Masterpact™ NW Low-Voltage Power/Insulated Case Circuit Breaker—Installation

ENGLISH

Class 0613

Instruction Bulletin

HRB28361
Rev. 02, 02/2015

Retain for future use.

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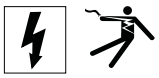
Hazard Categories and Special Symbols

Read these instructions carefully and look at the equipment to become familiar with the device before trying to install, operate, service or maintain it. The following special messages may appear throughout this bulletin or on the equipment to warn of potential hazards or to call attention to information that clarifies or simplifies a procedure.



The addition of either symbol to a “Danger” or “Warning” safety label indicates that an electrical hazard exists which will result in personal injury if the instructions are not followed.

ANSI

This is the safety alert symbol. It is used to alert you to potential personal injury hazards. Obey all safety messages that follow this symbol to avoid possible injury or death.

⚠ DANGER

DANGER indicates a hazardous situation which, if not avoided, **will result in** death or serious injury.

⚠ WARNING

WARNING indicates a hazardous situation which, if not avoided, **can result in** death or serious injury.

⚠ CAUTION

CAUTION indicates a hazardous situation which, if not avoided, **can result in** minor or moderate injury.

NOTICE

NOTICE is used to address practices not related to physical injury. The safety alert symbol is not used with this signal word.

NOTE: Provides additional information to clarify or simplify a procedure.

Please Note

Electrical equipment should be installed, operated, serviced, and maintained only by qualified personnel. No responsibility is assumed by Schneider Electric for any consequences arising out of the use of this material.

FCC Notice

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense. This Class A digital apparatus complies with Canadian ICES-003.

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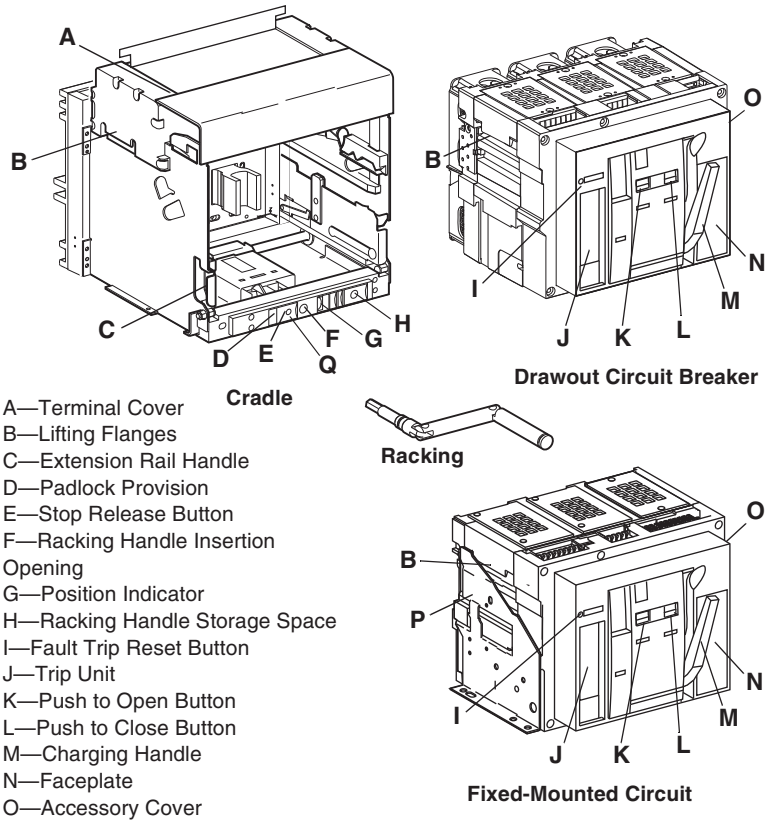
Section 1— General Information

Introduction

The Masterpact NW low-voltage power circuit breaker[1] and insulated case circuit breaker are designed to mount in a drawout cradle, using rear-mounted, plug-on pressure connections to provide electrical connection to the cradle. A fixed-mounted circuit breaker is also available.

Figure 1 – Circuit Breaker and Cradle



A—Terminal Cover
B—Lifting Flanges
C—Extension Rail Handle
D—Padlock Provision
E—Stop Release Button
F—Racking Handle Insertion Opening
G—Position Indicator
H—Racking Handle Storage Space
I—Fault Trip Reset Button
J—Trip Unit
K—Push to Open Button
L—Push to Close Button
M—Charging Handle
N—Faceplate
O—Accessory Cover
P—Fixed Mounting Brackets
Q—Cradle Date Code

These circuit breakers comply with the following standards:

Low-Voltage Power Circuit Breaker (Drawout and Fixed)	Insulated Case Circuit Breaker (Drawout and Fixed)
ANSI C37.13 ANSI C37.16 ANSI C37.17 ANSI C37.50 UL1066[1] CSA C22.2 No 31[1] NEMA SG3	UL489[2] NEMA AB1 CSA C22.2 No. 5-02[3]

[1] cULus

[2] UL® Listed

[3] CSA® Certified

[1] In this manual the phrase “circuit breaker” means circuit breaker and switch.

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Type L1F 800–2000 A low-voltage power circuit breakers and Type LF 800–2000 A insulated case circuit breakers are tested to show the arc-flash hazard risk category as referenced by NFPA 70E.

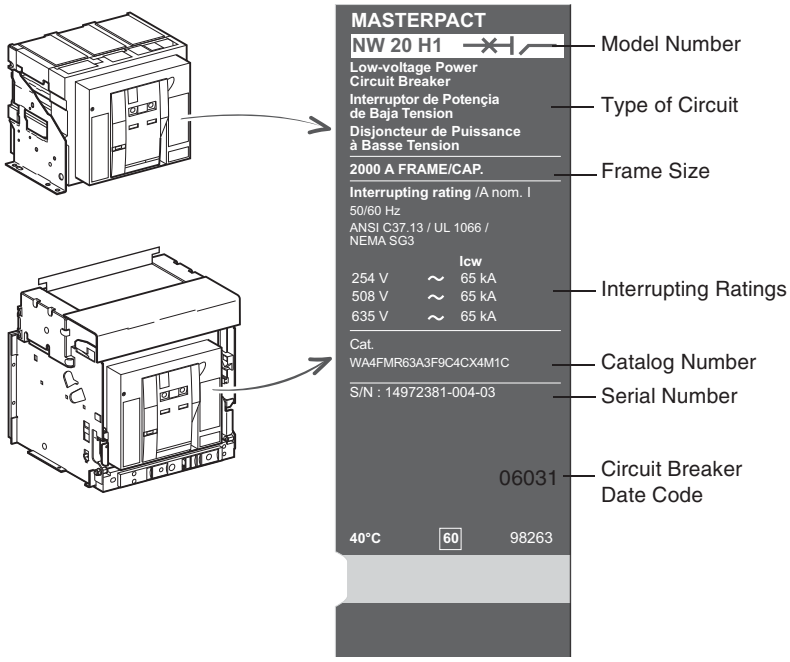
This bulletin provides installation instructions for Masterpact NW circuit breakers. Tripping functions are controlled by the Micrologic™ trip unit.

Information about a specific circuit breaker can be found on the faceplate label on the front of the circuit breaker.

Information about the accessories installed in the circuit breaker can be found on the accessory label on the right side of the circuit breaker.

For complete information on available circuit breaker models, frame sizes, interrupting ratings, sensor sizes and trip units, see catalog 0613CT1001, *Masterpact NT and NW Universal Power Circuit Breakers* on the Schneider Electric website.

Figure 2 – Faceplate Information



For additional information see the following user guides available on the Schneider Electric™ website:

- Bulletin 0613IB1204: *Masterpact™ NW Low-Voltage Power/Insulated Case Circuit Breaker User Guide*
- Bulletin 0613IB1205: *Masterpact™ NW Dimensional Drawings*
- Bulletin 0613IB1202: *Masterpact™ NT and NW Field Testing and Maintenance Guide*
- Bulletin 48049-136-05: *Micrologic 2.0A, 3.0A, 5.0A, and 6.0A Electronic Trip Units*
- Bulletin 48049-330-03: *Micrologic 5.0H and 6.0H Electronic Trip Units*
- Bulletin 48049-137-05: *Micrologic 5.0P and 6.0P Electronic Trip Unit*
- Bulletin 48049-207-05: *Micrologic 2.0, 3.0 and 5.0 Electronic Trip Units*

To access the website go to:

http://www.schneider-electric.com

For application assistance, please call 1-888-778-2733.

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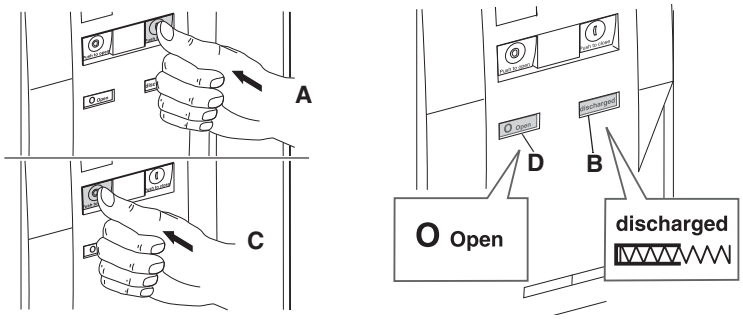
Before Working on Circuit Breaker

1. Turn circuit breaker off:

   Press “Push to close” button (**Figure 3, A**) to discharge spring, as indicated by window (**B**).

   Press “Push to open” button (**C**) to open contacts, as indicated by window (**D**).

Figure 3 – Turn Off Circuit Breaker



2. Disconnect power from circuit breaker.

   — For drawout circuit breaker: rack circuit breaker to disconnected position (**Figure 4, A**). See Drawout Circuit Breaker Disconnection, page 70.

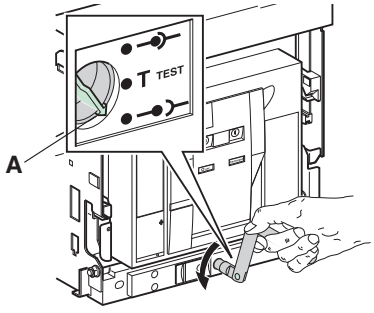
⚠ DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION OR ARC FLASH

- Apply appropriate personal protective equipment (PPE) and follow safe electrical work practices. See NFPA 70E or CSA Z462.
- This equipment must only be installed and serviced by qualified electrical personnel.
- Beware of potential hazards, wear personal protective equipment and take adequate safety precautions.

Failure to follow these instructions will result in death or serious injury.

Figure 4 – Disconnect Drawout Circuit Breaker



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— For fixed-mounted circuit breaker: turn off all power supplying equipment before working on or inside equipment.

⚠ DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION OR ARC FLASH

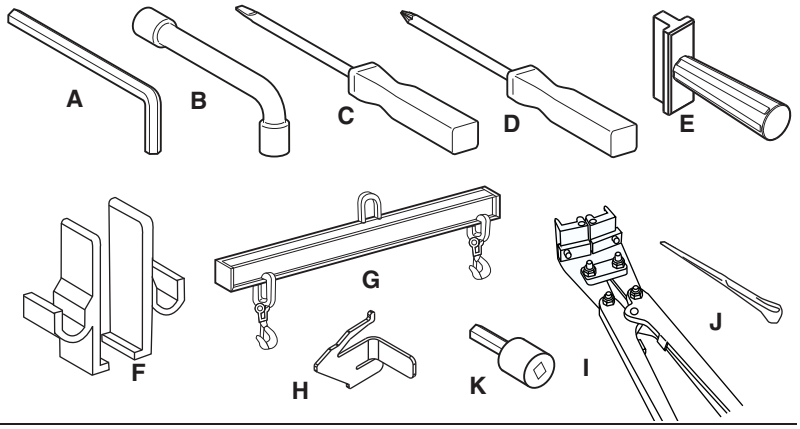
- Apply appropriate personal protective equipment (PPE) and follow safe electrical work practices. See NFPA 70E or CSA Z462.
- This equipment must only be installed and serviced by qualified electrical personnel.
- Turn off all power supplying this equipment before working on or inside equipment.
- Always use a properly rated voltage sensing device to confirm power is off.
- Replace all devices, doors and covers before turning on power to this equipment.

Failure to follow these instructions will result in death or serious injury.

Tools

Table 1 – Tools Required

A. Hex Key, 5 mm
B. Angled Socket Wrench, 1/2 in.
C. Straight Blade Screwdriver (#2 Pozidriv® or Slotted)
D. Torx® 20 Screwdriver
E. Cluster Reset Tool, Cat. No. CLUSRETOOL
F. Lifting Hooks, Cat. No. S48906
G. Crossbar
   W-Frame, Cat. No. S48900
   Y-Frame, Cat. No. S48901
H. Cradle Interlock Defeat Tool (Drawout Circuit Breaker Only, Provided)
I. Cluster Positioning Tool, Cat. No. S47542
J. Wago® Wire Insert Tool, Wago Part No. 209-129
K. 10 mm Hex Adapter for Cradle Racking Mechanism



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Unpacking and Inspection

NOTE: Repacking instructions can be found in bulletin 0613IB1203, *Masterpact NW Low-Voltage Power/Insulated Case Circuit Breaker–User Guide*, found on the Schneider Electric™ web site (see page 5).

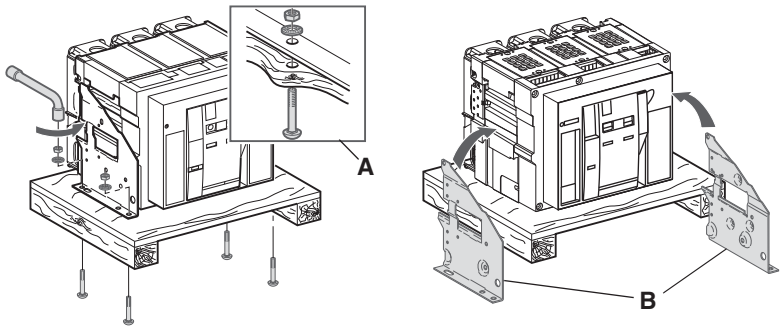
NOTICE
HAZARD OF EQUIPMENT DAMAGE
Do not place circuit breaker on its back. Doing so can damage the clusters.
Failure to follow these instructions can result in equipment damage.

Unpack Circuit Breaker

NOTE: Do not place the circuit breaker on its back. Doing so can damage the clusters.

1. Remove the four bolts, nuts and washers (**Figure 5, A**) securing the circuit breaker to the pallet.
2. On drawout circuit breakers only: remove the shipping brackets (**B**).

Figure 5 – Unpack Circuit Breaker



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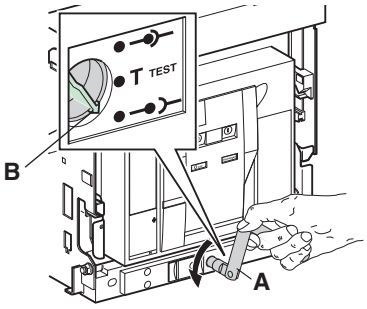
Unpack Circuit Breaker Shipped in Cradle

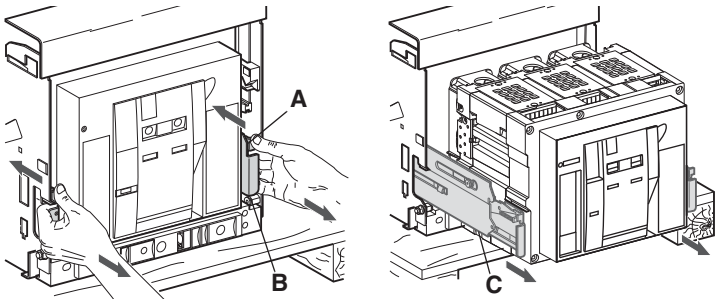
1. Rack the circuit breaker (**Figure 6, A**) to the disconnected position (**B**) (refer to Drawout Circuit Breaker Disconnection, page 70).

Figure 6 – Disconnect Circuit Breaker



2. Pressing in the latching tabs (**Figure 7, A**), pull out on the extension rail handles (**B**) until the extension rails are fully extended (**C**).

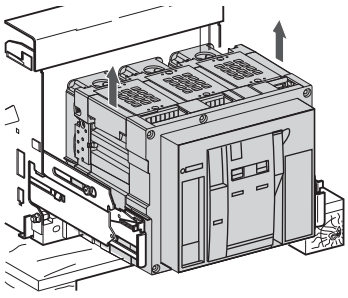
Figure 7 – Pull Out Circuit Breaker



NOTE: Do not place the circuit breaker on its back. Doing so can damage the clusters.

3. Remove circuit breaker. See Cradle Removal, page 37.

Figure 8 – Remove Circuit Breaker and Cradle



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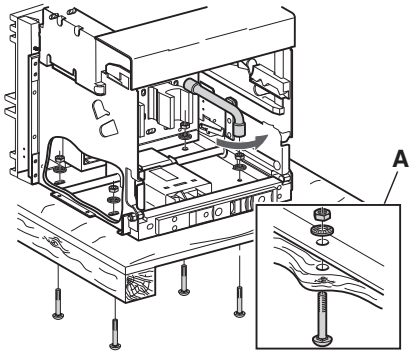
Unpack Cradle

1. Remove the four bolts, nuts and washers (Figure 9, A) securing cradle to pallet.
2. Remove cradle from pallet. See Lifting, page 16.

Figure 9 – Unpack Cradle



Cluster Inspection, Replacement and Lubrication

Cluster Inspection

1. Inspect clusters and cluster supports on back of the drawout circuit breaker. Make sure clusters are installed and configured properly as shown in Table 3.
2. Visually inspect clusters for signs of damage such as:
   - — Discolored areas
   - — Visible copper on fingers
   - — Cracked or broken springs
   - — Not aligned with other clusters (indicates spring damage)
3. Visually inspect clusters for wear.

Table 2 – Number of Clusters Per Pole

Type	N / N1	H1	HA	H / H2 / H3 / HF	L / L1 / LF / L1F / HB / HC
NW08	2	4	4	4 / 4 / 6 / 4	8
NW12	2	—	—	4	8
NW16	6	6	6	6	8
NW20	8	8	8	8	16
NW25/NW30	—	—	—	16	16
NW32	—	16	16	16	24
NW40/NW50	—	—	24	24	24
NW60	—	—	—	24	24

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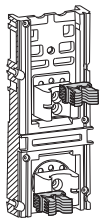
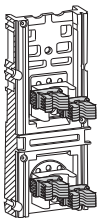
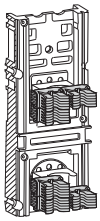
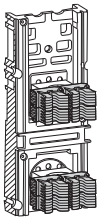
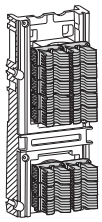
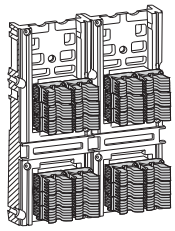
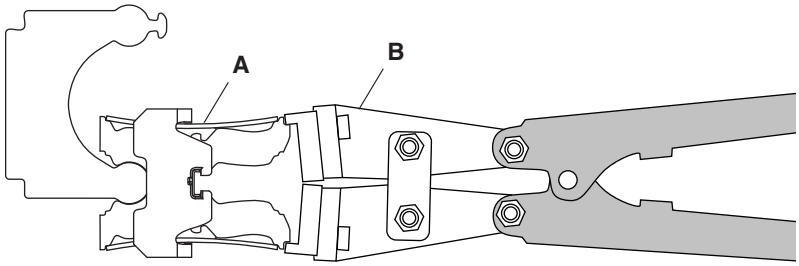
Table 3 – Cluster Configuration

Number of Clusters Per Pole **NOTE:** Cluster shields are not shown.					
2	4	6	8	16	24
					

4. Replace any cluster which does not pass inspection. Install new clusters (A) using cluster positioning tool (B).

Figure 10 – Install New Clusters



Cluster Lubrication

CAUTION

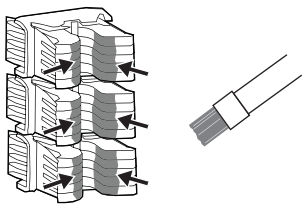
HAZARD OF EQUIPMENT DAMAGE

Inspect the cluster for lubrication when the circuit breaker is removed from the cradle.

Failure to follow these instructions can result in equipment damage.

Use grease kit (catalog number S48899) to lubricate cluster jaws as shown in Figure 11.

Figure 11 – Cluster Grease Application



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Cradle Stab Lubrication

The cradle stabs must be inspected and lubricated when the cradle is first installed and again during maintenance periods after all power has been disconnected.

⚠ DANGER

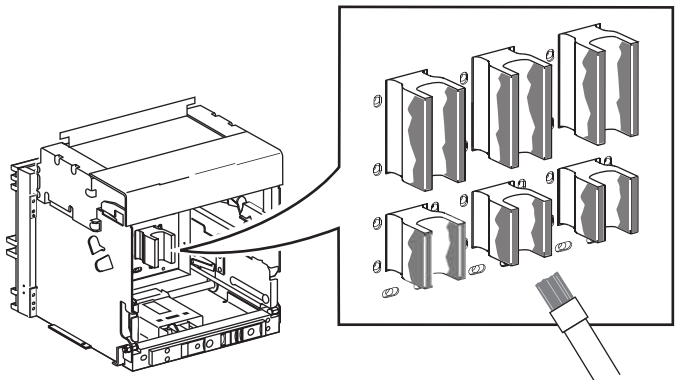
HAZARD OF ELECTRIC SHOCK, EXPLOSION OR ARC FLASH

- Apply appropriate personal protective equipment (PPE) and follow safe electrical work practices. See NFPA 70E or CSA Z462.
- This equipment must only be installed and serviced by qualified electrical personnel.
- Turn off all power supplying this equipment before working on or inside equipment.
- Always use a properly rated voltage sensing device to confirm power is off.
- Replace all devices, doors and covers before turning on power to this equipment.

Failure to follow these instructions will result in death or serious injury.

Confirm that both sides of stab are coated with lubricant. If necessary, use grease kit (catalog number S48899) to lubricate stab.

Figure 12 – Cradle Stab Grease Application



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Section 2— Lifting and Transporting

Both the circuit breaker and cradle have lifting flanges for lifting. To lift circuit breaker, use an overhead lifting device attached to the lifting flanges, following the directions given in this section.

⚠ DANGER

HAZARD OF DEVICE FALLING

- Be sure lifting equipment has lifting capacity for the unit being lifted.
- Follow manufacturer's instructions for use of lifting equipment.
- Wear hard hat, safety shoes and heavy gloves.

Failure to follow these instructions will result in death or serious injury.

Weights

Table 4 – Weights

Frame Rating	Connector Type[1]	Weights (lb./kg.)								
		Circuit Breaker		Cradle		Connector		Pallet	Total	
		3-Pole	4-Pole	3-Pole	4-Pole	3-Pole	4-Pole		3-Pole	4-Pole
800–2000 A, Drawout	FCF	109/50	142/65	97/44	116/53	42/19	55/25	17/8	265/121	330/151
	FCT	109/50	142/65	97/44	116/53	84/38	109/50	17/8	307/140	384/176
	RCTH/RCTV	109/50	142/65	97/44	116/53	17/8	22/10	17/8	240/110	297/136
800–2000 A, Fixed-Mounted	FCF	109/50	142/65	—	—	42/19	55/25	17/8	168/77	214/98
	FCT	109/50	142/65	—	—	84/38	109/50	17/8	210/96	268/123
	RCTH/RCTV	109/50	142/65	—	—	17/8	22/10	17/8	143/66	181/83
2500–3000 A, Drawout	RCTH/RCTV	127/58	165/75	124/57	149/68	26/12	34/15	17/8	294/135	365/166
	FCT	127/58	165/75	124/57	149/68	80/36	104/47	17/8	348/159	435/198
2500–3000 A, Fixed-Mounted	FCT	127/58	165/75	—	—	80/36	104/47	17/8	224/102	286/130
	RCTH/RCTV	127/58	165/75	—	—	26/12	34/15	17/8	170/78	216/98
2000 A L1/L1F & 3200 A, Drawout	RCOV	127/58	165/75	124/57	149/68	100/46	130/59	17/8	368/169	461/210
3200 A, Fixed	RCOV	127/58	165/75	—	—	100/46	130/59	17/8	244/112	312/142
4000 A, (W-Frame) Fixed-Mounted	RCOV (Special)	127/58	165/75	—	—	115/52	145/66	17/8	259/118	327/149
3200 A L1 & 4000 A, Drawout	FCF	227/103	295/134	278/126	334/152	84/38	109/50	39/18	628/285	777/354
	FCT	227/103	295/134	278/126	334/152	168/76	218/99	39/18	712/324	886/403
	RCTH/RCTV	227/103	295/134	278/126	334/152	52/24	68/31	39/18	596/271	736/335
4000 A, Fixed-Mounted	RCTH/RCTV	227/103	295/134	—	—	52/24	68/31	39/18	318/145	402/183
5000 A, Drawout	FCT	227/103	295/134	278/126	334/152	168/77	218/99	39/18	712/324	886/403
	RCTH/RCTV	227/103	295/134	278/126	334/152	52/24	68/31	39/18	596/271	736/335
5000 A, Fixed-Mounted	RCTH/RCTV	227/103	295/134	—	—	52/24	68/31	39/18	318/145	402/183
6000 A, Drawout	RCTV	227/103	295/134	278/126	334/152	396/180	528/240	39/18	940/427	1196/544
6000 A, Fixed-Mounted	RCTV	227/103	295/134	—	—	396/180	528/240	39/18	662/301	862/392

[1]FCF = Front-connected flat connector.
FCT = Front-connected "T" connector.
RCTH = Rear-connected "T" horizontal connector.
RCTV = Rear-connected "T" vertical connector.
RCOV = Rear-connected offset vertical.

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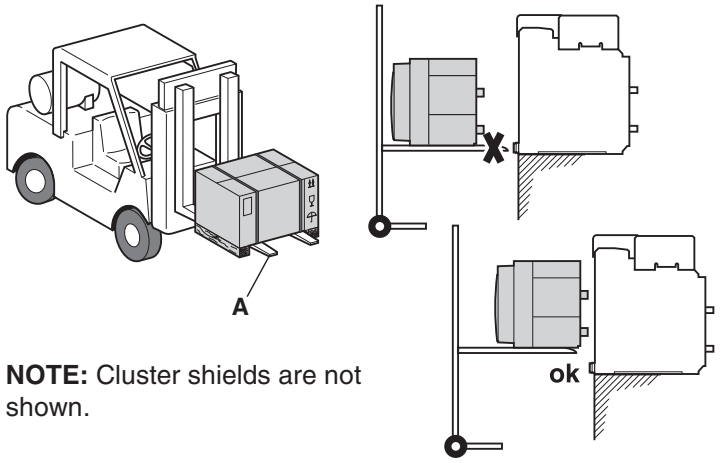
Using a Platform Lift

When using a platform lift, lift flanges (**Figure 13, A**) should not extend beyond the back of the circuit breaker.

Figure 13 – Using a Platform Lift



NOTE: Cluster shields are not shown.

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ENGLISH

Lifting

Lifting Drawout Circuit Breaker

NOTICE
HAZARD OF EQUIPMENT DAMAGE Cradle must be secured before installing or removing circuit breaker. **Failure to follow these instructions can result in equipment damage.**

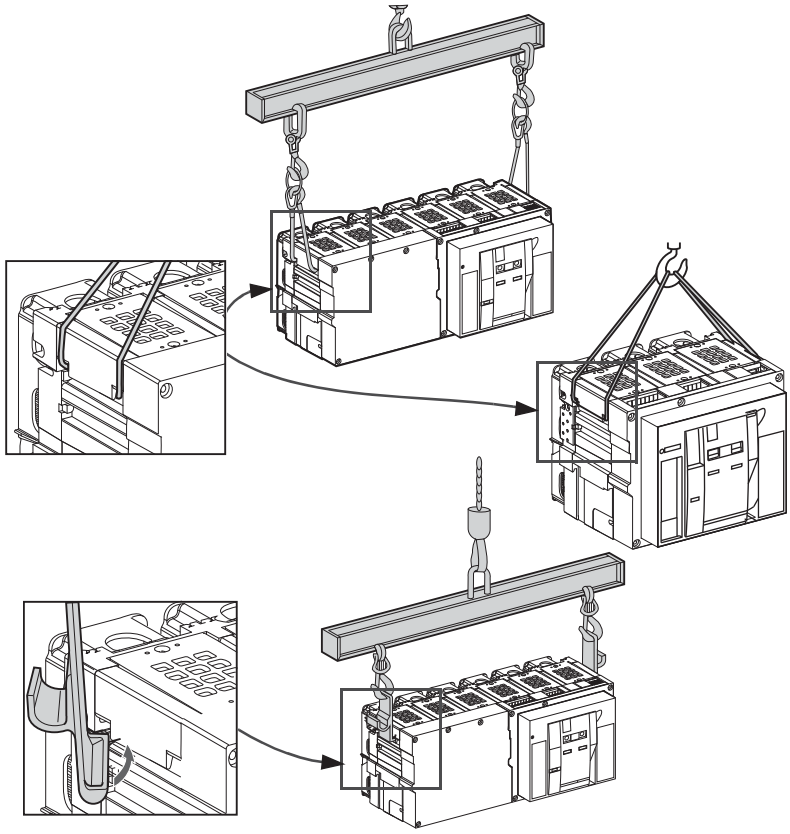
Lift using lifting flanges on sides of the circuit breaker, lifting hooks, and crossbar.

Lifting Hook Kit: S48906

W-Frame Crossbar Kit: S48900

Y-Frame Crossbar Kit: S48901

Figure 14 – Lifting Drawout Circuit Breaker



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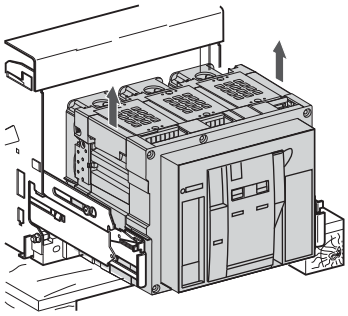
Lifting Cradle or Fixed-Mounted Circuit Breaker

NOTE: If circuit breaker is installed in cradle, remove circuit breaker from cradle before lifting cradle. To remove circuit breaker, see page 46.

Figure 15 – Removing Circuit Breaker From Cradle



Lift using the lifting flanges on the sides of the cradle or circuit breaker, a piece of bar stock through the connectors, lifting hooks, and crossbar.

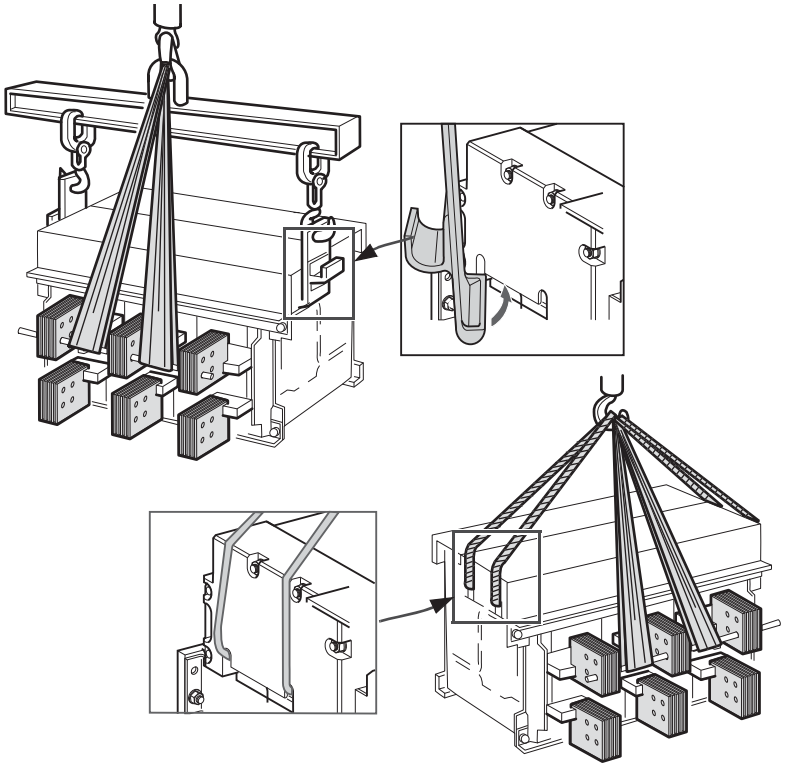
Lifting Hook Kit: S48906

W-Frame Crossbar Kit: S48900

Y-Frame Crossbar Kit: S48901

NOTE: Connectors must be supported while lifting cradle or fixed-mounted circuit breaker.

Figure 16 – Lifting Cradle or Fixed-Mounted Circuit Breaker



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Section 3— Drawout Circuit Breaker Installation

Equipment is normally shipped with cradles installed and circuit breakers shipped separately.

For equipment shipped without cradles installed, install cradles as described below.

For equipment shipped with cradles installed, see page 38 for circuit breaker installation.

NOTE: When cradles are shipped separately from equipment:

- Standard-width 800–3000 A and 3200 A circuit breakers can be shipped installed in the cradles;
- Wide-construction 3200 A L1 and 4000–6000 A circuit breakers must be shipped separately.

⚠ DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION OR ARC FLASH

- Apply appropriate personal protective equipment (PPE) and follow safe electrical work practices. See NFPA 70E or CSA Z462.
- This equipment must only be installed and serviced by qualified electrical personnel.
- Turn off all power supplying this equipment before working on or inside equipment.
- Always use a properly rated voltage sensing device to confirm power is off.
- Replace all devices, doors and covers before turning on power to this equipment.

Failure to follow these instructions will result in death or serious injury.

Cradle Installation

Install Accessories

Install any required cradle accessories which were not factory installed.

⚠ DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION OR ARC FLASH

Do not place tools or other materials on top of cradle.

Failure to follow these instructions will result in death or serious injury.

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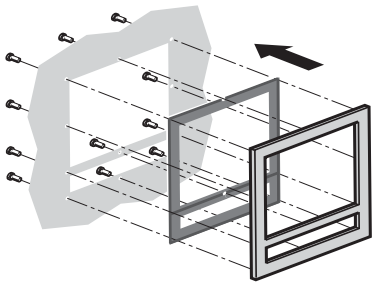
Install Door Escutcheon

If equipment has a door cutout, install the escutcheon shipped with cradle.

1. If not already present, cut opening in the equipment door and drill holes around the opening for the escutcheon. For opening dimensions and hole spacing, refer to bulletin 0613IB1205 on the Schneider Electric™ website (for website information see page 5).
2. Install escutcheon.

Figure 17 – Install Door Escutcheon

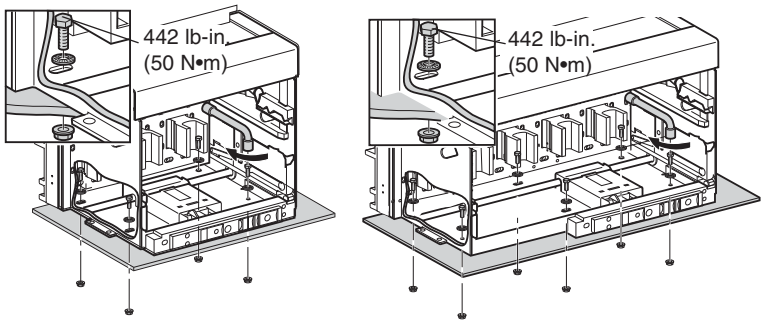


Secure Cradle

1. Turn off all power supplying the equipment before working on or inside equipment.

1. If mounting holes are not already present, drill mounting holes in the pan for mounting the cradle. For cradle mounting hole pattern dimensions, refer to bulletin 0613IB1205 on the Schneider Electric website (for website information see page 5).
2. Check flatness of the mounting surface. Surface must be flat to within 0.08 in. (2 mm).
3. Mount the cradle to the pan, using 3/8 in. bolts, washers, and nuts.

Figure 18 – Secure Cradle



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Clearance Requirements

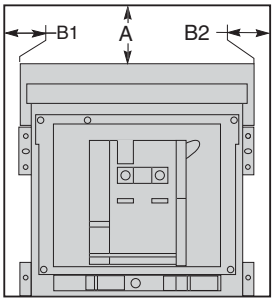
⚠ DANGER

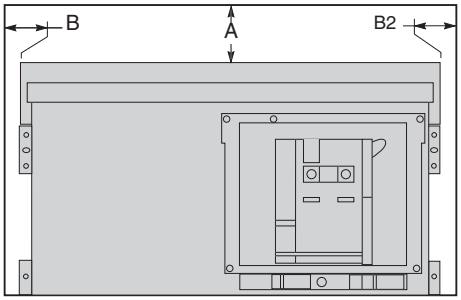
HAZARD OF ELECTRIC SHOCK, EXPLOSION OR ARC FLASH

Clearance requirements must be met for proper operation of the equipment.

Failure to follow these instructions will result in death or serious injury.

Table 5 – Clearance Requirements





Minimum Clearance	UL 1066 Listed (ANSI C37.50)				UL 489 Listed			
	A		B1 + B2		A		B1 + B2	
	in.	mm	in.	mm	in.	mm	in.	mm
Insulated Parts	0	0	0	0	0	0	0	0
Metal Parts	0	0	2.36	60	0	0	4.36	111

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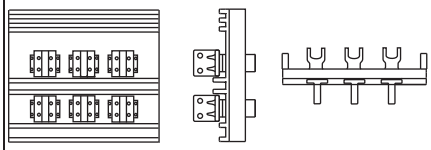
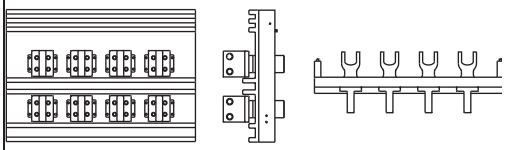
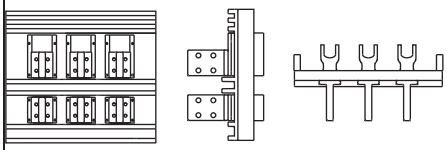
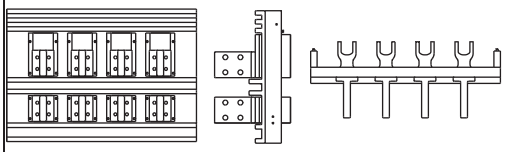
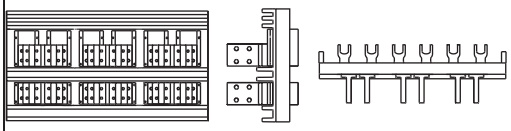
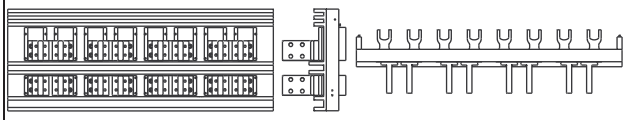
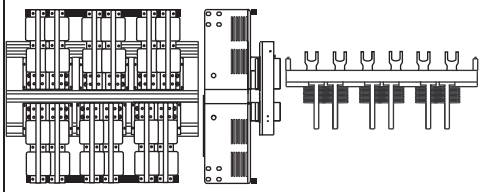
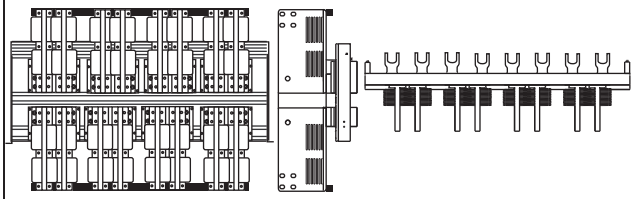
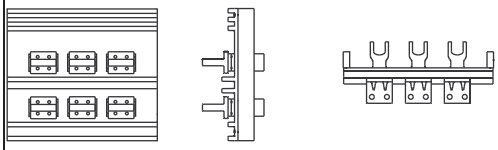
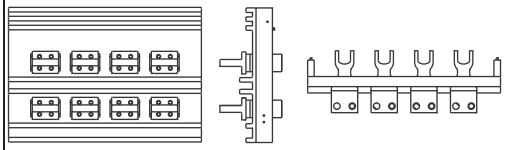
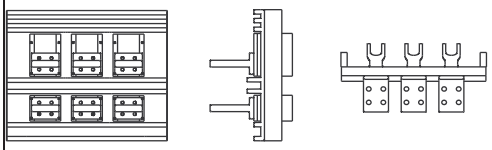
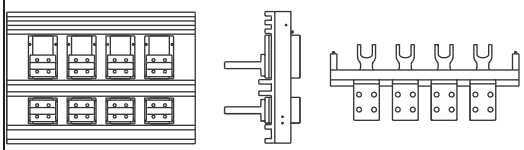
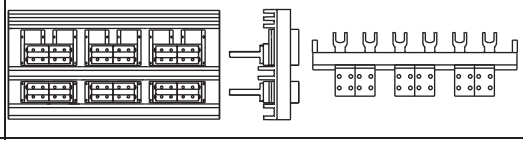
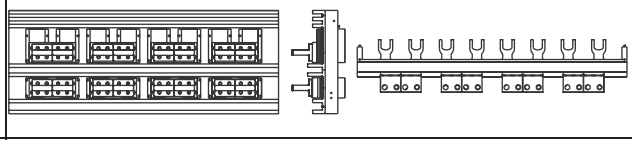
Install Connectors

Standard connectors are shown in Table 6. Secure connectors and torque bolts to 142–159 lb-in. (16–18 N•m). For information on non-standard connectors, contact the field office.

For connector dimensions, refer to bulletin 0613IB1205 on the Schneider Electric website (for website information see page 5).

Table 6 – Standard Connectors

Type	Rating	Three-Pole Layout Front – Side – Top	Four-Pole Layout Front – Side – Top
Rear-Connected “T” Vertical (RCTV)	800–2000 A		
	2500–3000 A		
	4000–5000 A		
	6000 A		
Rear-Connected “T” Horizontal (RCTH)	800–2000 A		
	2500–3000 A		
	3200 A L1 4000–5000 A		

Continued on next page

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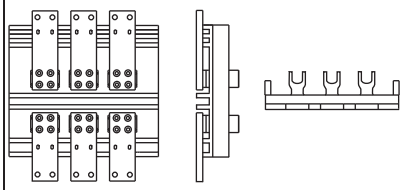
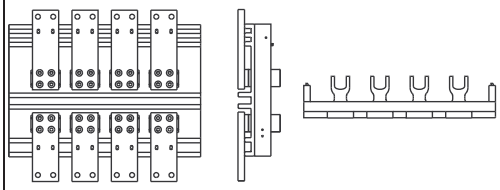
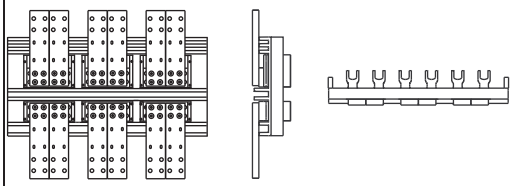
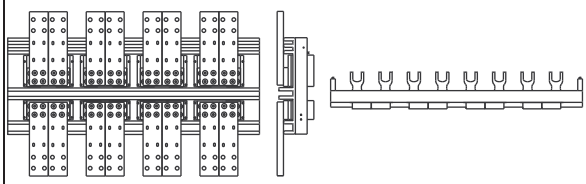
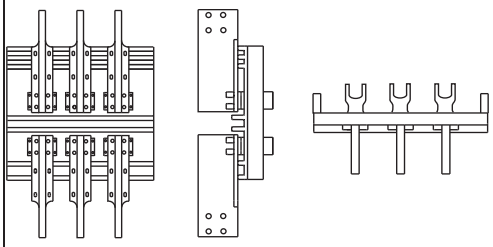
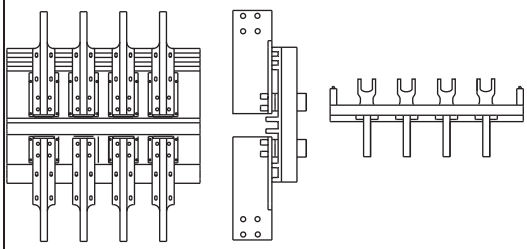
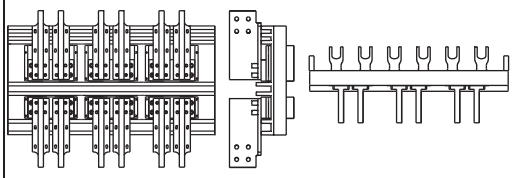
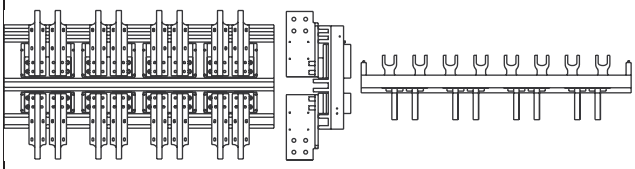
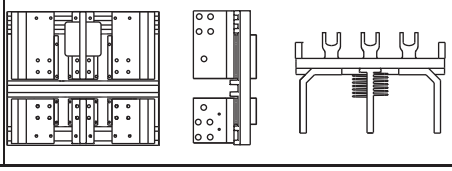
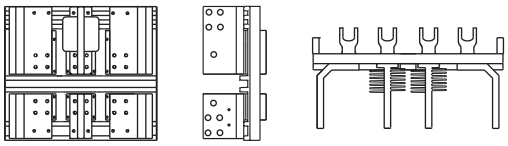
Table 6 – Standard Connectors *(continued)*

Type	Rating	Three-Pole Layout Front – Side – Top	Four-Pole Layout Front – Side – Top
Front-Connected Flat (FCF)	800–2000 A		
	3200 A L1 4000 A		
Front-Connected “T” (FCT)	800–3000 A		
	3200 A L1 4000–5000 A		
Rear-Connected Offset Vertical (RCOV)	3200 A 2000 A L1/L1F		

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Install Bussing

NOTICE

HAZARD OF EQUIPMENT DAMAGE

The busbar supports must be placed to support the weight of the bussing system and to withstand magnetic forces caused by short-circuit currents. See **Figure 19, A**.

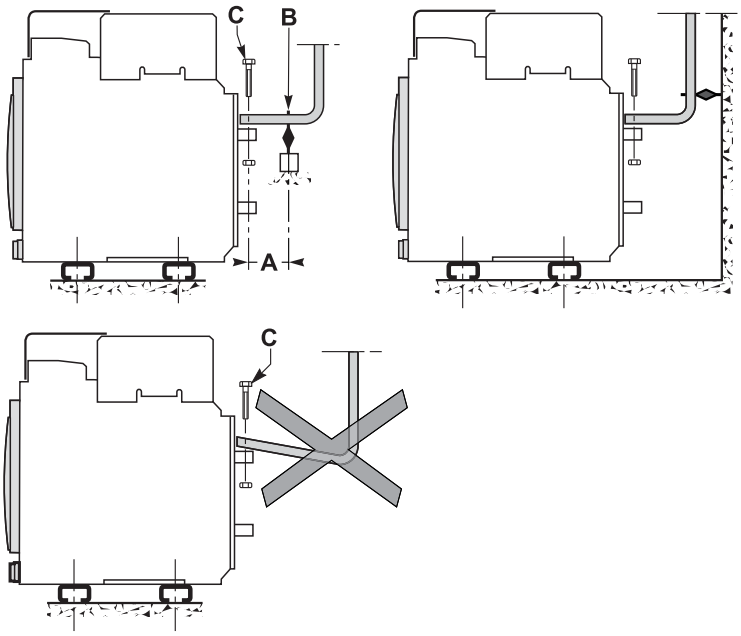
Failure to follow these instructions can result in equipment damage.

NOTE: Installer is responsible for bussing to connectors.

- Bus supports must be braced (**Figure 19, B**) to prevent short circuit forces from deflecting the connectors. The busbar supports (**A**) must be placed to support the weight of the bussing system and to withstand magnetic forces caused by short-circuit currents.
- Busbars should be adjusted to ensure that the connection points are correctly positioned before the bolts (**C**) are inserted. Bussing must be supported by framework of the switchgear, with no weight on connectors.

Bussing requirements by the circuit breaker and connectors are shown in Table 7.

Figure 19 – Busbar Connections



NOTE: The installer is responsible for bussing to the connectors. Bussing must be supported by the framework of the switchgear, with no weight on the connectors. Bus supports must be braced to prevent short circuit forces from deflecting the connectors.

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Table 7 – Bus Size Required

Circuit Breaker		Complies with	Connectors	Bus Per Connector	
Rating	Type			Number	Size
800 A, 1200 A	N/N1/H/H1/H2/H3/L /LF/L1/L1F	ANSI C37.50 UL 489	RCTH, RCTV, FCF, FCT	1	0.25 x 3 in. (6 x 76 mm)
1600 A	N/N1/H/H1/H2/H3/L /LF/L1/L1F	ANSI C37.50 UL 489	RCTH, RCTV, FCF, FCT	2	0.25 x 3 in. (6 x 76 mm)
2000 A	N/N1/H/H1/H2/H3/L /LF	ANSI 37.50 UL 489	RCTH	3	0.25 x 3 in. (6 x 76 mm)
			RCTV, FCT	2	0.25 x 4 in. (6 x 102 mm)
			FCF	3	0.25 x 3 in. (6 x 76 mm)
	L1/L1F	ANSI 37.50	RCOV	2	0.25 x 4 in. (6 x 102 mm)
2500 A	H/L	UL 489	RCTH	5	0.25 x 3 in. (6 x 76 mm)
			RCTV, FCT	2	0.25 x 5 in. (6 x 127 mm)
3000 A	H/L	UL 489	RCTH	8	0.25 x 3 in. (6 x 76 mm)
	H/L		RCTV, FCT	4	0.25 x 4 in. (6 x 102 mm)
3200 A	H1/H2/H3	ANSI 37.50	RCOV	3	0.25 x 5 in. (6 x 127 mm)
	L1		RCTH, FCF	3	0.25 x 6 in. (6 x 152 mm)
	L1		RCTV,FCT	3	0.25 x 5 in. (6 x 127 mm)
4000 A	H/H2/H3/L/L1	ANSI 37.50 UL 489	RCTH	4	0.25 x 6 in. (6 x 152 mm)
			RCTV, FCT	4	0.25 x 5 in. (6 x 127 mm)
		ANSI 37.50	FCF	4	0.25 x 6 in. (6 x 152 mm)
		UL 489	FCF	5	0.25 x 6 in. (6 x 152 mm)
5000 A	H/H2/H3/L/L1	ANSI 37.50 UL 489	RCTH	8	0.25 x 6 in. (6 x 152 mm)
			RCTV, FCT	6	0.25 x 5 in. (6 x 127 mm)
6000 A	H/L	UL 489	RCTV	6	0.25 x 6 in. (6 x 152 mm)

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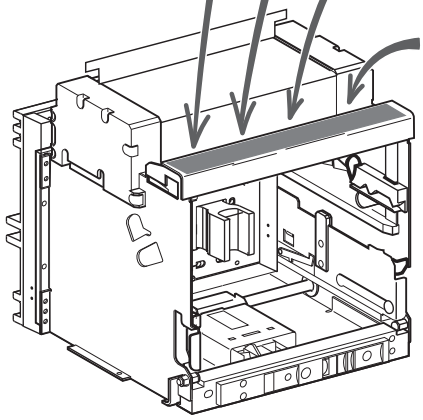
Accessory Connections Using Push-In Connectors

Figure 20 – Terminal Layout for Push-In Connector Installation



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

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

MN/MX2	MX1	XF	PF	MCH
D2/C12	C2	A2	254	B2
/C13	C3	A3	252	B3
D1/C11	C1	A1	251	B1

OF24	OF23	OF22	OF21	OF14	OF13	OF12	OF11	OF4	OF3	OF2	OF1	CT3	CT2	CT1
244	234	224	214	144	134	124	114	44	34	24	14	934	924	914
242	232	222	212	142	132	122	112	42	32	22	12	932	922	912
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

CE9	CE8	CE7
394	384	374
392	382	372
391	381	371

or

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

Function	Connector	Description
Auxiliary Contacts	OF[1]	Open/Closed Circuit Breaker or Switch Position Contacts
	EF	Combined Connected and Closed Contact
Cradle Contacts	CD	Disconnected Position Contacts
	CE	Connected Position Contacts
	CT	Test Position Contacts
Remote Operation	SDE	Electrical Fault Alarm Contact
	RES	Remote Reset
	MN	Undervoltage Trip Device
	MX[2]	Shunt Trip
	XF[2]	Shunt Close
	PF	Ready-to-Close Contact
	MCH	Spring-Charging Motor

[1] OF1, OF2, OF3 and OF4 contacts are standard.

[2] When communicating MX1 or XF coils are used, terminal (C3 or A3) must be connected to line even if the communication module is not installed. The bypass circuit through terminal C2/A2 is only momentary duty (0.5 sec). For continuous duty, use the communications command.

Trip Unit Type					
Basic	A	P	H	Connector	Description
–	•	•	•	Com: E1–E6	Communication
–	•	•	•	UC1: Z	Zone-Selective Interlocking
					Z1 = ZSI OUT signal
					Z2 = ZSI OUT
					Z3 = ZSI IN Signal
					Z4 = ZSI IN Short Time
					Z5 = ZSI IN Ground Fault
–	•	•	•	UC1: M1	Modified Differential Ground Fault (MDGF)
–	•	•	•	UC2: T	External Neutral
–	•	•	•	UC2: M	Modified Differential Ground Fault (MDGF)
–	•	•	•	UC3: F	24 Vdc External Power Supply
–	–	•	•	UC3: Vn	External Neutral Plug
–	–	•	•	UC4	External Phase Voltage Sensing
–	–	•	•	M2C/M6C	Two Programmable Contacts (internal relay) or Six Programmable Contacts (for connection to external M6C module).

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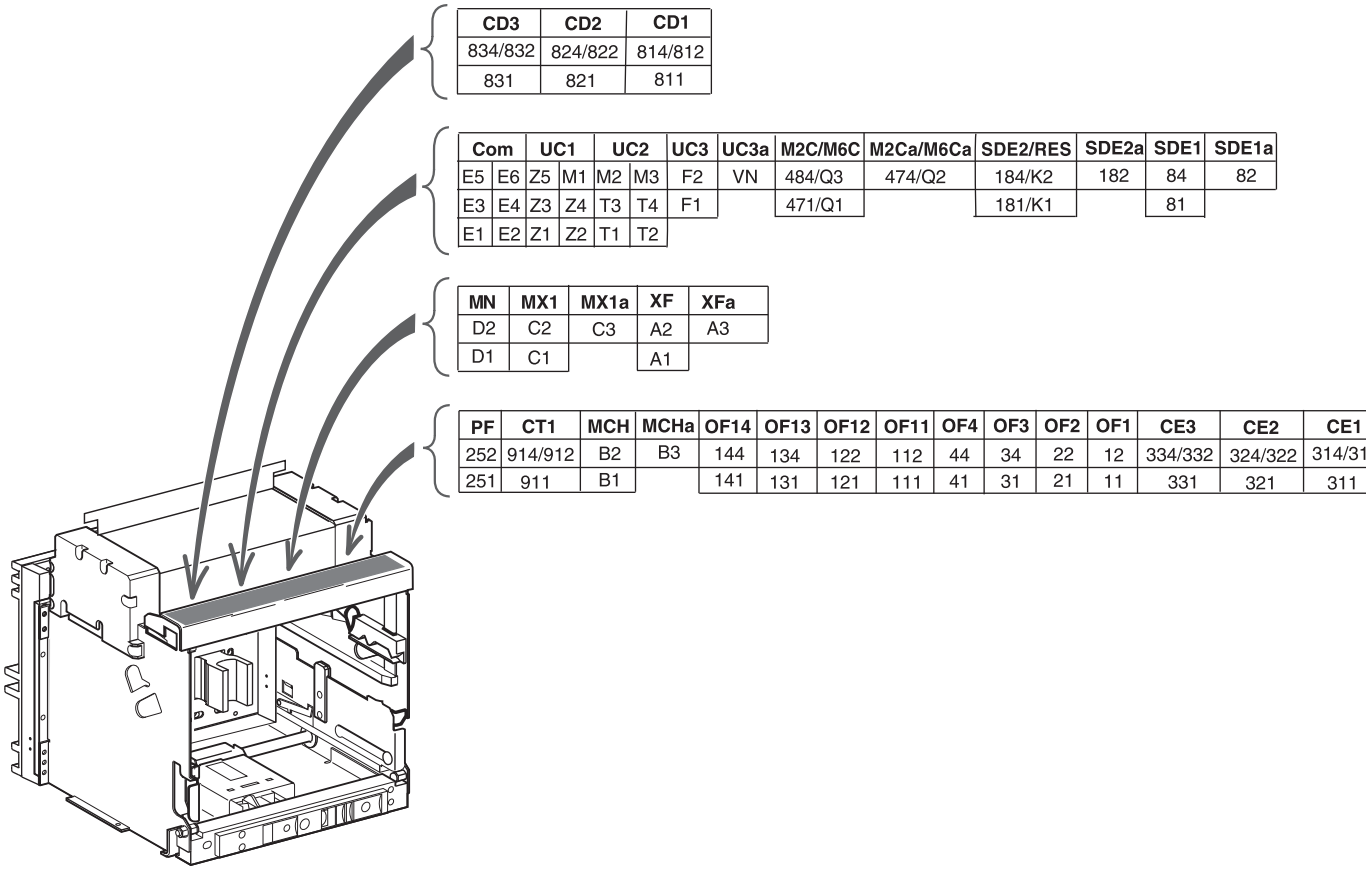
Accessory Connections Using Ring Terminal Connectors

Figure 21 – Terminal Layout for Ring Terminal Connector Installation



Function	Connector	Description
Auxiliary Contacts	OF[1]	Open/Closed Circuit Breaker or Switch Position Contacts
	EF	Combined Connected and Closed Contact
Cradle Contacts	CD	Disconnected Position Contacts
	CE	Connected Position Contacts
	CT	Test Position Contacts
Remote Operation	SDE	Electrical Fault Alarm Contact
	RES	Remote Reset
	MN	Undervoltage Trip Device
	MX[2]	Shunt Trip
	XF[2]	Shunt Close
	PF	Ready-to-Close Contact
	MCH	Spring-Charging Motor

[1] OF1, OF2, OF3 and OF4 contacts are standard.

[2] When communicating MX1 or XF coils are used, terminal (C3 or A3) must be connected to line even if the communication module is not installed. The bypass circuit through terminal C2/A2 is only momentary duty (0.5 sec). For continuous duty, use the communications command.

Trip Unit Type					
Basic	A	P	H	Connector	Description
–	•	•	•	Com: E1–E6	Communication
–	•	•	•	UC1: Z	Zone-Selective Interlocking
					Z1 = ZSI OUT Signal
					Z2 = ZSI OUT
					Z3 = ZSI IN Signal
					Z4 = ZSI IN Short Time
					Z5 = ZSI IN Ground Fault
–	•	•	•	UC1: M1	Modified Differential Ground Fault (MDGF)
–	•	•	•	UC2: T	External Neutral
–	•	•	•	UC2: M	Modified Differential Ground Fault (MDGF)
–	•	•	•	UC3: F	24 Vdc External Power Supply
–	–	•	•	UC3: Vn	External Neutral Plug
–	–	•	•	UC4	External Phase Voltage Sensing
–	–	•	•	M2C/M6C	Two Programmable Contacts (internal relay) or Six Programmable Contacts (for connection to external M6C module)

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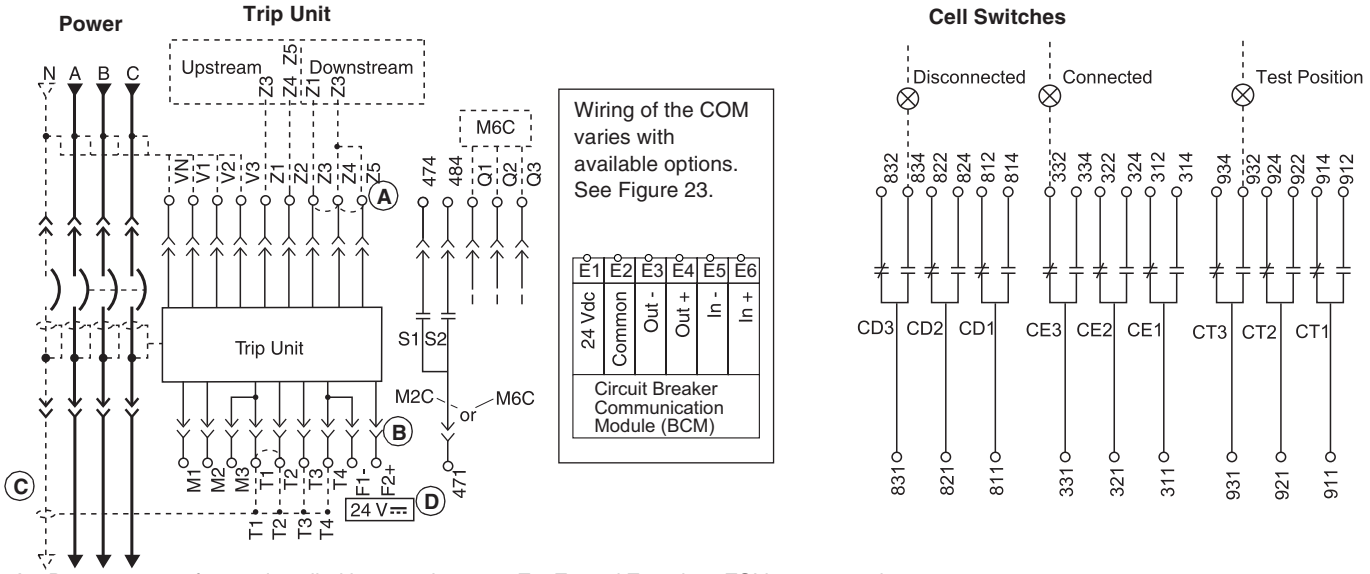
Wiring Diagrams for Auxiliary Connections

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

Figure 22 – Wiring Diagrams for Auxiliary Connections



A—Do not remove factory-installed jumpers between Z3, Z4 and Z5 unless ZSI is connected.
B—Do not remove factory-installed jumper between T1 and T2 unless neutral CT is connected. Do not install jumper between T3 and T4.
C—For proper wiring of neutral CT, refer to wiring schematics, pages 32 and 33.
D—24 Vdc power supply for trip unit must be separate and isolated from 24 Vdc power supply for communication modules.

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								

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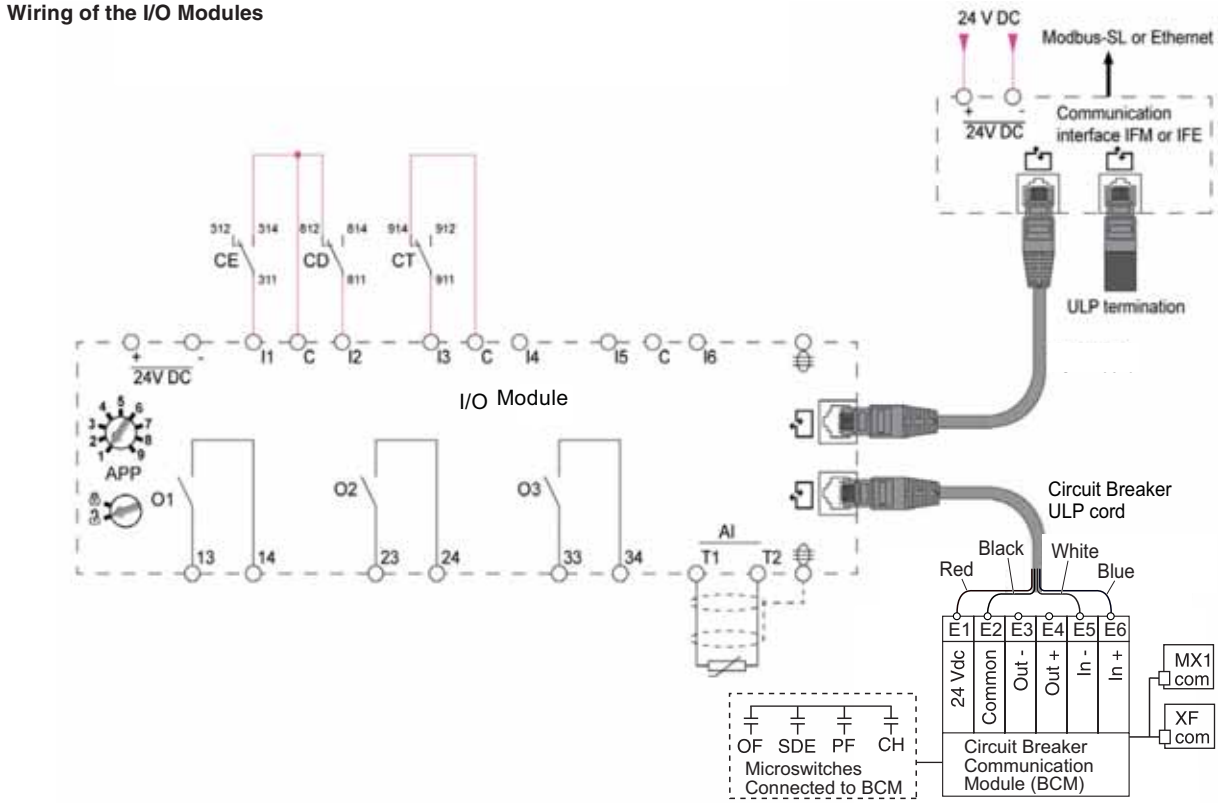
Figure 23 – Wiring Diagrams for the COM Option

Wiring of the I/O Modules



Wiring of the COM Option (Modbus BCM ULP and CCM Modules

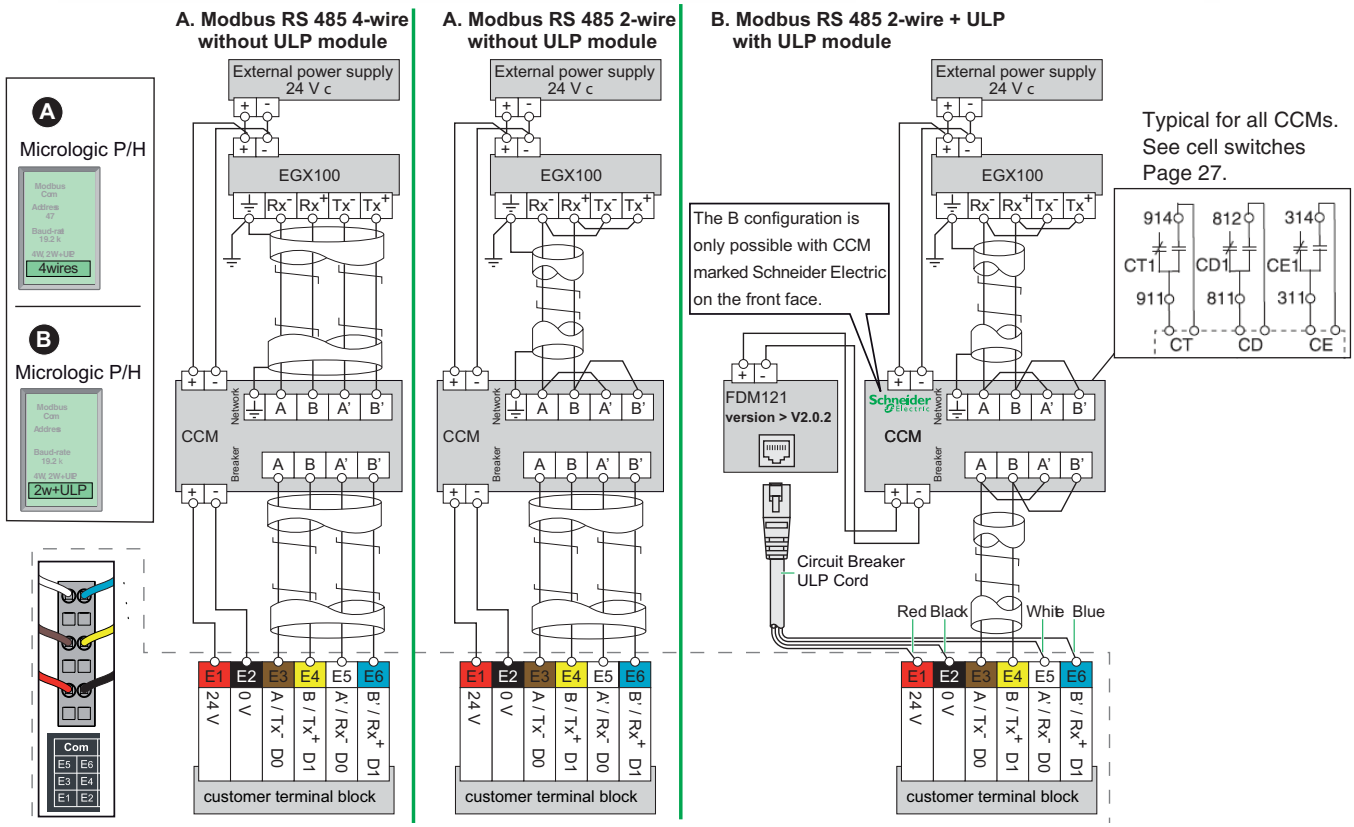


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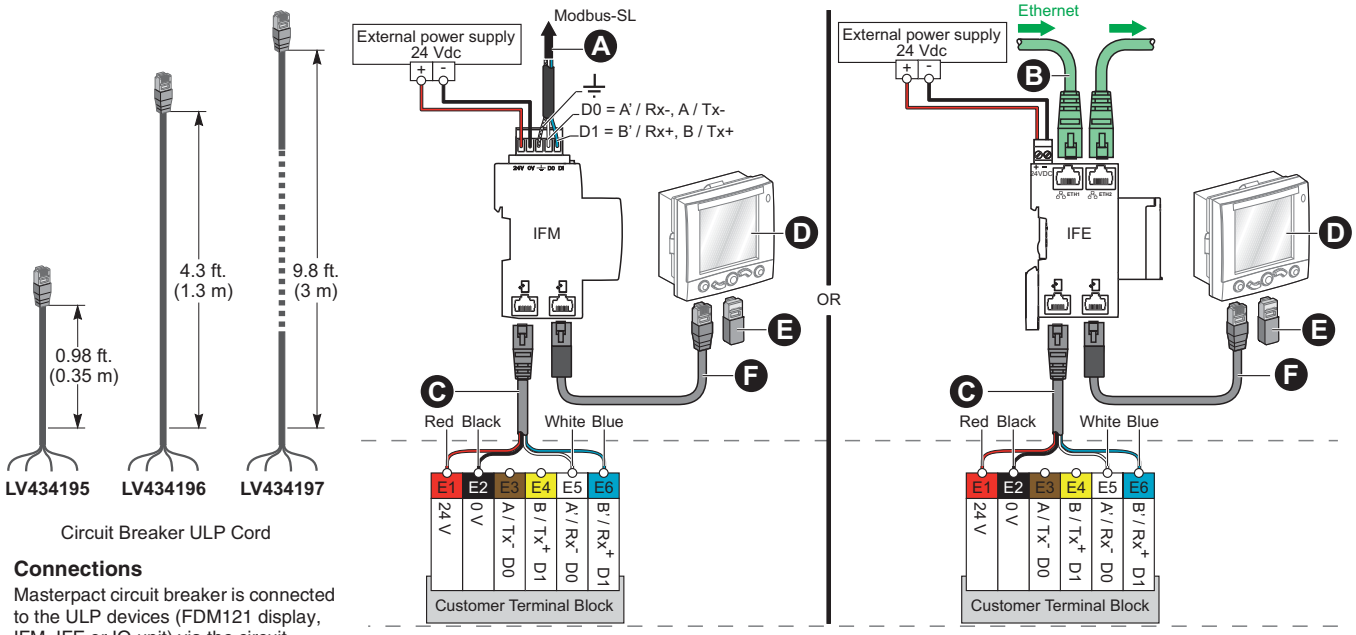
Figure 24 – Communication Components and FDM121 Connections



Circuit Breaker ULP Cord

Connections

Masterpact circuit breaker is connected to the ULP devices (FDM121 display, IFM, IFE or IO unit) via the circuit breaker ULP cord.

- Cord is available in three lengths: 0.98 ft. (0.35 m), 4.3 ft. (1.3 m) and 9.8 ft. (3 m).
- Lengths up to 32.9 ft. (10 m) are possible using extensions.

A. Modbus Network
B. Ethernet Network
C. Circuit Breaker ULP Cord
D. FDM Display
E. ULP Termination
F. ULP Cable

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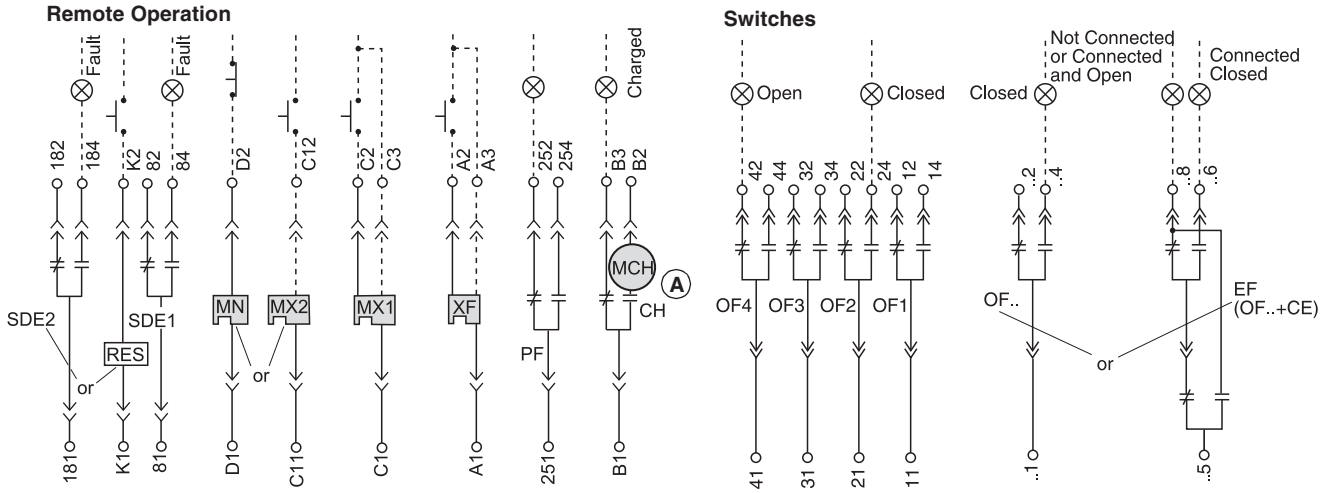
NOTE: All diagrams are showing circuit breaker open, connected and charged.

Figure 25 – 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

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

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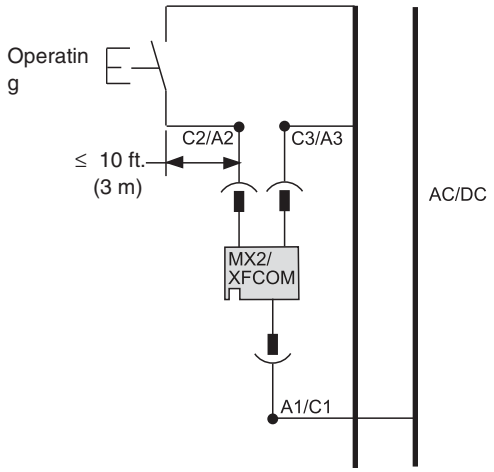
Communicating Shunt Trip (MX) and Shunt Close (XF)

A recommended wiring schematic for the communicating style shunt trip or shunt close coils is shown in Figure 26. Induced voltages in the circuit at terminal C2 and/or A2 can cause the shunt trip or shunt close to not work properly. The best way to prevent the 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 ten feet (three meters), use an interposing relay near terminal C2 or A2.

Figure 26 – Communicating Wiring Schematic

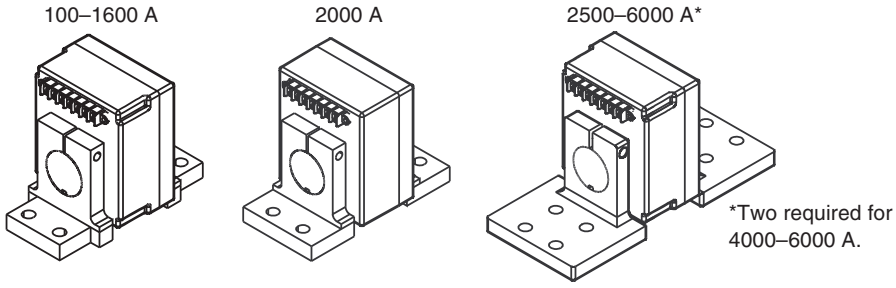


Ground-Fault Protection for Equipment

If the circuit breaker does not have an integral ground-fault tripping or alarm, skip this subsection.

A three-phase, four-wire circuit requires an external neutral current transformer (CT).

Figure 27 – Neutral Current Transformers



Connect the neutral CT to the circuit breaker according to wiring diagrams.

1. Connect the primary:
   - — If the load is connected to lower end of the circuit breaker, connect the load neutral to the H1 terminal of the neutral CT.
   - — If the source power is connected to the lower end of the circuit breaker, connect the source neutral to the H1 terminal of the neutral CT.

NOTE: The equipment grounding connection must be upstream (line side) of the neutral CT and a neutral connection must exist from the supply transformer to the equipment.

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For circuit breakers using Micrologic™ 5.0P, 5.0H, 6.0P, or 6.0H trip units, connect terminal Vn on the neutral current transformer to the Vn terminal of the control wiring terminal. (This is necessary to allow the trip unit to make voltage measurements.) Terminals Vc and Vn are internally connected.

NOTICE

HAZARD OF IMPROPER TRIP SYSTEM OPERATION

F1 and F2 must be isolated from ground. Verify all wiring per the instructions in this bulletin.

Failure to follow these instructions can result in a nuisance trip during closing.

2. Remove the factory-installed jumper connecting T1 and T2.
3. Feed the Belden® cable and plastic conduit from the neutral CT to the cradle terminals.
4. Connect the cable per the appropriate schematic in Figure 28 or 29.
5. Verify all wiring.

NOTE: Modified differential ground-fault circuitry and ground-source return ground-fault circuitry require the use of a modified differential ground-fault module (MDGF) and special current transformers. For wiring of those systems, see the instructions with the MDGF.

Figure 28 – Wiring Schematic for 800–4000 A Standard-Width NW Circuit Breakers

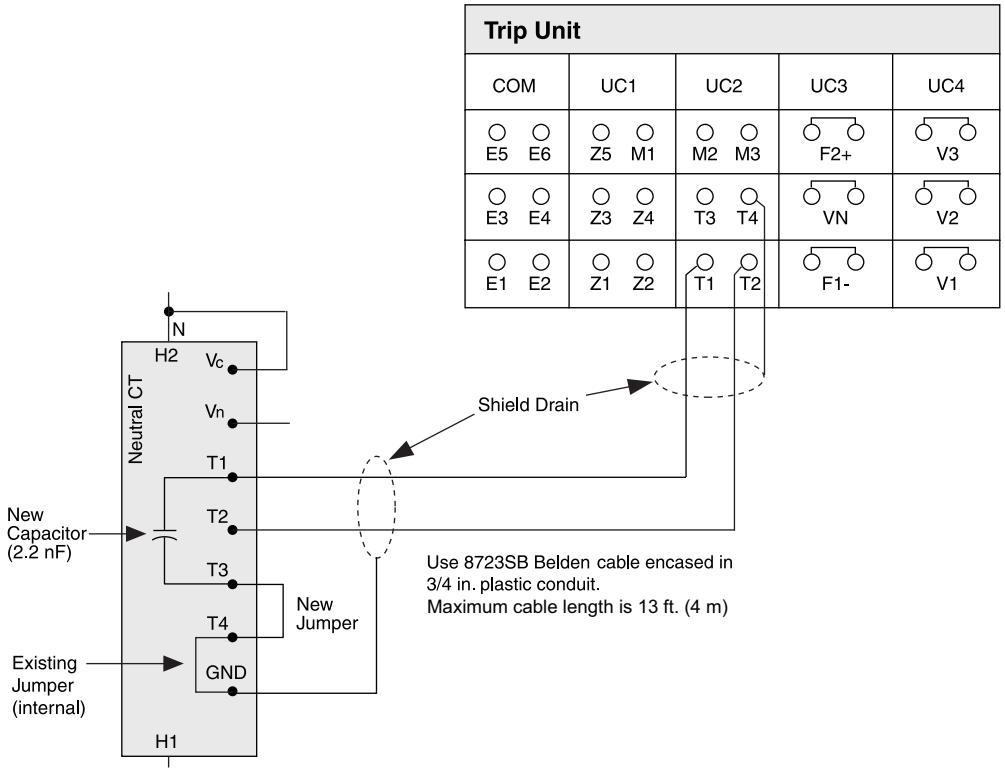

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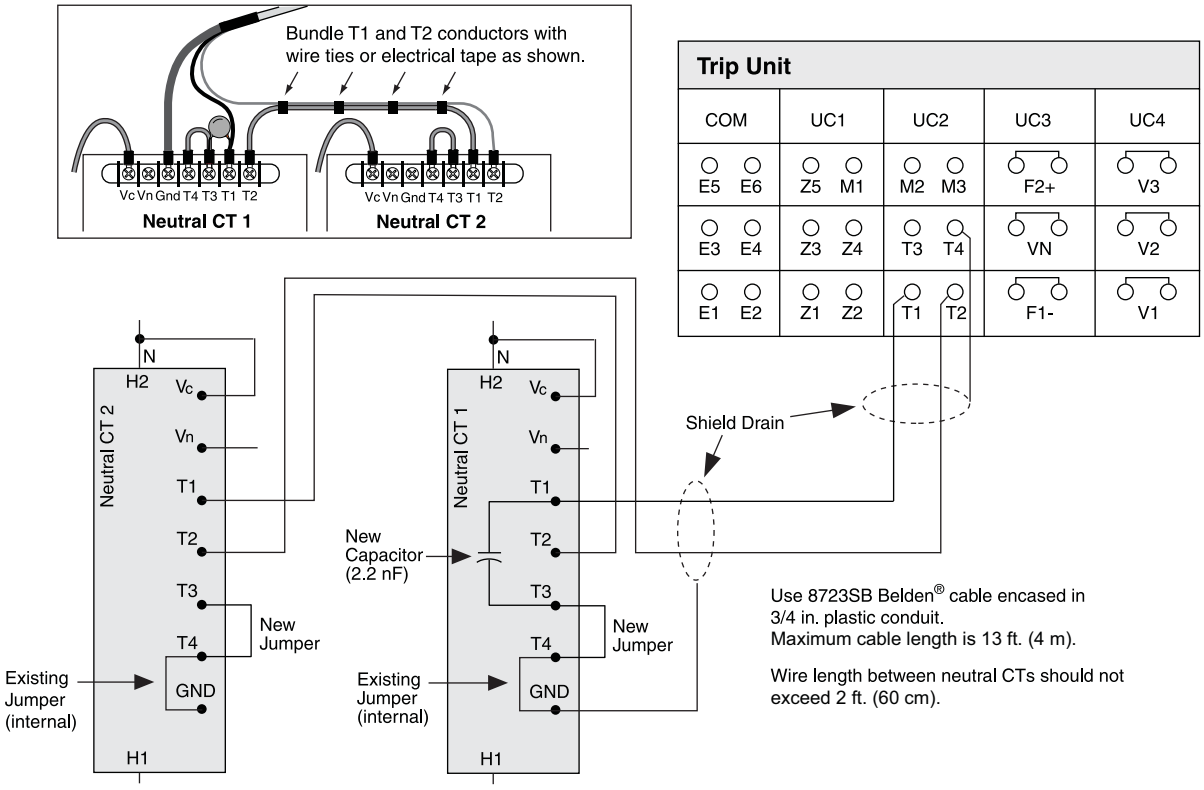
Figure 29 – Wiring Schematic for 3200–6000 A Wide-Construction NW Circuit Breakers

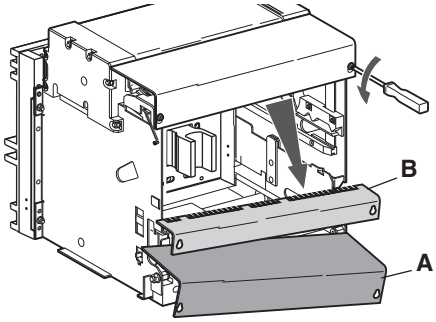


Accessory Wiring—Push-In Connectors

NOTE: Place cradle in test position to install or remove push-in connectors. Place in test position as described on page 70.

1. Remove the optional terminal cover (**Figure 30, A**), if installed, and the wiring cover (**B**).

Figure 30 – Remove Covers



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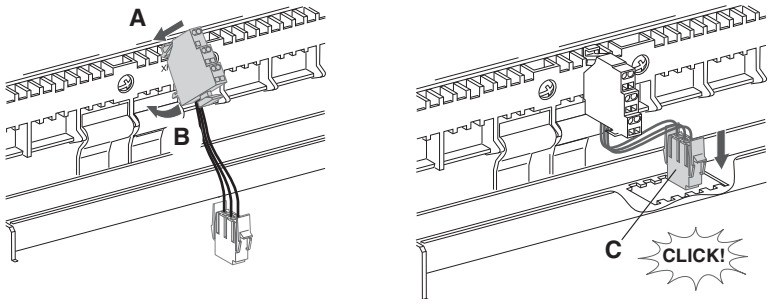
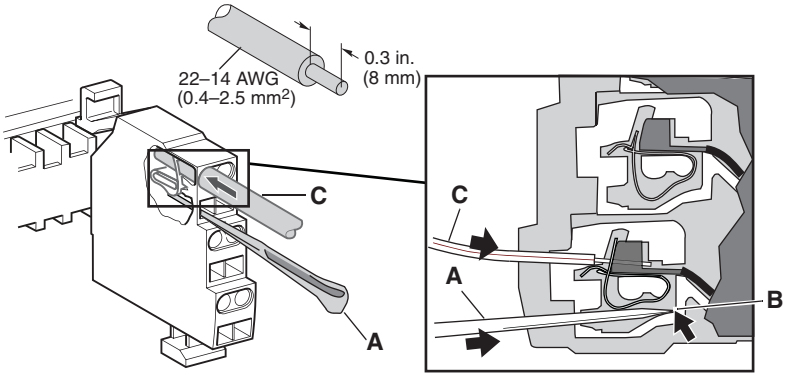
2. Install each push-in connectors in the correct slot (**Figure 31, A**). (Refer to the label on the cradle for standard positioning information.) Rotate the push-in connector down (**B**) to snap in place.
3. Install the wiring connector (**C**). Connector positions are indicated on front of the connector support.

Figure 31 – Install Push-In Connector



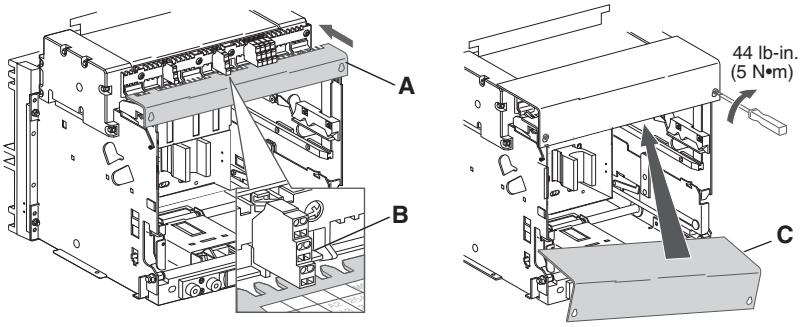
4. Push the Wago wire insert tool (**Figure 32, A**, Wago part no. 209-129) fully into the connector (to point **B**) and install control wires (**C**).

Figure 32 – Install Control Wires



5. Replace the wiring cover (**Figure 33, A**), sliding the top under the installed push-in connectors (**B**).
6. Replace the optional terminal cover (**C**), if installed.

Figure 33 – Replace Covers



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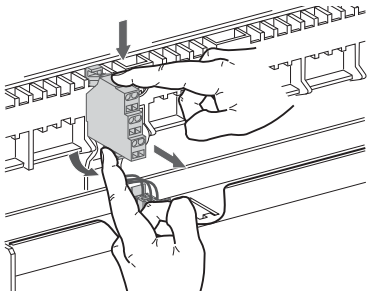
NOTE: Remove a push-in connector in reverse order of installation.

Remove the connector by pressing down on top of connector (**Figure 40, A**) while pushing up and out on bottom (**B**) to rotate connector off of latch.

Figure 34 – Remove Push-In Connector

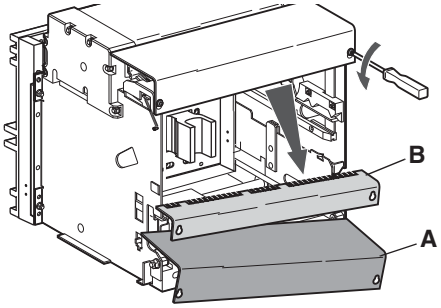


Accessory Wiring—Ring Terminal Connector

NOTE: Place the cradle in its test position to install or remove ring terminal connectors. Place in test position as detailed on page 70, Drawout Circuit Breaker Disconnection.

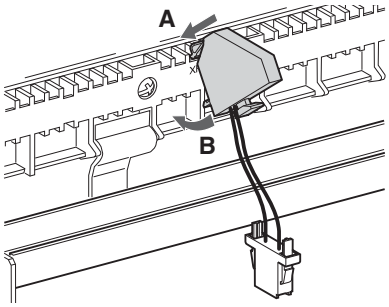
1. Remove the optional terminal cover (**Figure 35, A**), if installed, and the wiring cover (**B**).

Figure 35 – Remove Covers



2. Install each ring terminal connector in the correct slot (**Figure 36, A**). (Refer to the label on the cradle for standard positioning information.) Rotate the ring terminal block down (**B**) to snap in place.

Figure 36 – Install Ring Terminal Connector



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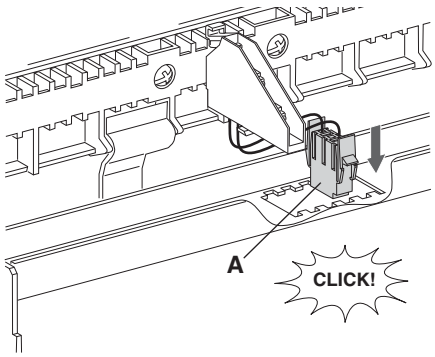
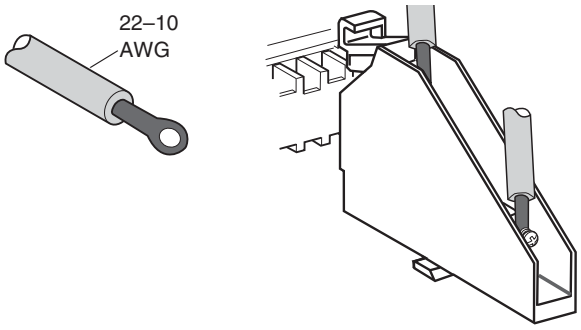
3. Install the wiring connector (**Figure 37, A**). Connector positions are indicated on front of the connector support.

Figure 37 – Install Wiring Connector



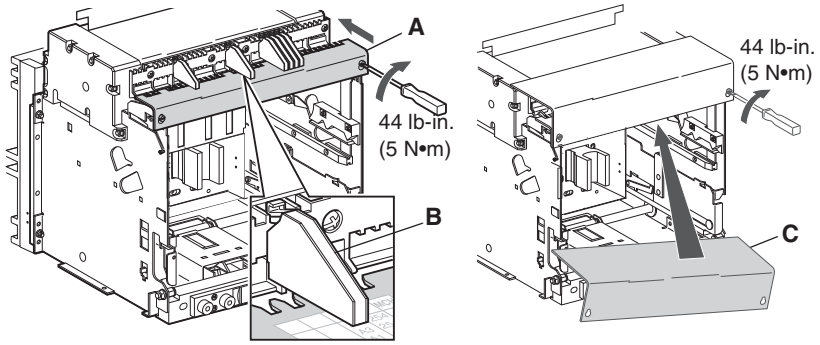
4. Install the ring terminals on the control wire. Secure the ring terminal on the ring terminal block.

Figure 38 – Install Control Wires



5. Replace the wiring cover (**Figure 39, A**), sliding the top under the installed ring terminal connectors (**B**).
6. Replace the optional terminal cover (**C**), if installed.

Figure 39 – Replace Wiring Cover



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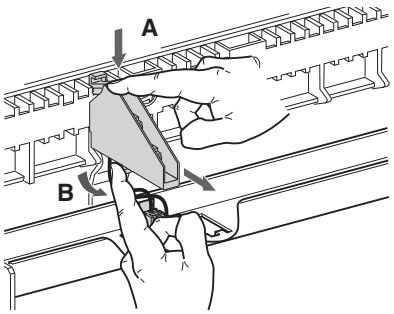
NOTE: To remove a ring terminal connector, the circuit breaker must be in test position. Remove the ring terminal connector in reverse order of installation.

Remove the connector by pressing down on top of connector (**Figure 40, A**) while pushing up and out on bottom (**B**) to rotate connector off of latch.

Figure 40 – Remove Ring Terminal Connector



Cradle Removal

1. Turn off all power supplying the equipment before working on or inside equipment.
2. Remove the cradle in reverse order of installation.

⚠ DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION OR ARC FLASH

- Apply appropriate personal protective equipment (PPE) and follow safe electrical work practices. See NFPA 70E or CSA Z462.
- This equipment must only be installed and serviced by qualified electrical personnel.

Failure to follow these instructions will result in death or serious injury.

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Circuit Breaker Installation

Cradle Rejection Kit

To prevent a Masterpact circuit breaker with an inappropriate ampacity or interrupting rating from being installed in the cradle, install rejection pins on cradle and circuit breaker prior to installing circuit breaker.

1. Determine rejection pin pattern required. (See Table 8 or 9.)

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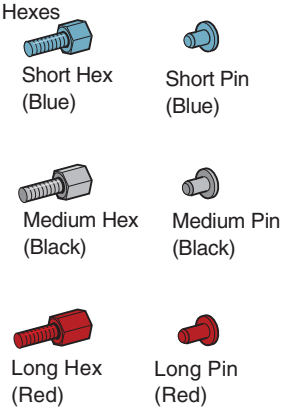
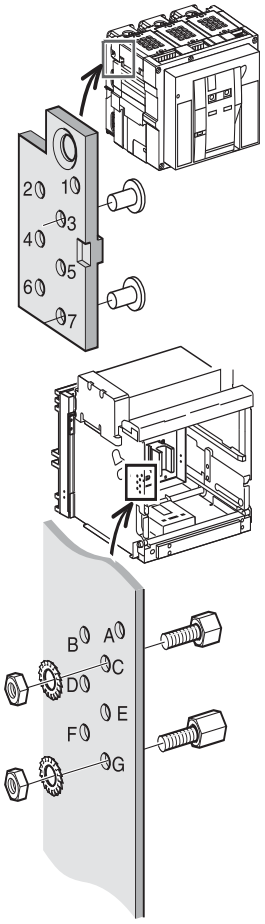
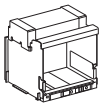
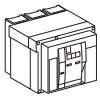
Table 8 – Recommended Cradle Rejection Pin Keying for Standard UL 1066 (ANSI C37.50) Listed Circuit Breakers

Cradle Rejection Hexes

Circuit Breaker Rejection Pins





Type														
	A	B	C	D	E	F	G	1	2	3	4	5	6	7
800 A N1	Black	Black	Black	Red	Blue	Blue	Black	Blue	Blue	Blue	—	Black	Black	Blue
800 A H1	Black	Black	Black	Blue	Red	Black	Blue	Blue	Blue	Blue	Black	—	Blue	Black
800 A H2	Black	Black	Black	Red	Red	Blue	Blue	Blue	Blue	Blue	—	—	Black	Black
800 A H3	Black	Black	Black	Blue	Blue	Red	Blue	Blue	Blue	Blue	Black	Black	—	Black
800 A L1	Black	Black	Black	Red	—	Red	Blue	Blue	Blue	Blue	—	Red	—	Black
800 A L1F	Black	Black	Black	—	Red	Red	Blue	Blue	Blue	Blue	Red	—	—	Black
800 A HF	Black	Black	Black	Blue	—	Red	Red	Blue	Blue	Blue	Black	Red	—	—
800 A HC	Black	Blue	Black	Red	—	Red	Red	Blue	Black	Blue	—	Red	—	—
800 A HA	Black	Black	Black	Red	Red	—	Red	Blue	Blue	Blue	—	—	Red	—
1600 A N1	—	Red	Blue	Red	Blue	Blue	Black	Red	—	Black	—	Black	Black	Blue
1600 A H1	—	Red	Blue	Blue	Red	Black	Blue	Red	—	Black	Black	—	Blue	Black
1600 A H2	—	Red	Blue	Red	Red	Blue	Blue	Red	—	Black	—	—	Black	Black
1600 A H3	—	Red	Blue	Blue	Blue	Red	Blue	Red	—	Black	Black	Black	—	Black
1600 A L1	—	Red	Black	Red	—	Red	Blue	Red	—	Blue	—	Red	—	Black
1600 A L1F	—	Red	Black	—	Red	Red	Blue	Red	—	Blue	Red	—	—	Black
1600 A HF	—	Red	Black	Blue	—	Red	Red	Red	—	Black	Black	Red	—	—
1600 A HC	—	Red	Blue	Red	—	Red	Red	Red	—	Black	—	Red	—	—
1600 A HA	—	Red	Blue	Red	Red	—	Red	Red	—	Black	—	—	Red	—
2000 A H1	Red	—	Red	Blue	Red	Black	Blue	—	Red	—	Black	—	Blue	Black
2000 A H2	Red	—	Red	Red	Red	Blue	Blue	—	Red	—	—	—	Black	Black
2000 A H3	Red	—	Red	Blue	Blue	Red	Blue	—	Red	—	Black	Black	—	Black
2000 A L1	Red	—	Red	Red	—	Red	Blue	—	Red	—	—	Red	—	Black
2000 A L1 Wide*	—	Red	Red	Red	Blue	Red	Black	Red	—	—	—	Black	—	Blue
2000 A L1F	Red	—	Red	—	Red	Red	Blue	—	Red	—	Red	—	—	Black
2000 A HF	Red	—	Red	Blue	—	Red	Red	—	Red	—	Black	Red	—	—
2000 A HC	Red	—	Blue	Red	—	Red	Red	—	Red	Black	—	Red	—	—
2000 A HA	Red	—	Red	Red	Red	—	Red	—	Red	—	—	—	Red	—
3200 A H1	Blue	Black	Red	Black	Red	Black	Black	Black	Blue	—	Blue	—	Blue	Blue
3200 A H2	Blue	Black	Red	Red	Red	Black	Blue	Black	Blue	—	—	—	Blue	Black
3200 A H3	Blue	Black	Red	Blue	Black	Red	Blue	Black	Blue	—	Black	Blue	—	Blue
3200 A HF	Blue	Black	Red	—	—	Red	Red	Black	Blue	—	Red	Red	—	—
3200 A HC	—	Black	Red	Red	—	Red	Red	Red	Blue	—	—	Red	—	—
3200 A HC Wide*	Red	Blue	Black	Red	Black	Red	Red	—	Black	Blue	—	Blue	—	—
3200 A L1 Wide*	Red	Black	Blue	Red	Black	Red	Black	—	Blue	Black	—	Blue	—	Blue
3200 A HA	—	Black	Red	Red	Red	—	Red	Black	Blue	—	—	—	Red	—
4000 A H2 Wide*	Black	Red	Blue	Red	Red	Black	Blue	Blue	—	Black	—	—	Blue	Black
4000 A H3 Wide*	Black	Red	Blue	Blue	Black	Red	Blue	Blue	—	Black	Black	Blue	—	Black
4000 A HA Wide*	Blue	Red	Blue	Red	Red	—	Red	Black	—	Blue	—	—	Red	—
4000 A HC Wide*	Blue	Red	Blue	Red	Blue	Red	Red	Black	—	Blue	—	Black	—	—
4000 A HF Wide*	Blue	Red	Blue	Blue	Black	Red	Red	Black	—	Blue	Black	Blue	—	—
4000 A L1 Wide*	Black	Red	Blue	Red	Blue	Red	Black	Blue	—	Black	—	Black	—	Blue
5000 A H2	Red	Black	Black	Red	Red	Black	Blue	—	Blue	Blue	—	—	Blue	Black
5000 A H3	Red	Black	Black	Blue	Black	Red	Blue	—	Blue	Blue	Black	Blue	—	Black
5000 A HA	Red	Black	Blue	Red	Red	—	Red	—	Blue	Black	—	—	Red	—
5000 A HF	Red	Black	Blue	Blue	Black	Red	Red	—	Blue	Black	Black	Blue	—	—
5000 A HC	Red	Black	Blue	Red	Blue	Red	Red	—	Blue	Black	—	Black	—	—
5000 A L1	Red	Black	Black	Red	Blue	Red	Black	—	Blue	Blue	—	Black	—	Blue
6000 A H2	Black	Black	Red	Red	Red	Black	Blue	Blue	Blue	—	—	—	Blue	Black
6000 A H3	Black	Black	Red	Blue	Black	Red	Blue	Blue	Blue	—	Black	Blue	—	Black
6000 A HA	Blue	Blue	Red	Red	Red	—	Red	Black	Black	—	—	—	Red	—
6000 A HF	Blue	Blue	Red	Blue	Black	Red	Red	Black	Black	—	Black	Blue	—	—
6000 A HC	Blue	Blue	Red	Red	Blue	Red	Red	Black	Black	—	—	Black	—	—
6000 A L1	Black	Black	Red	Red	Blue	Red	Black	Blue	Blue	—	—	Black	—	Blue

* Wide construction version.

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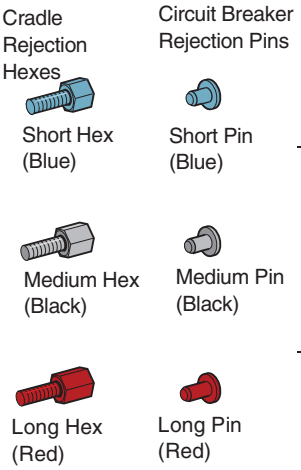
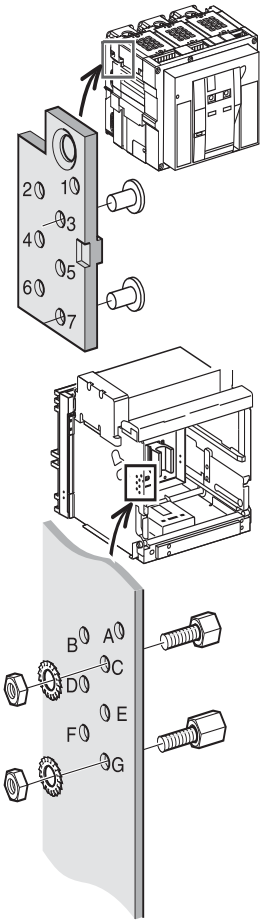
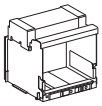
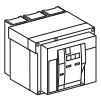
ENGLISH

Table 9 – Recommended Cradle Rejection Pin Keying for Standard UL 489 Listed Circuit Breakers





Type														
	A	B	C	D	E	F	G	1	2	3	4	5	6	7
800 A N	Black	Black	Black	Red	Red	Red	—	Blue	Blue	Blue	—	—	—	Red
800 A H	Black	Black	Blue	Blue	Blue	Blue	Red	Blue	Blue	Black	Black	Black	Black	—
800 A L	Black	Black	Black	Red	—	Blue	Red	Blue	Blue	Blue	—	Red	Black	—
800 A LF	Black	Blue	Black	Blue	Red	Blue	Red	Blue	Black	Blue	Black	—	Black	—
800 A HF	Black	Blue	Black	—	Red	Red	Black	Blue	Black	Blue	Red	—	—	Blue
800 A HB	Blue	Black	Black	Red	Red	Red	Black	Black	Blue	Blue	—	—	—	Blue
1200 A N	Red	Blue	Black	Red	Red	Red	—	—	Black	Blue	—	—	—	Red
1200 A H	Red	Blue	Black	Blue	Blue	Blue	Red	—	Black	Blue	Black	Black	Black	—
1200 A L	Red	Blue	Black	Red	—	Blue	Red	—	Black	Blue	—	Red	Black	—
1200 A LF	Red	Blue	Blue	Blue	Red	Blue	Red	—	Black	Black	Black	—	Black	—
1200 A HF	Red	Black	Blue	—	Red	Red	Red	—	Blue	Black	Red	—	—	—
1200 A HB	Black	Blue	Blue	Red	Red	Red	Red	Blue	Black	Black	—	—	—	—
1600 A N	—	Red	Blue	Red	Red	Red	—	Red	—	Black	—	—	—	Red
1600 A H	—	Red	Black	Blue	Blue	Blue	Red	Red	—	Blue	Black	Black	Black	—
1600 A L	—	Red	Black	Red	—	Blue	Red	Red	—	Blue	—	Red	Black	—
1600 A LF	—	Red	Blue	Blue	Red	Blue	Red	Red	—	Black	Black	—	Black	—
1600 A HF	—	Red	Blue	—	Red	Red	Red	Red	—	Black	Red	—	—	—
1600 A HB	—	Red	—	Red	Red	Red	Red	Red	—	Red	—	—	—	—
2000 A N	Red	—	Red	Red	Red	Red	—	—	Red	—	—	—	—	Red
2000 A H	Red	—	Red	Blue	Blue	Blue	Red	—	Red	—	Black	Black	Black	—
2000 A L	Red	—	Red	Red	—	Blue	Red	—	Red	—	—	Red	Black	—
2000 A LF	Red	—	Black	Blue	Red	Blue	Red	—	Red	Blue	Black	—	Black	—
2000 A HF	Black	—	Red	—	Red	Red	Red	Blue	Red	—	Red	—	—	—
2000 A HB	Red	—	—	Red	Red	Red	Red	—	Red	Red	—	—	—	—
2500 A H	—	Blue	Red	Red	Red	Red	—	Red	Blue	—	Black	Black	Black	—
2500 A L	—	Black	Red	Blue	Blue	Blue	Red	Red	Black	—	—	—	—	Red
2500 A HF	—	Blue	Red	—	Red	Red	Red	Red	Black	—	Red	—	—	—
2500 A HB	—	—	Red	Red	Red	Red	Red	Red	Red	—	—	—	—	—
3000 A H	Blue	Red	—	Red	Red	Red	—	Black	—	Red	—	—	—	Red
3000 A L	Black	Red	—	Blue	Blue	Blue	Red	Blue	—	Red	Black	Black	Black	—
3000 A HF	Blue	Red	—	—	Red	Red	Red	Black	—	Red	Red	—	—	—
3000 A HB	—	Black	Blue	Red	Red	Red	Red	Red	Blue	Black	—	—	—	—
4000 A H Wide*	Black	Red	Blue	Blue	Blue	Black	Red	Blue	—	Black	Black	Black	Blue	—
4000 A L Wide*	Black	Red	Blue	Red	Blue	Blue	Red	Blue	—	Black	—	Black	Black	—
4000 A HF Wide*	Blue	Red	Blue	—	Red	Red	Red	Black	—	Blue	Red	—	—	—
4000 A HB Wide*	Blue	Red	Blue	Black	Red	Blue	Red	Black	—	Blue	Blue	—	Black	—
5000 A H	Red	Black	Black	Blue	Blue	Black	Red	—	Blue	Blue	Black	Black	Blue	—
5000 A L	Red	Black	Black	Red	Blue	Blue	Red	—	Blue	Blue	—	Black	Black	—
5000 A HF	Red	Black	Blue	—	Red	Red	Red	—	Blue	Black	Red	—	—	—
5000 A HB	Red	Black	Blue	Black	Red	Blue	Red	—	Blue	Black	Blue	—	Black	—
6000 A H	Black	Black	Red	Blue	Blue	Black	Red	Blue	Blue	—	Black	Black	Blue	—
6000 A L	Black	Black	Red	Red	Blue	Blue	Red	Blue	Blue	—	—	Black	Black	—
6000 A HF	Blue	Blue	Red	—	Red	Red	Red	Black	Black	—	Red	—	—	—
6000 A HB	Blue	Blue	Red	Black	Red	Blue	Red	Black	Black	—	Blue	—	Black	—

* Wide construction version.

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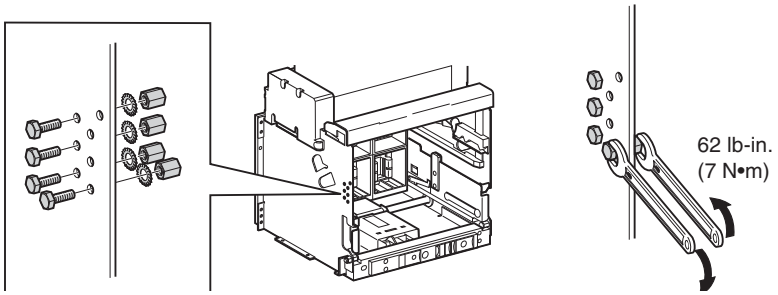
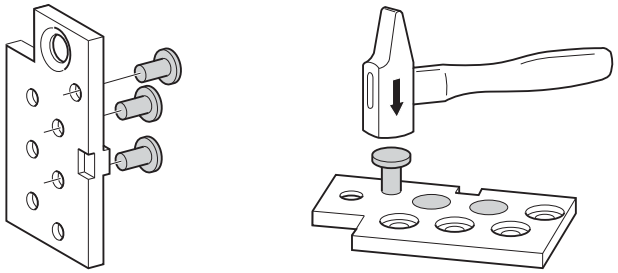
2. Install cradle rejection pins in the pattern determined from Table 8 or 9.

Figure 41 – Install Cradle Rejection Pins



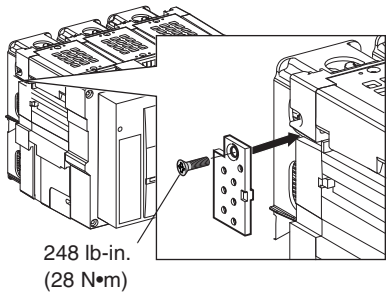
3. Install the circuit breaker rejection pins into the rejection pin plate in the pattern determined from Table 8 or 9.

Figure 42 – Install Circuit Breaker Rejection Pins



4. Install the rejection pin plate on the circuit breaker.

Figure 43 – Install Rejection Pin Plate



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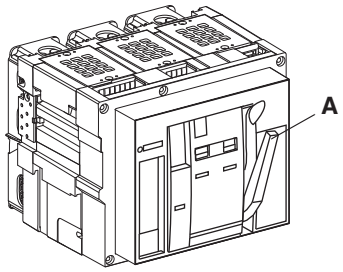
Install Accessories

Install any required circuit breaker accessories which were not factory installed.

If installing electrical accessories, remove accessory cover.

NOTICE
HAZARD OF EQUIPMENT DAMAGE Use caution when removing or replacing the circuit breaker accessory cover. The spring-charging handle (**Figure 44, A**) extends through the circuit breaker accessory cover and can be damaged when removing the accessory cover. **Failure to follow these instructions can result in equipment damage.**

Figure 44 – Spring Charging Handle

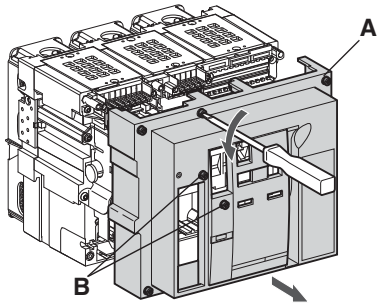


Loosen the accessory cover screws and remove the accessory cover (**Figure 45, A**).

NOTE: Screws (**B**) are for Type L, LF, L1, and L1F circuit breakers only.

Install accessory as instructed in the instructions packed with each accessory.

Figure 45 – Remove Accessory Cover



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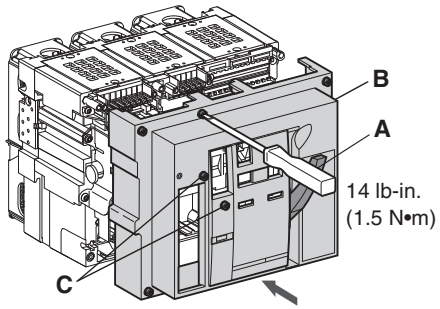
Replace the accessory cover by pulling the handle (**Figure 46, A**) forward and sliding the circuit breaker accessory cover (**B**) down over the handle. Tighten the accessory cover screws.

NOTE: Screws (**C**) are for Type L, LF, L1, and L1F circuit breakers only.

Figure 46 – Replace Accessory Cover



Install Circuit Breaker

NOTICE

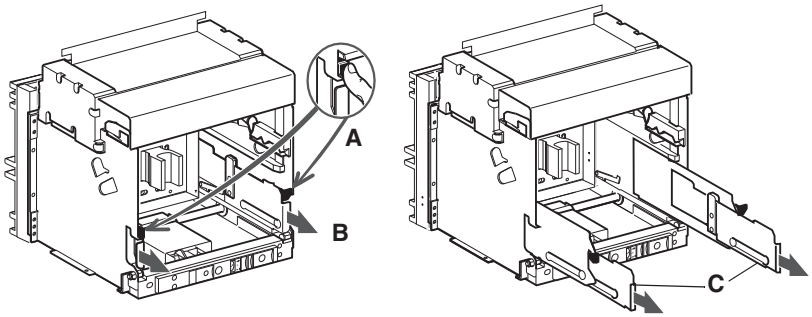
HAZARD OF EQUIPMENT DAMAGE

Cradle must be secured when installing or removing circuit breaker.

Failure to follow these instructions can result in equipment damage.

1. Press the latching tabs (**Figure 47, A**), then pull out the extension rail handles (**B**) until the extension rails (**C**) are fully extended.
2. Inspect the circuit breaker clusters for missing or misaligned clusters. See page 11 for information on checking, installing, and lubricating clusters.

Figure 47 – Pull Out Rails



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NOTICE

HAZARD OF EQUIPMENT DAMAGE

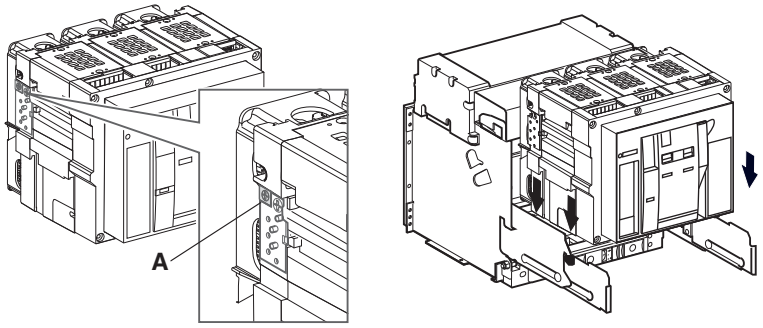
The shutter actuator must be installed on the circuit breaker for proper operation of cell shutters.

Failure to follow these instructions can result in equipment damage.

3. For cells with shutters, check that the shutter actuator (**Figure 48, A**) is installed on the circuit breaker.
4. Install the circuit breaker on the extension rails. See page 16 for proper lifting equipment.

   NOTE: The cradle must be secured on a pallet if it is not installed in the equipment prior to installing the circuit breaker.

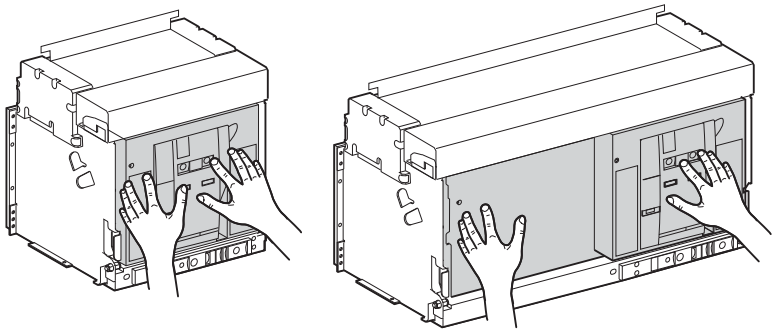
Figure 48 – Check Shutter Actuator



5. Push in the circuit breaker.
6. Connect the circuit breaker. See page 68, Drawout Circuit Breaker Connection for instructions on connecting the circuit breaker.

   See Section 6—Operation for instructions on operating the circuit breaker.

Figure 49 – Push In Circuit Breaker



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Test Equipment Ground-Fault Protection

Paragraph 230-95(c) of the National Electrical Code requires that all equipment ground-fault protection systems be tested when first installed. If the circuit breaker has equipment ground-fault protection installed, test it at this time.

Make sure the trip unit is powered. The trip unit is powered if:

- The circuit breaker is closed or bottom-fed and has more than 100 V of load voltage on two phases (P or H trip unit only).
- The full-function or hand-held test kit is connected and on.
- A 24 Vdc external power supply is connected.
- An external voltage tap is installed and a voltage of more than 100 V is present on two phases (P or H trip unit only).

If this is a radial (single-ended) system, press the ground-fault push-to-test button (**Figure 50, A**). The circuit breaker will trip and the trip unit ground-fault indicator light will come on.

Record results in Table 10.

If a complete check of the ground-fault system is necessary, use primary injection testing. If the system has multiple sources and/or requires field connections at the job site, use primary injection testing.

Figure 50 – Test Ground-Fault Push-to-Test

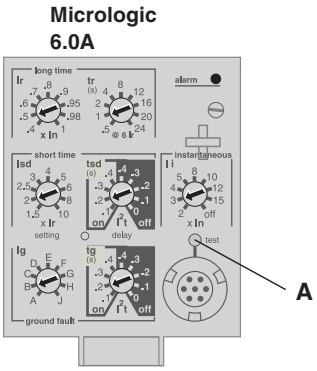

Table 10 – Ground-Fault Test Results

Date	Ground-Fault Settings	Test Results	Signature

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Circuit Breaker Removal

NOTICE

HAZARD OF EQUIPMENT DAMAGE

Cradle must be secured when installing or removing circuit breaker.

Failure to follow these instructions can result in equipment damage.

⚠ DANGER

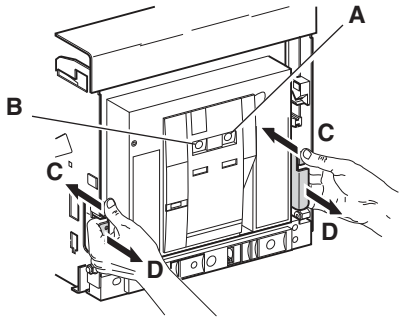
HAZARD OF DEVICE FALLING

- Be sure lifting equipment has lifting capacity for the unit being lifted. Follow manufacturer's instructions for use of lifting equipment.
- Wear hard hat, safety shoes and heavy gloves.

Failure to follow these instructions will result in death or serious injury.

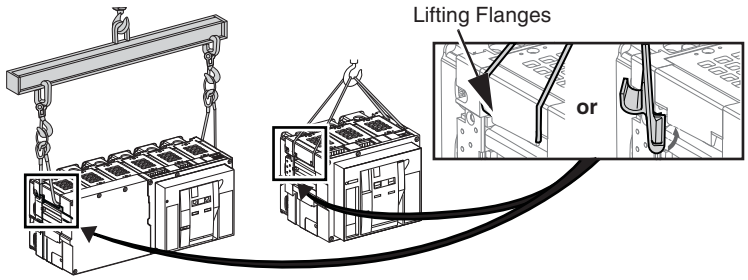
1. Disconnect circuit breaker as detailed on page 70, Drawout Circuit Breaker Disconnection.
2. With the circuit breaker in the disconnected position, press the "push ON" button (**Figure 51, A**) to close the circuit breaker.
3. Press the "push OFF" button (**B**) to open the circuit breaker.
4. Press latching tabs (**C**), then pull out extension rail handles (**D**).

Figure 51 – Circuit Breaker Removal



5. Remove circuit breaker from cradle rails using lifting flanges on sides of circuit breaker, see Section 2—Lifting and Transporting.

Figure 52 – Overhead Lifting



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Section 4— Fixed-Mounted Circuit Breaker Installation

Circuit Breaker Installation

Turn off all power supplying this equipment before working on or inside equipment.

Install Accessories

Install circuit breaker accessories not purchased as factory installed at this time.

If installing electrical accessories, remove accessory cover.

⚠ DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION OR ARC FLASH

- Apply appropriate personal protective equipment (PPE) and follow safe electrical work practices. See NFPA 70E or CSA Z462.
- This equipment must only be installed and serviced by qualified electrical personnel.
- Turn off all power supplying this equipment before working on or inside equipment.
- Always use a properly rated voltage sensing device to confirm power is off.
- Replace all devices, doors and covers before turning on power to this equipment.

Failure to follow these instructions will result in death or serious injury.

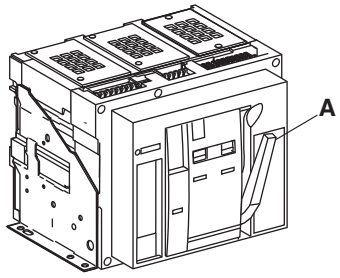
NOTICE

HAZARD OF EQUIPMENT DAMAGE

Use caution when removing or replacing the circuit breaker accessory cover. The spring-charging handle (**Figure 53, A**) extends through the circuit breaker accessory cover and can be damaged when removing the accessory cover.

Failure to follow these instructions can result in equipment damage.

Figure 53 – Spring Charging Handle



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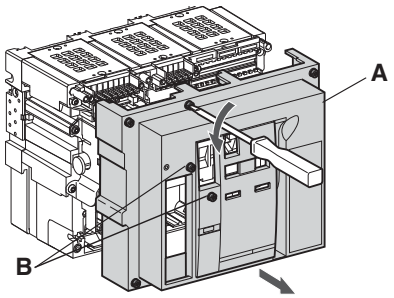
1. Loosen the accessory cover screws and remove the accessory cover (**Figure 54, A**).

   NOTE: Screws (**B**) are for Type L and L1 circuit breakers only.
2. Install accessories as instructed in the instructions packed with each accessory.

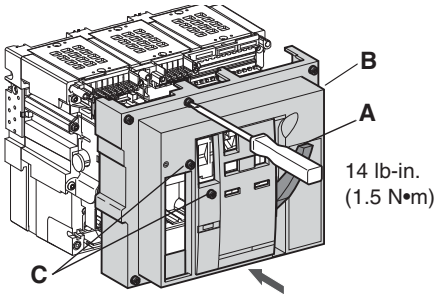
Figure 54 – Remove Accessory Cover



3. Replace the accessory cover by pulling the handle (**Figure 55, A**) forward and sliding the circuit breaker accessory cover (**B**) down over the handle. Tighten the accessory cover screws.

   NOTE: Screws (**C**) are for Type L and L1 circuit breakers only.

Figure 55 – Replace Accessory Cover



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Clearance Requirements

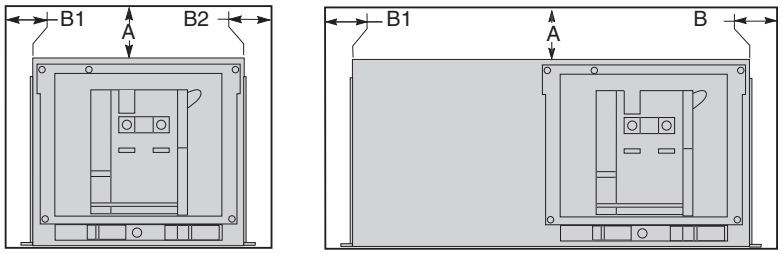
⚠ DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION OR ARC FLASH

Clearance requirements must be met for proper operation of the equipment.

Failure to follow these instructions will result in death or serious injury.

Table 11 – Clearance Requirements



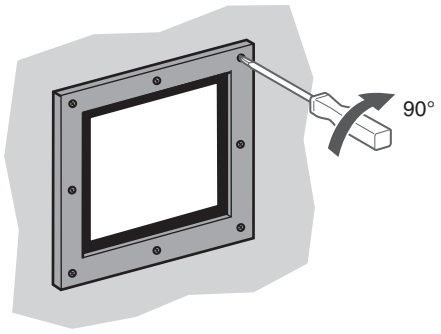
Minimum Clearance	A		B1 + B2	
	in.	mm	in.	mm
Insulated Parts	5.91	150	2.36	60
Metal Parts	5.91	150	5.72	120

Install Door Escutcheon

If the equipment has a door cutout, install the escutcheon shipped with circuit breaker.

1. If not already present, cut an opening in the equipment door for the escutcheon. For the opening dimensions, refer to bulletin 0613IB1205 on the Schneider Electric™ website (for website information see page 5).
2. Install the escutcheon.

Figure 56 – Install Door Escutcheon



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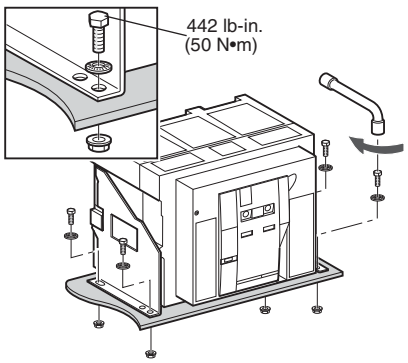
Install Circuit Breaker

1. If mounting holes are not already present, drill the mounting holes in the pan for mounting the circuit breaker. For circuit breaker mounting hole pattern dimensions, refer to bulletin 0613IB1205 on the Schneider Electric website (for website information see page 5).
2. Check flatness of the mounting surface. Mounting surface must be flat to within 0.08 in. (2 mm).
3. Mount the circuit breaker to pan, using 3/8 in. bolts, washers, and nuts.

NOTE: Vertical mounting brackets are available, if needed.

Figure 57 – Secure Circuit Breaker



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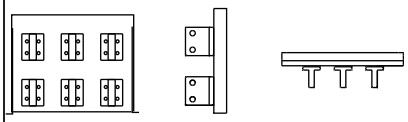
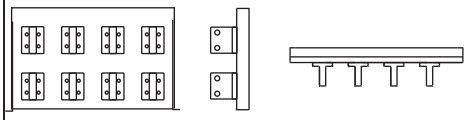
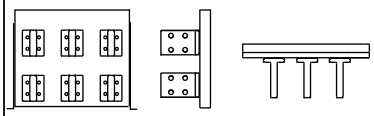
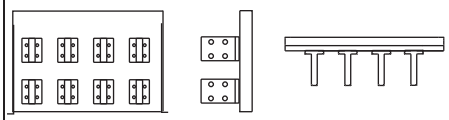
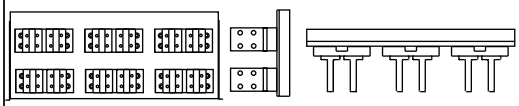
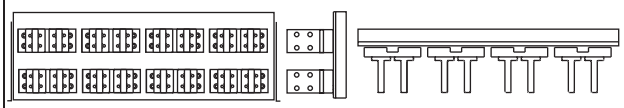
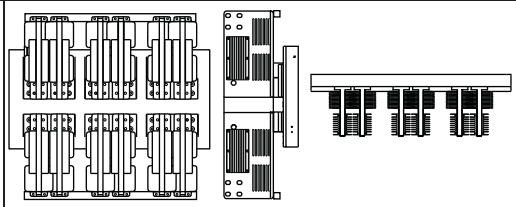
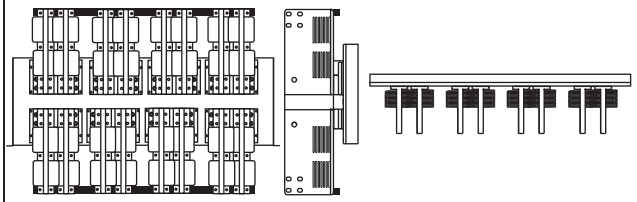
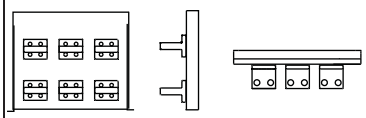
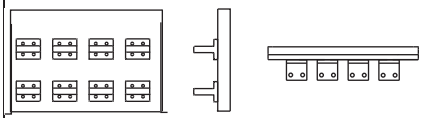
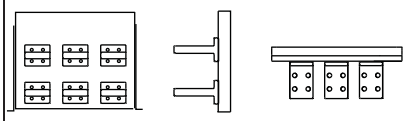
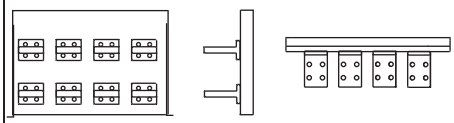
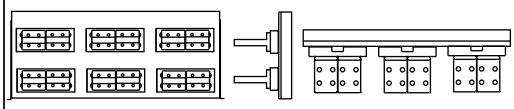
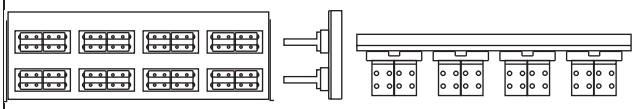
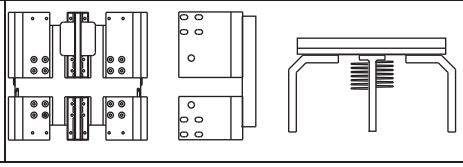
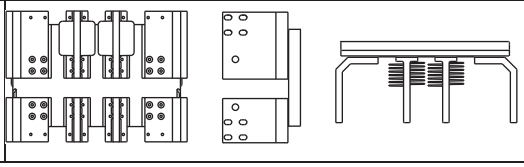
Install Connectors

Standard connectors are shown in Table 12. Tighten the mounting screws to 142–159 lb-in. (16–18 N•m).

For information on non-standard connectors, contact the field office.

For connector dimensions, refer to bulletin 0613IB1205 on the Schneider Electric website (for website information see page 5).

Table 12 – Standard Connectors

Type	Rating	3-Pole Layout Front – Side – Top	4-Pole Layout Front – Side – Top
Rear-Connected "T" Vertical (RCTV)	800–2000 A		
	2500–3000 A		
	4000–5000 A		
	6000 A		
Rear-Connected "T" Horizontal (RCTH)	800–2000 A		
	2500–3000 A		
	4000–5000 A		
Rear-Connected Offset Vertical (RCOV)	3200 A		

Continued on next page

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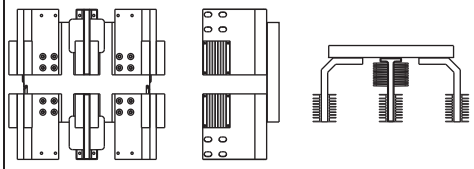
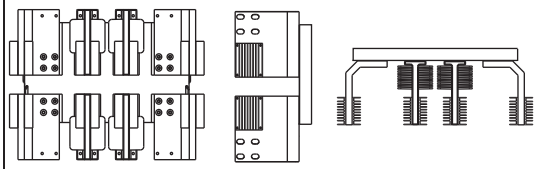
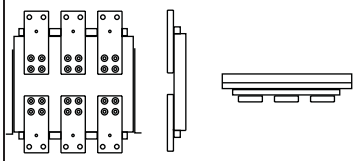
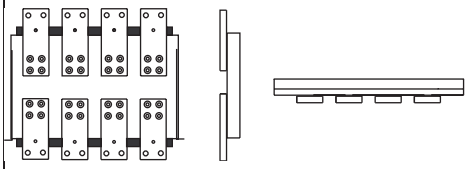
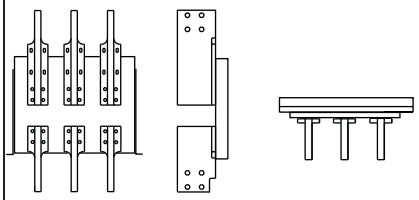
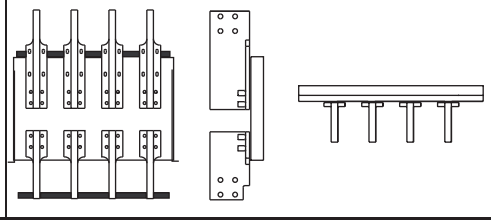
Table 12 – Standard Connectors *(continued)*

Type	Rating	3-Pole Layout Front – Side – Top	4-Pole Layout Front – Side – Top
Rear-Connected Offset Vertical (RCOV Special)	4000 A W-frame		
Front-Connected Flat (FCF)	800–2000 A		
Front-Connected “T” (FCT)	800–3000 A		

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Install Bussing

NOTICE

HAZARD OF EQUIPMENT DAMAGE

The busbar supports must be placed to support the weight of the bussing system and to withstand magnetic forces caused by short-circuit currents. See **Figure 58, A**.

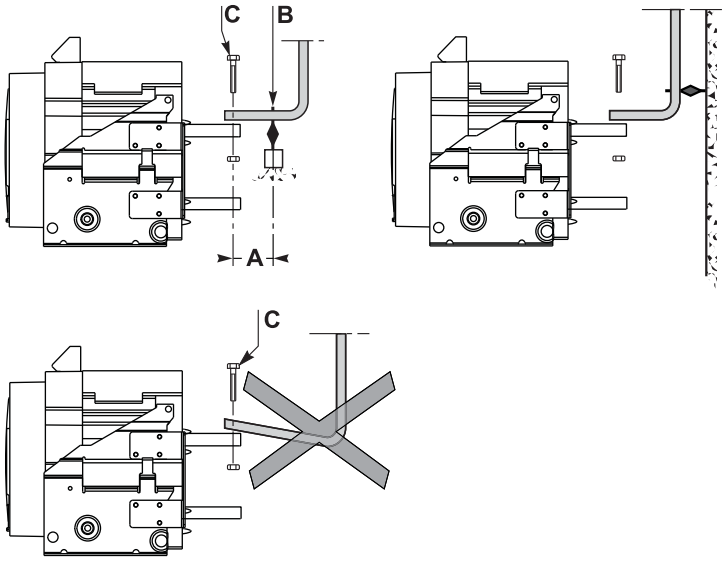
Failure to follow these instructions can result in equipment damage.

NOTE: Installer is responsible for bussing to connectors.

- Bus supports must be braced (**Figure 58, B**) to prevent short circuit forces from deflecting the connectors. The busbar supports (**A**) must be placed to support the weight of the bussing system and to withstand magnetic forces caused by short-circuit currents.
- Busbars should be adjusted to ensure that the connection points are correctly positioned before the bolts (**C**) are inserted. Bussing must be supported by framework of the switchgear, with no weight on connectors.

Bussing requirements by circuit breaker and connector are shown in Table 13.

Figure 58 – Busbar Connections



NOTE: The installer is responsible for bussing to connectors. Bussing must be supported by framework of the switchgear, with no weight on the connectors. Bus supports must be braced to prevent short circuit forces from deflecting the connectors.

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Table 13 – Bus Size Required

Circuit Breaker		Complies with	Connectors	Bus Per Connector	
Rating	**Type**			**Number**	**Size**
800–1200 A	N/N1/H/H1/H2/H3	ANSI C37.50 UL 489	RCTH, RCTV, FCF, FCT	1	0.25 x 3 in. (6 x 76 mm)
1600 A	N/N1/H/H1/H2/H3	ANSI C37.50 UL 489	RCTH, RCTV, FCF, FCT	2	0.25 x 3 in. (6 x 76 mm)
2000 A	N/N1/H/H1/H2/H3	ANSI 37.50 UL 489	RCTH	3	0.25 x 3 in. (6 x 76 mm)
			RCTV, FCT	2	0.25 x 4 in. (6 x 102 mm)
			FCF	3	0.25 x 3 in. (6 x 76 mm)
2500 A	H	UL 489	RCTH	5	0.25 x 3 in. (6 x 76 mm)
			RCTV, FCT	2	0.25 x 5 in. (6 x 127 mm)
3000 A	H	UL 489	RCTH	8	0.25 x 3 in. (6 x 76 mm)
	H		RCTV, FCT	4	0.25 x 4 in. (6 x 102 mm)
3200 A	H1/H2/H3	ANSI 37.50	RCOV	3	0.25 x 5 in. (6 x 127 mm)
4000 A (W-Frame)	H1/H2/H3	ANSI 37.50	RCOV (Special)	4	0.25 x 5 in. (6 x 127 mm)
4000 A	H/H2/H3	ANSI 37.50 UL 489	RCTH	4	0.25 x 6 in. (6 x 152 mm)
			RCTV, FCT	4	0.25 x 5 in. (6 x 127 mm)
		ANSI 37.50	FCF	4	0.25 x 6 in. (6 x 152 mm)
		UL 489	FCF	5	0.25 x 6 in. (6 x 152 mm)
5000 A	H/H2/H3	ANSI 37.50 UL 489	RCTH	8	0.25 x 6 in. (6 x 152 mm)
			RCTV, FCT	6	0.25 x 5 in. (6 x 127 mm)
6000 A	H	UL 489	RCTV	6	0.25 x 6 in. (6 x 152 mm)

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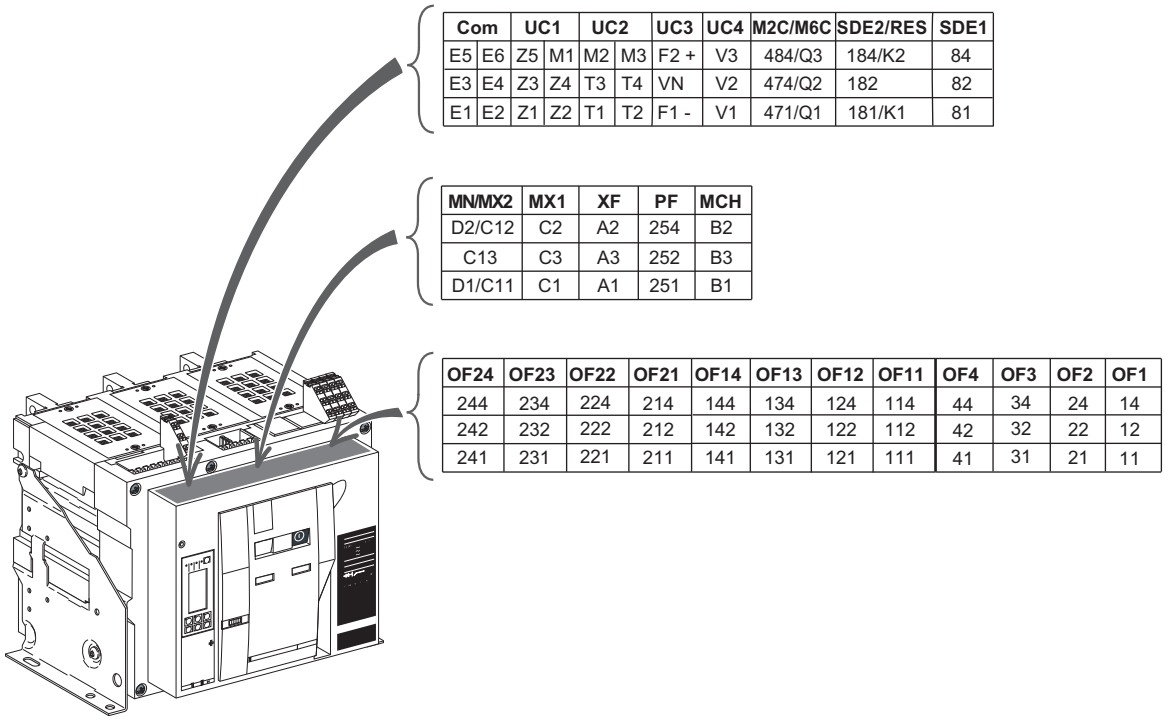
Accessory Connections Using Push-In Connectors

Table 14 – Terminal Layout for Push-In Connector Installation



Com		UC1		UC2		UC3	UC4	M2C/M6C	SDE2/RES	SDE1
E5	E6	Z5	M1	M2	M3	F2 +	V3	484/Q3	184/K2	84
E3	E4	Z3	Z4	T3	T4	VN	V2	474/Q2	182	82
E1	E2	Z1	Z2	T1	T2	F1 -	V1	471/Q1	181/K1	81

MN/MX2	MX1	XF	PF	MCH
D2/C12	C2	A2	254	B2
C13	C3	A3	252	B3
D1/C11	C1	A1	251	B1

OF24	OF23	OF22	OF21	OF14	OF13	OF12	OF11	OF4	OF3	OF2	OF1
244	234	224	214	144	134	124	114	44	34	24	14
242	232	222	212	142	132	122	112	42	32	22	12
241	231	221	211	141	131	121	111	41	31	21	11

Function	Connector	Description
Auxiliary Contacts	OF[1]	Open/Closed Circuit Breaker or Circuit Breaker Position Contacts
	EF	Combined Connected and Closed Contact
Remote Operation	SDE	Electrical Fault Alarm Contact
	RES	Remote Reset
	MN	Undervoltage Trip Device
	MX[2]	Shunt Trip
	XF[2]	Shunt Close
	PF	Ready-to-Close Contact
	MCH	Spring-Charging Motor

[1] OF1, OF2, OF3 and OF4 contacts are standard.
[2] When communicating MX1 or XF coils are used, terminal (C3 or A3) must be connected to line even if the communication module is not installed. The bypass circuit through terminal C2/A2 is only momentary duty (0.5 sec). For continuous duty, use the communications command.

Trip Unit Type					
Basic	A	P	H	Connector	Description
–	•	•	•	Com: E1–E6	Communication
–	•	•	•	UC1: Z	Zone-Selective Interlocking
					Z1 = ZSI OUT Signal
					Z2 = ZSI OUT
					Z3 = ZSI IN Signal
					Z4 = ZSI IN Short Time
					Z5 = ZSI IN Ground Fault
–	•	•	•	UC1: M1	Modified Differential Ground Fault (MDGF)
–	•	•	•	UC2: T	External Neutral
–	•	•	•	UC2: M	Modified Differential Ground Fault (MDGF)
–	•	•	•	UC3: F	24 Vdc External Power Supply
–	–	•	•	UC3: Vn	External Neutral Plug
–	–	•	•	UC4	External Phase Voltage Sensing
–	–	•	•	M2C/M6C	Two Programmable Contacts (internal relay) or Six Programmable Contacts (for connection to external M6C module)

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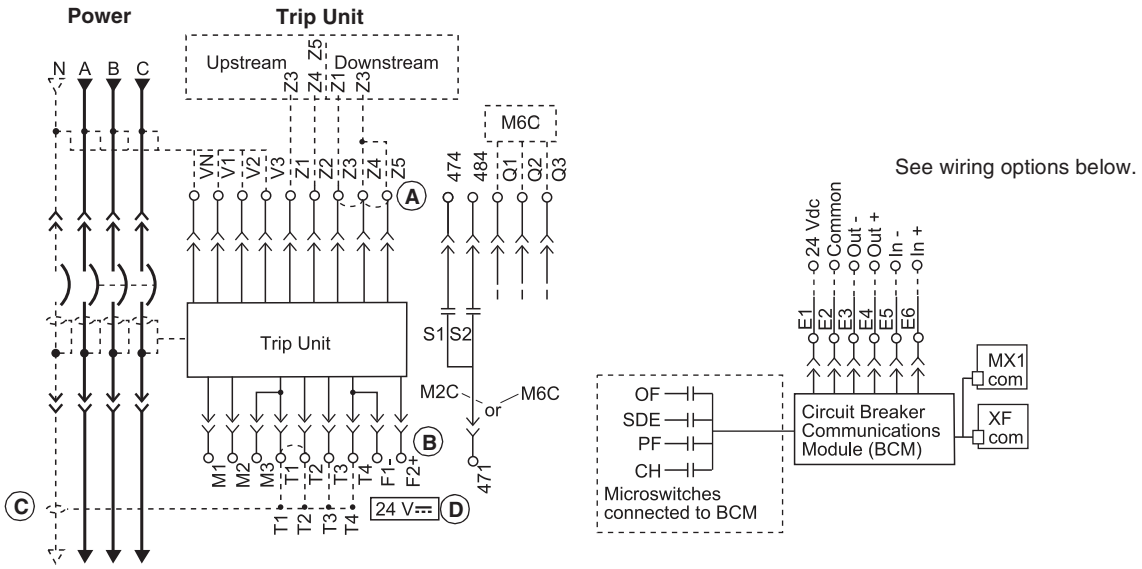
Wiring Diagrams for Auxiliary Connections

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

Figure 59 – Wiring Diagrams for Auxiliary Connections



A—Do not remove factory-installed jumpers between Z3, Z4 and Z5 unless ZSI is connected.
B—Do not remove factory-installed jumper between T1 and T2 unless neutral CT is connected. Do not install jumper between T3 and T4.
C—For proper wiring of neutral CT, refer to wiring schematics on page 61.
D—24 Vdc power supply for trip unit must be separate and isolated from 24 Vdc power supply for communication modules.

Wiring of the COM Option (Modbus BCM with or without ULP Module)

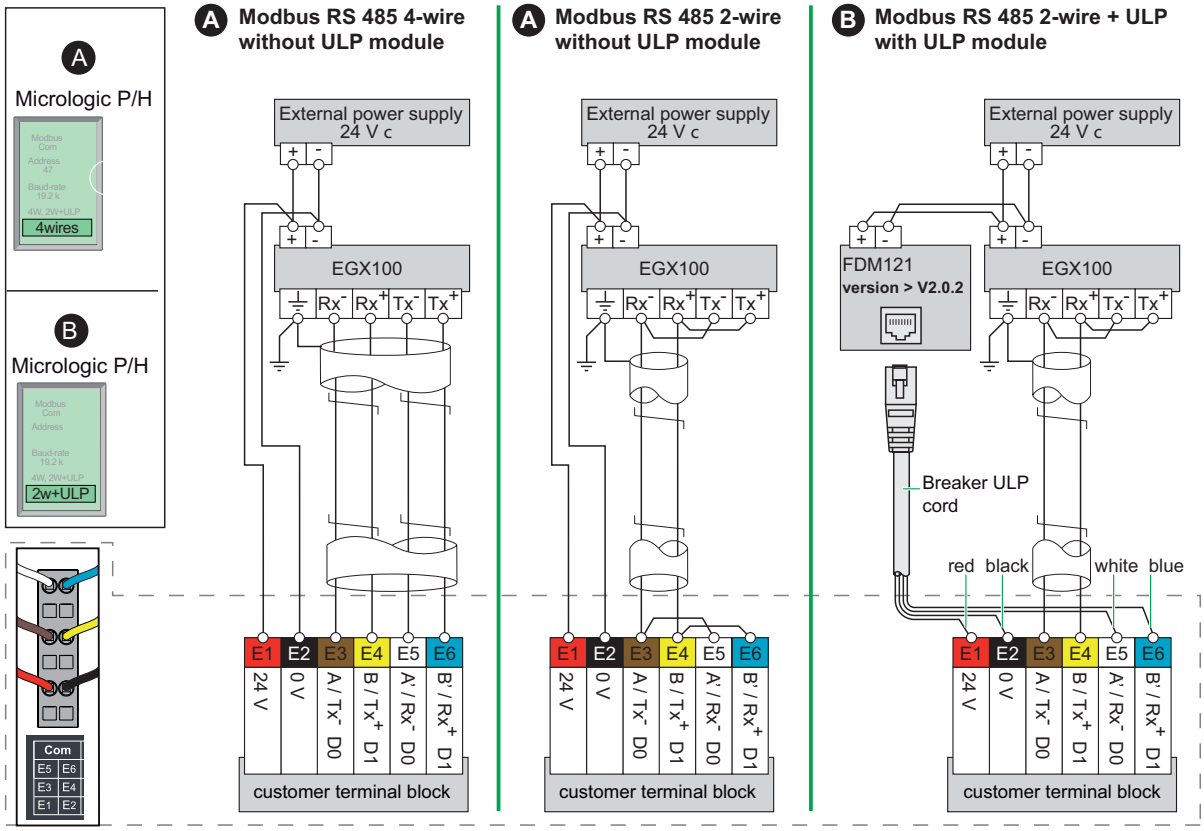


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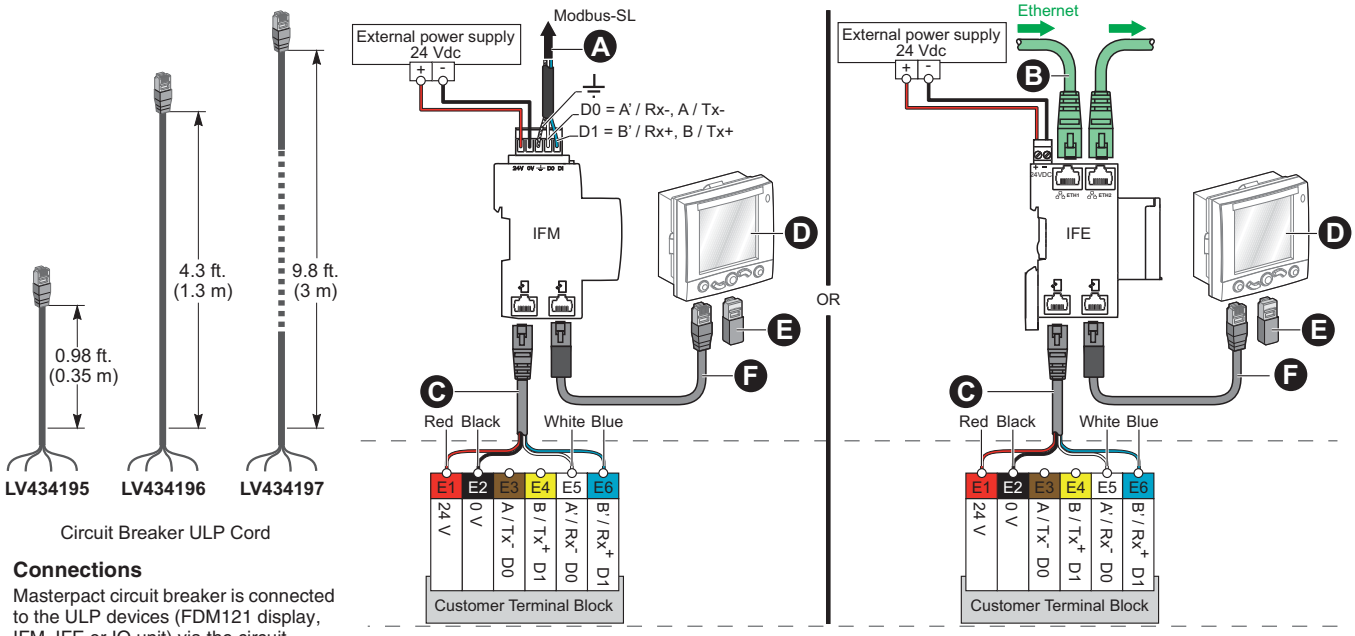
Figure 59 – Wiring Diagrams for Auxiliary Connections *(continued)*

Communication Components and FDM121 Connections



Circuit Breaker ULP Cord

Connections

Masterpact circuit breaker is connected to the ULP devices (FDM121 display, IFM, IFE or IO unit) via the circuit breaker ULP cord.

- Cord is available in three lengths: 0.98 ft. (0.35 m), 4.3 ft. (1.3 m) and 9.8 ft. (3 m).
- Lengths up to 32.9 ft. (10 m) are possible using extensions.

A. Modbus Network
B. Ethernet Network
C. Circuit Breaker ULP Cord
D. FDM Display
E. ULP Termination
F. ULP Cable

Markings for Push-In Type Terminals

Trip Unit							
COM	**UC1**	**UC2**	**UC3**	**UC4**	**M2C/M6C**	**SDE2/Res.**	**SDE1**
○ ○ E5 E6	○ ○ Z5 M1	○ ○ M2 M3	F2+	V3	484/Q3	184/K2	84
○ ○ E3 E4	○ ○ Z3 Z4	○ ○ T3 T4	VN	V2	474/Q2	182	82
○ ○ E1 E2	○ ○ Z1 Z2	○ ○ T1 T2	F1–	V1	471/Q1	181/K1	81

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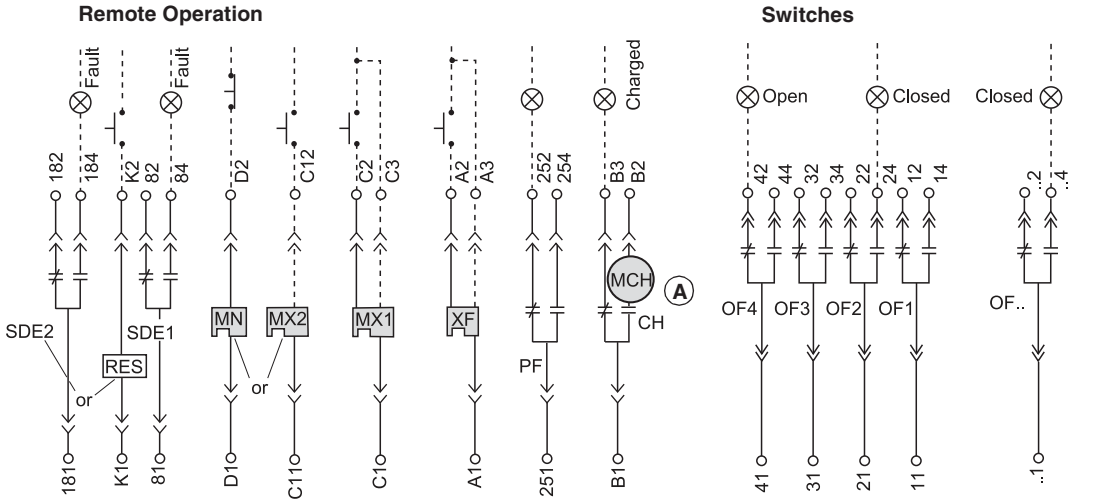
NOTE: All diagrams are showing circuit breaker open, connected and charged.

Figure 60 – 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											
MN/MX2	MX1	XF	PF	MCH	OF24	OF23	OF22	OF21	OF14	OF13	OF12	OF11	OF4	OF3	OF2	OF1
D2/C12	C2	A2	254	B2	244	234	224	214	144	134	124	114	44	34	24	14
C13	C3	A3	252	B3	242	232	222	212	142	132	122	112	42	32	22	12
D1/C11	C1	A1	251	B1	241	231	221	211	141	131	121	111	41	31	21	11

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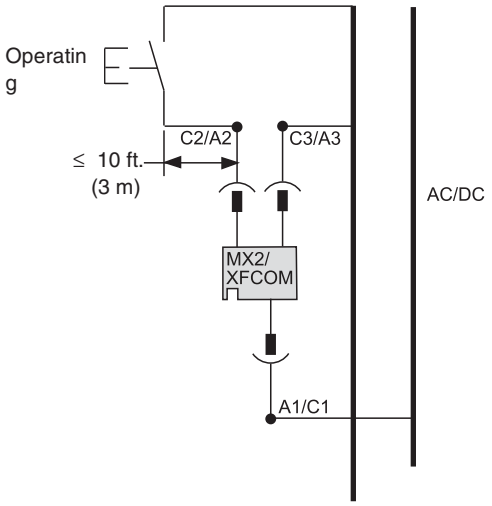
Communicating Shunt Trip (MX) and Shunt Close (XF)

A recommended wiring schematic for the communicating style shunt trip or shunt close coils is shown in Figure 61. Induced voltages in the circuit at terminal C2 and/or A2 can cause the shunt trip or shunt close to not work properly. The best way to prevent the 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 ten feet (three meters), use an interposing relay near terminal C2 or A2.

Figure 61 – Communicating Wiring Schematic

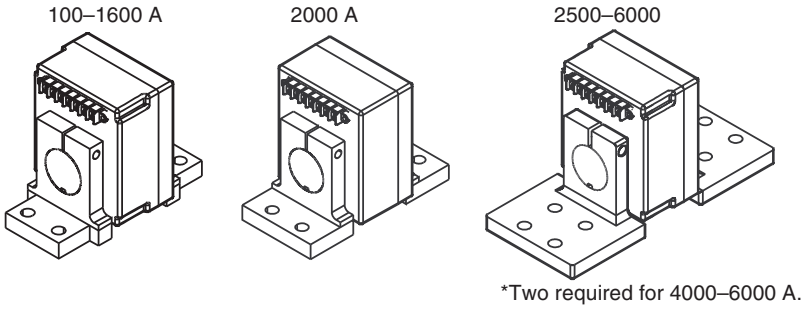


Ground-Fault Protection for Equipment

If the circuit breaker does not have integral ground-fault tripping or alarm, skip this subsection.

A three-phase, four-wire circuit requires an external neutral current transformer (CT). Connect the neutral CT to the circuit breaker according to the wiring diagrams in Figures 63 and 64.

Figure 62 – Neutral Current Transformers



*Two required for 4000–6000 A.

1. Connect the primary:
   - — If load is connected to the lower end of the circuit breaker, connect the load neutral to the H1 terminal of neutral CT.
   - — If the source power is connected to the lower end of the circuit breaker, connect the source neutral to the H1 terminal of the neutral CT.

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NOTE: The equipment grounding connection must be upstream (line side) of the neutral CT and a neutral connection must exist from the supply transformer to the equipment.

2. For circuit breakers using Micrologic™ 5.0P, 5.0H, 6.0P, or 6.0H trip units, connect terminal Vn on the neutral current transformer to the Vn terminal of the control wiring terminal. (This is necessary to allow the trip unit to make voltage measurements.) Terminals Vc and Vn are internally connected.

CAUTION

HAZARD OF IMPROPER TRIP SYSTEM OPERATION

F1 and F2 must be isolated from ground. Verify all wiring per the instructions in this bulletin.

Failure to follow these instructions can result in a nuisance trip during closing.

3. Remove the factory-installed jumper connecting T1 and T2.
4. Feed Belden cable from the neutral CT to the cradle terminals.
5. Connect the cable per the appropriate schematic in Figure 63 or 64.
6. Verify all wiring.

NOTE: Modified differential ground-fault circuitry and ground-source return ground-fault circuitry require the use of a modified differential ground-fault module (MDGF) and special current transformers. For wiring of those systems, see the instructions with the MDGF.

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Figure 63 – Wiring Schematic for 800–4000 A Standard-Width NW Circuit Breakers

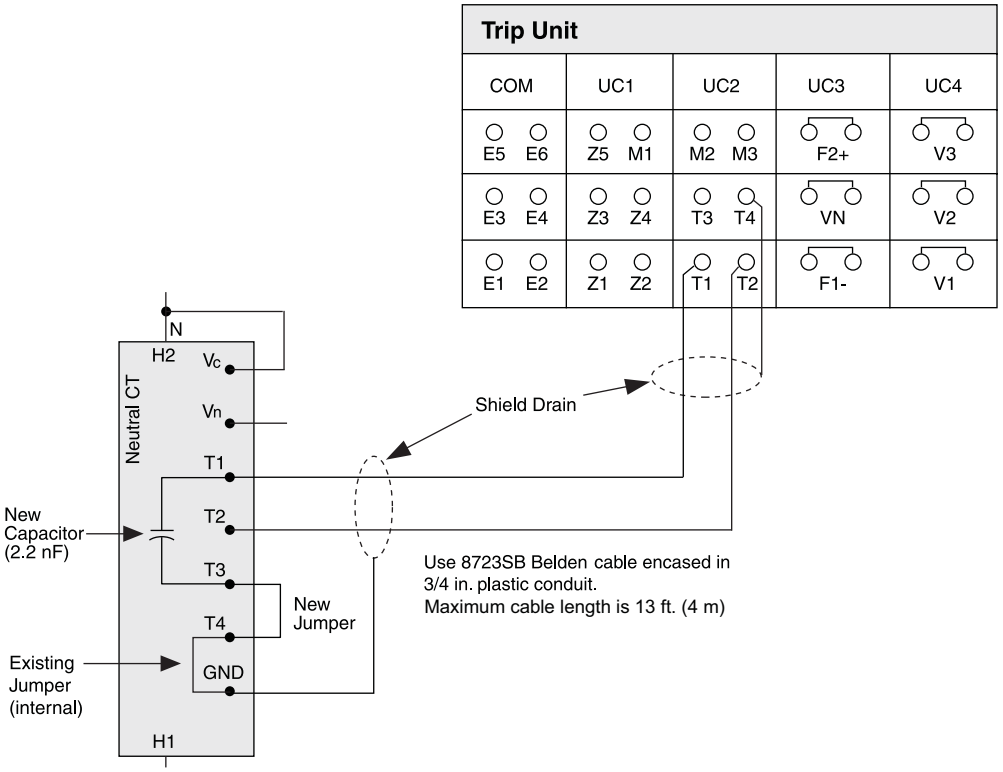
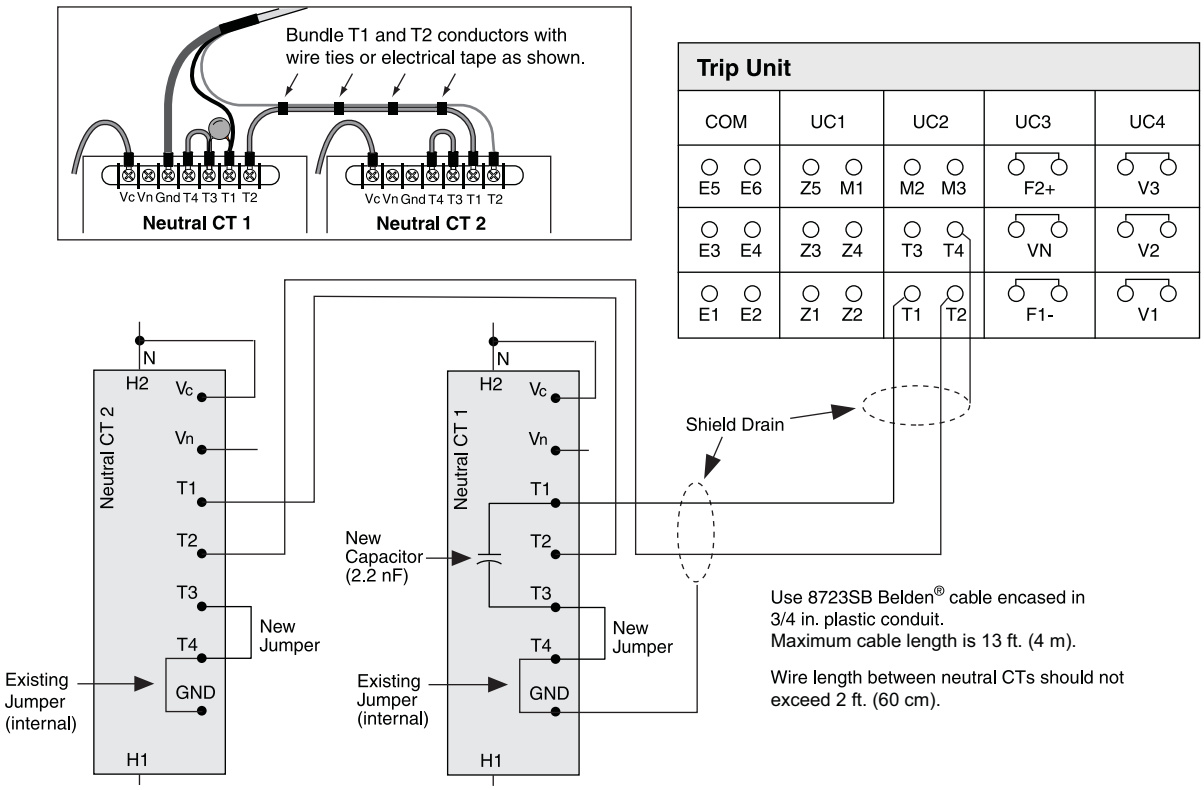


Figure 64 – Wiring Schematic for 3200–6000 A Wide-Construction NW Circuit Breakers



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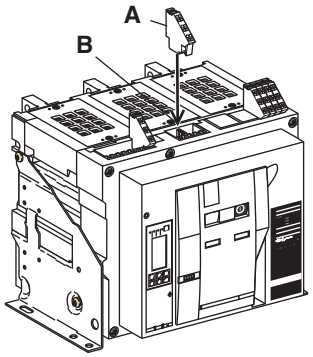
Accessory Wiring

1. Install push-in connector (**Figure 65, A**) in the correct slot (**B**). Connector positions are shown on label next to connector slots.

Figure 65 – Install Push-In Connector

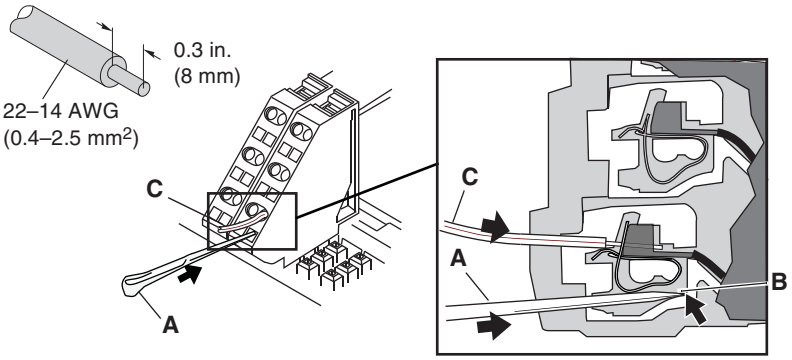


2. Push a Wago wire insert tool (**Figure 66, A**, Wago part no. 209-129) fully into the connector (to point **B**) and install the control wires (**C**).

NOTE: Remove a push-in connector in reverse order of installation.

See Section 6—Operation for instructions on operating circuit breaker.

Figure 66 – Install Control Wires



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Test Equipment Ground-Fault Protection

Paragraph 230-95(c) of the National Electrical Code requires that all equipment ground-fault protection systems be tested when first installed. If the circuit breaker has equipment ground-fault protection installed, test it at this time.

Make sure the trip unit is powered. The trip unit is powered if:

- The circuit breaker is closed or bottom-fed and has more than 100 V of load voltage on two phases (P or H trip unit only).
- A full-function or hand-held test kit is connected and on.
- A 24 Vdc external power supply is connected.
- An external voltage tap is installed and voltage of more than 100 V is present on two phases (P or H trip unit only).

If this is a radial (single-ended) system, press the ground-fault push-to-test button (**Figure 67, A**). The circuit breaker will trip and the trip unit ground-fault indicator light will come on.

Record results in Table 15.

If a complete check of the ground-fault system is necessary, use primary injection testing. If the system has multiple sources and/or requires field connections at the job site, use primary injection testing.

Figure 67 – Test Ground-Fault Push-to-Test

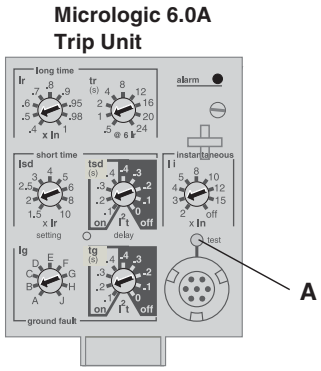

Table 15 – Ground-Fault Test Results

Date	Ground-Fault Settings	Test Results	Signature

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Circuit Breaker Removal

1. Turn off all power supplying this equipment before working on or inside equipment.
2. Remove the circuit breaker in reverse order of installation. Use lifting methods as detailed in Section 2—Lifting and Transporting.

⚠ DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION OR ARC FLASH

- Apply appropriate personal protective equipment (PPE) and follow safe electrical work practices. See NFPA 70E or CSA Z462.
- This equipment must only be installed and serviced by qualified electrical personnel.
- Turn off all power supplying this equipment before working on or inside equipment.
- Always use a properly rated voltage sensing device to confirm power is off.
- Replace all devices, doors and covers before turning on power to this equipment.

Failure to follow these instructions will result in death or serious injury.

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ENGLISH

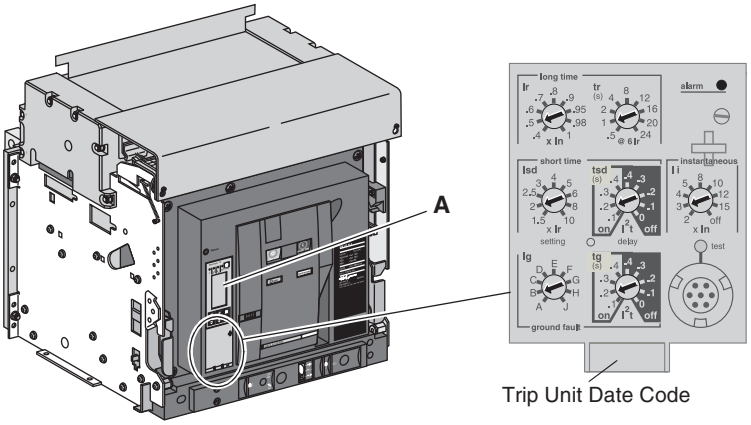
Section 5— Trip Unit

Protective functions, measurement functions, and communications are controlled by the Micrologic™ trip unit (**Figure 68, A**) installed in the circuit breaker. The trip unit is field replaceable for easy upgrading of functionality.

For complete information on the trip unit, its functions, and field replacement, see the trip unit user guide available from the Schneider Electric™ website.

For complete information on which trip units are available and their capabilities, see catalog 0613CT1001, *Masterpact NT and NW Universal Power Circuit Breakers* on the Schneider Electric website (for website information see page 5).

Figure 68 – Micrologic Trip Unit



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Section 6— Operation

Drawout Circuit Breaker Status

⚠ DANGER

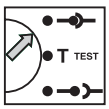
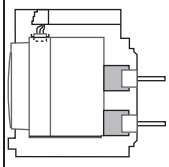
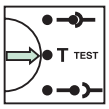
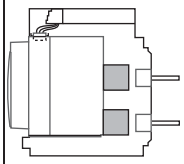
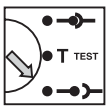
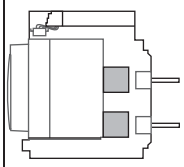
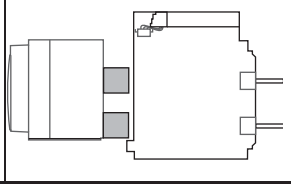
HAZARD OF ELECTRIC SHOCK, EXPLOSION OR ARC FLASH

- Apply appropriate personal protective equipment (PPE) and follow safe electrical work practices. See NFPA 70E or CSA Z462.
- This equipment must only be installed and serviced by qualified electrical personnel.

Failure to follow these instructions will result in death or serious injury.

Connection or disconnection of the drawout circuit breaker requires insertion of the racking handle (while pressing the “Push to open” button). If interlocks, padlocks, or an open door lock are in place, the racking handle cannot be inserted.

Table 16 – Drawout Circuit Breaker Positions

Position Indicator	Connector Position (Cluster shield not shown)	Connectors		Circuit Breaker Status
		Clusters	Secondary (Control)	
Connected 		Engaged	Engaged	Can be operated. Ready for service.
Test 		Disengaged	Engaged	Can be operated. Can have operation and control systems tested.
Disconnected 		Disengaged	Disengaged	Can be operated. Can be removed from carriage.
Withdrawn		Disengaged	Disengaged	Removed from carriage.

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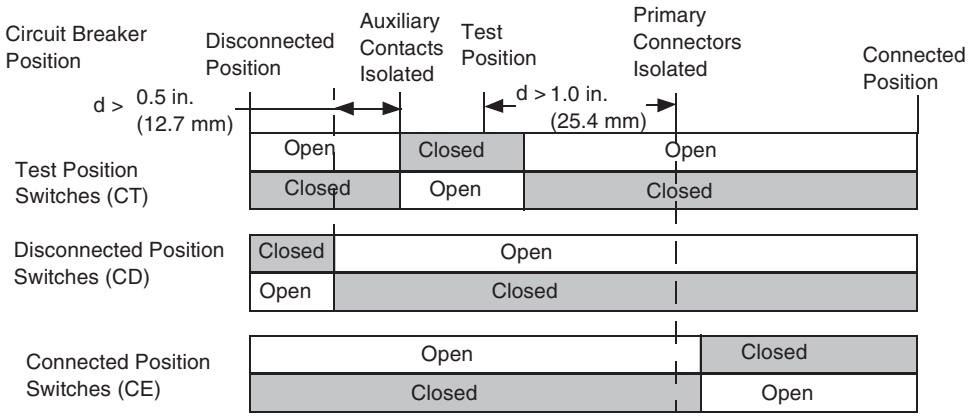
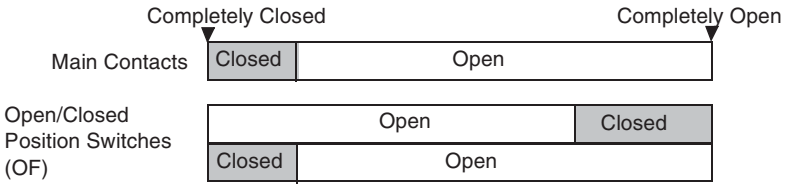
As the circuit breaker position changes, the position contacts change states.

Figure 69 – Device Position Operation



As the circuit breaker main contacts operate, the auxiliary contacts change positions.

Figure 70 – Device Contact Operation



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Drawout Circuit Breaker Connection

NOTICE

HAZARD OF EQUIPMENT DAMAGE

- Use the racking handle provided to rack the circuit breaker into or out of the cradle.
- Do not use power tools for racking.
- Do not continue to turn handle after stop release button has popped out.

Failure to follow these instructions can result in equipment damage.

⚠ DANGER

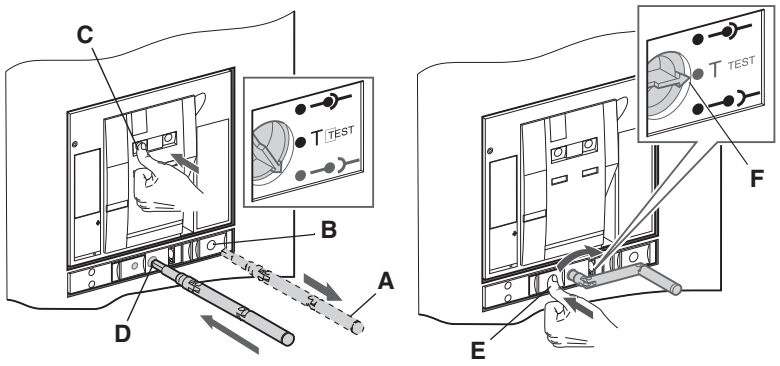
HAZARD OF ELECTRIC SHOCK, EXPLOSION OR ARC FLASH

- Apply appropriate personal protective equipment (PPE) and follow safe electrical work practices. See NFPA 70E or CSA Z462.
- This equipment must only be installed and serviced by qualified electrical personnel.

Failure to follow these instructions will result in death or serious injury.

1. Disconnect the load from the secondary disconnects.
2. Remove the racking handle (**Figure 71, A**) from its storage hole (**B**).
3. While pressing the “Push to open” button (**C**), insert the racking handle in the racking slot (**D**).
4. Push the stop release button (**E**).
5. Turn the racking handle clockwise until the test position (**F**) is reached. The stop release button will pop out.

Figure 71 – Rack Circuit Breaker to Test Position



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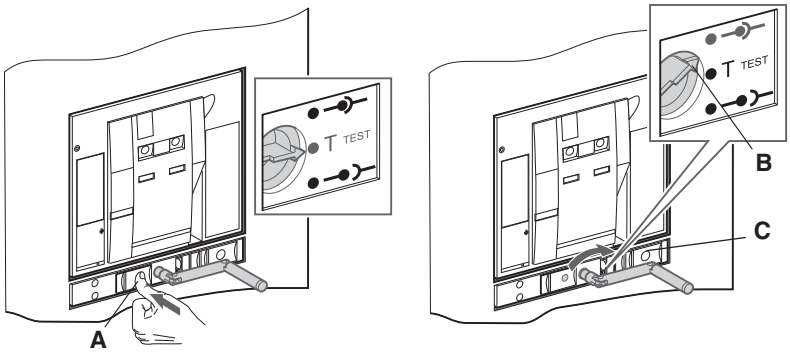
6. Push the stop release button (**Figure 72, A**).
7. Turn the racking handle clockwise until the connected position (**B**) is reached. The stop release button will pop out. Replace the racking handle in its storage hole (**C**).
8. Reconnect the load to the secondary disconnects.

Figure 72 – Rack Circuit Breaker to Connected Position



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Drawout Circuit Breaker Disconnection

NOTICE

HAZARD OF EQUIPMENT DAMAGE

- Use the racking handle provided to rack the circuit breaker into or out of the cradle.
- Do not use power tools for racking.
- Do not continue to turn handle after stop release button has popped out.

Failure to follow these instructions can result in equipment damage.

⚠ DANGER

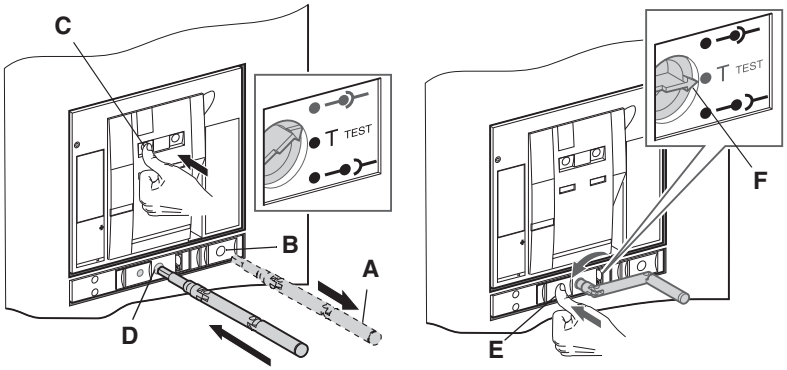
HAZARD OF ELECTRIC SHOCK, EXPLOSION OR ARC FLASH

- Apply appropriate personal protective equipment (PPE) and follow safe electrical work practices. See NFPA 70E or CSA Z462.
- This equipment must only be installed and serviced by qualified electrical personnel.

Failure to follow these instructions will result in death or serious injury.

1. Remove the load from the secondary disconnects.
2. Remove the racking handle (**Figure 73, A**) from its storage hole (**B**).
3. While pressing the “Push to open” button (**C**), insert the racking handle in the racking slot (**D**).
4. Push the stop release button (**E**). Turn the racking handle counterclockwise until the test position (**F**) is reached. The stop release button will pop out.

Figure 73 – Rack Circuit Breaker to Test Position



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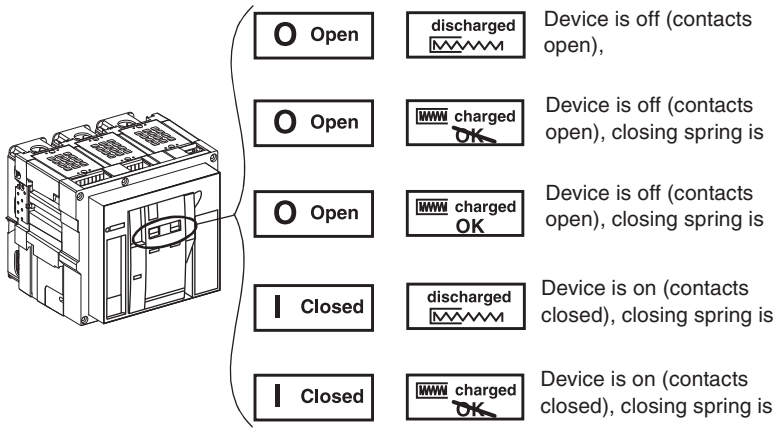
5. Push the stop release button (**Figure 74, A**).
6. Turn the racking handle counterclockwise until the disconnected position (**B**) is reached. The stop release button will pop out. Replace the racking handle in its storage hole.
7. Reconnect the load to the secondary disconnects.

Figure 74 – Rack Circuit Breaker to Disconnected Position

Circuit Breaker Operation

The circuit breaker is closed by means of a two-step stored energy mechanism. Status indicators on the front of the circuit breaker indicate whether the circuit breaker is open or closed, and whether the closing spring is charged or discharged. The opening springs are automatically charged when the circuit breaker closes.

Figure 75 – Status Indicators



[1] Not OK to turn on will be shown if:
Shunt trip is energized
Circuit breaker is not connected, test, disconnected or withdrawn position
Undervoltage trip is not energized

Anti-Pumping Function

The Masterpact circuit breaker is designed to mechanically provide an anti-pumping function. If either the shunt close or shunt trip coil is continuously powered, or both are powered at the same time, the circuit breaker will open and cannot be closed until the power has been removed. This prevents the circuit breaker from cycling between closing and opening (called pumping).

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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) coil. The ready-to-close switch (PF) can be series connected with the shunt close (XF) coil to prevent premature closing.

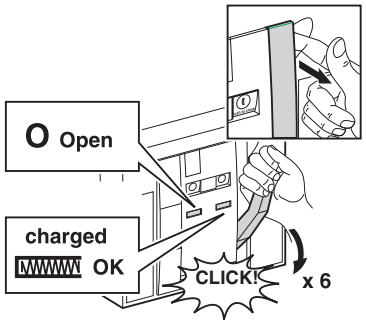
Charging the Closing Spring

To close the circuit breaker, the closing spring must be charged with sufficient energy for closing.

- Manual Charge: Use the charging handle to charge the closing spring.
- Automatic Charge: If the optional MCH spring-charging motor is installed, the spring is automatically charged after closing.

NOTE: The closing spring on the drawout circuit breaker will automatically discharge when the circuit breaker is moved from the disconnect to the withdrawn position.

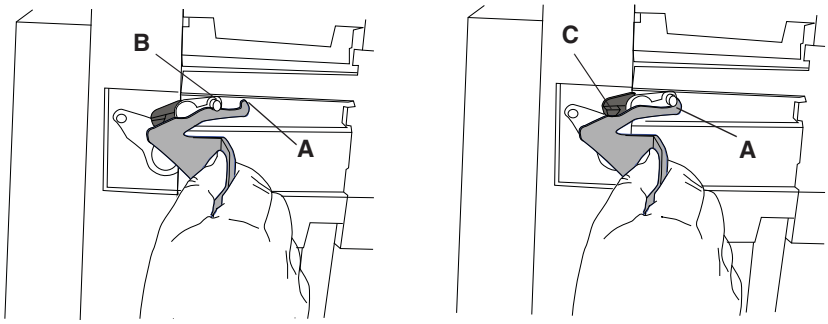
Figure 76 – Manual Spring Charge



NOTE: To close a drawout circuit breaker when it is not installed in the cradle, the cradle interlock must be defeated before the circuit breaker charging spring can be charged. A cradle interlock defeat tool is shipped with every circuit breaker. To install:

1. Slide the interlock defeat tool (**Figure 77, A**) into the groove under the interlock lever (**B**) on the right side of the circuit breaker.
2. Slide the tool toward the front of the circuit breaker and lock it in place under the cradle interlock shaft (**C**).

Figure 77 – Defeating Cradle Interlock



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Close Circuit Breaker

To close the circuit breaker, the following conditions must be met:

- The device is open (O).
- The charging spring is charged.
- “OK” is displayed.

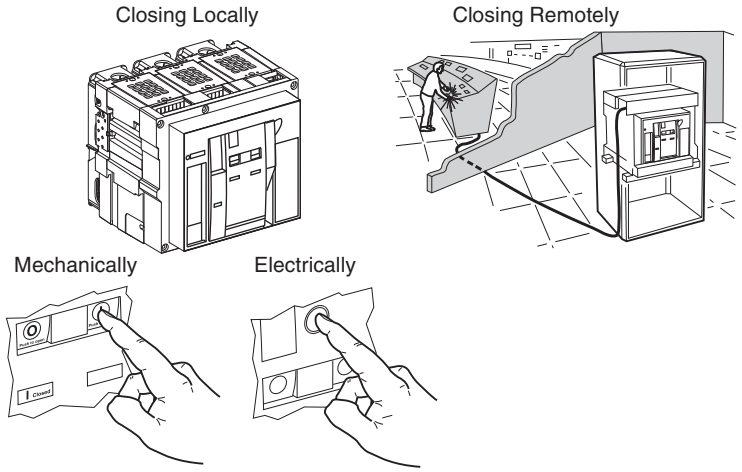
NOTE: The circuit breaker cannot be closed while an opening order is being received. If the “not OK” symbol is displayed, an order to open is being received (electrically or manually) and must be ended before the “OK” will be displayed.

If the above conditions are met, close the device:

- Mechanically: press the “Push to close” button on the circuit breaker.
- Electrically: if the optional shunt close (XF) is installed, press the optional electrical-close push button (BPFE) on the circuit breaker or a push button at a remote location.

  For more information, refer to the circuit breaker user guide on the Schneider Electric™ website (for website information see page 5).

Figure 78 – Close Circuit Breaker



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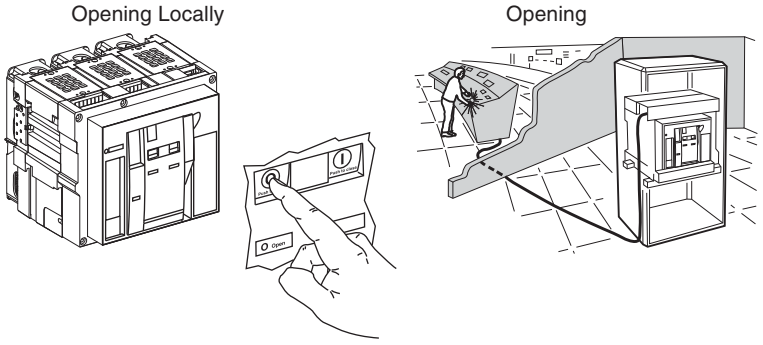
Open Circuit Breaker

- Mechanically: press the “Push to open” button on the circuit breaker.
- Electrically: operate remotely through the optional shunt trips (MX1 and MX2), undervoltage trip device (MN), or time-delay module for undervoltage trip accessory (MNR).

  For more information, refer to the circuit breaker user guide on the Schneider Electric website (for website information see page 5).

Figure 79 – Turn Off Circuit Breaker



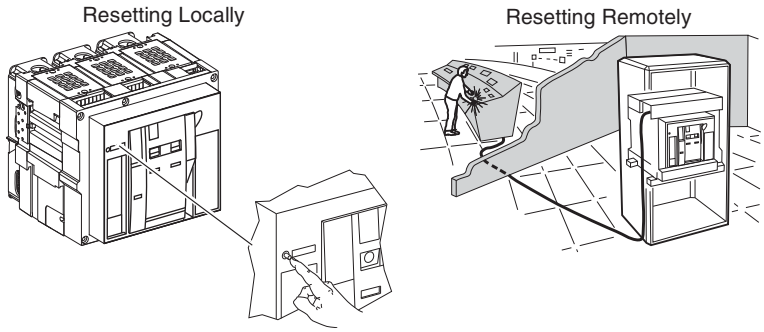
Reset Circuit Breaker

After a fault trip, the circuit breaker must be reset.

- Mechanically: press the “Reset” button located above the trip unit.

  Electrically: use the electrical reset option (RES) after an electrical fault. For more information, refer to the circuit breaker user guide on the Schneider Electric website (for website information see page 5).

Figure 80 – Reset Circuit Breaker



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Neutral Protection

Neutral protection protects the neutral conductors against overheating.

- For a three-pole circuit breaker with a P or H trip unit, neutral protection is possible if a neutral current transformer is used.
  - — Adjust the neutral using the trip unit keypad of the P or H trip unit.
  - — Possible settings are OFF, N/2, N, or 1.6N.
  - — Factory setting is OFF.

Oversize neutral protection (1.6N) requires the use of the appropriate oversize neutral current transformer. See price list for correct neutral current transformer.

NOTICE

HAZARD OF EQUIPMENT DAMAGE

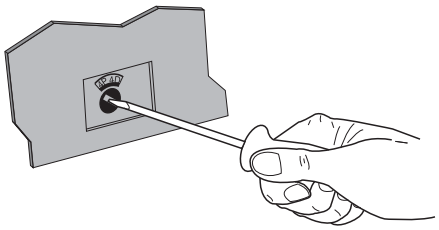
If a four-pole circuit breaker neutral pole switch is set to 4P 3D setting, the current in the neutral must not exceed the rated current of the circuit breaker.

For a three-pole circuit breaker with oversize neutral protection (1.6N), select the appropriate oversize neutral current transformer.

Failure to follow these instructions can result in equipment damage.

- For a four-pole circuit breaker, set the system type using the circuit breaker neutral selector dial (see Figure 81).
  - — With a P or H trip unit, make fine adjustments using the trip unit keypad, with the circuit breaker dial setting providing the upper limit for adjustment.
  - — Factory setting is 4P 4D.

Figure 81 – Four-Pole Circuit Breaker Neutral Selector Dial



Neutral Protection Settings for Four-Pole Circuit Breaker

Circuit Breaker Selector Dial	P or H Trip Unit Keypad Setting
4P 3D	Off, N/2, N
3P N/2	N/2
4P 4D	N/2, N

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- Neutral protection conductor type has four possible settings:
  - — Off (4P 3D)—Neutral protection is turned off.
  - — N/2 (3P N/2)—Neutral conductor capacity is one-half that of the line conductors.
  - — N (4P 4D)—Neutral conductor capacity is the same as that of the line conductors.
  - — 1.6N—Neutral conductor capacity is 1.6 times that of the line conductors. (Three pole circuit breaker with P or H trip unit only.)

Table 17 – Micrologic™ Trip Unit Conductor Type

Setting	Long-Time Pickup		Short-Time Pickup		Instantaneous		Ground-Fault Pickup	
	Trip Unit	Neutral	Trip Unit	Neutral	Trip Unit	Neutral	Trip Unit	Neutral
OFF	Ir	None	Isd	None	Ii	None	Ig	None
N/2	Ir	1/2 Ir	Isd	1/2 Isd	Ii	Ii	Ig	Ig
N	Ir	Ir	Isd	Isd	Ii	Ii	Ig	Ig
1.6N	Ir	1.6 x Ir	Isd	1.6 x Isd*	Ii	Ii	Ig	Ig

*In order to limit the range, limited to 10 x In.

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Section 7— Locks, Interlocks, and Accessories

A number of optional locking and interlocking devices and accessories are available for the Masterpact circuit breaker and cradle. The operation of these devices is described in bulletin 0613IB1203: *Masterpact™ NW Low-Voltage Power/Insulated Case Circuit Breaker with ArcBlok Technology—User Guide* available on the Schneider Electric™ website (for website information see page 5).

For a complete listing of the available locks, interlocks, and accessories, see catalog 0613CT1001, *Masterpact NT and NW Universal Power Circuit Breakers* on the Schneider Electric website. For more information, refer to the circuit breaker user guide on the Schneider Electric website (for website information see page 5).

For detailed installation instructions on field-installable locks, interlocks, and accessories refer to the installation instructions shipped with the devices.

Accessories can be installed in an installed circuit breaker or an installed cradle.

Installing Circuit Breaker Accessories

Place the circuit breaker in the disconnect position. See Circuit Breaker Disconnection, page 70, for instructions on disconnecting the circuit breaker.

Install circuit breaker accessories, see “Install Accessories” on page 42.

⚠ DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION OR ARC FLASH

- Apply appropriate personal protective equipment (PPE) and follow safe electrical work practices. See NFPA 70E or CSA Z462.
- This equipment must only be installed and serviced by qualified electrical personnel.

Failure to follow these instructions will result in death or serious injury.

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Installing Cradle Accessories

1. Turn off all power supplying this equipment before working on or inside equipment.
2. Remove the circuit breaker from the cradle. See Circuit Breaker Removal, page 46 for instructions on removing the circuit breaker.
3. Install accessory as instructed in the instructions packed with the individual accessory.
4. Replace the circuit breaker in the cradle. See Circuit Breaker Installation, page 38, for instructions on installing the circuit breaker.

⚠ DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION OR ARC FLASH

- Apply appropriate personal protective equipment (PPE) and follow safe electrical work practices. See NFPA 70E or CSA Z462.
- This equipment must only be installed and serviced by qualified electrical personnel.
- Turn off all power supplying this equipment before working on or inside equipment.
- Always use a properly rated voltage sensing device to confirm power is off.
- Replace all devices, doors and covers before turning on power to this equipment.

Failure to follow these instructions will result in death or serious injury.

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Section 8— Testing, Maintenance and Troubleshooting

For information on field testing, maintenance, and troubleshooting see bulletin 0613IB1201, Masterpact NT and NW Field Testing and Maintenance Guide, which can be found on the Schneider Electric website:

http://www.schneider-electric.com

For application assistance, please call 1-888-778-2733.

Table 18 – Troubleshooting Guide

Problem	Probable Causes	Solutions
Circuit breaker cannot be closed locally or remotely	Circuit breaker padlocked or keylocked in the “OPEN” position.	Disable the locking function.
	Circuit breaker interlocked mechanically in a source changeover system.	• Check the position of the other circuit breaker in the changeover system. • Modify the situation to release the interlock.
	Circuit breaker not completely connected.	Complete racking in (connection) of the circuit breakers.
	The reset button signalling a fault trip has not been reset.	• Clear the fault. • Push the reset button on the front of the circuit breaker.
	Stored energy mechanism is not charged.	• Charge the mechanism manually. • If it is equipped with an MCH spring charging motor, check the supply of power to the motor. If the problem persists, replace the spring charging motor.
	MX opening shunt release (shunt trip) is permanently supplied with power.	There is an opening order. Determine the origin of the order. The order must be cancelled before the circuit breaker can be closed.
	MN undervoltage release (UVR) not supplied with power.	• There is an opening order. Determine the origin of the order. • Check the voltage and the supply circuit (V 0.84 Vn). • If the problem persists, replace the release.
	XF closing release (shunt close) continuously supplied with power, but circuit breaker is not “ready to close” (XF not wired in series with PF contact).	Open the supply of power to the XF closing release, then send the closing order again using the XF, but only if the circuit breaker is “ready to close”.
	Circuit breaker uses a Micrologic P or H trip unit, which has a permanent trip order with minimum voltage and minimum frequency protection in the Trip mode and the trip unit powered.	Disable these protection function son the Micrologic P or H control unit.
Circuit breaker cannot be closed remotely but can be opened locally using the closing pushbutton.	Closing order not executed by the XF closing release (shunt close).	Check the voltage on the supply circuit (0.85–1.1 Vn). If the problem persists, replace the XF release.
Circuit breaker cannot be opened remotely but can be opened locally	Closing order not executed by the MX opening release (shunt trip).	Check the voltage on the supply circuit (0.7–1.1 Vn). If the problem persists, replace the XF release.
	Opening order not executed by the MN undervoltage release (UVR).	Drop in voltage is insufficient or residual voltage (> 0.35 Vn) across the terminals of the undervoltage release. If the problem persists, replace the MN release.
Circuit breaker cannot be opened locally.	Operating mechanism malfunction or damaged contacts.	Contact a Schneider Electric service center.
Circuit breaker can be reset locally but not remotely.	Insufficient supply voltage for the MCH spring charging motor.	• Check the voltage and the supply circuit (0.7–1.1 Vn). • If the problem persists, replace the MCH release.
Unexpected tripping with activation of the reset button signalling a fault trip.	A fault is present: • Overload • Earth fault (ground fault) • Short-circuit detected by the trip unit.	• Determine and clear the causes of the fault. • Check the condition of the circuit breaker before putting it back into service.

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Table 18 – Troubleshooting Guide

Problem	Probable Causes	Solutions
Unexpected tripping without activation of the reset button signalling a fault	MN undervoltage release (UVR) supply voltage too low.	Check the voltage on the supply circuit (V>0.58 Vn).
	Load-shedding order sent to the MX opening release (shunt trip).	• Check the overall load on the distribution system. • If necessary, modify the settings of the devices in the installation.
	Unnecessary opening order from the MX opening release (shunt trip).	Determine the origin of the order.
Instantaneous opening after each attempt to close the circuit breaker with activation of the reset button signalling a fault trip.	Thermal memory.	• See the trip unit user manual. • Press the reset button.
	Transient overcurrent when closing.	• Modify the distribution system or the trip unit settings. • Check the condition of the circuit breaker before putting it back into service. • Press the reset button.
	Closing on a short-circuit.	• Clear the fault. • Check the condition of the circuit breaker before putting it back into service. • Press the reset button.
Nuisance tripping of the circuit breaker with activation of the reset button signalling a fault trip.	Reset button is not pushed in completely.	Push the reset button in completely.
Cannot insert crank in connected, test, or disconnected position.	A padlock or keylock is present on the cradle or a door interlock is present.	Disable the locking function.
Cannot turn the crank.	The reset button has not been pressed.	Press the reset button while turning racking handle (crank).
Circuit breaker cannot be removed from the cradle.	Circuit breaker is not in the disconnected position.	Turn the racking handle (crank) until the circuit breaker is in the disconnected position and the reset button is out.
	The rails are not completely out.	Pull the rails all of the way out.
	Racking handle (crank) has not been removed from the racking mechanism.	Remove and store the racking handle.
Circuit breaker cannot be racked in (placed in connected position).	Cradle/ circuit breaker mismatch protection (cell keying) is preventing racking.	Check that the cradle corresponds with the circuit breaker.
	The disconnecting-contact clusters are incorrectly positioned.	Reposition the clusters.
	Cradle is locked in the disconnected position.	Disable the cradle locking function.
	The reset button has not been pressed, preventing rotation of the crank.	Press the reset button while turning racking handle (crank).
	The circuit breaker has not been sufficiently inserted into the cradle.	Insert the circuit breaker completely so that it is engaged in the racking mechanism.
Circuit breaker cannot be locked in disconnected position.	The circuit breaker is not in the right position.	Check the circuit breaker position by making sure that the rest button is out.
	Racking handle (crank) has not been removed from the racking mechanism.	Remove and store the racking handle.
Circuit breaker cannot be locked in connected or test position.	Check that locking in any position is enabled.	Contact a Schneider Electric service center.
	The circuit breaker is not in the right position.	Check the circuit breaker position by making sure the reset button is out.
	Racking handle (crank) has not been removed from the racking mechanism.	Remove and store the racking handle.
The crank cannot be inserted to connect or disconnect the circuit breaker.	The rails are not completely in.	Push the rails all the way in.
The right-hand rail of the cradle or the circuit breaker cannot be drawn out.	Racking handle (crank) has not been removed from the racking mechanism.	Remove and store the racking handle.

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