

Masterpact™ NW DC Circuit Breakers

Catalog
0613CT0501 R05/14
2014
Class 0613DC



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Section 1—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 up to 750 Vdc.

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	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™ or Schneider Electric™ 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-Pole (3P) or 4-Pole (4P) Construction: UL Listed (3P only) and IEC Rated (3P or 4P) 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.

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Anti-Pumping Feature: All Masterpact NW circuit breakers are designed with an anti-pumping feature that causes an opening order to always take 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.

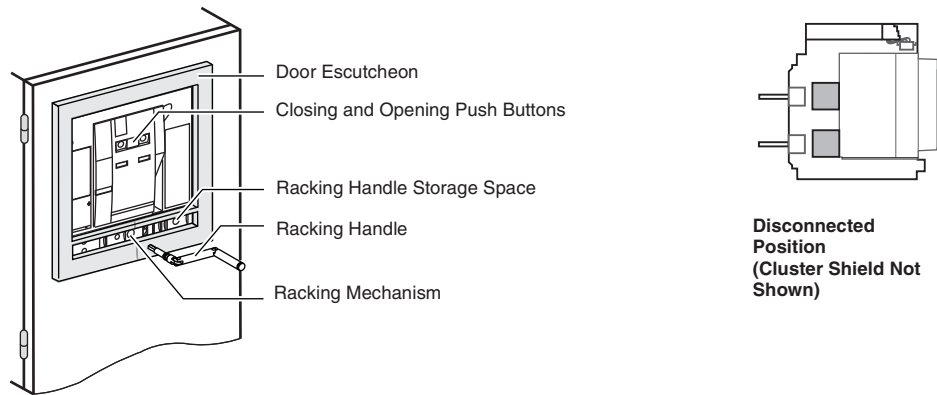
In the event that opening and closing orders are simultaneously maintained, the standard mechanism provides an anti-pumping function which continues to keep the main contacts in the open position.

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.

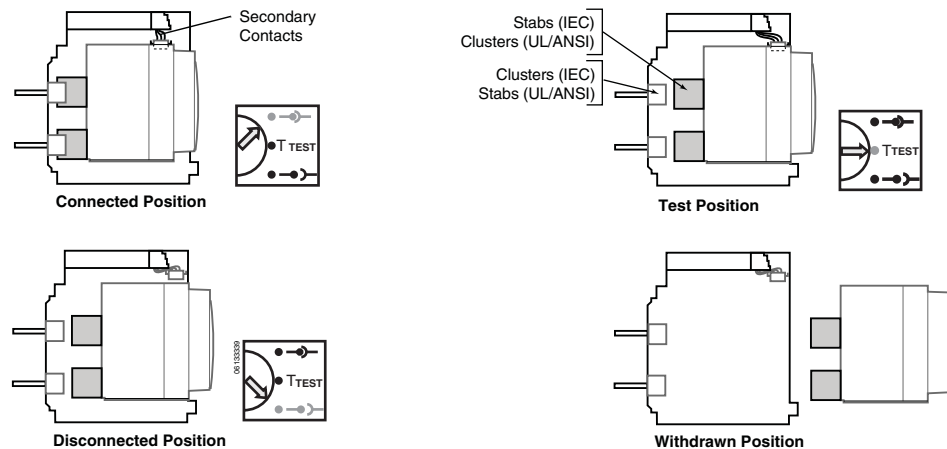
Figure 1: Racking Handle and Mechanism



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 (Cluster Shield Not Shown)



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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.

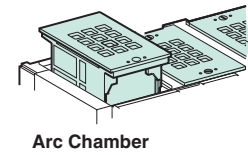
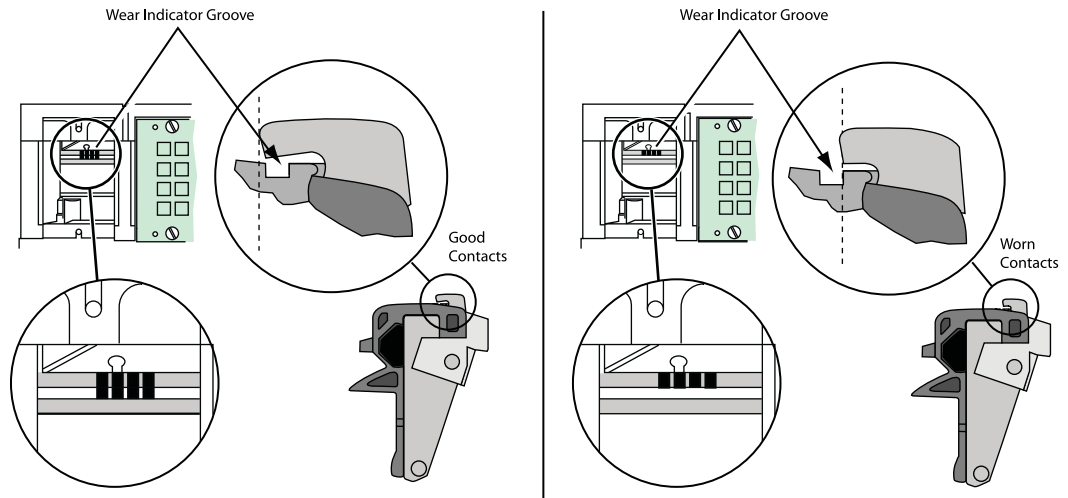


Figure 3: Contact Wear Indicators



Operating Conditions

See bulletin 0613IB1202, available in the Schneider Electric technical library, for information on normal and adverse operating conditions.

Ambient Temperature:

Masterpact circuit breakers can operate under the following temperature conditions:

- The electrical and mechanical characteristics are stipulated for an ambient temperature between -13°F (-25°C) and 158°F (70°C).
Mechanical closing of the circuit breaker (by pushbutton) is possible down to -31°F (-35°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.

Storage Temperature

Circuit breakers with trip units without LCD displays may be stored in the original packaging at temperatures between -40°F (-40°C) and 185°F (85°C).

For circuit breakers with trip units with LCD displays, this range is -13°F (-25°C) to 185°F (85°C).

Altitude:

Masterpact circuit breakers are suitable for use at altitudes of 13,000 ft. (3900 m) and below. See Table 6 on page 11 for Altitude correction factors.

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Vibration:

Masterpact circuit breakers meet IEC 60068-2-6 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)

Humidity:

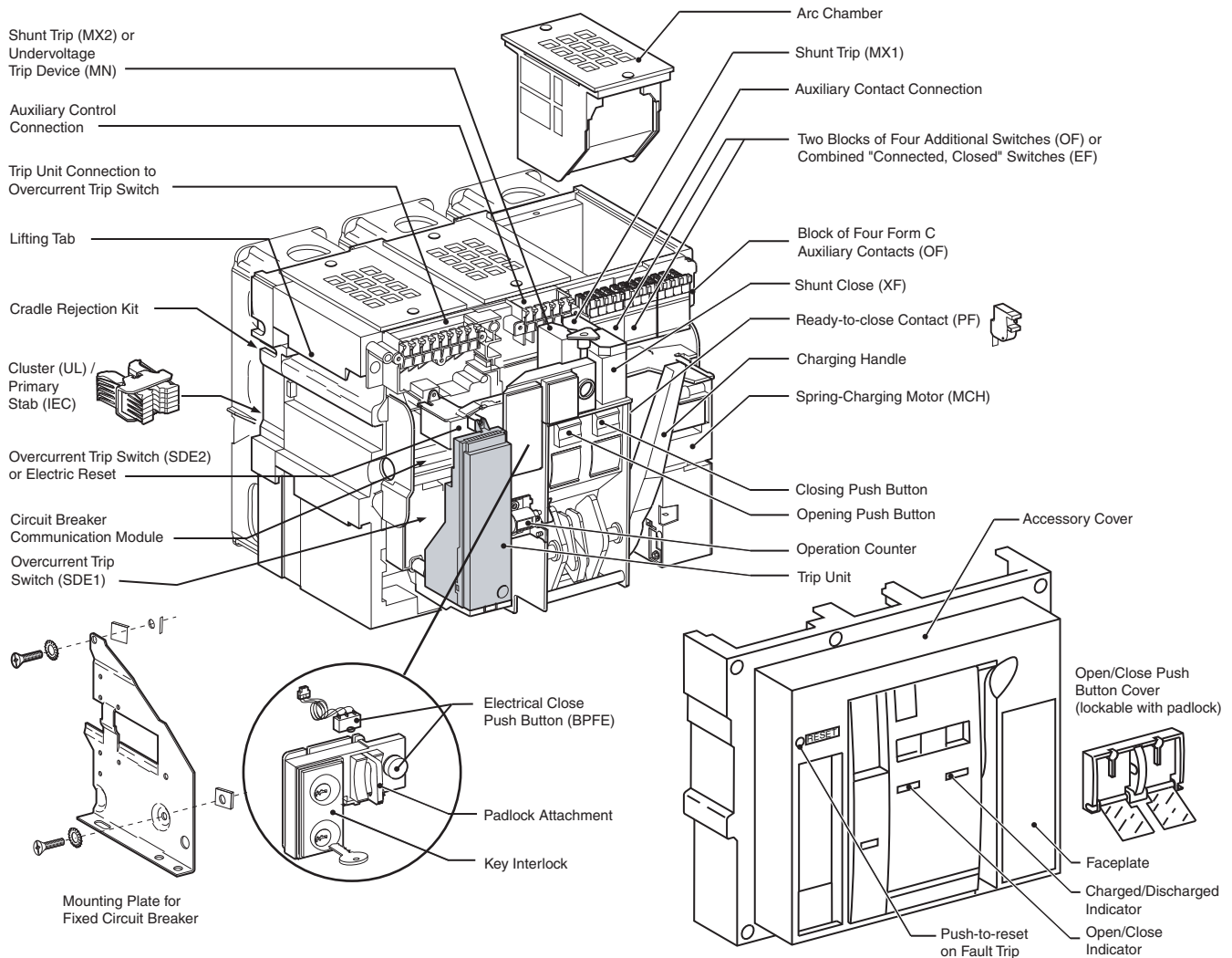
Masterpact circuit breakers have been tested to the following:

- IEC68-2-30—damp heat (temperature +55°C and relative humidity of 95%)
- IEC 68-2-52 level 2—salt mist

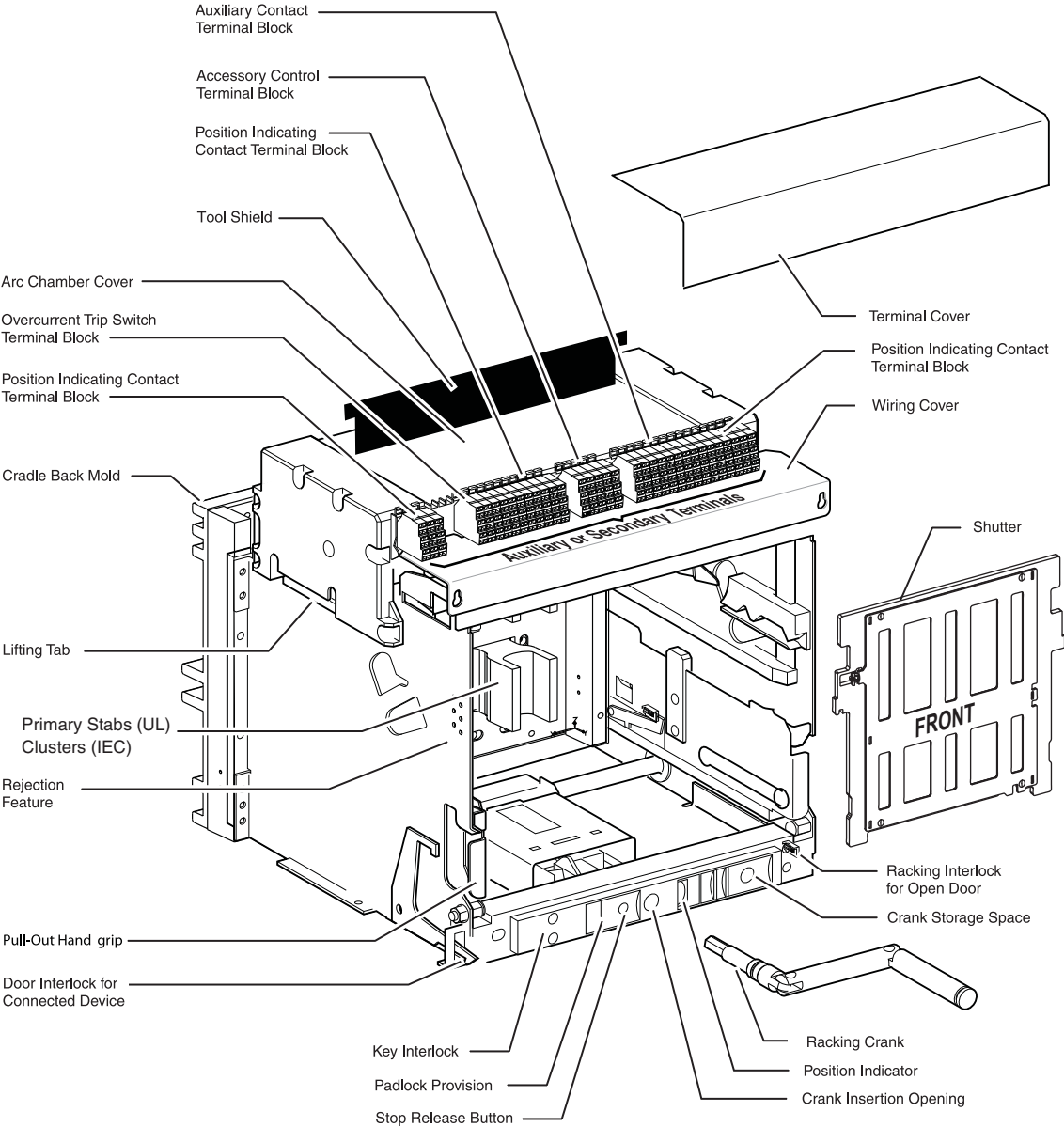
The materials used in Masterpact NT and NW circuit breakers will not support the growth of fungus and mold.

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



Masterpact™ NW DC Circuit Breakers

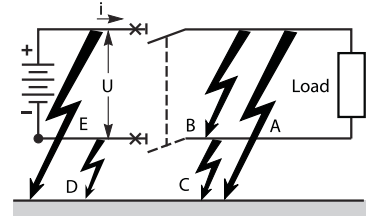
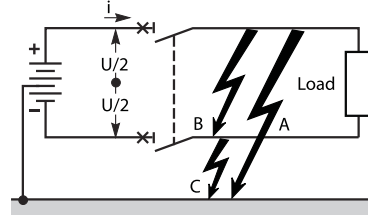
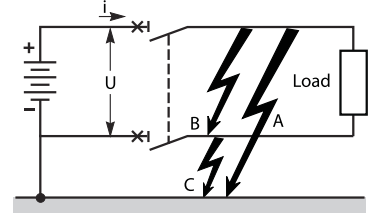
General Information

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

Distribution System	Faults	Fault Comments	Worst Case
Isolated Source 	Fault B	Isc maximum Both polarities (positive and negative) are involved in the fault	Simultaneous faults at A and D or C and E Either polarity may be involved at Voltage U.
	Fault A or C	No consequences	
	Faults A and D or Faults C and E	Isc max Either polarity may be involved at voltage U	
Grounded Middle Point 	Fault B	Isc maximum Both polarities (positive and negative) are involved in the fault	Fault B Each polarity may be involved at voltage U/2.
	Fault A or C	Isc < Isc maximum at U/2 The negative or positive polarity is involved	
Grounded Negative 	Fault A	Isc maximum Positive polarity is involved in the fault	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.
	Fault B	Isc maximum Both polarities (positive and negative) are involved in the fault	

Circuit Breaker Connection

Table 2: Circuit Breaker Connection Based on Distribution System

Type	Grounded Negative	Grounded Middle Point	Isolated Source Only system applicable to UL Listed circuit breakers
<p>Type N (IEC circuit breakers)</p> <p>Type N and H (UL Listed circuit breakers, Isolated Source only)</p> <p>24 Vdc ≤ UN ≤ 500 Vdc</p>			
	<p>Version C</p>	<p>Version C</p>	<p>Version C</p>
			<p>Version C1</p>
<p>Type H</p> <p>24 Vdc ≤ UN ≤ 500 Vdc</p>	<p>Version D</p>	<p>Version C</p>	<p>Version E</p>
<p>Type H</p> <p>500 Vdc < UN ≤ 750 Vdc</p>	<p>Version D</p>	<p>Version E</p>	<p>Version E</p>
<p>Type H</p> <p>750 Vdc < UN ≤ 900 Vdc</p>	<p>Version D</p>	<p>Version E</p>	<p>Version E</p>

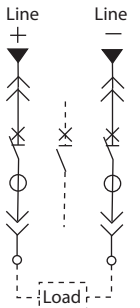
Masterpact™ NW DC Circuit Breakers

General Information

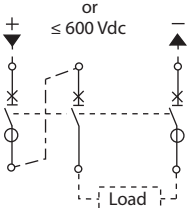
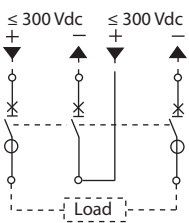
Frame Sizes and Interrupting ratings

Load Diagrams

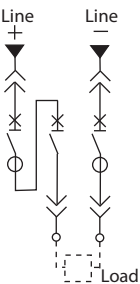
Version C



Version C1



Version D



Version E

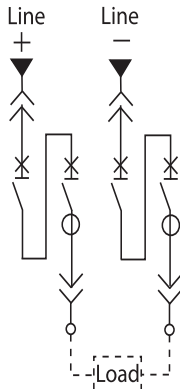


Table 3: Interrupting Ratings for UL 489 Listed Masterpact NW Circuit Breakers

Model Number (Version 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	800 A	10,000	2800	35 kA	30 to 75 ms	<70 ms
NW12NDC	1200 A					
NW16NDC	1600 A					
NW20NDC	2000 A					
NW25NDC	2500 A					
NW30NDC	3000 A					
NW40NDC	4000 A	10,000	1000	85 kA	30 to 75 ms	<70 ms
NW08HDC	800 A					
NW12HDC	1200 A					
NW16HDC	1600 A					
NW20HDC	2000 A					
NW25HDC	2500 A					
NW30HDC	3000 A					
NW40HDC	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%	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%	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	Mechanical	Without Maintenance	10,000						
	Electrical	Without Maintenance	500 Vdc	8500	8500	5000	5000	2000	2000
900 Vdc			—	2000	—	2000	—	1000	

Masterpact™ NW DC Circuit Breakers General Information

Correction Factors

Table 5: Temperature Correction Factors

	Maximum Ambient Temperature										
	140	122	104	86	77	68	50	32	14	-4	-22
°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


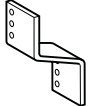
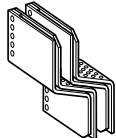
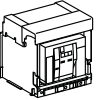

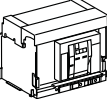
	< 6600 ft. (2000 m)	8500 ft. (2600 m)	13,000 ft. (3900 m)
Voltage	1.00	0.95	0.80
Current	1.00	0.99	0.96

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

Version	Circuit Breaker		Z-Connector			
			NW10DC–NW20DC		NW40DC	
	Type	Weight	Type	Weight	Type	Weight
C/D	3P Fixed	 132 lbs. (60 kg)		6 lbs. (2.5 kg)		29 lbs. (13 kg)
	3P Drawout	 198 lbs. (90 kg)				
E	4P Fixed	 176 lbs. (80 kg)				
	4P Drawout	 264 lbs. (120 kg)				

Masterpact™ NW DC Circuit Breakers

General Information

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	<input type="checkbox"/>
8a/8b form C		4a + 4b	<input type="checkbox"/>
12A/12B form C			<input type="checkbox"/>

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)		
Circuit Breaker:	List Price	
	\$	
Cradle:	\$	
	Total \$	Delivery (from receipt of order) <input type="text"/>

Delivery Schedule

Circuit Breaker and cradle to be shipped together	<input type="checkbox"/>
Cradle to be shipped prior to circuit breaker	<input type="checkbox"/>

Schneider Electric Conditions of Sale Apply

Section 2—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 that 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, page 62

- has an instantaneous protection with no time delay settings
- has no overload protection provided

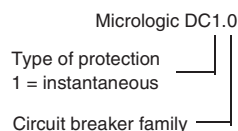


Figure 4: Micrologic DC1.0 Trip Unit

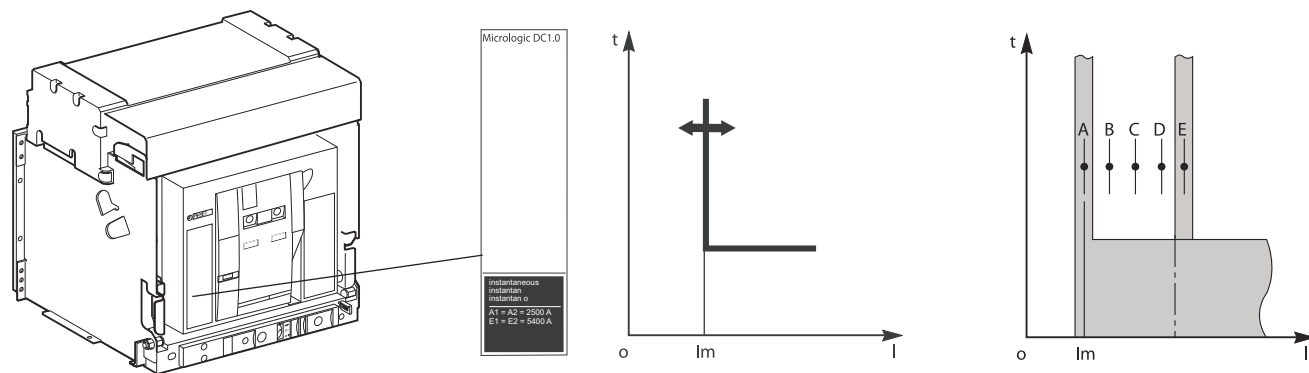
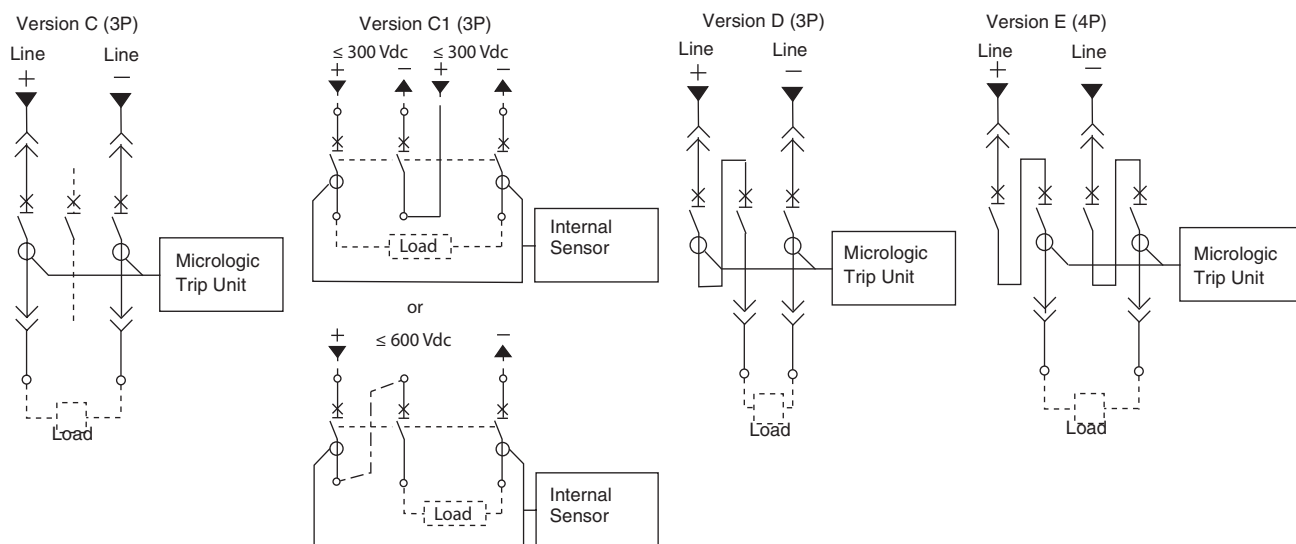


Figure 5: Circuit Breaker Configuration and Sensor Locations



Masterpact™ NW DC Circuit Breakers

Micrologic™ DC1.0 Trip Unit

- 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: There are 16 detent positions to adjust the instantaneous tripping points. Make sure that both dials are set to the same detent position.

Figure 6: Sensor Adjustment Dials

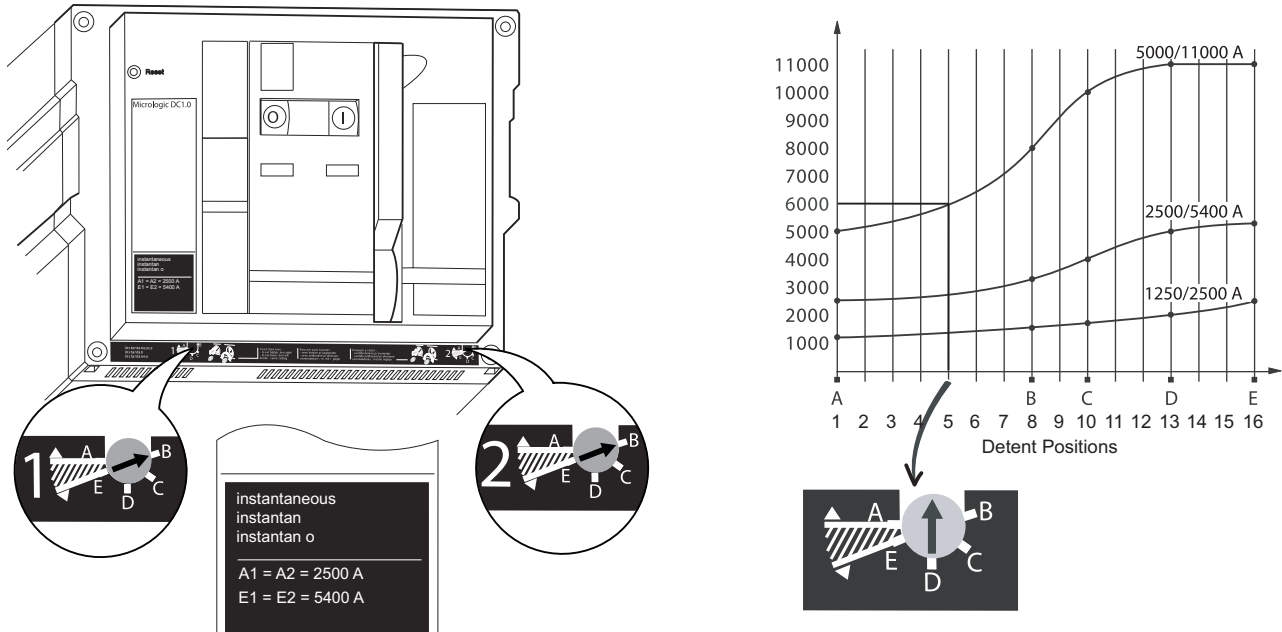


Table 9: Im Thresholds

Sensor	A	E
1250–2500 A	1250 A -20/+10%	2500 A -20/+10%
2500–5400 A	2500 A -20/+10%	5400 A -20/+10%
5000–11,000 A	5000 A -20/+10%	11000 A -20/+10%

Table 10: Sensors

Frame Rating	Model Number	Sensor Type		
		1250–2500 A	2500–5400 A	5000–11,000 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	X
2500 A	NW25	—	X	X
3000 A	NW30	—	X	X
4000 A	NW40	—	—	X

Section 3—Accessories

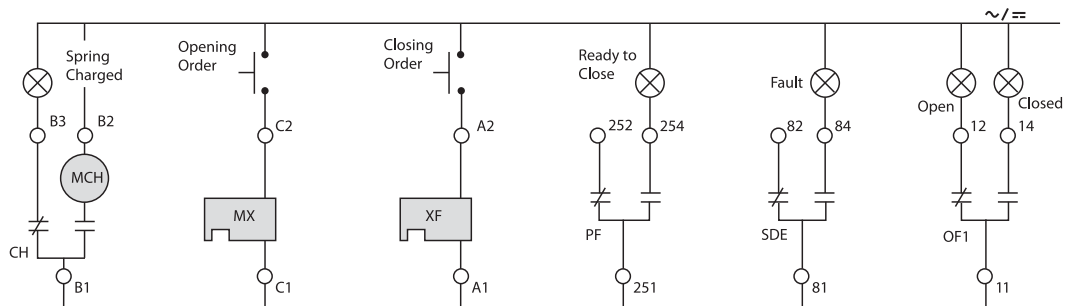
Options for Remote Operation

Two options are available for remote operation of Masterpact™ circuit breakers: direct connection or a communication network.

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.

The wiring diagrams for these two options are shown below.

Figure 7: Wiring Diagram for Remote ON/OFF Function by Direct Connection



Remote Operation Accessories

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

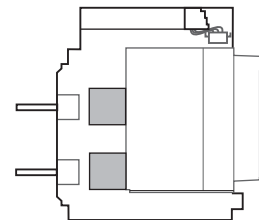
- A spring-charging motor (MCH) equipped with a spring-charged limit switch; see page 16 for more information.
- A shunt close (XF); see page 17 for more information.
- A shunt trip (MX1); see page 17 for more information.

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).



Masterpact Circuit Breaker Equipped for Remote ON/OFF Function
Cluster shield is not shown

Masterpact™ NW DC Circuit Breakers Accessories

Terminals

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	100mA at 24 V
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)

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).

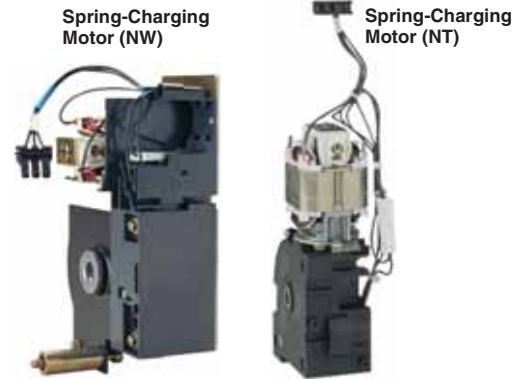


Table 12: Spring-Charging Motor Characteristics

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, 3 s maximum on NT	
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)

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 Length¹

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)

¹ 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 energized continuously or intermittently.

Shunt Close (XF): Remotely closes the circuit breaker if the spring mechanism is charged. The shunt close may be energized continuously or intermittently.



Shunt Trip (MX1) and Shunt Close (XF)

NOTE: Do not use a standing close order on the shunt close coil (XF).

Any opening order will open the breaker so a standing close order is not necessary. See Anti-Pump Feature on page 4.

Communication versions of the MX1 and XF are available for direct connection via the circuit breaker communication module (BCM).

Table 14: Shunt Trip and Shunt Close Characteristics

Characteristics	MX1 and MX2	XF	Min	Max
Voltage Ratings (V _n)	Vac	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
	50/60 Hz	380 Vac	266 Vac	418 Vac
		480 Vac	336 Vac	528 Vac
		12 Vdc	8 Vdc	13 Vdc
		24 Vdc	17 Vdc	26 Vdc
		48 Vdc	34 Vdc	52 Vdc
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 ¹	50 ms ±10 (NW and NT)	70 ms ±10 (NW ≤ 4000 A) 80 ms ±10 (NW > 4000 A) 55 ms (NT)		

¹ Shunt trip (MX1) and shunt close (XF) circuits must be energized for minimum of 200 ms.

Masterpact™ NW DC Circuit Breakers Accessories

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

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)



Second Shunt Trip (MX2)

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.

When energized, the shunt trip (MX1 or MX2) instantaneously opens the circuit breaker.

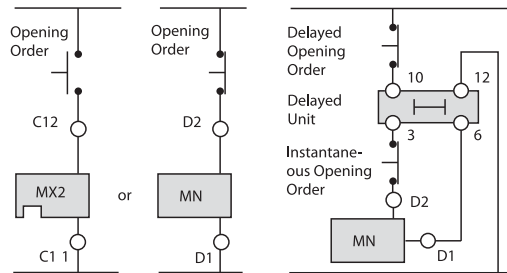
The undervoltage trip (MN) instantaneously opens the circuit breaker when its supply voltage drops to a value between 35% and 70% of its rated voltage.

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		MN	
Voltage Ratings (V_n)	Vac	24 Vac	
		48 Vac	
		120 Vac	
		240 Vac	
		277 Vac	
	50/60 Hz	380 Vac	
		480 Vac	
		Vdc	12 Vdc
			24 Vdc
			48 Vdc
125 Vdc			
250 Vdc			
Power Consumption (VA or W)	Constant/Inrush	4.5/200	
Operating Threshold	Opening	0.35 to 0.70 V_n	
	Closing	0.85 V_n	
Circuit Breaker Response Time at V_n	NW	90 ms \pm 10	
	NT	40 ms \pm 10	

Figure 8: Wire Diagram for the Remote Tripping Function



Time-Delay Module for Undervoltage Trip

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.



Time-Delay Module for Undervoltage Trip (MN)

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	

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.



Ready-to-Close Switch (PF)

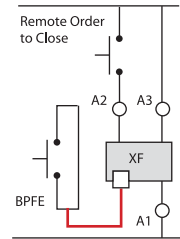
Table 17: Ready-to-Close Switch Characteristics

Type of Contact	1a/1b Form C			
Maximum Number of Contacts	1			
Breaking Capacity at a Power Factor (p.f.) of 0.3	Standard: 100 mA/24V 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

Masterpact™ NW DC Circuit Breakers Accessories

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.



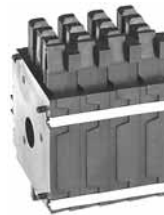
Remote Reset (RES) and Automatic Reset After Fault Trip

- 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).

Switches and Switch Accessories

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 for Masterpact NW Circuit Breaker

Masterpact NT Aux Switch (OF) with One Contact



Table 18: Auxiliary Switch Characteristics

Circuit Breaker Type	NT	NW		
Supplied as Standard (Form C)	4	4		
Maximum Number of Contacts	4	12		
Standard (100 mA/24 V minimum load)				
Vac	240/380	6 A	10 A	
	480	6 A	10 A	
	600/690	6 A	6 A	
Vdc	24/48	2.5 A	10 A	
	240	0.5 A	10 A	
	380	0.3 A	3 A	
Breaking Capacity at a Power Factor (p.f.) of 0.3	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	5 A	6 A
		240 Vac	5 A	6 A
		380 Vac	5 A	3 A
	Vdc	24/48 Vdc	5/2.5 A	6 A
		125 Vdc	0.5 A	6 A
		250 Vdc	0.3 A	3 A

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)

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 (not available for NT)			
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	



Masterpact™ NW DC Circuit Breakers Accessories

Cradle Position Switch

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.



Cradle Position Switch (CE, CD, CT)

Table 21: Cradle Position Switch Characteristics

Circuit Breaker Type	NT			NW			
	CE	CD	CT	CE	CD	CT	
Maximum Push-In Switches with Standard Actuators	3	2	1	3 ¹	3 ¹	3 ¹	
With Additional Actuators				9	0	0	
				6	3	0	
				3	6	0	
				6	0	3	
Standard (100 mA/24 V minimum load)							
Vac	240	8 A		8 A			
	380	8 A		8 A			
	480	8 A		8 A			
	600/690	6 A		6 A			
Breaking Capacity at a Power Factor (p.f) of 0.3	24/48	2.5 A		2.5 A			
	Vdc	125	0.8 A		0.8 A		
		250	0.3 A		0.3 A		
	Low-Level (2 mA/15 V minimum load)						
Vac	24/48	5 A		5 A			
	240	5 A		5 A			
	380	5 A		5 A			
	24/48	2.5 A		2.5 A			
Vdc	125	0.8 A		0.8 A			
	250	0.3 A		0.3 A			

¹ 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

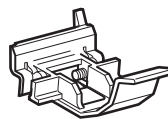
Additional Actuators for Cradle Position Switches on Masterpact NW Circuit Breakers

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.

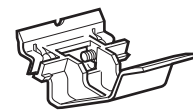
Figure 9: Cradle Position Switch Actuators



Actuator for up to Three CE Switches (standard)



Actuator for up to Three CD Switches (standard)



Actuator for up to Three CT Switches (standard)

Cradle Connections

Table 22: Standard Connectors for Drawout Circuit Breakers

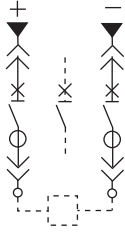
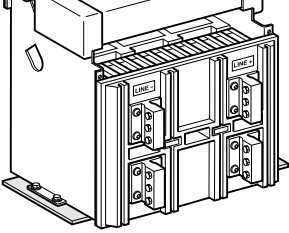
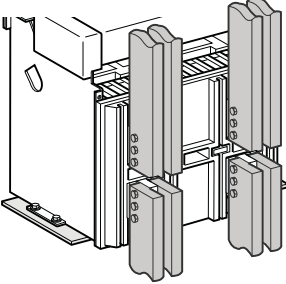
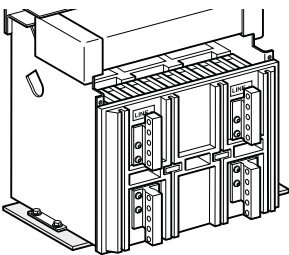
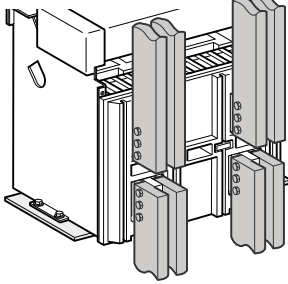
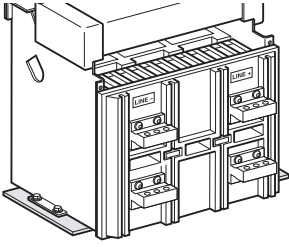
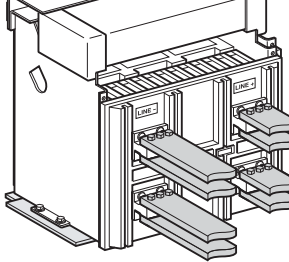
Type	Rating	Connector					
		Version C		Version C1			
Rear-Connected "T" Vertical (RCTV)	800–2000 A						
	2500–4000 A						
Rear-Connected (T) Horizontal (RCTH)	800–2000 A						
	2500–4000 A						

Table 23: Standard Connectors for Fixed-Mounted Circuit Breakers

Connector Type	Ampere Rating	Connectors					
		Version C		Version C1			
Rear-Connected "T" Vertical (RCTV)	800–2500 A						
	3000–4000 A						
Rear-Connected "T" Horizontal (RCTH)	800–2500 A						
	3000–4000 A						

Masterpact™ NW DC Circuit Breakers Accessories

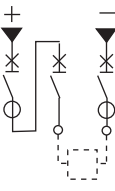
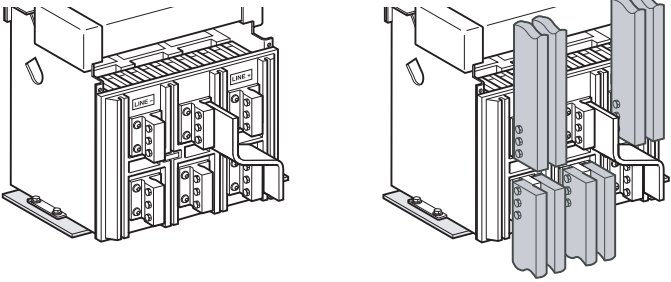
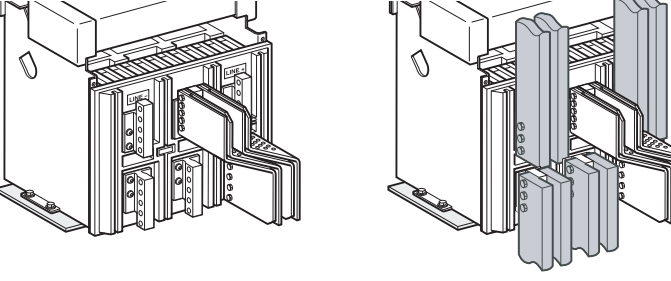
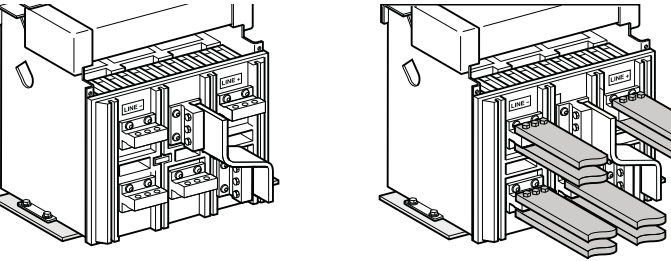
Table 24: Masterpact NW IEC Rated 3P/4P Drawout Circuit Breakers

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

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Masterpact™ NW DC Circuit Breakers Accessories

Table 24: Masterpact NW IEC Rated 3P/4P Drawout Circuit Breakers (continued)

Wiring	Connector Type	Ampere Rating	Connector and Bussing	
Version 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 24: Masterpact NW IEC Rated 3P/4P Drawout Circuit Breakers (continued)

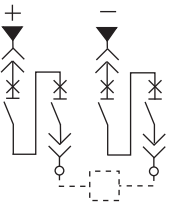
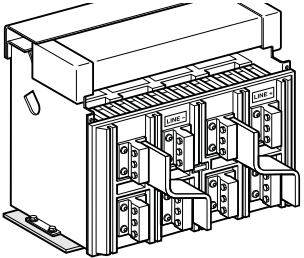
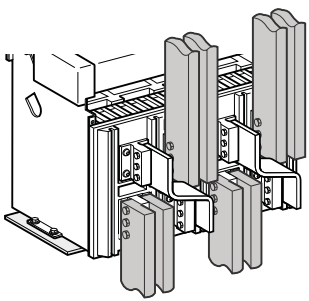
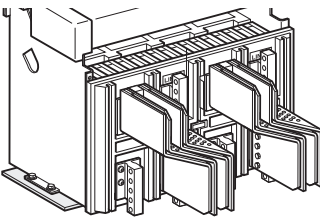
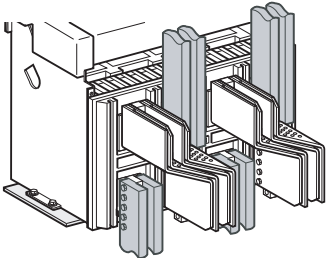
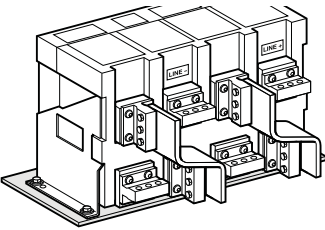
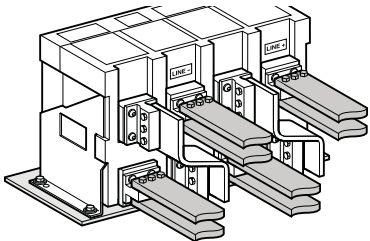
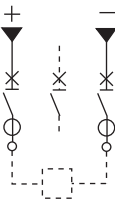
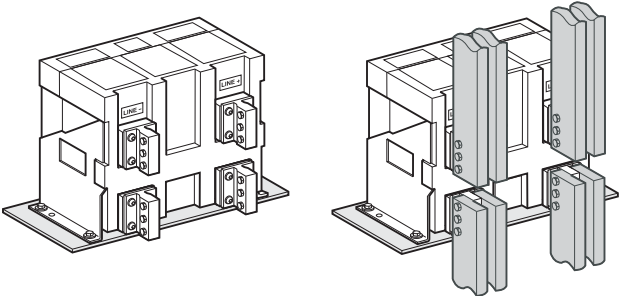
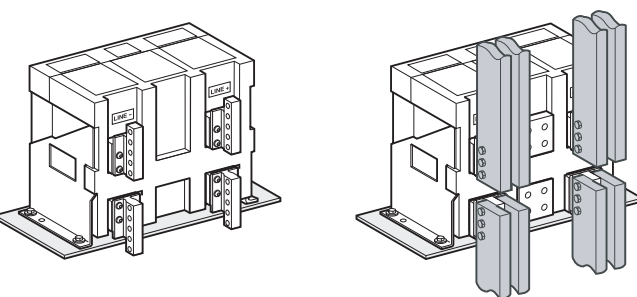
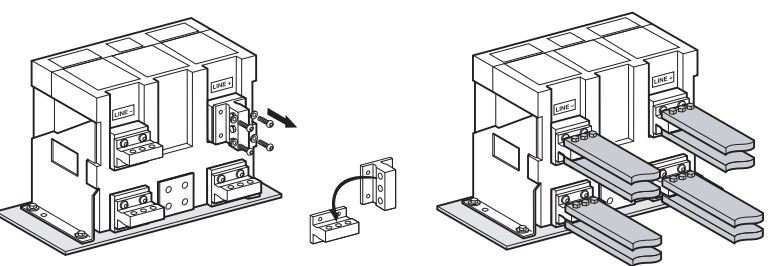
Wiring	Connector Type	Ampere Rating	Connector and Bussing	
<p>Version E (4P)</p> 	RCTV	1000–2000 A		
		4000 A		
	RCTH	1000–2000 A		
		4000 A	NA	

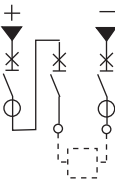
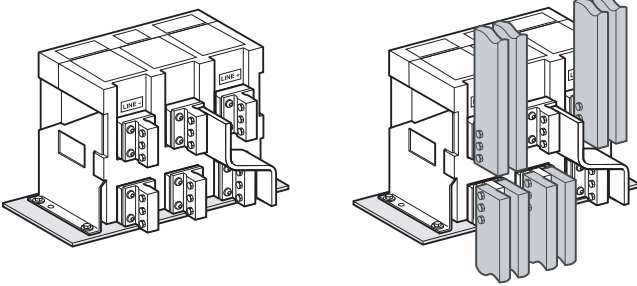
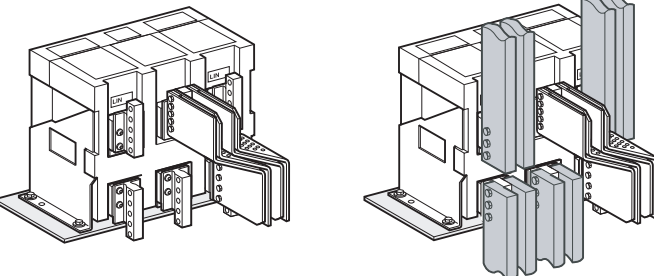
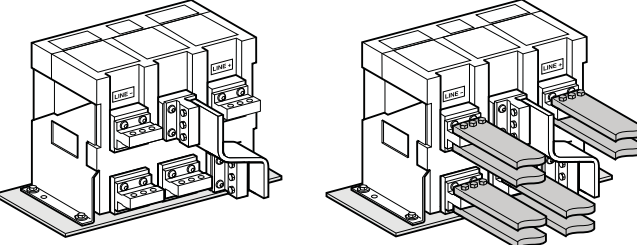
Table 25: Masterpact NW IEC Rated 3P/4P Fixed Circuit Breakers

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

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Masterpact™ NW DC Circuit Breakers Accessories

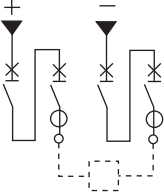
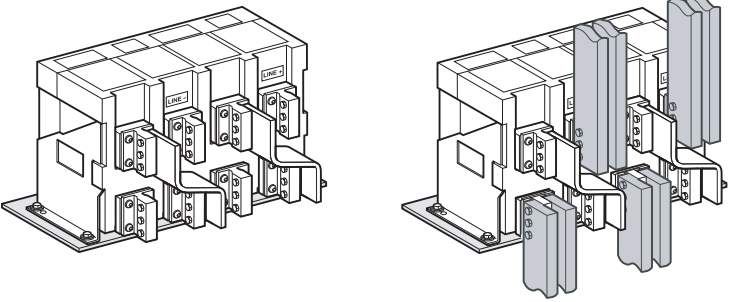
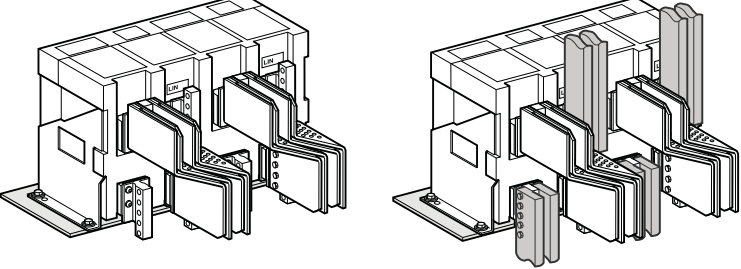
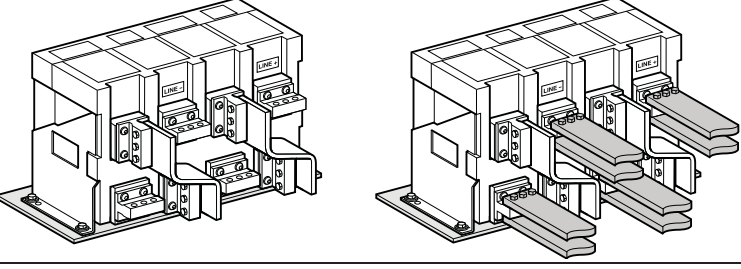
Table 25: Masterpact NW IEC Rated 3P/4P Fixed Circuit Breakers (continued)

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

Continued on next page

Masterpact™ NW DC Circuit Breakers Accessories

Table 25: Masterpact NW IEC Rated 3P/4P Fixed Circuit Breakers *(continued)*

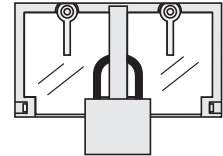
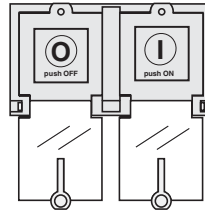
Wiring	Connector Type	Ampere Rating	Connectors and Bussing	
<p>Version E (4P)</p> 	RCTV	1000–2000 A		
		4000 A		
	RCTH	1000–2000 A		
		4000 A	NA	

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: 3/16–5/16 in. diameter, not supplied
- A wire seal
- Two screws



Push Button Lock

Open Position Padlock and Key Lock Provisions

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: 3/16–5/16 in. diameter, not supplied
- Key locks: One or two Kirk® 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.



Open Position Key Lock



Open Position Padlock Provision

Table 26: Circuit Breaker and Switch Locking Options

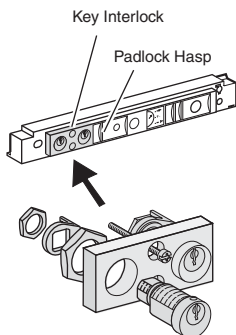
Type of Locking	Maximum Number of Locks	
Pushbutton Locking	Using padlocks	Three padlocks
	Using key locks	Two key locks (optional)
Open Position Locking	Using padlocks and key locks	Up to three padlocks and two key locks (optional)

Cradle Locking and Interlocking

Disconnected Position Locking

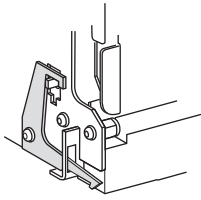
The circuit breaker can be locked in the disconnected position by key interlock (optional) or padlock (standard). The key interlock is on the cradle and accessible with the door locked.

- Kirk key interlocks 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.



Disconnected Position Locking Provisions

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.

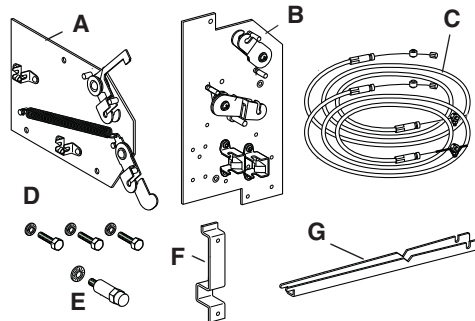
Racking Interlock Between Racking Crank and Off Position

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 10: Cable Door Interlock Kit Contents



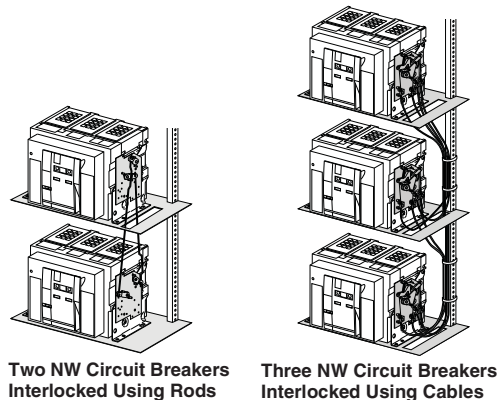
Kit Contents

- (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 11: Source Changeover Interlocks



Two NW Circuit Breakers Interlocked Using Rods

Three NW Circuit Breakers Interlocked Using Cables

Interlocking Two Circuit Breakers

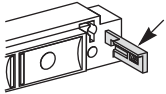
- Interlocking Two Mains Using Rods
- Interlocking Two Mains Using Cables

Interlocking Three Circuit Breakers Using Cables

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

Masterpact™ NW DC Circuit Breakers

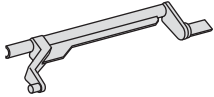
Accessories



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

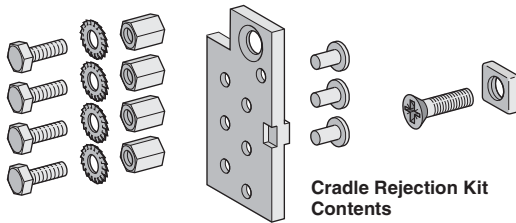
Automatic Spring Discharge Mechanism

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 12: Cradle Rejection Kits



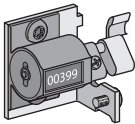
Cradle Rejection Kit Contents

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)



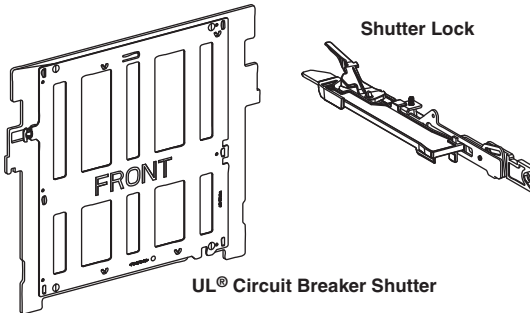
Mechanical Operation Counter (CDM)

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.

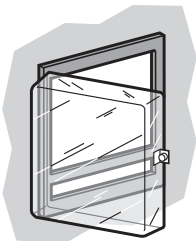
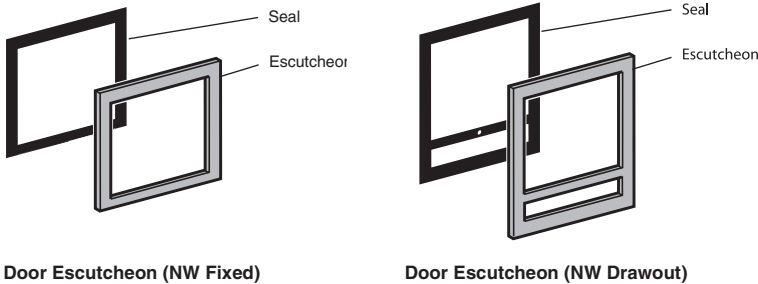
Not available on cradles with ArcBlok™ technology.



Door Escutcheon (CDP)

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

Figure 13: Door Escutcheons



Transparent Cover (CCP)

Transparent Cover (CCP) for Door Escutcheon

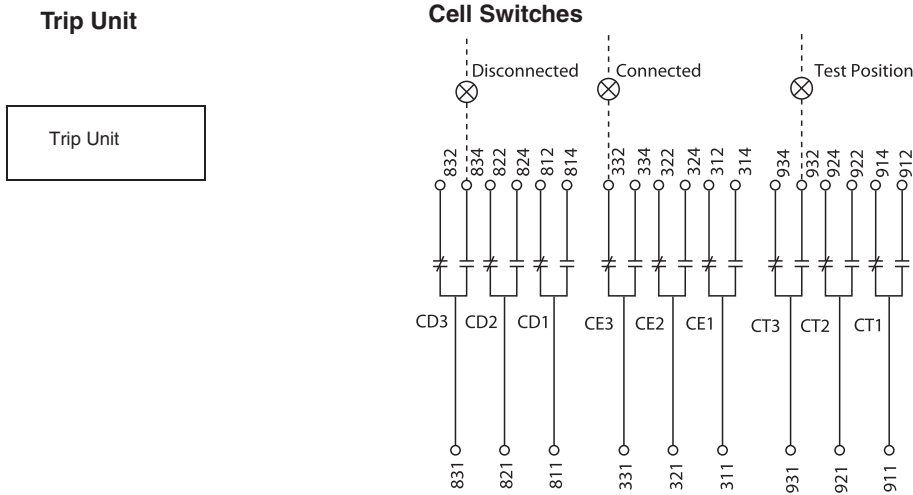
The cover is hinged-mounted and locked with a milled head, and is designed to be installed on the door escutcheon.

Masterpact™ NW DC Circuit Breakers Wiring Diagrams

Section 4—Wiring Diagrams

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

Figure 14: Wiring Diagrams for Masterpact NW Circuit Breakers



Markings for Push-In Type Terminals

Cell Switches			Trip Unit								Cell Switches					
CD3	CD2	CD1	COM	UC1	UC2	UC3	UC4	M2C/M6C	SDE2/Res.	SDE1	CE3	CE2	CE1			
834	824	814	E5	E6	Z5	M1	M2	M3	F2+	V3	484/Q3	184/K2	84	334	324	314
832	822	812	E3	E4	Z3	Z4	T3	T4	VN	V2	474/Q2	182	82	332	322	312
831	821	811	E1	E2	Z1	Z2	T1	T2	F1-	V1	471/Q1	181/K1	81	331	321	311
or																
CE6	CE5	CE4														
364	354	344														
362	352	342														
361	351	341														

Markings for Ring Terminals

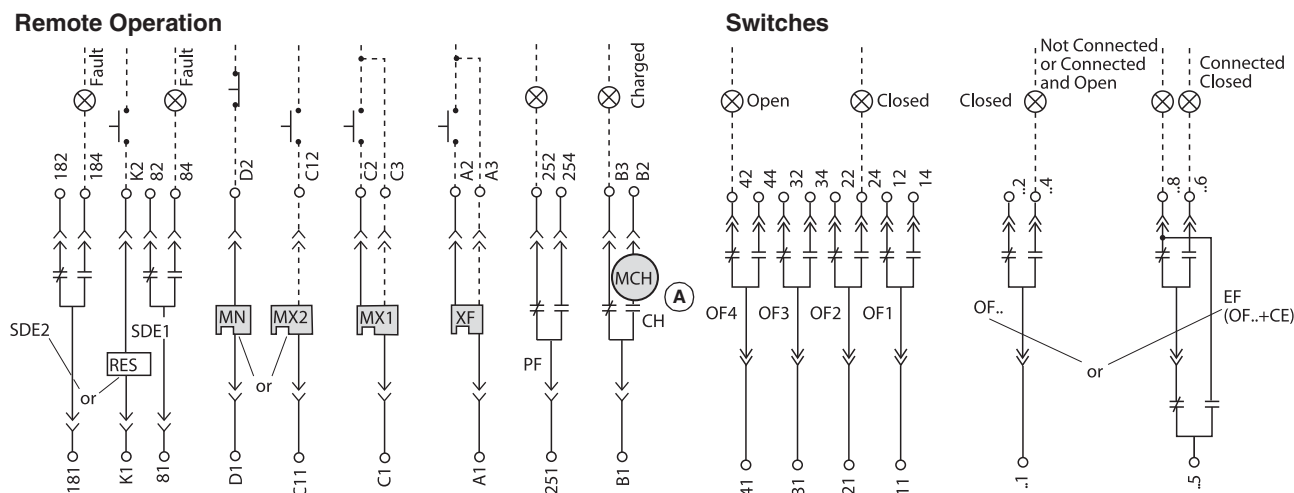
Cell Switches			Trip Unit													
CD3	CD2	CD1	COM	UC1	UC2	UC3	UC3a	M2C/M6C	M2Ca/M6Ca	SDE2/Res.	SDE2a	SDE1	SDE1a			
834/832	824/822	814/812	E5	E6	Z5	M1	M2	M3	F2	VN	484/Q3	474/Q2	184/K2	182	84	82
831	821	811	E3	E4	Z3	Z4	T3	T4	F1		471/Q1		181/K1		81	
			E1	E2	Z1	Z2	T1	T2								

= Not available on this circuit breaker

Masterpact™ NW DC Circuit Breakers Wiring Diagrams

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

Figure 15: Wiring Diagrams for Auxiliary Connections



A—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.

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								or			or		
EF24	EF23	EF22	EF21	EF14	EF13	EF12	EF11	CD6	CD5	CD4	CE9	CE8	C7
248	238	228	218	148	138	128	118	864	854	844	394	384	374
246	236	226	216	146	136	126	116	862	852	842	392	382	372
245	235	225	215	145	135	125	115	861	851	841	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

Masterpact™ NW DC Circuit Breakers Wiring Diagrams

Additional Wiring Information

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

OF4	Open/Closed Circuit Breaker or Switch Position Contacts	OF24: Open/Closed Circuit Breaker or Switch Position Contact
OF3		or
OF2		EF24: Combined Connected and Closed Contact
OF1		
		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	Disconnected Position Contacts	CE3	Connected Position Contacts	CT3	Test Position Contacts
CD2		CE2		CT2	
CD1		CE1		CT1	
or				or	
CE6	Connected Position Contacts			CE9	Connected Position Contacts
CE5				CE8	
CE4				CE7	
or				or	
				CD6	Disconnected Position Contacts
				CD5	
				CD4	

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 5—Dimensional Drawings

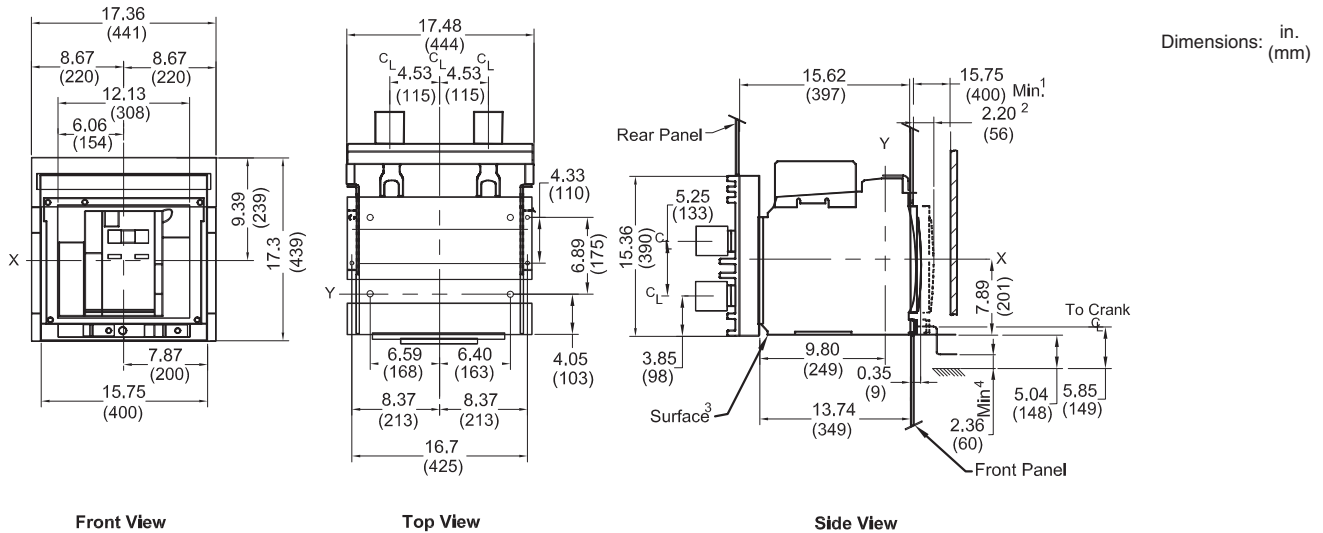
Enclosure Information

Table 27: Minimum Enclosure Information

Number of Poles	Circuit Breaker	Circuit Breaker Enclosure Dimensions		Ventilation Area					
		(H x W x D)		Top		Bottom		Front Face	
		in.	mm	in. ²	mm ²	in. ²	mm ²	in. ²	mm ²
3P	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 3P Drawout Circuit Breakers

Figure 16: 800–2500 A UL 3P Drawout Circuit Breaker with Type C Connections Master Drawing



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

Masterpact™ NW DC Circuit Breakers Dimensional Drawings

Figure 17: 800–2500 A 3P Drawout Circuit Breaker with Type C Connections Rear-Connected "T" Vertical (RCTV)

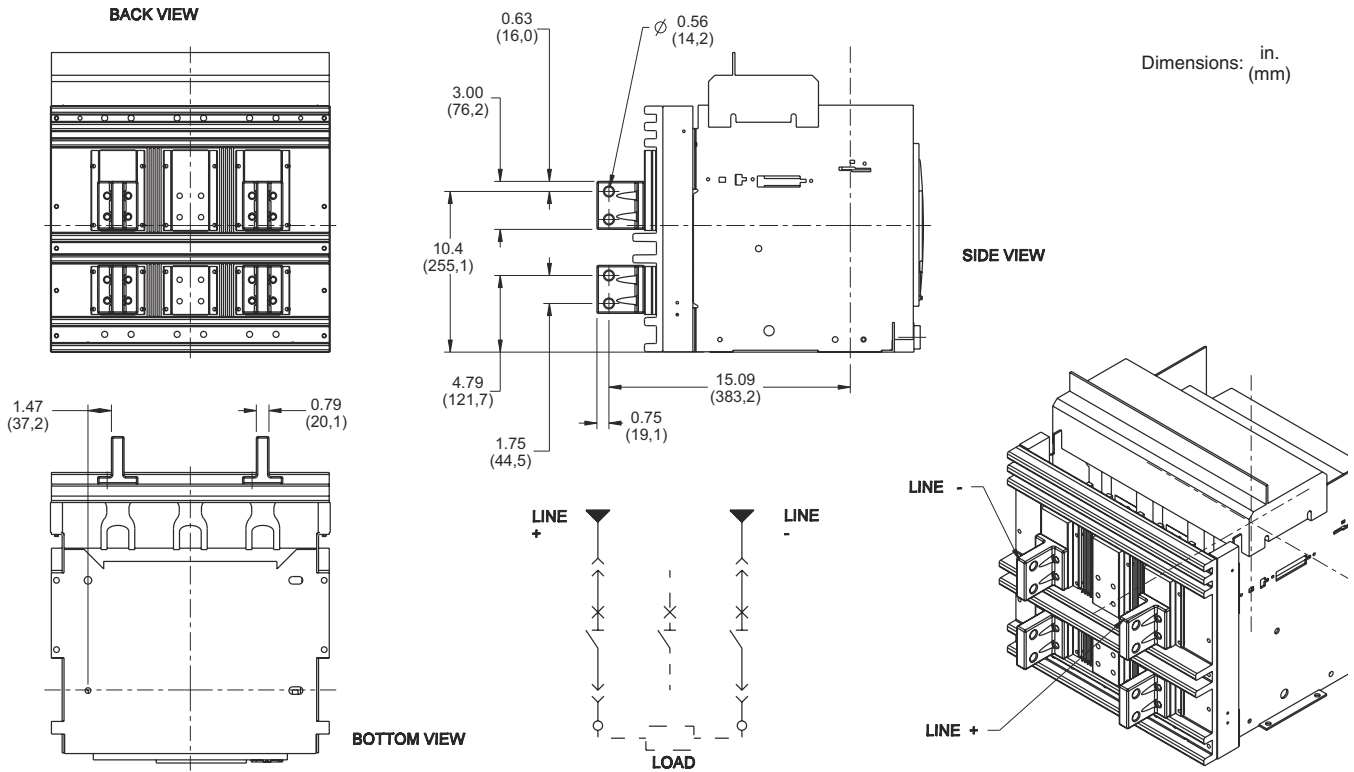
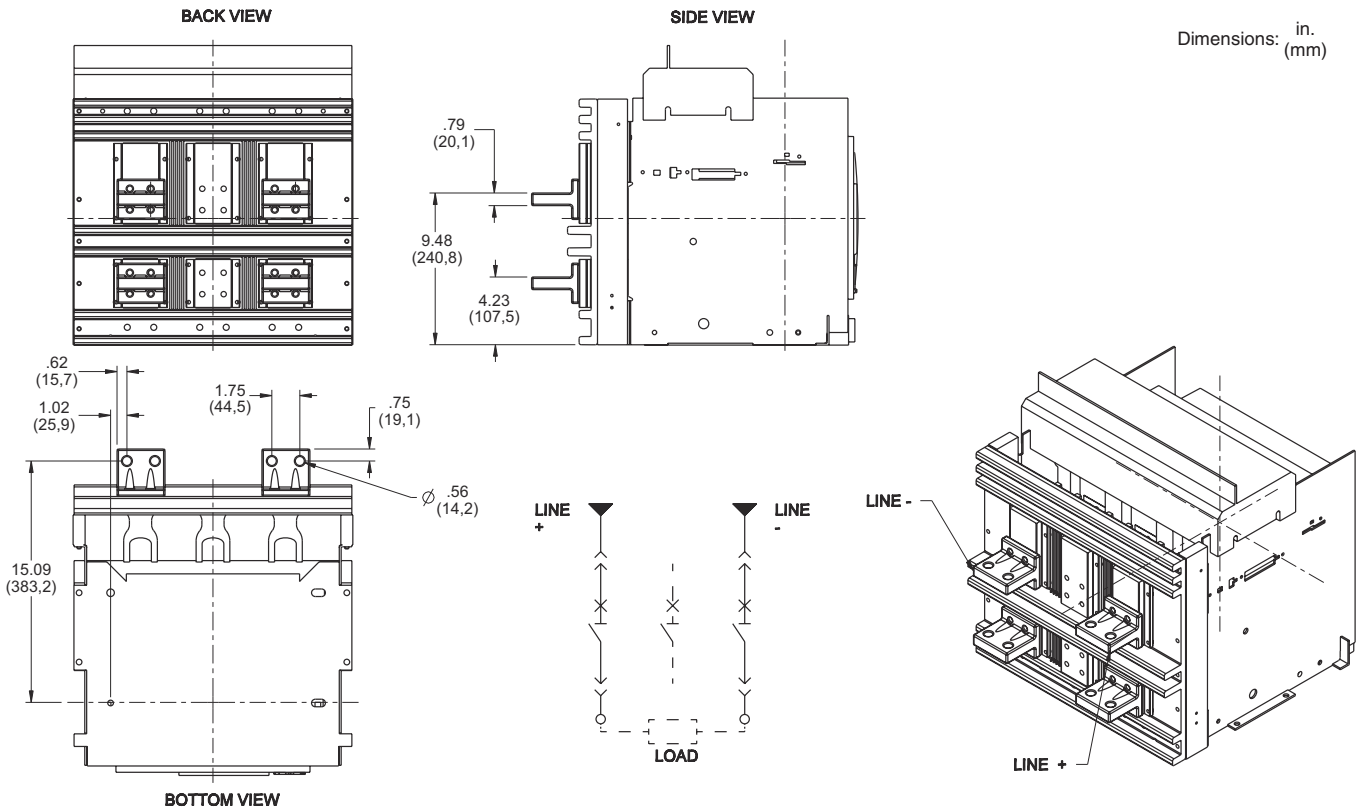


Figure 18: 800–2500 A 3P Drawout Circuit Breaker with Type C Connections Rear Connected "T" Horizontal (RCTH)



Masterpact™ NW DC Circuit Breaker Dimensional Drawings

Figure 19: 3000–4000 A 3P Drawout Circuit Breaker with Type C Connections Rear Connected "T" Horizontal (RCTV)

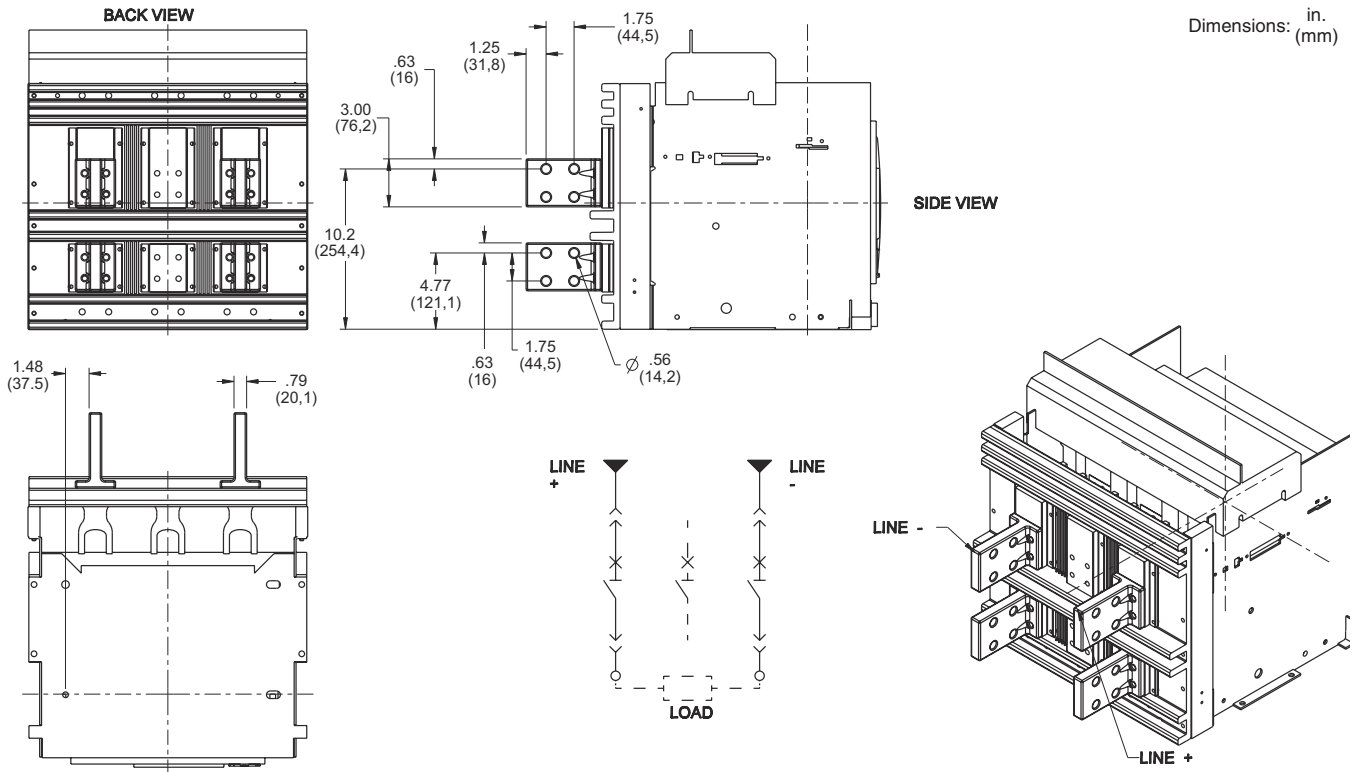
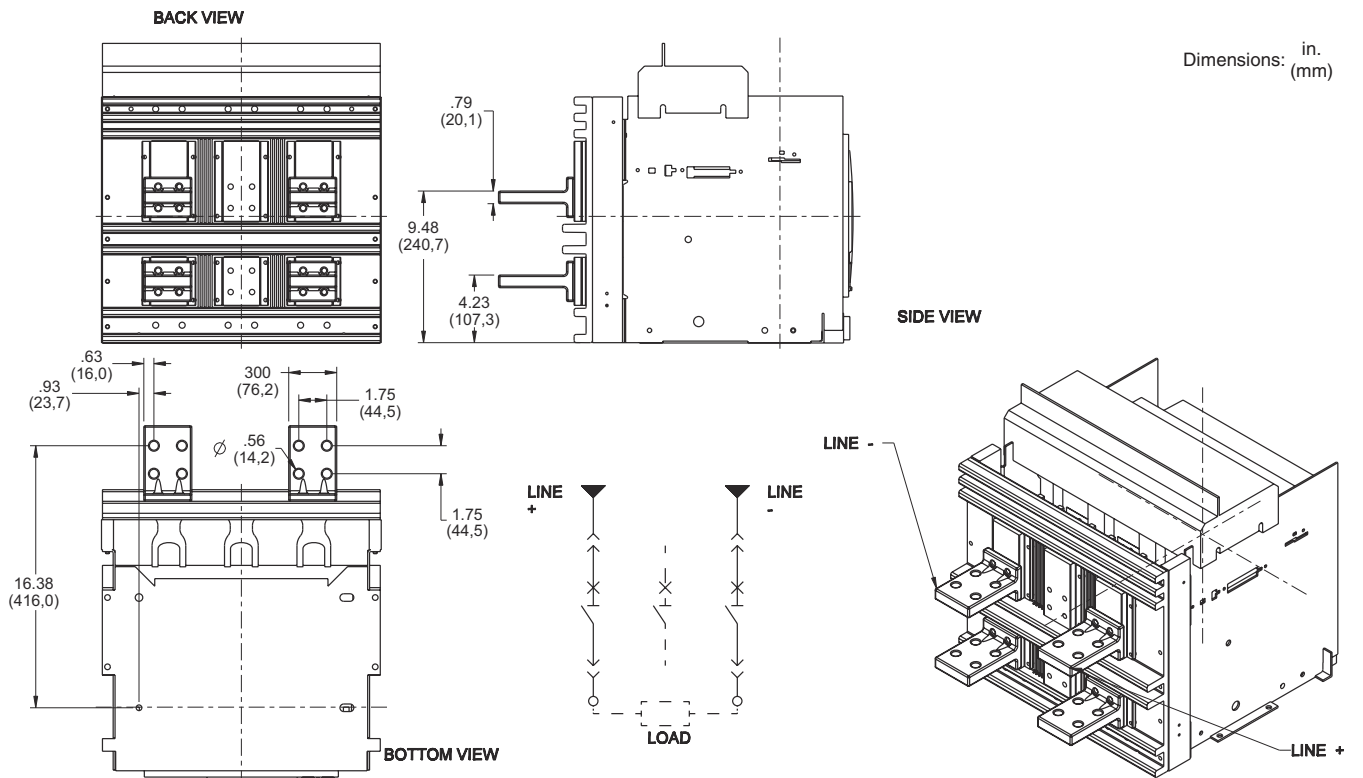


Figure 20: 3000–4000 A 3P Drawout Circuit Breaker with Type C Connections Rear Connected "T" Horizontal (RCTH)



Masterpact™ NW DC Circuit Breakers Dimensional Drawings

Figure 21: 800–2500 A UL 3P Drawout Circuit Breaker with Type C1 Connections Master Drawing

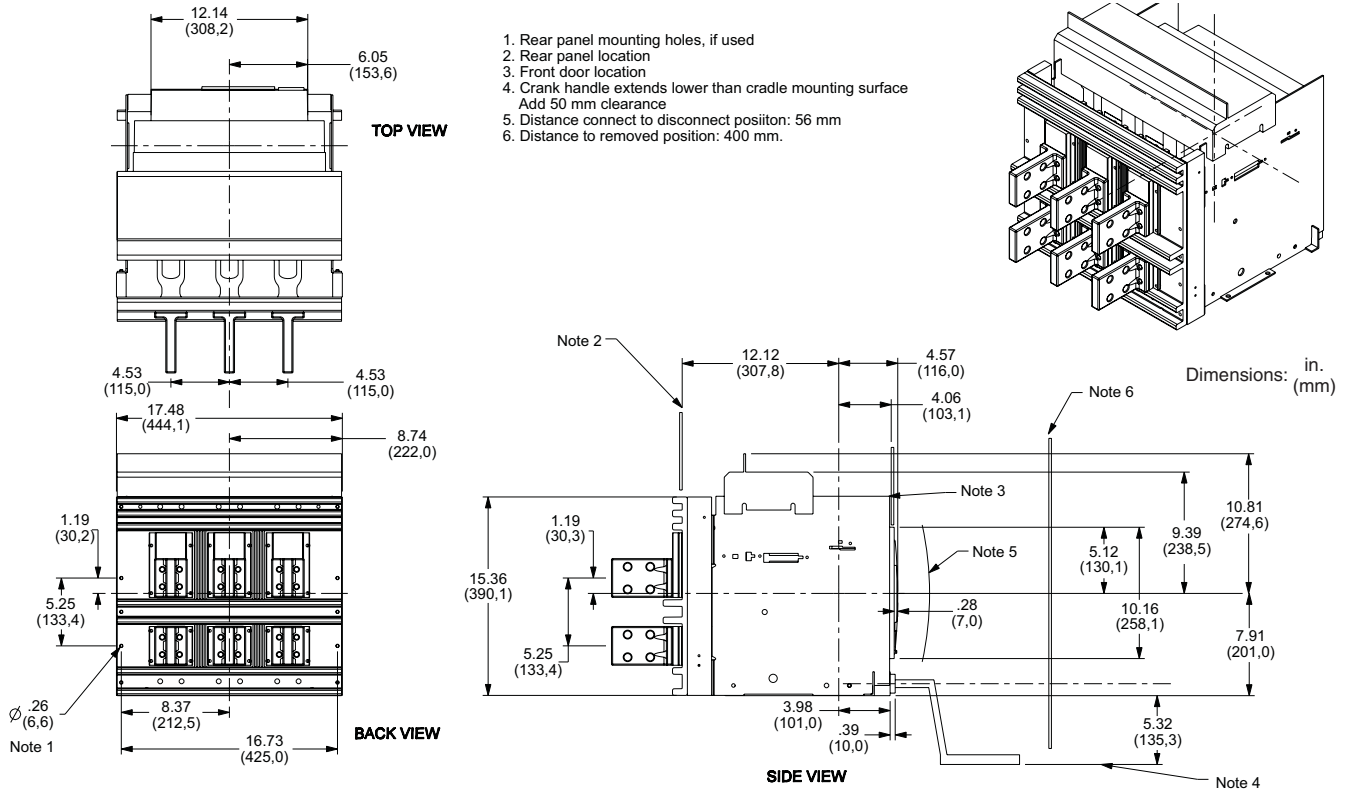
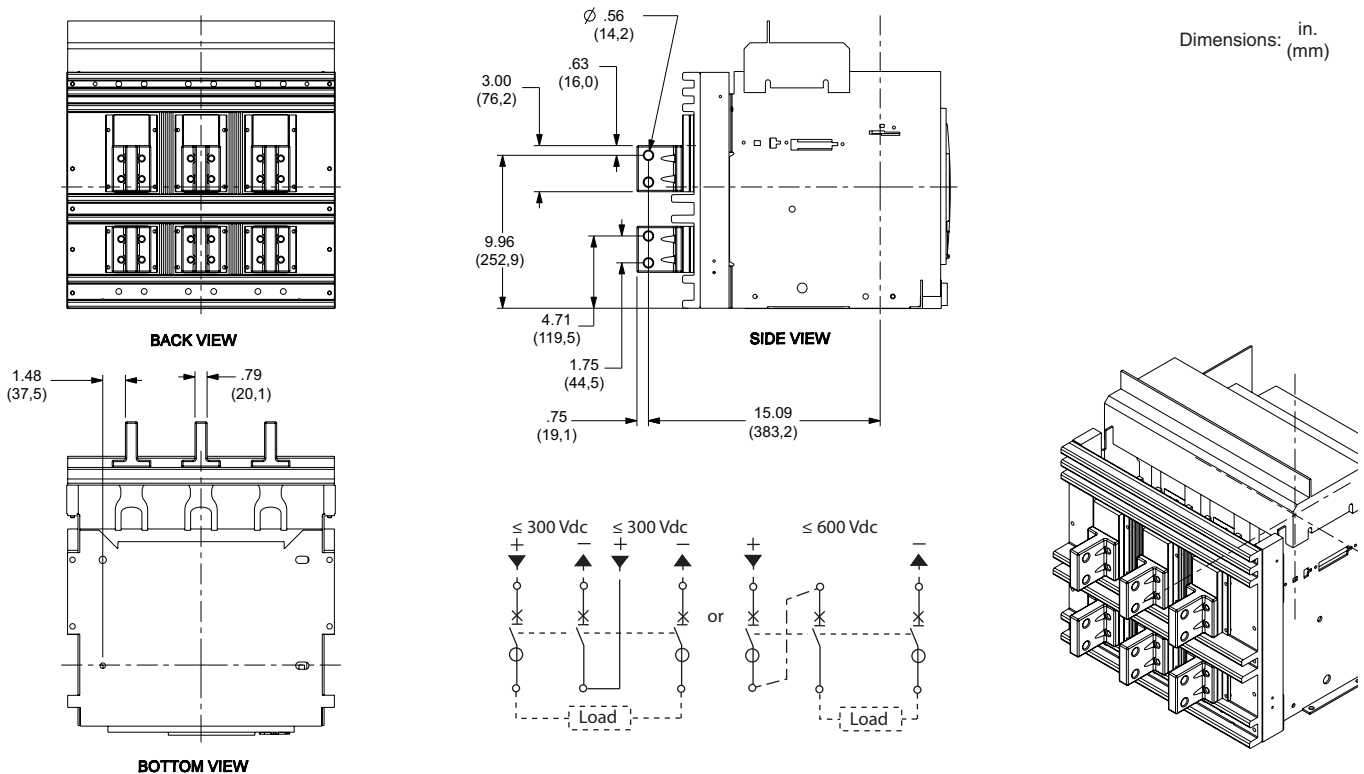


Figure 22: 800–2500 A 3P Drawout Circuit Breaker with Type C1 Connections Rear-Connected "T" Vertical (RCTV)



Masterpact™ NW DC Circuit Breakers Dimensional Drawings

Figure 23: 800–2500 A 3P Drawout Circuit Breaker with Type C1 Connections Rear Connected "T" Horizontal (RCTH)

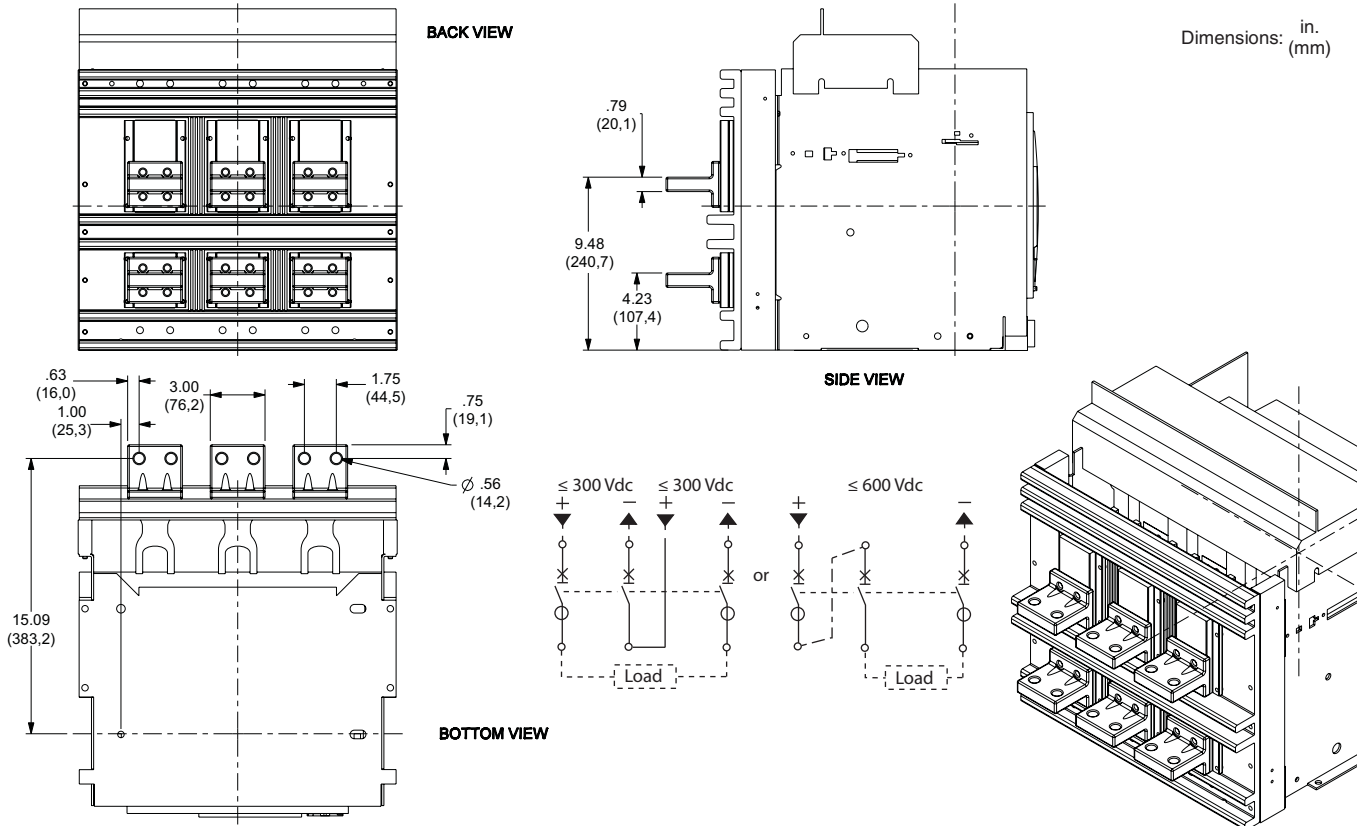
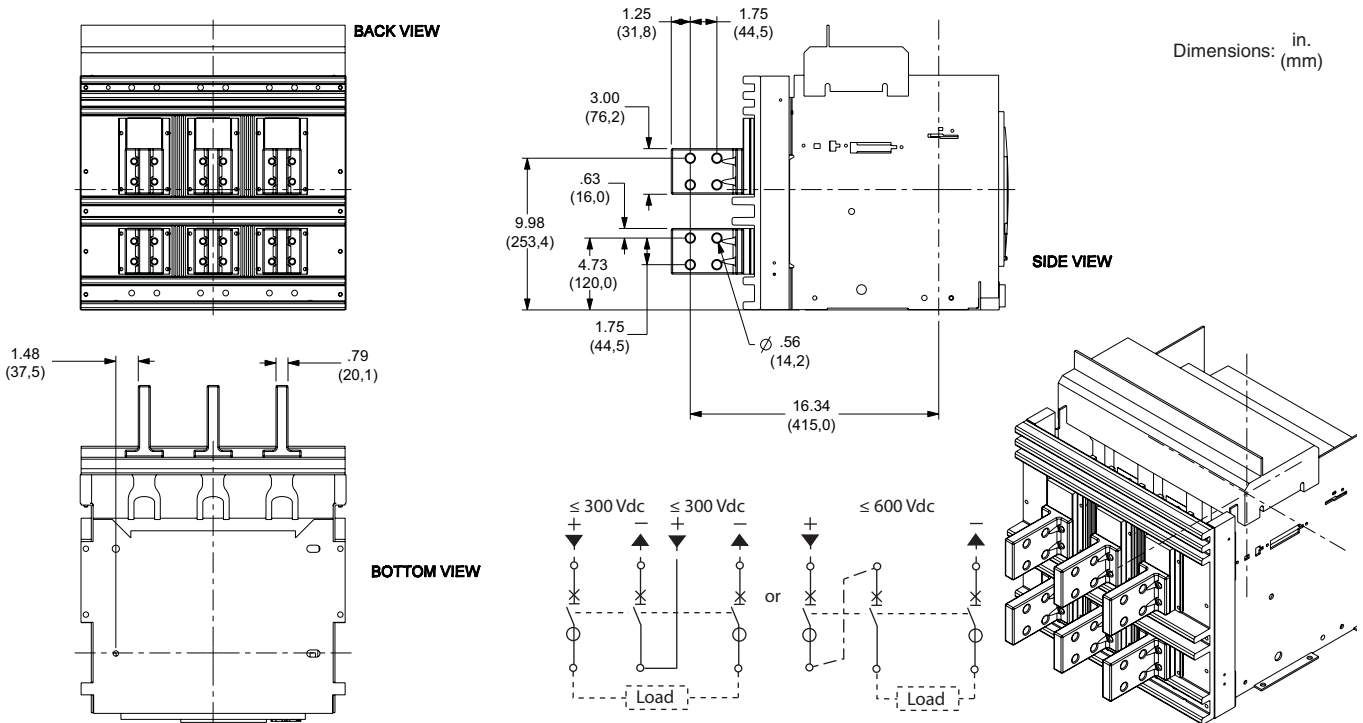


Figure 24: 3000–4000 A 3P Drawout Circuit Breaker with Type C1 Connections Rear Connected "T" Vertical (RCTV)



Masterpact™ NW DC Circuit Breakers Dimensional Drawings

Figure 25: 3000–4000 A 3P Drawout Circuit Breaker with Type C1 Connections Rear Connected "T" Horizontal (RCH)

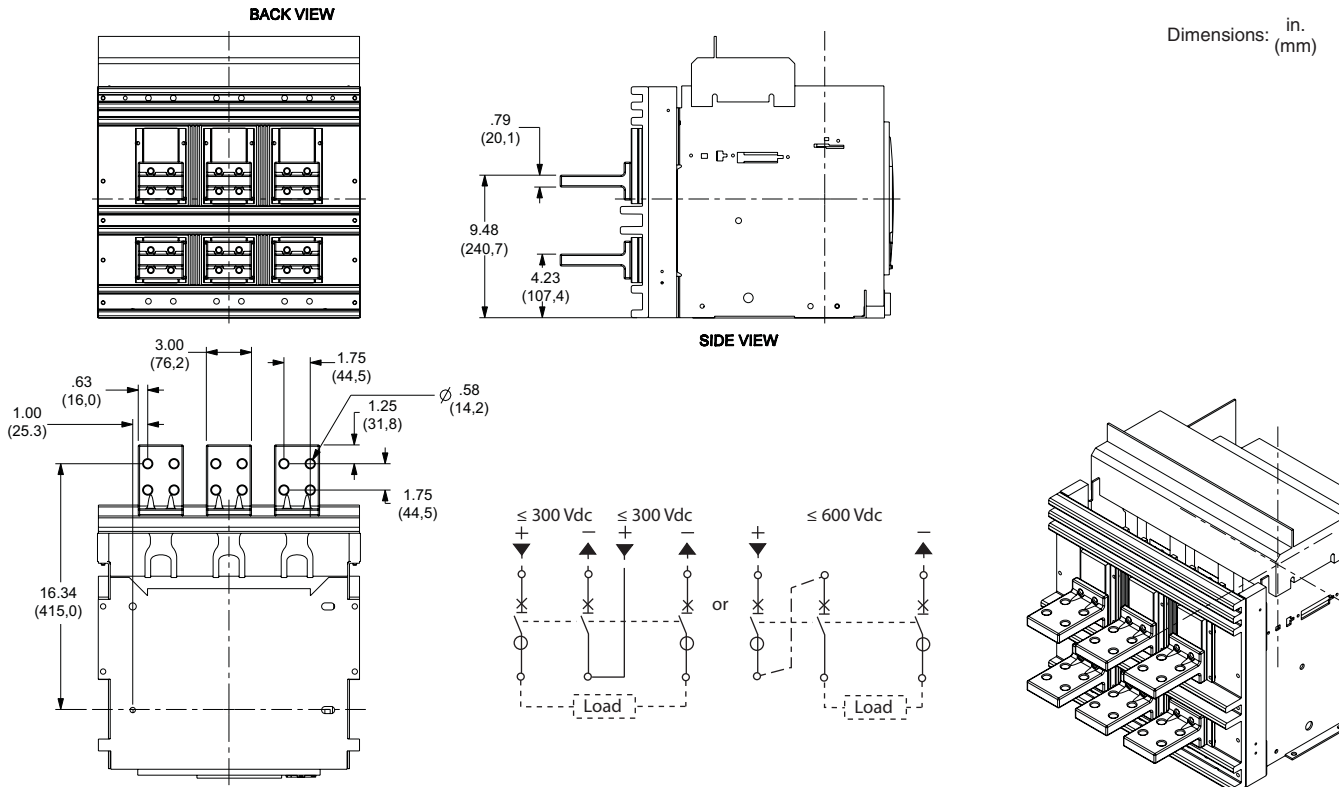


Figure 26: Drawout Cradle Mounting

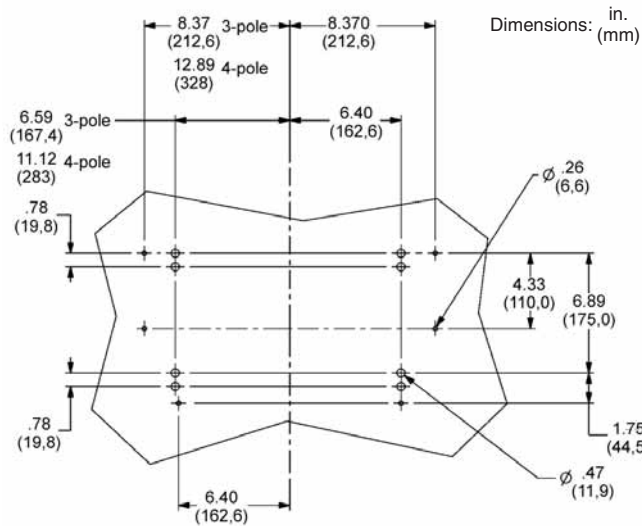


Figure 27: Door Cutout

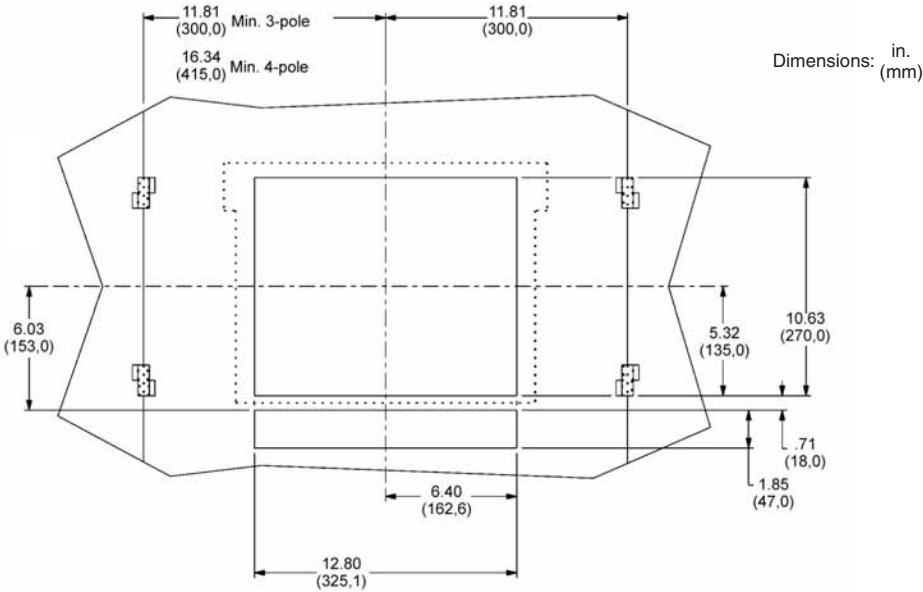
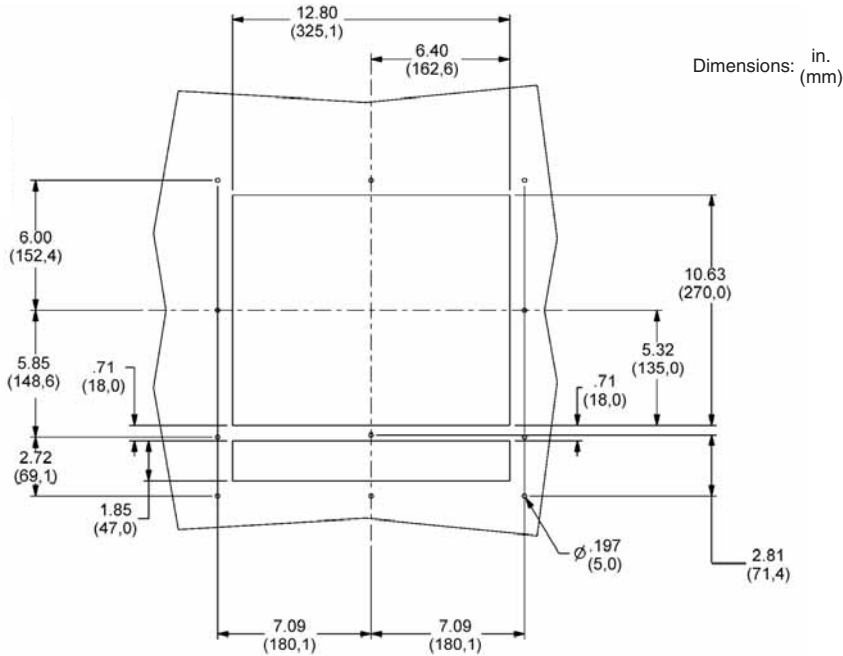


Figure 28: Door Escutcheon Hole Pattern



Masterpact™ NW DC Circuit Breakers

Dimensional Drawings

UL 3P Fixed-Mounted Circuit Breakers

Figure 29: 800–4000 A Fixed-Mounted Circuit Breaker with Type C Connections Master Drawing

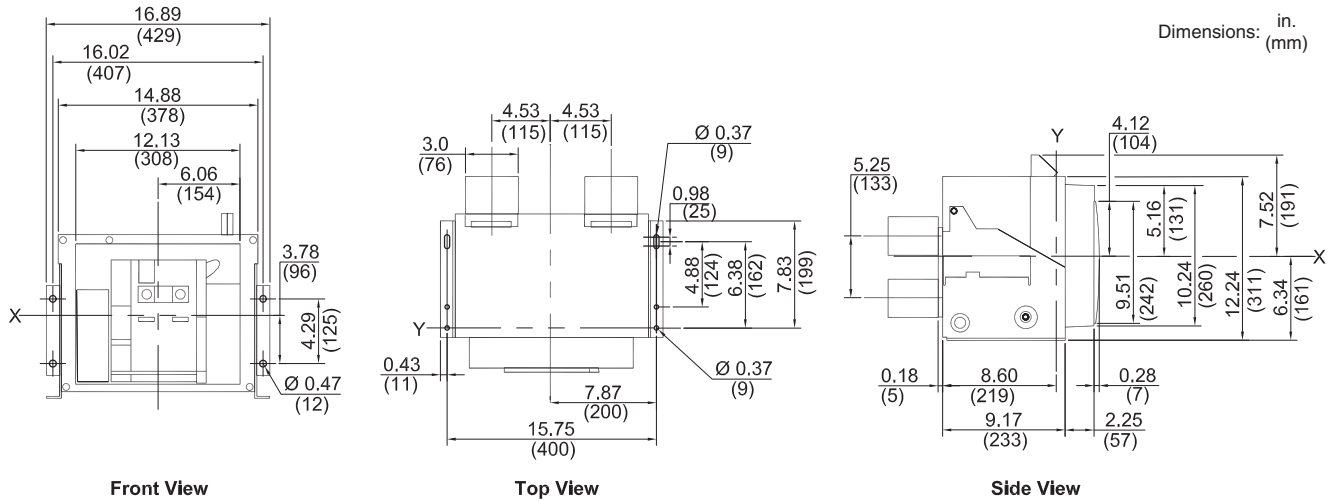
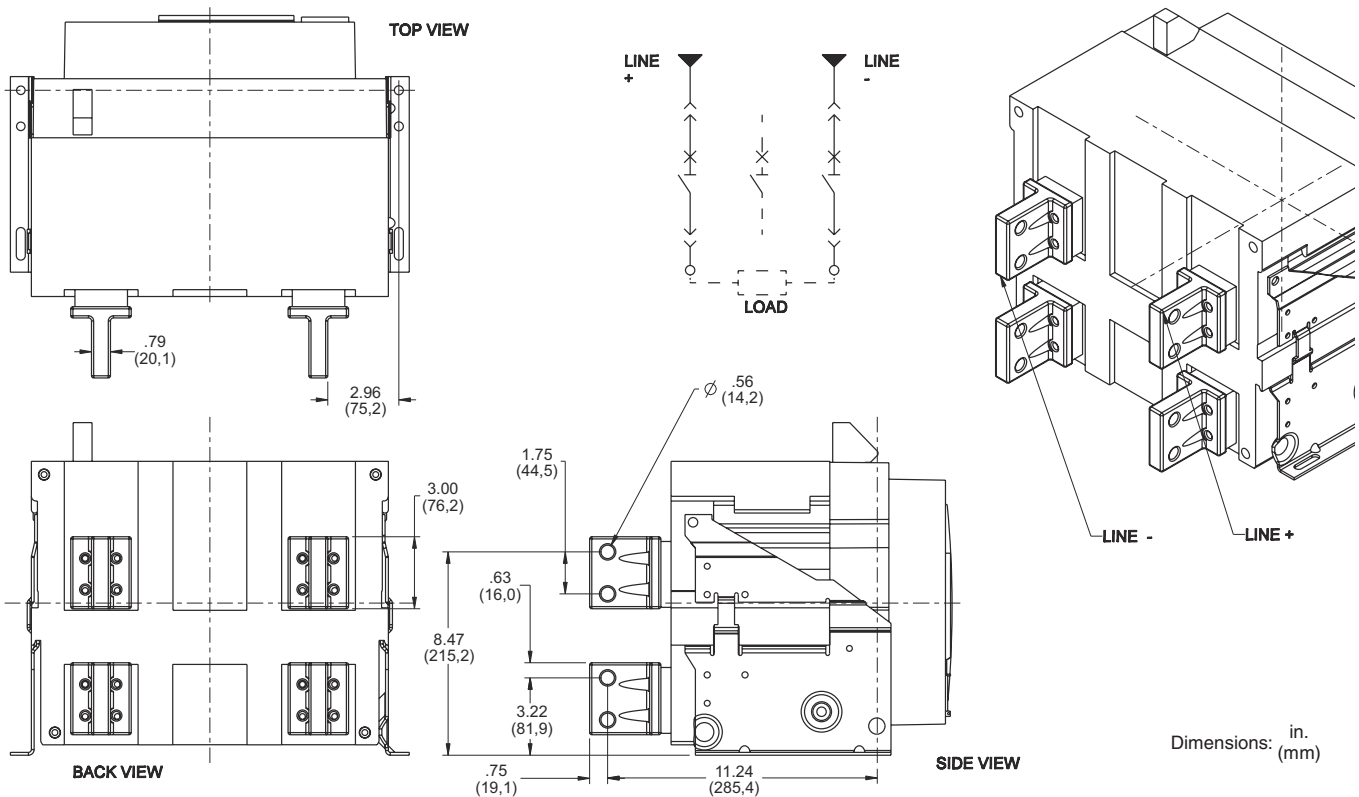


Figure 30: 800–2500 A Fixed-Mounted Circuit Breaker with Type C Connections Rear Connected "T" Vertical (RCTV)



Masterpact™ NW DC Circuit Breakers Dimensional Drawings

Figure 31: 800–2500 A Fixed-Mounted Circuit Breaker with Type C Connections Rear Connected "T" Horizontal (RCH)

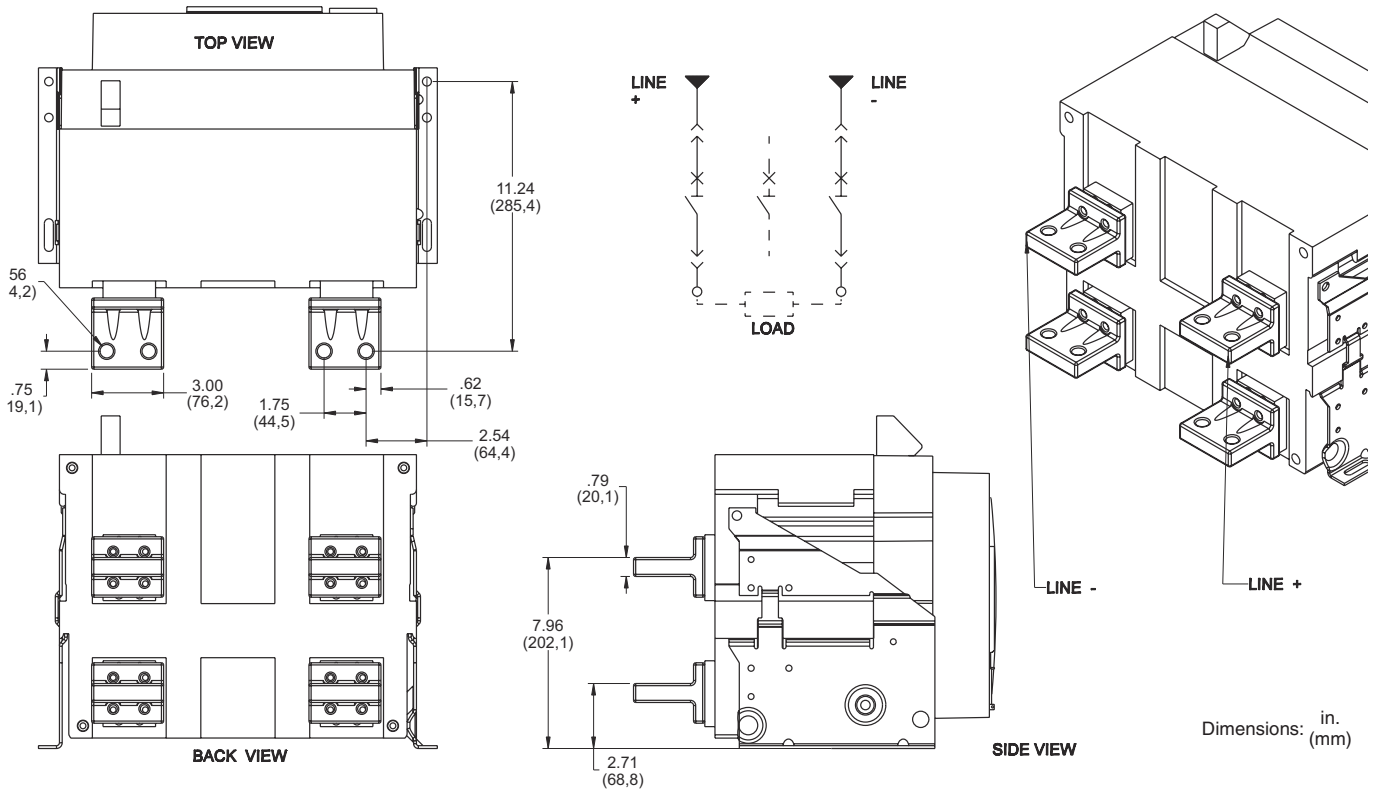
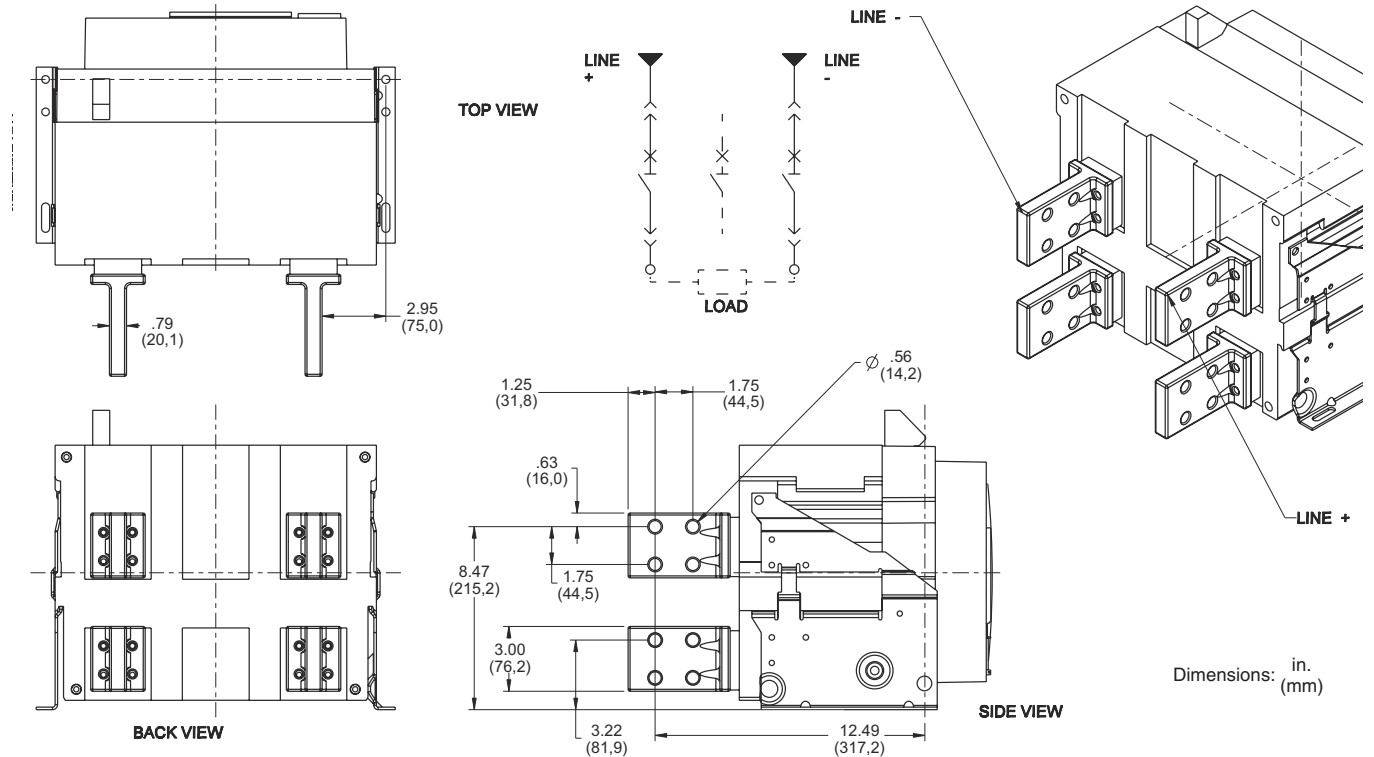


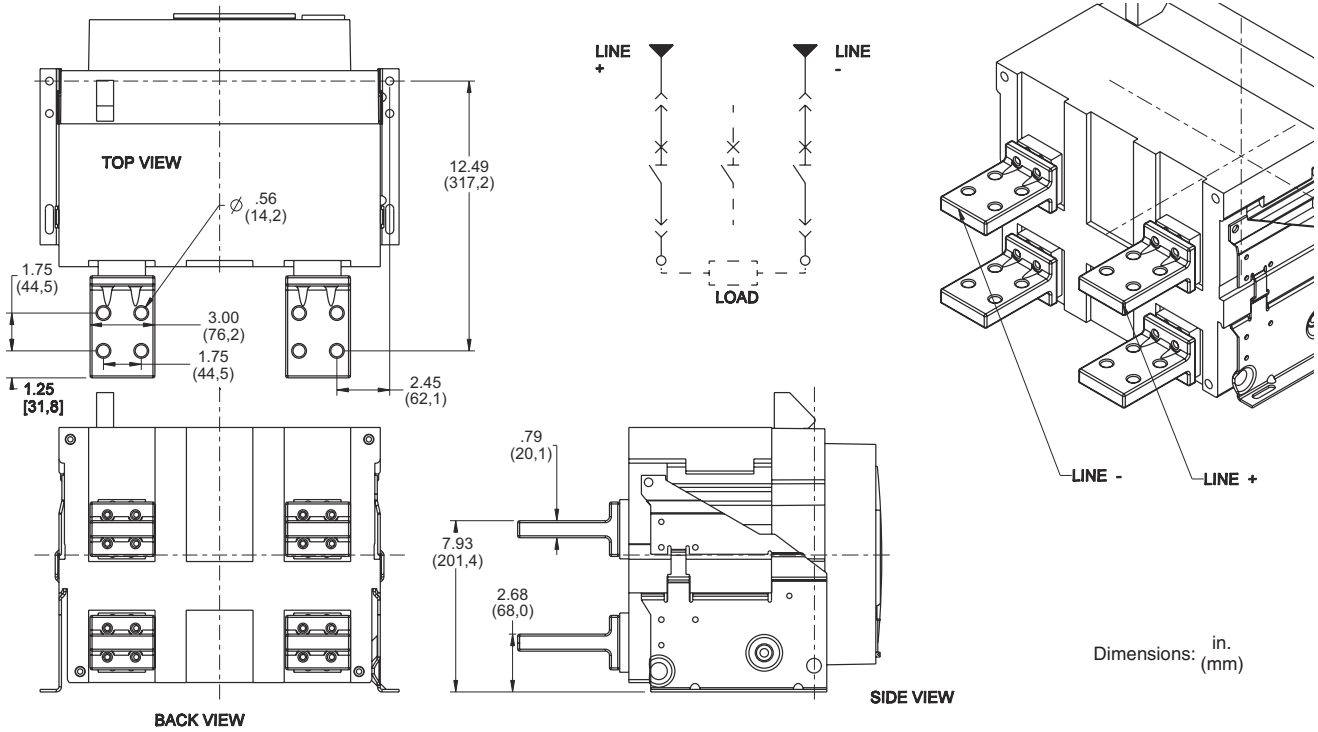
Figure 32: 3000–4000 A Fixed-Mounted Circuit Breaker with Type C Connections Rear Connected "T" Vertical (RCTV)



Masterpact™ NW DC Circuit Breakers

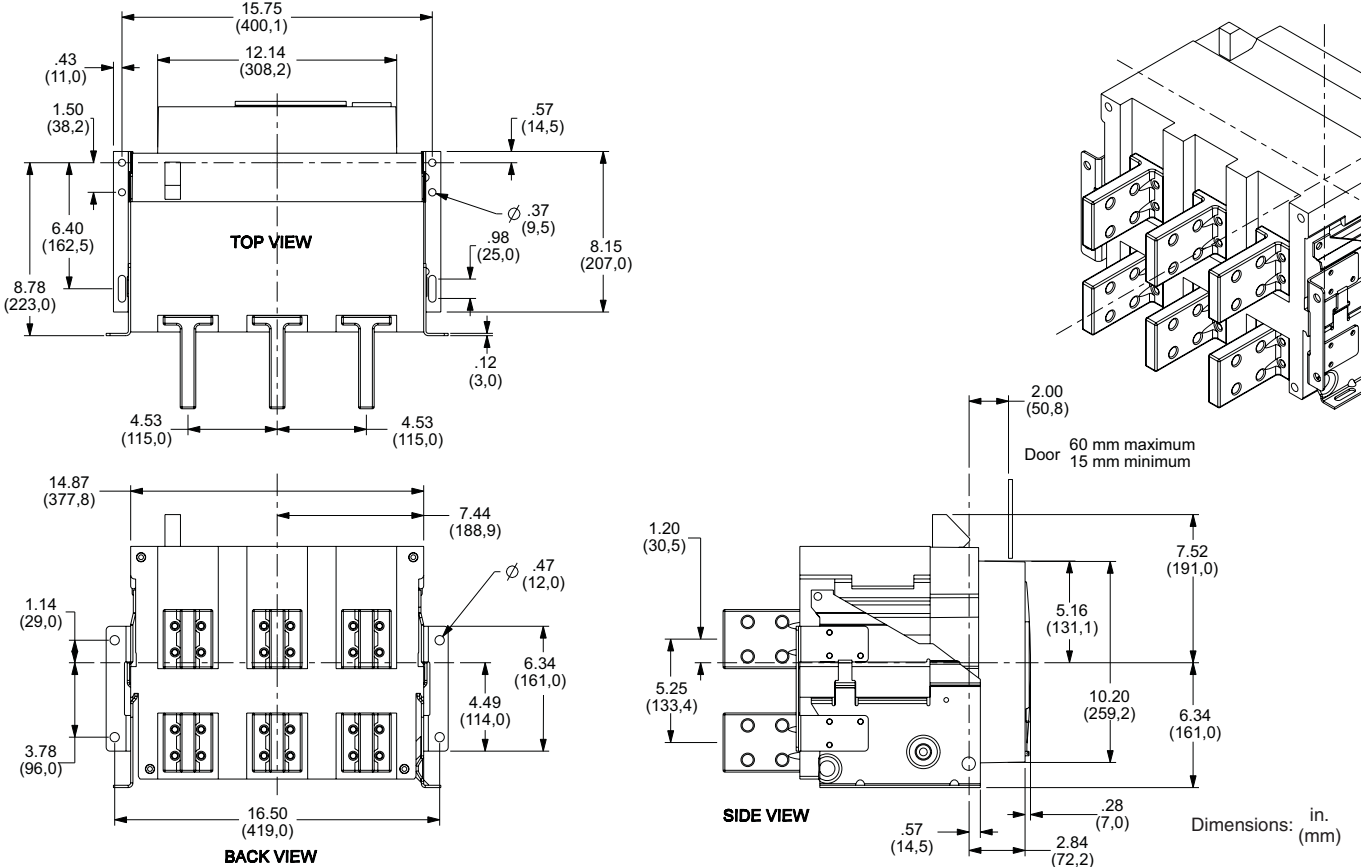
Dimensional Drawings

Figure 33: 3000–4000 A Fixed-Mounted Circuit Breaker with Type C Connections Rear Connected "T" Horizontal (RCH)



Masterpact™ NW DC Circuit Breakers Dimensional Drawings

Figure 34: 800–4000 A Fixed-Mounted Circuit Breaker with Type C1 Connections Master Drawing



Masterpact™ NW DC Circuit Breakers

Dimensional Drawings

Figure 35: 800–2500 A Fixed-Mounted Circuit Breaker with Type C1 Connections Rear Connected "T" Vertical (RCTV)

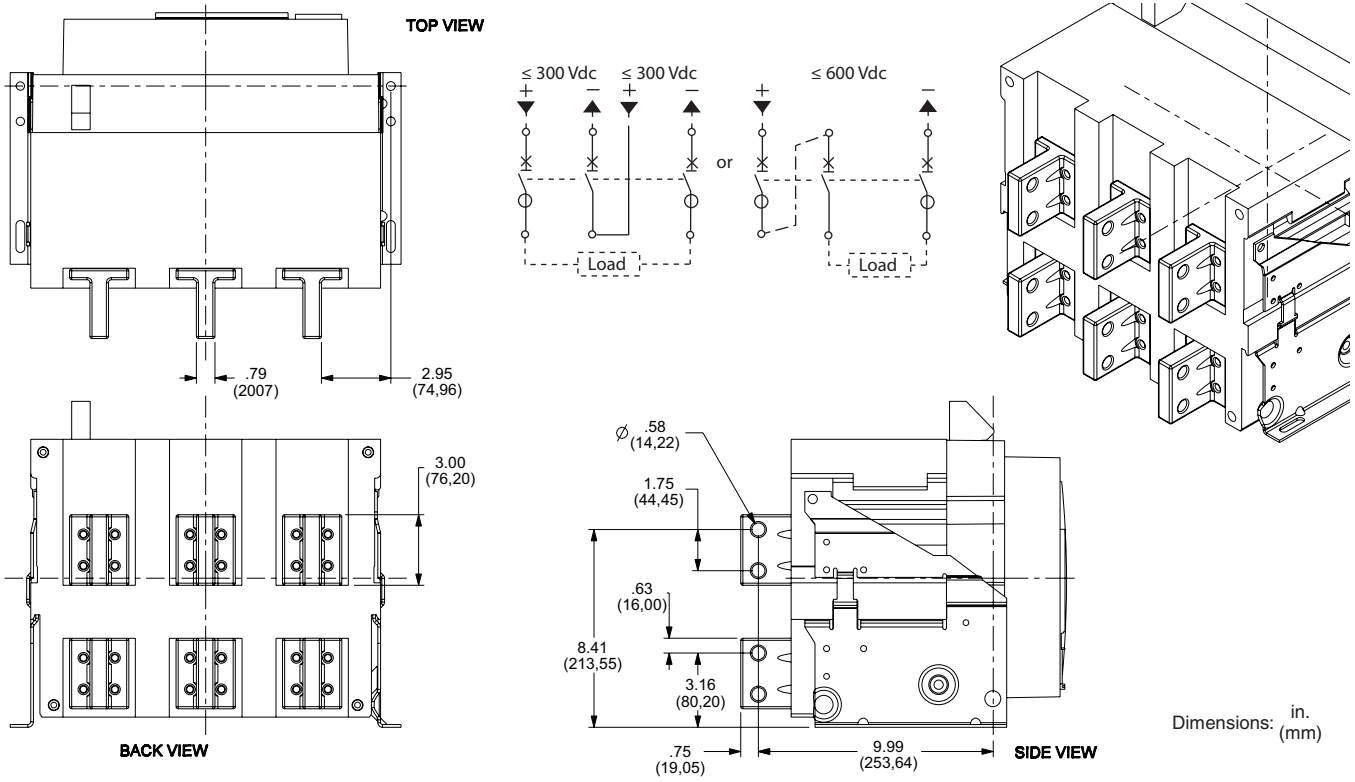
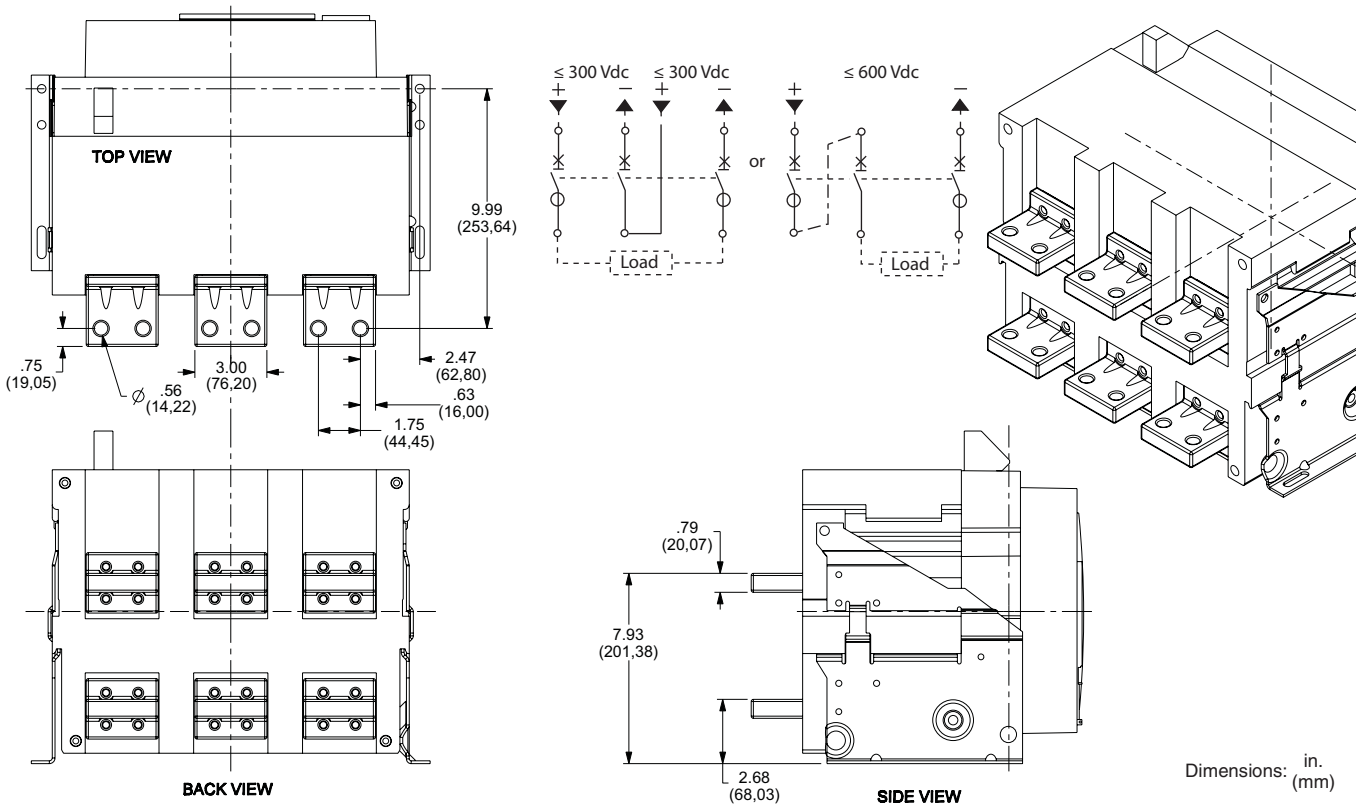
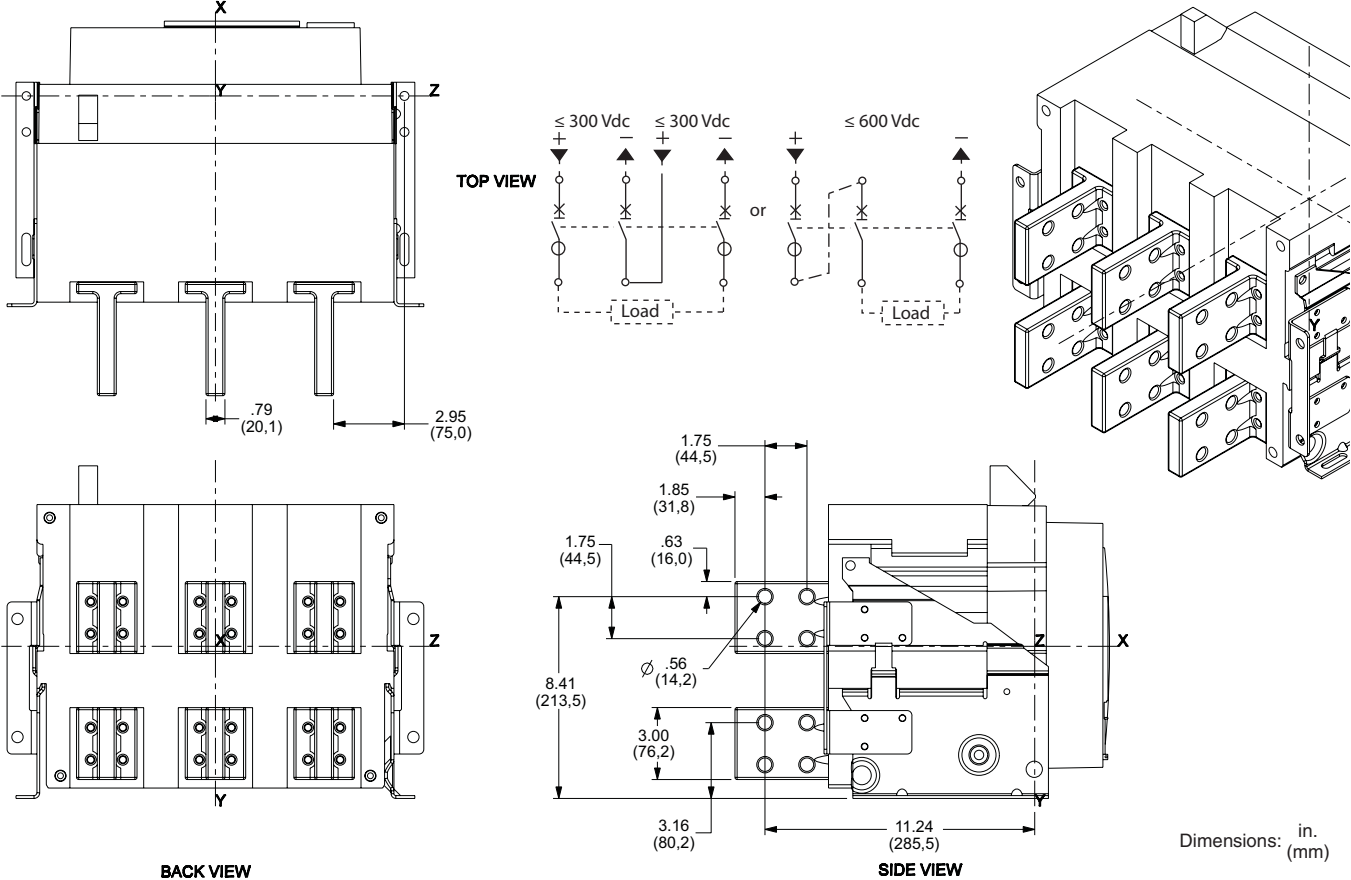


Figure 36: 800–2500 A Fixed-Mounted Circuit Breaker with Type C1 Connections Rear Connected "T" Horizontal (RCH)



Masterpact™ NW DC Circuit Breakers Dimensional Drawings

Figure 37: 3000–4000 A Fixed-Mounted Circuit Breaker with Type C1 Connections Rear Connected "T" Vertical (RCTV)



Masterpact™ NW DC Circuit Breakers Dimensional Drawings

Figure 38: 3000–4000 A Fixed-Mounted Circuit Breaker with Type C1 Connections Rear Connected "T" Horizontal (RCTH)

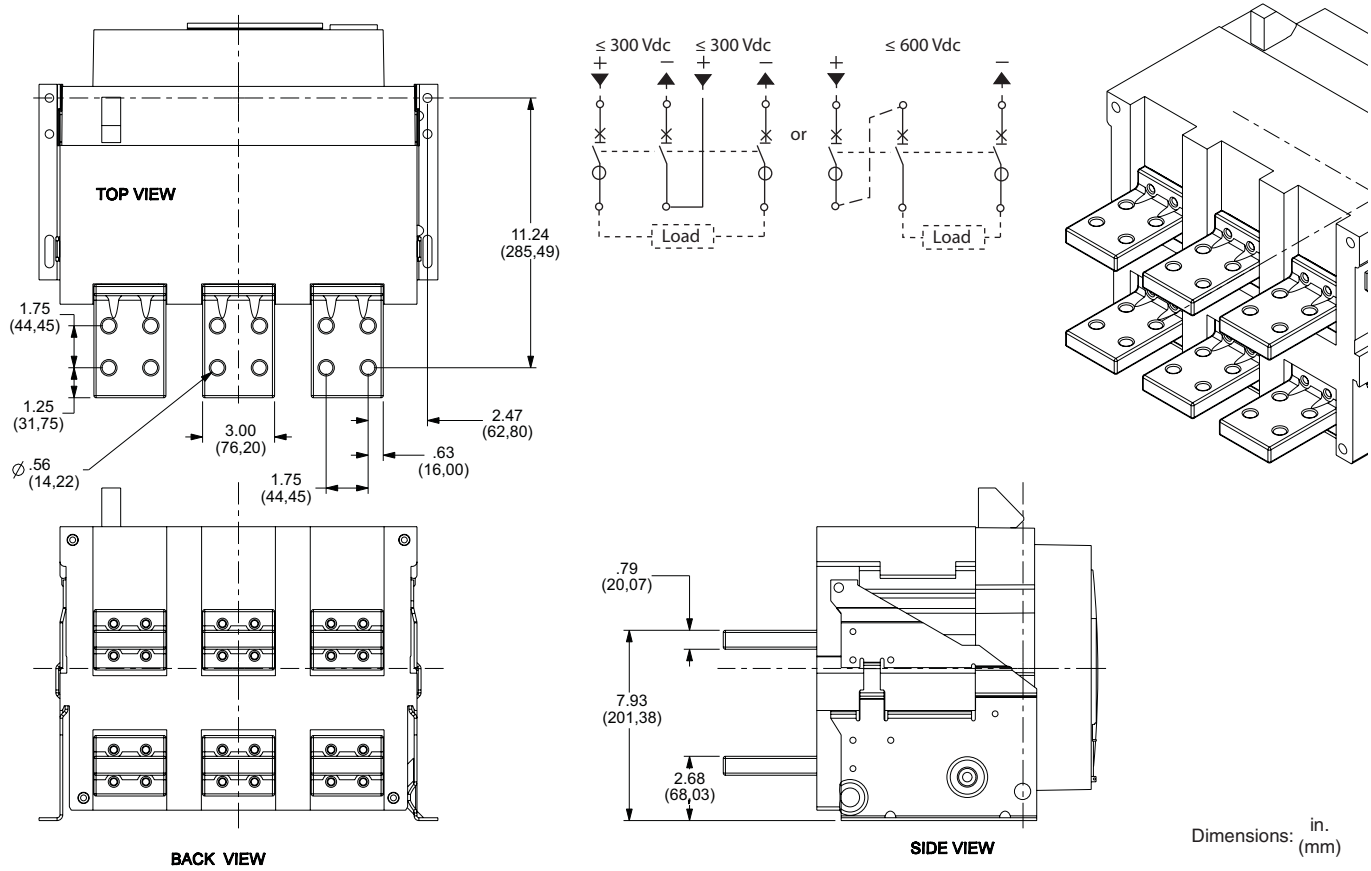


Figure 39: Door Cutout

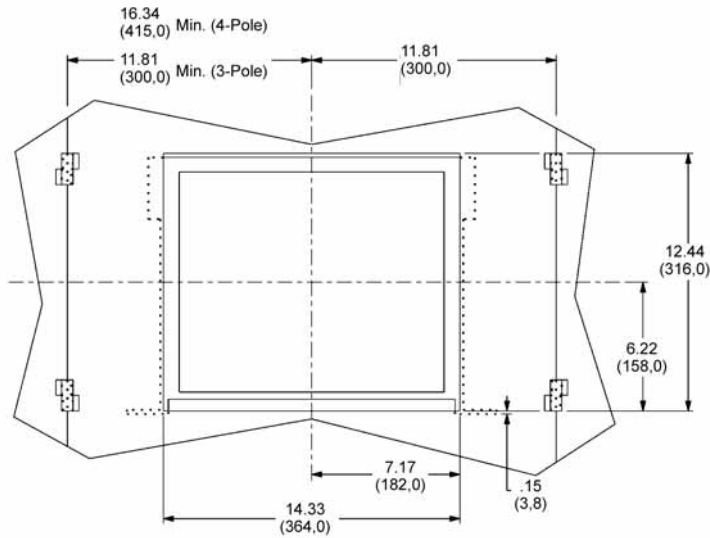
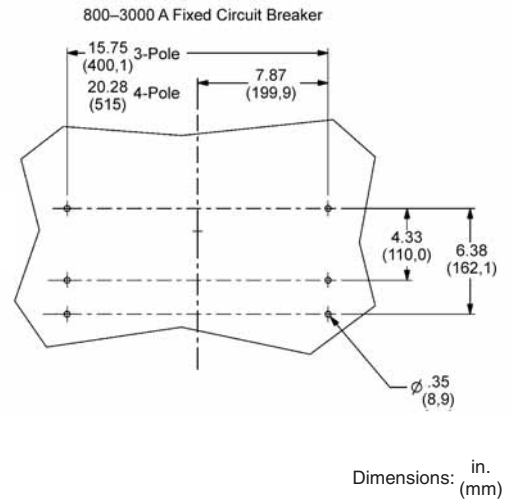
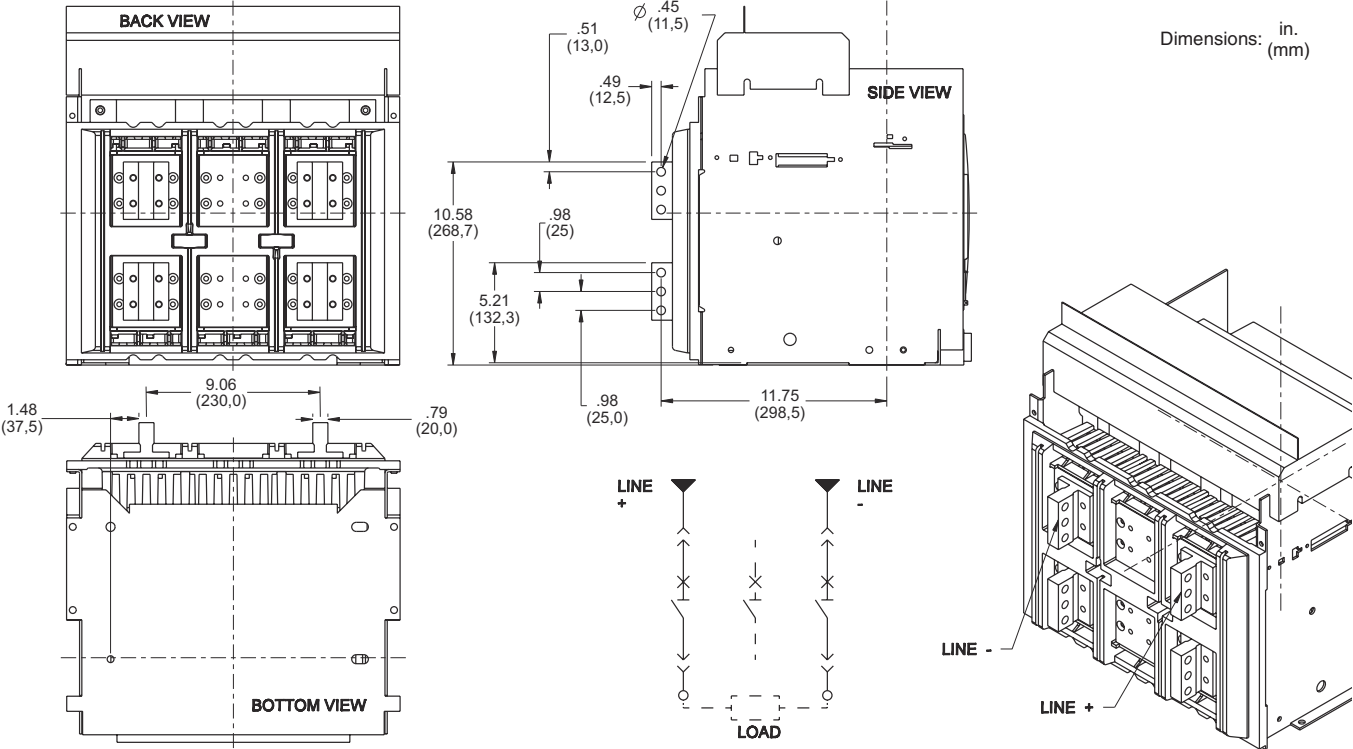


Figure 40: Circuit Breaker Mounting



IEC 3P Drawout Circuit Breakers

Figure 41: 1000–2000 A Version “C” Rear Connected “T” Vertical (RCTV)



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Figure 42: 1000–2000 A Version “C” Rear Connected “T” Horizontal (RCTH)

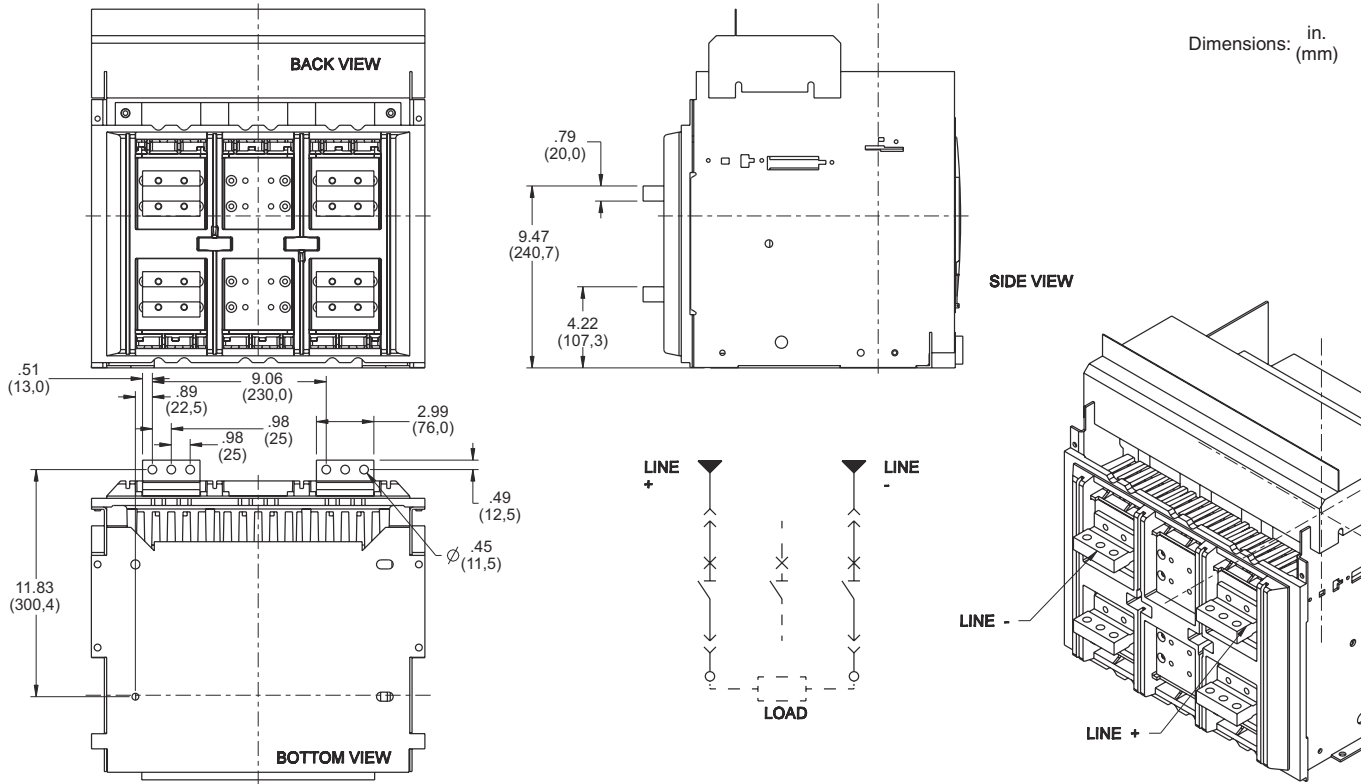
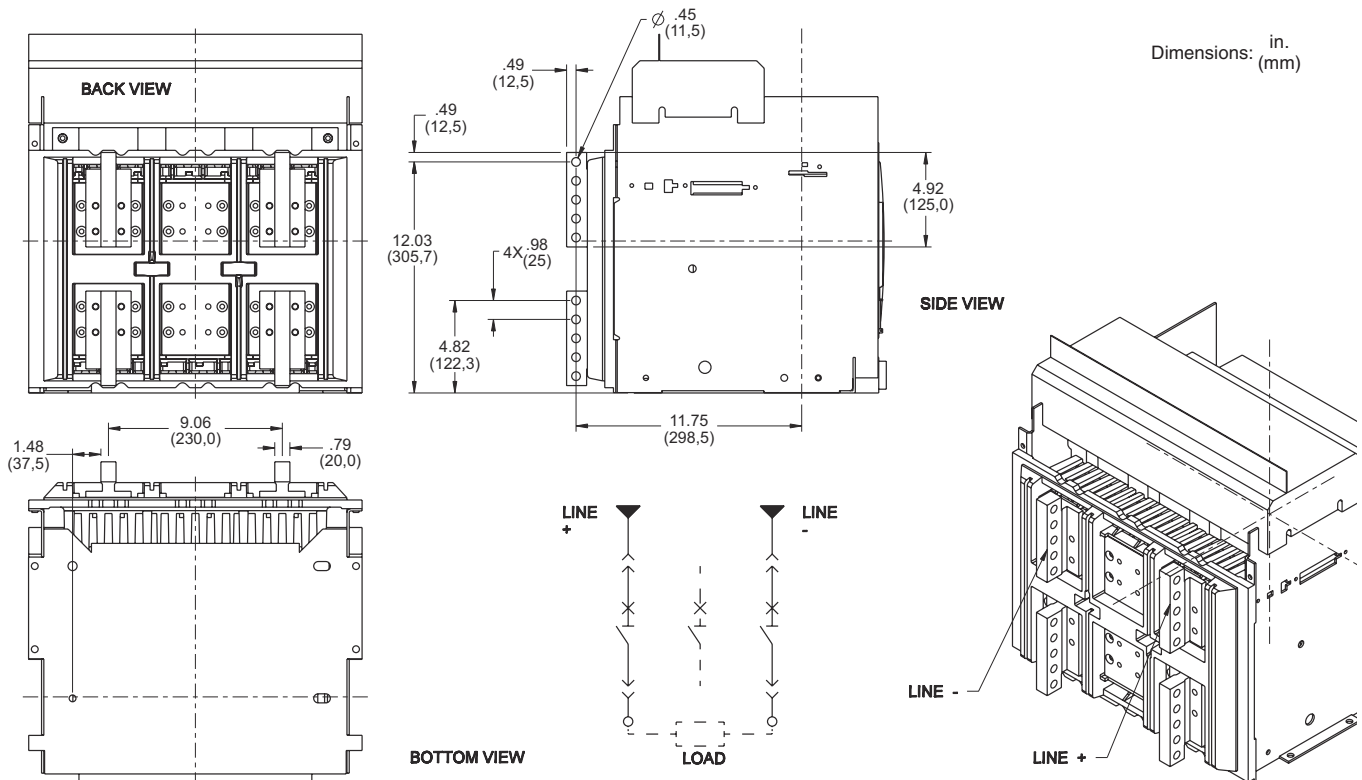


Figure 43: 4000 A Version “C” Rear Connected “T” Vertical (RCTV)



Masterpact™ NW DC Circuit Breakers Dimensional Drawings

Figure 44: 1000–2000 A Version “D” Rear Connected “T” Vertical (RCTV)

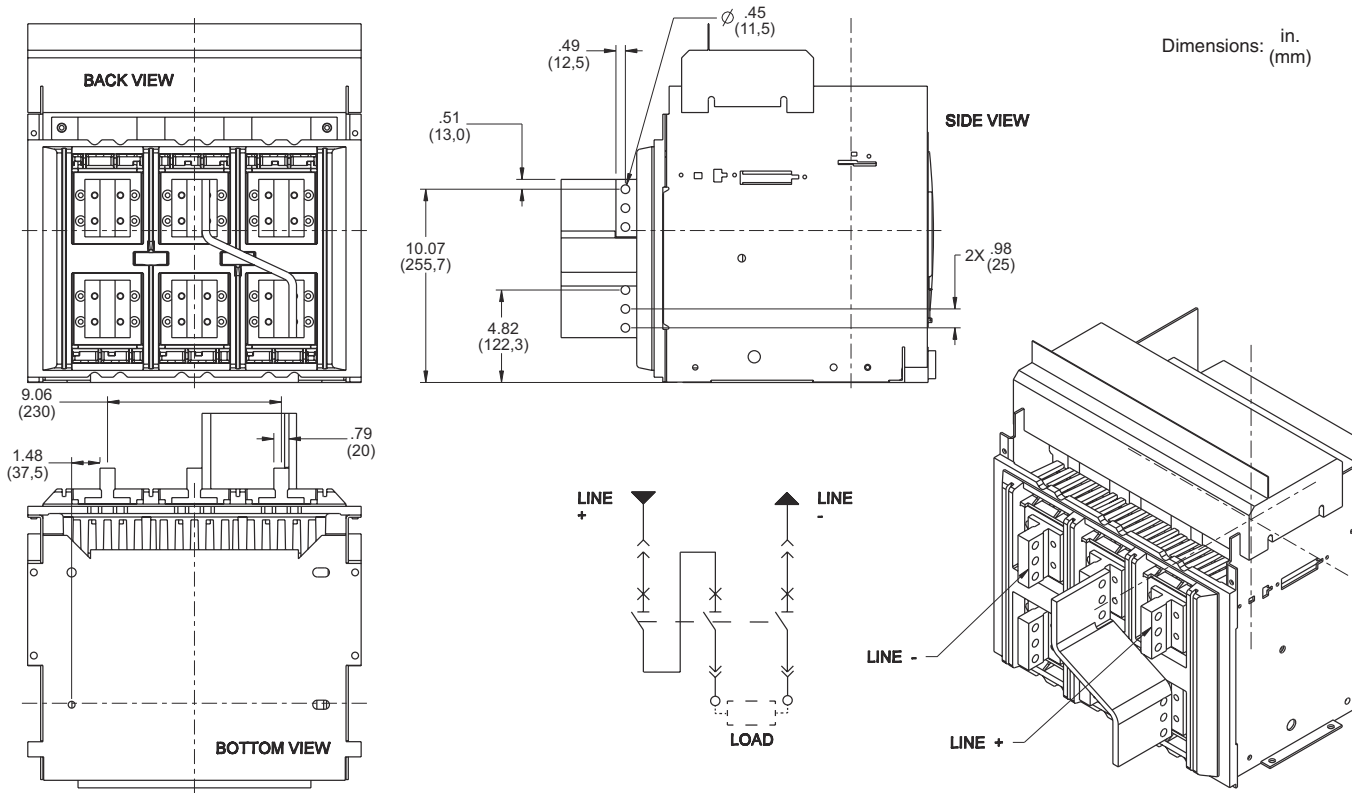
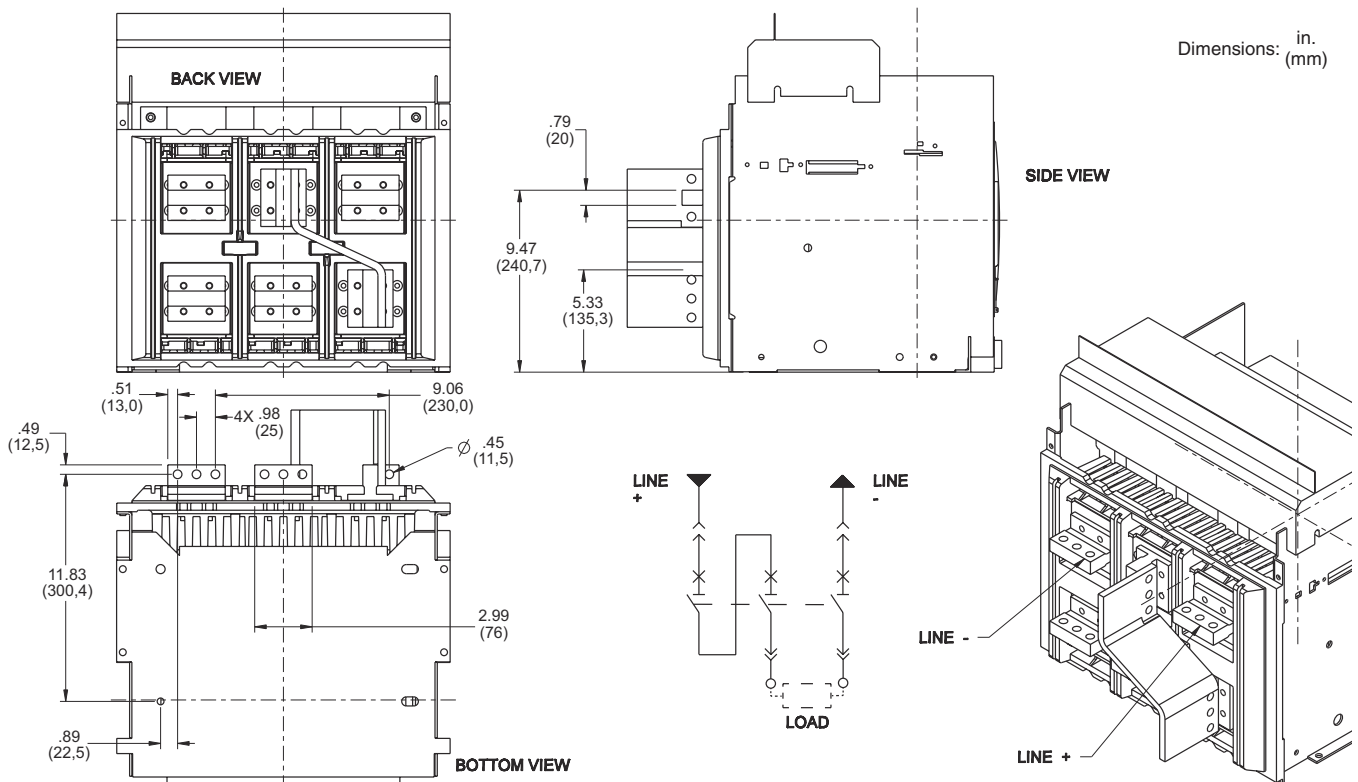
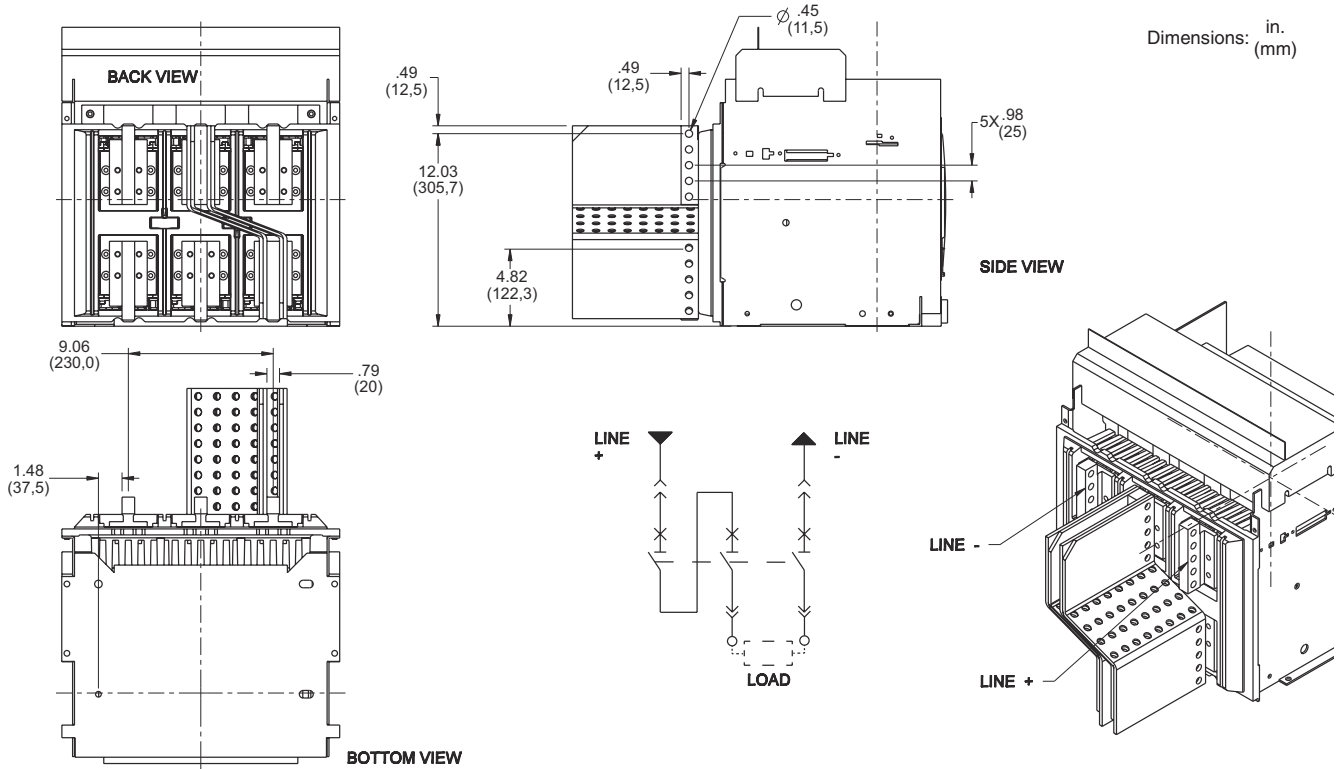


Figure 45: 1000–2000 A Version “D” Rear Connected “T” Horizontal (RCHT)



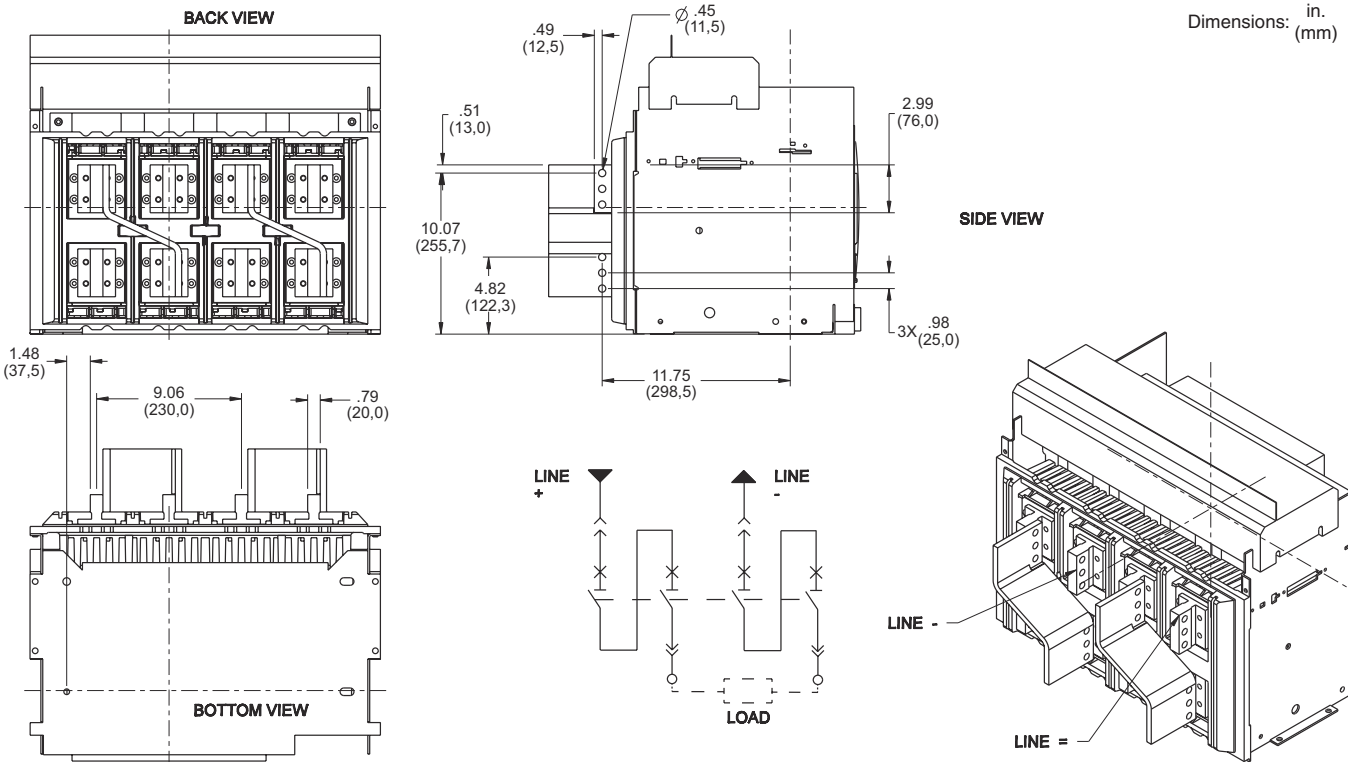
Masterpact™ NW DC Circuit Breakers Dimensional Drawings

Figure 46: 4000 A Version "D" Rear Connected "T" Vertical (RCTV)



IEC 4P Drawout Circuit Breakers

Figure 47: 1000–2000 A Version “E” Rear Connected “T” Vertical (RCTV)



Masterpact™ NW DC Circuit Breakers

Dimensional Drawings

Figure 48: 1000–2000 A Version “E” Rear Connected "T" Horizontal (RCTH)

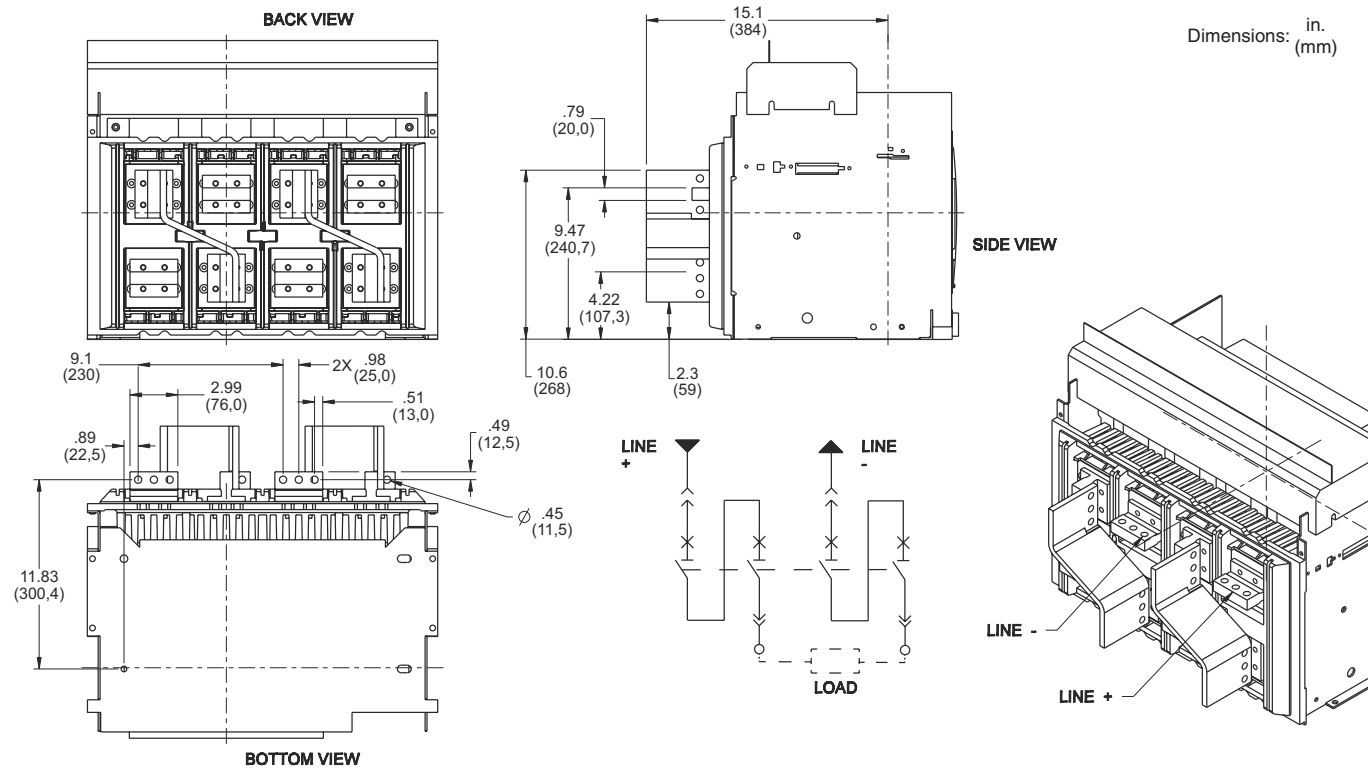
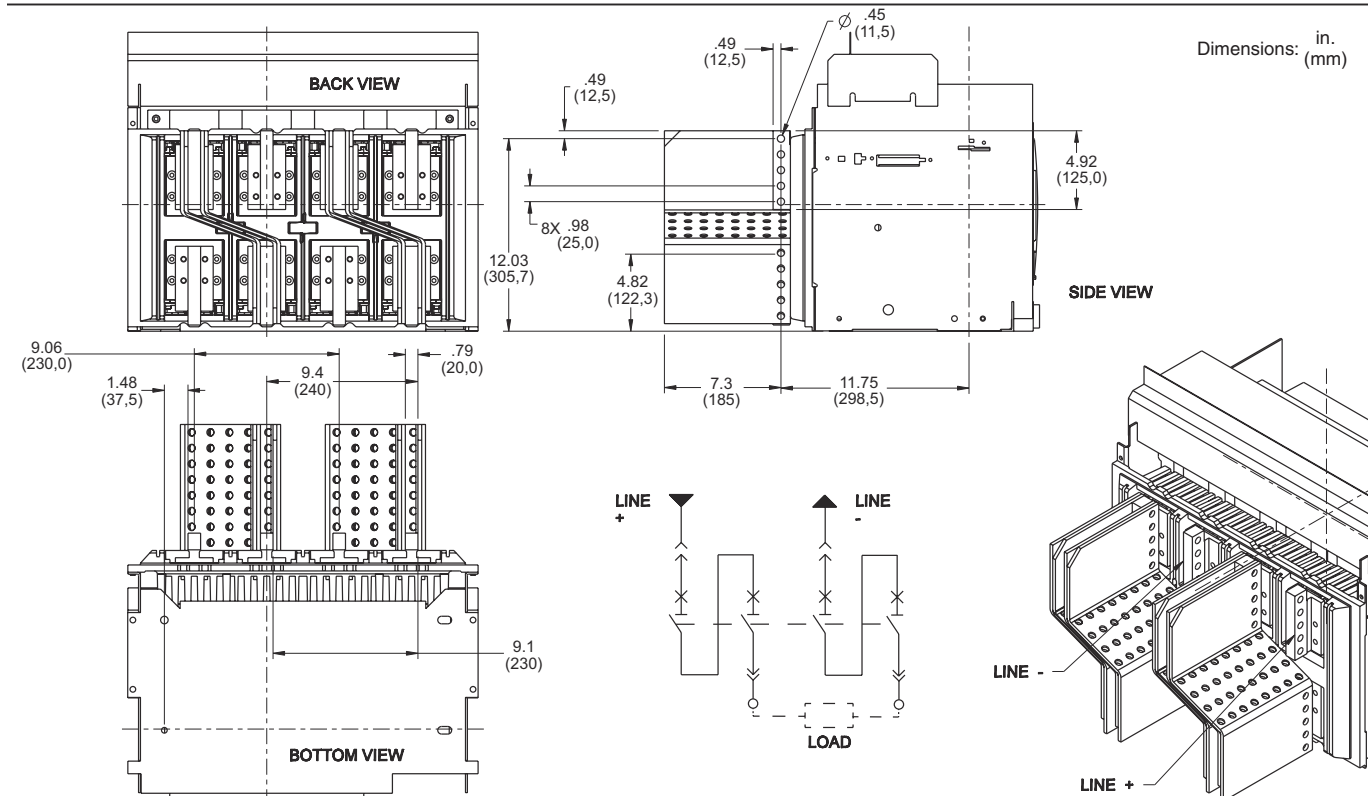


Figure 49: 4000 A Version “E” Rear Connected "T" Vertical (RCTV)



IEC 3P Fixed Circuit Breakers

Figure 50: 1000–2000 A Version “C” Rear Connected “T” Vertical (RCTV)

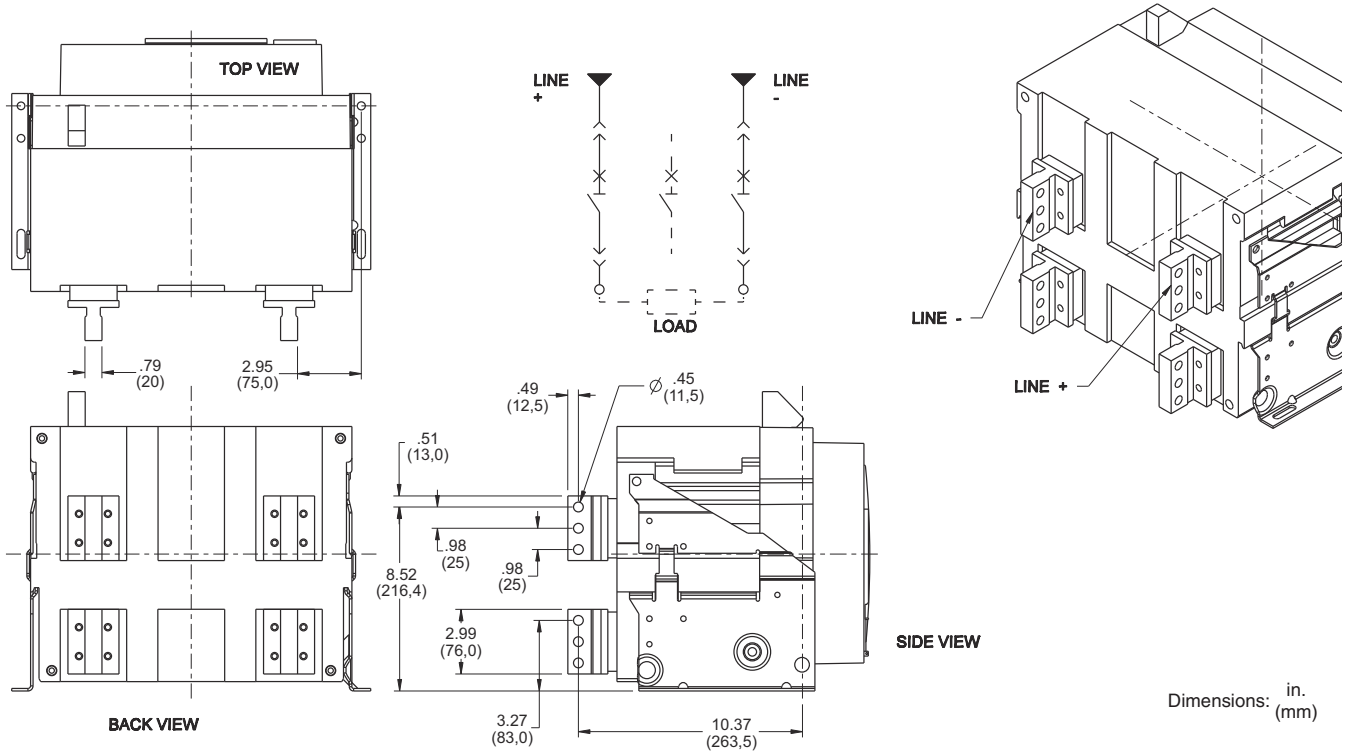
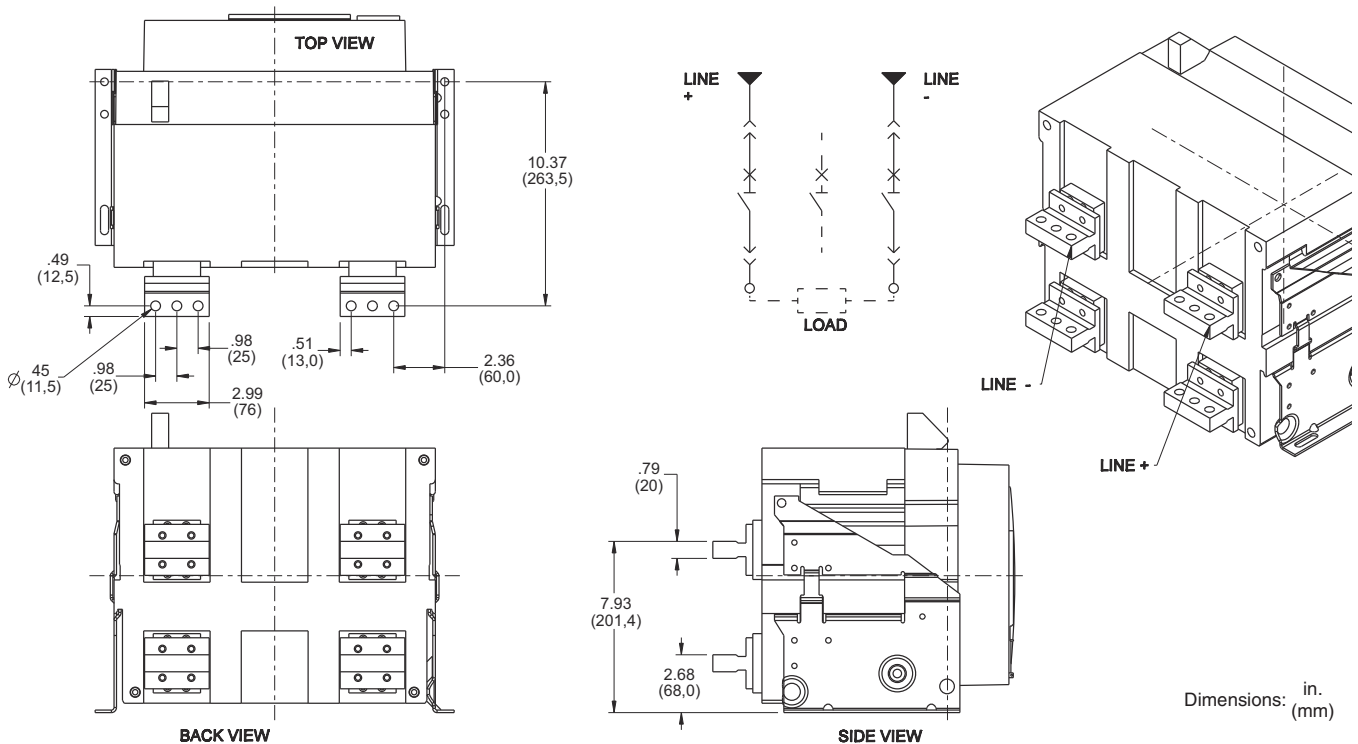


Figure 51: 1000–2000 A Version “C” Rear Connected “T” Horizontal (RCHT)



Masterpact™ NW DC Circuit Breakers Dimensional Drawings

Figure 52: 4000 A Version “C” Rear Connected “T” Vertical (RCTV)

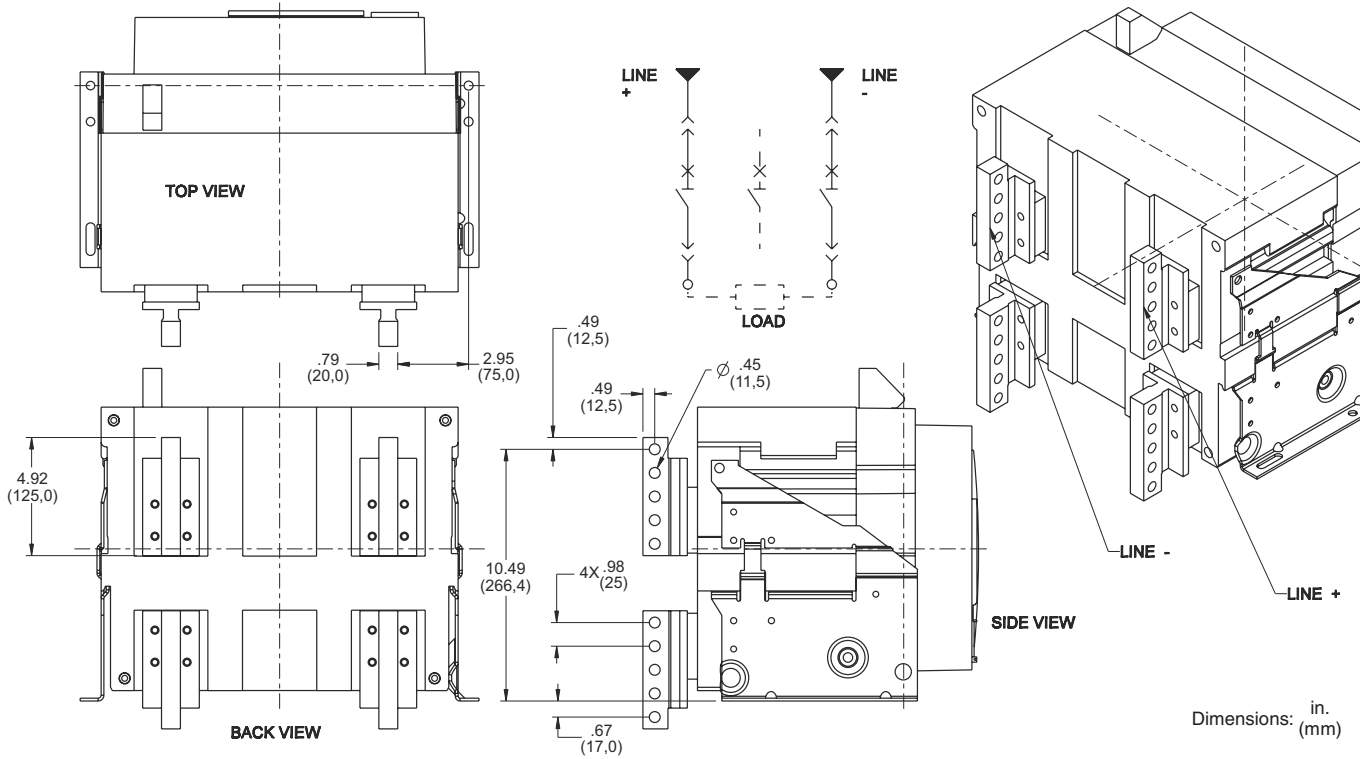
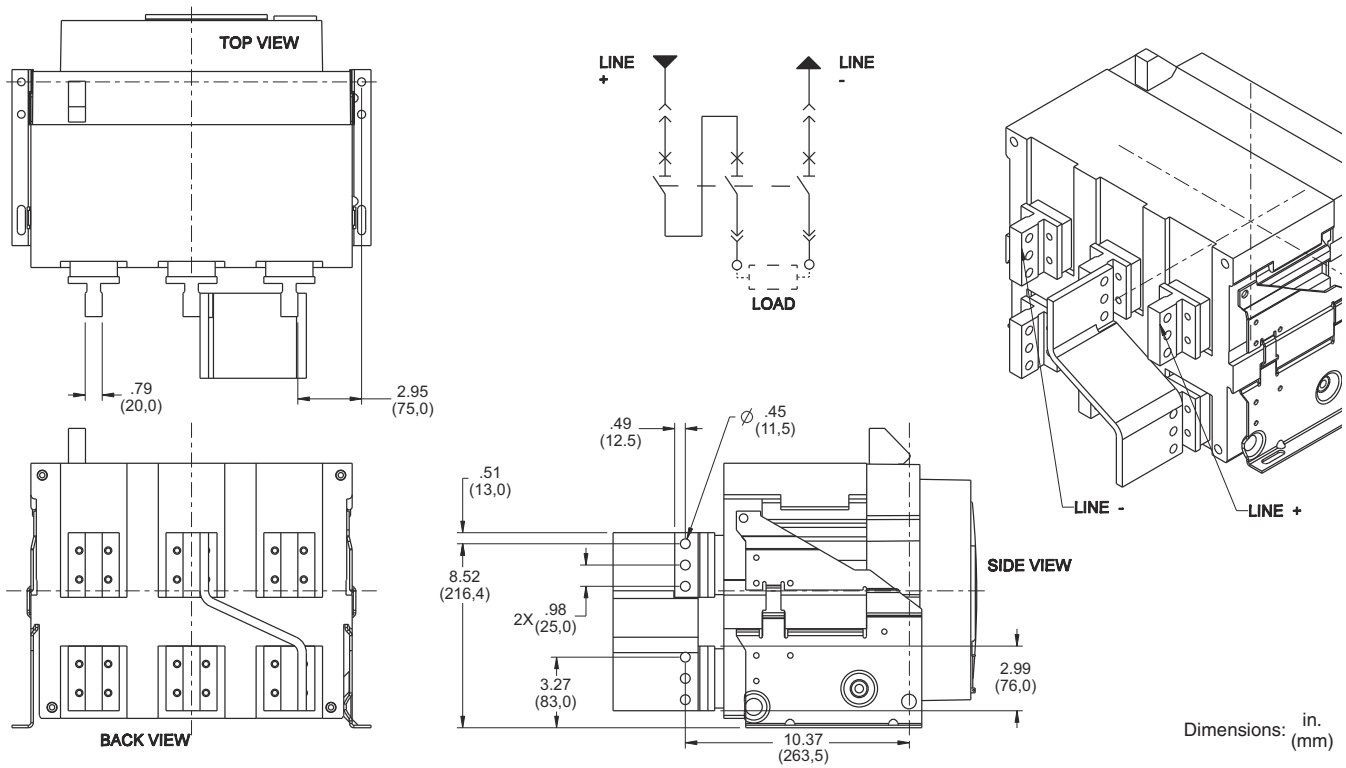


Figure 53: 1000–2000 A Version “D” Rear Connected “T” Vertical (RCTV)



Masterpact™ NW DC Circuit Breakers Dimensional Drawings

Figure 54: 1000–2000 A Version “D” Rear Connected “T” Horizontal (RCHT)

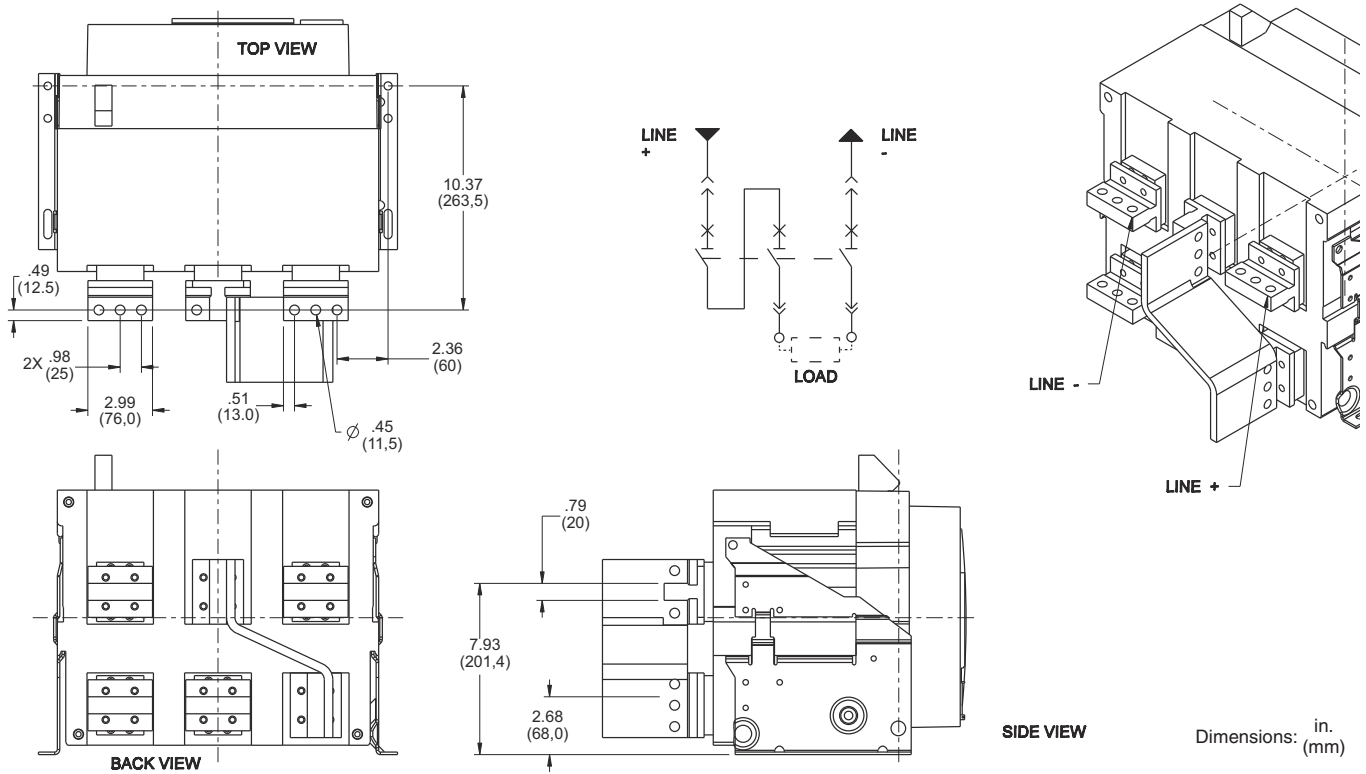
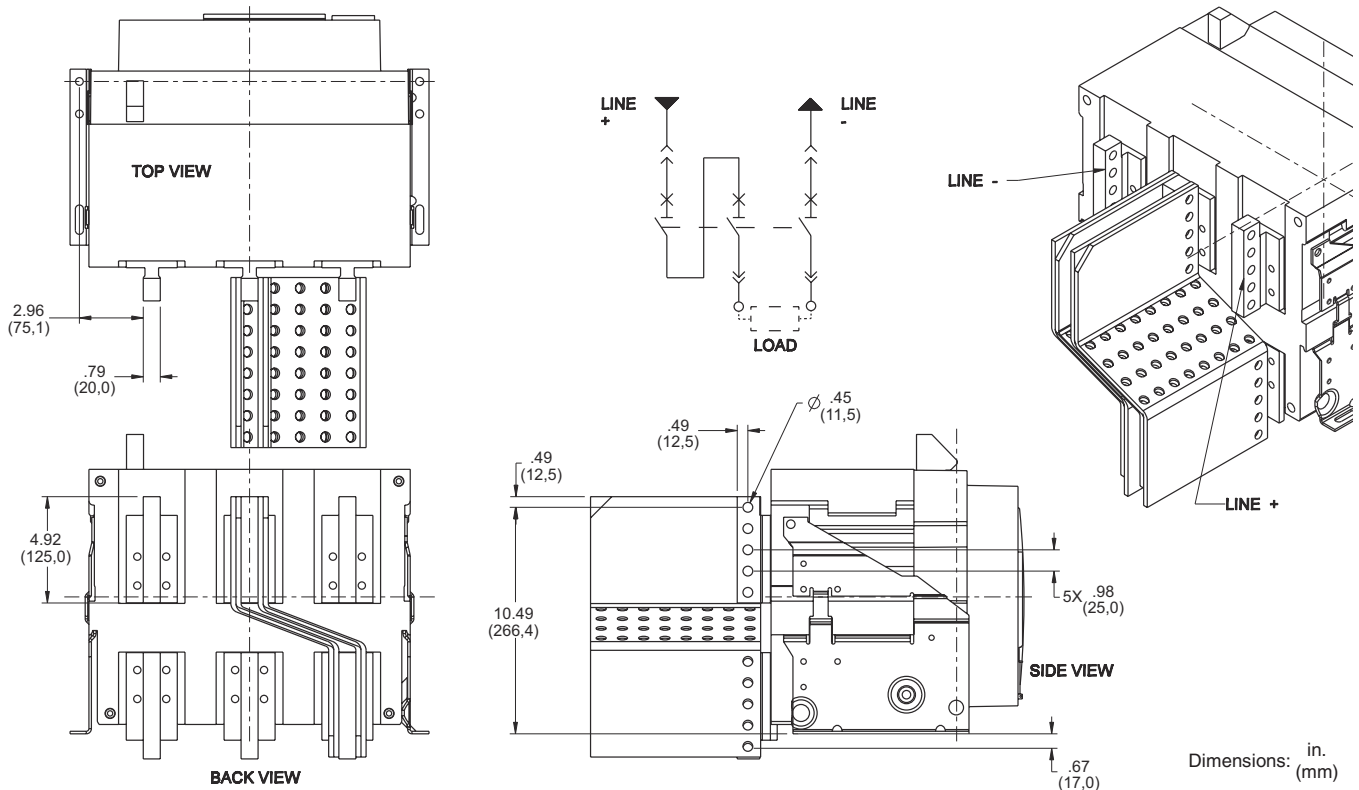


Figure 55: 4000 A Version “D” Rear Connected “T” Vertical (RCTV)

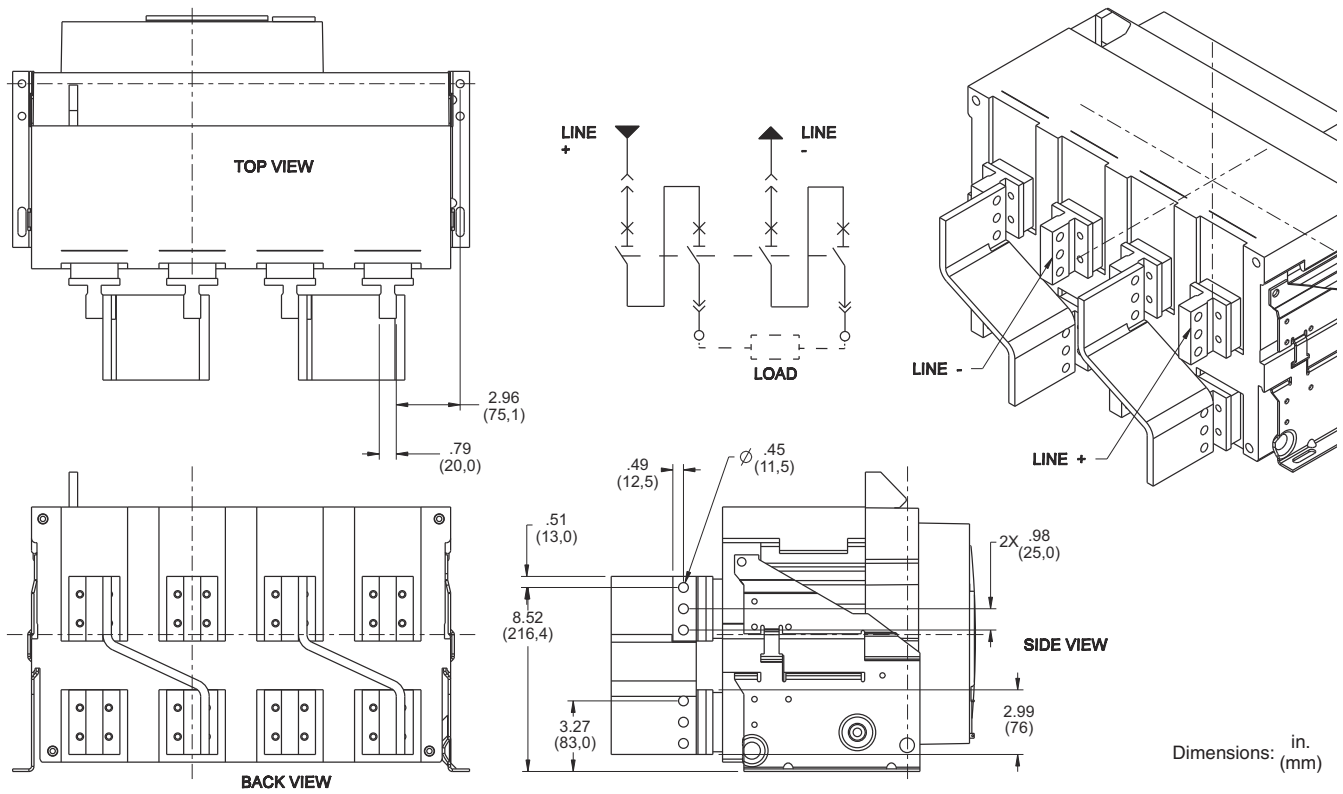


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Dimensional Drawings

IEC 4P Fixed Circuit Breakers

Figure 56: 1000–2000 A Version “E” Rear Connected "T" Vertical (RCTV)



Masterpact™ NW DC Circuit Breakers Dimensional Drawings

Figure 57: 1000–2000 A Version “E” Rear Connected “T” Horizontal (RCH)

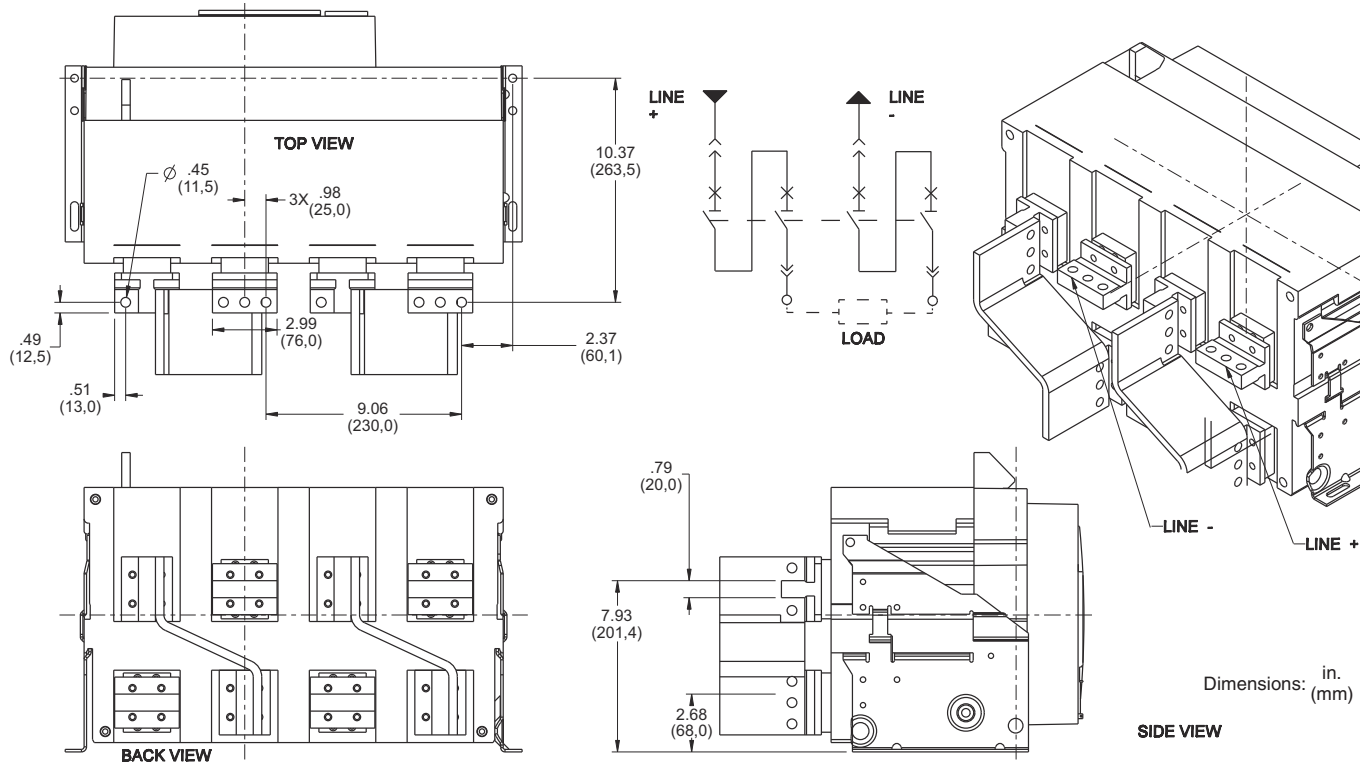
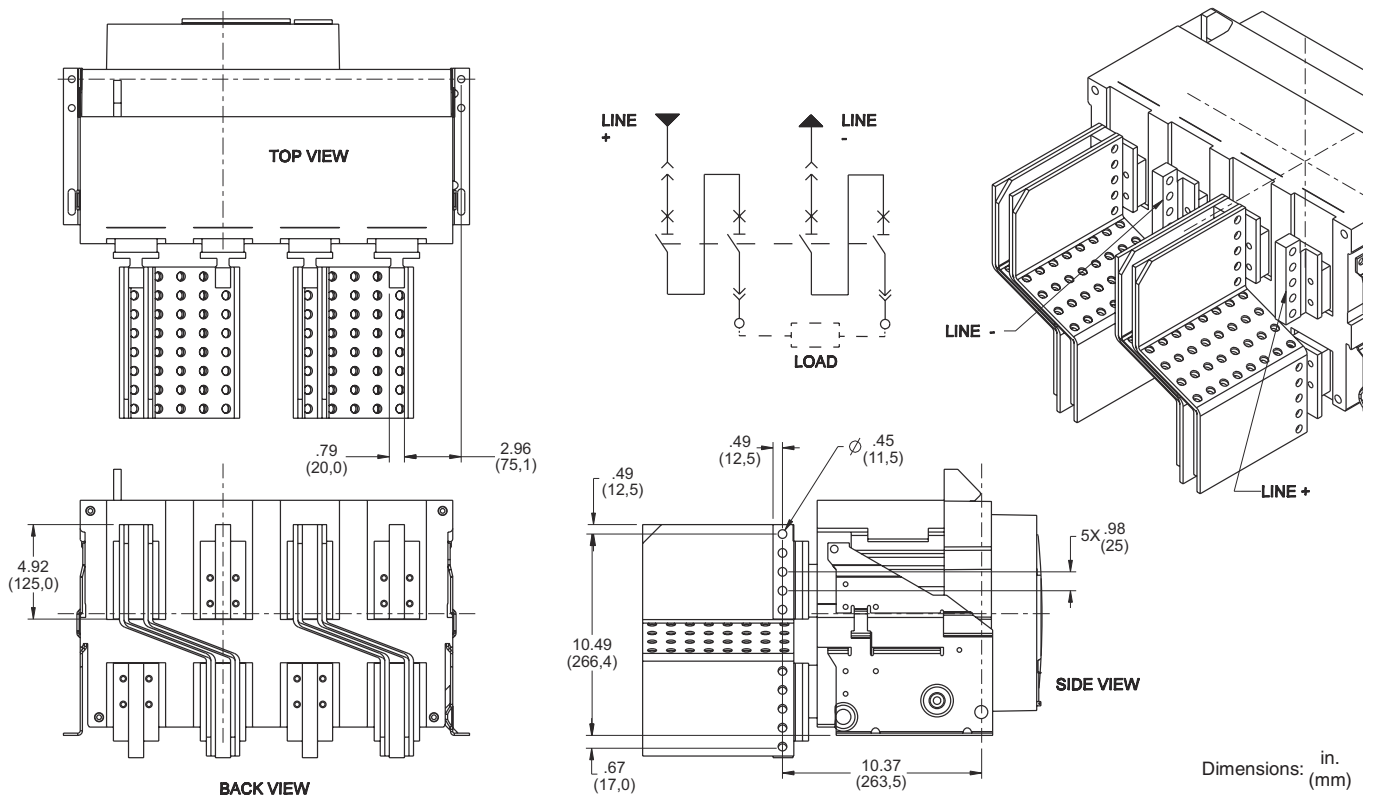
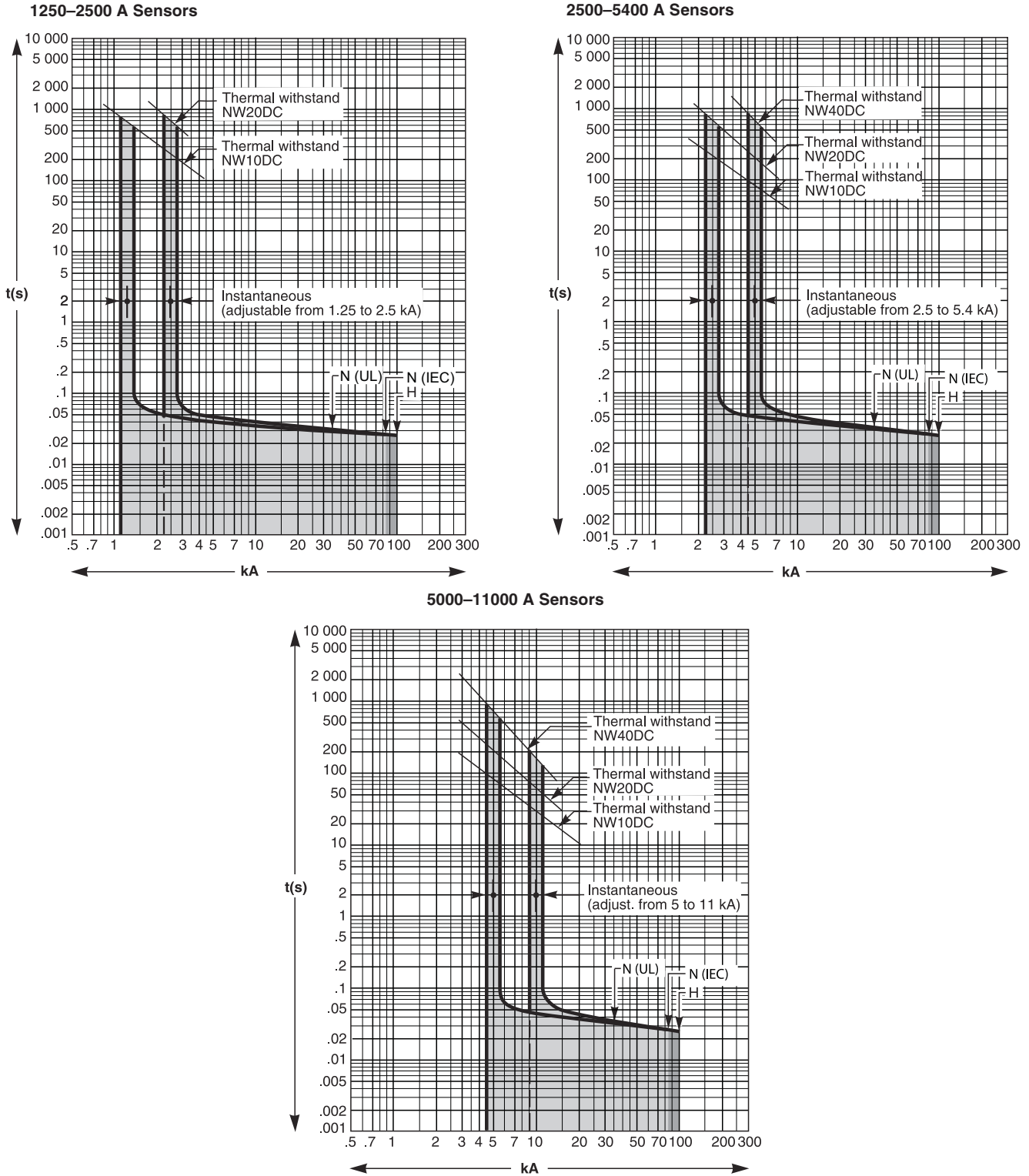


Figure 58: 4000 A Version “E” Rear Connected “T” Vertical (RCTV)



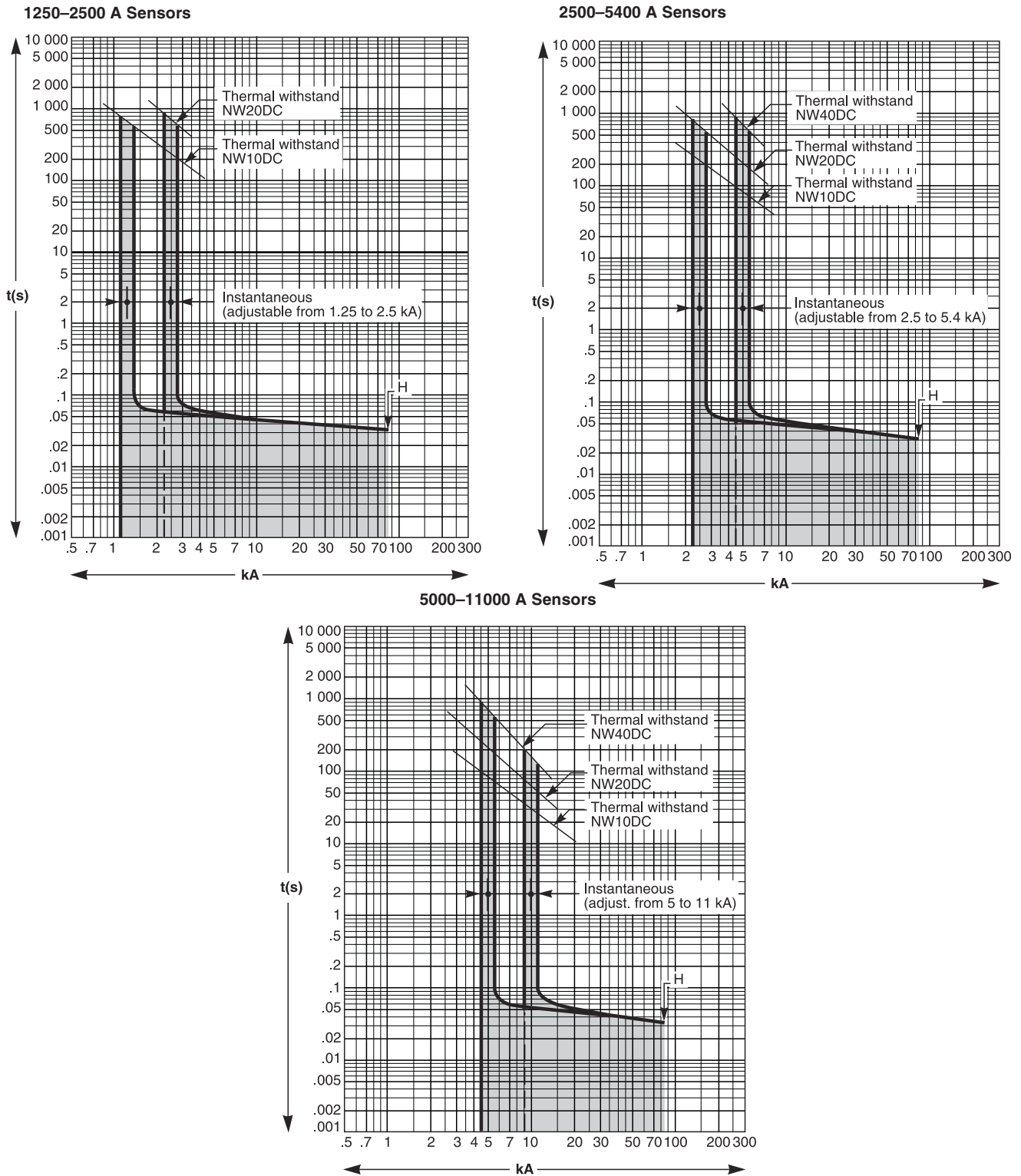
Section 6—Trip Curves

Figure 59: Trip Curves —Micrologic™ DC1.0 Instantaneous Protection, U = 500 Vdc, L/R = 5 ms (IEC) or 8 ms (UL)



Masterpact™ NW DC Circuit Breakers Trip Curves

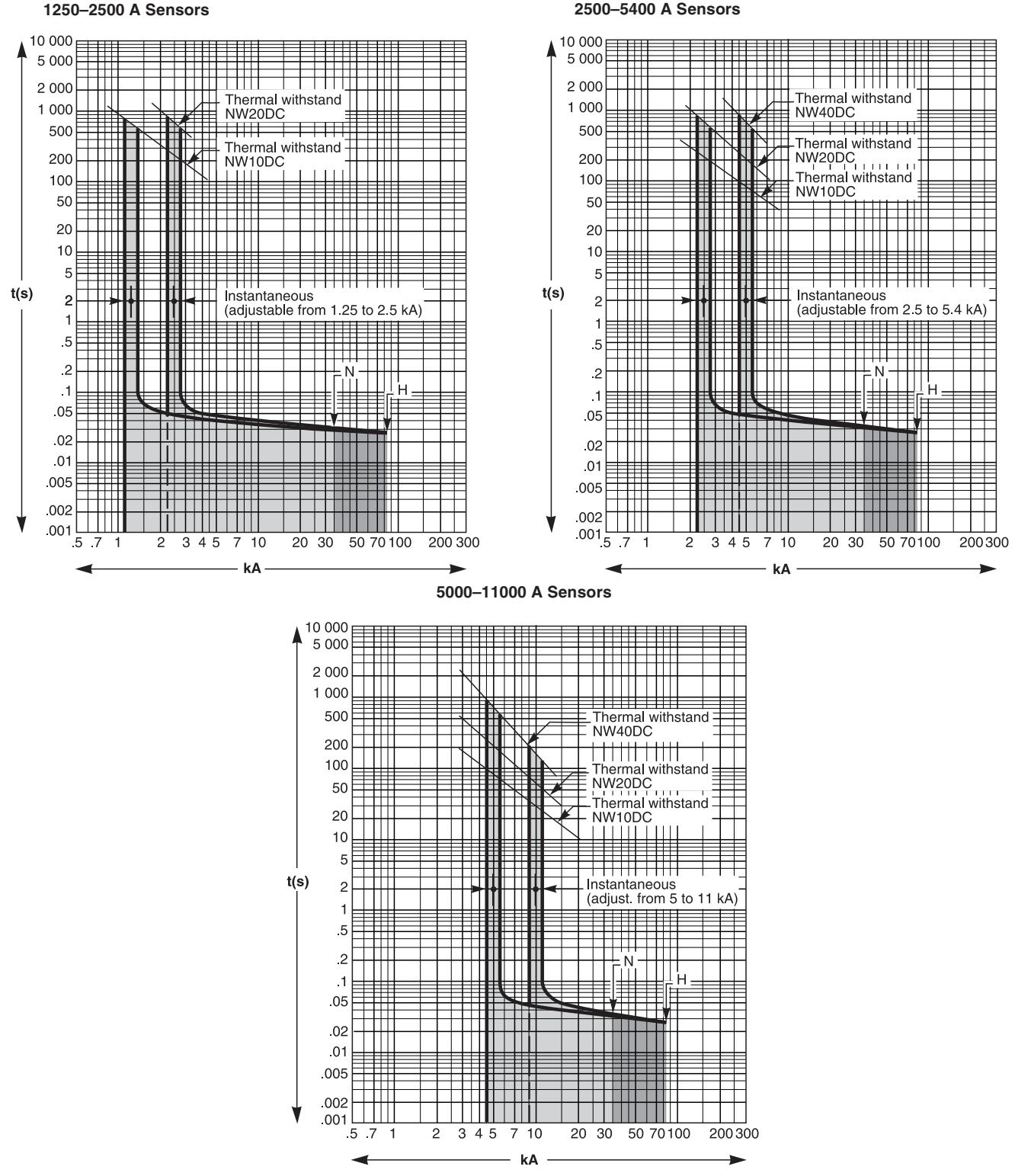
Figure 60: Trip Curves —Micrologic DC1.0 Instantaneous Protection, U = 750/900 Vdc, L/R = 5 ms



Masterpact™ NW DC Circuit Breakers

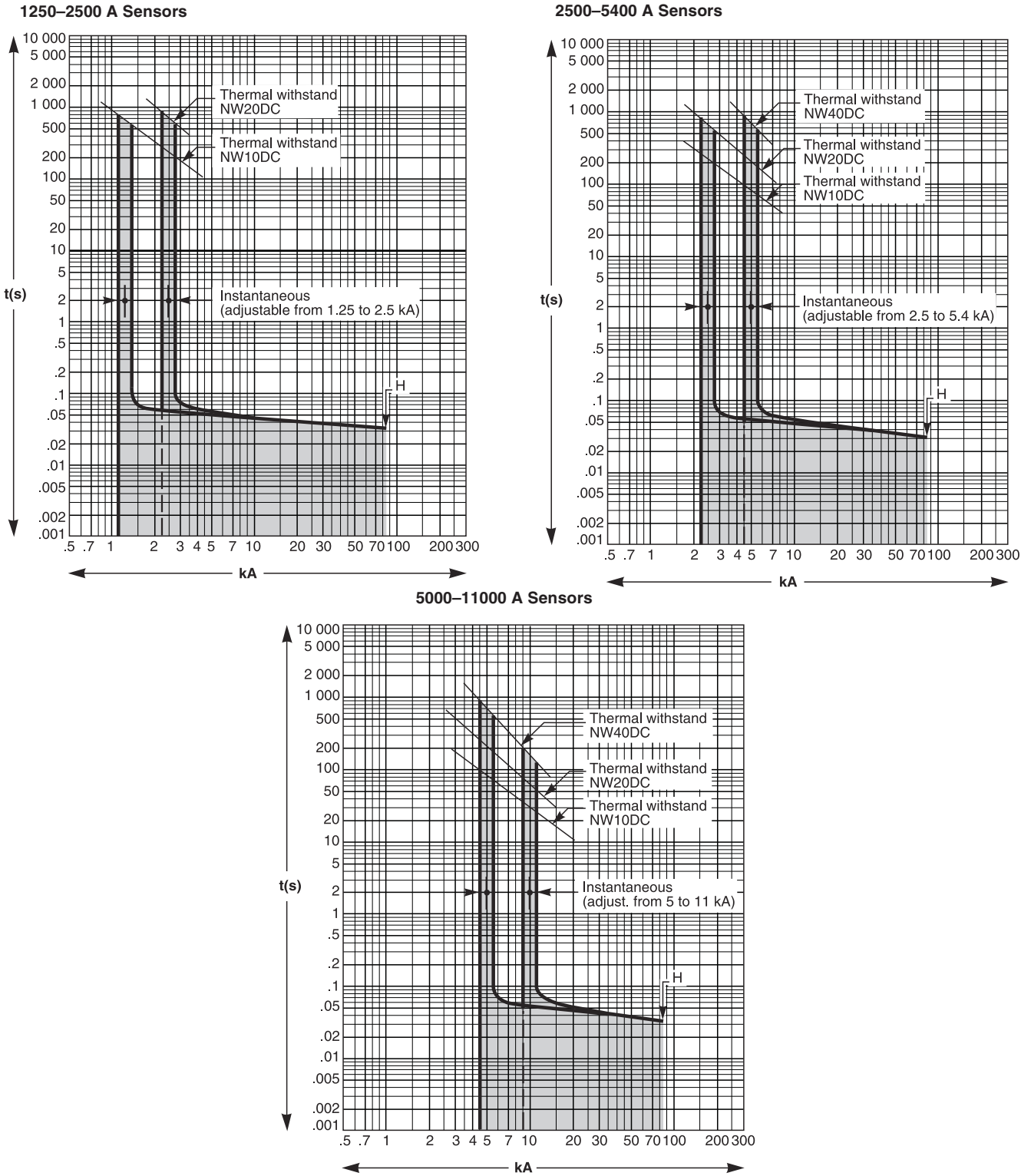
Trip Curves

Figure 61: Trip Curves —Micrologic DC1.0 Instantaneous Protection, U = 500 Vdc, L/R = 15 ms



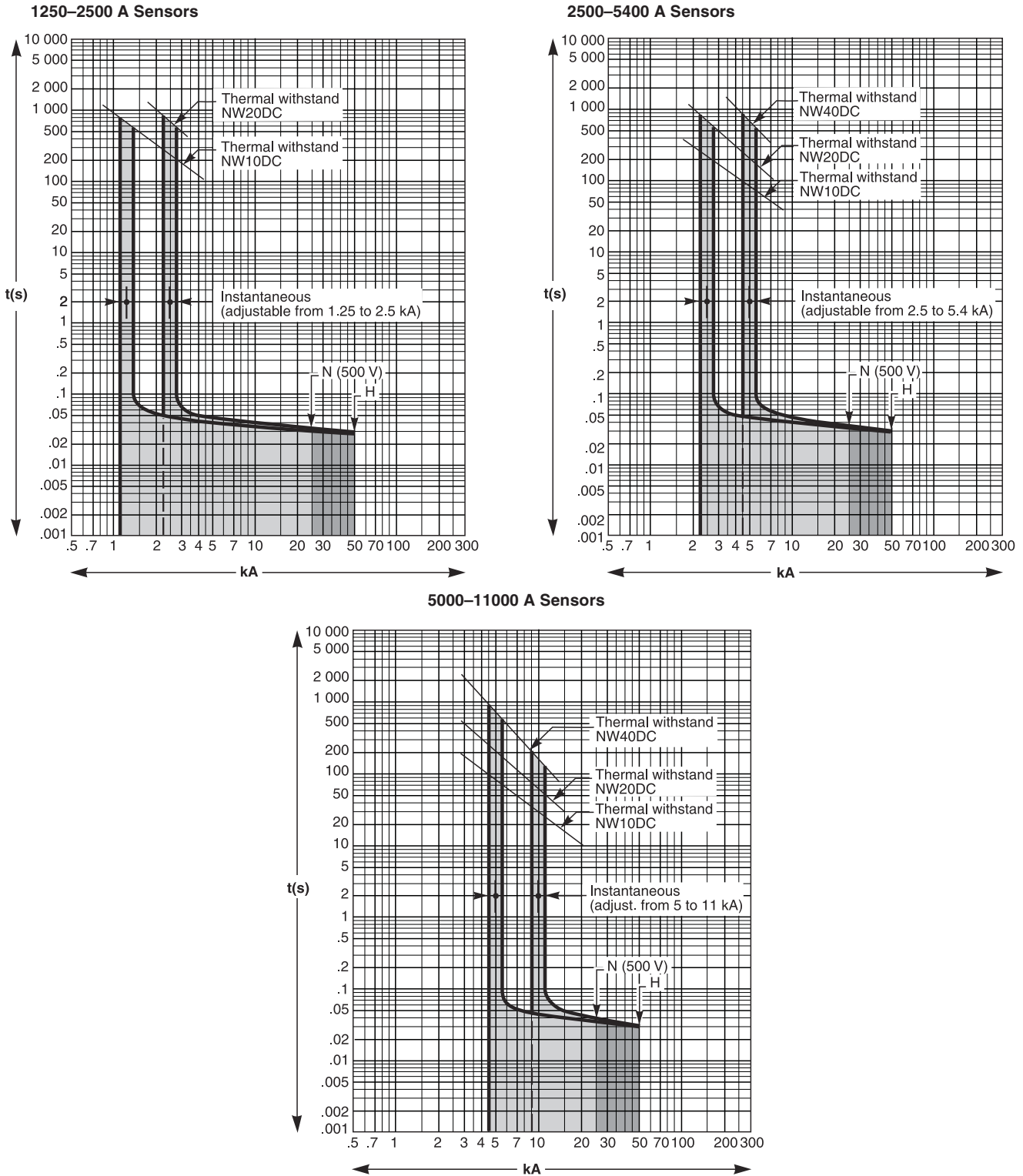
Masterpact™ NW DC Circuit Breakers Trip Curves

Figure 62: Trip Curves —Micrologic DC1.0 Instantaneous Protection, U = 750/900 Vdc, L/R = 15 ms



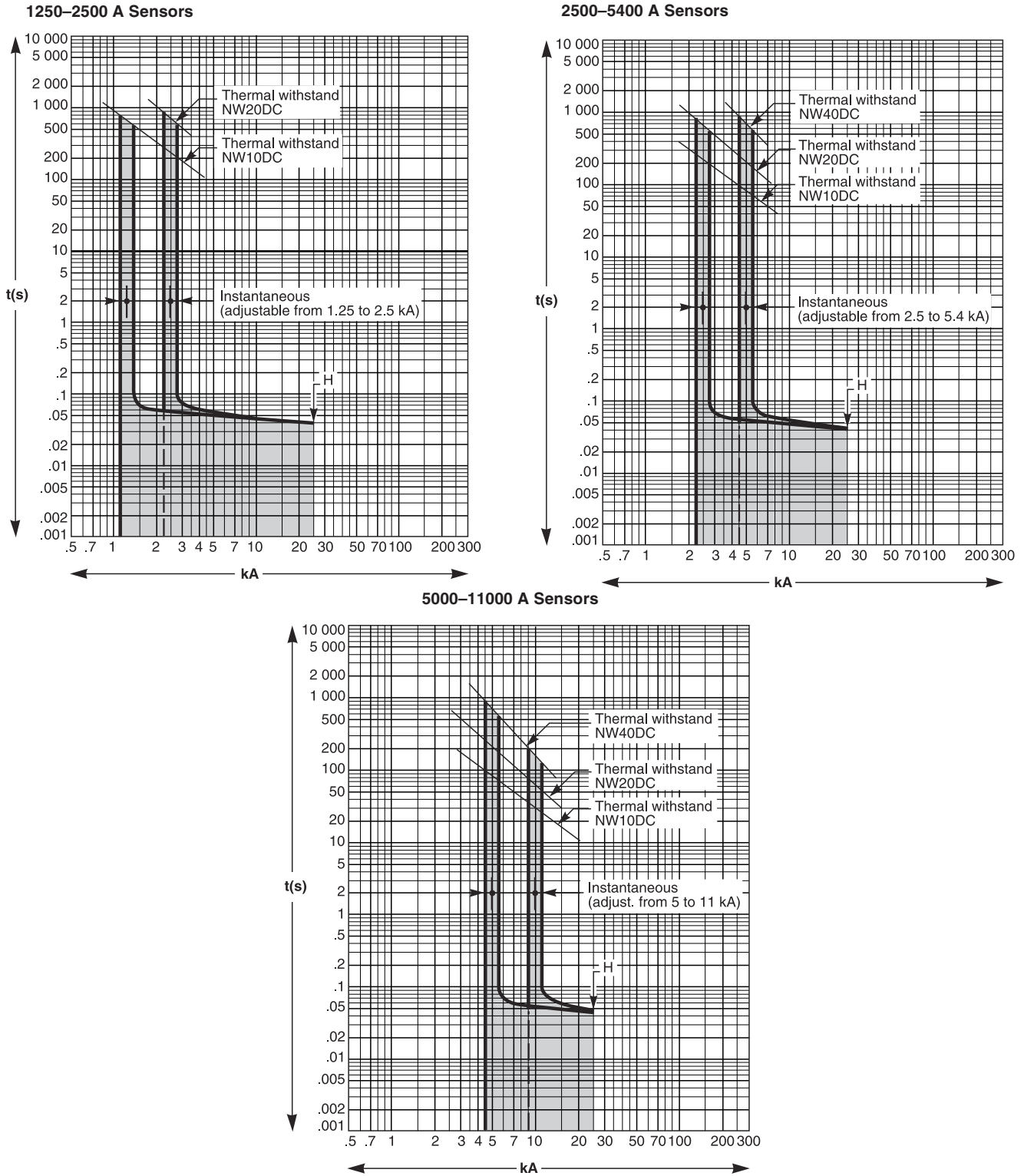
Masterpact™ NW DC Circuit Breakers Trip Curves

Figure 63: Trip Curves —Micrologic DC1.0 Instantaneous Protection, U = 500 Vdc, L/R = 30 ms



Masterpact™ NW DC Circuit Breakers Trip Curves

Figure 64: Trip Curves —Micrologic DC1.0 Instantaneous Protection, U = 750/900 Vdc, L/R = 30 ms



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