

AC-PRO Retrofit Kit

Retrofit Kit Instructions for Brown Boveri & CIE CLS-47-630 Low Voltage Circuit Breaker

Instructions for:
Manual Reset Actuator

Utility Relay Co.
Chagrin Falls, Ohio 44023
Phone: 888-289-2864 Fax: 440-708-1177
www.utilityrelay.com

LIMITED WARRANTY

Utility Relay Co., Ltd. warrants that every AC-PRO and ZERO-Hertz trip unit and related retrofit kit components (herein collectively referred to as "product") shall be free from defects in material and workmanship, and will perform as described in Utility Relay Company's sales literature and Instruction Manuals, under normal use and service for a period of (2) two years from date of invoice. EXCEPT AS SET FORTH HEREIN, IT IS EXPRESSLY AGREED THAT THERE IS NO WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE, AND THERE IS NO OTHER WARRANTY, EXPRESS, IMPLIED OR STATUTORY, BY UTILITY RELAY CO., LTD. WITH REFERENCE TO THE PRODUCT.

Should any warranty claim arise within the warranty period, contact Utility Relay Co., Ltd. at 888-289-2864 and do the following:

- 1.) Provide a complete description of the problem with the trip unit or retrofit kit component.
- 2.) Provide the Serial Number located on the back of the trip unit from the warranted retrofit kit.
- 3.) Obtain a Returned Materials Authorization number (RMA) and return shipping instructions.
- 4.) Promptly return the defective material to Utility Relay Company.

Warranty Disclaimer and Liability Limitation

As the sole and exclusive remedy, Utility Relay Co., Ltd. will repair or replace the trip unit and/or retrofit component(s) at no cost to the customer during the warranty period. The customer is liable and shall pay for shipment of defective products back to Utility Relay Co., Ltd. In no event shall Utility Relay Co., Ltd. be liable for any special, incidental or consequential damages.

Excluded from this warranty and not warranted by Utility Relay Company in any fashion, either expressed or implied are:

- 1.) Any product which has been disassembled (except to replace batteries), repaired, tampered with, altered, changed, or modified by persons other than Utility Relay Company's own authorized service personnel unless repair by others is made with the written consent of Utility Relay Company.
- 2.) Defects or damage to the Product resulting from wear, tear, misuse, negligence, improper storage, improper testing, impacts, or use with non-approved accessories.
- 3.) Products used for any other purpose other than originally intended by Utility Relay Company.

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Brown Boveri & CIE
CLS 47-630

1.0 General

All possible contingencies, which may arise during the installation, operation or maintenance, and all details and variations of this equipment, are not necessarily covered by these instructions.

1.1 Inspection

Carefully inspect the retrofit kit on arrival. If any damage is found, file a claim with the carrier and contact Utility Relay Company for replacement parts.

Verify that this is the correct kit for the circuit breaker being retrofitted.

Check the contents of the retrofit kit package against the kit bill of material to make sure that all the required parts are included.

Thoroughly read and understand these installation instructions as well as the AC-PRO trip unit instruction manual before proceeding with the circuit breaker retrofit.

2.0 Initial Breaker Tests

Before starting the retrofit, perform a visual/mechanical inspection and an electrical test of the breaker, CLS 47-630 to determine its condition.

Refer to the breaker manufacturer's instruction manual and accepted test standards such as the NETA Maintenance Specifications or PEARL reconditioning standards to verify that the breaker is in acceptable mechanical and electrical operating condition.

As a minimum, perform the following:

- a) Close and trip operation of the circuit breaker.
- b) Measure contact resistance of each pole.
- c) Measure insulation resistance from pole to pole, from pole to frame and across open contacts.
- d) Check contact compression.

Rectify any abnormalities found. Clean and lubricate the breaker as required.

3.0 Install Shunts & CTs

3.1 Remove Thermal Magnetic Series Trip Units

Overcurrent Release type GT23 thermalrelease

On each breaker pole, remove the GT23 thermal magnetic release series trip unit as follows:

- 1) Remove the two (2) hex nuts and star LW at the bottom of the series trip unit.
- 2) Remove the two (2) socket head CS and LW at the top of the series trip unit.
- 3) Keep the existing hardware for reuse later.
- 4) The series trip unit can now be removed.

3.2 CT Installation

Install the copper shunts and CT on each breaker pole as outlined below:

Refer to Figure 4 for the following:

- 1) Remove the paper backing from the HW-2910-1 silicone rubber spacer and stick it to the CU-167 top shunt approximately 1-1/8" from the front edge.
- 2) Loosely assemble the CU-167 top shunt, CT, CU-014 spacer, and CU-166 bottom shunt using a 3/8-16 X 2-3/4 H.C. screw, flat washer, lock washer and hex nut.
- 3) Place the CT/shunt assembly on the existing screws and attach using the existing hardware.
- 4) Fully tighten all hardware after adjusting the position of the shunts if required.

4.0 Manual Reset Actuator

4.1 Install Trip Paddle

Refer to Figure 5 for the following:

- 1) Attach the BR-221 trip paddle to the trip bar using (1) 8-32 X 1/2 Phillips screws, lock washer and hex nut.

4.2 Install Actuator

Refer to Figure 5 for the following:

- 1) Using the template from Figure 6, drill two (2) 9/32 holes in the right side of the mechanism frame. The template should be placed on the bottom of the frame and the frame drilled from the bottom.
- 2) Remove the vinyl tip, stop nuts and the reset knob from the actuator.
- 3) Replace the 5" actuator rod with a 4-1/2" actuator rod.
Use caution since the plunger is spring loaded.
- 4) Replace the reset knob and lock nut so it is flush with the plunger end of the actuator. The reset knob must be pushed to reset the actuator.
- 5) Place the "PUSH TO RESET" sticker on the reset knob.
- 6) Replace the stop nuts and adjust the location for 1/2" of travel.
- 7) Trip the actuator and tighten the 10-32 set screw in the plunger to hold the actuator rod in position.
- 8) Attach the actuator to BR-111 bracket with three (3) 10-32 X 3/8 Phillips screws and lock washers.
- 9) Align the bracket and actuator assembly with the BR-221 trip paddle. The actuator rod should go through the slot in the trip paddle.

- 10) Attach the assembly to the breaker frame with two (2) 1/4-20 X 5/8 HCS, lock washers and hex nuts in the previously drilled holes.
- 11) Screw the HW-9903-3 1/4-20 clamp-on collar on the end of the actuator rod but do not tighten the clamp screw at this time.

4.3 Adjust Actuator

Refer to Figure 7 for the following:

- 1) With the circuit breaker closed, and the actuator reset, rotate the trip paddle until the breaker trips. Note the exact position of the trip paddle when the mechanism trips.
- 2) With the actuator reset, screw the clamp-on collar towards the actuator until the trip paddle is held about 1/4" before the trip position as determined in step 1.
- 3) With the actuator reset, close the breaker. If the breaker trips free because the trip paddle is held to close to the trip position, move the clamp-on collar back and repeat the above.
- 4) Tighten the clamp screw on the clamp-on collar to lock it in position.
- 5) Trip the actuator and attempt to close the breaker. The breaker should trip free, if not, increase the actuator rod travel by moving the travel stop nuts.
- 7) Repeat the above until completely satisfied with the operation of the actuator.

IMPORTANT: WHEN THE ACTUATOR IS IN THE TRIP POSITION (NOT RESET), THE BREAKER MUST BE TRIP FREE.

THE SET SCREW IN THE PLUNGER MUST BE TIGHTENED TO ENSURE THAT THE ACTUATOR ROD REMAINS IN PROPER ADJUSTMENT.

5.0 Install Trip Unit

5.1 Standard Installation

Refer to Figures 1, 2 & 3 for the following:

- 1) Attach the BR-027 shield and the BR-075 bracket to the back of the trip unit using two (2) 8-32 X 3/8 Phillips screws and lock washers.

The BR-075 bracket should be between the back of the AC-PRO trip unit and the BR-027 shield.

Use the right two (2) holes in the BR-075 bracket (looking from the back) and the two (2) center holes in the trip unit.

- 2) Attach BR-075 bracket to BR-033 bracket using two (2) 8-32 X 1/2 Phillips screws, lock washers and hex nuts.
- 3) Place the trip unit/bracket assembly on the breaker support platform in front of the arc chutes. One existing hole may be used to mount the trip unit assembly. Using the BR-033 bracket as a guide, mark and drill a 7/32" Dia. hole for the second mounting screw.
- 4) Attach the trip unit/bracket assembly to the support platform using two (2) 10-32 X 1/2 Phillips screws, lock washers and hex nuts.
- 5) Ground the trip unit as described in Section 6.5.

6.0 Wiring

Refer to Figure 8 for the wiring diagram.

Use the wiring harness provided to make the connections to the CTs and the actuator.

The wiring harness plugs into the top of the AC-PRO. Be sure to tighten the two plug retaining screws after the wiring is complete.

Shorten the wires and tubing as required and use the cable ties and holders provided to make a clean installation. Make sure the wires will not be pinched, cut or chaffed by any moving parts or sharp edges.

6.1 Color Codes and Connections

The wiring harness connector color code and connections are as follows from left to right:

<u>Terminal #</u>	<u>Wire Color</u>	<u>Use</u>
1	Red (R)	Actuator "+"
2	Black (B)	Actuator "-"
3	Blue (L)	Phase "A" "Dot"
4	White (W)	Phase "A" Tap
5	Yellow (Y)	Phase "B" "Dot"
6	White (W)	Phase "B" Tap
7	Brown (N)	Phase "C" "Dot"
8	White (W)	Phase "C" Tap
9	Green (G)	Neutral "Dot" (4W & GF only)
10	White (W)	Neutral Tap (4W & GF only)

6.2 Current Transformer Connections

Each set of CT wires in the wiring harness is housed inside an individual PVC tube for added physical protection and to simplify the wiring process.

Connect to the #10-32 lugs using the ring tongue terminals provided. Make sure that the same tap is used on all three CTs.

6.3 Neutral Current Transformer

A neutral CT is only required on a 4-wire system with the ground fault function on.

On a 3-wire system, a neutral CT is not required even if the ground fault function is on.

The neutral CT and neutral wiring assembly are provided with the neutral CT kit.

When wiring to the neutral CT, make sure the same tap is used as the phase CTs.

6.4 Actuator Connection

Route the red and black wires from the actuator to the "ACTUATOR" terminal block on the trip unit. Trim the wires to an appropriate length. Use the protective sleeving on the wires.

Connect the red actuator wire to the "+" terminal on the wiring harness trip unit connector. Similarly, connect the black actuator wire to the other actuator terminal on the trip unit.

6.5 Ground Trip Unit

Ground the trip unit as follows: (See Figure 2)

- 1) Attach one end of the #14 SIS wire to the trip unit using a #10 ring terminal.
- 2) Attach the other end of the #14 SIS wire to the breaker frame using a #10 ring terminal. Make sure the wire will not be pinched, cut or chaffed by any moving parts or sharp edges.

7.0 Final Test

Perform a final electrical test of the breaker as in Section 2.

A primary injection test (hi-current) is recommended as the final test of the AC-PRO retrofit. See Section 11 "TESTING" in the AC-PRO trip unit instruction manual for complete details.

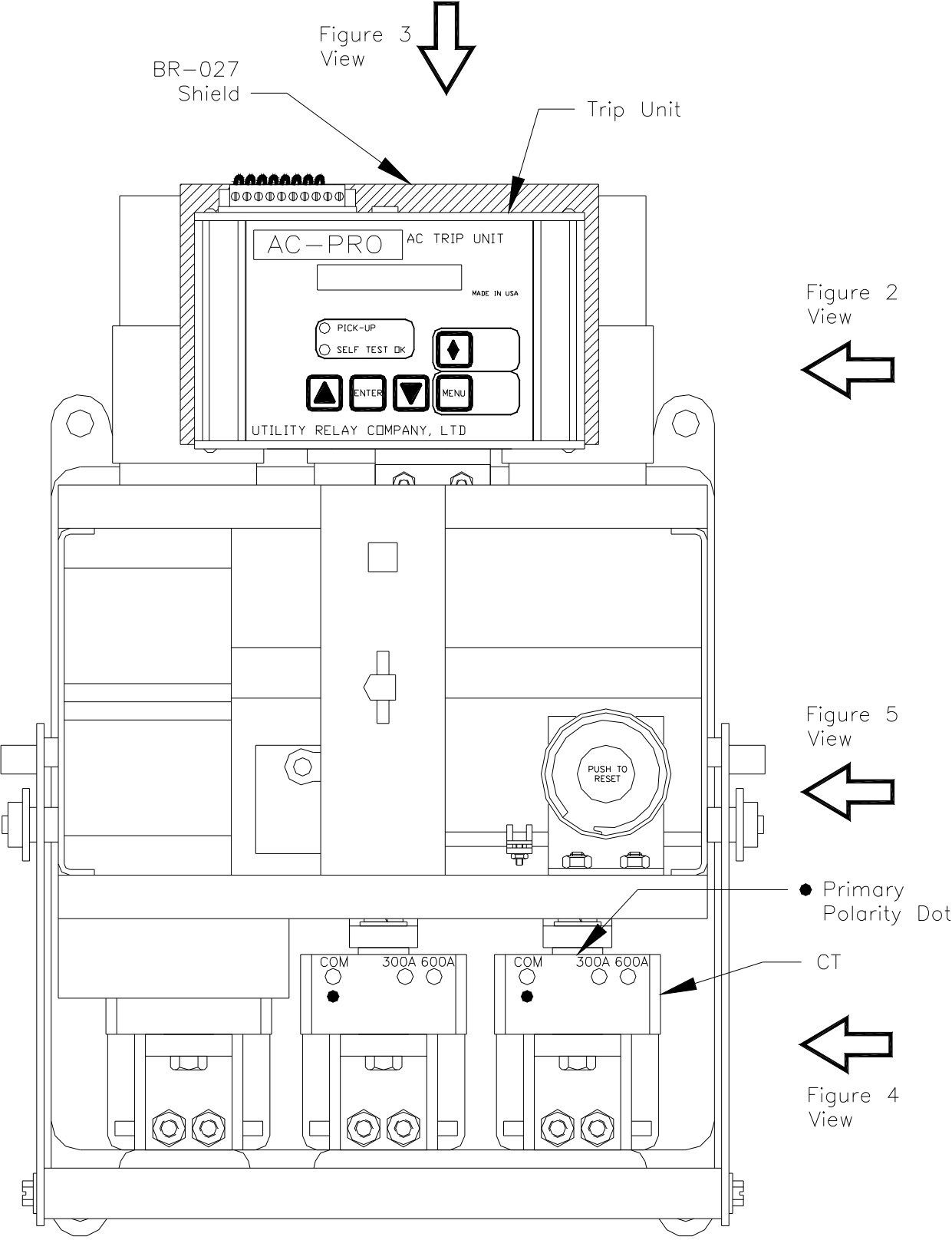


FIGURE 1
CLS-47
Front View

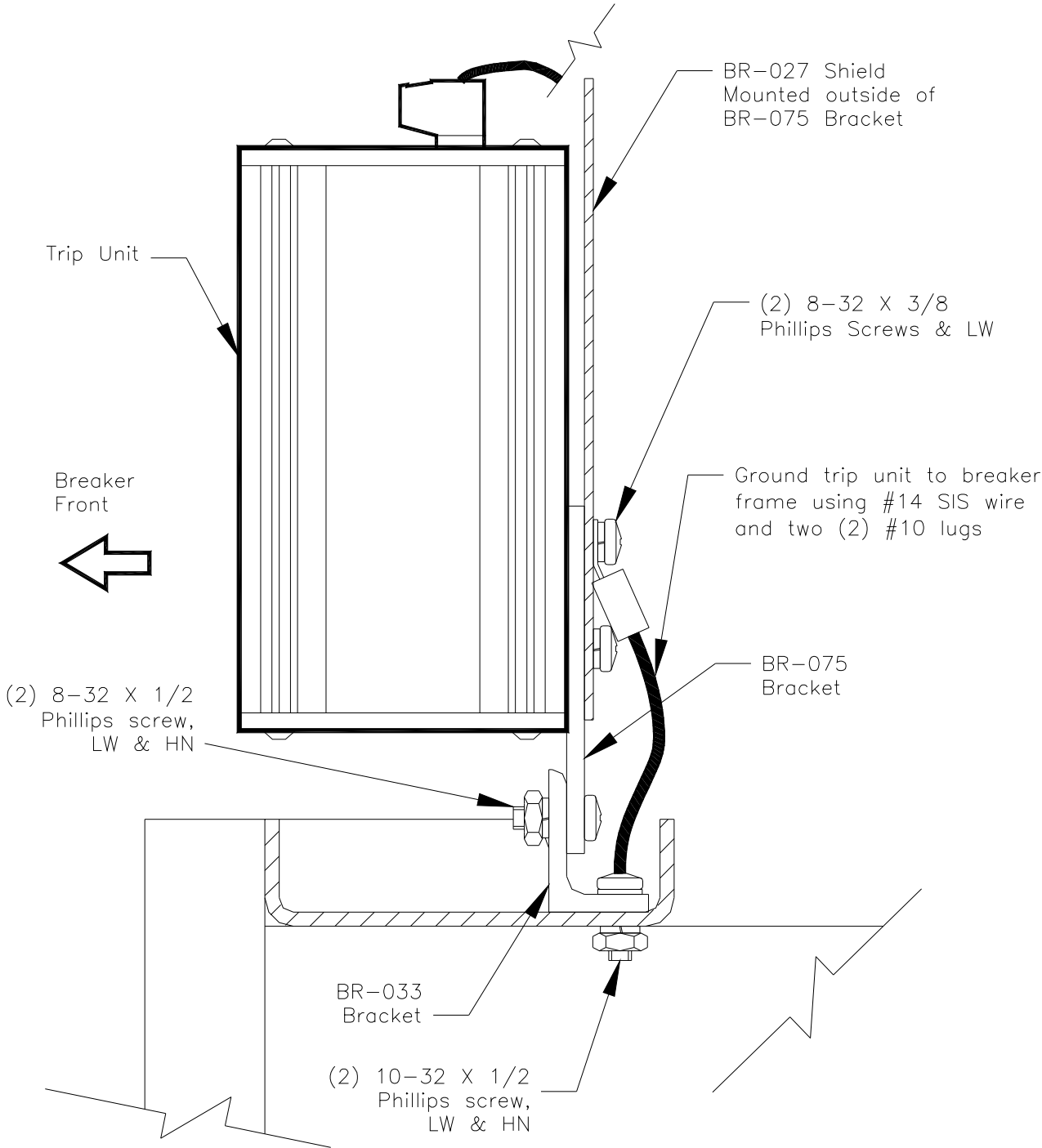


FIGURE 2
Trip Unit Installation
Side View

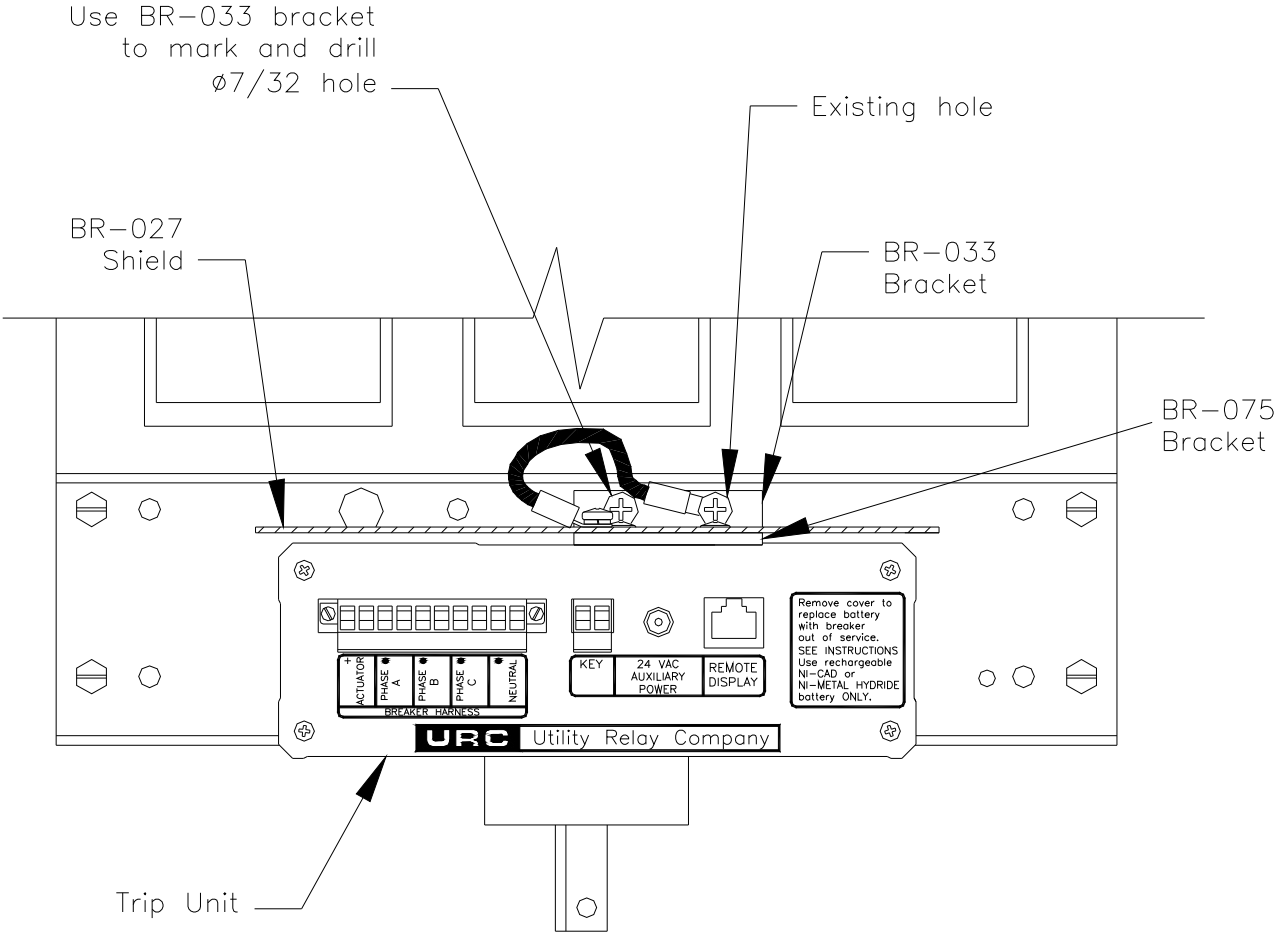


FIGURE 3
Trip Unit Installation
Top View

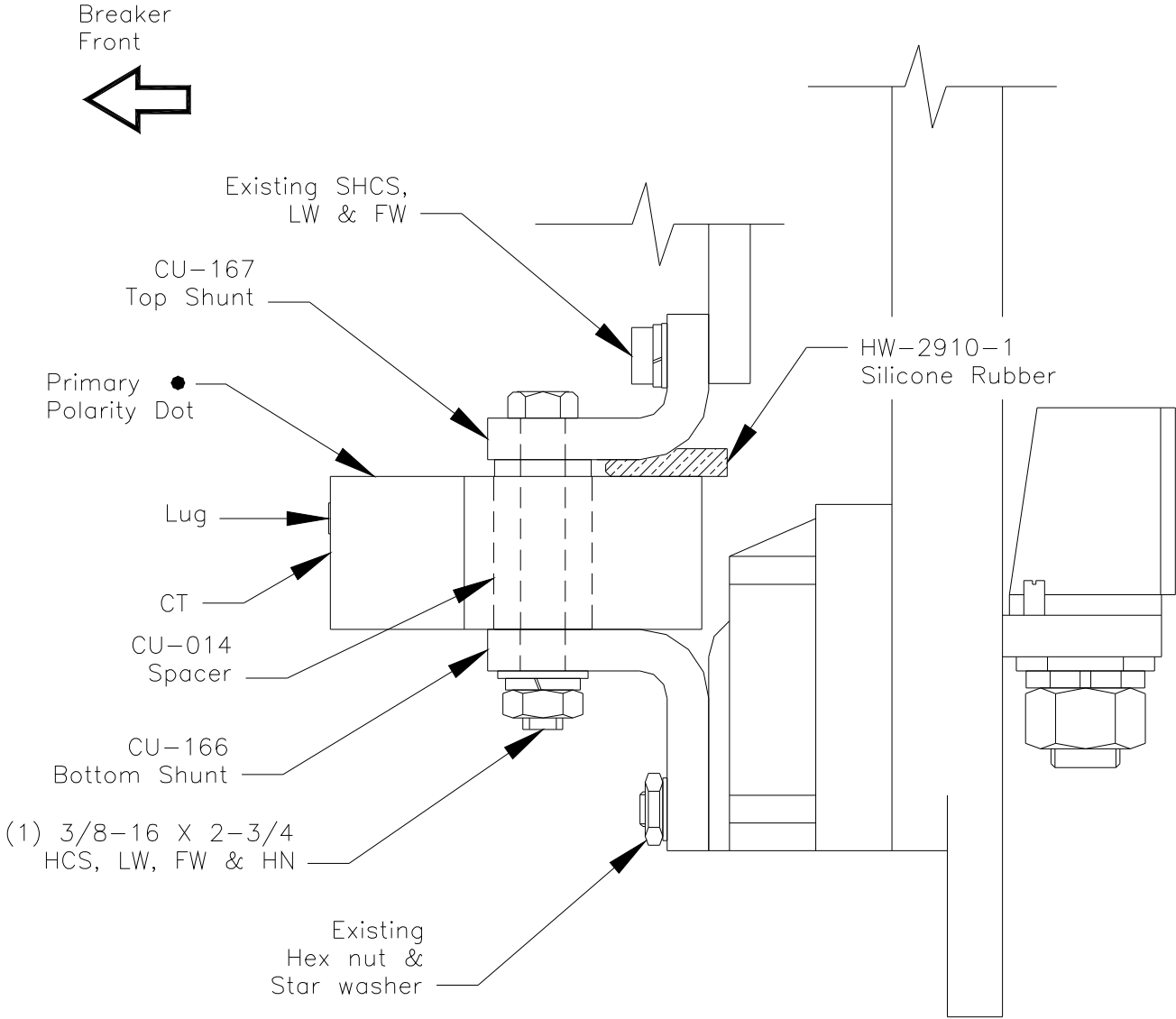


FIGURE 4
CT Installation

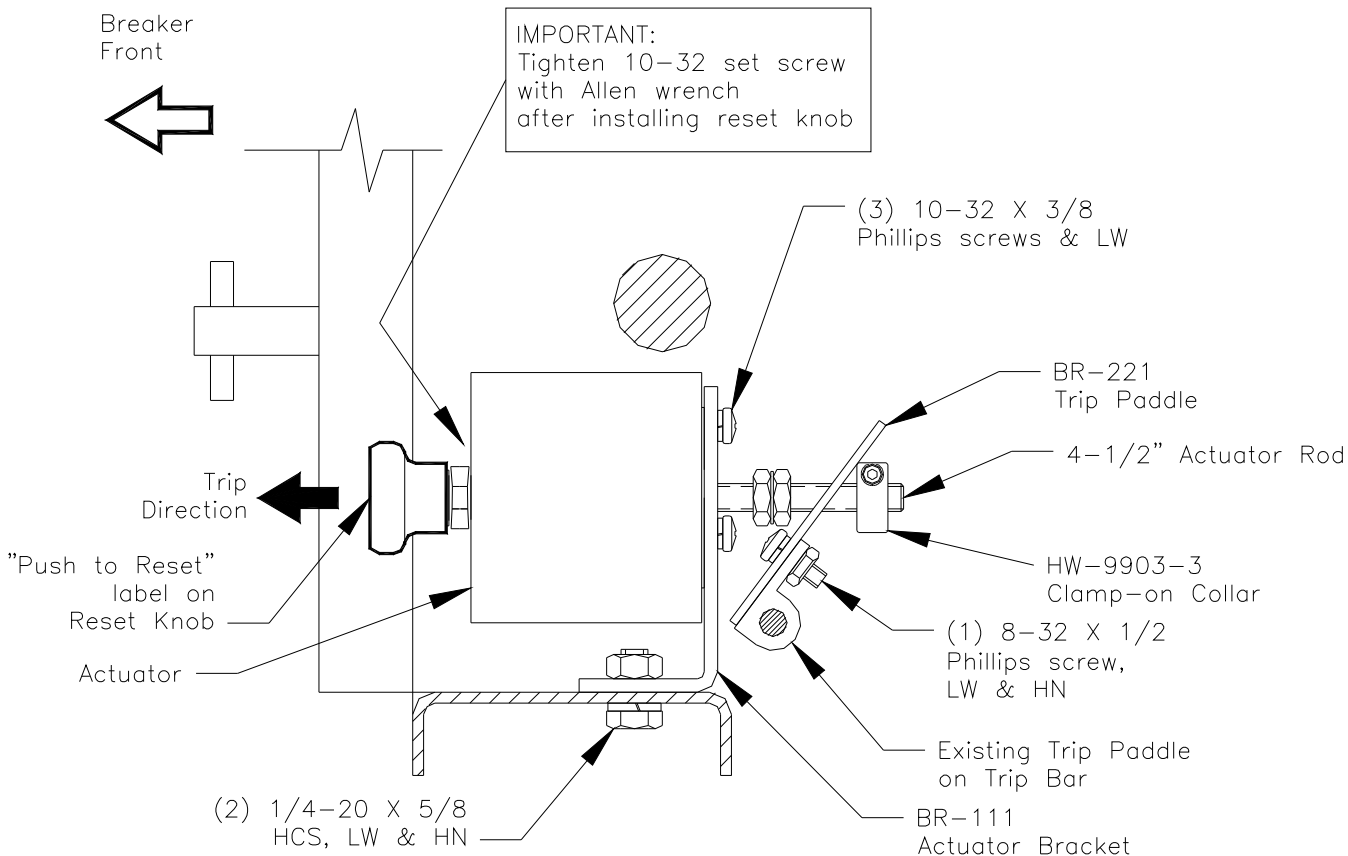


FIGURE 5
Manual Reset Actuator/Trip Paddle Installation
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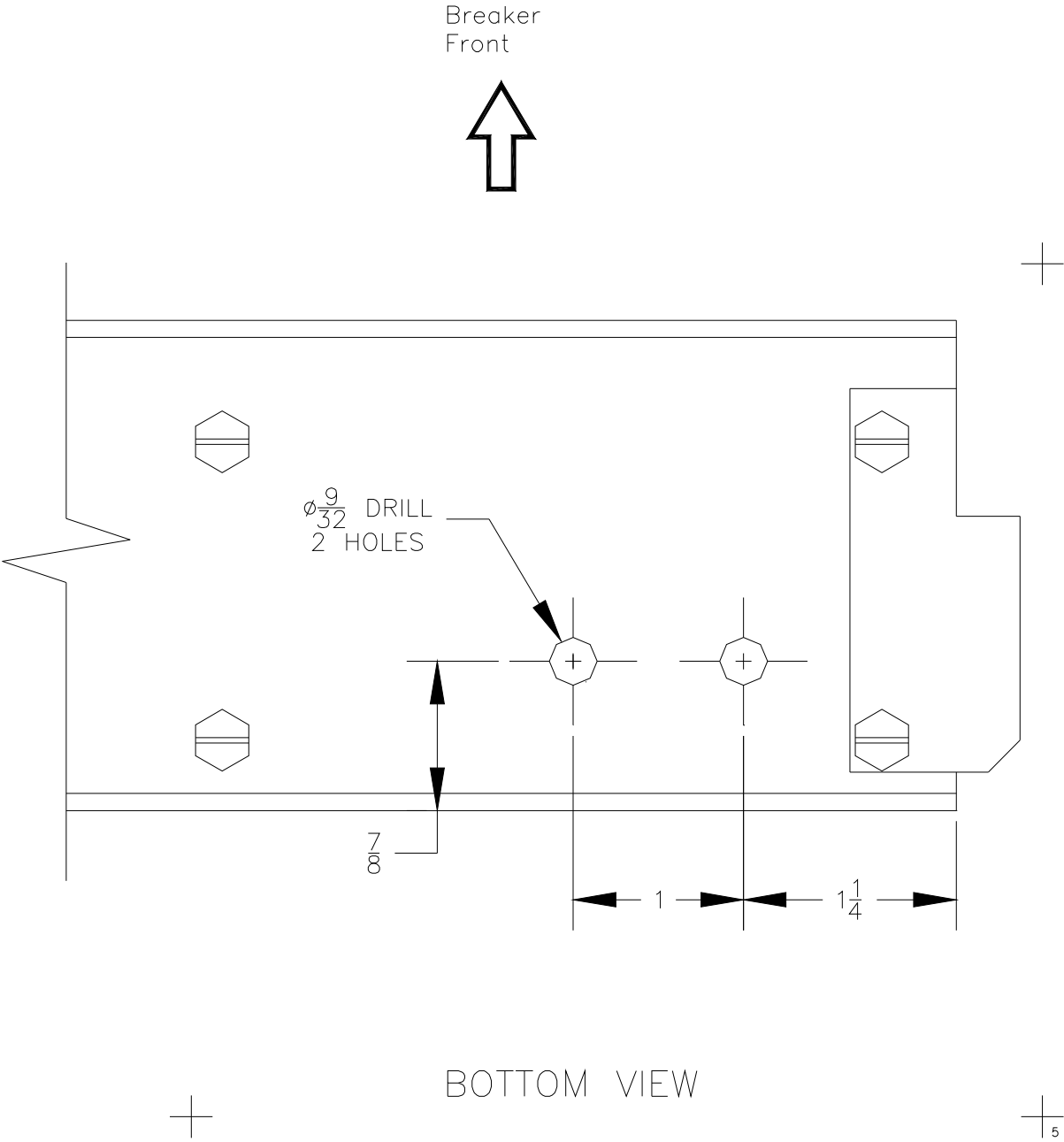


FIGURE 6
TEMPLATE: Manual Reset Actuator Bracket

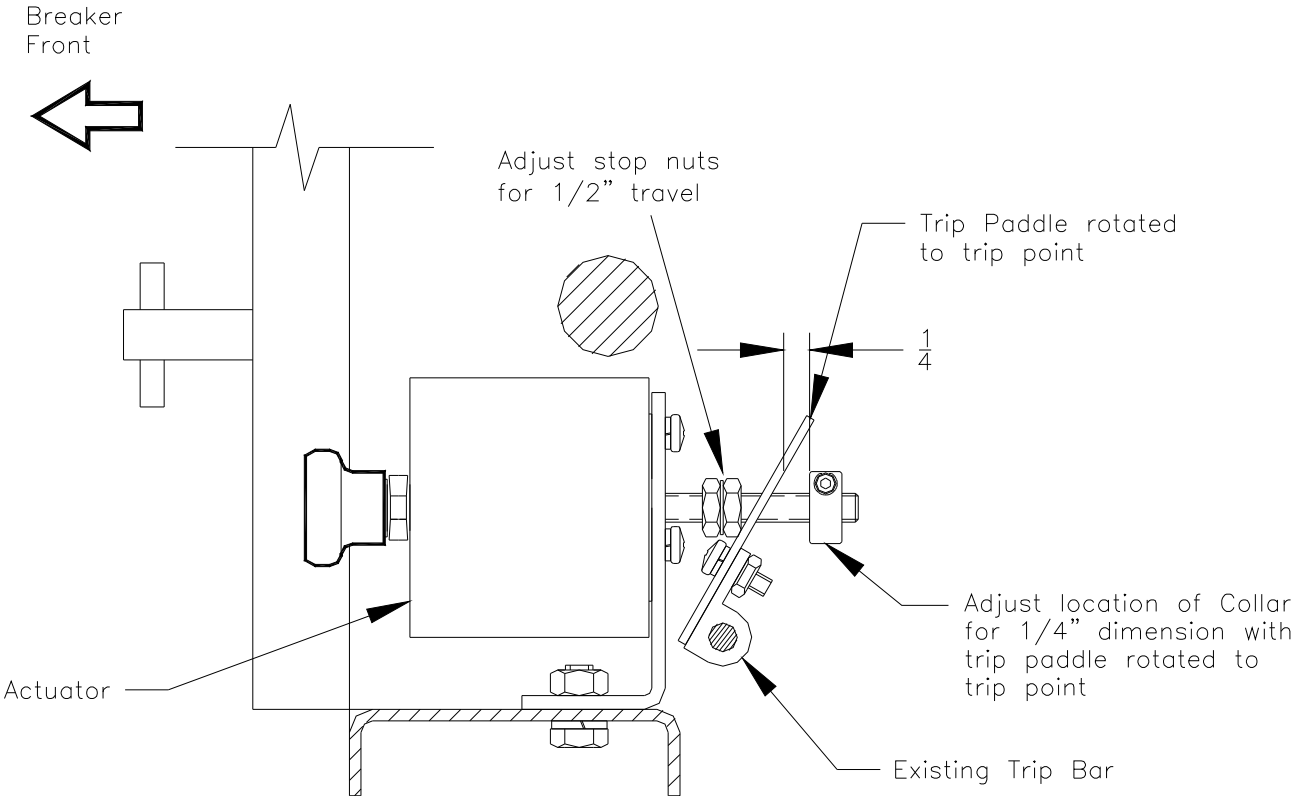


FIGURE 7
Actuator Adjustment
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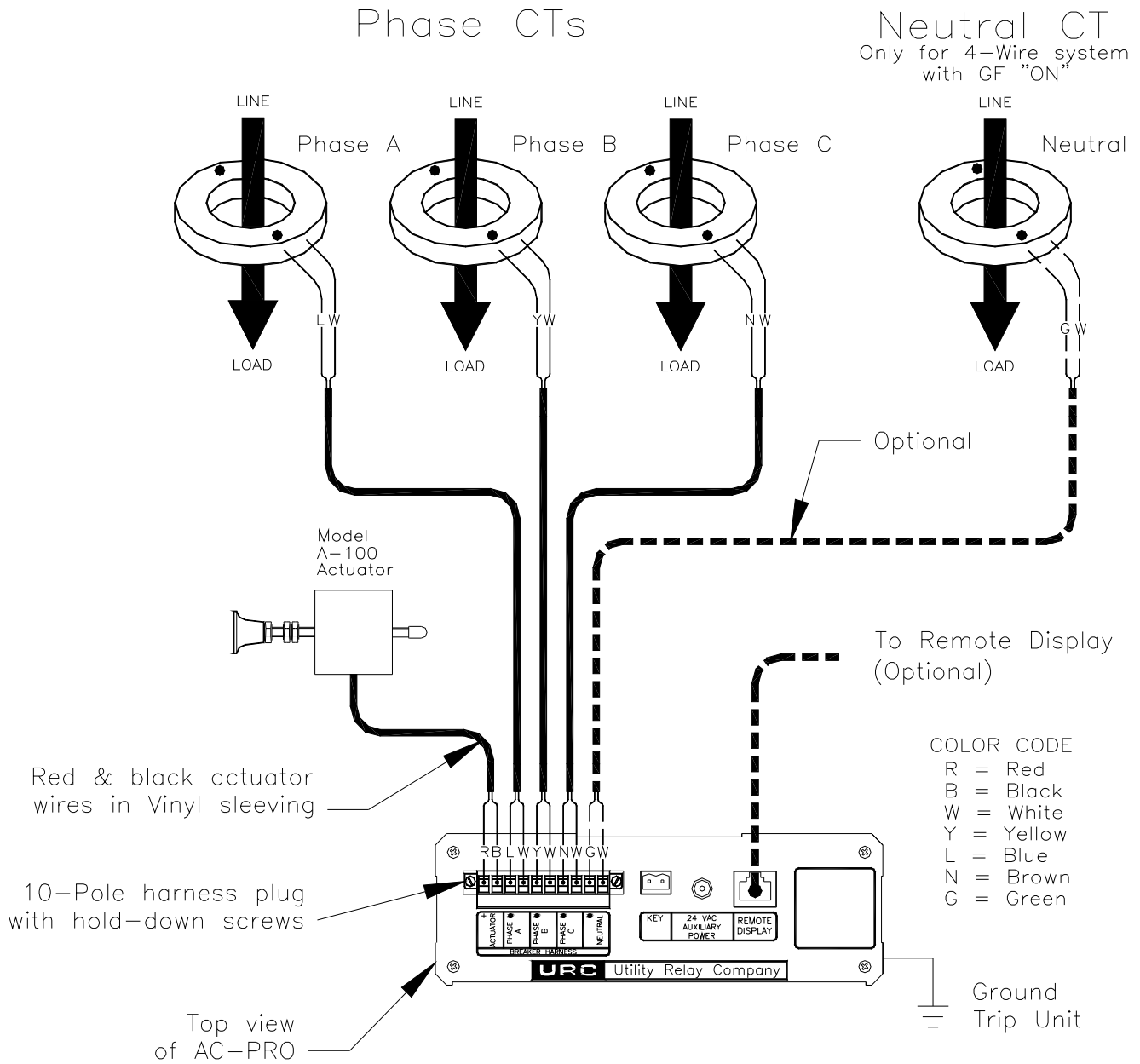


FIGURE 8
Wiring Diagram