



## Digitrip Retrofit System for the General Electric AKR – 4A / 5A – 30 / 50 Series Breakers



### 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.

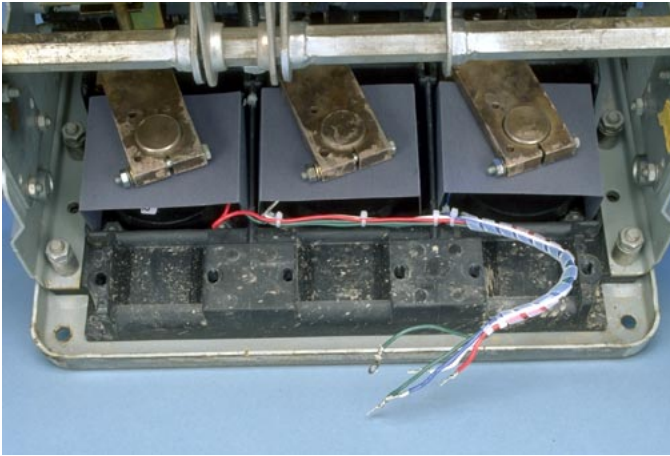
### Step 2: Removing the Original Components

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, Trip Components, associated wiring, and all mounting hardware.
- C. Remove and save the original Copper Connectors, Spacers, and all mounting hardware.
- D. Remove and scrap the original Sensors and Sensor Harness.



### Step 3: Installing the Sensors and Sensor Harness (Partial)



- 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. Set the three (3) Sensors in front of the Breaker, roughly positioned near each bottom Breaker Stab.

**NOTE: The Sensor Terminals must be positioned as shown to reduce the possibility of Arcing to the Breaker Frame.**

- C. Place the Sensor Harness near the Sensors, then connect the ring terminals of the Sensor Harness to the Sensor Terminals. Refer to Section 12 of the Retrofit Application Data, supplied with the Retrofit Kit, for detailed wiring specifications.



For AKR Retrofits, the following conventions apply.

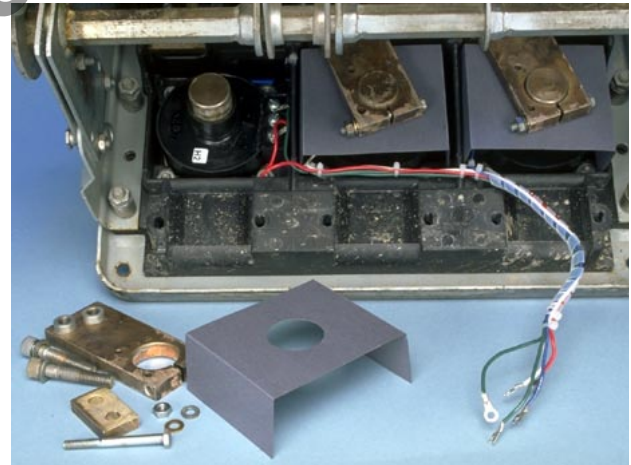
#### Sensor Style No.

4A35745H01	X1-X2 =	400A
	X1-X3 =	800A
4A35746H01	X1-X2 =	800A
	X1-X3 =	1,600A
8259A59H01	X1-X2 =	2,000A

*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.

- D. Slide one sensor over each Breaker Stab and route the Sensor Harness towards the bottom of the Breaker.
- E. Slide a Sensor Insulator over each Breaker Stab, positioned as shown.





- F. Using the original hardware, reinstall the Spacers and Copper Connectors removed in Step 2-C.

*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.

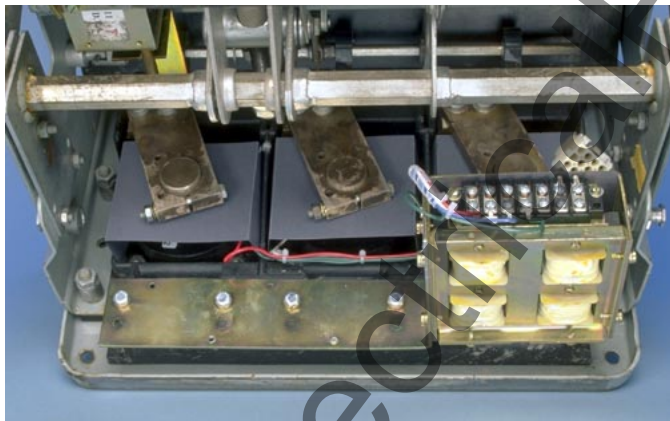


- C. Secure the Mounting Bracket to the Aux. CT Module as shown, using the original hardware and the (2) .190-16 x .500" thread cutting screws, (2) lock washers, and (2) flat washers supplied.



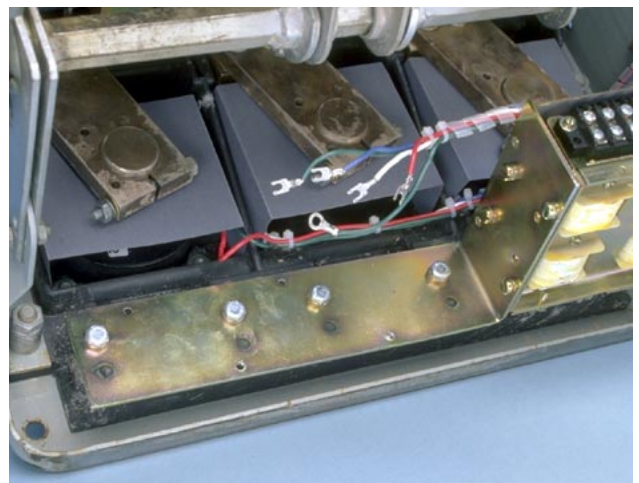
- D. Align the Aux. CT Module Assembly with the holes near the bottom of the Breaker Back Plate, then secure the Aux. CT Module Assembly using the (4) .250-20 x 2.50" bolts, (4) lock washers, and (4) flat washers supplied.

## Step 4: Installing the Aux. CT Module

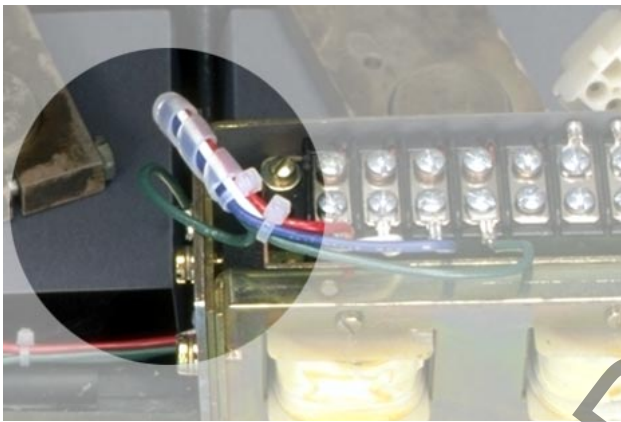


- A. Remove the two (2) screws from the left side of the Aux. CT Module.
- B. Align the holes in the short side of the Aux. CT Module Mounting Bracket with the holes in the left side of the Aux. CT Module.

**NOTE:** On some Breakers, it may be necessary to "space" the middle two (2) holes of the Aux. CT Module Assembly away from the Breaker Back Plate to keep the Mounting Plate from bowing when the bolts are tightened. Use the X-wide flat washers supplied with the Retrofit Kit for this purpose.



- E. Connect the Sensor Harness to the proper terminals on the Aux. CT Module. Refer to Section 12 of the Retrofit Application Data, supplied with the Retrofit Kit, for detailed wiring specifications.
- F. Remove one of the screws that secure the Mounting Bracket to the left side of the Aux. CT Module. Using the screw just removed, connect the green ground wire from the Sensor Harness (with ring terminal) to the Aux. CT Module.



- G. Secure the Sensor Harness, using the wire ties supplied, to keep it clear of any moving parts within the Breaker.

*For Kits Supplied with a PT Module Only.*

#### **Step 5: Installing the PT Module**

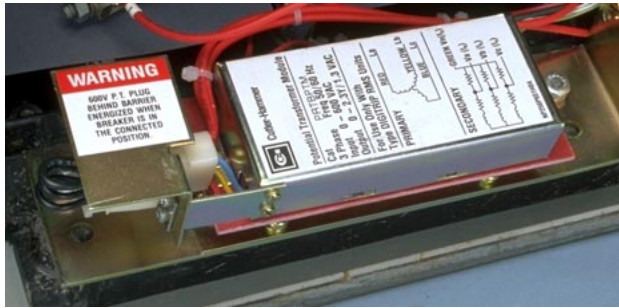


- A. Align the PT Module "Z" Mounting Bracket with the holes near the bottom center of the Aux. CT Module Mounting Bracket. Secure the PT Module Mounting Bracket using the (2) .190-16 x .500" thread cutting screws, (2) lock washers, and (2) flat washers supplied.





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



- C. 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.**

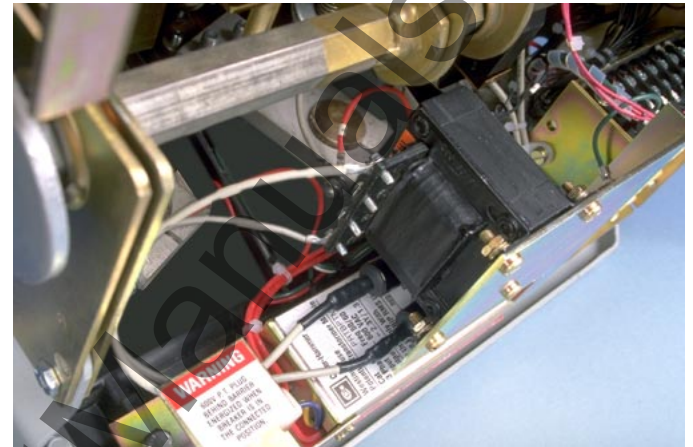
Route the PT Wires to a position suitable for attachment to the pinch bolts securing each Copper Connector. Move the PT Wire markers to a position where they will still be attached to the wires after cutting. Cut the wires to length, strip each wire .250", and install a .250" ring terminal on each wire.

Remove the nuts and washers from the pinch bolts. Using the hardware just removed, connect the PT Wires to the Copper Connectors.



*For Kits Supplied with a Breaker Mounted CPT Only.*

#### Step 6: Installing the Breaker Mounted CPT



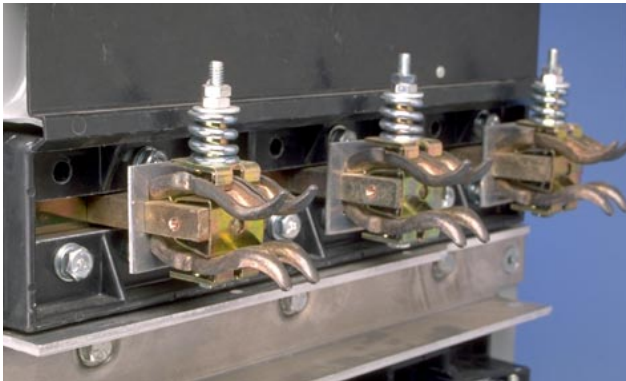
**NOTE: The power convention of Circuit Breakers is normally Top to Bottom, meaning the Top Breaker Stabs are on the Line Side of the Breaker and the Bottom Breaker Stabs are on the Load Side.**

**The 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.**

- A. Return the Breaker to its upright position.

- B. 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.

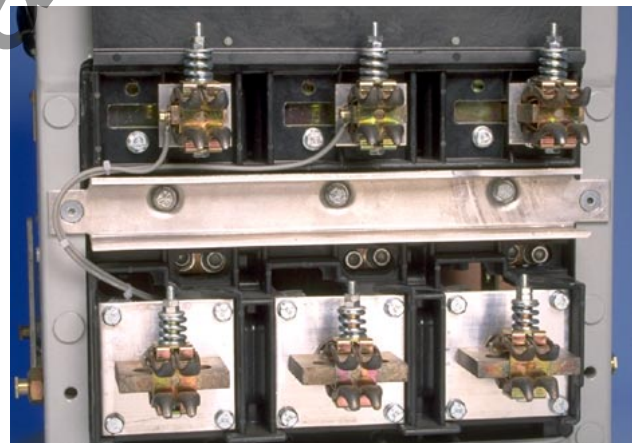


- C. Again tilt the Breaker towards the back until it rests on the bottom Finger Clusters to provide access to the bottom of the Breaker.
- D. Position the High Voltage Fused Wires (HV Wires) so the fuses are near the Aux. CT Module and in an accessible location.
- E. Secure the Line Side HV Wires to the Aux. CT Module, as shown, using an existing screw in the Aux. CT Module and the (1) wire clamp supplied.



**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.

- F. Route the HV Line Side Wires through the opening above the bottom right Breaker Stab, then up towards the appropriate top Breaker Stabs (Phase 1 & 2, or 2 & 3).
- G. Strip .250" from each Line Side HV Wire and attach a .190" ring terminal to each.
- H. 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.



- I. Place the CPT in front of the Breaker. 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.

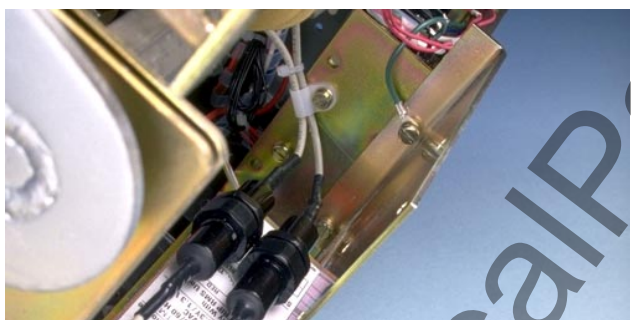


- J. Attach the HV Wires to the CPT terminals to achieve the required voltage. (See the following Table.)

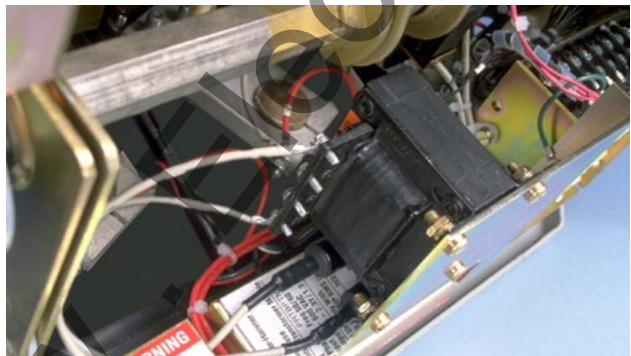
**Voltage Required    CPT Terminals Used**

480 Volt Circuit	H1 & H4
240 Volt Circuit	H1 & H3
208 Volt Circuit	H1 & H2

- K. Remove and scrap the two (2) bottom screws securing the Aux. CT Module Mounting Bracket to the Aux. CT Module. Mount the CPT Mounting Bracket to the Aux. CT Module Assembly, as shown, using the (2) .190-32 x .750" screws, (2) lock washers, and (2) flat washers supplied.



- L. 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.

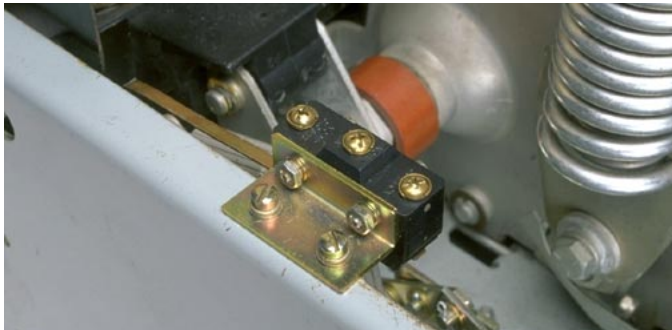


- M. Use the nylon wire ties provided to dress all wires to keep them away from any moving parts within the Breaker.
- N. Return the Breaker to its upright position.
- O. Attach the appropriate label for the Breaker to the Breaker Cover in a clearly visible position.



*For Kits Supplied with an Auxiliary Switch Only.*

### Step 7: Installing the Auxiliary Switch



- A. Using a pair of diagonals, cut 1.50" off the end of the Microswitch Arm.
- B. Attach the Microswitch to the Aux. Switch Mounting Bracket, as shown, using the (2) .138-32  $\times$  1.00" screws, (2) lock washers, (4) flat washers, and (2) nuts supplied.



- C. Align the Aux. Switch Assembly with the existing holes in the top of the left Breaker Frame. Secure the Aux. Switch Assembly, in the position shown, to the Breaker using the (2) .190-32  $\times$  .375" screws, (2) lock washers, and (2) flat washers supplied.



### Step 8: Installing the DTA and Reset Assemblies



- A. *For Electrically Operated Breakers Only.*  
Remove the cap screw securing the Trip Finger to the Breaker Cross Bar. Align the Trip Finger Extension Plate with the hole in the Trip Finger. Secure the Extension Plate to the Trip Finger using the original hardware.

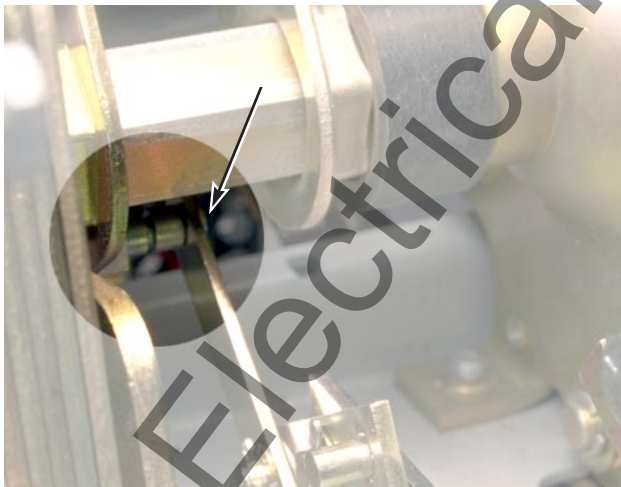




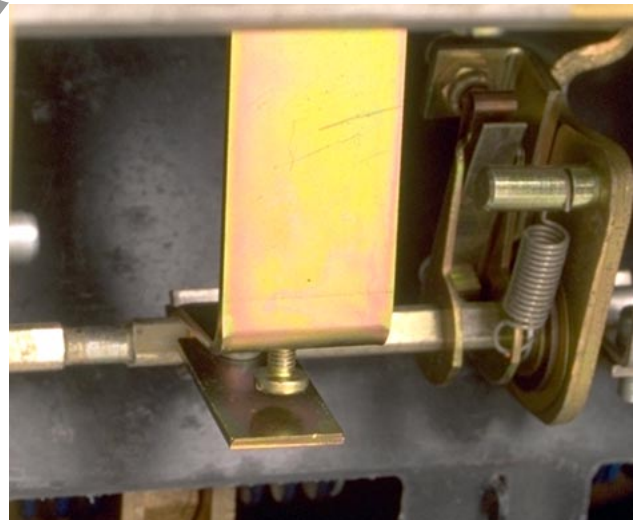
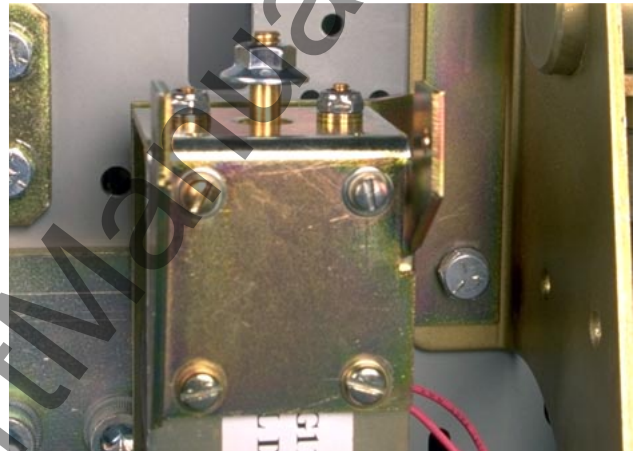
- B. Align the Reset Pivot Assembly with the existing holes in the Breaker Shelf. Apply Loc-Tite® 242 to the threads then mount the Reset Pivot Assembly using the (2) .164-32 × .375" screws, (2) lock washers, and (2) flat washers supplied.



- C. Connect the Reset Pivot Assembly Arm to the existing pin on the Breaker Trip Bar, as shown. Secure the Reset Pivot Assembly Arm to the pin using the "E-clip" supplied.



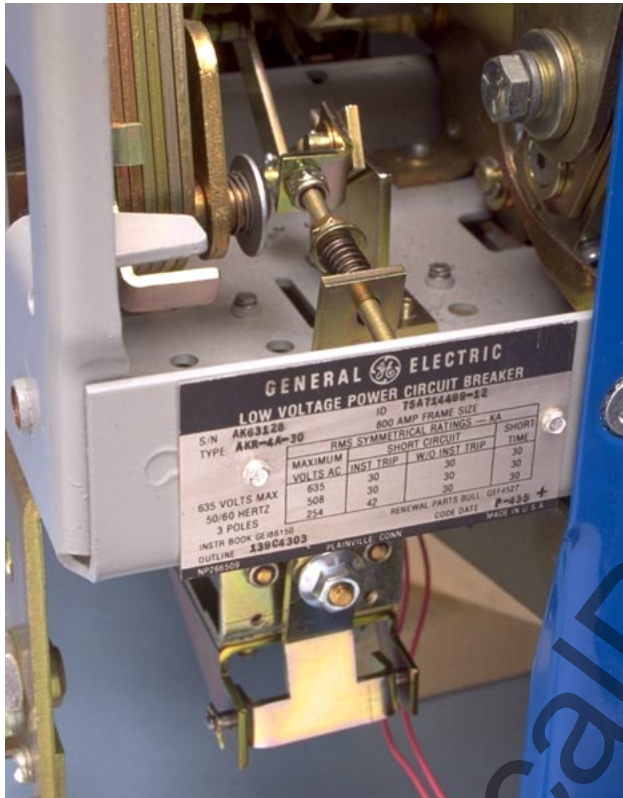
- D. Align the DTA Assembly with the existing holes in the Breaker Shelf. Apply Loc-Tite® 242 to the threads then secure the DTA Assembly to the Breaker Shelf using the (2) .250-20 × .750" bolts, (2) lock washers, and (2) flat washers supplied. Note the orientation of the DTA Gap Adjustment Screw to the Trip Finger.



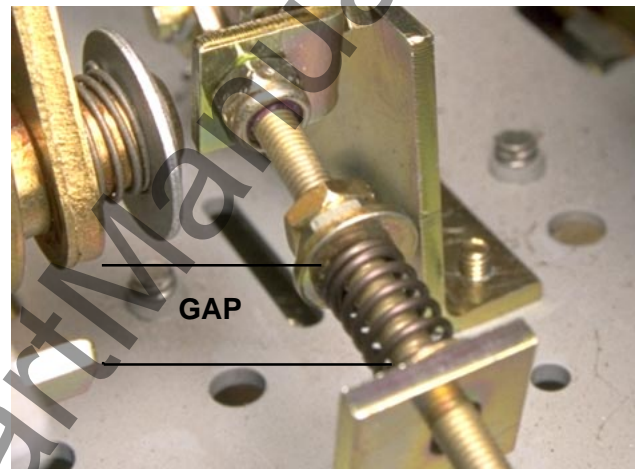
- E. Remove the flange nut from the end of the DTA Shaft. Insert the Reset Arm through the existing cut-out in the Breaker Shelf then attach the Reset Arm to the DTA Assembly using the pivot pin and (2) "X" washers supplied. Apply Loc-Tite® 242 to the threads of the DTA Shaft then reinstall the flange nut.



- F. Install the Reset Link between the Reset Arm and Reset Pivot Assembly, as shown, using the cotter pins, flat washers, and lock nut supplied. Note that the large flat washers must be installed on both ends of the spring.



- H. Turn the adjusting nuts on the Reset Link until the cage height (compressed spring length) is  $11/16"$  (.690"). This should create a reset force of 12 to 15 lbs. when measured on the Reset Arm near the DTA flange nut. If either of these specifications are not met, adjust the nuts on the Reset Link until these specifications are achieved.

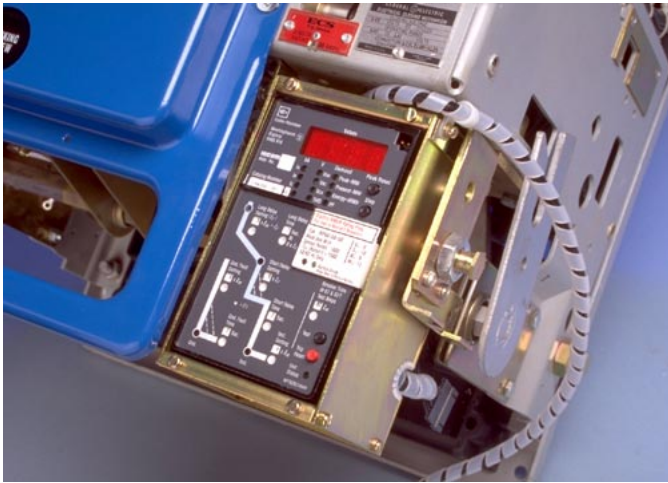


- G. Adjust the DTA Gap Adjustment Screw to achieve a gap between the screw head and the Trip Finger of approximately .09" to .12".



- I. Route the DTA Wires through the Breaker to the Aux. CT Module.
- J. Connect the "+" DTA Wire to the "OP" terminal of the Aux. CT Module and the unmarked wire to the "ON" terminal.
- G. Use the nylon wire ties supplied to dress the DTA Wires to keep them away from any moving parts within the Breaker.



**Step 9: Installing the Trip Unit**

- A. Remove and scrap the two (2) bolts, washers, and nuts from the right front corner of the Breaker Shelf that secure the right Racking Pin Assembly to the Breaker.
- B. Align the holes in the right Trip Unit Mounting Bracket and the original Racking Pin Assembly, as shown, with the holes from which the bolts were just removed. Secure the right Trip Unit Mounting Bracket to the Breaker using the (2) .250-20 x .750" bolts, (4) flat washers, (2) lock washers, and (2) nuts supplied.



- C. Remove the Trip Unit Box Cover.

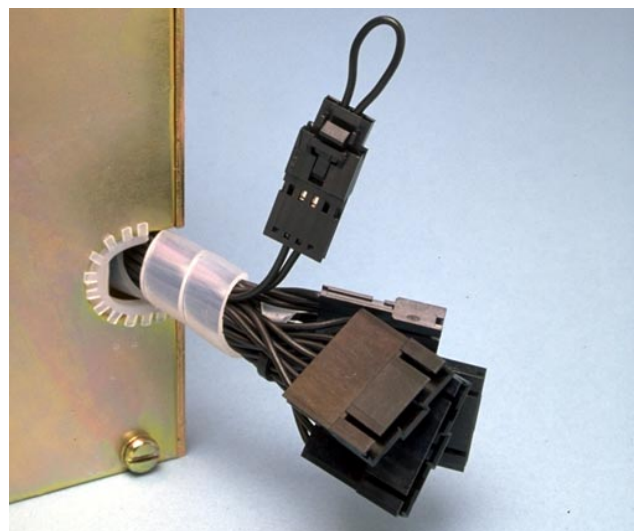
- D. Remove the existing screw then secure the left Trip Unit "L" Mounting Bracket to the Trip Unit Box (Minibox), as shown, using the (1) .164-32 x .375" screw, (1) lock washer, and (1) flat washer supplied.



*For 810 and 910 Kits Only.*

- E. **Only for Certain Applications.** If the Breaker being Retrofitted is to be used in an application where negative power readings must be defeated, the Negative Power Shorting Plug must be installed.

To defeat negative power readings, cut the wire tie attaching the Negative Power Shorting Plug to the Trip Unit Box. Install the Negative Power Shorting Plug, as shown, into the receptacle on the Trip Unit Box Pigtail.





- F. Align the white female communications cable connector in the Trip Unit Box with the receptacle in the back of the Trip Unit. Insert the connector until completely seated.

*For All Kits.*

- G. Align the Trip Unit Edge Card with the Receptacle in the Trip Unit Box. Plug the Trip Unit into the Trip Unit Box.

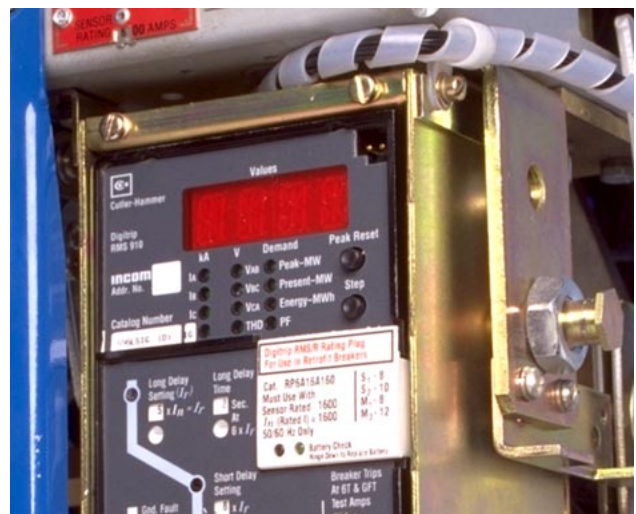
**CAUTION: Do not apply undue force to the Trip Unit. If it does not plug easily into the Trip Unit Box, make sure the Edge Card is properly aligned with the Receptacle and that the Jacking ("J") Screws are fully retracted. Applying undue force can damage the Trip Unit.**

- H. Connect the External Harness to the pigtail at the rear of the Trip Unit Box. Then route the External Harness over the top of the box.



**NOTE: For 510 Basic Kits, the External Harness is the plug pictured above. It is to be plugged into the corresponding receptacle on the Trip Unit Box Pigtail.**

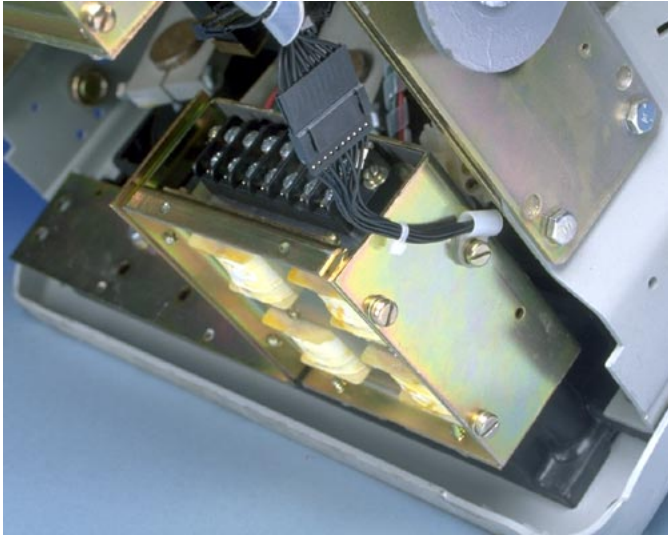
- I. Remove the existing hardware from the top right side of the Trip Unit Box. Align the Trip Unit Assembly with the holes in the Breaker Shelf and right Trip Unit Mounting Bracket as shown. Secure the Trip Unit Assembly to the Breaker using the (1) .250-20 x .750" bolt, (2) flat washers, (1) lock washer, and (1) nut supplied for the left mounting and the (2) .164-32 x .375" screws, (2) lock washers, and (2) flat washers for the right side. The External Harness can be secured to the Trip Unit Box using the wire clamp supplied and the screw securing the right Trip Unit Box Mounting Bracket.



- J. Remove the Trip Unit Cover and install the Rating Plug. Reinstall the Trip Unit Cover.
- K. Reinstall the Trip Unit Box Cover.



### Step 10: Final Connection of the Harnesses and Wiring



- A. Plug the Aux. CT Harness into the Aux. CT Module. Route the Aux. CT Harness to the Trip Unit Box. Plug the Aux. CT Harness into the appropriate connector in the Trip Unit Box Pigtail.
- B. *For Kits Supplied with a PT Module Only.* Plug the PT Extension Harness into the receptacle on the PT Harness. Connect the other end of the PT Module Extension Harness to the corresponding plug on the External Harness.
- C. *For Kits Supplied with an Aux. Switch Only.* Route the two (2) wires with ring terminals from the External Harness through the Breaker to the Microswitch. Connect one (1) wire to the normally open terminal and the other wire to the common terminal.

**NOTE:** Depending on the exact routing of the Aux. Switch Wires, it may be necessary to cut the last wire tie on the External Harness and remove more of the Aux. Switch Wires from the spiral wrap to provide sufficient length.

- D. *For Kits Supplied with a Breaker Mounted CPT Only.* Remove the External harness plug installed in the Trip Unit Pigtail. Route the CPT Harness up from the CPT to the Trip Unit Box. Connect the black plug of the CPT Harness into the same receptacle in the Pigtail. Reinsert the External Harness plug just removed into the female receptacle on the CPT Harness.
- E. Use the nylon wire ties supplied to dress all wires and harnesses to keep them away from any moving parts within the Breaker.

### Step 11: 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 Kits. 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 1 and 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 communicating 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 1 and 3 ohms.

When the test is complete, disconnect the External Harness from the Cell Harness. Final External Harness Connection will be performed in Step 12.

*For Kits Supplied with a Cell Harness Only.*

### Step 12: 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 13: 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 AKR Series Breakers

Step	Description	Style No.	Qty.	Comment
Step 3	Sensor		3	See Pick List
	Sensor Harness Parts	4A35731G06	1	
	Sensor Harness		1	
	Sensor Insulator		3	
	Wire Tie Nylon		5	
Step 4	Aux. CT Module	6506C44G__	1	
	Aux. CT Module Assembly Parts	4A35731G04	1	
	Aux. CT Module Mounting Bracket		1	
	.190-16 × .500 Lng. T.C. Screw		3	
	.190 Flat Washer Stl.		3	
	.190 Lock Washer Stl.		3	
	Aux. CT Module Mounting Parts	4A37531G05	1	
	.250-20 × 2.50 Lng. Hex Bolt		4	
	.250 Flat Washer Stl.		4	
	.250 Lock Washer Stl.		4	
	.250 X-Wide Flat Washer Stl.		4	
	Wire Tie Nylon (From Step 3)		5	
Step 5	PT Module Kit	6502C82G01	1	
	PT Module Mounting Parts	4A35731G11	1	
	PT Module "Z" Mounting Bracket		1	
	Glass Poly Insulation Barrier		1	
	.190-16 × .500 Lng. Screw Pan T.C.		2	
	.190 Flat Washer Stl.		2	Comm. Only
	.190 Lock Washer Stl.		2	
	.138-32 × .375 Lng Screw Fil.		2	
	.138 Flat Washer Stl.		2	
	.138 Lock Washer Stl.		2	
	Wire Tie Nylon		6	
	PT Extension Harness	6502C85G01	1	
Step 6	Breaker Mounted CPT Kit	8259A91G05	1	
	CPT Mounting Parts	4A35731G20	1	
	CPT Mounting Bracket		1	
	.190-16 × .750 Lng. Screw Pan T.C.		2	
	.190-32 × .500 Lng. Screw Fil.		4	CPT Only
	.190 Flat Washer Stl.		10	
	.190 Lock Washer Stl.		6	
	.190-32 Nut Hex Stl.		4	
	Wire Clamp Nylon		1	

## Digitrip Retrofit Kit Installation Components for the General Electric AKR Series Breakers (Continued)

Step	Description	Style No.	Qty.	Comment
Step 7	Aux. Switch Kit	4A35731G02	1	Comm. Only
	Microswitch		1	
	Aux. Switch Mounting Bracket		1	
	.190-32 × .375 Lng. Screw Fil.		2	
	.190 Flat Washer Stl.		2	
	.190 Lock Washer Stl.		2	
	.138-32 × 1.00 Lng. Screw Fil.		2	
	.138 Flat Washer Stl.		4	
	.138 Lock Washer Stl.		2	
	.138-32 Nut Hex Stl.		2	
	Wire Tie Nylon		6	
Step 8	DTA Assembly	4A35731G35	1	
	DTA Reset Parts	4A35731G08	1	
	Reset Pivot Assembly		1	
	Reset Assembly		1	
	Pivot		1	
	Pivot Pin		1	
	.188 X-Washers Stl.		2	
	.250 E-Clip		1	
	Trip Finger Extension Plate (Used for Electrically Operated Only)		1	
	.164-32 × .375 Lng. Screw Fil.		2	
	.164 Flat Washer Stl.		2	
	.164 Lock Washer Stl.		2	
	Loc-Tite® 242		1	
	DTA Mounting Parts	4A35731G09	1	
	.250-20 × .750 Lng. Hex Bolt		2	
	.250 Flat Washer Stl.		2	
	.250 Lock Washer Stl.		2	

**Digitrip Retrofit Kit Installation Components for the General Electric AKR Series Breakers (Continued)**

Step	Description	Style No.	Qty.	Comment
Step 9	RMS/R Trip Unit		1	See Pick List
	Trip Unit Box (Minibox)	6506C26G__	1	See Pick List
	Rating Plug		1	See Pick List
	Trip Unit Mounting Parts	4A35731G07	1	
	Trip Unit "L" Mounting Bracket L. H.		1	
	Trip Unit Mounting Bracket R. H.		1	
	.250-20 × .750 Lng. Hex Bolt		3	
	.250 Flat Washer Stl.		6	
	.250 Lock Washer Stl.		3	
	.250-20 Nut Hex Stl.		3	
	.164-32 × .375 Lng. Screw Pan		3	
	.164 Flat Washer Stl.		3	
	.164 Lock Washer Stl.		3	
	Wire Clamp Nylon		1	
	External Harness	6502C83G__	1	Except 510 Basic
	External Harness Parts	4A35731G10	1	
	.164-32 × .500 Lng. Screw Pan		1	
	.164 Flat Washer Stl.		1	
	.164 Lock Washer Stl.		1	
	Wire Clamp Nylon		1	
Step 10	Aux. CT Harness	6502C84G02	1	
	PT Extension Harness (From Step 5)		1	Comm. Only
Step 11	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.

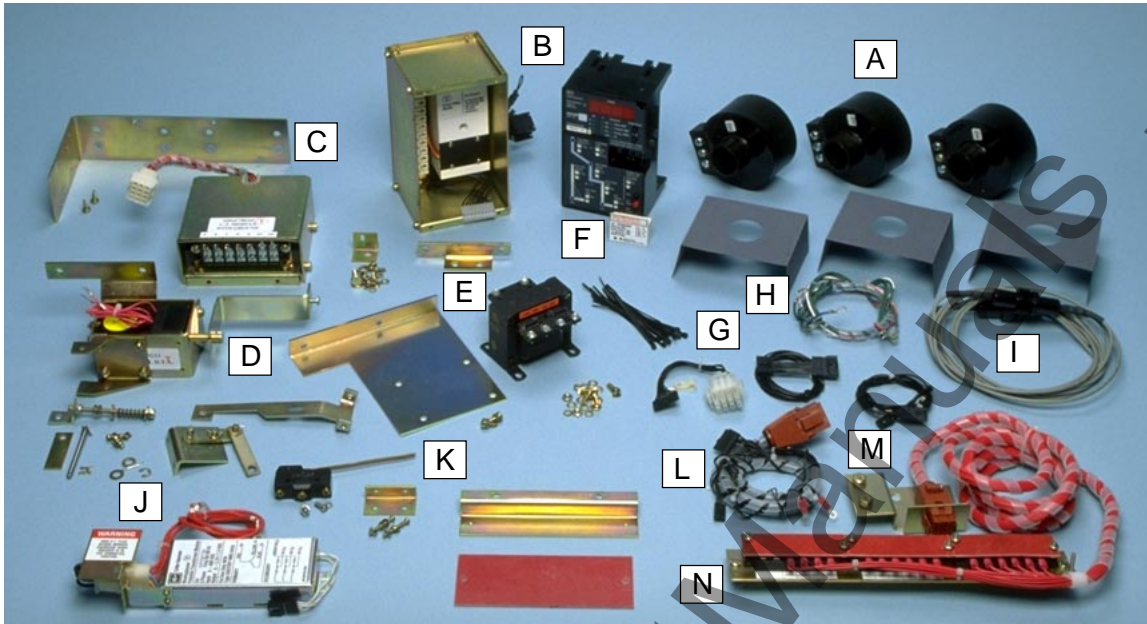
**Torque Values for General Mounting**

<b>Decimal Size (in)</b>	<b>Standard Size</b>	<b>Torque (in-lbs)</b>	<b>Torque (ft-lbs)</b>
.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**

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





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

Notes:

*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.*

Phone: **1-800-937-5487** Fax: (724) 779-5899

*The instructions for installation, testing, maintenance, or repair herein are provided for the use of the product in general commercial applications and may not be appropriate for use in nuclear applications. Additional instructions may be available upon specific request to replace, amend, or supplement these instructions to qualify them for use with the product in safety-related applications in a nuclear facility.*

The information, recommendations, descriptions, and safety notations in this document are based on Cutler-Hammer's experience and judgement with respect to retrofitting of power breakers. This information should not be considered to be all inclusive or covering all contingencies. If further information is required, Cutler-Hammer should be consulted.

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