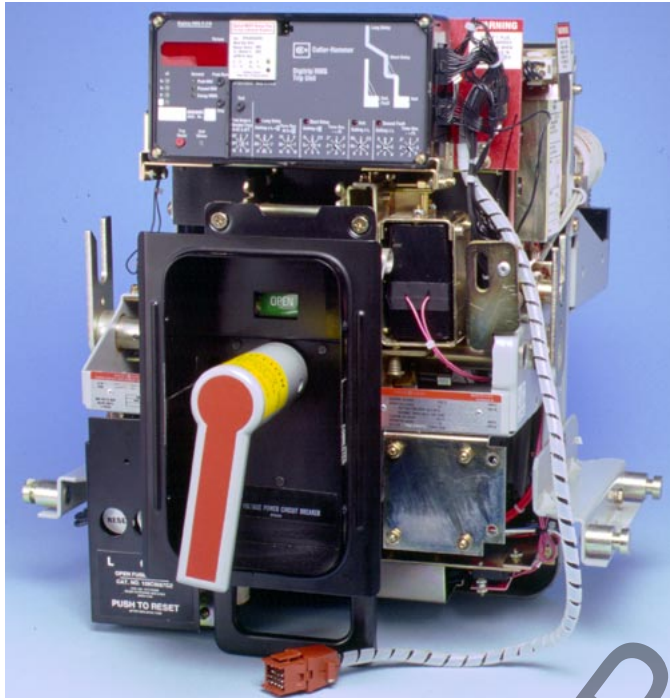




## Digitrip Retrofit System for the General Electric AKR / AKRU – 6D / 7D – 30S Series Breakers (Manually Operated Only)



### SAFETY PRECAUTIONS



### WARNING

**POWER CIRCUIT BREAKERS ARE EQUIPPED WITH HIGH SPEED, HIGH ENERGY OPERATING MECHANISMS. THE BREAKERS AND THEIR ENCLOSURES ARE DESIGNED WITH SEVERAL BUILT-IN INTERLOCKS AND SAFETY FEATURES INTENDED TO PROVIDE SAFE AND PROPER OPERATING SEQUENCES. TO PROVIDE MAXIMUM PROTECTION FOR PERSONNEL ASSOCIATED WITH THE INSTALLATION, OPERATION, AND MAINTENANCE OF THESE BREAKERS, THE FOLLOWING PRACTICES MUST BE FOLLOWED. FAILURE TO FOLLOW THESE PRACTICES MAY RESULT IN DEATH, PERSONAL INJURY, OR PROPERTY DAMAGE.**

- Only qualified persons, as defined in the National Electric Code, who are familiar with the installation and maintenance of power circuit breakers and their associated switchgear assemblies

should perform any work associated with these breakers.

- Completely read and understand all instructions before attempting any installation, operation, maintenance, or modification of these breakers.
- **Always turn off and lock out the power source feeding the breaker prior to attempting any installation, maintenance, or modification of the breaker. Do not use the circuit breaker as the sole means for isolating a high voltage circuit. Follow all lockout and tagging rules of the National Electric Code and all other applicable codes, regulations, and work rules.**
- Do not work on a closed breaker or a breaker with the closing springs charged. Trip (open) the breaker and be sure the stored energy springs are discharged before performing any work. The breaker may trip open or the charging springs may discharge, causing crushing or cutting injuries.
- For drawout breakers, trip (open), and then remove the breaker to a well-lit work area before beginning work.
- Do not perform any maintenance: including breaker charging, closing, tripping, or any other function which could cause significant movement of the breaker while it is on the extension rails. Doing so may cause the breaker to slip from the rails and fall, potentially causing severe personal injury to those in the vicinity.
- **Do not leave the breaker in an intermediate position in the switchgear cell. Always leave it in the connected, disconnected, or (optional) test position. Failure to do so could lead to improper positioning of the breaker and flashover, causing death, serious personal injury, and / or property damage.**
- **Do not defeat any safety interlock. Such interlocks are intended to protect personnel and equipment from damage due to flashover and exposed contacts. Defeating an interlock could lead to death, severe personal injury, and / or property damage.**

Cutler-Hammer Digitrip Retrofit Kits are available in a number of configurations that provide a wide range of features. The Digitrip System starts with the 510 Basic Kit which offers true RMS sensing, overcurrent protection, and self-testing features. Advanced Digitrip Retrofit Kits feature zone interlocking, digital alphanumeric displays, remote alarm signals, IMPACC communications, energy monitoring capabilities, power factors, and harmonic content measurements.

The following table provides a quick reference of the components supplied with each level of Retrofit Kit. Before beginning the Retrofit process, take a minute to review the information contained in the table. It is important that the Retrofitter understand

which level of Retrofit Kit is to be installed and which components are included with the Kit.

The instructions contained in this manual cover the installation of all levels of Retrofit Kit. If the Kit you are installing does not contain a certain component, skip the instructions for that component and proceed to the next.

Throughout the Retrofit process, refer to the Torque Tables at the back of this manual for specific torque values.

If you have any questions concerning the Retrofit Kit and / or the Retrofit process, contact Cutler-Hammer at 1-800-937-5487.

| Components                                      | 510 Basic | 510 with Zone Interlock | 610                 | 810                 | 910                 |
|---|-----------|-------------------------|---------------------|---------------------|---------------------|
| Trip Unit                                       |           |                         |                     |                     |                     |
| Rating Plug                                     |           |                         |                     |                     |                     |
| Auxiliary Current Transformer (CT) Module       |           |                         |                     |                     |                     |
| Auxiliary CT Harness                            |           |                         |                     |                     |                     |
| Sensors   |           |                         |                     |                     |                     |
| Sensor Harness                                  |           |                         |                     |                     |                     |
| Direct Trip Actuator (DTA)                      |           |                         |                     |                     |                     |
| Mounting Brackets and Hardware                  |           |                         |                     |                     |                     |
| External Harness                                | Plug      | 1 Connector Harness     | 2 Connector Harness | 4 Connector Harness | 4 Connector Harness |
| Cell Harness                                    |           |                         |                     |                     |                     |
| Breaker Mounted Control Power Transformer (CPT) |           |                         |                     |                     |                     |
| Potential Transformer (PT) Module               |           |                         |                     |                     |                     |
| Auxiliary Switch                                |           |                         |                     |                     |                     |

### Step 1: General Breaker Preparation

Before attempting to remove the Breaker from the Cell or perform any Retrofit Operation, be sure to read and understand the Safety Precautions section of this manual. In addition, be sure to read and understand the Instructions for the Application of Digitrip RMS Retrofit Kits on Power Circuit Breakers (Retrofit Application Data - Publication AD 33-855-1), supplied with the Digitrip Retrofit Kit.



#### WARNING

**DO NOT ATTEMPT TO INSTALL OR PERFORM MAINTENANCE ON EQUIPMENT WHILE IT IS ENERGIZED. SEVERE PERSONAL INJURY OR DEATH CAN RESULT FROM CONTACT WITH ENERGIZED EQUIPMENT. VERIFY THAT NO VOLTAGE IS PRESENT BEFORE PROCEEDING.**

- A. Trip the Breaker and remove it from the Cell. Move the Breaker to a clean, well-lit work bench.

**Note:** It is the responsibility of the Retrofitter to insure that the Breaker and all original components are in good condition. Visually inspect all Breaker components for signs of damage or wear. If any signs of damage or wear are detected for components not included in the Retrofit Kit, secure the necessary replacement parts before beginning the Retrofit Process.

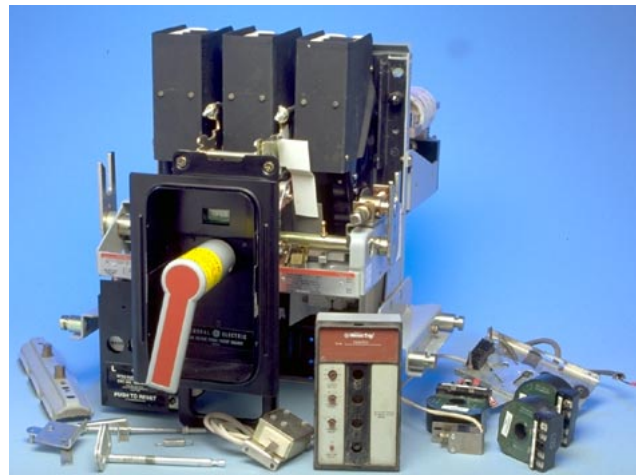
**The Force necessary to trip the Breaker should not exceed three (3) lbs.**

To begin the Retrofit Process, refer to the components list at the end of this manual. Lay out the components and hardware according to the steps outlined. The components and hardware will be used to complete each step in the Retrofit Process.

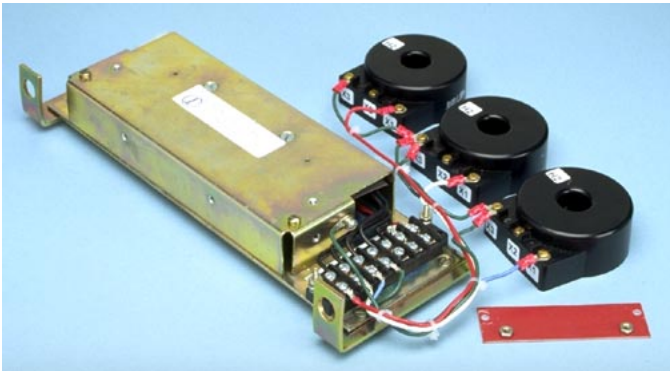
### Step 2: Removing the Original Components

Follow the G.E. Instruction Manual, originally supplied with the Breaker, to perform the following procedures.

- A. Remove and scrap the original Trip Unit, associated wiring, and all mounting hardware.
- B. Remove and scrap the original Trip Actuator and associated wiring, but save the mounting hardware.
- C. Remove and scrap the original Arc Chute Retaining Bar and mounting hardware.
- D. Remove and scrap the original Padlock Mechanism and "E-clip".
- E. Remove and save the original Copper Connectors and all mounting hardware.
- F. Remove and scrap the original Sensors and Sensor Harness.



### Step 3: Installing the Sensor Harness



- A. Remove the Glass Poly Insulation Plate covering the 7-Point Terminal Block on the Aux. CT Module.
- B. Attach the left and right Aux. CT Module Mounting Brackets to the sides of the Aux. CT Module, as shown, using the (4) .190-32 x .375" flat head screws, (4) flat washers, (4) lock washers, and (4) .190-32 nuts supplied. Note that the Mounting Brackets extend beyond the edges of the Aux. CT Module.



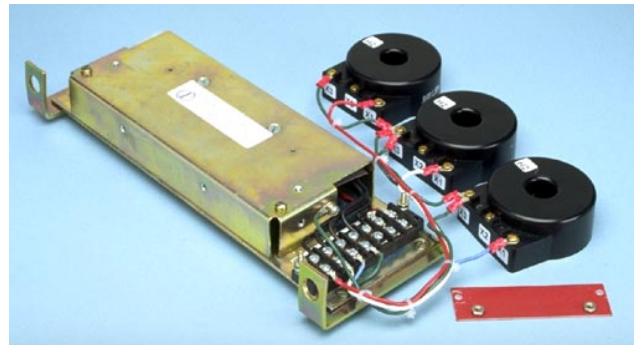
- C. Connect the Sensor Harness to the 7-Point Terminal Block. Refer to Section 12 of the Retrofit Application Data, supplied with the Retrofit Kit, for detailed Wiring Specifications.

- D. Connect the green ground wire from the Sensor Harness (with ring terminal) to the existing hole in the Aux. CT Module as shown, using the (1) .190-32 x .375" screw, (1) lock washer, and (1) flat washer supplied.



**Note: The Glass Poly Insulation Plate that covers the 7-Point Terminal Block should not be reinstalled until the DTA Wires have been connected later in the Retrofit Process.**

- E. Connect the ring terminals of the Sensor Harness to the Sensors. Refer to Section 12 of the Retrofit Applications Data, supplied with the Retrofit Kit, for detailed wiring specifications.



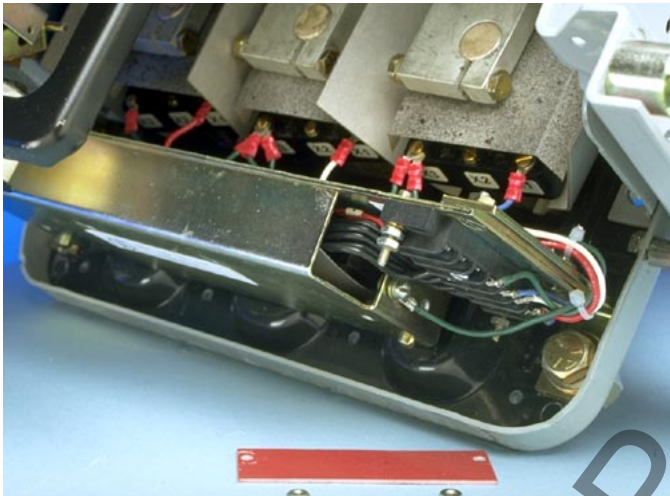
Depending on the Sensors supplied with the Retrofit Kit, the following conventions apply.

#### Sensor Style No.

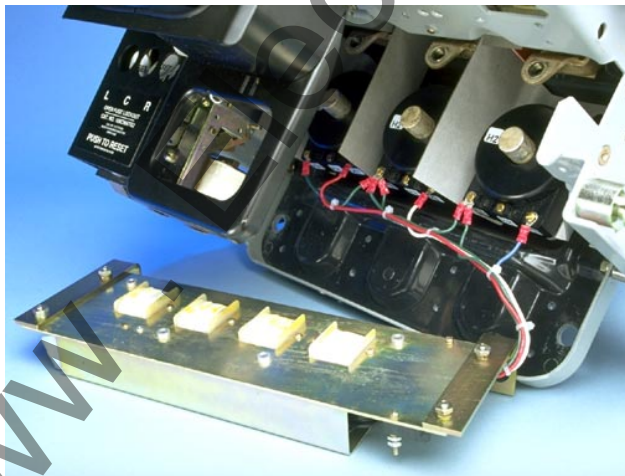
|            |              |
|------------|--------------|
| 4A35743H01 | X1-X2 = 300A |
|            | X1-X3 = 600A |
| 4A35744H01 | X1-X2 = 400A |
|            | X1-X3 = 800A |

*For Kits Supplied with a PT Module Only.*  
Refer to Section 7-3, Power Flow Convention, of the Retrofit Application Data, supplied with the Retrofit Kit, for additional wiring information and to verify the Phase Convention used on this Breaker Application.

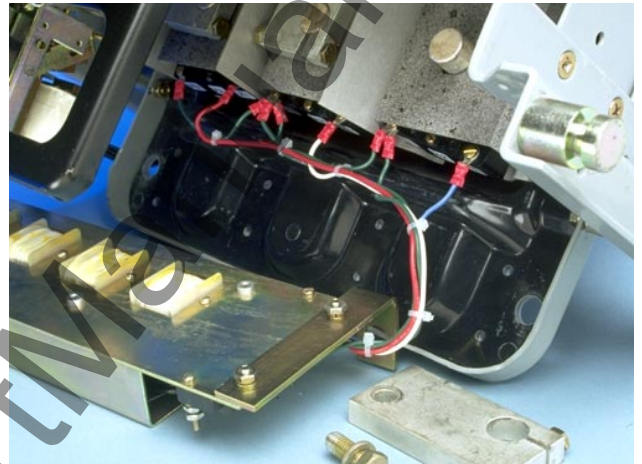
#### Step 4: Installing the Sensors and Aux. CT Module



- A. Tilt the Breaker towards the back until it rests on the bottom Finger Clusters. This will provide access to the bottom of the Breaker.
- B. With the Aux. CT Module resting on the work surface, slide the Sensors onto the Breaker Stabs. The Sensor Terminals must face the bottom of the Breaker.

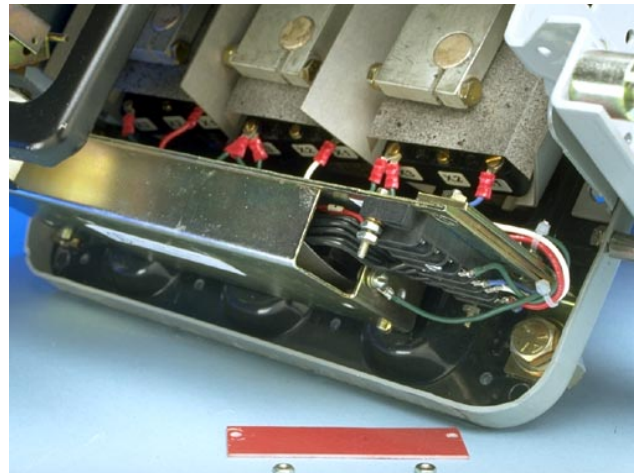


- C. Install a Sensor Insulator over each Breaker Stab, completely covering the Sensor.
- D. Reinstall the Copper Connectors removed in Step 2-E and secure using the original mounting hardware.

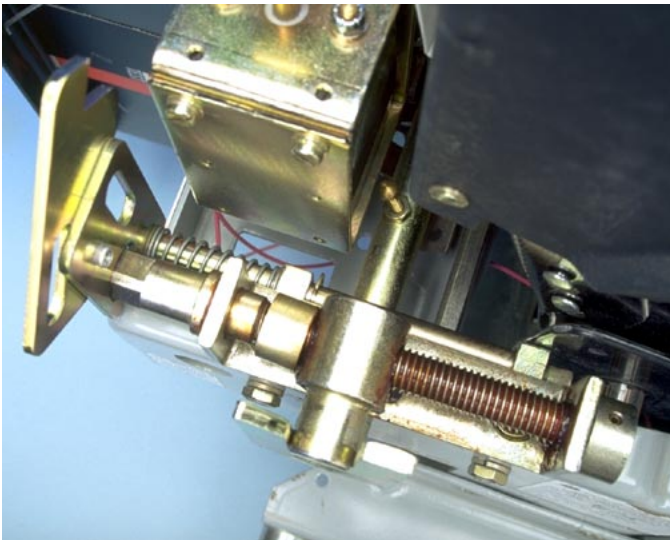


*For Kits Supplied with a PT Module Only.*  
Do not tighten the pinch bolts that secure the Copper Connectors to the Breaker Stabs. They will be used later in the Retrofit Process to connect the PT Wires to the Copper Connectors.

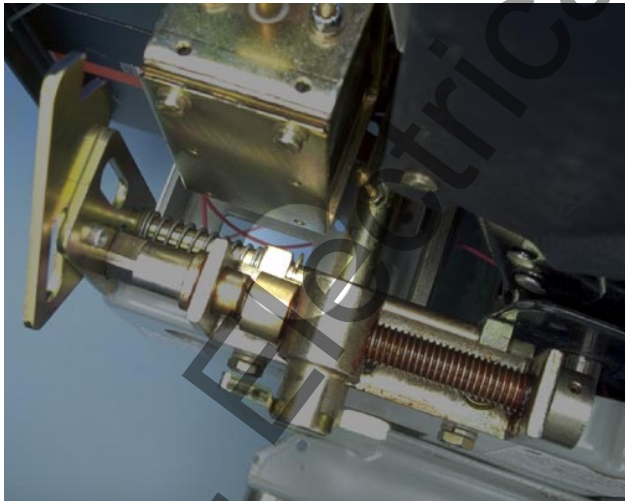
- E. Mount the Aux. CT Module to the Breaker Back Plate using the (2) .500-13 × 1.25" bolts, (4) flat washers, (2) lock washers, and (2) .500-13 nuts supplied.



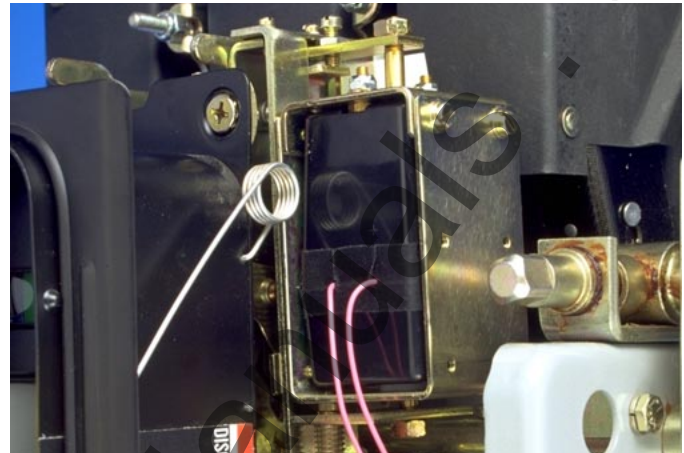
**Step 5: Installing the Padlock Mechanism**



- A. Slide the Padlock Mechanism Shaft, with the spring installed, into the original Padlock Guides, as shown.
- B. Compress the spring and snap the supplied "E-clip" into the notch on the Padlock Mechanism Shaft, then release the pressure on the spring.



**Step 6: Installing the DTA Assembly**



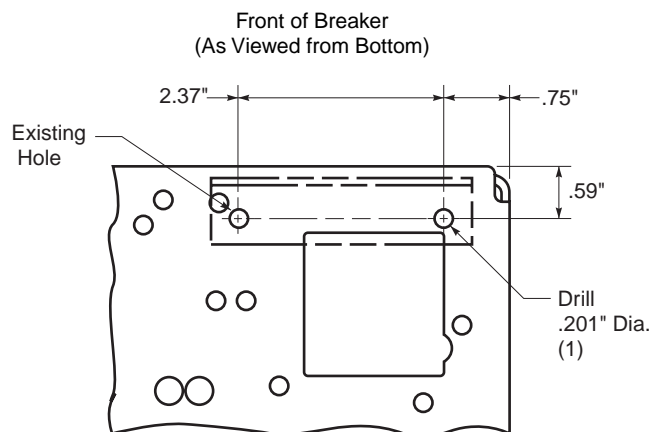
- A. Drill and tap the two existing holes on the top of the right center Breaker Frame to accept .138-32 screws.



- B. *For Kits Supplied with a Breaker Mounted CPT Only.* Using Drilling Plan A, drill one (1) .219" diameter hole in the right Breaker Shelf.

**NOTE: Cover the area below the Breaker Shelf to keep metal from falling into the lower Breaker Components.**

**Drilling Plan "A"**



- C. Align then insert the stud on the bottom of the DTA into the existing hole in the right Breaker Shelf.



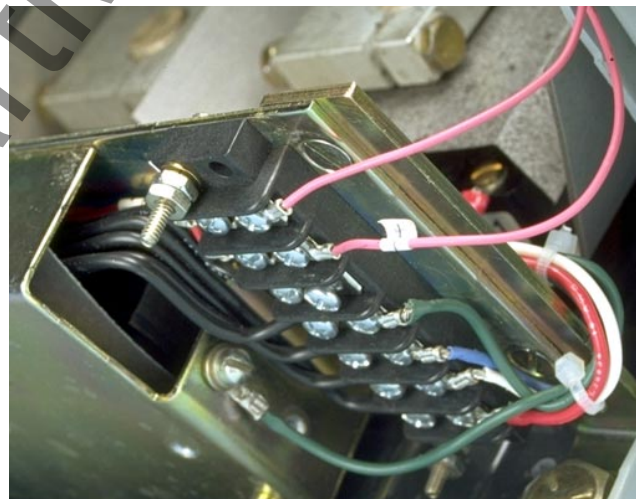
- D. Align the top DTA mounting holes with the holes tapped in the Step 6-A. Note that slight resistance will be felt as the DTA contacts the reset pin.



- E. Apply Loc-Tite® 242 to the threads then secure the top of the DTA to the holes drilled and tapped in Step 6-A using the (2) .138-32 x .375" screws, (2) lock washers, and (2) flat washers supplied.

- F. Apply Loc-Tite® 242 to the threads then secure the DTA bottom stud using the (1) flat washer, (1) lock washer, and (1) .190-32 nut supplied.

- G. Route the DTA wires along the right side of the Breaker to the 7-Point Terminal Block mounted to the Aux. CT Module. Route them so that they are clear of all moving parts within the Breaker. Connect the "+" DTA Wire to the "OP" Terminal and the unmarked wire to the "ON" terminal.

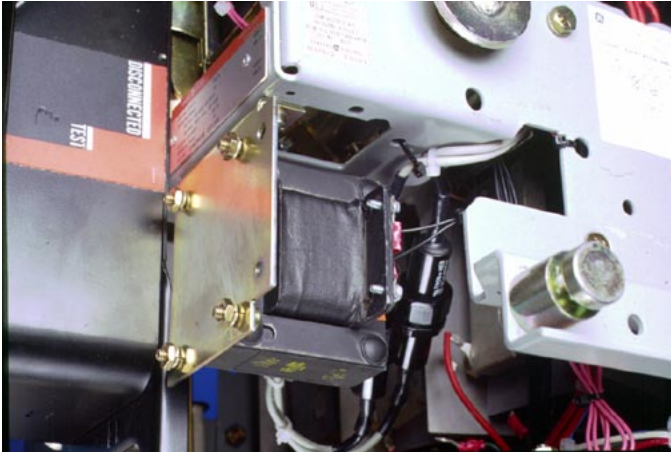


- H. Use the nylon wire ties supplied to dress the DTA Wires to keep them away from any moving parts within the Breaker.

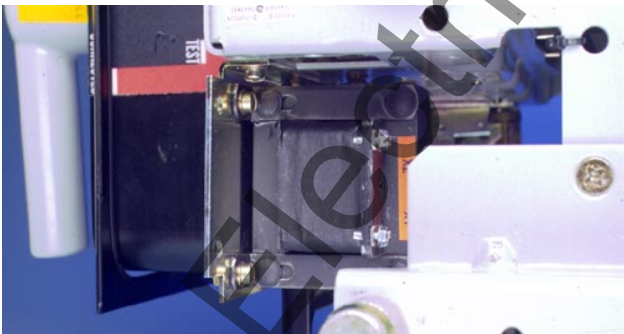
- I. Reinstall the Glass-Poly Insulation Plate over the 7-Point Terminal Block removed in Step 3-A using the original hardware.

For Kits Supplied with a Breaker Mounted CPT Only.

### Step 7: Installing the Breaker Mounted CPT



- A. Mount the CPT Mounting Bracket to the Breaker Shelf using the hole drilled in Step 6-B and the existing hole. Secure the Mounting Bracket to the Breaker Shelf, as shown, using the (2) .190-32 x .500" screws, (4) flat washers, (2) lock washers, and (2) nuts supplied.
- B. Secure the CPT to the CPT Mounting Bracket, as shown, using the (4) .190-32 x .500" screws, (4) lock washers, (8) flat washers, and (4) nuts supplied.

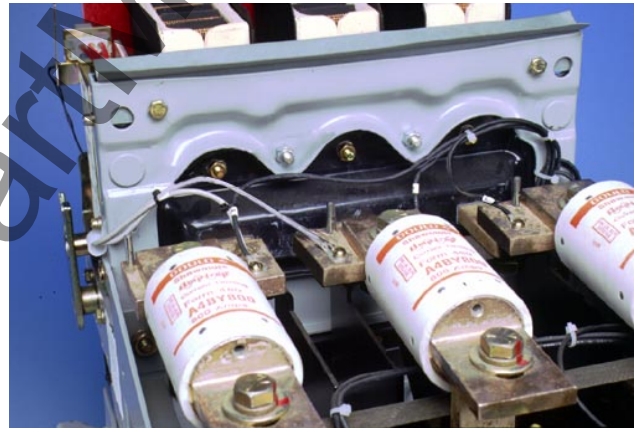


- C. Strip .250" of insulation and attach a .138" ring terminal to each wire of the CPT Harness. Connect the wires to the X1 and X2 terminals of the CPT.

- D. Attach the HV Wires to the CPT terminals to achieve the required voltage. (See the following Table.)

| Voltage Required | CPT Terminals Used |
|------------------|--------------------|
| 480 Volt Circuit | H1 & H4            |
| 240 Volt Circuit | H1 & H3            |
| 208 Volt Circuit | H1 & H2            |

- E. Route the HV Line Side Wires up through the Breaker along the inside of the right Breaker Frame, through the wire clamp, and towards the appropriate Breaker Stabs.



**NOTE:** The power convention of the Circuit Breakers is normally Top to Bottom, meaning the Top Breaker Stabs are on the Line Side of the Breaker and the Bottom Breaker Stabs are on the Load Side.

The Line Side High Voltage Fused Wires (HV Wires) from the CPT **MUST BE ATTACHED** to the Line Side of the Breaker. If it is determined that the power flow for the Breaker application is opposite the normal convention, the HV Wires must be attached to the Bottom Breaker Stabs. In the case of the Line Side being the Bottom Breaker Stabs, the pinch bolts that secure the Copper Connectors can be used for HV Wire attachment.



**NOTE: If the Breaker is equipped with fuses on the Line Side of the Breaker, the hardware securing the fuses can be used to connect the HV Wires. In this case skip to Step 7-H.**

- F. Using a 11/64" (.172") drill bit, drill and tap the Phase 1 & 2, or 2 & 3 Breaker Stabs to accept a .190-32 x .375" screw.

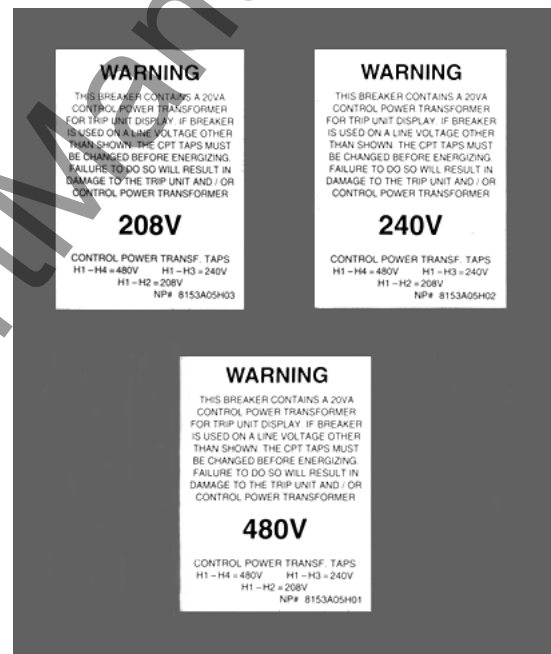
**NOTE: It may be necessary to remove a Finger Cluster and Breaker Stab to allow the Phase 2 Breaker Stab to be drilled.**



**NOTE: The Line Side High Voltage Fused Wires (HV Wires) are longer than necessary and are cut during the following steps. Before cutting the wires, be sure that sufficient length is left so that the HV Wire Fuses are accessible and that the connections can be made to the correct Breaker Stabs.**

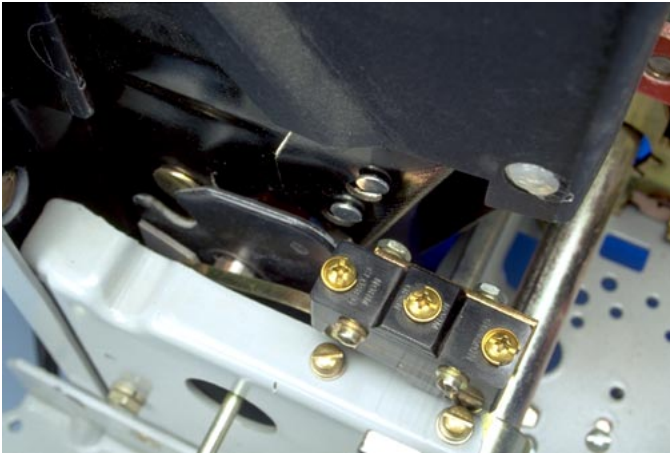
- G. *For Connection to the Breaker Stabs Only.* Cut the Line Side HV Wires to an appropriate length for connection to the correct Breaker Stabs. Strip .250" from each Line Side HV Wire and attach a .190" ring terminal to each. Connect the Line Side HV Wires to the appropriate Breaker Stabs using the (2) .190-32 x .375" screws, (2) lock washers, and (2) flat washers supplied.

- H. *For Connection to the Fuse Mountings.* Cut the Line Side HV Wires to an appropriate length for connection to the correct Fuse mountings. Strip .250" from each Line Side HV Wire and attach an appropriate size ring terminal to each. Connect the Line Side HV Wires to the correct Fuse mountings using the original hardware.
- I. Attach the appropriate label for the Breaker to the Breaker Cover in a clearly visible position.



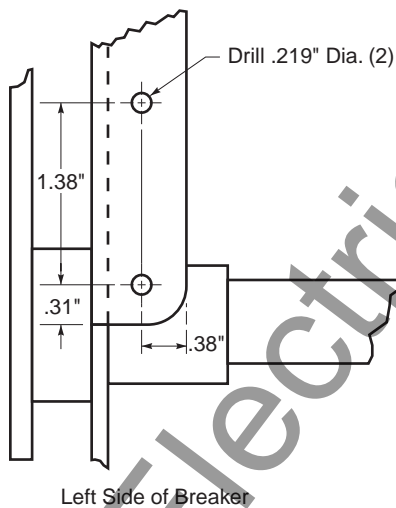
For Kits Supplied with an Aux. Switch Only.

### Step 8: Installing the Aux. Switch

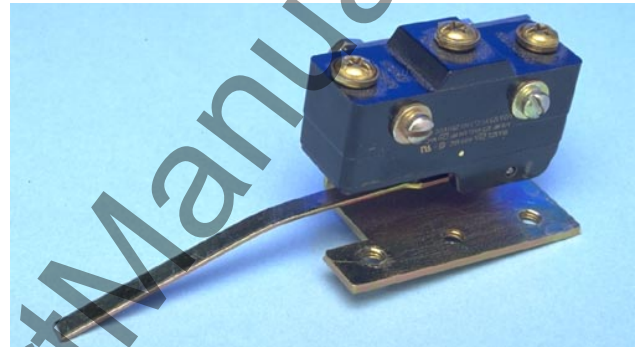


- A. Using Drilling Plan B, drill two (2) .219" diameter holes in the top of the left Breaker Frame.

#### Drilling Plan "B"



- B. Using diagonals, cut 2.50" off the Microswitch Arm. Slightly bend the Microswitch Arm to ride properly on the Breaker Cross Bar.
- C. Mount the Microswitch to the Aux. Switch Mounting Bracket, as shown, using the (2) .138-32  $\times$  1.00" screws, (4) flat washers, (2) lock washers, and (2) .138-32 nuts supplied.

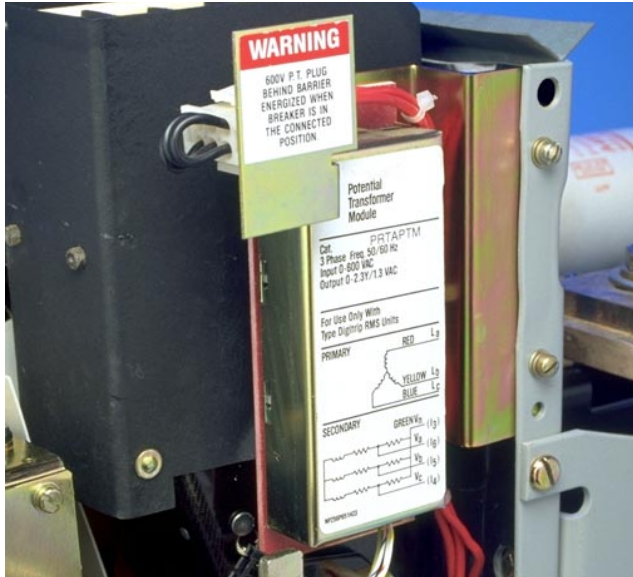


- D. Mount the Auxiliary Switch Assembly to the left Breaker Frame using the holes drilled in Step 7-A and the (2) .190-32  $\times$  .375" screws, (2) lock washers, and (2) flat washers.



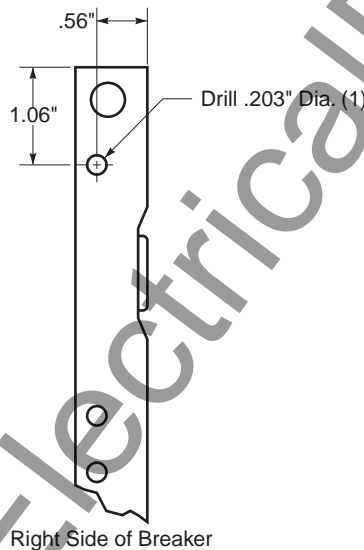
For Kits supplied with a PT Module Only.

**Step 9: Installing the PT Module**



- A. Using Drilling Plan C, drill one .203" diameter hole in the right side of the rear Breaker Frame.

**Drilling Plan "C"**



- B. Remove and save the hardware securing the PT Module Connector Bracket and Guard to the mounting bracket. Remove the hardware securing the mounting bracket to the side of the PT Module. Discard the mounting bracket and hardware. Secure the Connector Mounting Bracket and Guard to the side of the PT Module, as shown, using the original hardware.

- C. Mount the PT Module to the PT Module "Z" Mounting Bracket, as shown, using the (2) .138-32 x .375" screws, (2) flat washers, (2) lock washers, and (2) nuts supplied. The Glass Poly Insulation Barrier must be positioned between the PT Module and the PT Module "Z" Mounting Bracket.



- D. Align the PT Module Assembly with the hole drilled in Step 8-A and the existing hole. Note that the PT Module "Z" Mounting Bracket is positioned inside the rear Breaker Frame. Mount the PT Module Assembly to the rear Breaker Frame using the (2) .190-32 x .375" screws, (4) flat washers, and (2) lock washers supplied.



For Kits Supplied with a Breaker Mounted CPT Only. Secure the HV Wires to the Breaker using the wire clamp supplied and the top screw, lock washer, and flat washer mounting the PT Module assembly to the right rear Breaker Frame.

- E. Route the PT Wires down along the rear Breaker Frame to the Copper Connectors. Route them so that they are clear of all moving parts within the Breaker.

The PT Wires are marked for connection to Phases 1, 2, and 3 with corresponding numbers.

**NOTE: Before cutting the PT Wires, verify the Phase Convention used on the Breaker Application.**

Route the PT Wires to a position suitable for attachment to the Copper Connectors. Move the PT Wire markers to a position where they will still be attached to the wires after cutting. Cut the wires to length, strip each wire .250", and install a .250" ring terminal on each wire.

Connect the PT Wires to the pinch bolts on the Copper Connectors.

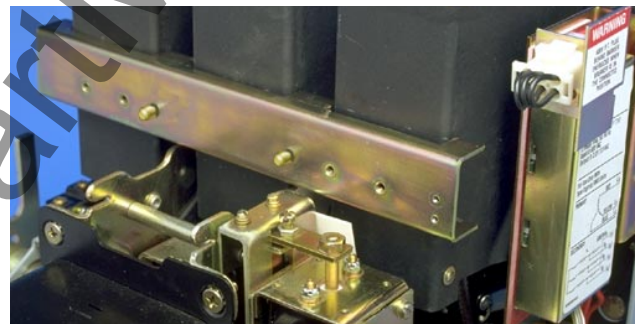


Use the nylon wire ties supplied to dress all wires to keep them away from any moving parts within the Breaker.

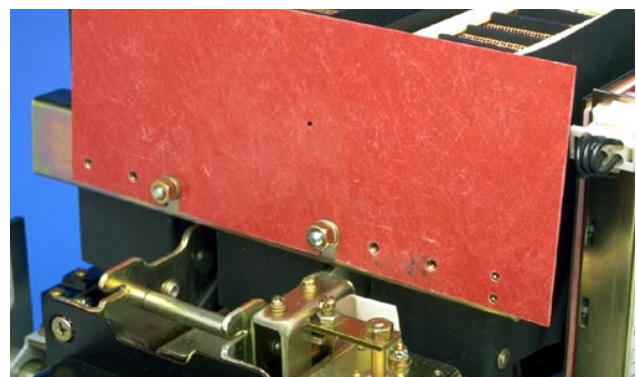
## Step 10: Installing the Trip Unit



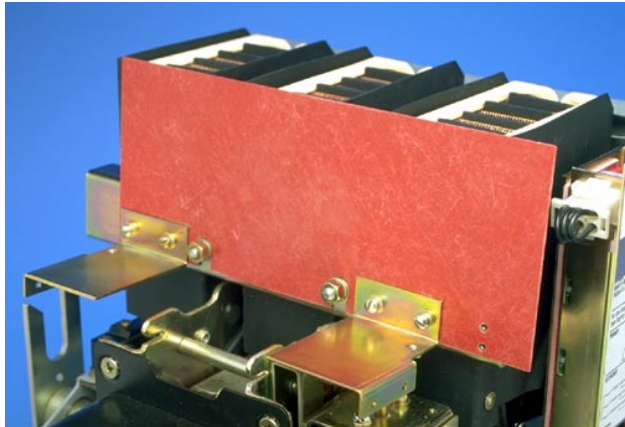
- A. Align the Arc Chute Retaining Bar with the existing studs, as shown.



- B. Align the Glass Poly Insulation Barrier with the existing studs then place it against the Arc Chute Retaining Bar. Secure the Insulation Barrier and the Arc Chute Retaining Bar, using the (2) flat washers, (2) lock washers, and (2) .250-20 nuts supplied. Note that the two (2) small holes on the Insulation Barrier must align with the holes in the Arc Chute Retaining Bar.



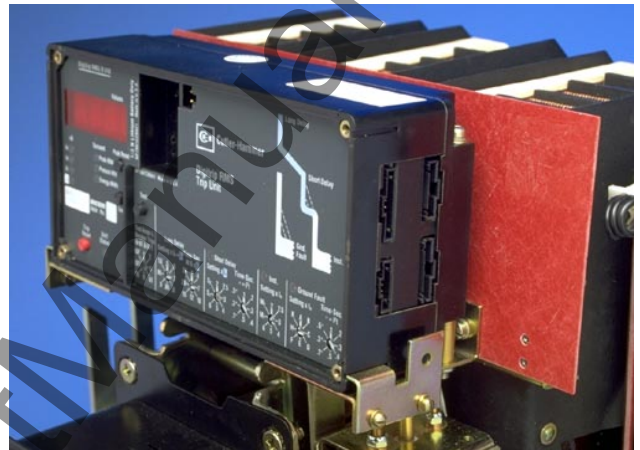
- C. Mount the Left and Right Trip Unit Mounting Brackets to the Glass Poly Barrier, as shown, using the (4) .190-32 × .500" screws, (4) lock washers, and (4) flat washers supplied.



- D. Mount the Trip Unit to the Trip Unit Mounting Brackets, as shown, using the (2) brass spacers, (2) .190-32 × 4.00" screws, (2) lock washers, and (2) flat washers.

**Note: The 4" screws are inserted from the top of the Trip Unit and the Spacers are inserted between the bottom of the Trip Unit and the Mounting Brackets.**

- E. Mount the Trip Unit Support Clips to the right and left Trip Unit Mounting Brackets, as shown, using the (4) .138-32 × .375" screws, (8) flat washers, (4) lock washers, and (4) nuts supplied. Note that the Support Clips engage the slots on both sides of the Trip Unit.



- F. Remove the Trip Unit Cover and install the Rating Plug. Replace the cover.
- G. *For Kits supplied with a PT Module Only.* Install the supplied PT Module Warning Label to the upper right corner of the Glass Poly Insulation Barrier.



### Step 11: Final Connection of the Harnesses and Wiring

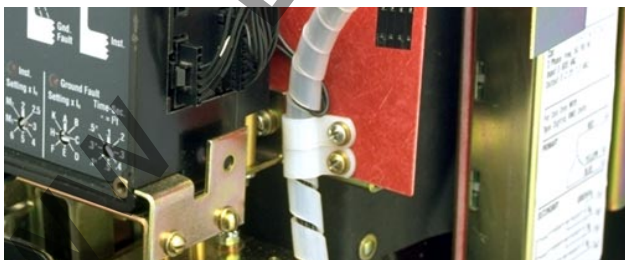


- A. Connect the External Harness to the Trip Unit.



**NOTE: For 510 Basic Kits, the External Harness is the plug pictured above. It is to be plugged into the right side of the Trip Unit.**

- B. Secure the External Harness to the holes in the Insulation Barrier and Arc Chute Retaining Bar using the (2) nylon wire clamps, (2) .138 × .380" thread cutting screws, (2) lock washers, and (2) flat washers supplied.



- C. Insert the large plug on the Aux. CT Harness into its receptacle on the Aux. CT Module. Route the Aux. CT Harness up through the Breaker to the right side of the Trip Unit. Route the harness so that it is clear of all moving parts within the Breaker. Connect the other end of the Aux. CT Harness to the male connector on the External Harness.
- D. *For Kits Supplied with a PT Module Only.* Connect the plug from the PT Module to the corresponding plug on the External Harness.
- E. *For Kits Supplied with an Aux. Switch Only.* Route the two (2) wires with ring terminals from the External Harness to the Aux. Switch. Connect one (1) wire to the normally open terminal and the other wire to the common terminal.
- F. *For Kits Supplied with a Breaker Mounted CPT Only.* Remove the External harness plug installed in the Trip Unit. Route the CPT Harness up from the CPT to the Trip Unit. Connect the black plug of the CPT Harness into the same receptacle in the Trip Unit. Reinsert the External Harness plug just removed into the female receptacle on the CPT Harness.
- G. Use the nylon wire ties provided to dress all wires and harnesses to keep them away from any moving parts within the Breaker.

**Step 12: Testing the Breaker**

- A. Measure the force necessary to trip the Breaker at the point where the DTA flange nut contacts the Trip Finger. The force necessary to trip the Breaker **MUST NOT EXCEED 3 lbs.**
- B. The Retrofit must be tested using primary injection. Refer to Section 8 of the *Instructions for the Application of Digitrip RMS Retrofit Kits on Power Circuit Breakers* (Publication AD 33-855-1, June, 1997), supplied with the Retrofit kit, for detailed testing procedures and specifications. For test information specific to the Trip Unit, refer to the IL publication supplied with the Retrofit kit (see the Pick List for the IL number).
- C. While Section 8 of the *Instructions for the Application of Digitrip RMS Retrofit Kits on Power Circuit Breakers* provides the information necessary for testing the Breaker, please keep the following notes in mind when reviewing other sections of the publication.

**CAUTION:** When all testing is complete, the Trip Unit must be reset. Failure to do so may cause the Battery in the Rating Plug to run down.

**Notes:**

1. Publication AD 33-855-1 was created specifically for the “hundred” series (500, 600, 700, etc.) Retrofit Kts. Therefore certain sections and figures do not apply to the “ten” series (510, 610, 810, etc.) Retrofit Kits. Specifically, these are Sections 13 and 14, as well as Figures 3-2, 3-3, and 3-4.
2. **For All Kits Other Than 510 Basic.** If testing the Breaker with Short Delay or Ground Fault functions, be sure to either plug in the Cell Harness Assembly or use the Zone Interlock Shorting Plug. Failure to do so may result in shorter than expected trip times.

3. **For 810 and 910 Kits Only.** Without any power applied to the system (neither the 120 volt power supply nor the Aux. Power Module connected), plug the External Harness into the Cell Harness and check the impedance between COM 1 and COM 2. The impedance should be between one (1) and three (3) ohms. If the impedance is not within this range, trace the wiring and examine each connection to assure its integrity.

**Confirm that the IMPACC communication wiring is correct by following the procedures detailed in Section 7.4 of the Instructions for the Application of Digitrip RMS Retrofit Kits on Power Circuit Breakers. Note that for 810 and 910 Kits, the impedance between COM 1 and COM 2 should be between one (1) and three (3) ohms.**

**When testing is complete, disconnect the External Harness from the Cell Harness. Final External Harness connection will be performed in Step 13.**

*For Kits Supplied with a Cell Harness Only.*

**Step 13: Mounting the Cell Harness**

- A. The Cell Harness is to be mounted in the Breaker Cell. The connector end is to be mounted on the right front side of the Cell, in a location suitable for connection with the External Harness. The Terminal Blocks can be mounted anywhere space is available in the Cell as long as connection to the External Harness can be made.
- B. Route the Cell Harness wiring to keep it away from any moveable parts within the Cell Housing.

### Step 14: Installing the Retrofitted Breaker in the Cell



#### WARNING

Do not leave the Breaker in an intermediate position in the Switchgear Cell. Always leave it in the **CONNECTED, DISCONNECTED, or (Optional) TEST** position. Failure to do so could lead to improper positioning of the Breaker and flashover, causing death, serious personal injury, and / or property damage.

**NOTE:** It is the responsibility of the Retrofitter to insure proper Breaker / Cell fit. When racking the Breaker into the Connected position, the Retrofitter **MUST FOLLOW BOTH** the manufacturer's instructions and the customer's

safety standards and procedures for racking a Breaker into the Connected position.

- A. With the Breaker in the Open position and the springs discharged, slowly rack the Breaker into the Connected position, making sure there is no interference or binding. The Breaker should rack smoothly and without mechanical interference between any Breaker and Cell parts. The Retrofitter will feel some resistance when the primary fingers connect onto the stabs of the Cell. This is normal.

However, if any unusual resistance is detected that could be abnormal interference between the Breaker and Cell parts, stop immediately and move the Breaker out of the Connected position. Examine what is causing the interference and correct the situation.

#### Digitrip Retrofit Kit Installation Components for the General Electric AKRU Series Breaker

| Step           | Description                           | Style No.  | Qty. | Comment       |
|----------------|---------------------------------------|------------|------|---------------|
| Step 3         | Aux. CT Module                        | 6503C59G__ | 1    |               |
|                | Aux. CT Module Assembly Parts         | 4A35748G04 | 1    |               |
|                | Aux. CT Module Mounting Bracket L. H. |            | 1    |               |
|                | Aux. CT Module Mounting Bracket R. H. |            | 1    |               |
|                | .190-32 × .375 Screw Flat Head        |            | 4    |               |
|                | .190 Lock Washer Stl.                 |            | 4    |               |
|                | .190 Flat Washer Stl.                 |            | 4    |               |
|                | .190-32 Nut Hex Stl.                  |            | 4    |               |
|                | Sensor Harness Parts                  | 4A35748G05 | 1    |               |
|                | Sensor Harness                        |            | 1    |               |
|                | Sensor Insulator                      |            | 3    |               |
|                | .190-32 × .375 Screw Fil.             |            | 1    |               |
|                | .190 Flat Washer Stl.                 |            | 1    |               |
|                | .190 Lock Washer Stl.                 |            | 1    |               |
| Wire Tie Nylon |                                       | 8          |      |               |
| Step 4         | Sensor                                |            | 3    | See Pick List |
|                | Sensor Insulator (From Step 3)        |            | 3    |               |
|                | Aux. CT Module Mounting Parts         | 4A35748G06 | 1    |               |
|                | .500-13 × 1.25 Lng. Hex Bolt          |            | 2    |               |
|                | .500 Flat Washer Stl.                 |            | 4    |               |
|                | .500 Lock Washer Stl.                 |            | 2    |               |
|                | .500-13 Nut Hex Stl.                  |            | 2    |               |



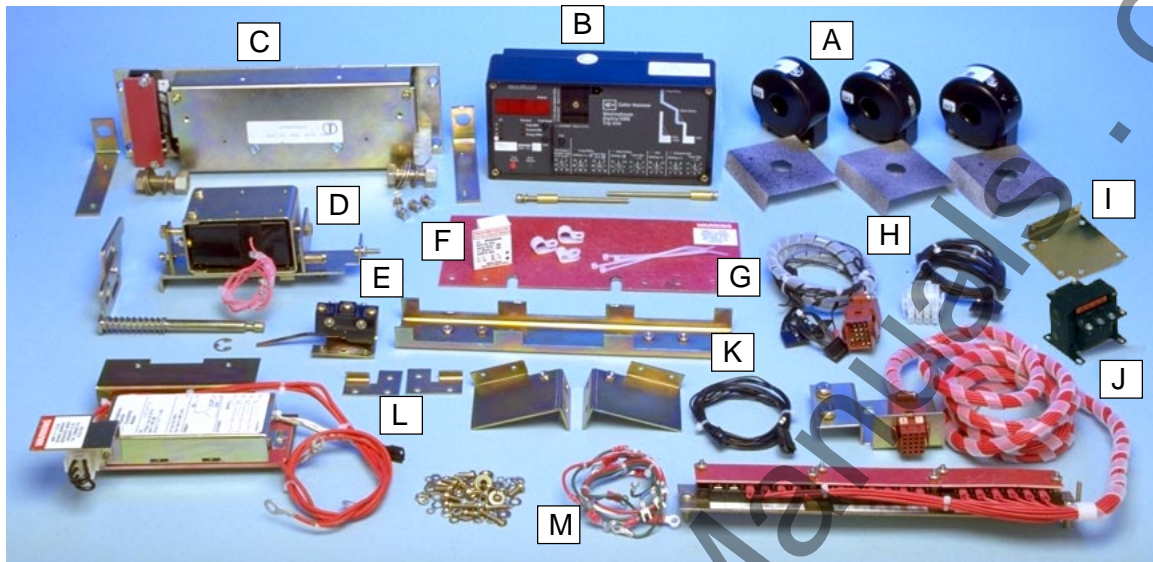
**Digitrip Retrofit Kit Installation Components for the General Electric AKRU Series Breaker (Continued)**

| Step   | Description   | Style No.  | Qty. | Comment                 |
|--------|---|------------|------|-------------------------|
| Step 5 | Padlock Parts                                       | 4A35748G07 | 1    |                         |
|        | Padlock Mechanism                                   |            | 1    |                         |
|        | .375 "E-clip"                                       |            | 1    |                         |
| Step 6 | DTA Assembly and Mounting Parts                     | 4A35748G35 | 1    |                         |
|        | .138-32 × .375 Screw Lng. Fil.                      |            | 2    |                         |
|        | .138 Flat Washer Stl.                               |            | 2    |                         |
|        | .138 Lock Washer Stl.                               |            | 2    |                         |
|        | .190 Flat Washer Stl.                               |            | 1    |                         |
|        | .190 Lock Washer Stl.                               |            | 1    |                         |
|        | .190-32 Nut Hex Stl.                                |            | 1    |                         |
|        | Loc-Tite® 242                                       |            | 1    |                         |
| Step 7 | Breaker Mounted CPT Kit                             | 8259A91G05 | 1    | CPT Only                |
|        | Ring Terminals (.138, .190, .250, .312, .375, .500) |            | 2    | Each Size               |
|        | CPT Mounting Parts                                  | 4A35748G20 | 1    | CPT Only                |
|        | CPT Mounting Bracket                                |            | 1    |                         |
|        | .190-32 × .500 Lng. Screw Pan Head                  |            | 6    |                         |
|        | .190-32 × .375 Lng. Screw Fil.                      |            | 2    |                         |
|        | .190 Lock Washer Stl.                               |            | 8    |                         |
|        | .190 Flat Washer Stl.                               |            | 14   |                         |
|        | .190-32 Nut Hex Stl.                                |            | 6    |                         |
|        | Wire Clamp Nylon                                    |            | 1    |                         |
| Step 8 | Aux. Switch Kit                                     | 4A35748G02 | 1    | Comm. Only              |
|        | Microswitch   |            | 1    |                         |
|        | Aux. Switch Mounting Bracket                        |            | 1    |                         |
|        | .138-32 × 1.00 Lng. Screw Fil.                      |            | 2    |                         |
|        | .138 Flat Washer Stl.                               |            | 4    |                         |
|        | .138 Lock Washer Stl.                               |            | 2    |                         |
|        | .138-32 Nut Hex Stl.                                |            | 2    |                         |
|        | .190-32 × .375 Lng. Screw Fil.                      |            | 2    |                         |
| Step 9 | PT Module Kit                                       | 6502C82G01 | 1    | Comm. Only<br>Each Size |
|        | .138-32 × .375 Lng. Screw Fil.                      |            | 2    |                         |
|        | .138 Flat Washer Stl.                               |            | 4    |                         |
|        | .138 Lock Washer Stl.                               |            | 2    |                         |
|        | .138-32 Nut Hex Stl.                                |            | 2    |                         |
|        | Ring Terminals (.190, .250, .312, .375, .500)       |            | 3    |                         |
|        | PT Module Mounting Parts                            | 4A35748G08 | 1    |                         |
|        | PT Module Mounting Bracket                          |            | 1    |                         |
|        | Glass Poly Insulation Plate                         |            | 1    |                         |
|        | .190-32 × .375 Lng. Screw Fil.                      |            | 2    |                         |

**Digitrip Retrofit Kit Installation Components for the General Electric AKRU Series Breaker (Continued)**

| Step                           | Description                        | Style No.  | Qty. | Comment          |
|--------------------------------|------------------------------------|------------|------|------------------|
| Step 9<br>(Cont.)              | .190 Flat Washer Stl.              |            | 4    | } Comm. Only     |
|                                | .190 Lock Washer Stl.              |            | 2    |                  |
|                                | PT Extension Harness               |            | 1    |                  |
|                                | Warning Nameplate                  |            | 1    |                  |
| Step 10                        | RMS/R Trip Unit                    |            | 1    | See Pick List    |
|                                | Rating Plug                        |            | 1    | See Pick List    |
|                                | Trip Unit Mounting Parts           | 4A35748G09 | 1    |                  |
|                                | Support Clip L. H.                 |            | 1    |                  |
|                                | Support Clip R. H.                 |            | 1    |                  |
|                                | Glass Poly Insulation Plate        |            | 1    |                  |
|                                | .190-32 × 4.00 Lng. Screw Fil.     |            | 2    |                  |
|                                | .190 Flat Washer Stl.              |            | 2    |                  |
|                                | .190 Lock Washer Stl.              |            | 2    |                  |
|                                | Spacer Brass                       |            | 2    |                  |
|                                | .138-32 × .375 Lng. Screw Fil.     |            | 4    |                  |
|                                | .138 Flat Washer Stl.              |            | 8    |                  |
|                                | .138 Lock Washer Stl.              |            | 4    |                  |
|                                | .138-32 Nut Hex Stl.               |            | 4    |                  |
|                                | Digitrip Nameplate                 |            | 1    |                  |
|                                | Arc Chute Retainer Parts           | 4A35748G10 | 1    |                  |
|                                | Arc Chute Retainer Bar             |            | 1    |                  |
|                                | Trip Unit Mounting Bracket L. H.   |            | 1    |                  |
|                                | Trip Unit Mounting Bracket R. H.   |            | 1    |                  |
|                                | .250 Flat Washer Stl.              |            | 2    |                  |
|                                | .250 Lock Washer Stl.              |            | 2    |                  |
|                                | .250-20 Nut Hex Stl.               |            | 2    |                  |
| .190-32 × .500 Lng. Screw Fil. |                                    | 4          |      |                  |
| .190 Flat Washer Stl.          |                                    | 4          |      |                  |
| .190 Lock Washer Stl.          |                                    | 4          |      |                  |
| Step 11                        | External Harness                   | 6502C83G__ | 1    |                  |
|                                | Aux. CT Extension Harness          | 6502C84G02 | 1    |                  |
|                                | PT Extension Harness (From Step 8) |            | 1    | Comm. Only       |
|                                | External Harness Parts             | 4A35748G11 | 1    |                  |
|                                | .138-32 × .375 Lng. Screw T.C.     |            | 2    |                  |
|                                | .138 Flat Washer Stl.              |            | 2    |                  |
|                                | .138 Lock Washer Stl.              |            | 2    |                  |
|                                | Wire Clamps Nylon                  |            | 2    |                  |
| Wire Clamps Nylon              |                                    | 2          |      |                  |
| Wire Ties Nylon                |                                    | 10         |      |                  |
| Step 13                        | Cell Harness                       | 6503C57G__ | 1    | Except 510 Basic |

Note: Due to the wide vintage of Breakers and the multiple functions of the Retrofit Components, some excess hardware may be left when the Retrofit is complete.



- A. Sensors
- B. Trip Unit
- C. Aux. CT Module
- D. Direct Trip Actuator (DTA)
- E. Aux. Switch
- F. Rating Plug
- G. External Harness
- H. Aux. CT Harness
- I. Aux. CPT Module
- J. Cell Terminal Block Assembly
- K. PT Extension Harness
- L. PT Module
- M. Sensor Harness

**Torque Values for General Mounting**

| Decimal Size (in) | Standard Size | Torque (in-lbs) | Torque (ft-lbs) |
|-------------------|---------------|-----------------|-----------------|
| .112              | 4-40          | 10              | 0.8             |
| .138              | 6-32          | 18              | 1.5             |
| .164              | 8-32          | 36              | 3.0             |
| .190              | 10-32         | 46              | 3.8             |
| .250              | 1/4-20        | 100             | 8.3             |
| .312              | 5/16-18       | 206             | 17.2            |
| .375              | 3/8-16        | 356             | 29.7            |
| .438              | 7/16-14       | 572             | 47.7            |
| .500              | 1/2-13        | 856             | 71.3            |

**Torque Values for Copper BUS Connectors**

| Decimal Size (in) | Standard Size | Torque (in-lbs) | Torque (ft-lbs) |
|-------------------|---------------|-----------------|-----------------|
| .250              | 1/4-20        | 60              | 5               |
| .312              | 5/16-18       | 144             | 12              |
| .375              | 3/8-16        | 240             | 20              |
| .500              | 1/2-13        | 600             | 50              |

We wish to thank you for purchasing the Digitrip Retrofit System. Digitrip Retrofit Kits are designed and manufactured in America with pride. All the components are engineered to fit the existing Circuit Breaker with little or no modifications to the existing Breaker. However due to the wide variety and vintage of Breakers in use today, an occasional problem may arise. Please contact us with any questions, comments or concerns.

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