SIEMENS

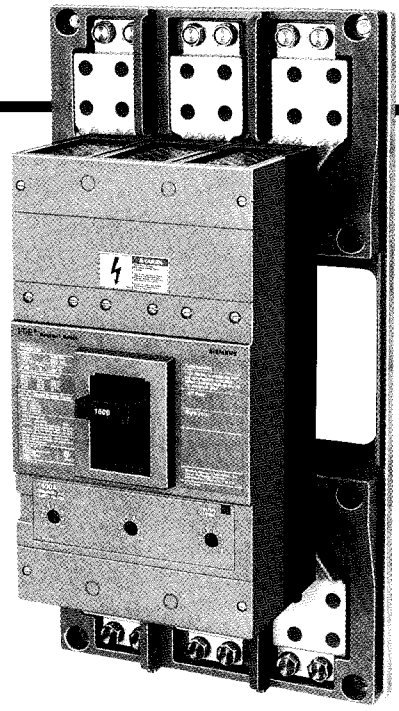
Molded Case Circuit Breakers

PD & RD Frame Information and Instruction Guide

Bulletin IPIM-0275B

Information and Instructions

General Information



General

PD and RD-Frame Sentron™ Series Circuit breakers, as shown on page 5, are for use in individual enclosures, switchboards and power and distribution panel boards. They are available as thermal magnetic, with interchangeable trip units (types PD6, RD6-standard interruption level HPD6, HRD6-high interruption level), non interchangeable trip units (types PXD6, RXD6-standard interruption level HPXD6, HRXD6-high interruption and CPD6, current limiting). Molded case switches (PXD6, RXD6).

CPD6 type Sentron™ Series circuit breakers combine thermal magnetic construction for overload protection in conjunction with the PD and RD-Frame's standard "blow-apart" contacts. This arrangement provides for current limiting protection under high fault interrupting conditions as outlined in the National Electric Code②, Article 240-11① and UL 489② standards. CPD6 type circuit breakers are fuseless and therefore eliminate the requirement of locating and replacing blown fuses should a high current fault occur. The common trip feature of the circuit breaker is completely retained so that all poles of the circuit breaker open when caused to trip due to an overload or short circuit.

Pressure wire connectors, suitable for use with aluminum or copper is available for all PD-Frame circuit breakers. Pressure wire connectors, suitable for copper only is available for all RD-Frame circuit breakers. A connect-all mounting block assembly is necessary to properly put all PD and RD-Frame circuit breakers into service. The latter mounting arrangement permits the removal of the circuit breakers from service without having to disconnect terminal connectors or cables. UL listed special features such as a shunt trip, auxiliary and alarm switches and undervoltage trip devices are available for field installation. The installation and removal of these devices is to be accomplished by properly authorized and qualified personnel only. Information concerning these special devices is found on pages 20–23.

Thermal Magnetic

PD6, RD6, PXD6, RXD6, HPD6, HRD6, HPXD6, HRXD6, and CPD6 type circuit breakers provide complete overload and short circuit protection by use of a time delay thermal trip element and an instantaneous magnetic trip device. Nominal instantaneous trip values are externally adjustable with eight trip points as shown below.

Ampere Rating	Nominal Instantaneous Values③			
	Low	2	3	4
1200-2000	5000	5715	6430	7145

Ampere Rating	Nominal Instantaneous Values③			
	5	6	7	High
1200-2000	7860	8575	9290	10,000

① National Electric Code (240-11)
"A current limiting overcurrent protective device, which, when interrupting currents in its current limiting range, will reduce the current flowing in the faulted circuit to a magnitude substantially less than that obtainable in the same circuit, if the device were replaced with a solid conductor having comparable impedance."

② Underwriters Laboratories (UL 489, Par. 2.5)
"A circuit breaker that does not employ a fusible element and that when operating within its current limiting range, limits the let-through I^2t of a 1/2 cycle wave of the symmetrical prospective current."

③ Tolerances are established in accordance to UL 489 standards.

Circuit breakers are calibrated at the factory, under controlled temperature conditions for applications in a 40°C (104°F) ambient.

The cover on the trip unit is sealed to prevent access to the trip elements. Alterations of the calibration of these elements should not be attempted. Removal of the seals will void the UL listing for that specific trip unit. Catalog numbers for ordering and informational purposes can be found on pages 42 and 43.

Molded Case Switch

A molded case switch is available in the PXD6, CPD6 and RXD6 type circuit breakers. This device contains a non-adjustable instantaneous self-protecting trip function that may open the switch on currents over 10,000 amps. No overload or low fault protection is provided. This protection must be supplied by separate overcurrent devices. (See page 4 for other details.) Catalog ordering information is located on pages 42 and 43.

Interrupting Ratings–Symmetrical RMS Amperes (kA) Based on UL 489 Standards

Interrupting ratings of the PD and RD-Frame circuit breakers are based on circuit and test conditions outlined in UL 489.

Breaker Type	RMS Symmetrical Amperes (kA)				
	UL A.I.R.				
	Volts AC (50/60 Hz)			Volts DC	
	240	480	600	250	500
PD6, PXD6, RD6, RXD6	65	50	25	30(2-P)	25(3-P)
HPD6, HPXD6, HRD6, HRXD6	100	65	50	30(2-P)	50(3-P)
CPD6	200	100	65	30(2-P)	50(3-P)

①CPD6 type circuit breakers are current limiting at 240V ac.

Breaker Type	IEC 947-2 (A.I.R.)					
	50/60 Hz					
	220/440		380/415		500	
	(Icu)	(Ics)	(Icu)	(Ics)	(Icu)	(Ics)
PD6, PXD6, RD6, RXD6	65	33	40	10	30	8
HPD6, HPXD6, HRD6, HRXD6	100	50	65	17	42	11
CPD6	200	100	100	25	65	17

Information and Instructions

Operation and Maintenance

Circuit Breaker Operation
With the mechanism latched and the contacts open, the operating handle will be in the OFF position. Moving the handle to the ON position closes the contacts and establishes a circuit through the breaker. Under overload or short circuit conditions sufficient to automatically trip or open the breaker, the operating handle moves to a position between ON and OFF. To relatch the circuit breaker after automatic operation, move the operating handle to the extreme OFF position. The circuit breaker is now ready for reclosing.

The overcenter toggle mechanism is trip free of the operating handle. The circuit breaker, therefore, cannot be held closed by means of the handle should a tripping condition exist. After automatic operation, the handle will assume an intermediate position between ON and OFF, thus displaying a clear indication of tripping.

Molded Case Switch Information:
PXD63S160A and RXD63S200A are suitable for use on a circuit capable of delivering not more than:
65,000A RMS Symm. @ 240 VAC
50,000A RMS Symm. @ 480 VAC
25,000A RMS Symm. @ 600 VAC
30,000A @ 250 VDC
when protected by a fuse or circuit breaker rated 1600A for the PXD63S1600A or 2000A for the RXD63S200A.

Maintenance
Experience has shown that properly applied molded case circuit breakers normally do not require maintenance. However, some industrial users may choose to establish an inspection and maintenance procedure to be carried out on a regular basis. For detailed information, consult applicable NEMA publications or your local Siemens sales office.

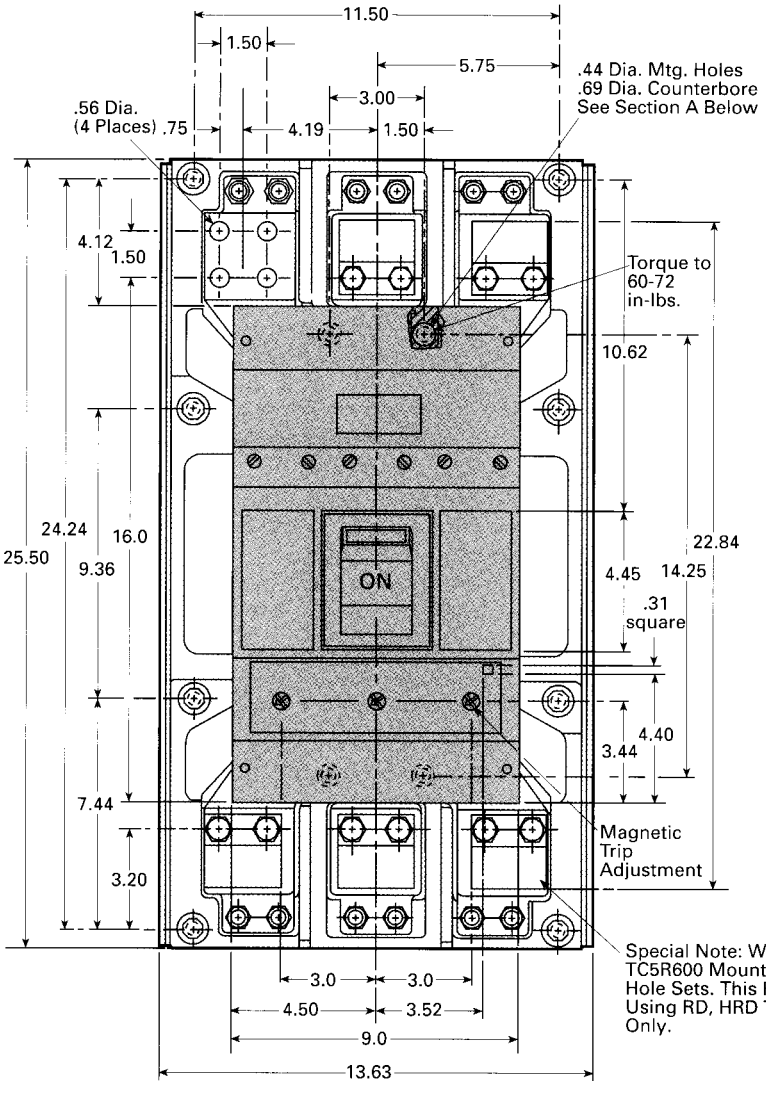
NOTE: Do not spray or allow any petroleum based chemicals, solvents, or paints to contact the molded parts or name plate.

SPECIAL NOTE:

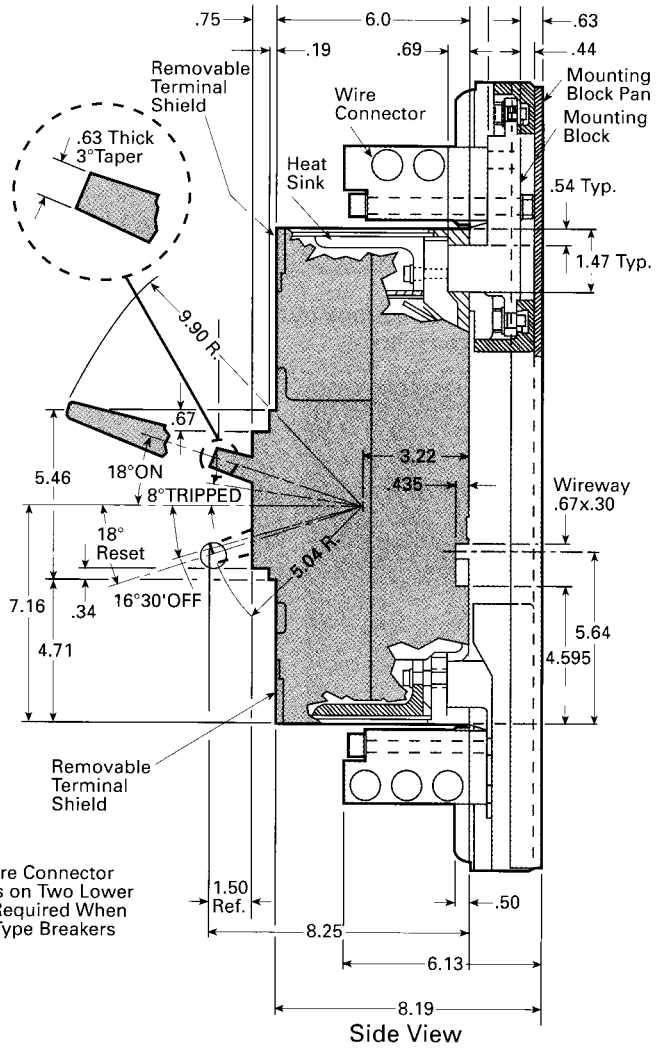
CPD6 circuit breakers are not UL listed as interchangeable trips – DO NOT REMOVE TRIP UNIT and replace with another. Removal of trip unit voids UL listing.

PD and RD-Frame Outline Drawings①

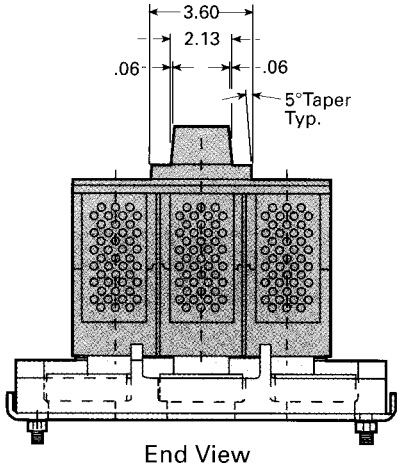
3-Pole



Front View



Side View

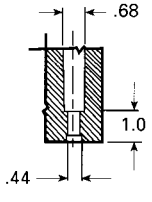


End View

Handle Operating Forces

Operation	Lb. wo/Ext.	Lb. w/Ext.
OFF to ON	75	40
ON to OFF	85	46
TRIPPED to RESET	130	70

① All drawing dimensions are shown in inches.



Section A

Note: See Wire Connector
Outline Drawings on Page 10.

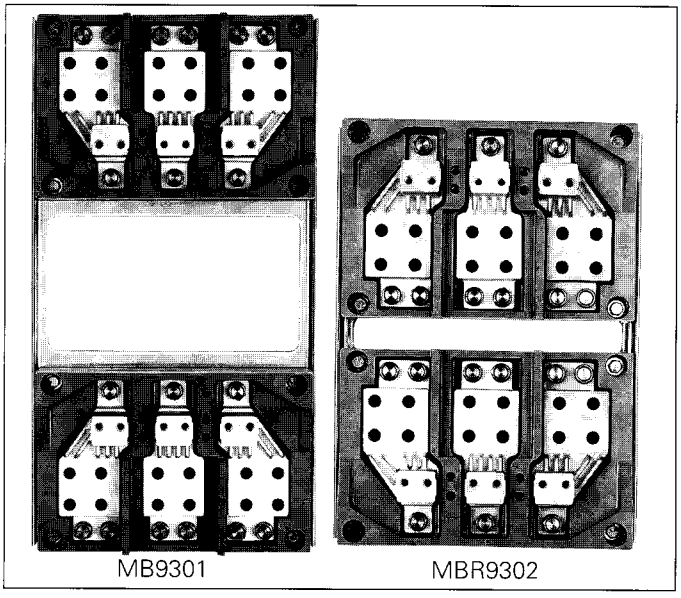
⚠ DANGER

Hazardous Voltage.
Will cause death or severe injury.

Turn power off supplying switchboard or panel before installing.

⚠ Safety Instructions

NOTE: These instructions outline the recommended installation procedure.



MB9301 MBR9302

Mounting of Connect-All Mounting Block Assembly

A. Provide suitable mounting supports **(1)** and drill holes as shown in Figure 1. (Recommended use of 1-3/8 x 7/8 x 3/16 steel angle.)

B. Provide cutout for breaker escutcheon in front plate **(2)**.

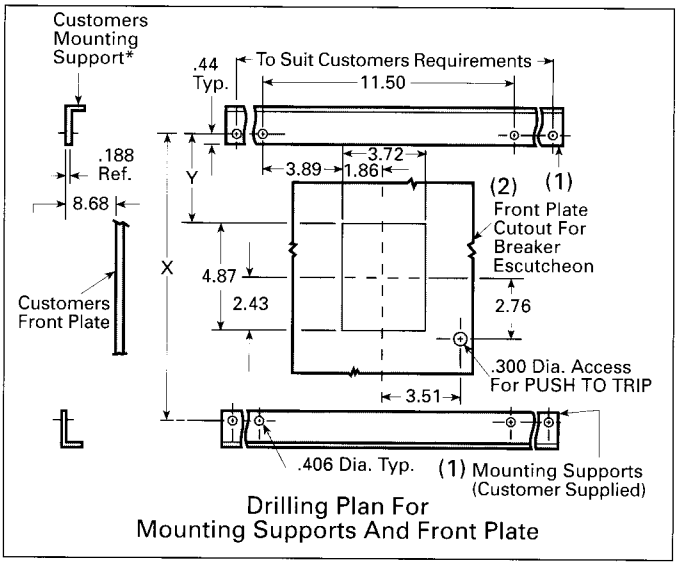
NOTE: Refer to Figure 2 for catalog number MB9301, and Figure 4 for catalog number MBR9302.

C. Remove four 3/8 x 1-1/2 hex head bolts **(3)**, nuts and washers (Figures 2 and 4) and re-use to mount assembly to support angles. Tighten mounting bolts and nuts securely.

Installation

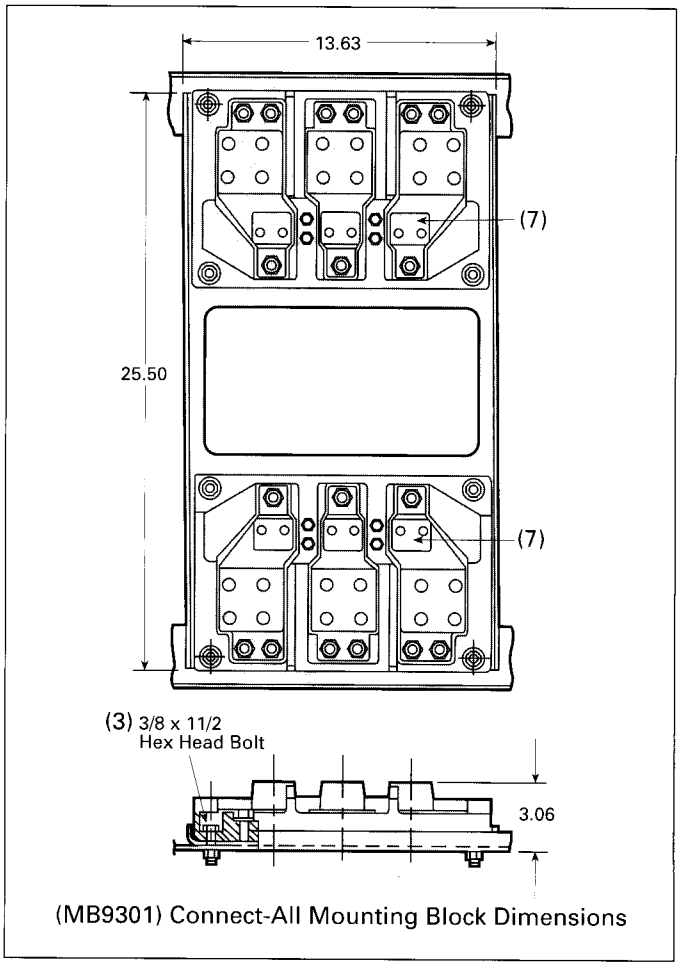
The PD and RD frame devices are for use in individual enclosures, panelboards, switchboards, or other approved equipment.

The installation procedure consists of inspecting, attaching required accessories, mounting the device and connecting and torquing the line and load wire connectors.



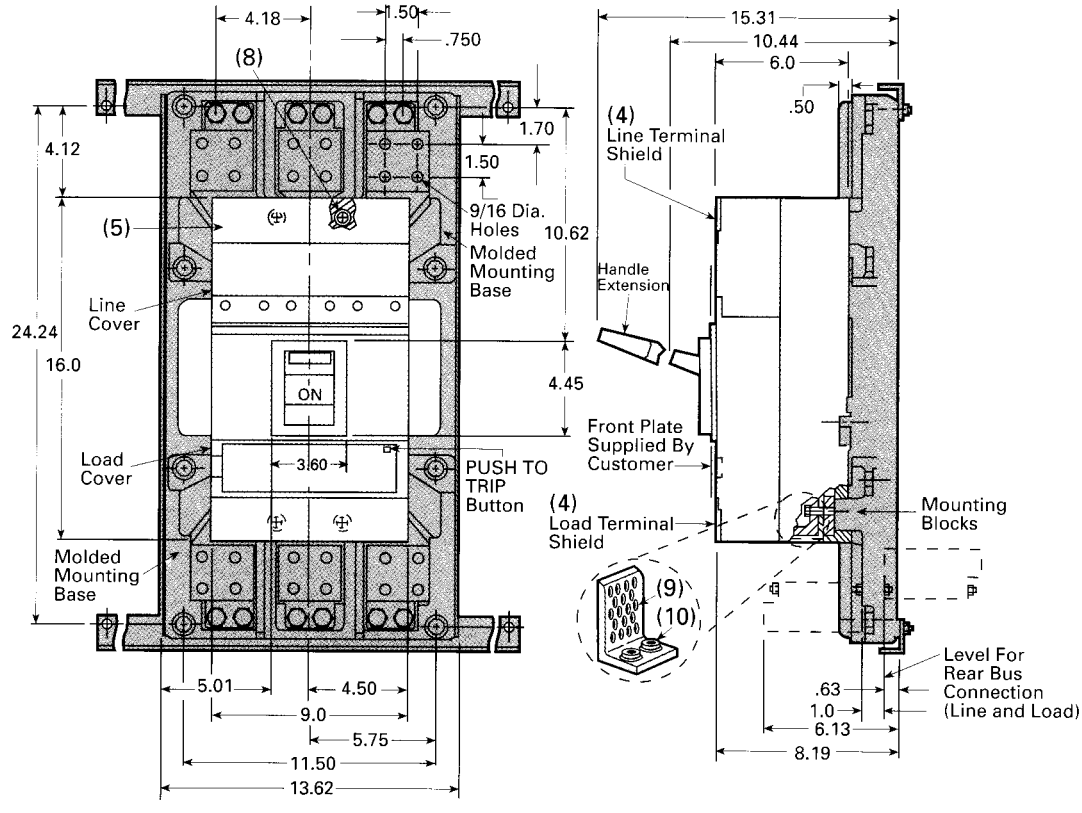
Drilling Plan For
Mounting Supports And Front Plate

Figure 1



(MB9301) Connect-All Mounting Block Dimensions

Figure 2



(MB9301) Connect-All Mounting Block and Circuit Breaker Dimensions

Figure 3

Unmounted wire connectors (where required) are available as separate catalog items. See Figure 6 for options on installation.

NOTE: Use TA5P600, TA4P750 or TC5R600 for the PD frame. Use TC5R600 or TA6R600 for the RD frame, see breaker marking (Do not use TA5P600 for RD frame).

NOTE: Molded case switches are supplied as complete devices only.

Circuit Breaker Preparation

A. Before mounting breaker onto connect-all mounting block assembly, turn off and lock out all power to prevent incidental or accidental electrical contact during the installation.

B. Make sure that the device is suitable for the installation by comparing nameplate ratings with system requirements. Inspect the breaker for completeness and check for any damage before mounting.

NOTE: Trip unit and accessory installation should be complete before the circuit breaker is mounted and connected. (See installation instructions for trip unit and accessories, in this manual, before proceeding.)

C. Make sure the device is in the tripped or off position. For circuit breakers, depress the red trip button (see Figures 3 and 5) or turn breaker off.

NOTE: Molded case switches do not have a PUSH TO TRIP button.

Circuit Breaker Manual Operation

Manual operation of the circuit breaker is controlled by the circuit breaker handle and the Push-To-Trip button. The circuit breaker handle has three indicating positions, two of which are molded into the handle to indicate ON and OFF. The third position indicates a TRIP position and is between ON and OFF positions.

A. Circuit Breaker Reset
After tripping, the circuit breaker is reset by moving the circuit breaker handle to the reset position and then moving the handle to the ON position.

NOTE: In the event of a thermal trip, the circuit breaker cannot be reset until the thermal element cools.

B. Push-To-Trip Button
The Push-To-Trip button checks the tripping function and is used to manually exercise the operating mechanism.

Mounting of Breaker Onto Connect-All Assembly

A. Remove the load and line terminal shields **(4)** by loosening the two terminal shield screws **(5)**. Also remove end plates **(6)**. See Figures 3 and 5.

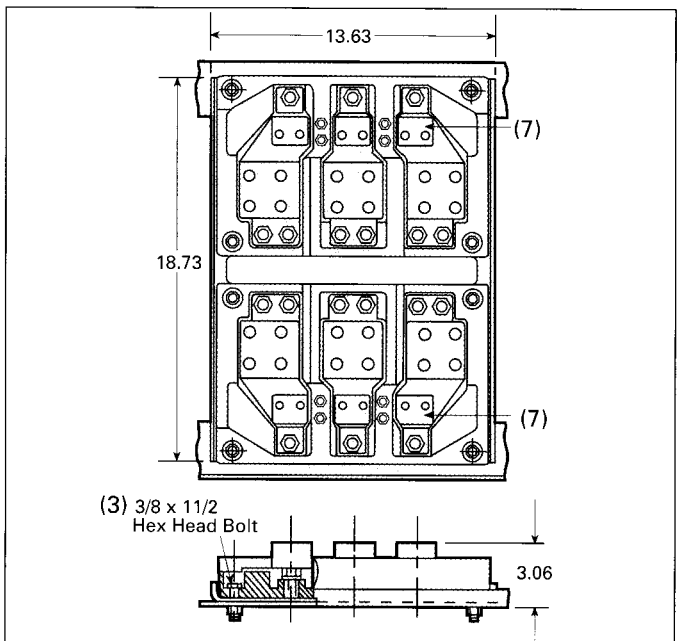
B. Place breaker onto protruding connect-all assembly terminals **(7)**, see Figures 2 and 4, and fasten breaker to molded mounting base with four slotted fillister head 3/8-16 x 1-3/4 long screws, washers and lockwashers **(8)**, see Figures 3 and 5. Tighten mounting screws to a torque of 5 to 6 ft-lbs.

C. Mount heatsink **(9)** with two hex head 3/8-16 x 1-3/4 long copper alloy bolts, washers and lock washers **(10)** per terminal. Tighten these bolts to a torque of 9 to 10 ft-lbs.

SPECIAL NOTE: For PD-Frame Circuit Breakers only 100% rated circuit breakers require the application of heat sinks (consult instructions supplied with mounting hardware).

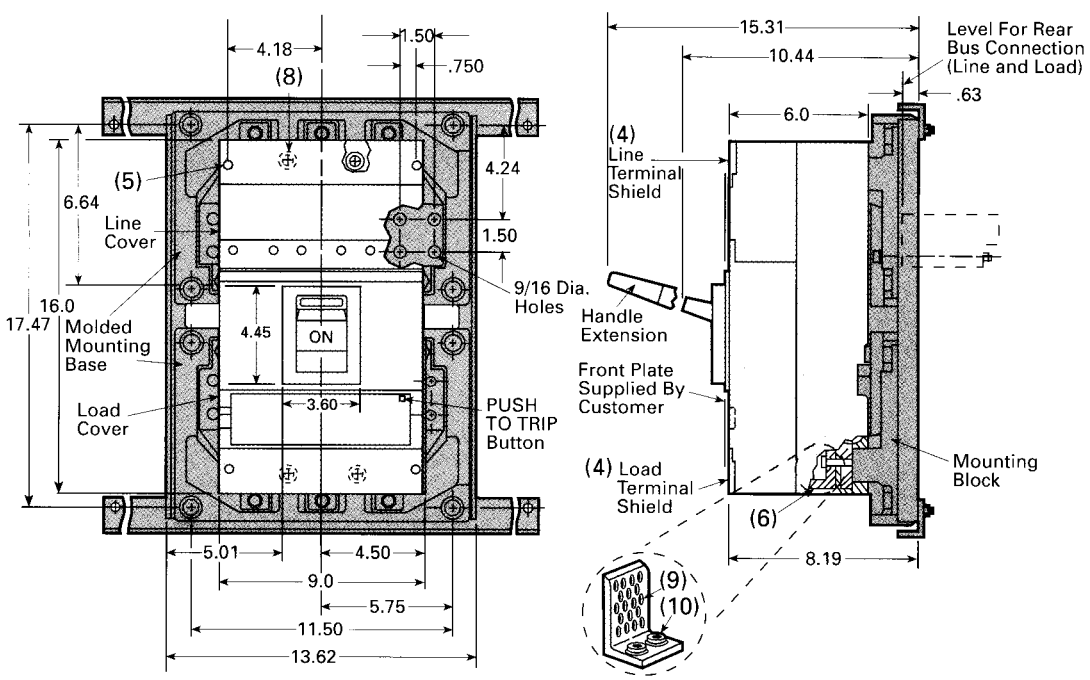
D. Replace all end plates **(6)**, and line and load terminal shields **(4)**. Tighten terminal shield screws securely.

E. After mounting the device, line and load terminals and accessory terminals should be connected.



(MBR9302) Connect-All Mounting Block Dimensions

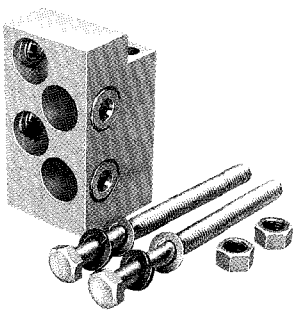
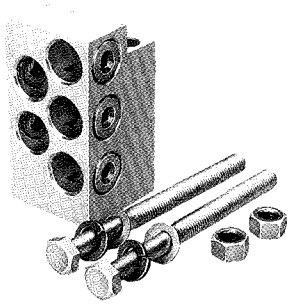
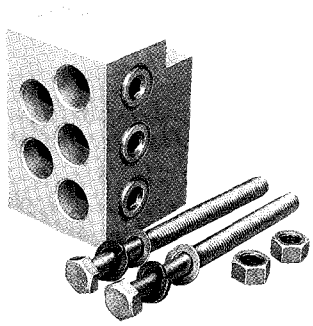
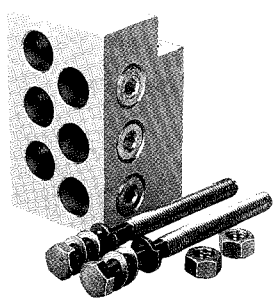
Figure 4



(MBR9302) Connect-All Mounting Block And Circuit Breaker Dimensions

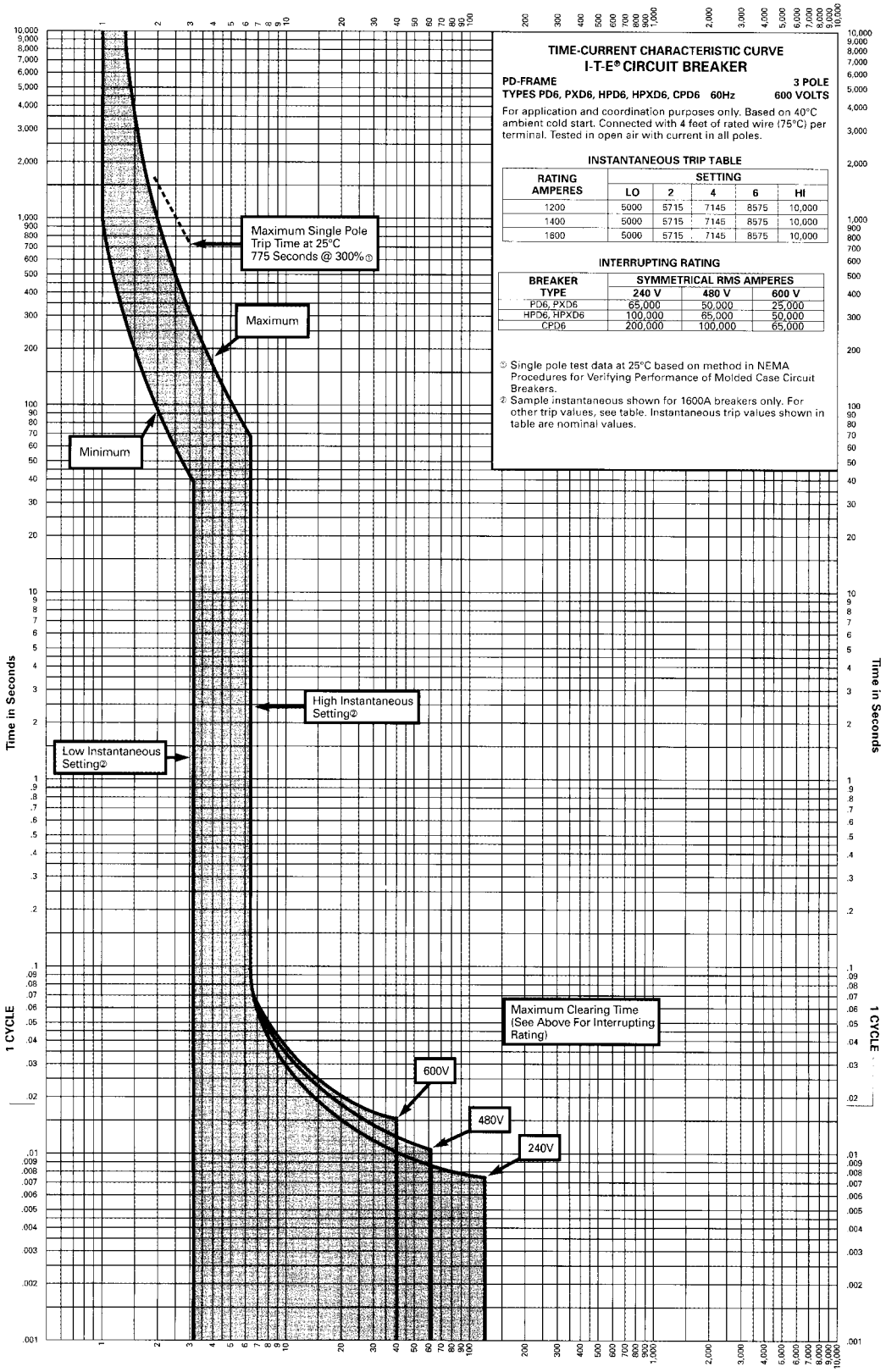
Figure 5

Table 2 – Connector Selection Chart

Connector Catalog Numbers	Circuit Breaker Ampere Rating	Connector Wire Range	Set Screw Torque	For Use With Type(s)
 TA4P750	1200-1600	(1-4) 600-750 Kcmil (Cu/Al)	480 in-lb.	PD6, PXD6, HPD6, HPXD6, CPD6
 TA5P600	1200-1600	(1-5) 300-400 Kcmil (Cu/Al) (1-5) 500-600 Kcmil (Cu/Al)	600 in-lb. 780 in-lb.	PD6, PXD6, HPD6, HPXD6, CPD6
 TC5R600	1600-2000	(1-5) 300-600 Kcmil (Cu Only)	600 in-lb.	PXD6, RXD6, HPXD6, HRXD6, PD6, RD6, HPD6, HRD6, CPD6
 TA6R600	1200-2000	(1-6) 300-600 Kcmil (Cu/Al)	600 in-lb.	PD6, PXD6, HPD6, HPXD6, RD6, RXD6, HRD6, HRXD6, CPD6

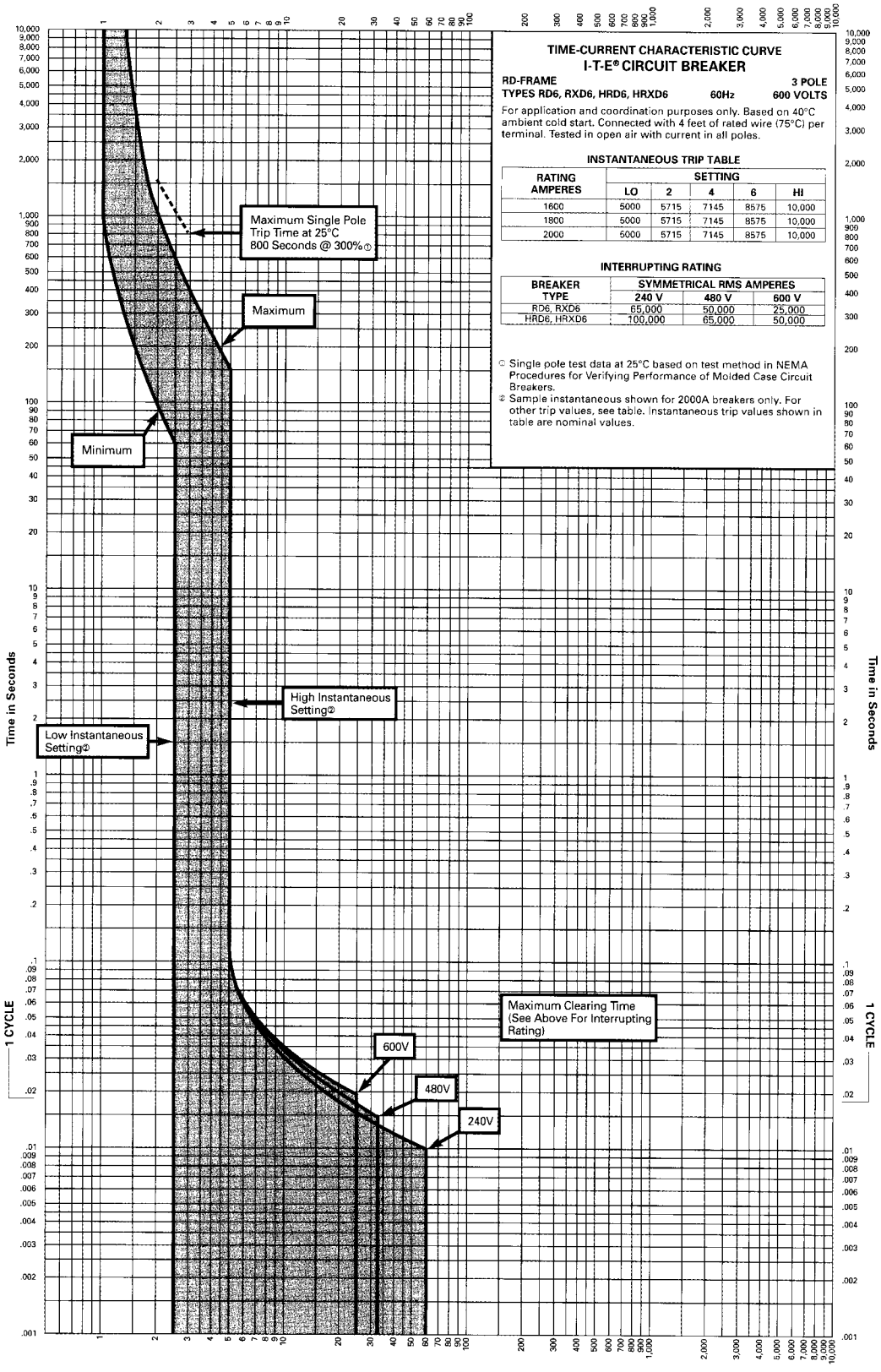
PD-Frame Time Current Curve

Types PD6, HPD6, CPD6, PXD6, HPXD6



RD-Frame Time Current Curve

Types RD6, HRD6, RXD6, HRXD6



Internal Accessories

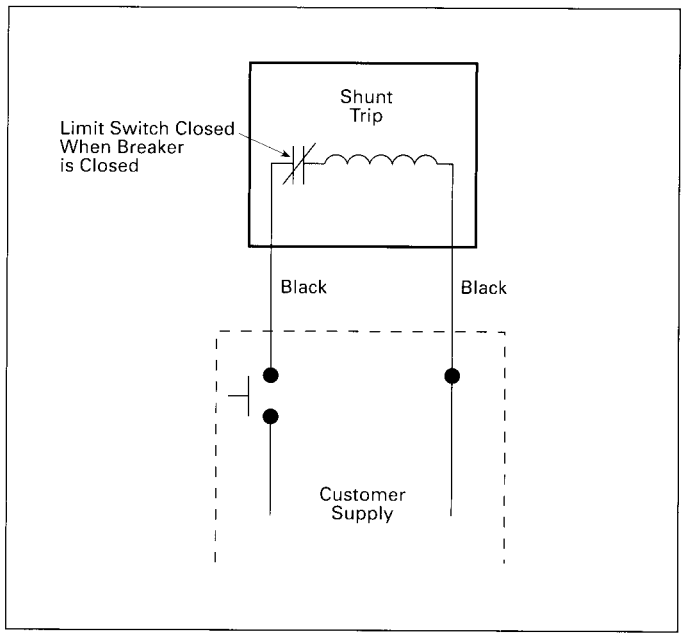
Mechanical and Electrical Check

Shunt Trip

A. Reset and turn circuit breaker ON.

B. Attach test circuit to accessory leads. While the test voltage reaches 55 percent or more of the rated coil voltage, the circuit breaker should trip.

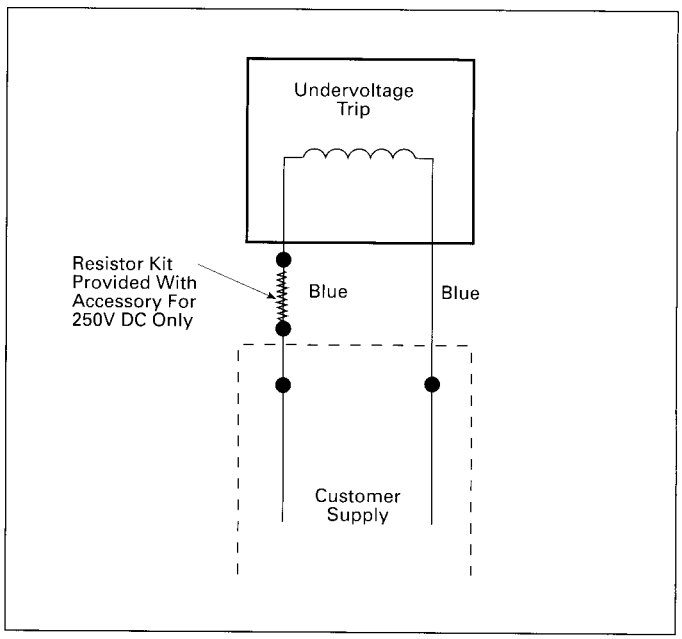
C. With breaker TRIPPED or OFF, check to make sure coil circuit has opened.



Undervoltage Trip

A. With breaker in TRIPPED position, connect test circuit to accessory leads. Energize undervoltage trip device at 85 percent of the marked rated voltage of the coil. Reset and turn breaker handle ON.

B. Reduce voltage to 35 percent of rated coil voltage. Circuit breaker must trip.



Electrical Data For Trip

Coil Voltage	Inrush Current At Rated Voltage (Amperes)	Catalog Number
60 Cycles AC		
120	0.55	S01MN6
208	0.61	S02MN6
240	0.69	S03MN6
277	0.76	S15MN6
480	0.30	S04MN6
600	0.40	S06MN6
DC		
12	2.55	S16MN6
24	1.70	S07MN6
48	0.60	S09MN6
125	0.57	S11MN6
250	0.89	S13MN6

Electrical Data For Undervoltage (UV) Trip

Coil Voltage	Sealed-In Current At Rated Voltage (Amperes)	Catalog Number
60 Cycles AC		
120	0.09	U01MN6
208	0.05	U02MN6
240	0.04	U03MN6
277	0.04	U15MN6
480	0.02	U04MN6
600	0.02	U06MN6
DC		
24	0.23	U07MN6
48	0.13	U09MN6
125	0.08	U11MN6
250*	0.04	U13MN6

*Requires a 2.5K ohm 25 watt resistor (clarostat cat. no. VP-25-K or equivalent). Resistor is to be mounted in series with coil and mounted in an enclosure by the customer.

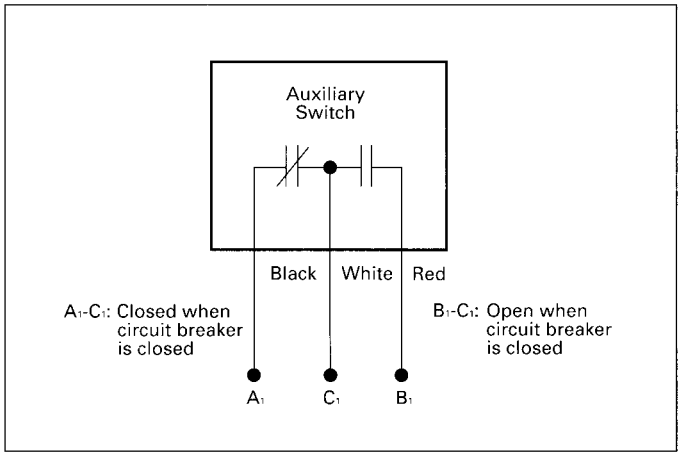
Mechanical and Electrical Check

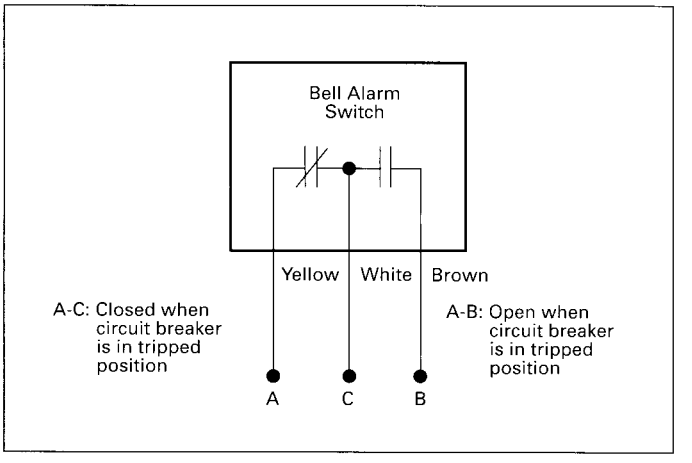
Auxiliary Switch Identification (All With Three Leads)

Wire Markings	Wire Color	Switch Terminals or Contacts
C1 or C2	White	C – Common Terminal
B1 or B2	Red	NC – Normally Closed Contact (Closed when circuit breaker is tripped or off)
A1 or A2	Black	NO – Normally Open Contact (Open when circuit breaker is tripped or off)

Bell Alarm Wire Identification (All With Three Leads)

Wire Markings	Wire Color	Switch Terminals or Contacts
C	White	C – Common Terminal
A	Yellow	NC – Normally Closed Contact (Closed when circuit breaker is tripped or off)
B	Brown	NO – Normally Open Contact (Open when circuit breaker is tripped or off)





Auxiliary and Bell Alarm Switch Kits

Catalog Number	Number of Auxiliary Switches	Ampere Rating of Switch				
		Volts AC			Volts DC	
		120	240	480	125	250
B00MN64	0	10	10	10	.5	.25
A01MN64B	1	10	10	10	.5	.25
A02MN64B	2	10	10	10	.5	.25
A01MN64	1	10	10	10	.5	.25
A02MN64	2	10	10	10	.5	.25

Accessory units that employ a combination will have the same wiring colors or identifiers. A double auxiliary switch combination will use wire markings A_1-A_2, B_1-B_2, C_1-C_2.

Bell Alarm Mechanical and Electrical Check

A. Use a buzzer or light indicator attached to switch leads A and C. With device in TRIPPED position, indicator light or buzzer should operate.

B. Reset breaker to OFF indicator light or buzzer should turn off.

C. Move breaker handle to ON indicator light or buzzer should remain off.

NOTE: Should the indicator not function properly during "check" procedure, inspect for incorrect installation or wiring.

Siemens Energy & Automation, Inc.
Power Distribution & Controls Division
3333 Old Milton Parkway
Alpharetta, GA 30005

For Nearest Sales Office
1-800-964-4114 or 800-241-4453
www.sea.siemens.com/sales/salesoffices.html

For Product Information
www.sea.siemens.com/power/