

# AC-PRO Retrofit Kit

---

Retrofit Kit Instructions for  
GE

AK-2/2A-15, M/O & E/O

AK-2/2A-25, M/O & E/O

Low Voltage Breaker

Instructions for:

Manual Reset Actuator

Mechanical Reset Actuator

Including Instructions for

AK-2/2A-25, M/O & E/O

AC-PRO<sup>+</sup> Communications

Utility Relay Co.

Chagrin Falls, Ohio 44023

Phone: 888-289-2864 Fax: 440-708-1177

[www.utilityrelay.com](http://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.

Visit [www.utilityrelay.com](http://www.utilityrelay.com) for latest warranty information.

12/02/05

# TABLE OF CONTENTS

	PAGE
Section 1.0	General.....1
1.1	Inspection.....1
2.0	Initial Breaker Tests.....2
3.0	Install Shunts & CTs.....2
3.1	Split the Breaker.....2
3.2	Remove Series Trip Units.....3
3.3	Shunts & CTs AK-2/2A-25.....3
3.4	Shunts & CTs AK-2/2A-15.....4
3.5	Primary Wound CTs.....4
3.6	Shunt/Non-Standard CT Installation.....5
3.7	Shunts & CTs with New Stabs AK-2-15....6
3.8	Replace Operating Mechanism.....6
4.0	Manual Reset Actuator.....7
4.1	Install Trip Paddle.....7
4.2	Install Trip Paddle Reset Spring.....7
4.3	Install Actuator.....8
4.4	Adjust Actuator.....9
5.0	Actuator & Trip Paddle Installation.....10
5.1	Install Actuator & Trip Paddle.....10
5.2	Adjust Actuator.....11
5.3	Install Reset Mechanism.....12
5.4	Adjust Reset Mechanism.....12
6.0	AC-PRO Installation.....13
6.1	Standard Installation.....13
6.2	Alternate Installation.....13
7.0	Wiring.....14
7.1	Color Codes & Connections.....14
7.2	Current Transformer Connections.....15
7.3	Neutral Current Transformer.....15
7.4	Actuator Connection.....15
7.5	Ground Trip Unit.....15
8.0	Final Test.....16
9.0	Communications.....16
9.1	Install PT Module.....16
9.2	Install Fuse Block for PT Module.....16
9.3	Communications Wiring.....17

## ILLUSTRATIONS

### Figure

1	Front View - AK2/2A-25.....	18
2	AK-2/2A-25/Alternate Trip Unit Mounting.....	19
3	Trip Unit Installation.....	20
4	Manual Reset Actuator/Trip Paddle Installation.....	21
5	TEMPLATE: Manual Reset Actuator Bracket.....	22
6	Reset Pin Installation.....	23
7	Mounting Plate Installation.....	24
8	Trip Paddle/Actuator Installation.....	25
9	Actuator Adjustment.....	26
10	Reset Spring Installation.....	27
11	Reset Collar Installation.....	28
12	Actuator/Reset Final Test.....	29
13	Rear View with Fuse Block.....	30
14	Shunt/Standard CT Installation - AK-2/2A-25.....	31
15	Shunt/Standard CT Installation - AK-2/2A-15.....	32
16	100/50A Primary Wound CT Installation.....	33
17	Shunt/Non-Standard CT Installation.....	34
18	CT/Shunt Installation with Communications.....	35
19	Shunt/CT Installation with New Stab - AK-2-15.....	36
20	Wiring Diagram, Primary Polarity Dot Facing "Line" ...	37
21	Wiring Diagram, Primary Polarity Dot Facing "Load" ...	38
22	PT Module Installation.....	39
23	Wiring Diagram for Communications.....	40

GE  
AK-2/2A-15/25

*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 Co. 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 retrofit.

## 2.0 Initial Breaker Tests

Before starting the retrofit, perform a visual/mechanical inspection and an electrical test of the breaker 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 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.
- e) Check for sufficient finger cluster spring tension at the rear stabs.

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

## 3.0 Install Shunts & CTs

### 3.1 Split the Breaker

To facilitate the removal of the existing series trip units and the installation of the shunts and CTs, it is suggested (but not mandatory) that the operating mechanism be removed from the breaker back.

- 1) Remove the arc chute retainer and the three arc chutes.
- 2) Remove the two (2) 1/4-20 Nyloc nuts fastening the top of the mechanism frame to the breaker.
- 3) Remove the long screw holding the two phenolic operating arms and slip the arms off the mechanism pins.
- 4) Remove the remaining screws and nuts holding the mechanism to the breaker back.
- 5) The mechanism can now be removed from the breaker back.

### 3.2 Remove Series Trip Units

On each breaker pole, remove the series trip unit as follows:

- 1) Remove the series trip unit cover by removing the screws on either side of the trip unit.
- 2) Remove the screw located just above the trip coil towards the rear of the breaker.
- 3) Remove the two (2) 3/8-16 H.C. screws from the trip coil.
- 4) The remainder of the series trip unit can now be removed.

### 3.3 Shunt/Standard CT Installation - AK-2/2A-25

Install the copper shunts and CT on each breaker pole as outlined below (See Figures 14 & 18):

- 1) Remove the paper backing from the HW-2910-1 silicone rubber spacer and stick it to the CU-012 top shunt approximately 1" from the bottom as shown in Figures 14 and 18.
- 2) Loosely attach the CU-013 bottom shunt to the right side threaded hole (previously used by the series trip coil) using a 3/8-16 X 1 H.C. screw and lock washer.
- 3) Install the CT and CU-012 top shunt using a CU-015 (CU-015-.875 for communications kits) spacer and a CU-014 (CU-014-1.625 for communications kits) spacer. Use a 3/8-16 X 2 H.C. screw and lock washer in the left side threaded hole (also previously used by the series trip coil) and use a 3/8-16 X 2 1/4 (3/8-16 X 2 1/2 for communications kits) H.C. screw and lock washer at the CT end. Do not fully tighten at this time.
- 4) Fully tighten all hardware after adjusting the position of the shunts from side to side if required.

### 3.4 Shunt/Standard CT Installation - AK-2/2A-15

Install the copper shunts and CT on each breaker pole as outlined below (See Figure 15):

- 1) Remove the paper backing from the HW-2910-1 silicone rubber spacers and stick them to the CU-058 top shunt and the CU-013 bottom shunt approximately 1" from the bottom as shown in Figure 15.
- 2) Loosely attach the CU-013 bottom shunt to the right side threaded hole (previously used by the series trip coil) using a 3/8-16 X 1 H.C. screw and lock washer.
- 3) Loosely assemble the CU-058 top shunt to the CU-059 shunt as shown in Figure 15 using two (2) 5/16-18 X 1 H.C. screws and lock washers.
- 4) Install the CT and CU-058/CU-059 shunt assembly using a CU-015 spacer and a CU-050 spacer. Use a 3/8-16 X 2 H.C. screw and lock washer in the left side threaded hole (also previously used by the series trip coil) and use a 3/8-16 X 2 3/4 H.C. screw and lock washer at the CT end. Do not fully tighten at this time.
- 5) Fully tighten all hardware after adjusting the position of the shunts from side to side if required.

### 3.5 Install Primary Wound CTs

Install the CT on each breaker pole as outlined below (See Figure 16):

- 1) Loosely attach the rear primary CT lead to the breaker using one (1) 3/8-16 X 3/4 H.C. screw, flat washer and lock washer.
- 2) Loosely attach the front primary CT lead to the breaker using one (1) CU-015 spacer, 3/8-16 X 1 3/4 H.C. screw, flat washer and lock washer.
- 3) Bend the primary leads as required to center the CT and securely tighten all hardware.

### 3.6 CT/Shunt Installation - Non-Standard CT's

Install the copper shunts and CT on each breaker pole as outlined below (See Figure 17):

- 1) Loosely attach the CU-013 bottom shunt to the right side threaded hole (previously used by the series trip coil) using a 3/8-16 X 1 H.C. screw and lock washer.
- 2) Install the CT and CU-012 top shunt using a CU-015 spacer and a CU-014 spacer. Use one (1) or two (2) silicone rubber washers as required. Use a 3/8-16 X 2 H.C. screw and lock washer in the left side threaded hole (also previously used by the series trip coil) and use a 3/8-16 X 2 1/4 H.C. screw and lock washer at the CT end. Do not fully tighten at this time.

<b>IMPORTANT:</b> Make sure the silicone rubber washers are not pinched between the spacer and shunt
--

- 3) Fully tighten all hardware after adjusting the position of the shunts from side to side if required.

### 3.7 CT/Shunt Installation With New Stabs - AK-2/2A-15

Install the copper shunts and CT on each breaker pole as outlined below (See Figure 19):

- 1) Loosely attach the CU-170 stab support to the CU-169 stab using two (2) 1/4-20 X 5/8 H.C. screws lock washers and flat washers.
- 2) Loosely attach the CU-171 CT post the CU-169 stab using one (1) 3/8-16 X 1 H.C. screw lock washer and flat washer.
- 3) Trip the HW-2910-1 Silicone rubber spacer as required and stick to the CU-169 stab as shown in Figure 19. Make sure the rubber spacer will not be pinched between the CU-169 stab and CU-171 CT post.
- 4) Slide the CT and the HW-9903 Nylon collar on the CU-171 CT post. The CT should be orientated so the terminals are towards the bottom of the breaker.
- 5) Loosely attach the CT/Shunt assembly to the breaker using one (1) 1/4-20 X 3/4 R.H. screw and one (1) 3/8-16 X 1 1/4 H.C. screw lock washers and flat washers.
- 6) After verifying that the CU-169 stab is "square" with the breaker and all the copper shunt pieces are properly aligned, firmly tighten the hardware.
- 7) Rotate the CT so that the terminals are pointing forward and push the HW-9903 Nylon collar down while tightening the collar set screw. The CT should be held firmly in place without chafing against the CU-169 stab.

### 3.8 Replace Operating Mechanism

- 1) Before replacing the operating mechanism, cut off the lower portion of the "B" phase trip paddle to avoid interference with the "B" phase shunts.
- 2) Replace the operating mechanism on the breaker back using the previously removed hardware.

#### *4.0 Manual Reset Actuator*

Skip this Section and go to Section 5 if the mechanical reset actuator will be installed.

#### *4.1 Install Trip Paddle*

See Figures 2 & 4 for the following:

- 1) Remove the "A" & "C" phase trip paddles from the trip bar.
- 2) Attach the BR-214-1 trip paddle to the trip bar using the BR-215 trip bar clamp and (2) 8-32 X 3/8 Phillips screws and lock washers. Do not tighten the screws at this time.

#### *4.2 Trip Paddle Reset Spring*

In some cases it is necessary to install a reset spring to counteract the weight of the trip paddle. See Figure 4 for the following:

- 1) Attach a T-105-1 #8 lug to the lower 8-32 X 3/8 Phillips screw attaching the BR-214-1 trip paddle to the BR-215 clamp.
- 2) Bend the end of the lug upward and attach one end of the reset spring to the lug.
- 3) Drill a 1/8 hole in the upper flange of the frame and hook the other of the spring through the hole.

The spring should give the trip paddle a positive rebound.

### 4.3 Install Actuator

See Figures 2 & 4 for the following:

- 1) Using the template from Figure 5, drill and tap two (2) 1/4-20 holes in the right side of the mechanism frame.
- 2) Attach the BR-123 actuator bracket to the mechanism frame using two (2) 1/4-20 X 1/2 H.C. screws and lock washers.
- 3) Remove the vinyl tip from the actuator rod and replace it with the HW-9903-3 clamp-on-collar as shown in Figures 2 and 4.
- 4) Adjust the HW-9903-3 clamp-on-collar flush with the end of the actuator rod and tighten the clamp screw on the clamp-on-collar.
- 5) Remove the reset knob from the A-100 actuator and attach the actuator to bracket BR-123 using three (3) 10-32 X 3/8 R.H. screws and lock washers.
- 6) Screw the reset knob onto the end of the actuator shaft and lock in place with a 1/4-20 jam nut.
- 7) Adjust the location of the trip paddle so the end of the actuator rod is in line with the flag on the trip paddle. Fully tighten the trip bar clamp screws.

**IMPORTANT:** Make sure the trip paddle is not in line with the rotating plastic end piece on the contact shaft.

If the rotating end piece hits the trip paddle as the breaker is closing, the breaker will trip free.

#### 4.4 Adjust Actuator

- 1) With the breaker closed, and the actuator reset, adjust the position of the actuator rod by screwing it in or out until the clamp-on collar is about 1/64" from the trip paddle.
- 2) Trip the breaker. Trip the actuator by striking the reset knob. Lock the actuator rod in position by tightening the 10-32 set screw with an Allen wrench.
- 3) As an initial adjust, adjust the stop nuts for 1/2" travel.
- 4) With the actuator reset, close the breaker. If the breaker will not close because the actuator rod is interfering with the trip paddle, re-adjust the position of the actuator rod.
- 5) Operate the actuator by lightly striking the reset knob. The breaker should trip. Verify that the trip paddle is not against its limit of travel.
- 6) Attempt to close the breaker without resetting the actuator. The breaker should trip free, if not, increase the actuator rod travel.
- 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 Mechanical Reset Actuator & Trip Paddle Installation

Skip Section 5 if the manual reset actuator was installed in Section 4.

### 5.1 Install Actuator & Trip Paddle

See Figures 6, 7 and 8 for the following:

- 1) Step 1, Figure 6.  
If the breaker is equipped with X and Y relays temporarily remove them to provide clearance for the actuator/trip paddle installation.
- 2) Step 2, Figure 6.  
Drill and tap the existing hole for a 10-32 screw.
- 3) Step 3, Figure 6.  
Install the BR-1A012 reset pin in the right operating link.

If the breaker has a bushing it should be replaced.

If the breaker doesn't have a bushing, the existing hole must be opened to 7/16 diameter.

- 4) Step 1, Figure 7.  
Attach the BR-1A008 mounting plate to the breaker using:  
  
One HW-0302-4, #10 X 1/4 spacer and 10-32 X 5/8 Phillips screw and lock washer in the previously taped hole.  
  
One HW-0202-4, #8 X 1/4 spacer and 8-36 X 7/8 Phillips screw and lock washer in the existing tapped hole.
- 5) Step 1, Figure 8.  
Attach the BR-214 trip paddle to the trip bar using the BR-215 trip bar clamp and (2) 8-32 X 3/8 Phillips screws and lock washers. Do not tighten the screws at this time.
- 6) Step 2, Figure 8.  
Attach the actuator assembly to the BR-1A008 mounting plate using two (2) 10-32 X 1/2 Phillips screws flat washers and lock washers.



### 5.3 Install Reset Mechanism

See Figures 10, 11 and 12 for the following:

- 1) Steps 1 & 2, Figure 10.  
Slide the trip paddle away from the actuator then close the breaker.
- 2) Step 3, Figure 10.  
Sandwich the torsion spring between two (2) BR-1A010 spring keepers.
- 3) Step 4, Figure 10.  
Attach the torsion spring assembly to the BR-1A008 mounting plate using a 1/4-20 X 1 1/4 R.H. screw and lock washer. The loop in the torsion spring must be over the BR-1A012 reset pin.
- 4) Steps 1 & 2, Figure 11.  
With the actuator in the trip position, slide the HW-9921 set screw collar onto the end of the torsion spring arm until it is against the actuator collar and tighten the set screw to lock it in position.

### 5.4 Adjust the Reset Mechanism

- 1) Step 3, Figure 11.  
Open the breaker and verify that the actuator reset.
- 2) Step 4, Figure 11.  
Close the breaker and verify the actuator remains reset. If the actuator does not remain reset, adjust the location of the HW-9921 set screw collar and re-check for trip free operation.
- 3) Step 1, Figure 12.  
Adjust the location of the trip paddle so that it is in line with the actuator rod. Fully tighten the trip bar clamp screws.
- 4) Step 2, Figure 12.  
Reinstall the X and Y relays and verify trip and reset operation several times by closing the breaker and firing the actuator with a 9 Volt battery.

## 6.0 Install Trip Unit

### 6.1 Standard Installation

See Figures 1 & 3 for the following:

- 1) Attach the BR-027 shield and the BR-014 bracket to the back of the trip unit using two (2) 8-32 X 3/8 Phillips screws and lock washers.

The BR-014 bracket should be between the back of the trip unit and the BR-027 shield.

- 2) Ground the trip unit as described in Section 7.5.
- 3) Mount the trip unit on the arc chute support bar by loosening the support bar captive nuts.

### 6.2 Alternate Installation

See Figures 2 & 3 for the following:

- 1) Attach the BR-027 shield and the BR-014 bracket to the back of the trip unit using two (2) 8-32 X 3/8 Phillips screws and lock washers.

The BR-027 shield should be between the back of the trip unit and the BR-014 bracket.

- 2) Mount the trip unit on the arc chute support bar by loosening the left support bar captive nut.
- 3) Ground the trip unit as described in Section 7.5.
- 4) Using the existing hole in the BR-014 bracket and in the arc chute support, mount the trip unit bracket with one (1) 10-32 x 1/4 PHS, LW and hex nut as shown in Figure 2.

## 7.0 Wiring

Use the wiring harness provided to make the connections to the CTs and the actuator. See Figure 20 or 21 for the wiring diagram.

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.

### 7.1 Color Codes and Connections

For CTs oriented with the primary polarity dot facing the "line", the wiring harness connector color code and connections are as follows from left to right (See Figure 20):

<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)

For CTs oriented with the primary polarity dot facing the "load", the wiring harness connector color code and connections are as follows from left to right (See Figure 21):

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

## 7.2 *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.

## 7.3 *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.

## 7.4 *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.

## 7.5 *Ground Trip Unit*

Ground the trip unit as follows: (See Figure 3)

- 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.

## 8.0 Final Test

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

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

## 9.0 Communications

The following instructions are for the communications option using the AC-PRO<sup>+</sup>:

### 9.1 Install PT Module

The PT Module mounts on the bottom front of the breaker as shown in Figure 22.

- 1) Attach the PT Module using the two center, lower holes in the breaker back. Use two (2) HW-0205-4, 5/8 long spacers and two (2) 8-32 X 1 Phillips screws and lock washers.

*Verify that the two (2) 8-32 X 1 screws will not penetrate more than 3/16" into the PT Module case.*

- 2) Attach the BR-712 shield using two (2) 8-32 X 3/8 Phillips screws, flat washers and lock washers.

### 9.2 Install Fuse Block for PT Module

Install the fuse block on the back of the breaker as follows:

- 1) Mount the BR-304-1 fuse block bracket on the back of the breaker frame on the ends of two (2) existing 1/4-20 screws. See Figure 13.
- 2) Attach the 3-pole fuse block to the BR-304-1 bracket with two (2) 8-32 X 3/8 P.H. screws and lock washers.

### 9.3 Communications Wiring

See figure 23 for the following:

A) Voltage Input

Determine the line side of the breaker and drill and tap a 10-32 hole in the three line side poles.

Use #14 SIS wire from the bus taps to the 3-pole fuse block. *It is very important to maintain the proper phasing.*

Use #18 MTW wire from the 3-pole fuse block to the PT Module. Use mesh sleeving to protect the wires.

B) Ground Input

Connect a #18 MTW wire from the "Ground" terminal of the PT Module to the breaker frame.

C) PT Module Harness

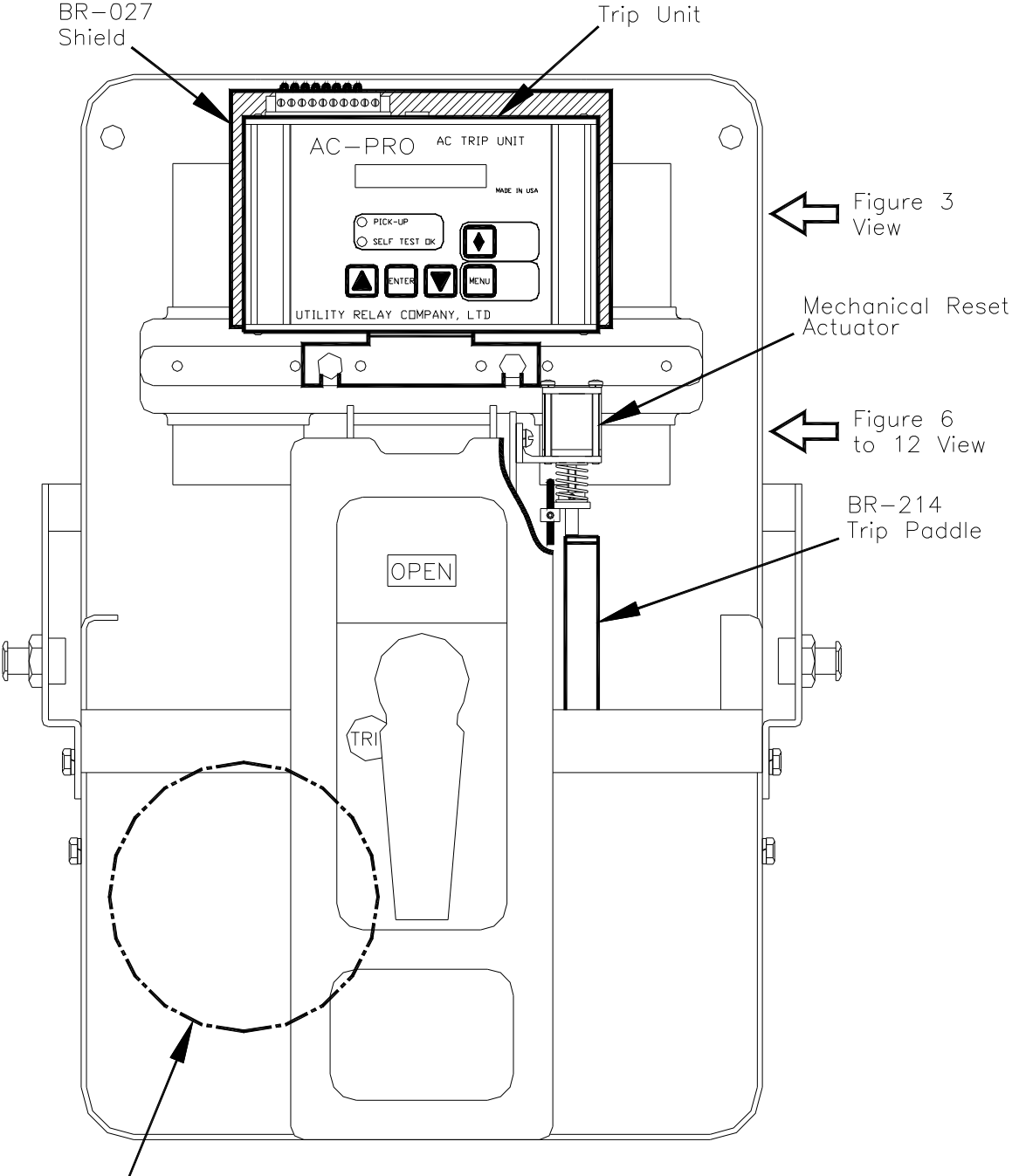
Plug the PT Module cable into the bottom of the AC-PRO<sup>+</sup> trip unit and the PT Module.

Use cable ties and holders to make a clean installation.

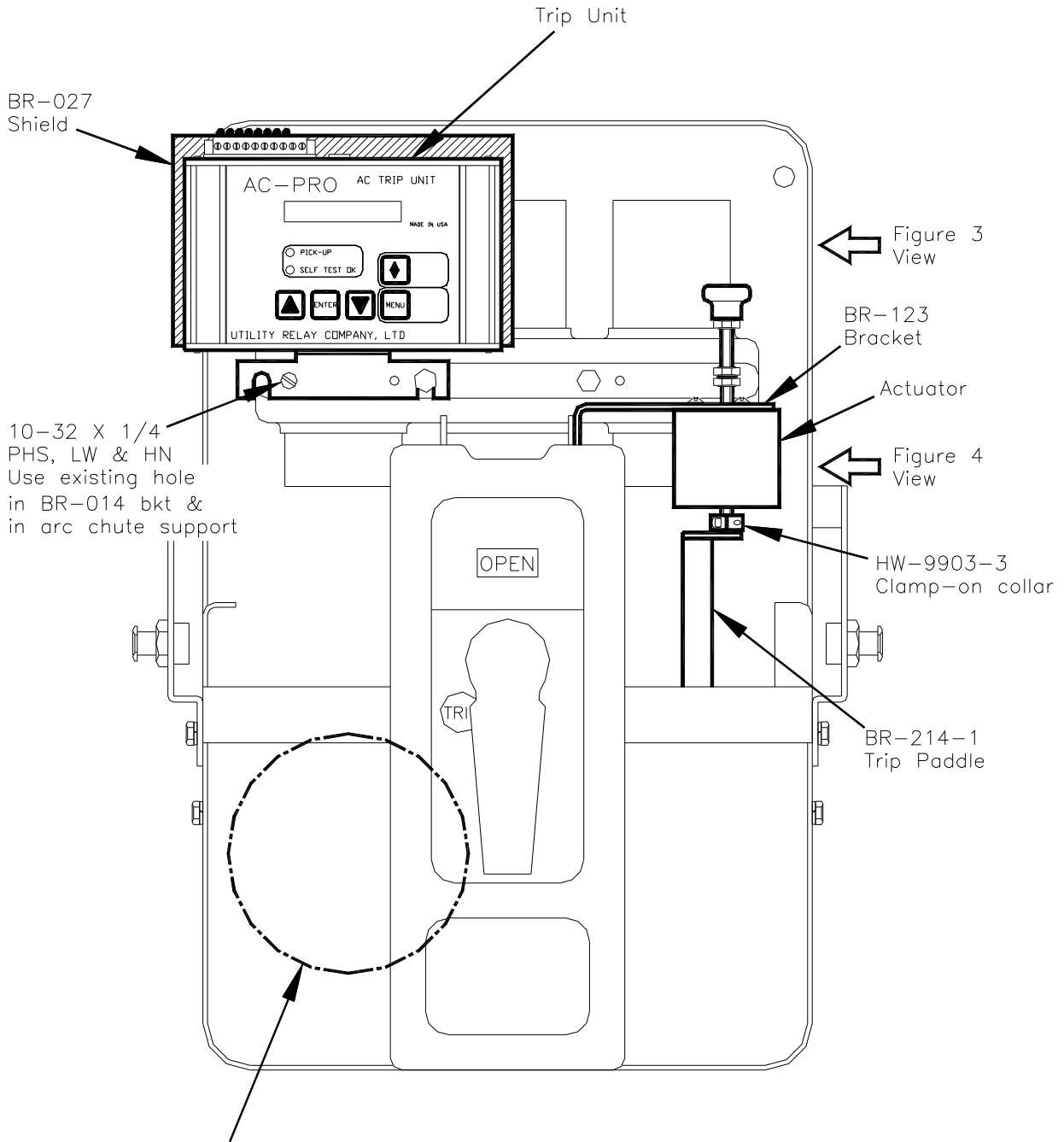
D) Breaker Position Indication

As an option, connect an unused "a" contact in the breaker auxiliary contacts to the two position input terminals on the PT Module.

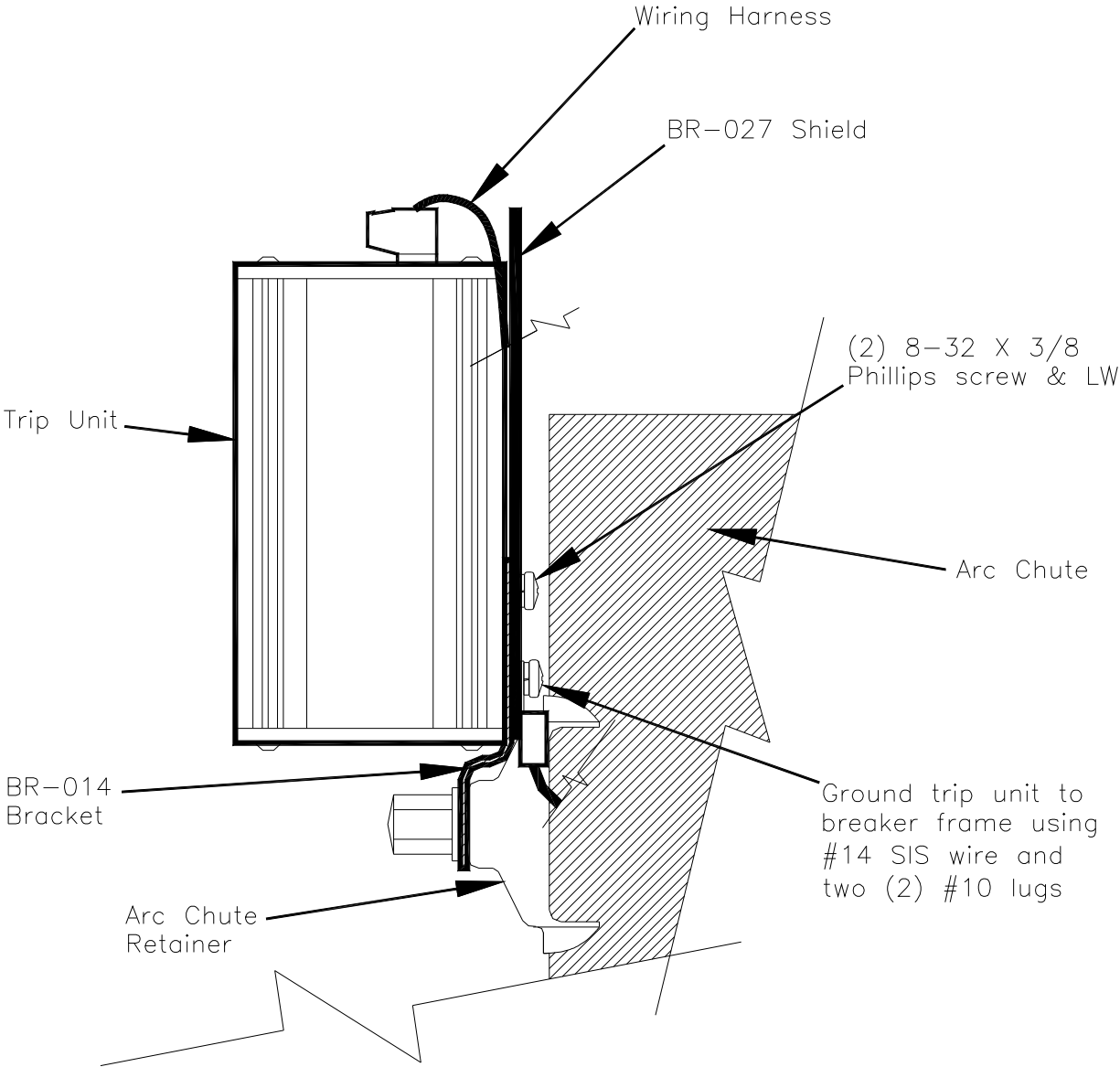
This will provide the breaker open or closed information to the communications system.



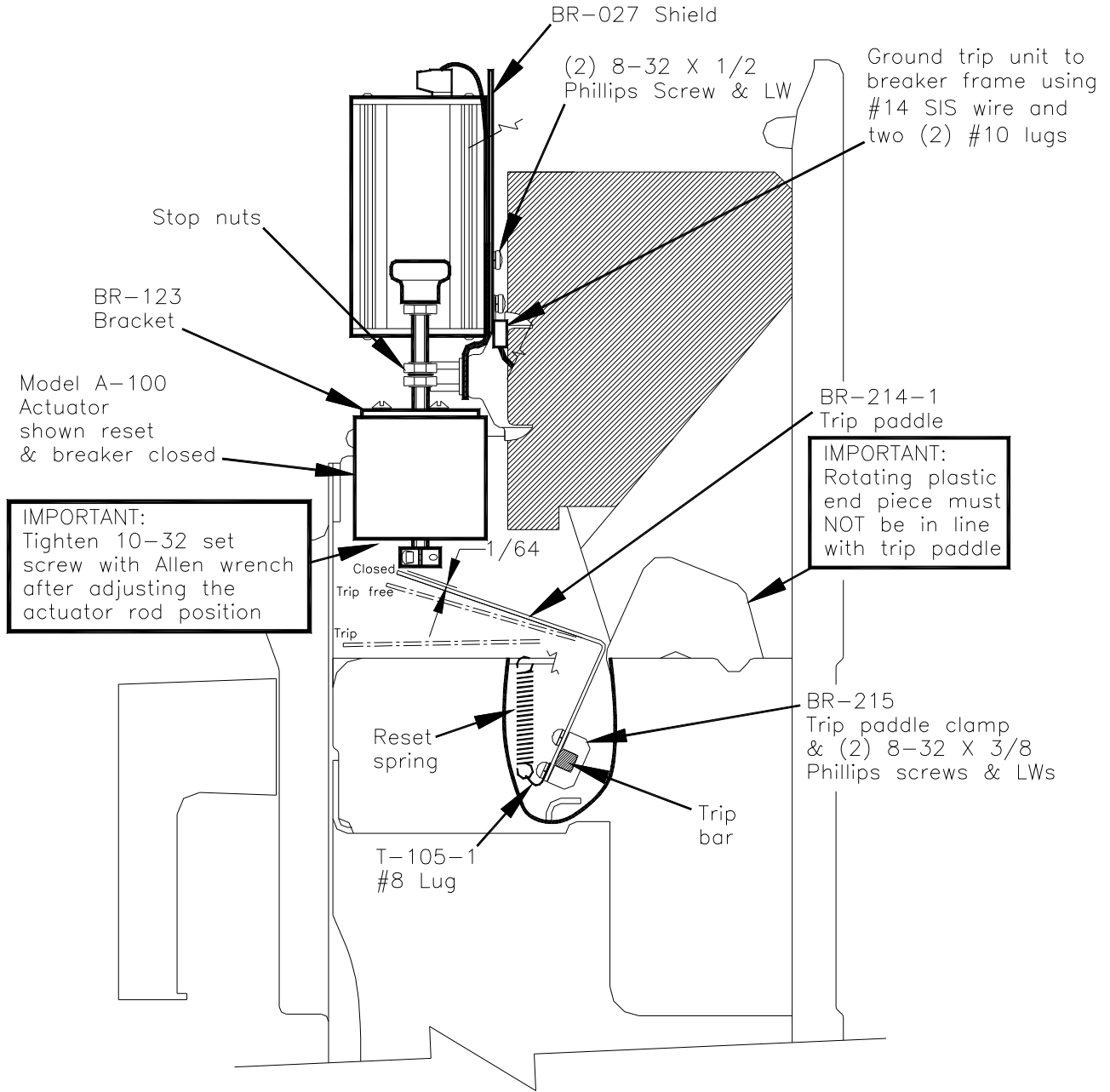
**FIGURE 1**  
**AK-2/2A-25**  
**Front View/Mechanical Reset Actuator**



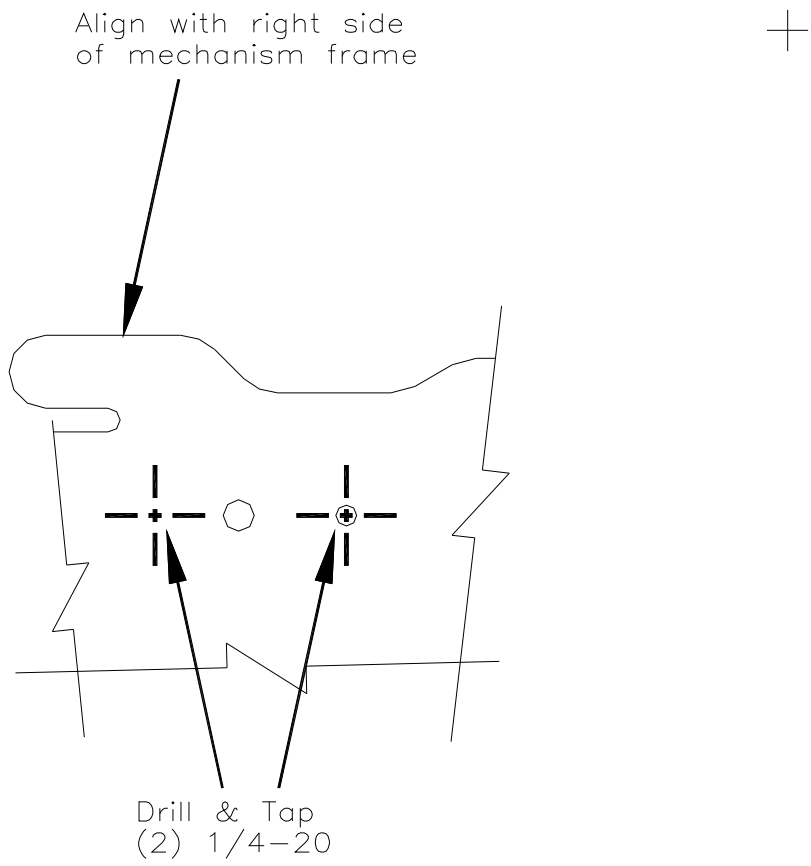
**FIGURE 2**  
**AK-2/2A-25**  
**Alternate Trip Unit Mounting/Manual Reset Actuator**



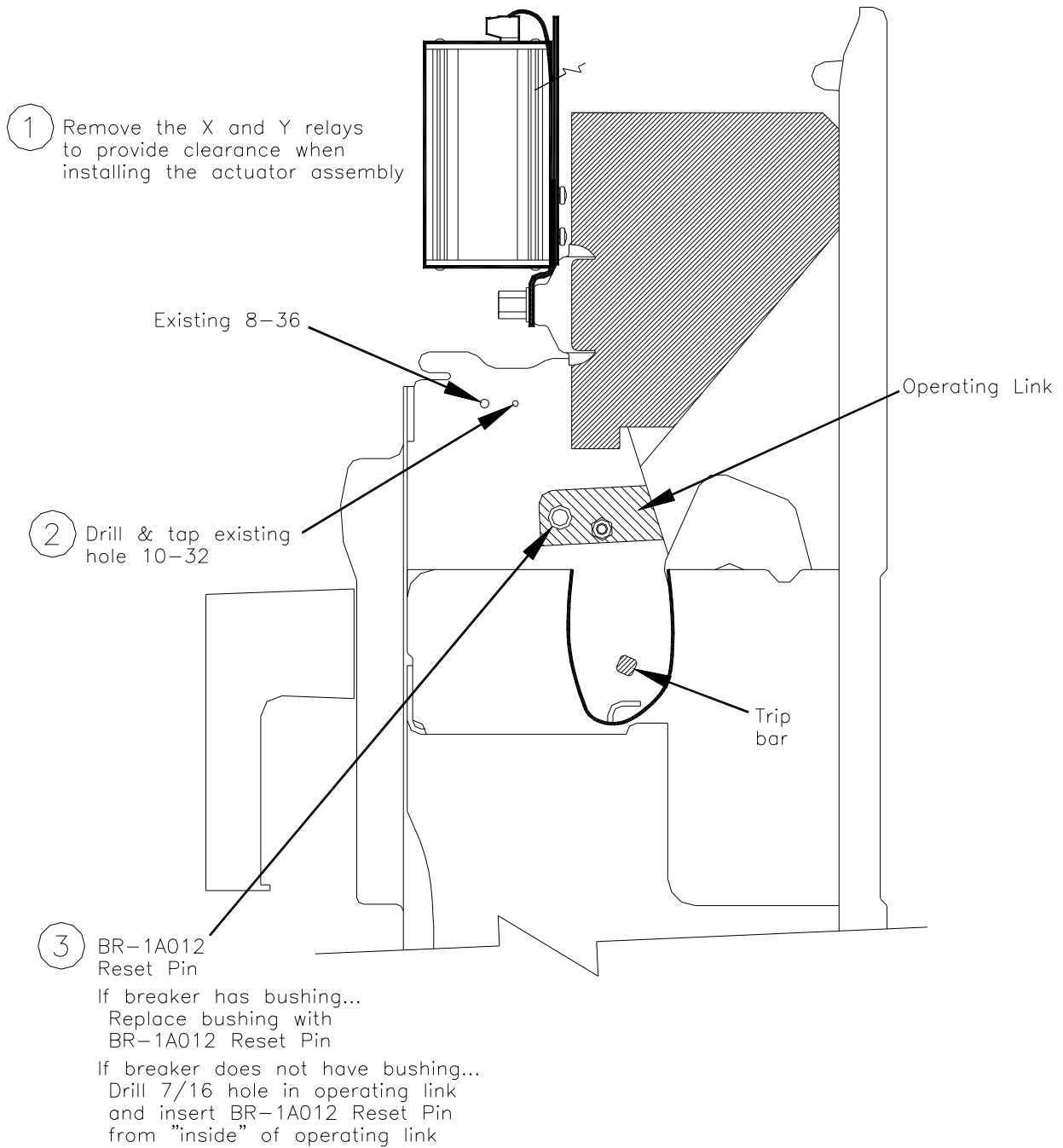
View of right side



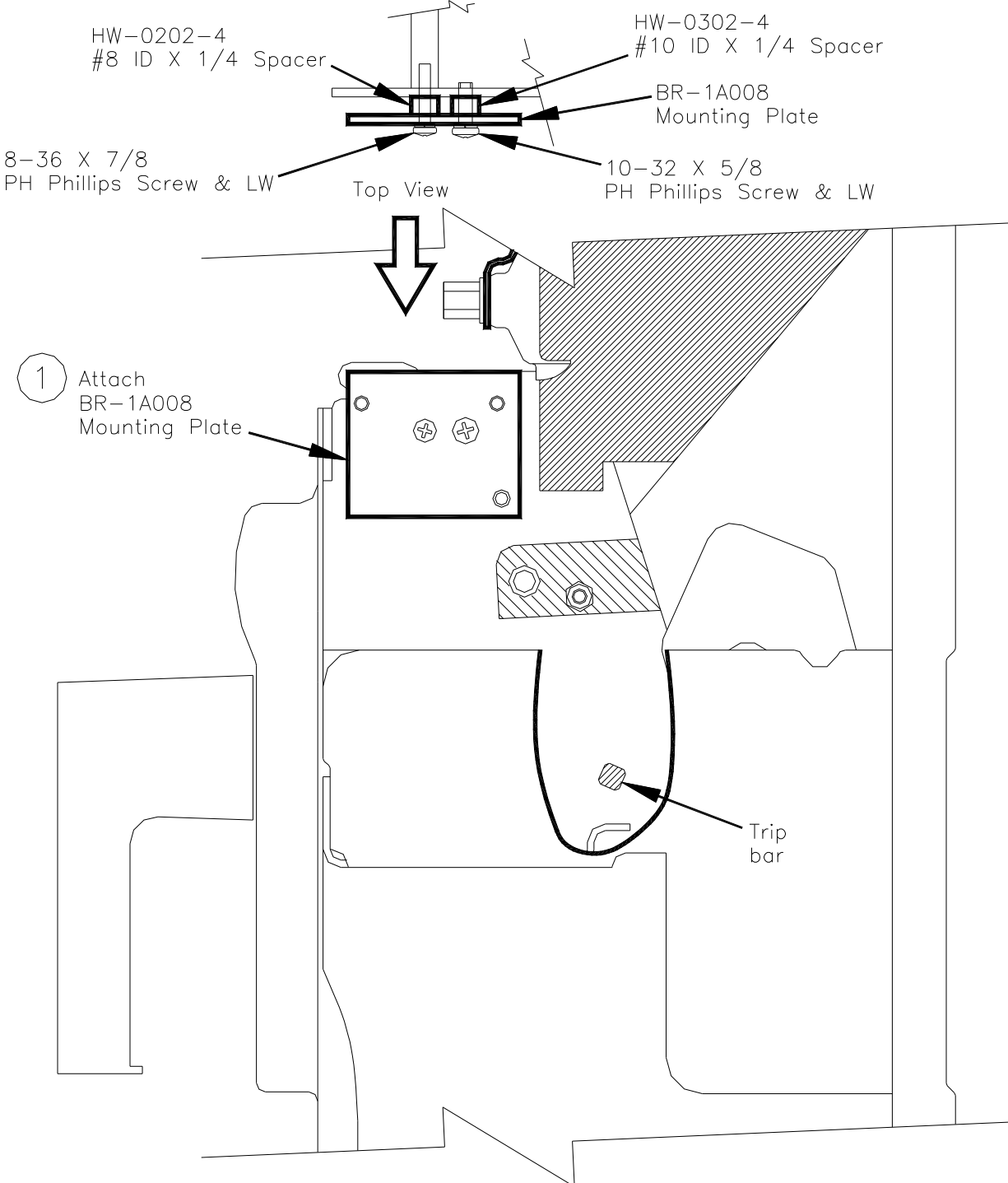
**FIGURE 4**  
**Manual Reset Actuator/Trip Paddle Installation**  
 Page 21



**FIGURE 5**  
**TEMPLATE: Manual Reset Actuator Bracket**



**FIGURE 6**  
**Reset Pin Installation/Mechanical Reset Actuator**



**FIGURE 7**  
**Mounting Plate Installation/Mechanical Reset Actuator**  
Page 24

2 Attach actuator assembly to BR-1A008 mounting plate. With actuator reset, adjust position so actuator rod touches trip paddle with breaker closed.

A-300-AK-2-25  
Actuator Assembly

(2) 10-32 X 1/2  
PH Phillips Screw, FW & LW

BR-215  
Trip paddle clamp  
& (2) 8-32 X 3/8  
Phillips screws & LWs

Trip bar

BR-214  
Trip Paddle

1 Remove the existing "A" & "C" phase trip paddles from the trip bar.

Attach trip paddle to trip bar.  
Do not fully tighten at this time.

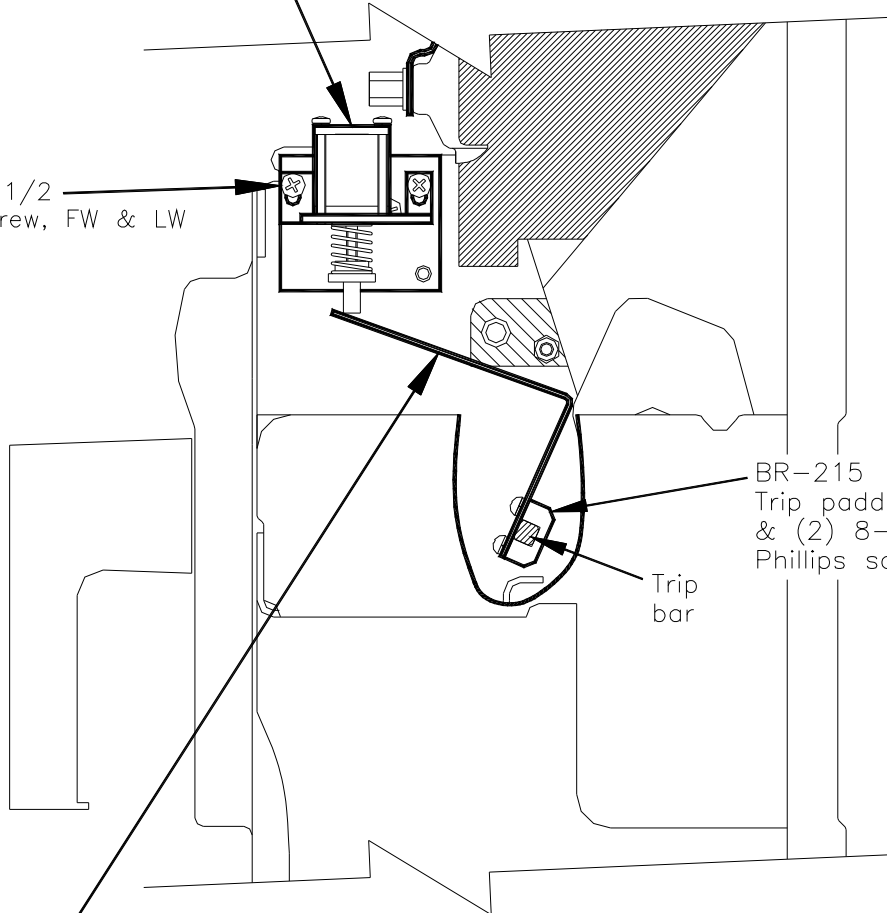


FIGURE 8

Trip Paddle/Mechanical Reset Actuator Installation

- 1 Verify trip free operation by trying to close the breaker with the actuator in the trip position. The breaker should NOT close.

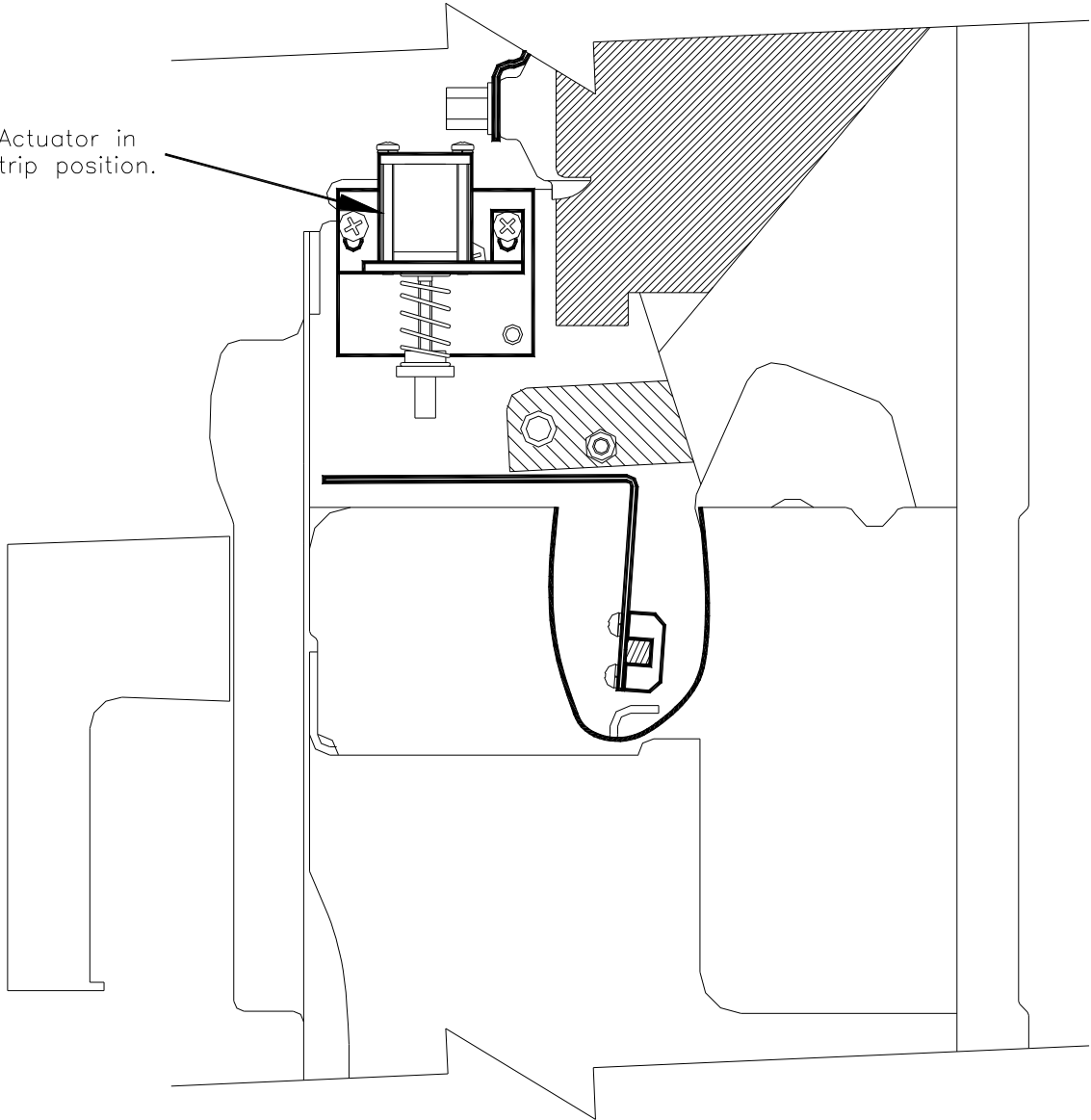
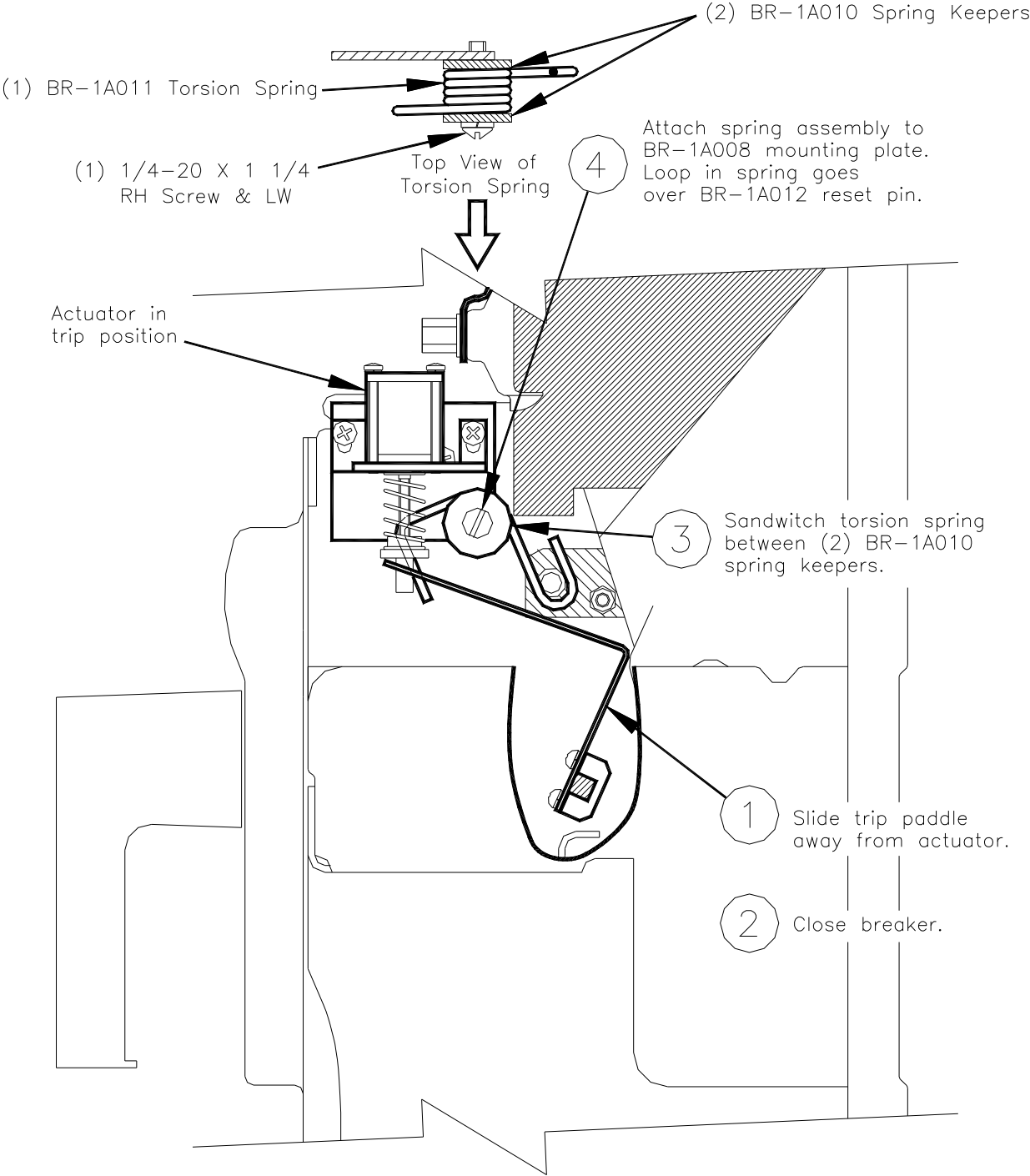
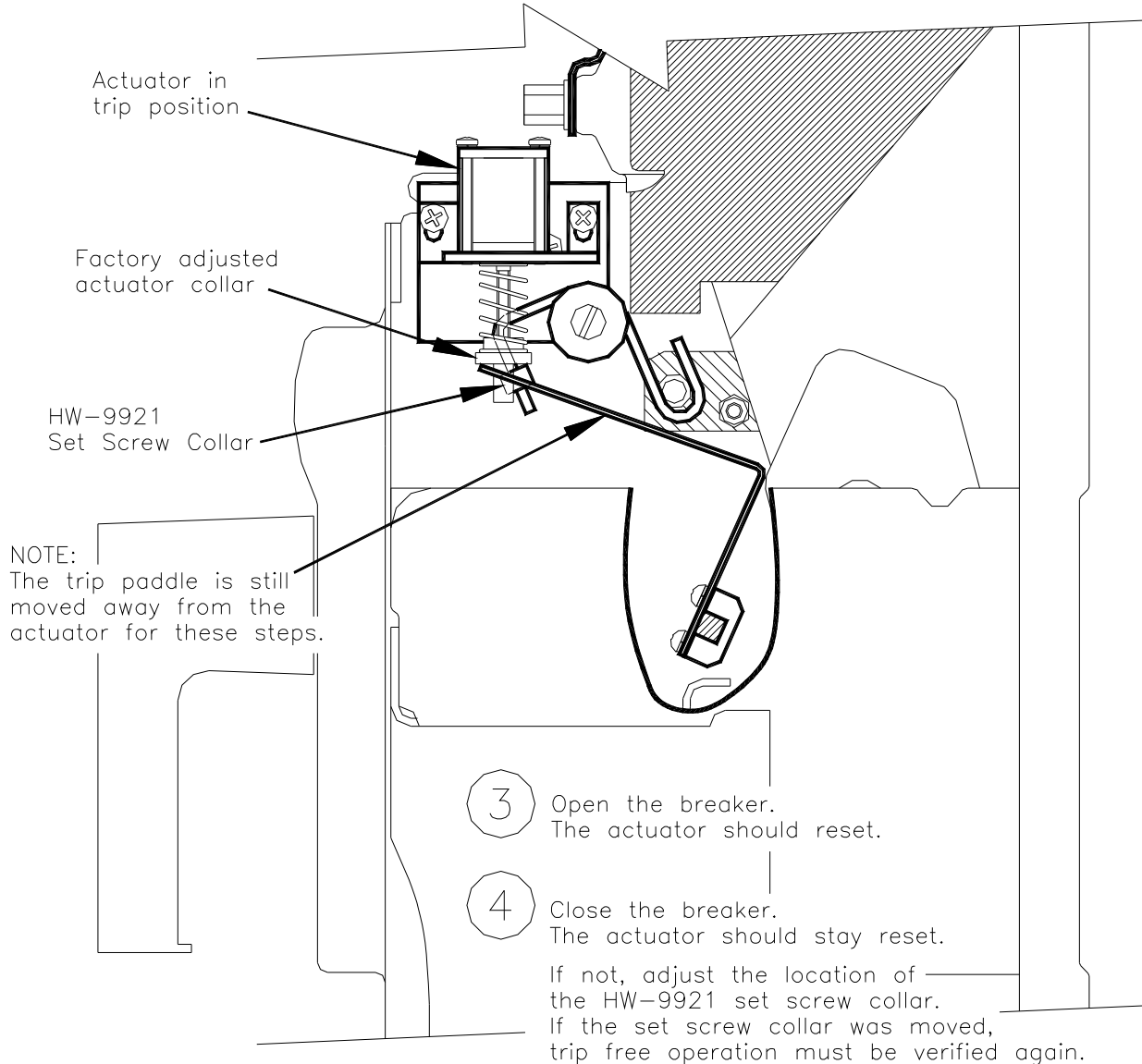


FIGURE 9  
Actuator Adjustment/Mechanical Reset Actuator  
Page 26



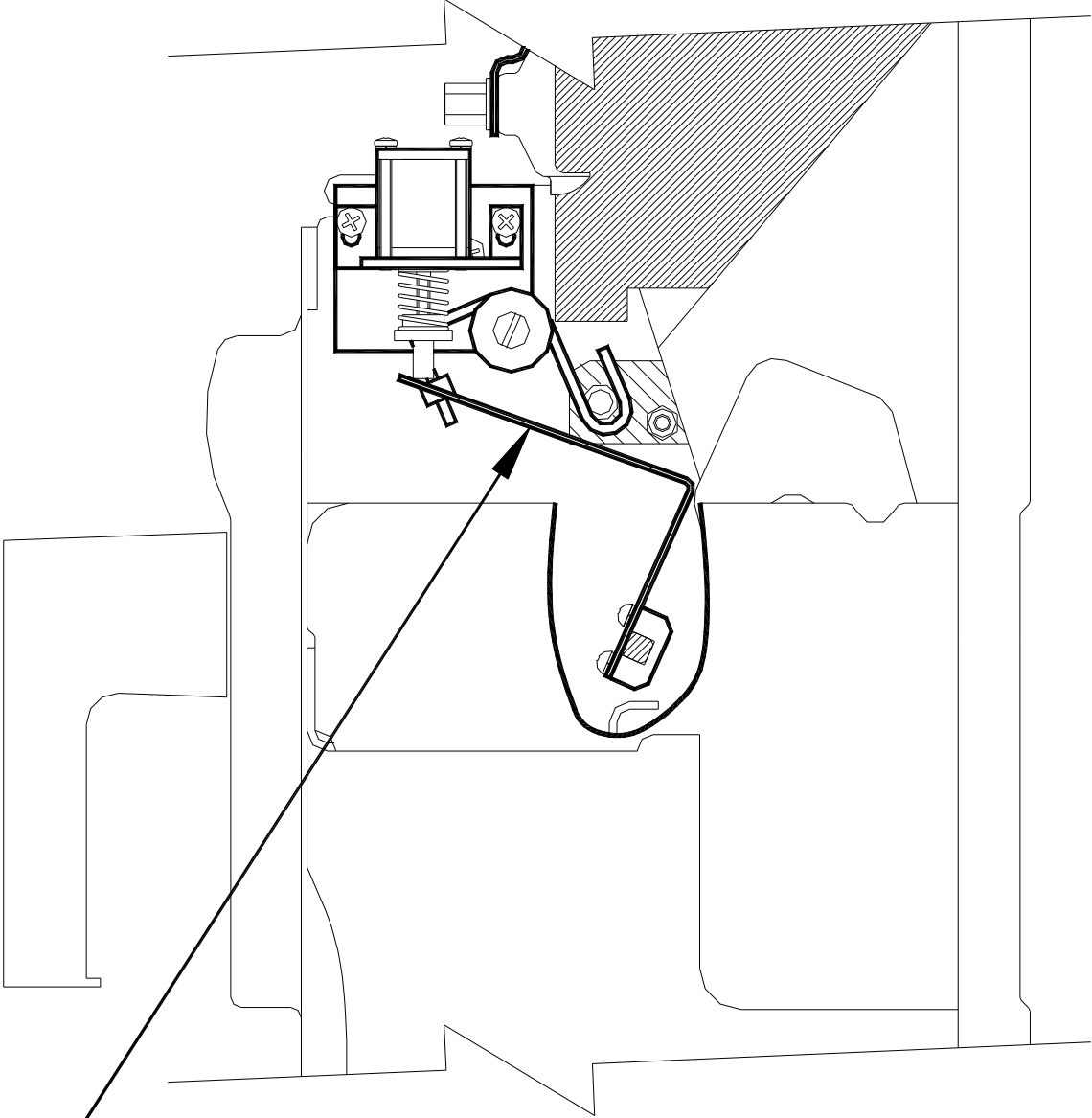
**FIGURE 10**  
**Reset Spring Installation/Mechanical Reset Actuator**

- 1 With actuator in trip position, slide the HW-9921 set screw collar onto the end of the spring arm.
- 2 With the HW-9921 collar against the actuator collar, firmly tighten the set screw to lock it in position.



**FIGURE 11**  
**Reset Collar Installation/Mechanical Reset Actuator**  
Page 28

2 After re-installing the X and Y relays, verify trip and reset operation several times by closing the breaker and firing the actuator with a 9 Volt battery.

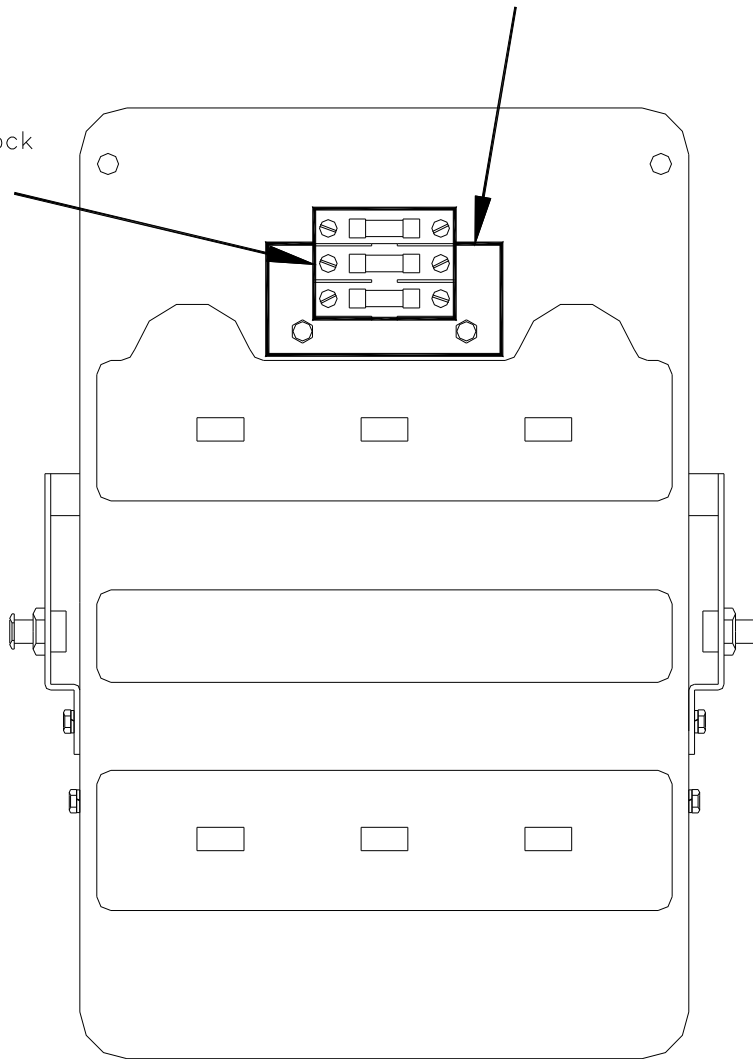


1 Slide trip paddle back into proper position and firmly tighten hardware.

**FIGURE 12**  
**Actuator/Reset Final Test/Mechanical Reset Actuator**

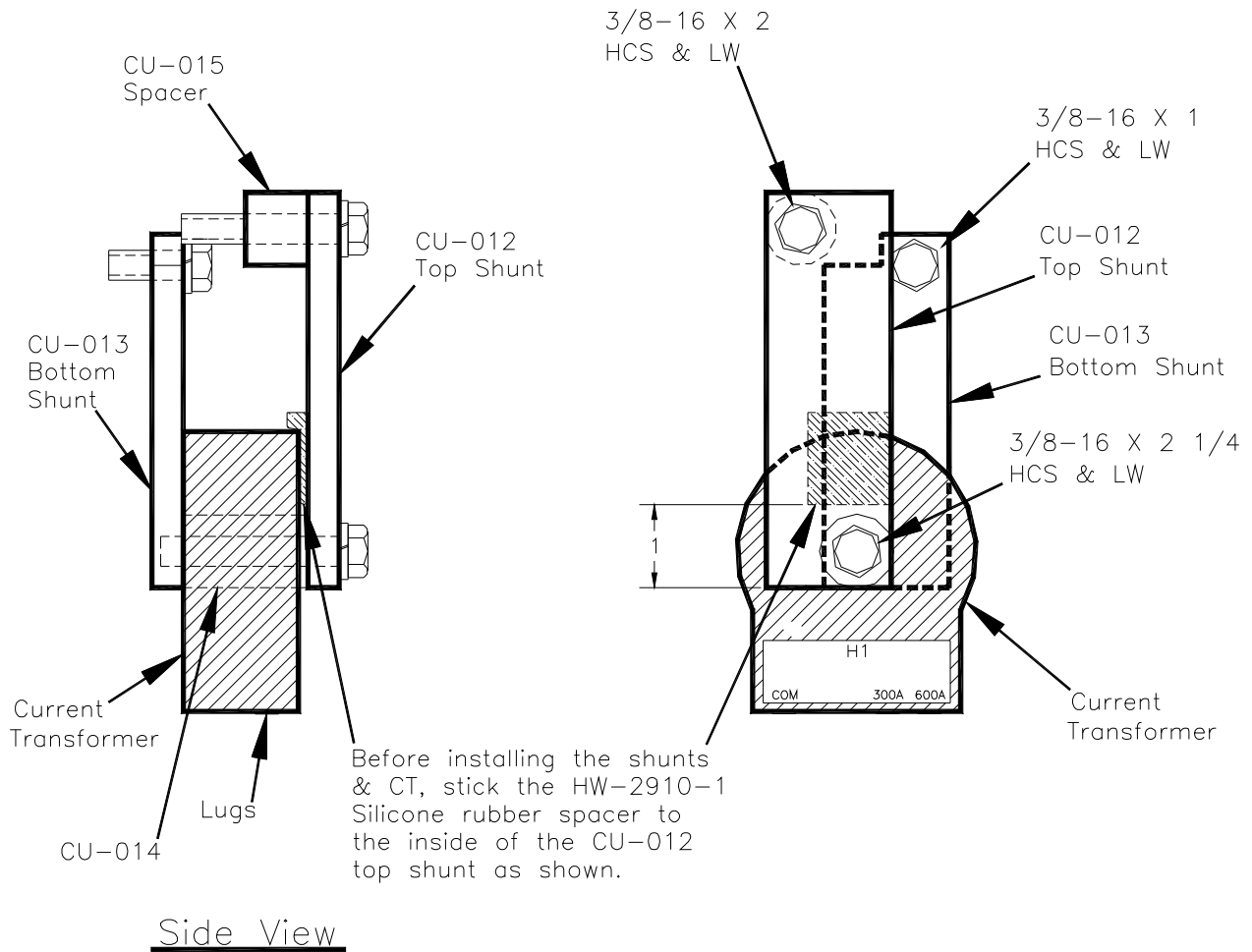
BR-304-2 Fuse block bracket  
Mount using:  
(2) 1/4-20 Hex couplers  
(2) 1/4-20 X 1/2 H.C. screw  
(4) 1/4 LW

3-Pole fuse block  
for PT Module  
Communications

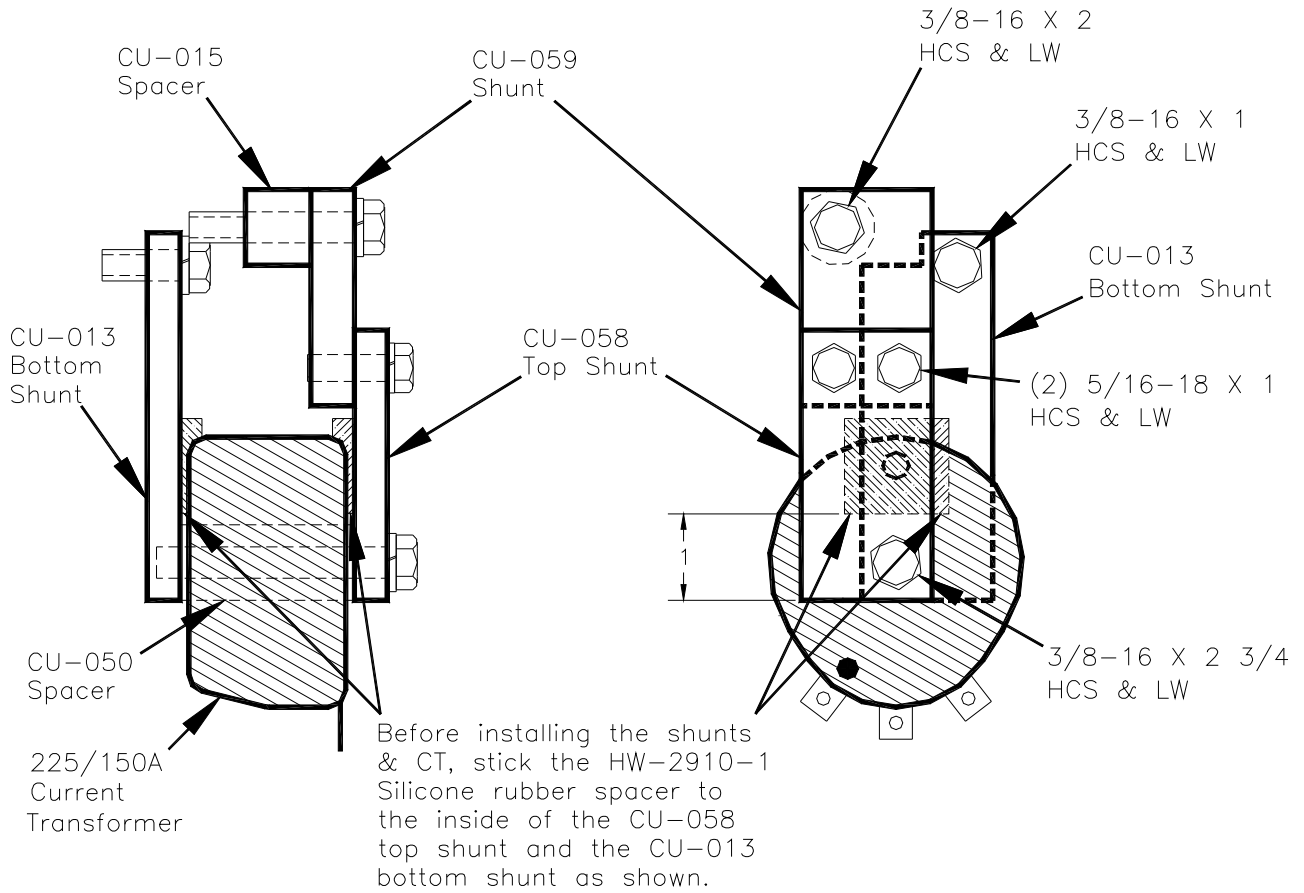


NOTE:  
On E/O breakers, mount the  
fuse block directly to the bottom  
of the secondary contact bracket brace.

**FIGURE 13**  
**Rear View with Fuse Block**

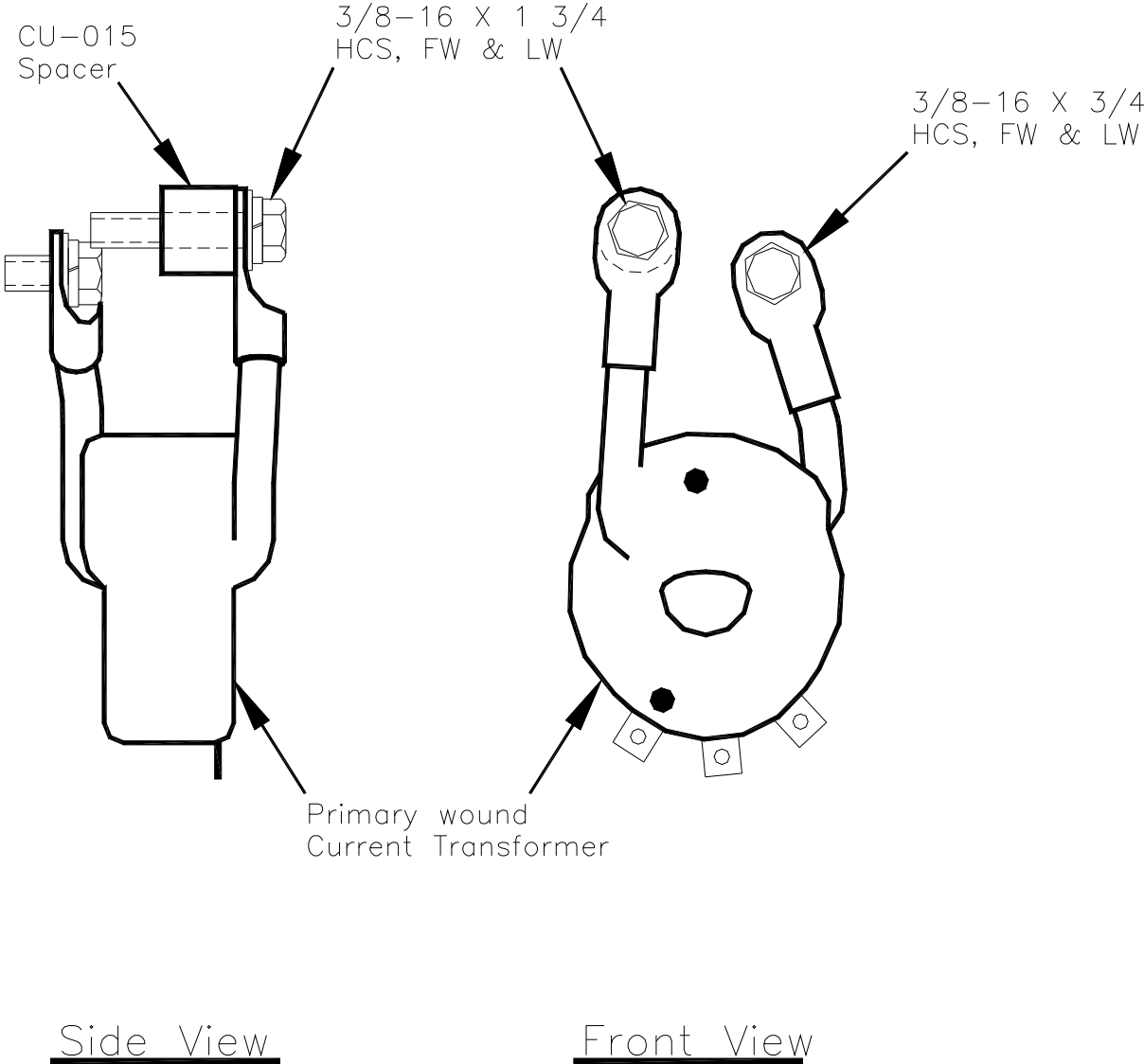


**FIGURE 14**  
**AK-2/2A-25 Shunt/Standard CT Installation**

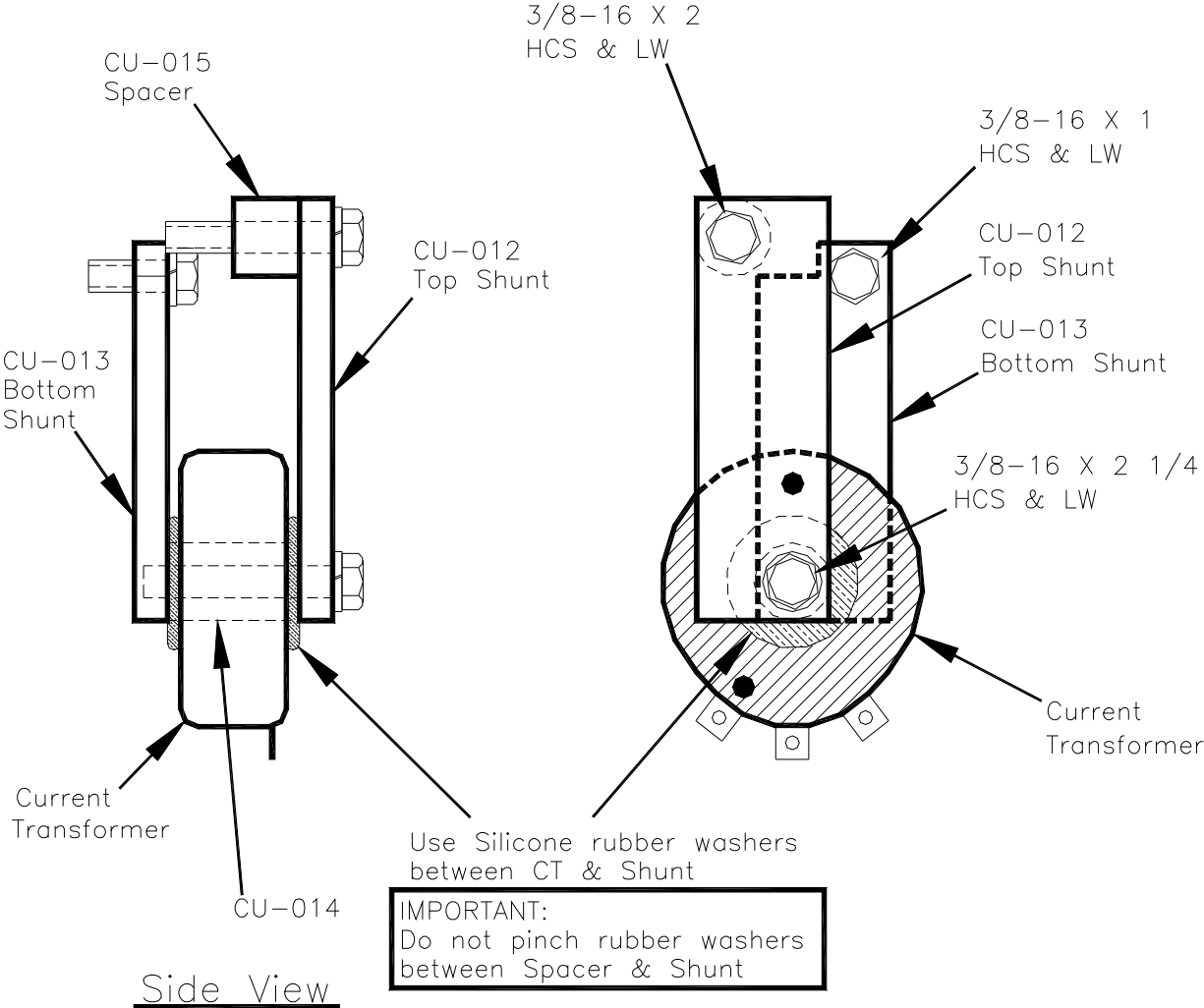


Side View

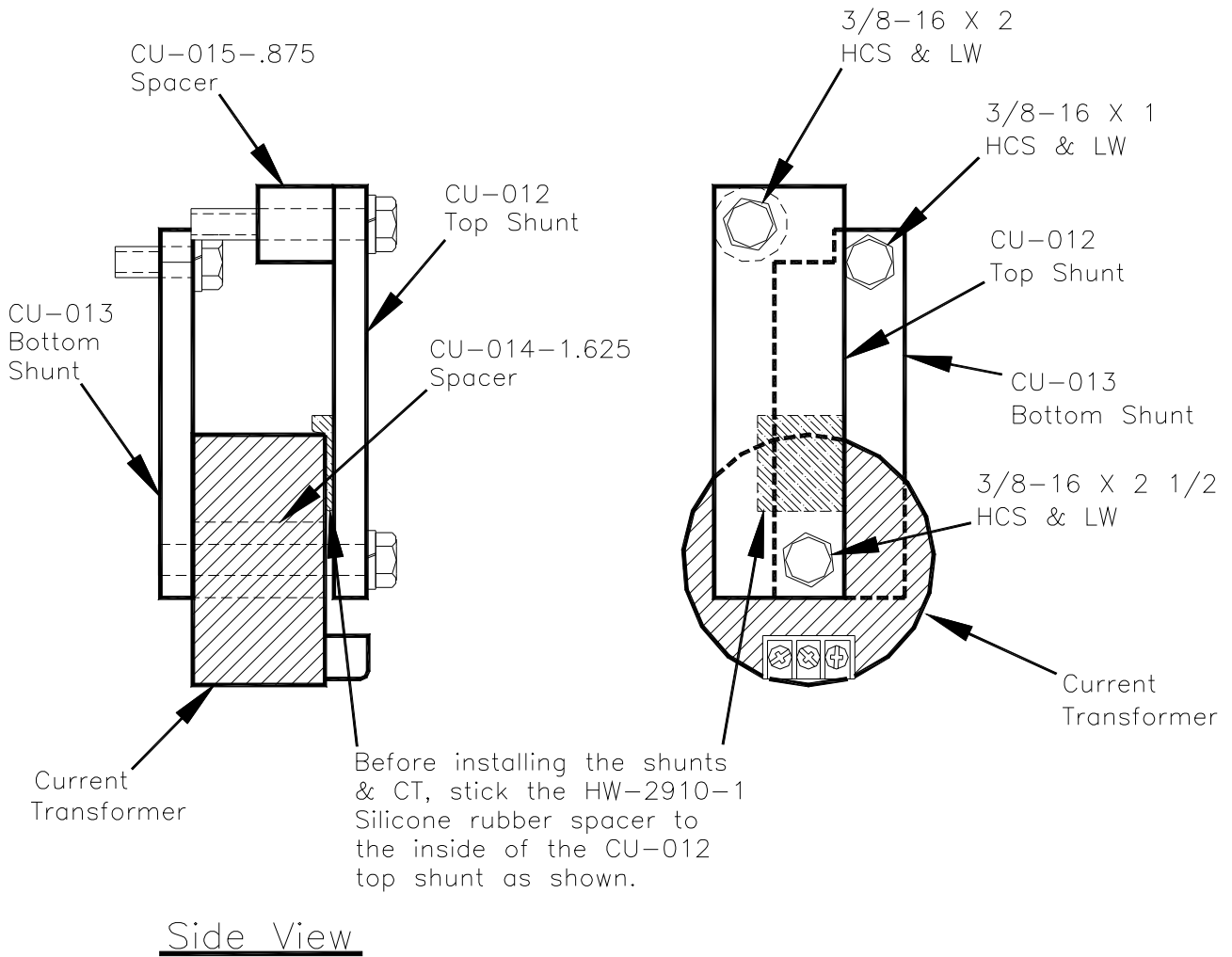
**FIGURE 15**  
**AK-2/2A-15 Shunt/Standard CT Installation**



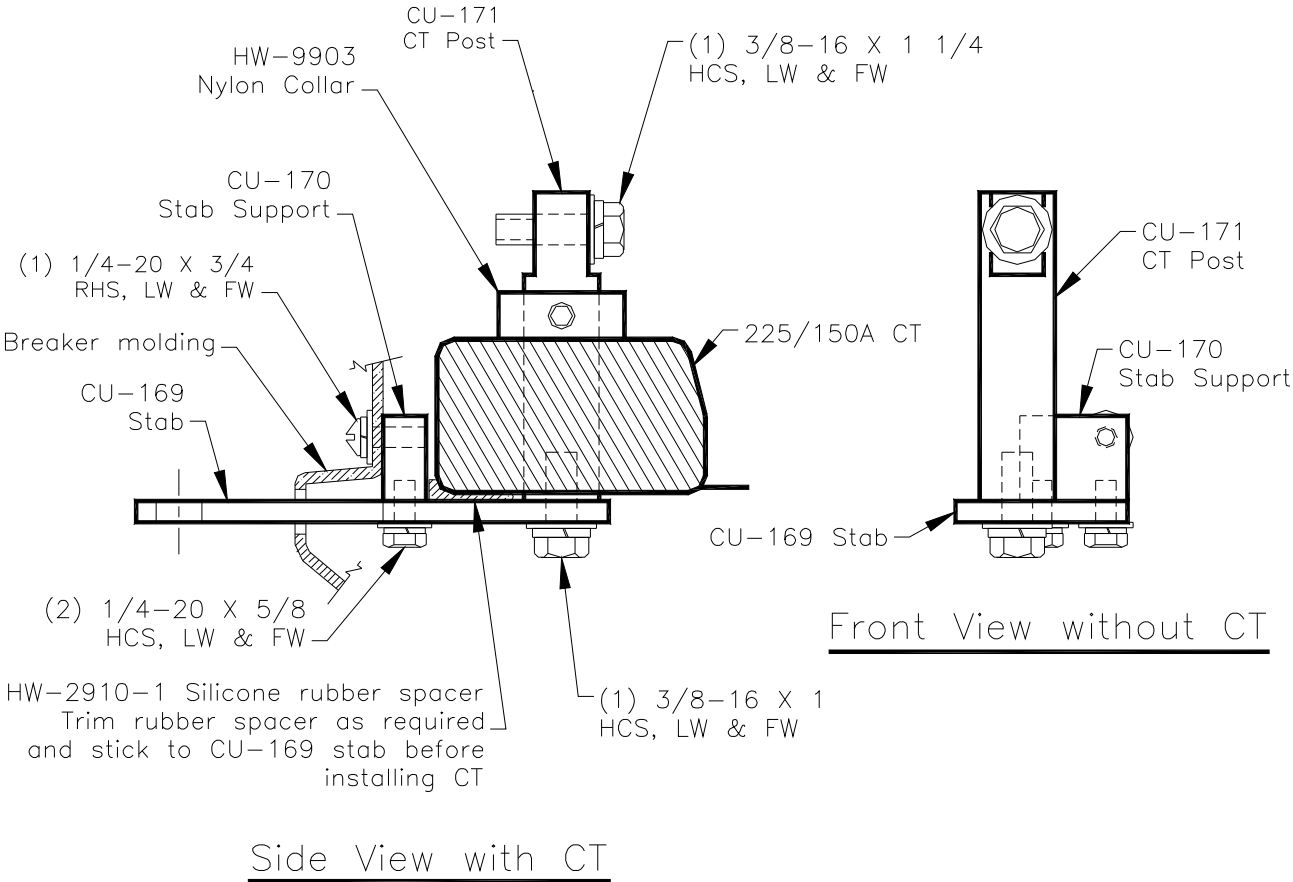
**FIGURE 16**  
**100/50A Primary Wound CT Installation**  
**Page 33**



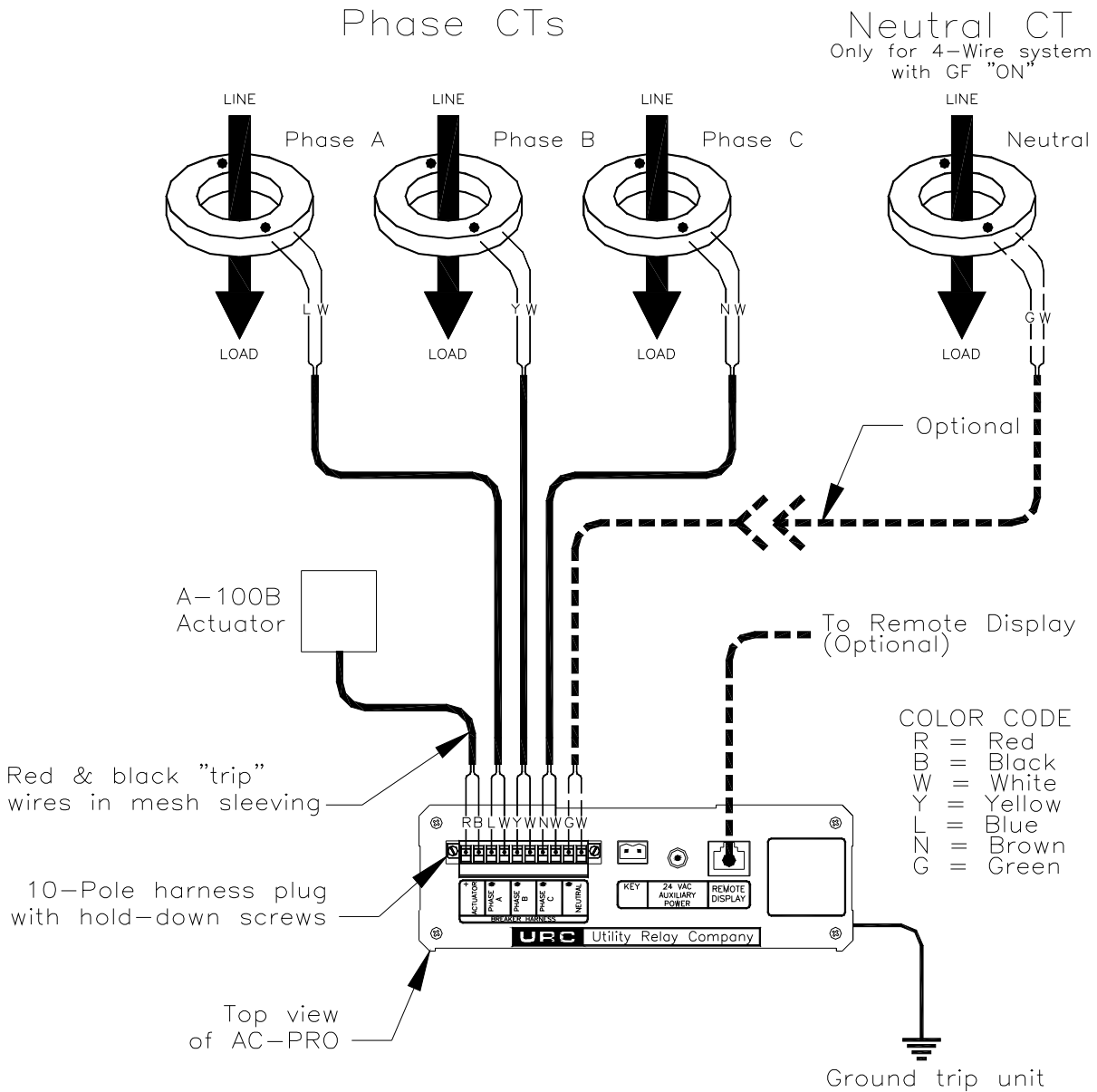
**FIGURE 17**  
**AK-2/2A-25 Shunt/Non-Standard CT Installation**



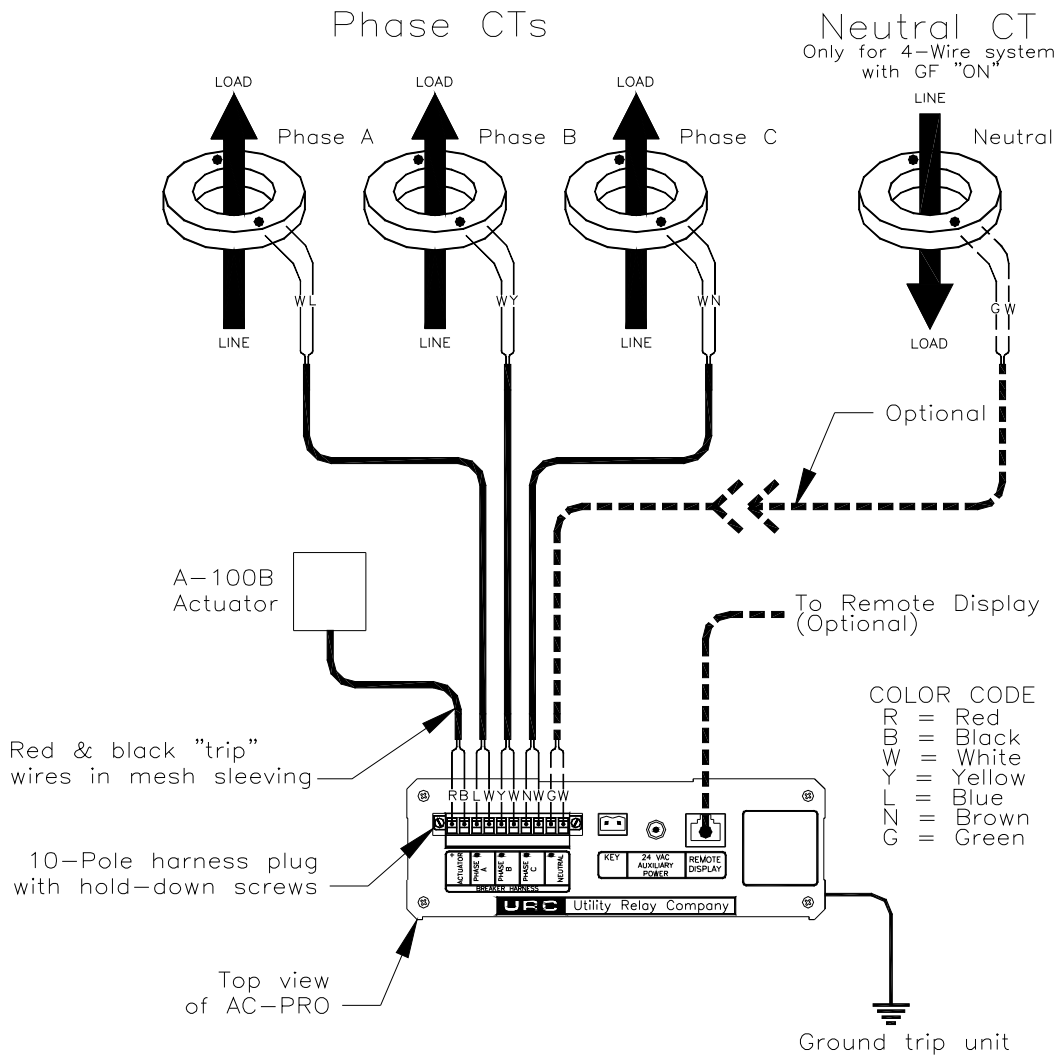
**FIGURE 18**  
**Shunt Installation**  
**AK-2/2A-25 CT with AC-PRO+ Communications**



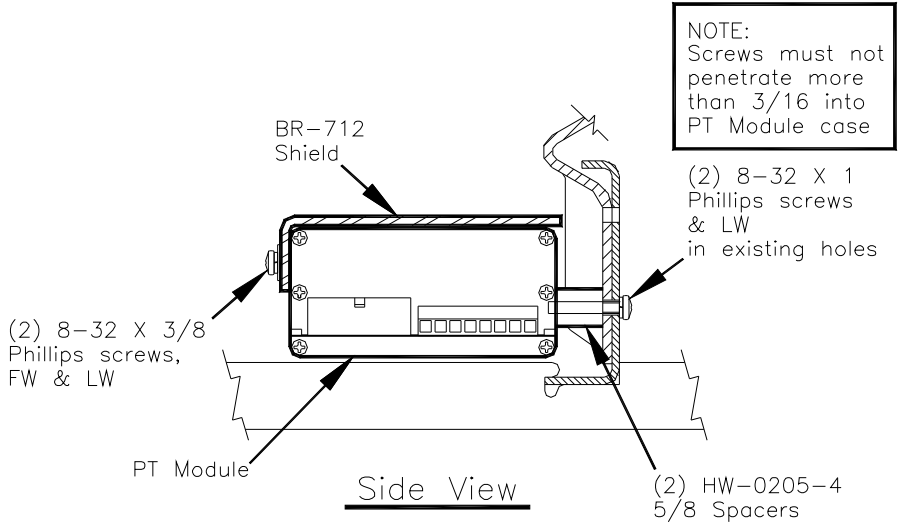
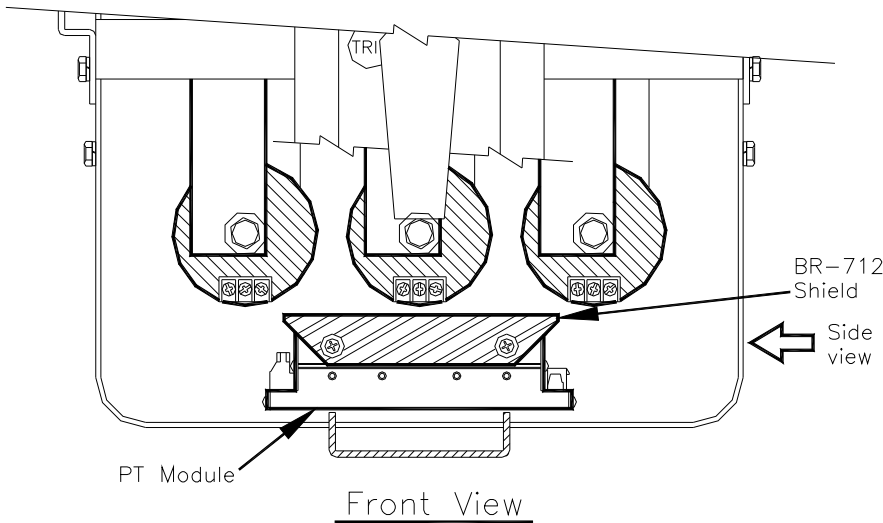
**FIGURE 19**  
**AK-2/2A-15 Standard CT/Shunt with New Stab Installation**



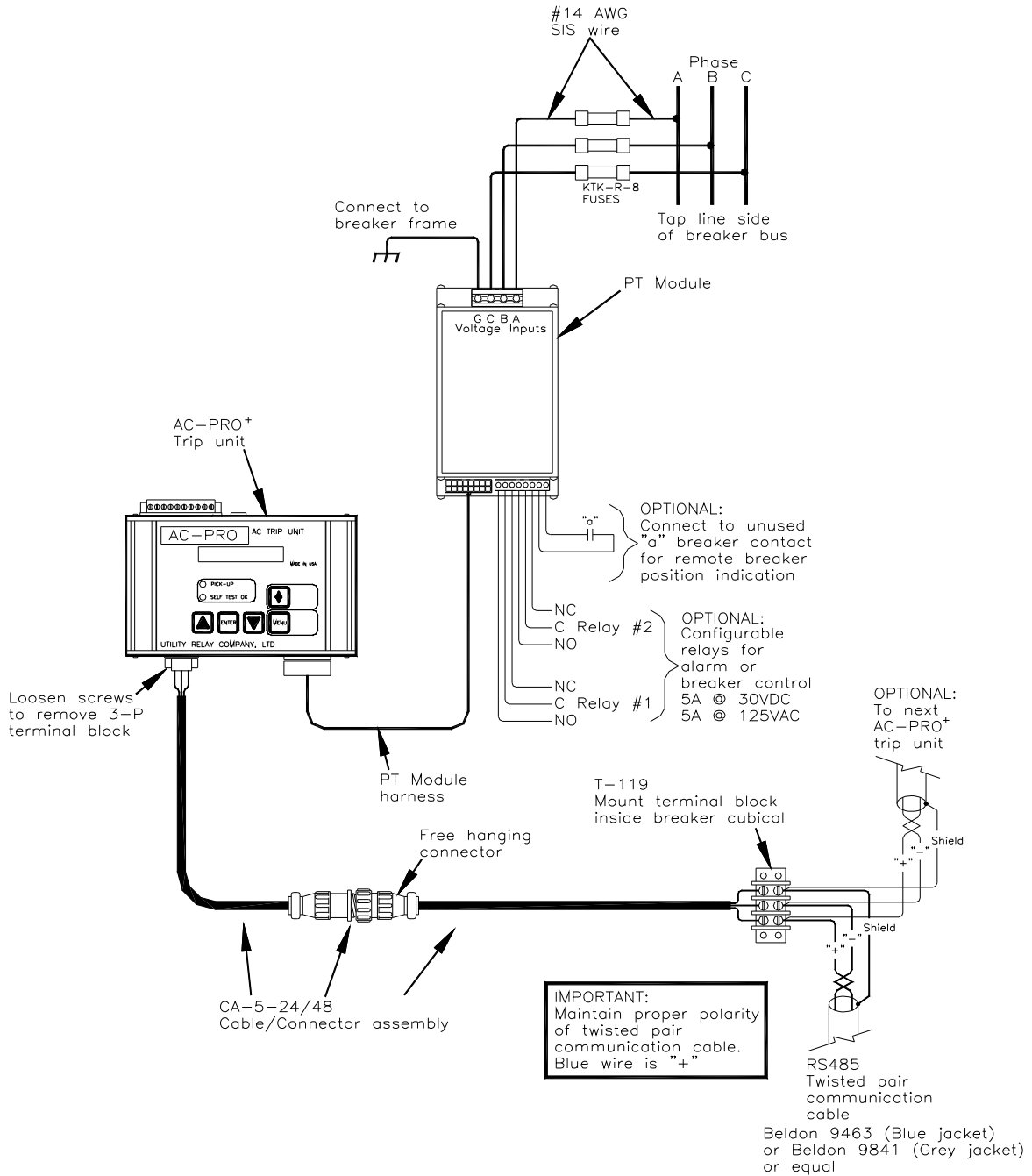
**FIGURE 20**  
**Standard Wiring Diagram**  
**With Primary Polarity Dot Facing "Line"**



**FIGURE 21**  
**Non-Standard Wiring Diagram**  
**With Primary Polarity Dot Facing "Load"**



**FIGURE 22**  
**AK-2/2A-25**  
**PT Module Installation**  
 Page 39



**FIGURE 23**  
**Wiring Diagram**  
**AC-PRO+ Communications**