

Typical M-Frame Circuit Breaker



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M-Frame (300–800 Amperes)

Product Description

- All Eaton M-Frame circuit breakers are HACR rated
- MDL-Frame circuit breakers are available as individual components (frame, trip unit, terminals), or factory assembled complete breakers
- MDLB, HMDLB-Frame circuit breakers with non-interchangeable trip units are suitable for reverse feed use

Standards and Certifications

- CE marked



2.3

Molded Case Circuit Breakers

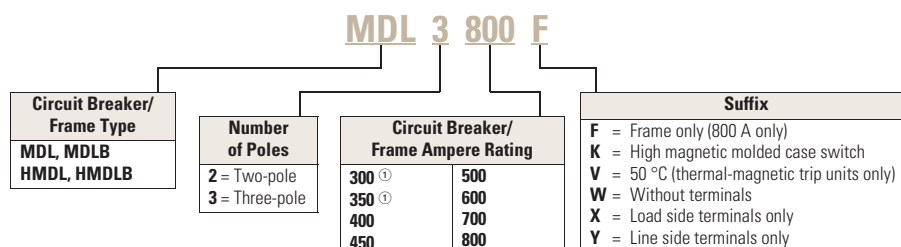
Series C

Catalog Number Selection

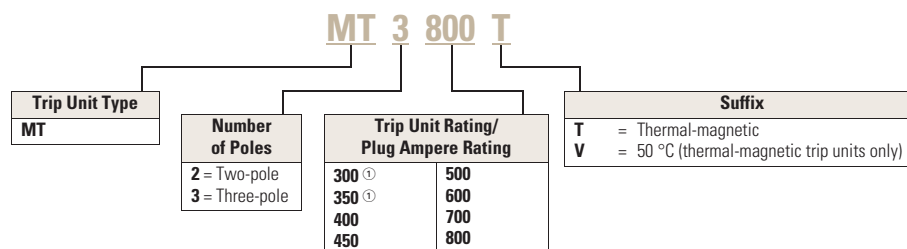
This information is presented only as an aid to understanding catalog numbers. It is not to be used to build catalog numbers for circuit breakers or trip units.

MDL Frame with Thermal-Magnetic Trip Unit Technology

Thermal-Magnetic Breakers and Frame ①

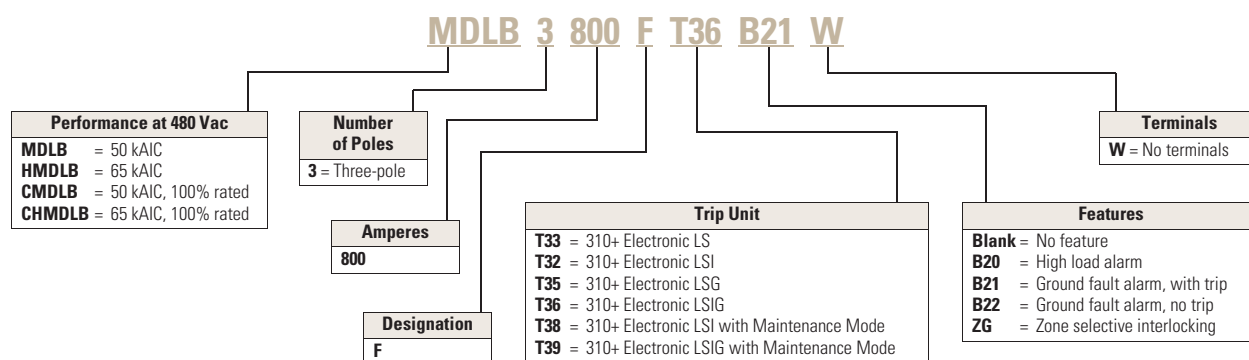


Thermal-Magnetic Trip Unit ①

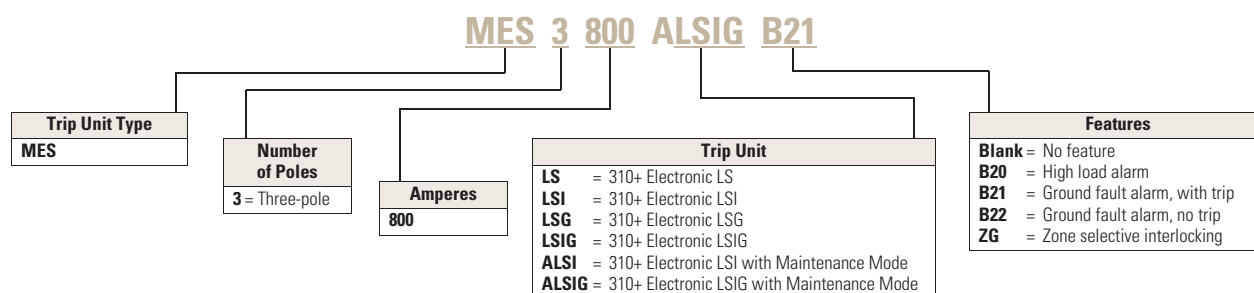


MDL Frame with 310+ Electronic Trip Unit Technology

310+ Circuit Breaker



310+ Electronic Trip Unit ①



Note

① Frames are the same for thermal-magnetic or 310+ electronic trip units, e.g., **MDL3800F**, **HMDL3800F**, etc.

Product Selection

Types MDL and HMDL Thermal-Magnetic Circuit Breakers with Interchangeable Trip Units—Two-Pole

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Maximum Continuous Ampere Rating at 40 °C	Standard Interrupting Capacity 600 Vac Rated 50 kAIC at 480 Vac		High Interrupting Capacity 600 Vac Rated 65 kAIC at 480 Vac		Thermal-Magnetic Trip Unit Only	Standard Terminals Only ① See Page V4-T2-217 for Optional Terminals Catalog Number
	Factory Assembled Circuit Consisting of Frame, Trip Unit and Terminals		Factory Assembled Circuit Consisting of Frame, Trip Unit and Terminals		For Use with Standard or High or Ultra High Interrupting Frames	
	Catalog Number	Frame Only Catalog Number	Catalog Number	Frame Only Catalog Number	Magnetic Trip Range is 5–10 Up Through 600 A; 4–8 on 700 and 800 A x Continuous Ampere Rating Catalog Number	
300	MDL2300	MDL2800F	HMDL2300	HMDL2800F	MT2300T	TA700MA1
350	MDL2350		HMDL2350		MT2350T	TA700MA1
400	MDL2400		HMDL2400		MT2400T	TA700MA1
450	MDL2450		HMDL2450		MT2450T	TA700MA1
500	MDL2500		HMDL2500		MT2500T	TA700MA1
600	MDL2600		HMDL2600		MT2600T	TA700MA1
700	MDL2700		HMDL2700		MT2700T	TA700MA1
800	MDL2800		HMDL2800		MT2800T	TA800MA2

Types MDL and HMDL Thermal-Magnetic Circuit Breakers with Interchangeable Trip Units—Three-Pole

Maximum Continuous Ampere Rating at 40 °C	Standard Interrupting Capacity 600 Vac Rated 50 kAIC at 480 Vac		High Interrupting Capacity 600 Vac Rated 65 kAIC at 480 Vac		Thermal-Magnetic Trip Unit Only	Standard Terminals Only ① See Page V4-T2-217 for Optional Terminals Catalog Number
	Factory Assembled Circuit Consisting of Frame, Trip Unit and Terminals		Factory Assembled Circuit Consisting of Frame, Trip Unit and Terminals		For Use with Standard or High or Ultra High Interrupting Frames	
	Catalog Number	Frame Only Catalog Number	Catalog Number	Frame Only Catalog Number	Magnetic Trip Range is 5–10 Up Through 600 A; 4–8 on 700 and 800 A x Continuous Ampere Rating Catalog Number	
300	MDL3300	MDL3800F	HMDL3300	HMDL3800F	MT3300T	TA700MA1
350	MDL3350		HMDL3350		MT3400T	TA700MA1
400	MDL3400		HMDL3400		MT3400T	TA700MA1
450	MDL3450		HMDL3450		MT3450T	TA700MA1
500	MDL3500		HMDL3500		MT3500T	TA700MA1
600	MDL3600		HMDL3600		MT3600T	TA700MA1
700	MDL3700		HMDL3700		MT3700T	TA700MA1
800	MDL3800		HMDL3800		MT3800T	TA800MA2

Note

① Two terminals are required per pole.

Types MDLB and HMDLB Thermal-Magnetic Circuit Breakers with Non-Interchangeable Trip Units—Two-Pole ^①

Maximum Continuous Ampere Rating at 40 °C	Standard Interrupting Capacity 600 Vac Rated 50 kAIC at 480 Vac Factory Assembled Circuit Consisting of Frame, Trip Unit and Terminals Catalog Number	High Interrupting Capacity 600 Vac Rated 65 kAIC at 480 Vac Factory Assembled Circuit Consisting of Frame, Trip Unit and Terminals Catalog Number	Standard Terminals Only ^② See Page V4-T2-217 for Optional Terminals Catalog Number
300	MDLB2300	HMDLB2300	TA700MA1
350	MDLB2350	HMDLB2350	TA700MA1
400	MDLB2400	HMDLB2400	TA700MA1
450	MDLB2450	HMDLB2450	TA700MA1
500	MDLB2500	HMDLB2500	TA700MA1
600	MDLB2600	HMDLB2600	TA700MA1
700	MDLB2700	HMDLB2700	TA700MA1
800	MDLB2800	HMDLB2800	TA800MA2

Types MDLB and HMDLB Thermal-Magnetic Circuit Breakers with Non-Interchangeable Trip Units—Three-Pole ^①

Maximum Continuous Ampere Rating at 40 °C	Standard Interrupting Capacity 600 Vac Rated 50 kAIC at 480 Vac Factory Assembled Circuit Consisting of Frame, Trip Unit and Terminals Catalog Number	High Interrupting Capacity 600 Vac Rated 65 kAIC at 480 Vac Factory Assembled Circuit Consisting of Frame, Trip Unit and Terminals Catalog Number	Standard Terminals Only ^② See Page V4-T2-217 for Optional Terminals Catalog Number
300	MDLB3300	HMDLB3300	TA700MA1
350	MDLB3350	HMDLB3350	TA700MA1
400	MDLB3400	HMDLB3400	TA700MA1
450	MDLB3450	HMDLB3450	TA700MA1
500	MDLB3500	HMDLB3500	TA700MA1
600	MDLB3600	HMDLB3600	TA700MA1
700	MDLB3700	HMDLB3700	TA700MA1
800	MDLB3800	HMDLB3800	TA800MA2

Notes

① Factory sealed for reverse feed application.

② Two terminals are required per pole.

Types MDL and HMDL Electronic Circuit Breakers with Interchangeable Trip Units

Order as Individual Components: breaker frame, trip unit and terminals.
See 310+ adjustability specifications on **Page V4-T2-220**.

Types MDL and HMDL Electronic Circuit Breakers with Interchangeable 310+ Trip Units—Three-Pole

Maximum Continuous Ampere Rating at 40 °C	Circuit Breaker Frame Only		Digitrip RMS 310+ Trip Unit Only ^①		LSG Adjustable Short Time Pickup with I ² t Short Delay and Ground Fault Protection	LSIG Independently Adjustable Short Time Pickup and Ground Fault Protection	Neutral CT for LSG and LSIG ^{②③}	Terminal Information
	Standard Interrupting Capacity 600 Vac Rated 50 kAIC at 480 Vac	High Interrupting Capacity 600 Vac Rated 65 kAIC at 480 Vac	Standard LS	Optional LSI				
	Catalog Number	Catalog Number	Adjustable Short Time Pickup with I ² t Short Delay Ramp	Independently Adjustable Short Time Pickup and Delay				
800	MDL3800F	HMDL3800F	MES3800LS	MES3800LSI	MES3800LSG	MES3800LSIG	LGFT600	See Page V4-T2-218

Types MDLB and HMDLB Electronic Circuit Breakers with Non-Interchangeable 310+ Trip Units ^④

Maximum Continuous Ampere Rating at 40 °C	Factory-Assembled Circuit Breaker Consisting of Frame and Trip Unit Less Terminals				
	LS	LSI	LSG	LSIG	
	Adjustable Short Time Pickup with I ² t Short Delay Ramp	Independently Adjustable Short Time Pickup and Delay	Adjustable Short Time Pickup with I ² t Short Delay and Ground Fault Protection	Independently Adjustable Short Time Pickup and Ground Fault Protection	Neutral CT for LSG and LSIG ②③
	Catalog Number				Catalog Number
Three-Pole Standard Interrupting Capacity 600 Vac Rated 50 kAIC at 480 Vac					
800	MDLB3800FT33W	MDLB3800FT32W	MDLB3800FT35W	MDLB3800FT36W	LGFT600
Three-Pole High Interrupting Capacity 600 Vac Rated 65 kAIC at 480 Vac					
800	HMDLB3800FT33W	HMDLB3800FT32W	HMDLB3800FT35W	HMDLB3800FT36W	LGFT600

100% Rated Types CMDL and CHMDL Electronic Circuit Breakers with Interchangeable Trip Units

The NEC allows the breaker to be rated at 100% of its frame size in an assembly, provided that 90 °C wire is applied at the 75 °C ampacity. All 100% rated circuit breakers have electronic trip units. Order as individual components: breaker frame, trip unit and terminals. See 310+ adjustability specifications on **Page V4-T2-220**.

100% Rated Types CMDL and CHMDL Electronic Circuit Breakers with Interchangeable 310+ Trip Units—Three-Pole

Maximum Continuous Ampere Rating at 40 °C	Circuit Breaker Frame Only		Digitrip RMS 310+ Trip Unit Only ^①		LSG Adjustable Short Time Pickup with I ² t Short Delay and Ground Fault Protection	LSIG Independently Adjustable Short Time Pickup and Ground Fault Protection	Neutral CT for LSG and LSIG ^{②③}	Terminal Information
	Standard Interrupting Capacity 600 Vac Rated 50 kAIC at 480 Vac	High Interrupting Capacity 600 Vac Rated 65 kAIC at 480 Vac	Standard LS	Options LSI				
	Catalog Number	Catalog Number	Adjustable Short Time Pickup with I ² t Short Delay Ramp	Independently Adjustable Short Time Pickup and Delay				
800	CMDL3800F	CHMDL3800F	MES3800LS	MES3800LSI	MES3800LSG	MES3800LSIG	LGFT600	See Page V4-T2-218

Notes

- ① For AC use only.
- ② Required for four-wire systems if neutral protection is desired.
- ③ Included with LSG and LSIG trip units or breakers.
- ④ Factory sealed, suitable for reverse feed application. CMDLB and CHMDLB are also available.

Molded Case Switches

Eaton’s molded case switches are used as compact switches in applications requiring high current switching capabilities. Molded case switches are constructed of circuit breaker

components and are of the high instantaneous automatic type. Molded case switches are listed in accordance with Underwriters Laboratories Standard UL 489.

Molded Case Switches

Maximum Continuous Ampere Rating at 40 °C	600 Vac Maximum, 250 Vdc Circuit Breaker Only without Line and Load Terminals Catalog Number
Two-Pole	
800	MDL2800WK
	MDLB2800WK ①
	HMDL2800WK
Three-Pole	
800	MDL3800WK
	MDLB3800WK ①
	HMDL3800WK

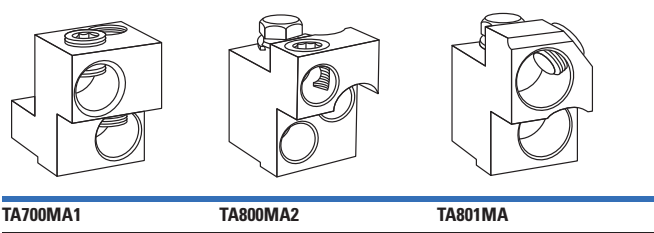
Notes

① MDLB and HMDLB are suitable for reverse feed applications.
Molded case switch may trip above 6000 amperes.

Accessories Selection Guide and Ordering Information

Line and Load Terminals

M-Frame circuit breakers use Cu/Al terminals as standard. When optional copper or Cu/Al terminals are required, order by catalog number. Specify if factory installation is required.



Line and Load Terminals

Maximum Breaker Amperes	Terminal Body Material	Wire Type	AWG Wire Range/No. Conductors	Terminal Catalog Number	Terminals with Control Wire Termination Catalog Number
Standard Cu/Al Pressure Terminals					
700	Aluminum	Cu/Al	1–500 kcmil (2)	TA700MA1	TA700MA1CWT
800 std.	Aluminum	Cu/Al	3/0–400 kcmil (3)	TA800MA2	TA800MA2CWT
800	Aluminum	Cu/Al	500–750 kcmil (2)	TA801MA	TA801MACWT
Optional Copper and Cu/Al Pressure Type Terminals					
600	Copper	Cu	2/0–500 kcmil (2)	T600MA1	—
800	Copper	Cu	3/0–300 kcmil (3)	T800MA1	—

Accessories

Allowable Accessory Combinations

Different combinations of accessories can be supplied, depending on the types of accessories and the number of poles in the circuit breaker.

MD Frame Accessories

Description	Reference Page	Two-Pole ^①		Three-Pole		
		Left	Right	Left	Center	Right
Internal Accessories (Only One Internal Accessory Per Pole)						
Alarm lockout (1Make/1Break)	V4-T2-276	■	■	■		■
Alarm lockout (2Make/2Break)	V4-T2-276	■	■	■		■
Auxiliary switch (1A, 1B)	V4-T2-278	■	■	■		■
Auxiliary switch (2A, 2B)	V4-T2-278	■	■	■		■
Auxiliary switch (3A, 3B)	V4-T2-278	■	■	■		■
Auxiliary switch (1A, 1B) and alarm switch combination	V4-T2-280	■	■	■		■
Auxiliary switch (2A, 2B) and alarm switch combination	V4-T2-280	■	■	■		■
Shunt trip—standard ^②	V4-T2-283	■	■	■		■
Shunt trip—low energy ^②	V4-T2-285	■	■	■		■
Undervoltage release mechanism ^②	V4-T2-291	■	■	■		■
External Accessories						
Rear fed terminals	V4-T2-310	●	●	●	●	●
Base mounting hardware	V4-T2-311				●	
Terminal shields	V4-T2-313				●	
Interphase barriers	V4-T2-313				●	
Non-padlockable handle block	V4-T2-314				■	
Padlockable handle lock hasp	V4-T2-315	□		□		□
Key interlock kit	V4-T2-316	□		□		□
Sliding bar interlock—requires two breakers	V4-T2-317	●	●	●	●	●
Walking beam interlock—requires two breakers	V4-T2-317	●	●	●	●	●
Electrical (motor) operator	V4-T2-318	●	●	●	●	●
Plug-in adapters	V4-T2-320	●	●	●	●	●
Rear connecting studs	V4-T2-321	●	●	●	●	●
Panelboard connecting straps	V4-T2-322	●	●	●	●	●
Handle mechanisms	V4-T2-430	●	●	●	●	●
Handle extension	V4-T2-445	●	●	●	●	●
Solid-state (electronic) portable test kit	V4-T2-324	●	●	●	●	●
Modifications (Refer to Eaton)						
Special calibration	—	●	●	●	●	●
Moisture fungus treatment	V4-T2-116	●	●	●	●	●
Freeze-tested circuit breakers	—	●	●	●	●	●
Marine/naval application	—	●	●	●	●	●

Legend

- Applicable in indicated pole position
- May be mounted on left or right pole—not both
- Accessory available/modification available

Notes

- ① Two-pole breaker supplied in three-pole frame. Current carrying parts omitted from center pole.
- ② Shunt trip and UVR cannot be mounted in right poles on MES trip units.

310+ Electronic Trip Unit Accessories

Description	Catalog Number
Electronic portable test kit	MTST230V ^①
Trip unit tamper protection wire seal	5108A03H01
External neutral sensor	LGFACT600 ^②
Breaker-mount cause-of-trip indication	TRIP-LED
Breaker-mount ammeter module	DIGIVIEW
Remote-mount ammeter module	DIGIVIEWR06 ^③

Technical Data and Specifications**UL 489/CSA Interrupting Capacity Ratings ^④**

Circuit Breaker Type	Number of Poles	Interrupting Capacity (kA Symmetrical Amperes)			
		Volts AC (50/60 Hz)			Volts DC ^{⑤⑥}
		240	480	600	250
MDL, MDLB	2, 3	65	50	25	22
CMDL	2, 3	65	50	25	—
HMDL, HMDLB	2, 3	100	65	35	25
CHMDL	2, 3	100	65	35	—

IEC 947-2 Interrupting Capacity Ratings ^④

Circuit Breaker Type	Number of Poles	Interrupting Capacity rms (kA Symmetrical Amperes) $I_{cu} \neq I_{cs}$			
		Volts AC (50/60 Hz)			Volts DC ^{⑤⑥}
		240	415	690	250
MDL, MDLB	2, 3	65/65	50/50	20/10	20/10
CMDL	2, 3	65/65	50/50	20/10	—
HMDL, HMDLB	2, 3	100/100	70/50	25/13	20/10
CHMDL	2, 3	100/100	70/50	25/13	—

Notes

① MTST230V applies to 100–230 Vac.

② Included with all LD LSG and LSG trip units and breakers.

③ Includes 6 ft cable for remote mounting; NEMA 3R rated.

④ Utilization Category A circuit breakers.

⑤ Two-pole or two poles of three-pole circuit breaker. Thermal-magnetic trip units only. MDL, HMDL breakers with electronic trip unit are not DC rated.

⑥ Time constant is 3 milliseconds minimum at 10 kA and 8 milliseconds at 22 kA.

310+ Specifications

Description	Specification
Trip Unit Type	Digitrip RMS 310+
Breaker Type	
Frame designation	MDL
Frames available	800 A
Continuous current range (A)	320–800 A
Ground fault pickup (A)	160–800 A
Interrupting capacities at 480 Vac (kAIC)	50, 65
100% rated	Yes
Protection	
Ordering options	LS, LSI, LSG, LSIG, ALSI, ALSIG
Arcflash Reduction Maintenance System (or Maintenance Mode)	Remote enabled on ALSI, ALSIG
Interchangeable trip unit	Yes
High load alarm (suffix B20) ①	Yes
Ground fault alarm with trip (suffix B21) ①	LSG, LSIG, ALSIG
Ground fault alarm, no trip (suffix B22) ①	LSG, LSIG, ALSIG
Zone selective interlocking (suffix ZG)	LSI, LSIG, ALSI, ALSIG
Cause of trip indication	Yes (via TRIP-LED or DIGIVIEW)
Thru-cover accessories	No

310+ Adjustability Specifications

Description	MDL Frame Specification	
310+ settings	800 A	
I_r = continuous current or long delay pickup (amperes) (All 310+)	I_r	
	A	320
	B	400
	C	450
	D	500
	E	600
	F	630
	G	700
	H (= I_n)	800
t_r = long delay time (seconds) (All 310+)	2	2
	4	4
	7	7
	10	10
	12	12
	15	15
	20	20
	24	24
I_{sd} (x I_r) = short delay pickup (All 310+)	Position 1	2x
	Position 2	3x
	Position 3	4x
	Position 4	5x
	Position 5	6x
	Position 6	7x
	Position 7	8x
	Position 8	8x
	Position 9	8x
t_{sd} = short delay time I^2t (milliseconds) (LS and LSG)	Fixed	67 @10x
t_{sd} = short delay time flat (milliseconds) (LSI, LSIG, ALSI, ALSIG)	Position 1	Inst
	Position 2	120
	Position 3	300
I_g (x I_n) = ground fault pickup (amperes) (310+ w/ ground fault)	Position 1	160
	Position 2	240
	Position 3	320
	Position 4	480
	Position 5	640
	Position 6	800
t_g = ground fault delay time (milliseconds) (LSG, LSIG, ALSIG)	Position 1	Inst
	Position 2	120
	Position 3	300
Independently adjustable Instantaneous (Ii) setting	②	
Maintenance Mode pickup ($2.5 \times I_n$) (amperes) (310+ with Maintenance Mode—ALSI and ALSIG)	Fixed	2000

Notes

① B2x suffixes cannot be combined with B2x suffixes.

② Not available for MDL. Independently adjustable Ii setting available in LG, NG, and RG ALSI and ALSIG trip units.

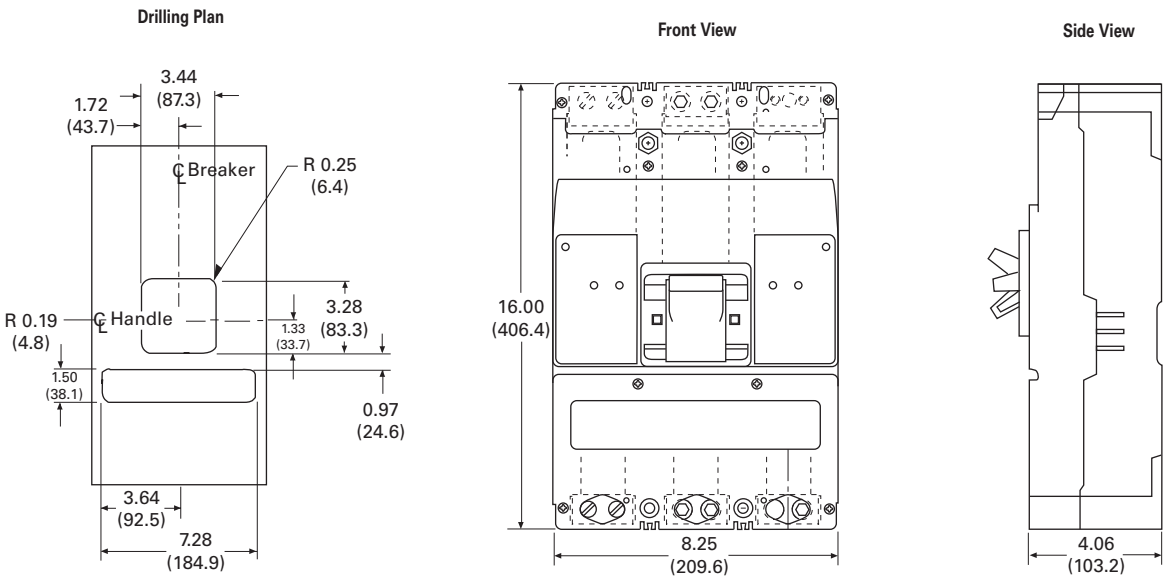
Dimensions and Weights

Dimensions in Inches (mm)

MD Frame

Number of Poles	Width	Height	Depth
2, 3	8.25 (209.6)	16.00 (406.4)	4.06 (103.1)

MDL-Frame, Two- and Three-Pole



Approximate Shipping Weight, Lbs (kg)

MD Frame

Breaker Type	Complete Breaker		Frame Only		Trip Unit ①	
	Two-Pole	Three-Pole	Two-Pole	Three-Pole	Two-Pole	Three-Pole
MDL, HMDL (T/M T.U.)	26.5 (12.0)	29.0 (13.2)	24.5 (11.1)	26.0 (11.8)	2.5 (1.1)	3.0 (1.4)
MDL, HMDL (Elec. T.U.)	—	30.0 (13.6)	—	26.0 (11.8)	—	4.0 (1.8)

Note

① Thermal-magnetic only.