Digitrip Retrofit System for Allis Chalmers LA-1600 Blue

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 Allis Chalmers LA-1600 Blue Instruction Manual, originally supplied with the Breaker, to perform the following procedure.

A. Loosen the set screw and remove the Charging Handle.

B. Remove and save the four (4) screws securing the blue front cover to the Breaker. Remove and save the front cover.

C. Remove and save the Finger Clusters and mounting hardware from the Breaker Stabs on which the Sensors are mounted.

D. Remove and scrap the original Sensors and Sensor Spacers.

E. Remove and scrap the original Trip Unit, the Trip Actuator, and all associated hardware and wiring.

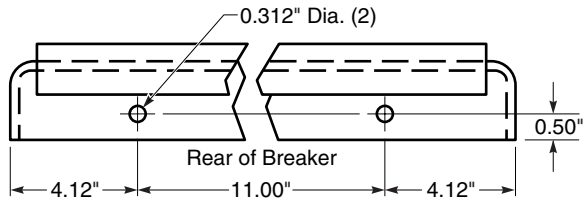
F. Using the original mounting hardware, reinstall the Finger Clusters removed in Step 2c.

Step 3: Drilling the Mounting Holes Needed for the Retrofit

Note: Throughout this step, cover the region below the area being drilled to prevent metal shavings from falling into the Breaker.

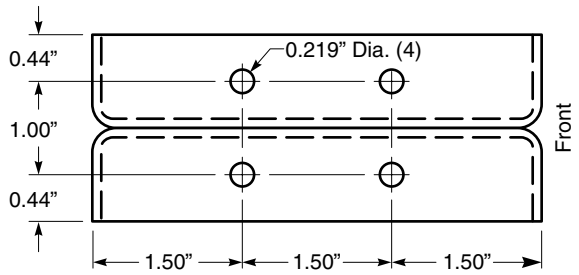
A. Using Drilling Plan “A”, drill two (2) .312" holes in the top flange of the Breaker Back Plate. These holes will be used to mount the Aux. CT Module later in the Retrofit process.

Drilling Plan “A”



B. Using Drilling Plan “B”, drill four (4) .219" holes in the top front of the Breaker Frame. These holes will be used to mount the Trip Unit later in the Retrofit process.

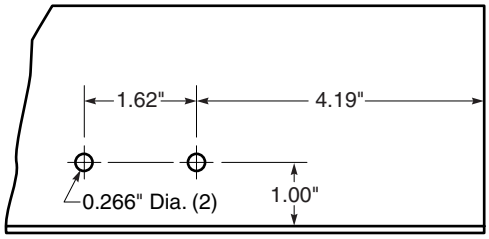
Drilling Plan “B”



For Kits Supplied with a Breaker Mounted CPT Only.

C. Using Drilling Plan “C”, drill two .266" holes in the left Breaker Frame. These holes will be used to mount the Breaker Mounted CPT later in the Retrofit process.

Drilling Plan “C”



D. Remove the Finger Clusters from either the Phase 1 & 2, or Phase 2 & 3 top Breaker Stabs. Save the Finger Clusters and the mounting hardware for use later in the Retrofit process.

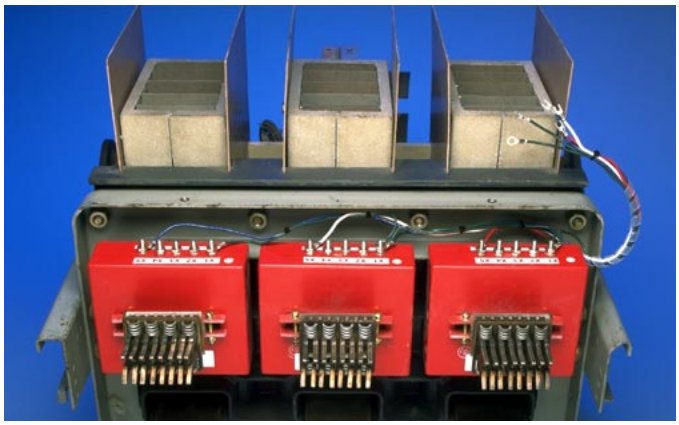
Position a Sensor Spacer over one of the top Breaker Stabs. Using the Sensor Spacer as a guide, mark the location of the hole on the Breaker Stab. Drill one (1) .219" hole through the Breaker Stab. Repeat the procedure for the other Breaker Stab. These holes will be used to mount the HV Wires later in the Retrofit process.

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 Studs.

Looking into the Breaker from the front, the right hex bolt on the Phase 1 and 2 or Phase 2 and 3 Bottom Breaker Studs can be used to mount the HV Wires.

Step 4: Installing the Sensors and Sensor Harness

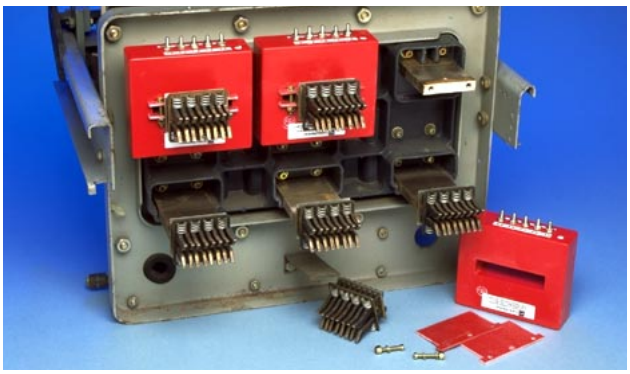


A. Remove the Finger Clusters from the top Breaker Stabs. Save the Finger Clusters and the mounting hardware for use later in the Retrofit process.

Note: If a Breaker Mounted CPT was ordered with the Retrofit Kit, two (2) of the Finger Clusters were removed from the top Breaker Stabs in Step 3.

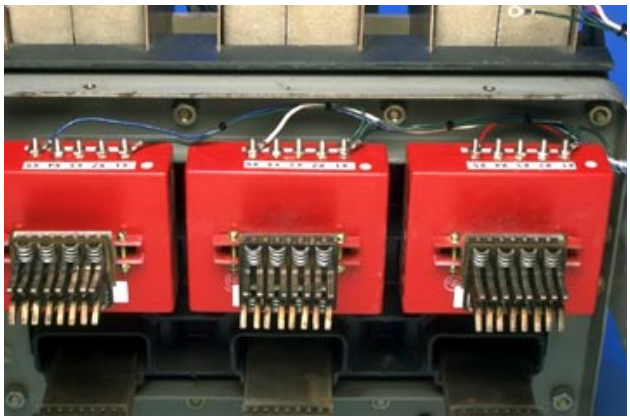
B. Slide a Sensor over each top Breaker Stab with the terminals facing up and the nameplate facing out.

C. Install one (1) Sensor Spacer on the top and one (1) on the bottom of each top Breaker Stab as shown. Using the (6) .190-32 × 1.25" screws, (12) flat washers, (6) lock washers, and (6) nuts supplied, tighten the Sensor Spacers so they "pinch" the top Breaker Stabs.



D. Using the original mounting hardware, reinstall the top Finger Clusters.

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



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

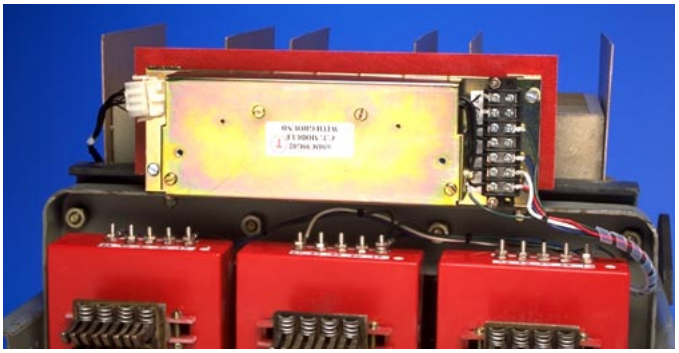
Sensor Style No. 8184A38H01

X1-X2 = 400 A X2-X5 = 1200 A
X1-X3 = 600 A X1-X5 = 1600 A
X1-X4 = 800 A

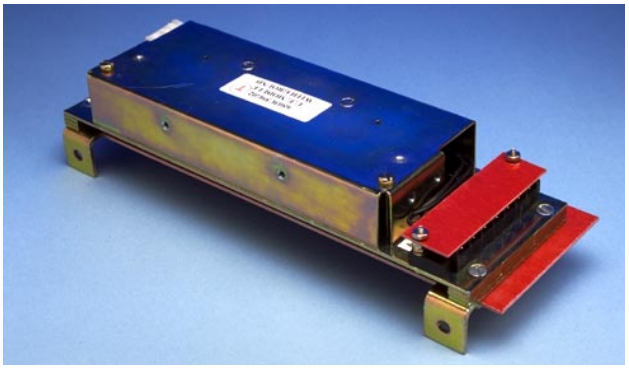
Sensor Style No. 8184A45H01

X1-X2 = 200 A

Step 5: Installing the Aux. CT Module



A. Secure the Aux. CT Module and the Aux. CT Module Mounting Brackets to the Glass Poly Barrier, as shown, using the (6) spacers, (4) .190-32 × 1.00" screws, (4) flat washers, (4) lock washers, and (4) nuts supplied. Note that three (3) spacers are used under each end of the Aux. CT Module.

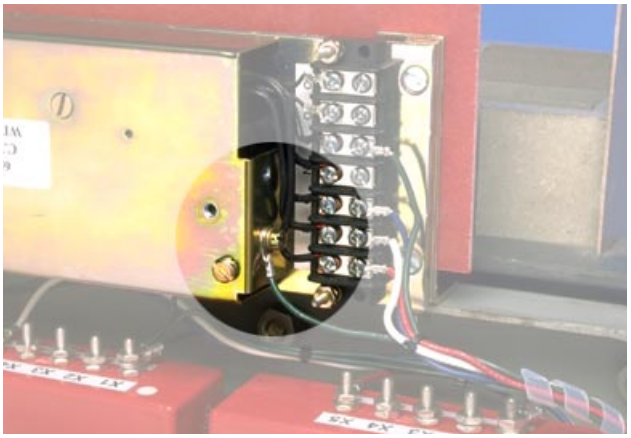


B. Mount the Aux. CT Module Assembly on the top of the Breaker Back Plate using the holes drilled in Step 3a and the (2) .250-20 × .750" screws, (4) flat washers, (2) lock washers, and (2) nuts supplied.

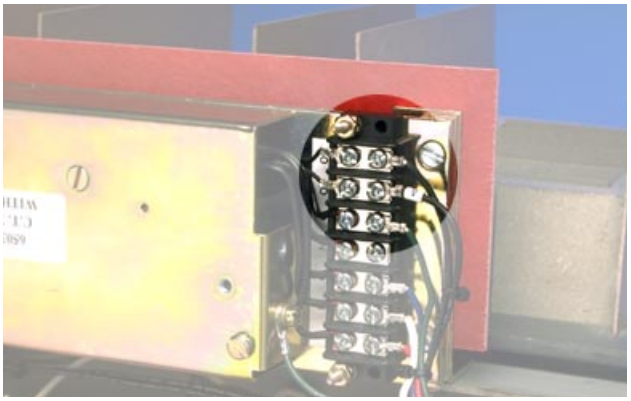
C. Remove the Glass Poly Barrier covering the 7-Point Terminal Block on the Aux. CT Module.

D. 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.

Connect the green ground wire from the Sensor Harness (with the ring terminal) to the left side of the Aux. CT Module, as shown, using the (1) .190-32 × .375" screw supplied.



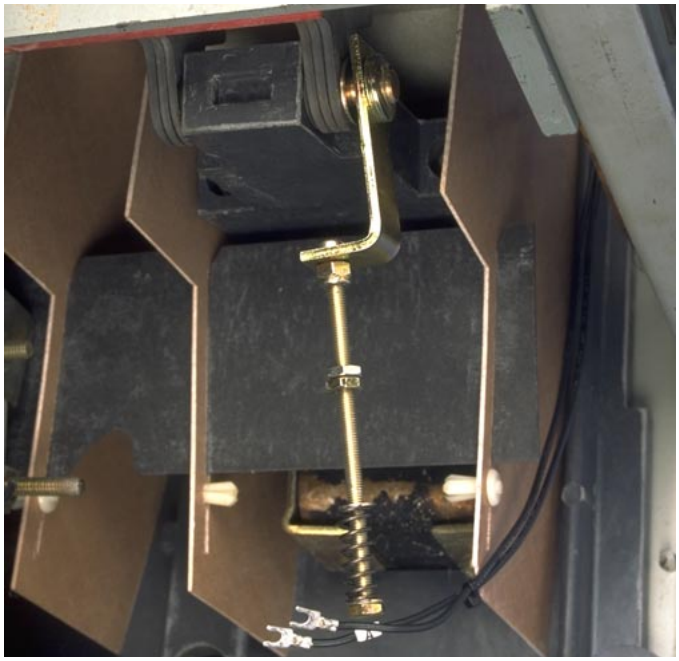
E. Connect the “+” wire of the DTA Extension Harness to the “OP” terminal of the Aux. CT Module and the unmarked wire to the “ON” terminal. Route the DTA Extension under to Aux. CT module, towards the right side of the Breaker, then down between the right Breaker Frame and the Insulation Plate. Final routing and connection of the DTA Extension Harness will be performed later in the Retrofit process.



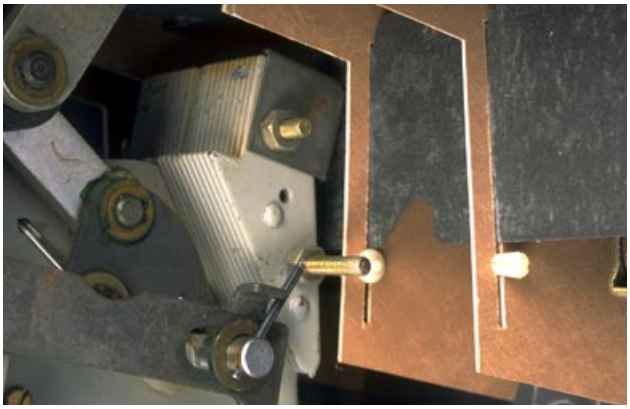
F. Reinstall the Glass Poly Barrier, removed in Step 5c, that covers the 7-Point Terminal Block.

G. Install the connector from the Aux. CT Harness into the receptacle on the Aux. CT Module.

Step 6: Installing the Reset Link Assembly



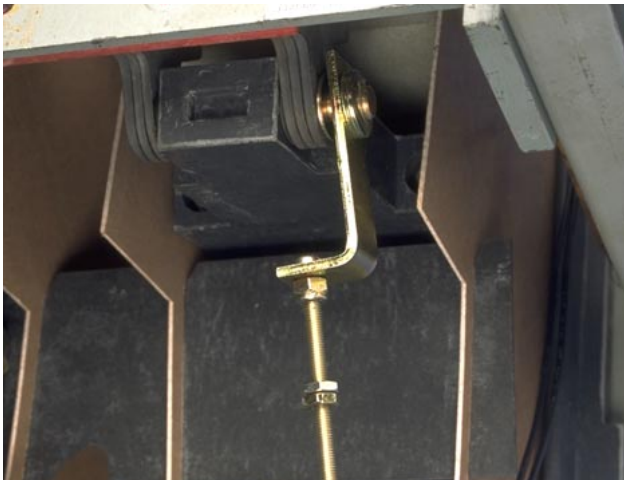
A. Remove and scrap the roll pin from the right end of the Breaker Trip Shaft. Install the new roll pin supplied in the Breaker Trip Shaft as shown.



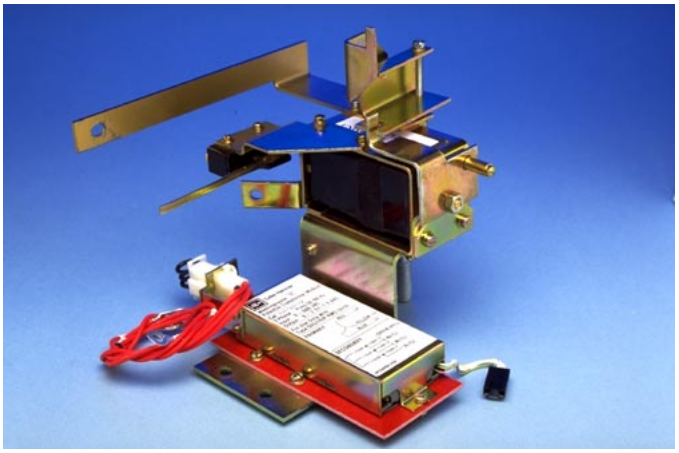
B. Remove and scrap the Wrist Pin and hardware that connects the Insulation Link to the Breaker Pole Shaft for Phase 3.

C. Install (1) Tru-arc lock ring and (1) flat washer on one end of the Wrist Pin. Completely insert the Wrist Pin into the Insulation Link and Breaker Pole Shaft from the left side.

D. Slide (1) flat washer, then the Reset Link Assembly, then another flat washer onto the Wrist Pin as shown. Install (1) Tru-arc lock ring on the right end of the Wrist Pin.

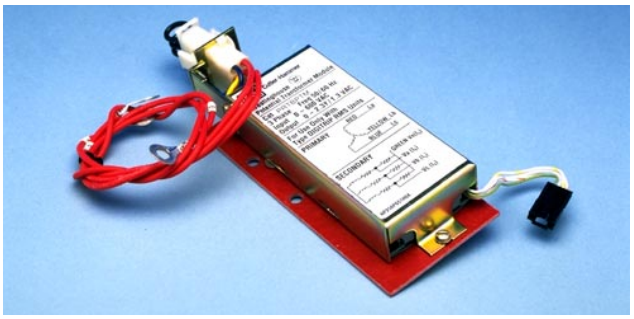


Step 7: Preparing the DTA Assembly

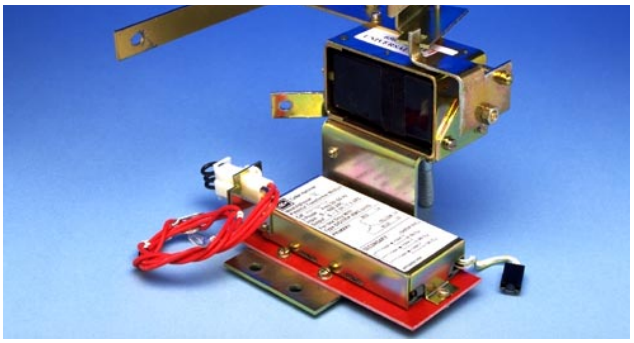


For Kits Supplied with a PT Module Only.

A. Mount the PT Module to the Glass Poly Insulation Barrier, as shown, using the (2) .138-32 × .500" screws, (4) flat washers, (2) lock washers, and (2) nuts supplied.

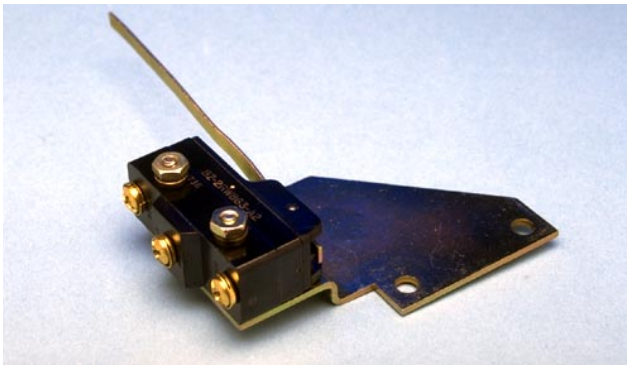


B. Mount the PT Module Assembly to the DTA Assembly, as shown, using the (2) .190-32 × .500" screws, (4) flat washers, (2) lock washers, and (2) nuts supplied.

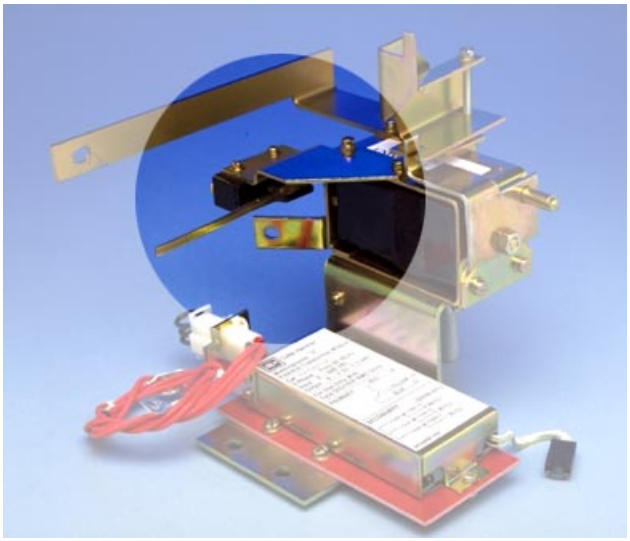


For Kits Supplied with an Auxiliary Switch Only.

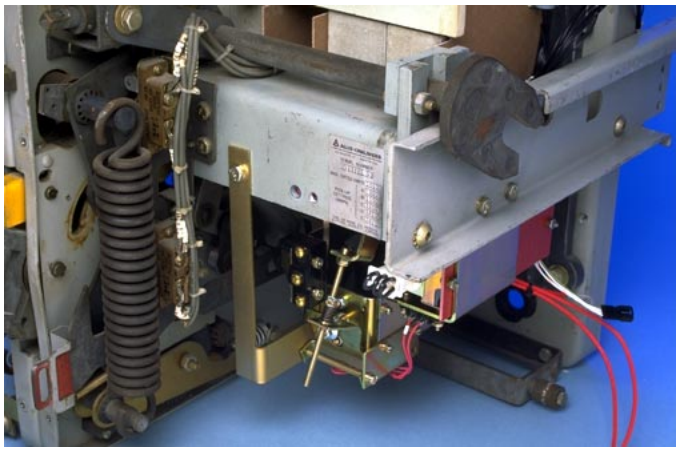
C. Using diagonals, cut 1.50" off the Microswitch Arm. Mount the Microswitch to the Auxiliary Switch Mounting Bracket, as shown, using the (2) .138-32 × 1.00" screws, (4) flat washers, (2) lock washers, and (2) .138-32 nuts supplied.



D. Mount the Auxiliary Switch Assembly to the DTA Assembly, as shown, using the (1) .164-32 × .380" screw, (1) .164-32 × .250" screw, (4) flat washers, and (2) lock washers. Note that the shorter screw is used to mount the narrow side of the Auxiliary Switch Assembly mounting bracket to the DTA, and the longer screw is used to mount the wider side.



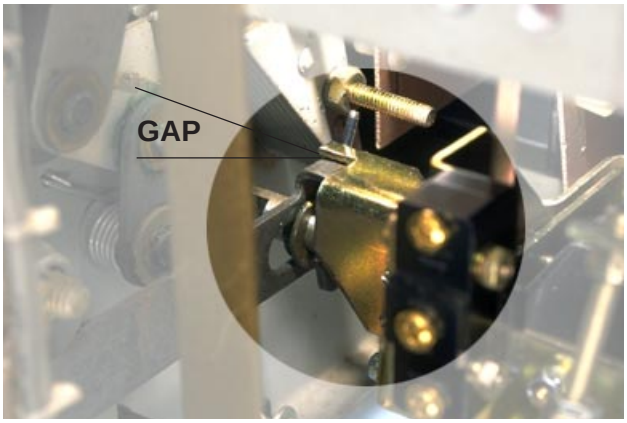
Step 8: Installing the DTA Assembly



A. Temporarily mount the DTA Assembly to the right Breaker Frame using the existing holes and the (2) .250-20 × .750" bolts, (4) flat washers, (2) lock washers, and (2) nuts supplied.

Note: Do not tighten the hardware securing the DTA to the Breaker Frame at this time.

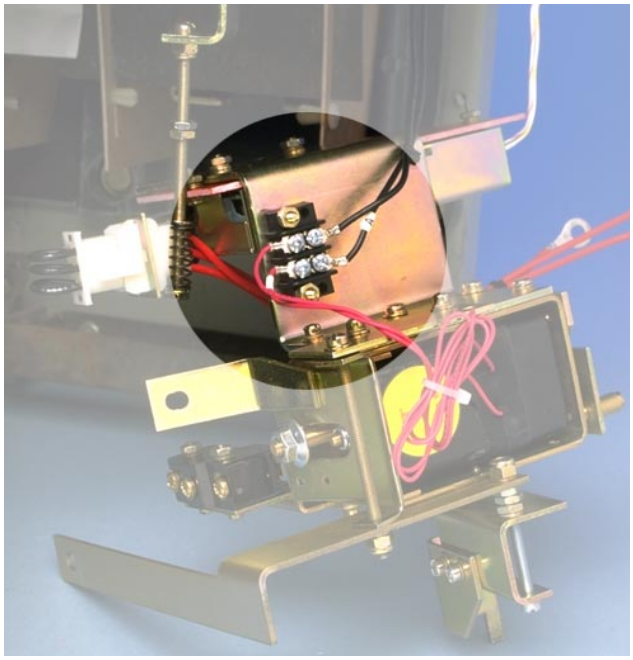
B. The mounting bracket used to secure the DTA Assembly to the front of the Breaker will be used to achieve a gap between the Trip Finger and Breaker Push-to-Trip Mechanism Arm. Move the DTA Assembly up or down until a gap of approximately .06" to .09" has been achieved. Using the center of the slot in the mounting bracket as a guide, mark the front Breaker Frame at the correct location where the hole must be drilled.



C. Remove the DTA Assembly. Using a .266" drill, drill a hole in the front Breaker Frame in the location marked in Step 8b.

Note: Cover the region below the area to be drilled to prevent metal shavings from falling into the Breaker Mechanism.

D. With the DTA Assembly setting in front of the Breaker, connect the wire from the DTA Extension Harness marked with the "+" to the "+" terminal and the unmarked wire to the other terminal on the 2-Point Terminal Block.



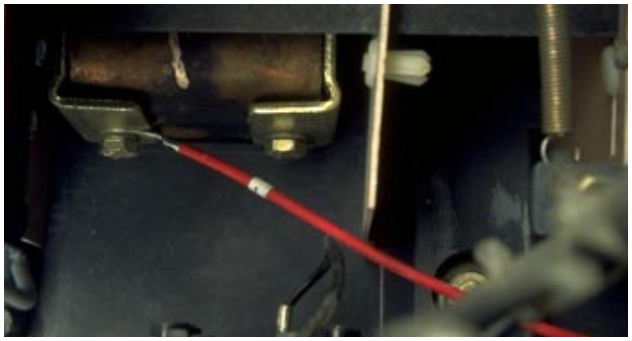
E. *For Kits Supplied with a PT Module Only.* Refer to Section 7-3, Power Flow Convention of the Retrofit Application Data, supplied with the Retrofit Kit for additional wiring information and to verify the Phase Convention used on this Breaker Application.

Remove the right hex bolt from the bottom of each Breaker Stud. The PT Wires are marked for connection to Phases 1, 2, and 3 with corresponding numbers.

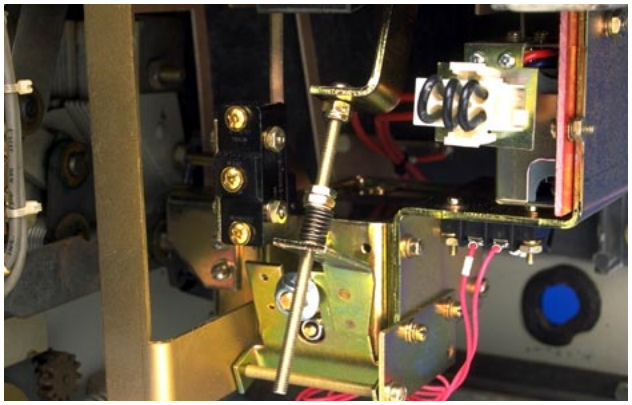
Note: Before cutting the PT Wires, verify the Phase Convention used on the Breaker Application.

Route the wires 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 length, strip each wire .250", and install a .250" ring terminal on each wire.

Connect the wires to the bottom Breaker Studs using the original mounting hardware.



F. Remove the nut securing the spring to the Reset Shaft. Make sure that the spring and washers stay in place on the Reset Shaft. While reinstalling the DTA Assembly, align the Reset Shaft with the slot in the Reset Arm.

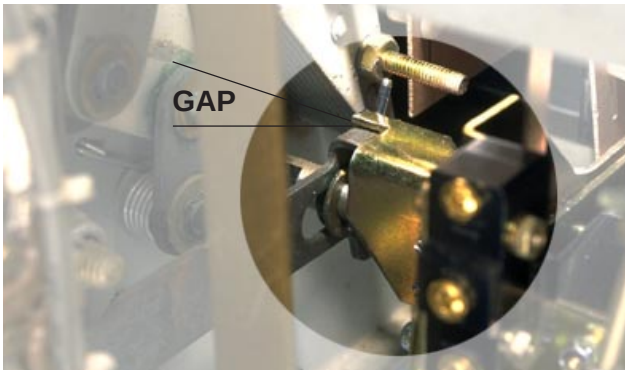


G. Align the DTA Assembly with the existing holes in the right Breaker Frame and the hole just drilled in the front Breaker Frame.

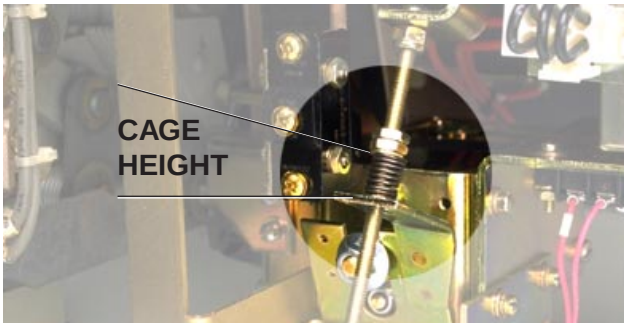
H. Secure the DTA Assembly to the Breaker, as shown, using the (3) .250-20 × .750" bolts, (6) flat washers, (3) lock washers, and (3) nuts supplied. Do not tighten the hardware at this time.

Step 9: Setting the Gap and Cage Height

A. With the DTA Assembly mounting bolts loosened, move the front of the DTA Assembly up or down until a gap of .06" to .09" is achieved between the Trip Finger and Breaker Push-to-Trip Mechanism. Tighten the mounting bolts. Recheck the gap to assure that it has not changed.



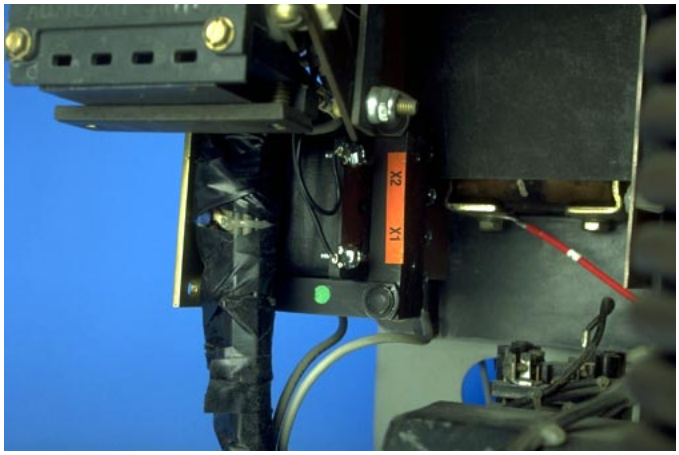
B. The cage height on the Reset Shaft should be approximately .41" to .47". If the cage height is incorrect, loosen the lock nut on the Reset Shaft then turn the adjusting nut until the correct cage height is achieved. Tighten the lock nut.



C. Connect a 24 VDC power supply to the DTA terminals; positive to positive and negative to negative. Close the Breaker manually. 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 or reset, it may be necessary to readjust the cage height. Make the necessary adjustments until the trips and resets are sure and positive each time.

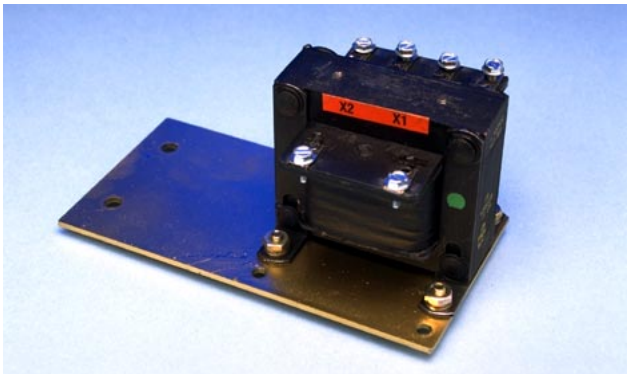
For Kits Supplied with a Breaker Mounted CPT Only.

Step 10: Installing the Breaker Mounted CPT



A. Secure the CPT to the CPT Mounting Bracket, as shown, using the (4) .190-32 × .500" screws, (8) flat washers, (4) lock washers, and (4) nuts supplied. Note that the screws, with flat washers installed, must be installed from the bottom of the CPT Mounting Bracket, and the flat washers, lock washers, and nuts are installed from the top.

Note: The CPT Harness terminals (X1 and X2) should be oriented to the side of the CPT Mounting Bracket with two extra holes.

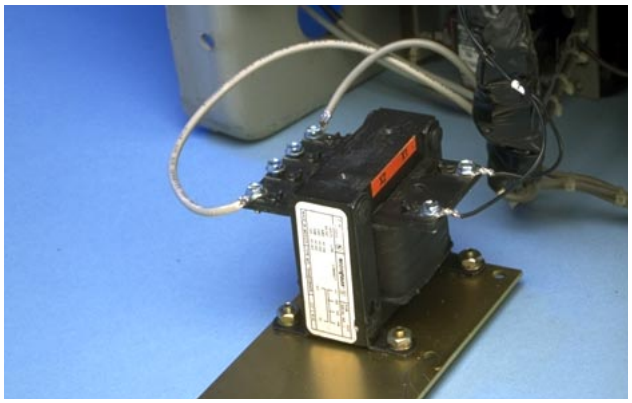


B. The CPT Harness will connect the CPT to the Trip Unit. Temporarily position the plug-in connection of the CPT Harness near the Top Center of the Breaker. Route the Harness down through the Breaker to the bottom left corner making sure the Harness is clear of all moving parts within the Breaker. Cut the Harness to a suitable length for attachment to the CPT.

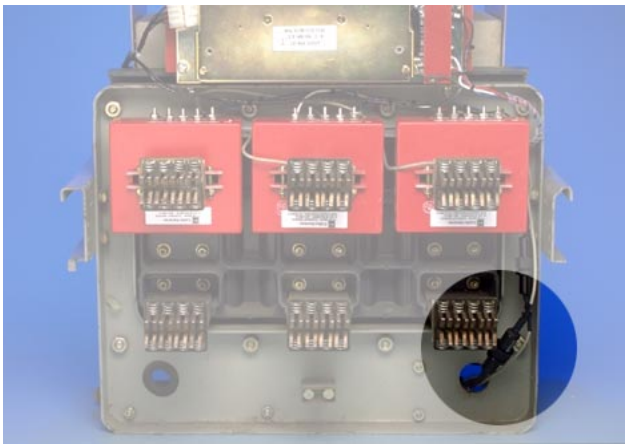
C. With the CPT Assembly setting in front of the Breaker, strip .250" of insulation and attach a .138" ring terminal to each wire of the CPT Harness. Connect the wires to the X1 and X2 terminals of the CPT.

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

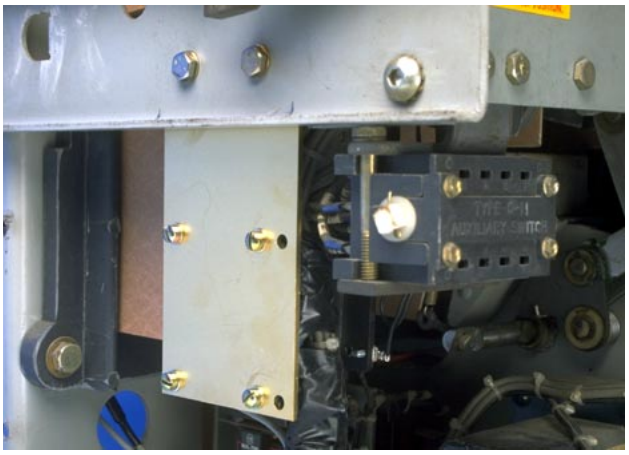
Voltage Required	CPT Terminals Used
480 Volt Circuit	H1 & H4
240 Volt Circuit	H1 & H3
208 Volt Circuit	H1 & H2



E. Route the HV Wires through the hole in the rear of the Breaker Frame next to the Breaker Stabs then up towards the top Breaker Stabs. The HV Wire fuses should be positioned to the outside of the Breaker.



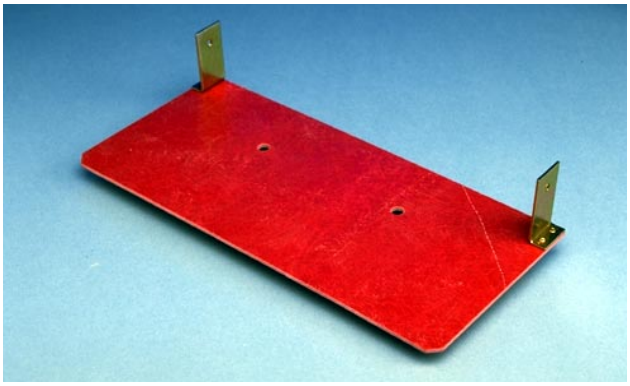
F. Align the CPT Assembly with the holes drilled in the left Breaker Frame in Step 3c. Secure the CPT Assembly to the inside of the left Breaker Frame, as shown, using the (2) .250-20 × .750" bolts, (4) flat washers, (2) lock washers, and (2) nuts supplied.



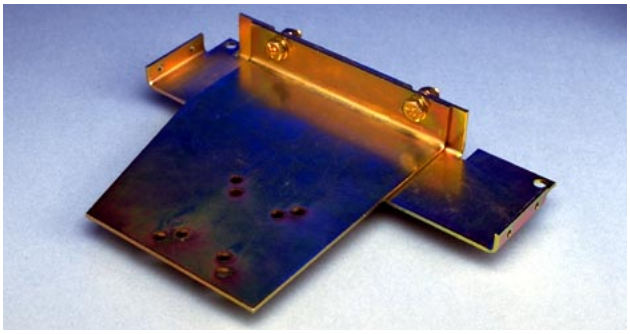
G. Attach the appropriate label for the Breaker in a clearly visible position. Three(3) labels are included with the CPT, one (1) for 480 Volt, one (1) for 240 Volt, and one (1) for 208 Volt systems.

Step 11: Preparing the Trip Unit Assembly

A. Secure the (2) Glass Poly Barrier Mounting Brackets to the Barrier, as shown, using the (4) .112-40 × .250" screws, (4) lock washers, and (4) flat washers supplied.



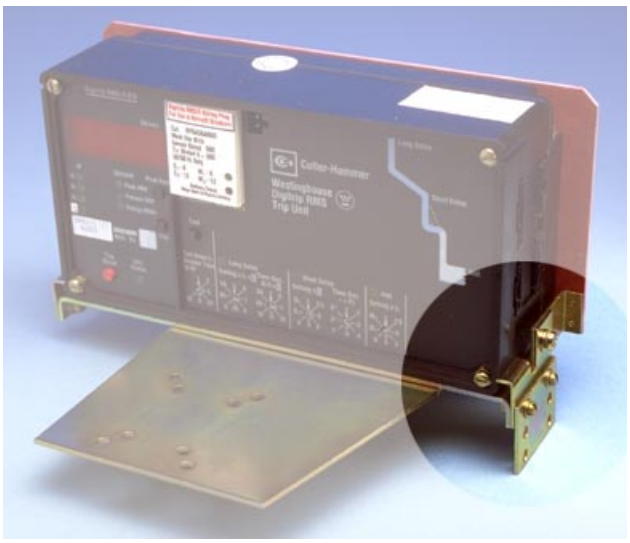
B. Secure the Trip Unit Mounting Bracket to the Breaker Mounting Bracket, as shown, using the (2) .250-20 × .750" bolts, (4) flat washers, (2) lock washers, and (2) nuts supplied.



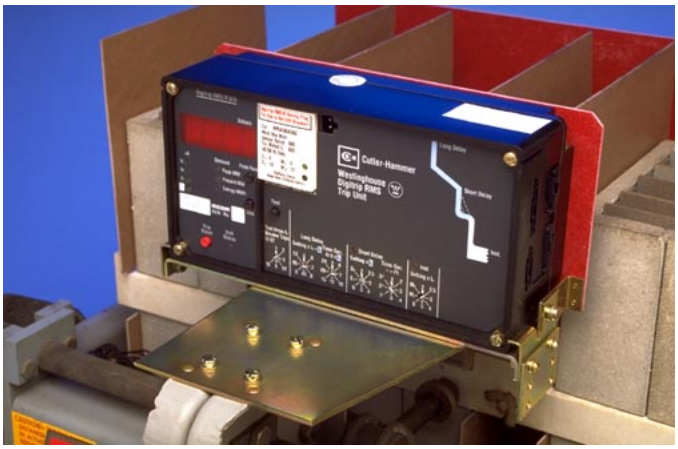
C. Install the Trip Unit on the Trip Unit Mounting Bracket using the (2) brass spacers, (2) .190-32 × 4.00" screws, (4) flat washers, (2) lock washers, and (2) nuts supplied, as shown. Note that the brass spacers are placed between the bottom of the Trip Unit and the mounting bracket.

D. Position the Trip Unit Support Brackets on the sides of the Trip Unit so they “pinch” the Trip Unit in place. Secure the External Harness Mounting Plate and the right hand Trip Unit Support Bracket to the Trip Unit Mounting Bracket, as shown, using the (2) .138-32 × .500" screws, (2) lock washers, (4) flat washers and (2) nuts supplied. Secure the left hand Trip Unit Support Bracket to the Trip Unit Mounting Bracket using the (2) .138-32 × .375" screws, (4) flat washers, (2) lock washers, and (2) nuts supplied.

E. Align the Glass Poly Barrier Assembly with the holes in the Trip Unit Support Brackets. Secure the Glass Poly Barrier Assembly to the Trip Unit Assembly using the (2) .164-32 × .250" screws, (4) flat washers, (2) lock washers, and (2) nuts supplied.



Step 12: Installing the Trip Unit Assembly

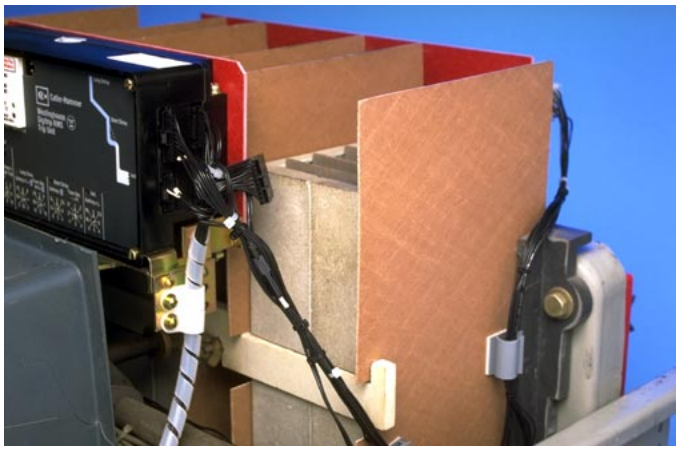


A. Mount the Trip Unit Assembly on top of the Breaker Mechanism, as shown, using the holes drilled in Step 3b and the (4) .190-32 × .500" screws, (8) flat washers, (4) lock washers, and (4) nuts supplied.

B. Remove the Trip Unit Cover and install the Rating Plug. Replace the cover.

C. Install the Digitrip Nameplate to the top of the Trip Unit.

Step 13: Final Connection of the Harnesses and Wiring



Note: The power convention of the Allis Chalmers LA-1600 Blue Series Breakers is normally *Top to Bottom*, meaning the Top Breaker Phase Frames 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 Studs.

Looking into the Breaker from the front, the right hex bolt on the Phase 1 and 2 or Phase 2 and 3 Bottom Breaker Studs can be used to mount the HV Wires.

Note: The Line Side HV Wires are longer that necessary and are cut during the following steps. Before cutting the wires, be sure that sufficient length is left so that the connections can be made to the correct Finger Clusters or Phase Frames.

A. *For Kits Supplied with a Breaker Mounted CPT Only.* Cut the HV Wires to the appropriate length for attachment to the appropriate Breaker Stabs. Strip .250" from each HV Wire and attach a .190" ring terminal. Using the holes drilled in Step 3d and the (2) .190-32 × 1.00" screws, (4) flat washers, and (2) elastic stop nuts, connect the HV Wires to the appropriate Breaker Stabs.

B. Connect the External Harness to the Trip Unit.

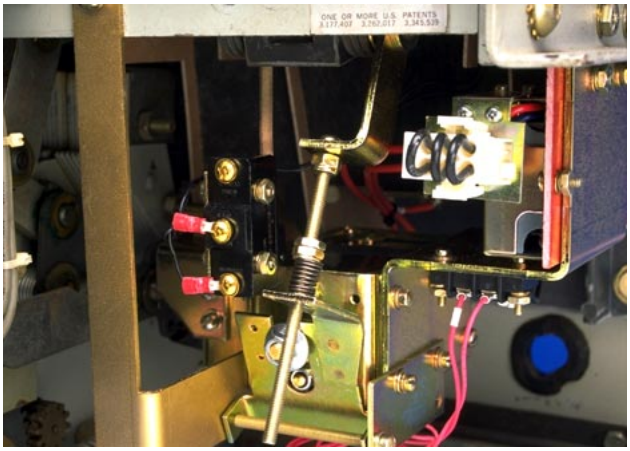
NOTE: For 510 Basic Retrofit Kits, the External Harness is the plug pictured here. It is to be plugged into the right side of the Trip Unit.

C. Connect the Aux. CT Harness to its receptacle on the Trip Unit

D. *For Kits Supplied with a Breaker Mounted CPT Only.* Remove the External Harness plug installed in the Trip Unit. Insert the black plug of the CPT Harness into the same receptacle in the Trip Unit. Reinsert the External Harness Plug just removed into the female receptacle on the CPT Harness.

E. *For Kits Supplied with a PT Module Only.* Connect the PT Harness to the External Harness. Plug the other end into the receptacle on the PT Module. Install the PT Warning Nameplate in a clearly visible position.

F. *For Kits Supplied with an Auxiliary Switch Only.* Connect the External Harness to the Auxiliary Switch by routing the two (2) wires (with ring terminals) from the External Harness to the Auxiliary Switch mounted on the DTA Assembly. Connect one wire to the normally “Open” terminal and the other wire to the “Common terminal.



G. Use the wire ties, wire clamps, and self adhesive wire clips provided to dress all wires and harnesses to keep them away from any moving parts within the Breaker.

Step 14: Testing the Breaker

A. Measure the force necessary to trip the Breaker at the point where the DTA Trip Finger contacts the roll pin. The force necessary to trip the Breaker **MUST NOT EXCEED THREE** (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 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 one (1) and three (3) ohms. If the impedance is not within this range, trace the wiring and examine each connection to assure its integrity.**

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

   When testing is complete, disconnect the External Harness from the Cell Harness. Final External Harness connection will be performed in Step 15.

For Kits Supplied with a Cell Harness Only.

Step 15: 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 16: 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 Allis Chalmers LA-1600 Blue Series Breaker

Step	Description	Style No.	Qty.	Comment
Step 4	Sensors	See Pick List	3	
	Sensor Mounting Parts	8258A20G04		
	Sensor Spacer		6	
	.190-32 × 1.25 Lng. Screw Fil.		6	
	.190 Flat Washer Stl.		12	
	.190-32 Nut Elastic Stop		6	
	Sensor Harness Parts	8258A20G13	1	
	Sensor Harness		1	
	DTA Extension Harness		1	
	.164-32 × .500 Lng. Screw		2	
	.164 Flat Washer Stl.		4	
	.164 Lock Washer Stl.		2	
	.164-32 Nut Hex Stl.		2	
	Wire Clamp		2	
	Wire Tie		12	
	Wire Clip		3	
Step 5	Aux. CT Module	6503C59G__	1	
	Aux. CT Module Mounting Parts	8258A20G05	1	
	Mounting Bracket		2	
	Barrier		2	
	Spacers		6	
	.190-32 × 1.00 Lng. Screw Flat Head		4	
	.190-32 × .375 Lng. Screw Flat Head		2	
	.190 Flat Washer Stl.		4	
	.190 Lock Washer Stl.		4	
	.190-32 Nut Hex Stl.		4	
	.250-20 × .75 Lng. Hex Bolt		2	
	.250 Flat Washer Stl.		4	
	.250 Lock Washer Stl.		2	
	.250-20 Nut Hex Stl.		2	
	DTA Extension Harness (From Step 4)		1	
Step 6	Breaker Reset Parts	8258A20G10	1	
	Reset Rod Assembly		1	
	Wrist Pin		1	
	.375 Tru-Arc Lock Ring		2	
	.375 Flat Washer Stl.		4	
	Roll Pin		1	

Digitrip Retrofit Kit Installation Components for the Allis Chalmers LA-1600 Blue Series Breaker (Continued)

Step	Description	Style No.	Qty.	Comment
Step 7	DTA Assembly	8258A20G33	1	
	PT Module	6502C82G01	1	
	.138-32 × .500 Lng. Screw		2	
	.138 Flat Washer Stl.		4	
	.138 Lock Washer Stl.		2	
	.138-32 Nut Hex Stl.		2	
	Ring Terminals (.190, .250, .312, .375, .500 - Each Size)		3	
	PT Module Mounting Parts	8258A20G12	1	
	PT Extension Harness		1	
	.190-32 × .500 Lng. Screw Fil.		2	
	.190 Flat Washer Stl.		4	
	.190 Lock Washer Stl.		2	
	.190-32 Nut Hex Stl.		2	Comm. Only
	Warning Nameplate		1	
	Aux. Switch Kit	8258A20G02	1	
	Microswitch		1	
	Mounting Bracket		1	
	.138-32 × 1.00 Lng. Screw Fil.		2	
	.138 Flat Washer Stl.		4	
	.138 Lock Washer Stl.		2	
	.138-32 Nut Hex Stl.		2	
	.164-32 × .380 Lng. Screw		1	
	.164-32 × .250 Lng. Screw		1	
	.164 Flat Washer Stl.		2	
	.164 Lock Washer Stl.		2	
Step 8	DTA Mounting Parts	8258A20G11	1	
	.250-20 × .750 Lng. Hex Bolt		3	
	.250 Lock Washer Stl.		6	
	.250 Flat Washer Stl.		3	
	.250-20 Nut Hex Stl.		3	

Digitrip Retrofit Kit Installation Components for the Allis Chalmers LA-1600 Blue Series Breaker (Continued)

Step	Description	Style No.	Qty.	Comment
Step 10	Breaker Mounted CPT Kit	8259A91G05	1	
	Ring Terminals (.138, .190, .250, .312, .375, .500 - Each Size)		2	
	CPT Mounting Parts	8258A20G20	1	
	CPT Mounting Bracket		1	
	.250-20 × .750 Lng. Hex Bolt		2	
	.250 Flat Washer Stl.		4	
	.250 Lock Washer Stl.		2	CPT Only
	.250-20 Nut Hex Stl.		2	
	.190-32 × .500 Lng. Screw Fil.		4	
	.190 Flat Washer Stl.		12	
	.190 Lock Washer Stl.		4	
	.190-32 Nut Hex Stl.		4	
	.190-32 × 1.00 Lng. Screw Fil.		2	
	.190-32 Elastic Stop Nut		2	
Step 11	Trip Unit		1	See Pick List
	Trip Unit Assembly Parts	8258A20G06	1	
	Trip Unit Mounting Bracket		1	
	Trip Unit Support Bracket R.H.		1	
	Trip Unit Support Bracket L.H.		1	
	Barrier		1	
	Mounting Clips		2	
	Breaker Mounting Bracket		1	
	Mounting Plate		1	
	Digitrip Nameplate		1	
	Spacer		2	
	.250-20 × .750 Lng. Hex Bolt		2	
	.250 Flat Washer Stl.		4	
	.250 Lock Washer Stl.		2	
	.250-20 Nut Hex Stl.		2	
	.190-32 × 4.00 Lng. Screw		2	
	.190 Flat Washer Stl.		4	
	.190 Lock Washer Stl.		2	
	.190-32 Nut Hex Stl.		2	
	.164-32 × .250 Lng. Screw		2	
	.164 Flat Washer Stl.		2	
	.164 Lock Washer Stl.		2	
	.138-32 × .500 Lng. Screw Fil.		2	
	.138-32 × .380 Lng. Screw Fil.		2	
	.138 Flat Washer Stl.		8	
	.138 Lock Washer Stl.		4	
	.138-32 Nut Hex Stl.		4	
	.112-40 × .250 Lng. Screw Fil.		4	
	.112 Flat Washer Stl.		4	
	.112 Lock Washer Stl.		4	

Digitrip Retrofit Kit Installation Components for the Allis Chalmers LA-1600 Blue Series Breaker (Continued)

Step	Description	Style No.	Qty.	Comment
Step 12	Rating Plug		1	See Pick List
	Trip Unit Mounting Parts	8258A20G07	1	
	.190-32 × .500 Lng. Screw Fil.		4	
	.190 Flat Washer Stl.		8	
	.190 Lock Washer Stl.		4	
	.190-32 Nut Hex Stl.		4	
	Digitrip Nameplate (From Step 11)		1	
Step 13	External Harness	6502C83G__	1	
	Wire Clamp (From Step 4)		2	
	Wire Tie (From Step 4)		12	
	Wire Clip (From Step 4)		3	
	.190-32 × 1.00 Lng. Screw Fil. (From Step 10)		2	CPT Only
	.190 Flat Washer Stl. (From Step 10)		4	
	.190-32 Elastic Stop Nut (From Step 10)		2	
	.164-32 × .500 Lng. Screw (From Step 4)		2	
	.164 Flat Washer Stl. (From Step 4)		4	
	.164 Lock Washer Stl. (From Step 4)		2	
	.164-32 Nut Hex Stl. (From Step 4)		2	
	Warning Nameplate (From Step 7)		1	Comm. Only
Step 15	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 remain when the Retrofit is complete.

Torque Values for General Mounting

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

Torque Values for Copper BUS Connectors

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

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

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. (412) 937-6441
(412) 937-6727

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