

Instructions

*DC Rating
Applies to
MagneTrip™ Only



POWER BREAK® Circuit Breakers

2500-4000 A Frames
600 Vac, 250 Vdc*

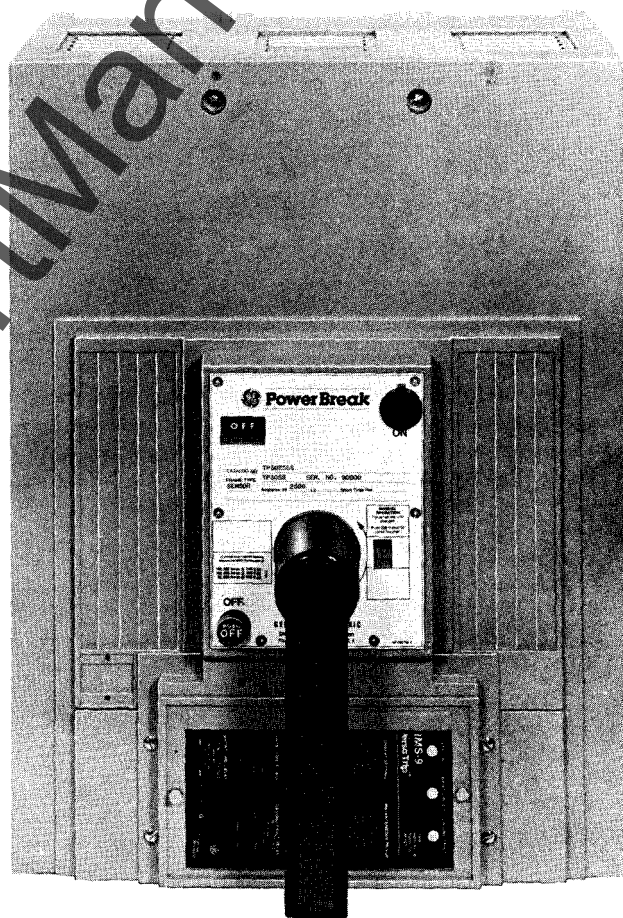
INTRODUCTION

The POWER BREAK® line of insulated case circuit breakers is designed to protect low voltage power circuits and equipment. Offered with fault detection (MicroVersaTrip® RMS-9 or MagneTrip™), these devices safely switch loads and interrupt circuits during abnormal conditions.

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.



GENERAL  ELECTRIC

LIFTING AND HANDLING

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

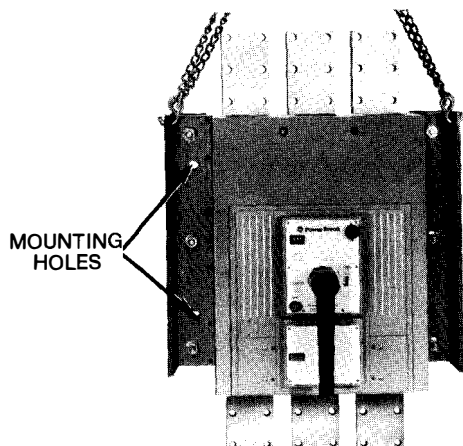


Figure 1. 4000A Frames

POWER BREAK CIRCUIT BREAKER WEIGHTS

| Frame Rating | Type | Weight (Lbs) |
|--------------|------------|--------------|
| 2500A | Manual | 175 |
| 2500A | Electrical | 215 |
| 3000A | Manual | 220 |
| 3000A | Electrical | 260 |
| 4000A | Manual | 320 |
| 4000A | Electrical | 360 |

2500-3000A Breaker Frames

Back-connected MicroVersaTrip® RMS-9 equipped devices have a terminal board mounted on the load end of the breaker base. DO NOT REST THE BREAKER ON THIS END.

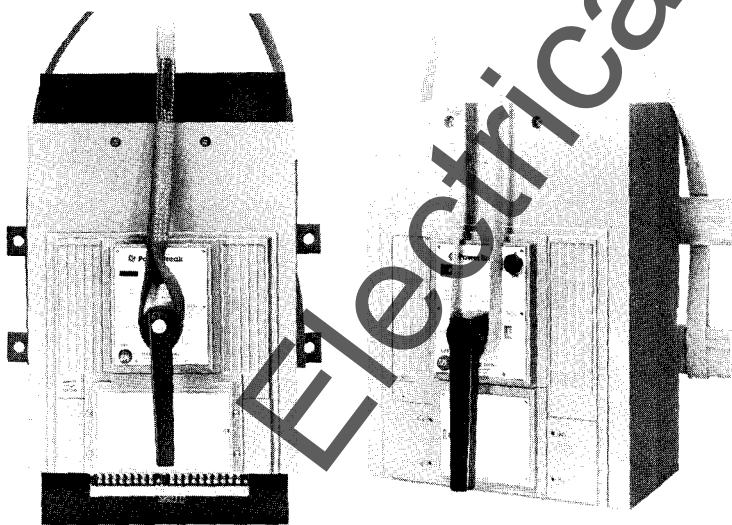


Figure 2. 2500-3000A Frames, Front-Connected

Figure 3. 2500-3000A Frames, Back-Connected

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 per the chart on page 3.
4. On front-connected 2500-4000 Amp frames (Fig. 5),
 1. Loosen and remove line and load shields.
 2. Remove but DO NOT disconnect the programmer terminal board wiring.
 3. AFTER connecting to bus work, re-install the terminal boards and load shields.

INSTALLATION

2500-3000 Amp Frames

• Front-Connected Devices

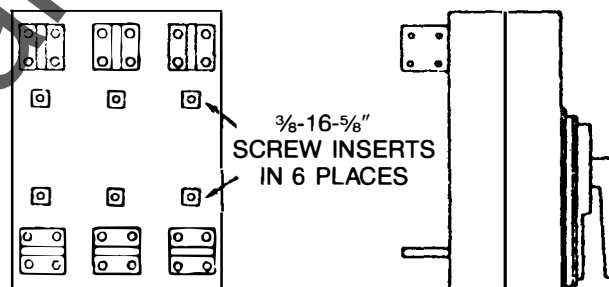
Use the (4) $\frac{5}{8}$ in clearance holes in the aluminum mounting straps (Figure 2).

• Back-Connected Device

Remove the (2) wood lift straps secured by (4) bolts to the back side of the breaker base. Use the (6) $\frac{3}{8}$ -16 by $\frac{5}{8}$ in deep inserts in the base to support the device. Torque bolts to 200-250 in.-lbs. (See Figure 4).

4000A Breaker Frame

Use (4) $\frac{5}{8}$ -inch bolts through clearance holes as shown in Figure 1. Torque to 600 inch-pounds.



NOTE: STUDS MAY BE ROTATED 90° (SEE ABOVE) FOR VERTICAL OR HORIZONTAL POSITIONS

Figure 4.

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.

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

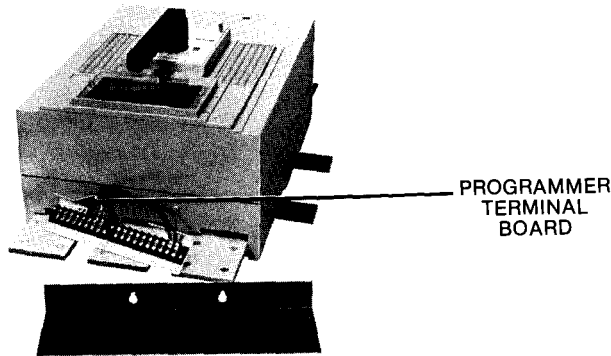


Figure 5. 2500A Frame MicroVersaTrip

| Breaker Frame | Terminal Stud | | Bus Connection | |
|---------------|-----------------|----------------|-----------------|----------------|
| | Bolt Size (DIA) | Torque (In-Lb) | Bolt Size (DIA) | Torque (In-Lb) |
| 2500-3000* | (4) 3/8-16 | 250 | (4) 3/8 in. | 250 |
| 4000 | (6) 1/2-13 | 400 | (4) 1/2 in. | 400 |

*3000A back-connected terminal studs are factory brazed to breaker.

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

| | |
|----------------------------------|----------|
| MicroVersaTrip® RMS-9 Programmer | GEH-5369 |
| 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. Likewise, MicroVersaTrip programmers and tap changer cards may be installed/replaced per GEH 4657 and pg. 8 of this manual respectively.

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 should depend on the environmental 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, the frequency of 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.

SEALING BREAKER

The breaker cover may be sealed by attaching a sealing wire through a hole provided in the rim of the MicroVersaTrip RMS-9 programmer, through a hole in the programmer window and through a hole in the thumb screw shown in figure 6. The hole in the programmer window is not provided and must be drilled when required for sealing the breaker.

CAUTION: Remove the programmer window before drilling to avoid damaging the programmer. (See Figure 7.)

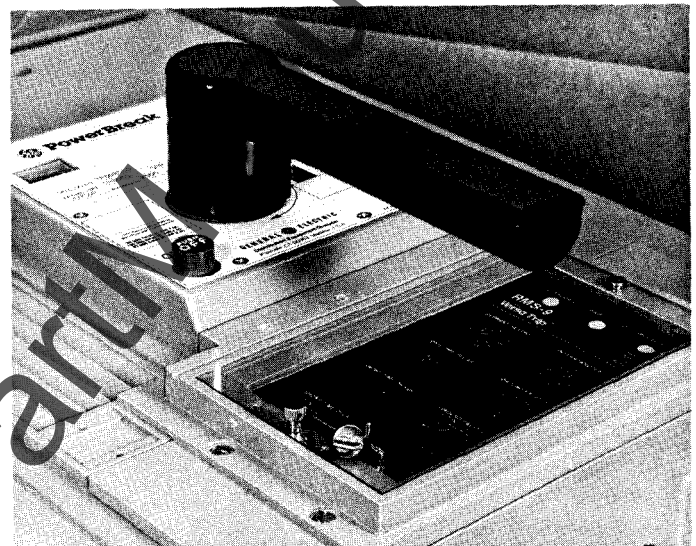


Figure 6. Sealed RMS-9 MicroVersaTrip Breaker

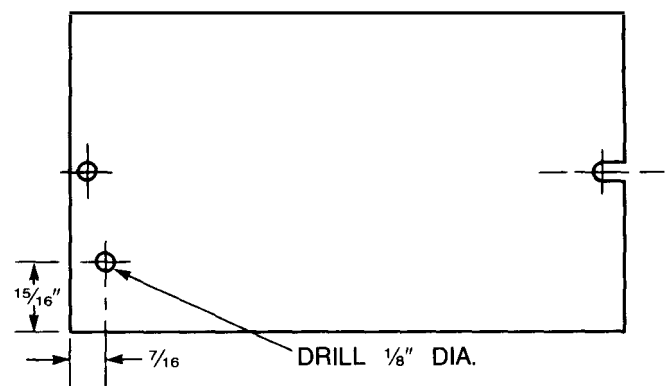


Figure 7. Drilling of Programmer Window for Sealing Wire

POWER BREAK® OPERATING FEATURES

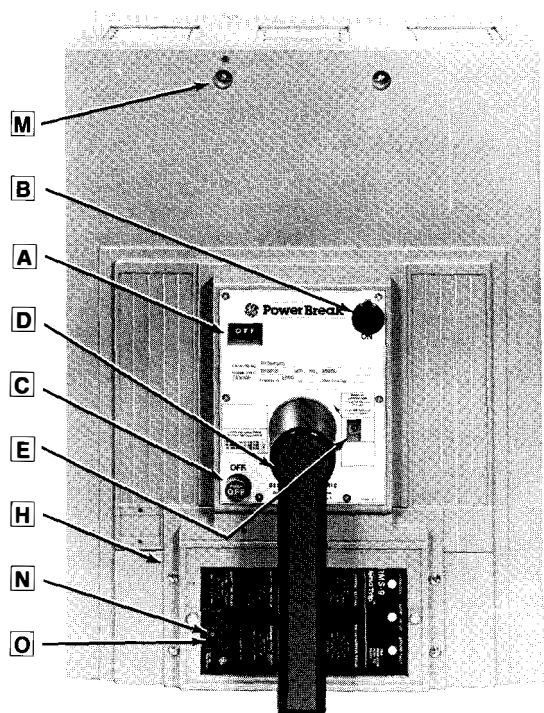


Figure 8.
2500A—Manual
MicroVersaTrip® RMS-9 Programmer

KEY:

- A - Indicator
Manual: ON—Red; OFF—Green;
Electrical: ON—Red; Charged—Yellow;
OFF—Green
- B - “ON” Button
- C - “OFF” Button
- D - Manual Charging Handle
- E - Mechanism Indicator—Manual
CHG—Yellow; O—White
- F - Lockable Manual Charge Engagement Button
- G - Terminal Board (MOM Drive Unit)
- H - Cover Escutcheon
- J - Removable Protective Window (MVT RMS-9 and MVT Only)
- K - Programmer Terminal Board (MVT RMS-9 and MVT Only)
- L - CT Tap Setting Indication (MicroVersaTrip® Only)
- M - Cover Mounting Screws (4), (2) under cover escutcheon)
- N - MicroVersaTrip RMS-9 programmer interchangeable rating plug
- O - MicroVersaTrip RMS-9 test set connection port

TABLE 1—SEQUENCE OF OPERATION

| Indicators | | Main Breaker Contacts | Condition Of Charging Springs | Next Permissible Operating Function |
|------------|------------|--------------------------|----------------------------------|---|
| Manual | Electrical | | | |
| A | A | | | |
| OFF | O | Open | Discharged | Mechanism May Be Charged |
| OFF | CHG | Open | Charged | Contacts May Be Closed Do Not Open Or Trip From This Stage |
| ON | O | Closed | Discharged | Contacts May Be Opened |

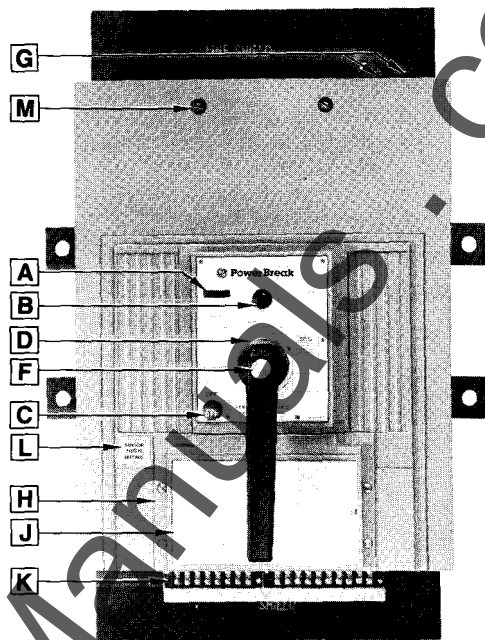


Figure 9.
2500 A—Electrical
Front-Connected

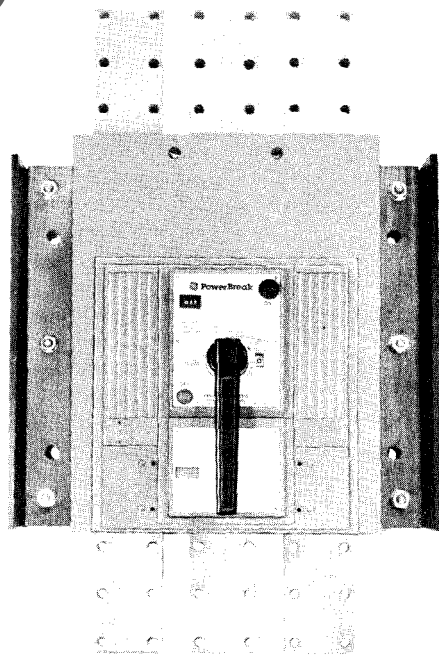


Figure 10.
4000A—Manual MagneTrip™ Trip Unit

OPERATING INSTRUCTIONS

MANUALLY OPERATED DEVICES

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. Repeat this cycle two more times. 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.
 - Draw-out interlock with carriage in any position except "TEST" or "ENGAGED".
 - Bell alarm lockout not reset after overcurrent lockout.
 - Undervoltage release device not energized.

CAUTION:

These 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. Locally—Depress the ON button on the breaker escutcheon (Also see Limited Close Access—Optional Features pg. 20)
2. Remotely—(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. Locally—Depress the "PUSH OFF" button on the breaker escutcheon.
2. Remotely—(Option)—Energize an accessory shunt trip or de-energize an accessory undervoltage release device.

APPLICATION DATA—Catalog Numbers TSXCC12S, TSXCC14S, TSXCC08S

TABLE 2—CLOSING SOLENOID

| Cat. No. Suffix | Rated Voltage | Operating Voltage Range* | Close Solenoid* Amperes @ Max. Voltage | Maximum Closing Time (Seconds) | Maximum Opening Time (Seconds) |
|-----------------|------------------|--------------------------|--|--------------------------------|--------------------------------|
| 12S | 120V ac, 50/60Hz | 102-132 | 6A | .083 | .083 |
| 14S | 240V ac, 50/60Hz | 204-264 | 3A | .083 | .083 |
| 08S | 24V dc | 19-29 | 11A | .083 | .083 |

NOTE: 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.

WIRING DIAGRAMS

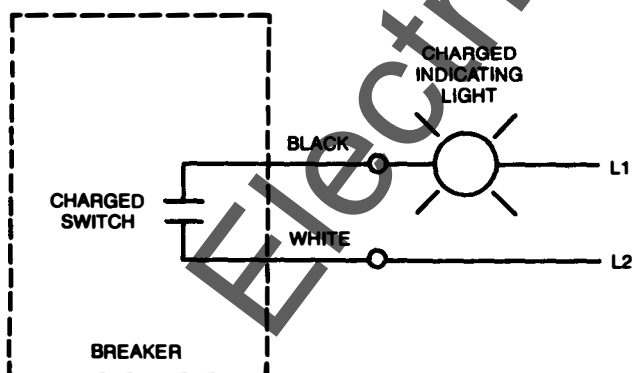


Figure 11.
Remote—Charge Indication
TSXCAS

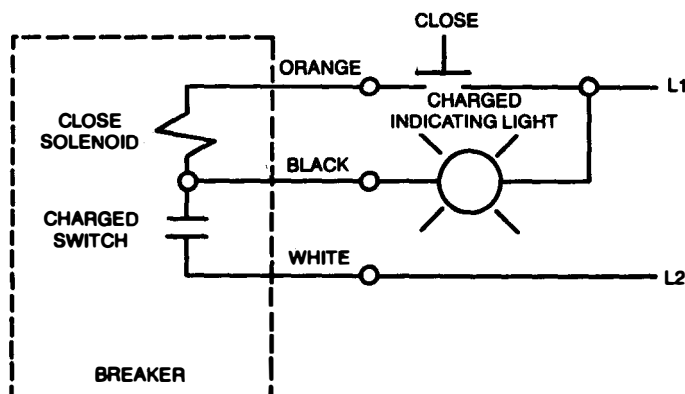


Figure 12.
Remote—Close and Charge Indication
TSXCC12S TSXCC14S TSXCC08S

OPERATING INSTRUCTIONS

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 clockwise to the home position. Repeat two (2) more times. 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).

DO NOT REPEATEDLY TRIP THE BREAKER FROM THIS CHARGE STAGE AS EQUIPMENT DAMAGE MAY RESULT.

C. To Open The Device

1. Local—Depress the “PUSH OFF” button on breaker escutcheon.
2. Remote—(Ordered with breaker at no extra charge)—Energize the accessory shunt trip or de-energize the undervoltage release provided.

D. Automation 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 devices both hold the breaker latch open when activated. To prevent continuous cycling 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 Figures 13 and 14.

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 drawout interlock (TPDO2), electrical operation is permitted only if the drawout carriage is in the ENGAGED or TEST position.

TABLE 3—OPERATIONAL DATA

| Rated Voltage | Operating Voltage Range | Motor Current (Amps) | | | Close Solenoid (Peak) Amps) | Fuses Type 3AB (Amps) ⁵ | Charge Time (Sec.) ² | Close Time (Sec.) ³ | Opening Time (Sec.) ⁴ |
|---------------|-------------------------|---------------------------|-----------|--------------|-----------------------------|------------------------------------|---------------------------------|--------------------------------|----------------------------------|
| | | Locked Rotor ¹ | Full Load | Average Load | | | | | |
| 120 Vac | 102-132 Vac | 20 | 7.0 | 4.0 | 8.8 | MDX 4 | 3.5 | .083 | .083 |
| 240 Vac | 204-264 Vac | 10 | 3.5 | 2.0 | 4.0 | MDA 4 | 3.5 | .083 | .083 |
| 125 Vdc | 100-140 Vdc | 20 | 4.0 | 3.0 | 3.4 | ABC 5 | 4.0 | .083 | .083 |
| 72 Vdc | 57- 81 Vdc | 28 | 10 | 7.0 | 8.1 | ABC 10 | 4.0 | .083 | .083 |
| 48 Vdc | 38- 58 Vdc | 30 | 10 | 7.0 | 6.7 | ABC 10 | 4.5 | .083 | .083 |
| 24 Vdc | 19- 29 Vdc | 60 | 20 | 14 | 14.1 | ABC 20 | 5.0 | .083 | .083 |

¹ Momentary motor reversing current is 150% locked rotor current.

² Measured from sequence initiation to motor cutoff at 100% rated voltage.

³ Measured from sequence initiation to contact closure at 100% rated voltage.

⁴ Measured from sequence initiation to contact opening at 100% rated voltage.

⁵ Recommended type is Bussman or equivalent. Do **NOT** use slo-blo fuses for type ABC.

WIRING DIAGRAMS

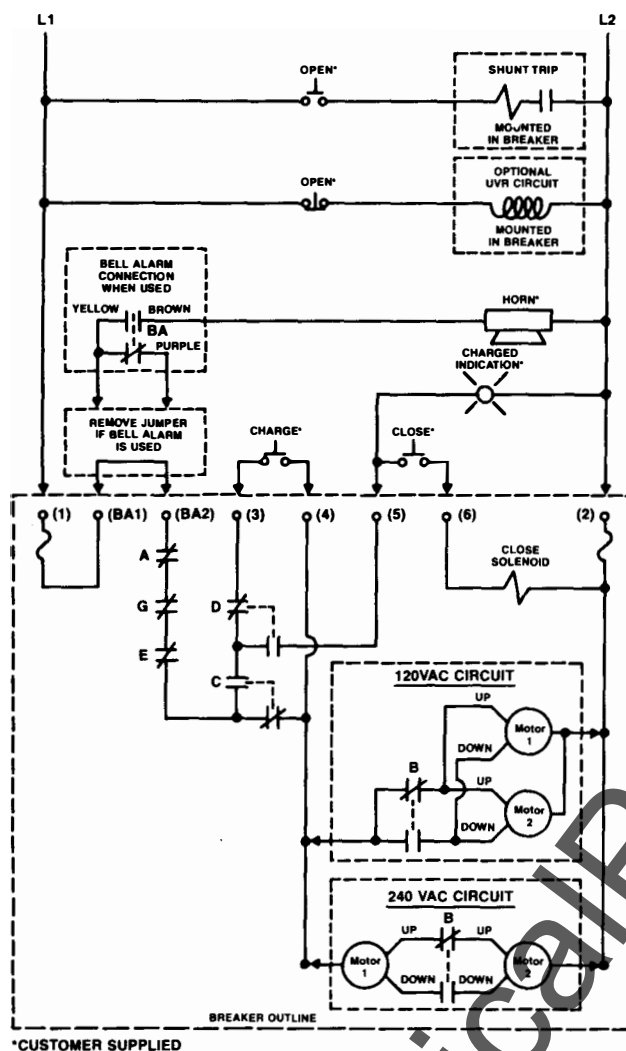


Figure 13. AC Power Sources

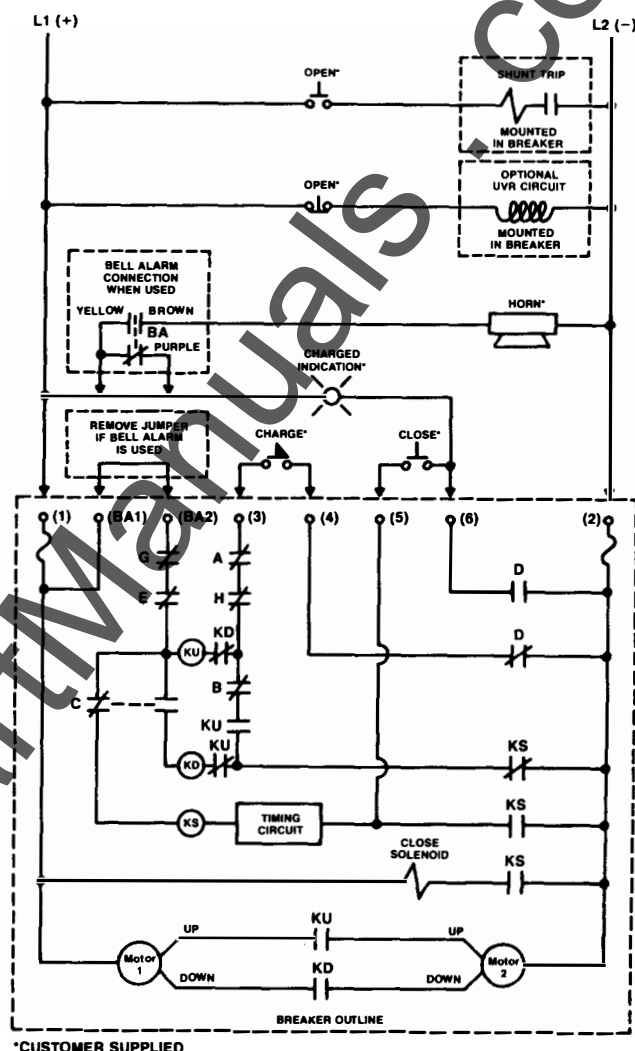


Figure 14. DC Power Sources

WIRING FOR REMOTE OPERATION

For proper operation the electrical circuit should be wired as shown. All customer supplied switches (or contacts) should be momentary action, 0.083 seconds minimum duration, with the exception of the charge contact for 120 and 240 Vac operators, which requires 0.25 sec. minimum duration. These switches/contacts must be rated at least 1/4-amp at 125 Vdc for dc motor operators and suitable to handle motor current and voltage for ac motor operators (see Table 3).

CAUTION:

1. Do not apply power to any terminals other than (1) and (2).
2. Observe proper polarity (+ at L1) on dc motor operators.

CONTROL POWER

The control power required for each motor operator may be determined from Table 3. If several motor operators are to be fed from the same source, it should be sized to accommodate all operators simultaneously, especially if they are wired for automatic charge.

The drop in source supply voltage from no load to the motor full load current level (ref. Table 3) should not exceed 7%. Acceptable dc power sources are: Three phase full wave rectified ac, dc generator; battery; or any other dc source with a peak-to-peak ripple voltage of not more than 15% of rated voltage at the motor full load current.

DIELECTRIC TESTING

The following procedure should be incorporated for dielectric or hi-pot testing:

1. Open the circuit breaker.
2. Remove all leads—control and power.
3. Short all electrical operator terminal board points.
4. Test between electrical operator terminal board points and load side of breaker center pole (this is connected to the frame).
5. Test at 2200 Vac for one (1) minute using a current limited, nondestructive ac hi-pot tester, with a maximum output of 20 milliamperes.

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. Adjust Trip Settings

1. Remove clear plastic protective window (Figure 8).
2. Change settings by rotating indicators to desired value or multipliers. See GEH-5369 for definitions of MicroVersaTrip RMS-9 Programmer functions and GEH-4657 for MicroVersaTrip® Programmer functions.
3. Re-install window.

B. Tap Changer Card (Old style MVT only)

When provided, this function allows the customer to change the rating of the breaker frame (see Figure 15).

High—100% of ampere rating on nameplate "Sensor Amp"

Low—50-75% of ampere 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.

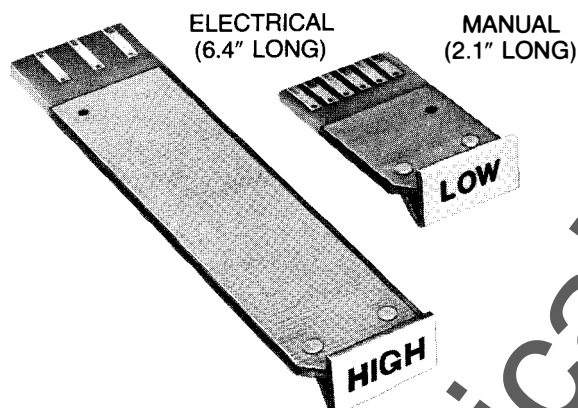


Figure 15.
Tap Changer Card
(High and Low Refer to Rating, Not Length)

DANGER—THE CIRCUIT BREAKER MUST BE REMOVED FROM THE ELECTRICAL SYSTEM

1. Turn the breaker—OFF
2. Loosen the (4) cover escutcheon mounting screws and remove. Remove the (4) cover mounting screws and remove the top cover. On MOM breakers, do not remove the mid-cover to replace/change the tap changer card.
3. Withdraw the HIGH (LOW) CARD from the tap changer 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 Figure 9 and 16).
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 (Figure 17).

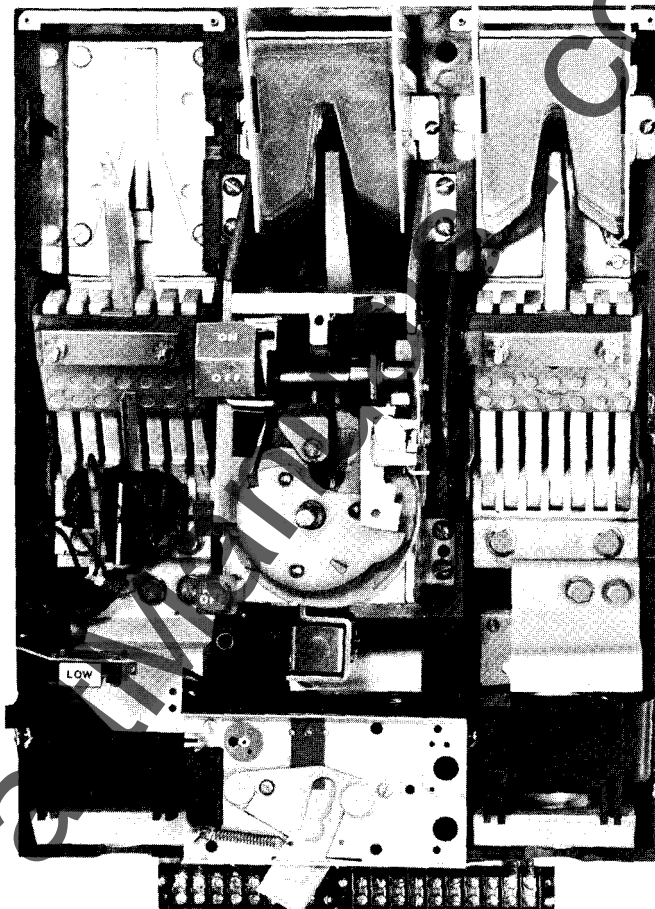


Figure 16.
Manual Breaker
Cover and Programmer Removed

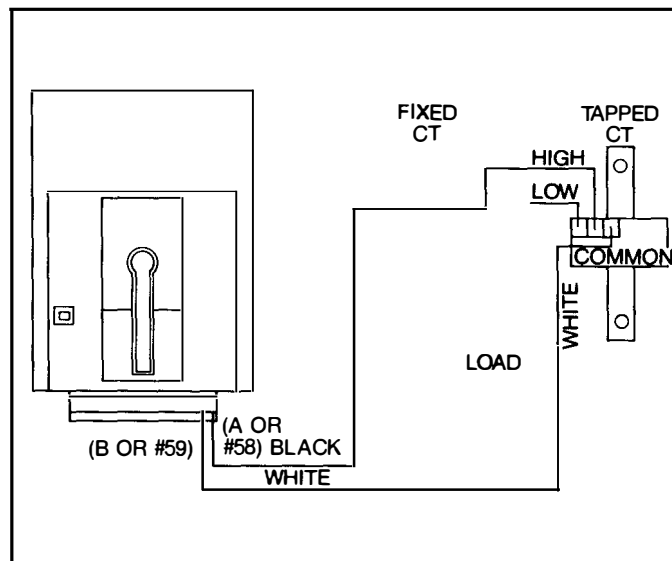


Figure 17.

TRIP UNIT AND SETTING

5. Replace the breaker cover and secure the (4) cover mounting screws to 50 in-lbs. Replace and secure the cover escutcheon.
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.

NOTE: DO NOT SHORT THE GROUND FAULT TERMINALS IF NOT USED WITH A NEUTRAL CT.

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 ampere rating to the breaker sensor rating.
2. Tapped or HIGH/LOW Rated Breaker Frames Match the neutral CT amp rating to the HIGH/LOW Setting of the breaker sensor rating.

Wire as shown in Figure 17.

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

MicroVersaTrip RMS-9 generation POWER BREAK devices are supplied with non-interchangeable programmers. The breaker rating may be changed by replacing the rating plug installed in the face of the programmer. (See GEH-5369 and GEH-5371.)

MicroVersaTrip generation POWER BREAK devices were previously 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:

1. High short time or H function programmers may not be used in frames which are not wired for the H function (special CTs).
2. 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 MicroVersaTrip programmers with overload remote 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. LOOSEN THE ESCUTCHEON MOUNTING SCREWS AND REMOVE.

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 Figure 18).
 - 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.



Figure 18.
Removing/Installing 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 (Figure 19).
 - b. Push in the Programmer Cover-Interlock until it locks in place (see Figure 18).
- (Note: Programmer has a stud on the box to defeat the programmer-cover-interlock locking spring)

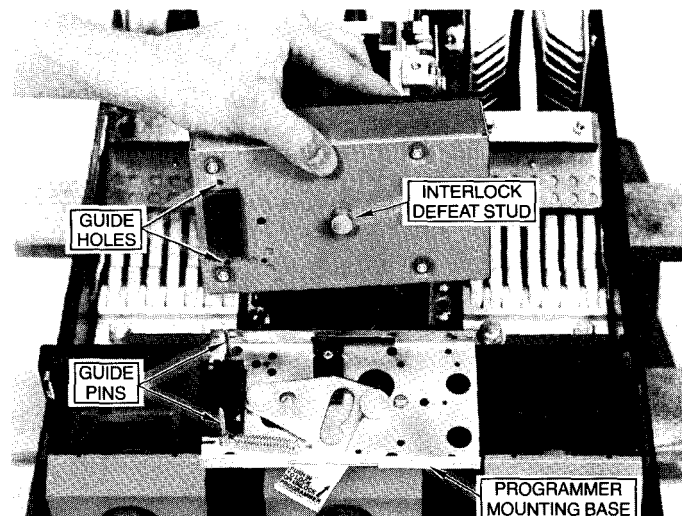


Figure 19.
Aligning Programmer To Base

TRIP UNIT AND SETTING

D. Programmers (Continued)

4. Replace top cover and secure. Replace the escutcheon.
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 under voltage release will not allow the mechanism to charge and close.
6. Programmers with ground fault
If a 4 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™ TRIP UNIT

To change trip settings

1. Remove cover escutcheon.
2. Change trip setting by rotating plastic buttons with a screwdriver (see Figure 20).
3. Replace cover escutcheon.

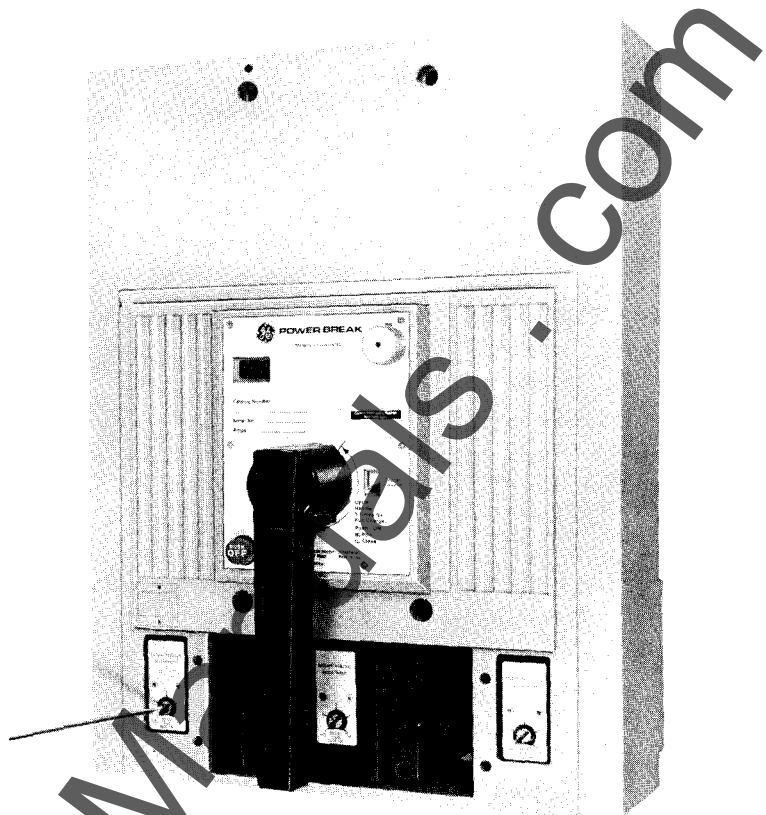


Figure 20.
Adjusting Trip Unit Setting

TO CHANGE OR INSTALL TRIP UNITS, SEE GEH-4658.

ACCESSORIES

The control leads of internally mounted accessories exit in pig-tail form from the left side of the breaker. Those leads are terminated at the secondary disconnect points for drawout 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) | Phase | Line End | Load End | 6 |
| | A | Red | Brown/White | |
| | B | Blue | White | |
| | C | Yellow | Black | |
| Closing Solenoid (Manual Devices Only) | White Black Orange | Common Remote Indication Remote Close | | 3 |

These instructions cover the field installation of internally mounted electrical accessories as listed under "Contents." The accessories are listed by Underwriters Laboratories, Inc. as "Circuit Breaker Accessories."

Since installation of all accessories requires the removal of the circuit breaker frame cover, such steps are presented on page 13 and are not repeated. Likewise, other steps, which are required for several accessories, are given only once and reference back to them are made.

TOOLS REQUIRED:

5/16" wide blade screwdriver
Small hammer
5/16" wrench
5/16" socket wrench
5/16" allen hex wrench
Torque-wrench (suggested).
Round file (1/4 inch)

TEST EQUIPMENT:

Volt meter
Continuity tester
Variable transformer
(see Electrical Data Table
on page 17 for power
requirements).

NOTE:

These accessories also suitable for field installation in 4000A non-interchangeable trip PowerBreak breakers with Magne Trip trip units; field installation, however, voids the UL Listing. Remove and discard the UL label on the circuit breaker.

CONTENTS

| | |
|-----------------------------|----|
| Cover and Trip Unit Removal | 12 |
| Shunt Trip Device | 14 |
| Undervoltage Release Device | 16 |
| Blown Fuse Trip Device | 17 |
| Auxiliary Switch | 19 |



Figure 21.

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.

CIRCUIT BREAKER COVER REMOVAL

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

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

1. Cover Removal—Manual Breakers

- a. Press the OFF button on the circuit breaker.
- b. Remove the escutcheon plate from the breaker cover (4 screws). See Figure 22.
- c. Remove the four breaker cover screws and lift off the cover.

2. Outer Cover Removal—Electrically Operated Breakers—See Figure 23.

- a. Disconnect all external leads from the terminal board.
- b. Remove the breaker outer cover. See Manual Circuit Breakers-Cover Removal.

NOTE: When removing the breaker outer cover, be sure that the terminal board support slips out of the notch in the outer cover and remains with the motor-power unit assembly. (See Figures 23 and 24.)

3. Inner Cover Removal

Unscrew the inner cover retaining screw, Figure 24, and remove the inner cover assembly from the breaker base.

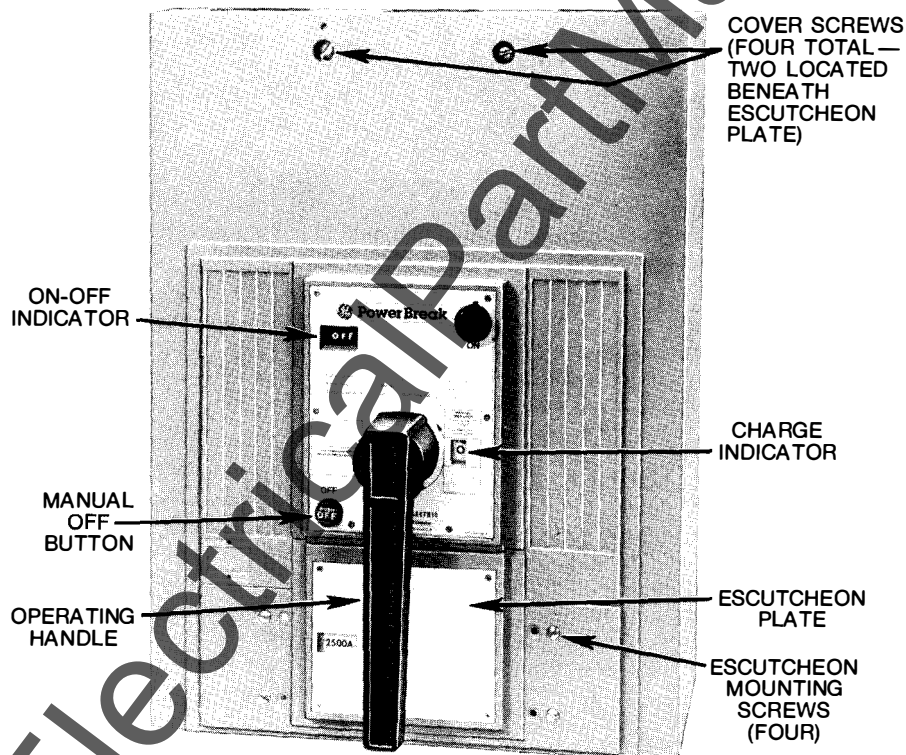


Figure 22. Manually Operated 3000A With MagneTrip™ Trip Unit

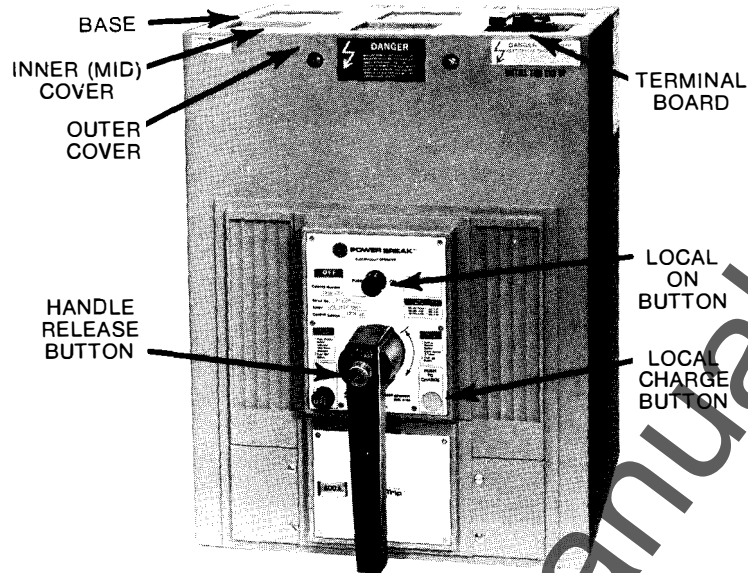


Figure 23. Electrically Operated

4. For easier installation of shunt trip, UVR or blown fuse trip, remove circuit breaker trip unit.
 - a. MicroVersaTrip Programmer—press in lock release lever on side of trip unit while pulling up unit.
 - b. MagneTrip Trip Unit (Dual-Magnetic—3000A max.)—
 1. Unscrew the hex-head bolts from the line end of the trip unit coils, but leave them in position.
 2. Unscrew the socket-head bolts and washers from the load end of the trip unit coils.
 3. Unscrew the round-head screws (4) supporting the trip unit.
 4. Remove the trip unit.

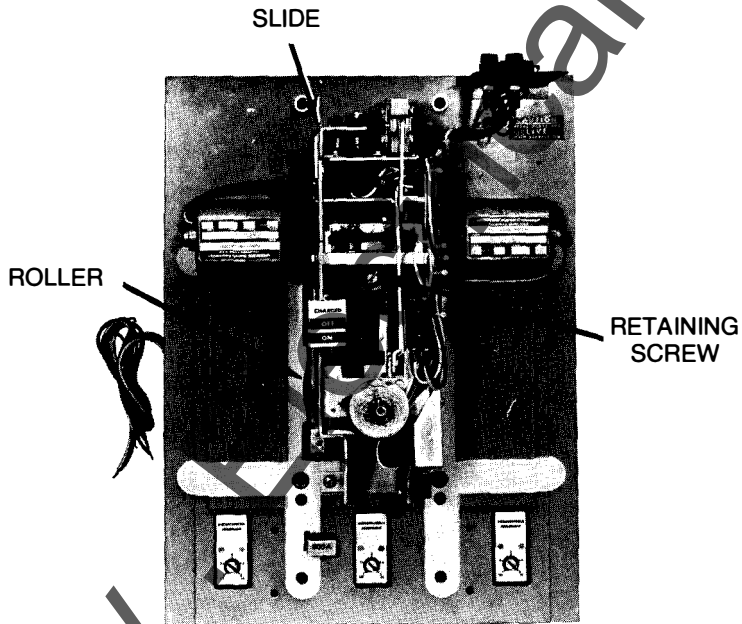


Figure 24.

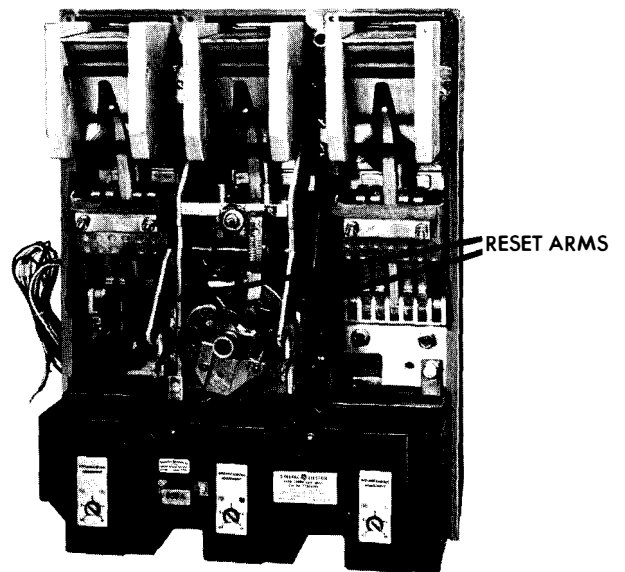


Figure 25. Breaker Base and Mechanism

Once the circuit breaker cover(s) has been removed, installation of the accessory may be completed. Refer to specific accessory installation below.

SHUNT TRIP DEVICE

GENERAL DESCRIPTION

The shunt trip device provides remote control capability to trip the circuit breaker. A cutoff switch is supplied as part of the shunt trip to automatically remove power from its coil when the circuit breaker is tripped.

Shunt trip device catalog numbers with suffix R or RB are for right side mounting; those with suffix L or LB are for left side mounting.

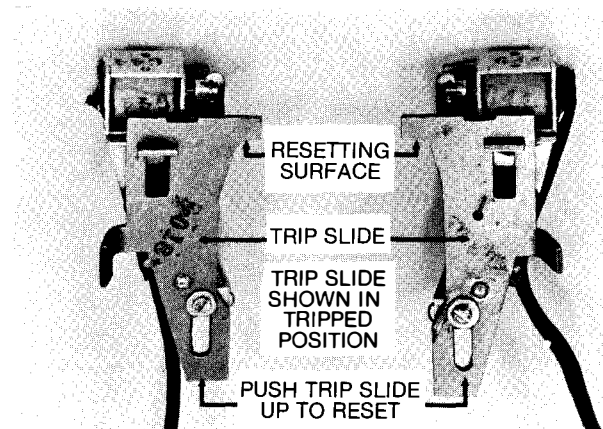


Figure 26-L Shunt Trip Device—Left Side Mounted. Figure 26-R Shunt Trip Device—Right Side Mounted.

TABLE 5—ELECTRICAL DATA

| Cat No. | Voltage Rating | Max Inrush Current Amps |
|---------|--------------------|-------------------------|
| TSST7 | 12 Vdc | 6.93 |
| TSST8 | 24 Vdc | 4.20 |
| TSST9 | 48 Vdc | 1.09 |
| TSST10 | 125 Vdc | 1.00 |
| TSST11 | 250 Vdc | 0.21 |
| TSST12 | 120 Vac 240 Vac | 2.25 4.50 |
| TSST13 | 480 Vac 600 Vac | 1.64 2.05 |

INSTALLATION

1. Crank the operating handle twice before removing the cover or block the crossbar down as shown in Figure 30. Either of these actions will position the resetting pin below the shunt trip slide resetting surface. (See Figures 26 and 29.)
2. For left side mounted device, see Figure 26-L. Insert shunt trip leads into mechanism above the trip slide extension arm so that leads come out of the mechanism below the extension arm. See Figure 28.
3. For either right or left side mountings:
 - a. Reset the trip slide as shown in Figure 26 and place the shunt trip device inside the breaker mechanism frame, as shown in Figure 28 or 29.

NOTE: The left side mounted device requires some care in maneuvering it through the space between the breaker trip slide and latch assembly. (See Figure 28.)

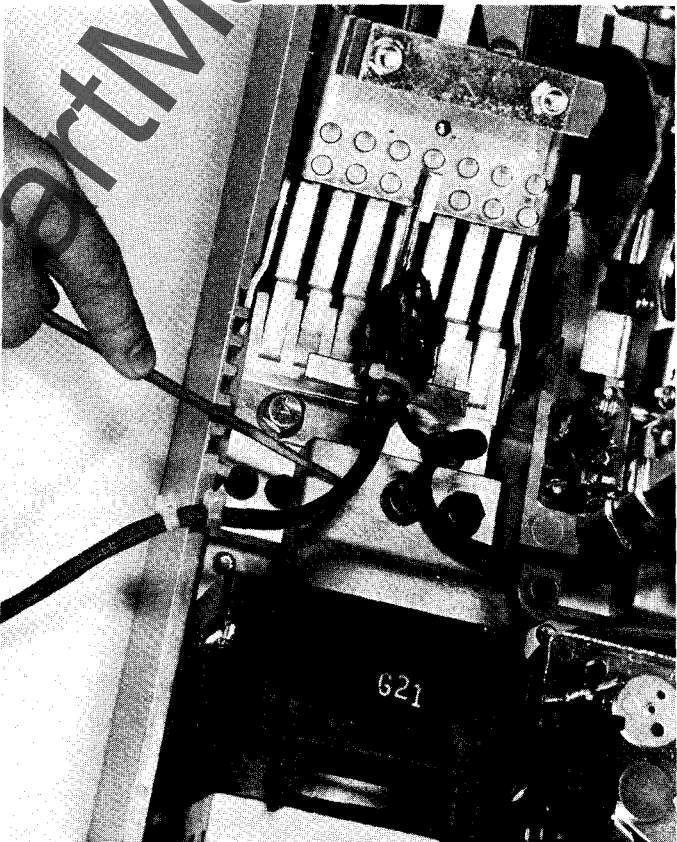


Figure 27. View Showing Knockout Method

- b. Install mounting screws through slotted holes into tapped holes in shunt trip frame.
 - c. Position unit to provide $\frac{1}{16}$ -inch to $\frac{3}{32}$ -inch gap, as shown in Figure 29 and tighten screws to 25-inch pounds torque.
 - d. Check to ensure that the resetting-roll pin is installed beneath the trip slide resetting surface.
 - e. Check to ensure that the trip slide moves freely. It may be necessary to reposition the solenoid leads slightly to ensure free movement (for left side mounting only).
4. Install the cutoff switch as follows:
 - a. Remove the left hex-head mounting bolt.
 - b. Discard the plain washer and install the switch assembly, as shown in Figure 30 using bolt and lockwasher.
 - c. Torque the bolt to 250-inch pounds while holding the auxiliary switch in the proper mounting position.
 - d. Insert the wires and flexible sleeving from the shunt trip through the slot in base.
 - e. Connect insulated spade terminal from shunt trip to mating connector on cut-off switch.
 - f. Pass the other lead through the flexible sleeve on the switch assembly. Install wire ties on wire bundle on the inside and outside of base to provide strain relief. (See Figure 27).
 5. Lead Exit: Use a $\frac{1}{4}$ " round file.
 - a. File out one knockout in the left side of the base just deep enough to allow the leads to exit. (Figure 27) Remove all debris.
 6. For functional check, replace trip unit first.
 - a. Manual Circuit breakers:
 1. Replace the breaker cover but do not tighten mounting screws (four).

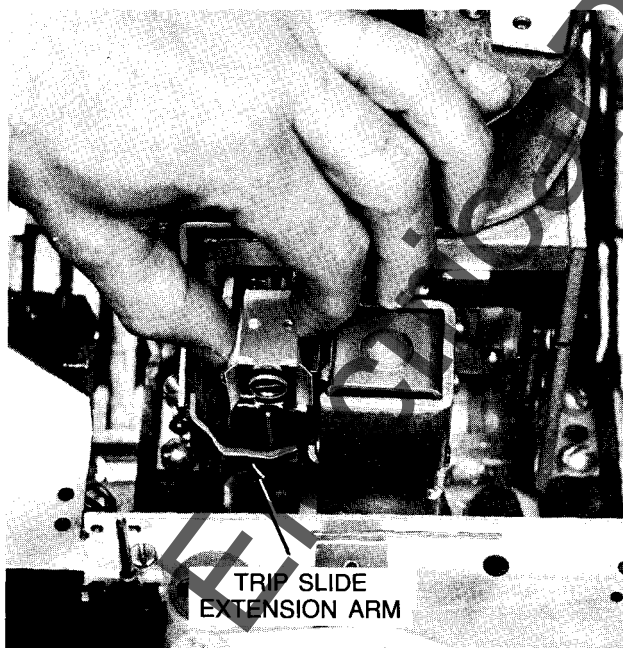


Figure 28. View of Left Hand Shunt Trip Mounting

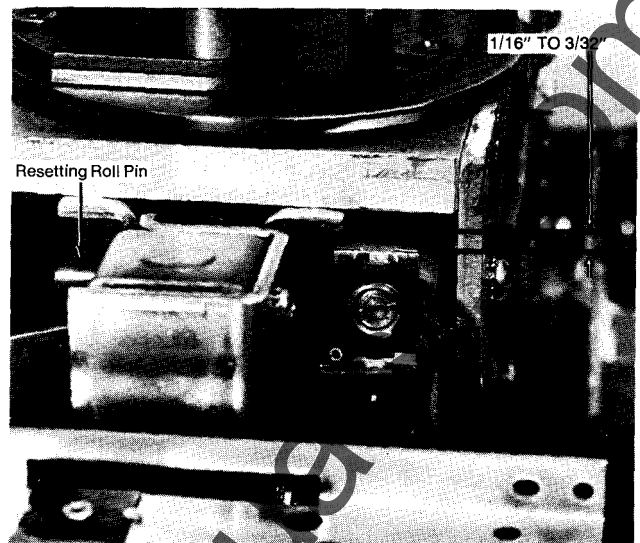


Figure 29. View of Right Hand Shunt Trip Mounting

- b. Electrical circuit breakers:
 1. Install inner cover. Refer to page 16.
 2. Install outer cover but do not tighten mounting screws (4).
7. Functional check
 - a. Turn on circuit breaker by cranking handle a third time, then push ON button.
 - b. Apply 55 percent of the rated accessory coil voltage to check the electrical and mechanical operation of the shunt-trip device. The main breaker contacts should open. Verify that voltage has been removed from the shunt trip coil.
 - c. Apply descriptive label to front of cover.
8. Reassemble the breaker as outlined on page 16.

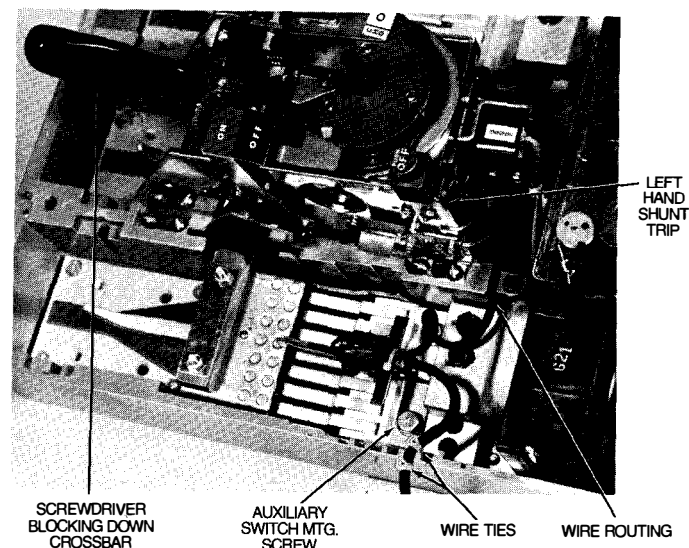


Figure 30.

COVER REASSEMBLY

1. Manual Circuit Breakers

NOTE: When replacing the circuit breaker outer cover, the phase barriers and the flat area on the handle shaft must be properly aligned.

- a. Install the breaker cover (4 screws).
- b. Install the escutcheon plate (4 screws).

2. Electrically Operated Breakers

Inner Cover Installation

- a. Slide the inner cover and motor-power unit assembly onto the breaker base and mechanism. Ensure correct alignment of the handle shafts (cam shaft and extension shaft) and that reset arms engage the grooves in the rollers shown in Figure 24 and 25.
- b. It may be necessary to pull the slide shown in Figure 24 towards the top of the breaker to help the indicator lever slide by mechanism reset fork allowing the inner cover assembly to seat properly.
- c. Tighten the inner cover retaining screw shown in Figure 24.

Outer Cover Installation

- d. Install the breaker outer cover (4 screws). See Figure 9. Be sure that the terminal board slides into the slots in the circuit breaker cover. See Figure 24.
- e. Install the escutcheon plate (4 screws). See Figure 22.
- f. Reconnect the power leads at the terminal board. See Figure 23.

UNDervoltage RELEASE DEVICE (UVR)

GENERAL DESCRIPTION

The undervoltage release device, Figure 31, is used to open the circuit breaker when the supply voltage drops to 35-60 percent of the rated voltage.

INSTALLATION

Installation of the undervoltage release device is very similar to the shunt trip (right side).

1. Breaker Cover Removal—follow steps 1-3 on page 12.
2. Refer to steps 1, 3 and 5 under “Shunt Trip Installation” to install the UVR in the right side of the center pole.

NOTE: It is very important to be sure the resetting roll pin is beneath the resetting surface of the resetting lever. See Figure 29 and Figure 32.

3. Check the leads at the undervoltage release device to be sure they do not interfere with any moving parts.
4. Install wire ties on wire bundle on the inside and outside of base to provide strain relief. See Figure 30.
5. Functional Checks
 - a. Replace the cover or covers (electrically operated).
 - b. Apply 85% of rated voltage to the coil and charge and close the breaker. Reduce the voltage to 35-60% of rated voltage and verify that the Undervoltage release trips the breaker.
6. Apply descriptive label to circuit breaker cover.

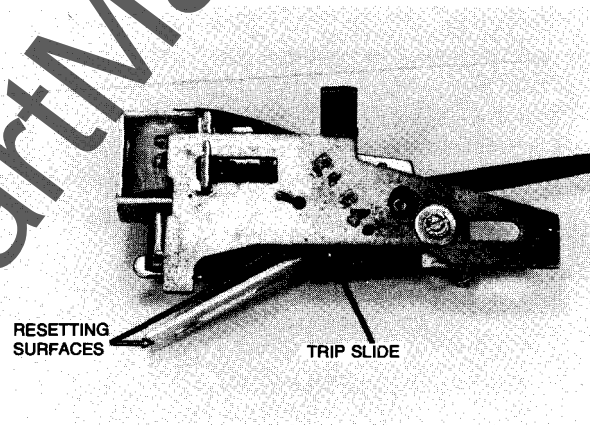


Figure 31. Undervoltage Release Device

ELECTRICAL DATA— UNDervoltage RELEASE

TABLE 6

| Cat. No. | Rated Voltage (60 Hz ac) | MA Current | | Dropping Resistor (Ohmite Type 270) |
|----------|-----------------------------|------------|----|--|
| | | dc | ac | |
| TSUV1 | 120V ac | — | 25 | none |
| TSUV2* | 240V ac | — | 25 | 5000Ω, 25 watt |
| TSUV4* | 480V ac | — | 25 | 15,000Ω, 50 watt |
| TSUV6* | 600V ac | — | 25 | 20,000Ω, 50 watt |
| TSUV7 | 12V dc | 211 | — | none |
| TSUV8 | 24V dc | 104 | — | none |
| TSUV9 | 48V dc | 54 | — | none |
| TSUV10 | 125V dc | 24 | — | none |
| TSUV11* | 250V dc | 24 | — | 5000Ω, 25 watt |

*Externally mounted dropping resistor supplied with device.

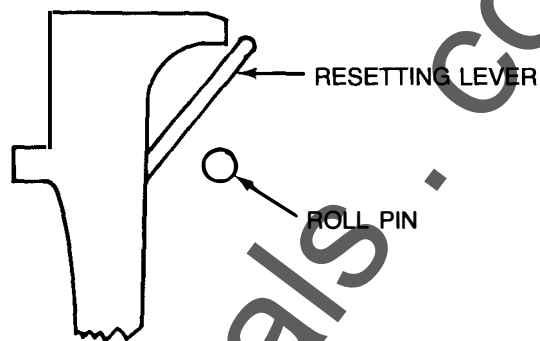


Figure 32. Roll Pin Position

BLOWN FUSE TRIP DEVICE

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 right-side shunt trip and the undervoltage release.

1. Breaker Cover Removal—follow steps 1-3 on page twelve. Be sure handle has been cranked twice before removing cover.

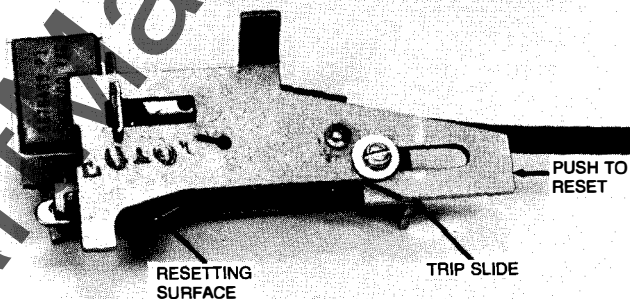


Figure 33. Blown Fuse Trip Device

2. Refer to step 3a-3e on pages fourteen and fifteen and Figure 29 to install blown fuse trip device.
3. Insert the wires and flexible sleeving from the blown fuse trip device through the knockout in the left side of the breaker base. (See Figures 27 and 30.)

Blown-Fuse Trip Device (cont'd.)

4. Install wire ties on wire bundle on the inside and outside of base to provide strain relief. See Figure 30.
5. 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.

6. Attach six (6) lead wires across each of the three fuses as shown in Figure 34.
7. Apply the descriptive label to the front of the breaker cover.

Cover Reassembly

Be sure cover (or covers) have been properly reassembled. Refer to steps 1 and 2 on page 16.

3-POLE THREE-PHASE APPLICATION Blown Fuse Trip Device

Leads must be connected exactly as shown. Blown fuse trip device may not operate correctly if phase sequence or position is changed.

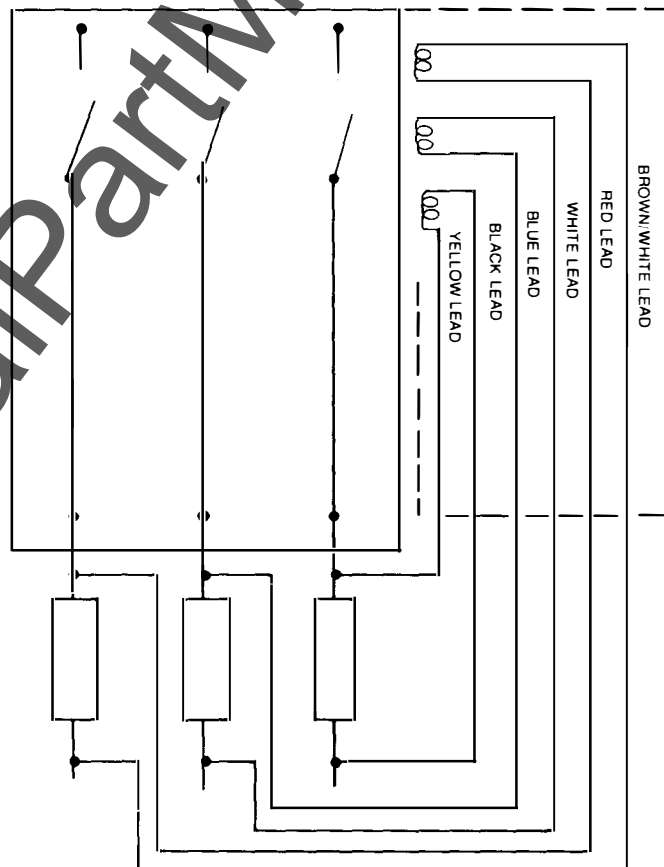


Figure 34. Wiring Diagram

AUXILIARY SWITCH

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 single-pole, double-throw (AB-type) and rated as shown in table below. Two switch positions must be devoted to each shunt trip accessory (if used).

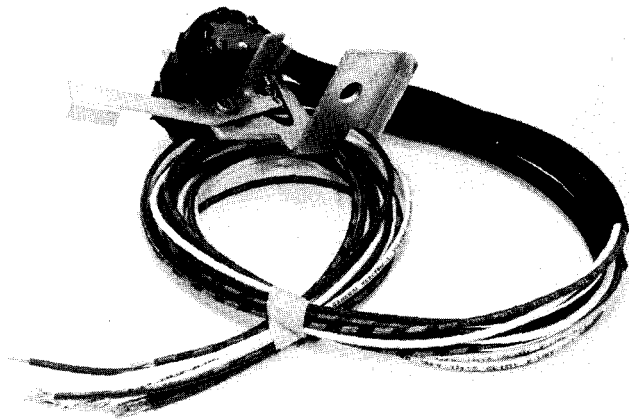


Figure 35. Auxiliary Switch

TABLE 7—ELECTRICAL DATA

| Voltage 240V ac max. 250V dc max. | Number of Switch Elements | Maximum Ampere Rating Switch Elements |
|---|------------------------------------|---|
| TSAS2AB* | 1-12 | 6A at 240 Vac 1/4A at 250 volts dc 1/2A at 125 volts dc |

*Suffix numbers 1 through 12 designate number of switch elements

INSTALLATION

1. Refer to circuit breaker cover removal instructions on page twelve.
2. Remove appropriate knockout(s) in the breaker base using a 1/4" round file as shown in Figure 36. Remove all debris from the breaker.

3. Remove the left hex-head bolt. Discard the plain washer and install the switch assembly as shown in Figure 37, using bolt and lockwasher. Torque the bolt to 250 inch-pounds while holding the unit in the correct position.
4. Insert leads and flexible sleeving through the knockout(s). Leads of respective stages should be identified to ensure proper connection after the breaker cover has been replaced and the breaker installed.

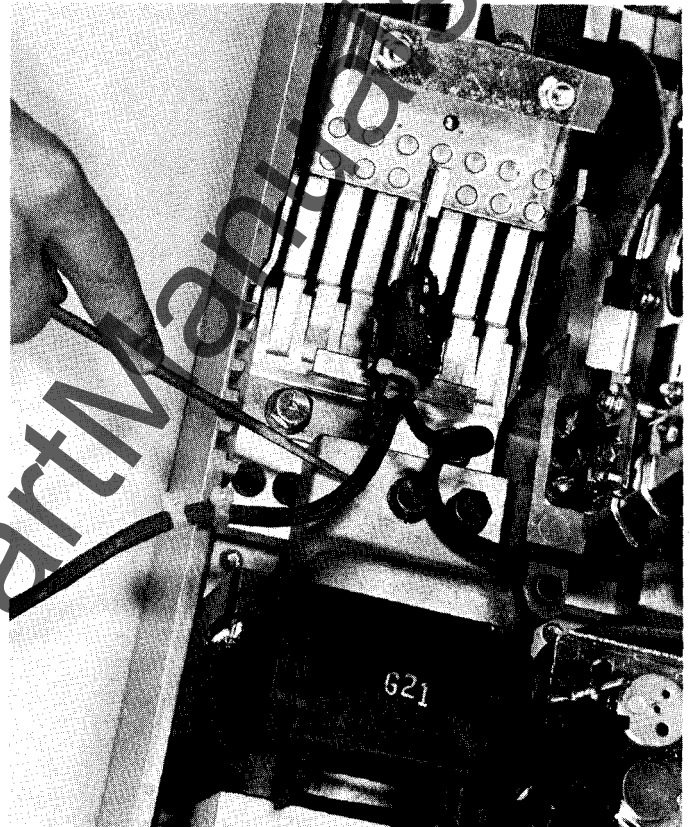


Figure 36.

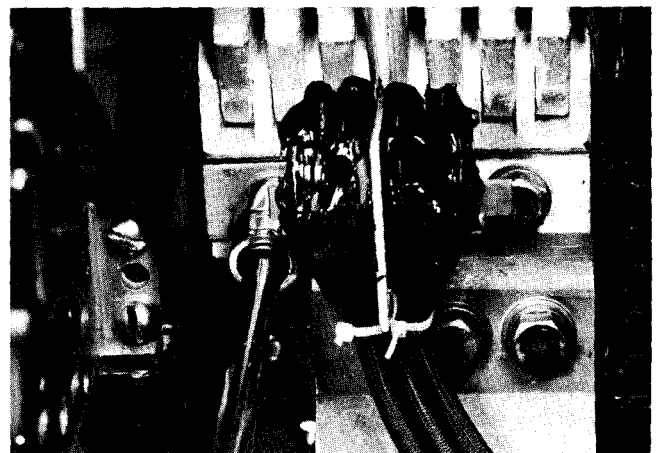


Figure 37.

5. Install wire ties on wire bundle(s) on the inside and outside of base to provide strain relief. See Figure 30.
6. Replace breaker cover (or covers for electrically operated breaker).
7. Perform installation checks:
 - a. Verify that "A" contacts Figure 38 (red and white leads) are open when breaker is open.
 - b. Verify that "B" contacts (brown/white and white leads) are closed when the breaker is open.
 - c. Verify that above circuit conditions are reversed when breaker is closed.
 - d. Following field installation, apply the descriptive label to the front of the breaker cover.

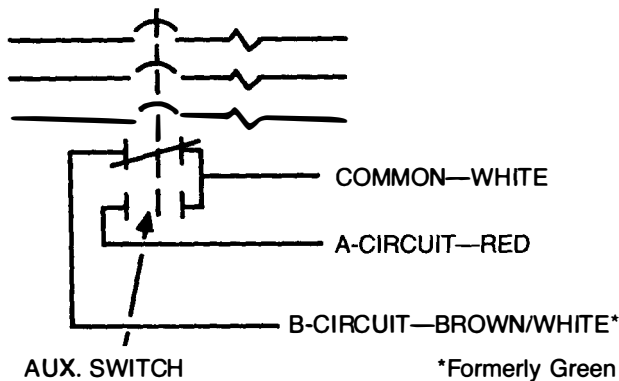


Figure 38.

4000A Power Break with MagneTrip Non-Interchangeable Trip

Installation of any of these accessories in a 4000A frame MagneTrip requires removal of sealant from one cover screw. Such modification voids the UL Listing. Remove and discard the UL label.

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 Buy Log GEP-1100 for cataloged features.

1. Limited close access button ("C" suffix in catalog number) Figure 39. Provides limited manual accessibility to ON Button. Function allows breaker to be turned ON in an emergency or for maintenance by use of 3/32" diameter pin or rod.
- Manually operated devices must be ordered with an accessory closing solenoid.

2. Remote Close Only.
No means of manually closing device. Manually operated devices must be ordered with closing solenoid.

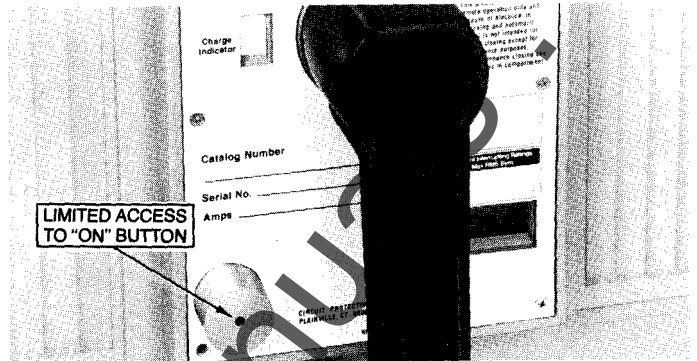


Figure 39.
Manual—Line-Bottom

INSTRUCTION MANUALS

Field installable accessories—this manual (GEH-4694)

Breaker padlock—GEH-4544

MicroVersaTrip®—GEH-4657

MagneTrip™ (Installation)—GEH-4658

MicroVersaTrip RMS-9—GEH-5369

MVT RMS-9 Rating plug—GEH-5371

MicroVersaTrip® RMS-9 Trip Time Curves:

Phase Overcurrent—GES-6235

Ground Fault—GES-6228

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.
GEH-4694A 0187 PSA

GENERAL ELECTRIC