



## Digitrip Retrofit System for Siemens-Allis LAF-1600 B & C Fused Breakers



LAF-1600 B SHOWN

### 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.**



# Digitrip Retrofit System for Siemens-Allis LAF-1600 B & C Fused Breakers

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**INTRODUCTION**

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, PowerNet communications, energy monitoring capabilities, power factors, and harmonic content measurements.

Table 1 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 Table 1. It is important that the Retrofitter understands 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.

**Table 1 Available Retrofit Kits**

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 33-855-4), supplied with the Digitrip Retrofit Kit.

**WARNING**

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**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 area.

**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 seven and a quarter (7.25) lbs.

**NOTE:** It is the responsibility of the Retrofitter to insure that the proper, manufacturer's recommended crimping tools and terminals are used for each type of connector. It is also the responsibility of the Retrofitter to insure that all wire preparations, connections, strippings, terminations, and wiring techniques are performed according to the latest IEEE, NEC, and / or NEMA industry standards, specifications, codes, and guidelines.

To begin the Retrofit Process, refer to the components list at the end of this manual. Layout the components and hardware according to the steps outlined. The parts bags are labeled with the corresponding step number. The components and hardware will be used to complete each step in the Retrofit Process.

## STEP 2: REMOVING THE ORIGINAL COMPONENTS

Refer to the Siemens-Allis LAF-1600 B and/or C Instruction Manual, originally supplied with the Breaker, to perform the following procedures.

- A. Remove and save the hardware securing the Manual Closing Handle to the Breaker. Remove and save the Manual Closing Handle.
- B. Remove and save the hardware securing the Front Cover to the Breaker. Remove and save the Front Cover.
- C. Remove and scrap the hardware securing the Static Trip Device Assembly (Trip Unit Assembly) to the right Breaker Frame. Remove and scrap the Static Trip Device Assembly and associated wiring.
- D. Remove and scrap the hardware securing the Tripping Actuator Assembly (original DTA) to the Breaker. Remove and scrap the Tripping Actuator Assembly and associated wiring.
- E. Remove and save the hardware securing the Primary Disconnect Fingers (Finger Clusters) to the bottom Breaker Studs. Remove and save the Finger Clusters.
- F. Remove and scrap the CTs (Sensors), spacers, and associated wiring.

**NOTE:** Depending on the original configuration of the Breaker, it may be necessary to remove the Fuse Carriage Assembly in order to remove the CTs. If this is necessary, refer to the Siemens-Allis LAF-1600 B and/or C Manual, originally supplied with the Breaker, for removal and installation instructions.



Fig. 1 Original Components Removed from the Breaker and Saved for Reinstallation.

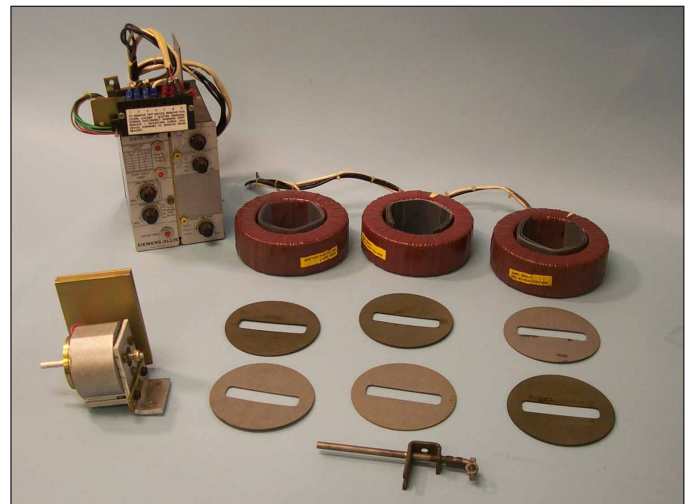
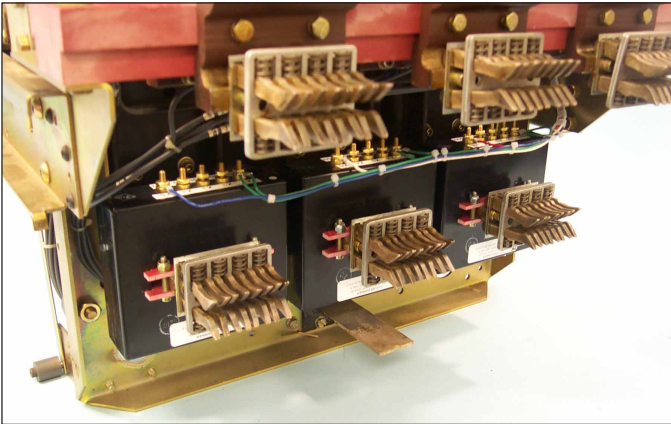


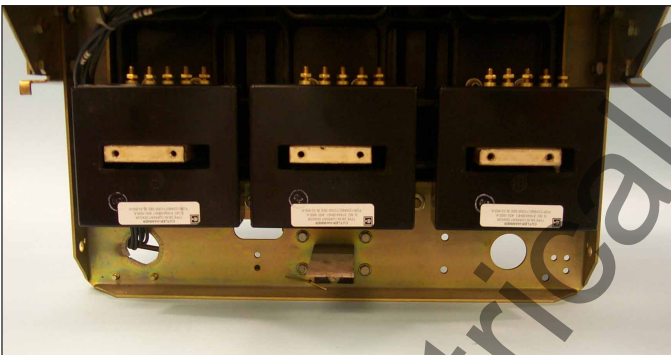
Fig. 2 Original Components Removed from the Breaker and Scrapped.

**STEP 3: INSTALLING THE SENSORS**



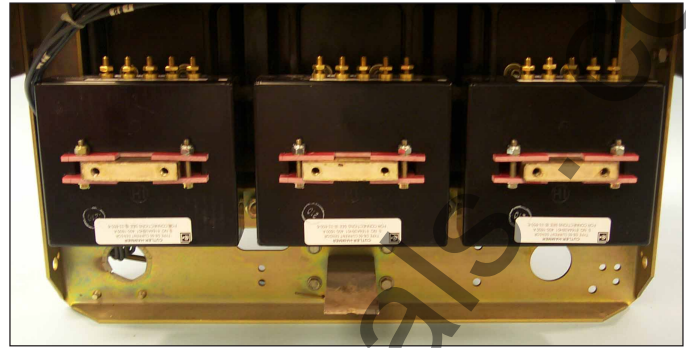
*Fig. 3 Overview: Sensors Installed on the Breaker.*

- A. Slide a Sensor over each bottom Breaker Stud, as shown. Note that the Sensor Terminals are at the top and that the Sensor Nameplates face the rear of the Breaker.



*Fig. 4 Sensors Installed on the Bottom Breaker Studs.*

- B. Position a Sensor Spacer at the top and bottom of each bottom Breaker Stud, as shown. Using the (6) .190-32 x 1.25" screws, (12) flat washers, and (6) Nylok nuts supplied secure the Sensor Spacers to the bottom Breaker Studs so they hold the Sensors against the Breaker Backplate. Do not over tighten the mounting hardware.



*Fig. 5 Sensor Spacers Installed on the Bottom Breaker Studs.*

- C. Connect the ring terminals of the Sensor Harness to the Sensors.

Refer to Section 12 of the Retrofit Application Data, supplied with the Retrofit Kit, for detailed wiring specifications.

For LAF-1600 B and C Retrofits, the following conventions apply.

*Table 2 Sensor Taps Rating*

Sensor Style No.	Terminal Com.	Amps
8184A38H01	X1 - X5 =	1,600 A
	X2 - X5 =	1,200 A
	X3 - X5 =	1,000 A
	X1 - X4 =	800 A
	X1 - X3 =	600 A
	X1 - X2 =	400 A

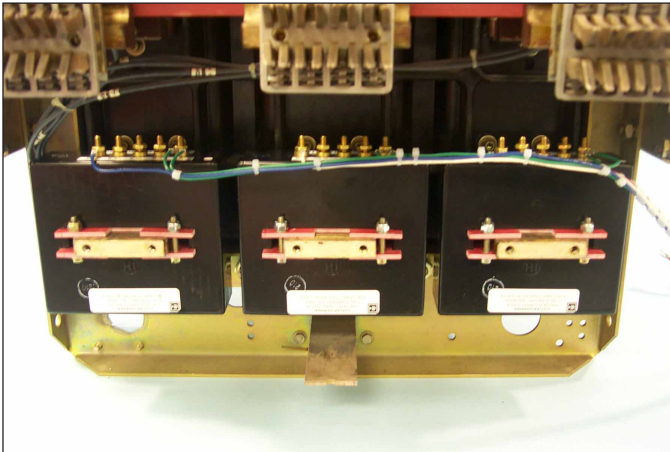


Fig. 6 Sensor Harness Connected to the Sensors.

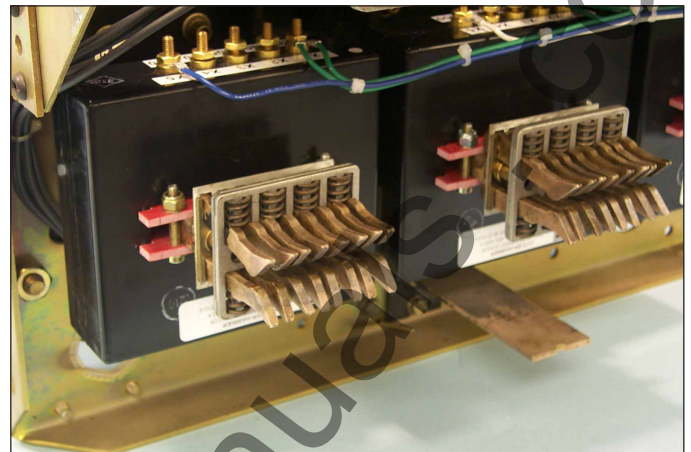


Fig. 8 Finger Clusters Reinstalled on the Bottom Breaker Studs.

- D. Temporarily route the Sensor Harness, as shown, up along the left side of the Breaker Backplate towards the top of the Breaker. Final Sensor Harness routing and connections will be made later in the Retrofit Process.

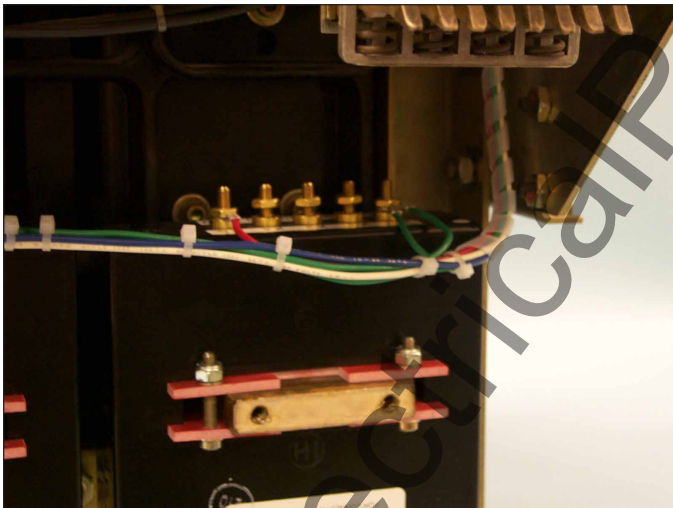


Fig. 7 Sensor Harness Routed Towards the Top of the Breaker.

- E. Using the original mounting hardware removed in Step 2-C, reinstall the Finger Clusters.

*For Kits Supplied with a PT Module Only:* Do not fully tighten the Finger Cluster hardware at this time. This hardware will be used to secure the PT Wires later in the Retrofit Process.

#### STEP 4: INSTALLING THE AUX. CT MODULE ASSEMBLY

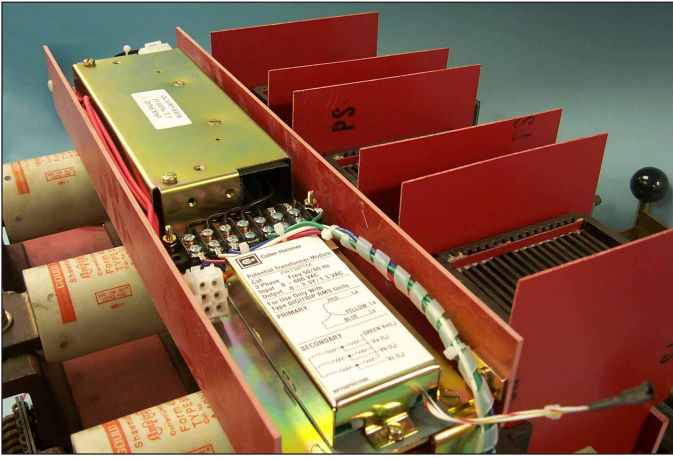


Fig. 9 Overview: Aux. CT Module Assembly Installed on the Breaker.

- A. Remove and save the mounting hardware securing the top of the Breaker Backplate to the rear Breaker Frame.



Fig. 10 Location of the Breaker Backplate Mounting Hardware.

- B. Align the right and left Aux. CT Module Mounting Brackets with the holes in the Breaker Backplate and rear Breaker Frame. Reinstall the mounting hardware removed in the previous step but do not fully tighten at this time.

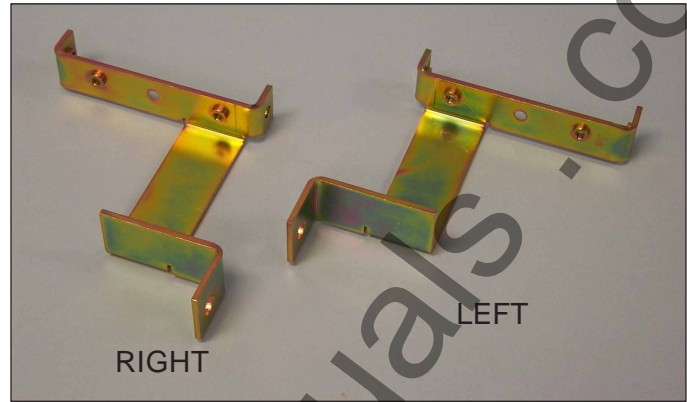


Fig. 11 Identifying the Aux. CT Module Mounting Brackets.

- C. Align the front Aux. CT Module Insulation Barrier with the existing holes in the front of the Aux. CT Module Mounting Brackets, as shown. Loosely secure the front Insulation Barrier to the mounting Brackets using the (2) .190-32 x .500" nylon screws supplied.

**NOTE:** The front and rear Aux. CT Module Insulation Barriers are the same and, therefore, interchangeable.



Fig. 12 Front Aux. CT Module Insulation Barrier Installed on the Mounting Brackets.

- D. Once the front Aux. CT Module Insulation Barrier is loosely secured to the Aux. CT Module Mounting Brackets, make sure the mounting brackets are level with the top of the Breaker. Fully tighten the mounting hardware for both the Mounting Brackets and front Insulation Barrier.

- E. Align the Insulation Barrier Mounting Brackets with the existing holes in the bottom Aux. CT Module Insulation Barrier, as shown. Secure the mounting brackets to the Insulation Barrier using the (4) .190-32 x .250" nylon screws supplied.

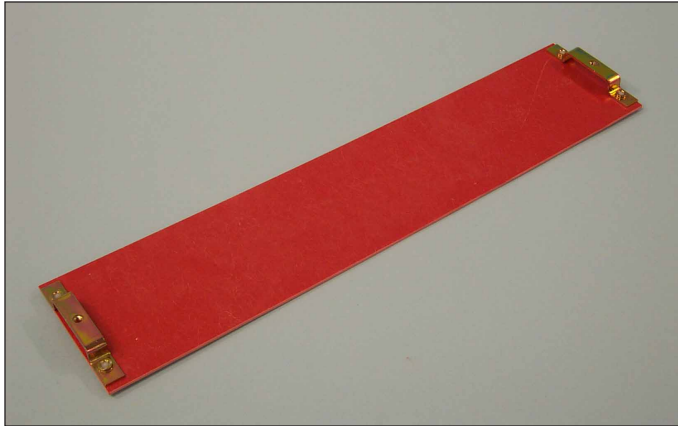


Fig. 13 Mounting Brackets Installed on the Bottom Aux. CT Module Insulation Barrier.

- F. Align the bottom Aux. CT Module Insulation Barrier Assembly with the existing center holes in the right and left Aux. CT Module Mounting Brackets, as shown. Secure the bottom Aux. CT Module Insulation Barrier Assembly to the Aux. CT Module Mounting Brackets using the (2) .190-32 x .375" flat head, counter sunk screws supplied.



Fig. 14 Bottom Aux. CT Module Insulation Barrier Assembly Installed on the Aux. CT Module Mounting Brackets.

- G. Align the Aux. CT Module Mounting Platform with the holes in the right and left Aux. CT Module Mounting Brackets, as shown. Secure the Aux. CT Module Mounting Platform to the Aux. CT Module Mounting Brackets using the (4) .190-32 x .375" flat head, counter sunk screws supplied.

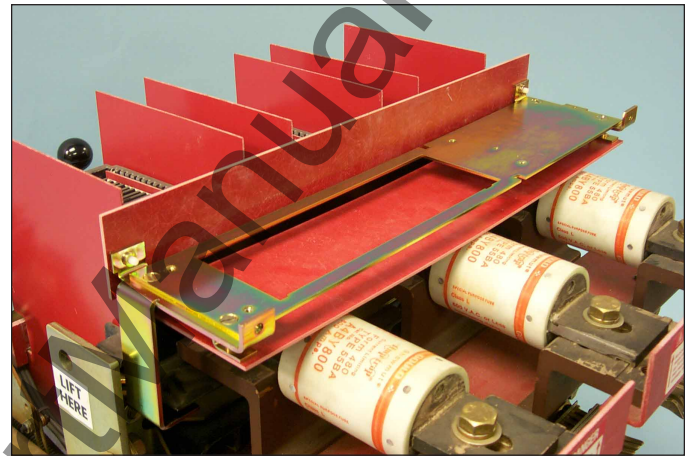


Fig. 15 Aux. CT Module Mounting Platform Installed on the Aux. CT Module Mounting Brackets.

- H. Align the rear Aux. CT Module Insulation Barrier with the existing holes in the rear of the Aux. CT Module Mounting Brackets, as shown. Secure the rear Insulation Barrier to the mounting Brackets using the (2) .190-32 x .500" nylon screws supplied.

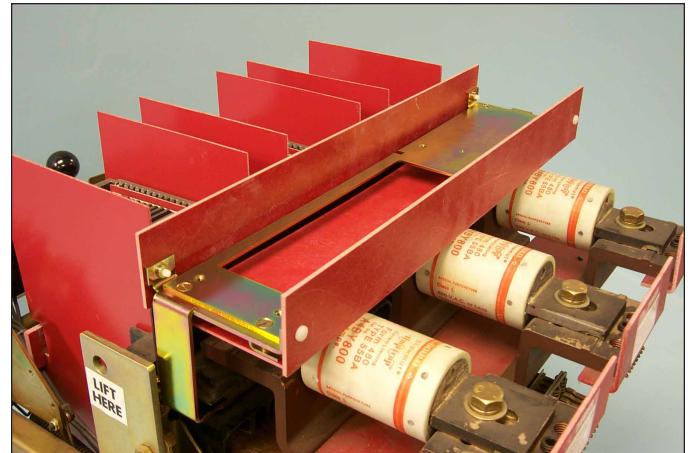


Fig. 16 Rear Aux. CT Module Insulation Barrier Installed on the Mounting Brackets.

- I. Align the Aux. CT Module with the existing holes in the Aux. CT Module Mounting Platform. Secure the Aux. CT Module to the mounting platform using the (4) .190-32 × .375" flat head, counter sunk screws supplied. Note that the Aux. CT Module Terminal Block should be oriented towards the left side of the Breaker. Connect the Aux. CT Harness the Aux. CT Module pigtail and route the Aux. CT Harness towards the right side of the Breaker.

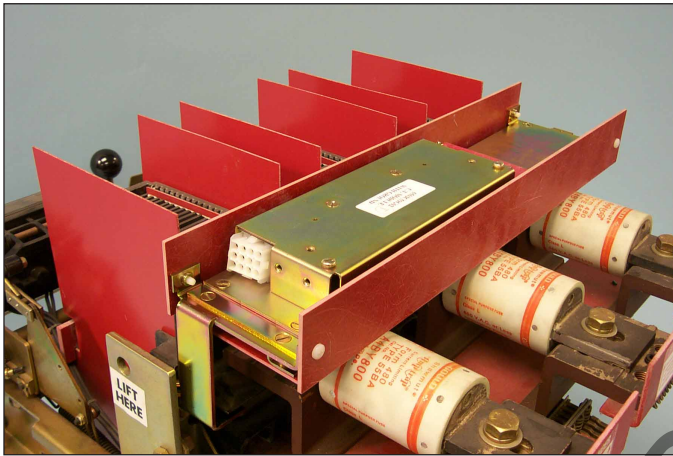


Fig. 17 Aux. CT Module Mounted to the Aux. CT Module Mounting Platform.

- J. Remove and save the cover from the Aux. CT Module Terminal Block. Route the Sensor Harness along the outside of the left Aux. CT Module Mounting Bracket to the Terminal Block. Using the (1) self-adhesive mounting pad and (1) wire tie supplied, secure the Sensor Harness to the left Aux. CT Module Mounting Bracket.

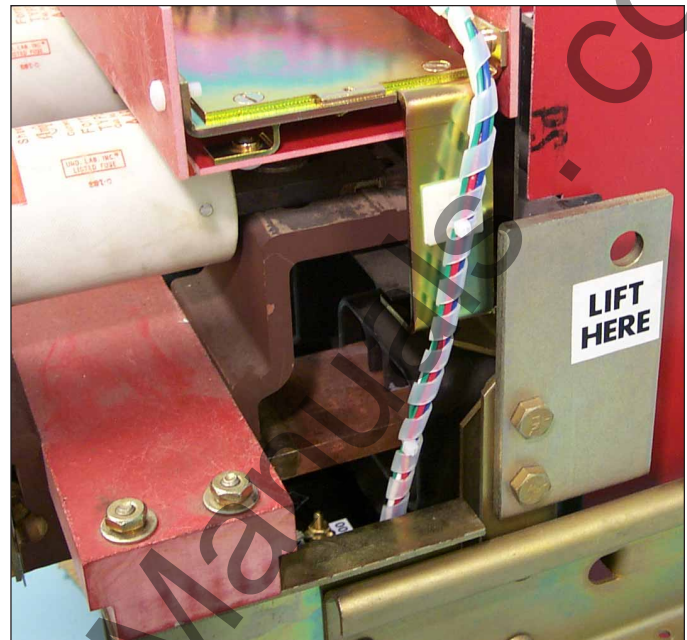


Fig. 18 Sensor Harness Secured to the Left Aux. CT Module Mounting Bracket.

- K. Connect the Sensor Harness to the proper terminals of the Aux. CT Module. Refer to Section 12 of the Retrofit Application Data, supplied with the Retrofit Kit, for detailed wiring specifications. The long tan and green wires in the Sensor Harness are used for a remote Neutral Sensor on a 4W Ground Breaker. If these wires are not used in this application, they should be removed from the Sensor Harness.

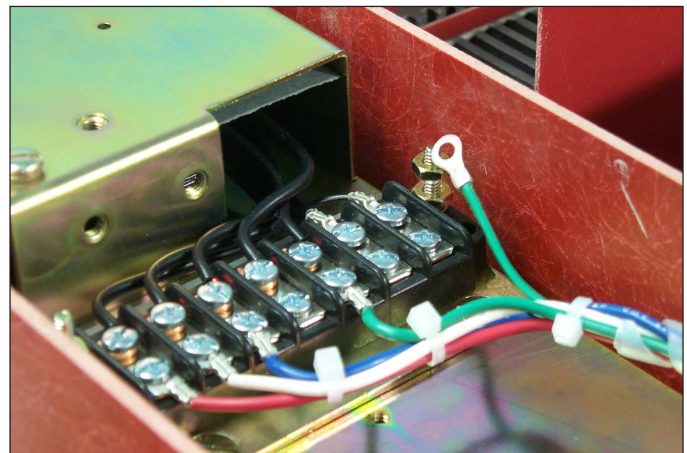


Fig. 19 Sensor Harness Connected to the Aux. CT Module Terminal Block.

- L. Remove one of the nuts from the front Terminal Block Cover Stud. Connect the Sensor Harness Ground Wire (with ring terminal) to the stud. Use the original nut to secure the ground wire.

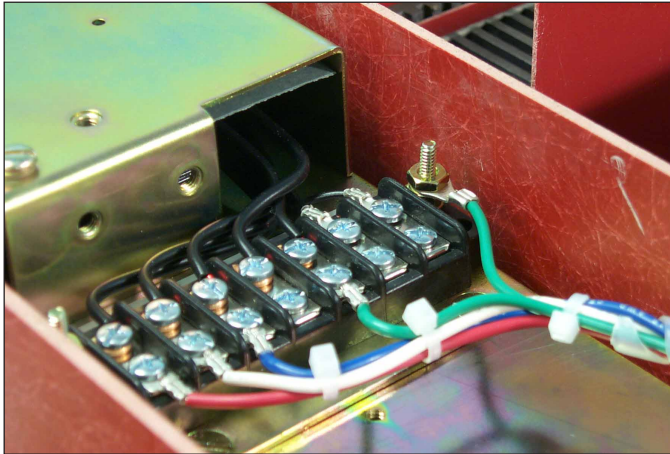


Fig. 20 Sensor Harness Ground Wire Connected to the Terminal Block Cover Stud.

**NOTE:** The Terminal Block Cover will be installed later in the Retrofit Process after the DTA Wires are connected to the Terminal Block.

*For Kits Supplied with a PT Module Only.*

- M. Remove and scrap the “PT Label Flag” from the PT Module.



Fig. 21 PT Module Warning Label Bracket Removed from the PT Module.

- N. Connect the PT Extension Harness to the PT Module.

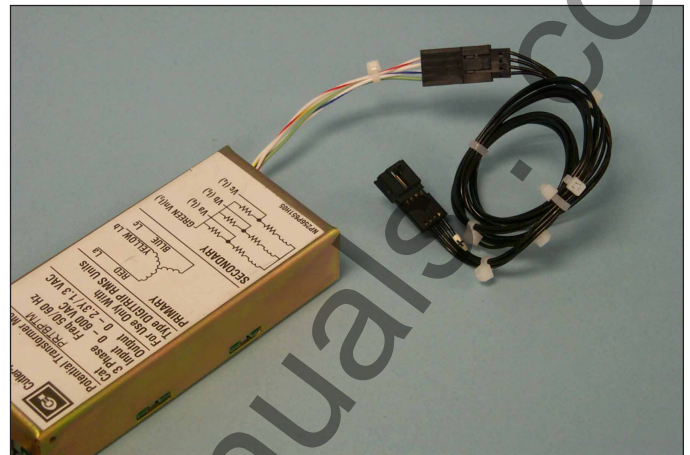


Fig. 22 PT Extension Harness Connected to the PT Module.

- O. Align the Insulation Barrier (Fish Paper) and PT Module with the existing holes in the Aux. CT Module Mounting Platform, as shown. Secure the Insulation Barrier and PT Module to the Aux. CT Module Mounting Platform using the (2) .138-32 x .250" screws, (2) lock washers, and (2) flat washers supplied.

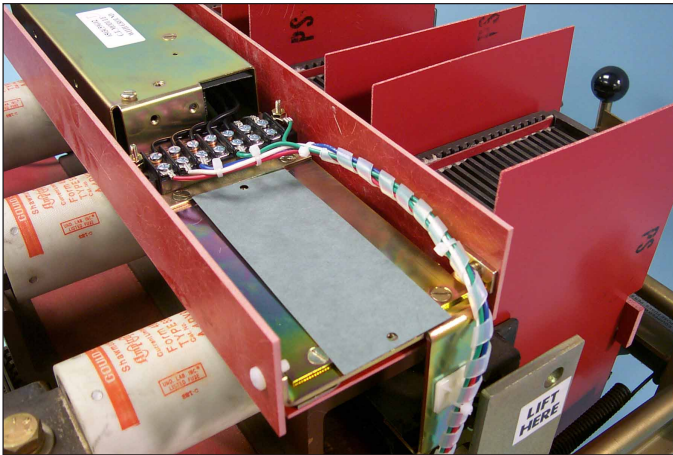


Fig. 23 PT Module and Insulation Barrier Mounted to the Aux. CT Module Mounting Platform.

On LAF-1600 B Breakers, route the PT Extension Harness towards the right side of the Breaker, in between the Aux. CT Module and the rear Aux. CT Module Insulation Barrier. On LAF-1600 C Breakers, the PT Extension Harness will be routed along the left side of the Breaker later in the Retrofit Process.

- P. Install a PT Module Warning Label on the front and rear Aux. CT Module Insulation Barriers so they are clearly visible.



Fig. 24 PT Warning Label Installed on the Front Aux. CT Module Insulation Barrier.



Fig. 25 PT Warning Label Installed on the Rear Aux. CT Module Insulation Barrier.

- Q. 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.

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 the left side of the Breaker, then downward to a position suitable for attachment to the bottom Breaker Studs. Move the PT Wire markers to a position where they will still be attached to the wires after cutting. Cut the wires to the appropriate length, strip each wire .250", and install a .250" ring terminal on each wire.

With one hex cap screw fully unthreaded and the other loosened, insert the ring terminal of each PT Wire between the Finger Cluster and Stud of each corresponding bottom Phase. Insert the fully unthreaded hex cap screws through the PT Wire ring terminals. Fully tighten all six (6) hex cap screws securing the Finger Clusters to the bottom Breaker Studs.

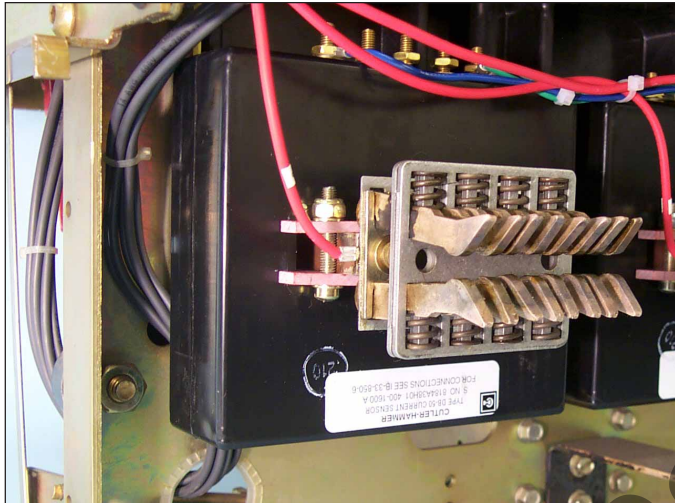


Fig. 26 PT Wires Connected to the Bottom Breaker Studs.

R. Secure the PT Wires to the left Aux. CT Module Mounting Bracket, right rear Breaker Frame, and Sensor Harness using the self-adhesive mounting pads and wire ties supplied.

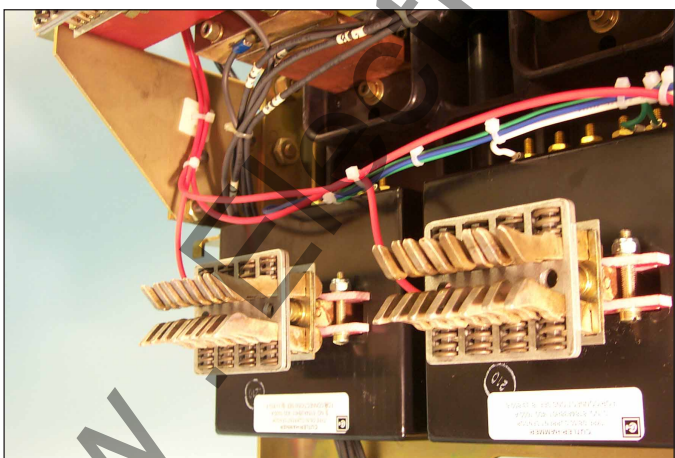


Fig. 27 PT Wires Secured to the Breaker and Sensor Harness.

**STEP 5: INSTALLING THE DTA ASSEMBLY**

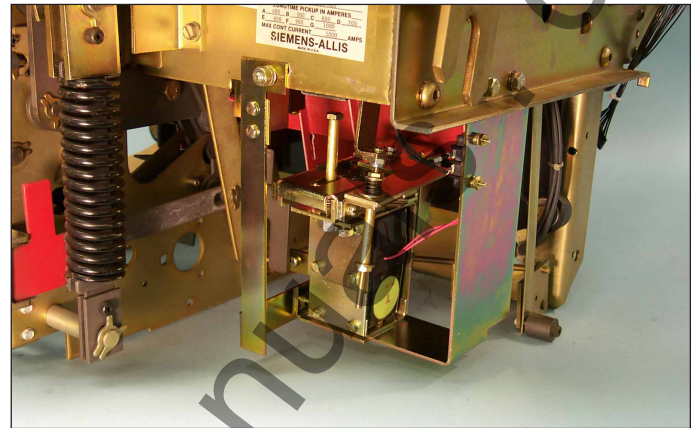


Fig. 28 Overview: DTA Assembly Installed in the Breaker.

A. Connect the DTA Extension Harness, Positive to Positive and Common to Common, to the 2-Point Terminal Block on the DTA Assembly.

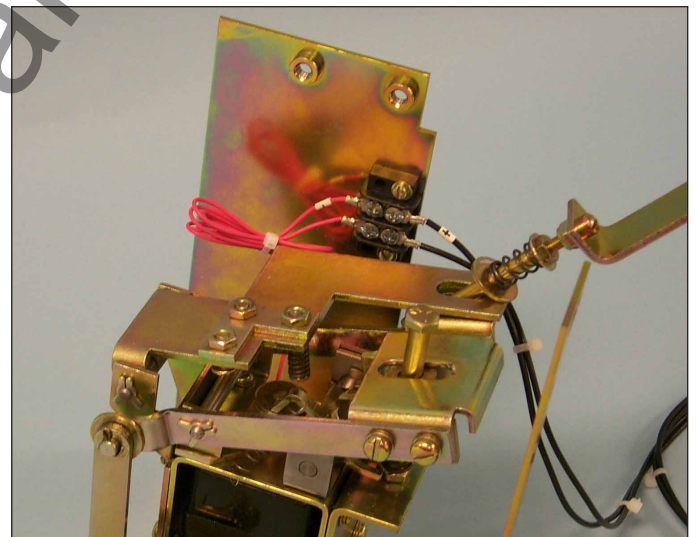


Fig. 29 DTA Extension Harness Connected to the 2-Point Terminal Block.

For Kits Supplied with an Auxiliary Switch Only.

B. Mount the Auxiliary Switch Mounting Bracket to the DTA Assembly, as shown, using the (2) .190-32 x .375 screws, (2) lock washers, and (2) flat washers supplied.

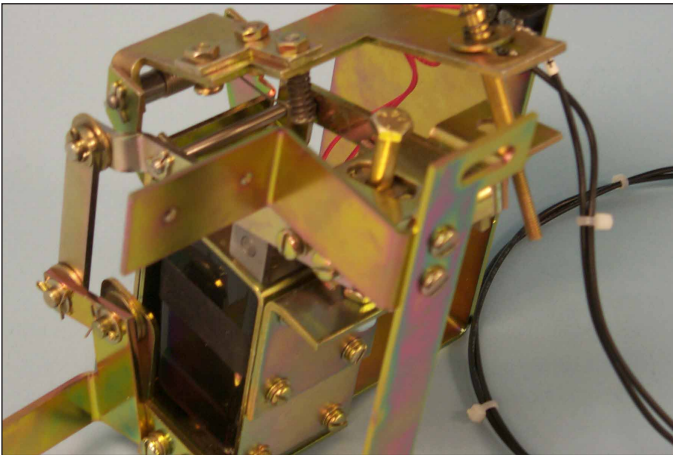


Fig. 30 Auxiliary Switch Mounting Bracket Installed on the DTA Assembly.

- C. Cut 2.375" off the Microswitch Arm. Mount the Microswitch to the Auxiliary Switch Mounting Bracket, as shown, using the (2) .138-32 x 1.00 screws, (4) flat washers, (2) lock washers, and (2) .138-32 nuts supplied.

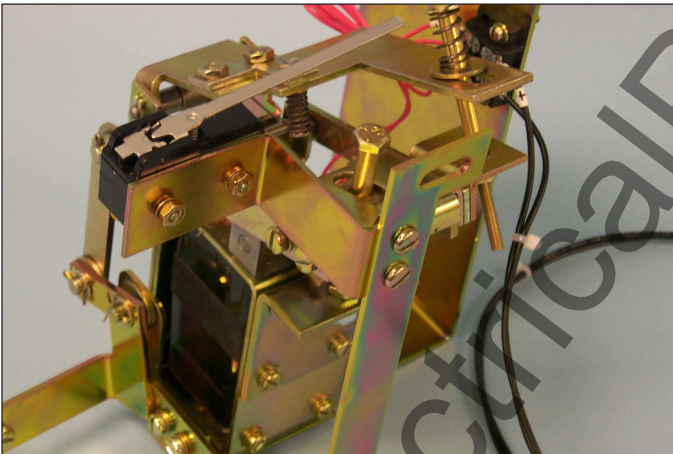


Fig. 31 Microswitch Installed on the Auxiliary Switch Mounting Bracket.

For All Retrofit Kits.

- D. Remove and scrap the Closing Cam Pin and hardware that connects the right Insulation Link to the Breaker Pole Shaft for Phase 3.

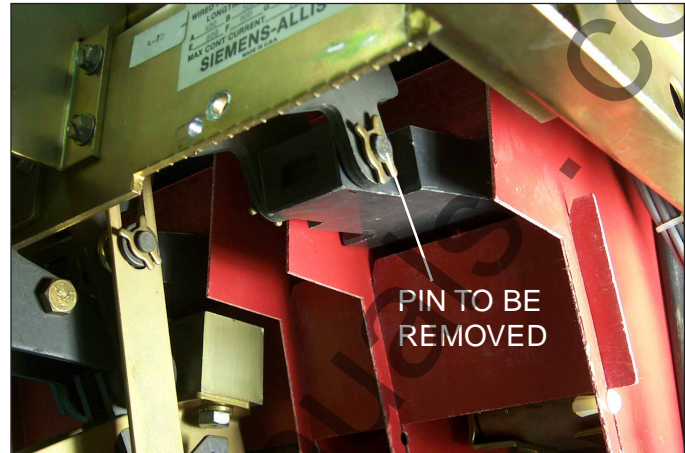


Fig. 32 Closing Cam Pin to be Removed from the Breaker.

- NOTE:** There are two new Closing Cam Pins supplied with the retrofit kit. The longer pin is used on LAF-1600 B Breakers and the shorter pin is used on LAF-1600 C Breakers.

- E. Install (1) wide flat washer and (1) Tru-arc lock ring on the appropriate new Closing Cam Pin supplied. Insert the Closing Cam Pin into the Insulation Link and Breaker Pole Shaft from the left side.

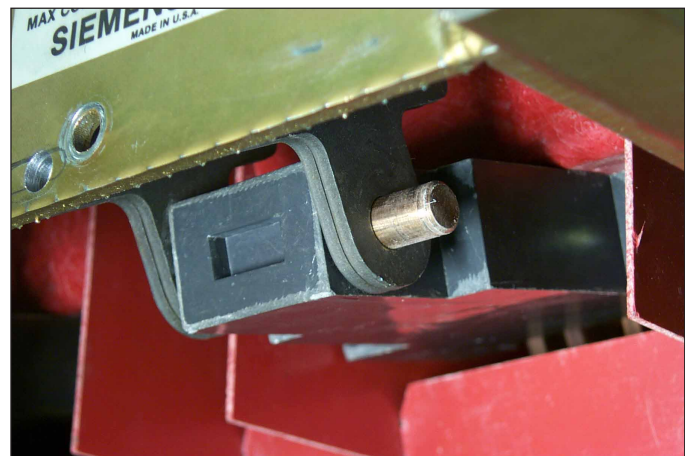


Fig. 33 New Wrist Pin Installed in the Breaker.

- F. The DTA is mounted to the Breaker using the two existing holes in the right Breaker Frame and a hole in the front Breaker Frame. In some cases, the holes needed to mount the DTA may not exist. In this case, use Drilling Plans "A" or "B" to drill the needed holes.

**NOTE:** Before drilling the holes, verify that there are no existing brackets or components mounted inside the Breaker that will be affected when drilling the holes. If brackets or components are present, contact Cutler-Hammer for additional instructions.

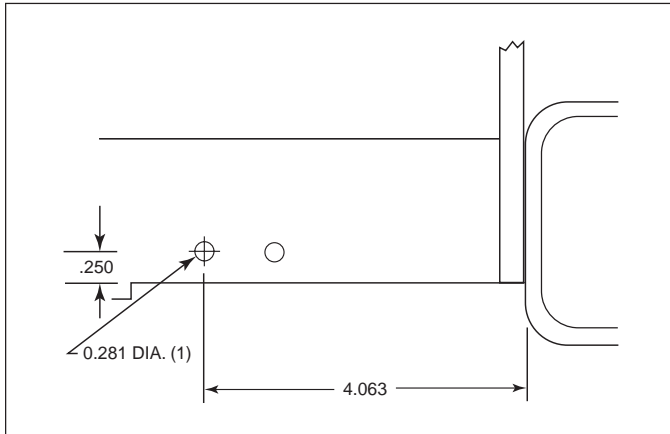


Fig. 34 Drilling Plan "A" (For LAF-1600 B Breakers).

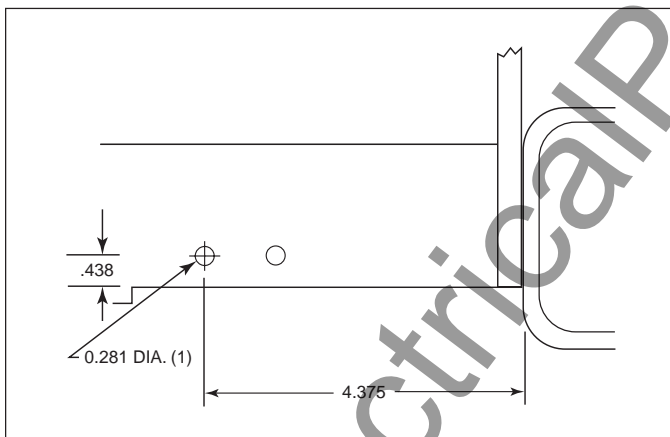


Fig. 35 Drilling Plan "B" (For LAF-1600 C Breakers).

G. For Kits Supplied with an Auxiliary Switch Only: Set the DTA Assembly near the front right corner of the Breaker. Place the External Harness near the top right corner of the Breaker. Route the two (2) wires, with ring terminals, from the External Harness down through the Breaker to the Aux. Switch. Connect one (1) wire to the normally "Open" terminal and the other wire to the "Common" terminal. Use the wire ties supplied to secure

the Auxiliary Switch wires away from any moving parts within the Breaker.

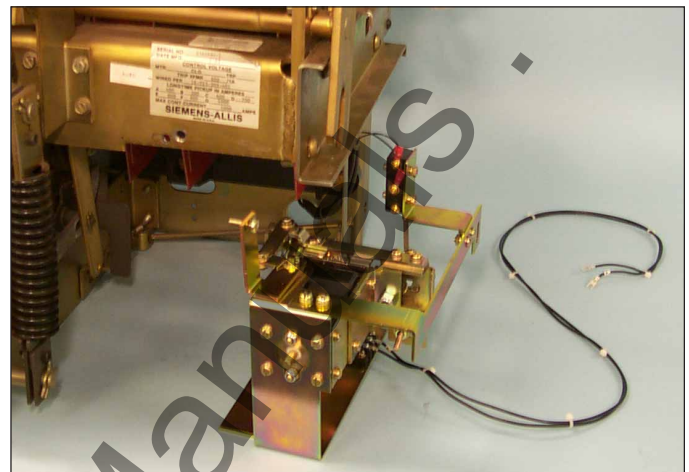


Fig. 36 Auxiliary Switch Wires Connected to the Auxiliary Switch Terminals.

H. Align the holes in the DTA Assembly with the existing or drilled holes in the front and right Breaker Frames, as shown. Secure the DTA Assembly to the right Breaker Frame using the (2) .250-20 x .750 bolts, (2) lock washers, and (2) flat washers supplied. Secure the DTA Assembly to the front Breaker Frame using the (1) .250-20 x .750 bolt, (1) lock washer, (1) flat washer, and (1) nut supplied.

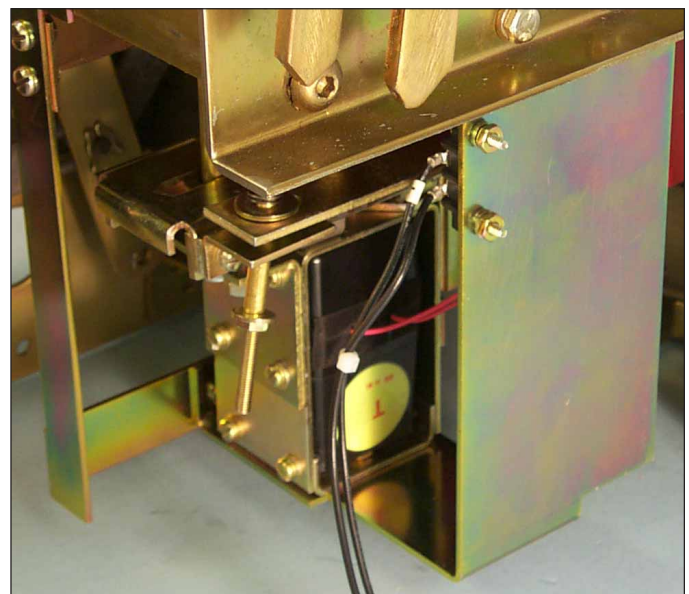


Fig. 37 DTA Assembly Mounted to the Breaker.

**NOTE:** When installing the Reset Assembly on the Closing Cam Pin, different configurations of wide flat washers is needed for the LAF-1600 B and C Breakers.

For the LAF-1600 B Breaker, four (4) wide flat washers are used between the Closing Cam and Reset Assembly to space the Reset Assembly away from the Closing Cam. The Tru-arc lock ring is used to secure the Reset Assembly on the Closing Cam Pin.

For the LAF-1600 C Breaker, no wide flat washers are used between the Closing Cam and Reset Assembly. One (1) wide flat washers and the Tru-arc lock ring are used to secure the Reset Assembly on the Closing Cam Pin.

- I. While holding the Closing Cam Pin in place, push the Reset Assembly downward to compress the Reset Spring until the hole in the Reset Assembly aligns with the Closing Cam Pin. Slide the Reset Assembly and applicable wide flat washers (see Note above) onto the Closing Cam Pin. Install (1) Tru-arc lock ring on the wrist pin to secure the Reset Assembly on the Closing Cam Pin.

**NOTE:** It may be necessary to loosen the nuts on the Reset Shaft to allow the Reset Assembly to be installed on the Closing Cam Pin.



Fig. 38 Reset Assembly Mounting on a LAF-1600 B Breaker.

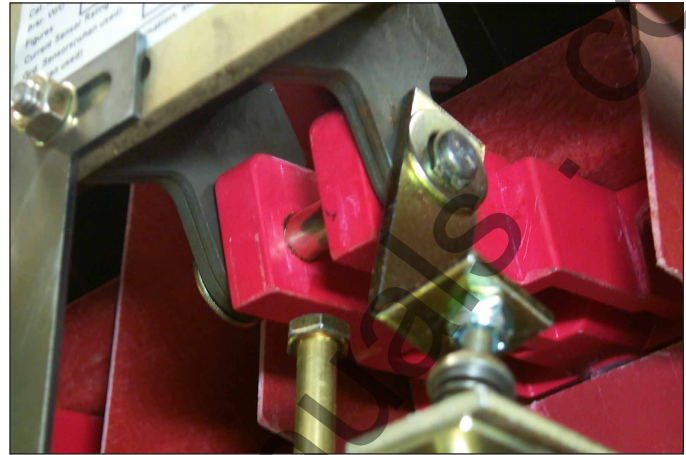


Fig. 39 Reset Assembly Mounting on a LAF-1600 C Breaker.

- J. Back-off the adjusting and locking nuts on the Reset Shaft. Apply Loc-Tite® 243 to the threads then turn the adjusting nuts until a cage height of 0.365 to 0.359" between inside surfaces on the washers at the top and bottom of the spring is achieved. Tighten the locking nut.

**NOTE:** The cage height is measured at the front of the spring (facing the front of the Breaker).

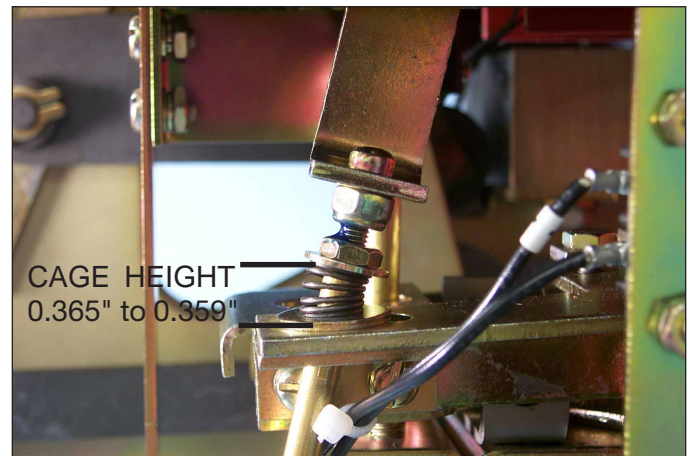


Fig. 40 Adjusting the Cage Height.

**! WARNING:**

**TO ADJUST THE GAP BETWEEN THE DTA ADJUSTING SCREW AND BREAK TRIP PADDLE, THE BREAKER MUST BE IN THE CLOSED POSITION. KEEP HANDS AND FINGERS AWAY FROM MOVING PARTS WITHIN THE BREAKER. FAILURE TO DO SO COULD RESULT IN SEVERE PERSONAL INJURY.**

- K. Temporarily reinstall the Charging Handle on the Breaker.
- L. Apply Loc-Tite® 243 to the threads of the DTA Adjusting Screw. CHARGE and CLOSE the Breaker. Turn the DTA Adjusting screw until a gap of 0.060" to 0.090" is achieved between the head of the Adjusting Screw and the Breaker Trip Paddle.

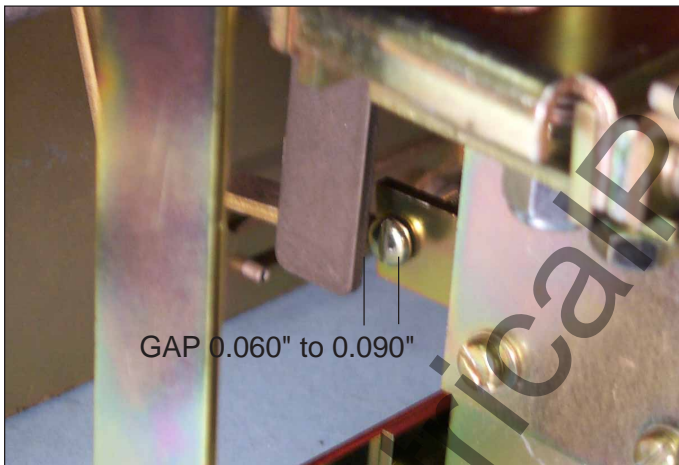


Fig. 41 Adjusting the Gap Between the DTA Adjusting Screw and the Breaker Trip Paddle.

- M. Return the Breaker to the OPEN position.
- N. Connect a 24 VDC power supply to the DTA terminals; positive to positive and negative to negative. Close the Breaker. Energize the DTA to trip the Breaker; de-energize when the Breaker trips. Make certain that the DTA resets. If the Breaker fails to properly trip insure that a gap of 0.060" to 0.090" exists between the DTA Adjusting Screw and the Breaker Trip Paddle. If the Breaker fails to properly reset, readjust the Reset Assembly

to insure a cage height of 0.365 and 0.359". Make the necessary adjustments until the trips and resets are sure and positive each time.

- O. Route the DTA Extension Harness between the right Breaker Frame and the right Phase Barrier to the area on the Aux. CT Module Assembly. Use the self-adhesive mounting pads and wire ties supplied to secure the DTA Extension Harness to the right Phase Barrier as shown.

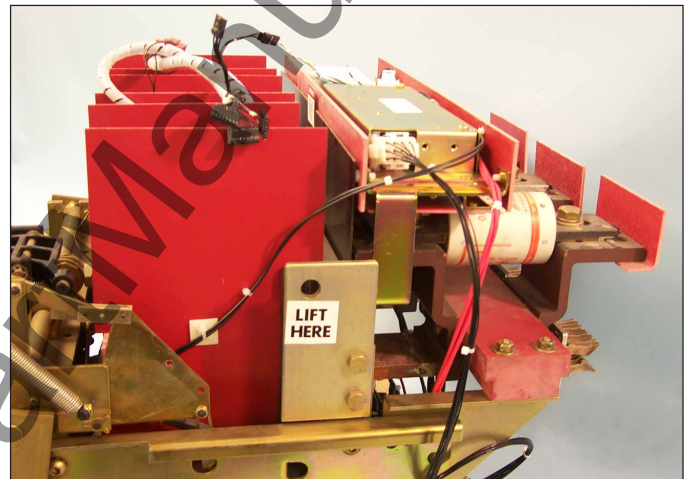


Fig. 42 DTA Extension Harness Secured to the Right Phase Barrier.

- P. Route the DTA Extension Harness to the Aux. CT Module Terminal Block. Connect the "+" DTA Wire to the "OP" terminal of the Aux. CT Module Terminal Block and the unmarked wire to the "ON" terminal.

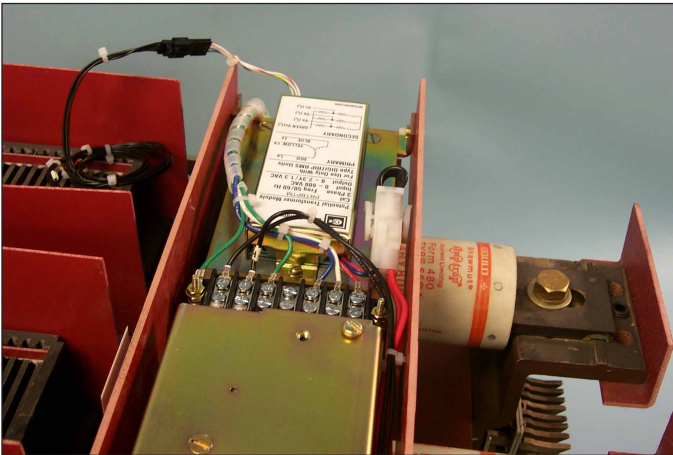


Fig. 43 DTA Extension Harness Connected to the Aux. CT Module Terminal Block.

Q. Reinstall the Aux. CT Module Terminal Block Cover removed in Step 4-J.

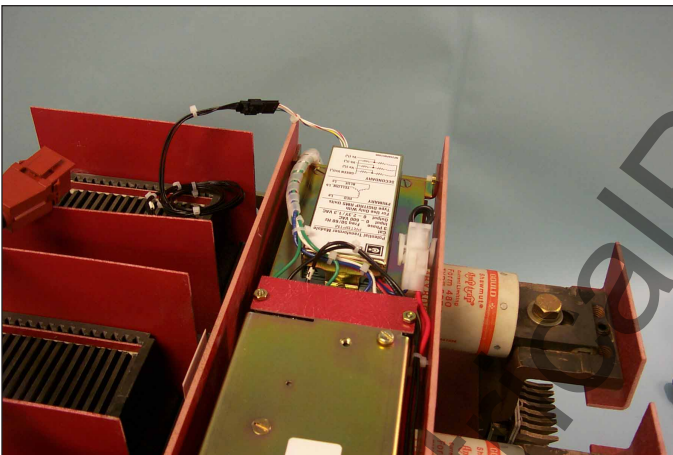


Fig. 44 Terminal Block Cover Installed on the Aux. CT Module Terminal Block.

**STEP 6: INSTALLING THE TRIP UNIT**

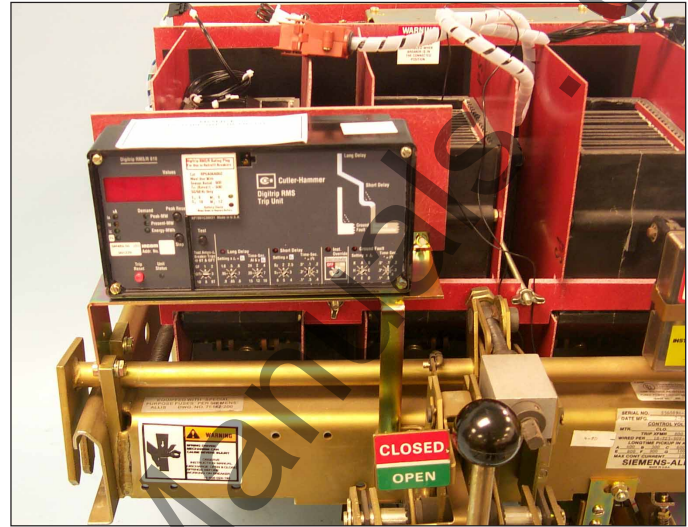


Fig. 45 Overview: Trip Unit Assembly Installed on a LAF-1600 B Breaker.

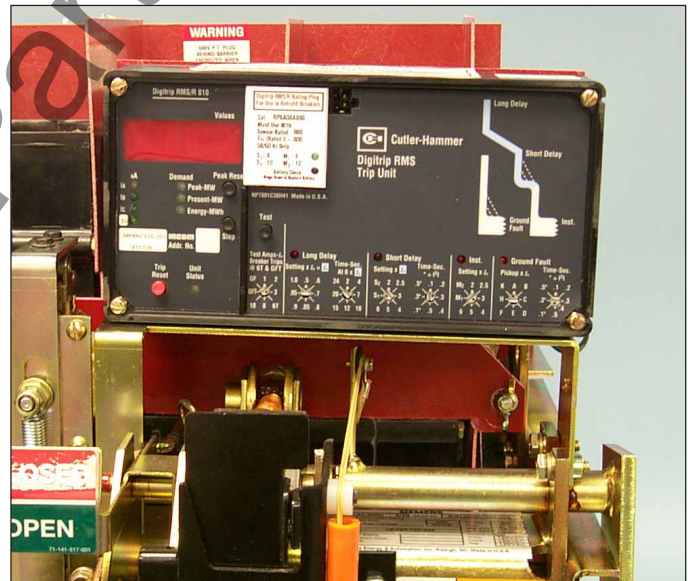


Fig. 46 Overview: Trip Unit Assembly Installed on a LAF-1600 C Breaker.

**NOTE:** Because of the difference in component locations, the mounting and location of the Trip Unit is different for the LAF-1600 B and LAF-1600 C Breakers. Both procedures are documented in this step. After determining which Breaker is being Retrofitted, follow the applicable procedure.

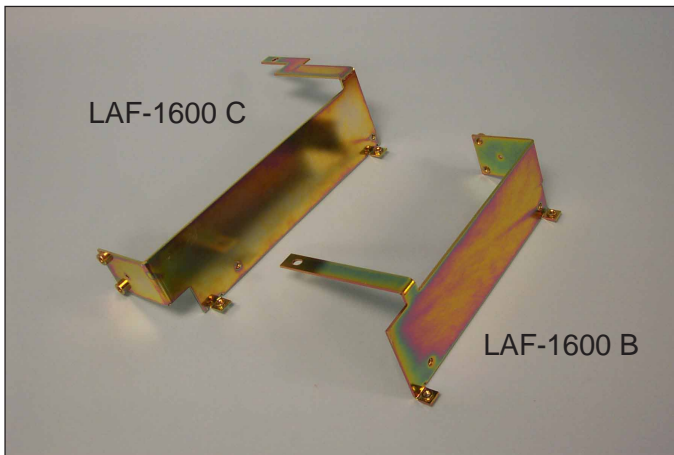


Fig. 47 Trip Unit Mounting Brackets for the LA-1600 B and C Breakers.

*For LAF-1600 B Breakers*

- A. Align the holes in the Trip Unit Insulation using the (2) .190-32 x .500 nylon screws supplied.

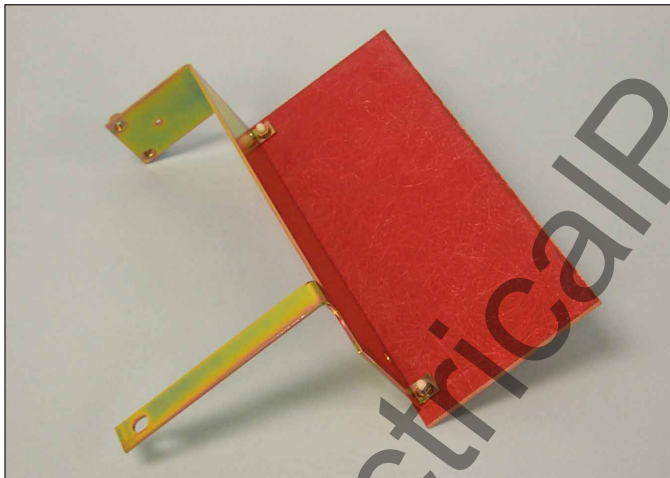


Fig. 48 Insulation Barrier Installed on the Trip Unit Mounting Bracket (LAF-1600 B).

- B. Remove and scrap the hardware securing the left Racking Shaft Bearing Cap to the right Breaker Frame. Scrap the Bearing Cap.



Fig. 49 Bearing Cap to be Removed (LAF-1600 B).

- C. Remove and save the top bolt located to the left of the Open / Closed Indicator.

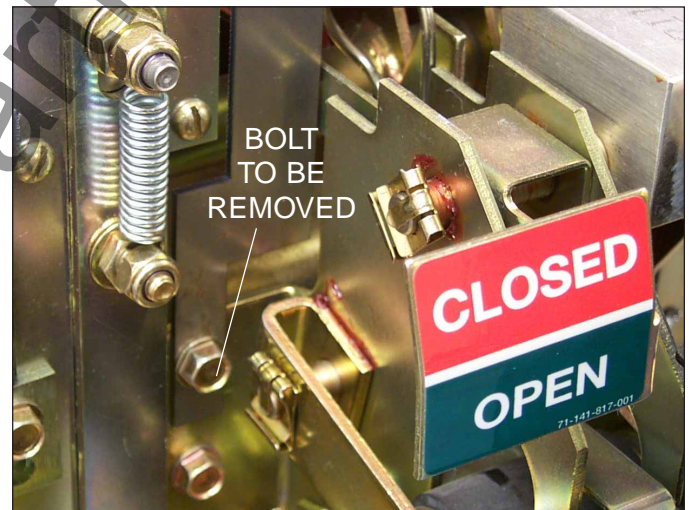


Fig. 50 Bolt to be Removed and Saved (LAF-1600 B).

- D. Align the Trip Unit Mounting Bracket Assembly with the holes for the left Bearing Cap and the hole from which the bolt was removed in the previous step. Secure the Trip Unit Mounting Bracket Assembly to the Breaker using the (2) .250-20 x .750 bolts, (2) lock washers, and (2) flat washers supplied and the bolt removed in the previous step.



Fig. 51 Trip Unit Mounting Bracket Assembly Installed on the Breaker.

- E Align the Trip Unit with the holes in the Trip Unit Mounting Bracket Assembly as shown. Secure the Trip Unit to the Mounting Bracket using the (2) .190-32 × 4.00 screws, (2) lock washers, (2) flat washers, and (2) brass spacers supplied. Note that the brass spacers are used between the bottom of the Trip Unit and the top of the Trip Unit Mounting Bracket.



Fig. 52 Trip Unit Installed on the Mounting Bracket (LAF-1600 B).

- F. Remove the Trip Unit Cover. Install the Rating Plug. Reinstall the Trip Unit Cover using the original hardware.
- G. Install the Digitrip Retrofit Label on the top of the Trip Unit.

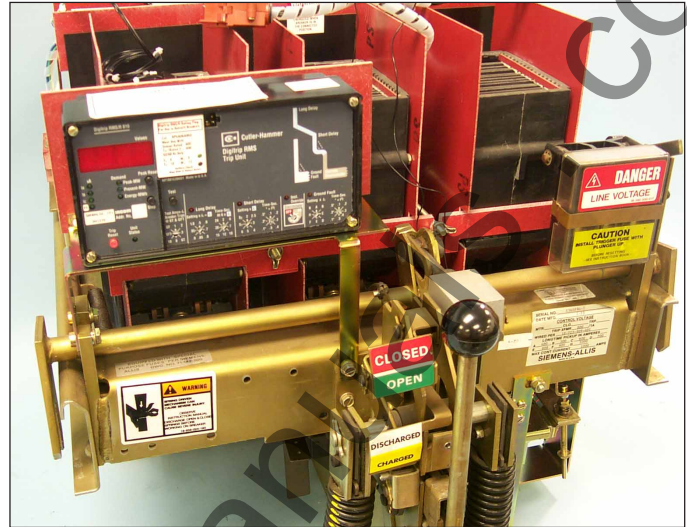


Fig. 53 Trip Unit Assembly with Rating Plug and Cover Installed on the Breaker (LAF-1600 B).

For LAF-1600 C Breakers

- A. Align the holes in the Trip Unit Insulation Barrier with the holes in the Trip Unit Mounting Bracket, as shown. Secure the Insulation Barrier to the Trip Unit Mounting Bracket using the (2) .190-32 × .500 nylon screws supplied.

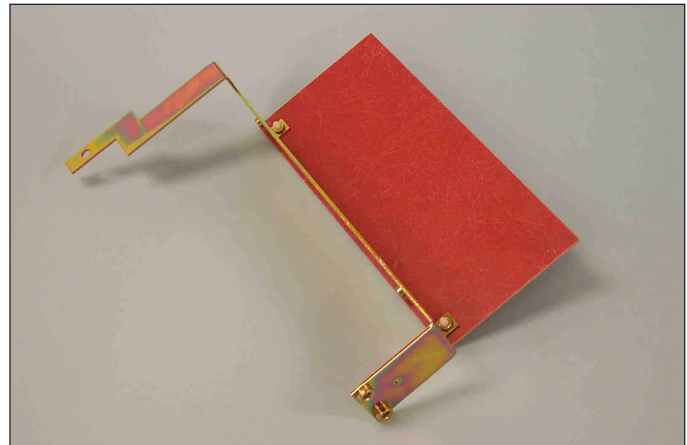


Fig. 54 Insulation Barrier Installed on the Trip Unit Mounting Bracket (LAF-1600 C).

- B. Remove and scrap the hardware securing the right Racking Shaft Bearing Cap to the right Breaker Frame. Scrap the Bearing Cap.



Fig. 55 Bearing Cap to be Removed (LAF-1600 C).

C. Remove and save the top bolt located to the left of the Open / Closed Indicator.

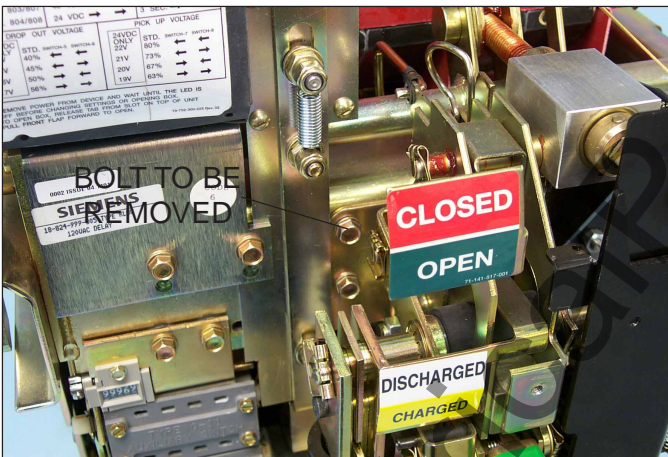


Fig. 56 Bolt to be Removed and Saved (LAF-1600 C).

D. Align the Trip Unit Mounting Bracket Assembly with the holes for the right Bearing Cap and the hole from which the bolt was removed in the previous step. Secure the Trip Unit Mounting Bracket Assembly to the Breaker using the (2) .250-20 x .750 bolts, (2) lock washers, and (2) flat washers supplied and the bolt removed in the previous step.

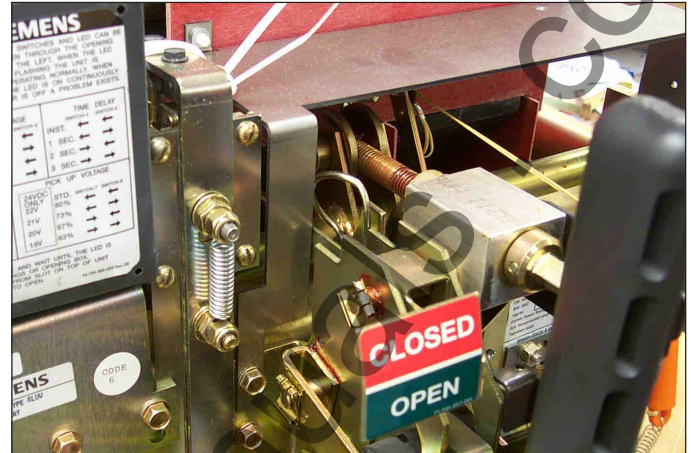


Fig. 57 Trip Unit Mounting Bracket Assembly on the Breaker (LAF-1600 C).

E. Align the Trip Unit with the holes in the Trip Unit Mounting Bracket Assembly, as shown. Secure the Trip Unit to the Mounting Bracket using the (2) .190-32 x 4.00 screws, (2) lock washers, (2) flat washers, and (2) brass spacers supplied. Note that the brass spacers are used between the bottom of the Trip Unit and the top of the Trip Unit Mounting Bracket.

F. Remove the Trip Unit Cover. Install the Rating Plug. Reinstall the Trip Unit Cover using the original hardware.



Fig. 58 Trip Unit Assembly with Rating Plug and Cover Installed on the Breaker (LAF-1600 C).

G. Install the Digitrip Retrofit Label on the top of the Trip Unit.

## STEP 7: INSTALLING THE EXTERNAL HARNESS AND FINAL CONNECTIONS

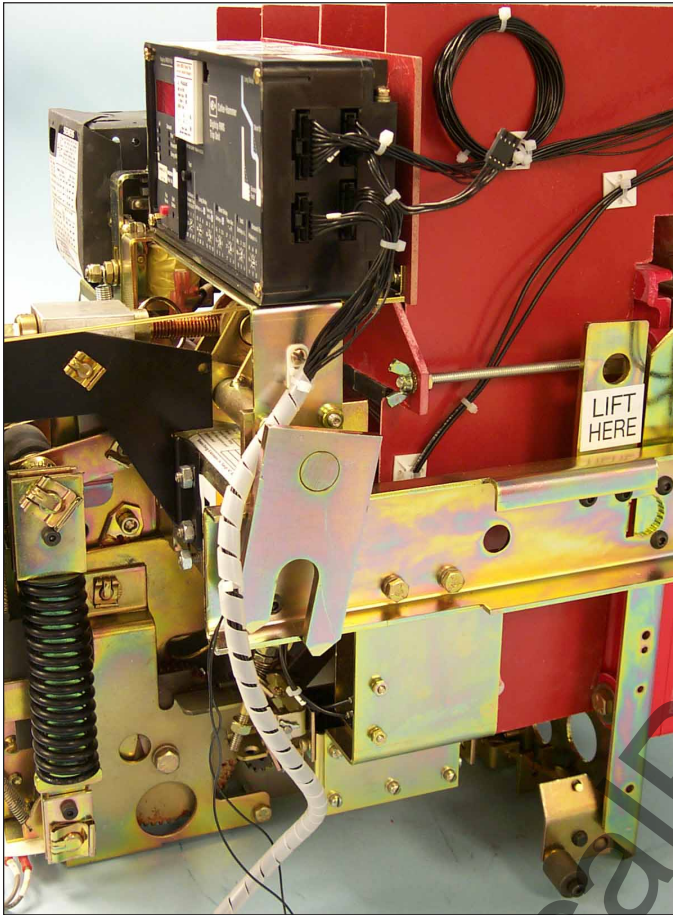


Fig. 59 Overview: Harnesses Connected to the Trip Unit.

**NOTE:** Even though the location of the Trip Unit is different for the LAF-1600 B and C Breakers, the procedures for the final harness and wire connection are similar. Where applicable, any differences will be noted. Photos of the LAF-1600 B Breaker are used in this section for graphic support.

- A. Plug the Aux. CT Harness into the connector on the Aux. CT Module Pigtail.
- B. Route the Aux. CT Harness across to the right side of the Breaker, then forward towards the Trip Unit. Connect the Aux. CT Harness to its receptacle in the Trip Unit. Use the self-adhesive mounting pad and wire tie supplied

to secure the Aux. CT Harness to the right Phase Barrier, as shown. Note that the Aux. CT Harness is longer than necessary. The excess should be “coiled” as it is secured to the right Phase Barrier.

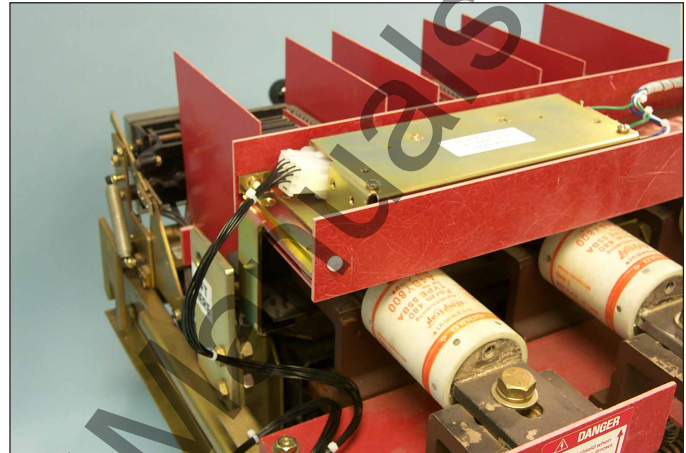


Fig. 60 Routing and Connection of the Aux. CT Harness.

- C. Connect the External Harness to the receptacles in the Trip Unit. On LAF-1600 B Breakers, secure the External Harness to the Trip Unit Mounting Bracket, as shown, using the (1) self adhesive mounting pad and (1) wire tie supplied. On LAF-1600 C Breakers, secure the External Harness to the Trip Unit Mounting Bracket, as shown, using the (1) Panduit tie mount and (1) .164-18 x .500 thread cutting screw, (1) lock washer, and (1) flat washer supplied.

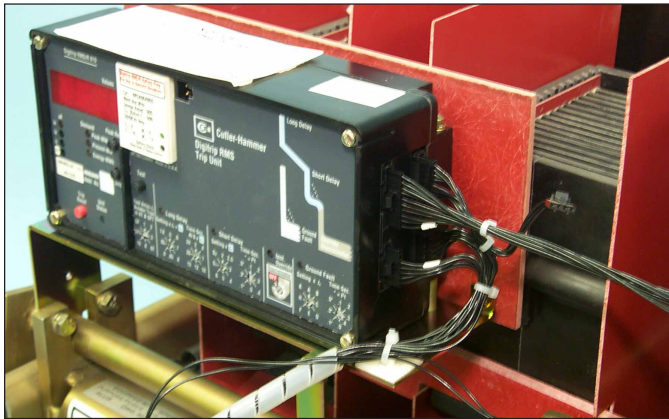


Fig. 61 External Harness Connected to the Trip Unit (LAF-1600 B Breaker).

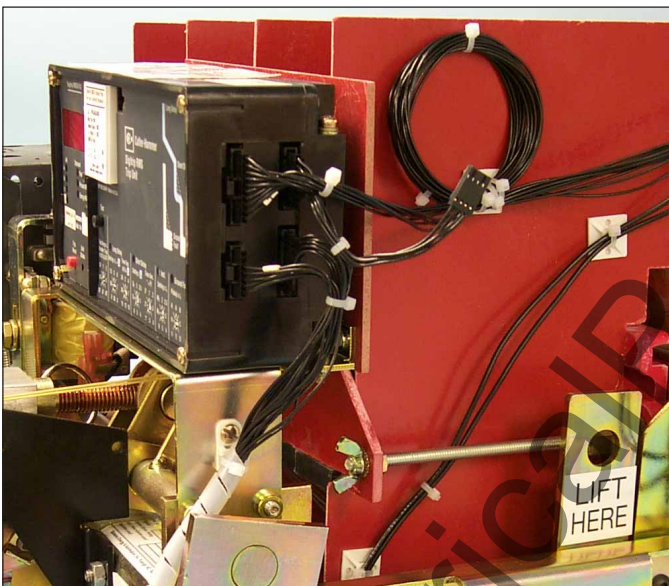


Fig. 62 External Harness Connected to the Trip Unit (LAF-1600 C Breaker).

**NOTE:** For 510 Basic Kits, the External Harness is the Shorting Plug pictured below. It is to be plugged into the corresponding receptacle in the Trip Unit.

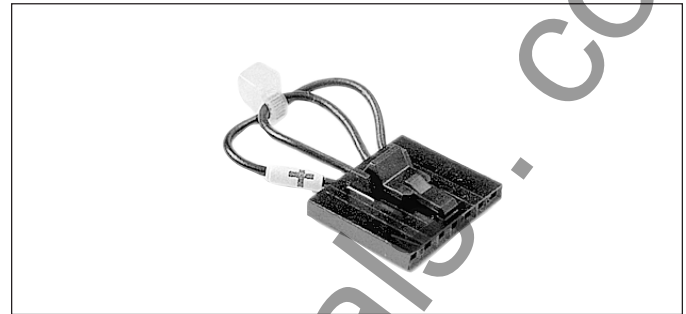


Fig. 63 510 Basic Kit External Harness Shorting Plug.

D. For Kits Supplied with a PT Module Only:  
Route the PT Extension Harness along the left side (LAF-1600 B) or right side (LAF-1600 C) of the Breaker, then to the right side of the Trip Unit. Connect the PT Extension to the corresponding plug on the External Harness. Use the self-adhesive mounting pad and wire tie supplied to secure the PT Extension Harness to the outside Phase Barrier. Note that the PT Extension Harness is longer than necessary. The excess should be “coiled” as it is secured to the outside Phase Barrier.

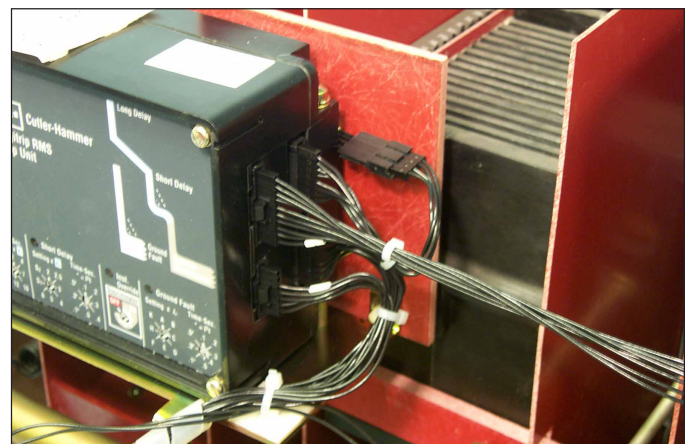


Fig. 64 Connection of the PT Extension Harness to the External Harness.

- E For Kits Supplied with an Auxiliary Switch Only:  
Use the wire ties supplied to secure the Auxiliary Switch wires away from any moving parts within the Breaker.
- F. Use the wire ties supplied to secure all wires and harnesses away from any moving parts within the Breaker.

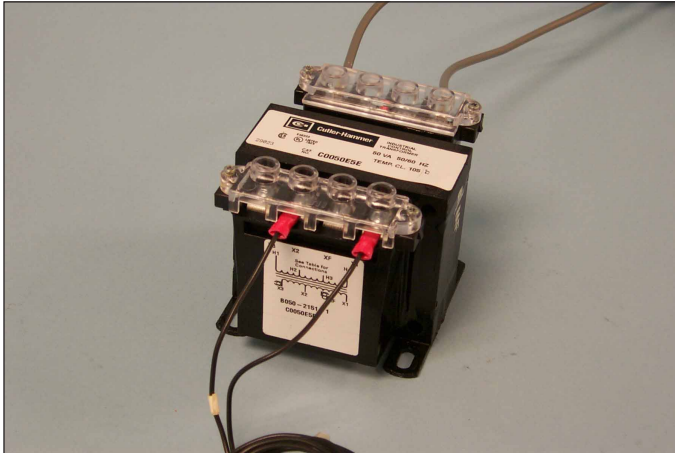
**STEP 8: INSTALLING THE CPT MODULE**

Fig. 65 Overview: CPT Module Ready for Installation in the Breaker Cell.

**NOTE:** Because of the compact nature of the Breaker, there is no room to mount the CPT Module to the Breaker. Therefore, the Retrofitter is required to find a location within the Breaker Cell to mount the CPT Module. The best possibilities are the top, bottom, or back of the Cell.



Fig. 66 The Inside of the Breaker Cell.

**CAUTION:**

**IF THE CPT MODULE IS MOUNTED IN THE BREAKER CELL, THE CPT HARNESS CONNECTION AT THE TRIP UNIT AND THE HV WIRE CONNECTIONS AT THE FUSE CRADLE WILL HAVE TO BE DISCONNECT AS THE BREAKER IS RACKED OUT OF THE CELL. FAILURE TO DO SO CAN RESULT IN DAMAGE TO THE TRIP UNIT, CPT MODULE, OR THE BREAKER ITSELF.**

- A. Remove and save the (2) .190 - 32 x .250" screws securing the fuse clips and male spade connector installed on the CPT Module. Discard the fuse clips and spade connector, then reinstall the screws in the CPT Terminals.



Fig. 67 Fuse Clips and Spade Connector Removed from the CPT.

**NOTE:** Depending on where the CPT Module is mounted in the Cell, the Load Side HV Wires may be longer than necessary. Before cutting the wires, be sure that sufficient length is left so that the HV Wire Fuses can be mounted in an accessible position and that the connections can be made to the correct “H” terminals on the CPT Module.

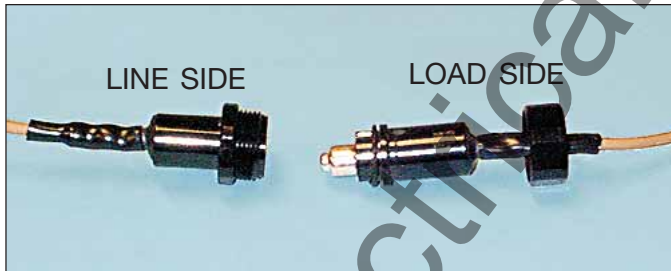


Fig. 68 Load and Line Sides of the HV Wires.

B. Temporarily position the CPT Module and the HV Fuses in their desired locations. Route the Load Side HV Wires to the CPT Module. Mark and cut the Load Side of each HV Wire to an appropriate length for connection to the “H” terminals of the CPT. Strip approximately .250" of insulation from the Load Side HV Wires and attach a .190" ring terminal to each. Attach the HV Wires to the CPT “H” terminals to achieve the required voltage (see Table 3).

**NOTE:** The terminals to which the Load Side HV wires are connected determine the voltage of the CPT. Verify that the line voltage of the circuit matches the CPT voltage BEFORE putting the Breaker into service.

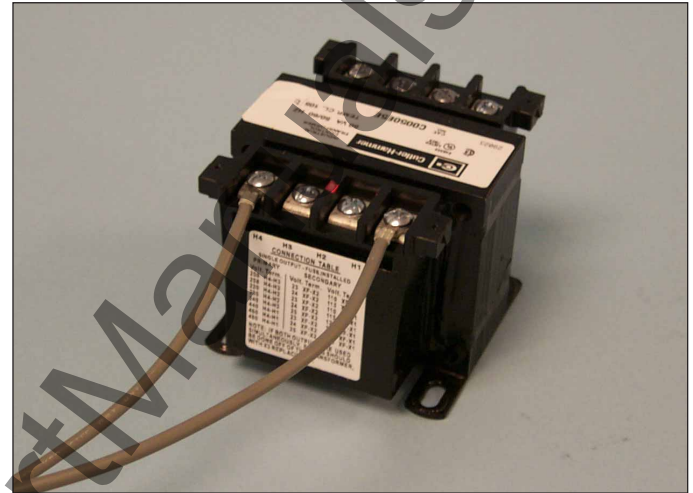


Fig. 69 Load Side HV Wires Connected to the “H” Terminals of the CPT Module.

**Table 3 CPT High Voltage Taps for Standard and Special Order CPTs**

<b>Standard CPT (Style #9A10037G01 &amp; G02)</b>	
<i>Voltage Required</i>	<i>CPT Terminals Used</i>
480 Volt Circuit	H1 & H4
240 Volt Circuit	H2 & H4
208 Volt Circuit	H3 & H4
<b>Special Order 575 Volt CPT (Style #9A10037G03 &amp; G04)</b>	
575 Volt Circuit	H1 & H4
460 Volt Circuit	H2 & H4
230 Volt Circuit	H3 & H4

C. Connect the CPT Harness wires to the appropriate “X” terminals of the CPT Module as shown. See Table 4 for Tap information.

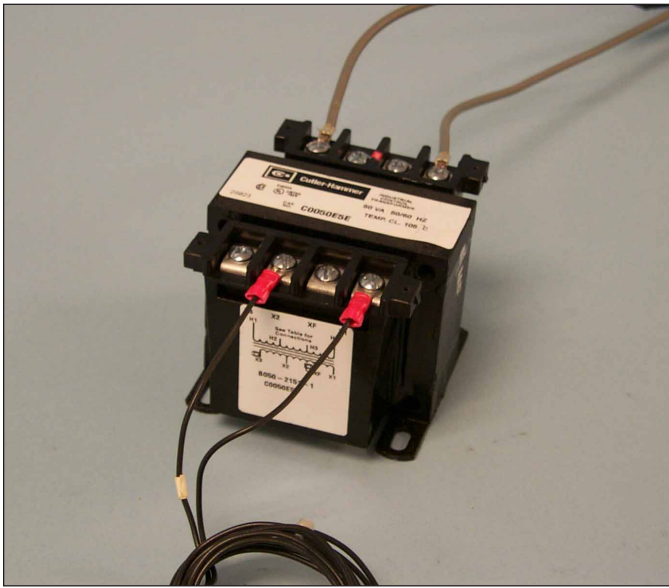


Fig. 70 CPT Harness Connected to the "X" Terminals of the CPT Module.

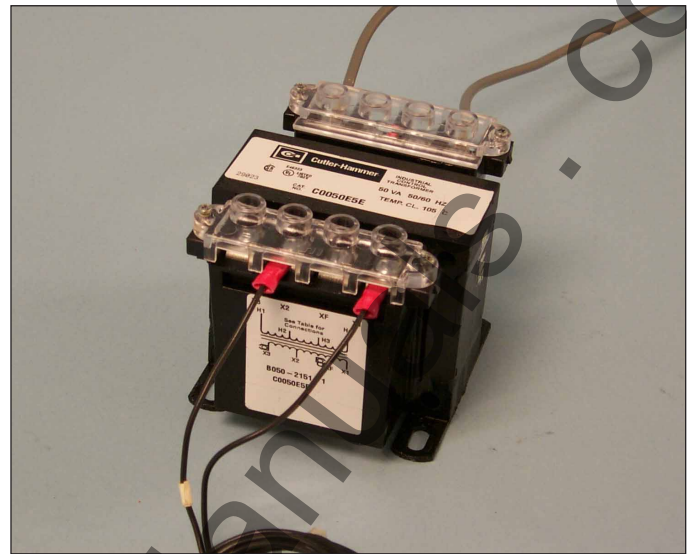


Fig. 71 Finger Safe Covers Installed on the CPT.

**Table 4 CPT Low Voltage Taps for Standard and Special Order CPTs (After Removing Fuse Clips)**

<b>Standard CPT (Style #9A10037G01 &amp; G02)</b>	
120 Voltage Required	CPT Terminals Used
Secondary Circuit	X1 & X2
<b>Special Order 575 Volt CPT (Style #9A10037G03 &amp; G04)</b>	
Secondary Circuit	X2 & X3

D. Install the "A" and "B" Finger-Safe Covers over the CPT Terminals as shown. Secure the Finger-Safe Covers to the CPT using the (4) .098 - 28 x .375" screws supplied with the CPT Kit. Torque the screws to 8 - 10 in./lbs.

- E. Mount the CPT Module in the desired location within the Breaker Cell. Insure that the selected location allows the CPT to clear all Breaker Components as the Breaker is being Racked into the Cell.
- F. Secure the HV Fuses in their desired location within the Breaker Cell. Insure that the selected location allows the HV Fuses to clear all Breaker Components as the Breaker is being Racked into the Cell.
- G. Install the appropriate CPT Voltage Label on the Breaker Front Cover, as shown.



Fig. 72 CPT Voltage Labels Supplied with the CPT Kit.



Fig. 73 CPT Voltage Label Installed on the Breaker Front Cover.

**! WARNING:**

**THE FOLLOWING STEPS CAN ONLY BE COMPLETED WHEN THE BREAKER IS ENGAGED IN THE RACKING MECHANISM AND IN THE DISCONNECTED POSITION.**

**NOTE:** The power convention of Circuit Breakers is normally Top to Bottom, meaning the top Breaker Studs are on the Line Side of the Breaker and the bottom Breaker Studs 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 Studs. In the case of the Line Side being the bottom Breaker Studs, the HV Wires can be connected to the existing hard-

ware on the bottom Studs. This will be similar to the procedure detailed earlier for connection of the PT Wires.

**NOTE:** The Line Side HV Wires may be longer than necessary. 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 hardware on the Fuse Cradle.

- H. With the Breaker engaged in the Racking Mechanism and in the **DISCONNECTED** position, route the HV Line Side Wires to the Phase 1 and 2 or the Phase 2 and 3 Fuse Cradles. Cut each HV Wire to an appropriate length for attachment to the Fuse Cradle hardware used to secure the existing Breaker Wires to the bottom of the rear Fuse Cradle. Strip .250" from each wire, then install a .190" ring terminal on each wire.
- I. Remove the existing hardware from the Phase 1 and 2 or Phase 2 and 3 rear Fuse Cradles. Secure the HV Line Side Wires and the original Breaker Wires to the rear Fuse Cradles using the hardware just removed.

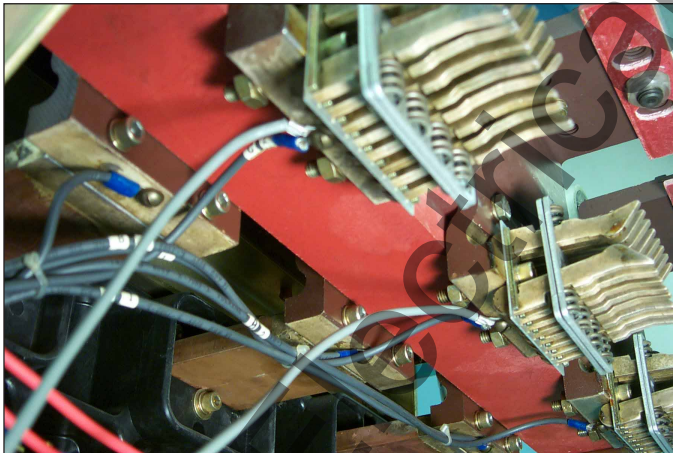


Fig. 74 HV Line Side Wires Connected to the Rear Fuse Cradle.

- J. Route the CPT Harness from the CPT Module to the right side of the Trip Unit. Remove the External Harness plug connected to the Trip Unit. Connect the black plug of the CPT Harness into the same receptacle in the Trip

Unit from which the plug was removed. Reinsert the External Harness plug just removed into the female receptacle on the CPT Harness.

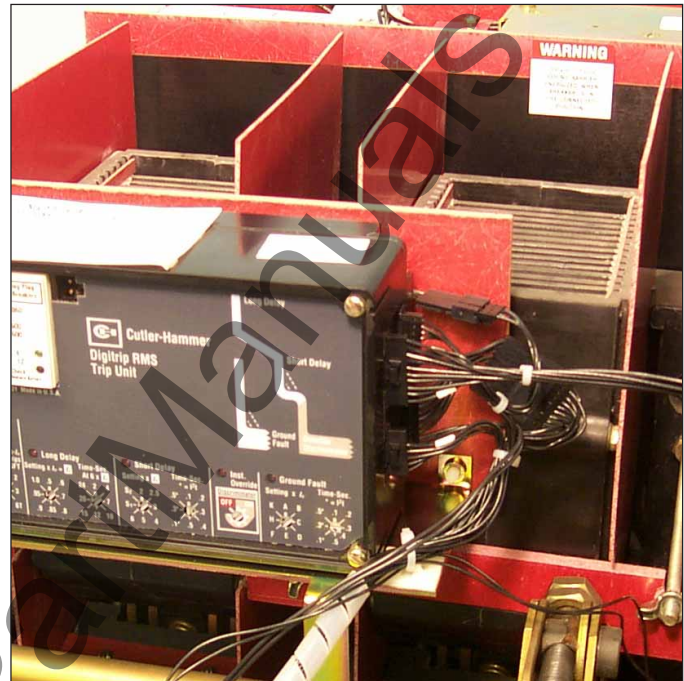


Fig. 75 CPT Harness Connected to the External Harness.

- K. Use the self-adhesive mounting pads and wire ties supplied to secure the HV Wires and CPT Harness to the Breaker Cell and Breaker Backplate, if applicable.

**STEP 9: FINAL BREAKER PREPARATION**

Fig. 76 Overview: Breaker Ready for Testing.

- A. Use the self-adhesive mounting pads and wire ties supplied to dress all wires and harnesses to keep them away from any moving parts within the Breaker.
- B. Reinstall the Breaker Front Cover using the original hardware removed in Step 2-B.
- C. Using the original mounting hardware removed in Step 2-A, reinstall the Manual Closing Handle.

**STEP 10: TESTING THE BREAKER**

- A. Measure the force necessary to trip the Breaker at where the DTA Adjusting Screw impacts the Breaker Trip Paddle. The force necessary to trip the Breaker **MUST NOT EXCEED** seven and a quarter (7.25) 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 33-855-4, September 2001), 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. *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.
2. *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 PowerNet 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 later in the Retrofit Process.

#### **STEP 11: 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 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 moving parts within the Cell Housing.

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**STEP 12: INSTALLING THE RETROFITTED  
BREAKER IN THE CELL**

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**WARNING:**

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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 Siemens-Allis LAF-1600 B & C Breaker RMS/R Retrofits

**NOTE:** Components specifically for the LAF-1600 B or C Model are identified with the letters “B” or “C”. Components with no letter identification are used for both models.

Step	Description	Style No.	Qty.	Model	Comment
Step 3	Sensor	8184A38H01	3		
	Sensor Mounting Parts	9A10150G04	1		
	Spacer		6		
	.190-32 × 1.25 Lng. Screw Stl. Fil.		6		
	.190 Flat Washer Stl.		12		
	.190-32 Nut Hex Stl. Nylok		6		
	Sensor Harness Mounting Parts	9A10150G07	1		
	Sensor Harness		1		
	Wire Tie Nylon		30		
	Mounting Pad - 1", Self-Adhesive		9		
Step 4	Aux. CT Module	6503C59G	1		
	Aux. CT Module Mounting Parts	9A10150G08	1		
	Mounting Bracket R. H.		1		
	Mounting Bracket L. H.		1		
	Mounting Bracket - Insulation Barrier		2		
	Insulation Barrier Bottom		1		
	Insulation Barrier Front & Rear		2		
	.190-32 × .250 Lng. Screw Nylon P. H.		4		
	.190-32 × .375 Lng. Screw Stl. F. H.		8		
	.190-32 × .500 Lng. Screw Nylon P. H.		4		
	Auxiliary CT Harness	6502C84G02	1		
	Wire Tie Nylon		1		From Step 3
	Mounting Pad - 1", Self-Adhesive		1		From Step 3
	PT Module	6502C82G01	1		} Comm. Only
	Ring Terminal (.190, .250, .312, .375, .500 - Each Size)		3		
	PT Module Mounting Parts	9A10150G10	1		
	PT Extension Harness		1		
	Insulation Barrier		1		
	.138-32 × .250 Lng. Screw Stl. P. H.		2		
	.138 Flat Washer Stl.		2		
.138 Lock Washer Stl.		2			
PT Warning Label		2			
Wire Tie Nylon		4		From Step 3	
				Comm. Only	
Mounting Pad - 1", Self-Adhesive		4		From Step 3	
				Comm. Only	
Step 5	DTA Assembly	9A10150G33	1		
	DTA Mounting Parts	9A10150G05	1		
	.250-20 × .750 Lng. Hex Bolt Stl.		3		
	.250 Flat Washer Stl.		3		
	.250 Lock Washer Stl.		3		

**Digitrip Retrofit Kit Installation Components for Siemens-Allis LAF-1600 B & C Breaker RMS/R Retrofits**

Step	Description	Style No.	Qty.	Model	Comment
	.250-20 Nut Hex Stl.		1		
	DTA Reset Parts	9A10150G06	1		
	DTA Extension Harness		1		
	Pin Insulating Link (2.62")		1	B	
	Pin Insulating Link (2.43")		1	C	
	.375 Wide Flat Washer Stl.		5		
	.375 Lock Ring Stl.		2		
	Loc-Tite® 243		1		
	Mounting Pad - 1", Self-Adhesive		1		From Step 3
	Wire Tie Nylon		2		From Step 3
	Auxiliary Switch Kit	9A10150G02	1		
	Microswitch		1		
	Mounting Bracket		1		
	.190-32 × .375 Lng. Screw Stl. Fil.		2		} Comm. Only
	.190 Flat Washer Stl.		2		
	.190 Lock Washer Stl.		2		
	.138-32 × 1.00 Lng. Screw Stl. Fil.		2		
	.138 Flat Washer Stl.		4		
	.138 Lock Washer Stl.		2		
	.138-32 Nut Hex Stl.		2		
	External Harness	6503C83G__	1		From Step 7
Step 6	Trip Unit	See Pick List	1		
	Rating Plug	See Pick List	1		
	Trip Unit Mounting Parts	9A10150G09	1		
	Mounting Bracket		1	B	
	Mounting Bracket		1	C	
	Insulation Barrier		1		
	Digitrip Retrofit Label		1		
	.250-20 × .750 Lng. Hex Bolt Stl.		2		
	.250 Flat Washer Stl.		2		
	.250 Lock Washer Stl.		2		
	.190-32 × 4.00 Lng. Screw Fil.		2		
	.190-32 × .500 Lng. Screw Nylon P. H.		2		
	.190 Flat Washer Stl.		2		
	.190 Lock Washer Stl.		2		
	Spacer Brass		2		
Step 7	External Harness	6503C83G__	1		
	External Harness Mounting Parts	9A10150G11	1		
	.164-18 × .500 Lng. Screw Stl. T. C.		1	C	
	.164 Flat Washer Stl.		1	C	
	.164 Lock Washer Stl.		1	C	
	Panduit Cable Mount		1	C	
	Mounting Pad - 1", Self-Adhesive		3 - 5	B	From Step 3
	Wire Tie Nylon		3 - 5	B	

### Digitrip Retrofit Kit Installation Components for Siemens-Allis LAF-1600 B & C Breaker RMS/R Retrofits

Step	Description	Style No.	Qty.	Model	Comment	
Step 8	CPT Kit	9A10037G01	1		} CPT Only	
	MTE Transformer		1			
	HV Fused Wires		2			
	CPT Wires		1			
	Mounting Hardware Kit		1			
	.190-32 × .750 Lng. Screw Stl. Fil.		4			
	.190 Flat Washer Stl.		8			
	.190 Lock Washer Stl.		4			
	.190-32 Nut Hex Stl.		4			
	Ring Terminal (.138, .190, .250, .312, .375, .500 - Each Size)		2			
	Wire Tie Nylon		12			
	Warning Label (208, 240, 480, & 575 Volt - Each)		1			
	Finger-Safe Cover Kit	FSK4	1			
	Cover (A, B, C, & D Each)		1			
	.098-28 × .375 Lng. Screw Stl. Fil.		4			
	Mounting Pad - 1", Self-Adhesive		2			From Step 3 CPT Only
	Wire Tie Nylon		2			From Step 3 CPT Only
Step 9	Mounting Pad - 1", Self-Adhesive				From Step 3	
	Wire Tie Nylon				From Step 3	
Step 11	Cell Harness	See Pick List	1			

**NOTE:** Due to the wide variety of Breakers and the multiple functions of the Retrofit components, some excess hardware may remain when the Retrofit is complete.

**Table 5 Torque Values for General Mounting and Screw Size Conversion**

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

**Table 6 Torque Values for Copper BUS Connectors**

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



Fig. 77 Retrofit Components

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

Notes

www.ElectricalPartManuals.com

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.*

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