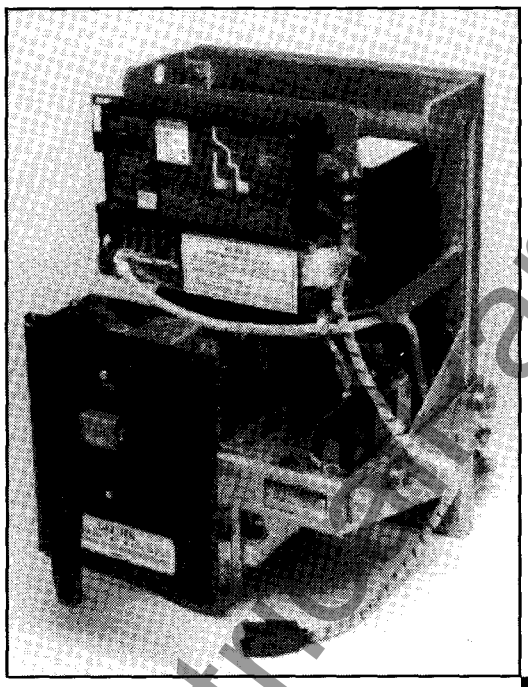
IL 33-855-2
March 1991

Westinghouse Digitrip Retrofit System For



DB-25

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.

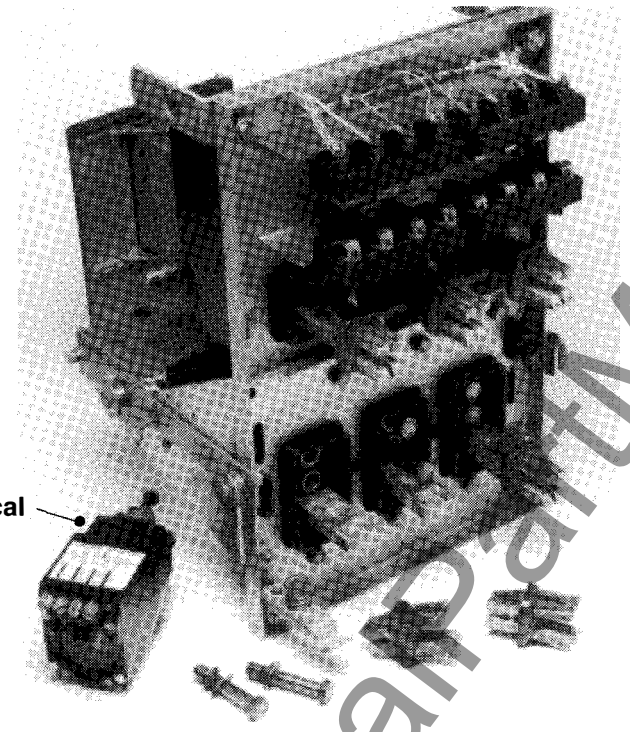
THERE ARE NO UNDERSTANDINGS, AGREEMENTS, REPRESENTATIONS OR WARRANTIES, EXPRESS OR IMPLIED, INCLUDING WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE, OTHER THAN THOSE SPECIFICALLY SET OUT IN ANY EXISTING CONTRACT BETWEEN THE PARTIES. ANY SUCH CONTRACT STATES THE ENTIRE OBLIGATION OR 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:

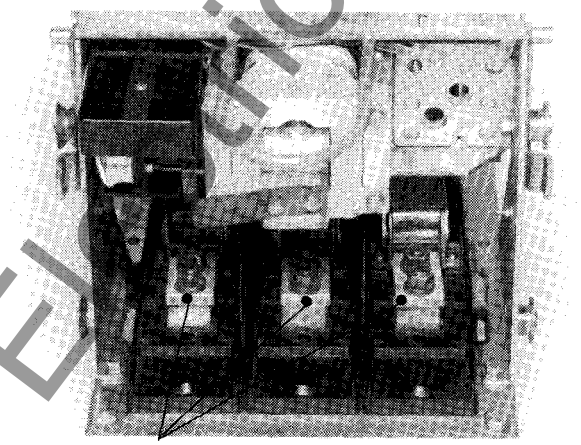


A. Remove the bottom Finger Clusters.

B. Remove one of the two .500-13 bolts above the bottom stud of each phase.

C. While holding the Electromechanical Trip with one hand, remove the other .500-13 bolt above the bottom stud of each phase. As the bolt is removed the Trip Unit will drop free. Remove each Trip Unit.

Step 3:

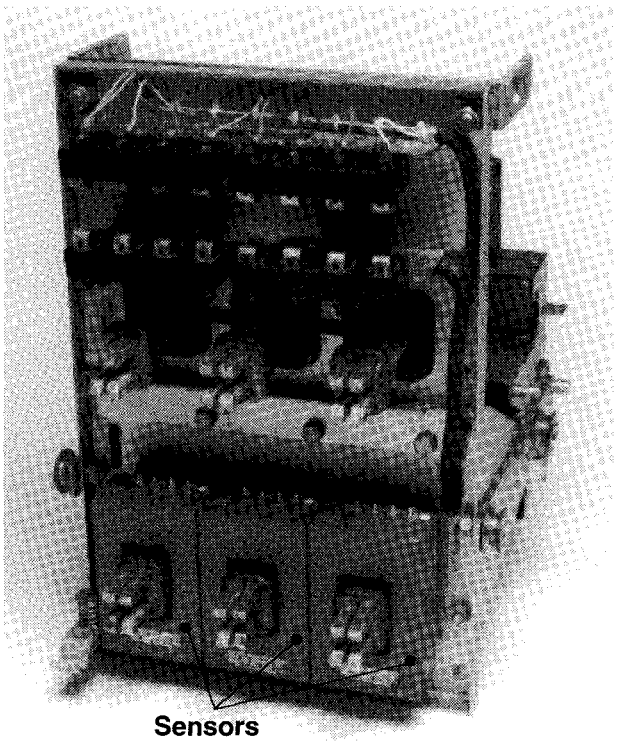


A. Install from the rear the .500-13 bolts in the two holes above the bottom stud of each phase.

Note: *On RMS/R 700 and 800 Kits Only.* Leave out the bottom .500-13 bolt of each phase. The PT Module Leads will attach to this bolt later.

B. From the bottom front, install a copper connector with the flat side facing front and the larger side on the top .500-13 bolt of each phase installed in Step 3A. Secure the Copper Connectors in place with a washer, lockwasher and .500-13 nut on each bolt.

Step 4:



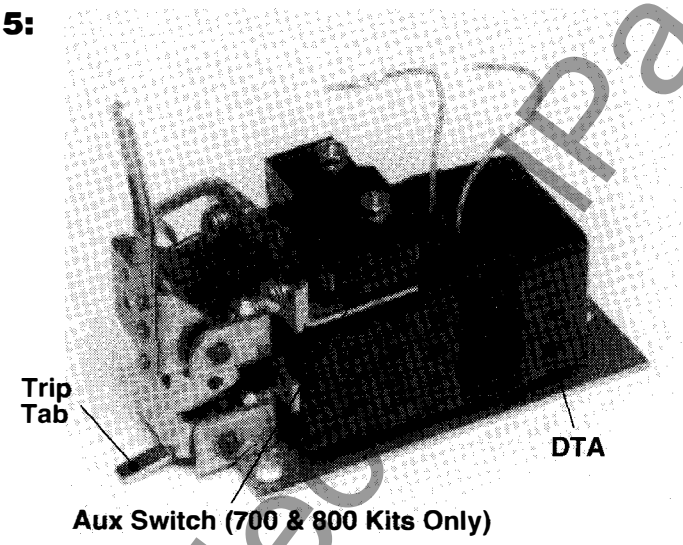
A. Install a Sensor on the bottom stud of each phase. The Terminals of the Sensors are to be facing up.

Note: *On RMS/R 700 and 800 kits Only.* Leave the Sensors off, they will be installed later.

B. Install the Finger Clusters removed in Step 1A.

Note: *On RMS/R 700 and 800 Kits Only.* Leave the Finger Clusters off, they will be installed later.

Step 5:



A. *RMS/R 700 and 800 Kits Only.* Mount the Microswitch to the Mounting Bracket with the hardware provided.

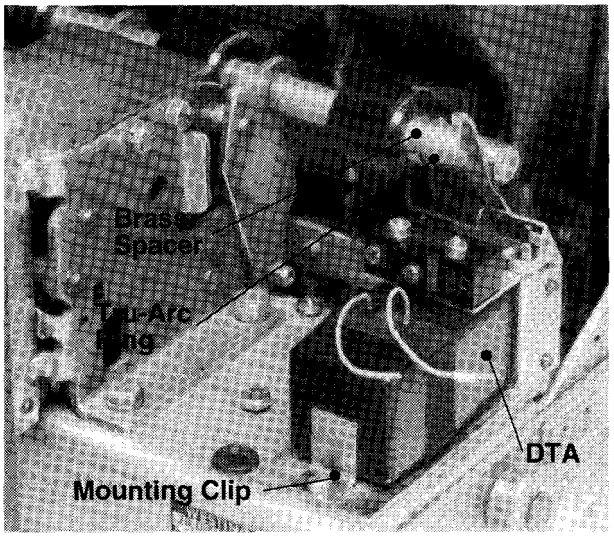
B. *RMS/R 700 and 800 Kits Only.* Mount the Microswitch Assembly on the Direct Trip Actuator (DTA) with hardware provided as shown.

C. *RMS/R 700 and 800 Kits Only.* Make sure the Microswitch works when the DTA Reset is pushed back.

Step 6: A. (Optional) Remove the center or right-hand Arc Chute from the Breaker. Manually push the moving Arcing Contacts closed, do not latch the Breaker. Clamp the contacts closed with a wire tie. This moves the Breaker Cross Bar out of the way to facilitate the DTA installation.

B. Remove the three Electromechanical Trip Paddles from the Breaker Trip Bar and scrap. This will reduce the force required to trip the Breaker.

Step 6: (cont.)



C. Remove the TRU-ARC ring from the right end of the breaker cross bar. Slide the tubular brass spacer provided over the cross bar so it is snug against the insulating link. Re-install the TRU-ARC ring.

D. Mount the DTA on the right side of the Breaker Platform with the .250-20 screw provided. The screw goes into the existing tapped hole in the Breaker Platform. The DTA Trip Tab should be under the Breaker Trip Bar.

E. Align the right edge of the DTA Base parallel to the right-hand side of the Breaker Platform. Using the small hole in the DTA Mounting as a templet, drill a clearance hole for a .190-32 screw.

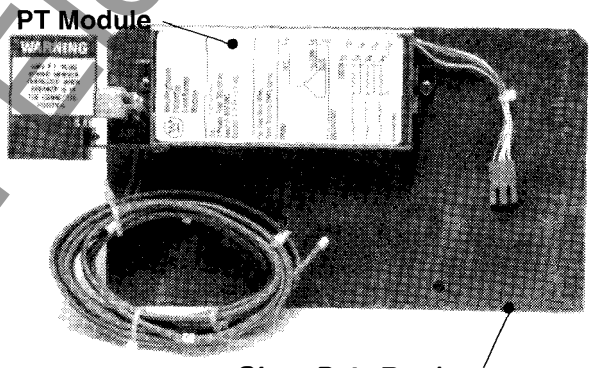
F. Mount the DTA rear Mounting Clip on the DTA Mounting with the hardware provided in the hole just drilled.

G. If you clamped the Arcing Contacts closed, remove the wire tie now. Close the Breaker manually. Check the gap between the DTA Trip Tab and the Breaker Trip Bar.The gap should be 1/32 to 1/8 inch. If not, trip the Breaker and bend the DTA Trip Tab. Close the Breaker again and check the gap, repeat the above if necessary.

H. 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, denergize when Breaker trips. Make certain that the DTA resets.

Note: When retrofitting a DBL-25, make sure there is no interference between the DTA Tripping Linkage and the Breaker Limiter Tripping Screw.

Step 7:



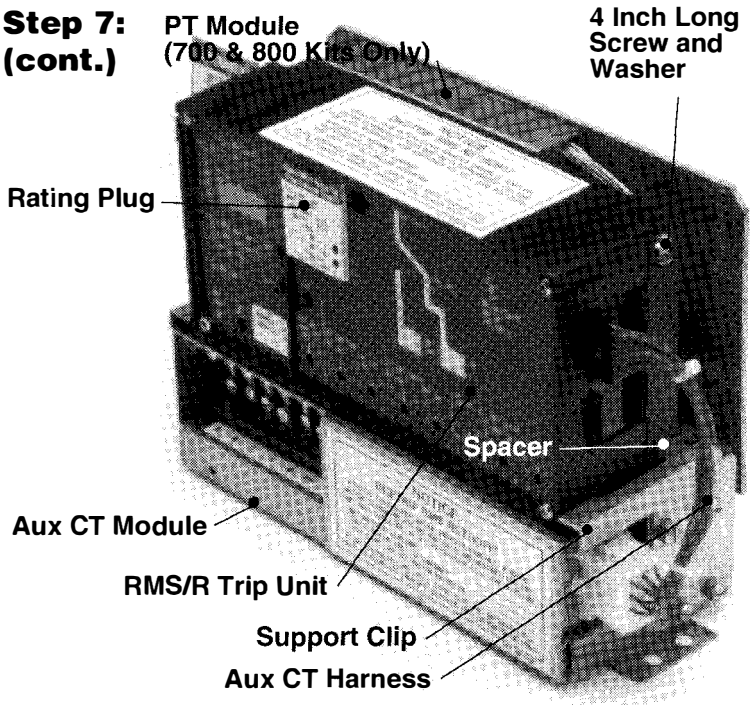
(Step 7D)

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.

Step 7: (cont.)



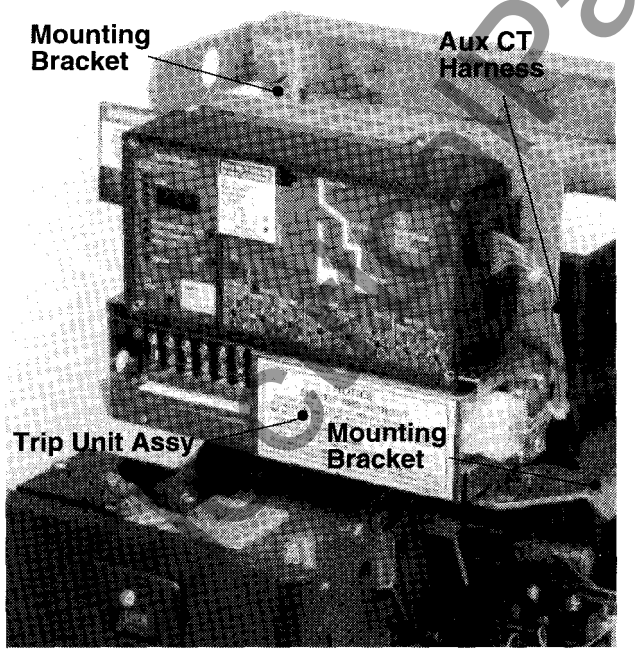
D. *RMS/R 700 and 800 Kits Only.* Mount the PT Module on the Glass Poly (red) Barrier with the hardware provided as shown.

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 8:



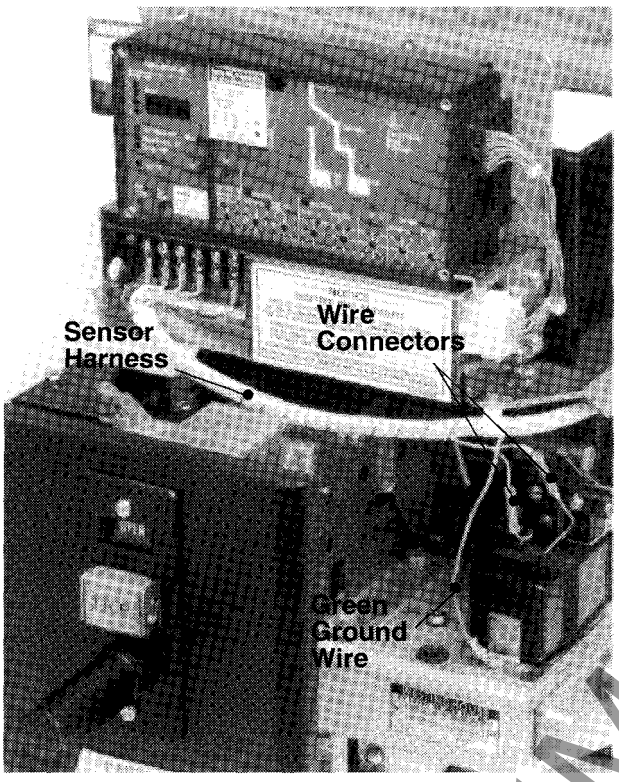
A. Remove the existing .500-13 hardware that holds the Breaker Lifting Bracket to the top left side of the Breaker Rear Frame, and remove the existing .375-16 hardware 9.50 in. further below.

B. Mount the left-hand Trip Unit Mounting Bracket on the Breaker Rear Frame with the hardware provided. (The Trip Unit Mounting Bracket will sit on top of the Breaker Lifting Bracket.)

C. Repeat Steps 8A and 8B to mount the right-hand Trip Unit Mounting Bracket.

D. Mount the Trip Unit Assy. on the trip unit mounting brackets with the .250-20 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 Oblong Grommet in the top 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 to the rear of the Breaker going thru the Oblong Grommet.

F. Attach the Sensor Wire Harness to the Aux. CT Module and the right-hand Mounting Bracket with 3 nylon wire clamps and hardware provided.

G. *RMS/R 700 and 800 Kits. Skip this step, it will be done later.* Connect the Ring Terminals to the proper terminals of the Sensors per connection diagram.

Sensor Style No. 8184A39H01
X1-X2 = 200A
X2-X4 = 400A
X1-X4 = 600A

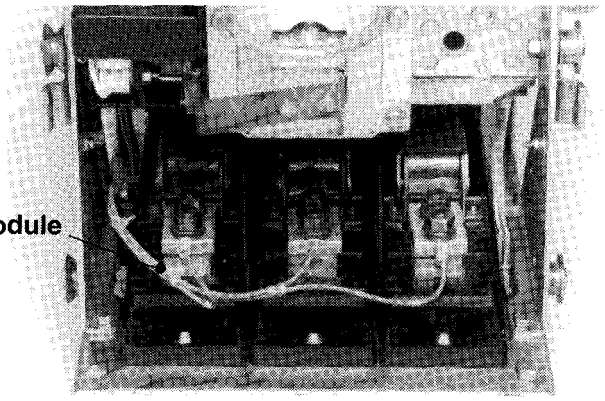
H. Cut off the Snap Spade Terminals of the 2 DTA wires, leaving approximately 3 inches of wire for termination. Transfer the + wire marker to the positive wire. Strip each wire back 1/4 inch.

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:

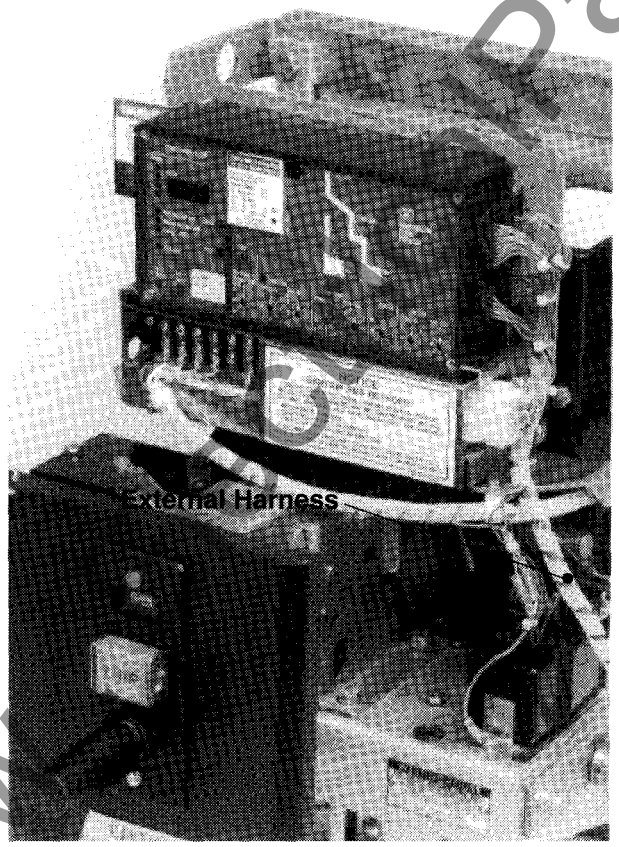


A. *RMS/R 700 and 800 Kits Only.* Route the 3 wires from the PT Module down into the Breaker to the Copper Connectors installed in Step 3B. Install in each phase from the rear the .500-13 bolt and flat washer left from Step 3A. Cut the wire marked with red to phase 1. Cut the wire marked with yellow to phase 2. Cut the wire marked with blue to phase 3. Strip the wires 1/4 inch and install a .50 Ring Terminal on each. Attach the wires to the correct .500-13 bolt of each phase with a nut, flat washer and lockwasher left from Step 3A.

B. *RMS/R 700 and 800 Kits Only.* Install Sensors per step 4A. Install Finger Clusters per Step 4B. Connect Sensor Harness per Step 9G.

C. 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.

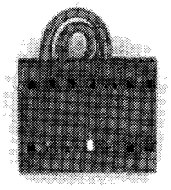
B. *RMS/R 700 and 800 Kits Only.* Connect the plug from the PT Module to the plug on the External Harness.

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-25 BREAKERS

STEP	DESCRIPTION	STYLE NO.	QTY.	COMMENT
STEP 3	COPPER CONNECTOR		3	
	.500-13 X 3.00 LNG HEX BOLT		6	
	.500 FLAT WASHER STL		6	
	.500 LOCK WASHER STL		6	
	.500 NUT HEX STL		6	
STEP 4	SENSOR 600:5 MR	8184A39H01	3	
STEP 5	AUX SWITCH KIT	8188A38G01	1	700/800 KITS ONLY
	MICROSWITCH		1	700/800 KITS ONLY
	MTG BRACKET		1	700/800 KITS ONLY
	.138-32 X 1.00 LNG SCREW FL		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 FH		2	700/800 KITS ONLY
	.190 FLAT WASHER STL		2	700/800 KITS ONLY
	.190 LOCK WASHER STL		2	700/800 KITS ONLY
STEP 6	DTA	692C704G03	1	
	MOUNTING CLIP		1	
	.250-20 X .500 LNG SCREW SEMS		1	
	.250 FLAT WASHER STL		1	
	.250 LOCK WASHER STL		1	
	.190-32 X .750 LNG SCREW FH		1	
	.190 FLAT WASHER STL		2	
	.190 LOCK WASHER STL		1	
	.190-32 NUT HEX STL		1	
STEP 7	RMS/R TRIP UNIT	1232C84G__	1	
	RATING PLUG PR6A06A060	3D86709G04	1	
	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 BKT RH		1	
	TRIP UNIT SUPPORT BKT LH		1	
	BARRIER RED POLYESTER		1	
	DIGITRIP NAMEPLATE		1	
	.190-32 X 4.00 LNG SCREW FH		2	
	SPACER BRASS		2	
	.190-32 X .625 LNG SCREW FH		6	
	.190 FLAT WASHER STL		8	
	.190 LOCK WASHER STL		8	
	WIRE CLAMP		2	700/800 KITS ONLY

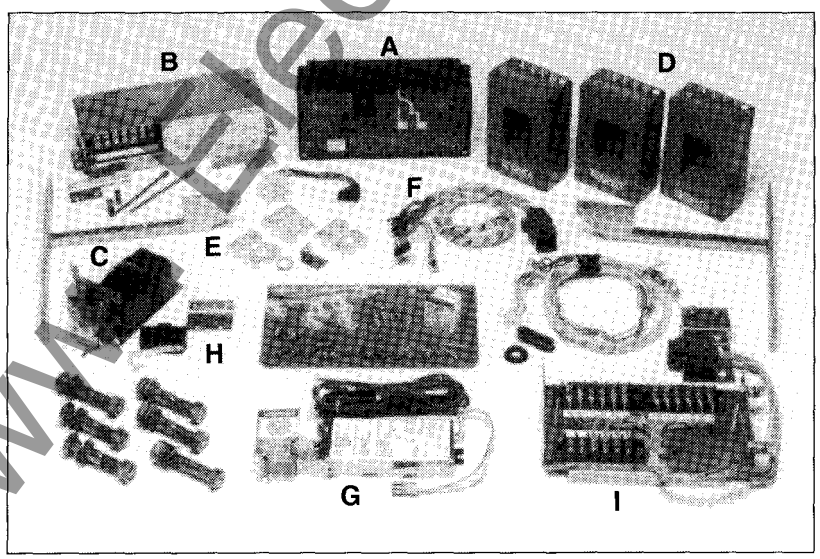
STEP	DESCRIPTION	STYLE NO.	QTY.	COMMENT

DIGITRIP RETROFIT KIT INSTALLATION COMPONENTS FOR DB-25 BREAKERS *(CONTINUED)*

STEP 8	TRIP UNIT ASSY		1	
	MTG BKT LH		1	
	MTG BKT RH		1	
	.500-13 X 1.50 LNG HEX BOLT		2	
	.500 FLAT WASHER STL		4	
	.500 LOCK WASHER STL		2	
	.500-13 NUT HEX STL		2	
	.375-16 X 1.50 LNG HEX BOLT		2	
	.375 FLAT WASHER STL		2	
	.375 LOCK WASHER STL		2	
	.375-16 NUT HEX STL		2	
	.250-20 X .500 LNG SCREW SEMS		2	
STEP 9	SENSOR HARNESS		1	
	GROMMET OBLONG		1	
	WIRE CLAMP		3	
	.16-32 X .500 LNG SCREW FH		3	
	.164 FLAT WASHER STL		3	
	.164 LOCK WASHER STL		3	
	.164-32 NUT HEX STL		3	
	TERMINAL CONNECTOR		2	
	TERMINAL CONNECTOR		2	
STEP 10	RING TERMINAL .500		3	700/800 KITS ONLY
	WIRE TIES		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 - Copper Connectors
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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