



Digitrip Retrofit System for Westinghouse DA-75 Frameless Breakers



SAFETY PRECAUTIONS



WARNING

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

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

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



Digitrip Retrofit System for Westinghouse DA-75 Frameless Breakers

CONTENTS

Description

- Introduction** 4
- Step 1: General Breaker Preparation** 5
- Step 2: Removing the Original Electromechanical Trip Units** 6
- Step 3: Installing the Sensors and Sensor Harness** 6
- Step 4: Preparing the DTA / Aux. CT Module Assembly** 10
- Step 5: Installing the DTA / Aux. CT Module Assembly** 12
- Step 6: Installing and Adjusting the Trip and Reset Links** 14
- Step 7: Installing the Trip Unit** 17
- Step 8: External Harness Installation and Final Wiring** 19
- Step 9: Testing the Breaker** 19
- Step 10: Installing the Retrofitted Breaker in the Cell** 20

Figures

- 1. Overview: Sensors and Sensor Harness Installed in the Breaker. 6
- 2. Correct Placement of the Spacers. 7
- 3. Correct Positioning of the “X” Markings for the Phase 1 and 3 Top Sensors. 7
- 4. Correct Mounting of the Bottom Sensor. 7
- 5. 6-Point Terminal Block Mounted to the Breaker. 8

- 6. Sensor Wires, Sensor Harness, and Terminal Block Jumper Connections at the 6-Point Terminal Block. 8
- 7. Sensor Wires and Sensor Harness Connected to the 6-Point Terminal Block. 8
- 8. Correct Routing of the Sensor Harness. 9
- 9. Correct Routing of the Sensor Wires and Sensor Harness. 9
- 10. Sensor Harness Mounted away from the Knife Switch. 9
- 11. Overview: DTA / Aux. CT Module Assembly. 10
- 12. Knife Switch Insulation Barrier Mounting Bracket Mounted to the Bottom DTA / Aux. CT Module Assembly Mounting Bracket. 10
- 13. The Components of the DTA / Aux. CT Module Mounting Assembly. 11
- 14. DTA Assembly Mounted to the DTA / Aux. CT Module Mounting Assembly. 11
- 15. DTA Assembly and Aux. CT Module Mounted to the DTA / Aux. CT Module Mounting Assembly. 11
- 16. Overview: DTA / Aux. CT Module Assembly Installed in the Breaker. 12
- 17. Hardware to be Removed from the Breaker to Allow for DTA / Aux. CT Module Assembly Installation. 12
- 18. DTA / Aux. CT Module Assembly Mounted to the Breaker. 13
- 19. Sensor Harness Connected to the Aux. CT Module. 13



- 20. Overview: Trip and Reset Links Installed in the Breaker. 14
- 21. Trip Finger Mounted to the Trip Finger Insulating Plate. 14
- 22. Trip Bracket Assembly and Trip Rod Installed in the Breaker. 15
- 23. Adjusting the Trip Rod Gap. 15
- 24. Reset Bracket Mounted to the Reset Bracket Insulating Plate. 15
- 25. Reset Bracket Assembly Mounted to the Breaker Cross Bar. 16
- 26. Brass Spacer Installed on the Reset Rod. .. 16
- 27. Reset Rod Installed in the Breaker. 16
- 28. Cage Height Adjustment. 17
- 29. Overview: Trip Unit Installed on the Breaker. 17
- 30. Trip Unit Mounted to the Trip Unit Mounting Plate. 18
- 31. Aux. CT Harness Connected to the Aux. CT Module and Trip Unit. 18
- 32. Digitrip Nameplate Installed on the Breaker. 18
- 33. 510 External Harness Shorting Plug. 19
- 34. Retrofit Components 25

Tables

- 1. Available Retrofit Kits 4
- 2. Torque Values for General Mounting and Screw Size Conversion 24
- 3. Torque Values for Copper BUS Connectors 24

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
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

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 33-855-2), supplied with the Digitrip Retrofit Kit.

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 components and hardware will be used to complete each step in the Retrofit Process.

**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 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 (7) 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.

STEP 2: REMOVING THE ORIGINAL ELECTRO-MECHANICAL TRIP UNITS

Refer to the Westinghouse DA-75 Frameless Instruction Manual, originally supplied with the Breaker, to perform the following procedure.

- A. If the Breaker has not been previously Retrofitted, remove and scrap the original Electromechanical Trip Units and all associated hardware.
- B. If the Breaker has been previously Retrofitted, remove the Sensors, Trip Unit, and all associated wiring and mounting hardware from the Breaker.

STEP 3: INSTALLING THE SENSORS AND SENSOR HARNESS

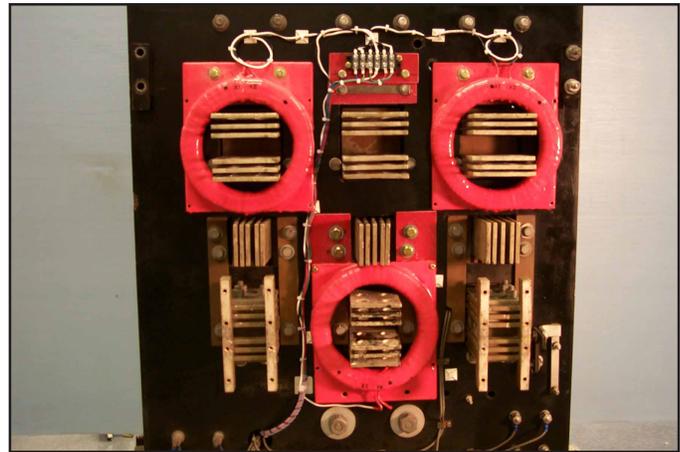


Fig. 1 Overview: Sensors and Sensor Harness Installed in the Breaker.

- A. Refer to the Westinghouse DA-75 Frameless Instruction Manual, originally supplied with the Breaker, and remove the Phase 1 and 3 top and Phase 2 bottom Finger Clusters and Finger Cluster Blocks from the Breaker Stabs. Save the Finger Clusters, Finger Cluster Blocks, and all mounting hardware for reinstallation later in the Retrofit process.

NOTE: If the Breaker being Retrofitted has existing Insulation Plates surrounding the Phase 1 and 3 top Breaker Stabs, DO NOT remove them. They are used to retain the Stationary Arcing Contact Springs.

NOTE: It may be necessary, in some cases, to file the existing holes in the Sensors being mounted to the Phase 1 and 3 top Breaker Stabs.

- B. Using the existing tapped holes and the (4) .250-20 × 1.00" bolts, (4) lock washers, (4) wide flat washers, and (4) plastic spacers supplied, mount a Sensor around the Phase 1 and 3 top Breaker Stabs. Note that the spacers are to be placed between the back of the Sensor and the Breaker Back Plate. Also note that the "X1" and "X2" markings on the Sensors must be oriented towards the TOP of the Breaker and face outwards.

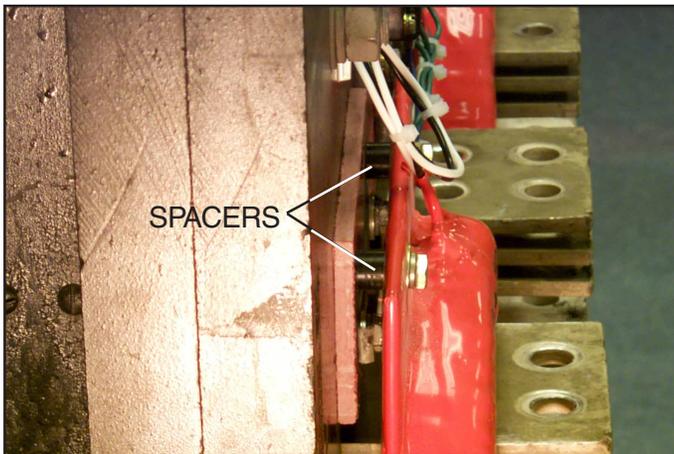


Fig. 2 Correct Placement of the Spacers.



Fig. 3 Correct Positioning of the "X" Markings for the Phase 1 and 3 Top Sensors.

- C. Remove and scrap the four (4) top bolts and washers securing the protruding Copper Plates on both sides of the Phase 2 bottom Breaker Stab.
- D. Align the new Insulation Plates with the existing holes and, using the (4) .375-16 x 3.50" bolts, (4) lock washers, and (4) flat washers supplied, secure the Insulation Plates to the Breaker.
- E. Using the tapped holes in the Insulation Plates and the (2) .190-32 x .500" screws, (2) lock washers, and (2) flat washers supplied, mount a Sensor around the Phase 2 bottom Breaker Stab. Note that the "X1" and "X2" markings on the Sensor must be oriented towards the BOTTOM of the Breaker and face outwards.

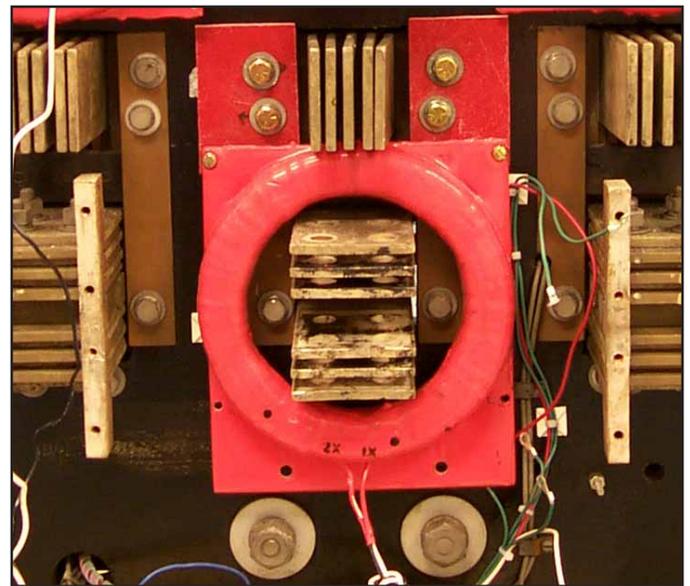


Fig. 4 Correct Mounting of the Bottom Sensor.

- F. If they have not already been removed, remove and scrap the two (2) bolts located near the top of the existing Insulation Plate located above the Phase 2 top Breaker Stab.
- G. Align the holes in the 6-Point Terminal with the holes in the 6-Point Terminal Block Mounting Plate. Secure the Terminal Block to the Mounting Plate using the (2) .164-32 x .500" screws, (2) lock washers, and (2) flat washers supplied.
- H. Align the 6-Point Terminal Block Assembly with the holes from which the hardware was removed in Step 3-F. Secure the Terminal Block Assembly using the (2) .250-20 x .500" bolts, (2) lock washers, and (2) flat washers supplied.

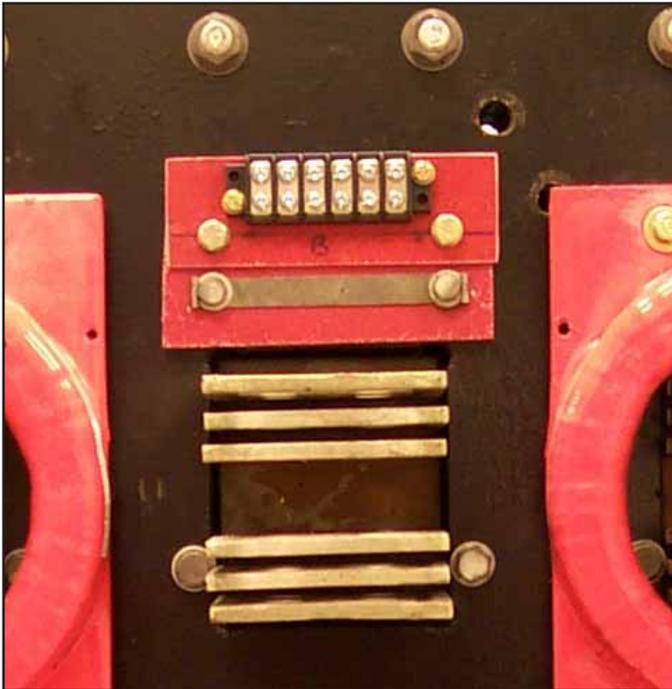


Fig. 5 6-Point Terminal Block Mounted to the Breaker.

- I. Route the Sensor Wires towards the 6-Point Terminal Block. Strip an appropriate length of insulation from the ends of the Sensor Wires and crimp a supplied #6 ring terminal to the end of each wire.
- J. Connect the Sensor Wires to the 6-Point Terminal as detailed in Figure 6.
- K. Connect the wires of the Sensor Harness to the 6-Point Terminal Block as detailed in Figure 6. Note that a Terminal Block Jumper must be used to connect the # 2 and # 3 bottom terminals.

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

For the Sensors supplied with the Retrofit Kit, the following convention applies.

Sensor Style No.

4A35642H01 X1 - X2 = 3000 A

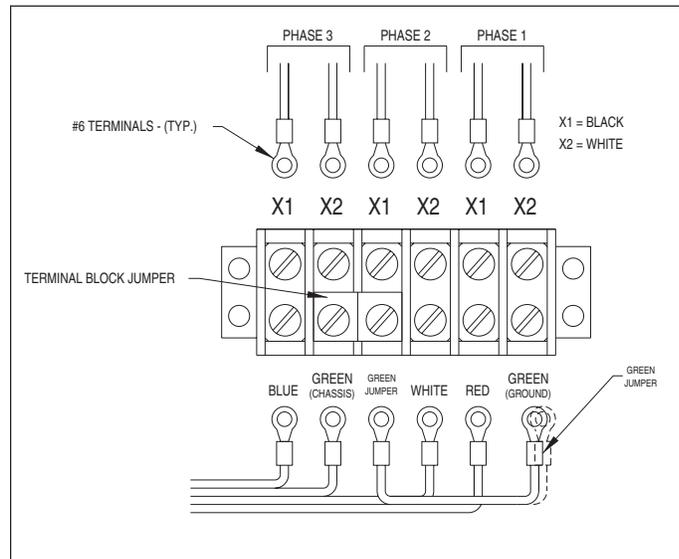


Fig. 6 Sensor Wires, Sensor Harness, and Terminal Block Jumper Connections at the 6-Point Terminal Block.

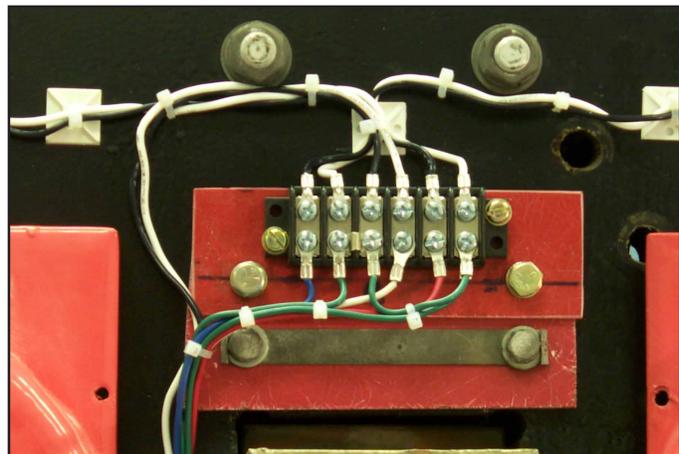


Fig. 7 Sensor Wires and Sensor Harness Connected to the 6-Point Terminal Block.

- L. Route the Sensor Harness down towards the bottom of the Breaker then through the existing hole near the bottom of the Breaker Back Plate.

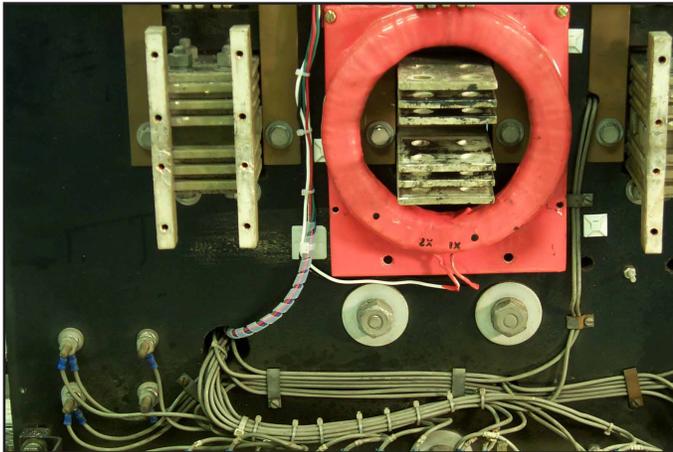


Fig. 8 Correct Routing of the Sensor Harness.

M. Use the supplied self-adhesive tie mounts and wire ties to secure the Sensor Wires and Sensor Harness as shown.

NOTE: The Sensor Wires and Sensor Harness must be kept clear of edges of the Breaker Back Plate and four (4) Racking Blocks.

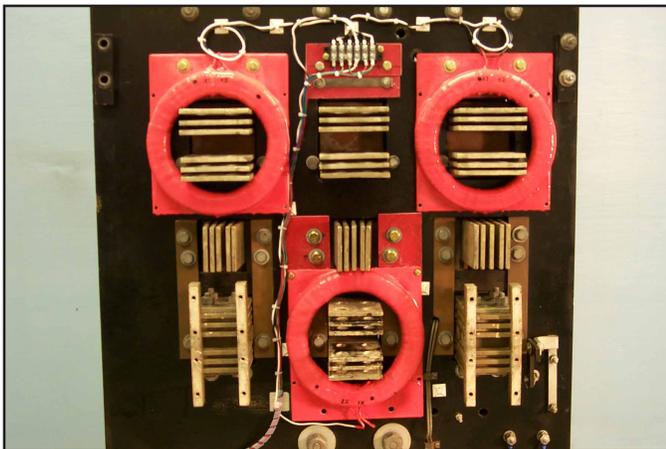


Fig. 9 Correct Routing of the Sensor Wires and Sensor Harness.

N. Use the supplied self-adhesive Tie Mounts and Wire Ties to secure the Sensor Harness to the inside of the Breaker Back Plate, above the Knife Switch.



WARNING

THE SENSOR HARNESS MUST BE KEPT AT LEAST ONE (1) INCH AWAY FROM THE KNIFE SWITCH.



Fig. 10 Sensor Harness Mounted away from the Knife Switch.

O. Reinstall the Finger Clusters and Finger Cluster Blocks using the original mounting hardware removed in Step 3-A.

STEP 4: PREPARING THE DTA / AUX. CT MODULE ASSEMBLY

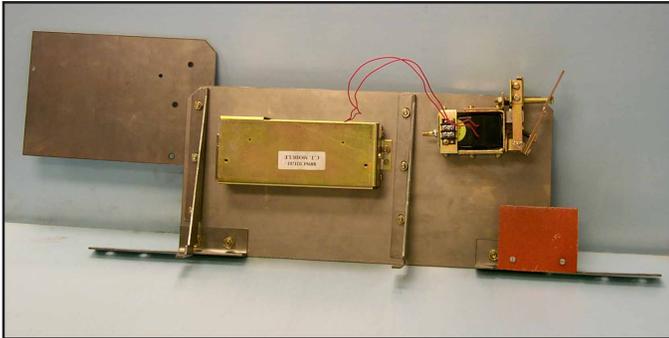


Fig. 11 Overview: DTA / Aux. CT Module Assembly.

- A. Align the Knife Switch Insulation Barrier Mounting Bracket with the holes in the Bottom DTA / Aux. CT Module Assembly Mounting Bracket as shown. Secure the Knife Switch Insulation Barrier Mounting Bracket using the (2) .164-32 × .250" screws and (2) lock washers supplied.



Fig. 12 Knife Switch Insulation Barrier Mounting Bracket Mounted to the Bottom DTA / Aux. CT Module Assembly Mounting Bracket.

- B. Secure the bottom DTA / Aux. CT Module Mounting Bracket Assembly to the DTA / Aux. CT Module Mounting Plate, as shown, using the (2) .375-16 × .875" bolts, (2) lock washers, (2) flat washers, and (2) nuts supplied.
- C. Apply Loc-Tite® 243 to the threads then secure the Knife Switch Insulation Barrier to the Knife Switch Insulation Barrier Mounting Bracket, as shown, using the (2) .164-32 × .500" nylon screws supplied.
- D. Secure the top DTA / Aux. CT Module Mounting Bracket to the DTA / Aux. CT Module Mounting Plate, as shown, using the (2) .375-16 × .875" bolts, (2) lock washers, (2) flat washers, and (2) nuts supplied.
- E. Secure the bottom DTA / Aux. CT Module Mounting Plate Gusset to the DTA / Aux. CT Module Mounting Plate, as shown, using the (3) .250-20 × .750" bolts, (3) lock washers, (3) flat washers, and (3) nuts supplied.

NOTE: There is a difference between the top and bottom DTA / Aux. CT Module Mounting Plate Gussets. The top Gusset has an extra "cut away" to allow for clearance around the top DTA / Aux. CT Module Mounting Bracket.

- F. Align the top DTA / Aux. CT Module Mounting Plate Gusset and the Trip Unit Mounting Plate with the holes near the top of the DTA / Aux. CT Module Mounting Plate. Secure the top DTA / Aux. CT Module Mounting Plate Gusset and the Trip Unit Mounting Plate to the DTA / Aux. CT Module Mounting Plate, as shown, using the (3) .250-20 × .750" bolts, (3) lock washers, (3) flat washers, and (3) nuts supplied.

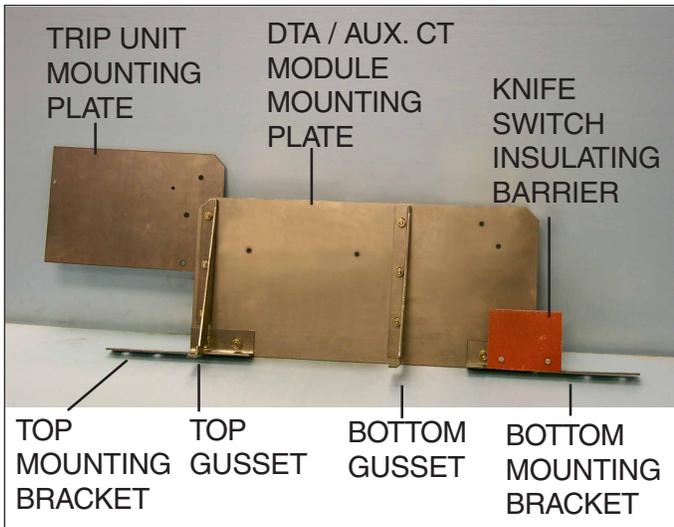


Fig. 13 The Components of the DTA / Aux. CT Module Mounting Assembly.

G. Align the DTA Assembly with the holes in the DTA / Aux. CT Module Mounting Plate, as shown. Secure the DTA Assembly to the DTA / Aux. CT Module Mounting Plate using the (2) .250-20 x .500 bolts and (2) lock washers supplied.

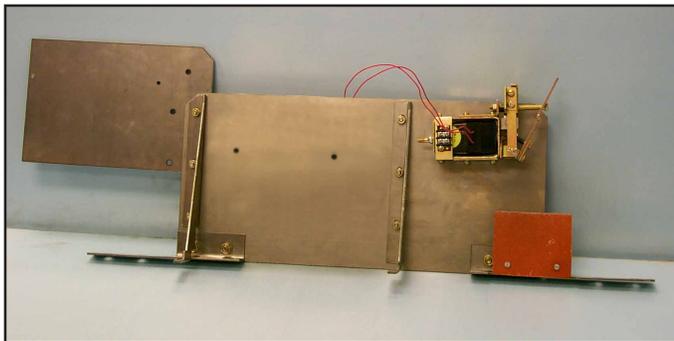


Fig. 14 DTA Assembly Mounted to the DTA / Aux. CT Module Mounting Assembly.

H. Align the Aux. CT Module with the holes in the DTA / Aux. CT Module Mounting Plate, as shown. Secure the Aux. CT Module to the DTA / Aux. CT Module Mounting Plate using the (2) .250-20 x .750" bolts, (2) lock washers, (2) flat washers, and (2) nuts supplied.

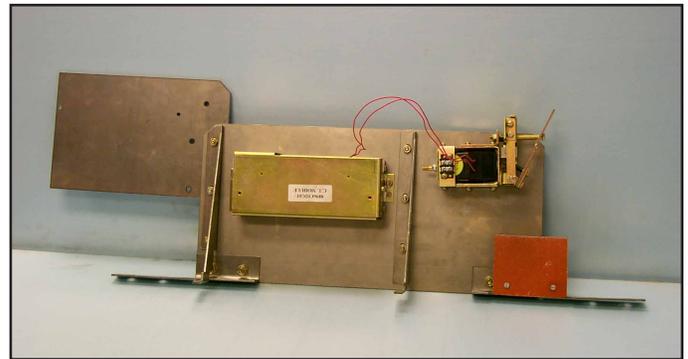


Fig. 15 DTA Assembly and Aux. CT Module Mounted to the DTA / Aux. CT Module Mounting Assembly.

I. Connect the DTA Wires to the terminals of the Aux. CT Module: positive (+) wire to the OP terminal and the unmarked wire to the ON terminal.

STEP 5: INSTALLING THE DTA / AUX. CT MODULE ASSEMBLY

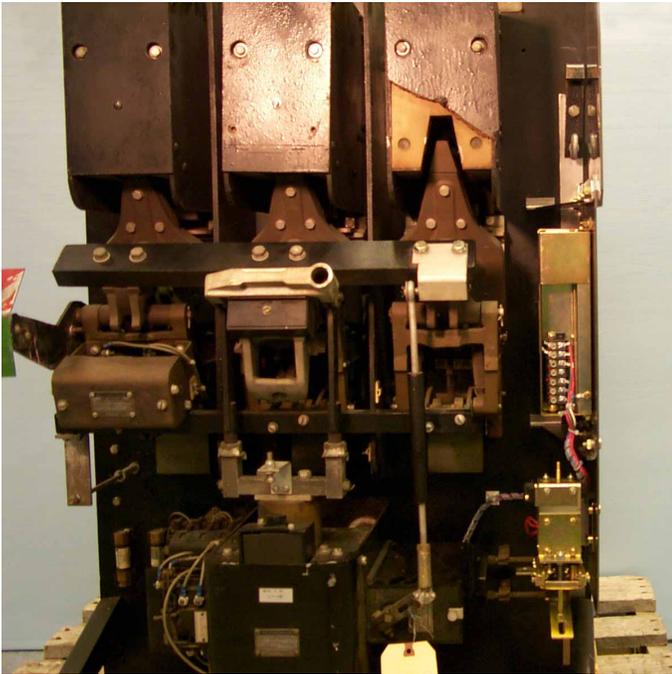


Fig. 16 Overview: DTA / Aux. CT Module Assembly Installed in the Breaker.

- A. Remove and save the mounting hardware and “Eye” hook that secure the right Lifting Hook and top right Racking Block to the Breaker Back Plate. Save the Lifting Hook and Racking Block.
- B. Remove and save the hardware that secures the bottom right Breaker Foot, bottom right Racking Block, and the Secondary Disconnect Mounting Bracket to the Breaker Back Plate. Save the Breaker Foot, Secondary Disconnect Mounting Bracket, and Racking Block.

NOTE: With the right Breaker Foot removed, the Breaker has an increased tendency to “tip” forward. Care should be taken to prevent this from occurring.

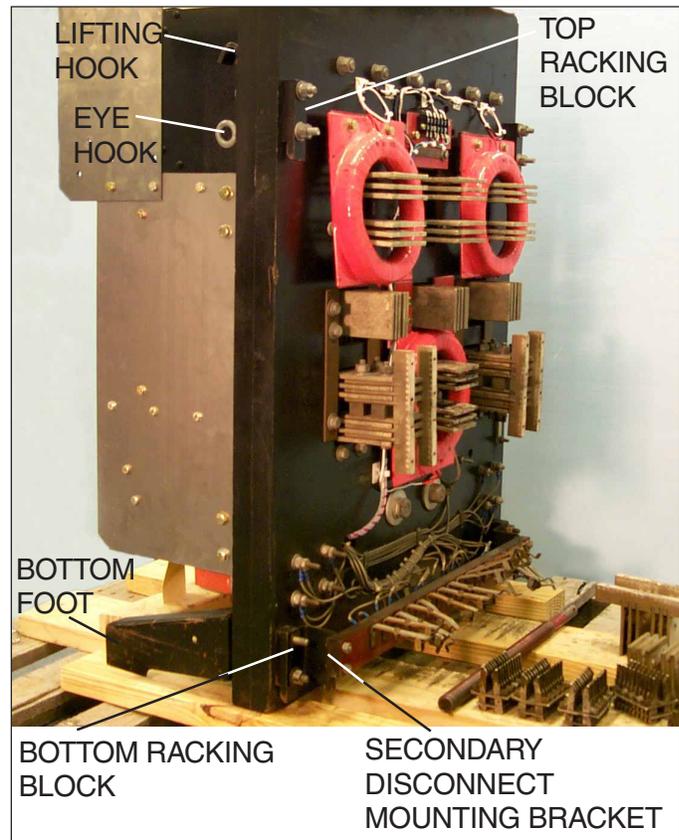


Fig. 17 Hardware to be Removed from the Breaker to Allow for DTA / Aux. CT Module Assembly Installation.

- NOTE:** An assistant may be required during the following steps.
- C. Align the DTA / Aux. CT Module Assembly with the holes in the Breaker Back Plate from which the hardware was removed in Steps 5-A and 5-B.
 - D. Using the original mounting hardware and “Eye” hook, secure the top of the DTA / Aux. CT Module Assembly, the right Lifting Hook, and top right Racking Block to the Breaker Back Plate.
 - E. Using the original mounting hardware, secure the bottom of the DTA / Aux. CT Module Assembly, the bottom right Breaker Foot, bottom right Racking Block, and Secondary Disconnect Mounting Bracket to the Breaker Back Plate.

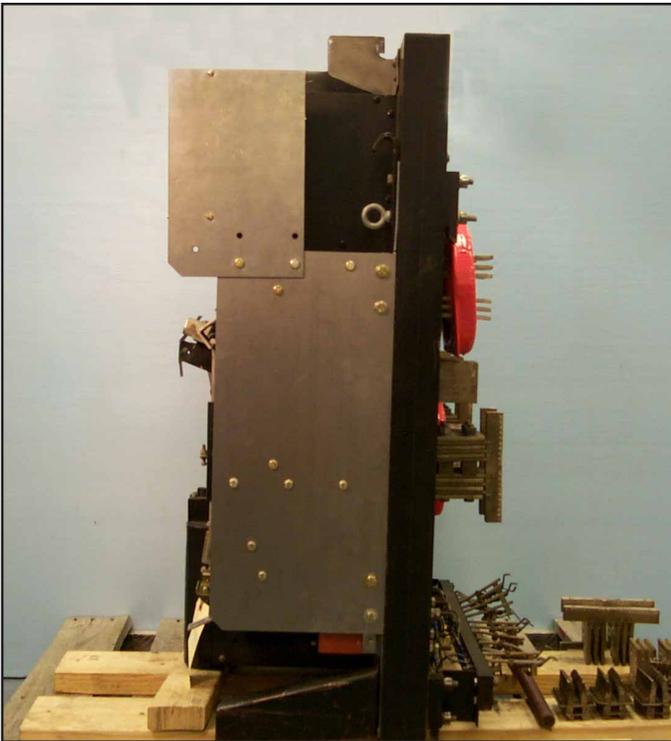


Fig. 18 DTA / Aux. CT Module Assembly Mounted to the Breaker.

- F. Route the Sensor Harness to the Aux. CT Module. 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 existing hole in the front of the Aux. CT Module using the (1) .190-16 x .500" thread cutting screw, (1) lock washer, and (1) flat washer supplied.

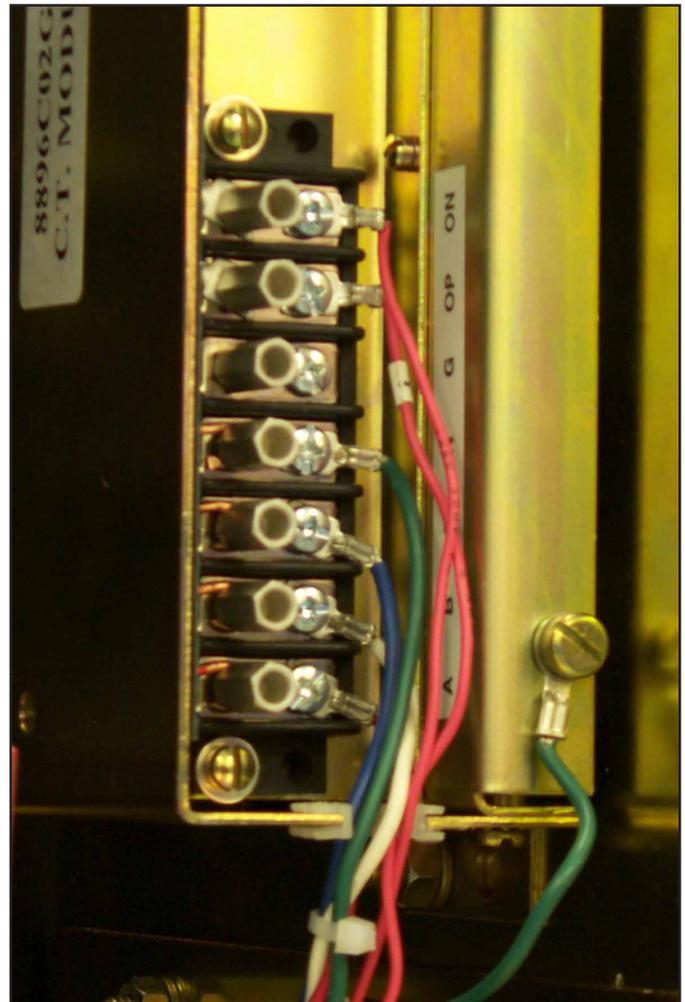


Fig. 19 Sensor Harness Connected to the Aux. CT Module.

STEP 6: INSTALLING AND ADJUSTING THE TRIP AND RESET LINKS

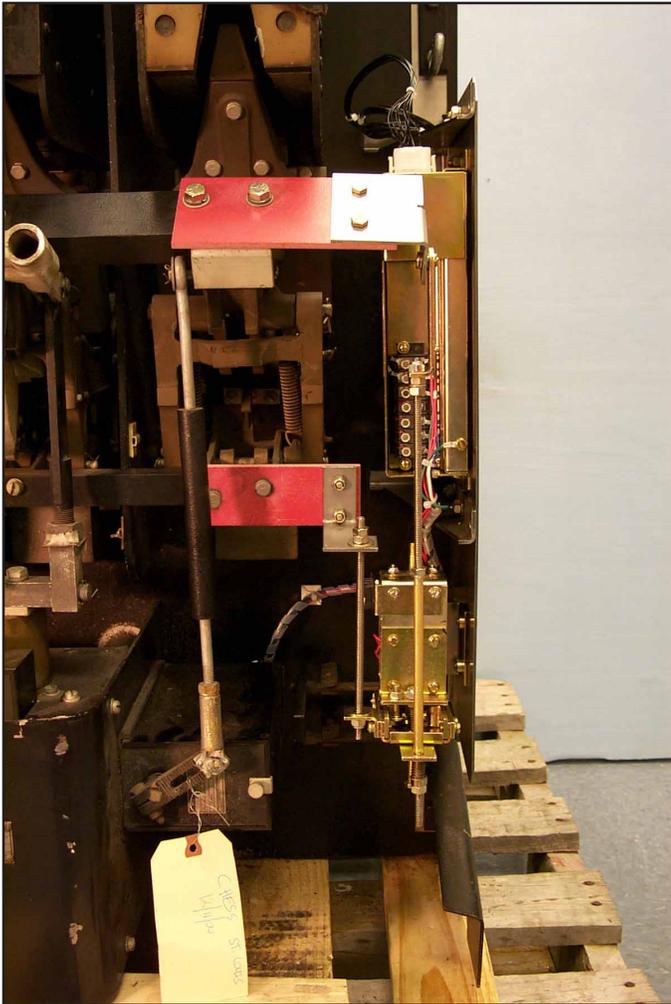


Fig. 20 Overview: Trip and Reset Links Installed in the Breaker.

- A. Align the holes in the Trip Finger with the holes in the Trip Finger Insulating Plate as shown. Secure the Trip Finger to the Trip Finger Insulating Plate using the (2) .190-32 x .625" screws, (2) flat washers, and (2) Nylok nuts supplied.

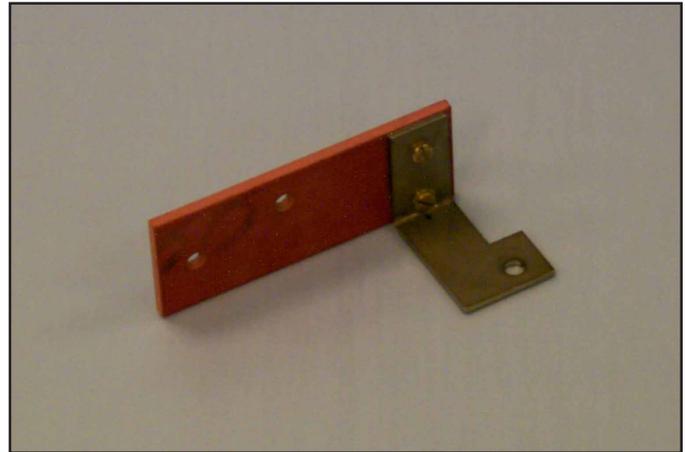


Fig. 21 Trip Finger Mounted to the Trip Finger Insulating Plate.

- B. Remove the existing hardware from the right side of the Breaker Trip Bar. Align the Trip Finger Assembly with the holes in the Trip Bar. Secure the Trip Bracket Assembly to the Breaker Trip Bar using the (2) .250-20 x 1.25" bolts, (2) lock washers, and (2) flat washers supplied.
- C. Thread the supplied Nylok nut onto the Trip Rod until approximately .375" of the Trip Rod protrudes from the nut. Working from the bottom, insert the Trip Rod through the Trip Mechanism on the DTA then through the Trip Finger Assembly. Install the (1) wide flat washer and (2) .250-20 nuts on the top end of the Trip Rod.

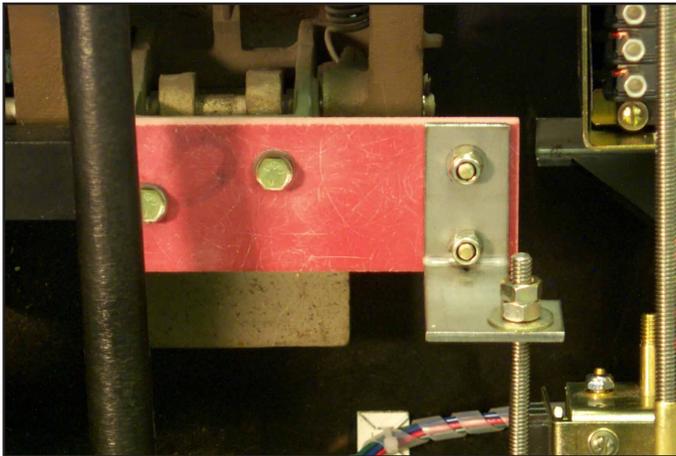


Fig. 22 Trip Bracket Assembly and Trip Rod Installed in the Breaker.

D. While holding lightly down on the Breaker Trip Bar and up on the Trip Rod, to remove any play, turn the bottom adjusting nut on the top of the Trip Rod until a gap of approximately .625" is achieved between the flat washer resting on the top of the Trip Finger and the nut. Turn the lock nut tight against the adjusting nut to lock in the adjustment.

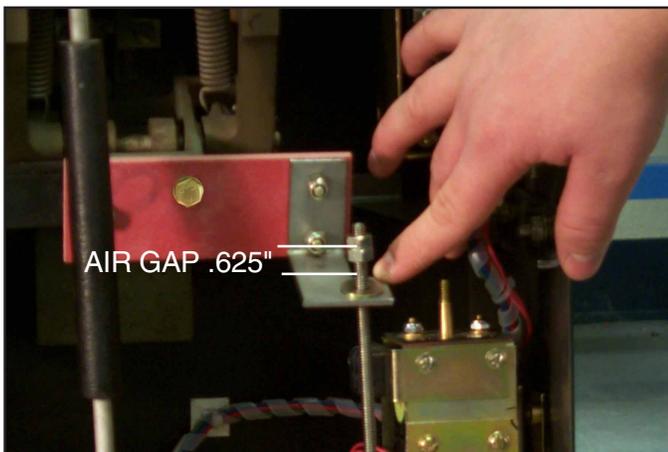


Fig. 23 Adjusting the Trip Rod Gap.

E. Align the holes in the Reset Bracket with the holes in the Reset Insulating Plate as shown. Secure the Reset Bracket to the Reset Bracket Insulating Plate using the (2) .250-20 x .750" bolts, (2) flat washers, (2) lock washers, and (2) nuts supplied.

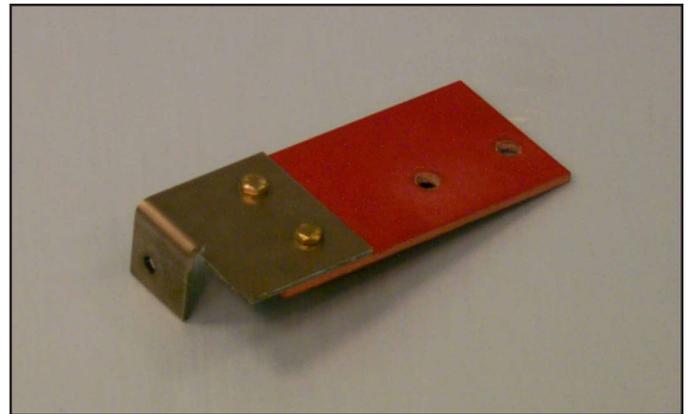


Fig. 24 Reset Bracket Mounted to the Reset Bracket Insulating Plate.

NOTE: The Reset Bracket Assembly will be mounted to the Breaker Cross Bar in the following steps. Even though both existing bolts will need to be removed from the right side of the Breaker Cross Bar during the procedure, removing them both at the same time will allow some of the Breaker components to become misaligned. Therefore, it is suggested that the bolts be replaced one at a time as detailed in the following steps.

- F. Remove one of the two existing bolts from the right side of the Breaker Cross Bar. Using (1) .375-16 x 2.00" bolt, (1) lock washer, and (1) flat washer supplied, partially mount the Reset Bracket Assembly to the Breaker Cross Bar.
- G. Remove the second of the two existing bolts from the right side of the Breaker Cross Bar. Using (1) .375-16 x .200" bolt, (1) lock washer, and (1) flat washer supplied, finish mounting the Reset Bracket Assembly to the Breaker Cross Bar.

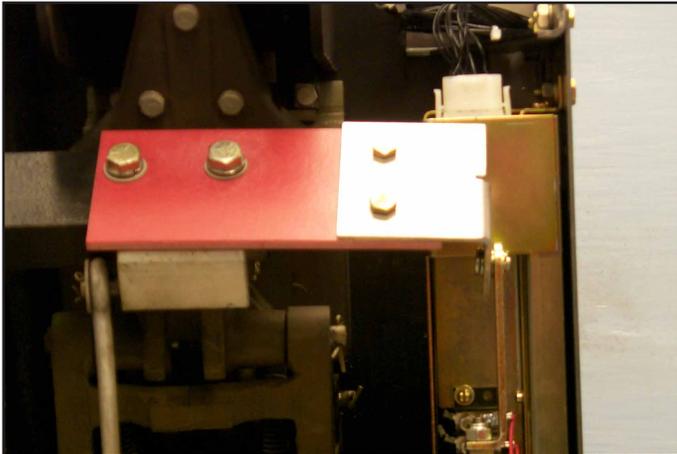


Fig. 25 Reset Bracket Assembly Mounted to the Breaker Cross Bar.

- H. Slide the Brass Spacer onto the bottom of the Reset Rod as shown.



Fig. 26 Brass Spacer Installed on the Reset Rod.

- I. While holding the Brass Spacer in place, insert the Reset Rod through the hole in the Reset Finger on the DTA. Install (1) .250" flat washer, the Reset Spring, (1) .250" oversized flat washer, and (2) .250-20 nuts onto the end of the Reset Rod.
- J. Align the top of the Reset Rod with the hole in the end of the Reset Bracket Assembly. Using the (1) .250" pin, (3) flat washers, and (1) cotter pin supplied, attach the Reset Rod to the Reset Bracket Assembly as shown.

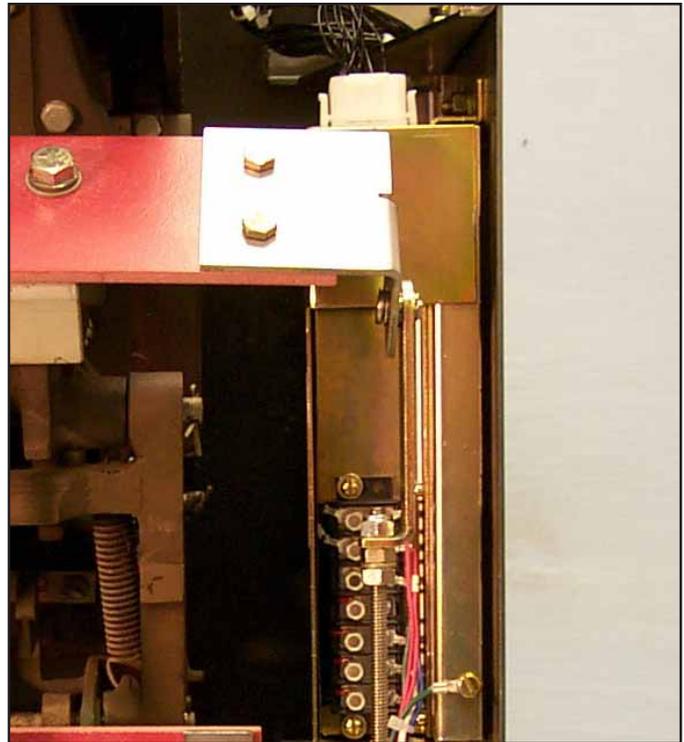


Fig. 27 Reset Rod Installed in the Breaker.

- K. With the nut above the Brass Spacer loose and using the adjusting nuts below the Reset Spring, turn the adjusting nut until a cage height of approximately .625" is achieved between the bottom of the wide washer and the top of the flat washer. Fully tighten the lock nut on the bottom of the Reset Rod.
- L. Apply Loc-Tite® 243 to the threads of the Reset Rod, then tighten the nut against the top of the Brass Spacer. Verify that the Cage Height is still correct. If not, perform any necessary adjustments.

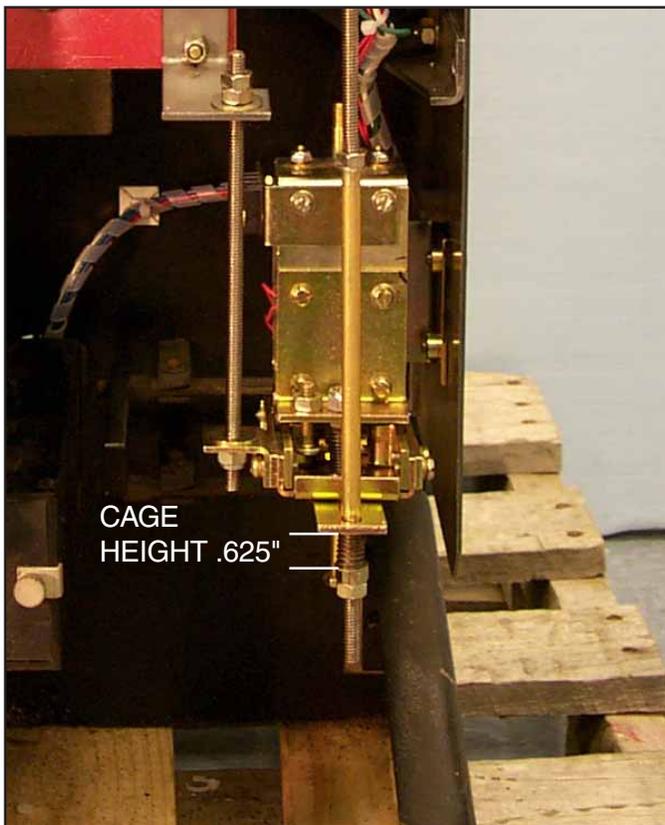


Fig. 28 Cage Height Adjustment.

M. 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, make the necessary adjustments to insure a .625" gap between the bottom of the top nut on the Trip Rod and top of the flat washer on the Trip Bracket Assembly, and a .625" cage height for the Reset Spring.

STEP 7: INSTALLING THE TRIP UNIT

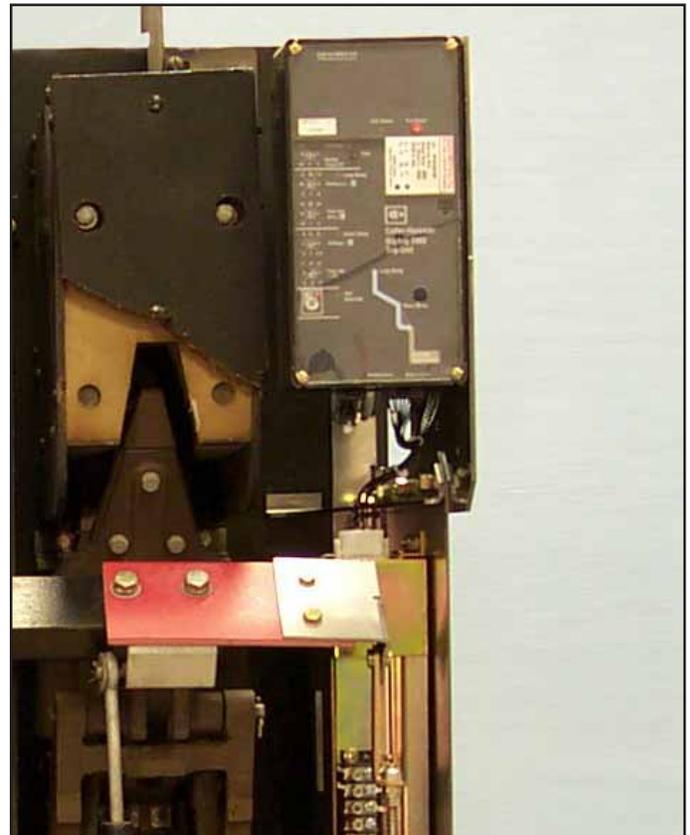


Fig. 29 Overview: Trip Unit Installed on the Breaker.

- A. Place a .190" flat washer on each of the (2) .190-32 x 4.00" screws supplied. Insert the screws into the existing holes in the Trip Unit Mounting Plate. Install a brass spacer onto each screw and push them flush against the Mounting Plate.
- B. Align the holes in the Trip Unit with screws inserted through the Trip Unit Mounting Plate. Slide the Trip Unit against the Mounting Plate. Secure the Trip Unit using the (2) flat washers, (2) lock washers, and (2) nuts supplied as shown.

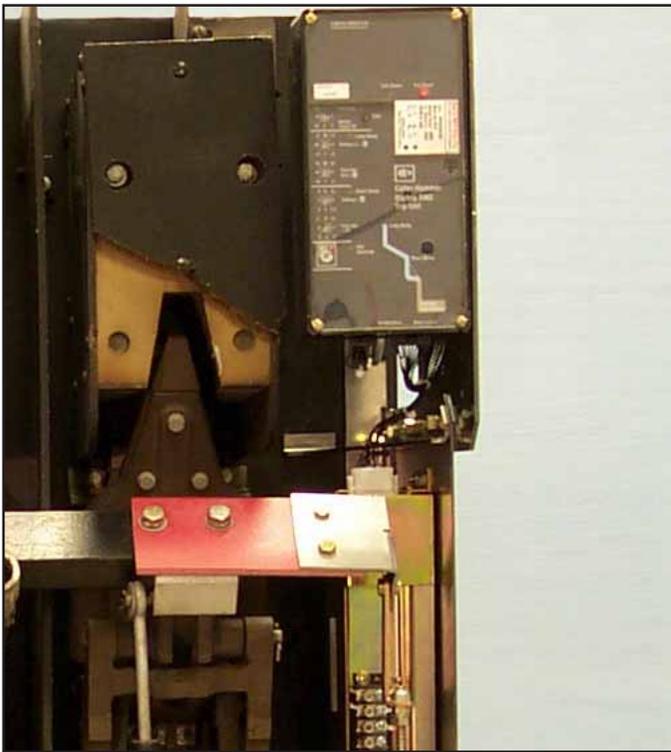


Fig. 30 Trip Unit Mounted to the Trip Unit Mounting Plate.

- C. Remove the Trip Unit cover and install the Rating Plug. Replace the cover.
- D. Connect the Aux. CT Harness to the Trip Unit and Aux. CT Module. Use the self-adhesive tie mounts and wire ties supplied to keep the Aux. CT Harness away from moving parts within the Breaker.

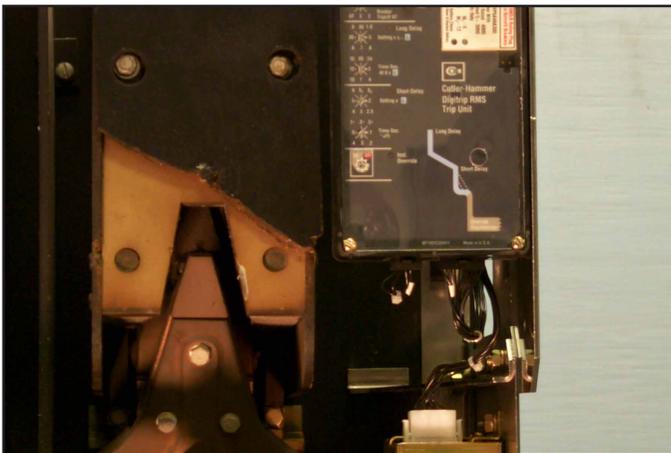


Fig. 31 Aux. CT Harness Connected to the Aux. CT Module and Trip Unit.

- E. Install the Digitrip Nameplate on the right side of the Trip Unit Mounting Plate as shown.

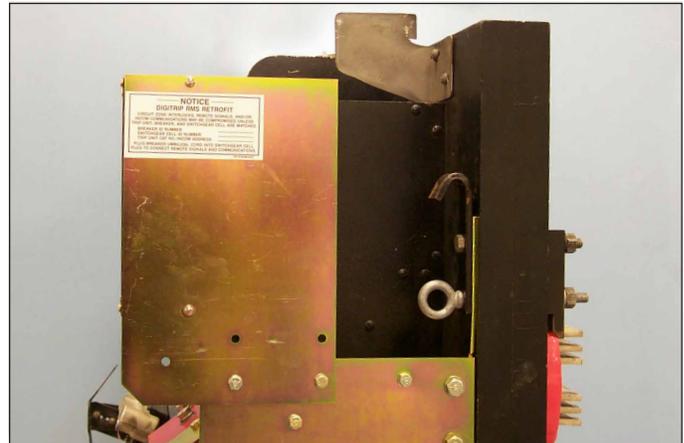


Fig. 32 Digitrip Nameplate Installed on the Breaker.

STEP 8: EXTERNAL HARNESS INSTALLATION AND FINAL WIRING

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



Fig. 33 510 External Harness Shorting Plug.

- B. Use the self-adhesive tie mounts and wire ties supplied to dress all wires and harnesses to keep them away from any moving parts within the Breaker.

STEP 9: TESTING THE BREAKER

- A. Measure the force necessary to trip the Breaker at the point where the DTA Trip Finger connects with the Trip Rod. The force necessary to trip the Breaker **MUST NOT EXCEED SEVEN (7) 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 33-855-2), 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.**

**STEP 10: 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 FLASH-OVER, 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 Westinghouse DA-75 Frameless Breakers

Step	Description	Style No.	Qty.	Comment
Step 3	Sensor 3,000 A	4A35642H01	3	
	Sensor Mounting Parts	9A10077G04	1	
	Sensor Harness		1	
	6-Point Terminal Block		1	
	Sensor Mounting Plate		2	
	Terminal Block Mounting Plate		1	
	.375 - 16 × 3.50 Lng. Hex Bolt		4	
	.375 Flat Washer Stl.		4	
	.375 Lock Washer Stl.		4	
	.250 - 20 × 1.00 Lng. Hex Bolt		4	
	.250 - 20 × .500 Lng. Hex Bolt		2	
	.250 Flat Washer Stl.		2	
	.250 Wide Flat Washer Stl.		4	
	.250 Lock Washer Stl.		6	
	.190 - 32 × .500 Lng. Screw Pan		2	
	.190 Flat Washer Stl.		2	
	.190 Lock Washer Stl.		2	
	.164 - 32 × .500 Lng. Screw Pan		2	
	.164 Flat Washer Stl.		2	
	.164 Lock Washer Stl.		2	
	Spacer Plastic		4	
	#6 Ring Tongue Terminal		6	
	Tie Mount Nylon S. A.		15	
Wire Tie Nylon		35		
Step 4	Knife Switch Insulation Mounting Parts	9A10077G07	1	
	Knife Switch Bracket		1	
	Insulation Plate Glass Poly		1	
	.164 - 32 × .250 Lng. Screw Pan		2	
	.164 - 32 × .500 Lng. Screw Nylon Pan		2	
	.164 Lock Washer Stl.		2	
	Loc-Tite® 243		1	
	Aux. CT / DTA Mounting Plate Parts	9A10077G08	1	
	Mounting Plate Bracket Top		1	
	Mounting Plate Bracket Bottom		1	
	.375 - 16 × .875 Lng. Hex Bolt		4	
	.375 Flat Washer Stl.		4	
	.375 Lock Washer Stl.		4	
	.375 - 16 Nut Hex Stl.		4	
	Gusset Mounting Parts	9A10077G09	1	
	Gusset Top		1	
	Gusset Bottom		1	
.250 - 20 × .750 Lng. Hex Bolt		6		
.250 Flat Washer Stl.		6		

Digitrip Retrofit Kit Installation Components for the Westinghouse DA-75 Frameless Breakers (Cont.)

Step	Description	Style No.	Qty.	Comment
Step 4 (Cont.)	.250 Lock Washer Stl.		6	
	.250 - 20 Nut Hex Stl.		6	
	Trip Unit Mounting Plate Parts	9A10077G10	1	
	Mounting Plate		1	
	.190 - 32 × 4.00 Lng. Screw Fil.		2	
	.190 Flat Washer Stl.		4	
	.190 Lock Washer Stl.		2	
	.190 - 32 Nut Hex Stl.		2	
	Spacer Brass		1	
	Digitrip Label		1	
	Aux. CT Module	8896C02G01	1	
	Aux. CT Module Mounting Parts	9A10077G05	1	
	Aux. CT Module / DTA Mounting Plate		1	
	.250 - 20 × .750 Lng. Hex Bolt		2	
	.250 Flat Washer Stl.		2	
	.250 Lock Washer Stl.		2	
	.250 - 20 Nut Hex Stl.		2	
	.190 - 16 × .500 Lng. Screw T. C.		1	
	.190 Flat Washer Stl.		1	
	.190 Lock Washer Stl.		1	
High Force DTA Assembly	9A10077G33	1		
DTA Mounting Parts	9A10077G06	1		
.250 - 20 × .500 Lng. Hex Bolt		2		
.250 Loc Washer Stl.		2		
Step 5	.190 - 16 × .500 Lng. Screw T. C.		1	From Step 4
	.190 Flat Washer Stl.		1	From Step 4
	.190 Lock Washer Stl.		1	From Step 4
Step 6	Trip Finger Mounting Parts	9A10077G11	1	
	Trip Finger		1	
	Trip Finger Plate		1	
	.250 - 20 × 1.25 Lng. Hex Bolt		2	
	.250 Flat Washer Stl.		2	
	.250 Lock Washer Stl.		2	
	.190 - 32 × .625 Lng. Screw Pan Head		2	
	.190 Flat Washer Stl.		2	
	.190 - 32 Nut Hex Nylok		2	
	Trip Rod Mounting Parts	9A10077G12	1	
	Trip Rod		1	
	.250 Wide Flat Washer Stl.		2	
	.190 - 32 Nut Hex Stl.		2	
	.190 - 32 Nut Hex Nylok		1	
	Reset Plate Mounting Parts	9A10077G13	1	

Digitrip Retrofit Kit Installation Components for the Westinghouse DA-75 Frameless Breakers (Cont.)

Step	Description	Style No.	Qty.	Comment
Step 6 (Cont.)	Reset Plate		1	
	Reset Bracket		1	
	.375 - 16 × 2.00 Lng. Hex Bolt		2	
	.375 Flat Washer Stl.		2	
	.375 Lock Washer Stl.		2	
	.250 - 20 × .750 Lng. Hex Bolt		2	
	.250 Flat Washer Stl.		2	
	.250 Lock Washer Stl.		2	
	.250 - 20 Nut Hex Stl.		2	
	Reset Shaft Mounting Parts	9A10077G14	1	
	Reset Shaft Assembly		1	
	.250 Wide Flat Washer Stl.		1	
	.250 Flat Washer Stl.		4	
	.250 Lock Washer Stl.		1	
	.250 - 20 Nut Hex Stl.		5	
	.250 - 20 Nut Hex Nylok		1	
	Sleeve Brass		1	
	Spring		1	
	.250 × .500 Pin		1	
	.065 × .750 Cotter Pin		1	
Loc-Tite® 243		1	From Step 4	
Step 7	Trip Unit	See Pick List	1	
	Rating Plug	See Pick List	1	
	.190 - 32 × 4.00 Lng. Screw Fil.		2	From Step 4
	.190 Flat Washer Stl.		4	From Step 4
	.190 Lock Washer Stl.		2	From Step 4
	.190 - 32 Nut Hex Stl.		2	From Step 4
	Spacer Brass		1	From Step 4
	Digitrip Label		1	From Step 4
Aux. CT Harness	6502C84G02	1		
Step 8	External Harness Shorting Plug	6502C83G01	1	
	Tie Mount Nylon S. A.		15	From Step 3
	Wire Tie Nylon		35	From Step 3

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.

Table 2 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 3 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. 34 Retrofit Components

- | | |
|-------------------------------|-----------------------------------|
| A. Sensors | F. Aux. CT Harness |
| B. Trip Unit | G. Sensor Harness |
| C. Aux. CT Module | H. External Harness Shorting Plug |
| D. Direct Trip Actuator (DTA) | I. Reset Linkage |
| E. Rating Plug | J. Trip Linkage |

Notes

Notes

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

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

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

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

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