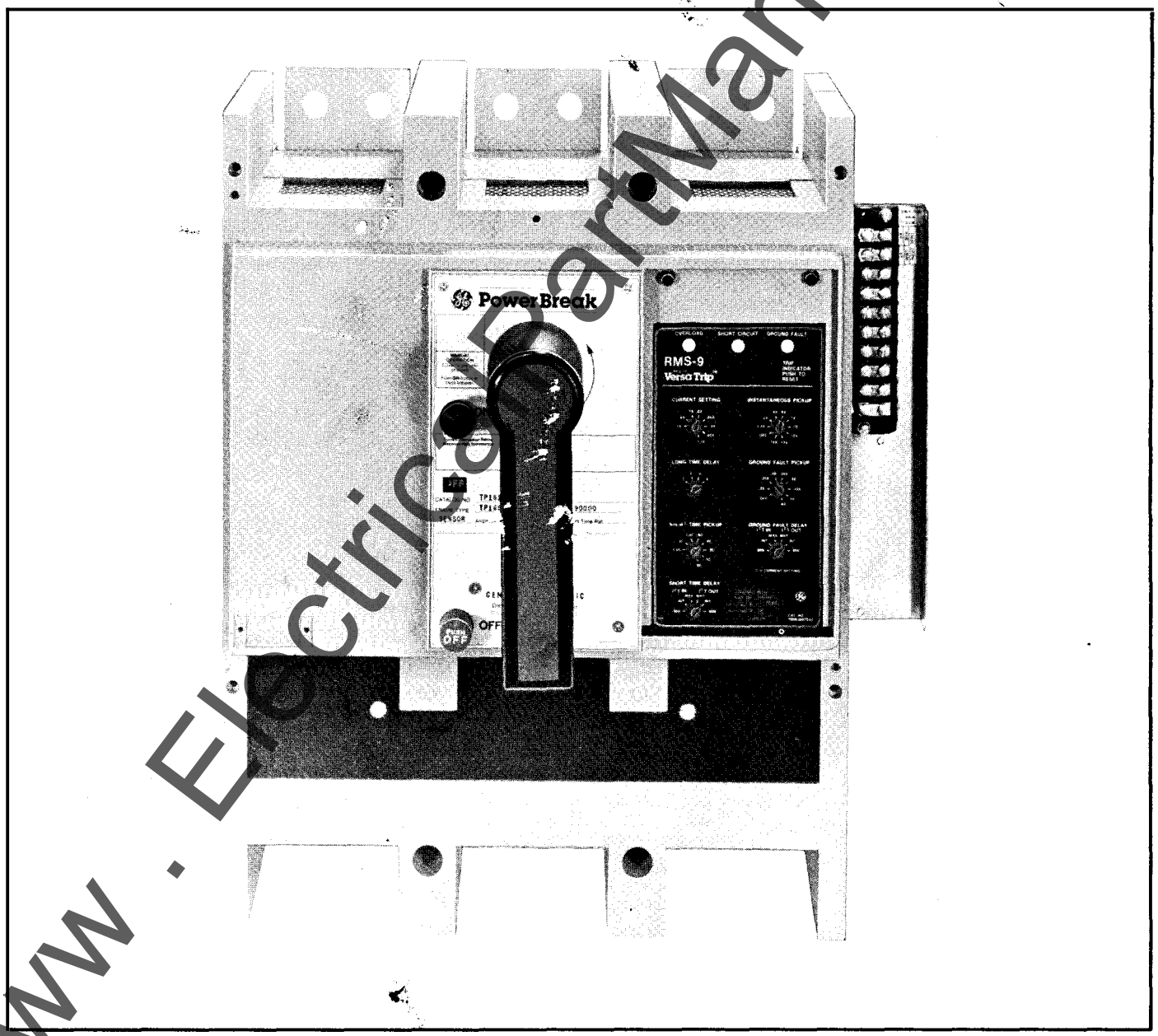
Instructions

GEH-4693B

POWER BREAK® Circuit Breakers

800-2000 Frames
240-600 Vac



GENERAL ELECTRIC

INTRODUCTION

The POWER BREAK® line of insulated case circuit breakers are designed to protect low-voltage power circuits and equipment. Current models are offered with MicroVersaTrip® RMS-9 solid state programmers or Magnetrip™ for fault detection.

Proper care should be exercised during unpacking and installation of breakers to prevent damage from careless or rough handling, or from exposure to moisture and dirt. Refer to the following sections on lifting, mounting, maintenance and storage.

RECEIVING

Each breaker is carefully inspected and packed before shipment. Immediately upon receipt, the circuit breaker should be inspected for any damage sustained in transit. If damaged or rough handling is evident, a damage claim should be filed immediately with the carrier and the nearest General Electric sales office should be notified.

LIFTING AND HANDLING

UNDER NO CIRCUMSTANCES SHOULD A DEVICE BE LIFTED SOLELY BY THE OPERATING HANDLE.

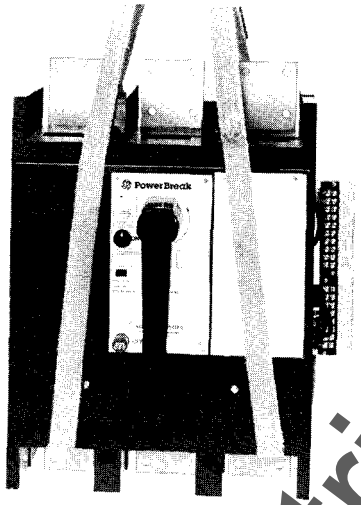


Figure 1. 800-2000A Frames

POWER-BREAK CIRCUIT BREAKER WEIGHTS

Frame Rating	Type	Weight (Lbs)
800A	Manual	50
800A	Electrical	64
1600A	Manual	82
1600A	Electrical	96
2000A	Manual	88
2000A	Electric	102

ELECTRICAL CONNECTIONS

1. Using an industry accepted solvent, remove any foreign material from the line and load strap surfaces and the corresponding surfaces of connecting bus or terminal studs. Ensure that the mating surfaces are smooth and free of burrs and nicks.

2. Place bus or terminal studs in desired position and align mounting holes.

3. Insert and fasten all hex-head bolts and washers according to the chart below.

BOLT TORQUES

Breaker Frame	Terminal Stud		Bus Connection	
	Bolt Size (Dia.)	Torque (In-Lb)	Bolt Size (Dia.)	Torque (In-Lb)
800	—	—	(1) ½ in.	300
1200-1600	—	—	(2) ½ in.	300
2000	—	—	(4) ½ in.	300

INSTALLATION

800 and 2000 Amp Frames Back Mounting Use (4) ¼-20 by ½ in. deep inserts in back of breaker (See Fig. 2 and 3). Torque screws to 50 in-lbs.

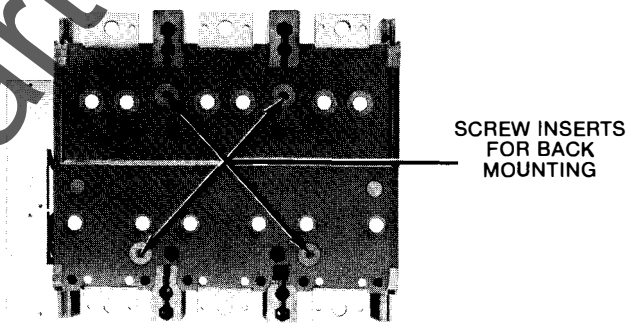


Figure 2. 800A Frame

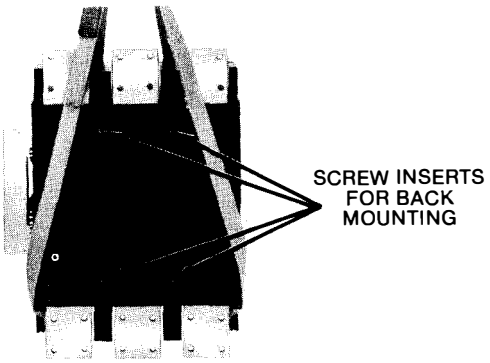


Figure 3. 1600 and 2000A Frames

Note: For setting trip settings, see appropriate breaker instruction booklets:

MicroVersaTrip® RMS-9 programmer	GEH-5369
MicroVersaTrip® RMS-9 Rating Plug	GEH-5371
MicroVersaTrip® programmer	GEH-4657
MagneTrip™ Trip Unit	GEH-4658

MAINTENANCE

WARNING: Before beginning any maintenance work, the breaker must be disconnected from all voltage sources, both power and control, and must be in the off (open) position.

Note: Accessories listed in this bulletin may be installed/replaced without voiding the UL listing.

MicroVersaTrip® RMS-9 programmer rating plugs may be changed per GEH-5369 and GEH-5371 without voiding the UL listing. MicroVersaTrip programmers and tap changer cards may be installed/replaced per GEH-4657 and pg. 7 of this manual respectively without voiding the UL listing.

Any other modifications void the UL listing, and the UL label must be destroyed.

Circuit breakers should be maintained through the implementation of a systematic maintenance program. A periodic inspection routine is recommended. The frequency of inspection should depend on the environment conditions of each breaker. All circuit breakers should be inspected at least annually. If it is operated frequently, or installed in an area of high humidity, dust or dirt, maintenance inspections should be increased. Under extreme adverse conditions, monthly inspections are recommended.

The maintenance inspection should begin with an overall visual check.

If dirt, grease, or any other foreign material is found on or in the breaker, it should be thoroughly and carefully cleaned. Do not use solvents on insulating material.

A rotating program providing for a periodic withdrawal from service of each breaker in turn for inspection and maintenance, is an excellent means of establishing a high level of service reliability. In such cases, one or more spare circuit breakers and all accessories should be available during the maintenance inspection to replace any breaker that may be removed for repairs.

NOTE: When ordering spare parts, always enclose the complete information from the nameplate, including the circuit breaker's serial number.

SEALING BREAKER

The breaker cover may be sealed by attaching sealing wire through the programmer window and through a hole provided in the rim of the MicroVersaTrip® RMS-9 programmer. Two sealing wires are recommended for a positive defeat-proof seal. (See Figures 4 and 5.)

STORAGE

It is recommended that a breaker be placed in service immediately in its permanent location. However, if it must be stored for an indefinite period it should be carefully protected against condensation, preferably by storage in a warm dry room. Circuit breakers for outdoor equipment should be stored in that equipment only when power is available and heaters are in operation to prevent condensation. The breaker should be stored in a clean location, free from corrosive gases or fumes. Particular care should be taken to protect the equipment from moisture and cement dust, as this combination may have a corrosive effect.

If the breaker is stored for any length of time, it should be inspected periodically to ensure good mechanical condition. Clean and dry the breaker thoroughly before placing in service.

LUBRICATION

Moderate lubrication is all that is required for most circuit breakers. Mechanical bearing points and sliding surfaces should be lubricated at the regular inspection periods with a thin film of molybdenum disulfide (Molykote G), or Mobil grease No. 28. It is recommended that kerosene be used to remove hardened grease and dirt from the latch and bearing surfaces. All excess lubricant should be removed to avoid any accumulation of dirt or dust.

CAUTION: Under no circumstances should lubricant be applied to contact areas.

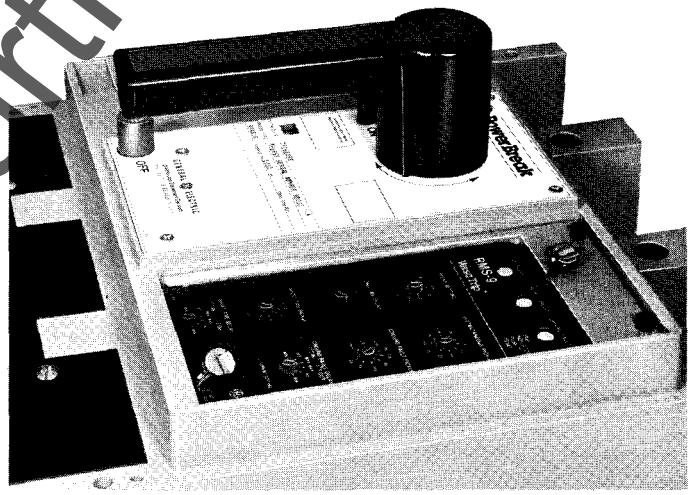


Figure 4.

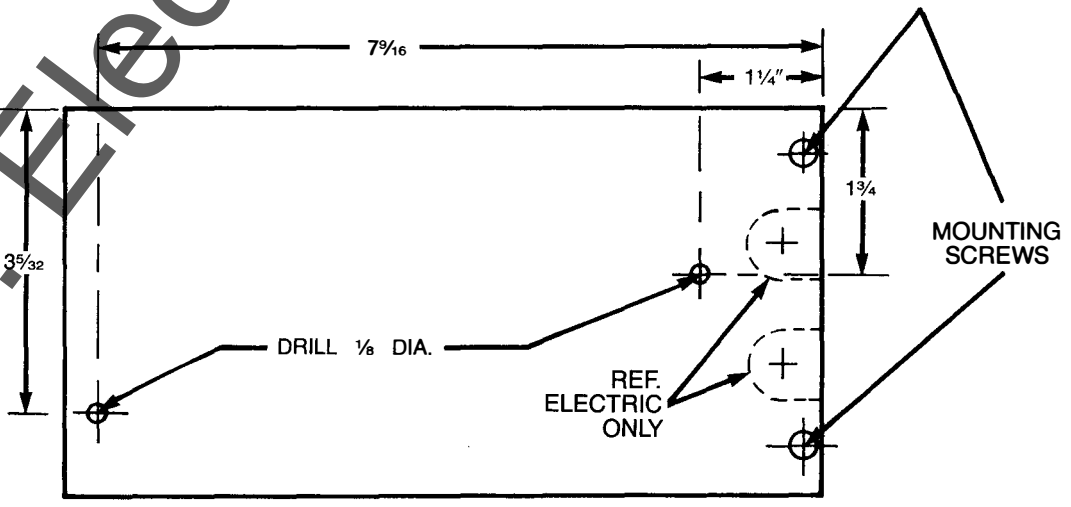


Figure 5. Drilling of Programmer Window for Sealing

800 AMPERE FRAME

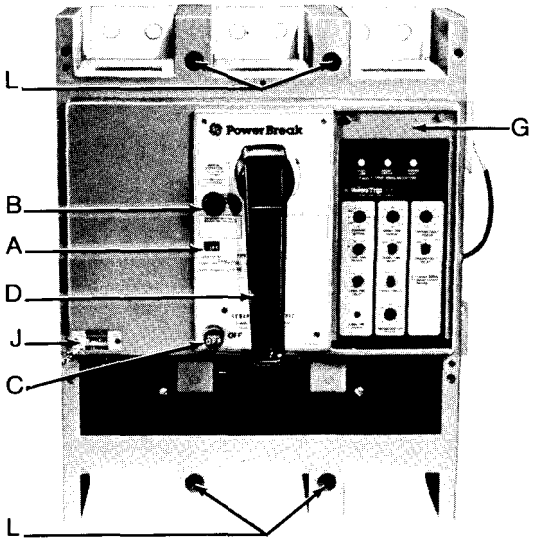


Figure 6. Manual Charge with MicroVersaTrip® Programmer

2000 AMPERE FRAME

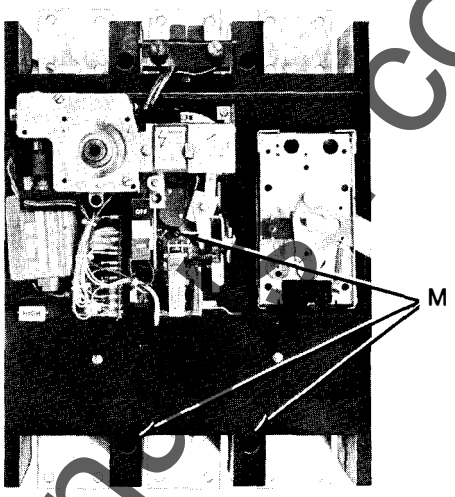


Figure 8. Electrical Charge Mid-Cover with Programmer, and Top Cover Removed

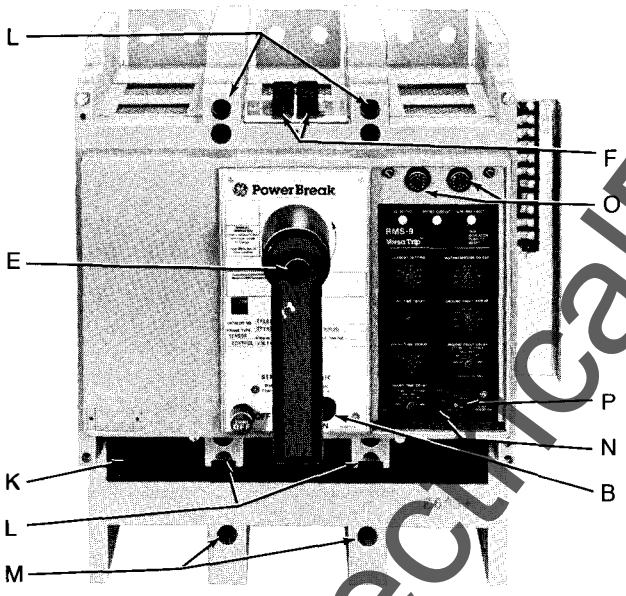


Figure 7. Electrical Charge with MicroVersaTrip® RMS-9 Programmer

KEY—STANDARD FEATURES

A Indicator "On"—Red
"CHG" (Manual, "CHARGED"(MOM)—yellow
OFF—Green
B "ON" button
C "OFF" button
D Manual charging handle
E Lockable manual charge engagement button (MOM only)
F Terminal board (MOM drive unit only)
G Removable protective window
J CT tap setting indicator (MicroVersaTrip only)
K Removable protective trip unit cover (Magnetrip™ only)
L Cover mounting screws (4)
M Mid-cover mounting screws (3) (MOM only)
N MicroVersaTrip RMS-9 programmer interchangeable rating plug
O MOM control circuit fuses
P MicroVersaTrip RMS-9 test set connection port

TABLE 1—SEQUENCE OF OPERATION

Indicator (A)	Main Breaker Contacts	Condition of Charging Springs	Next Permissible Operating Function
Off	Open	Discharged	Mechanism may be charged
CHARGED/CHG	Open	Fully Charged	Contacts may be closed
On	Closed	Discharged	Contacts may be opened

OPERATING INSTRUCTIONS

I. Manually Operated Devices (Manual)

A. To Charge the Mechanism Springs;

1. Charge the mechanism by rotating the operating handle 120° counter-clockwise (until the handle stops). Rotate the handle clockwise back to the home position. THIS OPERATION WILL *NOT* TURN THE BREAKER "ON"-CLOSE CONTACTS. The indicator will read "CHARGE".
2. If the breaker latch is held tripped by any of the following accessories, the mechanism springs will discharge at the end of the charging stroke and the breaker will revert to the discharged "OFF" condition.

- Kirk lock or padlock devices in locked "OFF" condition.
- Drawout interlock with carriage in any position except "TEST" or "ENGAGED".
- Bell alarm lockout not reset after overcurrent lockout.
- Undervoltage release device not energized.

CAUTION: The above conditions must be corrected to unlock the latch before repeating the charging cycle. Failure to do so may result in equipment damage.

B. To Close the Breaker:

1. Local—Depress the ON button on the breaker escutcheon (Also see Limited Close Access—*Accessory*).
2. Remote-(Option)—Energize the accessory closing solenoid.

   Do not repeatedly trip the device from the charge stage as equipment damage may result.

C. To Open the Breaker:

1. Local—Depress the "PUSH OFF" button on the breaker escutcheon.
2. Remote-(Option)—Energize an accessory shunt trip or de-energize an accessory undervoltage release device.

TABLE 2—CLOSING SOLENOID—Cat. Nos. TPXCC12S, TPXCC14S, TPXCC08S

Cat. No. Suffix	Rated Voltage	Operating Voltage Range*	Close Solenoid* Amperes @ Max. Voltage	Maximum Closing Time (Seconds)	Maximum Operating Time (Seconds)
12S	120V ac, 50/60Hz	102-132	3.3	.083	.050
14S	240V ac, 50/60Hz	204-264	1.7	.083	.050
08S	24V dc	19-29	13	.083	.050

The remote charge indicating switch is rated at 15A 250V ac and ½A 125V dc.

*The power source must stay within the rated operating voltage range of the close solenoid from no load to the full peak current rating of the device.

Remote charge indication TPXCAB

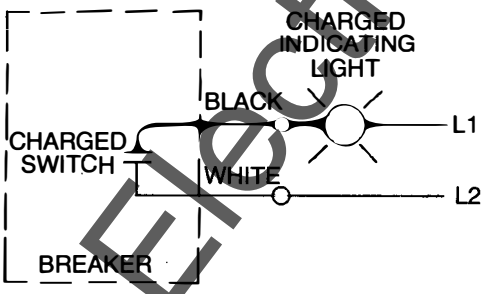


FIGURE 9.

Remote close and charge indication TPXCC12S, TPXCC14S, TPXCC08S

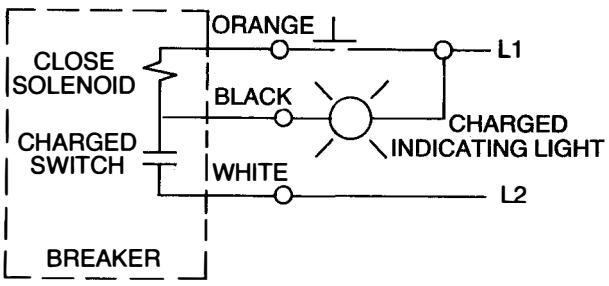


FIGURE 10.

OPERATING INSTRUCTIONS

II. Motor (Electrically) Operated Devices (MOM)

A. To Charge the Mechanism Springs:

1. Local—(a) Depress the lockable manual charge engagement button until it is flush with the handle surface. Slight rotation of the handle may be required to fully depress the button in order to align the internal coupling.

   (b) While holding the button down, rotate the operating handle fully 120° counter-clockwise until the handle stops. Return the handle clock-wise to the home position. This cycle will *NOT* turn the breaker ON. The mechanism indicator will read "CHARGED".

2. Remote—Charge electrically by connecting terminal 3 to terminal 4 (also see notes on automatic operation).

B. To Close the Device:

1. Local—Depress the ON button on breaker escutcheon.
2. Remote—Electrically close by energizing the closing solenoid provided by connecting terminal 5 to terminal 6 (See notes on Automatic Operation).

C. To Open the Device:

1. Local—Depress the "PUSH OFF" button on breaker escutcheon.
2. Remote—(Ordered with breaker)—Energize the accessory shunt trip or de-energize the undervoltage release provided.

D. For Automatic Operation:

1. *Automatic Close:* Jumper terminal 5 to terminal 6. Device closes immediately after the charging cycle is complete.
2. *Automatic Charging:* Jumper terminal 3 to terminal 4. Device charges immediately after device trips open (from faults or local/remote operation).

CAUTION:

1. Do not wire breakers for both automatic charge and automatic close unless a bell alarm overcurrent lockout function is incorporated. Failure to do so may result in repeated closures into an overcurrent fault.
2. The bell alarm lockout and undervoltage release device both hold the breaker latch open when activated. To prevent continuous cycling (see application note 4) when wired for automatic charging, the following is required:
   a) For bell alarm lockout—Interconnect bell alarm switch to motor operator terminal board as shown in Figure 11.

NOTE: The motor operator contains a feature which shuts off control power if the OFF button is held depressed. Thus, electrical operation is prevented if a "Kirk" lock or padlock accessory is used in the breaker locked OPEN condition. If the breaker is equipped with a draw-out interlock (TPDO-1), electrical operation is permitted only if the drawout carriage is in the ENGAGED or TEST position.

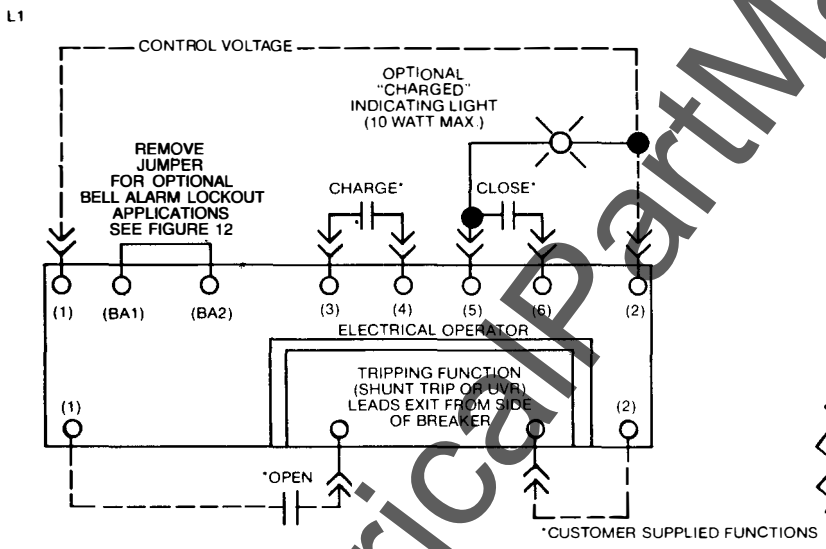


Figure 11.

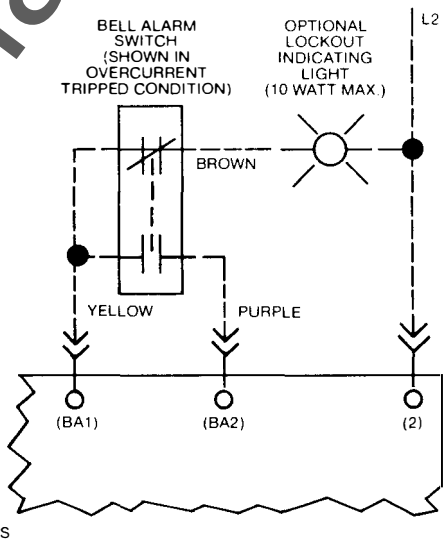


Figure 12.

WIRING NOTES

1. Customer supplied control contacts (i.e. "CHARGE" and "CLOSE") should be momentary action, rated ¼ amp at 125V dc for dc motor operators. For ac motor operators these contacts should be rated 3 amp 120Vac.
2. Do not apply power to any terminal board point other than points (1) and (2).
3. Observe proper polarity for dc electrical operators (Point (1) positive).
4. When hi-pot or dielectric testing:
   a) Remove all power leads—control and power.
   b) Short all electrical operator terminal board points.
   c) Open circuit breaker.
   d) Test between electrical operator terminal board points and load side of breaker center pole (This is connected to the frame).
   e) Test at 2200 VAC for one (1) minute using a current limited non-destructive AC hi-pot tester with maximum output of 20 milliamperes.

TABLE 3—APPLICATION DATA

Rated Voltage	Operating Voltage Range	Motor Current (Amperes)			Close Solenoid (Peak Amperes)	Fuses (Slo Blo) 125V	Nominal Charge Time (seconds)	Maximum Close Time (seconds)	Maximum Opening Time (seconds)
		Locked Rotor	Full Load	Average					
120Vac	102-132	8	2.5	1.5	3.0	2A	5.0	0.83	.050
125Vdc	100-140	10	2.5	1.5	3.5	2A	6.0	.083	.050
72Vdc	57-81	13	3.0	2.0	5.0	3A	6.0	.083	.050
48Vdc	38-58	20	5.0	2.5	6.6	4A	6.0	.083	.050
24Vdc	19-29	24	7.0	3.0	13.2	6¼A	7.5	.083	.050

APPLICATION NOTES

1. Size control power source per data's outlined in Table 3 above. If a single source is to supply several motor operators, it must be sized appropriately. Where breakers are wired for automatic charge it will be necessary to supply power to several operators simultaneously during startup.
2. The control power source should be sized so that the drop in voltage from "No Load" to "Full Load" does not exceed 7%.
3. Acceptable dc power sources are: dc generator; battery; three phase, full wave rectified ac; and other dc source with a peak-to-peak ripple voltage of not more than 15% of rated voltage at motor full load current (see Table 3).
4. Breakers built after approximately June, 1978 are equipped with an anti-cycling circuit which will lock the breaker out if the latch fails to reset (i.e.: due to a de-energized UVR). Lockout will occur if the charge time exceeds 20 seconds. Reset a locked-out breaker locally by pushing the "OFF" button, or remotely by momentarily removing control power from the electrical operator.

TRIP UNIT AND SETTING

I. MicroVersaTrip® RMS-9 and MicroVersaTrip® Programmers

Trip settings are set at minimal values on all functions. Customers may want to adjust settings to their own requirements.

A. To Adjust Trip Settings

1. Remove clear plastic protective window (Fig. 6).
2. Change settings by twisting indicators to desired value or multipliers. See GEH-4657 for definitions of MVT functions and GEH-5369 for MVT RMS-9 functions.
3. Re-install window.

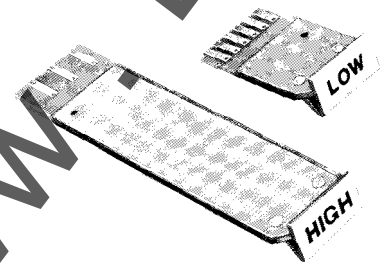


Figure 13. Manual Breaker-Card Length 2 1/8" Mom Breaker-Card Length 4 3/4"

B. Rating Plugs

MicroVersaTrip® RMS-9 programs require the installation of a rating plug in accordance with GEH-5369 and GEH-5371 to set the maximum continuous current rating.

C. Tap Changer Card

Some MicroVersaTrip® models include a tap changer card. When provided, this function allows the customer to change the rating of the breaker frame (see Fig. 13).

HIGH—100% of Amp rating on nameplate "Sensor Amp"

LOW—50%-75% of Amp rating on nameplate "Sensor Amp"

All devices provided with tap cards are shipped with both HIGH and LOW setting cards. The LOW is packed and supported on the breaker handle. The HIGH is installed in the breaker frame. To change settings, follow these instructions on removing the cover.

DANGER:

THE CIRCUIT BREAKER MUST BE REMOVED FROM THE ELECTRICAL SYSTEM

1. Turn the breaker—OFF.
2. Remove the (4) cover mounting screws and remove the top cover. On MOM breakers, remove only the top cover to replace/change the tap changer card.
3. Withdraw the HIGH (LOW) CARD from the tap charger support and install the LOW (HIGH) CARD. The print on the top of the card should be oriented the same as the breaker cover nameplate (refer to Fig. 6 and Fig. 14).

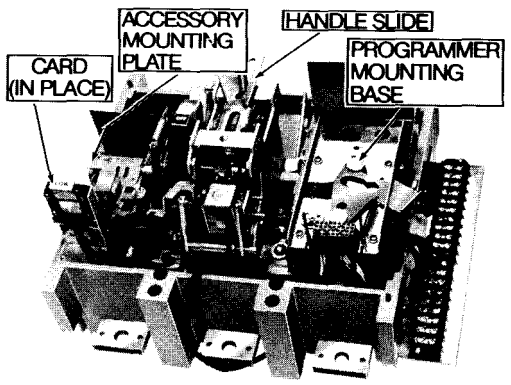


Figure 14. Cover and Programmer Removed

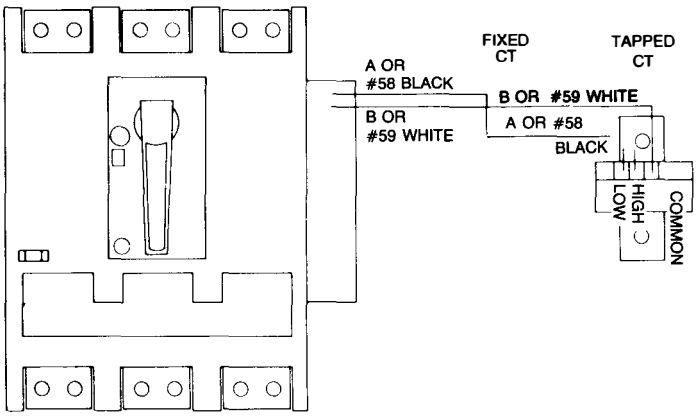


Figure 15. Neutral CT connection for 4 wire ground fault

4. Programmers providing the ground fault function must also have the tap setting changed on the tapped neutral CT (4 wire systems). Change the black wire lead from the HIGH (LOW) terminal to match the desired tap setting of the breaker frame. (Fig. 15).

5. Replace the breaker cover. (See Cover Reassembly—pg. 13).

6. Operate the breaker manually through the Charge—Close—Open cycle to be sure the device mechanically functions before energizing or connecting to the electrical system.

7. Store the extra tap card in a convenient place.

C. Neutral current transformer (4-wire ground fault system)

Ground fault protection is offered as an optional function of the MicroVersaTrip programmer. However, all MicroVersaTrip generation breaker frames are provided with terminal board points for connection to a neutral CT. DO NOT SHORT THESE TERMINALS IF NOT USED WITH A NEUTRAL CT.

Always match the CT rating to the rating of circuit breaker frame.

Specifically:

1. Fixed rated breaker frames—
   Match the neutral CT amp rating to the breaker sensor amp rating.

2. Tapped or high/low rated breaker Frames—
   Match the neutral CT amp rating to the High/Low setting of the breaker sensor amp rating.

Wiring:

MicroVersaTrip RMS-9 equipped breakers are **not** available with inverted construction (formerly designated by Cat. No. suffix "B"). These breakers may be either top fed (see Fig. 15A) or bottom fed (see figure 15B).

NOTE: The neutral CT is mounted in reverse in Fig. 15B when the breaker is bottom (reverse) fed.

CAUTION:

1. Match the tapped terminal for the black lead to the tap setting, if provided, on the breaker frame.

2. Observe the polarity markings on the neutral CT shell and breaker frame.

3. When a neutral CT is not used or not required (3-wire ground fault), DO NOT short the terminal points on the breaker frame for ground fault. Leave them open as supplied by the factory.

D. Programmers

1. MicroVersaTrip® RMS-9 Power Break models are supplied with non-interchangeable programmers (trip units). The breaker rating may be adjusted by changing the rating plug installed in the face of the programmer. See GEH-5369 and GEH-5371.

2. MicroVersaTrip model PowerBreak devices were ordered complete or as frame or programmer (trip unit) only.

   Some programmers/frames have rejection schemes to prevent mismatching of functions.

   These are the limitations of interchangeability:

   a. High short time or H function programmers may not be used in frames which are not wired for the H function (special CTs)

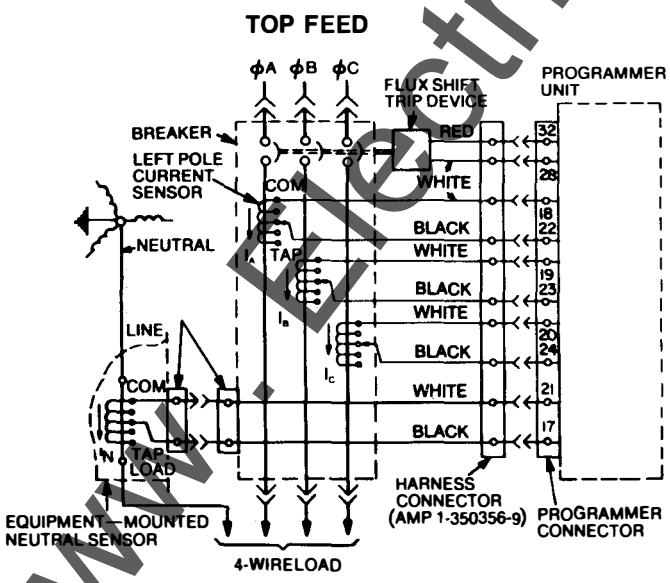


Fig. 15A Wiring Diagram — MVT/MVT RMS-9 With Ground Fault on 4-Wire Load

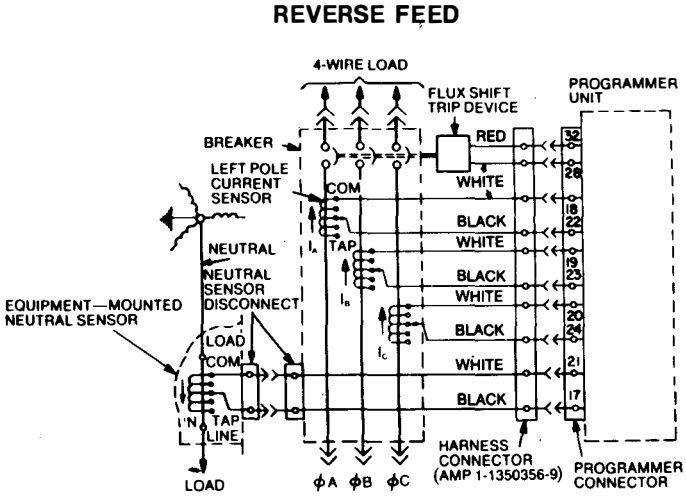


Fig. 15B Wiring Diagram — MVT/MVT RMS-9 With Ground Fault on 4-Wire Load

b. Special programmers for AK Type breakers with the M (No Instantaneous) function may not be used on Power Break devices

Refer to GEH-4657 for installation/replacement of MicroVersa-Trip programmers with remote overload indication, and recommended wiring for zone selective interlock.

To change or install programmers without remote indication, follow these instructions:

DANGER:

THE BREAKER MUST BE REMOVED FROM THE ELECTRICAL CIRCUIT.

1. Remove the (4) cover mounting screws and remove the top cover. On MOM breakers, remove only the top cover to replace/change the programmer.
2. Remove programmer:
   a) Push in programmer cover interlock (See Fig. 16).
   b) Lift programmer off base-mounting plate and terminal plug.
   c) Programmer cover interlock will now swing out and lock over the base to prevent the breaker cover from being replaced without installing another programmer.
3. Install programmer:
   a) Align holes in bottom of programmer box with guide pins of frame mounting plate. Lower programmer until it is fully down on the mounting plate and the connecting plug is secure (Fig. 17).
   b) Push in the programmer cover-interlock until it locks in place (See Fig. 16).

   NOTE: Programmer has a stud on the box to defeat the programmer-cover-interlock locking spring)
4. Replace top cover and secure (see cover reassembly pg. 13).
5. Manually operate the breaker through the Charge—Close—Open sequence to ensure proper mechanical functioning before energizing in the electrical system. REMINDER: A de-energized undervoltage release will not allow the mechanism to charge and close.

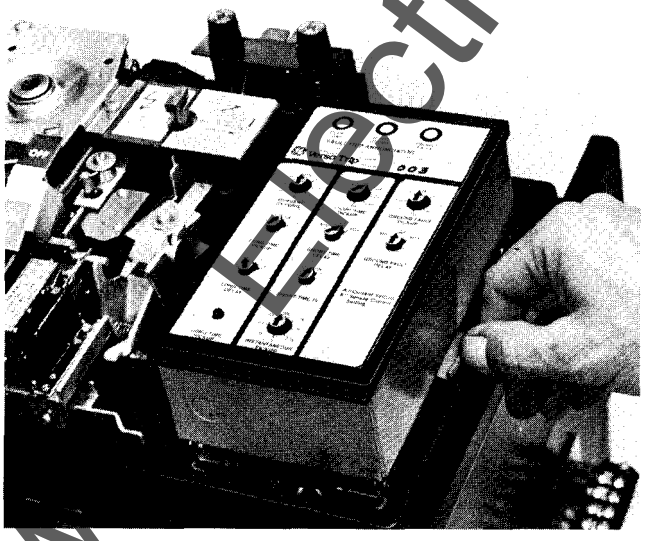


Figure 16.

6. Programmers with ground fault:

   If a four-wire system is to be used, a neutral CT must be provided. See the section on Neutral CT for instructions and precautions. DO NOT short the ground fault terminals provided on the breaker frame if not used.

II. Magnetrip

To change trip settings:

A. Remove protective cover (See Fig. 7).

B. Change trip setting by rotating plastic buttons with a screwdriver (See Fig. 18).

C. Replace protective cover.

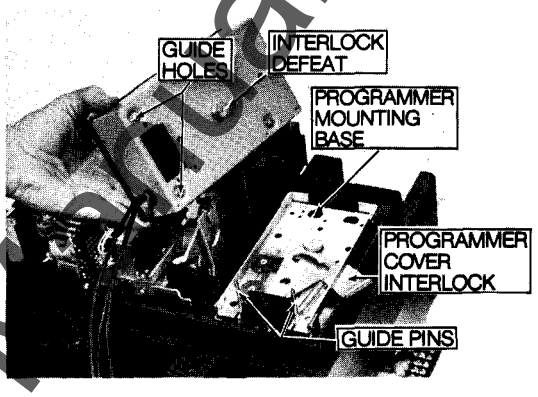


Figure 17. Aligning Programmer To Base

1600 AMPERE FRAME

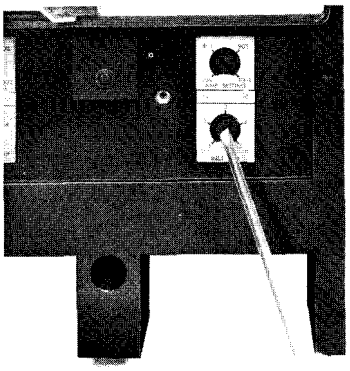


Figure 18. Adjusting Trip Unit Setting

ACCESSORIES INSTALLATION INSTRUCTIONS

The control leads of internally mounted accessories exit in pigtail form from the side of the breaker. These leads are terminated at the secondary disconnect points for draw-out breakers or at optional terminal blocks when specified for stationary mounted breakers. All leads are color coded as shown in Table 4.

TABLE 4— CIRCUIT BREAKER ACCESSORY LEAD COLOR CODE

Accessory	Lead Color			Leads Per Accessory
Shunt Trip	Black			2
Undervoltage Release	Blue			2
Auxiliary Switch	White—Common Red—OPEN (NO) Brown White—CLOSED (NC)			3 per switch
Bell Alarm (Overcurrent Lock-Out)	Yellow—Common Purple—CLOSED (NC) Brown —OPEN (NO)			3
Blown Fuse Trip (3 Coil Shunt Trip)	LINE END	LOAD END	PHASE	6
	Red	Brown White	A	
	Blue	White	B	
	Yellow	Black	C	
Closing Solenoid Manual Devices Only)	White	Common		3
	Black	Remote Indication		
	Orange	Remote Close		

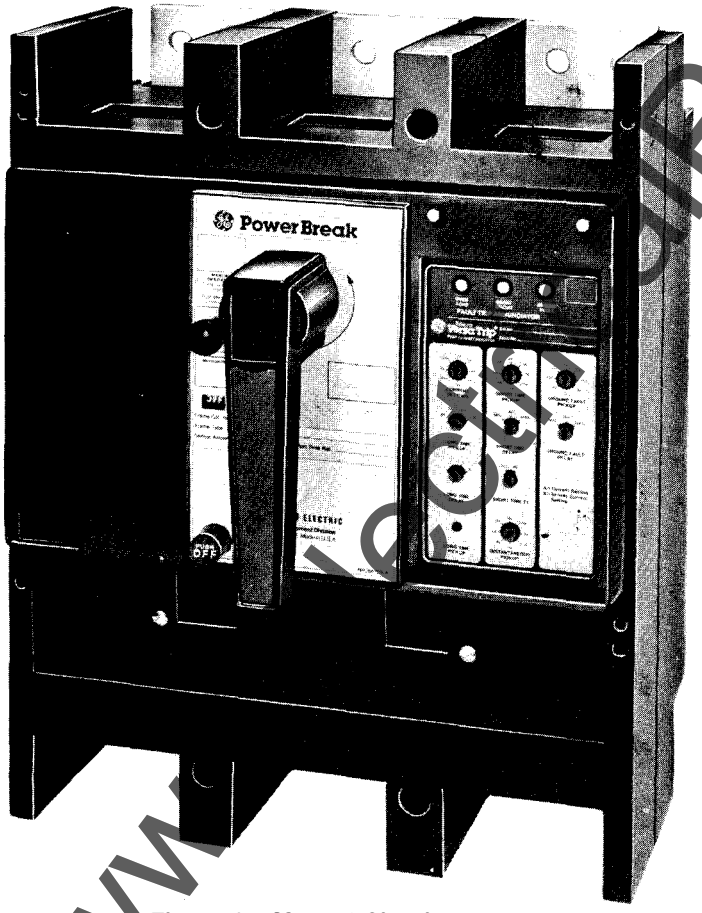


Figure 19. Manual Circuit Breaker

Introduction

These instructions cover the field installation of internally mounted electrical accessories. They are UL Listed for use in all 800-2000A Power Break frames with MicroVersaTrip® trip units. These accessories may also be installed in Power Break 800-1600A with MagneTrip™, but the UL Listing is voided.

Circuit Breaker Cover Removal

WARNING: When installing accessories, the breaker must be completely de-energized and disconnected from the electrical circuit. This is mandatory because breaker must be "ON" during certain stages of installation and testing.

CAUTION: Do not turn breaker up side down. Loose parts may become lost.

1. Cover Removal-Manual Breaker (Fig. 17).

A. Press the OFF button on the circuit breaker.
B. Remove four cover mounting screws.
C. Remove the breaker cover.

Tools Required

Screwdrivers (1/4 and 3/8) inch tip widths)
Needle-nose pliers
Round file (1/4 inch)
Torque-driver (suggested)

Test Equipment

Volt meter
Continuity tester
Variable transformer
(see p. 14 for size)

NOTE

All breakers are equipped with mechanical interlocks that automatically trip the breaker when the cover is removed with the breaker closed.

Contents

2. Electrically Operated Breaker

a. Outer Cover Removal.—See Fig. 20 or 21.

1. Press the OFF button on the circuit breaker.
2. Disconnect all external leads from the terminal board.
3. Remove four outer cover mounting screws (Fig. 20 and 21).
4. Remove outer cover.

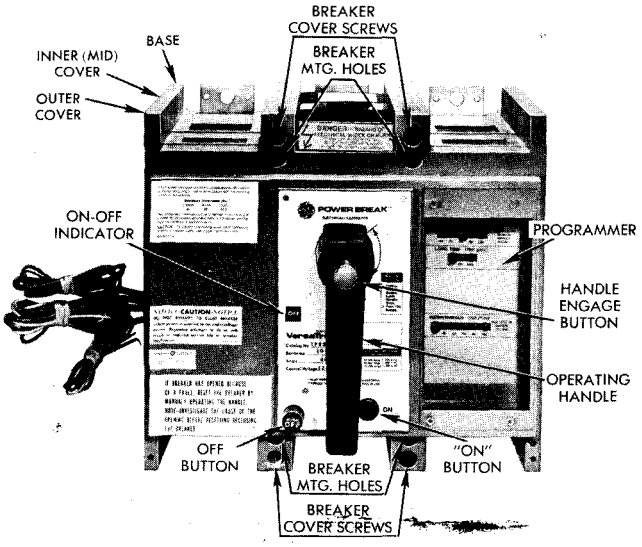


Figure 20. 800A Frame Electrical Breaker

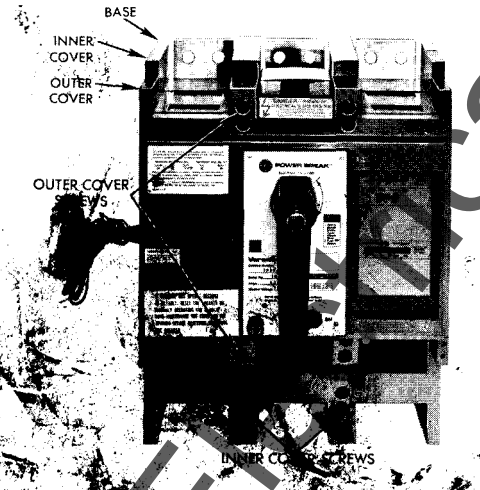


Figure 21. 1600-2000A Frame Electrical Breaker

b. Inner Cover Removal

1. 1600-2000A Frames only—Remove two inner cover mounting screws (See Fig. 21).
2. Loosen captive [illegible] shown in Fig. 22.
3. Remove inner cover.

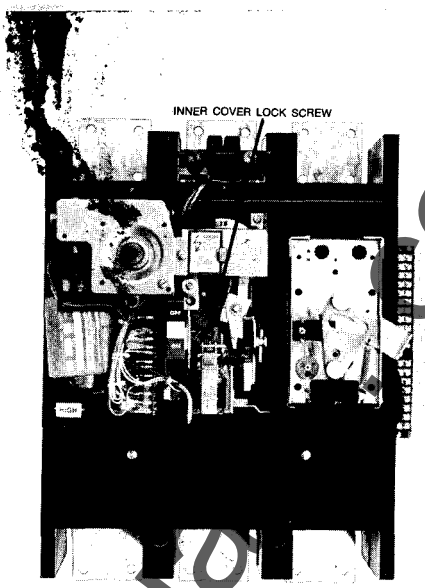


Figure 22. Inner Cover Lock Screw

SHUNT TRIP DEVICE FOR 800-2000A FRAMES

GENERAL DESCRIPTION

The shunt trip provides the capability of electrically tripping the breaker from a remote location. A cut-off switch is supplied as part of the shunt trip to automatically remove power from its coil when the circuit breaker is tripped.

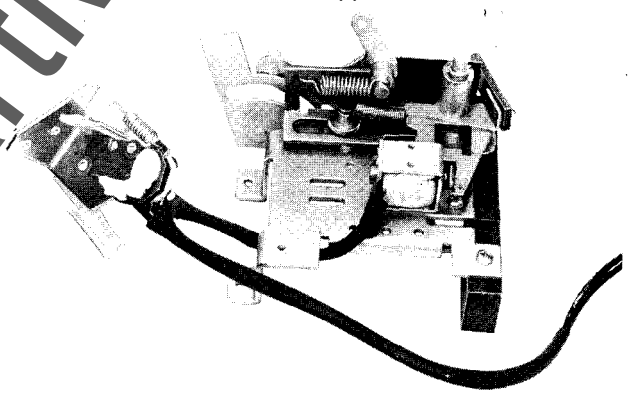


Figure 23. Shunt Trip and Cut-Off Switch. Coil is Shown Assembled to Mounting Plate, Which is Provided with Circuit Breaker.

TABLE 5—ELECTRICAL DATA

Shunt Trip Cat. No.	Voltage Rating	Max. Inrush Current-Amperes
TPST12S	120V ac 240V ac	2.25 4.50
TPST13S	480V ac 600V ac	1.64 2.05
TPST7S	12V dc	4.00
TPST8S	24V dc	2.18
TPST9S	48V dc	1.09
TPST10S	125V dc	1.00
TPST11S	250V dc	0.21

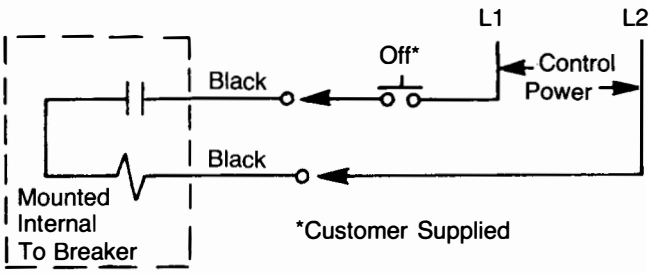


Figure 24. Wiring Diagram

MOUNTING PLATE REMOVAL

The mounting plate is used as the anchor position for the shunt trip, blown-fuse trip and undervoltage release accessories. It is supplied with the circuit whether or not any accessories have been installed.

1. Remove three (3) mounting plate retaining screws and isolation barrier, see Fig. 25.
2. Lift out accessory mounting plate and remove molded drive crank. (Fig. 29).
3. If tap changer is supplied, unscrew the two screws from phenolic block before removing mounting plate.

INSTALLATION

1. Assemble coil to mounting plate as shown in Fig. 25). If the mounting plate is also to be equipped with a blown-fuse trip device, mount the shunt trip as shown in Fig. 26.

NOTE: Shunt trip coils rated 12V dc or 24V dc must be mounted in a position nearest the latch. These coil ratings may not develop enough force to drive both the latch and blown-fuse trip device.

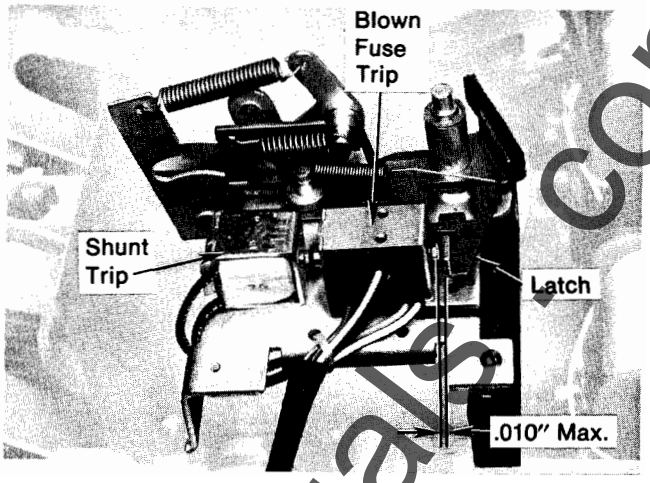


Figure 26.

2. When supplied with a blown-fuse trip device, the shunt trip plunger stop-nut is placed in contact with the plunger of the blown fuse trip device.
3. Mount cut-off switch by first depressing the switch actuator. Align tapped holes in switch bracket with holes in arm stop (left pole) and secure with No. 8 × 9/16 screws and lock washer. (Tighten to 23 inch pounds, see Fig. 27).
4. Remove knockouts as required in side of base. Each knockout will accommodate up to three bundles of wires (Fig. 25). Remove all sharp edges with a file.
5. Clean all debris from inside of breaker.

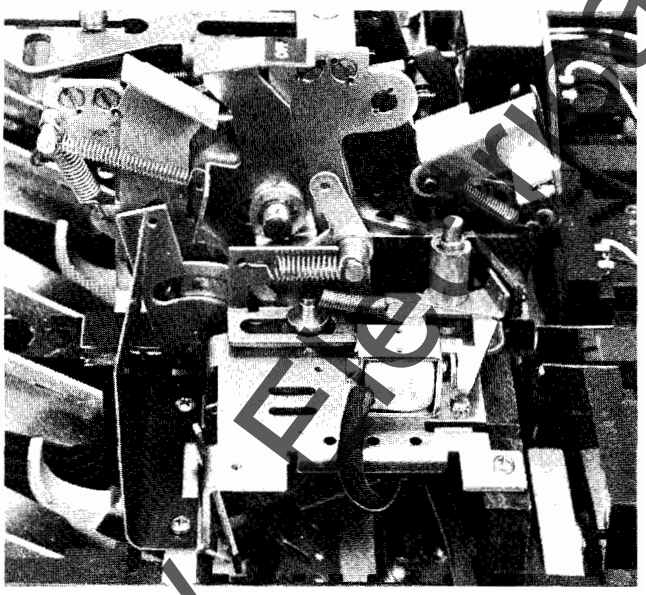


Figure 25.

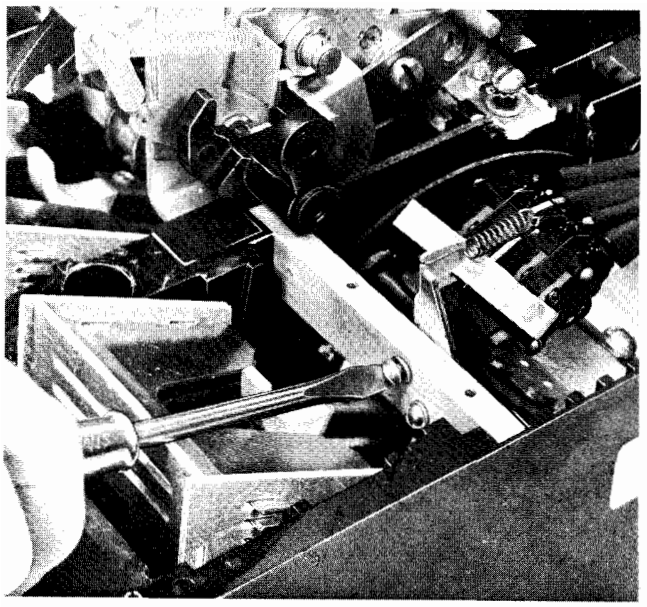


Figure 27.

NOTE: If shunt trip is being used to replace a defective coil, the cause of the initial failure should be first determined. If necessary consult factory for further guidance.

MOUNTING PLATE REINSTALLATION

1. Replace molded drive crank onto mechanism drive pin engaging roll pins into slot in drive crank. (See Fig. 28).

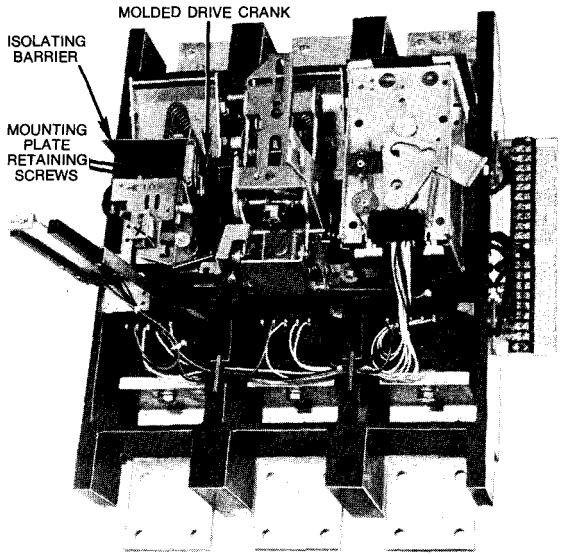


Figure 28.

2. Place mounting plate in position so that its two (2) operating studs engage the molded drive crank, see Fig. 28. Be sure isolating barrier is in place.
3. Fasten three (3) retaining screws, see Fig. 29 and torque to 20 inch-pounds (2 small screws) and 75 inch-pounds (large screws with tubing).
4. Attach wire-ties to leads and secure to mounting plate as shown in Fig. 29.
5. Insert leads into knockout in base sidewall making sure one wire ties on the inside of the base and the other is on the outside. See Fig. 29.
6. Apply descriptive label to front of circuit breaker cover.

COVER REASSEMBLY

Manual Circuit Breakers

1. Verify that all connections are secure and breaker is free of debris.
2. Verify that breaker is "OFF".
3. **CAUTION:** Verify that the accessory mounting plate insulator is properly located so it will not be damaged when assembling the cover. The cover phase barrier must pass to the right side of this insulator (see Figure 29).
4. Position the manual handle at the home position (6 o'clock) on the cover. Align the cover mounting screw holes with the breaker base. Install the cover screws to 50 to 60 inch-pounds torque.

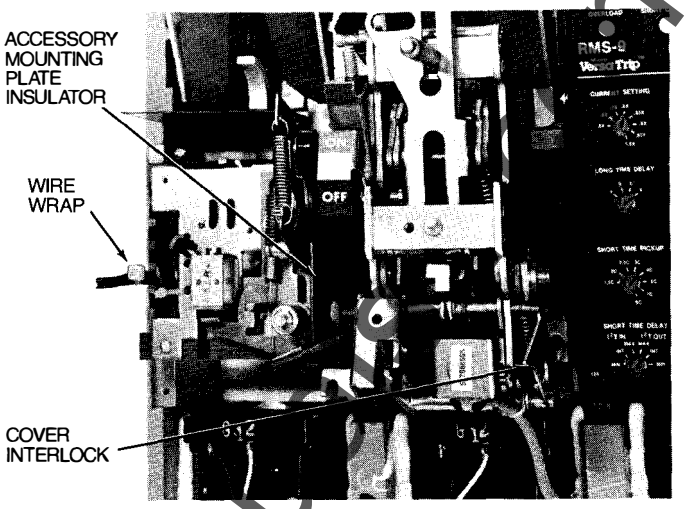


Figure 29.

5. Verify that the breaker can be charged per the instructions on page 5. The cover interlock (Figure 29) must properly engage the cover or it will hold the latch in the tripped position.

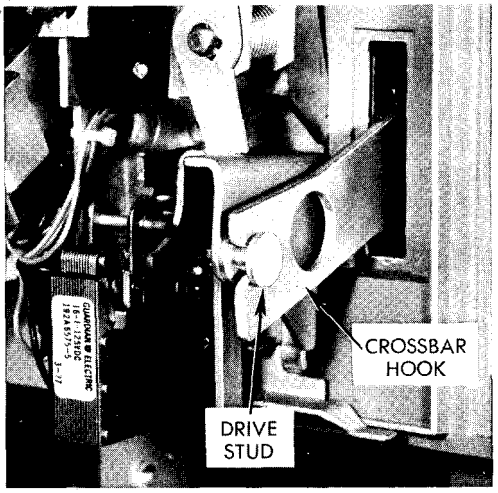


Figure 30.

Electrical Circuit Breakers

1. Inner Cover Installation
   - **a.** Verify that all connections are secure and breaker is free of debris.
   - **b.** CAUTION: Verify that the accessory mounting plate insulator is properly located. (Fig. 29) Slide the Inner Cover Assembly onto the breaker base being careful not to damage the insulator. Ensure that the crossbar hook engages the drive stud as shown in Fig. 30.
   - **c.** Tighten inner cover lock screw to 10-in. lbs. max., see Fig. 22.
   - **d.** 1600A-2000A Frames only—Replace two (2) inner cover mounting screws. See Fig. 21. Tighten to 50-60 inch-pounds torque.

2. Outer Cover Installation

   a. Position handle at the home position (6 o'clock) on the outer cover. Align outer cover mounting screw holes with those of the inner cover and install four cover mounting screws, see Figs. 20 and 21. Secure with 50 to 60 inch pounds torque.

   b. Connect control and power wiring per instructions provided with circuit breaker.

UNDERVOLTAGE RELEASE DEVICE

GENERAL DESCRIPTION

The undervoltage release device (UVR) is used to open the circuit breaker when the supply voltage drops to 35-60 percent of its rated value.

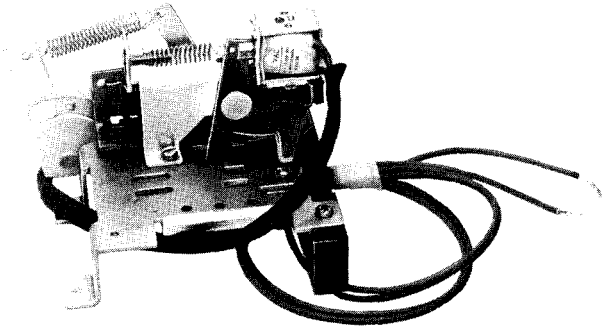


Figure 31. Undervoltage Release Accessory Shown Assembled to Mounting Plate

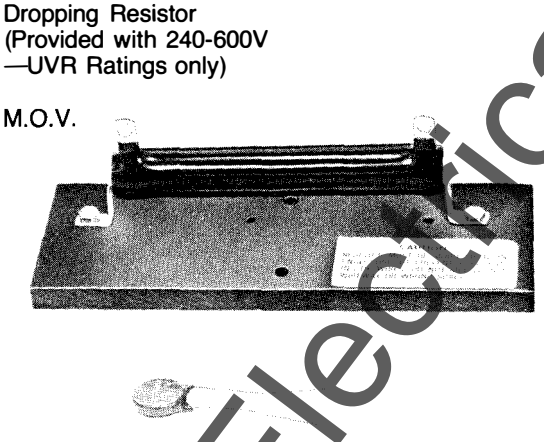


Figure 32.

TABLE 6—ELECTRICAL DATA

Cat. No.	Voltage Rating	Continous Current (Ma)	Dropping Resistor (Ohmite Type 270)
TPUV1S	120V ac	25	none
TPUV2S	240V ac	25	5000Ω, 25 watt
TPUV4S	480V ac	25	15,000Ω, 50 watt
TPUV6S	600V ac	25	20,000Ω, 50 watt
TPUV7S	12V dc	211	none
TPUV8S	24V dc	104	none
TPUV9S	48V dc	54	none
TPUV10S	125V dc	24	none
TPUV11S	250V dc	24	5000Ω, 25 watt

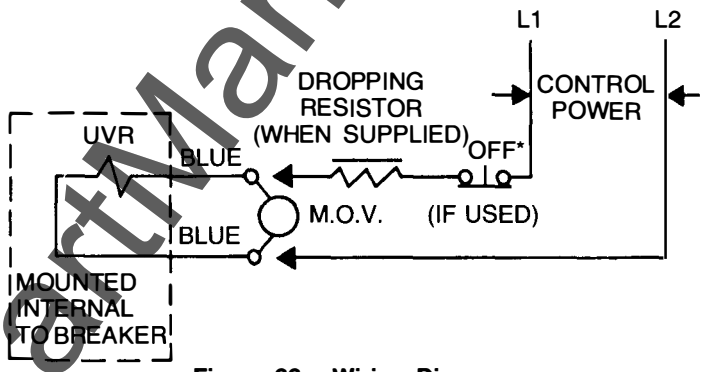


Figure 33. Wiring Diagram

INSTALLATION

1. Disassemble the circuit breaker cover(s) as outlined on pages 10 and 11.
2. Installation of the UVR is accomplished on the accessory mounting plate, which is factory installed in the left pole of the breaker.
3. Remove the slide reset lever spring from the mounting plate as shown in Fig. 34. Care should be exercised not to nick or damage the spring in any way, since it will be needed for reassembly.

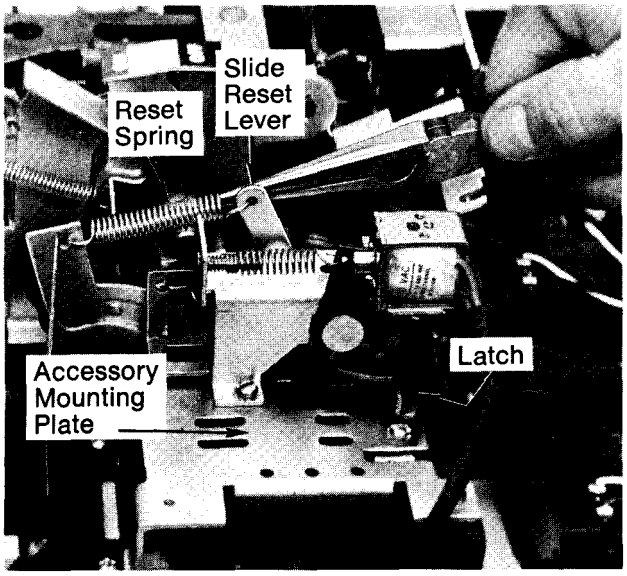


Figure 34.

4. Push the latch and slide reset lever forward to provide mounting clearance for the undervoltage release assembly.

5. Position the UVR assembly mounting bracket so that its retaining hole engages the latch pivot post as shown in Fig. 35.

6. Line up the UVR bracket's mounting hole with the tapped hole in the accessory mounting plate. Install screw and lock-washer (Fig. 30). Tighten to 9-11 inch pounds.

7. Replace slide reset lever spring (Fig. 34).

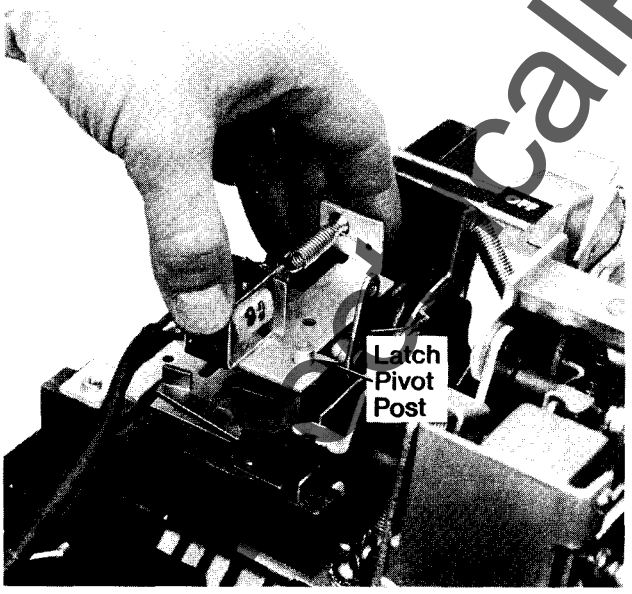


Figure 35.

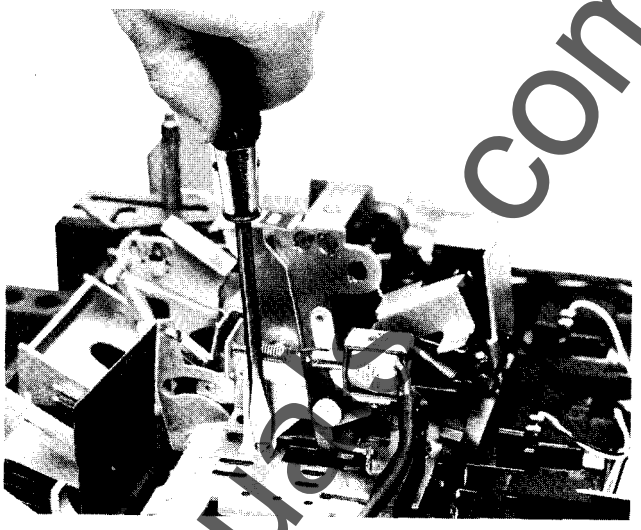


Figure 36.

8. Remove knockouts as required in side of base. Each knockout will accommodate up to three bundles of wires (Fig. 29). Remove all sharp edges with a file.

9. Clean all debris from inside of breaker.

10. Use the tie wraps provided to secure leads to mounting plate and to secure the wire bundle to inside and outside of the breaker base as shown in Fig. 29.

11. Reassemble the breaker as outlined in instructions on pages 13 and 14.

12. Mount the dropping resistor (when supplied) and M.O.V. (Fig. 32). Wire as shown in Fig. 33.

13. Functional Check.

- **a)** Apply rated voltage to the UVR coil.
- **b)** Turn the circuit breaker "on".
- **c)** Reduce control voltage. The circuit breaker should trip when the voltage drops to 35-60 percent of its rated value.

14. Apply the undervoltage release descriptive label to the left side of the breaker near the lead exit area.

BLOWN-FUSE TRIP DEVICE

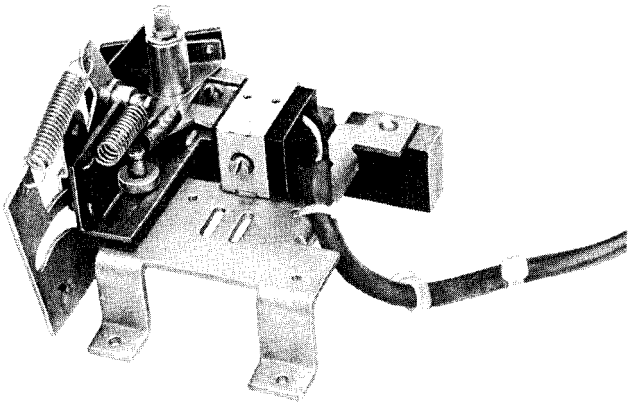


Figure 37.

GENERAL DESCRIPTION AND APPLICATION

The blown-fuse trip device (three-coil shunt trip) is intended for use in applications where breakers and fuses are used in series. This accessory prevents single-phasing conditions by monitoring the fuses and automatically tripping the circuit breaker when a fuse blows. It does not protect from single-phasing of the power source.

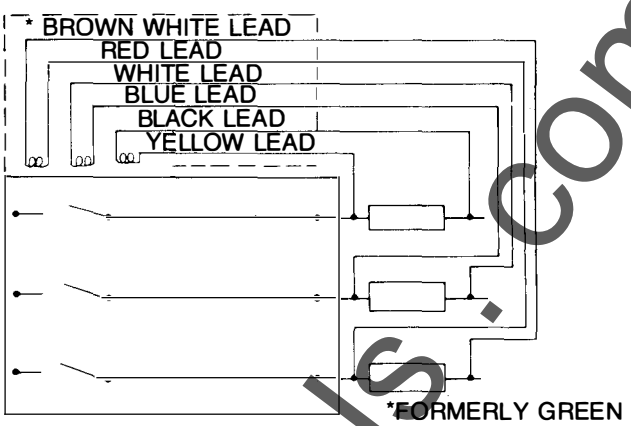
Each coil of the blown-fuse trip device is wired across a fuse so that the voltage across an open fuse is fed back to the accessory coil. When the coil is energized, the solenoid core releases the spring biased latch, allowing the slide to rotate the breaker latch, tripping the breaker. The fuse must be replaced and the breaker reset before it can be reclosed.

If the breaker is closed on an open fuse, the blown-fuse trip device will automatically open the circuit breaker.

INSTALLATION

Installation of the blown-fuse trip device is similar to the shunt trip installation.

1. Complete steps 1-3 under "Mounting Plate Removal" on page 12.
2. Complete steps 1 and 2 under "Installation" on page 12.
3. Perform installation checks listed below:
   - **a.** Replace the breaker cover. Close the breaker contacts.
   - **b.** To check electrical operation, apply 120 volts to one coil of the blown-fuse trip device for not more than one second. The breaker must trip. Repeat the test for each coil.



3-POLE THREE-PHASE APPLICATION
BLOWN-FUSE TRIP DEVICE

Figure 38. Wiring Diagram

4. Attach six (6) lead wires across each of the three fuses as shown in Fig. 38.
5. Apply the descriptive label to the front of the breaker cover.

COVER REASSEMBLY

Be sure cover (or covers) have been properly re-assembled. Refer to instructions on page 13.

AUXILIARY SWITCH

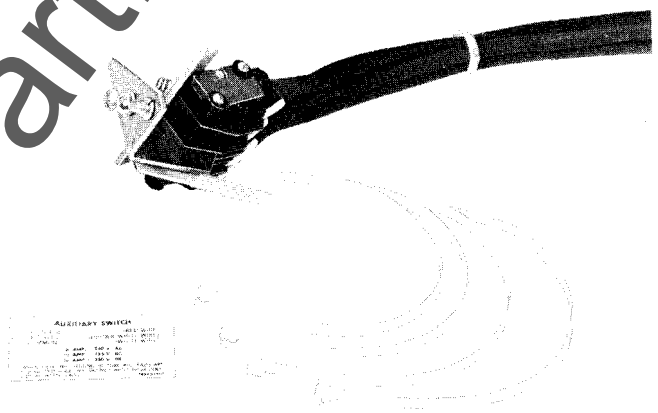


Figure 39. Auxiliary Switch

ELECTRICAL DATA

TABLE 7—AUXILIARY SWITCH KITS

Auxiliary Switch Catalog Number	Number of Switch Elements	Maximum Ampere Rating Switch Elements
TPAS2AB*	1-12	6A at 240VAC .25A at 250VDC .50A at 125VDC

*Suffix numbers 1 through 12 designate number of switch elements.

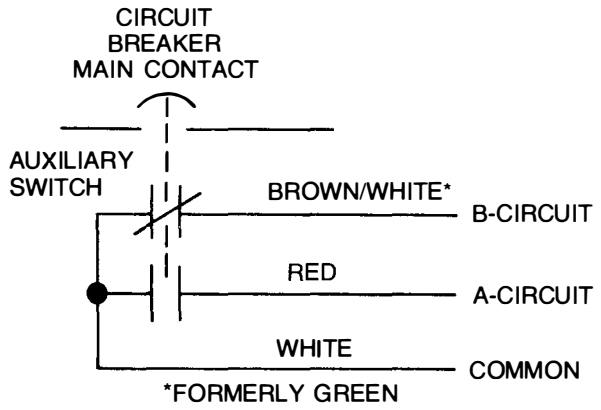


Figure 40. Wiring Diagram

DESCRIPTION

The auxiliary switch is used for remote indication of breaker main contact position—OPEN or CLOSED. No distinction is made between an open or tripped mode. A maximum of 12 switches can be installed per breaker. Each is a single-pole, double-throw (AB-type) and rated as shown in Table 7. Two switch positions must be devoted to each shunt trip accessory (if used) per breaker.

INSTALLATION

1. Refer to "Cover(s) Removal" instructions on page ten and remove cover (manual breaker) or covers (electrically operated breaker).
2. Installation location. Both left and right circuit breaker poles can accept up to six auxiliary switches. If the left pole contains a shunt trip, two of the six auxiliary switch positions must be used for the cutout switches; therefore only four auxiliary switches may be used in the left pole.
3. If auxiliary switches are to be installed in the right pole, remove interchangeable solid state trip unit by depressing lock release lever while lifting up on trip unit. Remove trip unit mounting plate. See Fig. 41.

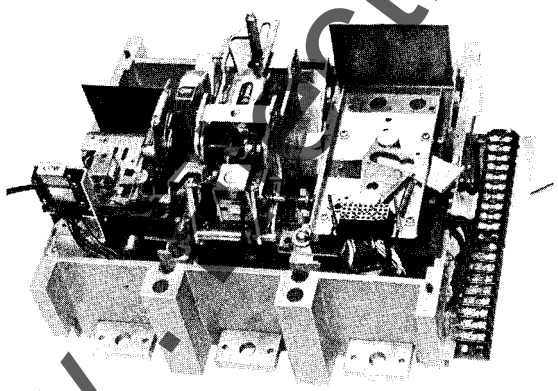


Figure 41.

4. Position the auxiliary switch assembly so that the tapped mounting holes on its bracket line up with the through holes in the arm stop (Fig. 42).
5. Secure auxiliary switch assembly to arm stop with two #8 × 9/16 screws and lock washers (Fig. 43). Tighten to 23 inch-pounds.
6. Remove knockouts as required in side of base. Each knockout will accommodate up to three bundles of wire (Fig. 29). Remove all sharp edges with a file.
7. Clean all debris from inside of breaker.

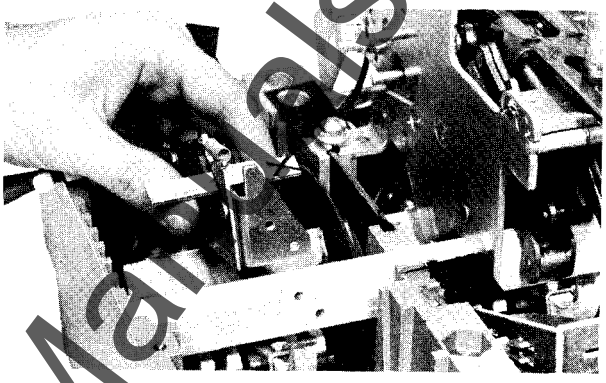


Figure 42.

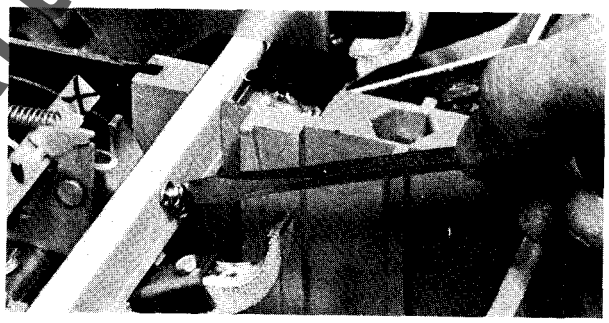


Figure 43.

8. Use the wraps provided to secure leads as shown in Fig. 29.
9. Replace solid state trip unit and its mounting plate.
10. Replace cover(s) by following "Cover Reassembly" instruction on page 13.
11. Functional Check
    a) With the breaker open ("OFF") use a continuity tester to verify continuity between the white and brown/white leads. An open circuit should exist between the red and white leads.
    b) With the circuit breaker closed ("ON") the auxiliary switch contacts should change sense.
12. Apply the auxiliary switch description label on the front of the breaker cover.

OPTIONAL FEATURES

Special features may be ordered as specific accessory catalog numbers or as an integral part of the breaker catalog number. Refer to the BuyLog® catalog GEP-1100 for these features.

I. Limited close access button ("C") suffix in catalog number (Fig. 44).

Provides limited manual accessibility to ON Button. Function allows breaker to be turned ON in an emergency for maintenance by use of 1/8" diameter pin or rod. Manually operated devices must be ordered with an accessory closing solenoid.

II. Remote Close Only

No means of manually closing device. Manually operated device. Manually operated devices must be ordered with closing solenoid.

III. Padlock Function

A. Handle Button Lock—To prevent manual charging of electrically operated breaker mechanism. See Figure 7 item E. Note: This is a standard feature.

B. OFF Button Padlock with Door Interlock.

To prevent Panel Door opening with Breaker "ON" or "CHARGED".

1. With breaker OFF paddle may rotate counterclockwise over breaker nameplate to clear enclosure panel door. Rotate clockwise to lock over door. (Fig. 45).

2. To defeat while breaker is "ON" or "CHARGED", depress spring and rotate to clear door. (Fig. 46).

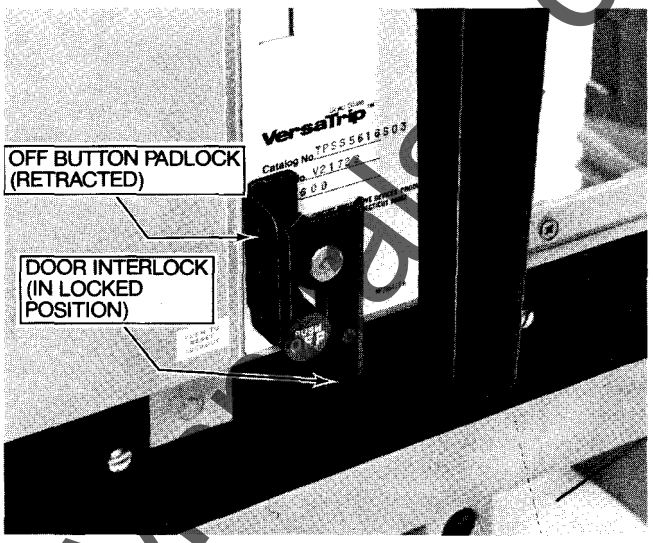


Figure 45.

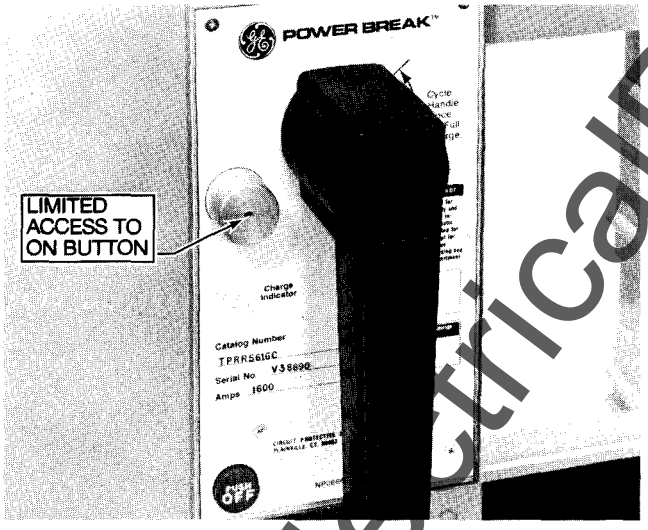


Figure 44.

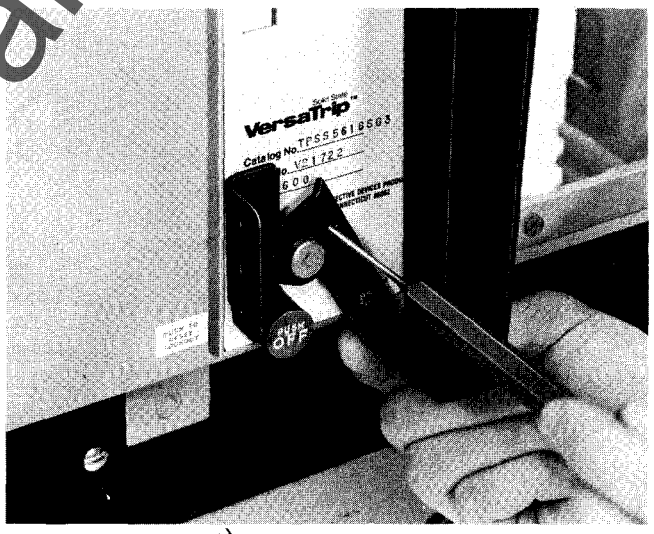


Figure 46.

Talk

These instructions do not purport to cover all details or variations in equipment nor to provide for every possible contingency to be met in connection with installation operation or maintenance. Should further information be desired or should particular problems arise which are not covered sufficiently for the purchaser's purposes, the matter should be referred to the General Electric Company.

For further information call or write your local General Electric Sales Office or . . .

General Electric Company
41 Woodford Avenue
Plainville, CT 06062 U.S.A.

Outside the U.S. write Construction Equipment Export Operation, 411 Theodore Fremd Ave., Rye, N.Y. 10580 U.S.A.

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