaining the rated current for two periods of 1/2 seconds each, with a 15-second interval of zero current between the two periods.
- ② Magnum MDSL current limiting power circuit breaker with integral current limiters. Current Limiter selected determines short-time and fixed instantaneous trip rating. Maximum voltage rating is 600 Vac.
- ③ Magnum MDSX current limiting power circuit breaker with fast opening contacts.

Magnum DS Switchgear Class UL 1066 Low Voltage Power Circuit Breakers, continued

| Frame Amperes | Breaker Type Catalog Position 1–6 | Frame Type | rms Symmetrical Current Ratings kA 50/60 Hz ^① | | | | Short-Time Withstand Rating | Fixed Internal Instantaneous Trip | Available Current Sensor and Rating Plugs for Digitrip RMS Trip Unit (Establishes Breaker I _n Rating) |
|---------------|-----------------------------------|---------------|--|--------------------------------|--------------------------------|------------------|-----------------------------|--|--|
| | | | Interruption Rating at 254 Vac | Interruption Rating at 508 Vac | Interruption Rating at 635 Vac | | | | |
| 2500 | MDS-625 | Standard | 65 | 65 | 65 | 65 | — | 200, 250, 300, 400, 600, 800, 1000, 1200, 1600, 2000, 2500 | |
| | MDS-825 | Standard | 85 | 85 | 85 | 85 | — | | |
| | MDS-C25 | Standard | 100 | 100 | 100 | 100 ^② | 85 | | |
| | MDS-H25 | Standard | 130 | 130 | 130 | 85 | 85 | | |
| 3200 | MDS-632 | Standard | 65 | 65 | 65 | 65 | — | 200, 250, 300, 400, 600, 800, 1000, 1200, 1600, 2000, 2500, 3000, 3200 | |
| | MDS-832 | Standard | 85 | 85 | 85 | 85 | — | | |
| | MDS-C32 | Standard | 100 | 100 | 100 | 85 | 85 | | |
| | MDS-H32 | Standard | 130 | 130 | 130 | 85 | 85 | | |
| | MDS-X32 ^③ | Double | 200 | 200 | ^④ | 50 | 50 | | |
| 4000 | MDN-640 | Double narrow | 65 | 65 | 65 | 65 | — | 2000, 2500, 3200, 4000 | |
| | MDN-840 | Double narrow | 85 | 85 | 65 | 85 | — | | |
| | MDN-C40 | Double narrow | 100 | 100 | 65 | 100 | — | | |
| | MDS-840 | Double | 85 | 85 | 85 | 85 | — | | |
| | MDS-C40 | Double | 100 | 100 | 100 | 100 | — | | |
| | MDS-H40 | Double | 130 | 130 | 130 | 130 | — | | |
| | MDS-X40 ^③ | Double | 200 | 200 | ^⑤ | 50 | 50 | | |
| | MDD-X40 | Double | 200 | 200 | 100 | 100 | — | | |
| 5000 | MDS-850 | Double | 85 | 85 | 85 | 85 | — | 2500, 3200, 4000, 5000 | |
| | MDS-C50 | Double | 100 | 100 | 100 | 100 | — | | |
| | MDS-H50 | Double | 130 | 130 | 130 | 130 | — | | |
| | MDS-X50 ^{③⑤} | Double | 200 | 200 | ^④ | 50 | 50 | | |
| | MDD-X50 | Double | 200 | 200 | 100 | 100 | — | | |

Notes

- ① Interruption ratings shown based on breaker equipped with integral Digitrip RMS trip unit. Interruption ratings for non-automatic breakers are equal to the published short-time withstand rating. These interruption ratings are based on the standard duty cycle consisting of an open operation, a 15-second interval and a close-open operation, in succession, with delayed tripping in case of short-delay devices. The standard duty cycle for short-time ratings consists of maintaining the rated current for two periods of 1/2 seconds each, with a 15-second interval of zero current between the two periods.
- ② Short-time withstand for MDSC at 2500A for 600 Vac is 85 kA.
- ③ Magnum MDSX current limiting power circuit breaker with fast opening contacts.
- ④ Product to be tested. Contact Eaton for product rating.
- ⑤ Breaker applied in a tested fan-cooled enclosure.

3.1

Power Breakers, Contactors and Fuses

Power Circuit Breakers

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Magnum MDSL Current Limiting Power Circuit Breaker



Contents

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| Magnum MDSL Current Limiting Power Circuit Breaker Product Selection | V4-T3-13 |
| Technical Data and Specifications | V4-T3-13 |
| Trip Curve Charts | V4-T3-14 |
| Magnum SB Low Voltage Insulated Case Circuit Breakers | V4-T3-15 |
| Magnum IEC Rated Air Circuit Breakers | V4-T3-23 |
| Magnum DC (Direct Current) Low Voltage Switches | V4-T3-33 |
| Series NRX Low Voltage Power Circuit Breakers with PXR | V4-T3-35 |
| Series NRX Low Voltage Power Circuit Breakers with Digitrip | V4-T3-47 |
| Medium Voltage Circuit Breakers | V4-T3-55 |

Magnum MDSL Current Limiting Power Circuit Breaker

Product Description

The following curves illustrate the ratings, melting time-current characteristics and current limiting, or let-through characteristics, of limiters for Magnum low voltage power circuit breakers.

The let-through current for a given limiter application is readily determined by extending a vertical line from the applicable maximum available symmetrical fault amperes at the bottom margin to the characteristic line for the particular limiter, and from this intersection extending a horizontal line to the left margin and reading the peak current. The withstand rating of any circuit elements protected by the limiters should be at least equal to this peak current.

It will be noted that the let-through current increases with the limiter size or ampere rating; in other words, the maximum current limiting effect is obtained with the smallest size. This effect is to be expected, since the resistance decreases as the rating increases. If the vertical line from the bottom margin as described in the previous paragraph does not intersect the limiter characteristic line,

the available system fault current is below the "threshold" current of that limiter, and it will offer no current limiting effect.

The current limiting principle is illustrated below:

I_a = The Available Peak Fault Current

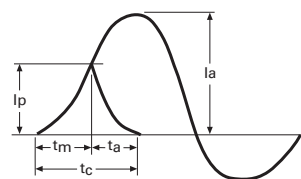
t_m = The Melting Time

I_p = The Peak Let-Through Current

t_a = The Arcing Time

t_c = The Total Interrupting (Clearing) Time

Current Limiting



Limiter Selection

The selection of a suitable limiter rating for a given application is generally governed by a choice of the following types of protection:

- A. Maximum protection of "downstream" components. Type MDSL breakers are often used for this purpose even when the maximum available fault currents are within the interruption rating of the corresponding unfused Magnum breakers.
- B. Protection of the circuit breaker only.

Case A would tend to use the smallest available limiter; Case B the largest. When downstream protection is required, the selection is usually a compromise, since certain small limiters cannot be coordinated with the breaker to avoid nuisance blowing on overloads or small and moderate short circuits.

Minimum, recommended and maximum limiter sizes for Magnum MDSL breakers are given in the table on **Page V4-T3-13**.

Product Selection

Magnum MDSL Sensor/Rating Plug vs. Current Limiter Selection ①

Sensor and Rating Plug I_n **MDSL Current Limiter Selection Chart** ②

| | | | | | | | | | | |
|------|-------|-------|-------|---------|---------|----------|--------|----------|----------|----------|
| 200 | MA250 | MA300 | MA400 | MA600 ③ | MA800 | MB1200 | MB1600 | MB2000 | MD2500 | MD3000 |
| 250 | | | MA400 | MA600 | MA800 ③ | MB1200 | MB1600 | MB2000 | MD2500 | MD3000 |
| 300 | | | MA400 | MA600 | MA800 ③ | MB1200 | MB1600 | MB2000 | MD2500 | MD3000 |
| 400 | | | | MA600 | MA800 | MB1200 ③ | MB1600 | MB2000 | MD2500 | MD3000 |
| 600 | | | | | MA800 | MB1200 | MB1600 | MB2000 ③ | MD2500 | MD3000 |
| 800 | | | | | | MB1200 | MB1600 | MB2000 | MD2500 ③ | MD3000 |
| 1000 | | | | | | | MB1600 | MB2000 | MD2500 ③ | MD3000 |
| 1200 | | | | | | | | MB2000 | MD2500 ③ | MD3000 |
| 1600 | | | | | | | | | | MD3000 ③ |
| 2000 | | | | | | | | | | MD3000 ③ |

Technical Data and Specifications

Magnum MDSL Ratings

| Frame | Catalog Number | Available Sensor/Rating Plug (Amperes) |
|-------|----------------|--|
| 800 | MDSL08 | 200, 250, 300, 400, 600, 800 |
| 1600 | MDSL16 | 200, 250, 300, 400, 600, 800, 1000, 1200, 1600 |
| 2000 | MDSC20 | 1600, 2000 |

Notes

- ① Select the current limiter based on the Magnum breaker frame and current sensor and rating plug as shown.
- ② Refer to MDSL current limiter curves for let-through and time characteristics.
- ③ The recommended ratings shown as shaded provide for reduced current let-through and breaker coordination within the trip unit settings. Selection of current limiters below the recommended ratings shown provides lower current let-through, however, trip unit settings must be considered to avoid nuisance operation.

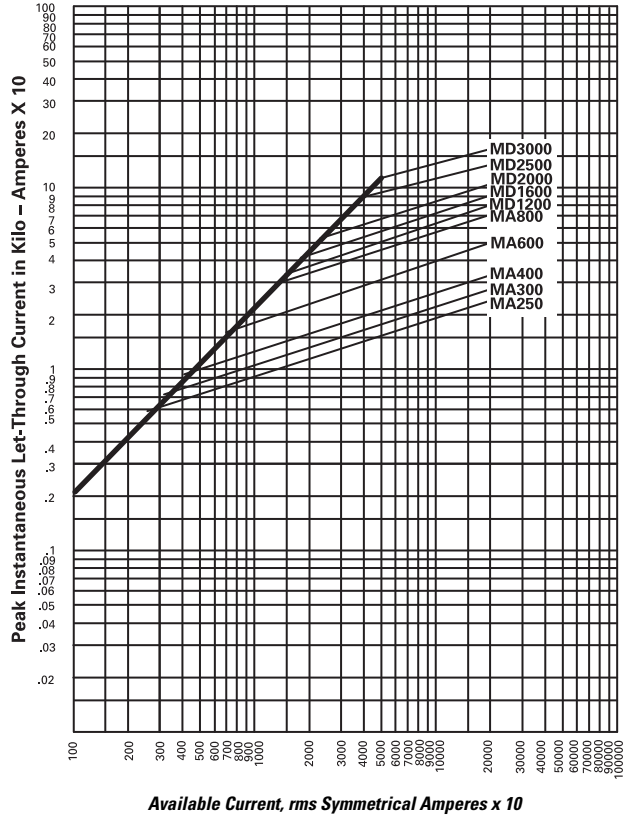
3.1

Power Breakers, Contactors and Fuses

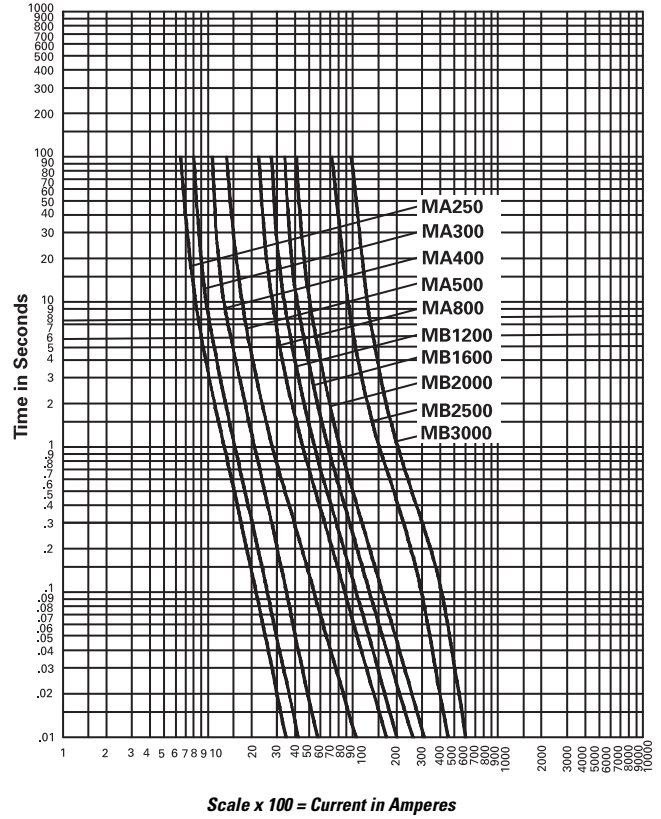
Power Circuit Breakers

Trip Curve Charts

Type Magnum DSL Limiters, Peak Let-Through Current Characteristics



Type Magnum DSL Limiters Average Melting Time-Current Characteristics



Note

For Time/Current Curves, see www.eaton.com/electrical

3

Magnum SB Low Voltage Insulated Case Circuit Breaker



Magnum SB Low Voltage Insulated Case Circuit Breakers

Product Description

Magnum SB is a low voltage insulated case circuit breaker family designed for the performance and economic requirements of UL 891 switchboards.

- Magnum SB insulated case circuit breakers have interruption ratings up to 130 kA at 635 Vac with continuous current ratings up to 5000 A
- Magnum SB insulated case circuit breakers have lighter-duty short-time withstand ratings and fixed internal instantaneous trips on most ratings, which is characteristic of UL 489 molded case breakers commonly used in UL 891 switchboards. This provides for greater economy and excellent coordination and selectivity for most commercial applications
- Fixed internal instantaneous trips will be phased in on all Magnum SB insulated case circuit breakers rated 3200 A and below to provide an extra safety factor by reducing the energy let-through to

downstream circuits at the maximum instantaneous trip point and to facilitate feeder circuit breaker protection in UL 891 switchboards with 3-cycle bus bracing

- Magnum SBSE current limiting power circuit breakers have 150 kA interruption ratings at 480 Vac with continuous current ratings up to 5000 A. The short-time withstand rating is 30 kA for standard frame and 50 kA for double frame breakers

| Magnum SB | | | |
|---|------------------------|-------------|--|
| SBNC16 Insulated Case | | | |
| Low Voltage AC Power Circuit Breaker | | | |
| 1600 Amp Frame 4 Pole 50/60 Hz | | | |
| Interruption Ratings in Amps | | | |
| Max Volts | Inst Trip | Short Delay | |
| 635 | 65,000A | 30,000A | |
| 508 | 100,000A | 30,000A | |
| 254 | 100,000A | 30,000A | |
| Accessories | | | |
| Motor Operator | 110 - 125 VAC 50/60 Hz | | |
| OTS/Bell Alarm | | | |
| Trip Unit Power | 120 VAC 50/60 Hz | | |
| Aux Switches | 4A / 4B | | |
| Spring Release Latch Check Switch | | | |
| G.O.P.: SAMPLE | It: 001 | Seq: 002 | |
| Case P.D.: SAMPLE | | Code: | |
| 02/18/05 | 16:19:53 | | |
| CAT#: SBNC164XE 16MUA NAAMY MYLAX | | | |
| Enclosure Requirements Dwg: 2C13090 | | | |
| Installation and Operating Instructions: I.B. 2C12060 | | | |
| Made in USA | | | |

Typical Magnum SB Low Voltage Insulated Case Circuit Breaker Nameplate

Contents

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| Low Voltage Power Circuit Breakers | V4-T3-2 |
| Magnum DS Low Voltage Power Circuit Breakers | V4-T3-6 |
| Magnum MDSL Current Limiting Power Circuit Breaker | V4-T3-12 |
| Magnum SB Low Voltage Insulated Case Circuit Breakers | |
| Catalog Number Selection | V4-T3-16 |
| Technical Data and Specifications | V4-T3-19 |
| Magnum IEC Rated Air Circuit Breakers | V4-T3-23 |
| Magnum DC (Direct Current) Low Voltage Switches | V4-T3-33 |
| Series NRX Low Voltage Power Circuit Breakers with PXR | V4-T3-35 |
| Series NRX Low Voltage Power Circuit Breakers with Digitrip | V4-T3-47 |
| Medium Voltage Circuit Breakers | V4-T3-55 |

Standards and Certifications

UL and ANSI Test Certifications

Magnum SB meets or exceeds the applicable ANSI, NEMA, UL and CSA standards, including:

- ANSI C37.13 (Low Voltage AC Power Circuit Breakers Used in Enclosures)
- ANSI C37.16 (Preferred Ratings, Related Requirements, and Application Recommendations for Low Voltage Power Circuit Breakers and AC Power Circuit Breakers)
- ANSI C37.17 (Trip Devices for AC and General Purpose DC Low Voltage Power Circuit Breakers)
- ANSI C37.50 (Test Procedures for Low Voltage AC Power Circuit Breakers Used in Enclosures)
- UL 1066 (Standard for Low Voltage AC and DC Power Circuit Breakers Used in Enclosures)
- NEMA SG3 (This standard adopts ANSI C37.16 in its entirety)

Comprehensive Enclosure Solutions

Magnum SB has proven performance in Eaton manufactured switchboards with the following test certifications:

- UL 891 (Certified Pow-R-Line C Low Voltage Switchboards)
- UL, CSA 22.2.31 Low Voltage Assemblies

Approvals and Marks

UL listed: Magnum DS Breaker UL File E52096 and Cassette UL File E204565



Product Selection

Contact Eaton for pricing.

3.1

Power Breakers, Contactors and Fuses

Power Circuit Breakers

Catalog Number Selection

Magnum SB Breaker Product Family

3

SB S 4 12 3 V E A 06 MU

Breaker Type
SB = Magnum switchboard

Frame Type
S = Standard or double
N = Narrow or double narrow
D = MDDX only
E = High endurance

Interrupting/Withstand Rating
4 = 42
5 = 50
6 = 65
8 = 85
C = 100
H = 130 (DSH)
E = 150 (DSE)
X = 200 (DSX/DDX)
L = 200 (DSL)

Continuous Amperes and Phasing (Facing Front of Breaker)
08 = 800 ABC
12 = 1200 ABC
16 = 1600 ABC
20 = 2000 ABC
25 = 2500 ABC
30 = 3000 ABC
32 = 3200 ABC or ABCABC
3N = 3200 AABCC
4N = 4000 AABCC
5N = 5000 AABCC
40 = 4000 ABCABC
50 = 5000 ABCABC

Mounting Configuration and Load Terminals
H = Fixed horizontal
V = Fixed vertical
L = Drawout (MDN)
W = Drawout (MDS)

Poles and Neutral (Facing Front of Breaker)
3 = Three
4 = Four (neutral left)

Nameplate Language
E = English
A = Spanish

Current Limiter Selection
A = Non-DSL (no limiter)
D = MA250
E = MA300
F = MA400
G = MA600
H = MA800
K = MB1200
L = MB1600
M = MB2000
N = MD2500
P = MD3000

Sensor and Rating Plug Rating

| | |
|-----------|-----------|
| NN = None | 13 = 1250 |
| 01 = 100 | 16 = 1600 |
| 02 = 200 | 20 = 2000 |
| 05 = 250 | 25 = 2500 |
| 03 = 300 | 30 = 3000 |
| 04 = 400 | 32 = 3200 |
| 06 = 600 | 40 = 4000 |
| 08 = 800 | 50 = 5000 |
| 10 = 1000 | |
| 12 = 1200 | |

Trip Unit and Protection, and External Control Voltage When Required

NN = Non-automatic (no trip unit)
52 = 520 LSI
5G = 520 LSI
M2 = 520M LSI
MT = 520M LSI (24/48 Vdc)
MU = 520M LSI (120 Vac)
MV = 520M LSI (240 Vac)
MQ = 520M LSI (125 Vdc)
MG = 520M LSI
MH = 520M LSI (24/48 Vdc)
MM = 520M LSI (120 Vac)
MN = 520 LSI (240 Vac)
MX = 520M LSI (125 Vdc)
ME = 520M LSI (24/48 Vdc)
MC = 520 LSI (120 Vac)
MF = 520M LSI (240 Vac)
MZ = 520M LSI (125 Vdc)
CT = 520M LSI (24/48 Vdc)
CU = 520M LSI (120 Vac)
CV = 520M LSI (240 Vac)
CQ = 520M LSI (125 Vdc)
CH = 520M LSI (24/48 Vdc)
CM = 520M LSI (120 Vac)
CN = 520M LSI (240 Vac)
CX = 520M LSI (125 Vdc)
CE = 520M LSI (24/48 Vdc)
CC = 520M LSI (120 Vac)
CF = 520M LSI (240 Vac)
CY = 520M LSI (125 Vdc)
1A = 1150 LSI (24/48 Vdc)
1C = 1150 LSI (120 Vac)
1E = 1150 LSI (240 Vac)
1Q = 1150 LSI (125 Vdc)
1F = 1150 LSI (24/48 Vdc)
1G = 1150 LSI (120 Vac)
1H = 1150 LSI (240 Vac)
1X = 1150 LSI (125 Vdc)
1J = 1150 LSI (24/48 Vdc)
1K = 1150 LSI (120 Vac)
1M = 1150 LSI (240 Vac)
1Y = 1150 LSI (125 Vdc)

Magnum SB Breaker Product Family, continued

A W C H N E H K L A X

Shunt Trip (ST)

N = None
A = 110–127 Vac/Vdc
R = 208–240 Vac/Vdc
C = 24 Vdc
H = 48 Vdc
B = 110–127 Vac/Vdc (100% duty)
S = 220–250 Vac/Vdc (100% duty)
D = 24 Vdc (100% duty)
K = 48 Vdc (100% duty)
J = 60 Vdc (100% duty)
6 = 60 Vdc

Motor Operator

M = Manual operated
N = 110–125 Vac (5-sec)
W = 110–125 Vdc (5-sec)
T = 220–250 Vdc (5-sec)
P = 208–277 Vac (5-sec)
L = 24 Vdc (5-sec)
K = 48 Vdc (5-sec)
S = 60 Vdc (5-sec)
1 = 110–125 Vac (3-sec)
2 = 220–250 Vac (3-sec)
4 = 24 Vdc (3-sec)
8 = 48 Vdc (3-sec)
5 = 110–125 Vdc (3-sec)
9 = 220–250 Vdc (3-sec)

Spring Release Device (SRD)

N = None
A = 110–127 Vac/Vdc
R = 208–240 Vac/Vdc
C = 24 Vdc
H = 48 Vdc
S = 60 Vdc

Undervoltage Release (UVR) or 2nd Shunt Trip (ST)

N = None
A = UVR (110–127 Vac)
R = UVR (208–240 Vac)
C = UVR (24 Vdc)
H = UVR (48 Vdc)
D = UVR (60 Vdc)
E = UVR (110–125 Vdc)
F = UVR (220–250 Vdc)
G = UVR (32 Vdc)
X = UVR (380–415 Vac)
J = UVR (480 Vac)
K = UVR (600 Vac)
1 = 2nd ST (110–127 Vac/Vdc)
2 = 2nd ST (208–250 Vac/Vdc)
3 = 2nd ST (24 Vdc)
4 = 2nd ST (48 Vdc)
6 = 2nd ST (60 Vdc)
B = 2nd ST (110–127 Vac/Vdc 100% duty)
O = 2nd ST (220–250 Vac/Vdc 100% duty)
I = 2nd ST (24 Vdc 100% duty)
Q = 2nd ST (48 Vdc 100% duty)
9 = 2nd ST (60 Vdc 100% duty)

Auxiliary Switch

N = None
2 = 2A/2B
4 = 4A/4B
6 = 6A/6B

Bell Alarms Switch (OTS) with 2a/2b Contacts and/or Mechanical Trip Indicator

| | Mech. Trip Indicator | Mech. Interlock for Manual Reset | OTS Switch with Two Form C Contacts |
|----------|----------------------|----------------------------------|-------------------------------------|
| E | No | — | No |
| N | Yes | No | No |
| Y | Yes | No | Yes |
| M | Yes | Yes | No |
| L | Yes | Yes | Yes |
| F | Yes | No | Yes with 24 V reset |
| G | Yes | No | Yes with 120 V reset |
| H | Yes | No | Yes with 240 V reset |
| I | Yes | Yes | Yes with 24 V reset |
| J | Yes | Yes | Yes with 120 V reset |
| K | Yes | Yes | Yes with 240 V reset |

Padlock Provisions for Blocking Close and/or Open ACB Manual Pushbuttons

N = None
M = Metal (block close and open)
P = Plastic (block close and open)
C = Metal (block close only)
H = Plastic (block close only)
S = Metal swdb lock-off (block close, depress open)

Operations Counter and/or Keylock Provisions

| | Counter | Keylock Provisions |
|----------|------------|----------------------|
| N | No counter | No locks |
| K | No counter | Kirk lock |
| C | No counter | Castell lock |
| R | No counter | Ronis lock |
| S | No counter | CES lock |
| A | Counter | No lock |
| Y | Counter | Kirk lock |
| L | Counter | Castell lock |
| H | Counter | Ronis lock indicator |
| E | Counter | CES lock |

Latch Check Switch/Trip Unit Metering Voltage Connection for Digitrip 1150 Trip Unit

| | Latch Check Switch | 1150 Voltage Connection |
|----------|--------------------|-------------------------|
| N | None | Upper terminals |
| M | None | Lower terminals |
| L | LCS wired to SRD | Upper terminals |
| Y | LCS Wired to SRD | Lower terminals |
| C | LCS Wired External | Upper terminals |
| D | LCS Wired External | Lower terminals |

Breaker Shipping Options and Instructions

A = Fixed breaker alone with door kit
B = Fixed breaker alone with door kit and pre-wired
F = Fixed breaker alone without door kit
A = Drawout breaker alone without door frame kit
C = Drawout breaker in cassette (un-wired)
P = Drawout breaker in cassette (shutters)
S = Drawout breaker in cassette (shutters)
W = Drawout breaker in cassette (pre-wired and shutters)
 Double frame drawout breakers ship without cassette
 drawout. ACBs ship in narrow and universal cassettes only.

Frame Use

X = All breakers

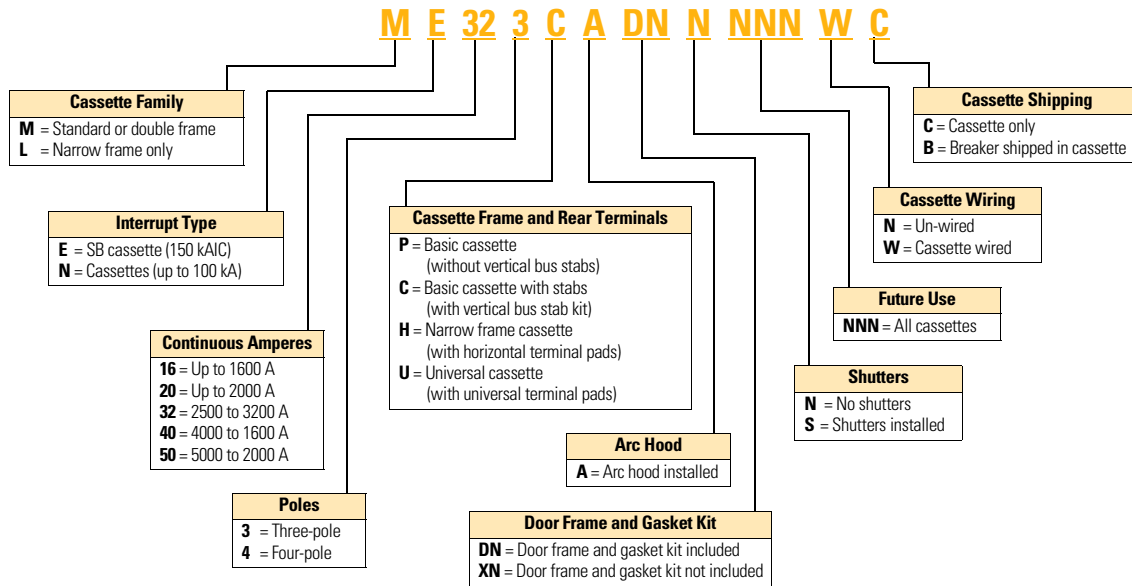
3.1

Power Breakers, Contactors and Fuses

Power Circuit Breakers

Cassette Magnum SB Breaker Product Family

3



Technical Data and Specifications

Magnum SB Switchboard Class Insulated Case Low Voltage Air Circuit Breakers

| Frame Amperes | Breaker Type Catalog Position 1–6 | Frame Type | rms Symmetrical Current Ratings kA 50/60 Hz ^① | | | Short-Time Withstand Rating | Fixed Internal Instantaneous Trip | Available Current Sensor and Rating Plugs for Digitrip RMS Trip Unit (Establishes Breaker I _n Rating) |
|---------------|-----------------------------------|------------|--|--------------------------------|--------------------------------|-----------------------------|-----------------------------------|--|
| | | | Interruption Rating at 254 Vac | Interruption Rating at 508 Vac | Interruption Rating at 635 Vac | | | |
| 800 | SBN-508 | Narrow | 50 | 50 | 35 | 20 | 18 x I _n | 200, 250, 300, 400, 600, 800 |
| | SBN-608 | Narrow | 65 | 65 | 42 | 20 | 18 x I _n | |
| | SBN-C08 | Narrow | 100 | 100 | 65 | 20 | 18 x I _n | |
| | SBS-608 | Standard | 65 | 65 | 65 | 20 | 18 x I _n | |
| | SBS-808 | Standard | 85 | 85 | 85 | 20 | 18 x I _n | |
| | SBS-C08 | Standard | 100 | 100 | 85 | 20 | 18 x I _n | |
| | SBS-H08 | Standard | 130 | 130 | 130 | 20 | 18 x I _n | |
| | SBS-E08 ^{②③} | Standard | 200 | 150 | 65 | 30 | 30 | |
| 1200 | SBN-512 | Narrow | 50 | 50 | 35 | 25 | 18 x I _n | 200, 250, 300, 400, 600, 800, 1000, 1200 |
| | SBN-612 | Narrow | 65 | 65 | 42 | 25 | 18 x I _n | |
| | SBN-C12 | Narrow | 100 | 100 | 65 | 25 | 18 x I _n | |
| | SBS-612 | Standard | 65 | 65 | 65 | 25 | 18 x I _n | |
| | SBS-812 | Standard | 85 | 85 | 85 | 25 | 18 x I _n | |
| | SBS-C12 | Standard | 100 | 100 | 85 | 25 | 18 x I _n | |
| | SBS-H12 | Standard | 130 | 130 | 130 | 25 | 18 x I _n | |
| | SBS-E12 ^② | Standard | 200 | 150 | 65 | 30 | 30 | |
| 1600 | SBN-516 | Narrow | 50 | 50 | 35 | 30 | 18 x I _n | 200, 250, 300, 400, 600, 800, 1000, 1200, 1600 |
| | SBN-616 | Narrow | 65 | 65 | 42 | 30 | 18 x I _n | |
| | SBN-C16 | Narrow | 100 | 100 | 65 | 30 | 18 x I _n | |
| | SBS-616 | Standard | 65 | 65 | 65 | 30 | 18 x I _n | |
| | SBS-816 | Standard | 85 | 85 | 85 | 30 | 18 x I _n | |
| | SBS-C16 | Standard | 100 | 100 | 85 | 30 | 18 x I _n | |
| | SBS-H16 | Standard | 130 | 130 | 130 | 30 | 18 x I _n | |
| | SBS-E16 ^② | Standard | 200 | 150 | 65 | 30 | 30 | |
| 2000 | SBN-620 | Narrow | 65 | 65 | 65 | 35 | 18 x I _n | 200, 250, 300, 400, 600, 800, 1000, 1200, 1600, 2000 |
| | SBN-C20 | Narrow | 100 | 100 | 65 | 35 | 18 x I _n | |
| | SBS-620 | Standard | 65 | 65 | 65 | 35 | 18 x I _n | |
| | SBS-820 | Standard | 85 | 85 | 85 | 35 | 18 x I _n | |
| | SBS-C20 | Standard | 100 | 100 | 85 | 35 | 18 x I _n | |
| | SBS-H20 | Standard | 130 | 130 | 130 | 35 | 18 x I _n | |
| | SBS-E20 ^② | Standard | 200 | 150 | 65 | 30 | 30 | |

Notes

^① Interruption ratings shown based on breaker equipped with integral Digitrip RMS trip unit. Interruption ratings for non-automatic breakers are equal to the published short-time withstand rating. These interruption ratings are based on the standard duty cycle consisting of an open operation, a 15-second interval and a close-open operation, in succession, with delayed tripping in case of short-delay devices. The standard duty cycle for short-time ratings consists of maintaining the rated current for two periods of 1/2 seconds each, with a 15-second interval of zero current between the two periods.

^② Magnum SBSE current limiting power circuit breaker with fast opening contacts.

^③ Not released.

^④ Product to be tested. Contact Eaton for product rating.

^⑤ Breaker applied in a tested fan-cooled enclosure.

Magnum SB is UL 1066 listed.

3.1

Power Breakers, Contactors and Fuses

Power Circuit Breakers

Magnum SB Switchboard Class Insulated Case Low Voltage Air Circuit Breakers, continued

| Frame Amperes | Breaker Type Catalog Position 1–6 | Frame Type | rms Symmetrical Current Ratings kA 50/60 Hz ^① | | | | Short-Time Withstand Rating | Fixed Internal Instantaneous Trip | Available Current Sensor and Rating Plugs for Digitrip RMS Trip Unit (Establishes Breaker I _n Rating) |
|---------------|-----------------------------------|---------------|--|--------------------------------|--------------------------------|-------|-----------------------------|--|--|
| | | | Interruption Rating at 254 Vac | Interruption Rating at 508 Vac | Interruption Rating at 635 Vac | | | | |
| 2500 | SBS-625 | Standard | 65 | 65 | 65 | 45 | 18 x I _n | 200, 250, 300, 400, 600, 800, 1000, 1200, 1600, 2000, 2500 | |
| | SBS-825 | Standard | 85 | 85 | 85 | 45 | 18 x I _n | | |
| | SBS-C25 | Standard | 100 | 100 | 85 | 45 | 18 x I _n | | |
| | SBS-H25 | Standard | 130 | 130 | 130 | 45 | 18 x I _n | | |
| | SBS-E25 ^② | Double | 200 | 150 | ^④ | 50 | 50 | | |
| 3000 | SBS-630 | Standard | 65 | 65 | 65 | 50 | 18 x I _n | 200, 250, 300, 400, 600, 800, 1000, 1200, 1600, 2000, 2500, 3000 | |
| | SBS-830 | Standard | 85 | 85 | 85 | 50 | 18 x I _n | | |
| | SBS-C30 | Standard | 100 | 100 | 85 | 50 | 18 x I _n | | |
| | SBS-H30 | Standard | 130 | 130 | 130 | 50 | 18 x I _n | | |
| | SBS-E30 ^② | Double | 200 | 150 | ^④ | 50 | 50 | | |
| 4000 | SBS-840 | Double | 85 | 85 | 85 | 72 | 18 x I _n | 2000, 2500, 3000, 4000 | |
| | SBS-C40 | Double | 100 | 100 | 100 | 72 | 18 x I _n | | |
| | SBS-H40 | Double | 130 | 130 | 130 | 72 | 18 x I _n | | |
| | SBN-840 | Double Narrow | 85 | 85 | 65 | 72/65 | 18 x I _n | | |
| | SBN-C40 | Double Narrow | 100 | 100 | 65 | 72/65 | 18 x I _n | | |
| | SBS-E40 ^② | Double | 200 | 150 | ^④ | 50 | 50 | | |
| 5000 | SBS-850 | Double | 85 | 85 | 85 | 85 | 18 x I _n | 2500, 3000, 4000, 5000 | |
| | SBS-C50 | Double | 100 | 100 | 100 | 90 | 18 x I _n | | |
| | SBS-H50 | Double | 130 | 130 | 130 | 90 | 18 x I _n | | |
| | SBS-E50 ^{②③} | Double | 200 | 150 | ^④ | 50 | 50 | | |

Notes

- ① Interruption ratings shown based on breaker equipped with integral Digitrip RMS trip unit. Interruption ratings for non-automatic breakers are equal to the published short-time withstand rating. These interruption ratings are based on the standard duty cycle consisting of an open operation, a 15-second interval and a close-open operation, in succession, with delayed tripping in case of short-delay devices. The standard duty cycle for short-time ratings consists of maintaining the rated current for two periods of 1/2 seconds each, with a 15-second interval of zero current between the two periods.
- ② Magnum SBSE current limiting power circuit breaker with fast opening contacts.
- ③ Breaker applied in a tested fan-cooled enclosure.
- ④ Product to be tested. Contact Eaton for product rating.

Magnum SB is UL 1066 listed.

Digitrip Trip Units for Magnum DS and SB ANSI/UL Rated Power Circuit Breakers



| Trip Unit Type | | Digitrip 520 | Digitrip 520M | Digitrip 520MC | Digitrip 1150+ ① |
|------------------------------------|--|------------------------------|------------------------------|------------------------------|------------------------------|
| Ampere range | | 200–5000 A | 200–5000 A | 200–5000 A | 200–5000 A |
| Interruption rating at 480 V | | 42–200 kA | 42–200 kA | 42–200 kA | 42–200 kA |
| rms sensing | | Yes | Yes | Yes | Yes |
| Protection and Coordination | | | | | |
| Protection | Ordering options | LI, LSI, LSIG, LSIA | LSI, LSIG | LSI, LSIG | LSI, LSIG, LSIA |
| | Fixed rating plug (I_n) | Yes | Yes | Yes | Yes |
| | Overtemperature trip | Yes | Yes | Yes | Yes |
| Long delay protection (L) | Long delay pickup | 0.4–1.0 x (I_n) | 0.4–1.0 x (I_n) | 0.4–1.0 x (I_n) | 0.4–1.0 x (I_n) |
| | Long delay time I^2t at 6 x I_r | 2–24 sec | 2–24 sec | 2–24 sec | 2–24 sec |
| | Long delay time I^4t | No | No | No | 1–5 sec |
| | IEEE curves | No | No | No | Yes |
| | Long delay thermal memory | Yes | Yes | Yes | Yes |
| | High load alarm | No | No | No | 0.5–1.0 x (I_r) |
| Short delay protection (S) | Short delay pickup | 200–1000% x (I_r) and M1 | 200–1000% x (I_r) and M1 | 200–1000% x (I_r) and M1 | 200–1000% x (I_r) and M1 |
| | Short delay time I^2t at 8 x I_r | 100–500 ms | 100–500 ms | 100–500 ms | 100–500 ms |
| | Short delay time flat | 100–500 ms | 100–500 ms | 100–500 ms | 100–500 ms |
| | Short delay time ZSI | Yes | Yes | Yes | Yes |
| Instantaneous protection (I) | Instantaneous pickup | 200–1000% x (I_n) and M1 | 200–1000% x (I_n) and M1 | 200–1000% x (I_n) and M1 | 200–1000% x (I_n) and M1 |
| | Making current release | Yes | Yes | Yes | Yes |
| | Off position | Yes | Yes | Yes | Yes |
| Ground fault protection (G) ② | Ground fault alarm | No | Yes | Yes | Yes |
| | Ground fault pickup | 25–100% x (I_n) | 25–100% x (I_n) | 25–100% x (I_n) | 24–100% x (I_n) |
| | Ground fault delay I^2t at 0.625 x I_n | 100–500 ms | 100–500 ms | 100–500 ms | 100–500 ms |
| Disable ground fault protection | | No | No | No | No |
| Neutral protection (N) | | Model LSI only | Model LSI only | Model LSI only | Model LSI only |
| System Diagnostics | | | | | |
| Cause of trip LEDs | | Yes | Yes | Yes | Yes |
| Magnitude of trip information | | No | Yes | Yes | Yes |
| Remote signal contacts | | No | Yes | Yes | Yes |
| Programmable contacts | | No | No | No | Yes |
| Electronic operations counter | | No | No | No | Yes |

Notes

① Over and undervoltage alarm or trip, over and underfrequency alarm or trip, voltage unbalance alarm or trip, reverse power trip and phase rotation alarm are included.

② 1200 A maximum ground fault setting per UL/NEC.

I_n = Rating plug and sensor rating.

I_r = Long delay pickup setting.

3.1

Power Breakers, Contactors and Fuses

Power Circuit Breakers

Digitrip Trip Units for Magnum DS and SB ANSI/UL Rated Power Circuit Breakers, continued



Digitrip 520



Digitrip 520M



Digitrip 520MC



Digitrip 1150+ ①

Trip Unit Type

System Monitoring

| | Digitrip 520 | Digitrip 520M | Digitrip 520MC | Digitrip 1150+ ① |
|-------------------------------|--------------|-----------------|-----------------|------------------|
| Digital display | No | 4-Character LCD | 4-Character LCD | 24-Character LED |
| Current (%) full scale sensor | No | Yes +/- 2% | Yes +/- 2% | Yes +/- 1% |
| Voltage (%) L to L | No | No | No | Yes +/- 1% |
| Power and energy (%) | No | No | No | Yes +/- 2% |
| Apparent power kVA and demand | No | No | No | Yes |
| Reactive power kVAR | No | No | No | Yes |
| Power factor | No | No | No | Yes |
| Crest factor | No | No | No | Yes |

System Communications

| | Digitrip 520 | Digitrip 520M | Digitrip 520MC | Digitrip 1150+ ① |
|-------------------------|--------------|---------------|--|---|
| Type | — | — | INCOM/PowerNet/Modbus ②/ PROFIBUS ② | INCOM/PowerNet/TripLink/ Modbus ②/PROFIBUS ② |
| Power supply in breaker | N/A | Optional | Standard | Standard |

Additional Features

| | Digitrip 520 | Digitrip 520M | Digitrip 520MC | Digitrip 1150+ ① |
|-------------------------------|--------------|---------------|----------------|-----------------------|
| Trip log (three events) | No | No | No | Yes |
| Electronic operations counter | No | No | No | Yes |
| Testing method ③ | Test set | Test set | Test set | Integral and test set |
| Waveform capture | No | No | No | Yes |

Arcflash Reduction Maintenance System Mode

| | Digitrip 520 | Digitrip 520M | Digitrip 520MC | Digitrip 1150+ ① |
|------------------------------|--------------|---------------|----------------|------------------|
| Breaker health monitor | No | No | No | Yes |
| Programmable relay functions | No | No | No | Yes ④ |

Notes

① Over and undervoltage alarm or trip, over and underfrequency alarm or trip, voltage unbalance alarm or trip, reverse power trip and phase rotation alarm are included.

② Requires externally mounted MMINT or PMINT module.

③ Test set for secondary injection.

④ Contact Eaton for availability.

I_n = Rating plug and sensor rating.

I_r = Long delay pickup setting.

Magnum IEC Double Narrow Frame Drawout Air Circuit Breaker, With Cassette



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| Wiring Diagrams | V4-T3-32 |
| Magnum DC (Direct Current) Low Voltage Switches | V4-T3-33 |
| Series NRX Low Voltage Power Circuit Breakers with PXR | V4-T3-35 |
| Series NRX Low Voltage Power Circuit Breakers with Digitrip | V4-T3-47 |
| Medium Voltage Circuit Breakers | V4-T3-55 |

Magnum IEC Rated Air Circuit Breakers

Product Description

Magnum air circuit breakers are designed to enable global power distribution solutions in IEC switchboards and other custom enclosures.

- Magnum IEC air circuit breakers have interruption ratings up to 100 kA at 690 Vac with continuous current ratings up to 6300 A
- Magnum IEC air circuit breaker continuous current frames are 100% rated. No thermal de-rating is required when applying the breaker in the low voltage systems enclosure at ambient temperatures of 104 °F (40 °C)
- Magnum IEC breakers carry the KEMA Keur Mark, which requires periodic follow-up testing, witnessed by KEMA, to demonstrate our product performs to its published nameplate ratings. This differentiates Magnum air circuit breakers from the competition, where in general, self-certification testing is performed on products when initially introduced with no binding commitments to perform subsequent follow-up third-party testing

Standards and Certifications

IEC Test Certifications

Magnum air circuit breakers meet or exceed the applicable IEC standards, including:

- EN/IEC 60947-2
- KEMA third-party witness and follow-up testing

Comprehensive Enclosure Solutions

Magnum air circuit breakers have proven performance in IEC switchboards and custom enclosures manufactured by Eaton and Low Voltage Systems Builders (OEMs) to the following standards:

- EN/IEC 60947-1
- EN/IEC 60439-1
- Eaton manufactured IEC Low Voltage Switchboard solutions include:
 - Eaton MEM M-Form (UK) Low Voltage Switchboards
 - Eaton Holec® Capitole 40 and Capitole 20 (Holland) Low Voltage Switchboards

- Eaton Tabula Low Voltage Switchboard Systems (global) for Low Voltage Systems Builders
- Eaton Elatis (Germany) Low Voltage Switchboards
- Eaton Xenergy and Modan switchboard systems (global) for low voltage systems builders
- American Bureau of Shipping (ABS)
- Det Norske Veritas (DNV)
- Lloyds of London
- South African Bureau of Standards (SABS)
- For a complete and comprehensive listing of all low voltage power breakers, please visit www.eaton.com



Approvals and Marks

Magnum air circuit breakers carry the following approvals and approval marks:

- CE
- KEMA Keur mark
- ABS (American Bureau of Shipping) Type Listed Certificate Number 04-HS422844B-PDA-DUB
- CCC (Certificate for China Compulsory Product Certification) to GB14048.2-2001, Certificate Numbers:
 - 2005010307139381
 - 2003010307094561
 - 2003010307094558

Note: The KEMA Keur Mark on the Magnum ACB Label Confirms Third-Party Witness and Follow-up Testing

3.1

Power Breakers, Contactors and Fuses

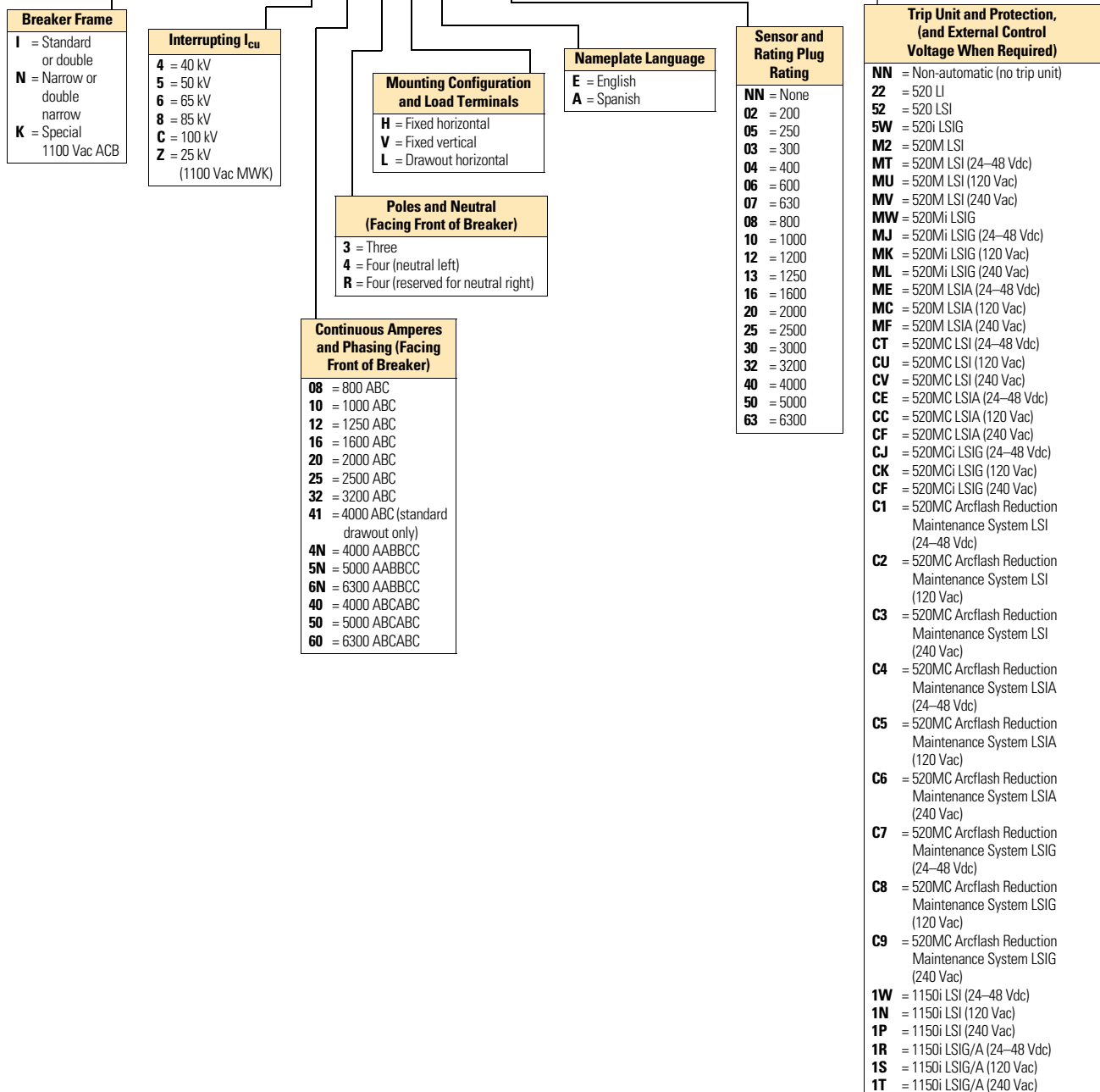
Power Circuit Breakers

Catalog Number Selection

Magnum IEC Breaker Product Family [Ⓞ]

3

MW N 5 12 4 V E A 03 MT 6 M C J 2 Y C N M W X



Note

[Ⓞ] Exclusionary rules apply. Refer to price list. Confirm all final part numbers with Eaton. Format structure subject to modifications and additions without notice.

Magnum IEC Breaker Product Family, continued ①

MW N 5 12 4 V E A 03 MT 6 M C J 2 Y C N M W X

Shunt Trip Attachment (STA)

N = None
 A = 110–127 Vac/Vdc
 R = 208–240 Vac/Vdc
 C = 24 Vdc
 H = 48 Vdc
 B = 110–127 Vac/Vdc (100% duty)
 S = 220–250 Vac/Vdc (100% duty)
 D = 24 Vdc (100% duty)
 K = 48 Vdc (100% duty)
 J = 60 Vdc (100% duty)
 6 = 60 Vdc

Spring Release Device (SRD)

N = None
 A = 110–127 Vac/Vdc
 R = 208–240 Vac/Vdc
 C = 24 Vdc
 H = 48 Vdc
 S = 60 Vdc

Auxiliary Switch

N = None
 2 = 2A/2B
 4 = 2A/2B
 6 = 2A/2B

Future Use

X = All ACBs

ACB Shipping Instructions

A = Fixed ACB with door kit
 B = Fixed breaker alone with door kit and pre-wired
 F = Fixed ACB without door kit
 A = D/O ACB only without door kit
 C = D/O ACB in cassette (un-wired)
 P = D/O ACB in cassette (pre-wired)
 S = D/O ACB in cassette (shutters)
 W = D/O ACB in cassette (pre-wired and shutters)
 Double frame D/O ACBs ship without cassette

Motor Operator

M = Manual operated
 N = 110–125 Vac (5-sec)
 W = 110–125 Vdc (5-sec)
 T = 220–250 Vdc (5-sec)
 P = 208–277 Vac (5-sec)
 L = 24 Vdc (5-sec)
 K = 48 Vdc (5-sec)
 S = 60 Vdc (5-sec)
 1 = 110–125 Vac (3-sec)
 2 = 220–250 Vac (3-sec)
 4 = 24 Vdc (3-sec)
 8 = 48 Vdc (3-sec)
 5 = 110–125 Vdc (3-sec)
 9 = 220–250 Vdc (3-sec)

Undervoltage Release (UVR) or 2nd Shunt Trip (ST)

N = None
 A = UVR (110–127 Vac)
 R = UVR (208–240 Vac)
 C = UVR (24 Vdc)
 H = UVR (48 Vdc)
 D = UVR (60 Vdc)
 E = UVR (110–125 Vdc)
 F = UVR (220–250 Vdc)
 G = UVR (32 Vdc)
 X = UVR (380–415 Vac)
 J = UVR (480 Vac)
 K = UVR (600 Vac)
 1 = 2nd ST (110–127 Vac/Vdc)
 2 = 2nd ST (208–250 Vac/Vdc)
 4 = 2nd ST (24 Vdc)
 8 = 2nd ST (48 Vdc)
 6 = 2nd ST (60 Vdc)
 B = 2nd ST (110–127 Vac/Vdc 100% duty)
 O = 2nd ST (220–250 Vac/Vdc 100% duty)
 I = 2nd ST (24 Vdc 100% duty)
 Q = 2nd ST (48 Vdc 100% duty)
 9 = 2nd ST (60 Vdc 100% duty)

Bell Alarms Switch (OTS) with 2a/2b Contacts and/or Mechanical Trip Indicator

| | Mech. Trip Indicator | Mech. Interlock for Manual Reset | OTS Switch with Two Form C Contacts |
|-----|----------------------|----------------------------------|-------------------------------------|
| E = | No | — | No |
| N = | Yes | No | No |
| Y = | Yes | No | Yes |
| M = | Yes | Yes | No |
| L = | Yes | Yes | Yes |
| F = | Yes | No | Yes with 24 V reset |
| G = | Yes | No | Yes with 120 V reset |
| H = | Yes | No | Yes with 240 V reset |
| I = | Yes | Yes | Yes with 24 V reset |
| J = | Yes | Yes | Yes with 120 V reset |
| K = | Yes | Yes | Yes with 240 V reset |

Latch Checking Switch/Trip Unit Metering Voltage Connection for Digitrip 1150 Trip Unit

| Latch Check Switch | 1150 Voltage Connection |
|------------------------|-------------------------|
| N = None | Upper terminals |
| M = None | Lower terminals |
| L = LCS wired to SRD | Upper terminals |
| Y = LCS wired to SRD | Lower terminals |
| C = LCS wired external | Upper terminals |
| D = LCS wired external | Lower terminals |

Padlock Provisions for Blocking Close and/or Open ACB Manual Pushbuttons

N = None
 M = Metal (block close and open)
 P = Plastic (block close and open)
 C = Metal (block close only)
 H = Plastic (block close only)

Operations Counter and/or Keylock Provisions

| | Counter | Keylock Provisions |
|-----|------------|----------------------|
| N = | No counter | No locks |
| K = | No counter | Kirk lock |
| C = | No counter | Castell lock |
| R = | No counter | Ronis lock |
| S = | No counter | CES lock |
| A = | Counter | No lock |
| Y = | Counter | Kirk lock |
| L = | Counter | Castell lock |
| H = | Counter | Ronis lock indicator |
| E = | Counter | CES lock |

Note

① Exclusionary rules apply. Refer to price list. Confirm all final part numbers with Eaton. Format structure subject to modifications and additions without notice.

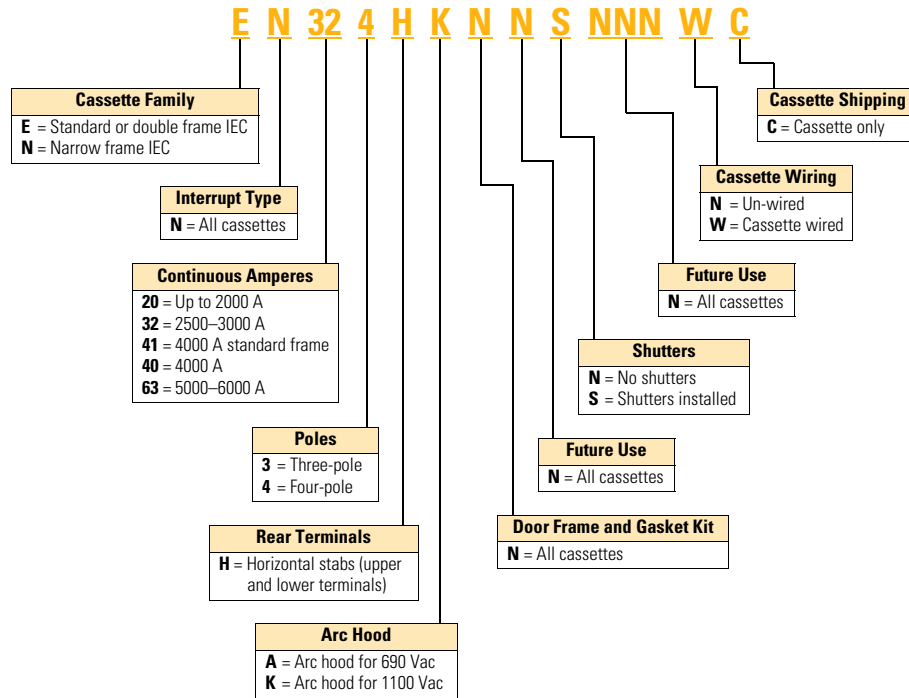
3.1

Power Breakers, Contactors and Fuses

Power Circuit Breakers

Cassette Magnum IEC Breaker Product Family ①

3



Note

① Exclusionary rules apply. Refer to price list. Confirm all final part numbers with Eaton. Format structure subject to modifications and additions without notice.

Technical Data and Specifications

Magnum IEC 60947-2 Rated Air Circuit Breakers

| Frame Amperes | Breaker Type Catalog Position 1-6 | Frame Type | rms Symmetrical Current Ratings kA ① | | | Withstand Rating I _{cw} 1-Sec / 3-Sec | Fixed Internal Instantaneous Trip | Available Current Sensor and Rating Plugs for Digitrip RMS Trip Unit (Establishes Breaker I _n Rating) |
|---------------|-----------------------------------|---------------|--|--|--|--|-----------------------------------|--|
| | | | Interruption Rating at 240 Vac I _{cu} = I _{cs} | Interruption Rating at 440 Vac I _{cu} = I _{cs} | Interruption Rating at 690 Vac I _{cu} = I _{cs} | | | |
| 800 | MWN-508 | Narrow | 50 | 50 | 50 | 50/— | — | 200, 250, 300, 400, 630, 800 |
| | MWN-608 | Narrow | 65 | 65 | 65 | 65/40 | — | |
| | MWI-608 | Standard | 65 | 65 | 65 | 65/— | — | |
| | MWI-808 | Standard | 85 | 85 | 85 | 85/65 | — | |
| | MWI-C08 | Standard | 100 | 100 | 85 | 85/65 | 85 | |
| 1000 | MWN-410 | Narrow | 40 | 40 | 40 | 40/— | — | 200, 250, 300, 400, 630, 800, 1000 |
| | MWN-510 | Narrow | 50 | 50 | 50 | 50/— | — | |
| | MWN-610 | Narrow | 65 | 65 | 65 | 65/40 | — | |
| | MWI-610 | Standard | 65 | 65 | 65 | 65/— | — | |
| | MWI-810 | Standard | 85 | 85 | 85 | 85/65 | — | |
| 1250 | MWI-C10 | Standard | 100 | 100 | 85 | 85/65 | 85 | 200, 250, 300, 400, 630, 800, 1000, 1250 |
| | MWN-412 | Narrow | 40 | 40 | 40 | 40/— | — | |
| | MWN-512 | Narrow | 50 | 50 | 50 | 50/— | — | |
| | MWN-612 | Narrow | 65 | 65 | 65 | 65/40 | — | |
| | MWI-612 | Standard | 65 | 65 | 65 | 65/— | — | |
| 1600 | MWI-812 | Standard | 85 | 85 | 85 | 85/65 | — | 200, 250, 300, 400, 630, 800, 1000, 1250, 1600 |
| | MWI-C12 | Standard | 100 | 100 | 85 | 85/65 | 85 | |
| | MWN-516 | Narrow | 50 | 50 | 50 | 50/— | — | |
| | MWN-616 | Narrow | 65 | 65 | 65 | 65/40 | — | |
| | MWI-616 | Standard | 65 | 65 | 65 | 65/— | — | |
| 2000 | MWI-816 | Standard | 85 | 85 | 85 | 85/65 | — | 200, 250, 300, 400, 630, 800, 1000, 1250, 1600, 2000 |
| | MWI-C16 | Standard | 100 | 100 | 85 | 85/65 | 85 | |
| | MWN-520 | Narrow | 50 | 50 | 50 | 50/30 | — | |
| | MWN-620 | Narrow | 65 | 65 | 65 | 65/40 | — | |
| | MWI-620 | Standard | 65 | 65 | 65 | 65/50 | — | |
| 2500 | MWI-820 | Standard | 85 | 85 | 85 | 85/65 | — | 200, 250, 300, 400, 630, 800, 1000, 1250, 1600, 2000, 2500 |
| | MWI-C20 | Standard | 100 | 100 | 85 | 85/65 | 85 | |
| | MWI-625 | Standard | 65 | 65 | 65 | 65/— | — | |
| | MWI-825 | Standard | 85 | 85 | 85 | 85/65 | — | |
| 3200 | MWI-C25 | Standard | 100 | 100 | 85 | 85/65 | 85 | 200, 250, 300, 400, 630, 800, 1000, 1250, 1600, 2000, 2500, 3200 |
| | MWI-H25 | Standard | 125 | 125 | 125 | 85/65 | — | |
| | MWI-632 | Standard | 65 | 65 | 65 | 65/50 | — | |
| | MWI-832 | Standard | 85 | 85 | 85 | 85/65 | — | |
| 4000 | MWI-C32 | Standard | 100 | 100 | 85 | 85/65 | 85 | 2000, 2500, 3200, 4000 |
| | MWI-H32 | Standard | — | — | 125 | — | — | |
| | MWI-641 ② | Standard | 65 | 65 | 65 | 65/50 | — | |
| | MWI-841 ② | Standard | 85 | 85 | 85 | 85/65 | — | |
| | MWI-C41 ② | Standard | 105 | 105 | 85 | 85/65 | — | |
| | MWN-64N | Double narrow | 65 | 65 | 65 | 65/— | — | |
| | MWN-84N | Double narrow | 85 | 85 | 65 | 85/— | — | |
| | MWN-C4N | Double narrow | 100 | 100 | 65 | 100/— | — | |
| 5000 | MWI-64N | Double | 65 | 65 | 65 | 65/— | — | 2500, 3200, 4000, 5000 |
| | MWI-84N | Double | 85 | 85 | 85 | 85/— | — | |
| 6300 | MWI-C4N | Double | 100 | 100 | 100 | 100/— | — | 3200, 4000, 5000, 6300 |
| | MWI-85N | Double | 85 | 85 | 85 | 85/— | — | |
| 6300 | MWI-C5N | Double | 100 | 100 | 100 | 100/— | — | 3200, 4000, 5000, 6300 |
| | MWI-86N | Double | 85 | 85 | 85 | 85/— | — | |
| 6300 | MWI-C6N | Double | 100 | 100 | 100 | 100/— | — | 3200, 4000, 5000, 6300 |
| | MWI-86N | Double | 85 | 85 | 85 | 85/— | — | |

Notes

- ① Interruption ratings shown based on breaker equipped with integral Digitrip RMS Trip Unit. Interruption ratings for non-automatic breakers are equal to the published breaker I_{cw} rating.
- ② Magnum IEC standard frame breakers rated for 4000 A continuous current are available in drawout configuration only.

3.1

Power Breakers, Contactors and Fuses

Power Circuit Breakers

Digitrip Trip Units for Magnum IEC Rated Air Circuit Breakers



| Trip Unit Type | | Digitrip 520i | Digitrip 520Mi | Digitrip 520MCi | Digitrip 1150i+ ① |
|------------------------------------|---|------------------------------|------------------------------|------------------------------|------------------------------|
| Ampere range | | 200–6300 A | 200–6300 A | 200–6300 A | 200–6300 A |
| Interruption rating at 690 V | | 40–100 kA | 40–100 kA | 40–100 kA | 40–100 kA |
| rms sensing | | Yes | Yes | Yes | Yes |
| Protection and Coordination | | | | | |
| Protection | Ordering options | LI, LSI, LSIG, LSIA | LSI, LSIG | LSI, LSIG | LSI, LSIG, LSIA |
| | Fixed rating plug (I_n) | Yes | Yes | Yes | Yes |
| | Overtemperature trip | Yes | Yes | Yes | Yes |
| Long delay protection (L) | Long delay setting | 0.4–1.0 x (I_n) | 0.4–1.0 x (I_n) | 0.4–1.0 x (I_n) | 0.4–1.0 x (I_n) |
| | Long delay time I^2t at 6 x I_r | 2–24 sec | 2–24 sec | 2–24 sec | 2–24 sec |
| | Long delay time I^4t | No | No | No | 1–5 sec |
| | IEC Type A, B, C curves | No | No | No | Yes |
| | Long delay thermal memory | Yes | Yes | Yes | Yes |
| | High load alarm | No | No | No | 0.7–1.0 x I_r |
| Short delay protection (S) | Short delay pickup | 200–1000% x (I_r) and M1 | 200–1000% x (I_r) and M1 | 200–1000% x (I_r) and M1 | 150–1000% x (I_r) and M1 |
| | Short delay time I^2t at 8 x I_r | 100–500 ms | 100–500 ms | 100–500 ms | 100–500 ms |
| | Short delay time flat | 100–500 ms | 100–500 ms | 100–500 ms | 100–500 ms |
| | Short delay time ZSI | Yes | Yes | Yes | Yes |
| Instantaneous protection (I) | Instantaneous pickup | 200–1000% x (I_n) and M1 | 200–1000% x (I_n) and M1 | 200–1000% x (I_n) and M1 | 200–1000% x (I_n) and M1 |
| | Making current release | Yes | Yes | Yes | Yes |
| | Off position | Yes | Yes | Yes | Yes |
| Earth fault protection (G) | Earth fault alarm | No | Yes | Yes | Yes |
| | Earth fault pickup | 25–100% x (I_n) | 25–100% x (I_n) | 25–100% x (I_n) | 24–100% x (I_n) |
| | Earth fault delay I^2t at 0.625 x I_n | 100–500 ms | 100–500 ms | 100–500 ms | 100–500 ms |
| | Earth fault delay flat | 100–500 ms | 100–500 ms | 100–500 ms | 100–500 ms |
| | Earth fault ZSI | Yes | Yes | Yes | Yes |
| | Earth fault memory | Yes | Yes | Yes | Yes |
| Disable ground fault protection | | No | No | No | Yes |
| Neutral protection (N) | | Model LSI only | Model LSI only | Model LSI only | Model LSI only |
| System Diagnostics | | | | | |
| Cause of trip LEDs | | Yes | Yes | Yes | Yes |
| Magnitude of trip information | | No | No | No | Yes |
| Remote signal contacts | | No | Yes | Yes | Yes |
| Programmable contacts | | No | No | No | 2 |

Notes

① Over and undervoltage alarm or trip, over and underfrequency alarm or trip, voltage unbalance alarm or trip, reverse power trip and phase rotation alarm are included.

I_n = Rating plug rating.

I_r = LDPU setting.

i Trip units are only used on IEC breakers with earth fault.

Digitrip Trip Units for Magnum IEC Rated Air Circuit Breakers, continued



Digitrip 520i



Digitrip 520Mi



Digitrip 520MCi



Digitrip 1150i+ ①

| Trip Unit Type | Digitrip 520i | Digitrip 520Mi | Digitrip 520MCi | Digitrip 1150i+ ① |
|---|---------------|-----------------|--|---|
| System Monitoring | | | | |
| Digital display | No | 4-Character LCD | 4-Character LCD | 24-Character LED |
| Current (%) full scale sensor | No | Yes +/- 2% | Yes +/- 2% | Yes +/- 1% |
| Voltage (%) L to L | No | No | No | Yes +/- 1% |
| Power and energy (%) | No | No | No | Yes +/- 2% |
| Apparent power kVA and demand | No | No | No | Yes |
| Reactive power kVAR | No | No | No | Yes |
| Power factor | No | No | No | Yes |
| Crest factor | No | No | No | Yes |
| Power quality—harmonics | No | No | No | Yes |
| % THD | No | No | No | Yes |
| System Communications | | | | |
| Type | — | — | INCOM/PowerNet/Modbus ②/ PROFIBUS ② | INCOM/PowerNet/TripLink/ Modbus ②/PROFIBUS ② |
| Power supply in breaker | N/A | Optional | Standard | Standard |
| Additional Features | | | | |
| Trip log (three events) | No | No | No | Yes |
| Electronic operations counter | No | No | No | Yes |
| Testing method ③ | Test set | Test set | Test set | Integral and test set |
| Waveform capture | No | No | No | Yes |
| Arcflash Reduction Maintenance System Mode | | | | |
| Breaker health monitor | No | No | No | Yes ④ |
| Programmable relay functions | No | No | No | Yes ① |

Notes

① Over and undervoltage alarm or trip, over and underfrequency alarm or trip, voltage unbalance alarm or trip, reverse power trip and phase rotation alarm are included.

② Requires externally mounted MMINT or PMINT module.

③ Test set for secondary injection.

④ Contact Eaton for availability.

I_n = Rating plug rating.

I_r = LDPU setting.

i Trip units are only used on IEC breakers with earth fault.

Magnum Options and Accessories

Breaker-Mounted Options and Accessories

Magnum breakers are available with a comprehensive array of factory-installed breaker options to enable configured-to-order solutions for specified customer requirements. Field option kits are available to provide easy service, modification and customization of the breaker at the point of use.

- **Shunt Trip device (ST).** Provides for remote electrically controlled breaker opening when energized by a rated voltage input
- **Spring Charge Motor (MOT).** Charges the breaker closing springs automatically, facilitating remote or local closing. The motor assembly includes its own cut-off switch that changes state at the end of the charging cycle. This contact can be wired out for external indication
- **Spring Release device (SR).** Provides for remote electrically controlled breaker closing when its coils are energized by a rated voltage input
- **Undervoltage Release (UVR).** Trips the breaker when an existing voltage signal is lost or falls below an established threshold
- **Auxiliary Switch.** Up to 6a/6b auxiliary individual dedicated contacts are available for customer use to indicate if the breaker is in the OPEN or CLOSE position
- **Mechanical Trip Indicator Flag.** The red trip indicator flag pops out to provide local visual indication when the Digitrip RMS trip unit acts to trip the breaker on an overcurrent condition. Available in two options: an interlocked version that mechanically locks out the breaker until the indicator is manually reset and a non-interlocked version for indication only.
- **Bell Alarm/Overcurrent Trip Switch (OTS).** Provides 2 Form C (changeover) contacts that change state when the Digitrip RMS trip unit acts to trip the breaker on an overcurrent condition. The contacts are available for external indication or customer use and are manually reset by the Mechanical Trip Indicator
- **Padlockable Pushbutton Cover.** Permits padlocking hinged cover plates to block access to the PUSH ON and PUSH OFF buttons on the breaker faceplate

- **Mechanical Operations Counter.** Records mechanical operations of the breaker over its installed life
- **Key Off Lock Provisions.** Enables mounting of a single cylinder Kirk®, Castell or Ronis key lock to lock the breaker in the OPEN position
- **Latch Check Switch.** Provides 1 Form C (changeover contact) that changes state when the breaker is ready to close. Can be wired to the Spring Release Device for fast transfer applications or wired for external ready-to-close indication



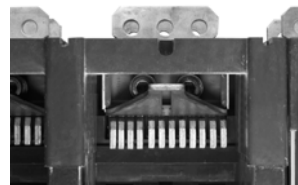
Shunt Trip, Spring Release and Undervoltage Release Device Installed on Accessory Deck



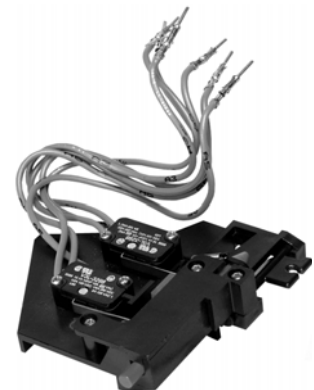
Auxiliary Switches Come in Modular 2a/2b Contact Stages Providing up to 6a/6b Dedicated Contacts



Arc Chutes are Easily Removable for Inspection and Access to Breaker Contacts



Heel-Toe Contact Design Provides Demonstrated Long Life and Includes Wear Indicator for Visual Inspection



Mechanical Trip Indicator With Bell Alarm (OTS) Switches Mounted

Magnum Breaker Control Device Application Guide—Vdc

| Breaker Control Device Nominal Voltage | | 24 Vdc | 32 Vdc | 48 Vdc | 60 Vdc | 125 Vdc | 250 Vdc |
|--|---------------------------------|-----------|-----------|-----------|-----------|------------|-------------|
| Shunt Trip (ST)— Trip Circuit | | | | | | | |
| Operational voltage range | 70–110% | 17–26 Vdc | — | 34–53 Vdc | 42–66 Vdc | 77–138 Vdc | 154–275 Vdc |
| Power consumption (inrush) | Required for 35 ms ^① | 250 W | — | 250 W | 250 W | 450 W | 450 W |
| Opening time | Seconds | 35 ms | — | 35 ms | 35 ms | 35 ms | 35 ms |
| Spring Release (SR)—Close Circuit | | | | | | | |
| Operational voltage range | 70–110% | 17–26 Vdc | — | 34–53 Vdc | 42–66 Vdc | 77–138 Vdc | 154–275 Vdc |
| Power consumption (inrush) | Required for 200 ms | 250 W | — | 250 W | 250 W | 450 W | 450 W |
| Closing time | Seconds | 40 ms | — | 40 ms | 40 ms | 40 ms | 40 ms |
| Spring Charge Motor (MOT) | | | | | | | |
| Operational voltage range | 85–110% voltage | 20–26 Vdc | — | 41–53 Vdc | 51–66 Vdc | 94–138 Vdc | 187–225 Vdc |
| Amperes (running) | Running | 12.0 A | — | 5.0 A | 4.0 A | 2.0 A | 1.0 A |
| Amperes (inrush) | % of running | 300% | — | 500% | 500% | 600% | 600% |
| Power consumption | — | 300 W | — | 250 W | 250 W | 250 W | 250 W |
| Charging time | Seconds | 5 sec | — | 5 sec | 5 sec | 5 sec | 5 sec |
| Undervoltage Release (UVR) | | | | | | | |
| Operational voltage range | 85–110% voltage | 20–26 Vdc | 27–35 Vdc | 41–53 Vdc | 51–66 Vdc | 94–138 Vdc | 187–275 Vdc |
| Dropout voltage range | 30–60% voltage | 7–14 Vdc | 10–19 Vdc | 14–29 Vdc | 18–36 Vdc | 33–75 Vdc | 66–150 Vdc |
| Power consumption (inrush) | Required for 200 ms | 250 W | 275 W | 275 W | 275 W | 450 W | 450 W |
| Power consumption (continuous) | Required for 400 ms | 18 W | 15 W | 18 W | 18 W | 10 W | 10 W |
| Opening time | Seconds | 70 ms | 70 ms | 70 ms | 70 ms | 70 ms | 70 ms |
| Auxiliary Switches | | | | | | | |
| Minimum load contact rating | Inductive load | 0.5 A | — | 0.5 A | — | 0.5 A | 0.25 A |

Magnum Breaker Control Device Application Guide—Vac

| Breaker Control Device Nominal Voltage | | 120 Vac | 240 Vac | 415 Vac | 480 Vac | 600 Vac |
|--|---------------------|------------|-------------|-------------|-------------|-------------|
| Shunt Trip (ST)— Trip Circuit | | | | | | |
| Operational voltage range | 70–110% | 77–140 Vac | 146–264 Vac | — | — | — |
| Power consumption (inrush) | Required for 35 ms | 450 VA | 450 VA | — | — | — |
| Opening time | Seconds | 35 ms | 35 ms | — | — | — |
| Spring Release (SR)—close circuit | | | | | | |
| Operational voltage range | 70–110% | 77–140 Vac | 146–264 Vac | — | — | — |
| Power consumption (inrush) | Required for 200 ms | 450 VA | 450 VA | — | — | — |
| Closing time | Seconds | 40 ms | 40 ms | — | — | — |
| Spring Charge Motor (MOT) | | | | | | |
| Operational voltage range | 85–110% voltage | 93–140 Vdc | 177–305 Vdc | — | — | — |
| Amperes (running) | Running | 2.0 A | 1.0 A | — | — | — |
| Amperes (inrush) | % of running | 600% | 600% | — | — | — |
| Power consumption | — | 250 VA | 250 VA | — | — | — |
| Charging time | Seconds | 5 sec | 5 sec | — | — | — |
| Undervoltage Release (UVR) | | | | | | |
| Operational voltage range | 85–110% voltage | 94–140 Vac | 177–264 Vac | 323–457 Vac | 408–528 Vac | 510–660 Vac |
| Dropout voltage range | 30–60% voltage | 33–76 Vac | 62–144 Vac | 114–249 Vac | 144–288 Vac | 180–360 Vac |
| Power consumption (inrush) | Required for 200 ms | 450 VA | 400 VA | 480 VA | 400 VA | 400 VA |
| Power consumption (continuous) | Required for 400 ms | 10 VA | 10 VA | 10 VA | 10 VA | 10 VA |
| Opening time | Seconds | 70 ms | 70 ms | 70 ms | 70 ms | 70 ms |
| Auxiliary Switches | | | | | | |
| Minimum load contact rating | Inductive load | 10 A | 10 A | — | — | — |

Note

^① 100% duty shunt trips require power consumption (inrush) for 200 ms.

3.1

Power Breakers, Contactors and Fuses

Power Circuit Breaker

Wiring Diagrams

Typical Magnum Breaker Control Circuit

3

Legend:

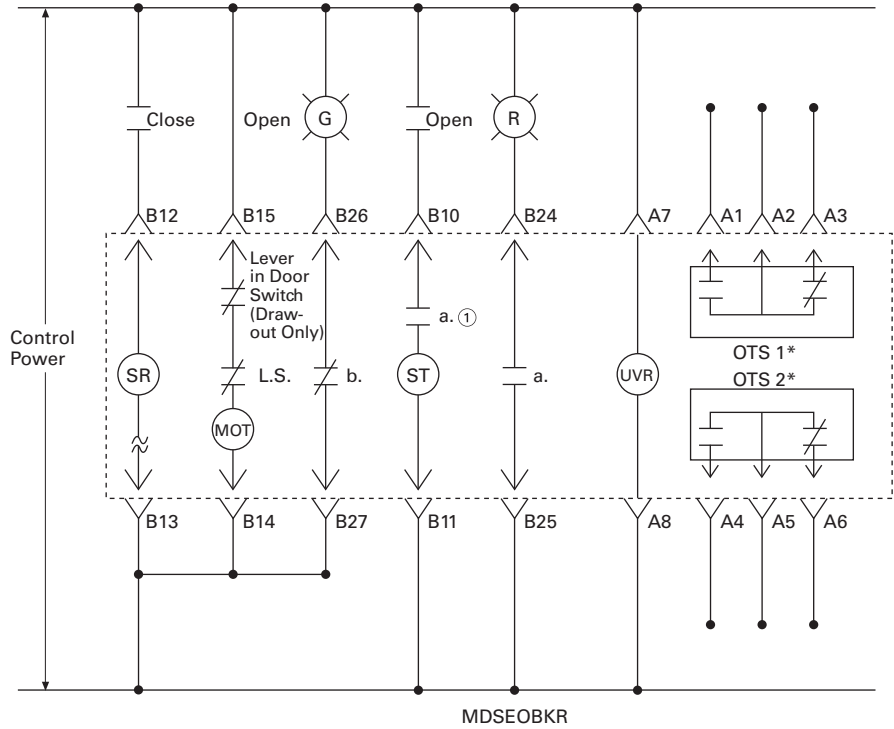
- LS Limit Switch for Closing Spring
- MOT Motor for Spring Charging
- ST Shunt Trip ①
- SR Spring Release
- UVR Undervoltage Release
- OTS Overcurrent Trip Switch

Description of Operation:

- 1 — Motor is energized through LS contact.
- 2 — Motor runs and charges closing spring.
- 3 — When closing spring is fully charged, LS contacts change state.
- 4 — Close contacts energize SR coil.
- 5 — When breaker closes, "b" opens.
- 6 — LS contacts change state and motor recharges closing springs.

Notes

- * Contacts shown for breaker open (not fully charged), not tripped.
- - - Dotted line denotes Magnum Breaker.
- ① Not needed with 100% duty rated shunt.



Magnum DC (Direct Current) Low Voltage Switches



Contents

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| Magnum DS Low Voltage Power Circuit Breakers | V4-T3-6 |
| Magnum MDSL Current Limiting Power Circuit Breaker | V4-T3-12 |
| Magnum SB Low Voltage Insulated Case Circuit Breakers | |
| Magnum IEC Rated Air Circuit Breakers | V4-T3-23 |
| Magnum DC (Direct Current) Low Voltage Switches | |
| Technical Data and Specifications | V4-T3-34 |
| Series NRX Low Voltage Power Circuit Breakers with PXR | V4-T3-35 |
| Series NRX Low Voltage Power Circuit Breakers with Digitrip | V4-T3-47 |
| Medium Voltage Circuit Breakers | V4-T3-55 |

Magnum DC (Direct Current) Low Voltage Switches

Product Description

Eaton Magnum DC switches are a comprehensive offering of third-party and globally certified DC switches that are designed to provide excellent safety with a high level of performance that meets the demands of a global market.

Applications

The new line of Magnum DC switches covers a wide range industry applications.

- Utility companies incorporating DC facility power and control for emergency or redundant power
- Backup UPS power systems requiring means to disconnect the battery for isolation and maintenance
- SCR and drive isolation switches for maintenance and emergency disconnect

Features and Benefits

The new DC switch in the industry-proven Magnum platform provides DC technology in a common power breaker platform.

- The DC switch provides disconnect and switching to meet demanding industry standards:
 - UL1066—300 Vdc, 50 kA withstand and interruption, up to 3200 A continuous current
 - UL 489—600 Vdc, 50 kA withstand and interruption, up to 3200 A continuous current
 - IEC 60947-2—1000 Vdc, 25 kA interruption and 65 kA withstand, up to 3200 A
- Common accessories with the Magnum AC line of power circuit breakers reduces inventory and integration time
- Fixed and drawout versions address important design criteria, balancing cost, size and serviceability
- Internationally approved factory-installed and field-installable accessories identical to the Magnum air circuit breaker offering

Standards and Certifications

UL and ANSI Test Certifications

Magnum DC switches meet or exceed the applicable ANSI, NEMA, UL and CSA standards, including:

- ANSI C37.14 (Low Voltage DC Power Circuit Breakers Used in Enclosures)
- ANSI C37.16 (Preferred Ratings, Related Requirements, and Application Recommendations for Low Voltage Power Circuit Breakers and AC and DC Power Circuit Breakers)
- ANSI C37.17 (Trip Devices for AC and General Purpose DC Low Voltage Power Circuit Breakers)
- UL 1066 (Standard for Low Voltage AC and DC Power Circuit Breakers Used in Enclosures)
- UL 489 Molded Case Switches

IEC Test Certification

Magnum Air Circuit Breakers meet or exceed the applicable IEC standards

- EN/IEC 60947-2

Approvals and Marks

- UL listed: Magnum DS Breaker UL File No. E52096 and Cassette UL File No. E204565
- ABS (American Bureau of Shipping) Type Approval
- CE
- CCC (Certificate for China Compulsory Product Certification) to GB14048.2-2001
- Det Norske Veritas (DNV)
- Lloyds of London
- South African Bureau of Standards (SABS)
- For a complete and comprehensive listing of all low voltage power breakers, please visit www.eaton.com



Product Selection

Contact Eaton for pricing.

3.1

Power Breakers, Contactors and Fuses

Power Circuit Breakers

Technical Data and Specifications

Ratings for Magnum DC Switches

| Catalog Type/standard | Frame Type | Number of Poles | Frame Ampere Rating | DC Voltage/Interrupt Rating/Withstand Rating | Load Switching | For Use in Grounded Systems | Connection Type | Fixed/Drawout | Certification |
|---|-----------------|-----------------|---------------------|--|----------------|-----------------------------|----------------------|---------------|---------------|
| ANSI/UL 1066 ratings at 300 Vdc | | | | | | | | | |
| DAS | Standard | 3 | 1600 | 300 V / 50 kA / 50 kA | Yes | Yes | Two-pole in series | Drawout | UL 1066 |
| DAS | Standard | 3 | 2000 | 300 V / 50 kA / 50 kA | Yes | Yes | Two-pole in series | Drawout | UL 1066 |
| DAS | Standard | 3 | 3200 | 300 V / 50 kA / 50 kA | Yes | Yes | Two-pole in series | Drawout | UL 1066 |
| UL 489 ratings at 600 Vdc | | | | | | | | | |
| DBS | Standard | 3 | 3200 | 600 V / 50 kA / 50 kA | Yes | Yes | Three-pole in series | Both | UL 489 |
| IEC ratings at 1000 Vdc ^① | | | | | | | | | |
| DEM/DGM | Narrow | 3 | 800 | 1000 V / 25 kA / 65 kA | Yes | No/yes ^① | Three-pole in series | Both | IEC 60947-2 |
| DEM/DGM | Narrow | 3 | 1000 | 1000 V / 25 kA / 65 kA | Yes | No/yes | Three-pole in series | Both | IEC 60947-2 |
| DEM/DGM | Narrow | 3 | 1250 | 1000 V / 25 kA / 65 kA | Yes | No/yes | Three-pole in series | Both | IEC 60947-2 |
| DEM/DGM | Narrow | 3 | 1600 | 1000 V / 25 kA / 65 kA | Yes | No/yes | Three-pole in series | Both | IEC 60947-2 |
| DEM/DGM | Narrow | 3 | 2000 | 1000 V / 25 kA / 65 kA | Yes | No/yes | Three-pole in series | Both | IEC 60947-2 |
| DEK/DGK | Standard | 3 | 2500 | 1000 V / 25 kA / 85 kA | Yes | No/yes | Three-pole in series | Both | IEC 60947-2 |
| DEK/DGK | Standard | 3 | 3200 | 1000 V / 25 kA / 85 kA | Yes | No/yes | Three-pole in series | Both | IEC 60947-2 |
| DEM/DGM | Double narrow | 6 | 4000 | 1000 V / 25 kA / 100 kA | Yes | No/yes | Three-pole in series | Both | IEC 60947-2 |
| DEM/DGM | Double narrow | 6 | 5000 | 1000 V / 25 kA / 100 kA | Yes | No/yes | Three-pole in series | Both | IEC 60947-2 |
| DEK/DGK | Double standard | 6 | 4000 | 1000 V / 25 kA / 100 kA | Yes | No/yes | Three-pole in series | Both | IEC 60947-2 |
| DEK/DGK | Double standard | 6 | 5000 | 1000 V / 25 kA / 100 kA | Yes | No/yes | Three-pole in series | Both | IEC 60947-2 |

Note

① DE is for use in ungrounded applications; DG is for use in grounded applications.

Series NRX Low Voltage Power Circuit Breaker with Power Xpert Release Trip Unit (PXR)



Series NRX with PXR NF Drawout Breaker



Series NRX with PXR RF Fixed Breaker

Contents

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| Magnum DS Low Voltage Power Circuit Breakers | V4-T3-6 |
| Magnum MDSL Current Limiting Power Circuit Breaker | V4-T3-12 |
| Magnum SB Low Voltage Insulated Case Circuit Breakers | V4-T3-15 |
| Magnum IEC Rated Air Circuit Breakers | V4-T3-23 |
| Magnum DC (Direct Current) Low Voltage Switches | V4-T3-33 |
| Series NRX Low Voltage Power Circuit Breakers with PXR | |
| Catalog Number Selection | V4-T3-38 |
| Technical Data and Specifications | V4-T3-42 |
| Series NRX Low Voltage Power Circuit Breakers with Digitrip | V4-T3-47 |
| Medium Voltage Circuit Breakers | V4-T3-55 |

Series NRX Low Voltage Power Circuit Breakers with PXR

Product Description

Series NRX is a low voltage power circuit breaker suitable for UL 1558, UL 891, and IEC switchgear and switchboards. The compact size and weight of three-pole drawout with cassette Series NRX, see **Pages V4-T3-39** and **V4-T3-41**, allows for a 24.00 (609.6 mm) switchgear enclosure. Series NRX with Power Release Xpert (PXR) trip unit is available with a variety of cable and bus connection options: rear fixed, front fixed, fixed hybrid and drawout.

The breaker ratings are:

NF Frame

- 800–1200 A for UL 489
- 630–1600 A IEC 60947-2

RF Frame

- 800–3000 A for UL 489
- 800–4000 A for IEC 60947-2

Application Description

The compact sizes of the two Series NRX circuit breakers, NF and RF frames, help reduce non-revenue generating floor space, and the modular design and common accessories allow for easy panel and switchboard integration. The Series NRX circuit breakers combine high interruption and short time withstand ratings with easy to integrate communications. NF Frame is rated for 800 A (UL 1066), 800 A and 1200 A (UL 489) and 630–1600 A (IEC 60947-2) with an interrupting capacity of 65 kA with short time withstand at 42 kA at the 440/480 Vac level. RF Frame is rated for 800–3000 A (UL 489) and 800–4000 A (IEC 60947-2) with an interrupting capacity of 100 kA with short time withstand at 65 kA (or 85 kA for IEC 60947-2) at the 440/480 Vac level.

The Series NRX circuit breaker provides all the capabilities of a power circuit breaker in the compact size of a molded case breaker. It offers you the same protection and performance —along with increased flexibility—at half the size of a typical power circuit breaker.

Eaton’s new PXR electronic trip units provide advanced metering, communication and diagnostic features with an easy-to-use interface. The Power Xpert® Protection Manager (PXPM) software for the PXR trip units can provide and perform secondary injection and test reporting through a PC to simplify testing, serviceability and customization.



3.1

Power Breakers, Contactors and Fuses

Power Circuit Breakers

3

Features, Benefits and Functions

Series NRX utilizes several innovative technologies:

- Rogowski coil—does not saturate like iron core sensors, and one sensor accommodates 200–1600 ampere range for NF and 800–4000 for RF. You never have to change a sensor and CTs are not required
- Tension clamp secondary terminals—10 A continuous rating at 600 V meets UL/CSA/RoHS and UL-94 V0. Mounted directly to fixed breaker or drawout cassette, they reduce wiring throughout enclosure and provide clean, organized wiring schemes
- A Modbus® communication port is standard in the PXR 25 trip units and is available as an option on PXR 20 trip units. This native Modbus RTU capability gives access to breaker status and metering information. Additional PCAM, MCAM or ECAM modules can be installed externally for PXR to expand the communication capability and simplify integration into existing electrical system design and protocols
- “Direct Drive” mechanism—symmetrically loaded forces of the two-staged stored energy mechanism improves robustness, reliability, and achieves improved breaker life ratings
- Fold-up cassette—with this simple design, all items in a cassette are replaceable without removing the cassette from the cell
- “Arc chute” design
- Breaker-mounted racking or levering-in device—Racking device is mounted on the breaker, decreasing the width of the cassette, because the cassette is not burdened with the cost or parts of the lev-in
- Plug-n-Play accessories—No special tools needed. Accessory comes with plug and wires ready to install
- Arcflash Reduction Maintenance System—Eaton’s patented technology provides maintenance staff with improved safety of downstream maintenance locations using a simple and reliable method to reduce fault clearing times and energy during an arc flash event (radiation, sound, pressure, temperature). Arcflash Reduction Maintenance System uses a separate analog trip circuit, providing faster signal processing and interruption times than the standard (digital) “instantaneous” protection. The Arcflash Reduction Maintenance System function is activated either directly on the circuit breaker through a local switch or remotely through communications or a digital input

Note: UL 489: For $I_n \leq 2500$ A, mechanical ops = 2500. For $I_n < 2500$, mechanical ops = 1500. For $I_n \leq 2500$ A, mechanical ops = 3000. For $I_n > 2500$, mechanical ops = 2000.

Standards and Certifications

- UL 489 (molded case circuit breakers, molded case switches and circuit breaker enclosures)
- IEC 60947-1 (low voltage switchgear and controlgear—Part 1 general rules)
- IEC 60947-2 (low voltage switchgear and controlgear—Part 2 circuit breakers)
- CSA 22.2 (molded case circuit breakers, molded case switches and circuit breaker enclosures)
- UL 891 (deadfront switchboard)
- UL 1558 (metal-enclosed low voltage power circuit breaker switchgear)



Reference Information—Series NRX with PXR Publications

List of Instruction Leaflets and Manuals

| Description | Publication Number | Frame Number |
|--|--------------------|--------------|
| NF Frames | | |
| Series NRX—Installation Instructions for Operation Counter | IL01301011E | NF |
| Series NRX—Installation Instructions for Drawout Cassette IP20 Safety Shutters | IL01301013E | NF |
| Series NRX—Installation Instructions for Fixed Breaker Arc Hood | IL01301014E | NF |
| Series NRX—Installation Instructions for Drawout Breaker Primary Adapters | IL01301016E | NF |
| Series NRX—Installation Instructions for Breaker and Cassette Interphase Barriers | IL01301021E | NF |
| Series NRX—Installation Instructions for Pushbutton Cover Kit | IL01301041E | NF |
| Series NRX—Installation Instructions for Drawout Circuit Breaker 2-Way Cable Interlock Kit | IL01301069E | NF |
| Series NRX—Installation Instructions for Drawout Circuit Breaker 3-Way Cable Interlock Kit | IL01301070E | NF |
| Series NRX—Installation Instructions for Fixed Circuit Breaker 2-Way Cable Interlock Kit | IL01301071E | NF |
| Series NRX—Installation Instructions for Fixed Circuit Breaker 3-Way Cable Interlock Kit | IL01301072E | NF |
| Series NRX—Installation Instructions for Cassette Door Interlock | IL01301073E | NF |
| Series NRX with PXR—Instructions for Neutral Current Sensor—Type NF | IL0131090EN | NF |
| Series NRX with PXR—Instructions for Cassette Cell Switch—Type NF | IL0131097EN | NF |
| Series NRX—Fixed Breaker Rear Connect and Front Connect Configurations | IL0131123EN | NF |
| Series NRX with PXR, Type NF low voltage power (air) circuit breakers instruction manual | MN013001EN | NF |
| Series NRX—Installation Instructions for Pop-Out Mechanical Trip Indicator | IL01301019E | NF |

List of Instruction Leaflets and Manuals, continued

| Description | Publication Number | Frame Number |
|--|--------------------|--------------|
| RF Frames | | |
| Series NRX—Installation Instructions for Drawout Cassette IP20 Safety Shutters | IL01301044E | RF |
| Series NRX—Installation Instructions for Breaker and Cassette Interphase Barrier | IL01301048E | RF |
| Series NRX—Installation Instructions for Rear Primary Adapters | IL01301053E | RF |
| Series NRX—Installation Instructions for Operation Counter | IL01301055E | RF |
| Series NRX—Installation Instructions for Front Connect Adapters | IL01301056E | RF |
| Series NRX—Installation Instructions for Pop-Out Mechanical Trip Indicator | IL01301058E | RF |
| Series NRX—Installation Instructions for Drawout Circuit Breaker 2-Way Cable Interlock Kit | IL01301059E | RF |
| Series NRX—Installation Instructions for Drawout Circuit Breaker 3-Way Cable Interlock Kit | IL01301060E | RF |
| Series NRX—Installation Instructions for Fixed Circuit Breaker 2-Way Cable Interlock Kit | IL01301061E | RF |
| Series NRX—Installation Instructions for Fixed Circuit Breaker 3-Way Cable Interlock Kit | IL01301062E | RF |
| Series NRX—Installation Instructions for Lev-in Key Interlocks | IL01301063E | RF |
| Series NRX—Installation Instructions for Pushbutton Cover Kit | IL01301065E | RF |
| Series NRX—Installation Instructions for Cassette Door Interlock | IL01301066E | RF |
| Series NRX with PXR—Instructions for Neutral Current Sensor—Type RF | IL0131094EN | RF |
| Series NRX with PXR—Instructions for Cassette Cell Switch—Type RF | IL0131095EN | RF |
| Series NRX with PXR, Type RF low voltage power (air) circuit breakers instruction manual | MN013002EN | RF |
| NF and RF Frames | | |
| Series NRX NF & RF Circuit Breakers with PXR 20/25 Trip Units - Time Current Curves | AD013001EN | NF and RF |
| Series NRX Drawout Circuit Breaker and Cassette Rejection Interlocks | IL01301006E | NF and RF |
| Series NRX—Installation Instructions for Fixed and Drawout Breaker Door Escutcheon | IL01301012E | NF and RF |
| Series NRX—Installation Instructions for IP55 Dust and Water-Resistant Cover | IL01301038E | NF and RF |
| Series NRX—Installation Instructions for Kirk Key Interlock Kit | IL01301039E | NF and RF |
| Series NRX—Installation Instructions for Ronis Key Lock Kit | IL01301040E | NF and RF |
| Series NRX—Installation Instructions for CES Key Lock Kit | IL01301049E | NF and RF |
| Series NRX—Installation Instructions for Castell Key Lock Kit | IL01301050E | NF and RF |
| Series NRX with PXR—Instructions for PT Module | IL01301074E | NF and RF |
| Series NRX with PXR—Instructions for Undervoltage Release, Shunt Trip, and Overcurrent Trip Switch | IL0131087EN | NF and RF |
| Series NRX with PXR—Instructions for Spring Release, Latch Check Switch, and Motor Operator | IL0131088EN | NF and RF |
| Series NRX with PXR—Instructions for Source Ground and Zero Sequence Ground Sensor | IL0131089EN | NF and RF |
| Series NRX with PXR—Instructions for Modbus Communications Adapter Module (MCAM) | IL0131091EN | NF and RF |
| Series NRX with PXR—Instructions for PROFIBUS DP Communications Adaptor Module (PCAM) | IL0131092EN | NF and RF |
| Series NRX with PXR—Instructions for Secondary Terminal Blocks | IL0131093EN | NF and RF |
| Series NRX with PXR—Instructions for Auxiliary Switch | IL0131096EN | NF and RF |
| Series NRX with PXR—Instructions for INCOM Communications Adapter Module | IL0131124EN | NF and RF |
| Series NRX with PXR—Installation Instructions for Ethernet Communications Adapter Module | IL0131125EN | NF and RF |
| PXR 20/25 Trip Unit for Series NRX Screen Navigation Guide | IL0131128EN | NF and RF |
| Time Delay Undervoltage Module for use with Undervoltage Release in Eaton Circuit Breakers | IL5721B33 | NF and RF |
| PXR 20/25 Trip Unit for Series NRX User Manual | MN013003EN | NF and RF |
| Series NRX with PXR Circuit Breaker Wiring Diagrams | TD013001EN | NF and RF |

3.1

Power Breakers, Contactors and Fuses

Power Circuit Breakers

Catalog Number Selection

Series NRX with Power Xpert Release NF Frame Circuit Breaker (exclusionary rules apply)

3

N G S6 08 3 W 2A 8 A B A N 4 X N D X

Breaker Frame Size
N = NF-frame for UL 489 or IEC

Standard, Mechanism, Device
G = IEC 60947-2, stored energy, air breaker
Y = UL 489, stored energy, insulated case breaker

Fault Current Rating
R4 = 42 kA at 480 Vac (UL 489 only)
R5 = 50 kA at 480 Vac (UL 489 only)
R6 = 65 kA at 480 Vac (UL 489 only)
S4 = 42 kA at 480 Vac (30 cycle, UL 489) or 415 Vac IEC
S5 = 50 kA at 480 Vac (30 cycle, UL 489) or 415 Vac IEC
S6 = 65 kA at 480 Vac (30 cycle, UL 489 only), 66 kA at 415 Vac IEC

Frame Rating (Amperes)
07 = 630 (IEC only)
08 = 800
10 = 1000 (IEC only)
12 = 1200 (UL only)
13 = 1250 (IEC only)
16 = 1600 (IEC only)

Poles, Phasing
3 = Three-pole, ABC
4 = Four-pole, NABC

Mounting Configuration
W = Drawout
B = Fixed mount rear connected with side mounting brackets
F = Front connected, fixed mount, for bus or cable connections with side mounting brackets^①
H = Fixed hybrid breaker, top rear connect and bottom front connect ^②
J = Fixed hybrid breaker, top front connect and bottom rear connect ^②

Motor Operator
M = Manually operated
B = 110–125 Vac/Vdc
W = 110–125 Vdc
T = 208–250 Vac/Vdc
P = 220–250 Vdc
L = 24 Vdc
H = 48 Vdc
S = 60 Vdc

Continuous Rating (I_n in Amperes)
0 = Non-auto switch
1 = 200
2 = 250
3 = 300
4 = 400
5 = 500
6 = 600
7 = 630 (IEC only)
8 = 800
A = 1000 (IEC only)
B = 1200 (UL only)
C = 1250 (IEC only)
D = 1600 (IEC only)

Shunt Trip
N = No shunt trip
A = 110–127 Vac/Vdc
R = 208–240 Vac/Vdc
L = 24 Vdc
H = 48 Vdc
S = 60 Vdc

Spring Release, Latch Check Switch
N = No spring release, no LCS
A = 110–127 Vac/Vdc, no LCS
B = 110–127 Vac/Vdc, spring release LCS
C = 110–127 Vac/Vdc, LCS wired external
R = 208–250 Vac/Vdc, no LCS
S = 208–250 Vac/Vdc, spring release LCS
T = 208–250 Vac/Vdc, LCS wired external
L = 24 Vdc, no LCS
P = 24 Vdc, spring release LCS
Q = 24 Vdc, LCS wired external
H = 48 Vdc, no LCS
J = 48 Vdc, spring release LCS
K = 48 Vdc, LCS wired external
1 = 60 Vdc, no LCS
2 = 60 Vdc, spring release LCS
3 = 60 Vdc, LCS wired external

Trip Unit, Power Supply
SW = Non-automatic switch, available only for fault current rating configuration S4
2A = PXR20 LSI
2B = PXR20 LSI with Modbus
2H = PXR20 LSI with Modbus and Arcflash Reduction Maintenance System
2K = PXR20 LSI with Arcflash Reduction Maintenance System
2C = PXR20 LSI
2D = PXR20 LSI with Modbus
2E = PXR20 LSI with Arcflash Reduction Maintenance System
2F = PXR20 LSI with Modbus and Arcflash Reduction Maintenance System
2P = PXR25 LSI with Modbus
2Q = PXR25 LSI with Modbus and Arcflash Reduction Maintenance System
2R = PXR25 LSI with Modbus
2S = PXR25 LSI with Modbus and Arcflash Reduction Maintenance System

Notes

- ① Four-pole cable kit only available up to 50 kA, 65 kA cable kit not available at this time.
- ② UL 489 three-pole only.

Series NRX with Power Xpert Release NF Frame Circuit Breaker (exclusionary rules apply), continued

N G S6 08 3 W 2A 8 A B A N 4 X N D X

UVR, Second Shunt Trip

N = None
A = 110–125 Vac/Vdc UVR
R = 220–250 Vac/Vdc UVR
L = 24 Vdc UVR
H = 48 Vdc UVR
S = 60 Vdc UVR
1 = 110–127 Vac/Vdc second shunt trip
2 = 208–240 Vac/Vdc second shunt trip
4 = 24 Vdc second shunt trip
8 = 48 Vdc second shunt trip
9 = 60 Vdc second shunt trip

Auxiliary Switches, Label Language

E = No auxiliary switches, English
2 = 2 Form C, English
4 = 4 Form C, English

| | Trip Indicator and Bell Alarm ① | OTS | Secondary Terminal Blocks | Remote Reset |
|----------|---------------------------------|----------|---------------------------|--------------|
| N | None | None | Per breaker options | None |
| X | Trip indicator | None | Per breaker options | None |
| Z | Trip indicator | 2 Form C | Per breaker options | None |
| M | Interlock trip indicator | None | Per breaker options | None |
| Y | Interlock trip indicator | 2 Form C | Per breaker options | None |
| 1 | None | None | Full complement | None |
| 2 | Trip indicator | None | Full complement | None |
| 3 | Trip indicator | 2 Form C | Full complement | None |
| 4 | Interlock trip indicator | None | Full complement | None |
| 5 | Interlock trip indicator | 2 Form C | Full complement | None |

| | Pushbutton Padlock Cover | Safe OFF Feature | Operations Counter |
|----------|--------------------------|------------------|--------------------|
| N | No | None | No |
| A | No | — | Provided |
| B | Yes (plastic/plastic) | — | No |
| J | Yes (plastic/plastic) | — | Provided |
| K | Yes (metal/metal) | — | No |
| L | Yes (metal/metal) | — | Provided |
| 1 | Yes (metal/metal) | Yes | No |
| 2 | Yes (metal/metal) | Yes | Provided |

Drawout Breaker Shipping, Fixed Breaker Terminals (Door frame kit ships as standard unless noted otherwise)

D = Drawout breaker shipping alone, without door frame kit
C = Drawout breaker shipping in cassette, no shutters, no terminals
1 = Drawout breaker shipping in cassette, no shutters, short vertical/horizontal
2 = Drawout breaker shipping in cassette, no shutters, long vertical/horizontal
4 = Drawout breaker shipping in cassette, with shutters, short vertical/horizontal
5 = Drawout breaker shipping in cassette, with shutters, long vertical/horizontal
9 = Drawout breaker shipping in cassette, with shutters, no terminals
K = Rear connect, fixed breaker, no terminal adapters
F = Fixed breaker, rear connect, with mounting feet and short terminal adapters
H = Fixed breaker, rear connect, with mounting feet and long terminal adapters
J = Front connect, fixed breaker, with no terminal adapters
Q = Fixed hybrid, no rear terminals, TA1200NB1M front cable terminals
T = Fixed hybrid, no rear terminals, TA1201NB1M front cable terminals

Series NRX with Power Xpert Release NF Frame Cassette

NY 12 3 F A B N S N N N C

Cassette Family and Breaker Frame

NY = UL 489 NF Frame
NG = IEC NF Frame

Continuous Ampere Range

12 = 800–1200 (UL 489)
16 = 630–1600 (IEC)

Poles and Phasing (Facing front of breaker)

3 = Three-pole ABC
4 = Four-pole NABC

Load Terminal Connections

A = With vertical/horizontal bus adapter kit (long style)
F = With flat tapped pads only
G = With vertical/horizontal bus adapter kit (short style)

Arc Hood

A = Arc hood installed (default)

Door Frame Gasket and Rejection Kits

B = Door kit included (default), with rejection kit

Cell Switch Options

N = Not included

Shutters

N = Not included (default)
S = Included

Cassette Shipping

C = Cassette only
B = Breaker shipped in cassette

Future

N = None

Future

N = None

Second Contact Terminals Installed

N = None
B = Breaker defined, when breaker ships in cassette
F = Full complement

Note

① Two Form C contacts except on NF with Power Xpert Release and OTS and RRTI, where only one Form C OTS contact will be provided.

3.1

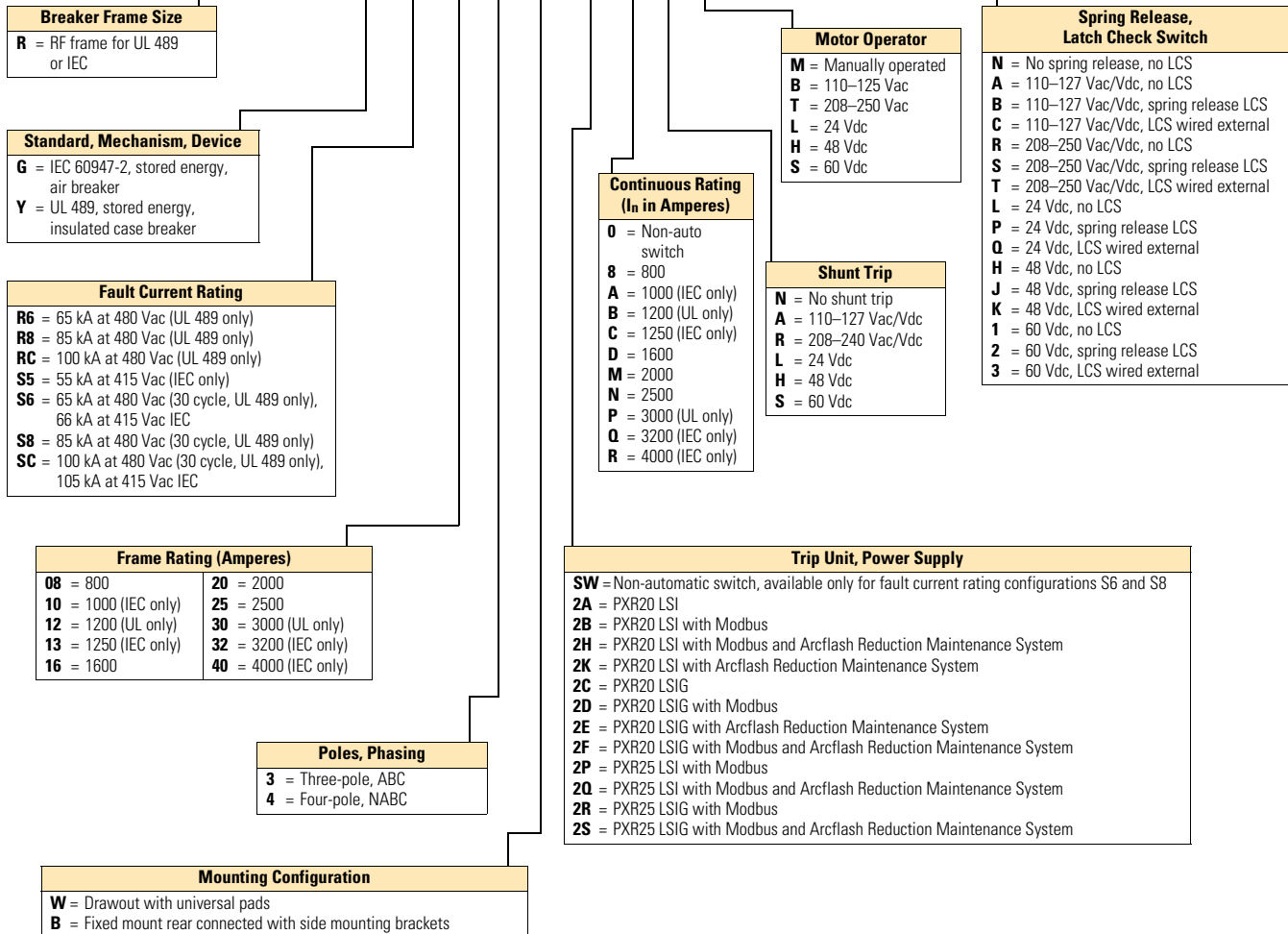
Power Breakers, Contactors and Fuses

Power Circuit Breakers

Series NRX with Power Xpert Release RF Frame Circuit Breaker (exclusionary rules apply)

3

R G S6 08 3 W 2A 8 A B A N 4 X N D X



Series NRX with Power Xpert Release RF Frame Circuit Breaker (exclusionary rules apply), continued

R G S6 08 3 W 2A 8 A B A N 4 X N D X

UVR, Second Shunt Trip

N = None
A = 110–125 Vac/Vdc UVR
R = 220–250 Vac/Vdc UVR
L = 24 Vdc UVR
H = 48 Vdc UVR
S = 60 Vdc UVR
1 = 110–127 Vac/Vdc second shunt trip
2 = 208–240 Vac/Vdc second shunt trip
4 = 24 Vdc second shunt trip
8 = 48 Vdc second shunt trip
9 = 60 Vdc second shunt trip

Auxiliary Switches, Label Language

E = No auxiliary switches, English
2 = 2 Form C, English
4 = 4 Form C, English
6 = 6 Form C, English
8 = 8 Form C, English
A = 10 Form C, English
W = 12 Form C, English

| | Trip Indicator and Bell Alarm | OTS | Secondary Terminal Blocks | Remote Reset |
|----------|-------------------------------|----------|---------------------------|--------------|
| N | None | None | Per breaker options | None |
| X | Trip indicator | None | Per breaker options | None |
| Z | Trip indicator | 2 Form C | Per breaker options | None |
| M | Interlock trip indicator | None | Per breaker options | None |
| A | Interlock trip indicator | None | Per breaker options | 24 Vdc RR |
| 6 | Interlock trip indicator | None | Per breaker options | 48 Vdc RR |
| 7 | Interlock trip indicator | None | Per breaker options | 60 Vdc RR |
| B | Interlock trip indicator | None | Per breaker options | 120 Vdc RR |
| C | Interlock trip indicator | None | Per breaker options | 240 Vdc RR |
| Y | Interlock trip indicator | 2 Form C | Per breaker options | None |
| D | Interlock trip indicator | 2 Form C | Per breaker options | 24 Vdc RR |
| 8 | Interlock trip indicator | 2 Form C | Per breaker options | 48 Vdc RR |
| 9 | Interlock trip indicator | 2 Form C | Per breaker options | 60 Vdc RR |
| E | Interlock trip indicator | 2 Form C | Per breaker options | 120 Vdc RR |
| F | Interlock trip indicator | 2 Form C | Per breaker options | 240 Vdc RR |
| 1 | None | None | Full complement | None |
| 2 | Trip indicator | None | Full complement | None |
| 3 | Trip indicator | 2 Form C | Full complement | None |
| 4 | Interlock trip indicator | None | Full complement | None |
| J | Interlock trip indicator | None | Full complement | 24 Vdc RR |
| G | Interlock trip indicator | None | Full complement | 48 Vdc RR |
| H | Interlock trip indicator | None | Full complement | 60 Vdc RR |
| K | Interlock trip indicator | None | Full complement | 120 Vdc RR |
| L | Interlock trip indicator | None | Full complement | 240 Vdc RR |
| 5 | Interlock trip indicator | 2 Form C | Full complement | None |
| R | Interlock trip indicator | 2 Form C | Full complement | 24 Vdc RR |
| U | Interlock trip indicator | 2 Form C | Full complement | 48 Vdc RR |
| V | Interlock trip indicator | 2 Form C | Full complement | 60 Vdc RR |
| S | Interlock trip indicator | 2 Form C | Full complement | 120 Vdc RR |
| T | Interlock trip indicator | 2 Form C | Full complement | 240 Vdc RR |

Options

X = Default
W = Low temperature applications (–57 °C)

Drawout Breaker Shipping, Fixed Breaker Terminals (Door frame kit ships as standard unless noted otherwise)

D = Drawout breaker shipping alone, without door frame kit
C = Drawout breaker shipping in cassette, no shutters, no terminals
1 = Drawout breaker shipping in cassette, no shutters, horizontal adapters
2 = Drawout breaker shipping in cassette, no shutters, vertical adapters
4 = Drawout breaker shipping in cassette, with shutters, vertical adapters
5 = Drawout breaker shipping in cassette, with shutters, horizontal mounting
9 = Drawout breaker shipping in cassette, with shutters, no terminals
K = Rear connect, fixed breaker, no terminal adapters
F = Fixed breaker, rear connect with vertical adapters
H = Fixed breaker, rear connect with horizontal adapters

| | Pushbutton Padlock Cover | Safe OFF Feature | Operations Counter |
|----------|--------------------------|------------------|--------------------|
| N | No | None | No |
| A | No | — | Provided |
| B | Yes (plastic/plastic) | — | No |
| J | Yes (plastic/plastic) | — | Provided |
| K | Yes (metal/metal) | — | No |
| L | Yes (metal/metal) | — | Provided |
| 1 | Yes (metal/metal) | Yes | No |
| 2 | Yes (metal/metal) | Yes | Provided |

Series NRX with Power Xpert Release RF Frame Cassette

RY 12 3 F A B N S N N N C

Cassette Family and Breaker Frame

RY = UL 489 NF Frame
RG = IEC NF Frame

Continuous Ampere Range

30 = 3000 A (UL only)
40 = 3200–4000 A (IEC only)

Poles and Phasing (Facing front of breaker)

3 = Three-pole ABC
4 = Four-pole NABC

Load Terminal Connections

F = With flat tapped pads only (no terminals)
G = With vertical/horizontal bus adapter kit (short style)
A = With vertical/horizontal bus adapter kit (long style)

Arc Hood

A = Arc hood installed (default)

Door Frame Gasket and Rejection Kits

B = Door kit included (default), with rejection kit

Cell Switch Options (Available on breaker + cassette or cassette only)

N = Not included
3 = Cell switch assembly with 3 Form C contacts

Shutters

N = Not included (default)
S = Included

Cassette Shipping

C = Cassette only
B = Breaker shipped in cassette

Future

N = None

Future

N = None

Second Contact Terminals Installed

N = None
B = Breaker defined, when breaker ships in cassette
F = Full complement

3.1

Power Breakers, Contactors and Fuses

Power Circuit Breakers

Technical Data and Specifications

UL 489 Ratings

3



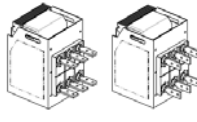
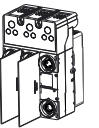
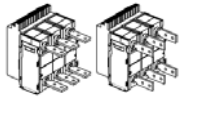
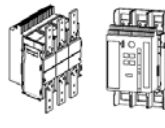
1 rms Symmetrical Current Ratings kA 50/60 Hz

| Frame Amperes | Breaker Type Catalog Number | Frame Type | Interrupting at 240 Vac | Interrupting at 480 Vac | Interrupting at 600 Vac | 30 Cycle Short-Time Withstand Rating ^① | Instantaneous Override (Equivalent Symmetrical rms, kA) ^② | Poles Available | Available Trip Rating (Establishes Breaker In Rating) ^③ |
|---|-----------------------------|------------|-------------------------|-------------------------|-------------------------|---|--|-----------------|--|
| NF Frame—UL 489 | | | | | | | | | |
| 800 | NYR4-08 | NF-R | 50 | 42 | 42 | 16 x I _n | 16 x I _n | 3, 4 | 200, 250, 300, 400, 500, 600, 800 |
| | NYR5-08 | NF-R | 65 | 50 | 42 | 16 x I _n | 16 x I _n | 3, 4 | |
| | NYR6-08 | NF-R | 85 | 65 | 42 | 16 x I _n | 16 x I _n | 3, 4 | |
| 1200 | NYR4-12 | NF-R | 50 | 42 | 42 | 16 x I _n | 16 x I _n | 3, 4 | 200, 250, 300, 400, 500, 600, 800, 1200 |
| | NYR5-12 | NF-R | 65 | 50 | 42 | 16 x I _n | 16 x I _n | 3, 4 | |
| | NYR6-12 | NF-R | 85 | 65 | 42 | 16 x I _n | 16 x I _n | 3, 4 | |
| NF Frame—UL 489 with high short-time (30 cycle) withstand capabilities | | | | | | | | | |
| 800 | NYS4-08 | NF-S | 50 | 42 | 42 | 42 | 42 | 3, 4 | 200, 250, 300, 400, 500, 600, 800 |
| | NYS5-08 | NF-S | 65 | 50 | 42 | 42 | 42 | 3, 4 | |
| | NYS6-08 | NF-S | 85 | 65 | 42 | 42 | 42 | 3, 4 | |
| 1200 | NYS4-12 | NF-S | 50 | 42 | 42 | 42 | 42 | 3, 4 | 200, 250, 300, 400, 500, 600, 800, 1200 |
| | NYS5-12 | NF-S | 65 | 50 | 42 | 42 | 42 | 3, 4 | |
| | NYS6-12 | NF-S | 85 | 65 | 42 | 42 | 42 | 3, 4 | |
| RF Frame—UL 489 | | | | | | | | | |
| 800 | RYR5-08 | RF-R | 65 | 65 | — | 16 x I _n | 16 x I _n | 3, 4 | 800 |
| | RYR8-08 | RF-R | 85 | 85 | — | 16 x I _n | 16 x I _n | 3, 4 | |
| | RYRC-08 | RF-R | 100 | 100 | — | 16 x I _n | 16 x I _n | 3, 4 | |
| 1200 | RYR5-12 | RF-R | 65 | 65 | — | 16 x I _n | 16 x I _n | 3, 4 | 800, 1200 |
| | RYR8-12 | RF-R | 85 | 85 | — | 16 x I _n | 16 x I _n | 3, 4 | |
| | RYRC-12 | RF-R | 100 | 100 | — | 16 x I _n | 16 x I _n | 3, 4 | |
| 1600 | RYR5-16 | RF-R | 65 | 65 | — | 16 x I _n | 16 x I _n | 3, 4 | 800, 1200, 1600 |
| | RYR8-16 | RF-R | 85 | 85 | — | 16 x I _n | 16 x I _n | 3, 4 | |
| | RYRC-16 | RF-R | 100 | 100 | — | 16 x I _n | 16 x I _n | 3, 4 | |
| 2000 | RYR5-20 | RF-R | 65 | 65 | — | 16 x I _n | 16 x I _n | 3, 4 | 800, 1200, 1600, 2000 |
| | RYR8-20 | RF-R | 85 | 85 | — | 16 x I _n | 16 x I _n | 3, 4 | |
| | RYRC-20 | RF-R | 100 | 100 | — | 16 x I _n | 16 x I _n | 3, 4 | |
| 2500 | RYR5-25 | RF-R | 65 | 65 | — | 16 x I _n | 16 x I _n | 3, 4 | 800, 1200, 1600, 2000, 2500 |
| | RYR8-25 | RF-R | 85 | 85 | — | 16 x I _n | 16 x I _n | 3, 4 | |
| | RYRC-25 | RF-R | 100 | 100 | — | 16 x I _n | 16 x I _n | 3, 4 | |
| 3000 | RYR5-30 | RF-R | 65 | 65 | — | 16 x I _n | 16 x I _n | 3, 4 | 800, 1200, 1600, 2000, 2500, 3000 |
| | RYR8-30 | RF-R | 85 | 85 | — | 16 x I _n | 16 x I _n | 3, 4 | |
| | RYRC-30 | RF-R | 100 | 100 | — | 16 x I _n | 16 x I _n | 3, 4 | |
| RF Frame—UL 489 with high short-time (30 cycle) withstand capabilities | | | | | | | | | |
| 800 | RYS6-08 | RF-S | 65 | 65 | — | 65 | — | 3, 4 | 800 |
| | RYS8-08 | RF-S | 85 | 85 | — | 65 | 65 | 3, 4 | |
| | RYSC-08 | RF-S | 100 | 100 | — | 65 | 65 | 3, 4 | |
| 1200 | RYS6-12 | RF-S | 65 | 65 | — | 65 | — | 3, 4 | 800, 1200 |
| | RYS8-12 | RF-S | 85 | 85 | — | 65 | 65 | 3, 4 | |
| | RYSC-12 | RF-S | 100 | 100 | — | 65 | 65 | 3, 4 | |
| 1600 | RYS6-16 | RF-S | 65 | 65 | — | 65 | — | 3, 4 | 800, 1200, 1600 |
| | RYS8-16 | RF-S | 85 | 85 | — | 65 | 65 | 3, 4 | |
| | RYSC-16 | RF-S | 100 | 100 | — | 65 | 65 | 3, 4 | |
| 2000 | RYS6-20 | RF-S | 65 | 65 | — | 65 | — | 3, 4 | 800, 1200, 1600, 2000 |
| | RYS8-20 | RF-S | 85 | 85 | — | 65 | 65 | 3, 4 | |
| | RYSC-20 | RF-S | 100 | 100 | — | 65 | 65 | 3, 4 | |
| 2500 | RYS6-25 | RF-S | 65 | 65 | — | 65 | — | 3, 4 | 800, 1200, 1600, 2000, 2500 |
| | RYS8-25 | RF-S | 85 | 85 | — | 65 | 65 | 3, 4 | |
| | RYSC-25 | RF-S | 100 | 100 | — | 65 | 65 | 3, 4 | |
| 3000 | RYS6-30 | RF-S | 65 | 65 | — | 65 | — | 3, 4 | 800, 1200, 1600, 2000, 2500, 3000 |
| | RYS8-30 | RF-S | 85 | 85 | — | 65 | 65 | 3, 4 | |
| | RYSC-30 | RF-S | 100 | 100 | — | 65 | 65 | 3, 4 | |


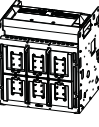
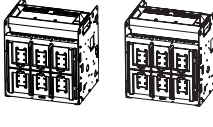
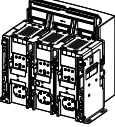
Notes

- ① UL 489 does not require a short-time withstand rating for breakers. The UL 489 Series NRX breakers have instantaneous override fixed at 22.5 x I_n (asymmetrical peak value). An equivalent symmetrical rms value would roughly equate to 16 x I_n.
- ② A 30-cycle withstand option is available for Series NRX breakers to provide better selectivity.
- ③ No change of hardware is required, trip rating can be programmed using I_n Programming Tool Kit.

Mounting and Load Connection Configurations—NF Frame

| Breaker Type | Breaker Mechanism | Standard Bus Connection Provisions | Rear-Connect Horizontal/ Vertical Adapter Kit with and without Cover (Kits shipped unassembled) | Fixed Front Connect Breaker Cable-Connected Cable Terminals | Hybrid Connect Breaker: Rear Connect Top— Cable Connect Bottom | Hybrid Connect Breaker: Cable Connect Top— Rear Connect Bottom |
|--|-------------------|-------------------------------------|---|--|--|--|
| Drawout Breaker  | Stored energy | Finger clusters | — | — | — | — |
| Cassette  | — | Rear-connected pre-drilled bus pads |  | — | — | — |
| Fixed  | Stored energy | Rear-connected pre-drilled bus pads |  |  | — | — |

Mounting and Load Connection Configurations—RF Frame

| Breaker Type | Breaker Mechanism | Standard Bus Connection Provisions | Rear-Connect Horizontal/ Vertical Adapter Kit with and without Cover (Kits shipped unassembled) |
|--|-------------------|-------------------------------------|---|
| Drawout Breaker  | Stored energy | Finger clusters | — |
| Cassette  | — | Rear-connected pre-drilled bus pads |  |
| Fixed  | Stored energy | Rear-connected pre-drilled bus pads | — |

Circuit Breaker Dimensions in Inches (mm) and Weights in lb (kg)

| Description | Height | | Width | | Depth | | Weight | |
|----------------------------|---------------|---------------|---------------|---------------|---------------|---------------|----------|-----------|
| | NF | RF | NF | RF | NF | RF | NF | RF |
| Fixed—Rear Connect | | | | | | | | |
| Three-pole | 13.31 (338.1) | 15.65 (397.6) | 8.25 (209.6) | 13.22 (335.8) | 7.15 (181.8) | 11.51 (292.4) | 45 (20) | 120 (55) |
| Four-pole | 13.31 (338.1) | 15.65 (397.6) | 11.00 (279.4) | 19.41 (492.9) | 7.15 (181.6) | 11.51 (292.4) | 62 (28) | 155 (71) |
| Fixed—Front Connect | | | | | | | | |
| Three-pole | 15.99 (406.3) | — | 8.25 (209.6) | — | 7.16 (181.8) | — | 45 (20) | 120 (55) |
| Four-pole | 15.99 (406.3) | — | 11.00 (279.4) | — | 7.15 (181.6) | — | 62 (28) | 155 (71) |
| Drawout | | | | | | | | |
| Three-pole | 14.17 (359.9) | 17.96 (456.1) | 10.00 (254.0) | 15.67 (397.9) | 10.50 (266.7) | 14.48 (367.8) | 87 (40) | 211 (96) |
| Four-pole | 14.17 (359.9) | 17.96 (456.1) | 12.75 (323.9) | 18.06 (458.7) | 10.50 (266.7) | 14.48 (367.8) | 109 (50) | 258 (117) |






3.1

Power Breakers, Contactors and Fuses


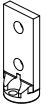


Power Circuit Breakers

3



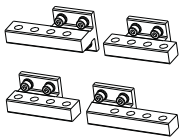
Available Front Connect Cable Terminals

| List Number | Connector | Ratings (kA) | To Breaker? | Catalog Number (Three-Pole) |
|---|---|--------------|-----------------------------|-----------------------------|
|  | 1 Bus conductor extension (42 kA and below) | 42 | — | NRXBUSEXT |
| | Bus conductor extension (50 kA and below) | 50 | — | NRXBUSEXT |
| | Bus conductor extension (65 kA and below) | 65 | — | NRXBUSEXT653 |
|  | 2 Cable terminals (two holes) | 65 | Yes | TA700NB1M |
| | With control wire provisions | 65 | Yes | TA700NB1MCWT |
|  | 3 Cable terminals (three holes) | 65 | Yes | TA1000NB1M |
| | With control wire provisions | 65 | Yes | TA1000NB1MCWT |
|  | 4 Cable terminals (four holes) | 65 | Load side only ^① | TA1200NB1M |
| | With control wire provisions | 65 | Load side only ^① | TA1200NB1MCWT |
|  | 5 Cable terminals (three holes for 750 kcmil) | 65 | Load side only ^① | TA1201NB1M |

Available Rear Connectors for Fixed Breakers or Cassettes (NF-Frame)

| List Number | Connector | Number of Poles | Catalog Number |
|---|--|-----------------|------------------|
|  | 1 Universal bus adapter—short | 3 | SADP316 |
| | | 4 | SADP416 |
|  | 2 Universal bus adapter—long | 3 | LADP316 |
| | | 4 | LADP416 |
|  | 3 Rear connect adapter extensions—short (horizontal holes) | 3 | SBADP316 |
| | | 4 | SBADP416 |
|  | 4 Rear connect adapter extensions—long (horizontal holes) | 3 | LBADPU316 |
| | | 4 | LBADPU416 |
| 5 | Front connect | 3 | CASADP316 |
| | | 4 | CASADP416 |

Available Rear Connectors for Fixed Breakers or Cassettes (RF-Frame)

| List Number | Connector | Number of Poles | Catalog Number |
|---|---------------------------------|-----------------|-------------------|
|  | 1 Horizontal/vertical kit | 3 | RFADP3PU32 |
| | | 4 | RFADP4PU32 |
|  | 2 Vertical kit | 3 | RFADP3PV40 |
| | | 4 | RFADP4PV40 |
|  | 3 Horizontal/vertical 4000A kit | 3 | RFADP3PH40 |
| | | 4 | RFADP4PH40 |

Note

^① For use on line side, user must use catalog number **NRXBUSEXT503** for 50 kA, or **NRXBUSEXT653** for 65 kA.

Line and Load Terminals

| Maximum Breaker Amperes | Terminal Body Material | Wire Type | AWG Wire (Number of Conductors) | AWG Wire Catalog Number ^① | Metric Wire Range mm ² | Metric Catalog Number ^① |
|--|------------------------|-----------|---------------------------------|--------------------------------------|-----------------------------------|------------------------------------|
| Standard Cu/Al Pressure Terminals | | | | | | |
| 700 | Aluminum | Cu/Al | 1–500 (2) | TA700NB1 | 50–240 | TA700NB1M |
| 1000 | Aluminum | Cu/Al | 3/0–400 (3) | TA1000NB1 | 95–185 | TA1000NB1M |
| 1200 | Aluminum | Cu/Al | 4/0–500 (4) | TA1200NB1 | 120–240 | TA1200NB1M |
| 1200 | Aluminum | Cu/Al | 500–750 (3) | TA1201NB1 | 300–400 | TA1201NB1M |

Accessory Ratings

Undervoltage Release Ratings

| Control Voltages | Frequency | Operational Voltage Range 85%–110% | Dropout Voltage Range 35%–60% | Inrush/Continuous Power Consumption (VA) | Opening Time (ms) -NF | Opening Time (ms) -RF |
|------------------|-----------|------------------------------------|-------------------------------|--|-----------------------|-----------------------|
| 24 | DC | 20–26 | 8–14 | 425/2 | 25 | 37 |
| 48 | DC | 41–53 | 17–29 | 750/3 | 25 | 37 |
| 60 | DC | 51–66 | 21–36 | 825/4 | 25 | 37 |
| 110–127 | 50–60 Hz | 94–140 | 44–66 | 1150/8 | 25 | 37 |
| 110–125 | DC | 94–138 | 44–66 | 1150/8 | 25 | 37 |
| 208–240 | 50–60 Hz | 177–264 | 84–125 | 1200/8 | 25 | 37 |
| 220–250 | DC | 187–275 | 88–132 | 1200/8 | 25 | 37 |

Shunt Trip Ratings

| Control Voltages | Frequency | Operational Voltage Range 70%–110% | Inrush/Continuous Power Consumption (VA) | Opening Time (ms) -NF | Opening Time (ms) -RF |
|------------------|-----------|------------------------------------|--|-----------------------|-----------------------|
| 24 | DC | 17–26 | 400/2 | 15 | 22 |
| 48 | DC | 34–53 | 500/3 | 15 | 22 |
| 60 | DC | 42–66 | 500/4 | 15 | 22 |
| 110–127 | 50–60 Hz | 77–140 | 800/8 | 15 | 22 |
| 110–125 | DC | 77–138 | 800/8 | 15 | 22 |
| 208–240 | 50–60 Hz | 146–264 | 850/8 | 15 | 22 |

Spring Release Ratings

| Control Voltages | Frequency | Operational Voltage Range 85%–110% | Inrush Power Consumption (VA) | Closing Time (ms) -NF | Closing Time (ms) -RF |
|------------------|-----------|------------------------------------|-------------------------------|-----------------------|-----------------------|
| 24 | DC | 20–26 | 400 | 20 | 35 |
| 48 | DC | 41–53 | 500 | 20 | 35 |
| 60 | DC | 51–66 | 500 | 20 | 35 |
| 110–127 | 50–60 Hz | 94–140 | 750 | 20 | 35 |
| 110–125 | DC | 94–138 | 750 | 20 | 35 |
| 208–240 | 50–60 Hz | 177–264 | 800 | 20 | 35 |

Note

① Single terminals individually packed.

3.1

Power Breakers, Contactors and Fuses

Power Circuit Breakers

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Motor Operator

| Control Voltages | Frequency | Operational Voltage Range 85%–110% | Running Current (A) | Typical Inrush Current | Power Consumption (VA) | Maximum Charging Time (sec) |
|------------------|-----------|------------------------------------|---------------------|------------------------|------------------------|-----------------------------|
| NF | | | | | | |
| 24 | DC | 20–26 | 6 | 325% | 160 | 4 |
| 48 | DC | 41–53 | 3 | 500% | 150 | 3 |
| 60 | DC | 51–66 | 2 | 350% | 150 | 4 |
| 110–127 | 50–60 Hz | 94–140 | 2 | 300% | 280 | 3 |
| 110–125 | DC | 94–138 | 1 | 500% | 150 | 3 |
| 208–240 | 50–60 Hz | 177–264 | 1 | 1000% | 280 | 4 |
| 220–250 | DC | 187–275 | 1 | 1000% | 280 | 4 |
| RF | | | | | | |
| 24 | DC | 20–26 | 7 | 350% | 200 | 6 |
| 48 | DC | 41–53 | 3 | 450% | 175 | 6 |
| 60 | DC | 51–66 | 2 | 450% | 225 | 6 |
| 110–127 | 50–60 Hz | 94–140 | 3 | 300% | 425 | 6 |
| 110–125 | DC | 94–138 | 2 | 375% | 275 | 6 |
| 208–240 | 50–60 Hz | 177–264 | 1.5 | 300% | 400 | 6 |
| 220–250 | DC | 187–275 | 1 | 400% | 250 | 6 |

Control Voltages and Currents

| Control Voltages | 24 Vdc | 48 Vdc | 60 Vdc | 110–125 Vdc | 110–127 Vac | 220–250 Vdc | 208–240 Vac |
|---|---------|---------|--------|-------------|-------------|-------------|-------------|
| Current | | | | | | | |
| Close current (inrush) | 14 | 10 | 8 | 7 | 7 | 4 | 4 |
| Shunt trip current (ST)—(inrush/continuous) | 16/0.08 | 10/0.06 | 8/0.07 | 7/0.07 | 7/0.07 | 4/0.04 | 4/0.04 |
| NF—Charge motor current (inrush/continuous) | 20/6 | 15/3 | 7/2 | 5/1 | 6/2 | 10/1 | 10/1 |
| RF—Charge motor current (inrush/continuous) | 23/7 | 14/3 | 14/3 | 8/2 | 9/3 | 4/1 | 5/1.5 |
| Operating Voltage Rating | | | | | | | |
| Close | 20–26 | 41–53 | 51–66 | 94–138 | 94–140 | 187–275 | 177–264 |
| Open | 17–26 | 34–53 | 42–66 | 77–138 | 77–140 | 154–275 | 146–264 |
| Charge—NF | 20–26 | 41–53 | 51–66 | 94–138 | 94–140 | 187–275 | 177–264 |
| Charge—RF | 26–26 | 41–53 | 51–66 | 94–138 | 94–140 | 187–275 | 177–264 |

Overcurrent Trip Switch

| Control Voltages | Frequency | Contact Rating (Amperes) |
|------------------|-----------|--------------------------|
| 250 | 50–60 Hz | 10 |
| 125 | DC | 0.5 |
| 250 | DC | 0.25 |

Auxiliary Switch

| Control Voltages | Frequency | Contact Rating (Amperes) |
|------------------|-----------|--------------------------|
| 250 | 50–60 Hz | 10 |
| 125 | DC | 0.5 |
| 250 | DC | 0.25 |

Breaker Position/Continuity—NF Frame

| Breaker Position | Continuity Between Red and Black Lead Pairs | Continuity Between Blue and Black Lead Pairs |
|------------------|---|--|
| Open | No | 47 and 45; 48 and 49 |
| | No | 53 and 51; 54 and 55 |
| Closed | 46 and 45; 50 and 49 | No |
| | 52 and 51; 56 and 55 | No |

Breaker Position/Continuity—RF Frame

| Breaker Position | Continuity Between Red and Black Lead Pairs | Continuity Between Blue and Black Lead Pairs |
|------------------|---|--|
| Open | No | 59 and 57; 60 and 61 |
| | No | 65 and 63; 66 and 67 |
| | No | 71 and 69; 72 and 73 |
| | No | 77 and 75; 78 and 79 |
| | No | 83 and 81; 84 and 85 |
| | No | 89 and 87; 90 and 91 |
| Closed | 58 and 57; 62 and 61 | No |
| | 64 and 63; 68 and 67 | No |
| | 70 and 69; 74 and 73 | No |
| | 76 and 75; 80 and 79 | No |
| | 82 and 81; 86 and 85 | No |
| | 88 and 87; 92 and 91 | No |

Series NRX with Digitrip



Series NRX NF Drawout Breaker



Series NRX Fixed Front Connect Breaker with Bus Extensions (Optional)

Contents

| <i>Description</i> | <i>Page</i> |
|--|-----------------|
| Low Voltage Power Circuit Breakers | V4-T3-2 |
| Magnum DS Low Voltage Power Circuit Breakers | V4-T3-6 |
| Magnum MDSL Current Limiting Power Circuit Breaker | V4-T3-12 |
| Magnum SB Low Voltage Insulated Case Circuit Breakers | V4-T3-15 |
| Magnum IEC Rated Air Circuit Breakers | V4-T3-23 |
| Magnum DC (Direct Current) Low Voltage Switches | V4-T3-33 |
| Series NRX Low Voltage Power Circuit Breakers with PXR | V4-T3-35 |
| Series NRX Low Voltage Power Circuit Breakers with Digitrip | |
| Catalog Number Selection | V4-T3-49 |
| Technical Data and Specifications | V4-T3-51 |
| Medium Voltage Circuit Breakers | V4-T3-55 |

Series NRX Low Voltage Power Circuit Breakers with Digitrip

Product Description

Series NRX is a low voltage power circuit breaker suitable for UL 1558, UL 891, and IEC switchgear and switchboards. The compact size and weight of three-pole drawout with cassette Series NRX, see **Page V4-T3-51**, allows for a 24.00 (609.6 mm) switchgear enclosure.

The breaker ratings are:

- 800 A for UL 1066
- 800 A, 1200 A for UL 489
- 630–1600 A IEC 60947-2 from a voltage range of 220–725 Vac

Application Description

The Series NRX is a compact globally certified low voltage power (air) circuit breaker. It is rated for 800 A (UL 1066), 800 A and 1200 A (UL 489) and 630–1600 A (IEC 60947-2) with an interrupting capacity of 65 kA with short time withstand at 42 kA at the 440/480 Vac level.

The Series NRX circuit breaker provides all the capabilities of a power circuit breaker in the compact size of a molded case breaker. It offers you the same protection and performance—along with increased flexibility—at half the size of a typical power circuit breaker.

The dimensions and design of Series NRX allows up to eight UL 1066 or UL 489 breakers in a 24-inch (600 mm) wide structure. The one frame size, regardless of ampere rating, reduces drawing conversion, structure integration time and parts inventory for several board, gear and machinery applications.

Features, Benefits and Functions

Series NRX utilizes several innovative technologies:

- Rogowski coil—does not saturate like iron core sensors, and one sensor accommodates 200–1600 ampere range. You never have to change a sensor and CTs are not required
- Tension clamp secondary terminals—10 A continuous rating at 600 V meets UL/CSA/RoHS and UL94 V0. Mounted directly to fixed breaker or drawout cassette, they reduce wiring throughout enclosure and provide clean, organized wiring schemes

- Breaker-mounted communication modules—communication modules for INCOM™, Modbus® and PROFIBUS mount directly to the cassette, reducing the space and room required in gear for communication capability
- “Direct Drive” mechanism—symmetrically loaded forces of the two-staged stored energy mechanism improves robustness, reliability, and achieves improved breaker life ratings
- Fold-up cassette—with this simple design, all items in a cassette are replaceable without removing the cassette from the cell
- “Arc chute” design
- Breaker-mounted racking or levering-in device—Racking device is mounted on the breaker, decreasing the width of the cassette, because the cassette is not burdened with the cost or parts of the lev-in
- Plug-N-Play accessories—No special tools needed. Accessory comes with plug and wires ready to install
- Arcflash Reduction Maintenance System—Eaton’s patented technology provides maintenance staff with improved safety of downstream maintenance locations using a simple and reliable method to reduce fault clearing times and energy during an arc flash event (radiation, sound, pressure, temperature). Arcflash Reduction Maintenance System uses a separate analog trip circuit, providing faster signal processing and interruption times than the standard (digital) “instantaneous” protection. The Arcflash Reduction Maintenance System function is activated either directly on the circuit breaker through a local switch or remotely through communications or a digital input

The use of these technologies allows Series NRX to offer a life of 20,000 mechanical operations and 10,000 electrical operations with a high degree of reliability.

3.1

Power Breakers, Contactors and Fuses

Power Circuit Breakers

3

Standards and Certifications

- UL 1066 (low voltage AC power circuit breakers used in enclosures)
- UL 489 (molded case circuit breakers, molded case switches and circuit breaker enclosures)
- EN 45011
- CEI EN 60947
- BS EN 60439-1 Form 4b
- IEC 60439-1 (low voltage switchgear and controlgear assemblies)
- IEC 60947-1 (low voltage switchgear and controlgear —Part 1 general rules)
- IEC 60947-2 (low voltage switchgear and controlgear —Part 2 circuit breakers)
- IEC 60947-3 (switches, disconnectors, switch-disconnectors and fuse-combination units)
- CSA 22.2 (molded case circuit breakers, molded case switches and circuit breaker enclosures)
- ANSI C37.51 (metal-enclosed low voltage AC power circuit breaker switchgear assemblies—conformance test procedures)
- ANSI C37.20.1 (metal-enclosed low voltage power circuit breaker switchgear)
- ANSI C37.60 (requirements for overhead, pad-mounted dry-type and submersible automatic reclosers and fault interrupters for AC systems)
- ANSI C37.50 (low voltage AC power circuit breakers used in enclosures—test procedures)
- ANSI C37.17 (for trip devices for AC and general purpose DC low voltage power circuit breakers)
- ANSI C37.16 (low voltage power circuit breakers and AC power circuit protectors—preferred ratings, related requirements, and application recommendations)
- ANSI C37.13 (IEEE® standard for low voltage AC power circuit breakers used in enclosures)
- CCC—China
- KEMA (&CB)
- UL 891 (deadfront switchboard)
- UL 1558 (metal-enclosed low voltage power circuit breaker switchgear)



Reference Information

List of Instruction Leaflets and Manuals

| Description | Publication Number |
|---|--------------------|
| Instruction Book for Fixed and Drawout Breaker/Cassette | MN01301001E |
| IL Drawout Circuit Breaker and Cassette Rejection Interlocks | IL01301006E |
| IL Auxiliary Switch in Right Accessory Tray | IL01301007E |
| IL UVR/ST/OTS in Left Accessory Tray | IL01301008E |
| IL Motor Operator | IL01301010E |
| IL Spring Release Device and Latch Check Switch (Numbers 5 and 6 are Combining into one Document) | IL01301010E |
| IL Door Escutcheon and Gasket Kit | IL01301012E |
| IL Drawout Cassette IP 20 Shutters | IL01301013E |
| IL Fixed Breaker Arc Hood Kit | IL01301014E |
| IL Fixed Breaker Front/Rear/Cable Connectors | IL01301015E |
| IL Drawout Cassette Front/Rear/Cable Connectors | IL01301016E |
| IL Racking Device Levering Device | IL01301018E |
| IL Mechanical Pop-Out Indicator and Interlocked Indicator | IL01301019E |
| IL Breaker and Cassette Phase Barriers | IL01301021E |
| IL Cassette Rails | IL01301025E |
| IL Mounting Feet | IL01301030E |
| IL Surface Mount | IL01301036E |
| IL Terminal Blocks | IL01301037E |
| IL Modbus Communication Adapter Module | IL01301034E |
| IL INCOM Communication Adapter Module | IL01301033E |
| IL Digitrip 520 and 520M Manual | IL70C1619H01 |
| IL IP55 Cover | IL01301038E |
| PROFIBUS Communication Module | IL01301035E |
| IL Kirk Key Lock | IL01301039E |
| IL Ronis Key Lock | IL01301040E |
| IL Pushbutton Covers | IL01301041E |

Catalog Number Selection

Series NRX Type NF-Frame Circuit Breaker (Exclusionary Rules Apply)

N S S6 08 3 W 52 8 A B A N 4 X N D X

Breaker Frame Size
N = Type NF, 630–1600 A, (70 mm pole spacing)

Standard, Mechanism, Device
S = UL 1066, stored energy, power breaker
X = UL 489, stored energy, insulated case breaker
E = IEC 60947-2, stored energy, air breaker

Fault Current Rating
S4 = 42 kA at 480 Vac UL or 415 Vac IEC
S5 = 50 kA at 480 Vac UL or 415 Vac IEC
S6 = 65 kA at 480 Vac UL or 415 Vac IEC

Frame Rating (Amperes)
07 = 630 (IEC only)
08 = 800
10 = 1000 (IEC only)
12 = 1200 (UL only)
13 = 1250 (IEC only)
16 = 1600 (On NF: IEC only)

Poles, Phasing
3 = Three-pole, ABC
4 = Four-pole, NABC

Mounting Configuration
W = Drawout
B = Fixed mount rear connected with side mounting brackets
R = Fixed mount rear connected without side mounting brackets
F = Front connected, fixed mount, for bus or cable connections with side mounting brackets

Rating Plug (Amperes)
1 = 200
2 = 250
3 = 300
4 = 400
5 = 500
6 = 600
7 = 630
8 = 800
A = 1000
B = 1200
C = 1250
D = 1600

Motor Operator
M = Manually operated
B = 110–125 Vac
W = 110–125 Vdc
T = 208–250 Vac
P = 220–250 Vdc
L = 24 Vdc
H = 48 Vdc
S = 60 Vdc

Shunt Trip
N = No shunt trip
A = 110–127 Vac/Vdc
R = 208–240 Vac/Vdc
L = 24 Vdc
H = 48 Vdc
S = 60 Vdc

Spring Release, Latch Check Switch
N = No spring release, no LCS
E = No spring release, LCS wired external
A = 110–127 Vac/Vdc, no LCS
B = 110–127 Vac/Vdc, spring release LCS
C = 110–127 Vac/Vdc, LCS wired external
R = 208–240 Vac/Vdc, no LCS
S = 208–240 Vac/Vdc, spring release LCS
T = 208–240 Vac/Vdc, LCS wired external
L = 24 Vdc, no LCS
P = 24 Vdc, spring release LCS
Q = 24 Vdc, LCS wired external
H = 48 Vdc, no LCS
J = 48 Vdc, spring release LCS
K = 48 Vdc, LCS wired external
1 = 60 Vdc, no LCS
2 = 60 Vdc, spring release LCS
3 = 60 Vdc, LCS wired external

| Trip Unit, Power Supply | |
|---|---|
| SW = Switch—no MCR—42 kA for IEC and UL 1066 (non-auto) | 13 = 1150i LSI, with ZSI, 24 Vdc |
| 22 = 520 LI, no ZSI | 1E = 1150 LSIA, no ZSI, 24 Vdc |
| 52 = 520 LSI, no ZSI | 1F = 1150 LSIA, with ZSI, 24 Vdc |
| 53 = 520 LSI, with ZSI | 1L = 1150 LSIG, no ZSI, 24 Vdc |
| 5G = 520 LSIG, no ZSI | 1M = 1150 LSIG, with ZSI, 24 Vdc |
| 5H = 520 LSIG, with ZSI | 14 = 1150 LSIGA, no ZSI, 24 Vdc |
| M2 = 520M LSI, no ZSI, 24 Vdc | 15 = 1150 LSIGA, with ZSI, 24 Vdc |
| M3 = 520M LSI, with ZSI, 24 Vdc | 1C = 1150 LSI, no ZSI, 24 Vdc, with Arcflash Reduction Maintenance System |
| MA = 520M LSIA, no ZSI, 24 Vdc | 1D = 1150 LSI, with ZSI, 24 Vdc, with Arcflash Reduction Maintenance System |
| MB = 520M LSIA, with ZSI, 24 Vdc | 16 = 1150i LSI, no ZSI, 24 Vdc, with Arcflash Reduction Maintenance System |
| MG = 520M LSIG, no ZSI, 24 Vdc | 17 = 1150i LSI, with ZSI, 24 Vdc, with Arcflash Reduction Maintenance System |
| MH = 520M LSIG, with ZSI, 24 Vdc | 1J = 1150 LSIA, no ZSI, 24 Vdc, with Arcflash Reduction Maintenance System |
| R2 = 520M LSI, no ZSI, 24 Vdc, with Arcflash Reduction Maintenance System | 1K = 1150 LSIA, with ZSI, 24 Vdc, with Arcflash Reduction Maintenance System |
| R3 = 520M LSI, with ZSI, 24 Vdc, with Arcflash Reduction Maintenance System | 1R = 1150 LSIG, with ZSI, 24 Vdc, with Arcflash Reduction Maintenance System |
| RA = 520M LSIA, no ZSI, 24 Vdc, with Arcflash Reduction Maintenance System | 1S = 1150 LSIG, with ZSI, 24 Vdc, with Arcflash Reduction Maintenance System |
| RB = 520M LSIA, with ZSI, 24 Vdc, with Arcflash Reduction Maintenance System | 18 = 1150i LSIGA, no ZSI, 24 Vdc, with Arcflash Reduction Maintenance System |
| RG = 520M LSIG, no ZSI, 24 Vdc, with Arcflash Reduction Maintenance System | 19 = 1150i LSIGA, with ZSI, 24 Vdc, with Arcflash Reduction Maintenance System |
| RH = 520M LSIG, with ZSI, 24 Vdc, with Arcflash Reduction Maintenance System | |
| 1A = 1150 LSI, with ZSI, 24 Vdc | |
| 1B = 150 LSI, with ZSI, 24 Vdc | |
| 12 = 1150i LSI, no ZSI, 24 Vdc | |

3.1 Power Breakers, Contactors and Fuses

Power Circuit Breakers

Series NRX Type NF-Frame Circuit Breaker (Exclusionary Rules Apply), continued

N S S6 08 3 W 52 8 A B A N 4 X N D X

3

| UVR, Second Shunt Trip | |
|------------------------|-------------------------------------|
| N | = None |
| A | = 110–125 Vac/Vdc UVR |
| R | = 220–250 Vac/Vdc UVR |
| L | = 24 Vdc UVR |
| H | = 48 Vdc UVR |
| S | = 60 Vdc UVR |
| G | = 32 Vdc UVR |
| 1 | = 110–127 Vac/Vdc second shunt trip |
| 2 | = 208–240 Vac/Vdc second shunt trip |
| 4 | = 24 Vdc second shunt trip |
| 8 | = 48 Vdc second shunt trip |
| 9 | = 60 Vdc second shunt trip |

| Auxiliary, Switches, Label Language | |
|-------------------------------------|--|
| E | = No auxiliary switches, no label (parent) |
| 2 | = 2 Form C, English |
| 4 | = 4 Form C, English |

| | Trip Indicator and Bell Alarm | OTS | Secondary Terminal Blocks |
|---|-------------------------------|----------|---------------------------|
| N | None | None | Per breaker options |
| X | Trip indicator | None | Per breaker options |
| Z | Trip indicator | 2 Form C | Per breaker options |
| M | Interlock trip indicator | None | Per breaker options |
| Y | Interlock trip indicator | 2 Form C | Per breaker options |
| 1 | None | None | Full complement |
| 2 | Trip indicator | None | Full complement |
| 3 | Trip indicator | 2 Form C | Full complement |
| 4 | Interlock trip indicator | None | Full complement |
| 5 | Interlock trip indicator | 2 Form C | Full complement |

| | Padlock Provisions | Key Lock Provisions | Operations Counter |
|---|-----------------------|---------------------|--------------------|
| N | No | None | No |
| A | No | — | Provided |
| B | Yes (plastic/plastic) | — | No |
| C | Yes (plastic/plastic) | — | Provided |

| Future Use | |
|------------|---------------|
| X | = All product |

| Drawout Breaker Shipping, Fixed Breaker Terminals (Door Frame Kit ships as standard unless noted otherwise) | |
|---|---|
| D | = Drawout breaker shipping alone, without door frame kit |
| C | = Drawout breaker shipping in cassette, no shutters, no terminals |
| 1 | = Drawout breaker shipping in cassette, no shutters, short vertical/horizontal |
| 2 | = Drawout breaker shipping in cassette, no shutters, long vertical/horizontal |
| 4 | = Drawout breaker shipping in cassette, with shutters, short vertical/horizontal |
| 5 | = Drawout breaker shipping in cassette, with shutters, long vertical/horizontal |
| 9 | = Drawout breaker shipping in cassette, no shutters, no terminals |
| F | = Fixed terminal adapters for rear connect, with mounting feet, short vertical/horizontal adapter kit |
| H | = Rear connect, fixed breaker, with long vertical/horizontal adapters |
| J | = Front connect fixed breaker, with no terminal adapters |
| K | = Rear connect, fixed breaker, no terminal adapters |

Series NRX Type NF-Frame Cassette

NX 12 3 F A B Z S N N N C

| Cassette Family and Breaker Frame | |
|-----------------------------------|-------------------|
| NS | = UL 1066 N-Frame |
| NX | = UL 489 N-Frame |
| NE | = IEC N-Frame |

| Continuous Ampere Range | |
|-------------------------|---------------------|
| 08 | = 800 (UL 1066) |
| 12 | = 800–1200 (UL 489) |
| 16 | = 630–1600 (IEC) |

| Poles and Phasing (Facing Front of Breaker) | |
|---|------------------|
| 3 | = Three-pole ABC |
| 4 | = Four-pole NABC |

| Load Terminal Connections | |
|---------------------------|--|
| F | = With flat tapped pads only |
| G | = With vertical/horizontal bus adapter kit (short style) |
| H | = With front-connected kit |
| N | = No cassette stabs (interunit only) |

| Arc Hood | |
|----------|--------------------------------|
| A | = Arc hood installed (default) |

| Door Frame Gasket and Rejection Kits | |
|--------------------------------------|---|
| B | = Door kit included (default), with rejection kit |
| D | = Door kit included, no rejection kit |
| R | = Not included, with rejection kit |
| N | = Not included, with rejection kit |

| Cell Switch Options (available on Breaker + Cassette or Cassette Only) | |
|--|-------------------------|
| W | = None |
| Z | = Cell switch installed |

| Cassette Shipping | |
|-------------------|-------------------------------|
| C | = Cassette only |
| B | = Breaker shipped in cassette |

| Future | |
|--------|--------|
| N | = None |

| Future | |
|--------|--------|
| N | = None |

| Secondary Contact Terminals Installed | |
|---------------------------------------|---|
| N | = None |
| B | = Breaker defined, when breaker ships in cassette |
| F | = Full complement |
| C | = Common options when cassette ships alone |

| Shutters | |
|----------|--------------------------|
| N | = Not included (default) |
| S | = Included |

Technical Data and Specifications

UL 1066 Ratings

| Description | Rating |
|--|--------|
| Continuous current rating (amperes) | 800 |
| Short-Circuit Rating (kA) | |
| 254 Vac | 85 |
| 508 Vac | 65 |
| 635 Vac | 35 |
| Short-time withstand (kA) [ⓐ] | 42 |

UL 489 Ratings

| Description | Rating | Rating |
|-------------------------------------|--------|--------|
| Continuous current rating (amperes) | 800 | 1200 |
| Short-Circuit Rating (kA) | | |
| 240 Vac | 85 | 85 |
| 480 Vac | 65 | 65 |
| 600 Vac | 42 | 42 |
| Short-time withstand (kA) | 42 | 42 |

IEC 60947-2 Ratings

| Description | Rating | | Rating | | Rating | |
|-------------------------------------|-------------|-----|---------------|-----|--------|-----|
| Continuous current rating (amperes) | 630 and 800 | | 1000 and 1250 | | 1600 | |
| Short-circuit rating (kA) | Icu | Ics | Icu | Ics | Icu | Ics |
| 240/254 Vac | 85 | 50 | 85 | 50 | 85 | 50 |
| 415/435 Vac | 65 | 50 | 65 | 50 | 65 | 50 |
| 690/725 Vac | 42 | 42 | 42 | 42 | 42 | 42 |
| Short-time withstand = Icw (kA) | 42 | 42 | 42 | 42 | 42 | 42 |

Approximate Dimensions in Inches (mm)

Series NRX Three-Pole Drawout with Cassette

| Height | Width | Depth | Lb (kg) |
|---------------|---------------|---------------|---------------|
| 14.18 (360.2) | 10.02 (254.5) | 10.68 (271.3) | 85.00 (38.59) |


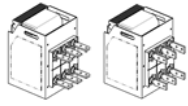

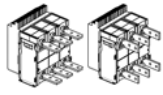
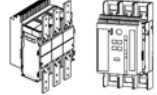

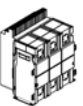
Series NRX Three-Pole Front Connect Fixed Breaker

| Height | Width | Depth | Lb (kg) |
|---------------|--------------|--------------|---------|
| 16.00 (406.4) | 8.25 (209.6) | 7.15 (181.6) | — |

Rear Fixed Circuit Breaker and Drawout with Cassette

| Breaker Type | Height | Width | Depth | Lb (kg) |
|------------------------------|---------------|---------------|---------------|----------------|
| Fixed | | | | |
| Three-pole | 13.18 (334.8) | 8.25 (209.6) | 7.15 (181.6) | 33.58 (15.23) |
| Four-pole | 13.18 (334.8) | 11.00 (279.4) | 7.15 (181.6) | 44.40 (20.14) |
| Drawout with Cassette | | | | |
| Three-pole | 14.18 (360.2) | 10.02 (254.5) | 10.69 (271.5) | 85.20 (38.65) |
| Four-pole | 14.18 (360.2) | 12.69 (322.3) | 10.69 (271.5) | 104.00 (47.17) |

Mounting and Load Connection Configurations

| Breaker Type | Breaker Mechanism | Standard Bus Connection Provisions | Rear-Connect Horizontal/Vertical Adapter Kit With and Without Cover (Kits Shipped Unassembled) | Rear Connect Breaker Front-Connect Horizontal/Vertical Adapter Kit With and Without Cover (Kits Shipped Separately) | Fixed Front Connect Breaker Cable-Connected Cable Terminals |
|---|-------------------|-------------------------------------|--|---|---|
| Drawout Breaker | Stored energy | Finger clusters | — | — | — |
|  | | | | | |
| Cassette | — | Rear-connected pre-drilled bus pads |  | — | — |
|  | | | | | |
| Fixed | Stored energy | Rear-connected pre-drilled bus pads |  |  |  |
|  | | | | | |

Note

[ⓐ] 35 kAIC short-time withstand at 635 V level only. All other voltages 42 kAIC short-time withstand.




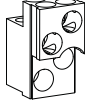

3.1

Power Breakers, Contactors and Fuses

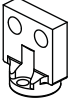
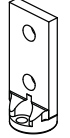

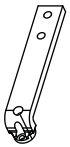
Power Circuit Breakers

3

Available Front Connect Cable Terminals

| List Number | Connector | Ratings (kA) | To Breaker? | Catalog Number (Three-Pole) |
|---|---|--------------|------------------|-----------------------------|
|  | Bus conductor extension (42 kA and below) | 42 | -- | NRXBUSEXT |
| | Bus conductor extension (50 kA and below) | 50 | -- | NRXBUSEXT |
| | Bus conductor extension (65 kA and below) | 65 | -- | NRXBUSEXT653 |
|  | Cable terminals (two holes) | 65 | Yes | TA700NB1M |
| | With control wire provisions | 65 | Yes | TA700NB1MCWT |
|  | Cable terminals (three holes) | 65 | Yes | TA1000NB1M |
| | With control wire provisions | 65 | Yes | TA1000NB1MCWT |
|  | Cable terminals (four holes) | 65 | Load side only ① | TA1200NB1M |
| | With control wire provisions | 65 | Load side only ① | TA1200NB1MCWT |
|  | Cable terminals (three holes for 750 kcmil) | 65 | Load side only ① | TA1201NB1M |

Available Rear Connectors for Fixed Breakers or Cassettes

| List Number | Connector | Catalog Number |
|---|--|------------------|
|  | Universal bus adapter—short | SADP316 |
| | | SADP416 |
|  | Universal bus adapter—long | LADP316 |
| | | LADP416 |
|  | Rear connect adapter extensions—short (horizontal holes) | SBADP316 |
| | | SBADP416 |
|  | Rear connect adapter extensions—long (horizontal holes) | LBADPU316 |
| | | LBADPU416 |

Line and Load Terminals

| Maximum Breaker Amperes | Terminal Body Material | Wire Type | AWG Wire (Number of Conductors) | AWG Wire Catalog Number ② | Metric Wire Range mm ² | Metric Catalog Number ② |
|--|------------------------|-----------|---------------------------------|---------------------------|-----------------------------------|-------------------------|
| Standard Cu/Al Pressure Terminals | | | | | | |
| 700 | Aluminum | Cu/Al | 1–500 (2) | TA700NB1 | 50–240 | TA700NB1M |
| 1000 | Aluminum | Cu/Al | 3/0–400 (3) | TA1000NB1 | 95–185 | TA1000NB1M |
| 1200 | Aluminum | Cu/Al | 4/0–500 (4) | TA1200NB1 | 120–240 | TA1200NB1M |
| 1200 | Aluminum | Cu/Al | 500–750 (3) | TA1201NB1 | 300–400 | TA1201NB1M |

Notes

① For use on line side, user must use catalog number **NRXBUSEXT503** for 50 kA, or **NRXBUSEXT653** for 65 kA.

② Single terminals individually packed.

Accessory Ratings**Shunt Trip**

| Control Voltages | Frequency | Operational Voltage Range 70–110% | Inrush/Continuous Power Consumption (VA) | Opening Time (ms) |
|------------------|-----------|-----------------------------------|--|-------------------|
| 24 | DC | 17–26 | 500/5 | 25 |
| 48 | DC | 34–53 | 530/5 | 25 |
| 110–127 | 50–60 Hz | 77–140 | 540/5 | 25 |
| 110–125 | DC | 77–138 | 540/5 | 25 |
| 208–240 | 50–60 Hz | 146–264 | 500/5 | 25 |
| 220–250 | DC | 154–275 | 515/5 | 25 |

UVR

| Control Voltages | Frequency | Operational Voltage Range 85–110% | Dropout Volts 35–60% | Inrush/Continuous Power Consumption (VA) | Opening Time (ms) |
|------------------|-----------|-----------------------------------|----------------------|--|-------------------|
| 24 | DC | 20–26 | 8–14 | 500/5 | 50 |
| 32 | DC | 27–35 | 11–19 | 620/5 | 50 |
| 48 | DC | 41–53 | 17–29 | 850/5 | 50 |
| 110–127 | 50–60 Hz | 94–140 | 44–94 | 890/5 | 50 |
| 110–125 | DC | 94–138 | 44–94 | 890/5 | 50 |
| 208–240 | 50–60 Hz | 177–264 | 84–125 | 910/5 | 50 |
| 220–250 | DC | 187–275 | 88–132 | 910/5 | 50 |
| 380–415 | AC | 323–457 | 145–228 | 960/5 | 50 |
| 480 | AC | 408–528 | 168–288 | 800/8 | 50 |
| 600 | AC | 510–660 | 210–360 | 800/12 | 50 |

Spring Release

| Control Voltages | Frequency | Operational Voltage Range 70–110% | Inrush Power Consumption (VA) | Closing Time (ms) |
|------------------|-----------|-----------------------------------|-------------------------------|-------------------|
| 24 | DC | 17–26 | 500 | 25 |
| 48 | DC | 34–53 | 530 | 25 |
| 110–127 | 50–60 Hz | 77–140 | 540 | 25 |
| 110–125 | DC | 77–138 | 540 | 25 |
| 208–240 | 50–60 Hz | 146–264 | 500 | 25 |
| 220–250 | DC | 154–275 | 515 | 25 |

OCT/OTS

| Control Voltages | Frequency | Contact Rating (Amperes) |
|------------------|-----------|--------------------------|
| 250 | 50–60 Hz | 10 |
| 125 | DC | 0.5 |
| 250 | DC | 0.25 |

Auxiliary Switch

| Control Voltages | Frequency | Contact Rating (Amperes) |
|------------------|-----------|--------------------------|
| 250 | 50–60 Hz | 10 |
| 125 | DC | 0.5 |
| 250 | DC | 0.25 |

3.1

Power Breakers, Contactors and Fuses

Power Circuit Breakers

3

Breaker Position/Continuity

| Breaker Position | Continuity Between Red and Black Lead Pairs | Continuity Between Blue and Black Lead Pairs |
|------------------|---|--|
| Open | NO | 45 and 43 |
| | NO | 46 and 47 |
| | NO | 51 and 49 |
| | NO | 52 and 53 |
| Closed | 44 and 43 | NO |
| | 48 and 47 | NO |
| | 50 and 49 | NO |
| | 54 and 53 | NO |

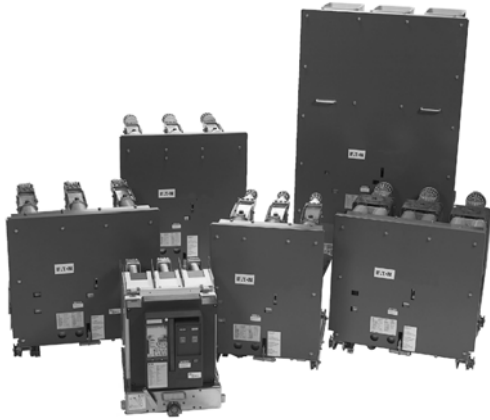
Motor Operator

| Control Voltages | Frequency | Operational Voltage Range 85–110% | Running Current (A) | Typical Inrush Current | Power Consumption (VA) | Maximum Charging Time (Sec) |
|------------------|-----------|-----------------------------------|---------------------|------------------------|------------------------|-----------------------------|
| 24 | DC | 20–26 | 5 | 500% | 150 | 3 |
| 48 | DC | 41–53 | 3 | 500% | 150 | 3 |
| 110–127 | 50–60 Hz | 94–140 | 2 | 300% | 280 | 3 |
| 110–125 | DC | 94–138 | 1 | 500% | 150 | 3 |
| 208–240 | 50–60 Hz | 177–264 | 1 | 1000% | 280 | 4 |
| 220–250 | DC | 187–275 | 1 | 1000% | 280 | 4 |

Control Voltages and Currents

| Control Voltages | 24 Vdc | 48 Vdc | 110–125 Vdc | 110–127 Vac | 220–250 Vdc | 208–240 Vac |
|---|---------|---------|-------------|-------------|-------------|-------------|
| Current | | | | | | |
| Close current (inrush) | 21 | 11 | 5 | 5 | 2 | 2 |
| Shunt trip current (ST)—(inrush/continuous) | 21 / .2 | 11 / .1 | 5 / .04 | 5 / .04 | 2 / .02 | 2 / .02 |
| Charge motor current—(inrush/continuous) | TBD | TBD | 5 / 1 | 6 / 2 | 10 / 1 | 10 / 1 |
| Operating Voltage Rating | | | | | | |
| Close | 17–26 | 34–53 | 77–138 | 77–140 | 154–275 | 146–264 |
| Trip | 17–26 | 34–53 | 77–138 | 77–140 | 154–275 | 146–264 |
| Charge | 20–26 | 41–53 | 94–138 | 94–140 | 187–275 | 177–264 |

Type VCP-W/VCP-T Medium Voltage Vacuum Circuit Breaker



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| Magnum DS Low Voltage Power Circuit Breakers | V4-T3-6 |
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Medium Voltage Circuit Breakers

Product Description

Breakers and structures for switchgear assemblies:

ANSI

- VCP-W medium voltage circuit breakers
 - 5/15 kV VCP-W (K>1, K=1, narrow design, extra-capability and generator circuit breakers available)
 - 27 kV and 38 kV (extra-capability circuit breakers available)
 - Ground and test devices
 - Dummy elements
- VCP-T medium voltage circuit breakers
 - 5/15 kV VCP-T (capacitor switching and magnetic actuated circuit breakers available)
 - Ground and test devices
 - Dummy elements

IEC

- T-VAC medium voltage circuit breakers
 - 5/15 kV VCP-T (capacitor switching circuit breakers available)
 - Ground and test devices
 - Dummy elements
- VCP-W IEC medium voltage circuit breakers
 - 3.6/7.2/12/17.5 kV
 - 24 kV

OEM Structures

- Metal-clad, compartmented design
- Barebones
- Power modules
- Mini modules
- Breaker compartment kits

Application Description

Eaton’s medium voltage circuit breakers offer the latest in vacuum technology, providing superior control and protection of medium voltage power equipment in utility, industrial, commercial, mining and marine installations. Built in a state-of-the-art ISO® 9002 certified facility, they meet and exceed all ANSI and IEC requirements. Available in drawout configurations, Eaton’s vacuum circuit breakers are a result of our ongoing commitment to research and development, which have resulted in significant breakthrough technologies. Each breaker is provided with its unique Quality Assurance Certificate that documents all tests and inspections performed.

Features, Benefits and Functions

VCP-W Standard Features

- Eaton's maintenance-free vacuum interrupters with visual contact erosion indicator
- Non-sliding/non-rolling V-Flex™ current transfer system
- Glass polyester insulation
- Cycloaliphatic epoxy insulation (optional with Type VCPW-SE breakers) for 27 kV and 38 kV breakers
- Front-accessible operating mechanism
- Electrically operated trip-free, spring stored energy mechanism
- Interlocks that prevent moving a closed circuit breaker into or out of the connected position
- Closing springs automatically discharge before moving the circuit breaker into or out of the enclosure
- Provisions for manual charging of closing springs
- Manual close and trip pushbuttons
- Operations counter
- Closing spring charged/discharged indicator
- Circuit breaker Open/Closed indicator
- Auxiliary switch with 2A/3B for DC and 1A/3B for AC spare contacts
- Spring charging motor, close coil, trip coil, latch check switch and anti-pump relay

VCP-T Standard Features

- Small without compromise—significantly smaller and lighter than comparable breakers
- Grounded steel barrier between mechanism and primary conductors
- Spring loaded, silver-plated primary disconnects (drawout breaker)
- Silver-plated primary connections (fixed circuit breaker)
- Manual charging of closing springs (includes shunt trip)
- Integral spring charging handle
- Auxiliary switch (5a and 5b contacts)
- Mechanical operations counter
- 24, 48, 125 and 250 Vdc, 120 and 240 Vac control
- Shunt trip
- ON and OFF pushbuttons
- Integral lifting hooks
- Through- or behind-door operation
- Identified/dedicated secondaries
- Secondary umbilical cord (drawout circuit breaker)
- Secondary disconnect block (fixed circuit breaker)
- Two-step stored energy mechanism
- O–0.3s–CO–15s–CO
- Anti-pump
- Trip free
- Latch check switch
- Visible contact erosion indicator
- Visible contact wipe indicator
- Disconnect, Test and Connect (drawout circuit breaker)
- Integral levering mechanism (drawout circuit breaker)
- Field-installable accessories

Standards and Certifications

- Designed, tested and certified in accordance with ANSI and IEC standards
- Applicable ANSI standards C37.04-1979 or 1999, C37.09-1979 or 1999, C37.06-2000 and C37.013
- Internal arc resistance tested to IEC 298, Appendix AA, 25 kA for 1 second
- Drawout circuit breaker fully qualified to IEC 56 by testing inside the IEC 298 switchgear cubicle
- IEEE C37.013 and amendment C37.013a-2007

Product Selection

Please contact your Eaton sales representative for additional product information and to review your specific application and required product configuration.

Technical Data and Specifications**ANSI Standards****ANSI Standard Ratings—VCP-W Vacuum Circuit Breaker Types Rated on Symmetrical Current Rating Basis—Standard Circuit Breakers** ^①

| Description | Circuit Breaker Type | | | | | | | | |
|--|----------------------|-------------|-------------|------------------------|-------------|--------------|--------------|---------------|--------------------------|
| | 50 VCP-WND250 | 50 VCP-W250 | 50 VCP-W350 | 50 VCP-W500 (63 kA) | 75 VCP-W500 | 150 VCP-W500 | 150 VCP-W750 | 150 VCP-W1000 | 150 VCP-W1500 (63 kA) |
| Identification | | | | | | | | | |
| Nominal voltage class kV | 4.16 | 4.16 | 4.16 | 4.16 | 7.2 | 13.8 | 13.8 | 13.8 | 13.8 |
| Nominal three-phase MVA class | 250 | 250 | 350 | — | 500 | 500 | 750 | 1000 | — |
| Rated Values | | | | | | | | | |
| Voltage | | | | | | | | | |
| Maximum voltage E kV rms | 4.76 | 4.76 | 4.76 | 4.76 | 8.25 | 15 | 15 | 15 | 15 |
| Voltage range factor K ^② | 1.24 | 1.24 | 1.19 | 1.00 | 1.25 | 1.30 | 1.30 | 1.30 | 1.00 |
| Insulation Level | | | | | | | | | |
| Withstand test voltage | | | | | | | | | |
| Power frequency (1 min.) kV rms | 19 | 19 | 19 | 19 | 36 | 36 | 36 | 36 | 36 |
| Impulse kV peak | 60 | 60 | 60 | 60 | 95 | 95 | 95 | 95 | 95 |
| Current | | | | | | | | | |
| Continuous current at 60 Hz amperes | 1200 | 1200 | 1200 | 1200 | 1200 | 1200 | 1200 | 1200 | 1200 |
| | | 2000 | 2000 | 2000 | 2000 | 2000 | 2000 | 2000 | 2000 |
| | | 3000 | 3000 | 3000 | 3000 | 3000 | 3000 | 3000 | 3000 |
| Short-circuit current (at rated max. kV) I kA rms | 29 | 29 | 41 | 63 | 33 | 18 | 28 | 37 | 63 |
| Interrupting time cycles | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 5 |
| Permissible tripping delay Y seconds | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Maximum voltage divided by K E/K kV rms ^② | 3.85 | 3.85 | 4.0 | 4.76 | 6.6 | 11.5 | 11.5 | 11.5 | 15.0 |
| Current Values | | | | | | | | | |
| Maximum symmetrical interrupting capability Short-time current K x 1 kA rms ^② | 36 | 36 | 49 | 63 | 41 | 23 | 36 | 48 | 63 |
| Closing and latching capability kA peak | 97 | 97 | 132 | 170 | 111 | 62 | 97 | 130 | 170 |
| Closing and latching momentary capability | 58 | 58 | 78 | 101 | 66 | 37 | 58 | 77 | 101 |
| Weight Lb (kg) | | | | | | | | | |
| 1200 A | 345 (157) | 350 (159) | 460 (209) | 525 (238) | 375 (170) | 350 (159) | 350 (159) | 460 (209) | 525 (238) |
| 2000 A | 345 (157) | 410 (186) | 490 (223) | 530 (241) | 410 (186) | 410 (186) | 410 (186) | 490 (223) | 530 (241) |
| 3000 A | 345 (157) | 525 (238) | 525 (238) | 550 (250) | 525 (238) | 525 (238) | 525 (238) | 525 (238) | 550 (250) |

Notes

^① Applicable ANSI Standards C37.04-1999, C37.06-2000 (including both K >1 and K =1 ratings), and C37.09-1999.

^② See *Consulting Application Guide* for further information.

3.1

Power Breakers, Contactors and Fuses

Power Circuit Breakers

ANSI Standard Ratings—VCP-W Vacuum Circuit Breaker Types Rated on Symmetrical Current Rating Basis— Extra Capability Breakers ^①

3

| Description | Circuit Breaker Type | | | | | | | | |
|--|----------------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|
| | 50 VCP-W25C | 50 VCP-W40C | 50 VCP-W50C | 50 VCP-W63C | 75 VCP-W50C | 150 VCP-W25C | 150 VCP-W40C | 150 VCP-W50C | 150 VCP-W63C |
| Identification | | | | | | | | | |
| Nominal voltage class kV | 4.16 | 4.16 | 4.16 | 4.16 | 7.2 | 13.8 | 13.8 | 13.8 | 13.8 |
| Nominal three-phase MVA class | — | — | — | — | — | — | — | — | — |
| Rated Values | | | | | | | | | |
| Voltage | | | | | | | | | |
| Maximum voltage E kV rms | 5.95 | 5.95 | 5.95 | 5.95 | 10.3 | 17.5 | 17.5 | 17.5 | 15.0 |
| Voltage range factor K ^② | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Insulation Level | | | | | | | | | |
| Withstand test voltage | | | | | | | | | |
| Power frequency (1 min.) kV rms | 24 | 24 | 24 | 24 | 42 | 42 | 42 | 42 | 42 |
| Impulse kV peak | 75 | 75 | 75 | 75 | 95 | 95 | 95 | 95 | 95 |
| Current | | | | | | | | | |
| Continuous current at 60 Hz amperes | 1200 | 1200 | 1200 | 1200 | 1200 | 1200 | 1200 | 1200 | 1200 |
| | 2000 | 2000 | 2000 | 2000 | 2000 | 2000 | 2000 | 2000 | 2000 |
| | 3000 | 3000 | 3000 | 3000 | 3000 | 3000 | 3000 | 3000 | 3000 |
| Short-circuit current (at rated max. kV) I kA rms | 25 | 40 | 50 | 63 | 50 | 25 | 40 | 50 | 63 |
| Interrupting time cycles | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 |
| Permissible tripping delay Y seconds | 2 ^③ | 2 ^③ | 2 ^③ | 2 ^③ | 2 ^③ | 2 ^③ | 2 ^③ | 2 ^③ | 2 ^③ |
| Maximum voltage divided by K E/K kV rms ^② | 5.95 | 5.95 | 5.95 | 5.95 | 10.3 | 17.5 | 17.5 | 17.5 | 15.0 |
| Current Values | | | | | | | | | |
| Maximum symmetrical interrupting capability Short-time current K x 1 kA rms ^② | 25 | 40 | 50 | 63 | 50 | 25 | 40 | 50 | 63 |
| Closing and latching capability kA peak | 97 | 139 | 139 | 175 | 139 | 97 | 139 | 139 | 175 |
| Closing and latching momentary capability | 58 | 83 | 83 | 104 | 83 | 58 | 83 | 83 | 104 |
| Weight Lb (kg) | | | | | | | | | |
| 1200 A | 350 (159) | 460 (209) | 525 (238) | 350 (159) | 460 (209) | 350 (159) | 350 (159) | 460 (209) | 525 (238) |
| 2000 A | 410 (186) | 490 (223) | 530 (241) | 410 (186) | 490 (223) | 410 (186) | 410 (186) | 490 (223) | 530 (241) |
| 3000 A | 525 (238) | 525 (238) | 550 (250) | 525 (238) | 525 (238) | 525 (238) | 525 (238) | 525 (238) | 550 (250) |

Notes

- ① Applicable ANSI Standards C37.04-1999, C37.06-2000 (including both K >1 and K =1 ratings), and C37.09-1999.
- ② See *Consulting Application Guide* for further information.
- ③ Tested for 3 seconds.

ANSI Standard Ratings—VCP-W Vacuum Circuit Breaker Types Rated on Symmetrical Current Rating Basis—Generator Breakers (to ANSI C37.013) ①

| Description | Circuit Breaker Type | | | | | |
|---|----------------------|-------------|-------------|--------------|--------------|--------------|
| | 50 VCP-WG50 | 50 VCP-WG63 | 50 VCP-WG75 | 150 VCP-WG50 | 150 VCP-WG63 | 150 VCP-WG75 |
| Identification | | | | | | |
| Nominal voltage class kV | 4.16 | 4.16 | 4.16 | 13.8 | 13.8 | 13.8 |
| Nominal three-phase MVA class | — | — | — | — | — | — |
| Rated Values | | | | | | |
| Voltage | | | | | | |
| Maximum voltage E kV rms | 4.76 | 4.76 | 4.76 | 15.0 | 15.0 | 15.0 |
| Voltage range factor K ② | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| Insulation Level | | | | | | |
| Withstand test voltage | | | | | | |
| Power frequency (1 min.) kV rms | 19 | 19 | 19 | 36 | 36 | 36 |
| Impulse kV peak | 60 | 60 | 60 | 95 | 95 | 95 |
| Current | | | | | | |
| Continuous current at 60 Hz amperes | 1200 | 1200 | 1200 | 1200 | 1200 | 1200 |
| | 2000 | 2000 | 2000 | 2000 | 2000 | 2000 |
| | 3000 | 3000 | 3000 | 3000 | 3000 | 3000 |
| | 4000 | 4000 | 4000 | 4000 | 4000 | 4000 |
| Short-circuit current (at rated max. kV) kA rms | 50 | 63 | 75 | 50 | 63 | 75 |
| Interrupting time cycles | | | | | | |
| 1200 A | 3 | 3 | 3 | 3 | 3 | 3 |
| 2000 A | 3 | 3 | 3 | 3 | 3 | 3 |
| 3000 A | 3 | 3 | 3 | 3 | 3 | 3 |
| 4000 A | 5 | 5 | 5 | 5 | 5 | 5 |
| Permissible tripping delay Y seconds | | | | | | |
| 1200 A | 1 and 3 | 1 and 3 | 1 and 3 | 1 and 3 | 1 and 3 | 1 and 3 |
| 2000 A | 1 and 3 | 1 and 3 | 1 and 3 | 1 and 3 | 1 and 3 | 1 and 3 |
| 3000 A | 1 and 3 | 1 and 3 | 1 and 3 | 1 and 3 | 1 and 3 | 1 and 3 |
| 4000 A | 1 | 1 | 1 | 1 | 1 | 1 |
| Maximum voltage divided by K E/K kV rms ② | 4.76 | 4.76 | 4.76 | 15.0 | 15.0 | 15.0 |
| Current Values | | | | | | |
| Maximum symmetrical interrupting capability | | | | | | |
| Short-time current K x 1 kA rms ② | 50 | 63 | 75 | 50 | 63 | 75 |
| Closing and latching capability kA peak | 137 | 173 | 206 | 137 | 173 | 206 |
| Closing and latching momentary capability | 82 | 103 | 123 | 82 | 103 | 123 |
| Weight Lb (kg) | | | | | | |
| 1200 A | 525 (238) | 525 (238) | 926 (419) | 525 (238) | 525 (238) | 926 (419) |
| 2000 A | 530 (241) | 530 (241) | 936 (424) | 530 (241) | 530 (241) | 936 (424) |
| 3000 A | 550 (250) | 550 (250) | 946 (429) | 550 (250) | 550 (250) | 946 (429) |
| 4000 A | 956 (433) | 956 (433) | 956 (433) | 956 (433) | 956 (433) | 956 (433) |

Notes

① Applicable ANSI Standards C37.04-1999, C37.06-2000 (including both K >1 and K =1 ratings), C37.09-1999 and C37.013 (including C37.013a-2007).

② See *Consulting Application Guide* for further information.

3.1

Power Breakers, Contactors and Fuses

Power Circuit Breakers

Available Type VCP-W Vacuum Circuit Breakers Rated on Symmetrical Current Basis Per ANSI Standards (Rated K=1)

| Identification | Drawout Circuit Breaker Type | | | | | | | | | |
|---|------------------------------|-----------------|-----------------|-----------------|-----------------|-----------------|------------------------|-----------------|-----------------|-------------------|
| | 50 VCP-W25 | 50 VCP-W40 | 50 VCP-W50 | 50 VCP-W63 | 75 VCP-W40 | 75 VCP-W50 | 150 VCP-W25 | 150 VCP-W40 | 150 VCP-W50 | 150 VCP-W63 |
| Rated Values | | | | | | | | | | |
| Maximum voltage (V) kV rms | 4.76 | 4.76 | 4.76 | 4.76 | 8.25 | 8.25 | 15 | 15 | 15 | 15 |
| Power frequency Hz ^① | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 60 |
| Insulation Level | | | | | | | | | | |
| Power frequency withstand voltage (1 min.) kV rms | 19 | 19 | 19 | 19 | 36 | 36 | 36 | 36 | 36 | 36 |
| Lightning impulse withstand voltage (1.2 x 50 μs) kV peak | 60 | 60 | 60 | 60 | 95 | 95 | 95 | 95 | 95 | 95 |
| Continuous current A rms ^② | 1200 | 1200 | 1200 | 1200 | 1200 | 1200 | 1200 [Ⓣ] | 1200 | 1200 | 1200 [Ⓣ] |
| | 2000 | 2000 | 2000 | 2000 | 2000 | 2000 | 2000 | 2000 | 2000 | 2000 [Ⓣ] |
| | 3000 | 3000 | 3000 | 3000 | 3000 | 3000 | 3000 | 3000 | 3000 | 3000 [Ⓣ] |
| Short-Circuit Ratings (Reference C37.04-1999 and C37.06-2009 except as noted [Ⓣ]) | | | | | | | | | | |
| Symmetrical interrupting current (I) kA rms sym ^③ | 25 | 40 | 50 | 63 | 40 | 50 | 25 | 40 | 50 | 63 |
| DC component (% DC) ^④ | 50 | 50 | 44 | 55 | 50 | 44 | 50 | 50 | 44 | 55 |
| Asymmetrical interrupting current (I _t) kA rms asym total ^⑤ | 31 | 49 | 59 | 80 | 49 | 59 | 31 | 49 | 59 | 80 |
| Closing and latching current (2.6 x I) kA peak | 65 | 104 | 130 | 164 | 104 | 130 | 65 | 104 | 130 | 164 |
| Short-time withstand current rms ^⑥ | 25 | 40 | 50 | 63 | 40 | 50 | 25 | 40 | 50 | 63 |
| Transient Recovery Voltage parameters are based on TD-4 | | | | | | | | | | |
| Peak voltage (E ₂) = (u _c) (kV peak) | 8.2 | 8.2 | 8.2 | 8.2 | 14 | 14 | 28 [Ⓣ] , 25.7 | 25.7 | 25.7 | 28 [Ⓣ] |
| Time to peak (T ₂ = t ₃ x 1.137) (μsec) | 50 | 50 | 50 | 50 | 59 | 59 | 75 | 75 | 75 | 75 |
| TRV rise time (t ₃) (μsec) | 44 | 44 | 44 | 44 | 52 | 52 | 66 | 66 | 66 | 66 |
| RRRV = u _c /t ₃ (kV/μsec) ^⑦ | 0.19 | 0.19 | 0.19 | 0.19 | 0.27 | 0.27 | 0.42, 0.39 | 0.39 | 0.39 | 0.42 |
| Interrupting time ms | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 |
| Cycles (60 Hz) | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 |
| Operating duty (duty cycle) | 0-0.3s-CO-3m-CO | 0-0.3s-CO-3m-CO | 0-0.3s-CO-3m-CO | 0-0.3s-CO-3m-CO | 0-0.3s-CO-3m-CO | 0-0.3s-CO-3m-CO | 0-0.3s-CO-3m-CO | 0-0.3s-CO-3m-CO | 0-0.3s-CO-3m-CO | 0-0.3s-CO-3m-CO |
| Mechanical endurance no-load operations ^{ⓉⓉ} | 10,000 | 10,000 | 10,000 | 10,000 | 10,000 | 10,000 | 10,000 | 10,000 | 10,000 | 10,000 |

Notes

- ① All circuit breakers are tested at 60 Hz, however, they can also be applied at 50 Hz with no de-rating.
- ② 4000 A fan cooled rating is available for 3000 A circuit breakers.
- ③ Because the voltage range factor K=1, the short-time withstand current and the maximum symmetrical interrupting current are equal to the rated symmetrical interrupting current.
- ④ Based on the standard DC time constant of 45 ms (corresponding to X/R of 17 for 60 Hz) and the minimum contact parting time as determined from the minimum opening time plus the assumed minimum relay time of 1/2 cycle (8.33 ms for 60 Hz).
- ⑤ The asymmetrical interrupting current, I total, is given by $I_t = I \times \text{Sqrt}(1 + 2 \times \%DC \times \%DC)$ kA rms asym total.
- ⑥ Duration of short-time current and maximum permissible tripping delay are both 2 seconds for all circuit breakers listed in this table, as required in C37.04-1999, C37.06-2000 and C37.06-2009.
- ⑦ RRRV can also be calculated as $= 1.137 \times E_2/T_2$.
- ⑧ Each operation consists of one closing plus one opening.
- ⑨ All 40 and 50 kA circuit breakers exceed required 5000 no-load operations; all 63 kA circuit breakers exceed the required 2000 no-load ANSI operations.
- Ⓣ These circuit breakers were tested to the preferred TRV ratings specified in C37.06-2000.

Available Type VCP-W Vacuum Circuit Breakers Rated on Symmetrical Current Basis Per ANSI Standards (Rated K=1), continued

| Identification | Drawout Circuit Breaker Type | | | | | | | | | |
|---|------------------------------|------------|------------|------------|------------|------------|-------------|-------------|-------------|-------------|
| | 50 VCP-W25 | 50 VCP-W40 | 50 VCP-W50 | 50 VCP-W63 | 75 VCP-W40 | 75 VCP-W50 | 150 VCP-W25 | 150 VCP-W40 | 150 VCP-W50 | 150 VCP-W63 |
| Capacitance Current Switching Capability (Reference C37.04a-2003, C37.06-2009 and C37.09a-2005) | | | | | | | | | | |
| Cable-charging current | | | | | | | | | | |
| Class | C2 | C2 | C2 | C2 | C2 | C2 | C2 | C2 | C2 | C2 |
| A rms | 3-10 | 3-10 | 3-10 | 7.5-25 | 7.5-25 | 7.5-25 | 7.5-25 | 7.5-25 | 7.5-25 | 7.5-25 |
| Isolated shunt capacitor bank current | | | | | | | | | | |
| Class | C2 | C2 | C2 | C2 | C2 | C2 | C2, C2, C1 | C2, C2, C1 | C2, C2, C1 | C2 |
| A rms | | | | | | | | | | |
| 1200 A | 75-630 | 75-630 | 75-630 | 75-630 | 75-630 | 75-630 | 75-630 | 75-630 | 75-630 | 75-630 |
| 2000 A | 75-1000 | 75-1000 | 75-1000 | 75-1000 | 75-1000 | 75-1000 | 75-1000 | 75-1000 | 75-1000 | 75-1000 |
| 3000 A | 75-1600 | 75-1600 | 75-1600 | 75-1600 | 75-1600 | 75-1600 | 75-1600 | 75-1600 | 75-1600 | 75-1600 |
| Back-to-Back Capacitor Switching | | | | | | | | | | |
| Capacitor bank current | | | | | | | | | | |
| Class | C2 | C2 | C2 | C2 | C2 | C2 | C2, C2, C1 | C2, C2, C1 | C2, C2, C1 | C2 |
| A rms | | | | | | | | | | |
| 1200 A | 75-630 | 75-630 | 75-630 | 75-630 | 75-630 | 75-630 | 75-630 | 75-630 | 75-630 | 75-630 |
| 2000 A | 75-1000 | 75-1000 | 75-1000 | 75-1000 | 75-1000 | 75-1000 | 75-1000 | 75-1000 | 75-1000 | 75-1000 |
| 3000 A | 75-1600 | 75-1600 | 75-1600 | 75-1600 | 75-1600 | 75-1600 | 75-1600 | 75-1600 | 75-1600 | 75-1600 |
| Inrush current kA peak | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 |
| Inrush frequency kHz | | | | | | | | | | |
| 1200 A | 0.8 | 0.8 | 0.8 | 0.8 | 0.8 | 0.8 | 0.8 | 0.8 | 0.8 | 0.8 |
| 2000 A | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 |
| 3000 A | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 | 0.3 |
| Out-of-Phase Switching | | | | | | | | | | |
| Voltage = 1.44 x V (kV rms) | 7 | 7 | 7 | 7 | 12 | 12 | 22 | 22 | 22 | 22 |
| Current = 0.25 x I (kA rms) | 6.3 | 10 | 12.5 | 15.8 | 10 | 12.5 | 6.3 | 10 | 12.5 | 15.8 |

3.1

Power Breakers, Contactors and Fuses

Power Circuit Breakers

VCP-W Vacuum Breaker Types Rated on Symmetrical Current Rating Basis ^①

| | Circuit Breaker Type | | | | | | | |
|---|----------------------|---------------------|---------------------|---------------------|---------------------|-----------------|-------------------|-----------------|
| | 270 VCP-W750 | 270 VCP-W1000 | 270 VCP-W1250 | 270 VCP-W1600 | 270 VCP-W2000 | 270 VCP-W25C | 270 VCP-W32C | 270 VCP-W40C |
| Identification | | | | | | | | |
| Nominal voltage class kV | 27 | 27 | 27 | 27 | 27 | 27 | 27 | 27 |
| Nominal three-phase MVA class | 750 | 1000 | 1250 | 1600 | 2000 | — | — | — |
| Rated Values | | | | | | | | |
| Voltage | | | | | | | | |
| Maximum voltage E kV rms | 27 ^② | 27 ^② | 27 ^② | 27 ^② | 27 ^② | 27 | 27 | 27 |
| Voltage range factor K ^③ | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| Insulation Level | | | | | | | | |
| Withstand test voltage | | | | | | | | |
| Power frequency (1 min.) kV rms | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 60 |
| Impulse kV peak | 125 | 125 | 125 | 125 | 125 | 125 | 125 | 125 |
| Current | | | | | | | | |
| Continuous current at 60 Hz amperes | 600 | 600 | 600 | 1200 | 1200 | 1200 | 1200 | 1200 |
| | 1200 | 1200 | 1200 | 2000 | 2000 | 1600 | 1600 | 1600 |
| | 2000 | 2000 | 2000 | — | — | — | — | — |
| Short-circuit current (at rated maximum kV) ^{④⑤} | 16 | 22 | 25 | 25 | 40 | 25 ^⑦ | 31.5 ^⑧ | 40 ^⑧ |
| Interrupting time ms (cycles) | 83 (5) ^⑥ | 83 (5) ^⑥ | 83 (5) ^⑥ | 83 (5) ^⑥ | 83 (5) ^⑥ | 50 (3) | 50 (3) | 50 (3) |
| Maximum permissible tripping delay Y seconds | 2 | 2 | 2 | 2 | 2 | 2.5 | 1.6 | 1.0 |
| Transient recovery voltage | | | | | | | | |
| E ₂ kV peak | 51 | 51 | 51 | 51 | 51 | 50 | 50 | 50 |
| T ₂ μs | 105 | 105 | 105 | 105 | 105 | 50 | 50 | 50 |
| Current Values | | | | | | | | |
| Closing and latching capability (2.6 K times rated short-circuit current) kA peak | 43 | 60 | 68 | 85 | 106 | 85 | 100 | 112 |
| Capacitor switching cable charging amperes | 31.5 | 31.5 | 31.5 | 31.5 | 31.5 | 31.5 | 31.5 | 31.5 |
| Weight Lb (kg) | | | | | | | | |
| 600 A | 460 (209) | 460 (209) | 460 (209) | 545 (247) | 545 (247) | 545 (247) | 545 (247) | 545 (247) |
| 1200 A | 480 (218) | 480 (218) | 480 (218) | 560 (254) | 600 (272) | 560 (254) | 560 (254) | 560 (254) |
| 2000 A | 500 (227) | 500 (227) | 500 (227) | — | — | — | — | — |

Notes

- ① CESI tested to applicable ANSI standards C37.04, C37.09 and C37.06. Consult Eaton for CESI copies of test reports on file. Operating duty cycle CO-15 seconds-CO. Operating time values: Opening 33–55 ms, closing 50–60 ms and reclosing 18 cycles (300 ms).
- ② Tested at 28.5 kV.
- ③ K = 1.0, therefore E = E/K and I = KI.
- ④ Also maximum interruption rating and short-time current rating.
- ⑤ Duration of short-time current = 3 seconds, except as noted in footnotes 7, 8 and 9.
- ⑥ Optional interrupting time of 50 ms (3 cycles) is available.
- ⑦ Duration of short-time current = 2.5 seconds.
- ⑧ Duration of short-time current = 1.6 seconds.
- ⑨ Duration of short-time current = 1 second.

Type VCP-W Vacuum Circuit Breaker Ratings

Type VCP-W Ratings on Symmetrical Current Rating Basis ①②

| Identification | Circuit Breaker Type | | | | |
|--|----------------------------------|-----------------------------------|-----------------------------------|-----------------------------------|-----------------------------------|
| | 380 VCP-W 6 and 380 VCP-WR 16 | 380 VCP-W 25 and 380 VCP-WR 25 | 380 VCP-W 32 and 380 VCP-WR 32 | 380 VCP-W 21 and 380 VCP-WR 21 | 380 VCP-W 40 and 380 VCP-WR 40 |
| Rated Values | | | | | |
| Voltage | | | | | |
| Nominal voltage class kV rms | 34.5 | 34.5 | 34.5 | 34.5 | 34.5 |
| Maximum voltage V kV rms | 38 | 38 | 38 | 38 | 38 |
| Voltage range factor K ③ | 1 | 1 | 1 | 1.65 ⑥ | 1 |
| V/K ③ kV rms | 38 | 38 | 38 | 23 ⑥ | 38 |
| Insulation Level Withstand Test | | | | | |
| Power frequency (1 minute) kV rms | 80 | 80 | 80 | 80 | 80 |
| Lightning impulse 1.2 x 50 ④ kV peak | 170 | 170 | 170 | 170 | 170 |
| Current | | | | | |
| Continuous current at 60 Hz ⑤ A rms | 600 | 600 | 600 | 1200 | 1200 |
| | 1200 | 1200 | 1200 | 2000 | 2000 |
| | 1600 | 1600 | 1600 | 3000FC | 3000FC |
| | 2000 | 2000 | 2000 | 2500 | 2500 |
| | — | — | 3000FC | — | — |
| | — | — | 2500 | — | — |
| Short-Circuit Current | | | | | |
| Sym. interrupting at V (Isc) kA rms | 16 | 25 | 31.5 | 21 | 40 |
| % DC component (Idc) | 47 | 47 | 47 | 47 | 47 |
| Asym. factor S (ref.) | 1.2 | 1.2 | 1.2 | 1.2 | 1.2 |
| Asym. interrupting (I _{as}) kA rms total | 19.2 | 30.0 | 37.8 | 39.5 | 48.0 |
| Maximum asym. interrupting at V/K (KxIsc) ③ kA rms | 16 | 25 | 31.5 | 35 ⑥ | 40 |
| Maximum asym. interrupting at V/K (SxKxIsc) ③ kA rms total | 19.3 | 30.0 | 37.8 | 42.0 | 48.0 |
| Closing and latching capability kA peak | 43 | 68 | 85 | 95 | 107 |
| Momentary current withstand capability kA rms total | 26 | 40 | 50 | 56 | 63 |
| Short-time current kA rms | 16 | 25 | 31.5 | 35 | 40 |
| Duration of short-time current s | 3 | 3 | 3 | 3 | 3 |
| Operating duty (duty cycle) | ⑧⑩ | ⑧⑩ | ⑧⑩ (2500 only ⑧⑩) | ⑧⑩ (2500 only ⑧⑩) | ⑧⑩ |
| Rated reclosing factor (R) % | 100 | 100 | 100 (2500 only 0%) | 100 (2500 only 0%) | 100 |
| Interrupting time ⑥ | | | | | |
| rms | 83 | 83 | 83 | 83 | 83 |
| Cycle | 5 | 5 | 5 | 5 | 5 |
| Maximum permissible tripping delay sec. | 2 | 2 | 2 | 2 | 2 |
| Transient recovery voltage (RRRV) kV/μs | 0.6 | 0.6 | 0.6 | 0.6 | 0.6 |
| Mechanical endurance ⑦ | 2000 | 2000 | 2000 | 2000 | 2000 |

Notes

- ① KEMA tested to applicable ANSI standards C37.04-1979, C37.09-1979 and C37.06-1979 (operating duty sequence CO–15s–CO). Typical operating time values: operating 45 ms, closing 75 ms and reclosing 300 ms (18 cycles).
- ② The standard breaker is not rated for capacitor switching. If you require capacitor switching, please refer to the “C” breakers.
- ③ K = 1.0, therefore E = E/K and I = KI. Refer to the *Consulting Application Guide* for more information.
- ④ The ANSI C37.06 standard requires 150 kV BIL. If higher BIL levels are required, please refer to the “C” breakers.
- ⑤ For forced air cooled fixed breaker applications, consult Eaton.
- ⑥ If you require 50 ms (3 cycle) interrupting time, please refer to the “C” breakers.
- ⑦ No-load operations.
- ⑧ At 23 kV rms (rated maximum voltage/K). Rated maximum symmetrical interrupting capability = 35 kA rms (K x 1).
- ⑨ CO–15s–CO.
- ⑩ Rated and tested also for rapid reclosing capability 0–0.3s–CO.
- ⑪ Not rated for rapid reclosing.

3.1

Power Breakers, Contactors and Fuses

Power Circuit Breakers

Type VCP-WC Vacuum Circuit Breaker Ratings

Type VCP-WC Ratings on Symmetrical Current Rating Basis ^{①②}

| Identification | Drawout Circuit Breaker Type | | | | |
|---|-------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|
| | 380 VCP-W 16C and 380 VCP-WR 16C | 380 VCP-W 25C and 380 VCP-WR 25C | 380 VCP-W 32C and 380 VCP-WR 32C | 380 VCP-W 21C and 380 VCP-WR 21C | 380 VCP-W 40C and 380 VCP-WR 40C |
| Rated Values | | | | | |
| Voltage | | | | | |
| Nominal voltage class kV rms | 34.5 | 34.5 | 34.5 | 34.5 | 34.5 |
| Maximum voltage V kV rms | 38 | 38 | 38 | 38 | 38 |
| Voltage range factor K ^③ | 1 | 1 | 1 | 1.65 ^⑥ | 1 |
| V/K ^③ kV rms | 38 | 38 | 38 | 23 ^⑥ | 38 |
| Insulation Level Withstand Test | | | | | |
| Power frequency (1 minute) kV rms | 80 | 80 | 80 | 80 | 80 |
| Lightning impulse 1.2 x 50 μ s ^④ kV peak | 170 | 170 | 170 | 170 | 170 |
| Current | | | | | |
| Continuous current at 60 Hz ^⑤ A rms | 600 | 600 | 600 | 1200 | 1200 |
| | 1200 | 1200 | 1200 | 2000 | 2000 |
| | 1600 | 1600 | 1600 | 3000FC | 3000FC |
| | 2000 | 2000 | 2000 | 2500 | 2500 |
| | — | — | 3000FC | — | — |
| | — | — | 2500 | — | — |
| Short-Circuit Current | | | | | |
| Sym. interrupting at V (Isc) kA rms | 16 | 25 | 33.1 | 21 | 40 |
| % DC component (Idc) | 75 | 65 | 57 | 52 | 63 |
| Asym. factor S (ref.) | 1.46 | 1.36 | 1.3 | 1.24 | 1.34 |
| Asym. interrupting (I _l) kA rms total | 23.3 | 34.0 | 42.5 | 26.1 | 53.5 |
| Maximum sym. interrupting at V/K (KxIsc) ^③ kA rms | 16 | 25 | 33.1 | 35 ^⑥ | 40 |
| Maximum asym. interrupting at V/K (SxKxIsc) ^③ kA rms total | 23.3 | 34.0 | 42.5 | 43.4 | 53.5 |
| Closing and latching capability kA peak | 50 | 75 | 91 | 102 | 107 |
| Momentary current withstand capability kA rms total | 30 | 44 | 54 | 60 | 65 |
| Short-time current kA rms | 16 | 25 | 31.5 | 35 | 40 |
| Duration of short-time current s | 3.09 | 3.09 | 3.09 | 3.21 | 3.04 |
| Operating duty (duty cycle) | ⑧⑨ | ⑧⑩ | ⑧⑩ (2500 A ^⑩) | ⑧⑩ (2500 A ^⑩) | ⑧⑩ |
| Rapid reclosing factor (R) % | 100 | 100 | 100 (2500 A N/A) | 100 (2500 A N/A) | — |
| Interrupting time ^⑥ | | | | | |
| rms | 50 | 50 | 50 | 50 | 50 |
| Cycles | 3 | 3 | 3 | 3 | 3 |
| Maximum permissible tripping delay sec. | | | | | |
| 2 | 2 | 2 | 2 | 2 | 2 |
| Transient recovery voltage (RRRV) kV/μs | | | | | |
| 0.7 | 0.7 | 0.7 | 0.7 | 0.7 | — |
| 1.3 | 1.3 | 0.7 | 1.3 | — | |
| — | — | 0.7 | 1.3 | — | |
| — | — | 1.3 | 0.7 | — | |
| — | — | 1.3 | — | — | |
| — | — | 0.7 | — | — | |

Notes

- ① KEMA tested to applicable ANSI standards C37.04-1979, C37.09-1979 and C37.06-1979 (operating duty sequence CO-15s-CO). Typical operating time values: operating 45 ms, closing 75 ms and reclosing 300 ms (18 cycles).
- ② The standard breaker is not rated for capacitor switching. If you require capacitor switching, please refer to the "C" breakers.
- ③ K = 1.0, therefore E = E/K and I = KI. Refer to the *Consulting Application Guide* for more information.
- ④ The ANSI C37.06 standard requires 150 kV BIL. If higher BIL levels are required, please refer to the "C" breakers.
- ⑤ For forced air cooled fixed breaker applications, consult Eaton.
- ⑥ If you require 50 ms (3 cycle) interrupting time, please refer to the "C" breakers.
- ⑦ No-load operations.
- ⑧ At 23 kV rms (rated maximum voltage/K). Rated maximum symmetrical interrupting capability = 35 kA rms (K x 1).
- ⑨ CO-15s-CO.
- ⑩ Rated and tested also for rapid reclosing capability 0-0.3s-CO.
- ⑪ Not rated for rapid reclosing.

Type VCP-WC Vacuum Circuit Breaker Ratings

Type VCP-WC Ratings on Symmetrical Current Rating Basis, continued^{①②}

| Identification | Drawout Circuit Breaker Type | | | | |
|--|-------------------------------------|-------------------------------------|--|--|-------------------------------------|
| | 380 VCP-W 16C and 380 VCP-WR 16C | 380 VCP-W 25C and 380 VCP-WR 25C | 380 VCP-W 32C and 380 VCP-WR 32C | 380 VCP-W 21C and 380 VCP-WR 21C | 380 VCP-W 40C and 380 VCP-WR 40C |
| Capacitor Switching Ratings | | | | | |
| Definite Purpose | | | | | |
| Overhead line current A rms | 5 | 5 | 5 (2500 A N/A) | 5 (2500 A N/A) | — |
| Isolated shunt capacitor bank current A rms | 250 | 250 | 250 | 250 | — |
| | 250 and 1000 (2000 A) | 250 and 1000 (2000 A) | 250 and 1000 (2000 A and 3000FC) (2500 N/A) | 250 and 1000 (2000 A and 3000FC) (2500 N/A) | — |
| Definite Purpose—Back-to-Back Capacitor Switching | | | | | |
| Cable charging current A rms | 56 | 56 | 53 | 53 | 53 |
| Capacitor bank current A rms | 250 | 250 | 250 | 250 | — |
| | 250 and 1000 (200 A) | 250 and 1000 (200 A) | 250 and 1000 (2000 A and 3000FC) (2500 N/A) | 250 and 1000 (2000 A and 3000FC) (2500 N/A) | — |
| Inrush current kA peak | 20 | 20 | 20 | 20 | — |
| | 20 and 20 (2000 A) | 20 and 20 (2000 A) | 20 and 20 (2000 A and 3000FC) (2500 N/A) | 20 and 20 (2000 A and 3000FC) (2500 N/A) | — |
| Inrush frequency kHz | 4.4 | 4.4 | 4.4 | 4.4 | — |
| | 5 and 5 (2000 A) | 5 and 5 (2000 A) | 5 and 5 (2000 A and 3000FC) (2500 N/A) | 5 and 5 (2000 A and 3000FC) (2500 N/A) | — |
| Mechanical endurance (no-load operations) | 15,000 | 15,000 | 15,000 | 15,000 | 15,000 |

3.1

Power Breakers, Contactors and Fuses

Power Circuit Breakers

IEC Standards

IEC Standards ①—VCP-W Vacuum Circuit Breaker Types Rated on Symmetrical Current Rating Basis

| Identification | Rated Values | | | | | | | |
|----------------|----------------------|----------------|--|---------------------------|------------------------|---|--------------------------------------|---|
| | Circuit Breaker Type | Voltage kV rms | Insulation Level Power Frequency kV rms Peak | Impulse Withstand kV Peak | Normal Current Amperes | Short-Circuit Breaking Current and 3-Second Short-Time Current kA rms | Short-Circuit Making Current kV Peak | Cable Charging Breaking Current Amperes |
| 36 VCP-WND25 | 3.6 | 10 | 40 | 630 | 25 | 65 | 10 | 350 (159) |
| | 3.6 | 10 | 40 | 1250 | 25 | 65 | 10 | 350 (159) |
| 36 VCP-WND32 | 3.6 | 10 | 40 | 630 | 31.5 | 82 | 10 | 350 (159) |
| | 3.6 | 10 | 40 | 1250 | 31.5 | 82 | 10 | 350 (159) |
| 72 VCP-WND25 | 7.2 | 20 | 60 | 630 | 25 | 65 | 10 | 350 (159) |
| | 7.2 | 20 | 60 | 1250 | 25 | 65 | 10 | 350 (159) |
| 72 VCP-WND32 | 7.2 | 20 | 60 | 630 | 31.5 | 82 | 10 | 350 (159) |
| | 7.2 | 20 | 60 | 1250 | 31.5 | 82 | 10 | 350 (159) |
| 36 VCP-W25 | 3.6 | 10 | 40 | 630 | 25 | 65 | 10 | 414 (188) |
| | 3.6 | 10 | 40 | 1250 | 25 | 65 | 10 | 430 (195) |
| | 3.6 | 10 | 40 | 2000 | 25 | 65 | 10 | 496 (225) |
| 36 VCP-W32 | 3.6 | 10 | 40 | 1250 | 31.5 | 82 | 10 | 414 (188) |
| | 3.6 | 10 | 40 | 2000 | 31.5 | 82 | 10 | 496 (225) |
| 36 VCP-W40 | 3.6 | 10 | 40 | 1250 | 40 | 104 | 10 | 496 (225) |
| | 3.6 | 10 | 40 | 2000 | 40 | 104 | 10 | 550 (250) |
| 72 VCP-W25 | 7.2 | 20 | 60 | 630 | 25 | 65 | 10 | 414 (188) |
| | 7.2 | 20 | 60 | 1250 | 25 | 65 | 10 | 414 (188) |
| | 7.2 | 20 | 60 | 2000 | 25 | 65 | 10 | 496 (225) |
| 72 VCP-W32 | 7.2 | 20 | 60 | 1250 | 31.5 | 82 | 10 | 414 (188) |
| | 7.2 | 20 | 60 | 2000 | 31.5 | 82 | 10 | 430 (195) |
| 72 VCP-W40 | 7.2 | 20 | 60 | 1250 | 40 | 104 | 10 | 430 (195) |
| | 7.2 | 20 | 60 | 2000 | 40 | 104 | 10 | 496 (225) |
| 120 VCP-W25 | 12.0 | 28 | 75 | 630 | 25 | 65 | 25 | 430 (195) |
| | 12.0 | 28 | 75 | 1250 | 25 | 65 | 25 | 496 (225) |
| | 12.0 | 28 | 75 | 2000 | 25 | 65 | 25 | 496 (225) |
| 120 VCP-W32 | 12.0 | 28 | 75 | 1250 | 31.5 | 82 | 25 | 430 (195) |
| | 12.0 | 28 | 75 | 2000 | 31.5 | 82 | 25 | 496 (225) |
| 120 VCP-W40 | 12.0 | 28 | 75 | 1250 | 40 | 104 | 25 | 496 (225) |
| | 12.0 | 28 | 75 | 2000 | 40 | 104 | 25 | 550 (250) |
| 175 VCP-W25 | 17.5 | 38 | 95 | 630 | 25 | 65 | — | 430 (195) |
| | 17.5 | 38 | 95 | 1250 | 25 | 65 | — | 496 (225) |
| | 17.5 | 38 | 95 | 2000 | 25 | 65 | — | 496 (225) |
| 175 VCP-W32 | 17.5 | 38 | 95 | 1250 | 31.5 | 82 | — | 430 (195) |
| | 17.5 | 38 | 95 | 2000 | 31.5 | 82 | — | 496 (225) |
| 175 VCP-W40 | 17.5 | 38 | 95 | 1250 | 40 | 104 | — | 496 (225) |
| | 17.5 | 38 | 95 | 2000 | 40 | 104 | — | 550 (250) |
| 175 VCP-W50 | 17.5 | 38 | 95 | 1250 | 50 | 130 | — | 1013 (460) |
| | 17.5 | 38 | 95 | 2000 | 50 | 130 | — | 1079 (490) |
| | 17.5 | 38 | 95 | 3150 | 50 | 130 | — | 1156 (525) |

Note

① IEC Standards 60056 and 60694 apply.

ANSI Standard Ratings—VCP-T and VCP-TR Vacuum Circuit Breakers (to ANSI C37.04 and C37.09)

| Identification | Rated Values | | | | | | |
|------------------------------------|----------------------|-------------------------|------------------------------|-------------------------------|---|----|---|
| | Circuit Breaker Type | Voltage Class kV rms | Insulation Level | | | | Short-Circuit Making Current kA Peak |
| Power Frequency kV rms | | | Impulse Withstand kV Peak | Continuous Current Amperes | Short-Circuit ^③ Breaking Current kA rms | | |
| 50 VCP-T16 and 50 VCP-TR16 | 4.76 | 19 | 60 | 600 | 16 | 42 | 20,000 |
| | 4.76 | 19 | 60 | 800 | 16 | 42 | 20,000 |
| | 4.76 | 19 | 60 | 1200 | 16 | 42 | 10,000 |
| | 4.76 | 19 | 60 | 1600 ^② | 16 | 42 | 10,000 |
| 50 VCP-T20 and 50 VCP-TR20 | 4.6 | 19 | 60 | 600 | 16 | 52 | 10,000 |
| | 4.6 | 19 | 60 | 800 | 16 | 52 | 10,000 |
| | 4.6 | 19 | 60 | 1200 | 16 | 52 | 10,000 |
| | 4.6 | 19 | 60 | 1600 ^② | 16 | 52 | 10,000 |
| 50 VCP-T25 and 50 VCP-TR25 | 4.76 | 19 | 60 | 600 | 25 | 65 | 10,000 |
| | 4.76 | 19 | 60 | 800 | 25 | 65 | 10,000 |
| | 4.76 | 19 | 60 | 1200 | 25 | 65 | 10,000 |
| | 4.76 | 19 | 60 | 1600 ^② | 25 | 65 | 10,000 |
| 75 VCP-T16 and 75 VCP-TR16 | 8.25 | 20 | 60 ^① | 600 | 16 | 42 | 20,000 |
| | 8.25 | 20 | 60 ^① | 800 | 16 | 42 | 20,000 |
| | 8.25 | 20 | 60 ^① | 1200 | 16 | 42 | 10,000 |
| | 8.25 | 20 | 60 ^① | 1600 ^② | 16 | 42 | 10,000 |
| 75 VCP-T20 and 75 VCP-TR20 | 8.25 | 20 | 60 ^① | 600 | 20 | 52 | 10,000 |
| | 8.25 | 20 | 60 ^① | 800 | 20 | 52 | 10,000 |
| | 8.25 | 20 | 60 ^① | 1200 | 20 | 52 | 10,000 |
| | 8.25 | 20 | 60 ^① | 1600 ^② | 20 | 52 | 10,000 |
| 75 VCP-T25 and 75 VCP-TR25 | 8.25 | 20 | 60 ^① | 600 | 25 | 65 | 10,000 |
| | 8.25 | 20 | 60 ^① | 800 | 25 | 65 | 10,000 |
| | 8.25 | 20 | 60 ^① | 1200 | 25 | 65 | 10,000 |
| | 8.25 | 20 | 60 ^① | 1600 ^② | 25 | 65 | 10,000 |
| 150 VCP-T16 and 150 VCP-TR16 | 15 | 36 | 95 | 600 | 16 | 42 | 10,000 |
| | 15 | 36 | 95 | 800 | 16 | 42 | 10,000 |
| | 15 | 36 | 95 | 1200 | 16 | 42 | 10,000 |
| | 15 | 36 | 95 | 1600 ^② | 16 | 42 | 10,000 |
| 150 VCP-T20 and 150 VCP-TR20 | 15 | 36 | 95 | 600 | 20 | 52 | 10,000 |
| | 15 | 36 | 95 | 800 | 20 | 52 | 10,000 |
| | 15 | 36 | 95 | 1200 | 20 | 52 | 10,000 |
| | 15 | 36 | 95 | 1600 ^② | 20 | 52 | 10,000 |
| 150 VCP-T25 and 150 VCP-TR25 | 15 | 36 | 95 | 600 | 25 | 65 | 10,000 |
| | 15 | 36 | 95 | 800 | 25 | 65 | 10,000 |
| | 15 | 36 | 95 | 1200 | 25 | 65 | 10,000 |
| | 15 | 36 | 95 | 1600 ^② | 25 | 65 | 10,000 |

Notes

- ① Use 15 kV breaker and cassette when 95 kV impulse withstand required.
- ② 1600 A VCP-T breaker available.
- ③ Also 2 second short-time current rating.

3.1

Power Breakers, Contactors and Fuses

Power Circuit Breakers

ANSI Standard Ratings—VCP-TL/VCP-TRL Vacuum Circuit Breakers (to ANSI C37.04 and C37.09)

| Identification Circuit Breaker Type ① | Rated Values | | | Continuous Current Amperes | Short-Circuit Breaking Current ② kA rms | Short-Circuit Making Current kA Peak | Mechanical Endurance ③ C-O Operations | Approx. Weight Fix/Drawout Lb |
|--|---------------------------------|---|------------------------------|-------------------------------|--|---|--|----------------------------------|
| | Rated Maximum Voltage kV rms | Insulation Level Power Frequency kV rms | Impulse Withstand kV Peak | | | | | |
| 50 VCP-TL16 and 50 VCP-TRL16 | 4.76 | 19 | 60 | 600 | 16 | 42 | 100,000 | 153/232 |
| | | | | 1200 | 16 | 42 | 100,000 | 155/234 |
| | | | | 1600 ④ | 16 | 42 | 100,000 | 157/NA |
| 50 VCP-TL20 and 50 VCP-TRL20 | 4.76 | 19 | 60 | 600 | 20 | 52 | 100,000 | 159/237 |
| | | | | 1200 | 20 | 52 | 100,000 | 161/239 |
| | | | | 1600 ④ | 20 | 52 | 100,000 | 163/NA |
| 50 VCP-TL25 and 50 VCP-TRL25 | 4.76 | 19 | 60 | 600 | 25 | 65 | 100,000 | 166/243 |
| | | | | 1200 | 25 | 65 | 100,000 | 168/245 |
| | | | | 1600 ④ | 25 | 65 | 100,000 | 170/NA |
| 75 VCP-TL16 and 75 VCP-TRL16 | 8.25 | 20 | 75 ⑤ | 600 | 16 | 42 | 100,000 | 155/232 |
| | | | | 1200 | 16 | 42 | 100,000 | 157/234 |
| | | | | 1600 ④ | 16 | 42 | 100,000 | 159/NA |
| 75 VCP-TL20 and 75 VCP-TRL20 | 8.25 | 20 | 75 ⑤ | 600 | 20 | 52 | 100,000 | 161/239 |
| | | | | 1200 | 20 | 52 | 100,000 | 161/241 |
| | | | | 1600 ④ | 20 | 52 | 100,000 | 163/NA |
| 75 VCP-TL25 and 75 VCP-TRL25 | 8.25 | 20 | 75 ⑤ | 600 | 25 | 65 | 100,000 | 166/245 |
| | | | | 1200 | 25 | 65 | 100,000 | 168/247 |
| | | | | 1600 ④ | 25 | 65 | 100,000 | 170/NA |
| 150 VCP-TL16 and 150 VCP-TRL16 | 15 | 36 | 95 | 600 | 16 | 42 | 100,000 | 155/234 |
| | | | | 1200 | 16 | 42 | 100,000 | 157/237 |
| | | | | 1600 ④ | 16 | 42 | 100,000 | 159/NA |
| 150 VCP-TL20 and 150 VCP-TRL20 | 15 | 36 | 95 | 600 | 20 | 52 | 100,000 | 161/239 |
| | | | | 1200 | 20 | 52 | 100,000 | 163/241 |
| | | | | 1600 ④ | 20 | 52 | 100,000 | 166/NA |
| 150 VCP-TL25 and 150 VCP-TRL25 | 15 | 36 | 95 | 600 | 25 | 65 | 100,000 | 168/245 |
| | | | | 1200 | 25 | 65 | 100,000 | 170/247 |
| | | | | 1600 ④ | 25 | 65 | 100,000 | 172/NA |

Notes

- ① Independent shunt trips are available for use with traditional protective relaying schemes.
- ② Also 2-second short-time current rating.
- ③ Operating mechanism up to 100,000 operations, vacuum interrupter 30,000.
- ④ 1600 A available as fixed VCP-TRL/VCP-TRLC circuit breaker only.
- ⑤ Use 15 kV breaker and cassette when impulse withstand >75 kV is required.

IEC Standard Ratings—T-VAC and T-VACR Vacuum Circuit Breakers (to IEC 62271-100)

| Identification | Rated Values | | | | | | |
|------------------------------------|----------------------|-------------------------|---|---|---|--|---|
| | Circuit Breaker Type | Voltage Class kV rms | Insulation Level Power Frequency Withstand Voltage kV rms | Lightning Impulse (U _w) Withstand Voltage kV Peak | Normal Current (I _n) Amperes | Short-Circuit ^③ Breaking Current kA rms | Short-Circuit Making Current kA Peak |
| 72 T-VAC16 and 72 T-VACR16 | 7.2 | 20 | 60 | 630 | 16 | 40 | 20,000 |
| | 7.2 | 20 | 60 | 800 | 16 | 40 | 20,000 |
| | 7.2 | 20 | 60 | 1250 | 16 | 40 | 10,000 |
| | 7.2 | 20 | 60 | 1600 ^② | 16 | 40 | 10,000 |
| 72 T-VAC20 and 72 T-VACR20 | 7.2 | 20 | 60 | 630 | 20 | 50 | 10,000 |
| | 7.2 | 20 | 60 | 800 | 20 | 50 | 10,000 |
| | 7.2 | 20 | 60 | 1250 | 20 | 50 | 10,000 |
| | 7.2 | 20 | 60 | 1600 ^② | 20 | 50 | 10,000 |
| 72 T-VAC25 and 72 T-VACR25 | 7.2 | 20 | 60 | 630 | 25 | 63 | 10,000 |
| | 7.2 | 20 | 60 | 800 | 25 | 63 | 10,000 |
| | 7.2 | 20 | 60 | 1250 | 25 | 63 | 10,000 |
| | 7.2 | 20 | 60 | 1600 ^② | 25 | 63 | 10,000 |
| 120 T-VAC16 and 120 T-VACR16 | 12 | 28 | 75 ^① | 630 | 16 | 40 | 20,000 |
| | 12 | 28 | 75 ^① | 800 | 16 | 40 | 20,000 |
| | 12 | 28 | 75 ^① | 1250 | 16 | 40 | 10,000 |
| | 12 | 28 | 75 ^① | 1600 ^② | 16 | 40 | 10,000 |
| 120 T-VAC20 and 120 T-VACR20 | 12 | 28 | 75 ^① | 630 | 20 | 50 | 10,000 |
| | 12 | 28 | 75 ^① | 800 | 20 | 50 | 10,000 |
| | 12 | 28 | 75 ^① | 1250 | 20 | 50 | 10,000 |
| | 12 | 28 | 75 ^① | 1600 ^② | 20 | 50 | 10,000 |
| 120 T-VAC25 and 120 T-VACR25 | 12 | 28 | 75 ^① | 630 | 25 | 63 | 10,000 |
| | 12 | 28 | 75 ^① | 800 | 25 | 63 | 10,000 |
| | 12 | 28 | 75 ^① | 1250 | 25 | 63 | 10,000 |
| | 12 | 28 | 75 ^① | 1600 ^② | 25 | 63 | 10,000 |
| 175 T-VAC16 and 175 T-VACR16 | 17.5 | 38 | 95 | 630 | 16 | 40 | 10,000 |
| | 17.5 | 38 | 95 | 800 | 16 | 40 | 10,000 |
| | 17.5 | 38 | 95 | 1250 | 16 | 40 | 10,000 |
| | 17.5 | 38 | 95 | 1600 ^② | 16 | 40 | 10,000 |
| 175 T-VAC20 and 175 T-VACR20 | 17.5 | 38 | 95 | 630 | 20 | 50 | 10,000 |
| | 17.5 | 38 | 95 | 800 | 20 | 50 | 10,000 |
| | 17.5 | 38 | 95 | 1250 | 20 | 50 | 10,000 |
| | 17.5 | 38 | 95 | 1600 ^② | 20 | 50 | 10,000 |
| 175 T-VAC25 and 175 T-VACR25 | 17.5 | 38 | 95 | 630 | 25 | 63 | 10,000 |
| | 17.5 | 38 | 95 | 800 | 25 | 63 | 10,000 |
| | 17.5 | 38 | 95 | 1250 | 25 | 63 | 10,000 |
| | 17.5 | 38 | 95 | 1600 ^② | 25 | 63 | 10,000 |

Notes

- ① Use 17.5 kV breaker and cassette when 95 kV impulse withstand required.
- ② 1600 A T-VAC breaker available.
- ③ Also 3-second short-time current rating.

3.1

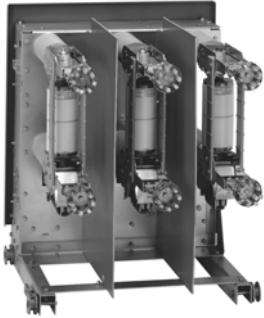
Power Breakers, Contactors and Fuses

Power Circuit Breakers

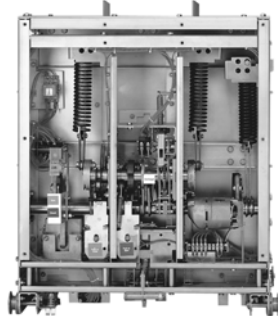
Dimensions

Approximate Dimensions in Inches (mm)

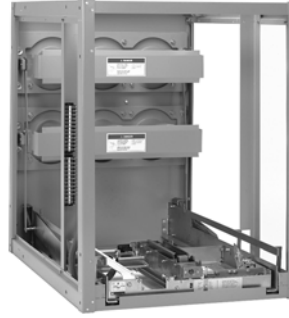
3



Type VCP-W Circuit Breaker
Shown from Rear



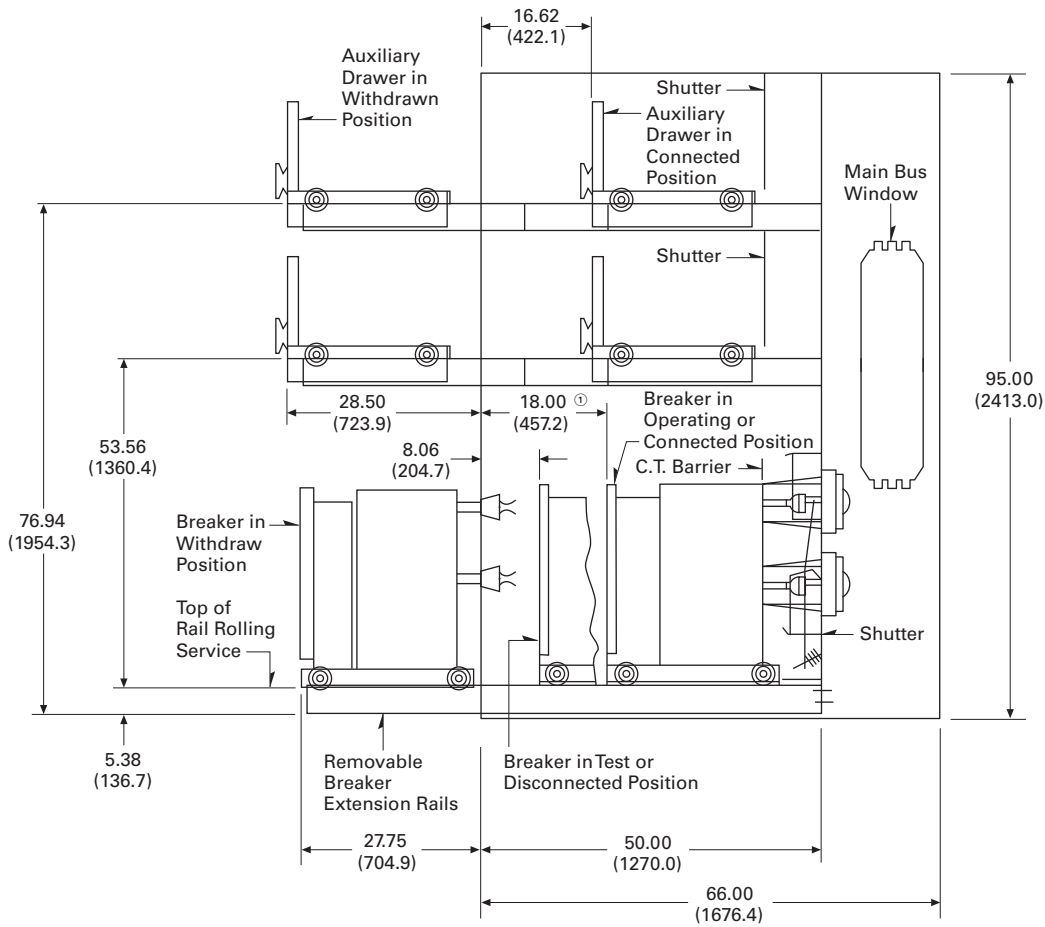
Type VCP-W Circuit Breaker
with Deadfront Panel Removed



Mini Module

5/15 kV VCPW-ND and VCP-W Power Modules

Power Module, 5/15 kV VCPW-ND 26.00 (660.4) Wide, VCP-W 36.00 (914.4) Wide



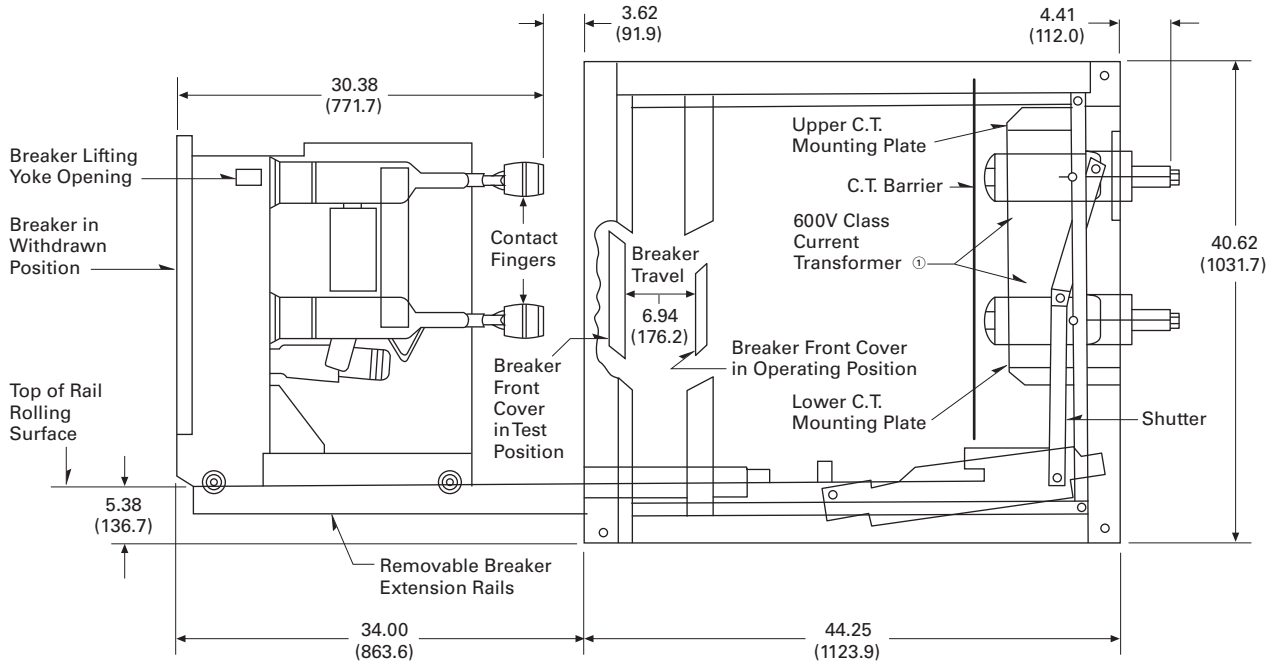
Note

① VCPW-ND dimensions of breaker travel 15.00 (381.0).

Approximate Dimensions in Inches (mm)

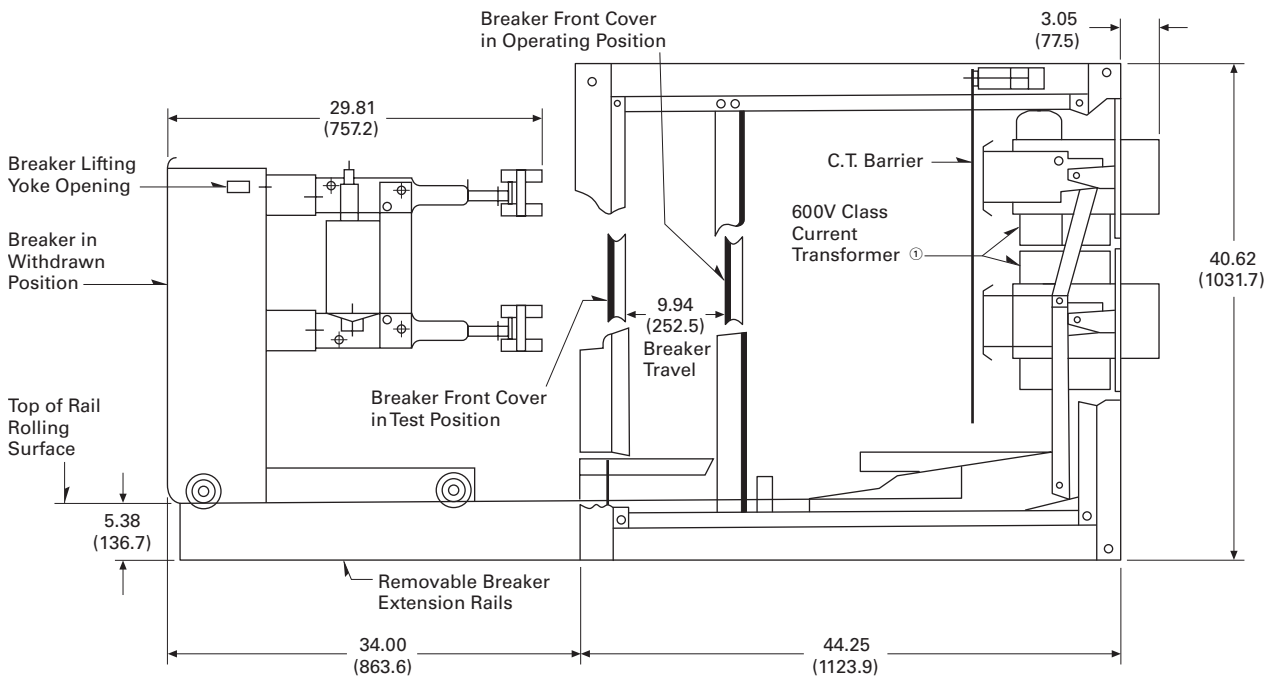
5/15 kV VCPW-ND and VCP-W Mini Modules

5 kV VCPW-ND Mini Module 25.88 (657.4) Wide



5/15 kV VCP-W Mini Module

5/15 kV VCP-W Mini-Module 35.88 (911.4) Wide



Note

① Current transformers not supplied.

Product Overview

Voltage Class

Eaton SL Medium Voltage Vacuum Contactors are designed to operate at voltages from 2200V to 15,000V, depending on contactor type. Typical system voltages are 2400V, 3300V, 4160V and 6600V for 7.2 kV contactors and 10,000V, 11,000V, 13,200V and 13,800V for 15 kV contactors.

Altitude

7.2 kV/160–400A SL Contactors are capable of operating in virtually any altitude range. Three versions are offered in Standard, High and Low altitude configurations. No de-rating is necessary for proper operation. Altitude designations are listed in the table below.

Altitude

| Altitude | Low | Standard | High |
|-----------------------------------|------------------------|------------------------|--------------------------|
| 7.2 kV/160–400A | | | |
| Feet | –11,500 to –3300 | –3300 to +6600 | +6600 to +13,100 |
| Meters | –3500 to –1000 | –1000 to +2000 | +2000 to +4000 |
| 7.2 kV/800A and 15 kV/300A | | | |
| Feet | N/A | –3300 to +11,800 | +11,800 to +16,000 |
| Meters | N/A | –1000 to +3600 | +3600 to +4900 |

Contents

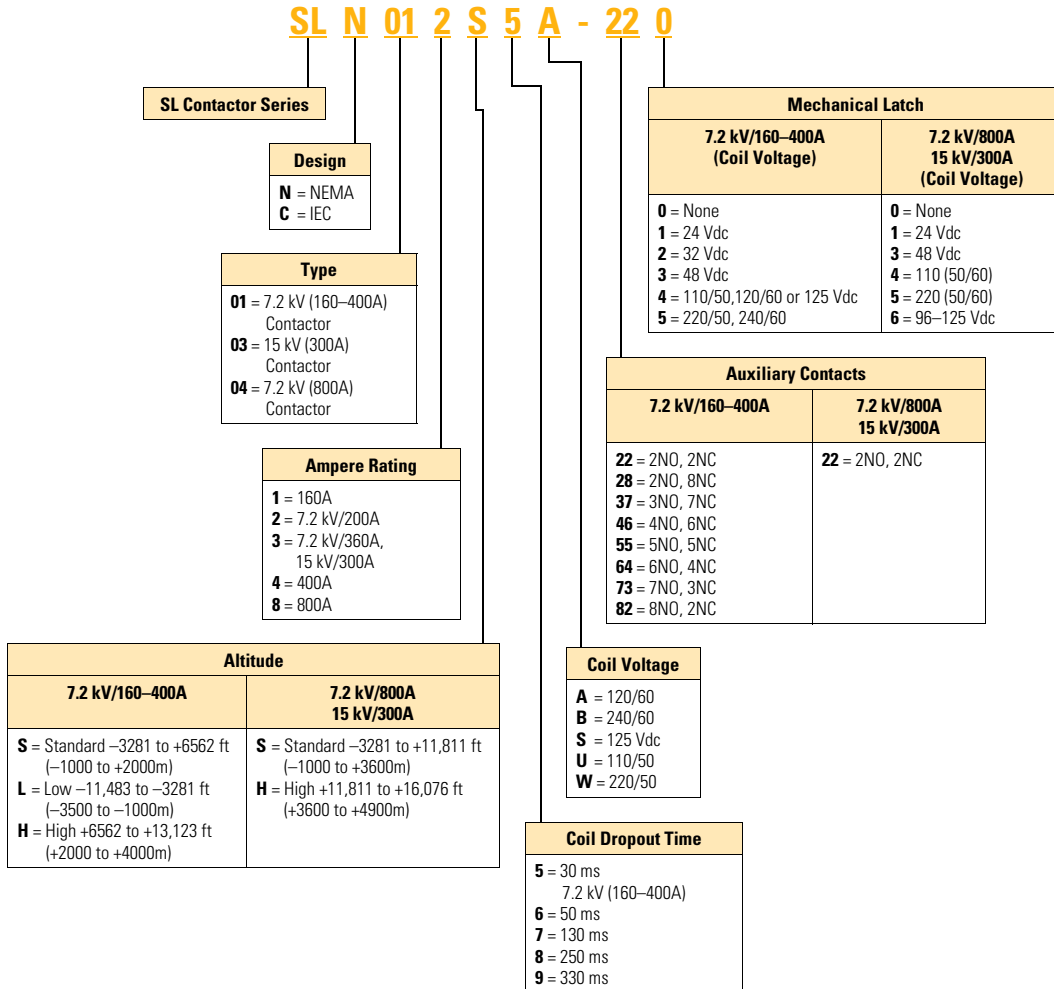
| <i>Description</i> | <i>Page</i> |
|---|-----------------|
| Catalog Number Selection | V4-T3-73 |
| SL MV Power Contactor 7.2 kV/160–400A | V4-T3-74 |
| SL MV Power Contactor 7.2 kV/800A | V4-T3-83 |
| SL MV Power Contactor 15 kV/300A | V4-T3-87 |

Control Voltage and Dropout Time

Control coil voltage and dropout time for all SL contactors are field selectable. Standard voltages available are 120/60V, 110/50V, 240/60V, 220/50V and 125 Vdc. Coil will pick up at 80% of rated coil voltage and dropout not sooner than 60% of rated coil voltage. Opening time is field selectable within the range of 30–330 ms for all 7.2 kV 160–400A contactors. Opening time is field selectable within the range of 50–330 ms for all 7.2 kV 800A and 15 kV 300A contactors.

Catalog Number Selection

Power Contactors



SL 7.2 kV/160–400A Medium Voltage Contactor



Contents

| <i>Description</i> | <i>Page</i> |
|---|-----------------|
| Product Overview | V4-T3-72 |
| SL MV Power Contactor 7.2 kV/160–400A | |
| Standards and Certifications | V4-T3-76 |
| Product Selection | V4-T3-76 |
| Options and Accessories | V4-T3-76 |
| Technical Data and Specifications | V4-T3-77 |
| Wiring Diagrams | V4-T3-80 |
| Dimensions | V4-T3-81 |
| SL MV Power Contactor 7.2 kV/800A | V4-T3-83 |
| SL MV Power Contactor 15 kV/300A | V4-T3-87 |

SL MV Power Contactor 7.2 kV/160–400A

Product Description

- A single family of contactors for any medium voltage control application. Voltage range of 2200–7200V
- Ampere ratings from 160 to 400A with induction motor horsepower ranges from 600 to 5500 hp
- Three different altitude versions
- Leading-edge vacuum technology
- Fully complies with global standards

Application Description

Eaton's SL Medium Voltage Contactor starting applications:

- Squirrel-cage induction motors
- Synchronous motors
- Wound-rotor

Fully applicable to:

- Full voltage starting
- Reduced voltage starting

The perfect choice for harsh duty applications:

- Mining
- Pulp and paper
- HVAC
- Petrochemical
- Automotive
- Many others

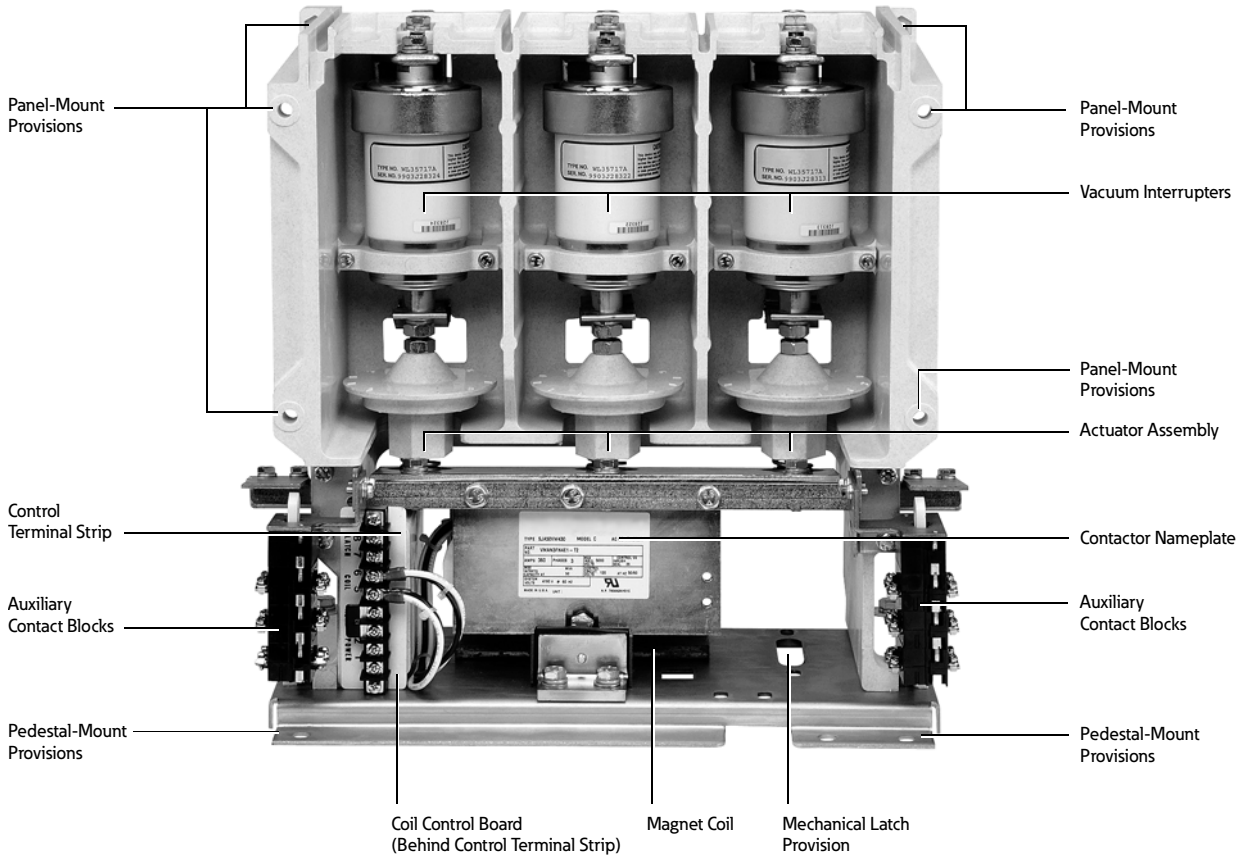
Features, Benefits and Functions

- Long life—300,000 electrical and over 2 million mechanical
- Mounting flexibility—panel or pedestal mounting provisions are standard. Unit can be mounted in horizontal or vertical position
- Field-selectable settings for coil voltage, AC/DC, and coil dropout time
- Field kits available for auxiliary contacts and mechanical latch. Accessories are common for all sizes
- Special ordering allows unit to be factory pre-set to customer specification, including field kit installation
- Highest quality available—all contactors manufactured within state-of-the-art "ISO-Certified" facilities. 100% made in America

Easy-to-Install Option Kits (Field Addition)

- Up to six extra auxiliary contacts
- Mechanical latch—many coil voltages

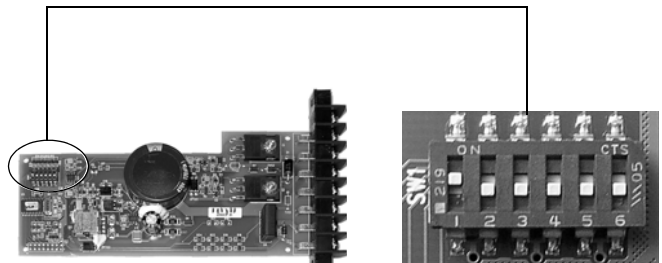
SL Series Features (7.2 kV/160–400A)



Control Settings



Control Terminal Strip



Coil Control Board

DIP Switches

3.2

Power Breakers, Contactors and Fuses

Medium Voltage Power Contactors

3

Standards and Certifications

Global Acceptability

- NEMA
- ANSI
- IEC

Third-Party Verification

- UL
- CSA
- KEMA
- Third-party qualified by UL, CSA, KEMA

Design and Test Standards

- UL 347, File No. E63257
- CSA File No. LR28548
- IEC No. 60470
- ANSI/NEMA ICS 3



Product Selection

Contact Eaton for pricing.

Options and Accessories

SL Vacuum Contactor Series—Sizes 7.2 kV/160–400A Accessory Kits

Mechanical Latch Kit

Field Mount to 7.2 kV/160–400A SL Vacuum Contactor. Coil voltages available in a wide range of AC and DC selections. Easy to install on new and existing units.



Mechanical Latch Kit

Auxiliary Contact Kit

Field Mount auxiliary contact kits for 7.2 kV/160–400A SL Vacuum Contactor. Contact kits are available in many configurations of NO-NC.



Auxiliary Contact Kit

Mechanical Interlock Kit

Field Mount mechanical interlock kits for 7.2 kV/160–400A SL Vacuum Contactor.



Mechanical Interlock Kit

Ordering Information—Mechanical Latch Kit

| Coil Voltage | Catalog Number |
|------------------------------------|------------------|
| 24 Vdc | SLA-ML24 |
| 32 Vdc | SLA-ML32 |
| 48 Vdc | SLA-ML48 |
| 110/50, 120/60, 125 Vdc selectable | SLA-ML120 |
| 220/50, 240/60 selectable | SLA-ML240 |

Ordering Information—Auxiliary Contact Kit

| Description | Catalog Number |
|--------------------|-----------------|
| 3NO–3NC additional | SLA-AS33 |
| 6NO additional | SLA-AS60 |
| 6NC additional | SLA-AS06 |
| 5NO–1NC additional | SLA-AS51 |
| 4NO–2NC additional | SLA-AS42 |
| 2NO–4NC additional | SLA-AS24 |
| 1NO–5NC additional | SLA-AS15 |

Ordering Information—Mechanical Interlock Kit

| Description | Catalog Number |
|------------------------------------|----------------|
| Vertical or horizontal arrangement | SLA-MI |

Technical Data and Specifications

The SL 400 Contactor Ratings

- Voltages of 2200–7200V
- Amperages from 160 to 400A
- Interrupting ratings as high as 8500A

Control Voltages (Field Adjustable)

- 110, 220 Vac, 50 Hz
- 120, 240 Vac, 60 Hz

- 125 Vdc

Dropout Time (Field Adjustable)

- 30 ms
- 50 ms
- 130 ms
- 250 ms
- 330 ms

Front and Rear View (7.2 kV/160–400A)



Front View



Rear View

Control Voltage Settings (7.2 kV/160–400A)

| Setting | SW1 | SW2 | SW3 |
|----------------|-----|-----|-----|
| 110 Vac, 50 Hz | Off | Off | Off |
| 120 Vac, 60 Hz | On | Off | Off |
| 220 Vac, 50 Hz | Off | On | Off |
| 240 Vac, 60 Hz | On | On | Off |
| 125 Vdc | Off | Off | On |

Dropout Time Settings (7.2 kV/160–400A)

| Delay Setting | SW4 | SW5 | SW6 |
|---------------|-----|-----|-----|
| 30 ms | Off | Off | Off |
| 50 ms | On | Off | Off |
| 130 ms | Off | On | Off |
| 250 ms | On | On | Off |
| 330 ms | Off | Off | On |

Altitude Designations (7.2 kV/160–400A)

| Altitude | Low | Standard | High |
|----------|------------------|----------------|------------------|
| Feet | –11,483 to –3281 | –3281 to +6562 | +6562 to +13,123 |
| Meters | –3500 to –1000 | –1000 to +2000 | +2000 to +4000 |

Note

Stock units pre-set to 120/60 Vac.

3.2

Power Breakers, Contactors and Fuses

Medium Voltage Power Contactors

SL Series Fuses

Fuse Application Table for SL Contactors—7.2 kV/160A

| Motor FLA | Voltage | Suggested Eaton Fuse | Rating | Minimum Opening Time |
|-----------|-----------|----------------------|---------|----------------------|
| 11–18 | 2400–4800 | 5BCLS-30 | 30–1R | 30 |
| 18–31 | 2400–4800 | 5BCLS-2R | 70–2R | 30 |
| 31–46 | 2400–4800 | 5BCLS-3R | 100–3R | 30 |
| 46–62 | 2400–4800 | 5BCLS-4R | 130–4R | 30 |
| 62–74 | 2400–4800 | 5BCLS-5R | 150–5R | 30 |
| 74–93 | 2400–4800 | 5BCLS-6R | 170–6R | 30 |
| 93–137 | 2400–4800 | 5BCLS-9R | 200–9R | 130 |
| 137–160 | 2400–4800 | 5BCLS-12R | 230–12R | 130 |
| 11–34 | 5500–6600 | 7BCLS-2R | 70–2R | 30 |
| 34–46 | 5500–6600 | 7BCLS-3R | 100–3R | 30 |
| 46–56 | 5500–6600 | 7BCLS-4R | 130–4R | 30 |
| 56–68 | 5500–6600 | 7BCLS-5R | 150–5R | 30 |
| 68–85 | 5500–6600 | 7BCLS-6R | 170–6R | 30 |
| 85–137 | 5500–6600 | 7BCLS-9R | 200–9R | 50 |
| 137–160 | 5500–6600 | 7BCLS-12R | 230–12R | 250 |

Fuse Application Table for SL Contactors—7.2 kV/200A

| Motor FLA | Voltage | Suggested Eaton Fuse | Rating | Minimum Opening Time |
|----------------------|-----------|----------------------|---------|----------------------|
| 11–18 | 2400–4800 | 5BCLS-30 | 30–1R | 30 |
| 18–31 | 2400–4800 | 5BCLS-2R | 70–2R | 30 |
| 31–46 | 2400–4800 | 5BCLS-3R | 100–3R | 30 |
| 46–62 | 2400–4800 | 5BCLS-4R | 130–4R | 30 |
| 62–74 | 2400–4800 | 5BCLS-5R | 150–5R | 30 |
| 74–93 | 2400–4800 | 5BCLS-6R | 170–6R | 30 |
| 93–137 | 2400–4800 | 5BCLS-9R | 200–9R | 130 |
| 137–200 ^① | 2400–4800 | 5BCLS-12R | 230–12R | 130 |
| 11–34 | 5500–6600 | 7BCLS-2R | 70–2R | 30 |
| 34–46 | 5500–6600 | 7BCLS-3R | 100–3R | 30 |
| 46–56 | 5500–6600 | 7BCLS-4R | 130–4R | 30 |
| 56–68 | 5500–6600 | 7BCLS-5R | 150–5R | 30 |
| 68–85 | 5500–6600 | 7BCLS-6R | 170–6R | 30 |
| 85–137 | 5500–6600 | 7BCLS-9R | 200–9R | 50 |
| 137–200 ^① | 5500–6600 | 7BCLS-12R | 230–12R | 250 |

Fuse Application Table for SL Contactors—7.2 kV/360A

| Motor FLA | Voltage | Suggested Eaton Fuse | Rating | Minimum Opening Time |
|----------------------|-----------|----------------------|---------|----------------------|
| 11–18 | 2400–4800 | 5BCLS-30 | 30–1R | 30 |
| 18–31 | 2400–4800 | 5BCLS-2R | 70–2R | 30 |
| 31–46 | 2400–4800 | 5BCLS-3R | 100–3R | 30 |
| 46–62 | 2400–4800 | 5BCLS-4R | 130–4R | 30 |
| 62–74 | 2400–4800 | 5BCLS-5R | 150–5R | 30 |
| 74–93 | 2400–4800 | 5BCLS-6R | 170–6R | 30 |
| 93–137 | 2400–4800 | 5BCLS-9R | 200–9R | 130 |
| 137–187 | 2400–4800 | 5BCLS-12R | 230–12R | 130 |
| 187–200 | 2400–4800 | 5BCLS-12R | 230–12R | 130 |
| 200–360 | 2400–4800 | N/A | — | — |
| 11–34 | 5500–6600 | 7BCLS-2R | 70–2R | 30 |
| 34–46 | 5500–6600 | 7BCLS-3R | 100–3R | 30 |
| 46–56 | 5500–6600 | 7BCLS-4R | 130–4R | 30 |
| 56–68 | 5500–6600 | 7BCLS-5R | 150–5R | 30 |
| 68–85 | 5500–6600 | 7BCLS-6R | 170–6R | 30 |
| 85–137 | 5500–6600 | 7BCLS-9R | 200–9R | 50 |
| 137–200 ^① | 5500–6600 | 7BCLS-12R | 230–12R | 250 |
| 200–360 | 5500–6600 | N/A | — | — |

Fuse Application Table for SL Contactors—7.2 kV/400A

| Motor FLA | Voltage | Suggested Eaton Fuse | Rating | Minimum Opening Time |
|----------------------|-----------|----------------------|---------|----------------------|
| 11–18 | 2400–4800 | 5BCLS-30 | 30–1R | 30 |
| 18–31 | 2400–4800 | 5BCLS-2R | 70–2R | 30 |
| 31–46 | 2400–4800 | 5BCLS-3R | 100–3R | 30 |
| 46–62 | 2400–4800 | 5BCLS-4R | 130–4R | 30 |
| 62–74 | 2400–4800 | 5BCLS-5R | 150–5R | 30 |
| 74–93 | 2400–4800 | 5BCLS-6R | 170–6R | 30 |
| 93–137 | 2400–4800 | 5BCLS-9R | 200–9R | 30 |
| 137–187 | 2400–4800 | 5BCLS-12R | 230–12R | 30 |
| 187–273 | 2400–4800 | 5BCLS-18R | 390–18R | 50 |
| 273–400 ^② | 2400–4800 | 5BCLS-24R | 450–24R | 130 |
| 11–34 | 5500–6600 | 7BCLS-2R | 70–2R | 30 |
| 34–46 | 5500–6600 | 7BCLS-3R | 100–3R | 30 |
| 46–56 | 5500–6600 | 7BCLS-4R | 130–4R | 30 |
| 56–68 | 5500–6600 | 7BCLS-5R | 150–5R | 30 |
| 68–85 | 5500–6600 | 7BCLS-6R | 170–6R | 30 |
| 85–137 | 5500–6600 | 7BCLS-9R | 200–9R | 30 |
| 137–187 ^① | 5500–6600 | 7BCLS-12R | 230–12R | 30 |
| 273–400 ^② | 5500–6600 | 7BCLS-24R | 450–24R | 250 |

Notes

① For FLA >180, maximum acceleration time = 4.5 seconds.

② For FLA >360, maximum acceleration time = 6 seconds.

Fuse selections based on LRC = FLA x 6 with acceleration time of 10 seconds except where otherwise noted.

SL Series Ratings

Type SL Vacuum Contactor Ratings (7.2 kV/160–400A)

| Rated Utilization Voltage | Interrupting Rating | | Application Table | | | | | Maximum Insulation Voltage |
|---------------------------|----------------------|--------------------|----------------------------|---|------|-----------------|----------------|----------------------------|
| | NEMA Unfused (E1) kA | NEMA Fused (E2) kA | Induction Motor Horsepower | Synchronous Motor Horsepower (0.8 PF) (1.0 PF) | | Transformer kVA | Capacitor kVAR | |
| 7.2 kV/160A Frame | | | | | | | | |
| 2200–2500 | 4.5 | 50 | 600 | 600 | 800 | 600 | 480 | 7200 |
| 3000–3600 | 4.5 | 50 | 900 | 900 | 1000 | 800 | 640 | 7200 |
| 3800–4800 | 4.5 | 50 | 1200 | 1200 | 1400 | 1000 | 960 | 7200 |
| 6000–6900 | 4.5 | 50 | 1800 | 1800 | 2200 | 1600 | 1320 | 7200 |
| 7.2 kV/200A Frame | | | | | | | | |
| 2200–2500 | 4.5 | 50 | 800 | 800 | 1000 | 750 | 600 | 7200 |
| 3000–3600 | 4.5 | 50 | 1100 | 1100 | 1250 | 1000 | 800 | 7200 |
| 3800–4800 | 4.5 | 50 | 1500 | 1500 | 1750 | 1250 | 1200 | 7200 |
| 6000–6900 | 4.5 | 50 | 2250 | 2250 | 2750 | 2000 | 1650 | 7200 |
| 7.2 kV/360A Frame | | | | | | | | |
| 2200–2500 | 4.5 | 50 | 1500 | 1500 | 1750 | 1200 | 1000 | 7200 |
| 3000–3600 | 4.5 | 50 | 2000 | 2000 | 2500 | 1600 | 1475 | 7200 |
| 3800–4800 | 4.5 | 50 | 2500 | 2500 | 3000 | 2000 | 2150 | 7200 |
| 6000–6900 | 4.5 | 50 | 4000 | 4000 | 5000 | 3200 | 2950 | 7200 |
| 7.2 kV/400A Frame | | | | | | | | |
| 2200–2500 | 8.5 | 50 | 1750 | 1750 | 2000 | 1500 | 1200 | 7200 |
| 3000–3600 | 8.5 | 50 | 2250 | 2250 | 2500 | 2000 | 1650 | 7200 |
| 3800–4800 | 8.5 | 50 | 3000 | 3000 | 3500 | 2500 | 2400 | 7200 |
| 6000–6900 | 8.5 | 50 | 4500 | 4500 | 5500 | 4000 | 3300 | 7200 |

Rating Specifications (7.2 kV/160–400A)

| Ampere Rating | 7.2 kV/160A | 7.2 kV/200A | 7.2 kV/360A | 7.2 kV/400A |
|---|-------------|-------------|-------------|-------------|
| Maximum Interrupting Current (Three operations—amperes) | 4500 | 4500 | 4500 | 8500 |
| Rated Current | 160 | 200 | 360 | 400 |
| IEC Make-Break Capability—AC4 (Amperes) | | | | |
| Make | 1600 | 2000 | 3600 | 4000 |
| Break | 1280 | 1600 | 2880 | 3200 |

3.2

Power Breakers, Contactors and Fuses

Medium Voltage Power Contactors

3

Product Specifications

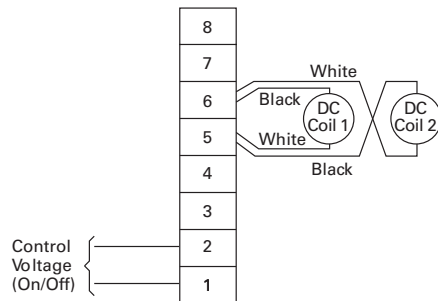
7.2 kV/160–400A

- Short-time current:
 - 30 seconds: 2400A
 - 1 second: 6000A
 - 8.7 ms: 63 kA peak (0.5 cycle)
- Normal service altitude: –3281 to +6562 ft (–1000 to +2000m)
- Mechanical life: 2.5 million
- Electrical life:
 - 6 x Rated Make/1x Rated Break: 300,000 operations
 - 6 x Rated Make/6 x Rated Break: 300,000 operations
- BIL (impulse withstand): 60 kV (1.2 x 50 microseconds)
- Dielectric strength: 20 kV rms (1 minute)
- Closing time: 80 ms (energization to contact touch)
- Selectable opening times:
 - 30 ms (2 cycles)
 - 50 ms (3 cycles)
 - 130 ms (8 cycles)
 - 250 ms (15 cycles)
 - 330 ms (20 cycles)
- Arcing time: 12 ms (0.75 cycle) or less
- Pickup voltage: 80% rated coil voltage
- Dropout voltage: 60% rated coil voltage
- Control voltages:
 - AC/Hz: 110/50, 120/60, 220/50, 240/60
 - DC: 125
- Control circuit burden:
 - Closing: (200 ms)
 - 110/120 AC, 125 DC 1 kVA
 - 220/240 AC 1.8 kVA
 - Holding:
 - 110/120 AC, 125 DC 40 VA
 - 220/240 AC 50 VA
- Auxiliary contact rating:
 - 600V (maximum)
 - 10A continuous current
 - Making capacity
 - AC: 7200 VA
 - DC: 125 VA
 - Breaking capacity
 - AC: 720 VA
 - DC: 125 VA
- Latch (when specified)
 - Mechanical life: 250,000 operations
 - Trip voltage
 - DC: 24V
 - DC: 125V
 - AC: 110/120V
 - Minimum trip voltage: 80% rated coil voltage
 - Trip burden
 - 24 Vdc: 400 VA
 - 48 and 125 Vdc: 400 VA
 - 110 and 120 Vac: 400 VA
 - 220 and 240 Vac: 400 VA
 - Trip time (2 cycles): 30 ms
- Weight
 - 150–360A: 47 lbs (21.3 kg)
 - 400A: 49 lbs (22.2 kg)

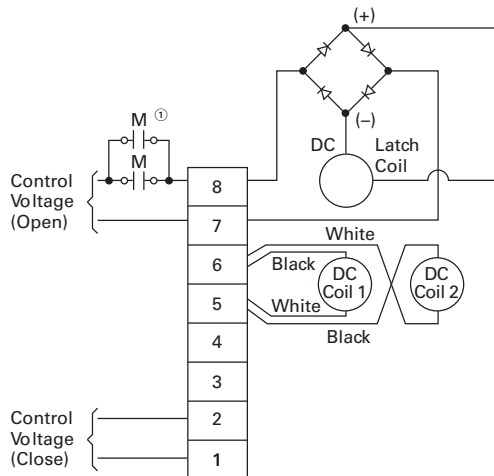
Wiring Diagrams

Electrical Connections Diagrams (7.2 kV/160–400A)

Connection for Magnetically Held Contactor



Connections for Mechanically Latched Contactor



Note

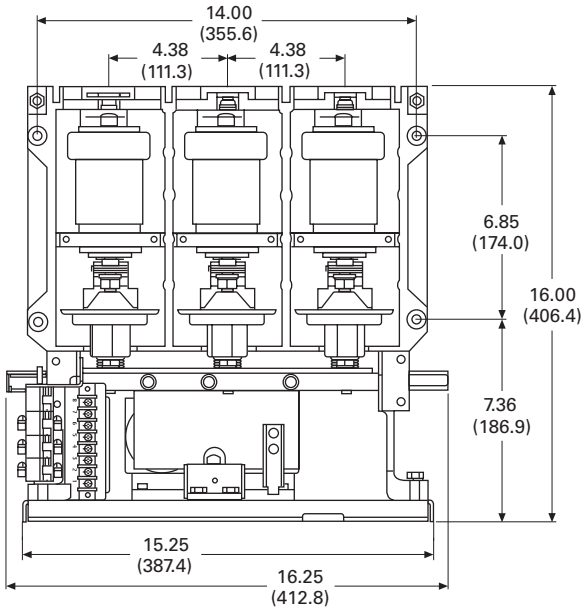
- ① M contacts are connected in parallel for AC voltages and for ≤48 Vdc. M contacts are connected in series for >48 Vdc.

Dimensions

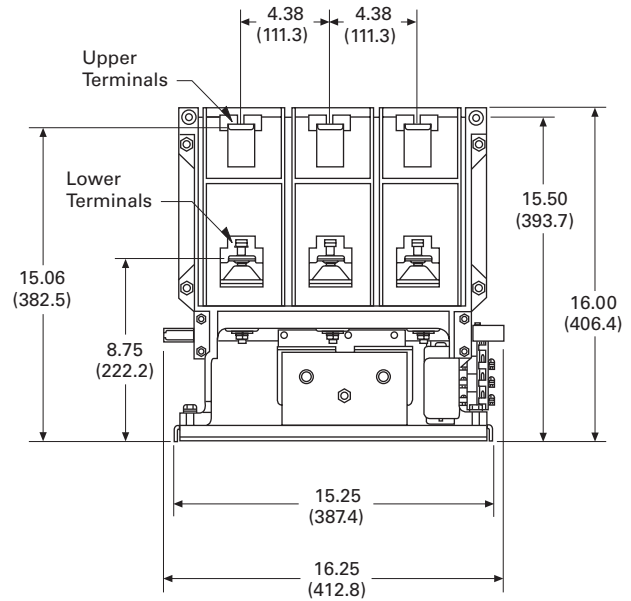
Approximate Dimensions in Inches (mm)

Dimensional Drawings 7.2 kV/160–400A

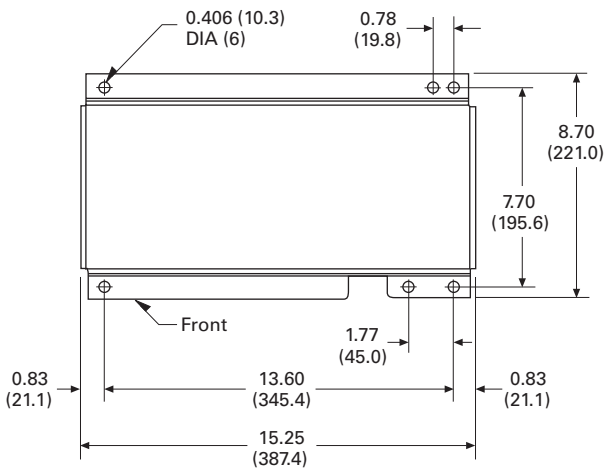
Front



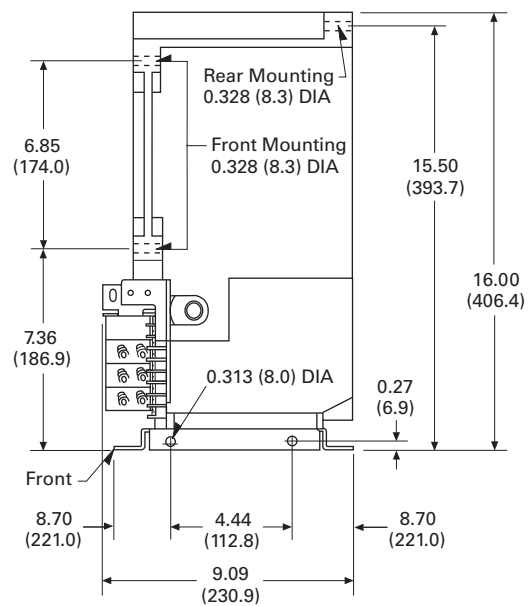
Rear



Base Plate



Side



3.2

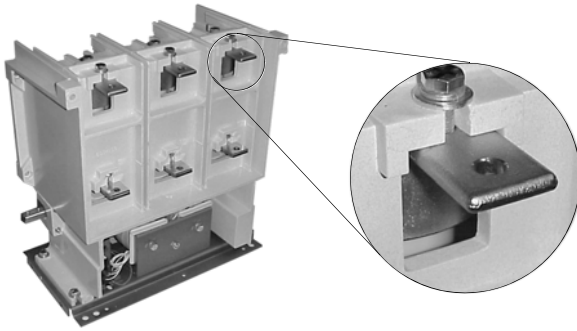
Power Breakers, Contactors and Fuses

Medium Voltage Power Contactors

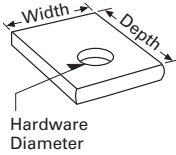
Approximate Dimensions in Inches (mm)

Lug Terminal

3



Lug Terminal



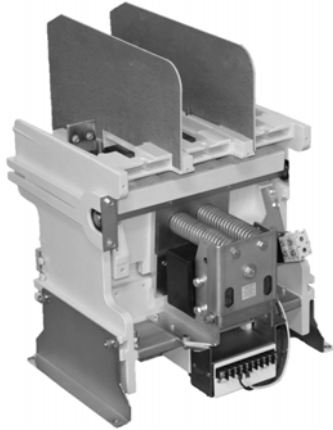
Upper Lug Terminal

| Contactor Ampere Rating | Width | Depth | Hardware (Bolt Diameter) |
|-------------------------|-------------|-------------|--------------------------|
| 7.2 kV/160 | 0.75 (19.1) | 1.31 (33.3) | 10 |
| 7.2 kV/200 | 1.00 (25.4) | 1.31 (33.3) | 10 |
| 7.2 kV/360 | 1.00 (25.4) | 1.31 (33.3) | 10 |
| 7.2 kV/400 | 1.00 (25.4) | 1.31 (33.3) | 10 |

Lower Lug Terminal

| Contactor Ampere Rating | Width | Depth | Hardware (Bolt Diameter) |
|-------------------------|-------------|-------------|--------------------------|
| 7.2 kV/160 | 1.25 (31.8) | 1.10 (27.9) | 10 |
| 7.2 kV/200 | 1.25 (31.8) | 1.10 (27.9) | 10 |
| 7.2 kV/360 | 1.25 (31.8) | 1.10 (27.9) | 10 |
| 7.2 kV/400 | 1.25 (31.8) | 1.10 (27.9) | 10 |

SL 7.2 kV/800A Medium Voltage Contactor



Contents

| <i>Description</i> | <i>Page</i> |
|--|-----------------|
| Product Overview | V4-T3-72 |
| SL MV Power Contactor 7.2 kV/160–400A. | V4-T3-74 |
| SL MV Power Contactor 7.2 kV/800A | |
| Options and Accessories | V4-T3-84 |
| Technical Data and Specifications | V4-T3-84 |
| Dimensions | V4-T3-86 |
| SL MV Power Contactor 15 kV/300A. | V4-T3-87 |

SL MV Power Contactor 7.2 kV/800A

Product Description

- A single family of contactors for any medium voltage control application. Voltage range of 2200–7200V
- 800A rating with induction motor horsepower ranges from 3000 to 10,000 hp

Application Description

Eaton's SL Medium Voltage Contactors starting applications:

- Squirrel-cage induction motors
- Synchronous motors
- Wound-rotor

Fully applicable to:

- Full voltage starting
- Reduced voltage starting

The perfect choice for harsh duty applications:

- Mining
- Pulp and paper
- HVAC
- Petrochemical
- Automotive
- Many others

Features, Benefits and Functions

- Two different altitude versions
- Leading-edge vacuum technology
- Long life—200,000 electrical and 250,000 mechanical
- Special ordering allows unit to be factory pre-set to customer specification, including field kit installation
- Highest quality available—all contactors manufactured within state-of-the-art "ISO-Certified" facilities. 100% made in America

Factory Installed Option Kit

- Mechanical latch—many coil voltages

Standards and Certifications

Acceptability

- NEMA
- ANSI
- IEC

Third-Party Verification

- UL
- CSA
- KEMA

Design and Test Standards

- UL 347, File No. E63257
- CSA
- ANSI/NEMA ICS 3
- IEC 60470



Product Selection

Contact Eaton for pricing.

3.2

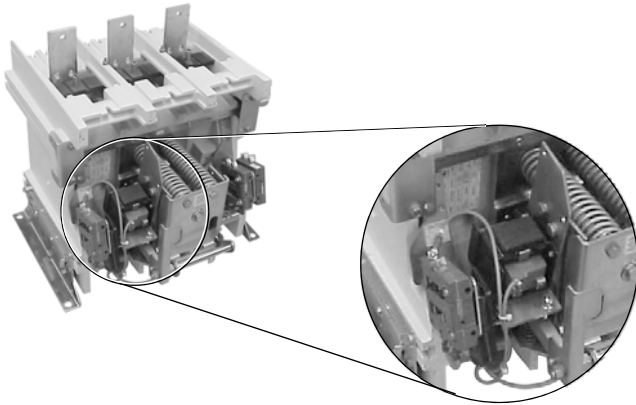
Power Breakers, Contactors and Fuses

Medium Voltage Power Contactors

Options and Accessories

SL Series—Accessory Options 800A

3



Mechanical Latch Assembly 800A

Mechanical Latch Option— SL Vacuum Contactor Size 800A

Factory installed for 800A SL Vacuum Contactor. Coil voltages available in a wide range of AC and DC selections.

Technical Data and Specifications

The SL Contactor Ratings

- Voltages of 2200–7200V
- 800A (720A enclosed)
- Interrupting rating of 12,500A

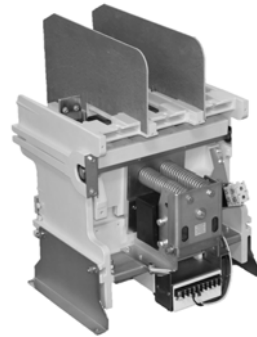
Control Voltages

- 110, 220 Vac, 50 Hz
- 120, 240 Vac, 60 Hz
- 125 Vdc

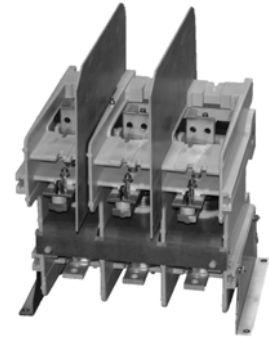
Dropout Time

- 50–330 ms, field selectable

Front and Rear View 7.2 kV/800A



Front View



Rear View

SL Series Fuses

Fuse Application Table for SL Contactors 7.2 kV/SL-800

| Motor FLA | Voltage | Suggested Eaton Fuse | Rating | Minimum Opening Time |
|-----------|-----------|----------------------|---------|----------------------|
| 225–360 | 2400–4800 | 5BCLS-24R | 450–24R | 50 |
| 360–449 | 2400–4800 | 5BCLS-36R | 650–36R | 130 |
| 450–720 | 2400–4800 | 5BCLS-44R | 800–44R | 250 |
| 225–400 | 5500–6600 | 7BCLS-24R | 450–24R | 50 |
| 400–449 | 5500–6600 | 7BCLS-36R | 650–36R | 130 |
| 450–720 | 5500–6600 | 7BCLS-44R | 800–44R | 250 |

Note

Fuse selections based on LRC = FLA x 6 with acceleration time of 10 seconds.

SL Series Ratings

Type SL Vacuum Contactor Ratings 7.2 kV/SL-800

| Rated Utilization Voltage | Interrupting Rating | | Application Table | | | | | |
|---------------------------|----------------------|-----------------------|----------------------------|--|--------|-----------------|----------------|----------------------------|
| | NEMA Unfused (E1) kA | NEMA Fused (E2) kA | Induction Motor Horsepower | Synchronous Motor Horsepower (0.8 PF) (1.0 PF) | | Transformer kVA | Capacitor kVAR | Maximum Insulation Voltage |
| 2200–2500 | 12.5 (50 MVA) | 50 (200 MVA at 2300V) | 3000 | 3000 | 3500 | 2500 | 2400 | 7200 |
| 3000–3600 | 12.5 (50 MVA) | 50 (285 MVA at 3300V) | 4000 | 4000 | 5000 | 3500 | 3200 | 7200 |
| 3800–5000 | 12.5 (75 MVA) | 50 (400 MVA at 4600V) | 5000 | 5000 | 6000 | 4500 | 4000 | 7200 |
| 6000–7200 | 12.5 (100 MVA) | 50 (570 MVA at 6600V) | 8000 | 8000 | 10,000 | 6000 | 4800 | 7200 |

3

Rating Specifications 7.2 kV/SL-800

| Ampere Rating | 7.2 kV/800A |
|---|--------------------|
| Maximum Interrupting Current (Three operations—amperes) | 12,500 |
| Rated Current | 800 (720 enclosed) |
| IEC Make-Break Capability—AC4 (Amperes) | |
| Make | 7650 |
| Break | 6120 |

Product Specifications

7.2 kV/800A

- Short-time current
 - 30 seconds: 4320A
 - 1 second: 10,800A
 - 8.7 ms (0.5 cycle) 86 kA peak
- Normal service altitude: –3281 to +6562 ft (–1000 to +2000m)
- Mechanical life: 250,000
- Electrical life: 200,000 operations
- BIL (impulse withstand): 60 kV (1.2 x 50 microseconds)
- Dielectric strength: 18.2 kV rms (1 minute)
- Closing time (energization to contact touch): 80 ms
- Opening times (de-energization to full open):
 - 50 ms (3 cycles)
 - 130 ms (8 cycles)
 - 200 ms (12 cycles)
 - 330 ms (20 cycles)
- Arcing time: 12 ms (0.75 cycle) or less
- Pickup voltage: 80% rated coil voltage
- Dropout voltage: 60% rated coil voltage
- Control voltages:
 - AC/Hz: 110/50, 120/60 Vac, 220/50, 240/60
 - DC: 125 Vdc
- Control circuit burden:
 - Closing (120/240): 2600 VA
 - Holding (120/240): 50 VA
- Auxiliary contact rating:
 - 600V (maximum)
 - 10A continuous current
- Making capacity
 - AC: 7200 VA
 - DC: 200 VA
- Breaking capacity
 - AC: 720 VA
 - DC: 200 VA
- Latch (when specified):
 - Mechanical life: 250,000 operations
 - Trip voltage
 - DC: 24, 48, 96V
 - AC: 110/120, 220/240V 50/60 Hz
 - Minimum trip voltage: 80% rated coil voltage
 - Trip burden
 - 24 Vdc: 1200 VA
 - 48 and 96 Vdc: 400 VA
 - 110 and 220 Vac: 500 VA
 - Trip time (2 cycles): 30 ms
- Weight: 95 lbs (43.1 kg)

3.2

Power Breakers, Contactors and Fuses

Medium Voltage Power Contactors

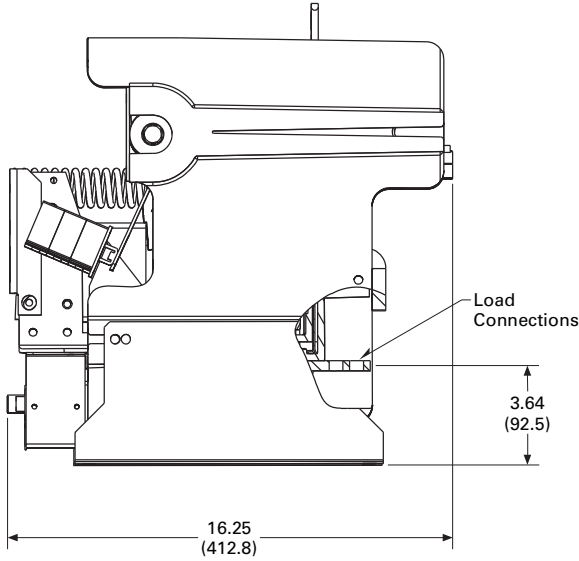
Dimensions

Approximate Dimensions in Inches (mm)

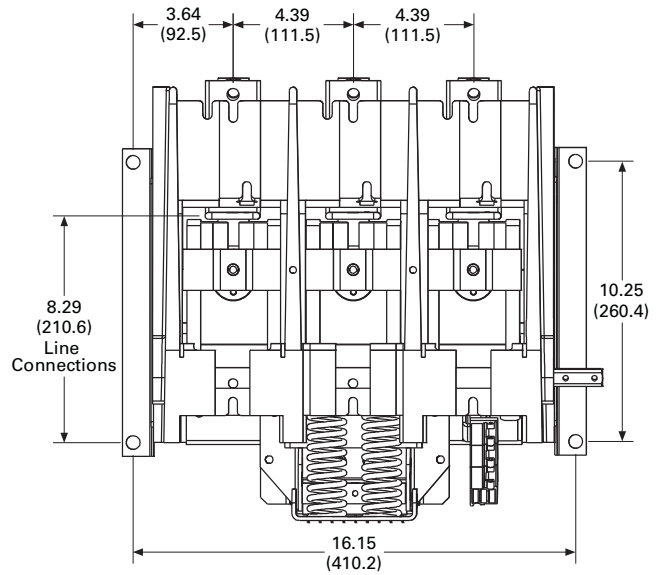
Dimensional Drawings 7.2 kV/800A

3

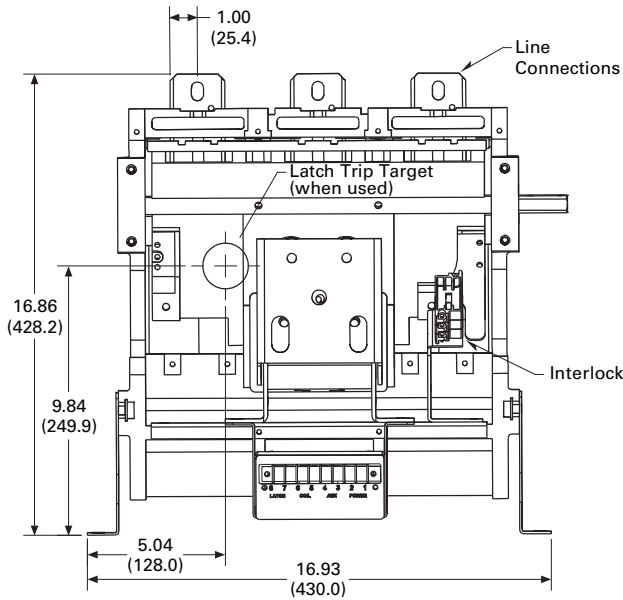
Side



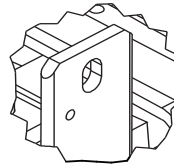
Top



Front

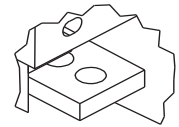


Lug Terminal



Detail A

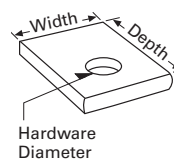
Line Lug Terminal
Use 10 mm or 3/8 inch Bolt



Detail B

Load Lug Terminal
Use 10 mm or 3/8 inch Bolt

Lug Terminal



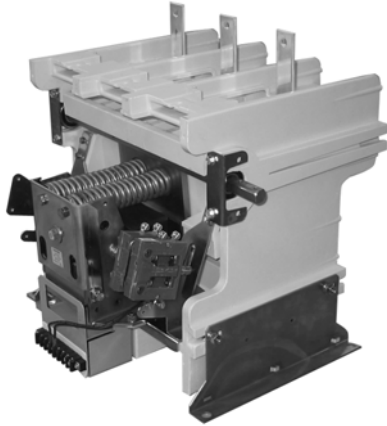
Upper Lug Terminal

| Contactor Ampere Rating | Width | Depth | Hardware (Bolt Diameter) |
|-------------------------|-------------|-------------|--------------------------|
| 7.2 kV/800 | 1.75 (44.5) | 2.00 (50.8) | 10 |

Lower Lug Terminal

| Contactor Ampere Rating | Width | Depth | Hardware (Bolt Diameter) |
|-------------------------|-------------|-------------|--------------------------|
| 7.2 kV/800 | 1.50 (38.1) | 1.50 (38.1) | 10 |

SL 15 kV/300A Medium Voltage Contactor



Contents

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| Product Overview | V4-T3-72 |
| SL MV Power Contactor 7.2 kV/160–400A. | V4-T3-74 |
| SL MV Power Contactor 7.2 kV/800A | V4-T3-83 |
| SL MV Power Contactor 15 kV/300A | |
| Options and Accessories | V4-T3-88 |
| Technical Data and Specifications | V4-T3-88 |
| Dimensions | V4-T3-90 |

SL MV Power Contactor 15 kV/300A

Product Description

- A single family of contactors for any medium voltage control application. Voltage range of 7200–15,000V
- 300A rating with induction motor horsepower ranges from 500 to 7500 hp
- Two different altitude versions
- Leading-edge vacuum technology
- Long life—200,000 electrical and 250,000 mechanical operations
- Special ordering allows unit to be factory pre-set to customer specification, including field kit installation
- Highest quality available—all contactors manufactured within state-of-the-art “ISO-Certified” facilities. 100% made in America

Application Description

Eaton’s SL Medium Voltage Contactors starting applications:

- Squirrel-cage induction motors
- Synchronous motors
- Wound-rotor

Fully applicable to:

- Full voltage starting
- Reduced voltage starting

The perfect choice for harsh duty applications:

- Mining
- Pulp and paper
- HVAC
- Petrochemical
- Automotive
- Many others

Features, Benefits and Functions

Factory Installed Option Kit

- Mechanical latch—many coil voltages

Standards and Certifications

Acceptability

- NEMA
- ANSI
- IEC

Third-Party Verification

- UL
- CSA
- KEMA

Design and Test Standards

- UL 347, File No. E63257
- CSA
- ANSI/NEMA ICS 3
- IEC 60470



Product Selection

Contact Eaton for pricing.

3.2

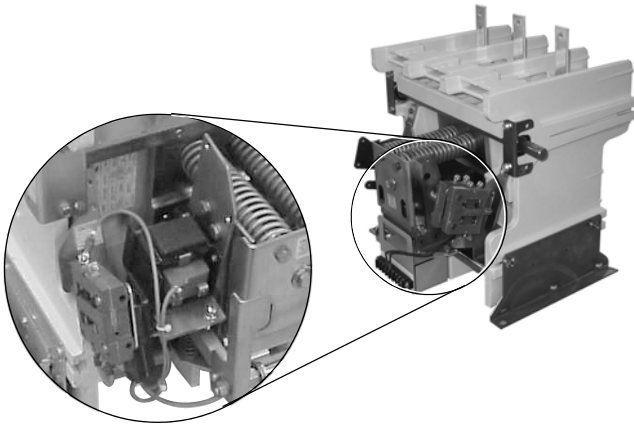
Power Breakers, Contactors and Fuses

Medium Voltage Power Contactors

Options and Accessories

SL Series—Accessory Options 15 kV/300A

3



Mechanical Latch Assembly 15 kV/300A

Mechanical Latch Option— SL Vacuum Contactor

Factory installed for 15 kV/300A SL Vacuum Contactor. Coil voltages available in a wide range of AC and DC selections.

Technical Data and Specifications

The SL Contactor Ratings

- Voltages to 15,000V
- 300A
- Interrupting rating of 5000A

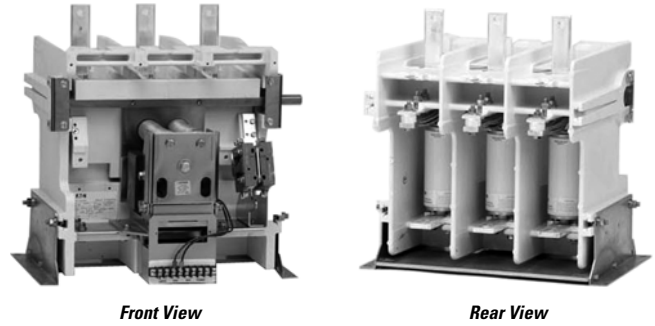
Control Voltages

- 110, 220 Vac, 50 Hz
- 120, 240 Vac, 60 Hz
- 125 Vdc

Dropout Time

- 50–330 ms
- Field selectable

Front and Rear View 15 kV/300A



SL Series Fuses

Fuse Application Table for SL Contactors 15 kV/SL-300A

| Motor FLA | Voltage | Suggested Eaton Fuse | Rating | Minimum Opening Time |
|-----------|---------------|----------------------|--------|----------------------|
| 50–300 ① | 10,000–13,800 | 15BHCLS-400 | 400 | 130 ms |

Notes

① For FLA >275, contact factory for maximum acceleration time.

Fuse selections based on LRC = FLA x 6 with acceleration time of 10 seconds except where otherwise noted.

SL Series Ratings

Type SL Vacuum Contactor Ratings 15 kV/300A

| Rated Utilization Voltage | Interrupting Rating | | Application Table | | | | | |
|---------------------------|----------------------|--------------------------|----------------------------|--|------|-----------------|-----------------|----------------------------|
| | NEMA Unfused (E1) kA | NEMA Fused (E2) kA | Induction Motor Horsepower | Synchronous Motor Horsepower (0.8 PF) (1.0 PF) | | Transformer kVA | Capacitor kVAR | Maximum Insulation Voltage |
| 10,000–11,000 | 5 | 50 (950 MVA at 11,000V) | 6000 | 6000 | 6750 | 5500 | Consult factory | 15,000 |
| 12,400–13,800 | 5 | 50 (1190 MVA at 13,800V) | 7500 | 7500 | 8500 | 6800 | Consult factory | 15,000 |

Rating Specifications 15 kV/300A

| Ampere Rating | 15 kV/300A |
|---|------------|
| Maximum Interrupting Current (Three operations—amperes) | 5000 |
| Rated Current | 300 |
| IEC Make-Break Capability—AC4 (Amperes) | |
| Make | 3000 |
| Break | 3000 |

Product Specifications

15 kV/300A

- Short-time current
 - 30 seconds: 1800A
 - 1 second: 4500A
 - 8.7 ms (0.5 cycle) 25 kA peak
- Normal service altitude: –3281 to +6562 ft (–1000 to +2000m)
- Mechanical life: 250,000 operations
- Electrical life: 200,000 operations
- BIL (impulse withstand): 75 kV (1.2 x 50 microseconds)
- Dielectric strength: 36 kV rms (1 minute)
- Closing time (energization to contact touch): 80 ms
- Selectable opening times (de-energization to full open):
 - 50 ms (3 cycles)
 - 130 ms (8 cycles)
 - 250 ms (12 cycles)
 - 330 ms (20 cycles)
- Arcing time: 12 ms (0.75 cycle) or less
- Pickup voltage: 80% rated coil voltage
- Dropout voltage: 60% rated coil voltage
- Control voltages:
 - AC/Hz: 110/50, 120/60 Vac, 220/50, 240/60
 - DC: 125 Vdc
- Control circuit burden:
 - Closing (120/240): 1700/2600 VA
 - Holding (120/240): 80 VA
- Auxiliary contact rating:
 - 600V (maximum)
 - 10A continuous current
- Making capacity
 - AC: 7200 VA
 - DC: 200 VA
- Breaking capacity
 - AC: 720 VA
 - DC: 200 VA
- Latch (when specified):
 - Mechanical life: 250,000 operations
 - Trip voltage
 - DC: 24, 48, 96V
 - AC: 110/120, 220/240V, 50/60 Hz
 - Minimum trip voltage: 80% rated coil voltage
 - Trip burden
 - 24 Vdc: 1200 VA
 - 48 and 96 Vdc: 400 VA
 - 110 and 220 Vac: 500 VA
 - Trip time (2 cycles): 30 ms
- Weight: 95 lbs (43.1 kg)

3.2

Power Breakers, Contactors and Fuses

Medium Voltage Power Contactors

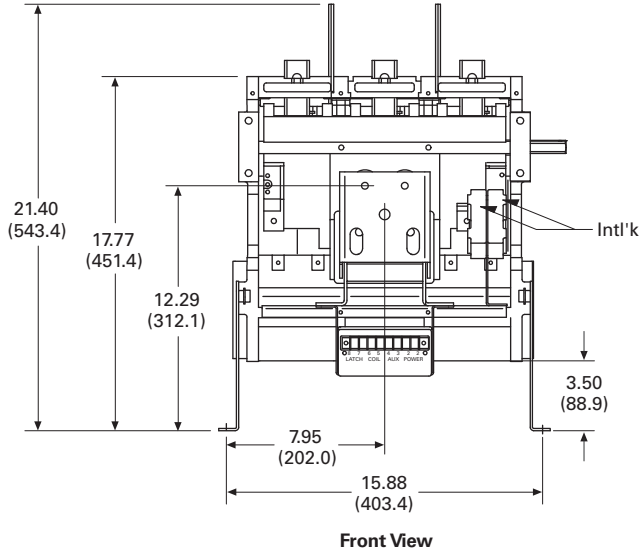
Dimensions

Approximate Dimensions in Inches (mm)

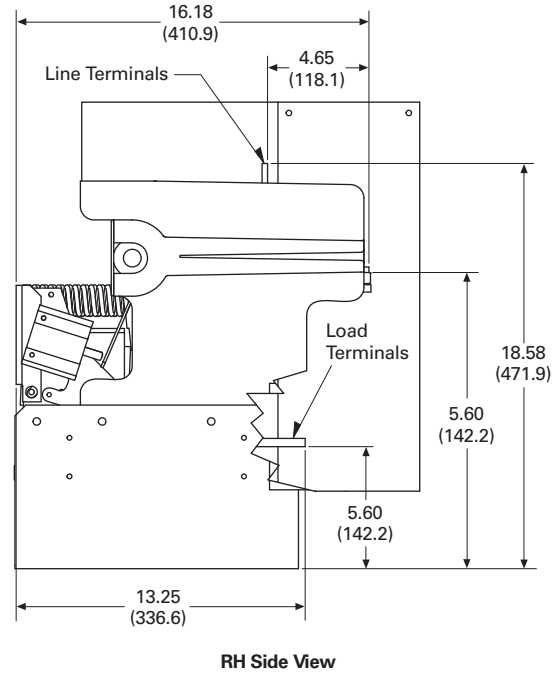
Dimensional Drawings 15 kV/300A

3

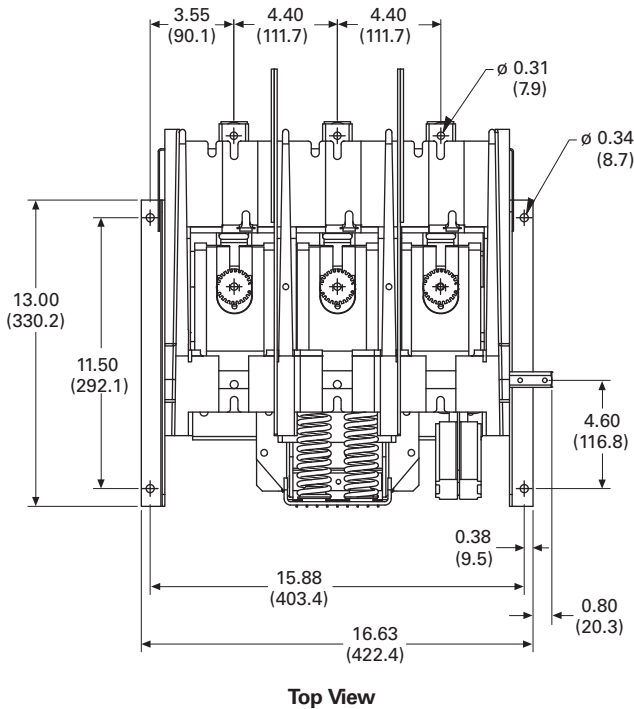
Front



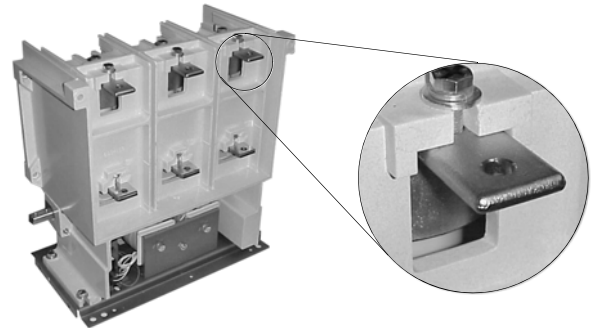
Side 15 kV/300A



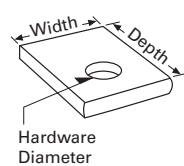
Top



Lug Terminal



Lug Terminal



Upper Lug Terminal

| Contactor Ampere Rating | Width | Depth | Hardware (Bolt Diameter) |
|-------------------------|-------------|-------------|--------------------------|
| 15 kV/300 | 1.25 (31.8) | 1.25 (31.8) | 10 |

Lower Lug Terminal

| Contactor Ampere Rating | Width | Depth | Hardware (Bolt Diameter) |
|-------------------------|-------------|-------------|--------------------------|
| 15 kV/300 | 1.50 (38.1) | 1.25 (38.1) | 10 |

Contents**Description**

Fuses General

Product Overview**Power Fuse**

Eaton's roots in the medium voltage power fuse business began over 75 years ago under Westinghouse® Electric. In 1935, Westinghouse introduced the medium voltage boric acid expulsion fuse followed by the medium voltage current limiting fuse. Even today, medium voltage fuses continue to use that core technology. Eaton continues to build on the technology legacy by engineering higher performance, cost-effective power fuse products.

Eaton's medium voltage fuses are manufactured and tested to the requirements of the C37-4X series of standards, which are maintained and updated regularly to maintain currency with industry practices. These standards are:

IEEE Std. C37.40™

IEEE Standard Service Conditions and Definitions for High Voltage Fuses, Distribution Enclosed Single-Pole Air Switches, Fuse Disconnecting Switches, and Accessories (ANSI).

IEEE Std. C37.41™

IEEE Standard Design Tests for High-Voltage (>1000V) Fuses, Fuse and Disconnecting Cutouts, Distribution Enclosed Single-Pole Air Switches, Fuse Disconnecting Switches, and Fuse Links and Accessories used with These Devices (ANSI).

ANSI C37.42™

IEEE Standard Specifications for High-Voltage (>1000V) Expulsion-Type Distribution-Class Fuses, Fuse and Disconnecting Cutouts, Fuse Disconnecting Switches, and Fuse Links, and Accessories used with These Devices (ANSI).

ANSI C37.46

American National Standard for High Voltage Expulsion and Current Limiting Type Power Class Fuses and Fuse Disconnecting Switches.

ANSI C37.47

American National Standard for High Voltage Current Limiting Type Distribution Class Fuses and Fuse Disconnecting Switches.

The following IEEE standards are also applicable to the fuse products covered in this publication:

IEEE Std. C37.48™

IEEE Guide for the Application, Operation, and Maintenance of High Voltage Fuses, Distribution Enclosed Single-Pole Air Switches, Fuse Disconnecting Switches, and Accessories (ANSI).

IEEE Std. C37.48.1™

IEEE Guide for the Classification, Application, and Coordination of Current-Limiting Fuses with Rated Voltages 1–38 kV.

A better understanding of some fuse terminology will help you understand and select the correct fuse. The following is a brief overview of those terms.

Power vs. Distribution

The differentiation is intended to indicate the test conditions and where fuses are normally applied on an electrical system, based on specific requirements for generating sources, substations and distribution lines. Each class has its own unique set of voltage, current and construction requirements (see C37.42, .46 and .47).

Low vs. Medium vs. High Voltage

While fuses are defined in the ANSI standards as either low or high voltage, Eaton has elected to name their fuses to correspond with the equipment in which they are installed. Therefore, per ANSI C84, our fuses are named as follows:

- Low voltage—1000V and below
- Medium voltage—greater than 1000 to 69,000V
- High voltage—greater than 69,000V

Expulsion vs. Current Limiting (Definitions per ANSI C47.40-1993)

An expulsion fuse is a vented fuse in which the expulsion effect of the gases produced by internal arcing, either alone or aided by other mechanisms, results in current interruption.

An expulsion fuse is not current limiting and as a result limits the duration of a fault on the electrical system, not the magnitude.

A current limiting fuse is a fuse that, when its current responsive element is melted by a current within the fuse's specified current limiting range, abruptly introduces a high resistance to reduce current magnitude and duration, resulting in subsequent current interruption. Refer to Fuse Types Protection Range figure on **Page V4-T3-93** for a features comparison.

Fuse Types

There are three current limiting fuse types: Backup, General Purpose and Full Range. It is important that the user have an understanding of these definitions to ensure proper application of the fuse (see Fuse Types Protection Range figure on **Page V4-T3-93**).

Backup Fuses

A fuse capable of interrupting all currents from the maximum rated interrupting current down to the rated minimum interrupting current.

Backup fuses are always used in a series with another interrupting device capable of interrupting currents below the fuse's minimum interrupting current.

General Purpose Fuses

A fuse capable of interrupting all currents from the rated interrupting current down to the current that causes melting of the fusible element in no less than one hour.

General Purpose fuses are typically used to protect feeders and components such as transformers.

Full Range Fuses

A fuse capable of interrupting all currents from the rated interrupting current down to the minimum continuous current that causes melting of the fusible element, with the fuse applied at the maximum ambient temperature specified by the manufacturer.

General Fuse Component Terms**Fuse Refill Unit (of an Expulsion Fuse)**

A fuse refill unit is a replaceable assembly containing the calibrated current-responsive fuse element and certain other items that facilitate current interruption. On its own, the refill unit has no interrupting ability. A refill unit must be mounted in a fuseholder with a spring assembly to form a refillable fuse unit. The refill unit is the section of the fuse that must be replaced after a fuse operation.

Fuseholder (of an Expulsion Fuse)

A fuseholder is a reusable holder that when equipped with a fuse refill unit forms a fuse unit, capable of interrupting an overload or fault current. A fuseholder is supplied with a spring and shunt assembly, necessary to complete the internal interrupting assembly. The spring and shunt assembly is supplied with the fuseholder but is also available as a replacement part, as it may need replacement after several of heavy operations.

Fuse Unit

A fuse unit is a replaceable unit or assembly that is able, on its own, to perform current interruption. In the case of a refillable fuse unit, the refill unit must be replaced after a fuse operation. Where a complete fuse unit is supplied from the factory, the complete fuse unit must be replaced after a fuse operation. All current-limiting fuses are fuse units.

Exhaust Control Device

When expulsion fuses are used in enclosures, exhaust control devices (filters, condensers or mufflers) are used to control the sound of the fuse operation, and to de-ionize and absorb the fuse exhaust products. These devices are normally supplied separately, because of different characteristics and ratings. They are reusable but may need replacement after several heavy operations.

Mounting

A mounting provides all the necessary parts to safely mount a fuse in its intended piece of equipment. The base is the metal support to which all other pieces attach. Insulators attach to the base and insulate the live fuse unit from the base and everything beyond the base. Live parts are the parts of the mounting that are energized once electricity is flowing. The live parts provide the means to hold the fuse unit in place, electrical contact, and a place to make line and load connections.

Non-Disconnect Mounting

A non-disconnect mounting does not provide a means for removing the fuse unit until the circuit is dead and the fuse unit can be removed manually. The fuse unit is held in place by friction through the use of fuse clips or by a cross bar.

Disconnect Mounting

The disconnect mounting allows the fuse unit to be removed (off load) using an insulated hook stick. The hookstick grabs a pull ring and disconnects the fuse unit, which may then be lifted out of its mounting.

Dropout Mounting

Dropout mountings are used in outdoor applications. The fuse unit is equipped with a mechanical trigger that unlatches the upper contact, allowing the fuse unit to drop out, increasing the dielectric separation, and providing visible indication of a blown fuse.

Live Parts

Live parts were briefly discussed as part of the “Mounting” definition. Everything above the insulators on the mounting excluding the fuse unit, fuse holder, and the fuse end fittings (if required) are considered the live parts. Fuse end fittings are discussed next and are not required with non-disconnect live parts, but are required and included with disconnect live parts. Live parts may be sold separately as replacement parts or for new OEM applications.

End Fittings

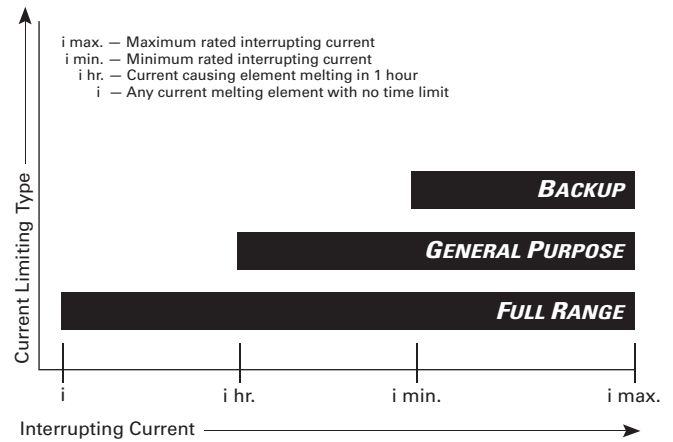
End fittings are metal parts that attach to each end of a fuse unit’s ferrules (end caps). As previously mentioned, they are used solely with disconnect fuse applications or when converting a non-disconnect to a disconnect fuse configuration.

When end fittings are ordered, a fitting for each end of the fuse is included. Keep in mind that end fittings can become damaged in use and, therefore, are sold separately from the live parts when necessary. It is not necessary to purchase an entire set of live parts when only the end fittings are required.

General High Voltage Fuse Comparison

| Expulsion | Current Limiting |
|---|--|
| Vented | Sealed |
| Electromechanical | Static |
| Interrupts at current zero | Limits fault current |
| Generally higher voltage and current application capabilities | Generally higher interrupting ratings |
| Different time/current characteristics | Different time/current characteristics |

Fuse Types Protection Range



Product Description

Eaton’s expulsion fuses use boric acid as the interrupting medium. Under a fault condition, arc heat decomposes the boric acid into water vapor. The water vapor blast deionizes the arc path preventing arc re-ignition after a natural current zero.

Type RBA indoor expulsion fuses must be fitted with a discharge filter or condenser, that moderates the discharge exhaust. The discharge filter limits the exhaust to a small and relatively inert amount of gas and lowers the noise level without affecting the fuse interrupting rating. Steam discharge, that can effect the interrupting, is fully restricted by the condenser.

Type RDB outdoor dropout fuses include an ejector spring that forces the arcing rod through the top of the fuse. The arcing rod strikes a latch on the mounting that forces the fuse to swing outward through a 180° arc into the dropout position.

Refill units can be field installed into RBA and RDB expulsion fuses. Once the operated unit has been removed, the separately purchased unit can be easily installed into the fuse holder.

Type DBU fuse units are designed for new and aftermarket utility applications. End fittings are available, in both indoor and outdoor versions, as well as live parts and mountings. Mufflers confine the arc within the fuse and substantially reduce the noise and exhaust when the fuse interrupts.



RBA E-Rated Refillable Boric Acid



RDB E-Rated Refillable Outdoor Dropout Boric Acid



DBU Dropout Boric Acid—for Use Indoors, Inside Switchgear or Outdoors

Contents

| Description | Page |
|------------------------------------|-----------------|
| Catalog Number Selection | V4-T3-95 |
| Product Selection | V4-T3-96 |

Accessories

The following accessories are available for expulsion fuses:

Mountings

Mountings include a base, porcelain or glass polyester insulators, and live parts. They help enable the fuse to be safely attached to the gear. Mountings can be either disconnect, nondisconnect or dropout. Non-disconnect mountings are available in bolt-on or clamp-type arrangements. Fuses may be vertical or underhung.

Live Parts

Live parts attach the fuse to the insulators and are considered part of the mounting. All parts above the insulators are live parts.

End Fittings

End fittings are metal parts that attach to each end of the fuse at the ferrules. They are used only on disconnect fuses or when converting a nondisconnect to a disconnect fuse.

Catalog Number Selection

Expulsion Fuse

Easy to Use, Easy to Order!

Eaton's fuse catalog numbering system makes it easy to order the right fuse. The catalog numbers are easy to remember, unique to each fuse, and are broken down in three descriptive segments: Fuse Type, Voltage Rating and Current Rating.

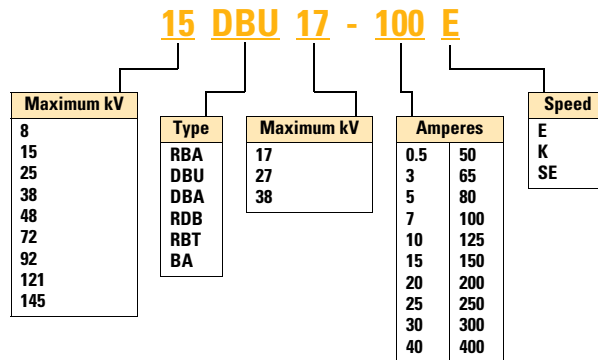
These Catalog numbers can be entered directly and easily:

- No change in order processing will occur if you use either a style number or its corresponding catalog number. You will get the same fuse
- If you are ordering a replacement for an older Westinghouse fuse, it will only have the style number. Order under this style number and you will get the correct fuse

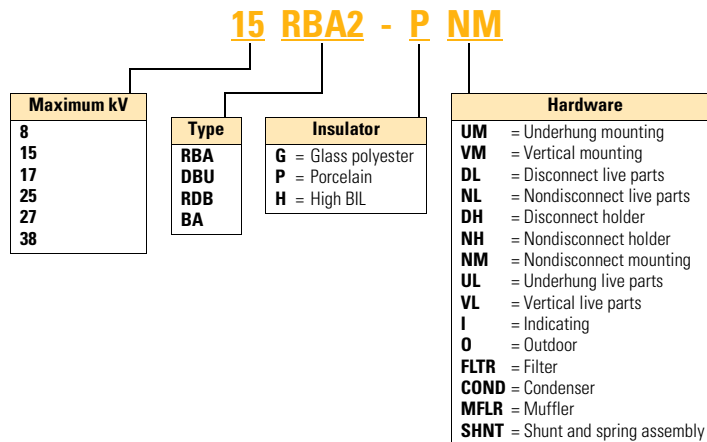
Examples:

| | |
|------------|--|
| 8RBA2-10E | 8.3 max. kV, RBA-200 refill, 10E amperes |
| DBU17-30K | 17.1 max. kV, DBU fuse unit, 30 amperes |
| 15RBA8-INH | 15.5 max. kV, RBA-800, indicating nondisconnect holder |
| RBA4-FLTR | RBA-400 filter |

Expulsion Fuse Units



Expulsion Fuse Accessories



3.4

Power Breakers, Contactors and Fuses

Expulsion Fuses

Product Selection

Contact Eaton for pricing.

Type RBA and RDB

3

Type 8RBA2 Expulsion Fuse Refill Units—8.3 kV Maximum (7.2 kV Nominal) 200A

RBA/RBT Refill Units

| Ampere Rating | Standard Speed (Fuse Refills) | | Time Lag (Fuse Refills) | | Approximate Shipping Weight Lbs (kg) |
|---------------|-------------------------------|------------------------|-------------------------|------------------------|--------------------------------------|
| | Catalog Number | Curve Reference 36-635 | Catalog Number | Curve Reference 36-635 | |
| 10E | 8RBA2-10E | 1, 2 | — | — | 1.0 (0.45) |
| 15E | 8RBA2-15E | 1, 2 | — | — | 1.0 (0.45) |
| 20E | 8RBA2-20E | 1, 2 | 8RBT2-20E | 3, 4 | 1.0 (0.45) |
| 25E | 8RBA2-25E | 1, 2 | 8RBT2-25E | 3, 4 | 1.0 (0.45) |
| 30E | 8RBA2-30E | 1, 2 | 8RBT2-30E | 3, 4 | 1.0 (0.45) |
| 40E | 8RBA2-40E | 1, 2 | 8RBT2-40E | 3, 4 | 1.0 (0.45) |
| 50E | 8RBA2-50E | 1, 2 | 8RBT2-50E | 3, 4 | 1.0 (0.45) |
| 65E | 8RBA2-65E | 1, 2 | 8RBT2-65E | 3, 4 | 1.0 (0.45) |
| 80E | 8RBA2-80E | 1, 2 | 8RBT2-80E | 3, 4 | 1.0 (0.45) |
| 100E | 8RBA2-100E | 1, 2 | 8RBT2-100E | 3, 4 | 1.0 (0.45) |
| 125E | 8RBA2-125E | 1, 2 | 8RBT2-125E | 3, 4 | 1.0 (0.45) |
| 150E | 8RBA2-150E | 1, 2 | 8RBT2-150E | 3, 4 | 1.0 (0.45) |
| 200E | 8RBA2-200E | 1, 2 | 8RBT2-200E | 3, 4 | 1.0 (0.45) |

Type RBA Expulsion Fuses for Use Indoors or in an Enclosure—8.3 kV Maximum (7.2 kV Nominal) 200A (For Use with 8RBA2 Fuseholders) ①

RBA Fuseholders, Mountings and Hardware (For Use with RBA/RBT Refills/holders for Indoor or Enclosure Applications)

| Ampere Rating | Style | Fuseholder | | Voltage (kV) | | LIWL (BIL) | Mounting (Including Live Parts Less Holder) | | Live Parts | Fuse Filters and Condensers | Spring and Shunt Assy. |
|---------------|----------------|-------------------------------|---------------------------|--------------|---------|------------|---|-----------------|------------|-----------------------------|------------------------|
| | | Non-Indicating Catalog Number | Indicating Catalog Number | Nominal | Maximum | | Porcelain Insulator | Glass Polyester | | | |
| 10E–200E | Non-disconnect | 8RBA2-NH | 8RBA2-INH | 4.8 | 5.5 | 60 | 5RBA2-PNM | 5RBA2-GNM | 15RBA2-NL | RBA2-FLTR RBA2-COND | 8RBA2-SHNT |
| | | | | | | | | | | | |
| | Disconnect | 8RBA2-DH | BRBA2-IDH | 4.8 | 5.5 | 60 | 5RBA2-PDM | 5RBA2-GDM | 14RBA2-DL | RBA2-FLTR RBA2-COND | 8RBA2-SHNT |
| | | | | | | | | | | | |
| | Bolt-in | — | 8RBA2-INH-B | 4.8 | 5.5 | 60 | 5RBA8-PNM | 5RBA8-GNM | 15RBA8-NL | RBA2-FLTR RBA2-COND | 8RBA2-SHNT |
| | | | | | | | | | | | |

Type RDB Expulsion Fuses for Use Outdoors—8.3 kV Maximum (7.2 kV Nominal) 200A ②

RDB Fuseholders, Mountings and Hardware (For Use with RBA/RBT Refills/holders for Outdoor Applications)

| Ampere Rating | Style | Fuseholder Catalog Number | Voltage (kV) | | LIWL (BIL) | Mounting (Including Live Parts Less Holder) | | Live Parts | Spring and Shunt Assy. | |
|---------------|---------|---------------------------|--------------|---------|------------|---|--------------------------|------------|------------------------|------------|
| | | | Nominal | Maximum | | Vertical (180°) Mounting | Underhung (90°) Mounting | | | |
| 10E–200E | Dropout | 8RDB2-DH | 7.2 | 8.3 | 95 | 8RDB2-VM | 8RDB2-UM | RDB2-VL | RDB2-UL | 8RDB2-SHNT |
| | | | | | | | | | | |

Notes

- ① For new installation, order one refill (Standard Speed or Time Lag), one fuseholder, one mounting, and one filter or condenser per phase. Live parts can be substituted for the mounting if the user is supplying base support and insulators.
- ② For new installation, order one refill (Standard Speed or Time Lag), one fuseholder and one mounting per phase. Live parts can be substituted for the mounting if the user is supplying base support and insulators.

Type 8RBA4 Expulsion Fuse Refill Units—8.3 kV Maximum (7.2 kV Nominal) 400A

RBA/RBT Refill Units

| Ampere Rating | Standard Speed (Fuse Refills) | | Time Lag (Fuse Refills) | | Approximate Shipping Weight Lbs (kg) |
|---------------|-------------------------------|------------------------|-------------------------|------------------------|--------------------------------------|
| | Catalog Number | Curve Reference 36-635 | Catalog Number | Curve Reference 36-635 | |
| 0.5 | 8RBA4-5 | 5, 6 | — | — | 2.1 (0.95) |
| 3 | 8RBA4-3 | 5, 6 | — | — | 2.1 (0.95) |
| 5E | 8RBA4-5E | 5, 6 | — | — | 2.1 (0.95) |
| 7E | 8RBA4-7E | 5, 6 | — | — | 2.1 (0.95) |
| 10E | 8RBA4-10E | 5, 6 | — | — | 2.1 (0.95) |
| 15E | 8RBA4-15E | 5, 6 | — | — | 2.1 (0.95) |
| 20E | 8RBA4-20E | 5, 6 | 8RBT4-20E | 7, 8 | 2.1 (0.95) |
| 25E | 8RBA4-25E | 5, 6 | 8RBT4-25E | 7, 8 | 2.1 (0.95) |
| 30E | 8RBA4-30E | 5, 6 | 8RBT4-30E | 7, 8 | 2.1 (0.95) |
| 40E | 8RBA4-40E | 5, 6 | 8RBT4-40E | 7, 8 | 2.1 (0.95) |
| 50E | 8RBA4-50E | 5, 6 | 8RBT4-50E | 7, 8 | 2.1 (0.95) |
| 65E | 8RBA4-65E | 5, 6 | 8RBT4-65E | 7, 8 | 2.1 (0.95) |
| 80E | 8RBA4-80E | 5, 6 | 8RBT4-80E | 7, 8 | 2.1 (0.95) |
| 100E | 8RBA4-100E | 5, 6 | 8RBT4-100E | 7, 8 | 2.1 (0.95) |
| 125E | 8RBA4-125E | 5, 6 | 8RBT4-125E | 7, 8 | 2.1 (0.95) |
| 150E | 8RBA4-150E | 5, 6 | 8RBT4-150E | 7, 8 | 2.1 (0.95) |
| 200E | 8RBA4-200E | 5, 6 | 8RBT4-200E | 7, 8 | 2.1 (0.95) |
| 250E | 8RBA4-250E | 5, 6 | 8RBT4-250E | 10, 11 | 2.1 (0.95) |
| 300E | 8RBA4-300E | 5, 6 | 8RBT4-300E | 10, 11 | 2.1 (0.95) |
| 400E | 8RBA4-400E | 5, 6 | 8RBT4-400E | 10, 11 | 2.1 (0.95) |

Type RBA Expulsion Fuses for Use Indoors or in an Enclosure—8.3 kV Maximum (7.2 kV Nominal) 400A (For Use with 8RBA4 Fuseholders) ①

RBA Fuseholders, Mountings and Hardware (For Use with RBA/RBT Refills/holders for Indoor or Enclosure Applications)

| Ampere Rating | Style | Fuseholder | | Voltage (kV) | | LIWL (BIL) | Mounting (Including Live Parts Less Holder) | | Live Parts | Fuse Filters and Condensers | Spring and Shunt Assy. | |
|---------------|----------------|-------------------------------|---------------------------|--------------|---------|------------|---|-----------------|------------|-----------------------------|------------------------|------------|
| | | Non-Indicating Catalog Number | Indicating Catalog Number | Nominal | Maximum | | Porcelain Insulator | Glass Polyester | | | | |
| 0.5–400E | Non-disconnect | 8RBA4-NH | 8RBA4-INH | 4.8 | 5.5 | 60 | 5RBA4-PNM | 5RBA4-GNM | 15RBA4-NL | RBA4-FLTR RBA4-COND | 8RBA4-SHNT | |
| | Non-disconnect | 8RBA4-NH | 8RBA4-INH | 7.2 | 8.3 | 75 | 8RBA4-PNM | 8RBA4-GNM | 15RBA4-NL | RBA4-FLTR RBA4-COND | 8RBA4-SHNT | |
| | Disconnect | 8RBA4-DH | 8RBA4-IDH | 4.8 | 5.5 | 60 | 5RBA4-PDM | 5RBA4-GDM | 14RBA4-DL | RBA4-FLTR RBA4-COND | 8RBA4-SHNT | |
| | Disconnect | 8RBA4-DH | 8RBA4-IDH | 7.2 | 8.3 | 75 | 8RBA4-PDM | 8RBA4-GDM | 14RBA4-DL | RBA4-FLTR RBA4-COND | 8RBA4-SHNT | |
| | Bolt-in | — | — | 8RBA2-INH-B | 4.8 | 5.5 | 60 | 5RBA8-PNM | 5RBA8-GNM | 15RBA8-NL | RBA4-FLTR RBA4-COND | 8RBA4-SHNT |
| | Bolt-in | — | — | 8RBA4-INH-B | 7.2 | 8.3 | 75 | 8RBA8-PNM | 8RBA8-GNM | 15RBA8-NL | RBA4-FLTR RBA4-COND | 8RBA4-SHNT |

Type RDB Expulsion Fuses for Use Outdoors—8.3 kV Maximum (7.2 kV Nominal) 400A ②

RDB Fuseholders, Mountings and Hardware (For Use with RBA/RBT Refills/holders for Outdoor Applications)

| Ampere Rating | Style | Fuseholder Catalog Number | Voltage (kV) | | LIWL (BIL) | Mounting (Including Live Parts Less Holder) | | Live Parts | Spring and Shunt Assy. | |
|---------------|---------|---------------------------|--------------|---------|------------|---|--------------------------|------------|------------------------|------------|
| | | | Nominal | Maximum | | Vertical (180°) Mounting | Underhung (90°) Mounting | | | |
| 0.5–400E | Dropout | 8RDB4-DH | 7.2 | 8.3 | 95 | 8RDB4-VM | 8RDB4-UM | RDB4-VL | RDB4-UL | 8RDB4-SHNT |
| | Dropout | 8RDB4-DH | 7.2 | 8.3 | 110 | 8RDB4-HVM | 8RDB4-HUM | RDB4-VL | RDB4-UL | 8RDB4-SHNT |

Notes

- ① For new installation, order one refill (Standard Speed or Time Lag), one fuseholder, one mounting, and one filter or condenser per phase. Live parts can be substituted for the mounting if the user is supplying base support and insulators.
- ② For new installation, order one refill (Standard Speed or Time Lag), one fuseholder and one mounting per phase. Live parts can be substituted for the mounting if the user is supplying base support and insulators.

3.4

Power Breakers, Contactors and Fuses

Expulsion Fuses

3

Type 8RBA4 Expulsion Fuse Refill Units Used in 8RBA8/8RDB4 Fuseholders— 8.3 kV Maximum (7.2 kV Nominal) 800A

RBA/RBT Refill Units

| Ampere Rating | Quantity | Standard Speed (Fuse Refills) | | Time Lag (Fuse Refills) | | Approximate Shipping Weight Lbs (kg) | |
|---------------|----------|-------------------------------|------------------------|-------------------------|------------------------|--------------------------------------|---|
| | | Catalog Number | Curve Reference 36-635 | Catalog Number | Curve Reference 36-635 | | |
| 450E | 2 | 8RBA4-250E | 9 | 2 | 8RBT4-250E | 12 | ① |
| 540E | 2 | 8RBA4-300E | 9 | 2 | 8RBT4-300E | 12 | ① |
| 720E | 2 | 8RBA4-400E | 9 | 2 | 8RBT4-400E | 12 | ① |

Type RBA Expulsion Fuses for Use Indoors or in an Enclosure— 8.3 kV Maximum (7.2 kV Nominal) 800A (For Use with 8RBA8 Fuseholders) ②

RBA Fuseholders, Mountings and Hardware (For Use with RBA/RBT Refills/holders for Indoor or Enclosure Applications)

| Ampere Rating | Style | Fuseholder | | Voltage (kV) | | LIWL (BIL) | Mounting (Including Live Parts Less Holder) | | Live Parts | Fuse Filters and Condensers | Spring and Shunt Assy. |
|---------------|----------------|-------------------------------|---------------------------|--------------|---------|------------|---|--------------------------------|------------|-----------------------------|------------------------|
| | | Non-Indicating Catalog Number | Indicating Catalog Number | Nominal | Maximum | | Porcelain Insulator Catalog Number | Glass Polyester Catalog Number | | | |
| 450E-720E | Non-disconnect | 8RBA8-NH | 8RBA8-INH | 4.8 | 5.5 | 60 | 5RBA8-PNM | 5RBA8-GNM | 15RBA8-NL | RBA4-FLTR ③ | 8RBA4-SHNT |
| | | | | | | | | | | RBA4-COND ③ | |
| | Non-disconnect | 8RBA8-NH | 8RBA8-INH | 7.2 | 8.3 | 75 | 8RBA8-PNM | 8RBA8-GNM | 15RBA8-NL | RBA4-FLTR ③ | 8RBA4-SHNT |
| | | | | | | | | | | RBA4-COND ③ | |

Type RDB Expulsion Fuses for Use Outdoors—8.3 kV Maximum (7.2 kV Nominal) 800A ④

RDB Fuseholders, Mountings and Hardware (For Use with RBA/RBT Refills/holders for Outdoor Applications)

| Ampere Rating | Style | Fuseholder | | Voltage (kV) | | LIWL (BIL) | Mounting (Including Live Parts Less Holder) | | Live Parts | Spring and Shunt Assy. | |
|---------------|------------|----------------|--|--------------|---------|------------|---|---|------------|------------------------|------------|
| | | Catalog Number | | Nominal | Maximum | | Vertical (180°) Mounting Catalog Number | Underhung (90°) Mounting Catalog Number | | | |
| 450E-720E | Disconnect | 8RDB4-NH | | 7.2 | 8.3 | 95 | 8RDB8-VM | 8RDB8-UM | RDB8-VL | RDB8-UL | 8RDB4-SHNT |
| | Disconnect | 8RDB4-NH | | 7.2 | 8.3 | 110 | 8RDB8-HVM | 8RDB8-HUM | RDB8-VL | RDB8-UL | 8RDB4-SHNT |

Notes

- ① Requires two fuse refills as shown. Price each refill individually. Example: To order refill units for a 720E, 8.3 kV fuse, order two pieces of an 8RBA4-400E.
- ② For new installation, order two refills (Standard or Time Lag), one fuseholder, one mounting, and two filters or condensers per phase. Live parts can be substituted for the mounting if the user is supplying base support and insulators.
- ③ Two filters or condensers required.
- ④ For new installation, order two refills (Standard or Time Lag), one fuseholder and one mounting per phase. Live parts can be substituted for the mounting if the user is supplying base support and insulators.

Type 15RBA2 Expulsion Fuse Refill Units— 15.5 kV Maximum (14.4 kV Nominal) 200A

RBA/RBT Refill Units

| Ampere Rating | Standard Speed (Fuse Refills) | | Time Lag (Fuse Refills) | | Approximate Shipping Weight Lbs (kg) |
|---------------|-------------------------------|------------------------|-------------------------|------------------------|--------------------------------------|
| | Catalog Number | Curve Reference 36-635 | Catalog Number | Curve Reference 36-635 | |
| 10E | 15RBA2-10E | 1, 2 | — | — | 1.1 (0.5) |
| 15E | 15RBA2-15E | 1, 2 | — | — | 1.1 (0.5) |
| 20E | 15RBA2-20E | 1, 2 | 15RBT2-20E | 3, 4 | 1.1 (0.5) |
| 25E | 15RBA2-25E | 1, 2 | 15RBT2-25E | 3, 4 | 1.1 (0.5) |
| 30E | 15RBA2-30E | 1, 2 | 15RBT2-30E | 3, 4 | 1.1 (0.5) |
| 40E | 15RBA2-40E | 1, 2 | 15RBT2-40E | 3, 4 | 1.1 (0.5) |
| 50E | 15RBA2-50E | 1, 2 | 15RBT2-50E | 3, 4 | 1.1 (0.5) |
| 65E | 15RBA2-65E | 1, 2 | 15RBT2-65E | 3, 4 | 1.1 (0.5) |
| 80E | 15RBA2-80E | 1, 2 | 15RBT2-80E | 3, 4 | 1.1 (0.5) |
| 100E | 15RBA2-100E | 1, 2 | 15RBT2-100E | 3, 4 | 1.1 (0.5) |
| 125E | 15RBA2-125E | 1, 2 | 15RBT2-125E | 3, 4 | 1.1 (0.5) |
| 150E | 15RBA2-150E | 1, 2 | 15RBT2-150E | 3, 4 | 1.1 (0.5) |
| 200E | 15RBA2-200E | 1, 2 | 15RBT2-200E | 3, 4 | 1.1 (0.5) |

Type RBA Expulsion Fuses for Use Outdoors— 15.5 kV Maximum (14.4 kV Nominal) 200A (For Use with 15RBA2 Fuseholders) ①

RBA Fuseholders, Mountings and Hardware (For Use with RBA/RBT Refills/holders for Outdoor Applications)

| Ampere Rating | Style | Fuseholder | | Voltage (kV) | | LIWL (BIL) | Mounting (Including Live Parts Less Holder) | | Live Parts | Fuse Filters and Condensers | Spring and Shunt Assy. |
|---------------|----------------|-------------------------------|---------------------------|--------------|---------|------------|---|-----------------|------------|-----------------------------|------------------------|
| | | Non-Indicating Catalog Number | Indicating Catalog Number | Nominal | Maximum | | Porcelain Insulator | Glass Polyester | | | |
| | | | | | | | | | | | |
| 10E–200E | Non-disconnect | 15RBA2-NH | 15RBA2-INH | 13.8 | 15.5 | 95 | 14RBA2-PNM | 14RBA2-GNM | 15RBA2-NL | RBA2-FLTR RBA2-COND | 15RBA2-SHNT |
| | Non-disconnect | 15RBA2-NH | 15RBA2-INH | 13.8 | 15.5 | 110 | 15RBA2-PNM | — | 15RBA2-NL | RBA2-FLTR RBA2-COND | 15RBA2-SHNT |
| | Disconnect | 15RBA2-DH | 15RBA2-IDH | 13.8 | 15.5 | 95 | 14RBA2-PDM | 14RBA2-GDM | 38RBA2-DL | RBA2-FLTR RBA2-COND | 15RBA2-SHNT |
| | Disconnect | 15RBA2-DH | 15RBA2-IDH | 13.8 | 15.5 | 110 | 15RBA2-PDM | — | 38RBA2-DL | RBA2-FLTR RBA2-COND | 15RBA2-SHNT |
| | Bolt-in | — | 15RBA2-INH-B | 13.8 | 15.5 | 95 | 14RBA8-PNM | 14RBA8-GNM | 15RBA8-NL | RBA2-FLTR RBA2-COND | 15RBA2-SHNT |
| | Bolt-in | — | 15RBA2-INH-B | 13.8 | 15.5 | 110 | 15RBA8-PNM | 15RBA8-GNM | 15RBA8-NL | RBA2-FLTR RBA2-COND | 15RBA2-SHNT |

Type RDB Expulsion Fuses for Use Outdoors— 15.5 kV Maximum (14.4 kV Nominal) 200A ②

RDB Fuseholders, Mountings and Hardware (For Use with RBA/RBT Refills/holders for Outdoor Applications)

| Ampere Rating | Style | Fuseholder Catalog Number | Voltage (kV) | | LIWL (BIL) | Mounting (Including Live Parts Less Holder) | | Live Parts | Spring and Shunt Assy. | |
|---------------|---------|---------------------------|--------------|---------|------------|---|--------------------------|------------|------------------------|----------------|
| | | | Nominal | Maximum | | Vertical (180°) Mounting | Underhung (90°) Mounting | | | |
| | | | | | | | | | | Catalog Number |
| 10E–200E | Dropout | 15RDB2-DH | 13.8 | 15.5 | 110 | 15RDB2-VM | 15RDB2-UM | RDB2-VL | RDB2-UL | 15RDB2-SHNT |
| | Dropout | 15RDB2-DH | 13.8 | 15.5 | 150 | 15RDB2-HVM | 15RDB2-HUM | RDB2-VL | RDB2-UL | 15RDB2-SHNT |

Notes

- ① For new installation, order one refill (Standard Speed or Time Lag), one fuseholder, one mounting, and one filter or condenser per phase. Live parts can be substituted for the mounting if the user is supplying base support and insulators.
- ② For new installation, order one refill (Standard Speed or Time Lag), one fuseholder and one mounting per phase. Live parts can be substituted for the mounting if the user is supplying base support and insulators.

3.4

Power Breakers, Contactors and Fuses

Expulsion Fuses

3

Type 15RBA4 Expulsion Fuse Refill Units— 15.5 kV Maximum (14.4 kV Nominal) 400A

RBA/RBT Refill Units

| Ampere Rating | Standard Speed (Fuse Refills) | | Time Lag (Fuse Refills) | | Approximate Shipping Weight Lbs (kg) |
|---------------|-------------------------------|------------------------|-------------------------|------------------------|--------------------------------------|
| | Catalog Number | Curve Reference 36-635 | Catalog Number | Curve Reference 36-635 | |
| 0.5 | 15RBA4-5 | 5, 6 | — | — | 2.3 (1.0) |
| 3 | 15RBA4-3 | 5, 6 | — | — | 2.3 (1.0) |
| 5E | 15RBA4-5E | 5, 6 | — | — | 2.3 (1.0) |
| 7E | 15RBA4-7E | 5, 6 | — | — | 2.3 (1.0) |
| 10E | 15RBA4-10E | 5, 6 | — | — | 2.3 (1.0) |
| 15E | 15RBA4-15E | 5, 6 | — | — | 2.3 (1.0) |
| 20E | 15RBA4-20E | 5, 6 | 15RBT4-20E | 7, 8 | 2.3 (1.0) |
| 25E | 15RBA4-25E | 5, 6 | 15RBT4-25E | 7, 8 | 2.3 (1.0) |
| 30E | 15RBA4-30E | 5, 6 | 15RBT4-30E | 7, 8 | 2.3 (1.0) |
| 40E | 15RBA4-40E | 5, 6 | 15RBT4-40E | 7, 8 | 2.3 (1.0) |
| 50E | 15RBA4-50E | 5, 6 | 15RBT4-50E | 7, 8 | 2.3 (1.0) |
| 65E | 15RBA4-65E | 5, 6 | 15RBT4-65E | 7, 8 | 2.3 (1.0) |
| 80E | 15RBA4-80E | 5, 6 | 15RBT4-80E | 7, 8 | 2.3 (1.0) |
| 100E | 15RBA4-100E | 5, 6 | 15RBT4-100E | 7, 8 | 2.3 (1.0) |
| 125E | 15RBA4-125E | 5, 6 | 15RBT4-125E | 7, 8 | 2.3 (1.0) |
| 150E | 15RBA4-150E | 5, 6 | 15RBT4-150E | 7, 8 | 2.3 (1.0) |
| 200E | 15RBA4-200E | 5, 6 | 15RBT4-200E | 7, 8 | 2.3 (1.0) |
| 250E | 15RBA4-250E | 5, 6 | 15RBT4-250E | 10, 11 | 2.3 (1.0) |
| 300E | 15RBA4-300E | 5, 6 | 15RBT4-300E | 10, 11 | 2.3 (1.0) |
| 400E | 15RBA4-400E | 5, 6 | 15RBT4-400E | 10, 11 | 2.3 (1.0) |

Type RBA Expulsion Fuses for Use Outdoors— 15.5 kV Maximum (14.4 kV Nominal) 400A (For Use with 15RBA4 Fuseholders) ①

RBA Fuseholders, Mountings and Hardware (For Use with RBA/RBT Refills/holders for Outdoor Applications)

| Ampere Rating | Style | Fuseholder | | Voltage (kV) | | LIWL (BIL) | Mounting (Including Live Parts Less Holder) | | Live Parts | Fuse Filters and Condensers | Spring and Shunt Assy. |
|---------------|----------------|-------------------------------|---------------------------|--------------|---------|------------|---|-----------------|------------|-----------------------------|------------------------|
| | | Non-Indicating Catalog Number | Indicating Catalog Number | Nominal | Maximum | | Porcelain Insulator | Glass Polyester | | | |
| 0.5–400E | Non-disconnect | 15RBA4-NH | 15RBA4-INH | 13.8 | 15.5 | 95 | 14RBA4-PNM | 14RBA4-GNM | 15RBA4-NL | RBA4-FLTR RBA4-COND | 15RBA4-SHNT |
| | Non-disconnect | 15RBA4-NH | 15RBA4-INH | 13.8 | 15.5 | 110 | 15RBA4-PNM | — | 15RBA4-NL | RBA4-FLTR RBA4-COND | 15RBA4-SHNT |
| | Disconnect | 15RBA4-DH | 15RBA2-IDH | 13.8 | 15.5 | 95 | 14RBA4-PDM | 14RBA4-GDM | 15RBA4-DL | RBA4-FLTR RBA4-COND | 15RBA4-SHNT |
| | Disconnect | 15RBA4-DH | 15RBA2-IDH | 13.8 | 15.5 | 110 | 15RBA4-PDM | — | 15RBA4-DL | RBA4-FLTR RBA4-COND | 15RBA4-SHNT |
| | Bolt-in | — | 15RBA4-INH-B | 13.8 | 15.5 | 95 | 14RBA8-PNM | 14RBA8-GNM | 15RBA8-NL | RBA-FLTR RBA4-COND | 15RBA4-SHNT |
| | Bolt-in | — | 15RBA4-INH-B | 13.8 | 15.5 | 110 | 15RBA8-PNM | 15RBA8-GNM | 15RBA8-NL | RBA-FLTR RBA4-COND | 15RBA4-SHNT |

Type RDB Expulsion Fuses for Use Outdoors— 15.5 kV Maximum (14.4 kV Nominal) 400A ②

RDB Fuseholders, Mountings and Hardware (For Use with RBA/RBT Refills/holders for Outdoor Applications)

| Ampere Rating | Style | Fuseholder Catalog Number | Voltage (kV) | | LIWL (BIL) | Mounting (Including Live Parts Less Holder) | | Live Parts | Spring and Shunt Assy. | |
|---------------|---------|---------------------------|--------------|---------|------------|---|--------------------------|------------|------------------------|-------------|
| | | | Nominal | Maximum | | Vertical (180°) Mounting | Underhung (90°) Mounting | | | |
| 0.5–400E | Dropout | 15RDB4-DH | 13.8 | 15.5 | 110 | 15RDB4-VM | 15RDB4-UM | RDB4-VL | RDB4-UL | 15RDB4-SHNT |
| | Dropout | 15RDB4-DH | 13.8 | 15.5 | 150 | 15RDB4-HVM | 15RDB4-HUM | RDB4-VL | RDB4-UL | 15RDB4-SHNT |

Notes

- ① For new installation, order one refill (Standard Speed or Time Lag), one fuseholder, one mounting, and one filter or condenser per phase. Live parts can be substituted for the mounting if the user is supplying base support and insulators.
- ② For new installation, order one refill (Standard Speed or Time Lag), one fuseholder and one mounting per phase. Live parts can be substituted for the mounting if the user is supplying base support and insulators.

**Type 15RBA4 Expulsion Fuse Refill Units Used in 15RBA8/15RDB4 Fuseholders—
15.5 kV Maximum (14.4 kV Nominal) 800A**

RBA/RBT Refill Units

| Ampere Rating | Quantity | Standard Speed (Fuse Refills) | | Quantity | Time Lag (Fuse Refills) | | Approximate Shipping Weight Lbs (kg) |
|---------------|----------|-------------------------------|------------------------|----------|-------------------------|------------------------|--------------------------------------|
| | | Catalog Number | Curve Reference 36-635 | | Catalog Number | Curve Reference 36-635 | |
| 450E | 2 | 15RBA4-250E | 9 | 2 | 15RBT4-250E | 12 | ① |
| 540E | 2 | 15RBA4-300E | 9 | 2 | 15RBT4-300E | 12 | ① |
| 720E | 2 | 15RBA4-400E | 9 | 2 | 15RBT4-400E | 12 | ① |

**Type RBA Expulsion Fuses for Use Outdoors—
15.5 kV Maximum (14.4 kV Nominal) 800A (For Use with 15RBA8 Fuseholders) ②**

RBA Fuseholders, Mountings and Hardware (For Use with RBA/RBT Refills/holders for Outdoor Applications)

| Ampere Rating | Style | Fuseholder | | Voltage (kV) | | | Mounting (Including Live Parts Less Holder) | | Live Parts | Fuse Filters and Condensers | Spring and Shunt Assy. |
|---------------|----------------|-------------------------------|---------------------------|--------------|---------|------------|---|-----------------|------------|-----------------------------|------------------------|
| | | Non-Indicating Catalog Number | Indicating Catalog Number | Nominal | Maximum | LIWL (BIL) | Porcelain Insulator | Glass Polyester | | | |
| | | | | | | | Catalog Number | Catalog Number | | | |
| 450E–720E | Non-disconnect | 15RBA8-NH | 15RBA8-INH | 13.8 | 15.5 | 95 | 14RBA8-PNM | 14RBA8-GNM | 15RBA8-NL | RBA4-FLTR ③ | 15RBA4-SHNT |
| | Non-disconnect | 15RBA8-NH | 15RBA8-INH | 13.8 | 15.5 | 110 | 15RBA8-PNM | 14RBA8-GNM | 15RBA8-NL | RBA4-FLTR ③ RBA4-COND ③ | 15RBA4-SHNT |

Type RDB Expulsion Fuses for Use Outdoors—15.5 kV Maximum (14.4 kV Nominal) 800A ④

RDB Fuseholders, Mountings and Hardware (For Use with RBA/RBT Refills/holders for Outdoor Applications)

| Ampere Rating | Style | Fuseholder | | Voltage (kV) | | | Mounting (Including Live Parts Less Holder) | | Live Parts | Spring and Shunt Assy. |
|---------------|------------|----------------|---------|--------------|------------|--------------------------|---|----------------|------------|------------------------|
| | | Catalog Number | Nominal | Maximum | LIWL (BIL) | Vertical (180°) Mounting | Underhung (90°) Mounting | | | |
| | | | | | | Catalog Number | Catalog Number | Catalog Number | | |
| 450E–720E | Disconnect | 15RDB4-NH | 13.8 | 15.5 | 110 | 15RDB8-VM | 15RDB8-UM | RDB8-VL | RDB8-UL | 15RDB4-SHNT |
| | Disconnect | 15RDB4-NH | 13.8 | 15.5 | 150 | 15RDB8-HVM | 15RDB8-HUM | RDB8-VL | RDB8-UL | 15RDB4-SHNT |

Notes

- ① Requires two fuse refills as shown. Price each refill individually. Example: To order refill units for a 720E, 15 kV fuse, order two pieces of an 8RBA4-400E.
- ② For new installation, order two refills (Standard or Time Lag), one fuseholder, one mounting, and two filters or condensers per phase. Live parts can be substituted for the mounting if the user is supplying base support and insulators.
- ③ Two filters or condensers required.
- ④ For new installation, order two refills (Standard or Time Lag), one fuseholder and one mounting per phase. Live parts can be substituted for the mounting if the user is supplying base support and insulators.

3.4

Power Breakers, Contactors and Fuses

Expulsion Fuses

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Type 25RBA2 Expulsion Fuse Refill Units—25.5 kV Maximum (23.0 kV Nominal) 200A

RBA/RBT Refill Units

| Ampere Rating | Standard Speed (Fuse Refills) | | Time Lag (Fuse Refills) | | Approximate Shipping Weight Lbs (kg) |
|---------------|-------------------------------|------------------------|-------------------------|------------------------|--------------------------------------|
| | Catalog Number | Curve Reference 36-635 | Catalog Number | Curve Reference 36-635 | |
| 10E | 25RBA2-10E | 1, 2 | — | — | 1.3 (0.6) |
| 15E | 25RBA2-15E | 1, 2 | — | — | 1.3 (0.6) |
| 20E | 25RBA2-20E | 1, 2 | 25RBT2-20E | 3, 4 | 1.3 (0.6) |
| 25E | 25RBA2-25E | 1, 2 | 25RBT2-25E | 3, 4 | 1.3 (0.6) |
| 30E | 25RBA2-30E | 1, 2 | 25RBT2-30E | 3, 4 | 1.3 (0.6) |
| 40E | 25RBA2-40E | 1, 2 | 25RBT2-40E | 3, 4 | 1.3 (0.6) |
| 50E | 25RBA2-50E | 1, 2 | 25RBT2-50E | 3, 4 | 1.3 (0.6) |
| 65E | 25RBA2-65E | 1, 2 | 25RBT2-65E | 3, 4 | 1.3 (0.6) |
| 80E | 25RBA2-80E | 1, 2 | 25RBT2-80E | 3, 4 | 1.3 (0.6) |
| 100E | 25RBA2-100E | 1, 2 | 25RBT2-100E | 3, 4 | 1.3 (0.6) |
| 125E | 25RBA2-125E | 1, 2 | 25RBT2-125E | 3, 4 | 1.3 (0.6) |
| 150E | 25RBA2-150E | 1, 2 | 25RBT2-150E | 3, 4 | 1.3 (0.6) |
| 200E | 25RBA2-200E | 1, 2 | 25RBT2-200E | 3, 4 | 1.3 (0.6) |

Type RBA Expulsion Fuses for Use Indoors or in an Enclosure—25.5 kV Maximum (23.0 kV Nominal) 200A (For Use with 25RBA2 Fuseholders) ①

RBA Fuseholders, Mountings and Hardware (For Use with RBA/RBT Refills/Holders for Indoor or Enclosure Applications)

| Ampere Rating | Style | Fuseholder | | Voltage (kV) | | LIWL (BIL) | Mounting (Including Live Parts Less Holder) | | Live Parts | Fuse Filters and Condensers | Spring and Shunt Assy. |
|---------------|----------------|-------------------------------|---------------------------|--------------|---------|------------|---|-----------------|------------|-----------------------------|------------------------|
| | | Non-Indicating Catalog Number | Indicating Catalog Number | Nominal | Maximum | | Porcelain Insulator | Glass Polyester | | | |
| 10E–200E | Non-disconnect | 25RBA2-NH | 25RBA2-INH | 23.0 | 25.5 | 150 | 25RBA2-PNM | — | 38RBA2-NL | RBA2-FLTR RBA2-COND | 25RBA2-SHNT |
| | Non-disconnect | 25RBA2-NH | 25RBA2-INH | 23.0 | 25.5 | 150 | 25RBA2-PNM | — | 38RBA2-NL | RBA2-FLTR RBA2-COND | 25RBA2-SHNT |
| | Disconnect | 25RBA2-DH | 25RBA2-IDH | 23.0 | 25.5 | 150 | 25RBA2-PDM | — | 38RBA2-DL | RBA2-FLTR RBA2-COND | 25RBA2-SHNT |
| | Disconnect | 25RBA2-DH | 25RBA2-IDH | 23.0 | 25.5 | 150 | 25RBA2-PDM | — | 38RBA2-DL | RBA2-FLTR RBA2-COND | 25RBA2-SHNT |
| | Bolt-in | — | 25RBA2-INH-B | 23.0 | 25.5 | 150 | 25RBA8-PNM | 24RBA8-GNM | 38RBA8-NL | RBA2-FLTR RBA2-COND | 25RBA2-SHNT |

Type RDB Expulsion Fuses for Use Outdoors—25.5 kV Maximum (23.0 kV Nominal) 200A ②

RDB Fuseholders, Mountings and Hardware (For Use with RBA/RBT Refills/Holders for Outdoor Applications)

| Ampere Rating | Style | Fuseholder Catalog Number | Voltage (kV) | | LIWL (BIL) | Mounting (Including Live Parts Less Holder) | | Live Parts | Spring and Shunt Assy. |
|---------------|---------|---------------------------|--------------|---------|------------|---|--------------------------|------------|------------------------|
| | | | Nominal | Maximum | | Vertical (180°) Mounting | Underhung (90°) Mounting | | |
| 10E–200E | Dropout | 25RDB2-DH | 23.0 | 25.5 | 150 | 25RDB2-VM | 25RDB2-UM | RDB2-VL | RDB2-UL 25RDB2-SHNT |
| | Dropout | 25RDB2-DH | 23.0 | 25.5 | 200 | 25RDB2-HVM | 25RDB2-HUM | RDB2-VL | RDB2-UL 25RDB2-SHNT |

Notes

- ① For new installation, order one refill (Standard Speed or Time Lag), one fuseholder, one mounting, and one filter or condenser per phase. Live parts can be substituted for the mounting if the user is supplying base support and insulators.
- ② For new installation, order one refill (Standard Speed or Time Lag), one fuseholder and one mounting per phase. Live parts can be substituted for the mounting if the user is supplying base support and insulators.

Type 25RBA4 Expulsion Fuse Refill Units—25.5 kV Maximum (23.0 kV Nominal) 400A

RBA/RBT Refill Units

| Ampere Rating | Standard Speed (Fuse Refills) | | Time Lag (Fuse Refills) | | Approximate Shipping Weight Lbs (kg) |
|---------------|-------------------------------|------------------------|-------------------------|------------------------|--------------------------------------|
| | Catalog Number | Curve Reference 36-635 | Catalog Number | Curve Reference 36-635 | |
| 0.5 | 25RBA4-5 | 5, 6 | — | — | 2.7 (1.2) |
| 3 | 25RBA4-3 | 5, 6 | — | — | 2.7 (1.2) |
| 5E | 25RBA4-5E | 5, 6 | — | — | 2.7 (1.2) |
| 7E | 25RBA4-7E | 5, 6 | — | — | 2.7 (1.2) |
| 10E | 25RBA4-10E | 5, 6 | — | — | 2.7 (1.2) |
| 15E | 25RBA4-15E | 5, 6 | — | — | 2.7 (1.2) |
| 20E | 25RBA4-20E | 5, 6 | 25RBT4-20E | 7, 8 | 2.7 (1.2) |
| 25E | 25RBA4-25E | 5, 6 | 25RBT4-25E | 7, 8 | 2.7 (1.2) |
| 30E | 25RBA4-30E | 5, 6 | 25RBT4-30E | 7, 8 | 2.7 (1.2) |
| 40E | 25RBA4-40E | 5, 6 | 25RBT4-40E | 7, 8 | 2.7 (1.2) |
| 50E | 25RBA4-50E | 5, 6 | 25RBT4-50E | 7, 8 | 2.7 (1.2) |
| 65E | 25RBA4-65E | 5, 6 | 25RBT4-65E | 7, 8 | 2.7 (1.2) |
| 80E | 25RBA4-80E | 5, 6 | 25RBT4-80E | 7, 8 | 2.7 (1.2) |
| 100E | 25RBA4-100E | 5, 6 | 25RBT4-100E | 7, 8 | 2.7 (1.2) |
| 125E | 25RBA4-125E | 5, 6 | 25RBT4-125E | 7, 8 | 2.7 (1.2) |
| 150E | 25RBA4-150E | 5, 6 | 25RBT4-150E | 7, 8 | 2.7 (1.2) |
| 200E | 25RBA4-200E | 5, 6 | 25RBT4-200E | 7, 8 | 2.7 (1.2) |
| 250E | 25RBA4-250E | 5, 6 | 25RBT4-250E | 10, 11 | 2.7 (1.2) |
| 300E | 25RBA4-300E | 5, 6 | 25RBT4-300E | 10, 11 | 2.7 (1.2) |

Type RBA Expulsion Fuses for Use Indoors or in an Enclosure—25.5 kV Maximum (23.0 kV Nominal) 400A (For Use with 25RBA4 Fuseholders) ①

RBA Fuseholders, Mountings and Hardware (For Use with RBA/RBT Refills/holders for Indoor or Enclosure Applications)

| Ampere Rating | Style | Fuseholder | | Voltage (kV) | | LIWL (BIL) | Mounting (Including Live Parts Less Holder) | | Live Parts | Fuse Filters and Condensers | Spring and Shunt Assy. |
|---------------|----------------|-------------------------------|---------------------------|--------------|---------|------------|---|-----------------|------------|-----------------------------|------------------------|
| | | Non-Indicating Catalog Number | Indicating Catalog Number | Nominal | Maximum | | Porcelain Insulator | Glass Polyester | | | |
| 0.5–300E | Non-disconnect | 25RBA4-NH | 25RBA4-INH | 23.0 | 25.5 | 150 | 25RBA4-PNM | — | 38RBA4-NL | RBA4-FLTR RBA4-COND | 25RBA4-SHNT |
| | Non-disconnect | 25RBA4-NH | 25RBA4-INH | 23.0 | 25.5 | 150 | 25RBA4-PNM | — | 38RBA4-NL | RBA4-FLTR RBA4-COND | 25RBA4-SHNT |
| | Disconnect | 25RBA4-DH | 25RBA4-IDH | 23.0 | 25.5 | 150 | 25RBA4-PDM | — | 38RBA4-DL | RBA4-FLTR RBA4-COND | 25RBA4-SHNT |
| | Disconnect | 25RBA4-DH | 25RBA4-IDH | 23.0 | 25.5 | 150 | 25RBA4-PDM | — | 38RBA4-DL | RBA4-FLTR RBA4-COND | 25RBA4-SHNT |
| | Bolt-in | — | 25RBA4-INH-B | 23.0 | 25.5 | 150 | 25RBA8-PNM | 25RBA8-GNM | 38RBA8-NL | RBA4-FLTR RBA4-COND | 25RBA4-SHNT |

Type RDB Expulsion Fuses for Use Outdoors—25.5 kV Maximum (23.0 kV Nominal) 400A ②

RDB Fuseholders, Mountings and Hardware (For Use with RBA/RBT Refills/holders for Outdoor Applications)

| Ampere Rating | Style | Fuseholder Catalog Number | Voltage (kV) | | LIWL (BIL) | Mounting (Including Live Parts Less Holder) | | Live Parts | Spring and Shunt Assy. | |
|---------------|---------|---------------------------|--------------|---------|------------|---|--------------------------|------------|------------------------|-------------|
| | | | Nominal | Maximum | | Vertical (180°) Mounting | Underhung (90°) Mounting | | | |
| 0.5–300E | Dropout | 25RDB4-DH | 23.0 | 25.5 | 150 | 25RDB4-VM | 25RDB4-UM | RDB4-VL | RDB4-UL | 25RDB4-SHNT |
| | Dropout | 25RDB4-DH | 23.0 | 25.5 | 200 | 25RDB4-HVM | 25RDB4-HUM | RDB4-VL | RDB4-UL | 25RDB4-SHNT |

Notes

- ① For new installation, order one refill (Standard Speed or Time Lag), one fuseholder and one mounting per phase. Live parts can be substituted for the mounting if the user is supplying base support and insulators.
- ② For new installation, order one refill (Standard Speed or Time Lag), one fuseholder, one mounting, and one filter or condenser per phase. Live parts can be substituted for the mounting if the user is supplying base support and insulators.

3.4

Power Breakers, Contactors and Fuses

Expulsion Fuses

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Type 25RBA4 Expulsion Fuse Refill Units Used in 25RBA8/15RDB4 Fuseholders— 25.5 kV Maximum (23.0 kV Nominal) 800A

RBA/RBT Refill Units

| Ampere Rating | Quantity | Standard Speed (Fuse Refills) | | Quantity | Time Lag (Fuse Refills) | | Approximate Shipping Weight Lbs (kg) |
|---------------|----------|-------------------------------|------------------------|----------|-------------------------|------------------------|--------------------------------------|
| | | Catalog Number | Curve Reference 36-635 | | Catalog Number | Curve Reference 36-635 | |
| 450E | 2 | 25RBA4-250E | 9 | 2 | 25RBT4-250E | 12 | ① |
| 540E | 2 | 25RBA4-300E | 9 | 2 | 25RBT4-300E | 12 | ① |

Type RBA Expulsion Fuses for Use Indoors or in an Enclosure— 25.5 kV Maximum (23.0 kV Nominal) 800A (For Use with 25RBA8 Fuseholders) ②

RBA Fuseholders, Mountings and Hardware (For Use with RBA/RBT Refills/holders for Indoor or Enclosure Applications)

| Ampere Rating | Style | Fuseholder | | Voltage (kV) | | LIWL (BIL) | Mounting (Including Live Parts Less Holder) | | Live Parts | Fuse Filters and Condensers | Spring and Shunt Assy. |
|---------------|----------------|-------------------------------|---------------------------|--------------|---------|------------|---|-----------------|------------|-----------------------------|------------------------|
| | | Non-Indicating Catalog Number | Indicating Catalog Number | Nominal | Maximum | | Porcelain Insulator | Glass Polyester | | | |
| 450E–540E | Non-disconnect | 25RBA8-NH | 25RBA8-INH | 23.0 | 25.5 | 150 | 25RBA8-PNM | — | 38RBA8-NL | RBA4-FLTR ③ RBA4-COND ③ | 25RBA4-SHNT |
| | Non-disconnect | 25RBA8-NH | 25RBA8-INH | 23.0 | 25.5 | 150 | 25RBA8-PNM | — | 38RBA8-NL | RBA4-FLTR ③ RBA4-COND ③ | 25RBA4-SHNT |

Type RDB Expulsion Fuses for Use Outdoors—25.5 kV Maximum (23.0 kV Nominal) 800A ④

RDB Fuseholders, Mountings and Hardware (For Use with RBA/RBT Refills/holders for Outdoor Applications)

| Ampere Rating | Style | Fuseholder | | Voltage (kV) | | LIWL (BIL) | Mounting (Including Live Parts Less Holder) | | Live Parts | Spring and Shunt Assy. | |
|---------------|------------|----------------|---------------------------|--------------|---------|------------|---|--------------------------|------------|------------------------|-------------|
| | | Catalog Number | Indicating Catalog Number | Nominal | Maximum | | Vertical (180°) Mounting | Underhung (90°) Mounting | | | |
| 450E–540E | Disconnect | 25RDB4-NH | | 23.0 | 25.5 | 150 | 25RDB8-VM | 25RDB8-UM | RDB8-VL | RDB8-UL | 25RDB4-SHNT |
| | Disconnect | 25RDB4-NH | | 23.0 | 25.5 | 200 | 25RDB8-HVM | 25RDB8-HUM | RDB8-VL | RDB8-UL | 25RDB4-SHNT |

Notes

- ① Requires two fuse refills as shown. Price each refill individually. Example: To order refill units for a 720E, 25 kV fuse, order two pieces of an 8RBA4-400E.
- ② For new installation, order two refills (Standard or Time Lag), one fuseholder, one mounting, and two filters or condensers per phase. Live parts can be substituted for the mounting if the user is supplying base support and insulators.
- ③ Two filters or condensers required.
- ④ For new installation, order two refills (Standard or Time Lag), one fuseholder and one mounting per phase. Live parts can be substituted for the mounting if the user is supplying base support and insulators.

Type 38RBA2 Expulsion Fuse Refill Units—38.0 kV Maximum (34.5 kV Nominal) 200A

RBA/RBT Refill Units

| Ampere Rating | Standard Speed (Fuse Refills) | | Time Lag (Fuse Refills) | | Approximate Shipping Weight Lbs (kg) |
|---------------|-------------------------------|------------------------|-------------------------|------------------------|--------------------------------------|
| | Catalog Number | Curve Reference 36-635 | Catalog Number | Curve Reference 36-635 | |
| 10E | 38RBA2-10E | 1, 2 | — | — | 1.4 (0.6) |
| 15E | 38RBA2-15E | 1, 2 | — | — | 1.4 (0.6) |
| 20E | 38RBA2-20E | 1, 2 | 38RBT2-20E | 3, 4 | 1.4 (0.6) |
| 25E | 38RBA2-25E | 1, 2 | 38RBT2-25E | 3, 4 | 1.4 (0.6) |
| 30E | 38RBA2-30E | 1, 2 | 38RBT2-30E | 3, 4 | 1.4 (0.6) |
| 40E | 38RBA2-40E | 1, 2 | 38RBT2-40E | 3, 4 | 1.4 (0.6) |
| 50E | 38RBA2-50E | 1, 2 | 38RBT2-50E | 3, 4 | 1.4 (0.6) |
| 65E | 38RBA2-65E | 1, 2 | 38RBT2-65E | 3, 4 | 1.4 (0.6) |
| 80E | 38RBA2-80E | 1, 2 | 38RBT2-80E | 3, 4 | 1.4 (0.6) |
| 100E | 38RBA2-100E | 1, 2 | 38RBT2-100E | 3, 4 | 1.4 (0.6) |
| 125E | 38RBA2-125E | 1, 2 | 38RBT2-125E | 3, 4 | 1.4 (0.6) |
| 150E | 38RBA2-150E | 1, 2 | 38RBT2-150E | 3, 4 | 1.4 (0.6) |
| 200E | 38RBA2-200E | 1, 2 | 38RBT2-200E | 3, 4 | 1.4 (0.6) |

Type RBA Expulsion Fuses for Use Indoors or in an Enclosure—38.0 kV Maximum (34.5 kV Nominal) 200A (For Use with 38RBA2 Fuseholders) ①

RBA Fuseholders, Mountings and Hardware (For Use with RBA/RBT Refills/holders for Indoor or Enclosure Applications)

| Ampere Rating | Style | Fuseholder | | Voltage (kV) | | LIWL (BIL) | Mounting (Including Live Parts Less Holder) | | Live Parts | Fuse Filters and Condensers | Spring and Shunt Assy. |
|---------------|----------------|-------------------------------|---------------------------|--------------|---------|------------|---|--------------------------------|------------|-----------------------------|------------------------|
| | | Non-Indicating Catalog Number | Indicating Catalog Number | Nominal | Maximum | | Porcelain Insulator Catalog Number | Glass Polyester Catalog Number | | | |
| 10E–200E | Non-disconnect | 38RBA2-NH | 38RBA2-INH | 34.5 | 38.0 | 150 | 38RBA2-PNM | — | 38RBA2-NL | RBA2-FLTR RBA2-COND | 38RBA2-SHNT |
| | Non-disconnect | 38RBA2-NH | 38RBA2-INH | 34.5 | 38.0 | 150 | 38RBA2-PNM | — | 38RBA2-NL | RBA2-FLTR RBA2-COND | 38RBA2-SHNT |
| | Disconnect | 38RBA2-DH | 38RBA2-IDH | 34.5 | 38.0 | 150 | 38RBA2-PDM | — | 38RBA2-DL | RBA2-FLTR RBA2-COND | 38RBA2-SHNT |
| | Disconnect | 38RBA2-DH | 38RBA2-IDH | 34.5 | 38.0 | 150 | 38RBA2-PDM | — | 38RBA2-DL | RBA2-FLTR RBA2-COND | 38RBA2-SHNT |
| | Bolt-in | — | 38RBA2-INH-B | 34.5 | 38.0 | 150 | 38RBA8-PNM | 38RBA8-GNM | 38RBA8-NL | RBA2-FLTR RBA2-COND | 38RBA2-SHNT |

Type RBA Expulsion Fuses for Use Indoors or in an Enclosure—38.0 kV Maximum (34.5 kV Nominal) 200A ②

RDB Fuseholders, Mountings and Hardware (For Use with RBA/RBT Refills/holders for Outdoor Applications)

| Ampere Rating | Style | Fuseholder Catalog Number | Voltage (kV) | | LIWL (BIL) | Mounting (Including Live Parts Less Holder) | | Live Parts | Spring and Shunt Assy. | |
|---------------|---------|---------------------------|--------------|---------|------------|---|---|------------|------------------------|-------------|
| | | | Nominal | Maximum | | Vertical (180°) Mounting Catalog Number | Underhung (90°) Mounting Catalog Number | | | |
| 10E–200E | Dropout | 38RDB2-DH | 34.5 | 38.0 | 200 | 38RDB2-VM | 38RDB2-UM | RDB2-VL | RDB2-UL | 38RDB2-SHNT |
| | Dropout | 38RDB2-DH | 34.5 | 38.0 | 250 | 38RDB2-HVM | 38RDB2-HUM | RDB2-VL | RDB2-UL | 38RDB2-SHNT |

Notes

- ① For new installation, order one refill (Standard Speed or Time Lag), one fuseholder, one mounting, and one filter or condenser per phase. Live parts can be substituted for the mounting if the user is supplying base support and insulators.
- ② For new installation, order one refill (Standard Speed or Time Lag), one fuseholder and one mounting per phase. Live parts can be substituted for the mounting if the user is supplying base support and insulators.

3.4

Power Breakers, Contactors and Fuses

Expulsion Fuses

Type 38RBA4 Expulsion Fuse Refill Units—38.0 kV Maximum (34.5 kV Nominal) 400A

RBA/RBT Refill Units

| Ampere Rating | Standard Speed (Fuse Refills) | | Time Lag (Fuse Refills) | | Approximate Shipping Weight Lbs (kg) |
|---------------|-------------------------------|------------------------|-------------------------|------------------------|--------------------------------------|
| | Catalog Number | Curve Reference 36-635 | Catalog Number | Curve Reference 36-635 | |
| 0.5 | 38RBA4-5 | 5, 6 | — | — | 3.1 (1.4) |
| 3 | 38RBA4-3 | 5, 6 | — | — | 3.1 (1.4) |
| 5E | 38RBA4-5E | 5, 6 | — | — | 3.1 (1.4) |
| 7E | 38RBA4-7E | 5, 6 | — | — | 3.1 (1.4) |
| 10E | 38RBA4-10E | 5, 6 | — | — | 3.1 (1.4) |
| 15E | 38RBA4-15E | 5, 6 | — | — | 3.1 (1.4) |
| 20E | 38RBA4-20E | 5, 6 | 38RBT4-20E | 7, 8 | 3.1 (1.4) |
| 25E | 38RBA4-25E | 5, 6 | 38RBT4-25E | 7, 8 | 3.1 (1.4) |
| 30E | 38RBA4-30E | 5, 6 | 38RBT4-30E | 7, 8 | 3.1 (1.4) |
| 40E | 38RBA4-40E | 5, 6 | 38RBT4-40E | 7, 8 | 3.1 (1.4) |
| 50E | 38RBA4-50E | 5, 6 | 38RBT4-50E | 7, 8 | 3.1 (1.4) |
| 65E | 38RBA4-65E | 5, 6 | 38RBT4-65E | 7, 8 | 3.1 (1.4) |
| 80E | 38RBA4-80E | 5, 6 | 38RBT4-80E | 7, 8 | 3.1 (1.4) |
| 100E | 38RBA4-100E | 5, 6 | 38RBT4-100E | 7, 8 | 3.1 (1.4) |
| 125E | 38RBA4-125E | 5, 6 | 38RBT4-125E | 7, 8 | 3.1 (1.4) |
| 150E | 38RBA4-150E | 5, 6 | 38RBT4-150E | 7, 8 | 3.1 (1.4) |
| 200E | 38RBA4-200E | 5, 6 | 38RBT4-200E | 7, 8 | 3.1 (1.4) |
| 250E | 38RBA4-250E | 5, 6 | 38RBT4-250E | 10, 11 | 3.1 (1.4) |
| 300E | 38RBA4-300E | 5, 6 | 38RBT4-300E | (0, 11) | 3.1 (1.4) |

Type RBA Expulsion Fuses for Use Indoors or in an Enclosure—38.0 kV Maximum (34.5 kV Nominal) 400A (For Use with 38RBA4 Fuseholders) ①

RBA Fuseholders, Mountings and Hardware (For Use with RBA/RBT Refills/Holders for Indoor or Enclosure Applications)

| Ampere Rating | Style | Fuseholder | | Voltage (kV) | | LIWL (BIL) | Mounting (Including Live Parts Less Holder) | | Live Parts | Fuse Filters and Condensers | Spring and Shunt Assy. |
|---------------|----------------|-------------------------------|---------------------------|--------------|---------|------------|---|-----------------|------------|-----------------------------|------------------------|
| | | Non-Indicating Catalog Number | Indicating Catalog Number | Nominal | Maximum | | Porcelain Insulator | Glass Polyester | | | |
| 0.5–300E | Non-disconnect | 38RBA4-NH | 38RBA4-INH | 34.5 | 38.0 | 150 | 38RBA4-PNM | — | 38RBA4-NL | RBA4-FLTR RBA4-COND | 38RBA4-SHNT |
| | Non-disconnect | 38RBA4-NH | 38RBA4-INH | 34.5 | 38.0 | 150 | 38RBA4-PNM | — | 38RBA4-NL | RBA4-FLTR RBA4-COND | 38RBA4-SHNT |
| | Disconnect | 38RBA4-DH | 38RBA2-IDH | 34.5 | 38.0 | 150 | 38RBA4-PDM | — | 38RBA4-DL | RBA4-FLTR RBA4-COND | 38RBA4-SHNT |
| | Disconnect | 38RBA4-DH | 38RBA2-IDH | 34.5 | 38.0 | 150 | 38RBA4-PDM | — | 38RBA4-DL | RBA4-FLTR RBA4-COND | 38RBA4-SHNT |
| | Bolt-in | — | 38RBA4-INH-B | 34.5 | 38.0 | 150 | 38RBA8-PNM | 38RBA8-GNM | 38RBA8-NL | RBA4-FLTR RBA4-COND | 38RBA4-SHNT |

Type RBA Expulsion Fuses for Use Indoors or in an Enclosure—38.0 kV Maximum (34.5 kV Nominal) 400A ②

RDB Fuseholders, Mountings and Hardware (For Use with RBA/RBT Refills/Holders for Outdoor Applications)

| Ampere Rating | Style | Fuseholder Catalog Number | Voltage (kV) | | LIWL (BIL) | Mounting (Including Live Parts Less Holder) | | Live Parts | Spring and Shunt Assy. | |
|---------------|---------|---------------------------|--------------|---------|------------|---|--------------------------|------------|------------------------|-------------|
| | | | Nominal | Maximum | | Vertical (180°) Mounting | Underhung (90°) Mounting | | | |
| 0.5–300E | Dropout | 38RDB4-DH | 34.5 | 38.0 | 150 | 38RDB4-VM | 38RDB4-UM | RDB4-VL | RDB4-UL | 38RDB4-SHNT |
| | Dropout | 38RDB4-DH | 34.5 | 38.0 | 200 | 38RDB4-HVM | 38RDB4-HUM | RDB4-VL | RDB4-UL | 38RDB4-SHNT |

Notes

- ① For new installation, order one refill (Standard Speed or Time Lag), one fuseholder, one mounting, and one filter or condenser per phase. Live parts can be substituted for the mounting if the user is supplying base support and insulators.
- ② For new installation, order one refill (Standard Speed or Time Lag), one fuseholder and one mounting per phase. Live parts can be substituted for the mounting if the user is supplying base support and insulators.

**Type 38RBA4 Expulsion Fuse Refill Units Used in 38RBA8/15RDB4 Fuseholders—
38.0 kV Maximum (34.5 kV Nominal) 800A**

RBA/RBT Refill Units

| Ampere Rating | Quantity | Standard Speed (Fuse Refills) | | Quantity | Time Lag (Fuse Refills) | | Approximate Shipping Weight Lbs (kg) |
|---------------|----------|-------------------------------|------------------------|----------|-------------------------|------------------------|--------------------------------------|
| | | Catalog Number | Curve Reference 36-635 | | Catalog Number | Curve Reference 36-635 | |
| 450E | 2 | 38RBA4-250E | 9 | 2 | 38RBT4-250E | 12 | ① |
| 540E | 2 | 38RBA4-300E | 9 | 2 | 38RBT4-300E | 12 | ① |

**Type RBA Expulsion Fuses for Use Indoors or in an Enclosure—
38.0 kV Maximum (34.5 kV Nominal) 800A (For Use with 38RBA8 Fuseholders) ②**

RBA Fuseholders, Mountings and Hardware (For Use with RBA/RBT Refills/holders for Indoor or Enclosure Applications)

| Ampere Rating | Style | Fuseholder | | Voltage (kV) | | | Mounting (Including Live Parts Less Holder) | | Live Parts | Fuse Filters and Condensers | Spring and Shunt Assy. |
|---------------|----------------|-------------------------------|---------------------------|--------------|---------|------------|---|--------------------------------|------------|-----------------------------|------------------------|
| | | Non-Indicating Catalog Number | Indicating Catalog Number | Nominal | Maximum | LIWL (BIL) | Porcelain Insulator Catalog Number | Glass Polyester Catalog Number | | | |
| | | | | | | | | | | | |
| 450E–540E | Non-disconnect | 38RBA8-NH | 38RBA8-INH | 34.5 | 38.0 | 150 | 38RBA8-PNM | — | 38RBA8-NL | RBA4-FLTR ③ RBA4-COND ③ | 38RBA4-SHNT |
| | Non-disconnect | 38RBA8-NH | 38RBA8-INH | 34.5 | 38.0 | 150 | 38RBA8-PNM | — | 38RBA8-NL | RBA4-FLTR ③ RBA4-COND ③ | 38RBA4-SHNT |

Type RBA Expulsion Fuses for Use Indoors or in an Enclosure—38.0 kV Maximum (34.5 kV Nominal) 800A ④

RDB Fuseholders, Mountings and Hardware (For Use with RBA/RBT Refills/holders for Outdoor Applications)

| Ampere Rating | Style | Fuseholder | | Voltage (kV) | | | Mounting (Including Live Parts Less Holder) | | Live Parts | Spring and Shunt Assy. |
|---------------|------------|----------------|---------|--------------|------------|---|---|----------------|------------|------------------------|
| | | Catalog Number | Nominal | Maximum | LIWL (BIL) | Vertical (180°) Mounting Catalog Number | Underhung (90°) Mounting Catalog Number | | | |
| | | | | | | | | Catalog Number | | |
| 450E–540E | Disconnect | 38RDB4-NH | 34.5 | 38.0 | 150 | 38RDB8-VM | 38RDB8-UM | RDB8-VL | RDB8-UL | 38RDB4-SHNT |
| | Disconnect | 38RDB4-NH | 34.5 | 38.0 | 200 | 38RDB8-HVM | 38RDB8-HUM | RDB8-VL | RDB8-UL | 38RDB4-SHNT |

Notes

- ① Requires two fuse refills as shown. Price each refill individually. Example: To order refill units for a 720E, 38 kV fuse, order 2 pieces of an 8RBA4-400E.
- ② For new installation, order two refills (Standard or Time Lag), one fuseholder, one mounting, and two filters or condensers per phase. Live parts can be substituted for the mounting if the user is supplying base support and insulators.
- ③ Two filters or condensers required.
- ④ For new installation, order two refills (Standard or Time Lag), one fuseholder and one mounting per phase. Live parts can be substituted for the mounting if the user is supplying base support and insulators.

3.4

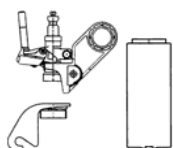
Power Breakers, Contactors and Fuses

Expulsion Fuses

Type DBU

3

DBU-EFID



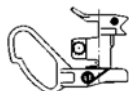
DBU17-GNM



DBU17-GDM



DBU-EFOD



Type DBU Expulsion Fuse Units 17.1 kV Maximum, 14.4 kV Nominal

| Ampere Rating | Standard Speed | | | Slow Speed | | | Ampere Rating | K Speed | |
|---------------|-------------------|------------------------|------------------------|---------------|-------------------|------------------------|---------------|-------------------|------------------------|
| | Catalog Number ①② | Curve Reference 36-643 | Curve Reference 36-643 | Ampere Rating | Catalog Number ①② | Curve Reference 36-643 | | Catalog Number ①② | Curve Reference 36-643 |
| 5E | DBU17-5E | 11,14 | — | — | — | — | 3K | DBU17-3K | 12, 15 |
| 7E | DBU17-7E | 11,14 | — | — | — | — | 6K | DBU17-6K | 12, 15 |
| 10E | DBU17-10E | 11,14 | — | — | — | — | 8K | DBU17-8K | 12, 15 |
| 13E | DBU17-13E | 11,14 | — | — | — | — | 10K | DBU17-10K | 12, 15 |
| 15E | DBU17-15E | 11,14 | 15SE | DBU17-15SE | 10, 13 | — | 12K | DBU17-12K | 12, 15 |
| 20E | DBU17-20E | 11,14 | 20SE | DBU17-20SE | 10, 13 | — | 15K | DBU17-15K | 12, 15 |
| 25E | DBU17-25E | 11,14 | 25SE | DBU17-25SE | 10, 13 | — | 20K | DBU17-20K | 12, 15 |
| 30E | DBU17-30E | 11,14 | 30SE | DBU17-30SE | 10, 13 | — | 25K | DBU17-25K | 12, 15 |
| 40E | DBU17-40E | 11,14 | 40SE | DBU17-40SE | 10, 13 | — | 30K | DBU17-30K | 12, 15 |
| 50E | DBU17-50E | 11,14 | 50SE | DBU17-50SE | 10, 13 | — | 40K | DBU17-40K | 12, 15 |
| 65E | DBU17-65E | 11,14 | 65SE | DBU17-65SE | 10, 13 | — | 50K | DBU17-50K | 12, 15 |
| 80E | DBU17-80E | 11,14 | 80SE | DBU17-80SE | 10, 13 | — | 65K | DBU17-65K | 12, 15 |
| 100E | DBU17-100E | 11,14 | 100SE | DBU17-100SE | 10, 13 | — | 80K | DBU17-80K | 12, 15 |
| 125E | DBU17-125E | 11,14 | 125SE | DBU17-125SE | 10, 13 | — | 100K | DBU17-100K | 12, 15 |
| 150E | DBU17-150E | 11,14 | 150SE | DBU17-150SE | 10, 13 | — | 140K | DBU17-140K | 12, 15 |
| 175E | DBU17-175E | 11,14 | 175SE | DBU17-175SE | 10, 13 | — | 200K | DBU17-200K | 12, 15 |
| 200E | DBU17-200E | 11,14 | 200SE | DBU17-200SE | 10, 13 | — | — | — | — |

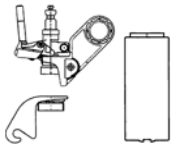
Type DBU Expulsion Fuse Mountings 17.1 kV Maximum, 14.4 kV Nominal

| Ampere Rating | Style | Style | Voltage (kV) | | | Mounting | Live Parts | End Fittings | Muffler |
|------------------------------------|---------|---------------|--------------|---------|------------|-------------|------------|--------------|----------|
| | | | Nominal | Maximum | LIWL (BIL) | | | | |
| 5E–200E, 15SE–200SE, 3K–200K | Indoor | Non loadbreak | 13.8 | 17.1 | 95 | DBU17-GNM ③ | DBU17-NL ③ | DBU-EFID ④ | DBU-MFLR |
| | Indoor | Loadbreak | 13.8 | 17.1 | 95 | DBU17-GDM ③ | DBU17-DL ③ | DBU-EFID ④ | DBU-MFLR |
| | Outdoor | Dropout | 13.8 | 17.1 | 125 | DBU-17-DM | — | DBU-EFOD | — |

Notes

- ① Maximum interrupting rating 14 kA symmetrical.
- ② Approximate shipping weight 2.1 lb (0.95 kg).
- ③ To complete the mounting catalog number, specify -R for right side cable terminator or -L for left side cable terminator.
- ④ End fittings DBU-EFID include a muffler.

DBU-EFID



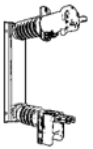
Type DBU Expulsion Fuse Units 27.0 kV Maximum, 25 kV Nominal

| Ampere Rating | Standard Speed | | | Slow Speed | | | K Speed | | |
|---------------|------------------------------|------------------------|---------------|------------------------------|------------------------|---------------|------------------------------|------------------------|--|
| | Catalog Number ^{①②} | Curve Reference 36-643 | Ampere Rating | Catalog Number ^{①②} | Curve Reference 36-643 | Ampere Rating | Catalog Number ^{①②} | Curve Reference 36-643 | |
| 5E | DBU27-5E | 11,17 | — | — | — | 3K | DBU27-3K | 12, 18 | |
| 7E | DBU27-7E | 11,17 | — | — | — | 6K | DBU27-6K | 12, 18 | |
| 10E | DBU27-10E | 11,17 | — | — | — | 8K | DBU27-8K | 12, 18 | |
| 13E | DBU27-13E | 11,17 | — | — | — | 10K | DBU27-10K | 12, 18 | |
| 15E | DBU27-15E | 11,17 | 15SE | DBU27-15SE | 10, 16 | 12K | DBU27-12K | 12, 18 | |
| 20E | DBU27-20E | 11,17 | 20SE | DBU27-20SE | 10, 16 | 15K | DBU27-15K | 12, 18 | |
| 25E | DBU27-25E | 11,17 | 25SE | DBU27-25SE | 10, 16 | 20K | DBU27-20K | 12, 18 | |
| 30E | DBU27-30E | 11,17 | 30SE | DBU27-30SE | 10, 16 | 25K | DBU27-25K | 12, 18 | |
| 40E | DBU27-40E | 11,17 | 40SE | DBU27-40SE | 10, 16 | 30K | DBU27-30K | 12, 18 | |
| 50E | DBU27-50E | 11,17 | 50SE | DBU27-50SE | 10, 16 | 40K | DBU27-40K | 12, 18 | |
| 65E | DBU27-65E | 11,17 | 65SE | DBU27-65SE | 10, 16 | 50K | DBU27-50K | 12, 18 | |
| 80E | DBU27-80E | 11,17 | 80SE | DBU27-80SE | 10, 16 | 65K | DBU27-65K | 12, 18 | |
| 100E | DBU27-100E | 11,17 | 100SE | DBU27-100SE | 10, 16 | 80K | DBU27-80K | 12, 18 | |
| 125E | DBU27-125E | 11,17 | 125SE | DBU27-125SE | 10, 16 | 100K | DBU27-100K | 12, 18 | |
| 150E | DBU27-150E | 11,17 | 150SE | DBU27-150SE | 10, 16 | 140K | DBU27-140K | 12, 18 | |
| 175E | DBU27-175E | 11,17 | 175SE | DBU27-175SE | 10, 16 | 200K | DBU27-200K | 12, 18 | |
| 200E | DBU27-200E | 11,17 | 200SE | DBU27-200SE | 10, 16 | — | — | — | |

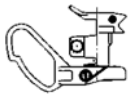
DBU17-GNM



DBU17-GDM



DBU-EFOD



Type DBU Expulsion Fuse Mountings 27.0 kV Maximum, 25 kV Nominal

| Ampere Rating | Style | Style | Voltage (kV) | | | Mounting | Live Parts | End Fittings | Muffler |
|------------------------------------|---------|---------------|--------------|---------|------------|------------------------|-----------------------|-----------------------|----------|
| | | | Nominal | Maximum | LIWL (BIL) | | | | |
| 5E–200E, 15SE–200SE, 3K–200K | Indoor | Non loadbreak | 23.5 | 27.0 | 110 | DBU27-GNM ^③ | DBU27-NL ^③ | DBU-EFID ^④ | DBU-MFLR |
| | Indoor | Loadbreak | 23.5 | 27.0 | 110 | DBU27-GDM ^③ | DBU27-DL ^③ | DBU-EFID ^④ | DBU-MFLR |
| | Outdoor | Dropout | 23.5 | 27.0 | 150 | DBU-27-DM | — | DBU-EFOD | — |

Notes

- ① Maximum interrupting rating 12.5 kA symmetrical.
- ② Approximate shipping weight 2.1 lb (0.95 kg).
- ③ To complete the mounting catalog number, specify -R for right side cale terminator or -L for left side cale terminator.
- ④ End fittings DBU-EFID include a muffler.

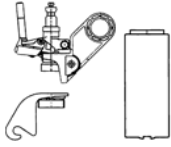
3.4

Power Breakers, Contactors and Fuses

Expulsion Fuses

3

DBU-EFID



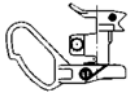
DBU17-GNM



DBU17-GDM



DBU-EFOD



Type DBU Expulsion Fuse Units 38.8 kV Maximum, 34.5 kV Nominal

| Ampere Rating | Standard Speed | | | Slow Speed | | | K Speed | | |
|---------------|------------------------------|------------------------|---------------|-----------------------------|------------------------|---------------|------------------------------|------------------------|--|
| | Catalog Number ^{①②} | Curve Reference 36-643 | Ampere Rating | Catalog Number ^② | Curve Reference 36-643 | Ampere Rating | Catalog Number ^{①②} | Curve Reference 36-643 | |
| 5E | DBU38-5E | 11,17 | — | — | — | 3K | DBU38-3K | 12, 18 | |
| 7E | DBU38-7E | 11,17 | — | — | — | 6K | DBU38-6K | 12, 18 | |
| 10E | DBU38-10E | 11,17 | — | — | — | 8K | DBU38-8K | 12, 18 | |
| 13E | DBU38-13E | 11,17 | — | — | — | 10K | DBU38-10K | 12, 18 | |
| 15E | DBU38-15E | 11,17 | 15SE | DBU38-15SE | 10, 16 | 12K | DBU38-12K | 12, 18 | |
| 20E | DBU38-20E | 11,17 | 20SE | DBU38-20SE | 10, 16 | 15K | DBU38-15K | 12, 18 | |
| 25E | DBU38-25E | 11,17 | 25SE | DBU38-25SE | 10, 16 | 20K | DBU38-20K | 12, 18 | |
| 30E | DBU38-30E | 11,17 | 30SE | DBU38-30SE | 10, 16 | 25K | DBU38-25K | 12, 18 | |
| 40E | DBU38-40E | 11,17 | 40SE | DBU38-40SE | 10, 16 | 30K | DBU38-30K | 12, 18 | |
| 50E | DBU38-50E | 11,17 | 50SE | DBU38-50SE | 10, 16 | 40K | DBU38-40K | 12, 18 | |
| 65E | DBU38-65E | 11,17 | 65SE | DBU38-65SE | 10, 16 | 50K | DBU38-50K | 12, 18 | |
| 80E | DBU38-80E | 11,17 | 80SE | DBU38-80SE | 10, 16 | 65K | DBU38-65K | 12, 18 | |
| 100E | DBU38-100E | 11,17 | 100SE | DBU38-100SE | 10, 16 | 80K | DBU38-80K | 12, 18 | |
| 125E | DBU38-125E | 11,17 | 125SE | DBU38-125SE | 10, 16 | 100K | DBU38-100K | 12, 18 | |
| 150E | DBU38-150E | 11,17 | 150SE | DBU38-150SE | 10, 16 | 140K | DBU38-140K | 12, 18 | |
| 175E | DBU38-175E | 11,17 | 175SE | DBU38-175SE | 10, 16 | 200K | DBU38-200K | 12, 18 | |
| 200E | DBU38-200E | 11,17 | 200SE | DBU38-200SE | 10, 16 | — | — | — | |

Type DBU Expulsion Fuse Mountings 38.0 kV Maximum, 34.5 kV Nominal

| Ampere Rating | Style | Style | Voltage (kV) | | | Mounting | Live Parts | End Fittings | Muffler |
|------------------------------------|--------|---------------|--------------|---------|------------|------------------------|-----------------------|-----------------------|----------|
| | | | Nominal | Maximum | LIWL (BIL) | | | | |
| 5E–200E, 15SE–200SE, 3K–200K | Indoor | Non loadbreak | 34.5 | 38 | 150 | DBU38-GNM ^③ | DBU38-NL ^③ | DBU-EFID ^④ | DBU-MFLR |

Notes

- ① Maximum interrupting rating 10 kA symmetrical (outdoor dropout, 8.5 kA indoor with muffler).
- ② Approximate shipping weight 2.1 lb (0.95 kg).
- ③ To complete the mounting catalog number, specify -R for right side cable terminator or -L for left side cable terminator.
- ④ End fittings DBU-EFID includes a muffler.

Technical Data and Specifications

Type DBA

Type DBA Expulsion Fuses for Use Indoors or Outdoors

| Ampere Rating | DBA-1 Fuse Units Catalog Number | Curve Reference 36-623 | Approximate Shipping Weight Lbs (kg) |
|--|------------------------------------|---------------------------|---|
| Type DBA-1 Fuse Refills | | | |
| 8.3 kV Maximum (7.2 kV Nominal) | | | |
| 0.5 | 8DBA1-5 | 10, 11 | 1.5 (0.7) |
| 3 | 8DBA1-3 | 10, 11 | 1.5 (0.7) |
| 5E | 8DBA1-5E | 10, 11 | 1.5 (0.7) |
| 7E | 8DBA1-7E | 10, 11 | 1.5 (0.7) |
| 10E | 8DBA1-10E | 10, 11 | 1.5 (0.7) |
| 15E | 8DBA1-15E | 10, 11 | 1.5 (0.7) |
| 20E | 8DBA1-20E | 10, 11 | 1.5 (0.7) |
| 25E | 8DBA1-25E | 10, 11 | 1.5 (0.7) |
| 30E | 8DBA1-30E | 10, 11 | 1.5 (0.7) |
| 40E | 8DBA1-40E | 10, 11 | 1.5 (0.7) |
| 50E | 8DBA1-50E | 10, 11 | 1.5 (0.7) |
| 65E | 8DBA1-65E | 10, 11 | 1.5 (0.7) |
| 80E | 8DBA1-80E | 10, 11 | 1.5 (0.7) |
| 100E | 8DBA1-100E | 10, 11 | 1.5 (0.7) |
| 125E | 8DBA1-125E | 10, 11 | 1.5 (0.7) |
| 150E | 8DBA1-150E | 10, 11 | 1.5 (0.7) |
| 200E | 8DBA1-200E | 10, 11 | 1.5 (0.7) |
| 15.5 kV Maximum (14.4 kV Nominal) | | | |
| 0.5 | 15DBA1-5 | 10, 11 | 2.1 (0.95) |
| 3 | 15DBA1-3 | 10, 11 | 2.1 (0.95) |
| 5E | 15DBA1-5E | 10, 11 | 2.1 (0.95) |
| 7E | 15DBA1-7E | 10, 11 | 2.1 (0.95) |
| 10E | 15DBA1-10E | 10, 11 | 2.1 (0.95) |
| 15E | 15DBA1-15E | 10, 11 | 2.1 (0.95) |
| 20E | 15DBA1-20E | 10, 11 | 2.1 (0.95) |
| 25E | 15DBA1-25E | 10, 11 | 2.1 (0.95) |
| 30E | 15DBA1-30E | 10, 11 | 2.1 (0.95) |
| 40E | 15DBA1-40E | 10, 11 | 2.1 (0.95) |
| 50E | 15DBA1-50E | 10, 11 | 2.1 (0.95) |
| 65E | 15DBA1-65E | 10, 11 | 2.1 (0.95) |
| 80E | 15DBA1-80E | 10, 11 | 2.1 (0.95) |
| 100E | 15DBA1-100E | 10, 11 | 2.1 (0.95) |
| 125E | 15DBA1-125E | 10, 11 | 2.1 (0.95) |
| 150E | 15DBA1-150E | 10, 11 | 2.1 (0.95) |
| 200E | 15DBA1-200E | 10, 11 | 2.1 (0.95) |

| Ampere Rating | DBA-1 Fuse Units Catalog Number | Curve Reference 36-623 | Approximate Shipping Weight Lbs (kg) |
|--------------------------------------|------------------------------------|---------------------------|---|
| 25 kV Maximum (23 kV Nominal) | | | |
| 0.5 | 25DBA1-5 | 10, 11 | 3.1 (1.4) |
| 3 | 25DBA1-3 | 10, 11 | 3.1 (1.4) |
| 5E | 25DBA1-5E | 10, 11 | 3.1 (1.4) |
| 7E | 25DBA1-7E | 10, 11 | 3.1 (1.4) |
| 10E | 25DBA1-10E | 10, 11 | 3.1 (1.4) |
| 15E | 25DBA1-15E | 10, 11 | 3.1 (1.4) |
| 20E | 25DBA1-20E | 10, 11 | 3.1 (1.4) |
| 25E | 25DBA1-25E | 10, 11 | 3.1 (1.4) |
| 30E | 25DBA1-30E | 10, 11 | 3.1 (1.4) |
| 40E | 25DBA1-40E | 10, 11 | 3.1 (1.4) |
| 50E | 25DBA1-50E | 10, 11 | 3.1 (1.4) |
| 65E | 25DBA1-65E | 10, 11 | 3.1 (1.4) |
| 80E | 25DBA1-80E | 10, 11 | 3.1 (1.4) |
| 100E | 25DBA1-100E | 10, 11 | 3.1 (1.4) |
| 125E | 25DBA1-125E | 10, 11 | 3.1 (1.4) |
| 150E | 25DBA1-150E | 10, 11 | 3.1 (1.4) |
| 200E | 25DBA1-200E | 10, 11 | 3.1 (1.4) |

3.4

Power Breakers, Contactors and Fuses

Expulsion Fuses

Type DBA Expulsion Fuses for Use Indoors or Outdoors, continued

3

| Ampere Rating | DBA-1 Fuse Units Catalog Number | Curve Reference 36-623 | Approximate Shipping Weight Lbs (kg) |
|--|------------------------------------|---------------------------|--|
| Type DBA-1 Fuse Refills | | | |
| 38 kV Maximum (34.5 kV Nominal) | | | |
| 0.5 | 38DBA1-5 | 10, 12 | 4.2 (1.9) |
| 3 | 38DBA1-3 | 10, 12 | 4.2 (1.9) |
| 5E | 38DBA1-5E | 10, 12 | 4.2 (1.9) |
| 7E | 38DBA1-7E | 10, 12 | 4.2 (1.9) |
| 10E | 38DBA1-10E | 10, 12 | 4.2 (1.9) |
| 15E | 38DBA1-15E | 10, 12 | 4.2 (1.9) |
| 20E | 38DBA1-20E | 10, 12 | 4.2 (1.9) |
| 25E | 38DBA1-25E | 10, 12 | 4.2 (1.9) |
| 30E | 38DBA1-30E | 10, 12 | 4.2 (1.9) |
| 40E | 38DBA1-40E | 10, 12 | 4.2 (1.9) |
| 50E | 38DBA1-50E | 10, 12 | 4.2 (1.9) |
| 65E | 38DBA1-65E | 10, 12 | 4.2 (1.9) |
| 80E | 38DBA1-80E | 10, 12 | 4.2 (1.9) |
| 100E | 38DBA1-100E | 10, 12 | 4.2 (1.9) |
| 125E | 38DBA1-125E | 10, 12 | 4.2 (1.9) |
| 150E | 38DBA1-150E | 10, 12 | 4.2 (1.9) |
| 200E | 38DBA1-200E | 10, 12 | 4.2 (1.9) |
| 48 kV Maximum (46 kV Nominal) | | | |
| 0.5 | 48DBA1-5 | 10, 12 | 6.5 (3.0) |
| 3 | 48DBA1-3 | 10, 12 | 6.5 (3.0) |
| 5E | 48DBA1-5E | 10, 12 | 6.5 (3.0) |
| 7E | 48DBA1-7E | 10, 12 | 6.5 (3.0) |
| 10E | 48DBA1-10E | 10, 12 | 6.5 (3.0) |
| 15E | 48DBA1-15E | 10, 12 | 6.5 (3.0) |
| 20E | 48DBA1-20E | 10, 12 | 6.5 (3.0) |
| 25E | 48DBA1-25E | 10, 12 | 6.5 (3.0) |
| 30E | 48DBA1-30E | 10, 12 | 6.5 (3.0) |
| 40E | 48DBA1-40E | 10, 12 | 6.5 (3.0) |
| 50E | 48DBA1-50E | 10, 12 | 6.5 (3.0) |
| 65E | 48DBA1-65E | 10, 12 | 6.5 (3.0) |
| 80E | 48DBA1-80E | 10, 12 | 6.5 (3.0) |
| 100E | 48DBA1-100E | 10, 12 | 6.5 (3.0) |
| 125E | 48DBA1-125E | 10, 12 | 6.5 (3.0) |
| 150E | 48DBA1-150E | 10, 12 | 6.5 (3.0) |
| 200E | 48DBA1-200E | 10, 12 | 6.5 (3.0) |

| Ampere Rating | DBA-1 Fuse Units Catalog Number | Curve Reference 36-623 | Approximate Shipping Weight Lbs (kg) |
|--------------------------------------|------------------------------------|---------------------------|--|
| 72 kV Maximum (69 kV Nominal) | | | |
| 0.5 | 72DBA1-5 | 10, 12 | 7.1 (3.2) |
| 3 | 72DBA1-3 | 10, 12 | 7.1 (3.2) |
| 5E | 72DBA1-5E | 10, 12 | 7.1 (3.2) |
| 7E | 72DBA1-7E | 10, 12 | 7.1 (3.2) |
| 10E | 72DBA1-10E | 10, 12 | 7.1 (3.2) |
| 15E | 72DBA1-15E | 10, 12 | 7.1 (3.2) |
| 20E | 72DBA1-20E | 10, 12 | 7.1 (3.2) |
| 25E | 72DBA1-25E | 10, 12 | 7.1 (3.2) |
| 30E | 72DBA1-30E | 10, 12 | 7.1 (3.2) |
| 40E | 72DBA1-40E | 10, 12 | 7.1 (3.2) |
| 50E | 72DBA1-50E | 10, 12 | 7.1 (3.2) |
| 65E | 72DBA1-65E | 10, 12 | 7.1 (3.2) |
| 80E | 72DBA1-80E | 10, 12 | 7.1 (3.2) |
| 100E | 72DBA1-100E | 10, 12 | 7.1 (3.2) |
| 125E | 72DBA1-125E | 10, 12 | 7.1 (3.2) |
| 150E | 72DBA1-150E | 10, 12 | 7.1 (3.2) |
| 200E | 72DBA1-200E | 10, 12 | 7.1 (3.2) |

Type DBA Expulsion Fuses for Use Indoors or Outdoors, continued

| Ampere Rating | DBA-1 Fuse Units Catalog Number | Curve Reference 36-623 | Approximate Shipping Weight Lbs (kg) |
|--|------------------------------------|---------------------------|--|
| Type DBA-2 Fuse Refills 38 kV Maximum (34.5 kV Nominal) | | | |
| 0.5 | 38DBA2-5 | 10, 12 | 10 (4.5) |
| 3 | 38DBA2-3 | 10, 12 | 10 (4.5) |
| 5E | 38DBA2-5E | 10, 12 | 10 (4.5) |
| 7E | 38DBA2-7E | 10, 12 | 10 (4.5) |
| 10E | 38DBA2-10E | 10, 12 | 10 (4.5) |
| 15E | 38DBA2-15E | 10, 12 | 10 (4.5) |
| 20E | 38DBA2-20E | 10, 12 | 10 (4.5) |
| 25E | 38DBA2-25E | 10, 12 | 10 (4.5) |
| 30E | 38DBA2-30E | 10, 12 | 10 (4.5) |
| 40E | 38DBA2-40E | 10, 12 | 10 (4.5) |
| 50E | 38DBA2-50E | 10, 12 | 10 (4.5) |
| 65E | 38DBA2-65E | 10, 12 | 10 (4.5) |
| 80E | 38DBA2-80E | 10, 12 | 10 (4.5) |
| 100E | 38DBA2-100E | 10, 12 | 10 (4.5) |
| 125E | 38DBA2-125E | 10, 12 | 10 (4.5) |
| 150E | 38DBA2-150E | 10, 12 | 10 (4.5) |
| 200E | 38DBA2-200E | 10, 12 | 10 (4.5) |
| 48 kV Maximum (46 kV Nominal) | | | |
| 0.5 | 48DBA2-5 | 10, 12 | 12 (5.4) |
| 3 | 48DBA2-3 | 10, 12 | 12 (5.4) |
| 5E | 48DBA2-5E | 10, 12 | 12 (5.4) |
| 7E | 48DBA2-7E | 10, 12 | 12 (5.4) |
| 10E | 48DBA2-10E | 10, 12 | 12 (5.4) |
| 15E | 48DBA2-15E | 10, 12 | 12 (5.4) |
| 20E | 48DBA2-20E | 10, 12 | 12 (5.4) |
| 25E | 48DBA2-25E | 10, 12 | 12 (5.4) |
| 30E | 48DBA2-30E | 10, 12 | 12 (5.4) |
| 40E | 48DBA2-40E | 10, 12 | 12 (5.4) |
| 50E | 48DBA2-50E | 10, 12 | 12 (5.4) |
| 65E | 48DBA2-65E | 10, 12 | 12 (5.4) |
| 80E | 48DBA2-80E | 10, 12 | 12 (5.4) |
| 100E | 48DBA2-100E | 10, 12 | 12 (5.4) |
| 125E | 48DBA2-125E | 10, 12 | 12 (5.4) |
| 150E | 48DBA2-150E | 10, 12 | 12 (5.4) |
| 200E | 48DBA2-200E | 10, 12 | 12 (5.4) |

| Ampere Rating | DBA-1 Fuse Units Catalog Number | Curve Reference 36-623 | Approximate Shipping Weight Lbs (kg) |
|--------------------------------------|------------------------------------|---------------------------|--|
| 72 kV Maximum (69 kV Nominal) | | | |
| 0.5 | 72DBA2-5 | 10, 12 | 15 (6.8) |
| 3 | 72DBA2-3 | 10, 12 | 15 (6.8) |
| 5E | 72DBA2-5E | 10, 12 | 15 (6.8) |
| 7E | 72DBA2-7E | 10, 12 | 15 (6.8) |
| 10E | 72DBA2-10E | 10, 12 | 15 (6.8) |
| 15E | 72DBA2-15E | 10, 12 | 15 (6.8) |
| 20E | 72DBA2-20E | 10, 12 | 15 (6.8) |
| 25E | 72DBA2-25E | 10, 12 | 15 (6.8) |
| 30E | 72DBA2-30E | 10, 12 | 15 (6.8) |
| 40E | 72DBA2-40E | 10, 12 | 15 (6.8) |
| 50E | 72DBA2-50E | 10, 12 | 15 (6.8) |
| 65E | 72DBA2-65E | 10, 12 | 15 (6.8) |
| 80E | 72DBA2-80E | 10, 12 | 15 (6.8) |
| 100E | 72DBA2-100E | 10, 12 | 15 (6.8) |
| 125E | 72DBA2-125E | 10, 12 | 15 (6.8) |
| 150E | 72DBA2-150E | 10, 12 | 15 (6.8) |
| 200E | 72DBA2-200E | 10, 12 | 15 (6.8) |

3.4

Power Breakers, Contactors and Fuses

Expulsion Fuses

Type DBA Expulsion Fuses for Use Indoors or Outdoors, continued

3

| Ampere Rating | DBA-1 Fuse Units Catalog Number | Curve Reference 36-623 | Approximate Shipping Weight Lbs (kg) |
|--|------------------------------------|---------------------------|---|
| Type DBA-2 Fuse Refills | | | |
| 92 kV Maximum (92 kV Nominal) | | | |
| 3 | 92DBA2-3 | 10, 13 | 19 (8.6) |
| 5E | 92DBA2-5E | 10, 13 | 19 (8.6) |
| 7E | 92DBA2-7E | 10, 13 | 19 (8.6) |
| 10E | 92DBA2-10E | 10, 13 | 19 (8.6) |
| 15E | 92DBA2-15E | 10, 13 | 19 (8.6) |
| 20E | 92DBA2-20E | 10, 13 | 19 (8.6) |
| 25E | 92DBA2-25E | 10, 13 | 19 (8.6) |
| 30E | 92DBA2-30E | 10, 13 | 19 (8.6) |
| 40E | 92DBA2-40E | 10, 13 | 19 (8.6) |
| 50E | 92DBA2-50E | 10, 13 | 19 (8.6) |
| 65E | 92DBA2-65E | 10, 13 | 19 (8.6) |
| 80E | 92DBA2-80E | 10, 13 | 19 (8.6) |
| 100E | 92DBA2-100E | 10, 13 | 19 (8.6) |
| 125E | 92DBA2-125E | 10, 13 | 19 (8.6) |
| 150E | 92DBA2-150E | 10, 13 | 19 (8.6) |
| 200E | 92DBA2-200E | 10, 13 | 19 (8.6) |
| 121 kV Maximum (115 kV Nominal) | | | |
| 3 | 121DBA2-3 | 10, 13 | 22 (10) |
| 5E | 121DBA2-5E | 10, 13 | 22 (10) |
| 7E | 121DBA2-7E | 10, 13 | 22 (10) |
| 10E | 121DBA2-10E | 10, 13 | 22 (10) |
| 15E | 121DBA2-15E | 10, 13 | 22 (10) |
| 20E | 121DBA2-20E | 10, 13 | 22 (10) |
| 25E | 121DBA2-25E | 10, 13 | 22 (10) |
| 30E | 121DBA2-30E | 10, 13 | 22 (10) |
| 40E | 121DBA2-40E | 10, 13 | 22 (10) |
| 50E | 121DBA2-50E | 10, 13 | 22 (10) |
| 65E | 121DBA2-65E | 10, 13 | 22 (10) |
| 80E | 121DBA2-80E | 10, 13 | 22 (10) |
| 100E | 121DBA2-100E | 10, 13 | 22 (10) |
| 125E | 121DBA2-125E | 10, 13 | 22 (10) |
| 150E | 121DBA2-150E | 10, 13 | 22 (10) |
| 200E | 121DBA2-200E | 10, 13 | 22 (10) |

| Ampere Rating | DBA-1 Fuse Units Catalog Number | Curve Reference 36-623 | Approximate Shipping Weight Lbs (kg) |
|--|------------------------------------|---------------------------|---|
| 145 kV Maximum (138 kV Nominal) | | | |
| 3 | 145DBA2-3 | 10, 13 | 25 (11.4) |
| 5E | 145DBA2-5E | 10, 13 | 25 (11.4) |
| 7E | 145DBA2-7E | 10, 13 | 25 (11.4) |
| 10E | 145DBA2-10E | 10, 13 | 25 (11.4) |
| 15E | 145DBA2-15E | 10, 13 | 25 (11.4) |
| 20E | 145DBA2-20E | 10, 13 | 25 (11.4) |
| 25E | 145DBA2-25E | 10, 13 | 25 (11.4) |
| 30E | 145DBA2-30E | 10, 13 | 25 (11.4) |
| 40E | 145DBA2-40E | 10, 13 | 25 (11.4) |
| 50E | 145DBA2-50E | 10, 13 | 25 (11.4) |
| 65E | 145DBA2-65E | 10, 13 | 25 (11.4) |
| 80E | 145DBA2-80E | 10, 13 | 25 (11.4) |
| 100E | 145DBA2-100E | 10, 13 | 25 (11.4) |
| 125E | 145DBA2-125E | 10, 13 | 25 (11.4) |
| 150E | 145DBA2-150E | 10, 13 | 25 (11.4) |
| 200E | 145DBA2-200E | 10, 13 | 25 (11.4) |

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| Type DSL | V4-T3-147 |

Catalog Number Selection

Easy to Use, Easy to Order!

Eaton’s fuse catalog numbering system makes it easy to order the right fuse. The catalog numbers are easy to remember, unique to each fuse, and are broken down in three descriptive segments: Fuse type, voltage rating and current rating.

These catalog numbers can be entered directly and easily:

- No change in order processing will occur if you use either a style number or its corresponding catalog number. You will get the same fuse

Examples:

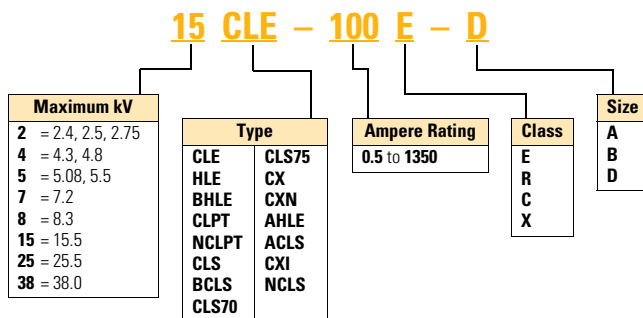
5CLE-30E—5.5 max. kV, CLE fuse unit, 30E amperes

15CXN-45C—15.5 max. kV, CXN fuse unit, 45C amperes

5CLS-GDM-E—5.5 max. kV, CLS fuse unit, glass polyester nondisconnect mounting

CLE-DL-D—CLE, disconnect live parts Size D

Current Limiting Fuses



3.5

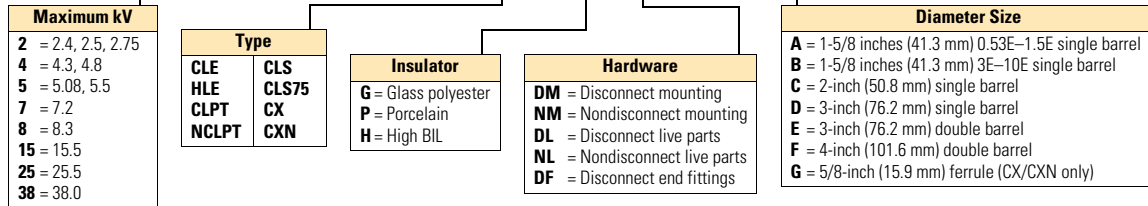
Power Breakers, Contactors and Fuses

Current Limiting Fuses

Current Limiting Fuse Accessories

15 CLE - P NM - C

3



Product Selection

Type CLE



Type CLE Current Limiting Fuses 2.75 kV Maximum (2.4 kV Nominal)

| Current Rating (Amperes) | Barrel Number | Interrupting Rating rms (kA Sym.) | Heritage Product | Indoor/Outdoor | Performance Curves | | | Catalog Number |
|--------------------------|---------------|-----------------------------------|------------------|----------------|----------------------|---------------------|--------------------------|------------------|
| | | | | | Minimum Melting Time | Total Clearing Time | Peak Let-Through Current | |
| 15E | 1 | 50 | H | Indoor | 56353202 | 56353302 | 63931702 | 2CLE-15E |
| 20E | 1 | 50 | H | Indoor | 56353202 | 56353302 | 63931702 | 2CLE-20E |
| 25E | 1 | 50 | H | Indoor | 56353202 | 56353302 | 63931702 | 2CLE-25E |
| 10E | 1 | 50 | H | Indoor | 53686104 | 53686204 | 63931704 | 2CLE-10E |
| 30E | 1 | 50 | H | Indoor | 53686104 | 53686204 | 63931704 | 2CLE-30E |
| 40E | 1 | 50 | H | Indoor | 53686104 | 53686204 | 63931704 | 2CLE-40E |
| 50E | 1 | 50 | H | Indoor | 53686104 | 53686204 | 63931704 | 2CLE-50E |
| 65E | 1 | 50 | H | Indoor | 53686104 | 53686204 | 63931704 | 2CLE-65E |
| 80E | 1 | 50 | H | Indoor | 53686104 | 53686204 | 63931704 | 2CLE-80E |
| 100E | 1 | 50 | H | Indoor | 53686104 | 53686204 | 63931704 | 2CLE-100E |
| 125E | 1 | 50 | H | Indoor | 53686104 | 53686204 | 63931704 | 2CLE-125E |
| 150E | 1 | 50 | H | Indoor | 53686104 | 53686204 | 63931704 | 2CLE-150E |
| 200E | 1 | 50 | H | Indoor | 53686104 | 53686204 | 63931704 | 2CLE-200E |
| 225E | 1 | 50 | H | Indoor | 53686104 | 53686204 | 63931704 | 2CLE-225E |
| 250E | 2 | 50 | H | Indoor | 53690002 | 53690102 | 63931802 | 2CLE-250E |
| 300E | 2 | 50 | H | Indoor | 53690002 | 53690102 | 63931802 | 2CLE-300E |
| 350X | 2 | 50 | H | Indoor | 53690002 | 53690102 | 63931802 | 2CLE-350X |
| 400X | 2 | 50 | H | Indoor | 53690002 | 53690102 | 63931802 | 2CLE-400X |
| 450X | 2 | 50 | H | Indoor | 53690002 | 53690102 | 63931802 | 2CLE-450X |

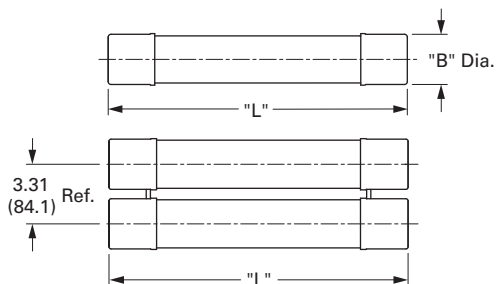
Type CLE Mountings and Hardware 2.75 kV Maximum (2.4 kV Nominal)

| Ampere Rating | Fuse Mounting Type ① | Voltage BIL (kV) | Diameter | Clip Center | Length | Approximate Shipping Weight Lbs (kg) | Mounting (Including Live Parts, End Fittings) ② | | Live Parts (Including End Fittings) ② | End Fittings (Disconnect Only) |
|---------------|----------------------|------------------|-------------|--------------|---------------|--------------------------------------|---|--|---------------------------------------|--------------------------------|
| | | | | | | | Porcelain Insulator Catalog Number | Glass-Polyester Insulator Catalog Number | Catalog Number | Catalog Number |
| 15E–25E | Non-disconnect | 60 | 2.00 (50.8) | 8.13 (206.5) | 9.50 (241.3) | 2 (0.91) | 2CLE-PNM-C | 2CLE-GNM-C | CLE-NL-C | — |
| | Disconnect | 60 | | | | | 2CLE-PDM-C | 2CLE-GDM-C | CLE-DL-C | CLE-DF-C |
| 10E–250E | Non-disconnect | 60 | 3.00 (76.2) | 7.00 (177.8) | 10.90 (276.9) | 7 (3.18) | 2CLE-PNM-D | 2CLE-GNM-D | CLE-NL-D | — |
| | Disconnect | 60 | | | | | 2CLE-PDM-D | 2CLE-GDM-D | CLE-DL-D | CLE-DF-D |
| 300E–450E | Non-disconnect | 60 | 3.00 (76.2) | 7.00 (177.8) | 10.90 (276.9) | 15 (6.81) | 2CLE-PNM-E | 2CLE-GNM-E | CLE-NL-E | — |
| | Disconnect | 60 | | | | | 2CLE-PDM-E | 2CLE-GDM-E | CLE-DL-E | CLE-DF-E |

Fuse Dimensional Details

Approximate Dimensions in Inches (mm)

Type CLE Fuse



| CLE kV | "L" | "B" Dia. |
|----------|---------------|-------------|
| 15E–25E | 9.50 (241.3) | 2.00 (50.8) |
| 10E–450E | 10.90 (276.9) | 3.00 (76.2) |

Notes

- ① See Page V4-T3-148 for diagram of typical mounting.
- ② End fittings supplied only when required.

3.5

Power Breakers, Contactors and Fuses

Current Limiting Fuses

3



Type CLE Current Limiting Fuses 5.5 kV Maximum (4.8 kV Nominal)

| Current Rating (Amperes) | Barrel Number | Interrupting Rating rms (kA Sym.) | Heritage Product | Indoor/Outdoor | Performance Curves | | | Catalog Number |
|--------------------------|---------------|-----------------------------------|------------------|----------------|----------------------|---------------------|--------------------------|----------------|
| | | | | | Minimum Melting Time | Total Clearing Time | Peak Let-Through Current | |
| 15E | 1 | 50 | H | Indoor | 56353204 | 56353304 | 63931702 | 5CLE-15E |
| 20E | 1 | 50 | H | Indoor | 56353204 | 56353304 | 63931702 | 5CLE-20E |
| 25E | 1 | 50 | H | Indoor | 56353204 | 56353304 | 63931702 | 5CLE-25E |
| 10E | 1 | 63 | — | Indoor/outdoor | 70548501 | 70548601 | 70548701 | 5CLE-10E-D |
| 15E | 1 | 63 | — | Indoor/outdoor | 70548501 | 70548601 | 70548701 | 5CLE-15E-D |
| 20E | 1 | 63 | — | Indoor/outdoor | 70548501 | 70548601 | 70548701 | 5CLE-20E-D |
| 25E | 1 | 63 | — | Indoor/outdoor | 70548501 | 70548601 | 70548701 | 5CLE-25E-D |
| 30E | 1 | 63 | — | Indoor/outdoor | 70548501 | 70548601 | 70548701 | 5CLE-30E |
| 40E | 1 | 50 | — | Indoor/outdoor | 70545801 | 70545901 | 70546701 | 5CLE-40E |
| 50E | 1 | 50 | — | Indoor/outdoor | 70545801 | 70545901 | 70546701 | 5CLE-50E |
| 65E | 1 | 50 | — | Indoor/outdoor | 70545801 | 70545901 | 70546701 | 5CLE-65E |
| 80E | 1 | 50 | — | Indoor/outdoor | 70545801 | 70545901 | 70546701 | 5CLE-80E |
| 100E | 1 | 50 | — | Indoor/outdoor | 70545801 | 70545901 | 70546701 | 5CLE-100E |
| 125E | 1 | 50 | — | Indoor/outdoor | 70545801 | 70545901 | 70546701 | 5CLE-125E |
| 150E | 1 | 63 | — | Indoor/outdoor | 70545801 | 70545901 | 70547601 | 5CLE-150E |
| 175E | 1 | 63 | — | Indoor/outdoor | 70545801 | 70545901 | 70547601 | 5CLE-175E |
| 200E | 1 | 63 | — | Indoor/outdoor | 70545801 | 70545901 | 70547601 | 5CLE-200E |
| 250E | 1 | 63 | — | Indoor/outdoor | 70545801 | 70545901 | 70547601 | 5CLE-250E |
| 300E | 2 | 63 | — | Indoor/outdoor | 70546001 | 70546101 | 70547601 | 5CLE-300E |
| 350E | 2 | 63 | — | Indoor/outdoor | 70546001 | 70546101 | 70547601 | 5CLE-350E |
| 400E | 2 | 63 | — | Indoor/outdoor | 70546001 | 70546101 | 70547601 | 5CLE-400E |
| 450E | 2 | 63 | — | Indoor/outdoor | 70546001 | 70546101 | 70547601 | 5CLE-450E |
| 600E | 2 | 40 | — | Indoor | 62908902 | 62908903 | 62908904 | 5CLE-600E |
| 750E | 2 | 40 | — | Indoor | 62908902 | 62908903 | 62908904 | 5CLE-750E |
| 1100E | 4 | 31 | — | Indoor | 62908902 | 62908903 | 62908904 | 5CLE-1100E |
| 1350E | 4 | 31 | — | Indoor | 62908902 | 62908903 | 62908904 | 5CLE-1350E |

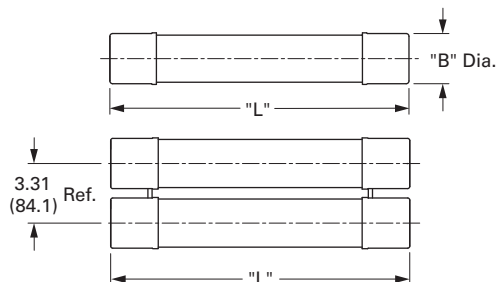
Type CLE Mountings and Hardware 5.5 kV Maximum (4.8 kV Nominal)

| Ampere Rating | Fuse Mounting Type ① | Voltage BIL (kV) | Diameter | Clip Center | Length | Approximate Shipping Weight Lbs (kg) | Mounting (Including Live Parts, End Fittings) ② | | Live Parts (Including End Fittings) ② | End Fittings (Disconnect Only) |
|-----------------|----------------------|------------------|--------------|---------------|---------------|--------------------------------------|---|--|---------------------------------------|--------------------------------|
| | | | | | | | Porcelain Insulator Catalog Number | Glass-Polyester Insulator Catalog Number | Catalog Number | Catalog Number |
| 10E-D–25E-D | Non-disconnect | 60 | 3.00 (76.2) | 14.00 (355.6) | 17.90 (454.7) | 9 (4.09) | 5CLE-PNM-D | 5CLE-GNM-D | CLE-NL-D | — |
| 30E–250E | Disconnect | 60 | | | | | 5CLE-PDM-D | 5CLE-GDM-D | CLE-DL-D | CLE-DF-D |
| 15E–25E | Non-disconnect | 60 | 2.00 (50.8) | 11.50 (292.1) | 12.90 (327.7) | 3 (1.36) | 5CLE-PNM-C | 5CLE-GNM-C | CLE-NL-C | — |
| | Disconnect | 60 | | | | | 5CLE-PDM-C | 5CLE-GDM-C | CLE-DL-C | CLE-DF-C |
| 300E–450E | Non-disconnect | 60 | 3.00 (76.2) | 14.00 (355.6) | 17.90 (454.7) | 19 (8.63) | 5CLE-PNM-E | 5CLE-GNM-E | CLE-NL-E | — |
| | Disconnect | 60 | | | | | 5CLE-PDM-E | 5CLE-GDM-E | CLE-DL-E | CLE-DF-E |
| 600E and 750E | Consult factory | 60 | 4.00 (101.6) | N/A | N/A | 40 (18.16) | — | — | — | — |
| 1100E and 1350E | Consult factory | — | 4.00 (101.6) | N/A | N/A | 80 (36.32) | — | — | — | — |

Fuse Dimensional Details

Approximate Dimensions in Inches (mm)

Type CLE Fuse



| CLE kV | "L" | "B" Dia. |
|----------|---------------|-------------|
| 15E–25E | 12.90 (327.7) | 2.00 (50.8) |
| 10E–450E | 17.90 (454.7) | 3.00 (76.2) |

Notes

- ① See Page V4-T3-148 for diagram of typical mounting.
- ② End fittings supplied only when required.



Type CLE Current Limiting Fuses 8.3 kV Maximum (7.2 kV Nominal)

| Current Rating (Amperes) | Barrel Number | Interrupting Rating rms (kA Sym.) | Heritage Product | Indoor/Outdoor | Performance Curves | | | Catalog Number |
|--------------------------|---------------|-----------------------------------|------------------|----------------|----------------------|---------------------|--------------------------|----------------|
| | | | | | Minimum Melting Time | Total Clearing Time | Peak Let-Through Current | |
| 15E | 1 | 50 | H | Indoor | 56353204 | 56353304 | 63931703 | 8CLE-15E |
| 20E | 1 | 50 | H | Indoor | 56353204 | 56353304 | 63931703 | 8CLE-20E |
| 25E | 1 | 50 | H | Indoor | 56353204 | 56353304 | 63931703 | 8CLE-25E |
| 10E | 1 | 50 | — | Indoor/outdoor | 70548501 | 70548601 | 70548801 | 8CLE-10E-D |
| 15E | 1 | 50 | — | Indoor/outdoor | 70548501 | 70548601 | 70548801 | 8CLE-15E-D |
| 20E | 1 | 50 | — | Indoor/outdoor | 70548501 | 70548601 | 70548801 | 8CLE-20E-D |
| 25E | 1 | 50 | — | Indoor/outdoor | 70548501 | 70548601 | 70548801 | 8CLE-25E-D |
| 30E | 1 | 50 | — | Indoor/outdoor | 70548501 | 70548601 | 70548801 | 8CLE-30E |
| 40E | 1 | 50 | — | Indoor/outdoor | 70546201 | 70546301 | 70547301 | 8CLE-40E |
| 50E | 1 | 50 | — | Indoor/outdoor | 70546201 | 70546301 | 70547301 | 8CLE-50E |
| 65E | 1 | 50 | — | Indoor/outdoor | 70546201 | 70546301 | 70547301 | 8CLE-65E |
| 80E | 1 | 50 | — | Indoor/outdoor | 70546201 | 70546301 | 70547301 | 8CLE-80E |
| 100E | 1 | 50 | — | Indoor/outdoor | 70546201 | 70546301 | 70547301 | 8CLE-100E |
| 125E | 1 | 50 | — | Indoor/outdoor | 70546201 | 70546301 | 70547301 | 8CLE-125E |
| 150E | 1 | 50 | — | Indoor/outdoor | 70546201 | 70546301 | 70547301 | 8CLE-150E |
| 175E | 1 | 50 | — | Indoor/outdoor | 70546201 | 70546301 | 70547301 | 8CLE-175E |
| 200E | 2 | 50 | — | Indoor/outdoor | 70546401 | 70546501 | 70547301 | 8CLE-200E |
| 250E | 2 | 50 | — | Indoor/outdoor | 70546401 | 70546501 | 70547301 | 8CLE-250E |
| 300E | 2 | 50 | — | Indoor/outdoor | 70546401 | 70546501 | 70547301 | 8CLE-300E |
| 350E | 2 | 50 | — | Indoor/outdoor | 70546401 | 70546501 | 70547301 | 8CLE-350E |

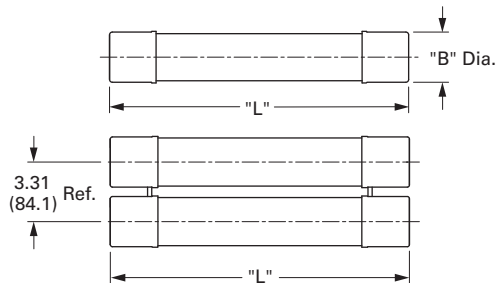
Type CLE Mountings and Hardware 8.3 kV Maximum (7.2 kV Nominal)

| Ampere Rating | Fuse Mounting Type ① | Voltage BIL (kV) | Diameter | Clip Center | Length | Approximate Shipping Weight Lbs (kg) | Mounting (Including Live Parts, End Fittings) ② | | Live Parts (Including End Fittings) ② | End Fittings (Disconnect Only) |
|-------------------------|----------------------|------------------|-------------|---------------|---------------|--------------------------------------|---|--|---------------------------------------|--------------------------------|
| | | | | | | | Porcelain Insulator Catalog Number | Glass-Polyester Insulator Catalog Number | Catalog Number | Catalog Number |
| 15E-25E | Non-disconnect | 75 | 2.00 (50.8) | 14.00 (355.6) | 15.50 (393.7) | 3 (1.36) | 8CLE-PNM-C | 8CLE-GNM-C | CLE-NL-C | — |
| | Disconnect | 75 | | | | | 8CLE-PDM-C | 8CLE-GDM-C | CLE-DL-C | CLE-DF-C |
| 10E-D-25E-D 30E-175E | Non-disconnect | 75 | 3.00 (76.2) | 14.00 (355.6) | 17.90 (454.7) | 9 (4.09) | 8CLE-PNM-D | 8CLE-GNM-D | CLE-NL-D | — |
| | Disconnect | 75 | | | | | 8CLE-PDM-D | 8CLE-GDM-D | CLE-DL-D | CLE-DF-D |
| 200E-350E | Non-disconnect | 75 | 3.00 (76.2) | 14.00 (355.6) | 17.90 (454.7) | 19 (8.63) | 8CLE-PNM-E | 8CLE-GNM-E | CLE-NL-E | — |
| | Disconnect | 75 | | | | | 8CLE-PDM-E | 8CLE-GDM-E | CLE-DL-E | CLE-DF-E |

Fuse Dimensional Details

Approximate Dimensions in Inches (mm)

Type CLE Fuse



| CLE kV | "L" | "B" Dia. |
|----------|---------------|-------------|
| 15E-25E | 15.50 (393.7) | 2.00 (50.8) |
| 10E-350E | 17.90 (454.7) | 3.00 (76.2) |

Notes

- ① See Page V4-T3-148 for diagram of typical mounting.
- ② End fittings supplied only when required.

3.5

Power Breakers, Contactors and Fuses

Current Limiting Fuses

3



Type CLE Current Limiting Fuses 15.5 kV Maximum (4.8 kV Nominal)

| Current Rating (Amperes) | Barrel Number | Interrupting Rating rms (kA Sym.) | Heritage Product | Indoor/Outdoor | Performance Curves | | | Catalog Number |
|--------------------------|---------------|-----------------------------------|------------------|----------------|----------------------|---------------------|--------------------------|------------------|
| | | | | | Minimum Melting Time | Total Clearing Time | Peak Let-Through Current | |
| 15E | 1 | 31.5 | H | Indoor | 56353204 | 56353304 | 63931703 | 15CLE-15E |
| 20E | 1 | 31.5 | H | Indoor | 56353204 | 56353304 | 63931703 | 15CLE-20E |
| 25E | 1 | 31.5 | H | Indoor | 56353204 | 56353304 | 63931703 | 15CLE-25E |
| 10E | 1 | 63 | — | Indoor/outdoor | 70548501 | 70548601 | 70548802 | 15CLE-10E-D |
| 15E | 1 | 63 | — | Indoor/outdoor | 70548501 | 70548601 | 70548802 | 15CLE-15E-D |
| 20E | 1 | 63 | — | Indoor/outdoor | 70548501 | 70548601 | 70548802 | 15CLE-20E-D |
| 25E | 1 | 63 | — | Indoor/outdoor | 70548501 | 70548601 | 70548802 | 15CLE-25E-D |
| 30E | 1 | 63 | — | Indoor/outdoor | 70548501 | 70548601 | 70548802 | 15CLE-30E |
| 40E | 1 | 63 | — | Indoor/outdoor | 70546801 | 70546901 | 70547501 | 15CLE-40E |
| 50E | 1 | 63 | — | Indoor/outdoor | 70546801 | 70546901 | 70547501 | 15CLE-50E |
| 65E | 1 | 63 | — | Indoor/outdoor | 70546801 | 70546901 | 70547501 | 15CLE-65E |
| 80E | 1 | 63 | ② | Indoor/outdoor | 70546801 | 70546901 | 70547501 | 15CLE-80E |
| 100E | 1 | 63 | ② | Indoor/outdoor | 70546801 | 70546901 | 70547501 | 15CLE-100E |
| 125E | 1 | 63 | ② | Indoor/outdoor | 70546801 | 70546901 | 70547501 | 15CLE-125E |
| 150E | 1 | 63 | ② | Indoor/outdoor | 70546801 | 70546901 | 70547501 | 15CLE-150E |
| 175E | 2 | 63 | ② | Indoor/outdoor | 70547001 | 70547101 | 70547501 | 15CLE-175E |
| 200E | 2 | 63 | ② | Indoor/outdoor | 70547001 | 70547101 | 70547501 | 15CLE-200E |
| 250E | 2 | 63 | ② | Indoor/outdoor | 70547001 | 70547101 | 70547501 | 15CLE-250E |
| 300E | 2 | 63 | ② | Indoor/outdoor | 70547001 | 70547101 | 70547501 | 15CLE-300E |
| 80E | 2 | 85 | H ② | Indoor | 59878302 | 59878402 | 63931604 | 15CLE2-80E |
| 100E | 2 | 85 | H ② | Indoor | 59878302 | 59878402 | 63931604 | 15CLE2-100E |
| 125X | 2 | 85 | H ② | Indoor | 59878302 | 59878402 | 63931604 | 15CLE2-125X |
| 150E | 3 | 50 | H ② | Indoor | 59878302 | 59878402 | 63931604 | 15CLE3-150E |
| 175E/200X | 3 | 50 | H ② | Indoor | 59878302 | 59878402 | 63931604 | 15CLE3-175E/200X |

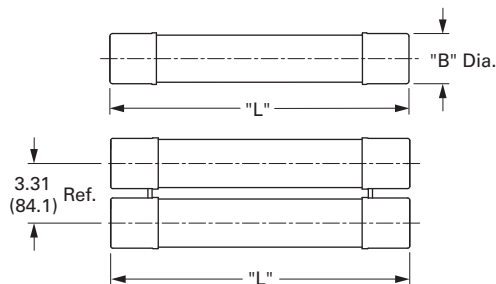
Type CLE Mountings and Hardware 15.5 kV Maximum (4.8 kV Nominal)

| Ampere Rating | Fuse Mounting Type ① | Voltage BIL (kV) | Diameter | Clip Center | Length | Approximate Shipping Weight Lbs (kg) | Mounting (Including Live Parts, End Fittings) ② | | Live Parts (Including End Fittings) ② | End Fittings (Disconnect Only) |
|-------------------------|----------------------|------------------|-------------|---------------|---------------|--------------------------------------|---|--|---------------------------------------|--------------------------------|
| | | | | | | | Porcelain Insulator Catalog Number | Glass-Polyester Insulator Catalog Number | Catalog Number | Catalog Number |
| 15E-25E | Non-disconnect | 95 | 2.00 (50.8) | 20.00 (508.0) | 21.50 (546.1) | 4.5 (2.04) | 15CLE-PNM-C | 15CLE-GNM-C | CLE-NL-D | — |
| | | 110 | — | — | — | — | 15CLE-HPNM-C | — | — | — |
| | Disconnect | 95 | — | — | — | — | 15CLE-PDM-C | 15CLE-GDM-C | CLE-DL-C | CLE-DF-C |
| | | 110 | — | — | — | — | 15CLE-HPDM-C | — | — | — |
| 10E-D-25E-D 30E-150E | Non-disconnect | 95 | 3.00 (76.2) | 20.00 (508.0) | 23.90 (607.1) | 11 (4.99) | 15CLE-PNM-D | 15CLE-GNM-D | CLE-NL-D | — |
| | | 110 | — | — | — | — | 15CLE-HPM-D | — | — | — |
| | Disconnect | 95 | — | — | — | — | 15CLE-PDM-D | 15CLE-GDM-D | CLE-DL-D | CLE-DF-D |
| | | 110 | — | — | — | — | 15CLE-HPDM-D | — | — | — |
| 175E-300E | Non-disconnect | 110 | 3.00 (76.2) | 20.00 (508.0) | 23.90 (607.1) | 23 (10.44) | 15CLE-PNM-E | — | CLE-DL-E | CLE-DF-E |
| | Disconnect | 110 | — | — | — | — | 15CLE-PDM-E | — | — | — |

Fuse Dimensional Details

Approximate Dimensions in Inches (mm)

Type CLE Fuse



| CLE kV | "L" | "B" Dia. |
|----------|---------------|-------------|
| 15E-25E | 21.50 (546.1) | 2.00 (50.8) |
| 10E-300E | 23.90 (607.1) | 3.00 (76.2) |

Notes

- ① See Page V4-T3-148 for diagram of typical mounting.
- ② For mountings, consult factory.
- ③ End fittings supplied only when required.

Type HLE



Type HLE Current Limiting Fuses 5.5 kV Maximum (4.8 kV Nominal) Interrupting Rating 63 (kA rms Sym.)

| Current Rating (Amperes) | Barrel Number | Indoor/Outdoor | Performance Curves | | | Catalog Number | Bolt-In Ferrule Catalog Number | AMPGARD Catalog Number |
|--------------------------|---------------|----------------|----------------------|---------------------|--------------------------|----------------|--------------------------------|------------------------|
| | | | Minimum Melting Time | Total Clearing Time | Peak Let-Through Current | | | |
| 10E | 1 | Indoor/outdoor | 70548507 | 70548607 | 70548703 | 5HLE-10E | 5BHLE-10E | 5AHLE-10E |
| 15E | 1 | Indoor/outdoor | 70548507 | 70548607 | 70548703 | 5HLE-15E | 5BHLE-15E | 5AHLE-15E |
| 20E | 1 | Indoor/outdoor | 70548507 | 70548607 | 70548703 | 5HLE-20E | 5BHLE-20E | 5AHLE-20E |
| 25E | 1 | Indoor/outdoor | 70548507 | 70548607 | 70548703 | 5HLE-25E | 5BHLE-25E | 5AHLE-25E |
| 30E | 1 | Indoor/outdoor | 70548507 | 70548607 | 70548703 | 5HLE-30E | 5BHLE-30E | 5AHLE-30E |
| 40E | 1 | Indoor/outdoor | 70545805 | 70545905 | 70547603 | 5HLE-40E | 5BHLE-40E | 5AHLE-40E |
| 50E | 1 | Indoor/outdoor | 70545805 | 70545905 | 70547603 | 5HLE-50E | 5BHLE-50E | 5AHLE-50E |
| 65E | 1 | Indoor/outdoor | 70545805 | 70545905 | 70547603 | 5HLE-65E | 5BHLE-65E | 5AHLE-65E |
| 80E | 1 | Indoor/outdoor | 70545805 | 70545905 | 70547603 | 5HLE-80E | 5BHLE-80E | 5AHLE-80E |
| 100E | 1 | Indoor/outdoor | 70545805 | 70545905 | 70547603 | 5HLE-100E | 5BHLE-100E | 5AHLE-100E |
| 125E | 1 | Indoor/outdoor | 70545805 | 70545905 | 70547603 | 5HLE-125E | 5BHLE-125E | 5AHLE-125E |
| 150E | 1 | Indoor/outdoor | 70545805 | 70545905 | 70547603 | 5HLE-150E | 5BHLE-150E | 5AHLE-150E |
| 175E | 1 | Indoor/outdoor | 70545805 | 70545905 | 70547603 | 5HLE-175E | 5BHLE-175E | 5AHLE-175E |
| 200E | 1 | Indoor/outdoor | 70545805 | 70545905 | 70547603 | 5HLE-200E | 5BHLE-200E | 5AHLE-200E |
| 250E | 1 | Indoor/outdoor | 70545805 | 70545905 | 70547603 | 5HLE-250E | 5BHLE-250E | 5AHLE-250E |
| 300E | 2 | Indoor/outdoor | 70546005 | 70546105 | 70547603 | 5HLE-300E | 5BHLE-300E | 5AHLE-300E |
| 350E | 2 | Indoor/outdoor | 70546005 | 70546105 | 70547603 | 5HLE-350E | 5BHLE-350E | 5AHLE-350E |
| 400E | 2 | Indoor/outdoor | 70546005 | 70546105 | 70547603 | 5HLE-400E | 5BHLE-400E | 5AHLE-400E |
| 450E | 2 | Indoor/outdoor | 70546005 | 70546105 | 70547603 | 5HLE-450E | 5BHLE-450E | 5AHLE-450E |

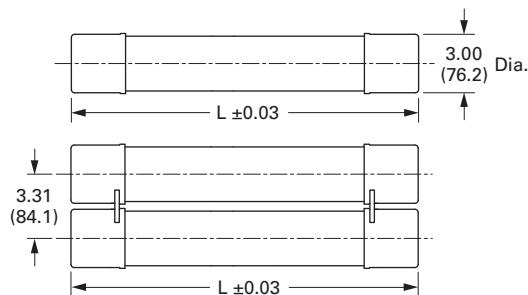
Type HLE Mountings and Hardware 5.5 kV Maximum (4.8 kV Nominal)

| Ampere Rating | Fuse Mounting Type ① | Voltage BIL (kV) | Diameter | Clip Center | Length | Approximate Shipping Weight Lbs (kg) | Mounting (Including Live Parts, End Fittings) ② | | Live Parts (Including End Fittings) ② | End Fittings (Disconnect Only) |
|---------------|----------------------|------------------|-------------|---------------|---------------|--------------------------------------|---|--|---------------------------------------|--------------------------------|
| | | | | | | | Porcelain Insulator Catalog Number | Glass-Polyester Insulator Catalog Number | | |
| 10E–250E | Non-disconnect | 60 | 3.00 (76.2) | 12.00 (304.8) | 15.90 (403.9) | 8 (3.63) | 5HLE-PNM-D | 5HLE-GNM-D | CLE-NL-D | — |
| | Disconnect | 60 | | | | | 5HLE-PDM-D | 5HLE-GDM-D | CLE-DL-D | CLE-DF-D |
| 300E–450E | Non-disconnect | 60 | 3.00 (76.2) | 12.00 (304.8) | 15.90 (403.9) | 17 (7.72) | 5HLE-PNM-E | 5HLE-GNM-E | CLE-NL-E | — |
| | Disconnect | 60 | | | | | 5HLE-PDM-E | 5HLE-GDM-E | CLE-DL-E | CLE-DF-D |

Fuse Dimensional Details

Approximate Dimensions in Inches (mm)

Type HLE Fuse



| HLE kV | L ± 0.03 |
|--------|---------------|
| 5.5 | 15.88 (403.4) |

Notes

- ① See Page V4-T3-148 for diagram of typical mounting.
- ② End fittings supplied only when required.



Type HLE Current Limiting Fuses 8.3 kV Maximum (7.2 kV Nominal) Interrupting Rating 50 (kA Sym.)

| Current Rating (Amperes) | Barrel Number | Indoor/Outdoor | Performance Curves | | | Catalog Number | Bolt-In Ferrule Catalog Number | AMPGARD Catalog Number |
|--------------------------|---------------|----------------|----------------------|---------------------|--------------------------|----------------|--------------------------------|------------------------|
| | | | Minimum Melting Time | Total Clearing Time | Peak Let-Through Current | | | |
| 10E | 1 | Indoor/outdoor | 70548507 | 70548607 | 70548804 | 8HLE-10E | 8BHLE-10E | 8AHLE-10E |
| 15E | 1 | Indoor/outdoor | 70548507 | 70548607 | 70548804 | 8HLE-15E | 8BHLE-15E | 8AHLE-15E |
| 20E | 1 | Indoor/outdoor | 70548507 | 70548607 | 70548804 | 8HLE-20E | 8BHLE-20E | 8AHLE-20E |
| 25E | 1 | Indoor/outdoor | 70548507 | 70548607 | 70548804 | 8HLE-25E | 8BHLE-25E | 8AHLE-25E |
| 30E | 1 | Indoor/outdoor | 70548507 | 70548607 | 70548804 | 8HLE-30E | 8BHLE-30E | 8AHLE-30E |
| 40E | 1 | Indoor/outdoor | 70546203 | 70546303 | 70547201 | 8HLE-40E | 8BHLE-40E | 8AHLE-40E |
| 50E | 1 | Indoor/outdoor | 70546203 | 70546303 | 70547201 | 8HLE-50E | 8BHLE-50E | 8AHLE-50E |
| 65E | 1 | Indoor/outdoor | 70546203 | 70546303 | 70547201 | 8HLE-65E | 8BHLE-65E | 8AHLE-65E |
| 80E | 1 | Indoor/outdoor | 70546203 | 70546303 | 70547201 | 8HLE-80E | 8BHLE-80E | 8AHLE-80E |
| 100E | 1 | Indoor/outdoor | 70546203 | 70546303 | 70547201 | 8HLE-100E | 8BHLE-100E | 8AHLE-100E |
| 125E | 1 | Indoor/outdoor | 70546203 | 70546303 | 70547201 | 8HLE-125E | 8BHLE-125E | 8AHLE-125E |
| 150E | 1 | Indoor/outdoor | 70546203 | 70546303 | 70547201 | 8HLE-150E | 8BHLE-150E | 8AHLE-150E |
| 175E | 1 | Indoor/outdoor | 70546203 | 70546303 | 70547201 | 8HLE-175E | 8BHLE-175E | 8AHLE-175E |
| 200E | 2 | Indoor/outdoor | 70546403 | 70546503 | 70547201 | 8HLE-200E | 8BHLE-200E | 8AHLE-200E |
| 250E | 2 | Indoor/outdoor | 70546403 | 70546503 | 70547201 | 8HLE-250E | 8BHLE-250E | 8AHLE-250E |
| 300E | 2 | Indoor/outdoor | 70546403 | 70546503 | 70547201 | 8HLE-300E | 8BHLE-300E | 8AHLE-300E |
| 350E | 2 | Indoor/outdoor | 70546403 | 70546503 | 70547201 | 8HLE-350E | 8BHLE-350E | 8AHLE-350E |

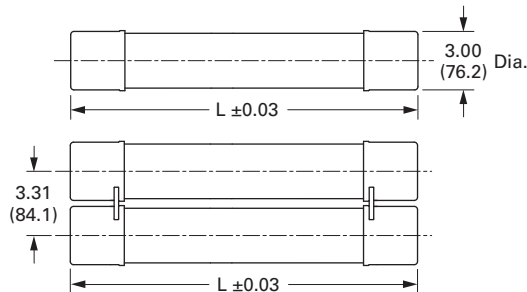
Type HLE Mountings and Hardware 8.3 kV Maximum (7.2 kV Nominal)

| Ampere Rating | Fuse Mounting Type ① | Voltage BIL (kV) | Diameter | Clip Center | Length | Approximate Shipping Weight Lbs (kg) | Mounting (Including Live Parts, End Fittings) ② | | Live Parts (Including End Fittings) ② | End Fittings (Disconnect Only) |
|---------------|----------------------|------------------|-------------|---------------|---------------|--------------------------------------|---|--|---------------------------------------|--------------------------------|
| | | | | | | | Porcelain Insulator Catalog Number | Glass-Polyester Insulator Catalog Number | Catalog Number | Catalog Number |
| 10E–175E | Non-disconnect | 75 | 3.00 (76.2) | 12.00 (304.8) | 15.90 (403.9) | 8 (3.63) | 8HLE-PNM-D | 8HLE-GNM-D | CLE-NL-D | — |
| | Disconnect | 75 | | | | | 8HLE-PDM-D | 8HLE-GDM-D | CLE-DL-D | CLE-DF-D |
| 200E–350E | Non-disconnect | 75 | | | | | 8HLE-PNM-E | 8HLE-GNM-E | CLE-NL-E | — |
| | Disconnect | 75 | | | | | 8HLE-PDM-E | 8HLE-GDM-E | CLE-DL-E | CLE-DF-E |

Fuse Dimensional Details

Approximate Dimensions in Inches (mm)

Type HLE Fuse



| HLE kV | L ± 0.03 |
|--------|---------------|
| 8.3 | 15.88 (403.4) |

Notes

- ① See Page V4-T3-148 for diagram of typical mounting.
- ② End fittings supplied only when required.



Type HLE Current Limiting Fuses 15.5 kV Maximum (14.4 kV Nominal)

| Current Rating (Amperes) | Barrel Number | Interrupting Rating rms (kA Sym.) | Indoor/Outdoor | Performance Curves | | | Peak Let-Through Current | Catalog Number | Bolt-In Ferrule Catalog Number |
|--------------------------|---------------|-----------------------------------|----------------|----------------------|---------------------|----------|--------------------------|----------------|--------------------------------|
| | | | | Minimum Melting Time | Total Clearing Time | | | | |
| 10E | 1 | 63 | Indoor/outdoor | 70548507 | 70548607 | 70548805 | 15HLE-10E | 15BHLE-10E | |
| 15E | 1 | 63 | Indoor/outdoor | 70548507 | 70548607 | 70548805 | 15HLE-15E | 15BHLE-15E | |
| 20E | 1 | 63 | Indoor/outdoor | 70548507 | 70548607 | 70548805 | 15HLE-20E | 15BHLE-20E | |
| 25E | 1 | 63 | Indoor/outdoor | 70548507 | 70548607 | 70548805 | 15HLE-25E | 15BHLE-25E | |
| 30E | 1 | 63 | Indoor/outdoor | 70548507 | 70548607 | 70548805 | 15HLE-30E | 15BHLE-30E | |
| 40E | 1 | 63 | Indoor/outdoor | 70546601 | 70546701 | 70547401 | 15HLE-40E | 15BHLE-40E | |
| 50E | 1 | 63 | Indoor/outdoor | 70546601 | 70546701 | 70547401 | 15HLE-50E | 15BHLE-50E | |
| 65E | 1 | 63 | Indoor/outdoor | 70546601 | 70546701 | 70547401 | 15HLE-65E | 15BHLE-65E | |
| 80E | 1 | 63 | Indoor/outdoor | 70546601 | 70546701 | 70547401 | 15HLE-80E | 15BHLE-80E | |
| 100E | 1 | 63 | Indoor/outdoor | 70546601 | 70546701 | 70547401 | 15HLE-100E | 15BHLE-100E | |
| 125E | 1 | 63 | Indoor/outdoor | 70546601 | 70546701 | 70547401 | 15HLE-125E | 15BHLE-125E | |
| 150E | 2 | 63 | Indoor/outdoor | 70546601 | 70546701 | 70547401 | 15HLE-150E | 15BHLE-150E | |
| 175E | 2 | 63 | Indoor/outdoor | 70546601 | 70546701 | 70547401 | 15HLE-175E | 15BHLE-175E | |
| 200E | 2 | 63 | Indoor/outdoor | 70546601 | 70546701 | 70547401 | 15HLE-200E | 15BHLE-200E | |
| 250E | 2 | 63 | Indoor/outdoor | 70546601 | 70546701 | 70547401 | 15HLE-250E | 15BHLE-250E | |

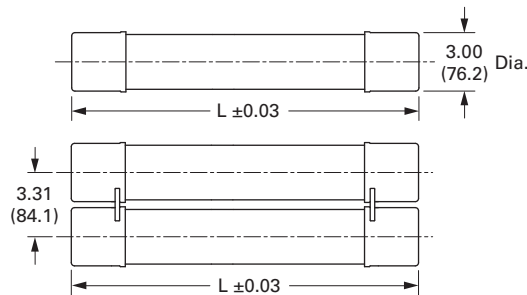
Type HLE Mountings and Hardware 15.5 kV Maximum (14.4 kV Nominal)

| Ampere Rating | Fuse Mounting Type ① | Voltage BIL (kV) | Diameter | Clip Center | Length | Approximate Shipping Weight Lbs (kg) | Mounting (Including Live Parts, End Fittings) ② | | Live Parts (Including End Fittings) ② | End Fittings (Disconnect Only) |
|---------------|----------------------|------------------|-------------|---------------|---------------|--------------------------------------|---|--|---------------------------------------|--------------------------------|
| | | | | | | | Porcelain Insulator Catalog Number | Glass-Polyester Insulator Catalog Number | Catalog Number | Catalog Number |
| 10E–175E | Non-disconnect | 95 | 3.00 (76.2) | 15.00 (381.0) | 18.90 (480.1) | 10 (4.54) | 15HLE-PNM-D | 15HLE-GNM-D | CLE-NL-D | — |
| | Disconnect | 95 | | | | | 15HLE-PDM-D | 15HLE-GDM-D | CLE-DL-D | CLE-DF-D |
| 150E–250E | Non-disconnect | 95 | 3.00 (76.2) | 15.00 (381.0) | 18.90 (480.1) | 21 (9.53) | 15HLE-PNM-E | — | CLE-NL-E | — |
| | Disconnect | 95 | | | | | 15HLE-PDM-E | — | CLE-DL-E | CLE-DF-E |

Fuse Dimensional Details

Approximate Dimensions in Inches (mm)

Type HLE Fuse



| HLE kV | L ± 0.03 |
|--------|---------------|
| 15.5 | 18.88 (479.6) |

Notes

- ① See Page V4-T3-148 for diagram of typical mounting.
- ② End fittings supplied only when required.

3.5

Power Breakers, Contactors and Fuses

Current Limiting Fuses

Type BHLE

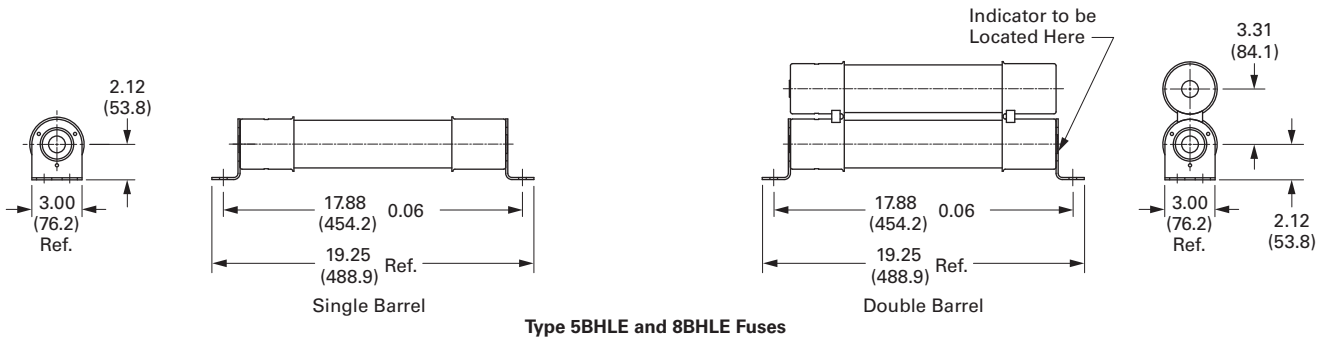
Approximate Dimensions in Inches (mm)

3 Type BHLE Current Limiting Fuses 5.5 kV Maximum (4.8 kV Nominal), Indoor, Bolt-In

| Current Rating (Amperes) | Barrel Number | Interrupting Rating rms (kA Sym.) | Diameter | Length | Approximate Shipping Weight Lbs (kg) | Performance Curves | | | Catalog Number |
|--------------------------|---------------|-----------------------------------|-------------|---------------|--------------------------------------|----------------------|---------------------|--------------------------|----------------|
| | | | | | | Minimum Melting Time | Total Clearing Time | Peak Let-Through Current | |
| 10E | 1 | 63 | 3.00 (76.2) | 15.90 (403.9) | 8 (3.63) | 70548507 | 70548607 | 70548703 | 5BHLE-10E |
| 15E | 1 | 63 | 3.00 (76.2) | 15.90 (403.9) | 8 (3.63) | 70548507 | 70548607 | 70548703 | 5BHLE-15E |
| 20E | 1 | 63 | 3.00 (76.2) | 15.90 (403.9) | 8 (3.63) | 70548507 | 70548607 | 70548703 | 5BHLE-20E |
| 25E | 1 | 63 | 3.00 (76.2) | 15.90 (403.9) | 8 (3.63) | 70548507 | 70548607 | 70548703 | 5BHLE-25E |
| 30E | 1 | 63 | 3.00 (76.2) | 15.90 (403.9) | 8 (3.63) | 70548507 | 70548607 | 70548703 | 5BHLE-30E |
| 40E | 1 | 63 | 3.00 (76.2) | 15.90 (403.9) | 8 (3.63) | 70545805 | 70545905 | 70547603 | 5BHLE-40E |
| 50E | 1 | 63 | 3.00 (76.2) | 15.90 (403.9) | 8 (3.63) | 70545805 | 70545905 | 70547603 | 5BHLE-50E |
| 65E | 1 | 63 | 3.00 (76.2) | 15.90 (403.9) | 8 (3.63) | 70545805 | 70545905 | 70547603 | 5BHLE-65E |
| 80E | 1 | 63 | 3.00 (76.2) | 15.90 (403.9) | 8 (3.63) | 70545805 | 70545905 | 70547603 | 5BHLE-80E |
| 100E | 1 | 63 | 3.00 (76.2) | 15.90 (403.9) | 8 (3.63) | 70545805 | 70545905 | 70547603 | 5BHLE-100E |
| 125E | 1 | 63 | 3.00 (76.2) | 15.90 (403.9) | 8 (3.63) | 70545805 | 70545905 | 70547603 | 5BHLE-125E |
| 150E | 1 | 63 | 3.00 (76.2) | 15.90 (403.9) | 8 (3.63) | 70545805 | 70545905 | 70547603 | 5BHLE-150E |
| 175E | 1 | 63 | 3.00 (76.2) | 15.90 (403.9) | 8 (3.63) | 70545805 | 70545905 | 70547603 | 5BHLE-175E |
| 200E | 1 | 63 | 3.00 (76.2) | 15.90 (403.9) | 8 (3.63) | 70545805 | 70545905 | 70547603 | 5BHLE-200E |
| 250E | 1 | 63 | 3.00 (76.2) | 15.90 (403.9) | 8 (3.63) | 70545805 | 70545905 | 70547603 | 5BHLE-250E |
| 300E | 2 | 63 | 3.00 (76.2) | 15.90 (403.9) | 17 (7.72) | 70546005 | 70546105 | 70547603 | 5BHLE-300E |
| 350E | 2 | 63 | 3.00 (76.2) | 15.90 (403.9) | 17 (7.72) | 70546005 | 70546105 | 70547603 | 5BHLE-350E |
| 400E | 2 | 63 | 3.00 (76.2) | 15.90 (403.9) | 17 (7.72) | 70546005 | 70546105 | 70547603 | 5BHLE-400E |
| 450E | 2 | 63 | 3.00 (76.2) | 15.90 (403.9) | 17 (7.72) | 70546005 | 70546105 | 70547603 | 5BHLE-450E |

Fuse Dimensional Details

Type BHLE Fuse



Approximate Dimensions in Inches (mm)

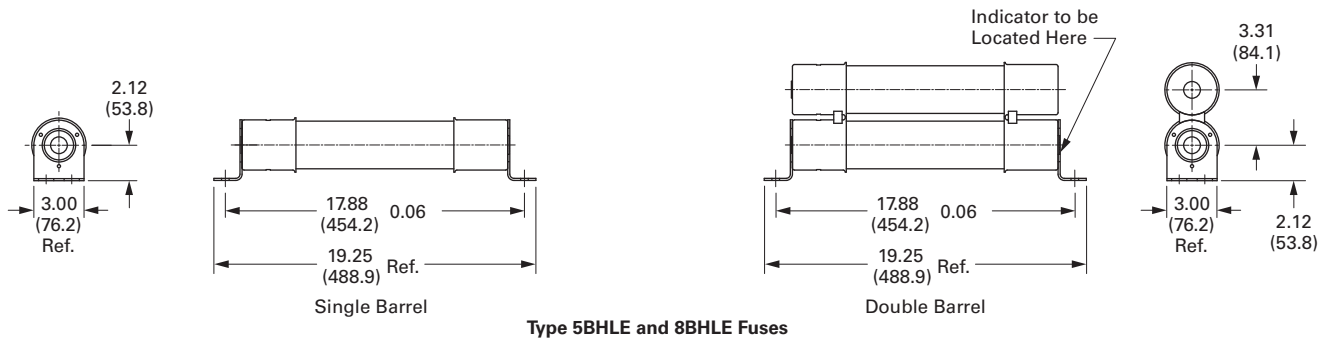
Type BHLE Current Limiting Fuses 8.3 kV Maximum (7.2 kV Nominal), Indoor, Bolt-In

| Current Rating (Amperes) | Barrel Number | Interrupting Rating rms (kA Sym.) | Diameter | Length | Approximate Shipping Weight Lbs (kg) | Performance Curves | | | Catalog Number |
|--------------------------|---------------|-----------------------------------|-------------|---------------|--------------------------------------|----------------------|---------------------|--------------------------|-------------------|
| | | | | | | Minimum Melting Time | Total Clearing Time | Peak Let-Through Current | |
| 10E | 1 | 50 | 3.00 (76.2) | 15.90 (403.9) | 8 (3.63) | 70548507 | 70548607 | 70548804 | 8BHLE-10E |
| 15E | 1 | 50 | 3.00 (76.2) | 15.90 (403.9) | 8 (3.63) | 70548507 | 70548607 | 70548804 | 8BHLE-15E |
| 20E | 1 | 50 | 3.00 (76.2) | 15.90 (403.9) | 8 (3.63) | 70548507 | 70548607 | 70548804 | 8BHLE-20E |
| 25E | 1 | 50 | 3.00 (76.2) | 15.90 (403.9) | 8 (3.63) | 70548507 | 70548607 | 70548804 | 8BHLE-25E |
| 30E | 1 | 50 | 3.00 (76.2) | 15.90 (403.9) | 8 (3.63) | 70548507 | 70548607 | 70548804 | 8BHLE-30E |
| 40E | 1 | 50 | 3.00 (76.2) | 15.90 (403.9) | 8 (3.63) | 70546203 | 70546303 | 70547201 | 8BHLE-40E |
| 50E | 1 | 50 | 3.00 (76.2) | 15.90 (403.9) | 8 (3.63) | 70546203 | 70546303 | 70547201 | 8BHLE-50E |
| 65E | 1 | 50 | 3.00 (76.2) | 15.90 (403.9) | 8 (3.63) | 70546203 | 70546303 | 70547201 | 8BHLE-65E |
| 80E | 1 | 50 | 3.00 (76.2) | 15.90 (403.9) | 8 (3.63) | 70546203 | 70546303 | 70547201 | 8BHLE-80E |
| 100E | 1 | 50 | 3.00 (76.2) | 15.90 (403.9) | 8 (3.63) | 70546203 | 70546303 | 70547201 | 8BHLE-100E |
| 125E | 1 | 50 | 3.00 (76.2) | 15.90 (403.9) | 8 (3.63) | 70546203 | 70546303 | 70547201 | 8BHLE-125E |
| 150E | 1 | 50 | 3.00 (76.2) | 15.90 (403.9) | 8 (3.63) | 70546203 | 70546303 | 70547201 | 8BHLE-150E |
| 175E | 1 | 50 | 3.00 (76.2) | 15.90 (403.9) | 8 (3.63) | 70546203 | 70546303 | 70547201 | 8BHLE-175E |
| 200E | 2 | 50 | 3.00 (76.2) | 15.90 (403.9) | 17 (7.72) | 70546403 | 70546503 | 70547201 | 8BHLE-200E |
| 250E | 2 | 50 | 3.00 (76.2) | 15.90 (403.9) | 17 (7.72) | 70546403 | 70546503 | 70547201 | 8BHLE-250E |
| 300E | 2 | 50 | 3.00 (76.2) | 15.90 (403.9) | 17 (7.72) | 70546403 | 70546503 | 70547201 | 8BHLE-300E |
| 350E | 2 | 50 | 3.00 (76.2) | 15.90 (403.9) | 17 (7.72) | 70546403 | 70546503 | 70547201 | 8BHLE-350E |

3

Fuse Dimensional Details

Type BHLE Fuse



3.5

Power Breakers, Contactors and Fuses

Current Limiting Fuses

Approximate Dimensions in Inches (mm)

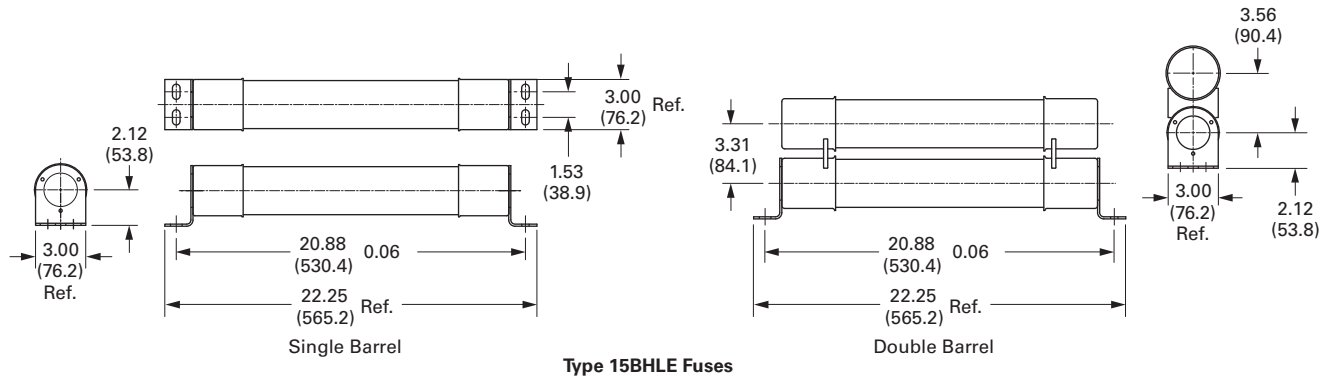
Type BHLE Current Limiting Fuses 15.5 kV Maximum (14.4 kV Nominal), Indoor/Outdoor, Bolt-In

3

| Current Rating (Amperes) | Barrel Number | Interrupting Rating rms (kA Sym.) | Diameter | Length | Approximate Shipping Weight Lbs (kg) | Performance Curves | | | Catalog Number |
|--------------------------|---------------|-----------------------------------|-------------|---------------|--------------------------------------|----------------------|---------------------|--------------------------|----------------|
| | | | | | | Minimum Melting Time | Total Clearing Time | Peak Let-Through Current | |
| 10E | 1 | 63 | 3.00 (76.2) | 18.90 (480.1) | 10 (4.54) | 70548507 | 70548607 | 70548805 | 15BHLE-10E |
| 15E | 1 | 63 | 3.00 (76.2) | 18.90 (480.1) | 10 (4.54) | 70548507 | 70548607 | 70548805 | 15BHLE-15E |
| 20E | 1 | 63 | 3.00 (76.2) | 18.90 (480.1) | 10 (4.54) | 70548507 | 70548607 | 70548805 | 15BHLE-20E |
| 25E | 1 | 63 | 3.00 (76.2) | 18.90 (480.1) | 10 (4.54) | 70548507 | 70548607 | 70548805 | 15BHLE-25E |
| 30E | 1 | 63 | 3.00 (76.2) | 18.90 (480.1) | 10 (4.54) | 70548507 | 70548607 | 70548805 | 15BHLE-30E |
| 40E | 1 | 63 | 3.00 (76.2) | 18.90 (480.1) | 10 (4.54) | 70546601 | 70546701 | 70547401 | 15BHLE-40E |
| 50E | 1 | 63 | 3.00 (76.2) | 18.90 (480.1) | 10 (4.54) | 70546601 | 70546701 | 70547401 | 15BHLE-50E |
| 65E | 1 | 63 | 3.00 (76.2) | 18.90 (480.1) | 10 (4.54) | 70546601 | 70546701 | 70547401 | 15BHLE-65E |
| 80E | 1 | 63 | 3.00 (76.2) | 18.90 (480.1) | 10 (4.54) | 70546601 | 70546701 | 70547401 | 15BHLE-80E |
| 100E | 1 | 63 | 3.00 (76.2) | 18.90 (480.1) | 10 (4.54) | 70546601 | 70546701 | 70547401 | 15BHLE-100E |
| 125E | 1 | 63 | 3.00 (76.2) | 18.90 (480.1) | 10 (4.54) | 70546601 | 70546701 | 70547401 | 15BHLE-125E |
| 150E | 2 | 63 | 3.00 (76.2) | 18.90 (480.1) | 21 (9.53) | 70546601 | 70546701 | 70547401 | 15BHLE-150E |
| 175E | 2 | 63 | 3.00 (76.2) | 18.90 (480.1) | 21 (9.53) | 70546601 | 70546701 | 70547401 | 15BHLE-175E |
| 200E | 2 | 63 | 3.00 (76.2) | 18.90 (480.1) | 21 (9.53) | 70546601 | 70546701 | 70547401 | 15BHLE-200E |
| 250E | 2 | 63 | 3.00 (76.2) | 18.90 (480.1) | 21 (9.53) | 70546601 | 70546701 | 70547401 | 15BHLE-250E |

Fuse Dimensional Details

Type BHLE Fuse



Type HCL

Type HCL Current Limiting Fuses 5.5 kV Maximum (4.8 kV Nominal), Indoor

| Current Rating (Amperes) | Barrel Number | Interrupting Rating rms (kA Sym.) | Diameter | Clip Center | Approximate Shipping Weight Lbs (kg) | Mounting Type | Live Parts (Includes End Fittings) Catalog Number | Performance Curves | | | Catalog Number |
|--------------------------|---------------|-----------------------------------|-------------|-------------|--------------------------------------|----------------|---|----------------------|---------------------|--------------------------|----------------|
| | | | | | | | | Minimum Melting Time | Total Clearing Time | Peak Let-Through Current | |
| 10E | 1 | 63 | 3.00 (76.2) | Clip-lock | 9 (4.09) | Non-disconnect | HCL-NL-1 | 70548505 | 70548605 | 70548702 | 5HCL-10E |
| 15E | 1 | 63 | 3.00 (76.2) | Clip-lock | 9 (4.09) | Non-disconnect | HCL-NL-1 | 70548505 | 70548605 | 70548702 | 5HCL-15E |
| 20E | 1 | 63 | 3.00 (76.2) | Clip-lock | 9 (4.09) | Non-disconnect | HCL-NL-1 | 70548505 | 70548605 | 70548702 | 5HCL-20E |
| 25E | 1 | 63 | 3.00 (76.2) | Clip-lock | 9 (4.09) | Non-disconnect | HCL-NL-1 | 70548505 | 70548605 | 70548702 | 5HCL-25E |
| 30E | 1 | 63 | 3.00 (76.2) | Clip-lock | 9 (4.09) | Non-disconnect | HCL-NL-1 | 70548505 | 70548605 | 70548702 | 5HCL-30E |
| 40E | 1 | 63 | 3.00 (76.2) | Clip-lock | 9 (4.09) | Non-disconnect | HCL-NL-1 | 70545803 | 70545903 | 70547602 | 5HCL-40E |
| 50E | 1 | 63 | 3.00 (76.2) | Clip-lock | 9 (4.09) | Non-disconnect | HCL-NL-1 | 70545803 | 70545903 | 70547602 | 5HCL-50E |
| 65E | 1 | 63 | 3.00 (76.2) | Clip-lock | 9 (4.09) | Non-disconnect | HCL-NL-1 | 70545803 | 70545903 | 70547602 | 5HCL-65E |
| 80E | 1 | 63 | 3.00 (76.2) | Clip-lock | 9 (4.09) | Non-disconnect | HCL-NL-1 | 70545803 | 70545903 | 70547602 | 5HCL-80E |
| 100E | 1 | 63 | 3.00 (76.2) | Clip-lock | 9 (4.09) | Non-disconnect | HCL-NL-1 | 70545803 | 70545903 | 70547602 | 5HCL-100E |
| 125E | 1 | 63 | 3.00 (76.2) | Clip-lock | 9 (4.09) | Non-disconnect | HCL-NL-1 | 70545803 | 70545903 | 70547602 | 5HCL-125E |
| 150E | 1 | 63 | 3.00 (76.2) | Clip-lock | 9 (4.09) | Non-disconnect | HCL-NL-1 | 70545803 | 70545903 | 70547602 | 5HCL-150E |
| 200E | 1 | 63 | 3.00 (76.2) | Clip-lock | 10 (4.54) | Non-disconnect | HCL-NL-1 | 70545803 | 70545903 | 70547602 | 5HCL-200E |
| 250E | 1 | 63 | 3.00 (76.2) | Clip-lock | 10 (4.54) | Non-disconnect | HCL-NL-1 | 70545803 | 70545903 | 70547602 | 5HCL-250E |
| 300E | 2 | 63 | 3.00 (76.2) | Clip-lock | 20 (9.08) | Non-disconnect | HCL-NL-1 | 70546003 | 70516103 | 70547602 | 5HCL-300E |
| 400E | 2 | 63 | 3.00 (76.2) | Clip-lock | 20 (9.08) | Non-disconnect | HCL-NL-1 | 70546003 | 70516103 | 70547602 | 5HCL-400E |
| 450E | 2 | 63 | 3.00 (76.2) | Clip-lock | 20 (9.08) | Non-disconnect | HCL-NL-1 | 70546003 | 70516103 | 70547602 | 5HCL-450E |
| 500E | 2 | 63 | 3.00 (76.2) | Clip-lock | 20 (9.08) | Non-disconnect | HCL-NL-1 | 66703401 | 66703501 | 66703701 | 5HCL-500E |
| 600E | 2 | 63 | 3.00 (76.2) | Clip-lock | 20 (9.08) | Non-disconnect | HCL-NL-1 | 66703401 | 66703501 | 66703701 | 5HCL-600E |
| 750E | 3 | 63 | 3.00 (76.2) | Bolt-in | 30 (13.62) | — | — | 66703401 | 66703501 | 66703701 | 5HCL-750E |
| | 3 | 63 | 3.00 (76.2) | Bolt-in | 30 (13.62) | — | — | 66703401 | 66703501 | 66703701 | 5BHCL-750E |
| 900E | 3 | 63 | 3.00 (76.2) | Bolt-in | 30 (13.62) | — | — | 66703401 | 66703501 | 66703701 | 5HCL-900E |
| | 3 | 63 | 3.00 (76.2) | Bolt-in | 30 (13.62) | — | — | 66703401 | 66703501 | 66703701 | 5BHCL-900E |

Type HCL Current Limiting Fuses (15.5 kV Maximum, 14.4 kV Nominal), Indoor

| Current Rating (Amperes) | Barrel Number | Interrupting Rating rms (kA Sym.) | Diameter | Clip Center | Approximate Shipping Weight Lbs (kg) | Mounting Type | Live Parts (Includes End Fittings) Catalog Number | Performance Curves | | | Catalog Number |
|--------------------------|---------------|-----------------------------------|-------------|-------------|--------------------------------------|----------------|---|----------------------|---------------------|--------------------------|----------------|
| | | | | | | | | Minimum Melting Time | Total Clearing Time | Peak Let-Through Current | |
| 10E | 1 | 63 | 3.00 (76.2) | Clip-lock | 10 (4.54) | Non-disconnect | HCL-NL-1 | 70548503 | 70548603 | 70548803 | 15HCL-10E |
| 15E | 1 | 63 | 3.00 (76.2) | Clip-lock | 10 (4.54) | Non-disconnect | HCL-NL-1 | 70548503 | 70548603 | 70548803 | 15HCL-15E |
| 20E | 1 | 63 | 3.00 (76.2) | Clip-lock | 10 (4.54) | Non-disconnect | HCL-NL-1 | 70548503 | 70548603 | 70548803 | 15HCL-20E |
| 25E | 1 | 63 | 3.00 (76.2) | Clip-lock | 10 (4.54) | Non-disconnect | HCL-NL-1 | 70548503 | 70548603 | 70548803 | 15HCL-25E |
| 30E | 1 | 63 | 3.00 (76.2) | Clip-lock | 10 (4.54) | Non-disconnect | HCL-NL-1 | 70548503 | 70548603 | 70548803 | 15HCL-30E |
| 40E | 1 | 63 | 3.00 (76.2) | Clip-lock | 10 (4.54) | Non-disconnect | HCL-NL-1 | 66703201 | 66703301 | 70547402 | 15HCL-40E |
| 50E | 1 | 63 | 3.00 (76.2) | Clip-lock | 10 (4.54) | Non-disconnect | HCL-NL-1 | 66703201 | 66703301 | 70547402 | 15HCL-50E |
| 65E | 1 | 50 | 3.00 (76.2) | Clip-lock | 12 (5.45) | Non-disconnect | HCL-NL-1 | 66703201 | 66703301 | 70547402 | 15HCL-65E |
| 80E | 1 | 50 | 3.00 (76.2) | Clip-lock | 12 (5.45) | Non-disconnect | HCL-NL-1 | 66703201 | 66703301 | 70547402 | 15HCL-80E |
| 100E | 1 | 50 | 3.00 (76.2) | Clip-lock | 12 (5.45) | Non-disconnect | HCL-NL-1 | 66703201 | 66703301 | 70547402 | 15HCL-100E |
| 125E | 1 | 50 | 3.00 (76.2) | Clip-lock | 12 (5.45) | Non-disconnect | HCL-NL-1 | 66703201 | 66703301 | 70547402 | 15HCL-125E |
| 150E | 2 | 50 | 3.00 (76.2) | Clip-lock | 24 (10.90) | Non-disconnect | HCL-NL-1 | 66703201 | 66703301 | 70547402 | 15HCL-150E |
| 200E | 2 | 50 | 3.00 (76.2) | Clip-lock | 24 (10.90) | Non-disconnect | HCL-NL-1 | 66703201 | 66703301 | 70547402 | 15HCL-200E |
| 250E | 2 | 50 | 3.00 (76.2) | Clip-lock | 24 (10.90) | Non-disconnect | HCL-NL-1 | 66703201 | 66703301 | 70547402 | 15HCL-250E |
| 300E | 2 | 50 | 3.00 (76.2) | Clip-lock | 24 (10.90) | Non-disconnect | HCL-NL-1 | 66703201 | 66703301 | 70547402 | 15HCL-300E |

Note

Approximate Dimensions in Inches (mm).

3.5

Power Breakers, Contactors and Fuses

Current Limiting Fuses

Fuse Dimensional Details

Approximate Dimensions in Inches (mm)

5.5 and 15.5 kV Clip Lock Mounted

| Ampere Rating | Number of Barrels | Figure Number | A | B | C | Interrupting Rating rms (kA Sym.) |
|--|-------------------|---------------|---------------|---------------|---|-----------------------------------|
| 5.5 kV Maximum—Clip Lock Style—15.25-Inch (387.4 mm) Clip Centers—3.00-Inch (76.2 mm) Barrel Diameter | | | | | | |
| 10E–150E | 1 | A | 16.81 (427.0) | 16.12 (409.4) | ① | 63 |
| 5.5 kV Maximum—Clip Lock Style—21.25-Inch (539.8 mm) Clip Centers—3.00-Inch (76.2 mm) Barrel Diameter | | | | | | |
| 200E–600E | 1 | A | 22.81 (579.4) | 22.12 (561.8) | ① | 63 |

15.5 kV Clip Lock Mounted

| Ampere Rating | Number of Barrels | Figure Number | A | B | C | Interrupting Rating rms (kA Sym.) |
|---|-------------------|---------------|---------------|---------------|---|-----------------------------------|
| 15.5 kV Maximum—Clip Lock Style—21.25-Inch (539.8 mm) Clip Centers—3.00-Inch (76.2 mm) Barrel Diameter | | | | | | |
| 65E–125E | 1 | A | 22.81 (579.4) | 22.12 (561.8) | ① | 63 |
| 150E–300E | 2 | B | 22.81 (579.4) | 22.12 (561.8) | ① | 50 |
| 15.5 kV Maximum—Clip Lock Style—18.25-Inch (463.6 mm) Clip Centers—3.00-Inch (76.2 mm) Barrel Diameter | | | | | | |
| 10E–50E | 1 | A | 19.81 (503.2) | 19.12 (485.6) | ① | 63 |

Bolt-In Series—5.5 kV

| Ampere Rating | Number of Barrels | Figure Number | A | B | C | D | Interrupting Rating rms (kA Sym.) |
|--|-------------------|---------------|---------------|---------------|---------------|---|-----------------------------------|
| 5.5 kV Maximum—Bolt-in Style—23.73-Inch (602.7 mm) Hole Centers—3.00-Inch (76.2 mm) Barrel Diameter | | | | | | | |
| 750E, 900E | 3 | C | 25.11 (637.8) | 22.37 (568.2) | 23.73 (602.7) | ① | 63 |

Type HCL Fuse Dimensional Details

Type HCL-14 Fuses

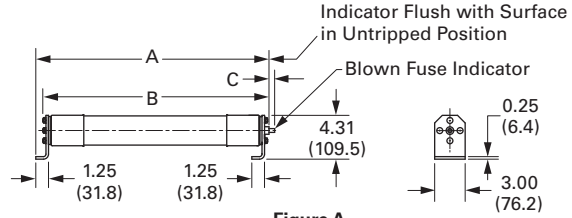


Figure A

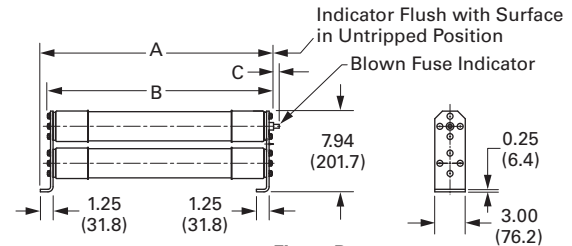


Figure B

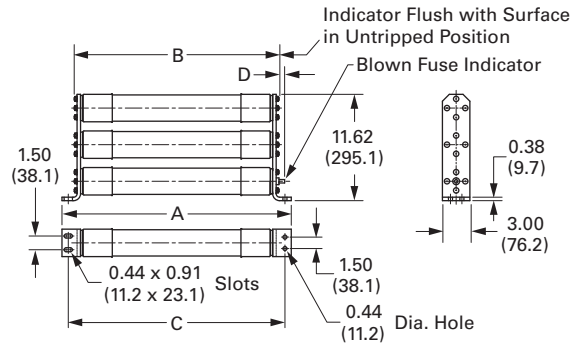
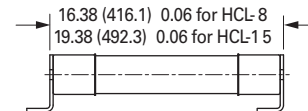


Figure C

Type HCL Fuses



Note

① 0.5 (12.7) tripped force 2 lb (0.9 kg).

Type CLS

Type CLS Current Limiting Fuses

| Maximum Design Voltage (kV) | Current Rating (Amperes) | "R" Designation | Barrel Number | Interrupting Rating rms (kA Sym.) | Diameter | Clip Center | Length | Approximate Shipping Weight Lbs (kg) | Performance Curves | | Peak Let-Through Current | Catalog Number | |
|-----------------------------|--------------------------|-----------------|---------------|-----------------------------------|-------------|----------------|----------------|--------------------------------------|----------------------|---------------------|--------------------------|------------------|------------------|
| | | | | | | | | | Minimum Melting Time | Total Clearing Time | | | |
| 2.54 | 25 | — | 1 | 50 | 3.00 (76.2) | 7.00 (177.8) | 10.80 (274.3) | 7 (3.18) | 66664702 | 66664704 | 66700202 | 2CLS-25 | |
| | 70 | 2R | 1 | 50 | 3.00 (76.2) | 7.00 (177.8) | 10.80 (274.3) | 7 (3.18) | 66664702 | 66664704 | 66700202 | 2CLS-2R | |
| | 100 | 3R | 1 | 50 | 3.00 (76.2) | 7.00 (177.8) | 10.80 (274.3) | 7 (3.18) | 66664702 | 66664704 | 66700202 | 2CLS-3R | |
| | 130 | 4R | 1 | 50 | 3.00 (76.2) | 7.00 (177.8) | 10.80 (274.3) | 7 (3.18) | 66664702 | 66664704 | 66700202 | 2CLS-4R | |
| | 150 | 5R | 1 | 50 | 3.00 (76.2) | 7.00 (177.8) | 10.80 (274.3) | 7 (3.18) | 66664702 | 66664704 | 66700202 | 2CLS-5R | |
| | 170 | 6R | 1 | 50 | 3.00 (76.2) | 7.00 (177.8) | 10.80 (274.3) | 7 (3.18) | 66664702 | 66664704 | 66700202 | 2CLS-6R | |
| | 200 | 9R | 1 | 50 | 3.00 (76.2) | 7.00 (177.8) | 10.80 (274.3) | 7 (3.18) | 66664702 | 66664704 | 66700202 | 2CLS-9R | |
| | 230 | 12R | 1 | 50 | 3.00 (76.2) | 7.00 (177.8) | 10.80 (274.3) | 7 (3.18) | 66664702 | 66664704 | 66700202 | 2CLS-12R | |
| | 390 | 18R | 2 | 50 | 3.00 (76.2) | 7.00 (177.8) | 10.80 (274.3) | 16 (7.26) | 66664702 | 66664704 | 66700202 | 2CLS-18R | |
| | 450 | 24R | 2 | 50 | 3.00 (76.2) | 7.00 (177.8) | 10.80 (274.3) | 16 (7.26) | 66664702 | 66664704 | 66700202 | 2CLS-24R | |
| | 25 | — | 1 | 50 | 50 | 3.00 (76.2) | Not applicable | 10.80 (274.3) | 7 (3.18) | 66664702 | 66664704 | 66700202 | 2ACLS-25 |
| | 70 | 2R | 1 | 50 | 50 | 3.00 (76.2) | Not applicable | 10.80 (274.3) | 7 (3.18) | 66664702 | 66664704 | 66700202 | 2ACLS-2R |
| | 100 | 3R | 1 | 50 | 50 | 3.00 (76.2) | Not applicable | 10.80 (274.3) | 7 (3.18) | 66664702 | 66664704 | 66700202 | 2ACLS-3R |
| | 130 | 4R | 1 | 50 | 50 | 3.00 (76.2) | Not applicable | 10.80 (274.3) | 7 (3.18) | 66664702 | 66664704 | 66700202 | 2ACLS-4R |
| | 150 | 5R | 1 | 50 | 50 | 3.00 (76.2) | Not applicable | 10.80 (274.3) | 7 (3.18) | 66664702 | 66664704 | 66700202 | 2ACLS-5R |
| | 170 | 6R | 1 | 50 | 50 | 3.00 (76.2) | Not applicable | 10.80 (274.3) | 7 (3.18) | 66664702 | 66664704 | 66700202 | 2ACLS-6R |
| | 200 | 9R | 1 | 50 | 50 | 3.00 (76.2) | Not applicable | 10.80 (274.3) | 7 (3.18) | 66664702 | 66664704 | 66700202 | 2ACLS-9R |
| | 230 | 12R | 1 | 50 | 50 | 3.00 (76.2) | Not applicable | 10.80 (274.3) | 7 (3.18) | 66664702 | 66664704 | 66700202 | 2ACLS-12R |
| | 390 | 18R | 2 | 50 | 50 | 3.00 (76.2) | Not applicable | 10.80 (274.3) | 16 (7.26) | 66664702 | 66664704 | 66700202 | 2ACLS-18R |
| | 450 | 24R | 2 | 50 | 50 | 3.00 (76.2) | Not applicable | 10.80 (274.3) | 16 (7.26) | 66664702 | 66664704 | 66700202 | 2ACLS-24R |
| | 25 | — | 1 | 50 | 50 | 3.00 (76.2) | Not applicable | 10.80 (274.3) | 8 (3.63) | 66664702 | 66664704 | 66700202 | 2BCLS-25 |
| | 70 | 2R | 1 | 50 | 50 | 3.00 (76.2) | Not applicable | 10.80 (274.3) | 8 (3.63) | 66664702 | 66664704 | 66700202 | 2BCLS-2R |
| | 100 | 3R | 1 | 50 | 50 | 3.00 (76.2) | Not applicable | 10.80 (274.3) | 8 (3.63) | 66664702 | 66664704 | 66700202 | 2BCLS-3R |
| | 130 | 4R | 1 | 50 | 50 | 3.00 (76.2) | Not applicable | 10.80 (274.3) | 8 (3.63) | 66664702 | 66664704 | 66700202 | 2BCLS-4R |
| | 150 | 5R | 1 | 50 | 50 | 3.00 (76.2) | Not applicable | 10.80 (274.3) | 8 (3.63) | 66664702 | 66664704 | 66700202 | 2BCLS-5R |
| 170 | 6R | 1 | 50 | 50 | 3.00 (76.2) | Not applicable | 10.80 (274.3) | 8 (3.63) | 66664702 | 66664704 | 66700202 | 2BCLS-6R | |
| 200 | 9R | 1 | 50 | 50 | 3.00 (76.2) | Not applicable | 10.80 (274.3) | 8 (3.63) | 66664702 | 66664704 | 66700202 | 2BCLS-9R | |
| 230 | 12R | 1 | 50 | 50 | 3.00 (76.2) | Not applicable | 10.80 (274.3) | 8 (3.63) | 66664702 | 66664704 | 66700202 | 2BCLS-12R | |
| 390 | 18R | 2 | 50 | 50 | 3.00 (76.2) | Not applicable | 10.80 (274.3) | 17 (7.72) | 66664702 | 66664704 | 66700202 | 2BCLS-18R | |
| 450 | 24R | 2 | 50 | 50 | 3.00 (76.2) | Not applicable | 10.80 (274.3) | 17 (7.72) | 66664702 | 66664704 | 66700202 | 2BCLS-24R | |
| 25 | — | 1 | 50 | 50 | 3.00 (76.2) | Not applicable | 10.80 (274.3) | 7 (3.18) | 66664702 | 66664704 | 66700202 | 2HCLS-25 | |
| 70 | 2R | 1 | 50 | 50 | 3.00 (76.2) | Not applicable | 10.80 (274.3) | 7 (3.18) | 66664702 | 66664704 | 66700202 | 2HCLS-2R | |
| 100 | 3R | 1 | 50 | 50 | 3.00 (76.2) | Not applicable | 10.80 (274.3) | 7 (3.18) | 66664702 | 66664704 | 66700202 | 2HCLS-3R | |
| 130 | 4R | 1 | 50 | 50 | 3.00 (76.2) | Not applicable | 10.80 (274.3) | 7 (3.18) | 66664702 | 66664704 | 66700202 | 2HCLS-4R | |
| 150 | 5R | 1 | 50 | 50 | 3.00 (76.2) | Not applicable | 10.80 (274.3) | 7 (3.18) | 66664702 | 66664704 | 66700202 | 2HCLS-5R | |
| 170 | 6R | 1 | 50 | 50 | 3.00 (76.2) | Not applicable | 10.80 (274.3) | 7 (3.18) | 66664702 | 66664704 | 66700202 | 2HCLS-6R | |
| 200 | 9R | 1 | 50 | 50 | 3.00 (76.2) | Not applicable | 10.80 (274.3) | 7 (3.18) | 66664702 | 66664704 | 66700202 | 2HCLS-9R | |
| 230 | 12R | 1 | 50 | 50 | 3.00 (76.2) | Not applicable | 10.80 (274.3) | 7 (3.18) | 66664702 | 66664704 | 66700202 | 2HCLS-12R | |
| 390 | 18R | 2 | 50 | 50 | 3.00 (76.2) | Not applicable | 10.80 (274.3) | 16 (7.26) | 66664702 | 66664704 | 66700202 | 2HCLS-18R | |
| 450 | 24R | 2 | 50 | 50 | 3.00 (76.2) | Not applicable | 10.80 (274.3) | 16 (7.26) | 66664702 | 66664704 | 66700202 | 2HCLS-24R | |

Note
Approximate Dimensions in Inches (mm).

3.5

Power Breakers, Contactors and Fuses

Current Limiting Fuses

Type CLS Current Limiting Fuses, continued

| Maximum Design Voltage (kV) | Current Rating (Amperes) | "R" Designation | Barrel Number | Interrupting Rating rms (kA Sym.) | Diameter | Clip Center | Length | Approximate Shipping Weight Lbs (kg) | Performance Curves | | | Catalog Number |
|-----------------------------|--------------------------|-----------------|---------------|-----------------------------------|-------------|----------------|---------------|--------------------------------------|----------------------|---------------------|--------------------------|------------------|
| | | | | | | | | | Minimum Melting Time | Total Clearing Time | Peak Let-Through Current | |
| 5.08 | 30 | — | 1 | 50 | 3.00 (76.2) | 12.00 (304.8) | 15.90 (403.9) | 8 (3.63) | 66690602 | 66690702 | 66700203 | 5CLS-30 |
| | 70 | 2R | 1 | 50 | 3.00 (76.2) | 12.00 (304.8) | 15.90 (403.9) | 8 (3.63) | 66690602 | 66690702 | 66700203 | 5CLS-2R |
| | 100 | 3R | 1 | 50 | 3.00 (76.2) | 12.00 (304.8) | 15.90 (403.9) | 8 (3.63) | 66690602 | 66690702 | 66700203 | 5CLS-3R |
| | 130 | 4R | 1 | 50 | 3.00 (76.2) | 12.00 (304.8) | 15.90 (403.9) | 8 (3.63) | 66690602 | 66690702 | 66700203 | 5CLS-4R |
| | 150 | 5R | 1 | 50 | 3.00 (76.2) | 12.00 (304.8) | 15.90 (403.9) | 8 (3.63) | 66690602 | 66690702 | 66700203 | 5CLS-5R |
| | 170 | 6R | 1 | 50 | 3.00 (76.2) | 12.00 (304.8) | 15.90 (403.9) | 8 (3.63) | 66690602 | 66690702 | 66700203 | 5CLS-6R |
| | 200 | 9R | 1 | 50 | 3.00 (76.2) | 12.00 (304.8) | 15.90 (403.9) | 8 (3.63) | 66690602 | 66690702 | 66700203 | 5CLS-9R |
| | 230 | 12R | 1 | 50 | 3.00 (76.2) | 12.00 (304.8) | 15.90 (403.9) | 8 (3.63) | 66690602 | 66690702 | 66700203 | 5CLS-12R |
| | 390 | 18R | 2 | 50 | 3.00 (76.2) | 12.00 (304.8) | 15.90 (403.9) | 17 (7.72) | 66690602 | 66690702 | 66700203 | 5CLS-18R |
| | 450 | 24R | 2 | 50 | 3.00 (76.2) | 12.00 (304.8) | 15.90 (403.9) | 17 (7.72) | 66690602 | 66690702 | 66700203 | 5CLS-24R |
| 5.08 | 30 | — | 1 | 50 | 3.00 (76.2) | Not applicable | 15.90 (403.9) | 8 (3.63) | 66690602 | 66690702 | 66700203 | 5ACLS-30 |
| | 70 | 2R | 1 | 50 | 3.00 (76.2) | Not applicable | 15.90 (403.9) | 8 (3.63) | 66690602 | 66690702 | 66700203 | 5ACLS-2R |
| | 100 | 3R | 1 | 50 | 3.00 (76.2) | Not applicable | 15.90 (403.9) | 8 (3.63) | 66690602 | 66690702 | 66700203 | 5ACLS-3R |
| | 130 | 4R | 1 | 50 | 3.00 (76.2) | Not applicable | 15.90 (403.9) | 8 (3.63) | 66690602 | 66690702 | 66700203 | 5ACLS-4R |
| | 150 | 5R | 1 | 50 | 3.00 (76.2) | Not applicable | 15.90 (403.9) | 8 (3.63) | 66690602 | 66690702 | 66700203 | 5ACLS-5R |
| | 170 | 6R | 1 | 50 | 3.00 (76.2) | Not applicable | 15.90 (403.9) | 8 (3.63) | 66690602 | 66690702 | 66700203 | 5ACLS-6R |
| | 200 | 9R | 1 | 50 | 3.00 (76.2) | Not applicable | 15.90 (403.9) | 8 (3.63) | 66690602 | 66690702 | 66700203 | 5ACLS-9R |
| | 230 | 12R | 1 | 50 | 3.00 (76.2) | Not applicable | 15.90 (403.9) | 8 (3.63) | 66690602 | 66690702 | 66700203 | 5ACLS-12R |
| | 390 | 18R | 2 | 50 | 3.00 (76.2) | Not applicable | 15.90 (403.9) | 17 (7.72) | 66690602 | 66690702 | 66700203 | 5ACLS-18R |
| | 450 | 24R | 2 | 50 | 3.00 (76.2) | Not applicable | 15.90 (403.9) | 17 (7.72) | 66690602 | 66690702 | 66700203 | 5ACLS-24R |
| 4.3 | 480 | 26R | 2 | 50 | 3.00 (76.2) | Not applicable | 15.90 (403.9) | 17 (7.72) | 66690602 | 66690702 | 66700203 | 4ACLS-26R |
| 5.08 | 30 | — | 1 | 50 | 3.00 (76.2) | Not applicable | 15.90 (403.9) | 8 (3.63) | 66690602 | 66690702 | 66700203 | 5BCLS-30 |
| | 70 | 2R | 1 | 50 | 3.00 (76.2) | Not applicable | 15.90 (403.9) | 8 (3.63) | 66690602 | 66690702 | 66700203 | 5BCLS-2R |
| | 100 | 3R | 1 | 50 | 3.00 (76.2) | Not applicable | 15.90 (403.9) | 8 (3.63) | 66690602 | 66690702 | 66700203 | 5BCLS-3R |
| | 130 | 4R | 1 | 50 | 3.00 (76.2) | Not applicable | 15.90 (403.9) | 8 (3.63) | 66690602 | 66690702 | 66700203 | 5BCLS-4R |
| | 150 | 5R | 1 | 50 | 3.00 (76.2) | Not applicable | 15.90 (403.9) | 8 (3.63) | 66690602 | 66690702 | 66700203 | 5BCLS-5R |
| | 170 | 6R | 1 | 50 | 3.00 (76.2) | Not applicable | 15.90 (403.9) | 8 (3.63) | 66690602 | 66690702 | 66700203 | 5BCLS-6R |
| | 200 | 9R | 1 | 50 | 3.00 (76.2) | Not applicable | 15.90 (403.9) | 8 (3.63) | 66690602 | 66690702 | 66700203 | 5BCLS-9R |
| | 230 | 12R | 1 | 50 | 3.00 (76.2) | Not applicable | 15.90 (403.9) | 8 (3.63) | 66690602 | 66690702 | 66700203 | 5BCLS-12R |
| | 390 | 18R | 2 | 50 | 3.00 (76.2) | Not applicable | 15.90 (403.9) | 17 (7.72) | 66690602 | 66690702 | 66700203 | 5BCLS-18R |
| | 450 | 24R | 2 | 50 | 3.00 (76.2) | Not applicable | 15.90 (403.9) | 17 (7.72) | 66690602 | 66690702 | 66700203 | 5BCLS-24R |
| 4.3 | 480 | 26R | 2 | 50 | 3.00 (76.2) | Not applicable | 15.90 (403.9) | 17 (7.72) | 66690602 | 66690702 | 66700203 | 4BCLS-26R |
| 5.08 | 30 | — | 1 | 50 | 3.00 (76.2) | Not applicable | 15.90 (403.9) | 8 (3.63) | 66690602 | 66690702 | 66700203 | 5HCLS-30 |
| | 70 | 2R | 1 | 50 | 3.00 (76.2) | Not applicable | 15.90 (403.9) | 8 (3.63) | 66690602 | 66690702 | 66700203 | 5HCLS-2R |
| | 100 | 3R | 1 | 50 | 3.00 (76.2) | Not applicable | 15.90 (403.9) | 8 (3.63) | 66690602 | 66690702 | 66700203 | 5HCLS-3R |
| | 130 | 4R | 1 | 50 | 3.00 (76.2) | Not applicable | 15.90 (403.9) | 8 (3.63) | 66690602 | 66690702 | 66700203 | 5HCLS-4R |
| | 150 | 5R | 1 | 50 | 3.00 (76.2) | Not applicable | 15.90 (403.9) | 8 (3.63) | 66690602 | 66690702 | 66700203 | 5HCLS-5R |
| | 170 | 6R | 1 | 50 | 3.00 (76.2) | Not applicable | 15.90 (403.9) | 8 (3.63) | 66690602 | 66690702 | 66700203 | 5HCLS-6R |
| | 200 | 9R | 1 | 50 | 3.00 (76.2) | Not applicable | 15.90 (403.9) | 8 (3.63) | 66690602 | 66690702 | 66700203 | 5HCLS-9R |
| | 230 | 12R | 1 | 50 | 3.00 (76.2) | Not applicable | 15.90 (403.9) | 8 (3.63) | 66690602 | 66690702 | 66700203 | 5HCLS-12R |
| | 390 | 18R | 2 | 50 | 3.00 (76.2) | Not applicable | 15.90 (403.9) | 17 (7.72) | 66690602 | 66690702 | 66700203 | 5HCLS-18R |
| | 450 | 24R | 2 | 50 | 3.00 (76.2) | Not applicable | 15.90 (403.9) | 17 (7.72) | 66690602 | 66690702 | 66700203 | 5HCLS-24R |

Note

Approximate Dimensions in Inches (mm).

Type CLS Current Limiting Fuses, continued

| Maximum Design Voltage (kV) | Current Rating (Amperes) | "R" Designation | Barrel Number | Interrupting Rating rms (kA Sym.) | Diameter | Clip Center | Length | Approximate Shipping Weight Lbs (kg) | Performance Curves | | | Catalog Number |
|-----------------------------|--------------------------|-----------------|---------------|-----------------------------------|--------------|----------------|---------------|--------------------------------------|----------------------|---------------------|--------------------------|-------------------|
| | | | | | | | | | Minimum Melting Time | Total Clearing Time | Peak Let-Through Current | |
| 5.08 | 70 | 2R | 2 | 50 | 3.00 (76.2) | Not applicable | 15.90 (403.9) | 20 (9.08) | 66690602 | 66690702 | 66700203 | 5CLS70-2R |
| | 100 | 3R | 2 | 50 | 3.00 (76.2) | Not applicable | 15.90 (403.9) | 20 (9.08) | 66690602 | 66690702 | 66700203 | 5CLS70-3R |
| | 130 | 4R | 2 | 50 | 3.00 (76.2) | Not applicable | 15.90 (403.9) | 20 (9.08) | 66690602 | 66690702 | 66700203 | 5CLS70-4R |
| | 150 | 5R | 2 | 50 | 3.00 (76.2) | Not applicable | 15.90 (403.9) | 20 (9.08) | 66690602 | 66690702 | 66700203 | 5CLS70-5R |
| | 170 | 6R | 2 | 50 | 3.00 (76.2) | Not applicable | 15.90 (403.9) | 20 (9.08) | 66690602 | 66690702 | 66700203 | 5CLS70-6R |
| | 200 | 9R | 2 | 50 | 3.00 (76.2) | Not applicable | 15.90 (403.9) | 20 (9.08) | 66690602 | 66690702 | 66700203 | 5CLS70-9R |
| | 230 | 12R | 2 | 50 | 4.00 (101.6) | Not applicable | 15.90 (403.9) | 40 (18.16) | 66690602 | 66690702 | 66700203 | 5CLS70-12R |
| | 390 | 18R | 2 | 50 | 4.00 (101.6) | Not applicable | 15.90 (403.9) | 40 (18.16) | 66690602 | 66690702 | 66700203 | 5CLS70-18R |
| | 450 | 24R | 2 | 50 | 4.00 (101.6) | Not applicable | 15.90 (403.9) | 40 (18.16) | 66690602 | 66690702 | 66700203 | 5CLS70-24R |
| | 600 | 32R | 2 | 50 | 4.00 (101.6) | Not applicable | 15.90 (403.9) | 40 (18.16) | 66690602 | 66690702 | 66700203 | 5CLS70-32R |
| | 650 | 36R | 2 | 50 | 4.00 (101.6) | Not applicable | 15.90 (403.9) | 40 (18.16) | 66690602 | 66690702 | 66700203 | 5CLS70-36R |
| | 700 | 44R | 2 | 50 | 4.00 (101.6) | Not applicable | 15.90 (403.9) | 40 (18.16) | 66690602 | 66690702 | 66700203 | 5CLS70-44R |
| 5.5 | 70 | 2R | 1 | 50 | 3.00 (76.2) | 14.00 (355.6) | 17.90 (454.7) | 11 (4.99) | 51285302 | 51285402 | 66700204 | 5LCLS-2R |
| | 100 | 3R | 1 | 50 | 3.00 (76.2) | 14.00 (355.6) | 17.90 (454.7) | 11 (4.99) | 51285302 | 51285402 | 66700204 | 5LCLS-3R |
| | 130 | 4R | 1 | 50 | 3.00 (76.2) | 14.00 (355.6) | 17.90 (454.7) | 11 (4.99) | 51285302 | 51285402 | 66700204 | 5LCLS-4R |
| | 150 | 5R | 1 | 50 | 3.00 (76.2) | 14.00 (355.6) | 17.90 (454.7) | 11 (4.99) | 51285302 | 51285402 | 66700204 | 5LCLS-5R |
| | 170 | 6R | 1 | 50 | 3.00 (76.2) | 14.00 (355.6) | 17.90 (454.7) | 11 (4.99) | 51285302 | 51285402 | 66700204 | 5LCLS-6R |
| | 200 | 9R | 1 | 50 | 3.00 (76.2) | 14.00 (355.6) | 17.90 (454.7) | 11 (4.99) | 51285302 | 51285402 | 66700204 | 5LCLS-9R |
| | 230 | 12R | 1 | 50 | 3.00 (76.2) | 14.00 (355.6) | 17.90 (454.7) | 11 (4.99) | 51285302 | 51285402 | 66700204 | 5LCLS-12R |
| | 390 | 18R | 2 | 50 | 3.00 (76.2) | 14.00 (355.6) | 17.90 (454.7) | 22 (9.99) | 51285302 | 51285402 | 66700204 | 5LCLS-18R |
| | 450 | 24R | 2 | 50 | 3.00 (76.2) | 14.00 (355.6) | 17.90 (454.7) | 22 (9.99) | 51285302 | 51285402 | 66700204 | 5LCLS-24R |
| | 8.3 | 70 | 2R | 1 | 50 | 3.00 (76.2) | 12.00 (304.8) | 15.90 (403.9) | 7 (3.18) | 66700602 | 66700702 | 66700205 |
| 100 | | 3R | 1 | 50 | 3.00 (76.2) | 12.00 (304.8) | 15.90 (403.9) | 7 (3.18) | 66700602 | 66700702 | 66700205 | 8CLS-3R |
| 130 | | 4R | 1 | 50 | 3.00 (76.2) | 12.00 (304.8) | 15.90 (403.9) | 7 (3.18) | 66700602 | 66700702 | 66700205 | 8CLS-4R |
| 150 | | 5R | 1 | 50 | 3.00 (76.2) | 12.00 (304.8) | 15.90 (403.9) | 7 (3.18) | 66700602 | 66700702 | 66700205 | 8CLS-5R |
| 170 | | 6R | 1 | 50 | 3.00 (76.2) | 12.00 (304.8) | 15.90 (403.9) | 7 (3.18) | 66700602 | 66700702 | 66700205 | 8CLS-6R |
| 7.2 | 200 | 9R | 1 | 50 | 3.00 (76.2) | 12.00 (304.8) | 15.90 (403.9) | 7 (3.18) | 66700602 | 66700702 | 66700205 | 7CLS-9R |
| | 230 | 12R | 1 | 50 | 3.00 (76.2) | 12.00 (304.8) | 15.90 (403.9) | 7 (3.18) | 66700602 | 66700702 | 66700205 | 7CLS-12R |
| | 390 | 18R | 2 | 50 | 3.00 (76.2) | 12.00 (304.8) | 15.90 (403.9) | 16 (7.26) | 66700602 | 66700702 | 66700205 | 7CLS-18R |
| | 450 | 24R | 2 | 50 | 3.00 (76.2) | 12.00 (304.8) | 15.90 (403.9) | 16 (7.26) | 66700602 | 66700702 | 66700205 | 7CLS-24R |
| 8.3 | 70 | 2R | 1 | 50 | 3.00 (76.2) | Not applicable | 15.90 (403.9) | 7 (3.18) | 66700602 | 66700702 | 66740205 | 7BCLS-2R |
| | 100 | 3R | 1 | 50 | 3.00 (76.2) | Not applicable | 15.90 (403.9) | 7 (3.18) | 66700602 | 66700702 | 66740205 | 7BCLS-3R |
| | 130 | 4R | 1 | 50 | 3.00 (76.2) | Not applicable | 15.90 (403.9) | 7 (3.18) | 66700602 | 66700702 | 66740205 | 7BCLS-4R |
| | 150 | 5R | 1 | 50 | 3.00 (76.2) | Not applicable | 15.90 (403.9) | 7 (3.18) | 66700602 | 66700702 | 66740205 | 7BCLS-5R |
| | 170 | 6R | 1 | 50 | 3.00 (76.2) | Not applicable | 15.90 (403.9) | 7 (3.18) | 66700602 | 66700702 | 66740205 | 7BCLS-6R |
| 7.2 | 200 | 9R | 1 | 50 | 3.00 (76.2) | Not applicable | 15.90 (403.9) | 7 (3.18) | 66700602 | 66700702 | 66740205 | 7BCLS-9R |
| | 230 | 12R | 1 | 50 | 3.00 (76.2) | Not applicable | 15.90 (403.9) | 7 (3.18) | 66700602 | 66700702 | 66740205 | 7BCLS-12R |
| | 390 | 18R | 2 | 50 | 3.00 (76.2) | Not applicable | 15.90 (403.9) | 16 (7.26) | 66700602 | 66700702 | 66740205 | 7BCLS-18R |
| | 450 | 24R | 2 | 50 | 3.00 (76.2) | Not applicable | 15.90 (403.9) | 16 (7.26) | 66700602 | 66700702 | 66740205 | 7BCLS-24R |
| 8.3 | 70 | 2R | 1 | 50 | 3.00 (76.2) | Not applicable | 15.90 (403.9) | 8 (3.63) | 66700602 | 66700702 | 66740205 | 8ACLS-2R |
| | 100 | 3R | 1 | 50 | 3.00 (76.2) | Not applicable | 15.90 (403.9) | 8 (3.63) | 66700602 | 66700702 | 66740205 | 8ACLS-3R |
| | 130 | 4R | 1 | 50 | 3.00 (76.2) | Not applicable | 15.90 (403.9) | 8 (3.63) | 66700602 | 66700702 | 66740205 | 8ACLS-4R |
| | 150 | 5R | 1 | 50 | 3.00 (76.2) | Not applicable | 15.90 (403.9) | 8 (3.63) | 66700602 | 66700702 | 66740205 | 8ACLS-5R |
| | 170 | 6R | 1 | 50 | 3.00 (76.2) | Not applicable | 15.90 (403.9) | 8 (3.63) | 66700602 | 66700702 | 66740205 | 8ACLS-6R |

Note
Approximate Dimensions in Inches (mm).

3.5

Power Breakers, Contactors and Fuses

Current Limiting Fuses

Type CLS Current Limiting Fuses, continued

| Maximum Design Voltage (kV) | Current Rating (Amperes) | "R" Designation | Barrel Number | Interrupting Rating rms (kA Sym.) | Diameter | Clip Center | Length | Approximate Shipping Weight Lbs (kg) | Performance Curves | | | Peak Let-Through Current | Catalog Number |
|-----------------------------|--------------------------|-----------------|---------------|-----------------------------------|--------------|----------------|---------------|--------------------------------------|----------------------|---------------------|----------|--------------------------|----------------|
| | | | | | | | | | Minimum Melting Time | Total Clearing Time | | | |
| 7.2 | 200 | 9R | 1 | 50 | 3.00 (76.2) | Not applicable | 15.90 (403.9) | 8 (3.63) | 66700602 | 66700702 | 66740205 | 7ACLS-9R | |
| | 230 | 12R | 1 | 50 | 3.00 (76.2) | Not applicable | 15.90 (403.9) | 8 (3.63) | 66700602 | 66700702 | 66740205 | 7ACLS-12R | |
| | 390 | 18R | 2 | 50 | 3.00 (76.2) | Not applicable | 15.90 (403.9) | 17 (7.72) | 66700602 | 66700702 | 66740205 | 7ACLS-18R | |
| | 450 | 24R | 2 | 50 | 3.00 (76.2) | Not applicable | 15.90 (403.9) | 17 (7.72) | 66700602 | 66700702 | 66740205 | 7ACLS-24R | |
| | 450 | 24R | 2 | 50 | 3.00 (76.2) | Not applicable | 15.90 (403.9) | 20 (9.08) | 66700602 | 66700702 | 66740205 | 7CLS70-24R | |
| | 650 | 36R | 3 | 50 | 3.00 (76.2) | Not applicable | 15.90 (403.9) | 30 (13.62) | 66700602 | 66700702 | 66740205 | 7CLS70-36R | |
| | 700 | 44R | 2 | 50 | 4.00 (101.6) | Not applicable | 15.90 (403.9) | 40 (18.16) | 66700602 | 66700702 | 66740205 | 7CLS70-44R | |
| 8.3 | 15 | Not applicable | 1 | 50 | 3.00 (76.2) | 14.00 (355.6) | 17.90 (454.7) | 11 (4.99) | 66664202 | 66664302 | 66679802 | 8CLS-15 | |
| | 30 | Not applicable | 1 | 50 | 3.00 (76.2) | 14.00 (355.6) | 17.90 (454.7) | 11 (4.99) | 66664202 | 66664302 | 66679802 | 8CLS-30 | |
| | 60 | Not applicable | 1 | 50 | 3.00 (76.2) | 14.00 (355.6) | 17.90 (454.7) | 11 (4.99) | 66664202 | 66664302 | 66679802 | 8CLS-60 | |
| | 70 | Not applicable | 1 | 50 | 3.00 (76.2) | 14.00 (355.6) | 17.90 (454.7) | 11 (4.99) | 66664202 | 66664302 | 66679802 | 8CLS-70 | |
| | 90 | Not applicable | 1 | 50 | 3.00 (76.2) | 14.00 (355.6) | 17.90 (454.7) | 11 (4.99) | 66664202 | 66664302 | 66679802 | 8CLS-90 | |
| | 110 | Not applicable | 1 | 50 | 3.00 (76.2) | 14.00 (355.6) | 17.90 (454.7) | 11 (4.99) | 66664202 | 66664302 | 66679802 | 8CLS-110 | |
| | 125 | Not applicable | 1 | 50 | 3.00 (76.2) | 14.00 (355.6) | 17.90 (454.7) | 11 (4.99) | 66664202 | 66664302 | 66679802 | 8CLS-125 | |
| | 150 | Not applicable | 2 | 50 | 3.00 (76.2) | 14.00 (355.6) | 17.90 (454.7) | 22 (9.99) | 66664202 | 66664302 | 66679802 | 8CLS-150 | |
| | 200 | Not applicable | 2 | 50 | 3.00 (76.2) | 14.00 (355.6) | 17.90 (454.7) | 22 (9.99) | 66664202 | 66664302 | 66679802 | 8CLS-200 | |
| | 225 | Not applicable | 2 | 50 | 3.00 (76.2) | 14.00 (355.6) | 17.90 (454.7) | 22 (9.99) | 66664202 | 66664302 | 66679802 | 8CLS-225 | |

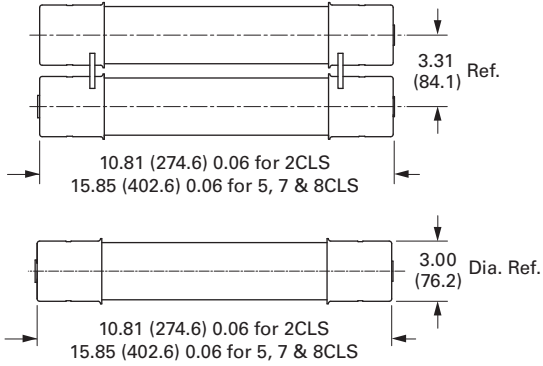
Note

Approximate Dimensions in Inches (mm).

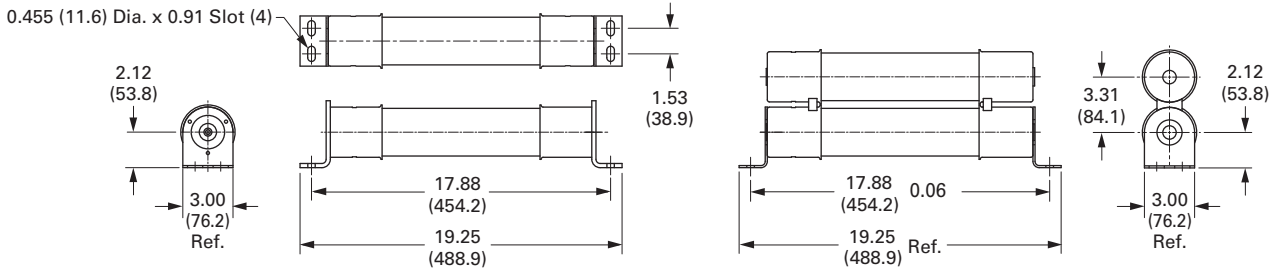
Fuse Dimensional Details

Approximate Dimensions in Inches (mm)

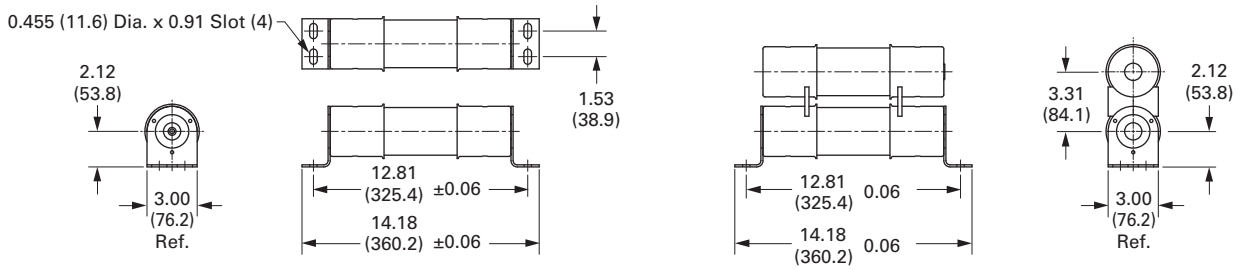
Type CLS Fuse



Type BCLS Fuse



Type 5BCLS and 7BCLS Fuses



Type 2BCLS Fuse

3.5

Power Breakers, Contactors and Fuses

Current Limiting Fuses

Type CLS Mountings and Hardware

| Maximum Design Voltage (kV) | Ampere Rating | Fuse Mounting Type | Voltage BIL (kV) | Mounting (Including Live Parts, End Fittings) ① | | Live Parts (Including End Fittings) Catalog Number | End Fittings (Disconnect Only) ① Catalog Number |
|-----------------------------|---------------|--------------------|------------------|---|---|---|--|
| | | | | Porcelain Insulator Catalog Number | Glass-Polyester Insulator Catalog Number | | |
| 2.54 | 25–230 | Non-disconnect | 60 | 2CLE-PNM-D | 2CLE-GNM-D | CLE-NL-D | — |
| | | Disconnect | 60 | 2CLE-PDM-D | 2CLE-GDM-E | CLE-DL-D | CLE-DF-D |
| | 390–450 | Non-disconnect | 60 | 2CLE-PNM-E | 2CLE-GNM-E | CLE-NL-E | — |
| | | Disconnect | 60 | 2CLE-PDM-E | 2CLE-GDM-E | CLE-DL-E | CLE-DF-E |
| 5.5 (CLS) | 30–230 | Non-disconnect | 60 | 5HLE-PNM-D | 5HLE-GNM-D | CLE-NL-D | — |
| | | Disconnect | 60 | 5HLE-PDM-D | 5HLE-GDM-E | CLE-DL-D | CLE-DF-D |
| | 390–480 | Non-disconnect | 60 | 5HLE-PNM-E | 5HLE-GNM-E | CLE-NL-E | — |
| | | Disconnect | 60 | 5HLE-PDM-E | 5HLE-GDM-E | CLE-DL-E | CLE-DF-E |
| 5.5 (LCLS) | 70–230 | Non-disconnect | 60 | 5CLE-PNM-D | 5CLE-GNM-D | CLE-NL-D | — |
| | | Disconnect | 60 | 5CLE-PDM-D | 5CLE-GDM-D | CLE-DL-D | CLE-DF-D |
| | | | 75 | 8CLE-PDM-D | 8CLE-GDM-D | CLE-DL-D | CLE-DF-D |
| | 390–450 | Non-disconnect | 60 | 5CLE-PNM-E | 5CLE-GNM-E | CLE-NL-E | — |
| | | Disconnect | 60 | 5CLE-PDM-E | 5CLE-GDM-E | CLE-DL-E | CLE-DF-E |
| | | | 75 | 8CLE-PDM-E | 8CLE-PDM-E | CLE-DL-E | CLE-DF-E |
| 8.3 | 70–100 | Non-disconnect | 75 | 8HLE-PNM-D | 8HLE-GNM-D | CLE-NL-D | — |
| | 130–230 | Disconnect | 75 | 8HLE-PDM-D | 8HLE-GDM-D | CLE-DL-D | CLE-DF-D |
| 7.2 | 390–450 | Non-disconnect | 75 | 8HLE-PDM-E | 8HLE-GNM-E | CLE-NL-E | — |
| | | Disconnect | 75 | 8HLE-PDM-E | 8HLE-GDM-E | CLE-DL-E | CLE-DF-E |
| 8.3 | 15–30 | Non-disconnect | 75 | 8CLE-PNM-D | 8CLE-GNM-D | CLE-NL-D | — |
| | 60–125 | Disconnect | 75 | 8CLE-PDM-D | 8CLE-GDM-D | CLE-DL-D | CLS-DF-D |
| | | | 75 | 8CLE-PNM-E | 8CLE-GNM-E | CLE-NL-E | — |
| | 150–225 | Disconnect | 75 | 8CLE-PDM-E | 8CLE-GDM-E | CLE-DL-E | CLE-DF-E |

Note

① Disconnect only.

Type CLPT

Indicating



Type CLPT Current Limiting Fuses 2.475 kV Maximum (2.4 kV Nominal)

| Current Rating (Amperes) | Interrupting Rating rms (kA Sym.) | Diameter | Clip Center | Length | Approximate Shipping Weight Lbs (kg) | Performance Curves | | Peak Let-Through Current | Catalog Number |
|--------------------------|-----------------------------------|-------------|-------------|--------------|--------------------------------------|----------------------|---------------------|--------------------------|----------------|
| | | | | | | Minimum Melting Time | Total Clearing Time | | |
| 0.25E | 63 | 0.81 (20.6) | — | 4.50 (114.3) | 0.25 (0.11) | 56357202 | 59883702 | 63933702 | 2NCLPT-.25E |
| 0.5E | 63 | 0.81 (20.6) | — | 4.50 (114.3) | 0.25 (0.11) | 56357202 | 59883702 | 63933702 | 2NCLPT-.5E |
| 1E | 40 | 0.81 (20.6) | — | 4.50 (114.3) | 0.25 (0.11) | 56357202 | 59883702 | 63933702 | 2NCLPT-1E |
| 2E | 40 | 0.81 (20.6) | — | 4.50 (114.3) | 0.25 (0.11) | 56357202 | 59883702 | 63933702 | 2NCLPT-2E |
| 5E | 25 | 0.81 (20.6) | — | 4.50 (114.3) | 0.25 (0.11) | 56357202 | 59883702 | 63933702 | 2NCLPT-5E |

Note

Approximate Dimensions in Inches (mm).

Non-Indicating



Type CLPT Current Limiting Fuses 5.5 kV Maximum (4.8 kV Nominal)

| Current Rating (Amperes) | Interrupting Rating rms (kA Sym.) | Diameter | Clip Center | Length | Approximate Shipping Weight Lbs (kg) | Performance Curves | | Peak Let-Through Current | Catalog Number |
|--------------------------|-----------------------------------|-------------|--------------|--------------|--------------------------------------|----------------------|---------------------|--------------------------|----------------|
| | | | | | | Minimum Melting Time | Total Clearing Time | | |
| Non-Indicating | | | | | | | | | |
| 0.5E | 63 | 0.81 (20.6) | — | 5.63 (143.0) | 0.25 (0.11) | 66702402 | 66702502 | 66704101 | 5NCLPT-.5E |
| 1E | 63 | 0.81 (20.6) | — | 5.63 (143.0) | 0.25 (0.11) | 66702402 | 66702502 | 66704101 | 5NCLPT-1E |
| 2E | 63 | 0.81 (20.6) | — | 5.63 (143.0) | 0.25 (0.11) | 66702402 | 66702502 | 66704101 | 5NCLPT-2E |
| 3E | 63 | 0.81 (20.6) | — | 5.63 (143.0) | 0.25 (0.11) | 66702402 | 66702502 | 66704101 | 5NCLPT-3E |
| 4E | 63 | 0.81 (20.6) | — | 5.63 (143.0) | 0.25 (0.11) | 66702402 | 66702502 | 66704101 | 5NCLPT-4E |
| 5E | 63 | 0.81 (20.6) | — | 5.63 (143.0) | 0.25 (0.11) | 66702402 | 66702502 | 66704101 | 5NCLPT-5E |
| 0.5E | 50 | 1.00 (25.4) | — | 5.63 (143.0) | 0.25 (0.11) | 66702402 | 66702502 | 66704101 | 317B487H02 |
| 1E | 50 | 1.00 (25.4) | — | 5.63 (143.0) | 0.25 (0.11) | 66702402 | 66702502 | 66704101 | 317B487H06 |
| 2E | 50 | 1.00 (25.4) | — | 5.63 (143.0) | 0.25 (0.11) | 66702402 | 66702502 | 66704101 | 317B487H03 |
| 3E | 50 | 1.00 (25.4) | — | 5.63 (143.0) | 0.25 (0.11) | 66702402 | 66702502 | 66704101 | 317B487H04 |
| 5E | 50 | 1.00 (25.4) | — | 5.63 (143.0) | 0.25 (0.11) | 66702402 | 66702502 | 66704101 | 317B487H05 |
| 0.5E | 63 | 1.60 (40.6) | 8.10 (205.7) | 9.50 (241.3) | 1.2 (0.54) | 70548302 | 70548402 | 63934002 | 5NCLPT-.5E-A |
| 1E | 63 | 1.60 (40.6) | 8.10 (205.7) | 9.50 (241.3) | 1.2 (0.54) | 70548302 | 70548402 | 63934002 | 5NCLPT-1E-A |
| 2E | 63 | 1.60 (40.6) | 8.10 (205.7) | 9.50 (241.3) | 1.2 (0.54) | 70548302 | 70548402 | 63934002 | 5NCLPT-2E-A |
| 3E | 63 | 1.60 (40.6) | 8.10 (205.7) | 9.50 (241.3) | 1.2 (0.54) | 70548302 | 70548402 | 63934002 | 5NCLPT-3E-A |
| 5E | 63 | 1.60 (40.6) | 8.10 (205.7) | 9.50 (241.3) | 1.2 (0.54) | 70548302 | 70548402 | 63934002 | 5NCLPT-5E-A |
| 10E | 63 | 1.60 (40.6) | 8.10 (205.7) | 9.50 (241.3) | 1.2 (0.54) | 70548302 | 70548402 | 63934002 | 5NCLPT-10E-A |
| Indicating | | | | | | | | | |
| 0.5E | 80 | 1.60 (40.6) | 8.10 (205.7) | 9.50 (241.3) | 1.2 (0.54) | 56353206 | 56353306 | 63934001 | 5CLPT-.5E |
| 1E | 80 | 1.60 (40.6) | 8.10 (205.7) | 9.50 (241.3) | 1.2 (0.54) | 56353206 | 56353306 | 63934001 | 5CLPT-1E |
| 1.5E | 80 | 1.60 (40.6) | 8.10 (205.7) | 9.50 (241.3) | 1.2 (0.54) | 56353206 | 56353306 | 63934001 | 5CLPT-1.5E |
| 3E | 80 | 1.60 (40.6) | 8.10 (205.7) | 9.50 (241.3) | 1.2 (0.54) | 56353206 | 56353306 | 63934001 | 5CLPT-3E |
| 5E | 80 | 1.60 (40.6) | 8.10 (205.7) | 9.50 (241.3) | 1.2 (0.54) | 56353206 | 56353306 | 63934001 | 5CLPT-5E |
| 10E | 80 | 1.60 (40.6) | 8.10 (205.7) | 9.50 (241.3) | 1.2 (0.54) | 56353206 | 56353306 | 63934001 | 5CLPT-10E |

Indicating



Type CLPT Mountings and Hardware 5.5 kV Maximum (4.8 kV Nominal) ③

| Ampere Rating | Fuse Mounting Type ① | Voltage BIL (kV) | Mounting (Including Live Parts, End Fittings) ② | | Live Parts (Including End Fittings) ② | End Fittings (Disconnect Only) |
|---------------|----------------------|------------------|---|--|---------------------------------------|--------------------------------|
| | | | Porcelain Insulator Catalog Number | Glass-Polyester Insulator Catalog Number | Catalog Number | Catalog Number |
| 0.5–2 | Non-disconnect | 60 | 5CLPT-PNM-A | 5CLPT-GNM-A | CLPT-NL | — |
| | Disconnect | 60 | 5CLPT-PDM-A | 5CLPT-GDM-A | CLPT-DL | CLPT-DF |
| 3–10 | Non-disconnect | 60 | 5CLPT-PNM-B | 5CLPT-GNM-B | CLPT-NL | — |
| | Disconnect | 60 | 5CLPT-PDM-B | 5CLPT-GDM-B | CLPT-DL | CLPT-DF |

Notes



① See Page V4-T3-148 for diagram of typical mounting.

② End fittings supplied only when required.

③ Refers only to 5CLPT and 5NCLPT-A fuses only.

Approximate Dimensions in Inches (mm).

Type CLPT Current Limiting Fuses 8.3 kV Maximum (7.2 kV Nominal)

| | Current Rating (Amperes) | Interrupting Rating rms (kA Sym.) | Diameter | Clip Center | Length | Approximate Shipping Weight Lbs (kg) | Performance Curves | | Peak Let-Through Current | Catalog Number | |
|---|---|-----------------------------------|-------------|---------------|---------------|--------------------------------------|----------------------|---------------------|--------------------------|----------------|-----------|
| | | | | | | | Minimum Melting Time | Total Clearing Time | | | |
| Non-Indicating | | | | | | | | | | | |
|  | 2E | 25 | 0.81 (20.6) | — | 8.00 (203.2) | 0.25 (0.11) | 56357206 | 59883706 | 63933704 | 8NCLPT-2E | |
| | 4E | 25 | 0.81 (20.6) | — | 8.00 (203.2) | 0.25 (0.11) | 56357206 | 59883706 | 63933704 | 8NCLPT-4E | |
| | 10E | 50 | 1.10 (27.9) | — | 5.00 (127.0) | 0.5 (0.23) | 56357206 | 59883706 | 63933704 | 8NCLPT-0E | |
| | 1E | 50 | 1.10 (27.9) | — | 5.00 (127.0) | 0.5 (0.23) | 56357206 | 59883706 | 63933704 | 8NCLPT-1E | |
| | 5E | 50 | 1.10 (27.9) | — | 5.00 (127.0) | 0.5 (0.23) | 56357206 | 59883706 | 63933704 | 8NCLPT-5E | |
| | 0.5E | 50 | 1.60 (40.6) | 8.10 (205.7) | 9.50 (241.3) | 1.5 (0.70) | 70548303 | 70548403 | 63934002 | 8NCLPT-.5E-A | |
| | 1E | 50 | 1.60 (40.6) | 8.10 (205.7) | 9.50 (241.3) | 1.5 (0.70) | 70548303 | 70548403 | 63934002 | 8NCLPT-1E-A | |
| | 2E | 50 | 1.60 (40.6) | 8.10 (205.7) | 9.50 (241.3) | 1.5 (0.70) | 70548303 | 70548403 | 63934002 | 8NCLPT-2E-A | |
| | 3E | 50 | 1.60 (40.6) | 8.10 (205.7) | 9.50 (241.3) | 1.5 (0.70) | 70548303 | 70548403 | 63934002 | 8NCLPT-3E-B | |
| | 5E | 50 | 1.60 (40.6) | 11.50 (292.1) | 12.90 (327.7) | 1.6 (0.73) | 70548303 | 70548403 | 63934002 | 8NCLPT-5E-B | |
| | 10E | 50 | 1.60 (40.6) | 11.50 (292.1) | 12.90 (327.7) | 1.6 (0.73) | 70548303 | 70548403 | 63934002 | 8NCLPT-10E-B | |
| | Indicating | | | | | | | | | | |
| |  | .5E | 80 | 1.60 (40.6) | 8.10 (205.7) | 9.50 (241.3) | 1.5 (0.70) | 56353206 | 56353306 | 63934001 | 8CLPT-.5E |
| | | 3E | 80 | 1.60 (40.6) | 8.10 (205.7) | 9.50 (241.3) | 1.6 (0.73) | 56353206 | 56353306 | 63934001 | 8CLPT-3E |
| 5E | | 50 | 1.60 (40.6) | 8.10 (205.7) | 9.50 (241.3) | 1.6 (0.73) | 56353206 | 56353306 | 63934001 | 8CLPT-5E | |
| 10E | | 50 | 1.60 (40.6) | 8.10 (205.7) | 9.50 (241.3) | 1.6 (0.73) | 56353206 | 56353306 | 63934001 | 8CLPT-10E | |

Type CLPT Mountings and Hardware 8.3 kV Maximum (7.2 kV Nominal) ^③

| Ampere Rating | Fuse Mounting Type ^① | Voltage BIL (kV) | Mounting (Including Live Parts, End Fittings) ^② | | Live Parts (Including End Fittings) ^② | End Fittings (Disconnect Only) |
|---------------|---------------------------------|------------------|--|--|--|--------------------------------|
| | | | Porcelain Insulator Catalog Number | Glass-Polyester Insulator Catalog Number | | |
| 0.5–2 | Non-disconnect | 75 | 8CLPT-PNM-A | 8CLPT-GNM-A | CLPT-NL | — |
| | Disconnect | 75 | 8CLPT-PDM-A | 8CLPT-GDM-A | CLPT-DL | CLPT-DF |
| 3–10 | Non-disconnect | 75 | 8CLPT-PNM-B | 8CLPT-GNM-B | CLPT-NL | — |
| | Disconnect | 75 | 8CLPT-PDM-B | 8CLPT-GDM-B | CLPT-DL | CLPT-DF |

Notes

- ① See Page V4-T3-148 for diagram of typical mounting.
 - ② End fittings supplied only when required.
 - ③ Refers only to 8CLPT and 8NCLPT-A or -B fuses only.
- Approximate Dimensions in Inches (mm).

Type CLPT Current Limiting Fuses 15.5 kV Maximum (7.2 kV Nominal)

| Current Rating (Amperes) | Interrupting Rating rms (kA Sym.) | Diameter | Clip Center | Length | Approximate Shipping Weight Lbs (kg) | Performance Curves | | | Catalog Number |
|--------------------------|-----------------------------------|-------------|---------------|---------------|--------------------------------------|----------------------|---------------------|--------------------------|---------------------|
| | | | | | | Minimum Melting Time | Total Clearing Time | Peak Let-Through Current | |
| Non-Indicating | | | | | | | | | |
| 0.5E | 63 | 1.60 (40.6) | 11.50 (292.1) | 12.90 (327.7) | 1.6 (0.73) | 70548303 | 70548403 | 63934002 | 15NCLPT-5E |
| 1E | 63 | 1.60 (40.6) | 11.50 (292.1) | 12.90 (327.7) | 1.6 (0.73) | 70548303 | 70548403 | 63934002 | 15NCLPT-1E |
| 2E | 63 | 1.60 (40.6) | 11.50 (292.1) | 12.90 (327.7) | 1.6 (0.73) | 70548303 | 70548403 | 63934002 | 15NCLPT-1.5E |
| 3E | 63 | 1.60 (40.6) | 16.10 (408.9) | 17.60 (447.0) | 2 (0.91) | 70548303 | 70548403 | 63934002 | 15NCLPT-3E |
| 5E | 63 | 1.60 (40.6) | 16.10 (408.9) | 17.60 (447.0) | 2 (0.91) | 70548303 | 70548403 | 63934002 | 15NCLPT-5E |
| 10E | 63 | 1.60 (40.6) | 16.10 (408.9) | 17.60 (447.0) | 2 (0.91) | 70548303 | 70548403 | 63934002 | 15NCLPT-10E |
| Indicating | | | | | | | | | |
| 0.5E | 80 | 1.60 (40.6) | 11.50 (292.1) | 12.90 (327.7) | 1.6 (0.73) | 56353206 | 56353306 | 63934001 | 15CLPT-5E |
| 1E | 80 | 1.60 (40.6) | 11.50 (292.1) | 12.90 (327.7) | 1.6 (0.73) | 56353206 | 56353306 | 63934001 | 15CLPT-1E |
| 2E | 80 | 1.60 (40.6) | 11.50 (292.1) | 12.90 (327.7) | 1.6 (0.73) | 56353206 | 56353306 | 63934001 | 15CLPT-1.5E |
| 3E | 80 | 1.60 (40.6) | 16.10 (408.9) | 17.60 (447.0) | 2 (0.91) | 56353206 | 56353306 | 63934001 | 15CLPT-3E |
| 5E | 80 | 1.60 (40.6) | 16.10 (408.9) | 17.60 (447.0) | 2 (0.91) | 56353206 | 56353306 | 63934001 | 15CLPT-5E |
| 10E | 50 | 1.60 (40.6) | 16.10 (408.9) | 17.60 (447.0) | 2 (0.91) | 56353206 | 56353306 | 63934001 | 15CLPT-10E |



Type CLPT Mountings and Hardware 15.5 kV Maximum (14.4 kV Nominal)

| Ampere Rating | Fuse Mounting Type ① | Voltage BIL (kV) | Mounting (Including Live Parts, End Fittings) ② | | Live Parts (Including End Fittings) ② | End Fittings (Disconnect Only) |
|---------------|----------------------|------------------|---|--|---------------------------------------|--------------------------------|
| | | | Porcelain Insulator Catalog Number | Glass-Polyester Insulator Catalog Number | | |
| 0.5–2 | Non-disconnect | 95 | 15CLPT-PNM-A | 15CLPT-GNM-A | CLPT-NL | — |
| | Disconnect | 95 | 15CLPT-PDM-A | 15CLPT-GDM-A | CLPT-DL | CLPT-DF |
| 3–10 | Non-disconnect | 95 | 15CLPT-PNM-B | 15CLPT-GNM-B | CLPT-NL | CLPT-DF |
| | Disconnect | 95 | 15CLPT-PDM-B | 15CLPT-GDM-B | CLPT-DL | — |

Notes

① See **Page V4-T3-148** for diagram of typical mounting.

② End fittings supplied only when required.

Approximate Dimensions in Inches (mm).

Type CLPT Current Limiting Fuses 25.5 kV Maximum (23.0 kV Nominal)

| Current Rating (Amperes) | Interrupting Rating rms (kA Sym.) | Diameter | Clip Center | Length | Approximate Shipping Weight Lbs (kg) | Performance Curves | | | Catalog Number |
|--------------------------|-----------------------------------|-------------|---------------|---------------|--------------------------------------|----------------------|---------------------|--------------------------|----------------|
| | | | | | | Minimum Melting Time | Total Clearing Time | Peak Let-Through Current | |
| 0.5E | 44 | 1.60 (40.6) | 16.10 (408.9) | 17.60 (447.0) | 2 (0.91) | 56353208 | 56353308 | 63933901 | 25CLPT-.5E |
| 1E | 44 | 1.60 (40.6) | 16.10 (408.9) | 17.60 (447.0) | 2 (0.91) | 56353208 | 56353308 | 63933901 | 25CLPT-1E |

Type CLPT Mountings and Hardware 25.5 kV Maximum (23.0 kV Nominal)

| Ampere Rating | Fuse Mounting Type ① | Voltage BIL (kV) | Mounting (Including Live Parts, End Fittings) ② | | Live Parts (Including End Fittings) ② | End Fittings (Disconnect Only) |
|---------------|----------------------|------------------|---|--|---------------------------------------|--------------------------------|
| | | | Porcelain Insulator Catalog Number | Glass-Polyester Insulator Catalog Number | Catalog Number | Catalog Number |
| 0.5E-1E | Non-disconnect | 150 | 25CLPT-PNM-A | — | 25CLPT-NL | — |
| | Disconnect | 150 | 25CLPT-PDM-A | — | 25CLPT-DL | CLPT-DF |

Type CLPT Current Limiting Fuses 38.0 kV Maximum (34.5 kV Nominal)

| Current Rating (Amperes) | Interrupting Rating rms (kA Sym.) | Diameter | Clip Center | Length | Approximate Shipping Weight Lbs (kg) | Performance Curves | | | Catalog Number |
|--------------------------|-----------------------------------|-------------|---------------|---------------|--------------------------------------|----------------------|---------------------|--------------------------|----------------|
| | | | | | | Minimum Melting Time | Total Clearing Time | Peak Let-Through Current | |
| 0.5E | 44 | 1.60 (40.6) | 17.10 (434.3) | 18.60 (472.4) | 2 (0.91) | 56353208 | 56353308 | 63933901 | 38CLPT-.5E |

Type CLPT Mountings and Hardware 38.0 kV Maximum (34.5 kV Nominal)

| Ampere Rating | Fuse Mounting Type ① | Voltage BIL (kV) | Mounting (Including Live Parts, End Fittings) ② | | Live Parts (Including End Fittings) ② | End Fittings (Disconnect Only) |
|---------------|----------------------|------------------|---|--|---------------------------------------|--------------------------------|
| | | | Porcelain Insulator Catalog Number | Glass-Polyester Insulator Catalog Number | Catalog Number | Catalog Number |
| 0.5E | Disconnect | — | Not applicable | Not applicable | 25CLPT-NL | CLPT-DF |
| | Non-disconnect | — | Not applicable | Not applicable | 25CLPT-DL | — |

Notes

① See Page V4-T3-148 for diagram of typical mounting.

② End fittings supplied only when required.

Approximate Dimensions in Inches (mm).

Type CX

3

Type CX



Type CX Current Limiting Fuses 4.3 kV Maximum (2.4 kV Nominal)

| Current Rating (Amperes) | Barrel Number | Interrupting Rating rms (kA Sym.) | Fuse Mounting Code | Diameter | Length | Approximate Shipping Weight Lbs (kg) | Performance Curves | | | | Catalog Number |
|--------------------------|---------------|-----------------------------------|--------------------|-------------|---------------|--------------------------------------|----------------------|---------------------|--------------------------|------------|------------------|
| | | | | | | | Minimum Melting Time | Total Clearing Time | Peak Let-Through Current | I^2t | |
| Non-Indicating | | | | | | | | | | | |
| 18C | 1 | 50 | G | 1.13 (28.7) | 10.00 (254.0) | 1 (0.45) | TC70544101 | TC70544501 | TC70544901 | TC70545101 | 4CX-18C |
| 25C | 1 | 50 | G | 1.13 (28.7) | 10.00 (254.0) | 1 (0.45) | TC70544101 | TC70544501 | TC70544901 | TC70545101 | 4CX-25C |
| 35C | 1 | 50 | G | 2.00 (50.8) | 10.00 (254.0) | 1 (0.45) | TC70544101 | TC70544501 | TC70544901 | TC70545101 | 4CX-35C |
| 45C | 1 | 50 | G | 2.00 (50.8) | 10.00 (254.0) | 2 (0.91) | TC70544101 | TC70544501 | TC70544901 | TC70545101 | 4CX-45C |
| 50C | 1 | 50 | G | 2.00 (50.8) | 10.00 (254.0) | 2 (0.91) | TC70544101 | TC70544501 | TC70544901 | TC70545101 | 4CX-50C |
| 60C | 1 | 50 | G | 2.00 (50.8) | 10.00 (254.0) | 2 (0.91) | TC70544102 | TC70544502 | TC70544901 | TC70545101 | 4CX-60C |
| 65C | 1 | 50 | G | 2.00 (50.8) | 10.00 (254.0) | 2 (0.91) | TC70544102 | TC70544501 | TC70544901 | TC70545101 | 4CX-65C |
| 75C | 1 | 50 | G | 2.00 (50.8) | 10.00 (254.0) | 2 (0.91) | TC70544102 | TC70544501 | TC70544901 | TC70545101 | 4CX-75C |
| 80C | 1 | 50 | G | 2.00 (50.8) | 10.00 (254.0) | 2 (0.91) | TC70544102 | TC70544502 | TC70544901 | TC70545101 | 4CX-80C |
| 100C | 1 | 50 | G | 2.00 (50.8) | 10.00 (254.0) | 2 (0.91) | TC70544102 | TC70544501 | TC70544901 | TC70545101 | 4CX-100C |
| Indicating | | | | | | | | | | | |
| 18C | 1 | 50 | G | 1.13 (28.7) | 10.00 (254.0) | 1 (0.45) | TC70544101 | TC70544501 | TC70544901 | TC70545101 | 4CXI-18C |
| 25C | 1 | 50 | G | 1.13 (28.7) | 10.00 (254.0) | 1 (0.45) | TC70544101 | TC70544501 | TC70544901 | TC70545101 | 4CXI-25C |
| 35C | 1 | 50 | G | 2.00 (50.8) | 10.00 (254.0) | 1 (0.45) | TC70544101 | TC70544501 | TC70544901 | TC70545101 | 4CXI-35C |
| 45C | 1 | 50 | G | 2.00 (50.8) | 10.00 (254.0) | 2 (0.91) | TC70544101 | TC70544501 | TC70544901 | TC70545101 | 4CXI-45C |
| 50C | 1 | 50 | G | 2.00 (50.8) | 10.00 (254.0) | 2 (0.91) | TC70544101 | TC70544501 | TC70544901 | TC70545101 | 4CXI-50C |
| 60C | 1 | 50 | G | 2.00 (50.8) | 10.00 (254.0) | 2 (0.91) | TC70544102 | TC70544502 | TC70544901 | TC70545101 | 4CXI-60C |
| 65C | 1 | 50 | G | 2.00 (50.8) | 10.00 (254.0) | 2 (0.91) | TC70544102 | TC70544501 | TC70544901 | TC70545101 | 4CXI-65C |
| 75C | 1 | 50 | G | 2.00 (50.8) | 10.00 (254.0) | 2 (0.91) | TC70544102 | TC70544501 | TC70544901 | TC70545101 | 4CXI-75C |
| 80C | 1 | 50 | G | 2.00 (50.8) | 10.00 (254.0) | 2 (0.91) | TC70544102 | TC70544502 | TC70544901 | TC70545101 | 4CXI-80C |
| 100C | 1 | 50 | G | 2.00 (50.8) | 10.00 (254.0) | 2 (0.91) | TC70544102 | TC70544501 | TC70544901 | TC70545101 | 4CXI-100C |

Type CX Mountings and Hardware 4.3 kV Maximum (2.4 kV Nominal)

| Ampere Rating | Fuse Mounting Type ^① | Size | Voltage BIL (kV) | Mounting (Including Live Parts, End Fittings) ^② | | Live Parts (Including End Fittings) ^② | End Fittings (Disconnect Only) |
|---------------|---------------------------------|------|------------------|--|--|--|--------------------------------|
| | | | | Porcelain Insulator Catalog Number | Glass-Polyester Insulator Catalog Number | | |
| 18C-100C | Non-disconnect | A | 60 | — | 5CX-GNM-G | CX-NL | — |
| | Disconnect | A | 60 | — | 5CX-GDM-G | CX-DL | CX-DF |

Notes

① See Page V4-T3-148 for diagram of typical mounting.

② End fittings supplied only when required.

Approximate Dimensions in Inches (mm).

Type CX



Type CX Current Limiting Fuses 5.5 kV Maximum (4.8 kV Nominal)

| Current Rating (Amperes) | Barrel Number | Interrupting Rating rms (kA Sym.) | Fuse Mounting Code | Diameter | Length | Approximate Shipping Weight Lbs (kg) | Performance Curves | | | Peak Let-Through Current | I ² t | Catalog Number |
|--------------------------|---------------|-----------------------------------|--------------------|-------------|---------------|--------------------------------------|----------------------|---------------------|------------|--------------------------|------------------|----------------|
| | | | | | | | Minimum Melting Time | Total Clearing Time | | | | |
| Non-Indicating | | | | | | | | | | | | |
| 10C | 1 | 50 | G | 1.13 (28.7) | 10.00 (254.0) | 1 (0.45) | TC70544201 | TC70544601 | TC70544902 | TC70545201 | 5CX-10C | |
| 12C | 1 | 50 | G | 1.13 (28.7) | 10.00 (254.0) | 1 (0.45) | TC70544201 | TC70544601 | TC70544902 | TC70545201 | 5CX-12C | |
| 18C | 1 | 50 | G | 1.13 (28.7) | 10.00 (254.0) | 1 (0.45) | TC70544201 | TC70544601 | TC70544902 | TC70545201 | 5CX-18C | |
| 20C | 1 | 50 | G | 1.13 (28.7) | 10.00 (254.0) | 1 (0.45) | TC70544201 | TC70544601 | TC70544902 | TC70545201 | 5CX-20C | |
| 21C | 1 | 50 | G | 2.00 (50.8) | 10.00 (254.0) | 2 (0.91) | TC70544202 | TC70544602 | TC70544902 | TC70545201 | 5CX-21C | |
| 25C | 1 | 50 | G | 2.00 (50.8) | 10.00 (254.0) | 2 (0.91) | TC70544201 | TC70544601 | TC70544902 | TC70545201 | 5CX-25C | |
| 30C | 1 | 50 | G | 1.13 (28.7) | 10.00 (254.0) | 1 (0.45) | TC70544201 | TC70544601 | TC70544902 | TC70545201 | 5CX-30C | |
| 35C | 1 | 50 | G | 2.00 (50.8) | 10.00 (254.0) | 2 (0.91) | TC70544202 | TC70544602 | TC70544902 | TC70545201 | 5CX-35C | |
| 40C | 1 | 50 | G | 2.00 (50.8) | 10.00 (254.0) | 2 (0.91) | TC70544201 | TC70544601 | TC70544902 | TC70545201 | 5CX-40C | |
| 50C | 1 | 50 | G | 2.00 (50.8) | 10.00 (254.0) | 2 (0.91) | TC70544201 | TC70544601 | TC70544902 | TC70545201 | 5CX-50C | |
| 60C | 1 | 50 | G | 2.00 (50.8) | 10.00 (254.0) | 2 (0.91) | TC70544202 | TC70544602 | TC70544902 | TC70545201 | 5CX-60C | |
| 65C | 1 | 50 | G | 2.00 (50.8) | 10.00 (254.0) | 2 (0.91) | TC70544201 | TC70544601 | TC70544902 | TC70545201 | 5CX-65C | |
| 75C | 1 | 50 | G | 2.00 (50.8) | 10.00 (254.0) | 2 (0.91) | TC70544201 | TC70544601 | TC70544902 | TC70545201 | 5CX-75C | |
| Indicating | | | | | | | | | | | | |
| 10C | 1 | 50 | G | 1.13 (28.7) | 10.00 (254.0) | 1 (0.45) | TC70544201 | TC70544601 | TC70544902 | TC70545201 | 5CXI-10C | |
| 12C | 1 | 50 | G | 1.13 (28.7) | 10.00 (254.0) | 1 (0.45) | TC70544201 | TC70544601 | TC70544902 | TC70545201 | 5CXI-12C | |
| 18C | 1 | 50 | G | 1.13 (28.7) | 10.00 (254.0) | 1 (0.45) | TC70544201 | TC70544601 | TC70544902 | TC70545201 | 5CXI-18C | |
| 20C | 1 | 50 | G | 1.13 (28.7) | 10.00 (254.0) | 1 (0.45) | TC70544201 | TC70544601 | TC70544902 | TC70545201 | 5CXI-20C | |
| 21C | 1 | 50 | G | 2.00 (50.8) | 10.00 (254.0) | 2 (0.91) | TC70544202 | TC70544602 | TC70544902 | TC70545201 | 5CXI-21C | |
| 25C | 1 | 50 | G | 2.00 (50.8) | 10.00 (254.0) | 2 (0.91) | TC70544201 | TC70544601 | TC70544902 | TC70545201 | 5CXI-25C | |
| 30C | 1 | 50 | G | 1.13 (28.7) | 10.00 (254.0) | 1 (0.45) | TC70544201 | TC70544601 | TC70544902 | TC70545201 | 5CXI-30C | |
| 35C | 1 | 50 | G | 2.00 (50.8) | 10.00 (254.0) | 2 (0.91) | TC70544202 | TC70544602 | TC70544902 | TC70545201 | 5CXI-35C | |
| 40C | 1 | 50 | G | 2.00 (50.8) | 10.00 (254.0) | 2 (0.91) | TC70544201 | TC70544601 | TC70544902 | TC70545201 | 5CXI-40C | |
| 50C | 1 | 50 | G | 2.00 (50.8) | 10.00 (254.0) | 2 (0.91) | TC70544201 | TC70544601 | TC70544902 | TC70545201 | 5CXI-50C | |
| 60C | 1 | 50 | G | 2.00 (50.8) | 10.00 (254.0) | 2 (0.91) | TC70544202 | TC70544602 | TC70544902 | TC70545201 | 5CXI-60C | |
| 65C | 1 | 50 | G | 2.00 (50.8) | 10.00 (254.0) | 2 (0.91) | TC70544201 | TC70544601 | TC70544902 | TC70545201 | 5CXI-65C | |
| 75C | 1 | 50 | G | 2.00 (50.8) | 10.00 (254.0) | 2 (0.91) | TC70544201 | TC70544601 | TC70544902 | TC70545201 | 5CXI-75C | |

Type CX Mountings and Hardware 5.5 kV Maximum (4.8 kV Nominal)

| Ampere Rating | Fuse Mounting Type ^① | Size | Voltage BIL (kV) | Mounting (Including Live Parts, End Fittings) ^② | | Live Parts (Including End Fittings) ^② | End Fittings (Disconnect Only) |
|---------------|---------------------------------|------|------------------|--|--|--|--------------------------------|
| | | | | Porcelain Insulator Catalog Number | Glass-Polyester Insulator Catalog Number | | |
| 10C-75C | Non-disconnect | A | 60 | — | 5CX-GNM-G | CX-NL | — |
| | Disconnect | A | 60 | — | 5CX-GDM-G | CX-DL | CX-DF |

Notes

^① See Page V4-T3-148 for diagram of typical mounting.

^② End fittings supplied only when required.

Approximate Dimensions in Inches (mm).

Type CX



3

Type CX Current Limiting Fuses 8.3 kV Maximum (7.2 kV Nominal)

| Current Rating (Amperes) | Barrel Number | Interrupting Rating rms (kA Sym.) | Fuse Mounting Code | Diameter | Length | Approximate Shipping Weight Lbs (kg) | Performance Curves | | | Peak Let-Through Current I _{2t} | Catalog Number |
|--------------------------|---------------|-----------------------------------|--------------------|-------------|---------------|--------------------------------------|----------------------|---------------------|------------|--|------------------|
| | | | | | | | Minimum Melting Time | Total Clearing Time | | | |
| Non-Indicating | | | | | | | | | | | |
| 3.5C | 1 | 50 | G | 1.13 (28.7) | 10.00 (254.0) | 2 (0.91) | TC70544302 | TC70544702 | TC70545001 | TC70545301 | 8CX-3.5C |
| 4C | 1 | 50 | G | 1.13 (28.7) | 10.00 (254.0) | 2 (0.91) | TC70544302 | TC70544702 | TC70545001 | TC70545301 | 8CX-4C |
| 4.5C | 1 | 50 | G | 1.13 (28.7) | 10.00 (254.0) | 2 (0.91) | TC70544301 | TC70544701 | TC70545001 | TC70545301 | 8CX-4.5C |
| 6C | 1 | 50 | G | 1.13 (28.7) | 10.00 (254.0) | 2 (0.91) | TC70544301 | TC70544701 | TC70545001 | TC70545301 | 8CX-6C |
| 7C | 1 | 50 | G | 1.13 (28.7) | 10.00 (254.0) | 2 (0.91) | TC70544302 | TC70544702 | TC70545001 | TC70545301 | 8CX-7C |
| 8C | 1 | 50 | G | 1.13 (28.7) | 10.00 (254.0) | 2 (0.91) | TC70544301 | TC70544701 | TC70545001 | TC70545301 | 8CX-8C |
| 10C | 1 | 50 | G | 1.13 (28.7) | 10.00 (254.0) | 2 (0.91) | TC70544301 | TC70544701 | TC70545001 | TC70545301 | 8CX-10C |
| 12C | 1 | 50 | G | 1.13 (28.7) | 10.00 (254.0) | 2 (0.91) | TC70544301 | TC70544701 | TC70545001 | TC70545301 | 8CX-12C |
| 15C | 1 | 50 | G | 1.13 (28.7) | 10.00 (254.0) | 2 (0.91) | TC70544302 | TC70544702 | TC70545001 | TC70545301 | 8CX-15C |
| 18C | 1 | 50 | G | 2.00 (50.8) | 10.00 (254.0) | 2 (0.91) | TC70544301 | TC70544701 | TC70545001 | TC70545301 | 8CX-18C |
| 20C | 1 | 50 | G | 2.00 (50.8) | 10.00 (254.0) | 2 (0.91) | TC70544301 | TC70544701 | TC70545001 | TC70545301 | 8CX-20C |
| 25C | 1 | 50 | G | 2.00 (50.8) | 10.00 (254.0) | 2 (0.91) | TC70544301 | TC70544701 | TC70545001 | TC70545301 | 8CX-25C |
| 30C | 1 | 50 | G | 2.00 (50.8) | 10.00 (254.0) | 2 (0.91) | TC70544301 | TC70544701 | TC70545001 | TC70545301 | 8CX-30C |
| 35C | 1 | 50 | G | 2.00 (50.8) | 10.00 (254.0) | 2 (0.91) | TC70544302 | TC70544702 | TC70545001 | TC70545301 | 8CX-35C |
| 40C | 1 | 50 | G | 2.00 (50.8) | 10.00 (254.0) | 2 (0.91) | TC70544301 | TC70544701 | TC70545001 | TC70545301 | 8CX-40C |
| Indicating | | | | | | | | | | | |
| 3.5C | 1 | 50 | G | 1.13 (28.7) | 10.00 (254.0) | 2 (0.91) | TC70544302 | TC70544702 | TC70545001 | TC70545301 | 8CXI-3.5C |
| 4C | 1 | 50 | G | 1.13 (28.7) | 10.00 (254.0) | 2 (0.91) | TC70544302 | TC70544702 | TC70545001 | TC70545301 | 8CXI-4C |
| 4.5C | 1 | 50 | G | 1.13 (28.7) | 10.00 (254.0) | 2 (0.91) | TC70544301 | TC70544701 | TC70545001 | TC70545301 | 8CXI-4.5C |
| 6C | 1 | 50 | G | 1.13 (28.7) | 10.00 (254.0) | 2 (0.91) | TC70544301 | TC70544701 | TC70545001 | TC70545301 | 8CXI-6C |
| 7C | 1 | 50 | G | 1.13 (28.7) | 10.00 (254.0) | 2 (0.91) | TC70544302 | TC70544702 | TC70545001 | TC70545301 | 8CXI-7C |
| 8C | 1 | 50 | G | 1.13 (28.7) | 10.00 (254.0) | 2 (0.91) | TC70544301 | TC70544701 | TC70545001 | TC70545301 | 8CXI-8C |
| 10C | 1 | 50 | G | 1.13 (28.7) | 10.00 (254.0) | 2 (0.91) | TC70544301 | TC70544701 | TC70545001 | TC70545301 | 8CXI-10C |
| 12C | 1 | 50 | G | 1.13 (28.7) | 10.00 (254.0) | 2 (0.91) | TC70544301 | TC70544701 | TC70545001 | TC70545301 | 8CXI-12C |
| 15C | 1 | 50 | G | 1.13 (28.7) | 10.00 (254.0) | 2 (0.91) | TC70544302 | TC70544702 | TC70545001 | TC70545301 | 8CXI-15C |
| 18C | 1 | 50 | G | 2.00 (50.8) | 10.00 (254.0) | 2 (0.91) | TC70544301 | TC70544701 | TC70545001 | TC70545301 | 8CXI-18C |
| 20C | 1 | 50 | G | 2.00 (50.8) | 10.00 (254.0) | 2 (0.91) | TC70544301 | TC70544701 | TC70545001 | TC70545301 | 8CXI-20C |
| 25C | 1 | 50 | G | 2.00 (50.8) | 10.00 (254.0) | 2 (0.91) | TC70544301 | TC70544701 | TC70545001 | TC70545301 | 8CXI-25C |
| 30C | 1 | 50 | G | 2.00 (50.8) | 10.00 (254.0) | 2 (0.91) | TC70544301 | TC70544701 | TC70545001 | TC70545301 | 8CXI-30C |
| 35C | 1 | 50 | G | 2.00 (50.8) | 10.00 (254.0) | 2 (0.91) | TC70544302 | TC70544702 | TC70545001 | TC70545301 | 8CXI-35C |
| 40C | 1 | 50 | G | 2.00 (50.8) | 10.00 (254.0) | 2 (0.91) | TC70544301 | TC70544701 | TC70545001 | TC70545301 | 8CXI-40C |

Type CX Mountings and Hardware 8.3 kV Maximum (7.2 kV Nominal)

| Ampere Rating | Fuse Mounting Type ① | Size | Voltage BIL (kV) | Mounting (Including Live Parts, End Fittings) ② | | Live Parts (Including End Fittings) ② | End Fittings (Disconnect Only) |
|---------------|----------------------|------|------------------|---|--|---------------------------------------|--------------------------------|
| | | | | Porcelain Insulator Catalog Number | Glass-Polyester Insulator Catalog Number | Catalog Number | Catalog Number |
| 3.5C-40C | Non-disconnect | B | 75 | — | 8CX-GNM-G | CX-NL | — |
| | Disconnect | B | 75 | — | 8CX-GDM-G | CX-DL | CX-DF |

Notes

① See Page V4-T3-148 for diagram of typical mounting.

② End fittings supplied only when required.

Approximate Dimensions in Inches (mm).

Type CX



Type CX Current Limiting Fuses 15.5 kV Maximum (14.4 kV Nominal)

| Current Rating (Amperes) | Barrel Number | Interrupting Rating rms (kA Sym.) | Fuse Mounting Code | Diameter | Length | Approximate Shipping Weight Lbs (kg) | Performance Curves | | | Peak Let-Through Current | I ² t | Catalog Number |
|--------------------------|---------------|-----------------------------------|--------------------|-------------|---------------|--------------------------------------|----------------------|---------------------|------------|--------------------------|------------------|----------------|
| | | | | | | | Minimum Melting Time | Total Clearing Time | | | | |
| Non-Indicating | | | | | | | | | | | | |
| 4C | 1 | 50 | G | 2.00 (50.8) | 14.30 (363.2) | 2 (0.91) | TC70544401 | TC70544801 | TC70545002 | TC70545401 | 15CX-4C | |
| 6C | 1 | 50 | G | 2.00 (50.8) | 14.30 (363.2) | 2 (0.91) | TC70544401 | TC70544801 | TC70545002 | TC70545401 | 15CX-6C | |
| 7C | 1 | 50 | G | 2.00 (50.8) | 14.30 (363.2) | 2 (0.91) | TC70544402 | TC70544802 | TC70545002 | TC70545401 | 15CX-7C | |
| 8C | 1 | 50 | G | 2.00 (50.8) | 14.30 (363.2) | 2 (0.91) | TC70544401 | TC70544801 | TC70545002 | TC70545401 | 15CX-8C | |
| 10C | 1 | 50 | G | 2.00 (50.8) | 14.30 (363.2) | 2 (0.91) | TC70544401 | TC70544801 | TC70545002 | TC70545401 | 15CX-10C | |
| 12C | 1 | 50 | G | 2.00 (50.8) | 14.30 (363.2) | 2 (0.91) | TC70544401 | TC70544801 | TC70545002 | TC70545401 | 15CX-12C | |
| 15C | 1 | 50 | G | 2.00 (50.8) | 14.30 (363.2) | 2 (0.91) | TC70544402 | TC70544802 | TC70545002 | TC70545401 | 15CX-15C | |
| 18C | 1 | 50 | G | 2.00 (50.8) | 14.30 (363.2) | 2 (0.91) | TC70544401 | TC70544801 | TC70545002 | TC70545401 | 15CX-18C | |
| 20C | 1 | 50 | G | 2.00 (50.8) | 14.30 (363.2) | 2 (0.91) | TC70544401 | TC70544801 | TC70545002 | TC70545401 | 15CX-20C | |
| 25C | 1 | 50 | G | 2.00 (50.8) | 14.30 (363.2) | 2 (0.91) | TC70544401 | TC70544801 | TC70545002 | TC70545401 | 15CX-25C | |
| 30C | 1 | 50 | G | 2.00 (50.8) | 14.30 (363.2) | 2 (0.91) | TC70544401 | TC70544801 | TC70545002 | TC70545401 | 15CX-30C | |
| 40C | 1 | 50 | G | 2.00 (50.8) | 14.30 (363.2) | 2 (0.91) | TC70544401 | TC70544801 | TC70545002 | TC70545401 | 15CX-40C | |
| Indicating | | | | | | | | | | | | |
| 4C | 1 | 50 | G | 2.00 (50.8) | 14.30 (363.2) | 2 (0.91) | TC70544401 | TC70544801 | TC70545002 | TC70545401 | 15CXI-4C | |
| 6C | 1 | 50 | G | 2.00 (50.8) | 14.30 (363.2) | 2 (0.91) | TC70544401 | TC70544801 | TC70545002 | TC70545401 | 15CXI-6C | |
| 7C | 1 | 50 | G | 2.00 (50.8) | 14.30 (363.2) | 2 (0.91) | TC70544402 | TC70544802 | TC70545002 | TC70545401 | 15CXI-7C | |
| 8C | 1 | 50 | G | 2.00 (50.8) | 14.30 (363.2) | 2 (0.91) | TC70544401 | TC70544801 | TC70545002 | TC70545401 | 15CXI-8C | |
| 10C | 1 | 50 | G | 2.00 (50.8) | 14.30 (363.2) | 2 (0.91) | TC70544401 | TC70544801 | TC70545002 | TC70545401 | 15CXI-10C | |
| 12C | 1 | 50 | G | 2.00 (50.8) | 14.30 (363.2) | 2 (0.91) | TC70544401 | TC70544801 | TC70545002 | TC70545401 | 15CXI-12C | |
| 15C | 1 | 50 | G | 2.00 (50.8) | 14.30 (363.2) | 2 (0.91) | TC70544402 | TC70544802 | TC70545002 | TC70545401 | 15CXI-15C | |
| 18C | 1 | 50 | G | 2.00 (50.8) | 14.30 (363.2) | 2 (0.91) | TC70544401 | TC70544801 | TC70545002 | TC70545401 | 15CXI-18C | |
| 20C | 1 | 50 | G | 2.00 (50.8) | 14.30 (363.2) | 2 (0.91) | TC70544401 | TC70544801 | TC70545002 | TC70545401 | 15CXI-20C | |
| 25C | 1 | 50 | G | 2.00 (50.8) | 14.30 (363.2) | 2 (0.91) | TC70544401 | TC70544801 | TC70545002 | TC70545401 | 15CXI-25C | |
| 30C | 1 | 50 | G | 2.00 (50.8) | 14.30 (363.2) | 2 (0.91) | TC70544401 | TC70544801 | TC70545002 | TC70545401 | 15CXI-30C | |
| 40C | 1 | 50 | G | 2.00 (50.8) | 14.30 (363.2) | 2 (0.91) | TC70544401 | TC70544801 | TC70545002 | TC70545401 | 15CXI-40C | |

Type CX Mountings and Hardware 15.5 kV Maximum (14.4 kV Nominal)

| Ampere Rating | Fuse Mounting Type ① | Size | Voltage BIL (kV) | Mounting (Including Live Parts, End Fittings) ② | | Live Parts (Including End Fittings) ② | End Fittings (Disconnect Only) |
|---------------|----------------------|------|------------------|---|--|---------------------------------------|--------------------------------|
| | | | | Porcelain Insulator Catalog Number | Glass-Polyester Insulator Catalog Number | | |
| 4C-40C | Non-disconnect | C | 95 | — | 15CX-GNM-G | CX-NL | — |
| | Disconnect | C | 95 | — | 15CX-GDM-G | CX-DL | CX-DF |

Notes

① See Page V4-T3-148 for diagram of typical mounting.

② End fittings supplied only when required.

Approximate Dimensions in Inches (mm).

Type CXN

Type CXN

3



Type CXN Current Limiting Fuses 8.3 kV Maximum (7.2 kV Nominal)

| Current Rating (Amperes) | Barrel Number | Interrupting Rating rms (kA Sym.) | Diameter | Length | Approximate Shipping Weight Lbs (kg) | Performance Curves | | | Catalog Number |
|--------------------------|---------------|-----------------------------------|--------------|---------------|--------------------------------------|----------------------|---------------------|--------------------------|---------------------------|
| | | | | | | Minimum Melting Time | Total Clearing Time | Peak Let-Through Current | |
| 60C | 1 | 50 | 3.00 (76.2) | 18.80 (477.5) | 8 (3.63) | 66675102 | 66675202 | 66664902 | 8CXN-60C |
| 100C | 1 | 50 | 3.00 (76.2) | 18.80 (477.5) | 8 (3.63) | 66675102 | 66675202 | 66664902 | 8CXN-100C |
| 125C | 1 | 50 | 4.00 (101.6) | 18.80 (477.5) | 14 (6.36) | 66675102 | 66675202 | 66664902 | 8CXN-125C |
| 150C | 1 | 50 | 4.00 (101.6) | 18.80 (477.5) | 14 (6.36) | 66675102 | 66675202 | 66664902 | 8CXN-150C |
| 200C | 1 | 50 | 4.00 (101.6) | 18.80 (477.5) | 14 (6.36) | 66675102 | 66675202 | 66664902 | 8CXN-200C |
| 250C | 1 | 50 | 4.00 (101.6) | 18.80 (477.5) | 14 (6.36) | 66675102 | 66675202 | 66664902 | 8CXN-250C |
| 120C | 2 | 50 | 3.00 (76.2) | 18.80 (477.5) | 16 (7.26) | 66675104 | 66675204 | 66664902 | 2 X 60C 8CXN-120C |
| 200C | 2 | 50 | 3.00 (76.2) | 18.80 (477.5) | 16 (7.26) | 66675104 | 66675204 | 66664902 | 2 X 100C 8CXN-200C |
| 250C | 2 | 50 | 3.00 (76.2) | 18.80 (477.5) | 16 (7.26) | 66675104 | 66675204 | 66664902 | 2 X 125C 8CXN-250C |
| 300C | 2 | 50 | 4.00 (101.6) | 18.80 (477.5) | 28 (12.71) | 66675104 | 66675204 | 66664902 | 2 X 150C 8CXN-300C |

Type CXN Mountings and Hardware 8.3 kV Maximum (7.2 kV Nominal)

| Ampere Rating | Fuse Mounting Type ^① | Voltage LIWL (BIL) | Glass Polyester Insulator Mounting (Including Live Parts, End Fittings) ^② | Live Parts ^② | End Fittings (Disconnect Only) |
|-----------------------------|---------------------------------|--------------------|--|-------------------------|--------------------------------|
| | | | Catalog Number | Catalog Number | Catalog Number |
| 60C–100C Single barrel | Non-disconnect | 95 | 15CXN-GNM-D | 15CXN-NL-D | — |
| | Non-disconnect | 95 | 15CXN-GNM-G | 15CXN-NL-G | — |
| | Disconnect | 95 | 15CXN-GDM-G | 15CXN-DL-G | 15CXN-DF-G |
| 125C–250C Single barrel | Non-disconnect | 95 | 15CXN-GNM-F | 15CXN-NL-F | — |
| | Non-disconnect | 95 | 15CXN-GNM-G | 15CXN-NL-G | — |
| | Disconnect | 95 | 25CXN-GDM-G | 15CXN-DL-G | 15CXN-DF-G |
| 120C, 200C Double barrel | Non-disconnect | 95 | 15CXN-GNM-D | 15CXN-NL-D | — |
| 250C, 300C Double barrel | Non-disconnect | 95 | 15CXN-GNM-F | 15CXN-NL-F | — |

Notes

^① See **Page V4-T3-148** for diagram of typical mounting.

^② End fittings supplied only when required.

Approximate Dimensions in Inches (mm).

Type CXN



Type CXN Current Limiting Fuses 15.5 kV Maximum (14.4 kV Nominal)

| Current Rating (Amperes) | Barrel Number | Interrupting Rating rms (kA Sym.) | Diameter | Length | Approximate Shipping Weight Lbs (kg) | Performance Curves | | | Catalog Number |
|--------------------------|---------------|-----------------------------------|--------------|---------------|--------------------------------------|----------------------|---------------------|--------------------------|---------------------------|
| | | | | | | Minimum Melting Time | Total Clearing Time | Peak Let-Through Current | |
| 45C | 1 | 50 | 3.00 (76.2) | 18.80 (477.5) | 8 (3.63) | 66674802 | 66675002 | 66665002 | 15CXN-45C |
| 60C | 1 | 50 | 3.00 (76.2) | 18.80 (477.5) | 8 (3.63) | 66674802 | 66675002 | 66665002 | 15CXN-60C |
| 75C | 1 | 50 | 4.00 (101.6) | 18.80 (477.5) | 14 (6.36) | 66674802 | 66675002 | 66665002 | 15CXN-75C |
| 85C | 1 | 50 | 4.00 (101.6) | 18.80 (477.5) | 14 (6.36) | 66674802 | 66675002 | 66665002 | 15CXN-85C |
| 100C | 1 | 50 | 4.00 (101.6) | 18.80 (477.5) | 14 (6.36) | 66674802 | 66675002 | 66665002 | 15CXN-100C |
| 90C | 2 | 50 | 3.00 (76.2) | 18.80 (477.5) | 16 (7.26) | 66674804 | 66675004 | 66665002 | 2 X 45C 15CXN-90C |
| 120C | 2 | 50 | 3.00 (76.2) | 18.80 (477.5) | 16 (7.26) | 66674804 | 66675004 | 66665002 | 2 X 60C 15CXN-120C |
| 150C | 2 | 50 | 4.00 (101.6) | 18.80 (477.5) | 28 (12.71) | 66674804 | 66675004 | 66665002 | 2 X 75C 15CXN-150C |
| 175C | 2 | 50 | 4.00 (101.6) | 18.80 (477.5) | 28 (12.71) | 66674804 | 66675004 | 66665002 | 2 X 85C 15CXN-175C |

Type CXN Mountings and Hardware 15.5 kV Maximum (14.4 kV Nominal)

| Ampere Rating | Fuse Mounting Type ① | Voltage LIWL (BIL) | Glass Polyester Insulator Mounting (Including Live Parts, End Fittings) ② | | End Fittings (Disconnect Only) Catalog Number |
|-----------------------------|----------------------|--------------------|---|-----------------------------|---|
| | | | Catalog Number | Live Parts ② Catalog Number | |
| 45C–60C Single barrel | Non-disconnect | 95 | 15CXN-GNM-D | 15CXN-NL-D | — |
| | Non-disconnect | 95 | 15CXN-GNM-G | 15CXN-NL-G | — |
| | Disconnect | 95 | 15CXN-GDM-G | 15CXN-DL-G | 15CXN-DF-G |
| 75C–100C Single barrel | Non-disconnect | 95 | 15CXN-GNM-F | 15CXN-NL-F | — |
| | Non-disconnect | 95 | 15CXN-GNM-G | 15CXN-NL-G | — |
| | Disconnect | 95 | 25CXN-GDM-G | 15CXN-DL-G | 15CXN-DF-G |
| 90C, 120C Double barrel | Non-disconnect | 95 | 15CXN-GNM-D | 15CXN-NL-D | — |
| 150C, 175C Double barrel | Non-disconnect | 95 | 15CXN-GNM-F | 15CXN-NL-F | — |

Notes

① See Page V4-T3-148 for diagram of typical mounting.

② End fittings supplied only when required.

Approximate Dimensions in Inches (mm).

3.5

Power Breakers, Contactors and Fuses

Current Limiting Fuses

Type CXF

3

Type CXF Indicated Full-Range Current-Limiting Fuses Mountings and Hardware

| Maximum Design Voltage (kV) | Ampere Rating | Mounting Fuse Mounting Type | Voltage BIL (kV) | Catalog Number | Live Parts Catalog Number | End Fittings Catalog Number |
|-----------------------------|---------------|-----------------------------|------------------|----------------|---------------------------|-----------------------------|
| 5.5 | 80–100 | Non-disconnect | — | — | CXN-NL-G | — |
| | 125–200 | Disconnect | — | — | CXN-GL-G | CXN-DF-G |
| 10 | 6–18 | Non-disconnect | 75 | 8CX-GNM-G | CX-NL | — |
| | 20–50 | Disconnect | 75 | 8CX-GDM-G | CX-DL | CX-DF |
| 8.3 | 65–80 | Non-disconnect | — | — | CXN-NL-G | — |
| | 100–125 | Disconnect | — | — | CXN-DL-G | CXN-DF-G |
| 17.2 | 6–18 | Non-disconnect | 95 | 15CX-GNM-G | CX-NL | — |
| | 20–50 | Disconnect | 95 | 15CX-GDM-G | CX-DL | CX-DF |
| 15.5 | 65–80 | Non-disconnect | — | — | CXN-NL-G | — |
| | 100 | Disconnect | — | — | CXN-DL-G | CXN-DF-G |
| 23 | 6–18 | Non-disconnect | — | — | CX-NL | — |
| | 20–50 | Disconnect | — | — | CX-DL | CX-DF |

Type DSL

6DSL-B1600



Type DSL Low Voltage Current Limiting Fuse

| Fuse Type/Voltage | Interrupting Rating rms (kA Sym.) | Application Data (Time Current Curves) | Approximate Ship Wt. Lbs (kg) | Catalog Number |
|-------------------------------------|-----------------------------------|--|-------------------------------|----------------|
| Type DSL fuse units 600V nominal | 200 | 33-792 (2) | 3.00 (1.4) | 6DSL-A150 |
| | 200 | 33-792 (2) | 3.00 (1.4) | 6DSL-A200 |
| | 200 | 33-792 (2) | 3.00 (1.4) | 6DSL-A250 |
| | 200 | 33-792 (2) | 3.00 (1.4) | 6DSL-A300 |
| | 200 | 33-792 (2) | 3.00 (1.4) | 6DSL-A400 |
| | 200 | 33-792 (2) | 3.00 (1.4) | 6DSL-A600 |
| | 200 | 33-792 (2) | 3.00 (1.4) | 6DSL-A800 |
| | 200 | 33-792 (2) | 4.00 (1.8) | 6DSL-B1200 |
| | 200 | 33-792 (2) | 4.00 (1.8) | 6DSL-B1600 |
| | 200 | 33-792 (2) | 4.00 (1.8) | 6DSL-B2000 |
| | 200 | 33-792 (3) | 5.50 (2.5) | 6DSL-C800 |
| | 200 | 33-792 (3) | 5.50 (2.5) | 6DSL-C1000 |
| | 200 | 33-792 (3) | 5.50 (2.5) | 6DSL-C1200 |
| | 200 | 33-792 (3) | 5.50 (2.5) | 6DSL-C1600 |
| | 200 | 33-792 (3) | 5.50 (2.5) | 6DSL-C2000 |
| | 200 | 33-792 (3) | 8.50 (3.9) | 6DSL-D2500 |
| | 200 | 33-792 (3) | 8.50 (3.9) | 6DSL-D3000 |
| | 200 | 33-792 | 20.00 (9.1) | 6DSL-E2500 |
| | 200 | 33-792 | 20.00 (9.1) | 6DSL-E3000 |
| | 200 | 33-792 | 20.00 (9.1) | 6DSL-E4000 |
| | 200 | 33-792 | 24.00 (10.9) | 6DSL-F5000 |

3.5

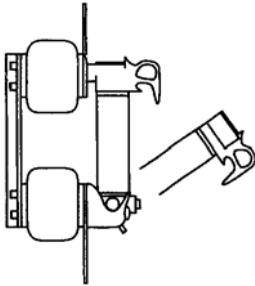
Power Breakers, Contactors and Fuses

Current Limiting Fuses

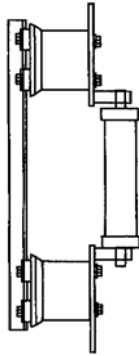
3

Typical Fuse Mounting for Current Limiting Fuses

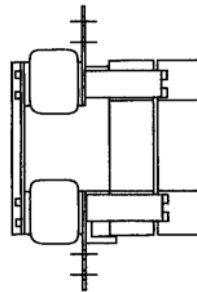
Single Barrel Disconnect with 2.00-Inch (50.8 mm) Diameter CLE Fuses



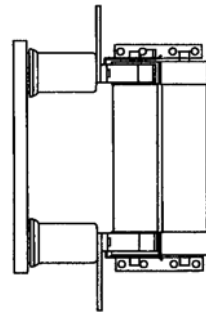
Non-Disconnect (CX)



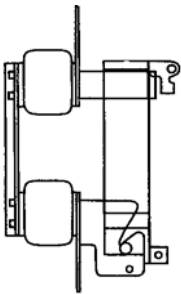
Double-Barrel Non-Disconnect All 2.00-Inch (50.8 mm) and 3.00-Inch (76.2 mm) Diameter CL Fuses



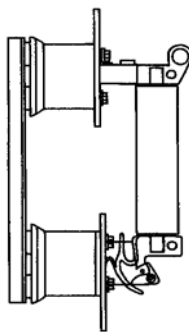
Non-Disconnect (15CXN-GNM-F and 15CXN-GNM-D)



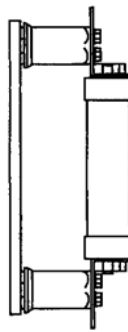
Single Barrel Disconnect All 3.00-Inch (76.2 mm) Diameter CLE Fuses



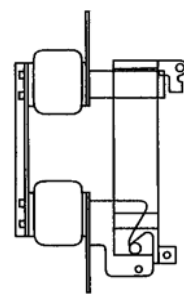
Disconnect (CX)



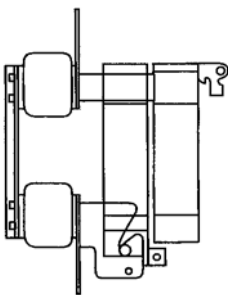
Non-Disconnect (15CXN-GNM-G)



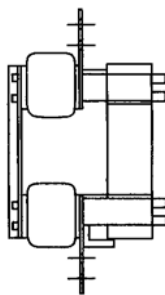
Disconnect (15CXN-GNM-F)



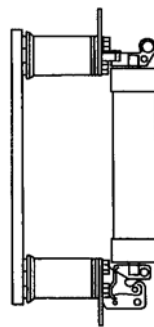
Double Barrel Disconnect All 3.00-Inch (76.2 mm) Diameter CLE Fuses



Single-Barrel Non-Disconnect All 2.00-Inch (50.8 mm) and 3.00-Inch (76.2 mm) Diameter CL Fuses



Disconnect (15CXN-GNM-G)



Eaton Terms & Conditions



Terms & Conditions



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Selling Policy (Supersedes Selling Policy 25-000, dated November 1, 2008)

Terms and Conditions of Sale

The Terms and Conditions of Sale set forth herein, and any supplements which may be attached hereto, constitute the full and final expression of the contract for the sale of products or services (hereinafter referred to as Product(s) or Services by Eaton Corporation (hereinafter referred to as Seller) to the Buyer, and supersedes all prior quotations, purchase orders, correspondence or communications whether written or oral between the Seller and the Buyer. Notwithstanding any contrary language in the Buyer's purchase order, correspondence or other form of acknowledgment, Buyer shall be bound by these Terms and Conditions of Sale when it sends a purchase order or otherwise indicates acceptance of this contract, or when it accepts delivery from Seller of the Products or Services.

THE CONTRACT FOR SALE OF THE PRODUCTS OR SERVICES IS EXPRESSLY LIMITED TO THE TERMS AND CONDITIONS OF SALE STATED HEREIN. ANY ADDITIONAL OR DIFFERENT TERMS PROPOSED BY BUYER ARE REJECTED UNLESS EXPRESSLY AGREED TO IN WRITING BY SELLER. No contract shall exist except as herein provided.

Complete Agreement

No amendment or modification hereto nor any statement, representation or warranty not contained herein shall be binding on the Seller unless made in writing by an authorized representative of the Seller. Prior dealings, usage of the trade or a course of performance shall not be relevant to determine the meaning of this contract even though the accepting or acquiescing party had knowledge of the nature of the performance and opportunity for objection.

Quotations

Written quotations are valid for 30 days from its date unless otherwise stated in the quotation or terminated sooner by notice.

Verbal quotations, unless accepted, expire the same day they are made.

A complete signed order must be received by Seller within 20 calendar days of notification of award, otherwise the price and shipment will be subject to re-negotiation.

Termination and Cancellation

Products

Any order may be terminated by the Buyer only by written notice and upon payment of reasonable termination charges, including all progress billings and all incurred direct manufacturing costs.

Services

Any order may be terminated by the Buyer only by written notice and upon payment of reasonable termination charges including all costs plus profit.

Seller shall have the right to cancel any order at any time by written notice if Buyer breaches any of the terms hereof, becomes the subject of any proceeding under state or federal law for the relief of debtors, or otherwise becomes insolvent or bankrupt, generally does not pay its debts as they become due or makes an assignment for the benefit of creditors.

Appendix 1—General Terms and Conditions of Sale

Effective Date: November 1, 2017

Prices

All prices are subject to change without notice. In the event of a price change, the effective date of the change will be the date of the new price or discount sheet, letter or telegram. All quotations made or orders accepted after the effective date will be on the new basis. For existing orders, the price of the unshipped portion of an order will be the price in effect at time of shipment.

Price Policy—Products and Services

When prices are quoted as firm for quoted shipment, they are firm provided the following conditions are met:

1. The order is released with complete engineering details.
2. Shipment of Products are made, and Services purchased are provided within the quoted lead time.
3. When drawings for approval are required for any Products, the drawings applicable to those Products must be returned within 30* calendar days from the date of the original mailing of the drawings by Seller. The return drawings must be released for manufacture and shipment and must be marked "APPROVED" or "APPROVED AS NOTED." Drawing re-submittals which are required for any other reason than to correct Seller errors will not extend the 30-day period.

* 60 days for orders through contractors to allow time for their review and approval before and after transmitting them to their customers.

If the Buyer initiates or in any way causes delays in shipment, provision of Services or return of approval drawings beyond the periods stated above, the price of the Products or Services will be increased 1% per month or fraction thereof up to a maximum of 18 months from the date of the Buyer's order. For delays resulting in shipment or provision of Services beyond 18 months from the date of the Buyer's order, the price must be renegotiated.

Price Policy—BLS

Refer to Price Policy 25-050.

Minimum Billing

Orders less than \$1,000 will be assessed a shipping and handling charge of 5% of the price of the order, with a minimum charge of \$25.00 unless noted differently on Product discount sheets.

Taxes

The price does not include any taxes. Buyer shall be responsible for the payment of all taxes applicable to, or arising from the transaction, the Products, its sale, value, or use, or any Services performed in connection therewith regardless of the person or entity actually taxed.

Terms of Payment

Products

Acceptance of all orders is subject to the Buyer meeting Seller's credit requirements. Terms of payment are subject to change for failure to meet such requirements. Seller reserves the right at any time to demand full or partial payment before proceeding with a contract of sale as a result of changes in the financial condition of the Buyer. Terms of Payment are either Net 30 days from the date of invoice of each shipment or carry a cash discount based on Product type. Specific payment terms for Products are outlined in the applicable Product discount schedules.

Services

Terms of payment are net within 30 days from date of invoice for orders amounting to less than \$50,000.00.

Terms of payment for orders exceeding \$50,000.00 shall be made according to the following:

1. Twenty percent (20%) of order value with the purchase order payable 30 days from date of invoice.
2. Eighty percent (80%) of order value in equal monthly payments over the performance period payable 30 days from date of invoice.

Except for work performed (i) under a firm fixed price basis or (ii) pursuant to terms of a previously priced existing contract between Seller and Buyer, invoices for work performed by Seller shall have added and noted on each invoice a charge of 3% (over and above the price of the work) which is related to Seller compliance with present and proposed environmental, health, and safety regulations associated with prescribed requirements covering hazardous materials management and employee training, communications, personal protective equipment, documentation and record keeping associated therewith.

Adequate Assurances

If, in the judgment of Seller, the financial condition of the Buyer, at any time during the period of the contract, does not justify the terms of payment specified, Seller may require full or partial payment in advance.

Delayed Payment

If payments are not made in accordance with these terms, a service charge will, without prejudice to the right of Seller to immediate payment, be added in an amount equal to the lower of 1.5% per month or fraction thereof or the highest legal rate on the unpaid balance.

Freight

Freight policy will be listed on the Product discount sheets, or at option of Seller one of the following freight terms will be quoted.

F.O.B.—P/S—Frt./Ppd. and Invoiced

Products are sold F.O.B. point of shipment freight prepaid and invoiced to the Buyer.

F.O.B.—P/S—Frt./Ppd. and Allowed

Products sold are delivered F.O.B. point of shipment, freight prepaid and included in the price.

F.O.B. Destination—Frt./Ppd. and Allowed

At Buyer's option, Seller will deliver the Products F.O.B. destination freight prepaid and 2% will be added to the net price.

The term "freight prepaid" means that freight charges will be prepaid to the accessible common carrier delivery point nearest the destination for shipments within the United States and Puerto Rico unless noted differently on the Product discount sheets. For any other destination, contact Seller's representative.

Shipment and Routing

Seller shall select the point of origin of shipment, the method of transportation, the type of carrier equipment and the routing of the shipment.

If the Buyer specifies a special method of transportation, type of carrier equipment, routing, or delivery requirement, Buyer shall pay all special freight and handling charges.

When freight is included in the price, no allowance will be made in lieu of transportation if the Buyer accepts shipment at factory, warehouse, or freight station or otherwise supplies its own transportation.

Risk of Loss

Risk of loss or damage to the Products shall pass to Buyer at the F.O.B. point.

Concealed Damage

Except in the event of F.O.B. destination shipments, Seller will not participate in any settlement of claims for concealed damage.

When shipment has been made on an F.O.B. destination basis, the Buyer must unpack immediately and, if damage is discovered, must:

1. Not move the Products from the point of examination.
2. Retain shipping container and packing material.
3. Notify the carrier in writing of any apparent damage.
4. Notify Seller representative within 72 hours of delivery.
5. Send Seller a copy of the carrier's inspection report.

Witness Tests/Customer Inspection

Standard factory tests may be witnessed by the Buyer at Seller's factory for an additional charge calculated at the rate of \$2,500 per day (not to exceed eight (8) hours) per Product type. Buyer may final inspect Products at the Seller's factory for \$500 per day per Product type.

Witness tests will add one (1) week to the scheduled shipping date. Seller will notify Buyer fourteen (14) calendar days prior to scheduled witness testing or inspection. In the event Buyer is unable to attend, the Parties shall mutually agree on a rescheduled date. However, Seller reserves the right to deem the witness tests waived with the right to ship and invoice Products.

Held Orders

For any order held, delayed or rescheduled at the request of the Buyer, Seller may, at its sole option (1) require payment to be based on any reasonable basis, including but not limited to the contract price, and any additional expenses, or cost resulting from such a delay; (2) store Products at the sole cost and risk of loss of the Buyer; and/ or (3) charge to the Buyer those prices under the applicable price policy. Payment for such price, expenses and costs, in any such event, shall be due by Buyer within thirty (30) days from date of Seller's invoice. Any order so held delayed or rescheduled beyond six (6) months will be treated as a Buyer termination.

Drawing Approval

Seller will design the Products in line with, in Seller's judgment, good commercial practice. If at drawing approval Buyer makes changes outside of the design as covered in their specifications, Seller will then be paid reasonable charges and allowed a commensurate delay in shipping date based on the changes made.

Drawing Re-Submittal

When Seller agrees to do so in its quotation, Seller shall provide Buyer with the first set of factory customer approval drawing(s) at Seller's expense. The customer approval drawing(s) will be delivered at the quoted delivery date. If Buyer requests drawing changes or additions after the initial factory customer approval drawing(s) have been submitted by Seller, the Seller, at its option, may assess Buyer drawing charges. Factory customer approval drawing changes required due to misinterpretation by Seller will be at Seller's expense. Approval drawings generated by Bid Manager are excluded from this provision.

Warranty

Warranty for Products

Seller warrants that the Products manufactured by it will conform to Seller's applicable specifications and be free from failure due to defects in workmanship and material for one (1) year from the date of installation of the Product or eighteen (18) months from the date of shipment of the Product, whichever occurs first.

In the event any Product fails to comply with the foregoing warranty, Seller will, at its option, either (a) repair or replace the defective Product, or defective part or component thereof, F.O.B. Seller's facility freight prepaid, or (b) credit Buyer for the purchase price of the Product. All warranty claims shall be made in writing.

Seller requires all non-conforming Products be returned at Seller's expense for evaluation unless specifically stated otherwise in writing by Seller.

This warranty does not cover failure or damage due to storage, installation, operation or maintenance not in conformance with Seller's recommendations and industry standard practice or due to accident, misuse, abuse or negligence. This warranty does not cover reimbursement for labor, gaining access, removal, installation, temporary power or any other expenses, which may be incurred in connection with repair or replacement.

This warranty does not apply to equipment not manufactured by Seller. Seller limits itself to extending the same warranty it receives from the supplier.

Appendix 1—General Terms and Conditions of Sale

Effective Date: November 1, 2017

Extended Warranty for Products

If requested by the Buyer and specifically accepted in writing by Seller, the foregoing standard warranty for Products will be extended from the date of shipment for the period and price indicated below:

- 24 months—2% of Contract Price
- 30 months—3% of Contract Price
- 36 months—4% of Contract Price

Special Warranty (In and Out) for Products

If requested by the Buyer and specifically accepted in writing by Seller, Seller will, during the warranty period for Products, at an additional cost of 2% of the contract price, be responsible for the direct cost of:

1. Removing the Product from the installed location.
2. Transportation to the repair facility and return to the site.
3. Reinstallation on site.

The total liability of Seller for this Special Warranty for Products is limited to 50% of the contract price of the particular Product being repaired and excludes expenses for removing adjacent apparatus, walls, piping, structures, temporary service, etc.

Warranty for Services

Seller warrants that the Services performed by it hereunder will be performed in accordance with generally accepted professional standards.

The Services, which do not so conform, shall be corrected by Seller upon notification in writing by the Buyer within one (1) year after completion of the Services.

Unless otherwise agreed to in writing by Seller, Seller assumes no responsibility with respect to the suitability of the Buyer's, or its customer's, equipment or with respect to any latent defects in equipment not supplied by Seller. This warranty does not cover damage to Buyer's, or its customer's, equipment, components or parts resulting in whole or in part from improper maintenance or operation or from their deteriorated condition. Buyer will, at its cost, provide Seller with unobstructed access to the defective Services, as well as adequate free working space in the immediate vicinity of the defective Services and such facilities and systems, including, without limitation, docks, cranes and utility disconnects and connects, as may be necessary in order that Seller may perform its warranty obligations. The conducting of any tests shall be mutually agreed upon and Seller shall be notified of, and may be present at, all tests that may be made.

Warranty for Power Systems Studies

Seller warrants that any power systems studies performed by it will conform to generally accepted professional standards. Any portion of the study, which does not so conform, shall be corrected by Seller upon notification in writing by the Buyer within six (6) months after completion of the study. All warranty work shall be performed in a single shift straight time basis Monday through Friday. In the event that the study requires correction of warranty items on an overtime schedule, the premium portion of such overtime shall be for the Buyer's account.

Limitation on Warranties for Products, Services and Power Systems Studies

THE FOREGOING WARRANTIES ARE EXCLUSIVE EXCEPT FOR WARRANTY OF TITLE. SELLER DISCLAIMS ALL OTHER WARRANTIES INCLUDING ANY IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE.

CORRECTION OF NON-CONFORMITIES IN THE MANNER AND FOR THE PERIOD OF TIME PROVIDED ABOVE SHALL CONSTITUTE SELLER'S SOLE LIABILITY AND BUYER'S EXCLUSIVE REMEDY FOR FAILURE OF SELLER TO MEET ITS WARRANTY OBLIGATIONS, WHETHER CLAIMS OF THE BUYER ARE BASED IN CONTRACT, IN TORT (INCLUDING NEGLIGENCE OR STRICT LIABILITY), OR OTHERWISE.

Asbestos

Federal Law requires that building or facility owners identify the presence, location and quantity of asbestos containing material (hereinafter "ACM") at work sites. Seller is not licensed to abate ACM. Accordingly, for any contract which includes the provision of Services, prior to (i) commencement of work at any site under a specific Purchase Order, (ii) a change in the work scope of any Purchase Order, the Buyer will certify that the work area associated with the Seller's scope of work includes the handling of Class II ACM, including but not limited to generator wedges and high temperature gaskets which include asbestos materials. The Buyer shall, at its expense, conduct abatement should the removal, handling, modification or reinstallation, or some or all of them, of said Class II ACM be likely to generate airborne asbestos fibers; and should such abatement affect the cost of or time of performance of the work, then Seller shall be entitled to an equitable adjustment in the schedule, price and other pertinent affected provisions of the contract.

Compliance with Nuclear Regulation

Seller's Products are sold as commercial grade Products not intended for application in facilities or activities licensed by the United States Nuclear Regulatory Commission for atomic purposes. Further certification will be required for use of the Products in any safety-related application in any nuclear facility licensed by the U.S. Nuclear Regulatory Commission.

Returning Products

Authorization and shipping instructions for the return of any Products must be obtained from Seller before returning the Products.

When return is occasioned due to Seller error, full credit including all transportation charges will be allowed.

Product Notices

Buyer shall provide the user (including its employees) of the Products with all Seller supplied Product notices, warnings, instructions, recommendations, and similar materials.

Force Majeure

Seller shall not be liable for failure to perform or delay in performance due to fire, flood, strike or other labor difficulty, act of God, act of any governmental authority or of the Buyer, riot, embargo, fuel or energy shortage, car shortage, wrecks or delays in transportation, or due to any other cause beyond Seller's reasonable control. In the event of delay in performance due to any such cause, the date of delivery or time for completion will be extended by a period of time reasonably necessary to overcome the effect of such delay.

Liquidated Damages

Contracts which include liquidated damage clauses for failure to meet shipping or job completion promises are not acceptable or binding on Seller, unless such clauses are specifically accepted in writing by an authorized representative of the Seller at its headquarters office.

Patent Infringement

Seller will defend or, at its option, settle any suit or proceeding brought against Buyer, or Buyer's customers, to the extent it is based upon a claim that any Product or part thereof, manufactured by Seller or its subsidiaries and furnished hereunder, infringes any United States patent, other than a claim of infringement based upon use of a Product or part thereof in a process, provided Seller is notified in reasonable time and given authority, information and assistance (at Seller's expense) for the defense of same. Seller shall pay all legal and court costs and expenses and court-assessed damages awarded therein against Buyer resulting from or incident to such suit or proceeding. In addition to the foregoing, if at any time Seller determines there is a substantial question of infringement of any United States patent, and the use of such Product is or may be enjoined, Seller may, at its option and expense: either (a) procure for Buyer the right to continue using and selling the Product; (b) replace the Product with non-infringing apparatus; (c) modify the Product so it becomes non-infringing; or (d) as a last resort, remove the Product and refund the purchase price, equitably adjusted for use and obsolescence. In no case does Seller agree to pay any recovery based upon its Buyer's savings or profit through use of Seller's Products whether the use be special or ordinary. The foregoing states the entire liability of Seller for patent infringement.

The preceding paragraph does not apply to any claim of infringement based upon: (a) any modification made to a Product other than by Seller; (b) any design and/or specifications of Buyer to which a Product was manufactured; or (c) the use or combination of Product with other products where the Product does not itself infringe. As to the above-identified claim situations where the preceding paragraph does not apply, Buyer shall defend and hold Seller harmless in the same manner and to the extent as Seller's obligations described in the preceding paragraph. Buyer shall be responsible for obtaining (at Buyer's expense) all license rights required for Seller to be able to use software products in the possession of Buyer where such use is required in order to perform any Service for Buyer.

With respect to a Product or part thereof not manufactured by Seller or its subsidiaries, Seller will attempt to obtain for Buyer, from the supplier(s), the patent indemnification protection normally provided by the supplier(s) to customers.

Compliance with OSHA

Seller offers no warranty and makes no representation that its Products comply with the provisions or standards of the Occupational Safety and Health Act of 1970, or any regulation issued thereunder. In no event shall Seller be liable for any loss, damage, fines, penalty or expenses arising under said Act.

Limitation of Liability

THE REMEDIES OF THE BUYER SET FORTH IN THIS CONTRACT ARE EXCLUSIVE AND ARE ITS SOLE REMEDIES FOR ANY FAILURE OF SELLER TO COMPLY WITH ITS OBLIGATIONS HEREUNDER.

NOTWITHSTANDING ANY PROVISION IN THIS CONTRACT TO THE CONTRARY, IN NO EVENT SHALL SELLER BE LIABLE IN CONTRACT, IN TORT (INCLUDING NEGLIGENCE OR STRICT LIABILITY) OR OTHERWISE FOR DAMAGE TO PROPERTY OR EQUIPMENT OTHER THAN PRODUCTS SOLD HEREUNDER, LOSS OF PROFITS OR REVENUE, LOSS OF USE OF PRODUCTS, COST OF CAPITAL, CLAIMS OF CUSTOMERS OF THE BUYER OR ANY SPECIAL, INDIRECT, INCIDENTAL OR CONSEQUENTIAL DAMAGES WHATSOEVER, REGARDLESS OF WHETHER SUCH POTENTIAL DAMAGES ARE FORESEEABLE OR IF SELLER HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES.

THE TOTAL CUMULATIVE LIABILITY OF SELLER ARISING FROM OR RELATED TO THIS CONTRACT WHETHER THE CLAIMS ARE BASED IN CONTRACT, IN TORT (INCLUDING NEGLIGENCE OR STRICT LIABILITY) OR OTHERWISE, SHALL NOT EXCEED THE PRICE OF THE PRODUCT OR SERVICES ON WHICH SUCH LIABILITY IS BASED.

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| Molded Case Circuit Breakers, Series C, External | |
| Accessories | V4-T2-416 |
| Termination Hardware | |
| Molded Case Circuit Breakers, Series C, External | |
| Accessories | V4-T2-412 |

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| Test Panel | |
| Molded Case Circuit Breakers, Add-On Ground | |
| Fault Protection | |
| Accessories | V4-T2-520 |
| Type BHLE | |
| Current Limiting Fuses | |
| Power Breakers, Contactors & Fuses | V4-T3-124 |
| Type CLE | |
| Current Limiting Fuses | |
| Power Breakers, Contactors & Fuses | V4-T3-117 |
| Type CLPT | |
| Current Limiting Fuses | |
| Power Breakers, Contactors & Fuses | V4-T3-135 |
| Type CLS | |
| Current Limiting Fuses | |
| Power Breakers, Contactors & Fuses | V4-T3-129 |
| Type CX | |
| Current Limiting Fuses | |
| Power Breakers, Contactors & Fuses | V4-T3-140 |
| Type CXF | |
| Current Limiting Fuses | |
| Power Breakers, Contactors & Fuses | V4-T3-146 |
| Type CXN | |
| Current Limiting Fuses | |
| Power Breakers, Contactors & Fuses | V4-T3-144 |
| Type DBU | |
| Expulsion Fuses | |
| Power Breakers, Contactors & Fuses | V4-T3-108 |
| Type DSL | |
| Current Limiting Fuses | |
| Power Breakers, Contactors & Fuses | V4-T3-147 |
| Type ELC Current Limiter Attachment | |
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| Type HCL | |
| Current Limiting Fuses | |
| Power Breakers, Contactors & Fuses | V4-T3-127 |
| Type HLE | |
| Current Limiting Fuses | |
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| Type LFD Current Limiter | |
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| Type RBA and RDB | |
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| Accessories | V4-T1-102 |
| Miniature Circuit Breakers and | |
| Supplementary Protectors | V4-T1-100–V4-T1-105 |
| UL 1053 DIN Rail RCCB 480/277 Vac | |
| Accessories | V4-T1-96 |
| Miniature Circuit Breakers and | |
| Supplementary Protectors | V4-T1-94–V4-T1-99 |

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| Miniature Circuit Breakers and Supplementary Protectors | |
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| UL 489 DIN Rail Miniature Circuit Breakers, FAZ-NA | |
| Accessories | V4-T1-62 |
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| UL 489 DIN Rail Miniature Circuit Breakers, FAZ-NA | |
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| Undervoltage Release | |
| Molded Case Circuit Breakers, Speciality Breakers, PVGard Solar Circuit Breakers | |
| Accessories | V4-T2-470 |
| Power Circuit Breakers, Magnum | |
| Accessories | V4-T3-30 |
| Undervoltage Release Mechanism | |
| Molded Case Circuit Breakers, Series C, Internal | |
| Accessories | V4-T2-388 |
| Molded Case Circuit Breakers, Series G, Internal | |
| Accessories | V4-T2-212 |
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| Accessories | V4-T2-512 |
| Molded Case Circuit Breakers, Speciality Breakers, Direct Current | |
| Accessories | V4-T2-461 |
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| Voltage Trips | |
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| Wohner busbar adapter | |
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| Accessories | V4-T2-209 |

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