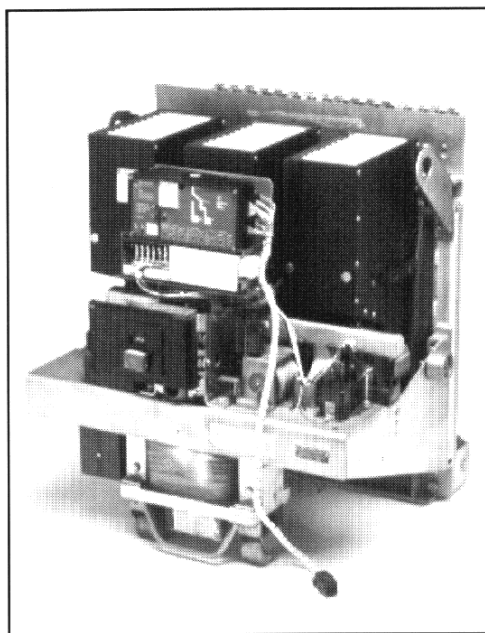




Westinghouse Digitrip Retrofit System For



**DB-75
DB-100**

Westinghouse Electric Corp.
Specialty Products and Services Department
Commercial Operations Division
Distribution & Control Business Unit
Five Parkway Center
Pittsburgh, PA 15220

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 lighted 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, TEST, or DISCONNECTED** 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 WILL LEAD TO DEATH, SEVERE PERSONAL INJURY AND/OR PROPERTY DAMAGE.**

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 a nuclear application. 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 Westinghouse's experience and judgment 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, the Westinghouse Electric Corporation should be consulted.

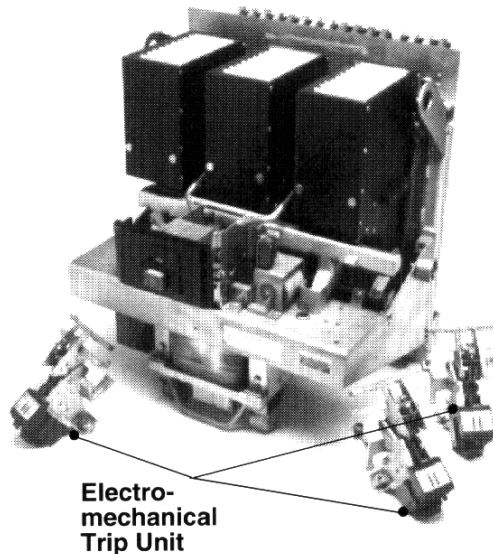
THERE ARE NO UNDERSTANDINGS, AGREEMENTS, REPRESENTATIONS OR WARRANTIES, EXPRESS OR IMPLIED, INCLUDING WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE, OTHER THAN THOSE SPECIFICALLY SET OUT IN ANY EXISTING CONTRACT BETWEEN THE PARTIES. ANY SUCH CONTRACT STATES THE ENTIRE OBLIGATION OR SELLER. THE CONTENTS OF THIS DOCUMENT SHALL NOT BECOME PART OF OR MODIFY ANY PRIOR OR EXISTING AGREEMENT, COMMITMENT OR RELATIONSHIP. In no event will Westinghouse be responsible to the user in contract, in tort (including negligence), strict liability or otherwise for any special, indirect, incidental or consequential damage or loss whatsoever including but not limited to damage to or loss of use of equipment, plant or power system, cost of capital, loss of profits or revenues, cost of replacement power, additional expenses in the use of existing power facilities, or claims against the user by its customers resulting from the use of the information, recommendations, descriptions and safety notations contained herein.

Step 1: Trip Breaker and remove from Cell. Take Breaker to a clean well lit work bench to perform the Retrofit.

Before attempting to perform the Retrofit, be sure to read and understand the Retrofit Application Data supplied with this kit.

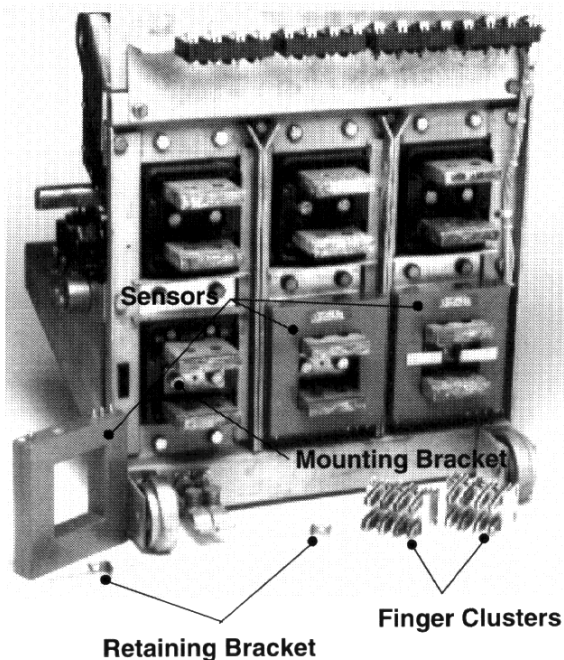
Refer to the components listing at the rear of this booklet. Lay out the components and hardware according to the steps as outlined. The components and hardware will be used to complete each assembly step that follows.

Step 2:



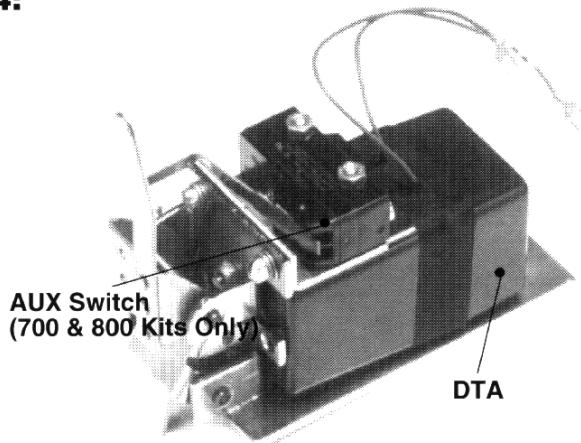
- A. Remove the three Electromechanical Trip Units from the bottom front of the breaker by removing the four hex mounting bolts from each.
- B. Remove the Trip Fingers from the Trip Bar directly above each Electromechanical Trip Unit.

Step 3:



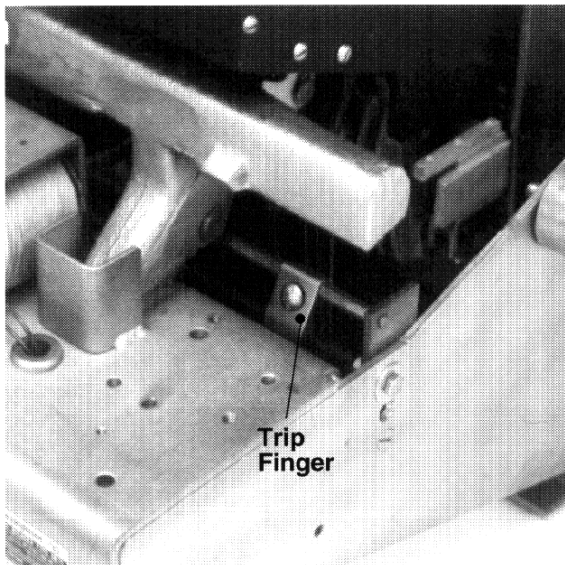
- A. Remove both sets of bottom Finger Clusters from each phase of the breaker.
- B. Remove the two hex bolts from the center of each bottom stud.
- C. Install a Sensor Mounting Bracket with the spacers facing the breaker in the center of each bottom stud using the hardware provided.
- D. Install a Sensor with the terminals facing down and the nameplate facing out on each bottom stud.
- E. Secure each Sensor in place with a Retaining Bracket and the hardware provided.
- F. Install the Finger Clusters removed in Step 3A.

Step 4:

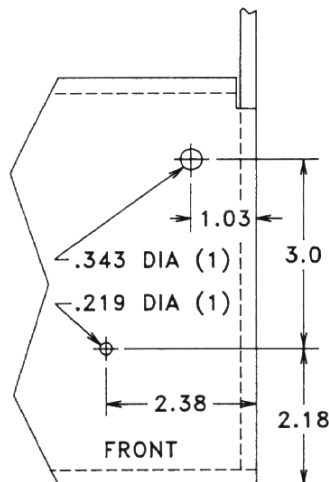


- A. *RMS/R 700 and 800 Kits Only.*
Mount the Microswitch to the Mounting Bracket with the hardware provided.
- B. *RMS/R 700 and 800 Kits Only.*
Mount the Microswitch Assembly on the Direct Trip Actuator (DTA) with hardware provided as shown.
- C. *RMS/R 700 and 800 Kits Only.*
Make sure the Microswitch works when the DTA Reset is pushed back.

Step 5:

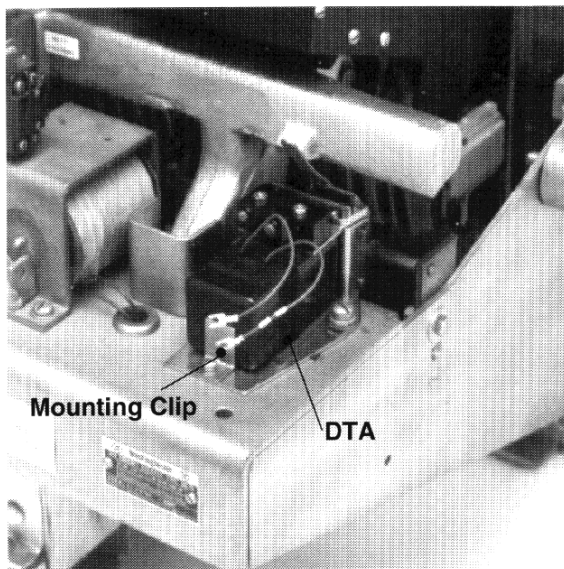


- A. Install the Trip Finger on the Breaker Trip Bar as shown with hardware provided. The center of the Trip Finger is to be 2.62" from the outer right side of the breaker.
- B. Layout and drill the breaker platform per Drilling Plan 'A'.
- C. Mount the DTA and Mounting Clip on the breaker platform as shown with the hardware provided in the holes just drilled.
- D. Close the breaker manually. Check the gap between the DTA Trip Tab and the Trip Finger. The gap should be about 1/8 inch, if not adjust.
- E. Connect a 24V DC power supply to the DTA Terminals, positive to positive and negative to negative. Close the Breaker manually. Energize the DTA to trip the Breaker, deenergize when Breaker trips. Make certain that the DTA resets.



DRILLING PLAN 'A'
(BREAKER PLATFORM)

Step 6:



A. Mount the RMS/R Trip Unit on top of the Aux. CT Module with 4 in. long screws, washers and spacers as shown. Do not tighten firmly yet.

B. Mount the left and right Trip Unit Support Clips on to the sides of the Aux. CT Module and into the bottom front slots of the Trip Unit.

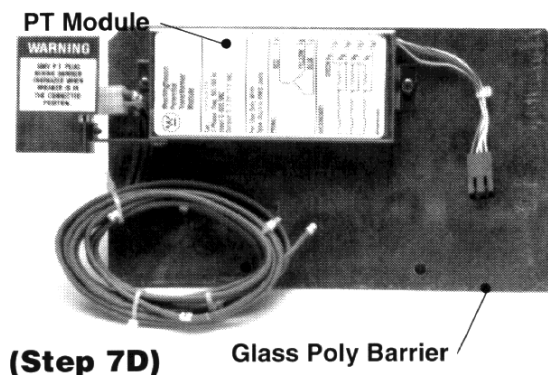
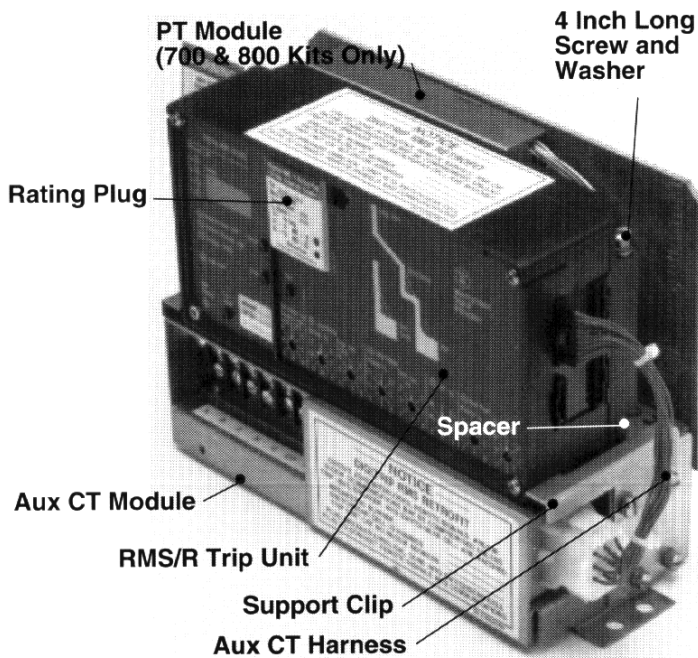
C. Tighten 4 in. long screws.

D. *RMS/R 700 and 800 Kits Only.* Mount the PT Module on the Glass Poly (red) Barrier with the hardware provided as shown.

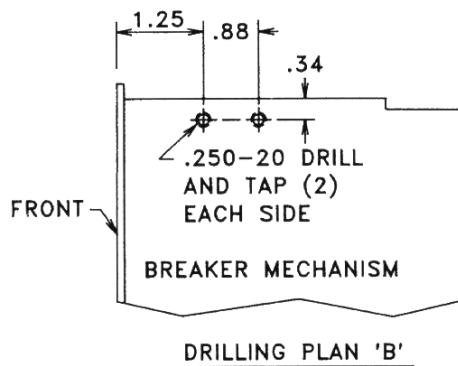
E. Mount the Glass Poly Barrier (red) on to the back of the Aux. CT Module with the hardware provided. (700 and 800 kits will have the PT Module mounted on it. Mount a nylon wire clamp on each screw. These are used to hold the PT wires in Step 10A.)

F. Remove Trip Unit Cover and install Rating Plug, replace cover.

G. Install Aux. CT harness between trip unit and Aux. CT Module.



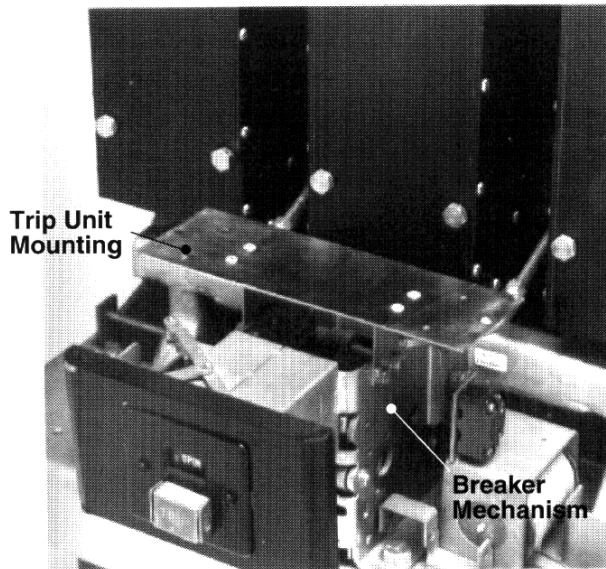
Step 7:



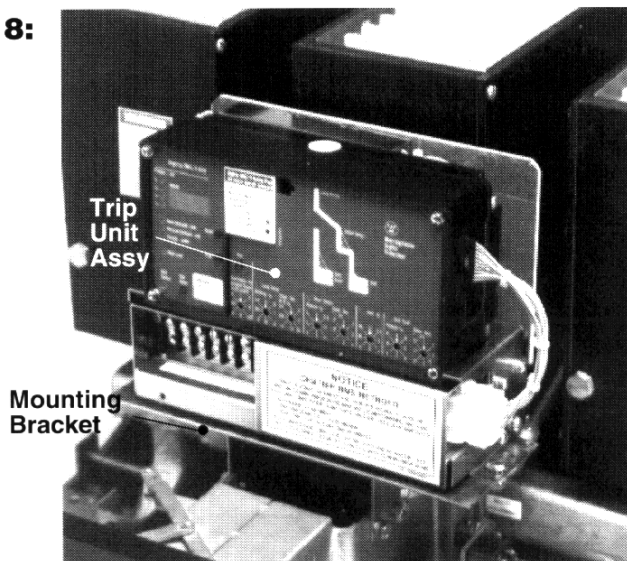
- A. Layout and drill each side of the breaker mechanism per Drilling Plan 'B'.

Note: Cover the area (both inside and outside) below to prevent the drilling chips from falling into the Breaker Mechanism.

- B. Mount the Trip Unit Mounting Bracket on top of the breaker mechanism as shown with the hardware provided using the holes just drilled.

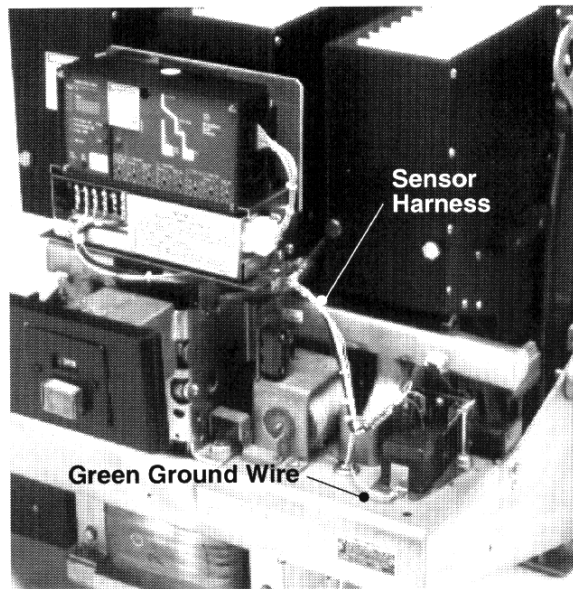


Step 8:



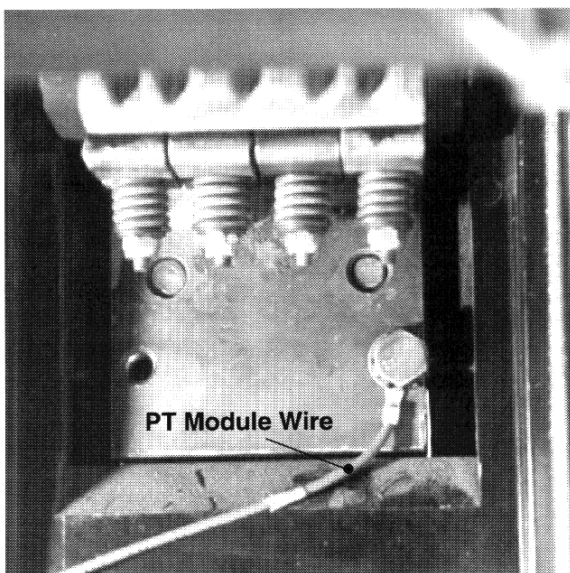
- A. Mount the Trip Unit Assy. on the Mounting Bracket as shown with the hardware provided.

Step 9:



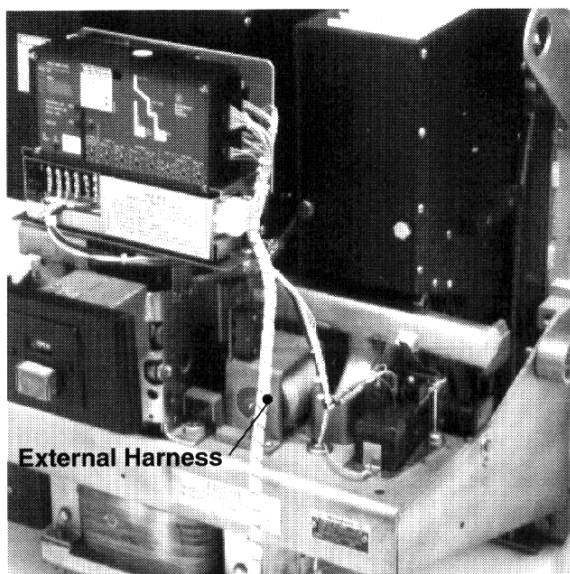
- A. These instructions refer to the wiring diagrams in the Retrofit Application Data for proper connection and application.
- B. Install the large round grommet in the bottom slot in the right side of the Breaker Rear Frame.
- C. Connect the Snap Spade Terminals of the Sensor Wire Harness to the proper terminals of the 7 point Terminal Block in the Aux. CT Module. (The long tan and green wires are for a Remote Neutral Sensor on a 4W Ground Breaker. They should be removed if not required.)
- D. Connect the green wire (Ring Terminal) to the .190-32 screw that holds the DTA to the Breaker Platform.
- E. Route the Sensor Wire Harness down thru the existing grommet in the breaker platform and back thru the grommet installed in Step 9B to the rear of the breaker.
- F. Attach the Sensor Wire Harness to the Aux. CT Module and Mounting Bracket with 2 nylon wire clamps and hardware provided.
- G. Connect the Ring Terminals to the proper terminals of the Sensors per connection diagram.
- | | |
|-----------------------------|-----------------------------|
| Sensor Style No. 8184A43H01 | Sensor Style No. 8184A44H01 |
| X1-X2 = 2000A | X1-X2 = 4000A |
| X1-X3 = 2500A | |
| X1-X4 = 3000A | |
- H. Cut off the Snap Spade Terminals of the 2 DTA wires, leaving approximately 3 inches of wire for termination. Transfer the + wire marker to the positive wire. Strip each wire back 1/4 inch.
- I. Find the 2 black wires in the Sensor Wire Harness, one wire is marked with a +. Route the wires down to the DTA. Cut the wires off even with the DTA wires. Transfer the + wire marker to the positive wire. Strip each wire back 1/4 inch.
- J. Connect the black wire marked with + to the DTA wire marked with + and the unmarked black wire to the unmarked DTA wire using the wire connectors provided.
- Note: When complete this will connect the positive wire of the DTA to the OP terminal and the unmarked negative wire of the DTA to the ON Terminal of the 7 Point Terminal Block in the Aux. CT Module.

Step 10:



- A. *RMS/R 700 and 800 Kits Only.*
Route the 3 wires from the PT Module down into the breaker to the bottom studs. The wires will attach to the right tapped hole in the copper. Cut the wire marked with red to phase 1. Cut the wire marked with yellow to phase 2. Cut the wire marked with blue to phase 3. Strip the wires 1/4 inch and install a 5/16 Ring Terminal on each. Attach the wires to the correct phase with hex bolt, washer and lockwasher.
- B. Use wire ties supplied to dress up wiring and to keep it away from any interference of Breaker moving parts.

Step 11:

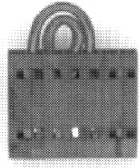


- A. Plug the External Harness into the sockets on the right side of the Trip Unit.
- B. *RMS/R 700 and 800 Kits Only.*
Connect the plug from the PT Module to the plug on the External Harness.
- C. Attach the External Harness to the right-hand side of the AUX. CT Module using 2 nylon wire clamps and self-threading screws into the predrilled holes.
- D. *RMS/R 700 and 800 Kits Only.*
Connect the two wires with Ring Terminals from the External

Harness to the Microswitch. One wire on to the normally open terminal and the other wire on to the common terminal.

- E. Use nylon wire ties to dress up wires around the plugs.

Note: For RMS/R 500 Basic Retrofit Kits, the External Harness is the plug pictured below. It is to be plugged into the right side of the Trip Unit.



Step 12: The Cell Harness is to be mounted in the Breaker Cell. The plug end is to be mounted on the right front side of the Cell. The Terminal Blocks can be mounted next to the plug. With the Breaker in the Cell and the External Harness connected the Breaker should be free to go from disconnect to the connect position, and all Retrofit wiring should be out of the way.

Step 13: The Retrofit is now complete and ready to be tested. See the Retrofit Application Data for test procedures.

DIGITRIP RETROFIT KIT INSTALLATION COMPONENTS FOR DB-75 AND DB-100 BREAKERS

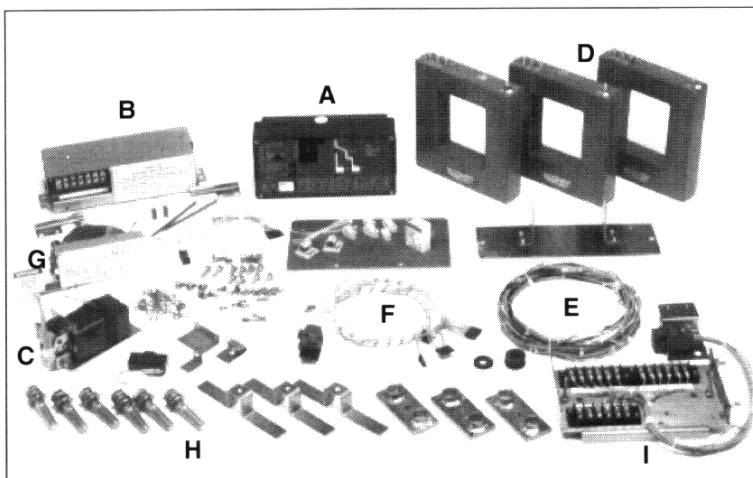
STEP	DESCRIPTION	STYLE NO.	QTY.	COMMENT
STEP 3	SENSOR 3000:5 MR	8184A43H01	3	DB-75 ONLY
	SENSOR 4000:5	8184A44H01	3	DB-100 ONLY
	MOUNTING BRACKET		3	
	RETAINING BRACKET		3	
	.500-13 X 2.50 LNG HEX BOLT		6	
	.500 FLAT WASHER STL		6	
	.500 LOCK WASHER STL		6	
	.250-20 X .500 LNG SCREW SEMS		3	
STEP 4	AUX SWITCH KIT	8188A38G01	1	700/800 KITS ONLY
	MICROSWITCH		1	700/800 KITS ONLY
	MOUNTING BRACKET		1	700/800 KITS ONLY
	.138-32 X 1.00 LNG SCREW FLT		2	700/800 KITS ONLY
	.138 FLAT WASHER STL		2	700/800 KITS ONLY
	.138 LOCK WASHER STL		2	700/800 KITS ONLY
	.138-32 NUT HEX STL		2	700/800 KITS ONLY
	.190-32 X .375 LNG SCREW FIL		2	700/800 KITS ONLY
	.190 FLAT WASHER STL		2	700/800 KITS ONLY
	.190 LOCK WASHER STL		2	700/800 KITS ONLY
STEP 5	DTA	692C706G03	1	
	MOUNTING CLIP		1	
	TRIP FINGER		1	
	.312-18 X 1.0 LNG SCREW FIL		1	
	.312 FLAT WASHER STL		1	
	.312 LOCK WASHER STL		1	
	.312-18 NUT HEX STL		1	
	.190-32 X .750 LNG SCREW FIL		1	
	.190 FLAT WASHER STL		1	
	.190 LOCK WASHER STL		1	
	.190-32 NUT HEX STL		1	
	.190-32 NUT HEX STL		1	
STEP 6	RMS/R TRIP UNIT	1232C84G__	1	
	RATING PLUG PR6A30A300	3D86709G08	1	DB-75 ONLY
	RATING PLUG PR6A40A400	3D86709G09	1	DB-100 ONLY
	AUX CT MODULE	6502C78G0_	1	
	AUX CT HARNESS	6502C84G01	1	
	PT MODULE	6502C82G01	1	700/800 KITS ONLY
	.138-32 X .50 LNG SCREW PAN		2	700/800 KITS ONLY
	.138 FLAT WASHER STL		4	700/800 KITS ONLY
	.138 LOCK WASHER STL		2	700/800 KITS ONLY
	.138-32 NUT HEX STL		2	700/800 KITS ONLY
	RMS/R CONVERSION PARTS	8188A35G01	1	
	TRIP UNIT SUPPORT BRKT RH		1	
	TRIP UNIT SUPPORT BRKT LH		1	
	BARRIER RED POLYESTER		1	
	DIGITRIP NAMEPLATE		1	
	.190-32 X 4.00 LNG SCREW FIL		2	
	SPACER BRASS		2	
	.190-32 X .625 LNG SCREW FIL		6	
	.190 FLAT WASHER STL		8	
	.190 LOCK WASHER STL		8	

**DIGITRIP RETROFIT KIT INSTALLATION COMPONENTS
FOR DB-75 AND DB-100 BREAKERS
(CONTINUED)**

STEP	DESCRIPTION	STYLE NO.	QTY.	COMMENT
STEP 7	TRIP UNIT MOUNTING BRKT		1	
	.250-20 X .500 LNG HEX BOLT		4	
	.250 FLAT WASHER STL		4	
	.250 LOCK WASHER STL		4	
STEP 8	TRIP UNIT ASSEMBLY		1	
	.250-20 X .500 LNG HEX BOLT		2	
	.250 FLAT WASHER STL		2	
	.250 LOCK WASHER STL		2	
	.250-20 NUT HEX STL		2	
STEP 9	SENSOR HARNESS		1	
	GROMMET ROUND		1	
	WIRE CLAMP		2	
	.164-32 X .500 LNG SCREW FIL		2	
	.164 FLAT WASHER STL		2	
	.164 LOCK WASHER STL		2	
	.164-32 NUT HEX STL		2	
	TERMINAL CONNECTOR		2	
	TERMINAL CONNECTOR		2	
STEP 10	RING TERMINAL .312		3	700/800 KITS ONLY
	WIRE TIES		3	700/800 KITS ONLY
	.312-18 X 1.0 LNG HEX BOLT		3	700/800 KITS ONLY
	.312 FLAT WASHER STL		3	700/800 KITS ONLY
	.312 LOCK WASHER STL		3	700/800 KITS ONLY
STEP 11	EXTERNAL HARNESS	6502C83G0_	1	
	WIRE CLAMP		2	ALL EXCEPT 500 BASIC
	.138-32 X .375 T.C. SCREW		2	ALL EXCEPT 500 BASIC
	WIRE TIES		2	
STEP 12	CELL HARNESS	6502C71G0_	1	ALL EXCEPT 500 BASIC

NOTE: DUE TO THE WIDE VINTAGE OF BREAKERS AND THE MULTIPLE FUNCTIONS OF THE RETROFIT COMPONENTS SOME EXCESS HARDWARE MAY BE LEFT WHEN THE RETROFIT IS COMPLETE.

Typical Retrofit Kit



- A - Trip Unit
- B - Auxiliary CT Module and Mountings
- C - Direct Trip Actuator
- D - Sensors
- E - Sensor Harness
- F - External Wire Harness
- G - PT Module (700 & 800 Kits Only)
- H - Aux Switch (700 & 800 Kits Only)
- I - Cell Harness

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

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