

# Controls and Power Electronics

For industrial applications





# Controls and Power Electronics

## POWER DEVICES

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A

Auxiliary relays and contactors

B

Motor protection devices

C

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D

## AUXILIARY DEVICES

Main switches

E

Control and signalling units

F

## POWER ELECTRONICS

Speed drive units

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H

## ENCLOSURES

Product overview

I

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## POWER DEVICES

### A

#### Contactors and thermal overload relays

##### Efficor - Global contactors



Compact starter either with thermal overload relay or manual motor starter.

- A.7

##### Series EA - Minicontactors



Three pole minicontactors  
7A (AC3)  
16A (AC1)

- A.31

##### Series M - Compact contactors



3 and 4P (4NO, 2NO+2NC, 4NC)  
6, 9 and 12A (AC-3)  
20A (AC-1) Control circuit AC  
and DC

- A.33

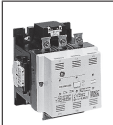
##### Series CL - Contactors



3 and 4P (4NO, 2NO+2NC) 9 to  
105A (AC-3) 25 to 140A  
(AC-1) AC, DC and with electronic  
module

- A.41

##### Series CK - Contactors



3 and 4P (4NO) 150 to 825A (AC-3)  
200 to 1250A (AC-1)  
AC, DC and with electronic module

- A.48

##### Series MTO - Thermal overload relays



For compact contactors series M  
from 0.11 to 14A

- A.52

##### Series RT - Thermal overload relays



For contactors Efficor, series CL  
and CK from 0.16 to 850A  
Class 10A, 10, 20, 30

- A.54

##### Series RE - Electronic overload relays



For contactors Efficor, series CL  
from 0.1 to 150A

- A.58

##### EntelliPro



Intelligent motor management  
relay

- A.60

### B

#### Plug-in relays and auxiliary contactors

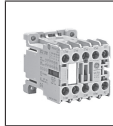
##### Series PRC - Plug-in relays



Miniature plug-in relays  
Standard 8-11 pin plug-in relays  
Interface relay

- B.2

##### Series M - Auxiliary contactors



lth = 16A

- B.8

##### Series RL - Auxiliary contactors



lth = 20A

- B.14

##### Series EC - Auxiliary contactors



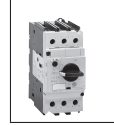
lth = 20A  
Double box clamp terminal

- B.17

### C

#### Motor protection devices

##### Surion - Manual motor starter



Thermal and magnetic protection -  
Magnetic protection only  
Setting ranges from 0.1 to 63A

- C.2

##### Series SFK - Motor protection circuit breaker



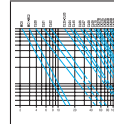
Thermal and magnetic protection of  
AC and DC motors  
Setting ranges from 0.1 to 25A

- C.26

### D

#### Applications

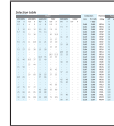
##### Technical data



Utilization categories  
Electrical endurance  
Machine directive -  
B10d value for contactors

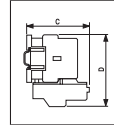
- D.3-D.8

##### Selection tables



- D.9-D.41

##### Dimensional drawings



- D.76

## AUXILIARY DEVICES

### E

#### Main switches

##### Series ML



**Standard programme**  
Main switches and emergency-stop switches for machinery

enclosed switches

- E.4

##### Switches for photovoltaic applications



To isolate the solar panels from the inverter, from 16 to 100Acd

- E.13

### F

#### Control and signalling units

##### Series P9 - Panel mounting - Units Ø 22 mm



- F.14

##### Series P9 - Base mounting



- F.24

##### Series P9 - Push-button stations / Equipped boxes



- F.28

##### Series P9 - Common accessories



- F.34

##### Series 077 - Units Ø 30 mm



- F.44

##### Series 105 - Signalling devices



- F.61

## POWER ELECTRONICS

### G

#### Speed drive units

##### AF7 drives



Drives designed for general purpose applications

- G.8

##### AF6 drives



Drives designed for general purpose applications

- G.28

### H

#### Softstarters

##### ASTAT XB - XBm



Small soft starter with integral by-pass

- H.13

##### ASTAT XL



Digital soft starter for 3 phase standard induction motors

- H.14

## ENCLOSURES

### I

#### Product overview

##### Enclosures



System Enclosures /  
Distribution Boards  
General Purpose Enclosures

- I.1

### X

#### Alphabetical index

##### By Catalog number

Visit [geindustrial.com](http://geindustrial.com) and click on

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Product selector

Home > Products > Motors & Lighting Control > Power devices


## Power devices

Efficient electro-mechanical solutions for motor starter applications.


[Product Selector](#)

### Contactors

In the last 15 years, GE contactors demonstrated their reliability and are the main part of diverse applications. Effcon is the new range of contactors and motor starting solutions with high performances and for any motor starting application, being totally qualified to use from railway up to industrial sectors. Designed to work under the toughest environmental conditions.




**Effcon** - Reliable starter solutions up to 105A. Provides Starter and Power Switching Solutions for OEMs and Panel Builders working in the toughest markets.



**Series EA** - Mini contactor series 7A



**Series M** - Compact contactor up to 12A



**Series CL** - General purpose application up to 105A



**Series CK** - Contactor from 150 up to 750A - High efficiency coil


**Related Publications**

- Articles
- Brochures
- Catalogs and Buyers Guides
- Drawings - CAD - 3D
- Pricelist

- All product info available in one central place
- All product info is available to download, print or e-mail
- Always the latest up-to-date info

Home > Products > Services > Industries > Resources > Your Business > News & Events > Where To Buy

Products > Power devices > Contactors > 6. Series M: Auxiliary contactors 16A 1th screw terminal



Representative Image [View Larger](#)

**Ref. No. : 100000 | Cat. No. : MCR040ATB**

Description: Screw terminal, 4N0, 12V DC (GE)

EAN: 8425095000001

- Control circuit:

[View More](#)

For more info visit: [uk.geindustrial.com](http://uk.geindustrial.com)

Specifications	
<b>Descriptors</b>	
Category	6. Series M: Auxiliary contactors 16A 1th screw terminal
<b>Specifications</b>	
Series	Auxiliary minicontactors (1th = 16A)
Control circuit	DC
Terminal	Screw terminal
Control Voltage: DC	12 V
Contacts acc. To EN 50011	4N0
Number of contacts	4
Utilisation category AC15	110/120V - 6A, 220/240V - 6A, 380/400V - 4A, 415/440V - 4A, 500V - 2.5A, 660/690V - 1.5A
Utilisation category DC13	110V - 1.2A, 220V - 0.6A, 24V - 5A, 440V - 0.25A, 48V - 3.5A

- Use the **Quick-search** using a **part number** or **keyword**
- Find a product by using the **parametric search**, simply enter the technical characteristics you are looking for
- **Compare** up to 4 products and view the technical data and accessories on a single page
- **High resolution images** are available by clicking on the small product image
- Product pages contain all available data: **technical specifications, dimensional drawings, product descriptions, ...**
- **CAD drawings** are available for download into product pages
- The data also displays the **available functions and accessories** for each product

Home > Products > Services > Industries > Resources > Your Business > News & Events > Where To Buy

Products > Power devices > Contactors

**Refine Your Results** [clear](#)

**Category**

- 1. Series M: Compact contactor series 9-12A AC3
- 2. Effcon: Reliable starting solutions 9-105A AC3.
- 3. Series CK: High efficiency contactor 150-825A AC3.

**Series**

- 2N0-2NC contactors from 40 to 80A (AC3)
- 2N0-2NC contactors from 9 to 40A (AC3)
- 3-pole contactors from 50 to 105A (AC3)

**Range**

- Base plate 45mm
- Base plate 55mm
- CL Contactors

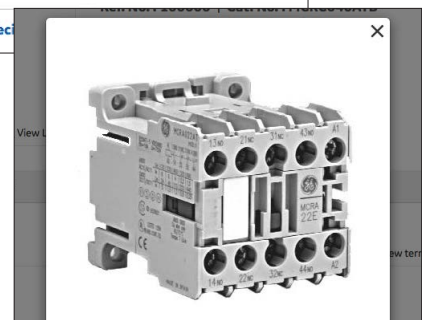
**Contactors**

2,550 products match your selections

Display 25 per page [Compare](#)

Image	Ref. No.	Cat. No.	Description
	100000	MCR040ATB	Screw terminal, 4N0, 12V DC (GE)
	100001	MCR040ATD	Screw terminal, 4N0, 24V/50Hz AC (GE)
	100002	MCR040ATG	Screw terminal, 4N0, 48V/50Hz/60V/60Hz AC (GE)
	100003	MCR040ATJ	Screw terminal, 4N0, 110V/50Hz/120V/60Hz AC (GE)

High resolution images available





# Contactors and Overload Relays

IEC operational rated current	AC3	A
	AC1	A
IEC rated operational power	220-240 V	kW
	380-415 V	kW
	690 V	kW
UL/CSA 3-phase motor rating	220-240 V	hp
	380-415 V	hp
	440-480 V	hp
	550-600 V	hp
Terminal capacity		mm <sup>2</sup> Max.
		AWG

EA	
7	
16	
1.5	
3	
-	
3	
3	
3	
-	
2x2.5	
16-12	

M	
9	
20	
2.2	
4	
7.5	
3	
5	
5	
7.5	
10	
2x2.5	
18-12	
12	
20	
3	
5.5	
7.5	
7.5	
10	
2x2.5	
18-12	

3 Poles	AC
	DC
4 Poles	AC/DC
	AC
2NO + 2NC	DC
	AC/DC

EA07A310S ◆
EA07D310S ◆
-
-
-
-
-
-

MC1A310AT ◆	MC2A310AT ◆
MC1C310AT ◆	MC2C310AT ◆
-	-
MC1A400AT ◆	MC2A400AT ◆
MC1C400AT ◆	MC2C400AT ◆
-	-
MC1AB00AT ◆	MC2AB00AT ◆
MC1CB00AT ◆	MC2CB00AT ◆
-	-

Replace ◆ by the coil code

Replace ◆ by the coil code

<b>Coil selection</b>	
Replace ◆ by the coil code	

Coil voltage AC	Code
24V 50/60 Hz	024
48V 50/60Hz	048
110V 50/60Hz	110
230V 50/60 Hz	230

Coil voltage DC	Code
24V	024
110V	110

Coil voltage AC	Code
24V 50/60 Hz	1
110-115V 50Hz 120V 60Hz	J
208-220V 60Hz	M
220-230V 50/60 Hz	6
380-400V 50Hz 440V 60Hz	U

Coil voltage DC	Code
24V -20%+10%	D
24V ±30%	WD
110V ±30%	WJ
125V ±30%	WL

<b>Suppressor</b>
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Type	Code
R/C 12-60Vac 50/60 Hz	MP0AAE01
R/C 72-250Vac 50/60 Hz	MP0AAE02
Diode 6-250Vdc	MP0CAE03
Varistor 24-48Vac/dc	MP0DAE04

<b>Main accessories</b>
<b>Frontal accessories</b>

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Contacts	Code
2NO	MARN220AT
1NO + 1NC	MARN211AT
2NC	MARN202AT
4NO	MARN431AT
3NO + 1NC	MARN431AT
2NO + 2NC	MARN422AT
1NO + 3NC	MARN413AT
4NC	MARN404AT

<b>Lateral aux. contact</b>
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Contacts	Code
1NO	MACL110AT
1NC	MACL101AT

<b>Interlock</b>
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Code
MMH0

<b>Thermal overload relay Class 10</b>
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Setting range (A)	Code
0.11-0.17	MT03A
0.17-0.26	MT03B
0.26-0.43	MT03C
0.43-0.65	MT03D
0.65-1	MT03E
0.85-1.3	MT03F
1.1-1.6	MT03G
1.35-2	MT03H
1.7-2.4	MT03I
2.2-3.2	MT03J
2.5-4	MT03R
3-4.7	MT03K
4-6.3	MT03L
5.5-8	MT03M
7.5-10.5	MT03N
10-14	MT03P

Base for separate mounting	MVB0T
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<b>Electronic overload relay Class selectable 5,10,20 and 30</b>
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<b>Surion Manual Motor Starter</b>
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<b>Link module contactor + MMS</b>
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GPS1+M
GPF1LMCBA



# Contactors and Overload Relays

EC					
9	12	18	25	32	40
25	25	32	45	60	60
2,2	3	4	7,5	9	11
4	5,5	7,5	11	15	18,5
7,5	11	15	22	30	37
3	4	5,5	7,5	10	10
5,5	7,5	10	15	15	20
5,5	7,5	10	15	20	25
7,5	10	15	20	20	20
2x6	2x6	2x6	2x10	2x16	2x16
18-10	18-10	18-10	18-8	18-6	18-6

EC09A311B ♦	EC12A311B ♦	EC18A311B ♦	EC25A311B ♦	EC32A300B ♦	EC40A300B ♦
EC09D311B ♦	EC12D311B ♦	EC18D311B ♦	EC25D311B ♦	EC32D300B ♦	EC40D300B ♦
EC09E311B ♦	EC12E311B ♦	EC18E311B ♦	EC25E311B ♦	EC32E300B ♦	EC40E300B ♦
EC09A400B ♦	EC12A400B ♦	EC18A400B ♦	EC25A400B ♦	EC32A400B ♦	EC40A400B ♦
EC09D400B ♦	EC12D400B ♦	EC18D400B ♦	EC25D400B ♦	EC32D400B ♦	EC40D400B ♦
EC09E400B ♦	EC12E400B ♦	EC18E400B ♦	EC25E400B ♦	EC32E400B ♦	EC40E400B ♦
-	EC12AB00B ♦	EC18AB00B ♦	EC25AB00B ♦	EC32AB00B ♦	-
-	EC12DB00B ♦	EC18DB00B ♦	EC25DB00B ♦	EC32DB00B ♦	-
-	EC12EB00B ♦	EC18EB00B ♦	EC25EB00B ♦	EC32EB00B ♦	-

Replace ♦ by the coil code

Coil voltage AC		Code	Super Wide Coil Voltage AC/DC		Code
24V 50/60 Hz		024	24-60V AC/DC -30% +10%		24-60
110V 50/60 Hz		110	48-130V AC/DC -20% +10%		48-130
120V 50/60 Hz		120	100-250V AC/DC -20% +10%		100-250
208V 50/60 Hz		208			
230 50/60 Hz		230			
400V 50/60 Hz		400			

Coil voltage DC		Code
24V -20% +10% Low consumption		024L

Type	Code
R/C 24-48Vac 50/60 Hz	ECSURC048
R/C 50-127Vac 50/60 Hz	ECSURC127
R/C 130-250Vac 50/60 Hz	ECSURC250
Diode 12-440Vdc	ECSUDI440
Varistor 24-48Vac/dc	ECSUVA048
Varistor 50-127 Vac/dc	ECSUVA127

Setting time	Code	Contacts	Code
0.1-30 s delay ON	ECPT30SC	2NO	ECFA220S
1-60 s delay ON	ECPT60SC	1NO + 1NC	ECFA211S
0.1-30 s delay OFF	ECPT30SD	2NC	ECFA202S
1-60 s delay OFF	ECPT60SD		

Contacts	Code	Note: EC*E Lateral Auxiliary can only be mounted on right side
2NO	ECLA220S	
1NO + 1NC	ECLA211S	
2NC	ECLA202S	

Contacts	Code
-	ECMI
2NC	ECMI02S

Setting range (A)	Code	Setting range (A)	Code
0.16-0.26 A	ECRT1B10B	8-12 A	ECRT2B10N
0.25-0.41 A	ECRT1B10C	10-16 A	ECRT2B10P
0.4-0.65 A	ECRT1B10D	14.5-18 A	ECRT2B10S
0.65-1.10 A	ECRT1B10F	17.5-22 A	ECRT2B10T
1-1.5 A	ECRT1B10G	21-26 A	ECRT2B10U
1.3-1.9 A	ECRT1B10H	25-32 A	ECRT2B10V
1.8-2.7 A	ECRT1B10J	30-40 A	ECRT2B10W
2.5-4 A	ECRT1B10K		
4-6.3 A	ECRT1B10L		
5.5-8.5 A	ECRT1B10M		
8-12 A	ECRT1B10N		
10-16 A	ECRT1B10P		
14.5-18 A	ECRT1B10S		
17.5-22 A	ECRT1B10T		

Base for separate mounting	ECRT1BS	Base for separate mounting	ECRT2BS
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Setting range (A)	Code
0.1-0.5	RE1D
0.4-2	RE1H
1-5	RE1K
1.6-8	RE1M
6.4-32	RE1S
9-45	RE1W

Base for separate mounting	RE1XP
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Setting range (A)	Code Rocket	Code Rotary	Setting range (A)	Code Rotary
0.1 - 0.16	GPS1BSAA	GPS1BHAA	28 - 40	GPS2BHAS
0.16 - 0.25	GPS1BSAB	GPS1BHAB		
0.25 - 0.4	GPS1BSAC	GPS1BHAC		
0.4 - 0.63	GPS1BSAD	GPS1BHAD		
0.63 - 1	GPS1BSAE	GPS1BHA E		
1 - 1.6	GPS1BSAF	GPS1BHAF		
1.6 - 2.5	GPS1BSAG	GPS1BHAG		
2.5 - 4	GPS1BSAH	GPS1BHAH		
4 - 6.3	GPS1BSAJ	GPS1BH AJ		
6.3 - 10	GPS1BSAK	GPS1BHA K		
9 - 13	GPS1BSAL	GPS1BHAL		
11 - 16	GPS1BSAM	GPS1BH AM		
14 - 20	GPS1BSAN	GPS1BH AN		
19 - 25	GPS1BSAP	GPS1BH AP		
24 - 32	GPS1BSAR	GPS1BH AR		

GPS1 + EC09A to EC25A	GPS1 + EC09E to EC25E	GPS1 + EC32A	GPS2 + EC32A to EC40A	GPS1 + EC32E	GPS2 + EC32E to EC40E
ECM1AL25	ECM1AL25	ECM1AL32	ECM2AL40	ECM1AL32	ECM2AL40

# Contactors and Overload Relays

IEC operational rated current	AC3	A
	AC1	A
IEC rated operational power	220-240 V	kW
	380-415 V	kW
	690 V	kW
UL/CSA 3-phase motor rating	220-240 V	hp
	380-415 V	hp
	440-480 V	hp
	550-600 V	hp
Terminal capacity		mm <sup>2</sup> Max. AWG

3 Poles	AC	
	DC	
	AC/DC	
4 Poles	AC	
	DC	
	AC/DC	
2NO + 2NC	AC	
	DC	
	AC/DC	

**Coil selection**  
Replace ♦ by the coil code

**Suppressor**

**Main accessories**  
**Frontal accessories**

**Lateral aux. contact**

**Interlock**

**Thermal overload relay Class 10**

**Electronic overload relay Class selectable 5,10,20 and 30**

**Surion**  
**Manual Motor Starter**

**Link module contactor + MMS**

EF					
40	50	65	80	95	105
90	90	110	110	140	140
11	11	18.5	22	25	30
18.5	22	30	37	45	55
37	45	55	75	90	90
15	15	20	25	30	40
20	30	40	50	60	75
30	30	40	50	60	75
30	40	50	60	75	75
1x35 or 1x20+1x16	1x35 or 1x20+1x16	1x35 or 1x20+1x16	1x35 or 1x20+1x16	1x50 or 1x35+1x25	1x50 or 1x35+1x25
13-2	13-2	13-2	13-2	11-1/0	11-1/0

-	EF50A300B ♦	EF65A300B ♦	EF80A300B ♦	EF95A300B ♦	EF105A300B ♦
-	EF50E300B ♦	EF65E300B ♦	EF80E300B ♦	EF95E300B ♦	EF105E300B ♦
-	EF50A400B ♦	-	EF80A400B ♦	EF95A400B ♦	-
-	-	-	-	-	-
-	EF50E400B ♦	-	EF80E400B ♦	EF95E400B ♦	-
EF40AB00B ♦	-	EF65AB00B ♦	EF80AB00B ♦	-	-
-	-	-	-	-	-
EF40EB00B ♦	-	EF65EB00B ♦	EF80EB00B ♦	-	-

Replace ♦ by the coil code

Coil voltage AC	Code
24V 50/60 Hz	024
110V 50/60 Hz 120V 60Hz	110
230 50/60 Hz	230
400V 50/60 Hz	400

Super Wide Coil Voltage AC/DC	Code
24-60V AC/DC -30%+10%	24-60
48-130V AC/DC -20%+10%	48-130
100-250V AC/DC -20%+10%	100-250
250-500V AC/DCv -20%+10%	250-500

Type	Code
R/C 12-60Vac 50/60 Hz	MPOAAE01
R/C 72-250Vac 50/60 Hz	MPOAAE02
Diode 6-250Vdc	MPOCAE03
Varistor 24-48Vac/dc	MPODAE04

Contacts	Code
2NO	ECFA220S
1NO + 1NC	ECFA211S
2NC	ECFA202S

Contacts	Code
4NO	ECFA440S
3NO + 1NC	ECFA431S
2NO + 2NC	ECFA422S
1NO + 3NC	ECFA413S
4NC	ECFA404S

Contacts	Code
2NO	BCLL20
1NO + 1NC	BCLL11

Contacts	Code
-	BELA
2NC	BELA02

Setting range (A)	Code
11.5-15 A	RT2A
14.5-19 A	RT2B
18.5-25 A	RT2C
24-32 A	RT2D
30-45 A	RT2E
42-55 A	RT2G
54-65 A	RT2H
64-82 A	RT2J
78-97 A	RT2L
90-110 A	RT2M

Base for separate mounting	RT2XP
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Setting range (A)	Code
15-75	RE2H
22-110	RE2M

Base for separate mounting	RE2XP
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Setting range (A)	Code Rotary
35 - 50	GPS2BHAT
45 - 63	GPS2BHAU

GPS2 + EF50A-EF80A	GPS2 EF50E-EF80E
EFM2AL80	EFM2EL80

# Contactors and Overload Relays

CK									
105	150	195	185	250	309	420	550	720	
200	250	250	325	400	500	600	700	1000	
30	45	55	55	75	90	132	160	200	
55	75	110	90	132	160	200	315	400	
90	132	160	160	250	250	400	560	710	
40	50	60	75	75	100	150	200	250	
60	100	125	150	150	250	300	400	500	
75	100	125	150	150	250	300	400	500	
100	125	125	150	150	300	400	500	600	
1x95	1x120 or 2x95	1x120 or 2x95	1x240 or 2x150	2(25x5) <sup>[2]</sup>	2(25x5) <sup>[2]</sup>	2(35x5) <sup>[2]</sup>	2(35x10) <sup>[2]</sup>	2(35x10) <sup>[2]</sup>	2(35x10) <sup>[2]</sup>
16-3/0 AWG	4/0 AWG	4/0 AWG	6 AWG-350kcmil	6 AWG - 350kcmil	6 AWG - 350kcmil	8 AWG - 350 kcmil	8 AWG - 500 kcmil	8 AWG - 500 kcmil	2(35x10) <sup>[2]</sup>

	CK75CA311 ◆	CK08CA311 ◆						
	CK75CE311 ◆	CK08CE311 ◆		CK09BE311 ◆	CK95BE311 ◆	CK10CE311 ◆	CK11CE311 ◆	CK12BE311 ◆
CK07BA411 ◆			CK08BA411 ◆	CK09BE411 ◆				
CK07BE411 ◆			CK08BE411 ◆	CK09BE411 ◆	CK95BE411 ◆	CK10CE411 ◆	CK11CE411 ◆	CK12BE411 ◆

Replace ◆ by the coil code

Coil voltage AC	Code
110V 50 Hz 120V 60Hz	J
220-230 50/60 Hz 277V 60Hz	N
500-660V 50 Hz 690V 60Hz	Y

Super Wide Coil Voltage AC/DC	Code
24-60V AC/DC -30% +10%	W24-60
48-130V AC/DC -20% +10%	W48-130
100-250V AC/DC -20% +10%	W100-250
250-500V AC/DCv -20% +10%	W250-500

Type	Code
R/C 12-48Vac 50/60 Hz	BSLR3G
R/C 50-127Vac 50/60 Hz	BSLR3K
R/C 130-250Vac 50/60 Hz	BSLR3R
AC/DC 24-500V	built-in

Contacts	Code
-	BEKH

Setting range (A)	Code
55-80	RT3B
63-90	RT3C
90-120	RT3D
110-140	RT3E
140-190	RT3F

Setting range (A)	Code
120-190	RT4N
185-280	RT4P
200-310	RT4R

Setting range (A)	Code
120-190	RT5A
175-280	RT5B
250-400	RT5C
315-500	RT5D
430-700	RT5E

Setting range (A)	Code
30-150	RE3E





A2

NO

1 L1

3 L2

5 L3

21 NC

500	690
	660
	12
	10
	13
	13



effiCOR

New

Provides Starter and Power Switching Solutions for OEMs and Panel Builders  
working in the toughest markets such as:

Oil & Gas | Marine | Mining | Power Generation / Grid | Transportation  
Industrial appliances | Telecom / Data centers | General industry



## Time saving

### Quick assembly of DOL Starter

- User friendly design to combine Surion motor starter and contactor
- Smart busbar systems and wiring kits
- Design of intelligent base plate
- Easy maintenance: Complete combination can be removed in one go

### No tools needed

- Mounting and dismounting the contactors without tools
- No tools required for accessories and auxiliaries

### Double box terminals as standard

- Secure connection: No overheat on small wires when 2 sizes in same terminal
- Identical torque (2.2Nm) for 9A up to 40A contactors



## Space saving

### Compact starter providing significant space reduction in cabinet:

- Manual motor starter
- OL relay



## Stock saving

Significant reduction of 60% in stock keeping units



## Energy efficient design

- Low energy consumption
- Long life span
- Reduced flammability risk and lower toxicity



## Complete range up to 105A

### Contactors

- 3 pole contactors
- 4 pole contactors
- 2NO-2NC contactors
- Auxiliary contactors

### Accessories

- Auxiliary contact blocks
- Pneumatic timer
- Mechanical latch
- Surge suppressor

### Motor starter solutions

- Thermal and electronic OL relays
- Fuseless starter kits
- Wiring kits for reversing and start-delta
- Parallel busbars



## Reliable technology

Designed and manufactured in Europe by GE to perform in the toughest environmental conditions

- Best in class B10d values according to ISO13849-1 safety requirements
- High electrical performance > 1.7 mil. operations
- Safe auxiliary contacts
- Temperature operation without derating: -40°C to +55°C
- AC/DC Super Wide voltage application: Cover all AC and DC range up to 500V with 4 coils
- Coordination type II for motor starter applications

### Approvals/Marking



EN50155, EN45545-2  
IEC60335



Efficor\*

# Reliable technology

## Best electrical endurance

Long life span; increased uptime resulting in lower maintenance cost.

Higher B10d reliability data: number of safe starting operations as per standard EN ISO 13849-1

ISO 13849 provides safety requirements and guidance principles for the design and integration of safety-related parts of control systems. It specifies characteristics that include the performance level required for carrying out safety functions. B10d is the number of cycles until 10% of the components fails dangerously.

EC09-12	2x10 <sup>6</sup> ops
EC18-25	1.7x10 <sup>6</sup> ops
EC32-40	1.37x10 <sup>6</sup> ops
EF50-105	1.5x10 <sup>6</sup> ops

## Safe control circuit

- High fidelity auxiliary with four points of contact ensuring conductivity
- Mirror contact according to IEC 60947-4-1
- Positive guided, mechanically linked contacts according to IEC 60947-5-1

## Widest temperature operation

From -40°C to +55°C without derating  
Suitable for extreme temperatures

## Lowest noise production: 32dBA

No humming noise, perfect fit in applications demanding limited noise.

## Safer plastics

NF 16-101 & NF 16-102  
DIN 5510.2, EN 60355 & EN 45545-2

**Only two frames covering 9 up to 105A series.**

**Five different depths:**

- Depth 1: 9A up to 18A
- Depth 2: 25A
- Depth 3: 32A up to 40A
- Depth 4: 50A up to 80A
- Depth 5: 95A up to 105A

RoHS

## Closed design

### Offering full protection against pollution

- Transparent front cover for dust protection
- No holes in the base
  - Avoids dust and external particles
  - Enhances the life of the device
- ✓ Ceramic applications
- ✓ Heavy duty environments
- ✓ Environments with high pollution degrees



# efficor\*



# Space saving

## Compact starter

Significant space reduction in the cabinet: Compact starter either with thermal overload relay or manual motor starter.

Starter mounting plates for user-friendly maintenance (easy removal of MMS Surion and/or contactor).

Busbar systems and wiring kits allow safe cabling avoiding mistakes, guaranteeing finger safe protection up to 6kV.

### Link module for compact starter up to 65A

Link module for compact starter  
Full coil access at the bottom

### Contactor with thermal overload relay

Uniformity in compact design

Thermal and electronic overload relay mounted directly to the contactor

All connections available

## Reduced panel dimensions

- Efficor contactor reduced width design allows designer to reduce panel dimensions or replace old contactors.
- Efficor contactors can be mounted side by side without derating.
- Significant depth reduction in DC contactors.
- Smaller control transformers in AC/DC applications thanks to state of the art electronic coils technology.
- Efficor starting solutions features, dimensions and drawings are available on-line in the most popular panel design software.



# Time saving

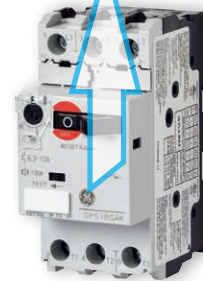
## Double box terminals

Identical torque (2.2 Nm) from 9 up to 40A.  
 Only one calibrated screwdriver needed for the runners.  
 Higher torque from 50 up to 105A.  
 Efficor contactors have main terminals in the front for easy access.



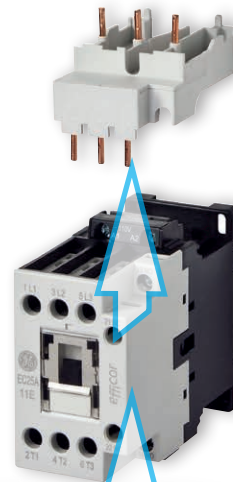
## Easy to use, no tools needed

Mounting or dismounting the contactors on/from the DIN-rail can be done without tools.  
 Even for mounting accessories and auxiliaries to the contactor, no tools are required.



## Quick assembly of direct online starter

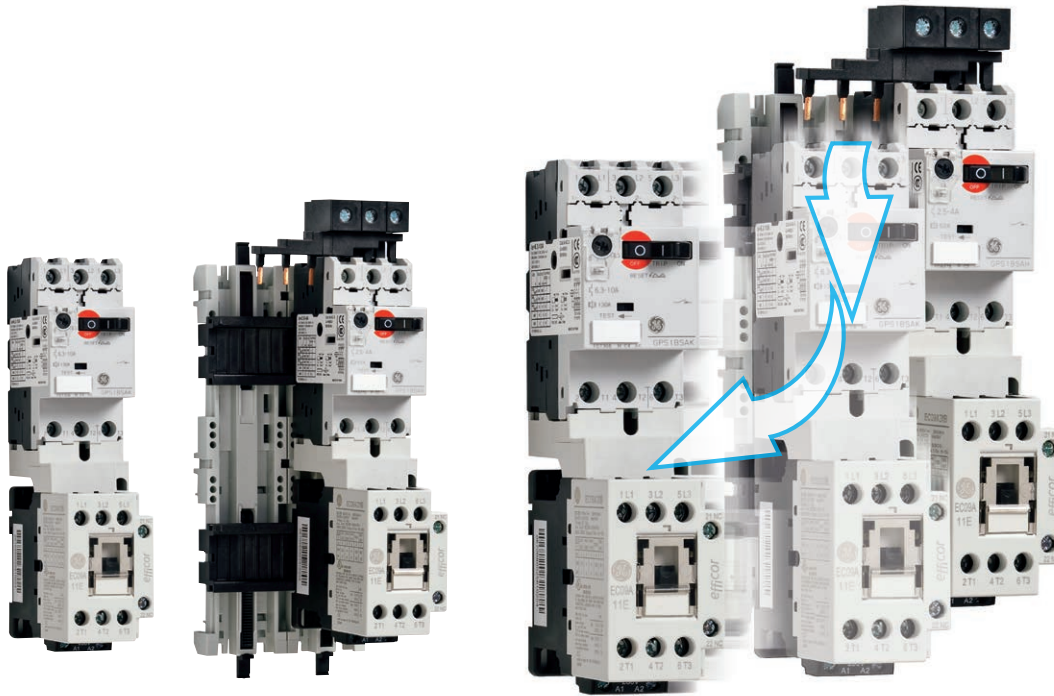
- User friendly design of link modules and base plates to combine manual motor starter and contactor.
- Smart busbar systems and wiring kits.
- Smart plate for DOL starters up to 40A.
- 4 coil terminal points for easy design and replacement of old contactors.



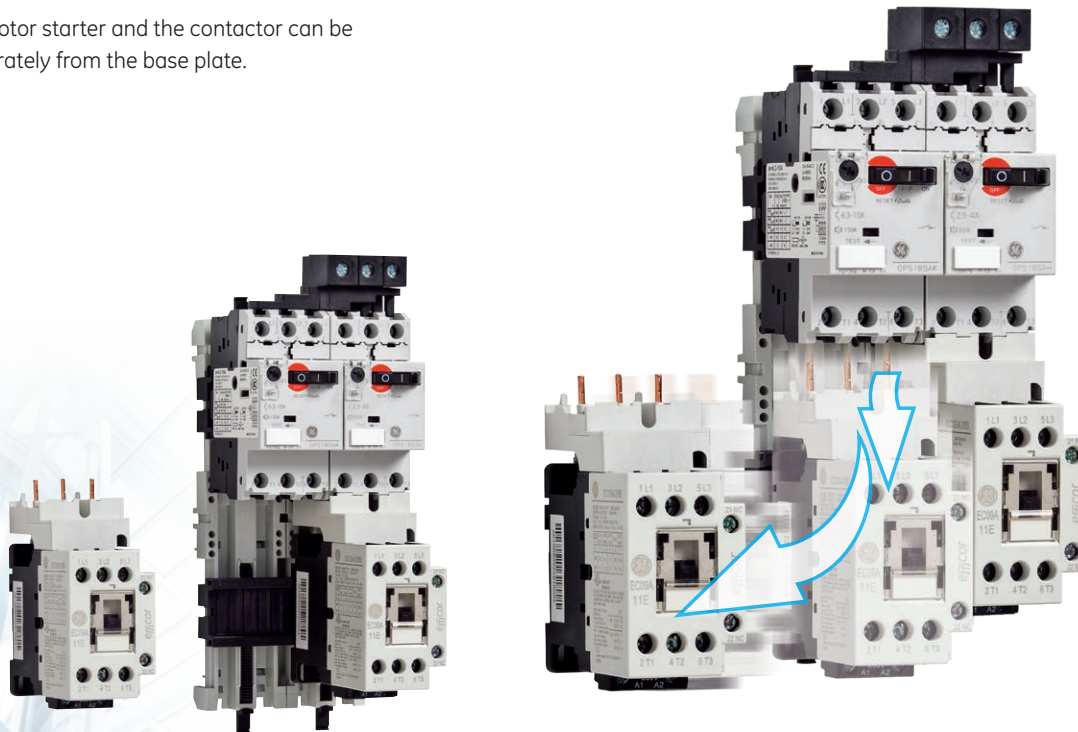


## Easy maintenance of direct online starter

- The complete starter combination can be removed from the base plate in one go.



- The manual motor starter and the contactor can be removed separately from the base plate.



Efficor\*

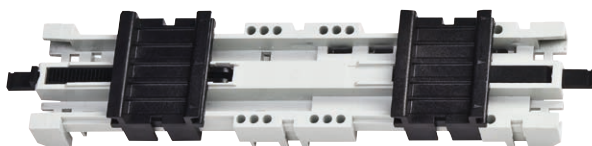
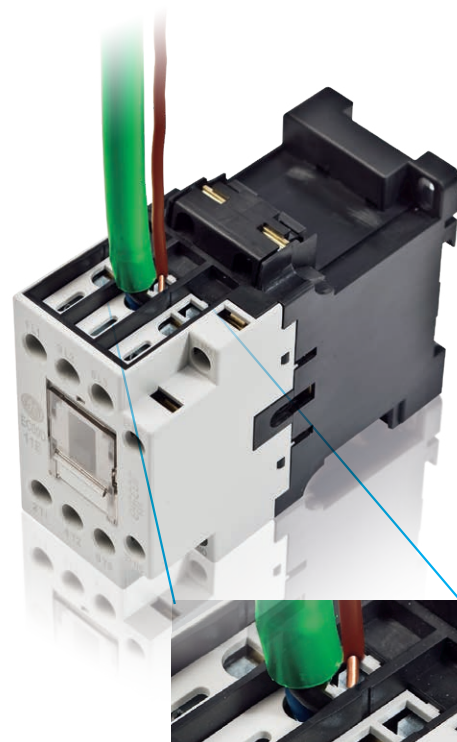
# Secure connection

## Double box terminals

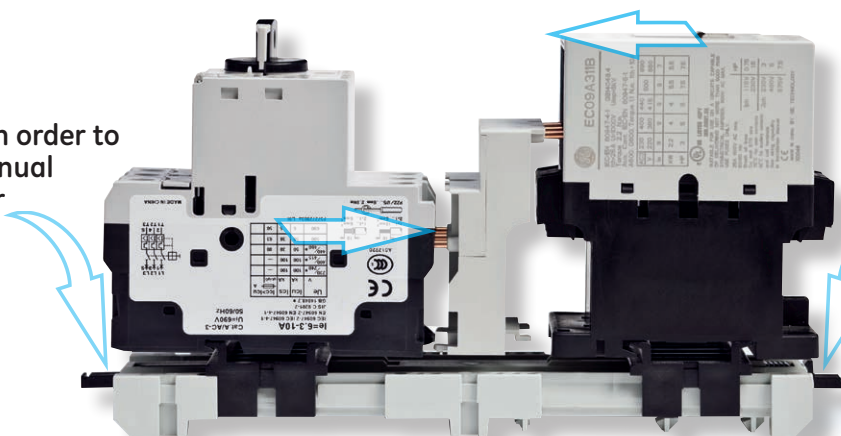
- Double box clamps for the whole range
  - Cables from 0.75mm<sup>2</sup> up to 16mm<sup>2</sup> in the same box clamps terminal for 4kW up to 18.5kW
  - Cables from 1mm<sup>2</sup> up to 35mm<sup>2</sup> in the same box clamps terminal for 22kW up to 37kW
  - Cables from 1.5mm<sup>2</sup> up to 50mm<sup>2</sup> in the same box clamps terminal for 45kW and 55kW
- No risk of losing cables
- Avoid temperature rising on the small cable

## Smart connectivity

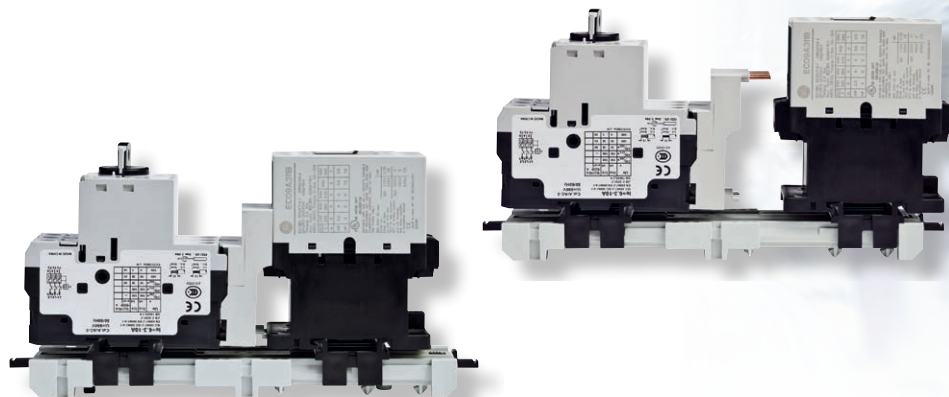
- Design of intelligent base plate
- Combination of a wide variety of link modules and wiring kits with the double box clamp terminals secures a safe connection



Push the lid in order to move the manual motor starter



Push the lid in order to move the contactor



# Stock saving

## 60% reduction in codes

When compared with the current range, the Efficor range means a significant reduction of 60% in stock keeping units. This improves customer financials, simplifying logistics, reducing inventory value and cutting administration costs.

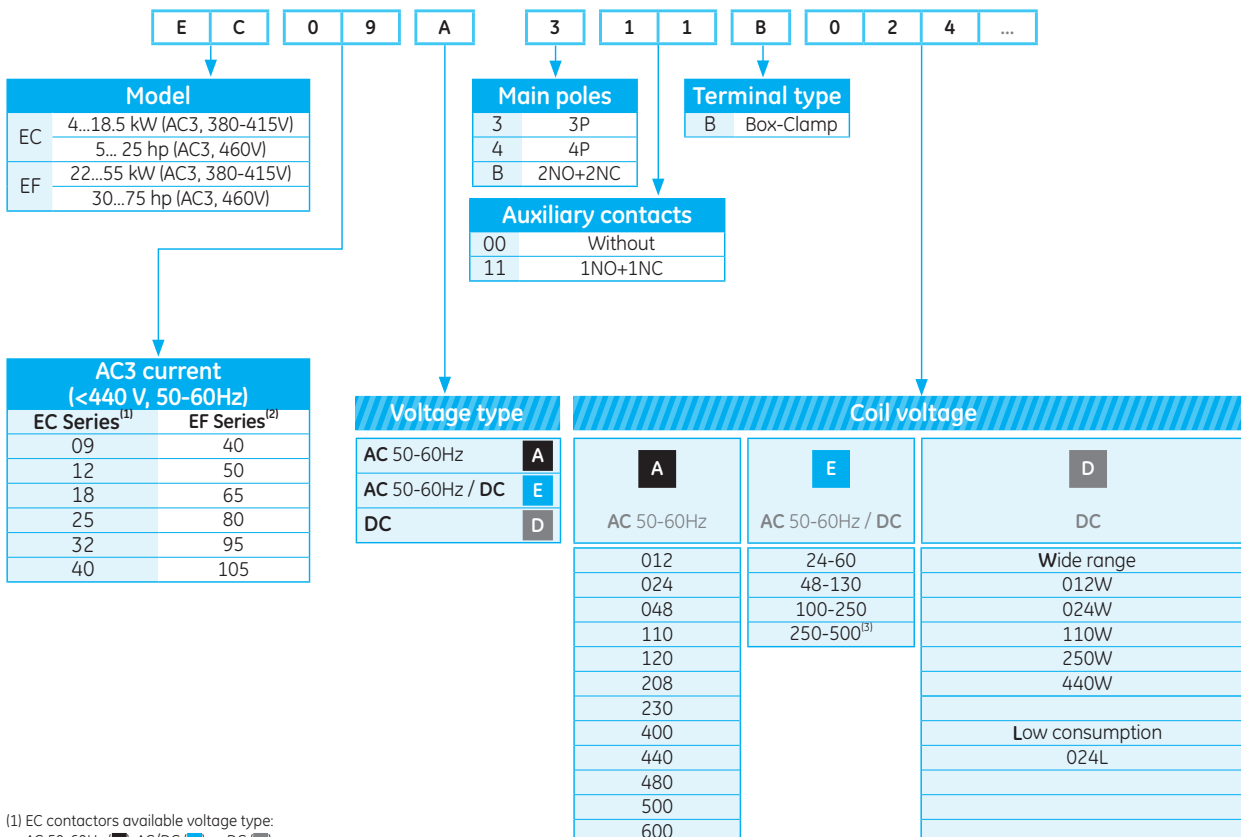
60% reduction in space and volume in warehouses

- 2 built-in auxiliary 3 pole contactors (up to 25A) - reduces customer choices by half - all in 45mm standard width.
- No auxiliary built-in from 32A or 4 poles, customer can choose frontal or lateral without penalizing overall dimensions.
- No need to stock special versions for plastic high performance demanding application because this is included as standard.
- Super wide voltage range electronic module available covering entire AC and DC coil ranges from 24V up to 500V with only 4 coils with voltage suppressor built-in.

## Easy identification

Self explanatory description of the catalog number is an important advantage

Example: EC 09 A 3 1 1 B 0 2 4 ...



(1) EC contactors available voltage type: AC 50-60Hz (A), AC/DC (E) or DC (D)  
 (2) EF contactors available voltage type: AC 50-60Hz (A) or AC/DC (E)  
 (3) 250-500 Only available for EF



# Energy efficiency

**Optimized operating with the combination of permanent magnet and electromagnet, spring and coil ensures low energy consumption.**

Permanent magnet technology advantages:

- Reduces the energy necessary to keep contactor on hold vs. standard DC coils
- Increases contactor life reducing contact bounce
- There is no peak consumption when contactor is closing
- The contactor is fully open or closed; avoiding intermediate contactor state reduces risk of coil burn and welding contacts

eco-design 

**Reliable technology**  
**Space saving**  
**Time saving**  
**Secure connection**  
**Stock saving**  
**Energy efficiency**

## Super wide voltage range electronic coils.

Provides the lowest energy consumption in combination with the widest operation range.

Reduces production shortage and maintenance downtimes with self-protecting software built-in.

- Optimizing logistics with four coils covering 24V up to 500V AC and DC.
- Secure holding operation, super wide voltage range avoids downtimes in weak networks.
- Universal service coil 100-250V AC/DC is suitable for use worldwide replacing more than 10 coils with standard technology (AC: 110, 120, 208, 220, 230, 240V and DC: 110, 125, 220 and 250V)
- Surge suppression always built-in; no need to use additional expensive external surge suppressor... less cost, less worries, simplified design
- Noise free. No humming noise as electronic module always operates coil in optimized condition
- Self-protecting software operates contactor in safe condition avoiding chattering and coil burn. This secures uptime.



# efficor\*



Main advantages

Intro

A

B

C

D

E

F

G

H

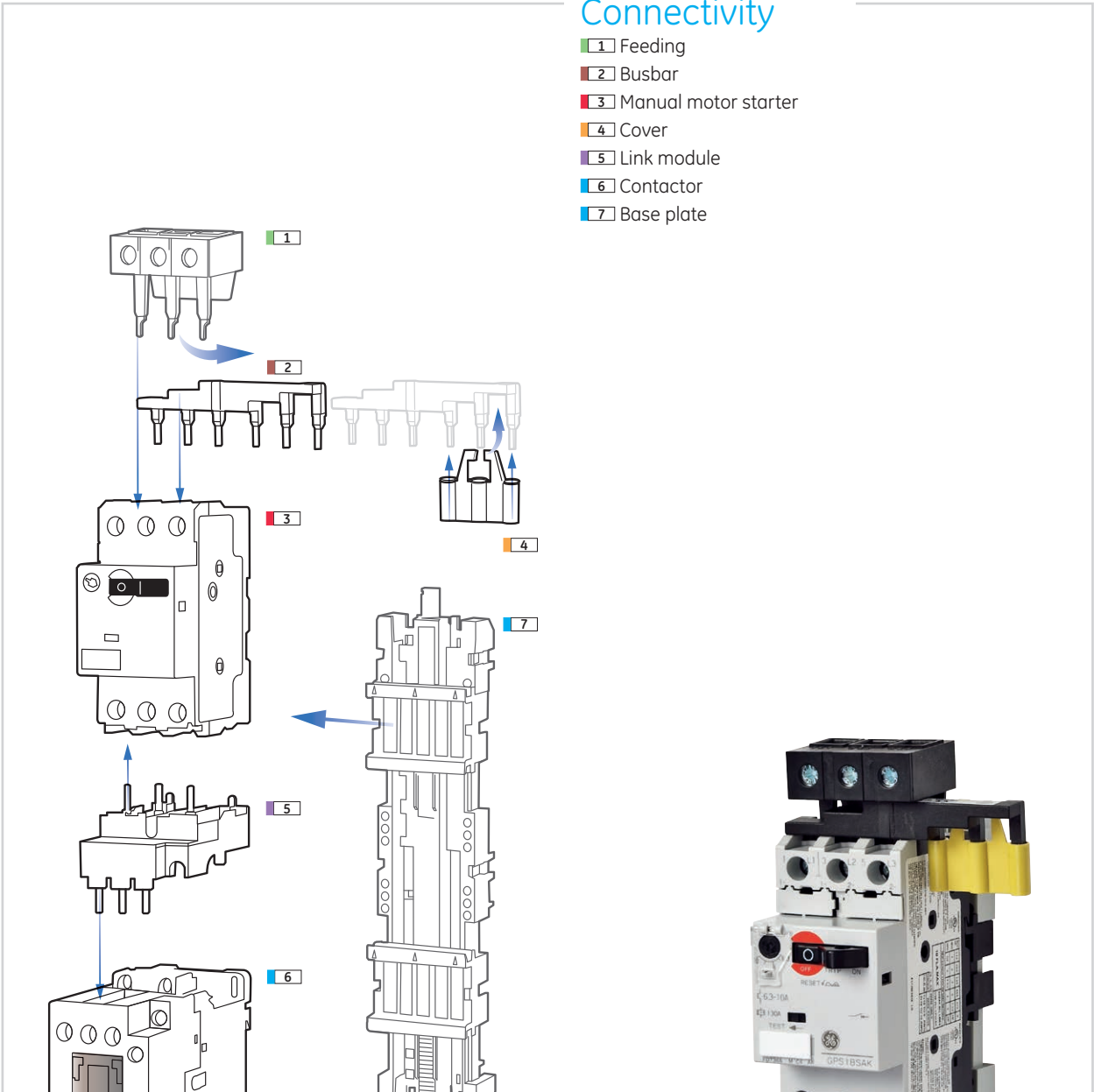
I

X



Connectivity

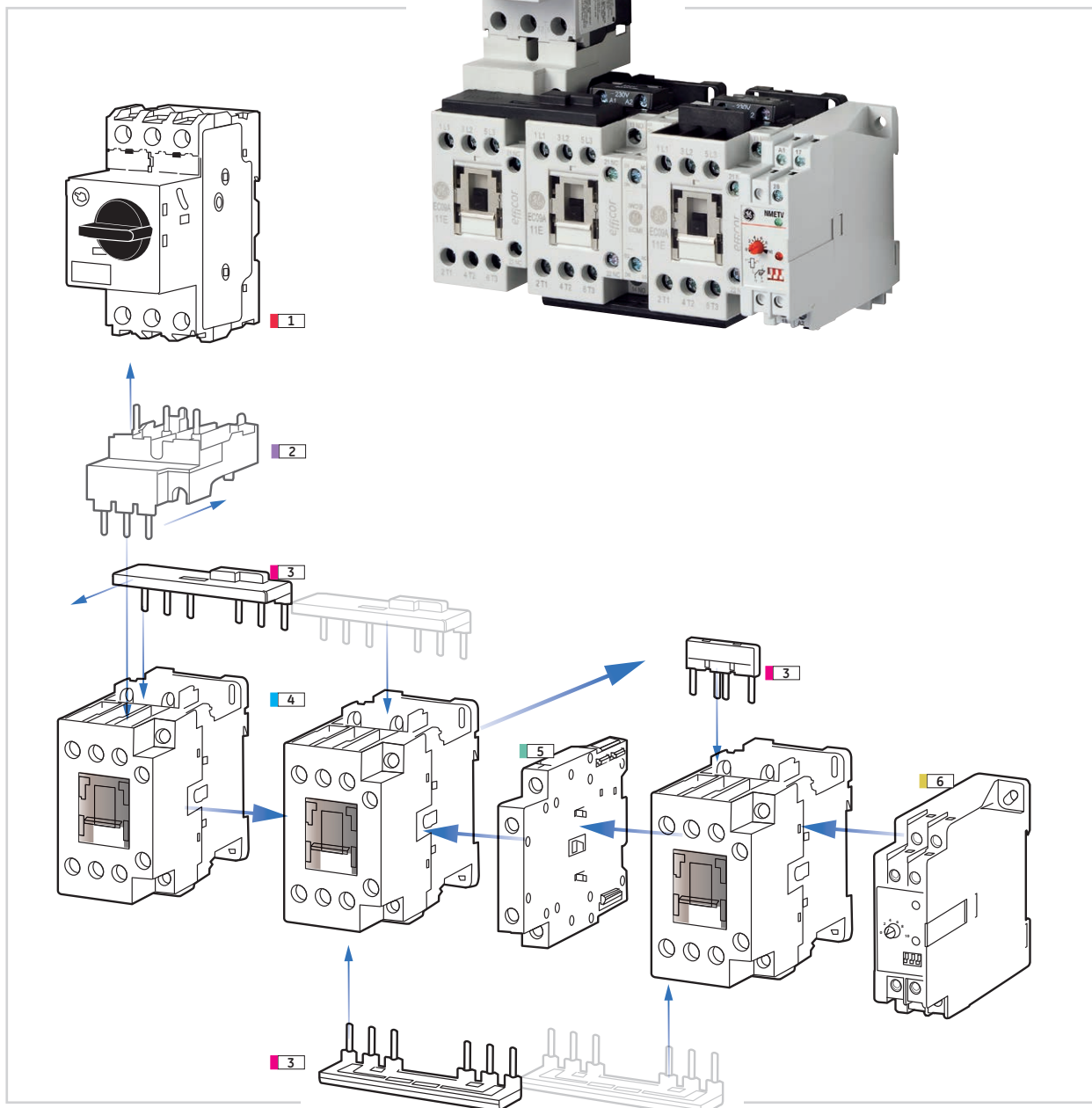
- 1 Feeding
- 2 Busbar
- 3 Manual motor starter
- 4 Cover
- 5 Link module
- 6 Contactor
- 7 Base plate



# Star delta starter

## Connectivity

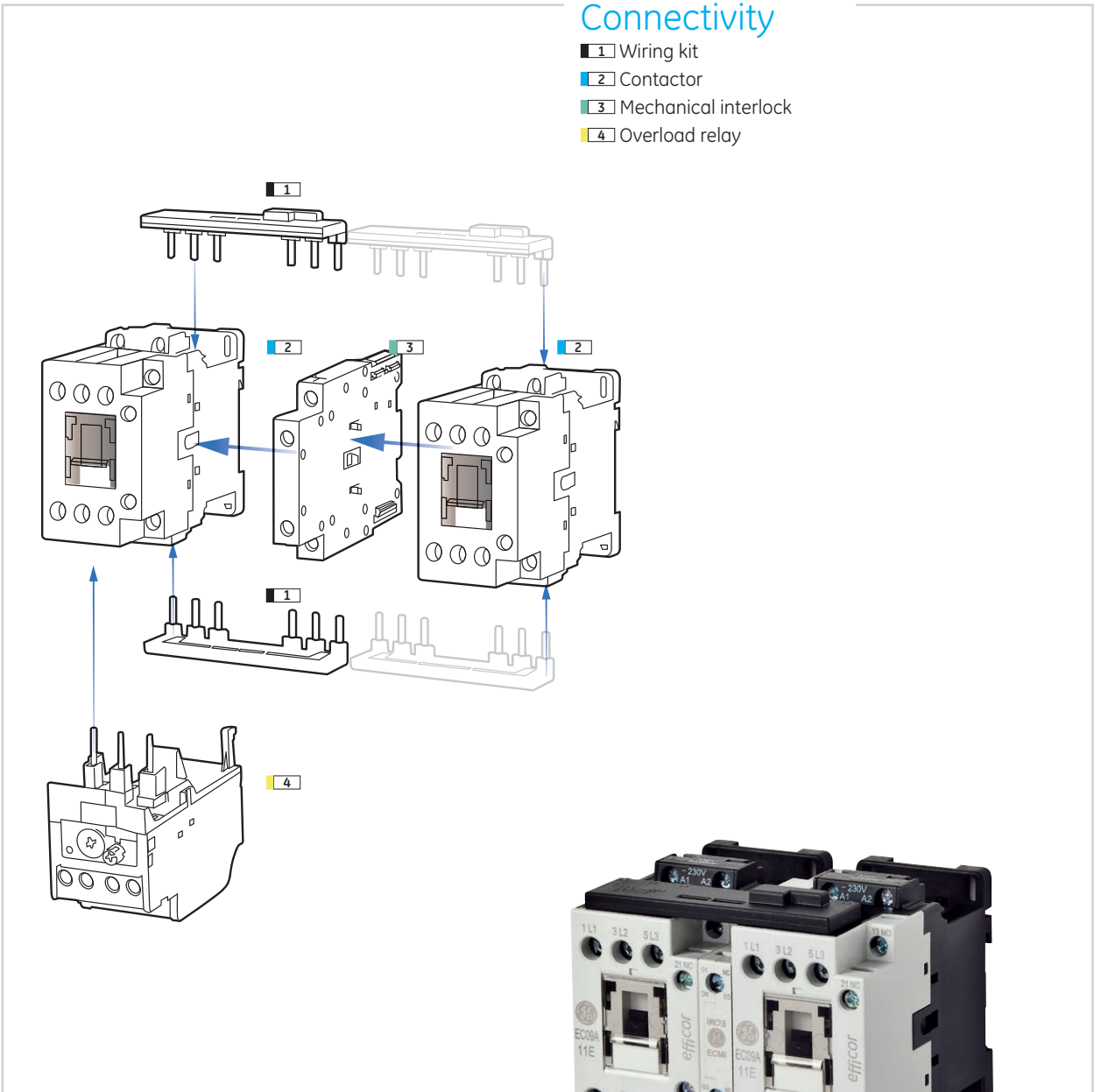
- 1 Manual motor starter
- 2 Link module
- 3 Wiring kit
- 4 Contactor(s)
- 5 Mechanical interlock
- 6 Timer



## Reversing starter (with thermal overload relay)

### Connectivity

- 1 Wiring kit
- 2 Contactor
- 3 Mechanical interlock
- 4 Overload relay

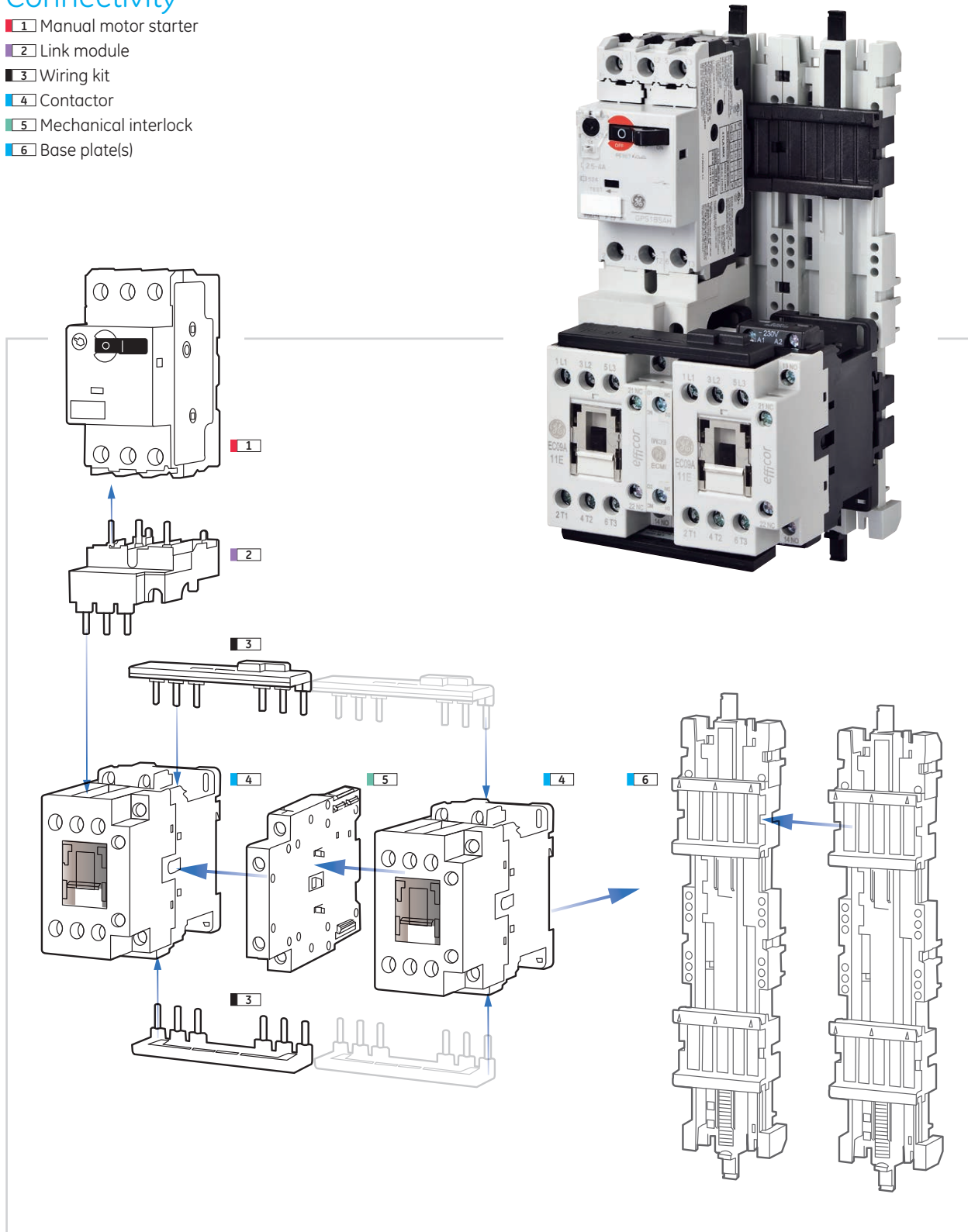




# Reversing starter (without thermal overload relay)

## Connectivity

- 1 Manual motor starter
- 2 Link module
- 3 Wiring kit
- 4 Contactor
- 5 Mechanical interlock
- 6 Base plate(s)



3 pole contactors - Double box terminals

Max. operating current		Admissible power AC3				Electrical endurance	Aux. cont.	Control circuit						
Not inductive load AC1 A	Motors <480V 3Ph 50-60Hz AC3 A	220-240V	380-415V	440-480V	690V	Cat. AC3 Operations (B10d)	NO	NC	AC			Voltage	Cat. no. <sup>(1)</sup>	Ref. no.
		kW hp	kW hp	kW hp	kW				Voltage	Cat. no.	Ref. no.			
25	9	2.2 3	4 5.5	4 5.5	7.5	2x10 <sup>6</sup>	1	1	12	EC09A311B012	267001	AC/DC		
									24	EC09A311B024	267002	24-60	EC09E311B24-60	216377
		48	EC09A311B048	267004	48-130	EC09E311B48-130	216378							
		110	EC09A311B110	267005	100-250	EC09E311B100-250	216379							
		120	EC09A311B120	267006	DC									
		208	EC09A311B208	267007	DC									
		230	EC09A311B230	267008	12	EC09D311B012W	267085							
		240	EC09A311B240	267009	24	EC09D311B024W	267086							
		400	EC09A311B400	267010	110	EC09D311B110W	267091							
		440	EC09A311B440	267011	250	EC09D311B250W	267094							
		480	EC09A311B480	267012	440	EC09D311B440W	267095							
		500	EC09A311B500	267013	DC									
		600	EC09A311B600	267014	24	EC09D311B024L	267096							
		25	12	3 4	5.5 7.5	5.5 7.5	11	2x10 <sup>6</sup>	1	1	12	EC12A311B012	267015	AC/DC
24	EC12A311B024										267016	24-60	EC12E311B24-60	216380
48	EC12A311B048			267018	48-130	EC12E311B48-130	216381							
110	EC12A311B110			267019	100-250	EC12E311B100-250	216382							
120	EC12A311B120			267020	DC									
208	EC12A311B208			267021	DC									
230	EC12A311B230			267022	12	EC12D311B012W	267100							
240	EC12A311B240			267023	24	EC12D311B024W	267101							
400	EC12A311B400			267024	110	EC12D311B110W	267106							
440	EC12A311B440			267025	250	EC12D311B250W	267109							
480	EC12A311B480			267026	440	EC12D311B440W	267110							
500	EC12A311B500			267027	DC									
600	EC12A311B600			267028	24	EC12D311B024L	267111							
32	18			4 5.5	7.5 10	7.5 10	15	1.7x10 <sup>6</sup>	1	1	12	EC18A311B012	267029	AC/DC
		24	EC18A311B024								267030	24-60	EC18E311B24-60	216383
		48	EC18A311B048	267032	48-130	EC18E311B48-130	216384							
		110	EC18A311B110	267033	100-250	EC18E311B100-250	216385							
		120	EC18A311B120	267034	DC									
		208	EC18A311B208	267035	DC									
		230	EC18A311B230	267036	12	EC18D311B012W	267115							
		240	EC18A311B240	267037	24	EC18D311B024W	267116							
		400	EC18A311B400	267038	110	EC18D311B110W	267121							
		440	EC18A311B440	267039	250	EC18D311B250W	267124							
		480	EC18A311B480	267040	440	EC18D311B440W	267125							
		500	EC18A311B500	267041	DC									
		600	EC18A311B600	267042	24	EC18D311B024L	267126							
		45	25	7.5 10	11 15	12 16	22	1.7x10 <sup>6</sup>	1	1	12	EC25A311B012	267043	AC/DC
24	EC25A311B024										267044	24-60	EC25E311B24-60	216386
48	EC25A311B048			267046	48-130	EC25E311B48-130	216387							
110	EC25A311B110			267047	100-250	EC25E311B100-250	216388							
120	EC25A311B120			267048	DC									
208	EC25A311B208			267049	DC									
230	EC25A311B230			267050	12	EC25D311B012W	267130							
240	EC25A311B240			267051	24	EC25D311B024W	267131							
400	EC25A311B400			267052	110	EC25D311B110W	267136							
440	EC25A311B440			267053	250	EC25D311B250W	267139							
480	EC25A311B480			267054	440	EC25D311B440W	267140							
500	EC25A311B500			267055	DC									
600	EC25A311B600			267056	24	EC25D311B024L	267141							
60	32			9 12	15 22	15 22	30	1.37x10 <sup>6</sup>	0	0	12	EC32A300B012	267057	AC/DC
		24	EC32A300B024								267058	24-60	EC32E300B24-60	216389
		48	EC32A300B048	267060	48-130	EC32E300B48-130	216390							
		110	EC32A300B110	267061	100-250	EC32E300B100-250	216391							
		120	EC32A300B120	267062	DC									
		208	EC32A300B208	267063	DC									
		230	EC32A300B230	267064	12	EC32D300B012W	267145							
		240	EC32A300B240	267065	24	EC32D300B024W	267146							
		400	EC32A300B400	267066	110	EC32D300B110W	267151							
		440	EC32A300B440	267067	250	EC32D300B250W	267154							
		480	EC32A300B480	267068	440	EC32D300B440W	267155							
		500	EC32A300B500	267069	DC									
		600	EC32A300B600	267070	24	EC32D300B024L	267156							
		60	40	11 15	18.5 25	22 30	37	1.37x10 <sup>6</sup>	0	0	12	EC40A300B012	267071	AC/DC
24	EC40A300B024										267072	24-60	EC40E300B24-60	216392
48	EC40A300B048			267074	48-130	EC40E300B48-130	216393							
110	EC40A300B110			267075	100-250	EC40E300B100-250	216394							
120	EC40A300B120			267076	DC									
208	EC40A300B208			267077	DC									
230	EC40A300B230			267078	12	EC40D300B012W	267160							
240	EC40A300B240			267079	24	EC40D300B024W	267161							
400	EC40A300B400			267080	110	EC40D300B110W	267166							
440	EC40A300B440			267081	250	EC40D300B250W	267169							
480	EC40A300B480			267082	440	EC40D300B440W	267170							
500	EC40A300B500			267083	DC									
600	EC40A300B600			267084	24	EC40D300B024L	267171							



(1) End character: W = Wide voltage (0.7-1.25xUn) and built-in diode.  
L = Low consumption.



### 3 pole contactors - Double box terminals

Max. operating current		Admissible power AC3				Electrical endurance	Aux. cont.	Control circuit							
Not inductive load AC1 A	Motors <480V 3Ph 50-60Hz AC3 A	220-240V	380-415V	440-480V	690V	Cat. AC3 Operations (B10d)	NO	NC	AC			AC/DC			
		kW hp	kW hp	kW hp	kW				Voltage <sup>1)</sup>	Cat. no.	Ref. no.	Voltage	Cat. no.	Ref. no.	Pack
90	50	11 15	22 30	22 30	35	1.5x10 <sup>6</sup>	0	0	12	EF50A300B012	270000	24-60	EF50E300B24-60	270074	1
									24	EF50A300B024	270001				
									48	EF50A300B048	270003				
									110	EF50A300B110	270004				
									208	EF50A300B208	270007				
									230	EF50A300B230	270008				
									400	EF50A300B400	270009				
									480	EF50A300B480	270011				
									600	EF50A300B600	270014				
110	65	18.5 25	30 40	37 50	45	1.5x10 <sup>6</sup>	0	0	12	EF65A300B012	270015	24-60	EF65E300B24-60	270079	1
									24	EF65A300B024	270016				
									48	EF65A300B048	270018				
									110	EF65A300B110	270019				
									208	EF65A300B208	270021				
									230	EF65A300B230	270022				
									400	EF65A300B400	270023				
									480	EF65A300B480	270025				
									600	EF65A300B600	270028				
110	80	22 30	37 50	37 60	45	1.5x10 <sup>6</sup>	0	0	12	EF80A300B012	270029	24-60	EF80E300B24-60	270083	1
									24	EF80A300B024	270030				
									48	EF80A300B048	270032				
									110	EF80A300B110	270033				
									208	EF80A300B208	270035				
									230	EF80A300B230	270036				
									400	EF80A300B400	270037				
									480	EF80A300B480	270039				
									600	EF80A300B600	270042				
140	95	25 34	45 60	55 75	55	1.5x10 <sup>6</sup>	0	0	12	EF95A300B012	270043	24-60	EF95E300B24-60	270087	1
									24	EF95A300B024	270044				
									48	EF95A300B048	270046				
									110	EF95A300B110	270047				
									208	EF95A300B208	270049				
									230	EF95A300B230	270050				
									400	EF95A300B400	270052				
									480	EF95A300B480	270054				
									600	EF95A300B600	270057				
140	105	30 40	55 75	55 75	65	1.5x10 <sup>6</sup>	0	0	12	EF105A300B012	270058	24-60	EF105E300B24-60	270091	1
									24	EF105A300B024	270059				
									48	EF105A300B048	270061				
									110	EF105A300B110	270062				
									208	EF105A300B208	270064				
									230	EF105A300B230	270065				
									400	EF105A300B400	270066				
									480	EF105A300B480	270070				
									600	EF105A300B600	270073				



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4 pole contactors - Double box terminals

Global contactors

Max. operating current		Admissible power AC1				Electrical endurance	Power cont.	Control circuit									
Not inductive load AC1 A	Motors <480V 3Ph 50-60Hz AC3 A	220-240V kW	380-415V kW	440-480V kW	690V kW	Cat. AC3 Operations (B10d)	NO	NC	AC			Voltage	Cat. no. <sup>[1]</sup>	Ref. no.			
									Voltage	Cat. no.	Ref. no.						
	25	12	9.5	16.5	19	30	4x10 <sup>5</sup>			4	0	12	EC12A400B012	267175		AC/DC	
										4	0	24	EC12A400B024	267176	24-60	EC12E400B24-60	216395
										4	0	48	EC12A400B048	267178	48-130	EC12E400B48-130	216396
										4	0	110	EC12A400B110	267179	100-250	EC12E400B100-250	216397
										4	0	120	EC12A400B120	267180			
										4	0	208	EC12A400B208	267181			DC
										4	0	230	EC12A400B230	267182	12	EC12D400B012W	267231
										4	0	240	EC12A400B240	267183	24	EC12D400B024W	267232
										4	0	400	EC12A400B400	267184	110	EC12D400B110W	267237
										4	0	440	EC12A400B440	267185	250	EC12D400B250W	267240
										4	0	480	EC12A400B480	267186	440	EC12D400B440W	267241
										4	0	500	EC12A400B500	267187			
										4	0	600	EC12A400B600	267188	24	EC12D400B024L	267242
	32	18	12	22	24	38	6x10 <sup>5</sup>			4	0	12	EC18A400B012	267189		AC/DC	
										4	0	24	EC18A400B024	267190	24-60	EC18E400B24-60	216398
										4	0	48	EC18A400B048	267192	48-130	EC18E400B48-130	216399
										4	0	110	EC18A400B110	267193	100-250	EC18E400B100-250	216400
										4	0	120	EC18A400B120	267194			
										4	0	208	EC18A400B208	267195			DC
										4	0	230	EC18A400B230	267196	12	EC18D400B012W	267246
										4	0	240	EC18A400B240	267197	24	EC18D400B024W	267247
										4	0	400	EC18A400B400	267198	110	EC18D400B110W	267252
										4	0	440	EC18A400B440	267199	250	EC18D400B250W	267255
										4	0	480	EC18A400B480	267200	440	EC18D400B440W	267256
										4	0	500	EC18A400B500	267201			
										4	0	600	EC18A400B600	267202	24	EC18D400B024L	267257
	45	25	17	29	34	54	6.5x10 <sup>5</sup>			4	0	12	EC25A400B012	267203		AC/DC	
										4	0	24	EC25A400B024	267204	24-60	EC25E400B24-60	216401
										4	0	48	EC25A400B048	267206	48-130	EC25E400B48-130	216402
										4	0	110	EC25A400B110	267207	100-250	EC25E400B100-250	216403
										4	0	120	EC25A400B120	267208			
										4	0	208	EC25A400B208	267209			DC
										4	0	230	EC25A400B230	267210	12	EC25D400B012W	267261
										4	0	240	EC25A400B240	267211	24	EC25D400B024W	267262
										4	0	400	EC25A400B400	267212	110	EC25D400B110W	267267
										4	0	440	EC25A400B440	267213	250	EC25D400B250W	267270
										4	0	480	EC25A400B480	267214	440	EC25D400B440W	267271
										4	0	500	EC25A400B500	267215			
										4	0	575	EC25A400B575	269083	24	EC25D400B024L	267272
	60	32	22.5	39.5	46	72	8x10 <sup>5</sup>			4	0	12	EC32A400B012	267217		AC/DC	
										4	0	24	EC32A400B024	267218	24-60	EC32E400B24-60	216404
										4	0	48	EC32A400B048	267220	48-130	EC32E400B48-130	216405
										4	0	110	EC32A400B110	267221	100-250	EC32E400B100-250	216406
										4	0	120	EC32A400B120	267222			
										4	0	208	EC32A400B208	267223			DC
										4	0	230	EC32A400B230	267224	12	EC32D400B012W	267276
										4	0	240	EC32A400B240	267225	24	EC32D400B024W	267277
										4	0	400	EC32A400B400	267226	110	EC32D400B110W	267282
										4	0	440	EC32A400B440	267227	250	EC32D400B250W	267285
										4	0	480	EC32A400B480	267228	440	EC32D400B440W	267286
										4	0	500	EC32A400B500	267229			
										4	0	600	EC32A400B600	267230	24	EC32D400B024L	267287

(1) End character: W = Wide voltage (0.7-1.25xUn) and built-in diode.  
L = Low consumption.



### 4 pole contactors - Double box terminals

Max. operating current		Admissible power AC1				Electrical endurance	Power cont.	Control circuit								
Not inductive load AC1 A	Motors <480V 3Ph 50-60Hz AC3 A	220-240V kW	380-415V kW	440-480V kW	690V kW	Cat. AC3 Operations (B10d)	NO	NC	AC		AC/DC					
									Voltage <sup>(1)</sup>	Cat. no.	Ref. no.	Voltage	Cat. no.	Ref. no.	Pack	
90	50	34	55	60	95	1.5x10 <sup>6</sup>	4	0	12	EF50A400B012	270095					1
									24	EF50A400B024	270096	24-60	EF50E400B24-60	270137	1	
									48	EF50A400B048	270098				1	
									110	EF50A400B110	270100	48-130	EF50E400B48-130	270138	1	
									208	EF50A400B208	270101				1	
									230	EF50A400B230	270102	100-250	EF50E400B100-250	270139	1	
									400	EF50A400B400	270103	250-500	EF50E400B250-500	270140	1	
									480	EF50A400B480	270105				1	
600	EF50A400B600	270108				1										
110	65	42	72.5	85	125	1.5x10 <sup>6</sup>	4	0	12	EF80A400B012	270109					1
									24	EF80A400B024	270110	24-60	EF80E400B24-60	270141	1	
									48	EF80A400B048	270112				1	
									110	EF80A400B110	270114	48-130	EF80E400B48-130	270142	1	
									208	EF80A400B208	270115				1	
									230	EF80A400B230	270116	100-250	EF80E400B100-250	270143	1	
									400	EF80A400B400	270117	250-500	EF80E400B250-500	270144	1	
									480	EF80A400B480	270119				1	
600	EF80A400B600	270122				1										
140	95	53	92	105	160	1.5x10 <sup>6</sup>	4	0	12	EF95A400B012	270123					1
									24	EF95A400B024	270124	24-60	EF95E400B24-60	270145	1	
									48	EF95A400B048	270126				1	
									110	EF95A400B110	270128	48-130	EF95E400B48-130	270146	1	
									208	EF95A400B208	270129				1	
									230	EF95A400B230	270130	100-250	EF95E400B100-250	270147	1	
									400	EF95A400B400	270131	250-500	EF95E400B250-500	270148	1	
									480	EF95A400B480	270133				1	
600	EF95A400B600	270136				1										



(1) Voltage 110V covers 110V 50-60Hz and 120V 60Hz.

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2NO - 2NC contactors - Double box terminals

Max. operating current		Admissible power AC3				Electrical endurance	Power cont.	Control circuit						
Not inductive load AC1 A	Motors <480V 3Ph 50-60Hz AC3 A	220-240V	380-415V	440-480V	690V	Cat. AC3 Operations (B10d)	NO	NC	AC			Voltage	Cat. no. <sup>[1]</sup>	Ref. no.
		kW hp	kW hp	kW hp	kW				Voltage	Cat. no.	Ref. no.			
25	12	3 4	5.5 7.5	5.5 7.5	7.5	2x10 <sup>6</sup>	2	2	12	EC12AB00B012	267291	AC/DC		
									24	EC12AB00B024	267292	24-60	EC12EB00B24-60	216407
		48	EC12AB00B048	267294	48-130				EC12EB00B48-130	216408				
		110	EC12AB00B110	267295	100-250				EC12EB00B100-250	216409				
		120	EC12AB00B120	267296	DC									
		208	EC12AB00B208	267297	DC									
		230	EC12AB00B230	267298	12				EC12DB00B012W	267347				
		240	EC12AB00B240	267299	24				EC12DB00B024W	267348				
		400	EC12AB00B400	267300	110				EC12DB00B110W	267353				
		440	EC12AB00B440	267301	250				EC12DB00B250W	267356				
		480	EC12AB00B480	267302	440				EC12DB00B440W	267357				
		500	EC12AB00B500	267303	DC									
		600	EC12AB00B600	267304	24				EC12DB00B024L	267358				
32	18	4 5.5	7.5 10	7.5 10	15	1.7x10 <sup>6</sup>	2	2	12	EC18AB00B012	267305	AC/DC		
									24	EC18AB00B024	267306	24-60	EC18EB00B24-60	216410
		48	EC18AB00B048	267308	48-130				EC18EB00B48-130	216411				
		110	EC18AB00B110	267309	100-250				EC18EB00B100-250	216412				
		120	EC18AB00B120	267310	DC									
		208	EC18AB00B208	267311	DC									
		230	EC18AB00B230	267312	12				EC18DB00B012W	267362				
		240	EC18AB00B240	267313	24				EC18DB00B024W	267363				
		400	EC18AB00B400	267314	110				EC18DB00B110W	267368				
		440	EC18AB00B440	267315	250				EC18DB00B250W	267371				
		480	EC18AB00B480	267316	440				EC18DB00B440W	267372				
		500	EC18AB00B500	267317	DC									
		600	EC18AB00B600	267318	24				EC18DB00B024L	267373				
45	25	7.5 10	11 15	12 16	22	1.7x10 <sup>6</sup>	2	2	12	EC25AB00B012	267319	AC/DC		
									24	EC25AB00B024	267320	24-60	EC25EB00B24-60	216413
		48	EC25AB00B048	267322	48-130				EC25EB00B48-130	216414				
		110	EC25AB00B110	267323	100-250				EC25EB00B100-250	216415				
		120	EC25AB00B120	267324	DC									
		208	EC25AB00B208	267325	DC									
		230	EC25AB00B230	267326	12				EC25DB00B012W	267377				
		240	EC25AB00B240	267327	24				EC25DB00B024W	267378				
		400	EC25AB00B400	267328	110				EC25DB00B110W	267383				
		440	EC25AB00B440	267329	250				EC25DB00B250W	267386				
		480	EC25AB00B480	267330	440				EC25DB00B440W	267387				
		500	EC25AB00B500	267331	DC									
		600	EC25AB00B600	267332	DC									
60	32	9 12	15 22	15 22	30	1.37x10 <sup>6</sup>	2	2	12	EC32AB00B012	267333	AC/DC		
									24	EC32AB00B024	267334	24-60	EC32EB00B24-60	216416
		48	EC32AB00B048	267336	48-130				EC32EB00B48-130	216417				
		110	EC32AB00B110	267337	100-250				EC32EB00B100-250	216418				
		120	EC32AB00B120	267338	DC									
		208	EC32AB00B208	267339	DC									
		230	EC32AB00B230	267340	12				EC32DB00B012W	267392				
		240	EC32AB00B240	267341	24				EC32DB00B024W	267393				
		400	EC32AB00B400	267342	110				EC32DB00B110W	267398				
		440	EC32AB00B440	267343	250				EC32DB00B250W	267401				
		480	EC32AB00B480	267344	440				EC32DB00B440W	267402				
		500	EC32AB00B500	267345	DC									
		600	EC32AB00B600	267346	DC									



(1) End character: W = Wide voltage (0.7-1.25xUn) and built-in diode.  
L = Low consumption.



2NO - 2NC contactors - Double box terminals

Max. operating current		Admissible power AC3				Electrical endurance	Power cont.	Control circuit									
Not inductive load AC1 A	Motors <480V 3Ph 50-60Hz AC3 A	220-240V	380-415V	440-480V	690V	Cat. AC3 Operations (B10d)	NO	NC	AC		AC/DC						
		kW hp	kW hp	kW hp	kW				Voltage <sup>(1)</sup>	Cat. no.	Ref. no.	Voltage	Cat. no.	Ref. no.	Pack		
90	40	11 15	18.5 20	22 30	22	1.5x10 <sup>6</sup>	2	2	12	EF40AB00B012	270149						1
							2	2	24	EF40AB00B024	270150	24-60	EF40EB00B24-60	270191			1
							2	2	48	EF40AB00B048	270152						1
							2	2	110	EF40AB00B110	270154	48-130	EF40EB00B48-130	270192			1
							2	2	208	EF40AB00B208	270155						1
							2	2	230	EF40AB00B230	270156	100-250	EF40EB00B100-250	270193			1
							2	2	400	EF40AB00B400	270157	250-500	EF40EB00B250-500	270194			1
							2	2	480	EF40AB00B480	270159						1
							2	2	600	EF40AB00B600	270162						1
110	65	18.5 20	22 30	37 50	37	1.5x10 <sup>6</sup>	2	2	12	EF65AB00B012	270163						1
							2	2	24	EF65AB00B024	270164	24-60	EF65EB00B24-60	270195			1
							2	2	48	EF65AB00B048	270166						1
							2	2	110	EF65AB00B110	270168	48-130	EF65EB00B48-130	270196			1
							2	2	208	EF65AB00B208	270169						1
							2	2	230	EF65AB00B230	270170	100-250	EF65EB00B100-250	270197			1
							2	2	400	EF65AB00B400	270171	250-500	EF65EB00B250-500	270198			1
							2	2	480	EF65AB00B480	270173						1
							2	2	600	EF65AB00B600	270176					1	
110	80	22 30	37 40	37 60	37	1.5x10 <sup>6</sup>	2	2	12	EF80AB00B012	270177						1
							2	2	24	EF80AB00B024	270178	24-60	EF80EB00B24-60	270200			1
							2	2	48	EF80AB00B048	270180						1
							2	2	110	EF80AB00B110	270182	48-130	EF80EB00B48-130	270201			1
							2	2	208	EF80AB00B208	270183						1
							2	2	230	EF80AB00B230	270184	100-250	EF80EB00B100-250	270202			1
							2	2	400	EF80AB00B400	270185	250-500	EF80EB00B250-500	270203			1
							2	2	480	EF80AB00B480	270187						1
							2	2	600	EF80AB00B600	270190				1		



(1) Voltage 110V covers 110V 50-60Hz and 120V 60Hz.

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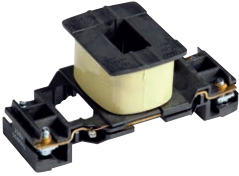
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Voltage type	Coil voltage		
AC 50-60Hz <b>A</b>	<b>A</b>	<b>E</b>	<b>D</b>
AC 50-60Hz / DC <b>E</b>	AC 50-60Hz	AC 50-60Hz / DC	DC
DC <b>D</b>			
	012	24-60	Wide range
	024	48-130	012W
	048	100-250	024W
	110	250-500 <sup>(1)</sup>	110W
	120		250W
	208		440W
	230		
	400		Low consumption
	440		024L
	480		
	500		
	600		

Spare coils for contactors and auxiliary contactors - Box clamp terminals

	Voltage	Use for	Cat. no.	Ref. no.	Pack
	12V AC	EC09A...EC18A, ECACA...B	ECCS1A012S	268687	5
	24V AC	EC09A...EC18A, ECACA...B	ECCS1A024S	268688	5
	48V AC	EC09A...EC18A, ECACA...B	ECCS1A048S	268690	5
	110V AC	EC09A...EC18A, ECACA...B	ECCS1A110S	268691	5
	120V AC	EC09A...EC18A, ECACA...B	ECCS1A120S	268692	5
	208V AC	EC09A...EC18A, ECACA...B	ECCS1A208S	268693	5
	230V AC	EC09A...EC18A, ECACA...B	ECCS1A230S	268694	5
	240V AC	EC09A...EC18A, ECACA...B	ECCS1A240S	268695	5
	400V AC	EC09A...EC18A, ECACA...B	ECCS1A400S	268696	5
	440V AC	EC09A...EC18A, ECACA...B	ECCS1A440S	268697	5
	480V AC	EC09A...EC18A, ECACA...B	ECCS1A480S	268698	5
	500V AC	EC09A...EC18A, ECACA...B	ECCS1A500S	268699	5
	575V AC	EC09A...EC18A, ECACA...B	ECCS1A575S	268984	5
	600V AC	EC09A...EC18A, ECACA...B	ECCS1A600S	268700	5
	12V AC	EC25A...EC40A...B	ECCS2A012S	268716	5
	24V AC	EC25A...EC40A...B	ECCS2A024S	268717	5
	48V AC	EC25A...EC40A...B	ECCS2A048S	268719	5
	110V AC	EC25A...EC40A...B	ECCS2A110S	268720	5
	120V AC	EC25A...EC40A...B	ECCS2A120S	268721	5
	208V AC	EC25A...EC40A...B	ECCS2A208S	268722	5
	230V AC	EC25A...EC40A...B	ECCS2A230S	268723	5
	240V AC	EC25A...EC40A...B	ECCS2A240S	268724	5
	400V AC	EC25A...EC40A...B	ECCS2A400S	268725	5
	440V AC	EC25A...EC40A...B	ECCS2A440S	268726	5
	480V AC	EC25A...EC40A...B	ECCS2A480S	268727	5
	500V AC	EC25A...EC40A...B	ECCS2A500S	268728	5
	575V AC	EC25A...EC40A...B	ECCS2A575S	268985	5
	600V AC	EC25A...EC40A...B	ECCS2A600S	268729	5
	12V AC	EF40A...EF105A	EFCSA012S	255020	1
	24V AC	EF40A...EF105A	EFCSA024S	255021	1
	48V AC	EF40A...EF105A	EFCSA048S	255022	1
	110V AC <sup>(1)</sup>	EF40A...EF105A	EFCSA110S	255023	1
	208V AC	EF40A...EF105A	EFCSA208S	255025	1
	230V AC	EF40A...EF105A	EFCSA230S	255026	1
	400V AC	EF40A...EF105A	EFCSA400S	255027	1
	480V AC	EF40A...EF105A	EFCSA480S	255028	1
	575V AC	EF40A...EF105A	EFCSA575S	255029	1
	600V AC	EF40A...EF105A	EFCSA600S	255030	1

(1) Voltage 110V AC covers 110V 50-60Hz and 120V 60Hz.





## Accessories for contactors

### Auxiliary contact blocks

	Contacts				Box clamp terminals		Pack
	NO	NC	NO EM	NC EM	Cat. no.	Ref. no.	
	.3  .4	.1  .2	.7  .8	.5  .6			

#### Frontal auxiliary blocks<sup>(1)</sup>

		Contacts				Box clamp terminals		Pack
		NO	NC	NO EM	NC EM	Cat. no.	Ref. no.	
<b>2 contacts</b>								
	1	1	-	-	ECFA211S	268872	5	
	2	0	-	-	ECFA220S	268873	5	
	0	2	-	-	ECFA202S	268874	5	
<b>4 contacts</b>								
	4	0	-	-	ECFA440S	268881	5	
	3	1	-	-	ECFA431S	268882	5	
	2	2	-	-	ECFA422S	268883	5	
	1	3	-	-	ECFA413S	268884	5	
	0	4	-	-	ECFA404S	268885	5	
	1	1	1	1	ECFA422SE	268886	5	

#### Lateral auxiliary blocks

		Contacts				Box clamp terminals		Pack
		NO	NC	NO EM	NC EM	Cat. no.	Ref. no.	
<b>Lateral auxiliary block for EC contactors<sup>(3)</sup></b>								
	2	0	-	-	ECLA220S	268899	10	
	1	1	-	-	ECLA211S	268900	10	
	0	2	-	-	ECLA202S	268901	10	
<b>Lateral auxiliary block for EF contactors</b>								
	2	0	-	-	BCLL20	104706	10	
	1	1	-	-	BCLL11	104707	10	
<b>Mechanical interlock for EC contactors</b>								
	0	0	-	-	ECMI	268908	10	
	0	2	-	-	ECMI02S	268910	10	
<b>Mechanical interlock for EF contactors</b>								
	0	0	-	-	BELA	104723	10	
	0	2	-	-	BELA02	104724	10	

### Pneumatic timer<sup>(2)</sup>

	Contacts			Type	Box clamp terminals		Pack
	NO	NC	Time		Cat. no.	Ref. no.	
	.7  .8	.5  .6					
	1	1	0.1-30 s	delay ON	ECPT30SC	268913	5
	1	1	1-60 s	delay ON	ECPT60SC	268914	5
	1	1	0.1-30 s	delay OFF	ECPT30SD	268916	5
	1	1	1-60 s	delay OFF	ECPT60SD	268917	5

(1) All frontal auxiliary blocks can be used with all contactor types.

(2) The pneumatic timer can be used with all contactor types.

(3) EC\*E Lateral Auxiliary can only be mounted on right side

### Surge suppressor

	Description	Cat. no.	Ref. no.	Pack	Description	Cat. no.	Ref. no.	Pack
	<b>Surge suppressor for EC contactors (plug-in) <sup>(A)</sup></b>				<b>Surge suppressor for AC version EF contactors <sup>(B)</sup></b>			
	Diode type, DC 12-440V	ECSUDI440	268931	10	R-C type, AC 12-48V	BSLR3G	104716	-
	R-C type, AC 24-48V	ECSURC048	268932	10	R-C type, AC 50-127V	BSLR3K	104717	-
	R-C type, AC 50-127V	ECSURC127	268933	10	R-C type, AC 130-250V	BSLR3R	104718	-
	R-C type, AC 130-250V	ECSURC250	268934	10	Varistor type, 24-48V	BSLV3G	104720	-
	R-C type, AC 230-440V	ECSURC440	268935	10	Varistor type, 50-127V	BSLV3K	104721	-
	R-C type, AC 400-600V	ECSURC600	268936	10	Varistor type, 130-250V	BSLV3R	104722	-
	Varistor type, AC/DC 24-48V	ECSUVA048	268937	10	Varistor type, 277-500V	BSLV3U	110836	-
	Varistor type, AC/DC 50-127V	ECSUVA127	268938	-				
	Varistor type, AC/DC 130-250V	ECSUVA250	268939	-				
	Varistor type, AC/DC 230-440V	ECSUVA440	268940	-				

(1) EF contactors with electronic coil version have always surge suppressor built-in. There is no need to buy surge suppressor protection separately.



### Mechanical latch <sup>(1)</sup>

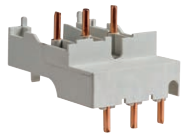



NC	Use with	Coil range	Coil voltage		Box clamp terminals		Pack	
			50-60Hz	DC	Cat. no.	Ref. no.		
	1	EC09A up to EC18A, ECACA	EC09 -EC18 24-32V	24-32V	-	ECML1AS032	268919	5
	1	EC09A up to EC18A, ECACA	EC09 -EC18 42-60V	42-60V	-	ECML1AS060	268920	5
1	EC09A up to EC18A, ECACA	EC09 -EC18 110-127V	110-127V	-	ECML1AS127	268921	5	
1	EC09A up to EC18A, ECACA	EC09 -EC18 220-240V	220-240V	-	ECML1AS277	268922	5	
1	EC09A up to EC18A, ECACA	EC09 -EC18 380-480V	380-480V	-	ECML1AS480	268923	5	
1	EC09A up to EC18A, ECACA	EC09 -EC18 500-690V	500-690V	-	ECML1AS660	268924	5	
1	EC25A up to EC40A	EC25 -EC40 24-32V	24-32V	-	ECML2AS032	268925	5	
1	EC25A up to EC40A	EC25 -EC40 42-60V	42-60V	-	ECML2AS060	268926	5	
1	EC25A up to EC40A	EC25 -EC40 110-127V	110-127V	-	ECML2AS127	268927	5	
1	EC25A up to EC40A	EC09 -EC18 220-240V	220-240V	-	ECML2AS277	268928	5	
1	EC25A up to EC40A	EC25 -EC40 380-480V	380-480V	-	ECML2AS480	268929	5	
1	EC25A up to EC40A	EC25 -EC40 500-690V	500-690V	-	ECML2AS660	268930	5	
1	EC09D up to EC18D, ECACD	-	-	24-36V	ECML1DS036	269325	5	
1	EC09D up to EC18D, ECACD	-	-	42-48V	ECML1DS048	269326	5	
1	EC09D up to EC18D, ECACD	-	-	60-72V	ECML1DS072	269327	5	
1	EC09D up to EC18D, ECACD	-	-	110-125V	ECML1DS125	269328	5	
1	EC09D up to EC18D, ECACD	-	-	220-250V	ECML1DS250	269329	5	
1	EC09D up to EC18D, ECACD	-	-	440V	ECML1DS440	269330	5	
1	EC25D up to EC40D	-	-	24-36V	ECML2DS036	269331	5	
1	EC25D up to EC40D	-	-	42-48V	ECML2DS048	269332	5	
1	EC25D up to EC40D	-	-	60-72V	ECML2DS072	269333	5	
1	EC25D up to EC40D	-	-	110-125V	ECML2DS125	269334	5	
1	EC25D up to EC40D	-	-	220-250V	ECML2DS250	269335	5	
1	EC25D up to EC40D	-	-	440V	ECML2DS440	269336	5	
1	EF50 up to EF105	-	24-32V	-	ECML3AS032	255005	5	
1	EF50 up to EF105	-	42-60V	-	ECML3AS060	255006	5	
1	EF50 up to EF105	-	110-127V	-	ECML3AS127	255007	5	
1	EF50 up to EF105	-	220-277V	-	ECML3AS227	255008	5	
1	EF50 up to EF105	-	380-480V	-	ECML3AS480	255009	5	
1	EF50 up to EF105	-	500-660V	-	ECML3AS660	255010	5	
1	EF50 up to EF105	-	-	24-36V	ECML3DS036	255011	5	
1	EF50 up to EF105	-	-	42-48V	ECML3DS048	255012	5	
1	EF50 up to EF105	-	-	60-72V	ECML3DS072	255013	5	
1	EF50 up to EF105	-	-	110-125V	ECML3DS125	255014	5	
1	EF50 up to EF105	-	-	220-250V	ECML3DS250	255015	5	
1	EF50 up to EF105	-	-	440V	ECML3DS440	255017	5	


(1) Not for use with DC low consumption version.

## Accessories for starters


### Fuseless starter kits

	Use with	Description	Cat. no.	Ref. no.	Pack
	GPS1 - EC09 up to EC25	Link module for AC and AC/DC version	ECM1AL25	268954	5
	GPS1 - EC32	Link module for AC and AC/DC version	ECM1AL32	268955	5
	GPS2 - EC32 and EC40	Link module for AC and AC/DC version	ECM2AL40	268956	5
	GPS2 - EF50E up to EF80E	Link module	EFM2EL80	255000	1
	GPS2 - EF50A up to EF80A	Link module	EFM2AL80	255035	1
	GPS1 - EC09 up to EC32	Base plate 45mm	ECBP45	268962	5
	GPS2 - EC32 and EC40	Base plate 55mm	ECBP55	268953	5

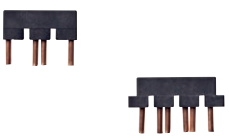
### Wiring kits for reversing starters

	Use with	Description	Cat. no.	Ref. no.	Pack
	Suitable for upper and lower connections with and without overload relay with mechanical interlock				
	EC09 up to EC25		ECKS1RV	268948	1
	EC32 and EC40		ECKS2RV	268950	1
	EF50 up to EF80		CLXC41	255036	1
	EF95 up to EF105		CLXC51	255001	1

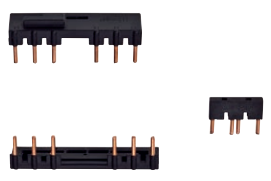
### Parallel busbar

	Use with	Description	Cat. no.	Ref. no.	Pack
	EC09 up to EC25	Parallel busbar for 2 contactors	ECBB1B2	268942	5
	EC32 and EC40	Parallel busbar for 2 contactors	ECBB2B2	268945	5

### Parallel poles

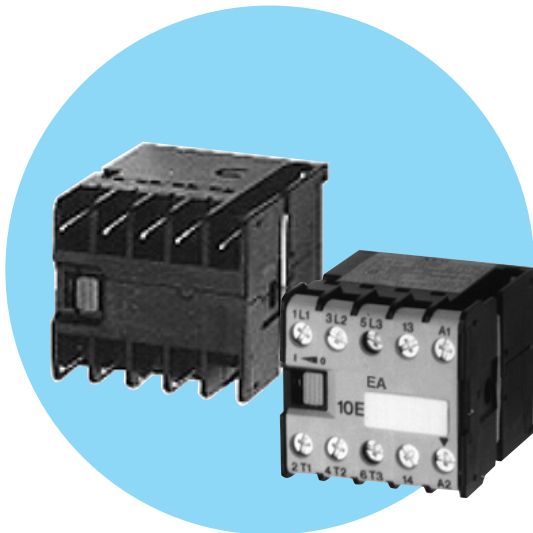
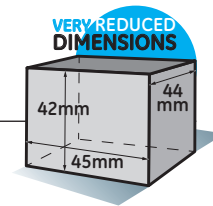
	Use with	Description	Cat. no.	Ref. no.	Pack
	EC09 up to EC25	3 poles in parallel	EC3PP1B	268943	6
	EC09 up to EC25	4 poles in parallel	EC4PP1B	268944	6
	EC32 and EC40	3 poles in parallel	EC3PP2B	268946	6
	EC32 and EC40	4 poles in parallel	EC4PP2B	268947	6

### Wiring kits for star delta starters

	Use with	Description	Cat. no.	Ref. no.	Pack
	Suitable for upper and lower connections with or without overload relay				
	EC09 up to EC25		ECKS1VD	268951	1
	EC32 and EC40		ECKS2VD	268952	1
	EF50		CLXC42	255002	1
	EF65 and EF80		CLXC43	255003	1
	EF95 and EF105		CLXC52	255004	1

Everything is under control

### Three pole minicontactors 7A (AC3) 16A (AC1)



- Control circuit:
  - Alternating current up to 230V AC at 50/60Hz
  - Direct current up to 110V DC
- Low consumption:
  - Only 1.2W In DC
  - 2.4VA In AC
- Power circuit: Up to 400V AC
- Rating:
  - 7.3A AC3 at 400V
  - 16A AC1
  - lth 16A
  - AC15: - 6A 230V
  - 4A 400V
  - A600
  - P300
- Motor rating AC-3 duty, 3 phases
  - 230V 1.5kW
  - 400/415V 3kW
- Very reduced dimensions: 42/45/44mm (HxWxD)
- Lateral carrier
- Terminal numbering in accordance with EN 50012
- Fixing by clipping onto 35mm DIN-rail (EN 50022-35) or by screws
- Terminal versions:
  - Screws as standard
  - Solder pin for circuit board application
- Integrated one auxiliary contact block: 1NO or 1NC
- No accessories
  - No available additional auxiliary contacts
  - Stand-alone thermal protection

#### Standards

IEC/EN 60947-1  
IEC/EN 60947-4-1  
VDE 0660  
BS5424

#### Approvals/Marking



## 3 Pole Contactors



Power rating AC3 (kW)		Terminal	Poles	Auxiliary contacts		Control circuit	Voltage	Cat. no.	Ref. no.	Pack
230V	400V			NO	NC					
1.5	3	Screw	3	1	0	AC	24	EA07A310S024	247990	10
1.5	3	Screw	3	0	1	AC	24	EA07A301S024	247991	10
1.5	3	Screw	3	1	0	AC	48	EA07A310S048	247992	10
1.5	3	Screw	3	0	1	AC	48	EA07A301S048	247993	10
1.5	3	Screw	3	1	0	AC	110	EA07A310S110	247994	10
1.5	3	Screw	3	0	1	AC	110	EA07A301S110	247995	10
1.5	3	Screw	3	1	0	AC	230	EA07A310S230	247996	10
1.5	3	Screw	3	0	1	AC	230	EA07A301S230	247997	10
1.5	3	Screw	3	1	0	DC	24	EA07D310S024	247998	10
1.5	3	Screw	3	0	1	DC	24	EA07D301S024	247999	10
1.5	3	Screw	3	1	0	DC	110	EA07D310S110	248000	10
1.5	3	Screw	3	0	1	DC	110	EA07D301S110	248001	10
0.75	1.5	Solder pin	3	1	0	AC	24	EA07A310I024	248004	10
0.75	1.5	Solder pin	3	0	1	AC	24	EA07A301I024	248005	10
0.75	1.5	Solder pin	3	1	0	DC	24	EA07D310I024	248006	10
0.75	1.5	Solder pin	3	0	1	DC	24	EA07D301I024	248007	10
0.75	1.5	Solder pin	3	1	0	DC	110	EA07D310I110	248008	10
0.75	1.5	Solder pin	3	0	1	DC	110	EA07D301I110	248009	10
0.75	1.5	Solder pin	3	1	0	AC	230	EA07A310I230	248002	10
0.75	1.5	Solder pin	3	0	1	AC	230	EA07A301I230	248003	10

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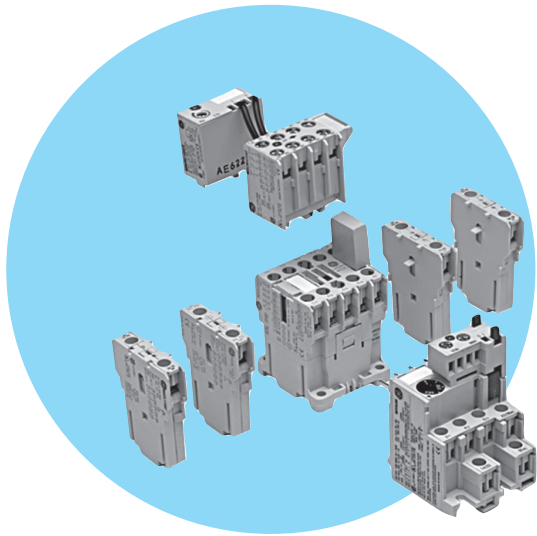
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## Three and four pole compact contactors 9 and 12A (AC3) 20A (AC1)



### Standards

IEC/EN 60947-1	BS 4794
IEC/EN 60947-4-1	NFC 63-110
IEC/EN 60947-5-1	CSA C22.2/14
EN 50003	VDE 0660
EN 50005	SEV 10254
EN 50012	JIS C8325
UL 508	JEM 1038
NEMA ICS-1	CENELEC HD 419

### Approvals/Marking



Lloyd's Register

Bureau Veritas

CE



(Contact GE for details)

- Order codes ● page A.34
- Auxiliary contact blocks ● page A.37
- Accessories ● page A.39
- Technical data ● page A.79
- Terminal numbering ● page A.85
- Dimensions ● page A.118

- Control circuit: Alternating current up to 600V  
Direct current up to 440V
- Terminal numbering in accordance with EN 50012
- Fixing by clipping onto 35 mm DIN rail (EN 50022-35) or by screws
- 6kV rated impulse withstand strength
- Screws and fast-on terminals protected against accidental contact in accordance with VDE 0106 T.100 and VBG4
- Versions: Ring terminal and printed circuit terminals
- Facility to mount instant and timed auxiliary contact blocks and voltage suppressor block
- Degree of protection IP20 (EN 60529).
- Maximum number of auxiliary contacts to be added: 6

### General data

	MC1...	MC2...
Maximum number of poles	4	4
Rated thermal current (Ith) $\theta \leq 60^{\circ}\text{C}$ <sup>(1)</sup>	(A) 20	20
Rated operational current $I_e$ <sup>(2)</sup> (3 x 440V, 50/60Hz, AC3)	(A) 9	12
Rated insulation current $U_i$	(V) 750	750
Rated operational current $U_e$	(V) 690	690

### Standard voltages

To complete the catalogue number, replace the symbol  $\blacklozenge$  by the code corresponding to the voltage and frequency of the control circuit (other voltages on request)

#### AC Coils

-	1	2	9	J	K	M	6	7	N	U	W	Y
50/60Hz	24	42	48				220-230	240				
50 Hz				110-115	115-127					380-400	415-440	500
60Hz				110-120		208-220			277	440	480	600

#### Operating voltage limits with bifrequency coils:

With 60Hz = 0.85 to 1.1 x Us

With 50Hz = 0.8 to 1.1 x Us in continuous service (ED = 100%) with a maximum ambient temperature of 40°C

#### DC Coils

-	B	D	G	J
Voltage	12	24	48	110

#### DC Wide Range Coils

-	WD	WG	WI	WJ	WL	WN	WS
Voltage	24	48	72	110	125	220	250

#### Operating voltage limits with DC coils:

Standard = 0.8 to 1.1 x Us

Wide Range = 0.7 to 1.3 x Us



### Three pole contactors

Max.operat.current Non- inductive loads AC1 <sup>(2)</sup> A	Motors <480V, 3 ~ 50/60Hz AC3 <sup>(3)</sup> A	Admissible power AC3						Aux. contacts		Control circuit: Alternating current		Control circuit: Direct current	
		1-phase		3-phase				.3   .4	.1   .2	Cat. no. <sup>(1)</sup>	Pack	Cat. no. <sup>(1)</sup>	Pack
		115V	220V	220-240V	380-415V	440-480V	690V	1	0	Ref. no. see bottom		Ref. no. see bottom	
<b>Terminal: screw</b>													
20	9	0.56	1.12	2.2	4	-	7.5	1	0	MC1A310AT ♦	20	MC1C310AT ♦	10
		0.75	1.5	3	5	5	-	0	1	MC1A301AT ♦	20	MC1C301AT ♦	10
20	12	0.75	2	3	5.5	-	7.5	1	0	MC2A310AT ♦	20	MC2C310AT ♦	10
		1	2.6	3	7.5	7.5	-	0	1	MC2A301AT ♦	20	MC2C301AT ♦	10
<b>Terminal: ring terminal</b>													
20	9	0.56	1.12	2.2	4	-	7.5	1	0	MC1A310AR ♦	20	MC1C310AR ♦	10
		0.75	1.5	3	5	5	-	0	1	MC1A301AR ♦	20	MC1C301AR ♦	10
20	12	0.75	2	3	5.5	-	7.5	1	0	MC2A310AR ♦	20	MC2C310AR ♦	10
		1	2.6	3	7.5	7.5	-	0	1	MC2A301AR ♦	20	MC2C301AR ♦	10
<b>Terminal: faston 2x2.8 insulated<sup>(5)</sup></b>													
16 <sup>(4)</sup>	9	0.56	1.12	2.2	4	-	7.5	1	0	MC1A310AF ♦	20	MC1C310AF ♦	10
		0.75	1.5	3	5	5	-	0	1	MC1A301AF ♦	20	MC1C301AF ♦	10
		-	-	3	5.5	-	7.5	-	-				
		-	-	3	7.5	7.5	-	-	-				
<b>Terminal: printed circuit</b>													
20	9	0.56	1.12	2.2	4	-	7.5	1	0	MC1A310AI ♦	20	MC1C310AI ♦	10
		0.75	1.5	3	5	5	-	0	1	MC1A301AI ♦	20	MC1C301AI ♦	10
20	12	0.75	2	3	5.5	-	7.5	1	0	MC2A310AI ♦	20	MC2C310AI ♦	10
		1	2.6	3	7.5	7.5	-	0	1	MC2A301AI ♦	20	MC2C301AI ♦	10
<b>Spare coil</b>										MB0A ♦	10	MB0C ♦	10

- (1) To complete the catalogue number, replace the symbol ♦ by the code corresponding to the voltage and frequency of the control circuit (other voltages on request) (see A.34)
- (2) Electrical endurance AC-1: MC1... 0.3 x 10<sup>6</sup> operations  
MC2... 0.35 x 10<sup>6</sup> operations
- (3) Electrical endurance AC-3 as per B10: MC1...(9A) = 1.4 x 10<sup>6</sup> operations  
MC2...(12A) = 1 x 10<sup>6</sup> operations
- (4) Terminal with wire 1.5mm<sup>2</sup>: le = 16A  
with wire 1mm<sup>2</sup>: le = 10A  
Insulated terminal type B 2.8x0.8 and wire 1mm<sup>2</sup> le = 8A in accordance with DIN 46247.
- (5) Fast-on 1x6.3 terminals on request (replace letter F by H in the catalogue number)



Interface contactors



Max. oper. current Non-inductive load AC1 A	Motors <480V, 3~ 50/60Hz AC3 <sup>(3)</sup> A	Admissible power AC3						Aux. contacts		Voltage 24V D.C, coil 1.2W <sup>(1)</sup>			Voltage 24V D.C, coil 2W <sup>(2)</sup>			
		1-phase		3-phase				•3 •4	•1 •2	Cat. no. <sup>(1)</sup>	Ref. no.	Pack	Cat. no. <sup>(1)</sup>	Ref. no.	Pack	
115V	220V	220-240V	380-415V	440-480V	690V	kW	kW									kW
Terminal: screw																
20	9	0.56	1.12	2.2	4	-	7.5	1	0	MC1I310ATD	100572	10	MC1K310ATD	100576	10	
		0.75	1.5	3	5	5	-	0	1	MC1I301ATD	100573	10	MC1K301ATD	100577	10	
20	12	0.75	2	3	5.5	-	7.5	1	0	MC2I310ATD	100559	10	MC2K310ATD	103590	10	
		1	2.6	3	7.5	7.5	10	0	1	MC2I301ATD	100538	10	MC2K301ATD	103591	10	
Spare coil										MB0ID	100470	10	MB0KD	100471	10	



(1) No possibility of adding instantaneous auxiliary contact blocks.  
 (2) Facility to mount an instantaneous auxiliary contact block of two contacts or two instantaneous auxiliary contact blocks of one contact.  
 (3) Electrical endurance AC-3 as per B10d: MC1...(9A) = 1.4 x 10<sup>6</sup> operations  
 MC2...(12A) = 1.4 x 10<sup>6</sup> operations

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### Four poles contactors

Max.oper.current	Admissible power AC3						Poles		Control circuit: Alternating current		Control circuit: Direct current		
	Non-inductive load	Motors <480V, 3~ 50/60Hz	1-phase		3-phase		d	b	Cat. no. (1)	Pack	Cat. no. (1)	Pack	
AC1 (2) A	AC3 (3) A	115V	220V	220-240V	380-415V	440-480V							690V
<b>Screw terminal</b>													
20	9	<b>AC1</b>											
		2.3	4.4	7.5	13	17	22.5	4	0	MC1A400AT ♦	10	MC1C400AT ♦	10
		-	-	-	-	-	-	3	1	MC1AC00AT ♦	10	MC1CC00AT ♦	10
		-	-	-	-	-	-	2	2	MC1AB00AT ♦	10	MC1CB00AT ♦	10
		<b>AC3</b>											
		0.56	1.12	2.2	4	-	7.5	0	4	MC1AA00AT ♦	10	MC1CA00AT ♦	10
0.75	1.5	3	5	5	-								
20	12	<b>AC1</b>											
		2.3	4.4	7.5	13	17	22.5	4	0	MC2A400AT ♦	10	MC2C400AT ♦	10
		-	-	-	-	-	-	3	1	MC2AC00AT ♦	10	MC2CC00AT ♦	10
		-	-	-	-	-	-	2	2	MC2AB00AT ♦	10	MC2CB00AT ♦	10
		<b>AC3</b>											
		0.75	2	3	5.5	-	7.5						
1	2.6	3	7.5	7.5	-								
<b>Terminal: faston 2x2.8 insulated (5)</b>													
16 (4)	9	<b>AC1</b>											
		2.3	4.4	7.5	13	17	22.5	2	2	MC1A400AF ♦	20	MC1C400AF ♦	10
		-	-	-	-	-	-	0	4	MC1AB00AF ♦	20	MC1CB00AF ♦	10
		<b>AC3</b>											
		0.56	1.12	2.2	4	-	7.5						
		0.75	1.5	3	5	5	-						
<b>Terminal: printed circuit</b>													
20	9	<b>AC1</b>											
		2.3	4.4	7.5	13	17	22.5	2	2	MC1A400AI ♦	20	MC1C400AI ♦	10
		-	-	-	-	-	-	0	4	MC1AB00AI ♦	20	MC1CB00AI ♦	10
		<b>AC3</b>											
		0.56	1.12	2.2	4	-	7.5						
		0.75	1.5	3	5	5	-						
<b>Spare coil</b>									MB0A ♦	10	MB0C ♦	10	

(1) To complete the catalogue number, replace the symbol ♦ by the code corresponding to the voltage and frequency of the control circuit (see A.34)  
 (2) Electrical endurance AC-1: MC1... 0.3 × 10<sup>6</sup> operations  
 MC2... 0.35 × 10<sup>6</sup> operations  
 (3) Electrical endurance AC-3 as per B10d: MC1...(9A) = 1.4 × 10<sup>6</sup> operations  
 MC2...(12A) = 1 × 10<sup>6</sup> operations  
 (4) Terminal with wire 1.5mm<sup>2</sup>: I<sub>e</sub> = 16A  
 with wire 1mm<sup>2</sup>: I<sub>e</sub> = 10A  
 Insulated terminal type B 2.8 × 0.8 and wire of 1mm<sup>2</sup> I<sub>e</sub> = 8A in accordance with DIN 46247.  
 (5) Faston 1 × 6.3 terminals on request, (replace letter F by H in the catalogue number).



Instantaneous auxiliary contact blocks

Front mounting



Number contacts	Combinations with basic contactor 10E	Contacts in acc. with EN 50012	Contacts in acc. with EN 50005	Aux. contacts		Cat. no.	Ref. no.	Pack
				.3   .4	.1   .2			
<b>Screw terminal</b>								
2	21E	11		1	1	MACN211AT	100999	10
2	12E	02		0	2	MACN202AT	100998	10
2			20	2	0	MARN220AT	100994	10
2			11	1	1	MARN211AT	100993	10
2			02	0	2	MARN202AT	100992	10
4	41E	31		3	1	MACN431AT	100997	10
4	32E	22		2	2	MACN422AT	100996	10
4	23E	13		1	3	MACN413AT	100995	10
4			40	4	0	MARN440AT	100991	10
4			31	3	1	MARN431AT	100990	10
4			22	2	2	MARN422AT	100989	10
4			13	1	3	MARN413AT	100988	10
4			04	0	4	MARN404AT	100987	10
<b>Ring terminal</b>								
2	21E	11		1	1	MACN211AR	103557	10
2	12E	02		0	2	MACN202AR	103558	10
2			20	2	0	MARN220AR	103349	10
2			11	1	1	MARN211AR	103350	10
2			02	0	2	MARN202AR	103351	10
4	41E	31		3	1	MACN431AR	103559	10
4	32E	22		2	2	MACN422AR	103560	10
4	23E	13		1	3	MACN413AR	103561	10
4			40	4	0	MARN440AR	103352	10
4			31	3	1	MARN431AR	103353	10
4			22	2	2	MARN422AR	103354	10
4			13	1	3	MARN413AR	103355	10
4			04	0	4	MARN404AR	103300	10

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## Instantaneous auxiliary contact blocks (continued)

	Number contacts	Combinations with basic contactor 10E	Contacts in acc. with EN 50012	Contacts in acc. with EN 50005	Aux. contacts		Cat. no.	Ref. no.	Pack	
					.3   .4	.1   .2				
<b>Lateral mounting</b>										
	• One or two additional blocks, to cover combinations of 1 or 2 contacts without increasing the height of the basic unit contactor									
	<b>Screw terminal</b>									
	1	20	10		1	0	MACL110AT	100560	10	
	1	11E	01		0	1	MACL101AT	100561	10	
	<b>Ring terminal</b>									
	1	20	10		1	0	MACL110AR	103555	10	
	1	11E	01		0	1	MACL101AR	103556	10	
	<b>Terminal: faston 2 x 2.8 insulated<sup>(1)</sup></b>									
	1	20	10		1	0	MACL110AF	100562	10	
	1	11E	01		0	1	MACL101AF	100563	10	
	<b>Terminal: printed circuit</b>									
	1	20	10		1	0	MACL110AI	100564	10	
1	11E	01		0	1	MACL101AI	100565	10		
	• One or two additional blocks, when up to 6 or 7 contacts are needed (combination possible with frontal blocks)									
	• One or two additional blocks on both sides, to cover up to five contacts (combination possible only with lateral blocks)									
	<b>Screw terminal</b>									
	1			10	1	0	MARL110ATS	100519	10	
	1			01	0	1	MARL101ATS	100520	10	
	<b>Ring terminal</b>									
	1			10	1	0	MARL110ARS	103299	10	
	1			01	0	1	MARL101ARS	103298	10	
	<b>Terminal: faston 2 x 2.8 insulated<sup>(1)</sup></b>									
	1			10	1	0	MARL110AFS	100521	10	
	1			01	0	1	MARL101AFS	100522	10	
	<b>Terminal: printed circuit</b>									
1			10	1	0	MARL110AIS	100523	10		
1			01	0	1	MARL101AIS	100524	10		

(1) Terminal with wire 1mm<sup>2</sup>: Ie = 10A  
Insulated terminal type B 2.8x0.8 with wire 1mm<sup>2</sup>: Ie = 8A, in accordance with DIN 46247

Accessories

	For use with:	Time	Function	Ue	Cat. no.	Ref. no.	Pack
 <p>Electronic timer block</p>	Lateral or front fixing to the contactor						
	MCR, MC ...	0.5 - 60 seg.	delay ON	24... 250V AC/DC	MREBC10AC2	100541	10
	MCR, MC ...	0.2 - 24 seg.	delay ON	24... 250V AC/DC	MREBC20AC2	100542	10
 <p>DIN-rail adaptor for electronic timer block</p>	For fixing onto EN 50022-35						
	MREBC...				MVB0R	100543	10
 <p>Voltage suppressor block</p>	Connection and (plug-in) fixing on to the connector						
	MCRA, MC ...	R/C	AC	12...60V 50/60Hz	MP0AAE1	100544	10
	MCRA, MC ...	R/C	AC	72... 240 V 50/60 Hz	MP0AAE2	100545	10
	MCRC, MC ...	Diode	DC	6...240 V DC	MP0CAE3	100546	10
	MCRC, MC ...	Varistor	AC/DC	24-48V	MP0DAE4	100536	10
	MCRC, MC ...	Varistor	AC/DC	50-127V	MP0DAE5	204848	10
	MCRC, MC ...	Varistor	AC/DC	130-250V	MP0DAE6	204849	10
 <p>Pole paralleling links</p>	To connect two, three or four phases in parallel						
	MC ...	2, 3, 4 (parallel)	Ø4.5mm - 16mm <sup>2</sup>		MVPOC	100600	10
 <p>Mechanical interlock</p>	Mechanical interlock and pole jumpers						
	MCR, MC ...				MMH0	100547	10
<p>Identification</p>	For use with:						
	MCR, MC ...	Labels (10 sheets of 260 labels)			EAT 260	100548	1
	MCR, MC ...	Labelling plate base. Plug-in labelling plate bases (50 pieces in one pack)			SPR	100549	1

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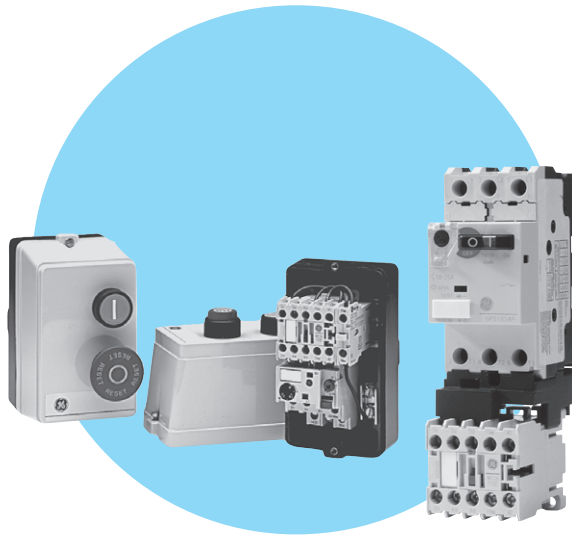
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## Direct-on-line starters




### 6 to 12A (AC-3)

- Power circuit: up to 690V AC
- Control circuit: up to 600V AC
- Polycarbonate enclosure (IP40 - IP65)
  - Shock resistance
  - Total insulation  $\square$
  - 4 knock-out input holes PG13.5
  - Cable entry in the base
- Terminals protected against accidental contact
- 16 setting ranges from 0.11 up to 14A
- Start contact block


### Series M - Direct-on-line starters

	Push-buttons	Protection degree		Cat. no.	Ref. no.	Pack.
Empty boxes	Start/Stop + Reset	IP40		MG0004PATO	209780	1
		IP65		MG0006PATO	209781	1
	Reset only	IP40		MG0004RATO	137557	1
		IP65		MG0006RATO	116402	1
	Start/Emergency stop	IP40		MG0004QATO	137556	1
IP65			MG0006QATO	116074	1	
Start contact block	Laterally mounted to the contactor, allowing the electrical operation the box push-button which incises on it.			MAGL110AT	100608	1

### Series M - Reversing starters

	Description	For use with contactor	AC / DC	Cat. no.	Ref. no.	Pack.
 Wiring kits for reversing starters	Suitable to be used with link modules	MC1... MC2...	AC / DC	WKMIU	101421	1
	Upper and lower connections without overload relays					

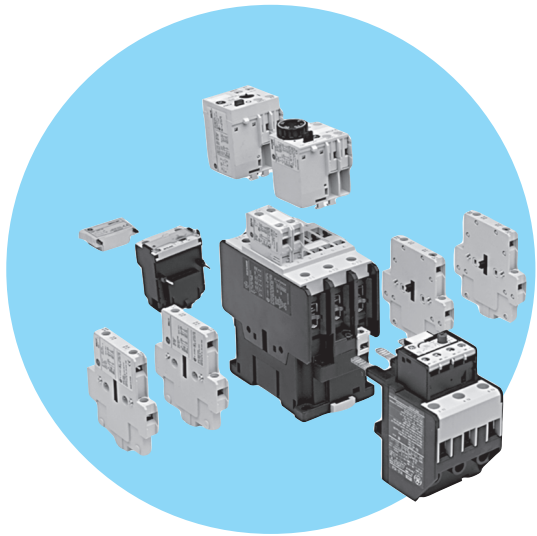
### Fuseless starters

	Frame size	For use with contactor	AC / DC	Cat. no.	Ref. no.	Pack.
	GPS1	MC0... MC1	AC / DC	GPF1MCBA	101410	5

Wiring diagrams ● page A.86  
 Dimensions ● page A.118



## Three and four pole contactors 9 to 105A (AC3) 25 to 140A (AC1)



### Standards/Marking

IEC/EN 60947-1	CSA 22.2/14
IEC/EN 60947-4-1	NFC 63-110
IEC/EN 60947-5-1	ASE 1025
EN 50005	VDE 0660/102
UL 508	CENELEC HD 419
NEMA ICS 1	
BS 5424 & 775	

### Approvals



(up to Ith=32A)



(Contact GE for details)

- Order codes ● page A.42
- Auxiliary contact blocks ● page A.44
- Accessories ● page A.44
- Technical data ● page A.88
- Terminal numbering ● page A.96
- Dimensions ● page A.120

- Control circuit: Alternating current up to 690V  
Direct current up to 440V
- Terminal numbering in accordance with EN 50005 and EN 50012
- Fixing by clipping onto 35mm DIN rail EN 50022-35 or by screws
- Screws protected against accidental contact in accordance with VDE 0106 T.100, VBG4.
- Ring terminal version
- Three coil terminals
- Mounting possibilities of front/side instantaneous auxiliary contact blocks, timed auxiliary contact blocks, mechanical latch, transient suppressor block and interface modules.
- Degree of protection: IP20 to CL00 ... CL02  
IP10 to CL03 ... CL10

### Standard voltages

To complete the catalogue number, replace the symbol ♦ by the code corresponding to the voltage and frequency of the control circuit.

#### AC Coils (V)

-	1	2	9	J	K	L	6	7	N	U	Y
50/60Hz	24	42	48				220-230	240			
50 Hz				110-115	127					380-400	500
60Hz				110-120		208			277	480	600

#### Operating voltage limits with bifrequency coils:

With 60Hz = 0.85 to 1.1 x Us

With 50Hz = 0.8 to 1.1 x Us in continuous service (ED = 100%) with a maximum ambient temperature of 40°C

#### DC Coils

-	B	D	G	H	J	K	N	T
Voltage	12	24	48	60	110	120-125	220	250

#### DC Wide Range Coils

-	WD	WE	WG	WI	WJ	WN
Voltage	24	33	48	72	110	220

#### Operating voltage limits with DC coils:

Standard = 0.8 to 1.1 x Us

Wide Range = 0.7 to 1.3 x Us

#### AC/DC Coils

-	WD	WH	WJ	WU
Voltage	24-60	48-130	100-250	250-500

#### Operating voltage limits with AC/DC coils:

Standard = 0.8 to 1.1 x Us



## Three pole contactors. Screw terminal

Contactors

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Max.oper.current Non- inductive load AC1 A	Motors <480V, 3 ~ 50/60Hz AC3 A	Admissible power AC3				Electrical endurance Operations	Aux. contacts	Control circuit: Alternating current		Control circuit: Direct current		Control circuit: Coil with electronic module (AC/DC)		
		220- 240V	380- 415V	440- 480V	690V			Cat. AC3	•3  •4	•1 •2	Cat. no. (1)	Pack(3)	Cat. no. (1)	Pack(3)
25	9	2.2 3	4 5	- 5	5.5 -	2x10 <sup>6</sup>	1 0	0 1	CL00A310T ♦ CL00A301T ♦	5 5	CL00D310T ♦ CL00D301T ♦	10 10	- -	- -
25	12	3 3	5.5 7.5	- 7.5	7.5 -	2x10 <sup>6</sup>	1 0	0 1	CL01A310T ♦ CL01A301T ♦	5 5	CL01D310T ♦ CL01D301T ♦	10 10	- -	- -
32	18	4 5.5	7.5 10	- 10	10 -	1.7x10 <sup>6</sup>	1 0	0 1	CL02A310T ♦ CL02A301T ♦	5 5	CL02D310T ♦ CL02D301T ♦	10 10	- -	- -
45	25	7.5 7.5	11 15	- 15	15 -	1.2x10 <sup>6</sup>	0 0	0 0	CL03A300T ♦	5	CL03D300T ♦	10	-	-
60	32	9 10	15 15	- 20	18.5 -	2x10 <sup>6</sup>	1 0	0 1	CL04A310M ♦ CL04A301M ♦	10 10	CL04D310M ♦ CL04D301M ♦	10 10	- -	- -
60	50	15 15	22 30	- 30	30 -	0.8x10 <sup>6</sup>	0 0	0 0	CL05A300M ♦	10	CL05D300M ♦	10	-	-
110	65	18.5 20	30 40	- 40	45 -	1.7x10 <sup>6</sup>	0 0	0 0	CL07A300M ♦	1	CL07D300M ♦	1	CL07E300M ♦	1
110	80	22 25	37 50	- 50	45 -	1.5x10 <sup>6</sup>	0 0	0 0	CL08A300M ♦	1	CL08D300M ♦	1	CL08E300M ♦	1
140	95	25 30	45 60	- 60	55 -	1.7x10 <sup>6</sup>	0 0	0 0	CL09A300M ♦	1	CL09D300M ♦	1	CL09E300M ♦	1
140	105	30 40	55 75	- 75	65 -	1.5x10 <sup>6</sup>	0 0	0 0	CL10A300M ♦	1	CL10D300M ♦	1	CL10E300M ♦	1
Spare coils						CL00-CL03	LB1A ♦		5	LB1D ♦	5	-		
						CL04-CL05	LB3A ♦		5	LB3D ♦	5	-		
						CL07-CL10	LB4A ♦		5	LB4D ♦	1	-		
		coil + electronic module CL07E-CL10E										LB4E ♦	1	

(1) To complete the catalogue number, replace the symbol ♦ by the code corresponding to the voltage and frequency of the control circuit (see page A.41).





Four pole contactors. Screw terminal



Max.oper.current Non-inductive loads		Admissible power AC1				Electrical endurance	Power contacts		Control circuit: Alternating current		Control circuit: Direct current		Control circuit: Coil with electronic module (AC/DC)	
AC1 A	AC3 A	220V 230V	380V 400V	415V 440V	500V		Cat. AC1 Operations	d	b	Cat. no. <sup>(1)</sup>	Pack <sup>(2)</sup>	Cat. no. <sup>(1)</sup>	Pack <sup>(2)</sup>	Cat. no. <sup>(1)</sup>
		kW	kW	kW	kW							Ref. no. see bottom		Ref. no. see bottom
25	12	9.5	16.5	18	21.5	1.5×10 <sup>6</sup>	4	0	CL01A400T♦	5	CL01D400T♦	10	-	-
32	18	12	22	23	27.5	1.5×10 <sup>6</sup>	4	0	CL02A400T♦	5	CL02D400T♦	10	-	-
							0	4	CL02AA00T♦ <sup>(3)</sup>	5	CL02DA00T♦ <sup>(3)</sup>	10	-	-
45	25	17	29	32	39	2×10 <sup>6</sup>	4	0	CL03A400M♦	10	CL03D400M♦	10	-	-
60	32	22.5	39.5	43	52	1.5×10 <sup>6</sup>	4	0	CL04A400M♦	10	CL04D400M♦	10	-	CL05E400M♦ 1
90	50	34	59	64	78	1.5×10 <sup>6</sup>	4	0	CL05A400M♦	1	CL05D400M♦	1	-	CL07E400M♦ 1
110	65	42	72.5	79	95	1.8×10 <sup>6</sup>	4	0	CL07A400M♦	1	CL07D400M♦	1	-	CL09E400M♦ 1
140	95	53	92	100	121	1.8×10 <sup>6</sup>	4	0	CL09A400M♦	1	CL09D400M♦	1	-	-



Max.oper.current Non-inductive loads		Admissible power AC3				Electrical endurance	Power contacts		Control circuit: Alternating current		Control circuit: Direct current		Control circuit: Coil with electronic module (AC/DC)	
AC1 A	Motors <440V, 3~ 50/60Hz AC3 A	220V 230V	380V 400V	415V 440V	500V		d	b	Cat. no. <sup>(1)</sup>	Pack <sup>(2)</sup>	Cat. no. <sup>(1)</sup>	Pack <sup>(2)</sup>	Cat. no. <sup>(1)</sup>	Pack <sup>(2)</sup>
		kW HP	kW HP	kW HP	kW HP					Ref. no. see bottom		Ref. no. see bottom		Ref. no. see bottom
25	12	3 4	5.5 7.5	5.5 7.5	7.5 10			CL01AB00T♦	5	CL01DB00T♦	5	-	-	
32	18	4 5.5	7.5 10	7.5 10	10 13.5			CL02AB00T♦	5	CL02DB00T♦	5	-	-	
45	25	7.5 10	12 16	12 16	15 20			CL03AB00M♦	10	CL03DB00M♦	10	-	-	
60	32	9 12	16 22	16 22	18.5 25			CL04AB00M♦	10	CL04DB00M♦	10	-	-	
90	50	11 15	18.5 25	22 30	25 34			CL05AB00M♦	1	CL05DB00M♦	1	CL05EB00M♦	1	
110	65	18.5 25	30 40	37 50	40 55			CL07AB00M♦	1	CL07DB00M♦	1	CL07EB00M♦	1	
110	80	22 30	37 50	45 60	45 60			CL08AB00M♦	1	CL08DB00M♦	1	CL08EB00M♦	1	

Spare coils



CL01-CL02	LB1A ♦	5	LB1D ♦	5	-
CL03-CL04	LB3A ♦	5	LB3D ♦	5	-
CL05A - CL08A	LB4A ♦	5	LB4D ♦	1	-
Coil + Electronic module CL05E - CL08E	LB4E ♦	1	-	-	LB4E ♦ 1

(1) To complete the catalogue number, replace the symbol ♦ by the code corresponding to the voltage and frequency of the control circuit (see A.42).

(2) Multipack, see A.43

(3) CL02\_A... (4 N.C contacts) have no possibility of adding auxiliary contacts blocks.

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## Auxiliary contact blocks

Instantaneous		Number of contacts	Contacts				Type	Time	Cat. no.	Ref. no.	Pack
			.3	.1	.7	.5					
			.4	.2	.8	.6					
	Frontal mounting	Terminal: screw									
		1	1	0	0	0			BCLF10	104700	10
		1	0	1	0	0			BCLF01	104701	10
		1	0	0	1	0			BCLF10G	104702	10
		1	0	0	0	1			BCLF01G	104703	10
	Side mounting	Terminal: screw									
		2	2	0	0	0			BCLL20	104706	10
		2	1	1	0	0			BCLL11	104707	10
		For combinations of more than 4 front-mounted and 2 side-mounted auxiliary contact blocks									
		2	2	0	0	0			BRLL20	104704	10
		2	1	1	0	0			BRLL11	104705	10
		2	0	2	0	0			BRLL02	106622	10

Pneumatic timer		Number of contacts	Contacts				Type	Time	Cat. no.	Ref. no.	Pack
			.3	.1	.7	.5					
			.4	.2	.8	.6					
	Front mounting	Terminal: screw									
		2	0	0	1	1	Delay ON	0.1 - 30 sec.	BTLF30C	104709	10
		2	0	0	1	1	Delay ON	1 - 60 sec.	BTLF60C	104710	10
		2	0	0	1	1	Delay OFF	0.1 - 30 sec.	BTLF30D	104711	10
		2	0	0	1	1	Delay OFF	1 - 60 sec.	BTLF60D	104712	10
		Terminal: ring terminal									
		2	0	0	1	1	Delay ON	0.1 - 30 sec.	BTRF30C	108903	10
		2	0	0	1	1	Delay ON	1 - 60 sec.	BTRF60C	108904	10
		2	0	0	1	1	Delay OFF	0.1 - 30 sec.	BTRF30D	108905	10
		2	0	0	1	1	Delay OFF	1 - 60 sec.	BTRF60D	108906	10
Seaking cover protection for pneumatic timer								BTLFX	113001	5	


## Accessories


		Number of contacts	Contacts				For use with:	Cat. no. <sup>(1)</sup>	Ref. no.	Pack	
			.3	.1	.7	.5					
			.4	.2	.8	.6					
	Interlock	Mechanical									
		-	-	-	-	-	CL00 ... CL10	BELA	104723	5	
		Mech./ electrical									
		2	0	2	-	-	CL00 ... CL10	BELA02	104724	5	
	Mechanical latch blocks	Frontal mounted to the contactor									
								CL00 ... CL10	RMLF ♦	see bottom	10
		♦	D	G	HC	J	N	U	Y		
		50Hz	24, 32	42, 48		110, 115, 120, 127	220, 230, 240	380, 400, 415, 440, 480	500, 660/690		
		60Hz	24, 32	48, 60		110, 115, 120, 127	208, 220, 240, 277	380, 400, 415, 440, 480	600		
		DC	24, 32, 36	42, 48	60, 72	110, 120, 125	220, 230, 240, 250	440			

1) To complete the catalogue number, replace the symbol ♦ by the code corresponding to the voltage and frequency of the control circuit (see A.42).



## Accessories


	For use with	Type	Control circuit	Ue	Cat. no.	Ref. no.	Pack.
 Transient voltage suppressor block	Fixation to the coil terminals, that allows simultaneous use with the auxiliary contact blocks.						
	CL00 ... CL05A3	R/C	AC	12V ... 48V	BSLR2G	104713	10
	CL00 ... CL05A3	R/C	AC	50V ... 127V	BSLR2K	104714	10
	CL00 ... CL05A3	R/C	AC	130V ... 250V	BSLR2R	104715	10
	CL05A4, CL06 ... CL10A	R/C	AC	12V ... 48V	BSLR3G	104716	10
	CL05A4, CL06 ... CL10A	R/C	AC	50V ... 127V	BSLR3K	104717	10
	CL05A4, CL06 ... CL10A	R/C	AC	130V ... 250V	BSLR3R	104718	10
	CL_D	Diode	DC	12V ... 600V	BSLDZ	104719	10
	CL00 ... CL10	Varistor	AC / DC	24V ... 48V	BSLV3G	104720	10
	CL00 ... CL10	Varistor	AC / DC	50V ... 127V	BSLV3K	104721	10
	CL00 ... CL10	Varistor	AC / DC	130V ... 250V	BSLV3R	104722	10
	CL00 ... CL10	Varistor	AC / DC	277V ... 500V	BSLV3U	110836	10

	For use with	Control circ.	Type	Time	Cat. no.	Ref. no.	Pack.
 Electronic timer module	Fixation to the coil terminals, that allows simultaneous use with the auxiliary contact blocks.						
	CL00 ... CL10	24-250V AC/DC	delay ON	0.1 - 2 sec.	BETL02C	113602	5
	CL00 ... CL10	24-250V AC/DC	delay ON	1.5 - 45 sec.	BETL45C	113603	5
	CL00 ... CL10	24-250V AC/DC	delay OFF	0.1 - 2 sec.	BETL02D	113604	5
	CL00 ... CL10	24-250V AC/DC	delay OFF	1.5 - 45 sec.	BETL45D	113605	5

## Accessories

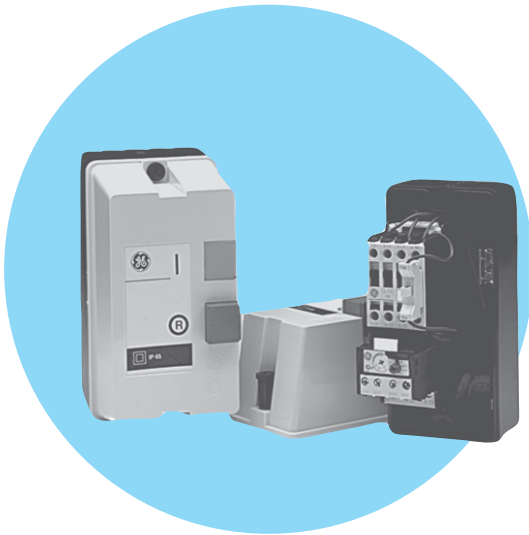
	For use with			Cat. no.	Ref. no.	Pack.
Identification	CL00 ... CL10	Sheets of labels (sheets of 260 labels each)		EAT 260	100548	1
	CL00 ... CL10	Labelling plate base (50 pieces in one pack)		SPR	100549	1
Pole terminal protector IPXXB	CL04			PTP04	113850	8
	CL05_3			PTP45	113851	6
	CL05_4 ... CL08			PTP08	113852	8
	CL09 ... CL10			PTP10	113853	8

## Series CL - Reversing starters

	Description	For use with contactor	AC / DC	Cat. no.	Ref. no.	Pack.
 Wiring kits for reversing starters	Suitable to be used with link modules	CL00..., CL01..., CL02...	AC / DC	WKLI02P	101422	1
	Upper and lower connections without overload relays					
Plate	Metallic plate	CL06, CL07, CL08		WKI0910	241751	1
		CL08, CL09, CL10		WKI0608	241752	1

## Direct-on-line starters

### Series CL 9 to 105A (AC-3)



- Power circuit: up to 690V AC
- Control circuit: up to 690V AC
- Protection degree IP00
- Polycarbonate enclosure (IP40 - IP65)
  - Shock resistance
  - Total insulation  $\square$
  - 4 knock-out input holes
- Empty enclosures version
- Start contact block

### Series CL - Direct-on-line starters

	For use with	Push-buttons	Protection degree	Cat. no.	Ref. no.	Pack.
	Empty boxes	Start/Stop + Reset	IP40	<b>LG0004P1B0</b>	209344	1
			IP65	<b>LG0006P1B0</b>	200004	1
		Without push-buttons	IP40	<b>LG0004S1B0</b>	209347	1
			IP65	<b>LG0006S1B0</b>	116011	1
		Only Reset	IP40	<b>LG0004R1B0</b>	116651	1
			IP65	<b>LG0006R1B0</b>	116652	1
	CL03...T	Start/Stop + Reset	IP40	<b>LG2504P1B0</b>	100885	1
			IP65	<b>LG2506P1B0</b>	101095	1
		Only Reset	IP40	<b>LG2504R1B0</b>	133611	1
			IP65	<b>LG2506R1B0</b>	133611	1
CL04	Start/Stop + Reset	IP40	<b>LG0404P1B0</b>	116653	1	
		IP65	<b>LG0406P1B0</b>	116656	1	
CL03, CL04	Without push-buttons	IP40	<b>LG0404S1B0</b>	133265	1	
		IP65	<b>LG0406S1B0</b>	116996	1	
	Neutral terminal			<b>BNL</b>	104797	10
	Conversion to permanent control	Pressure-fixed between push-buttons in direct-on-line enclosures for mechanical interlocking into permanent control.		<b>EPL</b>	104798	10
	Start contact block spare part	Pressure-fixed onto the front of direct-on-line starters allowing electrical operation using the start push-button on the enclosure. <i>Already built-in, order it as a spare part.</i>		<b>BMLF</b>	104800	10

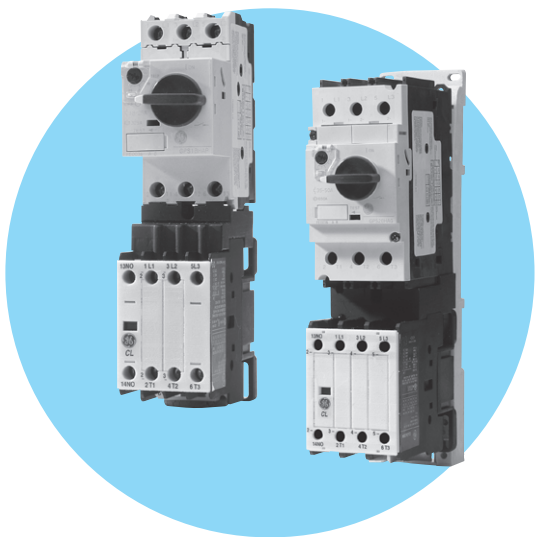
## Fuseless starters and busbar adapter plates

### Technical performances

- Compact and high performance solution
- Easy accessibility to the contactor coil terminal A1-A2
- Save spacing only using 45 and 55mm width base plates for busbar adapters
- Quick “clip on” and secure connections
- Minimum 50kA short-circuit breaking capacity applies throughout

For fuseless starter application turn the contactor 180° to have direct accessibility to the A1-A2 coil terminals when contactor is assembled to the manual motor starter.

Note: when turning the contactor 180° the built-in auxiliary contact (in case) will be located on the first left side terminal.



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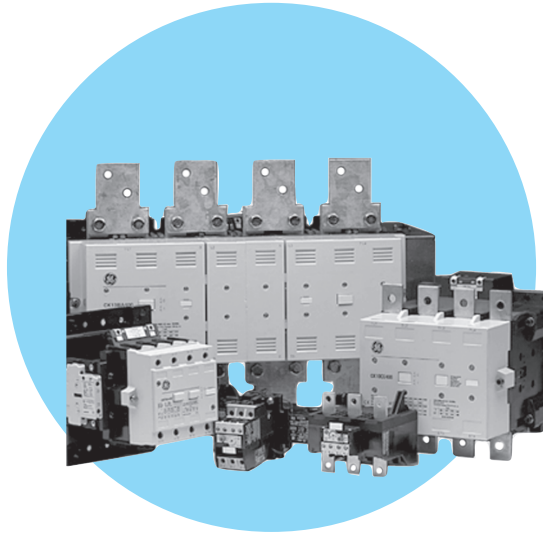
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### Fuseless starters

	Description	For use with contactor	ac/dc	Frame size	Cat. no.	Ref. no.	Pack.
	Link modules For mechanical and electrical connection between contactors and manual motor starters	CL00A.., CL01A.., CL02A..	ac	GPS1	<b>GPF1L02AA</b>	101411	5
		CL00D.., CL01D.., CL02D..	dc	GPS1	<b>GPF1L02DA</b>	101412	5
		CL03A..	ac	GPS1	<b>GPF1L25AA</b>	101413	5
		CL03D..	dc	GPS1	<b>GPF1L25DA</b>	101414	5
		CL04A..	ac	GPS1	<b>GPF1L04AA</b>	107165	5
		CL04D..	dc	GPS1	<b>GPF1L04DA</b>	107166	5
		CL04A..	ac	GPS2	<b>GPF2L04AA</b>	107190	5
		CL05A..	ac	GPS2	<b>GPF2L45AA</b>	101415	5
		CL04D..	dc	GPS2	<b>GPF2L04DA</b>	107191	5
		CL05A..	dc	GPS2	<b>GPF2L45DA</b>	101416	5
CL07A..	ac	GPS2	<b>GPF2L07AA</b>	101417	5		
	For mechanical and electrical connection between contactor and thermal overload relays RT1	CL00.. - CL03	ac/dc	GPS1	<b>GPF1L25CT1</b>	101512	5
		CL04.. - CL05	ac/dc	GPS2	<b>GPF1L45CT1</b>	101513	5
	Base plates Plastic plates for mounting the fuseless starter in panels or in 35mm DIN rail	CL00.., CL01.., CL02.., CL03..	ac/dc	GPS1	<b>GPF1B1A</b>	101418	5
		CL04.. and CL05..	ac/dc	GPS2	<b>GPF2B2A</b>	101419	5
		CL07..	ac/dc	GPS2	<b>GPF2B3A</b>	101420	5
		CL04..	ac/dc	GPS1	<b>GPF1B4A</b>	107163	5
	Link connector For two base plates for reversing applications	-	-	-	<b>GPF1CBA</b>	101427	10





## Three and four pole contactors 150 to 825A (AC3) 200 to 1250A (AC1)

- Control circuit: Alternating current up to 600V  
AC/DC up to 500V
- Degree of protection IP00 (IPxxB with accessories)
- Auxiliary and coil terminals originally protected against accidental contacts.  
Protection for power contacts on request (see accessories)
- CK contactors always provided with one auxiliary contact block BCLL11 (1NO+1NC)

The electronic module has been designed to support customer request to succeed in the most demanding applications. The new electronic module redesign from GE provides much better reliability versus any previous electronic modules or pure mechanical systems. This will help customer to reduce production shortages and maintenance downtimes to a minimum.

### Standards

IEC/EN 60947-1	CSA 22.2/14
IEC/EN 60947-4-1	CENELEC HD 419
IEC/EN 60947-5-1	NFC 63-110
EN 50005	ASE 1025
UL 508	UNE 20109
NEMA ICS 1	VDE 0660/102
BS 5424 & 775	

### Approvals/Marking



cULus

CE



Lloyd's Register



Bureau Veritas



RINA



#### 24-60V

##### (AC 50/60Hz and DC):

With special reinforce of the lower range (-30%) solving typical application issues when using big contactors with 24V supply.

#### 48-130V

##### (AC 50/60Hz and DC):

Covers the most common voltages used in transportation segment with only one contactor.

#### 100-250V

(AC 50/60Hz and DC): This range replaces the most popular automation voltages; 110-120VAC, 125VDC (MV application) and 220-240VAC.

Allowing OEM, Distributors and PB to optimize their stocks and service end customer.

#### 250-500V

##### (AC 50/60Hz and DC):

Typical voltage for Power Switching application. This contactor helps OEM in UPS, Data Centers and Power Quality application to standardize their machines to be sold WorldWide.

- Order codes ● page A.49
- Accessories & Spares ● page A.50
- Aux. contact blocks ● page A.51
- Technical data ● page A.99
- Dimensions ● page A.126



Three pole contactors

Max. operating current		Admissible power AC3					Electr. endurance	Control circuit AC				Control circuit AC/DC				
Not inductive load AC1 A	Motor <480V, 3~ AC3 A	220-240V	380-415V	440-480V	550-600V	690V	Cat. AC3 oper.	AC 50Hz	AC 60Hz	Cat. no.	Ref. no.	AC/DC	Cat. no.	Ref. no.		
		kW hp	kW hp	kW hp	kW hp	kW										
250	150	45	75			100	1.7x10 <sup>6</sup>	110	120	CK75CA311J	113103	24-60	CK75CE311W24-60	246150		
								220-230	277	CK75CA311N	133188	48-130	CK75CE311W48-130	246151		
		50	100					100	125	380-400	480	CK75CA311U	113105	100-250	CK75CE311W100-250	246152
										500	600	CK75CA311Y	113122	250-500	CK75CE311W250-500	246153
250	195	55	110			132	1.2x10 <sup>6</sup>	110	120	CK08CA311J	113133	24-60	CK08CE311W24-60	246154		
								220-230	277	CK08CA311N	133187	48-130	CK08CE311W48-130	246155		
		60	125					125	125	380-400	480	CK08CA311U	113135	100-250	CK08CE311W100-250	246156
										500	600	CK08CA311Y	101047	250-500	CK08CE311W250-500	246157
315	250	75	132			200	1.7x10 <sup>6</sup>					24-60	CK09BE311W24-60	246162		
												48-130	CK09BE311W48-130	246163		
		75	150									150	150	100-250	CK09BE311W100-250	246164
														250-500	CK09BE311W250-500	246165
450	309	90	160			250	1.5x10 <sup>6</sup>					24-60	CK95BE311W24-60	246166		
												48-130	CK95BE311W48-130	246167		
		100	250									250	300	100-250	CK95BE311W100-250	246168
														250-500	CK95BE311W250-500	246169
600	420	132	200			375	1.1x10 <sup>6</sup>					24-60	CK10CE311W24-60	246170		
												48-130	CK10CE311W48-130	246171		
		150	300									300	400	100-250	CK10CE311W100-250	246172
														250-500	CK10CE311W250-500	246173
700	550	160	310			450	1x10 <sup>6</sup>					24-60	CK11CE311W24-60	246174		
												48-130	CK11CE311W48-130	246175		
		200	400									400	500	100-250	CK11CE311W100-250	246176
														250-500	CK11CE311W250-500	246177
1000	720	200	400			500	0.8x10 <sup>6</sup>					24-60	CK12BE311W24-60	246178		
												48-130	CK12BE311W48-130	246179		
		250	500									500	600	100-250	CK12BE311W100-250	246180
														250-500	CK12BE311W250-500	246181
1250	825	250	400			550	0.7x10 <sup>6</sup>	100-130	100-130	CK13BA311J	104523					
								208-260	208-260	CK13BA311N	104524					
								380-440	380-440	CK13BA311U	104525					
								480-500	480-500	CK13BA311Y	104526					

AC spare coils for 3 phase contactors

Use with	AC Voltage	Cat. No.	Ref. No.
CK75CA3...CK08CA3	110V 50Hz 120V 60Hz	C12168J	104893
	220-230V 50Hz 277V 60Hz	C12168N	104894
	380-400V 50Hz 480V 60Hz	C12168U	113888
	500V 50Hz 600V 60Hz	C12168Y	133838
CK13BA3...	100-130V 50/60 Hz	C08998J	104833
	208-260V 50/60 Hz	C08998N	104834
	380-440V 50/60 Hz	C08998U	104835
	480-500V 50/60 Hz	C08998Y	110545

Spare part and conversion kit: electronic module and coil

3 poles	24-60V		48-130V	
	Cat. No.	Ref. No.	Cat. No.	Ref. No.
CK75CE311	KKIT4E24-60	246130	KKIT4E48-130	246131
CK08CE311	KKIT4E24-60	246130	KKIT4E48-130	246131
CK85BE311	KKIT5E24-60	246134	KKIT5E48-130	246135
CK09BE311	KKIT5E24-60	246134	KKIT5E48-130	246135
CK95BE311	KKIT5E24-60	246134	KKIT5E48-130	246135
CK10CE311	KKIT7E24-60	246138	KKIT7E48-130	246139
CK11CE311	KKIT7E24-60	246138	KKIT7E48-130	246139
CK12BE311	KKIT8E24-60	246142	KKIT8E48-130	246143
	100-250V		250-500V	
CK75CE311	KKIT4E100-250	246132	KKIT4E250-500	246133
CK08CE311	KKIT4E100-250	246132	KKIT4E250-500	246133
CK85BE311	KKIT5E100-250	246136	KKIT5E250-500	246137
CK09BE311	KKIT5E100-250	246136	KKIT5E250-500	246137
CK95BE311	KKIT5E100-250	246136	KKIT5E250-500	246137
CK10CE311	KKIT7E100-250	246140	KKIT7E250-500	246141
CK11CE311	KKIT7E100-250	246140	KKIT7E250-500	246141
CK12BE311	KKIT8E100-250	246144	KKIT8E250-500	246145

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## Four pole contactors

Max. operating current	Admissible Power							Electr. endurance	Control circuit AC				Control circuit AC/DC		
	AC3		AC1						Cat. AC3 oper.	AC		Cat. no.	Ref. no.	AC/DC	Cat. no.
Not inductive load AC1	380V 415V	220V 240V	380V 415V	440V 480V	550V 600V	690V	AC 50Hz	AC 60Hz							
A	A	kW	kW	kW	kW	kW									
200	55	105	76	131	143	173	228	1x10 <sup>6</sup>	110	120	CK07BA411J	104533	24-60	CK07BE411W24-60	246182
									220-230	277	CK07BA411N	104534	48-130	CK07BE411W48-130	246183
									380-400	480	CK07BA411U	104535	100-250	CK07BE411W100-250	246184
									500	600	CK07BA411Y	110337	250-500	CK07BE411W250-500	246185
350	100	185	123	214	233	281	371	0.6x10 <sup>6</sup>	110	120	CK08BA411J	104543	24-60	CK08BE411W24-60	246186
									220-230	277	CK08BA411N	104544	48-130	CK08BE411W48-130	246187
									380-400	480	CK08BA411U	104545	100-250	CK08BE411W100-250	246188
									500	600	CK08BA411Y	107244	250-500	CK08BE411W250-500	246189
400	132	250	152	263	287	346	457	0.6x10 <sup>6</sup>					24-60	CK09BE411W24-60	246190
													48-130	CK09BE411W48-130	246191
													100-250	CK09BE411W100-250	246192
													250-500	CK09BE411W250-500	246193
500	160	309	191	329	359	415	572	0.6x10 <sup>6</sup>					24-60	CK95BE411W24-60	246194
													48-130	CK95BE411W48-130	246195
													100-250	CK95BE411W100-250	246196
													250-500	CK95BE411W250-500	246197
600	220	408	228	395	431	519	686	0.5x10 <sup>6</sup>					24-60	CK10CE411W24-60	246198
													48-130	CK10CE411W48-130	246199
													100-250	CK10CE411W100-250	246200
													250-500	CK10CE411W250-500	246201
700	280	530	266	460	503	606	800	0.4x10 <sup>6</sup>					24-60	CK11CE411W24-60	246202
													48-130	CK11CE411W48-130	246203
													100-250	CK11CE411W100-250	246204
													250-500	CK11CE411W250-500	246205
1000	375	680	381	658	719	866	1143	0.4x10 <sup>6</sup>					24-60	CK12BE411W24-60	246206
													48-130	CK12BE411W48-130	246207
													100-250	CK12BE411W100-250	246208
													250-500	CK12BE411W250-500	246209
1250	450	800	476	822	898	1082	1428	0.6x10 <sup>6</sup>	100-130	100-130	CK13BA411J	104603			
									208-260	208-260	CK13BA411N	104604			
									380-440	380-440	CK13BA411U	104605			
									480-500	480-500	CK13BA411Y	107243			

## Spare part and conversion kit: electronic module and coil

4 poles	24-60V		48-130V		
	Cat. No.	Ref. No.	Cat. No.	Ref. No.	
CK07BE411	KKIT5E24-60	246134	KKIT5E48-130	246135	
CK08BE411	KKIT8E24-60	246142	KKIT8E48-130	246143	
CK09BE411	KKIT8E24-60	246142	KKIT8E48-130	246143	
CK95BE411	KKIT8E24-60	246142	KKIT8E48-130	246143	
CK10CE411	KKIT7E24-60	246138	KKIT7E48-130	246139	
CK11CE411	KKIT7E24-60	246138	KKIT7E48-130	246139	
CK12BE411	KKIT8E24-60	246142	KKIT8E48-130	246143	
		100-250V		250-500V	
CK07BE411	KKIT5E100-250	246136	KKIT5E250-500	246137	
CK08BE411	KKIT8E100-250	246144	KKIT8E250-500	246145	
CK09BE411	KKIT8E100-250	246144	KKIT8E250-500	246145	
CK95BE411	KKIT8E100-250	246144	KKIT8E250-500	246145	
CK10CE411	KKIT7E100-250	246140	KKIT7E250-500	246141	
CK11CE411	KKIT7E100-250	246140	KKIT7E250-500	246141	
CK12BE411	KKIT8E100-250	246144	KKIT8E250-500	246145	

## AC spare coils for 4 phase contactors

Use with	AC Voltage	Cat. No.	Ref. No.
CK07BA4...	110V 50Hz 120V 60Hz	C04255J	104813
CK07BA4...	220-230V 50Hz 277V 60Hz	C04255N	104814
CK07BA4...	380-400V 50Hz 480V 60Hz	C04255U	104815
CK07BA4...	500V 50Hz 600V 60Hz	C04255Y	110513
CK08BA4...	110V 50Hz 120V 60Hz	C04787J	104823
CK08BA4...	220-230V 50Hz 277V 60Hz	C04787N	104824
CK08BA4...	380-400V 50Hz 480V 60Hz	C04787U	104825
CK08BA4...	500V 50Hz 600V 60Hz	C04787Y	110529
CK13BA4...	110V 50Hz 120V 60Hz	C08998J	104833
CK13BA4...	220-230V 50Hz 277V 60Hz	C08998N	104834
CK13BA4...	380-400V 50Hz 480V 60Hz	C08998U	104835
CK13BA4...	500V 50Hz 600V 60Hz	C08998Y	110545





**Auxiliary instantaneous contact block**



Side mounting

Number of contacts	Contacts				Cat. no.	Ref. no.	Pack
	•3  •4	•1 •2	•7  •8	•5 •6			
2	2	0	0	0	BCLL20	104706	10
2	1	1	0	0	BCLL11	104707	10
Combinations of more than 2 blocks							
2	2	0	0	0	BRLL20	104704	10
2	1	1	0	0	BRLL11	104705	10
2	0	2	0	0	BRLL02	106622	10

**Accessories**

Transient voltage suppressor



For use with:	Suppressor type	Voltage	Ue	Cat. no.	Ref. no.	Pack	
Fixation to the coil terminals, that allows simultaneous use with the auxiliary contact blocks.							
CK75CA...CK08CA	RC	AC	24V - 48V	BSLR3G	104716	10	
CK75CA...CK08CA	RC	AC	50V - 127V	BSLR3K	104717	10	
CK75CA...CK08CA	RC	AC	130V - 240V	BSLR3R	104718	10	
CK75CA...CK08CA	Varistor	AC/DC	227V - 500V	BSLV3U	110836	10	
CK07BA, CK08BA and CK13BA	RC	AC	24V	KRC24	104760	10	
CK07BA, CK08BA and CK13BA	RC	AC	260V	KRC48/260	104761	10	
CK07BA, CK08BA and CK13BA	RC	AC	415V	KRC380/415	104762	10	
<b>Only for CSA market</b>							
CK75CE	Varistor	250-500	AC/DC	BSLV4U	204895	10	
CK08CE-CK12BE	Varistor	250-500	AC/DC	BSLV5U	204896	10	

Mechanical interlock



For use with:	Mounting	Cat. no.	Ref. no.	Pack
CK07B ... CK12	Horizontal	BEKH	104763	1
CK07B ... CK95	Vertical	BEKVS 1	104786	1
CK10C ... CK12B	Vertical	BEKVA 1	104785	1
CK13	Vertical	BEKV	104764	1

Pole terminal protection

For use with:	Type	Cat. no.	Ref. no.	Pack
CK75C ... CK08C	1 pole, VDE0106	CM1CA5F	105200	1
CK85B ... CK12B	1 pole, VDE0106	C09476	104766	6
CK08B ... CK12B	1 pole, VDE0106	C09479	204800	8
CK75C ... CK08C	1 pole IPXXB	PTPCK75	103747	1 <sup>(1)</sup>
CK85B ... CK95B	1 pole IPXXB	PTPCK95	103748	3 <sup>(2)</sup>
CK10C ... CK12B	1 pole IPXXB	PTPCK11	103749	1 <sup>(1)</sup>

(1) One phase  
(2) Three pole

**Spares**

Contact kits



For use with:	Type	Cat. no.	Ref. no.	Pack
One set consists of two fixed contacts, one moving contact and accessory parts. When contact replacement is needed, it is recommended to replace all the contacts at the same time.				
CK07B	NA	V1107BA	113612	1
CK75C	NA	V1175CA	113613	1
CK08C	NA	V1108CA	113614	1
CK08B	NA	V1108B4	113505	1
CK85B	NA	V1185BA	113615	1
CK09B	NA	V1109BA	113616	1
CK09B	NA	V1109B4	113899	1
CK95B	NA	V1195BA	113617	1
CK10C	NA	V1110CE	113618	1
CK11C	NA	V1111CE	113619	1
CK12B	NA	V1112BA	113620	1
CK13B	NA	V1113BA	113621	1

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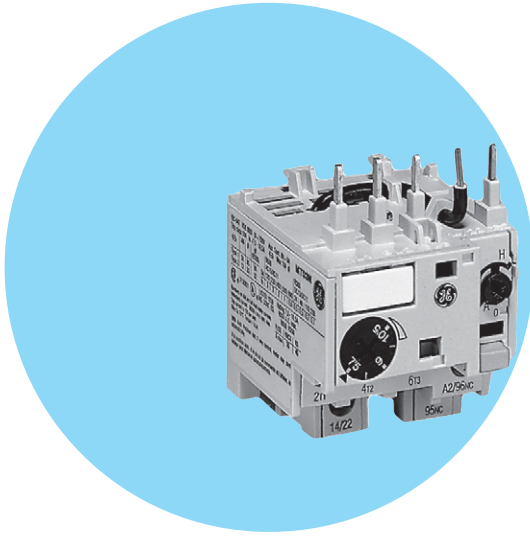
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## Thermal overload relays for contactors from 0.11 to 14A

- Control circuit up to 690V
- Power circuit up to 690V
- Three-pole differential (phase unbalance protection)
- Automatic ambient temperature compensation between -25°C and +60°C
- Choice of manual or automatic reset
- Direct connection to contactor or independent mounting using accessories.
- Screw and Ring terminal versions
- Terminals protected against accidental contact in accordance with VDE 0106 T.100 and VBG4.
- Terminal numbering in accordance with EN 50005
- Degree of protection IP20 (EN 60529)

### Standards

IEC/EN 60947-4-1	CSA 22.2/14
IEC/EN 60947-5-1	NI C 63-650
UNE 115	VDE 0660
NFC 63-650	UL 508

### General characteristics


- Thermal protection against balanced overload.
- Three-pole differential (phase unbalance protection).
- Automatic ambient temperature compensation.
- Front mounted selector for choosing utilisation current.
- Reset button, 2 positions :  
Manual(H) and Automatic(A) by turning the blue selector.
- Stop push button, independent of reset (red).
- Manual trip lever (tripping test).
- Tripping indicator (0-1).
- To facilitate wiring arrangements terminal 96 fits directly onto coil terminal (A2) and terminal 14/22 fits directly onto the feedback auxiliary contact.

### Approvals/Marking






Order codes ● page A.53  
 Technical data ● page A.130  
 Dimensions ● page A.131

Thermal overload relays for contactors

	For use with:	Setting range (regulation)		Fuse				Terminal: screw		Terminal: ring terminal		Pack
				aM		gL		Cat. no.	Ref. no.	Cat. no.	Ref. no.	
				Type 2	Type 1	Type 2	Type 1					
	MC0...	0.11	0.17	0.5	0.5	0.5	0.5	MT03A	101000	MT03RA	103540	10
	MC1...	0.17	0.26	0.85	1	1	1	MT03B	101001	MT03RB	103541	10
	MC2...	0.26	0.43	1	2	2	4	MT03C	101002	MT03RC	103542	10
		0.43	0.65	1	4	2	8	MT03D	101003	MT03RD	103543	10
		0.65	1	2	6	4	12	MT03E	101004	MT03RE	103544	10
		0.85	1.3	2	6	4	12	MT03F	101005	MT03RF	103545	10
		1.1	1.6	2	10	4	16	MT03G	101006	MT03RG	103546	10
		1.35	2	4	10	6	16	MT03H	101007	MT03RH	103547	10
		1.7	2.4	4	16	6	25	MT03I	101008	MT03RI	103548	10
		2.2	3.2	4	20	6	32	MT03J	101009	MT03RJ	103549	10
		2.5	4	4	20	6	32	MT03R	101015			10
		3	4.7	6	20	10	32	MT03K	101010	MT03RK	103550	10
		4	6.3	10	32	16	50	MT03L	101011	MT03RL	103551	10
		5.5	8	12	50	20	63	MT03M	101012	MT03RM	103552	10
		7.5	10.5	16	50	25	80	MT03N	101013	MT03RN	103553	10
		10	14	20	32	32	100	MT03P	101014	MT03RP	103554	10

Accessories

			Terminal	Cat. no.	Ref. no.	Pack
	Input terminals		Screw	MVE0T	101020	5
			Ring terminal	MVE0R	103562	5
	Base	For separate mounting onto standard EN 50022-35 profile		MVB0T	101021	5
	Auxiliary contact block	Frontal fixing to the relay With trip indicator (0-I) One block per relay and only for manual reset	Screw	MATV10AT	101022	10
			Ring terminal	MATV10AR	103563	10
	Identification	Sheets of labels (sheets of 260 labels each)		EAT 260	100548	1
		Labeling plate base (50 pieces in one pack)		SPR	100549	1

Order codes

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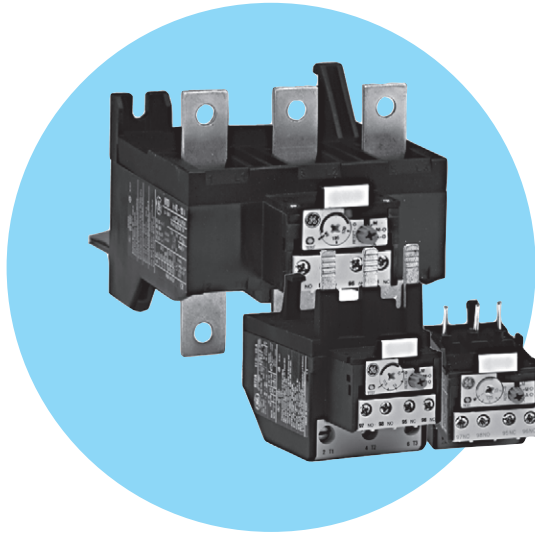
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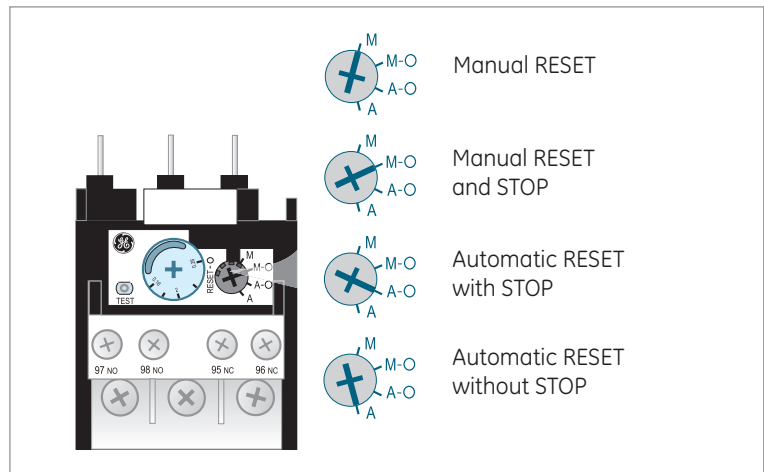
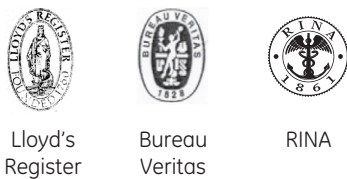
## Thermal overload relays for contactors from 0.16 to 850A

- Control circuit up to 690V AC
- Power circuit:
  - RT1, RT12: up to 690V
  - RT2, RT22, RT3, RT32, RT4/4L, RT5/5L & RT6/6L: up to 1000V
- Thermal protection against normal overloads.
- Three pole differential (phase unbalance protection).
- Protection against long starting times.
- Automatic ambient temperature compensation between -25°C +60°C.
- Front mounted test button.
- Trip indication.
- Independent auxiliary contacts with double rupture (1NO + 1NC).
- Function selector:
  - Manual RESET
  - Manual RESET and STOP
  - Automatic RESET with STOP
  - Automatic RESET without STOP

### Standards

IEC/EN 60947-4-1	CSA 22.2/14
IEC/EN 60947-5-1	NI C 63-650
UNE 115	VDE 0660
NFC 63-650	UL 508
CEI 17-50	

### Approvals/Marking



Order codes ● page A.55  
 Technical data ● page A.132  
 Dimensions ● page A.136



Thermal overload relays for EC contactors



Class	For use with	Setting range		Fuses <sup>(1)</sup>		Box clamp terminals		Pack		
		Min. A	Max. A	AM A	gL-gG A	Cat. no.	Ref. no.			
Class 10A	EC09 EC12 EC18	0.16	0.26	2	2	ECRT1B10B	268996	5		
		0.25	0.41	2	2	ECRT1B10C	268997	5		
		0.40	0.65	2	2	ECRT1B10D	268998	5		
		0.65	1.10	2	4	ECRT1B10F	268999	5		
		1.00	1.50	4	6	ECRT1B10G	269000	5		
		1.30	1.90	4	6	ECRT1B10H	269001	5		
		1.80	2.70	6	10	ECRT1B10J	269002	5		
		2.50	4.00	8	16	ECRT1B10K	269003	5		
		4.00	6.30	12	20	ECRT1B10L	269004	5		
		5.50	8.50	16	20	ECRT1B10M	269005	5		
		8.00	12.00	20	25	ECRT1B10N	269006	5		
		10.00	16.00	25	35	ECRT1B10P	269007	5		
		14.50	18.00	32	50	ECRT1B10S	269008	5		
		17.50	22.00	40	63	ECRT1B10T	269009	5		
		Class 10A	EC25 EC32 EC40	8.00	12.00	20	25	ECRT2B10N	268103	5
				10.00	16.00	25	35	ECRT2B10P	268104	5
				14.50	18.00	32	50	ECRT2B10S	268105	5
17.50	22.00			40	63	ECRT2B10T	268106	5		
21.00	26.00			40	63	ECRT2B10U	268107	5		
25.00	32.00			50	80	ECRT2B10V	268108	5		
30.00	40.00			63	100	ECRT2B10W	268109	5		

Thermal overload relays for contactors



Class	For use with	Setting range (regulation)		Fuses <sup>(1)</sup>		Screw terminal		Ring terminal		Pack		
		Min. A	Max. A	AM A	gL-gG A	Cat. no.	Ref. no.	Cat. no.	Ref. no.			
Class 10A	CL00 CL01 CL02 CL03 CL04 CL05	0.16	0.26	2	2	RT1B	113700	RT1RB	114087	5		
		0.25	0.41	2	2	RT1C	113701	RT1RC	114131	5		
		0.4	0.65	2	2	RT1D	113702	RT1RD	114089	5		
		0.65	1.1	2	4	RT1F	113703	RT1RF	114090	5		
		1.0	1.5	4	6	RT1G	113704	RT1RG	114091	5		
		1.3	1.9	4	6	RT1H	113705	RT1RH	114092	5		
		1.8	2.7	6	10	RT1J	113706	RT1RJ	114093	5		
		2.5	4.1	8	16	RT1K	113707	RT1RK	114094	5		
		4.0	6.3	12	20	RT1L	113708	RT1RL	114095	5		
		5.5	8.5	16	20	RT1M	113709	RT1RM	114096	5		
		8.0	12.0	20	25	RT1N	113710	RT1RN	114097	5		
		10.0	16.0	25	35	RT1P	113711	RT1RP	114098	5		
		14.5	18.0	32	50	RT1S	113712	RT1RS	114099	5		
		17.5	22.0	40	50	RT1T	113713	RT1RT	114100	5		
		21.0	26.0	40	63	RT1U	113714	RT1RU	114101	5		
		25.0	32.0	50	80	RT1V	113715	RT1RV	114102	5		
		30.0	40.0	63	100	RT1W	113716	RT1RW	114103	5		
		Class 10	CL07 CL08 CL09 CL10 EF50 EF65 EF80 EF95 EF105	11.5	15.0	32	35	RT2A	113717	RT2RA	114104	1
				14.5	19.0	40	50	RT2B	113718	RT2RB	114132	1
				18.5	25.0	50	63	RT2C	113719	RT2RC	114106	1
24.0	32.0			63	100	RT2D	113720	RT2RD	114133	1		
30.0	43.0			80	125	RT2E	113721	RT2RE	114134	1		
42.0	55.0			100	160	RT2G	113722	RT2RG	114109	1		
54.0	65.0			125	160	RT2H	113723	RT2RH	114146	1		
64.0	82.0			125	200	RT2J	113724	RT2RJ	114136	1		
78.0	97.0			125	200	RT2L	113725	RT2RL	114235	1		
90.0	110			160	250	RT2M	113726	RT2RM	114113	1		

(1) Most suitable fuse in accordance with IEC 60947-4-1.

(continued on page A.56)



## Thermal overload relays for contactors (continued)



	For use with:	Setting range (regulation)		Fuses <sup>(1)</sup>		Screw terminal		Pack	
		Min. A A	Max. A A	AM A	gL-gG A	Cat. no.	Ref. no.		
Class 10	CK75 CK08 Direct mounting	55	80	125	200	RT3B	113727	1	
		63	90	125	200	RT3C	113728	1	
		90	120	160	250	RT3D	113729	1	
		110	140	200	315	RT3E	113730	1	
		140	190	250	355	RT3F	113731	1	
	CK85 CK09 CK95 <sup>(2)</sup>	120	190	250	315	RT4N	113732	1	
		175	280	315	400	RT4P	113733	1	
		200	310	400	500	RT4R	113734	1	
	CK10 CK11 CK12 <sup>(2)</sup>	120	190	250	315	RT5A	113750	1	
		175	280	315	400	RT5B	113751	1	
		250	400	500	630	RT5C	113752	1	
		315	500	630	800	RT5D	113753	1	
		430	700	800	1000	RT5E	113754	1	
	CK13	500	850	100	1250	RT6A	113760	1	
	Class 20	CK75 CK08 Direct mounting	63	90	125	200	RT32C	113657	1
90			120	160	250	RT32D	113658	1	
110			140	200	315	RT32E	113659	1	
140			190	250	355	RT32F	113660	1	
Class 30	CL... CK... Mounting with screws	2.5	4	10	15	RT4LA	113735	1	
		4	6.5	12	20	RT4LB	113736	1	
		5.5	8.5	16	25	RT4LC	113737	1	
		7.5	11	20	32	RT4LD	113738	1	
		10	16	25	40	RT4LE	113739	1	
		12.5	20	32	50	RT4LF	113740	1	
		17	27	50	80	RT4LG	113741	1	
		26	40	80	125	RT4LH	113742	1	
		32	52	100	160	RT4LJ	113743	1	
		45	70	125	160	RT4LK	113744	1	
	CK85 CK09 CK95 <sup>(2)</sup>	60	90	160	200	RT4LL	113745	1	
		80	125	200	250	RT4LM	113746	1	
		120	190	250	315	RT4LN	113747	1	
		175	280	315	400	RT4LP	113748	1	
		200	310	400	500	RT4LR	113749	1	
		CK10 CK11 CK12 <sup>(2)</sup>	120	190	250	315	RT5LA	113755	1
			175	280	315	400	RT5LB	113756	1
			250	400	500	630	RT5LC	113757	1
			315	500	630	800	RT5LD	113758	1
			430	700	800	1000	RT5LE	113759	1
CK13	500	850	1000	1250	RT6LA	113761	1		

(1) Most suitable fuse in accordance with IEC 60947-4-1.

(2) Fitting direct to the contactor: by means of a coupling and connection set.

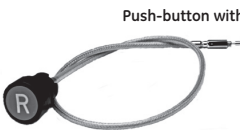
## Accessories



Use with	Description	Cat. no.	Ref. no.	Pack
<b>Base for separate mounting</b>				
ECRT1	DIN EN50022-35	ECRT1BS	268963	1
ECRT2	DIN EN50022-35	ECRT2BS	268964	1

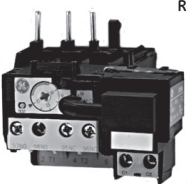
RT1	DIN EN50022-35	RTXP	105170	1
RT2	DIN EN50022-35	RT2XP	113764	1

Setting range cover protection	RT...	RTX3	113762	1
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Push-button with flexible cable	for distance RESET				
	RT1... - RT6... (front)	0.5 meters	RTXS	113855	1
	RT1... - RT6... (front)	1 meters	RTXSL	113856	1
	RT1... RT2... RT4... RT5... RT6... (back)		RTXBS	108864	1

Terminal protection	for RT3 or CK75C/CK08C			
	Thermal overload relay	pole IPxB	PTPCK75	103747



Remote electrical reset	RT1... - RT6...	RTXRR ♦	-	1
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### Available coil voltages (V)

♦	B	D	G	J	N	U	X
AC/DC	12	24	48	110	220	380	440
				240	415	480	

Order codes

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## Electronic overload relays



### Approvals/Marking



### Product features

- Lower power consumption
- Great accuracy
- Full reliability
- Phase unbalance protection
- Direct fitting to contactors Series CL
- Interchangeable with thermal overload relay
- Multiple trip class selection
- Manual / Auto reset

### ➤ Your benefits

- Saving space into cabinet
- Better motor protection
- Low risk to burn motor
- Better motor protection and current control
- Compact starter
- No need to redesign existing cabinet
- One device cover for start time motor
- One device for two solutions

### Main characteristics

- Setting range from 0.1 up to 150A
- Self powered
- Thermal memory
- Phase loss protection
- Phase unbalance protection
- Direct fitting to contactors Series CL
- Interchangeable with thermal overload relay
- Multiple trip class selection
- Manual / Auto reset
- Increased flexibility, less order codes, less stock
- Trip class: 5 - 10 - 20 - 30

Order codes ● page A.59  
 Dimensions ● page A.138



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Intro



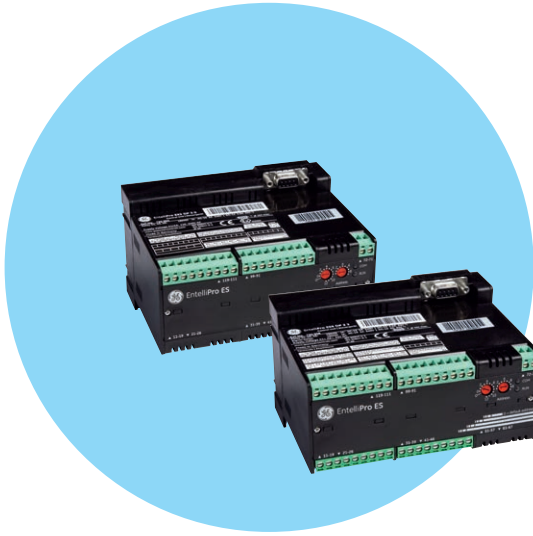
Electronic overload relays for contactors

	Suitable for	Setting range (A)		Fuses (A) <sup>(1)</sup>	Cat. no.	Ref. no.	Pack.
		Min.	Max.	gL - gG			
	CL00...CL05	0.1	0.5	2	RE1D	101866	5
		0.4	2	4	RE1H	101867	5
	EC09...EC40	1.0	5	10	RE1K	101868	5
		1.6	8	20	RE1M	101869	5
		6.4	32	63	RE1S	101870	5
		9.0	45	80	RE1W	101871	5
	CL07...CL10	15	75	125	RE2H	101872	1
	EF50...EF105	22	110	125	RE2M	101873	1
	CK75-CK08	30	150	250	RE3E	101874	1

Accessories

		Cat. no.	Ref. no.	Pack.
	Transparent cover for pushbutton reset For frames 1, 2 and 3	RETC	247795	10
	Independent mounting base adaptor Frame 1	RE1XP	247302	1
	Independent mounting base adaptor Frame 2	RE2XP	247303	1
	Use with	Cat. no.	Ref. no.	Pack
	Push-button with flexible cable			
	Front - 0.5 m	RTXS	113855	1
	Front - 1 m	RTXSL	113856	1
Back	RTXBS	108864	1	

(1) Most suitable fuse in accordance with IEC 60947-4-1, see coordination table on pg. A.142.



## Intelligent motor management relay EntelliPro ES3 / ES5

- Motor protection and motor control
- Pre-programmed motor typicals
- Communication Interface to Profibus-DP and Modbus RTU system
- Status information from motor and switchgear
- Maintenance information,
- Management of settings and configuration
- Predefined control logic
- Local control and display devices

### Protection

- Overload (Class 5 to 40)
- Earth fault (Residual current)
- Phase loss
- Thermistor (PTC)
- Start current
- Blocked rotor
- Under load
- Maximum starts per time
- Self monitoring
- External device monitoring

### Drive typicals

- Direct-on-line
- Reverse
- Star delta
- Star delta reverse
- Softstarter
- Softstarter reverse
- Dahlander
- Pole changing starter
- Solenoid valve
- Actuator

### Approvals/Marking



SIL certified



ATEX certified



CE

### Diagnostic

- Time to overload trip, release
- Number of operations
- Number of motor starts
- Motor ON-time, OFF-time
- Number of overload trips
- Number of thermistor trips
- Maximum currents
- Trip currents

### Order information

#### EntelliPro ES3 DP 2 2

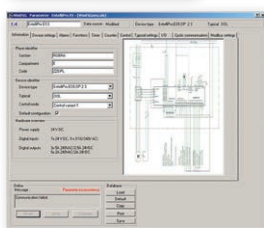
ES3 = Standard device  
ES5 = Medium device

2 = Power supply and 7 digital inputs, voltage 24V DC  
3 = Power supply and 7 digital inputs, voltage 110-240V AC

0 = no additional 9 digital inputs available  
2 = additional 9 digital input, voltage 24V DC  
3 = additional 9 digital input, voltage 110-240V AC

- Order codes ● page A.61
- Technical data ● page A.62
- Dimensions ● page A.64

Intelligent motor management relay



Type	Voltage	Ref. No.
<b>Standard device (I/O 7 digital inputs / 3 digital outputs)</b>		
EntelliPro ES3 DP 2 0	24V DC	720003
EntelliPro ES3 DP 3 0	240V AC	720004
<b>Mid device (I/O 16 digital inputs / 8 digital outputs + 4-20mA output)</b>		
EntelliPro ES5 DP 2 2	24V DC	720005
EntelliPro ES5 DP 2 3	Supply and 7 digital inputs 24V DC	720006
EntelliPro ES5 DP 3 3	9 digital inputs 110 - 240V DC 110 - 240V AC	720007
<b>Transformer</b>		
EntelliPro CT8	1,4A - 8A	720022
EntelliPro CT32	5,4A - 32A	720023
EntelliPro CT64	10,7A - 64A	720024
EntelliPro CT630	105A - 630A	720025
<b>HMI Control panel</b>		
EntelliPro CP3	HMI 3,3" LCD	720028
EntelliPro CP5	HMI 7" color TFT-LCD	720029
<b>Parameterizing user software</b>		
WinESG V3	EntelliPro software tool for Windows	720020
<b>Profibus-DP WinESG (OPC-PB-USB)</b>		
	Master Hardware	720037
<p>The WinESG CD, part number 720020, contains the WinESG installation file, necessary drivers, GSD file and installation information. WinESG runs on PCs with Windows 7 operating system or higher.</p> <p>To communicate to the EntelliPro devices also the Profibus-DP Master Hardware, part number 720037, is required.</p>		
<b>Demonstration KIT</b>		
Demo-case	Demonstration KIT for EntelliPro	720030

Order codes

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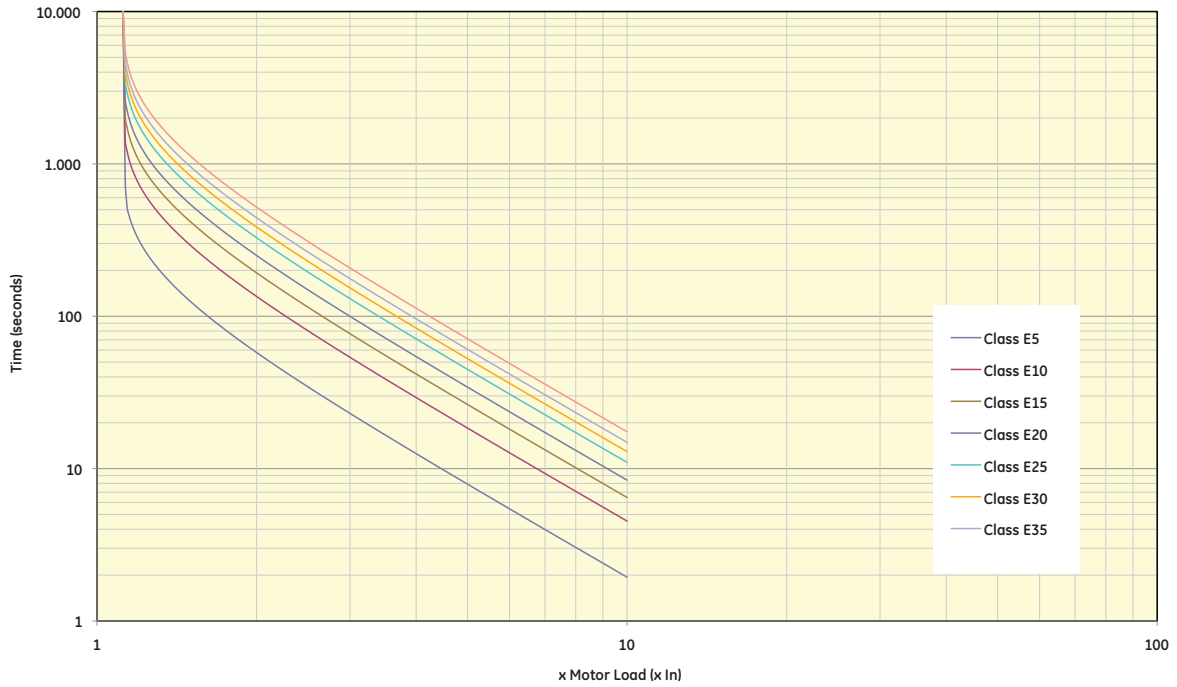
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## Intelligent motor management relay

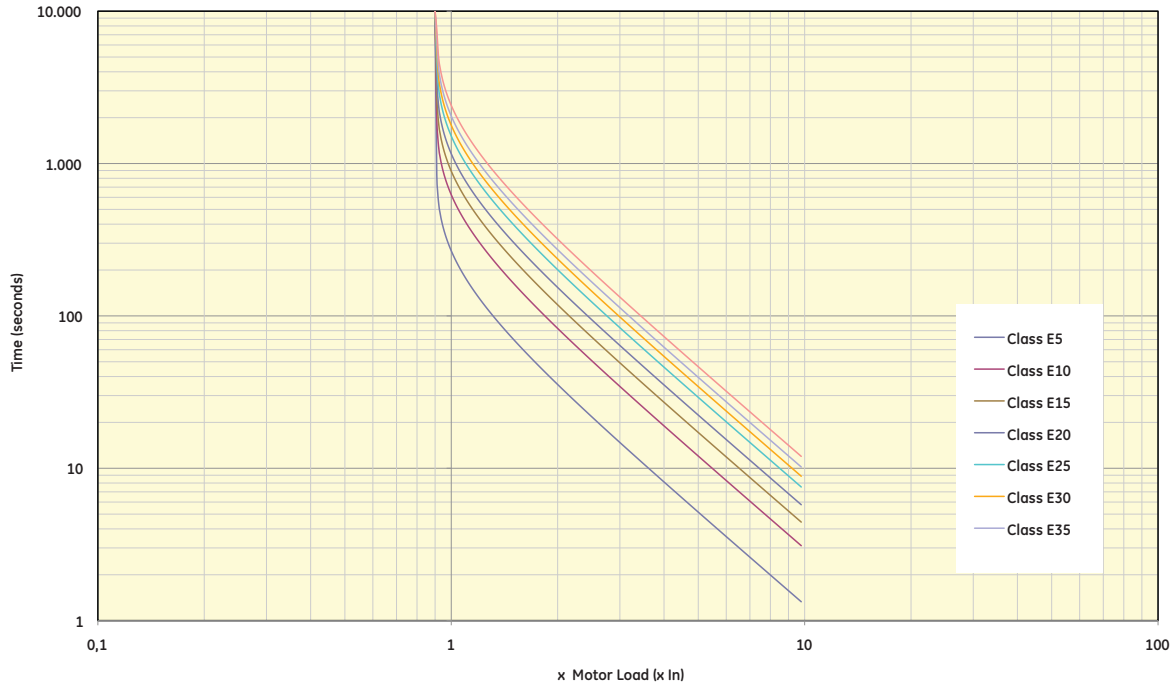
### Overload tripping curves IEC 60947-4-1 (3-Pole / 3-Wire)



Current (x In)	Class E5 (sec)	Class E10 (sec)	Class E15 (sec)	Class E20 (sec)	Class E25 (sec)	Class E30 (sec)	Class E35 (sec)	Class E40 (sec)	Tolerance (%)
1.2	314.70	734.29	1048.99	1363.68	1783.28	2097.98	2412.67	2832.27	10
1.4	156.93	366.16	523.09	680.01	889.25	1046.17	1203.10	1412.83	10
1.6	103.43	241.33	344.75	448.18	586.08	689.50	792.93	930.83	10
1.8	75.21	175.49	250.70	325.91	426.19	501.40	576.61	676.90	10
2	57.80	134.86	192.66	250.46	327.53	385.33	443.12	520.19	10
2.5	34.41	80.29	114.70	149.11	194.99	229.40	263.81	309.69	10
3	23.26	54.10	77.85	101.91	133.65	155.70	178.76	209.50	10
3.5	16.79	39.02	56.31	73.91	97.03	112.62	129.22	151.34	10
4	12.74	29.56	42.80	56.34	74.06	85.60	98.14	114.86	10
4.5	10.02	23.22	33.74	44.56	58.66	67.48	77.30	90.40	10
5	8.11	18.75	27.36	36.26	47.81	54.71	62.62	73.16	10
5.5	6.71	15.48	22.68	30.19	39.86	45.37	51.87	60.55	10
6	5.65	13.01	19.10	24.31	31.97	37.52	43.16	50.43	10
6.5	4.83	11.10	16.43	20.76	27.33	32.06	36.89	43.06	10
7	4.18	9.59	13.40	17.96	23.67	27.76	31.94	37.25	10
7.2	3.90	9.08	12.78	17.00	22.42	26.28	30.25	35.26	10
8	3.20	7.39	10.40	13.88	18.33	21.47	24.71	28.76	20
9	2.60	5.89	8.40	11.09	14.68	17.18	18.90	22.98	20
10	2.30	5.20	7.40	9.10	12.19	14.13	16.27	18.85	20



Overload tripping curves IEC 60947-4-1 (2-Pole / 2-Wire)

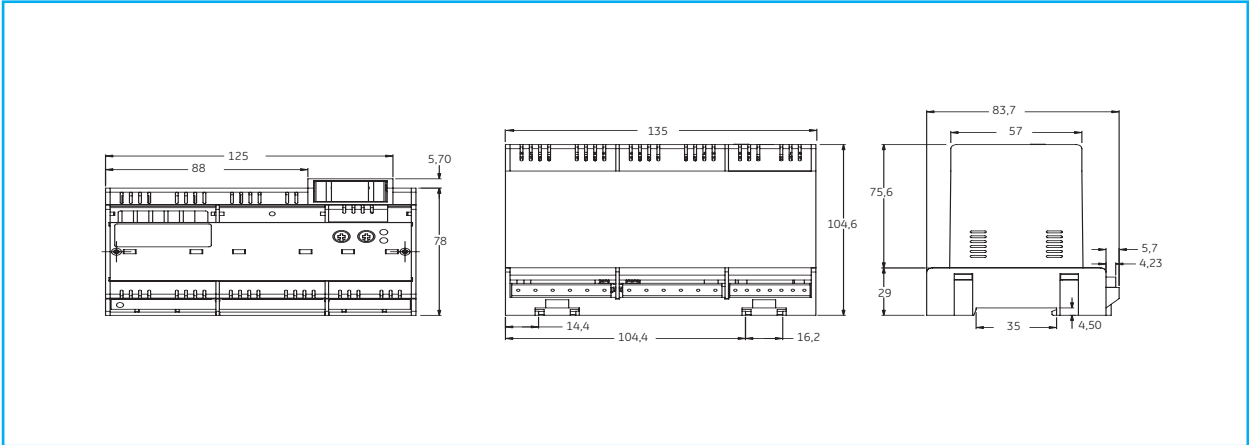


Current (x In)	Class E5 (sec)	Class E10 (sec)	Class E15 (sec)	Class E20 (sec)	Class E25 (sec)	Class E30 (sec)	Class E35 (sec)	Class E40 (sec)	Tolerance (%)
1	267.42	623.99	891.41	1158.83	1515.39	1782.81	2050.24	2406.80	10
1.2	130.59	304.72	435.31	565.91	740.03	870.63	1001.22	1175.35	10
1.4	83.87	195.69	279.56	263.43	475.25	559.12	642.98	754.81	10
1.6	59.72	139.35	199.07	258.79	338.42	398.14	457.88	537.48	10
1.8	45.12	105.27	150.39	195.51	255.67	300.78	345.90	406.06	10
2	35.46	82.75	118.21	153.67	200.96	236.42	271.88	319.17	10
2.5	21.73	50.71	72.45	94.18	123.16	144.90	166.63	195.61	10
3	14.76	34.44	49.20	63.97	83.65	98.41	113.17	132.85	10
3.5	10.70	24.98	35.68	46.39	60.66	71.36	82.07	96.34	10
4	8.13	18.97	27.09	35.22	46.06	54.19	62.32	73.15	10
4.5	6.39	14.90	21.29	27.67	36.19	42.57	48.96	57.48	10
5	5.15	12.02	17.17	22.33	29.20	34.35	39.50	46.37	10
5.5	4.25	9.91	14.15	18.40	24.06	28.30	32.55	38.21	10
6	3.56	8.31	11.86	15.42	20.17	23.73	27.29	32.04	10
6.5	3.03	7.06	10.09	13.12	17.16	20.18	23.21	27.25	10
7	2.80	6.30	8.79	11.70	15.47	17.88	20.94	24.36	10
7.2	2.60	6.05	8.42	11.09	14.66	16.92	19.83	23.07	10
8	2.20	4.90	6.80	9.14	12.09	13.78	16.22	19.04	20
9	1.75	3.80	5.66	7.21	9.61	10.98	13.00	15.05	20
10	1.66	3.50	5.30	6.39	7.87	8.98	12.19	14.01	20

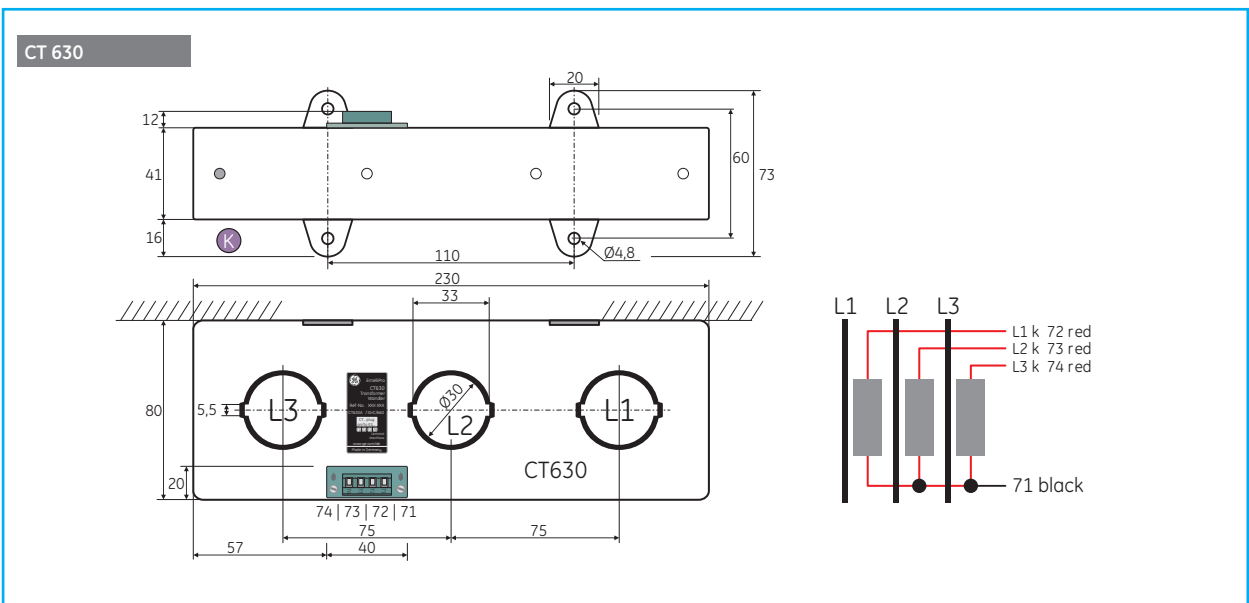
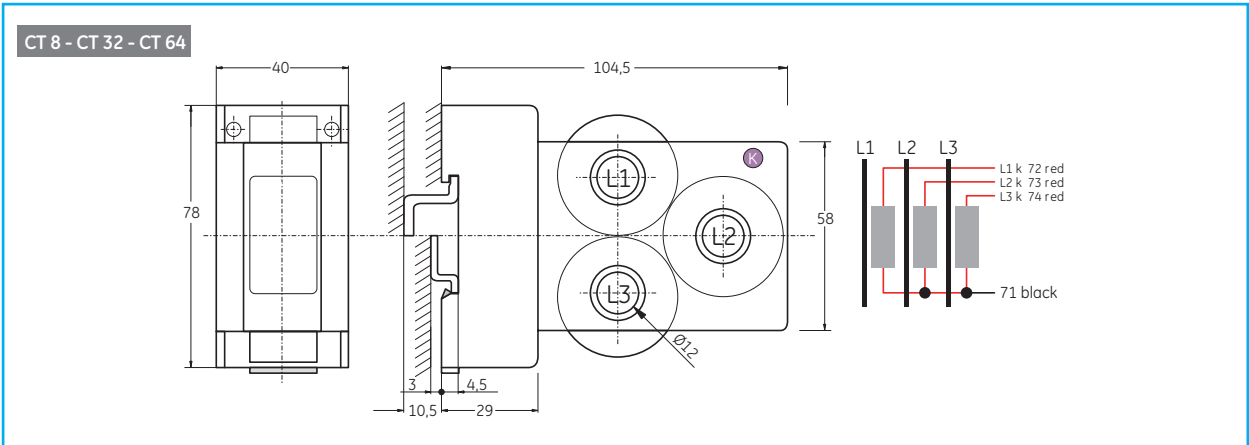


## Dimensional drawings

### EntelliPro ES3/ES5

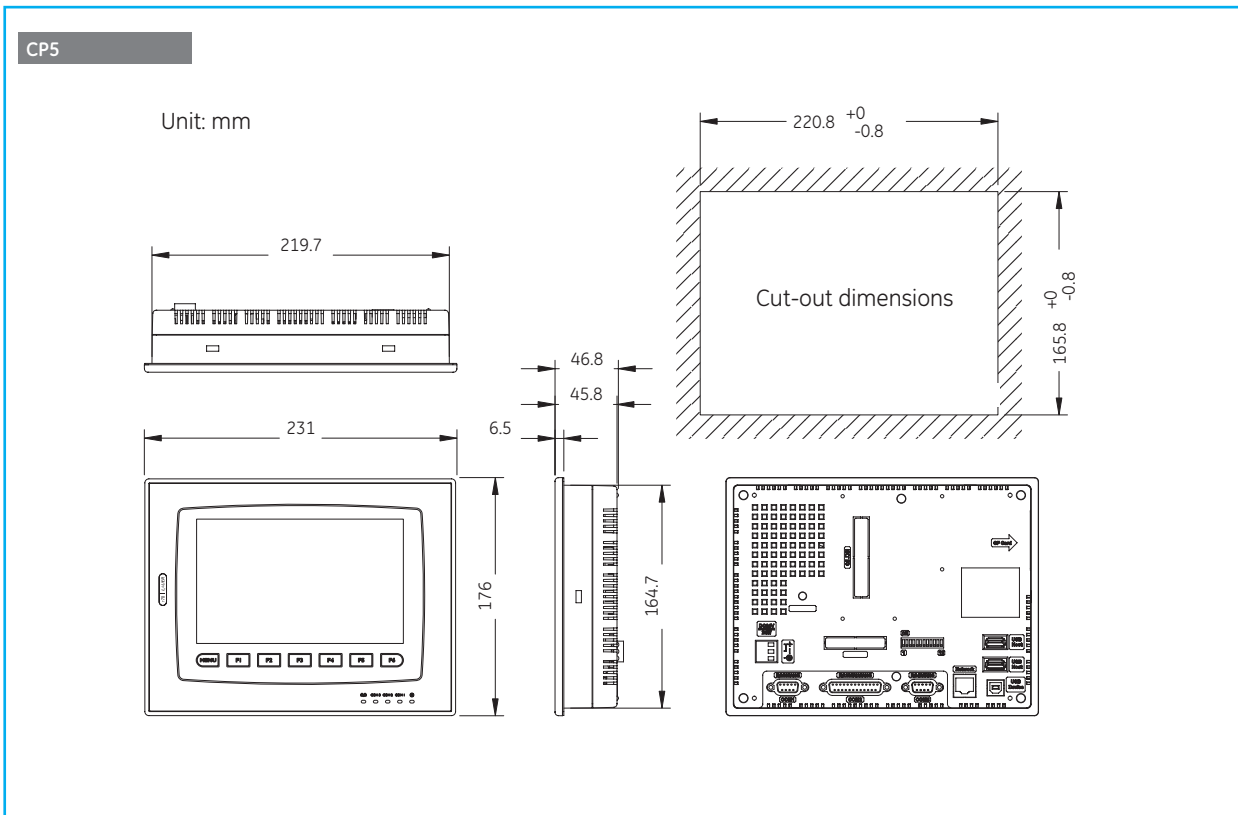
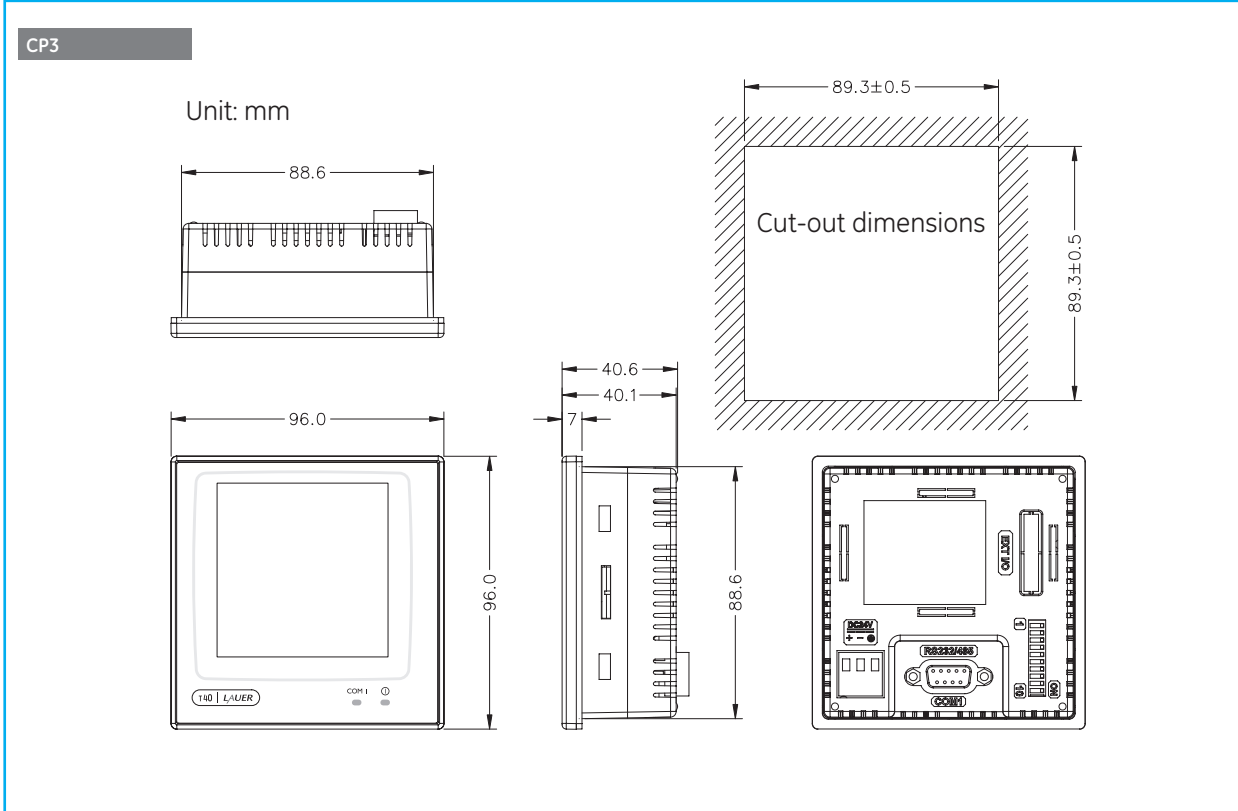


### Transformers



Dimensions in mm (inch = mm x 0.03937) - Weight in kg (lb = kg x 2.2046)

Control panel



Dimensions in mm (inch = mm x 0.03937) - Weight in kg (lb = kg x 2.2046)

### Conformity to standards

IEC/EN 60947-1	GB14048.4
IEC/EN 60947-4-1	UL508
IEC/EN 60947-5-1	UL486E
IEC/EN 60947-5-4	CSA2.22-14
EN50011	NF F16 101/102
EN50012	
EN50005	

### Approvals/Marking



### Ambient conditions

Storage temperature	-55°C to +80°C
Operation temperature	-40°C to +55°C
Without TOR	-40°C to +60°C
	-40°C to +70°C <sup>(1)</sup>
Altitude	<2000m

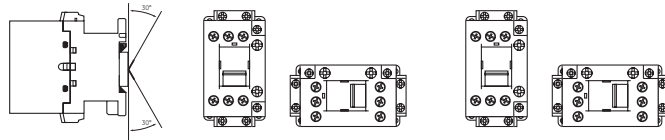
(1) From 100% to 110% of rated control voltage, no auxiliary blocks

### Climatic resistance (IEC 68-2)

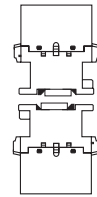
<b>Continuous tests 40 / 125 / 56</b>		
Cold (72h)	Temperature	-40°C
Dry heat (96h)	Temperature	+125°C
	Relative humidity	< 50%
Humid heat (56h)	Temperature	+40°C
	Relative humidity	95%
<b>Cyclic test (6 cycles)</b>		
First half-cycle	Low temperature	+25°C
	Relative humidity	93%
Second half-cycle	Low temperature	+55°C
	Relative humidity	95%

### Mounting positions

#### Installation capabilities



#### With derating values



-10% connection voltage  
+10% disconnection voltage  
with same rated power,  
data compared to vertical  
mounting

### Terminal capacity and tightening torque

	Conventional thermal current (Ith)	Head type	EC contactors			EF contactors		
			EC09...EC18 ECAC	EC25	EC32...EC40	EF50...EF80	EF95...EF105	
	<b>Box terminals</b>							
	Solid, stranded and finely stranded without ferrule	(mm <sup>2</sup> )	Slot & PZ2	0.75 ... 6	0.75 ... 10	0.75 ... 16	2.5 ... 35	4 ... 50
	Finely stranded with ferrule	(mm <sup>2</sup> )	Slot & PZ2	0.75 ... 6	0.75 ... 10	0.75 ... 16	2.5 ... 35	4 ... 50
	Finely stranded without ferrule	(mm <sup>2</sup> )	Slot & PZ2	0.75 ... 6	0.75 ... 10	0.75 ... 16	2.5 ... 35	4 ... 50
	AWG			18 ... 10	18 ... 8	18 ... 6	13 ... 2	11 ... 1/0
	Tightening torque	(Nm)		2.2	2.2	2.2	4-4.5	5.6-6.5
		(Lb x in.)		20	20	20	35-40	50-60
	Solid	(mm <sup>2</sup> )					2.5 ... 35	4 ... 50
	Stranded	(mm <sup>2</sup> )					2.5 ... 35	4 ... 50
	Finely stranded without ferrule	(mm <sup>2</sup> )	Slot & PZ2	0.75 ... 6	0.75 ... 10	0.75 ... 16	2.5 ... 35	4 ... 50
	Finely stranded with ferrule	(mm <sup>2</sup> )					2.5 ... 35	4 ... 50
	AWG			18 ... 10	18 ... 8	18 ... 6	13 ... 2	11 ... 1/0
	Tightening torque	(Nm)		2.2	2.2	2.2	4 - 4.5	5.6 - 6.5
		(Lb x in.)		20	20	20	35 - 40	50 - 60
	Solid, stranded and finely stranded without ferrule	(mm <sup>2</sup> )					Max. 1x16 + 1x10	Max. 1x25 + 1x25
	Finely stranded without ferrule	(mm <sup>2</sup> )					Max. 1x16 + 1x10	-
	Finely stranded with ferrule	(mm <sup>2</sup> )	Slot & PZ2	0.75 ... 6	0.75 ... 10	0.75 ... 16	Max. 1x16 + 1x10	-
	AWG			18 ... 10	18 ... 8	18 ... 6	Max. 1x5 + 1x7	Max. 1x3 + 1x3
	Tightening torque	(Nm)		2.2	2.2	2.2	4 - 4.5	5.6 - 6.5
		(Lb x in.)		20	20	20	35 - 40	50 - 60

### Coil Terminal capacity and tightening torque

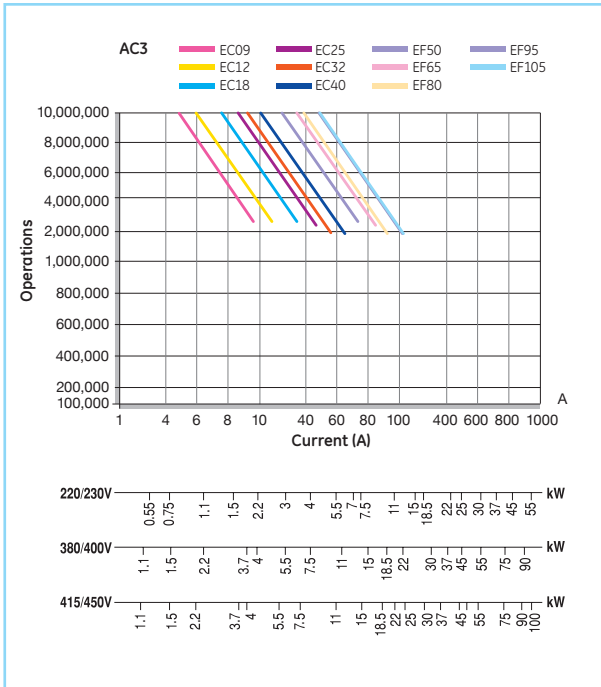
Tightening torque		0.8Nm - 7Lb/in
Solid wire	(mm <sup>2</sup> )	0.75 to 2x2
Flexible wire without terminal	(mm <sup>2</sup> )	0.75 to 2.5x2
Flexible wire without terminal with cap	(mm <sup>2</sup> )	0.75 to 2.5x21



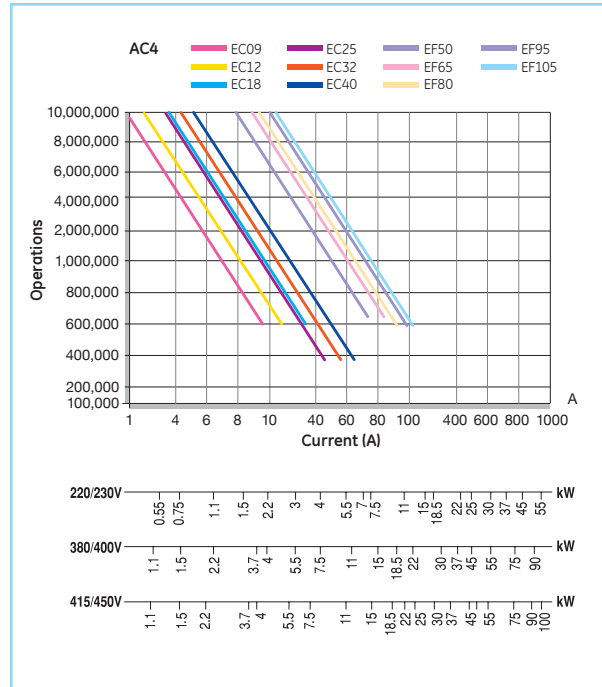


## Electrical endurance

### Category AC3 (3P contactors)



### Category AC4 (3P contactors)



Power circuit for EC contactors

		EC 09	EC 12	EC18	EC 25	EC 32	EC 40
<b>Three pole version</b>							
Rated thermal current I <sub>th</sub> at θ ≤ 55°C	(A)	25	25	32	45	60	60
Rated operational current I <sub>e</sub> AC-3	(A)	9	12	18	25	32	40
Rated operational voltage U <sub>e</sub>	(V)	690V acc. IEC 60947-4-1 / 600V acc. UL-CSA					
<b>Four pole version</b>							
Rated thermal current I <sub>th</sub> at θ ≤ 55°C	(A)	-	25	32	45	60	-
Rated operational voltage U <sub>e</sub>	(V)	690V acc. IEC 60947-4-1 / 600V acc. UL-CSA					
<b>Three and four pole version</b>							
Rated insulation voltage U <sub>i</sub>	(V)	1000V acc. IEC 60947-4-1 / 600V acc. UL-CSA					
Maximum continuous current AC-1	(A)	25	25	32	45	60	60
Frequency limits	(Hz)	25..400	25..400	25..400	25..400	25..400	25..400
Making capacity (RMS) (IEC- 60947) U = 500V	(A)	220	220	220	315	520	520
<b>Breaking capacity (RMS) (acc. IEC-60947)</b>							
U <sub>e</sub> = 500V	(A)	220	220	220	315	520	520
U <sub>e</sub> = 690V	(A)	120	120	120	144	232	232
<b>Short-time current from cold state</b>							
1s	(A)	570	570	570	790	1265	1265
5s	(A)	254	254	254	355	565	565
10s	(A)	180	180	180	250	400	400
30s	(A)	104	104	104	145	231	231
1min	(A)	74	74	74	102	164	164
3min	(A)	42	42	42	60	95	95
Recovery time	(min)	10	10	10	10	10	10
<b>Protection against short-circuit with fuses without thermal overload relay (TOR)</b>							
<b>Coordination type 1</b>							
gL-gG (U = 500V, 50kA or U = 415V, 80kA)	(A)	40	40	50	63	80	80
<b>Coordination type 2</b>							
gL-gG (U = 500V, 50kA or U = 415V, 80kA)	(A)	25	35	40	50	63	80
Average impedance per pole	(mΩ)	2.25	2.25	2.25	1.6	1.2	1.2
<b>Power dissipation per pole</b>							
AC-1	(W)	1.41	1.41	2.30	3.24	4.32	4.32
AC-3	(W)	0.18	0.32	0.73	1.00	1.23	1.92
<b>Insulation resistance</b>							
Between adjacent poles	(MΩ)	>10	>10	>10	>10	>10	>10
Between poles and earth	(MΩ)	>10	>10	>10	>10	>10	>10
Between input and output	(MΩ)	>10	>10	>10	>10	>10	>10



## Power circuit for EF contactors

		EF40	EF50	EF65	EF80	EF95	EF105
<b>Three pole version</b>							
Rated thermal current I <sub>th</sub> at θ ≤ 55°C	(A)	-	90	110	110	140	140
Rated operational current I <sub>e</sub> AC-3	(A)	-	50	65	80	95	105
Rated operational voltage U <sub>e</sub>	(V)	690V acc. IEC 60947-4-1 / 600V acc. UL-CSA					
<b>Four pole version</b>							
Rated thermal current I <sub>th</sub> at θ ≤ 55°C	(A)	90	-	110	110	140	-
Rated operational voltage U <sub>e</sub>	(V)	690	-	690V acc. IEC 60947-4-1 / 600V acc. UL-CSA			-
<b>Three and four pole version</b>							
Rated insulation voltage U <sub>i</sub>	(V)	1000V acc. IEC 60947-4-1 / 600V acc. UL-CSA					
Maximum continuous current AC-1	(A)	90	90	110	110	140	140
Frequency limits	(Hz)	25..400	25..400	25..400	25..400	25..400	25..400
Making capacity (RMS) (IEC- 60947)	(A)	1000	1000	1000	1000	1280	1280
<b>Breaking capacity (RMS) (acc. IEC-60947)</b>							
U <sub>e</sub> = 400V	(A)	920	920	920	920	1050	1050
U <sub>e</sub> = 500V	(A)	920	920	920	920	1050	1050
U <sub>e</sub> = 690V	(A)	780	780	780	780	950	950
<b>Short-time current from cold state</b>							
1s	(A)	1580	1580	2530	2530	3300	3300
5s	(A)	565	565	1130	1130	1485	1485
10s	(A)	500	500	800	800	1050	1050
30s	(A)	290	290	460	460	600	600
1min	(A)	205	205	325	325	430	430
3min	(A)	120	120	185	185	250	250
Recovery time	(min)	10	10	10	10	10	10
<b>Protection against short-circuit with fuses without thermal overload relay (TOR)</b>							
<b>Coordination type 1</b>							
gL-gG	(A)	200	200	200	200	250	250
<b>Coordination type 2</b>							
gL-gG	(A)	100	100	125	125	160	200
<b>Without welding</b>							
gL-gG	(A)	80	80	100	100	140	160
Average impedance per pole	(mΩ)	0.85	0.85	0.86	0.86	0.76	0.76
<b>Power dissipation per pole</b>							
AC-1	(W)	6.89	6.86	10.40	10.40	14.89	14.89
AC-3	(W)	1.36	2.12	3.63	5.50	6.86	8.37
<b>Insulation resistance</b>							
Between adjacent poles	(MΩ)	>10	>10	>10	>10	>10	>10
Between poles and earth	(MΩ)	>10	>10	>10	>10	>10	>10
Between input and output	(MΩ)	>10	>10	>10	>10	>10	>10



## Control circuit - EC contactors

		EC09 up to EC18 and ECAC	EC25 up to EC40
Rated insulation voltage U <sub>i</sub>	(V)	1000	1000
Impulse voltage U <sub>imp</sub>	(V)	6000	6000
<b>Mechanical endurance</b>			
Bifrequency coils (at 50Hz)	10 <sup>6</sup> ops.	10	10
<b>Maximum rate</b>			
AC-1 at rated power	ops./h	1200	1200
AC-2 at rated power	ops./h	1200	1000
AC-3 at rated power	ops./h	1200	1000
AC-4 at rated power	ops./h	360	240
No load	ops./h	7200	7200

## Control circuit - Alternating current for EC contactors

		EC09 up to EC18 and ECAC	EC25 up to EC40	EC09E up to EC18E	EC25E up to EC40E
Standard voltages U <sub>s</sub> 50Hz	(V)	12 - 600	12 - 600	24 - 250	24 - 250
Standard voltages U <sub>s</sub> 60Hz	(V)	12 - 600	12 - 600	24 - 250	24 - 250
<b>Voltage operating limits 50-60Hz coils</b>					
Operating 50Hz xU <sub>s</sub>		0.8 - 1.1	0.8 - 1.1	0.8 - 1.1	0.8 - 1.1
Operating 60Hz xU <sub>s</sub>		0.85 - 1.1	0.85 - 1.1	0.8 - 1.1	0.8 - 1.1
Pick-up 50Hz xU <sub>s</sub>		0.5...0.8	0.6...0.8	0.6...0.8	0.6...0.8
Pick-up 60Hz xU <sub>s</sub>		0.55...0.85	0.65...0.85	0.6...0.8	0.6...0.8
Drop-out 50Hz xU <sub>s</sub>		0.35...0.55	0.30...0.55	0.35...0.55	0.35...0.55
Drop-out 60Hz xU <sub>s</sub>		0.35...0.55	0.30...0.55	0.35...0.55	0.35...0.55
<b>Coil consumption at U<sub>s</sub> (cold state)</b>					
Magnetic circuit closed (50Hz/60Hz)	(VA)	9 / 6	11.3 / 8.5		
Magnetic circuit opened (50Hz/60Hz)	(VA)	70.1 / 68.2	144 / 138		
Magnetic circuit closed (50Hz&60Hz)	(VA)min-(VA)max			0.7 - 2.2	1.2 - 2.4
Magnetic circuit opened (50Hz&60Hz)	(VA)min-(VA)max			48.6 - 47.2	67 - 64.8
<b>Power factor (50Hz)</b>					
Magnetic circuit closed cos φ		0.24	0.20		
Magnetic circuit opened cos φ		0.85	0.70		
<b>Opening and closing times</b>					
Values between +10% U <sub>s</sub> and -20% U <sub>s</sub>					
Making time on energisation (NO)	(ms)	10 - 25	10 - 25		
Breaking time on de-energisation (NO)	(ms)	5 - 15	5 - 15		
Values at U <sub>s</sub>					
Making time on energisation (NO)	(ms)	10 - 25	10 - 25	25 - 45	40 - 60
Breaking time on de-energisation (NO)	(ms)	5 - 15	5 - 15	50 - 65	60 - 75

## Direct current for EC contactors

		Coils with wide voltage range		Coils with low consumption			
		EC09 up to EC18 and ECAC	EC25 up to EC40	EC09 up to EC18	EC25 up to EC40	EC09E up to EC18E	EC25E up to EC40E
Standard voltages U <sub>s</sub> DC	(V)	12 - 440	12 - 440	12 - 400	12 - 400	24 - 250	24 - 250
<b>Operating Limits</b>							
Operating xU <sub>s</sub>	(V DC)	0.70 - 1.25	0.70 - 1.25	0.80 - 1.1	0.80 - 1.1	0.80 - 1.1	0.80 - 1.1
Pick-up xU <sub>s</sub>	(V DC)	0.45 - 0.65	0.45 - 0.65	0.48 - 0.68	0.48 - 0.68	0.6 - 0.8	0.6 - 0.8
Drop-out xU <sub>s</sub>	(V DC)	0.12 - 0.30	0.12 - 0.30	0.12 - 0.30	0.12 - 0.30	0.35 - 0.55	0.35 - 0.55
<b>Coil consumption at U<sub>s</sub> (cold state)</b>							
Magnetic circuit open and Closed	(W)	7.5	9	3.6	5.3		
Magnetic circuit Closed	(W)min-(W)max					0.6 - 1	0.9 - 1.2
Magnetic circuit Opened	(W)min-(W)max					3.6	5.3
<b>Opening and closing times</b>							
Values between +10% U <sub>s</sub> and -20% U <sub>s</sub>							
Making time on energisation (NO)	(ms)	33 - 78	35 - 154	47 - 173	48 - 96		
Breaking time on de-energisation (NO)	(ms)	14 - 18	15 - 26	12 - 15	8 - 26		
Values at U <sub>s</sub>							
Making time on energisation (NO)	(ms)	33 - 78	35 - 66	44 - 83	33 - 75	25-45	40-60
Breaking time on de-energisation (NO)	(ms)	14 - 18	15 - 24	13 - 20	12 - 24	50-65	60-75



### Control circuit - EF contactors

		EF50A up to EF80A	EF95A up to EF105A
Rated insulation voltage $U_i$	(V)	1000	1000
Impulse voltage $U_{imp}$	(V)	6000	6000
<b>Mechanical endurance</b>			
Bifrequency coils (at 50Hz)	$10^6$ ops.	5	5
<b>Maximum rate</b>			
AC-1 at rated power	ops./h	1200	1200
AC-2 at rated power	ops./h	1000	750
AC-3 at rated power	ops./h	1200	600
AC-4 at rated power	ops./h	200	200
No load	ops./h	3600	3600

### Control circuit - Alternating current for EF contactors

		EF50A up to EF80A	EF95A up to EF105A
Standard voltages $U_s$ 50-60Hz	(V)	12 - 600	12 - 600
<b>Voltage operating limits 50-60Hz coils</b>			
Operating 50Hz xUs		0.8 - 1.1	0.8 - 1.1
Operating 60Hz xUs		0.85 - 1.1	0.85 - 1.1
Pick-up 50Hz xUs (at an ambient temperature of 25°C)		0.5...0.8	0.5...0.8
Pick-up 60Hz xUs (at an ambient temperature of 25°C)		0.6...0.8	0.6...0.8
Drop-out 50Hz xUs (at an ambient temperature of 25°C)		0.30...0.55	0.30...0.55
Drop-out 60Hz xUs (at an ambient temperature of 25°C)		0.30...0.55	0.30...0.55
<b>Coil consumption at <math>U_s</math> (cold state)</b>			
Magnetic circuit closed (50Hz/60Hz)	(VA)	25 / 16	25 / 16
Magnetic circuit opened (50Hz/60Hz)	(VA)	245 / 204	245 / 204
Thermal power dissipation (50Hz/60Hz)	(VA)	5.2 / 4.3	5.2 / 4.3
<b>Power factor (50Hz)</b>			
Magnetic circuit closed $\cos \varphi$		0.26	0.26
Magnetic circuit opened $\cos \varphi$		0.54	0.54
<b>Opening and closing times</b>			
Values between +10% $U_s$ and -20% $U_s$			
Making time on energisation (NO)	(ms)	9...35	9...35
Breaking time on de-energisation (NO)	(ms)	9...15	9...15
Values at $U_s$			
Making time on energisation (NO)	(ms)	15...35	15...35
Breaking time on de-energisation (NO)	(ms)	9...15	9...15

### Alternating current / Direct current for EF contactors

		Coils with wide voltage range	
		EF50E up to EF80E	EF95E up to EF105E
Rated insulation voltage $U_i$	(V)	1000	10000
Standard voltages $U_s$ DC	(V)	24 - 500	24 - 500
<b>Operating Limits</b>			
Operating xUs	(V DC)	0.85 - 1.1	0.85 - 1.1
Pick-up xUs	(V DC)	0.75	0.75
Drop-out xUs	(V DC)	0.5	0.5
<b>Coil consumption at <math>U_s</math> (cold state)</b>			
Magnetic circuit closed (50Hz&60Hz)	(VA)min-(VA)max	2.9 - 5.8	2.9 - 5.8
Magnetic circuit opened (50Hz&60Hz)	(VA)min-(VA)max	136 - 206	136 - 206
Magnetic circuit closed (DC)	(VA)min-(VA)max	2.7 - 3.8	2.7 - 3.8
Magnetic circuit opened (DC)	(VA)min-(VA)max	128 - 214	128 - 214
<b>Opening and closing times</b>			
Values at $U_s$			
Making time on energisation (NO)	(ms)	20 - 45	20 - 45
Breaking time on de-energisation (NO)	(ms)	20 - 55	20 - 55



## Built-in auxiliary contacts

		EC09 up to EC25 and ECAC	
Rated insulation voltage $U_i$ according to IEC 60947	(V)	1000	
Rated thermal current $I_{th}$ at $\theta \leq 55^\circ\text{C}$	(A)	10	
<b>Making capacity (RMS) acc. to IEC 60947</b>			
AC-15 $U_e \leq 400\text{V}$ , 50-60Hz	(A)	105	
DC-13 $U_e \leq 220\text{V DC}$	(A)	105	
<b>Breaking capacity (RMS) acc. to IEC 60947</b>			
AC-15 $U_e \leq 400\text{V}$ , 50-60Hz	(A)	105	
DC-13 $U_e \leq 220\text{V DC}$	(A)	2	
<b>AC-15</b> rated voltage and current $U_e$ - $I_e$ according to IEC	(V-A)	110/120-10	
		220/230-10	
		380/400-6	
		415/450-5	
		500-4	
	690/660-2		
according to UL, CSA		A600	
<b>DC-13</b> rated voltage and current $U_e$ - $I_e$ according to IEC	(V-A)	24-6	
		48-4	
		110-2	
		220-0.7	
		440-0.35	
according to UL, CSA		Q600	
Electrical endurance	$10^6$ ops.	0.2	
Minimum operational power (operational safety)		17 V - 5mA	
Short-circuit protection max. fuse class gl-gG without welding	(A)	10	
Insulation resistance	Between contacts	(M $\Omega$ )	>10
	Between contacts and earth	(M $\Omega$ )	
<b>Guaranteed no overlap between NO and NC contacts</b>			
Space		1.3mm	
Impedance of the contacts	(M $\Omega$ )	2.7	

## Auxiliary contact blocks

		ECFA/ECLA/BCLL	
Rated insulation voltage $U_i$ according to IEC 60947	(V)	1000	
Rated thermal current $I_{th}$ at $\theta \leq 55^\circ\text{C}$	(A)	10	
<b>Making capacity (Ieff) according to IEC 60947</b>			
AC-15 $U_e \leq 400\text{V}$ , 50-60Hz	(A)	60	
DC-13 $U_e \leq 220\text{V DC}$	(A)	60	
<b>Breaking capacity (Ieff) according to IEC 60947</b>			
AC-15 $U_e \leq 400\text{V}$ , 50-60Hz	(A)	60	
DC-13 $U_e \leq 220\text{V DC}$	(A)	0.95	
<b>AC-15</b> rated voltage and current $U_e$ - $I_e$ according to IEC	(V-A)	110/120-6	
		220/230-6	
		380/400-4	
		415/440-3.5	
		500-2.5	
	660/660-1.5		
according to UL, CSA		A600	
<b>DC-13</b> rated voltage and current $U_e$ - $I_e$ according to IEC	(V-A)	24-4	
		48-2	
		110-0.7	
		220-0.3	
		440-0.15	
according to UL, CSA		Q600	
Electrical endurance	$10^6$ ops.	0.2	
Mechanical endurance	$10^6$ ops.	10	
Minimum operational current (operational safety)		17-5 V-mA	
Short-circuit protection max. fuse class gl-gG without welding	(A)	10	
Insulation resistance	Between contacts	(M $\Omega$ )	>10
	Between contacts and earth	(M $\Omega$ )	
<b>Guaranteed no overlap between NO and NC contacts</b>			
Space		1.6mm for ECFA / 2.2mm for ECLA/ 1.3mm for BCLL	
Impedance of the contacts	(mili)	2.7	



## Mechanical latch blocks

Rated insulation voltage $U_i$	(V)	1000
Standard voltages $U_s$ : 50 to 60Hz and DC	(V)	24-660 & 24-440
Operating limits		85% to 110%
Consumption for unlatching (auto cut-out)	AC/DC	
24 to 72V		30W / 25VA
110 to 440V		15W / 12VA
<b>Electrical unlatching control</b>		
Minimum impulse	(ms)	25
Maintained		Auto cut by internal contact
Manual unlatching control		By manual push-button
<b>Electrical making control</b>		
Minimum pulse	(ms)	40 (auto cut)
Manual making control		By manual push-button
Auxiliary contact NC		
AC-15 utilisation according to IEC	(V-A)	110/120-6 220/230-6 380/400-4 415/450-3.5 500-2.5 690/660-1.5
according to UL/CSA		B600
DC-13 utilisation according to IEC	(V-A)	24-4 48-2 110-0.7 220-0.3 440-0.15
according to UL/CSA		Q600
Mechanical endurance	$10^6$ ops.	0.2
<b>Wiring diagrams</b>		
Alternating current		
Alternating current / Direct current		

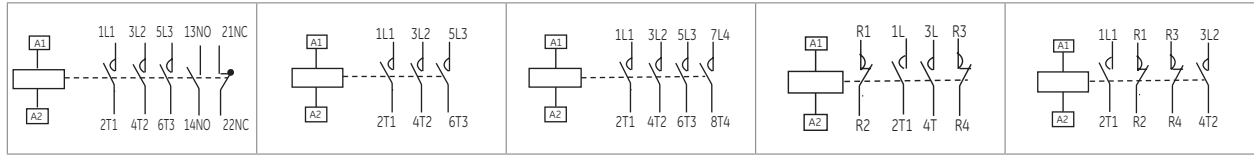
## Terminal capacity

Terminal capacity		Screw plate ECML*A, ECML*D
Flexible wire	(mm <sup>2</sup> )	2x0.5..2.5
AWG wire		2x20..14
Standard gauge		A3
Tightening torque	(Nm/Lb-in)	1.1 / 10

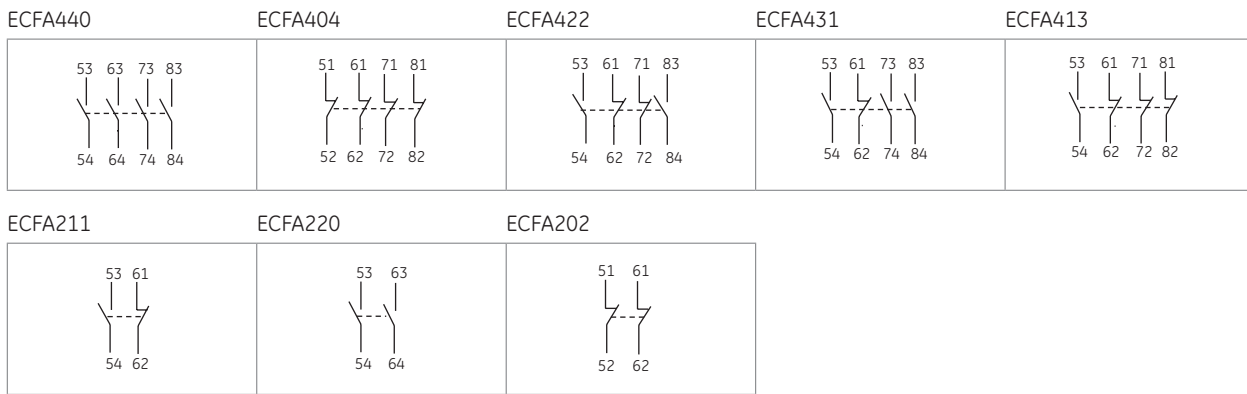
## Terminal numbering

### 3P and 4P contactors

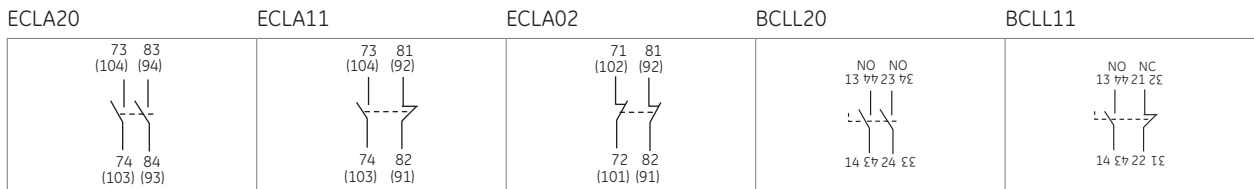
EC09A311..EC25A311	EC32A300..EF105A300	EC12A400..EF95A400	EC12AB00..EC25AB00	EC32AB00..EF80AB00
EC09D311..EC25D311	EC32D300..EF105E300	EC12D400..EF95E400	EC12DB00..EC25DB00	EC32DB00..EF80EB00
EC09E311..EC25E311	EC32E300..EF105E300	EC12E400..EF95E400	EC12EB00..EC25EB00	EC32EB00..EF80EB00



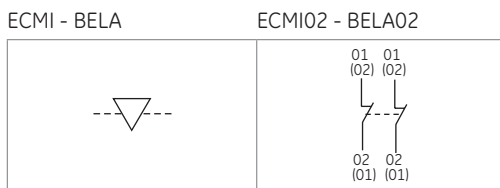
### Auxiliary contact blocks - Front mounting



### Auxiliary contact blocks - Lateral mounting



### Mechanical and mechanical/electrical interlock



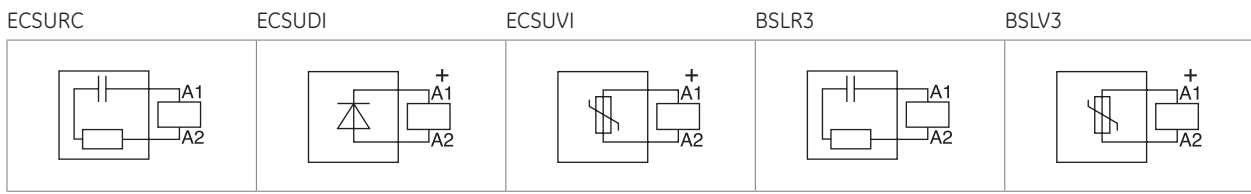


## Terminal numbering (continued)

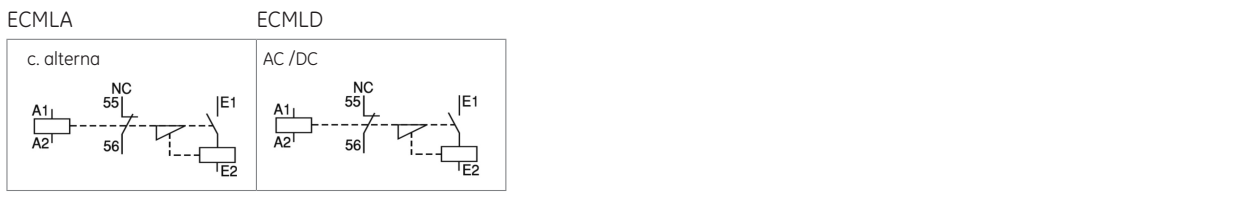
### Pneumatic timer blocks





### Voltage suppressor blocks



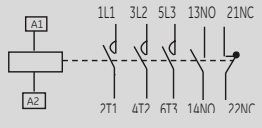

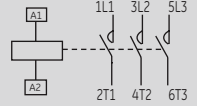

### Mechanical latch block



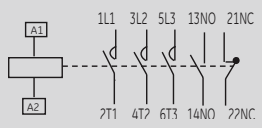

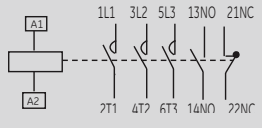

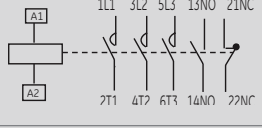

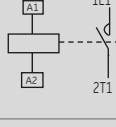

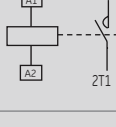

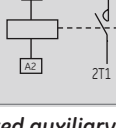

Terminal numbering according to EN 50012

Auxiliary contacts	Description	 NO	 NC	Possible basic auxiliary contactors + Auxiliary contacts blocks to be added
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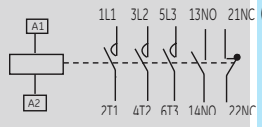



Terminal numbering according to EN 50012

	11E	1	1	EC09A311..EC25A311 EC09D311..EC25D311 EC09E311..EC25E311	
	-	0	0	EC32A300..EF105A300 EC32D300..EF105E300 EC32E300..EF105E300	

FRONT mounted auxiliary contact blocks with 2 contacts each




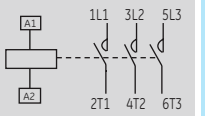
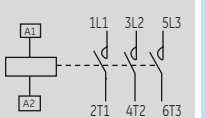
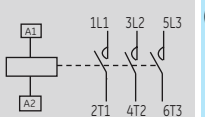
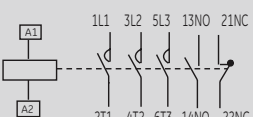
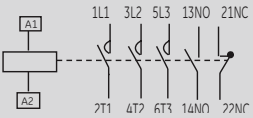
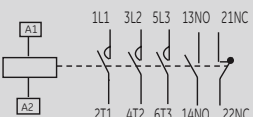
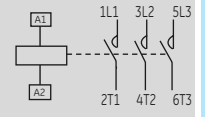
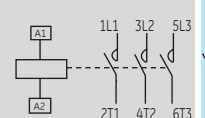
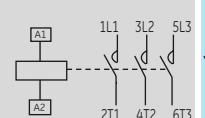
	13	1	3	EC09A311..EC25A311 EC09D311..EC25D311 EC09E311..EC25E311 +ECFA202	
	31	3	1	EC09A311..EC25A311 EC09D311..EC25D311 EC09E311..EC25E311 +ECFA220	
	22	2	2	EC09A311..EC25A311 EC09D311..EC25D311 EC09E311..EC25E311 +ECFA211	
	02	0	2	EC32A300..EF105A300 EC32D300..EF105E300 EC32E300..EF105E300 +ECFA202	
	20	2	0	EC32A300..EF105A300 EC32D300..EF105E300 EC32E300..EF105E300 +ECFA220	
	11	1	1	EC32A300..EF105A300 EC32D300..EF105E300 EC32E300..EF105E300 +ECFA211	

LATERAL mounted auxiliary contact blocks with 2 contacts each - RIGHT side mounted

	13	1	3	EC09A311..EC25A311 EC09D311..EC25D311 EC09E311..EC25E311 +ECLA220	
	22	2	2	EC09A311..EC25A311 EC09D311..EC25D311 EC09E311..EC25E311 +ECLA211	



### Terminal numbering according to EN 50012 (continued 1)

Auxiliary contacts	Description	 NO  NC		Possible basic auxiliary contactors + Auxiliary contacts blocks to be added
<b>LATERAL</b> mounted auxiliary contact blocks with 2 contacts each - <b>RIGHT</b> side mounted (continued)				
	31	3	1	EC09A311..EC25A311 EC09D311..EC25D311 EC09E311..EC25E311 <b>+ECLA220</b>
	02	0	2	EC32A300..EC40A300 EC32D300..EC40D300 EC32E300..EC40E300 <b>+ECLA202</b>
	11	1	1	EC32A300..EC40A300 EC32D300..EC40D300 EC32E300..EC40E300 <b>+ECLA211</b> EF50A300....EF105A300 EF50E300....EF105E300 <b>+BCLL11</b>
	20	2	0	EC32A300..EC40A300 EC32D300..EC40D300 EC32E300..EC40E300 <b>+ECLA220</b> EF50A300....EF105A300 EF50E300....EF105E300 <b>+BCLL20</b>
<b>LATERAL</b> mounted auxiliary contact blocks with 2 contacts each - <b>LEFT</b> side mounted				
	13	1	3	EC09A311..EC25A311 EC09D311..EC25D311 EC09E311..EC25E311 <b>+ECLA202</b>
	22	2	2	EC09A311..EC25A311 EC09D311..EC25D311 EC09E311..EC25E311 <b>+ECLA211</b>
	31	3	1	EC09A311..EC25A311 EC09D311..EC25D311 EC09E311..EC25E311 <b>+ECLA220</b>
	02	0	2	EC32A300..EC40A300 EC32D300..EC40D300 EC32E300..EC40E300 <b>+ECLA202</b>
	11	1	1	EC32A300..EC40A300 EC32D300..EC40D300 EC32E300..EC40E300 <b>+ECLA211</b> EF50A300....EF105A300 EF50E300....EF105E300 <b>+BCLL11</b>
	20	2	0	EC32A300..EC40A300 EC32D300..EC40D300 EC32E300..EC40E300 <b>+ECLA220</b> EF50A300....EF105A300 EF50E300....EF105E300 <b>+BCLL20</b>

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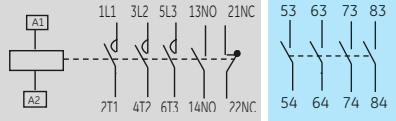

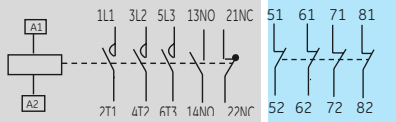

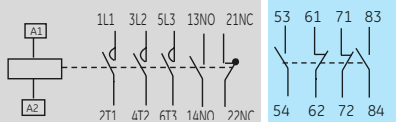

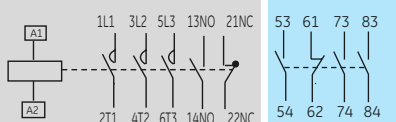



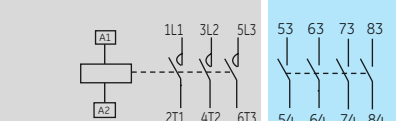

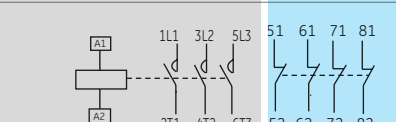

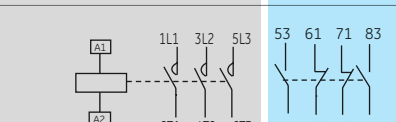

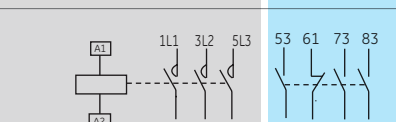

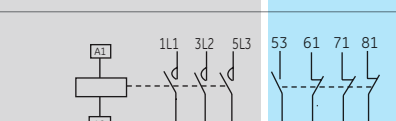

X



Terminal numbering according to EN 50012 (continued 2)

Auxiliary contacts	Description	 NO	 NC	Possible basic auxiliary contactors + Auxiliary contacts blocks to be added
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FRONT mounted auxiliary contact blocks with 4 contacts each

	51	5	1	EC09A311..EC25A311 EC09D311..EC25D311 EC09E311..EC25E311 +ECFA440	
	15	1	5	EC09A311..EC25A311 EC09D311..EC25D311 EC09E311..EC25E311 +ECFA404	
	33	3	3	EC09A311..EC25A311 EC09D311..EC25D311 EC09E311..EC25E311 +ECFA422	
	42	4	2	EC09A311..EC25A311 EC09D311..EC25D311 EC09E311..EC25E311 +ECFA431	
	24	2	4	EC09A311..EC25A311 EC09D311..EC25D311 EC09E311..EC25E311 +ECFA413	
	40	4	0	EC09A311..EC25A311 EC09D311..EC25D311 EC09E311..EC25E311 +ECFA440	
	04	0	4	EC09A311..EC25A311 EC09D311..EC25D311 EC09E311..EC25E311 +ECFA404	
	22	2	2	EC32A300..EF105A300 EC32D300..EF105E300 EC32E300..EF105E300 +ECFA422	
	31	3	1	EC32A300..EF105A300 EC32D300..EF105E300 EC32E300..EF105E300 +ECFA431	
	13	1	3	EC32A300..EF105A300 EC32D300..EF105E300 EC32E300..EF105E300 +ECFA413	

Global contactors

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## Technical data

### General

		MC1...	MC2...
Rated thermal current $I_{th} \theta \leq 60^{\circ}[1]$	(A)	20	20
Rated operational current $I_e^{[2]}$ (3x440V, 50/60Hz, AC-3)	(A)	9	12
Maximum number of poles		4	4
Rated insulation voltage $U_i$	(V)	750	750
Rated operational voltage $U_e$	(V)	690	690

- (1) Insulated terminal type B 2.8x0.8 with wire 1mm<sup>2</sup>:  
 $I_e = 8A$ , design DIN 46 247  
 (2) Max. operational current AC3, 3 -phase  $\leq 440V$ ,  
 according to IEC 947-4-1

### Conformity to standards

IEC/EN 60947-1	CSA C22.2/14	SEV 10254
IEC/EN 60947-4-1	CENELEC HD 419	JIS C8325
IEC/EN 60947-5-1	VDE 0660	JEM 1038
EN 50003	NFC 63110	NEMA ICS-1
EN 50005	BS 4794	UL 508
EN 50012		

### Approvals

cULus	NEMKO	SEMKO
SETI	DEMKO	RINA
IMQ		
Lloyd's Register	Bureau Veritas	CE

### Ambient conditions

Storage temperature	-55°C to +80°C
Operation temperature	-40°C to +55°C
Altitude	up to 3000m Nominal values from 3000 up to 4000m 90% $I_e$ 80% $U_e$ from 4000 up to 5000m 80% $I_e$ 75% $U_e$

### Climatic resistance

Continuous tests 40 / 125 / 56		
Cold (72h)		
Temperature	-40°C	
Dry heat (96h)		
Temperature	+125°C	
Relative humidity	< 50%	
Humid heat (56h)		
Temperature	+40°C	
Relative humidity	95%	
Cyclic tests		
First half-cycle (12h)		
Low temperature	+25°C	
Relative humidity	93%	
Second half-cycle (12h)		
Low temperature	+55°C	
Relative humidity	95%	
Number of consecutive cycles	6	

### Coil Terminal capacity and tightening torque

Tightening torque	0.8Nm - 7Lb/in
Solid Wire	(mm <sup>2</sup> ) 0.75 to 2x2
Flexible wire without terminal	(mm <sup>2</sup> ) 0.75 to 2.5x2
Flexible wire without terminal with cap	(mm <sup>2</sup> ) 0.75 to 2.5x2.1

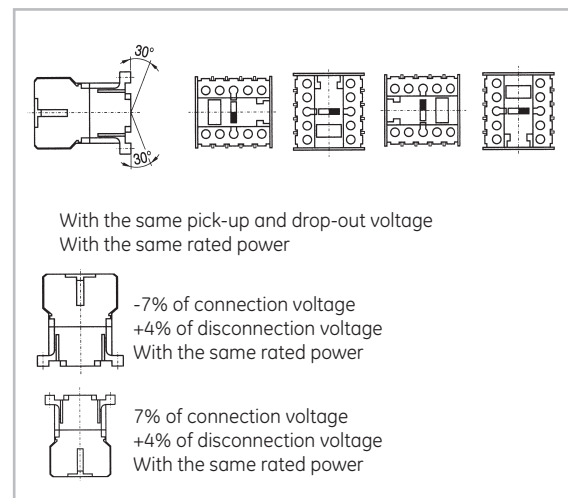
### Shock resistance (IEC 68-2-27)

Continuously closed (at 0.8Us)	
Admissible acceleration	25g
Impulse duration	11 ms
Continuously opened (no voltage)	
Admissible acceleration	20g
Impulse duration	11 ms

### Vibration resistance (IEC 68-2-6)

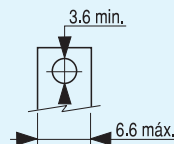
Continuously closed (at 0.8Us)	
Admissible acceleration	15g
Sweep between	10 - 200Hz
Continuously opened (no voltage)	
Admissible acceleration	5g (AC) - 35g (DC)
Sweep between	10 - 200Hz

### Mounting positions



### Terminal capacity

Terminal with M3,5 screw (with pozidrive head and safety flange)	Tightening torque
Solid wire	0.8Nm - 7 Lb/in
Flexible wire without terminal	mm <sup>2</sup> 0.75 to 2x2 w.
Flexible wire without terminal with cap	mm <sup>2</sup> 0.75 to 2.5x1 w.
	mm <sup>2</sup> 0.75 to 1x2 w.
Ring terminal	0.8Nm - 7 Lb/in



Faston terminal 2.8 - 2 insulated terminals	mm <sup>2</sup> 1x2w.
Terminal for printed circuit ( $\varnothing$ of PCB hole)	1.8mm
Ring terminal cap	7.8mm
Fork terminal cap	6.5 mm

## Control circuit

		MC_A...	MC_C...	MC_I...	MC_K...	MC_C...W
Rated insulation voltage (Ui)		(V)	750	750	750	750
Standard voltages (Us)						
50Hz(V)			24 ... 690	-	-	-
60Hz(V)			6 ... 600	-	-	-
DC		(V)	-	6 ... 440	24	24
12 ... 440						
Operating voltages limits						
Operating <sup>[1]</sup>		xUs	0.8 ... 1.1	0.8 ... 1.1	0.8 ... 1.25	0.7 ... 1.25
Drop-out		xUs	0.35 ... 0.55	0.15 ... 0.4	0.15 ... 0.3	0.15 ... 0.35
Operating voltages limits with coil 50/60Hz						
Operating		xUs	0.8 ... 1.1	-	-	-
Drop-out		xUs	0.35 ... 0.55	-	-	-
Consumption						
50 or 60Hz - monofrequency coil						
Pick-up		(VA)	26	-	-	-
Seal		(VA)	4	-	-	-
50/60Hz - bifrequency coil						
Pick-up		(VA)	32	-	-	-
Seal		(VA)	6	-	-	-
DC		(W)	-	3	1.2	2
4						
Power factor						
Magnetic circuit open		(cos φ)	0.8	-	-	-
Magnetic circuit closed		(cos φ)	0.35	-	-	-
Power dissipation		(W)	1.4	3	1.2	2
4						
Opening and closing times						
Values between ±%Us		%	+10 ... -20	+10 ... -20	+25 ... -30	+25 ... -30
Time on energisation NO		(ms)	6 ... 13	22 ... 36	30 ... 70	20 ... 50
Time on de-energisation NC		(ms)	8 ... 16	9 ... 12	9 ... 16	9 ... 16
Time on energisation NC		(ms)	5 ... 11	18 ... 27	20 ... 45	18 ... 35
Time on de-energisation NO		(ms)	6 ... 13	5 ... 7	5 ... 9	5 ... 9
Values at Us						
Time on excitation NO		(ms)	7 ... 12	24 ... 27	25 ... 45	25 ... 40
Time on desexcitation NC		(ms)	8 ... 16	9 ... 11	9 ... 16	9 ... 16
Time on excitation NC		(ms)	6 ... 10	20 ... 26	25 ... 35	20 ... 30
Time on desexcitation NO		(ms)	6 ... 13	5 ... 8	5 ... 9	5 ... 8
Maximum time without voltage		(ms)	3	3	3	3
Mechanical endurance						
Monofrequency coil		10 <sup>6</sup> ops.	>15	-	-	-
Bifrequency coil		10 <sup>6</sup> ops.	>10	-	-	-
DC		10 <sup>6</sup> ops.	-	10	10	10
10						
Maximum rate						
No load						
Monofrequency coil		ops/h	9000	-	-	-
Bifrequency coil		ops/h	3600	-	-	-
DC		ops/h	-	9000	9000	9000
9000						
AC1 and AC3 (at rated power)		ops/h	1200	1200	1200	1200
1200						
AC4 (at rated power)		ops/h	300	300	300	300
300						



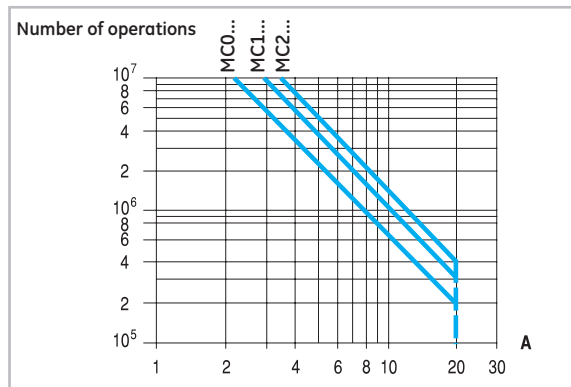
Main circuit (poles)

		MC1...	MC2...
Rated insulation voltage (Ui) (acc. IEC 947-4)	(V)	750	750
Rated thermal current (Ith) $\theta \leq 60^{\circ} \text{C}$	(A)	20	20
Frequency limits	(Hz)	0..400	0..400
Making capacity (r.m.s.) $U_e \leq 690\text{V } 50/60\text{Hz}$	(A)	160	160
Breaking capacity (r.m.s.) $U_e \leq 440\text{V}$	(A)	106	106
$U_e = 500\text{V}$	(A)	90	90
$U_e = 690\text{V}$	(A)	80	90
Short-time current			
0.3 sec.	(A)	470	470
1 sec.	(A)	250	250
5 sec.	(A)	125	125
10 sec.	(A)	95	95
30 sec.	(A)	70	70
1 min.	(A)	50	50
3 min.	(A)	40	40
Recovery time	min.	10	10
Protec. against short-circuits (IEC 947-4), w/o TOR			
Coordination type "1" gL/gG	(A)	32	32
Coordination type "2" gL/gG	(A)	20	20
w/o welding contacts gL/gG	(A)	16	16
Circuit breaker rating (curve G CEE 19.1)		20	20
Impedance per pole	(m $\Omega$ )	1.5	1.5
Power dissipation per pole			
AC1	(W)	0.6	0.6
AC3	(W)	0.128	0.228
Insulation resistance			
Between adjacent poles	(M $\Omega$ )	> 10	> 10
Between pole and earth	(M $\Omega$ )	> 10	> 10
Between input and output	(M $\Omega$ )	> 10	> 10
Guaranteed no overlap between NO and NC contacts			
Space	(mm)	1	1
Time	(ms)	> 2	> 2

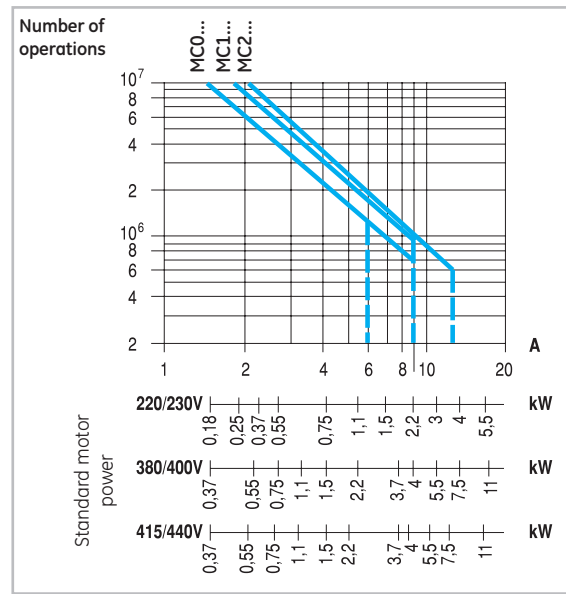
(1) Insulated terminal type B 2.8x0.8 with wire 1mm<sup>2</sup> Ie = 8A acc. to DIN 46247

Electrical endurance

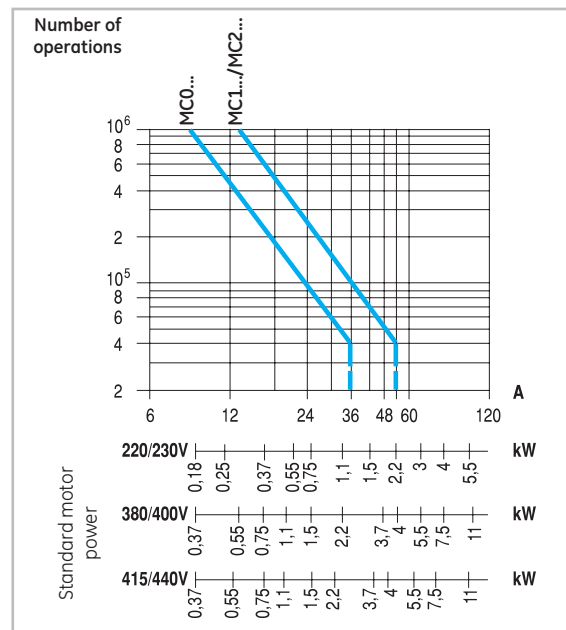
Category AC1



Category AC3



Category AC4

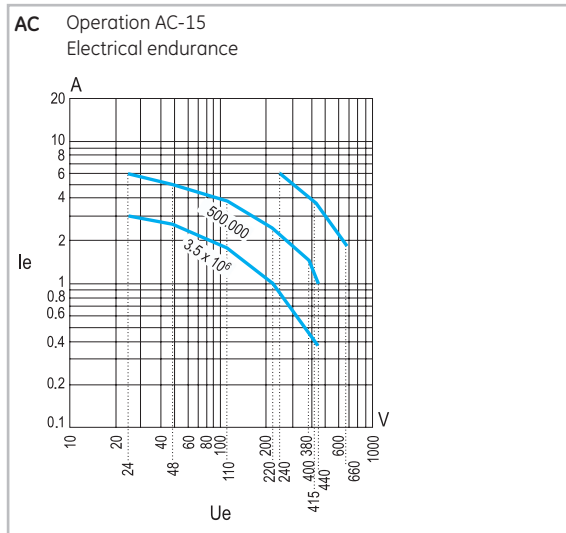


## Internal auxiliary contacts

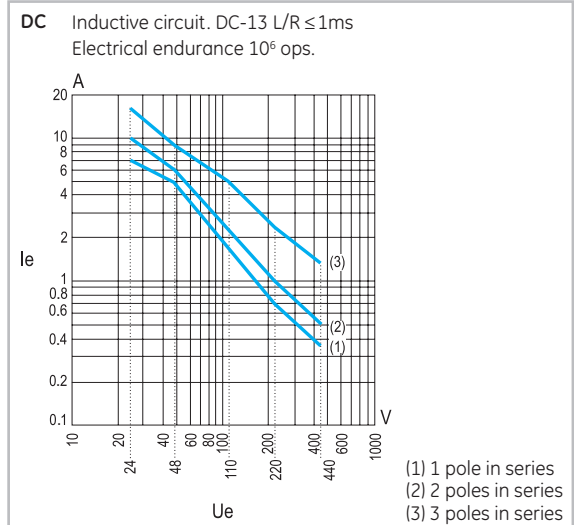
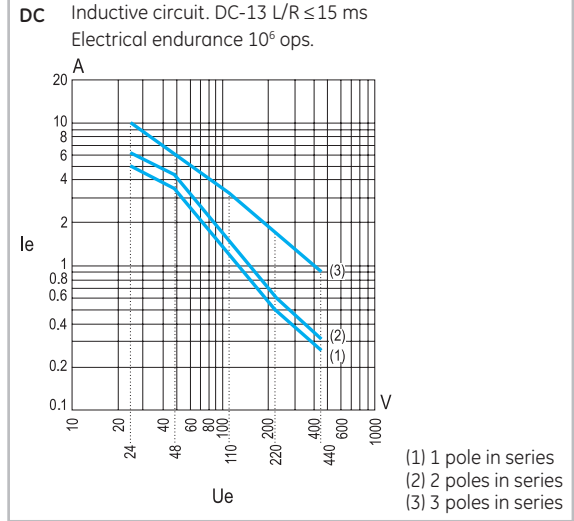
	MC1 / MC2
Rated insulation voltage (Ui) IEC 60947-5	(V) 750
Rated thermal current (Ith) $\theta \leq 60^{\circ}\text{C}^{\text{II}}$	(A) 16
Making capacity according with IEC 60947-5-1	
Ue $\leq$ 690 50-60Hz	(A) 160
Ue $\leq$ 440V DC	(A) 160
Breaking capacity (r.m.s.) IEC 60947-5-1	
AC-15	
Ue $\leq$ 440V / 50-60Hz	(A) 106
DC-13	
Ue $\leq$ 110V DC	(A) 3
Ue = 220V DC	(A) 1.2
Ue = 48V DC	(A) 10
Minimum operational power (operational safety.)	5mA, 17V
Short-circuit protection (max.class gI fuse) w/o welding	(A) 10
Insulation resistance	
Between adjacent contacts	(M $\Omega$ ) > 10
Between contacts and earth	(M $\Omega$ ) > 10
Between input and output	(M $\Omega$ ) > 10
Guaranteed no overlap between NO and NC contacts	
Space	(mm) 0,5
Minimal time	(ms) > 2
Impedance	(m $\Omega$ ) 2.3
Terminal capacity	Same as main circuit

(1) Insulated terminal type B 2.8x0.8 with wire 1mm<sup>2</sup> Ie = 8A acc. with DIN 46247

## AC characteristics



## DC characteristics



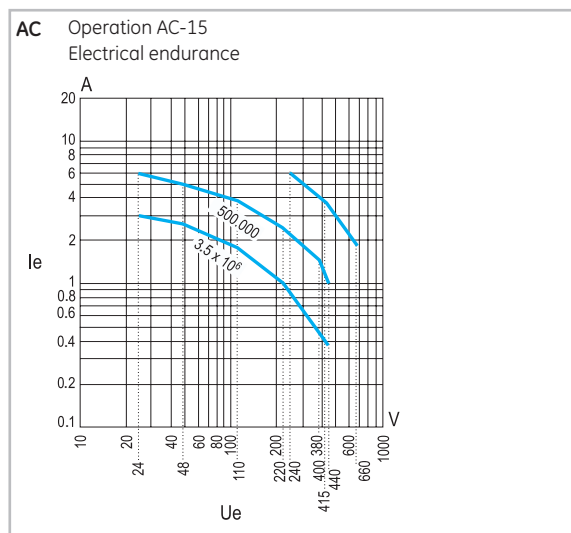


### Instantaneous auxiliary contact blocks

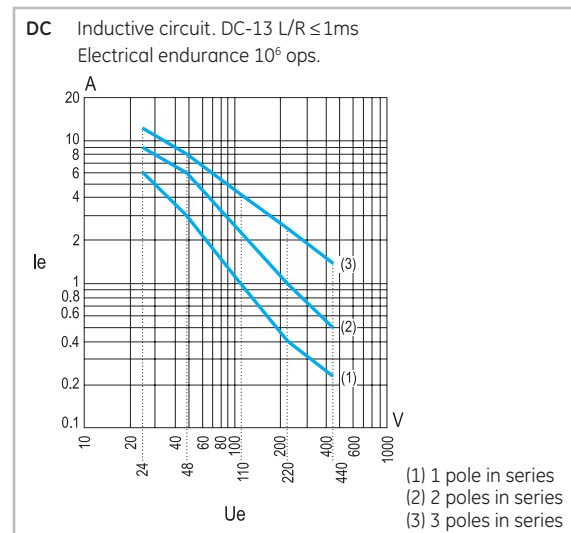
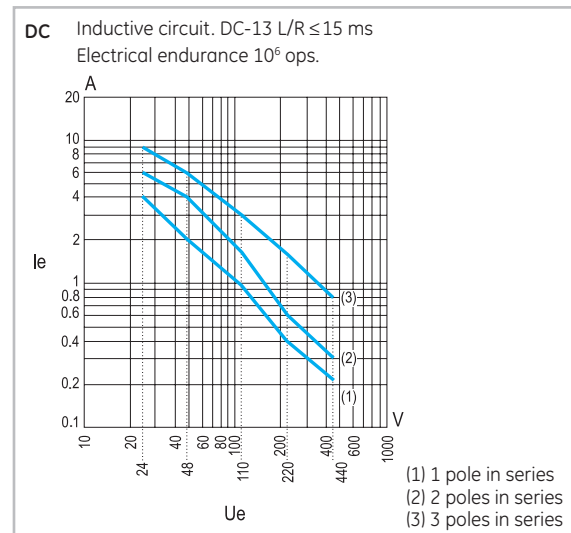
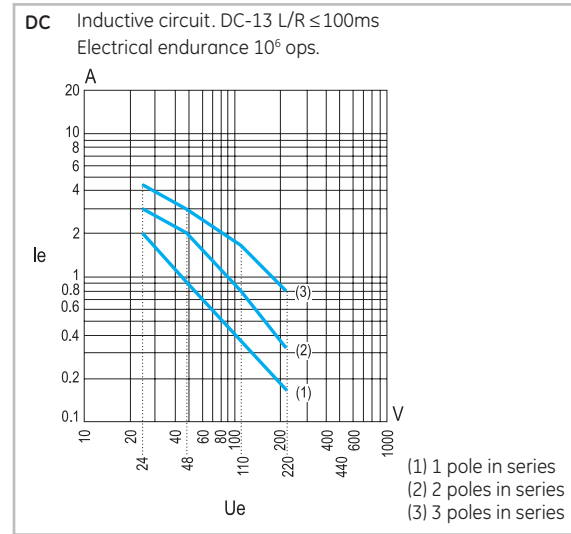
		MACN..., MACL...
Rated insulation voltage (Ui) acc. IEC 60947-1	(V)	750
Rated thermal current (Ith) $\theta \leq 60^{\circ}\text{C}^{\text{cl}}$	(A)	10
Making capacity (r.m.s.) according with IEC/EN 60947-5-1		
AC-15	Ue $\leq$ 220V 50/60Hz	(A) 73
	Ue = 380V 50/60Hz	(A) 38
	Ue = 690V 50/60Hz	(A) 22
DC-13	Ue $\leq$ 100V DC	(A) 2.6
	L/R=100ms Ue = 220V DC	(A) 1
	Ue = 440V DC	(A) 0.6
Breaking capacity (r.m.s.) acc. IEC/EN 60947-5-1		
AC-15	Ue $\leq$ 220V 50/60Hz	(A) 73
	Ue = 380V 50/60Hz	(A) 38
	Ue = 690V 50/60Hz	(A) 22
DC-13	Ue $\leq$ 100V DC	(A) 2
	LR=100ms Ue = 220V DC	(A) 0.8
	Ue = 440V DC	(A) 0.4
Rated voltage and rated current Ue-le		
AC-15	according to IEC 60947	120V - 6A
		230V - 6A
		400V - 4A
		500V - 1A
		600V - 1A
	according to UL, CSA	A600
DC-13	according to IEC 60947	24V - 4A
		48V - 2A
		110V - 0.7A
		220V - 0.3A
		440V - 0.1A
	according to UL, CSA	Q600
Minimum operational power (operational safety)		5 mA, 17V
Short-circuit protection (max. class gI fuse) w/o welding	(A)	10
Insulation resistance		
	Between adjacent contacts (M $\Omega$ )	> 10
	Between contacts an earth (M $\Omega$ )	> 10
	Between input and output (M $\Omega$ )	> 10
Guaranteed no overlap between NO and NC contacts		
	Space (mm)	0,5
	Minimal time (ms)	> 2
Impedance	(m $\Omega$ )	2,4
Terminal capacity		Same as main circuit

(1) Insulated terminal type B 2.8x0.8 with wire 1mm<sup>2</sup> le = 8A acc. with DIN 46247

### AC characteristics

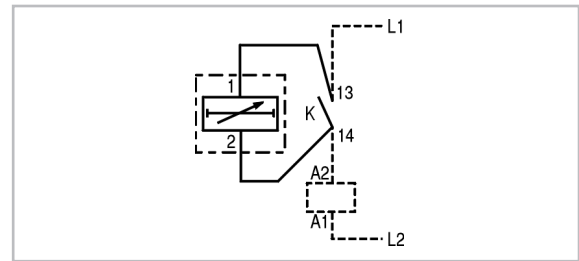


### DC characteristics



## Electronic timer block




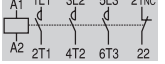

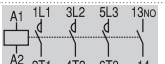

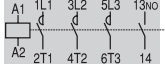

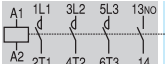

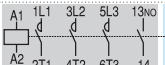

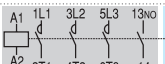

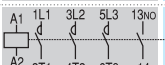

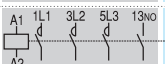

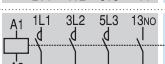

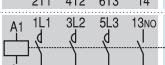

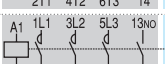

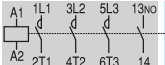

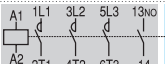

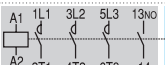
		MREBC...
Rated insulation voltage (Ui)	(V)	750
Rated thermal current (Ith) $\theta \leq 60^\circ\text{C}^{\text{II}}$	(A)	0.55
Supply voltage (AC and DC)	(V)	24 to 250
Operating limits		0.80 to 1.1 Us (0.85 to 1.1 Us to 12V)
Voltage drop	(V)	< 3
Maximum load current at:		
20°C	(A)	0.9
40°C	(A)	0.72
60°C	(A)	0.55
Minimum load for safe operation	(A)	> 10
Maximum current	(A)	10A per 40ms
Leakage current at 220V	(mA)	< 5
Operational current		
AC-15	(A)	0.7
DC-13	(A)	0.9
Timing range (delay ON)	(s)	0.5 to 60 ( $\pm 6\text{s}$ )
Rearrangement time	(ms)	< 100
Repeatability (accuracy) (%)		$\pm 1$
Ambient temperature		
storage	(°C)	-55 to + 80
operation	(°C)	-5 to + 60
Degree of protection		IP20
Mounting positions		Any
Terminals: 2 free cables		1mm <sup>2</sup> (AWG 17) 250mm



## Contact sequence

	Main contact (NO)	Main contact (NC)	Auxiliary contact (NO)	Auxiliary contact (NC)
<b>Three-pole minicontactor</b>				
MC...310...				
MC...301...				
<b>Four-pole minicontactor</b>				
MC...400...				
MC...B00...				
MC...A00...				
<b>Auxiliary contact block</b>				
MAC...				
MAR...				

Terminal numbering in accordance with EN 50012

Final structure of the contactor	Auxiliary contactors		Possible basic contactors + Auxiliary contact blocks to be added
	Combination	 	
	Description		
<b>Without auxiliary contact blocks</b>			
 	01E	0 1	MC_A301A...
 	10E	1 0	MC_A310A...
<b>Auxiliary contact blocks front mounted with two or four contacts</b>			
 	11E	1 1	MC_A310A... + MACN211A
 	21E	2 1	MC_A310A... + MACN211A
 	12E	1 2	MC_A310A... + MACN202A
 	31E	3 1	MC_A310A... + MACN431A
 	41E	4 1	MC_A310A... + MACN431A
 	22E	2 2	MC_A310A... + MACN422A
 	32E	3 2	MC_A310A... + MACN422A
 	13E	1 3	MC_A310A... + MACN413A
 	23E	2 3	MC_A310A... + MACN413A
<b>Auxiliary contact blocks lateral mounted with one contact</b>			
 	11E	1 1	MC_A310A... + MACL101A
 	21E	2 1	MC_A310A... + MACL101A + MACL110A
 	12E	1 2	MC_A310A... + MACL101A + MACL101A

Technical data

Intro

A

B

C

D

E

F

G

H

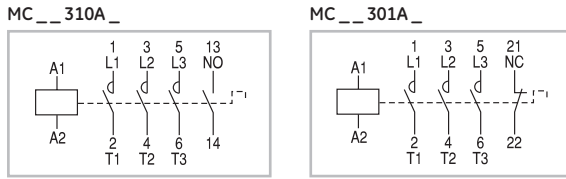
I

X

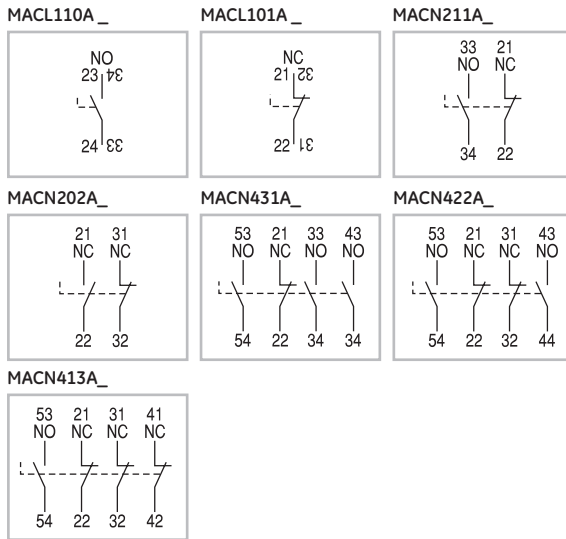


## Wiring diagrams

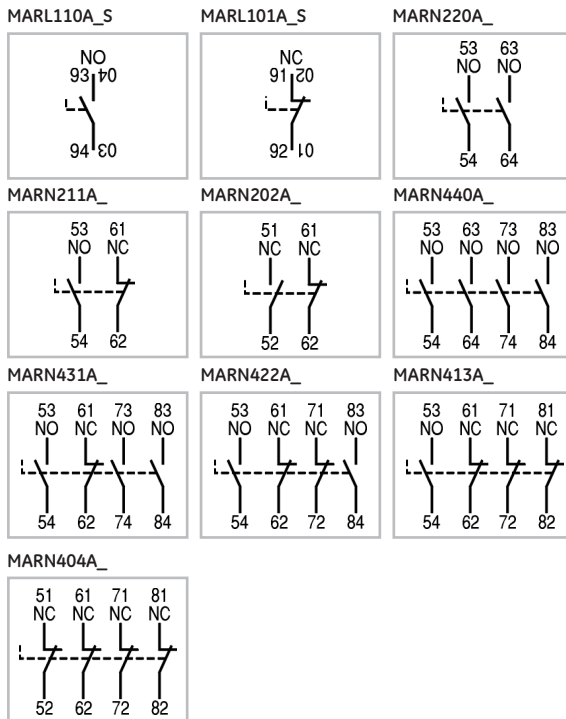
### Basic three-pole contactors. (EN 50012)



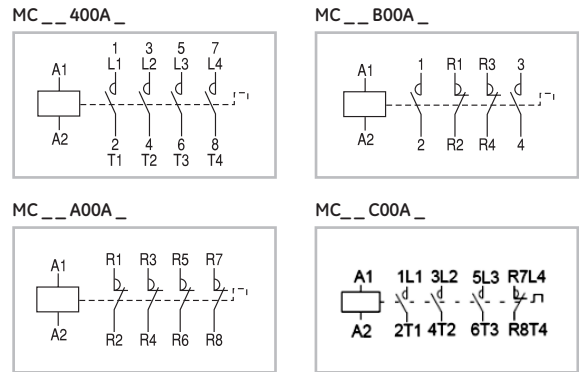
### Instantaneous auxiliary contact blocks. (EN 50012)



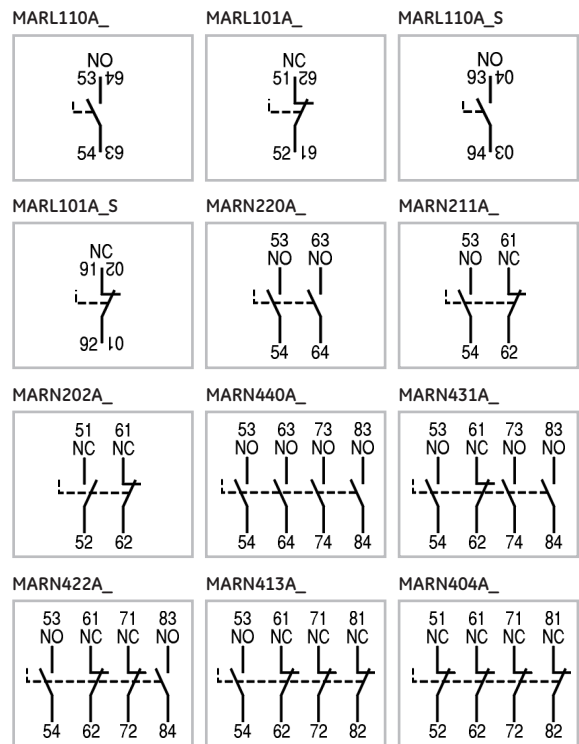
### Instantaneous auxiliary contact blocks. (EN 50005)



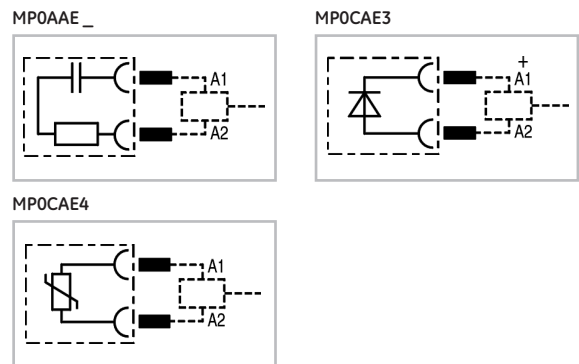
### Base four-pole contactors. (EN 50005)



### Instantaneous auxiliary contact blocks. (EN 50005)



### Voltage suppressor block



Everything is under control

## Conformity to standards

IEC/EN 60947-1	EN 50005	UNE 20109
IEC/EN 60947-4-1	CENELEC HD419	BS 5424 & 775
IEC/EN 60947-5-1	NF C63-110	NEMA ICS 1
UL 508	ASE 1025	VDE 0660/102
CSA 22.2/14		

## Approvals/Marking

cULus	RINA	CE
SETI	IMQ (up to Ith:32A)	
Lloyd's Register	Bureau Veritas	

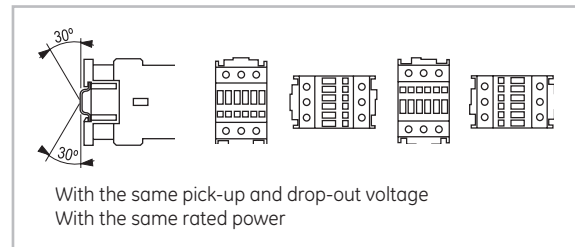
## Ambient conditions

Storage temperature	-55°C to +80°C	
Operation temperature	-40°C to +55°C	
Altitude	up to 3000m	Nominal values
	from 3000 up to 4000m	90%Ie 80%Ue
	from 4000 up to 5000m	80%Ie 75%Ue

## Climatic resistance (IEC 68-2)

Continuous tests 40 / 125 / 56		Cyclic test (6 cycles)	
Cold (72h)	Temperature	Humid heat	
		-40°C	First half-cycle (12h)
Dry heat (96h)	Temperature	Low temperature +25°C	
		+125°C	Relative humidity 93%
	Relative humidity	< 50%	
Humid heat (56h)	Temperature	Second half-cycle (12h)	
		+40°C	Low temperature +55°C
	Relative humidity	95%	

## Mounting positions



## Terminal capacity and tightening torque

		CL00 ... CL02	CL03	CL03*4 & CL04	CL05A3	CL05 ... CL08	CL09 ... CL10
	Solid, stranded and finely stranded without end sleeve (mm <sup>2</sup> )	2 x 0.5 ... 2.5	2 x 0.5 ... 2.5	-	-	-	-
	Finely stranded with or without end sleeve (mm <sup>2</sup> )	2 x 2.5 ... 6	2 x 2.5 ... 10	-	-	-	-
	AWG wires	2 x 1 ... 2.5	2 x 1 ... 2.5	-	-	-	-
	Tightening torque (Nm)	2 x 2.5 ... 6	2 x 2.5 ... 10	-	-	-	-
	(Lb x in.)	2 x 20 ... 12	2 x 20 ... 8	-	-	-	-
	Solid, stranded and finely stranded without end sleeve (mm <sup>2</sup> )	-	-	0.75 ... 16	0.75 ... 16	1 ... 35	1.5 ... 50
	Finely stranded with end sleeve (mm <sup>2</sup> )	-	-	0.75 ... 16	0.75 ... 16	1 ... 35	1.5 ... 50
	Finely stranded w/o end sleeve (mm <sup>2</sup> )	-	-	1 ... 16	1 ... 16	1 ... 35	1.5 ... 50
	AWG wires	-	-	18 ... 6	18 ... 6	16 ... 2	16 ... 2
	Tightening torque (Nm)	-	-	1.4	1.8	(4-4.5)	(5.6-6.5)
(Lb x in.)	-	-	12	16	35	50	
	Solid (mm <sup>2</sup> )	-	-	0.75 ... 16	0.75 ... 16	1 ... 16	4 ... 35
	Stranded (mm <sup>2</sup> )	-	-	0.75 ... 16	0.75 ... 16	1 ... 25	4 ... 35
	Finely stranded w/o end sleeve (mm <sup>2</sup> )	-	-	0.75 ... 16	0.75 ... 16	1 ... 25	4 ... 35
	Finely stranded with end sleeve (mm <sup>2</sup> )	-	-	1 ... 16	1 ... 16	1 ... 25	4 ... 35
	AWG wires	-	-	18 ... 6	18 ... 6	16 ... 4	10 ... 1
Tightening torque (Nm)	-	-	1.4	1.8	(4-4.5)	5.6	
(Lb x in.)	-	-	12	16	35	50	
	Solid, stranded and finely stranded without end sleeve (mm <sup>2</sup> )	-	-	Max. 16	Max. 16	Max. 50 ... 4	Max. 50 ... 35
	Finely stranded w/o end sleeve (mm <sup>2</sup> )	-	-	-	-	Max. 25 ... 16	-
	Finely stranded with end sleeve (mm <sup>2</sup> )	-	-	-	-	Max. 25 ... 16	-
	AWG wires	-	-	Max. 6	Max. 6	Max. 25 ... 25	Max. 1
	Tightening torque (Nm)	-	-	1.4	1.8	Max 4 ... 4	5.6
(Lb x in.)	-	-	12	16	35	50	
	Ring terminals (Ø i)	3,6	4,2	4,2	4,2	6,2	6,2
	(acc. with IEC/EN 60947-1) (A)	8	10	10	10	12,5	12,5
	Tightening torque (Nm)	1,6	1,4	1,4	1,4	3	3
(Lb x in.)	15	12	12	12	26	26	

## Coil Terminal capacity and tightening torque

Tightening torque	0.8Nm - 7Lb/in
Solid wire (mm <sup>2</sup> )	0.75 to 2x2
Flexible wire without terminal (mm <sup>2</sup> )	0.75 to 2.5x2
Flexible wire without terminal with cap (mm <sup>2</sup> )	0.75 to 2.5x21

## Power circuit

		CL00	CL01	CL02	CL03	CL04	CL05	CL05	CL06	CL07	CL08	CL09	CL10
<b>Three pole version</b>													
Rated thermal current I <sub>th</sub> at $\theta \leq 55^\circ\text{C}$	(A)	25	25	32	45	60	60	-	90	110	110	140	140
Rated operational current I <sub>e</sub> AC-3	(A)	9	12	18	25	32	50	-	50	65	80	95	105
Rated operational voltage U <sub>e</sub>	(V)	690	690	690	690	690	690	-	690	690	690	690	690
<b>Four pole version (4NO and 2NO+2NC)</b>													
Rated thermal current I <sub>th</sub> at $\theta \leq 55^\circ\text{C}$	(A)	-	25	32	45	60	-	90	-	110	110	140	-
Rated operational voltage U <sub>e</sub>	(V)	-	690	690	690	690	-	690	-	690	690	690	-
<b>Three and four pole version</b>													
Rated insulation voltage U <sub>i</sub>	(V)	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
Maximum continuous current AC-1	(A)	25	25	32	45	60	60	90	90	110	110	140	140
Frequency limits	(Hz)	25.400	25.400	25.400	25.400	25.400	25.400	25.400	25.400	25.400	25.400	25.400	25.400
Making capacity (RMS) (IEC 947)	(A)	450	450	450	450	550	550	1000	1000	1000	1000	1280	1280
Breaking capacity (RMS) (IEC 947)													
U <sub>e</sub> ≤ 400V	(A)	250	250	250	350	450	450	920	920	920	920	1050	1050
U <sub>e</sub> = 500V	(A)	250	250	250	320	450	450	920	920	920	920	1050	1050
U <sub>e</sub> = 690V	(A)	130	130	130	170	205	205	780	780	780	780	950	950
<b>Short-time current</b>													
1 sec.	(A)	455	455	570	630	1010	1265	1580	1580	2530	2530	3300	3300
5 sec.	(A)	205	205	254	280	450	450	565	710	1130	1130	1485	1485
10 sec.	(A)	144	144	180	200	320	400	500	500	800	800	1050	1050
30 sec.	(A)	85	85	104	115	185	230	290	290	460	460	600	600
1 min.	(A)	60	60	74	80	130	165	205	205	325	325	430	430
3 min.	(A)	35	35	46	50	90	100	120	120	185	185	250	250
Recovery time	(min.)	10	10	10	10	10	10	10	10	10	10	10	10
Protec. against short-circuit with fuses without TOR													
Coordination type "1"													
gL/gG	(A)	50	50	63	63	100	125	200	200	200	200	250	250
Coordination type "2"													
gL-gG	(A)	25	35	35	50	63	80	100	100	125	125	160	200
Without welding													
gL-gG	(A)	10	10	25	35	35	50	80	80	100	100	140	160
Impedance per pole	(mΩ)	2.35	2.35	2.41	1.65	1.28	0.95	0.85	0.85	0.86	0.86	0.76	0.76
Power dissipation per pole													
AC-1	(W)	1.47	1.47	2.46	3.34	4.6	3.42	6.89	6.86	10.40	10.40	14.89	14.89
AC-3	(W)	0.19	0.34	0.78	1.03	1.31	1.52	1.36	2.12	3.63	5.5	6.86	8.37
Insulation resistance													
Between adjacent poles	(MΩ)	>10	>10	>10	>10	>10	>10	>10	>10	>10	>10	>10	>10
Between poles and earth	(MΩ)	>10	>10	>10	>10	>10	>10	>10	>10	>10	>10	>10	>10
Between input and output	(MΩ)	>10	>10	>10	>10	>10	>10	>10	>10	>10	>10	>10	>10

## Control circuit

		CL00 ... CL03	CL04 ... CL05_3..	CL05_4 ... CL08	CL09 ... CL10
<b>Alternating current</b>					
Rated insulation voltage Ui	(V)	1000	1000	1000	1000
Standard voltages Us 50Hz	(V)	24..690	24..690	24..690	24..690
Standard voltages Us 60Hz	(V)	24..600	24..600	24..600	24..600
Voltage operating limits monofrequency coils					
Operating	xUs	0.8..1.1	0.8..1.1	0.8..1.1	0.8..1.1
Pick-up	xUs	0.6..0.8	0.65..0.8	0.65..0.8	0.65..0.8
Seal	xUs	0.35..0.55	0.4..0.6	0.4..0.6	0.4..0.6
Voltage operating limits 50/60Hz coils					
Operating 50Hz	xUs	0.8..1.1	0.8..1.1	0.8..1.1	0.8..1.1
Operating 60Hz	xUs	0.85..1.1	0.85..1.1	0.85..1.1	0.85..1.1
Pick-up 50Hz	xUs	0.5..0.8	0.6..0.8	0.6..0.8	0.6..0.8
Pick-up 60Hz	xUs	0.65..0.85	0.7..0.85	0.7..0.85	0.7..0.85
Seal 50Hz	xUs	0.3..0.55	0.35..0.60	0.35..0.60	0.35..0.60
Seal 60Hz	xUs	0.35..0.65	0.4..0.6	0.4..0.6	0.4..0.6
Consumption monofrequency coils					
Magnetic circuit closed	(VA)	6	9	15.5	15.5
Magnetic circuit opened (VA)		48	88	190	190
Consumption bifrequency coils					
Magnetic circuit closed (50Hz/60Hz)	(VA)	6.8 / 5.6	11.4 / 9.5	20 / 16.6	20 / 16.6
Magnetic circuit opened (50Hz/60Hz)	(VA)	53 / 44	120 / 100	245 / 204	245 / 204
Thermal power dissipation (50Hz/60Hz)	(W)	2.2 / 1.8	3.2 / 2.6	5.2 / 4.3	5.2 / 4.3
Power factor					
Magnetic circuit closed	cos φ	0.33	0.28	0.26	0.26
Magnetic circuit opened	cos φ	0.84	0.73	0.54	0.54
Opening and closing times					
Values between +10% Us and -20% Us					
Time on energisation (NO)	(ms)	6..20	7..25	9..35	9..35
Time on de-energisation (NO)	(ms)	6..13	5..25	9..15	9..15
Values at Us					
Time on energisation (NO)	(ms)	8..20	10..19	15..30	15..30
Time on de-energisation (NO)	(ms)	6..13	5..25	9..15	9..15
Mechanical endurance					
Monofrequency coils	10 <sup>6</sup> ops.	15	15	15	15
Bifrequency coils (at 50Hz)	10 <sup>6</sup> ops.	10	10	8	8
Maximum rate					
Monofrequency coils. No load	ops./h	9000	9000	9000	5000
AC-1 at rated power	ops./h	1200	1200	1200	1200
AC-2 at rated power	ops./h	1000	1000	1000	750
AC-3 at rated power	ops./h	1200	1200	1200	600
AC-4 at rated power	ops./h	360	360	200	200
Bifrequency coils. No load	ops./h	3600	3600	3600	3600

		Coils with electronic module				Coils with wide voltage range		
		CL00D	CL04D	CL05E	CL09E	CL00D..W	CL04D..W	CL05D4..W
		... CL03D	... CL05D3	... CL08E	... CL10E	... CL03D..W	... CL05D3..W	... CL10D..W
<b>Direct current</b>								
Rated insulation voltage Ui	(V)	1000	1000	1000	1000	1000	1000	1000
Standard voltages Us	(V)	12..440	12..440	24..440	24..440	12..440	12..440	12..440
Operating limits								
Operating	xUs	0.8..1.1	0.8..1.1	0.8..1.1	0.8..1.1	0.7..1.3	0.7..1.3	0.7..1.3
Pick-up	xUs	0.45..0.65	0.45..0.65	0.70..0.80	0.70..0.80	0.45..0.55	0.45..0.55	0.45..0.55
Drop-out	xUs	0.15..0.3	0.15..0.3	0.4..0.6	0.4..0.6	0.15..0.3	0.15..0.3	0.15..0.3
Consumption								
Magnetic circuit closed	(W)	5.5	8	10	10	6.5	10.4	20
Magnetic circuit opened (W)		5.5	8	170	170	6.5	10.4	20
Opening and closing times								
Values between +10% Us and -20% Us								
Time on energisation (NO)	(ms)	35..65	35..70	60..80	60..80	26..55	30..65	64..133
Time on de-energisation (NO)	(ms)	6..15	40..65	40..50	40..50	6..15	5..10	20..23
Values at Us								
Time on energisation (NO)	(ms)	35..45	40..55	50..60	50..60	35..45	40..55	75..95
Time on de-energisation (NO)	(ms)	7..12	30..65	55..60	55..60	7..12	6..8	20..22
Mechanical endurance								
	10 <sup>6</sup> ops.	15	15	12	12	15	15	12
Maximum rate								
No load	ops./h	3600	3600	2500	2500	3600	3600	3600
AC1 and AC3 at rated power	ops./h	1200	1200	1200	600	1200	1200	1200
AC4 at rated power	ops./h	360	360	200	200	360	360	200





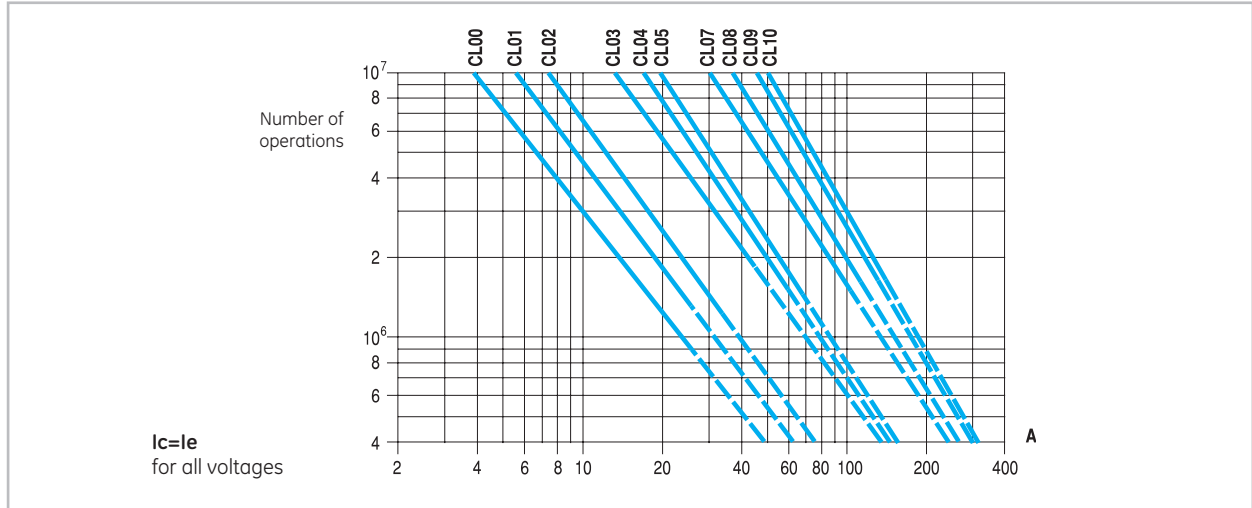
## Electrical endurance

### Mixed category AC4 / AC3

Electrical endurance for mixed category (AC-3/AC-4) is calculated with the following formula:

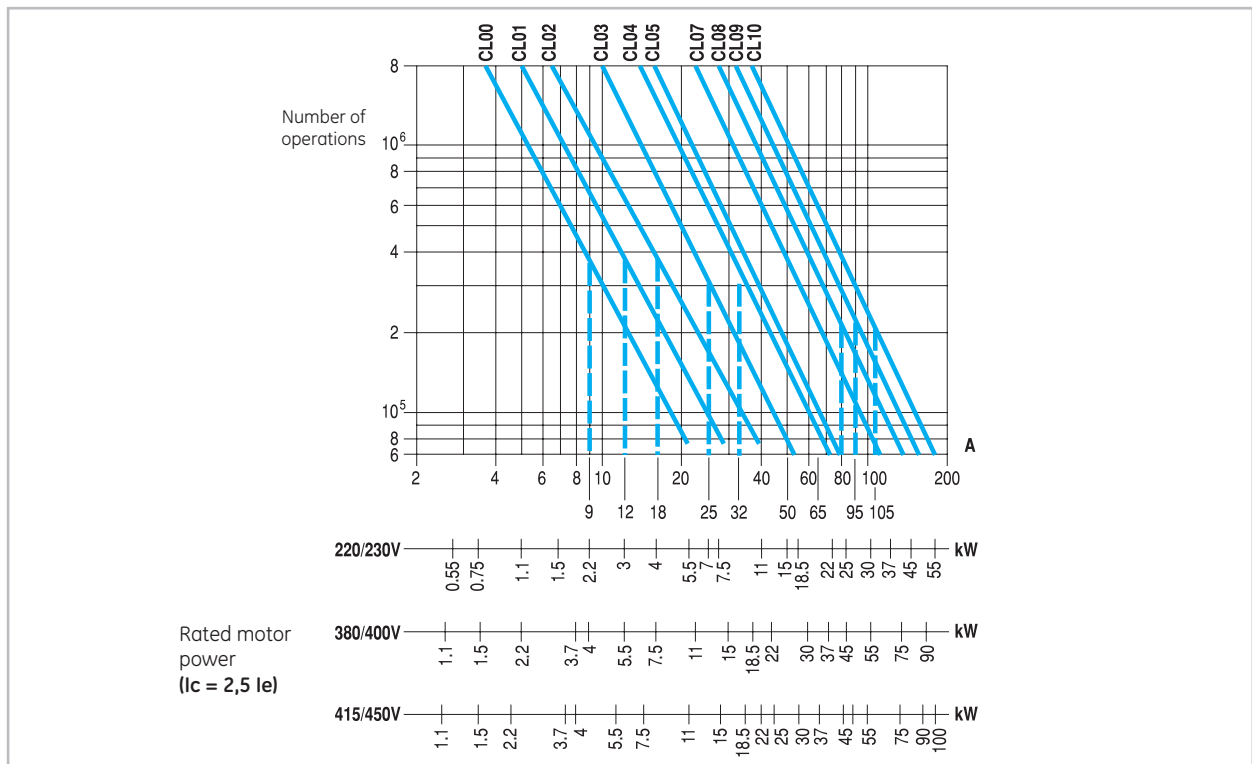
$$\text{Electrical endurance (AC-3/AC-4)} = \frac{\text{Electrical endurance (AC-3)}}{1 + \frac{\% \text{ oper AC-4}}{100} \times \left( \frac{\text{Elec.endur. (AC-3)}}{\text{Elec.endur.(AC-4)}} - 1 \right)}$$

### Category AC1<sup>(1)</sup>



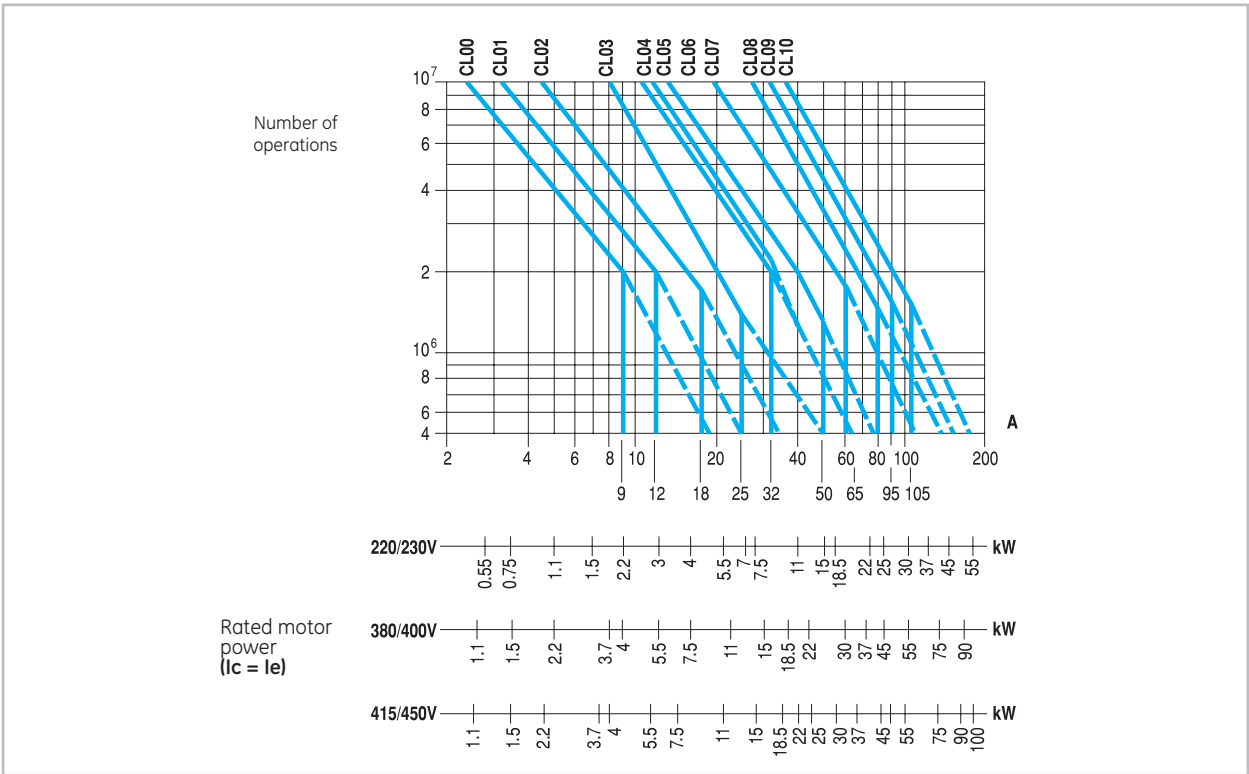
(1) AC1 application current shall not exceed Ith current of the contactor

### Category AC2

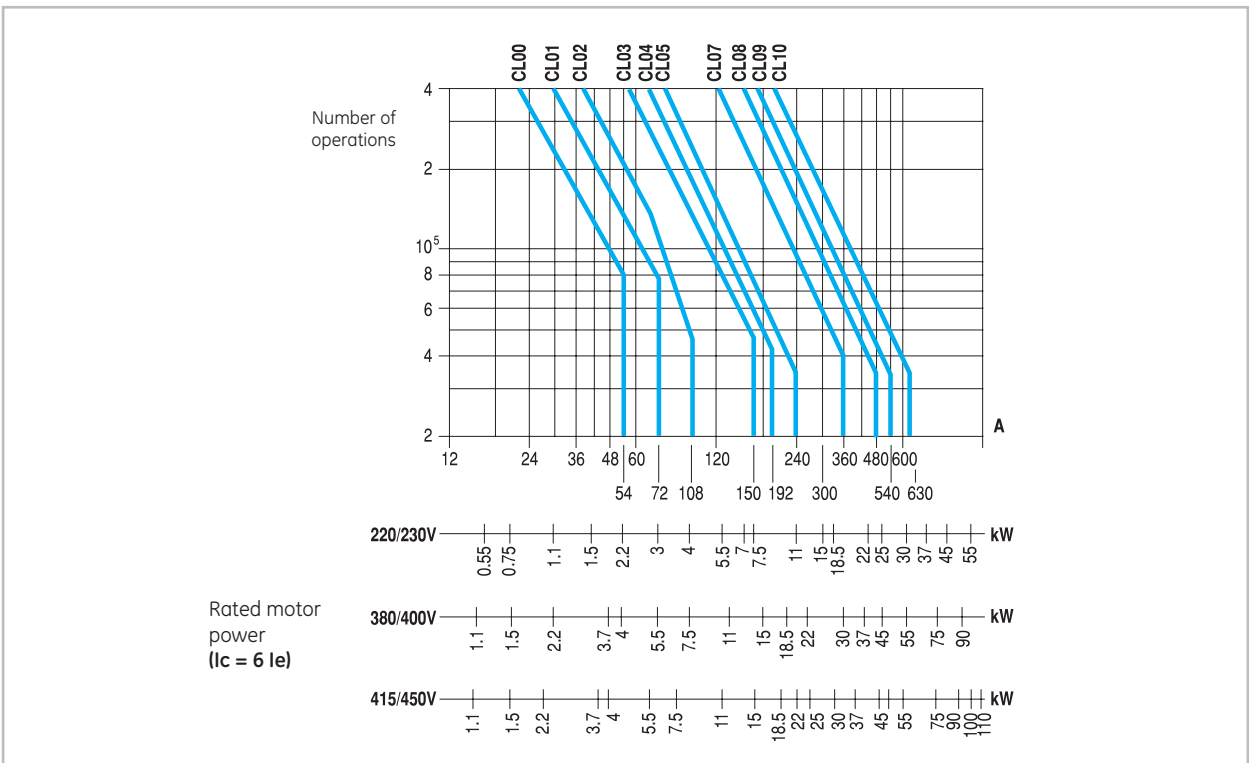


# Series CL

## Category AC3



## Category AC4



## Internal auxiliary contacts

			CL00 ... CL02		CL04	
Rated insulation voltage $U_i$ according to IEC 60947	(V)		1000		1000	
Rated thermal current $I_{th}$ at $\theta \leq 55^\circ\text{C}$	(A)		20		20	
Making capacity (r.m.s.) acc. to IEC 60947						
AC-15	$U_e \leq 400\text{V}, 50/60\text{Hz}$	(A)	250		250	
DC-13	$U_e \leq 220\text{V DC}$	(A)	250		250	
Breaking capacity (r.m.s.) acc. to IEC 60947						
AC-15	$U_e \leq 400\text{V}, 50/60\text{Hz}$	(A)	250		250	
DC-13	$U_e \leq 220\text{V DC}$	(A)	2		2	
AC-15	Rated voltage and current $U_e-I_e$	according to IEC	110/120V-10A 400/380V-6A 500V-4A	220/230V-10A 415/450V-5A 690/660V-2A	110/120V-10A 400/380V-6A 500V-4A	230/220V-10A 415/450V-5A 690/660V-2A
		according to UL, CSA	A600		A600	
		according to IEC	24V-6A 110V-2A 440V-0.35A	48V-4A 220V-0.7A	24V-6A 110V-2A 440V-0.35A	48V-4A 220V-0.7A
DC-13	Rated voltage and current $U_e-I_e$	according to IEC	24V-6A 110V-2A 440V-0.35A	48V-4A 220V-0.7A	24V-6A 110V-2A 440V-0.35A	48V-4A 220V-0.7A
		according to CSA	P600		P600	
		ops.	10 <sup>6</sup>		10 <sup>6</sup>	
Electrical endurance	ops.		10 <sup>6</sup>		10 <sup>6</sup>	
Minimum operational power (operational safety)						
Short-circuit protect.	Max.fuse class gl-gG without welding	(A)	17V - 5mA		17V - 5mA	
Insulation resistance	Between contacts	(M $\Omega$ )	> 10		> 10	
	Between contacts and earth	(M $\Omega$ )	> 10		> 10	
	Between input and output	(M $\Omega$ )	> 10		> 10	
Guaranteed no overlap between NO and NC contacts						
	Space	(mm)	1.3		2.6	
	Time	(ms)	1.5		1.5	
Impedance of the contacts		(m $\Omega$ )	1.28		1.28	

## Auxiliary contact blocks

			Instantaneous BCLF..., BCRF..., BCLL..., BRLL...		Timed blocks BTFL..., BTRF...	
Rated insulation voltage $U_i$ according to IEC 60947	(V)		1000		1000	
Rated thermal current $I_{th}$ at $\theta \leq 55^\circ\text{C}$	(A)		10		10	
Making capacity (I <sub>eff</sub> ) according to IEC 60947						
AC-15	$U_e \leq 400\text{V}, 50/60\text{Hz}$	(A)	90		90	
DC-13	$U_e \leq 220\text{V DC}$	(A)	90		90	
Breaking capacity (I <sub>eff</sub> ) according to IEC 60947						
AC-15	$U_e \leq 400\text{V}, 50/60\text{Hz}$	(A)	60		60	
DC-13	$U_e \leq 220\text{V DC}$	(A)	0.95		0.95	
AC-15	Rated voltage and current $U_e-I_e$	according to IEC	120/110V-6A 400/380V-4A 500V-2.5A	230/220V-6A 440/415V-3.5A 690/660V-1.5A	120/110V-6A 400/380V-4A 500V-2.5A	230/220V-6A 440/415V-3.5A 690/660V-1.5A
		according to UL, CSA	A600		A600	
		according to IEC	24V-4A 110V-0.7A 440V-0.15A	48V-2A 220V-0.3A	24V-4A 110V-0.7A 440V-0.15A	48V-2A 220V-0.3A
DC-13	Rated voltage and current $U_e-I_e$	according to IEC	24V-4A 110V-0.7A 440V-0.15A	48V-2A 220V-0.3A	24V-4A 110V-0.7A 440V-0.15A	48V-2A 220V-0.3A
		according to UL, CSA	Q600		Q600	
		ops.	10 <sup>6</sup>		10 <sup>6</sup>	
Electrical endurance	ops.		1		1	
Mechanical endurance	ops.		10		5	
Minimum operational current (operational safety)						
Short-circuit protect.	Max.fuse class gl-gG without welding	(A)	17V - 5mA		17V - 5mA	
Insulation resistance	Between contacts	(M $\Omega$ )	> 10		> 10	
	Between contacts and earth	(M $\Omega$ )	> 10		> 10	
	Between input and output	(M $\Omega$ )	> 10		> 10	
Guaranteed no overlap between NO and NC contacts						
	Space	(mm)	1.3		1.3	
	Time	(ms)	1.5		5	
Impedance of the contacts		(m $\Omega$ )	1.28		1.28	
Timing (ambient temperature between $-25^\circ\text{C}$ and $+55^\circ\text{C}$ )						
	Accuracy		-		± 5%	

## Mechanical latch blocks

	RMLF...	
Rated insulation voltage $U_i$	1000V	
Standard voltages $U_s$ : 50 to 60Hz and DC	24...690V	
Operating limits	0.75...1.1 x $U_s$	
Consumption for unlatching (auto cut-out)		
24 to 72V	210W / VA	
110 to 440V	130W / VA	
Electrical unlatching control <sup>(1)</sup>		
Minimum impulse	10ms	
Maintained	auto cut-out by integral contact	
Manual unlatching control	by local push-button	
Electrical making control		
Minimum pulse	40ms auto cut-out by integral contact	
Manual making control	by local push-button	
Auxiliary contact NC		
Utilisation AC-15 according to IEC	120V - 6A 230V/220V - 4A 400V/380V - 2.5A	500V - 1.5A 690V/660V - 1A
according to UL/CSA	A600	
Utilisation DC-13 according to IEC	24V - 3A 48V - 1.5A 110V - 0.6A	220V - 0.3A 400V - 0.15A
according to UL/CSA	Q600	
Mechanical endurance		
CL00...CL05*3	3 million (1200 ops/h)	
CL05*4...CL10	0.1 million (300 ops/h)	
Wiring diagram Alternating current		
Alternating current / Direct current		

(1) The contactor coil and the unlatch control must not be energised simultaneously

## Terminal capacity

	Terminal: screw BCLF, BCLL, BTLF y RMLF	Terminal: ring terminal BCRF, BTRF
Solid	2 x 0.5 to 2.5 or 1 x 4	
Stranded and finely stranded without end sleeve	2 x 0.5 to 2.5 or 1 x 4	
Finely stranded with end sleeve	2 x 0.5 to 2.5 or 1 x 4	
AWG wires, solid and stranded	12 - 22 AWG 75°C	
Tightening torque	1.1 Nm / 10 Lb x in.	
	Ring terminal $\varnothing i$ Tightening torque A	3.6 min. 6.5 max. 0.8Nm / 7 Lb x in.

Contact sequence

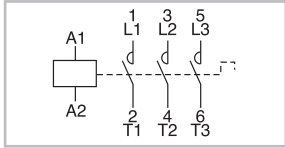
	Basic contactor	Auxiliary contact blocks Front mounted		Auxiliary contact blocks Lateral mounted	
		BCLF 10 BCRF 10	BCLF 01 BCRF 01	BCLL 20 BRLL 20	BCLL 11 BRLL 11
Three pole contactors 3 NO	CL00... CL01... CL02...	0 3.3 4.7	0 3.2 4.7	0 1.4 4.7	0 3.2 4.7 1.4
	CL03... CL04...	0 3 5.1	0 3.7 5.1	0 1.6 5.1	0 3.7 5.1 1.6
	CL05... CL06...	0 4 5.6	0 3.7 5.6	0 1.6 5.6	0 3.7 5.6 1.6
	CL07... CL08...	0 4.3 6.5	0 3.7 6.5	0 1.6 6.5	0 3.7 6.5 1.6
	CL09... CL10...	0 5.4 8	0 3.7 8	0 1.6 8	0 3.7 8 1.6
	CL01... CL02...	0 4.8 8	0 3.7 8	0 1.6 8	0 3.7 8 1.6
	CL03... CL04...	0 5.6 8	0 3.7 8	0 1.6 8	0 3.7 8 1.6
	CL05... CL06...	0 5.6 8	0 3.7 8	0 1.6 8	0 3.7 8 1.6
	CL07... CL08...	0 3.3 4.7	0 3.2 4.7	0 1.4 4.7	0 3.2 4.7 1.4
	CL09... CL10...	0 4 5.6	0 3.7 5.6	0 1.6 5.1	0 3.7 5.6 1.6
Four pole contactors 4 NO	CL01... CL02...	0 5.4 8	0 3.7 8	0 1.6 8	0 3.7 8 1.6
	CL03... CL04...	0 4.8 8	0 3.7 8	0 1.6 8	0 3.7 8 1.6
	CL05... CL06...	0 5.6 8	0 3.7 8	0 1.6 8	0 3.7 8 1.6
	CL07... CL08...	0 5.6 8	0 3.7 8	0 1.6 8	0 3.7 8 1.6
	CL09... CL10...	0 5.6 8	0 3.7 8	0 1.6 8	0 3.7 8 1.6
Four pole contactors 2 NO + 2 NC	CL01... CL02...	0 3.3 4.7 1.6	0 3.2 4.7	0 1.4 4.7	0 3.2 4.7 1.4
	CL03... CL04...	0 4 5.6 1.5	0 3.7 5.6	0 1.6 5.1	0 3.7 5.6 1.6
	CL05... CL06...	0 5.4 8 3.7	0 3.7 8	0 1.6 8	0 3.7 8 1.6
	CL07... CL08...	0 4.8 8 4.3	0 3.7 8	0 1.6 8	0 3.7 8 1.6
	CL09... CL10...	0 5.6 8	0 3.7 8	0 1.6 8	0 3.7 8 1.6



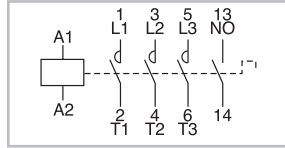
## Terminal numbering

### Three-pole and four-pole AC contactors

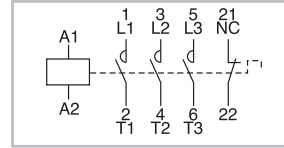
CL00A310... CL10A300...  
 CL03D300... CL05D300...  
 CL07E300... CL10E300...



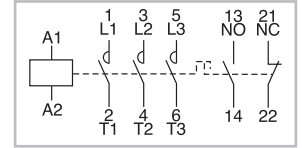
CL00\_310... CL02\_310...  
 CL04\_310...



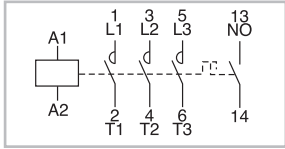
CL00\_301... CL02\_301...  
 CL04\_301...



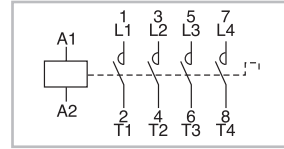
CL05A311... CL10A311...



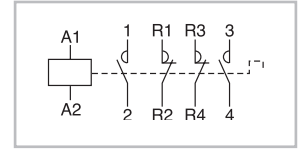
CL03\_300...



CL00A400... CL08A400...  
 CL01D400... CL04D400...  
 CL05E400... CL09E400...

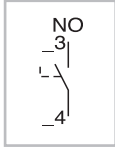


CL01AB00... CL08AB00...  
 CL01DB00... CL04DB00...  
 CL05EB00... CL08EB00...

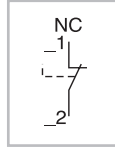


### Auxiliary contact blocks. Front mounting

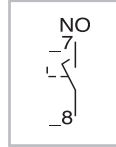
BC\_F10



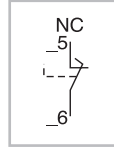
BC\_F01



BCLF10G

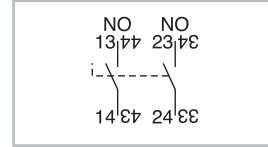


BCLF01G

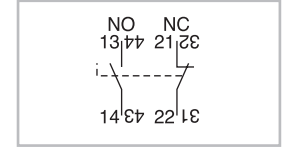


### Auxiliary contact blocks. Lateral mounting

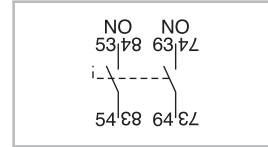
BCLL20



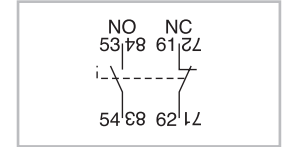
BCLL11



BRLL20

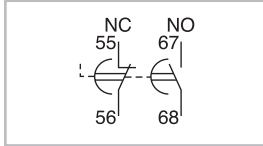


BRLL11

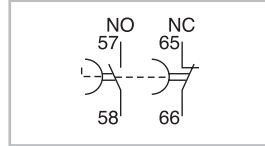


### Pneumatic timer blocks

BT\_F\_C

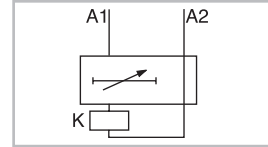


BT\_F\_D

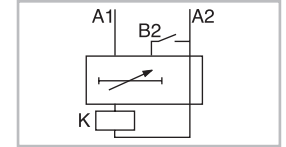


### Electronic timer blocks

BETL\_C



BETL\_D

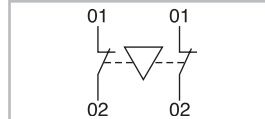


### Mechanical and mechanical/electrical interlock

BELA

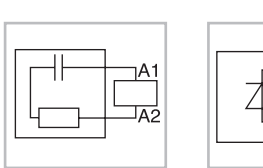


BELA02

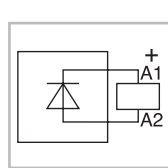


### Voltage suppressor blocks

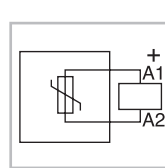
BSLR2, BSLR3



BSLDZ

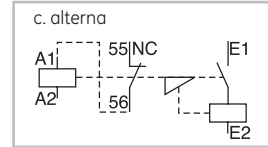


BSLV3

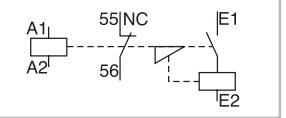


### Mechanical latch block

RMLF



AC/DC



Terminal numbering according to EN 50012

Description	Auxiliary contacts		Possible basic contactors + Auxiliary contacts blocks to be added
	Combination	Diagram	
<b>Without auxiliary contact blocks</b>			
	10E	1 0	CL00_310... - CL04_310...
	01E	0 1	CL00_301... - CL04_301...
<b>Front mounting auxiliary contact blocks with one contact each</b>			
	11E	1 1	CL00_310... - CL04_310... + BC_F01
	21E	2 1	CL00_310... - CL04_310... + BC_F01 + BC_F10
	12E	1 2	CL00_310... - CL04_310... + BC_F01 + BC_F10
	31E	3 1	CL00_310... - CL04_310... + BC_F01 + BC_F10 + BC_F10
	41E	4 1	CL00_310... - CL04_310... + BC_F01 + BC_F10 + BC_F10 + BC_F10
	22E	2 2	CL00_310... - CL04_310... + BC_F01 + BC_F10 + BC_F10
	32E	3 2	CL00_310... - CL04_310... + BC_F01 + BC_F10 + BC_F10 + BC_F10
	13E	1 3	CL00_310... - CL04_310... + BC_F01 + BC_F10 + BC_F10
	23E	2 3	CL00_310... - CL04_310... + BC_F01 + BC_F10 + BC_F01 + BC_F10
<b>Lateral mounting auxiliary contact blocks with two contacts each</b>			
	11E	1 1	CL03_300... - CL05_300... + BCLL11
	31E	3 1	CL03_300... - CL05_300... + BCLL11 + BCLL20
	22E	2 2	CL00_310... - CL05_300... + BCLL11 + BCLL11

The maximum number of auxiliary contacts is 4 for CL00 to CL03, 6 for CL04 and 8 for CL05, CL06 to CL10. When using the pneumatic BTLF-block, these numbers are reduced to two, resp. four (2 for CL00 to CL03, 4 for CL04, etc.)



## Terminal numbering according to EN 50012 (continued)

		Auxiliary contacts		Possible basic contactors		
		Combination		+ Auxiliary contacts blocks to be added		
		Description	NO	NC		
<b>Without auxiliary contact blocks</b>						
					CL03_300... - CL05_300...	CL06_300... - CL10_300...
<b>Front mounting auxiliary contact blocks with one contact each</b>						
	10E	1	0	CL03_300... - CL05_300... + BC_F10	CL06_300... - CL10_300... + BC_F10	
	01E	0	1	CL03_300... - CL05_300... + BC_F01	CL06_300... - CL10_300... + BC_F01	
	11E	1	1	CL03_300... - CL05_300... + BC_F10 + BC_F01	CL06_300... - CL10_300... + BC_F10 + BC_F01	
	21E	2	1	CL03_300... - CL05_300... + BC_F10 + BC_F01 + BC_F10	CL06_300... - CL10_300... + BC_F10 + BC_F01 + BC_F10	
	12E	1	2	CL03_300... - CL05_300... + BC_F10 + BC_F01 + BC_F01	CL06_300... - CL10_300... + BC_F10 + BC_F01 + BC_F01	
	31E	3	1	CL03_300... - CL05_300... + BC_F10 + BC_F01 + BC_F10 + BC_F10	CL06_300... - CL10_300... + BC_F10 + BC_F01 + BC_F10 + BC_F10	
	41E	4	1	CL03_300... - CL05_300... + BC_F10 + BC_F01 + BC_F10 + BC_F10	CL06_300... - CL10_300... + BC_F10 + BC_F01 + BC_F10 + BC_F10 + BC_F10	
	22E	2	2	CL03_300... - CL05_300... + BC_F10 + BC_F01 + BC_F01 + BC_F10	CL06_300... - CL10_300... + BC_F10 + BC_F01 + BC_F01 + BC_F10	
	32E	3	2	CL03_300... - CL05_300... + BC_F10 + BC_F01 + BC_F01 + BC_F10	CL06_300... - CL10_300... + BC_F10 + BC_F01 + BC_F01 + BC_F10 + BC_F10	
	13E	1	3	CL03_300... - CL05_300... + BC_F10 + BC_F01 + BC_F01 + BC_F01	CL06_300... - CL10_300... + BC_F10 + BC_F01 + BC_F01 + BC_F01	
	23E	2	3	CL03_300... - CL05_300... + BC_F10 + BC_F01 + BC_F01 + BC_F10	CL06_300... - CL10_300... + BC_F10 + BC_F01 + BC_F01 + BC_F01 + BC_F10	
<b>Lateral mounting auxiliary contact blocks with two contacts each</b>						
	11E	1	1	CL03_300... - CL05_300... + BCLL11	CL06_300... - CL10_300... + BCLL11	
	31E	3	1	CL03_300... - CL05_300... + BCLL11 + BCLL20	CL06_300... - CL10_300... + BCLL11 + BCLL20	
	22E	2	2	CL03_300... - CL05_300... + BCLL11 + BCLL11	CL06_300... - CL10_300... + BCLL11 + BCLL11	



## Conformity to standards

IEC/EN 60947-1	NF C 63-110	BS 5424 & 775
IEC/EN 60947-4-1	ASE 1025	NEMA ICS 1
CENELEC HD 419	CSA 22.2/14	VDE 0660/102
UL 508	UNE 20109	
EN 50005		

## Approvals/Marking

cULus	RINA	CE
NOM	FI	
Lloyd's Register	Bureau Veritas	

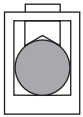
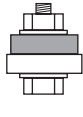
## Ambient conditions

Storage temperature	-55°C to +80°C	
Operation temperature	-40°C to +60°C	
Altitude	up to 3000m	Nominal values
	from 3000 up to 4000m	90%Ie 80%Ue
	from 4000 up to 5000m	80%Ie 75%Ue

## Climatic resistance (IEC 68-2)

Continuous tests 40 / 125 / 56		
Cold (72h)		
Temperature	-40°C	
Dry heat (96h)		
Temperature	+125°C	
Relative humidity	< 50%	
Humid heat (56 days)		
Temperature	+40°C	
Relative humidity	95%	
Cyclical test		
First half-cycle (12h)		
Low temperature	+25°C	
Relative humidity	93%	
Second half-cycle (12h)		
Low temperature	+55°C	
Relative humidity	95%	
Number of consecutive cycles	6	

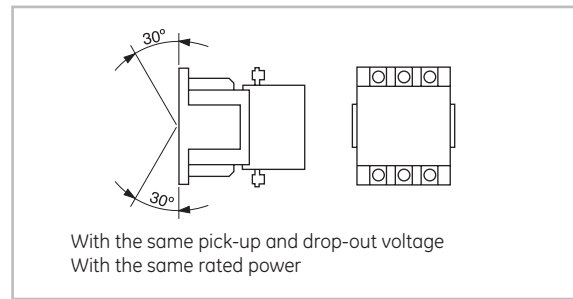
## Terminal capacity and tightening torque

		CK07B	CK75C CK08C	CK08B CK95B	CK10C	CK11C	CK12B	CK13B
	Solid (mm <sup>2</sup> )	1.5..95						
	Finely stranded w/end sleeve (mm <sup>2</sup> )	2..35						
	Finely stranded w/o end sleeve (mm <sup>2</sup> )	2..50						
	Stranded (mm <sup>2</sup> )	1.5..95						
	AWG wires (mm <sup>2</sup> )	16..00						
	Tightening torque (Nm)	8						
	(Lb x in)	70						
	Finely stranded w/end sleeve (mm <sup>2</sup> )		1 x 120 2 x 95	1 x 240 2 x 150	2 x 185	2 x 240	-	-
	AWG wires with end sleeve (mm <sup>2</sup> )		1 x 300 2 x 107	1 x 500 2 x 300	2 x 350		-	-
	Busbars		2 (25 x 5)	2 (25 x 5)	2 (35 x 10)	2 (35 x 10)	2 (35 x 10)	2 (60 x 10)
	Tightening torque (Nm)		8	23	31.5	31.5	31.5	31.5
		(Lb x in)		70	200	275	275	275

## Coil Terminal capacity and tightening torque

Tightening torque	0.8Nm - 7Lb/in	
Solid wire (mm <sup>2</sup> )	0.75 to 2x2	
Flexible wire without terminal (mm <sup>2</sup> )	0.75 to 2.5x2	
Flexible wire without terminal with cap (mm <sup>2</sup> )	0.75 to 2.5x21	

## Mounting positions



## Power circuit

		CK75C	CK08C	CK85B	CK09B	CK95B	CK10C	CK11C	CK12B	CK13B
<b>Three pole contactors</b>										
Rated thermal current I <sub>th</sub> at θ ≤ 40°C	(A)	250	250	315	315	450	600	700	1000	1250
Rated operational current I <sub>e</sub> AC-3	(A)	150	195	205	250	309	420	550	700	825
Rated operational voltage U <sub>e</sub>	(V)	1000	1000	1000	1000	1000	1000	1000	1000	1000
Rated insulation voltage U <sub>i</sub>	(V)	1000	1000	1000	1000	1000	1000	1000	1000	1000
Maximum continuous current AC-1	(A)	250	250	315	315	450	600	700	1000	1250
Frequency limits	(Hz)	25..400	25..400	25..400	25..400	25..400	25..400	25..400	25..400	25..400
Making capacity (RMS) (IEC 947)	(A)	1850	2200	2500	2500	3700	6500	6500	8400	8250
Breaking capacity (RMS) (IEC 947)										
U <sub>e</sub> ≤ 400V	(A)	1600	1850	2000	3500	3500	5600	5600	7300	6600
U <sub>e</sub> = 500V	(A)	1600	1850	2000	3500	3500	5600	5600	7000	6600
U <sub>e</sub> = 690V	(A)	1000	1200	1660	2200	2200	5000	5000	6700	6000
U <sub>e</sub> = 1000V	(A)	350	350	850	1100	1100	3000	3000	3500	3500
Short-time current	1 sec. (A)	2500	2500	4000	5500	5500	7500	7500	9700	11600
	5 sec. (A)	2500	2500	3200	3500	3500	5200	5200	7700	8800
	10 sec. (A)	2300	2300	2400	2500	2500	4000	4000	6100	7350
	30 sec. (A)	1250	1250	1400	1600	1600	2800	2800	4400	5300
	1 min. (A)	900	900	1000	1200	1200	1800	1800	3500	4500
	3 min. (A)	600	600	750	900	900	1200	1200	2300	2800
Recovery time	(min.)	10	10	10	10	10	10	10	10	10
Protec. against short-circuit with fuses										
without TOR										
Coord. type "1"	gL/gG (A)	355	355	500	500	630	1250	1250	1250	2×800
Coord. type "2"	gL/gG (A)	250	250	315	400	500	630	800	1000	1250
Without welding	gL/gG (A)	200	200	250	315	425	500	630	800	1000
Impedance per pole	(mΩ)	0.30	0.30	0.28	0.28	0.28	0.15	0.13	0.14	0.11
Power dissipation per pole	AC-1 (W)	19	19	27.7	27.7	56.7	54.3	63.7	140	171.8
	AC-3 (W)	6.8	10.3	11.7	17.5	26.7	26.5	45.3	68.6	74.8
Insulation resistance										
Between adjacent poles	(MΩ)	> 10	> 10	> 10	> 10	> 10	> 10	> 10	> 10	> 10
Between poles and earth	(MΩ)	> 10	> 10	> 10	> 10	> 10	> 10	> 10	> 10	> 10
Between input and output	(MΩ)	> 10	> 10	> 10	> 10	> 10	> 10	> 10	> 10	> 10
		CK07B	CK08B		CK09B	CK95B	CK10C	CK11C	CK12B	CK13B
<b>Four pole contactors</b>										
Rated thermal current I <sub>th</sub> at θ ≤ 40°C	(A)	200	350		400	500	600	700	1000	1250
Rated operational voltage U <sub>e</sub>	(V)	690	1000		1000	1000	1000	1000	1000	1000
Rated insulation voltage U <sub>i</sub>	(V)	1000	1000		1000	1000	1000	1000	1000	1000
Maximum continuous current AC-1	(A)	200	325		400	500	600	700	1000	1250
Frequency limits	(Hz)	25..400	25..4000		25..400	25..400	25..400	25..400	25..400	25..400
Making capacity (RMS) (IEC 947)	(A)	1150	1850		2500	3700	6500	6500	6700	8250
Breaking capacity (RMS) (IEC 947)										
U <sub>e</sub> ≤ 400V	(A)	950	1600		3500	3500	5600	5600	6700	6600
U <sub>e</sub> = 500V	(A)	950	1600		3500	3500	5600	5600	6700	6600
U <sub>e</sub> = 690V	(A)	800	1000		2200	2200	3500	3500	6000	6000
U <sub>e</sub> = 1000V	(A)	-	350		1100	1100	2000	2000	3500	3500
Short-time current	1 sec. (A)	2100	2500		5500	5500	7500	7500	9700	11600
	5 sec. (A)	1500	2500		3500	3500	5200	5200	7700	8800
	10 sec. (A)	1150	2300		2500	2500	4000	4000	6100	7350
	30 sec. (A)	750	1250		1600	1600	2800	2800	4400	5300
	1 min. (A)	550	900		1200	1200	1800	1800	3500	4500
	3 min. (A)	350	600		900	900	1200	1200	2300	2800
Recovery time	min.	10	10		10	10	10	10	10	10
Short-circuit protection with fuse										
without TOR										
Coord. type "1"	gL/gG (A)	315	500		500	630	1250	1250	1250	2×800
Coord. type "2"	gL/gG (A)	250	400		400	500	630	800	1000	1250
Without welding	gL/gG (A)	200	315		315	425	500	630	800	1000
Impedance per pole	(mΩ)	0.45	0.32		0.28	0.28	0.15	0.13	0.14	0.11
Power dissipation per pole	AC-1 (W)	18	33.8		44.8	56.7	61.2	68.6	140	171.8
	AC-3 (W)									
Insulation resistance										
Between adjacent poles	(MΩ)	> 10	> 10		> 10	> 10	> 10	> 10	> 10	> 10
Between poles and earth	(MΩ)	> 10	> 10		> 10	> 10	> 10	> 10	> 10	> 10
Between input and output	(MΩ)	> 10	> 10		> 10	> 10	> 10	> 10	> 10	> 10



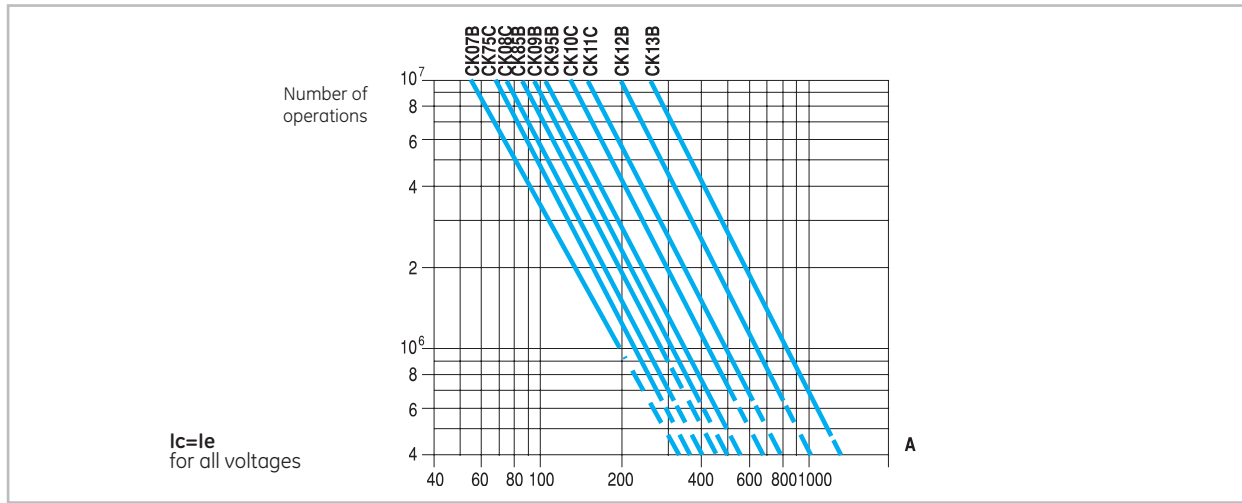
## Electrical endurance

### Mixed category AC4 / AC3

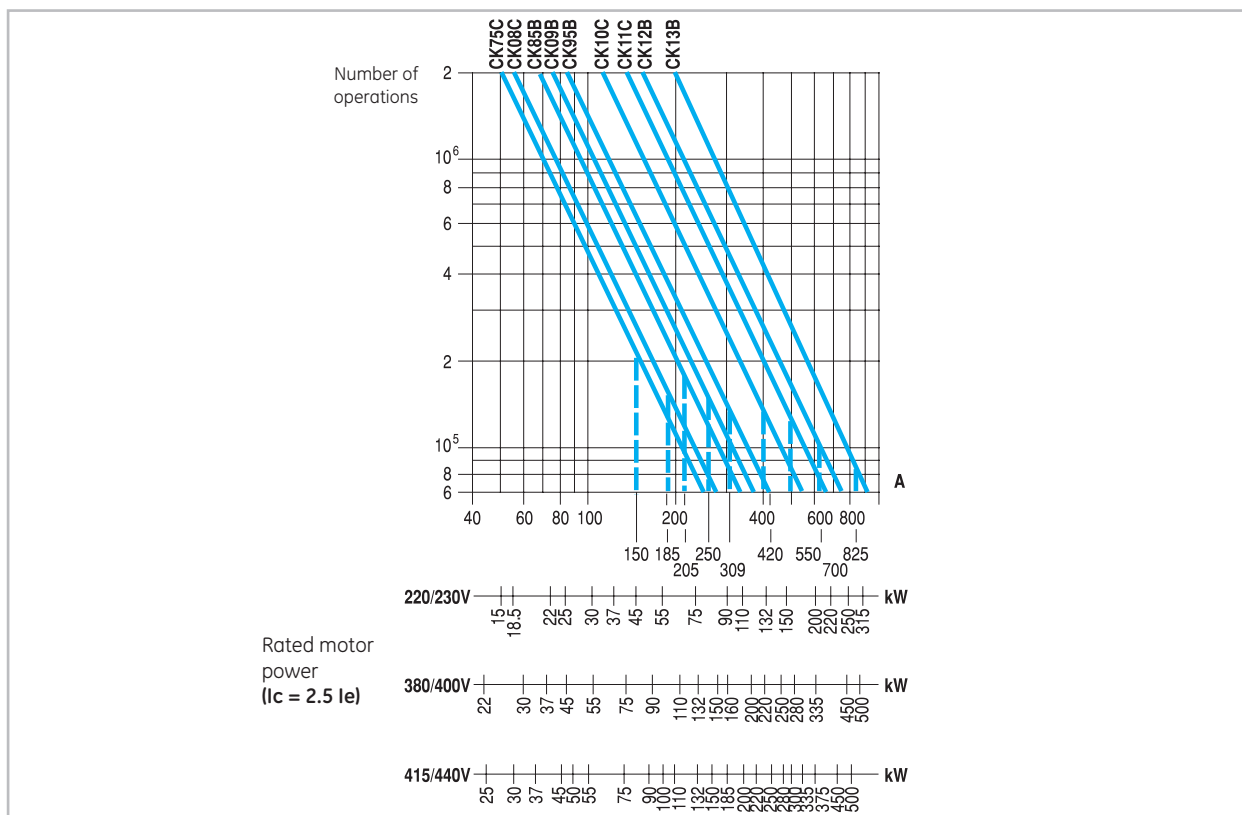
Electrical endurance for mixed category (AC-3/AC-4) is calculated with the following formula:

$$\text{Electrical endurance (AC-3/AC-4)} = \frac{\text{Electrical endurance (AC-3)}}{1 + \frac{\% \text{ oper AC-4}}{100} \times \left( \frac{\text{Elec.endur. (AC-3)}}{\text{Elec.endur. (AC-4)}} - 1 \right)}$$

### Category AC1



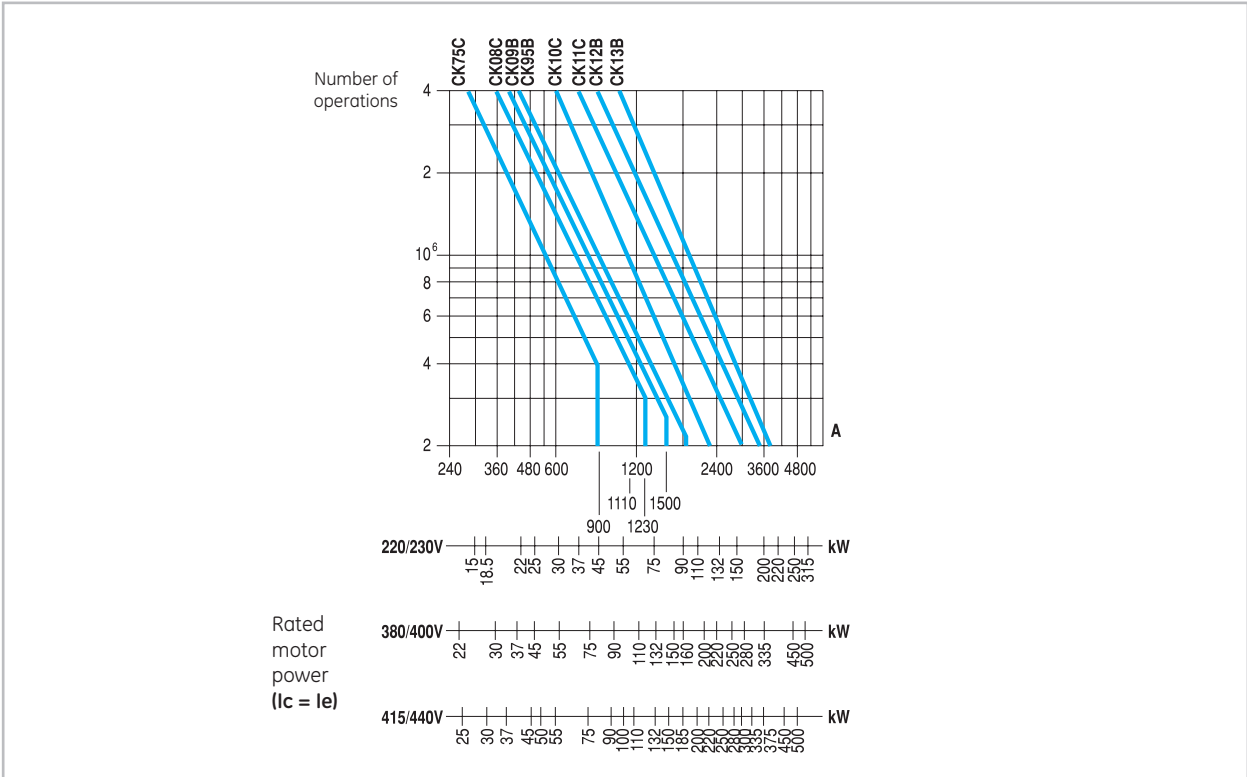
### Category AC2



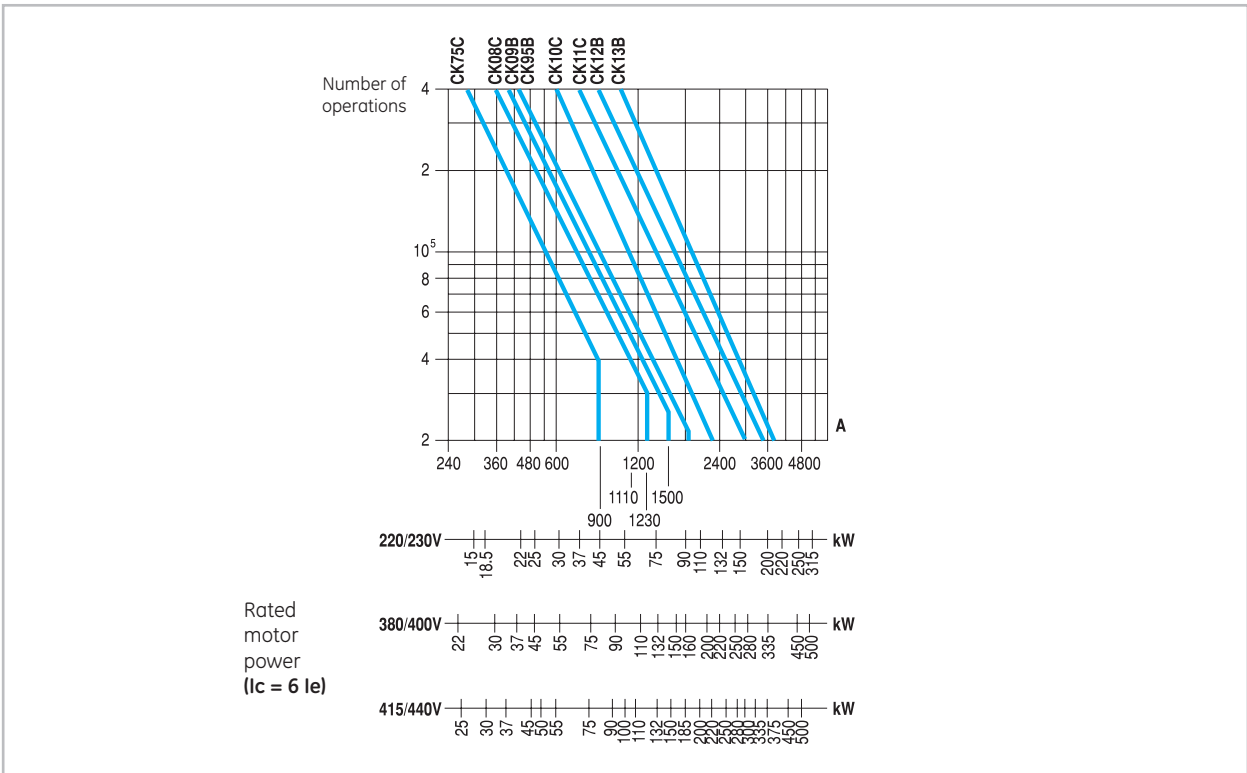
# Series CK

## Electrical endurance (continued)

### Category AC3



### Category AC4



## Three pole contactors - Control circuit

## Alternating current

		CK75CA CK75CE	CK08CA CK08CE	CK85BA CK85BE	CK09BE	CK95BE	CK10CE	CK11CE	CK12BE	CK12BE	CK13BA
Rated insulation voltage $U_i$	(V)	1000	1000	1000	1000	1000	1000	1000	1000	1000	1000
Standard voltages $U_s$ (50/60Hz)	(V)	24..690	24..690	24..690	24..690	24..690	24..690	24..690	24..72	100..690	24..440
Operating limits											
Switch-on	xUs	0.8..1.1	0.8..1.1	0.85..1.1	0.85..1.1	0.85..1.1	0.85..1.1	0.85..1.1	0.85..1.1	0.85..1.1	0.8..1.1
Switch-off	xUs	0.2..0.75	0.2..0.75	0.2..0.75	0.2..0.75	0.2..0.75	0.2..0.75	0.2..0.75	0.2..0.75	0.2..0.75	0.25..0.55
Consumption. Monofrequency coils											
Magnetic circuit	CK...A (VA)	42	42	46	-	-	-	-	-	-	6
closed	CK...E (VA)	3.5	3.5	6.3	6.3	6.3	9.1	9.1	10.9	10.9	-
Magnetic circuit	CK...A (VA)	500	500	830	-	-	-	-	-	-	2760
open	CK...E (VA)	212	212	350	350	350	515	515	543	543	-
Power	CK...A (W)	21	21	17	-	-	-	-	-	-	5
dissipation	CK...E (W)	1.8	1.8	3.5	3.5	3.5	4	4	4.5	4.5	-
Consumption. Bifrequency coils											
Magnetic circuit	50Hz (VA)	46	46	60	-	-	-	-	-	-	-
closed (CK...A)	60Hz (VA)	38.3	38.3	50	-	-	-	-	-	-	-
Magnetic circuit	50Hz (VA)	568	568	1082	-	-	-	-	-	-	-
open (CK...A)	60Hz (VA)	473	473	901	-	-	-	-	-	-	-
Power 50Hz	(W)	23	23	22.2	-	-	-	-	-	-	-
dissipation (CK...A)	60Hz (W)	19.1	19.1	18.5	-	-	-	-	-	-	-
Power factor											
Magnetic circuit	CK...A (cos $\phi$ )	0.4	0.4	0.37	-	-	-	-	-	-	approx. 1
closed	CK...E (cos $\phi$ )	-	-	-	-	-	-	-	-	-	-
Magnetic circuit	CK...A (cos $\phi$ )	0.6	0.6	0.6	-	-	-	-	-	-	approx. 1
open	CK...E (cos $\phi$ )	-	-	-	-	-	-	-	-	-	-
Opening and closing times at Us											
Making time	(ms)	20..25	20..25	36..40	60..70	60..80	80..90	80..90	150..170	70..80	50..55
at excitation (NO)											
Breaking time	(ms)	10..13	10..13	60..80	60..80	60..80	60..80	60..90	60..90	60..90	115..130
at de-energisation (NO)											
Mechanical endurance <sup>(1)</sup>	10 <sup>6</sup> ops	10	10	6.5	6.5	6.5	7.5	7.5	3.5	3.5	3
Maximum rate											
No load	ops./h	2400	2400	2400	1200	1200	900	900	900	900	600
AC-1/AC-3 at rated power	ops./h	600	600	600	600	600	300	300	300	300	120
AC-2 at rated power	ops./h	150	150	150	150	150	120	120	120	120	120
AC-4 at rated power	ops./h	150	150	150	150	150	120	120	120	120	120

(1) Mechanical endurance for e-module is 1 million operations

## Direct current - Electronic module

		CK75CE	CK08CE	CK85BE	CK09BE	CK95BE	CK10CE	CK11CE	CK12BE	CK12BE	
Rated insulation voltage $U_i$	(V)	1000	1000	1000	1000	1000	1000	1000	1000	1000	
Standard voltages $U_s$ (50/60Hz)	(V)	24..500	24..500	24..500	24..500	24..500	24..500	24..500	24..72	100..500	
Operating limits											
Switch-on	xUs	0.8..1.1	0.8..1.1	0.8..1.1	0.8..1.1	0.8..1.1	0.8..1.1	0.8..1.1	0.8..1.1	0.8..1.1	
Switch-off	xUs	0.2..0.75	0.2..0.75	0.2..0.75	0.2..0.75	0.2..0.75	0.2..0.75	0.2..0.75	0.2..0.75	0.2..0.75	
Consumption											
Magnetic circuit closed	(VA)-(W)	2.7-1.6	2.7-1.6	4.3-2.8	4.3-2.8	4.3-2.8	5.4-3.8	5.4-3.8	7.2-4.9	7.2-4.9	
Magnetic circuit open	(VA)-(W)	234-234	234-234	345-345	345-345	345-345	515-515	515-515	545-545	545-545	
Opening and closing times at Us											
Making time	(ms)	60..70	60..70	60..70	60..70	60..70	80..90	80..90	150..170	70..80	
at excitation (NO contacts)											
Breaking time	(ms)	40..50	40..50	60..80	60..80	60..80	60..80	60..80	60..90	60..90	
at de-energisation (NO contacts)											
Mechanical endurance	10 <sup>6</sup> ops.	10	10	6.5	6.5	6.5	7.5	7.5	3.5	3.5	
Maximum rate											
No load	ops./h	1200	1200	1200	1200	1200	900	900	900	900	
AC-3 at rated power	ops./h	600	600	600	600	600	300	300	300	300	
AC-4 at rated power	ops./h	150	150	150	150	150	120	120	120	120	

(1) Mechanical endurance for e-module is 1 million operations



## Four pole contactors - Control circuit

### Alternating current

		CK07BA CK07BE	CK08BA CK08BE	CK09BE	CK95BE	CK10CE	CK11CE	CK12BE	CK12BE	CK13BA
Rated insulation voltage $U_i$	(V)	1000	1000	1000	1000	1000	1000	1000	1000	1000
Standard voltages $U_s$ (50/60Hz)	(V)	24..690	24..690	24..690	24..690	24..690	24..690	24..72	100..690	110..440
Operating limits										
Switch-on	xUs	0.85..1.1	0.85..1.1	0.85..1.1	0.85..1.1	0.85..1.1	0.85..1.1	0.85..1.1	0.85..1.1	0.85..1.1
Switch-off	xUs	0.2..0.75	0.2..0.75	0.2..0.75	0.2..0.75	0.2..0.75	0.2..0.6	0.2..0.75	0.2..0.75	0.2..0.75
Consumption. Monofrequency coils										
Magnetic circuit	CK...A (VA)	46	130	-	-	-	-	-	-	6
closed	CK...E (VA)	6.3	10.9	10.9	10.9	5.4	5.4	10.9	10.9	-
Magnetic circuit	CK...A (VA)	830	2860	-	-	-	-	-	-	2760
open	CK...E (VA)	350	543	543	543	515	515	543	543	-
Power	CK...A (W)	17	53	-	-	-	-	-	-	5
dissipation	CK...E (W)	3.5	4.5	4.5	4.5	4	4	4.5	4.5	-
Consumption. Bifrequency coils										
Magnetic circuit	50Hz (VA)	60	159.3	-	-	-	-	-	-	-
closed (CK...A)	60Hz (VA)	50	132.7	-	-	-	-	-	-	-
Magnetic circuit	50Hz (VA)	1082	3509	-	-	-	-	-	-	-
open (CK...A)	60Hz (VA)	901	2924	-	-	-	-	-	-	-
Power	50Hz (W)	22.2	65.3	-	-	-	-	-	-	-
dissipation (CK...A)	60Hz (W)	18.5	54.4	-	-	-	-	-	-	-
Power factor										
Magnetic circuit	CK...A (cos $\phi$ )	0.37	0.37	-	-	-	-	-	-	approx. 1
closed	CK...E (cos $\phi$ )	-	-	-	-	-	-	-	-	-
Magnetic circuit	CK...A (cos $\phi$ )	0.6	0.6	-	-	-	-	-	-	approx. 1
open	CK...E (cos $\phi$ )	-	-	-	-	-	-	-	-	-
Opening and closing times at Us										
Making time	(ms)	36..40	60..70	70..80	70..80	110..115	80..90	150..170	110..115	50..55
at excitation (NO)										
Breaking time	(ms)	10..15	13..17	70..80	70..80	70..80	70..80	70..80	70..80	70..80
at de-energisation (NO)										
Mechanical endurance	10 <sup>6</sup> ops.	10	6.5	6.5	6.5	6.5	6.5	3.5	3.5	3
Maximum rate										
No load	ops/h	2400	900	900	900	900	900	900	900	600
AC-1/AC-3 at rated power	ops/h	600	600	600	600	300	300	300	300	120

### Direct current - Electronic module

		CK07BE	CK08BE	CK09BE	CK95BE	CK10CE	CK11CE	CK12BE	CK12BE	
Rated insulation voltage $U_i$	(V)	1000	1000	1000	1000	1000	1000	1000	1000	
Standard voltages $U_s$	(V)	24..500	24..500	24..500	24..500	24..500	24..500	24..72	110..500	
Operating limits										
Switch-on	xUs	0.75..1.1	0.8..1.1	0.8..1.1	0.8..1.1	0.8..1.1	0.8..1.1	0.8..1.1	0.8..1.1	
Switch-off	xUs	0.2..0.75	0.2..0.75	0.2..0.75	0.2..0.75	0.2..0.75	0.2..0.75	0.2..0.75	0.2..0.75	
Consumption										
Magnetic circuit closed	(VA)-(W)	4.3-2.8	7.2-4.9	7.2-4.9	7.2-4.9	5.4-3.8	5.4-3.8	7.2-4.9	7.2-4.9	
Magnetic circuit open	(VA)-(W)	345-345	545-545	545-545	545-545	515-515	515-515	545-545	545-545	
Opening and closing times at Us										
Making time	(ms)	60..70	70..80	70..80	70..80	80..90	80..90	150..170	110..115	
at excitation (NO contacts)										
Breaking time	(ms)	40..50	70..80	70..80	70..80	60..80	60..80	60..90	60..90	
at de-energisation (NO contacts)										
Mechanical endurance	10 <sup>6</sup> ops.	10	6.5	6.5	6.5	6.5	6.5	3.5	3.5	
Maximum rate										
No load	ops/h	1200	900	900	900	900	900	900	900	
AC-3 at rated power	ops/h	600	600	600	600	600	300	300	300	



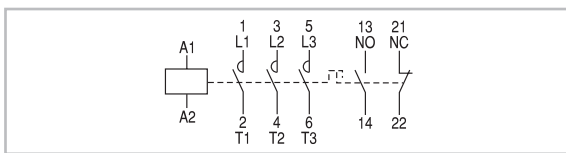
### Contact sequence

	Basic contactor	Auxiliary contact blocks Lateral mounted		
		BCLL 20 BRLL 20	BCLL 11 BRLL 11	
Three-pole contactors 3 NO	CK75C... CK08C...			
	CK85B... CK09B... CK95B...			
	CK10C... CK11C...			
	CK12B... CK13B...			
	CK07B...			
	CK08B... CK09B... CK95B...			
	CK10C... CK11C...			
	CK12B... CK13B...			

### Numbering of the terminals

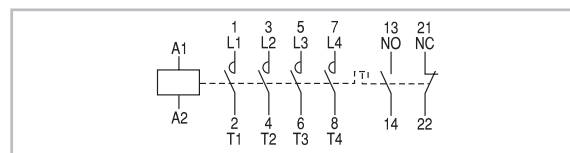
#### Three pole contactors

CK75C\_3 ... CK13B\_3\_



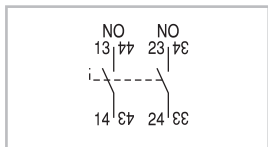
#### Four pole contactors

CK07B\_4 ... CK13B\_4\_

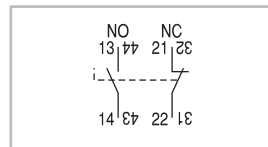


#### Auxiliary contact blocks. Lateral mounting

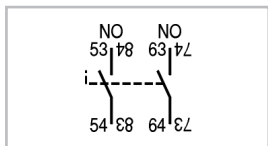
BCLL20



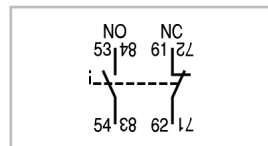
BCLL11



BRLL20

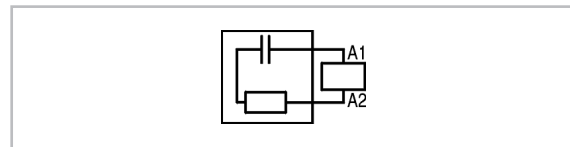


BRLL11



#### Voltage suppressor block

K/RC...



#### Mechanical interlock

BEKV, BEKVA1, BEKVS1, BEKVV



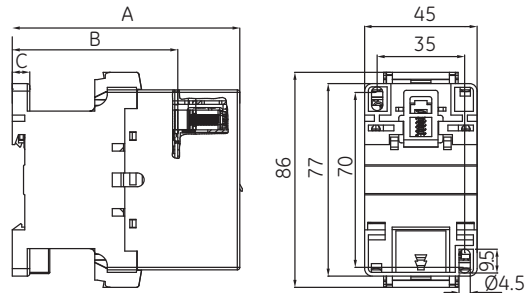
Everything is under control



## Dimensions and weights

### EC contactors

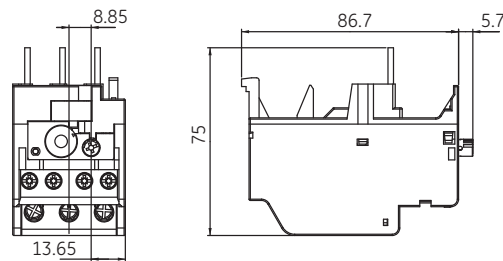
Contactors



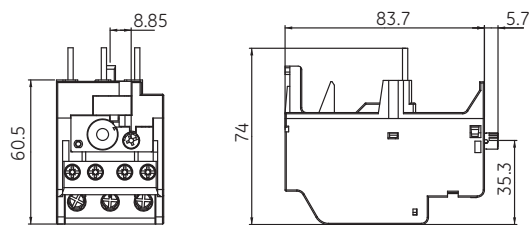
Dimensions in mm	EC09*3 - EC18*3 and ECACA	EC25*3	EC32*3 - EC40*3	EC09D3 - EC18D3 and ECACD	EC25D3	EC32D3 - EC40D3
A	92	97	102	102	110	115
B	66.2	66.2	67.2	76.2	80.2	81.2
C	7	7	7	7	7	7
Weight in g	350	490	530	620	700	740

\* A (AC) and E (AC/DC) configurations

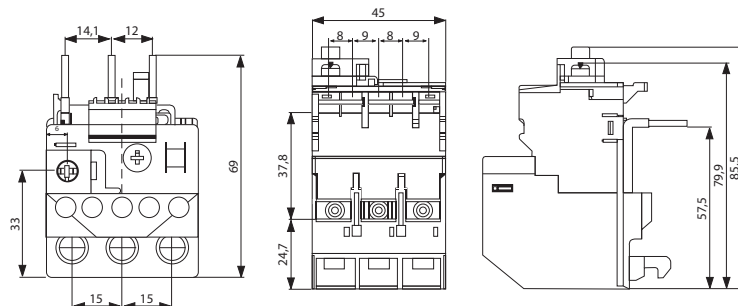
Thermal overload relay ECRT1  
186 g



Thermal overload relay ECRT2  
194 g



Electronic overload relay RE1  
200 g

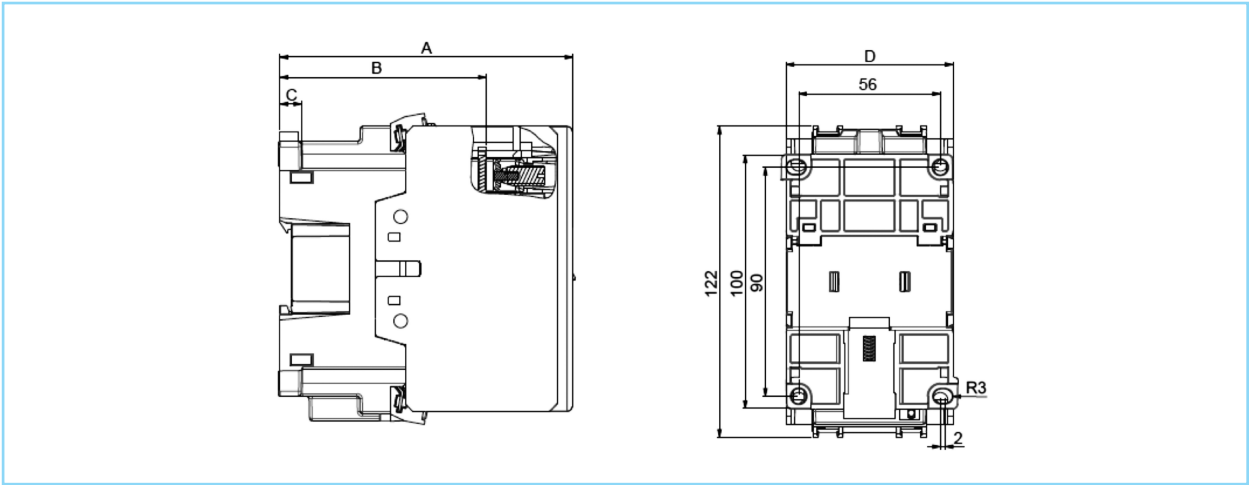


Dimensions in mm (inch = mm x 0.03937) - Weight in kg (lb = kg x 2.2046)



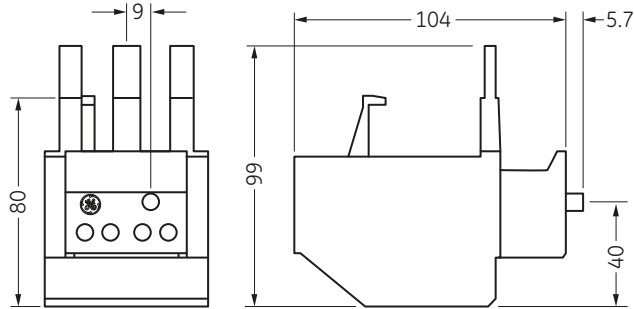
Dimensions and weights

EF contactors

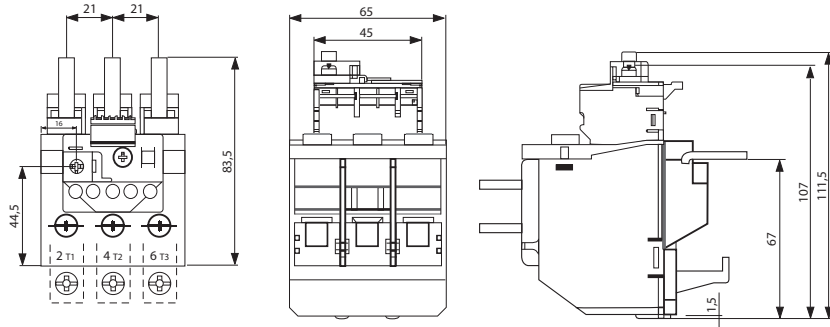


Dimensions in mm	EF50A3 - EF80A3	EF95A3-EF105A3	EF50E3 - EF80E3	EF95E3 - EF105E3
A	117	126	143	153
B	80	85	109	119
C	9	9	9	9
D	65	75	65	75
Weight in g	1125	1468	1270	1613

Thermal overload relay RT2  
400 g



Electronic overload relay RE2  
320 g



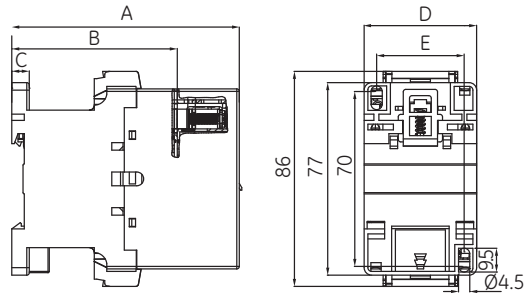
Dimensions in mm (inch = mm x 0.03937) - Weight in kg (lb = kg x 2.2046)



## Dimensions and weights

### EC contactors

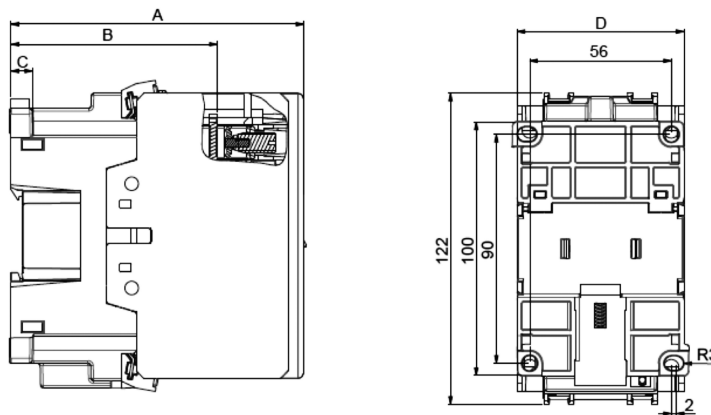
Contactors



Dimensions in mm	EC12*4 - EC18*4 EC12*B-EC18*B	EC25*4 EC25*B	EC32*4 EC32*B	EC12D4- EC18D4 EC12DB-EC18DB	EC25D4 EC25DB	EC32D4 EC32DB
A	92	97	102	102	110	115
B	66.2	66.2	67.2	76.2	80.2	81.2
C	7	7	7	7	7	7
D	45	45	56	45	45	56
E	35	35	45	35	35	45
Weight in g	350	490	530	620	700	740

\* A (AC) and E (AC/DC) configurations

### EF contactors

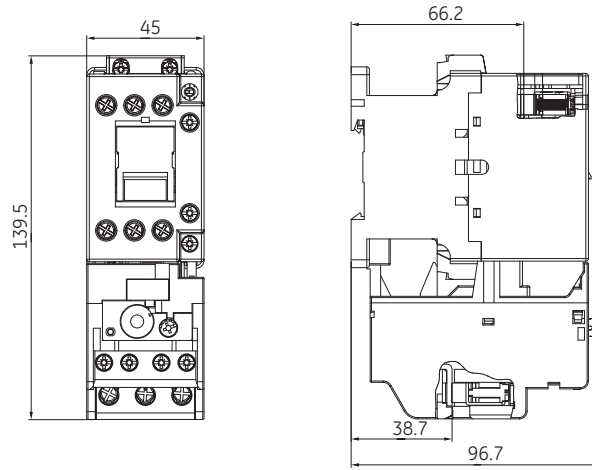


Dimensions in mm	EF40A4 - EF80A4	EF95A4	EF40E4 - EF80E4	EF95E4
A	118.5	126	143	153
B	80	85	109	119
C	9	9	9	9
D	87	96	87	96
Weight in g	1290	1613	1290	1613

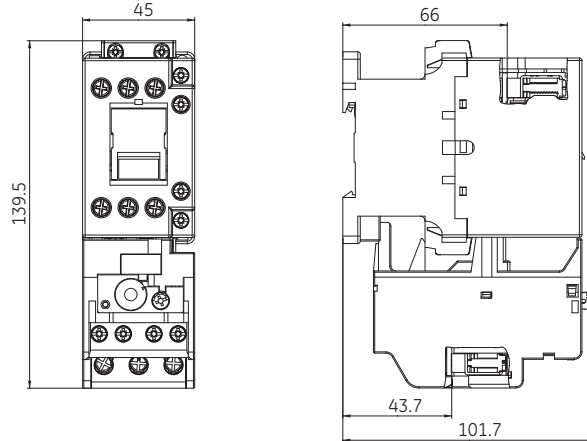
Dimensions and weights

EC contactors

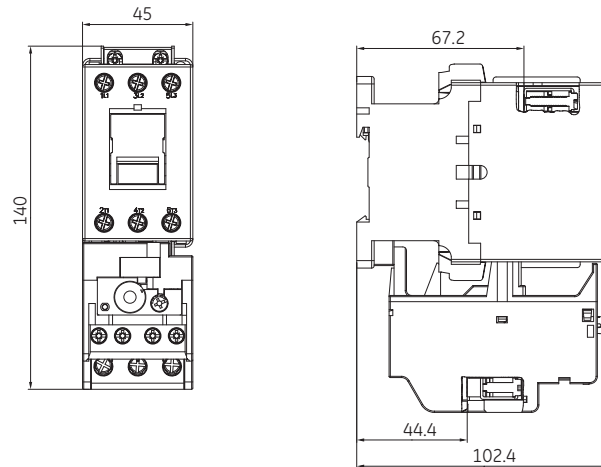
Combination of contactor EC09-12-18 (A and E) and thermal overload relay ECRT1



Combination of contactor EC25A and EC25E and thermal overload relay ECRT2



Combination of contactor EC32-40 (A and E) and thermal overload relay ECRT2



Dimensions in mm (inch = mm x 0.03937) - Weight in kg (lb = kg x 2.2046)

A

B

C

D

E

F

G

H

I

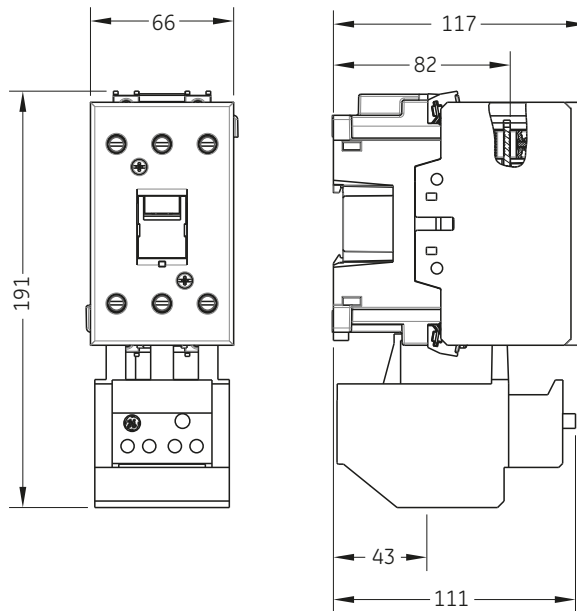
X



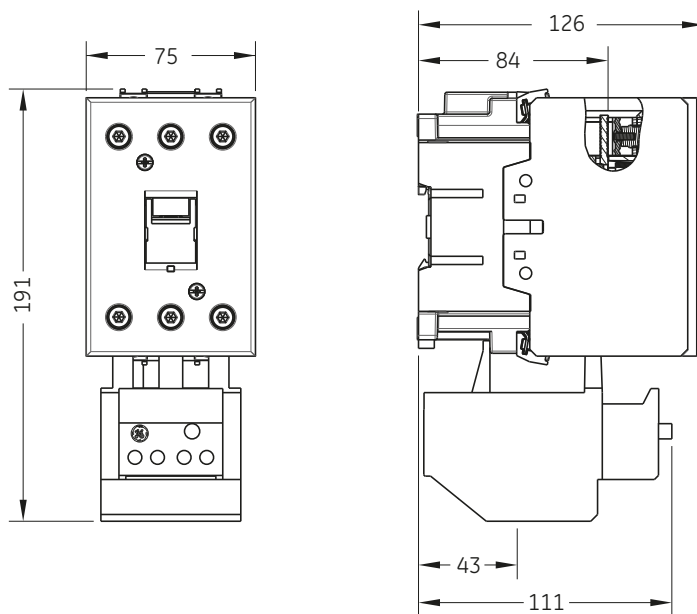
## Dimensions and weights

### EF contactors

Combination of contactor EF50A3-65A3-80A3 and thermal overload relay RT2



Combination of contactor EF95A3-105A3 and thermal overload relay RT2

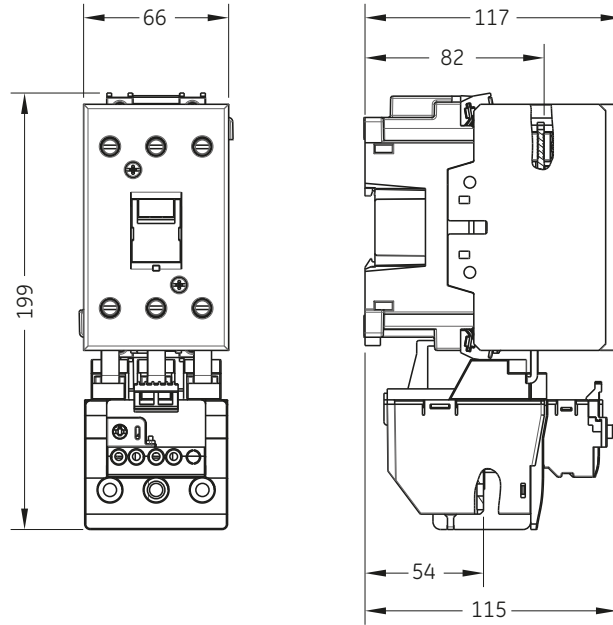


Dimensions in mm (inch = mm x 0.03937) - Weight in kg (lb = kg x 2.2046)

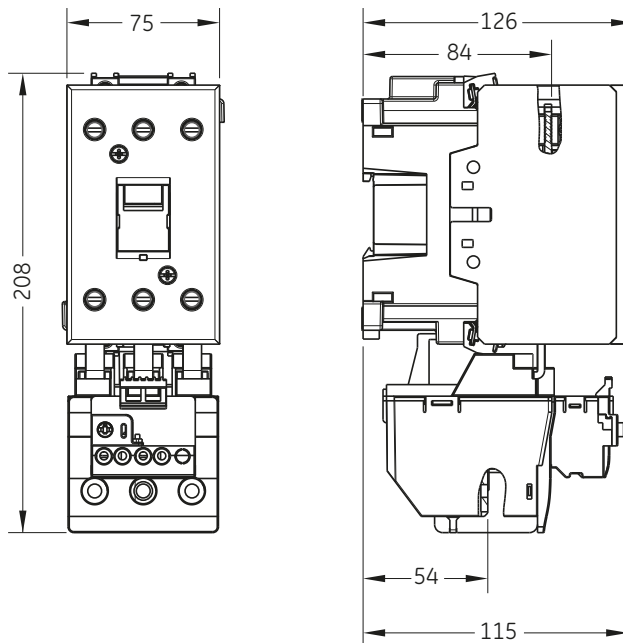
Dimensions and weights

EF contactors

Combination of contactor EF50A3-65A3-80A3 and overload relay RE2



Combination of contactor EF95A3-105A3 and overload relay RE2

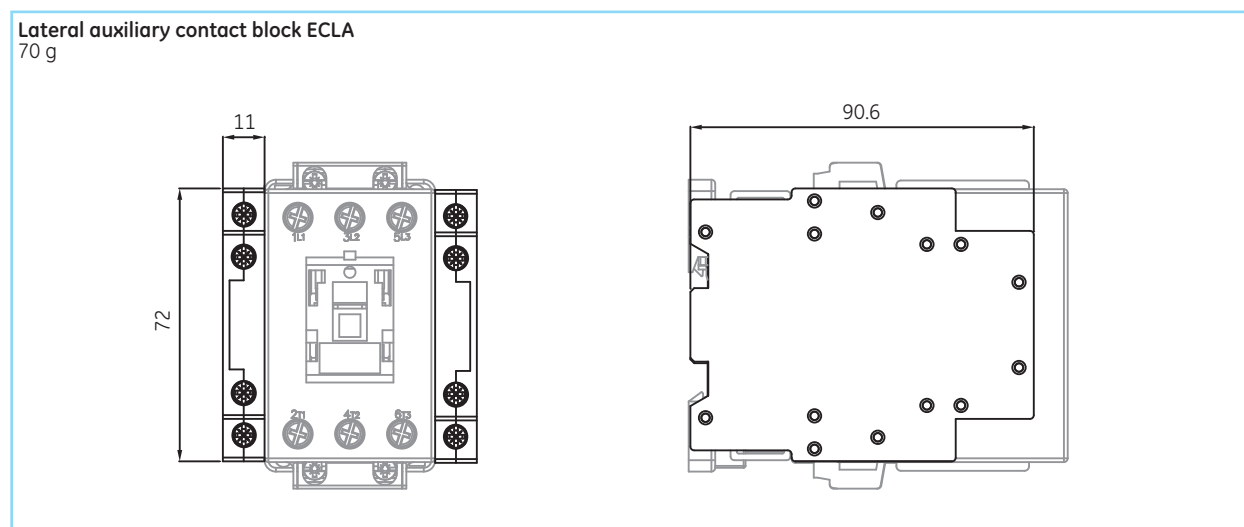
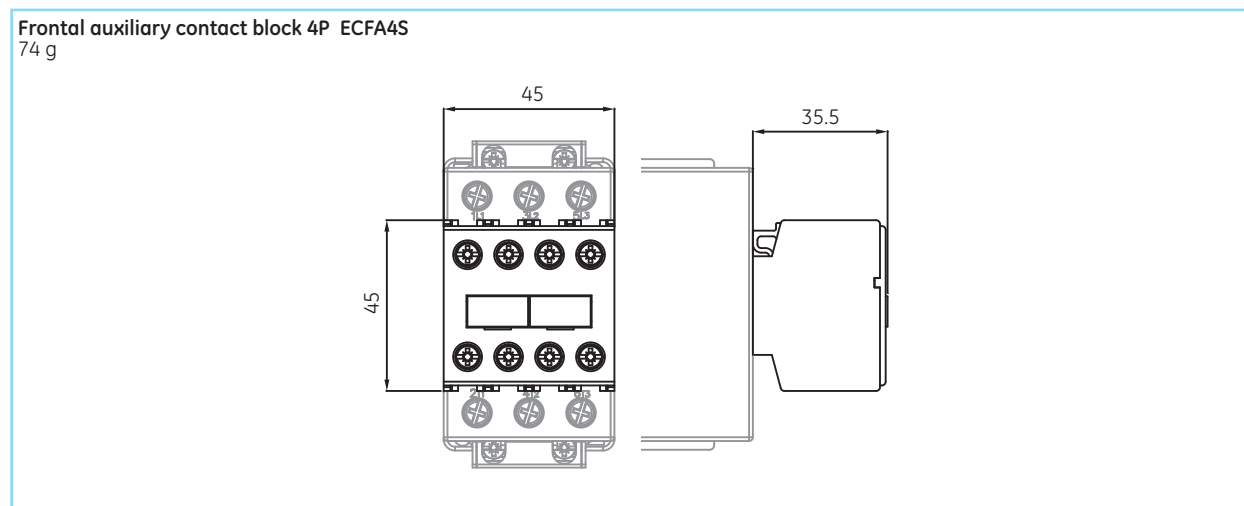
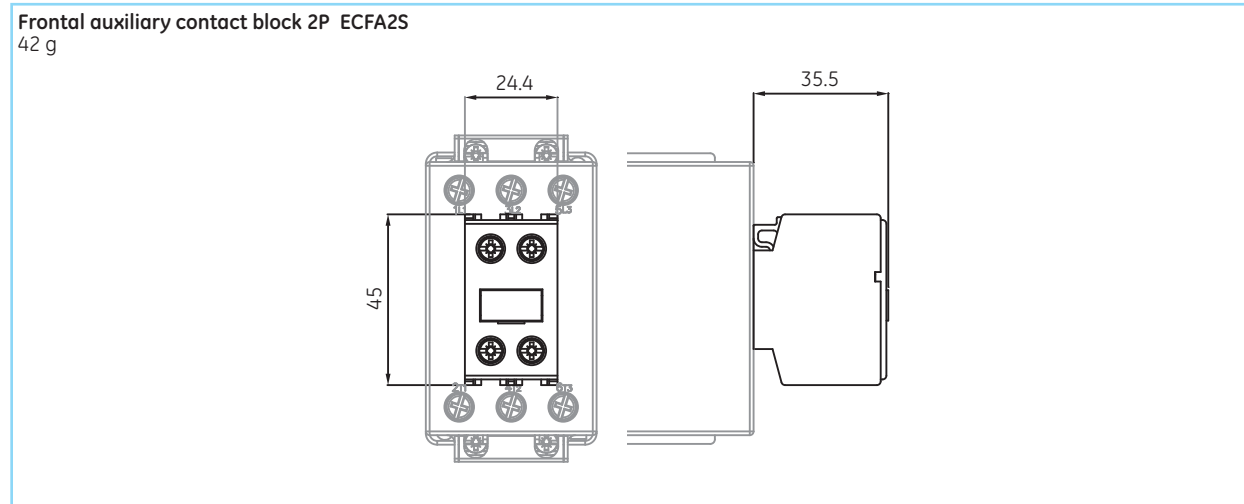


Dimensions in mm (inch = mm x 0.03937) - Weight in kg (lb = kg x 2.2046)



## Dimensions and weights

### EC contactors

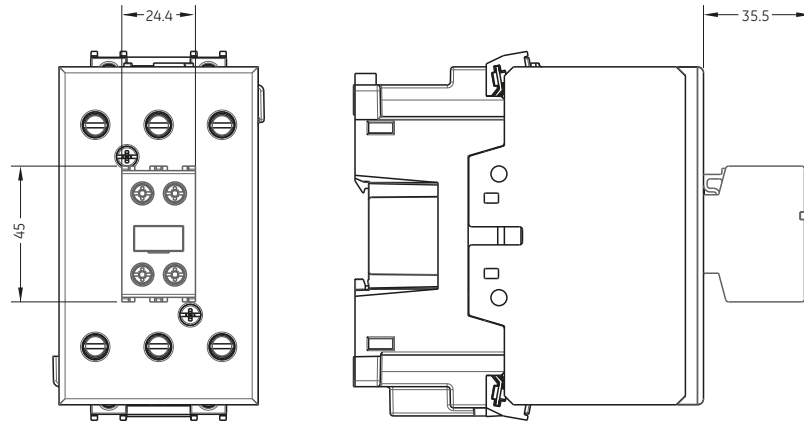


Dimensions in mm (inch = mm x 0.03937) - Weight in kg (lb = kg x 2.2046)

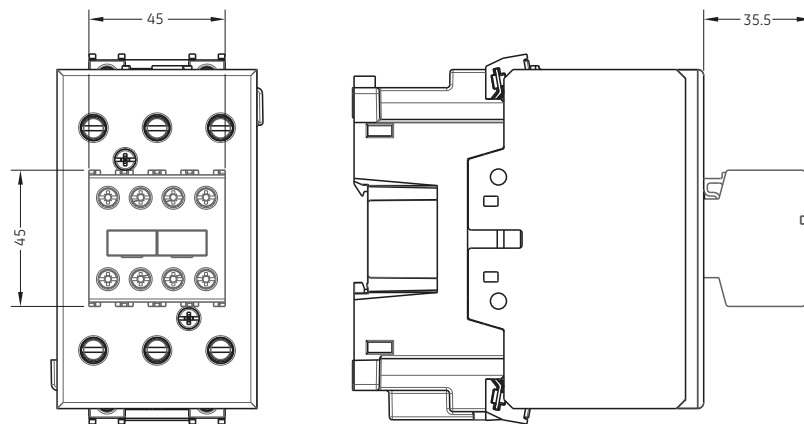
Dimensions and weights

EF contactors

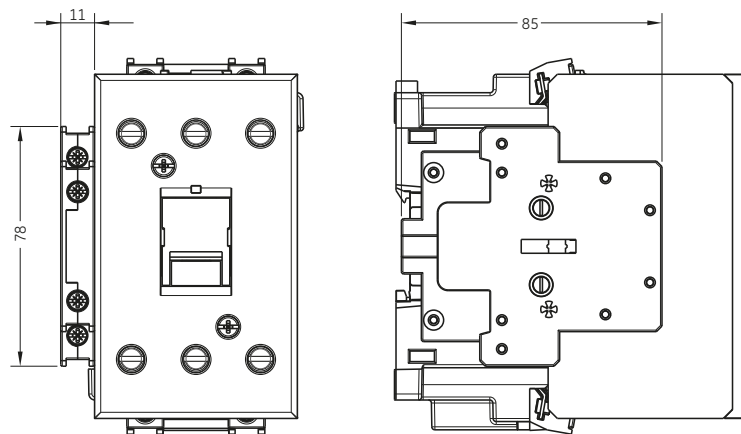
Frontal auxiliary contact block 2P ECFA2S



Frontal auxiliary contact block 4P ECFA4S



Lateral auxiliary contact block BCLL



Dimensions in mm (inch = mm x 0.03937) - Weight in kg (lb = kg x 2.2046)

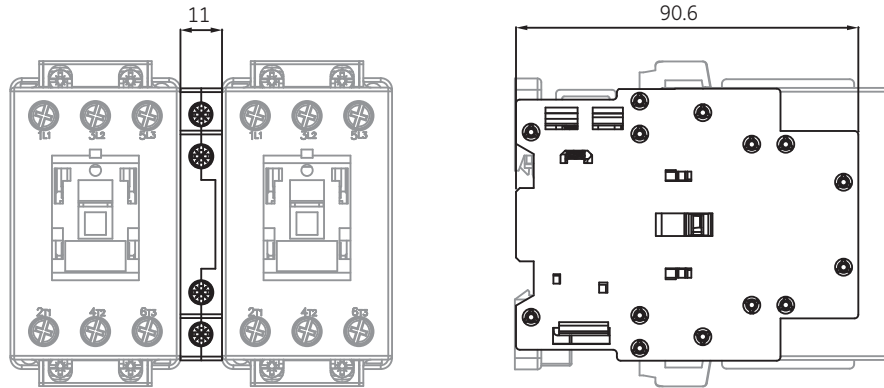




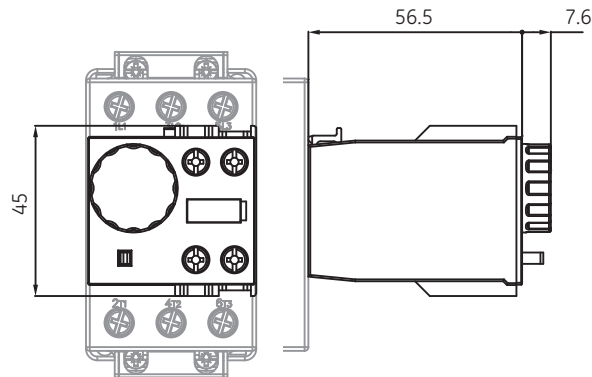
## Dimensions and weights

### EC contactors

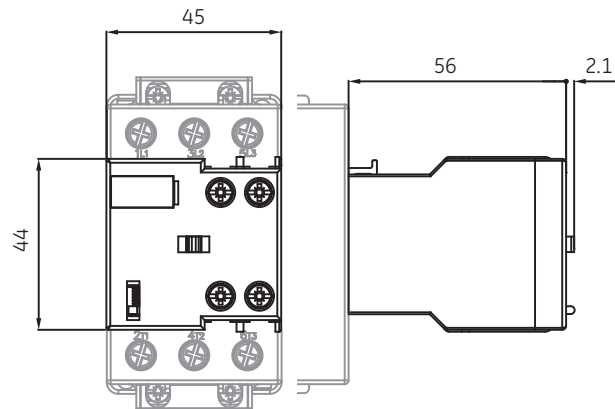
Lateral auxiliary mechanical interlock ECMI  
52 g



Pneumatic timer ECPT  
78 g



Mechanical latch ECML  
113 g



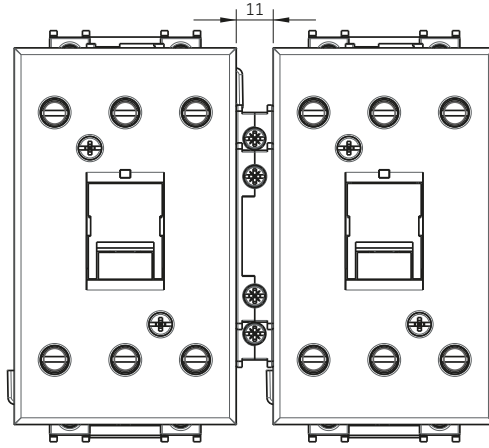
Dimensions in mm (inch = mm x 0.03937) - Weight in kg (lb = kg x 2.2046)



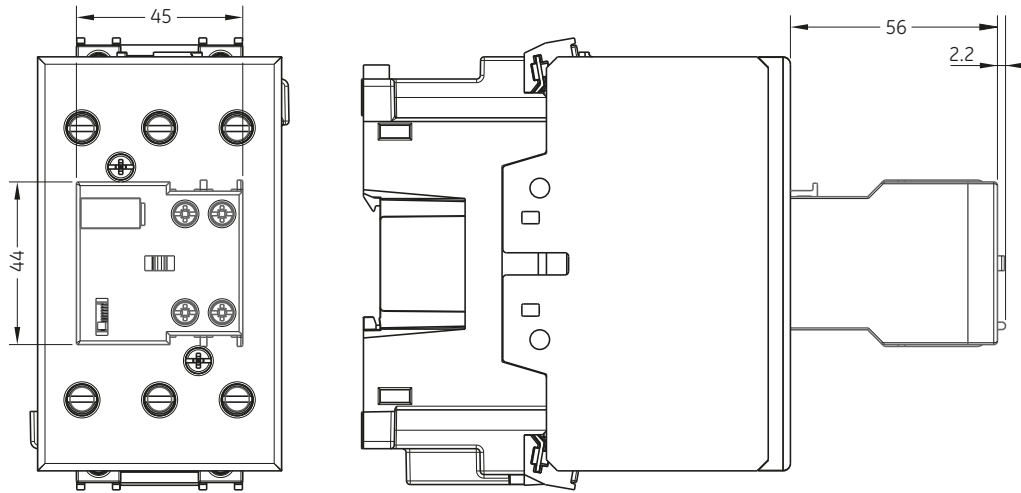
Dimensions and weights

EF contactors

Lateral auxiliary mechanical interlock BELA



Mechanical latch ECML  
113 g

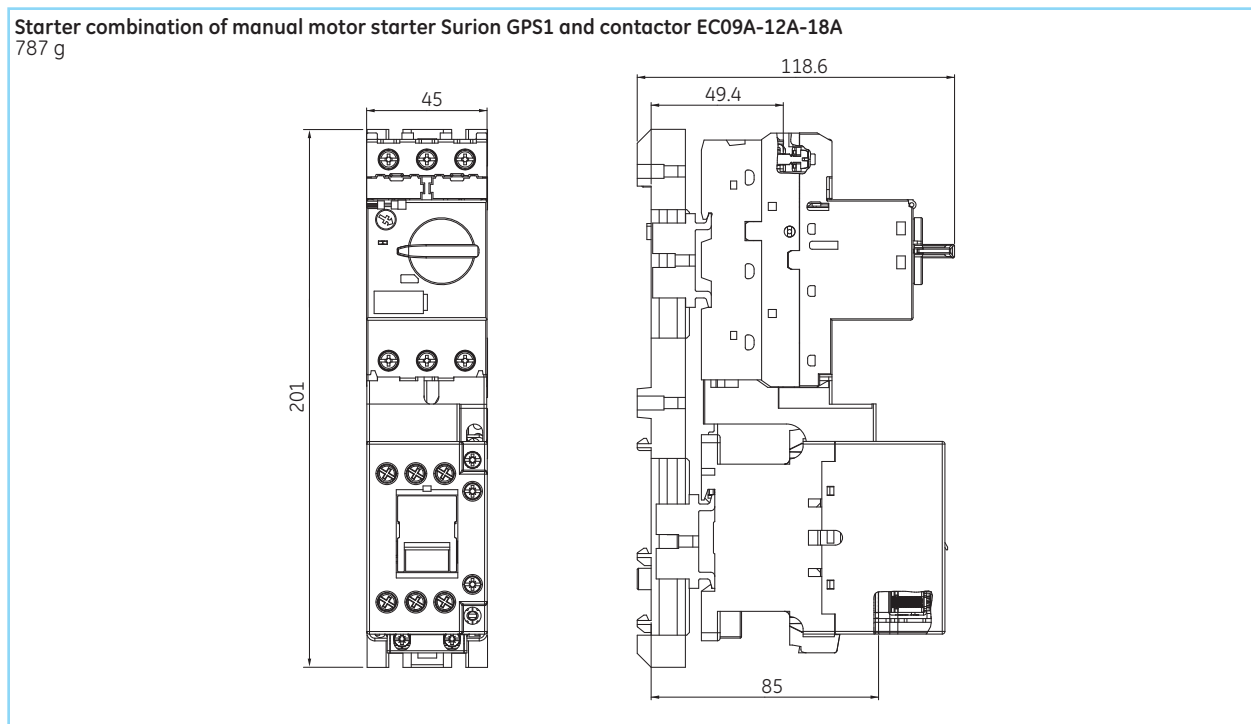


Dimensions in mm (inch = mm x 0.03937) - Weight in kg (lb = kg x 2.2046)

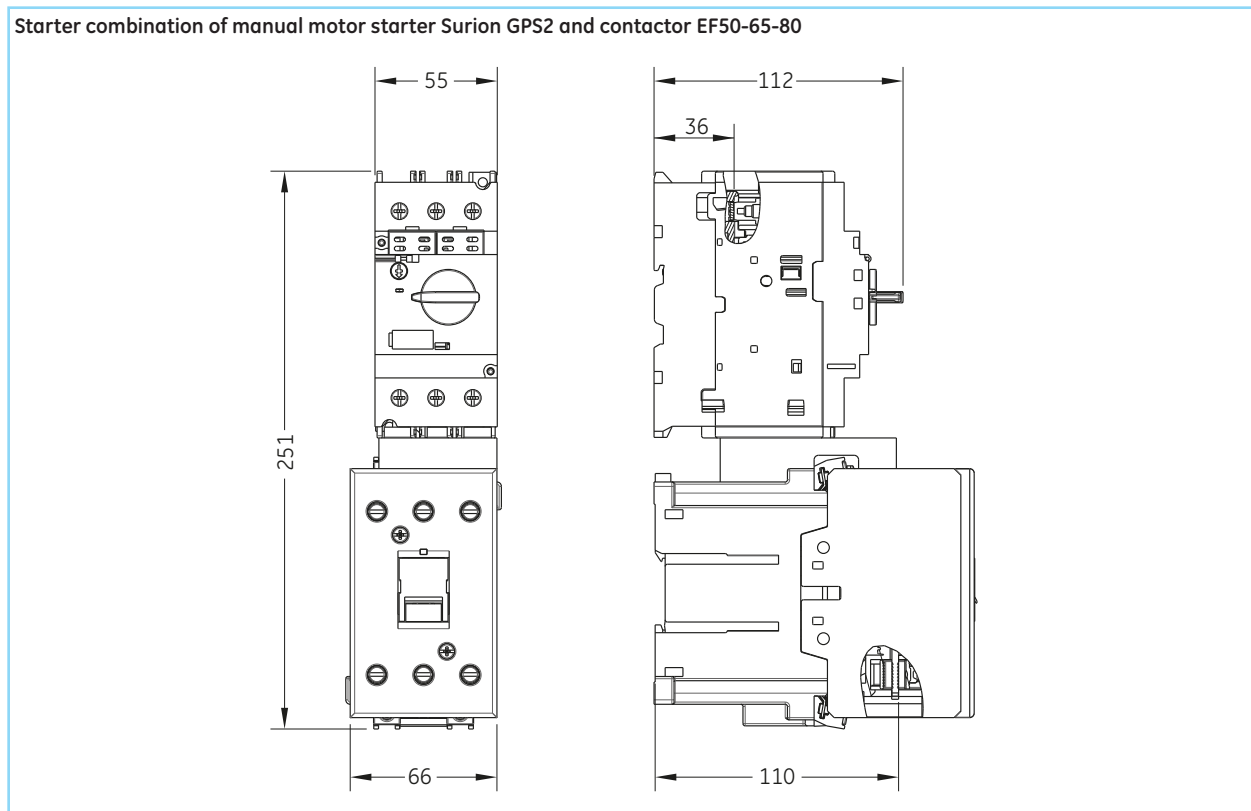


## Dimensions and weights

### EC contactors



### EF contactors

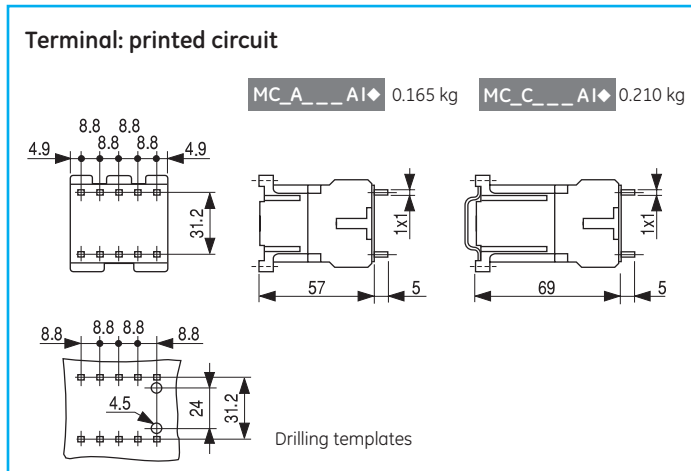
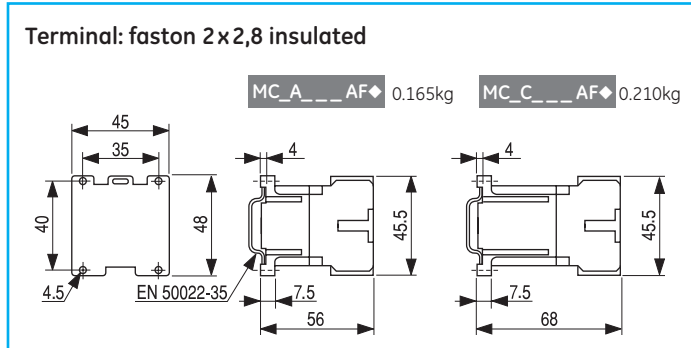
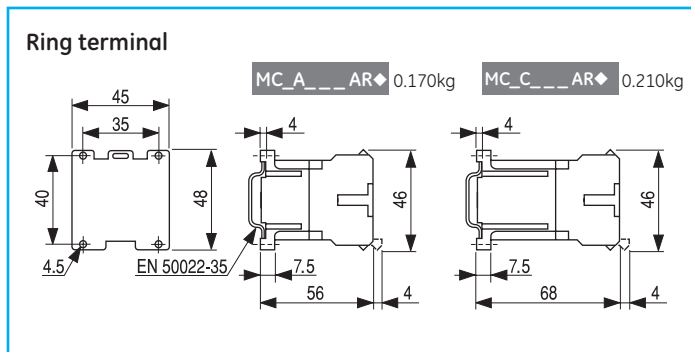
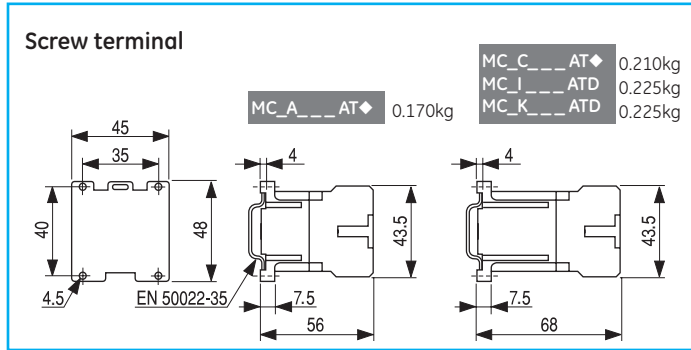


Dimensions in mm (inch = mm x 0.03937) - Weight in kg (lb = kg x 2.2046)

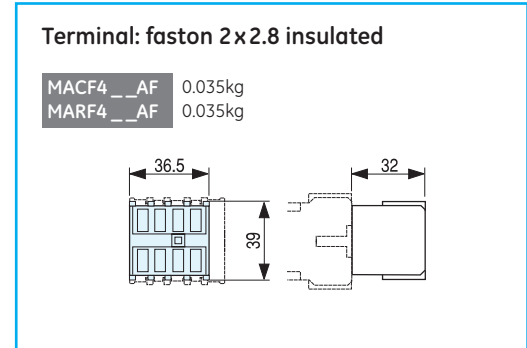
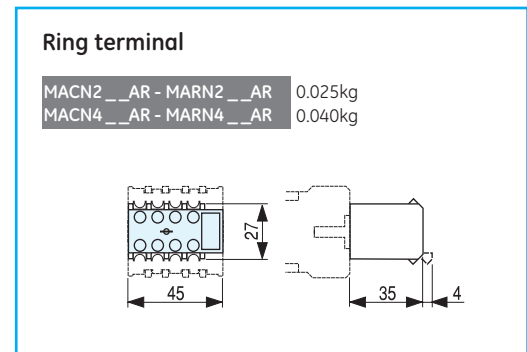
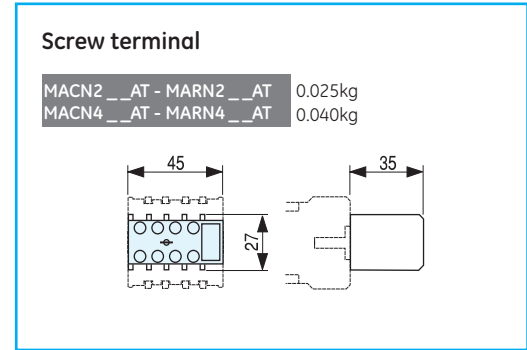


## Dimensional drawings

### Three and four pole contactors



### Auxiliary contact block. Lateral mounting



Dimensions in mm (inch = mm x 0.03937) - Weight in kg (lb = kg x 2.2046)



**Auxiliary contact blocks. Lateral mounting**

**Screw terminal**

MACL\_\_AT 0.013kg  
MARL\_\_ATS 0.013kg

(1) AC-control.  
(2) DC-control.

**Electronic timer block**

MREBC\_OAC2 0.040kg

(1) Frontal mounting  
(2) Lateral mounting

**Ring terminal**

MACL\_\_AR 0.013kg  
MARL\_\_ARS 0.013kg

(1) AC-control.  
(2) DC-control.

**Voltage suppressor block**

MPOA\_AE\_ 0.010kg  
MPOC\_AE3 0.010kg

**Terminal: faston 2x2.8 insulated**

MACL\_\_AF 0.009kg  
MARL\_\_AFS 0.009kg

(1) AC-control.  
(2) DC-control.

**Direct-on-line starters. IP40 / IP65**

**Series M**

**Terminal: printed circuit**

MACL\_\_AI 0.009 kg  
MARL\_\_AIS 0.009 kg

(1) AC-control.  
(2) DC-control.

Dimensions in mm (inch = mm x 0.03937) - Weight in kg (lb = kg x 2.2046)

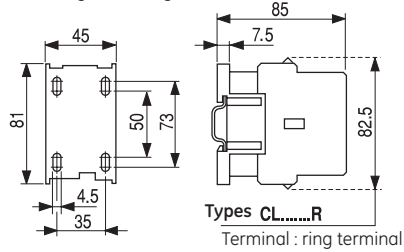


## Dimensional drawings

### Three pole contactors - Alternating current

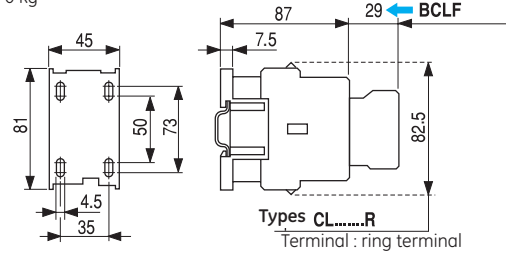
CL00A3..., CL01A3..., CL02A3....

0.280 kg 0.280 kg 0.280 kg



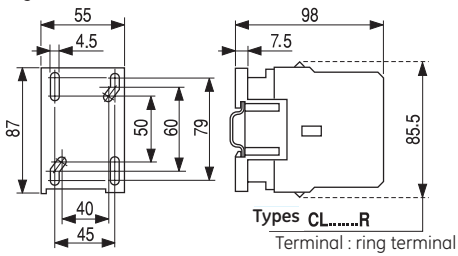
CL03A3...T

0.270 kg



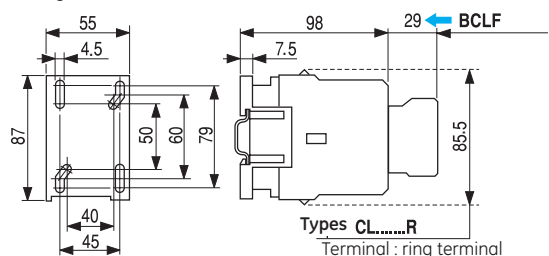
CL04A3....

0.500 kg



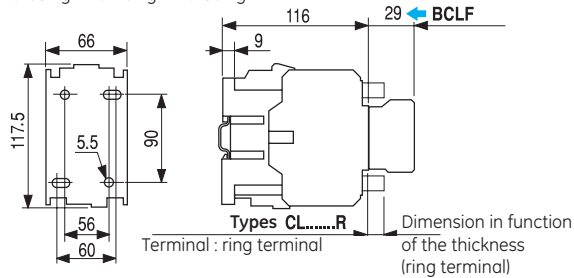
CL05A3....

0.520 kg



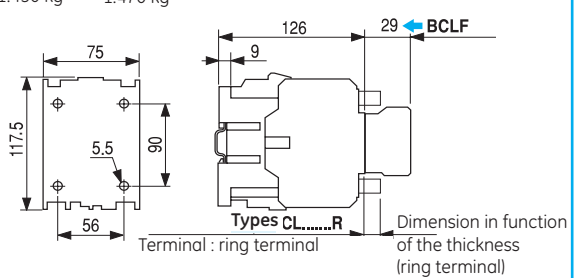
CL06A3..., CL07A3..., CL08A3....

1.105 kg 1.120 kg 1.130 kg



CL09A3..., CL10A3....

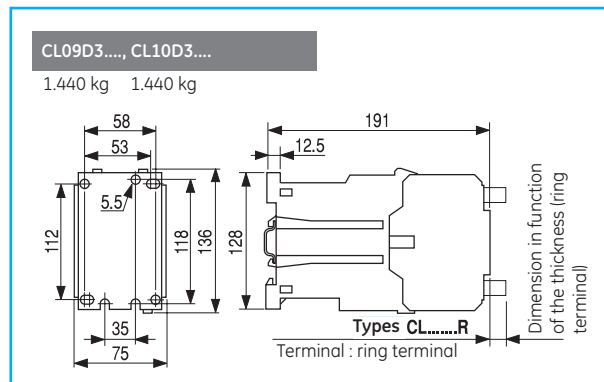
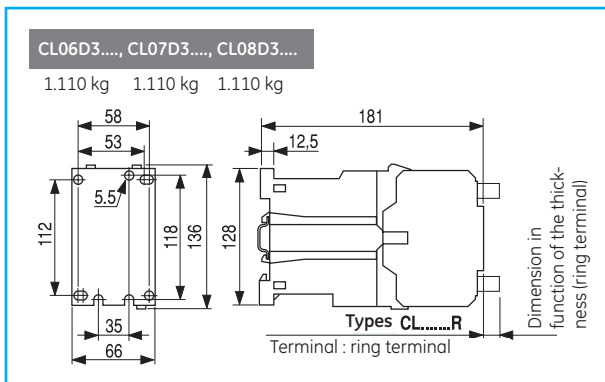
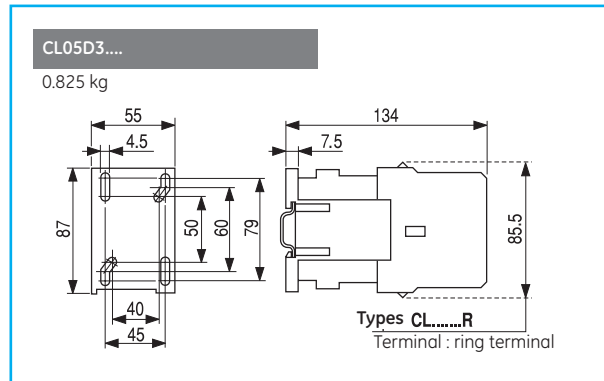
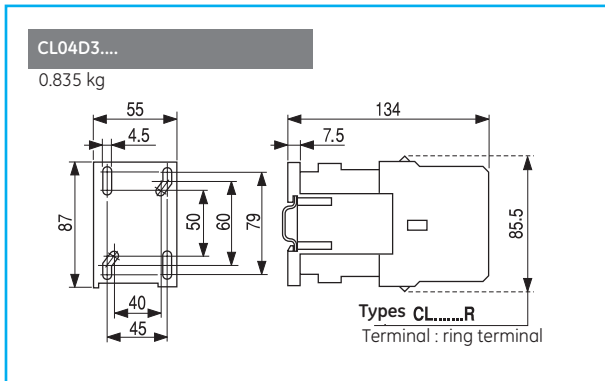
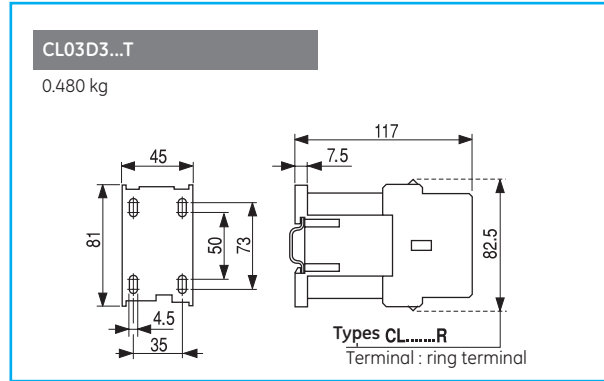
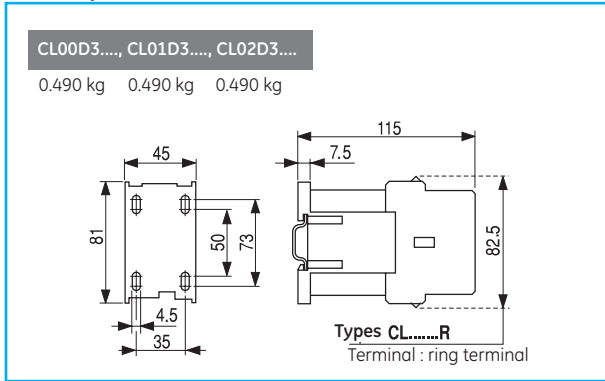
1.450 kg 1.470 kg



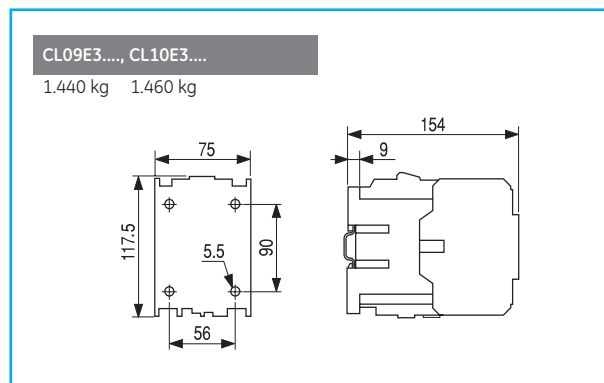
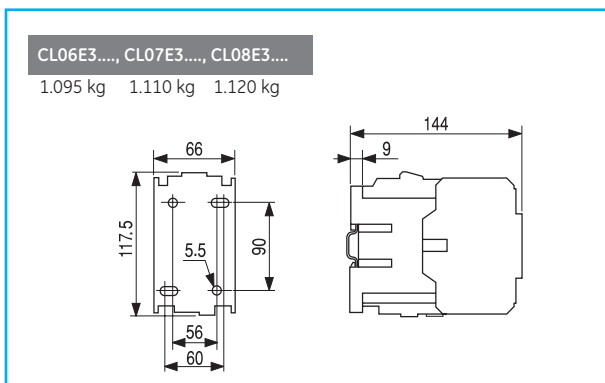
Dimensions in mm (inch = mm x 0.03937) - Weight in kg (lb = kg x 2.2046)



Three pole contactors - Direct current



Three pole contactors - Coil with electronic module



Dimensions in mm (inch = mm x 0.03937) - Weight in kg (lb = kg x 2.2046)

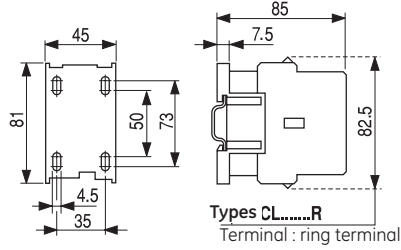


## Dimensional drawings

### Four pole contactors - Alternating current

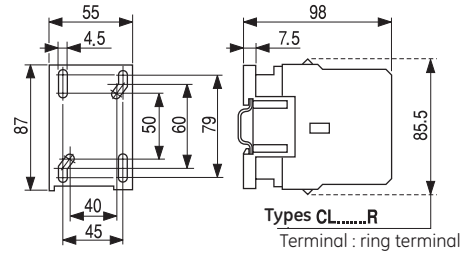
CL01A4...., CL02A4...., CL01AB...., CL02AB....

0.280 kg 0.280 kg 0.280 kg 0.280 kg



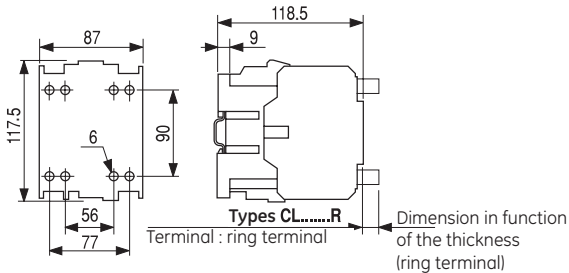
CL03A4...., CL04A4...., CL03AB...., CL04AB....

0.490 kg 0.500 kg 0.490 kg 0.500 kg



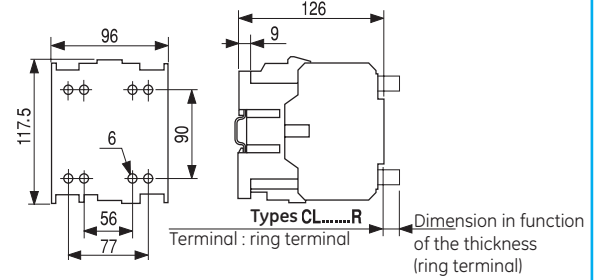
CL05A4...., CL07A4...., CL05AB...., CL07AB...., CL08AB....

1.240 kg 1.270 kg 1.240 kg 1.270 kg 1.270 kg



CL09A4....

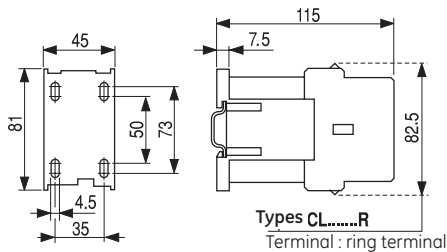
1.450 kg



### Four pole contactors - Direct current

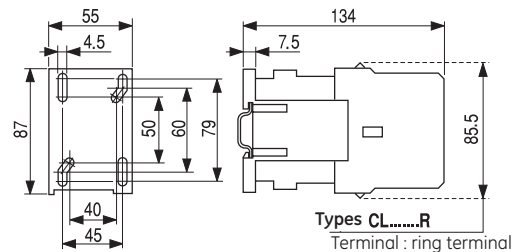
CL01D4...., CL02D4...., CL01DB...., CL02DB....

0.490 kg 0.490 kg 0.490 kg 0.490 kg



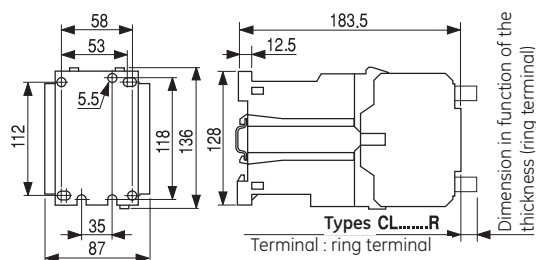
CL03D4...., CL04D4...., CL03DB...., CL04DB....

0.825 kg 0.835 kg 0.825 kg 0.835 kg

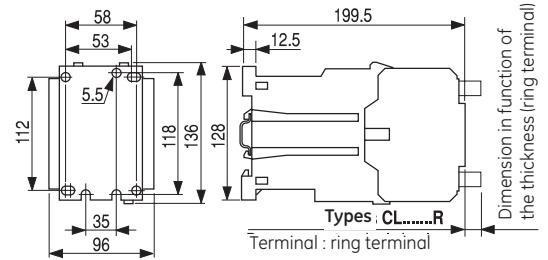


CL05D4...., CL07D4...., CL05DB...., CL07DB...., CL08DB....

1.290 kg 1.290 kg 1.290 kg 1.290 kg



CL09D4....

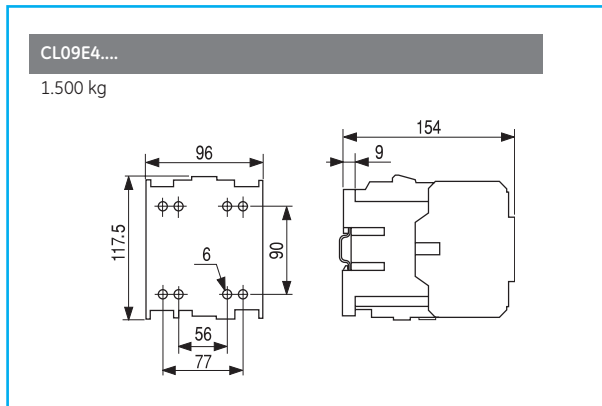
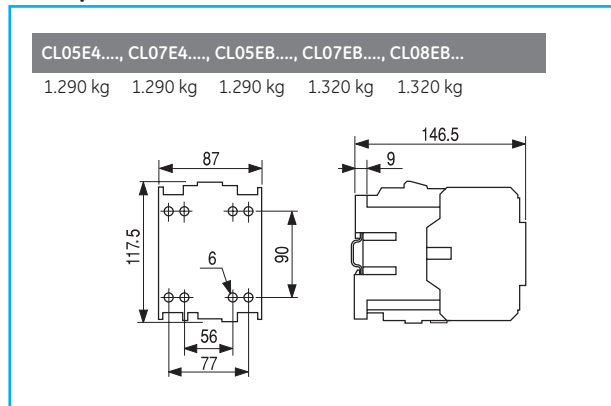


Dimensions in mm (inch = mm x 0.03937) - Weight in kg (lb = kg x 2.2046)





Four pole contactors - Coil with electronic module



Dimensions in mm (inch = mm x 0.03937) - Weight in kg (lb = kg x 2.2046)

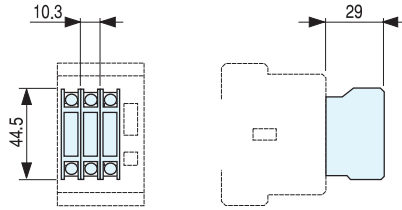


## Dimensional drawings

### Auxiliary contact blocks

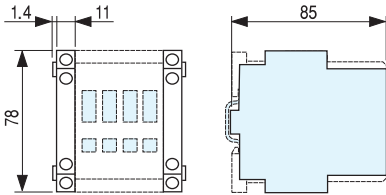
#### Screw terminal

BCLF... 0.015 kg



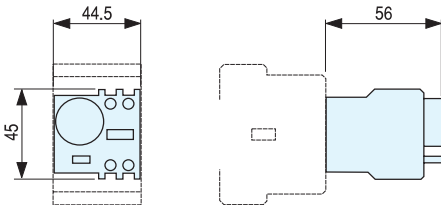
BCLL..., BRLL...

0.048 kg



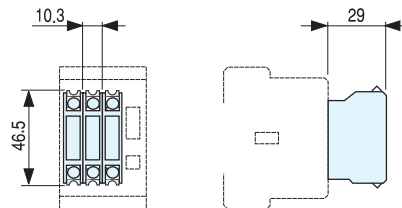
BTLF...

0.085 kg



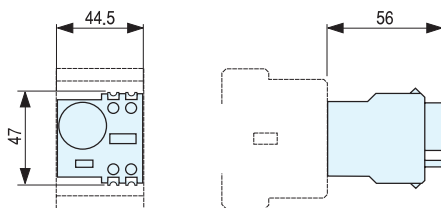
#### Ring terminal

BCRF... 0.015 kg



BTRF...

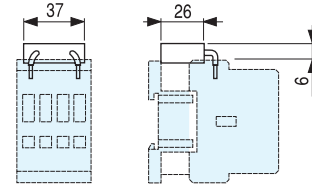
0.085 kg



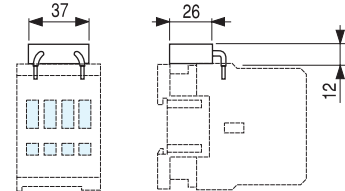
### Accessories

#### Voltage suppressor block

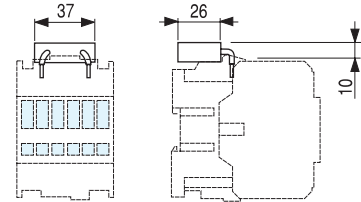
BSLR, BSLDZ, BSLV 0.020 kg



CL00 ... CL03



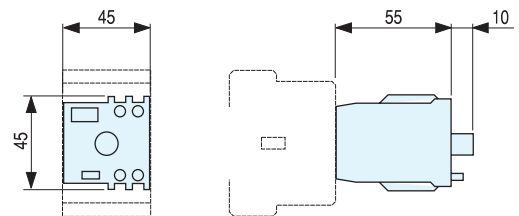
CL04...CL05\*3



CL05\*4... CL10

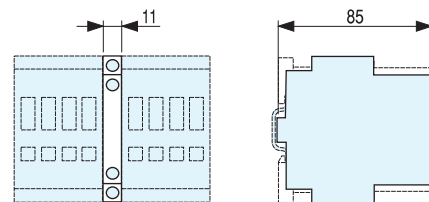
#### Mechanical latch block

RMLF 0.082 kg



#### Mechanical / mechanical-electrical interlock

BEL, BELA, BEL02, BELA02 0.025 kg

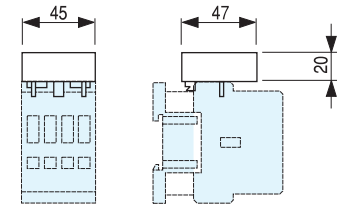


Dimensions in mm (inch = mm x 0.03937) - Weight in kg (lb = kg x 2.2046)

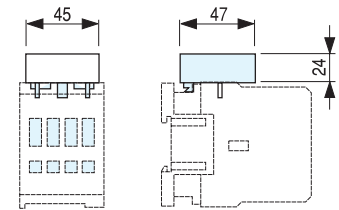


Electronic timer block

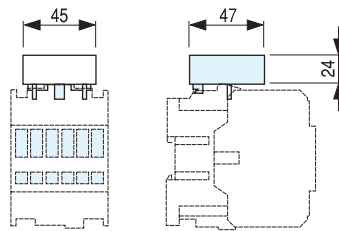
BETL02, BETL45 0.040 kg



CL00 ... CL03



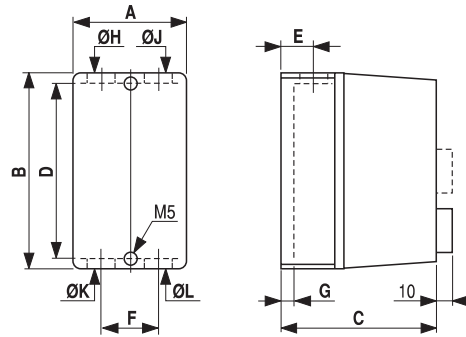
CL04...CL05\*3



CL05\*4... CL10

Direct-on-line starters. IP40 / IP65

Series CL



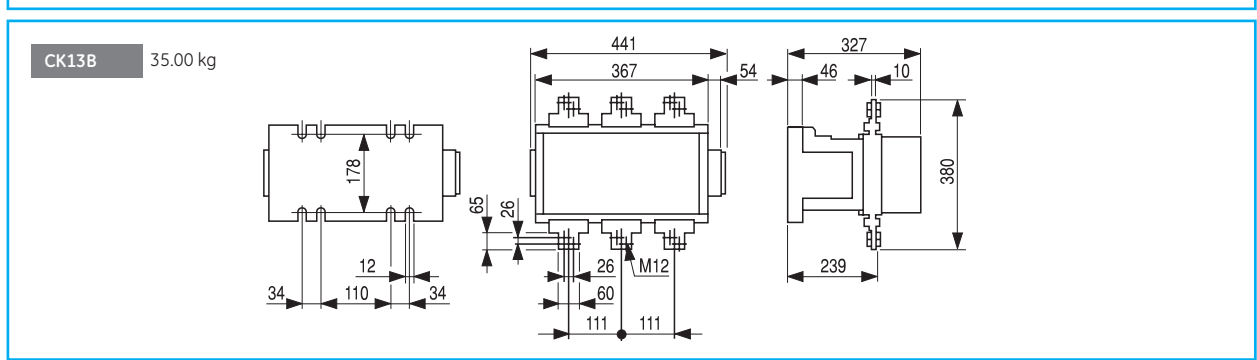
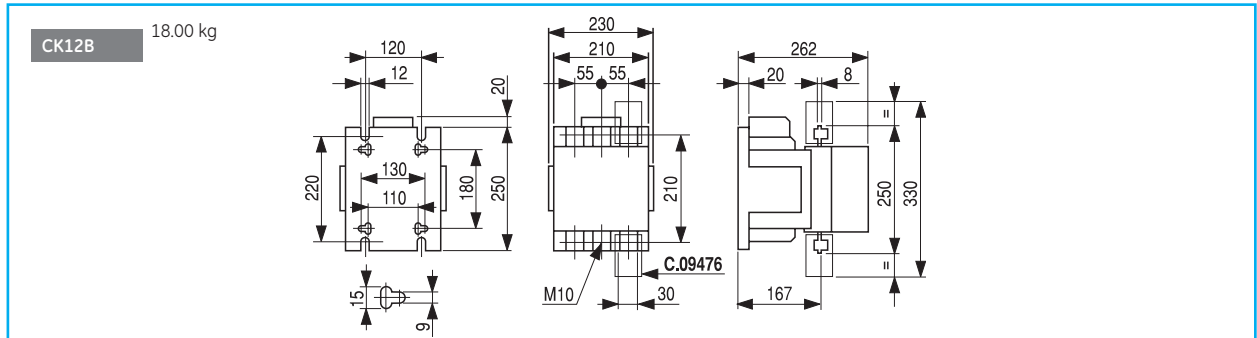
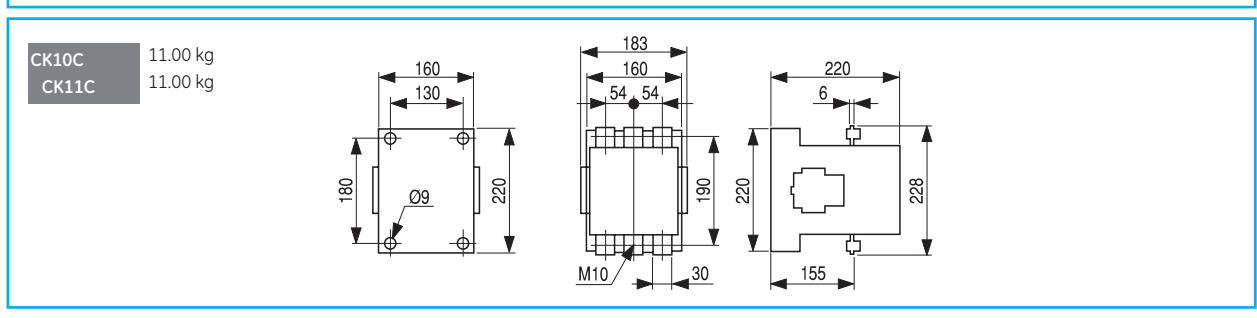
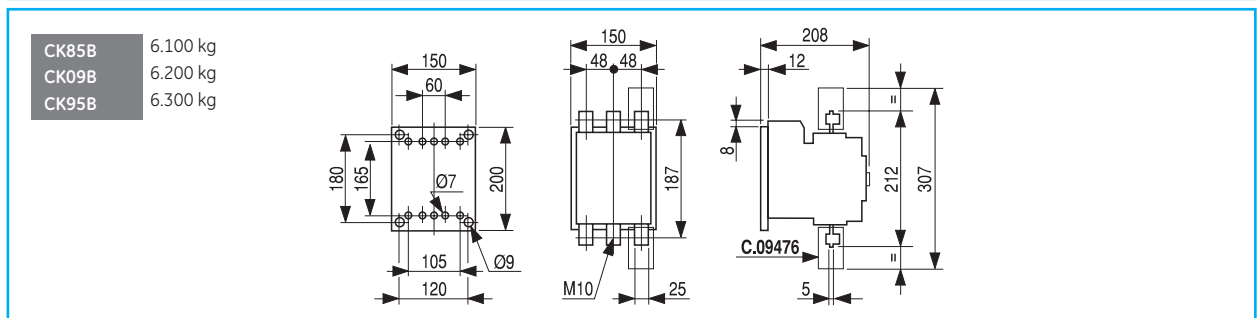
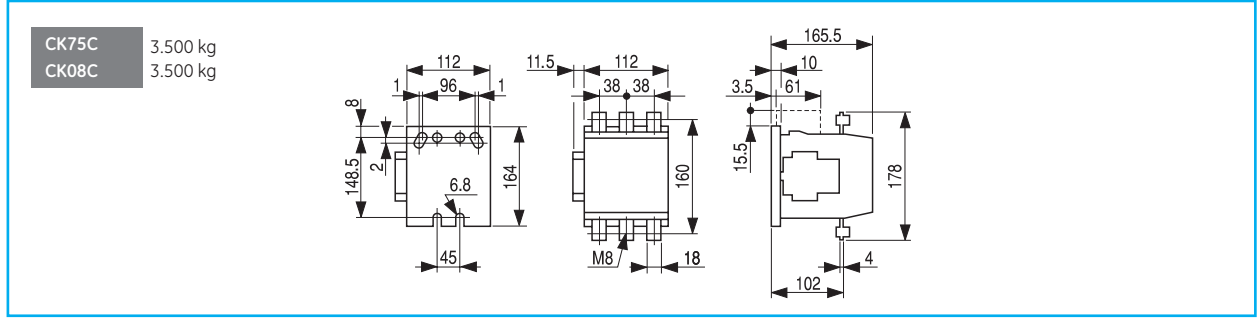
	LG00... - LG02...	LG25... - LG04...
A	87	101
B	180	195
C	124.5	136
D	162	177
E	20	23
F	49	57
G	8	8
Ø H	21	23
Ø J	21	21
Ø K	21	23
Ø L	21	23

Dimensions in mm (inch = mm x 0.03937) - Weight in kg (lb = kg x 2.2046)



## Dimensional drawings

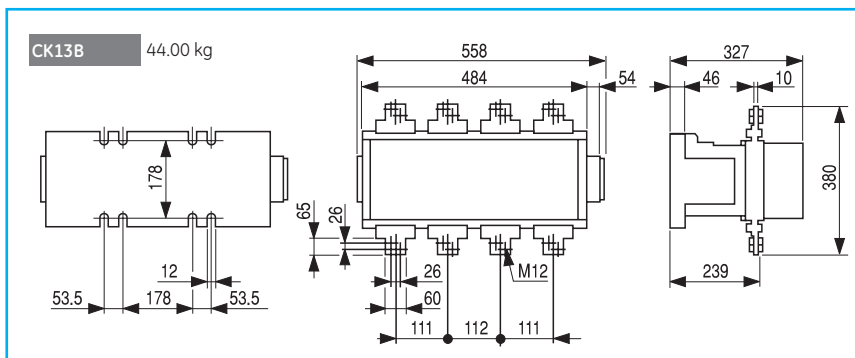
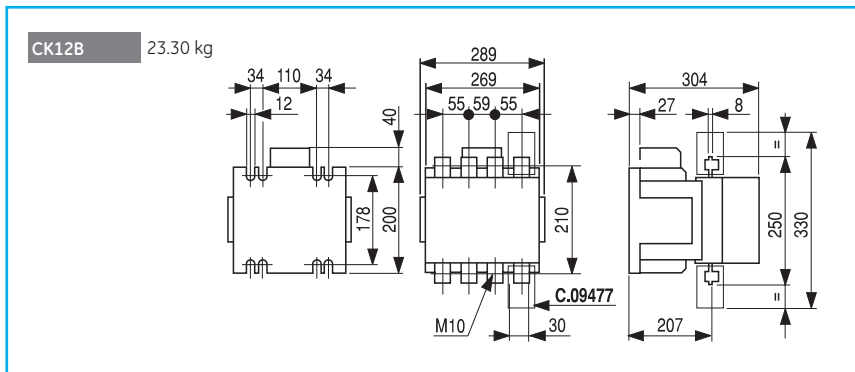
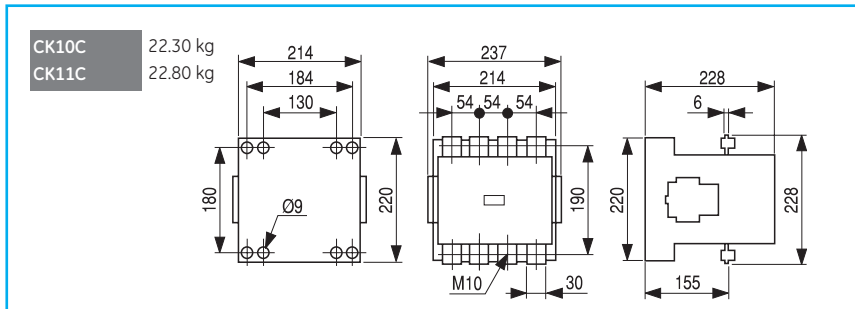
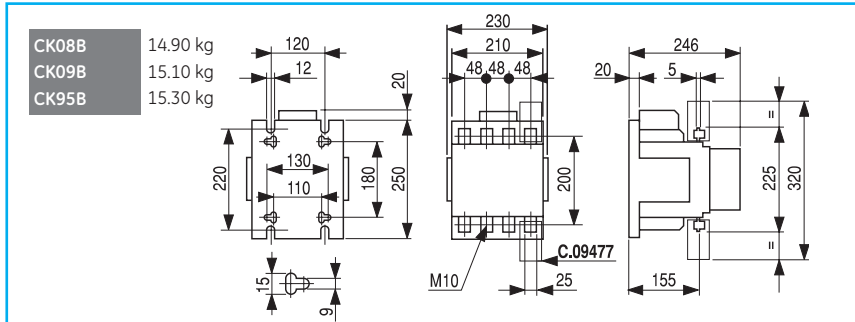
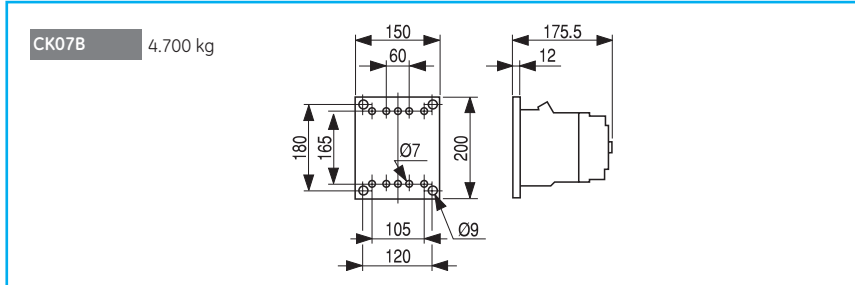
### Three pole contactors



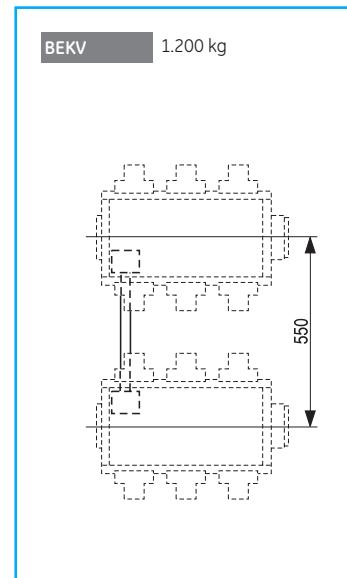
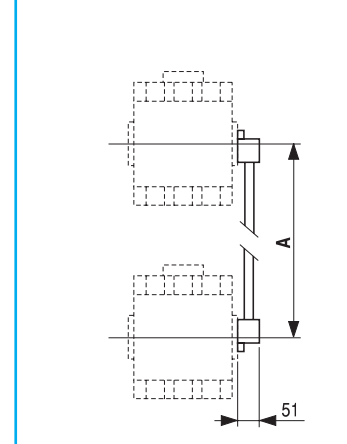
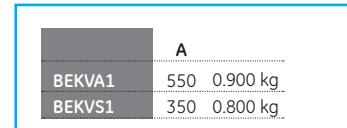
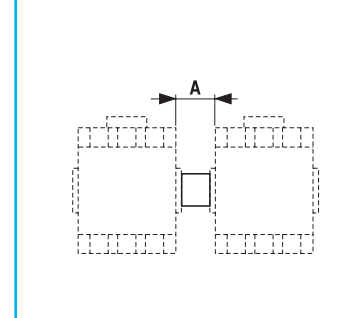
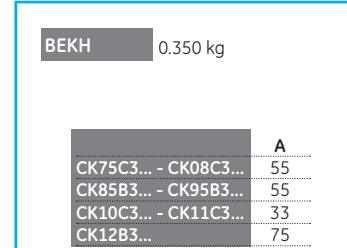
Dimensions in mm (inch = mm x 0.03937) - Weight in kg (lb = kg x 2.2046)



## Four pole contactors



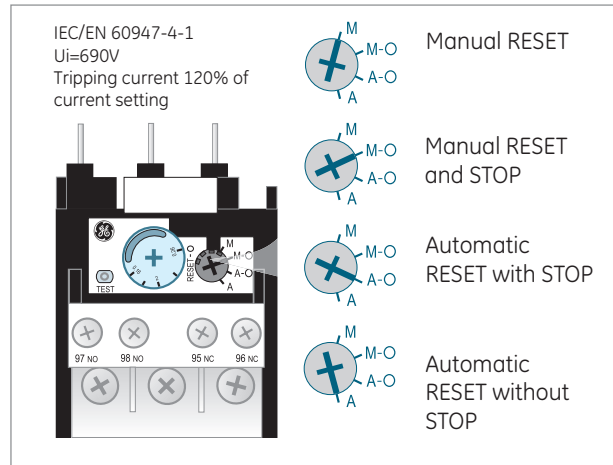
## Mechanical interlock



Dimensions in mm (inch = mm x 0.03937) - Weight in kg (lb = kg x 2.2046)

## Overload relays

- Control and Power Circuit up to 690V AC
- Thermal protection against balanced overload
- Three-pole differential (phase unbalance protection)
- Automatic ambient temperature compensation
- Front mounted selector for choosing utilization current
- Manual trip lever (tripping test)
- Tripping indicator (0-1)
- IP20 protection
- Reset button, 4 positions:
  - Manual RESET
  - Manual RESET and STOP
  - Automatic RESET with STOP
  - Automatic RESET without STOP



## Technical characteristics

		ECRT	RT2	RE
Class		10A	10	5, 10, 20 and 30
Setting range	(A)	0.16..40	11.5..110	0.1..110
<b>Main circuit</b>				
Rated insulation voltage	(V)	690	690	690
Frequency limits	(Hz)	0-400	0-400	0-400
<b>Control circuit</b>				
Rated insulation voltage (IEC60947-4) Ui	(V)	690	690	690
Rated thermal current Ith	(A)	10	10	10
Operating current				
AC-15 - rated voltage and current Ue-Ie	(V-A)	110/120-3	220/230-2 380/400-1 480/500-0.8	690/660-0.3
DC-13 - rated voltage and current Ue-Ie	(V-A)	24-2	48-1.4 110-0.6 220-0.3	440-0.1
Utilization according UL and CSA		B600-Q600		
Protective fuse type gL	(A)		10	
Terminal capacity	AWG		2.5	
Tightening capacity	(Nm)		0.8	

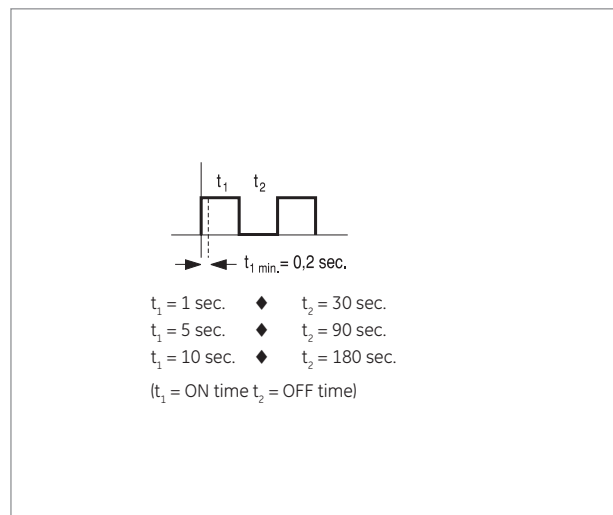
## Ambient conditions for ECRT, RT2 and RE

Storage temperature	-55°C to +80°C
Operation temperature (compensated)	-25°C to +60°C
Altitude <2000 m	without any changes in characteristics
Relative humidity	40°C, 95% no cond.
Protection treatment	Lloyd's Register Environmental category ENV1 & ENV2 10:33 Germanischer Lloyd Environmental category C

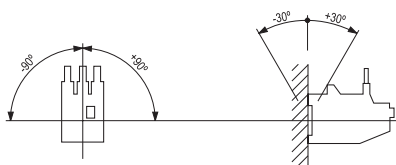
## Remote electrical reset

Power consumption	
AC	100VA
DC	100W

Coils not suitable for continuous operating duty



## Mounting positions

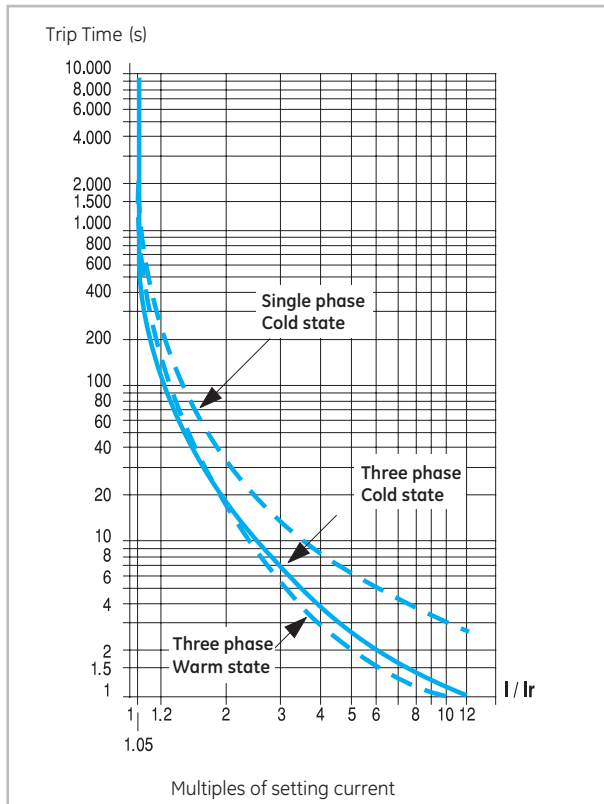


Inclination angle axis Y and Z: ±30°

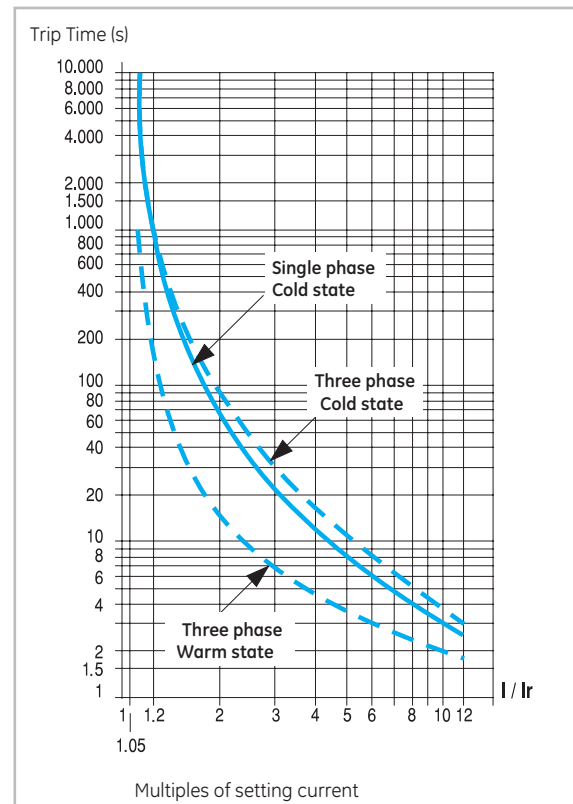


# Tripping curves

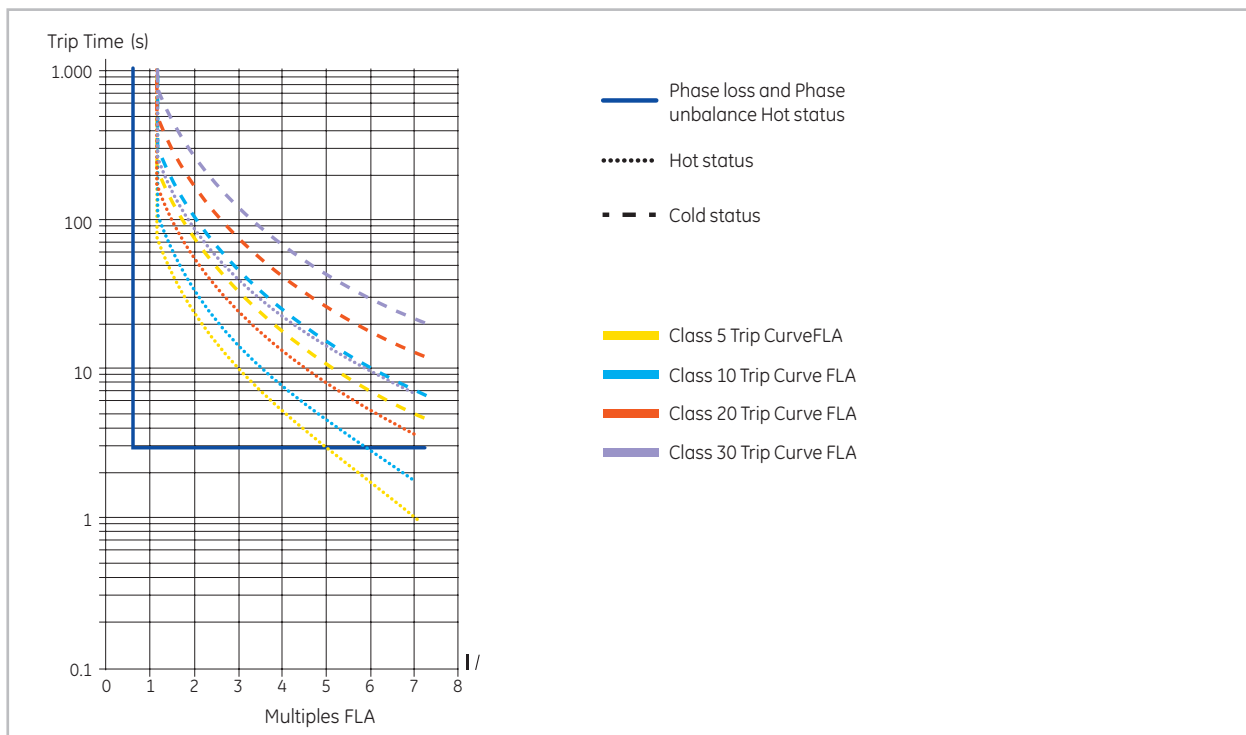
## ECRT Class 10A



## RT2 Class 10



## RE Class 5, 10, 20 and 30



## Technical data

### General

- Thermal protection against balanced overload.
- Three-pole differential ( phase unbalance protection).
- Automatic ambient temperature compensation.
- Front mounted selector for choosing utilisation current.
- Reset button, 2 positions:  
Manual(H) and Automatic(A) by turning the blue selector.
- Stop push button, independent of reset (red).
- Manual trip lever (tripping test).
- Tripping indicator (0-1).
- To facilitate wiring arrangements terminal 96 fits directly onto coil terminal (A2) and terminal 14/22 fits directly onto the feedback auxiliary contact.

### Conformity to standards

IEC 60947-4	CEI 17-50	VDE660
UNE 115	NI C63-650	UL508
NFC63-650		

### Approvals

UL	CSA	SEMKO
SETI	NEMKO	CE

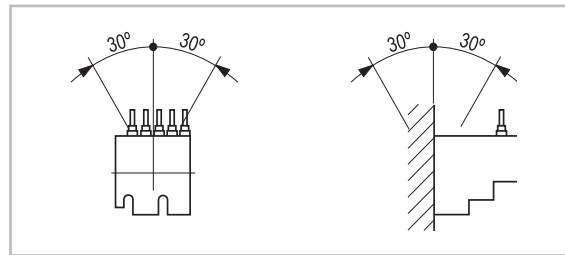
### Ambient conditions

Storage temperature	-55°C to +80°C	
Operation temperature	-25°C to +60°C	
Altitude	up to 3000m	Nominal values
	from 3000 to 4000m	90%le 80%Ue
	from 4000 to 5000m	80%le 75%Ue
Degree of protection	IP20	
Protection treatment	Tropical finish	

### Climatic resistance

Continuous tests 40 / 125 / 56		
Cold (72h)	Temperature	-40°C
	Dry heat (96h)	
	Temperature	+125°C
	Relative humidity	< 50%
Humid heat (56 days)	Temperature	+40°C
	Relative humidity	95%
Cyclical tests		
First half-cycle (12h)	Low temperature	+25°C
	Relative humidity	93%
Second half-cycle (12h)	Low temperature	+55°C
	Relative humidity	95%
Number of consecutive cycles	6	

### Mounting positions

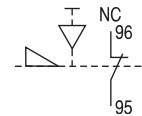


### Main circuit (poles)

		MTO...
Rated insulation voltage (Ui) according to IEC 947	(V)	750
Frequency	(Hz)	0..400
Power dissipation per pole	(W)	min. 1 / max. 2.5
Terminal capacity		
Screw M 3.5 (pozidrive head) safety flange		
Maximum capacity:		
Solid	(Ø mm)	2 x 2 wires
Stranded without end sleeve	(mm²)	2 wires Ø 2.5
Stranded with end sleeve		
pen (2 end sleeves)	(mm²)	2 wires Ø 0.75
pen (1 end sleeve)	(mm²)	2 wires Ø 1
		1 wires Ø 2.5
Tightening torque	(Nm)	0.8

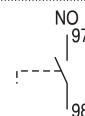
### Control circuit (incorporated auxiliary contact)

		MTO...
Rated insulation voltage (Ui) according to IEC 947	(V)	750
Rated thermal current (Ith) $\theta \leq 60^\circ\text{C}$	(A)	10
Tripping currents		
AC-15	Ue-le (V-A)	223-3, 380-2, 500-1
DC-13	Ue-le (V-A)	60-0.5, 110-0.2, 220-0.1
Short-circuit protection (max.glass gL fuse - w/h welding)	(A)	6
Number and type of contacts		



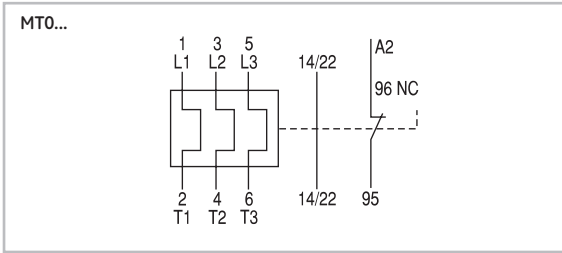
### Control circuit (auxiliary contact block)

		MATV10AT
Rated insulation voltage (Ui) according to IEC 947	(V)	750
Rated thermal current (Ith) $\theta \leq 60^\circ\text{C}$	(A)	10
Tripping currents		
AC-15	Ue-le (V-A)	223-1, 380-0.5
DC-13	Ue-le (V-A)	60-0.1, 110-0.5
Short-circuit protection (max.glass gL fuse - w/h welding)	(A)	6
Number and type of contacts		

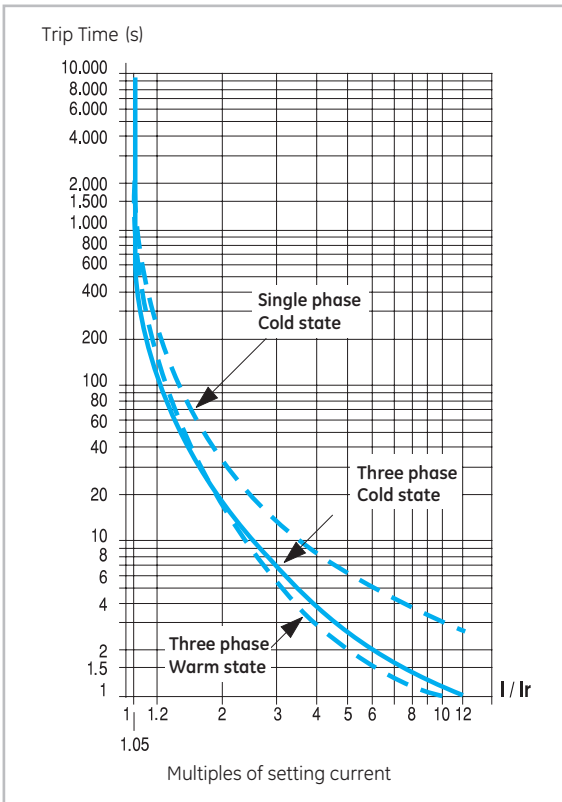




**Numbering of the terminals**

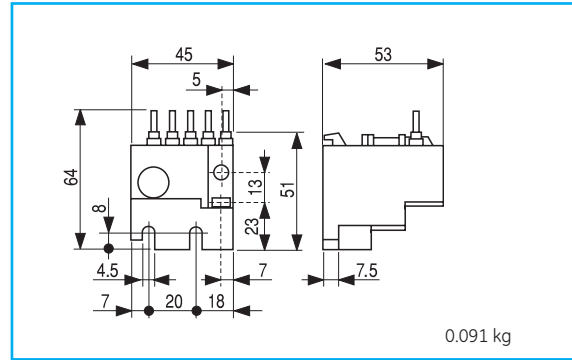


**Tripping curves**

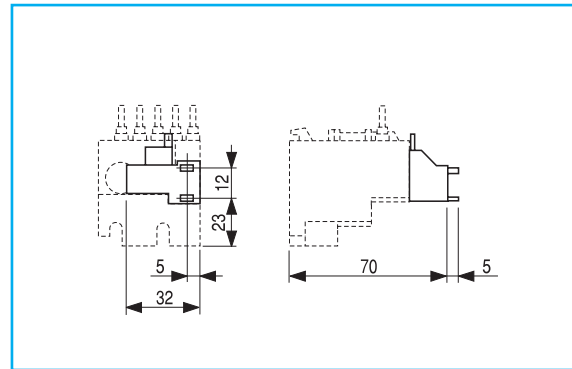


**Dimensional drawings**

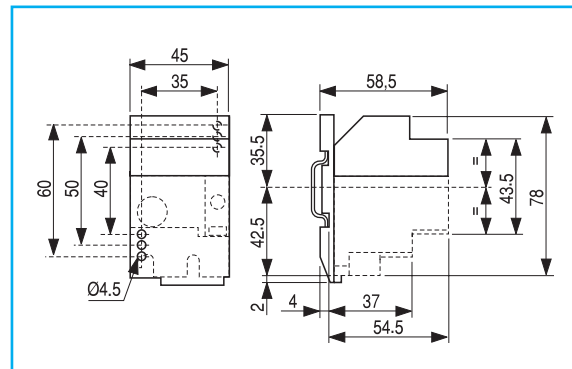
**Thermal overload relay**



**Thermal overload relay + aux. contact block (front mounting)**



**Independent mounting of the thermal overload relay**



Dimensions in mm (inch = mm x 0.03937) - Weight in kg (lb = kg x 2.2046)



## Technical data

		RT1...	RT2...	RT3...	RT4.../4L...	RT5.../5L...	RT6.../6L...
<b>General</b>							
Class		10A / 20	10 / 20	10 / 20	10 / 30	10 / 30	10 / 30
Setting range	(A)	0.16 ... 40	11.5 ... 110	55 ... 190	2.5 ... 310	120 ... 700	500 ... 850
Suitable for		CL00...CL05	CL06...CL10	CK75...CK08	CL,CK	CK10...CK12	CK13
<b>Main circuit</b>							
Rated insulation voltage	(V)	690	1000	1000	1000	1000	1000
(IEC947-4) Ui							
Frequency limits	(Hz)	0...400	0...400	0...400	50...60	50...60	50...60
<b>Terminal capacity</b>							
Clamp terminal - solid	(mm <sup>2</sup> )	16	50	120	-	-	-
Clamp terminal - flexible	(mm <sup>2</sup> )	10	50	120	-	-	-
Flat terminal	(mm)	-	-	25 x 5	-	-	80 x 10
Passing by hole (wire) through C.T. core	(mm <sup>2</sup> )	-	-	-	-	400	-
Passing by hole (bar) through C.T. core	(mm)	-	-	-	30 x 10	30 x 10	-
Tightening torque	(Nm)	2.5	4.5	6.5	23	31.5	-
<b>Control circuit</b>							
Rated insulation voltage	(V)	690					
(IEC60947-4) Ui							
Rated thermal current I <sub>th</sub>	(A)	10					
<b>Operation current</b>							
AC-15 - Ue-Ie	(V - A)	110/120 - 3 ; 220/240 - 2 ; 380/415 - 1 ; 480/500 - 0.8 ; 660/690 - 0.3					
DC-13 - Ue-Ie	(V - A)	24 - 2 ; 48 - 1.4 ; 110 - 0.6 ; 250 - 0.3 ; 440 - 0.1					
Utilisation according UL and CSA					B600 - Q600		
Protective fuse type gL	(A)	10					
Terminal capacity	(mm <sup>2</sup> )	2.5					
Tightening capacity	(Nm)	0.8					

## Conformity to standards

IEC/EN 60947-4-1	NFC 63-650	NI C 63-650
IEC/EN 60947-5-1	CEI 17-50	VDE 0660
UNE 115	CSA 22.2/14	UL 508

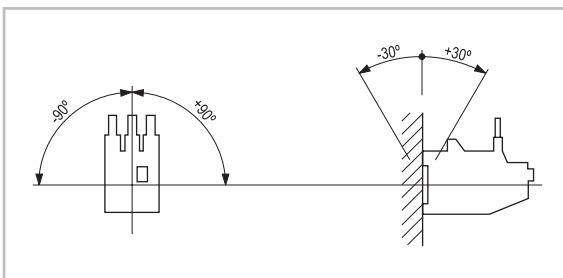
## Approvals/Marking

cULus	RINA	CE
Lloyd's Register	Bureau Veritas	

## Ambient conditions

Storage temperature	-40°C to +70°C
Operation temperature (compensated)	-25°C to +60°C
Altitude	up to 3000m
	w/o any changes in characteristics
Relative humidity	98%
Protection treatment	Tropical finish

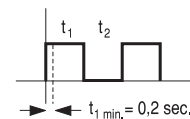
## Mounting positions



## Remote electrical reset

Power consumption		
AC	(VA)	100
DC	(W)	100

Coils not suitable for continuous operating duty

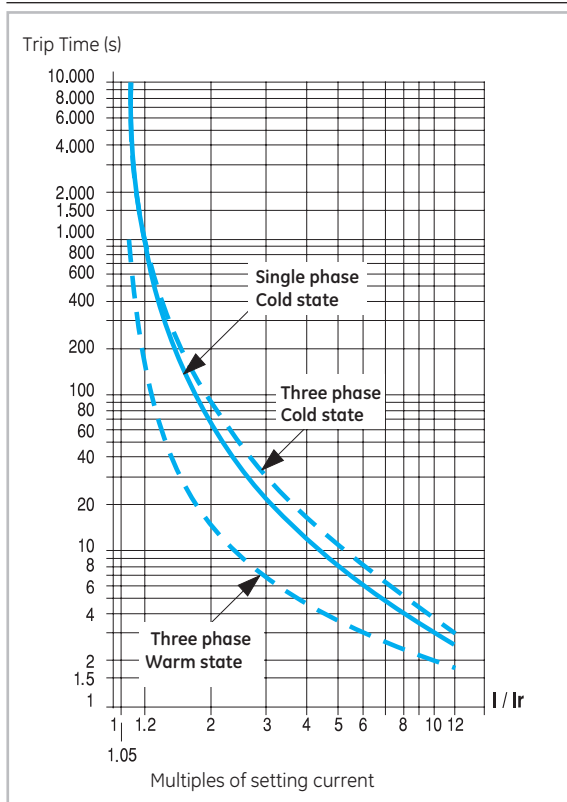


t <sub>1</sub> = 1 sec.	◆	t <sub>2</sub> = 30 sec.
t <sub>1</sub> = 5 sec.	◆	t <sub>2</sub> = 90 sec.
t <sub>1</sub> = 10 sec.	◆	t <sub>2</sub> = 180 sec.

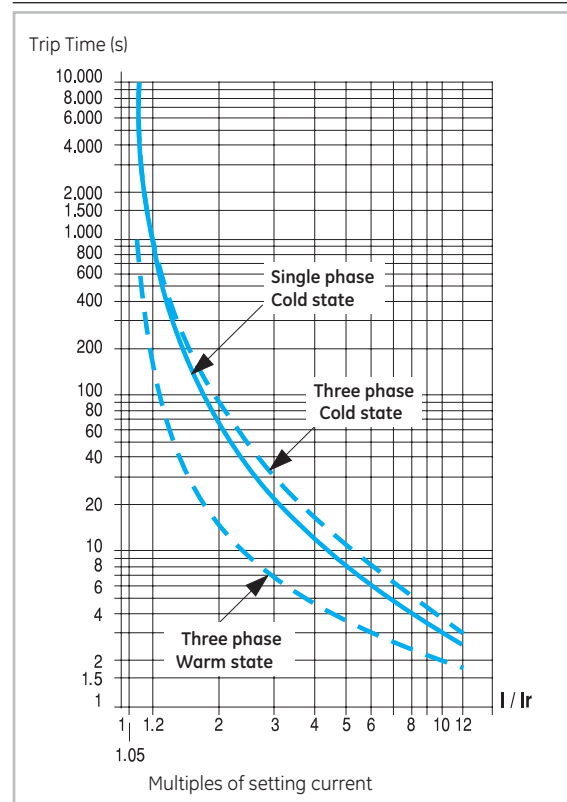
(t<sub>1</sub> = ON time t<sub>2</sub> = OFF time)

Tripping curves

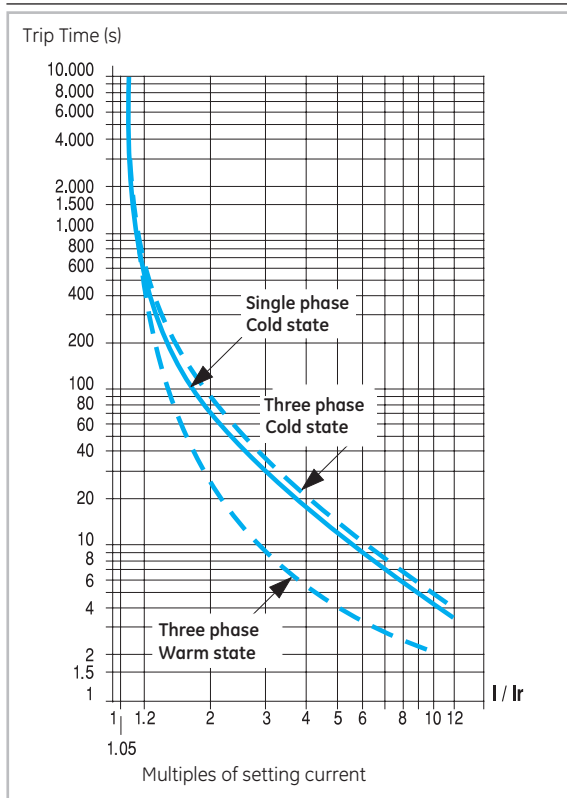
RT1 Class 10A



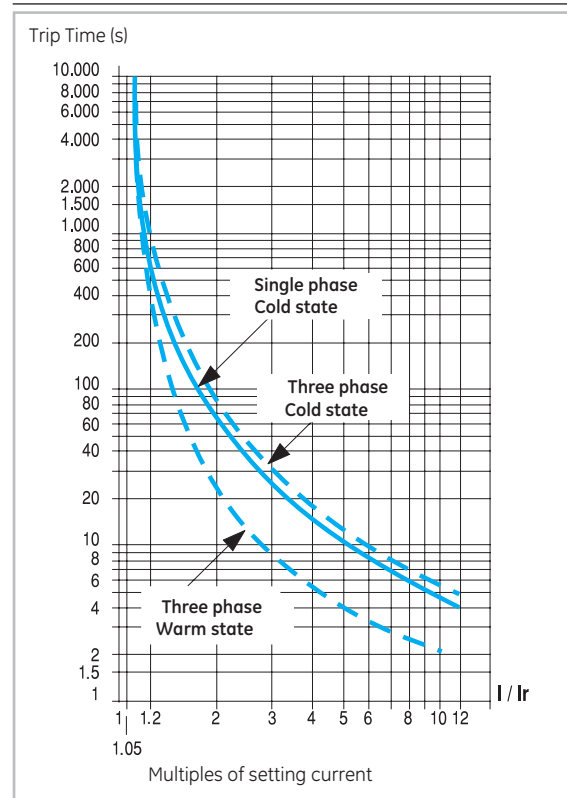
RT2 Class 10



RT12 Class 20



RT22 Class 20



Technical data

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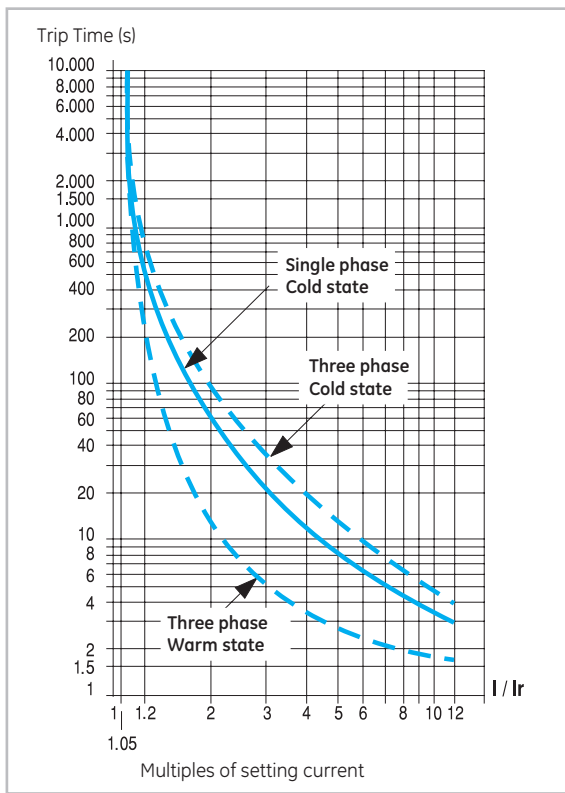
X



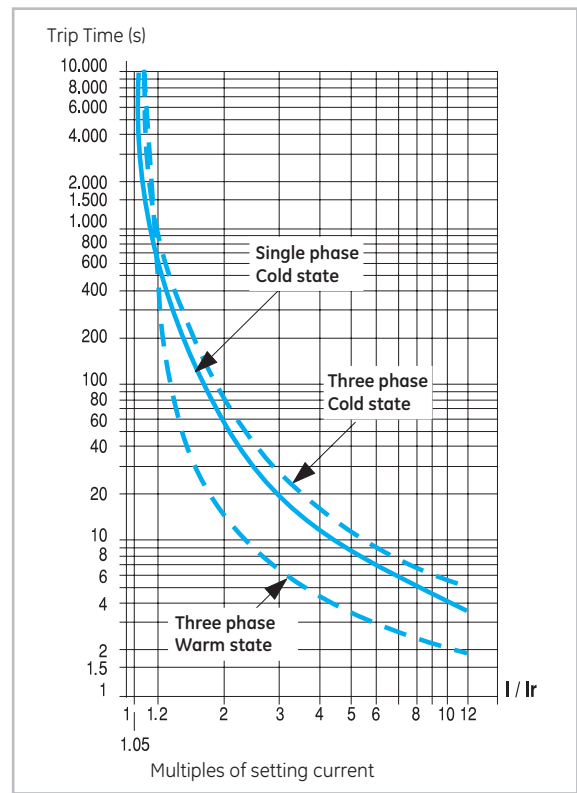
# Series RT

## Tripping curves

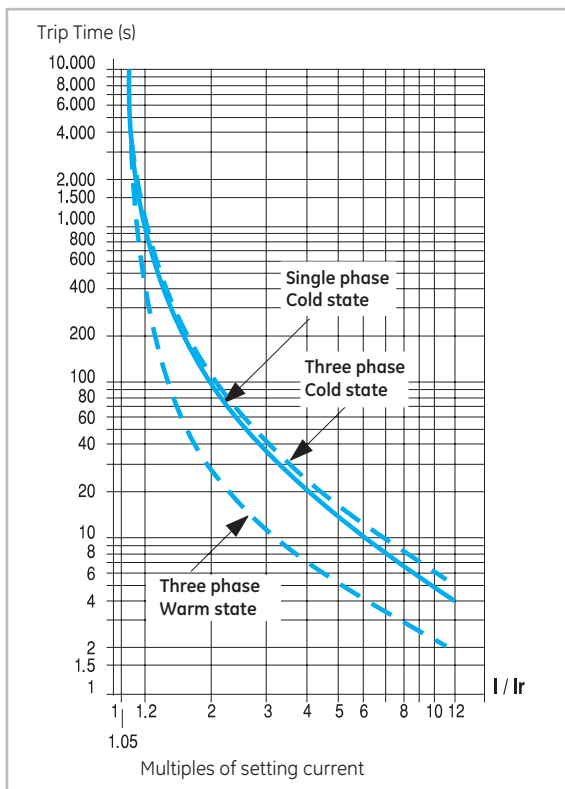
RT3 Class 10



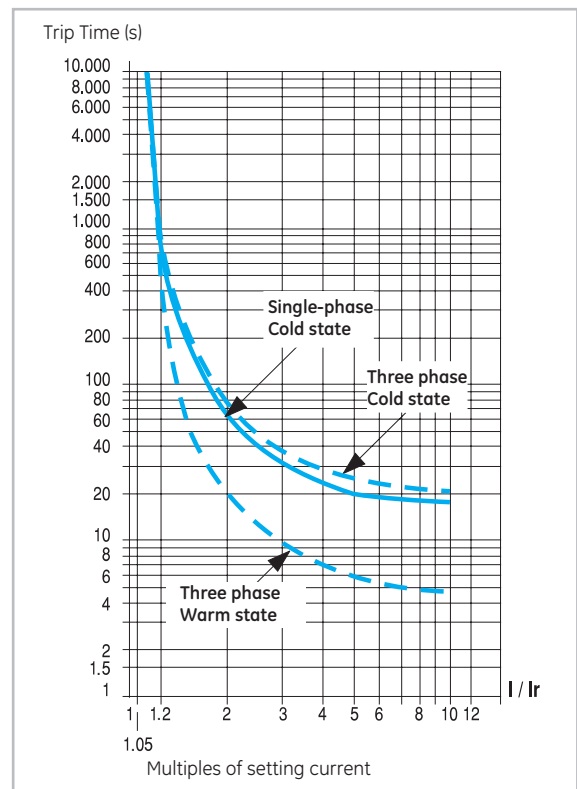
RT4 Class 10



RT32 Class 20

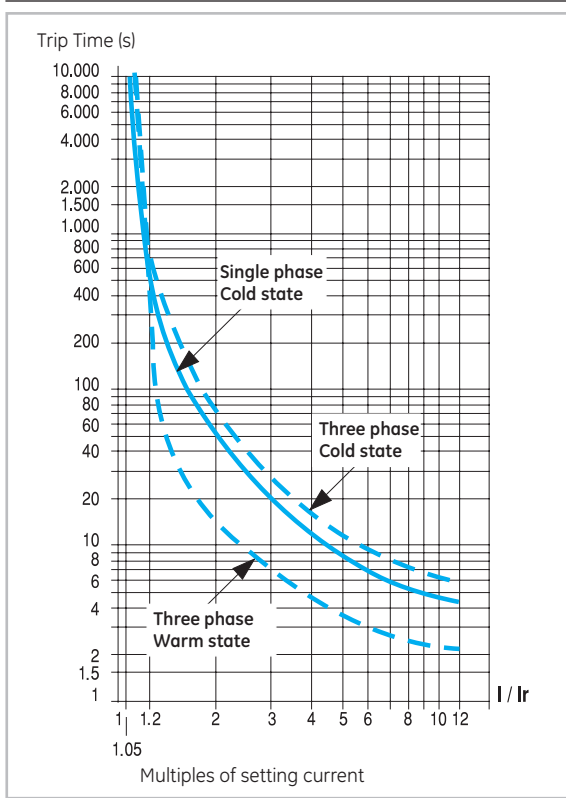


RT4L Class 30

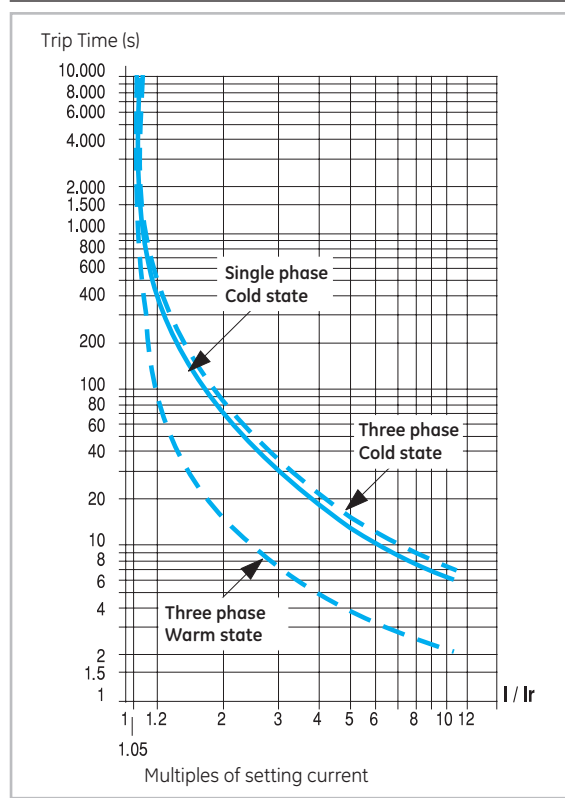


Tripping curves

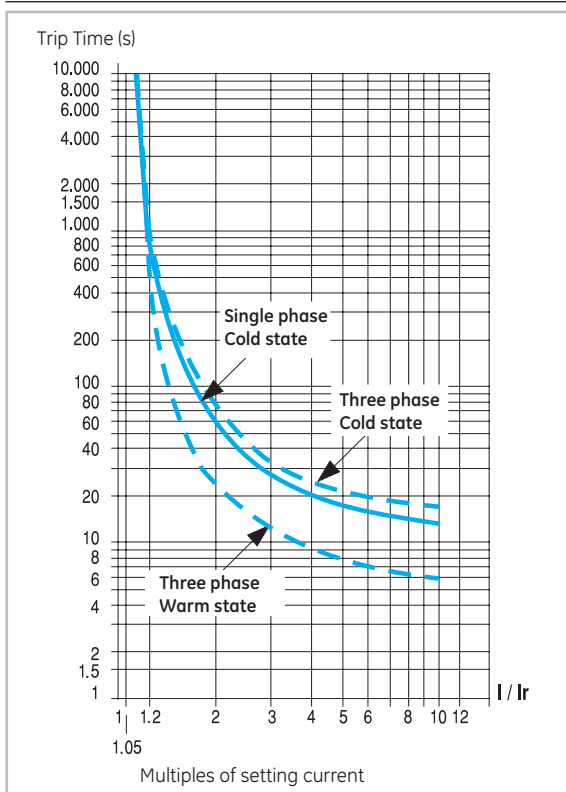
RT5 Class 10



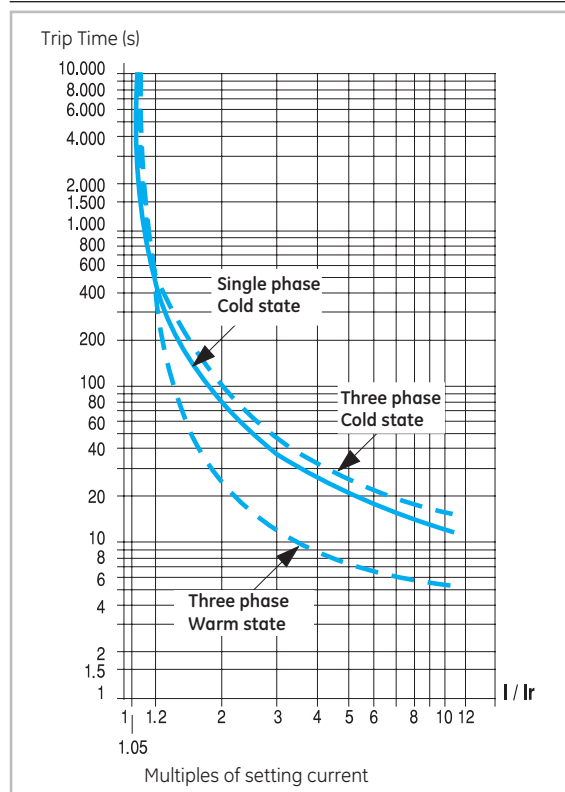
RT6 Class 10



RT5L Class 30



RT6L Class 30



Technical data

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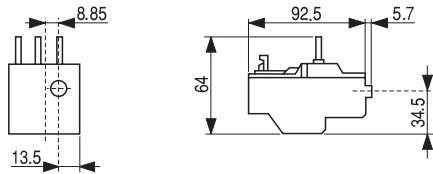
# Series RT

## Dimensional drawings

### Thermal overload relay for contactors

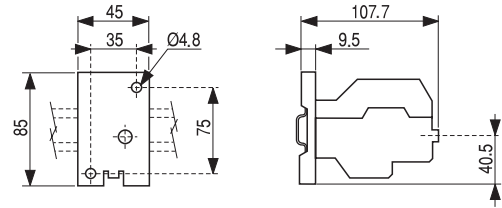
RT1 - RT12

0.190 kg



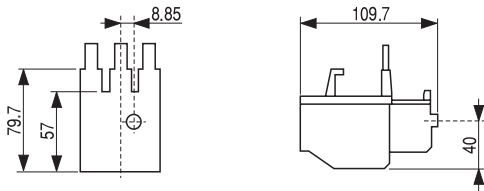
RT1 + RT XP

RT12 + RTXP



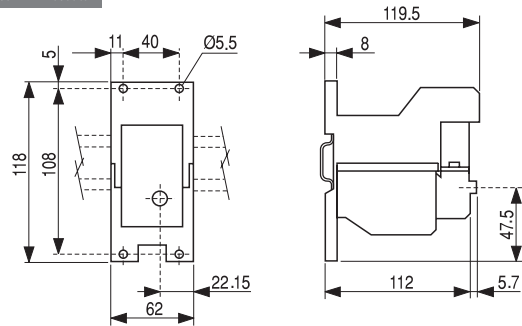
RT2 - RT22

0.400 kg



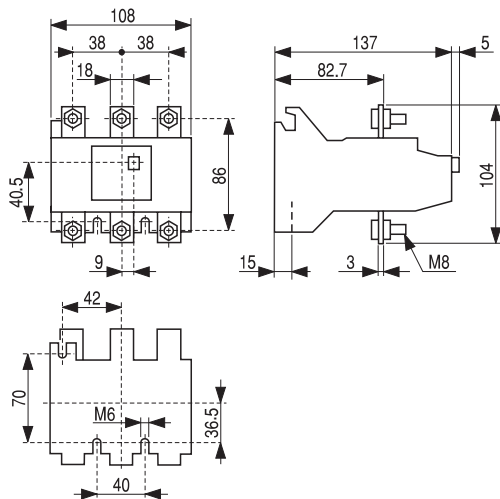
RT2 + RT XP

RT22 + RTXP



RT3 - RT32

0.900 kg



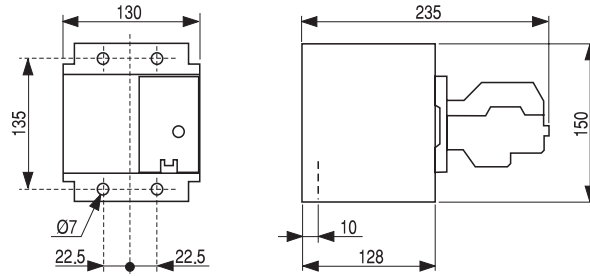
Dimensions in mm (inch = mm x 0.03937) - Weight in kg (lb = kg x 2.2046)



Thermal overload relay for contactors

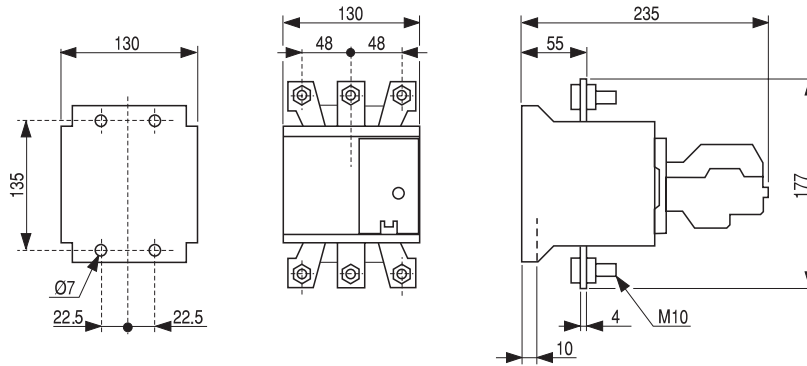
RT4LA...RT4LM

2.400 kg



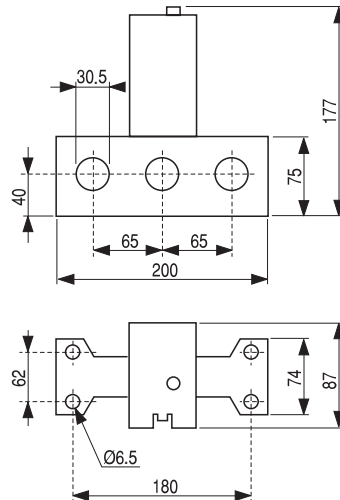
RT4/4LN...RT4/4LR

2.400 kg

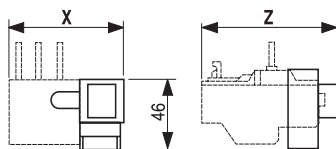


RT5 / 5L

0.875 kg



Remote electrical reset



RTXRR + ...	X	Z
RT1	75	110
RT2	84	121
RT3	108	153
RT4	150	240
RT5	200	196

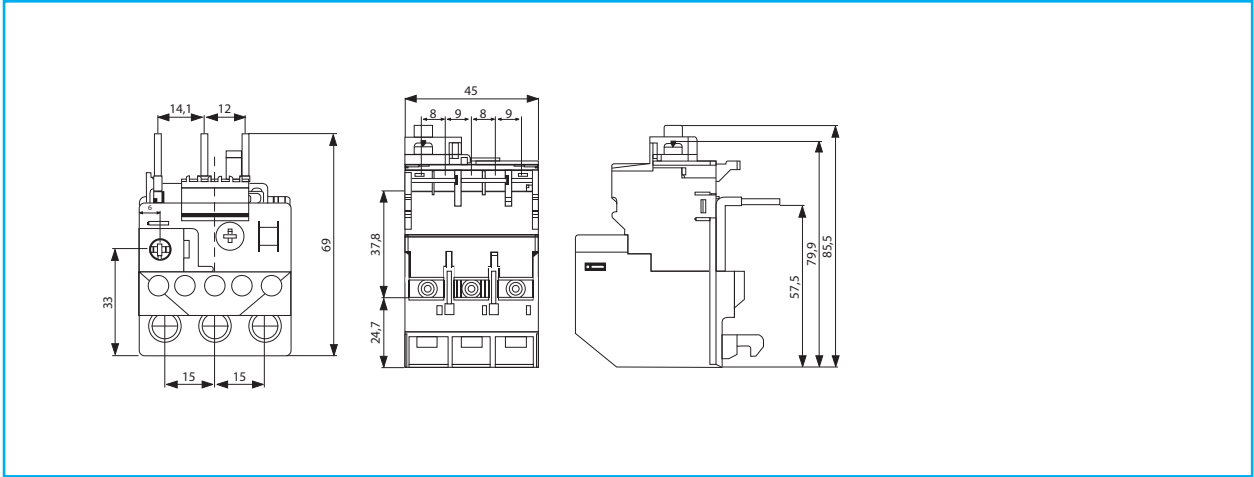
Dimensions in mm (inch = mm x 0.03937) - Weight in kg (lb = kg x 2.2046)



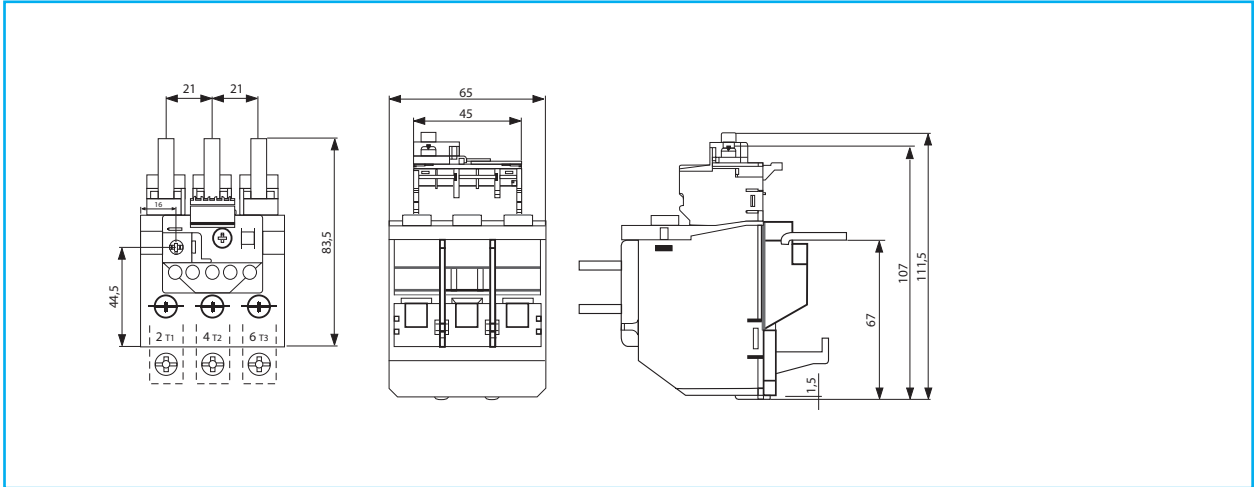
# Series RE

## Dimensional drawings

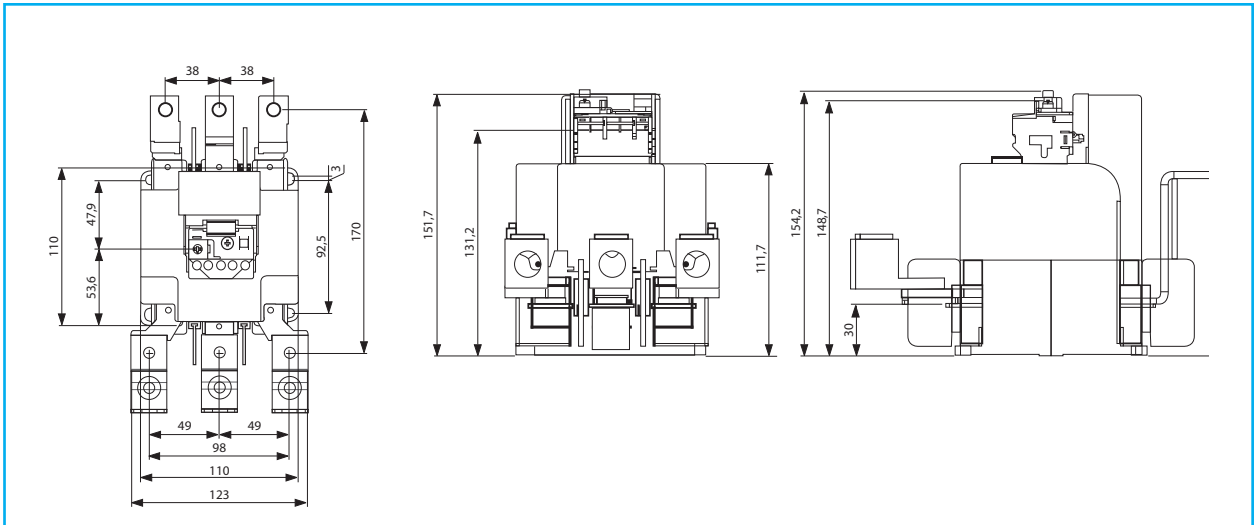
### Frame 1



### Frame 2



### Frame 3



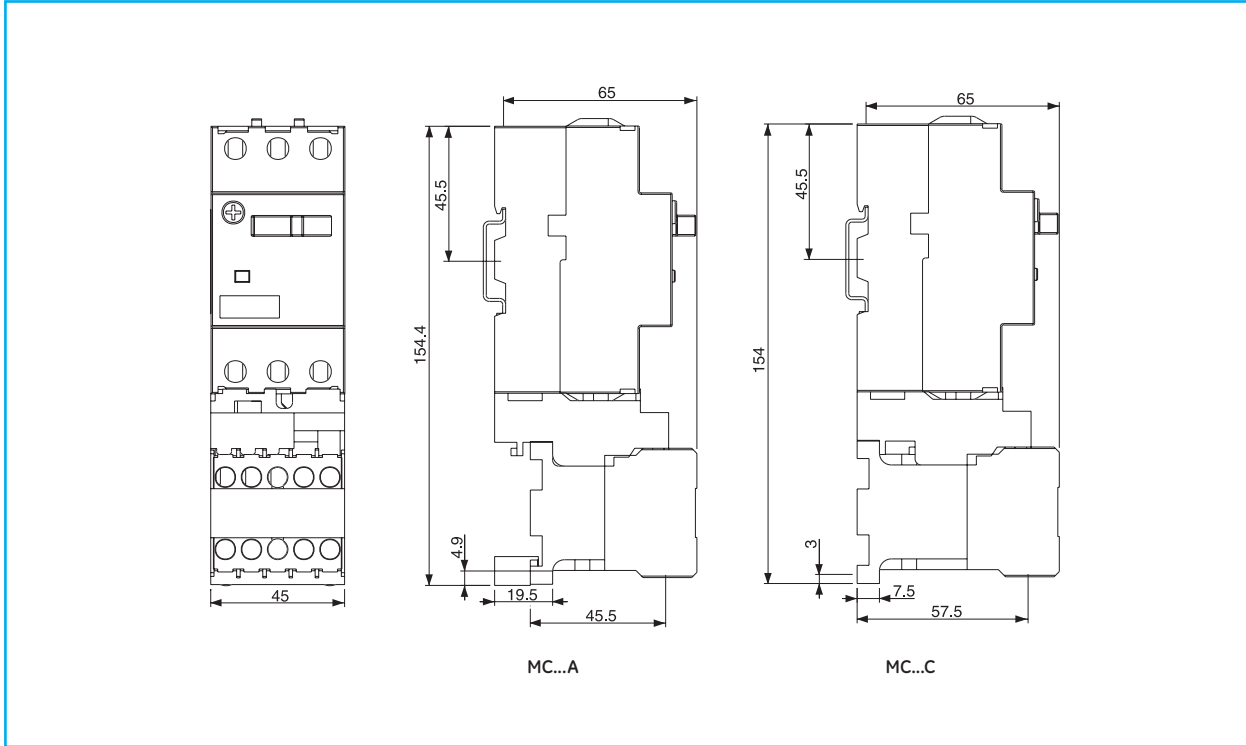
Dimensions in mm (inch = mm x 0.03937) - Weight in kg (lb = kg x 2.2046)



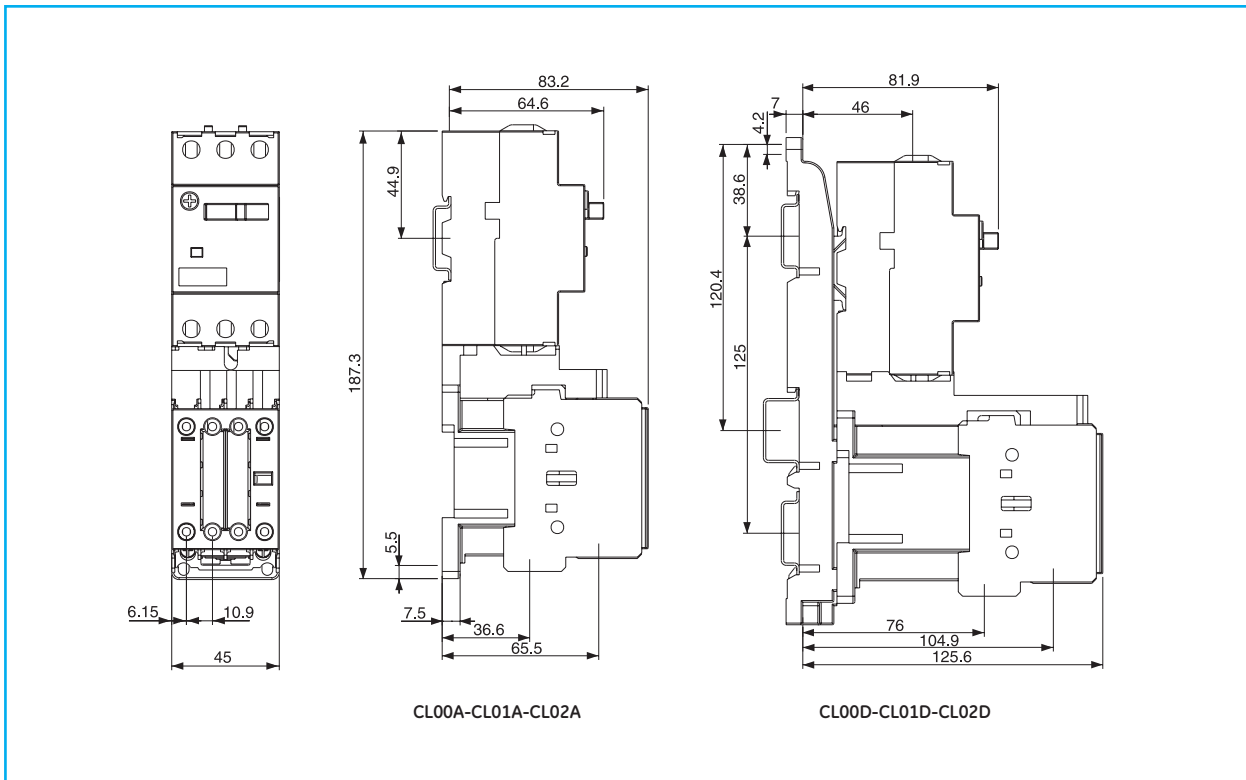


## Dimensional drawings

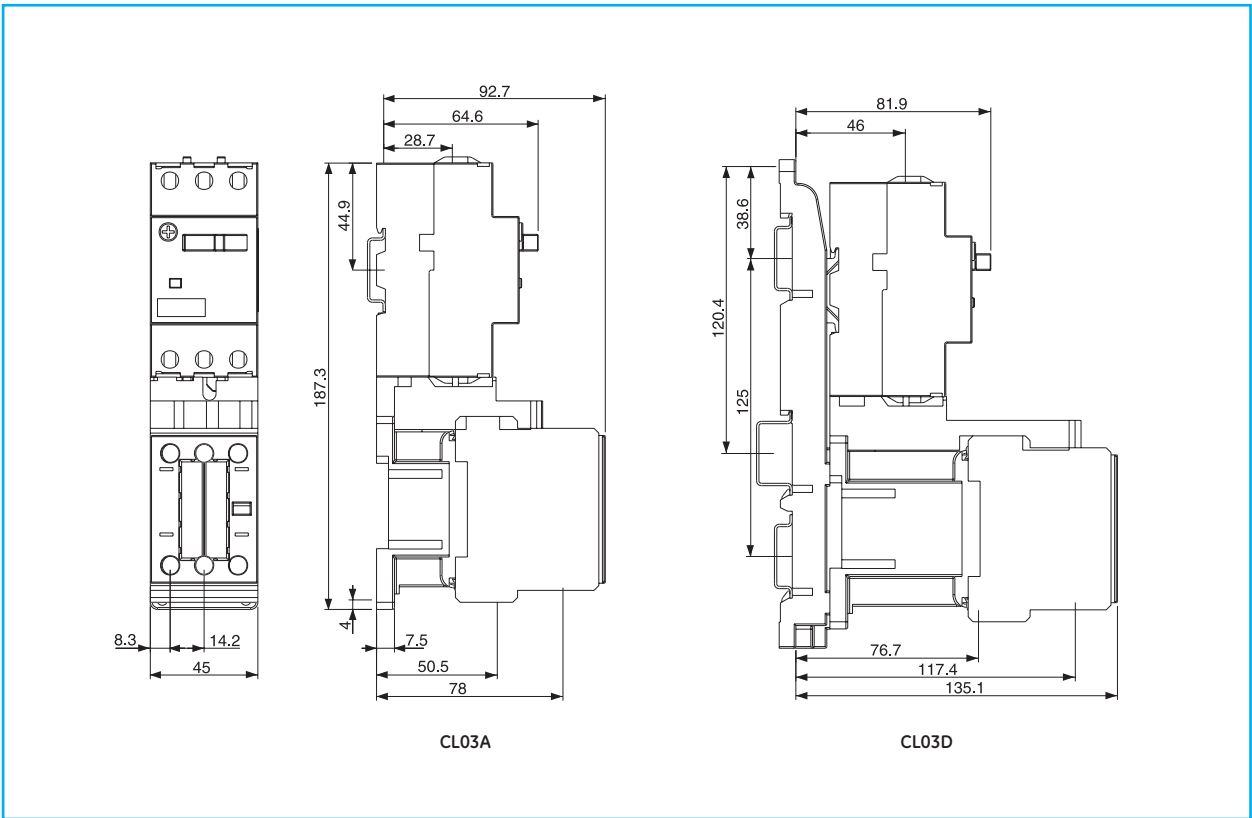
### Fuseless starter - GPS1 rocker + Minicontactor MC



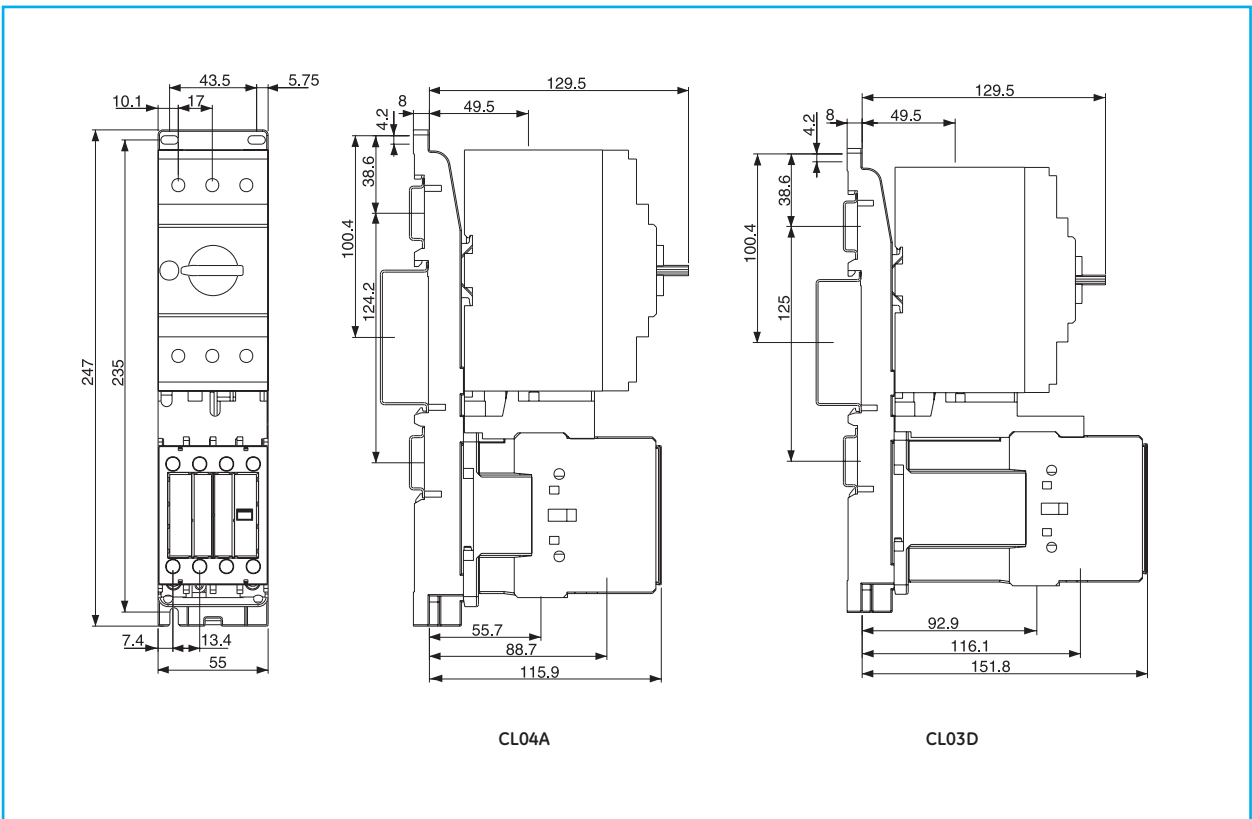
### Fuseless starter - GPS1 rocker + Contactor CL00-CL01-CL02



Fuseless starter - GPS1 rocker + Contactor CL03

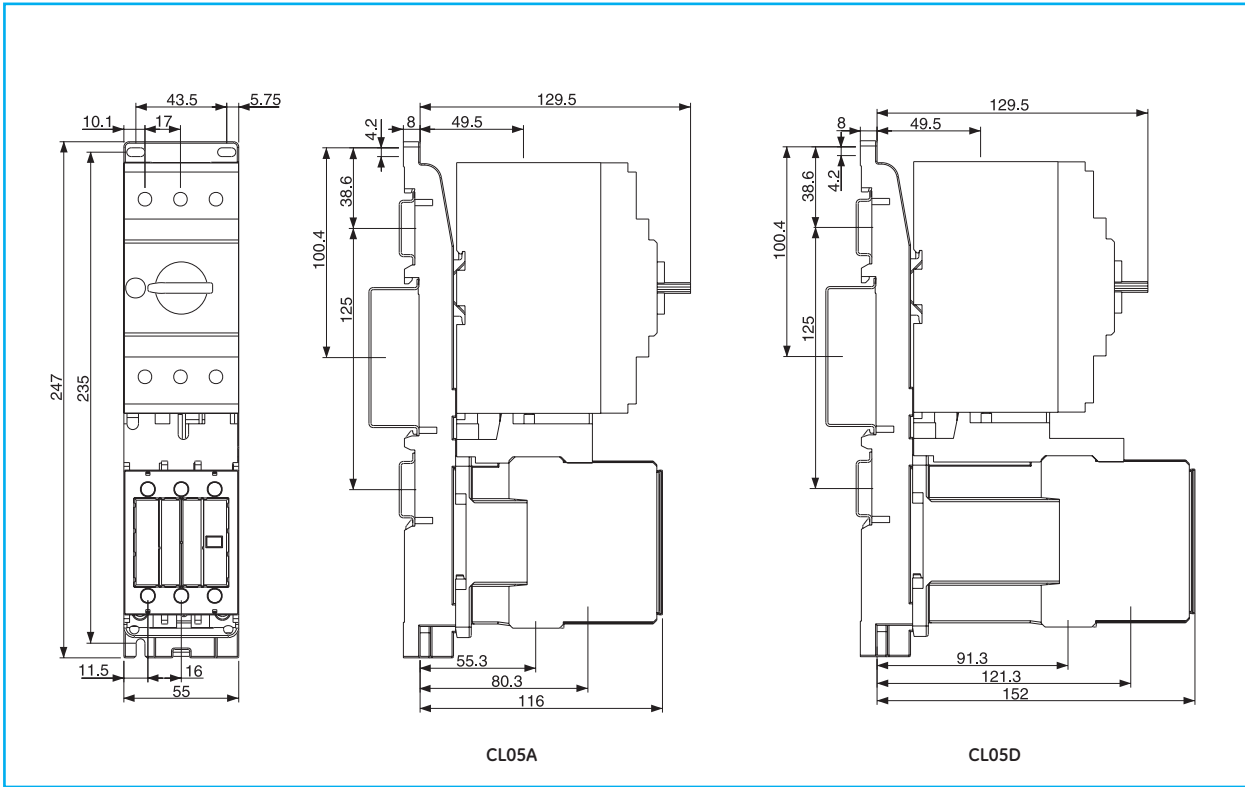


Fuseless starter - GPS2 + Contactor CL04

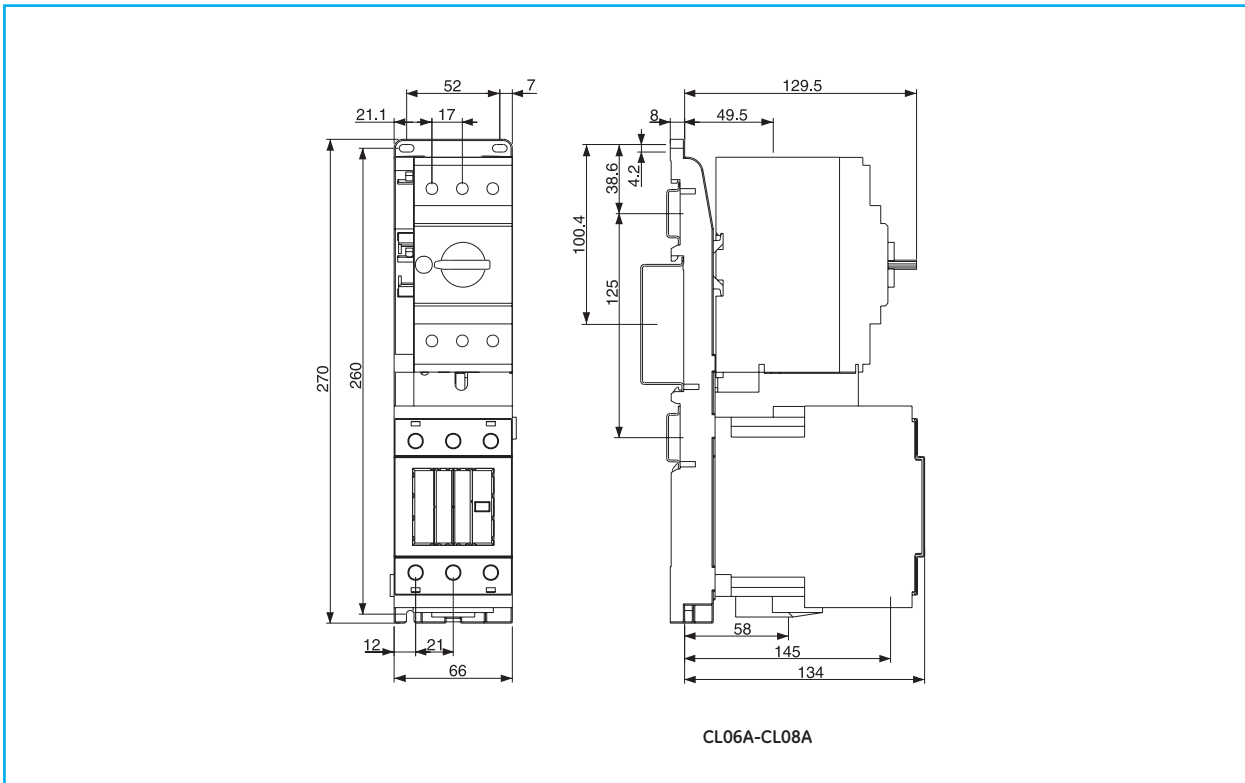


## Dimensional drawings

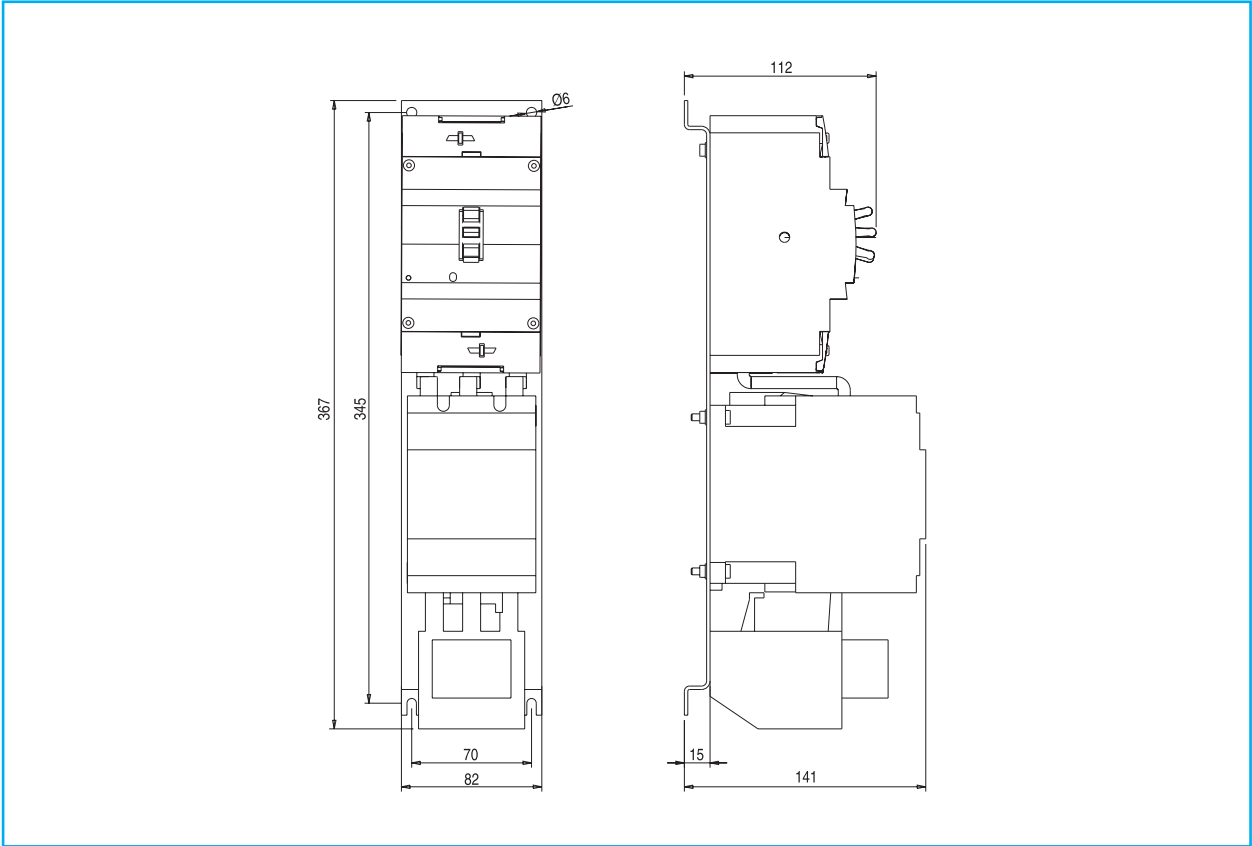
### Fuseless starter - GPS2 + Contactor CL05



### Fuseless starter - GPS2 + Contactor CL06-CL08



Fuseless starter - Record Plus + Contactor CL09 + Thermal overload relay RT2



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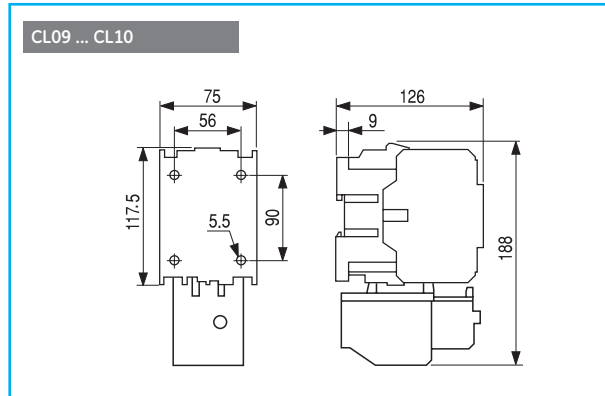
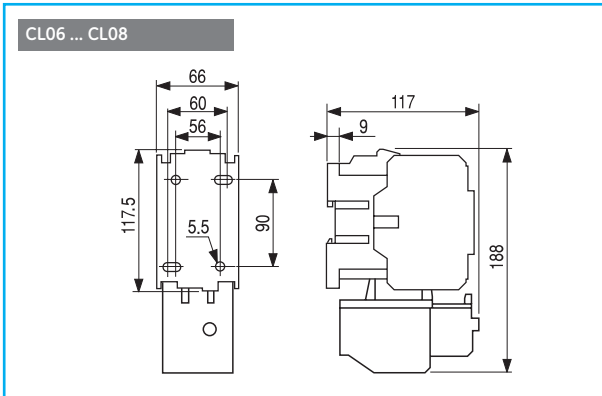
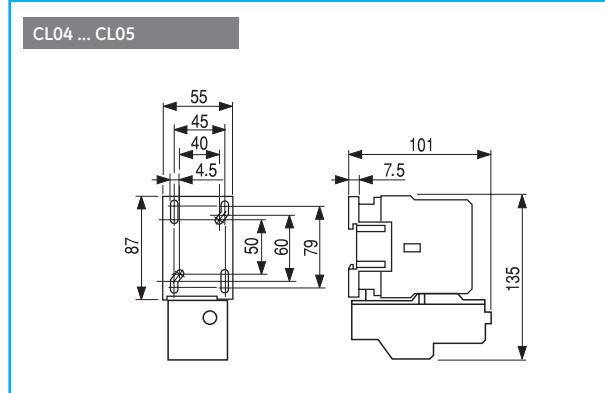
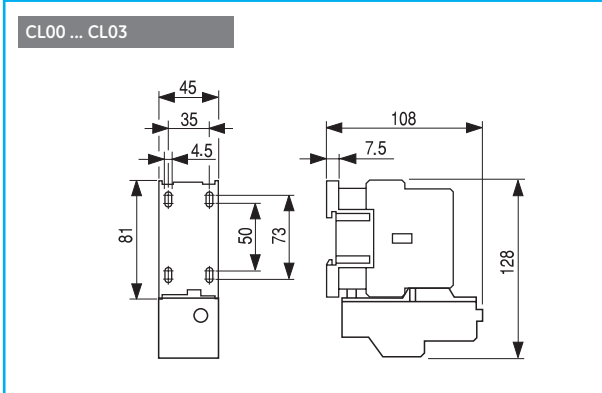
I

X



# Dimensional drawings

## Series CL - Direct-on-line starters



Dimensions

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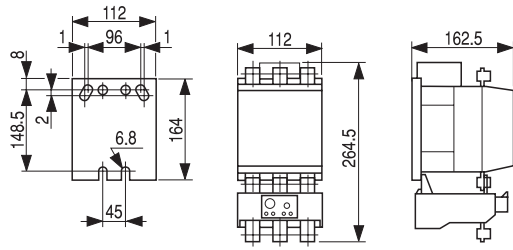
I

X

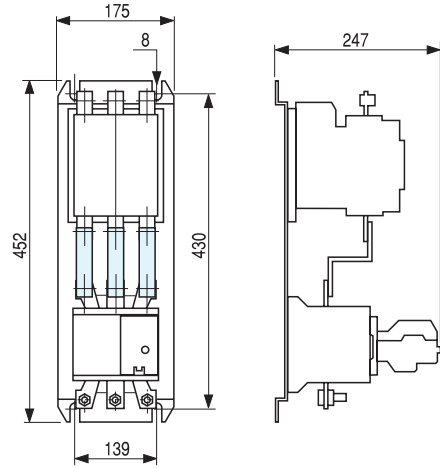


Series CK - Direct-on-line starters

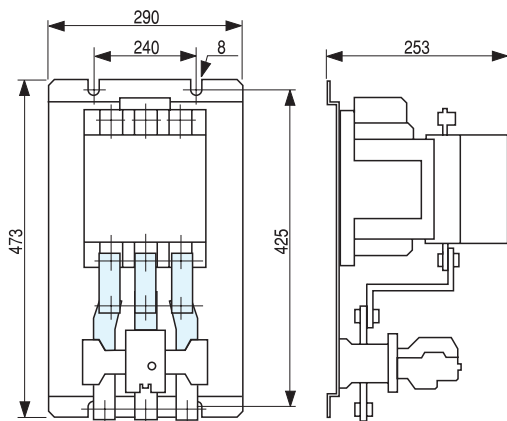
CK75 ... CK08



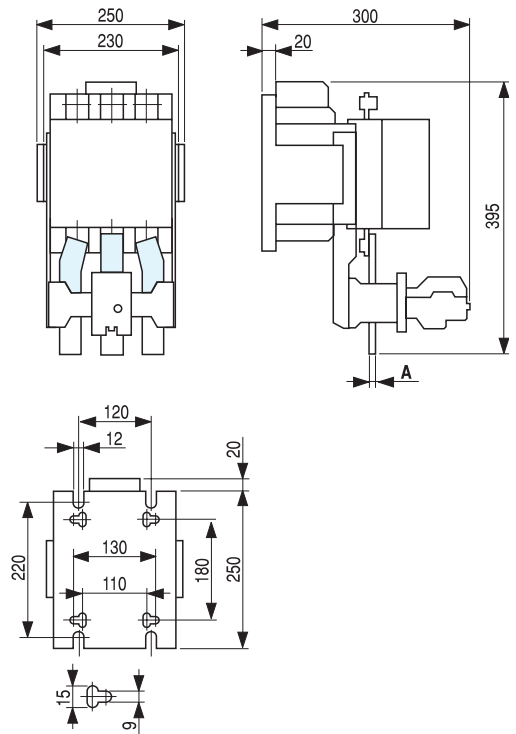
CK85 ... CK95



CK10 ... CK11



CK12



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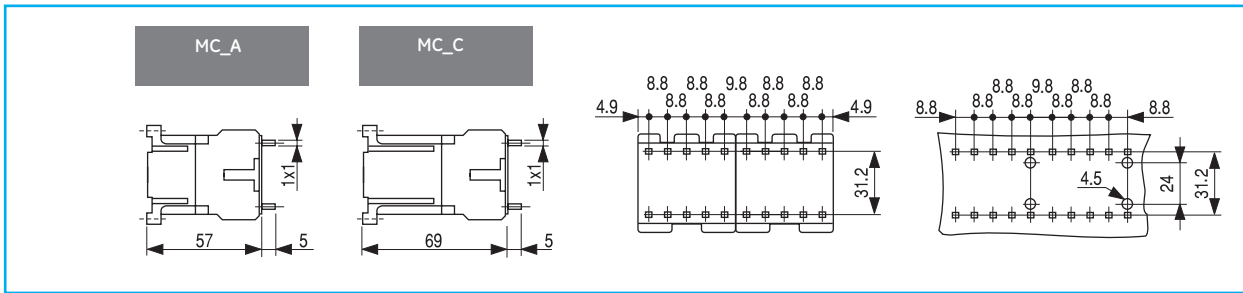
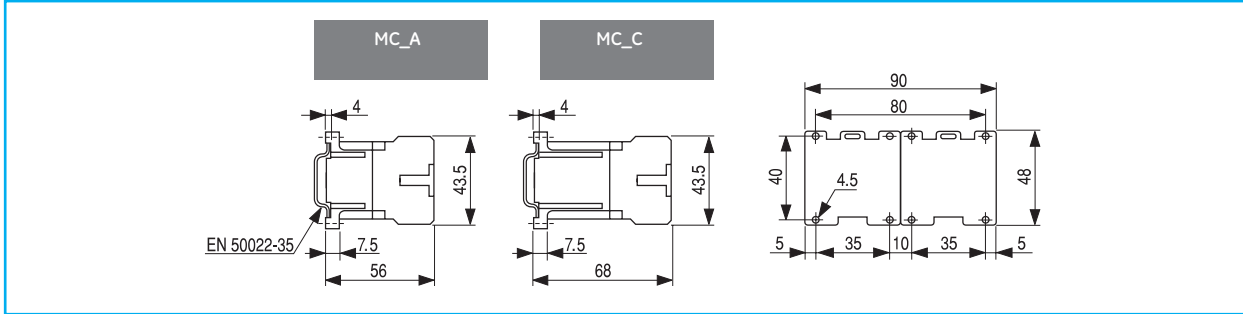
I

X

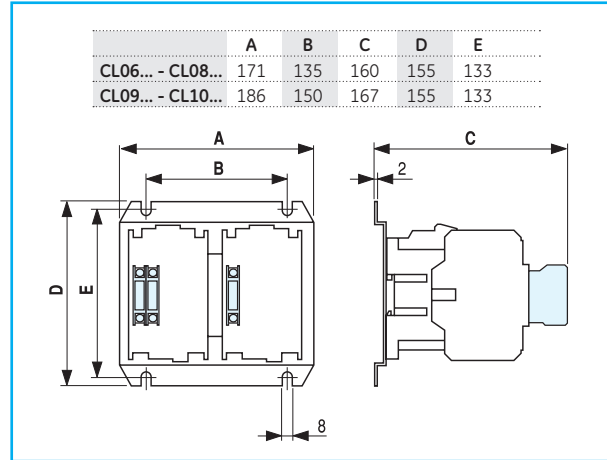
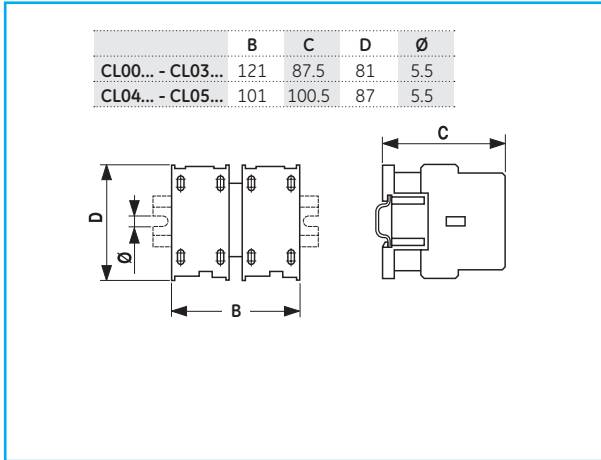


# Dimensional drawings

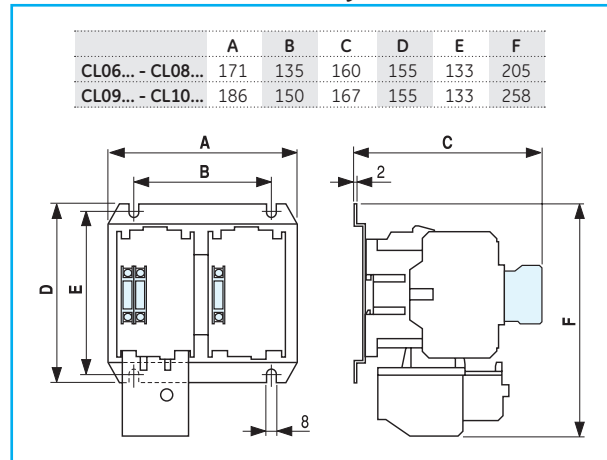
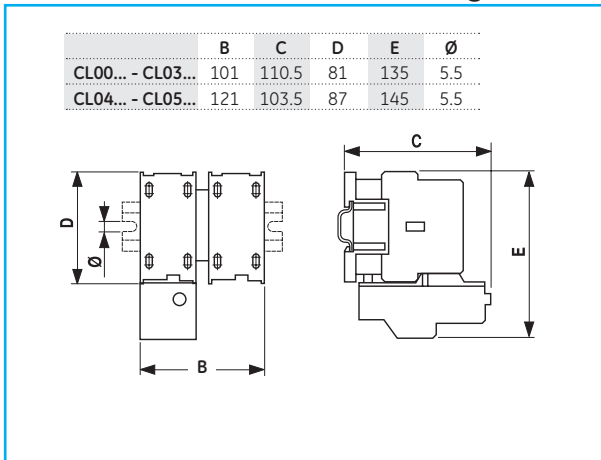
## Series M - Direct-on-line reversing starters



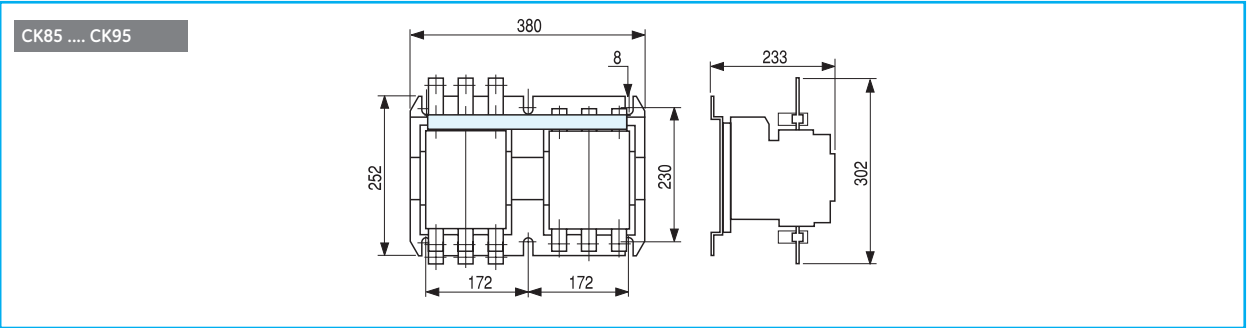
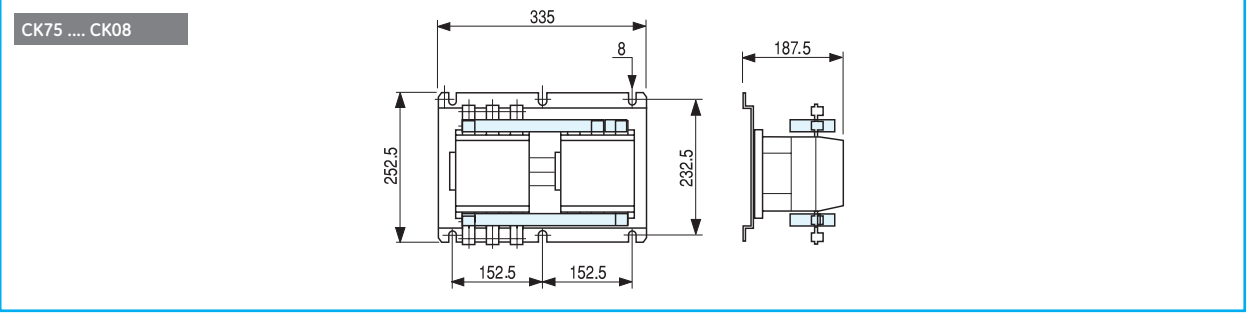
## Series CL - Direct-on-line reversing starters without thermal overload relay



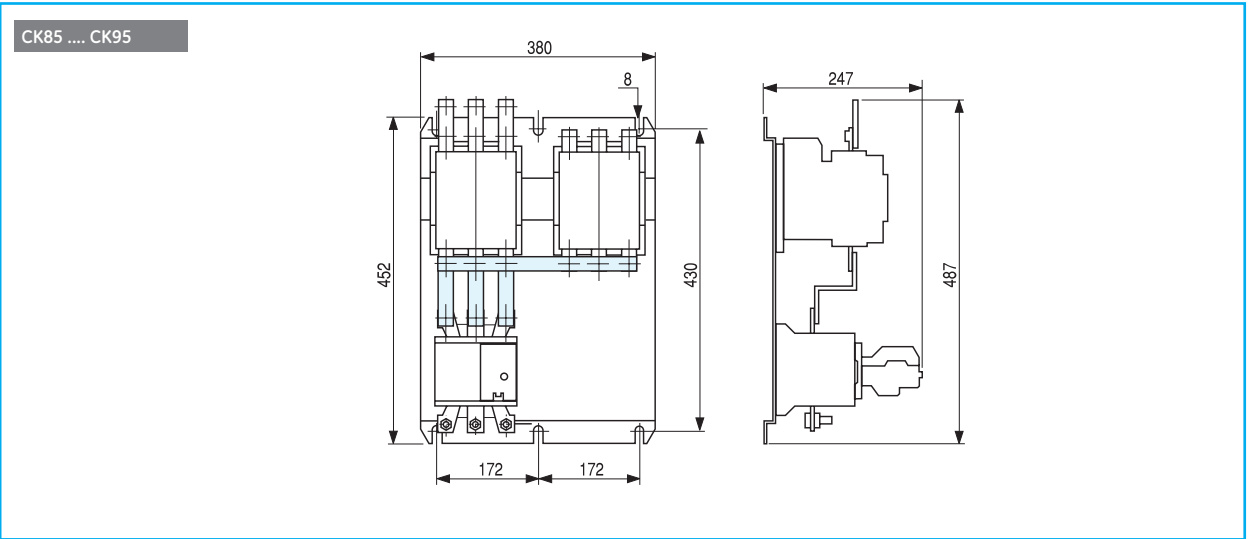
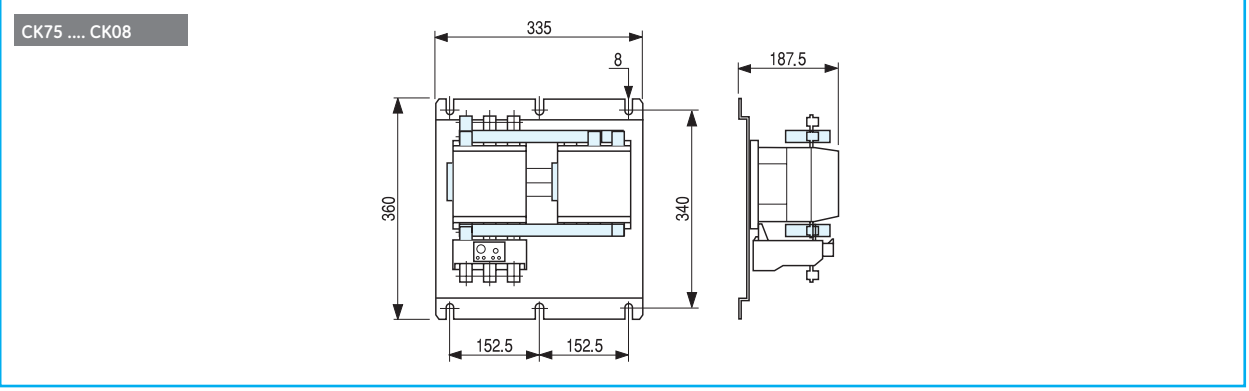
## Series CL - Direct-on-line reversing starters with thermal overload relay



**Series CK - Direct-on-line reversing starters without thermal overload relay**



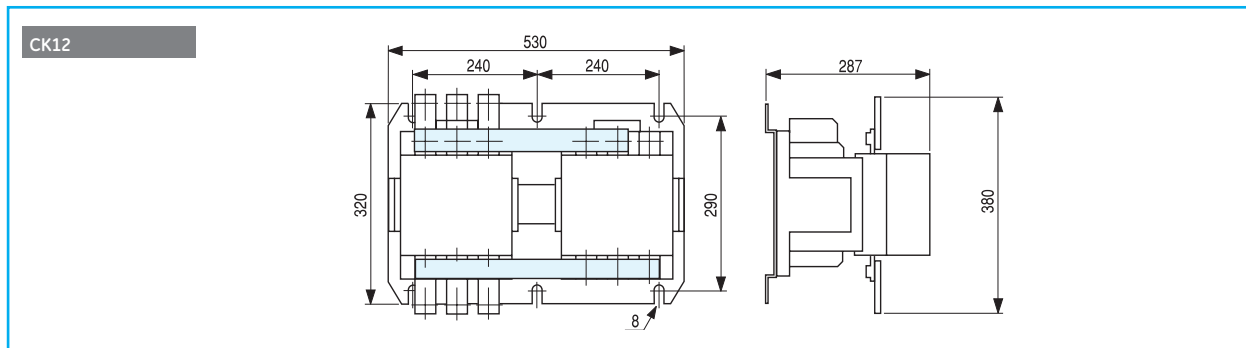
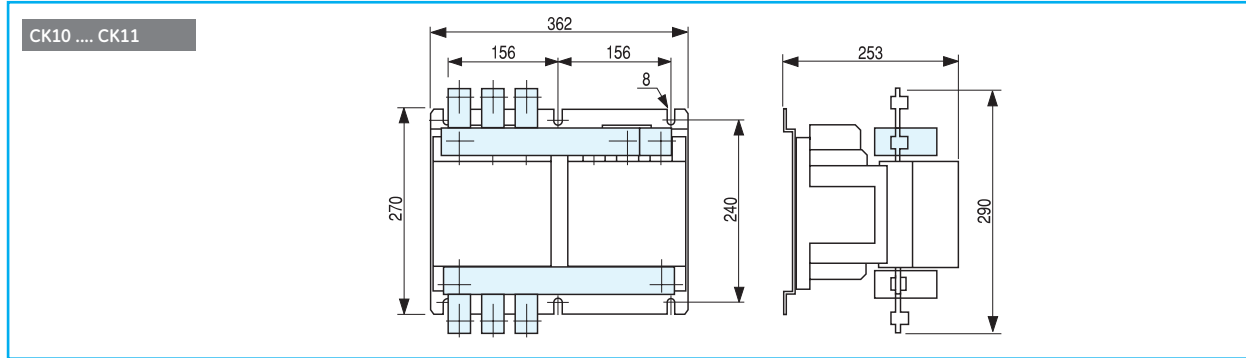
**Series CK - Direct-on-line reversing starters with thermal overload relay**



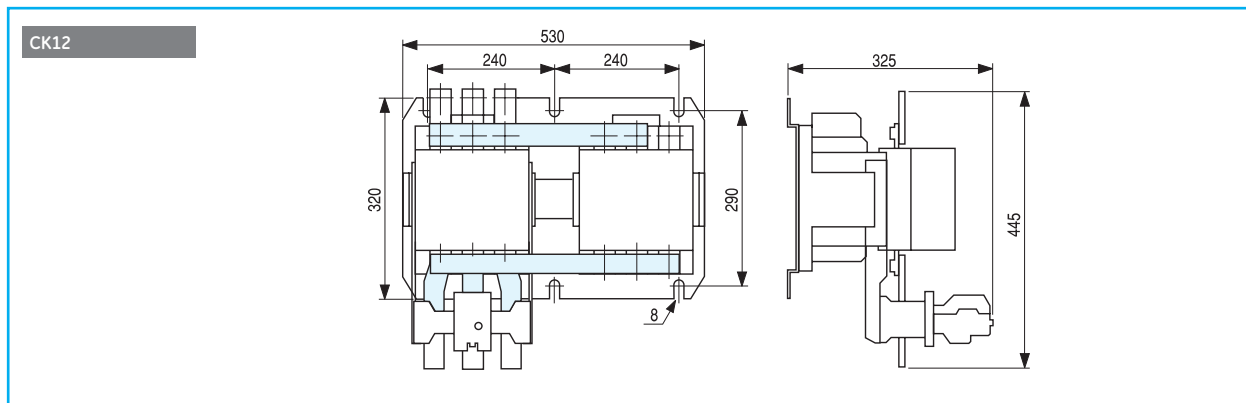
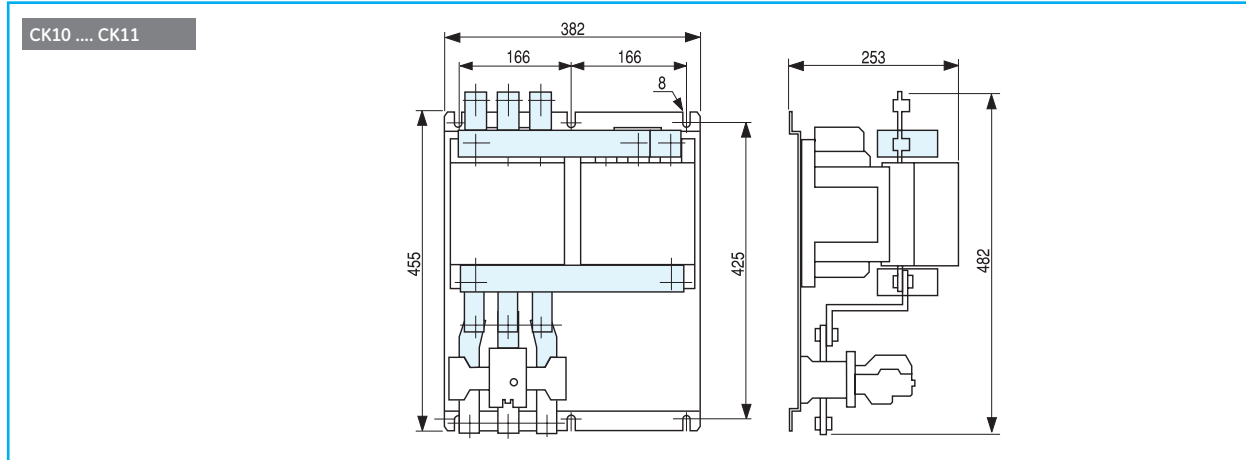


## Dimensional drawings

### Series CK - Direct-on-line reversing starters without thermal overload relay



### Series CK - Direct-on-line reversing starters with thermal overload relay



Series CL - Star-delta starters

	A	B	C	D
CL00... - CL03...	190	180	110.5	135
CL04...	220	210	103.5	145

	A	B	C	D	E	F
CL06... - CL08...	253	217	129	205	155	133
CL09...	263	247	138	247	155	133
CL10...	283	247	151	247	155	133

Series CK - Star-delta starters

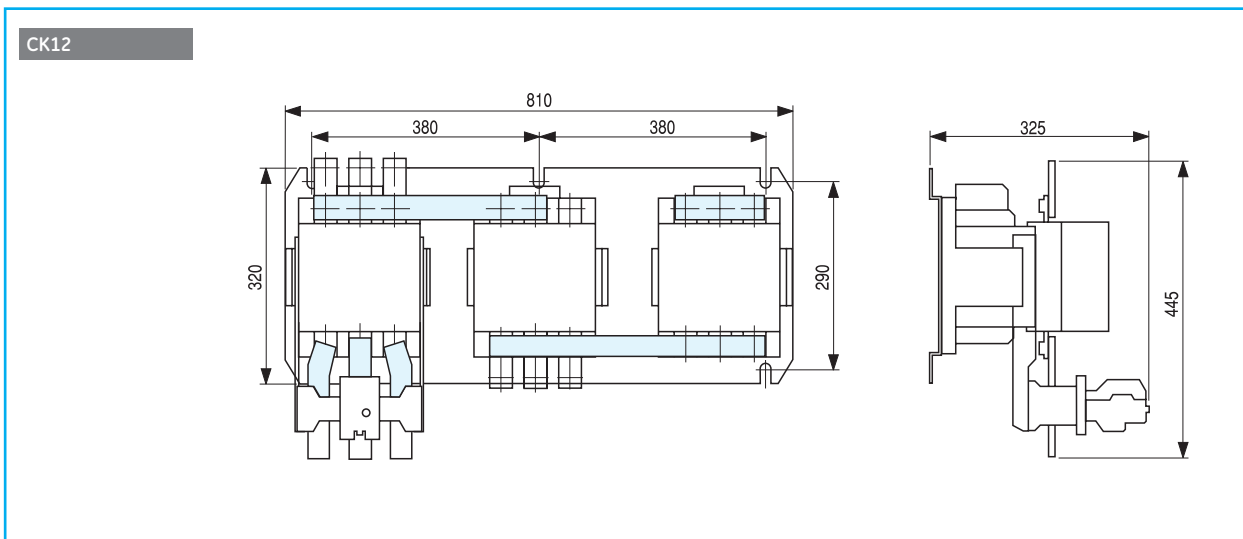
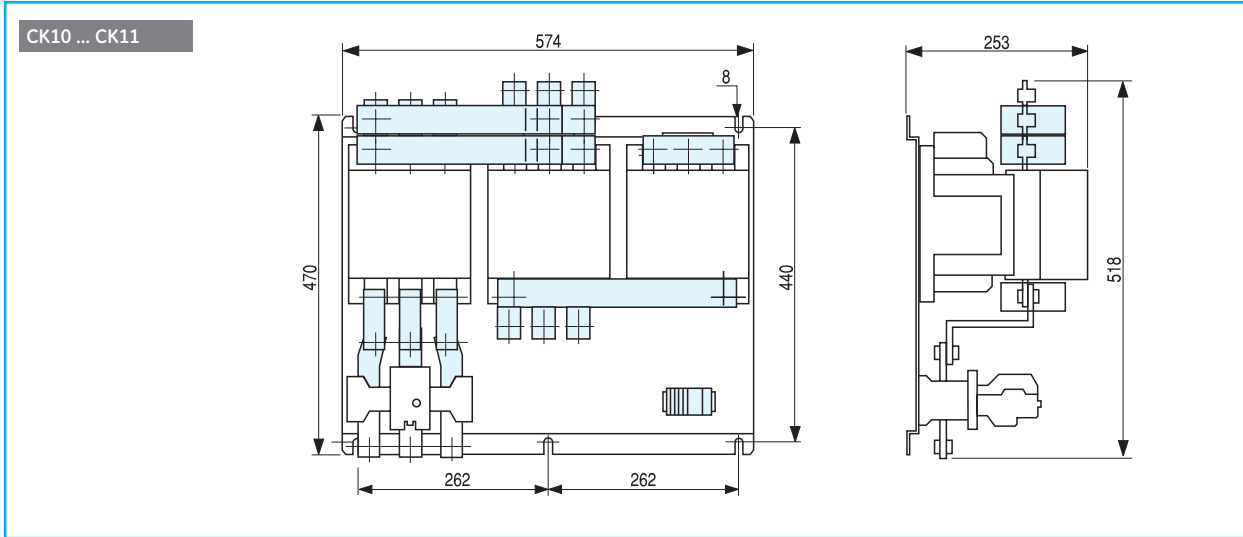
CK75 ... CK08

CK85 ... CK95



# Dimensional drawings

## Series CK - Star-delta starters



Everything is under control

# Plug-in Relays and Auxiliary Contactors

## Order codes

- B.2 Series PRC - Plug-in relays
- B.8 Series M - Auxiliary contactors
- B.14 Series RL - Auxiliary contactors
- B.17 Series EC - Auxiliary contactors

## Series PRC - Plug-in relays

- B.20 Technical data
- B.27 Dimensions

## Series M - Auxiliary contactors

- B.29 Technical data
- B.34 Terminal numbering
- B.37 Dimensions

## POWER DEVICES

Contactors and overload relays

[Auxiliary relays and contactors](#)

## Series RL - Auxiliary contactors

- B.39 Technical data
- B.42 Terminal numbering
- B.45 Dimensions

Motor protection devices

Applications

## AUXILIARY DEVICES

Main switches

## Effcor - Auxiliary contactors

- B.47 Technical data
- B.49 Terminal numbering
- B.51 Dimensions

Control and signalling units

## POWER ELECTRONICS

Speed drive units

Soft starters

## ENCLOSURES

Product overview

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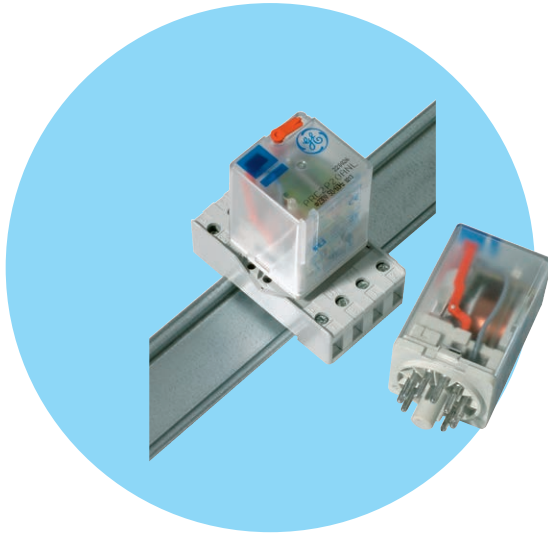
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## Plug-in auxiliary relays

- AC or DC coils
- Lockable test button with mechanical flag indicator.
- Sockets with rear 35mm rail (EN 50022) mounting.
- With LED indicator incorporated.

### Miniature relays

Types	Poles	AC ratings
PRC4M2...	2 CO	12A/250V
PRC4M3...	3 CO	10A/250V
PRC4M4...	4 CO	6A/250V

### Sockets

Types
PRCG-ES15/2N
PRCG-ES15/3N
PRCG-ES15/4N

### Standard 8-11 pin relays

Types	Poles	AC ratings
PRC2P2...	2 CO	10A/250V
PRC3P3...	3 CO	10A/250V

### Sockets

Types
PRZ8
PRZ11

## Approvals

According to types:

Plug-in relays	Sockets
CE	CE
cUL	cUL
VDE	

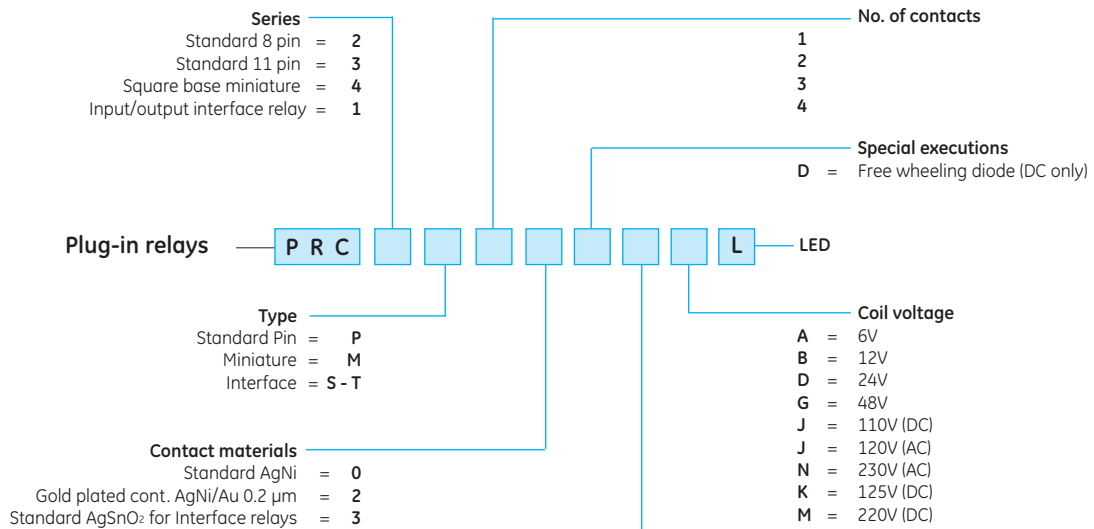
### Interface relay module

Types	Poles	AC ratings
PRC1S1...	1 CO	6A/250V
<b>For use with PLC systems</b>		
PRC1T1...	1 CO	16A/250V
PRC1T2...	2 CO	8A/250V

### Sockets

Types
-
PRCGZT80
PRCGZT80

## Catalogue number structure



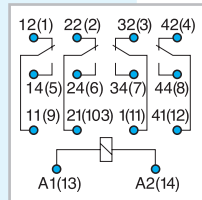
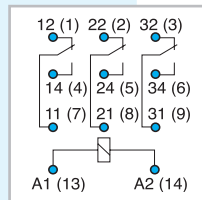
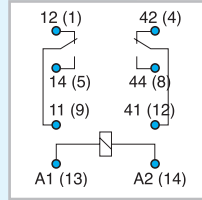
- Order codes ● page B.3
- Modules for sockets ● page B.6
- Technical characteristics ● page B.20
- Dimensions ● page B.27



Miniature plug-in relays



	Ratings AC	Contacts Standard material	Voltage		with LED		Pack.
					Cat. no.	Ref. no.	
2 changeover contacts	12A/250V	0 AgNi	AC 50/60Hz	12V	PRC4M20ABL	220710	10
				24V	PRC4M20ADL	220711	10
				48V	PRC4M20AGL	220712	10
				120V	PRC4M20AJL	220715	10
				230V	PRC4M20ANL	220717	10
				DC	12V	PRC4M20CBL	220713
			24V		PRC4M20CDL	220714	10
			48V		PRC4M20CGL	220716	10
			110V		PRC4M20CJL	220718	10
			125V		PRC4M20CKL	220029	10
			220V		PRC4M20CML	220046	10
			DC Diode	12V	PRC4M20DCBL	220754	10
				24V	PRC4M20DCDL	220755	10
				48V	PRC4M20DCGL	220756	10
				110V	PRC4M20DCJL	220757	10
						125V	PRC4M20DCKL
			220V	PRC4M20DCML	220045	10	
3 changeover contacts	10A/250V	0 AgNi	AC 50/60Hz	12V	PRC4M30ABL	221051	10
				24V	PRC4M30ADL	221052	10
				48V	PRC4M30AGL	221053	10
				120V	PRC4M30AJL	221056	10
				230V	PRC4M30ANL	221058	10
				DC	12V	PRC4M30CBL	221054
			24V		PRC4M30CDL	221055	10
			48V		PRC4M30CGL	221057	10
			110V		PRC4M30CJL	221059	10
			125V		PRC4M30CKL	220031	10
			220V		PRC4M30CML	220048	10
			DC Diode	12V	PRC4M30DCBL	221074	10
				24V	PRC4M30DCDL	221075	10
				48V	PRC4M30DCGL	221076	10
				110V	PRC4M30DCJL	221077	10
						125V	PRC4M30DCKL
			220V	PRC4M30DCML	220047	10	
4 changeover contacts	6A/250V	0 AgNi	AC 50/60Hz	12V	PRC4M40ABL	221809	10
				24V	PRC4M40ADL	221810	10
				48V	PRC4M40AGL	221811	10
				120V	PRC4M40AJL	221814	10
				230V	PRC4M40ANL	221816	10
				DC	12V	PRC4M40CBL	221812
			24V		PRC4M40CDL	221813	10
			48V		PRC4M40CGL	221815	10
			110V		PRC4M40CJL	221817	10
			125V		PRC4M40CKL	220033	10
			220V		PRC4M40CML	220050	10
			DC Diode	12V	PRC4M40DCBL	221851	10
				24V	PRC4M40DCDL	221852	10
				48V	PRC4M40DCGL	221853	10
				110V	PRC4M40DCJL	221854	10
						125V	PRC4M40DCKL
			220V	PRC4M40DCML	220049	10	



Sockets



				Cat. no.	Ref. no.	Pack.
For PRC4M2... 2 changeover contacts	Screw terminals Two levels	Socket Fixing clip Retainer/Extractor Identification plate	Metal White plastic	PRCG-ES15/2N	220912	10
				PRCG1052	220914	10
				PRCMS35	220915	10
				PRCTR1	220916	10
For PRC4M3... 3 changeover contacts	Screw terminals Two levels	Socket Fixing clip Retainer/Extractor Identification plate	Metal White plastic	PRCG-ES15/3N	221442	10
				PRCG1052	220914	10
				PRCMS35	220915	10
				PRCTR1	220916	10
For PRC4M4... 4 changeover contacts	Screw terminals Two levels	Socket Fixing clip Retainer/Extractor Identification plate	Metal White plastic	PRCG-ES15/4N	221934	10
				PRCG1052	220914	10
				PRCMS35	220915	10
				PRCTR1	220916	10

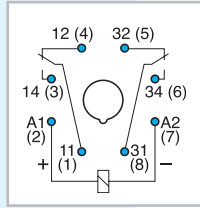


## Standard 8-11 pin plug-in relays

Standard 8 pin  
2 changeover contacts



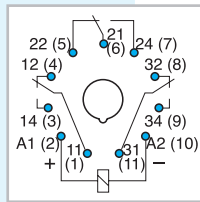
Ratings AC	Contacts Standard material	Voltage		with LED		Pack.
				Cat. no.	Ref. no.	
10A/250V	0 AgNi	AC 50/60Hz	12V	PRC2P20ABL	220019	10
			24V	PRC2P20ADL	220020	10
			48V	PRC2P20AGL	220021	10
			120V	PRC2P20AJL	220024	10
			230V	PRC2P20ANL	220026	10
		DC	12V	PRC2P20CBL	220022	10
			24V	PRC2P20CDL	220023	10
			48V	PRC2P20CGL	220025	10
			110V	PRC2P20CJL	220027	10
			DC Diode	12V	PRC2P20DCBL	220041
		24V		PRC2P20DCDL	220042	10
		48V		PRC2P20DCGL	220043	10
		110V		PRC2P20DCJL	220044	10



Standard 11 pin  
3 changeover contacts



Ratings AC	Contacts Standard material	Voltage		with LED		Pack.	
				Cat. no.	Ref. no.		
10A/250V	0 AgNi	AC 50/60Hz	12V	PRC3P30ABL	220310	10	
			24V	PRC3P30ADL	220311	10	
			48V	PRC3P30AGL	220312	10	
			120V	PRC3P30AJL	220315	10	
			230V	PRC3P30ANL	220317	10	
			DC	12V	PRC3P30CBL	220313	10
				24V	PRC3P30CDL	220314	10
				48V	PRC3P30CGL	220316	10
			DC Diode	110V	PRC3P30CJL	220318	10
		12V		PRC3P30DCBL	220335	10	
		24V		PRC3P30DCDL	220336	10	
		48V		PRC3P30DCGL	220337	10	
		110V		PRC3P30DCJL	220338	10	



## Sockets



For PRC2P20...  
Standard 8 pin

			Cat. no.	Ref. no.	Pack.	
Screw terminals One level	Socket	Fixing clip	PRCZ8	220216	10	
			PRCPZ11	220218	10	
	Solder terminal	Socket	Fixing clip	PRCG8	220217	10
				PRCR159	220219	10

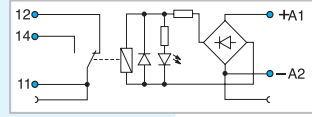
For PRC3P30...  
Standard 11 pin

Screw terminals One level	Socket	Fixing clip	PRCZ11	220647	10	
			PRCPZ11	220218	10	
	Solder terminal	Socket	Fixing clip	PRCG11	220648	10
				PRCR159	220219	10



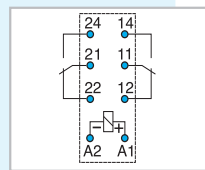
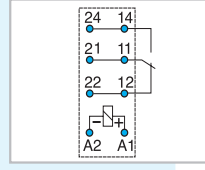
Interface relay

	Ratings AC1	Ratings DC1	Voltage		with LED		Pack.
					Cat. no.	Ref. no.	
6.2mm wide							
1 single pole	6A/250V	-	AC/DC	230V	PRC1S13BNL	222013	10
1 changeover contact	6A/250V	-	DC	12V	PRC1S13CBL	222007	10
				24V	PRC1S13CDL	222008	10
				AC/DC	24V	PRC1S13BDL	222004



Interface relay for PLC systems

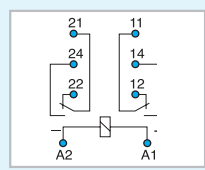
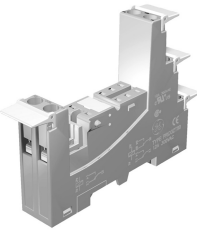
	Ratings AC1	Ratings DC1	Voltage		with LED		Pack.
					Cat. no.	Ref. no.	
1 changeover contact	16A/250V	16A/24V	AC	24V	PRC1T10ADL	221868	10
				120V	PRC1T10AJL	221869	10
				230V	PRC1T10ANL	221870	10
			DC	12V	PRC1T10CBL	221860	10
				24V	PRC1T10CDL	221861	10
				110V	PRC1T10CJL	221862	10
2 changeover contacts	8A/250V	8A/24V	AC	24V	PRC1T20ADL	221883	10
				120V	PRC1T20AJL	221884	10
				230V	PRC1T20ANL	221885	10
			DC	12V	PRC1T20CBL	221875	10
				24V	PRC1T20CDL	221876	10
				110V	PRC1T20CJL	221877	10



Complete set of relay, socket, module (diode+Led for DC-Varistor + Led for AC) and retaining clip + marking plate. 16mm width

Spare parts

		Voltage		Cat. no.	Ref. no.	Pack.	
1 changeover contact	Miniature P.C.B. relays. 16A	AC	24V	PRCT1AD	221896	20	
			120V	PRCT1AJ	221897	20	
			230V	PRCT1AN	221898	20	
		DC	12V	PRCT1CB	221890	20	
			24V	PRCT1CD	221891	20	
			110V	PRCT1CJ	221892	20	
2 changeover contacts	Miniature P.C.B. relays. 8A	AC	24V	PRCT2AD	221913	20	
			120V	PRCT2AJ	221914	20	
			230V	PRCT2AN	221915	20	
		DC	12V	PRCT2CB	221905	20	
			24V	PRCT2CD	221906	20	
			110V	PRCT2CJ	221907	20	
Socket for miniature P.C.B. relays							
Three level screws					PRCGZT80	221918	10
Retainer/Retractor Plate					PRCMS16	221920	10
					PRCTR	221921	10



NOTE: If more than 12A are applied to the relay contact, twin wiring is required. See the connection diagram of the relay

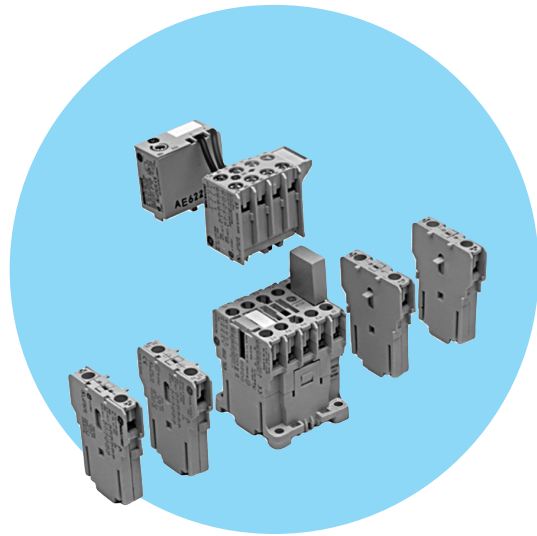




## Modules for sockets

				Color LED	Cat. no.	Ref. no.	Pack.
Diode	Protection against polarity inversion						
	For use with sockets: PRCG-ES15/2N PRCG-ES15/3N PRCG-ES15/4N PRCGZT80		6 / 230V DC		PRCM21P	222100	10
			6 / 230V DC		PRCM21N	222101	10
Diode and LED	Protection against polarity inversion Coil energizing indication						
	For use with sockets: PRCG-ES15/2N PRCG-ES15/3N PRCG-ES15/4N PRCGZT80		6 / 24V DC	Red	PRCM31R	222102	10
			24 / 60V DC	Green	PRCM31G	222104	10
			110 / 230V DC	Red	PRCM32R	222103	10
				Green	PRCM32G	222105	10
	For use with sockets: PRCG-ES15/2N PRCG-ES15/3N PRCG-ES15/4N PRCGZT80		6 / 24V DC	Red	PRCM41R	222110	10
			24 / 60V DC	Green	PRCM41G	222107	10
			110 / 230V DC	Red	PRCM42R	222111	10
				Green	PRCM42G	222124	10
				Red	PRCM43R	222112	10
			Green	PRCM43G	222125	10	
RC group	Arc suppression circuit						
	For use with sockets: PRCG-ES15/2N PRCG-ES15/3N PRCG-ES15/4N PRCGZT80		6 / 24V AC		PRCM51	222113	10
			24 / 60V AC		PRCM52	222114	10
			110 / 240V AC		PRCM53	222115	10
LED and varistor	No protection against polarity inversion Coil energizing indication AC/DC voltage allowed						
	For use with sockets: PRCG-ES15/2N PRCG-ES15/3N PRCG-ES15/4N PRCGZT80		6 / 24V AC	Red	PRCM91R	222116	10
				Green	PRCM91G	222126	10
			110 / 230V AC	Green	PRCM93G	222120	10
Varistor group	No indication Protection against overvoltage						
	For use with sockets: PRCG-ES15/2N PRCG-ES15/3N PRCG-ES15/4N PRCGZT80		24V AC		PRCM71	222121	10
			230V AC		PRCM73	222122	10

Everything is under control



## Auxiliary contactors Ith = 16A

- Control circuit: Alternating current up to 600V  
Direct current up to 250V
- Terminal numbering in accordance with EN 50011
- Fixing system for rapid and simple mounting by clamping onto standard 35mm DIN rail (EN 50022).
- 6kV rated impulse withstand strength
- Screw and push-on terminals protected against accidental contacts in accordance with VDE 0106 T.100 and VBG4.
- Printed circuit version.
- Ring terminal version.
- Facility to mount instant or timed auxiliary contact blocks and voltage suppressor blocks.
- Maximum number of auxiliary contacts to add: 6
- Degree of protection IP20 (EN 60529).
- According to IEC/EN 60947-1.

### Standards

IEC/EN 60947-5-1	BS 4794
IEC/EN 60947-1	CENELEC HD 420
EN 50002	NFC 63-110
EN 50005	NFC 63-140
EN 50011	CSA C22.2/14
UL 508	VDE 0660

### Approvals



Lloyd's Register



Bureau Veritas



RINA

### General data

<b>Maximum number of contacts (MCR...)</b>	4
<b>Rated thermal current (Ith) <math>\theta \leq 60^\circ</math></b>	(A) 16
<b>Rated operational voltage (Ue) acc. IEC 60947-1</b>	(V) 690
<b>Insulation voltage (Ui) acc. IEC 60947-1</b>	(V) 750

#### Utilisation category:

<b>AC-15</b>	<b>V</b>	110	220/240	380/400	415	440	500	660/690
	<b>A</b>	6	6	4	4	3	2.5	1.5

<b>DC-13</b>	<b>V</b>	24	48	110	220
	<b>A</b>	5	3.5	1.2	0.6

### Standard voltages

To complete the catalogue number, replace the symbol  $\blacklozenge$  by the code corresponding to the voltage and frequency of the control circuit.

#### AC Coils

AC	1	2	9	J	K	M	6	7	N	U	W	Y
50/60Hz	24	42	48				220-230	240				
50 Hz				110-115	115-127					380-400	415-440	500
60Hz				110-120		208-220			277	440	480	600

#### Voltage operating limits of dual-frequency coil:

at 60Hz = 0.85 a 1.1 x Us

at 50Hz = 0.8 a 1.1 x Us for uninterrupted duty (ED=100%), temperature = 40°C

#### DC Coils

-	B	D	G	J
<b>Voltage</b>	12	24	48	110

#### DC Wide Range Coils

-	WD	WG	WI	WJ	WL	WN	WS
<b>Voltage</b>	24	48	72	110	125	220	250

#### Operating voltage limits with DC coils:

Standard = 0.8 to 1.1 x Us

Wide range = 0.7 to 1.3 x Us

- Order codes ● page B.9
- Auxiliary contacts blocks ● page B.10
- Accessories ● page B.12
- Technical data ● page B.29
- Dimensions ● page B.37



Auxiliary contactors

	Contacts acc. EN 50011		Control circuit: alternating current			Control circuit: direct current		
	.3	.1	Cat. no. <sup>(1)</sup>	Ref. no. see bottom	Pack.	Cat. no. <sup>(1)</sup>	Ref. no. see bottom	Pack.
	<b>Screw terminal</b>							
	40E	4 0	MCRA040AT	◆	5	MCRC040AT	◆	10
	31E	3 1	MCRA031AT	◆	5	MCRC031AT	◆	10
	22E	2 2	MCRA022AT	◆	5	MCRC022AT	◆	10
	13E	1 3	MCRA013AT	◆	5	MCRC013AT	◆	10
	04E	0 4	MCRA004AT	◆	5	MCRC004AT	◆	10
	<b>Ring terminal</b>							
	40E	4 0	MCRA040AR	◆	5	MCRC040AR	◆	10
	31E	3 1	MCRA031AR	◆	5	MCRC031AR	◆	10
	22E	2 2	MCRA022AR	◆	5	MCRC022AR	◆	10
	13E	1 3	MCRA013AR	◆	5	MCRC013AR	◆	10
	04E	0 4	MCRA004AR	◆	5	MCRC004AR	◆	10
	<b>Terminal: faston 2x2.8 insulated<sup>(2)</sup></b>							
	40E	4 0	MCRA040AF	◆	5	MCRC040AF	◆	10
	31E	3 1	MCRA031AF	◆	5	MCRC031AF	◆	10
	22E	2 2	MCRA022AF	◆	5	MCRC022AF	◆	10
	13E	1 3	MCRA013AF	◆	5	MCRC013AF	◆	10
	04E	0 4	MCRA004AF	◆	5	MCRC004AF	◆	10
	<b>Terminal: printed circuit</b>							
	40E	4 0	MCRA040AI	◆	5	MCRC040AI	◆	10
	31E	3 1	MCRA031AI	◆	5	MCRC031AI	◆	10
	22E	2 2	MCRA022AI	◆	5	MCRC022AI	◆	10
	13E	1 3	MCRA013AI	◆	5	MCRC013AI	◆	10
	04E	0 4	MCRA004AI	◆	5	MCRC004AI	◆	10
	<b>Spare coil</b>		MB0A	◆	10	MB0C	◆	10

(1) To complete the catalogue number, replace the symbol ◆ by the code corresponding to the voltage and frequency of the control circuit. (see pag. B.8).

(2) Terminal: - with wire 1.5mm<sup>2</sup>: Ie = 16A - with wire 1mm<sup>2</sup>: Ie = 10A  
 Insulated terminal type B 2.8x0.8 with wire 1mm<sup>2</sup>: Ie = 8A to DIN 46247  
 Faston terminal 1x6.3 on request, replace the letter F by H in the catalogue number

Auxiliary contactors interface

	Contacts acc. EN 50011		Control circuit: direct current 24V / 1.2W <sup>(3)</sup>			Control circuit: direct current 24V / 2W <sup>(4)</sup>		
	.3	.1	Operating limits from 19 to 30V (0.8-1.25xUs)			Operating limits from 17 to 30V (0.7-1.25xUs)		
	.4	.2	Cat. no.	Ref. no.	Pack.	Cat. no.	Ref. no.	Pack.
	<b>Screw terminal</b>							
	40E	4 0	MCRI040ATD	100530	5	MCRK040ATD	100533	10
	31E	3 1	MCRI031ATD	100531	5	MCRK031ATD	100534	10
	22E	2 2	MCRI022ATD	100532	5	MCRK022ATD	100535	10
	<b>Spare coil</b>		MB0ID	100470	10	MB0KD	100471	10

(3) No possibility of adding instantaneous auxiliary blocks.  
 (4) Facility to mount instantaneous auxiliary contact block of two contacts (MARN2...) or two instantaneous auxiliary contact blocks of one contact (MARL1...).



### Instantaneous auxiliary contacts blocks

Number of contacts	Combination with MCRA040AT ◊ (40E) according to EN 50011	Contacts acc. to EN 50005		Cat. no.	Ref. no.	Pack.
		Designation (block marking)				
<b>Front mounting</b>						
<b>Screw terminal</b>						
2	60E	20	2 0	MARN220AT	100994	10
2	51E	11	1 1	MARN211AT	100993	10
2	42E	02	0 2	MARN202AT	100992	10
<b>Ring terminal</b>						
2	60E	20	2 0	MARN220AR	103349	10
2	51E	11	1 1	MARN211AR	103350	10
2	42E	02	0 2	MARN202AR	103351	10
<b>Screw terminal</b>						
4	80E	40	4 0	MARN440AT	100991	10
4	71E	31	3 1	MARN431AT	100990	10
4	62E	22	2 2	MARN422AT	100989	10
4	53E	13	1 3	MARN413AT	100988	10
4	44E	04	0 4	MARN404AT	100987	10
<b>Ring terminal</b>						
4	80E	40	4 0	MARN440AR	103352	10
4	71E	31	3 1	MARN431AR	103353	10
4	62E	22	2 2	MARN422AR	103354	10
4	53E	13	1 3	MARN413AR	103355	10
4	44E	04	0 4	MARN404AR	103300	10



Intro

A

B

C

D

E

F

G

H

I

X

Instantaneous auxiliary contacts blocks

Order codes

Intro

A

B

C

D

E

F

G

H

I






X

Number of contacts	Combination with MCRA040AT ⬆ (40E) according to EN 50011	Contacts acc. to EN 50005		Cat. no.	Ref. no.	Pack.
		Designation (block marking)				
• One or two blocks to cover combinations of 5 or 6 contacts without increasing the height of the basic unit.						
<b>Front mounting</b>						
<b>Screw terminal</b>						
1	50E	10	1 0	MARL110AT	100513	10
1	-	01	0 1	MARL101AT	100514	10
<b>Ring terminal</b>						
1	50E	10	1 0	MARL110AR	103556	10
1	-	01	0 1	MARL101AR	103557	10
<b>Terminal: Faston 2x2.8 insulated <sup>(1)</sup></b>						
1	50E	10	1 0	MARL110AF	100515	10
1	-	01	0 1	MARL101AF	100516	10
<b>Terminal: printed circuit</b>						
1	50E	10	1 0	MARL110AI	100517	10
1	-	01	0 1	MARL101AI	100518	10
• One or two additional blocks, when 9 or 10 contacts are required (combination possible with the front mounting block) • One or two additional blocks on both sides, to cover up to 8 contacts (combination only possible with lateral blocks)						
<b>Screw terminal</b>						
1	50E	10	1 0	MARL110ATS	100519	10
1	-	01	0 1	MARL101ATS	100520	10
<b>Ring terminal</b>						
1	50E	10	1 0	MARL110ARS	103299	10
1	-	01	0 1	MARL101ARS	103298	10
<b>Terminal: Faston 2x2.8 insulated <sup>(1)</sup></b>						
1	50E	10	1 0	MARL110AFS	100521	10
1	-	01	0 1	MARL101AFS	100522	10
<b>Terminal: printed circuit</b>						
1	50E	10	1 0	MARL110AIS	100523	10
1	-	01	0 1	MARL101AIS	100524	10

(1) Terminal with wire 1mm<sup>2</sup>: Ie = 10A  
 Insulated terminal type B 2.8x0.8 with wire 1mm<sup>2</sup>: Ie = 8A

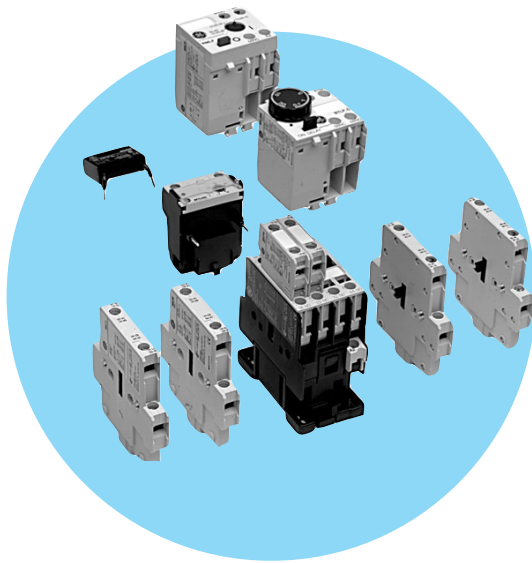


### Accessories

	For use with	Time	Function	Ue	Cat. no.	Ref. no.	Pack.
	Electronic timer block						
	MCR, MC ...	0.5 - 60 sec.	Delay ON	24 to 250V AC/DC	MREBC10AC2	100541	10
	MCR, MC ...	0.2 - 24 sec.	Delay ON	24 to 250V AC/DC	MREBC20AC2	100542	10
	Timer fitment						
	For fixing onto 35mm DIN-rail (EN 5022)				MREBC...	MVB0R	100543
	Voltage suppressor block						
	Connection and (plug-in) fixing onto front of the contactor						
	MCRA, MC ...	RC	AC	12 to 60V 50/60Hz	MPOAAE1	100544	10
	MCRA, MC ...	RC	AC	72 to 250V 50/60Hz	MPOAAE2	100545	10
	MCRC, MC ...	Diode	DC	6 to 250V DC	MPOCAE3	100546	10
	MCRC, MC ...	Varistor	AC/DC	24-48V	MPODAE4	100536	10
	MCRC, MC ...	Varistor	AC/DC	50-127V	MPODAE5	204848	10
MCRC, MC ...	Varistor	AC/DC	130-250V	MPODAE6	204849	10	
	Mechanical interlock						
	Kit comprising mechanical interlock and contactor jointing parts				MCR, MC ...	MMH0	100547
	Identification						
	MCR, MC ...	Sheets of labels (10 sheets of 260 labels each)			EAT 260	100547	10
	MCR, MC ...	Labelling plate base. Plug-in labelling plate bases (50 pieces in one pack)			SPR	100549	10



Everything is under control



## Auxiliary contactors *I<sub>th</sub>* = 20A

- Control circuit: Alternating current up to 690V  
Direct current up to 440V
- Terminal numbering in accordance with EN 50005 and EN 50011
- Fixing system for rapid and simple mounting onto standard 35mm DIN-rail (EN 50022-35)
- Terminals protected against accidental contact in accordance with VDE 0106 T.100, VBG4
- Ring terminal versions
- Three coil terminals
- Facility to mount side and/or front instantaneous contact blocks, timed auxiliary contacts, mechanical latch, voltage suppressor blocks and interface modules.
- Degree of protection IP20 (EN 60529)

### Standards

IEC/EN 60947-5-1	BS 4794
IEC/EN 60947-1	CENELEC HD410
EN 90947	CENELEC HD420
EN 60947	NFC 63-110
EN 50005	NFC 63-140
EN 50011	CSA C22.2/14
UL 508	VDE 0660/102
NEMA ICS 1	

### General data

<b>Maximum number of contacts (RL...)</b>	4
<b>Rated thermal current (I<sub>th</sub>) θ ≤ 55°</b>	(A) 20
<b>Rated operational voltage (U<sub>e</sub>)</b>	(V) 690
<b>Insulation voltage (U<sub>i</sub>)</b>	(V) 1000

#### Utilisation category:

AC-15	V	120	230/220	400/380	440/415	500	690/660
A	10	10	6	5	4	2	

DC-13	V	24	48	110	220	440
A	6	4	2	0.7	0.35	

### Approvals/Marking



### Standard voltages

#### AC Coils

-	1	2	9	J	K	L	6	7	N	U	Y
50/60Hz	24	42	48				220-230	240			
50 Hz				110-115	127					380-400	500
60Hz				110-120		208			277	440	600

#### DC Coils

-	B	D	G	H	J	K	N	T
Voltage	12	24	48	60	110	120-125	220	250

#### DC Wide Range Coils

-	WD	WE	WG	WI	WJ	WN
Voltage	24	33	48	72	110	220

- Order codes page B.15
- Accessories page B.16
- Technical data page B.39
- Dimensions page B.45



Auxiliary contactors

	Contacts				Control circuit: alternating current up to 690V			Control circuit: Direct current up to 440V		
	.3	.1	.7	.5	Cat. no. <sup>(1)</sup>	Ref. no. see bottom	Pack.	Cat. no. <sup>(1)</sup>	Ref. no. see bottom	Pack.
	<b>Screw terminal</b>									
	4	0	0	0	RL4RA040T	◆	5	RL4RD040T	◆	10
	3	1	0	0	RL4RA031T	◆	5	RL4RD031T	◆	10
	2	2	0	0	RL4RA022T	◆	5	RL4RD022T	◆	10
	0	4	0	0	RL4RA004T	◆	5	RL4RD004T	◆	10
	1	1	1	1	RL4RA022G	◆	5	RL4RD022G	◆	10
	<b>Ring terminal</b>									
	4	0	0	0	RL4RA040R	◆	5	RL4RD040R	◆	10
	3	1	0	0	RL4RA031R	◆	5	RL4RD031R	◆	10
	2	2	0	0	RL4RA022R	◆	5	RL4RD022R	◆	10
	0	4	0	0	RL4RA004R	◆	5	RL4RD004R	◆	10
	<b>Spare coil</b>									
	Screw terminal				LB1A	◆	5	LB1D	◆	5
	Ring terminal				LR1A	◆	5	LR1D	◆	5





(1) To complete the catalogue number, replace the symbol ◆ by the code corresponding to the voltage and frequency of the control circuit. (see pg. B.14).

Auxiliary contactors

Instantaneous		Number of contacts	Contacts				Function	Time	Cat. no.	Ref. no.	Pack.
			.3	.1	.7	.5					
	Frontal mounting	<b>Screw terminal</b>									
		1	1	0	0	0		BCLF10	104700	10	
		1	0	1	0	0		BCLF01	104701	10	
		1	0	0	1	0		BCLF10G	104702	10	
		1	0	0	0	1		BCLF01G	104703	10	
		<b>Ring terminal</b>									
1	1	0	0	0		BCRF10	108901	10			
1	0	1	0	0		BCRF01	108902	10			
	Side mounting	<b>Screw terminal</b>									
		2	2	0	0	0		BRL120	104704	10	
		2	1	1	0	0		BRL11	104705	10	
		2	0	2	0	0		BRL02	106622	10	
		<b>Ring terminal</b>									
		2	0	0	1	1	Delayed ON	0.1 - 30 sec.	BTLF30C	104709	10
2	0	0	1	1	Delayed ON	1 - 60 sec.	BTLF60C	104710	10		
2	0	0	1	1	Delayed OFF	0.1 - 30 sec.	BTLF30D	104711	10		
2	0	0	1	1	Delayed OFF	1 - 60 sec.	BTLF60D	104712	10		
	Frontal mounting	<b>Ring terminal</b>									
		2	0	0	1	1	Delayed ON	0.1 - 30 sec.	BTRF30C	108903	10
		2	0	0	1	1	Delayed ON	1 - 60 sec.	BTRF60C	108904	10
		2	0	0	1	1	Delayed OFF	0.1 - 30 sec.	BTRF30D	108905	10
		2	0	0	1	1	Delayed OFF	1 - 60 sec.	BTRF60D	108906	10
		<b>Sealing cover protection for pneumatic timer</b>							BTLFX	113001	5

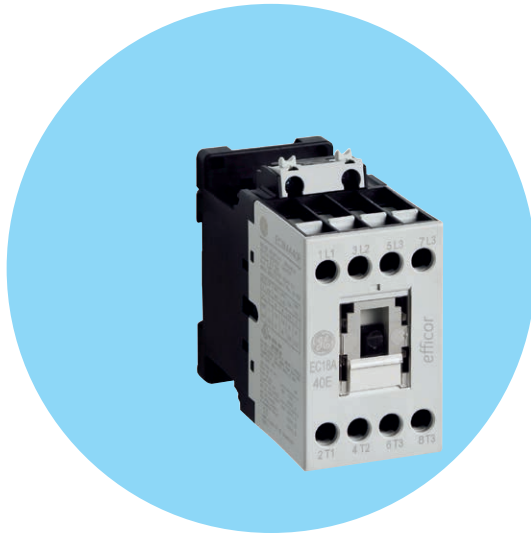


## Accessories

	Number of contacts	Contacts				Cat. no.	Ref. no.	Pack.	
		.3 .4	.1 .2	.7 .8	.5 .6				
 Mechanical interlock	<b>Mechanical</b>								
	-	-	-	-	<b>BELA</b>	104723	5		
	<b>Mechanical / electrical</b>								
	2	0	2	-	<b>BELA02</b>	104724	5		
 Mechanical latch blocks	Frontal mounted to the contactor								
					RL4RA..., RL4RD...	<b>RMLF</b>	see bottom	20	
(1) To complete the catalogue number, replace the symbol © by the code corresponding to the voltage and frequency of the control circuit.									
		<b>D</b>	<b>G</b>	<b>HC</b>	<b>J</b>	<b>N</b>	<b>U</b>	<b>Y</b>	
	<b>50Hz</b>	24, 32	42, 48		110, 115, 120, 127	220, 230, 240	380, 400, 415, 440, 480	500, 660/690	
	<b>60Hz</b>	24, 32	48, 60		110, 115, 120, 127	208, 220, 240, 277	380, 400, 415, 440, 480	600	
	<b>DC</b>	24, 32, 36	42, 48	60, 72	110, 120, 125	220, 230, 240, 250	440		
 Transient voltage suppressor block	<b>For use with</b>	<b>Type</b>		<b>Control circ.</b>	<b>Ue</b>	<b>Cat. no.</b>	<b>Ref. no.</b>	<b>Pack.</b>	
		Directly connected parallel to the coil terminals, allows simultaneous use with auxiliary contact blocks.							
	RL4RA...	R/C	AC	12V ... 48V	<b>BSLR2G</b>	104713	10		
	RL4RA...	R/C	AC	50V ... 127V	<b>BSLR2K</b>	104714	10		
	RL4RA...	R/C	AC	130V ... 250V	<b>BSLR2R</b>	104715	10		
	RL4RD...	Diode	DC		<b>BSLDZ</b>	104719	10		
	RL4RA... RL4RD...	Varistor	AC / DC	24V ... 48V	<b>BSLV3G</b>	104720	10		
	RL4RA... RL4RD...	Varistor	AC / DC	50V ... 127V	<b>BSLV3K</b>	104721	10		
RL4RA... RL4RD...	Varistor	AC / DC	130V ... 250V	<b>BSLV3R</b>	104722	10			
RL4RA... RL4RD...	Varistor	AC / DC	277V ... 500V	<b>BSLV3U</b>	110836	10			
 Identification	<b>For use with</b>				<b>Cat. no.</b>	<b>Ref. no.</b>	<b>Pack.</b>		
	RL4RA..., RL4RD...	Sheets of labels (10 sheets of 260 labels each)			<b>EAT 260</b>	100548	1		
	RL4RA..., RL4RD...	Labelling plate base. Plug-in labelling plate bases (50 pieces in one pack)			<b>SPR</b>	100549	1		
 Electronic timer module	<b>For use with</b>	<b>Control circuit</b>	<b>Function</b>	<b>Time</b>	<b>Cat. no.</b>	<b>Ref. no.</b>	<b>Pack.</b>		
	Directly connected parallel to the coil terminals, allows simultaneous use with auxiliary contact blocks.								
	RL4...	24-250V AC/DC	Delayed ON	0.1 - 2 sec.	<b>BETL02C</b>	113602	5		
	RL4...	24-250V AC/DC	Delayed ON	1.5 - 45 sec.	<b>BETL45C</b>	113603	5		
	RL4...	24-250V AC/DC	Delayed OFF	0.1 - 2 sec.	<b>BETL02D</b>	113604	5		
	RL4...	24-250V AC/DC	Delayed OFF	1.5 - 45 sec.	<b>BETL45D</b>	113605	5		



## Auxiliary contactors Ith = 20A



- Double cage clamp terminals
- Control circuit: Alternating current up to 690V, Direct current up to 440V
- Safe control circuit:
  - High fidelity auxiliary with four points of contact ensuring conductivity
  - Positive guided, mechanically linked contacts according to IEC 60947-5-1
- Wide temperature operation: -40°C to 55°C without derating
- Low noise, 32dBA... No humming noise
- Safer plastics: NF 16-101 and NF 16-102
- Closed design: Protection against pollution
- Terminal numbering in accordance with EN5005 and EN50011
- Fixing system for rapid and simple mounting onto standard 35mm DIN-rail
- Same accessories than Efficor contactor: Facility to mount side and/or front instantaneous contact blocks, timed auxiliary contacts, mechanical latch and voltage suppressor blocks.

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### Standards

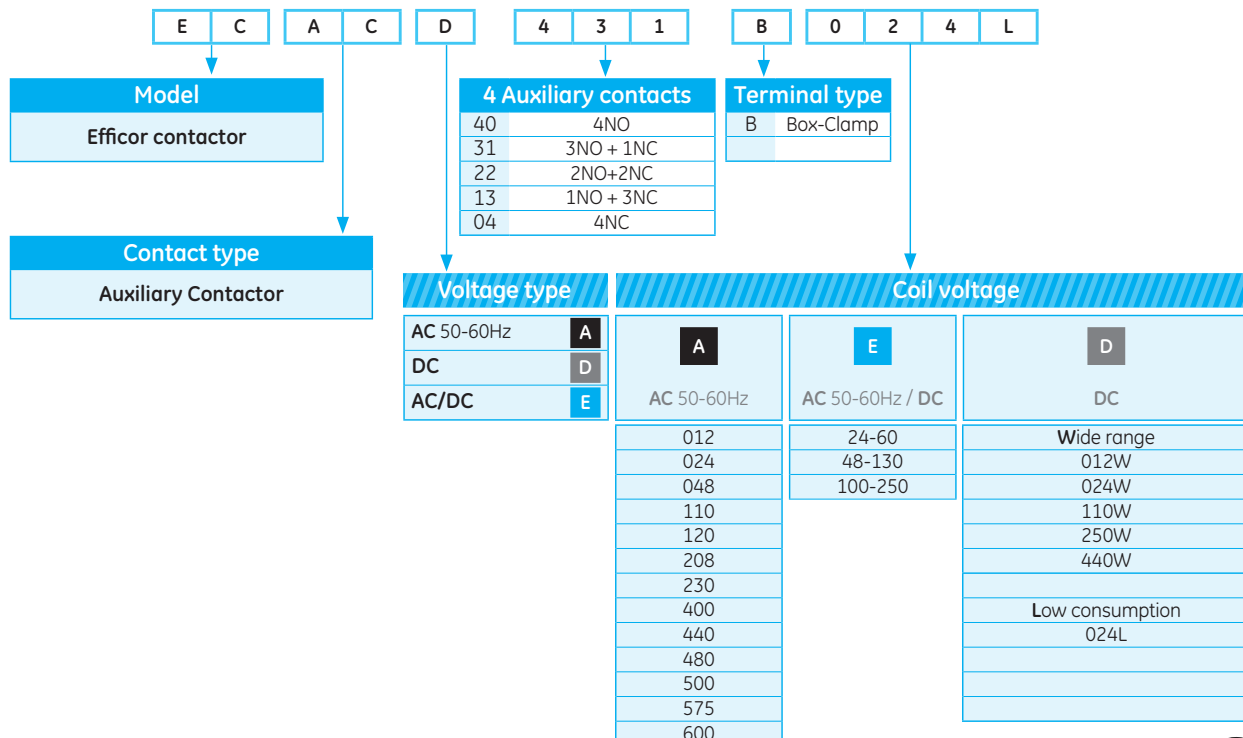
IEC/EN 60947-5-1    ANSI/UL 60947-1  
 IEC/EN 60947-1    ANSI/UL 60947-5-1  
 EN 50005            VDE 0660/102  
 EN 50011  
 EN 45545-2  
 EN50155

### Approval/Marking



### Catalog number configurator

Example: EC AC A 431 B 024 L



## Auxiliary contactors - Double box terminals - Ith 20A



Contacts		Control circuit					
NO 3 4	NC 1 2	AC			Voltage	Cat. no. <sup>[1]</sup>	Ref. no.
		Voltage	Cat. no.	Ref. no.			
4	0	12	ECACA440B012	268140		AC/DC	
4	0	24	ECACA440B024	268141	24-60	ECACE440B24-60	216419
4	0	48	ECACA440B048	268143	48-130	ECACE440B48-130	216420
4	0	110	ECACA440B110	268144	100-250	ECACE440B100-250	216421
4	0	120	ECACA440B120	268145			
4	0	208	ECACA440B208	268146		DC	
4	0	230	ECACA440B230	268147	12	ECACD440B012W	268210
4	0	240	ECACA440B240	268148	24	ECACD440B024W	268211
4	0	400	ECACA440B400	268149	110	ECACD440B110W	268216
4	0	440	ECACA440B440	268150	250	ECACD440B250W	268219
4	0	480	ECACA440B480	268151	440	ECACD440B440W	268220
4	0	500	ECACA440B500	268152			
4	0	600	ECACA440B600	268153	24	ECACD440B024L	268221
3	1	12	ECACA431B012	268154		AC/DC	
3	1	24	ECACA431B024	268155	24-60	ECACE431B24-60	216422
3	1	48	ECACA431B048	268157	48-130	ECACE431B48-130	216423
3	1	110	ECACA431B110	268158	100-250	ECACE431B100-250	216424
3	1	120	ECACA431B120	268159			
3	1	208	ECACA431B208	268160		DC	
3	1	230	ECACA431B230	268161	12	ECACD431B012W	268225
3	1	240	ECACA431B240	268162	24	ECACD431B024W	268226
3	1	400	ECACA431B400	268163	110	ECACD431B110W	268231
3	1	440	ECACA431B440	268164	250	ECACD431B250W	268234
3	1	480	ECACA431B480	268165	440	ECACD431B440W	268235
3	1	500	ECACA431B500	268166			
3	1	600	ECACA431B600	268167	24	ECACD431B024L	268236
2	2	12	ECACA422B012	268168		AC/DC	
2	2	24	ECACA422B024	268169	24-60	ECACE422B24-60	216425
2	2	48	ECACA422B048	268171	48-130	ECACE422B48-130	216426
2	2	110	ECACA422B110	268172	100-250	ECACE422B100-250	216427
2	2	120	ECACA422B120	268173			
2	2	208	ECACA422B208	268174		DC	
2	2	230	ECACA422B230	268175	12	ECACD422B012W	268240
2	2	240	ECACA422B240	268176	24	ECACD422B024W	268241
2	2	400	ECACA422B400	268177	110	ECACD422B110W	268246
2	2	440	ECACA422B440	268178	250	ECACD422B250W	268249
2	2	480	ECACA422B480	268179	440	ECACD422B440W	268250
2	2	500	ECACA422B500	268180			
2	2	600	ECACA422B600	268181	24	ECACD422B024L	268251
1	3	12	ECACA413B012	268182		AC/DC	
1	3	24	ECACA413B024	268183	24-60	ECACE413B24-60	216428
1	3	48	ECACA413B048	268185	48-130	ECACE413B48-130	216429
1	3	110	ECACA413B110	268186	100-250	ECACE413B100-250	216430
1	3	120	ECACA413B120	268187			
1	3	208	ECACA413B208	268188		DC	
1	3	230	ECACA413B230	268189	12	ECACD413B012W	268400
1	3	240	ECACA413B240	268190	24	ECACD413B024W	268401
1	3	400	ECACA413B400	268191	110	ECACD413B110W	268406
1	3	440	ECACA413B440	268192	250	ECACD413B250W	268409
1	3	480	ECACA413B480	268193	440	ECACD413B440W	268410
1	3	500	ECACA413B500	268194			
1	3	600	ECACA413B600	268195	24	ECACD413B024L	268411
0	4	12	ECACA404B012	268196		AC/DC	
0	4	24	ECACA404B024	268197	24-60	ECACE404B24-60	216431
0	4	48	ECACA404B048	268199	48-130	ECACE404B48-130	216432
0	4	110	ECACA404B110	268200	100-250	ECACE404B100-250	216433
0	4	120	ECACA404B120	268201			
0	4	208	ECACA404B208	268202		DC	
0	4	230	ECACA404B230	268203	12	ECACD404B012W	268270
0	4	240	ECACA404B240	268204	24	ECACD404B024W	268271
0	4	400	ECACA404B400	268205	110	ECACD404B110W	268276
0	4	440	ECACA404B440	268206	250	ECACD404B250W	268279
0	4	480	ECACA404B480	268207	440	ECACD404B440W	268280
0	4	500	ECACA404B500	268208			
0	4	600	ECACA404B600	268209			

(1) End character: W = Wide voltage (0.7-1.25xUn) and built-in diode. L = Low consumption.

Technical data, terminal numbering and dimensions are available in chapter A under Effcor.



Spare coils for contactors and auxiliary contactors - Box clamp terminals



Voltage	Use for	Cat. no.	Ref. no.	Pack
12V AC	EC09A...EC18A, ECACA...B	ECCS1A012S	268687	5
24V AC	EC09A...EC18A, ECACA...B	ECCS1A024S	268688	5
48V AC	EC09A...EC18A, ECACA...B	ECCS1A048S	268690	5
110V AC	EC09A...EC18A, ECACA...B	ECCS1A110S	268691	5
120V AC	EC09A...EC18A, ECACA...B	ECCS1A120S	268692	5
208V AC	EC09A...EC18A, ECACA...B	ECCS1A208S	268693	5
230V AC	EC09A...EC18A, ECACA...B	ECCS1A230S	268694	5
240V AC	EC09A...EC18A, ECACA...B	ECCS1A240S	268695	5
400V AC	EC09A...EC18A, ECACA...B	ECCS1A400S	268696	5
440V AC	EC09A...EC18A, ECACA...B	ECCS1A440S	268697	5
480V AC	EC09A...EC18A, ECACA...B	ECCS1A480S	268698	5
500V AC	EC09A...EC18A, ECACA...B	ECCS1A500S	268699	5
575V AC	EC09A...EC18A, ECACA...B	ECCS1A575S	268984	5
600V AC	EC09A...EC18A, ECACA...B	ECCS1A600S	268700	5

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## Technical data

### Sockets for miniature plug-in relays

		PRCG-ES15/2N	PRCG-ES15/3N	PRCG-ES15/4N
		Screw terminals two levels	Screw terminals two levels	Screw terminals two levels
<i>Specifications</i>				
Nominal load	(A)	12 (300V)	10 (300V)	10 (300V)
<i>Dielectric strength</i>				
Adjacent screws	(kV)	3	3	3
Screws - rail	(kV)	3	3	3
<i>Terminals</i>				
Type		Screw M4, Pozidriv	Screw M4, Pozidriv	Screw M3, Pozidriv
Max. torque	(Nm)	0.7	0.7	0.7
<i>Protection category</i>				
Capacity		IP20	IP20	IP20
Flexible wire	Solid wire	(mm <sup>2</sup> )	2x2.5	2x2.5
	Flexible wire	(mm <sup>2</sup> )	22-14 AWG	22-14 AWG
Ambient temperature	(°C)	-40 ... +70	-40 ... +70	-40 ... +70

### Sockets for 8-11 pin standard plug-in relays

		PRCZ8	PRCG08	PRCZ11	PRCG11
		Screw terminals One level	8 pin Solder terminal socket	Screw terminals One level	11 pin Solder terminal socket
<i>Specifications</i>					
Nominal load	(A)	10 (250V)	10 (250V)	10 (250V)	10 (250V)
<i>Dielectric strength</i>					
Adjacent screws	(kV)	2.5	2.5	2.5	2.5
Screws - rail	(kV)	3		3	
<i>Terminals</i>					
Type		Screw M3, Pozidriv	Hard brass tin-plated terminals	Screw M3, Pozidriv	Hard brass tin-plated terminals
Max. torque	(Nm)	0.7		0.7	
<i>Protection category</i>					
Capacity		IP20		IP20	
Flexible wire	Solid wire	(mm <sup>2</sup> )		2x2.5	
	Flexible wire	(mm <sup>2</sup> )		22-14 AWG	
Ambient temperature	(°C)	-40 ... +70		-40 ... +70	

### Sockets for miniature P.C.B. relays

		PRCGZ80	
		Screw terminals Two levels	
<i>Specifications</i>			
Nominal load	(A)	12 (300V)	
<i>Dielectric strength</i>			
Adjacent screws	(kV)	3	
Screws - rail	(kV)	3	
<i>Terminals</i>			
Type		Screw M4, Pozidriv	
Max. torque	(Nm)	0.7	
<i>Protection category</i>			
Capacity		IP20	
Flexible wire	Solid wire	(mm <sup>2</sup> )	2x2.5
	Flexible wire	(mm <sup>2</sup> )	22-14 AWG
Ambient temperature	(°C)	-40 ... +70	



Miniature plug-in relays

		PRC4M20...	PRC4M30...	PRC4M40...
		2 pole	3 pole	4 pole
<b>Contacts</b>				
Number of contacts		2 changeover	3 changeover	4 changeover
Standard material		AgNi	AgNi	AgNi
Optional material		AgNi/Au 5μ	AgNi/Au 5μ	AgNi/Au 5μ
<b>Voltage</b>				
Max. switching voltage	AC/DC (poll. 3)	250V	250V	250V
	AC (poll. 2)	400V	400V	400V
Min. switching voltage	AC/DC	5V	5V	5V
<b>Current</b>				
Rated load	AC1 (A)	12 (250V)	10 (250V AC)	6 (250V AC)
	AC15 (A)	3 (120V) / 1.5 (240V)	3 (120V) / 1.5 (240V)	1.5 (120V) / 0.75 (240V)
	DC1 (A)	10 (24V)	10 (24V)	6 (24V)
	DC13 (A)	0.22 (120V) / 0.1 (250V)	0.22 (120V) / 0.1 (250V)	0.22 (120V) / 0.1 (250V)
Min. switching current	(mA)	5	5	5
Max. inrush current	(A)	24	20	12
Rated current	(A)	12	10	6
Max. breaking capacity	(VA)	3000	2500	1500
Resistance	(mΩ)	≤100	≤100	≤100
		(100mA, 24V)	(100mA, 24V)	(100mA, 24V)
<b>Max. operating frequency</b>				
At rated load	cycles/hour	1200	1200	1200
No load	cycles/hour	18000	18000	18000
<b>Coil</b>				
Rated voltage	AC 50/60Hz (V)	6 ... 240	6 ... 240	6 ... 240
	DC (V)	5 ... 220	5 ... 220	5 ... 220
Must release time	AC	≥0.2 Un	≥0.2 Un	≥0.2 Un
	DC	≥0.1 Un	≥0.1 Un	≥0.1 Un
Operating range of supply voltage		Table 1, 2	Table 1, 2	Table 1, 2
Rated power consumption	AC 50Hz (VA)	1.5	1.6	1.6
	60Hz (VA)	1.3	1.3	1.3
	DC (W)	0.9	0.9	0.9
	AC/DC (W)	-	-	-
<b>Insulation according to EN 60664-1</b>				
Insulation rated voltage	(VAC)	250	250	250
Rated surge voltage	(V)	4000 1.2/50 μs	4000 1.2/50 μs	2500 1.2/50 μs
Overvoltage category		III	III	II
Insulation pollution degree		2	2	2
Dielectric strength	Coil-Contact (VAC)	2500	2500	2500
	Contact-Contact (VAC)	1500	1500	1500
	Pole-Pole (VAC)	2500	2500	2000
Contact coil distance	Clearance (mm)	≥ 2.5	≥ 2.5	≥ 1.6
	Creepage (mm)	≥ 4	≥ 4	≥ 3.2
<b>General data</b>				
Operating time (typical value)	AC (ms)	10	10	10
	DC (ms)	13	13	13
Release time (typical value)	AC (ms)	8	8	8
	DC (ms)	3	3	3
Electrical life	Resistive	≥ 10 <sup>5</sup>	≥ 10 <sup>5</sup>	≥ 10 <sup>5</sup>
		(12A, 250V AC)	(10A, 250V AC)	(6A, 250V AC)
	Cos φ	See curves	See curves	See curves
Mechanical life (cycles)		≥ 10 <sup>7</sup>	≥ 10 <sup>7</sup>	≥ 10 <sup>7</sup>
Ambient temperature	Storage (°C)	-40 ... +85	-40 ... +85	-40 ... +85
	Operating AC (°C)	-40 ... +55	-40 ... +55	-40 ... +55
	DC (°C)	-40 ... +70	-40 ... +70	-40 ... +70
Cover protection category		IP40	IP40	IP40
Shock resistance	(G)	10	10	10
Vibration resistance	(G)	5	5	5
		(for 10...150Hz)	(for 10...150Hz)	(for 10...150Hz)

Table 1. Coil data DC version

Rated voltage V DC	Coil resistance Ω	Coil operating range V DC	
		Min. (at 20°C)	Max. (at 55°C)
12	160	9.6	13.2
24	640	19.2	26.4
48	2600	38.4	52.8
110	13600	88	121
220	54000	176	242

Table 2. Coil data AC 50/60Hz version

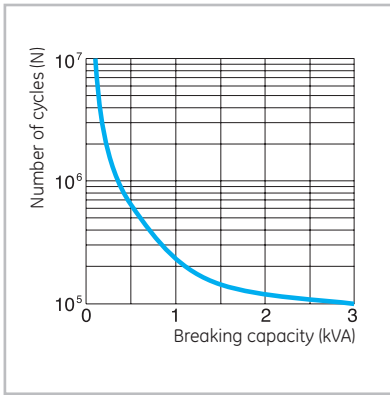
Rated voltage V AC	Coil resistance Ω	Coil operating range V AC	
		Min. (at 20°C)	Max. (at 55°C)
12	39	9.6	13.2
24	158	19.2	26.4
48	640	38.4	52.8
132	3770	96	120
230	16100	184	253



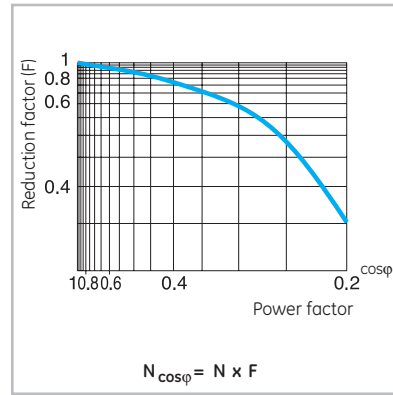
# Series PRC

## Miniature 2 pole plug-in relays

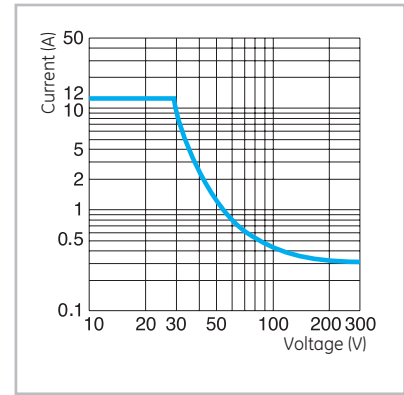
Electrical life at AC resistive load



Electrical life reduction factor at AC inductive load



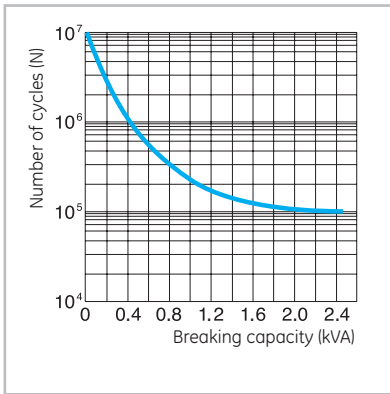
Max. DC resistive load breaking capacity



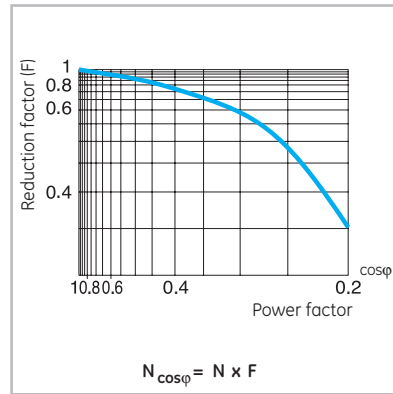
Plug-in relays

## Miniature 3 pole plug-in relays

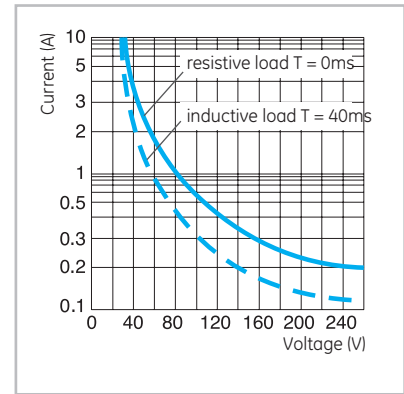
Electrical life at AC resistive load



Electrical life reduction factor at AC inductive load

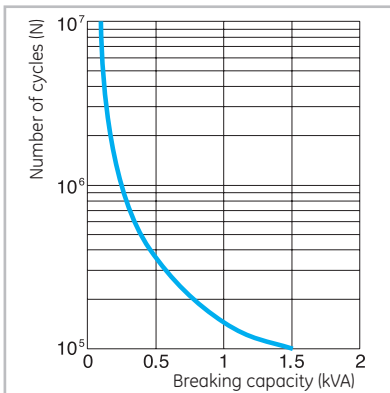


Max. DC load breaking capacity

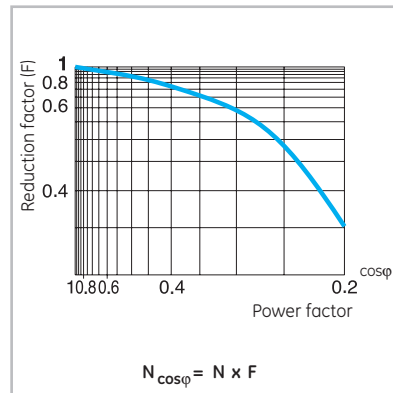


## Miniature 4 pole plug-in relays

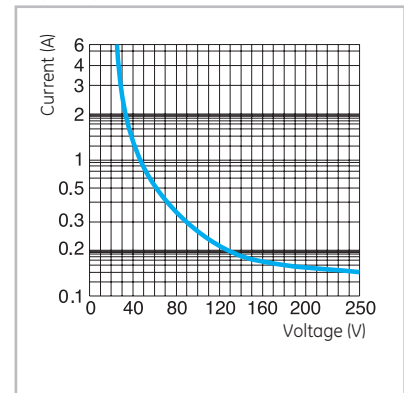
Electrical life at AC resistive load



Electrical life reduction factor at AC inductive load



Max. DC resistive load breaking capacity



Intro

A

B

C

D

E

F

G

H

I

X



Standard 8-11 pin plug-in relays

		PRC2P20...	PRC3P30...	
		Standard 8-pin	Standard 11-pin	
<b>Contacts</b>				
Number of contacts		2 changeover	3 changeover	
Standard material		AgNi	AgNi	
Optional material		AgNi/Au 5μ	AgNi/Au 5μ	
<b>Voltage</b>				
Max switching voltage	AC/DC (poll. 3)	250V	250V	
	AC (poll. 2)	400V	400V	
Min switching voltage AC/DC		10V (AgNi) 5V (AgNi/Au 5μ)	10V (AgNi) 5V (AgNi/Au 5μ)	
<b>Current</b>				
Rated load	AC1 (A)	10 (250V)	10 (250V AC)	
	AC15 (A)	3 (120V) / 1.5 (240V)	3 (120V) / 1.5 (240V)	
	DC1 (A)	10 (24V)	10 (24V)	
	DC13 (A)	0.22 (120V) / 0.1 (250V)	0.22 (120V) / 0.1 (250V)	
Min. switching current (mA)		5	5	
Max. inrush current (A)		30	30	
Rated current (A)		10	10	
Max. breaking capacity (VA)		2500	2500	
Resistance (mΩ)		H100 (100mA, 24V)	H100 (100mA, 24V)	
<b>Max. operating frequency</b>				
At rated load cycles/hour		1200	1200	
No load cycles/hour		12000	12000	
<b>Coil</b>				
Rated voltage	AC 50/60Hz (V)	6 ... 240	6 ... 240	
	DC (V)	6 ... 220	6 ... 220	
Must release time	AC	≥0.15 Un	≥0.15 Un	
	DC	≥0.1 Un	≥0.1 Un	
Operating range of supply voltage		Table 1, 2	Table 1, 2	
Rated power consumption	AC 50Hz (VA)	2.7	2.7	
	60Hz (VA)	2.5	2.5	
	DC (W)	1.5	1.5	
	AC/DC (W)	-	-	
<b>Insulation according to EN 60664-1</b>				
Insulation rated voltage (VAC)		250	250	
Rated surge voltage (V)		4000 12/50 μs	4000 12/50 μs	
Overvoltage category		III	III	
Insulation pollution degree		3	3	
Dielectric strength	Coil-Contact (VAC)	2500	2500	
	Contact-Contact (VAC)	1500	1500	
	Pole-Pole (VAC)	2000	2000	
Distance	Clearance (mm)	≥ 3	≥ 3	
	Creepage (mm)	≥ 4.2	≥ 4.2	
<b>General</b>				
Operating time (typical value)	AC (ms)	12	12	
	DC (ms)	12	12	
Release time (typical value)	AC (ms)	10	10	
	DC (ms)	7	7	
Electrical life		Resistive ≥ 2 × 10 <sup>5</sup> (10A, 250V AC) Cos φ See curves	Resistive ≥ 2 × 10 <sup>5</sup> (10A, 250V AC) See curves	
Mechanical life (cycles)		≥ 2 × 10 <sup>7</sup>	≥ 2 × 10 <sup>7</sup>	
Ambient temperature	Storage (°C)	-40 ... +85	-40 ... +85	
	Operating	AC (°C)	-40 ... +55	-40 ... +55
		DC (°C)	-40 ... +70	-40 ... +70
Cover protection category		IP40	IP40	
Shock resistance (G)		10	10	
Vibration resistance (G)		5	5	

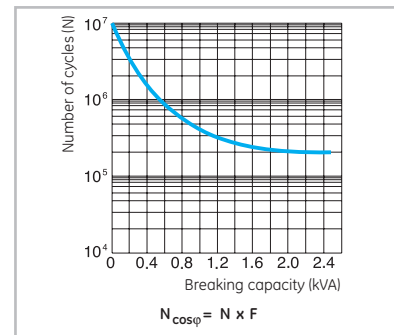
Table 1. Coil data DC version

Rated voltage V DC	Coil resistance Ω	Coil operating range V DC	
		Min. (at 20°C)	Max. (at 55°C)
12	110	9.6	13.2
24	430	19.2	26.4
48	1750	38.4	52.8
110	9200	88	121
220	37000	176	242

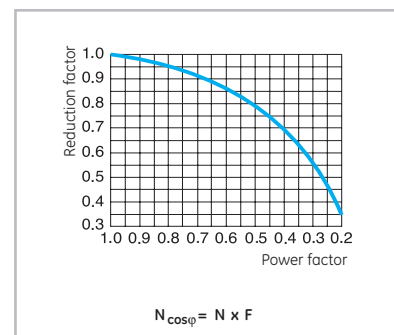
Table 2. Coil data AC 50/60Hz version

Rated voltage V AC	Coil resistance Ω	Coil operating range V AC	
		Min. (at 20°C)	Max. (at 55°C)
12	18.5	9.6	13.2
24	75	19.2	26.4
48	305	38.4	52.8
120	1910	96	132
230	7080	184	253

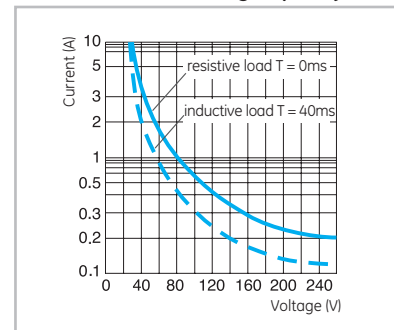
Electrical life at AC resistive load



Electrical life reduction factor at AC inductive load



Max. DC load breaking capacity



## Interface plug-in relays

			PRC1S13...
<b>Contacts</b>			
Number of contacts			1 changeover
Standard material			AgSnO <sub>2</sub>
Optional material			
<b>Voltage</b>			
Max switching voltage	AC/DC (poll. 3)		AC 250V / DC 150V
AC (poll. 2)			AC 400V / DC 300V
Min switching voltage	AC/DC		12V
<b>Current</b>			
Rated load	AC1	(A)	6 (250V)
	DC1	(A)	6 (30V)
Min. switching current		(mA)	10
Max. inrush current		(A)	15
Rated current		(A)	6
Max. breaking capacity		(VA)	1500V
Resistance		(mΩ)	≤100
			(100mA, 24V)
<b>Max. operating frequency</b>			
At rated load			360 cycles/hour
No load			72000 cycles/hour
<b>Coil</b>			
Rated voltage	AC/DC	(V)	24, 230
	AC 50/60Hz	(V)	230
	DC	(V)	12, 24
Must release time	AC		≥0.2 Un
voltage	DC		≥0.1 Un
Operating range of supply voltage			See Table 1
Rated power	AC 50Hz	(VA)	0.6...1.9
consumption	60Hz	(VA)	-
	DC	(W)	0.33
	AC/DC	(W)	0.48 (at 24V), 1.8 (at 230V)
<b>Insulation according to EN 60664-1</b>			
Insulation category			250
Rated surge voltage		(V)	4000 1.2/50 μs
Overvoltage category			III
Insulation pollution degree			3
Insulation rated voltage		(VAC)	400
Dielectric strength	Coil-Contact	(VAC)	4000
	Contact-Contact	(VAC)	1000
	Pole-Pole	(VAC)	-
Distance	Clearance	mm	≥ 8
contact coil	Creepage	mm	≥ 8
<b>General</b>			
Operating time	AC	(ms)	8
(typical value)	DC	(ms)	6
Release time	AC	(ms)	15
(typical value)	DC	(ms)	8
Electrical life	Resistive		
	Cos φ		
Mechanical life (cycles)			20 x 10 <sup>6</sup>
Ambient	Storage	(°C)	-40 ... +70
temperature	Operating AC	(°C)	-20 ... +55
	DC	(°C)	-20 ... +55
Cover protection category			IP20
Shock resistance		(G)	10
Vibration resistance		(G)	0.062" DA
			(10 ... 55Hz)

Table 1. Interface relay

Rated voltage V		Coil operating range V DC	
		Min.	Max.
12	DC	9	17
24	DC	17	30
24	AC/DC	18	30
230	AC	80	250
230	AC/DC	185	250



Interface relay for PLC systems

		PRC1T10...	
<b>Contacts</b>			
Number of contacts		1 changeover	
Standard material		AgNi	
<b>Optional material</b>			
<b>Voltage</b>			
Max. switching voltage	AC/DC	AC 400V / DC 300V	
Min. switching voltage	AC/DC	5V	
<b>Current</b>			
Rated load	AC1	(A)	16 (250V AC)
	DC1	(A)	16 (24V DC)
Min. switching current		(mA)	5
Max. inrush current		(A)	30
Rated current		(A)	16
Max. breaking capacity		(VA)	4000
Min. breaking capacity		(W)	0.3
Resistance		(mΩ)	≤100 (at 1A, 24V)
<b>Max. operating frequency</b>			
At rated load		600 cycles/hour	
No load		72000 cycles/hour	
<b>Coil</b>			
Rated voltage	AC 50/60Hz	(V)	24, 120, 230
	DC	(V)	12, 24, 110
Must release time voltage	AC		≥0.15 Un
	DC		≥0.1 Un
Operating range of supply voltage See Table 1, 2			
Rated power consumption	AC	(VA)	0.75
	DC	(W)	0.4
<b>Insulation</b>			
Insulation category		C250	
Insulation rated voltage		(VAC) 400	
Dielectric strength	Coil-Contact	(VAC)	5000
	Contact-Contact	(VAC)	1000
	Pole-Pole	(VAC)	-
Distance contact coil	Clearance	mm	≥ 10
	Creepage	mm	≥ 10
<b>General</b>			
Operating time (typical value)	AC	(ms)	7
	DC	(ms)	7
Release time (typical value)	AC	(ms)	5
	DC	(ms)	3
Electrical life	Resistive	(s)	≥ 0.7 × 10 <sup>5</sup> (at 16A, 250VAC)
	Cos φ		See curves
	L/R = 40ms		≥ 10 <sup>5</sup> (at 0.12A, 220VDC)
Mechanical life (cycles)		3 × 10 <sup>7</sup>	
Ambient temperature	Storage	(°C)	-40 ... +70
	Operating	(°C)	-40 ... +70
Cover protection category		IP40	
Shock resistance		(G) 30	
Vibration resistance		(G) 10 (for 10 ... 150Hz)	

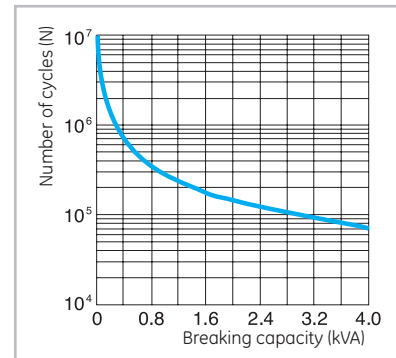
Table 1. Coil data DC version

Rated voltage V DC	Coil resistance (±10%) at 20°C Ω	Coil operating range V DC	
		U Min.	U Max.
12	360	8.4	30.6
24	1440	16.8	61.2
110	25200	77	280

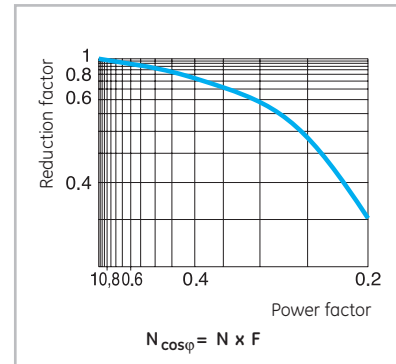
Table 2. Coil data AC 50/60Hz version

Rated voltage V AC	Coil resistance (±10%) at 20°C Ω	Coil operating range V AC	
		U Min.	U Max.
24	400	19.2	28.8
120	10200	96	144
230	38500	184	276

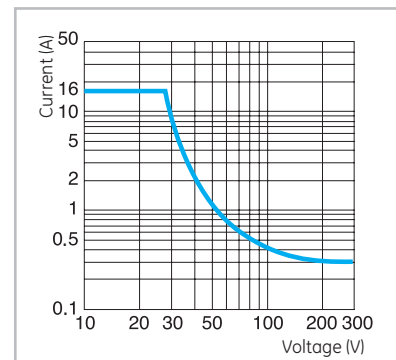
Electrical life at AC resistive load



Electrical life reduction factor at AC inductive load



Max. DC load breaking capacity



## Interface relay for PLC systems

		PRC1T20...	
<b>Contacts</b>			
Number of contacts		2 changeover	
Standard material		AgNi	
Optional material			
<b>Voltage</b>			
Max. switching voltage	AC/DC	AC 400V / DC 300V	
Min. switching voltage	AC/DC	5V	
<b>Current</b>			
Rated load	AC1	(A)	8 (250V AC)
	DC1	(A)	8 (24V DC)
Min. switching current		(mA)	5
Max. inrush current		(A)	15
Rated current		(A)	8
Max. breaking capacity		(VA)	2000
Min. breaking capacity		(W)	0.3
Resistance		(mΩ)	≤100 (at 1A, 24V)
<b>Max. operating frequency</b>			
At rated load		600 cycles/hour	
No load		72000 cycles/hour	
<b>Coil</b>			
Rated voltage	AC 50/60Hz	(V)	24, 230
	DC	(V)	12, 24
Must release time	AC		≥0.15 Un
voltage	DC		≥0.1 Un
Operating range of supply voltage			See Table 1, 2
Rated power	AC	(VA)	0.75
consumption	DC	(W)	0.4
<b>Insulation</b>			
Insulation category			C250
Insulation rated voltage		(VAC)	400
Dielectric strength	Coil-Contact	(VAC)	5000
	Contact-Contact	(VAC)	1000
	Pole-Pole	(VAC)	-
Distance	Clearance	mm	≥ 10
	contact coil Creepage	mm	≥ 10
<b>General</b>			
Operating time	AC	(ms)	7
(typical value)	DC	(ms)	7
Release time	AC	(ms)	5
(typical value)	DC	(ms)	3
Electrical life	Resistive	(s)	≥ 0.7 × 10 <sup>5</sup> (at 8A, 250VAC)
	Cos φ		See curves
	L/R = 40ms		≥ 10 <sup>5</sup> (at 0.12A, 220VDC)
Mechanical life (cycles)			3 × 10 <sup>7</sup>
Ambient temperature	Storage	(°C)	-40 ... +70
	Operating	(°C)	-40 ... +70
Cover protection category			IP40
Shock resistance		(G)	20
Vibration resistance		(G)	10 (for 10 ... 150Hz)

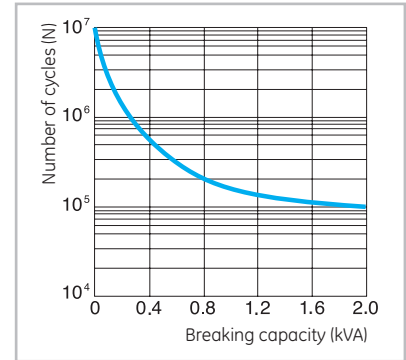
**Table 1. Coil data DC version**

Rated voltage V DC	Coil resistance (±10%) at 20°C Ω	Coil operating range V DC	
		U Min.	U Max.
12	360	8.4	30.6
24	1440	16.8	61.2
110	25200	77	280

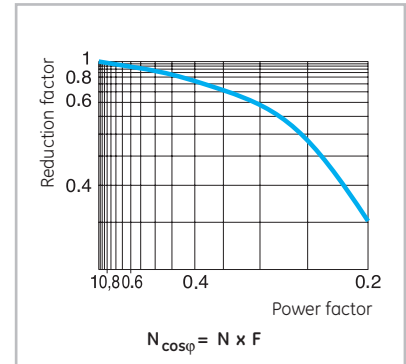
**Table 2. Coil data AC 50/60Hz version**

Rated voltage V AC	Coil resistance (±10%) at 20°C Ω	Coil operating range V AC	
		U Min.	U Max.
24	400	19.2	28.8
120	10200	96	144
230	38500	184	276

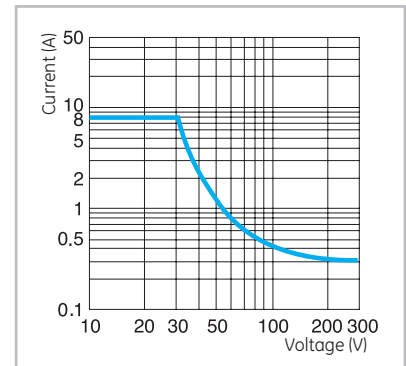
**Electrical life at AC resistive load**



**Electrical life reduction factor at AC inductive load**

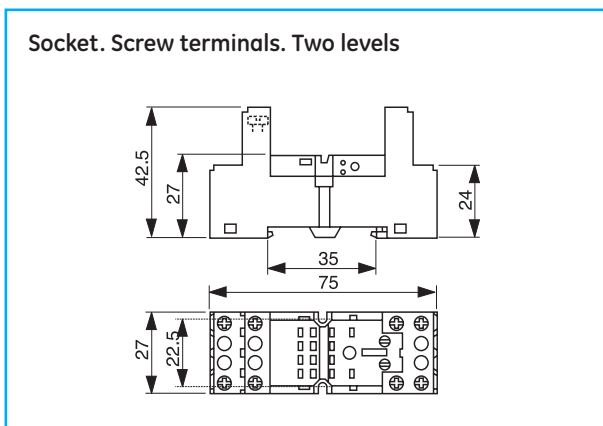
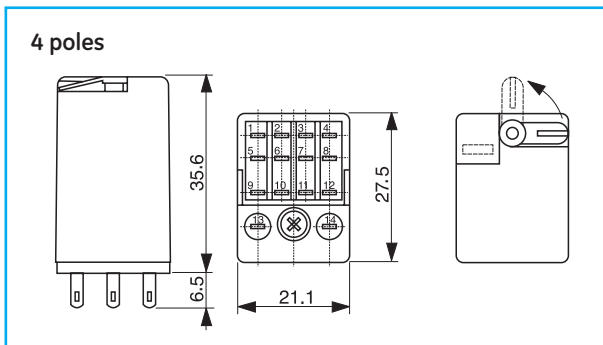
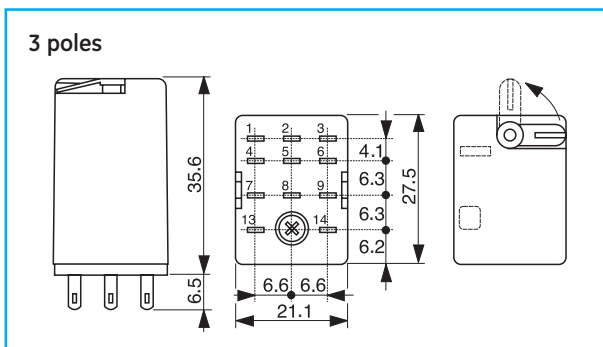
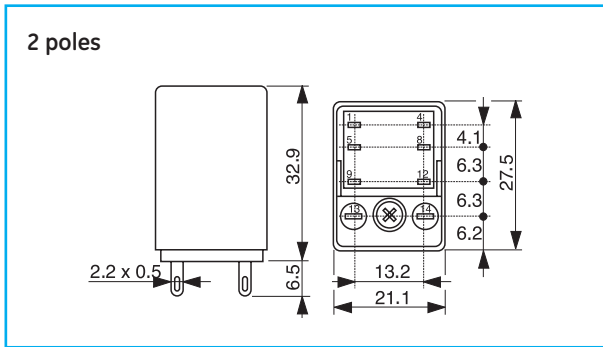


**Max. DC load breaking capacity**

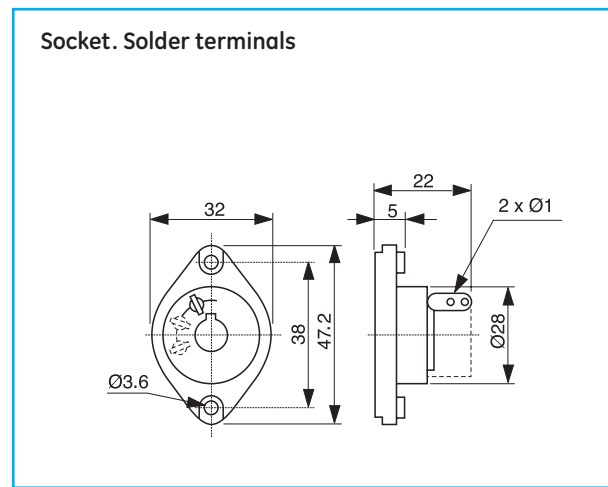
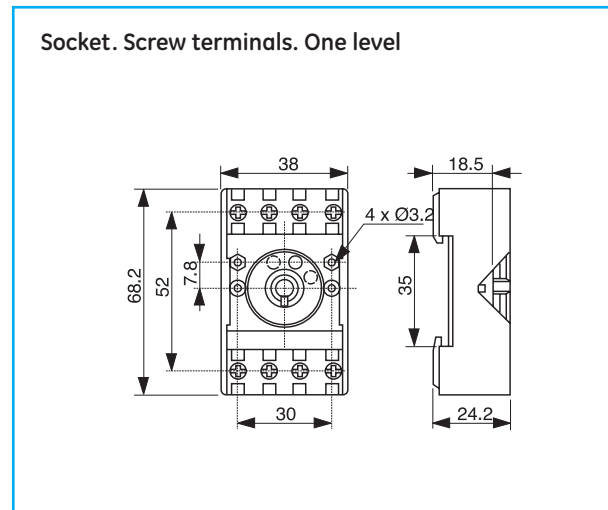
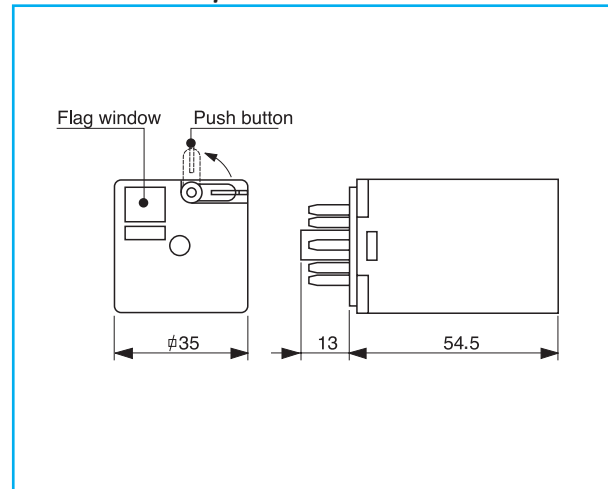


## Dimensional drawings

### Miniature



### Standard 8-11 pin

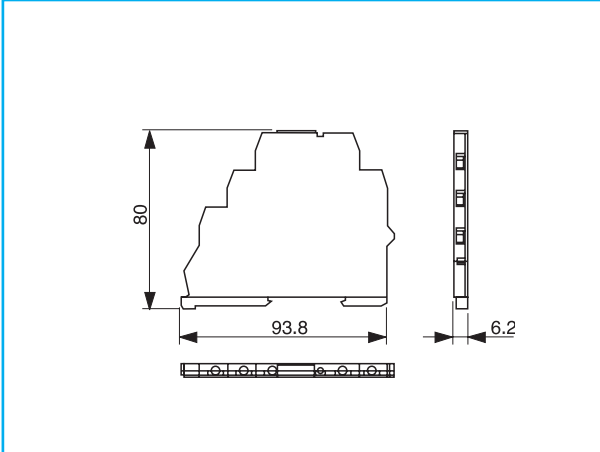


Dimensions in mm (inch = mm x 0.03937) - Weight in kg (lb = kg x 2.2046)

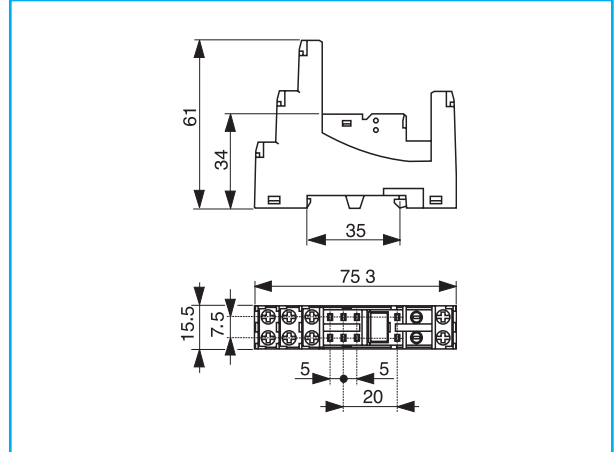


# Series M

Interface relay



Socket for miniature P.C.B. relays



Dimensions in mm (inch = mm x 0.03937) - Weight in kg (lb = kg x 2.2046)





## Technical data

### General

Maximum number of contacts (MCR...)	4
Rated thermal current (Ith) $\theta \leq 60^\circ$	16A
Rated operational voltage (Ue) acc. IEC 60947.1	690V
Insulation voltage (Ui) acc. IEC 60947.1	750V

### Conformity to standards

IEC / EN 60947-5-1	IEC / EN 60947-1	BS 4794
EN 50002	EN 50005	EN 50011
NFC 63-110	NFC 63-140	CENELEC HD 420
CSA C22.2/14	VDE 0660	UL 508

### Approvals

cULus	DEMKO	NEMKO
SEMKO	SETI	RINA
Lloyd's Register	Bureau Veritas	CE

### Ambient conditions

Storage temperature	-55°C to +80°C	
Operation temperature	-40°C to +60°C	
Altitude	Nominal values	
	up to 3000m	
	from 3000 to 4000m	90%le 80%Ue
	from 4000 to 5000m	80%le 75%Ue

### Climatic resistance (IEC 68-2)

Continuous tests		40 / 125 / 56
Cold (72h)	Temperature	-40°C
	Dry heat (96h)	
	Temperature	+125°C
	Relative humidity	< 50%
Humid heat (56 days)	Temperature	+40°C
	Relative humidity	95%
Cyclical tests (6 cycles)		
Humid heat		
First half-cycle (12h)	Low temperature	+25°C
	Relative humidity	93%
Second half-cycle (12h)	Low temperature	+55°C
	Relative humidity	95%

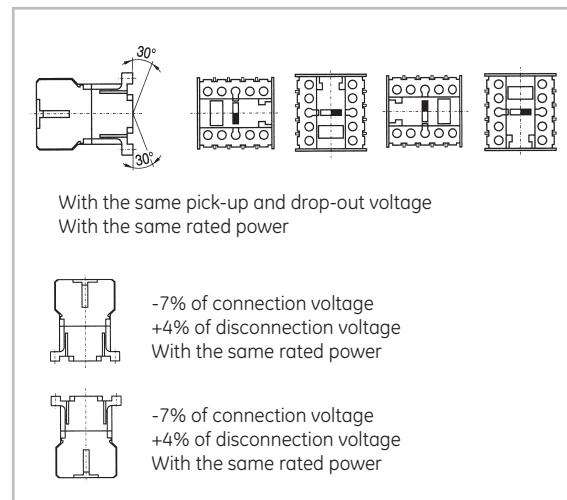
### Shock resistance (IEC 68-2-27)

Continuously closed (at 0.8Us)		
Admissible acceleration	25 g	
Impulse duration	11ms	
Continuously opened (no voltage)		
Admissible acceleration	20 g	
Impulse duration	11ms	

### Vibration resistance (IEC 68-2-6)

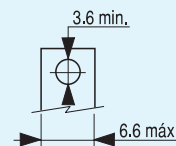
Continuously closed (at 0.8Us)		
Admissible acceleration	15 g	
Sweep between	10 - 200Hz	
Continuously opened (no voltage)		
Admissible acceleration	5 g AC - 3.5g DC	
Sweep between	10 - 200Hz	

### Mounting positions



### Terminal capacity

Terminal with screw M3.5 Tightening torque		
(with pozidrive head and safety flange)		
Solid wire	mm <sup>2</sup>	0.8 Nm - 7 Lb-in
Flexible wire without terminal	mm <sup>2</sup>	0.75 to 2.5x2 w.
Flexible wire with terminal with cap	mm <sup>2</sup>	0.75 to 2.5x1 w
	mm <sup>2</sup>	0.75 to 1x2 w
Ring terminal cap		0.8 Nm - 7 Lb/in



Fast-on 2.8 - 2 insulated terminals	mm <sup>2</sup>	1x2 w.
Terminal for printed circuit ( $\varnothing$ of PCB hole)		1.8mm
Ring terminal cap		7.8mm
Fork terminal cap		6.5mm

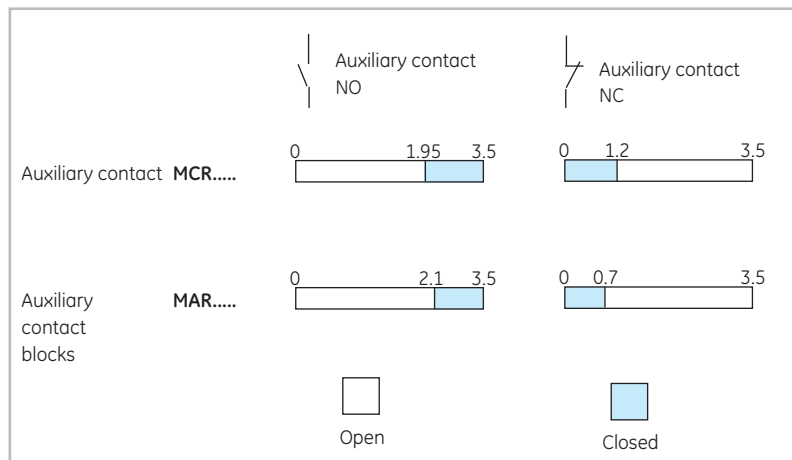
### Coil Terminal capacity and tightening torque

Tightening torque		0.8Nm - 7Lb/in
Solid wire	(mm <sup>2</sup> )	0.75 to 2x2
Flexible wire without terminal	(mm <sup>2</sup> )	0.75 to 2.5x2
Flexible wire without terminal with cap	(mm <sup>2</sup> )	0.75 to 2.5x2.1

## Control circuit

		MCRA...	MCRC...	MCRC...	MCRI...	MCRK...
Rated insulation voltage (Ui)	(V)	750	750	750	750	750
Standard voltages (Us)						
50Hz	(V)	24..690	-	-	-	-
60Hz	(V)	6..600	-	-	-	-
DC	(V)	-	6..440	12..440	24	24
Voltage <sup>(1)</sup>						
Operating limits	xUs	0.8..1.1	0.8..1.1	0.7..1.3	0.8..1.25	0.7..1.25
Drop-out	xUs	0.35..0.55	0.15..0.3	0.15..0.3	0.15..0.3	0.13..0.35
Consumption						
Pick-up	(VA)	26	-	-	-	-
Seal	(VA)	4	-	-	-	-
DC	(W)	-	3	4	1.2	2
Power factor						
Pick-up	(cos φ)	0.8	-	-	-	-
Seal	(cos φ)	0.35	-	-	-	-
Power dissipation	(W)	1.4	3	4	1.2	2
Opening and closing times						
Values between ± %Us	%	+10..-20	+10..-20	+30..-30	+25..-20	+25..-20
Time at energisation NO	(ms)	6..13	22..36	17..28	30..70	20..50
Time at de-energisation NC	(ms)	8..16	9..12	9..12	9..16	9..16
Time at energisation NC	(ms)	5..11	18..27	12..25	20..45	18..35
Time at de-energisation NO	(ms)	6..13	5..7	5..7	5..9	5..9
Values at Us						
Time at energisation NO	(ms)	7..12	24..27	19..23	25..45	25..40
Time at de-energisation NC	(ms)	8..16	9..11	9..11	9..16	9..16
Time at energisation NC	(ms)	6..10	20..26	15..21	25..35	20..30
Time at de-energisation NO	(ms)	6..13	5..8	5..8	5..9	5..9
Maximum time without voltage	(ms)	3	3	3	3	3
(without effecting the closed magnetic circuit)						
Mechanical endurance						
Monofrequency	x10 <sup>6</sup> ops.	15	-	-	-	-
Dual-frequency	x10 <sup>6</sup> ops.	10	-	-	-	-
DC	x10 <sup>6</sup> ops.	-	10	10	10	10
Maximum rate (no load)						
Monofrequency	n° ops./h	9000	-	-	-	-
Dual-frequency	n° ops./h	3600	-	-	-	-
DC	n° ops./h	-	9000	9000	9000	9000

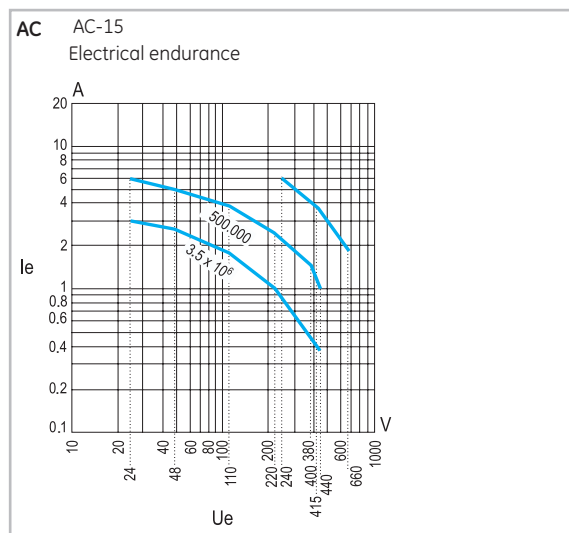
## Contact sequence (distance in mm)



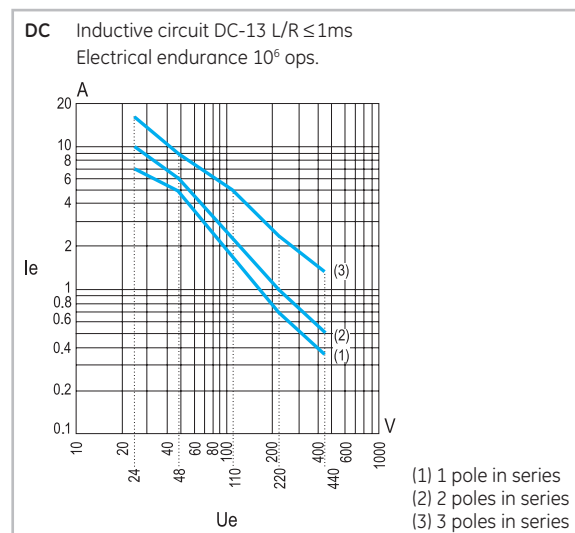
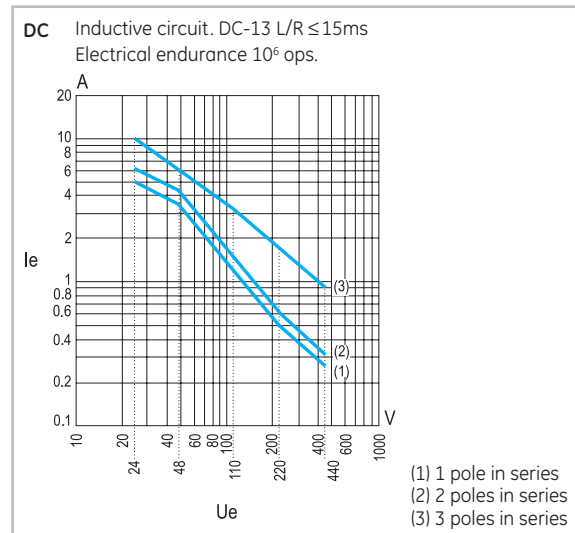
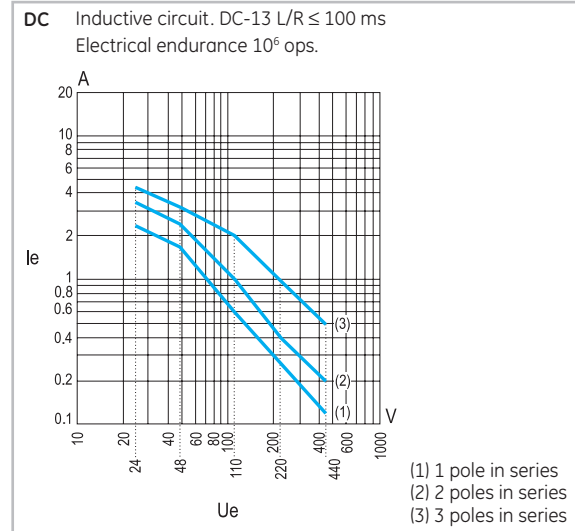
Internal auxiliary contacts

		MCR.....
Rated insulation voltage (Ui) acc. IEC 60947-1		750V
Rated thermal current (Ith) $\theta \leq 60^\circ\text{C}$ [1]		16A
Making capacity (r.m.s.) acc. IEC 60947-5		
AC-15	$U_e \leq 440\text{V } 50/60\text{Hz}$	160A
DC-13	$U_e \leq 220\text{V DC}$	3A
Breaking capacity (r.m.s.) acc. IEC 60947-5		
AC-15	$U_e \leq 440\text{V } 50/60\text{Hz}$	106A
DC-13 (L/R = 100 ms)	$U_e \leq 220\text{V DC}$	1.2A
	$U_e = 110\text{V DC}$	3A
	$U_e = 48\text{V DC}$	10A
Rated voltage and rated current $U_e$ - $I_e$		
AC-15	according to IEC 947	110/120V - 6A 220/240V - 6A 380/400V - 4A 415/440V - 4A 500V - 2.5A 660/690V - 1.5A
	according to UL, CSA	A600
	according to IEC	24V - 5A 48V - 3.5 A 110V - 1.2A 220V - 0.6A 440V - 0.25A
	according to UL, CSA	P600
	according to UL, CSA	5mA, 17V
Minimum operational power (operational safety)		10A
Short-circuit protection (max.class gI fuse without welding)		
Insulation resistance		
	between contacts	> 10M $\Omega$
	between contacts and earth	> 10M $\Omega$
	between input and output	> 10M $\Omega$
Guaranteed no overlap of the contacts		
	Space	1.1mm
	minimum time	> 2ms
Impedance		2.3m $\Omega$
Terminal capacity		Same as main circuit

Tripping characteristics (AC)



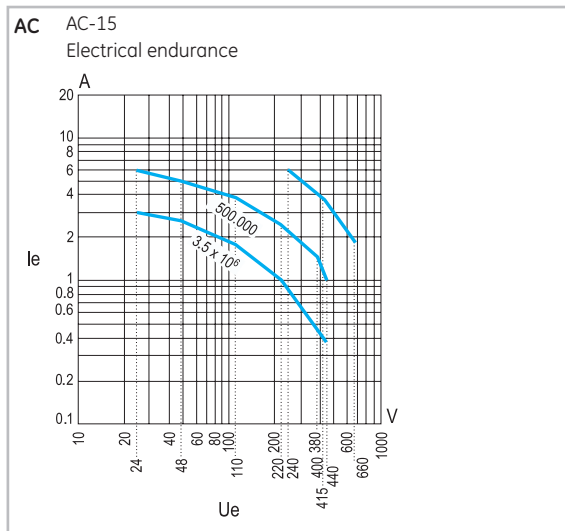
Tripping characteristics  $I_e/U_e$



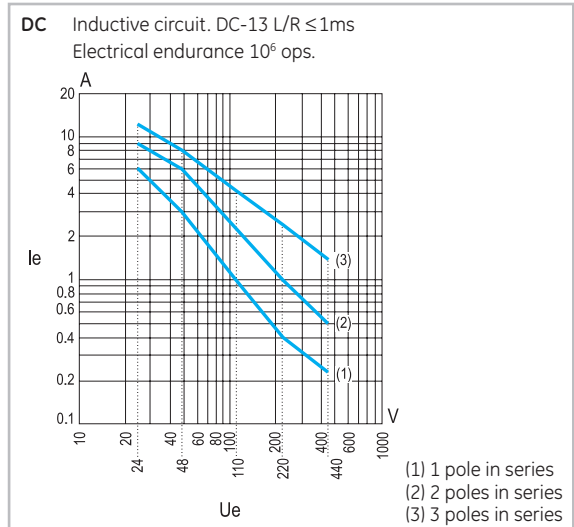
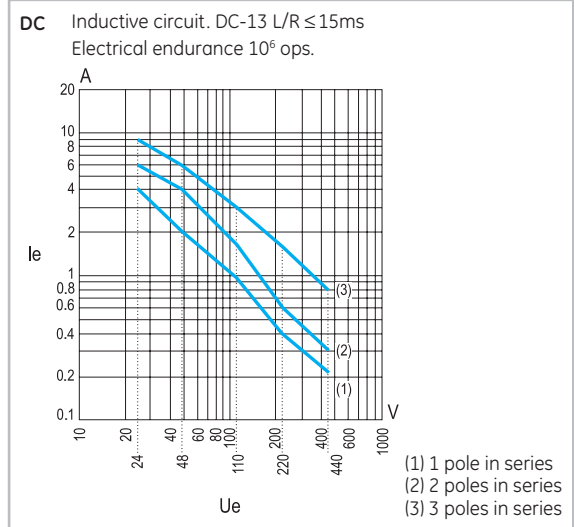
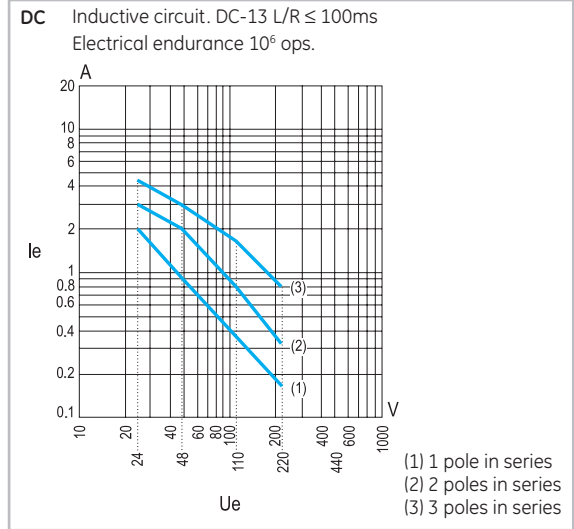
## External auxiliary contact blocks

		MARN..., MARL...
Rated insulation voltage (Ui) acc. IEC 60947-1		750V
Rated thermal current (Ith) $\theta \leq 60^\circ\text{C}$ [1]		10A
Making capacity (r.m.s.) acc. IEC 60947-5		
AC-15	$U_e \leq 220\text{V } 50/60\text{Hz}$	73A
	$U_e = 380\text{V } 50/60\text{Hz}$	38A
	$U_e = 690\text{V } 50/60\text{Hz}$	22A
DC-13 L/R = 100 ms	$U_e \leq 100\text{V DC}$	2.6A
	$U_e = 220\text{V DC}$	1A
	$U_e = 440\text{V DC}$	0.6A
Breaking capacity (r.m.s.) acc. IEC 60947-5		
AC-15	$U_e \leq 220\text{V } 50/60\text{Hz}$	73A
	$U_e = 380\text{V } 50/60\text{Hz}$	38A
	$U_e = 690\text{V } 50/60\text{Hz}$	22A
DC-13 L/R = 100 ms	$U_e \leq 100\text{V DC}$	2A
	$U_e = 220\text{V DC}$	0.8A
	$U_e = 440\text{V DC}$	0.4A
Rated voltage and rated current $U_e$ -Ie		
AC-15	according to IEC 60947	110/120V - 6A
		220/240V - 6A
		380/400V - 3A
		415/440V - 3A
		500V - 1A
	660/680V - 1A	
	according to UL, CSA	A600
DC-13	according to IEC 60947	24V - 4A
		48V - 2A
		110V - 0.7A
		220V - 0.3A
		440V - 0.1A
	according to UL, CSA	Q600
Minimum operational power (operational safety)		5mA, 17V
Short-circuit protection (max.class gI fuse without welding)		10A
Insulation resistance		
	between contacts	> 10M $\Omega$
	between contacts and earth	> 10M $\Omega$
	between input and output	> 10M $\Omega$
Guaranteed no overlap of the contacts		
	Space	0.5mm
	minimum time	> 2ms
Impedance		2.4m $\Omega$
Terminal capacity		Same as main circuit

## Tripping characteristics (AC)



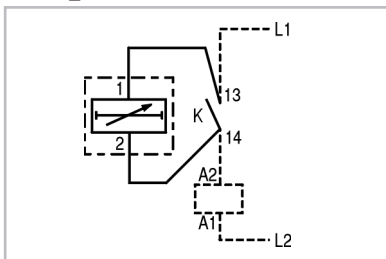
## Tripping characteristics Ie/ue



### Electronic timer block

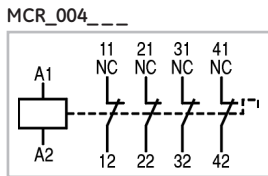
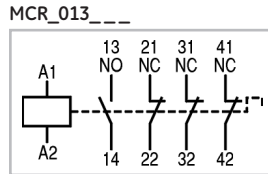
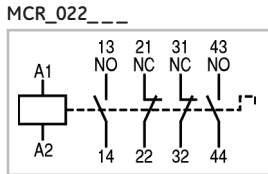
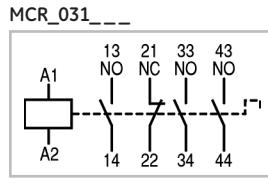
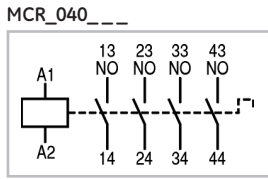
		MREBC...
Rated insulation voltage (Ui)		750V
Rated thermal current (Ith) $\theta \leq 60^{\circ}\text{C}$ <sup>(1)</sup>		0.55V
Standard voltages (AC y DC)		24 to 250V
Operation limits		0.80 to 1.1 Us
		(0.85 to 1.1 Us at 12V)
Voltage drop		< 3V
Maximum load current at		
	20°C	0.9A
	40°C	0.72A
	60°C	0.55A
Minimum load for safe operation		> 10mA
Maximum current (peak)		10A for 40ms
Leakage current at 220V		< 5mA
Operational current		
	AC-15	0.7A
	DC-13	0.9A
Timing range (delay ON)		0.5 to 60s ( $\pm 6\%$ )
Rearrangement time		< 100ms
Repeatability (accuracy)		$\pm 1\%$
Ambient temperature		
	Storage	from $-55$ up to $+80^{\circ}\text{C}$
	Operation	from $-5$ up to $+60^{\circ}\text{C}$
Degree of protection		IP20
Mounting position		any
Terminals : 2 free cables		1mm <sup>2</sup> (AWG 17)
		250mm

MREBC\_0AC2



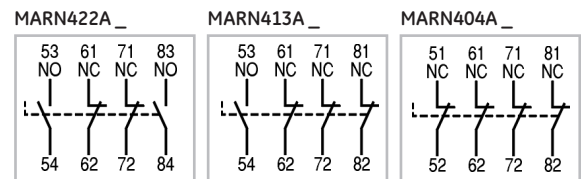
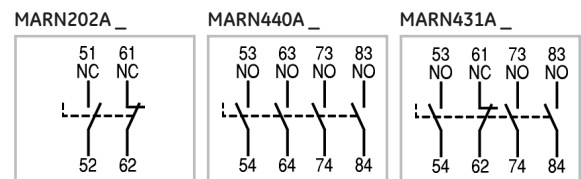
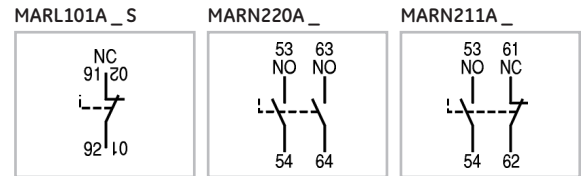
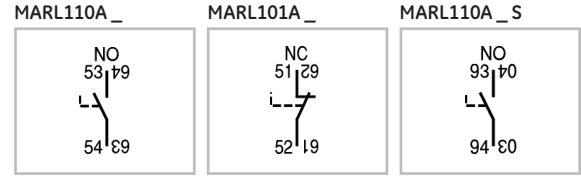
## Terminal numbering

### Auxiliary contactors. According to EN 50011

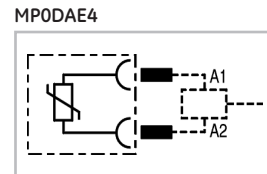
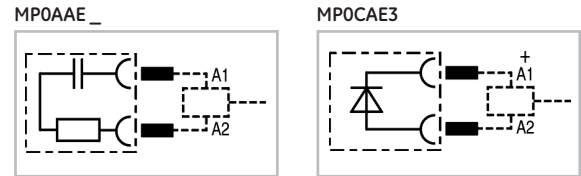


## Auxiliary contact blocks

According to EN 50005 & EN 50011



## Transient voltage suppressor block



### Terminal numbering in accordance with EN 50011

By combining other basic auxiliary contactors with auxiliary contact blocks MAR..., it is possible to obtain other combinations, and positions of contacts which are not covered by the table. But in all cases the maximum number of auxiliary contacts should be ten.

#### Type E

Standard contact combination in which the interchangeability of the devices does not affect the cabling or the diagram. Specifies a particular contact numbering and positioning.

	Final structure of the combination	Auxiliary contacts		Auxiliary contactor + Auxiliary contact blocks to be added	
		Combination	NO NC		
		Description	NO	NC	
Type E			4	0	MCRA040A..
			3	1	MCRA031A..
			2	2	MCRA022A..
			1	3	MCRA013A..
			0	4	MCRA004A..
			6	0	MCRA040A.. + MARN220A..
			5	1	MCRA040A.. + MARN211A..
			4	2	MCRA040A.. + MARN202A..
			8	0	MCRA040A.. + MARN440A..
			7	1	MCRA040A.. + MARN431A..
			6	2	MCRA040A.. + MARN422A..
			5	3	MCRA040A.. + MARN413A..
			4	4	MCRA040A.. + MARN404A..
			5	0	MCRA040A.. + MARL110A..
			4	1	MCRA031A.. + MARL110A..
		3	2	MCRA022A.. + MARL110A..	
		2	3	MCRA013A.. + MARL110A..	
		1	4	MCRA013A.. + MARL101A..	
		0	5	MCRA004A.. + MARL101A..	



## Terminal numbering in accordance with EN 50011 (continued)

By combining other basic auxiliary contactors with auxiliary contact blocks MAR..., it is possible to obtain other combinations, and positions of contacts which are not covered by the table. But in all cases the maximum number of auxiliary contacts should be ten.

### Type Z

Contact combination the same as Type E. Interchangeability of the devices may affect the cabling and the diagram. Neither contact numbering nor positioning are retained.

### Type X

Contact combination the same as Type E. Interchangeability of the devices may affect the cabling but not the diagram. The contact numbering is maintained but not their position.

### Type Y

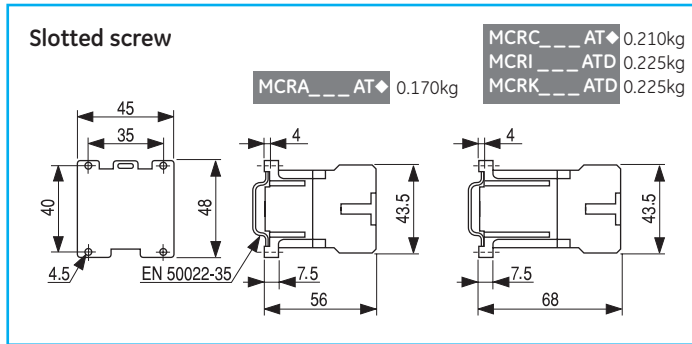
Contact combination which differs from Type E, although it is obtained by a combination of devices provided for this Type E.

	Final structure of the combination	Auxiliary contacts		Auxiliary contactor + Auxiliary contact blocks to be added		
		Combination				
		Description	NO	NC		
Type Z			6	0	MCRA040A.. + MARL110A.. + MARL110A..	
			5	1	MCRA040A.. + MARL110A.. + MARL101A..	
			4	2	MCRA040A.. + MARL101A.. + MARL101A..	
			10	0	MCRA040A.. + MARN440A.. + MARL110A..S + MARL110A..S	
			5	5	MCRA040A.. + MARN413A.. + MARL101A..S + MARL101A..S	
	Type X			8	0	MCRA040A.. + MARL110A.. + MARL110A.. + MARL110A..S + MARL110A..S
			7	1	MCRA040A.. + MARL110A.. + MARL101A.. + MARL110A..S + MARL110A..S	
			6	2	MCRA040A.. + MARL110A.. + MARL101A.. + MARL101A..S + MARL110A..S	
			5	3	MCRA040A.. + MARL110A.. + MARL101A.. + MARL101A..S + MARL101A..S	
			4	4	MCRA040A.. + MARL101A.. + MARL101A.. + MARL101A..S + MARL101A..S	
			9	1	MCRA040A.. + MARN431A.. + MARL110A..S + MARL110A..S	
			8	2	MCRA040A.. + MARN431A.. + MARL101A..S + MARL110A..S	
			7	3	MCRA040A.. + MARN422A.. + MARL101A..S + MARL110A..S	
			6	4	MCRA040A.. + MARN422A.. + MARL101A..S + MARL101A..S	
Type Y				4	2	MCRA031A.. + MARL110A.. + MARL101A..
				3	3	MCRA022A.. + MARL110A.. + MARL101A..
				4	2	MCRA031A.. + MARN211A..
			3	3	MCRA022A.. + MARN211A..	
			5	3	MCRA031A.. + MARN422A..	
			4	4	MCRA022A.. + MARN422A..	

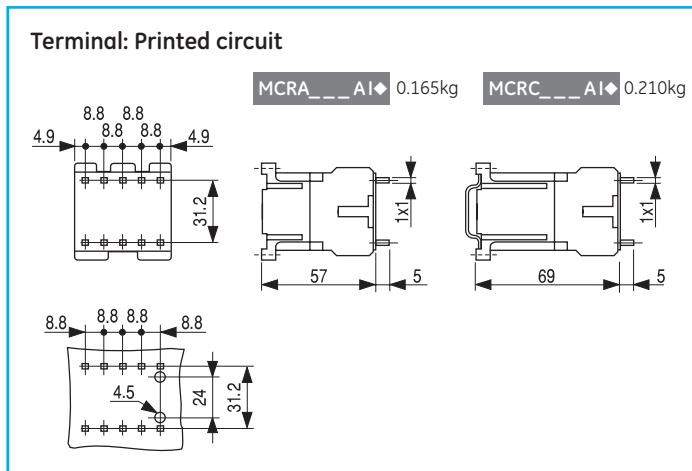
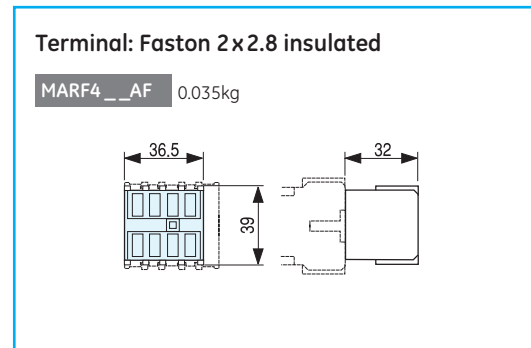
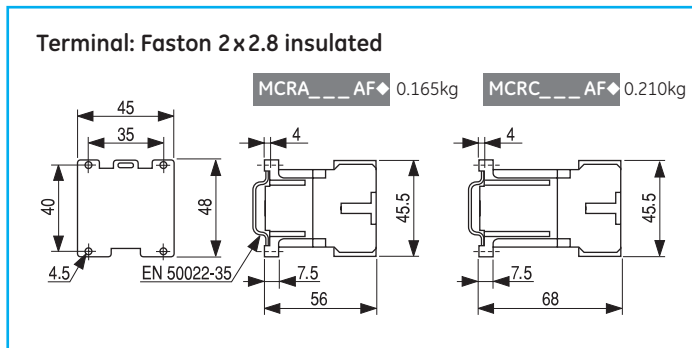
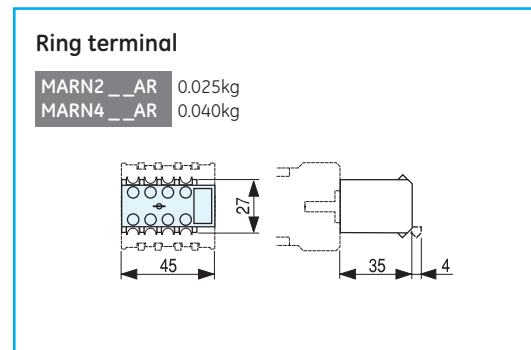
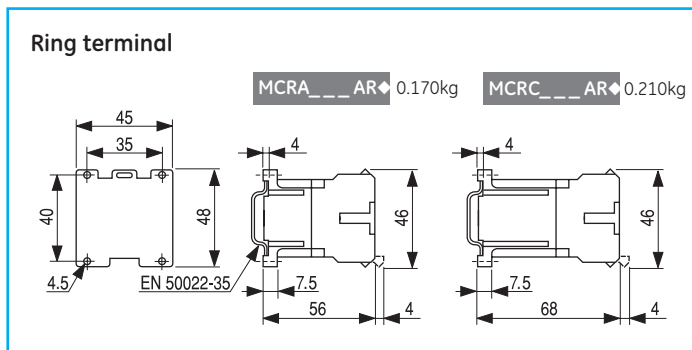
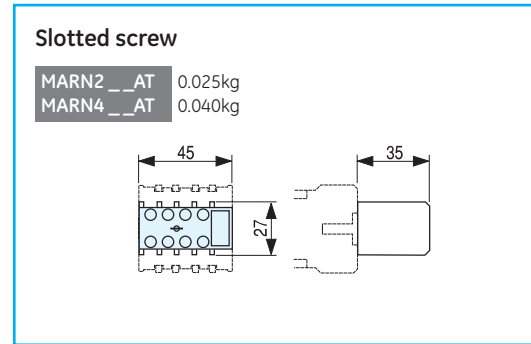


## Dimensional drawings

### Auxiliary minicontactors



### Auxiliary contact blocks. Front mounting



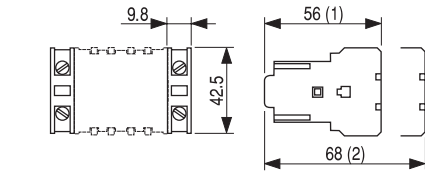
Dimensions in mm (inch = mm x 0.03937) - Weight in kg (lb = kg x 2.2046)



## Auxiliary contact blocks. Lateral mounting

### Slotted screw

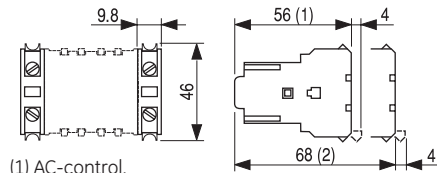
MARL\_\_\_AT, ATS 0.013kg



(1) AC-control.  
(2) DC-control

### Ring terminal

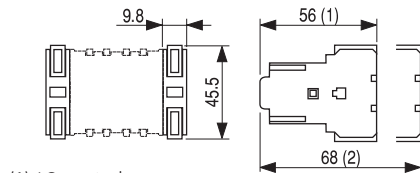
MARL\_\_\_AR, ARS 0.013kg



(1) AC-control.  
(2) DC-control

### Terminal: Faston 2 x 2.8 insulated

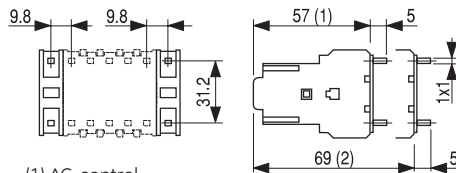
MARL\_\_\_AF, AFS 0.009kg



(1) AC-control.  
(2) DC-control

### Terminal: Printed circuit

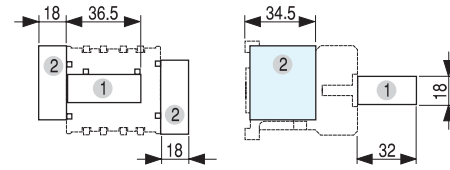
MARL\_\_\_AI, AIS 0.009kg



(1) AC-control  
(2) DC-control

## Electronic timer block

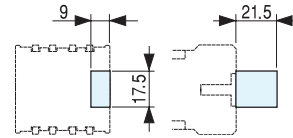
MREBC\_0AC2 0.040kg



(1) Frontal mounting  
(2) Lateral mounting

## Voltage suppressor block

MP0A\_AE\_ 0.010kg  
MPOC\_AE3 0.010kg



Dimensions in mm (inch = mm x 0.03937) - Weight in kg (lb = kg x 2.2046)

**General**

Maximum number of contacts	4
Rated thermal current (I <sub>th</sub> ) $\theta < 55^{\circ}\text{C}$	20A
Rated operational voltage (U <sub>e</sub> )	690V
Insulation voltage (U <sub>i</sub> )	1000V

**Conformity to standards**

IEC / EN 60947-1	IEC / EN 60947-5-1	ASE 1025
EN 50005	EN 50011	VDE 0660 / 102
NFC 63-110	NFC 63-140	
CENELEC HD 410	CENELEC HD 420	
NEMA ICS 1	CSA C22.2/14	
UL 508	BS 4794	

**Approvals/Marking**

cULus	DEMKO	NEMKO
SEMKO	FI	CE
Lloyd's Register	Bureau Veritas	

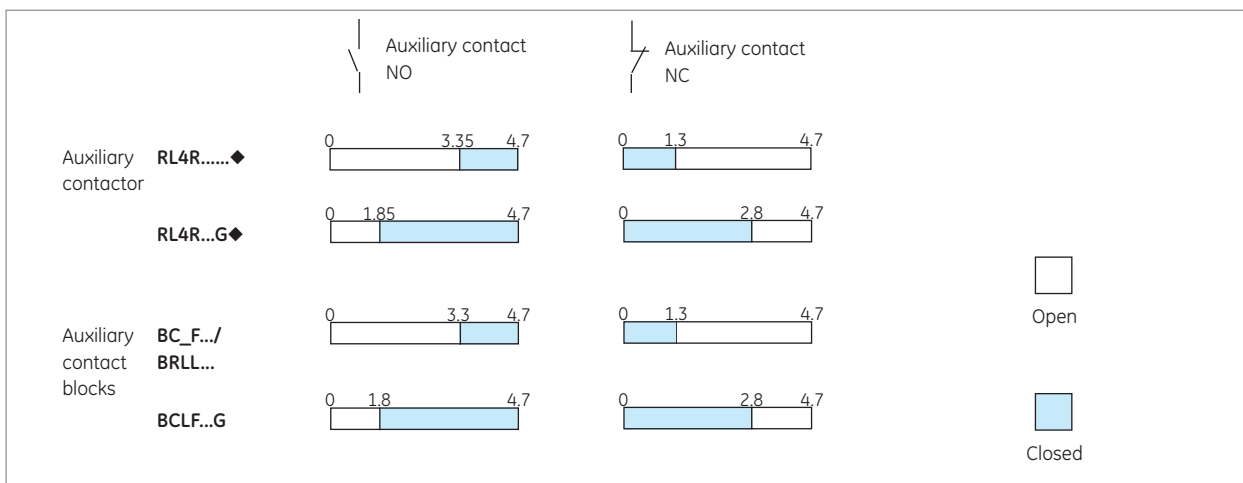
**Ambient conditions**

Storage temperature	-55°C to +80°C	
Operation temperature	-40°C to +60°C	
Altitude	up to 3000m	Nominal values
	from 3000 to 4000m	90%le 80%Ue
	from 4000 to 5000m	80%le 75%Ue

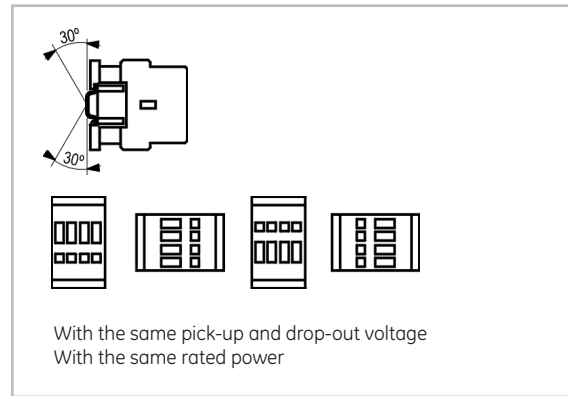
**Climatic resistance (IEC 68-2)**

Continuous tests	40 / 125 / 56	
Cold (72h)	Temperature	-40°C
	Dry heat (96h)	Temperature +125°C
	Relative humidity	< 50%
Humid heat (56 days)	Temperature	+40°C
	Relative humidity	95%
	Cyclical tests (6 cycles)	Humid heat
First half-cycle (12h)	Low temperature	+25°C
	Relative humidity	93%
	Second half-cycle (12h)	Low temperature
Relative humidity		95%

**Contact sequence (distance in mm)**



**Mounting positions**



**Control circuit**

	RL4RA...	RL4RD...	RL4RD...W
Rated insulation voltage U <sub>i</sub>	(V) 1000	1000	1000
Standard voltages U <sub>s</sub>			
50Hz (V)	24 ... 690	-	-
60Hz (V)	24 ... 600	-	-
DC	(V) -	12 ... 440	12 ... 440
Voltage <sup>[1]</sup>			
Operating limits	xU <sub>s</sub> 0.8 ... 1.1	0.8 ... 1.1	0.7 ... 1.3
Pick-up	xU <sub>s</sub> 0.65 ... 0.75	0.45 ... 0.65	0.45 ... 0.55
Seal	xU <sub>s</sub> 0.4 ... 0.55	0.15 ... 0.3	0.15 ... 0.3
Consumption			
AC Magnetic circuit closed	(VA) 6	-	-
Magnetic circuit open	(VA) 45	-	-
DC Magnetic circuit closed	(W) -	5.5	6.5
Magnetic circuit open	(W) -	5.5	6.5
Power dissipation	(W) 2.4	5.5	6.5
Power factor			
Magnetic circuit closed	cos $\phi$ 0.34	-	-
Magnetic circuit open	cos $\phi$ 0.82	-	-
Opening and closing times			
at 0.8 to 1.1 U <sub>s</sub>			
Closing time NO	(ms) 6 ... 25	35 ... 65	25 ... 65
Opening time NO	(ms) 6 ... 13	6 ... 13	6 ... 13
at U <sub>s</sub>			
Closing time NO	(ms) 8 ... 20	35 ... 45	25 ... 55
Opening time NO	(ms) 6 ... 13	7 ... 12	6 ... 13
Mechanical endurance	10 <sup>6</sup> ops 15	15	15
Maximum rate no load	ops/h 9000	3600	3600

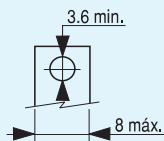


## Internal auxiliary contacts

	RL4.....
Rated insulation voltage (Ui) acc. IEC 60947-5	1000V
Rated thermal current (Ith) $\theta < 55^{\circ}\text{C}$	20A
Making capacity (r.m.s.) acc. IEC 60947-5	
AC-15 $U_e \leq 400\text{V}, 50/60\text{Hz}$	250A
DC-13 $U_e \leq 220\text{V DC}$	250A
Breaking capacity (r.m.s.) acc. IEC 60947-5	
AC-15 $U_e \leq 400\text{V}, 50/60\text{Hz}$	250A
DC-13 $U_e \leq 220\text{V DC}$	2A (4A with 2 contacts in series)
$U_e \leq 110\text{V DC}$	7A (12A with 2 contacts in series)
$U_e \leq 48\text{V DC}$	10A (18A with 2 contacts in series)
Rated voltage and rated current $U_e\text{-}I_e$	
AC-15 according to IEC	110/120V - 10A 220/240V - 10A 380/400V - 6A 415/440V - 5A 500V - 4A 660/690V - 2A
according to UL, CSA	A600
DC-13 according to IEC	24V - 6A 48V - 4A 110V - 2A 220V - 0.7A 440V - 0.35A
according to UL, CSA	P600
Electrical endurance	$1 \times 10^6$ ops.
Minimum operational voltage (operational safety)	17V
Minimum operational current	5mA
Short-circuit protection	
max. fus. class gL fuse	20A
without welding	10A
Insulation resistance	
between contacts	$> 10\text{m}\Omega$
between contacts and earth	$> 10\text{m}\Omega$
between input and output	$> 10\text{m}\Omega$
Guaranteed no overlap between NO and NC contacts	
space	1.3mm
minimum time	1.5ms
Impedance	1.28m $\Omega$

## Terminal capacity

Solid, stranded and finely stranded without end sleeve	mm <sup>2</sup>	2x0.5 to 6
Finely stranded with end sleeve	mm <sup>2</sup>	2x1 to 6
AWG wires, solid and stranded	mm <sup>2</sup>	2x20 to 12
Tightening torque		1.1 Nm / 10 Lb.in
Ring terminals		1.6 Nm / 15 Lb.in



## Coil Terminal capacity and tightening torque

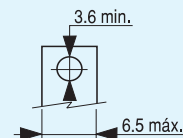
Tightening torque		0.8Nm - 7Lb/in
Solid wire	(mm <sup>2</sup> )	0.75 to 2x2
Flexible wire without terminal	(mm <sup>2</sup> )	0.75 to 2.5x2
Flexible wire without terminal with cap	(mm <sup>2</sup> )	0.75 to 2.5x21

## Instantaneous auxiliary contact blocks

	BCLF../BCRF../BRLL..
Rated insulation voltage (Ui) acc. IEC 60947-5	1000V
Rated thermal current (Ith) $\theta < 55^{\circ}\text{C}$	10A
Making capacity (r.m.s.) acc. IEC 60947-5	
AC-15 $U_e \leq 440\text{V}, 50/60\text{Hz}$	90A
DC-13 $U_e \leq 220\text{V DC}$	90A
Breaking capacity (r.m.s.) acc. IEC 60947-5	
AC-15 $U_e \leq 400\text{V}, 50/60\text{Hz}$	60A
DC-13 $U_e \leq 220\text{V DC}$	0.95A
Rated voltage and rated current $U_e\text{-}I_e$	
AC-15 according to IEC	110/120V - 6A 220/240V - 6A 380/400V - 4A 415/440V - 3.5A 500V - 2.5A 660/690V - 1.5A
according to UL, CSA	A600
DC-13	24V - 4A 48V - 2A 110V - 0.7A 220V - 0.3A 415/440V - 0.15A
according to UL, CSA	Q600
Electrical endurance	$1 \times 10^6$ ops.
Minimum operational voltage (operational safety)	17V
Minimum operational current	5mA
Short-circuit protection (without welding) gL	10A
Insulation resistance	
between contacts	$> 10\text{m}\Omega$
between contacts and earth	$> 10\text{m}\Omega$
between input and output	$> 10\text{m}\Omega$
Guaranteed no overlap between NO and NC contacts	
Space	1.3mm
minimum time	1.5ms
Impedance of the contacts	1.28m $\Omega$

## Terminal capacity

Solid, stranded and finely stranded without end sleeve	mm <sup>2</sup>	2x0.5 to 2.5
Finely stranded with end sleeve	mm <sup>2</sup>	2x2.5 to 4
without end sleeve		2x0.5 to 2.5
with end sleeve		2x2.5 to 4
AWG wires, solid and stranded	mm <sup>2</sup>	2x20 to 10
Tightening torque		0.8 Nm / 7 Lb.in
Ring terminals		0.8 Nm / 7 Lb.in

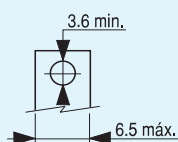


## Timed auxiliary contact blocks

		BTLF... / BTRF...
Rated insulation voltage (Ui) acc. IEC 60947-5		1000V
Rated thermal current (Ith) $\theta < 55^{\circ}\text{C}$		10A
Making capacity (r.m.s.) acc. IEC 60947-5		
AC-15	$U_e \leq 440\text{V}, 50/60\text{Hz}$	90A
DC-13	$U_e \leq 220\text{V DC}$	90A
Breaking capacity (r.m.s.) acc. IEC 60947-5		
AC-15	$U_e \leq 400\text{V}, 50/60\text{Hz}$	60A
DC-13	$U_e \leq 220\text{V DC}$	0.95A
Rated voltage and rated current $U_e$ - $I_e$		
AC-15	according to IEC	110/120V - 6A
		220/240V - 6A
		380/400V - 4A
		415/440V - 3.5A
		500V - 2.5A
		660/690V - 1.5A
	according to UL, CSA	A600
DC-13	according to IEC	24V - 4A
		48V - 2A
		110V - 0.7A
		220V - 0.3A
		415/440V - 0.15A
	according to UL, CSA	Q600
Electrical endurance		$1 \times 10^6$ ops.
Minimum operational voltage (operational safety)		17V
Minimum operational current		5mA
Short-circuit protection (without welding) gL		10A
Insulation resistance		
between contacts		$> 10\text{m}\Omega$
between contacts and earth		$> 10\text{m}\Omega$
between input and output		$> 10\text{m}\Omega$
Guaranteed no overlap between NO and NC contacts		
space		1.3mm
minimum time		1.5ms
Timing		
(Ambient temperature between $-25$ and $+55^{\circ}\text{C}$ )		
Accuracy		$\pm 5\%$
Loss of accuracy after $0.5 \times 10^6$ ops.		+ 20%
Loss of accuracy per rise $^{\circ}\text{C}$ ( $0 - 55^{\circ}\text{C}$ )		+ 0.75 % per $^{\circ}\text{C}$
Impedance of the contacts		1.28m $\Omega$
Mechanical endurance		$5 \times 10^6$ ops.
Peak current		
during 1 s.		50A
during 0.1 s.		100A

## Terminal capacity

Solid, stranded and finely stranded without end sleeve	(mm <sup>2</sup> )	2 x 0.5 to 2.5 2 x 2.5 to 4
Finely stranded with end sleeve	(mm <sup>2</sup> )	2 x 0.5 to 2.5 2 x 2.5 to 4
AWG wires, solid and stranded	(mm <sup>2</sup> )	2 x 20 to 10
Tightening torque		0.8 Nm / 7 Lb.in
Ring terminals		0.8 Nm / 7 Lb.in



## Mechanical latch blocks

		RMLF....
Rated insulation voltage (Ui)		1000V
Standard voltages (Us); 50-60Hz and direct current		24 ... 690V
Operating limits		0.75 to 1.1 xUs
Consumption for unlatching (auto cut-out)		210W /VA (24-72V) 130W /VA (110-440V)
Unlatching control <sup>[1]</sup>		
Electrical	Min.impuls	10 ms
		Maintained auto cut-out by integral contact 55-56 (only AC slots)
Manual		By local (0) push-button
Contactor control		
Electrical	Min.impuls	40 ms
		By local (I) push-button
Mechanical endurance RL4		$3 \times 10^6$ (1200ops./h)

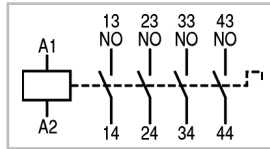
## Terminal capacity

Solid, stranded and finely stranded without end sleeve	mm <sup>2</sup>	2 x 0.5 to 2.5 2 x 2.5 to 4
Finely stranded with end sleeve	mm <sup>2</sup>	2 x 0.5 to 2.5 2 x 2.5 to 4
AWG wires, solid and stranded	mm <sup>2</sup>	2 x 20 to 10
Tightening torque		0.8 Nm / 7 Lb.in

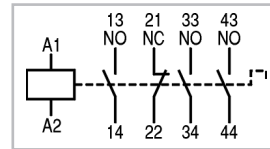
## Terminal numbering

### Auxiliary contactors

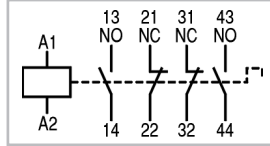
RL4R\_040\_\_



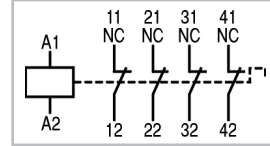
RL4R\_031\_\_



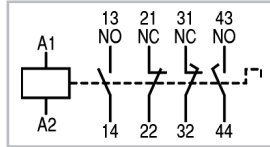
RL4R\_022\_\_



RL4R\_004\_\_

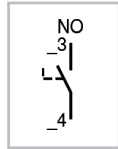


RL4R\_022G\_\_

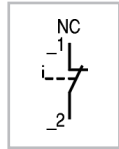


### Auxiliary contact blocks. Front mounting

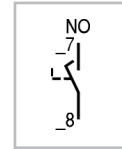
BC\_F10



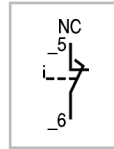
BC\_F01



BCLF10G

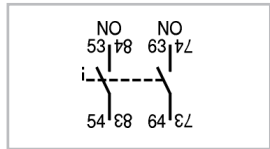


BCLF01G

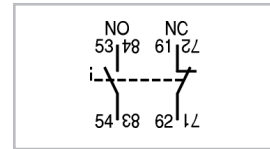


### Auxiliary contact blocks. Lateral mounting

BRLL20

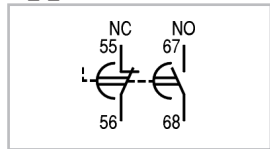


BRLL11

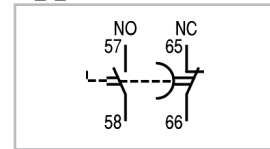


### Pneumatic timer blocks

BT\_F\_C

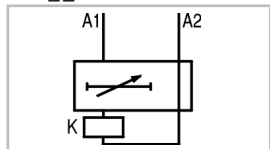


BT\_F\_D

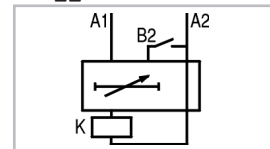


### Electronic timer blocks

BETL\_C



BETL\_D

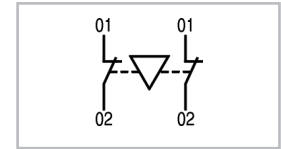


### Mechanical (-/electrical) interlock

BELA, BEL

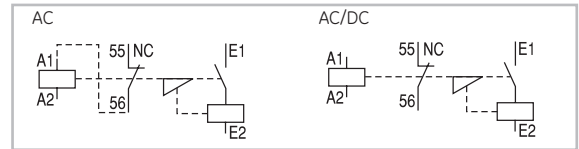


BELA02, BEL02



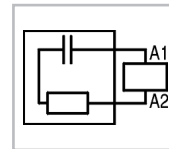
### Mechanical latch block

RMLF

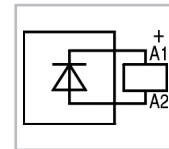


### Voltage suppressor blocks

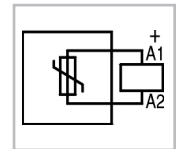
BSLR2



BSLDZ



BSLV3





















## Terminal numbering in accordance with EN 50011

By combining other basic auxiliary contactors with auxiliary contact blocks BLC..., it is possible to obtain other combinations, and positions of contacts which are not covered by the table. But in all cases the maximum number of additional auxiliary contacts should be four.

### Type E

Standard contact combination in which the interchangeability of the devices does not affect the cabling or the diagram. Specifies a particular contact numbering and positioning.

	Final structure of the combination	Auxiliary contacts		Auxiliary contactor +Auxiliary contact blocks to be added																			
		Combination	NO NC																				
		Description																					
Type E	 <table border="1"> <tr><td>A1</td><td>13NO</td><td>23NO</td><td>33NO</td><td>43NO</td></tr> <tr><td>A2</td><td>14</td><td>24</td><td>34</td><td>44</td></tr> </table>	A1	13NO	23NO	33NO	43NO	A2	14	24	34	44	40E	4	0	RL4RA040...								
	A1	13NO	23NO	33NO	43NO																		
	A2	14	24	34	44																		
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	A1	13NO	21NC	33NO	43NO																		
	A2	14	22	34	44																		
	 <table border="1"> <tr><td>A1</td><td>13NO</td><td>21NC</td><td>31NC</td><td>43NO</td></tr> <tr><td>A2</td><td>14</td><td>22</td><td>32</td><td>44</td></tr> </table>	A1	13NO	21NC	31NC	43NO	A2	14	22	32	44	22E	2	2	RL4RA022...								
	A1	13NO	21NC	31NC	43NO																		
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		A2	14	24	34	44	54																
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A1	11NC	21NC	31NC	41NC	53NO																		
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A1	11NC	21NC	31NC	41NC	51NC																		
A2	12	22	32	42	52																		
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	A1	13NO	23NO	33NO	43NO	53NO																	
	A2	14	24	34	44	54																	
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A1	13NO	23NO	33NO	43NO	53NO	61NC																	
A2	14	24	34	44	54	62																	
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A1	13NO	23NO	33NO	43NO	51NC	61NC																	
A2	14	24	34	44	52	62																	
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	A1	13NO	23NO	33NO	43NO	53NO	63NO	73NO	83NO														
	A2	14	24	34	44	54	64	74	84														
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	A1	13NO	23NO	33NO	43NO	53NO	61NC	73NO	83NO														
A2	14	24	34	44	54	62	74	84															
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A1	13NO	23NO	33NO	43NO	53NO	61NC	71NC	83NO															
A2	14	24	34	44	54	62	72	84															
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A1	13NO	23NO	33NO	43NO	53NO	61NC	71NC	81NC															
A2	14	24	34	44	54	62	72	82															
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A1	13NO	23NO	33NO	43NO	51NC	61NC	71NC	81NC															
A2	14	24	34	44	52	62	72	82															



## Terminal numbering in accordance with EN 50011 (continued)

By combining other basic auxiliary contactors with auxiliary contact blocks BLC..., it is possible to obtain other combinations, and positions of contacts which are not covered by the table. But in all cases the maximum number of additional auxiliary contacts should be four.
















### Type Z

Contact combination the same as Type E.

Interchangeability of the devices may affect the cabling and the diagram. Neither contact numbering nor positioning are retained.

### Type Y

Contact combination which differs from Type E, although it is obtained by a combination of devices provided for this Type E.

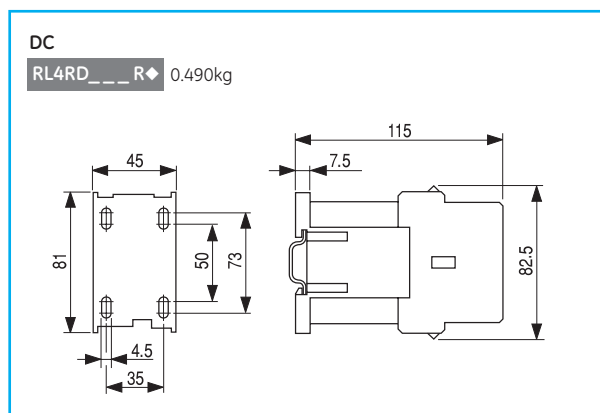
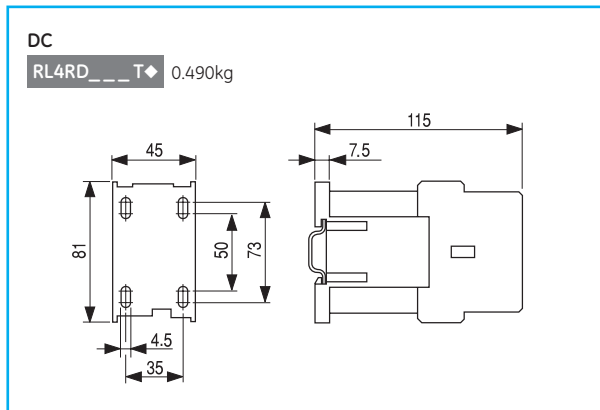
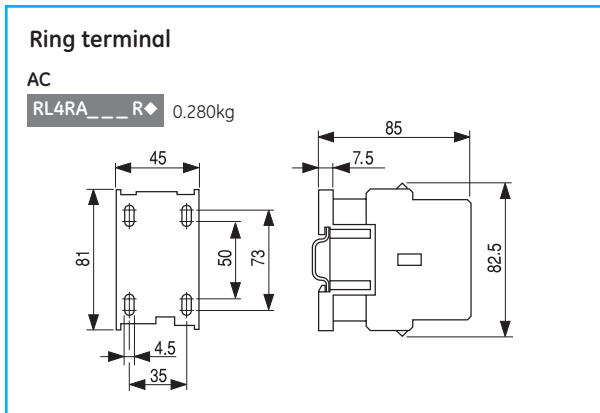
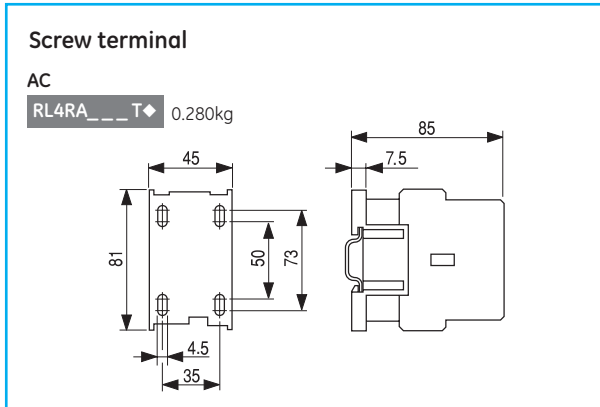
	Final structure of the combination	Auxiliary contacts		Auxiliary contactor +Auxiliary contact blocks to be added	
		Combination			
		Description	NO	NC	
Type Z	 <pre> A1 13NO 23NO 33NO 43NO 53NO 63NO A2 14 24 34 44 54 64                     </pre>	60Z	6	0	RL4RA040... + BRL20
	 <pre> A1 13NO 23NO 33NO 43NO 53NO 61NC A2 14 24 34 44 54 62                     </pre>	51Z	5	1	RL4RA040... + BRL11
	 <pre> A1 13NO 23NO 33NO 43NO 53NO 63NO 73NO 83NO A2 14 24 34 44 54 64 74 84                     </pre>	80Z	8	0	RL4RA040... + BRL20 + BRL20
	 <pre> A1 13NO 23NO 33NO 43NO 53NO 61NC 73NO 83NO A2 14 24 34 44 54 62 74 84                     </pre>	71Z	7	1	RL4RA040... + BRL11 + BRL20
	 <pre> A1 13NO 23NO 33NO 43NO 53NO 61NC 71NC 83NO A2 14 24 34 44 54 62 72 84                     </pre>	62Z	6	2	RL4RA040... + BRL11 + BRL11
Type Y	 <pre> A1 13NO 21NC 33NO 43NO 53NO 61NC A2 14 22 34 44 54 62                     </pre>	42Y	4	2	RL4RA031... + BC_F10 + BC_F01
	 <pre> A1 13NO 21NC 33NO 43NO 53NO 61NC A2 14 22 34 44 54 62                     </pre>	42Y	4	2	RL4RA031... + BRL11
	 <pre> A1 13NO 21NC 33NO 43NO 53NO 61NC 71NC 83NO A2 14 22 34 44 54 62 72 84                     </pre>	53Y	5	3	RL4RA031... + BC_F10 + BC_F01 + BC_F01 + BC_F10
	 <pre> A1 13NO 21NC 31NC 43NO 53NO 61NC 71NC 83NO A2 14 22 32 44 54 62 72 84                     </pre>	44Y	4	4	RL4RA022... + BC_F10 + BC_F01 + BC_F01 + BC_F10
	 <pre> A1 13NO 21NC 31NC 43NO 53NO 61NC A2 14 22 32 44 54 62                     </pre>	33Y	3	3	RL4RA022... + BC_F10 + BC_F01
	 <pre> A1 13NO 21NC 31NC 43NO 53NO 61NC A2 14 22 32 44 54 62                     </pre>	33Y	3	3	RL4RA022... + BRL11
	 <pre> A1 13NO 23NO 33NO 43NO 55NC 67NO 73NO 83NO A2 14 24 34 44 56 68 74 84                     </pre>				RL4RA040... + BTLF...C + BRL20
	 <pre> A1 13NO 23NO 33NO 43NO 57NO 65NC 73NO 83NO A2 14 24 34 44 58 66 74 84                     </pre>				RL4RA040... + BTLF...D + BRL20
	 <pre> A1 13NO 23NO 33NO 43NO 55NC 67NO 71NC 83NO A2 14 24 34 44 56 68 72 84                     </pre>				RL4RA040... + BTLF...C + BRL11
 <pre> A1 13NO 23NO 33NO 43NO 57NO 65NC 71NC 83NO A2 14 24 34 44 58 66 72 84                     </pre>				RL4RA040... + BTLF...D + BRL11	



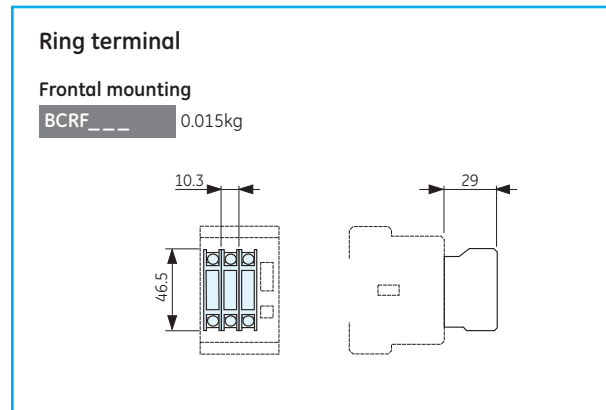
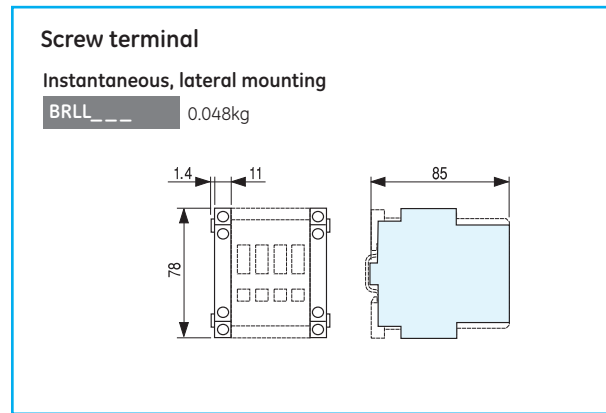
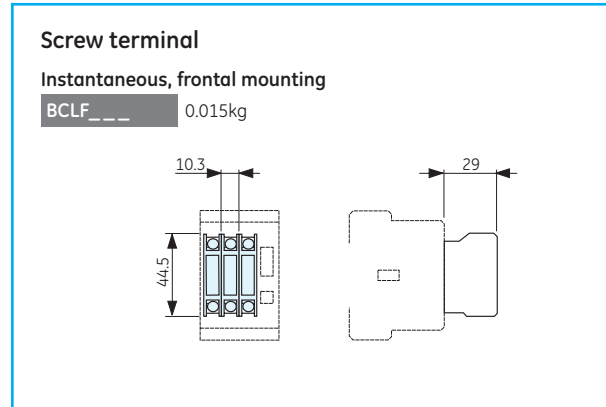


## Dimensional drawings

### Auxiliary contactors



### Instantaneous auxiliary contact blocks



Dimensions in mm (inch = mm x 0.03937) - Weight in kg (lb = kg x 2.2046)



Dimensions

Intro

A

B

C

D

E

F

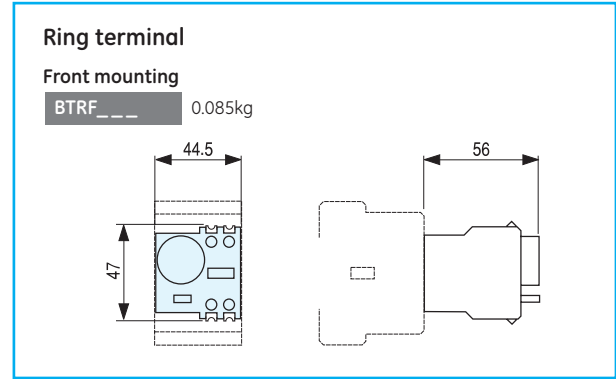
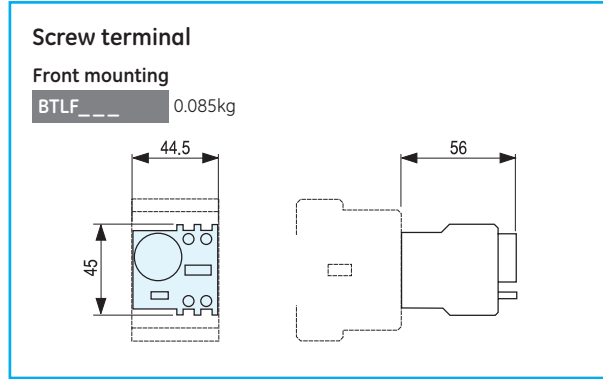
G

H

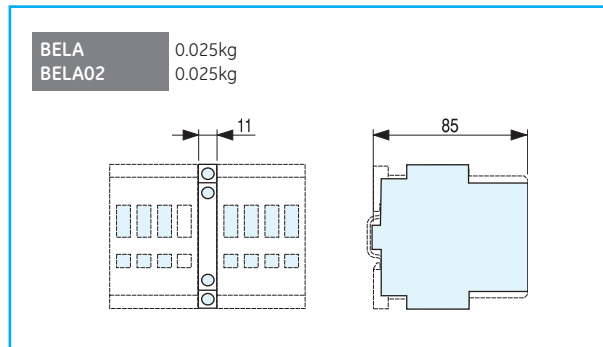
I

X

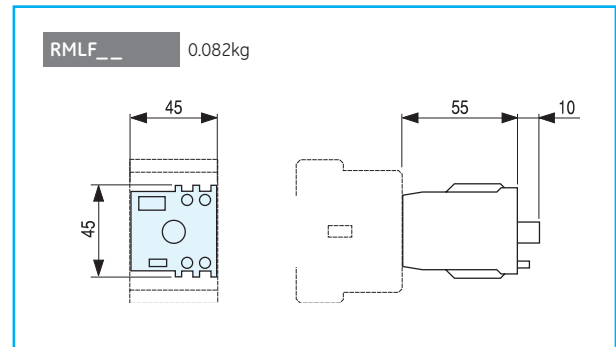
## Timed auxiliary contact blocks



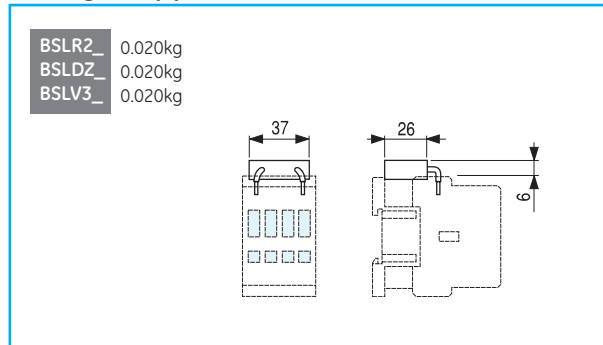
## Mechanical (-/electrical) interlock



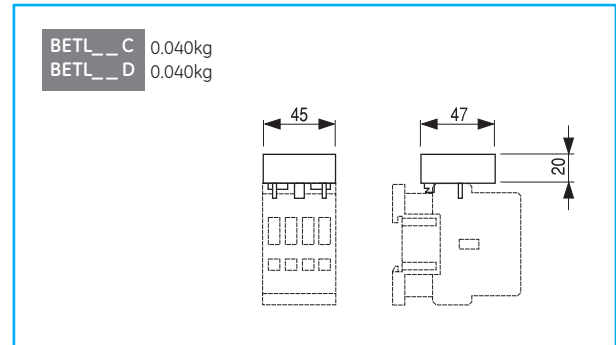
## Mechanical latch block



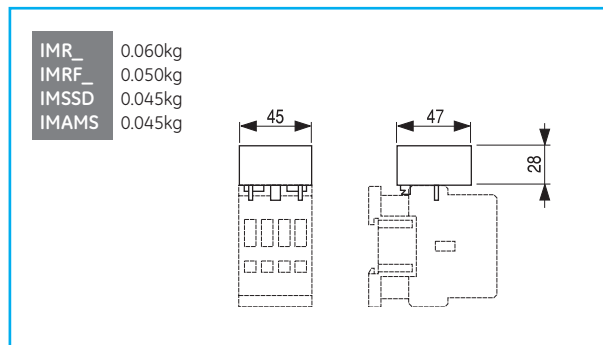
## Voltage suppressor blocks



## Electronic timer block



## Interface



Dimensions in mm (inch = mm x 0.03937) - Weight in kg (lb = kg x 2.2046)

## Conformity to standards

IEC/EN 60947-1	GB14048.4
IEC/EN 60947-5-1	UL508
EN50011	UL486E
EN50012	CSA2.22-14
EN50005	NF F16 101/102

## Approvals/Marking



## Ambient conditions

Storage temperature	-55°C to +80°C
Operation temperature	-40°C to +55°C
Without TOR	-40°C to +60°C
	-40°C to +70°C <sup>(1)</sup>
Altitude	<2000m

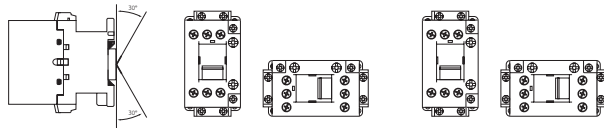
(1) From 100% to 110% of rated control voltage, no auxiliary blocks

## Climatic resistance (IEC 68-2)

<b>Continuous tests 40 / 125 / 56</b>	
Cold (72h)	Temperature -40°C
Dry heat (96h)	Temperature +125°C Relative humidity < 50%
Humid heat (56h)	Temperature +40°C Relative humidity 95%
Cyclic test (6 cycles)	Humid heat
First half-cycle	Low temperature +25°C Relative humidity 93%
Second half-cycle	Low temperature +55°C Relative humidity 95%

## Mounting positions

### Installation capabilities



### With derating values



-10% connection voltage  
+10% disconnection voltage with same rated power, data compared to vertical mounting

## Terminal capacity and tightening torque

Conventional thermal current (I <sub>th</sub> )	Head type	ECAC	
		ECAC	ECACE
<b>Box terminals</b>			
Solid, stranded and finely stranded without ferrule (mm <sup>2</sup> )	Slot & PZ2	0.75	
Finely stranded with ferrule (mm <sup>2</sup> )	Slot & PZ2	0.75	
Finely stranded without ferrule (mm <sup>2</sup> )	Slot & PZ2	0.75	
AWG		18 ... 10	
Tightening torque (Nm)		2.2	
		(Lb x in.)	20

## Coil Terminal capacity and tightening torque

Tightening torque		0.8Nm - 7Lb/in
Solid wire (mm <sup>2</sup> )	0.75 to 2x2	
Flexible wire without terminal (mm <sup>2</sup> )	0.75 to 2.5x2	
Flexible wire without terminal with cap (mm <sup>2</sup> )	0.75 to 2.5x21	

## Control circuit

	ECACA	ECACD	ECACE
Rated insulation voltage U <sub>i</sub> (V)	1000	1000	1000
Standard voltages U <sub>s</sub>			
50Hz (V)	24 ... 690	-	24-250
60Hz (V)	24 ... 600	-	24-250
DC (V)	-	12 ... 440	24-250
Voltage <sup>(1)</sup>			
Operating limits	xU <sub>s</sub> 0.8 ... 1.1	0.7 <sup>(1)</sup> ... 1.25 <sup>(1)</sup>	0.8 ... 1.1
Pick-up	xU <sub>s</sub> 0.65 ... 0.75	0.45 ... 0.65	0.6 ... 0.8
Seal	xU <sub>s</sub> 0.4 ... 0.55	0.15 ... 0.3	0.35 ... 0.55
Consumption			
AC Magnetic circuit closed (VA)	9	-	0.7 - 2.2
Magnetic circuit open (VA)	76.1	-	48.6 - 47.2
DC Magnetic circuit closed (W)	-	3.6 - 7.5	0.6 - 0.1
Magnetic circuit open (W)	-	3.6 - 7.5	3.6 (VA)
Power dissipation (W)	2.4	3.6 - 7.5	
Power factor			
Magnetic circuit closed cos φ	0.24	-	-
Magnetic circuit open cos φ	0.85	-	-
Opening and closing times			
at 0.8 to 1.1 U <sub>s</sub>			
Closing time NO (ms)	6 ... 25	35 ... 65	-
Opening time NO (ms)	6 ... 13	6 ... 13	-
at U <sub>s</sub>			
Closing time NO (ms)	8 ... 20	35 ... 45	25 ... 45
Opening time NO (ms)	6 ... 13	7 ... 12	50 ... 65
Mechanical endurance 10 <sup>6</sup> ops	10	10	10
Maximum rate no load ops/h	7200	7200	7200

1) Wide range coil

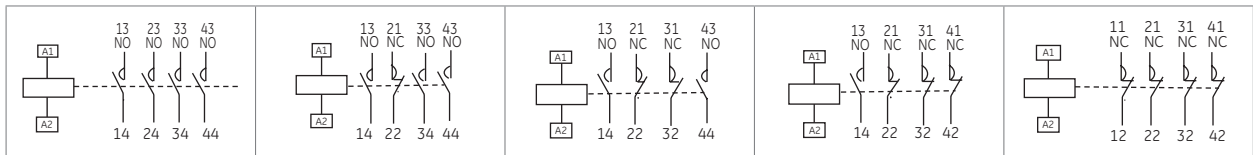


**Built-in auxiliary contacts**



		ECAC	ECFA/ECLA
Rated insulation voltage $U_i$ according to IEC 60947	(V)	1000	1000
Rated thermal current $I_{th}$ at $\theta \leq 55^\circ\text{C}$	(A)	10	10
<b>Making capacity (RMS) acc. to IEC 60947</b>			
AC-15 $U_e \leq 400\text{V}$ , 50-60Hz	(A)	105	60
DC-13 $U_e \leq 220\text{V DC}$	(A)	105	60
<b>Breaking capacity (RMS) acc. to IEC 60947</b>			
AC-15 $U_e \leq 400\text{V}$ , 50-60Hz	(A)	105	60
DC-13 $U_e \leq 220\text{V DC}$	(A)	2	0.95
<b>AC-15</b> rated voltage and current $U_e$ - $I_e$ according to IEC	(V-A)	110/120-10	110/120-6
		220/230-10	220/230-6
		380/400-6	380/400-4
		415/450-5	415/440-3.5
		500-4	500-2.5
690/660-2	660/660-1.5		
according to UL, CSA		A600	A600
<b>DC-13</b> rated voltage and current $U_e$ - $I_e$ according to IEC	(V-A)	24-6	24-4
		48-4	48-2
		110-2	110-0.7
		220-0.7	220-0.3
		440-0.35	440-0.15
according to UL, CSA		Q600	Q600
Electrical endurance	$10^6$ ops.	0.2	0.2
Minimum operational power (operational safety)		17 V - 5mA	10
Short-circuit protection max. fuse class gI-gG without welding	(A)	10	17-5 V-mA
Insulation resistance	Between contacts	( $m\Omega$ )	>10
	Between contacts and earth	( $m\Omega$ )	10
<b>Guaranteed no overlap between NO and NC contacts</b>			
Space		1.3mm	1.6mm for ECFA / 2.2mm for ECLA
Impedance of the contacts	( $m\Omega$ )	2.7	2.7

**Auxiliary contactors**







ECACA440	ECACA431	ECACA422	ECACA413	ECACA404
ECACD440	ECACD431	ECACD422	ECACD413	ECACD404
ECACE440	ECACE431	ECACE422	ECACE413	ECACE404



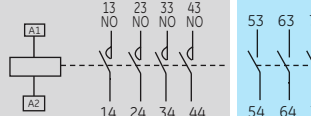









## Terminal numbering according to EN 50011

Auxiliary contacts	Description	 NO	 NC	Possible basic auxiliary contactors + Auxiliary contacts blocks to be added
--------------------	-------------	--	--	---

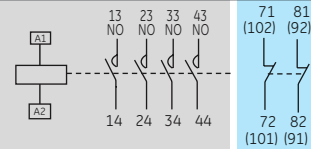

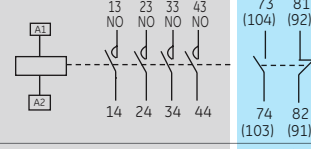

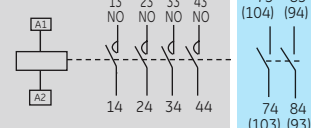

### 4NO auxiliary contactor terminal combination with 2P FRONTAL block

	42E	4	2	ECACA440 ECACD440 ECACE440 +ECFA202	
	60E	6	0	ECACA440 ECACD440 ECACE440 +ECFA220	
	51E	5	1	ECACA440 ECACD440 ECACE440 +ECFA211	



### 4NO auxiliary contactor terminal combination with 4P FRONTAL block

	80E	8	0	ECACA440 ECACD440 ECACE440 +ECFA440	
	44E	4	4	ECACA440 ECACD440 ECACE440 +ECFA440	
	62E	6	2	ECACA440 ECACD440 ECACE440 +ECFA422	
	71E	7	1	ECACA440 ECACD440 ECACE440 +ECFA431	
	53E	5	3	ECACA440 ECACD440 ECACE440 +ECLA413	

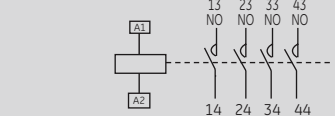

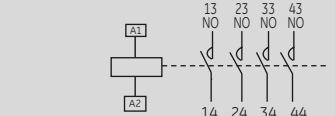

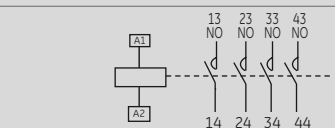

### 4NO auxiliary contactor terminal combination with LATERAL block mounted on the RIGHT side of the contactor

	42	4	2	ECACA440 ECACD440 ECACE440 +ECLA202	
	51	5	1	ECACA440 ECACD440 ECACE440 +ECLA211	
	60	6	0	ECACA440 ECACD440 ECACE440 +ECLA220	

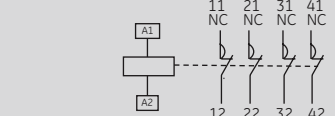

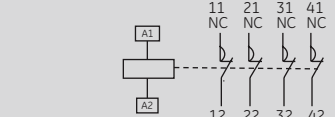

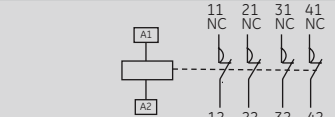

Terminal numbering according to EN 50011 (continued 1)

Auxiliary contacts	Description			Possible basic auxiliary contactors + Auxiliary contacts blocks to be added
--------------------	-------------	---	---	---

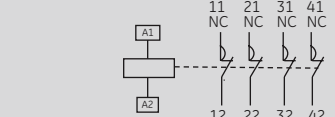

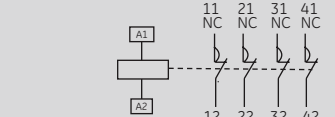

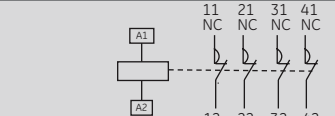

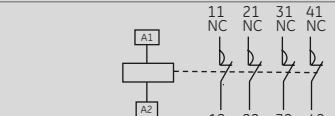

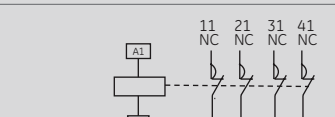

4NO auxiliary contactor terminal combination with LATERAL block mounted on the LEFT side of the contactor

	42	4	2	ECACA440 ECACD440 ECACE440 +ECLA202	
	51	5	1	ECACA440 ECACD440 ECACE440 +ECLA211	
	6	6	0	ECACA440 ECACD440 ECACE440 +ECLA220	

4NC auxiliary contactor terminal combination with 2P FRONTAL block

	06E	6	0	ECACA404 ECACD404 ECACE404 +ECFA202	
	24E	2	4	ECACA404 ECACD404 ECACE404 +ECFA220	
	15E	5	1	ECACA404 ECACD404 ECACE404 +ECFA211	

4NC auxiliary contactor terminal combination with 4P FRONTAL block

	44E	4	4	ECACA404 ECACD404 ECACE404 +ECFA440	
	08E	0	8	ECACA404 ECACD404 ECACE404 +ECFA404	
	26E	2	6	ECACA404 ECACD404 ECACE404 +ECFA422	
	35E	3	5	ECACA404 ECACD404 ECACE404 +ECFA431	
	17E	1	7	ECACA404 ECACD404 ECACE404 +ECLFA413	

## Terminal numbering according to EN 50011 (continued 2)

Auxiliary contacts	Description	NO	NC	Possible basic auxiliary contactors + Auxiliary contacts blocks to be added
--------------------	-------------	----	----	---

### 4NC auxiliary contactor terminal combination with LATERAL block mounted on the RIGHT side of the contactor

	42	0	6	ECACA404 ECACD404 ECACE404 +ECLA202	
	15	1	5	ECACA404 ECACD404 ECACE404 +ECLA211	
	24	2	4	ECACA404 ECACD404 ECACE404 +ECLA220	

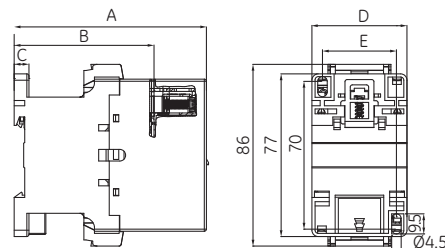
### 4NC auxiliary contactor terminal combination with LATERAL block mounted on the LEFT side of the contactor

	42	4	2	ECACA440 ECACD440 ECACE440 +ECLA202	
	51	5	1	ECACA440 ECACD440 ECACE440 +ECLA211	
	6	6	0	ECACA440 ECACD440 ECACE440 +ECLA220	

## Dimensions and weights

### EC contactors

#### Contactors



Dimensions in mm	ECACA and ECACE	ECACD
A	92	102
B	66.2	76.2
C	7	7
Weight in g	350	620



Everything is under control



## Surion - Manual motor starter

### Order codes

- C.2 **GPS1B - GPS2B** Thermal and magnetic protection
- C.4 **GPS1M - GPS2M** Magnetic protection
- C.6 Auxiliaries
- C.8 Accessories
- C.10 Enclosures

### Technical data

- C.12 Technical performance
- C.16 Mounting possibilities of the auxiliaries
- C.18 Dimensions

## POWER DEVICES

Contactors and overload relays

*Surion*

*Manual Motor Starters and Coordination tables  
see chapter D pages D.11-D.17*

Auxiliary relays and contactors

[Motor protection devices](#)

## SFK - Motor protection circuit breaker

- C.26 Order codes
- C.26 Terminal numbering
- C.26 Technical data
- C.26 Dimensions

## AUXILIARY DEVICES

Applications

Main switches

Control and signalling units

## POWER ELECTRONICS

Speed drive units

Soft starters

## ENCLOSURES

Product overview

Alphabetical index

Intro

A

B

**C**

D

E

F

G

H

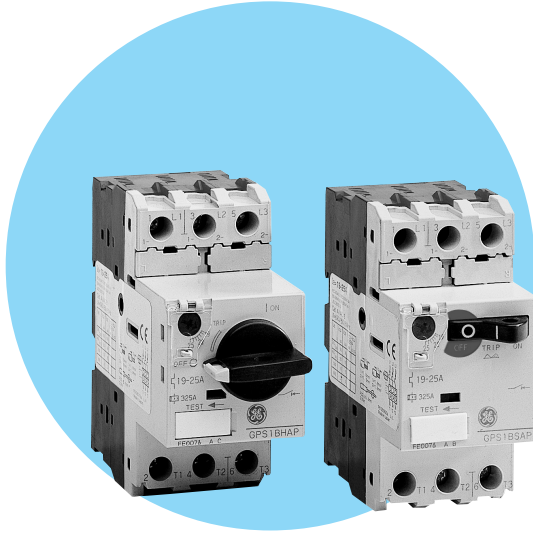
I

X



## Thermal and magnetic protection

### GPS1B - GPS2B



#### Standards/Approvals

IEC 60947-1, 60947-2, 60947-4-1  
 DIN VDE 0660T 100/101/102  
 UL508/CSA - UL508/cULus  
 Shipping approvals:



RINA



Bureau Veritas



Lloyd's Register  
 Germanischer Lloyd



cULus

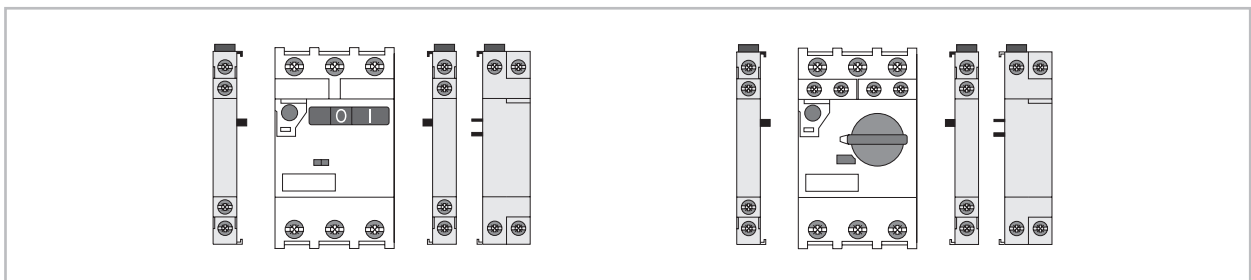


CE

#### Characteristics

- Rocker and rotary handle operator (GPS2 only rotary)
- Thermal and magnetic protection
- Standard and high breaking capacity  
 $I_{cu} = 100kA \geq I_{cs} = 100\% I_{cu}$   
 $I_{cu} < 100kA \geq I_{cs} \text{ min. } 75\% I_{cu}$
- Clear identification of the operation state (ON-OFF-tripped)
- Ambient temperature compensation
- Phase failure protection

#### Auxiliaries



#### Technical performances


Rated current $I_n$	(A)	0.1-63
Rated operational current $I_e$ (A)		0.1-63
Rated power at 400V AC	(kW)	0.02-30
Utilisation category		
IEC 60947-2 (circuit breaker)		A
IEC 60947-4-1 (MMS)		AC-3
Tripping class IEC 60947-4-1		10
Magnetic release $I_e \text{ max.}$	(A)	x13
Mechanical/electrical endurance		
GPS1		100,000/100,000
GPS2		50,000/25,000

- Accessories**
- Auxiliaries ● page C.6
  - Busbar system ● page C.9

- Technical data ● page C.12
- Dimensions ● page C.18
- Coordination tables ● page D.11




**GPS1B - Rocker Handle**

	CLASS 10								
	Rated power 3 phase motors at 400V AC Pn	Rated current In (1)	Thermal current setting range	Instantaneous short-circuit release	Rated ultimate short-circuit breaking capacity at 400V Icu (kA)	Rated service short-circuit breaking capacity at 400V Ics (kA)	Cat. no.	Ref. no.	Pack.
	(kW)	(A)	(A)	(A)					
0.02	0.16	0.10 - 0.16	2.1	100	100	GPS1BSAA	101211	5	
0.06	0.25	0.16 - 0.25	3.3	100	100	GPS1BSAB	101212	5	
0.09	0.4	0.25 - 0.40	5.2	100	100	GPS1BSAC	101213	5	
0.12/0.18	0.63	0.40 - 0.63	8.2	100	100	GPS1BSAD	101214	5	
0.25	1	0.63 - 1.00	13	100	100	GPS1BSAE	101215	5	
0.37/0.55	1.6	1.0 - 1.6	20.8	100	100	GPS1BSAF	101216	5	
0.75	2.5	1.6 - 2.5	32.5	100	100	GPS1BSAG	101217	5	
1.5	4	2.5 - 4.0	52	100	100	GPS1BSAH	101218	5	
2.2	6.3	4.0 - 6.3	81.9	100	100	GPS1BSAJ	101219	5	
3/4	10	6.3 - 10	130	100	100	GPS1BSAK	101220	5	
5.5	13	9 - 13	169	50	38	GPS1BSAL	101221	5	
7.5	16	11 - 16	208	25	19	GPS1BSAM	101222	5	
10	20	14 - 20	260	25	19	GPS1BSAN	101223	5	
11	25	19 - 25	325	25	19	GPS1BSAP	101224	5	
15	32	24 - 32	416	25	19	GPS1BSAR	101225	5	


(1) Rated current: highest thermal current setting range value.

**GPS1B - High breaking capacity.**

	CLASS 10								
	Rated power 3 phase motors at 400V AC Pn	Rated current In (1)	Thermal current setting range	Instantaneous short-circuit release	Rated ultimate short-circuit breaking capacity at 400V Icu (kA)	Rated service short-circuit breaking capacity at 400V Ics (kA)	Cat. no.	Ref. no.	Pack.
	(kW)	(A)	(A)	(A)					
0.02	0.16	0.10 - 0.16	2.1	100	100	GPS1BHAA	101234	5	
0.06	0.25	0.16 - 0.25	3.3	100	100	GPS1BHAB	101235	5	
0.09	0.4	0.25 - 0.40	5.2	100	100	GPS1BHAC	101236	5	
0.12/0.18	0.63	0.40 - 0.63	8.2	100	100	GPS1BHAD	101237	5	
0.25	1	0.63 - 1.00	13	100	100	GPS1BHA E	101238	5	
0.37/0.55	1.6	1 - 1.6	20.8	100	100	GPS1BHAF	101239	5	
0.75	2.5	1.6 - 2.5	32.5	100	100	GPS1BHAG	101240	5	
1.5	4	2.5 - 4.0	52	100	100	GPS1BHAH	101241	5	
2.2	6.3	4.0 - 6.3	81.9	100	100	GPS1BHAJ	101242	5	
3/4	10	6.3 - 10	130	100	100	GPS1BHA K	101243	5	
5.5	13	9 - 13	169	100	100	GPS1BHAL	101244	5	
7.5	16	11 - 16	208	50	38	GPS1BHAM	101245	5	
10	20	14 - 20	260	50	38	GPS1BHAN	101246	5	
11	25	19 - 25	325	50	38	GPS1BHAP	101247	5	
15	32	24 - 32	416	50	38	GPS1BHAR	101248	5	

(1) Rated current: highest thermal current setting range value.

**GPS2B - High breaking capacity**

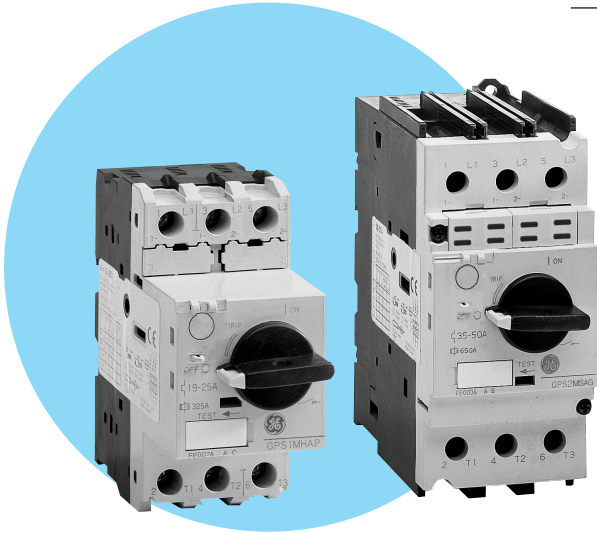
	CLASS 10								
	Rated power 3 phase motors at 400V AC Pn	Rated current In (1)	Thermal current setting range	Instantaneous short-circuit release	Short-circuit breaking capacity at 400V Icu (kA)	Short-circuit breaking capacity at 400V Ics (kA)	Cat. no.	Ref. no.	Pack.
	(kW)	(A)	(A)	(A)					
3/4	10	6.3 - 10	130	100	100	GPS2BHAK	101249	1	
5.5	13	9 - 13	169	100	100	GPS2BHAL	107120	1	
7.5	16	11 - 16	208	50	38	GPS2BHAM	101250	1	
10	20	14 - 20	260	50	38	GPS2BHAN	101251	1	
11	25	19 - 25	325	50	38	GPS2BHAP	101252	1	
15	32	24 - 32	416	50	38	GPS2BHAR	101253	1	
18.5	40	28 - 40	520	50	38	GPS2BHAS	101254	1	
22	50	35 - 50	650	50	38	GPS2BHAT	101255	1	
30	63	45 - 63	819	50	38	GPS2BHAU	101256	1	

(1) Rated current: highest thermal current setting range value.



## Magnetic protection

### GPS1M - GPS2M



### Standards/Approvals

IEC 60947-1, 60947-2, 60947-4-1  
 DIN VDE 0660T 100/101/102  
 UL508/CSA - UL508/cULus  
 Shipping approvals:



RINA



Bureau Veritas



Lloyd's Register  
 Germanischer Lloyd



cULus

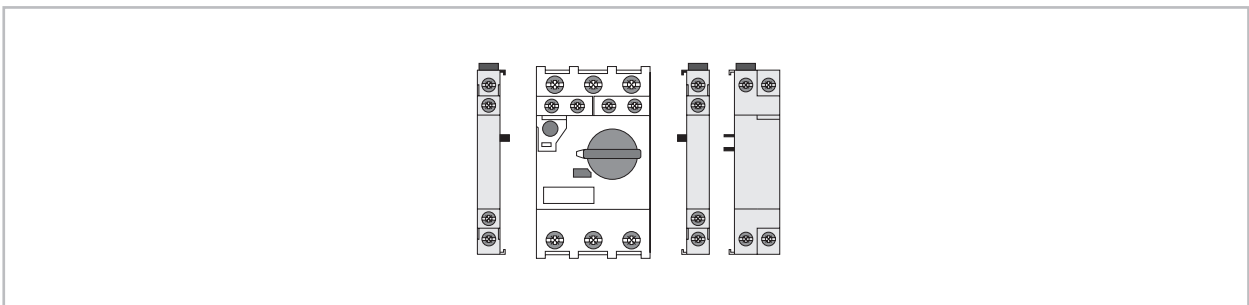


CE

### Characteristics

- Short-circuit protection for starters
- Rocker and rotary handle operator (GPS2 only rotary)
- Magnetic protection
- Standard and high breaking capacity  
 $I_{cu} = 100kA \geq I_{cs} = 100\% I_{cu}$   
 $I_{cu} < 100kA \geq I_{cs} \text{ min. } 75\% I_{cu}$
- Clear identification of the operation state (ON-OFF-tripped)

### Auxiliaries



#### Accessories

- Auxiliaries ● page C.6
- Busbar system ● page C.9

- Technical data ● page C.12
- Dimensions ● page C.18
- Coordination tables ● page D.11

### Technical performances

<b>Rated current <math>I_n</math></b>	(A) 0.1-63
<b>Rated operational current <math>I_e</math></b>	(A) 0.1-63
<b>Utilisation category</b>	A
IEC 60947-2 (circuit breaker)	
<b>Magnetic release <math>I_e \text{ max.}</math></b>	(A) x13
<b>Mechanical/electrical endurance</b>	
GPS1	100,000/100,000
GPS2	50,000/25,000



### GPS1M - High breaking capacity



Rated power 3 phase motors at 400V AC Pn	Rated current In	Thermal current setting range (1)	Instantaneous short-circuit release	Rated ultimate short-circuit breaking capacity at 400V Icu (kA)	Rated service short-circuit breaking capacity at 400V Ics (kA)	Cat. no.	Ref. no.	Pack.
(kW)	(A)	(A)	(A)					
0.02	0.16	-	2.1	100	100	GPS1MHAA	101280	5
0.06	0.25	-	3.3	100	100	GPS1MHAB	101281	5
0.09	0.4	-	5.2	100	100	GPS1MHAC	101282	5
0.12/0.18	0.63	-	8.2	100	100	GPS1MHAD	101283	5
0.25	1	-	13	100	100	GPS1MHAE	101284	5
0.37/0.55	1.6	-	20.8	100	100	GPS1MHAF	101285	5
0.75	2.5	-	32.5	100	100	GPS1MHAG	101286	5
1.5	4	-	52	100	100	GPS1MHAH	101287	5
2.2	6.3	-	81.9	100	100	GPS1MHAJ	101288	5
3/4	10	-	130	100	100	GPS1MHAK	101289	5
5.5	13	-	169	100	100	GPS1MHAL	101290	5
7.5	16	-	208	50	38	GPS1MHAM	101291	5
10	20	-	260	50	38	GPS1MHAN	101292	5
11	25	-	325	50	38	GPS1MHAP	101293	5
15	32	-	416	50	38	GPS1MHAR	101294	5

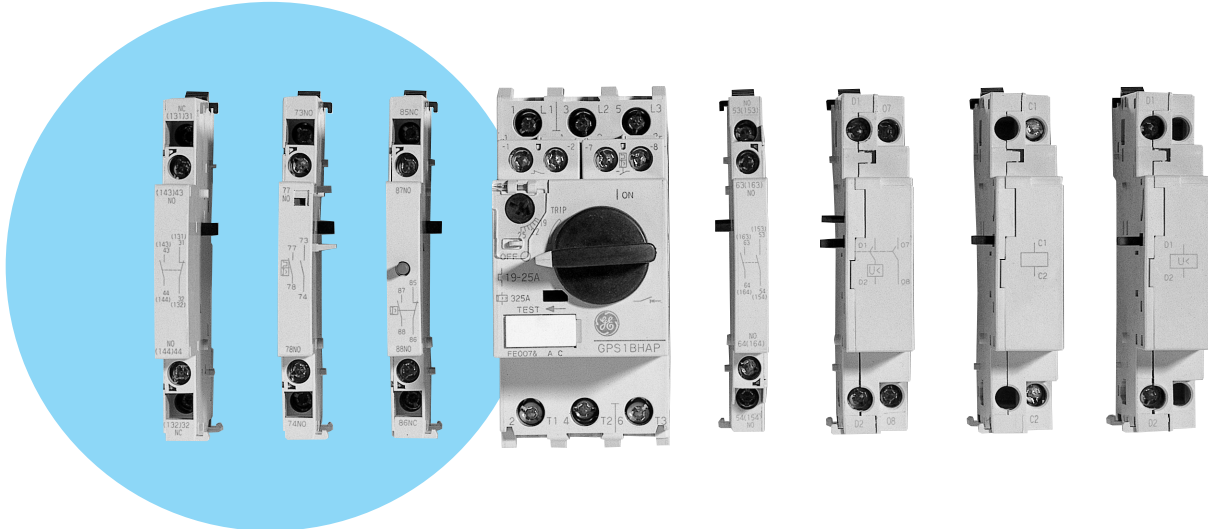
(1) Select appropriate thermal overload relay for the starter. See chapter A pages A.56 - A.61.

### GPS2M - High breaking capacity



Rated power 3 phase motors at 400V AC Pn	Rated current In	Thermal current setting range (1)	Instantaneous short-circuit release	Rated ultimate short-circuit breaking capacity at 400V Icu (kA)	Rated service short-circuit breaking capacity at 400V Ics (kA)	Cat. no.	Ref. no.	Pack.
(kW)	(A)	(A)	(A)					
4	10	-	130	100	100	GPS2MHAK	101295	1
5.5	13	-	169	100	100	GPS2MHAL	107122	1
7.5	16	-	208	50	38	GPS2MHAM	101296	1
10	20	-	260	50	38	GPS2MHAN	101297	1
11	25	-	325	50	38	GPS2MHAP	101298	1
15	32	-	416	50	38	GPS2MHAR	101299	1
18.5	40	-	520	50	38	GPS2MHAS	101300	1
22	50	-	650	50	38	GPS2MHAT	101301	1
30	63	-	819	50	38	GPS2MHAU	101302	1

(1) Select appropriate thermal overload relay for the starter. See chapter A pages A.56 - A.61.



Standards/Approvals

IEC 60947-1, 60947-2, 60947-4-1  
 DIN VDE 0660T 100/101/102  
 UL508/CSA - UL508/cULus  
 Shipping approvals:



RINA



Bureau Veritas



Lloyd's Register  
 Germanischer Lloyd



cULus

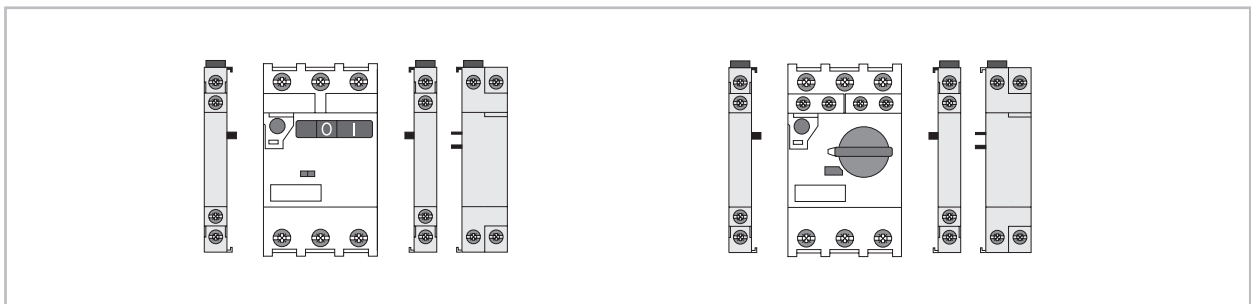


CE

Product range

- Auxiliary contacts (frontal & lateral)
- Alarm contact block
- Auxiliary and alarm contact block
- Short-circuit alarm contact block
- Shunt trip
- Undervoltage release
- Undervoltage release with 2NO early make contacts
- External handle operator
- Terminal protector
- Busbar system

Auxiliaries



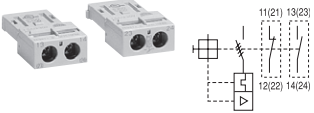
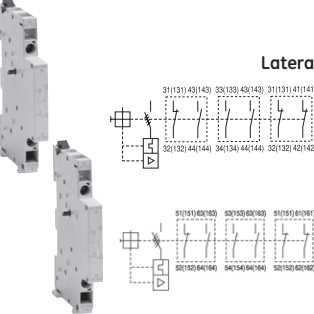
Technical performances

- All auxiliaries can be mounted and changed easily, without any tools
- Both frames GPS1 and GPS2 uses same auxiliaries
- All terminals are capable for 2 cables (0.5mm<sup>2</sup> - 2.5mm<sup>2</sup>)
- Side auxiliary contacts are rated to A600, P300 duty
- Frontal auxiliary contacts are rated to B300, Q300 duty
- Minimum operational contact 5mA, 17V DC
- All terminal screwhead are Pozidriv 2 and slotted combination

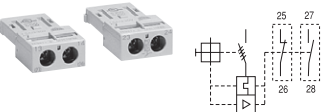
Technical data ● page C.12  
 Dimensions ● page C.18  
 Coordination tables ● page D.11



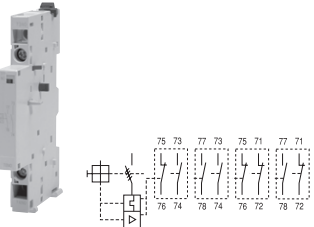
### Auxiliary contact blocks

	Description	For use with	Type	Cat. no.	Ref. no.	Pack.
	<b>Frontal</b> Maximum 2 auxiliary contact blocks per manual motor starter	GPS1... and GPS2...	1 NO	<b>GPAC10FBA</b>	101303	10
		GPS1... and GPS2...	1 NC	<b>GPAC01FBA</b>	101304	10
	<b>Lateral</b> Two contacts Side mounting on the <b>left</b>	GPS1... and GPS2...	1 NO + 1 NC	<b>GPAC11LLA</b>	101305	10
		GPS1... and GPS2...	2 NO	<b>GPAC20LLA</b>	101306	10
		GPS1... and GPS2...	2 NC	<b>GPAC02LLA</b>	101307	10
	Two contacts Side mounting on the <b>right</b>	GPS1... and GPS2...	1 NO + 1 NC	<b>GPAC11LRA</b>	101308	10
		GPS1... and GPS2...	2 NO	<b>GPAC20LRA</b>	101309	10
		GPS1... and GPS2...	2 NC	<b>GPAC02LRA</b>	101310	10

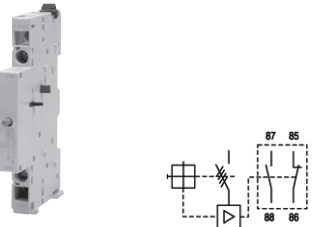
### Alarm contact block

	Description	For use with	Type	Cat. no.	Ref. no.	Pack.
	Frontal mounting on the <b>right</b> Single contact	GPS1... and GPS2...	1 NO	<b>GPAL10FRA</b>	101311	10
		GPS1... and GPS2...	1 NC	<b>GPAL01FRA</b>	101312	10

### Auxiliary / alarm contact block

	Description	For use with <sup>(1)</sup>	Type	Cat. no.	Ref. no.	Pack.
	Side mounting on the <b>left</b>	GPS1... and GPS2...	1 NO(Alarm)+1 NO(Aux)	<b>GPAD1010LLA</b>	101313	10
		GPS1... and GPS2...	1 NO(Alarm)+1 NC(Aux)	<b>GPAD1001LLA</b>	101314	10
	Two contacts	GPS1... and GPS2...	1 NC(Alarm)+1 NO(Aux)	<b>GPAD0110LLA</b>	101315	10
		GPS1... and GPS2...	1 NC(Alarm)+1 NC(Aux)	<b>GPAD0101LLA</b>	101316	10

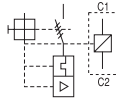
### Short-circuit alarm contact block

	Description	For use with	Type	Cat. no.	Ref. no.	Pack.
	Side mounting on the <b>left</b> Two contacts NO + NC Mechanical indication marking	GPS1... and GPS2...	1 NO + 1 NC	<b>GPAE11LLA</b>	101317	10

(1) If an alarm contact block is used together with an undervoltage trip device, the alarm contact block will not operate correctly when the MMS is automatically tripped due to undervoltage.

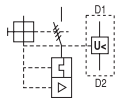


**Shunt trip device**



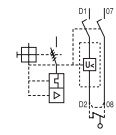
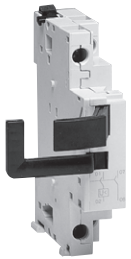
Description	For use with	Coil voltage	Cat. no.	Ref. no.	Pack.
Side mounting on the <b>right</b> Can not be used together with the undervoltage trip device	GPS1... and GPS2...	24V 50/60Hz	GPASLRAA1	101318	5
	GPS1... and GPS2...	48V 60Hz	GPASLRAAF	101319	5
	GPS1... and GPS2...	48V 50Hz / 60V 60Hz	GPASLRAAG	101320	5
	GPS1... and GPS2...	110/127V 50Hz / 120V 60Hz	GPASLRAAJ	101321	5
	GPS1... and GPS2...	208V 60Hz	GPASLRAAM	101322	5
	GPS1... and GPS2...	220/230V 50Hz / 240/260V 60Hz	GPASLRAAN	101323	5
	GPS1... and GPS2...	240V 50Hz / 277V 60Hz	GPASLRAAR	101324	5
	GPS1... and GPS2...	380/400V 50Hz	GPASLRAAU	101325	5
	GPS1... and GPS2...	415/440V 50Hz / 460/480V 60Hz	GPASLRAAW	101326	5
	GPS1... and GPS2...	500V 50Hz / 600V 60Hz	GPASLRAAY	101327	5
	GPS1... and GPS2...	24 to 60V DC	GPASLRADD	101328	5
	GPS1... and GPS2...	110 to 240V DC	GPASLRADJ	101329	5
	GPS1... and GPS2...	100V 50/60Hz	GPASLRAA11	101194	5

**Undervoltage trip device**



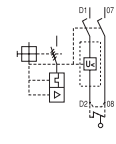
Description	For use with	Coil voltage	Cat. no.	Ref. no.	Pack.
Side mounting on the <b>right</b> Can not be used together with the shunt trip device	GPS1... and GPS2...	24V 50Hz	GPAULRAAD	101330	10
	GPS1... and GPS2...	24V 60Hz	GPAULRAAC	101331	10
	GPS1... and GPS2...	48V 50Hz	GPAULRAAG	101332	10
	GPS1... and GPS2...	48V 60Hz	GPAULRAAF	101333	10
	GPS1... and GPS2...	110/127V 50Hz / 120V 60Hz	GPAULRAAJ	101334	10
	GPS1... and GPS2...	208V 60Hz	GPAULRAAM	101335	10
	GPS1... and GPS2...	220/230V 50Hz / 240/260V 60Hz	GPAULRAAN	101336	10
	GPS1... and GPS2...	240V 50Hz / 277V 60Hz	GPAULRAAR	101337	10
	GPS1... and GPS2...	380/400V 50Hz	GPAULRAAU	101338	10
	GPS1... and GPS2...	415/440V 50Hz / 460/480V 60Hz	GPAULRAAW	101339	10
	GPS1... and GPS2...	500V 50Hz / 600V 60Hz	GPAULRAAY	101340	10
	GPS1... and GPS2...	100V 50/60Hz	GPAULRAA11	102625	10

**With 2NO early make auxiliary contacts**



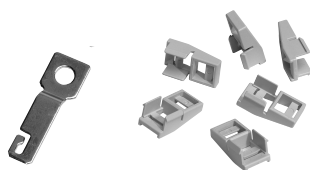
Description	For use with	Coil voltage	Cat. no.	Ref. no.	Pack.
Side mounting on the <b>right</b> Can not be used together with the shunt trip device	GPS1... S...	24V 50Hz	GPAU20LTAAD	101341	10
	GPS1... S...	24V 60Hz	GPAU20LTAAC	101342	10
	GPS1... S...	48V 50Hz	GPAU20LTAAG	101343	10
	GPS1... S...	48V 60Hz	GPAU20LTAAF	101344	10
	GPS1... S...	110/127V 50Hz / 120V 60Hz	GPAU20LTAJ	101345	10
	GPS1... S...	208V 60Hz	GPAU20LTAAM	101346	10
	GPS1... S...	220/230V 50Hz / 240/260V 60Hz	GPAU20LTAAN	101347	10
	GPS1... S...	240V 50Hz / 277V 60Hz	GPAU20LTAAR	101348	10
	GPS1... S...	380/400V 50Hz	GPAU20LTAU	101349	10
	GPS1... S...	415/440V 50Hz / 460/480V 60Hz	GPAU20LTAW	101350	10
	GPS1... S...	500V 50Hz / 600V 60Hz	GPAU20LTAAY	101351	10
	GPS1... S...	100V 50/60Hz	GPAU20LTA11	110360	10

**With 2NO early make auxiliary contacts**



Description	For use with	Coil voltage	Cat. no.	Ref. no.	Pack.
Side mounting on the <b>right</b> Can not be used together with the shunt trip device	GPS1... H and GPS2...	24V 50Hz	GPAU20LCAAD	101352	10
	GPS1... H and GPS2...	24V 60Hz	GPAU20LCAAC	101353	10
	GPS1... H and GPS2...	48V 50Hz	GPAU20LCAAG	101354	10
	GPS1... H and GPS2...	48V 60Hz	GPAU20LCAAF	101355	10
	GPS1... H and GPS2...	110/127V 50Hz / 120V 60Hz	GPAU20LCAAJ	101356	10
	GPS1... H and GPS2...	208V 60Hz	GPAU20LCAAM	101357	10
	GPS1... H and GPS2...	220/230V 50Hz / 240/260V 60Hz	GPAU20LCAAN	101358	10
	GPS1... H and GPS2...	240V 50Hz / 277V 60Hz	GPAU20LCAAR	101359	10
	GPS1... H and GPS2...	380/400V 50Hz	GPAU20LCAAU	101360	10
	GPS1... H and GPS2...	415/440V 50Hz / 460/480V 60Hz	GPAU20LCAAW	101361	10
	GPS1... H and GPS2...	500V 50Hz / 600V 60Hz	GPAU20LCAAY	101362	10
	GPS1... H and GPS2...	100V 50/60Hz	GPAU20LCA11	112185	10

**Terminal protector**



101509


107182

Description	For use with	Cat. no.	Ref. no.	Pack.
Snap-in tabs for screw mounting (set of 10)	GPS1...	GPAKS1A	101509	1
IP20 terminal covers	GPS2...	GPAPTP2A	107182	50
DIN rail vibration clamps	GPS1... / GPS2...	GPVDA	101514	2
Panel vibration clamps	GPS1... / GPS2...	GPVPA	101515	2
Increases vibration resistance of GPS1* from 5G to 8G (5-150Hz) in all directions. One clamp must be mounted on each side which increases total mounting width by 22mm (0.87"). For vibration resistance of GPS2*, contact customer service.				


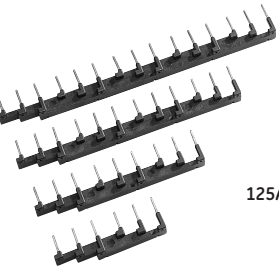





### External handle operator

	Description	For use with	Type	Cat. no.	Ref. no.	Pack.
	Used for distance mounting on a panel Lockable with 1, 2 or 3 padlocks diameter 4 to 8mm Two types: standard and emergency applications ON/OFF/TRIPPING position marking Protection degree: IP54 Shaft mounting depths: 139.8 - 289.8mm for GPA1HAB, GPA1HAR 161 - 311.1mm for GPA2HAB, GPA2HAR Package parts and quantities: 1 handle unit 1 shaft 1 shaft guide 1 latch (screws) 4 mounting screws	GPS1_H...	Standard (black)	GPA1HAB	101363	5
		GPS1_H ...	Emergency (red/yellow)	GPA1HAR	101364	5
		GPS2...	Standard (black)	GPA2HAB	101502	5
		GPS2 ...	Emergency (red/yellow)	GPA2HAR	101503	5

### Busbar system

	Description	For use with	Connection	Cat. no.	Ref. no.	Pack.		
	3-phase feed-in terminals	GPS1...	Terminal capacity: 25mm <sup>2</sup> Pin	GPB1FA	107186	10		
		GPS2...	Terminal capacity: 50mm <sup>2</sup> Pin	GPB2FA	107187	10		
		GPS1...	Terminal capacity: 25mm <sup>2</sup> Fork	SFVB8	254537	1		
	Main busbar 63A max.	Modular spacing 45mm	for 2 GPS1... + frontal auxiliaries	Pin	GPB1B02A	101390	5	
			for 3 GPS1... + frontal auxiliaries	Pin	GPB1B03A	101391	5	
			for 4 GPS1... + frontal auxiliaries	Pin	GPB1B04A	101392	5	
			for 5 GPS1... + frontal auxiliaries	Pin	GPB1B05A	101393	5	
			Modular spacing 54mm	for 2 GPS1... + 9mm lateral aux.	Pin	GPB1B12A	101394	5
	125A max.		for 3 GPS1... + 9mm lateral aux.	Pin	GPB1B13A	101395	5	
			for 4 GPS1... + 9mm lateral aux.	Pin	GPB1B14A	101396	5	
			for 5 GPS1... + 9mm lateral aux.	Pin	GPB1B15A	101397	5	
			Modular spacing 63mm	for 2 GPS1... + 18mm lateral aux. or 2x9mm lateral auxiliary	Fork	GPB1B22A	101398	10
			for 4 GPS1... + 18mm lateral aux. or 2x9mm lateral auxiliary	Fork	GPB1B24A	101399	10	
	Busbar cover	Touch guard for non used space	GPS1...	Pin	GPB1GA	101408	10	
			GPS2...	Pin	GPB2GA	101409	10	
		Terminal cover Type E	For compliance UL508E	GPS1	-	GPAPT1E	107315	1
		When using a Surion GPS1 as a manual self-protected combination motor starter (Type E). Cover enables compliance with NEC Section 430-52, 1" over air creepage and over surface clearance, phase to phase on the line side.						

## Enclosures for manual motor starters



### Product range

- Surface and flush mounting plastic enclosures (IP41 and IP55)
- Neutral and ground connection
- Three different types of push-buttons
  - Mushroom with impulse function
  - Mushroom self latching, unlatching by turning
  - Mushroom self latching, unlatching with a key
- Indicator lamps
- Padlocking device for three padlocks
- Conversion kit IP41 to IP55


### Technical performances

- Used with GPS1\_S manual motor starters
- Protection degree IP41 or IP55
- Possibility to mount frontal/lateral auxiliary contact blocks with an undervoltage release (without or with 2NO early make auxiliary contacts) inside the enclosures







#### Manual motor starter

- GPS1B ● page C.2
- GPS2B ● page C.2
- GPS1M ● page C.4
- GPS2M ● page C.4

**Enclosures for only GPS 1\_S**

	Description	Cat. no.	Ref. no.	Pack.
 <b>Plastic enclosures</b>	Surface mounting IP41	GPES41A	101365	1
	Surface mounting IP55	GPES55A	101366	1
	Flush mounting IP41	GPEF41A	101367	1
	Flush mounting IP55	GPEF55A	101368	1

**Mounting accessories for all enclosures**

	Description	Cat. no.	Ref. no.	Pack.
 <b>Neutral connection</b>	To be used inside the enclosure	GPENA	101369	1
 <b>Adaptor set</b>	For enclosures used with GPS1_S and undervoltage release with 2 NO auxiliary contacts	GPEUTA	107097	1
 <b>Padlocking device</b>	For three padlocks with max. 8mm shackle diameter Not to be used with emergency stop handle	GPEPA	101370	1
 <b>Conversion kit IP41 to IP55</b>		GPECA	101371	1
 <b>Mushroom push-button</b>	Mushroom spring return	GPEPMA	101372	1
	Mushroom self latching, turn to release	GPEPLA	101373	1
	Mushroom self latching, release with a key	GPEPKA	101374	1
 <b>Indicator lamps</b>	Green 110/120V	GPELGAJ	101375	1
	Green 220/240V	GPELGAN	101376	1
	Green 380/440V	GPELGAU	101377	1
	Green 480/500V	GPELGAX	101378	1
	Green 600V	GPELGAY	101379	1
	Red 110/120V	GPELRAJ	101380	1
	Red 220/240V	GPELRAN	101381	1
	Red 380/440V	GPELRAU	101382	1
	Red 480/500V	GPELRAX	101383	1
	Red 600V	GPELRAY	101384	1
	Transparent 110/120V	GPELCAJ	101385	1
	Transparent 220/240V	GPELCAU	101386	1
	Transparent 380/440V	GPELCAU	101387	1
	Transparent 480/500V	GPELCAJ	101388	1
	Transparent 600V	GPELCAJ	101389	1



### General data

Frame size	GPS1	GPS2
Rated insulation voltage U <sub>i</sub>	690V	1000V
Rated operating voltage U <sub>e</sub>	690V AC	690V AC
Rated impulse withstand strength U <sub>imp</sub>	6kV	8kV
Rated frequency	50/60Hz	50/60Hz
Total power loss P (W)	0.16 to 25A 7W 32A 8.5W	up to 32A 11W 40A to 50A 15W 63A 17W
Utilisation category: IEC 947-2 (Circuit breaker)	Cat. A	Cat. A
IEC 947-4-1 (Motor starter)	AC3	AC3
Mechanical operational performance	100,000 (70,000 for 32A)	50,000
Electrical operational performance	100,000 (70,000 for 32A)	25,000
Max. operations per hour (motor start-up)	25	25
Ambient conditions:		
Storage temperature	-40°C to +80°C	-40°C to +80°C
Operation temperature	-25°C to +60°C	-25°C to +60°C
Temperature compensation	-20°C to +60°C	-20°C to +60°C
Ambient temperature compensation	yes	yes
Operational altitude	up to 2000m	up to 2000m
Shock resistance (IEC 68)	30g (width 20ms)	30g (width 20ms)
Vibration resistance	8g (5 to 150Hz)	8g (5 to 150Hz)
Shock -hazard prot. (acc. DIN VDE 0106)	fingerproof	fingerproof
Protection degree (acc. to IEC529)	IP20	IP10 (IP20 with acc GPAPT2A)
Rated current I <sub>e</sub>	up to 32A	up to 63A
Overload protection	IEC 947-4-1	IEC 947-4-1
Phase failure protection	yes	yes
Tripping class	10	10
Magnetic release (factory set)	13xI <sub>emax</sub>	13xI <sub>emax</sub>
Test trip button	yes	yes
Standards & Approvals		
IEC 947-1 / -2 / -4-1	yes	yes
DIN VDE 0660T 100 / 101 / 102	yes	yes
UL508	yes	yes
UL508 type E	Only GPS1_H	yes
CE	yes	yes
cULus	yes	yes
D / S / N / Fi	In process	-
Shipping approvals	yes	yes

### Mounting data

Terminal capacity: Solid or stranded without end sleeve	1 x 1...10mm <sup>2</sup> 2 x 1...6mm <sup>2</sup>	1 or 2 x 1...25mm <sup>2</sup>
Stranded with end sleeve AWG	1 or 2 x 1...6mm <sup>2</sup> 1 x 18...8 / 2 x 18...10	1 x 1...25mm <sup>2</sup> / 2 x 1...16mm <sup>2</sup> 1 x 18...2 / 2 x 18...4
Operating mechanism lockable in OFF position diameter (mm)	3.5 to 4.5	3.5 to 4.5
Terminal type	screw	box
Tightening torque	2 Nm / 18Lb.in	5 Nm / 45 Lb.in
Screwdriver	Pz2 / slotted combination	Pz2 / slotted combination
Mounting:		
DIN-rail	yes	yes
Screws	no	yes
Operating position:		
turning to the front	30°	30°
turning to the back	90°	90°
turning to both sides	180°	180°
Handle operation	Rocker level / Rotary	Rotary
Dimensions		
width (mm)	45	55
height (mm)	90	120
depth (mm)	(GPS1_S) 75 / 92.5 (GPS1_H)	107.5

Ultimate short-circuit breaking capacity (Icu) in kA

For ranges GPS1BSA_ / GPS1MSA_																		
Rated current (A)	A	B	C	D	E	F	G	H	J	K	L	M	N	P	R	S	T	U
220/230V	100	100	100	100	100	100	100	100	100	100	100	100	100	50	50	50	-	-
400/415V	100	100	100	100	100	100	100	100	100	100	50	25	25	25	25	-	-	
440V	100	100	100	100	100	100	100	100	50	15	10	10	10	10	10	-	-	
500/525V	100	100	100	100	100	100	100	100	50	10	6	6	6	6	6	-	-	
600V	100	100	100	100	100	100	3	3	3	3	3	3	3	3	3	-	-	
690V	100	100	100	100	100	100	3	3	3	3	3	3	3	3	3	-	-	

For ranges GPS1BHA_ / GPS1MHA_																		
220/230V	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	-	-	-
400/415V	100	100	100	100	100	100	100	100	100	100	50	50	50	50	50	-	-	
440V	100	100	100	100	100	100	100	100	100	50	35	35	35	35	-	-	-	
500/525V	100	100	100	100	100	100	100	100	50	42	10	10	10	10	-	-	-	
600V	100	100	100	100	100	100	8	8	6	6	6	4	4	4	4	-	-	
690V	100	100	100	100	100	100	8	8	6	6	6	4	4	4	4	-	-	

For ranges GPS2BSA_ / GPS2MSA_																	
220/230V	-	-	-	-	-	-	-	-	-	100	100	100	50	50	50	50	50
400/415V	-	-	-	-	-	-	-	-	-	100	50	25	25	25	25	25	25
440V	-	-	-	-	-	-	-	-	-	15	10	10	10	10	10	10	10
500/525V	-	-	-	-	-	-	-	-	-	10	6	6	6	6	6	5	5
600V	-	-	-	-	-	-	-	-	-	4	4	4	4	4	4	4	4
690V	-	-	-	-	-	-	-	-	-	4	4	4	4	4	4	4	4

For ranges GPS2BHA_ / GPS2MHA_																	
220/230V	-	-	-	-	-	-	-	-	-	100	100	100	100	100	100	100	100
400/415V	-	-	-	-	-	-	-	-	-	100	100	50	50	50	50	50	50
440V	-	-	-	-	-	-	-	-	-	50	50	50	50	35	35	35	35
500/525V	-	-	-	-	-	-	-	-	-	50	42	12	12	12	10	10	10
600V	-	-	-	-	-	-	-	-	-	6	6	5	5	5	5	5	5
690V	-	-	-	-	-	-	-	-	-	6	6	5	5	5	5	5	5

Short-circuit proof with an Icu = 100kA or 50kA

Rated service short-circuit breaking capacity (Ics) in kA

For ranges GPS1BSA_ / GPS1MSA_																		
Rated current (A)	A	B	C	D	E	F	G	H	J	K	L	M	N	P	R	S	T	U
220/230V	100	100	100	100	100	100	100	100	100	100	100	100	100	38	38	-	-	
400/415V	100	100	100	100	100	100	100	100	100	100	38	19	19	19	19	-	-	
440V	100	100	100	100	100	100	100	100	38	11	8	8	8	8	8	-	-	
500/525V	100	100	100	100	100	100	100	100	38	8	5	5	5	5	5	-	-	
600V	100	100	100	100	100	100	2	2	2	2	2	2	2	2	2	-	-	
690V	100	100	100	100	100	100	2	2	2	2	2	2	2	2	2	-	-	

For ranges GPS1BHA_ / GPS1MHA_																	
220/230V	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	-	-
400/415V	100	100	100	100	100	100	100	100	100	100	38	38	38	38	-	-	
440V	100	100	100	100	100	100	100	100	100	38	38	25	25	25	-	-	
500/525V	100	100	100	100	100	100	100	100	38	32	8	8	8	8	-	-	
600V	100	100	100	100	100	100	6	6	5	5	5	3	3	3	-	-	
690V	100	100	100	100	100	100	6	6	5	5	5	3	3	3	-	-	

For ranges GPS2BSA_ / GPS2MSA_																	
220/230V	-	-	-	-	-	-	-	-	-	100	100	100	38	38	38	38	38
400/415V	-	-	-	-	-	-	-	-	-	100	32	19	19	19	19	19	19
440V	-	-	-	-	-	-	-	-	-	12	8	8	8	8	8	8	8
500/525V	-	-	-	-	-	-	-	-	-	8	5	5	5	5	5	4	4
600V	-	-	-	-	-	-	-	-	-	3	3	3	3	3	3	3	3
690V	-	-	-	-	-	-	-	-	-	3	3	3	3	3	3	3	3

For ranges GPS2BHA_ / GPS2MHA_																	
220/230V	-	-	-	-	-	-	-	-	-	100	100	100	100	100	100	100	100
400/415V	-	-	-	-	-	-	-	-	-	100	100	38	38	38	38	38	38
440V	-	-	-	-	-	-	-	-	-	38	38	38	38	25	25	25	25
500/525V	-	-	-	-	-	-	-	-	-	38	32	9	9	9	8	8	8
600V	-	-	-	-	-	-	-	-	-	5	5	4	4	4	4	4	4
690V	-	-	-	-	-	-	-	-	-	5	5	4	4	4	4	4	4

Back-up fuses are necessary in case of possibility of a short-circuit current higher than 100kA or 50kA at the installation point of the device (on request)

Ics = 100% Icu when Icu = 100kA  
Ics = 75% Icu when Icu < 100kA



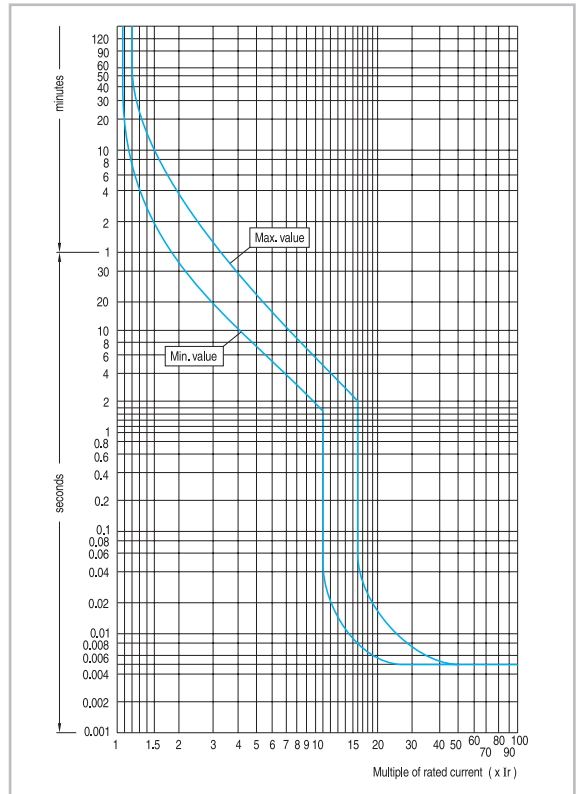
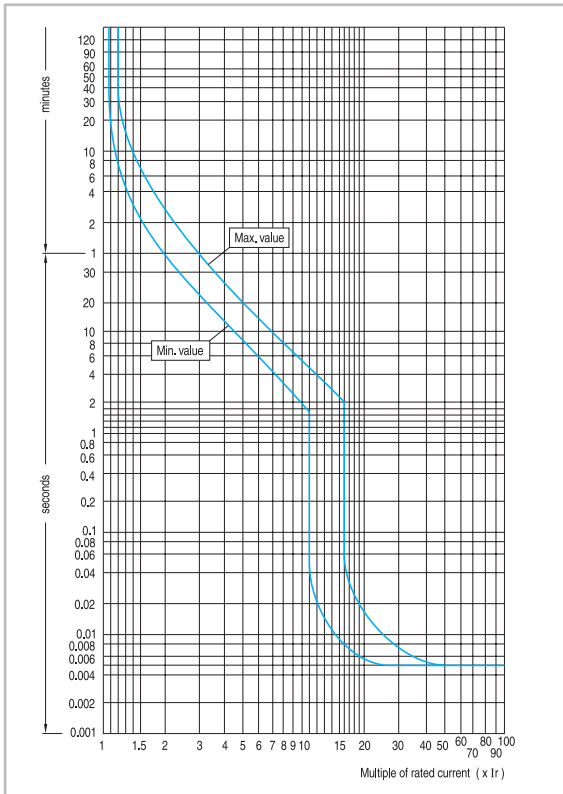
Back-up gl/gG fuses only if  $I_{cs} > I_{cu}$  (kA)

		For ranges GPS1BSA_ / GPS1MSA_																	
gl/gG fuses (A)		A	B	C	D	E	F	G	H	J	K	L	M	N	P	R	S	T	U
		1.6	0.25	0.4	0.63	1	1.6	2.5	4	6.3	10	13	16	20	25	32	40	50	63
230V	#	#	#	#	#	#	#	#	#	#	#	#	#	100	100	100	-	-	-
400V	#	#	#	#	#	#	#	#	#	#	#	80	100	100	100	100	-	-	-
440V	#	#	#	#	#	#	#	#	#	#	50	63	80	80	80	80	-	-	-
500V	#	#	#	#	#	#	#	#	#	50	50	63	63	63	80	80	-	-	-
600V	#	#	#	#	#	#	#	#	20	32	40	50	63	63	80	80	-	-	-
690V	#	#	#	#	#	#	#	20	32	40	50	50	63	63	63	63	-	-	-
		For ranges GPS1BHA_ / GPS1MHA_																	
230V	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	#	-	-	-
400V	#	#	#	#	#	#	#	#	#	#	#	#	100	125	125	125	-	-	-
440V	#	#	#	#	#	#	#	#	#	#	63	63	80	80	100	100	-	-	-
500V	#	#	#	#	#	#	#	#	#	#	50	63	80	80	80	80	-	-	-
600V	#	#	#	#	#	#	#	25	40	50	50	63	63	63	80	80	-	-	-
690V	#	#	#	#	#	#	#	25	40	50	50	63	63	63	63	63	-	-	-
		For ranges GPS2BSA_ / GPS2MSA_																	
230V	-	-	-	-	-	-	-	-	-	-	#	#	#	125	125	125	125	125	160
400V	-	-	-	-	-	-	-	-	-	-	#	80	100	125	125	125	125	125	160
440V	-	-	-	-	-	-	-	-	-	-	63	63	80	80	100	100	125	125	125
500V	-	-	-	-	-	-	-	-	-	-	63	63	80	80	80	80	100	100	125
600V	-	-	-	-	-	-	-	-	-	-	63	63	63	63	80	80	100	100	100
690V	-	-	-	-	-	-	-	-	-	-	63	63	63	63	63	63	63	80	100
		For ranges GPS2BHA_ / GPS2MHA_																	
230V	-	-	-	-	-	-	-	-	-	-	#	#	#	#	#	#	#	#	#
400V	-	-	-	-	-	-	-	-	-	-	#	#	100	125	125	125	125	125	160
440V	-	-	-	-	-	-	-	-	-	-	63	63	80	80	100	100	125	125	125
500V	-	-	-	-	-	-	-	-	-	-	63	63	80	80	80	80	100	100	125
600V	-	-	-	-	-	-	-	-	-	-	80	63	63	63	80	100	100	100	100
690V	-	-	-	-	-	-	-	-	-	-	80	63	63	63	63	63	63	80	100

Back-up gl/gG fuses only if  $I_{cs} > I_{cu}$  (kA)

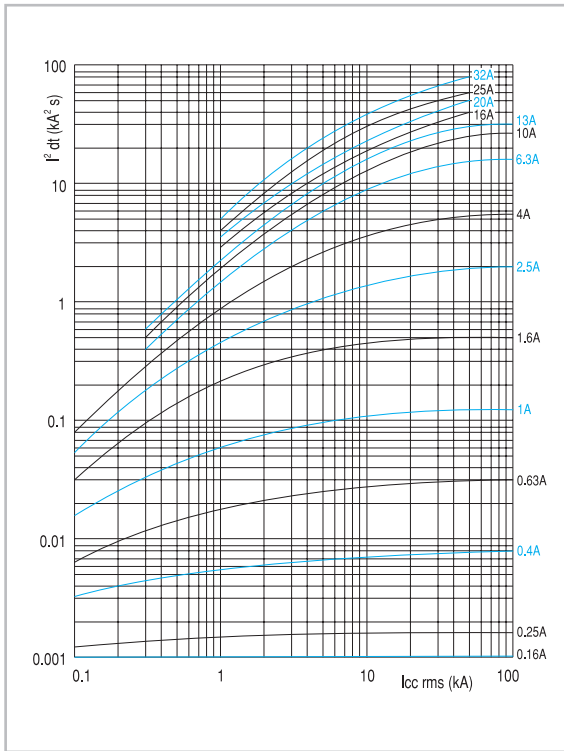
Manual motor starter: GPS1...

Manual motor starter: GPS2...

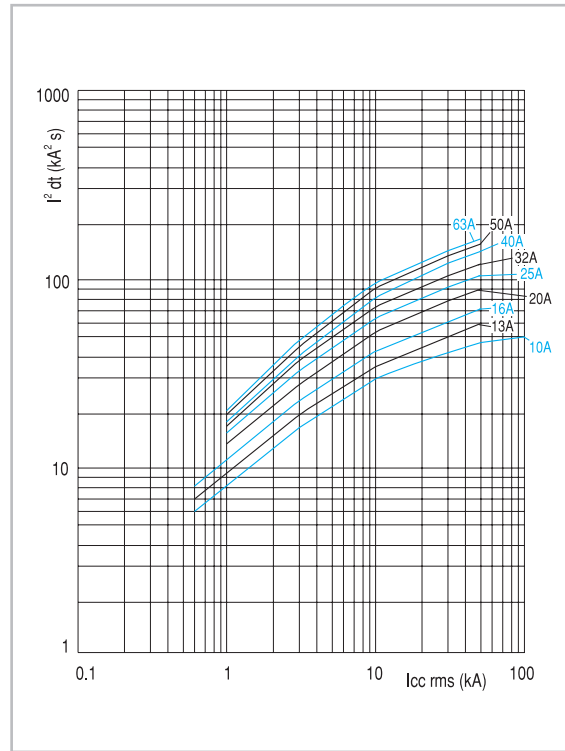


**Specific let-through energy at  $U_e = 400/415\text{ V}$**

Manual motor starter: GPS1...

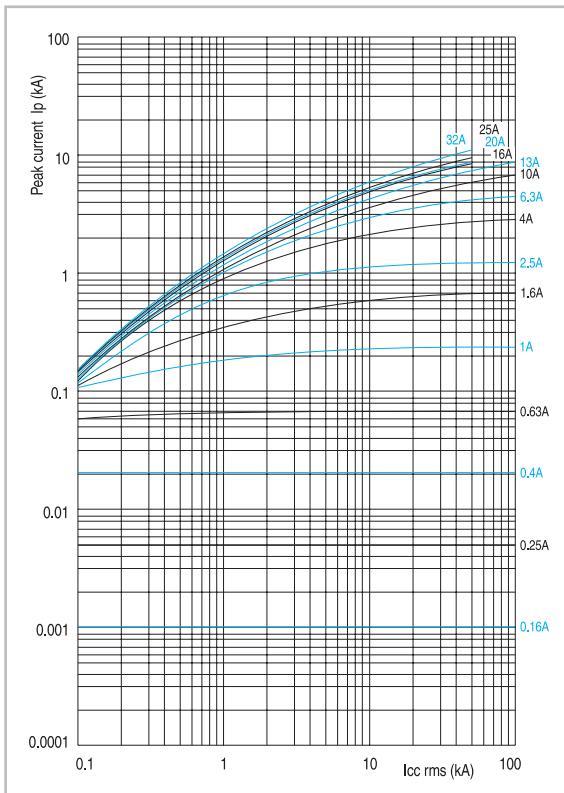


Manual motor starter: GPS2...

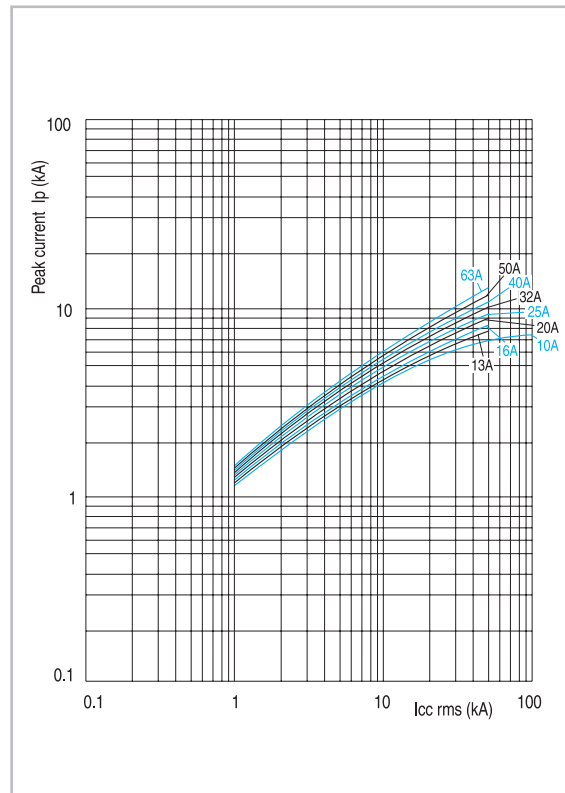


**Peak current limitation at  $U_e = 400/415\text{ V}$**

Manual motor starter: GPS1...



Manual motor starter: GPS2...



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## Mounting possibilities of the auxiliaries



Wiring diagram		Type	Description
	<b>Frontal auxiliaries</b> <b>Auxiliary contact block</b>	1NO or 1NC	Two <u>frontal</u> auxiliary contact blocks can be installed at the same time maintaining the overall width of the manual motor starter.
	<b>Alarm contact block</b>	1NO or 1NC	Installed on the <u>frontal</u> right side. Can be mounted in combination with the frontal auxiliary block. The overall width of the manual motor starter is maintained.
	<b>Lateral auxiliaries</b> <b>Auxiliary contact block</b>	2NO 1NO + 1NC 2NC	Different catalogue numbers for <u>left</u> or <u>right</u> mounting. Maximum number of auxiliary contact blocks mounted on each side: 2. Total number of auxiliary contacts in combination frontal and lateral: 8. Width of each lateral auxiliary contact block: 9mm. GPS1 rated at 32A allows maximum 2 auxiliary contact blocks (4 contacts).
	<b>Auxiliary/alarm contact block</b>	1NO (alarm) + 1NO (auxiliary) 1NO (alarm) + 1NC (auxiliary) 1NC (alarm) + 1NO (auxiliary) 1NC (alarm) + 1NC (auxiliary)	Installed on the <u>left</u> side. Maximum number of blocks per manual motor starter: 1. Can be fitted together with one lateral auxiliary contact block or one short-circuit alarm block mounted on the left side. Width of each lateral alarm/auxiliary contact block: 9mm.
	<b>Short-circuit alarm contact block</b>	1NO + 1NC	Installed on the <u>left</u> side. Tripping in case of short-circuit only. Can be fitted together with one lateral auxiliary contact block or one auxiliary/alarm block mounted on the left side. Width of each short-circuit alarm contact block: 9mm.
	<b>Shunt trip</b>		Installed on the <u>right</u> side. Can not be mounted together with the undervoltage release or any lateral block mounted on the same side. Width of each shunt trip: 18mm.
	<b>Undervoltage trip</b>		Installed on the <u>right</u> side. Can not be mounted together with a shunt trip device or any lateral block mounted on the same side. Width of each undervoltage trip: 18mm.
	<b>Undervoltage trip with 2NO early make auxiliary contacts</b>		Installed on the <u>right</u> side. Two different types, one for the GPS1_S.. and another for the GPS1_H.. and GPS2.. Can not be mounted together with a shunt trip device or any lateral block mounted on the same side. Width of each undervoltage trip: 18mm.

Shunt trip, undervoltage trip and undervoltage with 2NO contacts can be mounted together with any frontal block or left lateral block with above mentioned restrictions





Auxiliaries

Catalogue reference	GPAC_F..	GPAC_L..	GPAL..	GPAD..	GPAE..
	Aux. frontal block	Aux. lateral block	Alarm frontal block	Alarm/aux. lateral block	Short-circuit alarm block
Cont. cap. contacts class (UL508)	B300 / Q300	A600 / P300	B300 / Q300	A600 / P300	A600 / P300
Back-up fuses gG, gI	6A	10A	6A	10A	10A
Utilization category AC-15					
Rated operating voltage Ue (VAC)	48 125 230	48 125 230 400 500 690	48 125 230	48 125 230 400 500 690	48 125 230 400 500 690
Rated operational current (A)	5 3 1.5	6 4 4 2.2 1.5 0.6	5 3 1.5	6 4 4 2.2 1.5 0.6	6 4 4 2.2 1.5 0.6
Utilization category DC-13					
Rated operating voltage Ue (VDC)	48 110 220	48 110 220	48 110 220	48 110 220	48 110 220
Rated operational current (A)	1.38 0.55 0.27	5 1.3 0.5	1.38 0.55 0.27	5 1.3 0.5	5 1.3 0.5
Mounting data					
Mounting side	Front	Left or right	Frontal right	Left	Left
Terminals capacity:					
Solid or stranded without end sleeve	2x0.5...2.5mm <sup>2</sup>	2x0.5...2.5mm <sup>2</sup>	2x0.5...2.5mm <sup>2</sup>	2x0.5...2.5mm <sup>2</sup>	2x0.5...2.5mm <sup>2</sup>
AWG	2x18...14	2x18...14	2x18...14	2x18...14	2x18...14
Terminal type	screw	screw	screw	screw	screw
Tightening torque	0.8Nm	0.8Nm	0.8Nm	0.8Nm	0.8Nm
Screwdriver	Pz2/Slotted	Pz2/Slotted	Pz2/Slotted	Pz2/Slotted	Pz2/Slotted
Dimensions width (mm)	Maintain same width	Increase width 9mm	Maintain same width	Increase width 9mm	Increase width 9mm

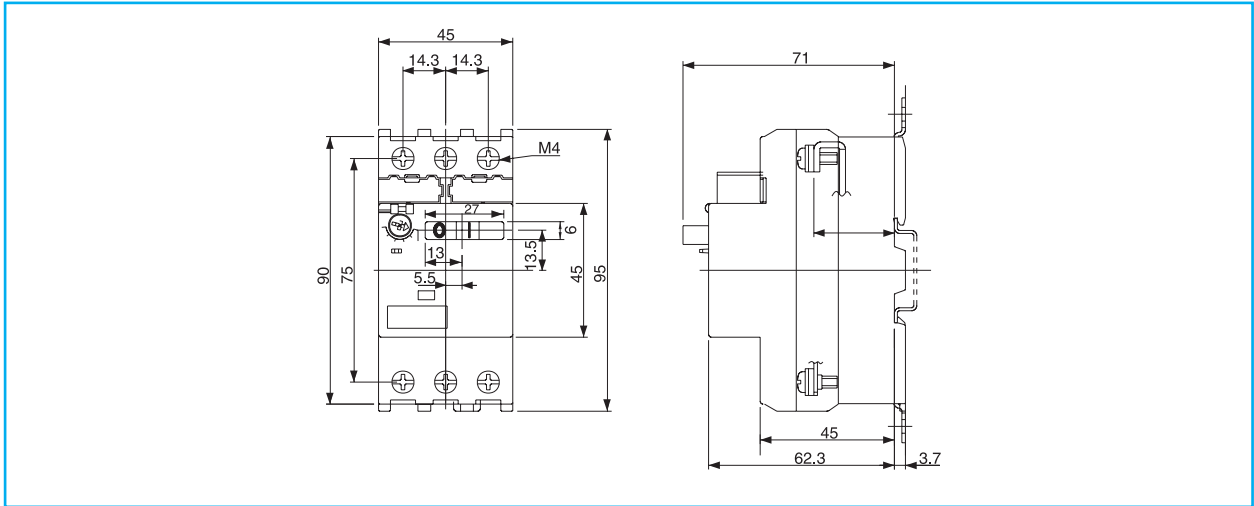
Catalogue reference	GPAU	GPAS
	Undervoltage trip	Shunt trip
Power consumption:		
Pick-up (VA/W)	21/12	21/12
Hold (VA/W)	8/1.2	-
Operating voltage		
Tripping (V)	0.35Ve-0.7Ve	0.7Ve-1.1Ve
Pick-up (V)	0.85Ve-1.1Ve	-
Max. operation supply (ms)	-	5(DC)
Rated operating voltage Ue	24V 50Hz 24V 60Hz 48V 50Hz 48V 60Hz 110/127V 50Hz / 120V 60Hz 208V 60Hz 220/230V 50Hz / 240/260V 60Hz 240V 50Hz / 277V 60Hz 380/400V 50Hz 415/440V 50Hz / 460/480V 60Hz 500V 50Hz / 600V 60Hz	24V 50/60Hz 48V 60Hz 48V 50Hz / 60V 60Hz 110/127V 50Hz / 120V 60Hz 208V 60Hz 220/230V 50Hz / 240/260V 60Hz 240V 50Hz / 277V 60Hz 380/400V 50Hz 415/440V 50Hz / 460/480V 60Hz 500V 50Hz / 600V 60Hz 24 to 60V DC 110 to 240V DC
Contacts class (UL508)	-	-
Back-up fuses (gG,gI)	10A	10A
Mounting data		
Mounting side	Right	Right
Terminals capacity:		
Solid or stranded without end sleeve	2x0.5...2.5mm <sup>2</sup>	2x0.5...2.5mm <sup>2</sup>
AWG	2x18...14	2x18...14
Terminal type	Screw	Screw
Tightening torque	0.8Nm	0.8Nm
Screwdriver	Pz2/Slotted	Pz2/Slotted
Dimensions width (mm)	Increase width 18mm	Increase width 18mm

Detailed dimensions see page C.19

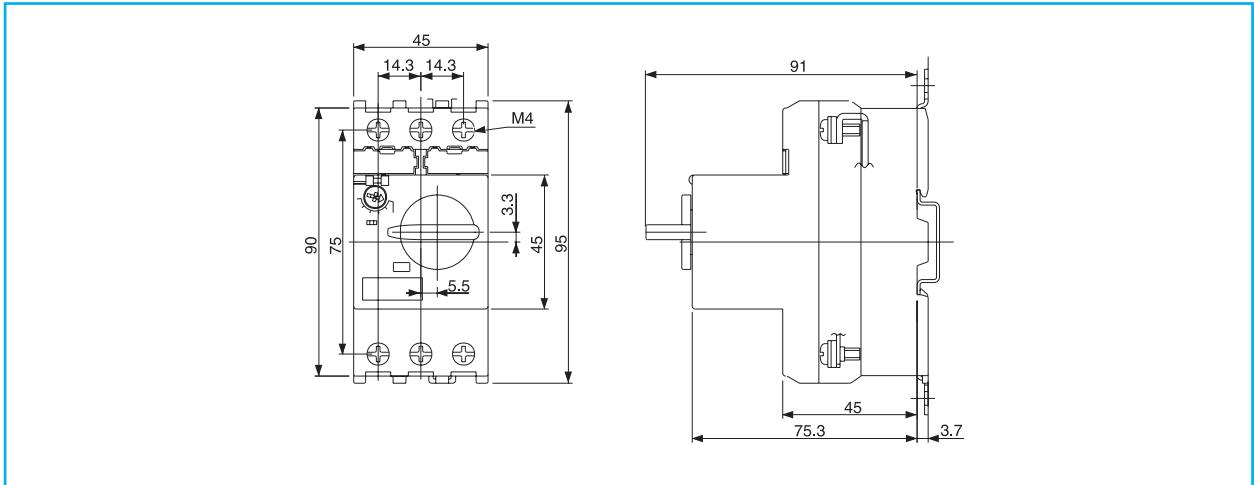


## Dimensional drawings

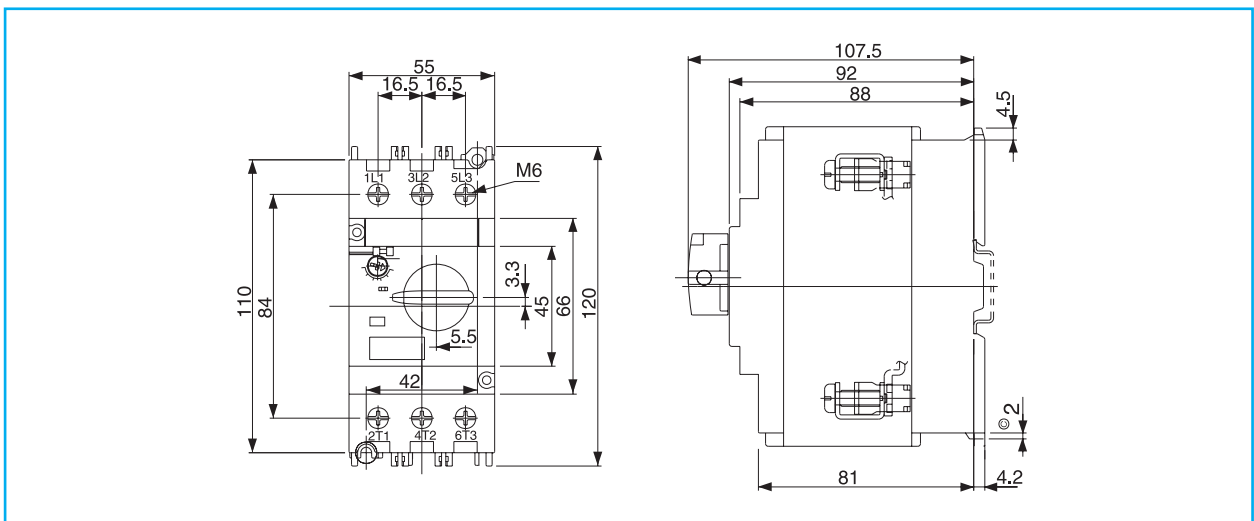
### Manual Motor Starter - GPS1 rocker



### Manual Motor Starter - GPS1 rotary



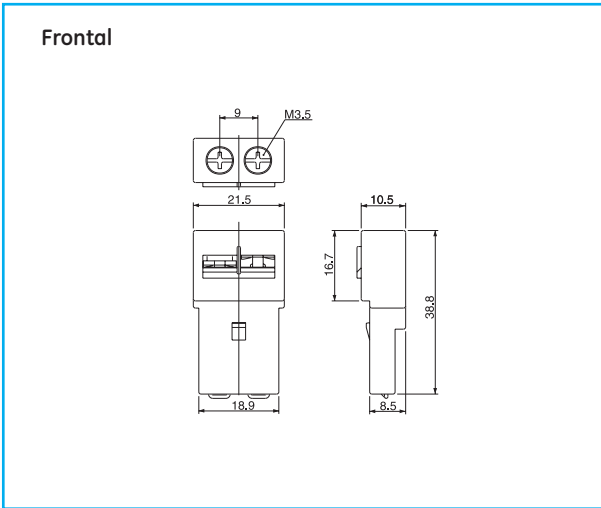
### Manual Motor Starter - GPS2



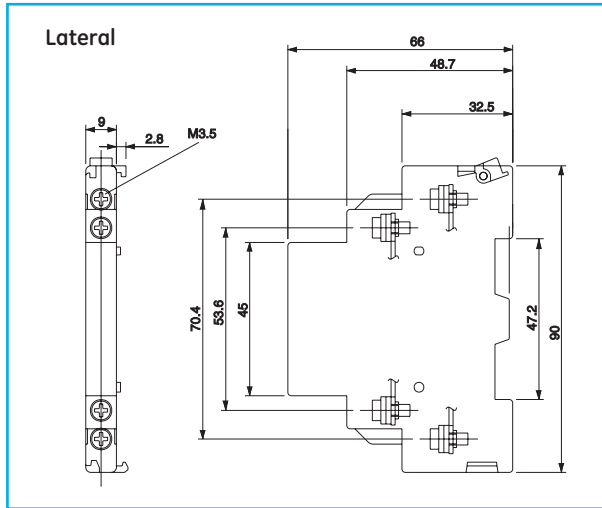
Dimensions in mm (inch = mm x 0.03937) - Weight in kg (lb = kg x 2.2046)



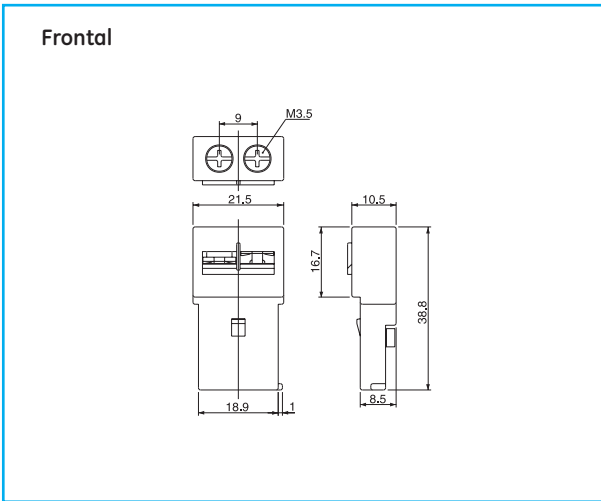
**Auxiliary contact blocks**



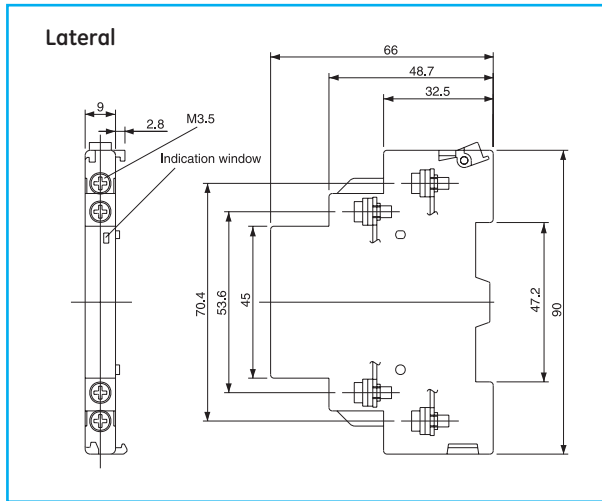
**Auxiliary contact blocks**



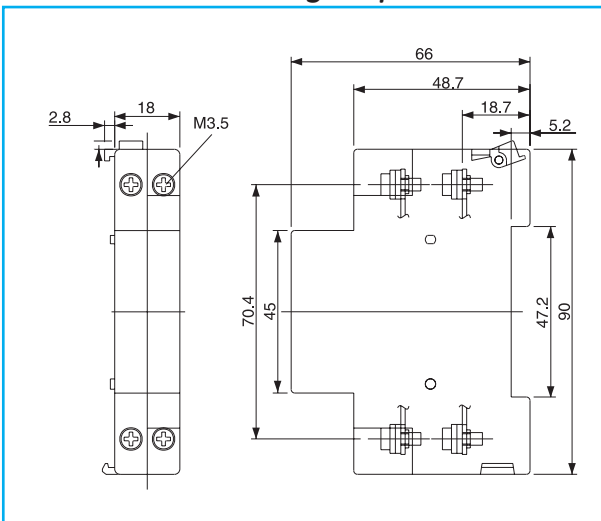
**Alarm contact blocks**



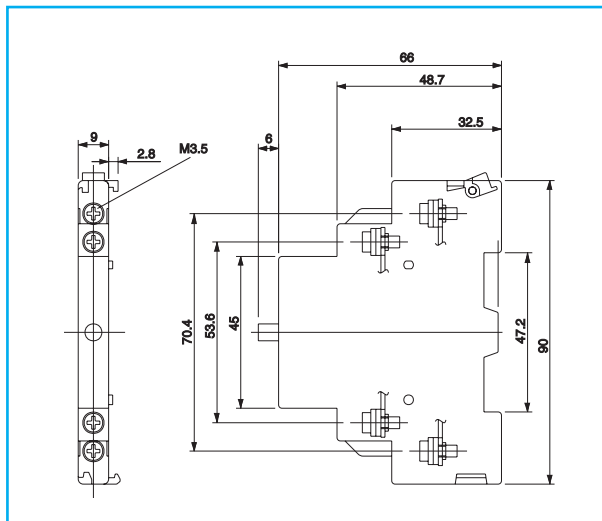
**Alarm contact blocks**



**Shunt and undervoltage trip devices**



**Short-circuit contact block**

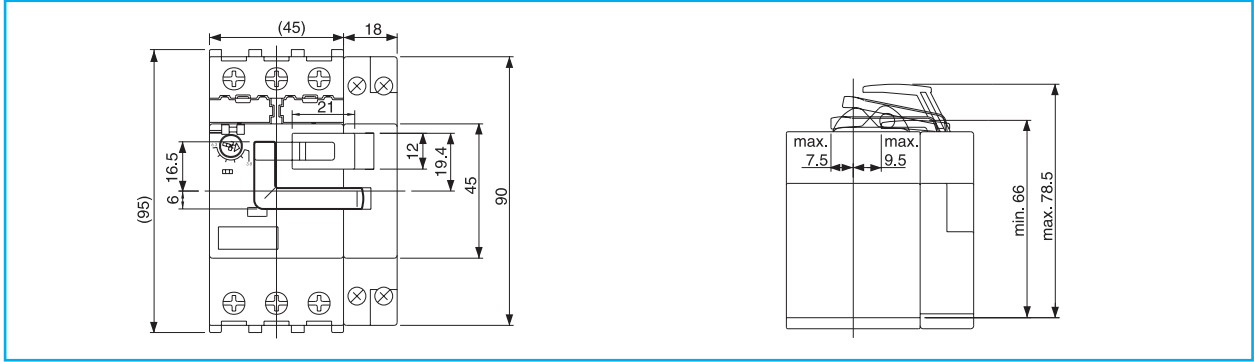


Dimensions in mm (inch = mm x 0.03937) - Weight in kg (lb = kg x 2.2046)

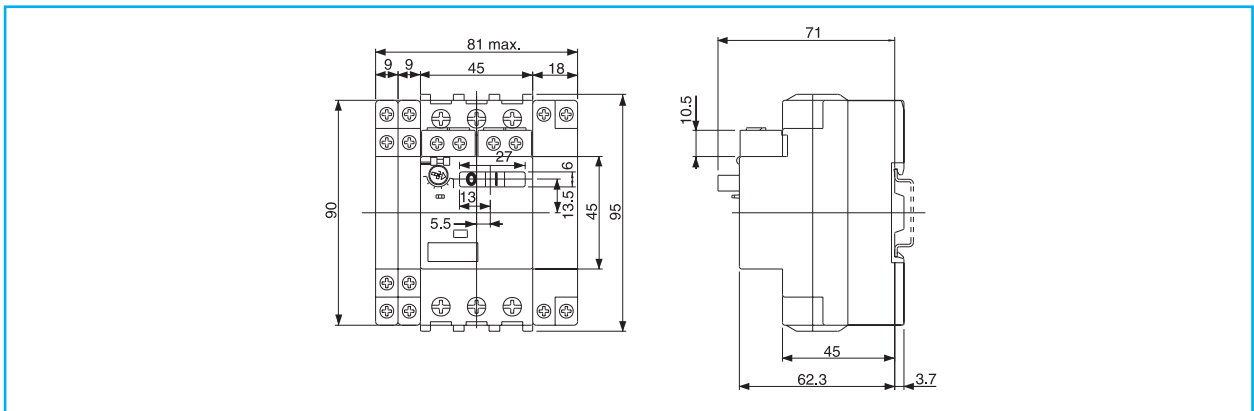


## Dimensional drawings

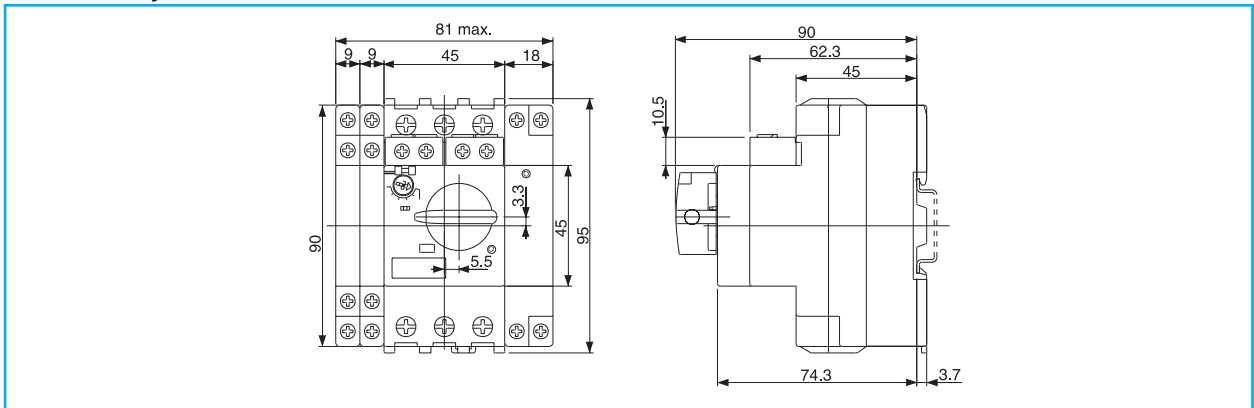
### GPS1 rocker + Undervoltage trip device with 2NO contacts



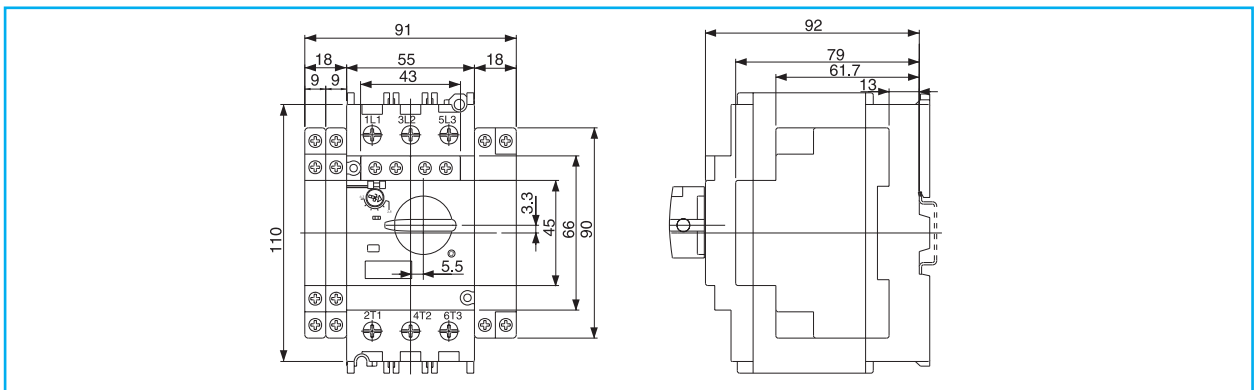
### GPS1 rocker + Auxiliaries



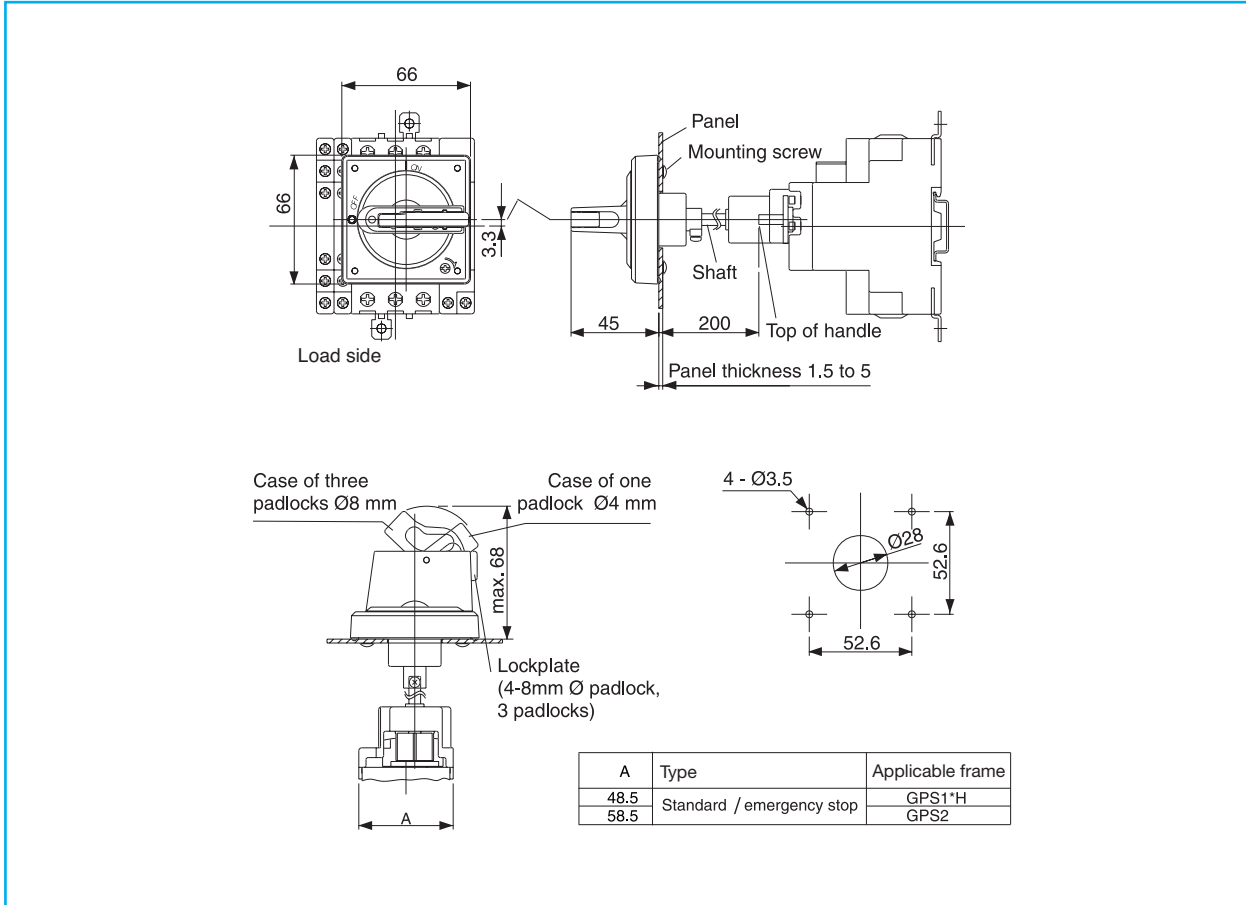
### GPS1 rotary + Auxiliaries



### GPS2 + Auxiliaries

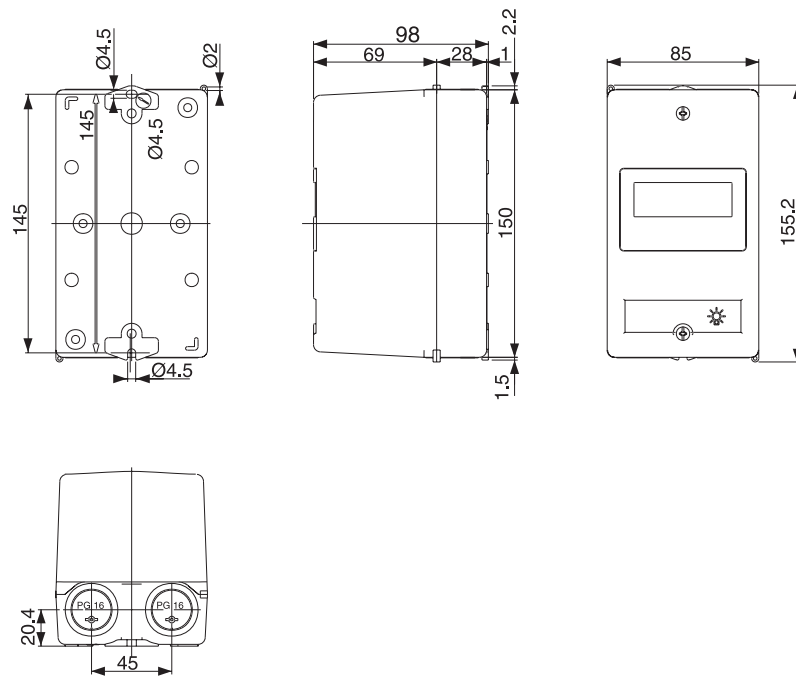


External handle operator

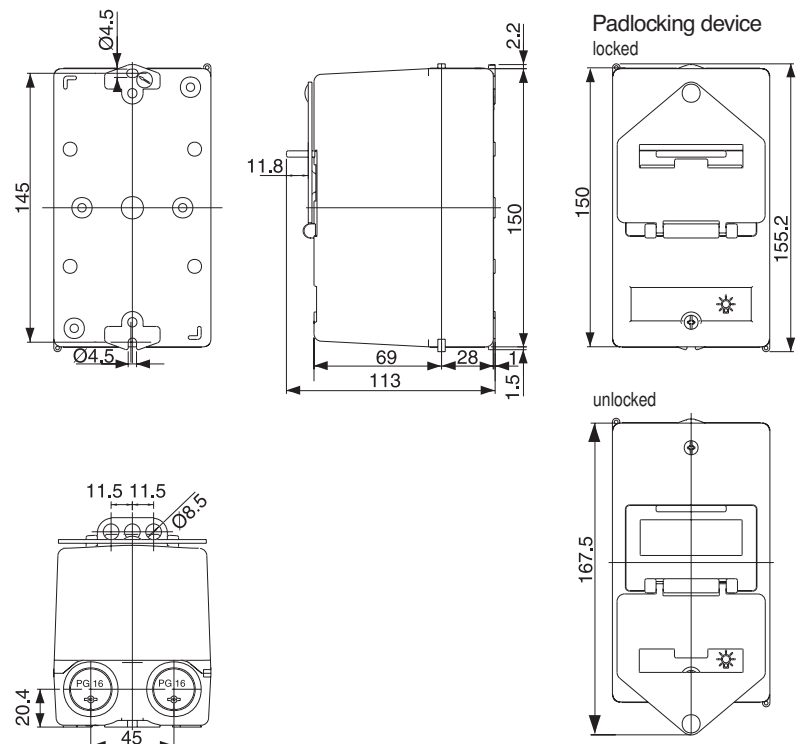


## Dimensional drawings

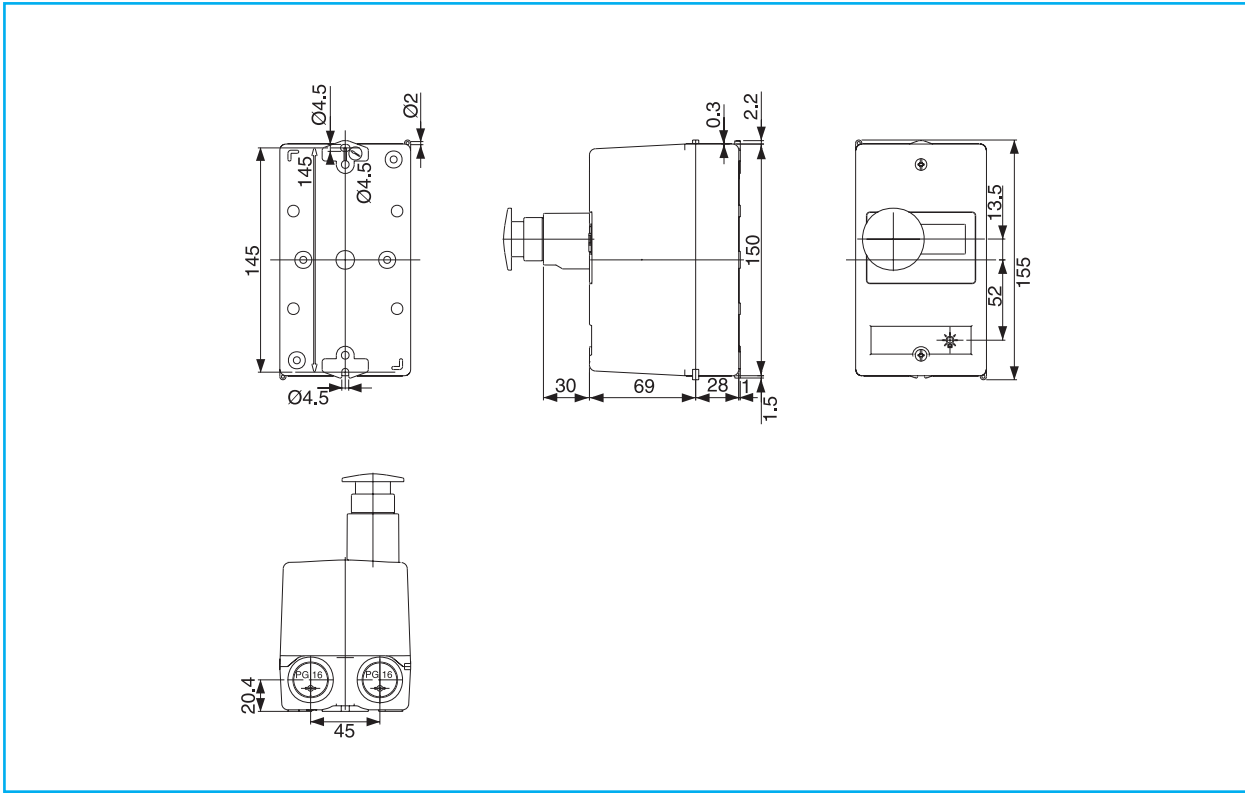
### Enclosure for GPS1 - Surface mounting



### Enclosure for GPS1 - Surface mounting with padlocking device



Enclosure for GPS1 - Surface mounting with emergency push-button



Dimensions

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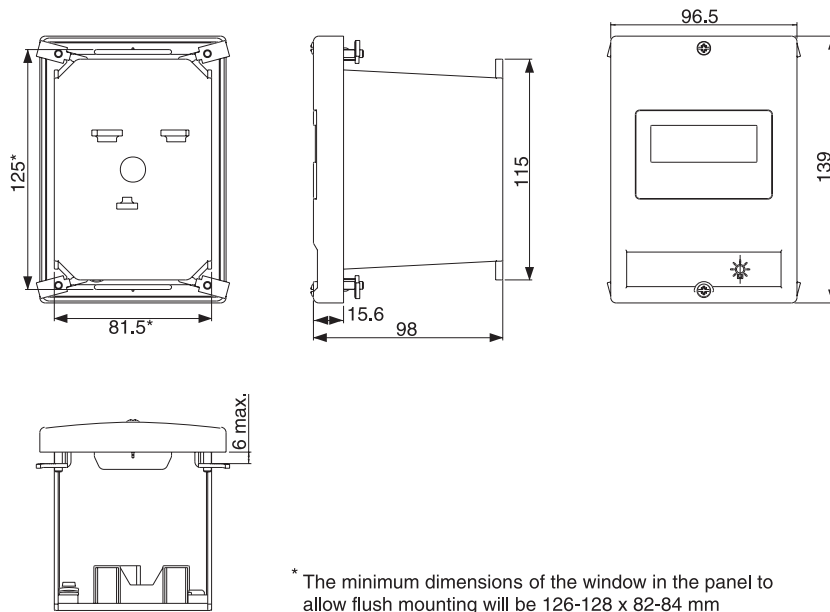
H

I

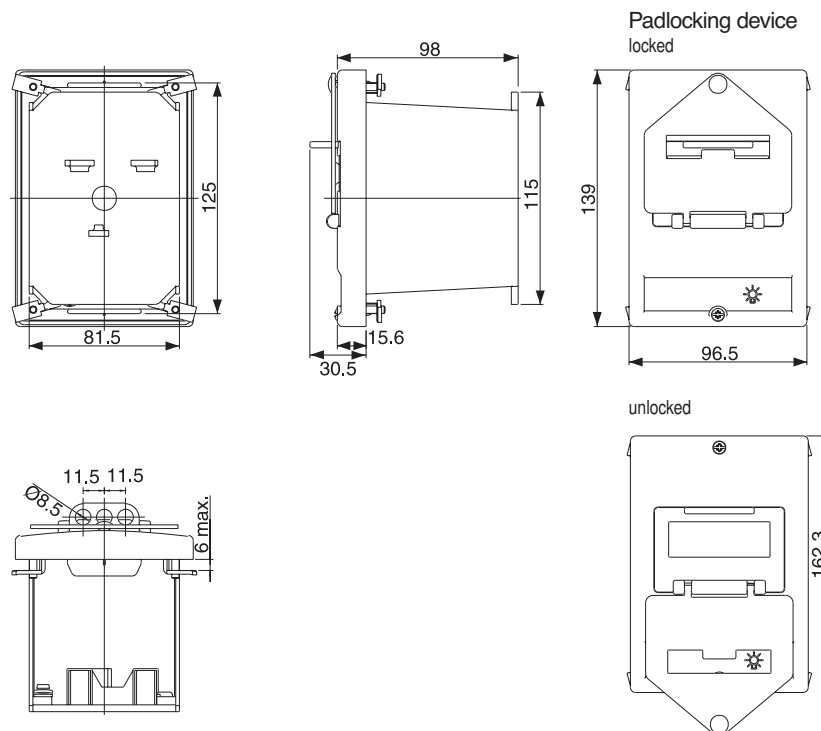
X

## Dimensional drawings

### Enclosure for GPS1 - Flush mounting



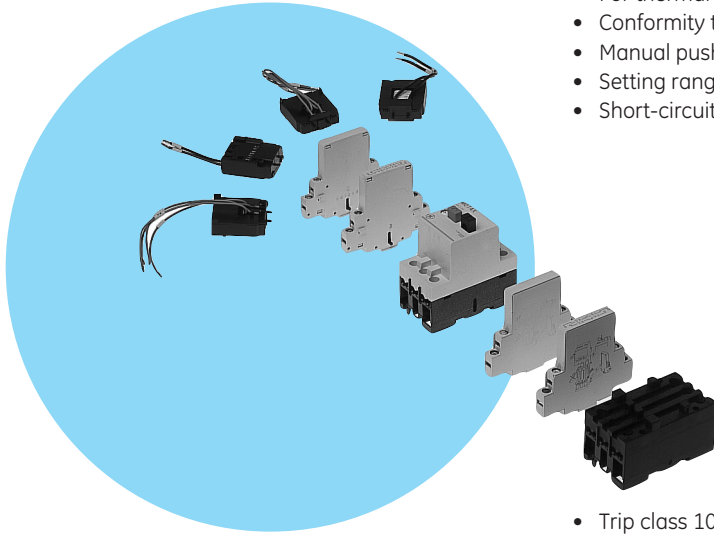
### Enclosure for GPS1 - Flush mounting with padlocking device





Everything is under control

## Motor protection circuit breaker




- For thermal and magnetic protection of AC and DC motors
- Conformity to standards IEC 947-2, IEC 947-4-1 and VDE 0660
- Manual push-button operation
- Setting ranges from 0.1 to 25A at 690V AC and 220V DC
- Short-circuit capacity of 65kA up to setting range of 1.6-2.5A/400V

### Standards

IEC 947-2  
IEC 947-4-1  
VDE 0660

### Approvals/Marking



- Trip class 10
- Instant magnetic tripping (12 times the maximum operating current Ie)
- Single phase protection
- Ambient temperature compensation between - 5° C and + 40° C
- Internal and external accessories easy to mount
- Quick fixing on DIN rail EN 50022-35 and, with two screws, on plate or wall
- Terminals protected against accidental contacts (IP20)
- Suitable for isolation (  ) and positive padlocking in open position (IEC 947-1 § 7-1-6)

### Motor protection circuit breakers

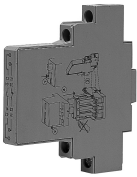



3-phase motor AC3 380/415V kW	Magnetical tripping current A	Thermal tripping current (setting range)		Cat. no.	Ref. no.	Pack.
		Min. A	Max. A			
0.02	1.9	0.1	0.16	SFK0A	120001	1
0.06	3.0	0.16	0.25	SFK0B	120002	1
0.06 / 0.09	4.8	0.25	0.4	SFK0C	120003	1
0.12 / 0.18	7.5	0.4	0.63	SFK0D	120004	1
0.25	12	0.63	1	SFK0E	120005	1
0.37 / 0.55	19	1	1.6	SFK0F	120006	1
0.75	30	1.6	2.5	SFK0G	120007	1
1.1 / 1.5	48	2.5	4	SFK0H	120008	1
2.2	75	4	6.3	SFK0I	120009	1
3.7 / 4.0	120	6.3	10	SFK0J	120010	1
5.5 / 7.5	190	10	16	SFK0K	120011	1
9.0	240	16	20	SFK0L	120012	1
11 / 12.5	300	20	25	SFK0M	120013	1




Circuit breaker to protect transformers on request




Auxiliary contact blocks

					Cat. no.	Ref. no.	Pack.	
	Side mounting		1NO	1NC	SFAL11N	120020	5	
			2NO		SFAL20N	120021	5	
			1NO	1NC	SFAL11D	120022	5	
			(advanced on closing)					
			2NO		SFAL20D	120023	5	
			(advanced on closing)					
	For lower energy levels (G 4V, G 4mA)	1change-over PE + N conductor	2NO		SFAL11S	120027	1	
			2NO		SFALPEN	264826	1	
			2NO					
	Internal mounting		1NO	1NC	SFAI11	120024	5	
		Switch trip	1NO		SFAK10	120025	5	
		indicator-alarm	1NC		SFAK01	120026	5	

Auxiliary contact blocks



					Cat. no.	Ref. no.	Pack.	
	Minimum power	Functioning range: $0.35U_e < U < 0.7U_e$						
		Manual reset						
		Dissipated power 2.2VA / 1W						
		110V / 50Hz	120V / 60Hz	SFB0RJ	120034	5		
		220V / 50Hz	240V / 60Hz	SFB0RN	120035	5		
380V / 50Hz	440V / 60Hz	SFB0RU	120036	5				
	Undervoltage release special for machinery	According to IEC204-1, DIN VDE 0113, INRS Art. L233-5						
		A combination of a special undervoltage release and auxiliary contact block SFAL20D						
		110V / 50Hz	120V / 60Hz	SFB0RJM	107256	5		
		220V / 50Hz	240V / 60Hz	SFB0RNM	120114	5		
		380V / 50Hz	440V / 60Hz	SFB0RUM	120115	5		
	Shunt trip	Functioning range: $0.7U_e < U < 1.2U_e$						
		Manual reset						
		110V / 50Hz	120V / 60Hz	SFB0AJ	120030	5		
		220V / 50Hz	240V / 60Hz	SFB0AN	120031	5		
		380V / 50Hz	440V / 60Hz	SFB0AU	120032	5		

Current limiter





					Cat. no.	Ref. no.	Pack.
	Current limiter	Combined with SFK.					
		Upgrades breaking capacity to 50kA/3~400V					
		Not available UL, CSA					
		$I_n = 32A$			SFVH03	120050	1



## Enclosures

				Cat. no.	Ref. no.	Pack.
	Surface mounting	Cable entry PG16	IP41-PG16	SFS04	120040	1
			Conversion kit IP55	SFS0K2	120046	1
		Cable entry PG16	IP55-PG16	SFS05	120041	1
		Cable entry Metric	IP41-M25	SFS04M	212558	1
		Cable entry Metric	IP55-M25	SFS05M	212559	1
	Flush mounting		IP41	SFE04	120042	1
			Conversion kit IP55	SFE0K2	120047	1
			IP55	SFE05	120043	1

## Accessories for enclosures

				Cat. no.	Ref. no.	Pack.
	Neutral connection	For use with surface and flush mounting enclosures		SFVN0	101369	1
	Padlocking device	Up to 3 padlocks 6 - 8mm		SFVN0	101369	1
	Emergency mushroom push-buttons IP55	Impulse function		SFPS0	120051	1
		Latched, pull to release		SFPRO	120052	1
		Key locked, turn to release		SFPE0	120053	1
		Conversion kit IP55 for SFS04		SFS04K1	245217	1
		Conversion kit IP55 for SFE04		SFE04K1	216604	1
	Indicator lamps for AC and DC	Green 110/120V		GPELGAJ	101375	1
		Green 220/240V		GPELGAN	101376	1
		Green 380/440V		GPELGAU	101377	1
		Green 480/500V		GPELGAX	101378	1
		Green 600V		GPELGAY	101379	1
		Red 110/120V		GPELRAJ	101380	1
		Red 220/240V		GPELRAN	101381	1
		Red 380/440V		GPELRAU	101382	1
		Red 480/500V		GPELRAX	101383	1
		Red 600V		GPELRAY	101384	1
		Transparent 110/120V		GPELCAJ	101385	1
		Transparent 220/240V		GPELCAN	101386	1
		Transparent 380/440V		GPELCAU	101387	1
Transparent 480/500V		GPELCAX	101388	1		
Transparent 600V		GPELCAY	101389	1		

Continued on page C.29

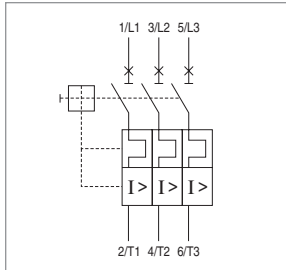
Accessories for enclosures (continued)

				Cat. no.	Ref. no.	Pack.
Three phase busbar block	4 units	Ui 690V / Ie 63A	L = 207mm	GPB104A	101392	2
	5 units	Ui 690V / Ie 63A	L = 261mm	GPB105A	101393	2
	Plastic cover for 3 unused terminals			GPB1GA	101408	2
Supply block	Plastic cover for 3 unused terminals			SFVB8	254537	5

Terminal numbering

Motor protection circuit breaker

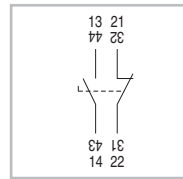
SFK...



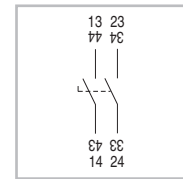
Auxiliary contact blocks

Side mounting

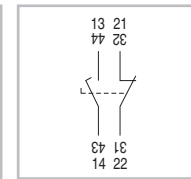
SFAL11N



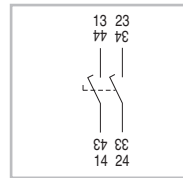
SFAL20N



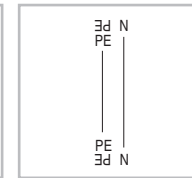
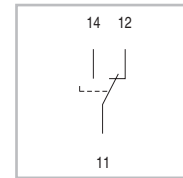
SFAL11D



SFAL20D

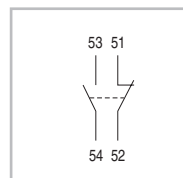


SFAL11S

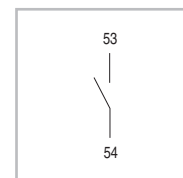


Internal mounting

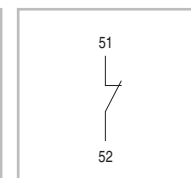
SFAI11



SFAK10



SFAK01



# Series SFK

## Technical data

### General

Rated thermal current (I <sub>th</sub> ) at 40°C	25A
Rated insulation voltage (U <sub>i</sub> )	690V
Rated operational voltage (U <sub>e</sub> )	AC 690V, 40/60Hz
(see application diagram)	DC 220V, with or without earth

### Standards

IEC 947-2	IEC 947-4-1	VDE 0660
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### Approvals

UL	CSA
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### Main circuit

Category	AC3, DC4
Operational frequency limits	40 to 60Hz
Opening time	aprox. 7ms
Mechanical endurance	10 <sup>5</sup> operations
Electrical endurance category AC3	10 <sup>5</sup> operations
Maximum operating rate	40 operations/hour
Total dissipated power at rated thermal current and hot state	6W

### Tripping characteristics

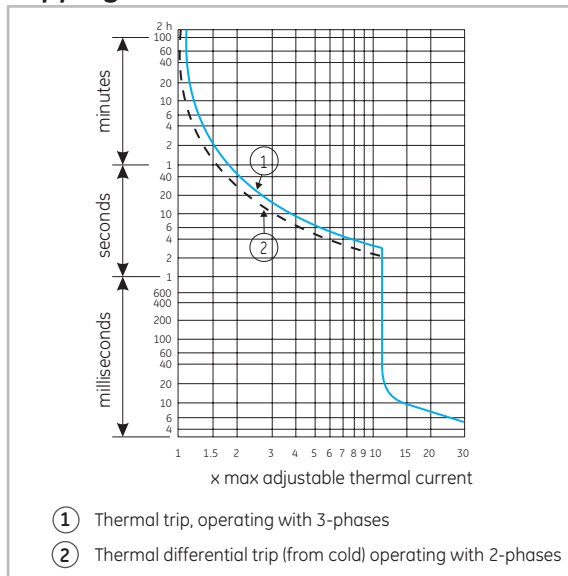
Thermal	
Symmetrical overloads	Class 10 (see curve 1, tripping curves)
Asymmetrical overloads (phase failure)	To IEC 947-4-1 (see curve 2, tripping curves)
Temperature compensation	- 5 to + 40°C

Magnetic	
	12 x I <sub>e</sub> (I <sub>e</sub> = max. thermal setting value)
Shunt release	
	0.7 - 1.2 U <sub>e</sub> 100% ED
Operating voltage limits	
Consumption	AC 1W DC 0.85 - 1.1 U <sub>e</sub> 100% ED

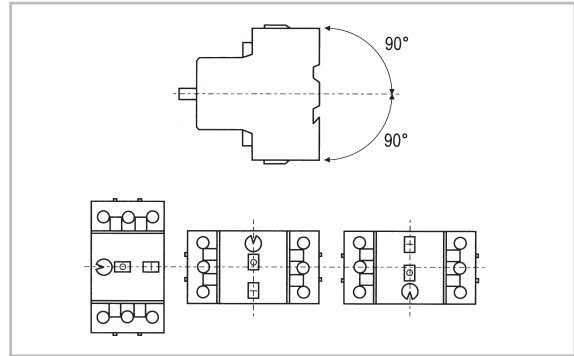
Undervoltage release	
Operating voltage limits	0.75 - 0.35 U <sub>e</sub>
Breaking voltage limits	2.2 VA
Consumption	1W

Wiring capacity	
Rigid wire	min. 2 wires of 0.75mm <sup>2</sup> max. 2 wires of 6mm <sup>2</sup>
Flexible wire	min. 2 wires of 0.75mm <sup>2</sup> max. 2 wires of 4mm <sup>2</sup>

### Tripping curve



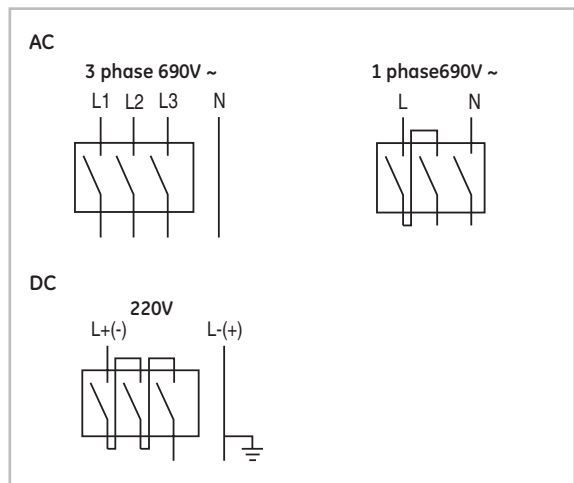
### Mounting positions



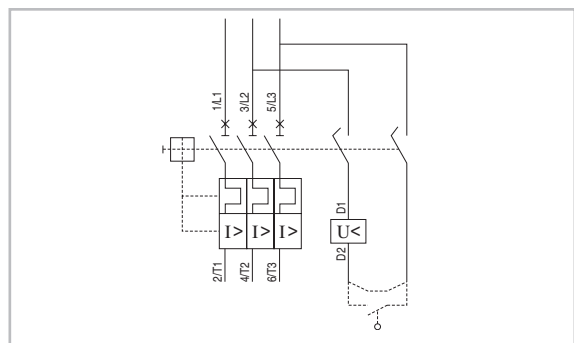
### Auxiliary contact blocks

	SFAL	SFAI - SFAK
Rated insulation voltage (U <sub>i</sub> ) according VDE 0110	500V	500V
Rated thermal current (I <sub>th</sub> )	6A	6A
AC-15	U <sub>e</sub> 230V 400V 500V I <sub>e</sub> 3,5A 2A 1A	230V 400V 500V 2A 1A 0,5A
DC-13	U <sub>e</sub> 60V 110V 220V I <sub>e</sub> 1,5A 1A 0,5A	60V 110V 220V 0,7A 0,55A 0,25A
Protective fuse gl	6A	6A
Wiring capacity		
Flexible wire	min. 2 x 0.75mm <sup>2</sup> max. 2 x 2.5mm <sup>2</sup>	2 x 0.75mm <sup>2</sup> 2 x 2.5mm <sup>2</sup>
Terminal type	M3,5, Pozidriv, safety flange screws	

### Wiring diagram



### Application diagram for tooling machines



Short-circuit breaking capacity Icu/Ics according to IEC 947-2

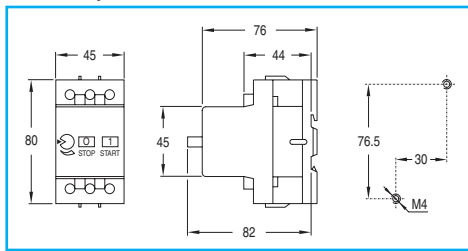
Thermal adjustment (A)	230V AC / 220V DC (1)				400V AC				415V AC				500V AC				690V AC			
	3ph motor AC3	Icu	Ics	Fuse (2)	3ph motor AC3	Icu	Ics	Fuse (2)	3ph motor AC3	Icu	Ics	Fuse (2)	3ph motor AC3	Icu	Ics	Fuse (2)	3ph motor AC3	Icu	Ics	Fuse (2)
	(kW)	(kA)	(kA)	(A)	(kW)	(kA)	(kA)	(A)	(kW)	(kA)	(kA)	(A)	(kW)	(kA)	(kA)	(A)	(kW)	(kA)	(kA)	(A)
0.1 - 0.16	-	65	65	(3)	0.02	65	65	(3)	0.02	65	65	(3)	0.04	65	65	(3)	0.06	42	42	(3)
0.16 - 0.25	-	65	65	(3)	0.06	65	65	(3)	0.06	65	65	(3)	0.06	65	65	(3)	0.12	42	42	(3)
0.25 - 0.4	0.06	65	65	(3)	0.09	65	65	(3)	0.12	65	65	(3)	0.12	65	65	(3)	0.18	42	42	(3)
0.4 - 0.63	0.09	65	65	(3)	0.12	65	65	(3)	0.18	65	65	(3)	0.25	65	65	(3)	0.37	42	42	(3)
0.63 - 1	0.12	65	65	(3)	0.25	65	65	(3)	0.25	65	65	(3)	0.37	65	65	(3)	0.75	1	1	20
1 - 1.6	0.25	65	65	(3)	0.55	65	65	(3)	0.55	65	65	(3)	0.75	65	65	(3)	1.1	1	1	20
1.6 - 2.5	0.37	65	65	(3)	0.75	65	65	(3)	0.75	10	5	25	1.1	3	1.5	25	1.5	1	0.5	20
2.5 - 4	0.75	65	65	(3)	1.5	10 (4)	5 (4)	35	1.5	10	5	35	2.2	3	1.5	35	3	1	0.5	25
4 - 6.3	1.1	65	37.5(4)	(3)	2.2	10 (4)	5 (4)	50	2.2	10	5	50	3	3	1.5	50	4	1	0.5	35
6.3 - 10	2.2	10 (4)	5 (4)	80	4	4 (4)	2 (4)	80	4	4	2	80	5.5	3	1.5	50	7.5	1	0.5	35
10 - 16	4	6 (4)	3 (4)	80	7.5	4 (4)	2 (4)	80	7.5	3.5	1.75	80	9	3	1.5	63	11	1	0.5	35
16 - 20	5	6 (4)	3 (4)	80	9	4 (4)	2 (4)	80	9	2.5	1.25	80	11	1.5	0.75	63	15	1	0.5	50
20 - 25	5.5	6 (4)	3 (4)	80	11	4 (4)	2 (4)	80	12.5	2.5	1.25	80	15	1.5	0.75	63	22	1	0.5	50

Icu = Ultimate short-circuit breaking capacity  
Ics = Service short-circuit breaking capacity

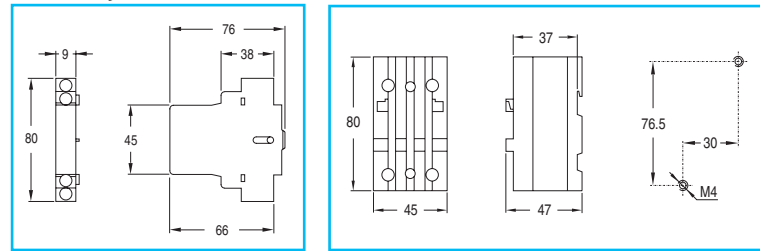
- (1) At 220V, t = 15 ms
- (2) Maximum value of the fuses when the presumed short circuit current is higher than the breaking capacity of the device. Type D, slow or NH type gG/gL.
- (3) No back-up fuse required to the Icu value
- (4) 50 kA in combination with current limiter

Dimensional drawings

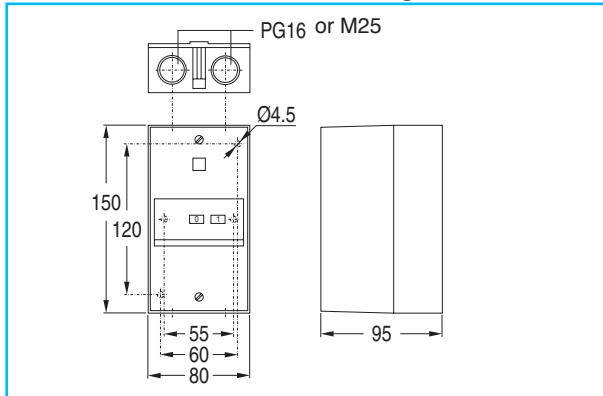
Motor protection circuit breaker



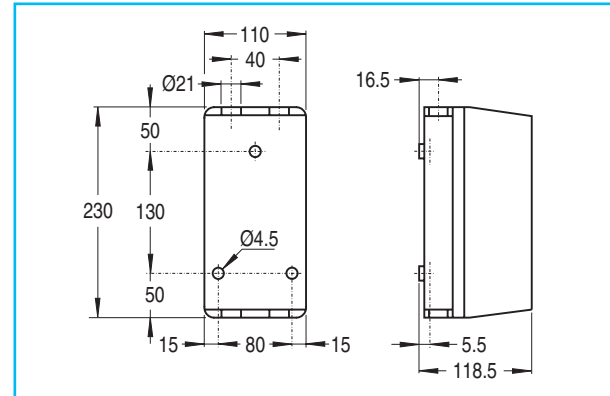
Auxiliary contact block Current limiter



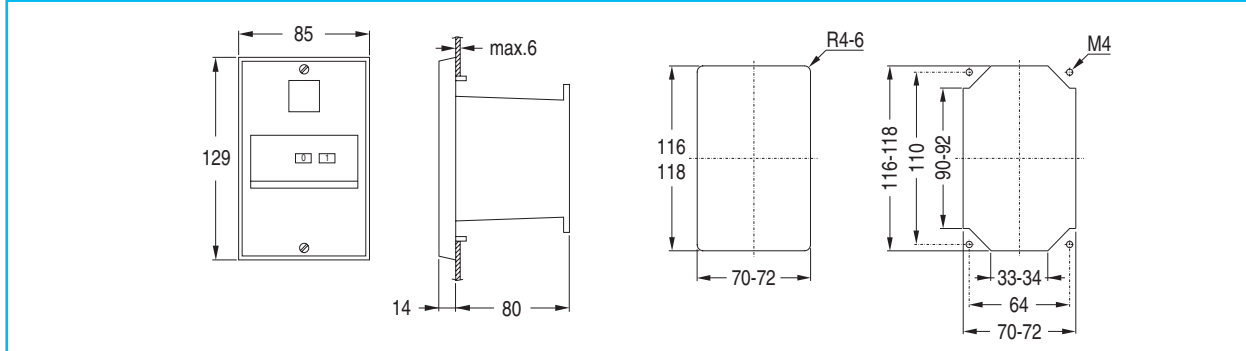
Enclosures: surface mounting



Enclosure to combine with contactor



Enclosures: flush mounting



Dimensions in mm (inch = mm x 0.03937) - Weight in kg (lb = kg x 2.2046)



Everything is under control



- D.3 Utilization categories
- D.7 Machine directive - B10d value for contactors

### Selection tables

- D.8 Coordination tables
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- D.22 Direct-on-line starters
- D.29 Star-delta starters
- D.33 Contactors for transformers
- D.34 Contactors for capacitors switching
- D.40 Contactors for control lighting circuits
- D.42 Contactors for DC utilization

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Auxiliary relays and contactors

Motor protection devices

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### UL Applications

- D.45 Horsepower and general-use ratings
- D.47 High-available short circuit ratings
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- D.61 Product index alpha numeric - UL reference
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Everything is under control

## Utilization categories according to IEC 60947-4-1

### Standard utilization categories AC

Category	Typical applications
AC-1	Non-inductive or slightly loads. Resistance furnaces
AC-2	Slip-ring motors: starting, plugging
AC-3	Squirrel-cage motors (1): starting, switching off motors during running.
AC-4	Squirrel-cage motors: starting, plugging, inching.
AC-5 a	Discharge lamps
AC-5 b	Incandescent lamps
AC-6 a	Transformers
AC-6 b	Cos $\phi$ capacitors
AC-7 a	Slightly inductive loads for domestic applications
AC-7 b	Motors in domestic applications
AC-8 a	Drive motors for cooling compressors (2) with manual reset and thermal overload relay
AC-8 b	Drive motors for cooling compressors (2) with manual reset and automatic reset

### Standard utilization categories DC

Category	Typical applications
DC-1	Non-inductive or slightly inductive loads. Resistance furnaces
DC-3	Shunt motors: starting, plugging, inching
DC-5	Series motors: starting, plugging, inching
DC-6	Incandescent lamps

- Category AC-3 can be used for accidental not continuous short period service, while mounting and testing machines. The number of operations shall not be greater than 5 per minute or 10 per 10 minutes.
- The drive motor of a hermetic cooling compressor is an assembly of a motor and compressor in the same housing, without any axle; the motor is working in the cooling liquid.
- Making conditions in alternating current are expressed by effective value. Moreover the asymmetrical current high value, referred to cos  $\phi$ , can assume a higher value.
- Tolerance for cos  $\phi = \pm 0.05$
- Tolerance for L/R =  $\pm 15\%$

## Making and breaking capacity

### IEC 60947-4-1

Values given for closing and opening by intermittent use

Cat.	Rated current	Closing (3)			Opening		
		Ic/Ie	Ur/Ue	cos $\phi$ (4)	Ic/Ie	Ur/Ue	cos $\phi$ (4)
AC-1	All values	1.5	1.05	0.80	1.5	1.05	0.80
AC-2	All values	4	1.05	0.65	4	1.05	0.65
AC-3	Ie $\leq$ 100A	10	1.05	0.45	8	1.05	0.45
	Ie > 100A	10	1.05	0.35	8	1.05	0.35
AC-4	Ie $\leq$ 100A	12	1.05	0.45	10	1.05	0.45
	Ie > 100A	12	1.05	0.35	10	1.05	0.35

Cat.	Rated current	Closing			Opening		
		Ic/Ie	Ur/Ue	L/R(5) (ms)	Ic/Ie	Ur/Ue	L/R(5) (ms)
DC-1	All values	1.5	1.05	1	1.5	1.05	1
DC-3	All values	4	1.05	2.5	4	1.05	2.5
DC-5	All values	4	1.05	15	4	1.05	15

## Electrical endurance

### IEC 60947-4-1

Values given for closing and opening intermittent use

Cat.	Rated current	Closing (3)			Opening		
		Ic/Ie	Ur/Ue	cos $\phi$ (4)	Ic/Ie	Ur/Ue	cos $\phi$ (4)
AC-1	All values	1	1	0.95	1	1	0.95
AC-2	All values	2.5	1	0.65	2.5	1	0.65
AC-3	Ie $\leq$ 17A	6	1	0.65	1	0.17	0.65
	Ie > 17A	6	1	0.35	1	0.17	0.35
AC-4	Ie $\leq$ 17A	6	1	0.65	6	1	0.65
	Ie > 17A	6	1	0.35	6	1	0.35

Cat.	Rated current	Closing			Opening		
		Ic/Ie	Ur/Ue (ms)	L/R(5) (ms)	Ic/Ie	Ur/Ue (ms)	L/R(5) (ms)
DC-1	All values	1	1	1	1	1	1
DC-3	All values	2.5	1	2	2.5	1	2
DC-5	All values	2.5	1	7.5	2.5	1	7.5

<b>Ue</b>	Rated voltage
<b>Ie</b>	Rated current
<b>Ur</b>	Recovery voltage
<b>Ic</b>	Breaking current



## Utilization category AC-1

### Three pole contactors

Type		MC0	MC1	MC2	CL00	CL01	CL02	CL03	CL04	CL05	CL06	CL07	CL08	CL09	CL10
Max. operat. current at ambient temp. of (for all voltages)	40°C (A)	20	20	20	25	25	32	45	60	60	90	110	110	140	140
	55°C (A)	20	20	20	25	25	32	45	60	60	90	110	110	140	140
	70°C (A)	16	16	16	20	20	25	32	48	48	72	88	88	110	110
Max. operat. power	230/220V (kW)	7.5	7.5	7.5	9.5	9.5	12	17	22.5	22.5	30	42	42	53	53
Three-phase resistors	400/380V (kW)	13	13	13	16.5	16.5	22	29	39.5	39.5	55	72.5	72.5	92	92
	440/415V (kW)	15	15	13	18	18	23	32	43	43	57	79	79	100	100
	500V (kW)	17	17	17	21.5	21.5	27.5	39	52	52	69	95	95	121	121
	690/660V (kW)	22.5	22.5	22.5	28.5	28.5	38	51	68.5	68.5	95	125	125	160	160
Cable size	(mm <sup>2</sup> )	2.5	2.5	2.5	4	4	6	10	16	16	35	35	35	50	50
Percentage of the max. operational current at	120 ops./h (%)	100	100	100	100	100	100	100	100	100	100	100	100	100	100
	300 ops./h (%)	100	100	100	100	100	100	100	100	100	100	100	100	100	100
	600 ops./h (%)	100	100	100	100	100	100	100	100	100	100	100	100	100	100
	1200 ops./h (%)	100	100	100	100	100	100	100	100	100	100	100	100	80	80
	3000 ops./h (%)	50	50	50	50	50	50	50	50	50	50	50	50	40	40

Type		CK75C	CK08C	CK85B	CK09B	CK95B	CK10C	CK11C	CK12B	CK13B
Max. operat. current at ambient temp. of (for all voltages)	40°C (A)	250	250	315	315	450	600	700	1000	1250
	55°C (A)	200	200	252	252	382	510	546	736	1125
	70°C (A)	155	155	195	195	300	402	468	680	1060
Max. operat. power	230/220V (kW)	90	90	114	114	170	191	234	289	450
Three-phase resistors	400/380V (kW)	155	155	196	196	310	329	406	500	780
	440/415V (kW)	180	180	227	227	343	329	470	578	904
	500V (kW)	200	200	259	259	389	415	533	657	1027
	690/660V (kW)	270	270	341	341	537	572	705	867	1354
	1000V (kW)	400	400	517	517	780	866	1060	1314	2054
Cable size	(mm <sup>2</sup> )	120	120	185	185	2x (30x5)	2x (30x8)	2x (30x8)	2x (30x10)	2x (30x10)
Percentage of the max. operational current at	120 ops./h (%)	100	100	100	100	100	100	100	100	100
	300 ops./h (%)	100	100	100	100	100	100	100	100	90
	600 ops./h (%)	100	100	100	100	100	80	80	80	70
	1200 ops./h (%)	80	80	80	80	80	-	-	-	-
	3000 ops./h (%)	40	40	40	40	-	-	-	-	-

### Four pole contactors

Type		MC0	MC1	MC2	CL01	CL02	CL03	CL04	CL05	CL07	CL08(1)	CL09(2)
Max. operat. current at ambient temp. of (for all voltages)	40°C (A)	20	20	20	25	32	45	60	90	110	110	140
	55°C (A)	20	20	20	25	32	45	60	90	110	110	140
	70°C (A)	16	16	16	20	25	32	48	72	88	88	110
Max. operat. power	230/220V (kW)	7.5	7.5	7.5	9.5	12	17	22.5	30	42	42	53
Three-phase resistors	400/380V (kW)	13	13	13	16.5	22	29	39.5	55	72.5	72.5	92
	440/415V (kW)	15	15	15	18	23	32	43	57	79	79	100
	500V (kW)	17	17	17	21.5	27.5	39	52	69	95	95	121
	690/660V (kW)	22.5	22.5	22.5	28.5	38	51	68.5	95	125	25	160
Cable size	(mm <sup>2</sup> )	2.5	2.5	2.5	4	6	10	16	35	35	35	50
Percentage of the max. operational current at	120 ops./h (%)	100	100	100	100	100	100	100	100	100	100	100
	300 ops./h (%)	100	100	100	100	100	100	100	100	100	100	100
	600 ops./h (%)	100	100	100	100	100	100	100	100	100	100	100
	1200 ops./h (%)	100	100	100	100	100	100	100	100	100	100	80
	3000 ops./h (%)	50	50	50	50	50	50	50	50	50	50	40

Type		CK07B	CK08B	CK09B	CK95B	CK10C	CK11C	CK12B	CK13B
Max. operat. current at ambient temp. of (for all voltages)	40°C (A)	200	325	400	500	600	700	1000	1250
	55°C (A)	170	260	320	425	510	546	736	1125
	70°C (A)	140	201	272	335	402	468	680	1060
Max. operat. power	230/220V (kW)	76	123	152	191	228	266	381	476
Three-phase resistors	400/380V (kW)	131	214	263	329	395	460	658	822
	440/415V (kW)	143	233	287	359	431	503	719	898
	500V (kW)	173	281	346	415	519	606	866	1082
	690/660V (kW)	228	371	457	572	686	800	1143	1428
	1000V (kW)	-	562	692	866	1039	1212	1732	2165
Cable size	(mm <sup>2</sup> )	95	185	2x (25x5)	2x (30x5)	2x (30x8)	2x (30x8)	2x (30x10)	2x (40x10)
Percentage of the max. operational current at	120 ops./h (%)	100	100	100	100	100	100	100	100
	300 ops./h (%)	100	100	100	100	100	100	100	90
	600 ops./h (%)	100	100	100	100	80	80	80	70
	1200 ops./h (%)	80	80	80	80	-	-	-	-
	3000 ops./h (%)	40	40	40	40	-	-	-	-

Increase in maximum operational current through connection poles in parallel: - 2 poles in parallel: Ie x 1.8  
 - 3 poles in parallel: Ie x 2.4  
 - 4 poles in parallel: Ie x 3.2

(1) Only types (2NO + 2NC)  
 (2) Only types (4NO)



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### Utilization category AC-3

#### Three pole contactors

Type		MC0	MC1	MC2	CL00	CL01	CL02	CL03	CL04	CL05	CL07	CL08	CL09	CL10
<b>Operational current Ie for Ue ≤ 400V</b>	(A)	6	9	12	9	12	18	25	32	50	65	80	95	105
<b>Max. operat. power</b>	230/220V (kW)	1.5	3	3	2.2	3	4	7.5	9	15	18.5	22	25	30
	(HP)	2	4	4	3	4	5.5	10	12	20	25	30	34	40
Three-phase motors 50/60Hz	400/380V (kW)	2.2	4	5.5	4	5.5	7.5	12	16	22	30	37	45	55
	(HP)	3	5.5	7.3	5.5	7.5	10	16	22	30	40	50	60	75
440/415V	(kW)	2.2	4	5.5	4	5.5	7.5	12	16	25	37	45	50	55
	(HP)	3	5.5	7.3	5.5	7.5	10	16	22	34	50	60	68	75
500V	(kW)	3	4	5.5	5.5	7.5	10	15	18.5	30	40	45	55	65
	(HP)	4	5.5	7.3	7.5	10	13.5	20	25	40	55	60	75	88
690/660V	(kW)	3	4	5.5	5.5	7.5	10	15	18.5	35	45	45	55	65
	(HP)	4	5.5	7.3	7.5	10	13.5	20	25	48	60	60	75	88
<b>Percentage of the max. operational current at</b>	120 ops/h (%)	100	100	100	100	100	100	100	100	100	100	100	100	100
	300 ops/h (%)	100	100	100	100	100	100	100	100	100	100	100	100	100
	600 ops/h (%)	100	100	100	100	100	100	100	100	100	100	100	100	100
	1200 ops/h (%)	100	100	100	100	100	100	100	100	100	100	100	75	75
	3000 ops/h (%)	35	35	35	35	35	35	35	35	35	35	35	25	25

Type		CK75C	CK08C	CK09B	CK95B	CK10C	CK11C	CK12B	CK13B
<b>Operational current Ie for Ue ≤ 400V</b>	(A)	150	195	250	309	420	550	700	825
<b>Max. operat. power</b>	230/220V (kW)	45	65	75	90	125	160	220	250
	(HP)	60	88	100	125	170	220	300	340
Three-phase motors 50/60Hz	400/380V (kW)	75	110	132	160	220	280	375	450
	(HP)	100	150	180	220	300	380	510	610
440/415V	(kW)	80	125	132	185	230	315	400	450
	(HP)	108	170	180	250	312	425	540	610
500V	(kW)	100	132	160	200	300	400	480	500
	(HP)	135	180	220	270	405	540	650	680
690/660V	(kW)	100	155	200	250	375	450	500	550
	(HP)	135	205	270	335	510	610	680	750
1000V	(kW)	65	110	150	200	300	375	450	500
	(HP)	88	150	205	270	405	510	610	680
<b>Percentage of the max. operational current</b>	120 ops/h (%)	100	100	100	100	100	100	100	100
	300 ops/h (%)	100	100	100	100	100	100	80	80
	600 ops/h (%)	100	100	100	100	75	75	75	65
	1200 ops/h (%)	75	75	75	75	-	-	-	-
	3000 ops/h (%)	25	25	25	-	-	-	-	-

### Utilization category AC-4

#### Three pole contactors

Type		MC0	MC1	MC2	CL00	CL01	CL02	CL03	CL04	CL05	CL07	CL08	CL09	CL10
<b>Operational current Ue ≤ 400V</b>	(A)	2.75	3.5	3.5	5	7	8	12	16	18.5	30	37	44	50
<b>Operational power</b> (200.000 operations)	230/220V (kW)	0.55	0.75	0.75	1.1	1.5	1.8	3	3.7	4	7.5	10	11	13
	(HP)	0.73	1	1	1.5	2	2.4	4	5	5.3	9.7	13	14.6	17.3
400/380V	(kW)	1.1	1.5	1.5	2.2	3	3.7	5.5	7.5	9	15	18.5	22	25
	(HP)	1.5	2	2	3	4	5	7.3	9.7	12	20	24.6	29.2	33
500V	(kW)	1.5	2.2	2.2	3	4	5.5	7.5	10	11	18.5	22	25	30
	(HP)	2	3	3	4	5.3	7.3	9.7	13	14.6	24.6	29.2	33	40
690/660V	(kW)	2.2	3	3	4	5.5	7.5	10	11	15	22	25	30	37
	(HP)	3	4	4	5.3	7.3	9.7	13	14.6	20	29.2	33	40	49
<b>Max. operational current ≤ 400V</b> (35.000 operations)	(A)	6	9	9	9	12	18	25	32	40	65	80	95	105
<b>Max. operational power 400/380V</b>	(kW)	2.2	4	4	4	5.5	7.5	12	16	18.5	30	37	45	55

Type		CK75C	CK08C	CK85B	CK09B	CK95B	CK10C	CK11C	CK12B	CK13B
<b>Operational current Ue ≤ 400V</b>	(A)	65	75	90	110	125	150	165	250	350
<b>Operational power</b>	230/220V (kW)	18.5	22	25	33	37	45	50	80	110
	(HP)	24.6	29.2	33	44	49	60	66.5	106	146
Three-phase motors 50/60Hz (200.000 operations)	400/380V (kW)	33	40	45	55	63	80	90	132	165
	(HP)	44	53	60	73	83.8	106	119	175	219
500V	(kW)	45	50	63	75	90	100	110	225	250
	(HP)	60	66.5	83.8	100	119	133	146	300	332
690/660V	(kW)	55	63	80	100	110	132	150	250	315
	(HP)	73	83.8	106	133	146	175	200	332	419
<b>Max. operational current ≤ 400V</b> (35.000 operations)	(A)	150	185	205	250	309	420	550	700	825
<b>Max. operational power 400/380V</b>	(kW)	75	90	110	132	160	220	280	375	450



## Utilization category AC-1

### Three pole contactors

Type		EC09	EC12	EC18	EC25	EC32	EC40	EF50	EF65	EF80	EF95	EF105	
Max. operat. current	40°C (A)	25	25	32	45	60	60	90	110	110	140	140	
at ambient temp. of (for all voltages)	55°C (A)	25	25	32	45	60	60	90	110	110	140	140	
	70°C (A)	20	20	25	32	48	48	72	88	88	110	110	
Max. operat. power	230/220V (kW)	9.5	9.5	12	17	22.5	22.5	30	42	42	53	53	
	Three-phase resistors	400/380V (kW)	16.5	16.5	22	29	39.5	39.5	55	72.5	72.5	92	92
	440/415V (kW)	18	18	23	32	43	43	57	79	79	100	100	
	500V (kW)	21.5	21.5	27.5	39	52	52	69	95	95	121	121	
	690/660V (kW)	28.5	28.5	38	51	68.5	68.5	95	125	125	160	160	
Cable size	(mm <sup>2</sup> )	6	6	6	10	16	16	35	35	35	50	50	
Percentage of the max. operational current at	120 ops./h (%)	100	100	100	100	100	100	100	100	100	100	100	
	300 ops./h (%)	100	100	100	100	100	100	100	100	100	100	100	
	600 ops./h (%)	100	100	100	100	100	100	100	100	100	100	100	
	1200 ops./h (%)	100	100	100	100	100	100	100	100	100	80	80	
	3000 ops./h (%)	50	50	50	50	50	50	50	50	50	40	40	

## Utilization category AC-3

### Three pole contactors

Types		EC09	EC12	EC18	EC25	EC32	EC40	EF50	EF65	EF80	EF95	EF105	
Operational current I <sub>e</sub> for U <sub>e</sub> ≤ 400V	(A)	9	12	18	25	32	40	50	65	80	95	105	
Max. operat. power	230/220V (kW)	2.2	3	4	7.5	9	11	15	18.5	22	25	30	
	Three-phase motors 50/60Hz	(HP)	3	4	5.5	10	12	15	20	25	30	34	40
	400/380V	(kW)	4	5.5	7.5	12	16	18.5	22	30	37	45	55
		(HP)	5.5	7.5	10	16	22	25	30	40	50	60	75
	440/415V	(kW)	4	5.5	7.5	12	16	22	25	37	45	50	55
		(HP)	5.5	7.5	10	16	22	30	34	50	60	68	75
	500V	(kW)	5.5	7.5	10	15	18.5	25	30	40	45	55	65
		(HP)	7.5	10	13.5	20	25	34	40	55	60	75	88
	690/660V	(kW)	5.5	7.5	10	15	18.5	30	35	45	45	55	65
		(HP)	7.5	10	13.5	20	25	40	48	60	60	75	88
Percentage of the max. operational current at	120 ops./h (%)	100	100	100	100	100	100	100	100	100	100	100	
	300 ops./h (%)	100	100	100	100	100	100	100	100	100	100	100	
	600 ops./h (%)	100	100	100	100	100	100	100	100	100	100	100	
	1200 ops./h (%)	100	100	100	100	100	100	100	100	100	75	75	
	3000 ops./h (%)	35	35	35	35	35	35	35	35	35	25	25	

## Utilization category AC-4

### Three pole contactors

Type		EC09	EC12	EC18	EC25	EC32	EC40	EF50	EF65	EF80	EF95	EF105	
Operational current U <sub>e</sub> ≤ 690V	(A)	5	7	8	12	16	18.5	23	30	37	44	50	
Operational power (200.000 operations)	230/220V (kW)	1.1	1.5	1.8	3	3.7	4	5.5	7.5	10	11	13	
	400/380V	(HP)	1.5	2	2.4	4	5	5.3	7.3	9.7	13	14.6	17.3
		(kW)	2.2	3	3.7	5.5	7.5	9	11	15	18.5	22	25
	500V	(HP)	3	4	5	7.3	9.7	12	14.6	20	24.6	29.2	33
		(kW)	3	4	5.5	7.5	10	11	15	18.5	22	25	30
	690/660V	(HP)	4	5.3	7.3	9.7	13	14.6	20	24.6	29.2	33	40
		(kW)	4	5.5	7.5	10	11	15	18.5	22	25	30	37
		(HP)	5.3	7.3	9.7	13	14.6	20	24.6	29.2	33	40	49
		(kW)	5.3	7.3	9.7	13	14.6	20	24.6	29.2	33	40	49
	Max. operational current ≤ 400V (35.000 operations)	(A)	9	12	18	25	32	40	50	65	80	95	105
Max. operational power 400/380V	(kW)	4	5.5	7.5	12	16	18.5	22	30	37	45	55	



## B10d value for contactors

### According to ISO 13849-1

This part of ISO 13849 provides safety requirements and guidance on the principles for the design and integration of safety-related parts of control systems (SRP/CS), including the design of software. For these parts of SRP/CS, it specifies characteristics that include the performance level required for carrying out safety functions. It applies to SRP/CS, regardless of the type of technology and energy used (electrical, hydraulic, pneumatic, mechanical, etc.), for all kinds of machinery.

#### Terms and definitions

**Fault:** State of an item characterized by the inability to perform a required function, excluding the inability during preventive maintenance or other planned actions, or due to lack of external resources.

**Failure:** Termination of the ability of an item to perform a required function.

**Dangerous failure:** Failure which has the potential to put the SRP/CS in a hazardous or fail-to-function state

**B10d:** Number of cycles until 10 % of the components fails dangerously (for pneumatic and electromechanical components).

**Confidence level:** Statistical measure of the number of times out of 100 that test results can be expected to be within a specified range.

#### Calculations

Standard B10 values at a high demand rate. With the help of the B10 value and a simplified formula (see section 6.7.8.2.1 of EN 62061), the user can then calculate the total failure rate of an electromechanical component:

$$\lambda = 0.1 \times C / B10$$

With C = operating cycles per hour. C is specified by the user. The failure rate is made up of safe ( $\lambda S$ ) and dangerous ( $\lambda D$ ) failures:

$$\lambda = \lambda S + \lambda D \text{ or:}$$

$$\lambda D = (\text{share of dangerous failures in } \%) \times \lambda$$

The failure rate of the dangerous failures  $\lambda D$  of the components used is needed for further calculations.

$$\lambda D = 50\% \text{ (value recommended by ISO 13849-1)}$$

$$\lambda S = (\text{share of safe failures in } \%) \times \lambda$$

The failure rate of the safe failures  $\lambda S$  of the components used is needed for further calculations.

$$\lambda S = 10\%$$

CL = Confidence Level used for statistical calculations

Confidence Level used is needed for further calculations

$$CL = 60\%$$

Listed in the following table are the standard B10 and B10d values and the share of dangerous failures for products groups, where B10d is determinate as:

$$B10_d = B10$$

Share of dangerous failures

#### Test

Electrical endurance (AC3) test has been conducted to collect data which have been taken to calculate B10d value for MC, Effcor (EC) and CL contactors series.

For contactors dangerous failures rate has been calculated according to IEC 60947-5-1. ( $\lambda D = 73\%$ ).

#### Results

	Contactor type	AC3 Current (A)	B10d (x10 <sup>6</sup> )
MC1	MC Series	9	1.4
EC09	Effcor	9	2.0
EC12	Effcor	12	2.0
EC18	Effcor	18	1.7
EC25	Effcor	25	1.7
EC32	Effcor	32	1.37
EC40	Effcor	40	1.37
EF50	Effcor	50	1.5
EF65	Effcor	65	1.5
EF80	Effcor	80	1.5
EF95	Effcor	95	1.5
EF105	Effcor	105	1.5



## Record Plus Coordination Type 2 at 80kA at 380/400 and 415V

Motor <sup>(1)</sup>			MCCB				Contactor			Overload relay	Box clamp	Clearance	
Rated power	Rated current (A)		Cat.No.	Rated current (In)	Thermal current	Magnetic setting Im pick-up band ±20% Im	Magnetic current setpoint		Operating current	Admissible power	Setting range	Smallest wire Cu (pvc) <sup>(2)</sup>	Min. frontal electrical safety clearance
kW	380/400V	415V		(A)	Setting range (A)	(A)	(A)	Series	A	P(kW)	Series	380/415V (mm <sup>2</sup> )	mm
4	9	8	FD63	12.5	12.5	-	169	EC25A..	25	11	ECRT2	8-12	1.5
5.5	12	11	FD63	12.5	12.5	-	169	EC25A..	25	11	ECRT2	10-16	1.5
7.5	16	14.8	FD63	20	20	-	210	EC32A..	32	15	ECRT3	14.5-18	4
11	22.5	21	FD63	30	30	-	300	EC32A..	32	15	ECRT3	21-26	6
15	30	28	FD63	30	30	-	450	EC40A..	40	18.5	ECRT3	25-35	6
18.5	37	35	FD63	50	50	-	500	EC40A..	40	18.5	ECRT3	30-40	10
22	-	40	FDN36MC050ED	50	-	500-750	580	EF50	50	22	RT2E	30-43	10
	44	-	FDN36MC050ED	50	-	500-750	580	EF50	50	22	RT2G	42-55	10
30	60	55	FDN36MC080ED	80	-	800-1200	800	EF65	65	30	RT2H	54-65	16
37	72	68	FDN36MC080ED	80	-	800-1200	950	EF80	80	37	RT2J	64-82	25
45	85	80	FDN36MC0100ED	100	-	1000-1500	1140	EF95	95	45	RT2L	78-97	35
55	105	100	FDN36MC0100ED	100	-	1000-1500	1400	EF105	105	55	RT2M	90-110	30

## Record Plus Coordination Type 2 at 80kA at 500/525V

Motor <sup>(1)</sup>			MCCB				Contactor			Overload relay	Box clamp	Clearance	
Rated power	Rated current (A)		Cat.No.	Rated current (In)	Thermal current	Magnetic setting Im pick-up band ±20% Im	Magnetic current setpoint		Operating current	Admissible power	Setting range	Smallest wire Cu (pvc) <sup>(2)</sup>	Min. frontal electrical safety clearance
kW	500/525V	-		(A)	Setting range (A)	(A)	(A)	Series	A	P(kW)	Series	380/415V (mm <sup>2</sup> )	mm
7.5	12	-	FD63	12.5	12.5	-	-	EC32A..	32	15	ECRT2	10-19	4
11	18.4	-	FD63	20	20	-	-	EC32A..	32	15	ECRT2	17.5-25	4
15	23	-	FD63	30	30	-	-	EC40A..	40	18.5	ECRT3	21-29	6
18.5	29	-	FD63	30	30	-	-	EC40A..	40	18.5	ECRT3	25-35	10
5.5	9	-	FEL36M012JF	-	-	49-105	117	EF65	65	30	RT4LD	7.5-11	1.5
7.5	12	-	FEL36M012JF	-	-	87.5-187.5	156	EF65	65	30	RT4LE	10-16	1.5
11	17	-	FEL36M020JF	-	-	140-300	221	EF65	65	30	RT4LF	12.5-20	2.5
15	23	-	FEL36M020JF	-	-	140-300	299	EF65	65	30	RT4LG	17-27	2.5
18.5	28.5	-	FEL36M030JF	-	-	240-450	370	EF95	95	45	RT4LH	26-40	4
22	33	-	FEL36M030JF	-	-	210-450	429	EF95	95	45	RT4LH	26-40	6

(1) Current values are relevant to four pole motors not having special characteristics of torque. Inrush currents: ≤ 8 time rated current for ≤ 1s.

(2) The minimum cycle cross-sections are referred to an ambient temperature of 30°C max. in free air and are selected to withstand the maximum let-through energy and the motor rated current. The user also has to consider the drop voltage, the type of laying and ambient temperature.





## Surion GPS high breaking capacity (Thermal Magnetic). Coordination Type 2 - 65kA at 380/400 & 415V

Motor <sup>(1)</sup>			Manual motor starter				Contactor	Box clamp		Links
Rated power	Rated current (A)		Cat.No.	Rated current (In)	Thermal current	Magnetic current	Series	Smallest wire Cu (pvc) <sup>(2)</sup>	Minimum frontal electrical safety clearance	Cat.No.
	380/400V	415V								
0.06	0.23	0.21	GPS1BHAB	0.25	0.16-0.25	3.2	EC9A..	0.75	20	ECM1AL25
0.09	0.34	0.31	GPS1BHAC	0.4	0.25-0.4	5.2	EC9A..	0.75	20	ECM1AL25
0.12	0.44	0.4	GPS1BHAD	0.63	0.4-0.63	8.2	EC9A..	0.75	20	ECM1AL25
0.18	0.65	0.63	GPS1BHAЕ	1	0.63-1	13	EC9A..	0.75	20	ECM1AL25
0.25	0.9	0.8	GPS1BHAЕ	1	0.63-1	13	EC9A..	0.75	20	ECM1AL25
0.37	1.25	1.1	GPS1BHAF	1.6	1-1.6	20.5	EC9A..	0.75	20	ECM1AL25
0.55	1.6	1.5	GPS1BHAF	1.6	1-1.6	20.5	EC9A..	0.75	20	ECM1AL25
0.75	2	1.9	GPS1BHAG	2.5	1.6-2.5	32.5	EC9A..	0.75	20	ECM1AL25
1.1	2.6	2.5	GPS1BHAH	4	2.5-4	52	EC9A..	0.75	20	ECM1AL25
1.5	3.5	3.4	GPS1BHAH	4	2.5-4	52	EC9A..	0.75	20	ECM1AL25
2.2	5	4.5	GPS1BHAJ	6.3	4-6.3	82	EC9A..	0.75	20	ECM1AL25
3	7	6.5	GPS1BHAK	10	6.3-10	130	EC9A..	1.5	20	ECM1AL25
4	9	8	GPS1BHAK	10	6.3-10	130	EC9A..	1.5	20	ECM1AL25
5.5	12	11	GPS1BHAL	13	9-13	169	EC12A..	2.3	20	ECM1AL25
7.5	16	14	GPS1BHAM	16	11.0-16	208	EC18A..	4	20	ECM1AL25
11	22.5	21	GPS1BHAP	25	19-25	325	EC25A..	6	20	ECM1AL25
15	30	28	GPS1BHAR	32	24-32	416	EC32A..	6	20	ECM1AL32
18.5	37	35	GPS2BHAS	40	28-40	520	EC40A..	10	20	ECM1AL32

Motor <sup>(1)</sup>			Manual motor starter			Contactor	Overload relay		Box clamp	
Rated power	Rated current (A)		Cat.No.	Rated current (In)	Magnetic current	Series	Series	Setting range	Smallest wire Cu (pvc) <sup>(2)</sup>	Minimum frontal electrical safety clearance
	380/400V	415V								
22	-	40	GPS2MHAT	50	650	EF50	RT2E	30-43	10	25
	44	-					RT2G	42-55		
30	60	55	GPS2MHAU	63	819	EF65	RT2H	54-65	16	

(1) Current values are relevant to four pole motors not having special characteristics of torque. Inrush currents: ≤ 8 time rated current for ≤ 1s.

(2) The minimum cycle cross-sections are referred to an ambient temperature of 30°C max. in free air and are selected to withstand the maximum let-through energy and the motor rated current. The user also has to consider the drop voltage, the type of laying and ambient temperature.



### Surion GPS-B: Coordination Type 1 65kA at 380/400V and 415V

Rated power (kW)	Motor <sup>(1)</sup>		Cat. no.	Manual motor starter			Contactor Series	Smallest wire Cu (PVC) <sup>(2)</sup> 380/415V (mm <sup>2</sup> )	Minimum frontal electrical safety clearance (mm)	Links Cat. no. <sup>(3)</sup>
	Rated current			Rated current In (A)	Thermal current Setting range (A)	Magnetic current (A)				
	380/400V (A)	415V (A)								
0.06	0.23	0.21	GPS1BSAB	0.25	0.16 - 0.25	3.2	MC0 / CL00	1	20	GPF1LMCBA / GPF1L02#
0.09	0.34	0.31	GPS1BSAC	0.4	0.25 - 0.4	5.2	MC0 / CL00	1	20	GPF1LMCBA / GPF1L02#
0.12	0.44	0.4	GPS1BSAD	0.63	0.4 - 0.63	8.2	MC0 / CL00	1	20	GPF1LMCBA / GPF1L02#
0.18	0.65	0.63	GPS1BSAE	1	0.63 - 1	13	MC0 / CL00	1	20	GPF1LMCBA / GPF1L02#
0.25	0.9	0.8	GPS1BSAE	1	0.63 - 1	13	MC0 / CL00	1	20	GPF1LMCBA / GPF1L02#
0.37	1.25	1.1	GPS1BSAF	1.6	1 - 1.6	20.5	MC0 / CL00	1	20	GPF1LMCBA / GPF1L02#
0.55	1.6	1.5	GPS1BSAF	1.6	1 - 1.6	20.5	MC0 / CL00	1	20	GPF1LMCBA / GPF1L02#
0.75	2	1.9	GPS1BSAG	2.5	1.6 - 2.5	32.5	MC0 / CL00	1	20	GPF1LMCBA / GPF1L02#
1.1	2.6	2.5	GPS1BSAH	4	2.5 - 4	52	MC0 / CL00	1	20	GPF1LMCBA / GPF1L02#
1.5	3.5	3.4	GPS1BSAH	4	2.5 - 4	52	MC0 / CL00	1	20	GPF1LMCBA / GPF1L02#
2.2	5	4.5	GPS1BSAJ	6.3	4 - 6.3	82	MC0 / CL00	1	20	GPF1LMCBA / GPF1L02#
3	7	6.5	GPS1BSAK	10	6.3 - 10	130	MC1 / CL00	1.5	20	GPF1LMCBA / GPF1L02#
4	9	8	GPS1BSAK	10	6.3 - 10	130	MC1 / CL00	1.5	20	GPF1LMCBA / GPF1L02#
5.5	12	11	GPS1BHAL	13	9 - 13	169	CL01	2.5	20	GPF1L02#
7.5	16	14	GPS1BHAM	16	11 - 16	208	CL02	2.5	20	GPF1L02#
11	22.5	21	GPS1BHAP	25	19 - 25	325	CL03	4	20	GPF1L25#
15	30	28	GPS1BHAR	32	24 - 32	416	CL04	6	20	GPF1L04#
11	22.5	21	GPS2BHAP	25	19 - 25	325	CL04	4	20	GPF2L04#
15	30	28	GPS2BHAR	32	24 - 32	416	CL04	6	20	GPF2L04#
18.5	37	35	GPS2BHAS	40	28 - 40	520	CL05	10	20	GPF2L45#
22	44	41	GPS2BHAT	50	35 - 50	650	CL06	10	25	GPF2L07AA
30	60	55	GPS2BHAU	63	45 - 63	820	CL07	16	25	GPF2L07AA

### Surion GPS-B: Coordination Type 2 65kA at 380/400V and 415V

Rated power (kW)	Motor <sup>(1)</sup>		Cat. no.	Manual motor starter			Contactor Series	Smallest wire Cu (PVC) <sup>(2)</sup> 380/415V (mm <sup>2</sup> )	Minimum frontal electrical safety clearance (mm)	Links Cat. no. <sup>(3)</sup>
	Rated current			Rated current In (A)	Thermal current Setting range (A)	Magnetic current (A)				
	380/400V (A)	415V (A)								
0.06	0.23	0.21	GPS1BHAB	0.25	0.16 - 0.25	3.2	CL00	1	20	GPF1L02#
0.09	0.34	0.31	GPS1BHAC	0.4	0.25 - 0.4	5.2	CL00	1	20	GPF1L02#
0.12	0.44	0.4	GPS1BHAD	0.63	0.4 - 0.63	8.2	CL00	1	20	GPF1L02#
0.18	0.65	0.63	GPS1BHA E	1	0.63 - 1	13	CL00	1	20	GPF1L02#
0.25	0.9	0.8	GPS1BHA E	1	0.63 - 1	13	CL00	1	20	GPF1L02#
0.37	1.25	1.1	GPS1BHAF	1.6	1 - 1.6	20.5	CL00	1	20	GPF1L02#
0.55	1.6	1.5	GPS1BHAF	1.6	1 - 1.6	20.5	CL00	1	20	GPF1L02#
0.75	2	1.9	GPS1BHAG	2.5	1.6 - 2.5	32.5	CL00	1	20	GPF1L02#
1.1	2.6	2.5	GPS1BHAH	4	2.5 - 4	52	CL03	1	20	GPF1L25#
1.5	3.5	3.4	GPS1BHAH	4	2.5 - 4	52	CL03	1	20	GPF1L25#
2.2	5	4.5	GPS1BHAJ	6.3	4 - 6.3	82	CL03	1	20	GPF1L25#
3	7	6.5	GPS1BHAJ	10	6.3 - 10	130	CL03	1.5	20	GPF1L25#
4	9	8	GPS1BHAJ	10	6.3 - 10	130	CL03	1.5	20	GPF1L25#
5.5	12	11	GPS1BHAL	13	9 - 13	169	CL03	2.5	20	GPF1L25#
7.5	16	14	GPS1BHAM	16	11 - 16	208	CL03	2.5	20	GPF1L25#
11	22.5	21	GPS1BHAP	25	19 - 25	325	CL03	4	20	GPF1L25#
15	30	28	GPS1BHAR	32	24 - 32	416	CL04	6	20	GPF1L04#
11	22.5	21	GPS2BHAP <sup>(4)</sup>	25	19 - 25	325	CL04	4	20	GPF2L04#
15	30	28	GPS2BHAR <sup>(4)</sup>	32	24 - 32	416	CL04	6	20	GPF2L04#
18.5	37	35	GPS2BHAS <sup>(4)</sup>	40	28 - 40	520	CL05	10	20	GPF2L45#
22	44	41	GPS2BHAT <sup>(4)</sup>	50	35 - 50	650	CL06	10	25	GPF2L07#
30	60	55	GPS2BHAU <sup>(4)</sup>	63	45 - 63	820	CL07	16	25	GPF2L07#

(1) Currents are relevant to four pole motors not having special characteristics of torque.

Inrush currents: 8 time rated current for 1s.

(2) The minimum cycle cross-sections are referred to an ambient temperature of 30°C max. in free air.

Cables are to withstand the maximum let-through energy and the motor rated current. Besides the user should consider the drop voltage on the cables, the type of laying and the ambient temperature.

(3) Complete cat. nrs., see page D.3

(4) Test running.



## Surion GPS-B: Coordination Type 1 50kA at 500V and 525V

Rated power (kW)	Motor <sup>(1)</sup>		Cat. no.	Manual motor starter			Contactor Series	Smallest wire Cu (PVC) <sup>(2)</sup> 380/415V (mm <sup>2</sup> )	Minimum frontal electrical safety clearance (mm)	Links Cat. no. <sup>(3)</sup>
	Rated current			Rated current In (A)	Thermal current Setting range (A)	Magnetic current (A)				
	500V	525V								
0.06	0.17	0.16	GPS1BSAB	0.25	0.16 - 0.25	3.2	MC0 / CL00	1	20	GPF1LMCBA / GPF1L02#
0.09	0.24	0.22	GPS1BSAB	0.25	0.16 - 0.25	3.2	MC0 / CL00	1	20	GPF1LMCBA / GPF1L02#
0.12	0.33	0.3	GPS1BSAC	0.4	0.25 - 0.4	5.2	MC0 / CL00	1	20	GPF1LMCBA / GPF1L02#
0.18	0.48	0.46	GPS1BSAD	0.63	0.4 - 0.63	8.2	MC0 / CL00	1	20	GPF1LMCBA / GPF1L02#
0.25	0.66	0.64	GPS1BSAE	1	0.63 - 1	13	MC0 / CL00	1	20	GPF1LMCBA / GPF1L02#
0.37	0.9	0.85	GPS1BSAE	1	0.63 - 1	13	MC0 / CL00	1	20	GPF1LMCBA / GPF1L02#
0.55	1.2	1.15	GPS1BSAF	1.6	1 - 1.6	20.5	MC0 / CL00	1	20	GPF1LMCBA / GPF1L02#
0.75	1.5	1.45	GPS1BSAF	1.6	1 - 1.6	20.5	MC0 / CL00	1	20	GPF1LMCBA / GPF1L02#
1.1	2.1	1.9	GPS1BSAG	2.5	1.6 - 2.5	32.5	MC0 / CL00	1	20	GPF1LMCBA / GPF1L02#
1.5	2.8	2.6	GPS1BSAH	4	2.5 - 4	52	MC0 / CL00	1	20	GPF1LMCBA / GPF1L02#
2.2	3.9	3.6	GPS1BSAH	4	2.5 - 4	52	MC0 / CL00	1	20	GPF1LMCBA / GPF1L02#
3	5.3	5	GPS1BSAJ	6.3	4 - 6.3	82	MC0 / CL00	1	20	GPF1LMCBA / GPF1L02#
4	6.8	6.5	GPS1BHAK	10	6.3 - 10	130	MC1 / CL00	1	20	GPF1LMCBA / GPF1L02#
5.5	9.1	8.6	GPS1BHAK	10	6.3 - 10	130	CL00	1.5	20	GPF1L02#
7.5	12	11.4	GPS1BHAL	13	9 - 13	169	CL01	2.5	20	GPF1L02#
10	15.5	14.8	GPS1BHAM	16	11 - 16	208	CL02	2.5	20	GPF1L02#
11	17.6	17	GPS1BHAN	20	14 - 20	260	CL03	2.5	20	GPF1L25#
15	23	22	GPS1BHAP	25	19 - 25	325	CL03	4	20	GPF2L25#
18.5	28.5	27	GPS1BHAR	32	24 - 32	416	CL04	6	20	GPF1L04#
11	17.6	17	GPS2BHAN	20	14 - 20	260	CL04	2.5	20	GPF2L04#
15	23	22	GPS2BHAP	25	19 - 25	325	CL04	4	20	GPF2L04#
18.5	28.5	27	GPS2BHAR	32	24 - 32	416	CL04	6	20	GPF2L04#
22	33	31.5	GPS2BHAS	40	28 - 40	520	CL05	6/10	20	GPF2L45#
30	45	43	GPS2BHAT	50	35 - 50	650	CL06	10	25	GPF2L07#
37	53	52	GPS2BHAU	63	45 - 63	820	CL07	16	25	GPF2L07#

## Surion GPS-B: Coordination Type 2 50kA at 500V and 525V

Rated power (kW)	Motor <sup>(1)</sup>		Cat. no.	Manual motor starter			Contactor Series	Smallest wire Cu (PVC) <sup>(2)</sup> 380/415V (mm <sup>2</sup> )	Minimum frontal electrical safety clearance (mm)	Links Cat. no. <sup>(3)</sup>
	Rated current			Rated current In (A)	Thermal current Setting range (A)	Magnetic current (A)				
	500V	525V								
0.06	0.17	0.16	GPS1BS/HAB	0.25	0.16 - 0.25	3.2	MC1 / CL00	1	20	GPF1LMCBA / GPF1L02#
0.09	0.24	0.22	GPS1BS/HAB	0.25	0.16 - 0.25	3.2	MC1 / CL00	1	20	GPF1LMCBA / GPF1L02#
0.12	0.33	0.3	GPS1BS/HAC	0.4	0.25 - 0.4	5.2	MC1 / CL00	1	20	GPF1LMCBA / GPF1L02#
0.18	0.48	0.46	GPS1BS/HAD	0.63	0.4 - 0.63	8.2	MC1 / CL00	1	20	GPF1LMCBA / GPF1L02#
0.25	0.66	0.64	GPS1BS/HAE	1	0.63 - 1	13	MC1 / CL00	1	20	GPF1LMCBA / GPF1L02#
0.37	0.9	0.85	GPS1BS/HAE	1	0.63 - 1	13	MC1 / CL00	1	20	GPF1LMCBA / GPF1L02#
0.55	1.2	1.15	GPS1BS/HAF	1.6	1 - 1.6	20.5	MC1 / CL00	1	20	GPF1LMCBA / GPF1L02#
0.75	1.5	1.45	GPS1BS/HAF	1.6	1 - 1.6	20.5	MC1 / CL00	1	20	GPF1LMCBA / GPF1L02#
1.1	2.1	1.9	GPS1BS/HAG	2.5	1.6 - 2.5	32.5	CL00	1	20	GPF1L02#
1.5	2.8	2.6	GPS1BS/HAH	4	2.5 - 4	52	CL03	1	20	GPF1L25#
2.2	3.9	3.6	GPS1BS/HAH	4	2.5 - 4	52	CL03	1	20	GPF1L25#
3	5.3	5	GPS1BS/HAJ	6.3	4 - 6.3	82	CL03	1	20	GPF1L25#
4	6.8	6.5	GPS1BHAK	10	6.3 - 10	130	CL03	1	20	GPF1L25#
5.5	9.1	8.6	GPS1BHAK	10	6.3 - 10	130	CL03	1.5	20	GPF1L25#
7.5	12	11.4	GPS1BHAL	13	9 - 13	169	CL03	2.5	20	GPF1L25#
10	15.5	14.8	GPS1BHAM	16	11 - 16	208	CL03	2.5	20	GPF1L25#
11	17.6	17	GPS1BHAN	20	14 - 20	260	CL03	2.5	20	GPF1L25#
15	23	22	GPS1BHAP	25	19 - 25	325	CL04	4	20	GPF1L04#
18.5	28.5	27	GPS1BHAR	32	24 - 32	416	CL04	6	20	GPF1L04#
11	17.6	17	GPS2BHAN	20	14 - 20	260	CL04	2.5	20	GPF2L04#
15	23	22	GPS2BHAP	25	19 - 25	325	CL04	4	20	GPF2L04#
18.5	28.5	27	GPS2BHAR	32	24 - 32	416	CL05	6	20	GPF2L45#
22	33	31.5	GPS2BHAS	40	28 - 40	520	CL06	6/10	25	GPF2L07#
30	45	43	GPS2BHAT	50	35 - 50	650	CL06	10	25	GPF2L07#
37	53	52	GPS2BHAU	63	45 - 63	820	CL07	16	25	GPF2L07#

(1) Currents are relevant to four pole motors not having special characteristics of torque. Inrush currents: 8 time rated current for 1s.  
 (2) The minimum cycle cross-sections are referred to an ambient temperature of 30°C max. in free air. Cables are to withstand the maximum let-through energy and the motor rated current. Besides the user should consider the drop voltage on the cables, the type of laying and the ambient temperature.  
 (3) Complete cat. nrs., see page D.3



## Surion GPS-M and Record Plus: Coordination Type 1 65kA at 380/400V and 415V

Coordination tables

Rated power (kW)	Motor <sup>(1)</sup>		Cat. no.	Breaker			Contactor Series	Overload relay		Smallest wire Cu (PVC) <sup>(2)</sup> 380/415V (mm <sup>2</sup> )	Minimum frontal safety clearance (mm)
	Rated current			Rated current In (A)	Magnetic setting Im Pick-up band ±20% Im (A)	Magnetic current (A)		Series	Setting range		
	380/400V (A)	415V									
0.06	0.23	0.21	GPS1MSAB	0.25	-	3.3	CL00	RT1B	0.16-0.26	1	20
0.09	0.34	0.31	GPS1MSAC	0.4	-	5.2	CL00	RT1C	0.25-0.41	1	20
0.12	0.44	0.4	GPS1MSAD	0.63	-	8.2	CL00	RT1D	0.4-0.65	1	20
0.18	0.65	0.63	GPS1MSAE	1	-	13	CL00	RT1D	0.4-0.65	1	20
0.25	0.9	0.8	GPS1MSAE	1	-	13	CL00	RT1F	0.65-1.1	1	20
0.37	1.25	1.1	GPS1MSAF	1.6	-	20.8	CL00	RT1G	1-1.5	1	20
0.55	1.6	1.5	GPS1MSAF	1.6	-	20.8	CL00	RT1H	1.3-1.9	1	20
0.75	2	1.9	GPS1MSAG	2.5	-	32.5	CL00	RT1J	1.8-2.7	1	20
1.1	2.6	2.5	GPS1MSAH	4	-	52	CL00	RT1K	2.5-4	1	20
1.5	3.5	3.4	GPS1MSAH	4	-	52	CL00	RT1K	2.5-4	1	20
2.2	5	4.5	GPS1MSAJ	6.3	-	81.9	CL00	RT1L	4-6.3	1	20
3	7	6.5	GPS1MSAK	10	-	130	CL00	RT1M	5.5-8.5	1.5	20
4	9	8	GPS1MSAK	10	-	130	CL00	RT1N	8-12	1.5	20
5.5	12	11	GPS1MHAL	13	-	169	CL01	RT1P	10-16	2.5	20
7.5	-	14	GPS1MHAM	16	-	208	CL02	RT1P	10-16	2.5	20
7.5	16	-	GPS1MHAM	16	-	208	CL02	RT1S	14.5-18	2.5	20
11	22.5	21	GPS1MHAP	25	-	325	CL03	RT1U	21-26	4	20
15	30	28	GPS1MHAR	32	-	416	CL04	RT1V	25-32	6	20
11	22.5	21	GPS2MHAP	25	-	325	CL04	RT1U	21-26	4	20
15	30	28	GPS2MHAR	32	-	416	CL04	RT1V	25-32	6	20
18.5	37	35	GPS2MHAS	40	-	520	CL05	RT1W	30-40	10	20
22	-	40	GPS2MHAT	50	-	650	CL06	RT2E	30-43	10	25
22	44	-	GPS2MHAT	50	-	650	CL06	RT2G	42-55	10	25
30	60	55	GPS2MHAU	63	-	819	CL07	RT2H	54-65	16	25
45	85	80	FDH36MC100GD	100	1000 - 1500	1140	CL09	RT2L	78 - 97	35	30
55	-	100	FDH36MC160JF	160	1600 - 2400	1400	CL10	RT2M	90 - 110	35	30
55	105	-	FDH36MC160JF	160	1600 - 240	1400	CL10	RT2M	90 - 110	35	30

## Surion GPS-M and Record Plus: Coordination Type 2 65kA at 380/400V and 415V

Rated power (kW)	Motor <sup>(1)</sup>		Cat. no.	Breaker			Contactor Series	Overload relay		Smallest wire Cu (PVC) <sup>(2)</sup> 380/415V (mm <sup>2</sup> )	Minimum frontal safety clearance (mm)
	Rated current			Rated current In (A)	Magnetic setting Im Pick-up band ±20% Im (A)	Magnetic current (A)		Series	Setting range		
	380/400V (A)	415V									
0.06	0.23	0.21	GPS1MHAB	0.25	-	3.3	CL00	RT1B	0.16-0.26	1	20
0.09	0.34	0.31	GPS1MHAC	0.4	-	5.2	CL00	RT1C	0.25-0.41	1	20
0.12	0.44	0.4	GPS1MHAD	0.63	-	8.2	CL00	RT1D	0.4-0.65	1	20
0.18	0.65	0.63	GPS1MHA E	1	-	13	CL00	RT1D	0.4-0.65	1	20
0.25	0.9	0.8	GPS1MHA E	1	-	13	CL00	RT1F	0.65-1.1	1	20
0.37	1.25	1.1	GPS1MHA F	1.6	-	20.8	CL00	RT1G	1-1.5	1	20
0.55	1.6	1.5	GPS1MHA F	1.6	-	20.8	CL00	RT1H	1.3-1.9	1	20
0.75	2	1.9	GPS1MHA G	2.5	-	32.5	CL00	RT1J	1.8-2.7	1	20
1.1	2.6	2.5	GPS1MHA H	4	-	52	CL03	RT1K	2.5-4	1	20
1.5	3.5	3.4	GPS1MHA H	4	-	52	CL03	RT1K	2.5-4	1	20
2.2	5	4.5	GPS1MHA J	6.3	-	81.9	CL03	RT1L	4-6.3	1	20
3	7	6.5	GPS1MHA K	10	-	130	CL03	RT1M	5.5-8.5	1.5	20
4	9	8	GPS1MHA K	10	-	130	CL03	RT1N	8-12	1.5	20
5.5	12	11	GPS1MHAL	13	-	169	CL03	RT1P	10-16	2.5	20
7.5	-	14	GPS1MHAM	16	-	208	CL03	RT1P	10-16	2.5	20
7.5	16	-	GPS1MHAM	16	-	208	CL03	RT1S	14.5-18	2.5	20
11	22.5	21	GPS2MHAP	25	-	325	CL03	RT1U	21-26	4	20
15	30	28	GPS2MHAR	32	-	416	CL04	RT1V	25-32	6	20
11	22.5	21	GPS2MHAP	25	-	325	CL04	RT1U	21-26	4	20
15	30	28	GPS2MHAR	32	-	416	CL04	RT1V	25-32	6	20
18.5	37	35	GPS2MHAS	40	-	520	CL05	RT1W	30-40	10	20
22	-	40	GPS2MHAT	50	-	650	CL06	RT2E	30-43	10	25
22	44	-	GPS2MHAT	50	-	650	CL06	RT2G	42-55	10	25
30	60	55	GPS2MHAU	63	-	819	CL07	RT2H	54-65	16	25
45	85	80	FDH36MC100GD	100	1000 - 1500	1140	CL09	RT2L	78 - 97	35	30
55	-	100	FDH36MC100GD	100	1000 - 1500	1400	CL10	RT2M	90 - 110	35	30
55	105	-	FDH36MC160JF	160	1600 - 2400	1400	CL10	RT2M	90 - 110	35	30

(1) Currents are relevant to four pole motors not having special characteristics of torque. Inrush currents: H 8 time rated current for H 1s.

(2) The minimum cycle cross-sections are referred to an ambient temperature of 30°C max. in free air and are selected to withstand the maximum let-through energy and the motor rated current. Besides the user has to consider the drop voltage, the type of laying and ambient temperature.



## Surion GPS-B: Coordination Type 2 50kA at 380/400V and 415V

Motor <sup>(1)</sup>			Manual motor starter				Contactor			Links
Rated power (kW)	Rated current		Cat. no.	Rated current In (A)	Thermal current Setting range (A)	Magnetic current (A)	Series	Smallest wire Cu (PVC) <sup>(2)</sup> 380/415V (mm <sup>2</sup> )	Minimum frontal electrical safety clearance (mm)	Links Cat. no. <sup>(3)</sup>
	380/400V (A)	415V								
0.06	0.23	0.21	GPS1BS/HAB	0.25	0.16 - 0.25	3.2	MC1 / CL00	1	20	GPF1LMCBA / GPF1L02#
0.09	0.34	0.31	GPS1BS/HAC	0.4	0.25 - 0.4	5.2	MC1 / CL00	1	20	GPF1LMCBA / GPF1L02#
0.12	0.44	0.4	GPS1BS/HAD	0.63	0.4 - 0.63	8.2	MC1 / CL00	1	20	GPF1LMCBA / GPF1L02#
0.18	0.65	0.63	GPS1BS/HAE	1	0.63 - 1	13	MC1 / CL00	1	20	GPF1LMCBA / GPF1L02#
0.25	0.9	0.8	GPS1BS/HAE	1	0.63 - 1	13	MC1 / CL00	1	20	GPF1LMCBA / GPF1L02#
0.37	1.25	1.1	GPS1BS/HAF	1.6	1 - 1.6	20.5	MC1 / CL00	1	20	GPF1LMCBA / GPF1L02#
0.55	1.6	1.5	GPS1BS/HAF	1.6	1 - 1.6	20.5	MC1 / CL00	1	20	GPF1LMCBA / GPF1L02#
0.75	2	1.9	GPS1BS/HAG	2.5	1.6 - 2.5	32.5	MC1 / CL00	1	20	GPF1LMCBA / GPF1L02#
1.1	2.6	2.5	GPS1BS/HAH	4	2.5 - 4	52	CL01	1	20	GPF1L02#
1.5	3.5	3.4	GPS1BS/HAH	4	2.5 - 4	52	CL01	1	20	GPF1L02#
2.2	5	4.5	GPS1BS/HAJ	6.3	4 - 6.3	82	CL02	1	20	GPF1L02#
3	7	6.5	GPS1BS/HAK	10	6.3 - 10	130	CL03	1.5	20	GPF1L25#
4	9	8	GPS1BS/HAK	10	6.3 - 10	130	CL03	1.5	20	GPF1L25#
5.5	12	11	GPS1BHAL	13	9 - 13	169	CL03	2.5	20	GPF1L25#
7.5	16	14	GPS1BHAM	16	11 - 16	208	CL03	2.5	20	GPF1L25#
11	22.5	21	GPS1BHAP	25	19 - 25	325	CL03	4	20	GPF1L25#
15	30	28	GPS1BHAR	32	24 - 32	416	CL04	6	20	GPF1L04#
11	22.5	21	GPS2BHAP	25	19 - 25	325	CL04	4	20	GPF2L04#
15	30	28	GPS2BHAR	32	24 - 32	416	CL04	6	20	GPF2L04#
18.5	37	35	GPS2BHAS	40	28 - 40	520	CL05	10	20	GPF2L45#
22	44	41	GPS2BHAT	50	35 - 50	650	CL06	10	25	GPF2L07#
30	60	55	GPS2BHAU	63	45 - 63	820	CL07	16	25	GPF2L07#

(1) Currents are relevant to four pole motors not having special characteristics of torque.  
Inrush currents: H 8 time rated current for H 1s.

(2) The minimum cycle cross-sections are referred to an ambient temperature of 30°C max. in free air. Cables are to withstand the maximum let-through energy and the motor rated current. Besides the user should consider the drop voltage on the cables, the type of laying and the ambient temperature.

(3) Complete cat. nrs., see page D.3



## Surion GPS-M and Record Plus MCCBs: Coordination Type 1 65kA at 380/400V and 415V

Rated power (kW)	Motor <sup>(1)</sup>		Cat. no.	Breaker			Contactor Series	Overload relay		Smallest wire Cu (PVC) <sup>(2)</sup> 380/415V (mm <sup>2</sup> )	Minimum frontal safety clearance (mm)
	Rated current			Rated current In (A)	Magnetic setting Im Pick-up band ±20% Im (A)	Magnetic current (A)		Series	Setting range		
	380/400V (A)	415V									
0.06	0.23	0.21	GPS1MS/HAB	0.25	-	3.3	CL00	RT1B	0.16-0.26	1	20
0.09	0.34	0.31	GPS1MS/HAC	0.4	-	5.2	CL00	RT1C	0.25-0.41	1	20
0.12	0.44	0.4	GPS1MS/HAD	0.63	-	8.2	CL00	RT1D	0.4-0.65	1	20
0.18	0.65	0.63	GPS1MS/HAE	1	-	13	CL00	RT1D	0.4-0.65	1	20
0.25	0.9	0.8	GPS1MS/HAE	1	-	13	CL00	RT1F	0.65-1.1	1	20
0.37	1.25	1.1	GPS1MS/HAF	1.6	-	20.8	CL00	RT1G	1-1.5	1	20
0.55	1.6	1.5	GPS1MS/HAF	1.6	-	20.8	CL00	RT1H	1.3-1.9	1	20
0.75	2	1.9	GPS1MS/HAG	2.5	-	32.5	CL00	RT1J	1.8-2.7	1	20
1.1	2.6	2.5	GPS1MS/HAH	4	-	52	CL00	RT1K	2.5-4	1	20
1.5	3.5	3.4	GPS1MS/HAH	4	-	52	CL00	RT1K	2.5-4	1	20
2.2	5	4.5	GPS1MS/HAJ	6.3	-	81.9	CL00	RT1L	4-6.3	1	20
3	7	6.5	GPS1MS/HAK	10	-	130	CL00	RT1M	5.5-8.5	1.5	20
4	9	8	GPS1MS/HAK	10	-	130	CL00	RT1N	8-12	1.5	20
5.5	12	11	GPS1MHAL	13	-	169	CL01	RT1P	10-16	2.5	20
7.5	-	14	GPS1MHAM	16	-	208	CL02	RT1P	10-16	2.5	20
7.5	16	-	GPS1MHAM	16	-	208	CL02	RT1S	14.5-18	2.5	20
11	22.5	21	GPS1MHAP	25	-	325	CL03	RT1U	21-26	4	20
15	30	28	GPS1MHAR	32	-	416	CL04	RT1V	25-32	6	20
11	22.5	21	GPS2MHAP	25	-	325	CL03	RT1U	21-26	4	20
15	30	28	GPS2MHAR	32	-	416	CL04	RT1V	25-32	6	20
18.5	37	35	GPS2MHAS	40	-	520	CL05	RT1W	30-40	10	20
22	-	40	GPS2MHAT	50	-	650	CL06	RT2E	30-43	10	25
22	44	-	GPS2MHAT	50	-	650	CL06	RT2G	42-55	10	25
30	60	55	GPS2MHAU	63	-	819	CL07	RT2H	54-65	16	25
37	72	68	FDN36MC080GD	80	-	950	CL08	RT2J	64-82	25	25
45	85	80	FDN36MC100GD	100	-	1140	CL09	RT2L	78-97	35	30
55	105	100	FDN36MC100GD	100	-	1400	CL10	RT2M	90-110	35	30

## Surion GPS-M and Record Plus MCCBs: Coordination Type 2 50kA at 380/400V and 415V

Rated power (kW)	Motor <sup>(1)</sup>		Cat. no.	Breaker			Contactor Series	Overload relay		Smallest wire Cu (PVC) <sup>(2)</sup> 380/415V (mm <sup>2</sup> )	Minimum frontal safety clearance (mm)
	Rated current			Rated current In (A)	Magnetic setting Im Pick-up band ±20% Im (A)	Magnetic current (A)		Series	Setting range		
	380/400V (A)	415V									
0.06	0.23	0.21	GPS1MS/HAB	0.25	-	3.3	CL00	RT1B	0.16-0.26	1	20
0.09	0.34	0.31	GPS1MS/HAC	0.4	-	5.2	CL00	RT1C	0.25-0.41	1	20
0.12	0.44	0.4	GPS1MS/HAD	0.63	-	8.2	CL00	RT1D	0.4-0.65	1	20
0.18	0.65	0.63	GPS1MS/HAE	1	-	13	CL00	RT1D	0.4-0.65	1	20
0.25	0.9	0.8	GPS1MS/HAE	1	-	13	CL00	RT1F	0.65-1.1	1	20
0.37	1.25	1.1	GPS1MS/HAF	1.6	-	20.8	CL00	RT1G	1-1.5	1	20
0.55	1.6	1.5	GPS1MS/HAF	1.6	-	20.8	CL00	RT1H	1.3-1.9	1	20
0.75	2	1.9	GPS1MS/HAG	2.5	-	32.5	CL00	RT1J	1.8-2.7	1	20
1.1	2.6	2.5	GPS1MS/HAH	4	-	52	CL01	RT1K	2.5-4	1	20
1.5	3.5	3.4	GPS1MS/HAH	4	-	52	CL01	RT1K	2.5-4	1	20
2.2	5	4.5	GPS1MS/HAJ	6.3	-	81.9	CL02	RT1L	4-6.3	1	20
3	7	6.5	GPS1MS/HAK	10	-	130	CL03	RT1M	5.5-8.5	1.5	20
4	9	8	GPS1MS/HAK	10	-	130	CL03	RT1N	8-12	1.5	20
5.5	12	11	GPS1MHAL	13	-	169	CL03	RT1P	10-16	1.5	20
7.5	-	14	GPS1MHAM	16	-	208	CL03	RT1P	10-16	2.5	20
7.5	16	-	GPS1MHAM	16	-	208	CL03	RT1S	14.5-18	2.5	20
11	22.5	21	GPS1MHAP	25	-	325	CL03	RT1U	21-26	4	20
15	30	28	GPS1MHAR	32	-	416	CL04	RT1V	25-32	6	20
11	22.5	21	GPS2MHAP	25	-	325	CL04	RT1U	21-26	4	20
15	30	28	GPS2MHAR	32	-	416	CL04	RT1V	25-32	6	20
18.5	37	35	GPS2MHAS	40	-	520	CL05	RT1W	30-40	6	20
22	-	40	GPS2MHAT	50	-	650	CL06	RT2E	30-43	10	25
22	44	-	GPS2MHAT	50	-	650	CL06	RT2G	42-55	10	25
30	60	55	GPS2MHAU	63	-	819	CL07	RT2H	54-65	16	25
37	72	68	FDN36MC080GD	80	-	950	CL08	RT2J	64-82	25	25
45	85	80	FDN36MC100GD	100	-	1140	CL09	RT2L	78-97	35	30
55	105	100	FDN36MC100GD	100	-	1400	CL10	RT2M	90-110	35	30

(1) Currents are relevant to four pole motors not having special characteristics of torque. Inrush currents: H 8 time rated current for H 1s.

(2) The minimum cycle cross-sections are referred to an ambient temperature of 30°C max. in free air and are selected to withstand the maximum let-through energy and the motor rated current. Besides the user has to consider the drop voltage, the type of laying and ambient temperature.



## Surion GPS-M and Record Plus MCCBs: Coordination Type 1 50kA at 500 and 525V

Rated power (kW)	Motor <sup>(1)</sup> Rated current		Cat. no.	Breaker			Contactor Series	Overload relay		Smallest wire Cu (PVC) <sup>(2)</sup> 380/415V (mm <sup>2</sup> )	Minimum frontal safety clearance (mm)
	500V	525V		Rated current In	Magnetic setting Im	Magnetic current		Series	Setting range		
	(A)	(A)		(A)	Pick-up band ±20% Im (A)	(A)					
0.06	0.17	0.16	GPS1MSAB	0.25	-	3.2	CL00	RT1B	0.16-0.26	1	20
0.09	0.24	0.22	GPS1MSAB	0.25	-	3.2	CL00	RT1B	0.16-0.26	1	20
0.12	0.33	0.3	GPS1MSAC	0.4	-	5.2	CL00	RT1C	0.25-0.41	1	20
0.18	0.48	0.46	GPS1MSAD	0.63	-	8.2	CL00	RT1D	0.4-0.65	1	20
0.25	-	0.64	GPS1MSAE	1	-	13	CL00	RT1D	0.4-0.65	1	20
0.25	0.66	-	GPS1MSAE	1	-	13	CL00	RT1F	0.65-1.1	1	20
0.37	0.9	0.85	GPS1MSAE	1	-	13	CL00	RT1F	0.65-1.1	1	20
0.55	1.2	1.15	GPS1MSAF	1.6	-	20.5	CL00	RT1G	1.0-1.5	1	20
0.75	1.5	1.45	GPS1MSAF	1.6	-	20.5	CL00	RT1H	1.3-1.9	1	20
1.1	2.1	1.9	GPS1MSAG	2.5	-	32.5	CL00	RT1J	1.8-2.7	1	20
1.5	2.8	2.6	GPS1MSAH	4	-	52	CL00	RT1K	2.5-4	1	20
2.2	3.9	3.6	GPS1MSAH	4	-	52	CL00	RT1K	2.5-4	1	20
3	5.3	5	GPS1MSAJ	6.3	-	82	CL00	RT1L	4.0-6.3	1	20
4	6.8	6.5	GPS1MHAJ	10	-	130	CL00	RT1M	5.5-8.5	1	20
5.5	9.1	8.6	GPS1MHAJ	10	-	130	CL00	RT1N	8.0-12.0	1.5	20
7.5	12	11.4	GPS1MHAL	13	-	169	CL01	RT1P	10-16	2.5	20
10	15.5	14.8	GPS1MHAM	16	-	208	CL02	RT1S	14.5-18	2.5	20
11	17.6	17	GPS1MHAN	20	-	260	CL03	RT1S	14.5-18	2.5	20
15	23	22	GPS1MHAP	25	-	325	CL03	RT1U	21-26	4	20
18.5	28.5	27	GPS1MHAR	32	-	416	CL04	RT1V	25-32	6	20
11	17.6	17	GPS2MHAN	20	-	260	CL04	RT1S	14.5-18	2.5	20
15	23	22	GPS2MHAP	25	-	325	CL04	RT1U	21-26	4	20
18.5	28.5	27	GPS2MHAR	32	-	416	CL04	RT1V	25-32	6	20
22	33	31.5	GPS2MHAS	40	-	520	CL05	RT2E	30-43	6/10	20
30	45	43	GPS2MHAT	50	-	650	CL06	RT2G	42-55	10	25
37	53	52	GPS2MHAU	63	-	820	CL07	RT2G	42-55	16	25
45	-	62	FDN36MC080GD	80	800 - 1200	1000	CL08	RT2H	54 - 65	16	30
45	65	-	FDN36MC080GD	80	800 - 1200	1000	CL08	RT2J	64 - 82	25	30
55	80	76	FDN36MC100GD	100	1000 - 1500	1200	CL09	RT2J	64 - 82	25	30

## Surion GPS-M and Record Plus MCCBs: Coordination Type 2 50kA at 500 and 525V

Rated power (kW)	Motor <sup>(1)</sup> Rated current		Cat. no.	Breaker			Contactor Series	Overload relay		Smallest wire Cu (PVC) <sup>(2)</sup> 380/415V (mm <sup>2</sup> )	Minimum frontal safety clearance (mm)
	500V	525V		Rated current In	Magnetic setting Im	Magnetic current		Series	Setting range		
	(A)	(A)		(A)	Pick-up band ±20% Im (A)	(A)					
0.06	0.17	0.16	GPS1MS/HAB	0.25	-	3.2	CL00	RT1B	0.16-0.26	1	20
0.09	0.24	0.22	GPS1MS/HAB	0.25	-	3.2	CL00	RT1B	0.16-0.26	1	20
0.12	0.33	0.3	GPS1MS/HAC	0.4	-	5.2	CL00	RT1C	0.25-0.41	1	20
0.18	0.48	0.46	GPS1MS/HAD	0.63	-	8.2	CL00	RT1D	0.4-0.65	1	20
0.25	-	0.64	GPS1MS/HAE	1	-	13	CL00	RT1D	0.4-0.65	1	20
0.25	0.66	-	GPS1MS/HAE	1	-	13	CL00	RT1F	0.65-1.1	1	20
0.37	0.9	0.85	GPS1MS/HAE	1	-	13	CL00	RT1F	0.65-1.1	1	20
0.55	1.2	1.15	GPS1MS/HAF	1.6	-	20.5	CL00	RT1G	1.0-1.5	1	20
0.75	1.5	1.45	GPS1MS/HAF	1.6	-	20.5	CL00	RT1H	1.3-1.9	1	20
1.1	2.1	1.9	GPS1MS/HAG	2.5	-	32.5	CL01	RT1J	1.8-2.7	1	20
1.5	2.8	2.6	GPS1MS/HAH	4	-	52	CL03	RT1K	2.5-4	1	20
2.2	3.9	3.6	GPS1MS/HAH	4	-	52	CL03	RT1K	2.5-4	1	20
3	5.3	5	GPS1MS/HAJ	6.3	-	82	CL03	RT1L	4.0-6.3	1	20
4	6.8	6.5	GPS1MHAJ	10	-	130	CL03	RT1M	5.5-8.5	1	20
5.5	9.1	8.6	GPS1MHAJ	10	-	130	CL03	RT1N	8.0-12	1.5	20
7.5	12	11.4	GPS1MHAL	13	-	169	CL03	RT1P	10-16	2.5	20
10	15.5	14.8	GPS1MHAM	16	-	208	CL03	RT1S	14.5-18	2.5	20
11	17.6	17	GPS1MHAN	20	-	260	CL03	RT1S	14.5-18	2.5	20
15	23	22	GPS1MHAP	25	-	325	CL04	RT1U	21-26	4	20
18.5	28.5	27	GPS1MHAR	32	-	416	CL04	RT1V	25-32	6	20
11	17.6	17	GPS2MHAN	20	-	260	CL04	RT1S	14.5-18	2.5	20
15	23	22	GPS2MHAP	25	-	325	CL04	RT1U	21-26	4	20
18.5	28.5	27	GPS2MHAR	32	-	416	CL05	RT1V	25-32	6	20
22	33	31.5	GPS2MHAS	40	-	520	CL06	RT2E	30-43	6/10	25
30	45	43	GPS2MHAT	50	-	650	CL06	RT2G	42-55	10	25
37	53	52	GPS2MHAU	63	-	820	CL07	RT2G	42-55	16	25
45	-	62	FDN36MC080GD	80	800 - 1200	1000	CL09	RT2H	54 - 65	16	30
45	65	-	FDN36MC080GD	80	800 - 1200	1000	CL09	RT2J	64 - 82	25	30
55	80	76	FDN36MC100GD	100	1000 - 1500	1200	CL10	RT2J	64 - 82	25	30

(1) Currents are relevant to four pole motors not having special characteristics of torque. Inrush currents: H 8 time rated current for H 1s.

(2) The minimum cycle cross-sections are referred to an ambient temperature of 30°C max. in free air and are selected to withstand the maximum let-through energy and the motor rated current. Besides the user has to consider the drop voltage, the type of laying and ambient temperature.



## Surion GPS-M and Record Plus MCCBs: Coordination Type 1 50kA at 500 and 525V

Rated power (kW)	Motor Rated current		Motor protection circuit breaker			Contactor Series	Thermal relay Class 10
	380/400V	415V	Cat. no.	Setting range In	Magnetic setting Im		
	(A)	(A)	(A)	(A)	(A)		
0.25	0.9	0.8	GPS1BHAЕ	0.63-1	13	CL00	Integrated into the motor protection circuit breaker
0.37	1.25	1.1	GPS1BHAF	1-1.6	20.5	CL00	Integrated into the motor protection circuit breaker
0.55	1.6	1.5	GPS1BHAF	1-1.6	20.5	CL00	Integrated into the motor protection circuit breaker
0.75	2	1.9	GPS1BHAG	1.6-2.5	32.5	CL00	Integrated into the motor protection circuit breaker
1.1	2.6	2.5	GPS1BHAH	2.5-4	52	CL03	Integrated into the motor protection circuit breaker
1.5	3.5	3.45	GPS1BHAH	2.5-4	52	CL03	Integrated into the motor protection circuit breaker
2.2	5	4.7	GPS1BHAJ	4-6.3	82	CL03	Integrated into the motor protection circuit breaker
3	7	6.5	GPS1BHAK	6.3-10	130	CL03	Integrated into the motor protection circuit breaker
4	9	8	GPS1BHAK	6.3-10	130	CL03	Integrated into the motor protection circuit breaker
5.5	12	11	GPS1BHAL	9.0-13	169	CL03	Integrated into the motor protection circuit breaker
7.5	16	14	GPS1BHAM	11.0-16	208	CL03	Integrated into the motor protection circuit breaker
11	22.5	21	GPS1BHAP	19-25	325	CL03	Integrated into the motor protection circuit breaker
15	30	28	GPS1BHAR	24-32	416	CL04	Integrated into the motor protection circuit breaker
18.5	37	35	GPS2BHAS	28-40	520	CL05	Integrated into the motor protection circuit breaker
22	44	41	GPS2BHAT	25-50	650	CL06	Integrated into the motor protection circuit breaker
30	60	55	GPS2BHAU	45-63	820	CL07	Integrated into the motor protection circuit breaker
37	72.5	65	FDH36MC080	80	950	CL08	RT2J (64-82A)
45	85	79	FDH36MC100	100	1140	CL09	RT2L (78-97A)

## Surion GPS-B and Record Plus MCCBs: Coordination Type 2 80kA at 380/400V and 415V

Rated power (kW)	Motor Rated current		Motor protection circuit breaker			Contactor Series	Thermal relay Class 10
	380/400V	415V	Cat. no.	Setting range In	Magnetic setting Im		
	(A)	(A)	(A)	(A)	(A)		
0.25	0.9	0.8	GPS1BHAЕ	0.63-1	13	CL00	Integrated into the motor protection circuit breaker
0.37	1.25	1.1	GPS1BHAF	1-1.6	20.5	CL00	Integrated into the motor protection circuit breaker
0.55	1.6	1.5	GPS1BHAF	1-1.6	20.5	CL00	Integrated into the motor protection circuit breaker
0.75	2	1.9	GPS1BHAG	1.6-2.5	32.5	CL00	Integrated into the motor protection circuit breaker
1.1	2.6	2.5	GPS1BHAH	2.5-4	52	CL03	Integrated into the motor protection circuit breaker
1.5	3.5	3.45	GPS1BHAH	2.5-4	52	CL03	Integrated into the motor protection circuit breaker
2.2	5	4.7	GPS1BHAJ	4-6.3	82	CL03	Integrated into the motor protection circuit breaker
3	7	6.5	GPS1BHAK	6.3-10	130	CL03	Integrated into the motor protection circuit breaker
4	9	8	GPS1BHAK	6.3-10	130	CL03	Integrated into the motor protection circuit breaker
5.5	12	11	GPS1BHAL	9.0-13	169	CL05	Integrated into the motor protection circuit breaker
7.5	16	14	FDH36MC020	20	210	CL04	RT1S (14.5-18A)
11	22.5	21	FDH36MC030	30	300	CL05	RT1U (21-26A)
15	30	28	FDH36MC030	30	450	CL05	RT1V (25-32A)
18.5	37	35	FDH36MC050	50	500	CL05	RT1W (30-40A)
22	44	41	FDH36MC050	50	580	CL06	RT2G (42-55A)
30	66	55	FDH36MC080	80	800	CL07	RT2H (54-65A)
37	72.5	65	FDH36MC080	80	950	CL08	RT2J (64-82A)
45	85	79	FDH36MC100	100	1140	CL09	RT2L (78-97A)





## Record Plus MCCBs: Coordination Type 2 150kA at 380/400V and 415V (Class 10 protection)

Rated power (kW)	Motor <sup>(1)</sup>		Thermal-magnetic circuit breaker				Contactor		Smallest wire Cu (PVC) <sup>(2)</sup> 380/415V (mm <sup>2</sup> )	Minimum frontal safety clearance (mm)
	Rated current		Cat. no.	Magnetic setting Im Pick-up band ±20% Im (A)	Magnetic current (A)	Magnetic current (A)	Thermal setpoint (400V) (A)	Series		
	380/400V (A)	415V								
7.5	16	14	FD•36TD016ED	160	160	12.8 - 16	16	CL05	2.5	20
11	22.5	21	FD•36TD025ED	250	250	20 - 25	22.5	CL05	4	20
15	30	28	FD•36TD032ED	320	320	26 - 32	30	CL05	6	20
18.5	37	35	FD•36TD040ED	400	400	32 - 40	37	CL05	10	20
22	44	40	FD•36TD050ED	500	500	40 - 50	40	CL06	10	25
30	60	55	FD•36TD063ED	630	630	50 - 63	55	CL07	16	25
37	72	68	FD•36TD080GD	800	800	64 - 80	68	CL08	25	25
45	85	80	FD•36TD100GD	1000	1000	80 - 100	80	CL09	35	30
55	105	100	FD•36TD125GD	1250	1250	100 - 125	100	CL10	35	30
75	138	135	FD•36TD160GD	1280	1280	128 - 160	135	CK75	50	40
90	170	165	FE•36TD200KF	1000 - 2000	1700	160 - 200	165	CK08	70	40
110	211	200	FE•36TD250KF	1250 - 2500	2100	200 - 250	200	CK85	95	40
132	245	240	FE•36TD250KF	1250 - 2500	2500	200 - 250	240	CK09	120	40

(•) Max Iq rating in kA: type N = 50 kA, type H = 80 kA, type L = 150 kA.

(1) Currents are relevant to four pole motors not having special characteristics of torque.

Inrush currents: H 8 times rated current for H 1s (Normal starting) or H 5s (Heavy starting).

(2) The minimum cycle cross-sections are referred to an ambient temperature of 30°C max. in free air and are selected to withstand the maximum let-through energy and the motor rated current. Besides the user has to consider the drop voltage, the type of laying and ambient temperature.

(3) Foreseen values for E-frame.



## Record Plus MCCBs: Coordination Type 2 Up to 150kA at 380/400V and 415V (Class 10 protection)

Rated power (kW)	Motor <sup>(1)</sup> Rated current		Only magnetic circuit breaker			Contactor	Overload relay		Smallest wire Cu (PVC) <sup>(2)</sup> 380/415V (mm <sup>2</sup> )	Minimum frontal safety clearance (mm)
	380/400V (A)	415V (A)	Cat. no.	Magnetic setting Im Pick-up band ±20% Im (A)	Magnetic current Setpoint (A)	Series	Series	Setting range		
4	9	8	FD•36MC012ED	125 - 188	120	CL04	RT1N	8 - 12	1.5	20
5.5	12	11	FD•36MC012ED	125 - 188	150	CL04	RT1P	10 - 16	2.5	20
7.5	-	14	FD•36MC020ED	200 - 300	200	CL04	RT1P	10 - 16	2.5	20
7.5	16	-	FD•36MC020ED	200 - 300	210	CL04	RT1S	14.5 - 18	2.5	20
11	22.5	21	FD•36MC030ED	300 - 450	450	CL05	RT1U	21 - 26	4	20
15	30	28	FD•36MC030ED	300 - 450	500	CL05	RT1V	25 - 32	6	20
18.5	37	35	FD•36MC050ED	500 - 750	500	CL05	RT1W	30 - 40	10	20
22	-	40	FD•36MC050ED	500 - 750	540	CL06	RT2E	30 - 43	10	25
22	44	-	FD•36MC050ED	500 - 750	580	CL06	RT2G	42 - 55	10	25
30	60	55	FD•36MC080GD	800 - 1200	800	CL07	RT2H	54 - 65	16	25
37	72	68	FD•36MC080GD	800 - 1200	950	CL08	RT2J	64 - 82	25	25
45	85	80	FD•36MC100GD	1000 - 1500	1140	CL09	RT2L	78 - 97	35	30
55	-	100	FD•36MC100GD	1000 - 1500	1400	CL10	RT2M	90 - 110	35	30
55	105	-	FE•36MC160JF	1600 - 2400	1400	CL10	RT2M	90 - 110	35	30
75	138	135	FE•36MC160JF	1600 - 2400	1900	CK75	RT3E	110 - 140	50	40
90	170	165	FE•36MC250KF	2500 - 3750	2500	CK08	RT3F	140 - 190	70	40
110	211	200	FE•36MC250KF	2500 - 3750	2800	CK85	RT4P	175 - 280	95	40
132	245	240	FE•36MC250KF	2500 - 3750	3150	CK09	RT4P	175 - 280	120	40

## Record Plus MCCBs: Coordination Type 2 Up to 150kA at 380/400V and 415V (Class 30 protection)

Rated power (kW)	Motor <sup>(1)</sup> Rated current		Only magnetic circuit breaker			Contactor	Overload relay		Smallest wire Cu (PVC) <sup>(2)</sup> 380/415V (mm <sup>2</sup> )	Minimum frontal safety clearance (mm)
	380/400V (A)	415V (A)	Cat. no.	Magnetic setting Im Pick-up band ±20% Im (A)	Magnetic current Setpoint (A)	Series	Series	Setting range		
2.2	5	4.5	FD•36MC008ED	80 - 120	80	CL03	RT4LB	4 - 6.5	1.5	20
3	7	6.5	FD•36MC008ED	80 - 120	90	CL04	RT4LC	5.5 - 8.5	1.5	20
4	9	8	FD•36MC012ED	125 - 188	120	CL04	RT4aLD	7.5 - 11	1.5	20
5.5	12	11	FD•36MC012ED	125 - 188	150	CL05	RT4LE	10 - 16	2.5	20
7.5	-	14	FD•36MC020EaD	200 - 300	200	CL05	RT4LE	10 - 16	2.5	20
7.5	16	-	FD•36MC020ED	200 - 300	210	CL05	RT4LF	12.5 - 20	2.5	20
11	22.5	21	FD•36MC030ED	300 - 450	450	CL05	RT4LG	17 - 27	4	20
15	30	28	FD•36MC030ED	300 - 450	500	CL05	RT4LH	26 - 40	6	20
18.5	37	35	FD•36MC050ED	500 - 750	500	CL06	RT4LH	26 - 40	10	25
22	-	40	FD•36MC050ED	500 - 750	540	CL06	RT4LJ	32 - 52	10	25
22	44	-	FD•36MC050ED	500 - 750	580	CL06	RT4LJ	32 - 52	10	25
30	60	55	FD•36MC080GD	800 - 1200	800	CL07	RT4LK	45 - 70	16	25
37	72	68	FD•36MC080GD	800 - 1200	950	CL08	RT4LL	60 - 90	25	25
45	85	80	FD•36MC100GD	1000 - 1500	1140	CL09	RT4LL	60 - 90	35	30
55	-	100	FD•36MC100GD	1000 - 1500	1400	CL10	RT4LM	80 - 125	35	30
55	105	-	FE•36MC160JF	1600 - 2400	1400	CL10	RT4LM	80 - 125	35	30
75	138	135	FE•36MC160JF	1600 - 2400	1900	CK75	RT4LN	120 - 190	50	40a
90	170	165	FE•36MC250KF	2500 - 3750	2500	CK08	RT4LN	120 - 190	70	40
110	211	200	FE•36MC250KF	2500 - 3750	2800	CK85	RT4LR	200 - 310	95	40
132	245	240	FE•36MC250KF	2500 - 3750	3150	CK09	RT4LR	200 - 310	120	40

(•) Max Iq rating in kA: type N = 50 kA, type H = 80 kA, type L = 150 kA.

- (1) Current are relevant to four pole motors not having special characteristics of torque.  
Inrush currents: H 8 times rated current for H 1s (Normal starting) or H 5s (Heavy starting).
- (2) The minimum cycle cross-sections are referred to an ambient temperature of 30°C max. in free air and are selected to withstand the maximum let-through energy and the motor rated current. Besides the user has to consider the drop voltage, the type of laying and ambient temperature.
- (3) Foreseen values for E-frame.



## Coordination Type 2 - 65kA at 380/400V and 415V - 50/60Hz

Motor <sup>(1)</sup>			Breaker				Contactor	Overload relay		Wire	
Rated power (kW)	Rated current		Cat. no. #	Rated current In (A)	Magnetic setting 1m Pick-up ±20% Im (A)	Magnetic current (A)	Series	Series	Setting range (A)	Smallest wire Cu (PVC) <sup>(2)</sup> (mm <sup>2</sup> )	Min frontal safety (mm)
	380/400V (A)	415V									
0.06	0.23	0.21	GPS1MHAB	0.25	-	3.3	CL00	RE1D	0.1-0.5	1	20
0.09	0.34	0.31	GPS1MHAC	0.4	-	5.2	CL00	RE1D	0.1-0.5	1	20
0.12	0.44	0.4	GPS1MHAD	0.63	-	8.2	CL00	RE1D	0.1-0.5	1	20
0.18	0.65	0.63	GPS1MHA	1	-	13	CL00	RE1H	0.4-2.0	1	20
0.25	0.9	0.8	GPS1MHA	1	-	13	CL00	RE1H	0.4-2.0	1	20
0.37	1.25	1.1	GPS1MHAF	1.6	-	20.8	CL00	RE1H	0.4-2.0	1	20
0.55	1.6	1.5	GPS1MHAF	1.6	-	20.8	CL00	RE1H	0.4-2.0	1	20
0.75	2	1.9	GPS1MHAG	2.5	-	32.5	CL00	RE1K	1.5-5.0	1	20
1.1	2.6	2.5	GPS1MHAH	4	-	52	CL03	RE1K	1.5-5.0	1	20
1.5	3.5	3.4	GPS1MHAH	4	-	52	CL03	RE1K	1.5-5.0	1	20
2.2	5	4.5	GPS1MHAJ	6.3	-	81.9	CL03	RE1K	1.5-5.0	1	20
3	7	6.5	GPS1MHAJ	10	-	130	CL03	RE1M	1.6-8.0	1.5	20
4	9	8	GPS1MHAJ	10	-	130	CL03	RE1S	6.4-32.0	1.5	20
5.5	12	11	GPS1MHAL	13	-	169	CL03	RE1S	6.4-32.0	2.5	20
7.5	-	14	GPS1MHAM	16	-	208	CL03	RE1S	6.4-32.0	2.5	20
8.8	16	-	GPS1MHAM	16	-	208	CL03	RE1S	6.4-32.0	2.5	20
11	22.5	21	GPS1MHAP	25	-	325	CL03	RE1S	6.4-32.0	4	20
15	30	28	GPS1MHAR	32	-	416	CL04	RE1S	6.4-32.0	6	20
11	22.5	21	GPS2MHAR	25	-	325	CL04	RE1S	6.4-32.0	4	20
15	30	28	GPS2MHAP	32	-	416	CL04	RE1S	6.4-32.0	6	20
18.5	37	35	GPS2MHAS	40	-	520	CL05	RE1W	9.0-45.0	10	20
22	-	40	GPS2MHAT	50	-	650	CL07	RE2H	15.0-75.0	10	25
30	44	--	GPS2MHAT	50	-	650	CL07	RE2H	15.0-75.0	10	25
30	60	55	GPS2MHAU	63	-	819	CL07	RE2H	15.0-75.0	16	25
35	65	60	FDH36MC080GD	80	900-1300	1100	CL08	RE2H	15.0-75.0	25	25
45	85	80	FDH36MC1 OOGD	100	1000-1500	1400	CL09	RE2M	22.0-110.0	25	30
55	-	100	FDH36MC1 OOGD	100	1000-1500	1400	CL10	RE2M	22.0-110.0	25	30
55	105	-	FEH36MC125JF	125	1250-1875	1250	CL10	RE2M	22.0-110.0	25	30
75	138	135	FEH36MC200KF	200	2250-3350	2800	CK75	RE3E	30.0-150.0	50	40

## Coordination Type 2 - 100kA at 500 - 525V - 50/60Hz

Motor <sup>(1)</sup>			qL/qG Fuses		EOL			Contactor		Wire	
Rated power kW	Rated current		Size In (A)	Series	Type	Setting range (A)	Series	PAC3 (kW)	Seco min	Safety clearance (mm)	
	500V (A)	525V									
0.06	0.17	0.16	2	000	RE1	D	0.1-0.5	CL00	5.5	1	20
0.03	0.24	0.22	2	000	RE1	D	0.1-0.5	CL00	5.5	1	20
0.12	0.33	0.3	2	000	RE1	D	0.1-0.5	CL00	5.5	1	20
0.18	0.48	0.46	2	000	RE1	D	0.1-0.5	CL00	5.5	1	20
0.25	0.66	0.64	2	000	RE1	H	0.4-2.0	CL00	5.5	1	20
0.37	0.3	0.85	4	000	RE1	H	0.4-2.0	CL00	5.5	1	20
0.55	1.2	1.15	4	000	RE1	H	0.4-2.0	CL00	5.5	1	20
0.75	1.5	1.45	4	000	RE1	H	0.4-2.0	CL00	5.5	1	20
1.1	2.1	1.3	6	000	RE1	K	1.5-5.0	CL00	5.5	1	20
1.5	2.8	2.6	10	000	RE1	K	1.5-5.0	CL00	5.5	1	20
1.1	2.1	1.3	6	000	RE1	K	1.5-5.0	CL01	7.5	1	20
1.5	2.8	2.6	10	000	RE1	K	1.5-5.0	CL01	7.5	1	20
2.2	3.3	3.6	10	000	RE1	K	1.5-5.0	CL01	7.5	1	20
1.5	2.8	2.6	10	000	RE1	K	1.5-5.0	CL03	15	1	20
2.2	3.3	3.6	10	000	RE1	K	1.5-5.0	CL03	15	1	20
3	5.3	5	16	000	RE1	M	1.6-8.0	CL03	15	1	20
4	6.8	6.5	20	000	RE1	M	1.6-8.0	CL03	15	1	20
5.5	3.1	8.6	25	000	RE1	S	6.4-32.0	CL03	15	1.5	20
7.5	12	11.4	32	000	RE1	S	6.4-32.0	CL03	15	2.5	20
10	15.5	14.8	40	000	RE1	S	6.4-32.0	CL03	15	2.5	20
11	17.6	17	40	000	RE1	S	6.4-32.0	CL03	15	2.5	20
15	23	22	50	000	RE1	S	6.4-32.0	CL04	18.5	4	20
18.5	28.5	27	63	000	RE1	S	6.4-32.0	CL04	18.5	6	20
4	6.8	6.5	20	000	RE1	M	1.6-8.0	CL05	25	1.5	20
5.5	3.1	8.6	25	000	RE1	S	6.4-32.0	CL05	25	2.5	20
7.5	12	11.4	32	000	RE1	S	6.4-32.0	CL05	25	2.5	20
11	17.6	17	40	000	RE1	S	6.4-32.0	CL05	25	2.5	20
15	23	22	50	000	RE1	S	6.4-32.0	CL05	25	4	20
18.5	28.5	27	63	000	RE1	W	3.0-45.0	CL05	25	5	20
22	33	31.5	80	000	RE1	H	15.0-75.0	CL05	25	5	20
18.5	28.5	27	63	000	RE2	H	15.0-75.0	CL07	30	5	25
22	33	31.5	80	000	RE2	H	15.0-75.0	CL07	30	5	25
30	45	43	80	000	RE2	H	15.0-75.0	CL07	30	10	25
37	53	52	100	000	RE2	H	15.0-75.0	CL07	40	10	25
40	53	56	100	000	RE2	H	15.0-75.0	CL08	45	16	25
45	65	62	125	00	RE2	H	15.0-75.0	CL09	55	16	30
55	80	76	125	00	RE2	M	22.0-110.0	CL10	65	25	30
75	105	100	160	01/1	RE3	E	30.0-150.0	CK75	100	35/25	40
30	130	124	250	01/1	RE3	E	30.0-150.0	CK08	110	50	40

(1) Current are relevant to four pole motors not having special characteristics of torque.

(2) The minimum cycle cross-sections are referred to an ambient temperature of 30°C max. in free air and are selected to withstand the maximum let-through energy and the motor rated current. Besides the user has to consider the drop voltage, the type of laying and ambient temperature if it is different.



Everything is under control

# IE3 Ready

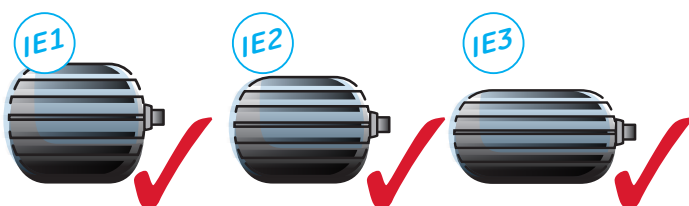
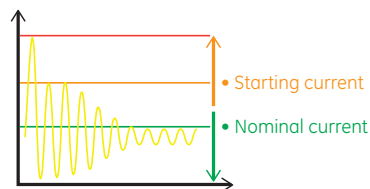
One of the earth's biggest challenges is to reduce CO<sub>2</sub> emissions. Consequently there are new regulatory standards to reduce energy consumption. IEC60034-30-1 defines the efficiency classes for induction motors. From January 1st 2017 efficiency classes IE3 (premium efficiency) for motors from 0.75 up to 375kW or IE2 (high efficiency) motor with a drive, will become mandatory.

Although IE3 compliant motors consume less energy than IE2 motors, IE3 motors draw higher inrush and starting currents. IE3 motors have been in the market for several years and the starting behavior varies between designers and manufacturers. On average the inrush peak starting current will increase by 20% and the locked motor current by 15% versus a standard IE2 motor.

When selecting a starter to protect and control an IE3 motor, special care has to be taken in order to avoid unwanted tripping of the short circuit protection. The median ratio between the Inrush peak and the motor rated current increases from 10.2 (IE2 motors) to 12.6 (IE3 motors). GE recommends a ratio of 14 in order to account for the spread on motor data. For a ratio below 14 the motor datasheet has to be checked.

Effcor starting solutions provides a complete portfolio to Switch and Protect Premium Efficiency IE3 motors

- Effcor contactors have been specifically designed to switch higher starting currents and can be used without constraint in DOL, star-delta and reversing starting applications.
- ECRT, RT2 and RE relays protect the motor against overloads. IE3 motor rated operating current need to be within the OL relay setting range.
- Surion MMS are designed to protect motors and provide line protection against overload and short-circuit. They need to be selected to allow a higher inrush current to avoid nuisance tripping during start.



# Applications

## Selection Table for Direct-On-Line starters

Values given are a harmonized IEC guideline between rated operational currents and rated operational powers determined on the basis of a four-pole squirrel-cage induction motor

**Selection Table**

Power		Guide values of rated operational current (A) at						Contactor	Overload Protection <sup>(4)</sup>		Breaker <sup>(5)</sup>		
kW <sup>(1)</sup>	hp <sup>(2)</sup>	110-120V	220-240V <sup>(3)</sup>	380-415V <sup>(3)</sup>	440-480V	500V	690V	Efficor	TOR	RE	Surion		
	1/2			1.3	1.1			EC09	ECRT1B10G	RE1H	GPS1_F		
			2.2					EC09	ECRT1B10G	RE1H	GPS1_F		
0.55	3/4	4.4						EC09	ECRT1B10J	RE1K	GPS1_G		
				1.5 <sup>(3)</sup>			1.2	0.87	EC09	ECRT1B10L	RE1M	GPS1_J	
									EC09	ECRT1B10F	RE1H	GPS1_E	
			2.6						EC09	ECRT1B10G	RE1H	GPS1_F	
0.75	1.1				1.6 <sup>(3)</sup>			EC09	ECRT1B10K	RE1K	GPS1_H		
				1.8					EC09	ECRT1B10H	RE1H	GPS1_F	
			3.2						EC09	ECRT1B10J	RE1H	GPS1_G	
		6.4							EC09	ECRT1B10K	RE1K	GPS1_H	
								1.1		EC09	ECRT1B10M	RE1S	GPS1_K
										EC09	ECRT1B10G	RE1H	GPS1_F
1.1	1-1/2			1.9				EC09	ECRT1B10G	RE1H	GPS1_F		
									EC09	ECRT1B10J	RE1H	GPS1_G	
			3.3						EC09	ECRT1B10K	RE1K	GPS1_H	
								1.6 <sup>(3)</sup>		EC09	ECRT1B10H	RE1H	GPS1_F
1.5	2			2.7	3			EC09	ECRT1B10J	RE1K	GPS1_G		
									EC09	ECRT1B10K	RE1K	GPS1_H	
				4.7						EC09	ECRT1B10L	RE1M	GPS1_J
										EC09	ECRT1B10K	RE1K	GPS1_H
			12		3.3	3.4				EC09	ECRT1B10K	RE1K	GPS1_H
										EC09	ECRT1B10L	RE1M	GPS1_J
2.2	3			4.3				EC12	ECRT1B10N	RE1S	GPS1_L		
									EC09	ECRT1B10K	RE1K	GPS1_H	
				6.3						EC09	ECRT1B10L	RE1M	GPS1_J
										EC09	ECRT1B10M	RE1S	GPS1_K
3	4	13.6						EC18	ECRT1B10P	RE1S	GPS1_M		
									EC09	ECRT1B10J	RE1K	GPS1_G	
								2.1		EC09	ECRT1B10K	RE1K	GPS1_H
										EC09	ECRT1B10L	RE1M	GPS1_J
4	5			3.6 <sup>(3)</sup>				EC09	ECRT1B10K	RE1K	GPS1_H		
									EC09	ECRT1B10L	RE1M	GPS1_J	
								2.8		EC09	ECRT1B10K	RE1K	GPS1_H
										EC09	ECRT1B10K	RE1K	GPS1_H
5.5	7-1/2			4.9				EC09	ECRT1B10L	RE1M	GPS1_J		
									EC09	ECRT1B10M	RE1S	GPS1_K	
										EC09	ECRT1B10L	RE1M	GPS1_J
										EC12	ECRT1B10N	RE1S	GPS1_L
7.5	10			6.1 <sup>(3)</sup>	4.8			EC09	ECRT1B10L	RE1M	GPS1_J		
									EC12	ECRT1B10N	RE1S	GPS1_L	
										EC25	ECRT2B10T	RE1S	GPS1_P
								3.8 <sup>(3)</sup>		EC09	ECRT1B10K	RE1K	GPS1_H
11	15							EC09	ECRT1B10L	RE1M	GPS1_J		
									EC09	ECRT1B10M	RE1S	GPS1_K	
								5.2		EC09	ECRT1B10M	RE1S	GPS1_K
										EC12	ECRT1B10N	RE1S	GPS1_L
15	20							EC09	ECRT1B10L	RE1M	GPS1_J		
									EC09	ECRT1B10M	RE1S	GPS1_K	
								4.9		EC09	ECRT1B10M	RE1S	GPS1_K
										EC18	ECRT1B10P	RE1S	GPS1_M
22	30							EC09	ECRT1B10M	RE1S	GPS1_K		
										EC12	ECRT1B10N	RE1S	GPS1_L
										EC18	ECRT1B10P	RE1S	GPS1_M
										EC32	ECRT2B10V	RE1W	GPS1_R
30	40							EC09	ECRT1B10M	RE1S	GPS1_K		
										EC12	ECRT1B10N	RE1S	GPS1_L
								9.2		EC12	ECRT1B10N	RE1S	GPS1_L
										EC25	ECRT2B10T	RE1S	GPS1_P
44	60			11.5				EC12	ECRT1B10N	RE1S	GPS1_L		
									EC12	ECRT1B10N	RE1S	GPS1_L	
60	80				11			EC25	ECRT2B10T	RE1S	GPS1_P		
									EC18	ECRT1B10P	RE1S	GPS1_M	
80	110			14				EC25	ECRT2B10T	RE1S	GPS1_P		
									EF50	RT2G	RE2M	GPS2_U	

(1) Preferred rated values according to IEC 60072-1 (primary series). 230V and 400V are the rated voltage for IEC.

(2) Horsepower and currents values according to UL 508 (60Hz).

(3) Inrush peak versus the motor rated current median is 12.6 for IE3 motors. The ratio on these breakers is in the range from 13 to 14 times.

Motor datasheet has to be checked. In case of higher inrush current than the average select next range of available breaker.

(4) Overload protection: Choose thermal (TOR) or electronic (RE) overload protection device.

(5) Choose thermo-magnetic or only magnetic breaker characteristic:

Optimized DOL starter: Breaker (thermomagnetic) + Contactor.

Conventional DOL starter: Breaker (only magnetic) + Contactor + Overload.



Power		Guide values of rated operational current (A) at						Contactor	Overload Protection <sup>(4)</sup>		Breaker <sup>(5)</sup>
kW <sup>(1)</sup>	hp <sup>(2)</sup>	110-120V	220-240V <sup>(1)</sup>	380-415V <sup>(1)</sup>	440-480V	500V	690V	Efficor	TOR	RE	Surion
10	10			18	14			EC18	ECRT1B10P	RE1S	GPS1_M
			28					EC18	ECRT1B10S	RE1S	GPS1_N
		56						EC32	ECRT2B10V	RE1W	GPS1_R
7.5	7.5			15.5 <sup>(3)</sup>		12.4	8.9	EF65	RT2H	RE2M	GPS2_U
								EC12	ECRT1B10N	RE1S	GPS1_K
			27					EC18	ECRT1B10P	RE1S	GPS1_M
11	11					17.6	12.8	EC18	ECRT1B10P	RE1S	GPS1_M
				22				EC32	ECRT2B10V	RE1W	GPS1_R
			38 <sup>(3)</sup>					EC25	ECRT2B10P	RE1S	GPS1_M
15	15			27	21			EC18	ECRT1B10S	RE1S	GPS1_N
			42					EC25	ECRT2B10T	RE1S	GPS1_P
		84						EC40	ECRT2B10W	RE1W	GPS2_S
20	20			34	27			EC25	ECRT2B10T	RE1S	GPS1_P
			54					EC32	ECRT2B10V	RE1W	GPS1_R
								EF50	RT2G	RE2M	GPS2_T
15	15					23	17	EF95	RT2L	RE2M <sup>(6)</sup>	FD-36MC100GD
				29				EC32	ECRT2B10V	RE1S	GPS1_R
			51					EC40	ECRT2B10W	RE1W	GPS2_S
18.5	18.5			35	34	28		EF65	RT2H	RE2M	GPS2_U
			61 <sup>(3)</sup>					EC40	ECRT2B10W	RE1W	GPS2_S
				44				EF50	RT2G	RE2M	GPS2_U
22	22						24	EF80	RT2J	RE2M <sup>(6)</sup>	FD-36MC080GD
			68					EC40	ECRT2B10W	RE1W	GPS2_S
				41			33	EC40	ECRT2B10W	RE1W	GPS2_S
30	30			51	40 <sup>(3)</sup>			EF50	RT2E	RE2M	GPS2_T
			72					EF80	RT2J	RE2M	FD-36MC080GD
								EC40	ECRT2B10W	RE1W	GPS2_S
40	40		80		52			EF65	RT2G	RE2M	GPS2_U
								EF80	RT2J	RE2M	FD-36MC080GD
			104					EF105	RT2M	RE2M	FE-36MC125JF
30	30			66		44	32	EF50	RT2E	RE2M	GPS2_S
								EF50	RT2G	RE2M	GPS2_U
			96	55				EF65	RT2H	RE2M	GPS2_U
37	37				65	53	39	EF105	RT2M	RE2M <sup>(6)</sup>	FE-36MC125JF
								EF50	RT2E	RE2M	GPS2_T
								EF65	RT2G	RE2M	GPS2_U
50	50			83	77			EF80	RT2J	RE2M	FD-36MC080GD
								EF80	RT2J	RE2M	FD-36MC080GD
								EF95	RT2L	RE2M	FD-36MC100GD
60	60			103				EF80	RT2J	RE2M	FD-36MC080GD
								EF105	RT2M	RE2M	FE-36MC125JF
								EF50	RT2G	RE2M	GPS2_U
45	45					64	47	EF65	RT2J	RE2M	FD-36MC080GD
								EF80	RT2L	RE2M	FD-36MC080GD
				80				EF65	RT2H	RE2M	GPS2_U
55	55					78	57	EF80	RT2L	RE2M <sup>(6)</sup>	FD-36MC080GD
								EF105	RT2M	RE2M <sup>(6)</sup>	FE-36MC125JF
				97				EF105	RT2M	RE2M	FE-36MC125JF
75							77	EF80	RT2J	RE2M	FD-36MC080GD
90							93	EF95	RT2M	RE2M	FD-36MC100GD

(1) Preferred rated values according to IEC 60072-1 (primary series). 230V and 400V are the rated voltage for IEC.

(2) Horsepower and currents values according to UL 508 (60Hz).

(3) Inrush peak versus the motor rated current median is 12.6 for IE3 motors. The ratio on these breakers is in the range from 13 to 14 times.

Motor datasheet has to be checked. In case of higher inrush current than the average select next range of available breaker.

(4) Overload protection: Choose thermal (TOR) or electronic (RE) overload protection device.

(5) Choose thermo-magnetic or only magnetic breaker characteristic:

Optimized DOL starter: Breaker (thermomagnetic) + Contactor.

Conventional DOL starter: Breaker (only magnetic) + Contactor + Overload.

(6) When used together with FE breaker, replace by RE3E separate mounting from contactor.



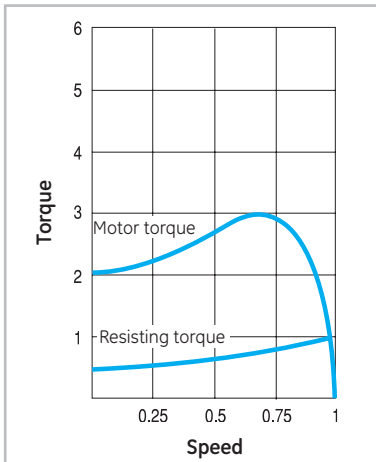
# Applications

## Direct-on-line starters

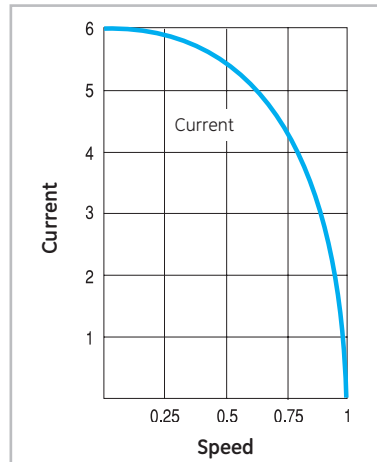
- Motors connected directly on-line with a contactor and a thermal overload relay.
- Simple installation with high starting torque and current.
- For use with motors of medium power that do not need a progressive star

AC-3	Switching off motors during running	$I_c = I_e$
AC-4	Switching off motors during starting	$I_c = 6 I_e$

Torque-speed curve

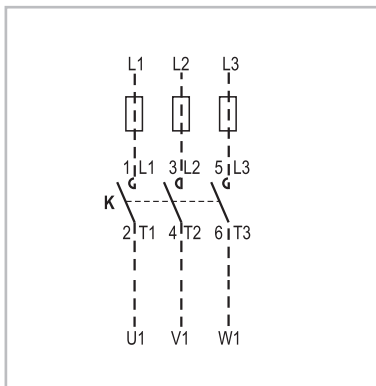


Current-speed curve

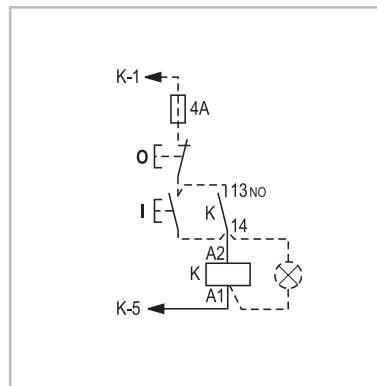


## Direct-on-line starter

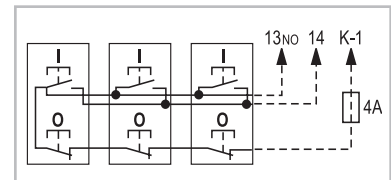
Power circuit



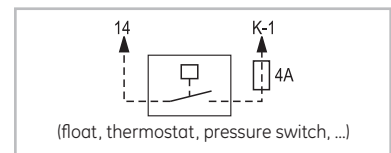
Control circuit



Control by two or more push-buttons

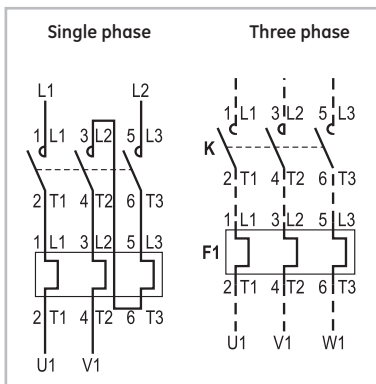


Control by permanent contact

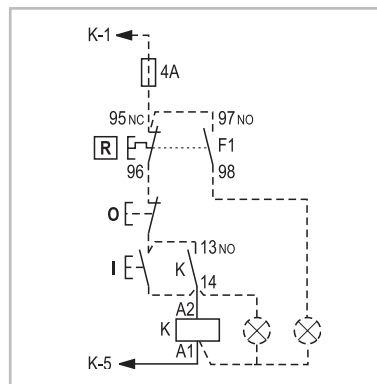


## Direct-on-line starter with reset push-button

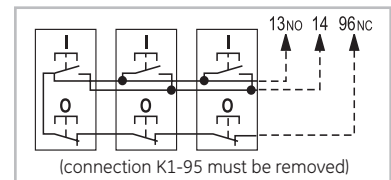
Power circuit



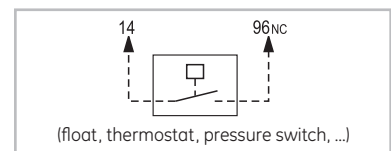
Control circuit



Control by two or more push-buttons



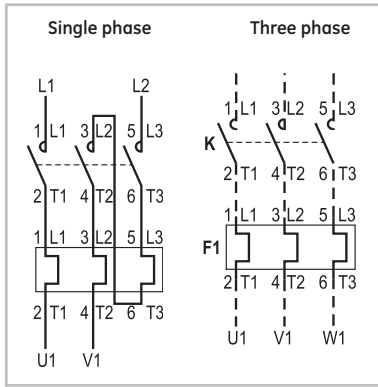
Control by permanent contact



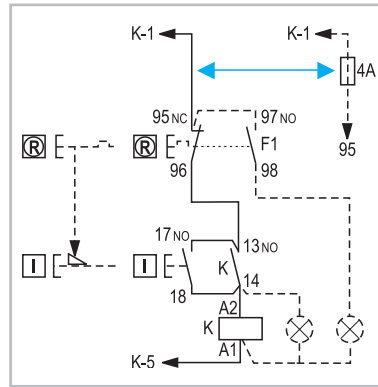


## Direct-on-line starter with start/stop/reset push-button

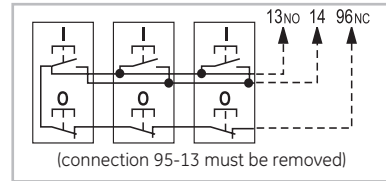
Power circuit



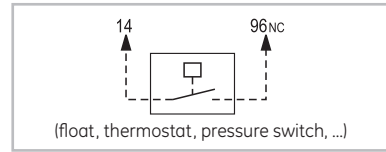
Control circuit



Control by two or more push-buttons

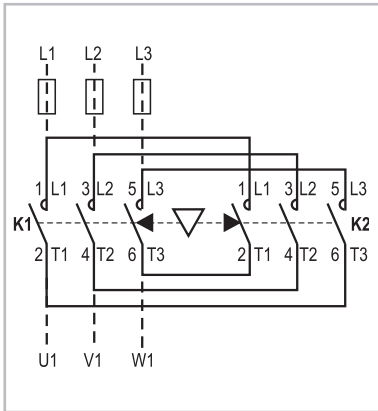


Control by permanent contact

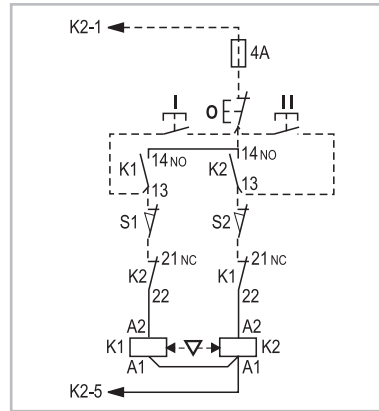


## Reversing starter without thermal overload relay

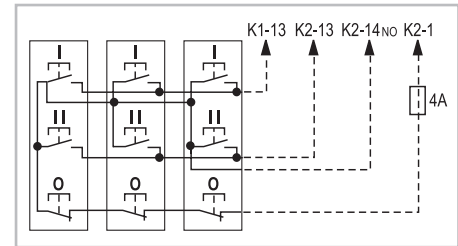
Power circuit



Control circuit

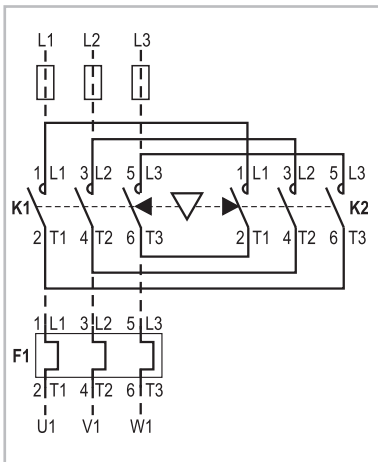


Control by two or more push-buttons

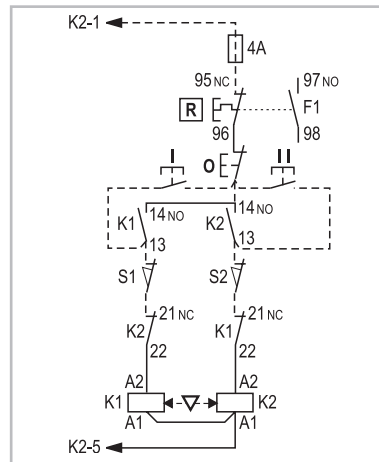


## Reversing starter with thermal overload relay

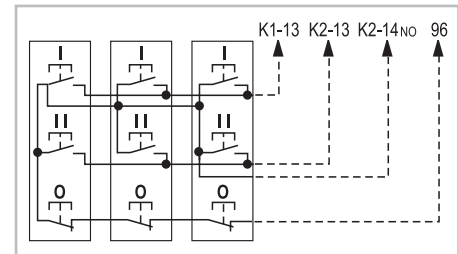
Power circuit



Control circuit



Control by two or more push-buttons



Selection table

Direct-on-line starters

		Motor										Contactor	Thermal relay	Fuse			
		230/200V		400/380V		440/415V		500V		690/660V				1000V		A	gG-gL
		kW	A	kW	A	kW	A	kW	A	kW	A	kW	A				
		-	-	-	-	-	-	-	-	0.06	0.13	-	-	MC0	MT03A	0.5	1
		-	-	0.06	0.23	0.06	0.21	0.06	0.17	0.09	0.2	-	-		MT03B	0.5	1
		-	-	-	-	-	-	-	-	0.12	0.25	-	-		MT03B	0.5	1
		0.06	0.39	0.09	0.34	0.09	0.31	0.09	0.26	0.18	0.35	-	-		MT03C	1	2
		-	-	-	-	0.12	0.4	0.12	0.33	-	-	-	-		MT03C	1	2
		0.09	0.58	0.12	0.44	-	-	0.18	0.46	0.25	0.46	-	-		MT03D	1	2
		-	-	0.18	0.61	0.18	0.56	0.25	0.6	-	-	-	-		MT03D	1	2
		-	-	-	-	-	-	-	-	0.37	0.7	-	-		MT03E	2	4
		0.12	0.76	0.25	0.78	0.25	0.7	0.37	0.9	0.55	0.9	-	-		MT03E	2	4
		0.18	1.05	0.37	1.13	0.37	1.1	0.55	1.2	0.75	1.1	-	-		MT03F	2	4
		0.25	1.4	-	-	-	-	-	-	-	-	-	-		MT03G	2	4
		-	-	0.55	1.6	0.55	1.5	0.75	1.5	1.1	1.5	-	-		MT03H	4	6
		0.37	2	0.75	2	0.75	2	1.1	2	1.5	2	-	-		MT03I	4	6
		-	-	1.1	2.6	1.1	2.5	1.5	2.6	-	-	-	-		MT03J	4	6
		0.56	2.75	-	-	-	-	-	-	2.2	2.9	-	-		MT03J	4	6
		0.75	3.5	1.5	3.5	1.5	3.4	2.2	3.8	3	3.5	-	-		MT03K	6	10
		1.1	5	2.2	5	2.2	4.5	3	5	-	-	-	-		MT03L	10	16
		1.5	7	-	-	-	-	-	-	-	-	-	-		MT03M	10	16
		-	-	-	-	-	-	-	-	3.7	4.6	-	-	MC1	MT03L	10	16
		-	-	-	-	-	-	-	-	4	5	-	-		MT03L	10	16
		-	-	3	7	3	6.5	3.7	6	-	-	-	-		MT03M	10	16
		-	-	-	-	3.7	7.3	4	6.5	-	-	-	-		MT03M	10	16
		-	-	3.7	8	4	8	-	-	-	-	-	-		MT03N	12	20
		2.2	9	4	9	-	-	-	-	-	-	-	-		MT03N	12	20
		-	-	-	-	-	-	-	-	5.5	6.7	-	-	MC2	MT03M	12	20
		-	-	-	-	-	-	5.5	9	-	-	-	-		MT03N	16	20
		3	12	5.5	12	5.5	11	-	-	-	-	-	-		MT03P	16	20
		-	-	0.06	0.23	0.06	0.21	0.06	0.17	0.09	0.2	-	-	EC09	ECRT1B10B	2	4
		-	-	-	-	-	-	0.09	0.26	0.12	0.25	-	-		ECRT1B10C	2	4
		0.06	0.39	0.09	0.34	0.09	0.31	0.12	0.33	0.18	0.35	-	-		ECRT1B10C	2	4
		0.09	0.58	0.12	0.44	0.12	0.4	0.18	0.46	0.25	0.46	-	-		ECRT1B10D	2	4
		-	-	0.18	0.61	0.18	0.56	0.25	0.6	-	-	-	-		ECRT1B10D	2	4
		-	-	-	-	-	-	-	-	0.37	0.7	-	-		ECRT1B10F	2	4
		0.12	0.76	0.25	0.78	0.25	0.7	0.37	0.9	0.55	0.9	-	-		ECRT1B10F	2	4
		0.18	1.05	0.37	1.13	0.37	1.1	0.55	1.2	0.75	1.1	-	-		ECRT1B10G	2	4
		0.25	1.4	0.55	1.6	0.55	1.5	0.75	1.5	1.1	1.5	-	-		ECRT1B10H	2	6
		0.37	2	0.75	2	0.75	2	1.1	2	1.5	2	-	-		ECRT1B10J	4	6
		0.55	2.75	1.1	2.6	1.1	2.5	1.5	2.6	2.2	2.9	-	-		ECRT1B10K	4	6
		0.75	3.5	1.5	3.5	1.5	3.4	2.2	3.8	-	-	-	-		ECRT1B10K	6	10
		-	-	-	-	-	-	-	-	3.7	4.6	-	-		ECRT1B10L	6	16
		1.1	5	2.2	5	2.2	4.5	-	-	-	-	-	-		ECRT1B10L	6	16
		1.5	7	-	-	3.7	7.3	3.7	6	5.5	7	-	-		ECRT1B10M	10	20
		-	-	3.7	8	-	-	-	-	-	-	-	-		ECRT1B10M	12	25
		2.2	9	4	9	4	9	5.5	9	-	-	-	-		ECRT1B10N	16	25
		-	-	-	-	-	-	-	-	7.5	9	-	-	EC12	ECRT1B10N	16	25
		3	12	5.5	12	5.5	11	7.5	12	-	-	-	-		ECRT1B10P	16	35
		3.7	14	-	-	7.5	14	-	-	-	-	-	-	EC18	ECRT1B10P	20	40
		4	16	7.5	16	-	-	10	15.5	-	-	-	-		ECRT1B10S	20	40
		-	-	-	-	-	-	-	-	11	13	-	-	EC25	ECRT1B10P	20	40
		-	-	-	-	-	-	11	17	13	16	-	-		ECRT1B10S	20	40
		5.5	21	-	-	11	21	13	20	-	-	-	-		ECRT1B10T	32	50
		-	-	11	22.5	-	-	15	23	-	-	-	-		ECRT2B10U	32	50

(continued on page D.27)



**Selection table (continued 1)**

Motor								Contactor	Thermal relay	Fuse					
230/200V		400/380V		440/415V		500V				690/660V		1000V			
kW	A	kW	A	kW	A	kW	A	kW	A	kW	A				
-	-	-	-	-	-	-	-	17	20	-	-	EC32	ECRT2B10T	32	50
7.5	27	15	30	15	28	17.5	26.5	-	-	-	-		ECRT2B10V	40	63
-	-	-	-	-	-	-	-	18.5	23	-	-		ECRT2B10U	32	50
-	-	-	-	-	-	-	-	22	25	-	-	EC40	ECRT2B10V	40	63
-	-	-	-	-	-	18.5	28.5	-	-	-	-		ECRT2B10V	40	63
-	-	18.5	37	18.5	35	22	33	-	-	-	-		ECRT2B10W	50	80
-	-	-	-	-	-	25	37.5	30	35	-	-		ECRT2B10W	50	80
11	40	-	-	22	40	-	-	-	-	-	-		RT2E (1)	50	80
-	-	22	44	25	45	-	-	33	38	-	-	EF50	RT2E	50	80
-	-	-	-	-	-	-	-	-	-	-	-		RT2G	63	80
15	50	-	-	-	-	-	-	-	-	-	-	EF65	RT2G	63	80
-	-	-	-	-	-	30	45	40	43	-	-		RT2E	63	80
-	-	30	60	30	55	37	55	-	-	-	-	EF80	RT2G	63	80
18.5	65	-	-	37	66	-	-	-	-	-	-		RT2H	80	125
-	-	-	-	-	-	-	-	45	49	-	-		RT2J	80	125
-	-	37	72	-	-	45	65	-	-	-	-	EF95	RT2G	80	125
22	75	-	-	-	-	-	-	-	-	-	-		RT2J	100	125
-	-	-	-	45	80	-	-	-	-	-	-		RT2L	100	160
-	-	-	-	-	-	-	-	55	60	-	-	EF105	RT2H	80	125
-	-	-	-	-	-	50	73	-	-	-	-		RT2J	100	125
25	84	45	85	50	88	55	80	-	-	-	-	EF105	RT2L	100	160
30	105	55	105	55	100	-	-	-	-	-	-		RT2M	125	200
-	-	-	-	-	-	-	-	-	-	55	40	CK75	RT4J	63	80
-	-	-	-	-	-	-	-	75	80	-	-		RT3C	125	160
-	-	-	-	-	-	-	-	90	97	-	-		RT3D	125	160
-	-	-	-	-	-	75	105	-	-	-	-	CK08	RT3D	160	200
37	126	-	-	-	-	-	-	-	-	-	-		RT3E	160	200
-	-	75	138	75	135	90	129	-	-	-	-		RT3E	200	224
45	150	-	-	-	-	-	-	-	-	-	-	CK08	RT3F	200	224
-	-	-	-	-	-	-	-	-	-	75	54		RT4 K	80	125
-	-	-	-	-	-	-	-	-	-	90	64		RT3B	100	160
-	-	-	-	-	-	-	-	110	118	-	-		RT3E	160	200
-	-	-	-	-	-	-	-	132	141	-	-		RT3F	200	250
-	-	90	170	90	165	110	156	-	-	-	-	CK85	RT3F	200	250
55	182	-	-	100	182	-	-	-	-	-	-		RT3F	200	250
-	-	-	-	-	-	-	-	-	-	110	78		RT4L (1)	100	160
-	-	-	-	-	-	-	-	150	166	-	-	CK09	RT4N (1)	250	315
-	-	-	-	110	200	132	188	-	-	-	-		RT4P (1)	250	315
-	-	110	211	-	-	-	-	-	-	-	-		RT4P (1)	250	315
-	-	-	-	-	-	-	-	-	-	132	94		RT4M (1)	125	160
-	-	-	-	-	-	-	-	-	-	150	105	CK95	RT4M (1)	160	200
-	-	-	-	-	-	-	-	160	170	-	-		RT4N (1)	200	250
-	-	-	-	-	-	-	-	185	193	-	-		RT4P (1)	250	315
-	-	-	-	-	-	-	-	-	-	160	113	CK10	RT4M (1)	160	200
-	-	-	-	-	-	-	-	-	-	185	130		RT4N (1)	160	200
-	-	-	-	-	-	-	-	-	-	200	141		RT4N (1)	200	250
-	-	-	-	-	-	-	-	-	-	220	155	CK95	RT5A (1)	200	250
-	-	-	-	-	-	-	-	-	-	250	175		RT5A (1)	250	315
-	-	-	-	-	-	-	-	220	230	-	-	CK95	RT4P (1)	315	400
-	-	-	-	150	269	185	261	250	262	-	-		RT4R (1)	355	400
-	-	150	283	160	285	-	-	-	-	-	-		RT4R (1)	400	425
90	309	160	309	-	-	200	281	-	-	-	-	RT4R (1)	400	425	

(1) Separate mounting: type RT2XP.

(continued on page D.28)



Selection table (continued 2)

Direct on-line starters

Motor											Contactor	Thermal relay	Fuse			
230/200V		400/380V		440/415V		500V		690/660V		1000V			aM	gG-gL		
kW	A	kW	A	kW	A	kW	A	kW	A	kW	A	A	A			
-	-	-	-	-	-	220	310	280	292	-	-	CK10	RT5C	400	425	
-	-	-	-	185	325	-	-	300	307	-	-		RT5C	425	500	
-	-	-	-	-	-	-	-	315	322	-	-		RT5C	425	500	
110	356	185	355	200	350	250	348	335	344	-	-		RT5D	425	500	
-	-	220	370	220	385	-	-	355	366	-	-		RT5D	500	500	
-	-	-	-	-	-	280	385	375	390	-	-		RT5D	500	500	
-	-	220	408	-	-	300	409	-	-	-	-		RT5D	500	500	
-	-	-	-	-	-	-	-	-	-	280	197		CK11	RT5B	250	315
-	-	-	-	-	-	-	-	-	-	300	211			RT5B	315	355
-	-	-	-	-	-	-	-	-	-	315	221			RT5B	315	355
-	-	-	-	-	-	-	-	-	-	335	234	RT5B		315	355	
-	-	-	-	-	-	-	-	-	-	355	245	RT5B		315	355	
-	-	-	-	-	-	-	-	400	412	-	-	RT5D		500	500	
132	425	-	-	250	437	315	426	-	-	-	-	RT5D		630	630	
-	-	-	-	-	-	335	456	425	442	-	-	RT5D		630	630	
-	-	250	475	280	480	355	485	450	462	-	-	RT5E		630	630	
150	500	-	-	300	508	375	513	-	-	-	-	RT5E		630	630	
160	520	280	530	315	530	400	543	-	-	-	-	RT5E	630	630		
-	-	-	-	-	-	-	-	-	-	375	256	CK12	RT5B	315	355	
-	-	-	-	-	-	-	-	-	-	400	273		RT5C	400	425	
-	-	-	-	-	-	-	-	-	-	425	290		RT5C	400	425	
-	-	-	-	-	-	-	-	-	-	450	307		RT5C	400	425	
-	-	-	-	-	-	-	-	475	488	-	-		RT5E	630	630	
-	-	-	-	-	-	-	-	500	514	-	-		RT5E	630	630	
-	-	300	563	335	565	-	-	-	-	-	-		RT5E	630	630	
185	609	315	580	355	600	-	-	-	-	-	-		RT5E	630	630	
200	630	335	630	375	630	450	613	-	-	-	-		RT5E	800	800	
220	710	355	650	-	-	475	647	-	-	-	-		RT5E	800	800	
-	-	375	680	400	673	-	-	-	-	-	-	RT5E	800	800		
-	-	-	-	-	-	-	-	-	-	475	324	CK13	RT5C	500	630	
-	-	-	-	-	-	-	-	-	-	500	341		RT5C	500	630	
-	-	-	-	-	-	500	680	-	-	-	-		RT6A	1000	1000	
-	-	400	720	425	714	-	-	-	-	-	-		RT6A	1000	1000	
-	-	425	763	450	756	-	-	-	-	-	-		RT6A	1000	1000	
250	823	450	800	-	-	-	-	-	-	-	-		RT6A	1000	1000	

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## Star-delta starters

### For AC squirrel cage motors

In order to use this type of starting, the following conditions must be met:

The ends of the three stator windings should terminate in a terminal box (6 terminals, see diagram).

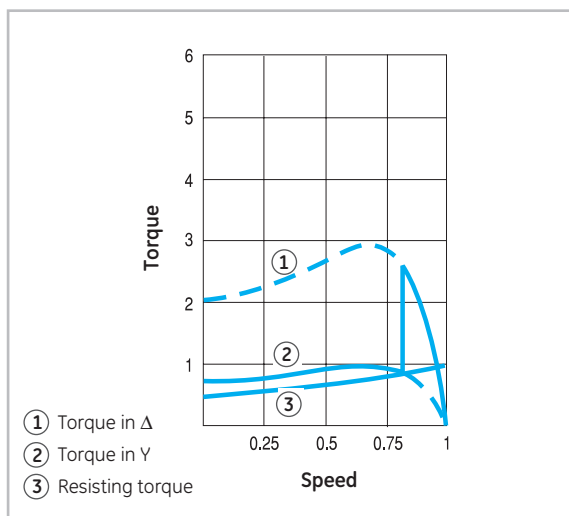
The line voltage should be the same as the motor delta connection voltage.

This starting system is suitable for machines where the resisting torque during starting is less than 1/3 of the motor torque (see torque speed curves).

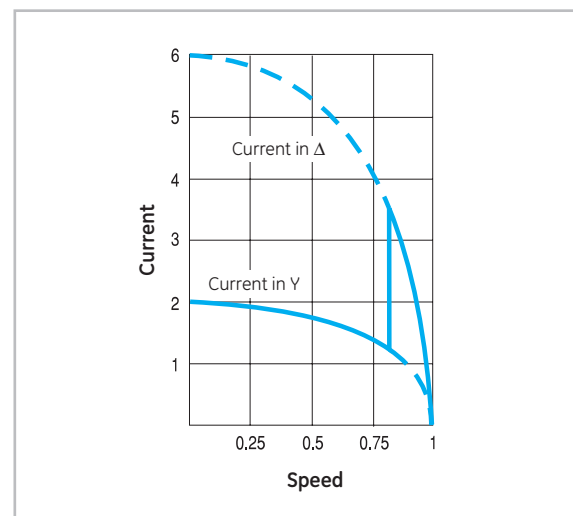
The target of this type of starting is to reduce the current during starting to 1/3, thereby reducing the linedrop (see current speed curves).

Reduce the motor torque to 1/3 to smooth out mechanical stress on the machine and on the load (see torque speed curves).

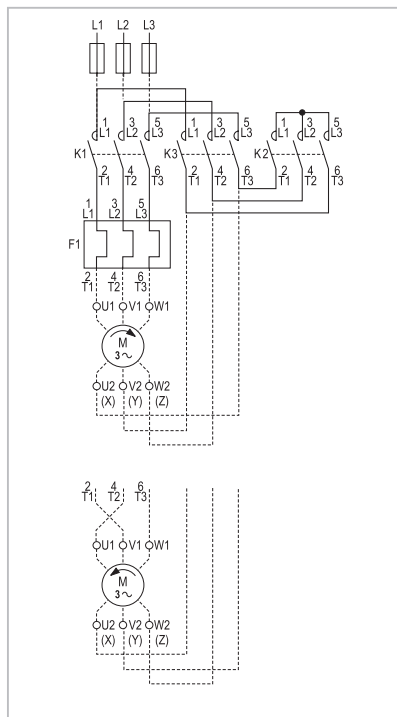
### Torque-speed curve



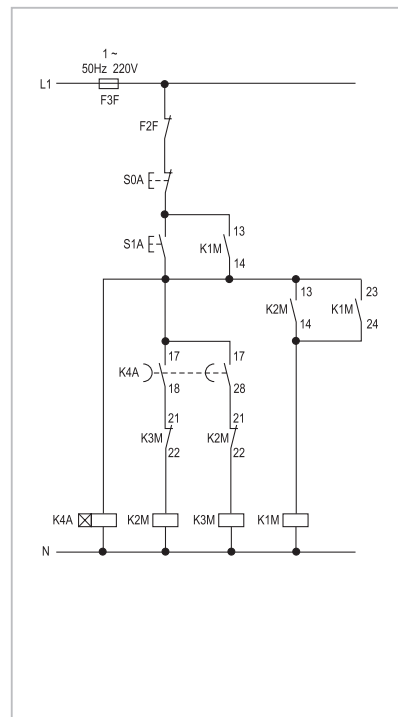
### Current-speed curve



### Power circuit



### Control circuit



## Star-delta starters

Selection table

	Motor										Contactors		Thermal	Fuse			
	230/200V		400/380V		440/415V		500V		690/660V		1000V		Line and	Star	relay	aM	gG-gL
	kW	A	kW	A	kW	A	kW	A	kW	A	kW	A	Delta			A	A
	2.2	9	4	9	-	-	5.5	9	7.5	9	-	-	EC09	EC09	ECRT1B10L	16	25
	3	12	5.5	12	5.5	11	7.5	12	-	-	-	-	EC09	EC09	ECRT1B10M	16	35
	3.7	14	-	-	-	-	-	-	-	-	-	-	EC09	EC09	ECRT1B10N	20	40
	4	16	7.5	16	7.5	14	-	-	-	-	-	-	EC12	EC09	ECRT1B10N	20	40
	-	-	-	-	-	-	-	-	11	13	-	-	EC12	EC09	ECRT1B10M	20	40
	-	-	-	-	-	-	11	17	-	-	-	-	EC12	EC09	ECRT1B10N	20	40
	5.5	21	11	22.5	11	21	-	-	-	-	-	-	EC18	EC12	ECRT1B10P	32	50
	-	-	-	-	-	-	-	-	15	18	-	-	EC18	EC12	ECRT1B10P	32	50
	-	-	-	-	-	-	15	23	-	-	-	-	EC18	EC12	ECRT1B10P	32	50
	-	-	-	-	-	-	-	-	18.5	23	-	-	EC25	EC18	ECRT1B10P	32	50
	7.5	27	15	30	15	28	-	-	-	-	-	-	EC25	EC18	ECRT1B10S	40	63
	-	-	-	-	-	-	18.5	28.5	22	26	-	-	EC25	EC18	ECRT1B10S	40	63
	-	-	-	-	18.5	35	22	33	-	-	-	-	EC25	EC18	ECRT1B10T	50	80
	11	40	18.5	37	-	-	-	-	-	-	-	-	EC25	EC25	ECRT2B10U	50	63
	-	-	-	-	-	-	-	-	30	35	-	-	EC25	EC25	ECRT2B10T	50	63
	-	-	22	44	22	40	30	45	-	-	-	-	EC25	EC25	ECRT2B10U	63	80
	15	50	25	50	-	-	-	-	-	-	-	-	EC32	EC25	ECRT2B10V	63	80
	-	-	-	-	-	-	-	-	37	41	-	-	EC40	EC25	ECRT2B10U	50	80
	-	-	30	60	30	55	-	-	-	-	-	-	EC40	EC25	ECRT2B10W	63	80
	18.5	65	-	-	-	-	-	-	-	-	-	-	EC40	EC25	ECRT2B10W	80	125
	-	-	-	-	-	-	37	55	45	49	-	-	EC40	EC25	ECRT2B10V	63	80
	22	75	-	-	-	-	-	-	-	-	-	-	EF50	EC32	RT2G	100	160
	-	-	33	65	37	66	-	-	-	-	-	-	EF50	EC32	RT1W	80	100
	-	-	-	-	-	-	45	65	55	60	-	-	EF50	EC32	RT2E	100	160
	-	-	37	72	-	-	-	-	-	-	-	-	EF50	EC32	RT2E	100	160
	-	-	45	85	45	80	55	80	-	-	-	-	EF50	EC32	RT2G	100	160
	-	-	-	-	-	-	-	-	75	80	-	-	EF65	EF50	RT2G	100	160
	30	105	55	105	55	100	-	-	-	-	-	-	EF65	EF50	RT2H	125	160
	-	-	-	-	-	-	75	105	-	-	-	-	EF80	EF50	RT2H	125	160
	37	126	-	-	-	-	-	-	-	-	-	-	EF80	EF50	RT2J	160	200
	-	-	-	-	75	135	-	-	-	-	-	-	EF80	EF50	RT2J	160	200
	-	-	-	-	-	-	-	-	90	97	-	-	EF95	EF50	RT2H	125	160
	40	138	-	-	-	-	-	-	-	-	-	-	EF95	EF65	RT2L	160	250
	-	-	-	-	-	-	90	129	-	-	-	-	EF95	EF65	RT2J	160	250
	-	-	75	138	-	-	-	-	-	-	-	-	EF95	EF65	RT2L	160	250
	-	-	-	-	-	-	-	-	110	118	-	-	EF105	EF65	RT2J	160	250
	45	150	-	-	-	-	-	-	-	-	-	-	EF105	EF65	RT2L	160	250
	-	-	-	-	-	-	110	156	-	-	-	-	EF105	EF80	RT2L	200	250
	-	-	90	170	90	165	-	-	-	-	-	-	EF105	EF80	RT2M	200	250
	-	-	-	-	-	-	-	-	132	141	-	-	CK75C	EF80	RT3C	160	200
	55	182	-	-	-	-	132	188	-	-	-	-	CK75C	EF80	RT3D	200	250
	-	-	-	-	110	200	-	-	-	-	-	-	CK75C	EF80	RT3D	250	315
	-	-	-	-	-	-	-	-	150	166	-	-	CK75C	EF95	RT3D	200	250
	-	-	-	-	-	-	-	-	160	170	-	-	CK75C	EF105	RT3D	200	250
	-	-	110	211	-	-	150	218	-	-	-	-	CK75C	EF105	RT3E	250	315
	-	-	-	-	132	240	160	228	-	-	-	-	CK75C	EF105	RT3E	250	315
	75	239	-	-	-	-	-	-	-	-	-	-	CK75C	EF105	RT3E	250	315
	-	-	-	-	-	-	-	-	-	-	90	64	CK75C	CK75C	RT4LJ	80	125
	-	-	-	-	-	-	-	-	-	-	110	78	CK75C	CK75C	RT4LJ	108	160
	-	-	132	245	-	-	-	-	-	-	-	-	CK75C	EF105	RT3F	315	355
	-	-	-	-	-	-	-	-	185	193	-	-	CK75C	CK75C	RT3E	250	315
	-	-	150	288	150	269	185	261	-	-	-	-	CK08C	CK75C	RT3F	315	355
	-	-	-	-	160	285	-	-	-	-	-	-	CK08C	CK75C	RT3F	315	355
	-	-	-	-	-	-	-	-	200	207	-	-	CK08C	CK75C	RT3E	250	315
	-	-	-	-	-	-	-	-	220	230	-	-	CK08C	CK75C	RT3E	250	315
	90	309	-	-	-	-	-	-	-	-	-	-	CK08C	CK75C	RT3F	315	355

For electrical endurance see technical data in Chapter A, but first divide the rated power and current values shown in the table by 1.73. The thermal overload relay should be set at 0.58 In of the motor.



Selection table (continued 1)

230/200V		400/380V		440/415V		500V		690/660V		1000V		Line and Delta	Star	Thermal relay	Fuse	
kW	A	kW	A	kW	A	kW	A	kW	A	kW	A				aM	gG-gL
-	-	-	-	-	-	-	-	-	-	132	94	CK08C	CK75C	RT4LK	125	160
-	-	-	-	-	-	-	-	-	-	150	105	CK08C	CK75C	RT3B	125	160
-	-	-	-	-	-	-	-	-	-	160	113	CK08C	CK75C	RT3B	125	160
-	-	-	-	-	-	-	-	-	-	185	130	CK85B	CK75C	RT4LL	160	200
-	-	160	309	-	-	200	281	250	262	-	-	CK85B	CK75C	RT4N	355	400
-	-	-	-	-	-	220	310	-	-	-	-	CK85B	CK75C	RT4N	355	400
-	-	-	-	185	325	-	-	-	-	-	-	CK85B	CK75C	RT4P	400	425
110	356	185	355	200	350	-	-	-	-	-	-	CK85B	CK75C	RT4P	400	425
-	-	-	-	-	-	-	-	280	262	-	-	CK09B	CK75C	RT4N	315	355
132	425	200	370	220	385	250	348	-	-	-	-	CK09B	CK75C	RT4P	500	500
-	-	220	408	-	-	280	385	-	-	-	-	CK09B	CK08C	RT4P	500	500
-	-	-	-	-	-	-	-	-	-	200	141	CK09B	CK08C	RT4LL	200	250
-	-	-	-	-	-	-	-	-	-	220	155	CK09B	CK08C	RT4LM	200	250
-	-	-	-	-	-	-	-	-	-	250	175	CK09B	CK08C	RT4LM	200	250
-	-	-	-	-	-	-	-	300	307	-	-	CK09B	CK08C	RT4N	355	400
-	-	-	-	-	-	-	-	315	322	-	-	CK09B	CK08C	RT4N	355	400
-	-	-	-	-	-	-	-	335	349	-	-	CK09B	CK08C	RT4P	500	500
-	-	-	-	-	-	-	-	-	-	280	197	CK95B	CK09B	RT4LM	250	315
-	-	-	-	250	437	-	-	-	-	-	-	CK95B	CK08C	RT4P	500	500
-	-	-	-	-	-	-	-	355	366	-	-	CK95B	CK85B	RT4P	425	500
-	-	-	-	-	-	300	409	375	390	-	-	CK95B	CK85B	RT4P	500	500
-	-	-	-	-	-	315	426	-	-	-	-	CK95B	CK85B	RT4P	500	500
150	500	250	475	280	480	-	-	-	-	-	-	CK95B	CK85B	RT4R	630	630
-	-	-	-	-	-	-	-	-	-	300	211	CK95B	CK85B	RT4LM	250	315
-	-	-	-	-	-	-	-	-	-	315	221	CK95B	CK85B	RT4LM	250	315
-	-	-	-	-	-	-	-	400	412	-	-	CK95B	CK85B	RT4R	500	500
-	-	-	-	-	-	-	-	425	442	-	-	CK95B	CK85B	RT4R	500	500
-	-	-	-	300	508	335	456	450	462	-	-	CK10C	CK85B	RT5C	630	630
160	520	-	-	-	-	355	485	-	-	-	-	CK10C	CK85B	RT4C	630	630
-	-	-	-	-	-	375	513	-	-	-	-	CK10C	CK85B	RT5C	630	630
-	-	280	530	315	530	-	-	-	-	-	-	CK10C	CK85B	RT5C	630	630
-	-	300	563	355	561	-	-	-	-	-	-	CK10C	CK85B	RT5C	630	630
-	-	315	580	-	-	-	-	-	-	-	-	CK10C	CK85B	RT5C	630	630
185	609	-	-	355	600	-	-	-	-	-	-	CK10C	CK85B	RT5C	800	800
-	-	-	-	-	-	-	-	-	-	335	234	CK10C	CK09B	RT5A	315	355
-	-	-	-	-	-	-	-	-	-	355	245	CK10C	CK09B	RT5A	315	355
-	-	-	-	-	-	-	-	-	-	375	256	CK10C	CK09B	RT5A	315	355
-	-	-	-	-	-	-	-	-	-	400	273	CK10C	CK09B	RT5A	355	400
-	-	-	-	-	-	-	-	-	-	425	290	CK10C	CK09B	RT5A	355	400
-	-	-	-	-	-	-	-	-	-	450	307	CK10C	CK09B	RT5A	355	400
-	-	-	-	-	-	-	-	475	488	-	-	CK10C	CK09B	RT5C	630	630
-	-	-	-	-	-	-	-	500	514	-	-	CK10C	CK09B	RT5C	630	630
-	-	-	-	-	-	400	543	530	545	-	-	CK10C	CK09B	RT5C	630	630
-	-	-	-	375	587	425	580	560	575	-	-	CK10C	CK09B	RT5C	630	630
200	630	335	630	375	630	450	613	-	-	-	-	CK10C	CK09B	RT5D	800	800
-	-	355	650	-	-	-	-	-	-	-	-	CK10C	CK09B	RT5D	800	800
-	-	-	-	-	-	-	-	600	616	-	-	CK10C	CK95B	RT5D	800	800
-	-	-	-	400	622	475	647	630	646	-	-	CK10C	CK95B	RT5D	800	800
-	-	-	-	-	-	-	-	-	-	475	324	CK10C	CK95B	RT5B	355	400
-	-	-	-	-	-	-	-	-	-	500	341	CK10C	CK95B	RT5B	400	425
-	-	-	-	-	-	-	-	-	-	600	407	CK10C	CK95B	RT5B	500	500
-	-	-	-	400	673	425	659	-	-	-	-	CK10C	CK10C	RT5D	800	800
-	-	375	680	-	-	500	680	670	688	-	-	CK11C	CK10C	RT5D	800	800
220	710	400	720	425	714	530	725	710	729	-	-	CK11C	CK10C	RT5D	800	800
-	-	-	-	450	756	560	762	750	770	-	-	CK11C	CK10C	RT5E	1000	1000
-	-	425	763	475	798	-	-	-	-	-	-	CK11C	CK10C	RT5E	1000	1000
-	-	-	-	-	-	600	817	-	-	-	-	CK11C	CK10C	RT5E	1000	1000

For electrical endurance see technical data in Chapter A, but first divide the rated power and current values shown in the table by 1.73. The thermal overload relay should be set at 0.58 In of the motor.



Selection table (continued 2)

		Motor										Contactors		Thermal	Fuse			
		230/200V		400/380V		440/415V		500V		690/660V		1000V		Line and	Star	relay	aM	gG-gL
		kW	A	kW	A	kW	A	kW	A	kW	A	kW	A	Delta			A	A
	250	823	-	-	-	-	-	-	-	-	-	-	-	CK11C	CK10C	RT5E	1000	1000
	-	-	-	-	-	-	-	-	-	-	-	630	428	CK11C	CK10C	RT5B	500	630
	-	-	-	-	-	-	-	-	-	-	-	670	455	CK11C	CK10C	RT5C	500	630
	-	-	450	800	-	-	-	-	-	-	-	-	-	CK11C	CK10C	RT5E	1000	1000
	-	-	475	846	500	840	-	-	-	-	-	-	-	CK11C	CK10C	RT5E	1000	1000
	-	-	-	-	-	-	-	-	-	800	821	-	-	CK11C	CK10C	RT5E	1000	1000
	-	-	500	892	530	890	630	857	850	873	-	-	-	CK11C	CK10C	RT5E	1000	1000
	280	910	530	943	560	941	670	912	-	-	-	-	-	CK11C	CK10C	RT5E	2x630	2x630
	300	975	-	-	-	-	710	965	-	-	-	-	-	CK12B	CK10C	RT5E	2x630	2x630
	315	1023	560	996	600	1010	750	1020	-	-	-	-	-	CK12B	CK10C	RT5E	2x630	2x630
	335	1083	-	-	630	1058	-	-	-	-	-	-	-	CK12B	CK10C	RT5E	2x630	2x630
	-	-	-	-	-	-	-	-	-	750	510	-	-	CK12B	CK11C	RT5C	630	630
	-	-	-	-	-	-	-	-	900	924	-	-	-	CK13B	CK11C	RT6A	2x630	2x630
	-	-	-	-	-	-	800	1088	950	975	-	-	-	CK13B	CK11C	RT6A	2x630	2x630
	-	-	600	1074	-	-	-	-	-	-	-	-	-	CK12B	CK11C	RT5E	2x630	2x630
	355	1142	-	-	710	1097	-	-	-	-	-	-	-	CK12B	CK11C	RT5E	2x630	2x630
	-	-	-	-	-	-	-	-	-	800	543	-	-	CK13B	CK11C	RT5C	630	800
	-	-	630	1128	670	1125	-	-	-	-	-	-	-	CK12B	CK11C	RT5E	2x630	2x630
	375	1206	670	1200	710	1190	850	1156	-	-	-	-	-	CK13B	CK11C	RT6A	2x800	2x800
	400	1286	710	1270	750	1255	-	-	-	-	-	-	-	CK13B	CK11C	RT6A	2x800	2x800
	425	1364	-	-	-	-	-	-	-	-	-	-	-	CK13B	CK12B	RT6A	2x800	2x800
	-	-	750	1342	-	-	-	-	-	-	-	-	-	CK13B	CK12B	RT6A	2x800	2x800

For electrical endurance see technical data in Chapter A, but first divide the rated power and current values shown in the table by 1.73. The thermal overload relay should be set at 0.58 In of the motor.

Contactors for rotor speed drives

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## Contactors for connection of power transformers

In this application it is essential to ascertain the no-load inrush current of the transformer  $I_{\mu}$ , (magnetisation current) which in the majority of cases determines the size of the contactor.

Two cases are illustrated in the table:

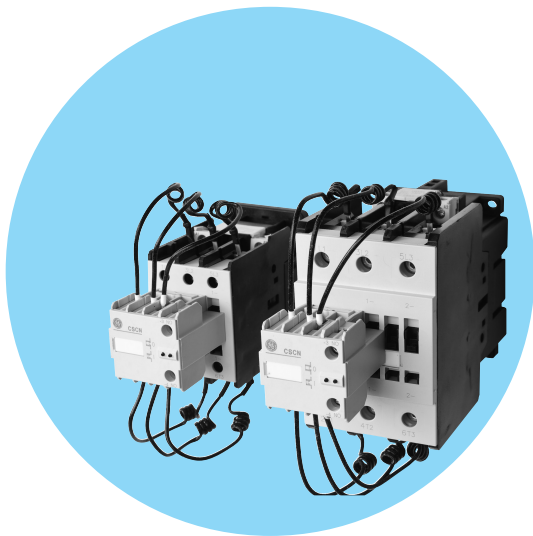
- No-load inrush current up to 20 times the rated transformer current
- No-load inrush current up to 40 times the rated transformer current.

The contactor should not cut out the short-circuit current; if the protective devices used are fuses, this condition will be intrinsically complied with.

In the case however of devices with tripping contacts the general line circuit breaker will be driven rather than the contactor coil.

### Selection table

$\frac{I_{\mu}}{I_e} = 20$		$\frac{I_{\mu}}{I_e} = 40$		Contactor
230V 240V kVA	380V 400V kVA	230V 240V kVA	380V 400V kVA	
2	3.5	1	1.75	EC09
2.75	5	1.37	2.5	EC12
4	7	2	3.5	EC18
5.75	10	2.85	5	EC25
7.25	12.5	3.65	6.25	EC32
9	15.5	4.50	7.75	EC40
12	21	6	10.5	EF50
15	25	7.5	12.5	EF65
20	35	10	16	EF80
25	40	12.5	20	EF95
30	50	15	25	EF95
35	55	17	27	CK75C
40	60	20	30	CK08C
45	75	22	35	CK85B
50	85	25	42.5	CK09B
80	150	40	75	CK10C
100	170	50	85	CK11C
127	215	64	107	CK12B
160	280	80	140	CK13B



## Contactors for capacitors switching

*With built-in resistance to switch three phase capacitor banks*

"CSCN" contactors incorporate a front block with three early-make auxiliary contacts together with 6 quick precharge resistors (two per phase) through which the capacitors are switched to the network, reducing the current peak. Once the resistors have damped the current peak, the main contacts short-circuit the resistors, carrying the uninterrupted current. A few milliseconds later the early-make auxiliary contact closes to guarantee that all current flows through the main contacts.

### Standards

IEC/EN 60947-1	CENELEC HD 419
IEC/EN 60947-4-1	VDE 0660/102
IEC/EN 60947-5-1	NFC 63-110
EN 50005	ASE 1025
UL 508	UNE 20109
CSA C22.2/14	

### Approvals/Marking



### Standard voltages

To complete the catalogue number, replace the symbol  $\blacklozenge$  by the code corresponding to the voltage and frequency of the control circuit, other voltages on request.

#### AC Coils (V)



-	1	2	9	J	K	L	6	7	N	U	Y
50/60Hz	24	42	48	110			220-230	240			
50 Hz					127					380-400	500
60Hz				120		208			277	480	600

#### Operating voltage limits with bifrequency coils:

**With 60Hz** = 0.85 to 1.1 x Us

**With 50Hz** = 0.8 to 1.1 x Us in continuous service (ED = 100%) with a maximum ambient temperature of 40°C

## Contactors for capacitors switching

Ith	Ambient temperature										Fuse gI - gG	Contacts		Cat. no. <sup>(1)</sup>	Ref. no. see bottom	Pack
	$\theta \leq 55^\circ\text{C}$					$\theta \leq 70^\circ\text{C}$						.3   .4	.1  .2			
	230V 240V kvar	400V kvar	415V kvar	500V kvar	660V 690V kvar	230V 240V kvar	400V kvar	415V kvar	500V kvar	660V 690V kvar						
	25	7.5	12.5	13	16	15	3.7	7.5	8	9.5	10	25	2	0	CSCN12A320 ♦	1
													1	1	CSCN12A311 ♦	1
													0	2	CSCN12A302 ♦	1
	32	10	16.7	17	21	20	5	10	11	12.5	12.5	35	2	0	CSCN16A320 ♦	1
													1	1	CSCN16A311 ♦	1
													0	2	CSCN16A302 ♦	1
	45	12.5	20	21	25	25	7.5	12.5	13	16	15	40	1	0	CSCN20A310 ♦	1
													0	1	CSCN20A301 ♦	1
													2	1	CSCN20A321 ♦	1
													1	2	CSCN20A312 ♦	1
	45	15	25	26	31	30	10	15	16	18	20	50	1	0	CSCN25A310 ♦	1
													0	1	CSCN25A301 ♦	1
												2	1	CSCN25A321 ♦	1	
												1	2	CSCN25A312 ♦	1	
60	20	30	31	38	35	16	22	23	27	25	63	1	0	CSCN30A310 ♦	1	
												0	1	CSCN30A301 ♦	1	
												2	1	CSCN30A321 ♦	1	
												1	2	CSCN30A312 ♦	1	
90	25	45	47	56	55	20	35	36	44	40	80	1	0	CSCN45A310 ♦	1	
												0	1	CSCN45A301 ♦	1	
												2	0	CSCN45A320 ♦	1	
												1	1	CSCN45A311 ♦	1	
												1	2	CSCN45A312 ♦	1	
110	35	55	57	69	65	30	45	47	56	50	125	1	0	CSCN55A310 ♦	1	
												0	1	CSCN55A301 ♦	1	
												2	0	CSCN55A320 ♦	1	
												1	1	CSCN55A311 ♦	1	
												1	2	CSCN55A312 ♦	1	
140	45	70	73	88	85	35	60	62	75	70	160	1	0	CSCN70A310 ♦	1	
												0	1	CSCN70A301 ♦	1	
												2	0	CSCN70A320 ♦	1	
												1	1	CSCN70A311 ♦	1	
												1	2	CSCN70A312 ♦	1	
	Spare coils															
	For series CSCN12 ... CSCN25													LB1A ♦		
	For series CSCN30													LB3A ♦		
For series CSCN45 ... CSCN70													LB4A ♦			

(1) To complete the reference, replace ♦ by the code corresponding to the voltage and frequency of the control circuit. (see pg. D.32)

## Technical data

### Technical characteristics

			CSCN12	CSCN16	CSCN20	CSCN25	CSCN30	CSCN45	CSCN55	CSCN70
<b>Main circuit (poles)</b>										
Rated operational voltage	(V)		690	690	690	690	690	690	690	690
Rated insulation voltage according to IEC947	(V)		1000	1000	1000	1000	1000	1000	1000	1000
Rated thermal current	(A)		25	32	45	45	60	90	110	140
Max. power utilization at 55°C	230/240V	(kvar)	7.5	10	12.5	15	20	25	35	45
	380/400V	(kvar)	12.5	16.7	20	25	30	45	55	70
	660/690V	(kvar)	15	20	25	30	35	55	65	85
Electrical endurance	(ops.)		280.000	280.000	280.000	250.000	200.000	150.000	120.000	90.000
Max. ops./hour	(ops./hour)		350	350	350	240	240	150	150	150
<b>Control circuit</b>										
Standard voltages	50Hz	(V)	24-690	24-690	24-690	24-690	24-690	24-690	24-690	24-690
	60Hz	(V)	24-600	24-600	24-600	24-600	24-600	24-600	24-600	24-600
<b>Consumption</b>										
Single frequency	Mar. circuit open	(VA)	45	45	48	48	88	191	191	198
	Mar. circuit closed	(VA)	6	6	7	7	9	15.5	15.5	17
Dual frequency	Mar. circuit open	(VA)	54	54	58	58	125	245	245	250
	Mar. circuit closed	(VA)	7	7	8	8	11.5	20	20	23
Dual frequency	Mar. circuit open	(VA)	35	35	39	39	110	215	215	220
	Mar. circuit closed	(VA)	5	5	6	6	11	15	15	19


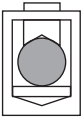
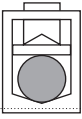
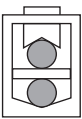
### Instantaneous auxiliary contact blocks

Rated insulation voltage Ui	(V)									1000
Rated thermal current Ith	(A)									10

### Ambient conditions

Storage temperature	(°C)									-50 ... +80
Operating temperature	(°C)									-25 to +55 (without derating)
Altitude up to 3000m										Nominal values
Mounting positions										Vertical mounting ±30°

### Terminal capacity and tightening torque

		CSCN12	CSCN16	CSCN20	CSCN25	CSCN30	CSCN45	CSCN55	CSCN70
	Solid, stranded and finely stranded without end sleeve (mm²)	1 x 0.5 ... 2.5		1 x 0.5 ... 2.5		-	-	-	-
	Finely stranded with or without end sleeve (mm²)	1 x 1 ... 2.5		1 x 1 ... 2.5		-	-	-	-
	AWG wires	1 x 20 ... 12		1 x 20 ... 8		-	-	-	-
	Tightening torque (Nm)	1.6		2.2		-	-	-	-
	(Lb x in.)	15		20		-	-	-	-
	Solid, stranded and finely stranded without end sleeve (mm²)	-		-		0.75 ... 16	1 ... 35	1.5 ... 50	
	Finely stranded with end sleeve (mm²)	-		-		0.75 ... 16	1 ... 35	1.5 ... 50	
	Finely stranded without end sleeve (mm²)	-		-		1 ... 16	1 ... 35	1.5 ... 50	
	AWG wires	-		-		18 ... 6	16 ... 2	16 ... 2	
	Tightening torque (Nm)	-		-		1.8	4	5.6	
(Lb x in.)	-		-		16	35	50		
	Solid (mm²)	-		-		0.75 ... 16	1 ... 16	4 ... 35	
	Stranded (mm²)	-		-		0.75 ... 16	1 ... 25	4 ... 35	
	Finely stranded without end sleeve (mm²)	-		-		0.75 ... 16	1 ... 25	4 ... 35	
	Finely stranded with end sleeve (mm²)	-		-		1 ... 16	1 ... 25	4 ... 35	
	AWG wires	-		-		18 ... 6	16 ... 4	10 ... 1	
Tightening torque (Nm)	-		-		1.8	4	5.6		
(Lb x in.)	-		-		16	35	50		
	Solid, stranded and finely stranded without end sleeve (mm²)	-		-		Max. 16	Max. 50 ... 4	Max. 50 ... 35	
	Finely stranded without end sleeve (mm²)	-		-		Max. 16	Max. 35 ... 2.5	Max. 35	
	Finely stranded with end sleeve (mm²)	-		-		Max. 16	Max. 25 ... 16	Max. 25 ... 16	
AWG wires	-		-		Max. 6	Max. 2 ... 12	Max. 2 ... 12	Max. 1	
Tightening torque (Nm)	-		-		1.8	4	5.6		
(Lb x in.)	-		-		16	35	50		

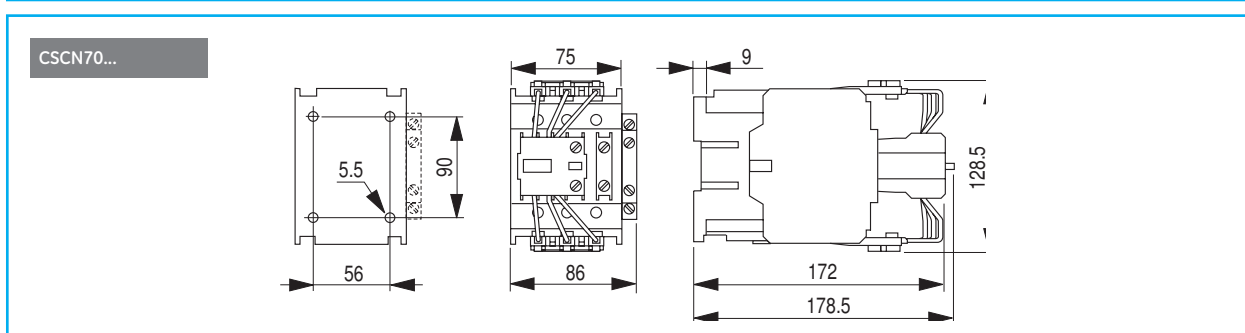
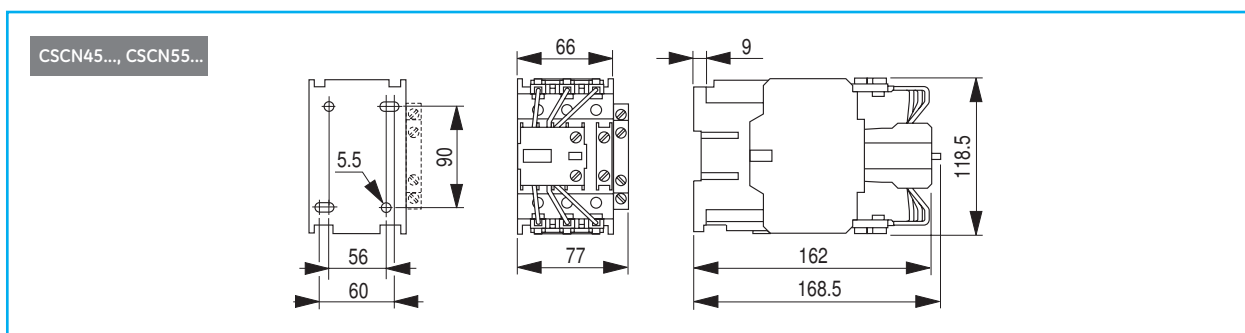
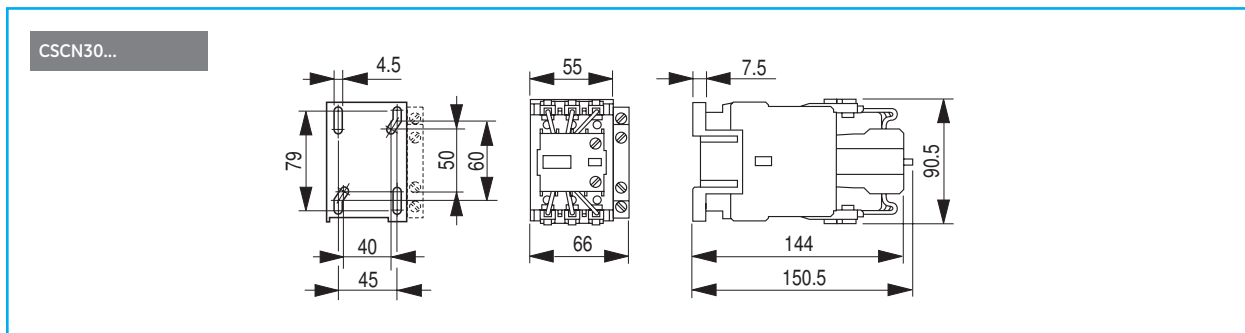
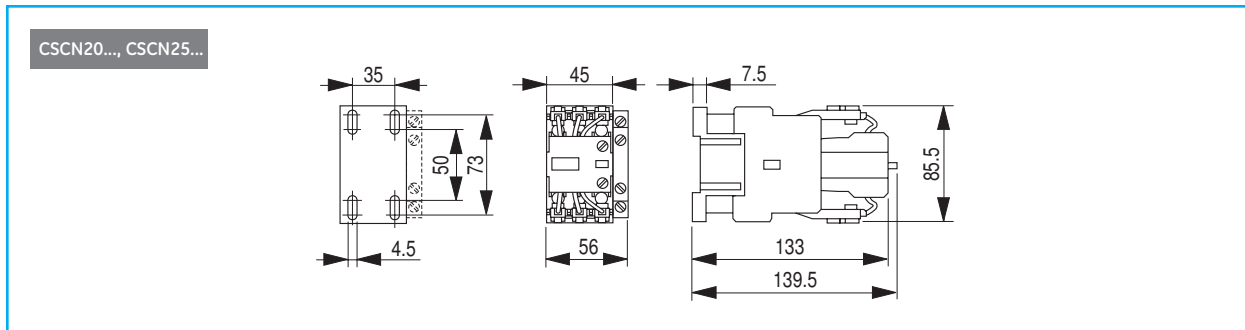
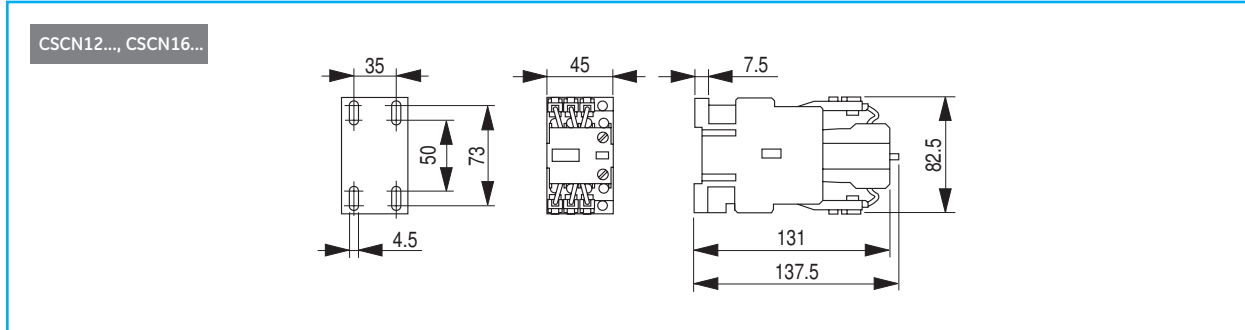
### Coil Terminal capacity and tightening torque

Tightening torque		0.8Nm - 7Lb/in
Solid Wire	(mm²)	0.75 to 2x2
Flexible wire without terminal	(mm²)	0.75 to 2.5x2
Flexible wire without terminal with cap	(mm²)	0.75 to 2.5x21



Dimensional drawings

Contactors for capacitors switching



# Applications

## Standard contactors for capacitors (category AC6b)

The most usual application of capacitors is for centralised automatic power factor ( $\cos \phi$ ) correction. A characteristic of capacitors is the high overcurrent which appears as they are connected.

Such overcurrents are due to:

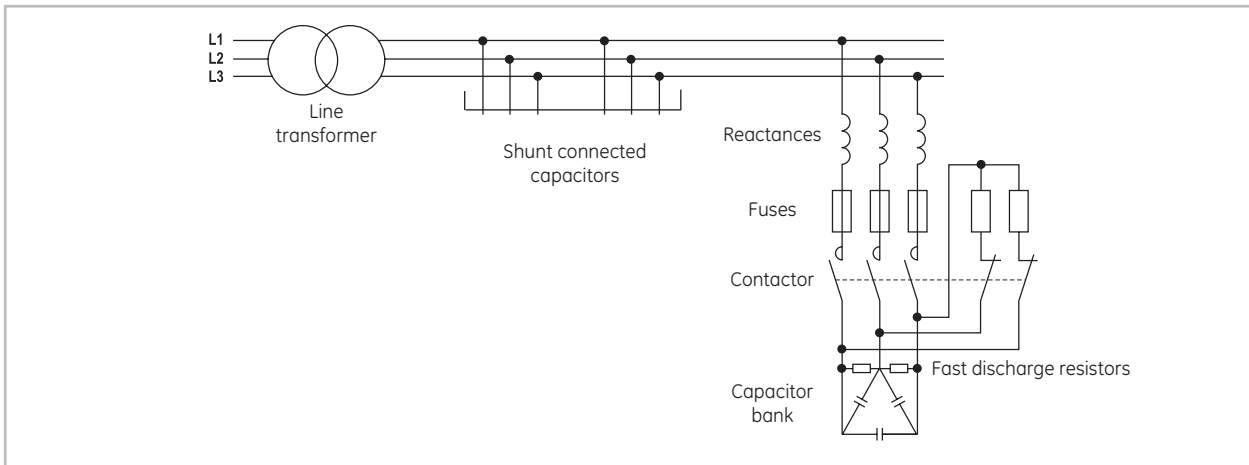
- Harmonic currents produced by saturated transformers, rectifiers, etc.
- Transient currents, the frequency and amplitude of which depend on the network inductance and the capacitor size.
- Additional transient currents arising where a capacitor is connected when others have already been connected, and caused by discharging of the latter.

GE Power Controls contactors are fitted with specially treated hardened alloy contacts which are highly resistant to welding and are therefore capable of withstanding high current peaks on connection.

The operation conditions taken as a basis for usage are:

- Near presence of other previously connected capacitors with a total power of up to eight times that of the capacitor to be connected.
- Shock coils reactances with a minimum inductance of  $4\mu\text{H}$ . These can be obtained by making 4 or 6 turns of 15cm windings on the conductor of each phase.
- Fast discharge resistor for reconnection within 60 seconds.

### Diagram



### Selection table

Contactor	$\theta \leq 55^\circ\text{C}$						$\theta \leq 70^\circ\text{C}$					Fuse gl - gG	I max. (peak)
	Type	Ith	220V 230V 240V kvar	400V kvar	415V kvar	500V kvar	690V 660V kvar	220V 230V 240V kvar	400V kvar	415V kvar	500V kvar		
CL00A	25	3	5	5.5	6.5	5.7	2.4	4	4.5	5.2	4.5	10	1000
CL01A	25	4.5	9.5	10.5	12.5	11	3.6	6	6.5	10	7	16	1000
CL02A	32	6.5	11	12	14.5	12.5	5.2	8.5	9	11.5	10	25	1000
CL03A3	45	7.5	12.5	14	16	15	6.5	10	11	13	12	25	1000
CL04A	60	12.5	21	23	27.5	24	10	17	18	22	19.5	40	2500
CL05A	60	16.5	25	27	32	30	13	20	22	25	22	50	2500
CL06A	90	22	40	43	52	50	17	30	33	41	35	80	3500
CL07A	110	25	45	48	58	65	19	35	37	46	40	125	3500
CL08A	110	30	50	54	65	70	22	40	43	52	50	125	3500
CL09A	140	40	65	70	85	95	35	58	62	75	85	160	3500
CL10A	140	45	70	80	90	105	43	70	75	90	105	160	3500
CK75C	250	60	110	118	145	150	48	88	94	116	120	250	5000
CK08C	250	70	125	135	162	170	56	100	107	130	136	250	5000
CK85B	315	80	150	160	195	200	64	120	130	156	160	315	5000
CK09B	315	95	165	177	215	230	85	148	160	192	205	315	5000
CK95B	450	105	190	205	250	288	95	175	188	230	265	450	5500
CK10C	600	135	260	280	340	370	120	235	252	375	330	630	10000
CK11C	700	190	325	350	425	450	152	260	280	340	360	800	10000
CK12B	1000	250	400	430	520	600	200	320	344	416	480	1000	12000
CK13B	1250	315	525	565	685	650	252	420	452	548	520	1250	15000

Electrical endurance: 100.000 operations



Everything is under control

## Contactors for control lighting circuits

The characteristics of the most usual lighting systems are as follows:

### Incandescent lamps

The connection current in very high -of the order of 15 times- rated current. Although this is a very short duration, it is only taken into account in order for the contactor connection current not to be exceeded. The power factor is always maintained at 1.

### Fluorescent lamps

The connection current is slightly higher than rated current. The power factor is about 0.5. To improve up to 0.9, compensating capacitors can be used. In such cases, the connection power of the capacitor must be taken into account, the effect of which is appreciably greater on the smaller contactors.

### High pressure mercury vapour lamps

The connection current varies, depending on type, between 1.6 and 2 times the rated current and will hold for between 3 and 5 minutes.

The power factor is of the order of 0.6 and this can be improved up to approximately unit value by means of compensating capacitors. In such cases, the connection power of the capacitor must be taken into account, the effect of which is appreciably greater on the smaller contactors.

### High pressure sodium vapour lamps

The connection current values varies, depending on type, between 1.3 and 1.6 times the rated current and will hold between 3 and 5 minutes.

The power factor is of the order of 0.45 and this can be improved up to approximately unit value by means of compensating capacitors. In such cases, the connection power of the capacitor must be taken into account, the effect of which is appreciably greater on the smaller contactors.

Selection table

Types	W	A	μF	MCR	MC0	MC1	MC2	RL	CL00	CL01	CL02	CL03*3
Incandescent	60	0.27		27	37	59	59	59	62	62	70	77
	100	0.45		16	22	35	35	35	40	40	50	60
	200	0.91		8	11	17	17	17	20	20	25	30
	300	1.36		5	7	11	11	11	13	13	17	20
	500	2.27		3	4	7	7	7	8	8	10	12
	1000	4.5		1	2	3	3	3	4	4	5	6
Fluorescent Single arrangement Without compensation	15	0.23		51	61	79	79	79	88	98	126	155
	20	0.37		32	38	49	49	49	57	61	78	110
	40	0.44		28	33	41	41	41	48	51	66	93
	65	0.7		18	21	26	26	26	30	32	41	58
	100	1.5		8	10	12	12	12	14	16	19	27
	15	0.23	3.5	26	32	49	49	49	61	77	94	111
Fluorescent Single arrangement With compensation	20	0.25	4.5	20	25	38	38	38	48	61	74	87
	40	0.3	4.5	20	25	38	38	38	48	61	74	87
	65	0.45	7	13	14	25	25	25	31	39	47	56
High pressure mercury vapour Without compensation	100	0.7	18	5	6	9	9	9	11	14	17	21
	250	2.13		5	5	5	6	6	6	8	10	12
	400	3.25		3	3	4	4	4	4	5	6	8
High pressure mercury vapour With compensation	700	5.4		2	2	2	2	2	2	3	4	5
	1000	7.5		1	1	2	2	2	2	2	3	3
	250	1.3	20	9	9	9	9	11	11	14	18	22
High pressure sodium vapour Without compensation	400	2.1	25	7	7	7	7	7	7	9	11	14
	700	3.6	40	5	5	5	5	4	4	5	6	8
	1000	5.3	60	3	3	3	3	3	3	3	4	5
High pressure sodium vapour With compensation	250	3		3	3	4	4	4	4	5	7	9
	400	4.4		2	2	3	3	3	3	4	5	6
	1000	10.3		1	1	1	1	1	1	2	2	2
Metal iodide Without compensation	250	1.45	40	5	5	5	5	10	10	12	16	20
	400	2.5	45	4	4	4	4	6	6	7	9	11
	1000	5.5	100	2	2	2	2	3	3	3	4	5
Metal iodide With compensation	250	2.17	-	3	3	4	4	4	4	5	7	9
	400	3.48	-	2	2	2	3	3	3	3	4	6
	700	6.09	-	1	1	1	1	1	1	2	2	3
	1000	8.7	-	1	1	1	1	1	1	1	2	2
	2000	17.39	-	0	0	0	1	1	1	1	1	1
	250	1.4	32	0	6	6	7	7	7	9	11	16
Metal iodide With compensation	400	2.0	45	0	4	5	5	5	5	6	8	11
	700	3.6	65	0	2	3	3	3	3	3	4	6
	1000	5.3	85	0	2	2	2	2	2	2	3	4
	2000	10.6	100	0	0	0	0	0	1	1	2	2

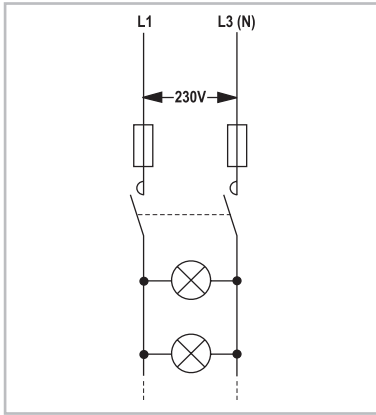




## Diagrams

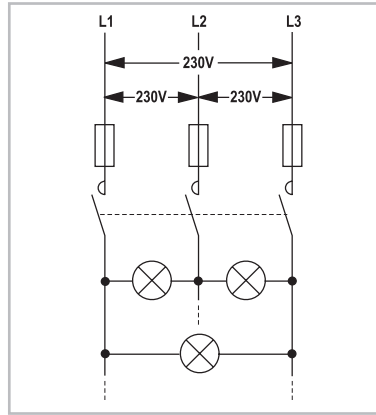
### Single-phase circuit

The total number of lamps will be as shown in the table.



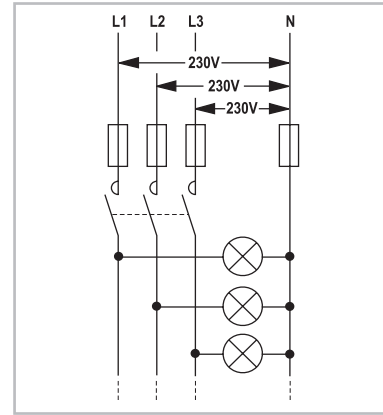
### 3-phase circuit, lamps delta-connected

The total number of lamps will be as shown in the table, multiplied by 1.73 and distributed in three equal quantities.



### 3-phase circuit, lamps star-connected

The total number of lamps will be as shown in the table, multiplied by 3 and distributed in three equal quantities.



Maximum number of lamps per phase at 230V

CL03*4	CL04	CL05	CL06	CL07	CL08	CL09	CL10	CK75C	CK08C	CK09	CK95	CK10	CK11	CK12	CK13
77	85	122	156	191	222	264	284	333	410	555	820	1320	1550	1860	1860
60	66	73	95	116	133	160	170	200	246	333	490	790	930	1120	1120
30	33	36	47	58	66	79	84	99	122	165	240	390	460	550	550
20	22	24	31	38	44	53	56	66	81	110	165	260	300	370	370
12	12	14	19	23	26	31	33	39	48	66	95	155	185	220	220
6	6	7	9	11	13	16	17	20	24	33	50	80	90	110	110
3	3	3	4	5	7	8	8	10	12	16	25	40	45	55	55
177	224	237	355	390	434	496	553	790	988	1245	1770	2340	2740	3910	4890
125	139	147	221	243	270	309	344	490	614	774	1090	1460	1700	2430	3040
105	118	124	186	204	227	260	289	413	516	650	920	1220	1430	2045	2550
66	74	78	116	127	142	163	181	259	324	409	570	770	900	1280	1600
30	34	36	54	59	66	76	85	121	151	190	270	360	420	600	750
119	134	149	191	232	273	312	347	496	621	786	900	1240	1450	1740	1740
92	103	115	148	180	212	243	270	385	482	610	700	960	1120	1350	1350
92	103	115	148	180	212	243	270	385	482	610	700	960	1120	1350	1350
59	66	74	95	115	136	155	173	248	310	393	440	610	720	860	860
23	23	29	37	45	53	60	67	96	120	152	170	240	280	330	330
14	15	18	27	30	33	36	42	60	75	95	136	181	211	302	377
9	10	12	18	20	22	24	28	40	49	62	89	119	138	198	247
5	6	7	11	12	13	14	17	24	30	38	54	71	83	119	149
4	4	5	8	9	9	10	12	17	21	27	39	51	60	86	107
31	27	33	49	55	60	66	77	109	156	156	171	311	311	374	467
25	17	20	31	34	37	41	48	87	125	125	137	249	249	299	374
16	10	12	18	20	22	24	28	54	78	78	86	156	156	187	234
10	7	8	12	13	15	16	19	36	52	52	57	104	104	125	156
10	11	13	19	21	24	26	30	43	54	68	96	129	150	214	268
7	7	9	13	15	16	18	20	29	37	46	66	88	102	146	183
3	3	4	6	6	7	7	9	12	16	20	28	37	44	62	78
16	25	30	44	49	54	59	69	97	131	131	144	263	263	324	404
14	14	17	26	29	31	34	40	51	72	72	80	145	145	174	217
7	6	8	12	13	14	16	18	23	33	33	36	65	65	78	98
12	12	12	19	21	23	25	29	41	52	65	93	124	145	207	259
8	8	8	12	13	14	16	18	26	32	41	58	78	91	129	162
4	4	4	7	7	8	9	10	15	18	23	33	44	52	74	92
3	3	3	5	5	6	6	7	10	13	16	23	31	36	52	65
2	2	2	2	3	3	3	4	5	6	8	12	16	18	26	32
21	21	21	32	36	39	43	50	68	97	97	107	195	195	234	292
15	15	15	23	25	28	30	35	48	69	69	76	138	138	166	208
8	8	8	13	14	15	17	19	34	48	48	53	96	96	115	144
6	6	6	8	9	10	11	13	26	37	37	40	73	73	88	110
3	3	3	4	5	5	6	7	22	31	31	34	62	62	75	93



# Efficor & MC Contactor DC Application

## Contactors for DC - Max. operational current $I_e$ (A) - DC utilization categories

### Category DC1. $L/R \leq 1ms$

Ue	Poles in serie	MC0	MC1	MC2	EC09	EC12	EC18	EC25	EC32	EC40	EF50	EF65	EF80	EF95	EF105
24V	1	6	9	9	18	18	18	25	32	40	50	65	65	80	80
	2	8	12	12	25	25	32	45	60	60	90	110	110	140	140
	3	15	20	20	25	25	32	45	60	60	90	110	110	140	140
	4	15	20	20	-	25	32	45	60	-	-	110	-	140	-
48V	1	5	7.5	7.5	15	15	15	20	25	35	45	55	55	70	70
	2	8	12	12	25	25	32	45	60	60	90	110	110	140	140
	3	12	16	16	25	25	32	45	60	60	90	110	110	140	140
	4	15	20	20	-	25	32	45	60	-	-	110	-	140	-
60V	1	4	6	6	12	12	12	18	18	32	40	50	50	65	65
	2	6	9	9	25	25	32	45	60	60	90	110	110	140	140
	3	12	16	16	25	25	32	45	60	60	90	110	110	140	140
	4	15	20	20	-	25	32	45	60	-	-	110	-	140	-
125V	1	1.6	2.5	2.5	6	6	6	8	8	8	16	16	16	16	16
	2	4	6	6	18	18	18	25	45	45	80	90	90	110	110
	3	5	10	10	25	25	25	45	60	60	90	110	110	140	140
	4	5	10	10	-	25	32	45	60	-	-	110	-	140	-
220V	1	0.2	0.36	0.36	0.8	0.8	0.8	1	1	1	2	2	2	2	2
	2	1.7	2.6	2.6	7.5	7.5	7.5	8	8	8	20	20	20	20	20
	3	4	8	8	25	25	25	45	50	50	90	110	110	140	140
	4	4	8	8	-	25	32	45	60	-	-	110	-	140	-
440V	1	0.09	0.13	0.13	0.4	0.4	0.4	0.5	0.5	0.5	0.8	0.8	0.8	0.8	0.8
	2	0.26	0.4	0.4	0.8	0.8	0.8	1	1	1	2	2	2	2	2
	3	0.5	1	1	8	8	8	10	10	10	15	15	15	15	15
	4	0.5	1	1	-	15	15	20	25	-	-	90	-	110	-
600V	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	2	-	-	-	0.4	0.4	0.4	0.5	0.5	0.5	1	1	1	1	1
	3	-	-	-	4	4	4	5	5	5	7.5	7.5	7.5	7.5	7.5
	4	-	-	-	-	8	10	12	12	-	-	65	-	75	-

### Category DC3. $L/R \leq 2.5ms$

Ue	Poles in serie	MC0	MC1	MC2	EC09	EC12	EC18	EC25	EC32	EC40	EF50	EF65	EF80	EF95	EF105
24V	1	-	-	-	12	12	12	18	25	32	40	50	50	65	65
	2	4	9	9	18	18	18	25	40	40	65	80	80	105	105
	3	8	12	12	18	18	18	25	40	40	65	80	80	105	105
	4	-	-	-	-	18	18	25	40	-	-	80	-	105	-
48V	1	-	-	-	9	9	9	12	18	20	30	35	35	45	45
	2	3	6	6	18	18	18	25	40	40	65	80	80	105	105
	3	6	9	9	18	18	18	25	40	40	65	80	80	105	105
	4	-	-	-	-	18	18	25	40	-	-	80	-	105	-
60V	1	-	-	-	7.5	7.5	7.5	10	15	15	25	30	30	35	35
	2	3	6	6	18	18	18	25	40	40	65	80	80	105	105
	3	6	9	9	18	18	18	25	40	40	65	80	80	105	105
	4	-	-	-	-	18	18	25	40	65	-	80	-	105	-
125V	1	-	-	-	2	2	2	3	3	3	3	3	3	3	3
	2	0.85	4.5	4.5	10	10	12	18	25	50	50	60	60	80	80
	3	1.7	6	6	15	15	18	25	32	35	35	80	80	105	105
	4	-	-	-	-	15	18	25	32	35	-	80	-	105	-
220V	1	-	-	-	0.6	0.6	0.6	0.6	0.6	0.8	0.8	0.8	0.8	0.8	0.8
	2	0.35	1.2	1.2	2	2	2	2	2	7	7	7	7	7	7
	3	0.7	2.5	2.5	12	12	12	18	25	50	50	65	65	95	95
	4	-	-	-	-	15	18	32	32	65	-	80	-	105	-
440V	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	2	0.05	0.15	0.15	0.3	0.3	0.3	0.5	0.5	1	1	1	1	1	1
	3	0.13	0.3	0.3	1.5	1.5	1.5	3	3	3	3	3	3	3	3
	4	-	-	-	-	6	6	6	6	50	-	65	-	75	-
600V	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	3	-	-	-	0.8	0.8	0.8	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
	4	-	-	-	-	2.5	2.5	2.5	2.5	2.5	-	30	-	35	-

### Category DC5. $L/R \leq 15ms$

Ue	Poles in serie	MC0	MC1	MC2	EC09	EC12	EC18	EC25	EC32	EC40	EF50	EF65	EF80	EF95	EF105
24V	1	-	-	-	12	12	12	18	25	32	40	50	50	65	65
	2	3	4.5	4.5	18	18	18	25	40	40	65	80	80	105	105
	3	6	9	9	18	18	18	25	40	40	65	80	80	105	105
	4	-	-	-	-	18	18	25	40	-	-	80	-	105	-
48V	1	-	-	-	9	9	9	12	18	20	30	35	35	45	45
	2	2.5	4	4	18	18	18	25	40	40	65	80	80	105	105
	3	6.5	8	8	18	18	18	25	40	40	65	80	80	105	105
	4	-	-	-	-	18	18	25	40	-	-	80	-	105	-
60V	1	-	-	-	7.5	7.5	7.5	10	15	15	25	30	30	35	35
	2	2	3	3	18	18	18	25	40	40	65	80	80	105	105
	3	5	7	7	18	18	18	25	40	40	65	80	80	105	105
	4	-	-	-	-	18	18	25	40	-	-	80	-	105	-
125V	1	-	-	-	0.8	0.8	0.8	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
	2	0.65	1.5	1.5	5	5	5	5	5	5	50	60	60	85	85
	3	1.3	2	2	15	15	15	20	25	32	60	70	70	95	95
	4	-	-	-	-	15	18	25	32	-	-	80	-	105	-
220V	1	-	-	-	-	-	-	-	-	-	0.5	0.5	0.5	0.5	0.5
	2	0.16	0.26	0.26	0.8	0.8	0.8	0.8	0.8	0.8	3	3	3	4	4
	3	0.5	0.8	0.8	3	3	3	3	3	3	7	7	7	7	7
	4	-	-	-	-	10	10	15	15	-	-	75	-	95	-
440V	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	3	0.4	0.1	1.1	0.5	0.5	0.5	0.7	0.7	0.7	1	1	1	1	1
	4	-	-	-	-	2	2	4	4	-	-	50	-	60	-
600V	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	4	-	-	-	-	0.75	0.75	2.5	2.5	-	-	25	-	30	-

Contactors for DC application

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## Max. operational current $I_e$ (A) - DC utilization categories (continued)

### Category DC1. $L/R \leq 1ms$

Ue	Poles in serie	CK07	CK75	CK08	CK85	CK09	CK95	CK10	CK11	CK12	CK13
24V	1	150	200	200	250	250	350	500	600	800	1000
	2	200	250	250	315	315	450	600	700	1000	1250
	3	200	250	250	315	315	450	600	700	1000	1250
	4	200	-	250	-	315	450	600	700	1000	1250
48V	1	125	170	170	200	200	295	425	500	600	850
	2	140	175	175	220	220	315	425	480	700	850
	3	200	250	250	315	315	500	600	700	1000	1250
	4	200	-	250	-	315	500	600	700	1000	1250
60V	1	100	140	140	175	175	245	350	420	560	700
	2	140	175	175	220	220	315	425	480	700	850
	3	200	250	250	315	315	500	600	700	1000	1250
	4	200	-	250	-	315	500	600	700	1000	1250
125V	1	20	25	25	30	30	50	60	70	100	125
	2	110	200	200	250	250	300	400	500	600	1000
	3	200	250	250	315	315	500	600	700	1000	1250
	4	200	-	250	-	315	500	600	700	1000	1250
220V	1	-	-	-	-	-	-	-	-	-	-
	2	65	110	110	150	150	200	250	250	300	400
	3	200	250	250	315	315	500	600	700	1000	1250
	4	200	-	250	-	315	500	600	700	1000	1250
440V	1	-	-	-	-	-	-	-	-	-	-
	2	-	-	-	-	-	-	-	-	-	-
	3	60	120	120	150	150	180	240	300	400	480
	4	110	-	200	-	250	315	400	500	700	800
600V	1	-	-	-	-	-	-	-	-	-	-
	2	-	-	-	-	-	-	-	-	-	-
	3	32	65	65	80	80	95	130	160	215	250
	4	85	-	100	-	130	170	215	265	375	430

### Category DC3. $L/R \leq 2.5ms$

Ue	Poles in serie	CK07	CK75	CK08	CK85	CK09	CK95	CK10	CK11	CK12	CK13
24V	1	105	150	185	205	250	309	420	550	700	825
	2	105	150	185	205	250	309	420	550	700	825
	3	105	150	185	205	250	309	420	550	700	825
	4	105	-	185	-	250	309	420	550	700	825
48V	1	70	105	130	140	175	215	290	385	490	575
	2	105	150	185	205	250	309	420	550	700	825
	3	105	150	185	205	250	309	420	550	700	825
	4	105	-	185	-	250	309	420	550	700	825
60V	1	55	85	105	110	140	175	230	300	390	460
	2	105	150	185	205	250	309	420	550	700	825
	3	105	150	185	205	250	309	420	550	700	825
	4	105	-	185	-	250	309	420	550	700	825
125V	1	20	25	25	30	30	50	60	70	100	125
	2	105	150	185	205	250	309	420	550	700	825
	3	105	150	185	205	250	309	420	550	700	825
	4	105	-	185	-	250	309	420	550	700	825
220V	1	-	-	-	-	-	-	-	-	-	-
	2	10	60	70	80	85	95	140	185	225	400
	3	105	150	185	205	250	309	420	550	700	825
	4	105	-	185	-	250	309	420	550	700	825
440V	1	-	-	-	-	-	-	-	-	-	-
	2	-	-	-	-	-	-	-	-	-	-
	3	8	50	55	65	70	80	120	150	180	320
	4	80	-	105	-	185	205	250	300	400	700
600V	1	-	-	-	-	-	-	-	-	-	-
	2	-	-	-	-	-	-	-	-	-	-
	3	4	25	25	30	35	40	60	75	90	165
	4	40	-	50	-	90	100	125	150	200	350

### Category DC5. $L/R \leq 15ms$

Ue	Poles in serie	CK07	CK75	CK08	CK85	CK09	CK95	CK10	CK11	CK12	CK13
24V	1	105	150	185	205	250	309	420	550	700	825
	2	105	150	185	205	250	309	420	550	700	825
	3	105	150	185	205	250	309	420	550	700	825
	4	105	-	185	-	250	309	420	550	700	825
48V	1	60	90	110	120	150	185	250	330	420	495
	2	105	150	185	205	250	309	420	550	700	825
	3	105	150	185	205	250	309	420	550	700	825
	4	105	-	185	-	250	309	420	550	700	825
60V	1	55	85	105	110	140	175	230	300	390	460
	2	105	150	185	205	250	309	420	550	700	825
	3	105	150	185	205	250	309	420	550	700	825
	4	105	-	185	-	250	309	420	550	700	825
125V	1	15	20	20	25	25	40	50	60	80	100
	2	80	95	105	150	185	205	250	300	400	700
	3	105	150	185	205	250	309	420	550	700	825
	4	105	-	185	-	250	309	420	550	700	825
220V	1	-	-	-	-	-	-	-	-	-	-
	2	8	50	55	65	70	80	120	150	180	320
	3	80	95	105	150	185	205	250	300	400	700
	4	105	-	185	-	250	309	420	550	700	825
440V	1	-	-	-	-	-	-	-	-	-	-
	2	-	-	-	-	-	-	-	-	-	-
	3	5	40	40	50	50	60	90	100	100	200
	4	65	-	95	-	150	185	205	250	300	400
600V	1	-	-	-	-	-	-	-	-	-	-
	2	-	-	-	-	-	-	-	-	-	-
	3	40	45	50	75	90	100	125	150	200	350
	4	35	-	45	-	75	90	100	125	150	200

Contactors for DC application

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Everything is under control

## Horsepower and General-Use Ratings Three Pole Contactors

Cat No.		EA	MC1	MC2	CL00	CL01	CL02	CL03	CL04	CL05	CL06	CL07	CL08	CL09	CL10	
<b>Poles No.</b>		3	3	3	3	3	3	3	3	3	3	3	3	3	3	
<b>General Use</b>	600Vac	(A)	16	20	20	25	25	32	32	60	60	90	110	110	140	140
	HP	1	0.5	0.5	0.75	0.75	1	1.5	3	3	5	5	7.5	7.5	10	10
<b>Single-Phase</b>	115Vac	FLA	9.8	9.8	13.8	13.8	16.0	20.0	34.0	34.0	56.0	56.0	80.0	80.0	100	100
	HP	1	1.5	2	1.5	2	3	3	5	5	7.5	10	15	15	20	20
	230Vac	FLA	10.0	12.0	10.0	12.0	17.0	17.0	28.0	28.0	40.0	50.0	68.0	68.0	88.0	88.0
	HP	3	3	3	3	3	5	5	10	10	15	20	20	25	30	30
	200Vac	FLA	11.0	11.0	11.0	11.0	17.5	17.5	32.2	32.2	48.3	62.1	62.1	78.2	92.0	92.0
	HP	3	3	3	3	3	5	5	10	15	15	20	20	25	30	30
<b>Three-Phase</b>	208Vac	FLA	9.6	9.6	10.6	10.6	16.7	16.7	30.8	46.2	46.2	59.4	59.4	74.8	88.0	88.0
	HP	3	3	5	3	3	5	7.5	10	15	15	20	25	30	40	40
	230Vac	FLA	6.1	9.7	9.6	9.6	15.2	22.0	28.0	42.0	42.0	54.0	68.0	80.0	104	104
	HP	3	5	7.5	5	7.5	10	15	20	30	30	40	50	60	75	75
	460Vac	FLA	7.6	11.0	7.6	11.0	14.0	21.0	27.0	40.0	40.0	52.0	65.0	77.0	96.0	96.0
	HP	5	10	7.5	10	15	15	25	40	40	50	60	75	75	75	75
	575Vac	FLA	6.1	11.0	9.0	11.0	17.0	17.0	27.0	41.0	41.0	52.0	62.0	77.0	77.0	77.0

Cat No.		CK75C	CK08C	CK09B	CK95B	CK10C	CK11C	CK12B
<b>Poles No.</b>		3	3	3	3	3	3	3
<b>General Use</b>	600Vac	(A)	156	180	200	310	500	600
	HP	15	20					650A (E) 750A (O)
<b>Single-Phase</b>	115Vac	FLA	135	180				
	HP	30	40					
	230Vac	FLA	136	176				
	HP	40	50	60	100	125	150	200
	200Vac	FLA	120	150	177	285	358	414
	HP	40	60	60	100	125	150	
<b>Three-Phase</b>	208Vac	FLA	114	169	169	273	343	396
	HP	50	60	75	100	150	200	250
	230Vac	FLA	130	154	192	248	360	480
	HP	100	125	150	250	300	400	500
	460Vac	FLA	124	156	180	302	361	477
	HP	125	125	150	300	400	500	600
	575Vac	FLA	125	125	144	289	382	472
	HP	125	125	144	289	382	472	574

## Horsepower and General-Use Ratings Four Pole Contactors

Cat No.		MC1	MC2	CL00	CL01	CL02	CL03	CL04	CL05	CL06	CL07	CL08	CL09	
<b>Poles No.</b>		4	4	4	4	4	4	4	4	4	4	4	4	
<b>General Use</b>	600Vac	(A)	20	20	25	25	32	45	60	90	90	110	110	140
	HP	0.5	0.5	0.75	0.75	1	2	3	3	5	5	7.5	7.5	10
<b>Single-Phase</b>	115Vac	FLA	9.8	9.8	13.8	13.8	16.0	24.0	34.0	56.0	56.0	80.0	80.0	100
	HP	1.5	2	1.5	2	3	3	5	7.5	7.5	10	15	15	20
	230Vac	FLA	10.0	12.0	10.0	12.0	17.0	17.0	28.0	40.0	50.0	68.0	68.0	88.0
	HP	3	3	3	3	5	7.5	10	10	15	20	20	25	30
	200Vac	FLA	11.0	11.0	11.0	11.0	17.5	25.3	32.2	32.2	48.3	62.1	62.1	78.2
	HP	3	3	3	3	5	7.5	10	10	15	20	20	25	30
<b>Three-Phase</b>	208Vac	FLA	9.6	9.6	10.6	10.6	16.7	24.2	30.8	30.8	46.2	59.4	59.4	74.8
	HP	3	5	3	3	5	7.5	10	15	15	20	25	30	30
	230Vac	FLA	6.1	9.7	9.6	9.6	15.2	22.0	28.0	42.0	42.0	54.0	68.0	80.0
	HP	5	7.5	5	7.5	10	15	20	30	30	40	50	60	60
	460Vac	FLA	7.6	11.0	7.6	11.0	14.0	21.0	27.0	40.0	40.0	52.0	65.0	77.0
	HP	5	10	7.5	10	15	20	25	30	40	50	60	75	75
	575Vac	FLA	6.1	11.0	9.0	11.0	17.0	22.0	27.0	32.0	41.0	52.0	62.0	77.0

Cat No.		CK08B	CK09B	CK95B	CK12B
<b>Poles No.</b>		4	4	4	4
<b>General Use</b>	600Vac	(A)	175	200	310
	HP				500
<b>Single-Phase</b>	115Vac	FLA			
	HP				
	230Vac	FLA			
	HP	50	60	100	200
	200Vac	FLA	150	177	285
	HP	60	60	100	552
<b>Three-Phase</b>	208Vac	FLA		169	273
	HP	60	75	100	250
	230Vac	FLA	154	192	248
	HP	125	150	250	500
	460Vac	FLA	156	180	302
	HP	125	150	300	600
	575Vac	FLA	125	144	289
	HP	125	144	289	574

(E) Enclosed  
(O) Open



## Horsepower and General-Use Ratings Three Pole Contactors

Cat No.		EC09	EC12	EC18	EC25	EC32	EC40	EF50	EF65	EF80	EF95	EF105	
Poles No.		3	3	3	3	3	3	3	3	3	3	3	
General Use	600Vac	(A)	25	25	30	32	55	55	90	110	110	140	140
	115Vac	HP	0.75	0.75	1	1.5	2	3	5	5	7.5	7.5	10
Single-Phase	115Vac	FLA	13.8	13.8	16.0	20.0	24	34	56.0	56.0	80.0	80.0	100
	230Vac	HP	1.5	2	3	3	5	5	7.5	10	15	15	20
Three-Phase	230Vac	FLA	10.0	12.0	17.0	17.0	28	28	40.0	50.0	68.0	68.0	88.0
	200Vac	HP							15	20	20	25	30
Three-Phase	200Vac	FLA							48.3	62.1	62.1	78.2	92.0
	208Vac	HP							15	20	20	25	30
Three-Phase	208Vac	FLA							46.2	59.4	59.4	74.8	88.0
	230Vac	HP	3	3	5	7.5	10	10	15	20	25	30	40
Three-Phase	230Vac	FLA	9.6	9.6	15.2	22	28	28	42	54.0	68.0	80.0	104
	460Vac	HP	5	7.5	10	15	20	25	30	40	50	60	75
Three-Phase	460Vac	FLA	7.6	11	14	21	27	34	41	52.0	65.0	77.0	96.0
	575Vac	HP	7.5	10	15	20	20	20	40	50	60	75	75
Three-Phase	575Vac	FLA	9	11	17	22	22	22	41	52.0	62.0	77.0	77.0
	600Vac	HP	7.5	10	15	20	20	20					
Three-Phase	600Vac	FLA	9	11	17	22	22	22					

## Horsepower and General-Use Ratings Four Pole Contactors

Cat No.		EC12	EC18	EC25	EC32	EF40	EF50	EF65	EF80	EF95	
Poles No.		4	4	4	4	4	4	4	4	4	
General Use	600Vac	(A)	25	30	32	55	90	90	110	110	140
	115Vac	HP	0.75	1	1.5	2	3	5	5	7.5	7.5
Single-Phase	115Vac	FLA	13.8	16.0	20.0	24	34.0	56.0	56.0	80.0	80.0
	230Vac	HP	2	3	3	5	7.5	7.5	10	15	15
Three-Phase	230Vac	FLA	12.0	17.0	17.0	28	40.0	40.0	50.0	68.0	68.0
	200Vac	HP					10	15	20	20	25
Three-Phase	200Vac	FLA					32.2	48.3	62.1	62.1	78.2
	208Vac	HP					10	15	20	20	25
Three-Phase	208Vac	FLA					30.8	46.2	59.4	59.4	74.8
	230Vac	HP	3	5	7.5	10	15	15	20	25	30
Three-Phase	230Vac	FLA	9.6	15.2	22	28	42.0	42.0	54.0	68.0	80.0
	460Vac	HP	7.5	10	15	20	30	30	40	50	60
Three-Phase	460Vac	FLA	11	14	21	27	40.0	40.0	52.0	65.0	77.0
	575Vac	HP	10	15	20	20	30	40	50	60	75
Three-Phase	575Vac	FLA	11	17	22	22	32.0	41.0	52.0	62.0	77.0
	600Vac	HP	10	15	20	20					
Three-Phase	600Vac	FLA	11	17	22	22					

## Lighting Application Category

Cat No.		CL02A400T*	CL02AB00T*	CL02AA00T*	CL04A310M*	CL07A300M*	EF50E300B*	EF65E300B*
Poles No (NO+NC)		4	2+2	0+4	3	3	3	3
Ballast Rating	Amp (A)	30	30	30	30	90	90	90
	Voltage (V)	600	600	600	480/277	480/277	480/277	480/277
Tungsten Rating	Amp (A)	20	20	20	30	60	60	60
	Voltage (V)	277	277	277	480/277	480/277	480/277	480/277

## Capacitor Loads Application Category

Cat No.		CSCN08	CSCN12	CSCN16	CSCN20	CSCN25	CSCN30	CSCN45	CSCN55	CSCN60	CSCN70
600Va	kVar	12	18	25	30	35	50	65	80	80	100
	A	11.5	18.0	25.1	30.1	35.1	50.2	65.2	80.3	80.3	100.4
460Va	kVar	9	15	20	25	30	40	55	70	70	90
	A	11.3	18.8	25.1	31.3	37.6	50.2	69.0	87.8	87.8	112.9
230Va	kVar	4.6	7.5	10	12.5	15	20	25	35	35	45
	A	11.5	18.8	25.1	31.3	37.6	50.2	62.7	87.8	87.8	112.9
200Va	kVar	4	6.5	7.5	10	12.5	17.5	22.5	30	30	40
	A	11.5	18.7	21.6	28.8	36.1	50.5	64.9	86.6	86.6	115.4
115Va	kVar	2.5	3.5	4.5	6	7.5	10	12.5	17	17	22.5
	A	12.5	17.6	22.6	30.1	35.1	50.2	62.7	85.3	85.3	112.9
Frame Size		1	1	1	2	2	3	4	4	4	5



## High-Available Short Circuit Ratings Contactor with Fuses

### M Series

Cat.No.	Max FLA	Short Circuit Current Rating		Fuse	
		kA	Volts Max.	Class	Max. Size
MC1	11	50	600	J	50A
MC2	11	50	600	J	50A

### CL Series

Cat.No.	Max FLA	Short Circuit Current Rating		Fuse	
		kA	Volts Max.	Class	Max. Size
CL00	11.0	100	600	J	40A
CL01	11.0	100	600	J	40A
CL02	17.5	100	600	J	40A
CL03*3*	22.0	100	600	J	45A
CL03*4*	25.3	100	600	J	70A
CL04	32.2	100	600	J	70A
CL05*3*	34.0	100	600	J	70A
CL05*4*	42.0	100	600	J	125A
CL06	48.3	100	600	J	125A
CL07	62.1	100	600	J	125A
CL08	68.0	100	600	J	125A
CL09	80.0	100	600	J	200A
CL10	104	100	600	J	200A

### CK Series

Cat.No.	Max FLA	Short Circuit Current Rating		Fuse	
		kA	Volts Max.	Class	Max. Size
CK75C	130	100	600	J	300A
CK08C	156	100	600	J	300A
CK08B	156	100	600	J	450A
CK09B	192	100	600	J	450A
CK95B	302	100	600	J	450A
CK10C	382	100	600	J	600A
CK11C	480	100	600	J	600A

### Efficor Series

Cat.No.	Max FLA	Short Circuit Current Rating		Fuse	
		kA	Volts Max.	Class	Max. Size
EC09	9.6	100	600	J	35A
EC12	11	100	600	J	40A
EC18	17.5	100	600	J	40A
EC25	25.3	100	600	J	45A
EC32	32.2	100	600	J	70A
EC40	34	100	600	J	70A
EF40	42.0	100	600	J	125A
EF50	48.3	100	600	J	125A
EF65	62.1	100	600	J	125A
EF80	68.0	100	600	J	125A
EF95	80.0	100	600	J	200A
EF105	104	100	600	J	200A

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## High-Available Short Circuit Ratings Overload with Fuses

### MT Overload Relay with Fuses

MOTOR FLA		Overload Relay	Maximum Fuse Size, Class J (A)	Max Short Circuit Rating	
Min	Max			RMS Sym (kA)	Volts
0.12	0.17	MT03A	1	50	600
0.17	0.26	MT03B	1	50	600
0.26	0.43	MT03C	1	50	600
0.43	0.65	MT03D	1	50	600
0.65	1	MT03E	3	50	600
0.85	1.3	MT03F	3	50	600
1.1	1.6	MT03G	6	50	600
1.35	2	MT03H	6	50	600
1.7	2.4	MT03I	6	50	600
2.2	3.2	MT03J	10	50	600
2.5	4	MT03R	10	50	600
3	4.7	MT03K	15	50	600
4	6.3	MT03L	20	50	600
5.5	8	MT03M	30	50	600
7.5	10.5	MT03N	40	50	600
10	14	MT03P	50	50	600

### ECRT Overload Relay with Fuses

MOTOR FLA		Overload Relay	Maximum Fuse Size, Class J (A)	Max Short Circuit Rating	
Min	Max			RMS Sym (kA)	Volts
0.16	0.26	ECRT1B10B	1	100	600
0.25	0.41	ECRT1B10C	1	100	600
0.4	0.65	ECRT1B10D	1	100	600
0.65	1.1	ECRT1B10F	3	100	600
1	1.5	ECRT1B10G	6	100	600
1.3	1.9	ECRT1B10H	6	100	600
1.8	2.7	ECRT1B10J	10	100	600
2.5	4.1	ECRT1B10K	15	100	600
4	6.3	ECRT1B10L	25	100	600
5.5	8.5	ECRT1B10M	30	100	600
8	12	ECRT1B10N	45	100	600
10	16	ECRT1B10P	60	100	600
14.5	18	ECRT1B10S	70	100	600
8	12	ECRT2B10N	45	100	600
10	16	ECRT2B10P	60	100	600
14.5	18	ECRT2B10S	70	100	600
17.5	22	ECRT2B10T	70	100	600
21	26	ECRT2B10U	70	100	600
25	32	ECRT2B10V	70	100	600
30	40	ECRT2B10W	70	100	600

### RT Overload Relay with Fuses

MOTOR FLA		Overload Relay	Maximum Fuse Size, Class J (A)	Max Short Circuit Rating	
Min	Max			RMS Sym (kA)	Volts
0.16	0.26	RT1B	1	100	600
0.25	0.41	RT1C	1	100	600
0.4	0.65	RT1D	1	100	600
0.65	1.1	RT1F	3	100	600
1	1.5	RT1G	6	100	600
1.3	1.9	RT1H	6	100	600
1.8	2.7	RT1J	10	100	600
2.5	4.1	RT1K	15	100	600
4	6.3	RT1L	25	100	600
5.5	8.5	RT1M	30	100	600
8	12	RT1N	40	100	600
8	12	RT1N	45	100	600
10	16	RT1P	40	100	600
10	16	RT1P	45	100	600
10	16	RT1P	60	100	600
11.5	15	RT2A	60	100	600
14.5	18	RT1S	45	100	600
14.5	18	RT1S	70	100	600
14.5	19	RT2B	70	100	600
17.5	22	RT1T	70	100	600
18.5	25	RT2C	100	100	600
21	26	RT1U	70	100	600
24	32	RT2D	125	100	600
25	32	RT1V	70	100	600
30	40	RT1W	70	100	600
30	43	RT2E	150	100	600
42	55	RT2G	200	100	600
54	65	RT2H	200	100	600
64	82	RT2J	200	100	600
78	97	RT2L	200	100	600
90	110	RT2M	200	100	600

### RT Overload Relay with Fuses

MOTOR FLA		Overload Relay	Maximum Fuse Size, Class J <sup>(1)</sup> (A)	Max Short Circuit Rating	
Min	Max			RMS Sym (kA)	Volts
55	80	RT3B	300	100	600
63	90	RT3C	350	100	600
90	120	RT3D	450	100	600
110	140	RT3E	450	100	600
140	190	RT3F	450	100	600
120	190	RT4N	700	100	600
175	280	RT4P	1000	100	600
200	310	RT4R	1200	100	600
120	190	RT5A	700	100	600
175	280	RT5B	1000	100	600
250	400	RT5C	1600	100	600
315	500	RT5D	2000	100	600
430	700	RT5E	2500	100	600
63	90	RT32C	350	100	600
90	120	RT32D	450	100	600
110	140	RT32E	450	100	600
140	190	RT32F	450	100	600
120	190	RT4LN	700	100	600
175	280	RT4LP	1000	100	600
200	310	RT4LR	1200	100	600
120	190	RT5LA	700	100	600
175	280	RT5LB	1000	100	600
250	400	RT5LC	1600	100	600
315	500	RT5LD	2000	100	600
430	700	RT5LE	2500	100	600

(1) RT4\* and RT5\* Overload Relays could be protected by Class L fuses with similar ratings

### RE Overload Relay with Fuses

MOTOR FLA		Overload Relay	Maximum Fuse Size, Class J (A)	Max Short Circuit Rating	
Min	Max			RMS Sym (kA)	Volts
0.1	0.5	RE1D	1	100	600
0.4	0.2	RE1H	6	100	600
1	5	RE1K	20	100	600
1.6	8	RE1M	30	100	600
6.4	32	RE1S	70	100	600
9	45	RE1W	70	100	600
15	75	RE2H	125	100	600
22	110	RE2M	150	100	600
30	150	RE3E	300	100	600





## High-Available Short Circuit Ratings Contactor with Breaker

### CL Series

Cat.No.	Max FLA	Short Circuit Current Rating		GE Circuit Breaker		Cat.No.	Max FLA	Short Circuit Current Rating		GE Circuit Breaker	
		kA	Volts Max.	Model	Max. Size			kA	Volts Max.	Model	Max. Size
CL03*4*	25.3	42	480	SEL	100A	CL03*4*	25.3	42	240	SEL	100A
	25.3	25	480	PEXN	100A					PEXE	100A
				SEH						100A	
CL04	25.3	18	480	PEXC	100A	CL04	25.3	18	240	SED	100A
	32.2	42	480	PEXE	100A					PEXB	100A
				SEL						100A	
CL05*3*	32.2	25	480	PEXN	100A	CL05*3*	32.2	42	240	PEXE	100A
	32.2	18	480	SEH	100A					PEXN	100A
				PEXC						100A	
CL05*4*	34.0	42	480	PEXE	100A	CL05*4*	34.0	42	240	SED	100A
	34.0	25	480	PEXB	100A					PEXB	100A
				SEL						100A	
CL06	34.0	18	480	PEXN	100A	CL06	34.0	18	240	PEXE	100A
	42.0	65	480	SEH	100A					SEL	100A
				PEXC						100A	
CL07	42.0	25	480	PEXE	100A	CL07	42.0	65	240	PEXN	100A
	42.0	18	480	SED	100A					SEH	100A
				PEXB						100A	
CL08	48.3	65	480	PEXN	100A	CL08	48.3	65	240	SEL	100A
	48.3	25	480	SEH	100A					PEXE	100A
				PEXC						100A	
CL09	48.3	18	480	PEXE	100A	CL09	48.3	18	240	SED	100A
	62.1	65	480	PEXB	100A					PEXB	100A
				SEL						100A	
CL10	62.1	25	480	PEXN	100A	CL10	62.1	65	240	SEL	100A
	62.1	18	480	SEH	100A					PEXN	100A
				PEXC						100A	
CL11	62.1	18	480	PEXE	100A	CL11	62.1	18	240	SED	100A
	68.0	65	480	PEXB	100A					PEXC	100A
				SEL						100A	
CL12	68.0	25	480	PEXN	100A	CL12	68.0	65	240	SEL	100A
	68.0	18	480	SEH	100A					PEXN	100A
				PEXC						100A	
CL13	80.0	42	480	PEXE	100A	CL13	80.0	42	240	SED	100A
	80.0	25	480	PEXB	100A					PEXB	100A
				SEL						100A	
CL14	80.0	18	480	PEXN	100A	CL14	80.0	18	240	PEXE	100A
	80.0	18	480	SEH	100A					SEL	100A
				PEXC						100A	
CL15	80.0	18	480	PEXE	100A	CL15	80.0	18	240	SED	100A
	104	42	480	PEXB	100A					PEXB	100A
				SEL						100A	
CL16	104	25	480	PEXN	100A	CL16	104	42	240	SEL	100A
	104	25	480	SEH	100A					PEXE	100A
				PEXC						100A	
CL17	104	18	480	PEXE	100A	CL17	104	18	240	SED	100A
	104	18	480	PEXB	100A					PEXB	100A
				SEL						100A	



## High-Available Short Circuit Ratings Contactor with Breaker

### CL Series

Cat.No.	Max FLA	Short Circuit Current Rating		GE Circuit Breaker	
		kA	Volts Max.	Model	Max. Size
CL00	11.0	65	120 1ph	TEY	20A
CL01	11.0	65	120 1ph	TEY	20A
CL02	17.5	65	120 1ph	TEY	20A

### CK Series

Cat.No.	Max FLA	Short Circuit Current Rating		GE Circuit Breaker	
		kA	Volts Max.	Model	Max. Size
CK75C	130	65	480	SFL	150 A
				PEXN	
	130	25	480	SFH	150 A
				PEXC	
CK08C	156	65	480	SFL	150 A
				PEXN	
	156	25	480	SFH	150 A
				PEXC	
CK08B	156	65	480	SGL	600A
				SGH	
	156	35	480	SGH	600A
				SGE	
CK09B	192	65	480	SGL	600A
				PGxN	
	192	35	480	PGxH	600A
				SGH	
CK95B	302	65	480	SGL	600A
				PGxN	
	302	35	480	SGH	600A
				PGxE	
CK10C	382	65	480	SGL	600 A
				PGxN	
	382	35	480	SGH	600 A
				PGxE	
CK11C	480	65	480	SGL	600 A
				PGxN	
	480	35	480	SGH	600 A
				PGxE	

# High-Available Short Circuit Ratings Contactor with Breaker

## Efficor Series

Cat.No.	Max FLA	Short Circuit Current Rating		GE Circuit Breaker		Cat.No.	Max FLA	Short Circuit Current Rating		GE Circuit Breaker		
		kA	Volts Max.	Model	Max. Size			kA	Volts Max.	Model	Max. Size	
EC09	9.6	30	480	SEL PEXN PEXE	35A	EC09	9.6	30	240	SEL SEH PEXN PEXE PEXC	35A	
		25	480	SEH PEXC SED PEXB	35A			9.6	18	240	SED	35A
		18	480	SEL PEXN PEXE	40A						EC12	11
25	480	SEH PEXC SED	40A	11	18	240	SED	40A				
18	480	PEXB SEL PEXN PEXE SEH	60A				EC18	17.5	30	480		
25	480	PEXC SED	60A	17.5	18	240					SED	60A
18	480	SEL PEXN PEXE SEH	60A								EC25	25.3
25	480	SEH PEXC SED PEXB	100A	25.3	18	240	SED	100A				
18	480	SEL PEXN PEXE SEH	110A				EC32	32.2	30	480		
25	480	SEH PEXC SED	110A	32.2	18	240					SED	110A
18	480	SEL PEXN PEXE SEH	125A								EC40	34
25	480	SEH PEXC SED	125A	34	18	240	SED	125A				
18	480	SEL PEXN PEXE SEH	100A				EF40	42.0	65	480		
25	480	SEH PEXC SED PEXB	100A	42.0	18	240					SED	100A
18	480	SEL PEXN PEXE SEH	100A								EF50	48.3
25	480	SEH PEXC SED PEXB	100A	48.3	18	240	SED	100A				
18	480	SEL PEXN PEXE SEH	100A				EF65	62.1	65	480		
25	480	SEH PEXC SED PEXB	100A	62.1	18	240					SED	100A
18	480	SEL PEXN PEXE SEH	100A								EF80	68.0
25	480	SEH PEXC SED PEXB	100A	68.0	18	240	SED	100A				
18	480	SEL PEXN PEXE SEH	150A				EF95	80.0	42	480		
25	480	SEH PEXC SED PEXB	150A	80.0	18	240					SED	150A
18	480	SEL PEXN PEXE SEH	150A								EF105	104
25	480	SEH PEXC SED PEXB	150A	104	18	240	SED	150A				
18	480	SEL PEXN PEXE SEH	150A				EF105	104	42	480		
25	480	SEH PEXC SED PEXB	150A	104	18	240					SED	150A
18	480	SEL PEXN PEXE SEH	150A									



## High-Available Short Circuit Ratings Contactor with Fuses and Overload Relay

### MT Thermal Overload Relays with M Contactors

MOTOR FLA		Overload Relay	Max Short Circuit Rating		Maximum Fuse Size Class J (A)	
Min	Max <sup>(1)</sup>		RMS Sym (kA)	Volts	MC1	MC2
0.12	0.17	MT03A	50	600	1	1
0.17	0.26	MT03B	50	600	1	1
0.26	0.43	MT03C	50	600	1	1
0.43	0.65	MT03D	50	600	1	1
0.65	1	MT03E	50	600	3	3
0.85	1.3	MT03F	50	600	3	3
1.1	1.6	MT03G	50	600	6	6
1.35	2	MT03H	50	600	6	6
1.7	2.4	MT03I	50	600	6	6
2.2	3.2	MT03J	50	600	10	10
2.5	4	MT03R	50	600	10	10
3	4.7	MT03K	50	600	15	15
4	6.3	MT03L	50	600	20	20
5.5	8	MT03M	50	600	30	30
7.5	10.5	MT03N	50	600	40	40
10	14	MT03P	50	600	50	50

(1) Do not exceed contactor current rating when selecting and adjusting overload relays.  
For separate mount use adapter MVB0T.

### RT Thermal Overload Relays with CL Contactors

MOTOR FLA		Overload Relay	Max Short Circuit Rating	Maximum Fuse Size Class J (A)											
Min	Max <sup>(1)</sup>			RMS Sym (kA)	Volts	CL00	CL01	CL02	CL03	CL04	CL05	CL06	CL07	CL08	CL09
0.16	0.26	RT1B	100	600	1	1	1	1	1	1	-	-	-	-	-
0.25	0.41	RT1C	100	600	1	1	1	1	1	1	-	-	-	-	-
0.4	0.65	RT1D	100	600	1	1	1	1	1	1	-	-	-	-	-
0.65	1.1	RT1F	100	600	3	3	3	3	3	3	-	-	-	-	-
1	1.5	RT1G	100	600	6	6	6	6	6	6	-	-	-	-	-
1.3	1.9	RT1H	100	600	6	6	6	6	6	6	-	-	-	-	-
1.8	2.7	RT1J	100	600	10	10	10	10	10	10	-	-	-	-	-
2.5	4.1	RT1K	100	600	15	15	15	15	15	15	-	-	-	-	-
4	6.3	RT1L	100	600	25	25	25	25	25	25	-	-	-	-	-
5.5	8.5	RT1M	100	600	30	30	30	30	30	30	-	-	-	-	-
8	12	RT1N	100	600	40	40	45	45	45	45	-	-	-	-	-
10	16	RT1P	100	600	-	-	40	45	60	60	-	-	-	-	-
14.5	18	RT1S	100	600	-	-	-	45	70	70	-	-	-	-	-
17.5	22	RT1T	100	600	-	-	-	-	70	70	-	-	-	-	-
21	26	RT1U	100	600	-	-	-	-	70	70	-	-	-	-	-
25	32	RT1V	100	600	-	-	-	-	70	70	-	-	-	-	-
30	40	RT1W	100	600	-	-	-	-	-	70	-	-	-	-	-
11.5	15	RT2A	100	600	-	-	-	-	-	-	60	60	60	60	60
14.5	19	RT2B	100	600	-	-	-	-	-	-	70	70	70	70	70
18.5	25	RT2C	100	600	-	-	-	-	-	-	100	100	100	100	100
24	32	RT2D	100	600	-	-	-	-	-	-	125	125	125	125	125
30	43	RT2E	100	600	-	-	-	-	-	-	125	125	125	150	150
42	55	RT2G	100	600	-	-	-	-	-	-	-	125	125	200	200
54	65	RT2H	100	600	-	-	-	-	-	-	-	-	125	200	200
64	82	RT2J	100	600	-	-	-	-	-	-	-	-	-	200	200
78	97	RT2L	100	600	-	-	-	-	-	-	-	-	-	-	200
90	110	RT2M	100	600	-	-	-	-	-	-	-	-	-	-	200

(1) Do not exceed contactor current rating when selecting and adjusting overload relays.  
For separate mount use base adapter RT1XP or RT2XP.

### RE Electronic Overload Relays with Efficor Contactors

MOTOR FLA		Overload Relay	Max Short Circuit Rating	Maximum Fuse Size Class J (A)												
Min	Max <sup>(1)</sup>			RMS Sym (kA)	Volts	CL00	CL01	CL02	CL03	CL04	CL05	CL06	CL07	CL08	CL09	CL10
0.1	0.5	RE1D	100	600	1	1	1	1	1	1	-	-	-	-	-	-
0.4	0.2	RE1H	100	600	6	6	6	6	6	6	-	-	-	-	-	-
1	5	RE1K	100	600	20	20	20	20	20	20	-	-	-	-	-	-
1.6	8	RE1M	100	600	30	30	30	30	30	30	-	-	-	-	-	-
6.4	32	RE1S	100	600	40	40	40	45	70	70	-	-	-	-	-	-
9	45	RE1W	100	600	-	-	45	45	70	70	-	-	-	-	-	-
15	75	RE2H	100	600	-	-	-	-	-	-	125	125	125	125	125	-
22	110	RE2M	100	600	-	-	-	-	-	-	125	125	125	150	150	-
30	150	RE3E	100	600	-	-	-	-	-	-	-	-	-	-	-	300

(1) Do not exceed contactor current rating when selecting and adjusting overload relays.  
For separate mount use base adapter RE1XP or RE2XP.



## High-Available Short Circuit Ratings Contactor with Fuses and Overload Relay

### RT Thermal Overload Relays with CK Contactors

MOTOR FLA		Overload Relay	Max Short Circuit Rating		Maximum Fuse Size Class J (A)					
Min	Max <sup>(1)</sup>		RMS Sym (kA)	Volts	CK75C	CK08C	CK09B	CK95B	CK10C	CK11C
55	80	RT3B	100	600	300	300	-	-	-	-
63	90	RT3C	100	600	300	300	-	-	-	-
90	120	RT3D	100	600	300	300	-	-	-	-
110	140	RT3E	100	600	300	300	-	-	-	-
140	190	RT3F	100	600	-	300	-	-	-	-
120	190	RT4N	100	600	-	-	450	450	-	-
175	280	RT4P	100	600	-	-	450	450	-	-
200	310	RT4R	100	600	-	-	-	450	-	-
120	190	RT5A	100	600	-	-	-	-	600	600
175	280	RT5B	100	600	-	-	-	-	600	600
250	400	RT5C	100	600	-	-	-	-	600	600
315	500	RT5D	100	600	-	-	-	-	600	600
430	700	RT5E	100	600	-	-	-	-	-	600
63	90	RT32C	100	600	300	300	-	-	-	-
90	120	RT32D	100	600	300	300	-	-	-	-
110	140	RT32E	100	600	300	300	-	-	-	-
140	190	RT32F	100	600	-	300	-	-	-	-
120	190	RT4LN	100	600	-	-	450	450	-	-
175	280	RT4LP	100	600	-	-	450	450	-	-
200	310	RT4LR	100	600	-	-	-	450	-	-
120	190	RT5LA	100	600	-	-	-	-	600	600
175	280	RT5LB	100	600	-	-	-	-	600	600
250	400	RT5LC	100	600	-	-	-	-	600	600
315	500	RT5LD	100	600	-	-	-	-	600	600
430	700	RT5LE	100	600	-	-	-	-	-	600

(1) Do not exceed contactor current rating when selecting and adjusting overload relays.  
RT4\* and RT5\* Overload Relays are separate mount

### ECRT and RT Thermal Overload Relays with Effcor Contactors

MOTOR FLA		Overload Relay	Max Short Circuit Rating		Maximum Fuse Size Class J (A)										
Min	Max <sup>(1)</sup>		RMS Sym (kA)	Volts	EC09	EC12	EC18	EC25	EC32	EC40	EF50	EF65	EF80	EF95	EF105
0.16	0.26	ECRT1B10B	100	600	1	1	1	-	-	-	-	-	-	-	-
0.25	0.41	ECRT1B10C	100	600	1	1	1	-	-	-	-	-	-	-	-
0.4	0.65	ECRT1B10D	100	600	1	1	1	-	-	-	-	-	-	-	-
0.65	1.1	ECRT1B10F	100	600	3	3	3	-	-	-	-	-	-	-	-
1	1.5	ECRT1B10G	100	600	6	6	6	-	-	-	-	-	-	-	-
1.3	1.9	ECRT1B10H	100	600	6	6	6	-	-	-	-	-	-	-	-
1.8	2.7	ECRT1B10J	100	600	10	10	10	-	-	-	-	-	-	-	-
2.5	4.1	ECRT1B10K	100	600	15	15	15	-	-	-	-	-	-	-	-
4	6.3	ECRT1B10L	100	600	25	25	25	-	-	-	-	-	-	-	-
5.5	8.5	ECRT1B10M	100	600	30	30	30	-	-	-	-	-	-	-	-
8	12	ECRT1B10N	100	600	35	40	40	-	-	-	-	-	-	-	-
10	16	ECRT1B10P	100	600	-	-	40	-	-	-	-	-	-	-	-
14.5	18	ECRT1B10S	100	600	-	-	40	-	-	-	-	-	-	-	-
8	12	ECRT2B10N	100	600	-	-	-	45	45	45	-	-	-	-	-
10	16	ECRT2B10P	100	600	-	-	-	45	60	60	-	-	-	-	-
14.5	18	ECRT2B10S	100	600	-	-	-	70	70	70	-	-	-	-	-
17.5	22	ECRT2B10T	100	600	-	-	-	-	70	70	-	-	-	-	-
21	26	ECRT2B10U	100	600	-	-	-	-	70	70	-	-	-	-	-
25	32	ECRT2B10V	100	600	-	-	-	-	70	70	-	-	-	-	-
30	40	ECRT2B10W	100	600	-	-	-	-	70	70	-	-	-	-	-
11.5	15	RT2A	100	600	-	-	-	-	-	60	60	60	60	60	60
14.5	19	RT2B	100	600	-	-	-	-	-	70	70	70	70	70	70
18.5	25	RT2C	100	600	-	-	-	-	-	100	100	100	100	100	100
24	32	RT2D	100	600	-	-	-	-	-	125	125	125	125	125	125
30	43	RT2E	100	600	-	-	-	-	-	125	125	125	150	150	150
42	55	RT2G	100	600	-	-	-	-	-	-	125	125	200	200	200
54	65	RT2H	100	600	-	-	-	-	-	-	-	125	200	200	200
64	82	RT2J	100	600	-	-	-	-	-	-	-	-	200	200	200
78	97	RT2L	100	600	-	-	-	-	-	-	-	-	-	200	200
90	110	RT2M	100	600	-	-	-	-	-	-	-	-	-	200	200

(1) Do not exceed contactor current rating when selecting and adjusting overload relays.  
For separate mount use base adapter ECRT1BS, ECRT2BS or RT2XP.

### RE Electronic Overload Relays with Effcor Contactors

MOTOR FLA		Overload Relay	Max Short Circuit Rating		Maximum Fuse Size Class J (A)										
Min	Max <sup>(1)</sup>		RMS Sym (kA)	Volts	EC09	EC12	EC18	EC25	EC32	EC40	EF50	EF65	EF80	EF95	EF105
0.1	0.5	RE1D	100	600	1	1	1	1	1	1	-	-	-	-	-
0.4	0.2	RE1H	100	600	6	6	6	6	6	6	-	-	-	-	-
1	5	RE1K	100	600	20	20	20	20	20	20	-	-	-	-	-
1.6	8	RE1M	100	600	30	30	30	30	30	30	-	-	-	-	-
6.4	32	RE1S	100	600	35	40	40	45	70	70	-	-	-	-	-
9	45	RE1W	100	600	-	-	40	45	70	70	-	-	-	-	-
15	75	RE2H	100	600	-	-	-	-	-	-	125	125	125	125	125
22	110	RE2M	100	600	-	-	-	-	-	-	125	125	125	150	150

(1) Do not exceed contactor current rating when selecting and adjusting overload relays.  
For separate mount use base adapter RE1XP or RE2XP.



## High-Available Short Circuit Ratings Contactor with Breaker and Thermal Overload

### CL Series

Cat.No.	Max FLA	O/L Relay	Short Circuit Current Rating		GE Circuit Breaker	
			kA	Volts Max.	Model	Max. Size
CL03*4*	25.3	RT1, RT12	42	480	SEL	100A
					PEXN	
	25.3	RT1, RT12	25	480	SEH	100A
					PEXC	
25.3	RT1, RT12	18	480	SED	100A	
				PEXB		
CL04	32.2	RT1, RT12	42	480	SEL	100A
					PEXN	
					SEH	
	32.2	RT1, RT12	25	480	PEXC	100A
					PEXE	
					SED	
32.2	RT1, RT12	18	480	PEXB	100A	
				SED		
				PEXB		
CL05*3*	34.0	RT1, RT12	42	480	SEL	100A
					PEXN	
	34.0	RT1, RT12	25	480	SEH	100A
					PEXC	
34.0	RT1, RT12	18	480	SED	100A	
				PEXB		
CL05*4*	42.0	RT2, RT22	65	480	SEL	100A
					PEXN	
	42.0	RT2, RT22	25	480	SEH	100A
					PEXC	
42.0	RT2, RT22	18	480	SED	100A	
				PEXB		
CL06	48.3	RT2, RT22	65	480	SEL	100A
					PEXN	
	48.3	RT2, RT22	25	480	SEH	100A
					PEXC	
48.3	RT2, RT22	18	480	SED	100A	
				PEXB		
CL07	62.1	RT2, RT22	65	480	SEL	100A
					PEXN	
	62.1	RT2, RT22	25	480	SEH	100A
					PEXC	
62.1	RT2, RT22	18	480	SED	100A	
				PEXB		
CL08	68.0	RT2, RT22	65	480	SEL	100A
					PEXN	
	68.0	RT2, RT22	25	480	SEH	100A
					PEXC	
68.0	RT2, RT22	18	480	SED	100A	
				PEXB		
CL09	80.0	RT2, RT22	65	480	SEL	150A
					PEXN	
	80.0	RT2, RT22	25	480	SEH	150A
					PEXC	
80.0	RT2, RT22	18	480	SED	150A	
				PEXB		
CL10	104	RT2, RT22	65	480	SEL	150A
					PEXN	
	104	RT2, RT22	25	480	SEH	150A
					PEXC	
104	RT2, RT22	18	480	SED	150A	
				PEXB		

Cat.No.	Max FLA	O/L Relay	Short Circuit Current Rating		GE Circuit Breaker	
			kA	Volts Max.	Model	Max. Size
CL03*4*	25.3	RT1, RT12	42	240	SEL	100A
					PEXE	
	25.3	RT1, RT12	42	240	PEXN	100A
					SEH	
25.3	RT1, RT12	18	240	PEXC	100A	
				SED		
CL04	32.2	RT1, RT12	42	240	SEL	100A
					PEXE	
					PEXN	
	32.2	RT1, RT12	42	240	SEH	100A
					PEXC	
					SED	
32.2	RT1, RT12	18	240	PEXB	100A	
				SED		
				PEXB		
CL05*3*	34.0	RT1, RT12	42	240	SEL	100A
					PEXE	
	34.0	RT1, RT12	42	240	PEXN	100A
					SEH	
34.0	RT1, RT12	18	240	PEXC	100A	
				SED		
CL05*4*	42.0	RT2, RT22	65	240	SEL	100A
					PEXN	
	42.0	RT2, RT22	65	240	SEH	100A
					PEXC	
42.0	RT2, RT22	18	240	SED	100A	
				PEXB		
CL06	48.3	RT2, RT22	65	240	SEL	100A
					PEXN	
	48.3	RT2, RT22	65	240	SEH	100A
					PEXE	
48.3	RT2, RT22	18	240	SED	100A	
				PEXB		
CL07	62.1	RT2, RT22	65	240	SEL	100A
					PEXN	
	62.1	RT2, RT22	65	240	SEH	100A
					PEXC	
62.1	RT2, RT22	18	240	SED	100A	
				PEXB		
CL08	68.0	RT2, RT22	65	240	SEL	100A
					PEXN	
	68.0	RT2, RT22	65	240	SEH	100A
					PEXE	
68.0	RT2, RT22	18	240	SED	100A	
				PEXB		
CL09	80.0	RT2, RT22	65	240	SEL	150A
					PEXN	
	80.0	RT2, RT22	65	240	SEH	150A
					PEXC	
80.0	RT2, RT22	18	240	SED	150A	
				PEXB		
CL10	104	RT2, RT22	65	240	SEL	150A
					PEXN	
	104	RT2, RT22	65	240	SEH	150A
					PEXE	
104	RT2, RT22	18	240	SED	150A	
				PEXB		

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## High-Available Short Circuit Ratings Contactor with Breaker and Thermal Overload

### CK Series

Cat.No.	Max FLA	O/L Relay	Short Circuit Current Rating		GE Circuit Breaker	
			kA	Volts Max.	Model	Max. Size
CK75C	130	RT3P, RT32P	65	480	SFL	250 A
					PExN	
CK75C	130	RT3P, RT32P	25	480	SFH	250 A
					PExC	
					PExE	
CK08C	156	RT3P, RT32P	65	480	SFL	250 A
					PExN	
					SFH	
CK08C	156	RT3P, RT32P	25	480	PExC	250 A
					PExE	
					SGL	
CK10C	382	RT5, RT5L	65	480	PGxN	600A
					PGxH	
					SGH	
CK10C	382	RT5, RT5L	35	480	PGxE	600A
					SGL	
					SGH	
CK11C	480	RT5, RT5L	65	480	PGxN	600A
					PGxH	
					SGH	
CK11C	480	RT5, RT5L	35	480	PGxE	600A
					SGH	

## High-Available Short Circuit Ratings Contactor with Breaker and Thermal Overload

### Effcor Series

Cat.No.	Max FLA	O/L Relay	Short Circuit Current Rating		GE Circuit Breaker	
			kA	Volts Max.	Model	Max. Size
EC09	9.6	ECRT1	30	480	SEL PEXN PEXE	40A
	9.6	ECRT1	25	480	SEH PEXC	40A
	9.6	ECRT1	18	480	SED PEXB	40A
EC12	11	ECRT1	30	480	SEL PEXN PEXE	40A
	11	ECRT1	25	480	SEH PEXC	40A
	11	ECRT1	18	480	SED PEXB	40A
EC18	17.5	ECRT1	30	480	SEL PEXN PEXE	70A
	17.5	ECRT1	25	480	SEH PEXC	70A
	17.5	ECRT1	18	480	SED PEXB	70A
EC25	25.3	ECRT2	30	480	SEL PEXN PEXE	100A
	25.3	ECRT2	25	480	SEH PEXC	100A
	25.3	ECRT2	18	480	SED PEXB	100A
EC32	32.2	ECRT2	42	480	SEL PEXN	100A
	32.2	ECRT2	35	480	PEXE SEH PEXC	100A
	32.2	ECRT2	18	480	SED PEXB	100A
EC40	34	ECRT2	42	480	SEL PEXN	100A
	34	ECRT2	35	480	PEXE SEH PEXC	100A
	34	ECRT2	18	480	SED PEXB	100A
EF40	42.0	RT2, RT22	65	480	SEL PEXN SEH PEXC	100A
	42.0	RT2, RT22	25	480	PEXE SED PEXB	100A
	42.0	RT2, RT22	18	480	SEL PEXN SEH PEXC	100A
EF50	48.3	RT2, RT22	65	480	SEH PEXC PEXE	100A
	48.3	RT2, RT22	25	480	SED PEXB	100A
	48.3	RT2, RT22	18	480	SEL PEXN SEH PEXC	100A
EF65	62.1	RT2, RT22	65	480	SEH PEXC PEXE	100A
	62.1	RT2, RT22	25	480	SED PEXB	100A
	62.1	RT2, RT22	18	480	SEL PEXN SEH PEXC	100A
EF80	68.0	RT2, RT22	65	480	SEL PEXN SEH PEXC	100A
	68.0	RT2, RT22	25	480	PEXE SED PEXB	100A
	68.0	RT2, RT22	18	480	SEL PEXN SEH PEXC	100A
EF95	80.0	RT2, RT22	65	480	SEL PEXN SEH PEXC	150A
	80.0	RT2, RT22	25	480	PEXE SED PEXB	150A
	80.0	RT2, RT22	18	480	SEL PEXN SEH PEXC	150A
EF105	104	RT2, RT22	65	480	SEL PEXN SEH PEXC	150A
	104	RT2, RT22	25	480	PEXE SED PEXB	150A
	104	RT2, RT22	18	480	SEL PEXN SEH PEXC	150A

Cat.No.	Max FLA	O/L Relay	Short Circuit Current Rating		GE Circuit Breaker	
			kA	Volts Max.	Model	Max. Size
EC09	9.6	ECRT1	30	240	SEL SEH PEXN PEXE PEXC	40A
			18	240	PEXB SED SEL	
EC12	11	ECRT1	30	240	SEL PEXN PEXE	40A
			25	240	SEH PEXC	
			18	240	SED PEXB	
EC18	17.5	ECRT1	30	240	SEL PEXN PEXE	70A
			25	240	SEH PEXC	
			18	240	SED PEXB	
EC25	25.3	ECRT2	30	240	SEL SEH PEXN PEXE PEXC	100A
			25	240	PEXB SED	
			18	240	SEL SEH PEXN PEXE PEXC	
EC32	32.2	ECRT2	42	240	SEL SEH PEXN PEXE PEXC	100A
			35	240	PEXB SED	
			18	240	SEL SEH PEXN PEXE PEXC	
EC40	34	ECRT2	42	240	SEL SEH PEXN PEXE PEXC	100A
			35	240	PEXB SED	
			18	240	SEL SEH PEXN PEXE PEXC	
EF40	42.0	RT2, RT22	65	240	SEL PEXN SEH PEXC	100A
			65	240	PEXE SED	
			18	240	SEL PEXN SEH PEXC	
EF50	48.3	RT2, RT22	65	240	SEL SEH PEXN PEXE PEXC	100A
			65	240	PEXB SED	
			18	240	SEL PEXN SEH PEXC	
EF65	62.1	RT2, RT22	65	240	SEL SEH PEXN PEXE PEXC	100A
			65	240	PEXB SED	
			18	240	SEL PEXN SEH PEXC	
EF80	68.0	RT2, RT22	65	240	SEL PEXN SEH PEXC	100A
			65	240	PEXE SED	
			18	240	SEL PEXN SEH PEXC	
EF95	80.0	RT2, RT22	65	240	SEL PEXN SEH PEXC	150A
			65	240	PEXE SED	
			18	240	SEL PEXN SEH PEXC	
EF105	104	RT2, RT22	65	240	SEL PEXN SEH PEXC	150A
			65	240	PEXE SED	
			18	240	SEL PEXN SEH PEXC	







### Combination Motor Controllers

### Surion Manual Motor Controller

Construction Type	Max. Motor HP Rating				Max. Motor FLA				SCCR (kA)		Manual Motor Controller		GE Cat. No. Component List						
	240V	480V/277V	200V	208V	230V	460V	200V	208V	230V	460V	240 V	480V/277 V	GE Cat. No.	Motor Current Adjust Range		Contactor	Feed-in Terminals	SC Alarm	Link Module
													Min. (A)	Max. (A)					
F	-	-	-	-	-	0.16	0.16	0.16	0.16	-	50	GPS1BHAA	0.1	0.16	-	-	-	-	-
F	-	-	-	-	-	0.25	0.25	0.25	0.25	-	50	GPS1BHAB	0.16	0.25	-	-	-	-	-
F	-	-	-	-	-	0.4	0.4	0.4	0.4	-	50	GPS1BHAC	0.25	0.4	-	-	-	-	-
F	-	-	-	-	-	0.63	0.63	0.63	0.63	-	50	GPS1BHAD	0.4	0.63	-	-	-	-	-
F	-	-	-	0.5	1	1	1	1	1.1	-	50	GPS1BHA	0.63	1	-	-	-	-	-
F	0.25	0.25	0.33	0.75	1.6	1.6	1.6	1.6	1.6	-	50	GPS1BHAF	1	1.6	-	-	-	-	-
F	0.5	0.5	0.5	1	2.5	2.4	2.2	2.1	2.1	-	50	GPS1BHAG	1.6	2.5	-	-	-	-	-
F	0.75	0.75	0.75	2	3.7	3.5	3.2	3.4	3.4	-	50	GPS1BHAH	2.5	4	-	-	-	-	-
F	1	1	1.5	3	4.8	4.6	6	4.8	4.8	-	50	GPS1BHAJ	4	6.3	-	GPAPT1E	GPAE11LLA	-	-
F	2	2	3	5	7.8	7.5	9.6	7.6	7.6	-	50	GPS1BHAK	6.3	10	-	-	-	-	-
F	3	3	3	5	11	10.6	9.6	11	11	-	50	GPS1BHAL	9	13	-	-	-	-	-
F	3	3	3	5	11	10.6	9.6	11	11	-	50	GPS1BHAM	11	16	-	-	-	-	-
F	3	3	3	5	11	10.6	9.6	11	11	-	50	GPS1BHAN	14	20	-	-	-	-	-
F	3	3	3	5	11	10.6	9.6	11	11	-	50	GPS1BHAP	19	25	-	-	-	-	-
F	3	3	3	5	11	10.6	9.6	11	11	-	50	GPS1BHAR	24	32	-	-	-	-	-
F	5	5	5	10	17.5	16.7	15.2	14	14	-	50	GPS1BHAM	14	20	-	-	-	-	-
F	5	5	5	10	17.5	16.7	15.2	14	14	-	50	GPS1BHAN	14	20	-	-	-	-	-
F	5	5	5	10	17.5	16.7	15.2	14	14	-	50	GPS1BHAP	19	25	-	-	-	-	-
F	5	5	5	10	17.5	16.7	15.2	14	14	-	50	GPS1BHAR	24	32	-	-	-	-	-
F	7.5	7.5	7.5	15	25.3	24.2	22	21	21	-	50	GPS1BHAM	14	20	-	-	-	-	-
F	10	10	10	20	32.2	30.8	28	27	27	-	50	GPS1BHAP	19	25	-	-	-	-	-
F	10	10	10	20	32.2	30.8	28	27	27	-	50	GPS1BHAR	24	32	-	-	-	-	-
F	15	15	15	30	48.3	46.2	42	40	40	-	50	GPS1BHM	11	16	-	-	-	-	-
F	15	15	15	30	48.3	46.2	42	40	40	-	50	GPS1BHN	14	20	-	-	-	-	-
F	15	15	15	30	48.3	46.2	42	40	40	-	50	GPS1BHP	19	25	-	-	-	-	-
F	15	15	15	30	48.3	46.2	42	40	40	-	50	GPS1BHR	24	32	-	-	-	-	-
F	15	15	15	30	48.3	46.2	42	40	40	-	50	GPS1BHS	28	40	-	-	-	-	-
F	15	15	15	30	48.3	46.2	42	40	40	-	50	GPS1BHT	35	50	-	-	-	-	-
F	15	15	20	40	48.3	46.2	54	52	52	-	50	GPS1BHU	45	63	-	-	-	-	-

UL Applications

### Surion Combination with Contactor M series

Construction Type	Max. Motor HP Rating				Max. Motor FLA				SCCR (kA)		Manual Motor Controller		GE Cat. No. Component List							
	240V	480V/277V	200V	208V	230V	460V	200V	208V	230V	460V	240 V	480V/277 V	GE Cat. No.	Motor Current Adjust Range		Contactor	Feed-in Terminals	SC Alarm	Link Module	Base Plate
													Min. (A)	Max. (A)						
F	-	-	-	-	-	0.16	0.16	0.16	0.16	-	50	GPS1BHAA	0.1	0.16	-	-	-	-	-	
F	-	-	-	-	-	0.25	0.25	0.25	0.25	-	50	GPS1BHAB	0.16	0.25	-	-	-	-	-	
F	-	-	-	-	-	0.4	0.4	0.4	0.4	-	50	GPS1BHAC	0.25	0.4	-	-	-	-	-	
F	-	-	-	-	-	0.63	0.63	0.63	0.63	-	50	GPS1BHAD	0.4	0.63	-	-	-	-	-	
F	-	-	-	0.5	1	1	1	1	1.1	-	50	GPS1BHA	0.63	1	-	-	-	-	-	
F	0.25	0.25	0.33	0.75	1.6	1.6	1.6	1.6	1.6	-	50	GPS1BHAF	1	1.6	-	-	-	-	-	
F	0.5	0.5	0.5	1	2.5	2.4	2.2	2.1	2.1	-	50	GPS1BHAG	1.6	2.5	-	-	-	-	-	
F	0.75	0.75	0.75	2	3.7	3.5	3.2	3.4	3.4	-	50	GPS1BHAH	2.5	4	-	-	-	-	-	
F	1	1	1.5	3	4.8	4.6	6	4.8	4.8	-	50	GPS1BHAJ	4	6.3	-	MC1[*] 310AT[**]	GPAPT1E	GPAE11LLA	GPF1LMCBA	-
F	2	2	3	5	7.8	7.5	9.6	7.6	7.6	-	50	GPS1BHAK	6.3	10	-	-	-	-	-	
F	3	3	3	5	11	10.6	9.6	11	11	-	50	GPS1BHAL	9	13	-	-	-	-	-	
F	3	3	3	5	11	10.6	9.6	11	11	-	50	GPS1BHAM	11	16	-	-	-	-	-	
F	3	3	3	5	11	10.6	9.6	11	11	-	50	GPS1BHAN	14	20	-	-	-	-	-	
F	3	3	3	5	11	10.6	9.6	11	11	-	50	GPS1BHAP	19	25	-	-	-	-	-	
F	3	3	3	5	11	10.6	9.6	11	11	-	50	GPS1BHAR	24	32	-	-	-	-	-	

### Surion GPS1 Combination with Contactor CL series

Construction Type	Max. Motor HP Rating				Max. Motor FLA				SCCR (kA)		Manual Motor Controller		GE Cat. No. Component List							
	240V	480V/277V	200V	208V	230V	460V	200V	208V	230V	460V	240 V	480V/277 V	GE Cat. No.	Motor Current Adjust Range		Contactor	Feed-in Terminals	SC Alarm	Link Module	Base Plate
													Min. (A)	Max. (A)						
F	-	-	-	-	-	0.16	0.16	0.16	0.16	-	50	GPS1BHAA	0.1	0.16	-	-	-	-	-	
F	-	-	-	-	-	0.25	0.25	0.25	0.25	-	50	GPS1BHAB	0.16	0.25	-	-	-	-	-	
F	-	-	-	-	-	0.4	0.4	0.4	0.4	-	50	GPS1BHAC	0.25	0.4	-	-	-	-	-	
F	-	-	-	-	-	0.63	0.63	0.63	0.63	-	50	GPS1BHAD	0.4	0.63	-	-	-	-	-	
F	-	-	-	0.5	1	1	1	1	1.1	-	50	GPS1BHA	0.63	1	-	-	-	-	-	
F	0.25	0.25	0.33	0.75	1.6	1.6	1.6	1.6	1.6	-	50	GPS1BHAF	1	1.6	-	-	-	-	-	
F	0.5	0.5	0.5	1	2.5	2.4	2.2	2.1	2.1	-	50	GPS1BHAG	1.6	2.5	-	-	-	-	-	
F	0.75	0.75	0.75	2	3.7	3.5	3.2	3.4	3.4	-	50	GPS1BHAH	2.5	4	-	-	-	-	-	
F	1	1	1.5	3	4.8	4.6	6	4.8	4.8	-	50	GPS1BHAJ	4	6.3	-	CL00[*] 310T[**]	GPAPT1E	GPAE11LLA	GPF1L02AA	GPF1B1A
F	2	2	3	5	7.8	7.5	9.6	7.6	7.6	-	50	GPS1BHAK	6.3	10	-	-	-	-	-	
F	3	3	3	5	11	10.6	9.6	11	11	-	50	GPS1BHAL	9	13	-	-	-	-	-	
F	3	3	3	5	11	10.6	9.6	11	11	-	50	GPS1BHAM	11	16	-	-	-	-	-	
F	3	3	3	5	11	10.6	9.6	11	11	-	50	GPS1BHAN	14	20	-	-	-	-	-	
F	3	3	3	5	11	10.6	9.6	11	11	-	50	GPS1BHAP	19	25	-	-	-	-	-	
F	3	3	3	5	11	10.6	9.6	11	11	-	50	GPS1BHAR	24	32	-	-	-	-	-	
F	5	5	5	10	17.5	16.7	15.2	14	14	-	50	GPS1BHAM	14	20	-	-	-	-	-	
F	5	5	5	10	17.5	16.7	15.2	14	14	-	50	GPS1BHAN	14	20	-	-	-	-	-	
F	5	5	5	10	17.5	16.7	15.2	14	14	-	50	GPS1BHAP	19	25	-	-	-	-	-	
F	5	5	5	10	17.5	16.7	15.2	14	14	-	50	GPS1BHAR	24	32	-	-	-	-	-	
F	-	-	-	-	-	0.16	0.16	0.16	0.16	-	50	GPS1BHAA	0.1	0.16	-	-	-	-	-	
F	-	-	-	-	-	0.25	0.25	0.25	0.25	-	50	GPS1BHAB	0.16	0.25	-	-	-	-	-	
F	-	-	-	-	-	0.4	0.4	0.4	0.4	-	50	GPS1BHAC	0.25	0.4	-	-	-	-	-	
F	-	-	-	-	-	0.63	0.63	0.63	0.63	-	50	GPS1BHAD	0.4	0.63	-	-	-	-	-	
F	-	-	-	0.5	1	1	1	1	1.1	-	50	GPS1BHA	0.63	1	-	-	-	-	-	
F	0.25	0.25	0.33	0.75	1.6	1.6	1.6	1.6	1.6	-	50	GPS1BHAF	1	1.6	-	-	-	-	-	
F	0.5	0.5	0.5	1	2.5	2.4	2.2	2.1	2.1	-	50	GPS1BHAG	1.6	2.5	-	-	-	-	-	
F	0.75	0.75	0.75	2	3.7	3.5	3.2	3.4	3.4	-	50	GPS1BHAH	2.5	4	-	-	-	-	-	
F	1	1	1.5	3	4.8	4.6	6	4.8	4.8	-	50	GPS1BHAJ	4	6.3	-	CL01[*] 310T[**]	GPAPT1E	GPAE11LLA	GPF1L02AA	GPF1B1A
F	2	2	3	5	7.8	7.5	9.6	7.6	7.6	-	50	GPS1BHAK	6.3	10	-	-	-	-	-	
F	3	3	3	5	11	10.6	9.6	11	11	-	50	GPS1BHAL	9	13	-	-	-	-	-	
F	3	3	3	5	11	10.6	9.6	11	11	-	50	GPS1BHAM	11	16	-	-	-	-	-	
F	3	3	3	5	11	10.6	9.6	11	11	-	50	GPS1BHAN	14	20	-	-	-	-	-	
F	3	3	3	5	11	10.6	9.6	11	11	-	50	GPS1BHAP	19	25	-	-	-	-	-	
F	3	3	3	5	11	10.6	9.6	11	11	-	50	GPS1BHAR	24	32	-	-	-	-	-	
F	5	5	5	1																

## Combination Motor Controllers

### Surion GPS1 Combination with Contactor CL series

Construction Type	Max. Motor HP Rating				Max. Motor FLA				SCCR (kA)		Manual Motor Controller			GE Cat. No. Component List						
											GE Cat. No.	Motor Current Adjust Range		Contactor	Feed-in Terminals	SC Alarm	Link Module	Base Plate		
												Min. (A)	Max. (A)							
240V	480V/277V	200V	208V	230V	460V	200V	208V	230V	460V	240 V	480V/277 V									
-	F	-	-	-	-	0.16	0.16	0.16	0.16	-	50	GPS1BHAA	0.1	0.16	CL03[*] 300T[**]	GPAPT1E	GPAE11LLA	GPF1L25AA	GPF1B1A	
-	F	-	-	-	-	0.25	0.25	0.25	0.25	-	50	GPS1BHAB	0.16	0.25						
-	F	-	-	-	-	0.4	0.4	0.4	0.4	-	50	GPS1BHAC	0.25	0.4						
-	F	-	-	-	-	0.63	0.63	0.63	0.63	-	50	GPS1BHAD	0.4	0.63						
-	F	-	-	-	0.5	1	1	1	1	11	-	50	GPS1BHA E	0.63						1
-	F	0.25	0.25	0.33	0.75	1.6	1.6	1.6	1.6	-	50	GPS1BHAF	1	1.6						
-	F	0.5	0.5	0.5	1	2.5	2.4	2.2	2.1	-	50	GPS1BHAG	1.6	2.5						
-	F	0.75	0.75	0.75	2	3.7	3.5	3.2	3.4	-	50	GPS1BHAH	2.5	4						
-	F	1	1	1.5	3	4.8	4.6	4.6	6	4.8	-	50	GPS1BHAJ	4						6.3
-	F	2	2	3	5	7.8	7.5	9.6	7.6	-	50	GPS1BHAK	6.3	10						
-	F	3	3	3	7.5	11	10.6	9.6	11	-	50	GPS1BHAL	9	13						
-	F	3	3	5	10	11	10.6	15.2	14	-	50	GPS1BHAM	11	16						
-	F	5	5	5	10	17.5	16.7	15.2	14	-	50	GPS1BHAN	14	20						
-	F	5	5	7.5	15	17.5	16.7	22	21	-	50	GPS1BHAP	19	25						
-	F	5	5	7.5	15	17.5	16.7	22	21	-	50	GPS1BHAR	24	32						
-	F	-	-	-	-	0.16	0.16	0.16	0.16	-	50	GPS1BHAA	0.1	0.16	CL04[*] 310M[**]	GPAPT1E	GPAE11LLA	GPF1L04AA	GPF1B4A	
-	F	-	-	-	-	0.25	0.25	0.25	0.25	-	50	GPS1BHAB	0.16	0.25						
-	F	-	-	-	-	0.4	0.4	0.4	0.4	-	50	GPS1BHAC	0.25	0.4						
-	F	-	-	-	-	0.63	0.63	0.63	0.63	-	50	GPS1BHAD	0.4	0.63						
-	F	-	-	-	0.5	1	1	1	1	11	-	50	GPS1BHA E	0.63						1
-	F	0.25	0.25	0.33	0.75	1.6	1.6	1.6	1.6	-	50	GPS1BHAF	1	1.6						
-	F	0.5	0.5	0.5	1	2.5	2.4	2.2	2.1	-	50	GPS1BHAG	1.6	2.5						
-	F	0.75	0.75	0.75	2	3.7	3.5	3.2	3.4	-	50	GPS1BHAH	2.5	4						
-	F	1	1	1.5	3	4.8	4.6	4.6	6	4.8	-	50	GPS1BHAJ	4						6.3
-	F	2	2	3	5	7.8	7.5	9.6	7.6	-	50	GPS1BHAK	6.3	10						
-	F	3	3	3	7.5	11	10.6	9.6	11	-	50	GPS1BHAL	9	13						
-	F	3	3	5	10	11	10.6	15.2	14	-	50	GPS1BHAM	11	16						
-	F	5	5	5	10	17.5	16.7	15.2	14	-	50	GPS1BHAN	14	20						
-	F	7.5	7.5	7.5	15	25.3	24.2	22	21	-	50	GPS1BHAP	19	25						
-	F	10	10	10	20	32.2	30.8	28	27	-	50	GPS1BHAR	24	32						

### Surion GPS2 Combination with Contactor CL series

Construction Type	Max. Motor HP Rating				Max. Motor FLA				SCCR (kA)		Manual Motor Controller			GE Cat. No. Component List					
											GE Cat. No.	Motor Current Adjust Range		Contactor	Feed-in Terminals	SC Alarm	Link Module	Base Plate	
												Min. (A)	Max. (A)						
240V	480V/277V	200V	208V	230V	460V	200V	208V	230V	460V	240 V	480V/277 V								
-	F	2	2	3	5	7.8	7.5	9.6	7.6	-	50	GPS2BHK	6.3	10	CL04[*] 310M[**]		GPAE11LLA	GPF2L04AA	GPF2B2A
-	F	3	3	3	7.5	11	10.6	9.6	11	-	50	GPS2BHL	9	13					
-	F	3	3	5	7.5	11	10.6	15.2	11	-	50	GPS2BHM	11	16					
-	F	5	5	5	10	17.5	16.7	15.2	14	-	50	GPS2BHN	14	20					
-	F	7.5	7.5	7.5	15	25.3	24.2	22	21	-	50	GPS2BHP	19	25					
-	F	10	10	10	20	32.2	30.8	28	27	-	50	GPS2BHR	24	32					
-	F	10	10	10	20	32.2	30.8	28	27	-	50	GPS2BHS	28	40					
-	F	10	10	10	20	32.2	30.8	28	27	-	50	GPS2BHT	35	50					
-	F	10	10	10	20	32.2	30.8	28	27	-	50	GPS2BHT	45	63					
-	F	2	2	3	5	7.8	7.5	9.6	7.6	-	50	GPS2BHK	6.3	10					
-	F	3	3	3	7.5	11	10.6	9.6	11	-	50	GPS2BHL	9	13					
-	F	3	3	5	7.5	11	10.6	15.2	11	-	50	GPS2BHM	11	16					
-	F	5	5	5	10	17.5	16.7	15.2	14	-	50	GPS2BHN	14	20					
-	F	7.5	7.5	7.5	15	25.3	24.2	22	21	-	50	GPS2BHP	19	25					
-	F	10	10	10	20	32.2	30.8	28	27	-	50	GPS2BHR	24	32					
-	F	10	10	10	20	32.2	30.8	28	27	-	50	GPS2BHS	28	40					
-	F	10	10	10	20	32.2	30.8	28	27	-	50	GPS2BHT	35	50					
-	F	10	10	10	20	32.2	30.8	28	27	-	50	GPS2BHT	45	63					
-	F	2	2	3	5	7.8	7.5	9.6	7.6	-	50	GPS2BHK	6.3	10	CL06[*] 300M[**]		GPAE11LLA	GPF2L07AA	GPF2B3A
-	F	3	3	3	7.5	11	10.6	9.6	11	-	50	GPS2BHL	9	13					
-	F	3	3	5	7.5	11	10.6	15.2	11	-	50	GPS2BHM	11	16					
-	F	5	5	5	10	17.5	16.7	15.2	14	-	50	GPS2BHN	14	20					
-	F	7.5	7.5	7.5	15	25.3	24.2	22	21	-	50	GPS2BHP	19	25					
-	F	10	10	10	20	32.2	30.8	28	27	-	50	GPS2BHR	24	32					
-	F	10	10	10	20	32.2	30.8	28	27	-	50	GPS2BHS	28	40					
-	F	15	15	15	30	48.3	46.2	42	40	-	50	GPS2BHT	35	50					
-	F	15	15	15	30	48.3	46.2	42	40	-	50	GPS2BHT	45	63					
-	F	2	2	3	5	7.8	7.5	9.6	7.6	-	50	GPS2BHK	6.3	10					
-	F	3	3	3	7.5	11	10.6	9.6	11	-	50	GPS2BHL	9	13					
-	F	3	3	5	7.5	11	10.6	15.2	11	-	50	GPS2BHM	11	16					
-	F	5	5	5	10	17.5	16.7	15.2	14	-	50	GPS2BHN	14	20					
-	F	7.5	7.5	7.5	15	25.3	24.2	22	21	-	50	GPS2BHP	19	25					
-	F	10	10	10	20	32.2	30.8	28	27	-	50	GPS2BHR	24	32					
-	F	10	10	10	20	32.2	30.8	28	27	-	50	GPS2BHS	28	40					
-	F	15	15	15	30	48.3	46.2	42	40	-	50	GPS2BHT	35	50					
-	F	15	15	15	30	48.3	46.2	42	40	-	50	GPS2BHT	45	63					
-	F	2	2	3	5	7.8	7.5	9.6	7.6	-	50	GPS2BHK	6.3	10	CL08[*] 300M[**]		GPAE11LLA	GPF2L07AA	GPF2B3A
-	F	3	3	3	7.5	11	10.6	9.6	11	-	50	GPS2BHL	9	13					
-	F	3	3	5	7.5	11	10.6	15.2	11	-	50	GPS2BHM	11	16					
-	F	5	5	5	10	17.5	16.7	15.2	14	-	50	GPS2BHN	14	20					
-	F	7.5	7.5	7.5	15	25.3	24.2	22	21	-	50	GPS2BHP	19	25					
-	F	10	10	10	20	32.2	30.8	28	27	-	50	GPS2BHR	24	32					
-	F	10	10	10	20	32.2	30.8	28	27	-	50	GPS2BHS	28	40					
-	F	15	15	15	30	48.3	46.2	42	40	-	50	GPS2BHT	35	50					
-	F	15	15	15	30	48.3	46.2	42	40	-	50	GPS2BHT	45	63					
-	F	15	15	20	40	48.3	46.2	54	52	-	50	GPS2BHU	45	63					
-	F	2	2	3	5	7.8	7.5	9.6	7.6	-	50	GPS2BHK	6.3	10					
-	F	3	3	3	7.5	11	10.6	9.6	11	-	50	GPS2BHL	9	13					
-	F	3	3	5	7.5	11	10.6	15.2	11	-	50	GPS2BHM	11	16					
-	F	5	5	5	10	17.5	16.7	15.2	14	-	50	GPS2BHN	14	20					
-	F	7.5	7.5	7.5	15	25.3	24.2	22	21	-	50	GPS2BHP	19	25					
-	F	10	10	10	20	32.2	30.8	28	27	-	50	GPS2BHR	24	32					
-	F	10	10	10	20	32.2	30.8	28	27	-	50	GPS2BHS	28	40					
-	F	15	15	15	30	48.3	46.2	42	40	-	50	GPS2BHT	35	50					
-	F	15	15	20	40	48.3	46.2	54	52	-	50	GPS2BHU	45	63					

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### Combination Motor Controllers

### Surion GPS1 Combination with Contactor Effcor series

Construction Type	Max. Motor HP Rating					Max. Motor FLA					SCCR (kA)		Manual Motor Controller		GE Cat. No. Component List					
	240V	480V/277V	200V	208V	230V	460V	200V	208V	230V	460V	240 V	480V/277 V	GE Cat. No.	Motor Current Adjust Range	Contactor	Feed-in Terminals	SC Alarm	Link Module	Base Plate	
F	F	-	-	-	-	0.16	0.16	0.16	0.16	100	65	GPS1BHAA	0.1	0.16	EC09[*] 311B[**]	GPAPT1E	GPAE11LLA	ECML1AL25	ECBP45	
F	F	-	-	-	-	0.25	0.25	0.25	0.25	100	65	GPS1BHAB	0.16	0.25						
F	F	-	-	-	-	0.4	0.4	0.4	0.4	100	65	GPS1BHAC	0.25	0.4						
F	F	-	-	-	-	0.63	0.63	0.63	0.63	100	65	GPS1BHAD	0.4	0.63						
F	F	-	-	-	0.5	1	1	1	1	1.1	100	65	GPS1BHA E	0.63						1
F	F	0.25	0.25	0.33	0.75	1.6	1.6	1.6	1.6	100	65	GPS1BHAF	1	1.6						
F	F	0.5	0.5	0.5	1	2.5	2.4	2.2	2.1	100	65	GPS1BHAG	1.6	2.5						
F	F	0.75	0.75	0.75	2	3.7	3.5	3.2	3.4	100	65	GPS1BHAH	2.5	4						
F	F	1	1	1.5	3	4.8	4.6	6	4.8	100	65	GPS1BHAJ	4	6.3						
F	F	2	2	3	5	7.8	7.5	9.6	7.6	100	65	GPS1BHA K	6.3	10						
F	F	3	3	3	5	11	10.6	9.6	7.6	100	65	GPS1BHAL	9	13						
F	F	3	3	3	5	11	10.6	9.6	7.6	65	65	GPS1BHAM	11	16						
F	F	3	3	3	5	11	10.6	9.6	7.6	65	65	GPS1BHAN	14	20						
F	F	3	3	3	5	11	10.6	9.6	7.6	65	65	GPS1BHAP	19	25						
F	F	3	3	3	5	11	10.6	9.6	7.6	65	65	GPS1BHAR	24	32						
F	F	-	-	-	-	0.16	0.16	0.16	0.16	100	65	GPS1BHAA	0.1	0.16						
F	F	-	-	-	-	0.25	0.25	0.25	0.25	100	65	GPS1BHAB	0.16	0.25						
F	F	-	-	-	-	0.4	0.4	0.4	0.4	100	65	GPS1BHAC	0.25	0.4						
F	F	-	-	-	-	0.63	0.63	0.63	0.63	100	65	GPS1BHAD	0.4	0.63						
F	F	-	-	-	0.5	1	1	1	1	1.1	100	65	GPS1BHA E	0.63	1					
F	F	0.25	0.25	0.33	0.75	1.6	1.6	1.6	1.6	100	65	GPS1BHAF	1	1.6						
F	F	0.5	0.5	0.5	1	2.5	2.4	2.2	2.1	100	65	GPS1BHAG	1.6	2.5						
F	F	0.75	0.75	0.75	2	3.7	3.5	3.2	3.4	100	65	GPS1BHAH	2.5	4						
F	F	1	1	1.5	3	4.8	4.6	6	4.8	100	65	GPS1BHAJ	4	6.3						
F	F	2	2	3	5	7.8	7.5	9.6	7.6	100	65	GPS1BHA K	6.3	10						
F	F	3	3	3	5	11	10.6	9.6	11	100	65	GPS1BHAL	9	13						
F	F	3	3	3	5	11	10.6	9.6	11	65	65	GPS1BHAM	11	16						
F	F	3	3	3	5	11	10.6	9.6	11	65	65	GPS1BHAN	14	20						
F	F	3	3	3	5	11	10.6	9.6	11	65	65	GPS1BHAP	19	25						
F	F	3	3	3	5	11	10.6	9.6	11	65	65	GPS1BHAR	24	32						
F	F	-	-	-	-	0.16	0.16	0.16	0.16	100	65	GPS1BHAA	0.1	0.16						
F	F	-	-	-	-	0.25	0.25	0.25	0.25	100	65	GPS1BHAB	0.16	0.25						
F	F	-	-	-	-	0.4	0.4	0.4	0.4	100	65	GPS1BHAC	0.25	0.4						
F	F	-	-	-	-	0.63	0.63	0.63	0.63	100	65	GPS1BHAD	0.4	0.63						
F	F	-	-	-	0.5	1	1	1	1	1.1	100	65	GPS1BHA E	0.63	1					
F	F	0.25	0.25	0.33	0.75	1.6	1.6	1.6	1.6	100	65	GPS1BHAF	1	1.6						
F	F	0.5	0.5	0.5	1	2.5	2.4	2.2	2.1	100	65	GPS1BHAG	1.6	2.5						
F	F	0.75	0.75	0.75	2	3.7	3.5	3.2	3.4	100	65	GPS1BHAH	2.5	4						
F	F	1	1	1.5	3	4.8	4.6	6	4.8	100	65	GPS1BHAJ	4	6.3						
F	F	2	2	3	5	7.8	7.5	9.6	7.6	100	65	GPS1BHA K	6.3	10						
F	F	3	3	3	5	11	10.6	9.6	11	100	65	GPS1BHAL	9	13						
F	F	3	3	3	5	11	10.6	15.2	14	65	65	GPS1BHAM	11	16						
F	F	5	5	5	10	17.5	16.7	15.2	14	65	65	GPS1BHAN	14	20						
F	F	5	5	5	10	17.5	16.7	15.2	14	65	65	GPS1BHAP	19	25						
F	F	5	5	5	10	17.5	16.7	15.2	14	65	65	GPS1BHAR	24	32						
F	F	-	-	-	-	0.16	0.16	0.16	0.16	100	65	GPS1BHAA	0.1	0.16						
F	F	-	-	-	-	0.25	0.25	0.25	0.25	100	65	GPS1BHAB	0.16	0.25						
F	F	-	-	-	-	0.4	0.4	0.4	0.4	100	65	GPS1BHAC	0.25	0.4						
F	F	-	-	-	-	0.63	0.63	0.63	0.63	100	65	GPS1BHAD	0.4	0.63						
F	F	-	-	-	0.5	1	1	1	1	1.1	100	65	GPS1BHA E	0.63	1					
F	F	0.25	0.25	0.33	0.75	1.6	1.6	1.6	1.6	100	65	GPS1BHAF	1	1.6						
F	F	0.5	0.5	0.5	1	2.5	2.4	2.2	2.1	100	65	GPS1BHAG	1.6	2.5						
F	F	0.75	0.75	0.75	2	3.7	3.5	3.2	3.4	100	65	GPS1BHAH	2.5	4						
F	F	1	1	1.5	3	4.8	4.6	6	4.8	100	65	GPS1BHAJ	4	6.3						
F	F	2	2	3	5	7.8	7.5	9.6	7.6	100	65	GPS1BHA K	6.3	10						
F	F	3	3	3	5	11	10.6	9.6	11	100	65	GPS1BHAL	9	13						
F	F	3	3	3	5	11	10.6	15.2	14	65	65	GPS1BHAM	11	16						
F	F	5	5	5	10	17.5	16.7	15.2	14	65	65	GPS1BHAN	14	20						
F	F	7.5	7.5	7.5	15	25.3	24.2	22	21	65	65	GPS1BHAP	19	25						
F	F	7.5	7.5	7.5	15	25.3	24.2	22	21	65	65	GPS1BHAR	24	32						
F	F	-	-	-	-	0.16	0.16	0.16	0.16	100	65	GPS1BHAA	0.1	0.16						
F	F	-	-	-	-	0.25	0.25	0.25	0.25	100	65	GPS1BHAB	0.16	0.25						
F	F	-	-	-	-	0.4	0.4	0.4	0.4	100	65	GPS1BHAC	0.25	0.4						
F	F	-	-	-	-	0.63	0.63	0.63	0.63	100	65	GPS1BHAD	0.4	0.63						
F	F	-	-	-	0.5	1	1	1	1	1.1	100	65	GPS1BHA E	0.63	1					
F	F	0.25	0.25	0.33	0.75	1.6	1.6	1.6	1.6	100	65	GPS1BHAF	1	1.6						
F	F	0.5	0.5	0.5	1	2.5	2.4	2.2	2.1	100	65	GPS1BHAG	1.6	2.5						
F	F	0.75	0.75	0.75	2	3.7	3.5	3.2	3.4	100	65	GPS1BHAH	2.5	4						
F	F	1	1	1.5	3	4.8	4.6	6	4.8	100	65	GPS1BHAJ	4	6.3						
F	F	2	2	3	5	7.8	7.5	9.6	7.6	100	65	GPS1BHA K	6.3	10						
F	F	3	3	3	5	11	10.6	9.6	11	100	65	GPS1BHAL	9	13						
F	F	3	3	3	5	11	10.6	15.2	14	65	65	GPS1BHAM	11	16						
F	F	5	5	5	10	17.5	16.7	15.2	14	65	65	GPS1BHAN	14	20						
F	F	7.5	7.5	7.5	15	25.3	24.2	22	21	65	65	GPS1BHAP	19	25						
F	F	10	10	10	20	32.2	30.8	28	27	65	65	GPS1BHAR	24	32						

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## Combination Motor Controllers

### Surion GPS2 Combination with Contactor Efficor series

Construction Type	Max. Motor HP Rating										Max. Motor FLA				SCCR (kA)		Manual Motor Controller		GE Cat. No. Component List				
	240V	480V/277V	200V	208V	230V	460V	200V	208V	230V	460V	240 V	480V/277 V	GE Cat. No.	Motor Current Adjust Range		Contactor	Feed-in Terminals	SC Alarm	Link Module	Base Plate			
													Min. (A)	Max. (A)									
F	F	2	2	3	5	7.8	7.5	9.6	7.6	100	50	GPS2BHK	6.3	10	EC32[*] 300B[**]	-	GPAE11LLA	ECM1AL40	ECBP55				
F	F	3	3	3	7.5	11	10.6	9.6	11	100	50	GPS2BHL	9	13									
F	F	3	3	5	7.5	11	10.6	15.2	11	100	50	GPS2BHM	11	16									
F	F	5	5	5	10	17.5	16.7	15.2	14	100	50	GPS2BHN	14	20									
F	F	7.5	7.5	7.5	15	25.3	24.2	22	21	100	50	GPS2BHP	19	25									
F	F	10	10	10	20	32.2	30.8	28	27	100	50	GPS2BHR	24	32									
F	F	10	10	10	20	32.2	30.8	28	27	100	50	GPS2BHS	28	40									
F	F	10	10	10	20	32.2	30.8	28	27	100	50	GPS2BHT	35	50									
F	F	10	10	10	20	32.2	30.8	28	27	100	50	GPS2BHU	45	63									
F	F	2	2	3	5	7.8	7.5	9.6	7.6	100	50	GPS2BHK	6.3	10									
F	F	3	3	3	7.5	11	10.6	9.6	11	100	50	GPS2BHL	9	13									
F	F	3	3	5	7.5	11	10.6	15.2	11	100	50	GPS2BHM	11	16									
F	F	5	5	5	10	17.5	16.7	15.2	14	100	50	GPS2BHN	14	20									
F	F	7.5	7.5	7.5	15	25.3	24.2	22	21	100	50	GPS2BHP	19	25									
F	F	10	10	10	20	32.2	30.8	28	27	100	50	GPS2BHR	24	32									
F	F	10	10	10	20	32.2	30.8	28	34	100	50	GPS2BHS	28	40									
F	F	10	10	10	25	32.2	30.8	28	34	100	50	GPS2BHT	35	50									
F	F	10	10	10	25	32.2	30.8	28	34	100	50	GPS2BHU	45	63									
F	F	2	2	3	5	7.8	7.5	9.6	7.6	100	65	GPS2BHK	6.3	10									
F	F	3	3	3	7.5	11	10.6	9.6	11	100	65	GPS2BHL	9	13									
F	F	3	3	5	7.5	11	10.6	15.2	11	100	65	GPS2BHM	11	16									
F	F	5	5	5	10	17.5	16.7	15.2	14	100	65	GPS2BHN	14	20									
F	F	7.5	7.5	7.5	15	25.3	24.2	22	21	100	65	GPS2BHP	19	25									
F	F	10	10	10	20	32.2	30.8	28	27	100	65	GPS2BHR	24	32									
F	F	10	10	10	25	32.2	30.8	28	34	100	65	GPS2BHS	28	40									
F	F	15	15	15	30	48.3	46.2	42	40	100	65	GPS2BHT	35	50									
F	F	15	15	15	30	48.3	46.2	42	40	100	65	GPS2BHU	45	63									
F	F	2	2	3	5	7.8	7.5	9.6	7.6	100	65	GPS2BHK	6.3	10									
F	F	3	3	3	7.5	11	10.6	9.6	11	100	65	GPS2BHL	9	13									
F	F	3	3	5	7.5	11	10.6	15.2	11	100	65	GPS2BHM	11	16									
F	F	5	5	5	10	17.5	16.7	15.2	14	100	65	GPS2BHN	14	20									
F	F	7.5	7.5	7.5	15	25.3	24.2	22	21	100	65	GPS2BHP	19	25									
F	F	10	10	10	20	32.2	30.8	28	27	100	65	GPS2BHR	24	32									
F	F	10	10	10	25	32.2	30.8	28	34	100	65	GPS2BHS	28	40									
F	F	15	15	15	30	48.3	46.2	42	40	100	65	GPS2BHT	35	50									
F	F	15	15	20	40	48.3	46.2	54	52	100	65	GPS2BHU	45	63									
F	F	2	2	3	5	7.8	7.5	9.6	7.6	100	65	GPS2BHK	6.3	10									
F	F	3	3	3	7.5	11	10.6	9.6	11	100	65	GPS2BHL	9	13									
F	F	3	3	5	7.5	11	10.6	15.2	11	100	65	GPS2BHM	11	16									
F	F	5	5	5	10	17.5	16.7	15.2	14	100	65	GPS2BHN	14	20									
F	F	7.5	7.5	7.5	15	25.3	24.2	22	21	100	65	GPS2BHP	19	25									
F	F	10	10	10	20	32.2	30.8	28	27	100	65	GPS2BHR	24	32									
F	F	10	10	10	25	32.2	30.8	28	34	100	65	GPS2BHS	28	40									
F	F	15	15	15	30	48.3	46.2	42	40	100	65	GPS2BHT	35	50									
F	F	15	15	20	40	48.3	46.2	54	52	100	65	GPS2BHU	45	63									

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Catalog Number	UL Reference		cUL/CSA Cert	Catalog Number	UL Reference		cUL/CSA Cert	Catalog Number	UL Reference		cUL/CSA Cert
	File E	Type			File E	Type			File E	Type	
BCLF01	103664	L	cUL	CL00A310T*	76233	L	cUL	EA07A310S230	76233	L	cUL
BCLF01G	103664	L	cUL	CL00D301T*	76233	L	cUL	EA07D301I024	76233	L	cUL
BCLF10	103664	L	cUL	CL00D310T*	76233	L	cUL	EA07D301I110	76233	L	cUL
BCLF10G	103664	L	cUL	CL01A301T*	76233	L	cUL	EA07D301S024	76233	L	cUL
BCLL11	103664	L	cUL	CL01A310T*	76233	L	cUL	EA07D301S110	76233	L	cUL
BCLL11	103664	L	cUL	CL01A400T*	76233	L	cUL	EA07D310I024	76233	L	cUL
BCLL20	103664	L	cUL	CL01A800T*	76233	L	cUL	EA07D310I110	76233	L	cUL
BCLL20	103664	L	cUL	CL01D301T*	76233	L	cUL	EA07D310S024	76233	L	cUL
BELA	103664	L	cUL	CL01D310T*	76233	L	cUL	EA07D310S110	76233	L	cUL
BELA	103664	L	cUL	CL01D400T*	76233	L	cUL	EA07D310I024	76233	L	cUL
BELA02	103664	L	cUL	CL01D800T*	76233	L	cUL	EA07D310I110	76233	L	cUL
BELA02	103664	L	cUL	CL02A301T*	76233	L	cUL	EA07D310S024	76233	L	cUL
BRL02	103664	L	cUL	CL02A301T*	76233	L	cUL	EA07D310S110	76233	L	cUL
BRL11	103664	L	cUL	CL02A400T*	76233	L	cUL	EC09A311B*	331054	L	cUL
BRL20	103664	L	cUL	CL02A400T*	76233	L	cUL	EC09D311B*	331054	L	cUL
BTLF30C	103664	L	cUL	CL02A400T*	76233	L	cUL	EC09E311B*	331054	L	cUL
BTLF30D	103664	L	cUL	CL02A800T*	76233	L	cUL	EC12A311B*	331054	L	cUL
BTLF60C	103664	L	cUL	CL02D301T*	76233	L	cUL	EC12A400B*	331054	L	cUL
BTLF60D	103664	L	cUL	CL02D310T*	76233	L	cUL	EC12AB00B*	331054	L	cUL
BTRF30C	103664	L	cUL	CL02DA00TD	76233	L	cUL	EC12D311B*	331054	L	cUL
BTRF30D	103664	L	cUL	CL02D800T*	76233	L	cUL	EC12D400B*	331054	L	cUL
BTRF60C	103664	L	cUL	CL03A300T*	76233	L	cUL	EC12DB00B*	331054	L	cUL
BTRF60D	103664	L	cUL	CL03A400M*	76233	L	cUL	EC12E311B*	331054	L	cUL
CK08BA411J	76233	L	cUL	CL03A800M*	76233	L	cUL	EC12E400B*	331054	L	cUL
CK08BA411N	76233	L	cUL	CL03D300T*	76233	L	cUL	EC12EB00B*	331054	L	cUL
CK08BA411U	76233	L	cUL	CL03D400M*	76233	L	cUL	EC18A311B*	331054	L	cUL
CK08BA411V	76233	L	cUL	CL03D800M*	76233	L	cUL	EC18A400B*	331054	L	cUL
CK08BE411W100-250	76233	L	cUL	CL04A301M*	76233	L	cUL	EC18AB00B*	331054	L	cUL
CK08BE411W24-60	76233	L	cUL	CL04A310M*	76233	L	cUL	EC18D311B*	331054	L	cUL
CK08BE411W250-500	76233	L	cUL	CL04A400M*	76233	L	cUL	EC18D400B*	331054	L	cUL
CK08BE411W48-130	76233	L	cUL	CL04A800M*	76233	L	cUL	EC18DB00B*	331054	L	cUL
CK08CA311J	76233	L	cUL	CL04D301M*	76233	L	cUL	EC18E311B*	331054	L	cUL
CK08CA311N	76233	L	cUL	CL04D310M*	76233	L	cUL	EC18E400B*	331054	L	cUL
CK08CA311U	76233	L	cUL	CL04D400M*	76233	L	cUL	EC18EB00B*	331054	L	cUL
CK08CA311V	76233	L	cUL	CL04D800M*	76233	L	cUL	EC25A311B*	331054	L	cUL
CK08CE311W100-250	76233	L	cUL	CL05A300M*	76233	L	cUL	EC25A400B*	331054	L	cUL
CK08CE311W24-60	76233	L	cUL	CL05A400M*	76233	L	cUL	EC25AB00B*	331054	L	cUL
CK08CE311W250-500	76233	L	cUL	CL05A800M*	76233	L	cUL	EC25D311B*	331054	L	cUL
CK08CE311W48-130	76233	L	cUL	CL05D300M*	76233	L	cUL	EC25D400B*	331054	L	cUL
CK09BE311W100-250	76233	L	cUL	CL05D400M*	76233	L	cUL	EC25DB00B*	331054	L	cUL
CK09BE311W24-60	76233	L	cUL	CL05D800M*	76233	L	cUL	EC25E311B*	331054	L	cUL
CK09BE311W250-500	76233	L	cUL	CL05E400M*	76233	L	cUL	EC25E400B*	331054	L	cUL
CK09BE311W48-130	76233	L	cUL	CL05E800M*	76233	L	cUL	EC25EB00B*	331054	L	cUL
CK09BE411W100-250	76233	L	cUL	CL07A300M*	76233	L	cUL	EC32A300B*	331054	L	cUL
CK09BE411W24-60	76233	L	cUL	CL07A400M*	76233	L	cUL	EC32A400B*	331054	L	cUL
CK09BE411W250-500	76233	L	cUL	CL07A800M*	76233	L	cUL	EC32AB00B*	331054	L	cUL
CK09BE411W48-130	76233	L	cUL	CL07D300M*	76233	L	cUL	EC32D300B*	331054	L	cUL
CK10CE311W100-250	76233	L	cUL	CL07D400M*	76233	L	cUL	EC32D400B*	331054	L	cUL
CK10CE311W24-60	76233	L	cUL	CL07D800M*	76233	L	cUL	EC32DB00B*	331054	L	cUL
CK10CE311W250-500	76233	L	cUL	CL07E300M*	76233	L	cUL	EC32E300B*	331054	L	cUL
CK10CE311W48-130	76233	L	cUL	CL07E400M*	76233	L	cUL	EC32E400B*	331054	L	cUL
CK11CE311W100-250	76233	L	cUL	CL07E800M*	76233	L	cUL	EC32EB00B*	331054	L	cUL
CK11CE311W24-60	76233	L	cUL	CL08A300M*	76233	L	cUL	EC40A300B*	331054	L	cUL
CK11CE311W250-500	76233	L	cUL	CL08A800M*	76233	L	cUL	EC40D300B*	331054	L	cUL
CK11CE311W48-130	76233	L	cUL	CL08B300M*	76233	L	cUL	EC40E300B*	331054	L	cUL
CK12BE311W100-250	76233	L	cUL	CL08D800M*	76233	L	cUL	ECACA400B*	103664	L	cUL
CK12BE311W24-60	76233	L	cUL	CL08DB00M*	76233	L	cUL	ECACA404B*	103664	L	cUL
CK12BE311W250-500	76233	L	cUL	CL08E300M*	76233	L	cUL	ECACA413B*	103664	L	cUL
CK12BE311W48-130	76233	L	cUL	CL08E800M*	76233	L	cUL	ECACA422B*	103664	L	cUL
CK12BE411W100-250	76233	L	cUL	CL09A300M*	76233	L	cUL	ECACA431B*	103664	L	cUL
CK12BE411W24-60	76233	L	cUL	CL09A400M*	76233	L	cUL	ECACE400B*	103664	L	cUL
CK12BE411W250-500	76233	L	cUL	CL09D300M*	76233	L	cUL	ECACE404B*	103664	L	cUL
CK12BE411W48-130	76233	L	cUL	CL09D400M*	76233	L	cUL	ECACE413B*	103664	L	cUL
CK75CA311J	76233	L	cUL	CL09E300M*	76233	L	cUL	ECACE422B*	103664	L	cUL
CK75CA311N	76233	L	cUL	CL09E400M*	76233	L	cUL	ECACE431B*	103664	L	cUL
CK75CA311U	76233	L	cUL	CL10A300M*	76233	L	cUL	ECBP45	211286	L	cUL
CK75CA311V	76233	L	cUL	CL10D300M*	76233	L	cUL	ECBP55	211286	L	cUL
CK75CE311W100-250	76233	L	cUL	CL10E300M*	76233	L	cUL	ECFA202S	103664	L	cUL
CK75CE311W24-60	76233	L	cUL	CLXC41				ECFA211S	103664	L	cUL
CK75CE311W250-500	76233	L	cUL	CLXC51				ECFA220S	103664	L	cUL
CK75CE311W48-130	76233	L	cUL	EA07A301I024	76233	L	cUL	ECFA404S	103664	L	cUL
CK95BE311W100-250	76233	L	cUL	EA07A301I230	76233	L	cUL	ECFA413S	103664	L	cUL
CK95BE311W24-60	76233	L	cUL	EA07A301S024	76233	L	cUL	ECFA422S	103664	L	cUL
CK95BE311W250-500	76233	L	cUL	EA07A301S048	76233	L	cUL	ECFA425E	103664	L	cUL
CK95BE311W48-130	76233	L	cUL	EA07A301S110	76233	L	cUL	ECFA431S	103664	L	cUL
CK95BE411W100-250	76233	L	cUL	EA07A301S230	76233	L	cUL	ECFA440S	103664	L	cUL
CK95BE411W24-60	76233	L	cUL	EA07A310I024	76233	L	cUL	ECKS1RV	211286	L	cUL
CK95BE411W250-500	76233	L	cUL	EA07A310I230	76233	L	cUL	ECKS2RV	211286	L	cUL
CK95BE411W48-130	76233	L	cUL	EA07A310S024	76233	L	cUL	ECLA202S	103664	L	cUL
CK95BE411W48-130	76233	L	cUL	EA07A310S048	76233	L	cUL	ECLA211S	103664	L	cUL
EA07A310S110	76233	L	cUL	EA07A310S230	76233	L	cUL	ECLA220S	103664	L	cUL
EA07A310S230	76233	L	cUL	EA07A310S024	76233	L	cUL	ECM1AL25	103664	L	cUL
EA07A310S048	76233	L	cUL	EA07A310S048	76233	L	cUL	ECM1AL32	103664	L	cUL
EA07A310S110	76233	L	cUL	EA07A310S110	76233	L	cUL	ECM2AL40	103664	L	cUL



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Catalog Number	UL Reference		cUL/CSA Cert
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ECMI02S	103664	L	cUL
ECML1AS032	103664	L	cUL
ECML1AS060	103664	L	cUL
ECML1AS127	103664	L	cUL
ECML1AS277	103664	L	cUL
ECML1AS480	103664	L	cUL
ECML1AS660	103664	L	cUL
ECML1DS036	103664	L	cUL
ECML1DS048	103664	L	cUL
ECML1DS072	103664	L	cUL
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EF80A400B*	331054	L	cUL
EF80AB06*	331054	L	cUL

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EF80E400B*	331054	L	cUL
EF80EB00B*	331054	L	cUL
EF95A300B*	331054	L	cUL
EF95A400B*	331054	L	cUL
EF95E300B*	331054	L	cUL
EF95E400B*	331054	L	cUL
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EFM2EL80	103664	L	cUL
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GPAC02LRA	9981	L	cUL
GPAC10FBA	9981	L	cUL
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GPASLRAA11	9981	L	cUL
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GPASLRAAY	9981	L	cUL
GPASLRAAZ	9981	L	cUL
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GPASLRAADJ	9981	L	cUL
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GPB1B05A	211286	L	cUL
GPB1B12A	211286	L	cUL
GPB1B13A	211286	L	cUL

Catalog Number	UL Reference		cUL/CSA Cert
	File E	Type	
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GPB1B15A	211286	L	cUL
GPB1B22A	211286	L	cUL
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GPB2GA	211286	L	cUL
GPFF1LMCBA	211286	L	cUL
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GPS1BHAB	9981, 1209	L	cUL
GPS1BHAC	9981, 1209	L	cUL
GPS1BHAD	9981, 1209	L	cUL
GPS1BHAE	9981, 1209	L	cUL
GPS1BHAF	9981, 1209	L	cUL
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GPS2MHAP	9981, 1209	L	cUL
GPS2MHAR	9981, 1209	L	cUL
GPS2MHAS	9981, 1209	L	cUL
GPS2MHAT	9981, 1209	L	cUL
GPS2MHAU	9981, 1209	L	cUL





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Catalog Number	UL Reference		cUL/CSA Cert
	File E	Type	
MACL101AF	103664	L	cUL
MACL101AI	103664	L	cUL
MACL101AR	103664	L	cUL
MACL101AT	103664	L	cUL
MACL110AF	103664	L	cUL
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MACL110AT	103664	L	cUL
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MC1CC00AT*	76233	L	cUL
MC1I301ATD	76233	L	cUL
MC1I310ATD	76233	L	cUL
MC1K301ATD	76233	L	cUL
MC1K310ATD	76233	L	cUL

Catalog Number	UL Reference		cUL/CSA Cert
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MC2A301AR*	76233	L	cUL
MC2A301AT*	76233	L	cUL
MC2A310AI*	76233	L	cUL
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MC2A400AT*	76233	L	cUL
MC2AB00AT*	76233	L	cUL
MC2AC00AT*	76233	L	cUL
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MC2C310AT*	76233	L	cUL
MC2C400AT*	76233	L	cUL
MC2CB00AT*	76233	L	cUL
MC2CC00AT*	76233	L	cUL
MC2I301ATD	76233	L	cUL
MC2I310ATD	76233	L	cUL
MC2K301ATD	76233	L	cUL
MC2K310ATD	76233	L	cUL
MC2K400ATD	76233	L	cUL
MCRA004AF*	103664	L	cUL
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MCRA004AR*	103664	L	cUL
MCRA004AT*	103664	L	cUL
MCRA013AF*	103664	L	cUL
MCRA013AI*	103664	L	cUL
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Catalog Number	UL Reference		cUL/CSA Cert
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MT03RP	103664	L	cUL
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PRC1S13BNL	198336	R	cUL/CSA
PRC1S13CBL	198336	R	cUL/CSA
PRC1S13CDL	198336	R	cUL/CSA
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PRC1T20ADL			CSA
PRC1T20AJL			CSA
PRC1T20ANL			CSA
PRC1T20CBL			CSA
PRC1T20CDL			CSA
PRC1T20CJL			CSA
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PRC2P20CBL	198336	R	cUL/CSA
PRC2P20CDL	198336	R	cUL/CSA
PRC2P20CGL	198336	R	cUL/CSA
PRC2P20CJL	198336	R	cUL/CSA
PRC2P20DCBL	198336	R	cUL/CSA
PRC2P20DCDL	198336	R	cUL/CSA
PRC2P20DCGL	198336	R	cUL/CSA
PRC2P20DCJL	198336	R	cUL/CSA
PRC4M20ABL	198336	R	cUL/CSA
PRC4M20ADL	198336	R	cUL/CSA
PRC4M20AGL	198336	R	cUL/CSA
PRC4M20AJL	198336	R	cUL/CSA
PRC4M20ANL	198336	R	cUL/CSA
PRC4M20CBL	198336	R	cUL/CSA
PRC4M20CDL	198336	R	cUL/CSA
PRC4M20CGL	198336	R	cUL/CSA
PRC4M20CJL	198336	R	cUL/CSA
PRC4M20CKL	198336	R	cUL/CSA
PRC4M20CML	198336	R	cUL/CSA
PRC4M20DCBL	198336	R	cUL/CSA
PRC4M20DCDL	198336	R	cUL/CSA
PRC4M20DCGL	198336	R	cUL/CSA
PRC4M20DCJL	198336	R	cUL/CSA
PRC4M20DCKL	198336	R	cUL/CSA
PRC4M20DCML	198336	R	cUL/CSA
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PRC4M30ADL	198336	R	cUL/CSA
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PRC4M30CDL	198336	R	cUL/CSA
PRC4M30CGL	198336	R	cUL/CSA
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PRC4M30DCML	198336	R	cUL/CSA
PRC4M40ABL	198336	R	cUL/CSA
PRC4M40ADL	198336	R	cUL/CSA



## Product Index Alpha Numeric - UL Reference

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PRC4M40CJL	198336	R	cUL/CSA
PRC4M40CKL	198336	R	cUL/CSA
PRC4M40CML	198336	R	cUL/CSA
PRC4M40DCBL	198336	R	cUL/CSA
PRC4M40DCDL	198336	R	cUL/CSA
PRC4M40DCGL	198336	R	cUL/CSA
PRC4M40DCJL	198336	R	cUL/CSA
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PRC4M40DCML	198336	R	cUL/CSA
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PRCGZT80	223190	R	cUL/CSA
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PRCT1CB			
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PRCT2AJ			
PRCT2AN			
PRCT2CB			
PRCT2CD			
PRCT2CJ			
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RE1K	103664	L	cUL
RE1M	103664	L	cUL
RE1S	103664	L	cUL
RE1W	103664	L	cUL
RE1XP	103664	L	cUL
RE2H	103664	L	cUL
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RE2XP	103664	L	cUL
RE3E	103664	L	cUL
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RL4RA004R*	103664	L	cUL
RL4RA004T*	103664	L	cUL

Catalog Number	UL Reference		cUL/CSA Cert
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RL4RA040T*	103664	L	cUL
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RL4RD004T*	103664	L	cUL
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RT1J	103664	L	cUL
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RT1S	103664	L	cUL
RT1T	103664	L	cUL
RT1U	103664	L	cUL
RT1V	103664	L	cUL
RT1W	103664	L	cUL
RT2A	103664	L	cUL
RT2B	103664	L	cUL
RT2C	103664	L	cUL
RT2D	103664	L	cUL
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RT2J	103664	L	cUL
RT2L	103664	L	cUL
RT2M	103664	L	cUL

Catalog Number	UL Reference		cUL/CSA Cert
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RT32D	103664	L	cUL
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RT3B	103664	L	cUL
RT3C	103664	L	cUL
RT3D	103664	L	cUL
RT3E	103664	L	cUL
RT3F	103664	L	cUL
RT4LA	103664	L	cUL
RT4LB	103664	L	cUL
RT4LC	103664	L	cUL
RT4LD	103664	L	cUL
RT4LE	103664	L	cUL
RT4LF	103664	L	cUL
RT4LG	103664	L	cUL
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RT4N	103664	L	cUL
RT4P	103664	L	cUL
RT4R	103664	L	cUL
RT5A	103664	L	cUL
RT5B	103664	L	cUL
RT5C	103664	L	cUL
RT5D	103664	L	cUL
RT5E	103664	L	cUL
RT5LA	103664	L	cUL
RT5LB	103664	L	cUL
RT5LC	103664	L	cUL
RT5LD	103664	L	cUL
RT5LE	103664	L	cUL
RT6A	103664	L	cUL
RTXP	103664	L	cUL
RTXRR*	103664	L	cUL
SFVB8	211286	L	cUL
WKLI02P	103664	L	cUL
WKMIU	103664	L	cUL

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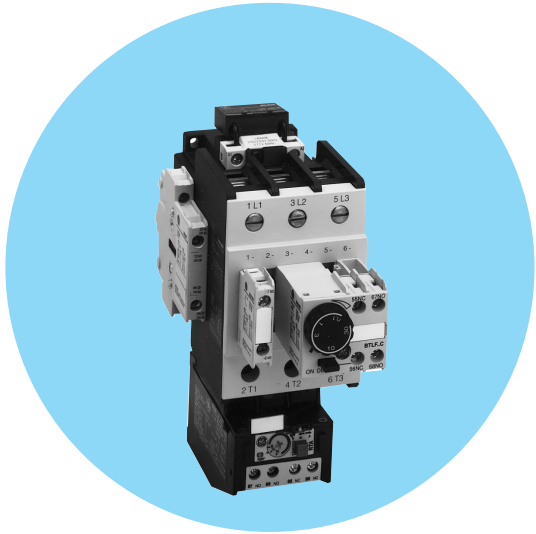
## CLN Contactors

### Overview

CLN contactors are available in NEMA Sizes 00 to 4 and they are used for full-voltage starting, stopping and reversing electric motors and switching a variety of applications such as heating loads, capacitors, lighting and transformers.

The long-life cycle, flexibility and ease of use make CLN contactors ideal for industrial and commercial applications that include marine, oil & gas, general industry, mining, hospitals and retail.

A wide array of overload relays and accessories provides greater design versatility, easy installation, flexible configurations, lower inventory requirements, and efficient use of panel space.



### Standards

NFPA 70E  
 National Electrical Code (NEC)  
 NEMA ICS 2 – Industrial Control Systems  
 UL 508

### Approvals/Marking



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## Contactors: CLN Series



NEMA Size	CLN Contactors	Continuous Current (A)	Controls Voltage	Catalog No.	Reference No.	Main Poles	Auxiliary Contacts Built-in	
							CLNAA310AT1	NC
00	CLNA	9	24V 60Hz	CLNAA310AT1	248122	3	1	0
			120V 60Hz	CLNAA310ATJ	248123			
			240V 60Hz	CLNAA310ATS	248124			
			480V 60Hz	CLNAA310ATU	248125			
0	CLNB	18	24V 60Hz	CLNBA310AT1	248126	3	1	0
			120V 60Hz	CLNBA310ATJ	248127			
			240V 60Hz	CLNBA310ATS	248128			
			480V 60Hz	CLNBA310ATU	248129			
1	CLNC	27	24V 60Hz	CLNCA310AM1	248130	3	1	0
			120V 60Hz	CLNCA310AMJ	248131			
			240V 60Hz	CLNCA310AMS	248132			
2	CLND	45	480V 60Hz	CLNCA310AMU	248133	3	1	0
			24V 60Hz	CLNDA310AM1	248134			
			120V 60Hz	CLNDA310AMJ	248135			
			240V 60Hz	CLNDA310AMS	248136			
3	CLNE	90	480V 60Hz	CLNDA310AMU	248137	3	1	0
			24V 60Hz	CLNEA310AM1	248138			
			120V 60Hz	CLNEA310AMJ	248139			
			240V 60Hz	CLNEA310AMS	248140			
4	CLNF	135	480V 60Hz	CLNEA310AMU	248141	3	1	1
			24-60V 60Hz-DC	CLNFE311ARD	248142			
			48-130V 60Hz-DC	CLNFE311ARJ	248143			
			100-250V 60Hz-DC	CLNFE311ARN	248144			
			250-500V 60Hz-DC	CLNFE311ARY	248145			

Spare coils	Contactor	24V 60Hz	48V 60Hz	110-120 60Hz	208V 60Hz	230V 60Hz	277V 60Hz	480V 60Hz	600V 60Hz
	CLNA	LB1A1	LB1A9	LB1AJ	LB1AL	LB1A6	LB1AN	LB1AU	LB1AY
	CLNB	LB3A1	LB3A9	LB3AJ	LB3AL	LB3A6	LB3AN	LB3AU	LB3AY
	CLNC	LB4A1	LB4A9	LB4AJ	LB4AL	LB4A6	LB4AN	LB4AU	LB4AY
	CLND								
	CLNE								

Contactor	24-48V (50-60Hz or DC)	60-130V (50-60Hz or DC)	100-250V (50-60Hz/DC)	250-500V (50-60Hz/DC)
CLNF	KKIT4E24-60	KKIT4E48-130	KKIT4E100-250	KKIT4E250-500

### Lugs Kit for CLNF



Contactor	Catalog Number
CLNF	CKX03

## Frontal Accessories to use with CLNA, CLNB, CLNC and CLNE



**Frontal Auxiliary Blocks:** Individual front-mount auxiliary to clip onto front face of the contactor. Contact Rating: A600, Q600

### Instantaneous

Number of Contacts	Contacts				Catalog No.	Reference No.
Terminal: screw						
1	1	0	0	0	<b>BCLF10</b>	104700
1	0	1	0	0	<b>BCLF01</b>	104701
1	0	0	1	0	<b>BCLF10G</b>	104702
1	0	0	0	1	<b>BCLF01G</b>	104703

## Lateral Accessories to use with CLNA, CLNB, CLNC, CLNE and CLNF



**Lateral Auxiliary Blocks:** Individual front-mount auxiliary to clip onto front face of the contactor. Contact Rating: A600, Q600

### Instantaneous

Number of Contacts	Contacts				Catalog No.	Reference No.
Terminal: screw						
2	2	0	0	0	<b>BCLL20</b>	104706
2	1	1	0	0	<b>BCLL11</b>	104707



**Lateral Mechanical and Cross Electrical Interlock:** Mechanical interlocks, used for horizontal interlocking of two contactors mounted side-by-side, prevent the closing of one contactor if the other remains closed. BEL02A includes two built-in NC contacts. Contact Rating: A600, Q600.

## For use with CLNA, CLNB, CLNC and CLNE

Number of Contacts	Contacts				Catalog No.	Reference No.
Mechanical / electrical						
2	0	2	-	-	<b>BELA02</b>	104724

## Horizontal mechanical interlock for use with CLNF



Catalog No.	Reference No.
<b>BEKH</b>	104763

**Notes:** For cross electrical interlocking, it is required to use a BCLL1 for each contactor. CLNF has already 1 BCLL11 built-in.

## Pole Terminal Protection

To use with	Catalog No.	Reference No.
CLNF	<b>PTPCK75</b>	103747



## Surge Suppressor

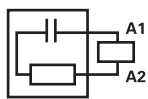
For suppression of disturbances in circuit voltage occurring upon opening of the contactor. Mounts directly on the top of the coil.



**RC Circuit protection:** Solution for AC operated contactors, reducing coil oscillation frequency and overvoltage peaks.

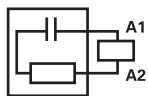
**Varistor:** Solution for AC and DC operated contactors, reduce overvoltage peak with low steady state consumption, but not oscillation frequency. This block is recommended for peak mitigation (not complete suppression as diode) and circuit surge protection. CLNF contactors already have a built-in suppressor and varistor.

### RC Suppressor for CLNA, CLNB, CLNC



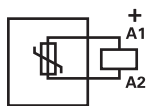
Type	Control Circuit	Ue	Catalog No.	Reference No.
R/C	AC	12V ... 48V	BSLR2G	104713
R/C	AC	50V ... 127V	BSLR2K	104714
R/C	AC	130V ... 250V	BSLR2R	104715

### RC Suppressor for CLND and CLNE



Type	Control Circuit	Ue	Catalog No.	Reference No.
R/C	AC	12V ... 48V	BSLR3G	104716
R/C	AC	50V ... 127V	BSLR3K	104717
R/C	AC	130V ... 250V	BSLR3R	104718

### Varistor for CLNA, CLNB, CLNC, CLND and CLNE



Type	Control Circuit	Ue	Catalog No.	Reference No.
Varistor	AC/DC	24V ... 48V	BSLV3G	104720
Varistor	AC/DC	50V ... 127V	BSLV3K	104721
Varistor	AC/DC	130V ... 250V	BSLV3R	104722
Varistor	AC/DC	277V ... 500V	BSLV3U	110836

## Other Frontal Accessories to use with CLNA, CLNB, CLNC and CLNE



**Pneumatic Timer:** Adjustable time-delayed auxiliary contacts. They come equipped with two time-delayed contacts 1NO and 1NC, electrically separated. To mount a pneumatic timer, simply clip on front face.

Number of Contacts	Contacts				Type	Time	Catalog No.	Reference No.
<b>Terminal: screw</b>								
2	0	0	1	1	Delay ON	0.1 - 30 sec.	<b>BTLE30C</b>	104709
2	0	0	1	1	Delay ON	1 - 60 sec.	<b>BTLE60C</b>	104710
2	0	0	1	1	Delay OFF	0.1 - 30 sec.	<b>BTLE30D</b>	104711
2	0	0	1	1	Delay OFF	1 - 60 sec.	<b>BTLE60D</b>	104712



**Mechanical Latch:** Used to convert a standard contactor to a mechanically held contactor. Easy to mount, it clips onto front face of contactor.

Voltage			Catalog No.	Reference No.
50 Hz AC	60 Hz AC	DC		
24-32	24-32	24-36	<b>RMLFD</b>	112992
42-48	48-60	42-48	<b>RMLFG</b>	112993
		60-72	<b>RMLFHC</b>	112991
110-127	110-127	110-125	<b>RMLFJ</b>	112994
220-240	208-277	220-250	<b>RMLFN</b>	112995
380-480	380-480	440	<b>RMLFU</b>	112996
500-690	600		<b>RMLFY</b>	112997



**Electronic Timer Module:** High repeatability Time-ON and Time-OFF delay modules for sequencing control of contactors. A red LED provides indication during time-delay operation. Fixation to the coil terminals, that allows simultaneous use with the auxiliary contact blocks.

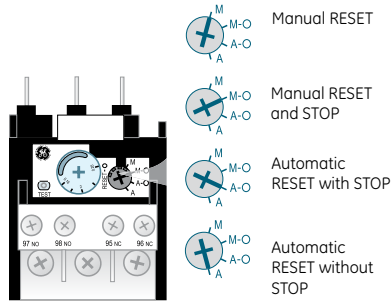
Control Circuit	Type	Time	Catalog No.	Reference No.
24-250V AC/DC	Delay ON	0.1 - 2 sec.	<b>BETL02C</b>	113602
24-250V AC/DC	Delay ON	1.5 - 45 sec.	<b>BETL45C</b>	113603
24-250V AC/DC	Delay OFF	0.1 - 2 sec.	<b>BETL02D</b>	113604
24-250V AC/DC	Delay OFF	1.5 - 45 sec.	<b>BETL45D</b>	113605



## Thermal Overload Relays: Series RT



- Class 10 Thermal protection against overloads
- Protection against long starting times
- Automatic ambient temperature compensation
- Trip indication, Tripping TEST
- Independent auxiliary contacts with double rupture 1NO+1NC. Contact Rating: A600, Q600
- 4 Function selector:



### To mount on CLNA, CLNB and CLNC



Setting Range (regulation)		Screw Terminal	
Min. A	Max. A	Catalog No.	Reference No.
A	A		
0.16	0.26	RT1B	113700
0.25	0.41	RT1C	113701
0.4	0.65	RT1D	113702
0.65	1.1	RT1F	113703
1.0	1.5	RT1G	113704
1.3	1.9	RT1H	113705
1.8	2.7	RT1J	113706
2.5	4.0	RT1K	113707
4.0	6.3	RT1L	113708
5.5	8.5	RT1M	113709
8.0	12.0	RT1N	113710
10.0	16.0	RT1P	113711
14.5	18.0	RT1S	113712
17.5	22.0	RT1T	113713
21.0	26.0	RT1U	113714
25.0	32.0	RT1V	113715
30.0	40.0	RT1W	113716
Base for separate mounting		RTXP	105170

### To mount on CLND and CLNE



Setting Range (regulation)		Screw Terminal	
Min. A	Max. A	Catalog No.	Reference No.
A	A		
11.5	15.0	RT2A	113717
14.5	19.0	RT2B	113718
18.5	25.0	RT2C	113719
24.0	32.0	RT2D	113720
30.0	43.0	RT2E	113721
42.0	55.0	RT2G	113722
54.0	65.0	RT2H	113723
64.0	82.0	RT2J	113724
78.0	97.0	RT2L	113725
90.0	110	RT2M	113726
Base for separate mounting		RT2XP	113764

## To mount on CLNF or separate mounting



Setting Range (regulation)		Screw Terminal	
Min. A	Max. A	Catalog No.	Reference No.
A	A		
55	80	RT3B	113727
63	90	RT3C	113728
90	120	RT3D	113729
110	140	RT3E	113730
140	190	RT3F	113731

## Accessories for Series RT



**Remote Electrical Reset:** Used in applications where the motor starter is inaccessible or in automated control systems where it is required to reset the OL relay remotely after the fault has been cleared. Electrical reset coils are rated for intermittent duty and use with momentary contacts.

- Minimum time 0.2sec ON for reliable operation. Power consumption is 100VA.
- Maximum duty: 1sec ON and 30sec OFF, 5sec ON and 90sec OFF, 10sec ON and 180sec OFF.

Voltage 50/60 Hz AC or DC	Catalog No.	Reference No.
12	RTXRRB	113661
24	RTXRRD	113662
48	RTXRRG	113663
110-120	RTXRRJ	113664
220-240	RTXRRN	113665
380-415	RTXRRU	113666
440-480	RTXRRX	113667



## Electronic Overload Relays: Series RE



- Selectable Class 5, 10, 20 and 30 Protection against overload
- Greater accuracy, full reliability
- Self-powered
- Thermal memory
- Trip indication, Tripping TEST
- Independent auxiliary contacts with double rupture 1NO+1NC.  
Contact Rating: A600, Q600
- Manual / Auto RESET

CLN Contactors

### To mount on CLNA, CLNB and CLNC



Setting Range (A)		Catalog No.	Reference No.
Min.	Max.		
0.1	0.5	RE1D	101866
0.4	2	RE1H	101867
1.0	5	RE1K	101868
1.6	8	RE1M	101869
6.4	32	RE1S	101870
9.0	45	RE1W	101871
Base for separate mounting		RE1XP	247302

### To mount on CLND and CLNE



Setting Range (A)		Catalog No.	Reference No.
Min.	Max.		
15	75	RE2H	101872
22	110	RE2M	101873
Base for separate mounting		RE2XP	247303

### To mount on CLNF or separate mounting



Setting Range (A)		Catalog No.	Reference No.
Min.	Max.		
30	150	RE3E	101874

### Accessories for Series RE

Description	Catalog No.	Reference No.
Transparent cover for pushbutton reset	RETC	247795

### Series RE and RT, Flexible Cable Reset Button

For remote mechanical reset



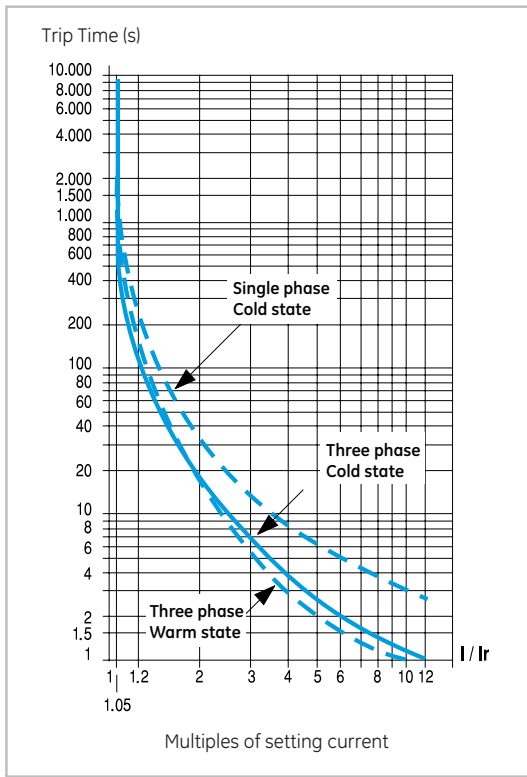
Description	Length	Catalog No.	Reference No.
Frontal Mount	19.3 in	RTXS	113855
Frontal Mount	39.3 in	RTXSL	113856
Back Mount		RTXBS	108864

Intro  
A  
B  
C  
D  
E  
F  
G  
H  
I  
X

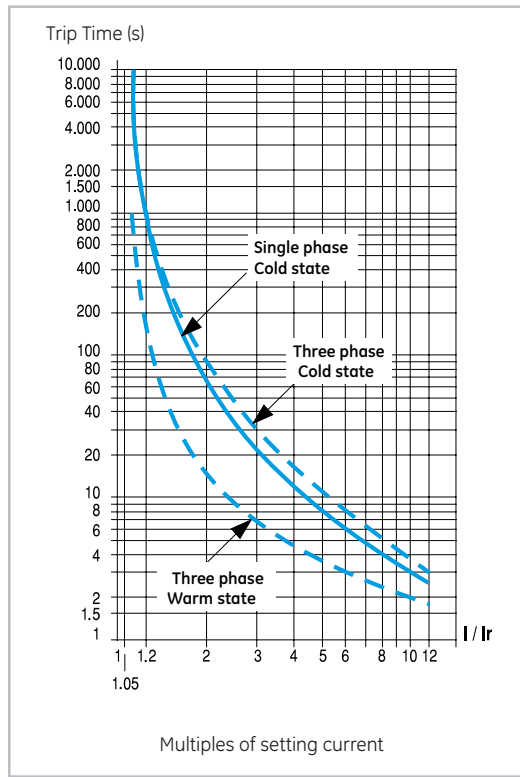


# Overload Relays Tripping Curves

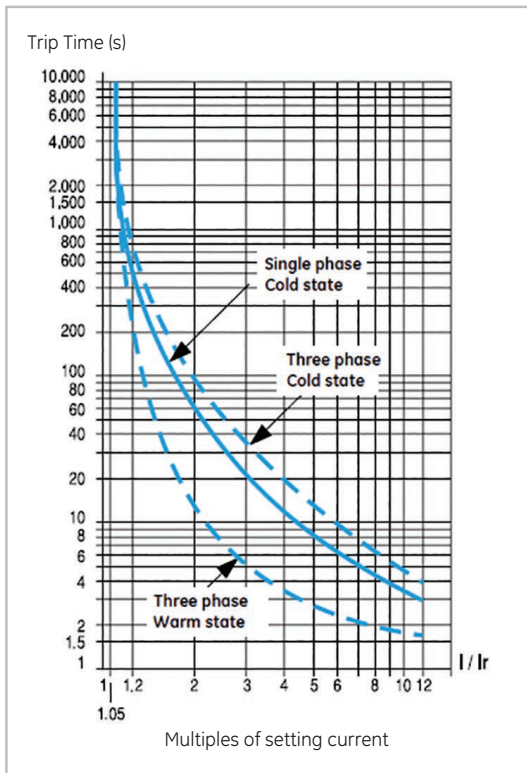
## Series RT1



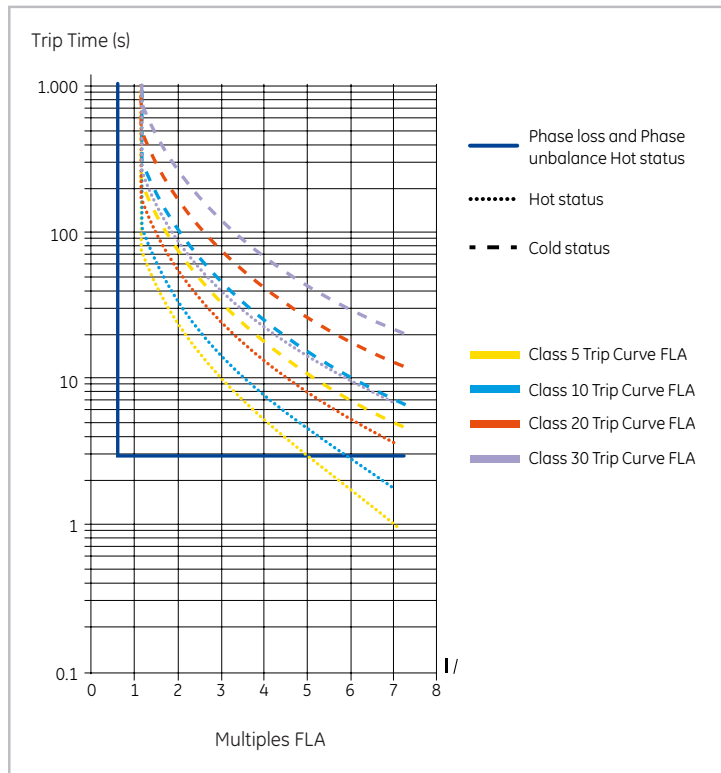
## Series RT2



## Series RT3 Class 10



## Series RE

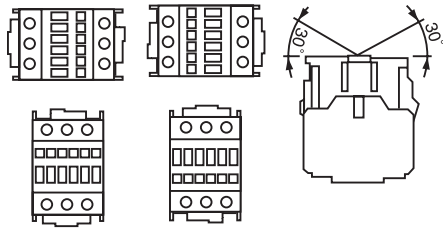


## Technical data for CLN Contactors

\* Technical data for OL relays and accessories can be found in general IEC catalog; Controls and Power Electronics

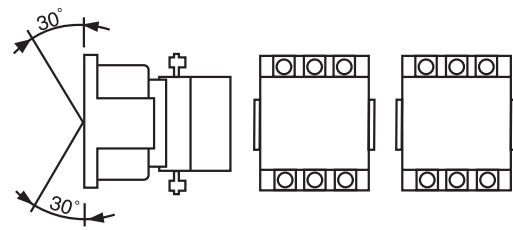
### Mounting positions

CLNA, CLNB, CLNC, CLND and CLNE



- With the same pick-up and drop-out voltage
- With the same rated power

CLNF



- With the same pick-up and drop-out voltage
- With the same rated power

### Terminal capacity and tightening torque

	Terminal Type	CLNA	CLNB	CLNC	CLND	CLNE	CLNF
	AWG Wires	14...8	14...8				
	Tightening torque (LB x in.)	15	20				
	AWG Wires			14...6	14...1/0	10...1/0	
	Tightening torque (LB x in.)			16	40	60	
	AWG Wires						4..0
	Busbars (mm)						2 (25 x 5)
	Tightening torque (LB x in.)						70

## Technical data for CLN Contactors

### Power Circuit

Description	Maximum Horsepower NEMA Size					
	00	0	1	2	3	4
<b>Normal Starting Duty HP Rating<sup>(1)</sup></b>						
<b>Single Phase</b>						
115V 60Hz	1/3	1	2	3	7 1/2	NA
230V 60Hz	1	2	3	7 1/2	15	NA
<b>Three Phase</b>						
200V 60Hz	1 1/2	3	7 1/2	10	25	40
230V 60Hz	1 1/2	3	7 1/2	15	30	50
380-415V 50Hz	1 1/2	5	10	25	50	75
460V 60Hz	2	5	10	25	50	100
575V 60Hz	2	5	10	25	50	100
<b>Plugging or Jogging HP Rating<sup>(1)</sup></b>						
<b>Single Phase</b>						
115V 60Hz	NA	1/2	1	2	5	NA
230V 60Hz	NA	1	2	5	10	NA
<b>Three Phase</b>						
200V 60Hz	NA	1 1/2	3	7 1/2	15	25
230V 60Hz	NA	1 1/2	3	10	20	30
380-415V 50Hz	NA	1 1/2	5	15	30	50
460V 60Hz	NA	2	5	15	30	60
575V 60Hz	NA	2	5	15	30	60
<b>Continuous Current Max</b>						
Starters and Enclosed Contactors	9	18	27	45	90	135
Open Contactors	10	20	30	50	100	150

(1) When operation of the controller requires jogging (inching) or plug stopping or when normal operation requires continued operation in excess of 5 operations per minute or 10 operations in a 10-minute period, the plugging or jogging horsepower ratings must be followed.

### Control Circuit

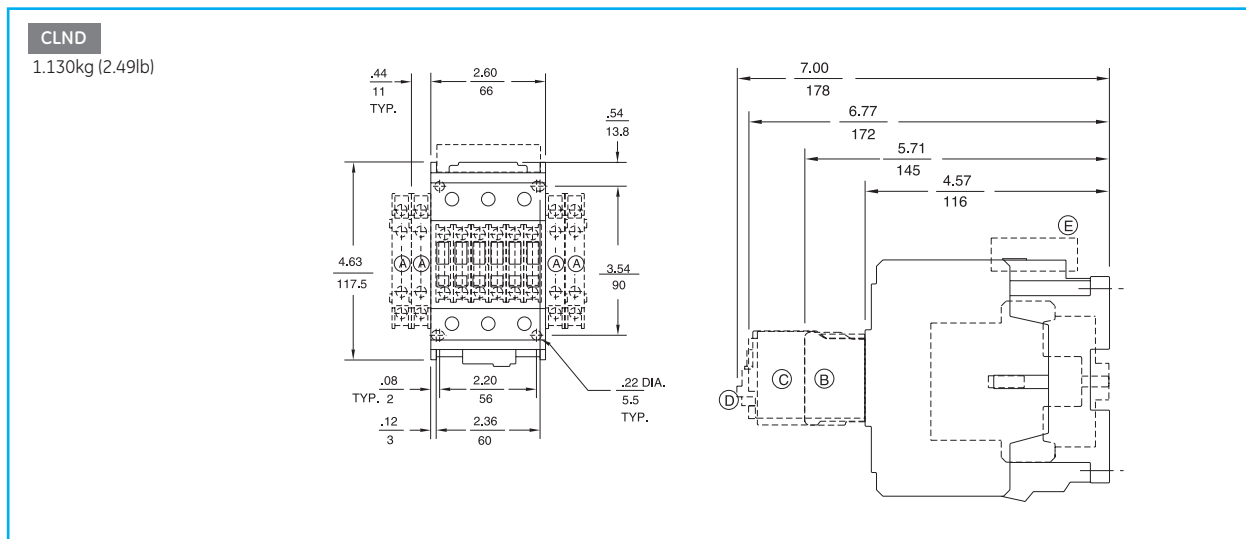
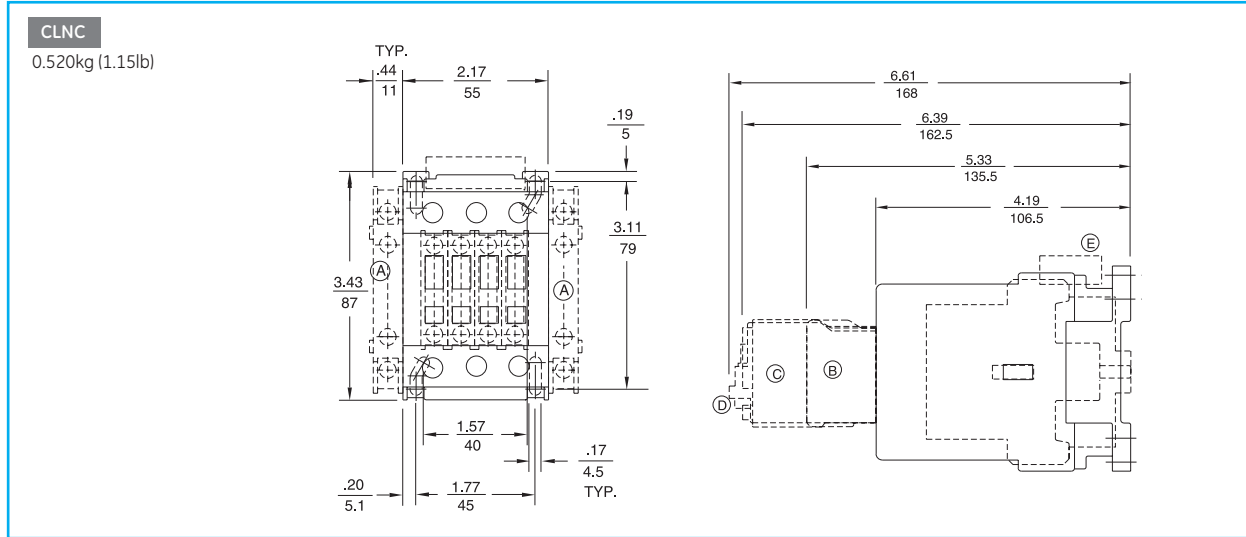
Description	Unit	Contactor Type					
		CLNA	CLNB	CLNC	CLND	CLNE	CLNF
<b>Rated insulation Voltage Ui</b>	V	1000	1000	1000	1000	1000	1000
<b>Voltage Operating limits</b>							
Operating	xUs	0.85...1.1	0.85...1.1	0.85...1.1	0.85...1.1	0.85...1.1	0.80...1.1
Pick-up	xUs	0.65...0.85	0.65...0.85	0.7...0.85	0.7...0.85	0.7...0.85	0.8
Seal	xUs	0.35...0.55	0.35...0.55	0.4...0.6	0.4...0.6	0.4...0.6	0.2...0.75
<b>Circuit Closed (motor running)</b>							
Consumption	VA	6	6	9.5	9.5	9.5	3.1
Power factor	cos	0.33	0.33	0.28	0.26	0.26	aprox 1
<b>Circuit Open (motor starting)</b>							
Consumption	VA	48	48	100	204	204	225
Power factor	cos	0.84	0.73	0.73	0.54	0.54	aprox 1
<b>Opening and closing times at Us</b>							
Time on energization	ms	250	320	450	920	1050	1600
Time on de-energization	ms	25	35	50	100	160	200





## Drawings (inches/mm)

### CLN Contactors

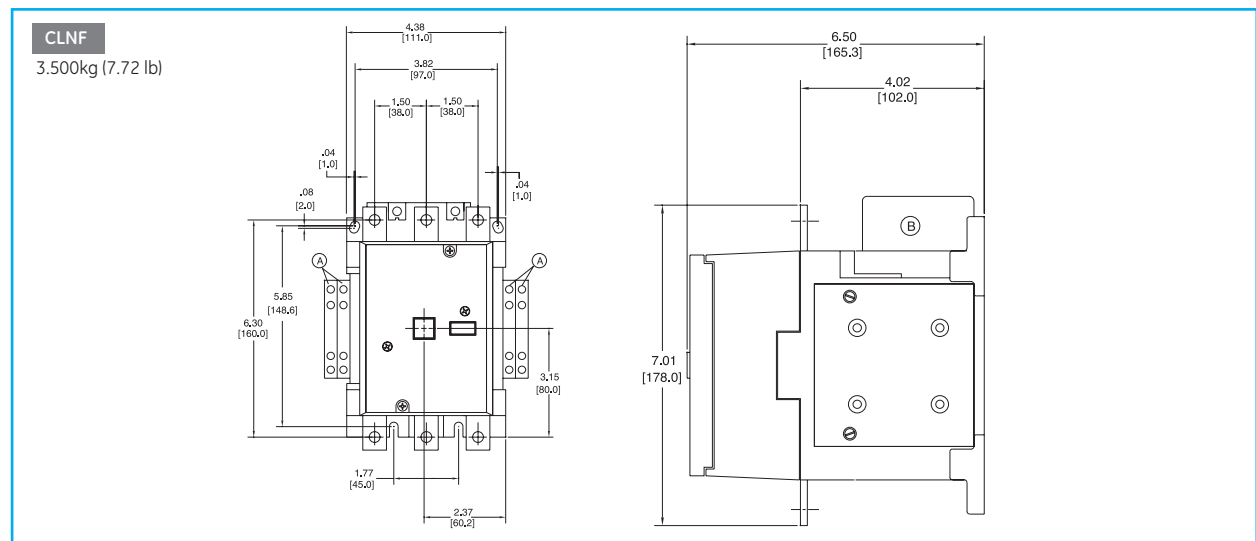
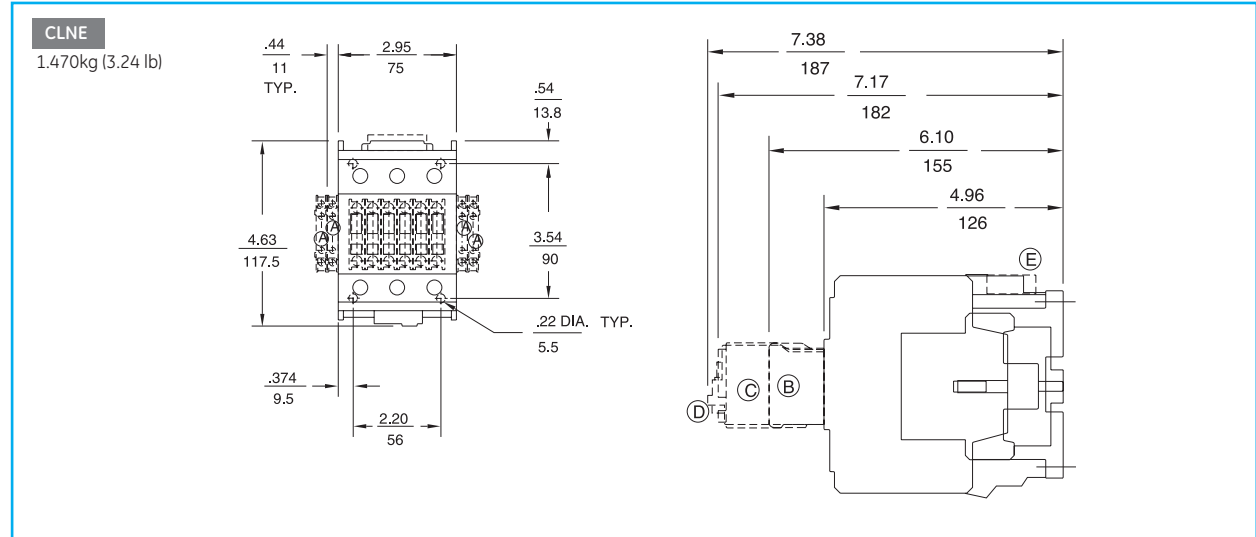


#### Legend and Notes

- A Extra Auxiliary Contacts, Side Mounted (if used)
- B Extra Auxiliary Contacts, Front Mounted (if used)
- C Pneumatic Timer (if used)
- D Mechanical Latch (if used)
- E Transient Voltage Suppressor

## Drawings (inches/mm)

### CLN Contactors



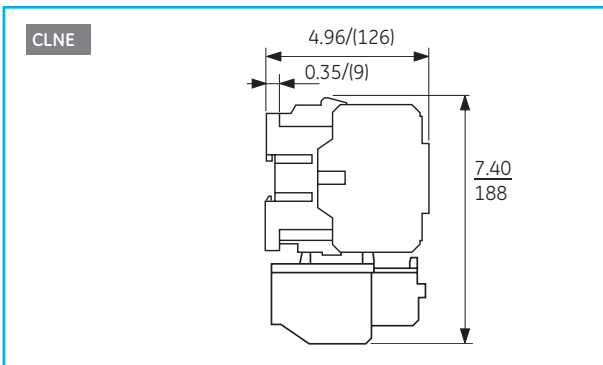
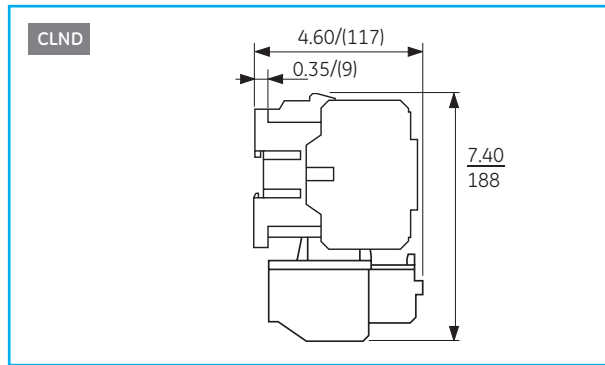
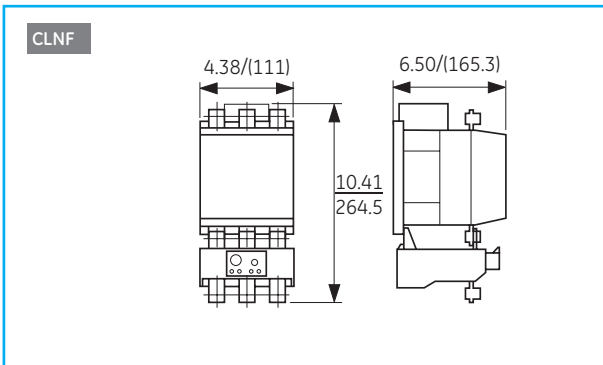
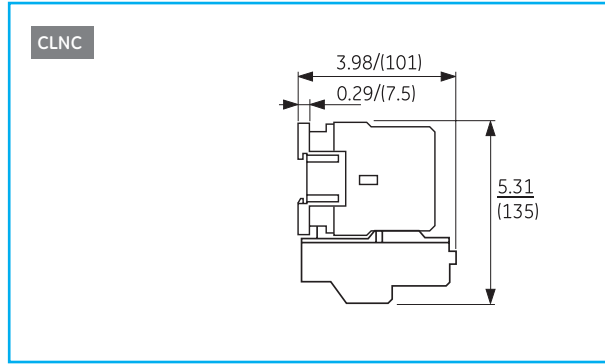
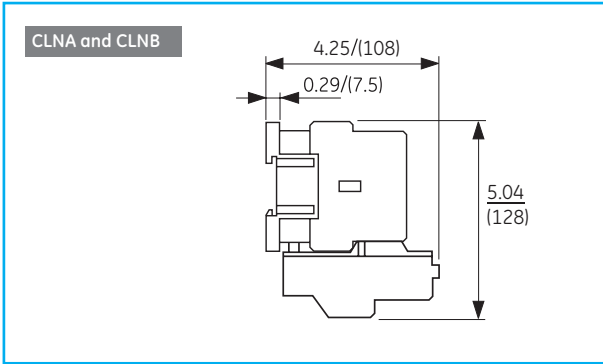
#### Legend and Notes

- A Extra Auxiliary Contacts, Side Mounted (if used)
- B Extra Auxiliary Contacts, Front Mounted (if used)
- C Pneumatic Timer (if used)
- D Mechanical Latch (if used)
- E Transient Voltage Suppressor

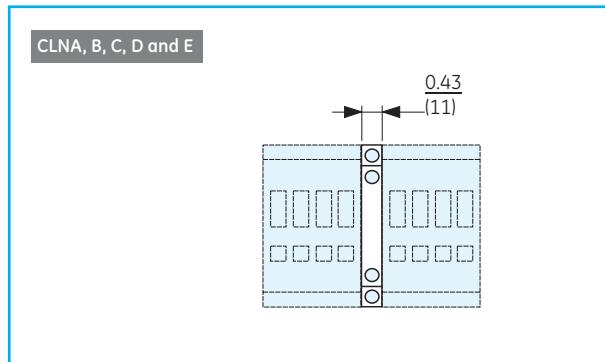
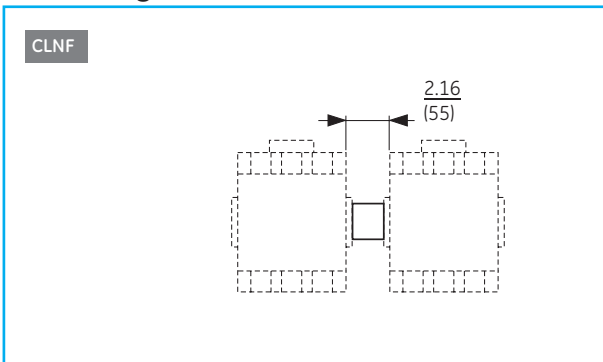


## Drawings (inches/mm)

### CLN Contactors + Overload Relay



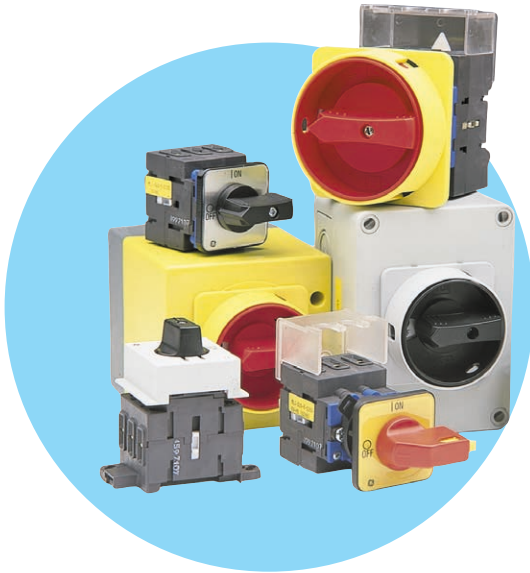
### Reversing Mechanical Interlock



Everything is under control







## Main switches

A manual operated main switch must be provided for every main circuit. It must be a switch-disconnector corresponding to utilization category AC23 (IEC 947-3) fulfils the following requirements:

- Disconnecting the electrical equipment from the main.
- Visible contact indication or a disconnection function by construction (the handle is in the "OFF" position when all contacts are open).
- If the main switch does not serve simultaneously as an emergency-stop switch, its handle should not be red. Black or grey handles are recommended.
- It should be lockable in the off-position (e.g. by padlock).
- All active conductors are to be disconnected from the main.
- The breaking capacity should be sufficient. In order to break the current of the largest motor in a blocked state together with the sum of the operating currents of the remaining motors/loads.
- The handle of the main switch must be easily accessible and must lie between 0.6 and 1.9m above the incomer level.

## Standards

Complying with:

- IEC 60947-3
- EN 60947-3
- DIN VDE 0660 Teil 107
- low voltage directive 73/73 EEC
- low voltage directive EMC 89/336 EEC

## Approvals/Marking

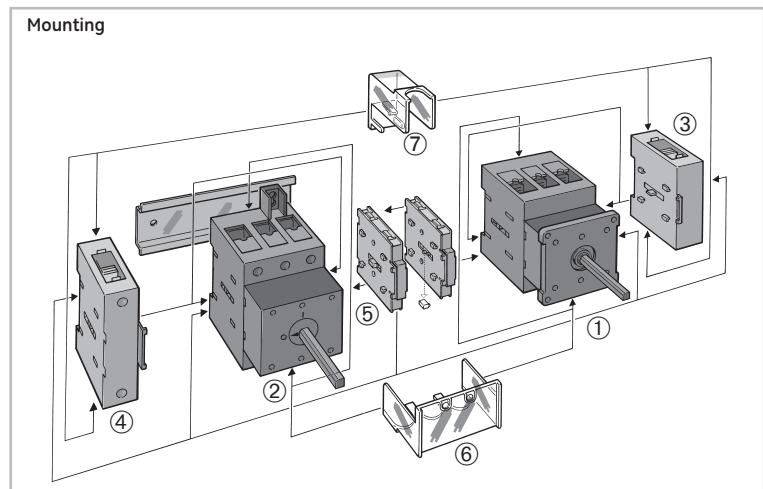


## Emergency-stop switches

The main switch may fulfil the function of an emergency-stop switch on certain machines.

The handles must be red on a yellow background.

The contacts of manual operated emergency-stop switch has to be opened by force.



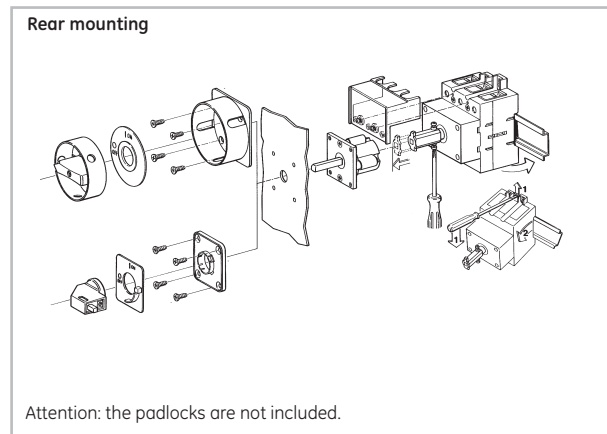
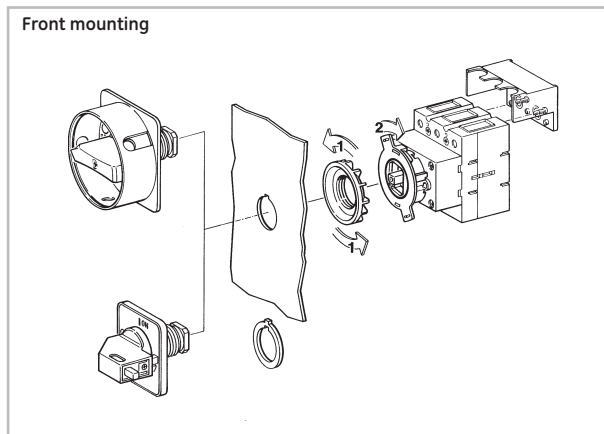
- ① Front mounting (flush mounting)
- ② Rear mounting
- ③ Main contact and PE-or N-terminals for ①
- ④ Main contact and PE-or N-terminals for ②
- ⑤ Auxiliary switch 1NO/1NG for ① and ②
- ⑥ Terminal cover triple for ① and ②
- ⑦ Terminal cover single for ③ and ④

Mounting possibilities ● page E.3  
 Accessories ● page E.6  
 Technical data ● page E.8  
 Dimensions ● page E.9


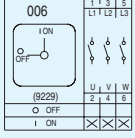

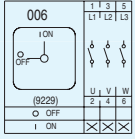

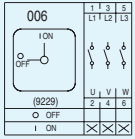

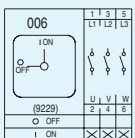

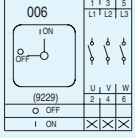


Mounting possibilities

	Ith Series	25A ML 1	40A ML 1	63A ML 2	80A ML 2	125A ML 3
<b>Front mounting (flush mounting)</b>						
<b>Central fixing</b>						
Ø 22.5mm for 3 padlocks	red/yellow	789178	789179			
Ø 22.5mm for 3 padlocks	black	789180	789181			
Ø 22.5mm for 1 or 2 padlocks	red/yellow	789174	789175			
Ø 22.5mm for 1 or 2 padlocks	black	789176	789177			
<b>4-hole fixing</b>						
With standard handle	black	789239	789240	789241	789242	789243
For 3 padlocks	red/yellow	789186	789187	789188	789189	789190
For 3 padlocks	black	789191	789192	789193	789194	789195
For 1 or 2 padlocks	red/yellow	789182	789183			
For 1 or 2 padlocks	black	789184	789185			
<b>Rear mounting</b>						
<b>With cover coupling</b>						
For 3 padlocks	red/yellow	789200	789201	789202	789203	789204
For 3 padlocks	black	789205	789206	789207	789208	789209
For 1 or 2 padlocks	red/yellow	789196	789197			
For 1 or 2 padlocks	black	789198	789199			
<b>With door coupling</b>						
For 3 padlocks	red/yellow	789214	789215	789216	789217	789218
For 3 padlocks	black	789219	789220	789221	789222	789223
For 1 or 2 padlocks	red/yellow	789210	789211			
For 1 or 2 padlocks	black	789212	789213			
<b>DIN-rail mounting</b>						
With standard handle	black	789234	789235	789236	789237	789238
For 1 or 2 padlocks	red/yellow	789224	789225	789226	789227	789228
For 1 or 2 padlocks	black	789229	789230	789231	789232	789233


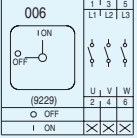

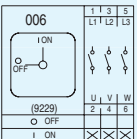

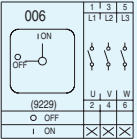

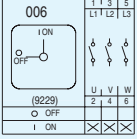

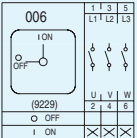

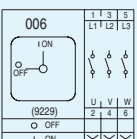


## Standard program

Central fixing Ø 22.5mm		Diagram	Terminal cover	Protection	Ithe	Red/yellow Ref. no.	Black/grey Ref. no.	Pack.
	<b>Locking handle by 1 or 2 padlocks</b>		✓	IP65	25A	<b>789174</b>	<b>789176</b>	1
			✓	IP65	40A	<b>789175</b>	<b>789177</b>	1
	<b>Locking handle by 3 padlocks</b>		✓	IP65	25A	<b>789178</b>	<b>789180</b>	1
			✓	IP65	40A	<b>789179</b>	<b>789181</b>	1
4-hole fixing								
	<b>Locking handle by 1 or 2 padlocks</b>		✓	IP55	25A	<b>789182</b>	<b>789184</b>	1
			✓	IP55	40A	<b>789183</b>	<b>789185</b>	1
	<b>Locking handle by 3 padlocks</b>		✓	IP55	25A	<b>789186</b>	<b>789191</b>	1
			✓	IP55	40A	<b>789187</b>	<b>789192</b>	1
			✓	IP55	63A	<b>789188</b>	<b>789193</b>	1
			✓	IP55	80A	<b>789189</b>	<b>789194</b>	1
			✓	IP55	125A	<b>789190</b>	<b>789195</b>	1
	<b>With standard black handle</b>		-	IP55	25A	-	<b>789239</b>	1
			-	IP55	40A	-	<b>789240</b>	1
			-	IP55	63A	-	<b>789241</b>	1
			-	IP55	80A	-	<b>789242</b>	1
			-	IP55	125A	-	<b>789243</b>	1



Standard program

DIN-rail mounting		Diagram	Terminal cover	Protection	Ithe	Red/yellow Ref. no.	Black/grey Ref. no.	Pack.
 <p>Locking handle by 1 or 2 padlocks</p>		✓	IP30	25A	789224	789229	1	
		✓	IP30	40A	789225	789230	1	
		✓	IP30	25A	789226	789231	1	
		✓	IP30	25A	789227	789232	1	
		✓	IP30	40A	789228	789233	1	
 <p>With standard black handle</p>		-	IP30	25A	-	789234	1	
		-	IP30	40A	-	789235	1	
		-	IP30	63A	-	789236	1	
		-	IP30	80A	-	789237	1	
		-	IP30	125A	-	789238	1	
 <p>With door coupling Locking handle by 1 or 2 padlocks</p>		✓	IP55	25A	789210	789212	1	
		✓	IP55	40A	789211	789213	1	
 <p>Locking handle by 3 padlocks</p>		✓	IP55	25A	789214	789219	1	
		✓	IP55	40A	789215	789220	1	
		✓	IP55	63A	789216	789221	1	
		✓	IP55	80A	789217	789222	1	
		✓	IP55	125A	789218	789223	1	
 <p>With door coupling Locking handle by 1 or 2 padlocks</p>		✓	IP65	25A	789196	789198	1	
		✓	IP65	40A	789197	789199	1	
 <p>Locking handle by 3 padlocks</p>		✓	IP65	25A	789200	789205	1	
		✓	IP65	40A	789201	789206	1	
		✓	IP65	63A	789202	789207	1	
		✓	IP65	80A	789203	789208	1	
		✓	IP65	125A	789204	789209	1	

Accessories see E.6



## Accessories - Contact blocks<sup>(1)</sup>



Neutral switched		
Front	Rear	
789244	789245	1
Series ML1		
789246	789247	1
Series ML2		
789248	789249	1
Series ML3		

Fixed neutral module		
Front	Rear	
789262	789263	1
Series ML1		
789264	789265	1
Series ML2		
789266	789267	3
Series ML3		



Switching contact		
Front	Rear	
789250	789251	1
Series ML1		
789252	789253	1
Series ML2		
789254	789255	1
Series ML3		

Auxiliary contact NO+NC lth = 16A		
Front	Rear	
789268	789269	1
Series ML1		
789268	789269	1
Series ML2		
789268	789269	1
Series ML3		



PE-terminal (Fixed)		
Front	Rear	
789256	789257	1
Series ML1		
789258	789259	1
Series ML2		
789260	789261	1
Series ML3		

## Accessories - Terminal cover



Single terminal cover (HS1)		
Series ML1	789270	1
Series ML2	789271	1
Series ML3	789271	1

Triple terminal cover (HS3)		
Series ML1	789272	1
Series ML2	789273	1
Series ML3	789274	1



Same cover for front or rear mounting

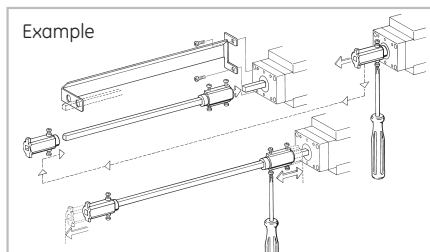
## Standard program



Shaft length	Depth range between door and base (mm)		Cat. no.
	ML1	ML2, ML3	
AL-65	170 - 215mm	185 - 320mm	789275
AL-165	265 - 335mm	280 - 350mm	789276
AL-265 <sup>(2)</sup>	365 - 435mm	380 - 450mm	789277
AL-365 <sup>(2)</sup>	465 - 535mm	480 - 550mm	789278
Shaft support for 265 and 365mm			789279

An extension shaft is necessary when the depth is higher than the length of the standard shaft.  
ML1: 105-135mm  
ML2 and ML3: 120-150mm

- (1) ML1: max. 2 units  
ML2 and ML3: max 3 units
- (2) Shaft support included.



Enclosed switches



The maintenance switch is an enclosed main switch with locking handle by 3 padlocks. With red handle and yellow front plate, if it should be used as an emergency-stop switch, otherwise black/grey.

There are six sizes of standard enclosures for the series ML. Each is equipped with a cover coupling and a double PE-terminal.

All enclosures have a degree of protection IP65 and are of solid impact and flame resistant polyester.

Enclosed switches



	Diagram	Ithe	Type of enclosure	Black/grey 3 padlocks Ref. no.	Red/yellow 3 padlocks Ref. no.	Pack.
Three poles		25A	E2	789285	789280	1
		32A	E3	789286	789281	1
		50A	E4	789287	789282	1
		63A	E5	789288	789283	1
		100A	E7	789289	789284	1
Four poles		25A	E2	789295	789290	1
		32A	E3	789296	789291	1
		50A	E4	789297	789292	1
		63A	E5	789298	789293	1
		100A	E7	789299	789294	1
Three poles + (1 NO + 1 NC)		25A	E2	789305	789300	1
		32A	E3	789306	789301	1
		50A	E4	789307	789302	1
		63A	E5	789308	789303	1
		100A	E7	789309	789304	1
Four poles + (1 NO + 1 NC)		25A	E2	789315	789310	1
		32A	E3	789316	789311	1
		50A	E4	789317	789312	1
		63A	E5	789318	789313	1
		100A	E7	789319	789314	1
Six poles		25A	E2	789325	789320	1
		32A	E3	789326	789321	1
		50A	E4	789327	789322	1
		63A	E5	789328	789323	1
		100A	E7	789329	789324	1
Six poles + (1 NO + 1 NC)		25A	E2	789335	789330	1
		32A	E3	789336	789331	1
		50A	E4	789337	789332	1
		63A	E5	789338	789333	1
		100A	E7	789339	789334	1

Accessories see E.6



## Technical data

### Main switches - According to IEC 60947-3, EN 60947-3, DIN VDE 0660 part 107, UL and CSA

Series			ML 1	ML 1	ML 2	ML 2	ML 3
Rated uninterrupted current	$I_{u \text{ open}} = I_{th}$	(A)	25	40	63	80	125
	$I_{th \text{ enclosed}}$	(A)	25	32	50	63	100
Rated insulation voltage $U_i$ (III/3)		(V)	690	690	690	690	690
Rated impulse withstand voltage $U_{imp}$ (III/3)		(kV)	6	6	6	6	6
Rated operational current $I_e$ AC21 A <sup>(3)</sup>		(A)	25	40	63	80	125
Rated operational voltage $U_e$		(V)	690	690	690	690	690
Frequency		(Hz)	50/60	50/60	50/60	50/60	50/60
<b>Making/breaking capacity</b>							
Utilization category AC3:	3 x 230V	(kW)	5.5	7.5	15	18.5	22
Motor switches for operational switching	3 x 400V	(kW)	7.5	11	22	30	37
Utilization category AC23A <sup>(3)</sup>	3 x 690V	(kW)	7.5	11	22	30	45
Motor switches (Main switches for machinery)	3 x 230V	(kW)	7.5	11	18.5	22	25
Rated breaking category AC23 A <sup>(3)</sup>	3 x 400V	(kW)	11	15	30 <sup>(1)</sup>	37 <sup>(2)</sup>	45
	3 x 690V	(A)	260	390	630	750	870
	3 x 400V	(A)	220	300	570	700	850
	3 x 690V	(A)	130	170	330	400	490
<b>Short-circuit capacity</b>							
Max. fuse rating gG		(A)	50	50	80	80	125
Rated conditional short-circuit current		(kA <sub>eff</sub> )	10	10	-	-	-
Rated short-circuit making capacity $I_{cm}$		(kA)	-	-	2.1	2.1	3.4
Rated short-time withstand $I_{cw}$ (1s-current)		(A <sub>eff</sub> )	300	480	765	960	1500
Disconnect function up to		(V)	690	690	690	690	690
Terminal screws (Pozidriv)			M4	M4	M5	M5	M6
Torque terminal screws		(Nm)	2.5	2.5	4	4	4.5
<b>Cable cross section</b>							
Solid or multi-stranded (Cu)		min. - max. (mm <sup>2</sup> )	1.5-10	1.5-10	2.5-35	2.5-35	6-70
Flexible with ferrule (DIN 46228)		min. - max. (mm <sup>2</sup> )	1.5-6	1.5-6	1.5-25	1.5-25	6-50
General purpose 3-phase		(A)	25	40	63	80	125
		(V)	600	600	600	600	600
 Motor 3-phase	240V	(HP)	7.5	10	15	20	25
	480V	(HP)	10	20	30	40	50
	600V	(HP)	10	20	30	40	50
 Motor 1-phase (2 pole)	120V	(HP)	1	1.5	3	4	6
	240V	(HP)	2	3	7.5	10	15
Cable cross section		AWG-No	14-7	14-3	14-2	14-2	8-1/0

(1) 22 kW in enclosure

(2) 30 kW in enclosure

(3) ML2/ML3 according to EN 60947-3 category B

### Auxiliary contact for main switches - According to IEC 60947-5-1

Series			ML 1/2/3
Rated uninterrupted current	$I_{u \text{ open}} = I_{th}$	(A)	16
	$I_{th \text{ enclosed}}$	(A)	16
Rated insulation voltage $U_i$ (III/3)		(V)	690
Rated impulse withstand voltage $U_{imp}$		(kV)	6
Rated operational current	$I_e$ (AC15)		
	230V	(A)	6
	400V	(A)	4
	690V	(A)	2
Max. fuse rating gG		(A)	16
Rated conditional short-circuit current		(kA <sub>eff</sub> )	3
Cable cross section, solid or multi-stranded		min. - max. (mm <sup>2</sup> )	1-4
Flexible with ferrule (DIN 46228)		min. - max. (mm <sup>2</sup> )	1-2.5
Terminal screws (Pozidriv)			M3
Torque terminal screws		(Nm)	0.6

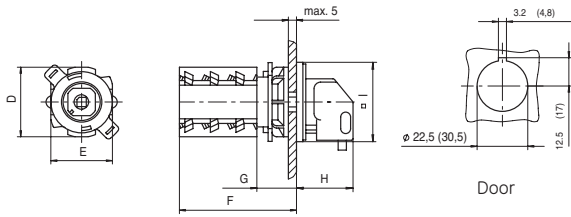




## Dimensional drawings

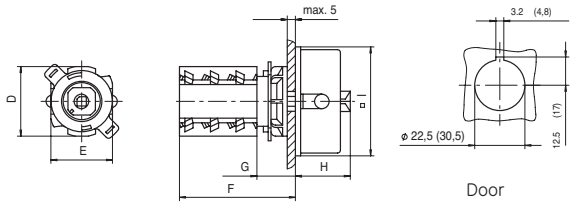
### Front mounting - Central fixing $\varnothing$ 22.5mm

For 1 or 2 padlocks,  $\varnothing$  max. 5mm



Series	D	E	F	G	H	I
ML1	55	45	75	25	35	48

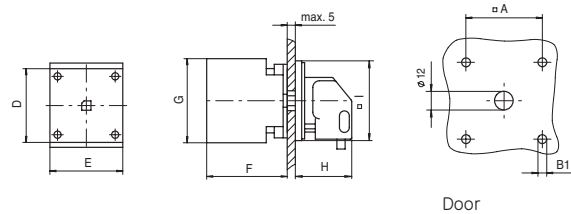
For 3 padlocks,  $\varnothing$  max. 9mm



Series	D	E	F	G	H	I
ML1	55	45	75	25	35	66

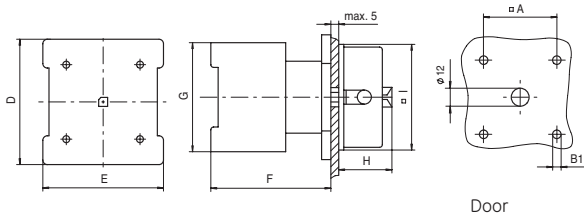
### Front mounting - 4-hole fixing

For 1 or 2 padlocks,  $\varnothing$  max. 5mm



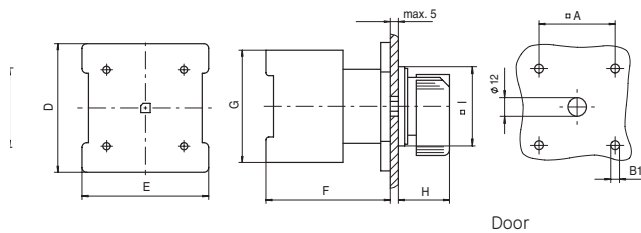
Series	A	B1	D	E	F	G	H	I
ML1	36	4.5	44	44	50	55	35	48

For 3 padlocks,  $\varnothing$  max. 5mm



Series	A	B1	D	E	F	G	H	I
ML1	36	4.5	44	44	50	55	32	66
ML2	48	5.5	58	58	72	75	37	86
ML3	48	5.5	78	78	72	80	37	86

### Front mounting - 4-hole fixing, with standard black handle



Series	A	B1	D	E	F	G	H	I
ML1	36	4.5	44	44	50	55	29	48
ML2	48	5.5	58	58	72	75	33	64
ML3	69	5.5	78	78	72	80	35	88

Dimensions in mm (inch = mm x 0.03937) - Weight in kg (lb = kg x 2.2046)

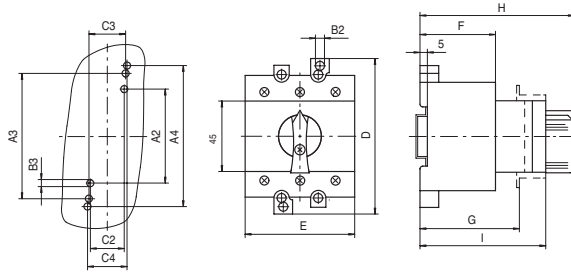


# Series ML

## Dimensional drawings

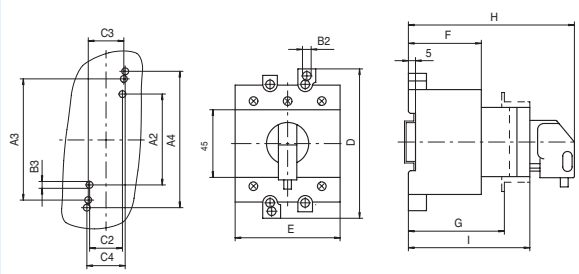
### Rear mounting - DIN-rail mounting

With standard black handle



Series	A2	A3	A4	B2	B3	C2	C3
ML1	60	65	70	4.2	3.8	22	30
ML2	-	80	90	5.5	5.2	-	23.5
ML3	-	80	90	5.5	5.2	-	23.5
Series	C4	D	E	F	G	H	I
ML1	25	78	52.5	42	48.5	87.5	67.5
ML2	25	100	53.5	49	-	100	79
ML3	25	100	70	49	-	100	79

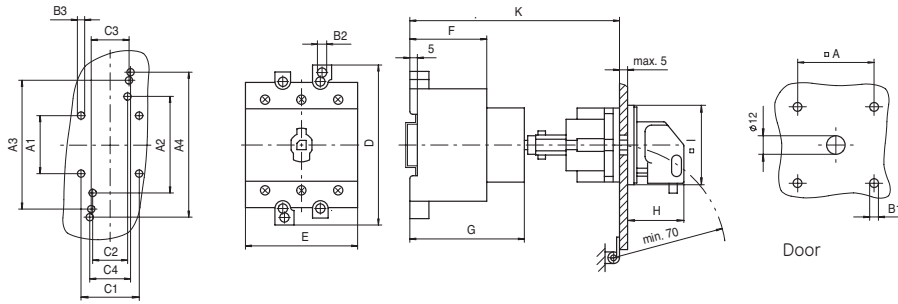
For 1 or 2 padlocks, Ø max. 5mm



Series	A2	A3	A4	B2	B3	C2	C3
ML1	60	65	70	4.2	3.8	22	30
ML2	-	80	90	5.5	5.2	-	23.5
ML3	-	80	90	5.5	5.2	-	23.5
Series	C4	D	E	F	G	H	I
ML1	25	78	52.5	42	48.5	91.5	67.5
ML2	25	100	53.5	49	-	104	79
ML3	25	100	70	49	-	104	79

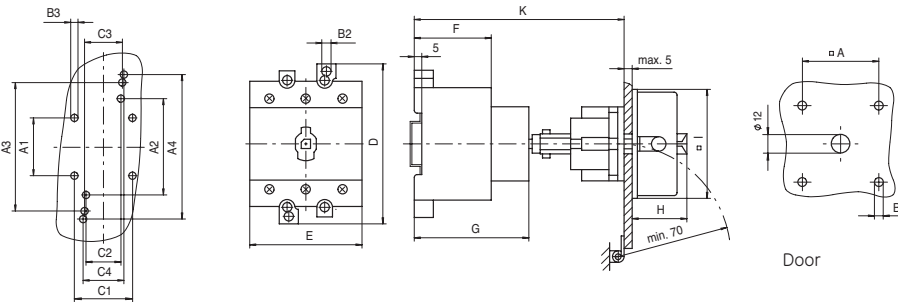
### Rear mounting - With door coupling

For 1 or 2 padlocks, Ø max. 5mm



Series	A	A2	A3	A4	B1	B2	B3	C2	C3	C4	D	E	F	G	H	I	K
ML1	36	60	65	70	4.5	4.2	3.8	22	30	25	78	45	42	55	35	48	105-135

For 3 padlocks, Ø max. 5mm



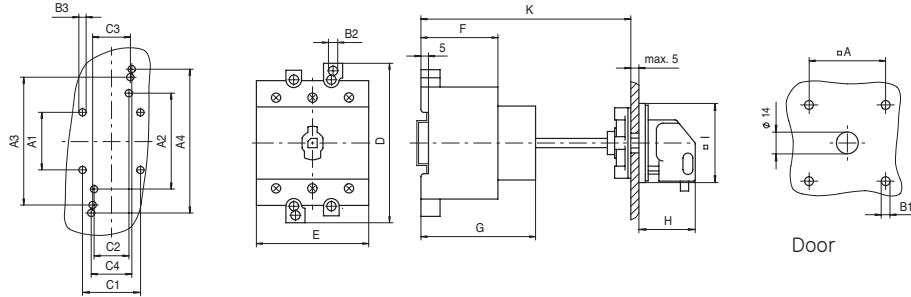
Series	A	A2	A3	A4	B1	B2	B3	C2	C3	C4	D	E	F	G	H	I	K
ML1	36	60	65	70	4.5	4.2	3.8	22	30	25	78	45	42	55	32	66	105-135
ML2	36	-	80	90	5.5	5.5	5.2	-	23.5	25	100	53.5	49	72	37	86	120-150
ML3	36	-	80	90	5.5	5.5	5.2	-	23.5	25	100	70	49	72	37	86	120-150

Dimensions in mm (inch = mm x 0.03937) - Weight in kg (lb = kg x 2.2046)



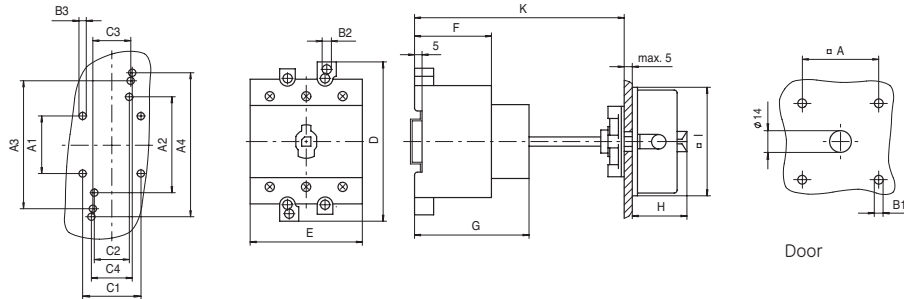
Rear mounting - With cover coupling

For 1 or 2 padlocks, Ø max. 9mm



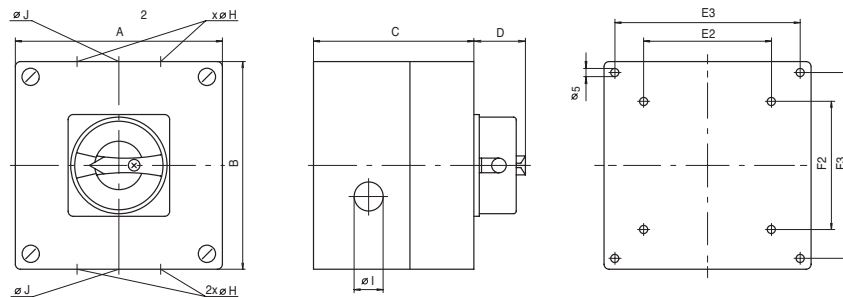
Series	A	A2	A3	A4	B1	B2	B3	C2	C3	C4	D	E	F	G	H	I	K
ML1	36	60	65	70	4.5	4.2	3.8	22	30	25	78	45	42	55	35	48	105-135

For 3 padlocks, Ø max. 9mm



Series	A	A2	A3	A4	B1	B2	B3	C2	C3	C4	D	E	F	G	H	I	K
ML1	36	60	65	70	4.5	4.2	3.8	22	30	25	78	45	42	55	32	66	88-98
ML2	36	-	80	90	5.5	5.5	5.2	-	23.5	25	100	53.5	49	72	37	86	103-113
ML3	36	-	80	90	5.5	5.5	5.2	-	23.5	25	100	70	49	72	37	86	103-113

Enclosed switches



Enclosure Type	A	B	C	D	E2	E3	F2	F3
E2	94	130	81	32	-	79	-	115
E3	130	130	99	32	-	115	-	115
E4	110	180	11	32	50	95	120	165
E5	180	182	111	37	120	165	120	167
E6	180	254	111	37	120	165	190	239
E7	265	265	140	37	194	-	230	-

Cable entry Type	H (1)	I (1)	H (2)	I (2)	J (2)
E2	PG 16/11	PG 11	-	-	-
E3	PG 21/16	PG 16	-	-	-
E4	-	-	PG 21	PG 11	-
E5	-	-	PG 29	-	PG 11
E6	-	-	PG 29	PG 11	-
E7	PG 36/29	PG 29	-	-	-

(1) Knock-out entry  
(2) Cable entry

Dimensions in mm (inch = mm x 0.03937) - Weight in kg (lb = kg x 2.2046)

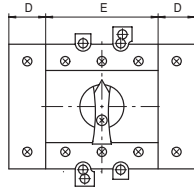


# Series ML

## Dimensional drawings

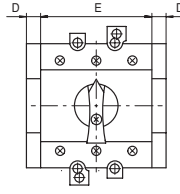
### Accessories

N-module and PE-terminal



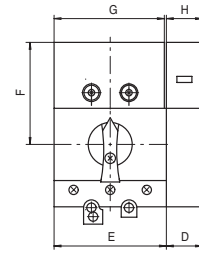
Series	D	E
ML1	14.5	45
ML2	23	53.5
ML3	23	70

Auxiliary contacts (NO + NC)



Series	D	E
ML1	9.5	45
ML2	9.5	53.5
ML3	9.5	70

Terminal covers



Series	D	E	F	G	H
ML1	14.5	45	53	41	14
ML2	23	53.5	61	52	22.5
ML3	23	70	65	68	22.5

Dimensions in mm (inch = mm x 0.03937) - Weight in kg (lb = kg x 2.2046)



## Switches for photovoltaic applications up to 1000V DC

To isolate the solar panels from the inverter, from 16 to 100A dc

- Available in 600 and 1000V DC
- Easy installation, ready to install
- Pre-wired for DC applications
- Compact size
- DIN rail mounting as standard, other configurations possible
- Clear identification of inputs and outputs
- Padlockable



### Approvals/Marking



### Technical data/Order codes

According IEC 60947-3	Ref. no.	Ref. no.							
		247532	247533	247534	817600	247536	247537	247538	
Rated operational voltage Ue (+10%)	(VDC)	600	600	600	1000	1000	1000	1000	
Rated impulse withstand voltage Uimp	(kV)	6	6	6	6	6	6	6	
Rated thermal current, DC-20 Ith	(Adc)	16	25	40	40	63	80	100	
In open air, normal conditions <sup>(1)</sup>									
Minimum cable or bar cross section - Cu	(mm <sup>2</sup> )	2.5	6	10	10	35	35	35	
Rated operational current									
600V DC	(Adc)	16	25	40	-	-	-	-	
1000V DC	(Adc)	-	10	25	40	63	80	100	
Power loss / Pole	(W)	1.5	1.5	1.5	1.5	4.5	5.5	3	
Number of poles		2	3	3	6	8	8	8	
Mechanical service life	(Ops)	30,000	30,000	30,000	30,000	30,000	30,000	30,000	
Dimensions (HxWxD)	(mm)	78x46x55	78x46x55	78x46x55	78x97x55	100x90x73	100x105x73	100x105x73	
Frontcover	-	included	included	included	included	not available	not available	not available	

(1) Defined by IEC 60947-1-6.1

### Enclosed DC switch without surge protection

Description	Ref. no.	Pack.



Everything is under control

			Intro
	<b>POWER DEVICES</b>	Contactors and overload relays	A
		Auxiliary relays and contactors	B
		Motor protection devices	C
	<b>Series P9</b>		
F.2	Control and signalling units $\varnothing$ 22mm		
	<b>Series 077</b>	Applications	D
F.44	Control and signalling units $\varnothing$ 30mm		
	<b>Series 105</b>	Main switches	E
	<b>AUXILIARY DEVICES</b>		
F.61	Signalling devices	<b>Control and signalling units</b>	<b>F</b>
	<b>POWER ELECTRONICS</b>	Speed drive units	G
		Soft starters	H
	<b>ENCLOSURES</b>	Product overview	I
		Alphabetical index	X





F.3	<b>Main features</b>
F.4	<b>Range overview</b>
F.6	<b>Technical data</b>
F.8	<b>Overview</b>
F.8	<b>Order codes - Panel mounting devices</b>
F.12	Catalogue number structure
F.13	Standard push-buttons
F.14	Pilot Devices
F.15	Double function push-buttons
F.16	Selector switches with knob
F.17	Selector switches with lever
F.18	Selector switches with key
F.20	Illuminated push-buttons
F.20	Illuminated selector switches
F.21	Selector push-buttons
F.22	Emergency lever
F.22	Reset push buttons
F.22	Potentiometer operators
F.22	Buzzers - Pilot lights
F.23	Joysticks
F.24	Contact blocks
F.25	Power supplies
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F.27	Electrical diagrams
F.28	Push-button stations in thermoplastic
F.29	Equipped boxes
F.31	Push-button stations in aluminium
F.32	Caps for standard push-buttons
F.33	Diffusers/insert for illuminated units
F.34	<b>Order codes - Common accessories</b>
F.38	<b>Overall dimensions</b>
F.38	Panel mounting
F.43	Enclosures for push-button stations

Intro

A

B

C

D

E

**F**

G

H

I

X



## Main features

### Shape, material and colours



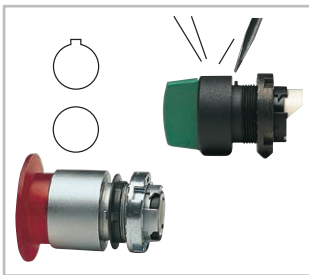
The P9 line offers three types of operators:

- round in satin chrome
- round in engineering thermoplastic
- square in engineering thermoplastic

Modern ergonomic P9 actuators are available in a wide variety of colours and styles, and are the result of superior industrial design experience.

Series P9 satisfies any sophisticated industrial applications.

### Fitting and positioning



All the P9 operators are fitted with seal to ensure IP66 degree of protection.

A locating tab on the operator allows the correct positioning on panels with holes drilled according to CENELEC EN 50007 standards (with notch). The tab also ensures panel stability and prevents unwanted rotations.

The tab can be removed with a screwdriver for applications in holes without notch.

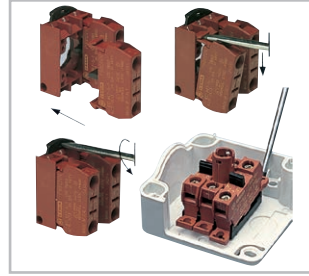
### Rear locking and back mounting procedure



P9 operators are back mounted to the panel by a patented locking ring. The units can be assembled using a standard screwdriver.

As an option, an assembly wrench is available.

### Fast mounting



All the P9 rear panel devices are snap-on.

Mounting between panel and operator is accomplished by means of a patented snap-on flange which ensures a fast fitting.

For base mounting, the fitting is done directly on the adaptor inside the enclosures base.

Each single block can be mounted or removed individually.

In panel mounting, it is also possible to install or remove the snap-on mounting flange with the contact block group;

Blocks and/or flange can be disassembled by a standard screwdriver, to simplify operations.

### Safety and reliability



The P9 contact blocks are designed to ensure maximum reliability in every condition and to monitor control circuits at low energy levels (12V-5mA minimum), thanks to advanced solution such as:

- four contact points
- high efficiency self-cleaning operation
- silver contacts properly shaped
- high contact pressure

### Mounting system



The P9 line offers a wide variety of operators, contact blocks and power supplies for panel mounting.

Furthermore a range of contact blocks and

power supplies are available for base mounting.

The base mounting option is simple thanks to plastic enclosures fitted with a standard mounting adaptor, which allows a snap-on and secure fastening.

# Series P9

## Panel mounting devices

### Control units

Standard push-b.



F.13

Mushroom push-button



F.13

Emergency push-button



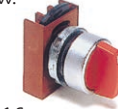
F.13

Key push-button



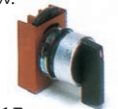
F.13

Knob selector sw.



F.16

Lever selector sw.



F.17

Key selector sw.



F.18

Selector push-b.



F.21

Toggle switch



F.21

Joystick



F.23

Emergency lever

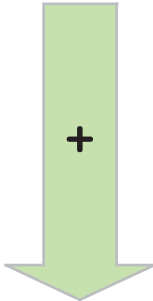


F.22

Double push-b.



F.15



Contact blocks



F.24



Control and signalling units Ø 22mm

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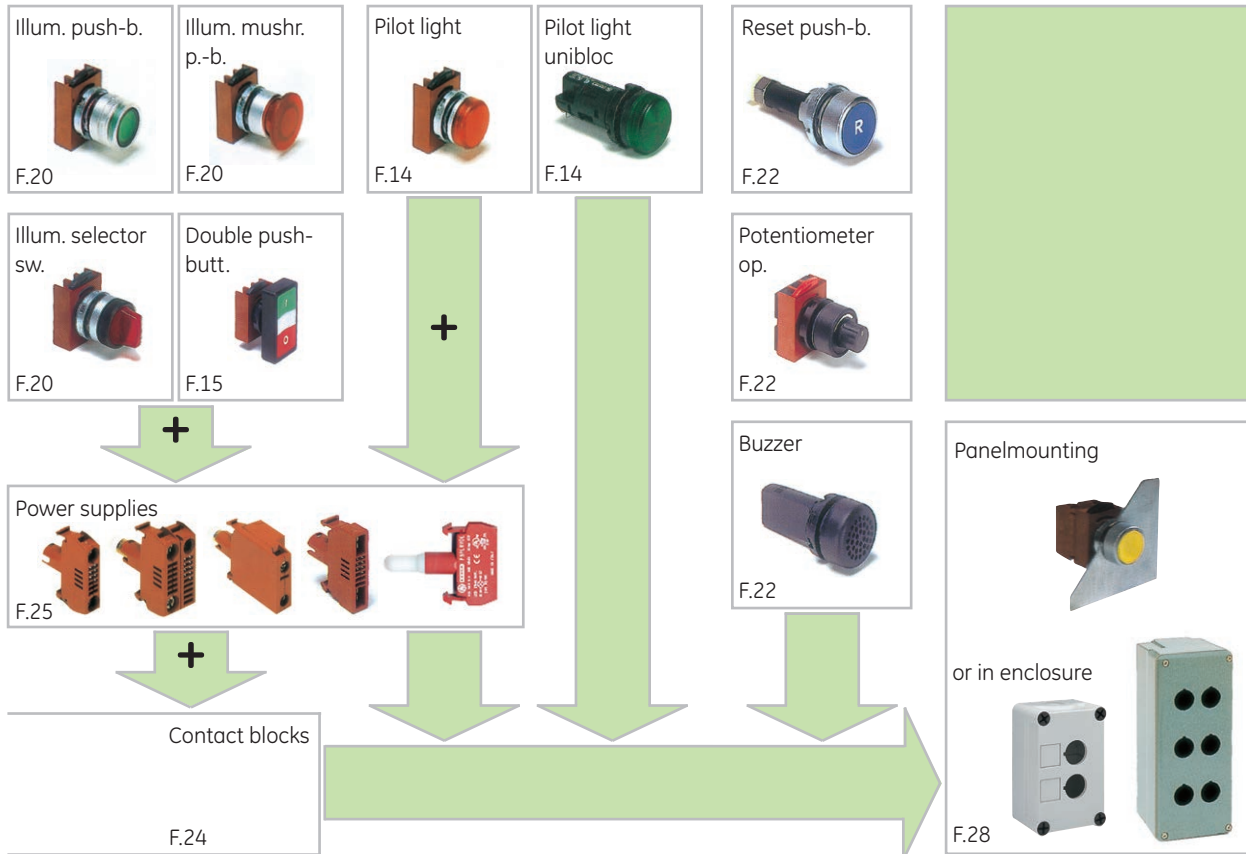
I

X



**Illuminated control units Signalling units**

**Others units**



**Accessories**

General	Push-buttons	Mushroom push-buttons	Illuminated push-buttons	Illuminated mushroom push-buttons	Illuminated selector switches	Pilot lights
Nameplates F.55	Rubber caps F.32	Name plates F.36	Diffusers F.33	Collar F.34	Padlock F.34	Diffusers F.33s
Plugs F.34	Padlock F.34	Collar Ø 40 F.34	Padlock F.34			
Flanges F.34	Push-on/push-off device F.34		Push-on/push-off device F.34			
Ring wrench F.34			Bulbs BA9S F.35			
Neutral plate F.36	Keys F.35			Bulb extractor F.34		



# Series P9

## Technical data

### Compliance with standards

IEC 947.5.1 - VDE 0660 - NFC 63140  
IEC/EN 60947.5.1 - UTE - BSI - NEMA  
CENELEC EN 50007

### Approvals

cUL U.S. - RINA - CE - GOST R - Lloyd's Register of Shipping -  
Bureau Veritas - Germanischer Lloyd

### Climatic protections

The standard versions are suitable for use in the following climates:

Temperate climate	cat. 23/50 (DIN 50014)
Wet climate	cat. 23/83 (DIN 50015)
Hot wet climate	cat. 40/92 (DIN 50015)
Variable wet climate	FW24 (DIN 50016)

### Temperature ranges

Operation	-30°C to +70°C
Storage	-40°C to +70°C

### Protection degree of the operators

IP66 according to CENELEC EN 60529 when they are mounted into enclosures with the same or a higher degree of protection.

Suitable for using into enclosures type NEMA 1-3-3R-3S-4-4X-12-13 according to UL 508.

### Protection degree of the terminals

IP2x according to CENELEC EN 60529.

### Shock resistance (acc. to MIL 202 B method 202 A)

1/2 sinusoid 11ms:  
No damage or disassembling at 100g for all devices, except for the illuminated operators with transformer 38g.

### Vibration resistance (according to IEC 68-2-6)

16 g with frequency range from 40 to 500Hz and maximum shifting 0.75mm (peak-to-peak).

### Rated insulation voltage

690V according to EN 60947.1

### Impulse withstand voltage

4 kV according to EN 60947.1

### Insulation class

Groep C according VDE 0110

### Electrical shocks protection (acc. IEC 536)

Metal operators	Class I
Plastic operators	Class II (double insulation)

### Short-circuit protection

With fuses 16A gG according to IEC 269.1 and 269.3.

### Performances of the contacts

- Slow acting
- Self-cleaning sliding
- NC forced breaking
- Double movable bridge
- Four switching points
- Double break

### Electrical resistance of the contact

≤25m Ω according to IEC 255, cat. 3

### Identification of the terminals

According CENELEC EN 50013

### Electrical performances

Rated thermal current I<sub>th</sub> = 10 A

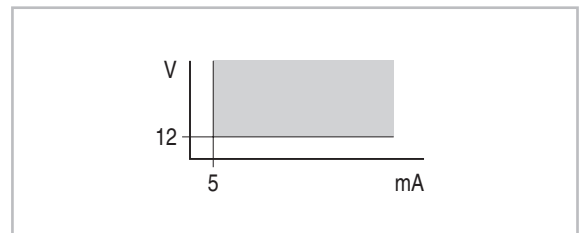
#### Performances according IEC 947.5.1

Categorie AC 15									
Voltage	Ue (V)	24	48	60	110	220	380	500	600
Current	Ie (A)	10	10	10	6	3	2	1.5	1.2
Categorie DC 13									
Voltage	Ue (V)	24	48	60	110	220	300		
Current	Ie (A)	2.5	1.4	1	0.55	0.27	0.2		

#### Performances according to CSA and UL

AC Heavy Duty	(A600)
DC Standard Duty	(Q300)

### Operating range



Control and signalling units Ø 22mm

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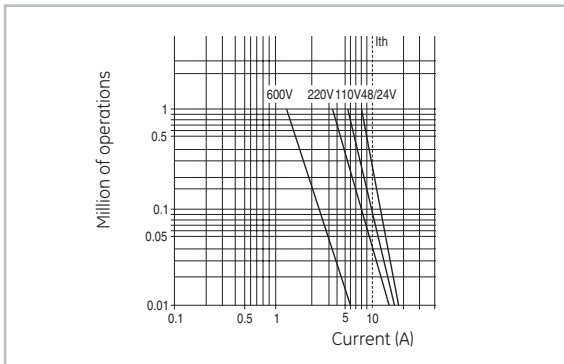
I

X

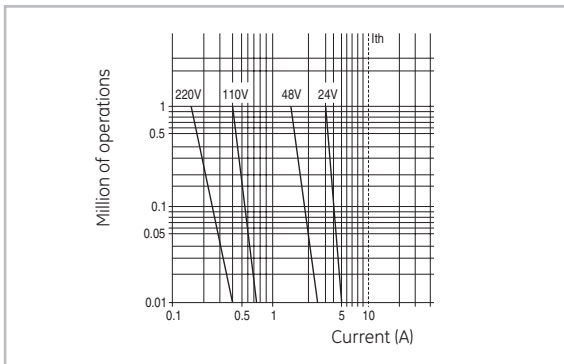


### Electrical endurance

Alternative current 50/60 Hz cat. AC 15



Direct current cat. DC 13



### Mechanical endurance

Locking emergency	
Mushroom head push-buttons 3 positions	0.3 Mil./op.
Illuminated mushroom head push-buttons 3 pos.	
Joysticks	
Key push-buttons	
Toggle switches	0.5 Mil./op.
Illuminated selector switches	
Push-on push-off device	
Standard selector switches	
Key selector switches	
Illuminated push-buttons	1 Mil./op.
Selector push-buttons	
Emergency lever	
Standard push-buttons	3 Mil./op.
Mushroom head push-buttons	

### Rear panel modularity

The P9 series is composed with 10mm or a multiple of 10mm modular units, fitted side by side on a proper mounting flange. The standard operators are supplied with a three position flange with a capacity of 3 units of 10mm or 1 of 10mm and 1 of 20mm or 1 of 30mm.

When the three position flange is not enough to satisfy the applications needs, the five position flange is required to add two more units of 10mm mounted side by side.

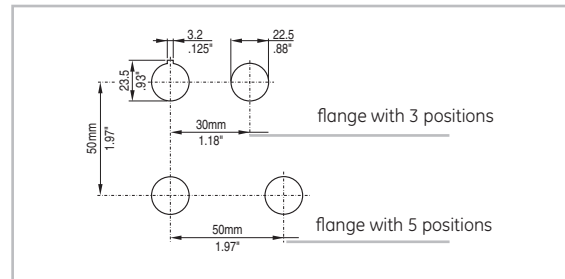
Using the five position flange take into account the bigger with (50mm instead of 30mm).

### Number of electrical contacts

	Flange	
	standard 3 positions	optional 5 positions
Standard push-buttons		
Mushroom head push-buttons	max 6	max 8
Emergency lever		
Standard selectors	max 4	max 8
Key selector switches		
Joysticks		
Key push-buttons	max 4	-
Selector push-buttons		
Toggle switches		
Mushroom head with lock	max 4	-
Mushroom head push-buttons 3 pos.	max 2	
Illuminated push-buttons		
Illuminated mushroom head push-buttons	max 4	max 4
Illuminated selector switches		
Illuminated mush. push-buttons with lock	max 2	max 2
Illuminated mush. push-buttons 3 pos.		

### Mounting

Fitted for panels 1 to 6mm. thick with holes drilled according to CENELEC EN 50007 standards.



# Series P9

Control and signalling units Ø 22mm

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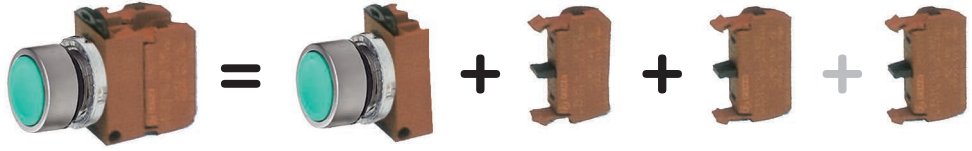
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I

X

## Standard control units



**Push-button**  
with flush cap

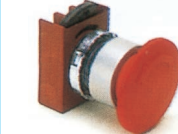
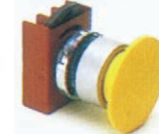
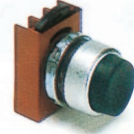
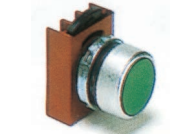
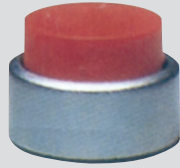
**Push-button**  
with raised cap

**Push-button**  
mushroom head

**Push-button**  
mushroom head  
with latch  
push-twist/pull/key  
to release

**Emergency**  
push-button  
with positive break  
push-twist to release  
EN418

Round satin  
chrome  
P9M



**P9MPN**◆G Ref. no.  
● .....N.. 184000  
● .....R.. 184001  
● .....V.. 184002  
● .....G.. 184003  
● .....L.. 184006  
⊗ .....0.. 184009

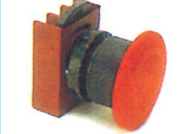
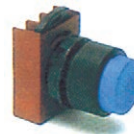
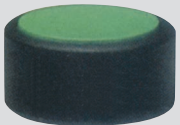
**P9MPN**◆S Ref. no.  
● .....N.. 184010  
● .....R.. 184011  
● .....V.. 184012  
● .....G.. 184013  
● .....L.. 184016  
⊗ .....0.. 184019

**P9MEM**4◆N Ref. no.  
● .....N.. 184030  
● .....R.. 184031  
● .....V.. 184032  
● .....G.. 184033  
● .....L.. 184046

Ref. no.  
● P9MER4RN184070  
(push-twist to release)  
● P9MET4RN1  
184061  
● (push-pull to release)  
P9MEC4RN95  
184073  
(push-key to release)

⊗ = without cap

Round plastic  
P9X



**P9XPN**◆G Ref. no.  
● .....N.. 185000  
● .....R.. 185001  
● .....V.. 185002  
● .....G.. 185003  
● .....L.. 185006  
⊗ .....0.. 185009

**P9XPN**◆S Ref. no.  
● .....N.. 185010  
● .....R.. 185011  
● .....V.. 185012  
● .....G.. 185013  
● .....L.. 185016  
⊗ .....0.. 185019

**P9XEM**4◆N Ref. no.  
● .....N.. 185040  
● .....R.. 185041

Ref. no.  
● P9XER4RN 185070  
(push-twist to release)  
● P9XET4RN1  
185061  
● (push-pull to release)  
P9XEC4RN95  
185074  
(push-key to release)

Ref. no.  
● P9XER4RAN185077  
(push-twist to release)  
● P9XER4RAW185078  
(push-twist to release)  
● P9XER4RA95N  
185079  
(push-key to release)

⊗ = without cap

## Caps for standard push-buttons



Flush and recessed



Raised

	Flush and recessed		Raised	
	Cat. no.	Ref. no.	Cat. no.	Ref. no.
<b>Neutral caps</b> select the colour and complete the code:	<b>P9ARBG</b> ◆	<b>18710</b> ◆	<b>P9ARBS</b> ◆	<b>18720</b> ◆
<b>Caps with symbols<sup>(1)</sup></b>				
Stop	P9ARBGR 029	187150	P9ARBSR 029	187210
Start	P9ARBGV 028	187112	P9ARBSV 028	187212
Continuous rectilinear motion	P9ARBGN 006 P9ARBGV 006 P9ARBGB 006	187117 187118 187152	P9ARBSN 006 P9ARBSV 006 P9ARBSB 006	187217 187218 187252
Increase	P9ARBGN 017	187125	-	-
Decrease	P9ARBGN 018	187127	-	-

◆ Complete the Cat. no. with:  
N R V G M L B H

◆ Complete the Ref. no. with:  
0 1 2 3 4 6 7 8

### Caps with text<sup>(1)</sup>

Reset

Stop/Reset

Test

Stop

Start

<sup>(1)</sup> Other symbols/text on request

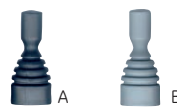


**Example:**  
Green push-button in metal, round with flush cap  
+ 2 contacts NO = P9 MPNVG + 2x P9 B10VN

Selector switch with knob	Selector switch with lever	Selector switch with key (code 3095) key removal in all positions	Joystick
 <p><b>I-II fixed</b> ● P9MSMD0N 184110</p> <p><b>I-O-II fixed</b> ● P9MSMZ0N →← 184200</p> <p><b>I-O-II spring return</b> ● P9MSMZ3N 184320</p>	 <p><b>I-II fixed</b> ● P9MSVD0N 184370</p> <p><b>I-O-II fixed</b> ● P9MSVZ0N →← 184379</p> <p><b>I-O-II spring return</b> ● P9MSVZ3N 184391</p>	 <p><b>I-II fixed</b> ● P9MSCD0K95 184402</p> <p><b>I-O-II fixed</b> ● P9MSCZ0T95 →← 184439</p> <p><b>I-O-II spring return</b> ● P9MSCZ3C95 184467</p>	 <p>fixed pos. ● P9MMN2F 184700</p> <p>transient pos. ● P9MMN2T 184701</p> <p>4 0 2 3</p> <p>fixed pos. ● P9MMN4F 184720</p> <p>transient pos. ● P9MMN4T 184721</p>
 <p><b>I-II fixed</b> ● P9XSMD0N 185110</p> <p><b>I-O-II fixed</b> ● P9XSMZ0N →← 185200</p> <p><b>I-O-II spring return</b> ● P9XSMZ3N 185320</p>	 <p><b>I-II fixed</b> ● P9XSVD0N 185370</p> <p><b>I-O-II fixed</b> ● P9XSVZ0N →← 185379</p> <p><b>I-O-II spring return</b> ● P9XSVZ3N 185391</p>	 <p><b>I-II fixed</b> ● P9XSCD0K95 185402</p> <p><b>I-O-II fixed</b> ● P9XSCZ0T95 →← 185439</p> <p><b>I-O-II spring return</b> ● P9XSCZ3C95 185467</p>	 <p>fixed pos. ● P9XMN2F 185700</p> <p>transient pos. ● P9XMN2T 185701</p> <p>4 0 2 3</p> <p>fixed pos. ● P9XMN4F 185720</p> <p>transient pos. ● P9XMN4T 185721</p>

	Flush and recessed		Raised	
	Cat. no.	Ref. no.	Cat. no.	Ref. no.
Blue	P9ARBGL 037	187143	-	-
Red	P9ARBGR 036	187144	-	-
Black	P9ARBGN 030	187145	P9ARBSN 030	187245
Green	P9ARBGV 030	187146	P9ARBSV 030	187246
Red	P9ARBGR 201	187147	P9ARBSR 201	187247
Green	P9ARBGV 202	187149	P9ARBSV 202	187249

### Spare boots for joysticks

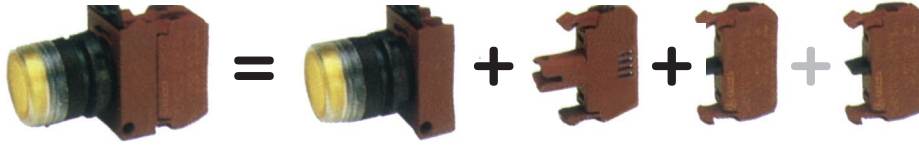


Cat./Ref. no.

<b>Rubber boots</b>	<b>(A)</b>
Standard	P9ARSCMN 188043
With interlock	P9ARSCMB 188044
<b>Silicone boots</b>	<b>(B)</b>
Standard	P9ARSGMN 187495
With interlock	P9ARSGMB 187496

# Series P9

## Illuminated control units



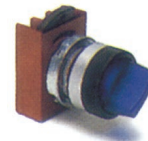
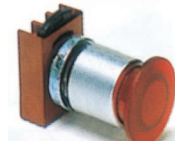
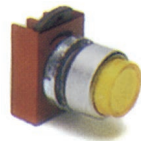
**Illuminated push-button**  
with flush cap

**Illuminated push-button**  
with raised cap

**Illuminated push-button**  
with mushroom head

**Illuminated push-button**  
push-pull to release  
with mushroom head

**Illuminated selector switch**



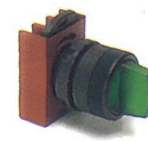
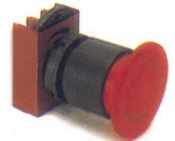
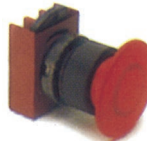
- P9MPL♦GD** Ref. no.
- .....R.. 184491
  - .....V.. 184492
  - .....G.. 184493
  - .....B.. 184497
  - .....L.. 184496

- P9MPL♦SD** Ref. no.
- .....R.. 184501
  - .....V.. 184502
  - .....G.. 184503
  - .....B.. 184507
  - .....L.. 184506

- ø 40 mm  
**P9MEM4♦L** Ref. no.
- .....R.. 184551
  - .....V.. 184552
  - .....G.. 184553
  - .....B.. 184557
  - .....L.. 184556

- ø 40 mm  
● P9MET4RL1 184561

- I-II fixed Ref. no.  
**P9MSLDOR♦** 184591  
I-O-II fixed  
**P9MSLZOR♦** 184601  
->-<  
I-O-II spring return  
**P9MSLZ3R♦** 184631  
♦ Colour palette =  
● R ● V ● G ● L



- P9XPL♦GD** Ref. no.
- .....R.. 185491
  - .....V.. 185492
  - .....G.. 185493
  - .....B.. 185497
  - .....L.. 185496

- P9XPL♦SD** Ref. no.
- .....R.. 185501
  - .....V.. 185502
  - .....G.. 185503
  - .....B.. 185507
  - .....L.. 185507

- ø 40 mm  
**P9XEM4♦L** Ref. no.
- .....R.. 185551
  - .....V.. 185552
  - .....G.. 185553
  - .....L.. 185556

- ø 40 mm  
● P9XETRR1 185561

- I-II fixed Ref. no.  
**P9XSLDOR♦** 185591  
I-O-II fixed  
**P9XSLZOR♦** 185601  
->-<  
I-O-II spring return  
**P9XSLZ3R♦** 185631  
♦ Colour palette =  
● R ● V ● G ● L

## Diffusers/insert for illuminated units



For pilot lights



For illuminated push buttons

	For pilot lights		For illuminated push buttons	
	Cat. no.	Ref. no.	Cat. no.	Ref. no.
Neutral	P9ARDLS	187300	P9ARDPL	187350
With symbols <sup>(1)</sup>				
Stop	P9ARDLS029	187301	P9ARDPL029	187351
Start	P9ARDLS028	187302	P9ARDPL028	187352
Continuous rectilinear motion	P9ARDLS006	187305	P9ARDPL006	187355
Increase	P9ARDLS017	187309	P9ARDPL017	187359
Decrease	P9ARDLS018	187310	P9ARDPL018	187360

<sup>(1)</sup> Other symbols on request



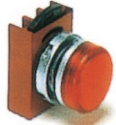


## Signalling units



**Pilot light**  
diffused lens

**Pilot light unibloc**  
full voltage  $\cong$  BA9S  
max. 2W not included



P9ML♦D Ref. no.	
● .....R..	184791
● .....V..	184792
● .....G..	184793
○ .....B..	184797
● .....L..	184796

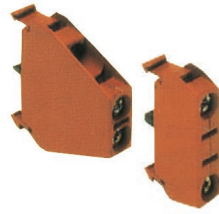


P9XL♦D Ref. no.	
● .....R..	185791
● .....V..	185792
● .....G..	185793
○ .....B..	185797
● .....L..	185796



P9XU♦DDO Ref. no.	
● .....R..	185821
● .....V..	185822
● .....G..	185823
○ .....B..	185827
● .....L..	185826

## Contact blocks



	Cat. no.	Ref. no.
1 NC	P9B01VN	187001
1 NO	P9B10VN	187002
2 NC	P9B02VN	187008
1 NC + 1 NO	P9B11VN	187000
2 NO	P9B20VN	187009

## Power supplies

Full voltage



Full voltage  $\cong$   
BA9S max. 380V-2W  
not included

P9PDNV0

187020

## Bulbs BA9s MultiLED



Vn AC/DC  $\pm$  10%

Vn	Cat. no.	Ref. no.
6V AC/DC 12V AC/DC 24V AC/DC 48V AC/DC 110V AC/DC 230V AC	BA9S6LEDR	187164
	BA9S12LEDR	187169
	BA9S24LEDR	187173
	BA9S48LEDR	187178
	BA9S110LEDR	187183
	BA9S230LEDR	187188
6V AC/DC 12V AC/DC 24V AC/DC 48V AC/DC 110V AC/DC 230V AC	BA9S6LEDV	187162
	BA9S12LEDV	187167
	BA9S24LEDV	187174
	BA9S48LEDV	187179
	BA9S110LEDV	187184
	BA9S230LEDV	187189
6V AC/DC 12V AC/DC 24V AC/DC 48V AC/DC 110V AC/DC 230V AC	BA9S6LEDG	187161
	BA9S12LEDG	187168
	BA9S24LEDG	187171
	BA9S48LEDG	187176
	BA9S110LEDG	187181
	BA9S230LEDG	187186
6V AC/DC 12V AC/DC 24V AC/DC 48V AC/DC 110V AC/DC 230V AC	BA9S6LEDL	187160
	BA9S12LEDL	187166
	BA9S24LEDL	187172
	BA9S48LEDL	187177
	BA9S110LEDL	187182
	BA9S230LEDL	187187
6V AC/DC 12V AC/DC 24V AC/DC 48V AC/DC 60V AC/DC 110V AC/DC 130V AC/DC 230V AC	BA9S6LEDB	187163
	BA9S12LEDB	187165
	BA9S24LEDB	187170
	BA9S48LEDB	187175
	BA9S60LEDB	187191
	BA9S110LEDB	187180
	BA9S130LEDB	187190
	BA9S230LEDB	187185

# Series P9

## Catalogue number structure <sup>(1)</sup>

### Push-buttons

P9		P				
STYLE	FORM	TYPE	CAP COLOUR	PUSH-BUTTON TYPE	LENS TYPE	
<b>Panel mounting</b> M = Round satin chrome X = Round plastic C = Round polished chrome S = Square plastic	P = Push-Button	N = Non illuminated L = Illuminated	N = Black R = Red V = Green G = Yellow L = Blue B = White	G = Flush S = Extended E = Recessed	D = Diffusor for illuminated push-button only	

### Selector switches

P9		S				
STYLE	FORM	TYPE	CAM	SPRING RETURN	COLOUR or KEY REMOVAL	
<b>Panel mounting</b> M = Round satin chrome X = Round plastic C = Round polished chrome S = Square plastic	S = Selector switches	M = Knob V = Lever L = Illuminated Knob C = Key operated	D, I or H = 2 positions E, L, U or Z = 3 positions X = 4 positions	0 = Fixed 3 = From left & right L → 0 ← R 1 = L → 5 = ← R	N = Black R = Red V = Green G = Yellow L = Blue	

### Pilot lights

P9		L		
STYLE	FORM	TYPE	LENS TYPE	
<b>Panel mounting</b> M = Round satin chrome X = Round plastic C = Round polished chrome S = Square plastic	L = Pilot light	R = Red V = Green G = Yellow B = White	D = Diffused	

### Contact blocks

P9	B				
FORM	NORMALLY OPEN CONTACTS	NORMALLY CLOSED CONTACTS	TERMINAL TYPE	CONTACT TYPE	
B = Contact Block	0 = None 1 = 1 NO	0 = None 1 = 1 NC	V = Standard screw B = Base mounting screw F = Faston	N = Normal A = Early closing R = Late opening	

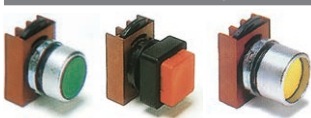







### Power supplies

P9	P				
FORM	TYPE	STYLE	TERMINAL TYPE	VOLTAGE	
P = Power supplies	D = Full voltage R = Resistor T = Transformer L = Led	0 = Normal M = Multi-function (continuous/blinking) D = Diode L = Long life T = Test F = Flashin	V = Standard screw B = Base mounting screw F = Faston	0 = Full voltage D = 24V J = 110-120V N = 220-240V	

<sup>(1)</sup> Nomenclature keys are indicative only. Do not use for orders.



Push-buttons

		Description	Cat. no.		Ref. no.		Cat. no.		Ref. no.	
			Metal	Plastic	see bottom	see bottom	Plastic	see bottom		
<b>Standard / Momentary</b>										
		With flush cap	<b>P9MPN●G</b>	<b>P9XPN●G</b>			<b>P9SPN●G</b>			
		With raised cap	<b>P9MPN●S</b>	<b>P9XPN●S</b>			<b>P9SPN●S</b>			
		Recessed	<b>P9MPN●E</b>							
<b>Mushroom head / Momentary</b>										
		Mushroom head Ø 28mm	<b>P9MEM3●N</b>	<b>P9XEM3●N<sup>[1]</sup></b>						
		Mushroom head Ø 40mm	<b>P9MEM4●N</b>	<b>P9XEM4●N<sup>[1]</sup></b>						
		Mushroom head Ø 60mm	<b>P9MEM6●N</b>				<b>P9SEM3RN</b>		186031	
		Mushroom head 30mm								
<b>Mushroom head with latch</b>										
<b>Standard</b>	<b>Push-pull to release</b>	Mushroom head Ø 40mm	<b>P9MET4●N1</b>	<b>P9XET4●N1</b>			<b>P9SET4R</b>		186061	
	<b>Push-twist to release</b>	Red mushroom head Ø 28mm	<b>P9MER3RN</b>	184070	<b>P9XER3RN</b>	185070				
		Red mushroom head Ø 40mm	<b>P9MER4RN</b>	184071	<b>P9XER4RN</b>	185071				
	<b>Push-key to release</b>	Red mushroom head Ø 40mm	<b>P9MEC4RN▲</b>		<b>P9XEC4RN▲</b>					
<b>Emergency with latch</b>										
<b>Positive break in accordance with EN 418</b>	<b>Push-twist to release</b>	RED mushroom head Ø 40mm			<b>P9XER4RAN</b>	185077	<b>P9SER4RA</b>		186072	
	<b>Push-twist to release</b>	Red mushroom head Ø 40mm with status indication			<b>P9XER4RAW</b>	185078				
	<b>Push-key to release</b>	Red mushroom head Ø 40mm with key code 3095			<b>P9XEC4RA95N</b>	185079	<b>P9SEC4RA95</b>		186073	
<b>Mushroom head / 3 positions</b>										
		Ø 40mm 1-0 fixed. 2 transient	<b>P9MET4●N2</b>							
		Ø 40mm 0 fixed. 1-2 transient	<b>P9MET4●N3</b>							
<b>With keylock <sup>[2]</sup></b>										
<b>Key withdrawable in position I &amp; II</b>			normal	<b>P9MPCN1K▲</b>						
			depressed	<b>P9MPCN2K▲</b>						
			normal & depressed	<b>P9MPCN3K▲</b>						
<b>Key with drawable position II</b>			normal	<b>P9MPCN1E▲</b>						
			depressed	<b>P9MPCN2E▲</b>						
			normal & depressed	<b>P9MPCN3E▲</b>						

(1) Color N or R  
(2) Keys on F.18

The catalogue numbers in **bold** are available from stock.

Colours	black	red	green	yellow	brown	blue	white	grey	without cap
Caps	● N	● R	● V	● G	● M	● L	● B	● H	● 0
Mushroom heads	● N	● R	● V	● G	-	● L	-	-	-

**Remark:** To complete the catalogue number, substitute the symbol ● by a letter for the choice of the colour and the symbol ▲ by a number for the type of key.



## Pilot Devices

Description	Cat. no.	Ref. no.	Cat. no.	Ref. no.	Cat. no.	Ref. no.
	Metal		Plastic		Plastic	
	see bottom		see bottom		see bottom	
<b>Standard</b>						
Diffused lens	<b>P9ML●D</b>		<b>P9XL●D</b>		<b>P9SL●D</b>	
Refracted lens (for neon bulb)	<b>P9ML●R</b>					
Glass lens	<b>P9ML●V</b>					
<b>Unibloc (complete pilot light)</b>						
Full voltage AC/DC						
BA9S max 382 V - 2 W not included						
Diffused lens			<b>P9XU●DD0</b>			

The catalogue numbers in **bold** are available from stock.

Colours	●	red	green	yellow	orange	blue	white	clear
Lens	●	R	V	G	A	L	B	

## Unibloc (Multi-LED BA9S included)

Voltage	Colour	Cat. no.	Ref. no.
24Vac/dc	Red	<b>P9XURDDD</b>	205238
	Green	<b>P9XUVDDD</b>	205239
	Yellow	<b>P9XUGDDD</b>	205240
	Blue	<b>P9XULDDD</b>	205241
	White	<b>P9XUBDDD</b>	205242
110-120Vac/dc	Red	<b>P9XURDDJ</b>	205243
	Green	<b>P9XUVDDJ</b>	205244
	Yellow	<b>P9XUGDDJ</b>	205245
	Blue	<b>P9XULDDJ</b>	205246
	White	<b>P9XUBDDJ</b>	205247
230Vac	Red	<b>P9XURDDN</b>	213701
	Green	<b>P9XUVDDN</b>	213702
	Yellow	<b>P9XUGDDN</b>	213703
	Blue	<b>P9XULDDN</b>	213704
	White	<b>P9XUBDDN</b>	213705




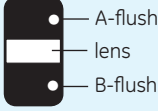
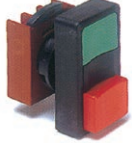
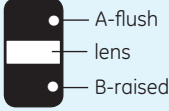

## Bulbs BA9s

Description			Cat. no.	Ref. no.
			Plastic	
Filament type	Vn	W		
	6	0.6	<b>BA9S606</b>	187850
	6	1.5	<b>BA9S615</b>	187851
	12	2.0	<b>BA9S122</b>	187852
	24	2.0	<b>BA9S242</b>	187853
	30	2.1	<b>BA9S30</b>	187854
	48	2.0	<b>BA9S48</b>	187855
	60	1.2	<b>BA9S6012</b>	187856
	130	2.0	<b>BA9S130</b>	187857
	220	2.0	<b>BA9S220</b>	187868
Neon type	110	0.11	<b>BA9SN110</b>	187860
	220	0.33	<b>BA9SN220</b>	187861
MultiLED	VN AC/DC ±10%			
		6	<b>BA9S6LED●</b>	
		12	<b>BA9S12LED●</b>	
		24	<b>BA9S24LED●</b>	
		48	<b>BA9S48LED●</b>	
		60	<b>BA9S60LED</b>	187191
		110-120	<b>BA9S110LED●</b>	
		130	<b>BA9S130LED</b>	187190
	(AC) 230		<b>BA9S230LED●</b>	

Colours	●	red	green	yellow	blue	white
	●	R	V	G	L	B



Double function push-buttons<sup>(1)</sup>


















	Description	Colours	Plastic caps without symbols		Plastic with symbols	
			Cat. no.	Ref. no.	Cat. no.	Ref. no.
						
<b>IP40 protection (acc. to IEC 529)</b>						
	With white lens assembled for indicator light. Black insert for not illuminated function included in the packaging.	A - Black B - Red	P9DPLNRG00	186880	P9DPLNRG01	186890
		A - Green B - Red	<b>P9DPLVRG00</b>	186881	<b>P9DPLVRG01</b>	186891
		A - Black B - Red	P9DPLNRS00	186882	P9DPLNRS01	186892
		A - Green B - Red	P9DPLVRS00	186883	P9DPLVRS01	186893
<b>Clear cap (silicon rubber)</b>						
	IP66 protection (acc. to IEC 529)	A - flush B - flush	080CPDT	173208	080CPDT	173208
		A - Green B - raised	P9ADCST	187796	P9ADCST	187796

(1) With white lens assembled.  
Black insert for not illuminated function included in the packaging.

The catalogue numbers in **bold** are available from stock.



## Selector switches with knob

	Function <sup>(1)</sup>	Cat. no.		Ref. no.		Cat. no.		Ref. no.		
		Metal		see bottom		Plastic		see bottom		
		Metal		Plastic		Plastic		Plastic		
<b>2 positions</b>										
	Fixed		D	<b>P9MSMD0●</b>		<b>P9XSMD0N</b>	185110	<b>P9SSMD0N</b>	186110	
			I	<b>P9MSMI0●</b>		<b>P9XSMI0N</b>	185120	<b>P9SSMI0N</b>	186120	
			H	<b>P9MSMH0●</b>						
	With spring return		D	<b>P9MSMD5●</b>		<b>P9XSMD5N</b>	185150	<b>P9SSMD5N</b>	186140	
			I	<b>P9MSMI5●</b>				<b>P9SSMI5N</b>	186150	
			H	<b>P9MSMH1●</b>						
<b>3 positions</b>										
	Fixed		E	<b>P9MSME0●</b>				<b>P9SSME0N</b>	186170	
			L	<b>P9MSML0●</b>						
			U	<b>P9MSMU0●</b>		<b>P9XSMU0N</b>	185190	<b>P9SSMU0N</b>	186190	
			Z, B	<b>P9MSMZ0●</b>		<b>P9XSMZ0N</b>	185200	<b>P9SSMZ0N</b>	186200	
	With spring return		E	<b>P9MSME1●</b>				<b>P9SSME1N</b>	186210	
			L	<b>P9MSML1●</b>						
			U	<b>P9MSMU1●</b>				<b>P9SSMU1N</b>	186230	
			Z, B	<b>P9MSMZ1●</b>		<b>P9XSMZ1N</b>	185240	<b>P9SSMZ1N</b>	186240	
			E	<b>P9MSME5●</b>						
			L	<b>P9MSML5●</b>						
			U	<b>P9MSMU5●</b>						
			Z, B	<b>P9MSMZ5●</b>		<b>P9XSMZ5N</b>	185280	<b>P9SSMZ5N</b>	186280	
		E	<b>P9MSME3●</b>							
		L	<b>P9MSML3●</b>							
		U	<b>P9MSMU3●</b>							
		Z, B	<b>P9MSMZ3●</b>		<b>P9XSMZ3N</b>	185320	<b>P9SSMZ3N</b>	186320		
<b>4 positions</b>										
	Fixed		X	<b>P9MSMX0●</b>		<b>P9XSMX0N</b>	185330	<b>P9SSMX0N</b>	186330	
	With spring return		X	<b>P9MSMX5●</b>						
<b>5 positions</b>										
	Fixed		X	<b>P9MSMY0●</b>						
			W	<b>P9MSMW0●</b>						

(1) Electrical diagrams, see F.27

The catalogue numbers in **bold** are available from stock.

Colours round shape	black	red	green	yellow	blue	
Knobs	●	<b>N</b>	<b>R</b>	<b>V</b>	<b>G</b>	<b>L</b>



Control and signalling units Ø 22mm

Intro

A

B

C

D

E

F

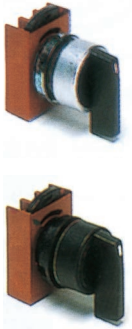






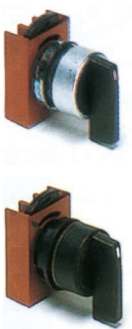
















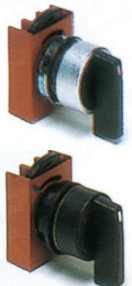







G

H

I

X

Selector switches with lever

	Function <sup>(1)</sup>		Cat. no.		Ref. no.		
					see bottom		
			Metal	Plastic			
<b>2 positions</b>							
	Fixed		D	<b>P9MSVD0●</b>	<b>P9XSVD0N</b>	185370	
			I	P9MSVI0●	P9XaSVI0N	185371	
			H	P9MSVH0●			
	With spring return		D	<b>P9MSVD5●</b>	<b>P9XSVD5N</b>	185373	
			I	<b>P9MSVI5●</b>			
			H	<b>P9MSVH1●</b>			
<b>3 positions</b>							
	Fixed		E	<b>P9MSVE0●</b>			
			L	<b>P9MSVL0●</b>			
			U	<b>P9MSVU0●</b>			
			Z, B	<b>P9MSVZ0●</b>	<b>P9XSVZ0N</b>	185379	
	With spring return		E	<b>P9MSVE1●</b>			
			L	<b>P9MSVL1●</b>			
			U	<b>P9MSVU1●</b>			
			Z, B	<b>P9MSVZ1●</b>			
			E	<b>P9MSVE5●</b>			
			L	<b>P9MSVL5●</b>			
			U	<b>P9MSVU5●</b>			
			Z, B	<b>P9MSVZ5●</b>			
	E	<b>P9MSVE3●</b>					
	L	<b>P9MSVL3●</b>					
	U	<b>P9MSVU3●</b>					
	Z, B	<b>P9MSVZ3●</b>	<b>P9XSVZ3N</b>	185391			
<b>4 positions</b>							
	Fixed		X	<b>P9MSVX0●</b>	<b>P9XSVX0N</b>	185392	
			X	<b>P9MSVX5●</b>			
	With spring return		X	<b>P9MSVX5●</b>			
			X	<b>P9MSVX5●</b>			
<b>5 positions</b>							
	Fixed		X	<b>P9MSVY0●</b>			
			W	<b>P9MSVW0●</b>			















(1) Electrical diagrams, see F.27

The catalogue numbers in **bold** are available from stock.


Colours round shape	black	red	green	yellow	blue
Knobs	●	N	R	V	L



## Selector switches with key

	Function <sup>(1)</sup>	Key removal	Cat. no.		Ref. no.		Cat. no.		Ref. no.	
			Metal		see bottom		Plastic		see bottom	
			Metal		Plastic		Plastic <sup>(2)</sup>			
<b>2 positions</b>										
 Fixed	 D	I	<b>P9MSCD0A</b> ▲		P9XSCD0A95 185400		<b>P9SSCD0A95</b>		186400	
			P9MSCD0E▲		P9XSCD0E95 185401					
			P9MSCD0K▲		P9XSCD0K95 185402					
	 I	0	P9MSCI0C▲							
			P9MSCI0E▲							
			P9MSCI0N▲							
	 H	0	P9MSCH0A▲							
			P9MSCH0C▲							
			P9MSCH0H▲							
 With spring return	 D	I	<b>P9MSCD5A</b> ▲		P9XSCD5A95 185409		<b>P9SSCD5A95</b>		186409	
			P9MSCI5C▲		P9XSCI5C95 185410					
			P9MSCH1C▲							
	 I	0	P9MSCI5C▲		P9XSCI5C95 185410		P9SSCI5C95		186410	
	 H	0	P9MSCH1C▲							
<b>3 positions</b>										
 Fixed	 E	I	<b>P9MSCE0A</b> ▲							
			P9MSCE0C▲							
			P9MSCE0E▲							
			P9MSCE0H▲							
			P9MSCE0K▲							
			P9MSCE0N▲							
	 L	I	<b>P9MSCL0A</b> ▲							
			P9MSCL0C▲							
			P9MSCL0E▲							
			P9MSCL0H▲							
			P9MSCL0K▲							
			P9MSCL0N▲							
	 U	I	<b>P9MSCU0A</b> ▲							
			P9MSCU0C▲							
			P9MSCU0E▲							
			P9MSCU0H▲							
			P9MSCU0K▲							
			P9MSCU0N▲							
	 Z, B	I	<b>P9MSCZ0A</b> ▲		P9XSCZ0A95 185433					
			P9MSCZ0C▲		P9XSCZ0C95 185434					
			P9MSCZ0E▲		P9XSCZ0E95 185435					
			P9MSCZ0H▲							
			P9MSCZ0K▲							
			P9MSCZ0N▲							
 Z, B	I-0-II	<b>P9MSCZ0T</b> ▲		P9XSCZ0T95 185439		<b>P9SSCZ0T95</b>		186439		

## Keys for round metal shape

	Standard version number	▲	95								
	Standard version with specific number	▲	01	02	03	04	05	10	16	19	55 (Ronis)
	FIAT version number	▲	33	34	37	38	40				
	Colour		yellow	black	red	blue	orange				

(1) Electrical diagrams, see F.27

(2) Key for square shape and round plastic shape, only standard version 95

The catalogue numbers in **bold** are available from stock.



Control and signalling units Ø 22mm

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




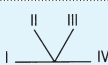

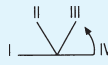
H

I


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Selector switches with key

	Function <sup>(1)</sup>	Key removal	Cat. no.	Ref. no. see bottom	Cat. no.			Ref. no. see bottom	Cat. no.	Ref. no. see bottom	
					Metal	Plastic	Plastic <sup>(2)</sup>				
											
<b>3 positions</b>											
<p>With spring return</p>   		E	0	<b>P9MSC1C▲</b>							
			II	<b>P9MSC1E▲</b>							
			0-II	<b>P9MSC1N▲</b>							
		L	0	<b>P9MSC1C▲</b>							
			II	<b>P9MSC1E▲</b>							
			0-II	<b>P9MSC1N▲</b>							
		U	0	<b>P9MSCU1C▲</b>							
			II	<b>P9MSCU1E▲</b>							
			0-II	<b>P9MSCU1N▲</b>							
	Z, B	0	<b>P9MSCZ1C▲</b>								
		II	<b>P9MSCZ1E▲</b>								
		0-II	<b>P9MSCZ1N▲</b>								
		E	I	<b>P9MSC5A▲</b>							
			0	<b>P9MSC5C▲</b>							
			I-0	<b>P9MSC5H▲</b>							
		L	I	<b>P9MSC5A▲</b>							
			0	<b>P9MSC5C▲</b>							
			I-0	<b>P9MSC5H▲</b>							
U		I	<b>P9MSCU5A▲</b>								
		0	<b>P9MSCU5C▲</b>								
		I-0	<b>P9MSCU5H▲</b>								
Z, B	I	<b>P9MSCZ5A▲</b>	<b>P9XSCZ5A95</b>	185461	<b>P9SSCZ5A95</b>	186461					
	0	<b>P9MSCZ5C▲</b>	<b>P9XSCZ5C95</b>	185462							
	I-0	<b>P9MSCZ5H▲</b>	<b>P9XSCZ5H95</b>	185463							
	E	0	<b>P9MSC3C▲</b>								
		L	0	<b>P9MSC3C▲</b>							
		U	0	<b>P9MSCU3C▲</b>							
		Z, B	0	<b>P9MSCZ3C▲</b>	<b>P9XSCZ3C95</b>	185467	<b>P9SSCZ3C95</b>	186467			
<b>4 positions</b>											
<p>Fixed</p>   		X	I	<b>P9MSCX0A▲</b>							
			II	<b>P9MSCX0B▲</b>							
			III	<b>P9MSCX0D▲</b>							
			IV	<b>P9MSCX0E▲</b>							
			I-II	<b>P9MSCX0F▲</b>							
			I-III	<b>P9MSCX0J▲</b>							
			I-IV	<b>P9MSCX0K▲</b>							
			II-III	<b>P9MSCX0L▲</b>							
			II-IV	<b>P9MSCX0M▲</b>							
			III-IV	<b>P9MSCX0P▲</b>							
			I-II-III	<b>P9MSCX0R▲</b>							
			I-II-IV	<b>P9MSCX0S▲</b>							
			I-III-IV	<b>P9MSCX0U▲</b>							
			II-III-IV	<b>P9MSCX0V▲</b>							
			I-II-III-IV	<b>P9MSCX0Z▲</b>							
	<p>With spring return</p> 		X	I	<b>P9MSCX5A▲</b>						
				II	<b>P9MSCX5B▲</b>						
				III	<b>P9MSCX5D▲</b>						
			I-II	<b>P9MSCX5F▲</b>							
			I-III	<b>P9MSCX5J▲</b>							
			II-III	<b>P9MSCX5L▲</b>							
			I-II-III	<b>P9MSCX5R▲</b>							

Keys for round metal shape

	Standard version number	▲	95								
	Standard version with specific number	▲	01	02	03	04	05	10	16	19	55 (Ronis)
	FIAT version number	▲	33	34	37	38	40				
Colour		yellow	black	red	blue	orange					

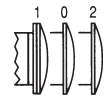
(1) Electrical diagrams, see F.27  
 (2) Key for square shape and round plastic shape, only standard version 95

The catalogue numbers in **bold** are available from stock.



## Illuminated push-buttons

			Cat. no.	Ref. no.	Cat. no.	Ref. no.	Cat. no.	Ref. no.
			Metal	see bottom	Plastic	see bottom	Plastic	see bottom
<b>Standard / Momentary</b>	With diffused lens:	Flush	<b>P9MPLGD</b>		<b>P9XPLGD</b>		<b>P9SPLGD</b>	
		Raised	<b>P9MPLSD</b>		<b>P9XPLSD</b>		<b>P9SPLSD</b>	
		Recessed	P9MPLGD					
<b>Mushroom head / Momentary</b>	Mushroom head Ø 40mm		<b>P9MEM4L</b>		<b>P9XEM4L<sup>(1)</sup></b>			
	Mushroom head $\square$ 30mm					P9SEM3RL	186551	
<b>Mushroom head / With latch</b>	Push-pull to release							
	Mushroom head Ø 40mm		P9MET4L1		P9XET4L1 <sup>(1)</sup>		P9SET4RL1	186561
<b>Mushroom head / 3 positions</b>	With mushroom Ø 40mm							
		1-0 fixed, 2 transient	P9MET4L2		P9XET4RL2	185571		
		0 transient, 1-2 fixed	P9MET4L3					



## Illuminated selector switches with knob

<b>2 positions</b>		Function <sup>(2)</sup>					
	Fixed		D	<b>P9MSLD0●</b>	<b>P9XSLD0●</b>	<b>P9SSLD0●</b>	
	With spring return		Z, B	<b>P9MSLZ0●</b>	<b>P9XSLZ0●</b>	<b>P9SSLZ0●</b>	
			Z, B	P9MSLZ1●			
			Z, B	P9MSLZ5●			
			Z, B	<b>P9MSLZ3●</b>			

## Illuminated selector switches with lever

<b>2 positions</b>		Function <sup>(2)</sup>					
	Fixed		D	<b>P9MSAD0●</b>			
	With spring return		Z, B	<b>P9MSAZ0●</b>			
			Z, B	P9MSAZ1●			
			Z, B	P9MSAZ5●			
			Z, B	<b>P9MSAZ3●</b>			








(1) Color R, V or G  
(2) Electrical diagrams, see F.27

The catalogue numbers in **bold** are available from stock.





Colours	●	red	green	yellow	orange	blue	white	clear
Lens	●	R	V	G	A	L	B	I
Mushroom heads	●	R	V	G	A	L	B	I
Knob/lever	●	R	V	G	A	L	B	I





Selector push-buttons (black coloured)

	Function <sup>(1)</sup>	Cat. no.	Ref. no.	Cat. no.		Ref. no.	
				Metal		Plastic	
<b>2 positions</b>							
	Fixed 	201	P9MPS21G	184690			
		231	<b>P9MPS22G</b>	184691			
		235	P9MPS23G	184692			
<b>3 positions</b>							
	Fixed 	301	P9MPS34G	184693			
		323	P9MPS35G	184694			

Toggle switches (black coloured)

	Function <sup>(2)</sup>	D	Cat. no.	Ref. no.	Cat. no.	Ref. no.	Cat. no.	Ref. no.								
									<b>2 positions</b>							
										Fixed position 		P9MCD	184695	P9XCD	185695	P9SCD
<b>3 positions</b>																
	Fixed position 	B	P9MCB	184696												
		Transient to zero from one position	B	P9MCC	184697											

Rubber protective caps (IP66)

Description	Cat. no.	Ref. no. see bottom	Cat. no.		Ref. no. see bottom	
			Plastic		Plastic	
Standard flush push-buttons 	coloured (nitrilic rubber)	080CP●		P9ASCG●		
	clear (silicon rubber)	080CPT	170198	P9ASCGT	170790	
Raised push buttons 	clear (silicon rubber)	P9ARCST	187490	P9ASCST	187791	

(1) Electrical diagrams, see F.27

The catalogue numbers in **bold** are available from stock.



# Series P9

Control and signalling units Ø 22mm

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## Emergency lever



	Cat. no.	Ref. no.	Cat. no.	Ref. no.	Cat. no.	Ref. no.
	Metal		Plastic		Plastic	
Red lever	P9MWR	184770				

## Reset push-button



White symbol on blue background	P9MRG	184771	P9XRG	185771		
---------------------------------	-------	--------	-------	--------	--	--

## Potentiometer operator (potentiometer not included)



Black knob	P9MZ	184772	P9XZ	185772	P9SZ	186772
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## Buzzer











<b>Black coloured</b>	24V		P9XBD	185773	P9SBD	186773
Bitonal sound	110-240V		P9XBM	185774	P9SBM	186774
Full voltage AC/DC						
Frequency: 2kHz						
Sound intensity: 80dB at 1m						
Consumption: 3 to 9mA						

The catalogue numbers in **bold** are available from stock.



Colours		black	red	green	yellow	orange	blue	white	clear
Mushroom heads	●	N	R	V	G	-	L	-	-
Knobs/lever	●	N	R	V	G	-	L	-	-
Lenses		-	R	V	G	A	L	B	I
Protective caps	●	N	R	V	G	-	-	-	-



Joysticks (black coloured)

			Cat. no.	Ref. no.	Cat. no.	Ref. no.	
			Metal		Plastic		
							
<b>2 positions + central zero position<sup>(1)</sup></b>							
	Without interlock		fixed positions	P9MMN2F	184700	P9XMN2F	185700
			transient positions	<b>P9MMN2T</b>	184701	<b>P9XMN2T</b>	185701
			1 transient - 3 fixed positions	P9MMN2A	184702		
			1 fixed - 3 transient positions	P9MMN2B	184703		
	With interlock		fixed positions	P9MMB2F	184710	P9XMB2F	185710
			transient positions	<b>P9MMB2T</b>	184711	<b>P9XMB2T</b>	185711
			1 transient - 3 fixed positions	P9MMB2A	184712	P9XMB2A	185712
			1 fixed - 3 transient positions	P9MMB2B	184713	P9XMB2B	185713
<b>4 positions + central zero position<sup>(1)</sup></b>							
	Without interlock		fixed positions	P9MMN4F	184720	P9XMN4F	185720
			transient positions	<b>P9MMN4T</b>	184721	<b>P9XMN4T</b>	185721
	With interlock		fixed positions	P9MMB4F	184740	P9XMB4F	185740
			transient positions	P9MMB4T	184741	P9XMB4T	185741

Spare boots for joysticks

		Standard rubber boot for joystick	(a)	P9ARSCMN	188043
		Standard rubber boot for joystick with interlock	(a)	P9ARSCMB	188044
		Silicone boot for joystick	(b)	P9ARSGMN	187495
		Silicone boot for joystick with interlock	(b)	P9ARSGMB	187496

(1) Electrical diagrams, see F.27

The catalogue numbers in **bold** are available from stock.



## Contact blocks



(Not for emergency stop)

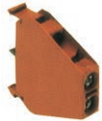
**Logic Reed**  
A new range of LOGIC REED contact blocks with faston terminals for use with power lower than 12V - 5mA.

		Cat. no.	Ref. no.
Contact type	NC NO	<b>P9B01FH</b> <b>P9B10FH</b>	187014 187015
Rated voltage	AC2 to 120V max. DC2 to 30V max.		
Rated current	AC/DC - 0.001 to 0.15A max.		
Rated power	AC - 8VA max. DC - 4.5W max.		
Minimum centerline distance	30x32mm		
Mounting on operators	through specific bayonet flange adaptor	<b>P9ACFSM</b>	
Full voltage power supply		<b>P9PDHF</b>	

With screw



min. 1 of 22 AWG (0.32mm<sup>2</sup>)  
max. 2 of 12 AWG (3.3mm<sup>2</sup>)



Faston



1x(6.35x0.8mm)  
2x(2.8x0.8mm)

Contact type



		Contact type	Cat. no.	Ref. no.
		NC+NO	<b>P9B11VN</b>	187000
		NC+NC	<b>P9B02VN</b>	187008
		NO+NO	<b>P9B20VN</b>	187009
		NC	<b>P9B01VN</b>	187001
		NO	<b>P9B10VN</b>	187002
		NC late opening	<b>P9B01VR</b>	187003
		NO early closing	<b>P9B10VA</b>	187004
		NC	<b>P9B01FN</b>	187012
		NO	<b>P9B10FN</b>	187013





**Terminal adapter**  
printed circuit board adapter

**P9ACA6** 188804

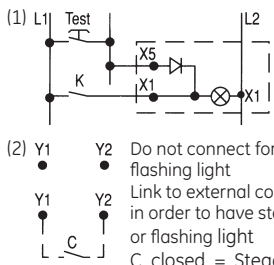
The catalogue numbers in **bold** are available from stock.



Power supplies

With screw	Position on flange	Contact type	Cat. no.	Ref. no.
 <p>min. 1 of 22 AWG (0.32mm<sup>2</sup>) max. 2 of 12 AWG (3.3mm<sup>2</sup>)</p>	<p>3 2 1</p> <p>X1      □ ■ □ X2  </p>	<p>Full voltage ≅ IEC: BA9S max 380V-2W not included UL-CSA: BA9S max 250V-2W not included</p>	 <p><b>P9PDNV0</b></p>	187020
		Logic Reed fullvoltage for low power	P9PDHF	187056
	<p>X1 — □ ■ □ X2  </p>	Long life 110/120V ≅ BA9S 130V-2W included	P9PRLVJ	187021
	<p>X1 — □ ■ □ X2  </p>	Resistor + Diode 220/240V ~ BA9S 130V-2W included	P9PRDVN	187022
	<p>X1 — □ ■ □ X2  </p>	Resistor 110/120V ≅ BA9S 60V-1.2W included	<b>P9PRNVJ</b>	187023
		220/240V ≅ BA9S 130V-2W included	<b>P9PRNVN</b>	187024
	<p>X1 — □ ■ □ X2  </p>	Resistor ENEL version BA9S 48V-2W included 110V ≅	P9PREVJ	187025
		125/127V ≅	P9PREVL	187026
	<p>X5 — □ ■ □ X1 — □ ■ □ X2  </p>	UL-CSA: BA9S max 250V-2W not included Test full voltage (1) ≅ IEC: BA9S max 380V-2W not included	P9PDTV0	187027
	<p>X5 — □ ■ □ X1 — □ ■ □ X2  </p>	Test resistor (1) 220/240V ≅ BA9S 130V-2W included	P9PRTVN	187028
	<p>X1 — □ ■ □ X2  </p>	Transformer 50/60Hz BA9S 6V-1.5W included	<b>P9PTNV♦</b>	see bottom
	<p>Y1 X1 — □ ■ □ Y2 X2  </p>	Multifunction (2) full voltage 24V ≅ BA9S 24V-2W included	<b>P9PDMVD</b>	187040
		Multifunction (2) full voltage 110V ≅ BA9S 130V-2W included	P9PDMVJ	187041
	<p>Y1 X1 — □ ■ □ Y2 X2  </p>	Multifunction (2) Transformer 50/60Hz BA9S 6V-0.6W included	<b>P9PTMV◇</b>	see bottom
 <p>Faston</p> <p>1x(6.35x0.8mm) 2x(2.8x0.8mm)</p>	<p>X1      □ ■ □ X2  </p>	<p>Full voltage IEC:BA9S max 380V-2W not included UL-CSA: BA9S max 250V-2W not included</p>	P9PDNF0	187055
 <p>Integrated LED</p>	<p>x1      □ ■ □ x2  </p>	<p>Standard light      24V AC/DC 120V AC 230V AC</p> <p>Flashing light      24V AC/DC 120V AC 230V AC</p>	<p><b>P9PLNVD●</b> <b>P9PLNVJ●</b> <b>P9PLNVN●</b></p> <p><b>P9PLFVD●</b> <b>P9PLFVJ●</b> <b>P9PLFVN●</b></p>	<p>see bottom</p> <p>see bottom</p>

The catalogue numbers in **bold** are available from stock.



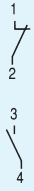







Colours	red	green	yellow	orange	blue	white
LED	● R	● V	● G	● A	● L	● B
Voltage	110-120	220-250	400	415-440	480-500	
♦	J	N	U	W	Y	
◇	J	N	U	-	-	








# Series P9

## Base mounting - Contact blocks

With screw			Contact type	Cat. no.	Ref. no.
 <p>min. 1 of 22 AWG (0.32mm<sup>2</sup>) max. 2 of 12 AWG (3.3mm<sup>2</sup>)</p> 			NC	 	<b>P9B01BN</b> 187017
			NO	 	<b>P9B10BN</b> 187018

## Base mounting - Power supplies

With screw		Position on flange	Bulb power supply	Cat. no.	Ref. no.
 <p>min. 1 of 22 AWG (0.32mm<sup>2</sup>) max. 2 of 12 AWG (3.3mm<sup>2</sup>)</p> 	<p>3 2 1</p>	<p>Full voltage ≐ IEC: BA9S max 380V-2W not included UL-CSA: BA9S max 250V-2W not included</p>	  	<b>P9PDNBO</b>	187070

Control and signalling units Ø 22mm

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Diagrams

Selector switches

Positions	Function	Contacts	Position on flange 2 3 1
	D	B10	<input type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/>
	D	B10 B01	<input checked="" type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/>
	D	B11	<input type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/>
	I	B11	<input type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/>
	H	B11 B11	<input type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/>
	B	B10 B10	<input checked="" type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/>
	E	B11	<input type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/>
	L	B11	<input type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/>
	U	B11 B11	<input checked="" type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/>
	Z	B11 B11	<input checked="" type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/>
	Z	B10 B01	<input checked="" type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/>
	X	B11 B11	<input checked="" type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/>
	Y	B11 B11	<input checked="" type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/>
	W	B11 B11	<input checked="" type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/>

Selector push-buttons

Positions	Function	Contacts	Normal Depressed	Position on flange 2 3 1
	201	B11 B11		<input checked="" type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/>
	231	B11 B11		<input checked="" type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/>
	235	B11 B11		<input checked="" type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/>
	301	B11 B11		<input checked="" type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/>
	323	B11 B11		<input checked="" type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/>

✱ Can not be depressed

Joysticks

Positions	Contacts	Position on flange 2 3 1
	B11	<input type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/>
	B11	<input checked="" type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/>
	B11	<input type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/>
	B11	<input checked="" type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/>
	B11	<input type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/>

Toggle switches

Positions	Function	Contacts	Position on flange 2 3 1
	D	B11	<input type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/>
	B	B11	<input type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/>

Mushroom head push-buttons 3 pos.

Function	Contacts	Position on flange 2 3 1
2	B01R B01	<input checked="" type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/>
3	B11	<input type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/>

Base mounting

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## Empty box for DIN-rail application (Light grey coloured RAL 7035)



Diagram	Cat. no.	Ref. no.
1	P9EPEM	189200
<ul style="list-style-type: none"> <li>- Up to 3 base mounting contact blocks and power supplies</li> <li>- 1 hole P9EPEM 189200</li> <li>- Can be used in modular cabinet</li> <li>- 36mm width</li> <li>- Double protection</li> </ul>		

## Push-button stations in thermoplastic (Light grey coloured RAL 7035)

### For panel and base mounting

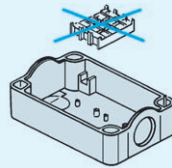
- IP66 according to IEC529, EN 60529
- Engineered thermoplastic covers, bases and screws
- Self extinguishing Class V0, according to UL 94
- Rust resistant (4X according to UL 508)
- Total insulation with all thermoplastic operators
- Contact blocks and power supplies for both base and front mounting

### For panel and base mounting

Cover with holes  
Knockouts conduit entry



Number of holes	Cat. no.	Ref. no.
1 (yellow cover)	P9PEG1	189000
1	P9PEE01	189001
2	P9PEE02	189002
2 (yellow cover)	P9PEG2	189006
3	P9PEE03	189003
4	P9PEE04	189004
6	P9PEE06	189005



For panel mounting

### Accessories

#### Write-on plates

Bilaminated, self adhesive, 20x20mm  
Black background  
engravable for white texts









#### Earth terminal clamp











Description	Symbols	Cat. no.	Ref. no.
Without text		P9AELN	189030
Text in English (1) START		P9AELN202	189031
STOP		P9AELN201	189032
FORWARD		P9AELN214	189033
REVERSE		P9AELN215	189034
CLOSE		P9AELN205	189035
OPEN		P9AELN206	189036
UP		P9AELN204	189037
DOWN		P9AELN203	189038
LEFT		P9AELN222	189152
RIGHT		P9AELN224	189154
	→	P9AELN006	189041
	I	P9AELN028	189042
	0	P9AELN029	189043
	II	P9AELN035	189044
	III	P9AELN038	189045
	0-I	P9AELN039	189046
	I-0-II	P9AELN042	189047
		P9AEMT	189029

The catalogue numbers in **bold** are available from stock.

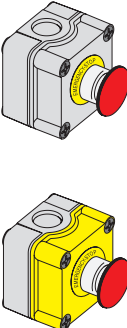
(1) Other languages on request

Push-button stations in thermoplastic (continued)

Equipped versions		Operators	Colour	Diagram	Nameplate	Cat. no.	Ref. no.
	One unit	Flush push-button	green		I	<b>P9EPA01Y02</b>	189010
		Flush push-button	white		I	<b>P9EPA01Y03</b>	189011
		Emergency push-button with latch according to EN418 (yellow cover)	red		0	<b>P9EPAG1Y0N</b>	189007
		Emergency push-button with latch & status indicator according to EN418 (yellow cover)	red		0	<b>P9EPAG1Y01W</b>	189008
		Emergency push-button with latch according to EN418 - key to release (yellow cover)	red		0	<b>P9EPAG1Y06N</b>	189009

Equipped versions		Operators	Colour	Diagram	Nameplate	Cat. no.	Ref. no.	
	Two units	Flush push-buttons	green		I	<b>P9EPA02Y01</b>	189016	
				red		0		
	Three units	Full voltage pilot light max 380V-2W not included	BA9S	white		blank	<b>P9EPA03Y01</b>	189018
		Flush push-buttons		green		I		
				red		0		
		Flush push-buttons		black		↑	<b>P9EPA03Y05</b>	189022
				red		0		
				black		↓		

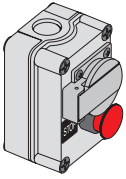
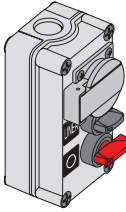
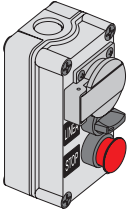
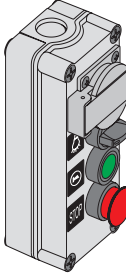
Equipped boxes

Specially enclosures to use for shaft lifts (other versions, please contact us)		Composition	Individual operators	Cat. no.	Ref. no.	Pack
	One operator	Thermoplastic box. 1 element	P9EPE01	<b>P9EPC01X00</b>	215432	1
		Emergency push button mushroom head Ø 40, push-pull to release	P9XET4RN1			
		1NC contact block	P9B01VN			
		1NO contact block	P9B10VN			
		Nameplate with inscription "EMERGENCY-STOP"	080XTGR02			
		PG16 packing gland				
		Thermoplastic box. Yellow cover. 1 element	P9EPEG1	<b>P9EPC01X01</b>	215433	1
		Emergency push-button mushroom head Ø 40, push-twist to release	P9XER4RN			
		1NC contact block	P9B01VN			
		Nameplate with inscription "EMERGENCY-STOP"	080XTGR02			

The catalogue numbers in **bold** are available from stock.



## Equipped boxes (continued)

		Composition	Individual operators	Cat. no.	Ref. no.	Pack
		Specially enclosures to use for shaft lifts (other versions, please contact us)				
Control and signalling units Ø 22mm		<b>Two operators</b>	Thermoplastic box, 2 elements Emergency push button mushroom head Ø 28, push-twist to release 1NC contact block Nameplate with inscription "STOP" 16A Schuko socket-outlet with cover	P9EPE02 P9XER3RN  P9B01VN P9AELN201	<b>P9EPL02X01</b>	189136    1
		<b>Three operators</b>	Thermoplastic box, 3 elements Selector switch, 2 positions, with black knob 1NC contact block 1NO contact block Nameplate with inscription "LINEA" Selector switch, 2 positions, with red lever 1NO contact block Nameplate with inscription "O-I" 16A Schuko socket-outlet with cover	P9EPE03 P9XSMD0N P9B01VN P9B10VN P9AELN523 P9XSVD0R P9B10VN P9AELN039	<b>P9EPL03X01</b>	189138       1
		<b>Three operators</b>	Thermoplastic box, 3 elements Selector switch, 2 positions, with black knob 1NC contact block 1NO contact block Nameplate with inscription "LINEA" Emergency push-button mushroom head Ø 28, push-twist to release 1NC contact block Nameplate with inscription "STOP" 16A Schuko socket-outlet with cover	P9EPE03 P9XSMD0N P9B01VN P8B10VN P9AELN523 P9XER3RN P9B01VN P9AELN201	<b>P9EPL03X02</b>	189139       1
		<b>Four operators</b>	Thermoplastic box, 4 elements Selector switch, 2 positions, with black knob 1NC contact block 1NO contact block Nameplate with "Light" symbol Standard/momentary push button with flush cap, green 1NO contact block Nameplate with "Bell" symbol Emergency push-button mushroom head Ø 28, push-twist to release 1NC contact block Nameplate with inscription "STOP" 16A Schuko socket-outlet with cover	P9EPE04 P9XSMD0N P9B01VN P9B10VN P9AELN100 P9XPNVG P9B10VN P9XER3RN P9B01VN P9AELN201	<b>P9EPL04X01</b>	189141          1
						

The catalogue numbers in **bold** are available from stock.



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## Push-button stations in aluminium (Grey coloured RAL 7012)

For panel mounting		Protection	Number of holes	Type	Cat. no.	Ref. no.
	Cover with holes with conduit entry	IP66 (according to IEC 529, EN 60529)	1	1	<b>080SP1</b>	170801
			1	1M <sup>[1]</sup>	<b>080SP1M</b>	170831
			2	2	<b>080SP2</b>	170802
			2	2M <sup>[1]</sup>	<b>080SP2M</b>	170832
			3	3	<b>080SP3</b>	170803
			4	4	<b>080SP4</b>	170804
			4	4M <sup>[1]</sup>	<b>080SP4M</b>	170834
			6	6	<b>080SP6</b>	170806
			8	8	<b>080SP8</b>	170807
			12	12	<b>080SP12</b>	170808
			18	18	<b>080SP18</b>	170809
			24	24	<b>080SP24</b>	170810
			35	35	<b>080SP35</b>	170811
				Cover with holes without conduit entry	IP66 (according to IEC 529, EN 60529)	1
1	1M <sup>[1]</sup>	080SP1MSFE				170839
2	2	080SP2SFE				170842
2	2M <sup>[1]</sup>	080SP2MSFE				170845
3	3	080SP3SFE				170848
4	4	080SP4SFE				170850
4	4M <sup>[1]</sup>	080SP4MSFE				170851
6	6	080SP6SFE				170852
8	8	080SP8SFE				170854
12	12	080SP12SFE				170857
18	18	080SP18SFE				170860
24	24	080SP24SFE				170862
35	35	080SP35SFE				170864
	Cover without holes with conduit entry	IP66 (according to IEC 529, EN 60529)				1
			1	1M <sup>[1]</sup>	080SP1MSFC	170838
			2	2	080SP2SFC	170841
			2	2M <sup>[1]</sup>	080SP2MSFC	170844
			3	3	080SP3SFC	170847
			4	4	080SP2SFC	170841
			4	4M <sup>[1]</sup>	080SP2MSFC	170844
			6	6	080SP3SFC	170847
			8	8	080SP8SFC	170853
			12	12	080SP12SFC	170856
			18	18	080SP18SFC	170859
			24	24	080SP18SFC	170859
			35	35	080SP35SFC	170863
				Cover without holes without conduit entry	IP66 (according to IEC 529, EN 60529)	1
1	1M <sup>[1]</sup>	080SP1MSF				170840
2	2	080SP2SF				170843
2	2M <sup>[1]</sup>	080SP2MSF				170846
3	3	080SP3SF				170849
4	4	080SP2SF				170843
4	4M <sup>[1]</sup>	080SP2MSF				170846
6	6	080SP3SF				170849
8	8	080SP8SF				170855
12	12	080SP12SF				170858
18	18	080SP18SF				170861
24	24	080SP18SF				170861
35	35	080SP35SF				170865

[1] With deep socle

## Accessories

Description	Cat. no.	Ref. no.
Kit of two hinges for types 18, 24, 35 with holes	<b>080KCSP</b>	170883

The catalogue numbers in **bold** are available from stock.

Overall dimensions, see F.43



## Caps for standard push-buttons

Control and signalling units Ø 22mm

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	Colour	Cat. no.	Ref. no.	Cat. no.	Ref. no.	Cat. no.	Ref. no.	Cat. no.	Ref. no.
		Flush and recessed		Raised		Flush		Raised	
Neutral									
		<b>P9ARBG ●</b>	18710 ■	<b>P9ARBS ●</b>	18720 ■	<b>P9ASBG ●</b>	18750 ■	<b>P9ASBS ●</b>	18760 ■
With symbols <sup>(1)</sup>									
Stop 	Black	<b>P9ARBGN 029</b>	187150	<b>P9ARBSN 029</b>	187250	<b>P9ASBGN 029</b>	187550	<b>P9ASBSN 029</b>	187650
	Red	<b>P9ARBGR 029</b>	187110	<b>P9ARBSR 029</b>	187210	<b>P9ASBGR 029</b>	187510	<b>P9ASBSR 029</b>	187610
Start 	Black	<b>P9ARBGN 028</b>	187111	<b>P9ARBSN 028</b>	187211	<b>P9ASBGN 028</b>	187511	<b>P9ASBSN 028</b>	187611
	Green	<b>P9ARBGV 028</b>	187112	<b>P9ARBSV 028</b>	187212	<b>P9ASBGV 028</b>	187512	<b>P9ASBSV 028</b>	187612
	White	<b>P9ARBGB 028</b>	187151	<b>P9ARBSB 028</b>	187251	<b>P9ASBGB 028</b>	187551	<b>P9ASBSB 028</b>	187651
Continuous rectilinear motion 	Black	<b>P9ARBGN 006</b>	187117	<b>P9ARBSN 006</b>	187217	<b>P9ASBGN 006</b>	187517	<b>P9ASBSN 006</b>	187617
	Green	<b>P9ARBGV 006</b>	187118	<b>P9ARBSV 006</b>	187218	<b>P9ASBGV 006</b>	187518	<b>P9ASBSV 006</b>	187618
	White	<b>P9ARBGB 006</b>	187152	<b>P9ARBSB 006</b>	187252	<b>P9ASBGB 006</b>	187552	<b>P9ASBSB 006</b>	187652
Increase 	Black	<b>P9ARBGN 017</b>	187125						
Decrease 	Black	<b>P9ARBGN 018</b>	187127						
Reset 	Blue	<b>P9ARBGL 037</b>	187143			<b>P9ASBGL 037</b>	187543	<b>P9ASBSL 037</b>	187643
Stop/Reset 	Red	<b>P9ARBGR 036</b>	187144						
Test 	Black	<b>P9ARBGN 030</b>	187145	<b>P9ARBSN 030</b>	187245	<b>P9ASBGN 030</b>	187545	<b>P9ASBSN 030</b>	187645
	Green	<b>P9ARBGV 030</b>	187146	<b>P9ARBSV 030</b>	187246	<b>P9ASBGV 030</b>	187546	<b>P9ASBSV 030</b>	187646
Stop 	Red	<b>P9ARBGR 201</b>	187147	<b>P9ARBSR 201</b>	187247	<b>P9ASBGR 201</b>	187547	<b>P9ASBSR 201</b>	187647
Start 	Black	<b>P9ARBGN 202</b>	187148	<b>P9ARBSN 202</b>	187248	<b>P9ASBGN 202</b>	187548	<b>P9ASBSN 202</b>	187648
	Green	<b>P9ARBGV 202</b>	187149	<b>P9ARBSV 202</b>	187249	<b>P9ASBGV 202</b>	187549	<b>P9ASBSV 202</b>	187649
	White	<b>P9ARBGB 202</b>	188909	<b>P9ARBSB 202</b>	188978	<b>P9ASBGB 202</b>	189859	<b>P9ASBSB 202</b>	189928


















(1) Other symbols on request

The catalogue numbers in **bold** are available from stock.

Colours		black	red	green	yellow	brown	blue	white	grey
Caps	●	<b>N</b>	<b>R</b>	<b>V</b>	<b>G</b>	<b>M</b>	<b>L</b>	<b>B</b>	<b>H</b>
	■	<b>0</b>	<b>1</b>	<b>1</b>	<b>3</b>	<b>4</b>	<b>6</b>	<b>7</b>	<b>8</b>



Diffusers/insert for illuminated units

		Cat. no.	Ref. no.	Cat. no.	Ref. no.	Cat. no.	Ref. no.
		For pilot lights		For illuminated push buttons		For pilot lights and illuminated push buttons	
Neutral							
		P9ARDLS	187300	P9ARDPL	187350	080QDF	173220
With symbols <sup>(1)</sup>	on white background						
Stop		<b>P9ARDLS029</b>	187301	<b>P9ARDPL029</b>	187351	<b>080QDF029</b>	187701
Start		<b>P9ARDLS028</b>	187302	<b>P9ARDPL028</b>	187352	<b>080QDF028</b>	187702
Continuous rectilinear motion		<b>P9ARDLS006</b>	187305	<b>P9ARDPL006</b>	187355	<b>080QDF006</b>	187705
Increase		P9ARDLS017	187309	P9ARDPL017	187359	080QDF017	187709
Decrease		P9ARDLS018	187310	P9ARDPL018	187360	080QDF018	187710
Auto cycle		P9ARDLS026	187311	P9ARDPL026	187361	080QDF026	187711
Manual		P9ARDLS027	187312	P9ARDPL027	187362	080QDF027	185788
Locking		P9ARDLS031	187313	P9ARDPL031	187363	080QDF031	187713
Releasing		P9ARDLS032	187314	P9ARDPL032	187364	080QDF032	187714
Coolant		P9ARDLS001	187315	P9ARDPL001	187365	080QDF001	187715
Light		P9ARDLS002	187316	P9ARDPL002	187366	080QDF002	187716
Test		P9ARDLS030	187318	P9ARDPL030	187368	080QDF030	185789
Stop		<b>P9ARDLS201</b>	187319	<b>P9ARDPL201</b>	187369	<b>080QDF201</b>	187719
Start		<b>P9ARDLS202</b>	187320	<b>P9ARDPL202</b>	187370	<b>080QDF202</b>	187720

(1) Other symbols on request

The catalogue numbers in **bold** are available from stock.



# Series P9

## Common accessories

Plugs	Description	Cat. no.	Ref. no.	Cat. no.	Ref. no.
		Plastic		Plastic	
	Round	<b>P9ARHPR</b>	187491		
	Square 30x30mm			<b>P9ASHP3</b>	187792
	Rectangular 30x50mm			<b>P9ASHP5</b>	187793
<b>Protections</b>					
	Collar for mushroom head push-buttons Ø 40mm.	P9ARRE4	187492		
	Protection cover padlockable for standard push-buttons, illuminated push-buttons, selector switches, illuminated selector switches with knob.	P9ACRCL	187840	P9ACRCL	187840
<b>Flanges</b>					
	With three positions	P9ACFS3	187841	P9ACFS3	187841
	With five positions	P9ACFS5	187842	P9ACFS5	187842
	With two positions	P9ACFSM	187846	P9ACFSM	187846
<b>Adapter screw plug-in terminal</b>					
	Only for Logic Reed contact blocks and power supplies	<b>P9ACAFV</b>	187847	<b>P9ACAFV</b>	<b>187847</b>
<b>Adapter</b>					
	Gives round control and signalling units a square appearance. Made in black thermoplastic. Can be used with nameplate for square operators P9ASTBS (see F.38). Excluded for mushroom flush buttons with positive break and types with 3 positions.	<b>P9ARSN1</b>	188805		
<b>Push-on/push off</b>					
	Device for standard push-buttons and illuminated push-buttons. To be added only to single pole contact blocks. The NO-contacts must be early closing types.	<b>P9ACDPP</b>	187843	<b>P9ACDPP</b>	187843
<b>Extended screw</b>					
	For reset push-buttons (setting min. 80, max. 170mm)	P9ACVLR	187844	P9ACVLR	187844
<b>Central contact driving plug</b>					
	For standard momentary push-buttons and momentary mushroom head push-buttons.			P9ASHAC	187794
<b>Tools</b>					
	Locking ring wrench	<b>P9ACWAF</b>	187845	<b>P9ACWAF</b>	187845
	Bulb extractor	<b>080ESL</b>	170212	<b>080ESL</b>	170212
	Extractor for caps and lenses			<b>P9ASEBG</b>	187795

The catalogue numbers in **bold** are available from stock.



Control and signalling units Ø 22mm

Intro

A

B

C

D

E

F

G



H

I



X



### Spare keys




Description		Cat. no.	Ref. no.
		Plastic	
			
<b>Standard version</b>	<b>Code</b>		
	3095	<b>077C3095</b>	173095
	9901	<b>077C9901</b>	179901
	9902	<b>077C9902</b>	179902
	9903	<b>077C9903</b>	179903
	9904	<b>077C9904</b>	179904
	9905	<b>077C9905</b>	179905
	9910	<b>077C9910</b>	179910
	9916	<b>077C9916</b>	179916
	9919	<b>077C9919</b>	179919
	3353	<b>077C3353</b>	173353
	(Ronis) 455	<b>077CR455</b>	173455
<b>FIAT version</b>	<b>Colour</b>	<b>Code</b>	
	yellow	73033	077CF73033 173033
	black	73034	077CF73034 173034
	red	73037	077CF73037 173037
	blue	73038	077CF73038 173038
	orange	73040	077CF73040 173040

### Bulbs BA9s

Description		Cat. no.	Ref. no.
		Plastic	
			
<b>Filament type</b>	<b>Vn</b> <b>W</b>		
	6            0.6	<b>BA9S606</b>	187850
	6            1.5	<b>BA9S615</b>	187851
	12          2.0	BA9S122	187852
	24          2.0	<b>BA9S242</b>	187853
	30          2.1	<b>BA9S30</b>	187854
	48          2.0	BA9S48	187855
	60          1.2	BA9S6012	187856
	130        2.0	<b>BA9S130</b>	187857
	220        2.0	BA9S220	187868
<b>Neon type</b>			
	110        0.11	BA9SN110	187860
	220        0.33	<b>BA9SN220</b>	187861
<b>MultiLED</b>	<b>VN AC/DC ±10%</b>		
		6	BA9S6LED•
		12	BA9S12LED•
		24	BA9S24LED•
		48	BA9S48LED•
		60	BA9S60LED 187191
		110	BA9S110LED•
		130	BA9S130LED 187190
	(AC) 230	BA9S230LED•	

Colours	●	red	green	yellow	blue	white
		R	V	G	L	B

### Insert holders

Description		Cat. no.	Ref. no.	Cat. no.	Ref. no.
		Plastic		Plastic	
					
Supplied with neutral insert engravable on both sides or transparent.					
<b>Standard 30x50mm</b>	Background black/red, white text	<b>P9ARTBS</b>	188000	<b>P9ASTBS</b>	188010
	Background white, black text	<b>P9ARTWS</b>	188005	<b>P9ASTWS</b>	188011
	Transparent	<b>P9ARTTS</b>	188012	<b>P9ASTTS</b>	188014
<b>Extended 45x50mm</b>	Background black/red, white text	<b>P9ARTBM</b>	188001		
	Background white, black text	<b>P9ARTWM</b>	188008		
	Transparent	<b>P9ARTTM</b>	188013		

The catalogue numbers in **bold** are available from stock.




## Rectangular inserts

For insert holders 30x50mm		Neutral			Aluminium English <sup>(1)</sup>		
	Description	Cat. no.	Ref. no.	Description	Cat. no.	Ref. no.	
	black/red background	<b>P9ACPBS</b>	188015				
	white background	<b>P9ACPWS</b>	188017				
	transparent	<b>P9ACPTS</b>	188018				
For insert holders 45x50mm		Neutral			Aluminium English <sup>(1)</sup>		
	Description	Cat. no.	Ref. no.	Description	Cat. no.	Ref. no.	
START	Black background	START	P9ACPBS202	188202	Without inscription	P9ARTAPN	116099
		STOP	P9ACPBS201	188201	O - I	P9ARTAPN039	116140
		REVERSE	P9ACPBS215	188215	I O II	P9ARTAPN042	116141
		CLOSE	P9ACPBS205	188205	ON	P9ARTAPN212	116147
		OPEN	P9ACPBS206	188206	RESET	P9ARTAPN291	116150
		UP	P9ACPBS204	188204	II	P9ARTAPN040	116991
		DOWN	P9ACPBS203	188203	I	P9ARTAPN028	118846
		LEFT	P9ACPBS222	188222	STOP	P9ARTAPN201	116143
		RIGHT	P9ACPBS224	188224	START	P9ARTAPN202	116144
		FAST	P9ACPBS208	188208	OPEN	P9ARTAPN206	116145
		SLOW	P9ACPBS207	188207	OF	P9ARTAPN213	116148
		OPEN-CLOSE	P9ACPBS234	188234			
		HAND-AUTO	P9ACPBS243	188243			
		STOP-START	P9ACPBS232	188232			
		FORWARD-REVERSE	P9ACPBS231	188231			
		OFF-ON	P9ACPBS233	188233			
		AUTO-OFF-HAND	P9ACPBS258	188258			
MARCHE	FORWARD-O-REVERSE	P9ACPBS239	188239				
	O - I	<b>P9ACBS039</b>	188030				


## Round plates for emergency

		Diameter 59mm			Diameter 78mm		
	Description	Cat. no.	Ref. no.	Description	Cat. no.	Ref. no.	
	Without text	yellow background	<b>080XTGR</b>	179514	black background	<b>080XTG8</b>	179515
	With text	yellow background			black background		
	EMERGENZA	<b>080XTGR01</b>	179525	EMERGENZA	<b>080XTG801</b>	179535	
	EMERGENCY STOP	<b>080XTGR02</b>	179526	EMERGENCY STOP	<b>080XTG802</b>	179536	
	ARRET D'URGENCE	<b>080XTGR03</b>	179510	ARRET D'URGENCE	<b>080XTG803</b>	179511	
	NOT - AUS	<b>080XTGR04</b>	179527	NOT - AUS	<b>080XTG804</b>	179537	
	NOODSTOP	<b>080XTGR05</b>	179528	NOODSTOP	<b>080XTG805</b>	179538	
	PARO EMERGENCIA	<b>080XTGR06</b>	179529	PARO EMERGENCIA	<b>080XTG806</b>	179539	
	NOTSTOP	<b>080XTGR07</b>	179530	NOTSTOP	<b>080XTG807</b>	179540	
	PARAGEM EMERGENCIA	<b>080XTGR08</b>	179531	PARAGEM EMERGENCIA	<b>080XTG808</b>	179541	

## Neutral plate

		Description	Cat. no.	Ref. no.
	Snap-on system	For identification of contact blocks and power supplies	P9ACPIU	188016

## Adapter ring

		Description	Cat. no.	Ref. no.
		Adapter ring for 30mm hole to mount P9 22mm in a 30mm hole	P9ARAM32	188801

The catalogue numbers in **bold** are available from stock.

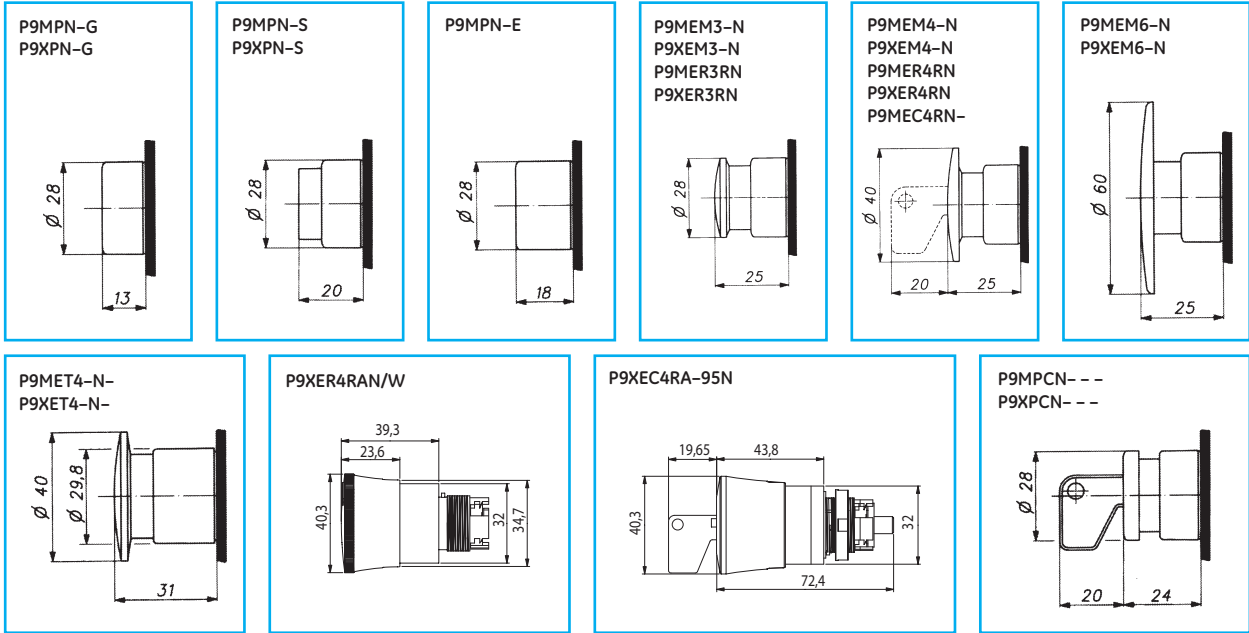
(1) Other languages on request.

Everything is under control

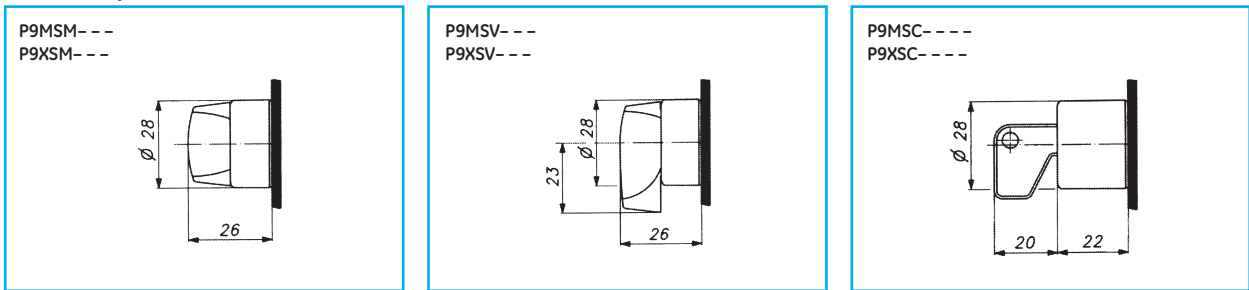
# Series P9

## Dimensional drawings

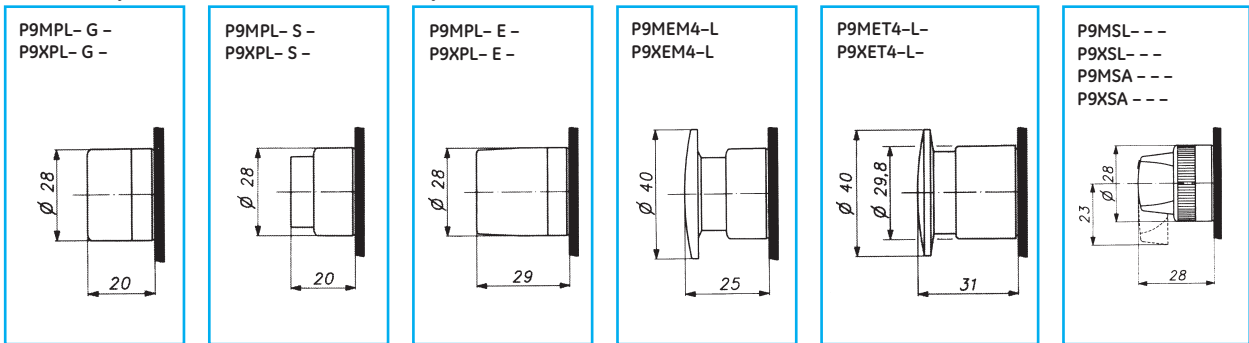
### Round operators - Push-buttons



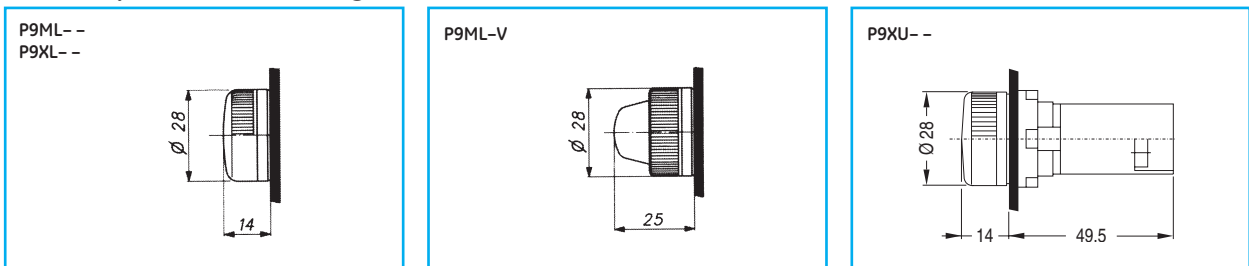
### Round operators - Selector switches



### Round operators - Illuminated push-buttons and selector switches



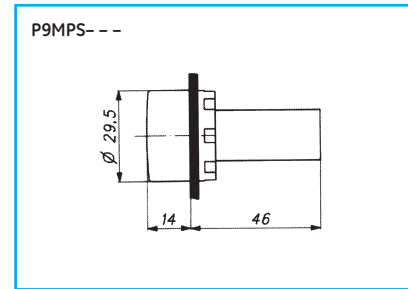
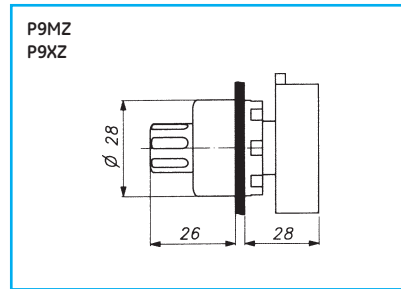
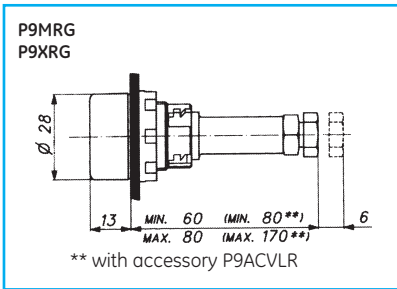
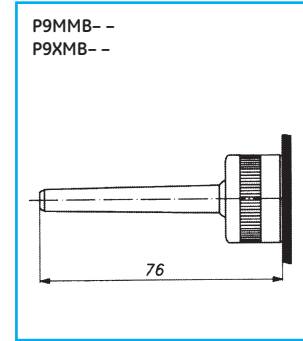
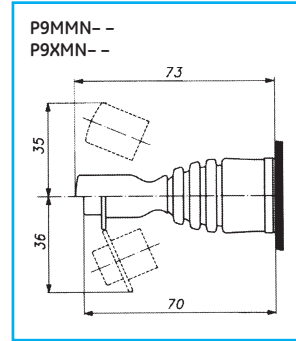
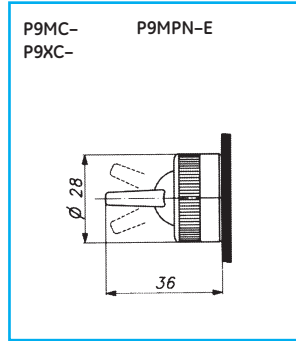
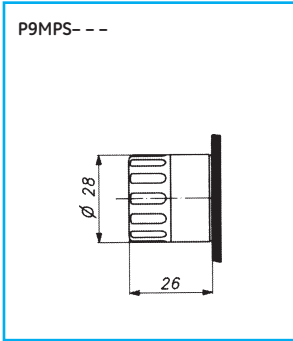
### Round operators - Pilot lights



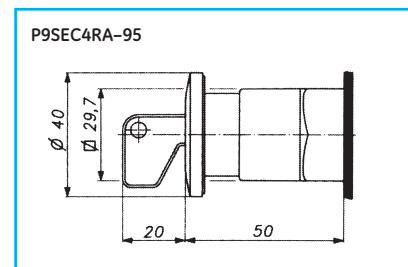
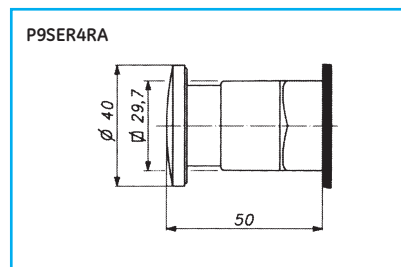
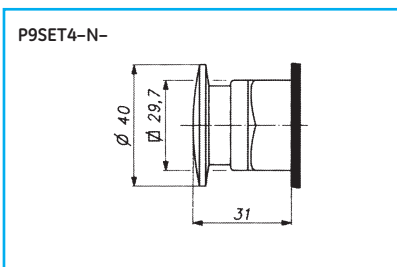
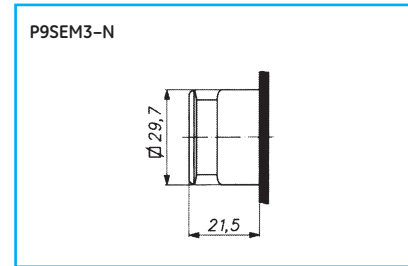
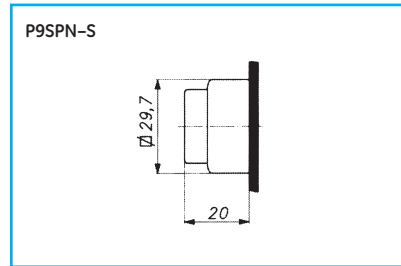
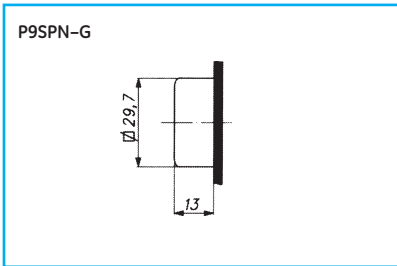
Dimensions in mm (inch = mm x 0.03937) - Weight in kg (lb = kg x 2.2046)



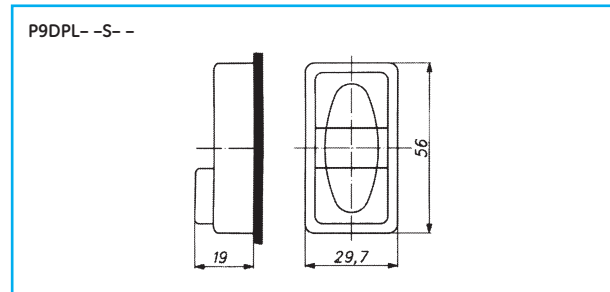
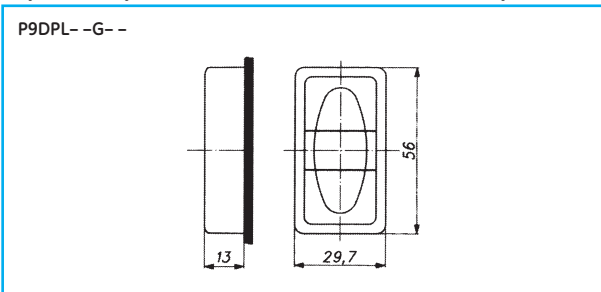
Round operators - Other devices



Square operators - Push-buttons



Square operators - Double function push-buttons



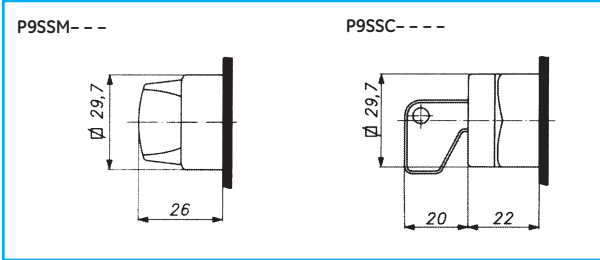
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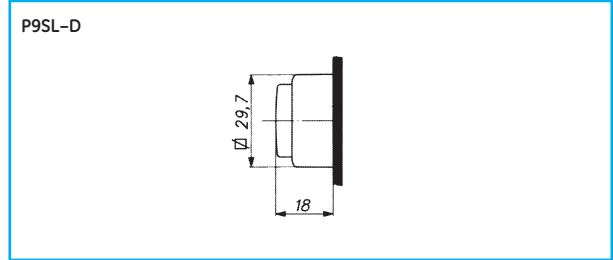
# Series P9

## Dimensional drawings

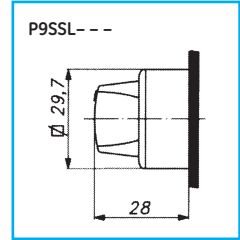
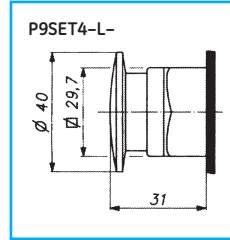
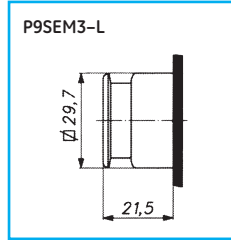
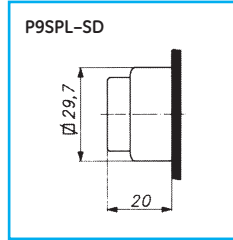
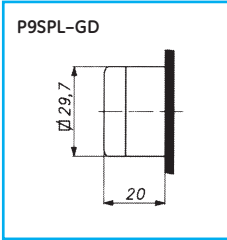
### Square operators - Selector switches



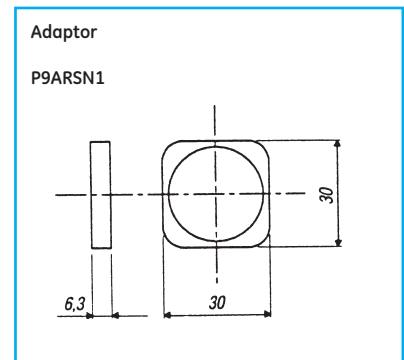
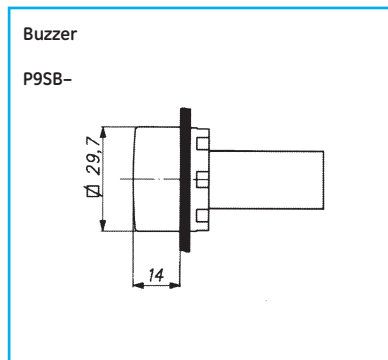
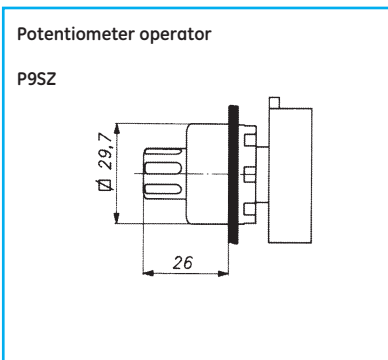
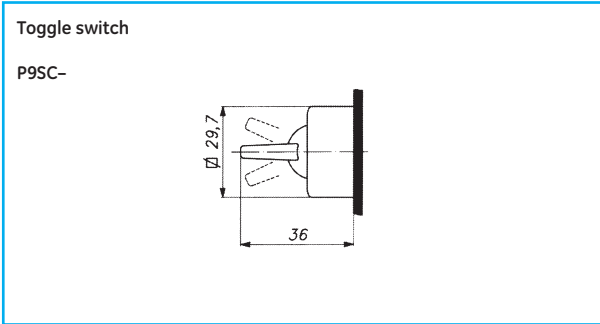
### Square operators - Pilot lights



### Square operators - Illuminated push-buttons and selector switches



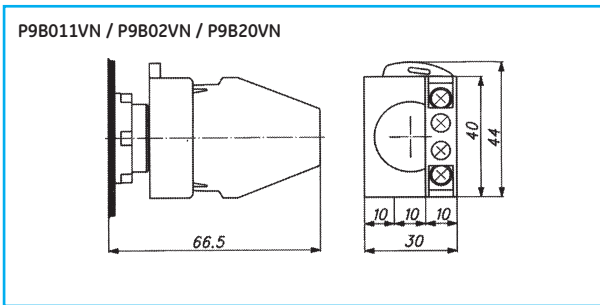
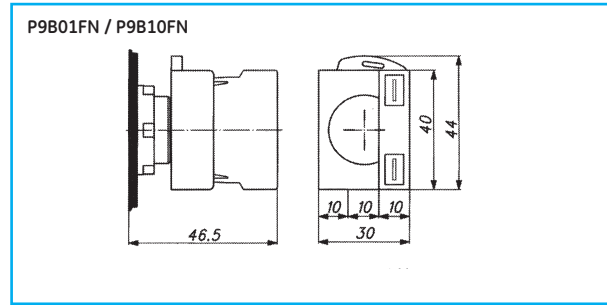
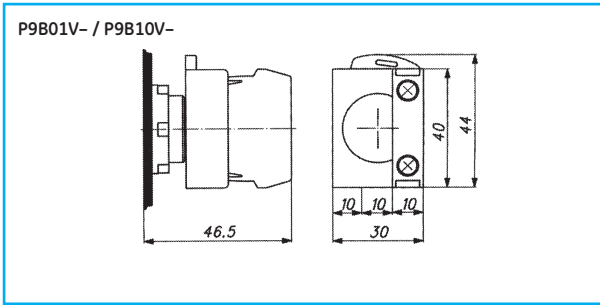
### Square operators - Other devices



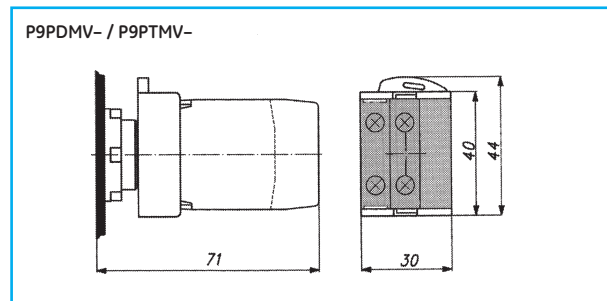
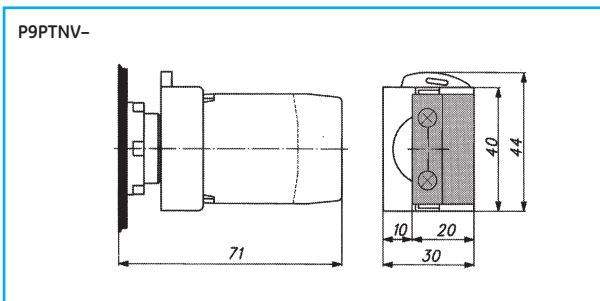
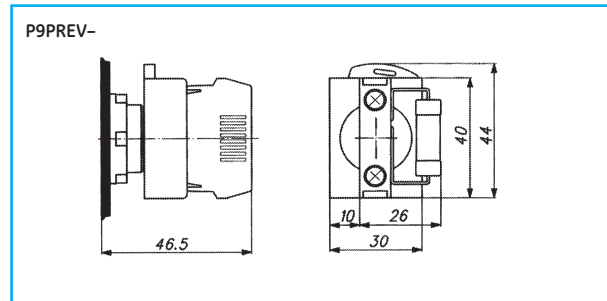
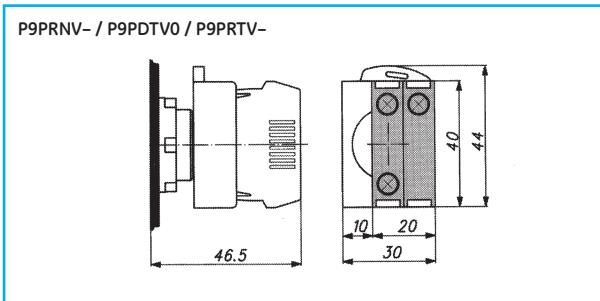
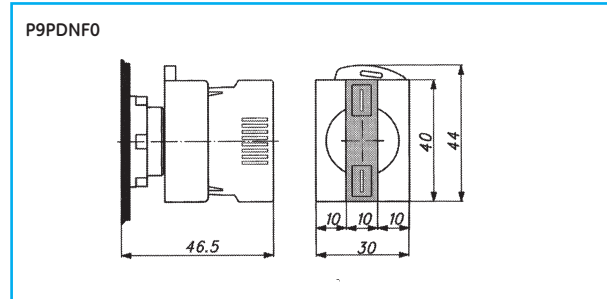
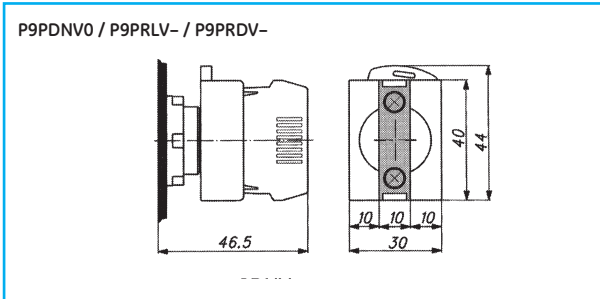
Dimensions in mm (inch = mm x 0.03937) - Weight in kg (lb = kg x 2.2046)



Contact blocks



Power supplies



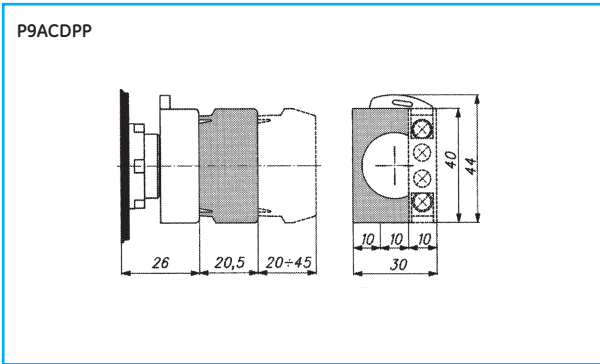
Dimensions in mm (inch = mm x 0.03937) - Weight in kg (lb = kg x 2.2046)



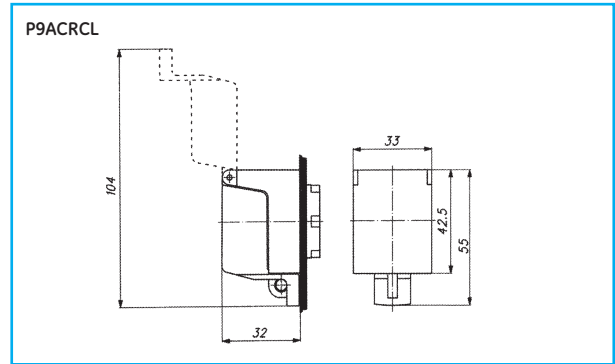
# Series P9

## Dimensional drawings

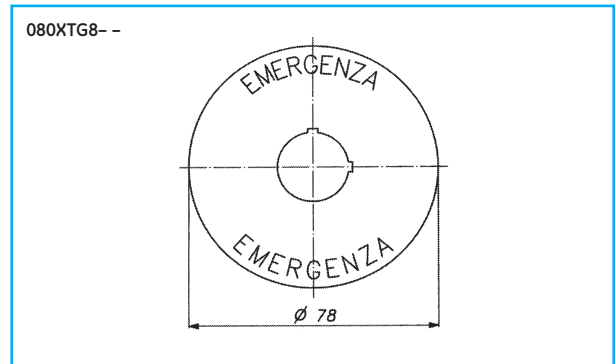
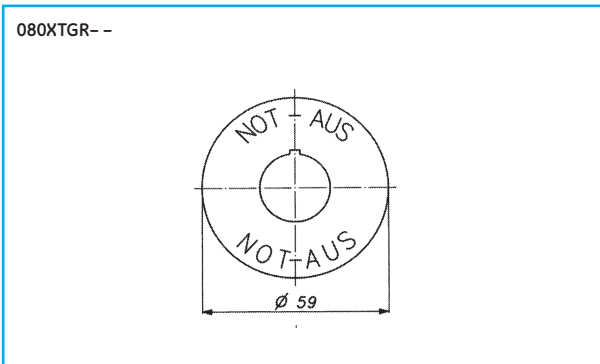
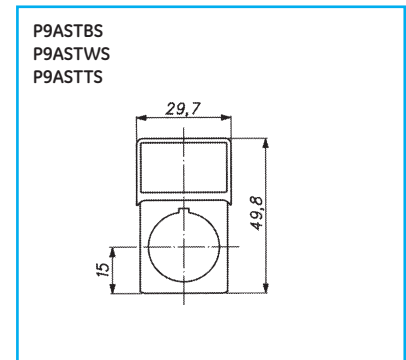
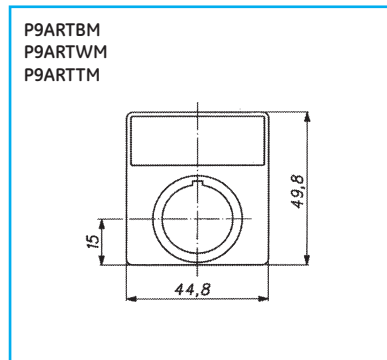
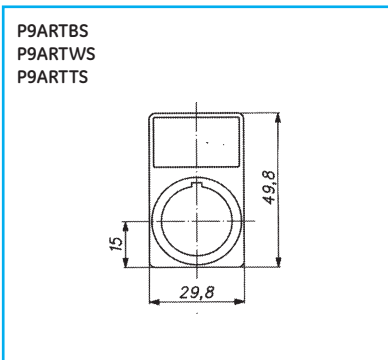
### Push-on / push-off devices



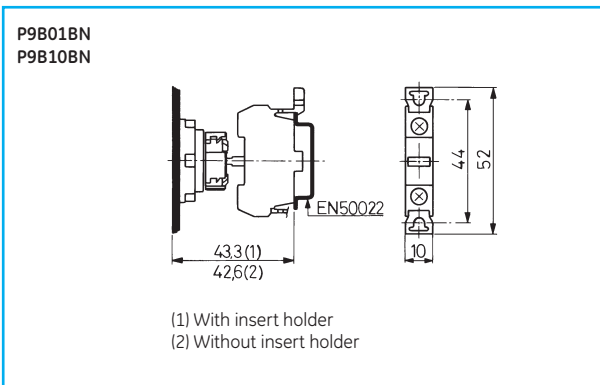
### Protection cover



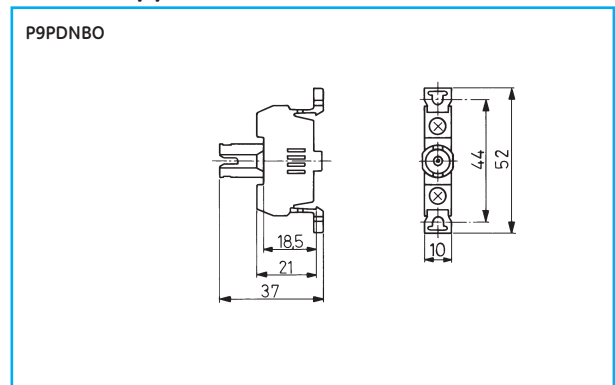
### Insert holders and plates



### Contact blocks



### Power supplies



Dimensions in mm (inch = mm x 0.03937) - Weight in kg (lb = kg x 2.2046)





Overall dimensions

Enclosures for push-button stations in thermoplastic

Holes	A	B	C	E1	E2	H
1	72	46	16.5	23 <sup>(1)</sup>	15.5	57
2	110	78	16.5	23 <sup>(1)</sup>	21.5	95
3	140	108	16.5	23 <sup>(1)</sup>	21.5	125
4	175	143	16.5	23 <sup>(1)</sup>	21.5	160
6	235	200	19.5	29 <sup>(2)</sup>	23	220

(1) Suitable for cable gland, with locknut, PG16 or 1/2" NPT  
 (2) Suitable for cable gland, with locknut, PG21 or 3/4" NPT  
 (3) Flush push-button: 13  
 Pilot light: 14  
 Emergency push-button: 50  
 Key selector switch: 22  
 For customized versions see operator dimensions.

Enclosures for push-button stations in aluminium

Type	Holes Ø 22		Dimensions						Fixing templates	
	vertic.	horizont.	A (mm)	B (mm)	C (mm)	D (mm)	E (mm)	F	HxLxØ max (mm)	position of the holes
1	1	-	87	87	75	72	21.5	PG 21	74x55x4	1-3
1M	1	-	87	87	100	97	21.5	PG 21	68x55x4	1-3
2	2	-	145	87	75	72	21.5	PG 21	132x55x4	1-3
2M	2	-	145	87	100	97	21.5	PG 21	126x55x4	1-3
3	3	-	195	87	100	97	21.5	PG 21	176x55x4	1-3
4	2	2	145	87	75	72	21.5	PG 21	132x55x4	1-3
4M	2	2	145	87	100	97	21.5	PG 21	126x55x4	1-3
6	3	2	195	87	100	97	21.5	PG 21	176x55x4	1-3
8	2	4	152	152	101.5	98.5	27	PG 29	136x119x6	1-3
12	3	4	205	230	101.5	98.5	27	PG 29	172x214x6	1-2-3-4
18	3	6	257	300	101.5	98.5	35	PG 36	221x282x6	1-2-3-4
24	4	6	257	300	101.5	98.5	35	PG 36	221x282x6	1-2-3-4
35	5	7	350	350	123	106.5	41	PG 36	180x180x10	1-2-3-4

Dimensions in mm (inch = mm x 0.03937) - Weight in kg (lb = kg x 2.2046)



# Series 077

## Technical data

### Compliance with standards

IEC 947.5.1 - VDE 0660 - NFC 63140  
CEI EN 60947.5.1 - UTE - BSI - NEMA  
CENELEC EN 50007

### Approvals

UL (U.S.A.) - CSA (Canada) - RINA - CE

### Climatic protections

The standard versions are suitable for use in the following climates:

Temperate climate	cat. 23/50 (DIN 50014)
Wet climate	cat. 23/83 (DIN 50015)
Hot wet climate	cat. 40/92 (DIN 50015)
Variable wet climate	FW24 (DIN 50016)

### Temperature ranges

Operation	-25°C to +70°C
Storage	-40°C to +70°C

### Protection degree of the operators

IP65 according to IEC 529 when they are mounted into enclosures with the same or a higher degree of protection.  
IP66 with appropriate protective caps.

### Protection degree of the terminals

IP2x according to IEC 529.  
Fully integrated on signalling units, illuminated push-buttons and illuminated selector switches. With accessory on contact blocks for control units.

### Rated insulation voltage

690V according to EN 60947.1

### Impulse withstand voltage

4 kV according to EN 60947.1

### Insulation class

Group C according to VDE 0110

### Electric shocks protection

Class I according to IEC 536

### Short-circuit protection

With fuses type gI of 10A according to IEC 947.5.1

### Connection terminals

Connection terminals  
Screw type with retractable clamp.  
Clamping capacity of rigid and/or flexible conductors:  
- minimum 22 AWG (0.32mm<sup>2</sup>)  
- maximum 12 AWG (3.3mm<sup>2</sup>)

### Performances of the contacts

- Slow acting
- Self-cleaning
- NC forced breaking
- Double break

### Electrical performances

Rated thermal current I<sub>th</sub> = 10A

#### Performances according IEC 947.5.1

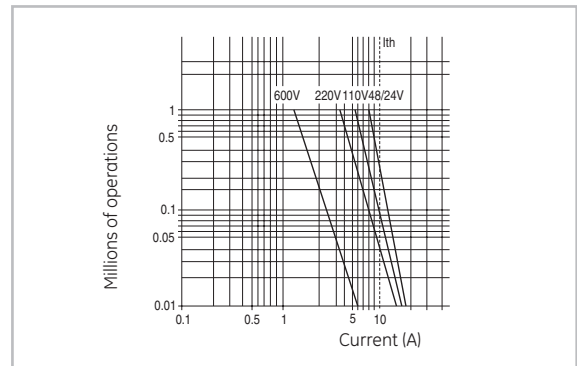
Categorie AC 15 (A600)									
Voltage	U <sub>e</sub> (V)	24	48	60	110	220	380	500	600
Current	I <sub>e</sub> (A)	10	10	10	6	3	2	1.5	1.2
Categorie DC 13 (P600)									
Voltage	U <sub>e</sub> (V)	24	48	60	110	220	300	500	600
Current	I <sub>e</sub> (A)	5	2.7	2	1.1	0.55	0.3	0.22	0.2
Categorie DC 13 (Q300) for illuminated push-buttons and illuminated selector switch									
Voltage	U <sub>e</sub> (V)	24	48	60	110	220	300		
Current	I <sub>e</sub> (A)	2.5	1.1	1	0.55	0.27	0.2		

#### Performances according to CSA and UL

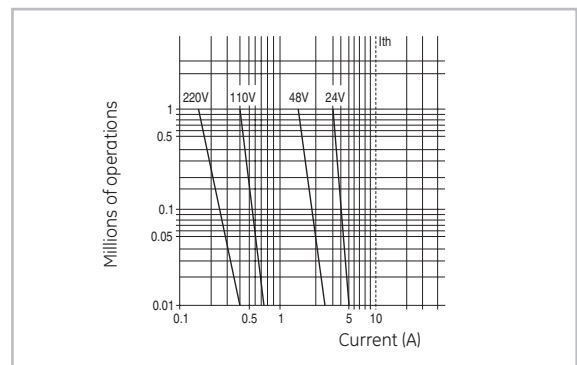
AC Heavy Duty (A600)	
DC Standard Duty (Q300) for illuminated push-buttons and illuminated selector switch	

### Electrical endurance

Alternative current 50/60Hz cat. AC 15



Direct current cat. DC 13



Control and signalling units Ø 30mm

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### Mechanical endurance

Joysticks	
Key push-buttons	0.5 × 10 <sup>6</sup> op.
Locking mushroom push button	
Knob selector switches	
Lever selector switches	
Key selector switches	
Illuminated selector switches	1 × 10 <sup>6</sup> op.
Selector push-buttons	
Timed push-buttons	
Illuminated push-buttons	
Momentary std push-buttons	
Momentary mush. push-buttons	3 × 10 <sup>6</sup> op.

### Number of contact blocks

Momentary standard push-buttons	4 double pole
Momentary mush. push-buttons	(8 single pole)
Key push-buttons	4 double pole
Locking emergency	(4 single pole)
Selector switches	6 double pole
(4 pos. types excl)	(6 single pole)
4 pos. selector switches	2 double pole
Selector push-buttons	6 double pole
	(6 single pole)
Joysticks 2 and	4 double pole
4 positions	(4 single pole)
Illuminated push-buttons	For different contacts
Illuminated selector switches	configuration, contact our sales office

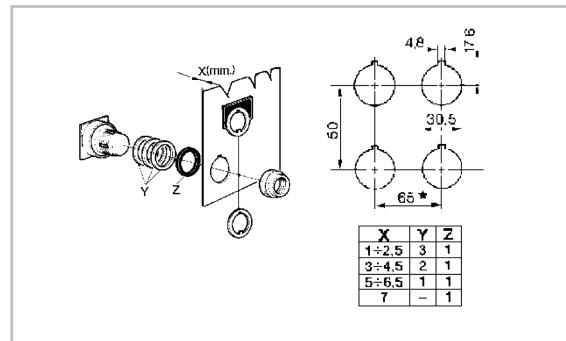
### Fitting of units

The units of Series 077 are designed for fitting onto panels with a thickness between 1 and 7mm., with holes of 30.5mm. diameter, according to rules established by EN 60947.5.1.

A special metal ring supplied with each unit or one of the name plates included among the fittings, enables the unit to be exactly positioned.







All equipment is supplied with a set of spacing rings to adjust variations in the thickness of the panel thus ensuring a uniform front protrusion.

For a correct fitting, it needs to observe the diagram below and tables indications.



# Series 077

## Push-buttons

Standard/Momentary		Description	Contacts	Cat. no.	Ref. no.
			NC+NO	<b>077P11</b>	180019
			NC	<b>077P01</b>	180039
			NO	<b>077P10</b>	180029
Standard/Time delayed <sup>(1)</sup>		Description	Contacts	Cat. no.	Ref. no.
		Contacts delayed at the release of the push button. Accuracy ±5% Setting range: 0,1 - 30 sec. 10 - 180 sec.	NC+NO	<b>077P11T30</b>	180120
			NC+NO	<b>077P11T180</b>	180121
To complete by		Description	Ring type	Cat. no.	Ref. no.
	Fixing kits With 4 coloured caps: black, red, green, yellow		with guard	<b>077GGBCN</b>	<b>180020</b>
			without guard	<b>077GSBCN</b>	<b>180010</b>
	With 4 coloured caps: brown, orange, blue, white		with guard	<b>077GGBCS</b>	180050
			without guard	<b>077GSBCS</b>	180040
	With 1 clear and 4 marking etched on both sides		with guard	<b>077GGBCF</b>	180137
			without guard	<b>077GSBCF</b>	180136
					

The catalogue numbers in **bold** are available from stock.

(1) Not approved by RINA and Lloyd's Register

Control and signalling units Ø 30mm

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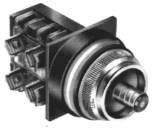
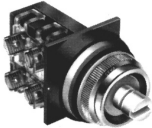


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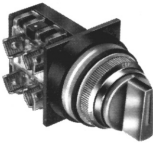









Push-buttons

Mushroom head/Momentary	Description	Contacts	Cat. no.	Ref. no.
		NC+NO	077E11	180049
		NC	077E01	180069
		NO	077E10	180059
Mushroom head with latch	Push-twist to release	NC+NO	077RE11	180079
		NC+NO	077RE01	180099
		NC+NO	077RE10	180089
With keylock <sup>(1)</sup>	Key withdrawable in positions I & II	NC+NO	077PC11C	180100
	Lockable in position: normal & depressed	NC+NO	077PC11G	180104
<p>Locking</p>  <p>(type G unlock)</p>	depressed without pre-setting <sup>(2)</sup>	NC+NO	077PC11G	180104

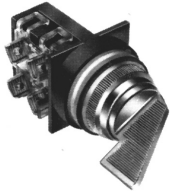

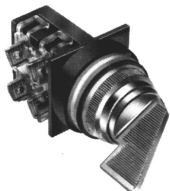




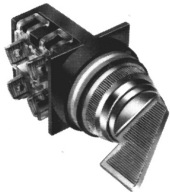

(1) Supplied with two standard keys 3095.

(2) Combined with mushroom head 077ECR makes an mushroom head with latch push-key to release.

## Selector switches with knob

2 positions			Function <sup>(1)</sup>	Contacts	Cat. no.	Ref. no. see bottom
	Fixed		D	NC+NO	<b>077SDN11</b>	180170
			H	NC+NO	077SHN11	180180
3 positions						
	Fixed		B	NC+NO	<b>077SBN11</b>	180230
			U	2NC+2NO	<b>077SUN22</b>	180440
			Z	2NC+2NO	<b>077SZN22</b>	180480
	With spring return		B	NC+NO	077SBN11SC	180240
			B	NC+NO	077SBN11DC	180250
			B	NC+NO 2NC + 2NO	<b>077SBN11RC</b> <b>077SN22RC</b>	180260 180510









## Selector switches with lever

2 positions			Function <sup>(1)</sup>	Contacts	Cat. no. Metal	Ref. no.
	Fixed		D	NC+NO	<b>077SLD11</b>	180601
3 positions						
	Fixed		B	NC+NO	<b>077SLB11</b>	180607
			Z	2NC+2NO	077SLZ22	180623
	With spring return		Z	2NC+2NO	077SLZ22DC	180625
			Z	2NC+2NO	<b>077SLZ22RC</b>	180626
4 positions						
	Fixed		X	2NC+2NO	<b>077SLX22</b>	180606

The catalogue numbers in **bold** are available from stock.

(1) Electrical diagrams, see F.57

Selector switches with key<sup>(1)</sup>






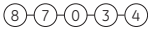

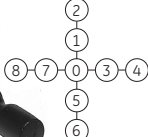
2 positions			Function <sup>(2)</sup>	Contacts	Key removal	Cat. no.	Ref. no.
	Fixed		D	NC+NO	I	<b>077SCD1101</b>	180630
				NC+NO	II	077SCD1105	180631
				NC+NO	I-II	077SCD1109	180632
	With spring return		I	NC+NO	0	<b>077SCI11DC03</b>	180640
			H	NC+NO	0	077SCH11SC03	180636
3 positions							
	Fixed		B	NC+NO	I-0-II	<b>077SCB1120</b>	180843
	With spring return		B	NC+NO	I-0	<b>077SCB11DC07</b>	180852
			Z	NC+NO	I	077SCZ22DC01	180906
			B	NC+NO	0	<b>077SCB11RC03</b>	180853

The catalogue numbers in **bold** are available from stock.

(1) Supplied with two standard keys 3095.  
 (2) Electrical diagrams, see F.57



## Joysticks

2 positions + central zero position		Function <sup>(1)</sup>	Contacts	Cat. no.		Ref. no.		
				Without interlock	With interlock			
 	Fixed position	N	2NC+2NO	<b>077MTS2422</b>	180910	077MTS2422B	181000	
		R	2NC+2NO	<b>077MTS2422R</b>	180912	077MTS2422RB	181002	
	Transient position	N	2NC+2NO	<b>077MT24S22</b>	180911	<b>077MT24S22B</b>	181001	
		R	2NC+2NO	<b>077MT24S22R</b>	180913	077MT24S22RB	181003	
4 positions + central zero position								
 	Fixed positions	N	2NC+2NO	<b>077MTS123422</b>	180914	077MTS123422B	181004	
	Transient positions		2NC+2NO	<b>077MT1234S22</b>	180915	<b>077MT1234S22B</b>	181005	
	2+2 positions + central zero position							
	 	Fixed positions	X	4NC+4NO	<b>077M2S2SX44</b>	180918	077M2S2SX44B	181008
Transient positions			4NC+4NO	<b>077M2T2TX44</b>	180919	077M2T2TX44B	181009	
4, 8 transient -3, 7 fixed			4NC+4NO	<b>077M2S2TX44</b>	180921			
Transient positions		Y	4NC+4NO	<b>077M2T2TY44</b>	180923			
4+4 positions + central zero position								
 	Transient positions	X	8NC+8NO	<b>077M4T4TX88</b>	180927			
	2, 4, 6, 8 transient -1, 3, 5, 7 fixed			8NC+8NO	<b>077M4S4TX88</b>	180929	077M4S4TX88B	181019
	Transient positions	Y	8NC+8NO	<b>077M4T4TY88</b>	180931	077M4T4TY88B	181021	

The catalogue numbers in **bold** are available from stock.

(1) Electrical diagrams, see F.57



### Illuminated push-buttons

Illuminated push-buttons

Momentary		Description	Contacts	Cat. no.	Ref. no.
		Full voltage ~ / $\overline{\text{---}}$ BA9s max 380V - 2 W not included	NC+NO	<b>077PLM11D0</b>	181040
			NO+NO	077PLM20D0	181041
			NO	077PLM10D0	181043
		With transformer 50/60Hz BA9s6V-1.5W included	NC+NO	<b>077PLM11T</b> ♦	
To complete by					
<b>Lenses</b>					
		Standard Mushroom head Ø 35mm (to use with the fixing ring 077GG03)		077GPL● 077GELR	see bottom 180971
<b>Locking rings</b>					
		Without guard		<b>077GG03</b>	180980
		With metal guard		<b>077GGM</b>	180981
		With transparent guard		<b>077GGT</b>	180982

The catalogue numbers in **bold** are available from stock.

Suffix	110-120V	220-250V
♦	J	N

Colours	red	green	yellow	orange	bleu	white	clear
Standard lenses	<b>R</b>	<b>V</b>	<b>G</b>	<b>A</b>	<b>BL</b>	<b>B</b>	I

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# Series 077

## Illuminated selector switches

2 positions		Function <sup>(1)</sup>	Contacts	Cat. no.	Ref. no.
	Fixed	D	NC+NO	<b>077ISD11D0</b>	181060
3 positions					
	Fixed	B	NC+NO	<b>077ISB11D0</b>	181170
			NC+NO	<b>077ISB11T♦</b>	
	With spring return	B	NC+NO	077ISB11D0RC	181174
		Z	NC+NO	077ISZ11D0RC	181176
To complete by					
	Lenses				
		Knob		<b>077MIS●</b>	see bottom

The catalogue numbers in **bold** are available from stock.

(1) Electrical diagrams, see F.57

Suffix	110-120V	220-250V	
♦	J	N	
Colours	red	green	yellow
●	R	V	G

Control and signalling units Ø 30mm

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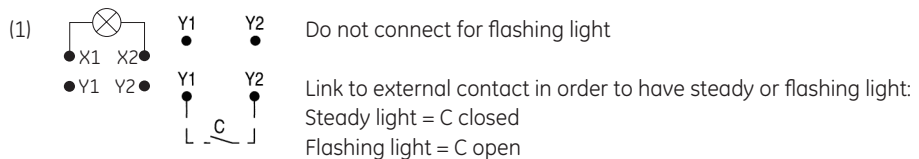
## Pilot lights

	Description	Cat. no.	Ref. no.
	Full voltage ~ / $\equiv$ BA9s max. 380V-2W not included	<b>077LDNV0</b>	181300
	With resistor ~ / $\equiv$ 110-120V, BA9s60V-1.2W included 220-240V, BA9s130V-2W included	<b>077LRNVJ</b> <b>077LRNVN</b>	181301 181302
	With transformer 50/60Hz BA9s6v-1.5w included	<b>077LTNV♦</b>	
	Multifunction <sup>(1)</sup> full voltage 24V ~ / $\equiv$ BA9s24V-2W included	<b>077LDMVD</b>	181305
	Multifunction <sup>(1)</sup> with transformer 50/60Hz BA9s6V-0.6W included	<b>077LTMV♦</b>	
<b>To complete by</b>			
	<b>Lenses</b>		
	Plastic version	<b>077GL●</b>	see bottom
<b>To complete by</b>			
	Full voltage ; / $\equiv$ For bulb E14 base max 660V(1)-6W not included	<b>077DLE14</b>	181260
<b>To complete by</b>			
	<b>Lenses</b>		
	For pilot lights 077DLE14 - plastic version	<b>099GW1●</b>	see bottom

The catalogue numbers in **bold** are available from stock.













Suffix	110-120V	220-250V
♦	<b>J</b>	<b>N</b>

Colours	red	green	yellow	orange	blue	white	grey
●	<b>R</b>	<b>V</b>	<b>G</b>	<b>A</b>	<b>BL</b>	<b>B</b>	<b>H</b>



# Series 077

## Accessories






		Description	Cat. no.	Ref. no.
	Push-on/ push-off device	<b>For momentary standard push-buttons</b> Converts momentary push-button to push-on/push-off. This device can only be used with 077-01 (NC) and/or 077-10A (NO early make) contact blocks.	<b>077DPP</b>	181550
	Push-pull to release device	<b>For momentary mushroom push-buttons</b> Converts momentary mushroom push-button to push to latch/pull to release.	<b>077DAE</b>	181554
	Handles	Knob for selector switches	<b>077M●</b>	see bottom
	Protection	Guard-ring for mushroom head push-button dia 35mm.	<b>077GE35</b>	181620
	Plug	For unused mounting hole.	<b>077TPF</b>	181601
	Potentiometer operator	Suitable for potentiometers with shaft 50mm long and 6mm diameter. Potentiometer not included.	<b>077OPZ</b>	181570
	Rubber protective caps	For standard push-buttons Coloured Clear	<b>077CP●</b> <b>077CPT</b>	see bottom 181588
		For illuminated standard push-buttons Clear	<b>077CLPT</b>	181600
		For knob selector switches Black colour with clear knob	<b>077CST</b>	181603
	Spare keys	Standard version	Code 3095	<b>077C3095</b> 173095
	Bulbs BA9s	Filament type	Vn	Wn
			6	0.6
			6	1.5
			12	2
			24	2
			30	2.1
			48	2
			60	1.2
			130	2
		Neon type	110	0.11
			220	0.33
				
				<b>BA9S606</b> 187850
				<b>BA9S615</b> 187851
				BA9S122 187852
				<b>BA9S242</b> 187853
				BA9S30 187854
				BA9S48 187855
				BA9S6012 187856
				<b>BA9S130</b> 187857
				BA9SN110 187860
				<b>BA9SN220</b> 187861

The catalogue numbers in **bold** are available from stock.

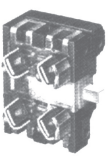
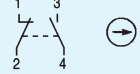






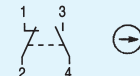


Colours ●	black	red	green	yellow	blue	white
Knobs	N	R	V	G	BL	-
Protective caps	N	R	V	G	-	-
Mono LED	-	R	V	G	BL	B



## Nameplates

	Description	Cat. no.	Ref. no.
	For push-button and pilot lights		
	Without text (black background)	077TNA	181650
	With text in English (black background)	 STOP	077TNA40 181840
	For 2 position selector switch and selector push-button		
	Without text (black background)	077TNA2	181660
	With text (black background)	ON - OFF	077TNA230 181930
	For 3 position selector switch and selector push-button		
	Without text (black background)	077TNA3	181670
	With text (black background)	MANUAL CYCLE-O-AUTOMATIC OPEN - OFF - CLOSE UP - OFF - DOWN	077TNA301 181951 077TNA312 181962 077TNA313 181963
	Diameter 62mm for emergency push-buttons		
	Without text (yellow background)	077TGR	181720
	With text (yellow background)	EMERGENCY STOP	077TGR02 181722

## Contact blocks

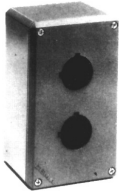
2 positions		Contacts	Cat. no.	Ref. no.
	Standard	For all the applications Illuminated push-buttons and illuminated selector switches excluded		
			NC+NO	<b>077-11</b> 180001
			NC	<b>077-01</b> 180003
			NO	<b>077-10</b> 180002
			NC late opening	<b>077-01R</b> 180008
			NO early closing	<b>077-10A</b> 180007
	Accessories for contact blocks 077-...	IP2X protection	for use with NO <b>077PTB10</b> 181608 for use with NC <b>077PTB01</b> 181609 for use with NO+NC <b>077PTB11</b> 181615	
		For 2 + 2 and 4 + 4 positions joysticks	Snap action	099SPDTDB 180009
			For illuminated push-buttons and illuminated selector switches	
	NC			P9B01VN 187001
	NO			P9B10VN 187002

The catalogue numbers in **bold** are available from stock.



## Enclosures for push-button stations in aluminium alloy (Grey RAL 7012)

Control and signalling units Ø 30mm



Cover with holes with conduit entry

No. of holes	Type	Cat. no.	Ref. no.
1	1	<b>077SP1</b>	180521
1	1M	<b>077SP1M</b>	180522
2	2	<b>077SP2</b>	180523
2	2M	<b>077SP2M</b>	180524
3	3	<b>077SP3</b>	180525
4	4V	<b>077SP4V</b>	180526
4	4	<b>077SP4</b>	180527
6	6	<b>077SP6</b>	180528
9	9	<b>077SP9</b>	180529
12	12	<b>077SP12</b>	180530
16	16	<b>077SP16</b>	180531
20	20	<b>077SP20</b>	180532
25	25	<b>077SP25</b>	180533
30	30	<b>077SP30</b>	180534
36	36	<b>077SP36</b>	180535
		077-01R	180008

Cover with holes without conduit entry

1	1	077SP1SFE	180536
1	1M	077SP1MSFE	180537
2	2	077SP2SFE	180538
2	2M	077SP2MSFE	180539
3	3	077SP3SFE	180540
4	4V	077SP4VSFE	180541
4	4	077SP4SFE	180542
6	6	077SP6SFE	180543
9	9	077SP9SFE	180544
12	12	077SP12SFE	180545
16	16	077SP16SFE	180546
20	20	077SP20SFE	180547
25	25	077SP25SFE	180548
30	30	077SP30SFE	180549
36	36	077SP36SFE	180550

Cover without holes with conduit entry



	1	080SP1SFC	170835
	1M	080SP1MSFC	170838
	2	080SP2SFC	170841
	2M	080SP2MSFC	170844
	3	080SP3SFC	170847
	4V	077SP4VSFC	180551
	4	080SP8SFC	170853
	6	080SP12SFC	170856
	9	080SP12SFC	170856
	12	080SP18SFC	170859
	16	080SP18SFC	170859
	20	080SP35SFC	170863
	25	080SP35SFC	170863
	30	<b>077SP36SFC</b>	180552
	36	077SP36SFC	180552

Cover without holes without conduit entry

	1	080SP1SF	170837
	1M	080SP1MSF	170840
	2	080SP2SF	170843
	2M	080SP2MSF	170846
	3	080SP3SF	170849
	4V	077SP4VSF	180553
	4	080SP8SF	170855
	6	080SP12SF	170858
	9	080SP12SF	170858
	12	080SP18SF	170861
	16	080SP18SF	170861
	20	080SP35SF	170865
	25	080SP35SF	170865
	30	<b>077SP36SF</b>	180554
	36	077SP36SF	180554

Accessories  
Kit of two hinges for types from 12 to 36 holes.

**080KCSF** 170883

The catalogue numbers in **bold** are available from stock.



## Diagrams

### Selector switches

	Function	Contacts	Diagram
	D 077 11...		
	I 077 11...		
	H 077 11...		
	B 077 11...		
	Z 077 11... 077 11...		

### Illuminated selector switches

Full voltage type	Function	Contacts	Diagram
	D 077 10... 077 01...		
	B 077 10... 077 01...		
	Z 077 10... 077 01...		

### Joysticks

Positions	Function	Contacts	Diagram
	N 077 11... 077 11...		
	R 077 11... 077 11...		
	N 077 11... 077 11...		

### Joysticks

Positions	Function	Contacts	Diagram
	X 077 11... 077 11... 077 11... 077 11...		
	Y 077 11... 077 11... 077 11... 077 11...		
	X 077 11... 077 11... 077 11... 077 11... 077 11... 077 11... 077 11... 077 11...		
	Y 077 11... 077 11... 077 11... 077 11... 077 11... 077 11... 077 11... 077 11...		

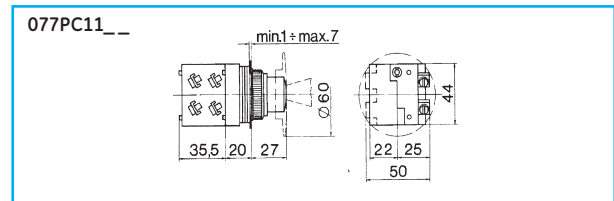
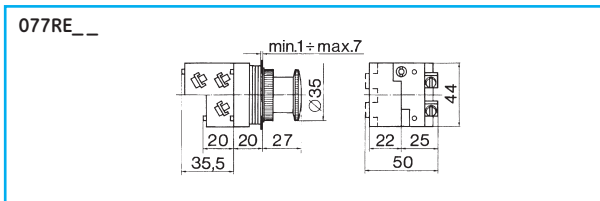
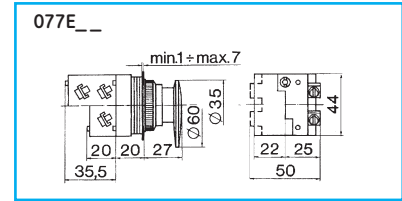
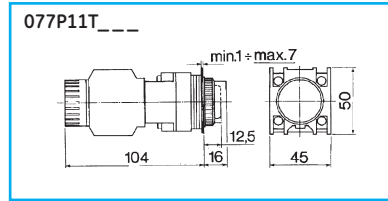
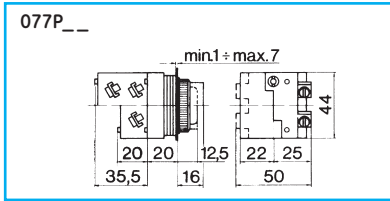
■ = closed contact



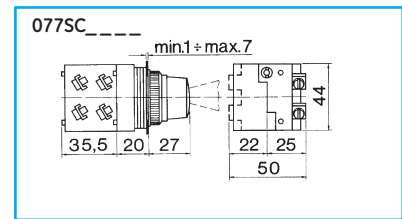
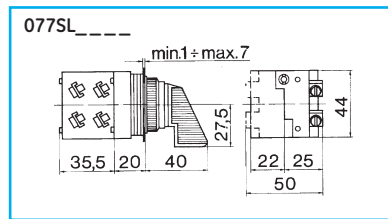
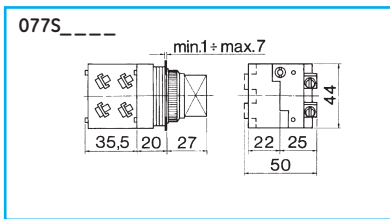
# Series 077

## Dimensional drawings

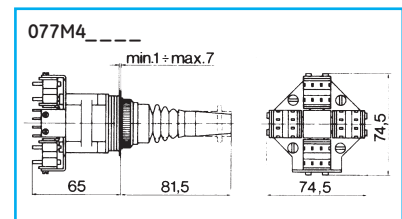
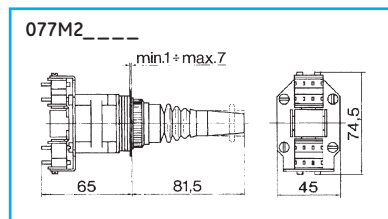
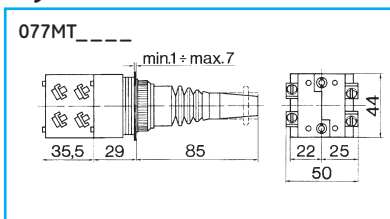
### Push-buttons



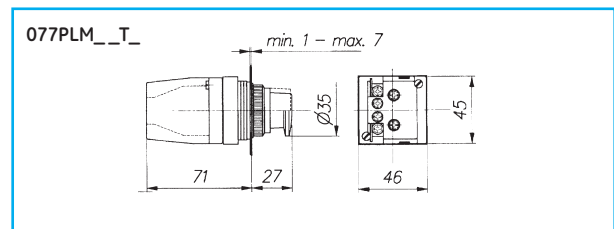
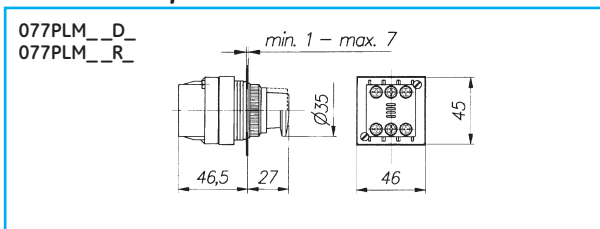
### Selector switches



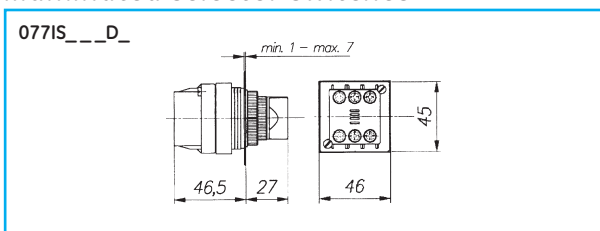
### Joysticks



### Illuminated push-buttons



### Illuminated selector switches

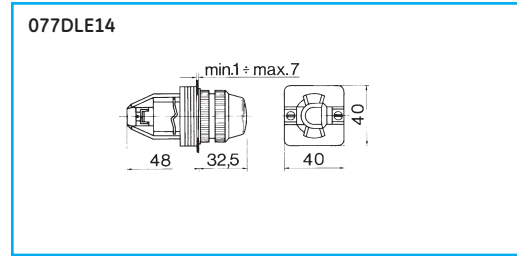
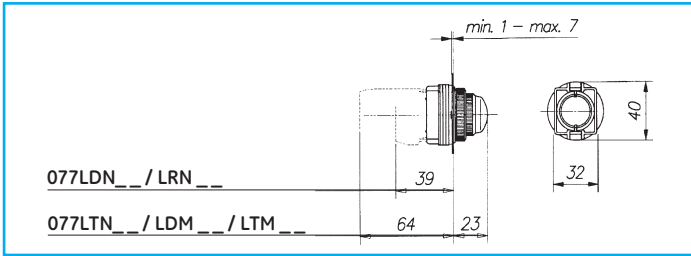


Dimensions in mm (inch = mm x 0.03937) - Weight in kg (lb = kg x 2.2046)

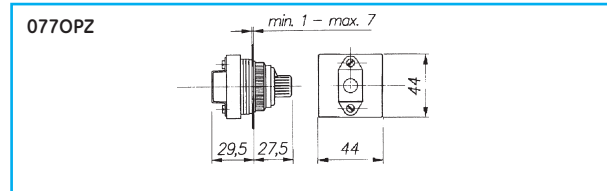
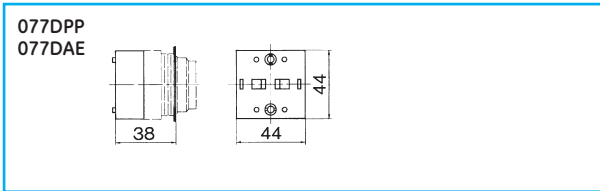




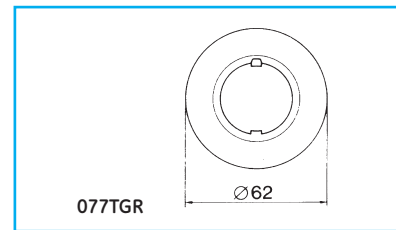
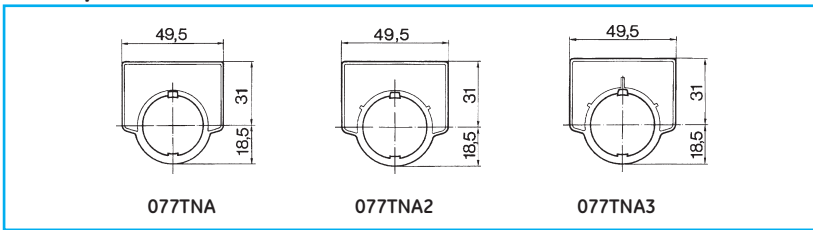
Pilot lights



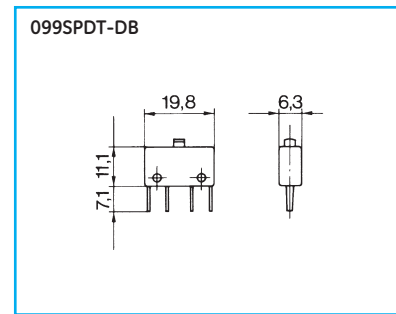
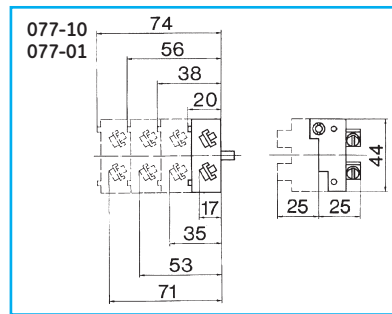
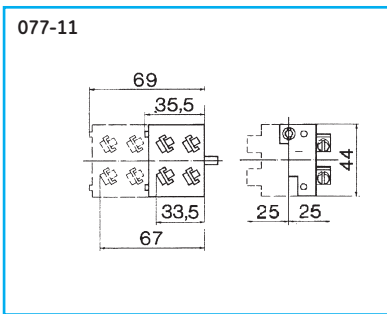
Kits



Nameplates



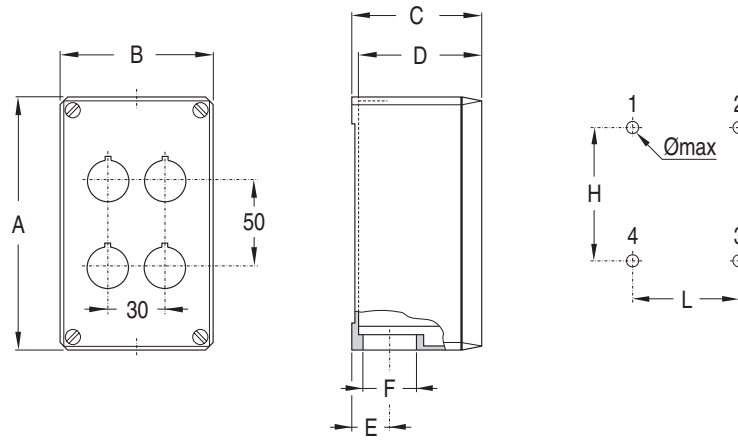
Contact blocks



# Series 077

## Dimensional drawings

### Aluminium enclosures

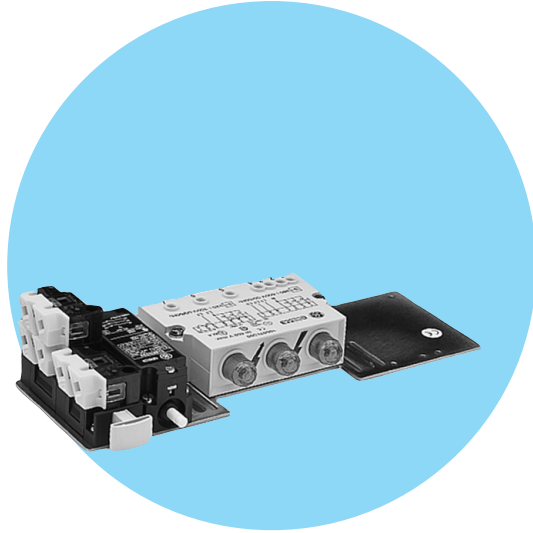


Type	Number of holes Ø 30		Dimensions						Fixing templates	
	Vertic.	Horizont.	A (mm)	B (mm)	C (mm)	D (mm)	E (mm)	F	HxLxØ max (mm)	position of the holes
1	-	-	87	87	75	72	21.5	PG 21	74x55x4	1 - 3
1M	-	-	87	87	100	97	21.5	PG 21	68x55x4	1 - 3
2	2	-	145	87	75	72	21.5	PG 21	132x55x4	1 - 3
2M	2	-	145	87	100	97	21.5	PG 21	126x55x4	1 - 3
3	3	-	195	87	100	97	21.5	PG 21	176x55x4	1 - 3
4V	4	-	257	92	86.5	83.5	23	PG 21	224x76x6	1 - 3
4	2	2	152	152	101.5	98.5	27	PG 29	136x119x6	1 - 3
6	2	3	205	230	101.5	98.5	27	PG 29	172x214x6	1-2-3-4
9	3	3	205	230	101.5	98.5	27	PG 29	172x214x6	1-2-3-4
12	3	4	257	300	101.5	98.5	35	PG 36	221x282x6	1-2-3-4
16	4	4	257	300	101.5	98.5	35	PG 36	221x282x6	1-2-3-4
20	5	4	350	350	123.5	106.5	41	PG 36	180x180x10	1-2-3-4
25	5	5	350	350	123.5	106.5	41	PG 36	180x180x10	1-2-3-4
30	6	5	410	410	144.5	127.5	53	PG 48	180x180x10	1-2-3-4
36	6	6	410	410	144.5	127.5	53	PG 48	180x180x10	1-2-3-4

Dimensions in mm (inch = mm x 0.03937) - Weight in kg (lb = kg x 2.2046)



## Signalling devices



### General

Series 105 signalling units are used to indicate the electric equipment power supply conditions.

For this purpose the devices shall be wired after the main disconnecting switch and clearly in view when the cabinet's doors are opened. Series 105 DTL devices can be used on three-phase lines with or without the neutral wire or single-phase power lines, indicating the hazardous condition due to the applied voltage.

Three luminous red lamps are used. The flashing devices are normally used in combination with limit switches contacts NC type 114FCT03 that provides insertion when the cabinet door are open only.

### Climatic protection

The standard versions are suitable for use in the following climates:

- Temperate climate cat. 23/50 (DIN 50014)
- Wet climate cat. 23/83 (DIN 50015)
- Hot wet climate cat. 40/92 (DIN 50015)
- Variable wet climate cat. FW 24 (DIN 50016)

### Standards

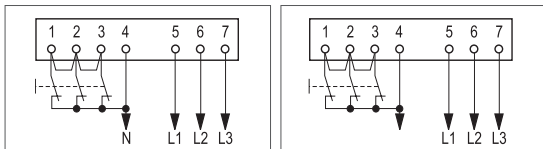
CEI, IEC, VDE, BSI and UTE

### Approvals

CE, UL, CSA

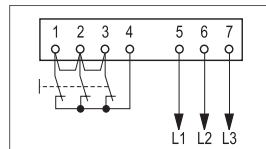
### Suggested connections

Indicates the presence of 3, 2 or 1 phase only by means of the relative lamp.



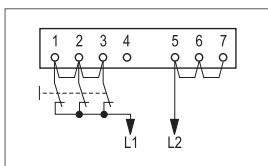
**3-phase line with insulated neutral** **3-phase line with grounded neutral**

Indicates the presence of 3 or 2 phases by means of the relative lamp. One phase only is not indicated (all lamps OFF)

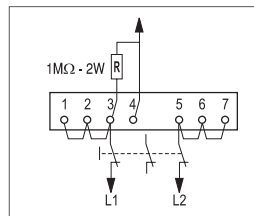


**3-phase line without neutral**

Indicates both phases with 3 lamps ON at same time. One phase only is not indicated (all lamps OFF)



**Single-phase line (general diagram)**



**Single phase-line (alternative diagram)**

1. Phase to phase connection on a 3 phase line with grounded neutral. Indicates the presence of 2-phases or 1 only with the 3 lamps ON at the same time.
2. Phase to neutral connection on a 3 phase line with grounded neutral or phase to phase by a matching transformer with one phase grounded. Indicates the presence of the ungrounded phase with the 3 lamps ON at the same time. No indication occur if the ungrounded phase is missing (all lamps OFF).

### Specifications

Temperature ranges	Operation	from -25°C up to +70°C
	Storage	from -40°C up to +70°C
Degree of protection (according to IEC 529)		IP 20
<b>Electrical</b>		
Rated insulation voltage according to EN 60947.1		690V
Impulse withstand voltage according to EN 60947.1		4kV
Electrical input		2mA max.
Connections	Terminal strip with numbered terminals, accessible from outside	
	protected against accidental contacts according to DIN 57106 and IP 20 according to IEC 529	
Clamping capacity		Maximum one flexible conductor 12 AWG (3.3mm <sup>2</sup> )

Order codes ● page F.62  
Dimensional drawings ● page F.64



## Flashing devices



Supply voltage		Cat. no.	Ref. no.	Pack
Three-phase (50-60Hz)	Single-phase (50/60Hz)			
220V	110-127V	105DTL220	132230	1
380-600V	220-350V	105DTL500	132231	1
690V		105DTL690	132232	1

## 3 pole limit switch for device control



Protection degree	Cables entry	Operation force	Contacts	Cat. no.	Ref. no.	Pack
IP40	PG11	8.5 N min.	3NC	114FCT03	130320	25
IP65	PG11	8.5 N min.	3NC	114FCT03T	130321	25

## Parallel bridge for 3 poles limit switches



Cat. no.	Ref. no.	Pack
105 PT	132234	50x5

## Parallel bridge for 3 poles limit switches



The unit includes the following components:

- one flashing device 105DTL220 or 105DTL500.
- one 3-pole limit switch 114FCT03 for connection of the flashing device
- one electrical interlock device and panel light 105GIL or 105GIL10.
- one mounting plate 105PM on which are fitted on the above devices.

If two doors have to be protected (as double enclosure closing on the middle) the mounting plate shall be fitted also one limit switch 114FCT03 and one device 105GIL or 105GIL10.

### Approvals:

UL (USA) - CSA (Canada)

Supply voltage			Cat. no.	Ref. no.	Pack
Three-phase (50-60Hz)	Single-phase (50/60Hz)	Tripping coil			
220V	110-127V	Shunt trip	105GP1P220	132250	1
220V	110-127V	Undervoltage trip	105GP1P220M	132251	1
380-600V	220-350V	Shunt trip	105GP1P500	132252	1
380-600V	220-350V	Undervoltage trip	105GP1P500M	132253	1

### Electrical interlock device and cubicle lighting<sup>(1)</sup>



The switch can be directly driven by the enclosure door.  
If several doors are employed, one switch per door shall be used.  
When properly connected, the following functions are provided:

- Position 1 (pushed) door closed: light OFF, tripping coil of main switch unpowered ( normal equipment operation )
- Position 2. (free) door opening: light ON, tripping coil of main switch powered (equipment shall cut-out automatically).
- Position 3 (pulled) door open: light ON, tripping coil of main switch unpowered (adjustment on the equipment of dry checks). When door is closed again, the switch revert automatically from position 2 or 3 to position 1.

Terminals have IP2X protection degree according to IEC/EN 60529

**Approvals:**

UL (USA) - CSA (Canada)

Tripping coil		Cat. no.	Ref. no.	Pack																
Shunt trip		105 GIL	132240	1																
	<table border="1"> <thead> <tr> <th></th> <th>1</th> <th>2</th> <th>3</th> </tr> </thead> <tbody> <tr> <td>E</td> <td></td> <td></td> <td></td> </tr> <tr> <td>F</td> <td></td> <td></td> <td></td> </tr> <tr> <td>G</td> <td></td> <td></td> <td></td> </tr> </tbody> </table>		1	2	3	E				F				G				  		
	1	2	3																	
E																				
F																				
G																				
Undervoltage trip		105 GIL 10	132241	1																
	<table border="1"> <thead> <tr> <th></th> <th>1</th> <th>2</th> <th>3</th> </tr> </thead> <tbody> <tr> <td>E</td> <td></td> <td></td> <td></td> </tr> <tr> <td>F</td> <td></td> <td></td> <td></td> </tr> <tr> <td>G</td> <td></td> <td></td> <td></td> </tr> </tbody> </table>		1	2	3	E				F				G				  		
	1	2	3																	
E																				
F																				
G																				

### Electrical interlock device<sup>(1)</sup>



The switch is directly driven by the enclosure door.  
If several doors are employed, one switch per door is needed.  
When properly connected, the same functions of devices above shall be provided but without enclosure control light.  
Terminals have IP2X protection degree according to IEC 529

Tripping coil		Cat. no.	Ref. no.	Pack								
Shunt trip		105 CI	132242	1								
	<table border="1"> <thead> <tr> <th></th> <th>1</th> <th>2</th> <th>3</th> </tr> </thead> <tbody> <tr> <td>G</td> <td></td> <td></td> <td></td> </tr> </tbody> </table>		1	2	3	G						
	1	2	3									
G												
Undervoltage trip		105 CI 10	132243	1								
	<table border="1"> <thead> <tr> <th></th> <th>1</th> <th>2</th> <th>3</th> </tr> </thead> <tbody> <tr> <td>G</td> <td></td> <td></td> <td></td> </tr> </tbody> </table>		1	2	3	G						
	1	2	3									
G												

### Mounting plate



		Cat. no.	Ref. no.	Pack
		105 PM	132244	1

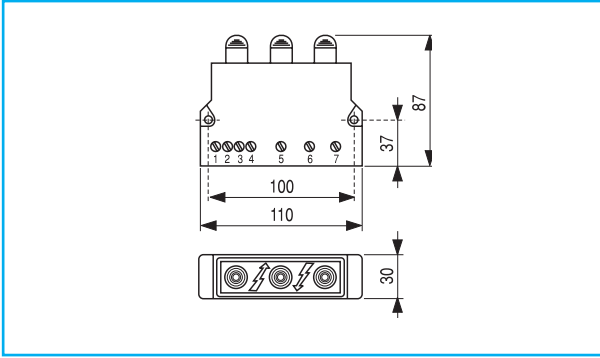
(1) For electrical performance and features of contact blocks please see F.44



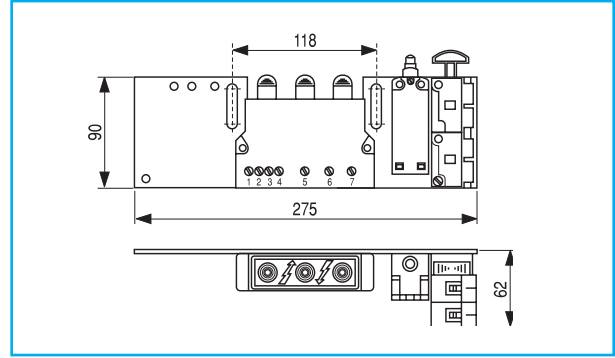
# Series 105

## Dimensional drawings

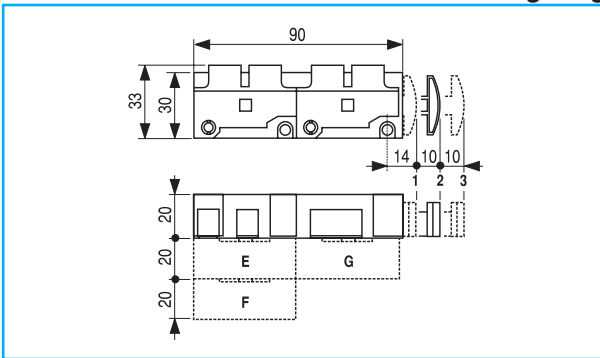
Series 105 - Flashing devices



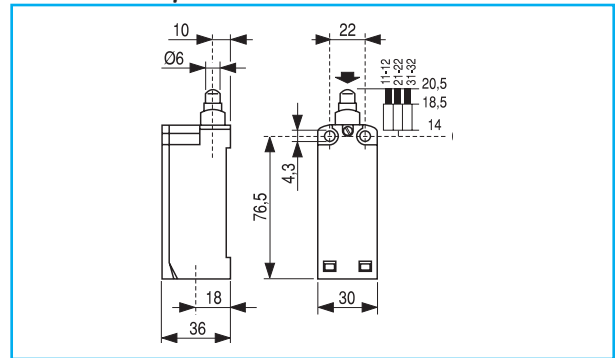
Series 105 - Single door protection unit



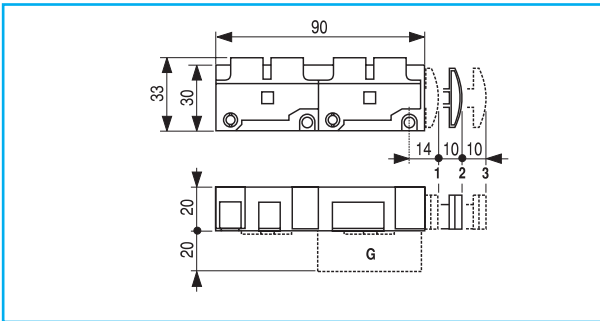
Series 105 - Electrical interlock and cubicle lighting



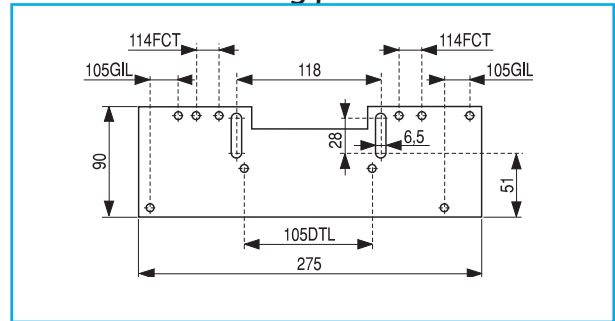
Series 105 - 3 pole limit switch for device control



Series 105 - Electrical interlock device



Series 105 - Mounting plate



Dimensions in mm (inch = mm x 0.03937) - Weight in kg (lb = kg x 2.2046)



<b>G.2 AF Drives</b>	<b>POWER DEVICES</b>	Contactors and overload relays	A
G.2 Introduction			
G.8 AF-70 LP - Micro Drives		Auxiliary relays and contactors	B
G.18 AF-700 FP - Fan and Pump Drives			
		Motor protection devices	C
G.28 AF-60 LP - Micro Drives			
G.34 AF-650 GP - General Purpose Drives		Applications	D
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	<b>AUXILIARY DEVICES</b>	Main switches	E
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## POWER ELECTRONICS

## Speed drive units

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## ENCLOSURES

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## Highlight of benefits

### One family

- For both general purpose and fan/pump applications
- Just one drive series to run an entire production line
- Broad range: 180W to 1.4 MW, 230 V – 690 V

### Designed for lifetime

- Built-in communication for easier integration
- Built-in DC chokes increase the lifetime of the capacitors
- Conformal coating available

### Low operating costs

- Low energy consumption – up to 98% efficiency
- Less energy needed for cooling
- Automatic Energy Optimizer (AEO) potentially saves up to 5% energy compared to standard drives
- Low cost of ownership – no periodic maintenance/ replacement cost

## Constant torque applications Heavy Duty

Constant torque applications include those where the load does not change significantly with the speed as **conveyors, lifting gear and mixers**.

A motor block on a conveyor will always weight the same, regardless of whether the conveyor is running at low or high speed.

The torque required to move this motor block is always the same. Although friction and acceleration torques will vary depending on the operating state, the torque requirement for the load remains constant.

The power required by a system of this type is proportional to the torque required and to the speed of the motor.

Savings can be achieved directly if the speed can be reduced at constant load. Adapting the speed of the belt to the quantity of goods to be transported not only enables those goods to be processed without interruption but also leads to a **reduction on the energy required**.





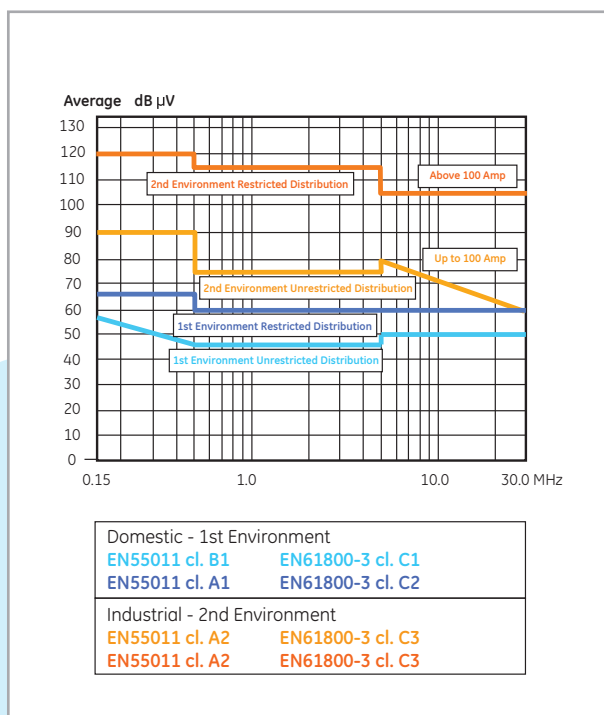
## Variable torque applications Light Duty

Often involve **pumps and fans**. However, a distinction has to be made in the case of pumps. Although the most popular types of centrifugal pump have a quadratic torque characteristic but **eccentric, vacuum or positive displacement pumps have a constant torque characteristic**. Pumps and fans have a significant share of all power consumed by industrial applications, with consumption levels approximately at 40%. Speed control is a simple yet very effective way of saving energy where fans and pumps with variable load torques are concerned.

Reducing the speed generates a cubic reduction in energy requirements. This significant potential for savings makes all applications with variable torque ideal candidates for the implementation of energy saving. Operators need to take into account that changes in speed alter the operating point and affect the efficiency. If the difference between the maximum power required and average part-load operation is too great, systems should be cascaded. It is often the case that investments pay for themselves relatively quickly when existing systems are converted.

### Built-in EMC (RFI) filter

- Drive is ready to use and faults due to incorrect installation or wrong filter selection are avoided
- Immunity from electrical interference and minimal emission
- Saves panel space and installation costs
- Facilitates meeting CE EMC directives



### Built-in DC link reactor (AF-6x0)

- Low harmonic emission: THDi < 48%
- No voltage drop => full output voltage
- Reduces installation cost
- Fulfils EN 61000-3-2/3-12
- True power factor 0.9

### Reliable operation in harsh environment

- Protection against environmental pollution, aggressive gasses, moisture and dust
- Reduces the probability of failure resulting in less down-time
- Increases the lifetime of the drive
- High protection Class 3C2 **as standard** and increased protection in harsh environments with Class 3C3 **as optional**
- Optional conformal coating is tested to ANSI/ISA S71.04-1985 Class G3 (airborne gasses - harsh) and Class GX (airborne gasses - severe)

### High immunity

- Immunity to fluctuating supply voltage (+/- 10%)
- Efficient overvoltage protection
- Fully short-circuit- and earth-leakage proof
- 100kA prospective short-circuit current capability



# AF Drives

## Special pump functions functions (AF-600 & AF-700)

### No flow detection

- No flow detection is based on speed and power
- Two sets of data must be programmed into the drive
- Manual or auto set up
- Used to enable sleep mode in closed loop systems for energy savings

### End-of-curve protection

- If there is a water leak in the pipe, it will not produce pressure
- The pump is delivering a large volume of water but cannot maintain the static head
- Drive will go to full flow to try producing pressure (set point)
- The drive running at high speed with a feedback signal less than 97.5% of the set point pressure causes End of Curve action

### Dry pump protection

- Special no-flow condition, where pressure can not be produced, if there is no water
- Drive will go to full speed to try producing full pressure
- Low power consumption at high speed causes Dry Pump action



# Applications



## PC software tool

- On and offline commission
- Help description for each drive parameter
- Oscilloscope function
- Logging of alarms and warnings for improved system performance and documentation
- Interacts with process management
- Communicates through USB, RS485 or Network

## Plug-in option modules

- Tailored for specific application needs
- Low handling cost
- Easy service/ upgrade with a wide range of options
- Field installable Plug n' Play and self configuring

## Network option modules

- Support for all leading protocols
- Easy installation and commissioning
  - Top cable entry -or-
  - Bottom cable entry (if used you cannot add I/O option modules)
- Built-in Networks: Modbus RTU

Only for AF650 GP and AF600 FP

- Network option modules: Profibus DP, DeviceNet, Ethernet IP, Modbus TCP, Profinet RT
- Additional Option Modules for AF-600 FP: BACnet and LonWorks



# AF Drives Services

Planning

Engineering

Sale

Start-up & installation

Operation & Maintenance

Upgrade & Modernization

Disposal

## GE Drives Services

Your electrical infrastructure's availability, stability, and adaptability are crucial to your business success. Rely on the support professionals who know your systems best! GE's Drives Services offerings range far beyond standard product support: from on-site services for risk-reducing installation and startup, to availability services to help you proactively reduce downtime and meet your service-level commitments.

From installation to product retirement, warranty upgrades to remote monitoring, proactive care to 24/7 problem resolution, you can rely on GE's field service organization for all your electrical infrastructure support needs.

## Our Service Portfolio

GE services are designed to provide lifelong operation of all our Drives systems. We have a range of service offerings to meet your requirements. We are at home in all areas of industry and business life, specialized in solutions and services for your electrical infrastructure.

### On-Site & Emergency Services

- 24/7 Emergency hotline
- Installation
- Commissioning, start-up
- Repair, upgrade, retrofit
- Assessment, inspection, testing
- Online assistance
- Video live support

### Parts and Repairs

- Spare parts supply
- Repair services
- Product replacement / return
- Equipment rentals

## Maintenance Programs

The reliability and efficiency of your electrical infrastructure ultimately depends upon the maintenance programs you choose.

A maintenance agreement is an opportunity for you to increase productivity and availability while lowering your owning and operating costs. Preventive maintenance helps you find equipment problems before they cause failure, leaving you with fewer repairs and less unscheduled downtime.

**We have tailored our service contracts to meet your individual demand by offering three different contract types:**

### • BASIC Service

Annual maintenance, technical support 24/7 and defined intervention time

### • VALUE Service

BASIC features plus free intervention in case of emergency

### • PREMIUM Service

VALUE service features plus all material needed for repair

### Contractual Services

- Maintenance service contracts
- Preventive, planned maintenance
- Upgrade management
- Project & site management
- Consultancy and audits

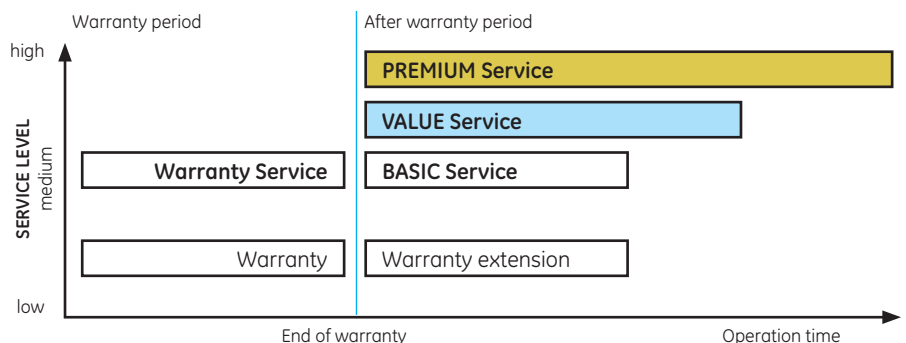
### Contractual Services

- Maintenance service contracts
- Preventive, planned maintenance
- Upgrade management
- Project & site management
- Consultancy and audits

## Contract Features

Depending on your requirements, you can choose from following services:

- 24/7 technical support by our local Service Centre
- Guaranteed presence on site within the agreed time (Next Working Day, 12, 6 or 4 hours)
- Annual maintenance visit to analyze the Drive and operational conditions
- Spare parts included for emergency repairs
- Guaranteed 24/7 availability in our stock for most common parts for your Drive
- Preferential pricing for parts and hourly rates



## AF-7 series

The new AF-7 series is part of GE's complete range of variable frequency drives and providing more solutions to our customer's needs. These new drives offer significant energy savings in addition to space-saving designs and application features.

### New Micro-Drives: AF-70 LP

The AF-70 LP is the new compact drive. Available in both IP20 and IP66, its simple mounting with its basic parameter configuration, make this drive ideal for fans, pumps, and conveyor applications. Simple commissioning, user-friendly keypad control, built-in EMC Filter class B (C1) and application macros with in addition built-in Modbus-RTU and CANopen communication provide optimum solution for control and monitoring systems.

### New Fan & Pump Drives: AF-700 FP

With large increase in global energy costs and legislation related to the industrial production of CO2 gases, the need to reduce energy consumption has never been greater. The AF-700 FP is the new Fan and Pump application drive. Available in IP20, IP55 and IP66, built-in EMC Filter class B (C1) and user friendly parameter configuration through its fixed keypad with OLED display. AF-700 FP can be used with environmental sensors to reduce pump or fan speed in air handling or pumping applications without compromising the required output of the system. Built-in Modbus-RTU and BACnet MS/TP communication provides ready integration with industrial network systems.



## AF-70 LP – Micro Drives



The Micro Drive AF-70 LP is a compact but powerful and easy to use AC variable frequency drive. The AF-70 LP drive is available in both IP20 and IP66, that includes EMC (RFI) Filter class B (C1) and built-in Brake chopper for 1.5kW and above.

- Following models are available:
- Single-phase, 230Vac, from 0.37 to 4kW
  - Three-phase, 230Vac, from 0.37 to 11kW
  - Three-phase, 400Vac, from 0.75 to 22kW

### Features

- Sensorless Vector Control for all Motor Types
- Precise and reliable control for IE2, IE3 & IE4 motors
- For Constant or Variable Torque applications
- Built-in EMC (RFI) Filter class B (C1) (disconnectable)
- PI control
- Dynamic braking chopper from 1.5kW and above
- Dual analogue inputs
- Operates up to 50°C, without derating
- Bluetooth connectivity (optional)
- Built-in Modbus RTU and CANopen communication
- Conformal Coating as standard
- Fan & Pump functionalities such as Flying Start and Fire Override
- Easy to use PC software

### Approvals / Marking

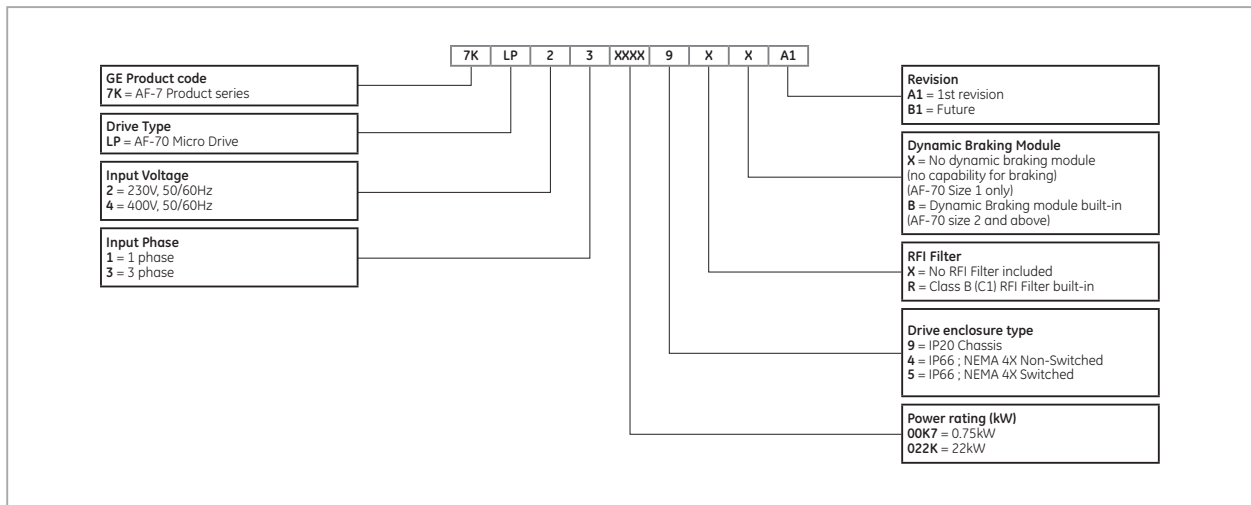


UL, cUL

### Applications

- Conveyors
- Mixers
- Mills
- Fans such as air curtains, extractors, air handling units
- Pumps such as transfer pumps, dosing pumps
- Swimming pools, Spas, Fountains

### Product numbering system diagram



Product number for illustrative purposes only



IP20

230Vac, 1-phase, 50/60Hz input, with EMC (RFI) filter class B (C1)



Output rated power			Dynamic Braking	Cat. No.	Ref. No.	Unit Size
kW	HP	A				
0.37	0.5	2.3	No	7KLP2100K49RXA1	168600	1
0.75	1	4.3	No	7KLP2100K79RXA1	168601	1
1.5	2	7	No	7KLP21001K9RXA1	168602	1
1.5	2	7	Yes	7KLP21001K9RBA1	168603	2
2.2	3	10.5	Yes	7KLP21002K9RBA1	168604	2

230Vac, 3-phase, 50/60Hz input, with EMC (RFI) filter class B (C1)



Output rated power			Dynamic Braking	Cat. No.	Ref. No.	Unit Size
kW	HP	A				
1.5	2	7	Yes	7KLP23001K9RBA1	168611	2
2.2	3	10.5	Yes	7KLP23002K9RBA1	168612	2
4	5	18.0	Yes	7KLP23004K9RBA1	168613	3
5.5	7.5	24	Yes	7KLP23005K9RBA1	168614	3
7.5	10	30	Yes	7KLP23007K9RBA1	168615	4
11	15	46	Yes	7KLP23011K9RBA1	168616	4

400Vac, 3-phase, 50/60Hz input, with EMC (RFI) filter class B (C1)



Output rated power			Dynamic Braking	Cat. No.	Ref. No.	Unit Size
kW	HP	A				
0.75	1	2.2	No	7KLP4300K79RXA1	168626	1
1.5	2	4.1	No	7KLP43001K9RXA1	168627	1
1.5	2	4.1	Yes	7KLP43001K9RBA1	168628	2
2.2	3	5.8	Yes	7KLP43002K9RBA1	168629	2
4	5	9.5	Yes	7KLP43004K9RBA1	168630	2
5.5	7.5	14	Yes	7KLP43005K9RBA1	168631	3
7.5	10	18	Yes	7KLP43007K9RBA1	168632	3
11	15	24	Yes	7KLP43011K9RBA1	168633	3
15	20	30	Yes	7KLP43015K9RBA1	168634	4
18.5	25	39	Yes	7KLP43018K9RBA1	168635	4
22	30	46	Yes	7KLP43022K9RBA1	168636	4

230Vac, 1-phase, 50/60Hz input, without EMC (RFI) filter



Output rated power			Dynamic Braking	Cat. No.	Ref. No.	Unit Size
kW	HP	A				
0.37	0.5	2.3	No	7KLP2100K49XXA1	168605	1
0.75	1	4.3	No	7KLP2100K79XXA1	168606	1
1.5	2	7	No	7KLP21001K9XXA1	168607	1
1.5	2	7	Yes	7KLP21001K9XBA1	168608	2
2.2	3	10.5	Yes	7KLP21002K9XBA1	168609	2
4	5	15.3	Yes	7KLP21004K9XBA1	168610	3

230Vac, 3-phase, 50/60Hz input, without EMC (RFI) filter



Output rated power			Dynamic Braking	Cat. No.	Ref. No.	Unit Size
kW	HP	A				
0.37	0.5	2.3	No	7KLP2300K49XXA1	168617	1
0.75	1	4.3	No	7KLP2300K79XXA1	168618	1
1.5	2	7	No	7KLP23001K9XXA1	168619	1
1.5	2	7	Yes	7KLP23001K9XBA1	168620	2
2.2	3	10.5	Yes	7KLP23002K9XBA1	168621	2
4	5	18.0	Yes	7KLP23004K9XBA1	168622	3
5.5	7.5	24	Yes	7KLP23005K9XBA1	168623	3
7.5	10	30	Yes	7KLP23007K9XBA1	168624	4
11	15	46	Yes	7KLP23011K9XBA1	168625	4

400Vac, 3-phase, 50/60Hz input, without EMC (RFI) filter



Output rated power			Dynamic Braking	Cat. No.	Ref. No.	Unit Size
kW	HP	A				
0.75	1	2.2	No	7KLP4300K79XXA1	168637	1
1.5	2	4.1	No	7KLP43001K9XXA1	168638	1
1.5	2	4.1	Yes	7KLP43001K9XBA1	168639	2
2.2	3	5.8	Yes	7KLP43002K9XBA1	168640	2
4	5	9.5	Yes	7KLP43004K9XBA1	168641	2
5.5	7.5	14	Yes	7KLP43005K9XBA1	168642	3
7.5	10	18	Yes	7KLP43007K9XBA1	168643	3
11	15	24	Yes	7KLP43011K9XBA1	168644	3
15	20	30	Yes	7KLP43015K9XBA1	168645	4
18.5	25	39	Yes	7KLP43018K9XBA1	168646	4
22	30	46	Yes	7KLP43022K9XBA1	168647	4



# AF-70 LP

IP66 with frontal switches

230Vac, 1-phase, 50/60Hz input, with EMC (RFI) filter class B (C1)



Output rated power			Dynamic Braking	Cat. No.	Ref. No.	Unit Size
kW	HP	A				
0.37	0.5	2.3	No	7KLP2100K45RXA1	168682	1
0.75	1	4.3	No	7KLP2100K75RXA1	168683	1
1.5	2	7	No	7KLP21001K5RXA1	168684	1
1.5	2	7	Yes	7KLP21001K5RBA1	168685	2
2.2	3	10.5	Yes	7KLP21002K5RBA1	168686	2

230Vac, 3-phase, 50/60Hz input, with EMC (RFI) filter class B (C1)

Output rated power			Dynamic Braking	Cat. No.	Ref. No.	Unit Size
kW	HP	A				
1.5	2	7	Yes	7KLP23001K5RBA1	168693	2
2.2	3	10.5	Yes	7KLP23002K5RBA1	168694	2
4	5	18.0	Yes	7KLP23004K5RBA1	168695	3

400Vac, 3-phase, 50/60Hz input, with EMC (RFI) filter class B (C1)



Output rated power			Dynamic Braking	Cat. No.	Ref. No.	Unit Size
kW	HP	A				
0.75	1	2.2	No	7KLP4300K75RXA1	168702	1
1.5	2	4.1	No	7KLP43001K5RXA1	168703	1
1.5	2	4.1	Yes	7KLP43001K5RBA1	168704	2
2.2	3	5.8	Yes	7KLP43002K5RBA1	168705	2
4	5	9.5	Yes	7KLP43004K5RBA1	168706	2
5.5	7.5	14	Yes	7KLP43005K5RBA1	168707	3
7.5	10	18	Yes	7KLP43007K5RBA1	168708	3

230Vac, 1-phase, 50/60Hz input, **without** EMC (RFI) filter

Output rated power			Dynamic Braking	Cat. No.	Ref. No.	Unit Size
kW	HP	A				
0.37	0.5	2.3	No	7KLP2100K45XXA1	168687	1
0.75	1	4.3	No	7KLP2100K75XXA1	168688	1
1.5	2	7	No	7KLP21001K5XXA1	168689	1
1.5	2	7	Yes	7KLP21001K5XBA1	168690	2
2.2	3	10.5	Yes	7KLP21002K5XBA1	168691	2
4	5	15.3	Yes	7KLP21004K5XBA1	168692	2

230Vac, 3-phase, 50/60Hz input, **without** EMC (RFI) filter

Output rated power			Dynamic Braking	Cat. No.	Ref. No.	Unit Size
kW	HP	A				
0.37	0.5	2.3	No	7KLP2300K45XXA1	168696	1
0.75	1	4.3	No	7KLP2300K75XXA1	168697	1
1.5	2	7	No	7KLP23001K5XXA1	168698	1
1.5	2	7	Yes	7KLP23001K5XBA1	168699	2
2.2	3	10.5	Yes	7KLP23002K5XBA1	168700	2
4	5	18.0	Yes	7KLP23004K5XBA1	168701	3

400Vac, 3-phase, 50/60Hz input, **without** EMC (RFI) filter

Output rated power			Dynamic Braking	Cat. No.	Ref. No.	Unit Size
kW	HP	A				
0.75	1	2.2	No	7KLP4300K75XXA1	168709	1
1.5	2	4.1	No	7KLP43001K5XXA1	168710	1
1.5	2	4.1	Yes	7KLP43001K5XBA1	168711	2
2.2	3	5.8	Yes	7KLP43002K5XBA1	168712	2
4	5	9.5	Yes	7KLP43004K5XBA1	168713	2
5.5	7.5	14	Yes	7KLP43005K5XBA1	168714	3
7.5	10	18	Yes	7KLP43007K5XBA1	168715	3

AF-7 drives

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New





IP66 *without* frontal switches

230Vac, 1-phase, 50/60Hz input, with EMC (RFI) filter class B (C1)



Output rated power			Dynamic Braking	Cat. No.	Ref. No.	Unit Size
kW	HP	A				
0.37	0.5	2.3	No	7KLP2100K44RXA1	168648	1
0.75	1	4.3	No	7KLP2100K74RXA1	168649	1
1.5	2	7	No	7KLP21001K4RXA1	168650	1
1.5	2	7	Yes	7KLP21001K4RBA1	168651	2
2.2	3	10.5	Yes	7KLP21002K4RBA1	168652	2

230Vac, 3-phase, 50/60Hz input, with EMC (RFI) filter class B (C1)

Output rated power			Dynamic Braking	Cat. No.	Ref. No.	Unit Size
kW	HP	A				
1.5	2	7	Yes	7KLP23001K4RBA1	168659	1
2.2	3	10.5	Yes	7KLP23002K4RBA1	168660	1
4	5	18.0	Yes	7KLP23004K4RBA1	168661	1

400Vac, 3-phase, 50/60Hz input, with EMC (RFI) filter class B (C1)



Output rated power			Dynamic Braking	Cat. No.	Ref. No.	Unit Size
kW	HP	A				
0.75	1	2.2	No	7KLP4300K74RXA1	168668	1
1.5	2	4.1	No	7KLP43001K4RXA1	168669	1
1.5	2	4.1	Yes	7KLP43001K4RBA1	168670	2
2.2	3	5.8	Yes	7KLP43002K4RBA1	168671	2
4	5	9.5	Yes	7KLP43004K4RBA1	168672	2
5.5	7.5	14	Yes	7KLP43005K4RBA1	168673	3
7.5	10	18	Yes	7KLP43007K4RBA1	168674	3

230Vac, 1-phase, 50/60Hz input, *without* EMC (RFI) filter

Output rated power			Dynamic Braking	Cat. No.	Ref. No.	Unit Size
kW	HP	A				
0.37	0.5	2.3	No	7KLP2100K44XXA1	168653	1
0.75	1	4.3	No	7KLP2100K74XXA1	168654	1
1.5	2	7	No	7KLP21001K4XXA1	168655	1
1.5	2	7	Yes	7KLP21001K4XBA1	168656	2
2.2	3	10.5	Yes	7KLP21002K4XBA1	168657	2
4	5	15.3	Yes	7KLP21004K4XBA1	168658	3

230Vac, 3-phase, 50/60Hz input, *without* EMC (RFI) filter

Output rated power			Dynamic Braking	Cat. No.	Ref. No.	Unit Size
kW	HP	A				
0.37	0.5	2.3	No	7KLP2300K44XXA1	168662	1
0.75	1	4.3	No	7KLP2300K74XXA1	168663	1
1.5	2	7	No	7KLP23001K4XXA1	168664	1
1.5	2	7	Yes	7KLP23001K4XBA1	168665	2
2.2	3	10.5	Yes	7KLP23002K4XBA1	168666	2
4	5	18.0	Yes	7KLP23004K4XBA1	168667	3

400Vac, 3-phase, 50/60Hz input, *without* EMC (RFI) filter

Output rated power			Dynamic Braking	Cat. No.	Ref. No.	Unit Size
kW	HP	A				
0.75	1	2.2	No	7KLP4300K74XXA1	168675	1
1.5	2	4.1	No	7KLP43001K4XXA1	168676	1
1.5	2	4.1	Yes	7KLP43001K4XBA1	168677	2
2.2	3	5.8	Yes	7KLP43002K4XBA1	168678	2
4	5	9.5	Yes	7KLP43004K4XBA1	168679	2
5.5	7.5	14	Yes	7KLP43005K4XBA1	169000	3
7.5	10	18	Yes	7KLP43007K4XBA1	168681	3



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## Options and accessories

### Remote Keypad



Description	Cat. No.	Ref. No.
Remote mounting keypad on enclosure doors. Kit includes gasket and 3 meters' cable. Keypad is rated IP54.		
Remote LED Keypad with RJ45 Cable, unit size 1 & 2	7KRMKPD1	168830
Remote OLED Keypad with RJ45 Cable, for unit size 3 and above	7KRMKPD2	168831

### Communication Modules

Description	Cat. No.	Ref. No.
Profibus External Gateway & Cables	7KGTWPDP	168800
DeviceNET External Gateway & Cables	7KGTWDEV	168801
Bluetooth Interface	7KBTI	168810
USB PC Connection Kit	7KUSB	168811

### Input/Output Modules

Description	Cat. No.	Ref. No.
Dual Relay Output Card	7KLPRLY	168832
HVAC Relay Output Card	7KLPHVAC	168834

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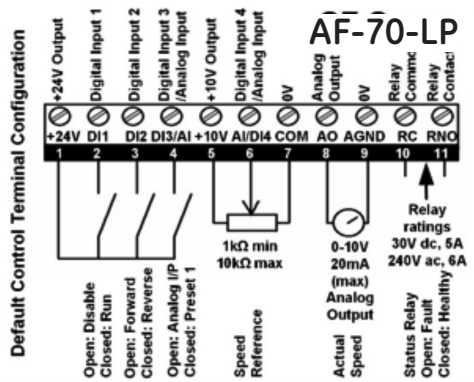
Basic wiring diagrams

**IP20 & IP66 (Nema 4X) Non- Switched Units**

**IP66 (Nema 4X) Switched Units**

A	Protective Earth (PE) Connection
B	Incoming Power Connection
C	Fuse / Circuit Breaker Selection
D	Optional Input Choke
E	Optional External EMC Filter
F	Internal Disconnect / Isolator
G	Optional Brake Resistor
H	Motor Connection
I	Analog Output
J	Relay Output
K	Using the REV/0/FWD Selector Switch (Switched Version Only)
L	Analog Inputs
M	Digital Inputs

Basic control terminal



# AF-70 LP

## Specifications

### Environmental conditions

Enclosure	IP20 and IP66
Installation location	Do not install in locations where product could be exposed to dust, corrosive gas, inflammable gas, oil mist, vapor, water drops or direct sunlight. There must be no salt in the atmosphere. Condensation must not be caused by sudden changes in temperature. For use at altitudes of 3280 ft. (1000 m) or less without derating.
Ambient temperature	Operating: -10 to +50°C, without derating Storage: -40 to +60°C
Ambient humidity	Humidity: 5 to 95% (non condensing)
Vibration	1.0G according EN 61800-5-1

### Standards

Approvals	CE, UL, cUL
EMC Directive	2004/108/EC Category C1 according EN 61800-3:2004
Machinery Directive	2006/42/EC

### Input power supply

Rated Input AC voltage	200 - 240 Vac, 1-phase, 50-60 Hz, +/- 10% V 200 - 240 Vac, 3-phase, 50-60 Hz, +/- 10% V 380 - 480 Vac, 3-phase, 50-60 Hz, +/- 10% V
Maximum voltage imbalance	3% of rated supply voltage
Rated Input frequency	48 - 62Hz
Displacement power factor	> 0.98
Switching on input power supply	Maximum twice/minute, evenly spaced

### Output

Rated output voltage	0 - 100 % of supply voltage
Output frequency	0 - 500Hz, with 0.1Hz resolution
Accel/decel times	0.01 - 600 seconds
Overload current rating	150% for 60 seconds 175% for 2.5 seconds
Efficiency	>98%

### Control

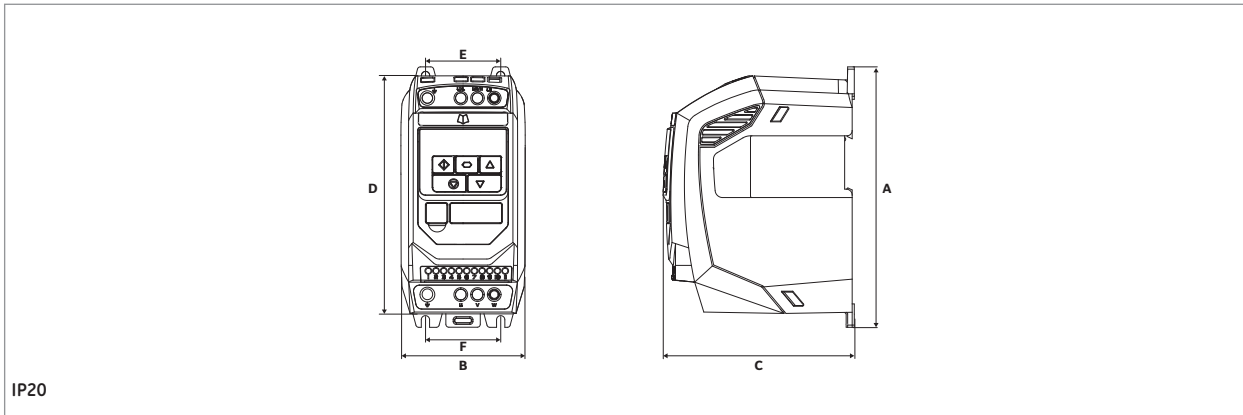
Control method	Sensorless Vector Speed Control PM Vector Control BLDC Control Synchronous Reluctance
Switching frequency	4 - 32kHz
Braking	Motor Flux Braking
Jump Frequency	Single point, adjustable
Operation method	Analog signal: 0 - 10V 10 - 0V 0 - 20mA 20 - 0mA 4 - 20mA 20 to 4mA  Digital signal: Keypad potentiometer Modbus RTU (9.6 - 115.2 kbps selectable) CANopen (125 - 1000 kbps)

### Control: Inputs/Outputs

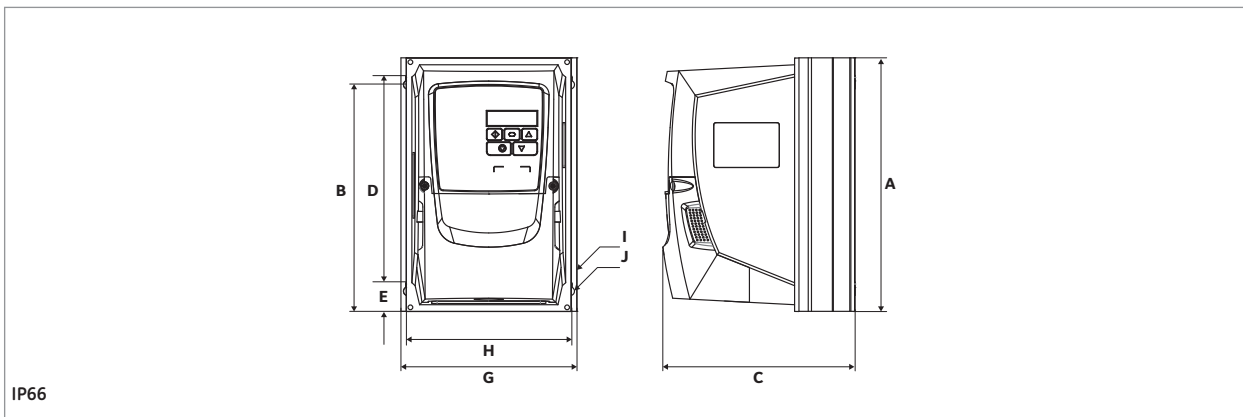
Supply	24Vdc, 100mA 10Vdc, 5mA for potentiometer
4 programmable inputs	2 Digital 2 Analog / Digital selectable
Digital inputs	8 - 30Vdc, internal or external supply Response time < 4ms
Analog inputs	Resolution: 12 bits Response time < 4ms Accuracy: ± 2% full scale
2 Programmable outputs	1 Analog / Digital 1 Relay
Relay outputs	250Vac, 30Vdc max Switching current capacity: 6A AC, 5A DC
Analog outputs	0 - 10V



Dimensional drawings



Drive Unit Size	Input voltage	Power rating	A		B		C		D		E		F		Weight Kg
			mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	
1	240V	0.37 to 1.5kW	173	6.81	83	3.27	123	4.84	162	6.38	50	1.97	50	1.97	1.0
	400V	0.75 to 1.5kW													
2	240V	1.5 to 2.2kW	221	8.70	110	4.33	150	5.91	209	8.23	63	2.48	63	2.48	1.7
	400V	1.5 to 4kW													
3	240V	4 to 5.5kW	261	10.28	131	5.16	175	6.89	247	9.72	80	3.15	80	3.15	3.2
	400V	5.5 to 11kW													
4	240V	7.5 to 11kW	420	16.54	171	6.73	212	8.35	400	15.75	125	4.92	125	4.92	9.1



Drive Size	Input voltage	Power rating	A		B		D		E		F		G		H		I		J		Weight	
			mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	kg	lb
1	240V	0.37 to 1.5kW	232.0	9.13	207.0	8.15	189.0	7.44	25.0	0.98	179.0	7.05	161.0	6.34	148.5	5.85	4.0	0.16	8.0	0.31	3.1	6.8
	400V	0.75 to 1.5kW																				
2	240V	1.5 to 2.2kW	257.0	10.12	220.0	8.67	200.0	7.87	28.5	1.12	187.0	7.36	188.0	7.40	176.0	6.93	4.2	0.17	8.5	0.33	4.1	9.0
	400V	1.5 to 4kW																				
3	240V	4kW	310.0	12.20	276.5	10.89	251.5	9.90	33.4	1.31	252	9.92	211.0	8.30	197.5	7.78	4.2	0.17	8.5	0.33	7.6	16.7
	400V	5.5 to 7.5kW																				

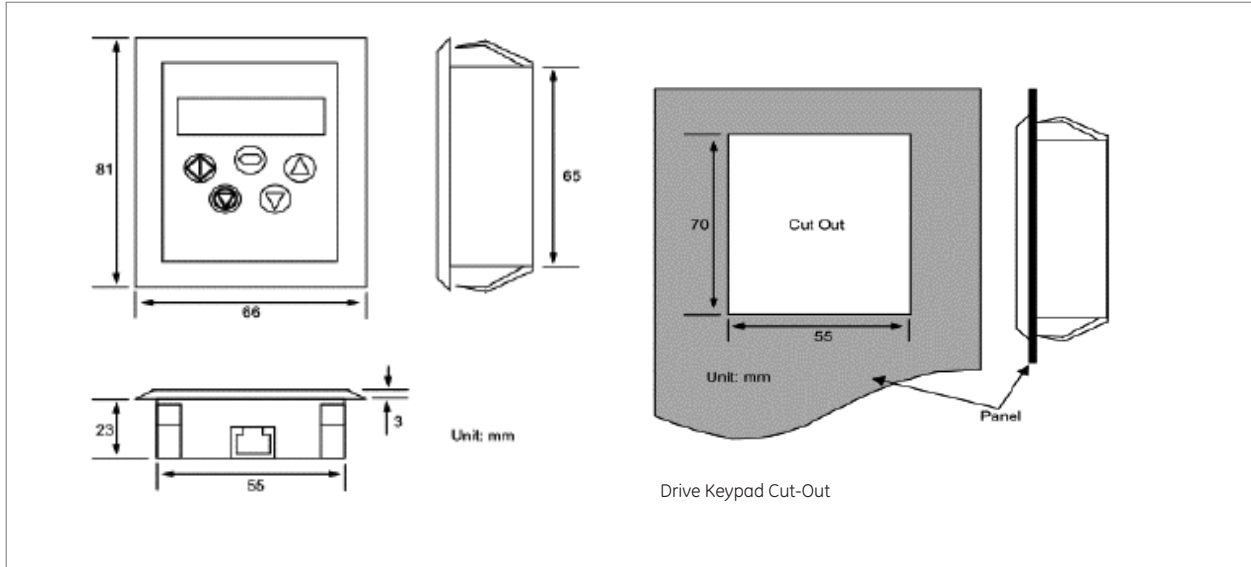
Dimensions in mm (inch = mm x 0.03937) - Weight in kg (lb = kg x 2.2046)



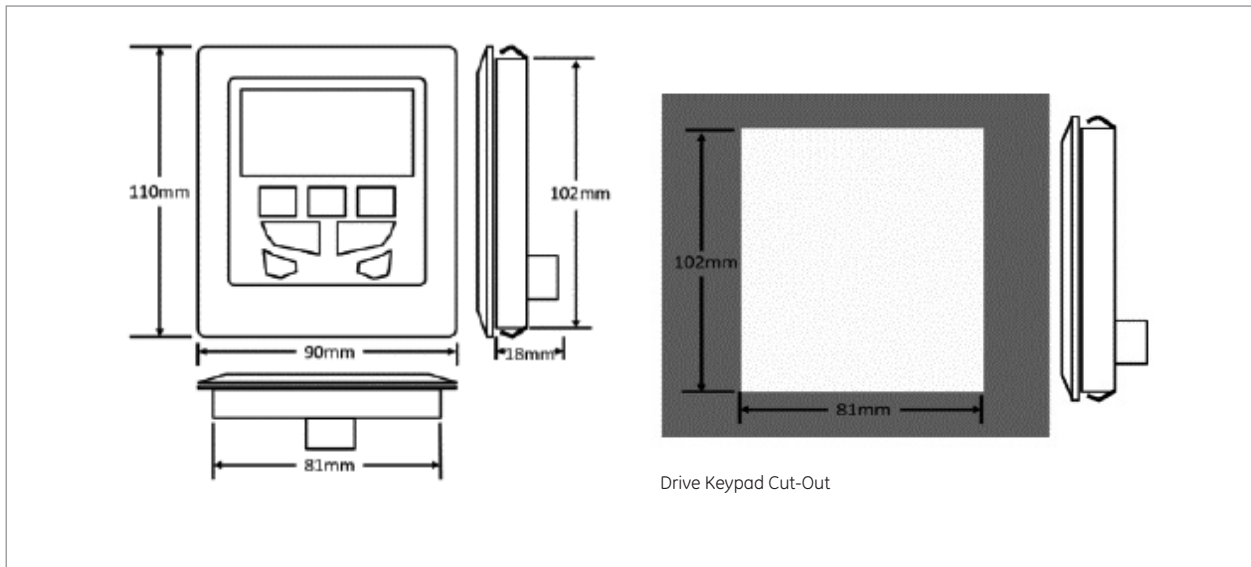
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## Dimensional drawings

### Keypad



Description	Cat. No.	Ref. No.
Remote LED Keypad with RJ45 Cable, unit size 1 & 2	7KRMKPD1	168830



Description	Cat. No.	Ref. No.
Remote OLED Keypad with RJ45 Cable, for unit size 3 and above	7KRMKPD2	168831

Dimensions in mm (inch = mm x 0.03937) - Weight in kg (lb = kg x 2.2046)



Everything is under control

## AF-700 FP – Fan & Pump Drive



The AF-700 FP is dedicated for Fan and Pump applications. The AF-700 FP drive is available in IP20, IP55 and IP66, that includes EMC (RFI) Filter class B (C1), Safe Torque Off (STO) input, Modbus RTU and BACnet communications as standard.

Following models are available:

- Single-phase, 230Vac, from 0.75 to 2.2kW
- Three-phase, 230Vac, from 0.75 to 75kW
- Three-phase, 400Vac, from 0.75 to 250kW
- Three-phase, 600Vac, from 0.75 to 110kW

### Features

- Sensorless Vector Control for all Motor Types
- Suitable with IE2, IE3 & IE4 motors
- Dedicated features for HVAC and Water applications
- OLED Multi Language Display
- Built-in EMC (RFI) Filter class B (C1) (disconnectable)
- Reduced Harmonic Distortion (THDi) (according EN 61000-3-12)
- Safe Torque Off (STO) input as standard
- Local Mains Switch for unit sizes 4 and 5 (15 to 45kW @ 400Vac)
- Bluetooth connectivity (optional)
- Built-in Modbus RTU and BACnet communication
- Conformal Coating as standard
- Optional communication modules: Profibus, Profinet, EtherCat, BACnet IP, Modbus TCP, Ethernet IP and DeviceNet
- Better heat management with panel through kits
- Easy to use PC software

### Approvals / Marking



UL, cUL

### Applications

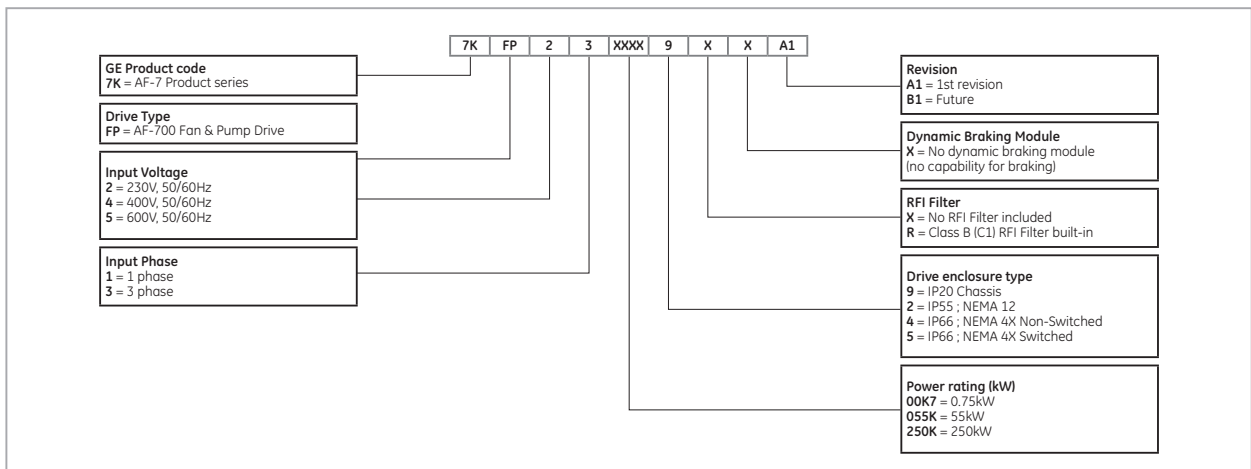
#### Fan

HVAC, cooling towers, VAV, supply and return, exhaust, fume hood, make-up air, induced and forced draft, furnace temperature control.

#### Pump

Chilled water, pressure boosting, cooling tower, wastewater, chiller, irrigation, hydro-storage.

### Product numbering system diagram



Product number for illustrative purposes only





IP20

**230Vac, 1-phase, 50/60Hz input, with EMC (RFI) filter class B (C1)**



Output rated power			Cat. No.	Ref. No.	Unit Size
kW	HP	A			
0.75	1	4.3	7KFP2100K79RXA1	168716	2
1.5	2	7	7KFP21001K9RXA1	168717	2
2.2	3	10.5	7KFP21002K9RXA1	168718	2

**230Vac, 3-phase, 50/60Hz input, with EMC (RFI) filter class B (C1)**



Output rated power			Cat. No.	Ref. No.	Unit Size
kW	HP	A			
0.75	1	4.3	7KFP2300K79RXA1	168719	2
1.5	2	7	7KFP23001K9RXA1	168720	2
2.2	3	10.5	7KFP23002K9RXA1	168721	2
4	5	18	7KFP23004K9RXA1	168722	3
5.5	7.5	24	7KFP23005K9RXA1	168723	3
7.5	10	30	7KFP23007K9RXA1	168724	4
11	15	46	7KFP23011K9RXA1	168725	4
15	20	61	7KFP23015K9RXA1	168726	5
18.5	25	72	7KFP23018K9RXA1	168727	5
22	30	90	7KFP23022K9RXA1	168728	5

**400Vac, 3-phase, 50/60Hz input, with EMC (RFI) filter class B (C1)**



Output rated power			Cat. No.	Ref. No.	Unit Size
kW	HP	A			
0.75	1	2.2	7KFP4300K79RXA1	168729	2
1.5	2	4.1	7KFP43001K9RXA1	168730	2
2.2	3	5.8	7KFP43002K9RXA1	168731	2
4	5	9.5	7KFP43004K9RXA1	168732	2
5.5	7.5	14	7KFP43005K9RXA1	168733	3
7.5	10	18	7KFP43007K9RXA1	168734	3
11	15	24	7KFP43011K9RXA1	168735	3
15	20	30	7KFP43015K9RXA1	168736	4
18.5	25	39	7KFP43018K9RXA1	168737	4
22	30	46	7KFP43022K9RXA1	168738	4
30	40	61	7KFP43030K9RXA1	168739	5
37	50	72	7KFP43037K9RXA1	168740	5
45	60	90	7KFP43045K9RXA1	168741	5
200	300	370	7KFP43200K9RXA1	168742	8
250	350	450	7KFP43250K9RXA1	168743	8

**575Vac, 3-phase, 50/60Hz input, with EMC (RFI) filter class B (C1)**



Output rated power			Cat. No.	Ref. No.	Unit Size
kW	HP	A			
0.75	1	2.1	7KFP5300K79RXA1	168744	2
1.5	2	3.1	7KFP53001K9RXA1	168745	2
2.2	3	4.1	7KFP53002K9RXA1	168746	2
4	5	6.5	7KFP53004K9RXA1	168747	2
5.5	7.5	9	7KFP53005K9RXA1	168748	2
7.5	10	12	7KFP53007K9RXA1	168749	3
11	15	17	7KFP53011K9RXA1	168750	3
15	20	22	7KFP53015K9RXA1	168751	3
18.5	25	28	7KFP53018K9RXA1	168752	4
22	30	34	7KFP53022K9RXA1	168753	4
30	40	43	7KFP53030K9RXA1	168754	4
37	50	54	7KFP53037K9RXA1	168755	5
45	60	65	7KFP53045K9RXA1	168756	5

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# AF-700 FP

IP55

## 230Vac, 3-phase, 50/60Hz input, with EMC (RFI) filter class B (C1)



Output rated power			Cat. No.	Ref. No.	Unit Size
kW	HP	A			
7.5	10	30	7KFP23007K2RXA1	168907	4
11	15	46	7KFP23011K2RXA1	168908	4
15	20	61	7KFP23015K2RXA1	168909	5
18.5	25	72	7KFP23018K2RXA1	168910	5
22	30	90	7KFP23022K2RXA1	168911	5
30	40	110	7KFP23030K2RXA1	168912	6
37	50	150	7KFP23037K2RXA1	168913	6
45	60	180	7KFP23045K2RXA1	168914	6
55	75	202	7KFP23055K2RXA1	168915	7
75	100	248	7KFP23075K2RXA1	168916	7

## 400Vac, 3-phase, 50/60Hz input, with EMC (RFI) filter class B (C1)



Output rated power			Cat. No.	Ref. No.	Unit Size
kW	HP	A			
15	20	30	7KFP43015K2RXA1	168917	4
18.5	25	39	7KFP43018K2RXA1	168918	4
22	30	46	7KFP43022K2RXA1	168919	4
30	40	61	7KFP43030K2RXA1	168920	5
37	50	72	7KFP43037K2RXA1	168921	5
45	60	90	7KFP43045K2RXA1	168922	5
55	75	110	7KFP43055K2RXA1	168923	6
75	100	150	7KFP43075K2RXA1	168924	6
90	125	180	7KFP43090K2RXA1	168925	6
110	150	202	7KFP43110K2RXA1	168926	7
132	200	240	7KFP43132K2RXA1	168927	7
160	250	302	7KFP43160K2RXA1	168928	7

## 575Vac, 3-phase, 50/60Hz input, with EMC (RFI) filter class B (C1)



Output rated power			Cat. No.	Ref. No.	Unit Size
kW	HP	A			
15	20	22	7KFP53015K2RXA1	168929	4
18.5	25	28	7KFP53018K2RXA1	168930	4
22	30	34	7KFP53022K2RXA1	168931	4
30	40	43	7KFP53030K2RXA1	168932	4
37	50	54	7KFP53037K2RXA1	168933	5
45	60	65	7KFP53045K2RXA1	168934	5
55	75	78	7KFP53055K2RXA1	168935	6
75	100	105	7KFP53075K2RXA1	168936	6
90	125	130	7KFP53090K2RXA1	168937	6
110	150	150	7KFP53110K2RXA1	168938	6

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IP66 with frontal switches

230Vac, 1-phase, 50/60Hz input, with EMC (RFI) filter class B (C1)



Output rated power			Cat. No.	Ref. No.	Unit Size
kW	HP	A			
0.75	1	4.3	7KFP2100K75RXA1	168779	2
1.5	2	7	7KFP21001K5RXA1	168780	2
2.2	3	10.5	7KFP21002K5RXA1	168781	2

230Vac, 3-phase, 50/60Hz input, with EMC (RFI) filter class B (C1)



Output rated power			Cat. No.	Ref. No.	Unit Size
kW	HP	A			
0.75	1	4.3	7KFP2300K75RXA1	168782	2
1.5	2	7	7KFP23001K5RXA1	168783	2
2.2	3	10.5	7KFP23002K5RXA1	168784	2
4	5	18	7KFP23004K5RXA1	168785	3
5.5	7.5	24	7KFP23005K5RXA1	168786	3

400Vac, 3-phase, 50/60Hz input, with EMC (RFI) filter class B (C1)



Output rated power			Cat. No.	Ref. No.	Unit Size
kW	HP	A			
0.75	1	2.2	7KFP4300K75RXA1	168787	2
1.5	2	4.1	7KFP43001K5RXA1	168788	2
2.2	3	5.8	7KFP43002K5RXA1	168789	2
4	5	9.5	7KFP43004K5RXA1	168790	2
5.5	7.5	14	7KFP43005K5RXA1	168791	3
7.5	10	18	7KFP43007K5RXA1	168792	3
11	15	24	7KFP43011K5RXA1	168793	3

575Vac, 3-phase, 50/60Hz input, with EMC (RFI) filter class B (C1)



Output rated power			Cat. No.	Ref. No.	Unit Size
kW	HP	A			
0.75	1	2.1	7KFP5300K75RXA1	168900	2
1.5	2	3.1	7KFP53001K5RXA1	168901	2
2.2	3	4.1	7KFP53002K5RXA1	169002	2
4	5	6.5	7KFP53004K5RXA1	169003	2
5.5	7.5	9	7KFP53005K5RXA1	168904	2
7.5	10	12	7KFP53007K5RXA1	168905	3
11	15	17	7KFP53011K5RXA1	168906	3



# AF-700 FP

IP66 *without* frontal switches

## 230Vac, 1-phase, 50/60Hz input, with EMC (RFI) filter class B (C1)



Output rated power			Cat. No.	Ref. No.	Unit Size
kW	HP	A			
0.75	1	4.3	7KFP2100K74RXA1	168757	2
1.5	2	7	7KFP21001K4RXA1	168758	2
2.2	3	10.5	7KFP21002K4RXA1	168759	2

## 230Vac, 3-phase, 50/60Hz input, with EMC (RFI) filter class B (C1)



Output rated power			Cat. No.	Ref. No.	Unit Size
kW	HP	A			
0.75	1	4.3	7KFP2300K74RXA1	168760	2
1.5	2	7	7KFP23001K4RXA1	168761	2
2.2	3	10.5	7KFP23002K4RXA1	168762	2
4	5	18	7KFP23004K4RXA1	168763	3
5.5	7.5	24	7KFP23005K4RXA1	168764	3

## 400Vac, 3-phase, 50/60Hz input, with EMC (RFI) filter class B (C1)



Output rated power			Cat. No.	Ref. No.	Unit Size
kW	HP	A			
0.75	1	2.2	7KFP4300K74RXA1	168765	2
1.5	2	4.1	7KFP43001K4RXA1	168766	2
2.2	3	5.8	7KFP43002K4RXA1	168767	2
4	5	9.5	7KFP43004K4RXA1	168768	2
5.5	7.5	14	7KFP43005K4RXA1	168769	3
7.5	10	18	7KFP43007K4RXA1	168770	3
11	15	24	7KFP43011K4RXA1	168771	3

## 575Vac, 3-phase, 50/60Hz input, with EMC (RFI) filter class B (C1)



Output rated power			Cat. No.	Ref. No.	Unit Size
kW	HP	A			
0.75	1	2.1	7KFP5300K74RXA1	168772	2
1.5	2	3.1	7KFP53001K4RXA1	168773	2
2.2	3	4.1	7KFP53002K4RXA1	168774	2
4	5	6.5	7KFP53004K4RXA1	168775	2
5.5	7.5	9	7KFP53005K4RXA1	168776	2
7.5	10	12	7KFP53007K4RXA1	168777	3
11	15	17	7KFP53011K4RXA1	168778	3

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Options and accessories

Remote Keypad



Description	Cat. No.	Ref. No.
Remote mounting keypad on enclosure doors. Kit includes gasket and 3 meters' cable. Keypad is rated IP54.		
Remote LED Keypad with RJ45 Cable, unit size 1 & 2	7KRMKPD1	168830
Remote OLED Keypad with RJ45 Cable, for unit size 3 and above	7KRMKPD2	168831

Communication Modules

Description	Cat. No.	Ref. No.
EtherCAT communication Module	7KFPECAT	168802
Profibus DP communication Module	7KFPPDP	168803
Profinet communication Module	7KFPPRT	168804
Ethernet IP communication Module	7KFPEIP	168805
DeviceNet communication Module	7KFPDEV	168806
BACnet IP communication Module	7KFPBAC	168807
Modbus TCP communication Module	7KFPMBTCP	168808
Bluetooth Interface	7KBTI	168810
USB PC Connection Kit	7KUSB	168811

Input/Output Modules

Description	Cat. No.	Ref. No.
Extended I/O Module	7KFPGPIO	168837
Cascade Control Module	7KFPCCTRL	168838

Local Mains Switch

Description	Cat. No.	Ref. No.
Local Mains Switch for unit size 4	7KFPM5W	168839
Local Mains Switch for unit size 5	7KFPM5W	168840

Panel Through Kit

Description	Cat. No.	Ref. No.
Panel Through Kit for unit size 4	7KFPPTK4	168844
Panel Through Kit for unit size 5	7KFPPTK5	168845
Panel Through Kit for unit size 6	7KFPPTK6	168846
Panel Through Kit for unit size 7	7KFPPTK7	168847

AF-700 FP Fan & Pump Drive

Intro

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# AF-700 FP

## Basic wiring diagrams

AF-7 drives

Intro

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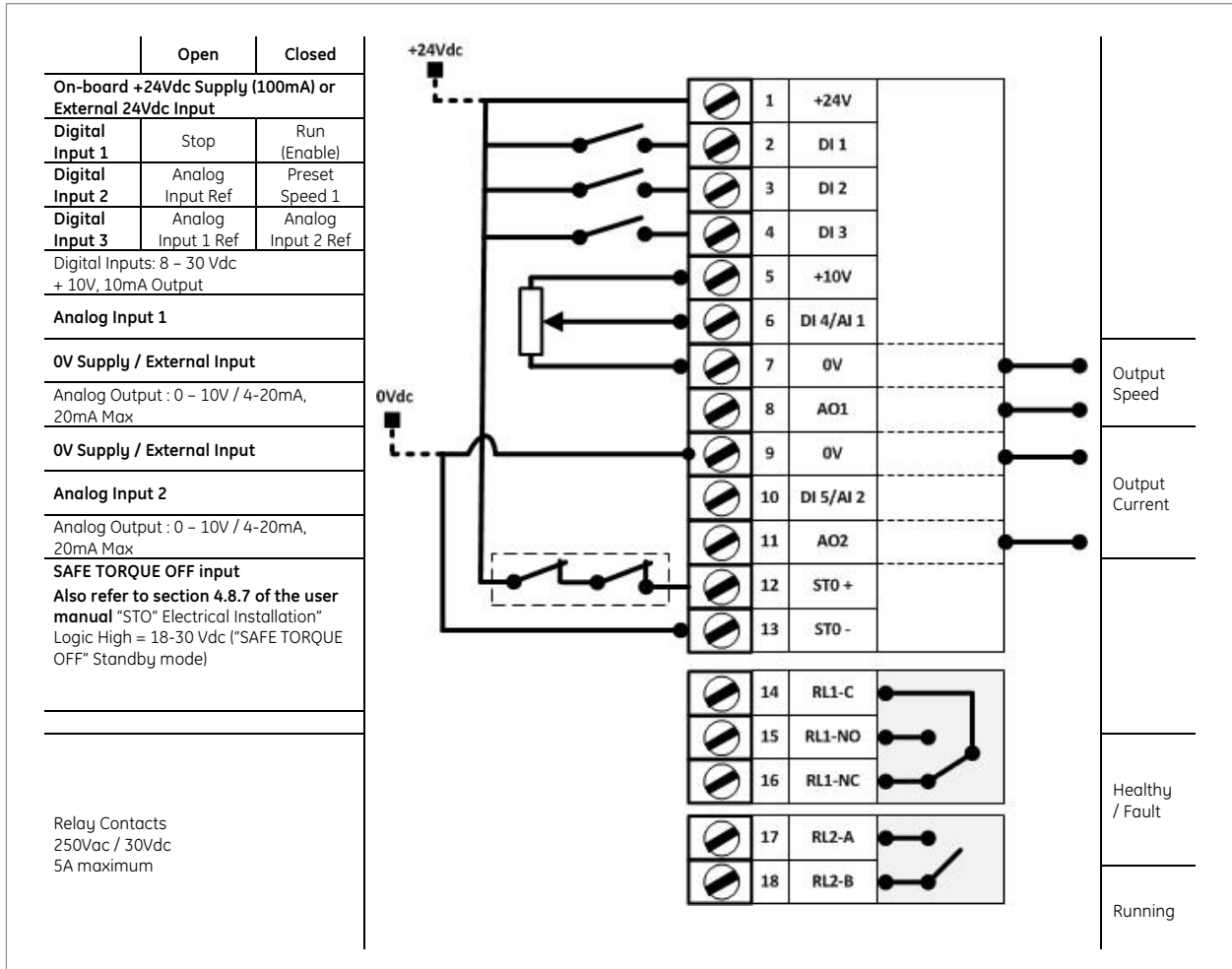
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New



## Specifications

### Environmental conditions

Enclosure	IP20, IP55 and IP66
Installation location	Do not install in locations where product could be exposed to dust, corrosive gas, inflammable gas, oil mist, vapor, water drops or direct sunlight. There must be no salt in the atmosphere. Condensation must not be caused by sudden changes in temperature. For use at altitudes of 3280 ft. (1000 m) or less without derating.
Ambient temperature	Operating: -10 to +50°C Storage: -40 to +60°C
Ambient humidity	Humidity: 5 to 95% (non condensing)
Vibration	1.0G according EN 61800-5-1

### Standards

Approvals	CE, UL, cUL
EMC Directive	2004/108/EC Category C1 according EN 61800-3:2004
Low Voltage Directive	2014/35/EU
Harmonics	IEC 61000-3-12

### Input power supply

Rated Input AC voltage	200 - 240 Vac, 1-phase, 50-60 Hz, +/- 10% V 200 - 240 Vac, 3-phase, 50-60 Hz, +/- 10% V 380 - 480 Vac, 3-phase, 50-60 Hz, +/- 10% V 500 - 600 Vac, 3-phase, 50-60 Hz, +/- 10% V
Maximum voltage imbalance	3% of rated supply voltage
Rated Input frequency	48 - 62Hz
Displacement power factor	> 0.98
Switching on input power supply	Maximum twice/minute, evenly spaced

### Output

Rated output voltage	0 - 100 % of supply voltage
Output frequency	0 - 250Hz, with 0.1Hz resolution
Accel/decel times	0.1 - 600 seconds
Overload current rating	110% for 60 seconds 165% for 4 seconds
Efficiency	>98%

### Control

Control method	sensorless Vector Speed Control PM Vector Control BLDC Control Synchronous Reluctance
Switching frequency	4 - 32kHz
Jump Frequency	Single point, adjustable
Operation method	Analog signal: 0 - 10V or 10 - 0V -10V to +10V 0 - 20mA or 20 - 0mA 4 - 20mA or 20 to 4mA Digital signal: Keypad potentiometer Modbus RTU (9.6 - 115.2 kbps selectable) BACnet MS/TP (9.6 - 76.8 kbps selectable)

### Control: Inputs/Outputs

Supply	24Vdc, 100mA 10Vdc, 5mA for potentiometer
5 programmable inputs	3 Digital 2 Analog / Digital selectable
Digital inputs	8 - 30Vdc, internal or external supply Response time < 4ms
Analog inputs	Resolution: 12 bits Response time < 4ms Accuracy: < 1% full scale
PTC input	Motor PTC / Thermistor with trip level: 3kΩ
2 Programmable outputs	1 Analog / Digital 1 Relay
Relay outputs	250Vac, 30Vdc max Switching current capacity: 6A AC, 5A DC
Analog outputs	0 - 10V or 10 - 0V -10V to +10V 0 - 20mA or 20 - 0mA 4 - 20mA or 20 - 4mA

### Diagnostics

Fault memory	Last 4 trips Logging of data prior to trip for diagnostic purposes: Output current, Drive temperature and DC Bus voltage
Maintenance	Indicator with user adjustable maintenance interval; includes Service life monitoring
Monitoring	Hours run meter kWh meters Cooling fan run time

### Application features

Load monitoring	Over Torque protection (fan / bump blocked) Under Torque protection (broken belt / shaft) Pump blockage detection with cleaning and autotuned function, user configurable
Fire mode	Bidirectional ; selectable speed setpoint (fixed, PID, analog or fieldbus)
PID control	Internal PID controller Multi-setpoint Standby / Sleep mode Boost function
Multi-pump control	Control of fixed speed assist pumps (need optional Cascade control module) Control of duty, assist and standby variable speed pumps via internal Master - Slave network; Automatic changeover on fault and on time; Fully redundant
Pump cleaning	Bi-directional pump cleaning cycle operation ; adjustable

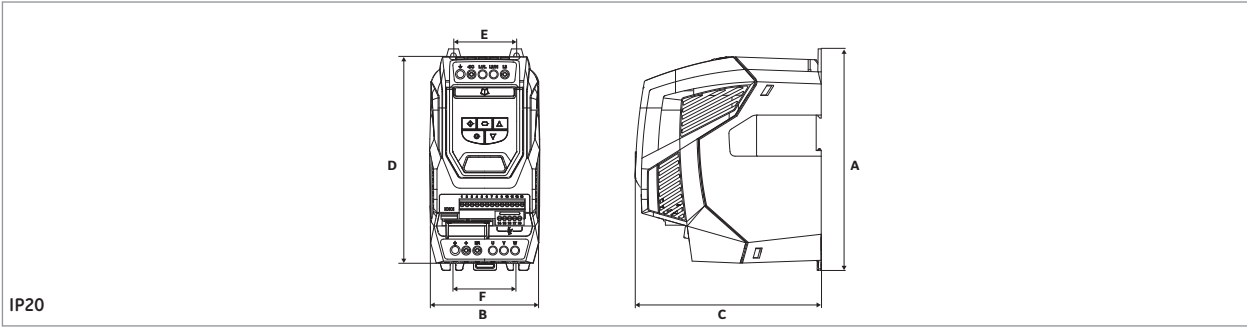


# AF-700 FP

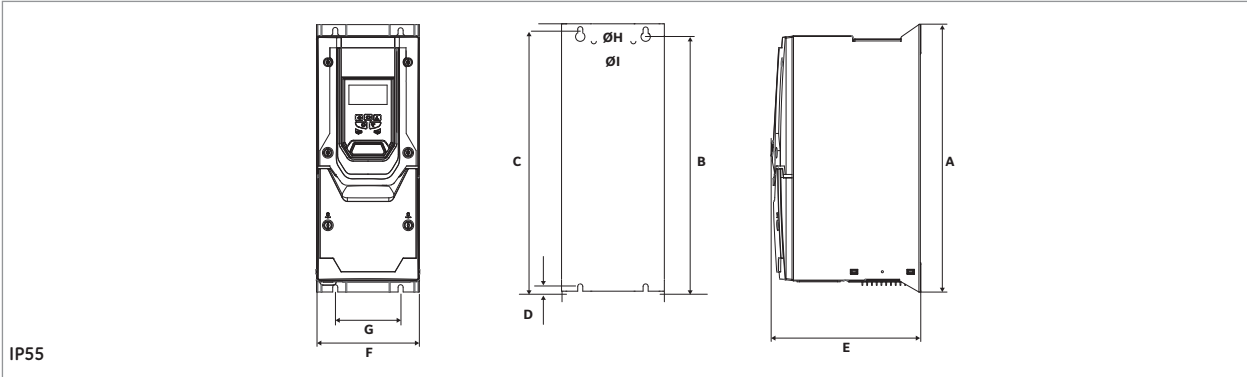
## Dimensional drawings

### Drives

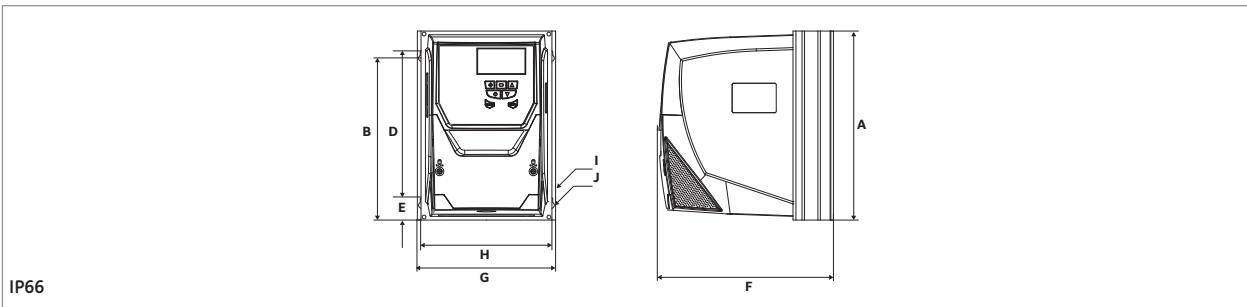
AF-7 drives



Unit Size	A		B		C		D		E		F		Weight	
	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	Kg	lb
2	221	8.70	110	4.33	185	7.28	209	8.23	63	2.48	63	2.48	1.8	4.0
3	261	10.28	131	5.16	205	8.07	247	9.72	80	3.15	80	3.15	3.5	7.7
4	418	16.46	160	6.30	240	9.45	400	15.75	125	4.92	125	4.92	9.2	20.3
5	486	19.13	222	8.74	260	10.24	-	-	175	6.89	175	6.89	18.1	39.9



Unit Size	Input voltage	Power rating	A		B		D		E		F		G		H		I		Weight	
			mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	kg	lb
4	450	17.32	428	16.46	433	16.65	8	0.31	252	9.92	171	6.73	110	4.33	8.5	0.33	15	0.59	12	25.4
5	540	21.26	515	20.28	520	20.47	8	0.31	270	10.63	235	9.25	175	6.89	8.5	0.33	15	0.59	23.1	50.9
6	865	34.06	830	32.68	840	33.07	10	0.39	330	12.99	330	12.99	200	7.87	11.0	0.44	22	0.87	55	121.2
7	1280	50.39	1245	49.02	1255	49.41	10	0.39	360	14.17	330	12.99	200	7.87	11.0	0.44	22	0.87	89	196.2



Unit Size	Input voltage	Power rating	A		B		D		E		F		G		H		I		Weight	
			mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	kg	lb
2A	257	10.12	220	8.67	200	7.87	28.4	1.12	239	9.41	188	7.40	176	6.93	4.2	0.17	8.5	0.33	4.8	10.6
2B	257	10.12	220	8.67	200	7.87	28.4	1.12	260	10.24	188	7.40	176	6.93	4.2	0.17	8.5	0.33	5.5	12.1
3	310	12.20	276.5	10.89	251.5	9.90	33.4	1.31	273	10.75	211	8.29	198	7.78	4.2	0.17	8.5	0.33	8.5	18.7

Dimensions in mm (inch = mm x 0.03937) - Weight in kg (lb = kg x 2.2046)



New

Intro

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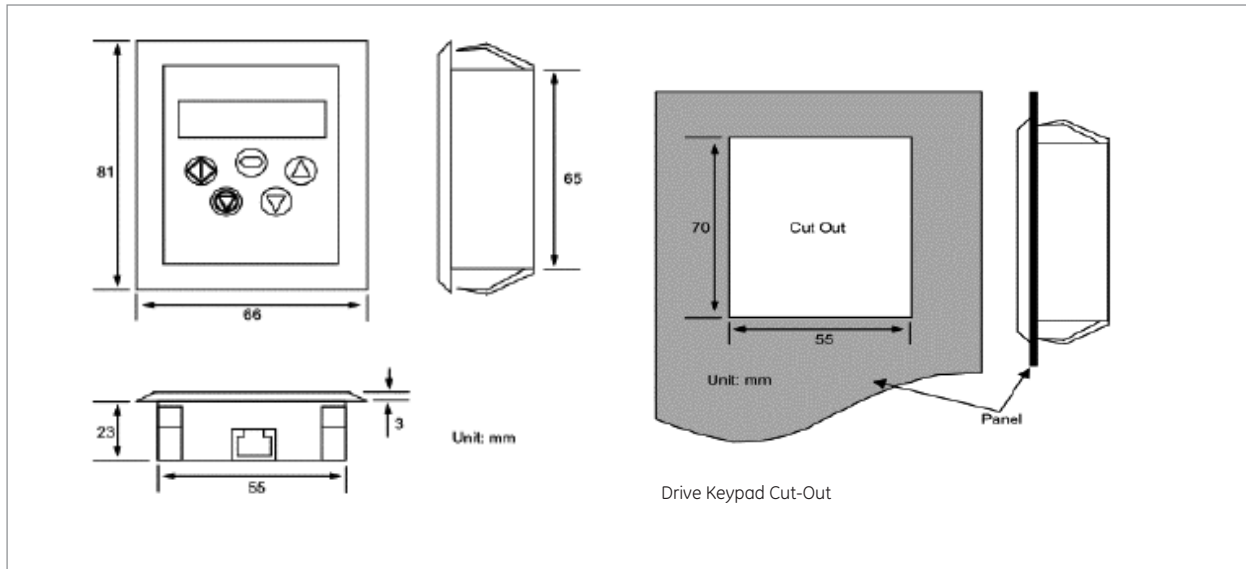
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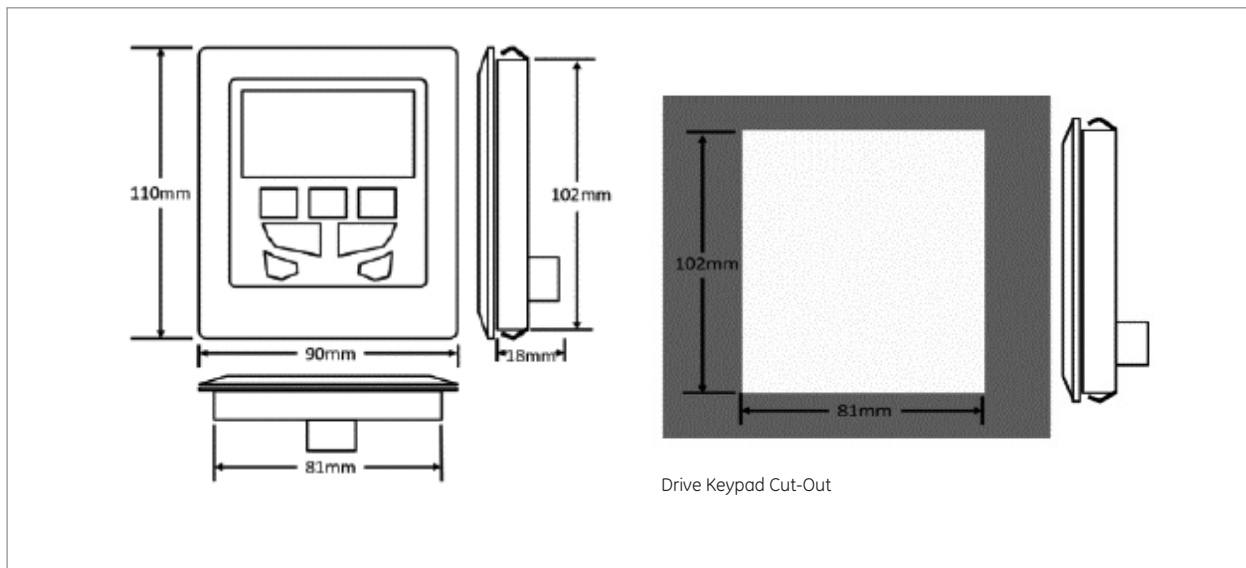
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**Dimensional drawings**  
**Keypad**



Description	Cat. No.	Ref. No.
Remote LED Keypad with RJ45 Cable, unit size 1 & 2	7KRMKPD1	168830



Description	Cat. No.	Ref. No.
Remote OLED Keypad with RJ45 Cable, for unit size 3 and above	7KRMKPD2	168831

Dimensions in mm (inch = mm x 0.03937) - Weight in kg (lb = kg x 2.2046)



## AF-60 LP - Micro Drives

The Micro Drive AF-60 LP is a compact but powerful and easy to use AC variable frequency drive.

The drive is available in its standard configuration that includes built-in Brake chopper for 1.5kW and above, single-turn potentiometer for speed reference and LCD keypad display that can be remotely mounted.

Following models are available:

- Single-phase, 230Vac, from 0.18 to 2.2kW
- Three-phase, 230Vac, from 0.25 to 3.7kW
- Three-phase, 400Vac, from 0.37 to 22kW



## Features

### Ready to start from the beginning

- Self-protecting features
- 150% current overload up to 1 minute
- "Pick up" start (catch a spinning motor)
- Potentiometer on keypad
- Keypad is hot pluggable and can be password protected
- RS485 communication, Modbus protocol
- RFI class A1 filter built-in
- Dynamic brake incorporated from 1.5kW
- High level functions, PID for feedback systems, mechanical brake control for lifts
- Easy to use PC software
- Integrated logic control, PLC

### Built-in durability

- Robust housing (IP20) protects the drive and allows side-by-side mounting
- Conformal coated circuit boards and high quality capacitors maximize uptime
- Intelligent heat management leads to long life

### Built-in simplicity speeds installation and set-up

- Installation and set-up immediate
- Wiring diagram, template and quick guide
- DIN-rail kit optional, to 2.2kW (unit size M1 and M2)

## Approvals / Marking

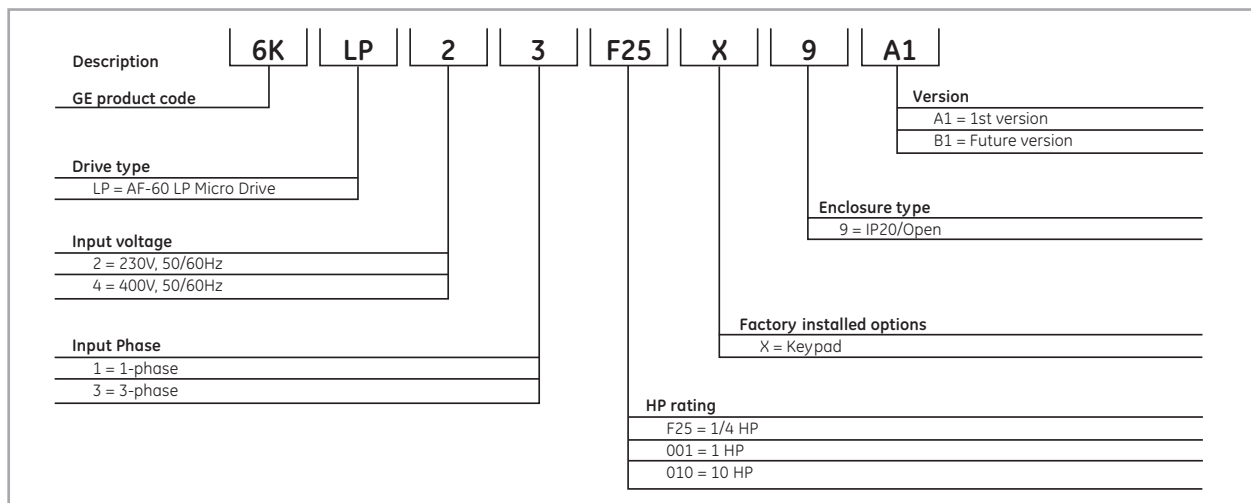


UL, cUL, C-Tick

## Applications

- Fans
- Pumps
- Mixers
- Conveyors
- Material handling
- Industrial machinery, including: agitators, lathes, spinning machines, machine tools, packaging equipment, plastics and woodworking

## Product numbering system diagram



Product number for illustrative purposes only



**IP20**

**230 Vac, 1-phase, 50/60 Hz input**

Nominal motor ratings		Cat. No.	Ref. No.	Unit Size	Efficiency (%) <sup>(1)</sup>	Losses (W) <sup>(1)</sup>	IP21 kit	DIN-rail mounting kit
Power kW	Current A							
0.18	1.2	6KLP21F25X9A1	404774	M1	94.5	15.5	NEMA1ACL P1	RMACLP1
0.37	2.2	6KLP21F50X9A1	404775	M1	95.6	25.0	NEMA1ACL P1	RMACLP1
0.75	4.2	6KLP21001X9A1	404776	M1	96.0	44.0	NEMA1ACL P1	RMACLP1
1.5	6.8	6KLP21002X9A1	404777	M2	96.7	67.0	NEMA1ACL P2	RMACLP1
2.2	9.6	6KLP21003X9A1	404778	M3	97.1	85.1	NEMA1ACL P3	N/A

**230 Vac, 3-phase, 50/60 Hz input**

0.25	1.5	6KLP23F33X9A1	404779	M1	94.9	20.0	NEMA1ACL P1	RMACLP1
0.37	2.2	6KLP23F50X9A1	404780	M1	95.8	24.0	NEMA1ACL P1	RMACLP1
0.75	4.2	6KLP23001X9A1	404781	M1	96.3	39.5	NEMA1ACL P1	RMACLP1
1.5	6.8	6KLP23002X9A1	404782	M2	97.2	57.0	NEMA1ACL P2	RMACLP1
2.2	9.6	6KLP23003X9A1	404783	M3	97.4	77.1	NEMA1ACL P3	N/A
3.7	15.2	6KLP23005X9A1	404784	M3	97.4	122.8	NEMA1ACL P3	N/A

**400 Vac, 3-phase, 50/60 Hz input**

0.37	1.2	6KLP43F50X9A1	404785	M1	95.5	25.5	NEMA1ACL P1	RMACLP1
0.75	2.2	6KLP43001X9A1	404786	M1	96.0	43.5	NEMA1ACL P1	RMACLP1
1.5	3.7	6KLP43002X9A1	404787	M2	97.2	56.5	NEMA1ACL P2	RMACLP1
2.2	5.3	6KLP43003X9A1	404788	M2	97.1	81.5	NEMA1ACL P2	RMACLP1
4	9	6KLP43005X9A1	404789	M3	98.0	133.5	NEMA1ACL P3	N/A
5.5	12	6KLP43007X9A1	404790	M3	98.0	166.8	NEMA1ACL P3	N/A
7.5	15.5	6KLP43010X9A1	404791	M3	98.0	217.5	NEMA1ACL P3	N/A
11	23	6KLP43015X9A1	404792	M4	97.4	342	NEMA1ACL P4	N/A
15	31	6KLP43020X9A1	404793	M4	97.4	454	NEMA1ACL P4	N/A
18.5	37	6KLP43025X9A1	404794	M5	98.0	428	NEMA1ACL P5	N/A
22	43	6KLP43030X9A1	404795	M5	97.9	520	NEMA1ACL P5	N/A

Brake chopper is included with 1.5kW drives and above  
 (1) At rated load conditions



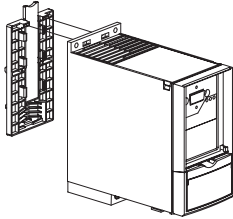
### Remote mounting kit for keypad



Remote mounting kit for mounting keypad on enclosure doors.  
Kit includes gasket, mounting brackets, and cable. Keypad is rated IP21.

Description	Cat. No.	Ref. No.
Remote mounting kit for keypad cable (3m)	RMKYPDACLP1	404797

### DIN-rail mounting kit

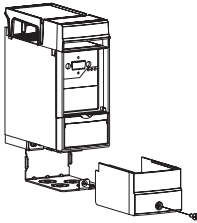


This adapter can be used to mount AF-60 LP Micro Drives at 0.75kW and below to 35mm DIN-rail.

Description	Cat. No.	Ref. No.
DIN-rail mounting kit for unit size M1 or M2 <sup>(1)</sup>	RMACLP1	404806

(1) Please note that these DIN-rail mounting kits only include bottom cover.

### IP21 kit

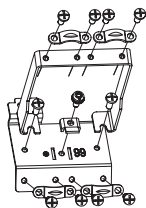


This kit can be mounted to the IP20 protected AF-60 LP Micro Drives to provide IP21 protection.

Description	Cat. No.	Ref. No.
For 0.75kW and below drives (unit size M1)	NEMA1ACL1	404798
For 1.5kW at 230V, 2.2kW at 400V and below drives (unit size M2)	NEMA1ACL2	404799
For 2.2kW at 230V, 3.7kW at 400V and above drives (unit size M3)	NEMA1ACL3	404800
For 11kW and 15kW at 400V drives (unit size M4)	NEMA1ACL4 <sup>(2)</sup>	404801
For 18.5kW and 22kW at 400V drives (unit size M5)	NEMA1ACL5 <sup>(2)</sup>	404802

(2) Please note that these IP21 kits only include bottom cover.

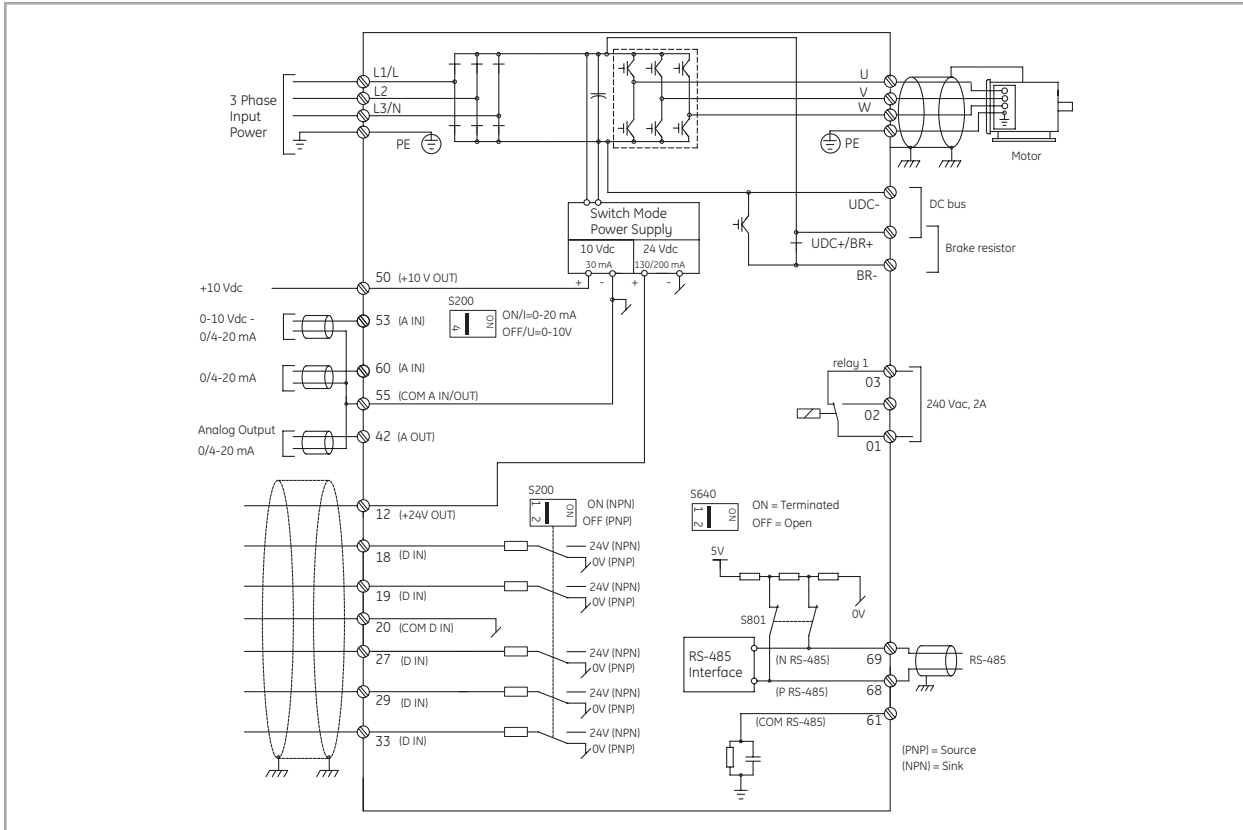
### De-coupling plate kit



For EMC applications and strain relief for drive wiring.

Description	Cat. No.	Ref. No.
For 1.5kW at 230V, 2.2kW at 400V and below drives (unit size M1 and M2)	DEPLTACL1	404804
For 2.2kW at 230V, 3.7kW at 400V and above drives (unit size M3)	DEPLTACL2	404805
For 11kW at 400V and above drives (unit size M4 and M5)	DEPLTACL3	404803

Basic wiring diagrams



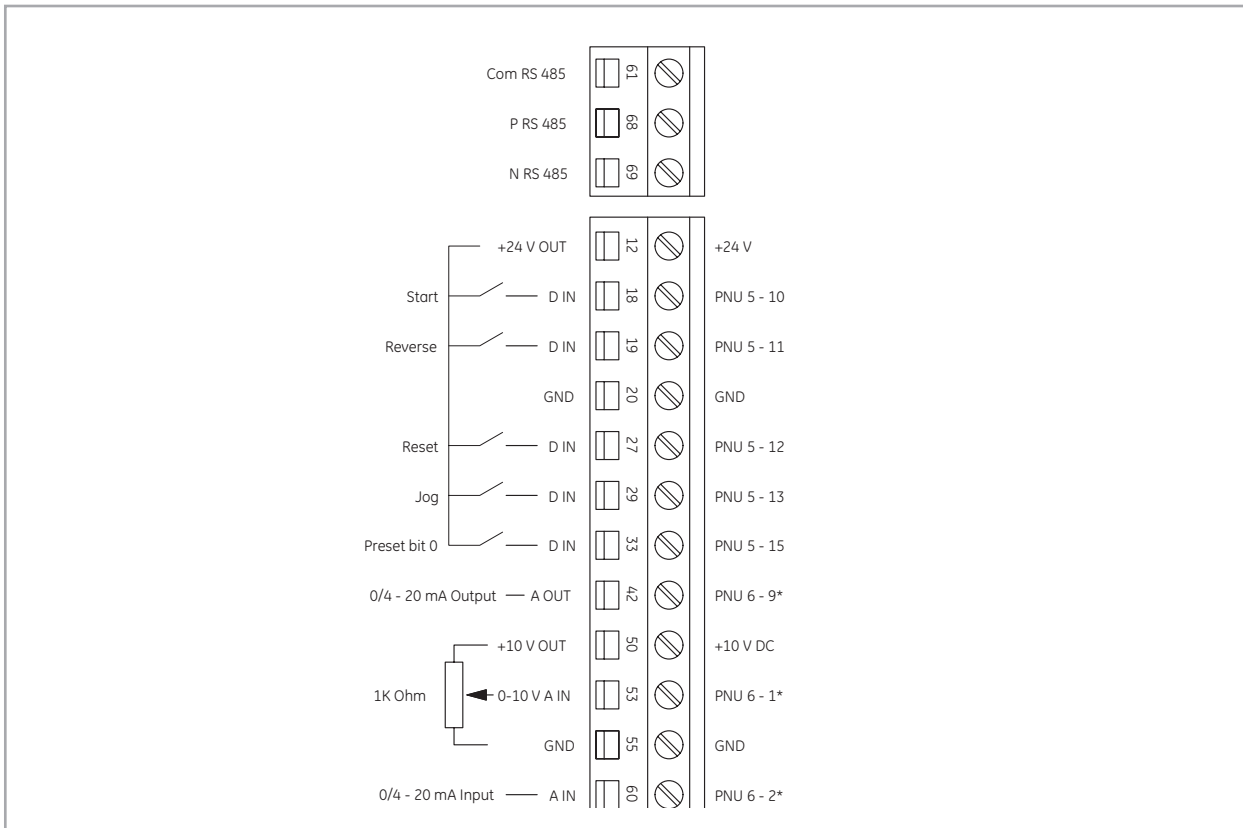
Micro Drives

Intro

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Basic control terminal (PNP configuration and drive factory default settings)



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# AF-60 LP

## Specifications

### Environmental conditions

Enclosure	IP20 (IP21 with optional kit)
Installation location	For use at altitudes of (1000m) or less without derating.
Ambient temperature	-10° to +50°C for above 45°C, there will be derating; please consult GE
Ambient humidity	5 to 95% RH (non-condensing)
Vibration	1.0 G
Storage temperature	-25° to 65°C

### Standards

Approvals	CE, UL, cUL, and C-Tick Suitable for use on a circuit capable of delivering not more than 100,000 rms symmetrical amperes for 230V and 400V. WEEE and RoHS Compliant
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### Input power supply

Rated Input AC voltage	200-240Vac, 1-phase, 50-60 Hz, +/- 10% V 200-240 Vac, 3-phase, 50-60 Hz, +/- 10% V 380-480 Vac, 3-phase, 50-60 Hz, +/- 10% V
Maximum voltage imbalance	3% of rated supply voltage
True power factor	> 0.4 nominal at rated load
Displacement power factor	> 0.98
Switching on input power supply	Maximum twice/minute
Environment according to EN60664-1	Overvoltage category III/pollution degree 2

### Output

Rated output voltage	0-100% of supply voltage
Output frequency	0-200 Hz (Adv. Vector Control Plus Mode), 0-400 Hz (Volts/Hertz Mode)
Switching on output	Unlimited
Accel/decel times	0.05-3600 seconds
Overload current rating	150% of drive rated current for 1 minute

### Control

Control method	Sinusoidal PWM Control (V/Hz with torque vector control)
Switching frequency select	2, 4, 8, 12, 16 kHz
Operation method	Keypad operation: Hand, Off, Auto Digital Input: Programmable for Start/Stop, Forward/Reverse, Jog Timer operation: Stop after predetermined time frame Link operation: RS-485 Modbus RTU
Frequency reference setting	Up or Down buttons on keypad or external reference
Analog input	Built in potentiometer 0-10 Vdc analogue input 4-20 mA analogue input
Preset speeds	8 presets via digital inputs
Link operation	Drive RS-485 or Modbus RTU
Second reference setting	Switch from speed reference 1 to reference 2 via digital input
Trim reference setting	Available for speed reference offset via potentiometer, voltage input, or current input
Acceleration/deceleration time	0.05-3600 seconds (two acceleration and deceleration rates are selectable via digital inputs. Acceleration and deceleration patterns can be selected from linear or S-curve)
DC injection braking	Starting frequency: 0.0-400 Hz Braking level: 0-150% of rated current Braking time: 0.0-60.0 seconds
Frequency limit	0-400 Hz
Jump frequency control	Two jump (or skip) frequencies via parameter set to avoid mechanical vibration
Jogging operation	Operation via On key or digital input (Fwd or Rev)
Auto-restart after power failure	Restarts the drive without stopping after instantaneous power failure
Slip compensation	Maintains motor at constant speed with load fluctuations
Energy savings	Controls output voltage to minimize motor loss during constant speed operation
Start mode function	This functionality smoothly catches a spinning motor

### Logic controller (LC)

Logic controller events	Over 23 types of programmable events
Comparators	Array of 4 comparators
Timers	Array of 3 timers, adjustable from 0.0 to 3600 sec
Logic rules	Array of 4 boolean logic rules
Logic controller states	Array of 20 logic controller action states

### Process controller (PID)

Feedback select	No function, analogue input 1, analogue input 2, pulse input, local bus reference
Control	Normal or inverse
Anti windup	Disabled or enabled
Start speed	0.0-200 Hz
Proportional gain	0.00-10.00
Integral gain	0.10-9999 seconds
Feed forward factor	0-400%
On reference bandwidth	0-200%

### Indication

LEDs	Green - drive is on Yellow - indicates a warning Red - indicates an alarm
Monitor Units Available	Frequency, current, voltage, power, horsepower, % load, speed, or time

### Trip codes

2	Live zero error
4	Line phase loss
7	DC overvoltage
8	DC undervoltage
9	Drive overload
10	Motor overtemperature
11	Motor thermistor overtemperature
12	Torque limit
13	Overcurrent
14	Ground fault
16	Short circuit
17	Control word timeout
25	Brake resistor short-circuited
27	Brake chopper short-circuited
28	Brake check
29	Power board overtemperature
30	Missing U phase
31	Missing V phase
32	Missing W phase
38	Internal fault
47	Control voltage fault
51	Auto tune check - wrong motor parameters
52	Auto tune low inom - motor current is too low
59	Current limit
63	Mechanical brake low
80	Drive restored to factory settings

### Monitoring parameters available

Power	kW
Power	HP
Motor voltage	V
Frequency	Hz
Motor current	A
Frequency	%
Motor thermal	%
DC link voltage	V
Drive current	A
Drive max current	A
Logic controller state	ON/OFF

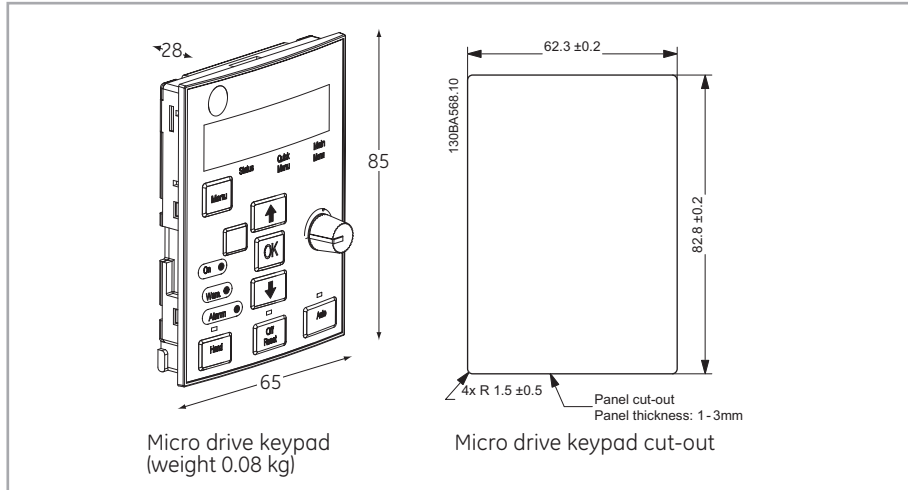
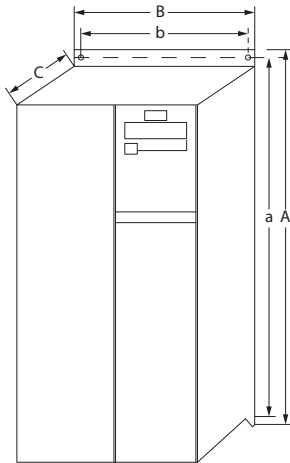


## Dimensional drawings

### Micro drives

Unit size	Nominal motor power ratings (kW)			Height (mm)			Width (mm)		Depth (mm)	Weight kg
	230 V 1ph	230 V 3ph	400 V 3ph	A	A (including decoupling plate)	a	B	b	C	
M1	0.18 - 0.75	0.25 - 0.75	0.37 - 0.75	150	205	140.4	70	55	148	1.1
M2	1.5	1.5	1.5 - 2.2	176	230	166.4	75	59	168	1.6
M3	2.2	2.2 - 3.7	4 - 7.5	239	294	226	90	69	194	3.0
M4	-	-	11 - 15	292	347.5	272.4	125	97	249	6.0
M5	-	-	18.5 - 22	335	387.5	315	165	140	256	9.5

### Micro drive keypad



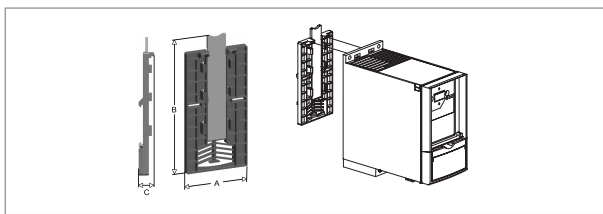
Micro drive keypad  
(weight 0.08 kg)

Micro drive keypad cut-out

Note: Please allow 5 cm between drives with field installed IP21 kits. Also, please consult the relevant AF-6 Series drives Operating Instructions for recommended clearance above and below each drive rating.

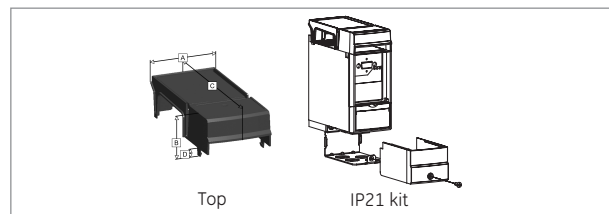
#### DIN-rail mounting kit for 0.75kW and below drives (unit size M1 and M2)

Cat. No.	Ref. No.	A (mm)	B (mm)	C (mm)
RMACLP1	404806	60	129	13.5



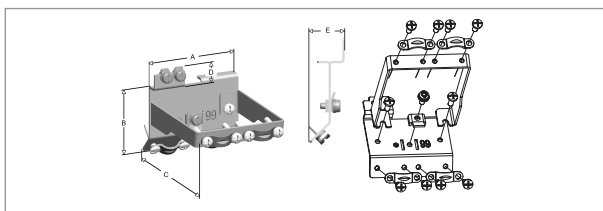
#### IP21 field installed kit - top

Cat. No.	Ref. No.	A (mm)	B (mm)	C (mm)	D (mm)
NEMA1ACLP1	404798	72	43	151	8
NEMA1ACLP2	404799	77	43	172	8
NEMA1ACLP3	404800	92	43	199	8



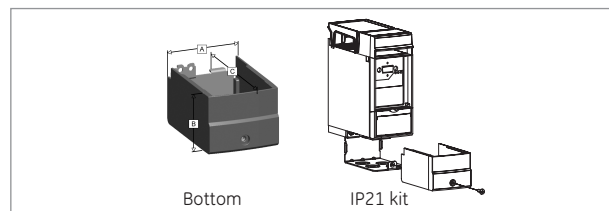
#### De-coupling plate kit

Cat. No.	Ref. No.	A (mm)	B (mm)	C (mm)	D (mm)	E (mm)
DEPLTACLP1	404804	70	52	100	14	22.6
DEPLTACLP2	404805	70	52	N/A	14	22.6



#### IP21 field installed kit - bottom

Cat. No.	Ref. No.	A (mm)	B (mm)	C (mm)	D (mm)
NEMA1ACLP1	404798	70	55	107	8
NEMA1ACLP2	404799	75	55	114	8
NEMA1ACLP3	404800	90	55	121	8



Dimensions in mm (inch = mm x 0.03937) - Weight in kg (lb = kg x 2.2046)





## AF-650 GP - General Purpose Drives

The AF-650 GP general purpose drive is a powerful, flexible and easy to use drive with many standard features. It is ideally suited for both heavy duty and light duty applications.

The drive is available in its standard configuration that includes IP20 or IP00 chassis, LCD keypad display that can be remote mounted, DC link reactors, built-in Modbus RTU and RFI class A2 filter. Available in IP 55 and IP 66 enclosures.

Following models are available:

- Three-phase, 230Vac, from 0.25 to 45kW
- Three-phase, 400Vac, from 0.37 to 1000kW
- Three-phase, 690Vac, from 11 to 1200kW

## Features

- Self-protecting features
- Other available configurations: RFI class A1/B1 filter, braking chopper and conformal coating.
- Configurations are available in IP55 and IP66
- RFI class A2 filter and DC link reactor as standard configuration
- Duality of power, Heavy or Light Duty
- 150% current overload for 1 minute (Heavy Duty)
- 110% current overload for 1 minute (Light Duty)
- Hot pluggable, illuminated LCD display, unit indications, rotation direction indication, trended charts display speed, torque, current, full alarm messages & descriptions
- Speed and process PID controls
- Integrated logic control, PLC
- Flying start (catch a spinning motor)
- Precise stop function
- Safe Stop/Safe Torque function built-in (SIL 2)
- Advanced brake control
- 24V encoder feedback built-in
- Easy to use PC software
- Built-in communication networks for ModBus RTU
- Optional protocols: Profibus DP, Profinet, ModBus TPC/IP, Ethernet/IP and DeviceNet
- High standard protection class 3C2 as standard, optional class 3C3

## Approvals / Marking

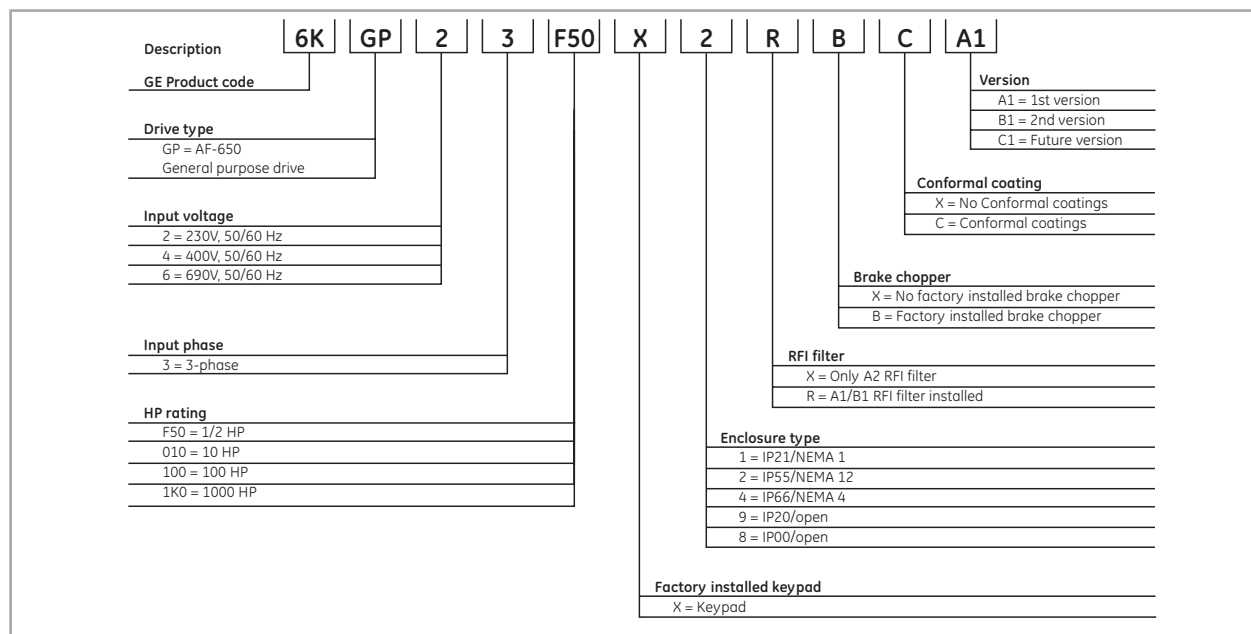


UL, cUL, C-Tick, EAC

## Applications

Conveyors, mixers, agitators, lathes, spinning machines, machine tool, grinder, extruders, plastic injection molding machines, constant displacement pumps, woodworking machines.

## Product numbering system diagram



Product number for illustrative purposes only





**IP00 / IP20 / IP21, with EMC filter Class A2 (C3)**  
**230V, 3-phase, 50/60Hz input**

Heavy Duty rating			Light Duty rating			Enclosure type <sup>(1)</sup> :	WITH braking chopper		WITHOUT braking chopper		Unit size
Nominal motor ratings			Nominal motor ratings				Cat. No. and Ref. No.		Cat. No. Ref. No.		
Power kW	Current A	Overload current during 60s (A)	Power kW	Current A	Overload current during 60s (A)						
0.25	1.8	2.88	0.25	1.8	2.88	IP20	6KGP23F33X9XBXA1	6KGP23F33X9XXXXA1	404670	12	
0.37	2.4	3.84	0.37	2.4	3.84		6KGP23F50X9XBXA1	6KGP23F50X9XXXXA1	404671	12	
0.75	4.6	7.36	0.75	4.6	7.36		6KGP23001X9XBXA1	6KGP23001X9XXXXA1	404672	12	
1.5	7.5	12	1.5	7.5	12		6KGP23002X9XBXA1	6KGP23002X9XXXXA1	404673	12	
2.2	10.6	16.96	2.2	10.6	16.96		6KGP23003X9XBXA1	6KGP23003X9XXXXA1	404674	12	
3.7	16.7	26.72	3.7	16.7	26.72		6KGP23005X9XBXA1	6KGP23005X9XXXXA1	404675	13	
5.5	24.2	38.72	5.5/7.5	30.8	33.88		6KGP23007X9XBXA1	6KGP23007X9XXXXA1	404676	23	
7.5	30.8	49.28	11	46.2	50.82		6KGP23010X9XBXA1	6KGP23010X9XXXXA1	404677	23	
11	46.2	73.92	15	59.4	65.34		6KGP23015X9XBXA1	6KGP23015X9XXXXA1	404678	24	
15	59.4	89.1	18.5	74.8	82.28		6KGP23020X9XBXA1	6KGP23020X9XXXXA1	404679	24	
18.5	74.8	112.2	22	88	96.8		6KGP23025X9XBXA1	6KGP23025X9XXXXA1	404680	33	
22	88	132	30	115	126.5		6KGP23030X9XBXA1	6KGP23030X9XXXXA1	404681	33	
30	115	172.5	37	143	157.3		6KGP23040X9XBXA1	6KGP23040X9XXXXA1	404682	34	
37	143	214.5	45	170	187		6KGP23050X9XBXA1	6KGP23050X9XXXXA1	404683	34	

**400V, 3-phase, 50/60Hz input**

Heavy Duty rating			Light Duty rating			Enclosure type <sup>(1)</sup> :	WITH braking chopper		WITHOUT braking chopper		Unit size
Nominal motor ratings			Nominal motor ratings				Cat. No. Ref. No.		Cat. No. Ref. No.		
Power kW	Current A	Overload current during 60s (A)	Power kW	Current A	Overload current during 60s (A)						
0.37	1.3	2.08	0.37	1.3	1.43	IP20	6KGP43F50X9XBXA1	403116	6KGP43F50X9XXXXA1	400412	12
0.75	2.4	3.84	0.75	2.4	2.64		6KGP43001X9XBXA1	403117	6KGP43001X9XXXXA1	400451	12
1.5	4.1	6.56	1.5	4.1	4.51		6KGP43002X9XBXA1	403118	6KGP43002X9XXXXA1	401212	12
2.2	5.6	8.96	2.2	5.6	6.16		6KGP43003X9XBXA1	403119	6KGP43003X9XXXXA1	401362	12
4	10	16	4	10	11		6KGP43005X9XBXA1	403120	6KGP43005X9XXXXA1	402735	12
5.5	13	20.8	5.5	13	14.3		6KGP43007X9XBXA1	403121	6KGP43007X9XXXXA1	402738	13
7.5	16	25.6	7.5	16	17.6		6KGP43010X9XBXA1	403122	6KGP43010X9XXXXA1	402746	13
11	24	38.4	11/15	32	35.2		6KGP43015X9XBXA1	403123	6KGP43015X9XXXXA1	402747	23
15	32	51.2	18.5	37.5	41.25		6KGP43020X9XBXA1	403124	6KGP43020X9XXXXA1	402748	23
18.5	37.5	60	22	44	48.4		6KGP43025X9XBXA1	403125	6KGP43025X9XXXXA1	402765	24
22	44	70.4	30	61	67.1		6KGP43030X9XBXA1	403126	6KGP43030X9XXXXA1	402766	24
30	61	97.6	37	73	80.3		6KGP43040X9XBXA1	403127	6KGP43040X9XXXXA1	402767	24
37	73	116.8	45	90	99		6KGP43050X9XBXA1	403128	6KGP43050X9XXXXA1	402768	33
45	90	144	55	106	116.6		6KGP43060X9XBXA1	403129	6KGP43060X9XXXXA1	402769	33
55	106	168	75	147	161.7		6KGP43075X9XBXA1	403130	6KGP43075X9XXXXA1	402857	34
75	147	235.2	90	177	194.7		6KGP43100X9XBXA1	403131	6KGP43100X9XXXXA1	402863	34
90	177	265.5	110	212	233.2		6KGP43125X9XBXA1	403132	6KGP43125X9XXXXA1	402864	43h
110	212	318	132	260	286	6KGP43150X9XBXA1	409620	6KGP43150X9XXXXA1	409601	43h	
132	260	390	160	315	346.5	6KGP43200X9XBXA1	409621	6KGP43200X9XXXXA1	409602	43h	
160	315	472.5	200	395	434.5	6KGP43250X9XBXA1	409622	6KGP43250X9XXXXA1	409603	44h	
200	395	592.5	250	480	528	6KGP43300X9XBXA1	409623	6KGP43300X9XXXXA1	409604	44h	
250	480	720	315	588	647	6KGP43350X9XBXA1	409624	6KGP43350X9XXXXA1	409605	44h	
315	600	900	355	658	723.8	6KGP43400X9XBXA1	403138	6KGP43400X9XXXXA1	402870	52	
355	658	987	400	745	819.5	6KGP43500X9XBXA1	403139	6KGP43500X9XXXXA1	402871	52	
400	745	1117.5	450	800	880	6KGP43550X9XBXA1	403140	6KGP43550X9XXXXA1	402872	52	
450	800	1200	500	880	968	6KGP43600X1XBXA1	403141	6KGP43600X1XXXXA1	402873	61	
500	880	1320	560	990	1089	6KGP43650X1XBXA1	403142	6KGP43650X1XXXXA1	402874	61	
560	990	1485	630	1120	1232	6KGP43700X1XBXA1	403143	6KGP43700X1XXXXA1	402875	61	
630	1120	1680	710	1260	1386	6KGP43900X1XBXA1	403144	6KGP43900X1XXXXA1	402876	61	
710	1260	1890	800	1460	1606	6KGP431K0X1XBXA1	403145	6KGP431K0X1XXXXA1	402877	62	
800	1460	2190	1000	1720	1870	6KGP431K2X1XBXA1	403146	6KGP431K2X1XXXXA1	402878	62	

**690V, 3-phase, 50/60Hz input**

Heavy Duty rating			Light Duty rating			Enclosure type:	WITH braking chopper		WITHOUT braking chopper		Unit size
Nominal motor ratings			Nominal motor ratings				Cat. No. and Ref. No.		Cat. No. and Ref. No.		
Power kW	Current A	Overload current during 60s (A)	Power kW	Current A	Overload current during 60s (A)						
11	13	20.8	15	18	19.8	IP21 conformal coated	6KGP63015X1XBXA1	6KGP63015X1XXCA1	22		
15	18	28.8	18.5	22	24.2		6KGP63020X1XBXA1	6KGP63020X1XXCA1	22		
18.5	22	35.2	22	27	29.7		6KGP63025X1XBXA1	6KGP63025X1XXCA1	22		
22	27	43.2	30	34	37.4		6KGP63030X1XBXA1	6KGP63030X1XXCA1	22		
30	34	51	37	41	45.1		6KGP63040X1XBXA1	6KGP63040X1XXCA1	32		
37	41	61.5	45	52	57.2		6KGP63050X1XBXA1	6KGP63050X1XXCA1	32		
45	52	78	55	62	68.2		6KGP63060X1XBXA1	6KGP63060X1XXCA1	32		
55	62	93	75	83	91.3		6KGP63075X1XBXA1	6KGP63075X1XXCA1	32		
75	83	124.5	90	108	118.8		6KGP63100X1XBXA1	6KGP63100X1XXCA1	32		
90	108	162	110	131	144.1		6KGP63125X9XBXA1	6KGP63125X9XXCB1	45h/43h		
110	131	196.5	132	155	170.5		6KGP63150X9XBXA1	6KGP63150X9XXCB1	45h/43h		
132	155	232.5	160	192	211.2		6KGP63200X9XBXA1	6KGP63200X9XXCB1	45h/43h		
160	192	288	200	242	266.2		6KGP63250X9XBXA1	6KGP63250X9XXCB1	47h/44h		
200	242	363	250	290	319		6KGP63300X9XBXA1	6KGP63300X9XXCB1	47h/44h		
250	290	435	315	344	378.4		6KGP63350X9XBXA1	6KGP63350X9XXCB1	47h/44h		
315	344	516	355	380	418		6KGP63400X9XBXA1	6KGP63400X9XXCB1	47h/44h		
355	380	570	400	410	451		6KGP63550X8XBXA1	6KGP63550X8XXCA1	52		
400	410	615	500	500	550	6KGP63600X8XBXA1	6KGP63600X8XXCA1	52			
500	500	750	560	570	627	6KGP63650X8XBXA1	6KGP63650X8XXCA1	52			
560	570	855	630	630	693	6KGP63750X8XBXA1	6KGP63750X8XXCA1	52			
630	630	945	710	730	803	6KGP63900X1XBXA1	6KGP63900X1XXCA1	61			
710	730	1095	800	850	935	6KGP631K0X1XBXA1	6KGP631K0X1XXCA1	61			
800	850	1275	900	945	1039.5	6KGP631K1X1XBXA1	6KGP631K1X1XXCA1	61			
900	945	1417.5	1000	1060	1166	6KGP631K2X1XBXA1	6KGP631K2X1XXCA1	63			
1000	1060	1590	1200	1260	1386	6KGP631K3X1XBXA1	6KGP631K3X1XXCA1	63			
1200	1260	1890	1400	1415	1556.5	6KGP631K6X1XBXA1	6KGP631K6X1XXCA1	63			

(1) IP21 kits are available as field installed options for all 230V drives from 0.25 to 37kW for all 400V drives from 0.37 to 75kW. See Page G.41.



# AF-650 GP

IP00 / IP20 / IP21, with EMC filter Class A1/B1 (C1/C2)

230V, 3-phase, 50/60Hz input

Heavy Duty rating Nominal motor ratings			Light Duty rating Nominal motor ratings			Enclosure type <sup>(1)</sup> :	WITH braking chopper		WITHOUT braking chopper		Unit size
Power kW	Current A	Overload current during 60s (A)	Power kW	Current A	Overload current during 60s (A)		Cat. No. and Ref. No.		Cat. No. and Ref. No.		
0.25	1.8	2.88	0.25	1.8	2.88	IP20	6KGP23F33X9RBXA1	6KGP23F33X9RXXA1	12		
0.37	2.4	3.84	0.37	2.4	3.84		6KGP23F50X9RBXA1	6KGP23F50X9RXXA1	12		
0.75	4.6	7.36	0.75	4.6	7.36		6KGP23001X9RBXA1	6KGP23001X9RXXA1	12		
1.5	7.5	12	1.5	7.5	12		6KGP23002X9RBXA1	6KGP23002X9RXXA1	12		
2.2	10.6	16.96	2.2	10.6	16.96		6KGP23003X9RBXA1	6KGP23003X9RXXA1	12		
3.7	16.7	26.72	3.7	16.7	26.72		6KGP23005X9RBXA1	6KGP23005X9RXXA1	13		
5.5	24.2	38.72	5.5/7.5	30.8	33.88		6KGP23007X9RBXA1	6KGP23007X9RXXA1	23		
7.5	30.8	49.28	11	46.2	50.82		6KGP23010X9RBXA1	6KGP23010X9RXXA1	23		
11	46.2	73.92	15	59.4	65.34		6KGP23015X9RBXA1	6KGP23015X9RXXA1	24		
15	59.4	89.1	18.5	74.8	82.28		6KGP23020X9RBXA1	6KGP23020X9RXXA1	24		
18.5	74.8	112.2	22	88	96.8		6KGP23025X9RBXA1	6KGP23025X9RXXA1	33		
22	88	132	30	115	126.5		6KGP23030X9RBXA1	6KGP23030X9RXXA1	33		
30	115	172.5	37	143	157.3		6KGP23040X9RBXA1	6KGP23040X9RXXA1	34		
37	143	214.5	45	170	187		6KGP23050X9RBXA1	6KGP23050X9RXXA1	34		

400V, 3-phase, 50/60Hz input

Heavy Duty rating Nominal motor ratings			Light Duty rating Nominal motor ratings			Enclosure type <sup>(1)</sup> :	WITH braking chopper		WITHOUT braking chopper		Unit size
Power kW	Current A	Overload current during 60s (A)	Power kW	Current A	Overload current during 60s (A)		Cat. No.	Ref. No.	Cat. No.	Ref. No.	
0.37	1.3	2.08	0.37	1.3	1.43	IP20	6KGP43F50X9RBXA1	403203	6KGP43F50X9RXXA1	402935	12
0.75	2.4	3.84	0.75	2.4	2.64		6KGP43001X9RBXA1	403204	6KGP43001X9RXXA1	402936	12
1.5	4.1	6.56	1.5	4.1	4.51		6KGP43002X9RBXA1	403205	6KGP43002X9RXXA1	402937	12
2.2	5.6	8.96	2.2	5.6	6.16		6KGP43003X9RBXA1	403206	6KGP43003X9RXXA1	402938	12
4	10	16	4	10	11		6KGP43005X9RBXA1	403207	6KGP43005X9RXXA1	402939	12
5.5	13	20.8	5.5	13	14.3		6KGP43007X9RBXA1	403208	6KGP43007X9RXXA1	402940	13
7.5	16	25.6	7.5	16	17.6		6KGP43010X9RBXA1	403209	6KGP43010X9RXXA1	402941	13
11	24	38.4	11/15	32	35.2		6KGP43015X9RBXA1	403210	6KGP43015X9RXXA1	402942	23
15	32	51.2	18.5	37.5	41.25		6KGP43020X9RBXA1	403211	6KGP43020X9RXXA1	402943	23
18.5	37.5	60	22	44	48.4		6KGP43025X9RBXA1	403212	6KGP43025X9RXXA1	402944	24
22	44	70.4	30	61	67.1		6KGP43030X9RBXA1	403213	6KGP43030X9RXXA1	402945	24
30	61	97.6	37	73	80.3		6KGP43040X9RBXA1	403214	6KGP43040X9RXXA1	402946	24
37	73	116.8	45	90	99		6KGP43050X9RBXA1	403215	6KGP43050X9RXXA1	402947	33
45	90	144	55	106	116.6		6KGP43060X9RBXA1	403216	6KGP43060X9RXXA1	402948	33
55	106	168	75	147	161.7		6KGP43075X9RBXA1	403217	6KGP43075X9RXXA1	402949	34
75	147	235.2	90	177	194.7		6KGP43100X9RBXA1	403218	6KGP43100X9RXXA1	402950	34
90	177	265.5	110	212	233.2		6KGP43125X9RBCB1	409634	6KGP43125X9RXXCB1	409607	43h
110	212	318	132	260	286	6KGP43150X9RBCB1	409635	6KGP43150X9RXXCB1	409608	43h	
132	260	390	160	315	346.5	6KGP43200X9RBCB1	409636	6KGP43200X9RXXCB1	409609	43h	
160	315	472.5	200	395	434.5	6KGP43250X9RBCB1	409637	6KGP43250X9RXXCB1	409610	44h	
200	395	592.5	250	480	528	6KGP43300X9RBCB1	409638	6KGP43300X9RXXCB1	409611	44h	
250	480	720	315	588	647	6KGP43350X9RBCB1	409639	6KGP43350X9RXXCB1	409612	44h	
315	600	900	355	658	723.8	6KGP43450X8RBCA1	403225	6KGP43450X8RXXCA1	402957	52	
355	658	987	400	745	819.5	6KGP43500X8RBCA1	403226	6KGP43500X8RXXCA1	402958	52	
400	745	1117.5	450	800	880	6KGP43550X8RBCA1	403227	6KGP43550X8RXXCA1	402959	52	
450	800	1200	500	880	968	6KGP43600X1RBCA1	403228	6KGP43600X1RXXCA1	402960	63	
500	880	1320	560	990	1089	6KGP43650X1RBCA1	403229	6KGP43650X1RXXCA1	402961	63	
560	990	1485	630	1120	1232	6KGP43750X1RBCA1	403230	6KGP43750X1RXXCA1	402962	63	
630	1120	1680	710	1260	1386	6KGP43900X1RBCA1	403231	6KGP43900X1RXXCA1	402963	63	
710	1260	1890	800	1460	1606	6KGP431K0X1RBCA1	403232	6KGP431K0X1RXXCA1	402964	64	
800	1460	2190	1000	1720	1870	6KGP431K2X1RBCA1	403233	6KGP431K2X1RXXCA1	402965	64	

690V, 3-phase, 50/60Hz input

Heavy Duty rating Nominal motor ratings			Light Duty rating Nominal motor ratings			Enclosure type:	WITH braking chopper		WITHOUT braking chopper		Unit size
Power kW	Current A	Overload current during 60s (A)	Power kW	Current A	Overload current during 60s (A)		Cat. No. and Ref. No.		Cat. No. and Ref. No.		
11	13	20.8	15	18	19.8	IP21 conformal coated	6KGP63015X1RBCA1		6KGP63015X1RXXCA1		22
15	18	28.8	18.5	22	24.2		6KGP63020X1RBCA1		6KGP63020X1RXXCA1		22
18.5	22	35.2	22	27	29.7		6KGP63025X1RBCA1		6KGP63025X1RXXCA1		22
22	27	43.2	30	34	37.4		6KGP63030X1RBCA1		6KGP63030X1RXXCA1		22
30	34	51	37	41	45.1		6KGP63040X1RBCA1		6KGP63040X1RXXCA1		32
37	41	61.5	45	52	57.2		6KGP63050X1RBCA1		6KGP63050X1RXXCA1		32
45	52	78	55	62	68.2		6KGP63060X1RBCA1		6KGP63060X1RXXCA1		32
55	62	93	75	83	91.3		6KGP63075X1RBCA1		6KGP63075X1RXXCA1		32
75	83	124.5	90	108	118.8		6KGP63100X1RBCA1		6KGP63100X1RXXCA1		32
90	108	162	110	131	144.1		6KGP63125X9RBCB1		6KGP63125X9RXXCB1		45h/43h
110	131	196.5	132	155	170.5		6KGP63150X9RBCB1		6KGP63150X9RXXCB1		45h/43h
132	155	232.5	160	192	211.2		6KGP63200X9RBCB1		6KGP63200X9RXXCB1		45h/43h
160	192	288	200	242	266.2		6KGP63250X9RBCB1		6KGP63250X9RXXCB1		47h/44h
200	242	363	250	290	319		6KGP63300X9RBCB1		6KGP63300X9RXXCB1		47h/44h
250	290	435	315	344	378.4		6KGP63350X9RBCB1		6KGP63350X9RXXCB1		47h/44h
315	344	516	355	380	418		6KGP63450X9RBCB1		6KGP63450X9RXXCB1		47h/44h
355	380	570	400	410	451		6KGP63550X8RBCA1		6KGP63550X8RXXCA1		52
400	410	615	500	500	550	6KGP63600X8RBCA1		6KGP63600X8RXXCA1		52	
500	500	750	560	570	627	6KGP63650X8RBCA1		6KGP63650X8RXXCA1		52	
560	570	855	630	630	693	6KGP63750X8RBCA1		6KGP63750X8RXXCA1		52	
630	630	945	710	730	803	6KGP63900X1RBCA1		6KGP63900X1RXXCA1		62	
710	730	1095	800	850	935	6KGP631K0X1RBCA1		6KGP631K0X1RXXCA1		62	
800	850	1275	900	945	1039.5	6KGP631K1X1RBCA1		6KGP631K1X1RXXCA1		62	
900	945	1417.5	1000	1060	1166	6KGP631K2X1RBCA1		6KGP631K2X1RXXCA1		64	
1000	1060	1590	1200	1260	1386	6KGP631K3X1RBCA1		6KGP631K3X1RXXCA1		64	
1200	1260	1890	1400	1415	1556.5	6KGP631K6X1RBCA1		6KGP631K6X1RXXCA1		64	

(1) IP21 kits are available as field installed options for all 230V drives from 0.25 to 37kW for all 400V drives from 0.37 to 75kW. See Page G.41.

AF-6 drives

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IP54 / IP55, with EMC filter Class A2 (C3)  
230V, 3-phase, 50/60Hz input

Heavy Duty rating			Light Duty rating			Enclosure type:	WITH braking chopper		WITHOUT braking chopper		Unit size
Nominal motor ratings			Nominal motor ratings				Cat. No.	Ref. No.	Cat. No.	Ref. No.	
Power kW	Current A	Overload current during 60s (A)	Power kW	Current A	Overload current during 60s (A)						
0.25	1.8	2.88	0.25	1.8	2.88	IP55	6KGP23F33X2XBXA1		6KGP23F33X2XXXA1	404710	15
0.37	2.4	3.84	0.37	2.4	3.84		6KGP23F50X2XBXA1		6KGP23F50X2XXXA1	404711	15
0.75	4.6	7.36	0.75	4.6	7.36		6KGP23001X2XBXA1		6KGP23001X2XXXA1	404712	15
1.5	7.5	12	1.5	7.5	12		6KGP23002X2XBXA1		6KGP23002X2XXXA1	404713	15
2.2	10.6	16.96	2.2	10.6	16.96		6KGP23003X2XBXA1		6KGP23003X2XXXA1	404714	15
3.7	16.7	26.72	3.7	16.7	26.72		6KGP23005X2XBXA1		6KGP23005X2XXXA1	404715	15
5.5	24.2	38.72	5.5/7.5	30.8	33.88		6KGP23007X2XBXA1		6KGP23007X2XXXA1	404716	21
7.5	30.8	49.28	11	46.2	50.82		6KGP23010X2XBXA1		6KGP23010X2XXXA1	404717	21
11	46.2	73.92	15	59.4	65.34		6KGP23015X2XBXA1		6KGP23015X2XXXA1	404718	22
15	59.4	89.1	18.5	74.8	82.28		6KGP23020X2XBXA1		6KGP23020X2XXXA1	404719	31
18.5	74.8	112.2	22	88	96.8		6KGP23025X2XBXA1		6KGP23025X2XXXA1	404720	31
22	88	132	30	115	126.5		6KGP23030X2XBXA1		6KGP23030X2XXXA1	404721	31
30	115	172.5	37	143	157.3		6KGP23040X2XBXA1		6KGP23040X2XXXA1	404722	32
37	143	214.5	45	170	187		6KGP23050X2XBXA1		6KGP23050X2XXXA1	404723	32

400V, 3-phase, 50/60Hz input

Heavy Duty rating			Light Duty rating			Enclosure type:	WITH braking chopper		WITHOUT braking chopper		Unit size
Nominal motor ratings			Nominal motor ratings				Cat. No.	Ref. No.	Cat. No.	Ref. No.	
Power kW	Current A	Overload current during 60s (A)	Power kW	Current A	Overload current during 60s (A)						
0.37	1.3	2.08	0.37	1.3	1.43	IP55	6KGP43F50X2XBXA1	403156	6KGP43F50X2XXXA1	402888	15
0.75	2.4	3.84	0.75	2.4	2.64		6KGP43001X2XBXA1	403157	6KGP43001X2XXXA1	402889	15
1.5	4.1	6.56	1.5	4.1	4.51		6KGP43002X2XBXA1	403158	6KGP43002X2XXXA1	402890	15
2.2	5.6	8.96	2.2	5.6	6.16		6KGP43003X2XBXA1	403159	6KGP43003X2XXXA1	402891	15
4	10	16	4	10	11		6KGP43005X2XBXA1	403160	6KGP43005X2XXXA1	402892	15
5.5	13	20.8	5.5	13	14.3		6KGP43007X2XBXA1	403161	6KGP43007X2XXXA1	402893	15
7.5	16	25.6	7.5	16	17.6		6KGP43010X2XBXA1	403162	6KGP43010X2XXXA1	402894	15
11	24	38.4	11/15	32	35.2		6KGP43015X2XBXA1	403163	6KGP43015X2XXXA1	402895	21
15	32	51.2	18.5	37.5	41.25		6KGP43020X2XBXA1	403164	6KGP43020X2XXXA1	402896	21
18.5	37.5	60	22	44	48.4		6KGP43025X2XBXA1	403165	6KGP43025X2XXXA1	402897	22
22	44	70.4	30	61	67.1		6KGP43030X2XBXA1	403166	6KGP43030X2XXXA1	402898	22
30	61	97.6	37	73	80.3		6KGP43040X2XBXA1	403167	6KGP43040X2XXXA1	402899	22
37	73	116.8	45	90	99		6KGP43050X2XBXA1	403168	6KGP43050X2XXXA1	402900	31
45	90	144	55	106	116.6		6KGP43060X2XBXA1	403169	6KGP43060X2XXXA1	402901	31
55	106	168	75	147	161.7		6KGP43075X2XBXA1	403170	6KGP43075X2XXXA1	402902	32
75	147	235.2	90	177	194.7		6KGP43100X2XBXA1	403171	6KGP43100X2XXXA1	402903	32
90	177	265.5	110	212	233.2		6KGP43125X2XBCB1	409626	6KGP43125X2XXCB1	409646	41h
110	212	318	132	260	286	6KGP43150X2XBCB1	409628	6KGP43150X2XXCB1	409647	41h	
132	260	390	160	315	346.5	6KGP43200X2XBCB1	409630	6KGP43200X2XXCB1	409648	41h	
160	315	472.5	200	395	434.5	6KGP43250X2XBCB1	409631	6KGP43250X2XXCB1	409649	42h	
200	395	592.5	250	480	528	6KGP43300X2XBCB1	409632	6KGP43300X2XXCB1	409650	42h	
250	480	720	315	600	660	6KGP43350X2XBCB1	409633	6KGP43350X2XXCB1	409606	42h	
315	600	900	355	658	723.8	6KGP43400X2XBCA1	403178	6KGP43400X2XXCA1	402910	52	
355	658	987	400	745	819.5	6KGP43500X2XBCA1	403179	6KGP43500X2XXCA1	402911	52	
400	745	1117.5	450	800	880	6KGP43550X2XBCA1	403180	6KGP43550X2XXCA1	402912	52	
450	800	1200	500	880	968	6KGP43600X2XBCA1	403181	6KGP43600X2XXCA1	402913	61	
500	880	1320	560	990	1089	6KGP43650X2XBCA1	403182	6KGP43650X2XXCA1	402914	61	
560	990	1485	630	1120	1232	6KGP43750X2XBCA1	403183	6KGP43750X2XXCA1	402915	61	
630	1120	1680	710	1260	1386	6KGP43900X2XBCA1	403184	6KGP43900X2XXCA1	402916	61	
710	1260	1890	800	1460	1606	6KGP431K0X2XBCA1	403185	6KGP431K0X2XXCA1	402917	62	
800	1460	2190	1000	1720	1870	6KGP431K2X2XBCA1	403186	6KGP431K2X2XXCA1	402918	62	

690V, 3-phase, 50/60Hz input

Heavy Duty rating			Light Duty rating			Enclosure type:	WITH braking chopper		WITHOUT braking chopper		Unit size
Nominal motor ratings			Nominal motor ratings				Cat. No. and Ref. No.	Ref. No.	Cat. No. and Ref. No.	Ref. No.	
Power kW	Current A	Overload current during 60s (A)	Power kW	Current A	Overload current during 60s (A)						
11	13	20.8	15	18	19.8	IP55 conformal coated	6KGP63015X2XBCA1		6KGP63015X2XXCA1		22
15	18	28.8	18.5	22	24.2		6KGP63020X2XBCA1		6KGP63020X2XXCA1		22
18.5	22	35.2	22	27	29.7		6KGP63025X2XBCA1		6KGP63025X2XXCA1		22
22	27	43.2	30	34	37.4		6KGP63030X2XBCA1		6KGP63030X2XXCA1		22
30	34	51	37	41	45.1		6KGP63040X2XBCA1		6KGP63040X2XXCA1		32
37	41	61.5	45	52	57.2		6KGP63050X2XBCA1		6KGP63050X2XXCA1		32
45	52	78	55	62	68.2		6KGP63060X2XBCA1		6KGP63060X2XXCA1		32
55	62	93	75	83	91.3		6KGP63075X2XBCA1		6KGP63075X2XXCA1		32
75	83	124.5	90	108	118.8		6KGP63100X2XBCA1		6KGP63100X2XXCA1		32
90	108	162	110	131	144.1		6KGP63125X2XBCB1		6KGP63125X2XXCB1		45h/41h
110	131	196.5	132	155	170.5		6KGP63150X2XBCB1		6KGP63150X2XXCB1		45h/41h
132	155	232.5	160	192	211.2		6KGP63200X2XBCB1		6KGP63200X2XXCB1		45h/41h
160	192	288	200	242	266.2		6KGP63250X2XBCB1		6KGP63250X2XXCB1		47h/42h
200	242	363	250	290	319		6KGP63300X2XBCB1		6KGP63300X2XXCB1		47h/42h
250	290	435	315	344	378.4		6KGP63350X2XBCB1		6KGP63350X2XXCB1		47h/42h
315	344	516	355	380	418		6KGP63400X2XBCB1		6KGP63400X2XXCB1		47h/42h
355	380	570	400	410	451		6KGP63500X2XBCA1		6KGP63500X2XXCA1		51
400	410	615	500	500	550	6KGP63600X2XBCA1		6KGP63600X2XXCA1		51	
500	500	750	560	570	627	6KGP63650X2XBCA1		6KGP63650X2XXCA1		51	
560	570	855	630	630	693	6KGP63750X2XBCA1		6KGP63750X2XXCA1		51	
630	630	945	710	730	803	6KGP63900X2XBCA1		6KGP63900X2XXCA1		61	
710	730	1095	800	850	935	6KGP631K0X2XBCA1		6KGP631K0X2XXCA1		61	
800	850	1275	900	945	1039.5	6KGP631K1X2XBCA1		6KGP631K1X2XXCA1		61	
900	945	1417.5	1000	1060	1166	6KGP631K2X2XBCA1		6KGP631K2X2XXCA1		63	
1000	1060	1590	1200	1260	1386	6KGP631K3X2XBCA1		6KGP631K3X2XXCA1		63	
1200	1260	1890	1400	1415	1556.5	6KGP631K6X2XBCA1		6KGP631K6X2XXCA1		63	



# AF-650 GP

## IP54 / IP55, with EMC filter A1/B1 (C1/C2)

### 230V, 3-phase, 50/60Hz input

Heavy Duty rating Nominal motor ratings			Light Duty rating Nominal motor ratings			Enclosure type:	WITH braking chopper		WITHOUT braking chopper		Unit size
Power kW	Current A	Overload current during 60s (A)	Power kW	Current A	Overload current during 60s (A)		Cat. No. and Ref. No.		Cat. No. and Ref. No.		
0.25	1.8	2.88	0.25	1.8	2.88	IP55	6KGP23F33X2RBXA1	6KGP23F33X2RXXA1	15		
0.37	2.4	3.84	0.37	2.4	3.84		6KGP23F50X2RBXA1	6KGP23F50X2RXXA1	15		
0.75	4.6	7.36	0.75	4.6	7.36		6KGP23001X2RBXA1	6KGP23001X2RXXA1	15		
1.5	7.5	12	1.5	7.5	12		6KGP23002X2RBXA1	6KGP23002X2RXXA1	15		
2.2	10.6	16.96	2.2	10.6	16.96		6KGP23003X2RBXA1	6KGP23003X2RXXA1	15		
3.7	16.7	26.72	3.7	16.7	26.72		6KGP23005X2RBXA1	6KGP23005X2RXXA1	15		
5.5	24.2	38.72	5.5/7.5	30.8	33.88		6KGP23007X2RBXA1	6KGP23007X2RXXA1	21		
7.5	30.8	49.28	11	46.2	50.82		6KGP23010X2RBXA1	6KGP23010X2RXXA1	21		
11	46.2	73.92	15	59.4	65.34		6KGP23015X2RBXA1	6KGP23015X2RXXA1	22		
15	59.4	89.1	18.5	74.8	82.28		6KGP23020X2RBXA1	6KGP23020X2RXXA1	31		
18.5	74.8	112.2	22	88	96.8		6KGP23025X2RBXA1	6KGP23025X2RXXA1	31		
22	88	132	30	115	126.5		6KGP23030X2RBXA1	6KGP23030X2RXXA1	31		
30	115	172.5	37	143	157.3		6KGP23040X2RBXA1	6KGP23040X2RXXA1	32		
37	143	214.5	45	170	187		6KGP23050X2RBXA1	6KGP23050X2RXXA1	32		

### 400V, 3-phase, 50/60Hz input

Heavy Duty rating Nominal motor ratings			Light Duty rating Nominal motor ratings			Enclosure type:	WITH braking chopper		WITHOUT braking chopper		Unit size
Power kW	Current A	Overload current during 60s (A)	Power kW	Current A	Overload current during 60s (A)		Cat. No.	Ref. No.	Cat. No.	Ref. No.	
0.37	1.3	2.08	0.37	1.3	1.43	6KGP43F50X2RBXA1	403243	6KGP43F50X2RXXA1	402975	15	
0.75	2.4	3.84	0.75	2.4	2.64	6KGP43001X2RBXA1	403244	6KGP43001X2RXXA1	402976	15	
1.5	4.1	6.56	1.5	4.1	4.51	6KGP43002X2RBXA1	403245	6KGP43002X2RXXA1	402977	15	
2.2	5.6	8.96	2.2	5.6	6.16	6KGP43003X2RBXA1	403246	6KGP43003X2RXXA1	402978	15	
4	10	16	4	10	11	6KGP43005X2RBXA1	403247	6KGP43005X2RXXA1	402979	15	
5.5	13	20.8	5.5	13	14.3	6KGP43007X2RBXA1	403248	6KGP43007X2RXXA1	402980	15	
7.5	16	25.6	7.5	16	17.6	6KGP43010X2RBXA1	403249	6KGP43010X2RXXA1	402981	15	
11	24	38.4	11/15	32	35.2	6KGP43015X2RBXA1	403250	6KGP43015X2RXXA1	402982	21	
15	32	51.2	18.5	37.5	41.25	6KGP43020X2RBXA1	403251	6KGP43020X2RXXA1	402983	21	
18.5	37.5	60	22	44	48.4	6KGP43025X2RBXA1	403252	6KGP43025X2RXXA1	402984	22	
22	44	70.4	30	61	67.1	6KGP43030X2RBXA1	403253	6KGP43030X2RXXA1	402985	22	
30	61	97.6	37	73	80.3	6KGP43040X2RBXA1	403254	6KGP43040X2RXXA1	402986	31	
37	73	116.8	45	90	99	6KGP43050X2RBXA1	403255	6KGP43050X2RXXA1	402987	31	
45	90	144	55	106	116.6	6KGP43060X2RBXA1	403256	6KGP43060X2RXXA1	402988	31	
55	106	168	75	147	161.7	6KGP43075X2RBXA1	403257	6KGP43075X2RXXA1	402989	32	
75	147	235.2	90	177	194.7	6KGP43100X2RBXA1	403258	6KGP43100X2RXXA1	402990	32	
90	177	265.5	110	212	233.2	6KGP43125X2RBCB1	409640	6KGP43125X2RXC1	409613	45h	
110	212	318	132	260	286	6KGP43150X2RBCB1	409641	6KGP43150X2RXC1	409614	45h	
132	260	390	160	315	346.5	6KGP43200X2RBCB1	409642	6KGP43200X2RXC1	409615	45h	
160	315	472.5	200	395	434.5	6KGP43250X2RBCB1	409643	6KGP43250X2RXC1	409616	47h	
200	395	592.5	250	480	528	6KGP43300X2RBCB1	409644	6KGP43300X2RXC1	409617	47h	
250	480	720	315	588	647	6KGP43350X2RBCB1	409645	6KGP43350X2RXC1	409618	47h	
315	600	900	355	658	723.8	6KGP43400X2RBCA1	403265	6KGP43400X2RXC1	402997	52	
355	658	987	400	745	819.5	6KGP43500X2RBCA1	403266	6KGP43500X2RXC1	402998	52	
400	745	1117.5	450	800	880	6KGP43550X2RBCA1	403267	6KGP43550X2RXC1	402999	52	
450	800	1200	500	880	968	6KGP43600X2RBCA1	403268	6KGP43600X2RXC1	403094	63	
500	880	1320	560	990	1089	6KGP43650X2RBCA1	403269	6KGP43650X2RXC1	403095	63	
560	990	1485	630	1120	1232	6KGP43700X2RBCA1	403270	6KGP43700X2RXC1	403096	63	
630	1120	1680	710	1260	1386	6KGP43900X2RBCA1	403271	6KGP43900X2RXC1	403097	63	
710	1260	1890	800	1460	1606	6KGP431K0X2RBCA1	403272	6KGP431K0X2RXC1	403098	64	
800	1460	2190	1000	1720	1870	6KGP431K2X2RBCA1	403273	6KGP431K2X2RXC1	403099	64	

### 690V, 3-phase, 50/60Hz input

Heavy Duty rating Nominal motor ratings			Light Duty rating Nominal motor ratings			Enclosure type:	WITH braking chopper		WITHOUT braking chopper		Unit size
Power kW	Current A	Overload current during 60s (A)	Power kW	Current A	Overload current during 60s (A)		Cat. No. and Ref. No.		Cat. No. and Ref. No.		
11	13	20.8	15	18	19.8	IP55 conformal coated	6KGP63015X2RBCA1	6KGP63015X2RXC1	22		
15	18	28.8	18.5	22	24.2		6KGP63020X2RBCA1	6KGP63020X2RXC1	22		
18.5	22	35.2	22	27	29.7		6KGP63025X2RBCA1	6KGP63025X2RXC1	22		
22	27	43.2	30	34	37.4		6KGP63030X2RBCA1	6KGP63030X2RXC1	22		
30	34	51	37	41	45.1		6KGP63040X2RBCA1	6KGP63040X2RXC1	32		
37	41	61.5	45	52	57.2		6KGP63050X2RBCA1	6KGP63050X2RXC1	32		
45	52	78	55	62	68.2		6KGP63060X2RBCA1	6KGP63060X2RXC1	32		
55	62	93	75	83	91.3		6KGP63075X2RBCA1	6KGP63075X2RXC1	32		
75	83	124.5	90	108	118.8		6KGP63100X2RBCA1	6KGP63100X2RXC1	41		
90	108	162	110	131	144.1		6KGP63125X2RBCB1	6KGP63125X2RXC1	45h/42h		
110	131	196.5	132	155	170.5		6KGP63150X2RBCB1	6KGP63150X2RXC1	45h/41h		
132	155	232.5	160	192	211.2		6KGP63200X2RBCB1	6KGP63200X2RXC1	45h/41h		
160	192	288	200	242	266.2		6KGP63250X2RBCB1	6KGP63250X2RXC1	47h/42h		
200	242	363	250	290	319		6KGP63300X2RBCB1	6KGP63300X2RXC1	47h/42h		
250	290	435	315	344	378.4		6KGP63350X2RBCB1	6KGP63350X2RXC1	47h/42h		
315	344	516	355	380	418		6KGP63450X2RBCB1	6KGP63450X2RXC1	47h/42h		
355	380	570	400	410	451		6KGP63550X2RBCA1	6KGP63550X2RXC1	51		
400	410	615	500	500	550	6KGP63600X2RBCA1	6KGP63600X2RXC1	51			
500	500	750	560	570	627	6KGP63650X2RBCA1	6KGP63650X2RXC1	51			
560	570	855	630	630	693	6KGP63750X2RBCA1	6KGP63750X2RXC1	51			
630	630	945	710	730	803	6KGP63900X2RBCA1	6KGP63900X2RXC1	62			
710	730	1095	800	850	935	6KGP631K0X2RBCA1	6KGP631K0X2RXC1	62			
800	850	1275	900	945	1039.5	6KGP631K1X2RBCA1	6KGP631K1X2RXC1	62			
900	945	1417.5	1000	1060	1166	6KGP631K2X2RBCA1	6KGP631K2X2RXC1	64			
1000	1060	1590	1200	1260	1386	6KGP631K3X2RBCA1	6KGP631K3X2RXC1	64			
1200	1260	1890	1400	1415	1556.5	6KGP631K6X2RBCA1	6KGP631K6X2RXC1	64			

AF-6 drives

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IP66, with EMC filter Class A2 (C3)

230V, 3-phase, 50/60Hz input

Heavy Duty rating Nominal motor ratings			Light Duty rating Nominal motor ratings			WITH braking chopper		WITHOUT braking chopper		Unit size
Power kW	Current A	Overload current during 60s (A)	Power kW	Current A	Overload current during 60s (A)	Cat. No. and Ref. No.	Cat. No.	Ref. No.		
0.25	1.8	2.88	0.25	1.8	2.88	6KGP23F33X4XBXA1	6KGP23F33X4XXXXA1	404724	15	
0.37	2.4	3.84	0.37	2.4	3.84	6KGP23F50X4XBXA1	6KGP23F50X4XXXXA1	404725	15	
0.75	4.6	7.36	0.75	4.6	7.36	6KGP23001X4XBXA1	6KGP23001X4XXXXA1	404726	15	
1.5	7.5	12	1.5	7.5	12	6KGP23002X4XBXA1	6KGP23002X4XXXXA1	404727	15	
2.2	10.6	16.96	2.2	10.6	16.96	6KGP23003X4XBXA1	6KGP23003X4XXXXA1	404728	15	
3.7	16.7	26.72	3.7	16.7	26.72	6KGP23005X4XBXA1	6KGP23005X4XXXXA1	404729	15	
5.5	24.2	38.72	5.5/7.5	30.8	33.88	6KGP23007X4XBXA1	6KGP23007X4XXXXA1	404730	21	
7.5	30.8	49.28	11	46.2	50.82	6KGP23010X4XBXA1	6KGP23010X4XXXXA1	404731	21	
11	46.2	73.92	15	59.4	65.34	6KGP23015X4XBXA1	6KGP23015X4XXXXA1	404732	22	
15	59.4	89.1	18.5	74.8	82.28	6KGP23020X4XBXA1	6KGP23020X4XXXXA1	404733	31	
18.5	74.8	112.2	22	88	96.8	6KGP23025X4XBXA1	6KGP23025X4XXXXA1	404734	31	
22	88	132	30	115	126.5	6KGP23030X4XBXA1	6KGP23030X4XXXXA1	404735	31	
30	115	172.5	37	143	157.3	6KGP23040X4XBXA1	6KGP23040X4XXXXA1	404736	32	
37	143	214.5	45	170	187	6KGP23050X4XBXA1	6KGP23050X4XXXXA1	404737	32	

400V, 3-phase, 50/60Hz input

Heavy Duty rating Nominal motor ratings			Light Duty rating Nominal motor ratings			WITH braking chopper		WITHOUT braking chopper		Unit size
Power kW	Current A	Overload current during 60s (A)	Power kW	Current A	Overload current during 60s (A)	Cat. No.	Ref. No.	Cat. No.	Ref. No.	
0.37	1.3	2.08	0.37	1.3	1.43	6KGP43F50X4XBXA1	403187	6KGP43F50X4XXXXA1	402919	15
0.75	2.4	3.84	0.75	2.4	2.64	6KGP43001X4XBXA1	403188	6KGP43001X4XXXXA1	402920	15
1.5	4.1	6.56	1.5	4.1	4.51	6KGP43002X4XBXA1	403189	6KGP43002X4XXXXA1	402921	15
2.2	5.6	8.96	2.2	5.6	6.16	6KGP43003X4XBXA1	403190	6KGP43003X4XXXXA1	402922	15
4	10	16	4	10	11	6KGP43005X4XBXA1	403191	6KGP43005X4XXXXA1	402923	15
5.5	13	20.8	5.5	13	14.3	6KGP43007X4XBXA1	403192	6KGP43007X4XXXXA1	402924	15
7.5	16	25.6	7.5	16	17.6	6KGP43010X4XBXA1	403193	6KGP43010X4XXXXA1	402925	15
11	24	38.4	11/15	32	35.2	6KGP43015X4XBXA1	403194	6KGP43015X4XXXXA1	402926	21
15	32	51.2	18.5	37.5	41.25	6KGP43020X4XBXA1	403195	6KGP43020X4XXXXA1	402927	21
18.5	37.5	60	22	44	48.4	6KGP43025X4XBXA1	403196	6KGP43025X4XXXXA1	402928	22
22	44	70.4	30	61	67.1	6KGP43030X4XBXA1	403197	6KGP43030X4XXXXA1	402929	22
30	61	97.6	37	73	80.3	6KGP43040X4XBXA1	403198	6KGP43040X4XXXXA1	402930	31
37	73	116.8	45	90	99	6KGP43050X4XBXA1	403199	6KGP43050X4XXXXA1	402931	31
45	90	144	55	106	116.6	6KGP43060X4XBXA1	403200	6KGP43060X4XXXXA1	402932	31
55	106	169.6	75	147	161.7	6KGP43075X4XBXA1	403201	6KGP43075X4XXXXA1	402933	32
75	147	235.2	90	177	194.7	6KGP43100X4XBXA1	403202	6KGP43100X4XXXXA1	402934	32



# AF-650 GP

IP66, with EMC filter Class A1/B1 (C1/C2)

230V, 3-phase, 50/60Hz input

AF-6 drives

Heavy Duty rating Nominal motor ratings			Light Duty rating Nominal motor ratings			WITH braking chopper		WITHOUT braking chopper		Unit size
Power kW	Current A	Overload current during 60s (A)	Power kW	Current A	Overload current during 60s (A)	Cat. No. and Ref. No.		Cat. No. and Ref. No.		
0.25	1.8	2.88	0.25	1.8	2.88	6KGP23F33X4RDXA1		6KGP23F33X4RXXA1		15
0.37	2.4	3.84	0.37	2.4	3.84	6KGP23F50X4RDXA1		6KGP23F50X4RXXA1		15
0.75	4.6	7.36	0.75	4.6	7.36	6KGP23001X4RDXA1		6KGP23001X4RXXA1		15
1.5	7.5	12	1.5	7.5	12	6KGP23002X4RDXA1		6KGP23002X4RXXA1		15
2.2	10.6	16.96	2.2	10.6	16.96	6KGP23003X4RDXA1		6KGP23003X4RXXA1		15
3.7	16.7	26.72	3.7	16.7	26.72	6KGP23005X4RDXA1		6KGP23005X4RXXA1		15
5.5	24.2	38.72	5.5/7.5	30.8	33.88	6KGP23007X4RDXA1		6KGP23007X4RXXA1		21
7.5	30.8	49.28	11	46.2	50.82	6KGP23010X4RDXA1		6KGP23010X4RXXA1		21
11	46.2	73.92	15	59.4	65.34	6KGP23015X4RDXA1		6KGP23015X4RXXA1		22
15	59.4	89.1	18.5	74.8	82.28	6KGP23020X4RDXA1		6KGP23020X4RXXA1		31
18.5	74.8	112.2	22	88	96.8	6KGP23025X4RDXA1		6KGP23025X4RXXA1		31
22	88	132	30	115	126.5	6KGP23030X4RDXA1		6KGP23030X4RXXA1		31
30	115	172.5	37	143	157.3	6KGP23040X4RDXA1		6KGP23040X4RXXA1		32
37	143	214.5	45	170	187	6KGP23050X4RDXA1		6KGP23050X4RXXA1		32

400V, 3-phase, 50/60Hz input

Heavy Duty rating Nominal motor ratings			Light Duty rating Nominal motor ratings			WITH braking chopper		WITHOUT braking chopper		Unit size
Power kW	Current A	Overload current during 60s (A)	Power kW	Current A	Overload current during 60s (A)	Cat. No.	Ref. No.	Cat. No.	Ref. No.	
0.37	1.3	2.08	0.37	1.3	1.43	6KGP43F50X4RDXA1	403274	6KGP43F50X4RXXA1	403100	15
0.75	2.4	3.84	0.75	2.4	2.64	6KGP43001X4RDXA1	403275	6KGP43001X4RXXA1	403101	15
1.5	4.1	6.56	1.5	4.1	4.51	6KGP43002X4RDXA1	403276	6KGP43002X4RXXA1	403102	15
2.2	5.6	8.96	2.2	5.6	6.16	6KGP43003X4RDXA1	403277	6KGP43003X4RXXA1	403103	15
4	10	16	4	10	11	6KGP43005X4RDXA1	403278	6KGP43005X4RXXA1	403104	15
5.5	13	20.8	5.5	13	14.3	6KGP43007X4RDXA1	403279	6KGP43007X4RXXA1	403105	15
7.5	16	25.6	7.5	16	17.6	6KGP43010X4RDXA1	403280	6KGP43010X4RXXA1	403106	15
11	24	38.4	11/15	32	35.2	6KGP43015X4RDXA1	403281	6KGP43015X4RXXA1	403107	21
15	32	51.2	18.5	37.5	41.25	6KGP43020X4RDXA1	403282	6KGP43020X4RXXA1	403108	21
18.5	37.5	60	22	44	48.4	6KGP43025X4RDXA1	403283	6KGP43025X4RXXA1	403109	22
22	44	70.4	30	61	67.1	6KGP43030X4RDXA1	403284	6KGP43030X4RXXA1	403110	22
30	61	97.6	37	73	80.3	6KGP43040X4RDXA1	403285	6KGP43040X4RXXA1	403111	31
37	73	116.8	45	90	99	6KGP43050X4RDXA1	403286	6KGP43050X4RXXA1	403112	31
45	90	144	55	106	116.6	6KGP43060X4RDXA1	403287	6KGP43060X4RXXA1	403113	31
55	106	169.6	75	147	161.7	6KGP43075X4RDXA1	403288	6KGP43075X4RXXA1	403114	32
75	147	235.2	90	177	194.7	6KGP43100X4RDXA1	403289	6KGP43100X4RXXA1	403115	32

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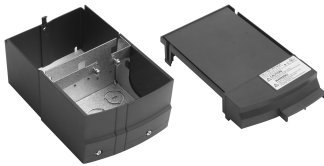
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Options and accessories

Field installed IP21 add-on option kits



Voltage	Rating kW	IP21 Kit Cat. No.	Ref. No.
230	0.25	NEMA1ACA2	404831
	0.37	NEMA1ACA2	404831
	0.75	NEMA1ACA2	404831
	1.5	NEMA1ACA2	404831
	2.2	NEMA1ACA2	404831
	3.7	NEMA1ACA3	404832
	5.5	NEMA1ACB3	404833
	7.5	NEMA1ACB3	404833
	11	NEMA1ACB4	404834
	15	NEMA1ACB4	404834
	18.5	NEMA1ACC3	404835
	22	NEMA1ACC3	404835
	30	NEMA1ACC4	404836
400	0.37	NEMA1ACA2	404831
	0.75	NEMA1ACA2	404831
	1.5	NEMA1ACA2	404831
	2.2	NEMA1ACA2	404831
	3.7	NEMA1ACA2	404831
	5.5	NEMA1ACA3	404832
	7.5	NEMA1ACA3	404832
	11	NEMA1ACB3	404833
	15	NEMA1ACB3	404833
	18.5	NEMA1ACB4	404834
	22	NEMA1ACB4	404834
	30	NEMA1ACB4	404834
	37	NEMA1ACC3	404835
45	NEMA1ACC3	404835	
55	NEMA1ACC4	404836	
75	NEMA1ACC4	404836	

Remote mounting kit for graphical LCD keypad



Remote mounting kit for mounting graphical LCD Keypad on enclosure door for AF-650/AF-600. kit includes gasket, mounting brackets, and cable. Keypad is rated IP65.

Description	Cat. No.	Ref. No.
Remote mounting kit with cable (3m)	RMKYPDAC	404851
Remote mounting kit without cable	OPCRMKNC	404850

Communications modules



<b>Profibus DP communications module</b> Profibus DP internal drive mounted module for use on AF-650 GP and AF-600 FP drives. Supports Profibus DP V1 communications networks.	OPCPDP	404848
<b>DeviceNet communications module</b> DeviceNet internal drive mounted module for use on AF-650 GP and AF-600 FP drives. ODA certified device.	OPCDEV	404818
<b>Ethernet IP communications module</b> Ethernet IP internal drive mounted module for use on AF-650 GP and AF-600 FP drives. ODA certified device. Features 2-port built-in switch. Also includes webserver and e-mail notification.	OPCEIP	404820
<b>Modbus TCP communications module</b> Modbus TCP internal drive mounted module for use on AF-650 GP and AF-600 FP drives.	OPCMBTCP	404824
<b>ProfNet RT communications module</b> ProfNet RT internal drive mounted module for use on AF-650 GP and AF-600 FP drives.	OPCPRT	404825
<b>Profibus SUB-D9 Adapter</b> Profibus SUB-D9 adapter to connect to SUB-D9 connectors and cables in all installed devices.	OPCTERMD9	409562



### General purpose I/O module

General purpose I/O internal drive mounted module for use on AF-650 GP and AF-600 FP drives.

- Module includes: 3x digital inputs 24V
- 2x digital outputs PNP/NPN
- 2x analogue inputs 0-10V
- 1x analogue output 0/4-20mA



Description	Cat. No.	Ref. No.
General purpose I/O module	OPCGPIO	404821

### Programmable Input/Output Module

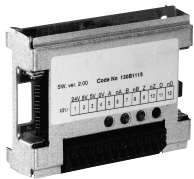
Programmable I/O module for use on the AF-650GP drive has 3 outputs and 3 inputs to extend the available I/O selection on the control card. It can be used to achieve multi-zone control with 3 pressure transmitters, and provide digital output for driving a relay, input to PLC I/O cards and input to another VFD in sequentially-controlled application.



Programmable I/O Module	OPCPRGIO	409552
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### Encoder module

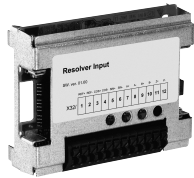
Encoder internal drive mounted module for use on the AF-650 GP drive. Module supports all 5V incremental encoders. Also supports hyperface sincos encoders.



Encoder input module	OPCENC	404819
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### Resolver module

Resolver internal drive mounted module for use on the AF-650 GP drive. Module supports 4-8Vrms, 2.5kHz - 15kHz, 50mA resolvers. Resolution is 10bit at 4Vrms.



Resolver input module	OPCRES	404852
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### Relay output module

Relay output internal drive mounted module for use on the AF-650 GP. Module adds (3) Form C relay outputs to the drive. Relays are rated at 2A at 240V resistive load.



Relay output module	OPCRLY	404849
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### 24V DC External supply module

24V DC external supply internal drive mounted module for use on the AF-650 GP drives. This module accepts an external 24V DC supply which is used to keep the control board of the drive and other option modules powered in the event of a Line side power outage. Can be used with Communications and I/O Modules.



24V DC External supply module	OPC24VPS	404815
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Options and accessories (continued)

**Safe PLC I/O module**



Safe PLC I/O internal drive mounted module for use on the AF-650 GP drive. This module provides a safety input based on a single pole 24V DC input.

Description	Cat. No.	Ref. No.
Safe PLC I/O Module	OPCSAFE	404853

**Screw terminal accessory**



Screw terminal accessory is available for field installation on AF-650 GP drives. These screw terminals can replace the cage clamp terminals which ship with each drive. This set of three terminals are for the digital inputs, analog I/O, and RS485 connection.

Description	Cat. No.	Ref. No.
Screw terminal accessory	OPCSTERM	404822

**Pedestal kit**



Pedestal kit allows unit size 41h and 42h drives to be floor mounted (IP21 and IP55, 90 to 200/315kW at 400/690V for AF-650 GP).

Description	Cat. No.	Ref. No.
Pedestal kit for unit size 41h	OPCPED41H	409506
Pedestal kit for unit size 42h	OPCPED42H	409507

**USB kit**



This kit allows for the USB programming terminal to be brought out to the front cover of the drive. Works with all drive types.

For all drives up to unit size 5X	OPCUSB	404861
For all unit size 6X drives	OPCUSB6X	404860

**Power shields**

These shields are used to cover the drive power terminals on IP21 and IP54/55 drive types.

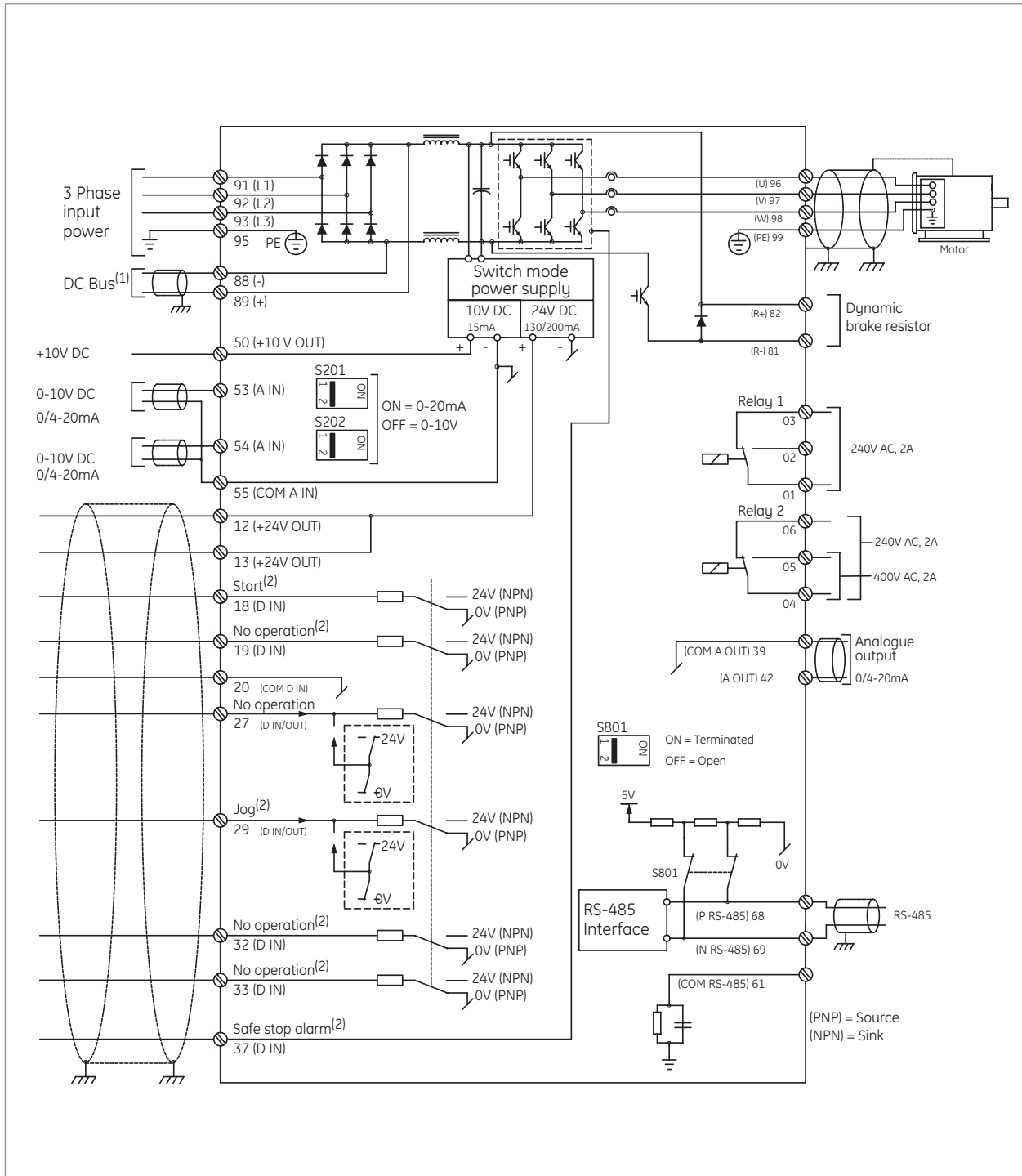
For Unit size 51 drives	OPCCOVER51	404847
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# AF-650 GP

## Basic wiring diagrams

AF-6 drives



- (1) These terminals are only available with optional factory installed brake chopper.  
 (2) Indicates default setting; see parameter group E-## to re-program.



# Specifications

## Environmental conditions

Enclosures	IP20 chassis, IP00 chassis, IP21, IP55, IP54, IP66
Installation location	For use at altitudes of 1000 m or less without derating
Storage temperature	-25° to 65° C
Ambient temperature	-10° to +50° C for above 45° C, there will be derating; please consult GE
Ambient humidity	5 to 95 % RH (non-condensing)
Vibration	1.0G
Cooling method	Fan cooled all ratings. Fan control auto, 50 % level, 75 % level, 100 % level adjustable

## Standards

Approvals	CE, UL, cUL, and C-Tick Suitable for use on a circuit capable of delivering not more than 100,000 rms symmetrical amperes for 230V and 400V.
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### Input power supply

Rated Input AC voltage	200-240 Vac, 3-phase, 50-60 Hz, +/- 10%V 380-500 Vac, 3-phase, 50-60 Hz, +/- 10%V 525-690 Vac, 3-phase, 50-60 Hz, +/- 10%V
Maximum voltage imbalance	3% of rated supply voltage
True power factor	> 0.9 at rated load
Displacement power factor	> 0.98
Switching on input power supply	Maximum twice/minute up to 7.5kW, maximum once/minute above 7.5kW
Environment according to EN60664-1	Overvoltage category III/pollution degree 2

## Output

Rated output voltage	0-100% of supply voltage
Output frequency	0-590 Hz
Switching on output	Unlimited
Accel/decel times	0.01-3600 seconds
Overload current rating	Sinusoidal PWM control (V/Hz, Avd. vector control, sensorless vector, and flux vector with motor feedback)

## Control

Starting torque	160% starting torque for 1 minute (constant torque), 110% starting torque for 1 minute (variable torque)
Carrier frequency (motor noise)	Selectable - 1, 1.5, 2, 2.5, 3, 3.5, 4, 5, 6, 7, 8, 10, 12, 14, 16 kHz
Torque boost	Selectable by up to 5 individual V/Hz settings in V/Hz Mode or by 0 - 300% setting of torque boost parameter in Adv. vector mode
Acceleration/deceleration time	0.01-3600 seconds (4 acceleration and deceleration times are selectable via digital inputs. Acceleration and deceleration patterns can be selected from linear or deceleration patterns can be selected from linear or S-curve)
Data protection	Passw protection for quick menu or main menu, 0-9999.
Pattern operation	Settings via built-in logic controller sequencer
Jump frequency control	4 jump (or skip) frequencies via parameter set to avoid mechanical vibration
Slip compensation	Maintains motor at constant speed with load fluctuations
Torque limit control	Output torque can be controlled within a range of 0.0 to 160% (0.1 and steps)
Preset speeds	8 programmable preset speeds selectable by 3 digital inputs
Trim reference setting	Available for speed reference offset via potentiometer, voltage input, or current input
DC injection braking	Starting frequency: 0.0-590 Hz, Braking time: 0.0-60.0 seconds Braking level: 0-100% of rated current
Jogging operation	Operation via on key or digital input (Fwd or Rev)
Auto-restart after power failure	Restarts the drive without stopping after instantaneous power failure
Energy savings	Controls output voltage to minimize motor loss during constant speed operation
Start mode function	This functionality smoothly catches a spinning motor

## Logic controller (LC)

Logic controller events	Up to 37 types of programmable events
Comparators	Array of 6 comparators
Timers	Array of 8 timers, adjustable from 0.0 to 3600 sec
Logic rules	Array of 6 boolean logic rules
Logic controller states	Array of 20 logic controller action states

## Process controller (PID)

Feedback select	Up to 2 references. Selectable - no function, motor feedback, separate encoder, encoder option module, or resolver option module
Control	Normal or inverse
Anti windup	Disabled or enabled
Start speed	0.0-200 Hz
Proportional gain	0.00-10.00

Integral time	0.1 - 10000.0 ms
Differential time	0.0 - 10 s
Differential gain	1.0-50.00
Feed forward factor	0-500%
On reference bandwidth	0-200%

## Operation

Operation method	Keypad operation: hand, off, auto digital input; programmable for start/stop, forward/reverse, jog timer operation: stop after predetermined time frame Built-in RS-485 Modbus USB port for programming drive with optional PC software
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Frequency reference signal	Left or right arrow buttons on keypad in manual mode Speed potentiometer: 0 to +10 Vdc, 10 to 0 Vdc 0-10Vdc analog input 0/4-20mA analog input
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References	Up to 3 input references can be selected from analog input #1 or #2, frequency input #1 or #2, network, or potentiometer
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Input signals	6x digital inputs, 24 Vdc PNP or NPN 1x safe stop digital input suitable for category 3 installations to meet EN-954-1 2x pulse inputs rated to 110kHz or 1x pulse input and 1 - encoder Input 24 Vdc rated to 4096 PPR 2x analog inputs -10 to +10V scalable or 0/4 to 20 mA scalable
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Output signals	2x digital outputs 24 Vdc (digital outputs are used in place of 2 of the digital inputs) 2x form C relays rated to 2A at 230 Vac 1x analog output 0/4 to 20mA
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Protective functions	Line phase loss	Missing U phase
	DC overvoltage	Missing V phase
DC undervoltage	DC undervoltage	Missing W phase
	Drive overload	Internal fault
Motor overtemperature	Motor overtemperature	Control voltage fault
	Motor thermistor over-temperature	Auto tune check - wrong motor parameters
Torque limit	Torque limit	Auto Tune low inom - motor current is too low
	Overcurrent	Current limit
Ground fault	Ground fault	Mechanical brake low
	Short circuit	Drive initialized to default value
Control word timeout	Control word timeout	Keypad error
	Brake resistor short-circuited	No motor
Brake chopper short-circuited	Brake chopper short-circuited	Soft charge fault
	Brake check	Auto tuning fault
DC Link voltage high	DC Link voltage high	Serial comms bus fault
	DC Link voltage low	Hardware mismatch
Internal fan fault	Internal fan fault	Speed limit
	External fan fault	
Power board overtemperature	Power board overtemperature	

## Keypad

Keypad features	LCD display with 6 alpha-numeric lines. multi-language support Hot pluggable, remote mount option, and copycat feature, IP65 rating when remote mounted on enclosure LED's - green - drive is on, yellow - indicates a warning, red - indicates an alarm, amber - indicates active menu keys and h-o-a keys 2 level password protection
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Password	Up to 4 separate complete parameter set-ups are available
Alternate motor parameters	Up to 4 separate complete parameter set-ups are available
Graphical trending	Trend speed, power, frequency or any value programmed in status display

## RS485 modbus RTU serial communications

Physical level	EIA/RS485
Transmission distance	500m
Node address	32
Transmission speed	2400, 4800, 9600, 19200, 38400, or 115200 (bits/s)
Transmission mode	Half duplex
Transmission protocol	Modbus RTU
Character code	Binary
Character length	8 bits
Error check	CRC

## Mounting clearance

All AF-650 GP drives can be mounted side-by-side without spacing. For all drives rated 75kW or below allow 100 mm free space above and below. For all drives rated 90kW and above allow 225 mm free space above and below.



# AF-650 GP

Heavy Duty efficiency, Watt loss, unit size, dimensions and weights

## 230 Vac

Nominal motor ratings		Efficiency			Watt loss (W)	Unit size	Drive type	Height (mm)	Width (mm)	Depth (mm)	Weight (kg)
Power kW	Current A	at 5 kHz (%)	at 4 kHz (%)	at 3 kHz (%)							
0.25	1.8	94			21	12	IP20 chassis	375	90	220	5
0.37	2.4	94			29	12	IP20 chassis	375	90	220	5
0.75	4.6	95			54	12	IP20 chassis	375	90	220	5
1.5	7.5	96			82	12	IP20 chassis	375	90	220	5
2.2	10.6	96			115	12	IP20 chassis	374	130	220	7
3.7	16.7	96			185	13	IP20 chassis	420	165	262	12
5.5	24.2		96.4		239	23	IP20 chassis	420	165	262	12
7.5	30.8		95.9		371	23	IP20 chassis	595	230	242	24
11	46.2		96.4		463	24	IP20 chassis	595	230	242	24
15	59.4		96		621	24	IP20 chassis	630	308	334	35
18.5	74.8			97	740	33	IP20 chassis	630	308	334	35
22	88			97	874	33	IP20 chassis	800	370	334	50
30	115			97	1143	34	IP20 chassis	800	370	334	50
37	143			97	1400	34	IP20 chassis	31.5	14.57	13.15	110.2

## 400 Vac

0.37	1.3	93			35	12	IP20 chassis	375	90	220	5
0.75	2.4	96			46	12	IP20 chassis	375	90	220	5
1.5	4.1	97			62	12	IP20 chassis	375	90	220	5
2.2	5.6	97			88	12	IP20 chassis	375	90	220	5
3.7	10	97			124	12	IP20 chassis	375	90	220	5
5.5	13	97			187	13	IP20 chassis	375	130	220	7
7.5	16	97			255	13	IP20 chassis	375	130	220	7
11	24		98		291	23	IP20 chassis	420	165	262	12
15	32		98		379	23	IP20 chassis	420	165	262	12
18.5	37.5		98		444	24	IP20 chassis	595	230	242	24
22	44		98		547	24	IP20 chassis	595	230	242	24
30	61			98	570	24	IP20 chassis	595	230	242	24
37	73			98	697	33	IP20 chassis	630	308	334	35
45	90			98	891	33	IP20 chassis	630	308	334	35
55	106			98	1022	34	IP20 chassis	800	370	334	50
75	147			98	1232	34	IP20 chassis	800	370	334	50
90	177			98	2031	43h	IP20 chassis	909	250	375	98
110	212			98	2289	43h	IP20 chassis	909	250	375	98
132	260			98	2923	43h	IP20 chassis	909	250	375	98
160	315			98	3093	44h	IP20 chassis	1122	350	375	116
200	395			98	4039	44h	IP20 chassis	1122	350	375	116
250	480				5005	44h	IP20 chassis	1122	350	375	116
315	600				6796	52	IP00 chassis	1547	585	497.8	313
355	658				7498	52	IP00 chassis	1547	585	497.8	313
400	745				7976	52	IP00 chassis	1547	585	497.8	313
450	800				9031	61	IP21	2282	1400	606	1004
500	80				10146	61	IP21	2282	1400	606	1004
560	990				10649	61	IP21	2282	1400	606	1004
630	1120				12490	61	IP21	2282	1400	606	1004
710	1260				14244	62	IP21	2282	1800	606	1262
800	1460				15466	62	IP21	2282	1800	606	1262

## 690 Vac

11	13	98			228	22	IP21	650	242	260	27
15	18	98			285	22	IP21	650	242	260	27
18.5	22	98			335	22	IP21	650	242	260	27
22	27	98			375	22	IP21	650	242	260	27
30	34	98			480	32	IP21	770	370	335	65
37	41	98			592	32	IP21	770	370	335	65
45	51	98			720	32	IP21	770	370	335	65
55	62	98			880	32	IP21	770	370	335	65
75	83	98			1800	32	IP21	770	370	335	65
90	108		98		1480	43h	IP20 chassis	909	250	375	98
110	131		98		1800	43h	IP20 chassis	909	250	375	98
132	155		98		2159	43h	IP20 chassis	909	250	375	98
160	192		98		2446	44h	IP20 chassis	1122	350	375	164
200	242		98		3123	44h	IP20 chassis	1122	350	375	164
250	290		98		3771	44h	IP20 chassis	1122	350	375	164
315	344			98	4258	44h	IP20 chassis	1122	350	375	164
355	380			98	4130	52	IP00 chassis	1547	585	497.8	313
400	410			98	4605	52	IP00 chassis	1547	585	497.8	313
500	500			98	6328	52	IP00 chassis	1547	585	497.8	313
560	570			98	7201	52	IP00 chassis	1547	585	497.8	313
630	630	98			7826	61	IP21	2282	1400	606	1004
710	730	98			8983	61	IP21	2282	1400	606	1004
800	850	98			10646	61	IP21	2282	1400	606	1004
900	945	98			11681	62	IP21	2282	1800	606	1262
1000	1060	98			12997	62	IP21	2282	1800	606	1262

AF-6 drives

Intro

A

B

C

D

E

F

G

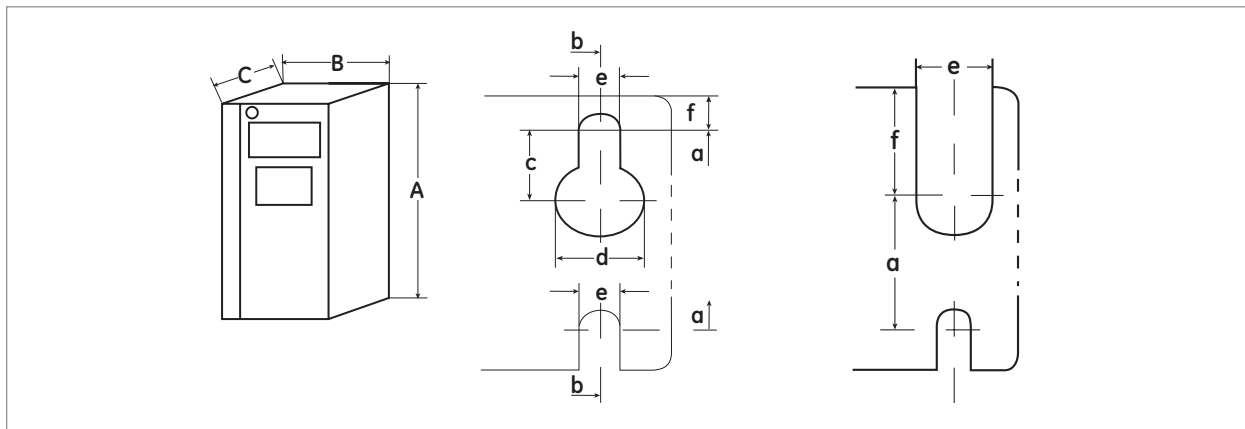
H

I

X



Dimensional drawings



Dimensions, 1X unit sizes (mm)

Unit size		Dimensions	12	13	15 <sup>(1)</sup>
Enclosure type			IP20	IP20	IP55/IP66
Voltage	230V		0.25 to 2.2kW 1/3 to 3HP	3.7kW 5HP	0.25 to 3.7kW 1/3 to 5HP
	400V		0.37 to 3.7kW 1/2 to 5HP	5.5 to 7.5kW 7.5 to 10HP	0.37 to 7.5kW 1/2 to 10HP
Height	Height of backplate	A	270	270	420
	Height with de-coupling plate	A	375	375	
	Distance between mounting holes	a	257	257	402
Width	Width of backplate	B	90	130	240
	Distance between mounting holes	b	70	110	215
Depth	Depth without I/O and/or network option	C	205	205	195
	Depth with I/O and/or network option	C	220	220	195
Screw holes		c	8.0	8.0	8.3
		d	11.0	11.0	12.0
		e	5.5	5.5	6.5
		f	9.0	9.0	9.0
Weight (kg)			4.9	6.6	13.5 / 14.2

Dimensions, 2X unit sizes (mm)

Unit size		Dimensions	21 <sup>(1)</sup>	22 <sup>(1)</sup>	23	24
Enclosure type			IP55/IP66	IP21/IP55/IP66	IP20	IP20
Voltage	230V		5.5 to 7.5kW 7.5 to 10HP	11kW 15HP	5.5 to 7.5kW 7.5 to 10HP	11 to 15kW 15 to 20HP
	400V		11 to 15kW 15 to 20HP	18.5 to 22kW 25 to 30HP	11 to 15kW 15 to 20HP	18.5 to 30kW 25 to 40HP
	690V			11 to 22kW 15 to 30HP		
Height	Height of backplate	A	480	650	400	520
	Height with de-coupling plate	A	-	-	420	595
	Distance between mounting holes	a	455	625	380	495
Width	Width of backplate	B	240	240	165	230
	Distance between mounting holes	b	210	210	140	200
Depth	Depth without I/O and/or network option	C	260	260	250	240
	Depth with I/O and/or network option	C	260	260	260	240
Screw holes		c	12.0	12.0	8.0	-
		d	19.0	19.0	12.0	-
		e	9.0	9.0	6.8	8.5
		f	9.0	9.0	7.9	15.0
Weight (kg)			23.0	27.0	12.0	23.5

(1) IP55/IP66 units need to have cable glands according table on page G.48

Dimensions in mm (inch = mm x 0.03937) - Weight in kg (lb = kg x 2.2046)



# AF-650 GP

## Dimensional drawings

### Dimensions, 3X unit sizes (mm)

Unit size		Dimensions	31 <sup>(2)</sup>	32 <sup>(2)</sup>	33	34
Enclosure type			IP55/IP66	IP21/IP55/IP66	IP20	IP20
Voltage	230V		15 to 22kW 20 to 30HP	30 to 37kW 40 to 50HP	18.5 to 22kW 25 to 30HP	30 to 37kW 40 to 50HP
	400V		30 to 45kW 40 to 60HP	55 to 75kW 75 to 100HP	37 to 45kW 50 to 60HP	55 to 75kW 75 to 100HP
	690V			30 to 75kW 40 to 100HP		
Height	Height of backplate	A	680	770	550	660
	Height with de-coupling plate	A	-	-	630	800
	Distance between mounting holes	a	650	740	520	630
Width	Width of backplate	B	310	370	310	370
	Distance between mounting holes	b	270	335	270	330
Depth	Depth without I/O and/or network option	C	310	335	335	335
	Depth with I/O and/or network option	C	310	335	335	335
Screw holes		c	12.5	12.5	-	-
		d	19.0	19.0	-	-
		e	9.0	9.0	8.5	8.5
		f	9.8	9.8	17.0	17.0
Weight (kg)			45	65	35	50

### Dimensions IP20 open chassis drives with field installed IP21 kits<sup>(1)</sup> (mm)

Unit Size	12	13	23	24	33	34
Enclosure type	IP20 open chassis with IP21 kit					
Voltage						
230V	0.25 to 2.2kW 1/3 to 3HP	3.7kW 5HP	5.5 to 7.5kW 7.5 to 10HP	11 to 15kW 15 to 20HP	18.5 to 22kW 25 to 30HP	30 to 37kW 40 to 50HP
400V	0.25 to 2.2kW 1/2 to 5HP	5.5 to 7.5kW 7.5 to 10HP	11 to 15kW 15 to 20HP	18.5 to 30kW 25 to 40HP	37 to 45kW 50 to 60HP	55 to 75kW 75 to 100HP
Height						
Height with kit	375	375	475	671	754	950
Width						
Width of backplate	94	130	165	231	397	371
Distance between mounting holes	70	110	140	201	269	330
Depth						
Depth without I/O and/or network option	205	205	249	242	338	338
Depth with I/O and/or network option	220	220	262	242	338	338

(1) Please consult IP21 kit Instructions for further mounting details and dimensions.

(2) IP55/IP66 units need to have cable glands according table below (Cable entry overview)

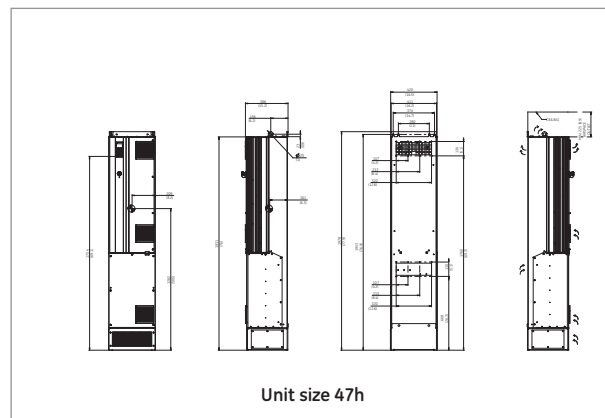
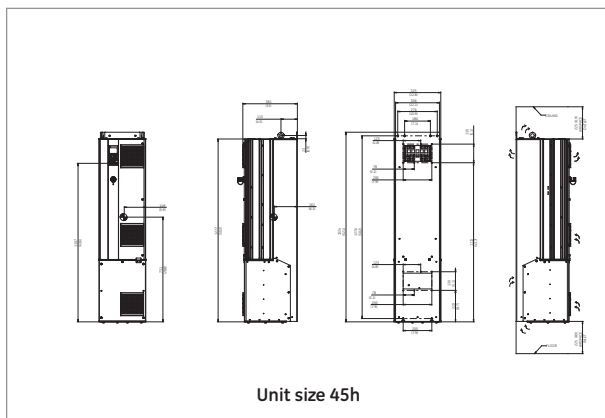
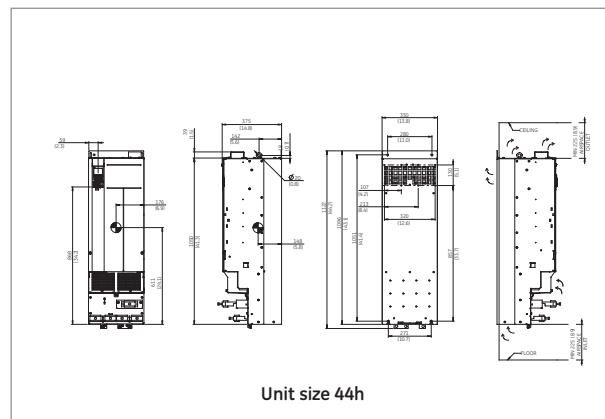
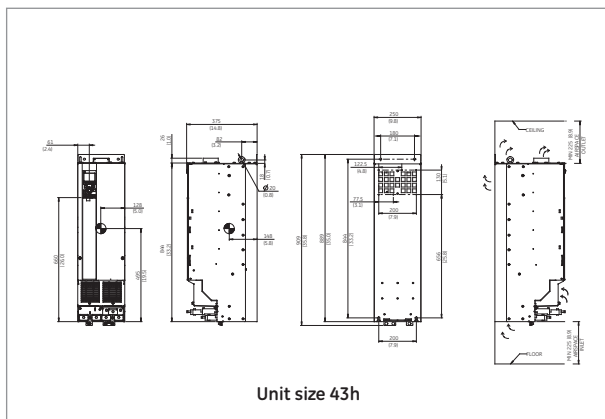
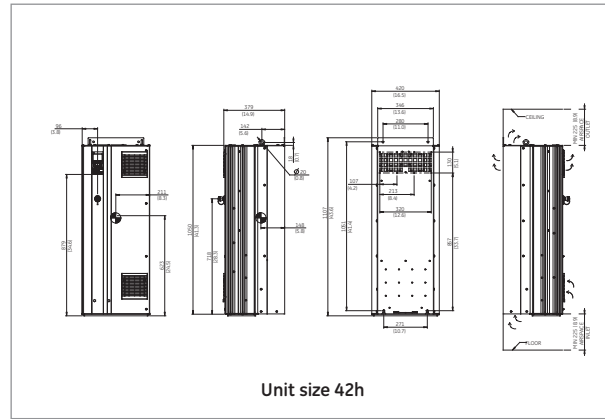
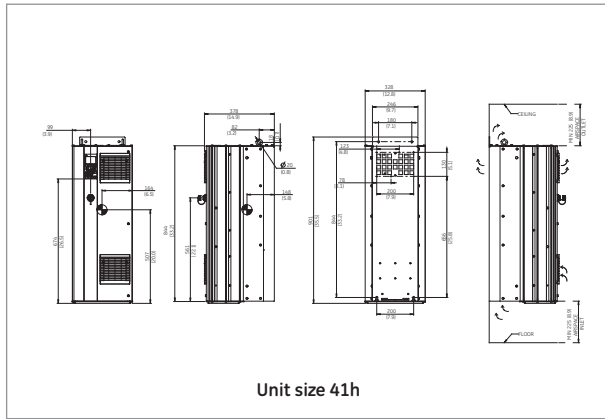
Note: please allow 5cm between drives with field installed IP21 kits. Also, please consult the relevant AF-6 Series drives operating instructions for recommended clearance above and below each drive rating.

### Cable entry overview

Unit Size	Enclosure type		Ø26.3	Ø33.1	Ø42.9	knock-outs	Prefix holes
15	IP55	Hole sizes to fit the cable glands	4	-	-	2*26.3	2
15	IP66		4	-	-	2*26.3	2
21	IP55		1	3	-	1*21.5 - 1*17.2	2
21	IP66		1	3	-	1*21.5 - 1*17.2	2
22	IP55		1	1	2	1*21.6	3
22	IP66		1	1	2	1*21.6	3
31	IP55 (400V)		2	1	1	0	-
31	IP55 (200V)		2	2	-	0	-
32	IP55		2	-	2	0	-



Dimensional drawings in mm (inches)



Unit size		With braking chopper					
		41h	42h	43h	44h	45h	47h
Enclosure type		IP21/IP54	IP21/IP54	IP20	IP20	IP21/IP54	IP21/IP54
	Voltage	400V	160 to 250kW 125 to 260HP	90 to 132kW 125 to 200HP	160 to 250kW 250 to 350HP	90 to 132kW 125 to 200HP	160 to 250kW 250 to 350HP
		690V	90 to 132kW 125 to 200HP	160 to 315kW 250 to 450HP	90 to 132kW 125 to 200HP	160 to 315kW 250 to 450HP	
Shipping dimensions	Height	590	590	590	590	660	660
	Width	1000	1170	1000	1170	1820	2470
	Depth	460	535	460	535	510	590
Drive dimensions	Height	901	1107	909	1122	1324	1978
	Width	325	420	250	350	325	420
	Depth	378	379	375	375	381	386
Weight (kg)		98	164	98	164	116	200

Dimensions in mm (inch = mm x 0.03937) - Weight in kg (lb = kg x 2.2046)



# AF-650 GP

## Dimensional drawings in mm (inches)

**Unit size 51, IP21 and IP54**

<b>Unit size 51</b>	
<b>Enclosure type</b>	IP21/IP54
<b>Voltage 400V</b>	315 to 400kW 450 to 550HP
<b>690V</b>	355 to 560kW 550 to 750HP
<b>Shipping dimensions</b>	
Height	841
Width	2197
Depth	734
<b>Drive dimensions</b>	
Height	2000
Width	600
Depth	498
<b>Weight (kg)</b>	313

**Unit size 52, IP00/Chassis**

<b>Unit size 52</b>	
<b>Enclosure type</b>	IP00
<b>Voltage 400V</b>	315 to 400kW 450 to 550HP
<b>690V</b>	355 to 560kW 550 to 750HP
<b>Shipping dimensions</b>	
Height	831
Width	1704
Depth	734
<b>Drive dimensions</b>	
Height	1547
Width	585
Depth	498
<b>Weight (kg)</b>	313

**Unit size 61**

<b>Unit size 61</b>	
<b>Enclosure type</b>	IP21/IP54
<b>Voltage 400V</b>	450 to 630kW 600 to 900HP
<b>690V</b>	630 to 800kW 900 to 1150HP
<b>Shipping dimensions</b>	
Height	2324
Width	1570
Depth	927
<b>Drive dimensions</b>	
Height	2282
Width	1400
Depth	606
<b>Weight (kg)</b>	1004

Dimensions in mm (inch = mm x 0.03937) - Weight in kg (lb = kg x 2.2046)





Dimensional drawings in mm (inches)

**Unit size 62**

<b>Unit size 62</b>	
<b>Enclosure type</b>	IP21/IP55
<b>Voltage</b> 400V	710 to 800kW 1000 to 1200HP
690V	900 to 1000kW 1250 to 1350HP
<b>Shipping dimensions</b>	
Height	2324
Width	1961
Depth	419
<b>Drive dimensions</b>	
Height	2282
Width	1800
Depth	606
<b>Weight (kg)</b>	1262

**Unit size 63**

<b>Unit size 63 (with options)</b>	
<b>Enclosure type</b>	IP21/IP55
<b>Voltage</b> 400V	450 to 630kW 600 to 900HP
690V	630 to 800kW 900 to 1150HP
<b>Shipping dimensions</b>	
Height	2324
Width	2159
Depth	927
<b>Drive dimensions</b>	
Height	2282
Width	2000
Depth	606
<b>Weight (kg)</b>	1300

**Unit size 64**

<b>Unit size 64 (with options)</b>	
<b>Enclosure type</b>	IP21/IP55
<b>Voltage</b> 400V	710 to 800kW 1000 to 1200HP
690V	900 to 1000kW 1250 to 1350HP
<b>Shipping dimensions</b>	
Height	2324
Width	2543
Depth	927
<b>Drive dimensions</b>	
Height	2282
Width	2400
Depth	606
<b>Weight (kg)</b>	1541

Dimensions in mm (inch = mm x 0.03937) - Weight in kg (lb = kg x 2.2046)



## AF-600 FP - Fan and Pump Drives

The AF-600 FP Fan and Pump Drive is a powerful, flexible and easy to use AC variable torque drive.

The drive is available in its standard configuration that includes LCD keypad display that can be remote mounted, DC link reactors, built-in Modbus RTU, Metasys N2, Apogee FLN P1 and RFI Class A2 filter. Available in IP55/IP66 enclosure.

Following models are available:

- Three-phase, 230Vac, from 0.75 to 45kW
- Three-phase, 400Vac, from 0.75 to 1000kW
- Three-phase, 690Vac, from 1.1 to 1400kW

### Features

All features HVAC needs

- RFI class A2 filter and DC link reactor as standard configuration.
- Built-in communication networks for ModBus RTU, Metasys N2 and Apogee FLN P1
- Field installed network options: BACnet, LonWorks, Profibus DP, Profinet, Modbus TCP/IP, Ethernet/IP and DeviceNet
- 110% current overload for 1 minute (Light Duty)
- Hot pluggable, illuminated LCD display, unit indications, rotation direction indication, trended charts display speed, torque, current, full alarm messages & descriptions
- 4 auto-tuning PID controllers
- Integrated logic control, PLC
- Flying start (catch a spinning motor)
- Easy to use PC software
- Energy monitoring feature
- Flow compensation
- Pump cascade controller
- Sleep mode
- Fan belt monitoring
- Stairwell pressurization
- Fire override mode
- High standard protection Class 3C2 as standard, optional class 3C3

### Approvals / Marking



UL, cUL, C-Tick, EAC

### Applications

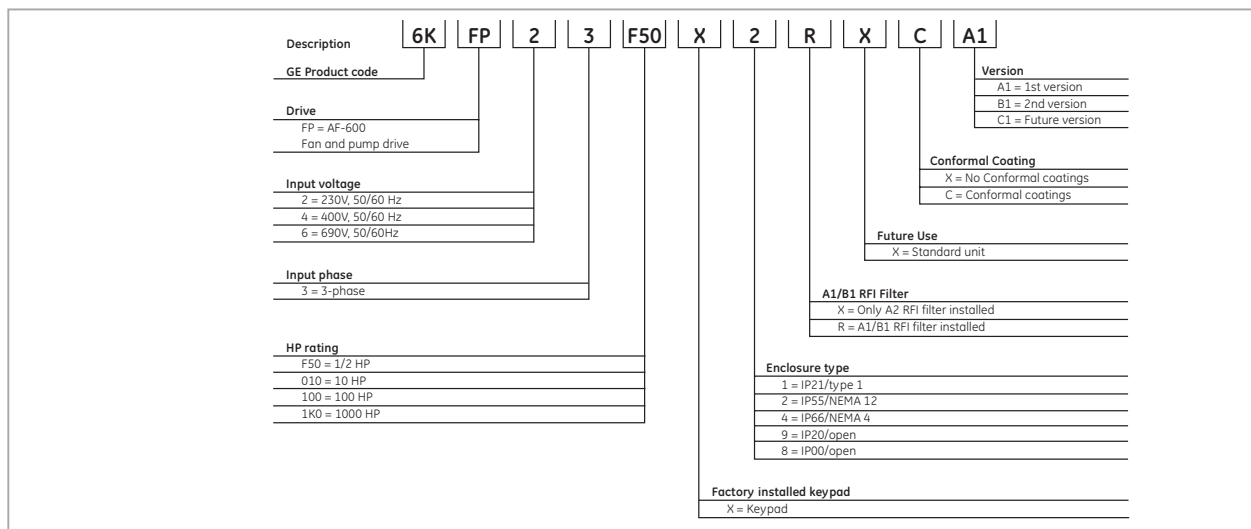
#### Fan

HVAC, cooling towers, VAV, supply and return, exhaust, fume hood, make-up air, induced and forced draft, furnace temperature control.

#### Pump

Chilled water, pressure boosting, cooling tower, wastewater, chiller, irrigation, hydro-storage.

### Product numbering system diagram



Product number for illustrative purposes only



**IP00 / IP20 / IP21, with EMC filter Class A2 (C3)  
230V, 3-phase, 50/60Hz input**

Nominal motor ratings			Enclosure type <sup>(1)</sup> :	Cat. No.	Ref. No.	Unit size
Power kW	Current A	Overload current (A) (110% 1 Min)				
0.75	4.6	5.1	IP20	6KFP23001X9XXXA1	404684	12
1.5	7.5	8.3		6KFP23002X9XXXA1	404685	12
2.2	10.6	11.7		6KFP23003X9XXXA1	404686	12
3.7	16.7	18.4		6KFP23005X9XXXA1	404687	13
5.5	24.2	26.6		6KFP23007X9XXXA1	404688	23
7.5	30.8	33.9		6KFP23010X9XXXA1	404689	23
11	46.2	50.8		6KFP23015X9XXXA1	404690	23
15	59.4	65.3		6KFP23020X9XXXA1	404691	24
18.5	74.8	82.3		6KFP23025X9XXXA1	404692	24
22	88	96.8		6KFP23030X9XXXA1	404693	33
30	115	126.5		6KFP23040X9XXXA1	404694	33
37	143	157		6KFP23050X9XXXA1	404695	34
45	170	187		6KFP23060X9XXXA1	404696	34

**400V, 3-phase, 50/60Hz input**

Nominal motor ratings			Enclosure type <sup>(1)</sup> :	Cat. No.	Ref. No.	Unit size
Power kW	Current A	Overload current (A) (110% 1 Min)				
0.75	2.4	2.64	IP20	6KFP43001X9XXXA1	403855	12
1.5	4.1	4.51		6KFP43002X9XXXA1	403856	12
2.2	5.6	6.16		6KFP43003X9XXXA1	403857	12
4	10	11		6KFP43005X9XXXA1	403858	12
5.5	13	14.3		6KFP43007X9XXXA1	403859	13
7.5	16	17.6		6KFP43010X9XXXA1	403860	13
11	24	26.4		6KFP43015X9XXXA1	403861	23
15	32	35.2		6KFP43020X9XXXA1	403862	23
18.5	37.5	41.25		6KFP43025X9XXXA1	403863	23
22	44	48.4		6KFP43030X9XXXA1	403864	24
30	61	67.1		6KFP43040X9XXXA1	403865	24
37	73	80.3		6KFP43050X9XXXA1	403866	24
45	90	99		6KFP43060X9XXXA1	403867	33
55	106	116.6		6KFP43075X9XXXA1	403868	33
75	147	161.7		6KFP43100X9XXXA1	403869	34
90	177	194.7		6KFP43125X9XXXA1	403870	34
110	212	233.2	IP20 conformal coated	6KFP43150X9XXCB1	409679	43h
132	260	286		6KFP43200X9XXCB1	409680	43h
160	315	346.5		6KFP43250X9XXCB1	409682	43h
200	395	434.5		6KFP43300X9XXCB1	409683	44h
250	480	528	IP00 conformal coated	6KFP43350X9XXCB1	409684	44h
315	588	646.8		6KFP43450X9XXCB1	409685	44h
355	658	723.8		6KFP43500X8XXCA1	403877	52
400	745	819.5		6KFP43550X8XXCA1	403878	52
450	800	880	IP21 conformal coated	6KFP43600X8XXCA1	403879	52
500	880	968		6KFP43650X1XXCA1	403880	61
560	990	1089		6KFP43750X1XXCA1	403881	61
630	1120	1232		6KFP43900X1XXCA1	403882	61
710	1260	1386	IP21 conformal coated	6KFP431K0X1XXCA1	403883	61
800	1460	1606		6KFP431K2X1XXCA1	403884	62
1000	1720	1892		6KFP431K3X1XXCA1	403885	62

**690V, 3-phase, 50/60Hz input**

Nominal motor ratings			Enclosure type <sup>(1)</sup> :	Cat. No. and Ref. No.	Unit size	
Power kW	Current A	Overload current (A) (110% 1 Min)				
11	13	14.3	IP21 conformal coated	6KFP43015X1XXCA1	22	
15	18	19.8		6KFP43020X1XXCA1	22	
18.5	22	24.2		6KFP43025X1XXCA1	22	
22	27	29.7		6KFP43030X1XXCA1	22	
30	34	37.4		6KFP43040X1XXCA1	22	
37	41	45.1		6KFP43050X1XXCA1	32	
45	52	57.2		6KFP43060X1XXCA1	32	
55	62	68.2		6KFP43075X1XXCA1	32	
75	83	91.3		6KFP43100X1XXCA1	32	
90	108	118.8		6KFP43125X1XXCA1	32	
110	131	144.1		IP20 conformal coated	6KFP43150X9XXCB1	43h
132	155	170.5			6KFP43200X9XXCB1	43h
160	192	211.2			6KFP43250X9XXCB1	43h
200	242	266.2			6KFP43300X9XXCB1	44h
250	290	319		IP00 conformal coated	6KFP43350X9XXCB1	44h
315	344	378.4			6KFP43450X9XXCB1	44h
400	400	440	6KFP43550X9XXCB1		44h	
450	450	495	6KFP43600X8XXCA1		52	
500	500	550	IP21 conformal coated	6KFP43650X8XXCA1	52	
560	570	627		6KFP43750X8XXCA1	52	
630	630	693		6KFP43900X8XXCA1	52	
710	730	803		6KFP431K0X1XXCA1	61	
800	850	935	6KFP431K1X1XXCA1	61		
900	945	1039.5	6KFP431K2X1XXCA1	61		
1000	1060	1166	6KFP431K3X1XXCA1	63		
1200	1260	1386	6KFP431K6X1XXCA1	63		
1400	1415	1556.5	6KFP431K9X1XXCA1	63		

(1) Drives are rated IP21 without the need for a separate kit.

(2) IP21 kits are available as field installed options for all 230V drives from 1.1 to 45kW and for all 400V drives from 1.1 to 90kW. See page G.59.



# AF-600 FP

IP00 / IP20 / IP21, with EMC filter Class A1/B1 (C1/C2)  
230V, 3-phase, 50/60Hz input

AF-6 drives

Nominal motor ratings			Enclosure type <sup>(2)</sup> :	Cat. No. and Ref. No.	Unit size
Power kW	Current A	Overload current (A) (110% 1 Min)			
0.75	4.6	5.1	IP20	6KFP23001X9RXXA1	12
1.5	7.5	8.3		6KFP23002X9RXXA1	12
2.2	10.6	11.7		6KFP23003X9RXXA1	12
3.7	16.7	18.4		6KFP23005X9RXXA1	13
5.5	24.2	26.6		6KFP23007X9RXXA1	23
7.5	30.8	33.9		6KFP23010X9RXXA1	23
11	46.2	50.8		6KFP23015X9RXXA1	23
15	59.4	65.3		6KFP23020X9RXXA1	24
18.5	74.8	82.3		6KFP23025X9RXXA1	24
22	88	96.8		6KFP23030X9RXXA1	33
30	115	126.5		6KFP23040X9RXXA1	33
37	143	157		6KFP23050X9RXXA1	34
45	170	187		6KFP23060X9RXXA1	34

## 400V, 3-phase, 50/60Hz input

Nominal motor ratings			Enclosure type <sup>(2)</sup> :	Cat. No.	Ref. No.	Unit size	
Power kW	Current A	Overload current (A) (110% 1 Min)					
0.75	2.4	2.64	IP20	6KFP43001X9RXXA1	403973	12	
1.5	4.1	4.51		6KFP43002X9RXXA1	403974	12	
2.2	5.6	6.16		6KFP43003X9RXXA1	403975	12	
4	10	11		6KFP43005X9RXXA1	403976	12	
5.5	13	14.3		6KFP43007X9RXXA1	403977	13	
7.5	16	17.6		6KFP43010X9RXXA1	403978	13	
11	24	26.4		6KFP43015X9RXXA1	403979	23	
15	32	35.2		6KFP43020X9RXXA1	403980	23	
18.5	37.5	41.25		6KFP43025X9RXXA1	403981	23	
22	44	48.4		6KFP43030X9RXXA1	403982	24	
30	61	67.1		6KFP43040X9RXXA1	403983	24	
37	73	80.3		6KFP43050X9RXXA1	403984	24	
45	90	99		6KFP43060X9RXXA1	403985	33	
55	106	116.6		6KFP43075X9RXXA1	403986	33	
75	147	161.7	6KFP43100X9RXXA1	403987	34		
90	177	194.7	6KFP43125X9RXXA1	403988	34		
110	212	233.2	IP20 conformal coated	6KFP43150X9RXC1	409692	43h	
132	260	286		6KFP43200X9RXC1	409693	43h	
160	315	346.5		6KFP43250X9RXC1	409694	43h	
200	395	434.5		6KFP43300X9RXC1	409695	44h	
250	480	528		6KFP43350X9RXC1	409700	44h	
315	588	646.8		6KFP43450X9RXC1	409702	44h	
355	658	723.8		IP00 conformal coated	6KFP43500X8RXC1	403995	52
400	745	819.5			6KFP43550X8RXC1	403996	52
450	800	880		IP21 conformal coated	6KFP43600X8RXC1	403997	52
500	880	968			6KFP43650X1RXC1	403998	63
560	990	1089	6KFP43750X1RXC1		403999	63	
630	1120	1232	6KFP43900X1RXC1		404000	63	
710	1260	1386	6KFP431K0X1RXC1		404205	63	
800	1460	1606	6KFP431K2X1RXC1		404206	64	
1000	1720	1892	6KFP431K3X1RXC1	404208	61		

## 690V, 3-phase, 50/60Hz input

Nominal motor ratings			Enclosure type <sup>(2)</sup> :	Cat. No. and Ref. No.	Unit size	
Power kW	Current A	Overload current (A) (110% 1 Min)				
11	13	14.3	IP21 conformal coated	6KFP43015X1RXC1	22	
15	18	19.8		6KFP43020X1RXC1	22	
18.5	22	24.2		6KFP43025X1RXC1	22	
22	27	29.7		6KFP43030X1RXC1	22	
30	34	37.4		6KFP43040X1RXC1	22	
37	41	45.1		6KFP43050X1RXC1	32	
45	52	57.2		6KFP43060X1RXC1	32	
55	62	68.2		6KFP43075X1RXC1	32	
75	83	91.3		6KFP43100X1RXC1	32	
90	108	118.8		6KFP43125X1RXC1	32	
110	131	144.1		6KFP43150X9RXC1	43h	
132	155	170.5		6KFP43200X9RXC1	43h	
160	192	211.2		6KFP43250X9RXC1	43h	
200	242	266.2		6KFP43300X9RXC1	44h	
250	290	319	6KFP43350X9RXC1	44h		
315	344	378.4	6KFP43450X9RXC1	44h		
400	400	440	IP00 conformal coated	6KFP43550X9RXC1	44h	
450	450	495		6KFP43600X8RXC1	52	
500	500	550		6KFP43650X8RXC1	52	
560	570	627		6KFP43750X8RXC1	52	
630	630	693		6KFP43900X8RXC1	52	
710	730	803		IP21 conformal coated	6KFP431K0X1RXC1	62
800	850	935			6KFP431K1X1RXC1	62
900	945	1039.5			6KFP431K2X1RXC1	62
1000	1060	1166			6KFP431K3X1RXC1	64
1200	1260	1386		6KFP431K6X1RXC1	64	
1400	1415	1556.5	6KFP431K9X1RXC1	64		

(1) Drives are rated IP21 without the need for a separate kit.

(2) IP21 kits are available as field installed options for all 230V drives from 1.1 to 45kW and for all 400V drives from 1.1 to 90kW. See page G.59.



**IP54 / IP55, with EMC filter Class A2 (C3)  
230V, 3-phase, 50/60Hz input**

Nominal motor ratings			Enclosure type <sup>(2)</sup> :	Cat. No.	Ref. No.	Unit size
Power kW	Current A	Overload current (A) (110% 1 Min)				
0.75	4.6	5.1	IP55	6KFP23001X2XXXXA1	404697	12
1.5	7.5	8.3		6KFP23002X2XXXXA1	404698	12
2.2	10.6	11.7		6KFP23003X2XXXXA1	404699	12
3.7	16.7	18.4		6KFP23005X2XXXXA1	404700	13
5.5	24.2	26.6		6KFP23007X2XXXXA1	404701	23
7.5	30.8	33.9		6KFP23010X2XXXXA1	404702	23
11	46.2	50.8		6KFP23015X2XXXXA1	404703	23
15	59.4	65.3		6KFP23020X2XXXXA1	404704	24
18.5	74.8	82.3		6KFP23025X2XXXXA1	404705	24
22	88	96.8		6KFP23030X2XXXXA1	404706	33
30	115	126.5		6KFP23040X2XXXXA1	404707	33
37	143	157		6KFP23050X2XXXXA1	404708	34
45	170	187		6KFP23060X2XXXXA1	404709	34

**400V, 3-phase, 50/60Hz input**

Nominal motor ratings			Enclosure type <sup>(2)</sup> :	Cat. No.	Ref. No.	Unit size
Power kW	Current A	Overload current (A) (110% 1 Min)				
0.75	2.4	2.64	IP55	6KFP43001X2XXXXA1	403886	15
1.5	4.1	4.51		6KFP43002X2XXXXA1	403887	15
2.2	5.6	6.16		6KFP43003X2XXXXA1	403888	15
4	10	11		6KFP43005X2XXXXA1	403889	15
5.5	13	14.3		6KFP43007X2XXXXA1	403890	15
7.5	16	17.6		6KFP43010X2XXXXA1	403891	15
11	24	26.4		6KFP43015X2XXXXA1	403892	15
15	32	35.2		6KFP43020X2XXXXA1	403893	21
18.5	37.5	41.25		6KFP43025X2XXXXA1	403894	21
22	44	48.4		6KFP43030X2XXXXA1	403895	22
30	61	67.1		6KFP43040X2XXXXA1	403896	22
37	73	80.3		6KFP43050X2XXXXA1	403897	31
45	90	99		6KFP43060X2XXXXA1	403898	31
55	106	116.6		6KFP43075X2XXXXA1	403899	31
75	147	161.7		6KFP43100X2XXXXA1	403900	32
90	177	194.7		6KFP43125X2XXXXA1	403901	32
110	212	233.2	6KFP43150X2XXCB1	409686	41h	
132	260	286	6KFP43200X2XXCB1	409687	41h	
160	315	346.5	6KFP43250X2XXCB1	409688	41h	
200	395	434.5	6KFP43300X2XXCB1	409689	42h	
250	480	528	6KFP43350X2XXCB1	409690	42h	
315	588	646.8	6KFP43450X2XXCB1	409691	42h	
355	658	723.8	6KFP43500X2XXCA1	403908	52	
400	745	819.5	6KFP43550X2XXCA1	403909	52	
450	800	880	6KFP43600X2XXCA1	403910	52	
500	880	968	6KFP43650X2XXCA1	403911	61	
560	990	1089	6KFP43750X2XXCA1	403912	61	
630	1120	1232	6KFP43900X2XXCA1	403913	61	
710	1260	1386	6KFP431K0X2XXCA1	403914	61	
800	1460	1606	6KFP431K2X2XXCA1	403915	62	
1000	1720	1892	6KFP431K3X2XXCA1	403916	62	

**690V, 3-phase, 50/60Hz input**

Nominal motor ratings			Enclosure type <sup>(2)</sup> :	Cat. No. and Ref. No.	Unit size
Power kW	Current A	Overload current (A) (110% 1 Min)			
11	13	14.3	IP55 conformal coated	6KFP43015X2XXCA1	22
15	18	19.8		6KFP43020X2XXCA1	22
18.5	22	24.2		6KFP43025X2XXCA1	22
22	27	29.7		6KFP43030X2XXCA1	22
30	34	37.4		6KFP43040X2XXCA1	22
37	41	45.1		6KFP43050X2XXCA1	32
45	52	57.2		6KFP43060X2XXCA1	32
55	62	68.2		6KFP43075X2XXCA1	32
75	83	91.3		6KFP43100X2XXCA1	32
90	108	118.8		6KFP43125X2XXCA1	32
110	131	144.1		6KFP43150X2XXCB1	41h
132	155	170.5		6KFP43200X2XXCB1	41h
160	192	211.2		6KFP43250X2XXCB1	41h
200	242	266.2		6KFP43300X2XXCB1	42h
250	290	319		6KFP43350X2XXCB1	42h
315	344	378.4		6KFP43450X2XXCB1	42h
400	400	440	6KFP43550X2XXCB1	42h	
450	450	495	6KFP43600X2XXCA1	51	
500	500	550	6KFP43650X2XXCA1	51	
560	570	627	6KFP43750X2XXCA1	51	
630	630	693	6KFP43900X2XXCA1	51	
710	730	803	6KFP431K0X2XXCA1	61	
800	850	935	6KFP431K1X2XXCA1	61	
900	945	1039.5	6KFP431K2X2XXCA1	61	
1000	1060	1166	6KFP431K3X2XXCA1	63	
1200	1260	1386	6KFP431K6X2XXCA1	63	
1400	1415	1556.5	6KFP431K9X2XXCA1	63	

(1) Drives are rated IP21 without the need for a separate kit.

(2) IP21 kits are available as field installed options for all 230V drives from 1.1 to 45kW and for all 400V drives from 1.1 to 90kW. See page G.59.



# AF-600 FP

IP54 / IP55, with EMC filter Class A1/B1 (C1/C2)

230V, 3-phase, 50/60Hz input

AF-6 drives

Nominal motor ratings			Enclosure type <sup>(2)</sup> :	Cat. No. and Ref. No.	Unit size
Power kW	Current A	Overload current (A) (110% 1 Min)			
0.75	4.6	5.1	IP55	6KFP23001X2RXXA1	15
1.5	7.5	8.3		6KFP23002X2RXXA1	15
2.2	10.6	11.7		6KFP23003X2RXXA1	15
3.7	16.7	18.4		6KFP23005X2RXXA1	15
5.5	24.2	26.6		6KFP23007X2RXXA1	15
7.5	30.8	33.9		6KFP23010X2RXXA1	21
11	46.2	50.8		6KFP23015X2RXXA1	21
15	59.4	65.3		6KFP23020X2RXXA1	22
18.5	74.8	82.3		6KFP23025X2RXXA1	31
22	88	96.8		6KFP23030X2RXXA1	31
30	115	126.5		6KFP23040X2RXXA1	31
37	143	157		6KFP23050X2RXXA1	32
45	170	187		6KFP23060X2RXXA1	32

400V, 3-phase, 50/60Hz input

Nominal motor ratings			Enclosure type <sup>(2)</sup> :	Cat. No.	Ref. No.	Unit size
Power kW	Current A	Overload current (A) (110% 1 Min)				
0.75	2.4	2.64	IP55	6KFP43001X2RXXA1	404209	15
1.5	4.1	4.51		6KFP43002X2RXXA1	404210	15
2.2	5.6	6.16		6KFP43003X2RXXA1	404263	15
4	10	11		6KFP43005X2RXXA1	404293	15
5.5	13	14.3		6KFP43007X2RXXA1	404387	15
7.5	16	17.6		6KFP43010X2RXXA1	404388	15
11	24	26.4		6KFP43015X2RXXA1	404389	21
15	32	35.2		6KFP43020X2RXXA1	404464	21
18.5	37.5	41.25		6KFP43025X2RXXA1	404465	21
22	44	48.4		6KFP43030X2RXXA1	404466	22
30	61	67.1		6KFP43040X2RXXA1	404467	22
37	73	80.3		6KFP43050X2RXXA1	404468	31
45	90	99		6KFP43060X2RXXA1	404469	31
55	106	116.6		6KFP43075X2RXXA1	404470	31
75	147	161.7		6KFP43100X2RXXA1	404471	32
90	177	194.7	6KFP43125X2RXXA1	404472	32	
110	212	233.2	6KFP43150X2RXCBA1	409703	41h	
132	260	286	6KFP43200X2RXCBA1	409704	41h	
160	315	346.5	6KFP43250X2RXCBA1	409705	41h	
200	395	434.5	6KFP43300X2RXCBA1	409706	42h	
250	480	528	6KFP43350X2RXCBA1	409707	42h	
315	588	646.8	6KFP43450X2RXCBA1	409708	42h	
355	658	723.8	6KFP43500X2RXCBA1	404528	51	
400	745	819.5	6KFP43550X2RXCBA1	404529	51	
450	800	880	6KFP43600X2RXCBA1	404532	51	
500	880	968	6KFP43650X2RXCBA1	404533	63	
560	990	1089	6KFP43750X2RXCBA1	404534	63	
630	1120	1232	6KFP43900X2RXCBA1	404535	63	
710	1260	1386	6KFP431K0X2RXCBA1	404536	63	
800	1460	1606	6KFP431K2X2RXCBA1	404537	64	
1000	1720	1892	6KFP431K3X2RXCBA1	404538	64	

690V, 3-phase, 50/60Hz input

Nominal motor ratings			Enclosure type <sup>(2)</sup> :	Cat. No. and Ref. No.	Unit size
Power kW	Current A	Overload current (A) (110% 1 Min)			
11	13	14.3	IP55 conformal coated	6KFP43015X2RXCBA1	15
15	18	19.8		6KFP43020X2RXCBA1	21
18.5	22	24.2		6KFP43025X2RXCBA1	21
22	27	29.7		6KFP43030X2RXCBA1	22
30	34	37.4		6KFP43040X2RXCBA1	22
37	41	45.1		6KFP43050X2RXCBA1	31
45	52	57.2		6KFP43060X2RXCBA1	31
55	62	68.2		6KFP43075X2RXCBA1	31
75	83	91.3		6KFP43100X2RXCBA1	32
90	108	118.8		6KFP43125X2RXCBA1	32
110	131	144.1		6KFP43150X2RXCBA1	41h
132	155	170.5		6KFP43200X2RXCBA1	41h
160	192	211.2		6KFP43250X2RXCBA1	41h
200	242	266.2		6KFP43300X2RXCBA1	42h
250	290	319		6KFP43350X2RXCBA1	42h
315	344	378.4	6KFP43450X2RXCBA1	42h	
400	400	440	6KFP43550X2RXCBA1	51	
450	450	495	6KFP43600X2RXCBA1	51	
500	500	550	6KFP43650X2RXCBA1	51	
560	570	627	6KFP43750X2RXCBA1	51	
630	630	693	6KFP43900X2RXCBA1	15	
710	730	803	6KFP431K0X2RXCBA1	62	
800	850	935	6KFP431K1X2RXCBA1	62	
900	945	1039.5	6KFP431K2X2RXCBA1	62	
1000	1060	1166	6KFP431K3X2RXCBA1	64	
1200	1260	1386	6KFP431K6X2RXCBA1	64	
1400	1415	1556.5	6KFP431K9X2RXCBA1	64	

(1) Drives are rated IP21 without the need for a separate kit.

(2) IP21 kits are available as field installed options for all 230V drives from 1.1 to 45kW and for all 400V drives from 1.1 to 90kW. See page G.59.



**IP66, with EMC filter Class A2 (C3)**  
**230V, 3-phase, 50/60Hz input**

Nominal motor ratings		Overload current (A) (110% 1 Min)	Enclosure type <sup>(2)</sup> :	Cat. No. and Ref. No.	Unit size
Power kW	Current A				
0.75	4.6	5.1	IP66 Conformal coated	6KFP23001X4XXCA1	15
1.5	7.5	8.3		6KFP23002X4XXCA1	15
2.2	10.6	11.7		6KFP23003X4XXCA1	15
3.7	16.7	18.4		6KFP23005X4XXCA1	15
5.5	24.2	26.6		6KFP23007X4XXCA1	15
7.5	30.8	33.9		6KFP23010X4XXCA1	21
11	46.2	50.8		6KFP23015X4XXCA1	21
15	59.4	65.3		6KFP23020X4XXCA1	22
18.5	74.8	82.3		6KFP23025X4XXCA1	31
22	88	96.8		6KFP23030X4XXCA1	31
30	115	126.5		6KFP23040X4XXCA1	31
37	143	157		6KFP23050X4XXCA1	32
45	170	187		6KFP23060X4XXCA1	32

**400V, 3-phase, 50/60Hz input**

Nominal motor ratings		Overload current (A) (110% 1 Min)	Enclosure type <sup>(2)</sup> :	Cat. No. and Ref. No.	Unit size
Power kW	Current A				
0.75	1.3	1.43	IP66 Conformal coated	6KFP43001X4XXCA1	15
1.5	2.4	2.64		6KFP43002X4XXCA1	15
2.2	4.1	4.51		6KFP43003X4XXCA1	15
4	5.6	6.16		6KFP43005X4XXCA1	15
5.5	10	11		6KFP43007X4XXCA1	15
7.5	13	14.3		6KFP43010X4XXCA1	15
11	16	17.6		6KFP43015X4XXCA1	21
15	32	35.2		6KFP43020X4XXCA1	21
18.5	37.5	41.25		6KFP43025X4XXCA1	21
22	44	48.4		6KFP43030X4XXCA1	22
30	61	67.1		6KFP43040X4XXCA1	22
37	73	80.3		6KFP43050X4XXCA1	31
45	90	99		6KFP43060X4XXCA1	31
55	106	116.6		6KFP43075X4XXCA1	31
75	147	161.7		6KFP43100X4XXCA1	32
90	177	194.7		6KFP43125X4XXCA1	32

(1) Drives are rated IP21 without the need for a separate kit.

(2) IP21 kits are available as field installed options for all 230V drives from 1.1 to 45kW and for all 400V drives from 1.1 to 90kW. See page G.59.



# AF-600 FP

IP66, with EMC filter Class A1/B1 (C1/C2)

230V, 3-phase, 50/60Hz input

Nominal motor ratings			Enclosure type <sup>(2)</sup> :	Cat. No. and Ref. No.	Unit size
Power kW	Current A	Overload current (A) (110% 1 Min)			
0.75	4.6	5.1	IP66 Conformal Coated	6KFP23001X4RXCA1	15
1.5	7.5	8.3		6KFP23002X4RXCA1	15
2.2	10.6	11.7		6KFP23003X4RXCA1	15
3.7	16.7	18.4		6KFP23005X4RXCA1	15
5.5	24.2	26.6		6KFP23007X4RXCA1	15
7.5	30.8	33.9		6KFP23010X4RXCA1	21
11	46.2	50.8		6KFP23015X4RXCA1	21
15	59.4	65.3		6KFP23020X4RXCA1	22
18.5	74.8	82.3		6KFP23025X4RXCA1	31
22	88	96.8		6KFP23030X4RXCA1	31
30	115	126.5		6KFP23040X4RXCA1	31
37	143	157		6KFP23050X4RXCA1	32
45	170	187		6KFP23060X4RXCA1	32

400V, 3-phase, 50/60Hz input

Nominal motor ratings			Enclosure type <sup>(2)</sup> :	Cat. No. and Ref. No.	Unit size
Power kW	Current A	Overload current (A) (110% 1 Min)			
0.75	1.3	1.43	IP66 Conformal Coated	6KFP43001X4RXCA1	15
1.5	2.4	2.64		6KFP43002X4RXCA1	15
2.2	4.1	4.51		6KFP43003X4RXCA1	15
4	5.6	6.16		6KFP43005X4RXCA1	15
5.5	10	11		6KFP43007X4RXCA1	15
7.5	13	14.3		6KFP43010X4RXCA1	15
11	16	17.6		6KFP43015X4RXCA1	21
15	32	35.2		6KFP43020X4RXCA1	21
18.5	37.5	41.25		6KFP43025X4RXCA1	21
22	44	48.4		6KFP43030X4RXCA1	22
30	61	67.1		6KFP43040X4RXCA1	22
37	73	80.3		6KFP43050X4RXCA1	31
45	90	99		6KFP43060X4RXCA1	31
55	106	116.6		6KFP43075X4RXCA1	31
75	147	161.7		6KFP43100X4RXCA1	32
90	177	194.7		6KFP43125X4RXCA1	32

(1) Drives are rated IP21 without the need for a separate kit.

(2) IP21 kits are available as field installed options for all 230V drives from 1.1 to 45kW and for all 400V drives from 1.1 to 90kW. See page G.59.

AF-6 drives

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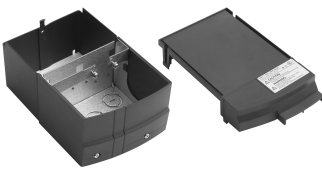
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Options and accessories

Field installed IP21 add-on option kits



Voltage	Power kW	IP21 kit Cat. No.	Ref. No.
230	0.75	NEMA1ACA2	404831
	1.5	NEMA1ACA2	404831
	2.2	NEMA1ACA2	404831
	3.7	NEMA1ACA3	404832
	5.5	NEMA1ACB3	404833
	7.5	NEMA1ACB3	404833
	11	NEMA1ACB3	404833
	15	NEMA1ACB4	404834
	18.5	NEMA1ACB4	404834
	22	NEMA1ACC3	404835
	30	NEMA1ACC3	404835
400	37	NEMA1ACC4	404836
	45	NEMA1ACC4	404836
	0.75	NEMA1ACA2	404831
	1.5	NEMA1ACA2	404831
	2.2	NEMA1ACA2	404831
	3.7	NEMA1ACA2	404831
	5.5	NEMA1ACA3	404832
	7.5	NEMA1ACA3	404832
	11	NEMA1ACB3	404833
	15	NEMA1ACB3	404833
	18.5	NEMA1ACB3	404833
22	NEMA1ACB4	404834	
30	NEMA1ACB4	404834	
37	NEMA1ACB4	404834	
45	NEMA1ACC3	404835	
55	NEMA1ACC3	404835	
75	NEMA1ACC4	404836	
90	NEMA1ACC4	404836	

Remote mounting kit for graphical LCD keypad



Remote mounting Kit for mounting graphical LCD Keypad on enclosure door. Kit includes gasket, mounting brackets, and cable. Keypad is rated IP65.

Description	Cat. No.	Ref. No.
Remote mounting kit for graphical LCD keypad with cable (3m)	RMKYPDAC	404851
Remote mounting kit without cable	OPCRMKNC	404850

Communications modules



<b>Profibus DP communications module</b> Profibus DP internal drive mounted module for use on AF-650 GP and AF-600 FP drives. Supports Profibus DP V1 communications networks.	OPCPDP	404848
<b>DeviceNet communications module</b> DeviceNet internal drive mounted module for use on AF-650 GP and AF-600 FP drives. ODVA certified device.	OPCDEV	404818
<b>Ethernet IP communications module</b> Ethernet IP internal drive mounted module for use on AF-650 GP and AF-600 FP drives. ODVA certified device. Features 2-port built-in switch. Also includes webserver and e-mail notification.	OPCEIP	404820
<b>Modbus TCP communications module</b> Modbus TCP internal drive mounted module for use on AF-650 GP and AF-600 FP drives.	OPCMBTCP	404824
<b>ProfiNet RT communications module</b> ProfiNet RT internal drive mounted module for use on AF-650 GP and AF-600 FP drives.	OPCPRT	404825
<b>LonWorks communications module</b> LonWorks internal drive mounted module for use on AF-600 FP drives only. Supports LonWorks building automation communications networks.	OPCLON	404823
<b>BacNet communications module</b> BacNet internal drive mounted module for use on AF-600 FP drives only. Supports BacNet MSTP building automation communications networks.	OPCBAC	404817
<b>Profibus SUB-D9 Adapter</b> Profibus SUB-D9 adapter to connect to SUB-D9 connectors and cables in all installed devices.	OPCTERMD9	409562



# AF-600 FP

## Options and accessories (continued)

AF-6 drives



### Relay output module

Relay output internal drive mounted module for use on AF-600 drives.

Module adds (3) Form C relay outputs to the drive. Relays are rated at 2A at 240V resistive load.

Description	Cat. No.	Ref. No.
Relay output module	OPCRLY	404849



### Analog I/O module

Analog I/O internal drive mounted module for use on AF-600 FP drive only.

Module includes: 3 Analogue inputs 0-10V, 0/4-20mA

3 Analogue outputs 0-10V

Battery back-up power for AF-600 FP's internal real time clock

Analog I/O module	OPCAIO	404816
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### 24V DC external supply module

24V DC external supply internal drive mounted module for use on AF-600 FP drives. This module accepts an external 24V DC supply which is used to keep the control board of the drive and other option modules powered in the event of a line side power outage.

Can be used with communications and I/O modules.

24V DC external supply module	OPC24VPS	404815
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### General purpose I/O module

General purpose I/O internal drive mounted module for use on AF-600 FP drives.

Module includes: 3x digital inputs 24V

2x digital outputs PNP/NPN

2x analogue inputs 0-10V

1x analogue output 0/4-20mA

General purpose I/O module	OPCGPIO	404821
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### Screw terminal accessory

Screw terminal accessory is available for field installation on AF-600 FP drives. These screw terminals can replace the cage clamp terminals which ship with each drive. This set of three terminals are for the digital inputs, analog I/O, and RS485 connection.

Screw terminal accessory	OPCSTERM	404822
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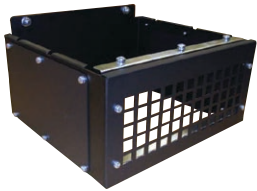
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Options and accessories (continued)



**Pedestal kit**

Pedestal kit allows Unit Size 41h and 42h drives to be floor mounted (IP21/54/55, 110 to 250/315kW at 400V for AF-600 FP).

Description	Cat. No.	Ref. No.
Pedestal kit for unit size 41h	OPCPED41H	409506
Pedestal kit for unit size 42h	OPCPED42H	409507

**USB kit**

This kit allows for the USB programming terminal to be brought out to the front cover of the drive. Works with all drive types.



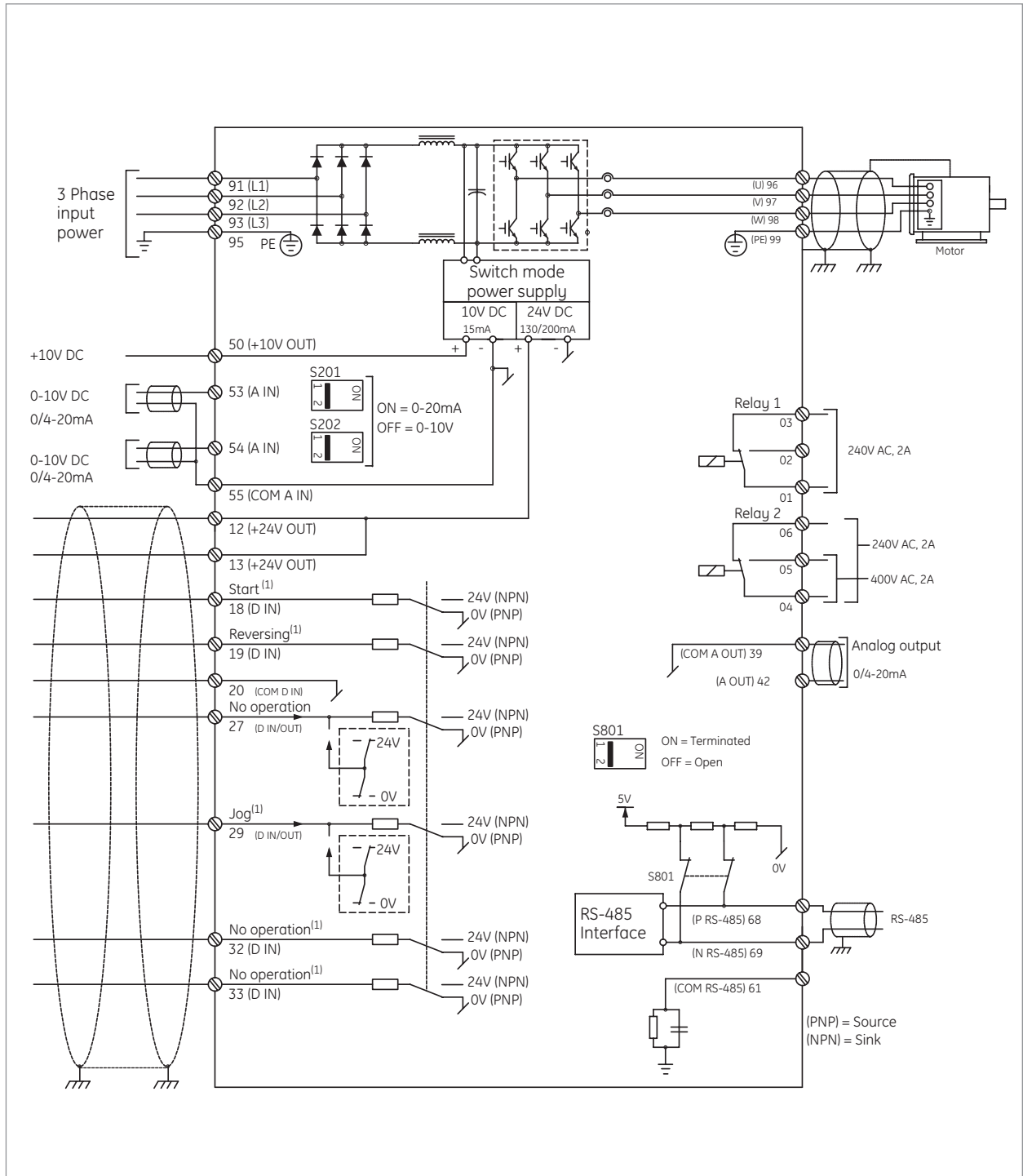
Description	Cat. No.	Ref. No.
For all drives up to unit size 5X	OPCUSB	404861
For all unit size 6X drives	OPCUSB6X	404860

**Power shields**

These shields are used to cover the drive power terminals on IP21 and IP54/55 drive types.

Description	Cat. No.	Ref. No.
For unit size 51 drives	OPCCOVER51	404847





(1) Indicates default setting; see parameter group E-## to re-program.



## Specifications

### Environmental conditions

Enclosures	IP20 chassis, IP00 chassis, IP21, IP55, IP54
Installation location	For use at altitudes of 1000 m or less without derating.
Storage temperature	-25° to 65° C
Ambient temperature	-10° to +50° C for above 45°C, there will be derating; please consult GE
Ambient humidity	5 to 95% RH (non-condensing)
Vibration	1.0 G
Cooling method	Fan cooled all ratings. Fan control auto, 50% level, 75% level, 100% level adjustable

### Standards

Approvals	CE, UL, cUL, and C-Tick Suitable for use on a circuit capable of delivering not more than 100,000 rms symmetrical amperes for 230V and 400V.
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### Input power supply

Rated input AC voltage	200-240 Vac, 3-phase, 50-60 Hz, +/- 10% V 380-480 Vac, 3-phase, 50-60 Hz, +/- 10% V 525-690 Vac, 3-phase, 50-60 Hz, +/- 10% V
Maximum voltage imbalance	3% of rated supply voltage
True power factor	> 0.9 nominal at rated load
Displacement power factor	> 0.98
Switching on input power supply	Maximum twice/minute up to 7.5kW, maximum once/minute above 7.5kW
Environment according to EN60664-1	Overvoltage category III/pollution degree 2
DC link reactors	Built-In DC Link Reactors on all ratings
RFI filters	Built-In RFI Filters to reduce noise generated by the drive.

### Output

Rated output voltage	0-100% of supply voltage
Output frequency	0-590 Hz
Switching on output	Unlimited
Accel/decel times	1-3600 seconds
Control method	Sinusoidal PWM control (V/Hz, Avd. vector control)

### Control

Starting torque	110% starting torque for 1 minute (variable torque)
Carrier frequency (motor noise)	Selectable - 1, 1.5, 2, 2.5, 3, 3.5, 4, 5, 6, 7, 8, 10, 12, 14, 16 kHz
Torque boost	0 - 300% setting to compensate voltage in relation to the load at low speed
Acceleration/deceleration time	0.01-3600 seconds (4 acceleration and deceleration times are selectable via digital inputs. Acceleration and deceleration patterns can be selected from linear or S-curve)
Data protection	Password protection for quick menu or main menu, 0-9999.
Pattern operation	Settings via built-in logic controller sequencer
Jump frequency control	4 jump (or skip) frequencies via parameter set to avoid mechanical vibration
Slip compensation	Maintains motor at constant speed with load fluctuations
Torque limit control	Output torque can be controlled within a range of 0.0 to 110% (0.1 and steps)
Preset speeds	8 programmable preset speeds selectable by 3 digital inputs
Built-in communications	Drive RS-485, Modbus RTU, Metasys N2, or Apogee FLN P1
Trim reference setting	Available for speed reference offset via potentiometer, voltage input, or current input
DC injection braking	Starting frequency: 0.0-590 Hz, Braking time: 0.0-60.0 seconds, Braking level: 0-100% of rated current
Jogging operation	Operation via on key or digital input (fwd or rev)

Auto-restart after power failure	Restarts the drive without stopping after instantaneous power failure
Energy savings	Controls output voltage to minimize motor loss during constant speed operation
Start mode function	This functionality smoothly catches a spinning motor
Fire override mode	Overrides drive's protective features and keeps motor running
Pump cascade controller	Distributes running hours evenly over up to 4 pumps
Sleep mode	Drive detects low or no flow conditions and adjusts output
Dry pump detection	Detects pump operation and can set off alarm, shuts off, or other programmed actions
Belt monitoring	Drive can detect relationship between current and speed to recognize a broken belt
Real time clock	With programmable timed actions

### Logic controller (LC) sequencer

Logic controller events	Up to 38 programmable events
Comparators	Array of 6 comparators
Timers	Array of 8 timers, adjustable from 0.0 to 3600 sec
Logic rules	Array of 6 boolean logic rules
Logic controller states	Array of 20 logic controller action states

### Process controller (PID)

Controller	4 auto tune PID controllers built-in
Feedback select	Up to 2 references. Selectable - no function, motor feedback, separate encoder, encoder option module, or resolver option module
Control	Normal or inverse
Anti windup	Disabled or enabled
Start speed	0.0-200 Hz
Proportional gain	0.00-10.00
Integral time	0.1 - 10000.0 ms
Differential time	0.0 - 10 s
Differential gain	1.0-50.00
Feed forward factor	0-500%
On reference bandwidth	0-200%

### Operation

Operation method	Keypad operation: hand, off, auto digital input: programmable for start/stop, forward/reverse, jog timer operation: stop after predetermined time frame Communications: RS-485 Modbus RTU, Metasys N2, and Apogee FLN P1 USB port for programming drive with optional PC software
Frequency reference signal	Left or right arrow buttons on keypad in manual mode Speed potentiometer: 0 to +10Vdc, 10 to 0Vdc 0-10Vdc analog input 0/4-20 ma analog input
References	Up to 3 Input references can be selected from analogue input #1 or #2, frequency input #1 or #2, network, or potentiometer
Output signals	2x digital outputs 24 Vdc (digital outputs are used in place of 2 of the digital inputs) 2x form C relays rated to 2A at 230 Vac 1x analog output 0/4 to 20mA



# AF-600 FP

## Specifications

<b>Protective functions</b>	Line phase loss DC overvoltage DC undervoltage Drive overload Motor overtemperature Motor thermistor overtemperature Torque limit Overcurrent Ground fault Short circuit Control word timeout Brake resistor short-circuited Brake chopper short-circuited Brake check DC Link voltage high DC Link voltage low Internal fan fault External fan fault Power board overtemperature Missing U phase Missing V phase Missing W phase Internal fault Control voltage fault Auto tune check - wrong motor parameters Auto Tune low inom - motor current is too low Current limit Mechanical brake low Drive initialized to default value Keypad error No motor Soft charge fault Auto tuning fault Serial comms bus fault Hardware mismatch Speed limit
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### Keypad

<b>Keypad features</b>	LCD display with 6 alpha-numeric lines. Multi-language support Hot pluggable, remote mount option, and copy-cat Feature, IP65 rating when remote mounted on enclosure LED's - green - drive is on, yellow - indicates a warning, red - indicates an alarm, amber - indicates active menu keys and H-O-A keys
<b>Password</b>	2 level password protection
<b>Alternate motor parameters</b>	Up to 4 separate complete parameter set-ups are available
<b>Graphical trending</b>	Trend speed, power, frequency

### RS485 Modbus RTU serial communications

<b>Physical level</b>	EIA/RS485
<b>Transmission distance</b>	500m
<b>Node address</b>	32
<b>Transmission speed</b>	2400, 4800, 9600, 19200, 38400, or 115200 (bits/s)
<b>Transmission mode</b>	Half Duplex
<b>Transmission protocol</b>	Modbus RTU
<b>Character code</b>	Binary
<b>Character length</b>	8 bits
<b>Error check</b>	CRC

### Mounting clearance

All AF-600 FP drives can be mounted side-by-side without spacing. For all drives rated 90kW or below allow 100mm free space above and below.  
For all drives rated 110kW and above allow 225mm free space above and below.



Efficiency, Watt loss, unit size, dimensions and weights

230 Vac, 3-phase, 50/60Hz

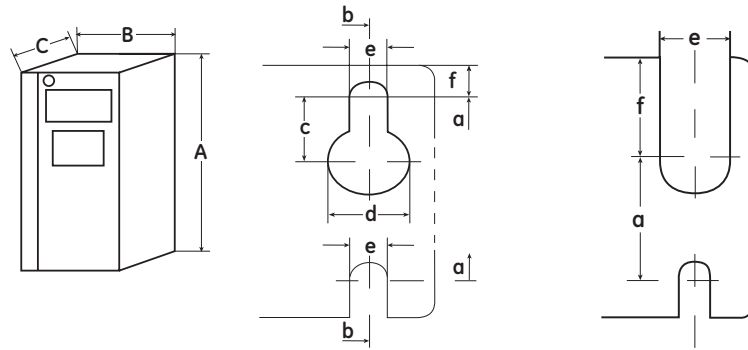
Nominal motor ratings		Efficiency			Watt loss (W)	Unit size	Drive type	Height (mm)	Width (mm)	Depth (mm)	Weight (kg)
Power kW	Current A	at 5 kHz (%)	at 4 kHz (%)	at 3 kHz (%)							
0.75	6.6	96			63	12	IP20	375	90	220	5
1.5	7.5	96			82	12		375	90	220	5
2.2	10.6	96			116	12		375	90	220	5
4	16.7	96			185	13		375	90	220	5
5.5	24.2		96		269	23		375	130	220	7
7.5	30.8		96		310	23		375	130	220	7
11	46.2		96		447	23		420	165	262	12
15	59.4		96		602	24		420	165	262	12
18.5	74.8		96		737	24		595	230	242	24
22	88			97	845	33		595	230	242	24
30	115			97	1140	33		595	230	242	24
37	143			97	1353	34		630	308	334	35
45	170			97	1636	34		630	308	334	35

400 Vac, 3-phase, 50/60Hz

Nominal motor ratings		Efficiency				Watt Loss (W)	Unit size	Drive type	Height (mm)	Width (mm)	Depth (mm)	Weight (kg)
Power kW	Current A	at 5 kHz (%)	at 4 kHz (%)	at 3 kHz (%)	at 2 kHz (%)							
0.75	2.4	96				58	12	IP20	375	90	220	5
1.5	4.1	97				62	12		375	90	220	5
2.2	5.6	97				88	12		375	90	220	5
4	10	97				124	12		375	90	220	5
5.5	13	97				187	13		375	90	220	5
7.5	16	97				255	13		375	130	220	7
11	24		98			278	23		375	130	220	7
15	32		98			392	23		420	165	262	12
18.5	37.5		98			465	23		420	165	262	12
22	44		98			525	24		595	230	242	24
30	61		98			698	24		595	230	242	24
37	73		98			739	24		595	230	242	24
45	90			98		843	33		630	308	334	35
55	106			98		1083	33		630	308	334	35
75	147			98		1384	34		800	370	334	50
90	177			98		1474	34		800	370	334	50
110	212			98		2559	43h	909	250	35	62	
132	260			98		2954	43h	909	250	35	62	
160	315			98		3770	43h	909	250	35	62	
200	395			98		4116	44h	1122	350	375	125	
250	480			98		5137	44h	1122	350	375	125	
315	600				98	6674	44h	1122	350	375	125	
355	658				98	7532	52	1547	585	497.8	313	
400	745				98	8677	52	1547	585	497.8	313	
450	800				98	9428	52	1547	585	497.8	313	
500	80				98	10162	61	2282	1400	606	1004	
560	990				98	11822	61	2282	1400	606	1004	
630	1120				98	12512	61	2282	1400	606	1004	
710	1260				98	14674	61	2282	1400	606	1004	
800	1460				98	17293	62	2282	1800	606	1262	
1000	1720				98	19278	62	2282	1800	606	1262	



## Dimensional drawings



### Dimensions, 1X unit sizes (mm)

Unit size		Dimensions	12	13	15
<b>Enclosure type</b>			IP20	IP20	IP55
<b>Voltage</b>	230V		0.75 to 2.2kW 1 to 3HP	3.7kW 5HP	0.75 to 3.7kW 1 to 5HP
	400V		0.75 to 2.2kW 1 to 5HP	5.5 to 7.5kW 7.5 to 10HP	0.75 to 7.5kW 1 to 10HP
<b>Height</b>	Height of backplate	A	268	268	420
	Height with de-coupling plate	A	375	375	-
	Distance between mounting holes	a	257	257	402
<b>Width</b>	Width of backplate	B	90	130	242
	Distance between mounting holes	b	70	110	215
<b>Depth</b>	Depth without I/O and/or network option	C	205	205	195
	Depth with I/O and/or network option	C	220	220	195
<b>Screw holes</b>		c	8.0	8.0	8.3
		d	11.0	11.0	12.0
		e	5.5	5.5	6.5
		f	9.0	9.0	9.0
<b>Weight (kg)</b>			4.9	6.6	13.5 / 14.2

### Dimensions, 2X unit sizes (mm)

Unit size		Dimensions	21 <sup>(1)</sup>	22 <sup>(1)</sup>	23	24
<b>Enclosure type</b>			IP55	IP21/IP55	IP20	IP20
<b>Voltage</b>	230V		5.5 to 11kW 7.5 to 15HP	15kW 20HP	5.5 to 11kW 7.5 to 15HP	15 to 18.5kW 20 to 25HP
	400V		11 to 15kW 15 to 25HP	22 to 30kW 30 to 40HP	11 to 18.5kW 15 to 25HP	22 to 37kW 30 to 50HP
	690V		-	11 to 30kW 15 to 40HP	-	-
<b>Height</b>	Height of backplate	A	480	650	399	521
	Height with de-coupling plate	A	-	-	420	595
	Distance between mounting holes	a	455	625	380	495
<b>Width</b>	Width of backplate	B	242	242	165	230
	Distance between mounting holes	b	210	210	140	200
<b>Depth</b>	Depth without I/O and/or network option	C	260	260	249	242
	Depth with I/O and/or network option	C	260	260	262	242
<b>Screw holes</b>		c	12.0	12.0	8.0	-
		d	19.0	19.0	12.0	-
		e	9.0	9.0	6.8	8.5
		f	9.0	9.0	7.9	15.0
<b>Weight (kg)</b>			23.0	27.0	12.0	23.5

(1) IP55/IP66 units need to have cable glands according table on page G.48 (Cable entry overview)

Dimensions in mm (inch = mm x 0.03937) - Weight in kg (lb = kg x 2.2046)





## Dimensional drawings

### Dimensions, 3X unit sizes (mm)

Unit size		Dimensions	31 <sup>(2)</sup>	32 <sup>(2)</sup>	33	34
<b>Enclosure type</b>			IP55	IP21/IP55	IP20	IP20
<b>Voltage</b>	230V		18.5 to 30kW 25 to 40HP	37 to 45kW 50 to 60HP	22 to 30kW 30 to 40HP	37 to 45kW 50 to 60HP
	400V		37 to 55kW 50 to 75HP	75 to 90kW 100 to 125HP	45 to 55kW 60 to 75HP	75 to 90kW 100 to 125HP
	690V			37 to 90kW 50 to 125HP		
<b>Height</b>	Height of backplate	<b>A</b>	680	770	550	660
	Height with de-coupling plate	<b>A</b>	-	-	630	800
	Distance between mounting holes	<b>a</b>	648	739	521	631
<b>Width</b>	Width of backplate	<b>B</b>	308	370	308	370
	Distance between mounting holes	<b>b</b>	272	334	270	330
<b>Depth</b>	Depth without I/O and/or network option	<b>C</b>	310	335	333	333
	Depth with I/O and/or network option	<b>C</b>	310	335	333	333
<b>Screw holes</b>		<b>c</b>	12.5	12.5	-	-
		<b>d</b>	19.0	19.0	-	-
		<b>e</b>	9.0	9.0	8.5	8.5
		<b>f</b>	9.8	9.8	17.0	17.0
<b>Weight (kg)</b>			45	65	35	50

### Dimensions IP20 open chassis drives with field installed IP21 kits<sup>(1)</sup> (mm)

Unit size		12	13	23	24	33	34
<b>Enclosure type</b>		IP20 open chassis with IP21 Kit					
<b>Voltage</b>	230V	0.75 to 2.2kW 1 to 3HP	3.7kW 5HP	5.5 to 11kW 7.5 to 15HP	15 to 18.5kW 20 to 25HP	22 to 30kW 30 to 40HP	37 to 45kW 50 to 60HP
	400V	0.75 to 2.2kW 1 to 5HP	5.5 to 7.5kW 7.5 to 10HP	11 to 18.5kW 15 to 25HP	22 to 37kW 30 to 50HP	45 to 55kW 60 to 75HP	75 to 90kW 100 to 125HP
<b>Height</b>	Height with kit	375	375	475	671	754	950
<b>Width</b>	Width of backplate	94	130	165	231	397	371
	Distance between mounting holes	70	110	140	201	269	330
<b>Depth</b>	Depth without I/O and/or network option	205	205	249	242	338	338
	Depth with I/O and/or network option	220	220	262	242	338	338

(1) Please consult IP21 kit instructions for further mounting details and dimensions.

(2) IP55/IP66 units need to have cable glands according table on page G.48 (Cable entry overview)

Note: Please allow 5cm between drives with field installed IP21 kits. Also, please consult the relevant AF-6 Series drives operating Instructions for recommended clearance above and below each drive rating.

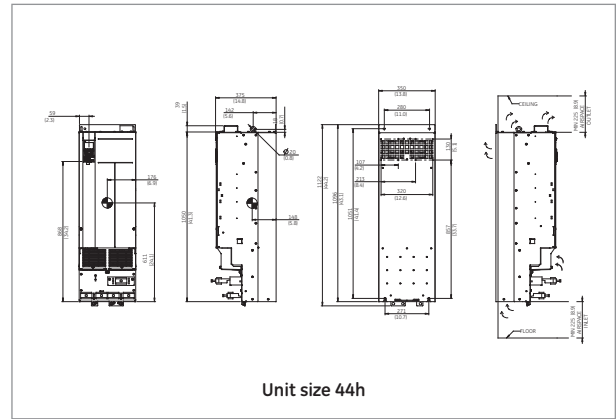
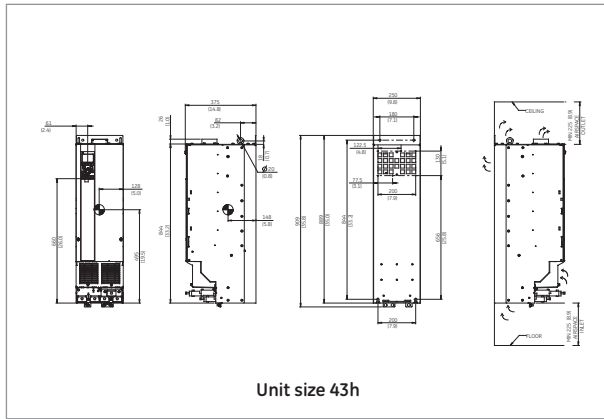
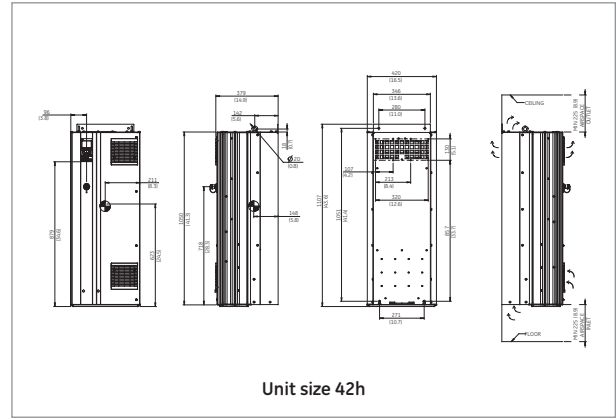
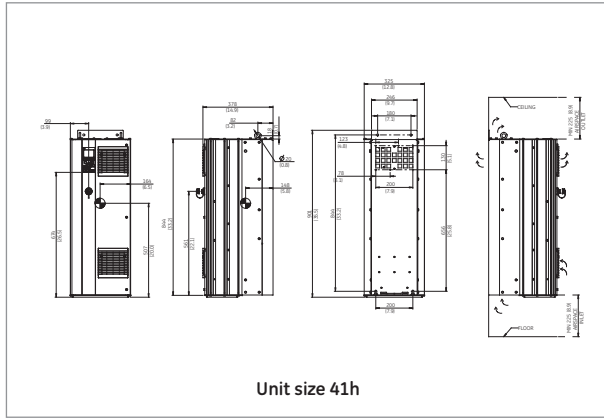
Dimensions in mm (inch = mm x 0.03937) - Weight in kg (lb = kg x 2.2046)



# AF-600 FP

## Dimensional drawings in mm (inches)

AF-6 drives



Unit size		41h	42h	43h	44h
Enclosure type		IP21/IP54	IP21/IP54	IP20	IP20
Voltage	400V	110 to 160kW 150 to 250HP	200 to 315kW 300 to 450HP	110 to 160kW 125 to 250HP	200 to 315kW 300 to 450HP
	690V	90 to 132kW 125 to 200HP	160 to 315kW 250 to 450HP	90 to 132kW 125 to 200HP	160 to 315kW 250 to 450HP
Shipping dimensions	Height	590	590	590	590
	Width	1000	1170	1000	1170
	Depth	460	535	460	535
Drive dimensions	Height	901	1107	909	1122
	Width	325	420	250	350
	Depth	378	379	375	375
Weight (kg)		98	164	98	164

Dimensions in mm (inch = mm x 0.03937) - Weight in kg (lb = kg x 2.2046)



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Dimensional drawings in mm (inches)

**Unit size 51, IP21 and IP54/UL**

<b>Unit size 51</b>	
<b>Enclosure type</b>	IP21/IP55
<b>Voltage 400V</b>	355 to 450kW 500 to 600HP
<b>Voltage 690V</b>	450 to 630kW 600 to 900HP
<b>Shipping dimensions</b>	
Height	841
Width	2197
Depth	734
<b>Drive dimensions</b>	
Height	2000
Width	600
Depth	494
<b>Weight (kg)</b>	313

**Unit size 52, IP00/chassis**

<b>Unit size 52</b>	
<b>Enclosure type</b>	IP00
<b>Voltage 400V</b>	355 to 450kW 500 to 600HP
<b>Voltage 690V</b>	450 to 630kW 600 to 900HP
<b>Shipping dimensions</b>	
Height	831
Width	1704
Depth	734
<b>Drive dimensions</b>	
Height	1547
Width	585
Depth	498
<b>Weight (kg)</b>	313

**Unit size 61**

<b>Unit size 61</b>	
<b>Enclosure type</b>	IP21/IP55
<b>Voltage 400V</b>	500 to 710kW 650 to 1000HP
<b>Voltage 690V</b>	710 to 900kW 1000 to 1250HP
<b>Shipping dimensions</b>	
Height	2324
Width	1570
Depth	927
<b>Drive dimensions</b>	
Height	2282
Width	1400
Depth	607
<b>Weight (kg)</b>	1004

Dimensions in mm (inch = mm x 0.03937) - Weight in kg (lb = kg x 2.2046)



# AF-600 FP

## Dimensional drawings in mm (inches)

**Unit size 62**

<b>Unit size 62</b>	
<b>Enclosure type</b>	IP21/IP55
<b>Voltage 400V</b>	800 to 1000kW 1200 to 1350HP
<b>Voltage 690V</b>	1000 to 1400kW 1350 to 1900HP
<b>Shipping Dimensions</b>	
Height	2324
Width	2159
Depth	927
<b>Drive Dimensions</b>	
Height	2282
Width	2000
Depth	606
<b>Weight (kg)</b>	1300

**Unit size 63**

<b>Unit size 63 (with options)</b>	
<b>Enclosure type</b>	IP21/IP55
<b>Voltage 400V</b>	500 to 710kW 650 to 1000HP
<b>Voltage 690V</b>	710 to 900kW 1000 to 1250HP
<b>Shipping dimensions</b>	
Height	2324
Width	1961
Depth	419
<b>Drive dimensions</b>	
Height	2282
Width	1800
Depth	606
<b>Weight (kg)</b>	1262

**Unit size 64**

<b>Unit size 64 (with options)</b>	
<b>Enclosure type</b>	IP21/IP55
<b>Voltage 400V</b>	800 to 1000kW 1200 to 1350HP
<b>Voltage 690V</b>	1000 to 1400kW 1350 to 1900HP
<b>Shipping dimensions</b>	
Height	2324
Width	2543
Depth	927
<b>Drive dimensions</b>	
Height	2282
Width	2400
Depth	606
<b>Weight (kg)</b>	1541

Dimensions in mm (inch = mm x 0.03937) - Weight in kg (lb = kg x 2.2046)



Everything is under control

## Braking resistors

Designed to be used with high inertia loads which need to be stopped rapidly.  
Used to dissipate energy that is transferred back from the motor during regeneration.

### 230 Vac

Output rated power		Drive Brake Chopper	5% Duty Cycle		Cat. No.	Ref. No.
kW	HP		Resistance (Ohms)	Power continuous (W)		
0.37	0.5	N/A				
0.75	1	N/A				
1.5	2	Built-in	100	200	7KLPBR100P200	168812
2.2	3	Built-in	100	200	7KLPBR100P200	168812
4	5	Built-in	100	200	7KLPBR100P200	168812
5.5	7.5	Built-in	100	200	7KLPBR100P200	168812
7.5	10	Built-in	33	300	7KLPBR033P300	168814
11	15	Built-in	33	300	7KLPBR033P300	168814

### 400 Vac

Output rated power		Drive Brake Chopper	5% Duty Cycle		Cat. No.	Ref. No.
kW	HP		Resistance (Ohms)	Power continuous (W)		
0.75	1	N/A	100	200	-	-
1.5	2	Built-in	100	200	7KLPBR100P200	168812
2.2	3	Built-in	100	200	7KLPBR100P200	168812
4	5	Built-in	100	200	7KLPBR100P200	168812
5.5	7.5	Built-in	100	200	7KLPBR100P200	168812
7.5	10	Built-in	100	200	7KLPBR100P200	168812
11	15	Built-in	33	300	7KLPBR033P300	168814
15	20	Built-in	33	300	7KLPBR033P300	168814
18.5	25	Built-in	33	300	7KLPBR033P300	168814
22	30	Built-in	100	200	7KLPBR100P200	168812



## External EMC (RFI) Filter

## IP20, 1-phase input

Output rated power		Description	Cat. No.	Ref. No.	Unit Size
kW	HP				
0.75	1	EMC Filter, 1 Phase, 10 A, IP20	7KEMC1010	168815	2
1.5	2	EMC Filter, 1 Phase, 25 A, IP20	7KEMC1025	168816	2
2.2	3	EMC Filter, 1 Phase, 25 A, IP20	7KEMC1025	168816	2

## IP20, 3-phase input

Output rated power		Description	Cat. No.	Ref. No.	Unit Size
kW	HP				
0.75	1	EMC Filter, 3 Phase, 6 A, IP20	7KEMC3006	168817	2
1.5	2	EMC Filter, 3 Phase, 16 A, IP20	7KEMC3016	168818	2
2.2	3	EMC Filter, 3 Phase, 16 A, IP20	7KEMC3016	168818	2
4	5	EMC Filter, 3 Phase, 16 A, IP20	7KEMC3016	168818	2
4	5	EMC Filter, 3 Phase, 25 A, IP20	7KEMC3025	168819	3
5.5	7.5	EMC Filter, 3 Phase, 25 A, IP20	7KEMC3025	168819	3
7.5	10	EMC Filter, 3 Phase, 25 A, IP20	7KEMC3025	168819	3
11	15	EMC Filter, 3 Phase, 25 A, IP20	7KEMC3025	168819	3
7.5	10	EMC Filter, 3 Phase, 50 A, IP20	7KEMC3050	168820	4
11	15	EMC Filter, 3 Phase, 50 A, IP20	7KEMC3050	168820	4
15	20	EMC Filter, 3 Phase, 50 A, IP20	7KEMC3050	168820	4
18.5	25	EMC Filter, 3 Phase, 50 A, IP20	7KEMC3050	168820	4
22	30	EMC Filter, 3 Phase, 50 A, IP20	7KEMC3050	168820	4
30	40	EMC Filter, 3 Phase, 80 A, IP20	7KEMC3080	168821	5
37	50	EMC Filter, 3 Phase, 80 A, IP20	7KEMC3080	168821	5
45	60	EMC Filter, 3 Phase, 180 A, IP20	7KEMC3180	168822	5
45	60	EMC Filter, 3 Phase, 180 A, IP20	7KEMC3180	168822	6
55	475	EMC Filter, 3 Phase, 180 A, IP20	7KEMC3180	168822	6
75	100	EMC Filter, 3 Phase, 180 A, IP20	7KEMC3180	168822	6
90	125	EMC Filter, 3 Phase, 180 A, IP20	7KEMC3180	168822	6
110	150	EMC Filter, 3 Phase, 300 A, IP00	7KEMC3300	168823	7
132	200	EMC Filter, 3 Phase, 300 A, IP00	7KEMC3300	168823	7
160	250	EMC Filter, 3 Phase, 300 A, IP00	7KEMC3300	168823	7
200	300	EMC Filter, 3 Phase, 500 A, IP00	7KEMC3500	168829	8
250	350	EMC Filter, 3 Phase, 500 A, IP00	7KEMC3500	168829	8

## IP66, 1-phase input

Output rated power		Description	Cat. No.	Ref. No.	Unit Size
kW	HP				
0.75	1	EMC Filter, 1 Phase, 10 A, IP66	7KEMC1010X4	168824	2
1.5	2	EMC Filter, 1 Phase, 25 A, IP66	7KEMC1025X4	169001	2
2.2	3	EMC Filter, 1 Phase, 25 A, IP66	7KEMC1025X4	169001	2

## IP66, 3-phase input

Output rated power		Description	Cat. No.	Ref. No.	Unit Size
kW	HP				
0.75	1	EMC Filter, 3 Phase, 6 A, IP66	7KEMC3006X4	168826	2
1.5	2	EMC Filter, 3 Phase, 16 A, IP66	7KEMC3016X4	168827	2
2.2	3	EMC Filter, 3 Phase, 16 A, IP66	7KEMC3016X4	168827	2
4	5	EMC Filter, 3 Phase, 16 A, IP66	7KEMC3016X4	168827	2
5.5	7.5	EMC Filter, 3 Phase, 25 A, IP66	7KEMC3025X4	168828	3
7.5	10	EMC Filter, 3 Phase, 25 A, IP66	7KEMC3025X4	168828	3
11	15	EMC Filter, 3 Phase, 25 A, IP66	7KEMC3025X4	168828	3



# Options & Accessories

## External EMC (RFI) Filter

### IP20, 1-phase input

Output rated power		Description	Cat. No.	Ref. No.	Unit Size
kW	HP				
0.37	0.5	EMC Filter, 1 Phase, 10 A, IP20	7KEMC1010	168815	1
0.75	1	EMC Filter, 1 Phase, 10 A, IP20	7KEMC1010	168815	1
1.5	2	EMC Filter, 1 Phase, 25 A, IP20	7KEMC1025	168816	1
1.5	2	EMC Filter, 1 Phase, 25 A, IP20	7KEMC1025	168816	2
2.2	3	EMC Filter, 1 Phase, 25 A, IP20	7KEMC1025	168816	2

### IP20, 3-phase input

Output rated power		Description	Cat. No.	Ref. No.	Unit Size
kW	HP				
0.37	0.5	EMC Filter, 3 Phase, 6 A, IP20	7KEMC3006	168817	1
0.75	1	EMC Filter, 3 Phase, 6 A, IP20	7KEMC3006	168817	1
1.5	2	EMC Filter, 3 Phase, 6 A, IP20	7KEMC3006	168817	1
1.5	2	EMC Filter, 3 Phase, 16 A, IP20	7KEMC3016	168818	2
2.2	3	EMC Filter, 3 Phase, 16 A, IP20	7KEMC3016	168818	2
4	5	EMC Filter, 3 Phase, 16 A, IP20	7KEMC3016	168818	2
4	5	EMC Filter, 3 Phase, 25 A, IP20	7KEMC3025	168819	3
5.5	7.5	EMC Filter, 3 Phase, 25 A, IP20	7KEMC3025	168819	3
7.5	10	EMC Filter, 3 Phase, 25 A, IP20	7KEMC3025	168819	3
11	15	EMC Filter, 3 Phase, 25 A, IP20	7KEMC3025	168819	3
7.5	10	EMC Filter, 3 Phase, 50 A, IP20	7KEMC3050	168820	4
11	15	EMC Filter, 3 Phase, 50 A, IP20	7KEMC3050	168820	4
15	20	EMC Filter, 3 Phase, 50 A, IP20	7KEMC3050	168820	4
18.5	25	EMC Filter, 3 Phase, 50 A, IP20	7KEMC3050	168820	4
22	30	EMC Filter, 3 Phase, 50 A, IP20	7KEMC3050	168820	4

### IP66, 1-phase input

Output rated power		Description	Cat. No.	Ref. No.	Unit Size
kW	HP				
0.37	0.5	EMC Filter, 1 Phase, 10 A, IP66	7KEMC1010X4	168824	1
0.75	1	EMC Filter, 1 Phase, 10 A, IP66	7KEMC1010X4	168824	1
1.5	2	EMC Filter, 1 Phase, 10 A, IP66	7KEMC1010X4	168824	1
1.5	2	EMC Filter, 1 Phase, 25 A, IP66	7KEMC1025X4	169001	2
2.2	3	EMC Filter, 1 Phase, 25 A, IP66	7KEMC1025X4	169001	2

### IP66, 3-phase input

Output rated power		Description	Cat. No.	Ref. No.	Unit Size
kW	HP				
0.37	0.5	EMC Filter, 3 Phase, 6 A, IP66	7KEMC3006X4	168826	1
0.75	1	EMC Filter, 3 Phase, 6 A, IP66	7KEMC3006X4	168826	1
1.5	2	EMC Filter, 3 Phase, 6 A, IP66	7KEMC3006X4	168826	1
1.5	2	EMC Filter, 3 Phase, 16 A, IP66	7KEMC3016X4	168827	2
2.2	3	EMC Filter, 3 Phase, 16 A, IP66	7KEMC3016X4	168827	2
4	5	EMC Filter, 3 Phase, 16 A, IP66	7KEMC3016X4	168827	2
4	5	EMC Filter, 3 Phase, 25 A, IP66	7KEMC3025X4	168828	3
5.5	7.5	EMC Filter, 3 Phase, 25 A, IP66	7KEMC3025X4	168828	3
7.5	10	EMC Filter, 3 Phase, 25 A, IP66	7KEMC3025X4	168828	3

AF-7 drives

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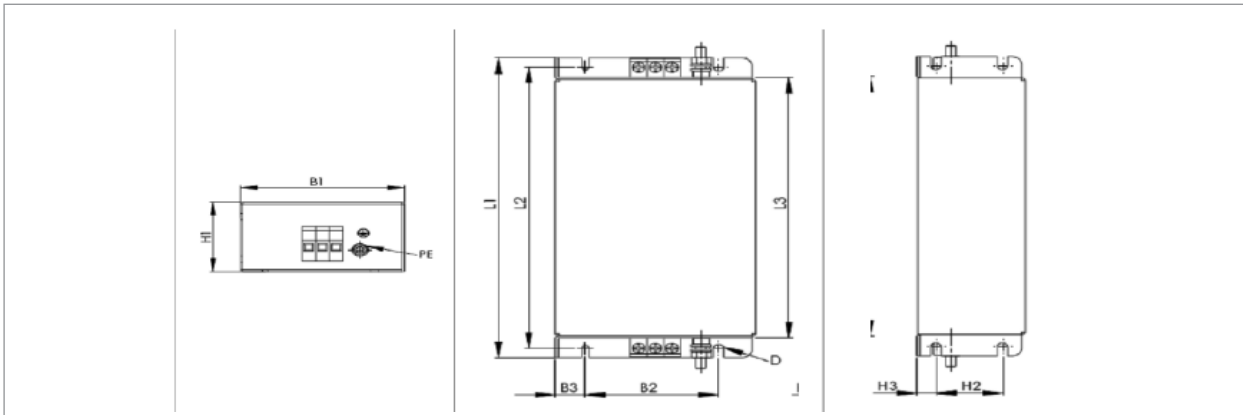
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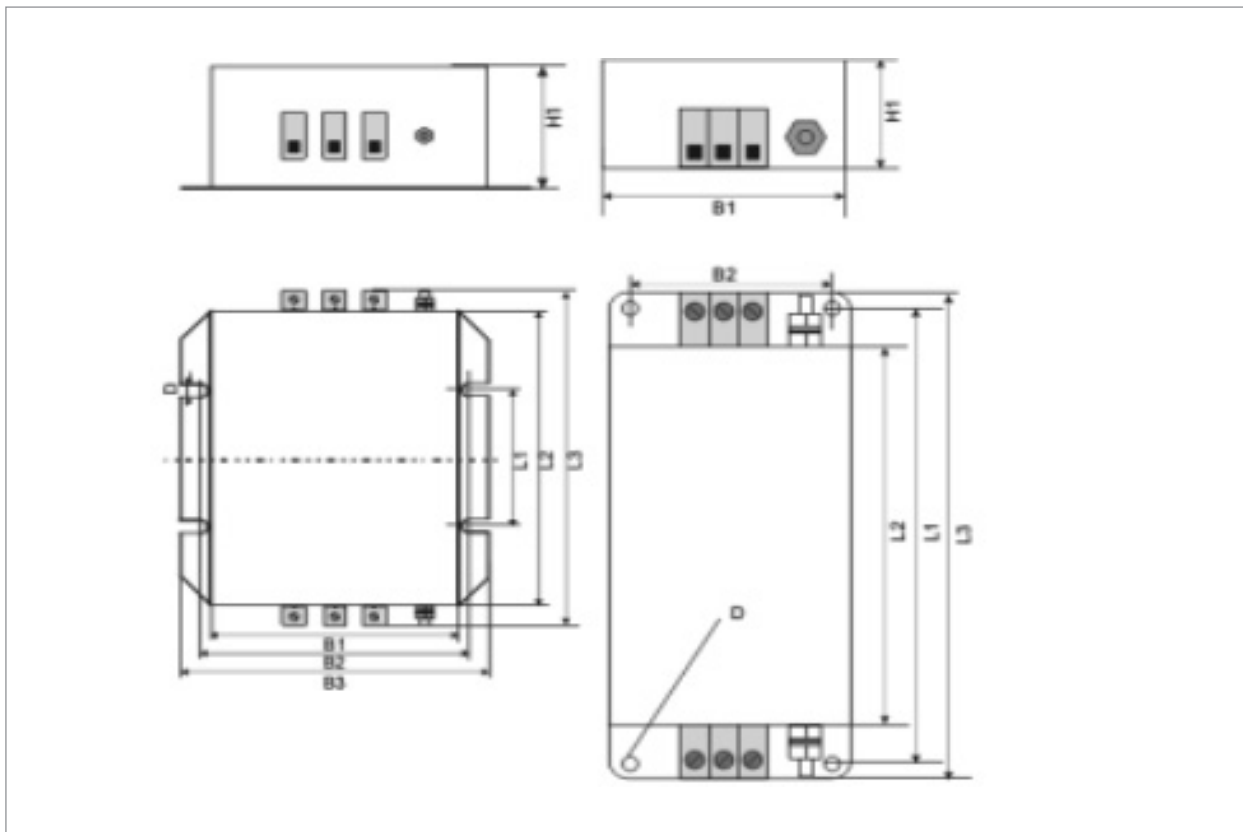




## Dimensional drawings



Cat. No.	Ref. No.	Description	PE Connection	Dimensions in mm										Weight (kg)
				L1	L2	L3	B1	B2	B3	H1	H2	H3	D	
7KEMC1010	168815	EMC Filter, 1 Phase, 10 A, IP20	2 x M6	180	166	150	70	45	12.5	65	40	12.5	6.2	1.5
7KEMC1025	168816	EMC Filter, 1 Phase, 10 A, IP20	2 x M6	250	236	220	70	45	12.5	65	40	12.5	6.2	2.8
7KEMC3006	168817	EMC Filter, 3 Phase, 6 A, IP20	2.5	210	169	180	85	55	15	60	40	10	6.2	2.7
7KEMC3016	168818	EMC Filter, 3 Phase, 16 A, IP20	2.5	230	216	200	120	80	20	65	40	12.5	6.2	2.7
7KEMC3025	168819	EMC Filter, 3 Phase, 25 A, IP20	2.5	230	216	200	120	80	20	65	40	12.5	6.2	2.7



Cat. No.	Ref. No.	Description	PE Connection	Dimensions in mm										Weight (kg)
				L1	L2	L3	B1	B2	B3	H1	D			
7KEMC3050	168820	EMC Filter, 3 Phase, 50 A, IP20	2 x M6	115	200	240	120	136	150	65	6.5	4.5		

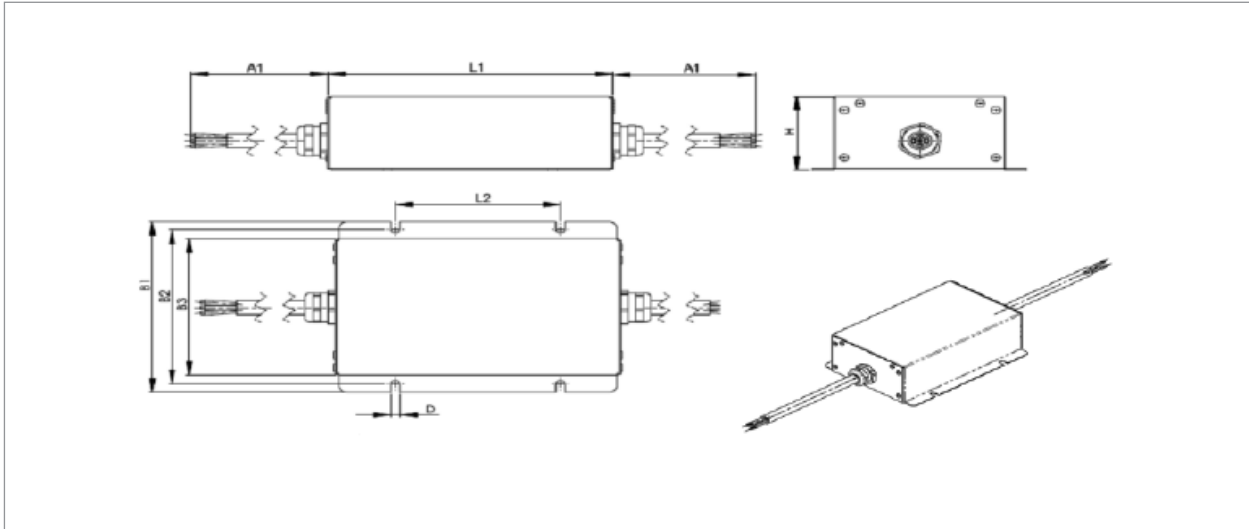
Dimensions in mm (inch = mm x 0.03937) - Weight in kg (lb = kg x 2.2046)



# Options & Accessories

## Dimensional drawings

### External EMC Filters



Cat. No.	Ref. No.	Description	PE Connection	Dimensions in mm								D	A1
				L1	L2	L3	B1	B2	B3	H1			
7KEMC1010X4	168824	EMC Filter, 1 Phase, 10 A, IP66	2 x M6	180	166	150	70	45	12.5	65	6.2	500	
7KEMC1025X4	168825	EMC Filter, 1 Phase, 25 A, IP66	2 x M6	250	236	220	70	45	12.5	65			
7KEMC3006X4	168826	EMC Filter, 3 Phase, 6 A, IP66	2.5	210	196	180	85	55	15	60	6.2	500	
7KEMC3016X4	168827	EMC Filter, 3 Phase, 16 A, IP66	2.5	230	216	200	120	80	20	65			
7KEMC3025X4	168828	EMC Filter, 3 Phase, 25 A, IP66	2.5	200	115	-	150	136	120	65	6.2	500	

### Braking resistor

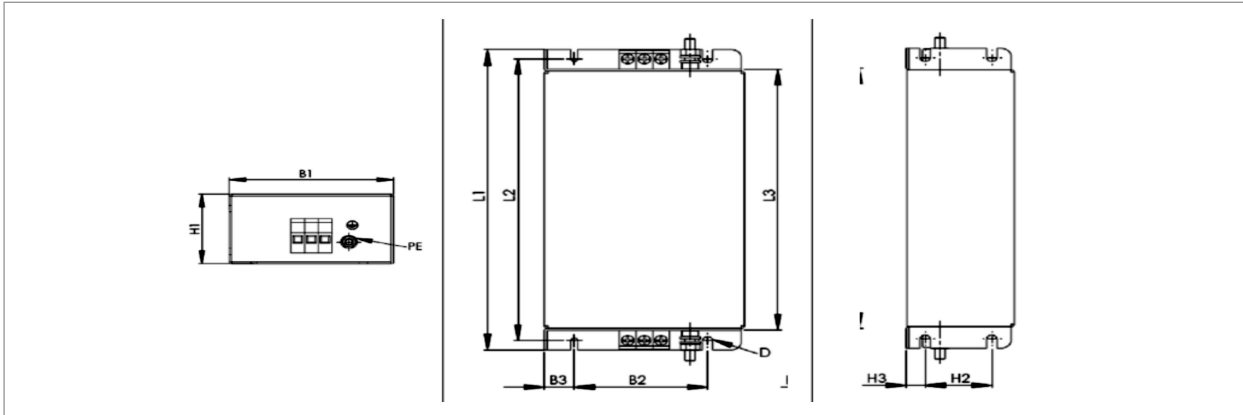
Cat. No.	Ref. No.	Description	Dimensions in mm		
			Height (mm)	Length (mm)	Depth (mm)
7KLPBR100P200	168812	Braking Resistor,100R,200W	40	188	9
7KLPBR033P300	168814	Brake Resistor,33R,300W	80	330	10

Dimensions in mm (inch = mm x 0.03937) - Weight in kg (lb = kg x 2.2046)

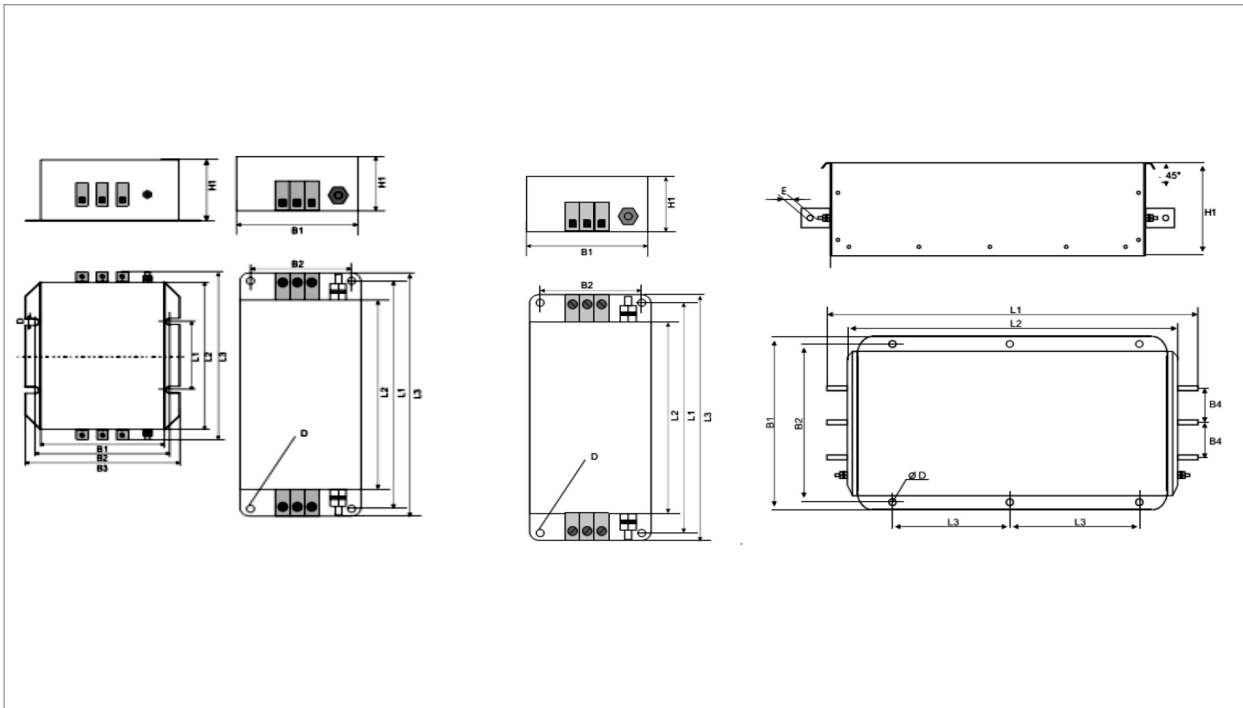


## Dimensional drawings

### External EMC filters



Cat. No.	Ref. No.	Description	PE Connection	Dimensions in mm											Weight (kg)
				L1	L2	L3	B1	B2	B3	H1	H2	H3	D		
7KEMC1010	168815	EMC Filter, 1 Phase, 10 A, IP20	2 x M6	180	166	150	70	45	12.5	65	40	12.5	6.2	1.5	
7KEMC1025	168816	EMC Filter, 1 Phase, 10 A, IP20	2 x M6	250	236	220	70	45	12.5	65	40	12.5	6.2	2.8	
7KEMC3006	168817	EMC Filter, 3 Phase, 6 A, IP20	2.5	210	169	180	85	55	15	60	40	10	6.2	2.7	
7KEMC3016	168818	EMC Filter, 3 Phase, 16 A, IP20	2.5	230	216	200	120	80	20	65	40	12.5	6.2	2.7	
7KEMC3025	168819	EMC Filter, 3 Phase, 25 A, IP20	2.5	230	216	200	120	80	20	65	40	12.5	6.2	2.7	



Cat. No.	Ref. No.	Description	PE Connection	Dimensions in mm											Weight (kg)
				L1	L2	L3	B1	B2	B3	H1	D				
7KEMC3050	168820	EMC Filter, 3 Phase, 50 A, IP20	2 x M6	115	200	240	120	136	150	65	6.5	4.5			
7KEMC3080	168821	EMC Filter, 3 Phase, 80 A, IP20	2 x M10	373	350	400	170	130	-	65	6.5	5			
7KEMC3180	168822	EMC Filter, 3 Phase, 180 A, IP20	2 x M10	470	360	510	180	156	-	115	9	7.2			
7KEMC3300	168823	EMC Filter, 3 Phase, 300 A, IP00	2 x M10	660	530	700	260	220	-	130	9	10			
7KEMC3500	168829	EMC Filter, 3 Phase, 500 A, IP00	2 x M12	390	306	-	260	235	-	135	11	12			

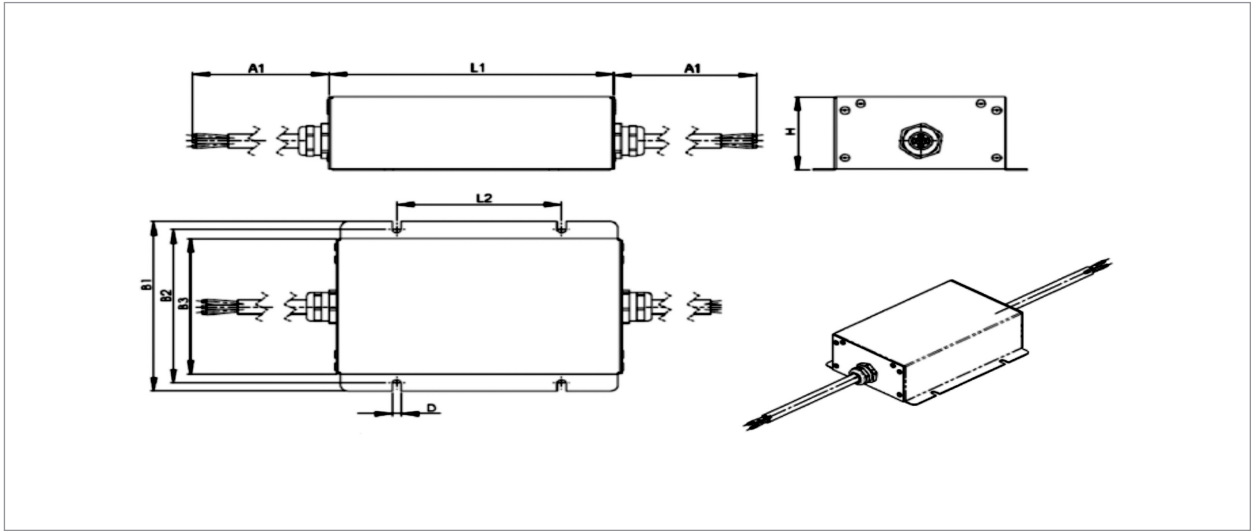
Dimensions in mm (inch = mm x 0.03937) - Weight in kg (lb = kg x 2.2046)



# Options & Accessories

## Dimensional drawings

### External EMC filters



Cat. No.	Ref. No.	Description	PE Connection	Dimensions in mm								D	A1
				L1	L2	L3	B1	B2	B3	H1			
7KEMC1010X4	168824	EMC Filter, 1 Phase, 10 A, IP66	2 x M6	180	166	150	70	45	12.5	65			
7KEMC1025X4	169001	EMC Filter, 1 Phase, 25 A, IP66	2 x M6	250	236	220	70	45	12.5	65			
7KEMC3006X4	168826	EMC Filter, 3 Phase, 6 A, IP66	2.5	210	196	180	85	55	15	60	6.2	500	
7KEMC3016X4	168827	EMC Filter, 3 Phase, 16 A, IP66	2.5	230	216	200	120	80	20	65			
7KEMC3025X4	168828	EMC Filter, 3 Phase, 25 A, IP66	2.5	200	115	-	150	136	120	65			

Dimensions in mm (inch = mm x 0.03937) - Weight in kg (lb = kg x 2.2046)



## Dynamic Braking Resistors

Dynamic braking allows for faster deceleration rates than could be achieved via a coast to stop. Dynamic braking consists of the internal drive brake chopper and separate add-on dynamic braking resistors. Important application notes:

- The AF-60 LP Micro Drive dynamic braking can be used for stopping a load with an inertia equal to or less than the applied motor's rotor inertia.
- High inertia or overhauling loads may cause extended deceleration times which could cause overheating and tripping of the drive.
- The dynamic braking is not a holding brake. It does not prevent a motor at rest from rotating.

Note: refer to the drives' Operating Instruction for installation and connection details.

### Dynamic braking resistors- AF-60 LP drives

#### 230 Vac

Nominal applied motor kW	Nominal applied motor HP	Max. braking torque (%)	Brake chopper	Recommended dynamic braking resistor				Total Ohms	Total kW	
				10% duty cycle		40% duty cycle			10% duty cycle	40% duty cycle
				Cat. No.	Ref. No.	Cat. No.	Ref. No.			
0.18	1/4	-	N/A	-	-	-	-	-	-	
0.37	1/2	-	N/A	-	-	-	-	-	-	
0.75	1	-	N/A	-	-	-	-	-	-	
1.5	2	150	Built-in	TLR74P200	129870	4 x TLR74P200	4 x 129870	74	0.2	0.8
2.2	3	150	Built-in	TLR44P600	129166	TLR43P1000	129177	44	0.6	1
3.7	5	150	Built-in	TLR29P600	129167	TLR22P2500	129879	29	0.6	2.5

#### 400 Vac

Nominal applied motor kW	Nominal applied motor HP	Max. braking torque (%)	Brake chopper	Recommended dynamic braking resistor				Total Ohms	Total kW	
				10% duty cycle		40% duty cycle			10% duty cycle	40% duty cycle
				Cat. No.	Ref. No.	Cat. No.	Ref. No.			
0.37	1/2	-	N/A	-	-	-	-	-	-	
0.75	1	-	N/A	-	-	-	-	-	-	
1.5	2	150	Built-in	TLR295P200	129876	4 x TLR295P200	4 x 129876	295	0.2	0.8
2.2	3	150	Built-in	TLR216P200	129868	4 x TLR216P200	4 x 129868	216	0.2	0.8
4	5	150	Built-in	TLR118P600	129174	4 x TLR118P600	4 x 129174	118	0.6	2.4
5.5	8	150	Built-in	TLR86P600	129175	4 x TLR86P600	4 x 129175	86	0.6	2.4
7.5	10	150	Built-in	TLR59P1000	129176	4 x TLR59P1000	4 x 129176	59	1	4
11	15	150	Built-in	TLR43P1000	129177			43	1	-
15	20	150	Built-in	TLR35P1500	129877			35	1.5	-
18.5	25	150	Built-in	TLR29P1800	129878			29	1.8	-
22	30	150	Built-in	TLR22P2500	129879			22	2.5	-

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# Options & Accessories

## Dynamic braking resistors - AF-650 GP drives

### 230 Vac

Nominal applied motor kW	Nominal applied motor HP	Max. braking torque (%)	Repetitive braking torque duty - 10%					Repetitive braking torque duty - 40%				
			(kW)	Ohms	Cont. max breaking time(s)	Cat. No.	Ref. No.	(kW)	Ohms	Cont. max breaking time(s)	Cat. No.	Ref. No.
0.25	1/3	160	0.2	405	12	TLR405P200	129867	0.43	425	120	TLR405P200	129867
0.37	1/2	160	0.2	295	12	TLR295P200	129876	0.80	310	120	4 x TLR295P200	4 x 129876
0.75	1	160	0.6	118	12	TLR118P600	129174	0.26	145	120	TLR118P600	129174
1.5	2	160	1	59	12	TLR59P1000	129176	0.80	65	120	TLR59P1000	129176
2.2	3	160	1	43	12	TLR43P1000	129177	1.00	50	120	TLR43P1000	129177
3.7	5	160	1.8	29	12	TLR29P1800	129878	3.00	25	120	TLR22P2500	129879
5.5	7.5	158	2.5	22	12	TLR22P2500	129879	-	-	-	-	-
7.5	10	153	3	17.6	12	2 x TLR8,8P1500	2 x 129171	-	-	-	-	-
11	15	154	5	10	12	2 x TLR5P2500	2 x 129871	-	-	-	-	-
15	20	150	6	8	12	2 x TLR4P3000	2 x 129872	-	-	-	-	-
18.5	25	150	6	8	12	2 x TLR4P3000	2 x 129872	-	-	-	-	-
22	30	150	6	4.7	30			-	-	-	-	-
30	40	150	8	3.3	30			-	-	-	-	-
37	50	150	10	2.7	30			-	-	-	-	-
						On request		-	-	-	-	-

### 400 Vac

Nominal applied motor kW	Nominal applied motor HP	Max. braking torque (%)	Repetitive braking torque duty - 10%					Repetitive braking torque duty - 40%				
			(kW)	Ohms	Cont. max breaking time(s)	Cat. No.	Ref. No.	(kW)	Ohms	Cont. max breaking time(s)	Cat. No.	Ref. No.
0.37	0.5	160	0.2	750	12	TLR750P200	116301	0.2	620	120	TLR750P200	116301
0.75	1	160	0.2	750	12	TLR750P200	116301	0.2	620	120	TLR750P200	116301
1.5	2	160	0.2	295	12	TLR295P200	129876	0.4	310	120	2 x TLR750P200	2 x 116301
2.2	3	160	0.2	216	12	TLR216P200	129868	0.4	210	120	2 x TLR432P200	2 x 129875
4	5	160	0.6	118	12	TLR118P600	129174	2	110	120	2 x TLR59P1000	2 x 129176
5.5	7.5	160	0.6	86	12	TLR86P600	129175	3	80	120	2 x TLR35P1500	2 x 129877
7.5	10	160	1	59	12	TLR59P1000	129176	6	65	120	2 x TLR35P3000	2 x 129888
11	15	160	1	43	12	TLR43P1000	129177	5	40	120	2 x TLR22P2500	2 x 129879
15	20	160	1.5	35	12	TLR35P1500	129877	7.4	30	120	2 x TLR15P3700	2 x 129881
18.5	25	160	1.8	29	12	TLR29P1800	129878	10	25	120	4 x TLR22P2500	4 x 129879
22	30	160	2.5	22	12	TLR22P2500	129879	10	20	120	4 x TLR22P2500	4 x 129879
30	40	150	3.7	15	12	TLR15P3700	129881	14.8	15	120	4 x TLR15P3700	4 x 129881
37	50	150	4.7	12.5	12							
45	60	150	6.4	9.2	12							
55	75	150	7.7	4.3	12							
75	100	150	13.6	4.3	12							
90	125	150	17	3.4	30							
110	150	150	17	3.4	30							
132	200	150	22.5	10.4	30							
160	250	150	27.2	8.6	30							
200	300	150	17	3.3	30							
250	350	150	22.4	10.4	30							
355	450	150	27.2	8.6	30							
400	550	150	144	1.3	30							
450	600	150	144	1.3	30							
500	650	150	144	1.3	30							
560	750	150	144	1.3	30							
630	900	150	144	1.3	30							
710	1000	150	144	1.3	30							
800	1200	150	144	1.3	30							

AF Drives

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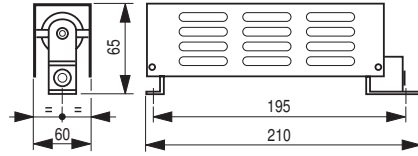
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	Description	Cat. no	Ref. no	Pack
Braking resistors 100% braking torque, 10% ED	-	TLR100P200	108223	1
	-	TLR75P200	116300	1
	-	TLR750P200	116301	1
	-	TLR400P200	116302	1
	-	TLR250P200	108227	1



	Description	Losses (W)	Cat. no	Ref. no	Pack
Reactors	Input reactors for single phase drives	2.5	ACRP3A7H0	168490	-
		5	ACRP8A2H5	168491	-
		7	ACRP12A2H5	168492	-
		7.5	ACRP18A1H3	168493	-
		8	ACRP22A0H84	168494	-
	Input reactors for three phase drives	11	ACRP6A2H5	168496	-
		14	ACRP9A1H3	168497	-
		8	ACRP3A8H1	168509	-
		9	ACRP4A5H1	168510	-
		11	ACRP6A3H4	168511	-

Cat.No.	Losses W	Fig.	A	B	C	D	E	Ø	Weight (kg)
ACRP3A7H0	2.4	4	75	96	85	80	56	6	1.3
ACRP8A2H5	5.2	4	75	96	100	80	56	6	1.8
ACRP12A2H5	6.8	4	84	102	110	86	65	6	2.7
ACRP18A1H3	7.3	4	96	112	106	96	77	6	3.2
ACRP22A0H84	8	4	96	112	116	96	77	6	3.7
ACRP6A2H5	17	1	120	80	152	41	100	6	1.5
ACRP9A1H3	18	1	120	80	152	41	100	6	1.6
ACRP3A8H1	17	1	120	80	152	41	100	6	1.4
ACRP4A5H1	16	1	120	80	152	41	100	6	1.5
ACRP6A3H4	19	1	120	80	152	41	100	6	1.7

Fig. 4

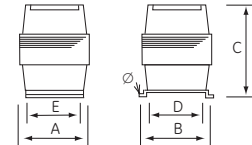
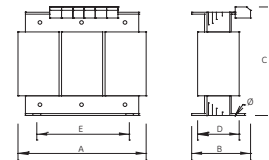


Fig. 1



Dimensions in mm



# Options & Accessories

## AC input reactors

Fig. 1

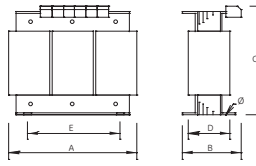


Fig. 3

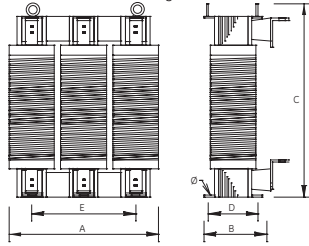
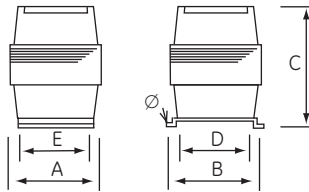


Fig. 4



Cat. No.	Ref.No.	Losses W	Fig.	Dimensions (mm)						Weight (kg)
				A	B	C	D	E	Ø	
ACRP8A2H5	168491	5.2	4	75	96	100	80	56	6	1.8
ACRP12A2H5	168492	6.8	4	84	102	110	86	65	6	2.7
ACRP18A1H3	168493	7.3	4	96	112	106	96	77	6	3.2
ACRP22A0H84	168494	8	4	96	112	116	96	77	6	3.7
ACRP4A2H5	168495	16	1	120	80	152	41	100	6	1.3
ACRP6A2H5	168496	18	1	120	80	152	41	100	6	1.5
ACRP9A1H3	168497	17	1	120	80	152	41	100	6	1.6
ACRP12A0H84	168498	18	1	120	80	152	41	100	6	1.7
ACRP18A0H56	168499	21	1	120	90	152	51	100	6	2.4
ACRP27A0H37	168500	32	1	150	95	183	46	125	6	3.3
ACRP35A0H27	168501	35	1	150	95	183	46	125	6	3.7
ACRP3A8H1	168509	17	1	120	80	152	41	100	6	1.4
ACRP4A5H1	168510	16	1	120	80	152	41	100	6	1.5
ACRP6A3H4	168511	19	1	120	80	152	41	100	6	1.7
ACRP10A2H	168512	23	1	120	90	152	51	100	6	2.5
ACRP14A1H4	168513	29	1	150	95	178	46	125	6	3.2
ACRP18A1H1	168514	35	1	150	95	178	46	125	6	4
ACRP27A0H75	168515	77	1	150	106	233	72	100	9	4.8
ACRP35A0H58	168516	98	1	150	111	233	77	100	9	5.5
ACRP38A0H58	168517	96	1	150	116	233	82	100	9	6.4
ACRP45A0H45	168518	102	1	150	121	233	87	100	9	7.1
ACRP70A0H29	168519	147	1	150	151	250	117	100	9	11
ACRP90A0H22	168520	158	1	180	136	286	102	120	9	13.1
ACRP115A0H18	168521	186	1	180	156	301	122	120	9	16.9
ACRP160A0H14	168522	268	3	240	181	288	107	160	9	25.7

Dimensions in mm (inch = mm x 0.03937) - Weight in kg (lb = kg x 2.2046)





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Welcome to the new digital soft starters!  
GE ASTAT family

## ASTAT XB and XBm

Soft starters

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The GE ASTAT family of Low Voltage Soft Starters is pleased to welcome the new **XB** and **XBm** series in the power range from 18 to 200A, 7.5 to 110kW at 400V AC, 10 to 150HP at 460V AC, with a wide voltage range of 200 to 575V AC

Perfect for applications like Pump, Fans, Compressors, Conveyors,...

These new series are compact and cost effective soft starter solution, simple operation, with a built-in bypass function and conformal coated as standard. Easy DIN-rail mounting for sizes up to 60A, 30kW/50HP at 460V AC, 2-wire or 3-wire start/stop control and excellent starting duty (4 x In for 6 seconds). Heavy starting ratings at 4x In for 20 seconds. Compatible with grounded delta power systems.

The ASTAT XBm is a Constant Current system with current measurement and control. It provides a range of motor protection functions in addition to soft start and soft stop. Protections include motor overload, phase loss and excess start time, along with a programmable relay.

### Features:

- ✓ Compact design
- ✓ Built-in bypass
- ✓ Friendly use
- ✓ Conformal coated PCBs (3C2)
- ✓ DIN-rail mounting up to 30kW at 400V AC, 50HP at 460V AC
- ✓ Motor protections (XBm series)
- ✓ Remote operator kit available as option



# ASTAT XL

New digital soft starter **XL** series in the power range from 23 to 1600A, 11 to 800kW at 400V AC, 15 to 1200HP at 460V AC, with a wide voltage range of 200 to 690V AC

Perfect for applications like Pump, Fans, Compressors, Conveyors, Mixers, Mills, Centrifuges,...

These new series has an intuitive user-friendly keypad, with four-line multi-language text (8 languages: English, German, French, Spanish, Portuguese, Italian, Chinese and Russian), Real-time graphs of motor operating performance and 3 types of Setup menus: Standard, Extended and Quick. It can record the last 8 trips, up to 99 events log.

The ASTAT XL is a Constant Current and Current Ramp but also able to control acceleration. According to your application, you can select between early, constant or late acceleration/deceleration.



## Features:

- ✓ Compact design
- ✓ Built-in bypass (up to 1000A)
- ✓ User friendly programming and feedback
- ✓ Conformal coated PCBs (3C2)
- ✓ Automatically detects in-line or inside delta connection
- ✓ Adjustable busbars for both top and bottom entry  
above 360A, 200kW at 400V AC, 300HP at 460V AC
- ✓ Motor protections
- ✓ DC injection braking distributed over the 3 phases



## Short overview

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Series ASTAT	XB	XBm	XL
<b>Starting functions</b>			
Timed Voltage Ramp	✓		
Current Limit		✓	✓
Current Ramp		✓	✓
Kick Start			✓
Adaptative Control			✓
<b>Stopping</b>			
Coast to stop	✓	✓	✓
Timed Voltage Ramp	✓	✓	✓
Adaptative Control			✓
<b>Protection</b>			
Excess Start time		✓	✓
Phase loss		✓	✓
Phase sequence		✓	✓
Current imbalance		✓	✓
Instantaneous overcurrent		✓	✓
Undercurrent			✓
Motor overload		✓	✓
Motor thermistor		✓	✓
Bypass overload		✓	✓
Power Circuit fault	✓	✓	✓
Supply frequency	✓	✓	✓
Communications failure	✓	✓	✓
<b>Interface</b>			
Fixed relay (main contactor)	✓	✓	✓
Programmable relay (Trip or Run)		✓	✓
Run relay	✓		✓
<b>Accessories</b>			
Remote operator	✓	✓	✓
Modbus RTU interface	✓	✓	✓
Modbus TCP/IP interface	✓	✓	✓
Profibus interface	✓	✓	✓
Profinet interface	✓	✓	✓
Ethernet/IP interface	✓	✓	✓
DeviceNet interface	✓	✓	✓
USB interface	✓	✓	✓
IP20 Terminal protection kit (above 140A)	✓	✓	✓
IP20 Terminal protection kit (from 255 to 1000A)			✓
ASTAT Select tool ed.1 (free download)	✓	✓	✓
ASTAT Setup tool ed.3 (free download)	✓	✓	✓

Legend  = AVAILABLE  = NOT AVAILABLE

New



# What is your application?

Use the table below to select a soft starter based on typical start current and time requirements for your application.

**NOTE**

Soft starter settings depend on the details of the individual installation (including the characteristics of the starter, motor and load).

APPLICATION	300%, 10 seconds	350%, 15 seconds	400%, 20 seconds	450%, 30 seconds
	LIGHT DUTY	NORMAL DUTY	HEAVY DUTY	SEVERE DUTY
<b>Bow thruster</b>			✓	
<b>Centrifuge</b>				✓
<b>Chipper</b>				✓
<b>Compressor</b>				
centrifugal		✓		
reciprocating - loaded				✓
reciprocating - unloaded			✓	
screw - loaded			✓	
screw - unloaded		✓		
<b>Conveyor</b>				
horizontal		✓		
inclined			✓	
vertical (bucket)				✓
<b>Crusher</b>				
cone		✓		
jaw				✓
rotary			✓	
<b>Debarker</b>			✓	
<b>Fan</b>				
blower/axial (damped)			✓	
blower/axial (undamped)				✓
centrifugal (damped)		✓		
centrifugal (undamped)				✓
high pressure				✓
<b>Mill</b>				
ball				✓
hammer				✓
<b>Pump</b>				
bore	✓			
centrifugal		✓		
positive displacement			✓	
submersible		✓		
<b>Saw</b>				
bandsaw (headrig)				✓
circular (slabber, edger)		✓		
<b>Shredder</b>				✓

**WARNING**

This selection guide assumes typical motor and operating conditions. Consult your supplier for applications with:

- High start frequency
- High altitude installations (i.e. > 1000 m)
- High ambient installations (i.e. > 40°C)
- Soft stop times exceeding 30 seconds

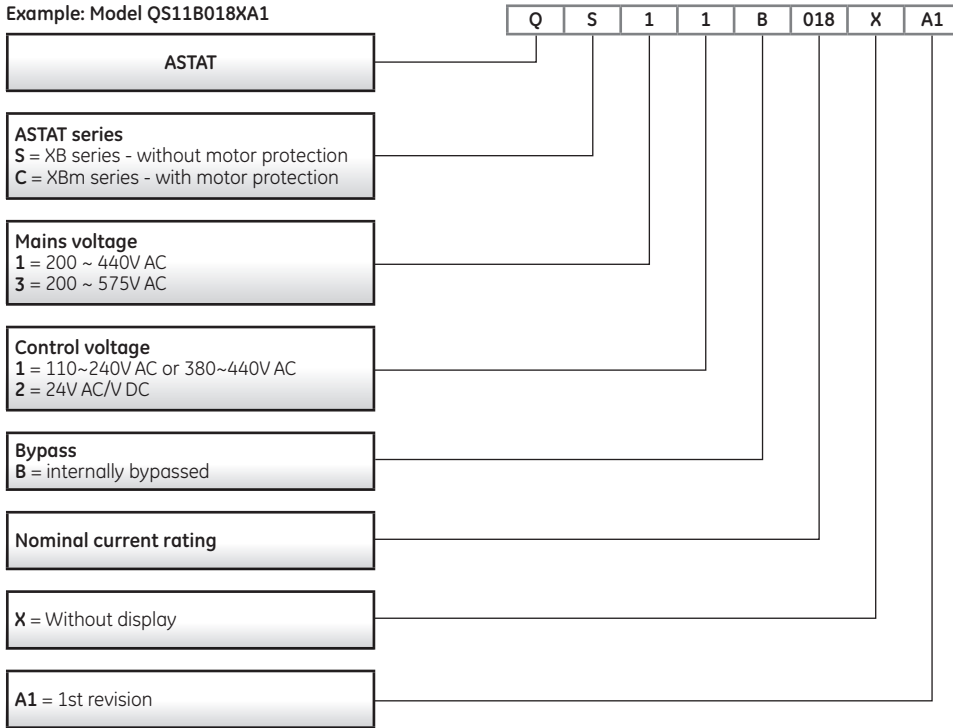


Everything is under control

# Catalogue number structure

## ASTAT XB and XBm

Example: Model QS11B018XA1



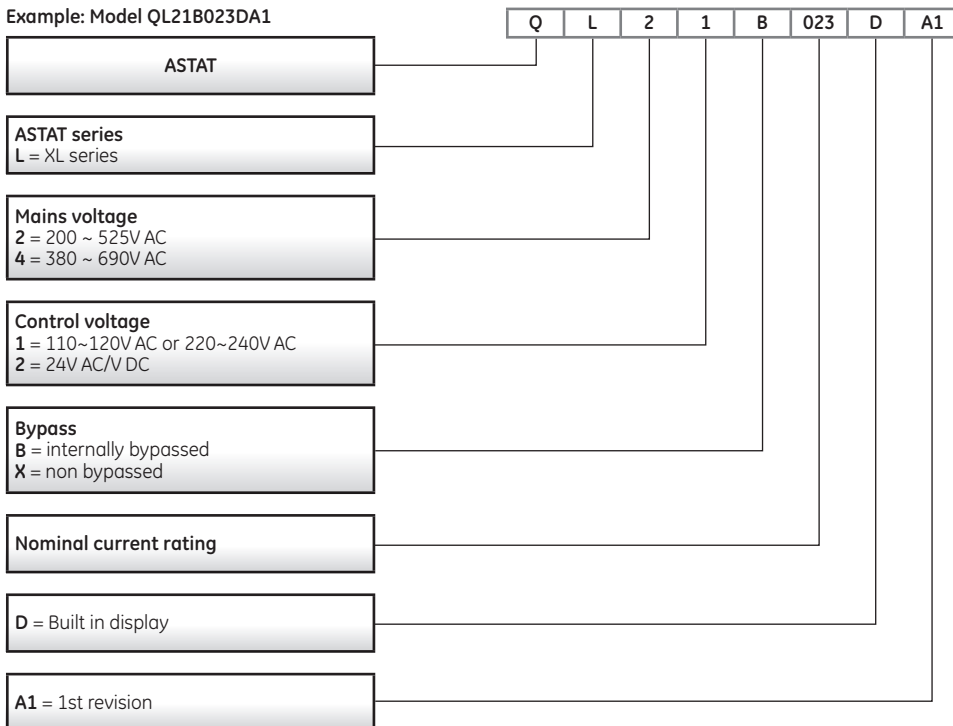
## Current Ratings

Unit Size	
18A	1
34A	
42A	
48A	
60A	2
75A	
85A	
100A	3
140A	
170A	
200A	

AC53b 4.0-6:354  
AC53b 4.0-6:394

## ASTAT XL

Example: Model QL21B023DA1



## Current Ratings

		Bypassed	Non bypassed
18	23A	-	-
	43A	-	-
	50A	-	-
	53A	-	-
	76A	-	-
	97A	-	-
	100A	-	-
28	105A	-	-
	145A	-	-
	170A	-	-
	200A	-	-
	220A	-	-
38	255A	3C	255A
	350A		360A
	425A		380A
48	500A	4C	430A
	580A		620A
	700A		650A
	820A		790A
	920A	930A	
	1000A	5C	1200A
	-		1410A
	-		1600A



# ASTAT XB - XBm - XL

## Specifications

Series	XB - XBm	XL
<b>Rated current range</b>		
	18 to 200A	23 to 1600A
<b>Motor connection</b>	In-line	In-line or Inside delta
<b>Bypass</b>	Internal	Internal, from 23 to 1000A External, from 255 to 1600A
<b>Supply</b>		
<b>Mains frequency</b>	45 Hz to 66Hz	45Hz to 66Hz
<b>Rated insulation voltage</b>	600V AC	600V AC
<b>Mains Voltage (A1, A2, A3)</b>		
XB series: QS1_B ___XA1		-
XBm series: QC1_B ___XA1	3 x 200V AC ~ 440V AC (+ 10%/ -15%)	-
XB series: QS3_B ___XA1		-
XBm series: QC3_B ___XA1	3 x 200V AC ~ 575V AC (+ 10%/ -15%)	-
XL series: QL2_B/X ___DA1	-	3 x 200V AC ~ 525V AC (± 10%)
	-	3 x 380V AC ~ 600V AC (± 10%) (in-line or inside delta connection)
XL series: QL4_B/X ___DA1	-	3 x 380V AC ~ 690V AC (±10%) (earthed star supply system only)
<b>Control Voltage (A1, A2, A3)</b>		
XB series: QS_1B ___XA1	110 ~ 240V AC (+ 10% / -15%)	-
XBm series: QC_1B ___XA1	or 380 ~ 440V AC (+ 10% / -15%)	-
XB series: QS_2B ___XA1		-
XBm series: QC_2B ___XA1	24V AC AC/24V DC (+ 20%)	-
XL series: QL_1B/X ___DA1	-	110 ~ 240V AC (+ 10% / -15%), 600mA
XL series: QL_2B/X ___DA1	-	24V AC AC/24V DC (+ 20%), 2,8A
<b>Current consumption (during run)</b>	< 100mA	-
<b>CURRENT CONSUMPTION (INRUSH)</b>		
QSx1xxxxXA1	10A	-
QSx2xxxxXA1	2A	-
<b>Inputs</b>		
<b>Input rating</b>	-	Active 24V DC, 8mA approx
<b>Start (terminal 01)</b>	NO, 150 kOhm at 300V AC max and 5,6 kOhm at 24V AC/DC	-
<b>Start (terminal 54, 55)</b>	-	NO
<b>Stop (terminal 02)</b>	NO, 150 kOhm at 300V AC max and 5,6 kOhm at 24V AC/DC	-
<b>Stop (terminal 56, 57)</b>	-	NC
<b>Reset (terminal 58, 57)</b>	-	NC
<b>Programmable input (terminal 53, 55)</b>	-	NO
<b>Motor Thermistor (B4, B5) (ASTAT XBm only)</b>	-	-
<b>Motor Thermistor (terminal 64, 65)</b>	-	Trip > 3.6kOhm, reset < 1.6kOhm
<b>Relay Outputs</b>	-	10A at 250V AC resistive, 5A at 250V AC AC15 pf 0.3
<b>Main Contactor (13, 14)</b>	NO	-
	6A, 30V DC resistive / 2A, 400V AC, AC11	-
<b>ASTAT XB - Run relay</b>	NO	-
<b>ASTAT XBm - Programmable relay (23, 24)</b>	NO	-
	6A, 30V DC resistive / 2A, 400 VAC, AC11	-
<b>Programmable Outputs</b>		
Relay A (terminal 13, 14)	-	NO
Relay B (terminal 21, 22, 24)	-	CO
Relay C (terminal 33, 34)	-	NO
<b>Analog output (terminal 40, 41)</b>	-	0-20mA or 4-20mA (selectable)
Maximum load	-	600W (12V DC at 20mA)
Accuracy	-	±5%
<b>24V DC output (terminal 55, 41)</b>	-	-
Maximum load	-	200mA
Accuracy	-	±10%





Series	XB - XBm	XL
<b>Environmental</b>		
IP20	18 to 100A	23 to 105A
IP00	140 to 200A	145 to 1600A
Operating temperature	-10 °C, max 60 °C, above 40°C with derating	
Storage temperature	-25 °C to +60 °C	
Operating altitude	0 - 1000m, above 1000m with derating	
Humidity	5% to 95% Relative Humidity	
Pollution degree	Degree 3	
Vibration	IEC 60068 Test Fc Sinusoidal 4Hz to 13,2Hz: ±1mm displacement 13,2Hz to 200Hz: ±0,7 g	
Conformal Coating	Standard (3C2)	
<b>Electromagnetic Capability (Compliant With EU Directive 89/336/EEC)</b>		
EMC Emission	IEC 60947-4-2 Class B and Lloyds Marine No 1 Specification	
Equipment class (EMC)	Class B	
Conducted radio frequency emission	0,15MHz to 0,5MHz: < 56 - 46dB (µV), 0,5MHz to 5MHz: < 46 dB (µV), 5MHz to 30MHz: < 50dB (µV)	
Radiated radio frequency emission	30 MHz to 230 MHz: < 30 dB (µV/m), 230 MHz to 1000 MHz: < 37dB (µV/m)	
EMC Immunity	IEC 60947-4-2	
Electrostatic discharge	4kV contact discharge, 8kV air discharge	-
Radio frequency electromagnetic field	0,15MHz to 1000MHz: 140 dB (µV)	-
Rated impulse withstand voltage (fast transients 5/50 ns)	2kV line to earth, 1kV line to line	-
Voltage dip and short time interruption	100ms (at 40% nominal voltage)	-
Harmonics and distortion	IEC 61000-2-4 (Class 3), EN/IEC 61800-3	
<b>Short Circuit Capability</b>		
Rated short circuit current XB, XBm: 18 to 48A	5kA (1)	-
Rated short circuit current XB, XBm: 60 to 200A	10kA (1)	-
(1) These short circuit ratings are with fuses used as given in the table under Semiconductor fuses		
Coordination with semiconductor fuses	-	Type 2
Coordination with HRC fuses	-	Type 1
QLxxB023D ~ QLxxB220D	-	prospective current 65kA
QLxxB255D ~ QLxxB1K0D	-	prospective current 85kA
QLxxX255D ~ QLxxX930D	-	prospective current 85kA
QLxxX1K2D ~ QLxxX1K6D	-	prospective current 100kA
<b>Heat Dissipation</b>		
During Start	3W/Ampere	4.5W/Ampere
During Run	10W typical	
QLxxB023D ~ QLxxB053D	-	≤ 39W approx.
QLxxB076D ~ QLxxB105D	-	≤ 51W approx.
QLxxB145D ~ QLxxB220D	-	≤ 120W approx.
QLxxB255D ~ QLxxB500D	-	≤ 140W approx.
QLxxB580D ~ QLxxB1K0D	-	≤ 357W approx.
QLxxX255D ~ QLxxX1K6D	-	4.5W/ampere approx.
<b>UL certification</b>		
<b>IMPORTANT: ADDITIONAL REQUIREMENTS AND CONFIGURATION SETTINGS FOR ASTAT XL TO BE UL-COMPLIANT</b>		
See also UL Fuse selection and Short Circuit ratings		
QLxxB023D ~ QLxxB105D	-	No additional requirement
QLxxB145D ~ QLxxB220D	-	Use finger guard kit, QOFPROTXL2, 872395
-	-	Use the recommended pressure terminal/connector kit
QLxxB255D ~ QLxxB425D	-	Use finger guard kit, QOFPROTXL3, 872396
-	-	Use the recommended pressure terminal/connector kit
QLxxX255D	-	Use the recommended pressure terminal/connector kit
QLxxX360D ~ QLxxX1K6D	-	Configure the busbar for line / load terminals at opposite ends of ASTAT XL (i.e. Top In, Bottom Out or Top Out, Bottom In)
-	-	Use the recommended pressure terminal/connector kit
QLxxB500D ~ QLxxB1K0D	-	These models are UL recognised components. Separate cable landing busbars may be required within the electrical cabinet when terminating cables sized according to the National Wiring Code (NEC) regulations



## Soft Start Methods

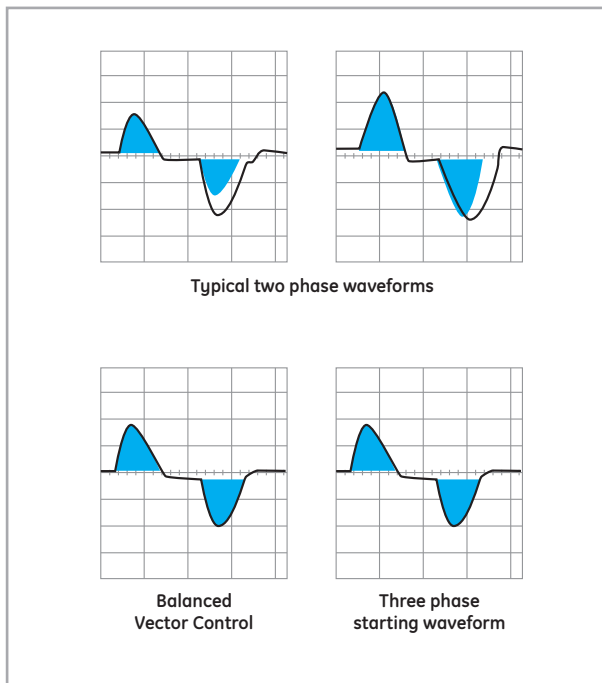
### Balanced Vector Control

In the past soft starters using 2 phase control caused extra heating in the motor and required higher starting currents because the output waveform was not symmetrical.

ASTAT XB and XBm soft starters control only two phases, but include balanced vector control technology that balances the output waveform to make it symmetrical. By balancing the waveform the ASTAT XB and XBm provides 3 phase like performance with compact soft starter technology.

This eliminates previous limitations of 2 phase controllers such as:

- Limited starts per hour
- Limited to light loads only
- Limited to motor <55kW at 400V AC, 75HP at 460V AC

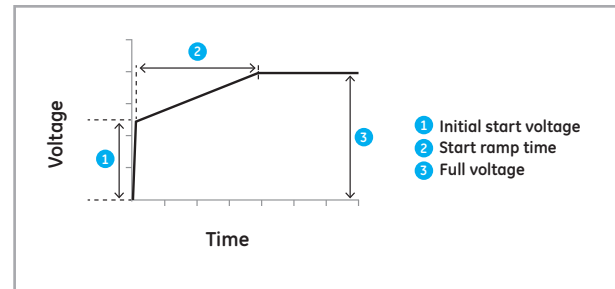


### Start methods

#### Voltage Ramp (ASTAT XB)

Voltage ramp soft starting raises the voltage from a specified starting level (1) to full voltage over an extended period of time (2).

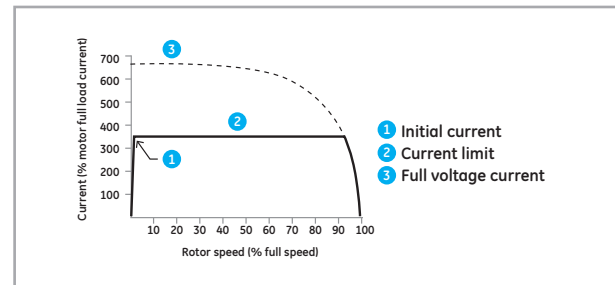
Voltage ramp starting is the simplest way to influence start current and torque.



#### Constant Current (ASTAT XBm)

Constant current is the traditional form of soft starting, which raises the current from zero to a specified level and keeps the current stable at that level until the motor has accelerated.

Constant current starting is ideal for applications where the start current must be kept below a particular level.

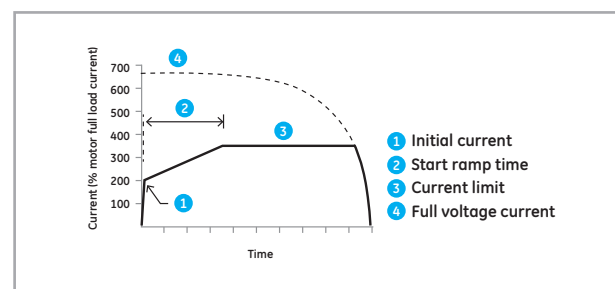


#### Current Ramp (ASTAT XBm)

Current ramp soft starting raises the current from a specified starting level (1) to a maximum limit (3), over an extended period of time (2).

Current ramp starting can be useful for applications where:

- the load can vary between starts
- the load breaks away easily, but starting time needs to be extended
- the electricity supply is limited



### Easy configuration (ASTAT XB)

- 1 Select initial voltage (%) and start ramp time

Select stop ramp time (up to 20 seconds)

- 2 TVR stop adds inertia to the load and allows the motor to slow down gradually

For coast to stop, set Stop Ramp Time = No softstop



### Easy configuration (ASTAT XBm)

- 1 Select current limit (% FLC)  
Select initial current and start ramp time  
Use current ramp for limited supplies (e.g. generator sets) and installations where the motor may start with varying loads

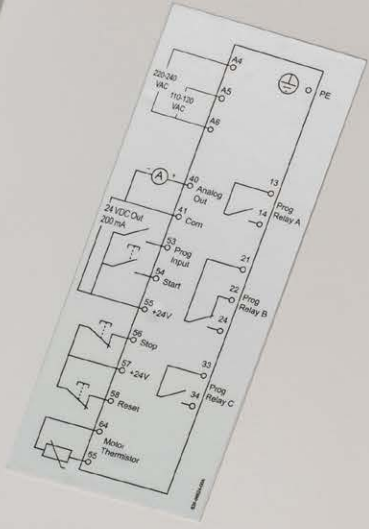
- 2 Motor FLC - Affects all protection and start settings.  
Minimum FLC setting is 50% of the nameplate rating.

- 3 Soft stop - Select stop ramp time (up to 20 seconds)  
  
Timed Voltage Ramp stop adds inertia to the load and allows the motor to slow down gradually

For coast to stop, set Stop Ramp Time = No soft stop

- 4 Protections - Motor Trip Class  
Excess Start Time – selectable up to 20 seconds, plus built-in limit of 120 seconds ; Phase Sequence (combined with Aux Relay)





872296-QL21B580D  
Part Desc: ASTAT XL (08/08) V5 C1  
Rating: 3 phase 200-525 VAC 50/60 Hz  
58A AC-53e-3 10/50 300W/400W/400VAC  
S/N: 614828-424  
Technical Support  
www.ge.com/industrial/solutions  
For full technical details refer User Manual

The control panel of the ASTAT XL Advanced Soft Starter. It features the GE logo at the top left. The text "ASTAT XL Advanced Soft Starter" is printed at the top right. Below the text is a green LCD screen. The panel is equipped with several buttons: "Hand Auto", "Status", "Graph", "Alarm Logs", "Start" (green), "Stop" (red), "Reset", "Ready", "Run", "Alarm", "Exit", "Menu", and "Enter". At the bottom of the panel, there are four indicator lights labeled "Input A", "Start", "Stop", and "Reset".

## Order codes

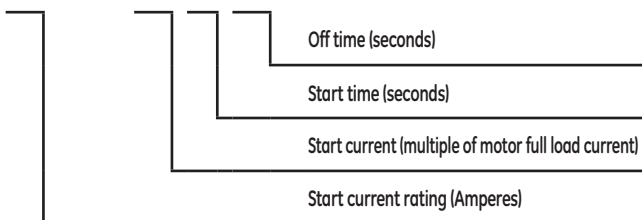
		350%, 15 seconds		400%, 20 seconds		Mains voltage: 200 to 440V AC; Control voltage: 110 to 240V AC				Mains voltage: 200 to 575V AC; Control voltage: 110 to 240V AC			
Output Power at		NORMAL DUTY		HEAVY DUTY		ASTAT XB		ASTAT XBm		ASTAT XB		ASTAT XBm	
400Vac (kW)	460Vac (HP)					Cat. No.	Ref. No.	Cat. No.	Ref. No.	Cat. No.	Ref. No.	Cat. No.	Ref. No.
		<b>AC53b 4-6:354</b>		<b>AC53b 4-20:340</b>									
		40°C	50°C	40°C	50°C								
7.5	10	18A	17A	17A	15A	QS11B018XA1	872411	QC11B018XA1	872869	QS31B018XA1	872078	QC31B018XA1	872153
15	20	34A	32A	30A	28A	QS11B034XA1	872858	QC11B034XA1	872870	QS31B034XA1	872080	QC31B034XA1	872154
18.5	25	42A	40A	36A	33A	QS11B042XA1	872859	QC11B042XA1	872871	QS31B042XA1	872085	QC31B042XA1	872155
22	30	48A	44A	40A	36A	QS11B048XA1	872861	QC11B048XA1	872872	QS31B048XA1	872090	QC31B048XA1	872159
30	40	60A	55A	49A	45A	QS11B060XA1	872862	QC11B060XA1	872873	QS31B060XA1	872099	QC31B060XA1	872173
		<b>AC53b 4-6:594</b>		<b>AC53b 4-20:580</b>									
		40°C	50°C	40°C	50°C								
37	50	75A	68A	65A	59A	QS11B075XA1	872863	QC11B075XA1	872874	QS31B075XA1	872118	QC31B075XA1	872175
45	60	85A	78A	73A	67A	QS11B085XA1	872864	QC11B085XA1	872875	QS31B085XA1	872123	QC31B085XA1	872183
55	75	100A	100A	96A	87A	QS11B100XA1	872865	QC11B100XA1	872876	QS31B100XA1	872124	QC31B100XA1	872184
75	100	140A	133A	120A	110A	QS11B140XA1	872866	QC11B140XA1	872877	QS31B140XA1	872125	QC31B140XA1	872185
90	125	170A	157A	142A	130A	QS11B170XA1	872867	QC11B170XA1	872878	QS31B170XA1	872135	QC31B170XA1	872186
110	150	200A	186A	165A	152A	QS11B200XA1	872868	QC11B200XA1	872879	QS31B200XA1	872146	QC31B200XA1	872187

		350%, 15 seconds		400%, 20 seconds		Mains voltage: 200 to 440V AC; Control voltage: 24V AC/DC				Mains voltage: 200 to 575V AC; Control voltage: 24V AC/DC			
Output Power at		NORMAL DUTY		HEAVY DUTY		ASTAT XB		ASTAT XBm		ASTAT XB		ASTAT XBm	
400Vac (kW)	460Vac (HP)					Cat. No.	Ref. No.	Cat. No.	Ref. No.	Cat. No.	Ref. No.	Cat. No.	Ref. No.
		<b>AC53b 4-6:354</b>		<b>AC53b 4-20:340</b>									
		40°C	50°C	40°C	50°C								
7.5	10	18A	17A	17A	15A	QS12B018XA1	873074	QC12B018XA1	873096	QS32B018XA1	873085	QC32B018XA1	873097
15	20	34A	32A	30A	28A	QS12B034XA1	873075	QC12B034XA1	873098	QS32B034XA1	873086	QC32B034XA1	873099
18.5	25	42A	40A	36A	33A	QS12B042XA1	873076	QC12B042XA1	873100	QS32B042XA1	873087	QC32B042XA1	873101
22	30	48A	44A	40A	36A	QS12B048XA1	873077	QC12B048XA1	873102	QS32B048XA1	873088	QC32B048XA1	873103
30	40	60A	55A	49A	45A	QS12B060XA1	873078	QC12B060XA1	873073	QS32B060XA1	873089	QC32B060XA1	873104
		<b>AC53b 4-6:594</b>		<b>AC53b 4-20:580</b>									
		40°C	50°C	40°C	50°C								
37	50	75A	68A	65A	59A	QS12B075XA1	873079	QC12B075XA1	873105	QS32B075XA1	873090	QC32B075XA1	873106
45	60	85A	78A	73A	67A	QS12B085XA1	873080	QC12B085XA1	873107	QS32B085XA1	873091	QC32B085XA1	873108
55	75	100A	100A	96A	87A	QS12B100XA1	873081	QC12B100XA1	873109	QS32B100XA1	873092	QC32B100XA1	873110
75	100	140A	133A	120A	110A	QS12B140XA1	873082	QC12B140XA1	873111	QS32B140XA1	873093	QC32B140XA1	873112
90	125	170A	157A	142A	130A	QS12B170XA1	873083	QC12B170XA1	873113	QS32B170XA1	873094	QC32B170XA1	873114
110	150	200A	186A	165A	152A	QS12B200XA1	873084	QC12B200XA1	873115	QS32B200XA1	873095	QC32B200XA1	873116

Above values are for altitude < 1000m/3300ft

## AC53b Utilisation Code

80A : AC-53b 3.5 - 15 : 345



**Starter Current Rating:** The full load current rating of the soft starter given the parameters detailed in the remaining sections of the utilization code.

**Start Current:** The maximum available start current.

**Start Time:** The maximum allowable start time.

**Off Time:** The minimum allowable time between the end of one start and the beginning of the next start.

## ASTAT XB and XBm Options

Description	Cat. No.	Ref. No.
Ethernet Communication module	QOEIP	872378
DeviceNet Communication module	QODEV	872379
Modbus RTU Communication module	QOMB	872383
Modbus TCP Communication module	QOMBTCP	872384
Profibus Communication module	QOPDP	872386
Profinet Communication module	QOPRT	872387
USB module	QOUSB	872388
Remote Control Panel	QORCPXB	872392
IP20 finger protection 140 to 200A	QOFPROTXB	872394



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New

# ASTAT XL

## Order codes

### Current ratings for bypass operation - In-line connection

Output Power at		300%, 10 seconds	350%, 15 seconds	400%, 20 seconds	450%, 30 seconds	Mains voltage: 200 to 525V AC; Control voltage: 110 to 240V AC	Mains voltage: 380 to 690V AC; Control voltage: 110 to 240V AC
400Vac (kW)	460Vac (HP)	LIGHT DUTY	NORMAL DUTY	HEAVY DUTY	SEVERE DUTY	ASTAT XL	
		AC53b 3.0-10:350	AC53b 3.5-15:345	AC53b 4.0-20:340	AC53b 4.5-30:330	Cat. No.	Ref. No.
40°C							
11	15	23 A	20 A	17 A	15 A	QL21B023DA1	872221
18.5	20	43 A	37 A	31 A	26 A	QL21B043DA1	872239
22	25	50 A	44 A	37 A	30 A	QL21B050DA1	872241
25	30	53 A	53 A	46 A	37 A	QL21B053DA1	872243
40°C							
		AC53b 3.0-10:390	AC53b 3.5-15:385	AC53b 4.0-20:580	AC53b 4.5-30:570	Cat. No.	Ref. No.
30	40	76 A	64 A	55 A	47 A	QL21B076DA1	872245
37	50	97 A	82 A	69 A	58 A	QL21B097DA1	872246
45	60	100 A	88 A	74 A	61 A	QL21B100DA1	872247
55	75	105 A	105 A	95 A	78 A	QL21B105DA1	872248
55	75	145 A	123 A	106 A	90 A	QL21B145DA1	872249
75	100	170 A	145 A	121 A	97 A	QL21B170DA1	872256
90	125	200 A	189 A	160 A	134 A	QL21B200DA1	872258
110	150	220 A	210 A	178 A	148 A	QL21B220DA1	872274
132	200	255 A	231 A	201 A	176 A	QL21B255DA1	872276
160	250	255 A	231 A	201 A	176 A	QL21X255DA1	872312
200	300	350 A	329 A	284 A	244 A	QL21B350DA1	872284
250	350	360 A	360 A	310 A	263 A	QL21X360DA1	872318
315	450	380 A	380 A	359 A	299 A	QL21X380DA1	872320
400	550	425 A	411 A	355 A	305 A	QL21B425DA1	872292
450	600	430 A	430 A	368 A	309 A	QL21X430DA1	872322
500	650	500 A	445 A	383 A	326 A	QL21B500DA1	872294
560	750	580 A	492 A	425 A	364 A	QL21B580DA1	872296
132	200	620 A	620 A	540 A	434 A	QL21X620DA1	872324
160	250	650 A	650 A	561 A	455 A	QL21X650DA1	872328
160	250	700 A	592 A	512 A	438 A	QL21B700DA1	872302
200	300	790 A	790 A	714 A	579 A	QL21X790DA1	872330
315	450	820 A	705 A	606 A	516 A	QL21B820DA1	872303
355	500	920 A	804 A	684 A	571 A	QL21B920DA1	872304
450	600	930 A	930 A	829 A	661 A	QL21X930DA1	872332
500	650	1000 A	936 A	796 A	664 A	QL21B1K0DA1	872306
630	900	1200 A	1200 A	1200 A	1071 A	QL21X1K2DA1	872333
710	1000	1410 A	1410 A	1319 A	1114 A	QL21X1K4DA1	872334
800	1200	1600 A	1600 A	1600 A	1353 A	QL21X1K6DA1	872336

Output Power at		300%, 10 seconds	350%, 15 seconds	400%, 20 seconds	450%, 30 seconds	Mains voltage: 200 to 525V AC; Control voltage: 24V AC/DC	Mains voltage: 380 to 690V AC; Control voltage: 24V AC/DC
400Vac (kW)	460Vac (HP)	LIGHT DUTY	NORMAL DUTY	HEAVY DUTY	SEVERE DUTY	ASTAT XL	
		AC53b 3.0-10:350	AC53b 3.5-15:345	AC53b 4.0-20:340	AC53b 4.5-30:330	Cat. No.	Ref. No.
40°C							
11	15	23 A	20 A	17 A	15 A	QL22B023DA1	873119
18.5	20	43 A	37 A	31 A	26 A	QL22B043DA1	873120
22	25	50 A	44 A	37 A	30 A	QL22B050DA1	873121
25	30	53 A	53 A	46 A	37 A	QL22B053DA1	873122
40°C							
		AC53b 3.0-10:390	AC53b 3.5-15:385	AC53b 4.0-20:580	AC53b 4.5-30:570	Cat. No.	Ref. No.
30	40	76 A	64 A	55 A	47 A	QL22B076DA1	873118
37	50	97 A	82 A	69 A	58 A	QL22B097DA1	873123
45	60	100 A	88 A	74 A	61 A	QL22B100DA1	873124
55	75	105 A	105 A	95 A	78 A	QL22B105DA1	873125
55	75	145 A	123 A	106 A	90 A	QL22B145DA1	873126
75	100	170 A	145 A	121 A	97 A	QL22B170DA1	873127
90	125	200 A	189 A	160 A	134 A	QL22B200DA1	873117
110	150	220 A	210 A	178 A	148 A	QL22B220DA1	873128
132	200	255 A	231 A	201 A	176 A	QL22B255DA1	873129
160	250	255 A	231 A	201 A	176 A	QL22X255DA1	873138
200	300	350 A	329 A	284 A	244 A	QL22B350DA1	873130
250	350	360 A	360 A	310 A	263 A	QL22X360DA1	873139
315	450	380 A	380 A	359 A	299 A	QL22X380DA1	873140
400	550	425 A	411 A	355 A	305 A	QL22B425DA1	873131
450	600	430 A	430 A	368 A	309 A	QL22X430DA1	873141
500	650	500 A	445 A	383 A	326 A	QL22B500DA1	873132
560	750	580 A	492 A	425 A	364 A	QL22B580DA1	873133
132	200	620 A	620 A	540 A	434 A	QL22X620DA1	873142
160	250	650 A	650 A	561 A	455 A	QL22X650DA1	873143
160	250	700 A	592 A	512 A	438 A	QL22B700DA1	873134
200	300	790 A	790 A	714 A	579 A	QL22X790DA1	873144
315	450	820 A	705 A	606 A	516 A	QL22B820DA1	873135
355	500	920 A	804 A	684 A	571 A	QL22B920DA1	873136
450	600	930 A	930 A	829 A	661 A	QL22X930DA1	873145
500	650	1000 A	936 A	796 A	664 A	QL22B1K0DA1	873137
630	900	1200 A	1200 A	1200 A	1071 A	QL22X1K2DA1	873146
710	1000	1410 A	1410 A	1319 A	1114 A	QL22X1K4DA1	873147
800	1200	1600 A	1600 A	1600 A	1353 A	QL22X1K6DA1	873148

Above values are for altitude < 1000m/3300ft



Order codes

Current ratings for bypass operation - Inside delta connection

Output Power at		300%, 10 seconds	350%, 15 seconds	400%, 20 seconds	450%, 30 seconds	Mains voltage: 200 to 525V AC; Control voltage: 110 to 240V AC	Mains voltage: 380 to 690V AC; Control voltage: 110 to 240V AC
400Vac (kW)	460Vac (HP)	LIGHT DUTY	NORMAL DUTY	HEAVY DUTY	SEVERE DUTY	ASTAT XL	
		AC53b 3.0-10:350	AC53b 3.5-15:345	AC53b 4.0-20:340	AC53b 4.5-30:330	Cat. No.	Ref. No.
40°C							
11	15	34 A	30 A	26 A	22 A	QL21B023DA1	872221
18.5	20	64 A	59 A	51 A	44 A	QL21B043DA1	872239
22	25	75 A	66 A	55 A	45 A	QL21B050DA1	872241
25	30	79 A	79 A	69 A	55 A	QL21B053DA1	872243
40°C							
		AC53b 3.0-10:390	AC53b 3.5-15:385	AC53b 4.0-20:580	AC53b 4.5-30:570	Cat. No.	Ref. No.
30	40	114 A	96 A	83 A	70 A	QL21B076DA1	872245
37	50	145 A	123 A	104 A	87 A	QL21B097DA1	872246
45	60	150 A	132 A	112 A	92 A	QL21B100DA1	872247
55	75	157 A	157 A	143 A	117 A	QL21B105DA1	872248
55	75	218 A	184 A	159 A	136 A	QL21B145DA1	872249
75	100	255 A	217 A	181 A	146 A	QL21B170DA1	872256
90	125	300 A	283 A	241 A	200 A	QL21B200DA1	872258
110	150	330 A	315 A	268 A	223 A	QL21B220DA1	872274
132	200	382 A	346 A	302 A	264 A	QL21B255DA1	872276
160	250	382 A	346 A	302 A	264 A	QL21X255DA1	872312
200	300	525 A	494 A	427 A	366 A	QL21B350DA1	872284
250	350	540 A	540 A	465 A	395 A	QL21X360DA1	872318
315	450	570 A	570 A	539 A	449 A	QL21X380DA1	872320
400	550	638 A	617 A	533 A	458 A	QL21B425DA1	872292
450	600	645 A	645 A	552 A	464 A	QL21X430DA1	872322
500	650	750 A	668 A	575 A	490 A	QL21B500DA1	872294
560	750	870 A	738 A	637 A	546 A	QL21B580DA1	872296
132	200	930 A	930 A	810 A	651 A	QL21X620DA1	872324
160	250	975 A	975 A	842 A	683 A	QL21X650DA1	872328
160	250	1050 A	889 A	768 A	658 A	QL21B700DA1	872302
200	300	1185 A	1185 A	1071 A	868 A	QL21X790DA1	872330
315	450	1230 A	1058 A	910 A	774 A	QL21B820DA1	872303
355	500	1380 A	1206 A	1026 A	857 A	QL21B920DA1	872304
450	600	1395 A	1395 A	1244 A	992 A	QL21X930DA1	872332
500	650	1500 A	1404 A	1194 A	997 A	QL21B1K0DA1	872306
630	900	1800 A	1800 A	1800 A	1606 A	QL21X1K2DA1	872333
710	1000	2115 A	2115 A	1979 A	1671 A	QL21X1K4DA1	872334
800	1200	2400 A	2400 A	2400 A	2030 A	QL21X1K6DA1	872336

Output Power at		300%, 10 seconds	350%, 15 seconds	400%, 20 seconds	450%, 30 seconds	Mains voltage: 200 to 525V AC; Control voltage: 24V AC/DC	Mains voltage: 380 to 690V AC; Control voltage: 24V AC/DC
400Vac (kW)	460Vac (HP)	LIGHT DUTY	NORMAL DUTY	HEAVY DUTY	SEVERE DUTY	ASTAT XL	
		AC53b 3.0-10:350	AC53b 3.5-15:345	AC53b 4.0-20:340	AC53b 4.5-30:330	Cat. No.	Ref. No.
40°C							
11	15	34 A	30 A	26 A	22 A	QL22B023DA1	873119
18.5	20	64 A	59 A	51 A	44 A	QL22B043DA1	873120
22	25	75 A	66 A	55 A	45 A	QL22B050DA1	873121
25	30	79 A	79 A	69 A	55 A	QL22B053DA1	873122
40°C							
		AC53b 3.0-10:390	AC53b 3.5-15:385	AC53b 4.0-20:580	AC53b 4.5-30:570	Cat. No.	Ref. No.
30	40	114 A	96 A	83 A	70 A	QL22B076DA1	873118
37	50	145 A	123 A	104 A	87 A	QL22B097DA1	873123
45	60	150 A	132 A	112 A	92 A	QL22B100DA1	873124
55	75	157 A	157 A	143 A	117 A	QL22B105DA1	873125
55	75	218 A	184 A	159 A	136 A	QL22B145DA1	873126
75	100	255 A	217 A	181 A	146 A	QL22B170DA1	873127
90	125	300 A	283 A	241 A	200 A	QL22B200DA1	873117
110	150	330 A	315 A	268 A	223 A	QL22B220DA1	873128
132	200	382 A	346 A	302 A	264 A	QL22B255DA1	873129
160	250	382 A	346 A	302 A	264 A	QL22X255DA1	873138
200	300	525 A	494 A	427 A	366 A	QL22B350DA1	873130
250	350	540 A	540 A	465 A	395 A	QL22X360DA1	873139
315	450	570 A	570 A	539 A	449 A	QL22X380DA1	873140
400	550	638 A	617 A	533 A	458 A	QL22B425DA1	873131
450	600	645 A	645 A	552 A	464 A	QL22X430DA1	873141
500	650	750 A	668 A	575 A	490 A	QL22B500DA1	873132
560	750	870 A	738 A	637 A	546 A	QL22B580DA1	873133
132	200	930 A	930 A	810 A	651 A	QL22X620DA1	873142
160	250	975 A	975 A	842 A	683 A	QL22X650DA1	873143
160	250	1050 A	889 A	768 A	658 A	QL22B700DA1	873134
200	300	1185 A	1185 A	1071 A	868 A	QL22X790DA1	873144
315	450	1230 A	1058 A	910 A	774 A	QL22B820DA1	873135
355	500	1380 A	1206 A	1026 A	857 A	QL22B920DA1	873136
450	600	1395 A	1395 A	1244 A	992 A	QL22X930DA1	873145
500	650	1500 A	1404 A	1194 A	997 A	QL22B1K0DA1	873137
630	900	1800 A	1800 A	1800 A	1606 A	QL22X1K2DA1	873146
710	1000	2115 A	2115 A	1979 A	1671 A	QL22X1K4DA1	873147
800	1200	2400 A	2400 A	2400 A	2030 A	QL22X1K6DA1	873148

Note: Models QLxxX\_\_DA1 must be externally bypassed  
Above values are for altitude < 1000m/3300ft



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### Current ratings for continuous operation (not bypassed) - In-line connection

Output Power at		300%, 10 seconds	350%, 15 seconds	400%, 20 seconds	450%, 30 seconds	Mains voltage: 200 to 525V AC; Control voltage: 110 to 240V AC		Mains voltage: 380 to 690V AC; Control voltage: 110 to 240V AC	
400Vac (kW)	460Vac (HP)	LIGHT DUTY	NORMAL DUTY	HEAVY DUTY	SEVERE DUTY	ASTAT XL		ASTAT XL	
		AC53b 3-10:50-6	AC53b 3.5-15:50-6	AC53b 4-20:50-6	AC53b 4.5-30:50-6	Cat. No.	Ref. No.	Cat. No.	Ref. No.
40°C									
132	200	255 A	222 A	195 A	171 A	QL21X255DA1	872312	QL41X255DA1	872364
160	250	360 A	351 A	303 A	259 A	QL21X360DA1	872318	QL41X360DA1	872365
160	250	380 A	380 A	348 A	292 A	QL21X380DA1	872320	QL41X380DA1	872366
200	300	430 A	413 A	355 A	301 A	QL21X430DA1	872322	QL41X430DA1	872368
315	450	620 A	614 A	515 A	419 A	QL21X620DA1	872324	QL41X620DA1	872369
355	500	650 A	629 A	532 A	437 A	QL21X650DA1	872328	QL41X650DA1	872370
450	600	790 A	790 A	694 A	567 A	QL21X790DA1	872330	QL41X790DA1	872371
500	650	930 A	930 A	800 A	644 A	QL21X930DA1	872332	QL41X930DA1	872372
630	900	1200 A	1200 A	1135 A	983 A	QL21X1K2DA1	872333	QL41X1K2DA1	872373
710	1000	1410 A	1355 A	1187 A	1023 A	QL21X1K4DA1	872334	QL41X1K4DA1	872374
800	1200	1600 A	1600 A	1433 A	1227 A	QL21X1K6DA1	872336	QL41X1K6DA1	872376

Output Power at		300%, 10 seconds	350%, 15 seconds	400%, 20 seconds	450%, 30 seconds	Mains voltage: 200 to 525V AC; Control voltage: 24V AC/DC		Mains voltage: 380 to 690V AC; Control voltage: 24V AC/DC	
400Vac (kW)	460Vac (HP)	LIGHT DUTY	NORMAL DUTY	HEAVY DUTY	SEVERE DUTY	ASTAT XL		ASTAT XL	
		AC53b 3-10:50-6	AC53b 3.5-15:50-6	AC53b 4-20:50-6	AC53b 4.5-30:50-6	Cat. No.	Ref. No.	Cat. No.	Ref. No.
40°C									
132	200	255 A	222 A	195 A	171 A	QL21X255DA1	872312	QL41X255DA1	872364
160	250	360 A	351 A	303 A	259 A	QL21X360DA1	872318	QL41X360DA1	872365
160	250	380 A	380 A	348 A	292 A	QL21X380DA1	872320	QL41X380DA1	872366
200	300	430 A	413 A	355 A	301 A	QL21X430DA1	872322	QL41X430DA1	872368
315	450	620 A	614 A	515 A	419 A	QL21X620DA1	872324	QL41X620DA1	872369
355	500	650 A	629 A	532 A	437 A	QL21X650DA1	872328	QL41X650DA1	872370
450	600	790 A	790 A	694 A	567 A	QL21X790DA1	872330	QL41X790DA1	872371
500	650	930 A	930 A	800 A	644 A	QL21X930DA1	872332	QL41X930DA1	872372
630	900	1200 A	1200 A	1135 A	983 A	QL21X1K2DA1	872333	QL41X1K2DA1	872373
710	1000	1410 A	1355 A	1187 A	1023 A	QL21X1K4DA1	872334	QL41X1K4DA1	872374
800	1200	1600 A	1600 A	1433 A	1227 A	QL21X1K6DA1	872336	QL41X1K6DA1	872376

Above values are for altitude < 1000m/3300ft

### Current ratings for continuous operation (not bypassed) - Inside delta connection

Output Power at		300%, 10 seconds	350%, 15 seconds	400%, 20 seconds	450%, 30 seconds	Mains voltage: 200 to 525V AC; Control voltage: 110 to 240V AC		Mains voltage: 380 to 690V AC; Control voltage: 110 to 240V AC	
400Vac (kW)	460Vac (HP)	LIGHT DUTY	NORMAL DUTY	HEAVY DUTY	SEVERE DUTY	ASTAT XL		ASTAT XL	
		AC53b 3-10:50-6	AC53b 3.5-15:50-6	AC53b 4-20:50-6	AC53b 4.5-30:50-6	Cat. No.	Ref. No.	Cat. No.	Ref. No.
40°C									
132	200	382 A	334 A	293 A	257 A	QL21X255DA1	872312	QL41X255DA1	872364
160	250	540 A	527 A	455 A	388 A	QL21X360DA1	872318	QL41X360DA1	872365
160	250	570 A	570 A	522 A	437 A	QL21X380DA1	872320	QL41X380DA1	872366
200	300	645 A	620 A	533 A	451 A	QL21X430DA1	872322	QL41X430DA1	872368
315	450	930 A	920 A	773 A	628 A	QL21X620DA1	872324	QL41X620DA1	872369
355	500	975 A	943 A	798 A	656 A	QL21X650DA1	872328	QL41X650DA1	872370
450	600	1185 A	1185 A	1041 A	850 A	QL21X790DA1	872330	QL41X790DA1	872371
500	650	1395 A	1395 A	1200 A	966 A	QL21X930DA1	872332	QL41X930DA1	872372
630	900	1800 A	1800 A	1702 A	1474 A	QL21X1K2DA1	872333	QL41X1K2DA1	872373
710	1000	2115 A	2033 A	1780 A	1535 A	QL21X1K4DA1	872334	QL41X1K4DA1	872374
800	1200	2400 A	2400 A	2149 A	1840 A	QL21X1K6DA1	872336	QL41X1K6DA1	872376

Output Power at		300%, 10 seconds	350%, 15 seconds	400%, 20 seconds	450%, 30 seconds	Mains voltage: 200 to 525V AC; Control voltage: 24V AC/DC		Mains voltage: 380 to 690V AC; Control voltage: 24V AC/DC	
400Vac (kW)	460Vac (HP)	LIGHT DUTY	NORMAL DUTY	HEAVY DUTY	SEVERE DUTY	ASTAT XL		ASTAT XL	
		AC53b 3-10:50-6	AC53b 3.5-15:50-6	AC53b 4-20:50-6	AC53b 4.5-30:50-6	Cat. No.	Ref. No.	Cat. No.	Ref. No.
40°C									
132	200	382 A	334 A	293 A	257 A	QL21X255DA1	872312	QL41X255DA1	872364
160	250	540 A	527 A	455 A	388 A	QL21X360DA1	872318	QL41X360DA1	872365
160	250	570 A	570 A	522 A	437 A	QL21X380DA1	872320	QL41X380DA1	872366
200	300	645 A	620 A	533 A	451 A	QL21X430DA1	872322	QL41X430DA1	872368
315	450	930 A	920 A	773 A	628 A	QL21X620DA1	872324	QL41X620DA1	872369
355	500	975 A	943 A	798 A	656 A	QL21X650DA1	872328	QL41X650DA1	872370
450	600	1185 A	1185 A	1041 A	850 A	QL21X790DA1	872330	QL41X790DA1	872371
500	650	1395 A	1395 A	1200 A	966 A	QL21X930DA1	872332	QL41X930DA1	872372
630	900	1800 A	1800 A	1702 A	1474 A	QL21X1K2DA1	872333	QL41X1K2DA1	872373
710	1000	2115 A	2033 A	1780 A	1535 A	QL21X1K4DA1	872334	QL41X1K4DA1	872374
800	1200	2400 A	2400 A	2149 A	1840 A	QL21X1K6DA1	872336	QL41X1K6DA1	872376

Above values are for altitude < 1000m/3300ft





## Minimum and Maximum Current settings

Model	In-line connection		Inside delta connection	
	Minimum	Maximum	Minimum	Maximum
QLxxB023D	5A	23A	5A	34A
QLxxB043D	9A	43A	9A	64A
QLxxB050D	10A	50A	10A	75A
QLxxB053D	11A	53A	11A	79A
QLxxB076D	15A	76A	15A	114A
QLxxB097D	19A	97A	19A	145A
QLxxB100D	20A	100A	20A	150A
QLxxB105D	21A	105A	21A	157A
QLxxB145D	29A	145A	29A	217A
QLxxB170D	34A	170A	34A	255A
QLxxB200D	40A	200A	40A	300A
QLxxB220D	44A	220A	44A	330A
QLxxB255D	51A	255A	51A	382A
QLxxX255D	51A	255A	51A	382A
QLxxB350D	70A	350A	70A	525A
QLxxX360D	72A	360A	72A	540A
QLxxX380D	76A	380A	76A	570A
QLxxB425D	85A	425A	85A	638A
QLxxX430D	86A	430A	86A	645A
QLxxB500D	100A	500A	100A	750A
QLxxB580D	116A	580A	116A	870A
QLxxX620D	124A	620A	124A	930A
QLxxX650D	130A	650A	130A	975A
QLxxB700D	140A	700A	140A	1050A
QLxxX790D	158A	790A	158A	1185A
QLxxB820D	164A	820A	164A	1230A
QLxxB920D	184A	920A	184A	1380A
QLxxX930D	186A	930A	186A	1395A
QLxxB1K0D	200A	1000A	200A	1500A
QLxxX1K2D	240A	1200A	240A	1800A
QLxxX1K4D	282A	1410A	282A	2115A
QLxxX1K6D	320A	1600A	320A	2400A

## ASTAT XL Options

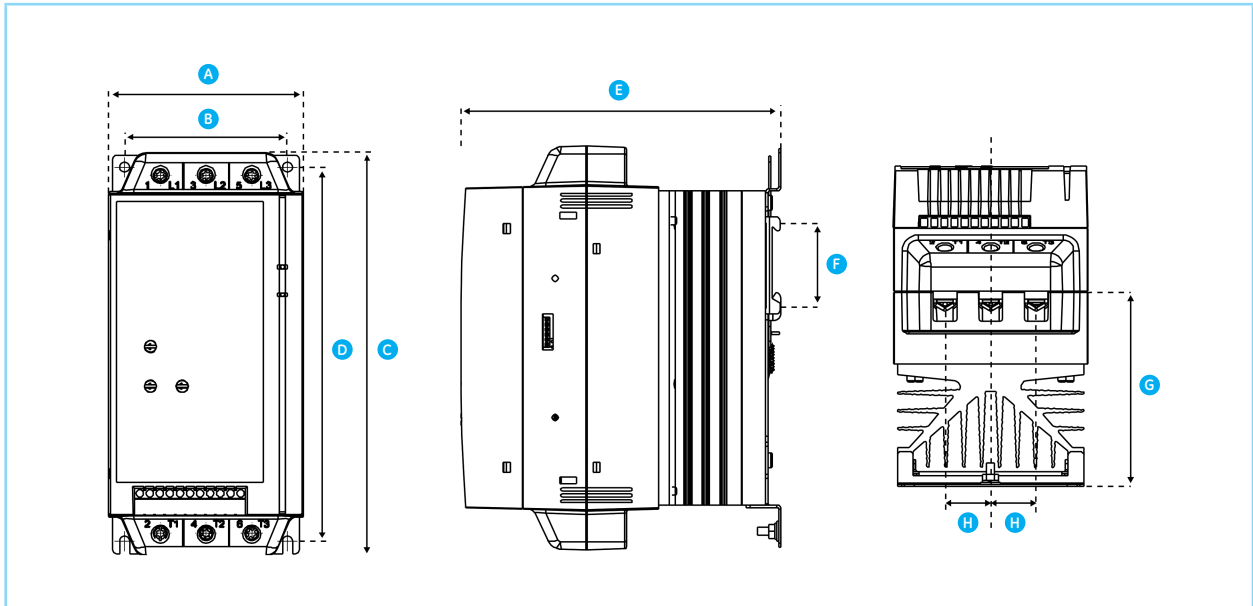
Description	Cat. No.	Ref. No.
Ethernet Communication module	QOEIP	872378
DeviceNet Communication module	QODEV	872379
Modbus RTU Communication module	QOMB	872383
Modbus TCP Communication module	QOMBTCP	872384
Profibus Communication module	QOPDP	872386
Profinet Communication module	QOPRT	872387
USB module	QOUSB	872388
Remote Control Panel	QORCPXL	872391
IP20 finger protection 145 to 220A	QOFPROTXL2	872395
IP20 finger protection 255 to 425A	QOFPROTXL3	872396
IP20 finger protection 500 to 1000A	QOFPROTXL4	872399



# ASTAT XB - XBm - XL

## Dimensions

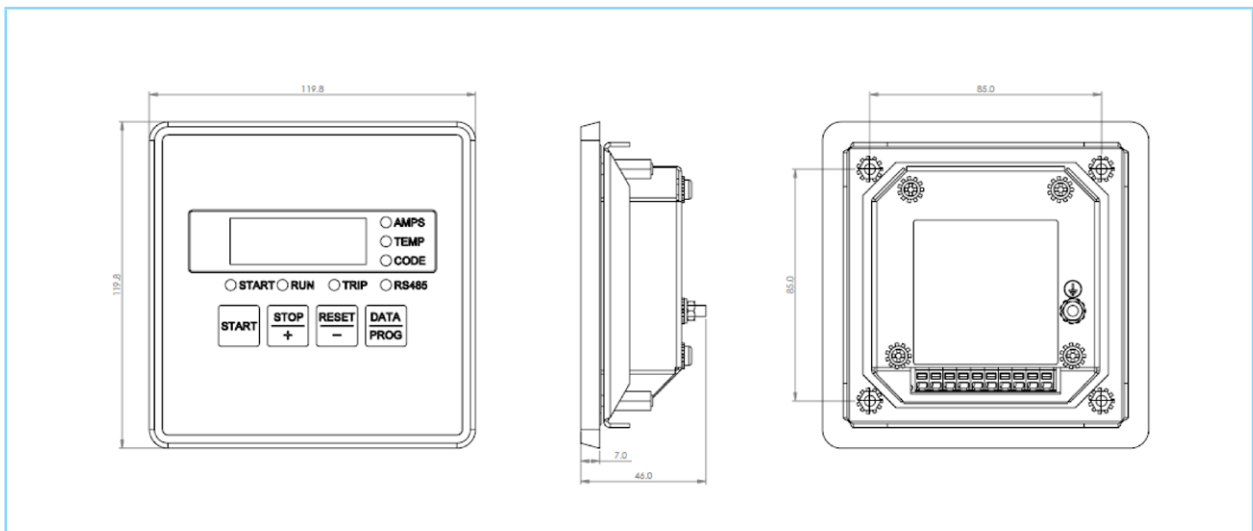
### ASTAT XB and XBm



### Dimensions in mm (inch)

Model	A Width	B Width	C Height	D Height	E Depth	F	G	H	Weight kg (lb)
QS/QCxxB018X									
QS/QCxxB034X									
QS/QCxxB042X	98 (3.85)	82 (3.22)	201 (7.91)	188 (7.40)	165 (6.49)	55 (2.16)	90,5 (3.6)	23 (0.9)	2.1 (4.6)
QS/QCxxB048X									
QS/QCxxB060X									
QS/QCxxB075X									
QS/QCxxB085X	145 (5.70)	124 (4.88)	215 (8.46)	196 (7.71)	193 (7.59)		110,5 (4.4)	37 (1.5)	3.8 (8.4)
QS/QCxxB100X									
QS/QCxxB140X									
QS/QCxxB170X	200 (7.87)	160 (6.29)	240 (9.44)	216 (8.50)	214 (8.42)		114,5 (4.5)	51 (2.0)	6.1 (13.5)
QS/QCxxB200X									

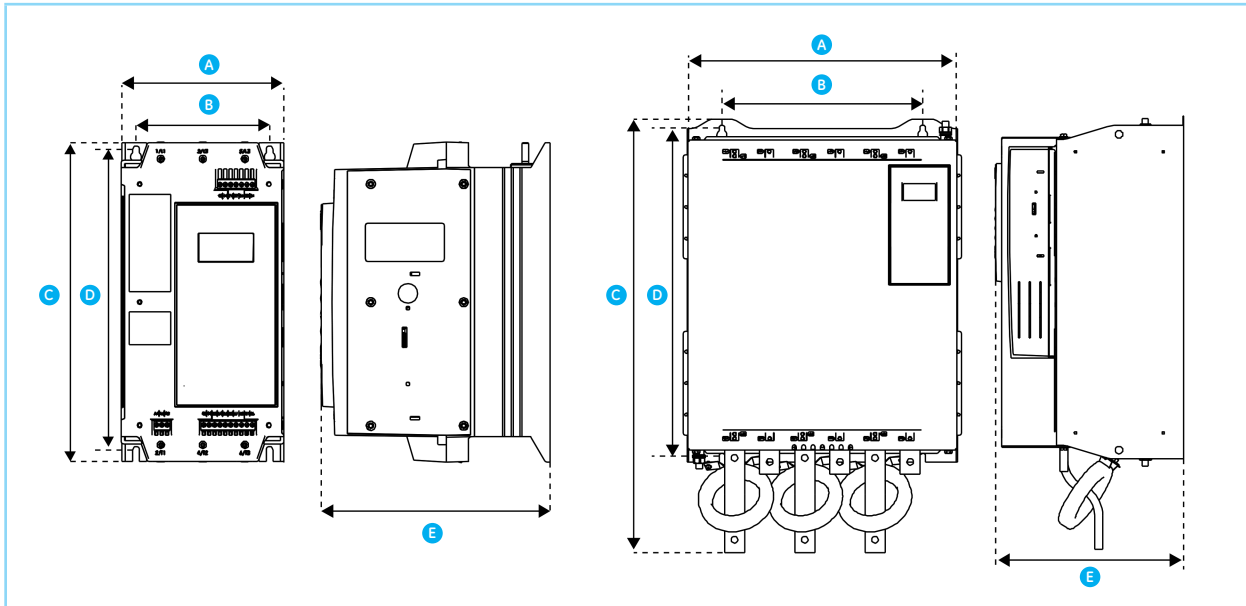
### Remote operator of ASTAT XB and XBm



Dimensions in mm (inch = mm x 0.03937) - Weight in kg (lb = kg x 2.2046)



Dimensions  
ASTAT XL



Dimensions in mm (inch)

Model	A Width	B Width	C Height	D Height	E Depth	Weight kg (lb)
QLxxB0023D						
QLxxB0043D					183 (7.2)	4.1 (9.0)
QLxxB0050D						
QLxxB0053D	150 (5.9)	124 (4.9)	295 (11.6)	278 (10.9)		4.4 (9.7)
QLxxB0076D						
QLxxB0097D					213 (8.4)	4.9 (10.8)
QLxxB0100D						
QLxxB0105D						13.6 (30.0)
QLxxB0145D						13.8 (30.4)
QLxxB0170D						
QLxxB0200D	275 (10.8)	250 (9.8)	438 (17.2)	380 (15.0)	248 (9.8)	14.6 (32.2)
QLxxB0220D						26 (57.3)
QLxxB0255D						
QLxxB0350D	424 (16.7)	376 (14.8)	440 (17.3)	392 (15.4)	296 (11.7)	29.4 (64.8)
QLxxB0425D						
QLxxB0500D						49 (108.0)
QLxxB0580D						
QLxxB0700D	433 (17.0)	320 (12.6)	640 (25.2)	600 (23.6)	293 (11.5)	62.5 (137.8)
QLxxB0820D						
QLxxB0920D						63 (138.9)
QLxxB1000D						
QLxxX0255D	390 (15.4)	320 (12.6)	460 (18.1)	400 (15.7)	278 (10.9)	23 (50.7)
QLxxX0360D						
QLxxX0380D						36 (79.4)
QLxxX0430D						
QLxxX0620D	430 (16.9)	320 (12.6)	689 (27.1)	522 (20.6)	301 (11.9)	39.5 (87.1)
QLxxX0650D						
QLxxX0790D						51.5 (113.5)
QLxxX0930D						128.5 (283.3)
QLxxX1200D						
QLxxX1410D	574 (22.6)	500 (19.7)	860 (33.9)	727 (28.6)	362 (14.3)	130 (286.6)
QLxxX1600D						140 (308.6)

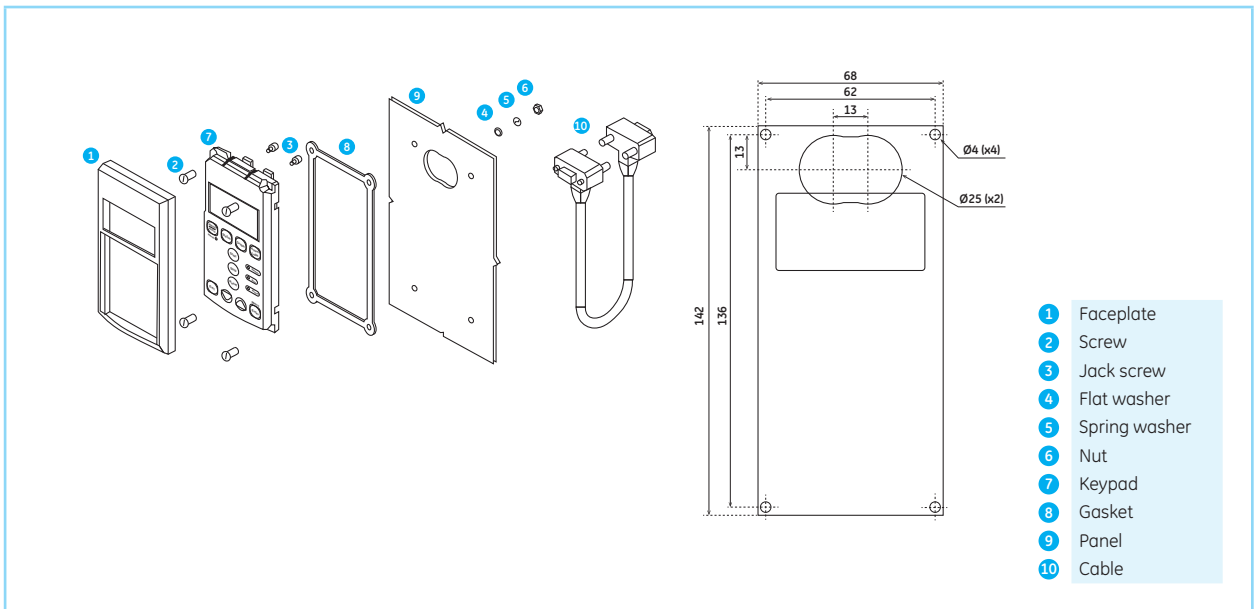
Dimensions in mm (inch = mm x 0.03937) - Weight in kg (lb = kg x 2.2046)



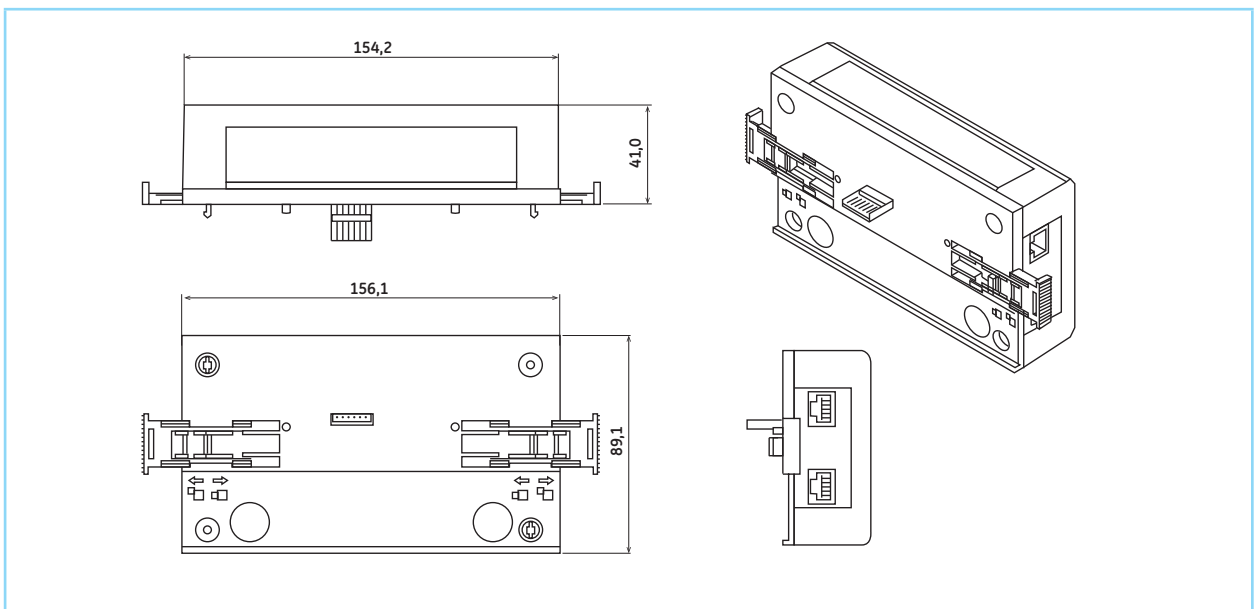
# ASTAT XB - XBm - XL

## Dimensions

### ASTAT XL remote control panel



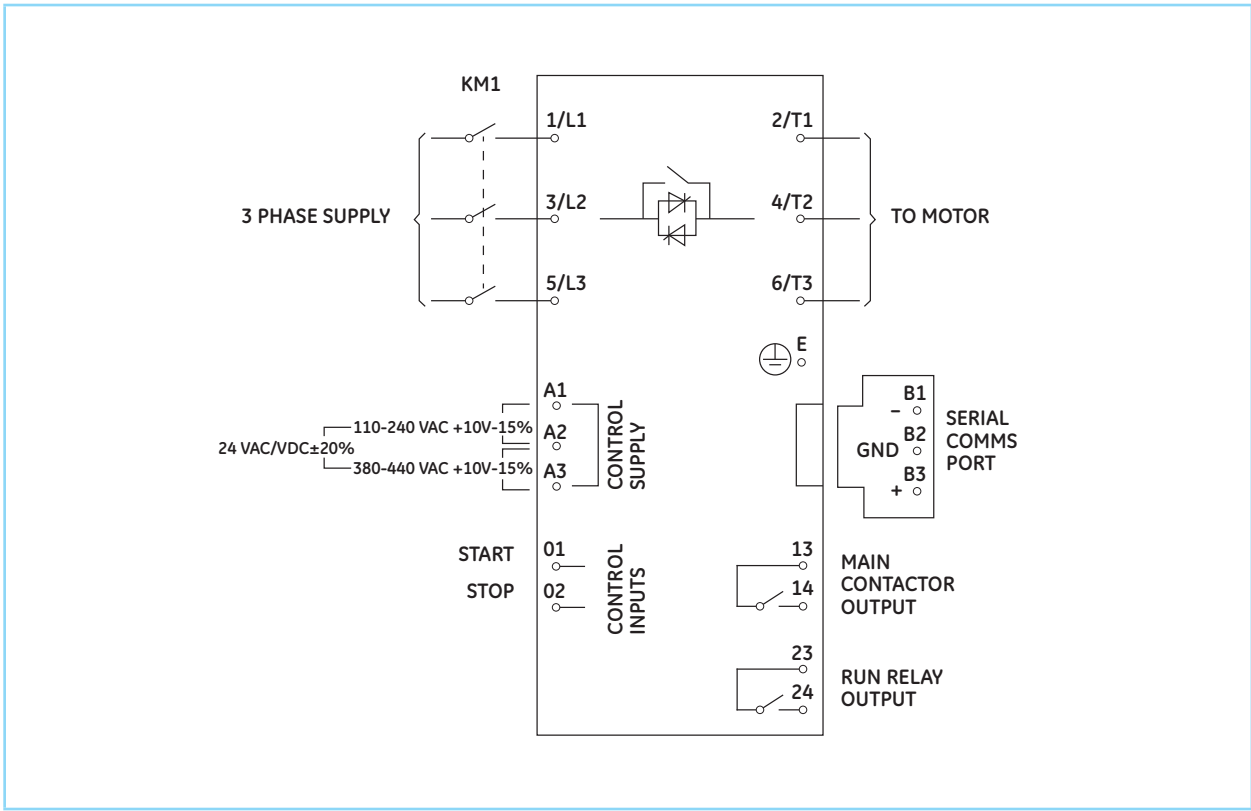
## Communication modules



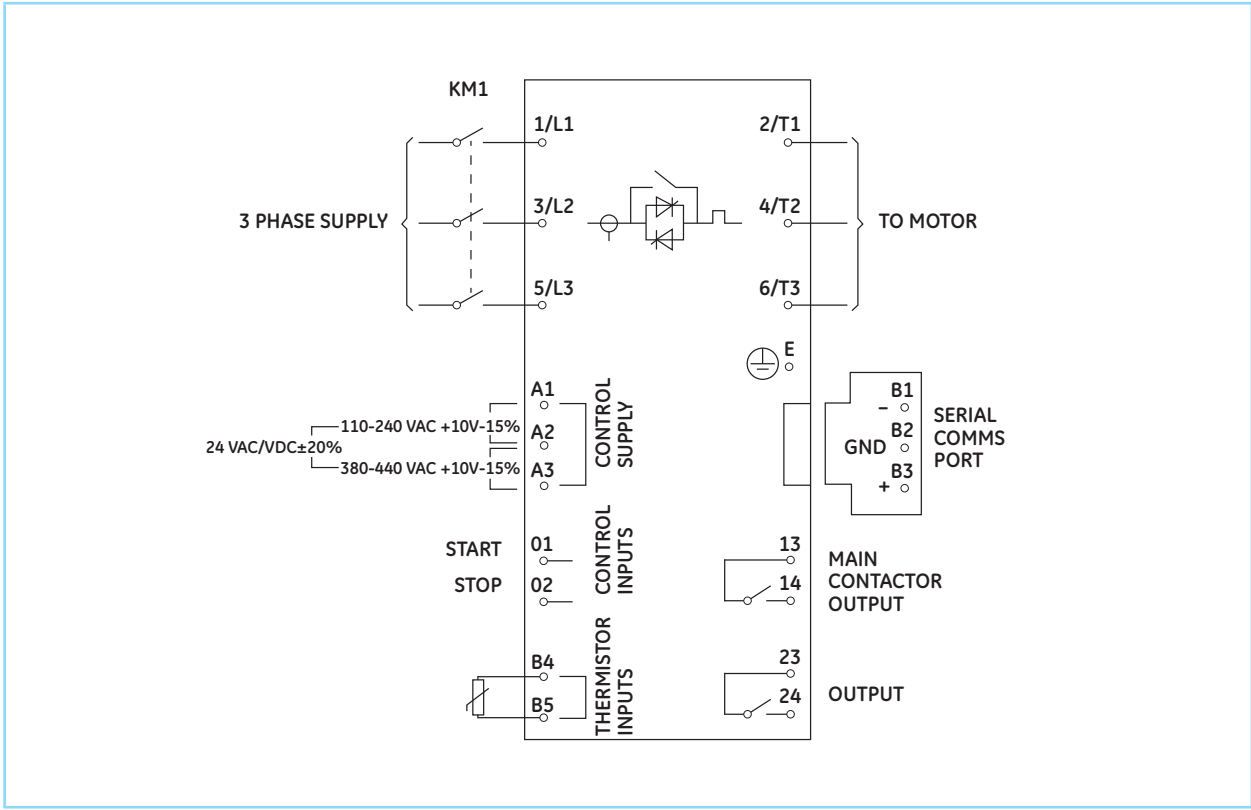
Dimensions in mm (inch = mm x 0.03937) - Weight in kg (lb = kg x 2.2046)



Basic wiring diagrams  
ASTAT XB



ASTAT XBm



# ASTAT XB - XBm - XL

## Semiconductor Fuses

Semiconductor fuses can be used with ASTAT XB and XBm soft starters to reduce the potential for damage to SCRs from transient overload currents and for Type 2 coordination. ASTAT XB and XBm soft starters have been tested to achieve Type 2 coordination with semiconductor fuses. Suitable Bussmann and Ferraz/Mersen semiconductor fuses are detailed below:

Model	SCR I <sup>2</sup> t (A <sup>2</sup> s)	Ferraz/Mersen Fuse European/IEC style (North American style)	Bussmann Fuse Square body	Bussmann Fuse British style (BS88)
QS/QCxx018	1150	6.6URD30xxxA0063 (A070URD30xxx0063)	170M-1314	63 FE
QS/QCxx034	8000	6.6URD30xxxA0125 (A070URD30xxx0125)	170M-1317	160 FEE
QS/QCxx042	10500	6.6URD30xxxA0160 (A070URD30xxx0160)	170M-1318	160 FEE
QS/QCxx048	15000	6.6URD30xxxA0160 (A070URD30xxx0160)	170M-1318	180 FM
QS/QCxx060	18000	6.6URD30xxxA0160 (A070URD30xxx0160)	170M-1319	180 FM
QS/QCxx075	51200	6.6URD30xxxA0250 (A070URD30xxx0250)	170M-1321	250 FM
QS/QCxx085	80000	6.6URD30xxxA0315 (A070URD30xxx0315)	170M-1321	250 FM
QS/QCxx100	97000	6.6URD30xxxA0315 (A070URD30xxx0315)	170M-1321	250 FM
QS/QCxx140	168000	6.6URD31xxxA0450 (A070URD31xxx0450)	170M-1322	500 FMM
QS/QCxx170	245000	6.6URD31xxxA0450 (A070URD31xxx0450)	170M-3022	500 FMM
QS/QCxx200	320000	6.6URD31xxxA0450 (A070URD31xxx0450)	170M-3022	500 FMM

ASTAT XL: see pages 69 to 75 from User Manual of ASTAT XL.

Soft starters

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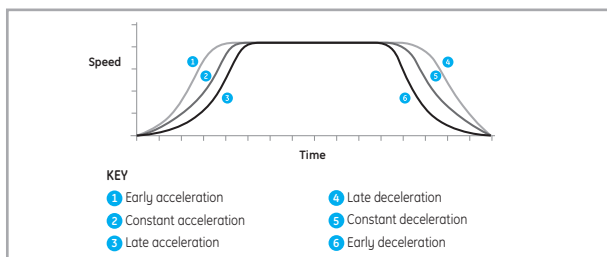
New



# ASTAT XL - Adaptive Control

**New soft start control type that allows the selection of different acceleration and deceleration profiles according to application needs.**

Gradual and shock free acceleration can benefit all motor applications, but many situations need more precise control over acceleration and/or deceleration. Ideal for pump stopping: Match the deceleration profile to the unique hydraulic characteristics of the individual system.



### Two algorithms

Adaptive control is based on two algorithms, one for measuring (learning) the motor characteristics and one for controlling the motor

### Starting and stopping profiles

The control algorithm defines starting and stopping profiles which relate motor speed to elapsed time.

### Comparison

During each start and stop, adaptive control compares the motor's estimated speed with the selected profile.

### Refining the model

The algorithm refines its model with data from every subsequent start and stop.

### First soft start

During the first soft start the measuring algorithm measures the motor's characteristics at zero speed and at maximum efficiency

### Up to six profiles

ASTAT XL allows for control with three acceleration and three deceleration profiles.

### Adjustment

The soft starter then adjusts the power to the motor to achieve the selected profile (more power if the estimated speed is to low, less power if the speed is to high).

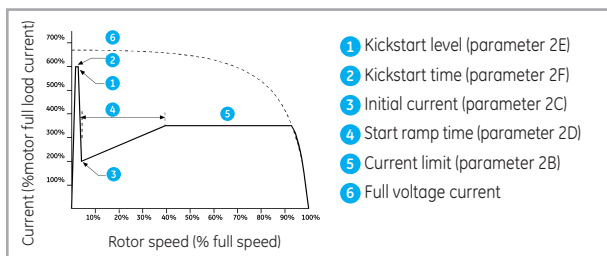
### Fine tuning

The user can fine tune the adaptive control gain for smoother performance.

### Kickstart (ASTAT XL)

Provides a short boost of extra torque at the beginning of a start, and can be used in conjunction with current ramp or constant current starting.

Kickstart can be useful to help start loads that require high breakaway torque but then accelerate easily (for example: flywheel loads such as presses).



### Other features

#### Emergency Run Mode (Fire mode)

In some cases, the equipment must run at all costs (eg ventilation fans in high rise buildings must run in case of fire, regardless of the risk to the

starter). It initiates a start and deactivates all protections, allowing the motor to run as long as possible.

#### Dual Parameter Set

Supports two sets of motor data and start/stop profile:

- duty-standby pumps
- different start performance for varying load conditions
- soft braking

#### PowerThrough

The starter can operate in two-phase control if one SCR is damaged. This allows continued operation while arranging repairs.

#### Auto-Reset

Auto-reset selected trips. It allows uninterrupted safe operation of un-manned installations.

You can select which trips to reset, reset delay and maximum resets.

#### DC Brake

Electrically brakes high inertia loads. It increase productivity of machines such as band-saws

and chippers by reducing the time needed to replace saw bands or cutting heads. The starter pulses the DC over all three phases and does not require an external contactor.

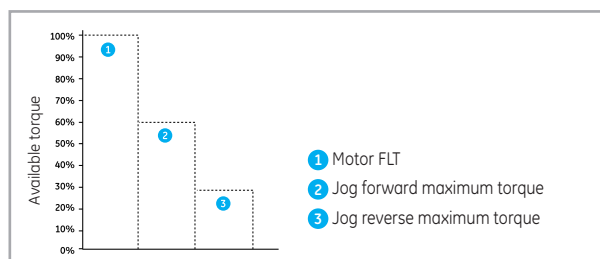
#### 24 VDC Output

Provides an in-built 24 VDC auxiliary power supply, removing the cost of a separate supply.

#### Jog

Run the motor at part speed (approx 11%). The maximum torque is approx 60% of motor FLT in forward and 45% FLT in reverse.

Ideal to position loads such as mixers or hopper bins ready for unloading



### UL Compliance: Terminal/Connector Parts

For models QLxxB145D~QLxxB425D and QLxxX255D~QLxxX1K6D to be UL compliant, you must use the recommended pressure terminal/connector as detailed in the table below.

Model	FLC (A)	No. of wires	Recommended lugs part No.
QLxxB145D	145	1	OPHD 95-16
QLxxB170D	170	1	OPHD 120-16
QLxxB200D	200	1	OPHD 150-16
QLxxB220D	220	1	OPHD 185-16
QLxxB255D	255	1	OPHD 240-20
QLxxB350D	350	1	OPHD 400-16
QLxxB425D	425	2	OPHD 185-16
QLxxX255D	255	1	OPHD 240-20
QLxxX360D	360	1	OPHD 240-20
QLxxX380D	380	1	OPHD 240-20
QLxxX430D	430	2	1 x 600T-2
QLxxX620D	620	2	1 x 600T-2
QLxxX650D	650	2	1 x 600T-2
QLxxX790D	790	4	2 x 600T-2
QLxxX930D	930	3	2 x 600T-2
QLxxX1K2D	1200	4	1 x 750T-4
QLxxX1K4D	1410	4	1 x 750T-4
QLxxX1K6D	1600	5	1 x 750T-4 and 1 x 600T-3



# ASTAT XB - XBm - XL

## Basic wiring diagrams

- 1 x programmable input where you can connect transducers and probes, simpler control circuits and lower installation cost.
- 3 x remote digital inputs
- 3 x programmable outputs
- 1 x Analog output

## Adjustable Busbars

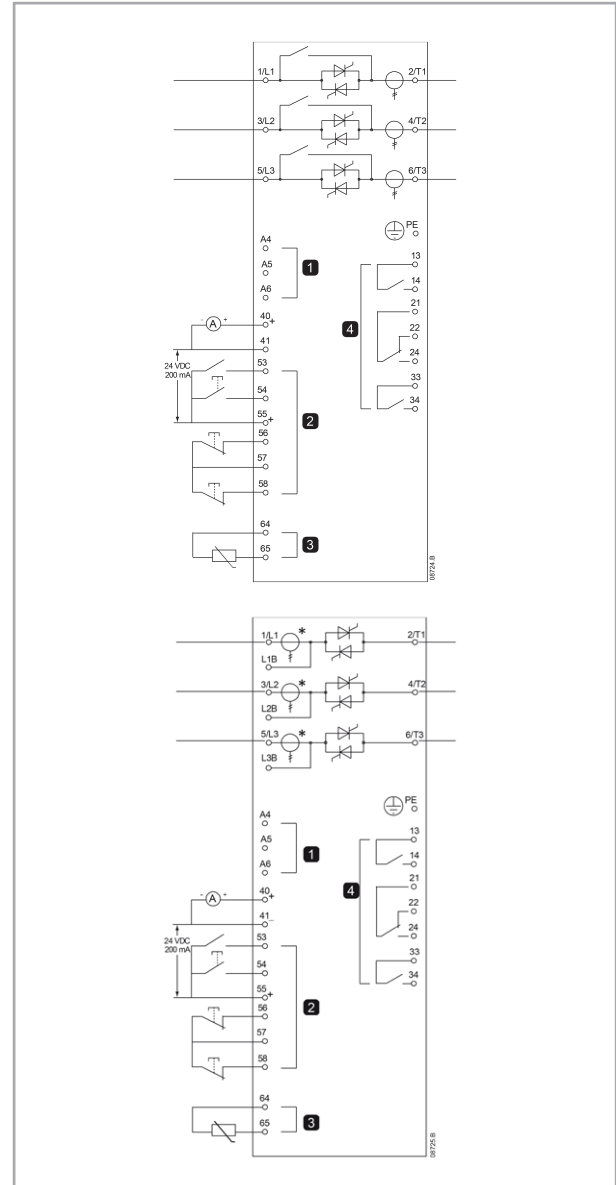
Cabling or busbar work for higher power installations can be costly and require significant panel space. ASTAT XL soft starters  $\geq 360$  A reduce cable costs and panel space requirements because they allow for top or bottom connection of both input and output cabling.

## Easy access of Control terminals

Pluggable terminal blocks make wiring easy. Separate terminal blocks for control and I/O ensure tidier wiring.



## Schematic diagrams



1	Control voltage (model dependent)
2	Remote control inputs
3	Motor thermistor input
4	Relay outputs
40, 41	Analog output
55, 41	24 VDC output
54, 55	Start
56, 57	Stop
58, 57	Reset
53, 55	Programmable input A
13, 14	Relay output A
21, 22, 24	Relay output B
33, 34	Relay output C

### NOTE

Different models require control voltage to different terminals:

- 1 (110~120 VAC) A5, A6
- 1 (220~240 VAC) A4, A6
- 2 (24 VAC/VDC) A5, A6

### NOTE

\* QLxxX255D current transformers are located on the output. Bypass terminals are labelled T1B, T2B and T3B.





# Control Panel

Full text language display

Metering screens  
Trip diagnostics  
Trip log  
Event log

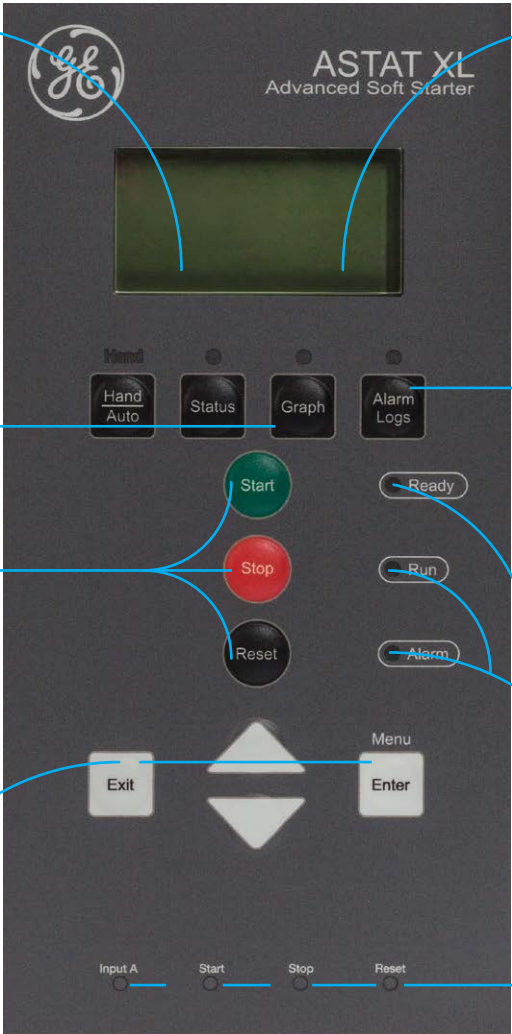
Shortcut keys

Performance logs and commissioning tools

Local control push-buttons

Status LEDs

Navigation buttons



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# Quick Setup

1. Select your application
2. Starter suggests typical parameters and values
3. Review and adjust as required

Quick Setup		
Pump centrifugal ->	-> Pump centrifugal	
Pump submercible fan, damped Fan, undamped Compressor, screw Compressor, reciprocating Conveyor Crusher, rotary Chusher, jaw	<b>Parameter</b> Motor FLC Stat mode Adaptive Start Profile Start ramp time Stop mode Adaptive stop profile Stop time	<b>Suggested value</b> Model dependent Adaptive control Early acceleration 10 seconds Adaptive control Late decelarion 15 seconds

New



# ASTAT XB - XBm - XL

## Accessories XB - XBm

### Remote Operator

(only for ASTAT XB and XBm) , QORCPXB , 872392

The remote operator controls and monitors motor performance via a communication module including:

- Operational control (start, stop, reset)
- Status monitoring (start, run and trip)
- Performance monitoring (motor current and temperature)
- Trip Code display
- 4-20mA analog output



## Accessories XL

### Remote Control Panel

Beside the control panel located on the soft starter ASTAT XL, it is possible to have a remote control panel that replicates display functionality and content, while operating in parallel. This control panel is hot removable and it has function the copycat function. Remote mountable keypad with IP65 and supplied with 3m cable



## Common accessories XB - XBm - XL

### Communication Modules

Supports USB and many network communication such as Profibus, Profinet, Ethernet, DeviceNet and Modbus RTU protocols, via an easy-to-install Plug & Play communication interface modules.



### IP20 Protection Kit

This option ensures personnel safety by preventing accidental contact with live terminals. Provide IP20 protection when used with cable of diameter 22mm or greater.



### ASTAT Setup Tool ed.3

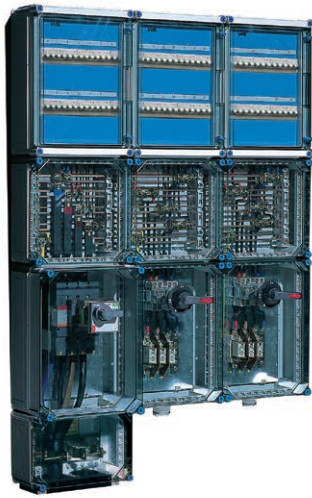
With this new edition, exclusive for ASTAT XB, XBm and XL series, you can control and monitor your soft starter from your desktop computer.



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# System Enclosures / Distribution Boards



## QuiXtra\* 630

Low voltage distribution board for commercial and industrial environments.

☑ IP43

According to IEC 61439-2

Range of 24 different enclosures:

9 heights, from 450 up to 1800 mm

3 widths: 364, 660 and 876 mm

1 depth: 250 mm

Rated operational voltage: 415V

Rated current up to 630A



## QuiXtra\* 4000

Low voltage distribution board for commercial and industrial environments.

☑ IP30 and IP55

According to IEC 61439-2

Range of 11 different enclosures:

1 height, 2155 mm

4 widths: 447, 600, 743 and 959 mm

3 depths: 450, 600 and 800 mm

Rated operational voltage: 415V, 690V

Rated current up to 4000A

## VMS

Modular enclosures system

Modular enclosures of glass-fibre reinforced polycarbonate.

☑ IP65 - IK08

According to EN/IEC 61439-2

Rated current up to 1100A

Modular dimensions in increments of 100 mm in height and width, in five sizes:

320 x 220 mm

640 x 320 mm

320 x 320 mm

640 x 440 mm

440 x 320 mm



## SEN Plus

A comprehensive range of low voltage switchgear applications:

- withdrawable and fixed power centres with air circuit breakers
- distribution panels with fully withdrawable or fixed versions for MCCBs and fuse switches
- motor control centres with fully withdrawable or fixed technique for fused/fuseless motor starter applications



# General Purpose Enclosures



## ARIA

### Multipurpose polyester cabinets

▣ IP66 - IK08  
UL - CSA - Lloyd's  
7 sizes, from 315 x 215 x 170 mm up to 1035 x 835 x 300 mm.  
Made out of glass-fibre reinforced polyester, RAL7035. Monobloc design.



## PolySafe

### Multipurpose polyester cabinets

▣ IP65/IP54 - IK10  
UL - CSA - Lloyd's  
14 standard dimensions, from 500 x 500 mm up to 1250 x 1000 mm.  
One depth: 320 mm.  
Made out of glass-fibre reinforced polyester, RAL7035. Panel design, without mold-in metal parts. Allows combination in height, width and depth



## APO

### Modular polyester boxes

▣ IP67 - IK08  
UL - CSA - Lloyd's  
9 basic enclosures from 185 x 150 x 130 mm up to 600 x 600 x 175 mm.  
Greater depth is obtained by depth extension frames. Enclosures can be combined in height and width.



## MultiBox

### Small multipurpose boxes

▣ IP66 - IK07/08  
11 basic sizes, from 65 x 65 mm up to 361 x 254 mm.  
With 5 cover depths.  
Made of polystyrene or glass-fibre reinforced polycarbonate.



## EH

### Cabinets for underground cable distribution.

More than 30 enclosures, in various configurations: DIN and non-DIN size, with double compartments, with increased depth, with front and rear doors. Providing solutions to various applications.



## UC-Cabinet

### Underground connection cabinet

5 standard configurations.  
32A up to 125A outgoing ratings.  
The diving bell principle prevents flood damage.



Everything is under control





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# Controls Alphabetical Index

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077BMM	200205		077M4S4TX88	180929	F.50	077SP1M	180522	F.56	080SP2SFC	170841	F.56
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077C9901	179901	F.35	077M4S4TY88	180933	F.50	077SP1SFE	180536	F.56	080SP3	170803	F.56
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077C9903	179903	F.35	077M4T4TY88	180931	F.50	077SP20	180532	F.56	080SP35SF	170865	F.56
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077C9910	179910	F.35	077MISG	181153	F.52	077SP25SFE	180548	F.56	080SP3SF	170849	F.56
077CF73033	173033	F.35	077MISR	181151	F.52	077SP2M	180524	F.56	080SP3SFC	170847	F.56
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077E01	180069	F.47	077MTS2422B	181000	F.50	077SP9SFE	180544	F.56	080XTG807	179540	F.36
077E10	180059	F.47	077MTS2422HD	200246	F.50	077SUN22	180440		080XTGR	179514	F.36
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BA95615	187851	F.14	CK08CA311M	111581	A.49	CL00A301TK	109186	A.42	CL01A310TU	104085	A.42
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BA956LEDV	187164	F.11	CK08CA311Z	110251	A.49	CL00A301TY	109195	A.42	CL01A400T1	110600	A.43
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MARL110AF	100515	A.38	MCI301AF2	102681	A.34	MCI4000AI6	100188	A.36	MCI301ATKW	102377	A.34
MARL110AFS	100521	A.38	MCI301AF6	102685	A.34	MCI4000AI9	100189	A.36	MCI301ATWG	100409	A.34
MARL110AI	100517	A.38	MCI301AFJ	100243	A.34	MCI4000AIJ	100423	A.36	MCI301ATWG-B	200795	A.34
MARL110AIS	100523	A.38	MCI301AFN	100244	A.34	MCI4000AIM	101708	A.36	MCI301ATWI	100357	A.34
MARL110AR	103356	A.38	MCI301AFU	100109	A.34	MCI4000AIN	100424	A.36	MCI301ATWJ-B	220370	A.34
MARL110ARS	103299	A.38	MCI301AFW	102678	A.34	MCI4000AIU	100425	A.36	MCI301ATWL-B	220459	A.34
MARL110AT	100513	A.38	MCI301AH6	116938	A.34	MCI4000AIV	295150	A.36	MCI301ATWN-B	220368	A.34
MARL110ATS	100519	A.38	MCI301AI1	102722	A.34	MCI4000AT1	102986	A.36	MCI301ATWS-B	220358	A.34
MARN202AR	103351	A.37	MCI301AI6	107167	A.34	MCI4000AT2	102987	A.36	MCI301AID	125848	A.34
MARN202AT	100992	A.37	MCI301AI9	100149	A.34	MCI4000AT6	102991	A.36	MCI301AFB	100230	A.34
MARN211AR	103350	A.37	MCI301AIU	100263	A.34	MCI4000AT7	102992	A.36	MCI301AFD	100236	A.34
MARN211AT	100993	A.37	MCI301AIN	100264	A.34	MCI4000AT9	100296	A.36	MCI301AID	100256	A.34
MARN220AR	103349	A.37	MCI301AIU	100265	A.34	MCI4000ATJ	100363	A.36	MCI301AIG	100257	A.34
MARN220AT	100994	A.37	MCI301AR1	103399	A.34	MCI4000ATJMP	103989	A.36	MCI301ARWD	100429	A.34
MARN400AR	103300	A.37	MCI301AR9	103400	A.34	MCI4000ATK	102979	A.36	MCI301ARWJ	101713	A.34
MARN404AT	100987	A.37	MCI301ARJ	100175	A.34	MCI4000ATM	102980	A.36	MCI301ATB	100210	A.34
MARN413AR	103355	A.37	MCI301ARN	103403	A.34	MCI4000ATN	100364	A.36	MCI301ATD	100216	A.34
MARN413AT	100988	A.37	MCI301ARU	103404	A.34	MCI4000ATNMP	103988	A.36	MCI301ATDD	113312	A.34
MARN422AR	103354	A.37	MCI301AT1	102638	A.34	MCI4000ATU	100365	A.36	MCI301ATDV	100117	A.34
MARN422AT	100989	A.37	MCI301AT2	102639	A.34	MCI4000ATW	102984	A.36	MCI301ATE	102732	A.34
MARN431AR	103353	A.37	MCI301AT6	102643	A.34	MCI4000ATY	102985	A.36	MCI301ATG	100217	A.34
MARN431AT	100990	A.37	MCI301AT7	102644	A.34	MCI4000G15	290489	A.36	MCI301ATJ	100218	A.34
MARN440AR	103352	A.37	MCI301AT9	100320	A.34	MCI4000G18	290482	A.36	MCI301ATWD	102376	A.34
MARN440AT	100991	A.37	MCI301ATJ	100223	A.34	MCI4000AF2	103092	A.36	MCI301ATWG	100380	A.34
MATV10AT	101022	A.53	MCI301ATJ-B	220352	A.34	MCI4000AFJ	100413	A.36	MCI301ATWH-B	200793	A.34
MBOA10	100450	A.34/B.9	MCI301ATN	100224	A.34	MCI4000AFN	100190	A.36	MCI301ATWI	100356	A.34
MBOA16	102367	A.34/B.9	MCI301ATNMP	103982	A.34	MCI4000AFU	100207	A.36	MCI301ATWJ-B	220371	A.34
MBOA19G	293071	A.34/B.9	MCI301ATU	100225	A.34	MCI4000AIN	100208	A.36	MCI301ATWL-B	220460	A.34
MBOA1E	209469	A.34/B.9	MCI301ATW	102636	A.34	MCI4000AIU	100302	A.36	MCI301ATWN	247309	A.34
MBOA1G	136013	A.34/B.9	MCI301ATY	102637	A.34	MCI4000AT1	103028	A.36	MCI301ATWN-B	220369	A.34
MBOA3	102409	A.34/B.9	MCI301GFJ	290238	A.36	MCI4000AT2	103029	A.36	MCI301ATWS-B	200792	A.34
MBOA5	102411	A.34/B.9	MCI301G11	290403	A.34	MCI4000AT6	103033	A.36	MCI301ATB	125659	A.34
MBOA7	102413	A.34/B.9	MCI301G1J	290428	A.34	MCI4000AT9	100305	A.36	MCI301JTD	125849	A.34
MBOA8	102414	A.34/B.9	MCI301GIN	290397	A.34	MCI4000ATF	103019	A.36	MCI400AFD	100396	A.36
MBOA9	133717	A.34/B.9	MCI301OF1	102659	A.34	MCI4000ATH	103020	A.36	MCI400AFWN	100330	A.36
MBOACG	293075	A.34/B.9	MCI301AF2	102660	A.34	MCI4000ATJ	100383	A.36	MCI400AIB	100420	A.36
MBOADG	133275	A.34/B.9	MCI301AF6	102664	A.34	MCI4000ATK	103021	A.36	MCI400AID	100426	A.36
MBOAFG	133276	A.34/B.9	MCI301AFJ	100179	A.34	MCI4000ATM	103022	A.36	MCI400AIVN	100332	A.36
MBOAGG	293077	A.34/B.9	MCI301AFN	100234	A.34	MCI4000ATM-B	220377	A.36	MCI301ARWD	102543	A.36
MBOAJG	133277	A.34/B.9	MCI301AFU	100235	A.34	MCI4000ATN	100384	A.36	MCI400ARV	100389	A.36
MBOAK	102400	A.34/B.9	MCI301AH6	116492	A.34	MCI4000ATU	100385	A.36	MCI400ARWJ	200003	A.36
MBOAME	133385	A.34/B.9	MCI301AHU	116494	A.34	MCI4000ATW	100308	A.36	MCI400ATB	100360	A.36
MBOANE	209482	A.34/B.9	MCI301AHUMP	116474	A.34	MCI4000ATX	103063	A.36	MCI400ATD	100366	A.36
MBOANJ	125817	A.34/B.9	MCI301AI1	102701	A.34	MCI4000ATY	100310	A.36	MCI400ATG	100367	A.36
MBOANM	125371	A.34/B.9	MCI301AI6	101707	A.34	MCI4000ATZ	100405	A.36	MCI400ATH	103220	A.36
MBOAO	116400	A.34/B.9	MCI301AI9	100180	A.34	MCI4000AT1	100312	A.36	MCI400ATJ	100368	A.36
MBOARG	133651	A.34/B.9	MCI301AIU	100253	A.34	MCI4000AT2	100433	A.36	MCI400ATWD	102387	A.36
MBOATJ	125820	A.34/B.9	MCI301AIK	100439	A.34	MCI4000AT3	100434	A.36	MCI400ATWJ	100358	A.36
MBOAUG	133278	A.34/B.9	MCI301AIN	100254	A.34	MCI4000AT4	100322	A.36	MCI400ATWJ-B	102389	A.36
MBOAWM	137191	A.34/B.9	MCI301AIU	100255	A.34	MCI4000AT5	103007	A.36	MCI400ATWL-B	220462	A.36
MBOCBG	135135	A.34/B.9	MCI301AIW	102699	A.34	MCI4000AT6	103008	A.36	MCI400ATWN-B	220340	A.36
MBOCDG	137282	A.34/B.9	MCI301AR1	103386	A.34	MCI4000AT7	103012	A.36	MCI400ATWS-B	220359	A.36
MBOCJG	137287	A.34/B.9	MCI301AR9	103387	A.34	MCI4000AT8	103013	A.36	MCI400AID	133164	A.36
MBOCLE	133186	A.34/B.9	MCI301ARJ	100182	A.34	MCI4000AT9	100400	A.36	MCI400AFD	100406	A.36
MBOCNG	137289	A.34/B.9	MCI301ARN	103390	A.34	MCI4000ATC	102996	A.36	MCI400AIB	100436	A.36
MBOCWD	137286	A.34/B.9	MCI301ARU	103391	A.34	MCI4000ATE	102997	A.36	MCI400AIVD	247772	A.36
MBOCWG	137285	A.34/B.9	MCI301AT1	102617	A.34	MCI4000ATF	102998	A.36	MCI400ARWD	100580	A.36
MBOCJW	102497	A.34/B.9	MCI301AT10	100472	A.34	MCI4000ATH	102999	A.36	MCI400ARWJ	200002	A.36
MBOA1	102407	A.34/B.9	MCI301AT2	102618	A.34	MCI4000ATJ	100373	A.36	MCI400ATB	100352	A.36
MBOA4	102410	A.34/B.9	MCI301AT6	102622	A.34	MCI4000ATJMP	103991	A.36	MCI400ATD	100376	A.36
MBOA6	102412	A.34/B.9	MCI301AT6MP	100249	A.34	MCI4000ATK	103000	A.36	MCI400ATG	100377	A.36
MBOAC	102396	A.34/B.9	MCI301AT7	102623	A.34	MCI4000ATM	103001	A.36	MCI400ATJ	100378	A.36
MBOAD	100451	A.34/B.9	MCI301AT9	100298	A.34	MCI4000ATN	100374	A.36	MCI400ATL	101717	A.36
MBOAE	102397	A.34/B.9	MCI301ATJ	100213	A.34	MCI4000ATR	103002	A.36	MCI400ATWD	102388	A.36
MBOAG	100452	A.34/B.9	MCI301ATK	102610	A.34	MCI4000ATS	103003	A.36	MCI400ATWI	100359	A.36
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MBOAN	100454	A.34/B.9	MCI301ATNMP	103980	A.34	MCI4000ATW	103005	A.36	MCI400ATWN-B	220341	A.36
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MBOAW	102405	A.34/B.9	MCI301ATY	102616	A.34	MCI3010ATD	290522	A.36	MCI3010ATD	100572	A.35
MBOAY	102406	A.34/B.9	MCI301GFF	290188	A.34	MCI3010ATD	290512	A.36	MCI3010ATD	113326	A.35
MBOCA	102415	A.34/B.9	MCI301GFN	137373	A.34	MCI301AFD	100246	A.34	MCI3010ARD	103447	A.35
MBOCB	100460	A.34/B.9	MCI301GFU	290171	A.34	MCI301AFG	100440	A.34	MCI3010ATD	100577	A.35
MBOCC	102416	A.34/B.9	MCI301GHU	102688	A.34	MCI301AFJ	100248	A.34	MCI3010ARD	103446	A.35
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MC2A310AT1	103577	A.34	MCR000ATN	100044	B.9	MCR022AFWL	100494	B.9	MCR040ATW	101003	A.53
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MC2A310AT6	103579	A.34	MCR000ATW	102095	B.9	MCR022AIDS	100495	B.9	MCR040ATW	101005	A.53
MC2A310AT9	103268	A.34	MCR000ATY	102096	B.9	MCR022ARWD	100069	B.9	MCR040ATW	101006	A.53
MC2A310ATC	135703	A.34	MCR013AF1	101653	B.9	MCR022ARWJ	102494	B.9	MCR040ATW	101007	A.53
MC2A310ATJ	103573	A.34	MCR013AF6	100479	B.9	MCR022ATB	100020	B.9	MCR040ATW	101008	A.53
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MC2A310ATU	103575	A.34	MCR013AIN	100134	B.9	MCR022ATE	102334	B.9	MCR040ATW	101012	A.53
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MC2A400ATN	116177	A.36	MCR022AFJ	100073	B.9	MCR031AFD	100066	B.9	MCR040ATW	103549	A.53
MC2A400ATU	103292	A.36	MCR022AFN	100074	B.9	MCR031AFJ	100086	B.9	MCR040ATW	103550	A.53
MC2A400ATW	116193	A.36	MCR022AFW	100481	B.9	MCR031AFWN	100529	B.9	MCR040ATW	103551	A.53
MC2AB00AT1	101648	A.36	MCR022AIG	100482	B.9	MCR031AID	100116	B.9	MCR040ATW	103552	A.53
MC2AB00AT6	103027	A.36	MCR022AIJ	100123	B.9	MCR031AIG	100100	B.9	MCR040ATW	103553	A.53
MC2AB00AT9	248068	A.36	MCR022AIN	100124	B.9	MCR031ARWD	102346	B.9	MCR040ATW	103554	A.53
MC2AB00ATJ	110548	A.36	MCR022AIU	100125	B.9	MCR031ARWE	102360	B.9	MCR040ATW	101026	A.53
MC2AB00ATN	135699	A.36	MCR022ARJ	100485	B.9	MCR031ARWJ	102493	B.9	MCR040ATW	101028	A.53
MC2AB00ATW	247441	A.36	MCR022ARU	103318	B.9	MCR031ATB	100010	B.9	MCR040ATW	101030	A.53
MC2C301AID	247948	A.34	MCR022AT1	102055	B.9	MCR031ATD	100016	B.9	MCR040ATW	101032	A.53
MC2C301ARWD	100438	A.34	MCR022AT2	102056	B.9	MCR031ATDD	113325	B.9	MCR040ATW	101830	A.53
MC2C301ATB	103589	A.34	MCR022AT4	102058	B.9	MCR031ATDV	100567	B.9	MCR040ATW	100543	A.39
MC2C301ATD	103580	A.34	MCR022AT6	102060	B.9	MCR031ATE	102325	B.9	MCR040ATW	101021	A.53
MC2C301ATDMP	103023	A.34	MCR022AT7	102061	B.9	MCR031ATG	100017	B.9	MCR040ATW	103562	A.53
MC2C301ATDV	100566	A.34	MCR022AT9	108236	B.9	MCR031ATJ	100018	B.9	MCR040ATW	101020	A.53
MC2C301ATG	103581	A.34	MCR022ATJ	100023	B.9	MCR031ATWD	102348	B.9	MCR040ATW	100600	A.39
MC2C301ATWD	102379	A.34	MCR022ATK	102048	B.9	MCR031ATWG	100083	B.9	MCR040ATW	188804	F.24
MC2C301ATWJ	102382	A.34	MCR022ATM	102049	B.9	MCR031ATWJ	100582	B.9	MCR040ATW	187800	F.24
MC2C301ATWL	204886	A.34	MCR022ATN	100024	B.9	MCR031ATWJ-B	107170	B.9	MCR040ATW	187801	F.24
MC2C301ATWN	100435	A.34	MCR022ATU	100025	B.9	MCR031ATWJ-B	220406	B.9	MCR040ATW	187802	F.24
MC2C310ARD	103419	A.34	MCR022ATW	102053	B.9	MCR031ATWL-B	220457	B.9	MCR040ATW	187843	F.34
MC2C310ARWD	100430	A.34	MCR022ATY	102054	B.9	MCR031ATWN-B	220403	B.9	MCR040ATW	187841	F.34
MC2C310ARWJ	101716	A.34	MCR031AF1	101662	B.9	MCR031ATWS-B	220442	B.9	MCR040ATW	187842	F.34
MC2C310ATB	103588	A.34	MCR031AF6	102354	B.9	MCR040AFM	100056	B.9	MCR040ATW	187846	F.24
MC2C310ATD	103584	A.34	MCR031AFJ	107089	B.9	MCR040AFG	100057	B.9	MCR040ATW	187827	F.24
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MC2C310ATDV	100558	A.34	MCR031AI1	101665	B.9	MCR040AFWL	100583	B.9	MCR040ATW	187826	F.24
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P9YPNNG	185900	F.13	PRC4M40CBL	221812	B.3	RL4RA022G1	104921	B.15	RL4RD004TWI	101144	B.15
P9YPNVG	185902	F.13	PRC4M40CDL	221813	B.3	RL4RA022G2	104922	B.15	RL4RD004TWN	104974	B.15
P9YSCD0A95	185970	F.18	PRC4M40CGL	221815	B.3	RL4RA022G3	104923	B.15	RL4RD004TWW	101146	B.15
P9YSCZ0T95	185980	F.18	PRC4M40CJL	221817	B.3	RL4RA022G4	104924	B.15	RL4RD004TX	113085	B.15
P9YSMD0N	185960	F.16	PRC4M40CCKL	220033	B.3	RL4RA022G5	104925	B.15	RL4RD022G8	113040	B.15
P9YSM20N	185962	F.16	PRC4M40CML	220050	B.3	RL4RA022G6	104926	B.15	RL4RD022GD	113046	B.15
PRC1S13BDL	222004	B.5	PRC4M40DCBL	221851	B.3	RL4RA022G7	104927	B.15	RL4RD022GG	113047	B.15
PRC1S13BNL	222013	B.5	PRC4M40DCDL	221852	B.3	RL4RA022G8	104928	B.15	RL4RD022GH	113088	B.15
PRC1S13CBL	222007	B.5	PRC4M40DCGL	221853	B.3	RL4RA022G9	104929	B.15	RL4RD022GJ	113048	B.15
PRC1S13CDL	222008	B.5	PRC4M40DCJL	221854	B.3	RL4RA022GH	104905	B.15	RL4RD022GK	113090	B.15
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PRC1T10AJL	221869	B.5	PRC4M40DCML	220049	B.3	RL4RA022GK	104908	B.15	RL4RD022GP	113091	B.15
PRC1T10ANL	221870	B.5	PRCG011	220648	B.4	RL4RA022GN	104912	B.15	RL4RD022GT	113093	B.15
PRC1T10CBL	221860	B.5	PRCG08	220217	B.4	RL4RA022GR	104913	B.15	RL4RD022GX	113094	B.15
PRC1T10CDL	221861	B.5	PRCG1052	220914	B.3	RL4RA022GS	104911	B.15	RL4RD022RD	108876	B.15
PRC1T10CJL	221862	B.5	PRCG-ES15/2N	220912	B.3	RL4RA022GU	104916	B.15	RL4RD022RG	113025	B.15
PRC1T20ADL	221883	B.5	PRCG-ES15/3N	221442	B.3	RL4RA022GV	104915	B.15	RL4RD022RK	101115	B.15
PRC1T20AJL	221884	B.5	PRCG-ES15/4N	221934	B.3	RL4RA022GW	104917	B.15	RL4RD022RT	104899	B.15
PRC1T20ANL	221885	B.5	PRCGZT80	221918	B.5	RL4RA022GX	104918	B.15	RL4RD022RWD	104929	B.15
PRC1T20CBL	221875	B.5	PRCM21N	222101	B.6	RL4RA022GY	104919	B.15	RL4RD022RWJ	104931	B.15
PRC1T20CDL	221876	B.5	PRCM21P	222100	B.6	RL4RA022GZ	104920	B.15	RL4RD022TB	113020	B.15
PRC1T20CJL	221877	B.5	PRCM31G	222104	B.6	RL4RA022R1	241466	B.15	RL4RD022TD	113026	B.15
PRC2P20ABL	220019	B.4	PRCM31R	222102	B.6	RL4RA022R6	211540	B.15	RL4RD022TG	113027	B.15
PRC2P20ADL	220020	B.4	PRCM32G	222105	B.6	RL4RA022R7	101688	B.15	RL4RD022TH	113070	B.15
PRC2P20AGL	220021	B.4	PRCM32R	222103	B.6	RL4RA022R2	108870	B.15	RL4RD022TJ	113028	B.15
PRC2P20AJL	220024	B.4	PRCM33G	222106	B.6	RL4RA022R3	108873	B.15	RL4RD022TK	113072	B.15
PRC2P20ANL	220026	B.4	PRCM33R	222109	B.6	RL4RA022R5	108856	B.15	RL4RD022TN	113029	B.15
PRC2P20CBL	220022	B.4	PRCM41G	222107	B.6	RL4RA022T1	109064	B.15	RL4RD022TT	113075	B.15
PRC2P20CDL	220023	B.4	PRCM41R	222110	B.6	RL4RA022T15	247924	B.15	RL4RD022TU	113035	B.15
PRC2P20CGL	220025	B.4	PRCM42G	222124	B.6	RL4RA022T2	109065	B.15	RL4RD022TV	113014	B.15
PRC2P20CJL	220027	B.4	PRCM42R	222111	B.6	RL4RA022T6	109069	B.15	RL4RD022TWE	101148	B.15
PRC2P20DCBL	220041	B.4	PRCM43G	222125	B.6	RL4RA022T7	109070	B.15	RL4RD022TWG	101150	B.15
PRC2P20DCDL	220042	B.4	PRCM43R	222122	B.6	RL4RA022T9	113983	B.15	RL4RD022TWI	113004	B.15
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PRC3P30ADL	220311	B.4	PRCM71	222121	B.6	RL4RA022TN	104024	B.15	RL4RD022TWX	113076	B.15
PRC3P30AGL	220312	B.4	PRCM73	222122	B.6	RL4RA022TS	109056	B.15	RL4RD031RD	108875	B.15
PRC3P30AJL	220315	B.4	PRCM91G	222126	B.6	RL4RA022TU	104025	B.15	RL4RD031RK	101114	B.15
PRC3P30ANL	220317	B.4	PRCM91R	222116	B.6	RL4RA022TV	109060	B.15	RL4RD031R1	113011	B.15
PRC3P30CBL	220313	B.4	PRCM93G	222120	B.6	RL4RA022TY	109062	B.15	RL4RD031R2	248154	B.15
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PRC3P30CGL	220316	B.4	PRCM535	220915	B.6	RL4RA031R6	101136	B.15	RL4RD031T	113010	B.15
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RT1RP	114098	A.55	RT4LGH	139642	A.56	RTXRJG	136454	A.57	V31209BJ	133384	
RT1RS	114099	A.55	RT4LGI	139643	A.56	RTXRJN	113665	A.57	V31210BG	116582	
RT1RT	114100	A.55	RT4LGK	139644	A.56	RTXRNG	136455	A.57	V31225WB	138795	
RT1RU	114101	A.55	RT4LGL	139645	A.56	RTXRNU	113666	A.57	V31235BG	116572	
RT1RV	114102	A.55	RT4LGM	139646	A.56	RTXRUG	136456	A.57	V31245BG	116574	
RT1RW	114103	A.55	RT4LGN	139647	A.56	RTXRUX	113667	A.57	V31203B	133170	
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RT1T	113713	A.55	RT4LGR	139649	A.56	RTXSL	113856	A.57	V31204B	133885	
RT1TMP	139221	A.55	RT4LH	113742	A.56	SFA11	120024	C.27	V31204BG	116573	
RT1U	113714	A.55	RT4LJ	113743	A.56	SAK01	120026	C.27	V31205BG	116575	
RT1UMP	139199	A.55	RT4LK	113744	A.56	SAK10	120025	C.27	V31207BG	116578	
RT1V	113715	A.55	RT4LL	113745	A.56	SFAL10	120022	C.27	V31208BG	116580	
RT1VMP	202692	A.55	RT4LM	113746	A.56	SFAL11N	120020	C.27	WKLI02P	101422	A.45
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RT22G	113652		RT4N	113732	A.56	SFALPEN	264826	C.27			
RT22GD	114076		RT4P	113733	A.56	SFBOAJ	120030	C.27			
RT22GE	114077		RT4R	113734	A.56	SFBOAN	120031	C.27			
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6KGP43100X4RXC1	403202	G.34	6KGP43450X8RXC1	403225	G.34	6KGP63015X1RXC1	403795	G.34	6KGP63050X2RXC1	403809	G.34
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#### **Belgium**

GE Industrial Belgium  
Nieuwevaart 51  
B-9000 Gent  
Tel. +32 (0)9 265 21 11

#### **Finland**

GE Industrial Solutions  
Kuortaneenkatu 2  
FI-00510 Helsinki  
Tel. +358 (0)10 394 3760

#### **France**

GE Industrial Solutions  
204, Rue du Rond-Point du Pont de Sèvres  
F-92100 Boulogne-Billancourt  
Tel. +33 (0)800 912 816

#### **Germany**

GE Industrial Solutions  
Robert-Bosch Str. 3  
D-50354 Hürth-Efferen  
Tel. +49 (0) 2233/ 9719-0

#### **Hungary**

GE Hungary Kft.  
Váci ut 81-83.  
H-1139 Budapest  
Tel. +36 1 447 6050

#### **Italy**

GE Industrial Solutions  
Centro Direzionale Colleoni  
Via Paracelso 16  
Palazzo Andromeda B1  
I-20864 Agrate Brianza (MB)  
Tel. +39 039 637 371

#### **Netherlands**

GE Industrial Solutions  
Parallelweg 10  
NL-7482 CA Haaksbergen  
Tel. +31 (0)53 573 03 03

#### **North Africa**

General Electric International,  
sq Inc. (Succursale)  
Crystal Building 3,  
3rd Floor, Marina Casablanca,  
20050 Casablanca, Morocco  
Tel. +212 529 025 502

#### **Norway**

GE Industrial Solutions  
Drammensveien 165  
0277 Oslo  
Tel. +47 (0)8 001 72 56

#### **Poland**

GE Power Controls  
Gdanski Business Centre  
Inflancka 4C, bud. D  
00-189 Warszawa  
Tel. +48 22 520 53 53

#### **Rudawka 96**

43-382 Bielsko-Biala  
Tel. +48 33 828 62 33

#### **Russia**

GE Industrial Solutions  
27/8, Electrozavodskaya street  
Moscow, 107023  
Tel. +7 495 937 11 11

#### **South Africa**

GE Industrial Solutions  
Unit 4, 130 Gazelle Avenue  
Corporate Park Midrand 1685  
P.O. Box 76672 Wendywood 2144  
Tel. +27 11 238 3000

#### **Spain**

GE POWER CONTROLS IBÉRICA, S.L.  
Calle Miño 122 Naves E-F  
Polígono Industrial Santa Margarita  
08223 Terrassa (Barcelona)  
Tel. +34 900 993 625

#### **Sweden**

GE Industrial Slutions  
Vendevägen 89  
SE-182 32 Danderyd  
Tel. +46 (0)20 79 16 70

#### **United Arab Emirates**

GE Industrial Solutions  
Injaz Building, 3rd Floor  
Dubai Internet City  
PO Box 11549, Dubai  
Tel. +971 4 4546912

#### **United Kingdom**

GE Industrial Solutions  
2 The Arena, Downshire Way  
Bracknell, Berkshire  
RG12 1PU  
Tel. +44 (0)800 587 1239

#### **Asia and Far East**

GE Industrial Solutions  
4F, Building 2, CTP, No1 Hua Tuo Rd.  
Zhang Jiang Hi-Tech Park  
Shangai, China 201203  
Tel. +86 21 3877 7888

#### **Latin America**

GE Industrial Solutions  
790 N.W. 107th Avenue, Suite 200  
Miami, FL 33172 USA  
Tel. +1 305 551 5155

#### **North America**

GE Industrial Solutions  
41 Woodford Avenue  
Plainville CT, USA 06062  
and  
12305 Kurland Drive  
Houston, TX USA 77034  
Tel. +1 800-431-7867

