PowerPacT P-Frame and NS630b-NS1600 Circuit Breaker Instruction Manual

Contents

Instruction Bulletin

48049-148-05
Rev. 13, 06/2023

Replaces 48049-148-05 Rev. 12, 12/2022

PowerPacT™ P-Frame and NS630b–NS1600 Circuit Breakers

Retain for future use.

Before starting the installation read and understand all instructions.

Scan the attached QR code for a digital copy of the instruction bulletin.

For additional information see our website: **https://www.se.com**:

Necessary Tools

- Screwdriver, Pozidriv® #2 or 3, or slotted
- Socket Wrench, 7 mm internal hex
- Screwdriver, long-shanked slotted
- Torque Wrench, 5/16 in.

Circuit Breaker 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, CSA Z462, NOM 029-STPS or local equivalent.
- 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.
- Beware of potential hazards, and carefully inspect the work area for tools and objects that may have been left inside the equipment.

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

⚠ **WARNING:** This product can expose you to chemicals including DINP, which is known to the State of California to cause cancer, and DIDP which is known to the State of California to cause birth defects or other reproductive harm. For more information go to: **www.P65Warnings.ca.gov**.

1. Turn off all power supplying this equipment before working on or inside equipment.
2. Make sure circuit breaker is in tripped or OFF (O) position.

DANGER

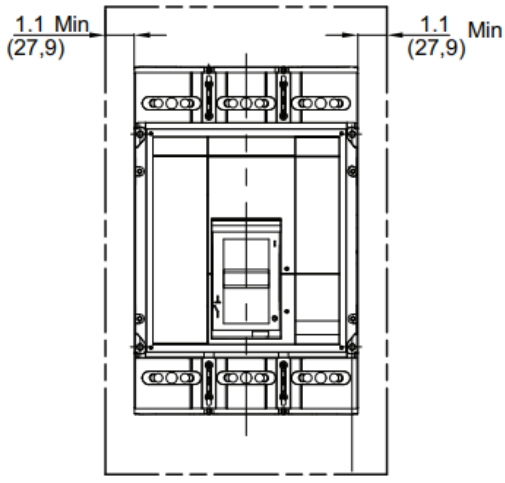
HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH
Install circuit breaker so minimum clearance distance to grounded metal is maintained.**Failure to follow these instructions will result in death or serious injury.**

1. Check clearances between circuit breaker and closest grounded metal.

TABL. 1 : Minimum Enclosure Dimensions

Circuit Breaker		Enclosure (H x W x D)		Ventilation			
				Top		Bottom	
A	Rating	in.	mm	in.²	mm²	in.²	mm²
≤ 800 A	100%	51.9 x 20.25 x 7.75	1318.3 x 514.4 x 196.9	–	–	–	–
≤ 1200 A	Standard	51.9 x 20.25 x 7.75	1318.3 x 514.4 x 196.9	–	–	–	–
> 800 A	100%	62.25 x 23 x 14.75	1581.2 x 584.2 x 374.7	16.5	10,645	16.5	10,645

FIG. 1 : Minimum Clearance to Metal

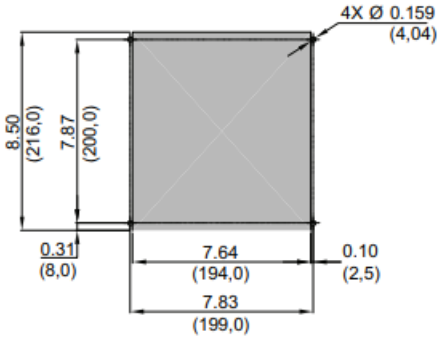


Dimensions: in. (mm)

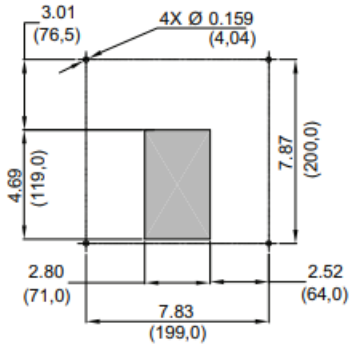
2. Prepare enclosure for circuit breaker.

FIG. 2 : Enclosure Mounting Holes and Door Cutout Dimensions

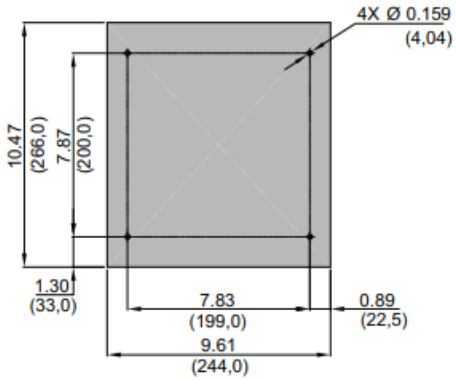
Accessory Cover Cutout



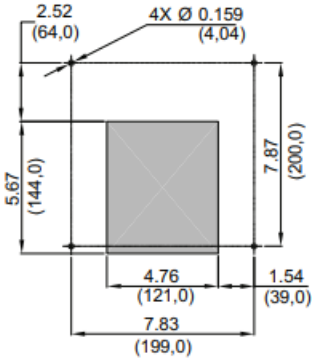
Handle Cutout (Toggle Mech. Only)



Accessory Cover Escutcheon Cutout



Handle Escutcheon Cutout
(Toggle Mech. Only)



Dimensions: in. (mm)

- Drill mounting holes in mounting surface. Tap holes for 10-32 threads.
- Cut opening in cover for circuit breaker handle, handle escutcheon, accessory cover, or accessory cover escutcheon.

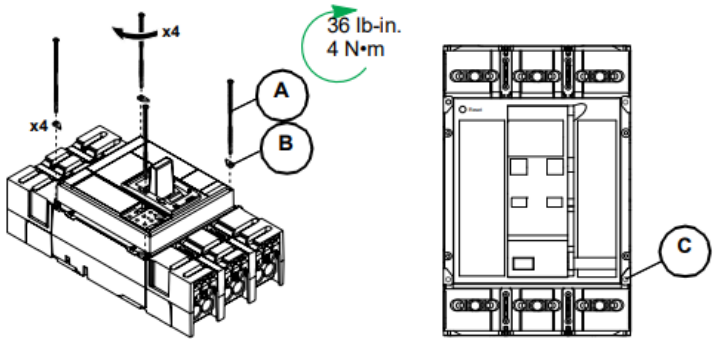
3. Mount circuit breaker.

WARNING

HAZARD OF ELECTRIC SHOCK, ARC FLASH OR EQUIPMENT DAMAGE

- Mount circuit breaker using only insulated mounting screws provided.
- All four washers (A) and mounting screws (B) must be installed and torqued to designated value.
- Electrically-operated circuit breakers must be grounded by installing insulated mounting screw in lower right mounting screw hole (C).

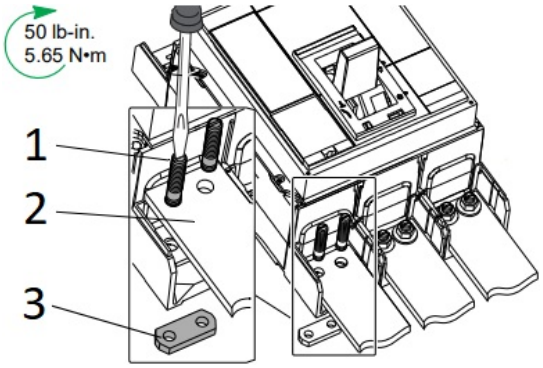
Failure to follow these instructions can result in death, serious injury or equipment damage.



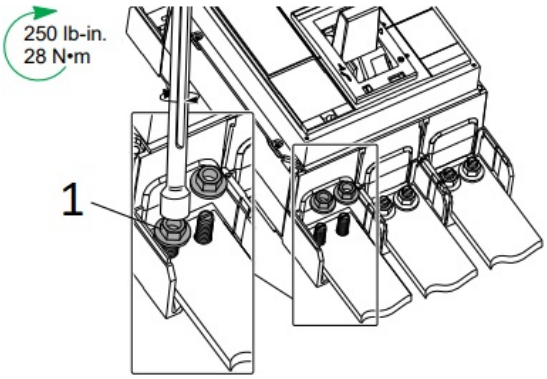
A. 4 washers, provided

B. 4 Insulated 10-32 x 4.5 in. screws, provided

For bus-connected circuit breakers, bolt bus to circuit breaker.



1. Bolts (provided)
2. Bus
3. Nut plate



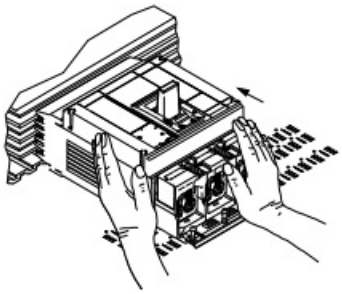
1. Nut (provided)

I-Line™ Circuit Breaker Installation

NOTICE
HAZARD OF EQUIPMENT DAMAGE • Do not adjust jaws. • Do not remove joint compound. • If necessary, use Square D™ joint compound PJC7201. **Failure to follow these instructions can result in equipment damage.**

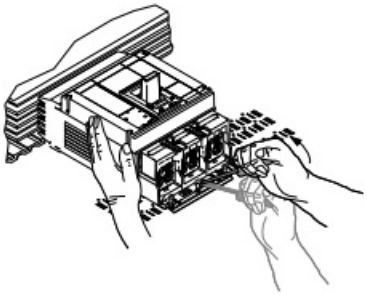
1. Place circuit breaker in the tripped or OFF (O) position.
2. Install circuit breaker on the I-Line bus.

(1)



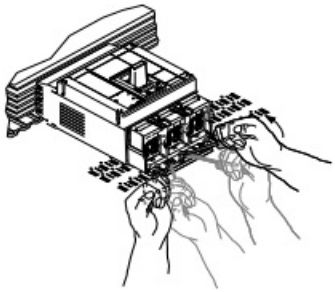
Position circuit breaker on I-Line platform

(2)



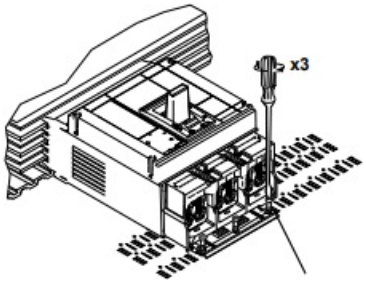
Hold while starting to rack on.

(3)



Rack until firmly in place

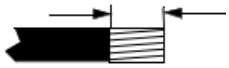
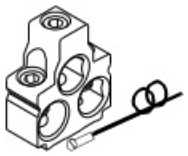
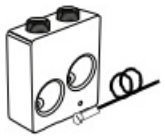
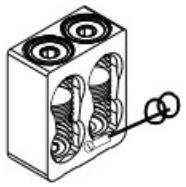
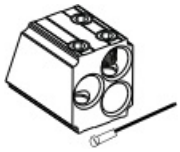
(4)



Tighten screws firmly without bending mounting bracket

Cable Installation

TABL. 2 : Lug Information

Lug	Lug with Optional Control Wire Installed	Catalog No	Conductor				Torque	
			Type	Size	Qty.	Strip Length[3] 	Wire Binding Screw	Control Wire Screw
		AL800M23K[1,2]	Al/Cu	3/0-500 kcmil (95-240 mm²)	3	1.0 in. (25 mm)	442.5 lb-in. (50 N•m)	9-12 lb-in. (1-1.3 N•m)
		CU800M23K[2]	Cu					
		AL800P6K[1,2]	Al/Cu	3/0-600 kcmil (95-300 mm²)	2	1.2 in. (30 mm)	442.5 lb-in. (50 N•m)	9-12 lb-in. (1-1.3 N•m)
		AL1200P24K[1,4]	Al/Cu	3/0-500 kcmil (95-240 mm²)	4	1.2 in. (30 mm)	442.5 lb-in. (50 N•m)	9-12 lb-in. (1-1.3 N•m)
		CU1200P24K[4]	Cu					
		AL1200P25K[1,2,5]	Al/Cu	3/0-500 kcmil (95-240 mm²)	4	Top holes: 1.25 in. (30 mm) Bottom holes: 2.25 in. (57 mm)	442.5 lb-in. (50 N•m)	9-12 lb-in. (1-1.3 N•m)
		CU1200P25K[2,5]	Cu					
		AL1200P6KU[1,2,5]	Al/Cu	350-600 kcmil (185-300 mm²)	3	Top and middle holes: 1.25 in. (30 mm) Bottom holes: 2.25 in. (57 mm)	442.5 lb-in. (50 N•m)	9-12 lb-in. (1-1.3 N•m)

[1] For version with tapped hole for control wire add a T before the K to the catalog number (e.g. AL800M23TK).
[2] Add suffix “4” for four-pole circuit breaker kits (e.g. AL800M23K4 or AL800M23TK4).
[3] Conductors must be cut square for secure termination.
[4] For load end (bottom) mounting only.
[5] Not suitable for use on I-line circuit breakers.

1. Square conductor ends and preform conductors to final configuration.

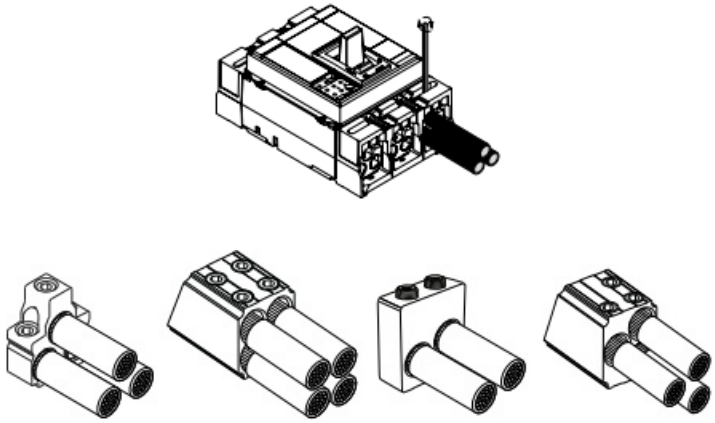
   (Conductor must be cut square for secure termination.)
2. Use a proper insulation stripping tool to strip conductor ends.
3. Do not nick strands.

NOTICE
HAZARD OF FALSE TORQUE INDICATION Do not allow conductor strands to interfere with threads of wire binding screw. **Failure to follow these instructions can result in equipment damage.**

AL800M23K, CU800M23K, AL800P6K, AL1200P25K, CU1200P25K and AL1200P6KU Lug Kits

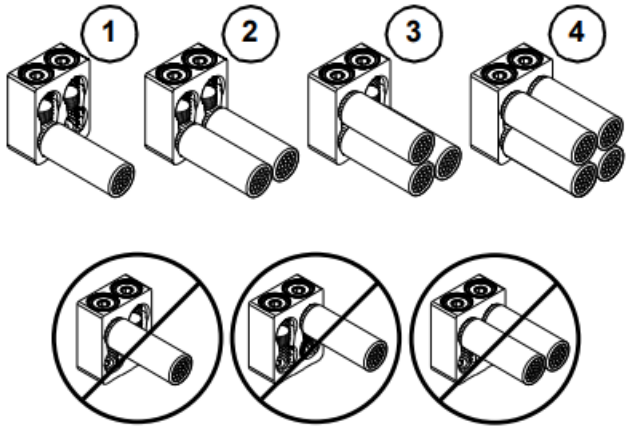
For factory-installed lugs, install cables in lug and torque wire binding screw as recommended on the faceplate.

For field-installable lug kits, see instruction bulletin shipped with the kit.



AL1200P24K and CU1200P24K Lug Kits

1. For factory-installed lugs, install cable in order listed and torque wire binding screw as recommended on the faceplate.
2. Install bottom cables first.
3. Fully tighten bottom wire binding screws before installing top cables.
4. Remove foam spacer before installing cable.



Cable Restraint

NOTICE
HAZARD OF CONDUCTOR MOVEMENT UNDER SHORT-CIRCUIT CONDITIONS Restrain circuit breaker conductors as required in Table 3.**Failure to follow these instructions can result in e quipment damage.**

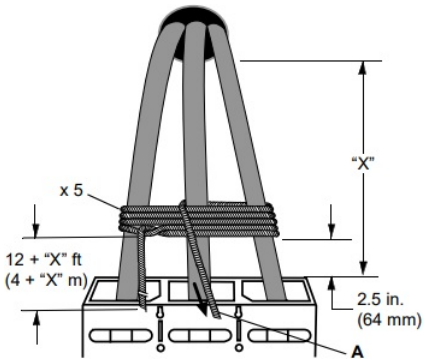
TABL. 3 : Cable Restraint

Frame	Available Fault Curren t	Conductors Use d	Unsupported Cable Lengt h	Restraint Recommende d
800 A	≤ 65 kA	(3) ≥ 300 kcmil	≤ 11 in. (279 mm)	No[1]
	All other cases			Yes
1200 A	≤ 65 kA	(4) ≥ 350 kcmil	≤ 14 in. (256 mm)	No[1]
	All other cases			Yes

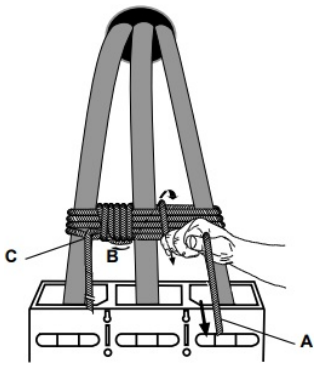
[1] Restraint is required if any requirement is not met.

Restrain conductors using 30 ft. (9 m) of 3/8 in. (9.5 mm) sisal rope or equivalent.

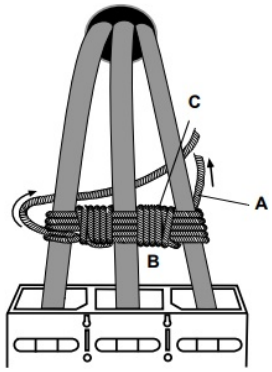
(1)



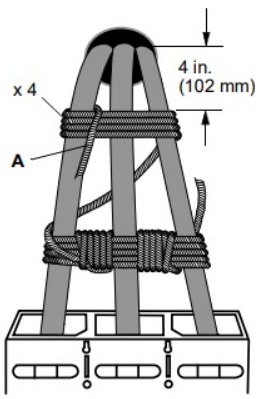
(2)



(3)

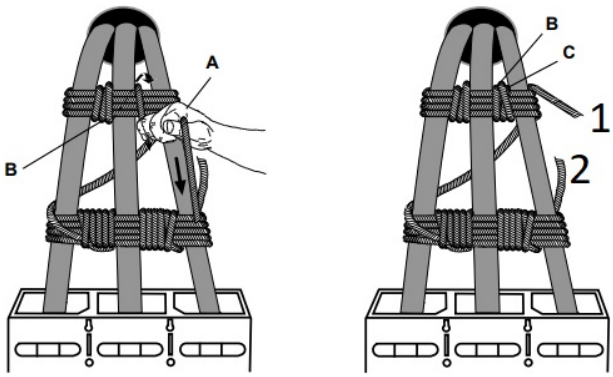


(4)



(5)

(6)



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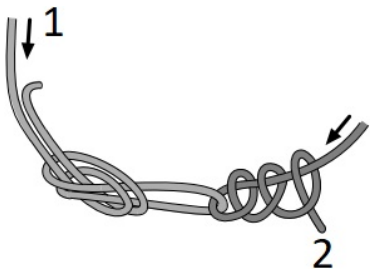
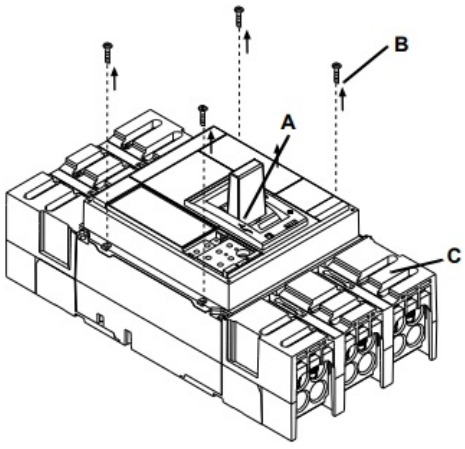


1. End 1
2. End 2

A. Pull rope taught.
B. Completely fill space between conductors.
C. Weave final rope loop underneath previous loop.

Installing Accessories

Remove Accessory Cover

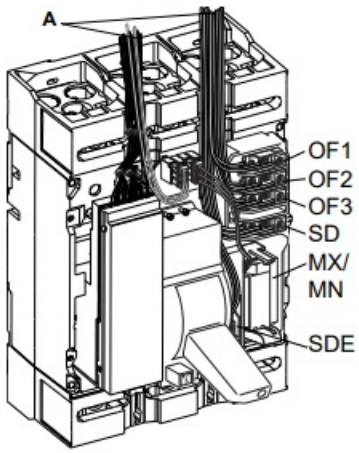
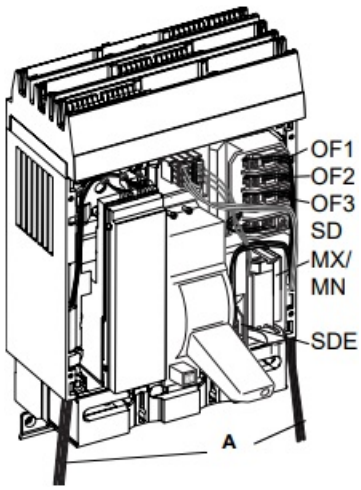
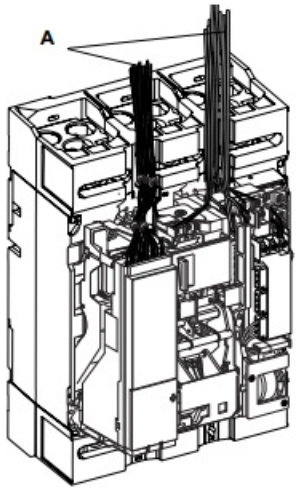
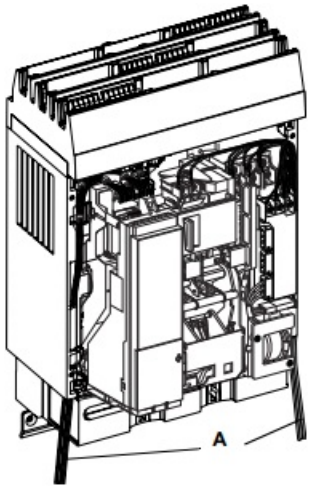


1. Make sure circuit breaker is in tripped or OFF (O) position (A).
2. Loosen four accessory cover screws (B).
3. Remove accessory cover (C).

Install Accessories and Control Wiring

1. Install field-installable circuit breaker accessories as instructed in the instructions packed with each accessory.
2. Install control wiring to accessories. Torque terminal screws to 10 lb-in. (1.13 N•m).

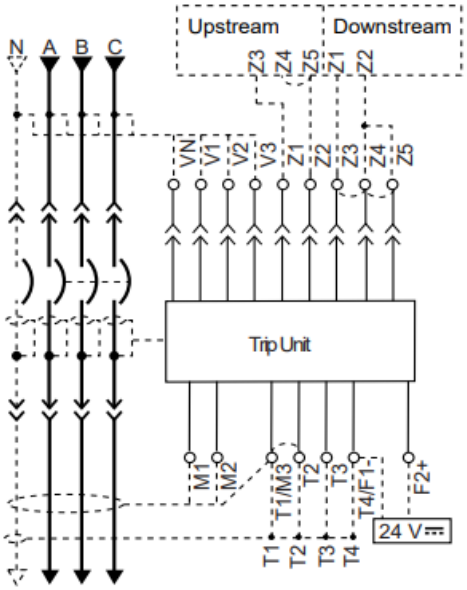
TABL. 4 : Accessory Control Wiring

<table>
<tr><td colspan="2">Manually Operated</td></tr>
<tr><td>Individually-Mounted Circuit Breaker</td><td>I-Line Circuit Breaker</td></tr>
<tr><td> 
</td><td> 
</td></tr>
<tr><td colspan="2">Electrically Operated</td></tr>
<tr><td>Individually-Mounted Circuit Breaker</td><td>I-Line Circuit Breaker</td></tr>
<tr><td> 
</td><td> 
</td></tr>
</table>

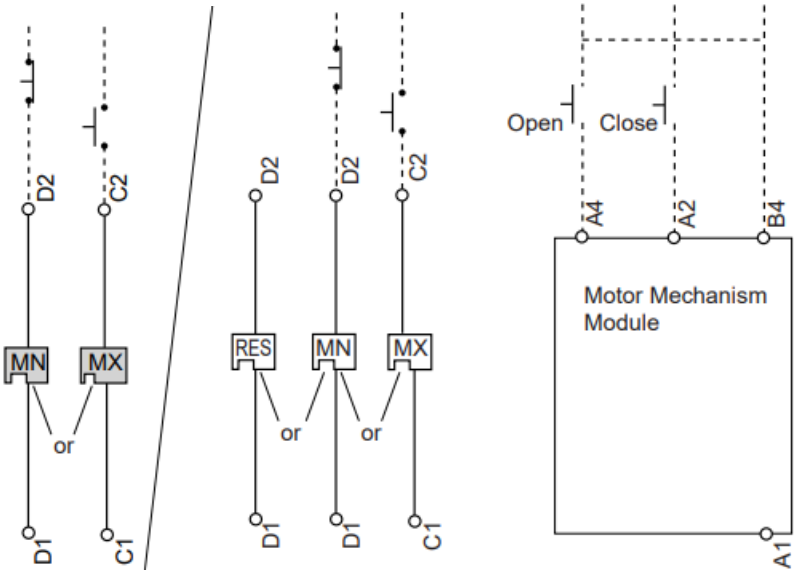
NOTE: All diagrams show circuit breaker in tripped position.

FIG. 3 : Accessory Control Wiring Diagrams (English)

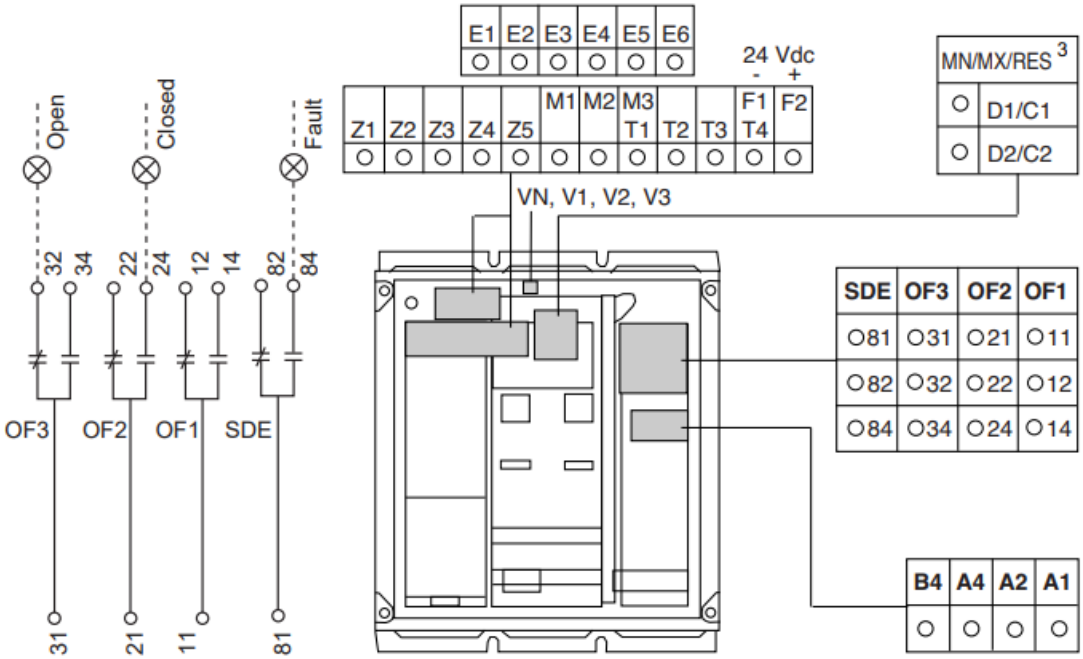
Power **Trip Unit** [1]



Remote Operation **Remote Operation with Motor**



Alarm Contacts



Connector	Recommended Wire Size
E1-E2	22 AWG (0.34 mm²) MIN shielded pair cable or twisted pair copper wires
V1, V2, V3, Vn	22-16 AWG (0.34-1.5 mm²)
T	22 AWG (0.34 mm²) stranded shielded cable
E3-E6, Q1, Q2, Q3	22 AWG (0.34 mm²) shielded twisted pairs with drain (Belden 8723 or equal)[2]
OF, SD, SDE	18-16 AWG (1-1.5 mm²)
MN, MX, RES	18-14 AWG (1-2.5 mm²)
F	Size per aux. 24 Vdc power supply
Z1-Z5	22-18 AWG (0.34-0.8 mm²)

Trip Unit Type				Connector	Description
Basic	**A**	**P**	**H**		
–	•	•	•	Com: E1-E6	Circuit breaker communication module E1 = +24 Vdc E2 = Common E3 = A/Tx- D0 E4 = B/Tx+ D1 E5 = A/Rx- D0 E6 = B/Rx+ D1
–	•	•	•	Z	Zone-selective Interlocking (ZSI) Z1 = ZSI OUT signal Z2 = ZSI OUT Z3 = ZSI IN signal Z4 = ZSI IN short-time delay Z5 = ZSI IN ground fault
–	•	•	•	T	External neutral sensor
–	•	•	•	F	24 Vdc external power supply
–	–	•	•	Vn	External voltage plug
–	–	•	•	V1, V2, V3[2]	External phase voltage takeoff
–	–	•	•	M6C[2]: Q1, Q2, Q3	6 programmable contacts 24 Vdc external power supply required
Function				**Connector**	**Description**
Auxiliary Contacts				SDE	Electrical fault alarm contact
				OF	Open/Closed circuit breaker or switch position contacts
Remote Operation				MN	Undervoltage trip device
				MX	Shunt trip
				RES	Remote Reset
Motor Mech Module				A4	Electrical opening
				A2	Electrical closing
				B4, A1	Power supply for control devices and gear motor

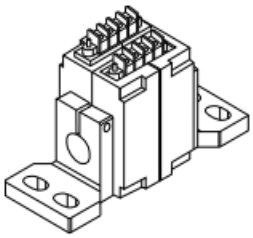
[1] Remove factory jumpers between Z3, Z4 and Z5 if ZSI is connected. Remove factory jumper between T1 and T2 if neutral CT is connected.
[2] Optional M6C and external voltage takeoff are supplied with flying leads.
[3] Remote Reset (RES), Undervoltage Trip (MN), and Shunt Trip (MX) cannot be used together in any combination.

Remote Reset is only for PowerPacT P-frame electrically operated fixed circuit breakers.

Ground-Fault Protection for Equipment

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

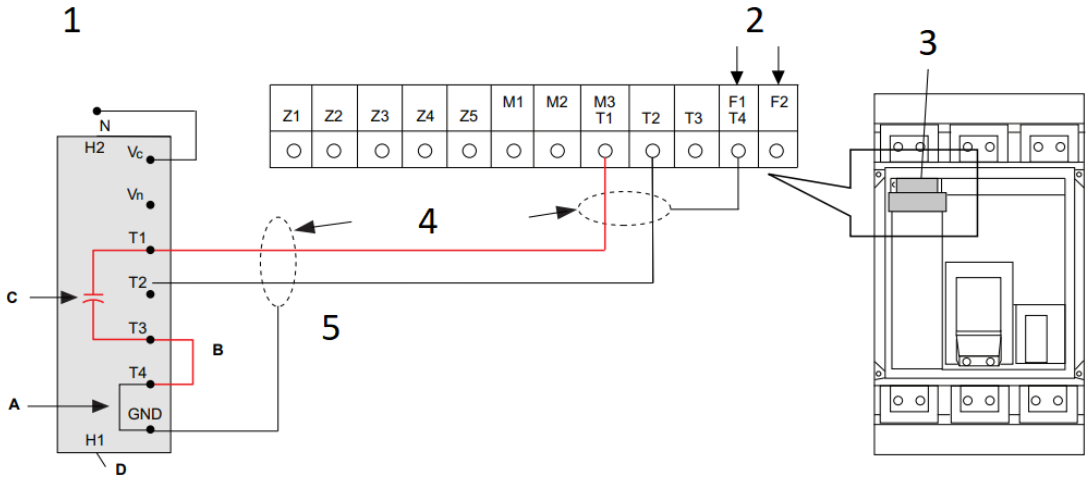
A three-phase, four-wire circuit requires an external neutral current transformer (CT).



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.

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.**

FIG. 6 : Wiring Schematic



1. Minimum input-to-output isolation 2500 V

   Output ± 5% (including max. 1% ripple)

   Dielectric withstand (input/output): 3 kV rms
2. Regulated and isolated 24 Vdc power supply (ungrounded)
3. Connect control wiring to terminals under the circuit breaker accessory cover.
4. Shield Drain
5. Use ≤ 4 m (13 ft.) 8723SB Belden® cable encased in 3/4 in. (19 mm) plastic conduit.

   A. Existing Jumper (internal)

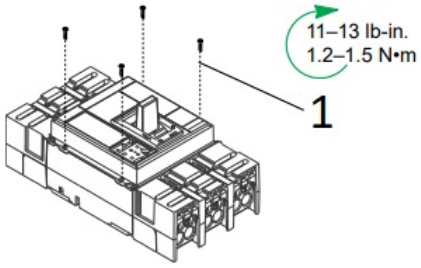
   B. New Jumper

C. New Capacitor (2.2 µF)

D. Neutral CT

Replace Accessory Cover

NOTICE
HAZARD OF EQUIPMENT DAMAGE • Accessory cover must be secured with all four screws tightened to stated torque. • Do not overtorque screws. • Do not use power equipment to torque screws. **Failure to follow these instructions can result in equipment damage.**

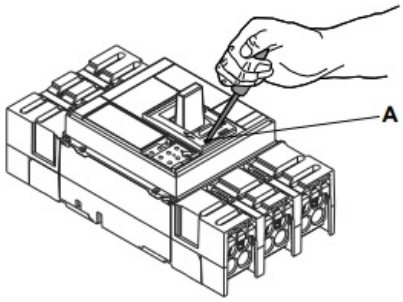


1. Tighten screws

1. Cover Seal Installation KIT S29375 (Optional)

Operation

Manually-Operated Circuit Breakers:
Press push-to-trip button (A) at installation to check operation. Repeat once a year to exercise circuit breaker.
Electrically-Operated Circuit Breakers:
Charge circuit breaker with charging handle and press ON (I) and OFF (O) button at installation to check operation. Repea



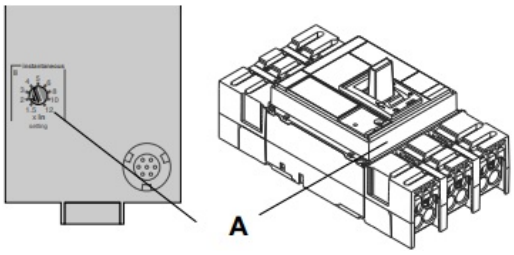
NOTE: Push-to-trip button will not trip circuit breaker if it is in the OFF (O) position.

Trip Unit Adjustment

For ET1.0I Electronic Trip Units: Adjust instantaneous trip (Ii) by adjusting switch (A).

For MicroLogic™ Trip Units refer to the trip unit user guide available on the Schneider Electric website (see Page

1).



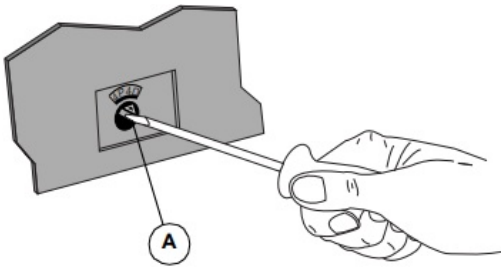
Neutral Protection Adjustment

NOTE: Applies to four-pole circuit breakers only.

A. For ET electronic trip units and MicroLogic 2.0, 3.0, 5.0, 2.0A, 3.0A and 5.0 A electronic trip units:

— Remove fourth pole lens cover.
— Use a slotted screwdriver to adjust neutral setting on circuit breaker (A).
— Replace fourth pole lens cover. Torque screw to 5.3 lb-in. (0.6 N•m).

B. For MicroLogic 5.0P, 6.0P, 5.0H and 6.0H electronic trip units refer to the trip unit user guide available on the Schneider Electric website (see page 1).



Circuit Breaker Switch Setting	Neutral Protection
4P 3D	No neutral protection
3P N/2	1/2 neutral protection
4P 4D	Full neutral protection (Factory default setting)

Circuit Breaker Removal

DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

- Apply appropriate personal protective equipment (PPE) and follow safe electrical work practices. See NFPA 70E, CSA Z462, NOM 029-STPS or local equivalent.
- 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.
- Beware of potential hazards, and carefully inspect the work area for tools and objects that may have been left inside the equipment.

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

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

Testing

Circuit breaker trip unit operation can be tested using the available test kit(s) found in Section 7 of The Digest (Reference 0100CT1901).

Troubleshooting

If problems occur during installation, refer to information below. If trouble persists, contact the field office.

DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

- Apply appropriate personal protective equipment (PPE) and follow safe electrical work practices. See NFPA 70E, CSA Z462, NOM 029-STPS or local equivalent.
- This equipment must only be installed and serviced by qualified electrical personnel.
- Troubleshooting may require energizing auxiliary devices with a test power supply. Make sure that the power supply is off before connecting or disconnecting it to the auxiliary device.
- Do not touch the terminals of the device during the test.

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

Condition	Possible Causes	Solution
Circuit breaker fails to stay closed.	1. Trip adjustment set too low. 2. Undervoltage trip not energized. 3. Shunt trip energized. 4. Short circuit or overload on system.	1. Adjust trip setting. 2. Energize undervoltage trip. 3. De-energize shunt trip. 4. Check system for short circuit or overload.
Circuit breaker trips, but no short circuit or overload is evident.	1. Trip adjustment set too low. 2. Voltage is below undervoltage trip setting.	1. Adjust trip setting. 2. Check system for low voltage.
Push-to-trip button will not trip circuit breaker.	Circuit breaker already tripped or off (O).	Move circuit breaker handle to reset, then to on (I).
Circuit breaker cannot be opened manually.	Damage to current path.	Contact local field office.

Electrical equipment must 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.

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Documents / Resources

	PowerPacT P-Frame and NS630b-NS1600 Circuit Breaker [pdf] Instruction Manual PGA36120U43A, P-Frame and NS630b-NS1600 Circuit Breaker, P-Frame, P-Frame Circuit Breaker, NS630b-NS1600 Circuit Breaker, Circuit Breaker, NS630b Breaker, NS1600 Breaker, NS630b, NS1600, Breaker

References

- P65Warnings.ca.gov
- p65warnings.ca.gov/
- User Manual