Masterpact® NW DC Circuit Breakers

Class 0613DC

Catalog
November

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CONTENTS

Merlin Gerin
Square D
Telemecanique

Schneider Electric
Building a New Electric World

GENERAL INFORMATION

INTRODUCTION

Masterpact® NW Circuit Breakers are designed to protect electrical systems from damage caused by short circuits. All Masterpact circuit breakers are designed to open and close a circuit manually, and to open the circuit automatically at a predetermined overcurrent setting.

Selection of a dc circuit breaker is based on the type of dc system, the rated voltage, and the maximum short-circuit current at the point of installation. UL Listed circuit breakers are for use on ungrounded systems rated 500 Vdc (600 Vdc unloaded) or less. IEC Rated circuit breakers are for use on ungrounded, grounded middle point, or grounded negative systems.

CODES AND STANDARDS

Masterpact circuit breakers are manufactured and tested in accordance with the following standards:

Insulated Case Circuit Breaker	IEC® Rated Circuit Breaker	IEC® Extreme Atmospheric Conditions
UL 489 (UL Listed to Supplement SC) NEMA AB1 CSA C22.2 NO 5-02	IEC 60947-2	IEC 68-2-1: Dry cold at –55°C IEC 68-2-2: Dry heat at +85°C IEC 68-2-30: Damp heat (temp. +55°C, rel. humidity 95%) IEC 68-2-52 Level 2: Salt mist

Circuit breakers should be applied according to guidelines detailed in the National Electrical Code (NEC®) and other local wiring codes.

Masterpact circuit breakers are available in Square D, Merlin Gerin, or Federal Pioneer brands.

UL File Numbers:

Masterpact NW: E63335, Vol. 4, Sec. 1

FEATURES AND BENEFITS

100% Rated Circuit Breaker: Masterpact circuit breakers are designed for continuous operation at 100% of their current rating.

True Two-step Stored Energy Mechanism: Masterpact circuit breakers are operated via a stored-energy mechanism which can be manually or motor charged. The closing time is less than five cycles. Closing and opening operations can be initiated by remote control or by push buttons on the circuit breaker front cover. An O–C–O cycle is possible without recharging.

Drawout or Fixed Mount, 3- or 4-pole Construction: UL Listed (3-pole only) and IEC Rated (3- or 4-pole) Masterpact circuit breakers are available in drawout or fixed mounts.

Field-installable Accessories: Most accessories are field installable with only the aid of a screwdriver and without adjusting the circuit breaker. The uniform design of the circuit breaker line allows most accessories to be common for the whole line.

Reinforced Insulation: Two insulation barriers separate the circuit breaker front from the current path.

Isolation Function by Positive Indication of Contact Status: The mechanical indicator is truly representative of the status of all the main contacts.

Segregated Compartment: Once the accessory cover has been removed to provide access to the accessory compartment, the main contacts remain fully isolated. Furthermore, interphase partitioning allows full insulation between each pole even if the accessory cover has been removed.

Front Connection of Secondary Circuits: All accessory terminals (ring terminals are available as an option) are located on a connecting block which is accessible from the front in the connected, test and disconnected positions. This is particularly useful for field inspection and modification.

Anti-pumping Feature: All Masterpact NW circuit breakers are designed with an anti-pumping feature that causes an opening order to always takes priority over a closing order. Specifically, if opening and closing orders occur simultaneously, the charged mechanism discharges without any movement of the main contacts keeping the circuit breaker in the open (OFF) position.

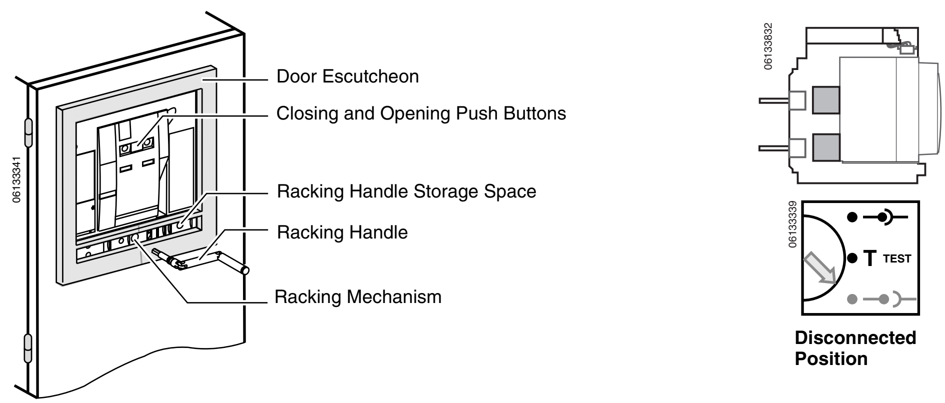
In the event that opening and closing orders are simultaneously maintained, the standard mechanism provides and anti-pumping function which continues to keep the main contacts in the open position.

In addition, after fault tripping or opening the circuit breaker intentionally (using the manual or electrical controls and with the closing coil continuously energized) the circuit breaker cannot be closed until the power supply to the closing coil is discontinued and then reactivated.

NOTE: When the automatic reset after fault trip (RAR) option is installed, the automatic control system must take into account the information supplied by the circuit breaker before issuing a new closing order or before blocking the circuit breaker in the open position.

Disconnection Through the Front Door: The racking handle and racking mechanism are accessible through the front door cutout. Disconnecting the circuit breaker is possible without opening the door and exposing live parts.

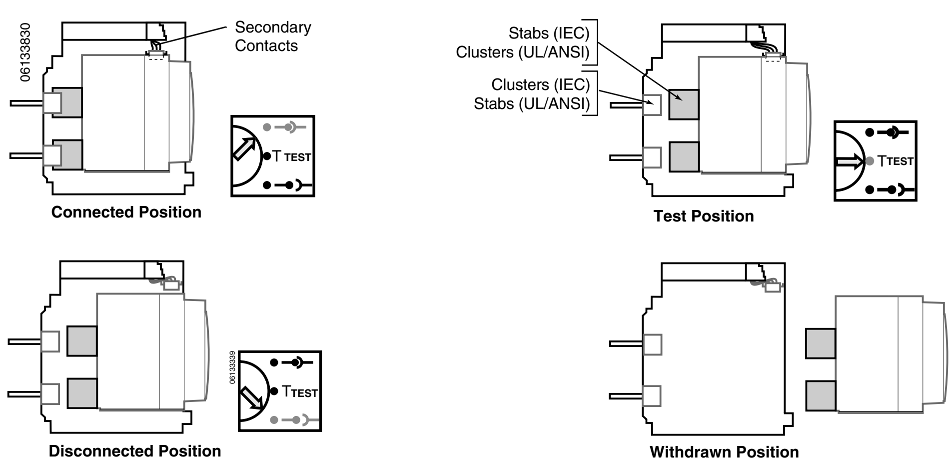
Figure 1: Racking Handle and Mechanism



Drawout Mechanism: The drawout assembly mechanism allows the circuit breaker to be racked in four positions (connected, test, disconnected, or withdrawn), as shown in the figure below.

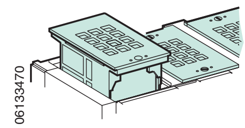
NOTE: For UL circuit breakers, the clusters are mounted on the circuit breaker; for IEC circuit breakers, the clusters are mounted on the cradle.

Figure 2: Racking Positions



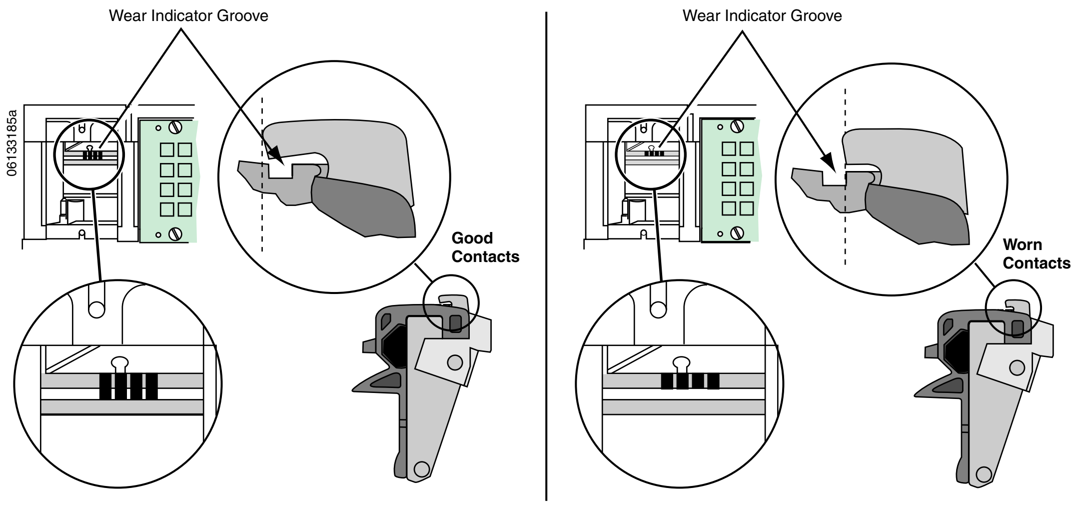
 SQUARE D

Reduced Maintenance: Under normal operating conditions, the circuit breaker does not require maintenance. However, if maintenance or inspection is necessary, the arc chambers are easily removed so you may visually inspect the contacts and wear indicator groove (see the figure below for how wear is indicated). The operation counter can also indicate when inspections and possible maintenance should be done.



Arc Chamber

Figure 3: Contact Wear Indicators



OPERATING CONDITIONS

Masterpact® circuit breakers are suited for use:

- At ambient temperatures between -22°F (-30°C) and 140°F (60°C)
- At altitudes +13,000 ft. (3900 m)

Masterpact circuit breakers have been tested for operation in industrial atmospheres. It is recommended that the equipment be cooled or heated to the proper operating temperature and kept free of excessive vibration and dust. Operation at temperatures above 104°F (40°C) may require derating or overbussing the circuit breaker. See the appropriate instruction bulletin and page 11 of this catalog for additional information.

Masterpact circuit breakers meet IEC 68-2-6 Standards for vibration.

- 2 to 13.2 Hz and amplitude 0.039 in. (1 mm)
- 13.2 to 100 Hz constant acceleration 0.024 oz. (0.7 g.)

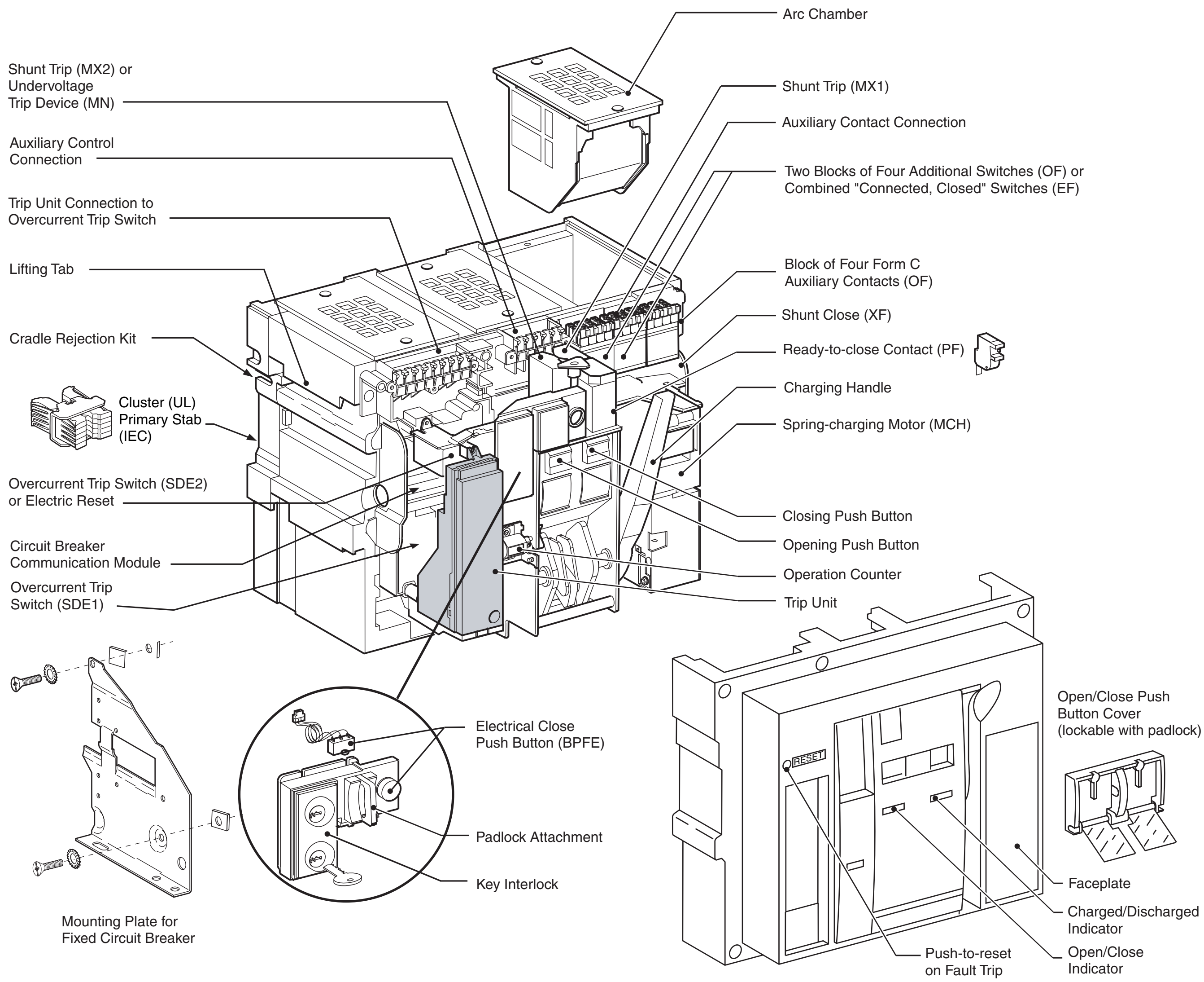
The materials used in Masterpact NW circuit breakers will not support the growth of fungus and mold.

Masterpact circuit breakers have been tested to the following:

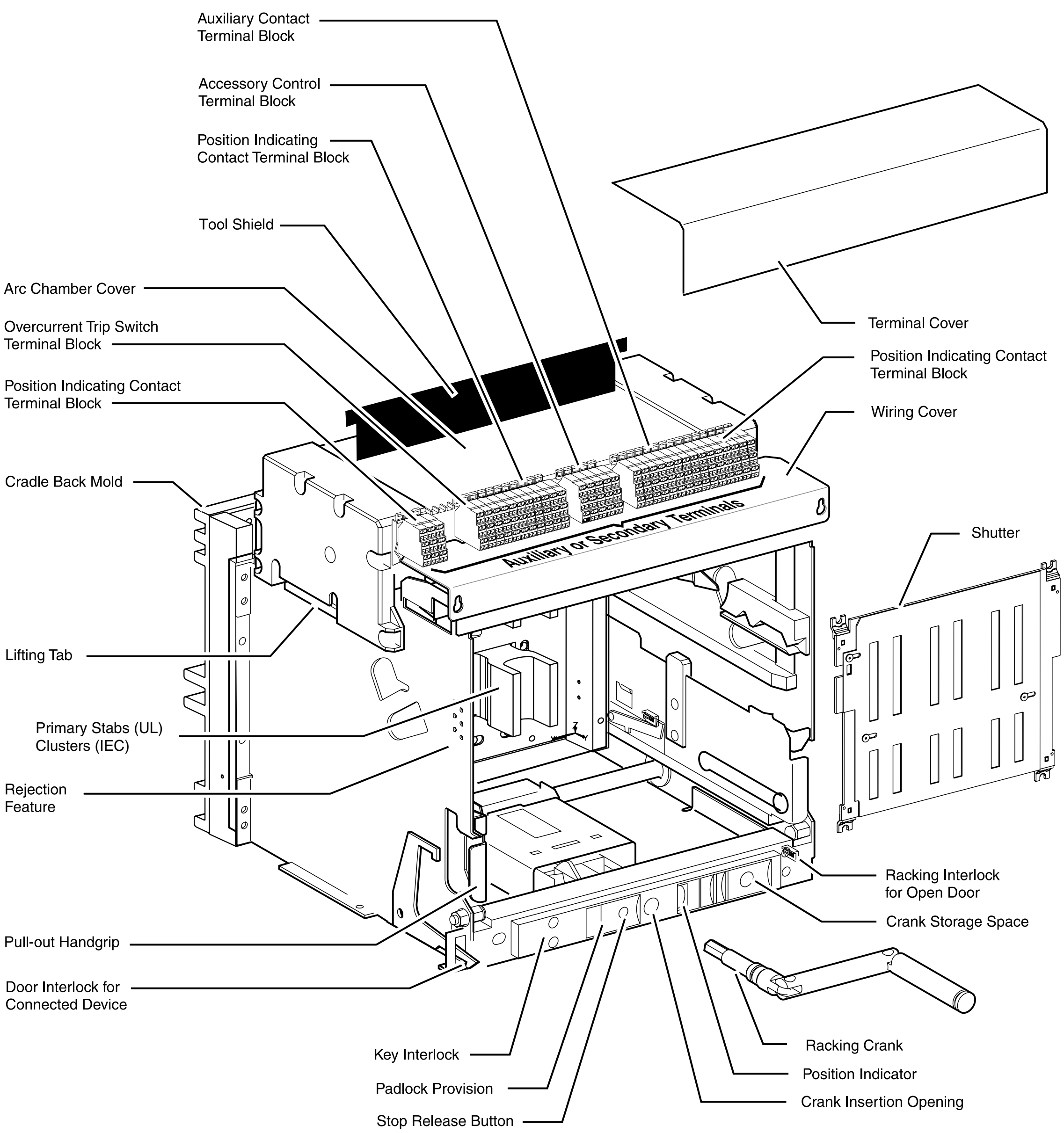
- IEC 68-2-30 — Damp heat (temperature +55°C and relative humidity of 95%)
- IEC 68-2-52 level 2 — salt mist

MASTERPACT NW CIRCUIT BREAKER DESIGN

NOTE: For UL Listed circuit breakers, the clusters are mounted on the circuit breaker; for IEC Rated circuit breakers, the clusters are mounted on the cradle.



MASTERPACT NW CRADLE DESIGN

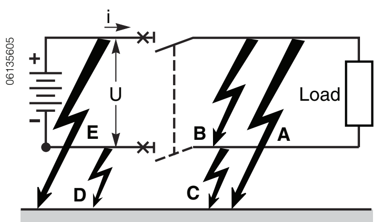
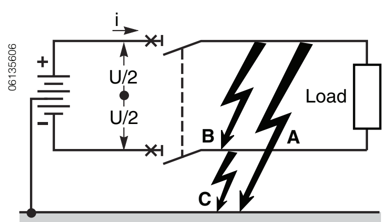
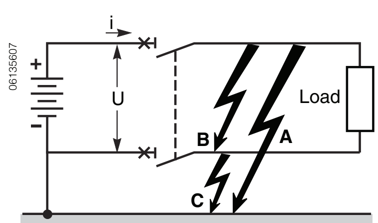


DC SYSTEMS

Selection of a dc circuit breaker is based on the type of dc system, the rated voltage, and the maximum short-circuit current at the point of installation.

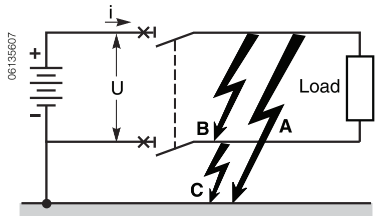
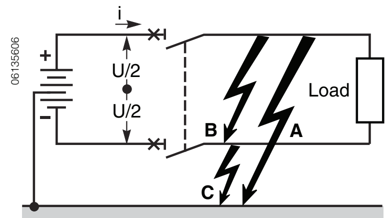
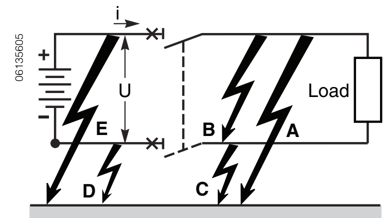
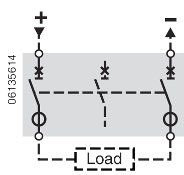
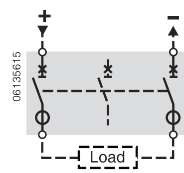
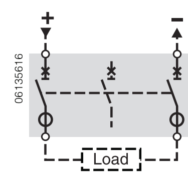
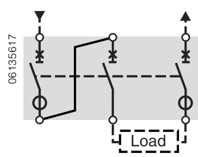
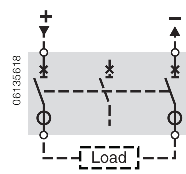
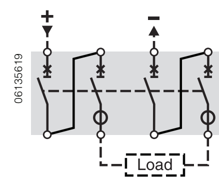
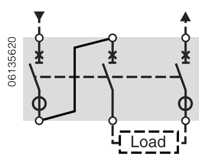
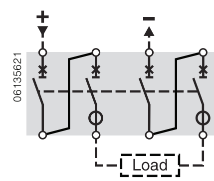
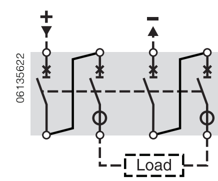
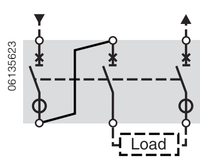
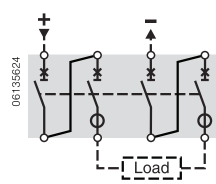
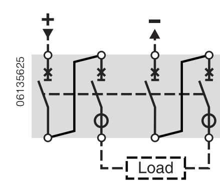
The three types of dc systems are:

Table 1: DC Systems

<table>
<tr><th>Distribution System</th><th>Faults</th><th>Fault Comments</th><th>Worst Case</th></tr>
<tr><td rowspan="3">Isolated Source
</td><td>Fault B</td><td>Isc maximum
Both polarities (positive and negative) are involved in the fault</td><td rowspan="3">Simultaneous faults at A and D or C and E
Either polarity may be involved at Voltage U.</td></tr>
<tr><td>Fault A or C</td><td>No consequences</td></tr>
<tr><td>Faults A and D
or
Faults C and E</td><td>Isc max
Either polarity may be involved at voltage U</td></tr>
<tr><td rowspan="2">Grounded Middle Point
</td><td>Fault B</td><td>Isc maximum
Both polarities (positive and negative) are involved in the fault</td><td rowspan="2">Fault B
Each polarity may be involved at voltage U/2</td></tr>
<tr><td>Fault A or C</td><td>Isc < Isc maximum at U/2
The negative or positive polarity is involved.</td></tr>
<tr><td rowspan="2">Grounded Negative
</td><td>Fault A</td><td>Isc maximum
Positive polarity is involved in the fault</td><td rowspan="2">Fault A
All poles taking part in breaking must be placed in series on the positive polarity. If the negative polarity is grounded, an additional pole must be provided to be used for isolation of the negative pole but not for breaking.</td></tr>
<tr><td>Fault B</td><td>Isc maximum
Both polarities (positive and negative) are involved in the fault</td></tr>
</table>

CIRCUIT BREAKER CONNECTION

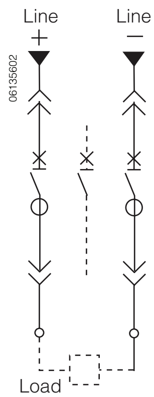
Table 2: Circuit Breaker Connection Based on Distribution System

	Grounded Negative	Grounded Middle Point	Isolated Source
Type			
Type N 24 Vdc ≤UN ≤500 Vdc	 Version C	 Version C	 Version C Only system applicable to UL Listed circuit breakers
Type H 24 Vdc ≤UN ≤500 Vdc	 Version D	 Version C	 Version E
Type H 500 Vdc < UN ≤750 Vdc	 Version D	 Version E	 Version E
Type H 750 Vdc < UN ≤900 Vdc	 Version D	 Version E	 Version E

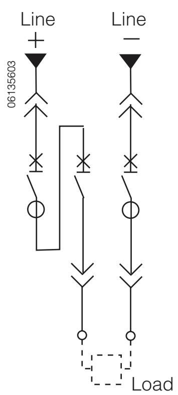
FRAME SIZES AND INTERRUPTING RATINGS

Load Diagrams

Type C



Type D



Type E

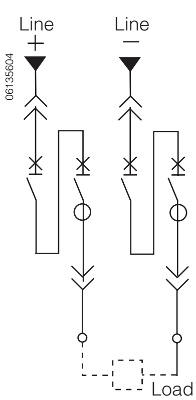


Table 3: Interrupting Ratings for UL 489 Listed Masterpact NW Circuit Breakers

Model Number (Type C)	Circuit Breaker Rating	Endurance Rating (C/O cycles) (with no maintenance)		Breaking Capacity[1] 500 Vdc (max 600 Vdc unloaded) L/R 8 ms	Breaking Time	Closing Time
		Mechanical	Electrical			
NW08NDC NW12NDC NW16NDC	800 A 1200 A 1600 A	10,000	2800	35 kA	30 to 75 ms	<70 ms
NW20NDC	2000 A	10,000	1000			
NW25NDC NW30NDC	2500 A 3000 A	10,000	1000			
NW40NDC	4000 A	10,000	1000			

[1] This circuit breaker is only suitable for use on ungrounded UPS systems, as stipulated in UL 489 standard supplement SC (SC11.4 and SC11.5)

Table 4: Ratings for IEC 60947-2 Rated Masterpact NW Circuit Breakers

Circuit Breaker Frame				NW10		NW20		NW40	
Circuit Breaker Designation (AIR)				**N**	**H**	**N**	**H**	**N**	**H**
Rated current	In			1000 A		2000 A		4000 A	
Circuit breaker type				N	H	N	H	N	H
Ultimate breaking capacity	Icu	L/R ≤5 ms	500 Vdc	85 kA	100 kA	85 kA	100 kA	85 kA	100 kA
			750 Vdc	—	85 kA	—	85 kA	—	85 kA
			900 Vdc	—	85 kA	—	85 kA	—	85 kA
		L/R ≤15 ms	500 Vdc	35 kA	85 kA	35 kA	85 kA	35 kA	85 kA
			750 Vdc	—	50 kA	—	50 kA	—	50 kA
			900 Vdc	—	35 kA	—	35 kA	—	35 kA
		L/R ≤30 ms	500 Vdc	25 kA	50 kA	25 kA	50 kA	25 kA	50 kA
			750 Vdc	—	50 kA	—	50 kA	—	50 kA
			900 Vdc	—	25 kA	—	25 kA	—	25 kA
Rated Service Breaking Capacity (kA)	Ics		% Icu	100%		100%		100%	
Rated short-time withstand current (kA)	Icw		1 s	50	85	50	85	50	85
Rated making capacity (kA)	Icm		% Icu	100%		100%		100%	
Break time				30 to 75 ms		30 to 75 ms		30 to 75 ms	
Closing time				< 70 ms		< 70 ms		< 70 ms	
Switch Designation (AIR)				**—**	**HA**	**—**	**HA**	**—**	**HA**
Rated making capacity (kA)	Icm				85		85		85
Rated short-time withstand current (kA)	Icw		1 s		85		85		85
Installation and maintenance									
Service life C/O cycles x 1000	mechanical	Without maintenance	10,000						
	electrical	Without maintenance	500 Vdc	8500	8500	5000	5000	2000	2000
			900 Vdc	—	2000	—	2000	—	1000

CORRECTION FACTORS

Table 5: Temperature Correction Factors

	Maximum Ambient Temperature										
°F	140	122	104	86	77	68	50	32	14	–4	–22
°C	60	50	40	30	25	20	10	0	–10	–20	–30
Current	0.83	0.92	1.00	1.07	1.11	1.14	1.21	1.27	1.33	1.39	1.44

Table 6: Altitude Correction Factors

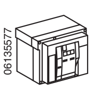
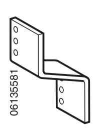
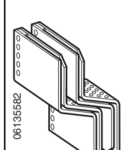
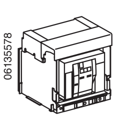
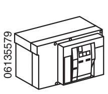
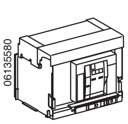
	< 6600 ft. (2000 m)	8500 ft (2600 m)	13,000 ft. (3900 m)
Voltage	1.00	0.95	0.80
Current	1.00	0.99	0.96

SHIPPING WEIGHTS

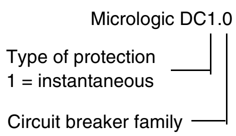
Table 7: Weights for UL 489 Listed Masterpact NW Circuit Breakers

Frame Rating	Connector Type	Weights (lbs./kg.) Circuit Breaker	Cradle	Connector	Pallet	Total
800–2500 A, drawout	RCTH/RCTV	109 lbs. (50 kg)	97 lbs (44 kg)	17 lbs (8 kg)	17 lbs (8 kg)	240 lbs (109 kg)
800–2500 A, fixed-mounted	RCTH/RCTV	109 lbs. (50 kg)	—	17 lbs (8 kg)	17 lbs (8 kg)	143 lbs (65 kg)
3000–4000 A, drawout	RCTH/RCTV	109 lbs. (50 kg)	97 lbs (44 kg)	26 lbs (12 kg)	17 lbs (8 kg)	249 lbs (114 kg)
3000–4000 A, fixed-mounted	RCTH/RCTV	109 lbs. (50 kg)	—	26 lbs (12 kg)	17 lbs (8 kg)	152 lbs (70 kg)

Table 8: Weights for IEC 60947-2 Rated Masterpact NW Circuit Breakers

Suffix	Circuit Breaker Type		Circuit Breaker Weight	Z-connector NW10DC–NW20DC Type	NW10DC–NW20DC Weight	NW40DC Type	NW40DC Weight
C/D	3-pole fixed	 06135577	19 lbs (42 kg)	 06135581	1.1 lb. (2.5 kg)	 06135582	5.9 lbs (13 kg)
C/D	3-pole drawout	 06135578	35 lbs (78 kg)				
E	4-pole fixed	 06135579	24 lbs (52 kg)				
E	4-pole drawout	 06135580	43 lbs (95 kg)				

MICROLOGIC® DC1.0 TRIP UNIT



All Masterpact® NW DC circuit breakers are equipped with Micrologic® DC1.0 trip units, which is designed to protect power circuits and load devices.

The Micrologic DC1.0 trip unit:

- is associated with sensors with instantaneous trip values than can be adjusted on the front of the trip unit
- has three sensor versions provide different threshold ranges:
  - — 1250–2500 A
  - — 2500–5400 A
  - — 5000–11000 A

  See trip curves, Figure 52
- has an instantaneous protection with no time delay settings
- has no overload protection provided

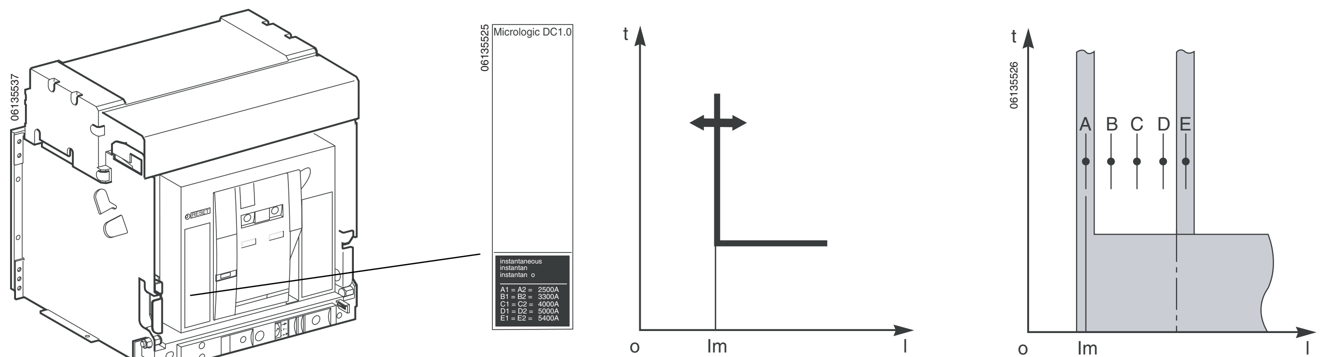


Figure 4: Micrologic DC1.0 Trip Unit

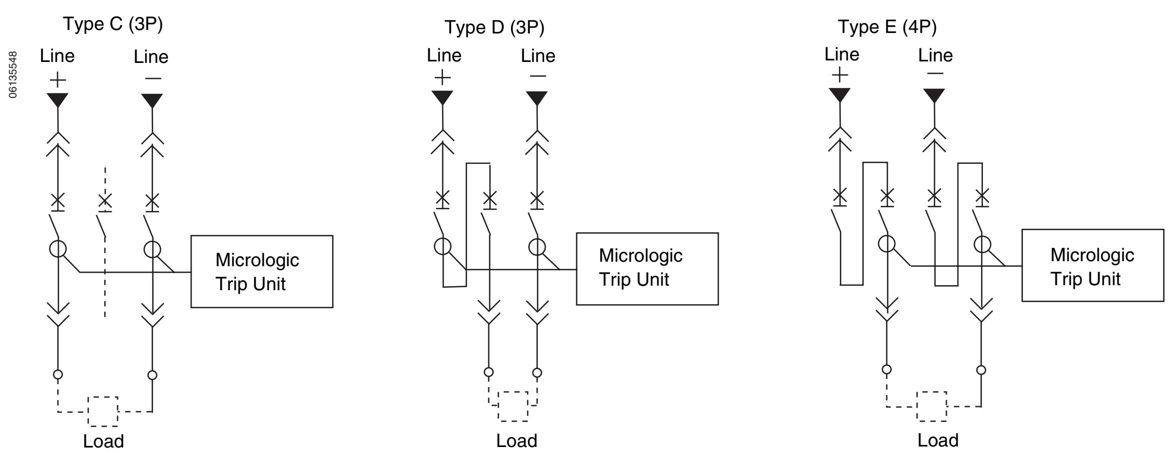


Figure 5: Circuit Breaker Configuration and Sensor Locations

- has sensor adjustment dials accessible in front of the circuit breaker behind the door of the cubicle. Both sensors must have the same settings

NOTE: Dials are normally set to setting marked, for example B1 and B2 for 8000 A. Eleven intermediate values can also be set which are not indicated on the adjustment knob, for example between A and B for 6000 A.

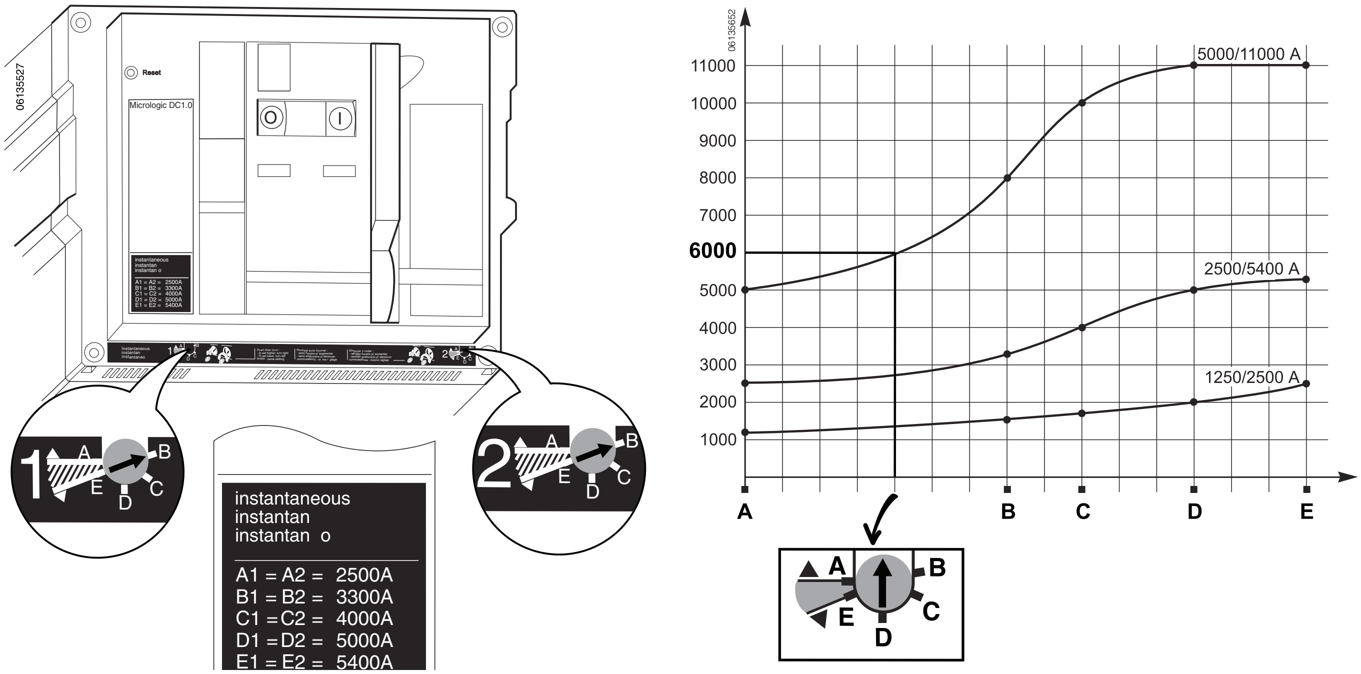


Figure 6: Sensor Adjustment Dials

Table 9: Im Thresholds

Sensor	A	B	C	D	E
1250–2500 A	1250 A ± 8%	1500 A ±10%	1600 A ±10%	2000 A ±10%	2500 A ±10%
2500–5400 A	2500 A ± 8%	3300 A ±10%	4000 A ±10%	5000 A ±10%	5400 A ±10%
5000–11,000 A	5000 A ± 8%	8000 A ±10%	10,000 A ±10%	11,000 A ±10%	11,000 A ±10%

Table 10: Sensors

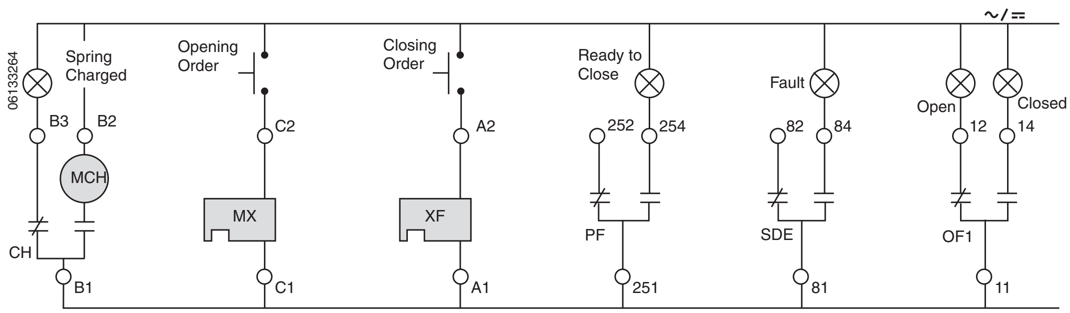
Frame Rating	Model Number	Sensor Type		
		1250–2500 A	2500–5400 A	5400–11,000 A
800 A	NW08	X	X	X
1000 A	NW10	X	X	X
1200 A	NW12	X	X	X
1600 A	NW16	X	X	X
2000 A	NW20	—	X	X
2500 A	NW25	—	X	X
3000 A	NW30	—	X	X
4000 A	NW40	—	—	X

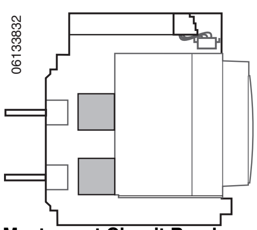
ACCESSORIES

REMOTE OPERATION

NOTE: When remote operation features are used, a minimum of four seconds is required for the spring charging motor (MCH) to completely charge the circuit breaker closing springs prior to actuating the shunt close (XF) device.

Figure 7: Wiring Diagram for Remote ON/OFF Function





Masterpact Circuit Breaker Equipped for Remote ON/OFF Function

The remote ON/OFF function is used to remotely open and close the circuit breaker. It is made up of the following components:

- A spring-charging motor (MCH) equipped with a spring-charged limit switch; see page 15 for more information
- A shunt close (XF); see page 15 for more information
- A shunt trip (MX1); see page 15 for more information

Optionally, the function may be completed with:

- A ready-to-close contact (PF)
- An electrical closing push button (BPFE)
- A remote reset following a fault (RES)

The remote operation function may be completed with:

- Auxiliary contacts (OF)
- Overcurrent trip switch (SDE)

NOTE: Induced voltages in the circuit at terminal C2 and/or A2 can cause the shunt close to not work properly. The best way to prevent induced voltages is keep the circuit to terminal C2 and A2 as short as possible. If it is impossible to keep the circuit less than 10 feet (3 m), use an interposing relay near terminal C2 or A2.

Terminals

Terminal

Table 11: Terminal Characteristics

Standards		UL 486E
Termination Capacity		22–14 AWG solid or stranded wire with max. O.D. of insulation 3.5 mm
Current	Nominal	10 A
	Minimum	100 mA at 24 V

Table 11: Terminal Characteristics

Pull-out Forces	22 AWG = 4.5 lbs (20 N) 20 AWG = 6.75 lbs (30 N) 18 AWG = 6.75 lbs (30 N) 16 AWG = 9 lbs (40 N) 14 AWG = 11.5 lbs (50 N)

Spring-charging Motor (MCH)

Spring Charging Motor

The spring-charging motor automatically charges the spring mechanism for closing the circuit breaker and also recharges the spring mechanism when the circuit breaker is in the ON position. Instantaneous reclosing of the circuit breaker is thus possible following circuit breaker opening. The spring-mechanism charging handle is used only as a backup if auxiliary power is absent.

The spring-charging motor is equipped as standard with a limit switch contact (CH) that signals the charged position of the mechanism (springs charged).

Table 12: Spring Charging Motor Characteristics

Characteristics		MCH
Voltage Ratings (V_n)	Vac 50/60 Hz	48/60, 100/130, 200/250, 240/277, 380/415, 400/440, 480
	Vdc	24/30, 48/60, 100/125, 200/250
Operating Threshold		0.85 to 1.1 V_n
Power Consumption		180 VA
Motor Overcurrent		2–3 x I_n for 0.1 s
Charging Time		4 s maximum on NW
Duty Cycle		3 cycles per minute maximum
Endurance		10,000 cycles for NW < 4000 A 5000 cycles for NW ≥ 4000 A
CH Contact		10 A at 240 V

Shunt Trip (MX1) and Shunt Close (XF)

Shunt Trip (MX1) and Shunt Close (XF)

Maximum Wire Length—The inrush currents for these devices are approximately 200 VA. When low supply voltages (12, 24 or 48 V) are used, the maximum allowable wire length is dependent on the voltage and the wire size.

Table 13: Maximum Wire Length◆

Device	Percent of Source Voltage	Source Voltage					
		12 Vdc		24 Vdc		48 Vdc	
Wire Size		#14 AWG ($2.08 mm^2$)	#16 AWG ($1.31 mm^2$)	#14 AWG ($2.08 mm^2$)	#16 AWG ($1.31 mm^2$)	#14 AWG ($2.08 mm^2$)	#16 AWG ($1.31 mm^2$)
UVR (MN)	100%	—	—	159 ft. (48.5 m)	100 ft. (30.5 m)	765 ft. (233.2 m)	472 ft. (143.9 m)
	85%	—	—	44 ft. (13.4 m)	29 ft. (8.8 m)	205 ft. (62.5 m)	129 ft. (39.3 m)
Shunt Trip (MX) and Shunt Close (XF)	100%	57 ft. (17.4 m)	34 ft. (10.4 m)	314 ft. (95.7 m)	200 ft. (61.0 m)	1503 ft. (457.8 m)	944 ft. (287.7 m)
	85%	27 ft. (8.2 m)	17 ft. (5.2 m)	205 ft. (62.5 m)	126 ft. (38.4 m)	957 ft. (291.7 m)	601 ft. (183.2 m)

◆ The length shown in the table is for each of the two supply wires.

Shunt trip (MX1): When energized, the shunt trip instantaneously opens the circuit breaker. The shunt trip may be supplied continuously or intermittently.

Shunt close (XF): Remotely closes the circuit breaker if the spring mechanism is charged.

Table 14: Shunt Trip and Shunt Close Characteristics

Characteristics		MX1	XF	Min	Max
Voltage Ratings (V_n)	Vac 50/60 Hz	24 Vac		17 Vac	26 Vac
		48 Vac		34 Vac	52 Vac
		120 Vac		60 Vac	132 Vac
		240 Vac		168 Vac	264 Vac
		277 Vac		194 Vac	304 Vac
		380 Vac		266 Vac	418 Vac
		480 Vac		336 Vac	528 Vac
	Vdc	12 Vdc		8 Vdc	13 Vdc
		24 Vdc		17 Vdc	26 Vdc
		48 Vdc		34 Vdc	52 Vdc
		125 Vdc		88 Vdc	137 Vdc
		250 Vdc		175 Vdc	275 Vdc
Operating Threshold		0.7 to 1.1 V_n	0.85 to 1.1 V_n		
Power Consumption (VA or W)	Steady-state/inrush	4.5/200			
Circuit Breaker Response Time at V_n		50 ms ±10	70 ms ±10 (NW ≤4000 A) 80 ms ±10 (NW > 4000 A)		

Additional Shunt Trip (MX2) or Undervoltage Trip (MN)

Second Shunt Trip (MX2)

This function opens the circuit breaker via an electrical order.

It is made up of:

- Shunt trip (MX2, second MX) or,
- Undervoltage trip (MN)
  - — Instantaneous trip
  - — Fixed undervoltage trip (time delayed) or,
  - — Adjustable undervoltage trip (time delayed)

As shown in the wiring diagram for the remote tripping function below, the delay unit (installed outside the circuit breaker) may be disabled by an emergency off button to obtain non-delayed opening of the circuit breaker.

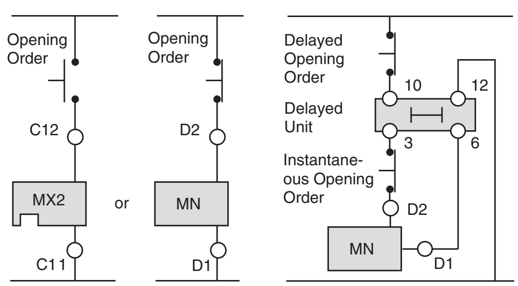


Figure 8: Wire Diagram for the Remote Tripping Function

When energized, the shunt trip (MX1) instantaneously opens the circuit breaker. A continuous supply of power to the second shunt trip (MX2) locks the circuit breaker in the off position.

The undervoltage trip (MN) instantaneously opens the circuit breaker when its supply voltage drops to a value between 35% and 70% of its rated voltage.

If the undervoltage trip is not energized, it is impossible to close the circuit breaker, either manually or electrically. An attempt to close the circuit breaker produces no movement of the main contacts. Closing is allowed when the supply voltage of the undervoltage trip reaches 85% of rated voltage.

Table 15: Undervoltage Trip Characteristics

Characteristics		MX2	Min	Max
Voltage Ratings (V_n)	Vac 50/60 Hz	24 Vac	17 Vac	26 Vac
		48 Vac	34 Vac	52 Vac
		120 Vac	60 Vac	132 Vac
		240 Vac	168 Vac	264 Vac
		277 Vac	194 Vac	304 Vac
		380 Vac	266 Vac	418 Vac
		480 Vac	336 Vac	528 Vac
	Vdc	12 Vdc	8 Vdc	13 Vdc
		24 Vdc	17 Vdc	26 Vdc
		48 Vdc	34 Vdc	52 Vdc
		125 Vdc	88 Vdc	137 Vdc
		250 Vdc	175 Vdc	275 Vdc
Power Consumption (VA or W)	Constant/Inrush	4.5/200		
Circuit Breaker Response Time at V_n		50 ms ±10		

Time-delay Module for Undervoltage Trip


Time-delay Module for Undervoltage Trip (MN)

To eliminate circuit breaker nuisance tripping during temporary voltage dips (micro-breaks), operation of the undervoltage trip (MN) can be delayed. This function is achieved by adding an external delay unit (either adjustable or non-adjustable) to the undervoltage trip (MN) circuit.

Table 16: Time-delay Module Characteristics

Voltage Ratings of Undervoltage Trip		Vac 50/60 Hz	24/30, 48/60, 100/130, 200/250, 380/480
		Vdc	24/30, 48/60, 100/130, 200/250
Voltage Ratings of Time-delay Module	Adjustable	Vac 50/60 Hz	48/60, 100/130, 200/250, 380/480
		Vdc	48/60, 100/130, 200/250, 380/480
	Non-Adjustable	Vac 50/60 Hz	100/130, 200/250
		Vdc	100/130, 200/250
Operating Threshold		Opening	0.35 to 0.7 V_n
		Closing	0.85 V_n
Power Consumption			4.5 VA/W (Holding), 200 VA/W (Inrush)
Time-delay Settings	Adjustable		0.5, 0.9, 1.5, and 3.0 s
	Non-Adjustable		0.25 s

SWITCHES

Ready-to-close Switch (PF)


Ready-to-close Switch (PF)

The ready-to-close position switch indicates that the following conditions are met and the circuit breaker can be closed:

- The circuit breaker is open
- The closing springs are charged
- There is no standing closing or opening order

Table 17: Ready-to-close Switch Characteristics

Type of Contact	1a/1b Form C
Maximum Number of Contacts	1

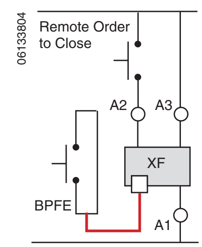
Table 17: Ready-to-close Switch Characteristics

	Standard: 100 mA/24V minimum load		Low-Level: 2 mA/15 V minimum load	
Breaking Capacity at a Power Factor (p.f.) of 0.3	240/380 Vac	5 A	24/48 Vac	3 A
	480 Vac	5 A	240 Vac	3 A
	600/690 Vac	3 A	380 Vac	3 A
	24/48 Vdc	3 A	24/48 Vdc	3 A
	240 Vdc	0.3 A	125 Vdc	0.3 A
	380 Vdc	0.15 A	250 Vdc	0.15 A

Electrical Closing Push Button (BPFE)

Located on the front panel of the circuit breaker, this push button carries out electrical closing of the circuit breaker, taking into account all of the safety functions that are part of the control/monitoring system of the installation. The push button is installed on the control circuit of the shunt close, and connects to the communicating shunt close module (XF-COM). Terminal A2 of XF-COM is used to remotely close the circuit breaker.

Electrical Closing Push Button (BPFE)

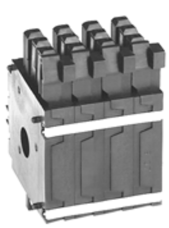


Remote Reset (RES) and Automatic Reset After Fault Trip

- Following tripping, the remote reset (RES) resets the overcurrent trip switch (SDE) and the mechanical indicator. (Voltage rating: 110/130 Vac and 200/240 Vac.) RES is not compatible with an additional overcurrent trip switch (SDE2).
- Automatic reset after fault-trip: Following tripping, a reset of the mechanical indicator (reset button) is no longer required to enable circuit breaker closing (factory adjustable only).

Auxiliary Switch (OF)

The rotary-type auxiliary switches are directly driven by the trip mechanism when the minimum isolation distance between the main circuit breaker contact is reached.



Auxiliary Switch (OF) with Four Contacts

Table 18: Auxiliary Switch Characteristics

Supplied as Standard (Form C)			4
Maximum Number of Contacts			12
Breaking Capacity at a Power Factor (p.f.) of 0.3	Standard (100 mA/24 V minimum load)		
	Vac	240/380	10 A
		480	10 A
		600/690	6 A
	Vdc	24/48	10 A
		240	10 A
		380	3 A
	Low-level (1 mA/4 V minimum load with a maximum current and voltage of 100 mA/10 V. Note: If the maximum voltage and current is exceeded, the low-level function of the switch will be lost but the switch will continue to function as a standard switch with the following specifications.		
	Vac	24/48 Vac	6 A
		240 Vac	6 A
		380 Vac	3 A
	Vdc	24/48 Vdc	6 A
		125 Vdc	6 A
		250 Vdc	3 A

Overcurrent Trip Switch (SDE)

Overcurrent Trip Switch (SDE)

Circuit breaker tripping due to a fault is signalled by a red mechanical fault indicator (reset) and one overcurrent trip switch (SDE).

Following tripping, the mechanical indicator must be reset before the circuit breaker may be closed. An additional overcurrent trip switch (SDE2) is supplied as an option and is not compatible with the remote reset (RES).

Table 19: Overcurrent Trip Switch Characteristics

Supplied as Standard	1a/1b Form C			
Maximum Number of Contacts	2			
Breaking Capacity at a Power Factor (p.f.) of 0.3	Standard: 100 mA/24 V minimum load		Low-level: 2 mA/15 V minimum load	
	240/380 Vac	5 A	24/48 Vac	3 A
	480 Vac	5 A	240 Vac	3 A
	600/690 Vac	3 A	380 Vac	3 A
	24/48 Vdc	3 A	24/48 Vdc	3 A
	240 Vdc	0.3 A	125 Vdc	0.3 A
	380 Vdc	0.15 A	250 Vdc	0.15 A

Connected/Closed Switch (EF)

Connected/Closed Switch (EF)

This switch combines the “device connected” and “device closed” information to produce “circuit closed” information. The connected/closed switch (EF) is supplied as an option and must be used with an additional auxiliary switch (OF) and fits into its connector (it is not available for ring terminals).

Table 20: Connected/Closed Switch Characteristics

Circuit Breaker Type	NW			
Maximum Number of Contacts	8a/8b Form C			
Breaking Capacity at a Power Factor (p.f.) of 0.3	Standard: 100 mA/24 V minimum load		Low-level: 2 mA/15 V minimum load	
	240/380 Vac	6 A	24/48 Vac	5 A
	480 Vac	6 A	240 Vac	5 A
	600/690 Vac	6 A	380 Vac	5 A
	24/48 Vdc	2.5 A	24/48 Vdc	2.5 A
	125 Vdc	0.8 A	125 Vdc	0.8 A
	250 Vdc	0.3 A	250 Vdc	0.3 A

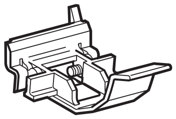
Cradle Position Switch

Cradle Position Switch (CE, CD, CT)

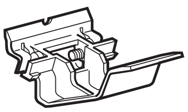
Three series of optional auxiliary switches are available for the cradle:

- Cradle position switches (CE) to indicate the connected position.
- Cradle position switches (CD) to indicate the disconnected position. This position is indicated when the required clearance for isolation of the power and auxiliary circuits is reached.
- Cradle position switches (CT) to indicate the test position. In this position, the power circuits are disconnected and the auxiliary circuits are connected.

Actuator for up to Three CE Switches (standard)



Actuator for up to Three CD Switches (standard)



Actuator for up to Three CT Switches (standard)

Table 21: Cradle Position Switch Characteristics

Circuit Breaker Type			NW		
			CE	CD	CT
Maximum Push-in Switches with Standard Actuators			3■	3■	3■
With Additional Actuators			9	0	0
			6	3	0
			6	0	3
Breaking Capacity at a Power Factor (p.f) of 0.3	Standard (100 mA/24 V minimum load)				
	Vac	240	8 A		
		380	8 A		
		480	8 A		
		600/690	6 A		
	Vdc	24/48	2.5 A		
		125	0.8 A		
		250	0.3 A		
	Low-level (2 mA/15 V minimum load)				
	Vac	24/48	5 A		
		240	5 A		
		380	5 A		
	Vdc	24/48	2.5 A		
		125	0.8 A		
		250	0.3 A		

■ Possible Ring-terminal Combinations		
CE	CD	CT
1b	1a	1b
1b	1a, 1b	1b
1a, 2b	1a, 2b	1a
1a, 2b	2a, 1b	1b
2a, 1b	1a, 2b	1b
1a	1a	1a
3a	3a	1a
3b	3b	1b

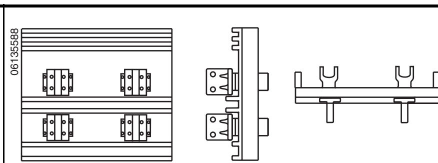
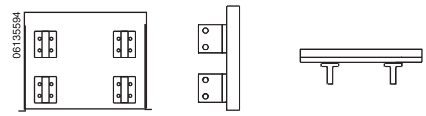
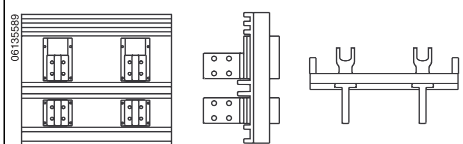
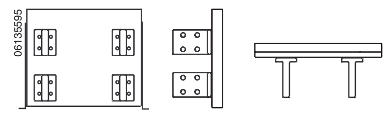
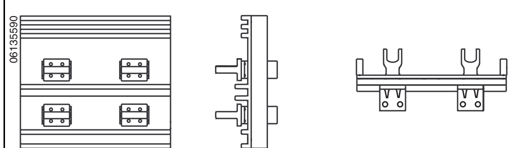
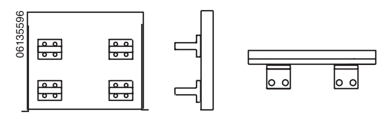
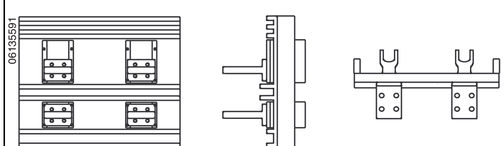
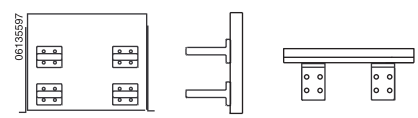
Additional Actuators for Cradle Position Switches on Masterpact NW Circuit Breakers

A set of additional actuators may be installed on the cradle to change or add the functions of the cradle position switches. Each standard actuator can be replaced by any other actuator to change the function of the cradle position switch.

SQUARE D

CRADLE CONNECTIONS

Table 22: Masterpact NW UL Listed Circuit Breaker Connectors (Rear Connections)

Type	Rating	Connector: Drawout Circuit Breaker	Connector: Fixed Circuit Breaker
Rear-connected “T” vertical (RCTV)	800–2500 A		
	3000–4000 A		
Rear-connected (T) horizontal (RCTH)	800–2500 A		
	3000–4000 A		

 SQUARE D

Table 23: Masterpact NW IEC Rated 3-pole/4-pole Drawout Circuit Breakers

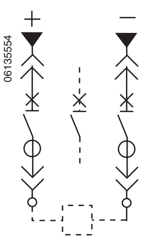
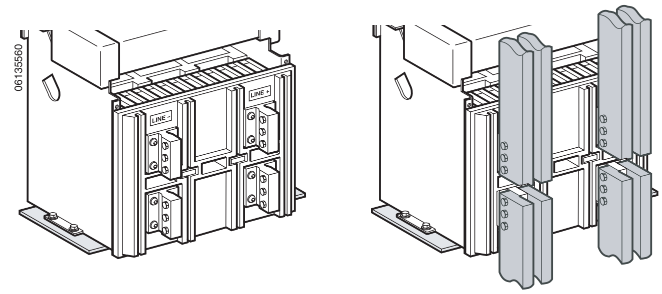
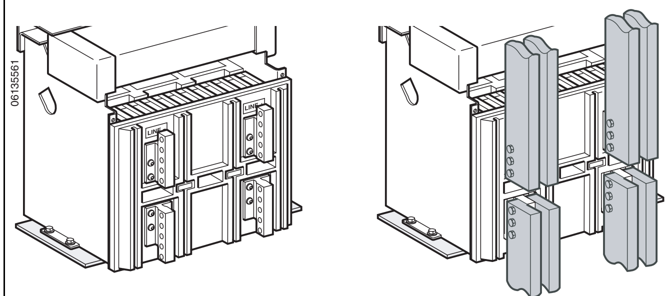
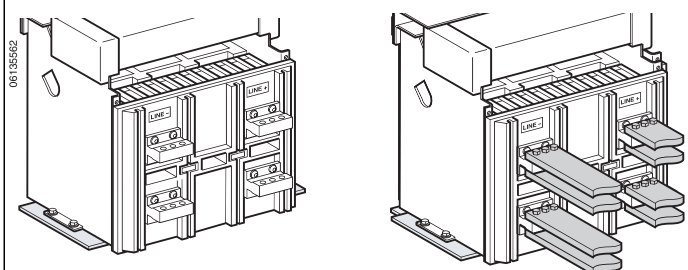
Wiring	Connector Type	Ampere Rating	Connector and Bussing
Type C (3P) 	RCTV	1000–2000 A	
		4000 A	
	RCTH	1000–2000 A	
		4000 A	NA

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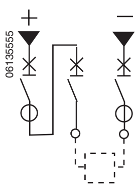
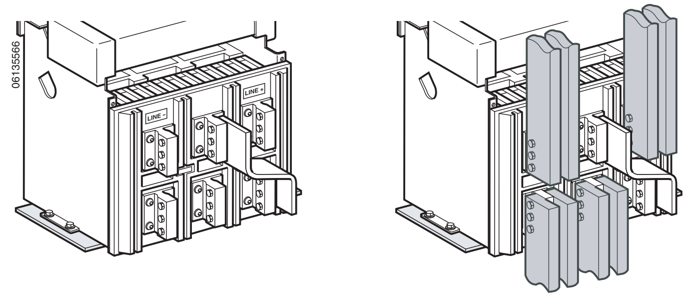
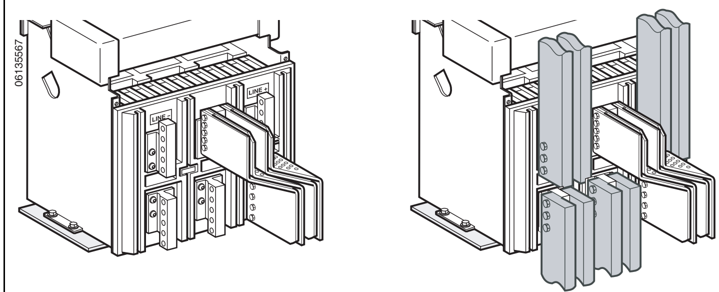
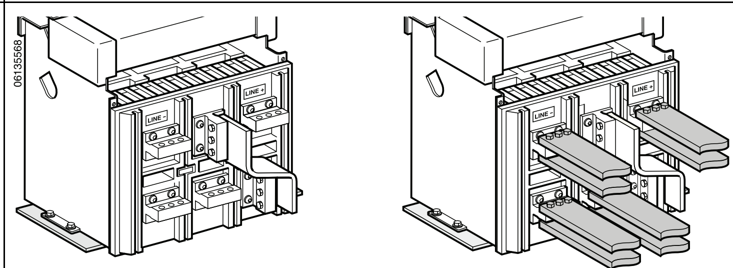
Table 23: Masterpact NW IEC Rated 3-pole/4-pole Drawout Circuit Breakers *(continued)*

Wiring	Connector Type	Ampere Rating	Connector and Bussing
Type D (3P) 	RCTV	1000–2000 A	
		4000 A	
	RCTH	1000–2000 A	
		4000 A	NA

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Masterpact® NW DC Circuit Breakers
Accessories

Table 23: Masterpact NW IEC Rated 3-pole/4-pole Drawout Circuit Breakers *(continued)*

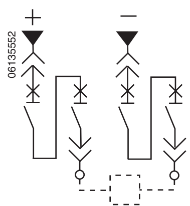
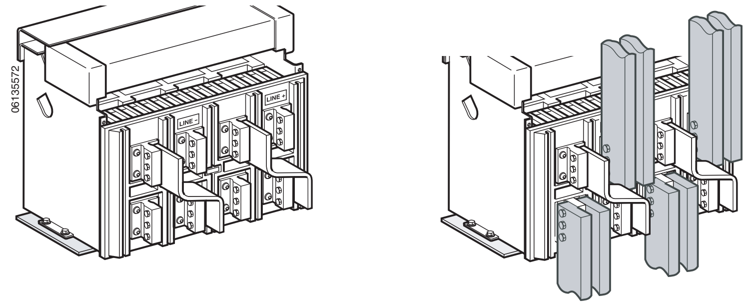
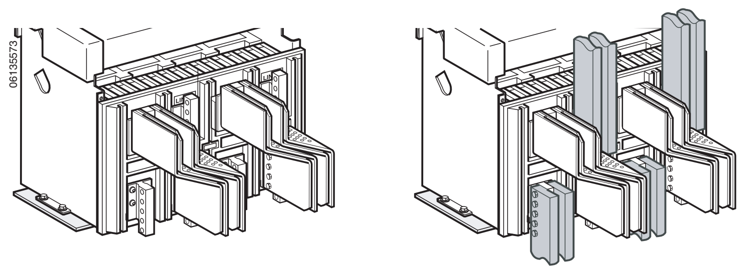
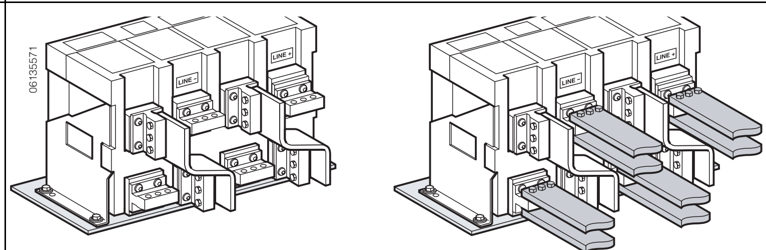
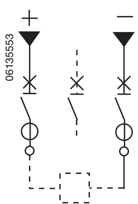
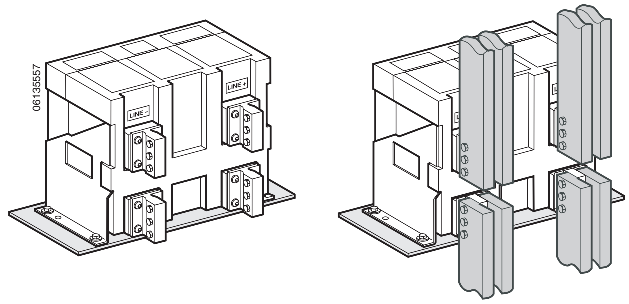
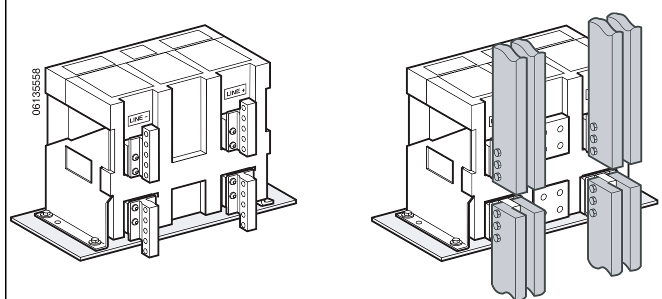
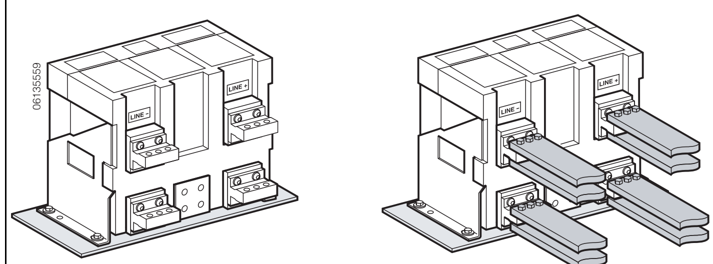
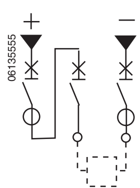
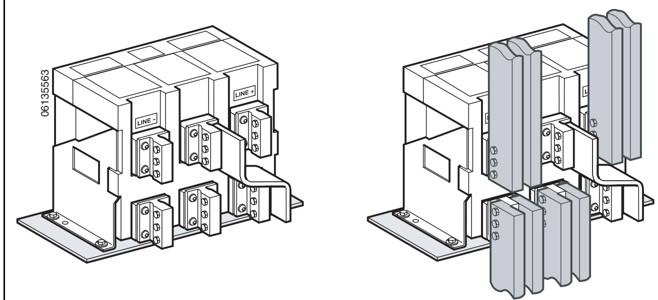
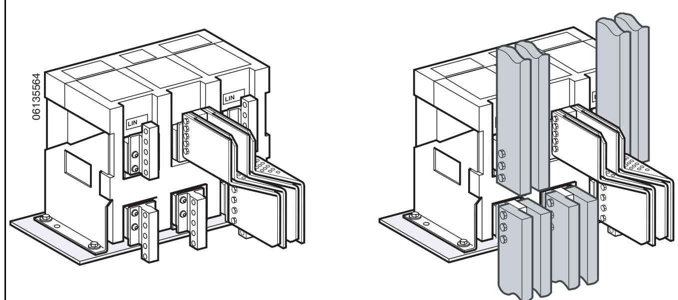
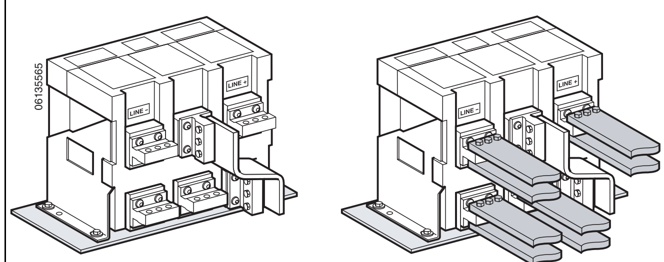
Wiring	Connector Type	Ampere Rating	Connector and Bussing
Type E (4P) 	RCTV	1000–2000 A	
		4000 A	
	RCTH	1000–2000 A	
		4000 A	NA

Table 24: Masterpact NW IEC Rated 3-pole/4-pole Fixed Circuit Breakers

Wiring	Connector Type	Ampere Rating	Connectors and Bussing
Type C (3P) 	RCTV	1000–2000 A	
		4000 A	
	RCTH	1000–2000 A	
		4000 A	NA

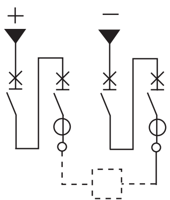
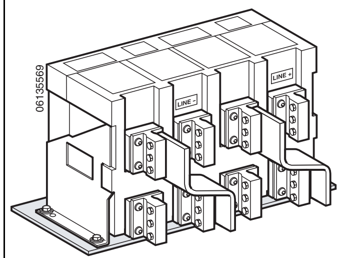
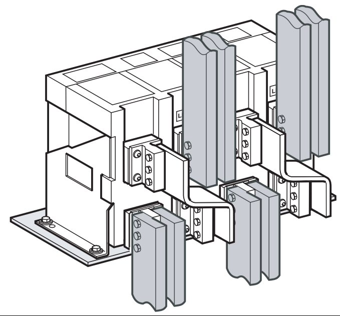
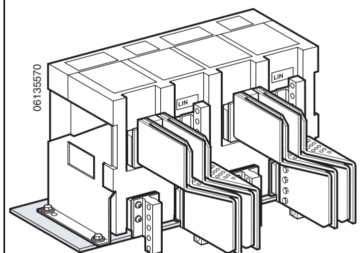
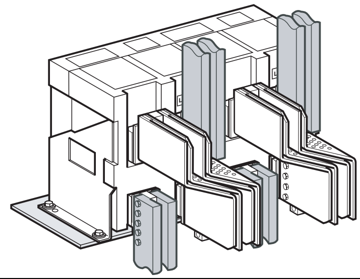
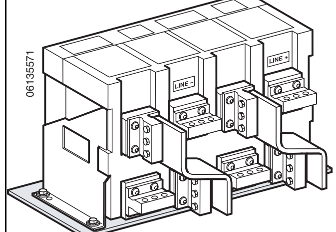
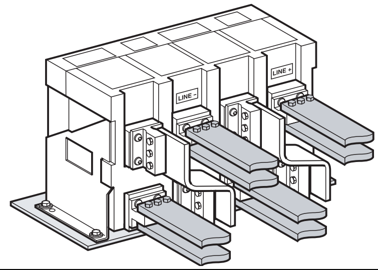
Continued on next page

Table 24: Masterpact NW IEC Rated 3-pole/4-pole Fixed Circuit Breakers *(continued)*

Wiring	Connector Type	Ampere Rating	Connectors and Bussing
Type D (3P) 	RCTV	1000–2000 A	
		4000 A	
	RCTH	1000–2000 A	
		4000 A	NA

Continued on next page

Table 24: Masterpact NW IEC Rated 3-pole/4-pole Fixed Circuit Breakers *(continued)*

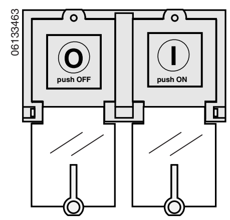
Wiring	Connector Type	Ampere Rating	Connectors and Bussing
Type E (4P) 06135556 	RCTV	1000–2000 A	06135569  
		4000 A	06135570  
	RCTH	1000–2000 A	06135571  
		4000 A	NA

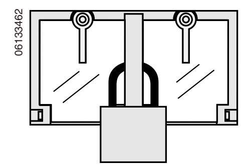
CIRCUIT BREAKER LOCKING AND INTERLOCKING

Push Button Lock

A transparent cover blocks access to the push buttons used to open and close the device. It is possible to independently lock the opening button and/or the closing button. The push buttons may be locked using:

- One to three padlocks: 3/16” to 5/16” diameter, not supplied
- A lead seal
- Two screws





Push Button Lock

Open Position Padlock and Key Lock Provisions

Open Position Key Lock

Open Position Padlock Provision

The circuit breaker is locked in the off position by physically keeping the opening push button pressed down using one of the following:

- One to three padlocks: 3/16” to 5/16” diameter, not supplied
- Key locks: One or two Kirk or Federal Pioneer key locks (keyed alike or differently) are available for UL Listed/ANSI Certified circuit breakers; for IEC Rated circuit breakers, Ronis, Castell, or Profalux key locks are available

Keys may be removed only when locking is effective. The key locks are available in any of the following configurations:

- One key lock
- One key lock mounted on the device + one identical key lock supplied separately for interlocking with another device
- Two different key locks mounted on the circuit breaker for double locking

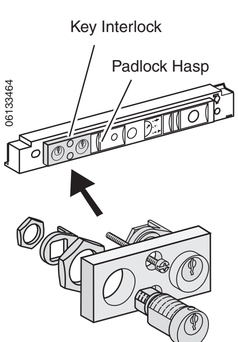
A locking kit for installation of one or two key locks may be ordered separately.

Table 25: Circuit Breaker and Switch Locking Options

Type of Locking		Maximum Number of Locks
Pushbutton Locking	Using padlocks	Three padlocks
Open Position Locking	Using key locks	Two key locks (optional)
	Using padlocks and key locks	Up to three padlocks and two key locks (optional)

CRADLE LOCKING AND INTERLOCKING

Disconnected Position Locking

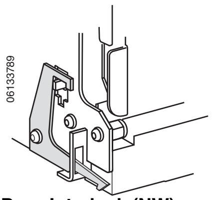


Disconnected Position Locking Provisions

The circuit breaker can be locked in the disconnected position by key interlock (optional) or padlock (standard). The key interlock is on the cradle and accessible with the door locked.

- Key interlock, Kirk or Federal Pioneer are available for UL/ANSI circuit breakers; for IEC circuit breakers, Ronis, Castell, or Profalux key locks are available. Captive key when unlocked.
- Locking on disconnected, test, and connected positions is optional for IEC circuit breakers and standard for UL/ANSI circuit breakers.

Door Interlock



Door Interlock (NW)

The door interlock prevents the compartment door from being opened when the circuit breaker is in the connected or test position. If the circuit breaker is put into the connected position with the door open, the door can be closed without disconnecting the circuit breaker. For greater protection, this interlock can be used in conjunction with the open door racking interlock.

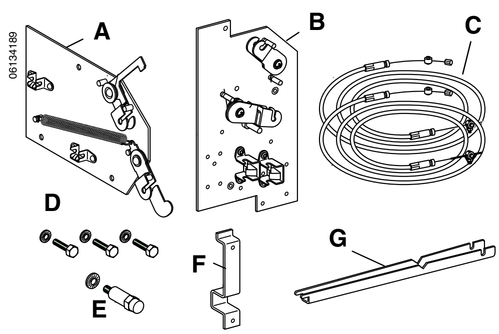
Racking Interlock Between Racking Crank and Off Position

The racking interlock is standard for UL and ANSI circuit breakers, and optional for IEC circuit breakers. It prevents insertion of the racking crank unless the OFF push button is pressed.

Cable Door Interlock Kit

This option prevents the compartment door from being opened when the circuit breaker is in the closed position. This kit includes:

Figure 9: Cable Door Interlock Kit Contents



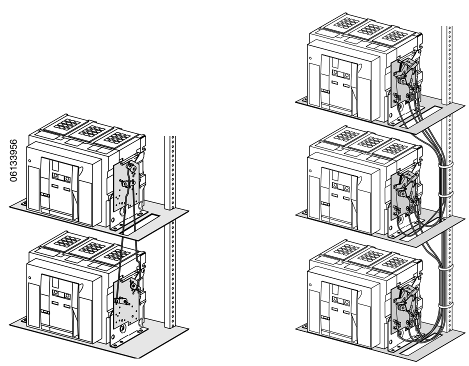
Kit Contents

(A) Panel Interlocking Plate
(B) Circuit Breaker Interlocking Plate
(C) Interlocking Cables
(D) Bolts with Washers
(E) Guide-bolt with Washer
(F) Interlocking Bracket
(G) Calibration Tray

Source Changeover Interlocks

Source changeover interlocks allow mechanical interlocking between two or three circuit breakers. (fixed and drawout)

Figure 10: Source Changeover Interlocks



Two NW Circuit Breakers Interlocked Using Rods

Three NW Circuit Breakers Interlocked Using Cables

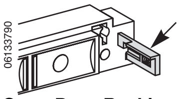
Interlocking Two Circuit Breakers

- Interlocking Two Mains Using Rods
- Interlocking Two Mains Using Cables

Interlocking Three Circuit Breakers Using Cables

- Interlocking Two Mains and One Generator
- Interlocking Two Mains and One Tie
- Interlocking Three Mains

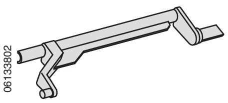
Open Door Racking Interlock



Open Door Racking Interlock

The racking interlock prevents racking in the circuit breaker when the door is open. (Insertion of the circuit breaker racking crank is not possible when the compartment door is open.)

Automatic Spring Discharge Mechanism



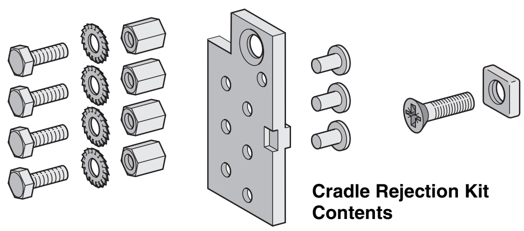
Automatic Spring Discharge Mechanism

The automatic spring discharge mechanism is standard for UL and ANSI circuit breakers, and optional for IEC circuit breakers. It releases the closing spring energy when the circuit breaker is moved from the disconnected position to the fully withdrawn position.

Cradle Rejection Kits

The cradle rejection feature (standard) ensures that only the properly designated circuit breaker or switch is matched with the selected cradle assembly.

Figure 11: Cradle Rejection Kits

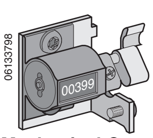


Rail Padlocking

Rail padlocking is standard for UL, ANSI, and IEC cradles. When used in combination with the disconnected position locking device, rail padlocking prevents the movement of the circuit breaker from the disconnected position to the fully withdrawn position when the padlock hasp is pulled out and locked.

MISCELLANEOUS ACCESSORIES

Mechanical Operation Counter (CDM)



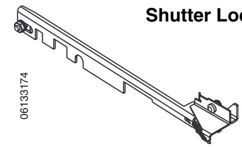
Mechanical Operation Counter (CDM)

The mechanical operation counter (CDM) registers the total number of operating cycles. One CDM is installed per circuit breaker.

Shutter and Shutter Lock

The shutters automatically block access to the main disconnects when the circuit breaker is in the disconnected, test, or fully withdrawn position. The shutter lock is used to prevent connection of the circuit breaker or to lock the shutters in the closed position.

UL Circuit Breaker Shutter

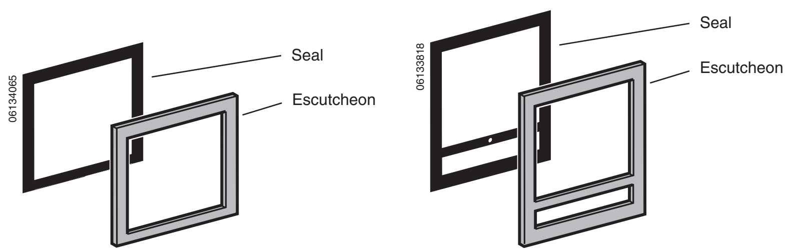


Shutter Lock

Door Escutcheon (CDP)

These door escutcheons provide a frame and seal for the circuit breaker.

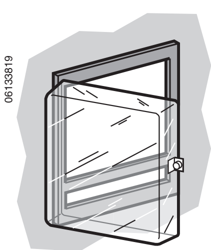
Figure 12: Door Escutcheons



Door Escutcheon (NW Fixed)

Door Escutcheon (NW Drawout)

Transparent Cover (CCP) for Door Escutcheon



Transparent Cover (CCP)

The cover is hinged-mounted and locked with a milled head, and is designed to be installed on the door escutcheon.

SQUARE D

WIRING DIAGRAMS

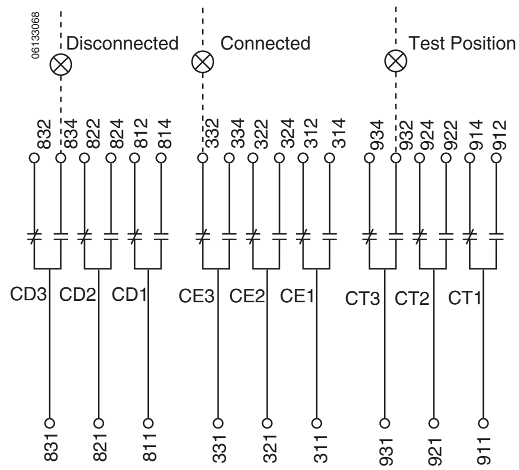
NOTE: All diagrams are showing circuit breaker open, connected and charged.

Figure 13: Wiring Diagrams for Masterpact NW Circuit Breakers

Trip Unit

Trip Unit

Cell Switches



Markings for Push-in Type Terminals

Cell Switches		
CD3	**CD2**	**CD1**
834	824	814
832	822	812
831	821	811

or

CE6	CE5	CE4
364	354	344
362	352	342
361	351	341

Trip Unit								Cell Switches		
COM	**UC1**	**UC2**	**UC3**	**UC4**	**M2C/M6C**	**SDE2/Res.**	**SDE1**	**CE3**	**CE2**	**CE1**
E5 E6	Z5 M1	M2 M3	F2+	V3	484/Q3	184/K2	84	334	324	314
E3 E4	Z3 Z4	T3 T4	VN	V2	474/Q2	182	82	332	322	312
E1 E2	Z1 Z2	T1 T2	F1–	V1	471/Q1	181/K1	81	331	321	311

Markings for Ring Terminals

Cell Switches		
CD3	**CD2**	**CD1**
834/832	824/822	814/812
831	821	811

Trip Unit											
COM	**UC1**	**UC2**	**UC3**	**UC3a**	**M2C/M6C**	**M2Ca/M6Ca**	**SDE2/Res.**	**SDE2a**	**SDE1**	**SDE1a**
E5 E6	Z5 M1	M2 M3	F2	VN	484/Q3	474/Q2	184/K2	182	84	82
E3 E4	Z3 Z4	T3 T4	F1		471/Q1		181/K1		81	
E1 E2	Z1 Z2	T1 T2								

■ = Not available on this circuit breaker

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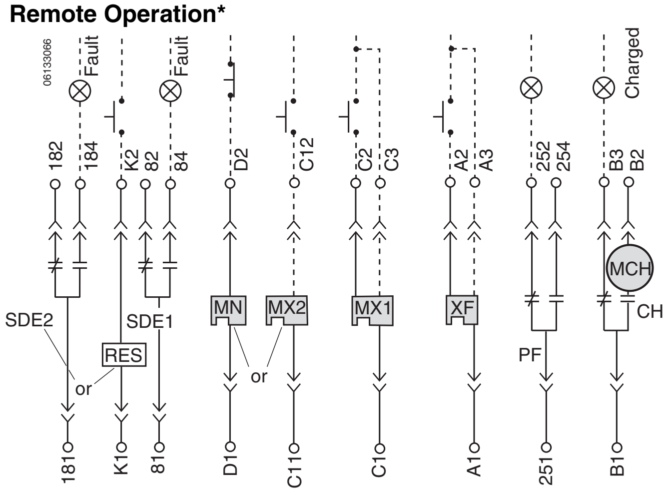
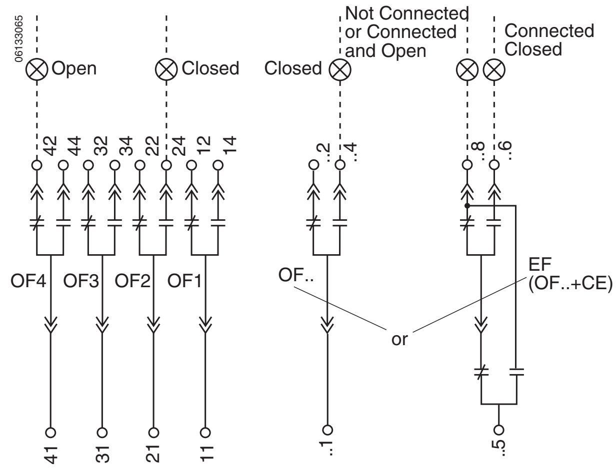
NOTE: All diagrams are showing circuit breaker open, connected and charged.

Figure 14: Wiring Diagrams for Auxiliary Connections

Remote Operation*



Switches



Markings for Push-in Type Terminals

Remote Operation					Auxiliary Switches												Cell Switches		
MN/MX2	MX1	XF	PF	MCH	OF24	OF23	OF22	OF21	OF14	OF13	OF12	OF11	OF4	OF3	OF2	OF1	CT3	CT2	CT1
D2/C12	C2	A2	254	B2	244	234	224	214	144	134	124	114	44	34	24	14	934	924	914
C13	C3	A3	252	B3	242	232	222	212	142	132	122	112	42	32	22	12	932	922	912
D1/C11	C1	A1	251	B1	241	231	221	211	141	131	121	111	41	31	21	11	931	921	911

or

EF24	EF23	EF22	EF21	EF14	EF13	EF12	EF11
248	238	228	218	148	138	128	118
246	236	226	216	146	136	126	116
245	235	225	215	145	135	125	115

or

CD6	CD5	CD4
864	854	844
862	852	842
861	851	841

or

CE9	CE8	C7
394	384	374
392	382	372
391	381	371

Markings for Ring Terminals

Remote Operation									Auxiliary Switches								Cell Switches		
MN	MX1	MX1a	XF	XFa	PF	CT1	MCH	MCHa	OF14	OF13	OF12	OF11	OF4	OF3	OF2	OF1	CE3	CE2	CE1
D2	C2	C3	A2	A3	252	914/912	B2	B3	144	134	122	112	44	34	22	12	334/332	324/322	314/312
D1	C1		A1		251	911	B1		141	131	121	111	41	31	21	11	331	321	311

*When remote operation features are used, make sure there is a minimum of four seconds for the spring charging motor (MCH) to completely charge the circuit breaker closing springs prior to actuating the shunt close (XF) device.

ADDITIONAL WIRING INFORMATION

Alarm Contacts (OF1, OF2, OF3 and OF4 are standard equipment)

OF4 OF3 OF2 OF1	Open/Closed circuit breaker or switch position contacts	OF24: Open/Closed circuit breaker or switch position contact or EF24: Combined connected and closed contact
		OF23 or EF23
		OF22 or EF22
		OF21 or EF21
		OF14 or EF14
		OF13 or EF13
		OF12 or EF12
		OF22 or EF22
		OF11 or EF11

Cradle Contacts

CD3 CD2 CD1	Disconnected position contacts	CE3 CE2 CE1	Connected position contacts	CT3 CT2 CT1	Test position contacts
or				or	
CE6 CE5 CE4	Connected position contacts			CE9 CE8 CE7	Connected position contacts
				or	
				CD6 CD5 CD4	Disconnected position contacts

Remote Operation

SDE	Electrical fault alarm contact
RES	Remote reset
MN	Undervoltage trip device
MX	Shunt trip
XF	Shunt close
PF	Ready-to-close contact
MCH	Spring-charging motor

SECTION 1— DIMENSIONAL DRAWINGS

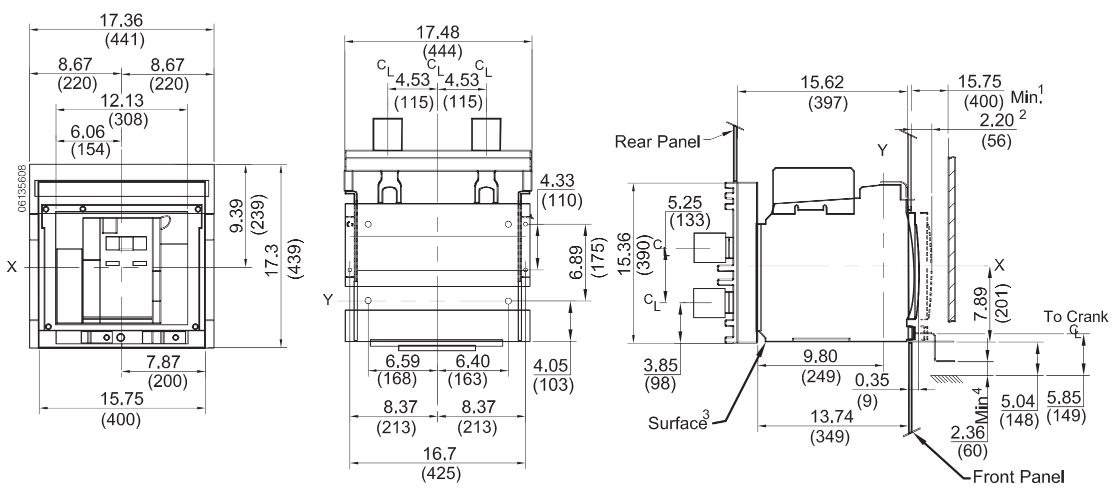
ENCLOSURE INFORMATION

Table 26: Minimum Enclosure Information

Number of Poles	Circuit Breaker	Circuit Breaker Enclosure Dimensions (H x W x D)		Ventilation Area					
				Top		Bottom		Front Face	
		in.	mm	in.^{2}	mm^2	in.^{2}	mm^2	in.^{2}	mm^2
3-pole	UL Listed	18.37 x 30.00 x 15.75	466.6 x 762.0 x 400	16.62	10 720	16.62	10 720	—	—

UL 3-POLE DRAWOUT CIRCUIT BREAKERS

Figure 15: 800-2500 A Master Drawing



Front View **Top View** **Side View**

1. Minimum to withdraw circuit breaker.
2. Distance to drawout position.
3. Circuit breaker mounting surface.
4. Minimum for circuit breaker racking handle.

Figure 16: 800-2500 A Rear Connected "T" Vertical (RCTV)

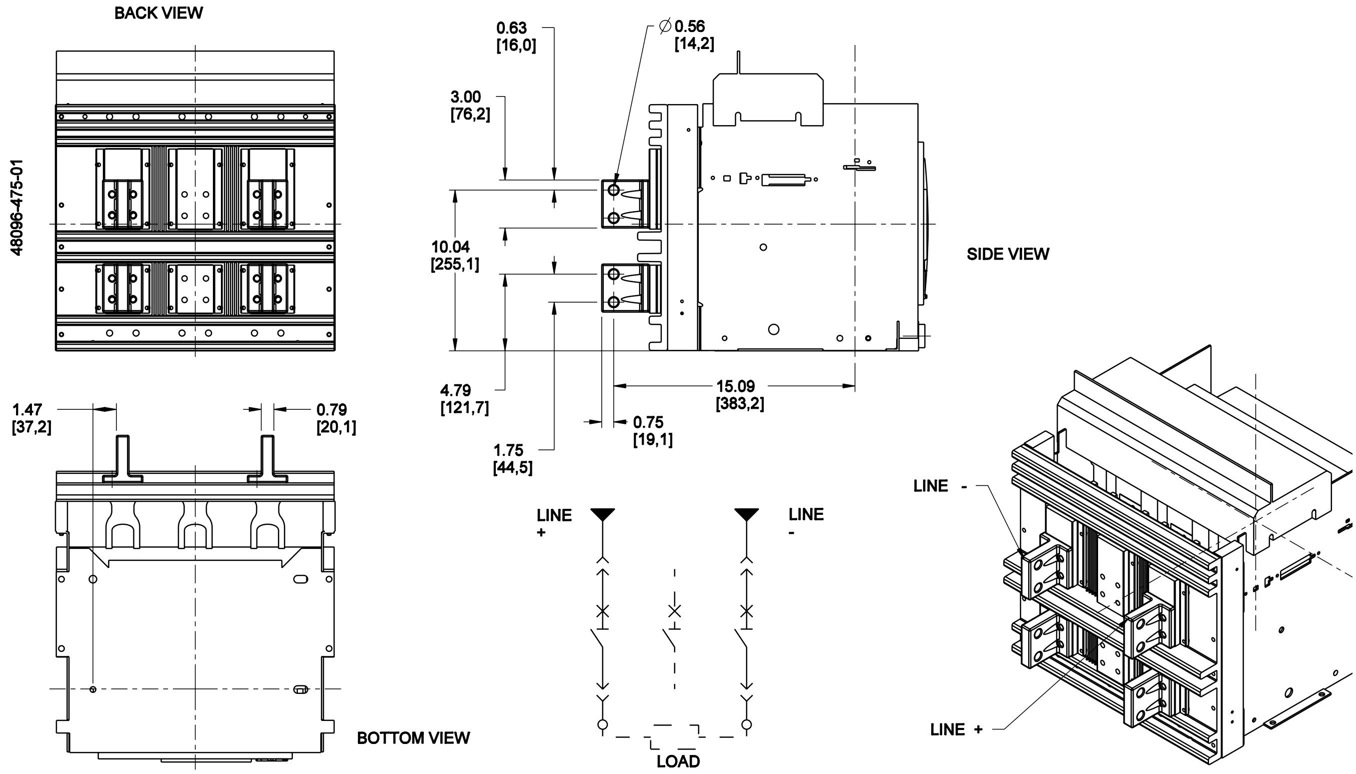


Figure 17: 800-2500 A Rear Connected "T" Horizontal (RCTH)

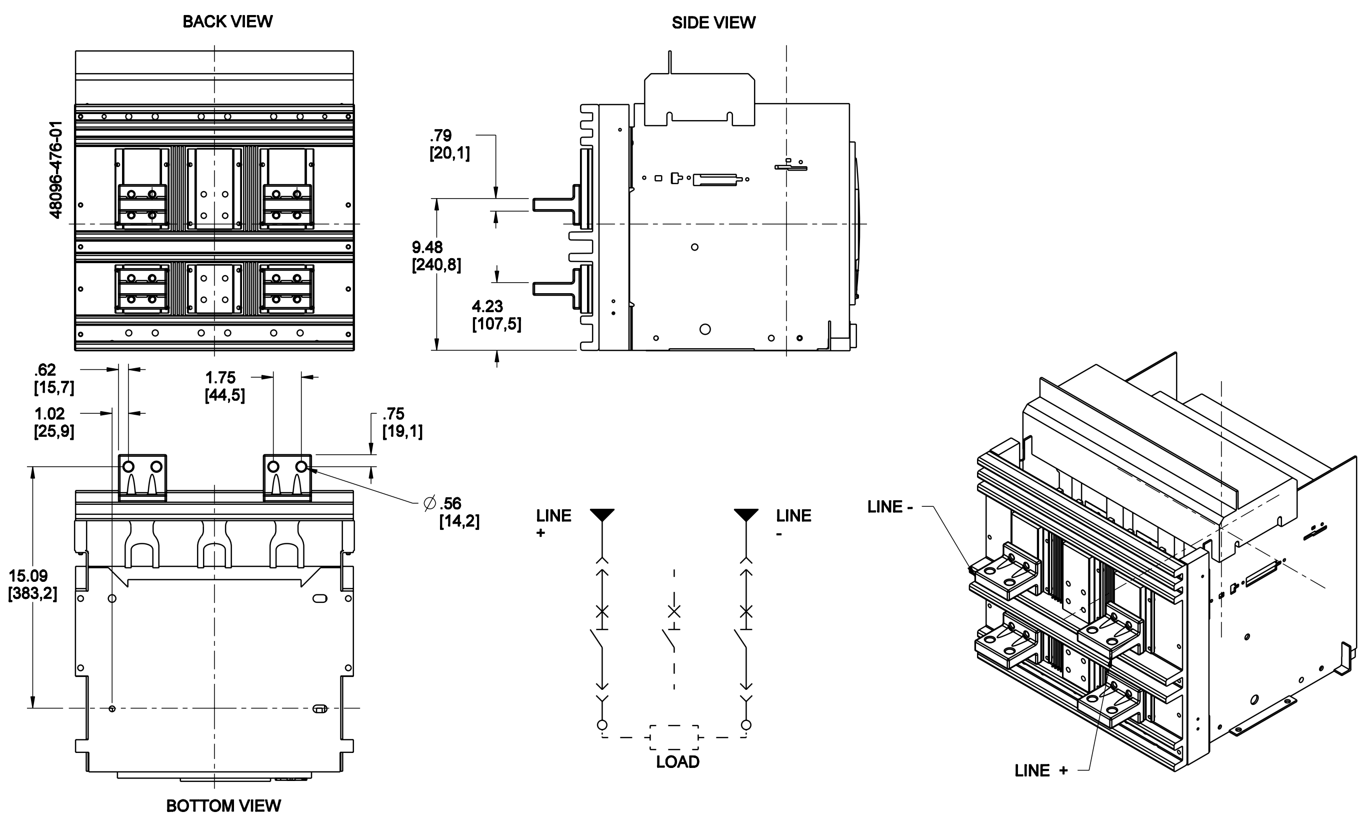


Figure 18: 3000-4000 A Rear Connected "T" Horizontal (RCTV)

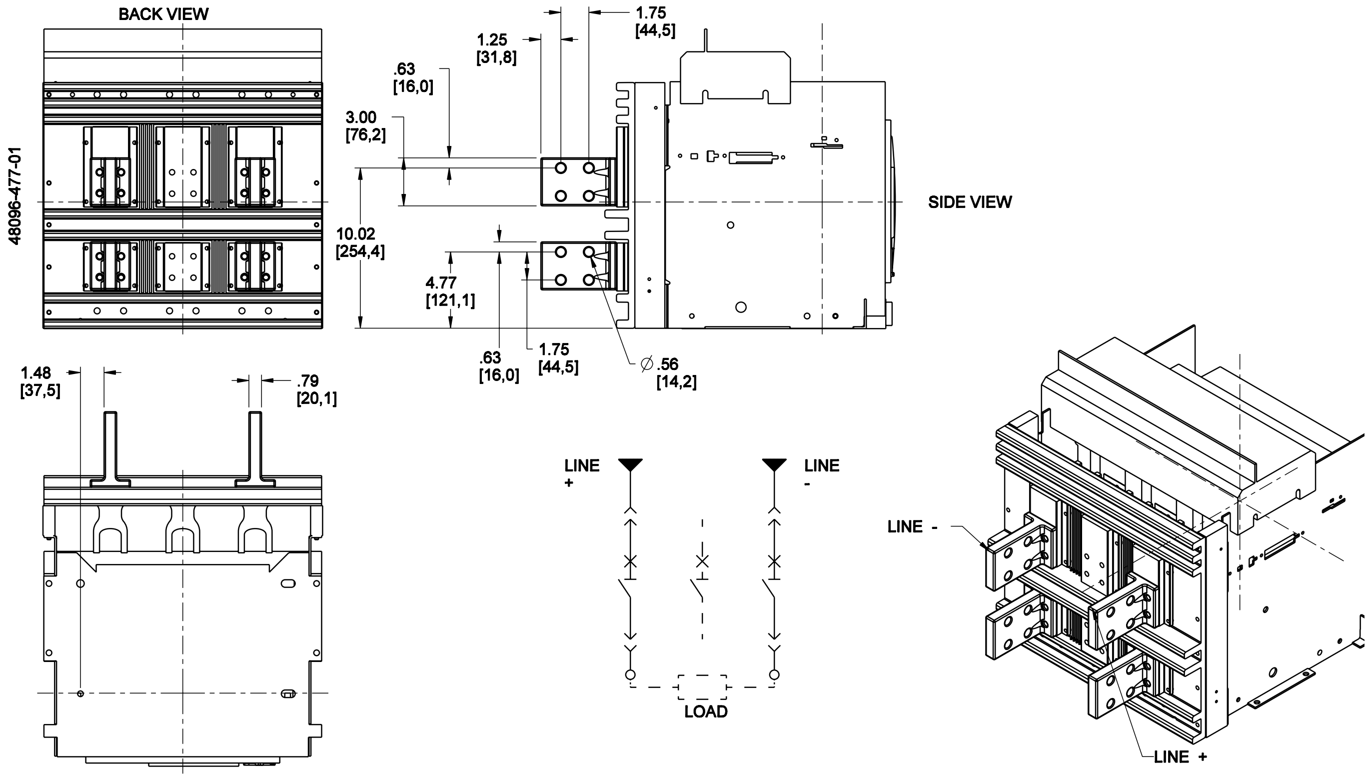


Figure 19: 3000-4000 A Rear Connected "T" Horizontal (RCTH)

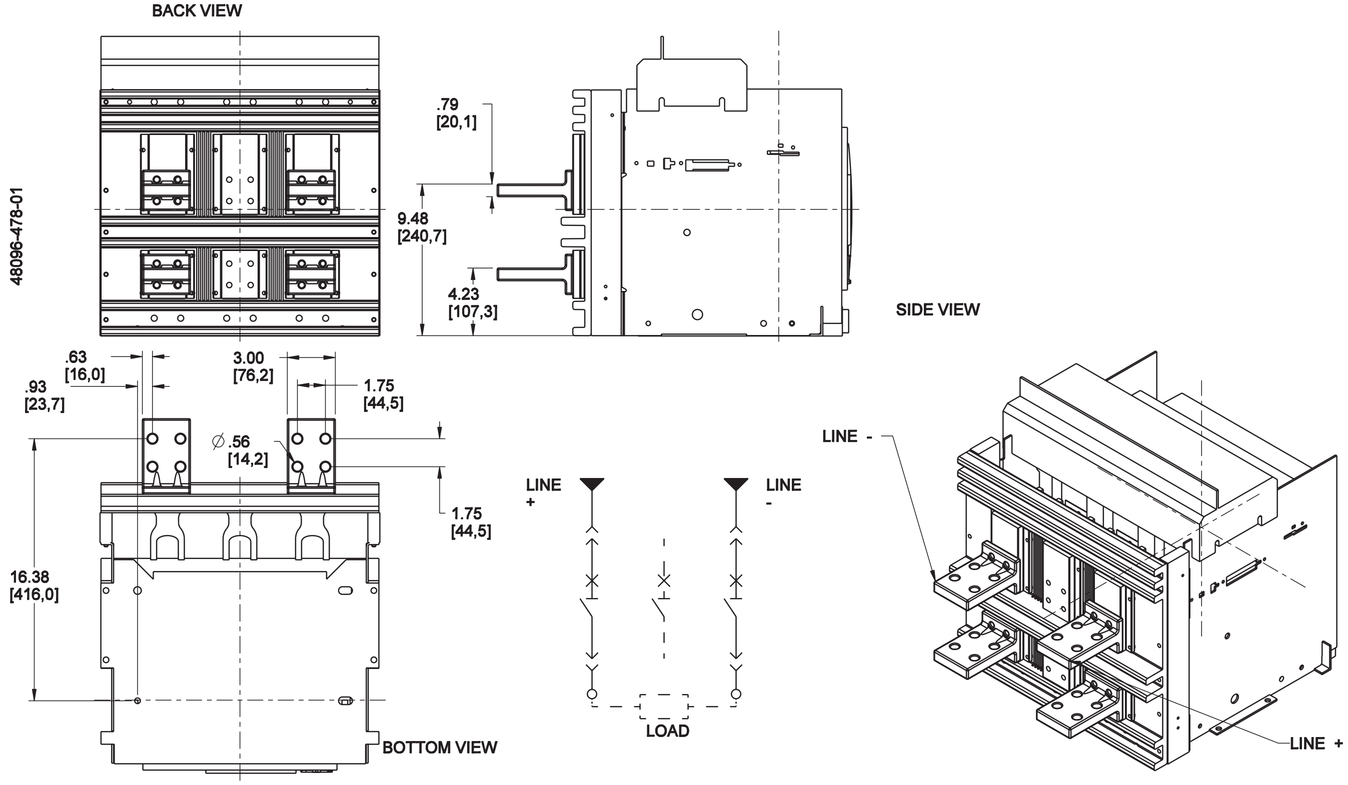


Figure 20: Drawout Cradle Mounting

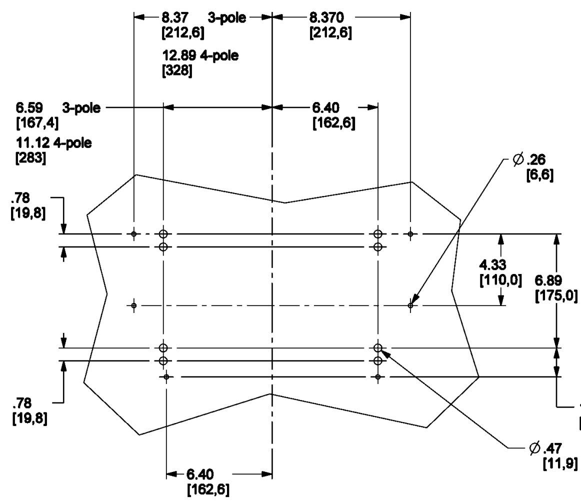


Figure 21: Door Cutout

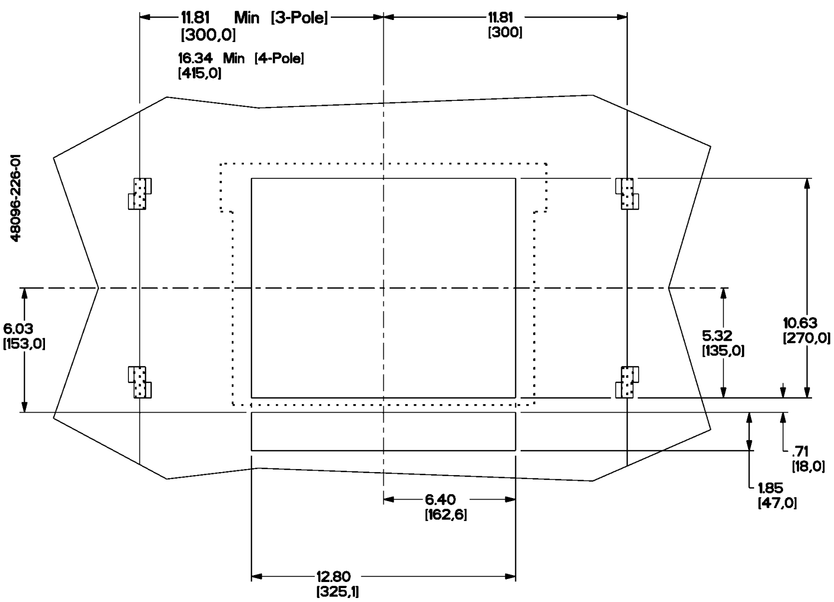


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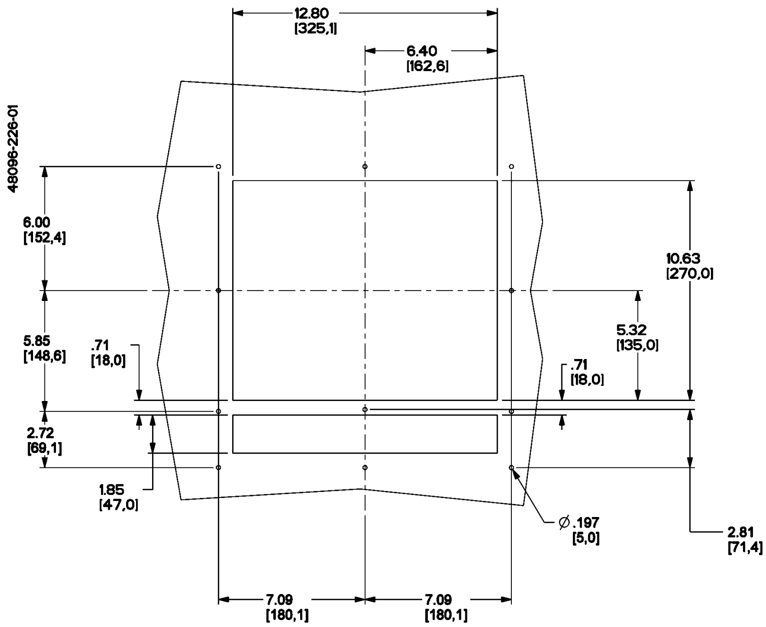
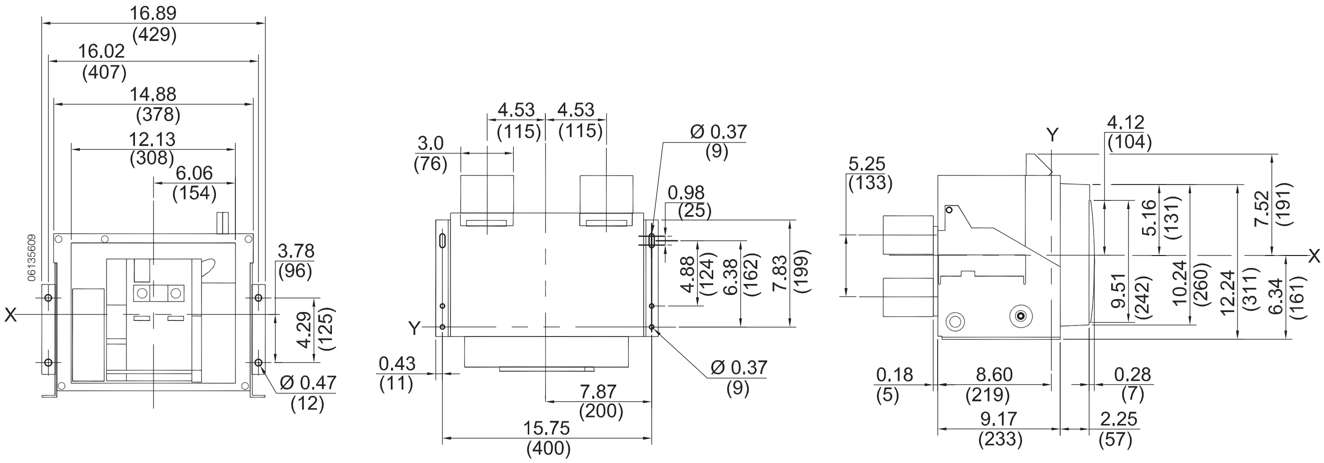
Figure 22: Door Escutcheon Hole Pattern



UL 3-POLE FIXED CIRCUIT BREAKERS

Figure 23: 800-4000 A Master Drawing



Front View — Top View — Side View

Figure 24: 800-2500 A Rear Connected "T" Vertical (RCTV)

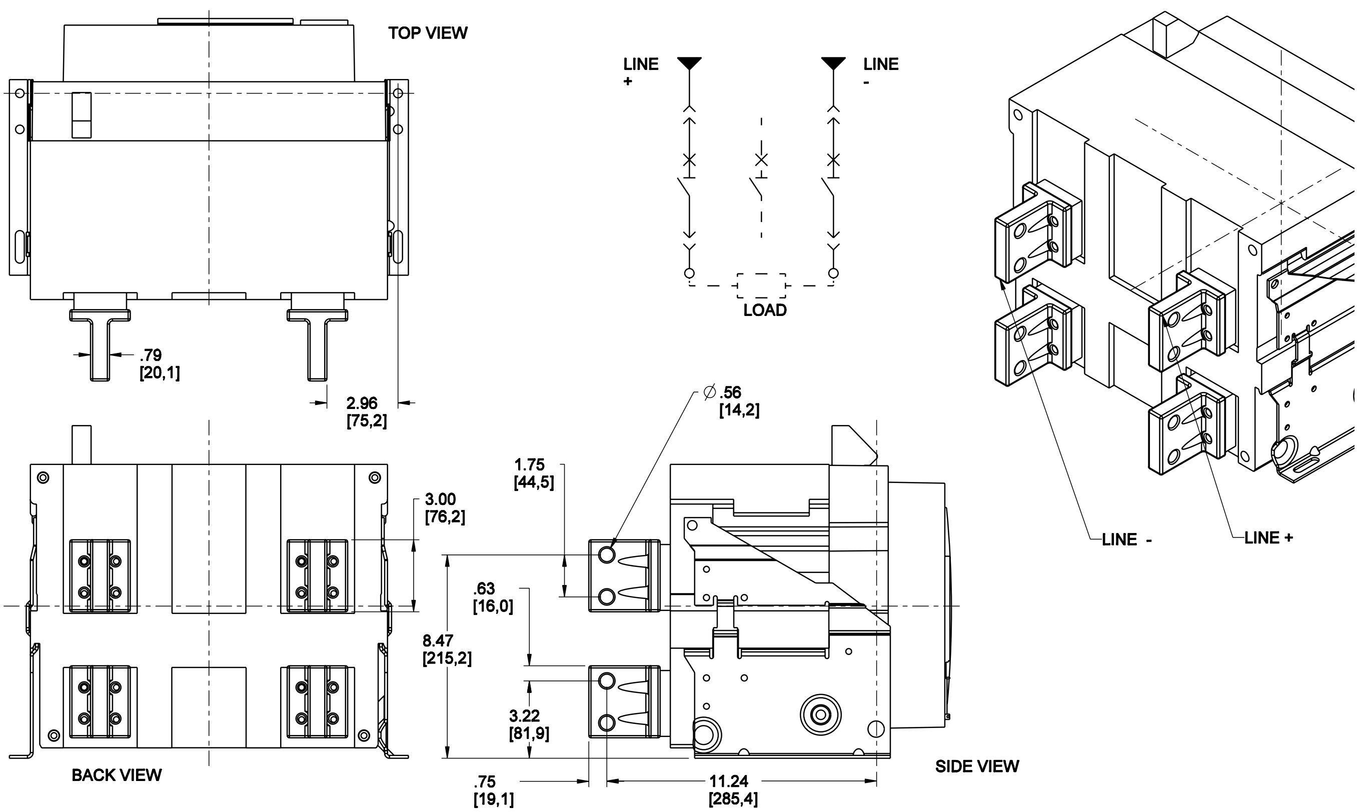


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Figure 25: 800-2500 A Rear Connected "T" Horizontal (RCTH)

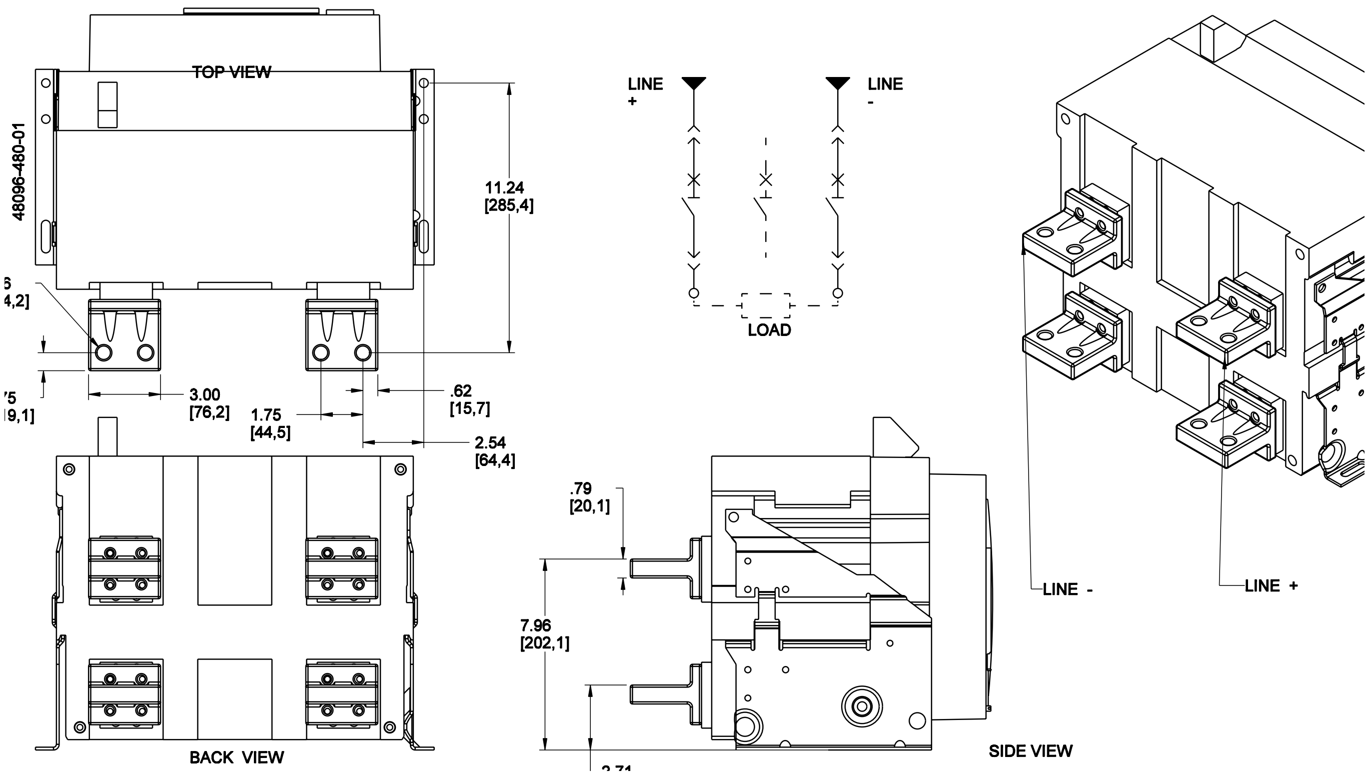


Figure 26: 3000-4000 A Rear Connected "T" Vertical (RCTV)

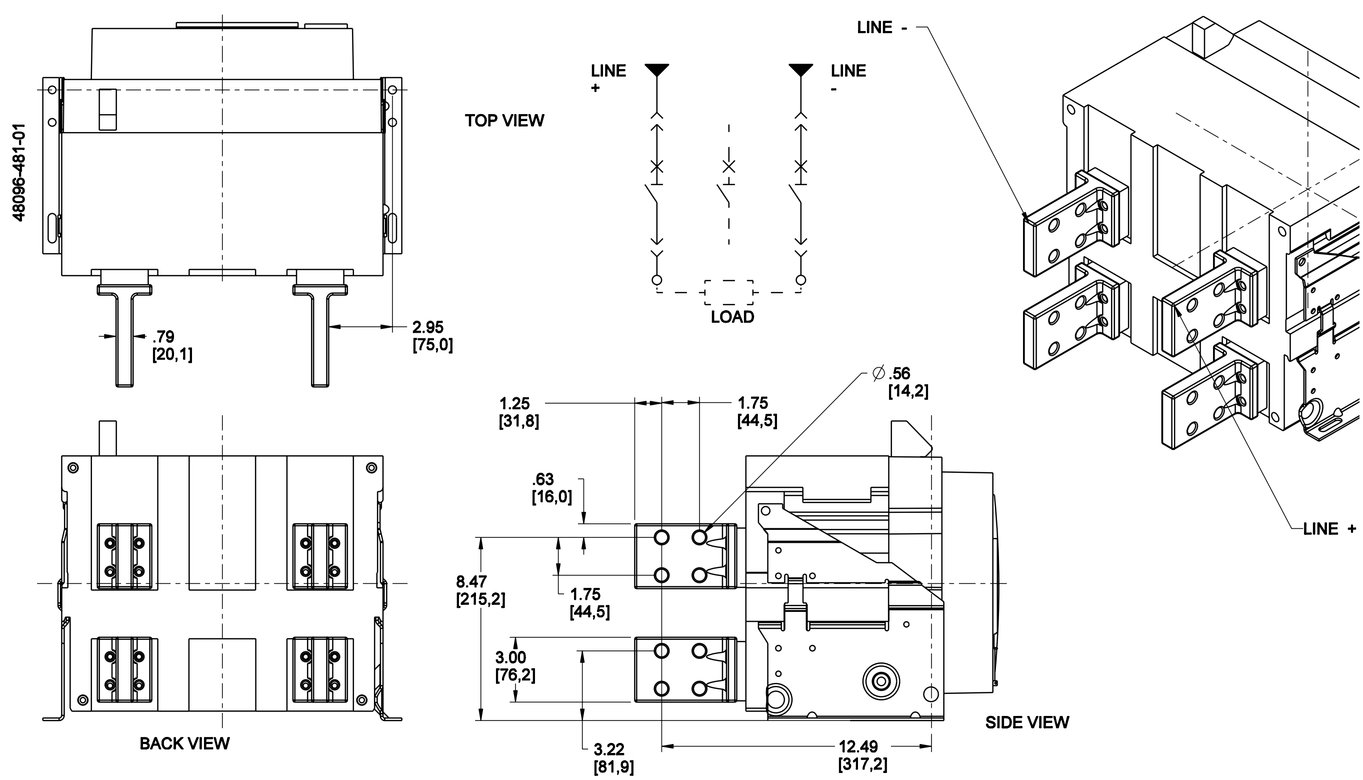


Figure 27: 3000-4000 A Rear Connected "T" Horizontal (RCTH)

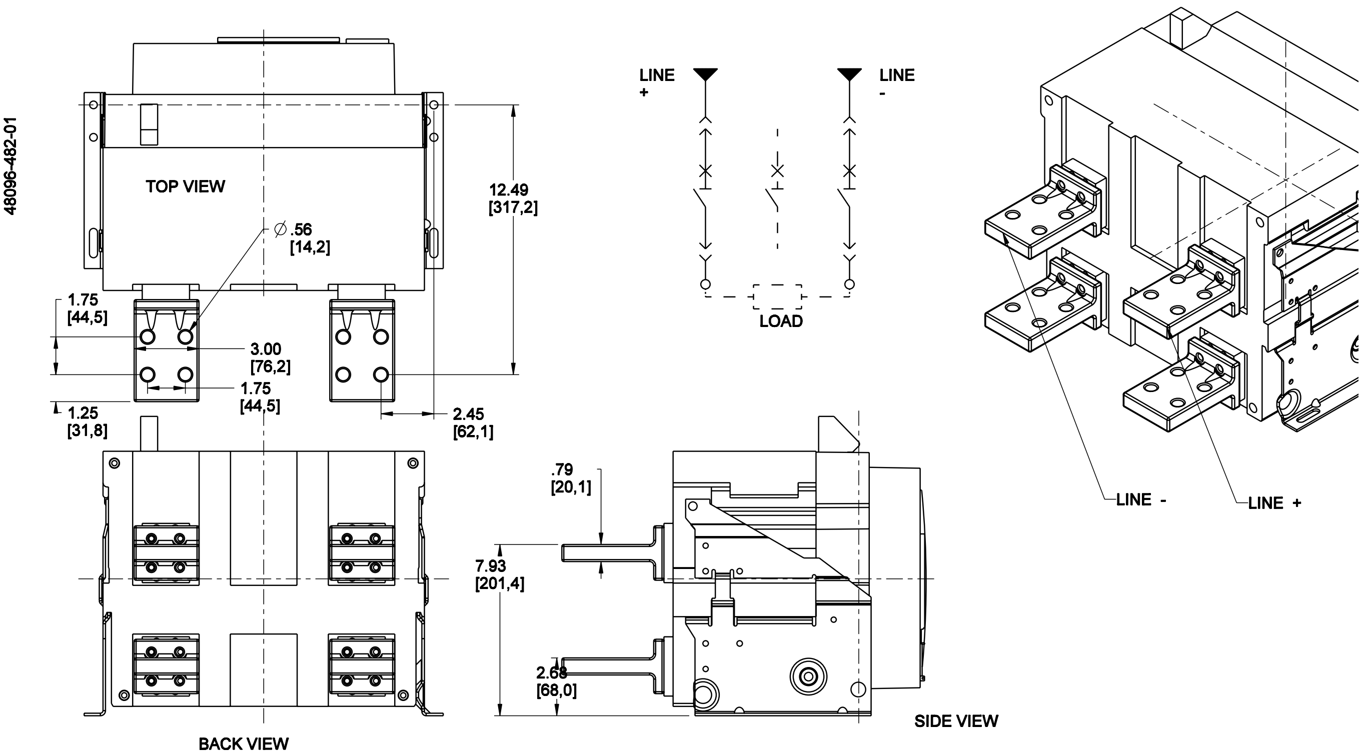
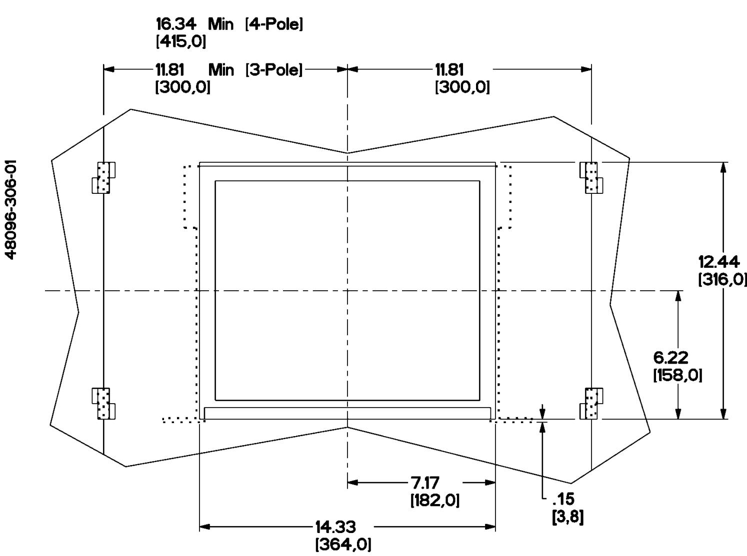
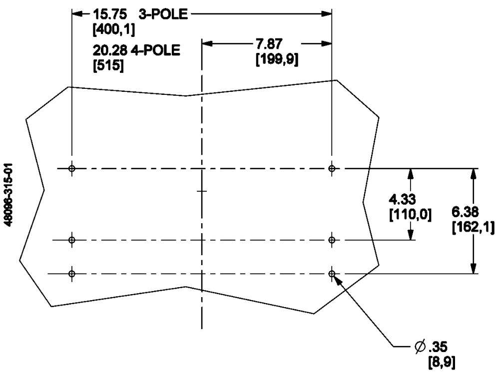


Figure 28: Door Cutout



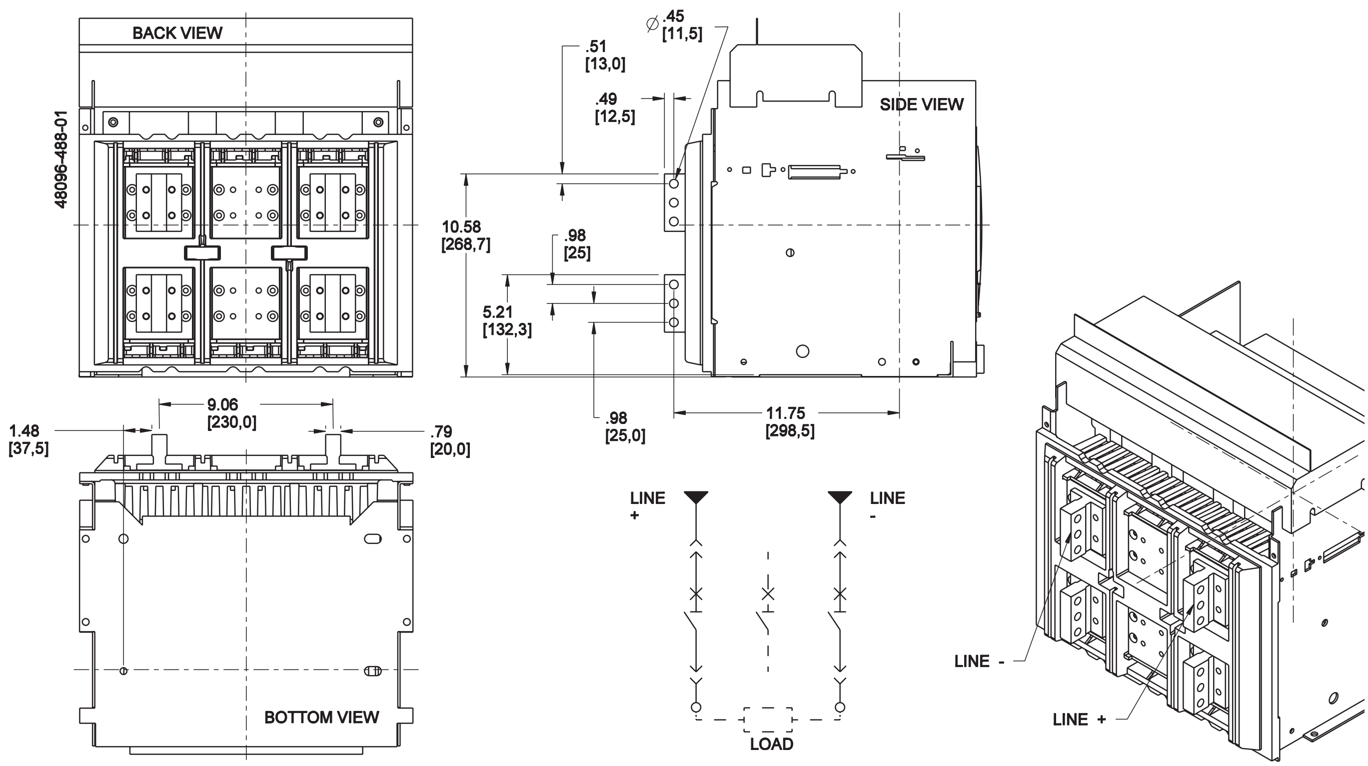
SQUARE D

Figure 29: Circuit Breakers Mounting



IEC 3-POLE DRAWOUT CIRCUIT BREAKERS

Figure 30: 1000-2000 A Type “C” Rear Connected "T" Vertical (RCTV)



 SQUARE D

Figure 31: 1000-2000 A Type “C” Rear Connected "T" Horizontal (RCTH)

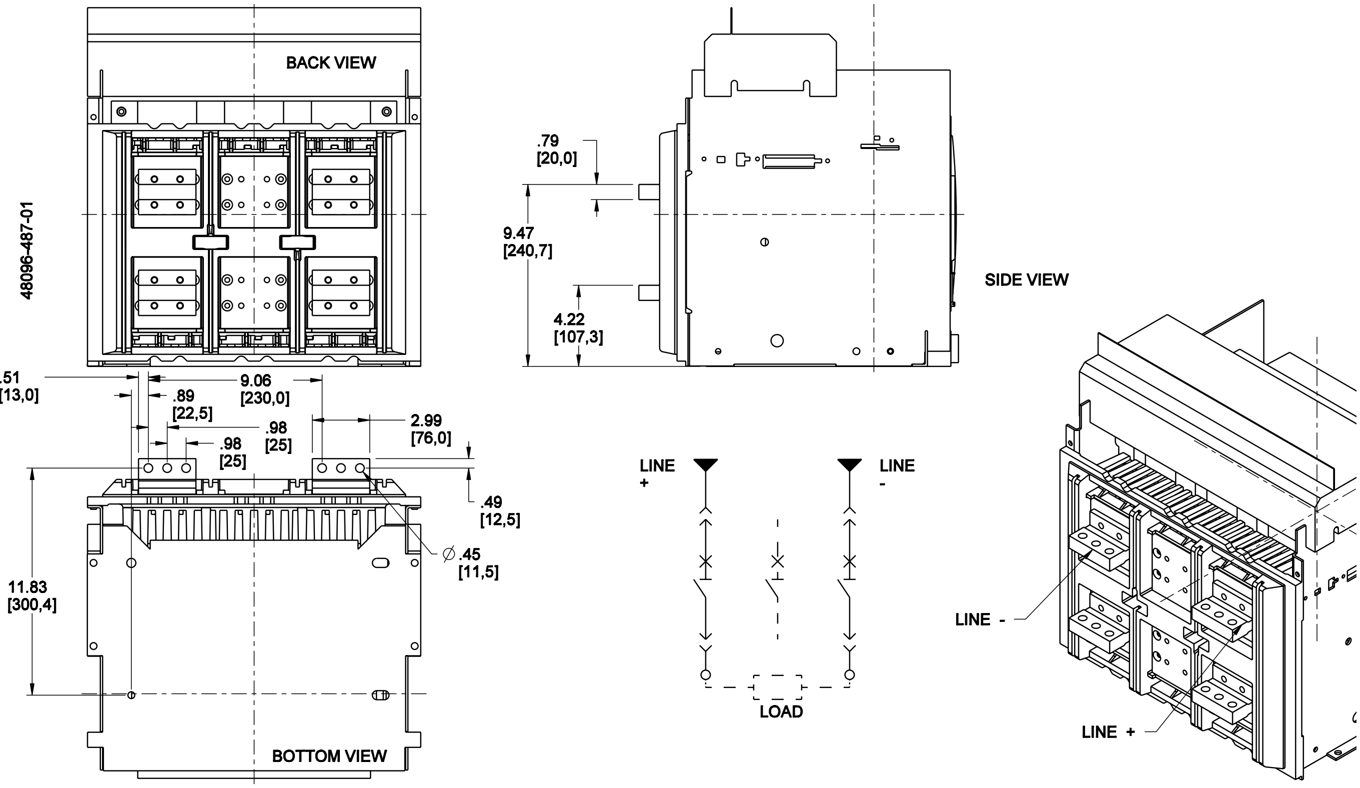


Figure 32: 4000 A Type “C” Rear Connected "T" Vertical (RCTV)

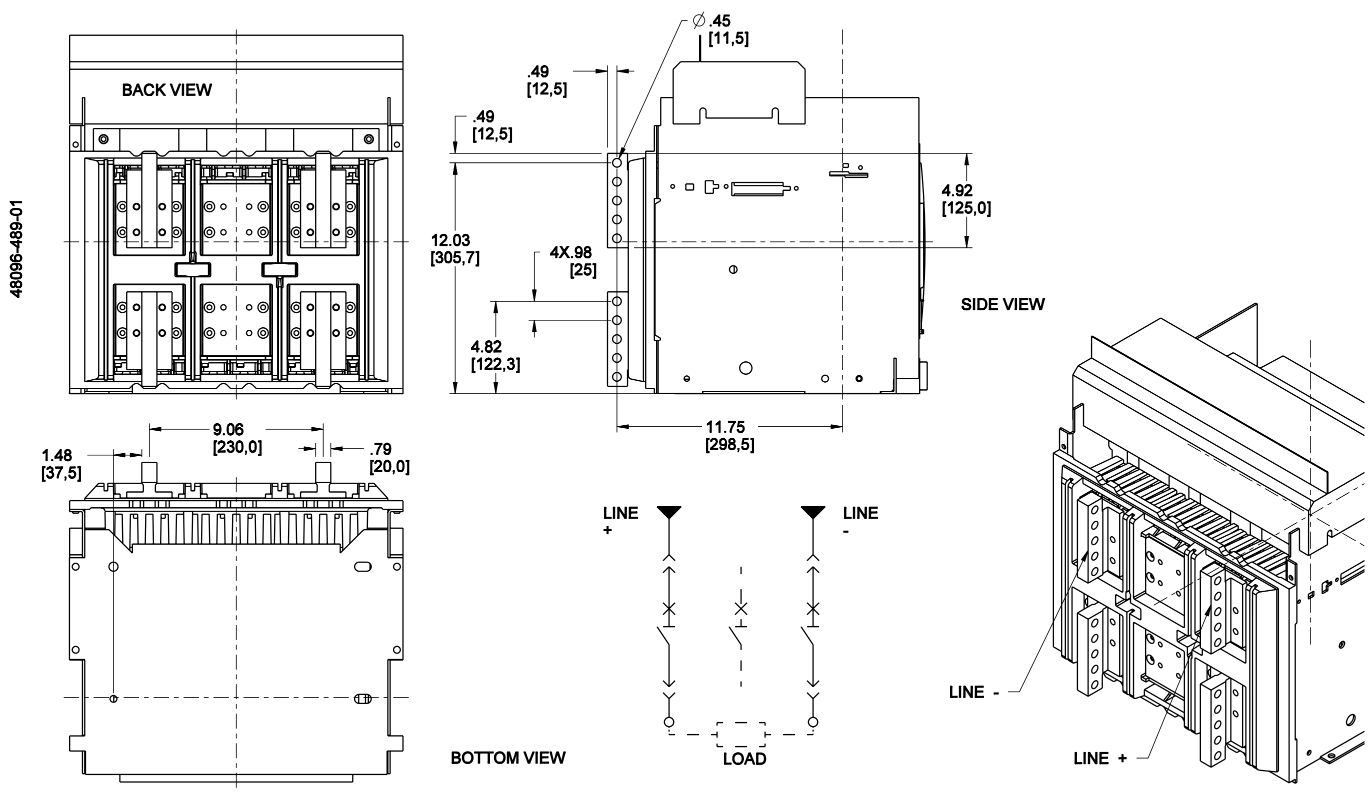


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Figure 33: 1000-2000 A Type “D” Rear Connected "T" Vertical (RCTV)

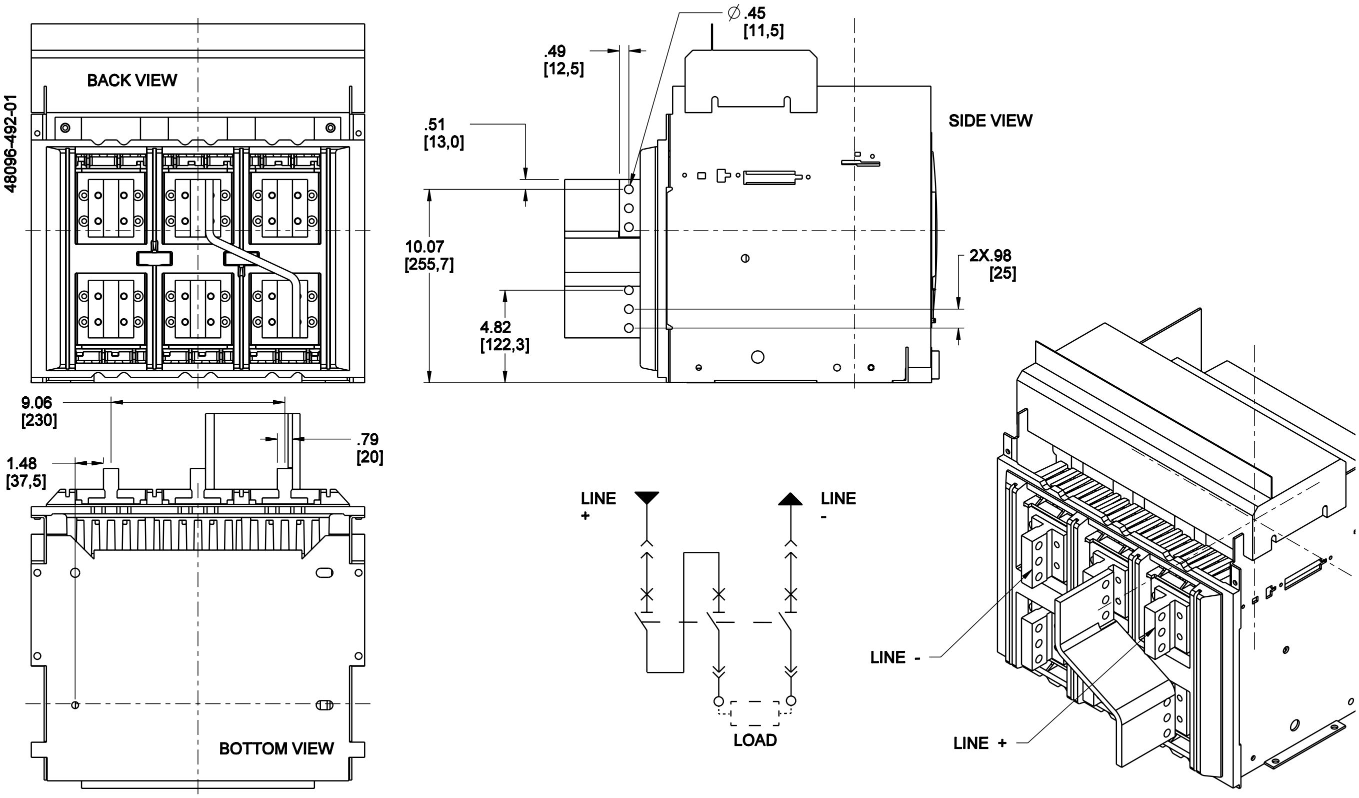


Figure 34: 1000-2000 A Type “D” Rear Connected "T" Horizontal (RCTH)

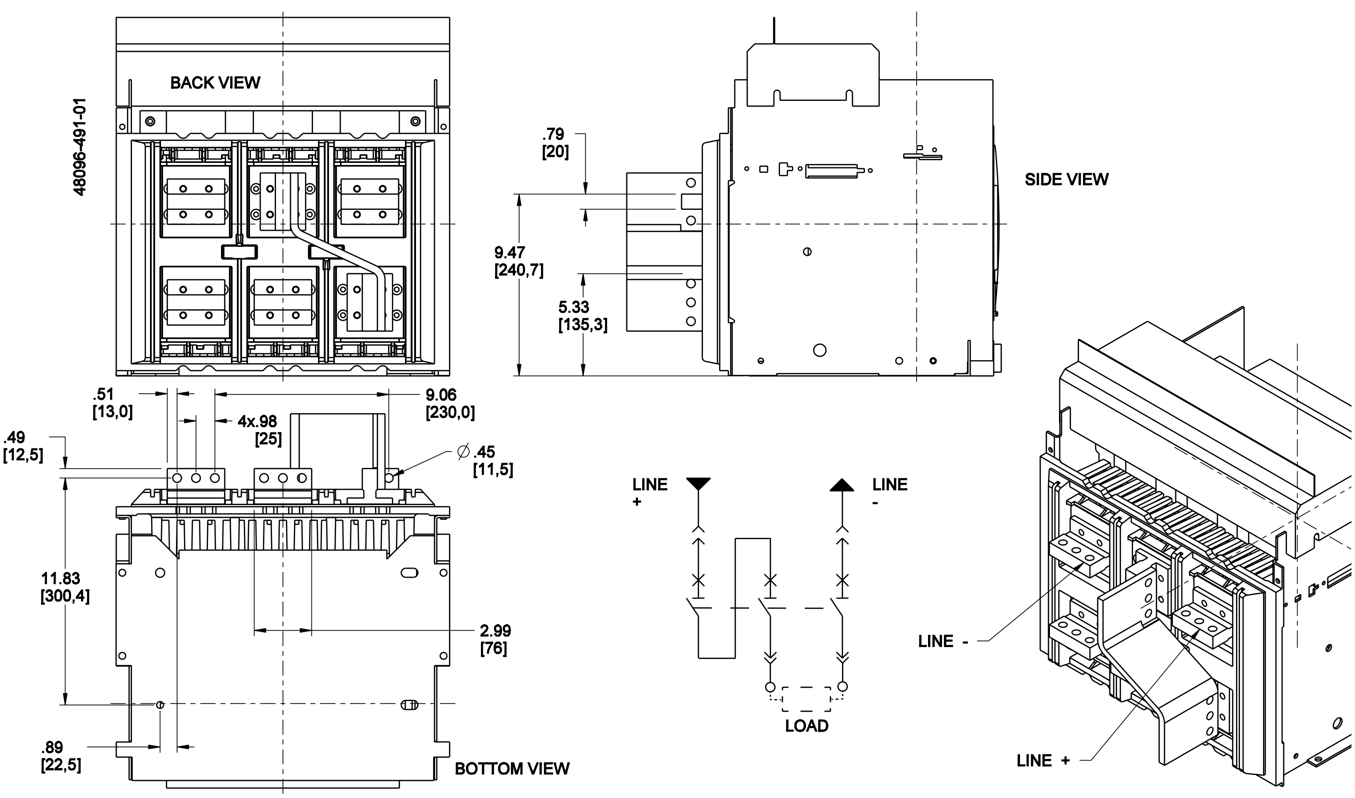
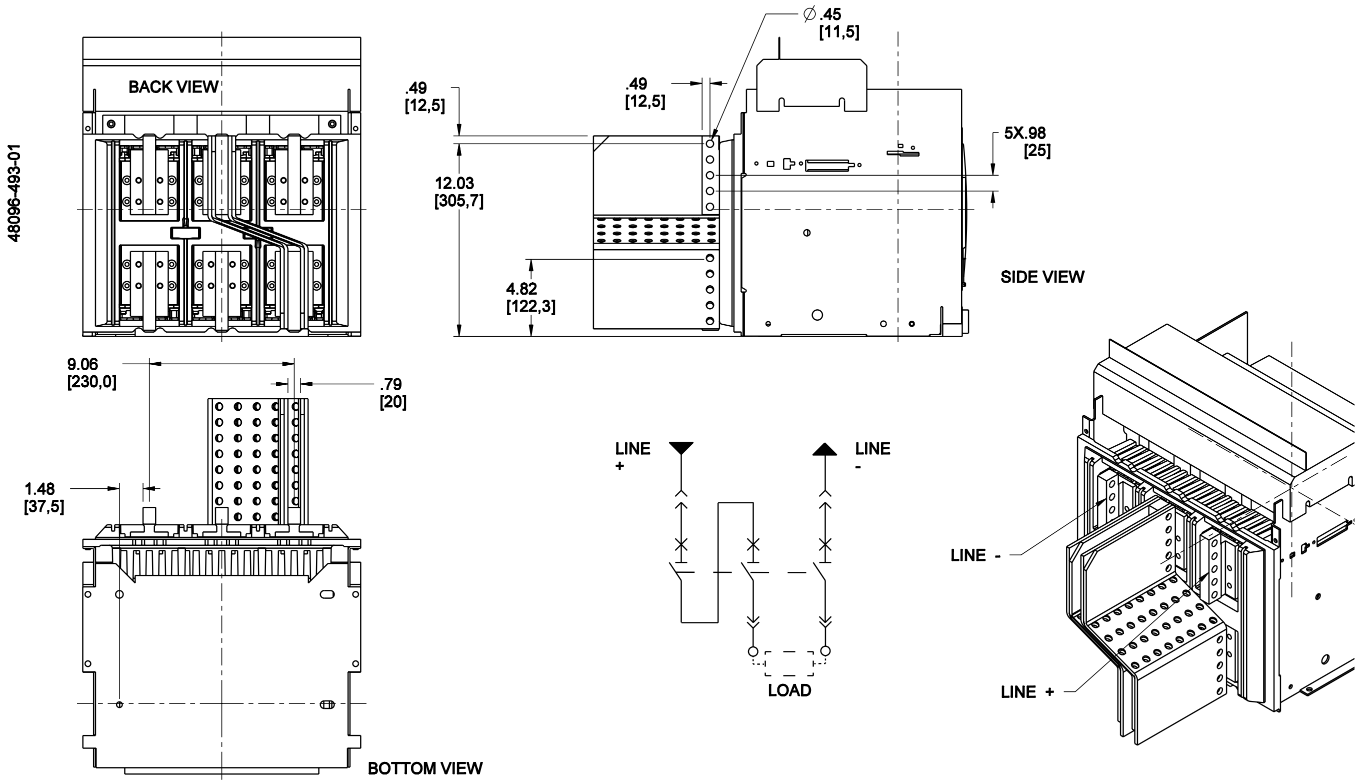


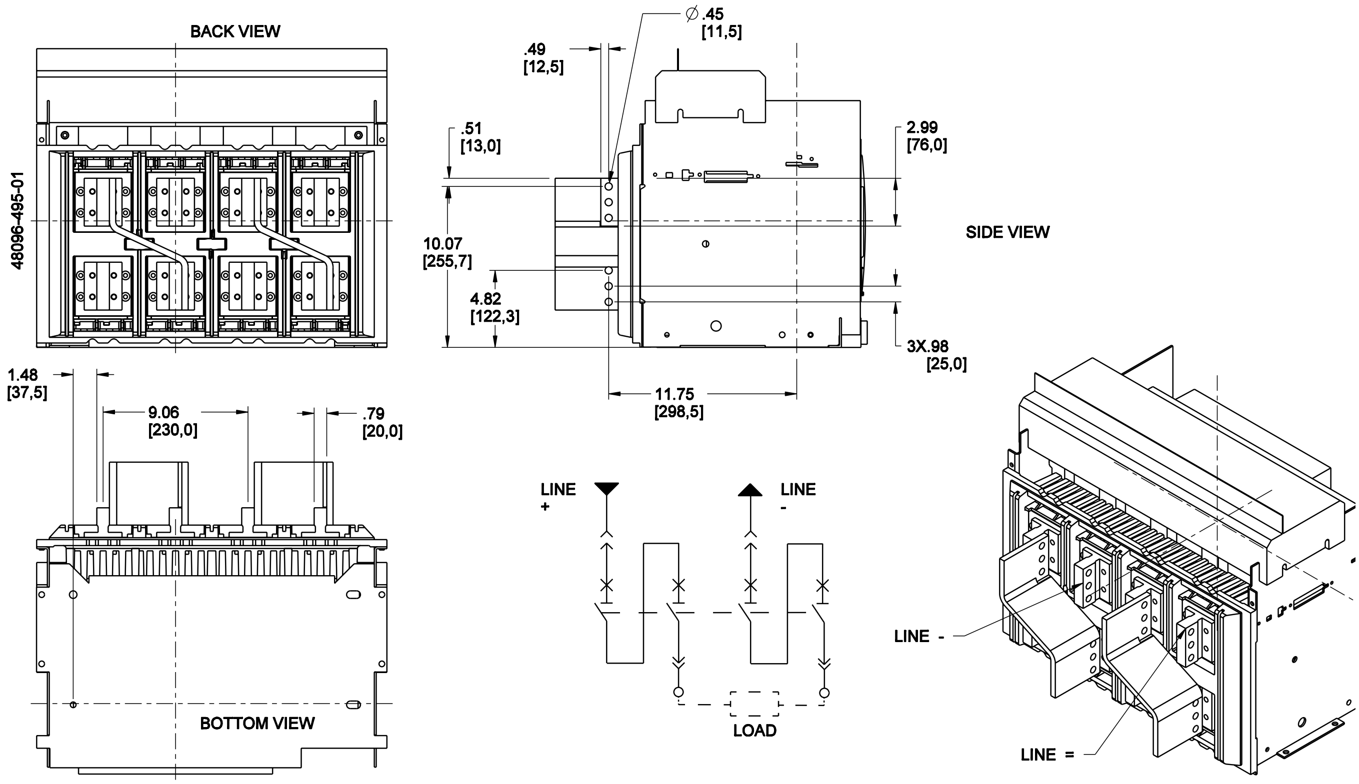
Figure 35: 4000 A Type “D” Rear Connected "T" Vertical (RCTV)



SQUARE D

IEC 4-POLE DRAWOUT CIRCUIT BREAKERS

Figure 36: 1000-2000 A Type “E” Rear Connected "T" Vertical (RCTV)



 SQUARE D

Figure 37: 1000-2000 A Type "E" Rear Connected "T" Horizontal (RCTH)

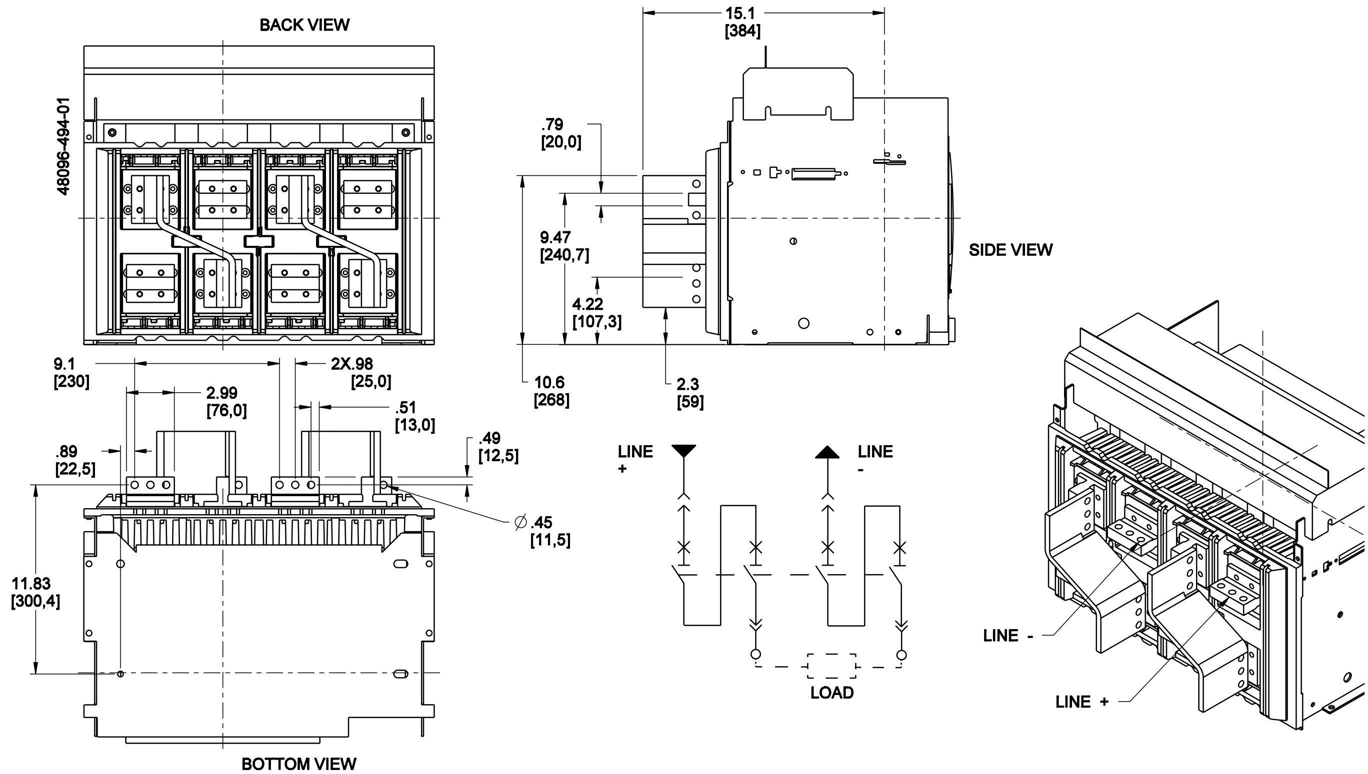
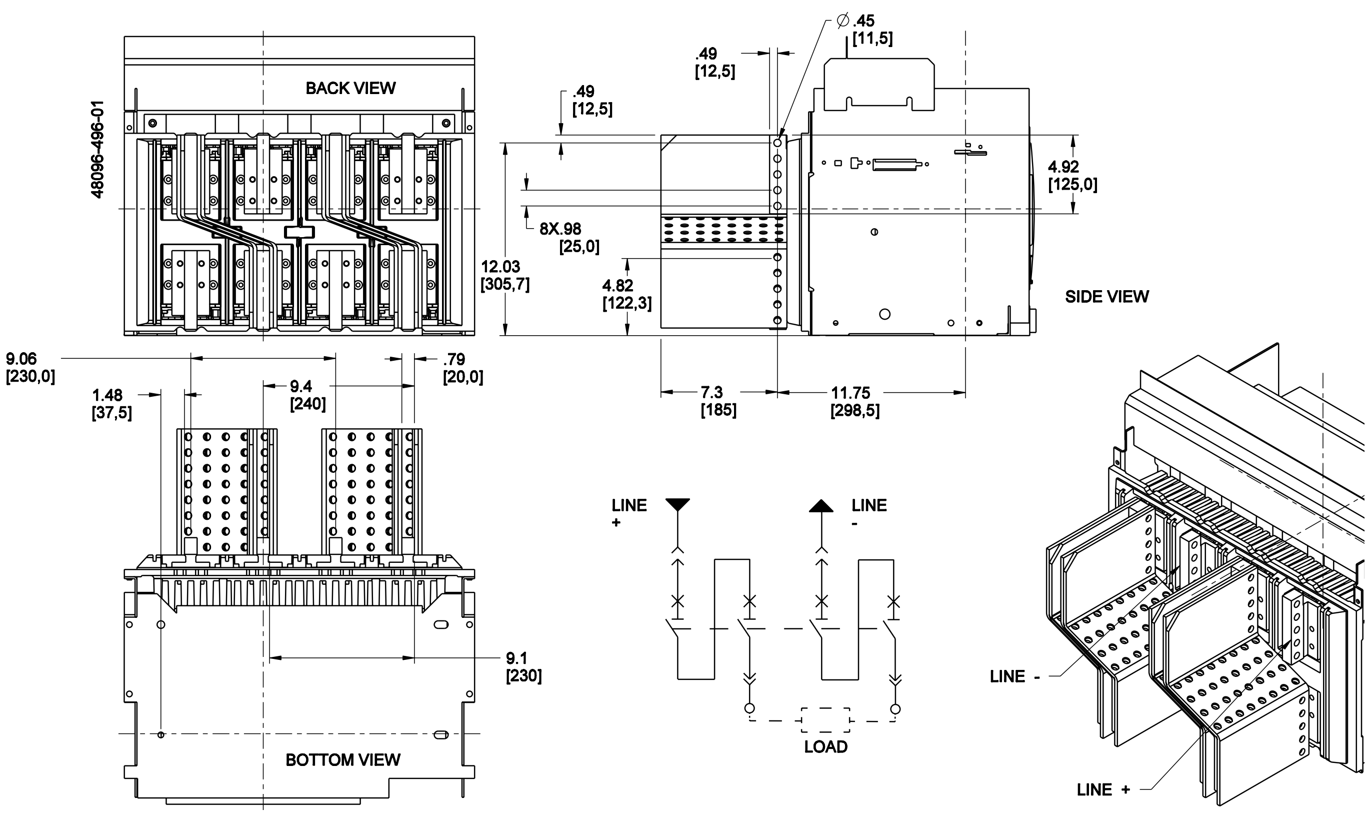


Figure 38: 4000 A Type "E" Rear Connected "T" Vertical (RCTV)



IEC 3-POLE FIXED CIRCUIT BREAKERS

Figure 39: 1000-2000 A Type “C” Rear Connected "T" Vertical (RCTV)

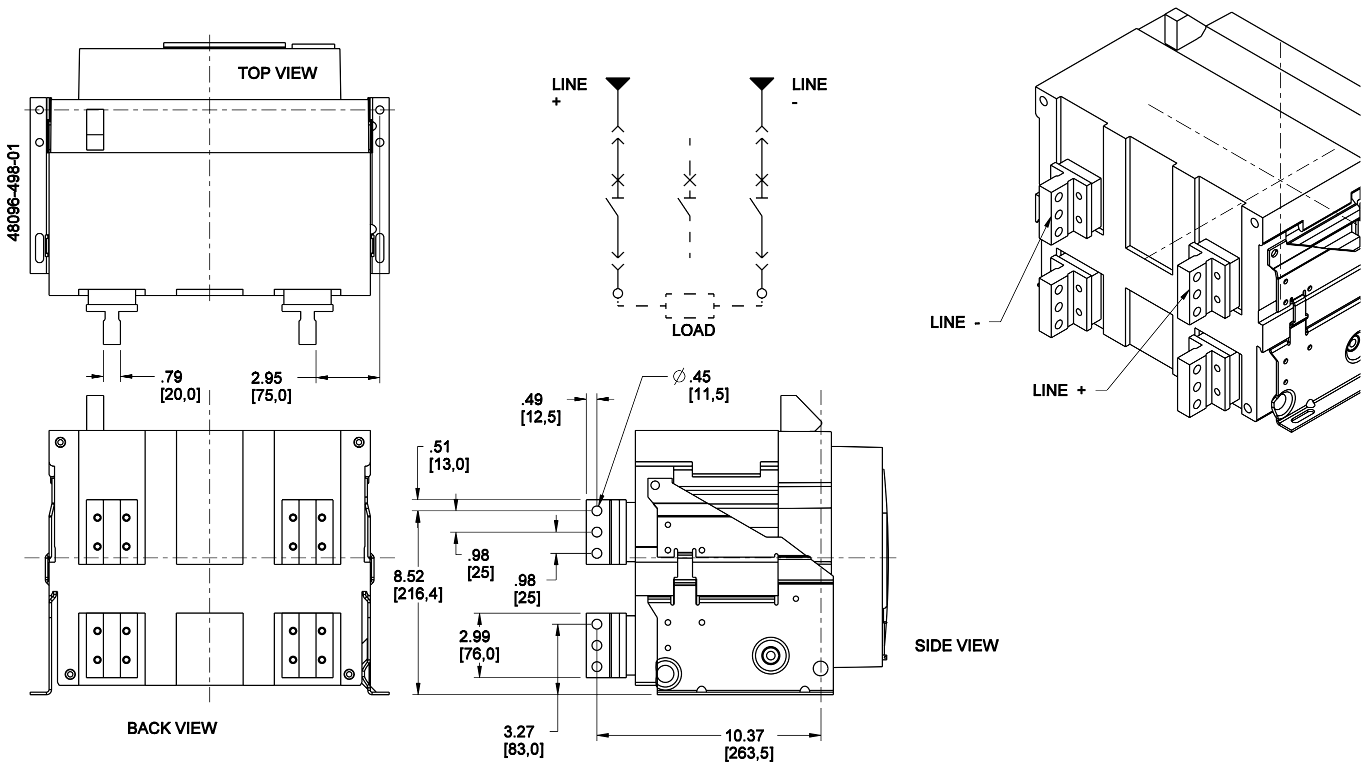


Figure 40: 1000-2000 A Type “C” Rear Connected "T" Horizontal (RCTH)

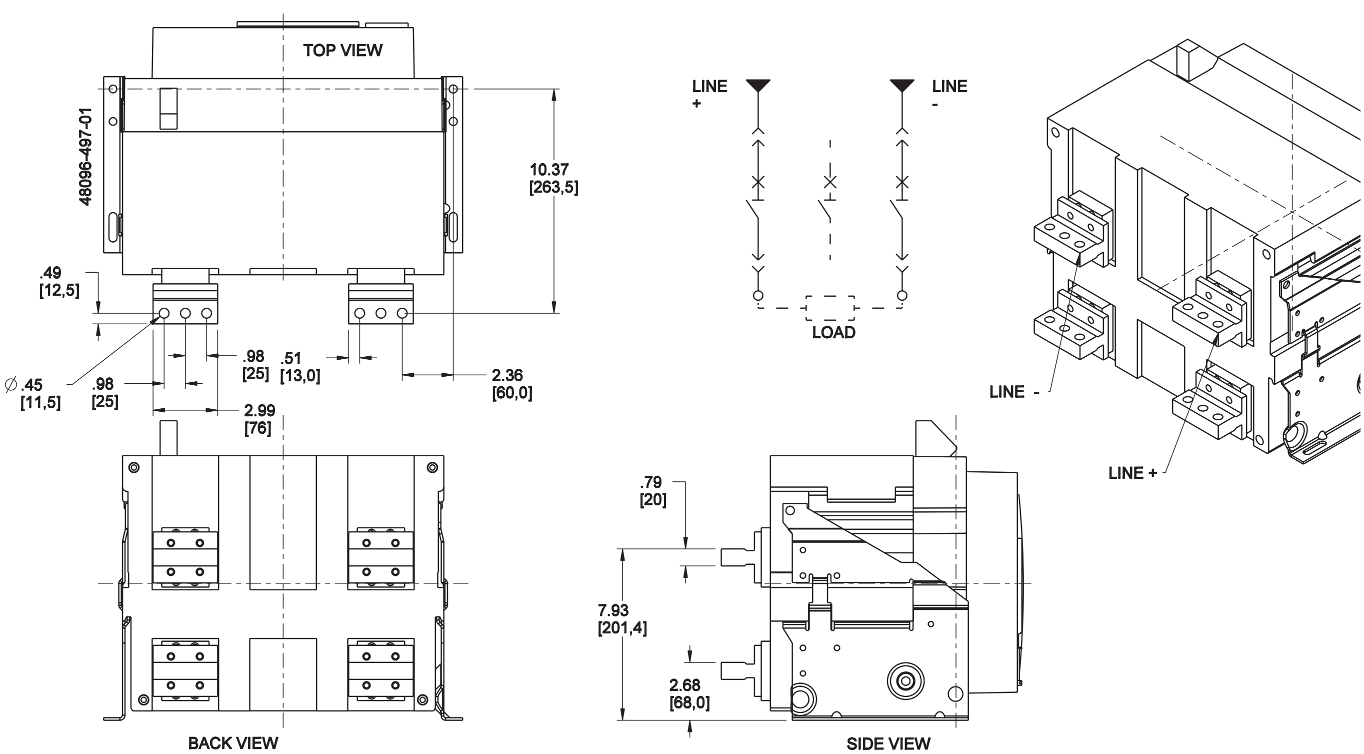


Figure 41: 4000 A Type “C” Rear Connected "T" Vertical (RCTV)

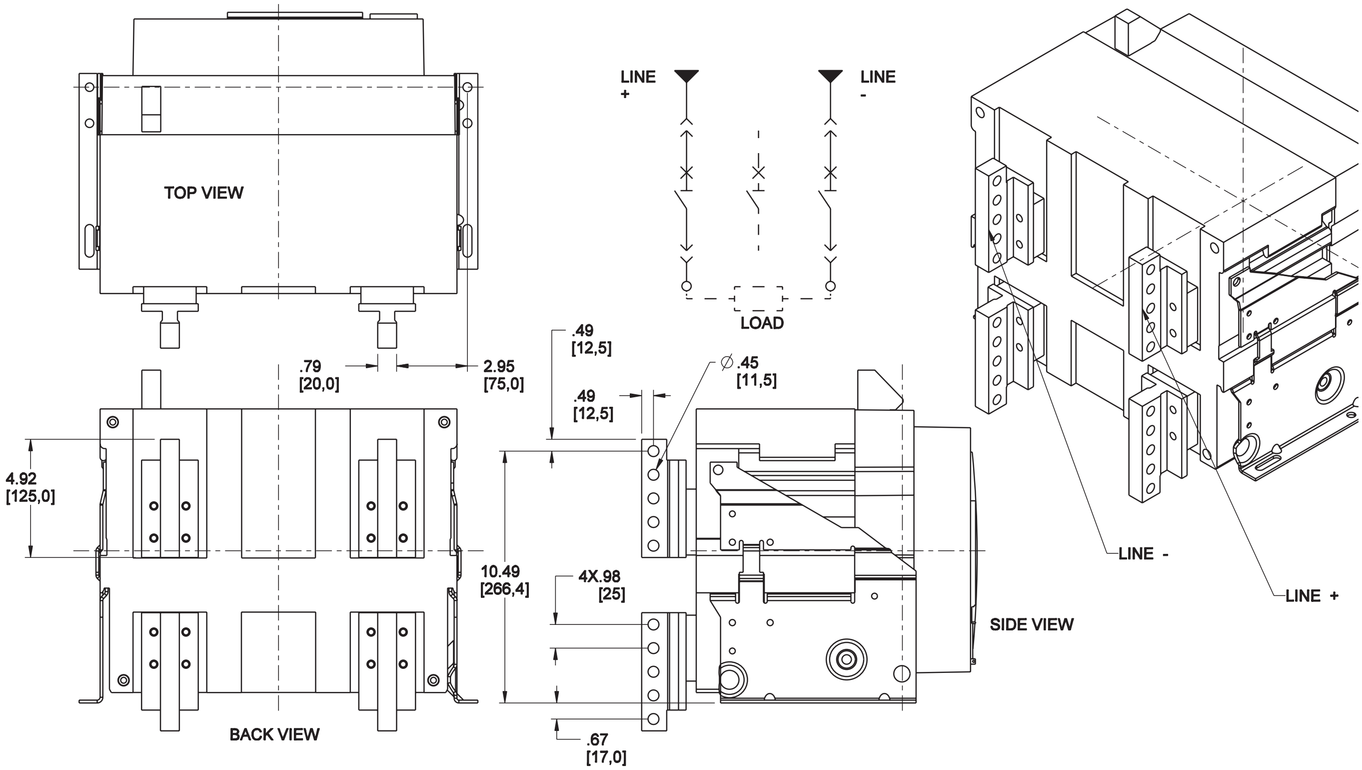


Figure 42: 1000-2000 A Type “D” Rear Connected "T" Vertical (RCTV)

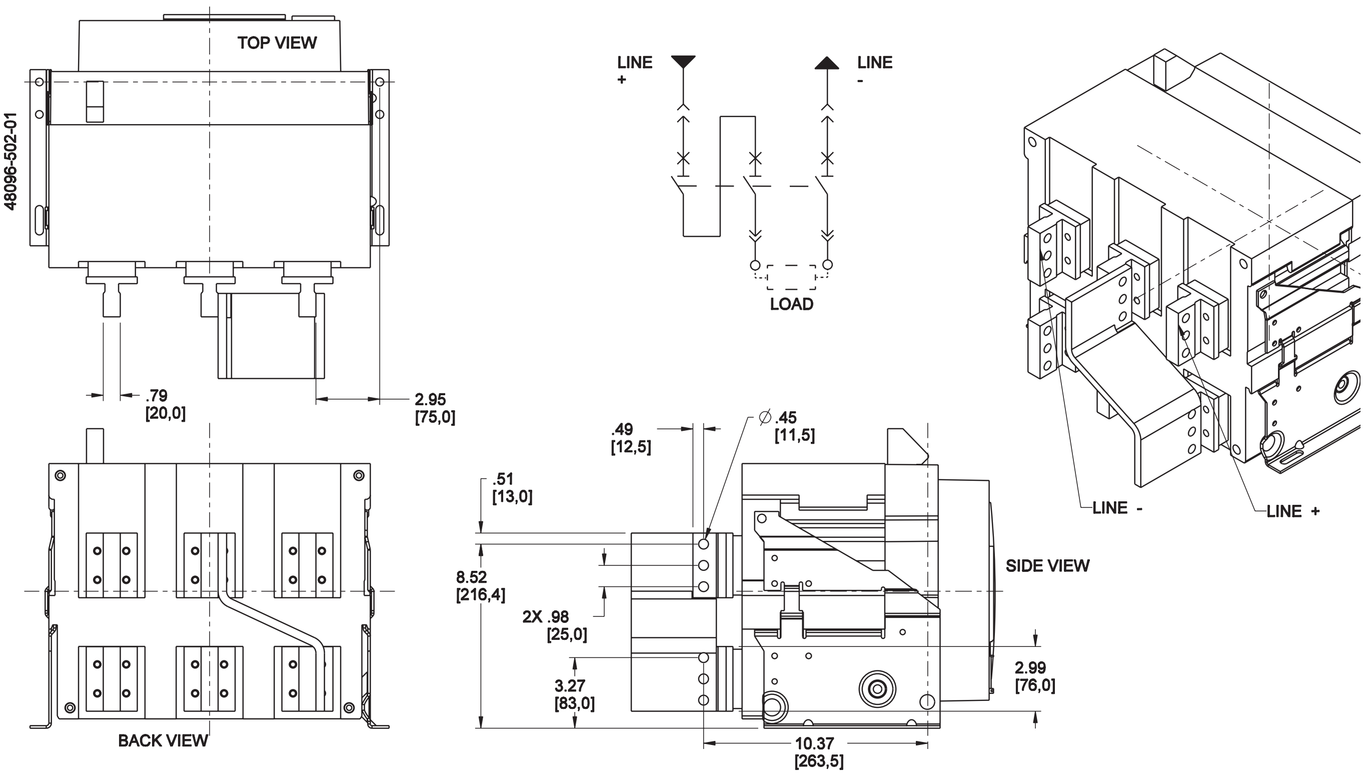


Figure 43: 1000-2000 A Type "D" Rear Connected "T" Horizontal (RCTH)

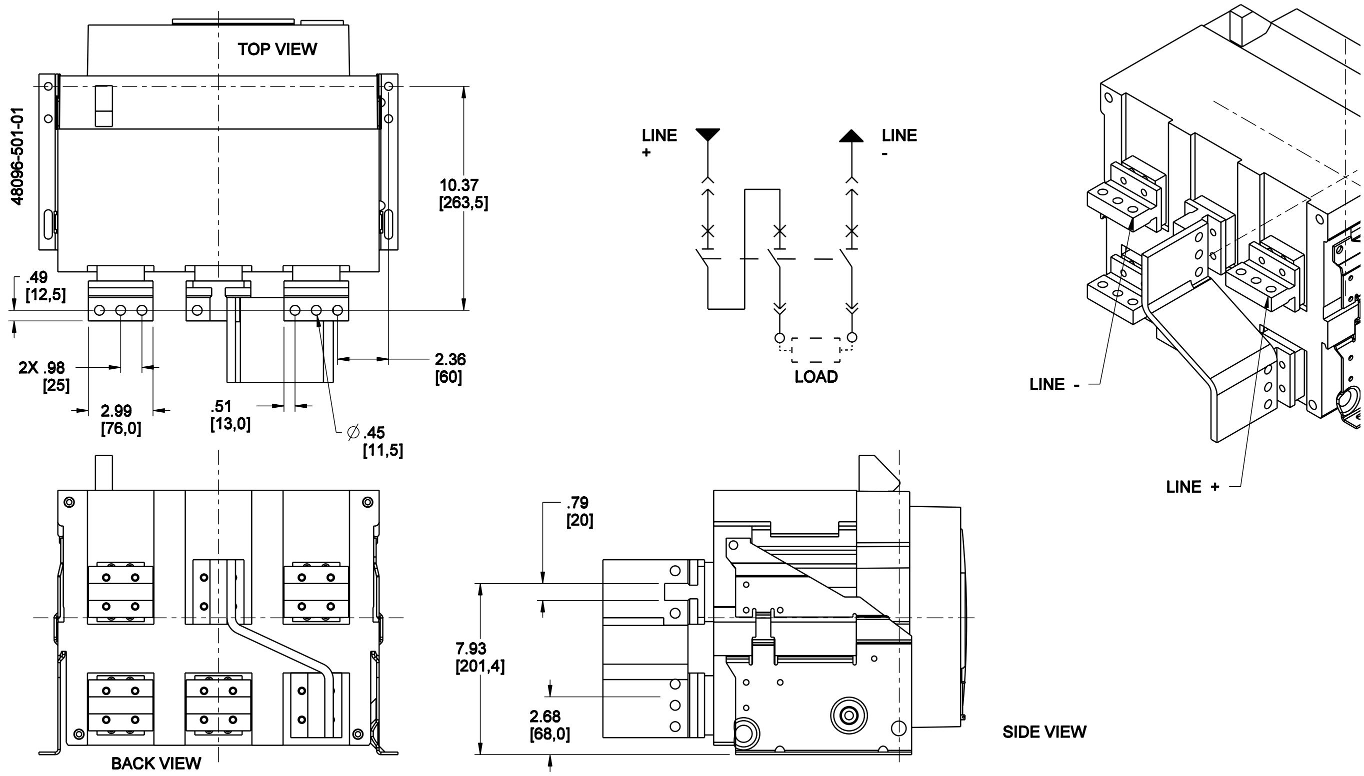
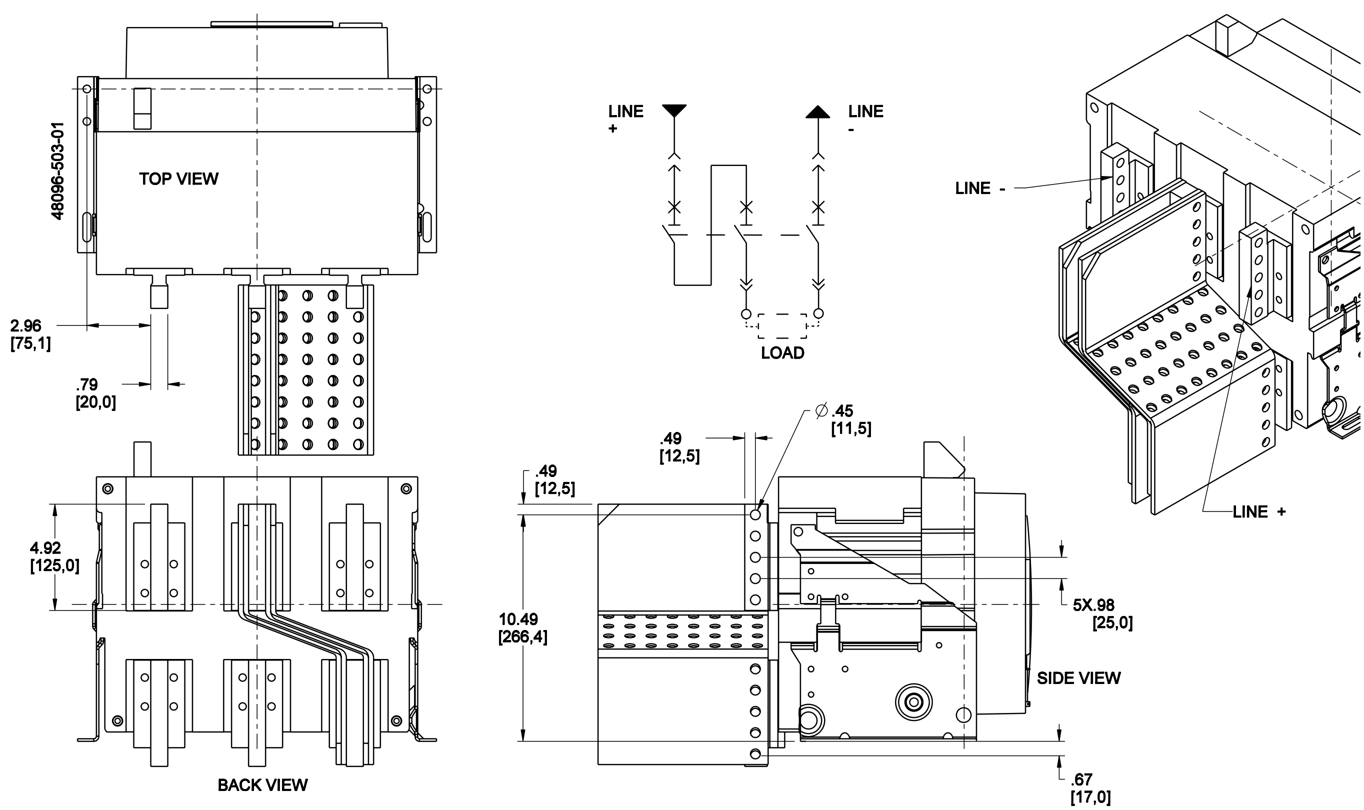
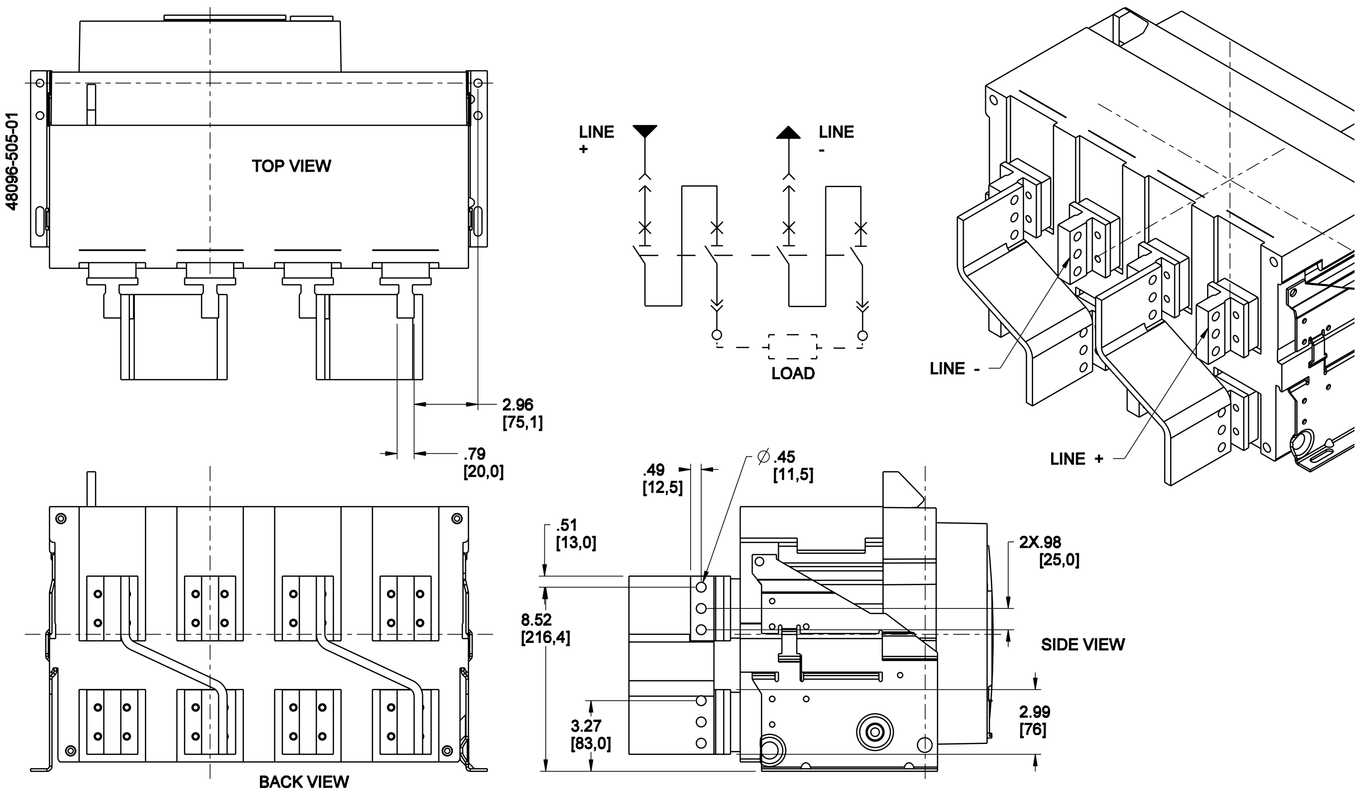


Figure 44: 4000 A Type "D" Rear Connected "T" Vertical (RCTV)



IEC 4-POLE FIXED CIRCUIT BREAKERS

Figure 45: 1000-2000 A Type "E" Rear Connected "T" Vertical (RCTV)



 SQUARE D 11/2005

Figure 46: 1000-2000 A Type “E” Rear Connected "T" Horizontal (RCTH)

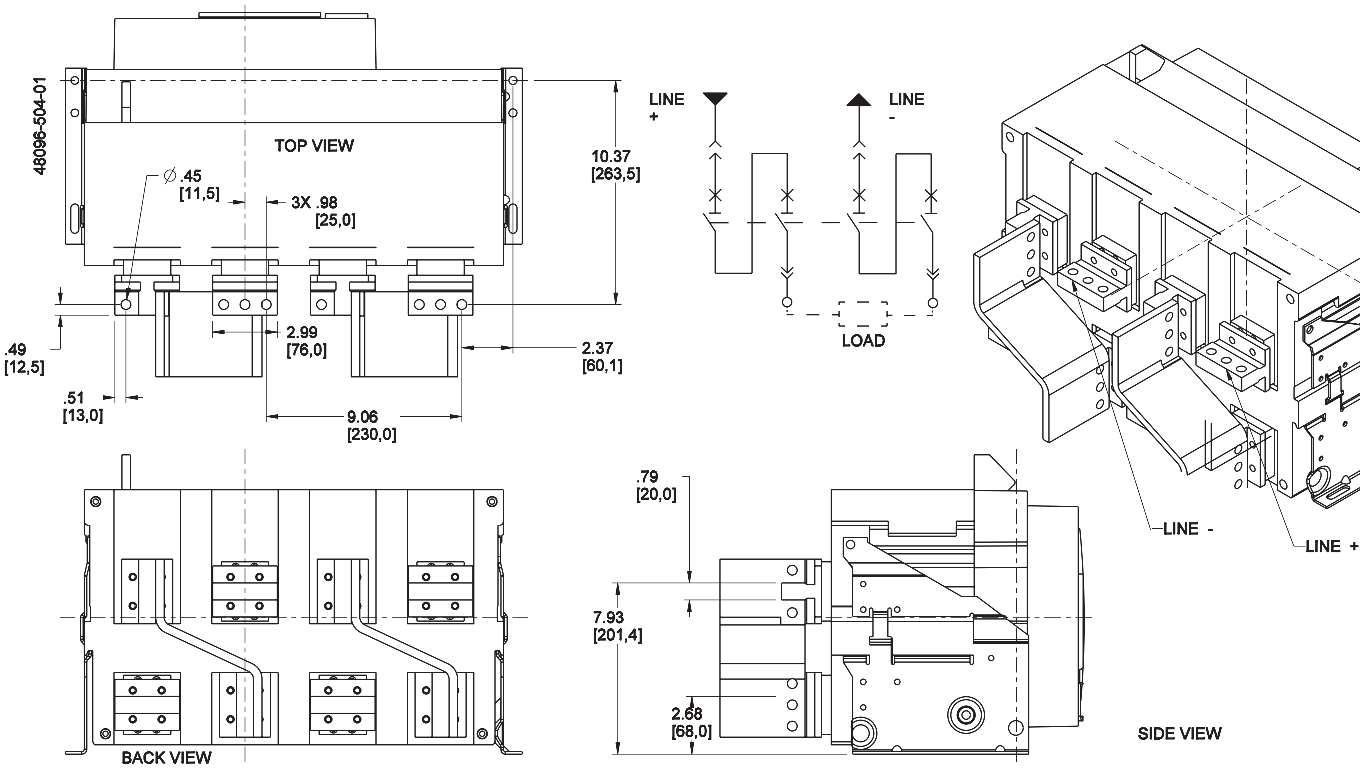
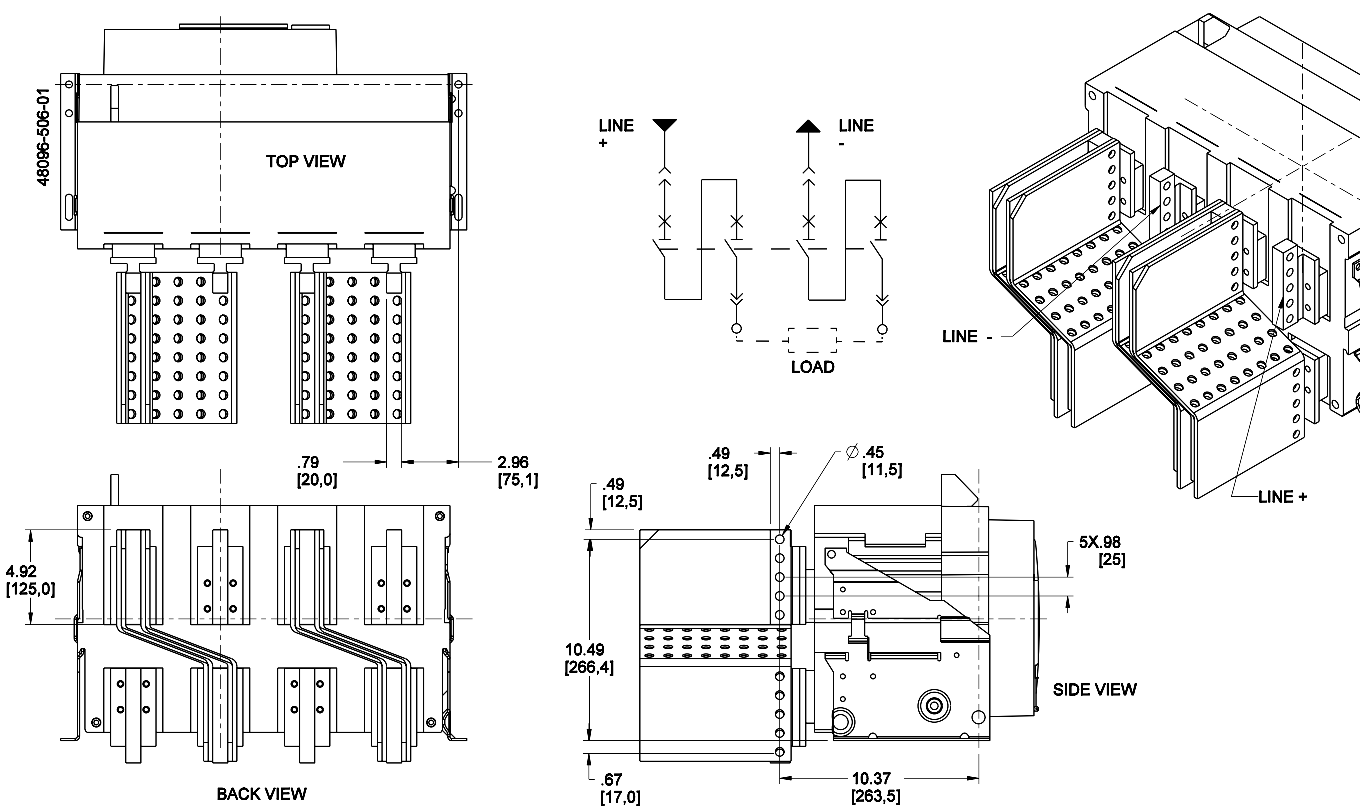


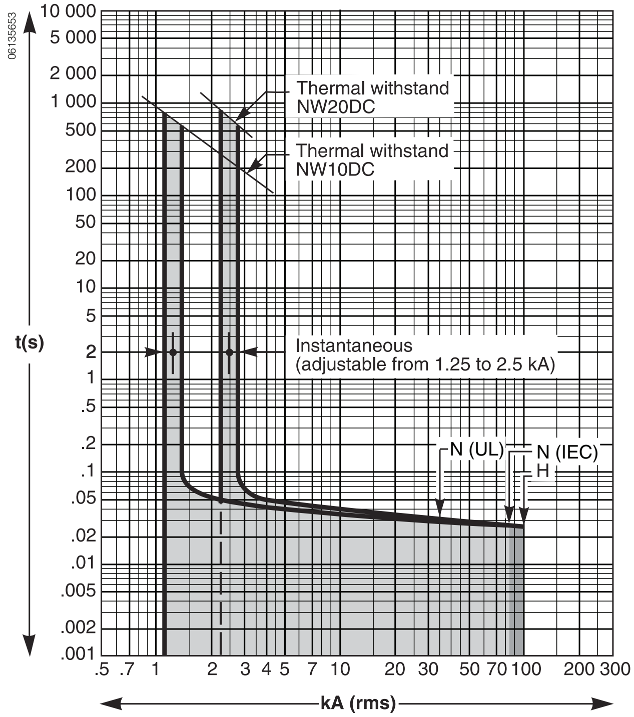
Figure 47: 4000 A Type “E” Rear Connected "T" Vertical (RCTV)



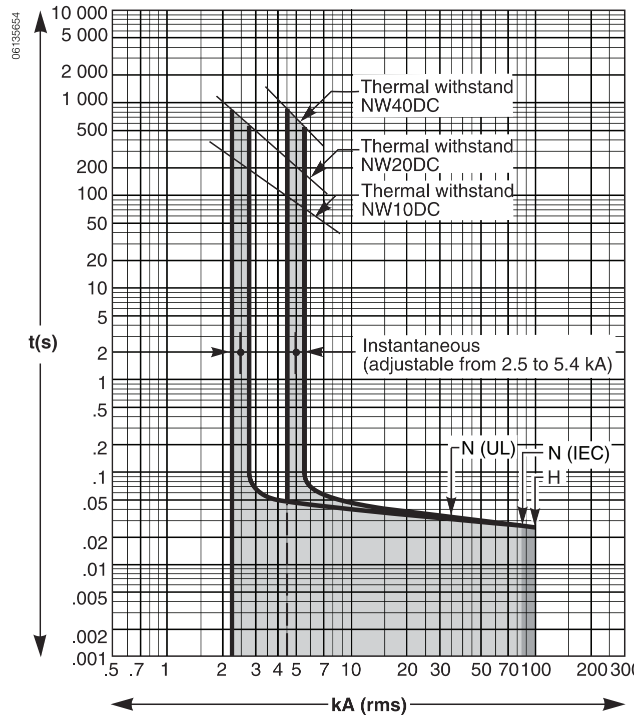
TRIP CURVES

Figure 48: Trip Curves —Micrologic® DC1.0 Instantaneous Protection, U = 500 Vdc, L/R = 5 ms (IEC) or 8 ms (UL)

1250–2500 A Sensors



2500–5400 A Sensors



5000–11,000 A Sensors

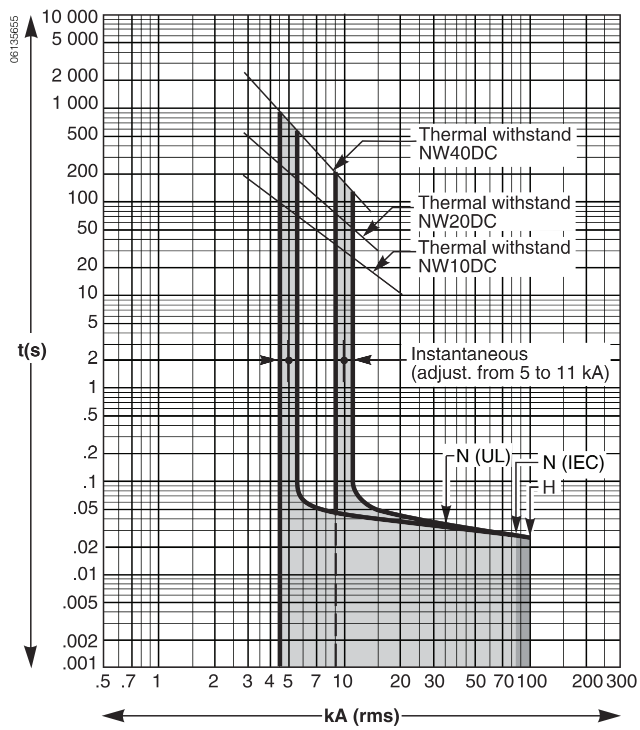
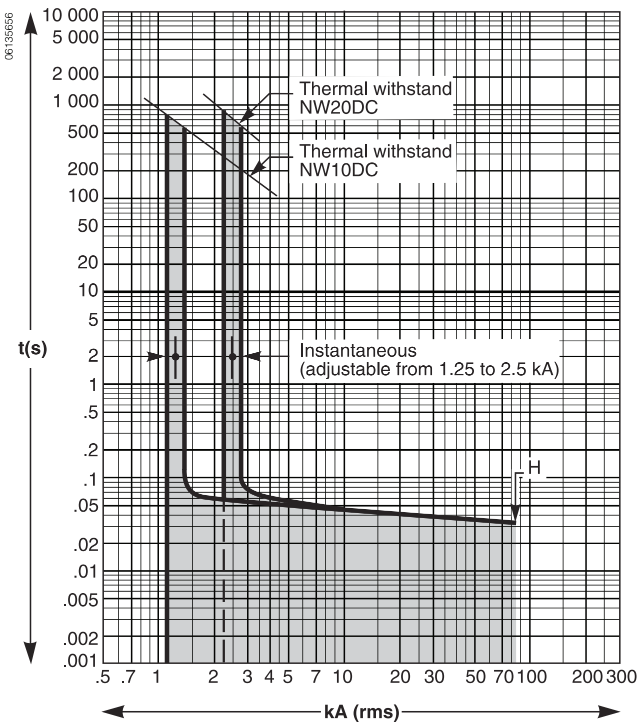
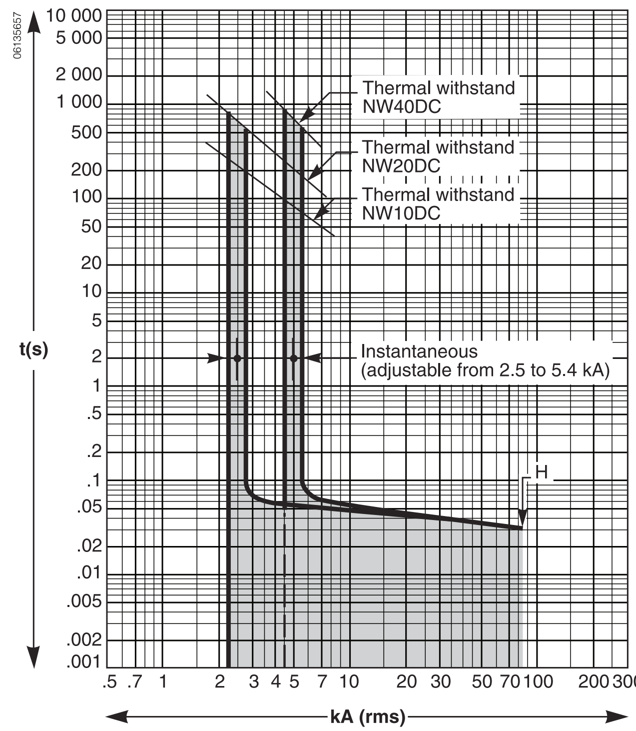


Figure 49: Trip Curves —Micrologic® DC1.0 Instantaneous Protection, U = 750/900 Vdc, L/R = 5 ms

1250–2500 A Sensors



2500–5400 A Sensors



5000–11,000 A Sensors

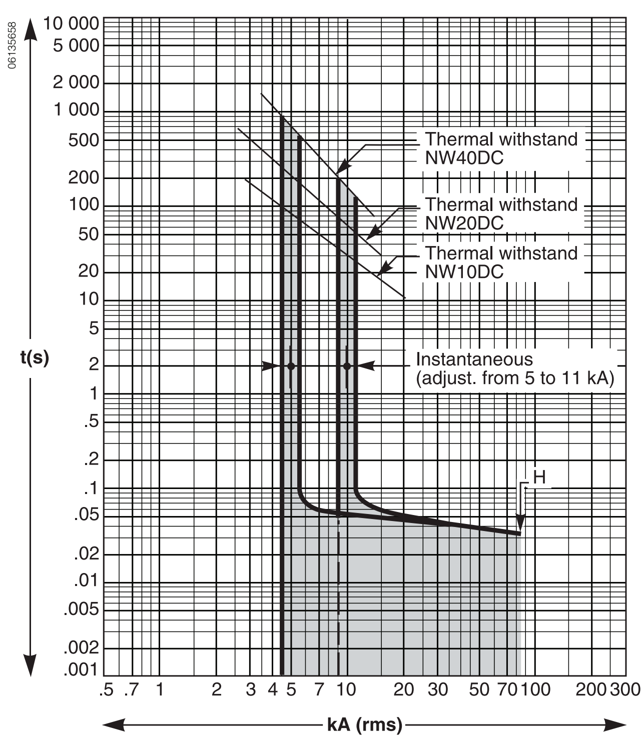
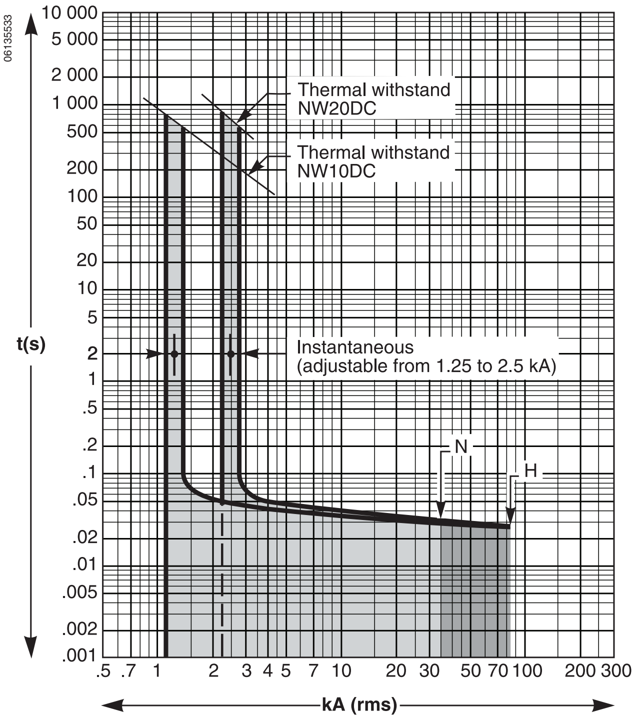
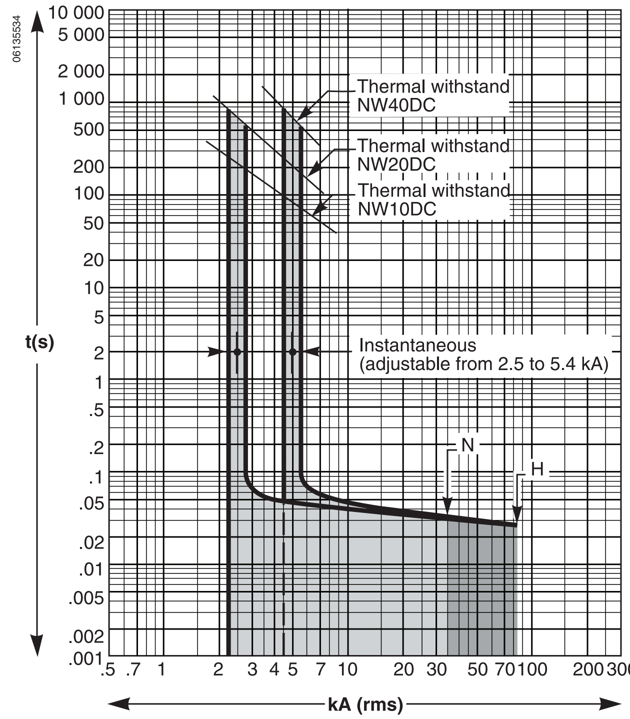


Figure 50: Trip Curves —Micrologic® DC1.0 Instantaneous Protection, U = 500 Vdc, L/R = 15 ms

1250–2500 A Sensors



2500–5400 A Sensors



5000–11,000 A Sensors

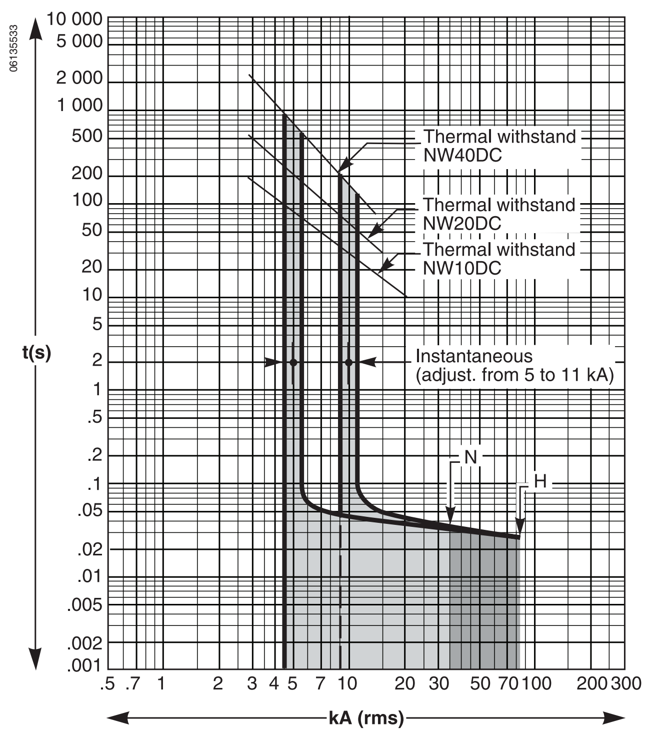


Figure 51: Trip Curves —Micrologic® DC1.0 Instantaneous Protection, U = 750/900 Vdc, L/R = 15 ms

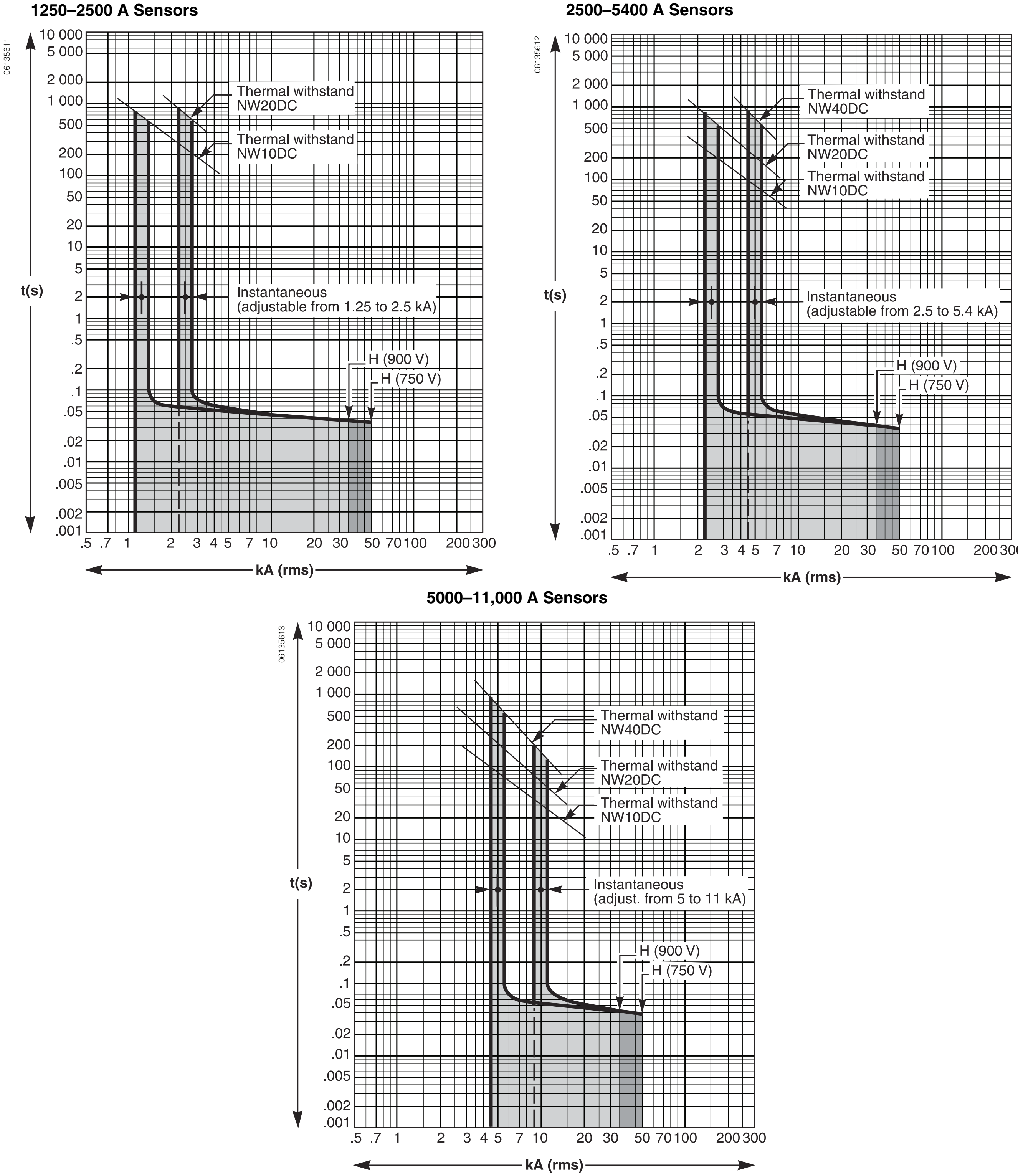
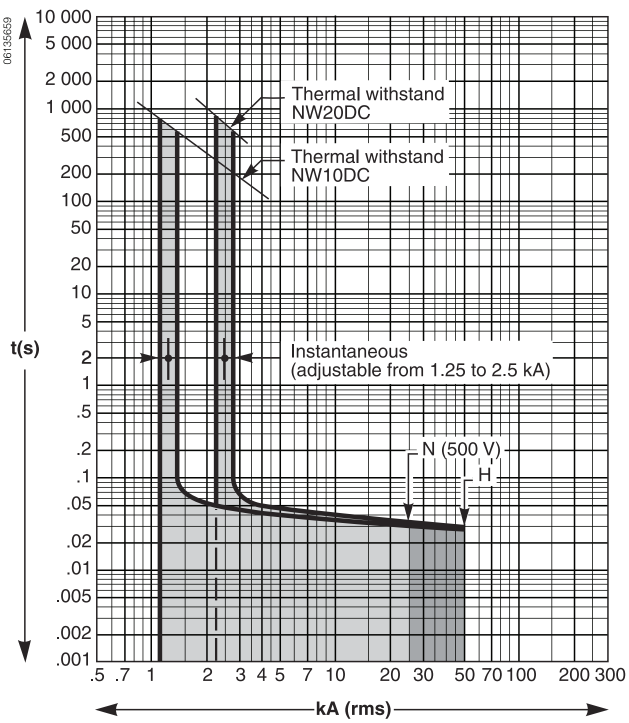
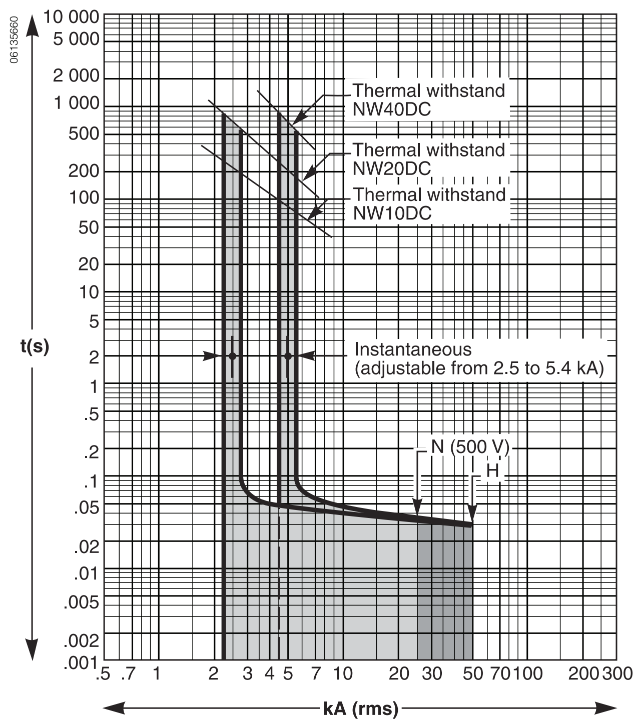


Figure 52: Trip Curves —Micrologic® DC1.0 Instantaneous Protection, U = 500 Vdc, L/R = 30 ms

1250–2500 A Sensors



2500–5400 A Sensors



5000–11,000 A Sensors

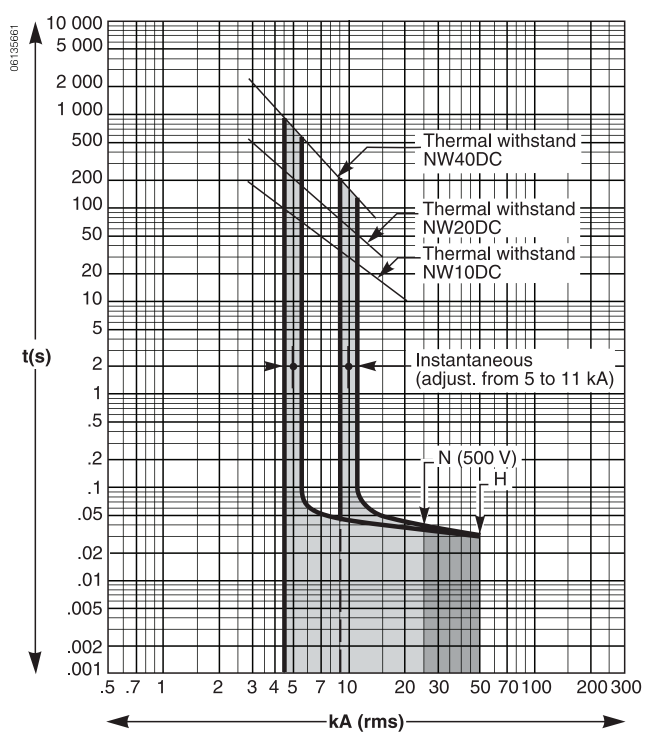
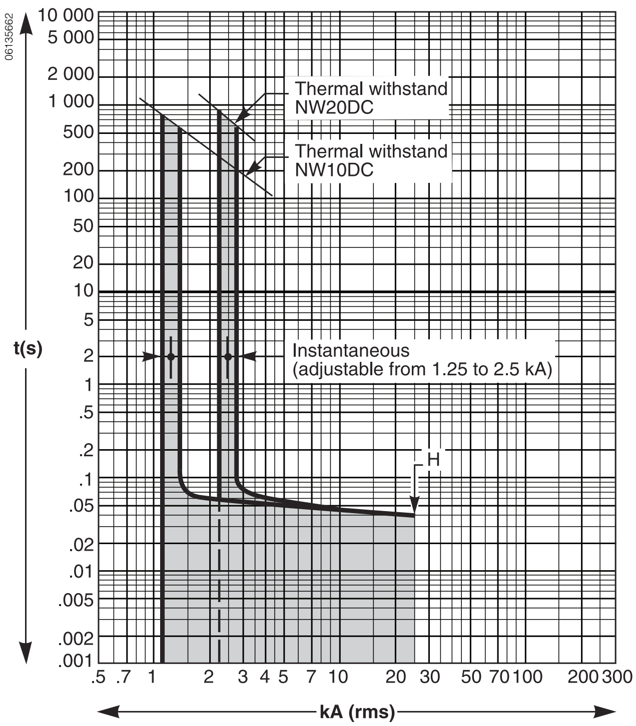
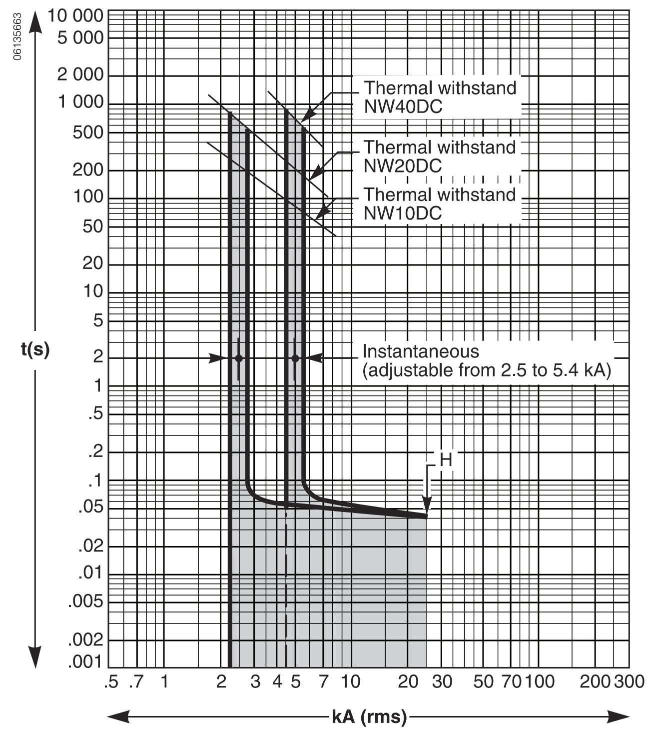


Figure 53: Trip Curves —Micrologic® DC1.0 Instantaneous Protection, U = 750/900 Vdc, L/R = 30 ms

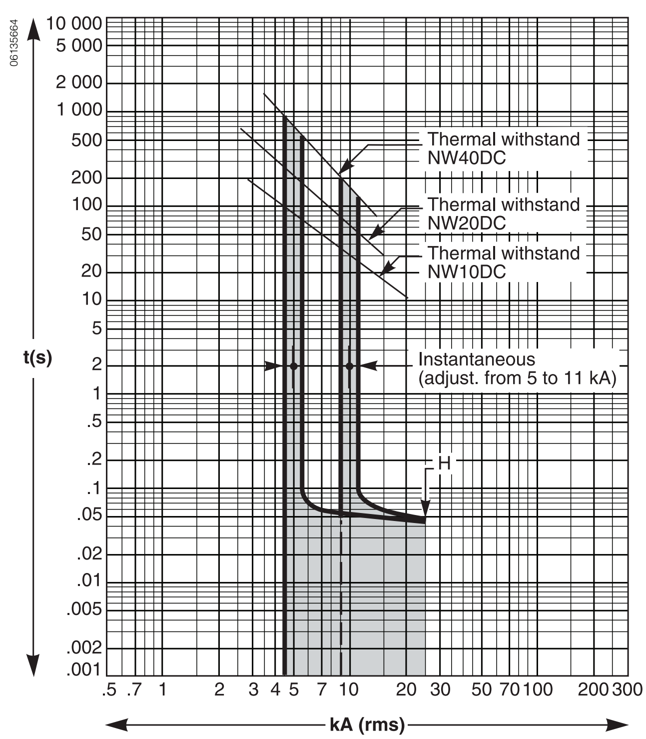
1250–2500 A Sensors



2500–5400 A Sensors



5000–11,000 A Sensors



SQUARE D

SELECTION

INTRODUCTION

Overview of Selection Procedure

1. Select the completely assembled circuit breaker (circuit breaker frame + trip unit):
   — The frame ampere rating required
   — The system voltage
   — The interruption rating required
   — The grounding system
   — The connections
2. Select circuit breaker frame options, if required.
3. Select cradle options, if required.

Table 27: Circuit Breaker Accessory Options

Accessories Available for the Circuit Breaker and Cradle

- Shunt close
- Shunt trip
- Undervoltage trip
- Fixed time delay
- Adjustable time delay
- Spring-charging motor
- Auxiliary contacts (standard)
- Ready-to-close contact
- Overcurrent trip switch (standard)
- Rack in interlock
- Key locks for circuit breaker and cradle
- Padlock attachment (circuit breaker + cradle)
- Mechanical interlocks
- Cradle position switches
- Door interlock
- Operations counter
- Safety Shutter
- Cradle rejection kit (standard)
- Rail Padlocking

FACTORY-ASSEMBLED CIRCUIT BREAKERS AND SWITCHES

Table 28: UL 489 Listed Circuit Breakers

Frame Rating (A)	Model Number	Interrupting Rating
		600 V dc unloaded (500 V dc loaded)
800	NW08N	35 kA
1200	NW12N	
1600	NW16N	
2000	NW20N	
2500	NW25N	
3000	NW30N	
4000	NW40N	

Table 29: IEC 60947-2 Rated Circuit Breakers

Frame Rating (A)	Model Number	Interrupting Rating								
		L/R ≤5 ms			L/R ≤15 ms			L/R ≤30 ms		
		500 Vdc	750 Vdc	900 Vdc	500 Vdc	750 Vdc	900 Vdc	500 Vdc	750 Vdc	900 Vdc
1000	NW10N	85 kA	—	—	35 kA	—	—	25 kA	—	—
	NW10H	100 kA	85 kA	85 kA	85 kA	50 kA	35kA	50 kA	50 kA	25 kA
2000	NW20N	85	—	—	35 kA	—	—	25	—	—
	NW20H	100 kA	85 kA	85 kA	85 kA	50 kA	35 kA	50 kA	50 kA	25 kA
4000	NW40N	85	—	—	35 kA	—	—	25	—	—
	NW40H	100 kA	85 kA	85 kA	85 kA	50 kA	35 kA	50 kA	50 kA	25 kA

Switch Selection

Table 30: IEC 60947-3 Rated, Non-automatic Switch

Frame Rating (A)	Model Number	Making Capacity Icm	Withstand Current Icw (1 s)
1000	NW10HA	85 kA	85 kA
2000	NW20HA	85 kA	85 kA
4000	NW40HA	85 kA	85 kA

REQUEST FOR QUOTATION FORM

For faster quote processing, please use the following request for quotation form. For each section, check the applicable box or enter values corresponding to your choice. Note: this request for quotation form does not take into account incompatibilities. Order to be placed on CSSS.

Date		Customer Name:	RFQ No.:
From	Location	Account No.:	Q2C No.:
Phone No.	Fax No.	Contact Name:	Phone No.:
Messages		Location:	Fax No.:

UL Listed Circuit Breaker			Qty
Masterpact Type	NW08		
	NW12		
	NW16		
	NW20		
	NW25		
	NW30		
	NW40		
Circuit Breaker Interruption Rating		N only available	
Load Connection		Type C only available	
Type of Equipment	Fixed		
	Drawout chassis		
Type of Connection	Vertical	Top	Bottom
	Horizontal	Top	Bottom

IEC Rated Circuit Breaker or Switch Disconnector			Qty
Masterpact Type	NW10		
	NW20		
	NW40		
Circuit Breaker Interruption Rating		N, H	
Switch-disconnector Interruption Rating		HA	
Type of Sensor	1250 to 2500 A		
	2500 to 5400 A		
	5000 to 11000 A		
Load Connection	C, D, E		
Type of Equipment	Fixed		
	Drawout		
Type of Connection	Vertical	Top	Bottom
	Horizontal	Top	Bottom

Cradle Secondary Disconnects

Choose one:

- Push-in terminal (standard)
- Ring terminal (UL option only)

Accessories for Remote Operation			
Spring-charging Motor (MCH		_____	V ac
		_____	V dc
Shunt close (XF)		_____	V ac
		_____	V dc
Shunt Trip (MX1)		_____	V ac
		_____	V dc
Additional shunt trip (MX2)		_____	V ac
OR		_____	V dc
Undervoltage Trip (MN)	–choose one		
	Instantaneous	_____	V ac
		_____	V dc
	Fixed-time delay	_____	V ac
		_____	V dc
	Adjustable-time delay	_____	V ac
		_____	V dc
Electrical closing push button (BPFE)			
Remote reset after fault trip (RES)		100–130 Vac	
(incompatible with SDE2)		200–240 Vac	

Wiring for Cradle (Complete only if ordering cradle without circuit breaker)

- Wiring for additional overcurrent trip switch (SDE2) or electrical reset (RES)
- Wiring for undervoltage trip (MN) or additional shunt trip (MX2)
- (Wiring for shunt trip (MX), shunt close (XF) and spring-charging motor (MCH)
- Wiring for ready-to-close contact (PF)
- Wiring for four additional form C auxiliary switches (push-in terminals) or 2a+2b auxiliary switches (ring terminals (OF)
- Wiring for eight additional form C auxili9ary switches (Push-in terminals) (OF)

Manufacturing Numbers Provided with Quotation

Circuit Breaker: ____________________

Cradle: ____________________

REQUEST FOR QUOTATION FORM

Auxiliary, Alarm and Cradle Position Switches				
Auxiliary Switch (OF)				
Choose one:	Push-in type terminal	or	Ring terminal	
	4a/4b form C (std.)		2a + 2b	☐
	8a/8b form C	☐	4a + 4b	☐
	12A/12B form C	☐		
Overcurrent trip switches				
Standard (1a/1b form C)			(SDE1) standard	
Additional overcurrent trip switches (choose one)				
1a/1b form C) (incompatible with RES)	(SDE2)			
(1a/1b form C) (incompatible with RES)	(low-level (SDE2)			
Ready-to-close switch (PF)	Std	☐	low-level	☐
Push-in type cradle position switches (1a/1b form C)				
Connected position (max. qty.: 3			qty __	
Test position (max. qty.: 3)			qty __	
Disconnected position (max. qty.: 3)			qty __	
Low-level cradle position switch				
Choose one:			Qty.	
Connected/CLosed switch (max. qty.: 8)			(EF) ______	
Connected/CLosed switch (max. qty.: 8)			(low-level EF) ______	
Ring terminal type cradle position switches (1a or 1b contact)				
Connected position (max. 3a or 3b)	qty/type ___________			
Test position (max. 1a or 1b)	qty/type ___________			
Disconnected position (max. 3a or 3b)	qty/type ___________			

Cradle Interlocking and Accessories		
Door interlock		
Racking interlock between racking crank and Off position		
	std on UL, check for IEC	☐
Open door racking interlock		☐
Automatic spring discharge	std on UL, check for IEC	☐
Cradle rejection kit		standard
Terminal Shield		☐
Miscellaneous Accessories		
Mechanical operation counter		☐
Shutter		☐
Shutter with padlock provision and position indicator		☐
Transparent cover w/ door escutcheon (drawout circuit breaker only		☐
Locking and Interlocking	Cradle	Brkr.
Padlockable push button cover		☐
Padlock provision only	Std	☐
One key lock	☐	☐
(Select manufacturer below)		
Two key locks keyed alike	☐	☐
(Select manufacturer below)		
Two key locks keyed differently	☐	☐
(Select manufacturer below)		
Key lock manufacturer		
Kirk ☐	Ronis ☐	
Federal Pioneer ☐	Profalux ☐	Castell ☐

Manufacturing Number (provided with quotation)		
	List Price	
Circuit Breaker:	$	
Cradle:	$	Delivery (from receipt of order)
Total	$	______________________

Delivery Schedule	
Circuit Breaker and cradle to be shipped together	☐
Cradle to be shipped prior to circuit breaker	☐

Schneider Electric Conditions of Sale Apply

SQUARE D

Schneider Electric USA

3700 Sixth St SW
Cedar Rapids, IA 52404
USA
1-888-Square D
1-888-778-2733

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