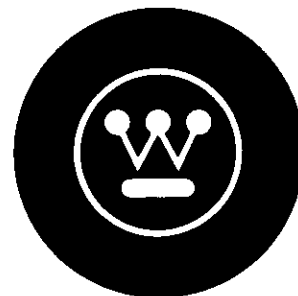


Instructions for the Retrofit of DB-15, DB-25, DB-50, DB-75 and DB-100 Low Voltage Breakers



**READ AND UNDERSTAND THESE INSTRUCTIONS
BEFORE ATTEMPTING ANY ASSEMBLY OR
OPERATION ON THE BREAKERS TO BE RETROFITTED**

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Westinghouse Electric Corporation
Switchgear Division, East Pittsburgh, Pa. 15112

I.B. 33-850-6 Effective August, 1982

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TABLE OF CONTENTS

Description	Page
SECTION 1 – GENERAL INFORMATION	
Introduction	5
Sensors	5
Amptector	5
Adjustments	6
Actuator	7
Ground Protection	7
Servicing of Amptector	7
Discriminator	7
Retrofit Kits	8
Requirements	8
Wiring Diagram	9
SECTION 2 – INSTALLATION INSTRUCTIONS FOR THE DB-15 BREAKER	
Removal of Electro-Mechanical Trips	12
DB-15 Retrofit Kit Bill of Material	12
Placement of Actuator	12
Placement of Amptector	14
Wiring Harness and Sensors	14
Test	14
SECTION 3 – INSTALLATION INSTRUCTIONS FOR THE DB-25 BREAKER	
Removal of Electro-Mechanical Trips	16
DB-25 Retrofit Kit Bill of Material	16
Placement of Actuator	16
Placement of Amptector	16
Wiring Harness and Sensors	16
Test	17
SECTION 4 – INSTALLATION INSTRUCTIONS FOR THE DB-50 BREAKER	
Removal of Electro-Mechanical Trips	19
DB-50 Retrofit Kit Bill of Material	19
Placement of Actuator	19
Placement of Amptector	19
Wiring Harness and Sensors	21
Test	21
SECTION 5 – INSTALLATION INSTRUCTIONS FOR THE DB-75 AND DB-100 BREAKERS	
DB-75 and DB-100 Bill of Material	22
Removal of Electro-Mechanical Trips	22
Placement of Actuator	22
Placement of Amptector	26
Wiring Harness and Sensors	26
Test	26

LIST OF ILLUSTRATIONS

Figure	Title	Page
1	Schematic of Solid State Tripping	5
2	Amptector IA.	5
3	Amptector IA Time Current Characteristics	6
4	Actuator Diagram	7
5	Wiring Diagram	9
6	Removal of Electro-Mechanical Trip Devices	10
7	Location of Existing Hole for Actuator	10
8	Positioning of Actuator	10
9	Mounting of Amptector Bracket.	10
10	Amptector Mounted with Wiring Harness.	11
11	Actuator Mounted and Wired.	11
12	Harness Threaded Through Lower Slot DB-15, DB-25 and DB-50.	11
13	Sensors in Place DB-25, DB-50.	11
14	Actuator Modification DB-15	12
15	Actuator Mounted on DB-15	15
16	Right Side View of DB-15.	13
17	Mounting of Barrier DB-15	15
18	Mounting of Sensors and Harness DB-15	15
19	Right Side View of DB-25.	18
20	Attaching Wiring Harness to Sensors DB-25 and DB-50.	17
21	Right Side View of DB-50.	20
22	Amptector Mounted on Cross Plate DB-50.	21
23	Right Side View of DB-75 and DB-100	23
24	Positioning of Actuator Trip Bar DB-75/100.	24
25	Positioning of Actuator Trip Paddle DB-75/100	25
26	Right Hand Side View of Actuator DB-75/100	25
27	Actuator in Place and Readied for Drilling .190-32 Hole	25
28	Location of Holes for Amptector Bracket DB-75/100.	25
29	Amptector Mounting Bracket DB-75/100.	27
30	Amptector Mounted on Bracket DB-75/100	27
31	Location of Grommet for Harness DB-75/100	27
32	Sensor Mounting Detail DB-75/100.	27
33	Sensor Mounted in Place with Bracket.	27

SECTION 1 – GENERAL INFORMATION

INTRODUCTION

The retrofit kit which you have received contains all the necessary parts to convert your DB breaker from a device using a electro-mechanical tripping system to one which will have solid state tripping. To understand the transition, one should be acquainted with the basic components and their functions.

The circuit breaker is tripped on fault conditions by combined operation of three components:

- (a) Sensors
- (b) Amprector solid-state trip unit
- (c) Actuator

Schematically this can be shown in Figs. 1 and 4. This makes a very flexible system covering a wide range of tripping characteristics, due to the adjustable amprector and the range of sensors available. All necessary tripping energy is derived from the load current flowing through the sensors, no separate power source is required. The tripping characteristics for a specific breaker rating, as established by the sensor rating, are determined by the continuously variable settings of the Amprector static trip unit. This unit supplies a pulse of tripping current to the actuator which trips the breaker.

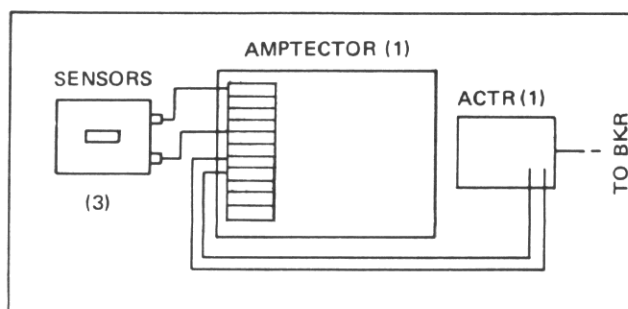


Fig. 1 Schematic of Solid State Tripping

SENSORS

The sensors produce an output proportional to the load current, so the breaker continuous current rating within the frame size can be changed simply by changing the sensors. Proper polarities must be maintained.

It is the sensor rating (or tap) that determines the actual current for one (1) per unit current on the amprector.

The following sensor ratings which are available on the retrofit kits are listed below.

Breaker Frame Size Rating	Sensor Rating
DB-15 225 Amperes	225/150/100/5A Multi Ratio
DB-25 600 Amperes	600/400/200/100/5A Multi Ratio
DB-50 1600 Amperes	200/5A Single Ratio
	800/600/400/5A Multi Ratio
	1600/1200/1000/5A Multi Ratio
DB-75 3000 Amperes	3000/2500/2000/5A Multi Ratio
DB-100 4000 Amperes	4000/5A Single Ratio

All sensors are mounted on the rear lower studs on the back of the breaker base except for the DB-15 which has two sensors mounted on the upper rear studs and one in the center phase of the lower rear stud.

AMPRECTOR

The Westinghouse Amprector IA is a solid state device that provides adjustable overcurrent tripping for the retrofitted DB breaker. Only one amprector is required per breaker; it receives all of its energy from a set of sensors — one mounted on each pole of the breaker. It develops an output for its associated trip actuator, when preselected conditions of current magnitude and duration are exceeded.

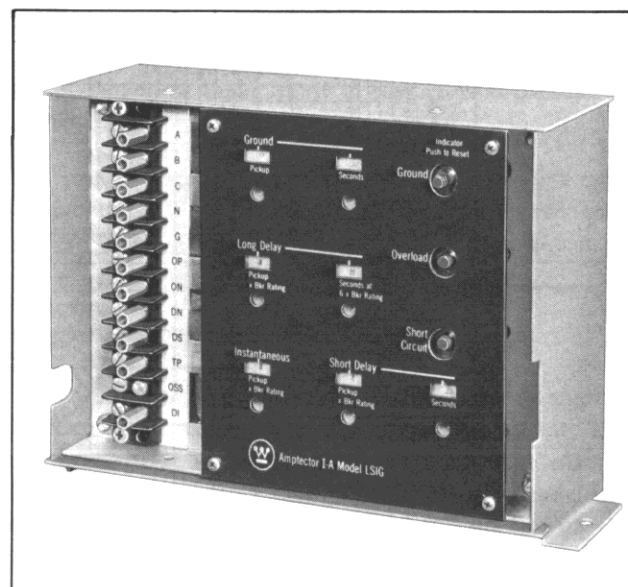


Fig. 2 Amprector IA

The Amprector for retrofit is supplied with three models of combination of four (4) independent continuously adjustable overcurrent tripping functions:

Long delay (L)
Short delay (S)
Instantaneous (I)
Ground (G)

The following combinations of the amprector are available LIG, LSG and LSIG.

ADJUSTMENTS

There are a maximum of seven (7) adjustable controls on the Amprector IA, each can be adjusted with a screwdriver through openings in the front face plate, Fig. 2.

1. Long delay current pick-up
2. Long delay time
3. Short delay current pick-up
4. Short delay time
5. Instantaneous current pick-up
6. Ground current pick-up
7. Ground delay time

NOTE: The term "pick-up" as used here means the magnitude of current at which the amprector timing function begins.

Ranges

The ranges of pick-up current settings and time delay are shown by time characteristic curve, Fig. 3.

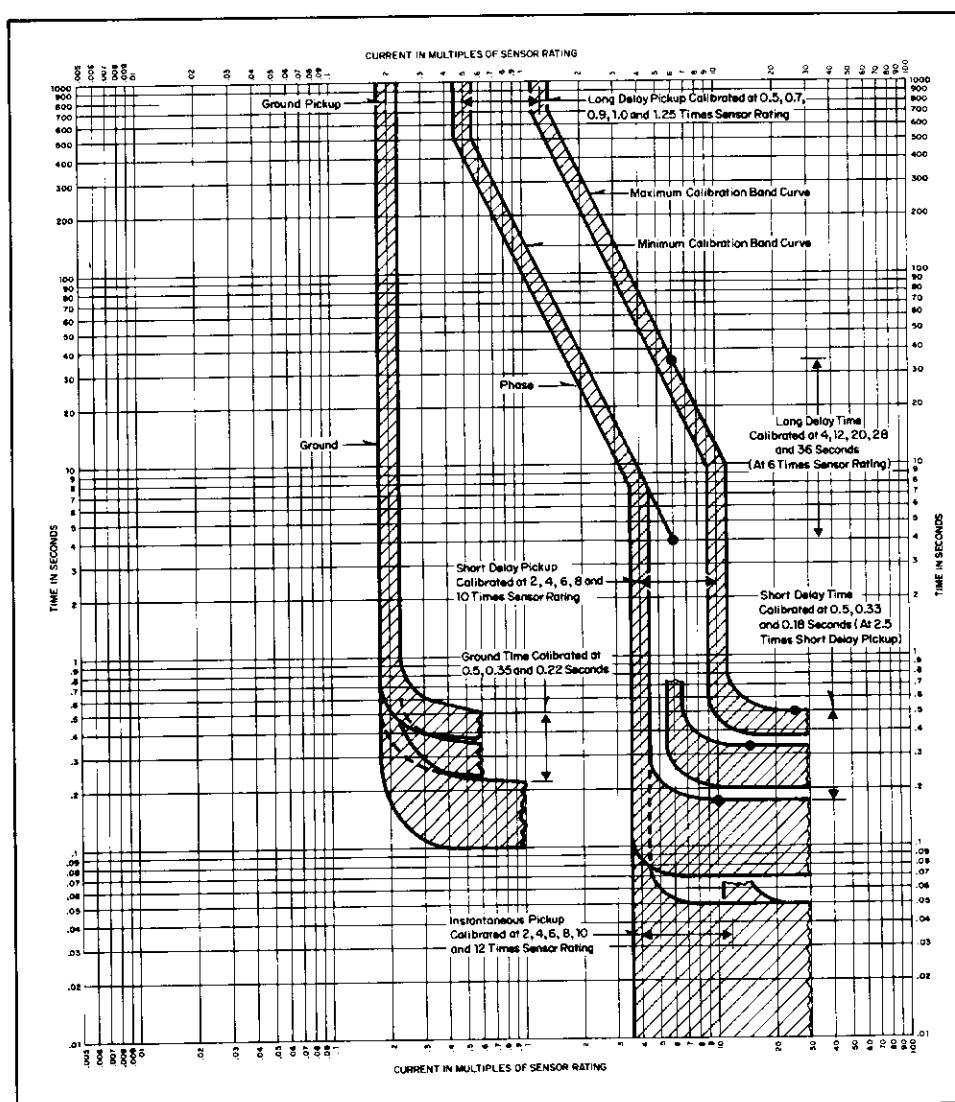


Fig. 3 Amprector IA Time Current Characteristics

ACTUATOR

The actuator receives a tripping pulse from the amptector and produces a mechanical force to trip the breaker. The actuator is made up of a permanent magnet, a disc held by the magnet, a rod acted on by a spring, a lever for tripping the breaker, and a lever for mechanically resetting the actuator. The magnet cannot pull and reset the disc against the force of the spring acting on the rod, but can overcome the spring force when the disc is in contact with the magnet. A tripping pulse from the amptector counteracts the effect of the permanent magnet, allowing the spring to separate the disc from the magnet and move the rod to actuate the trip lever. Fig. 4 shows a simplified sketch of the actuator.

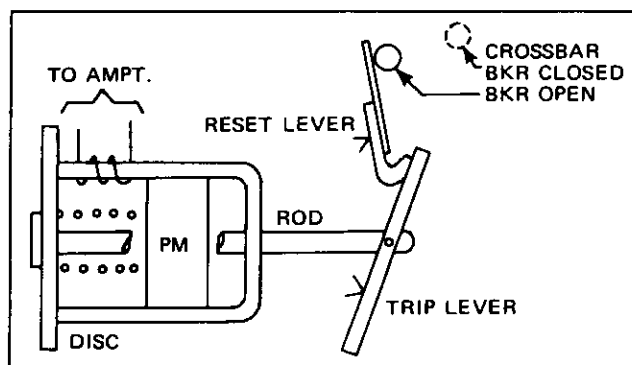


Fig. 4 Actuator Diagram

GROUND PROTECTION

All the Amptectors in retrofit kits are supplied with a ground element. The ground fault protection is provided by energizing this element with the residual of the currents through the three properly polarized phase sensors in a 3 phase 3 wire system, the three sensors and neutral in a 3 phase 4 wire system, or from an external source of ground current sensing. The Amptector can also be wired so that there is no ground fault protection (see Fig. 5).

The ground pick-up values as shown in Table A are the required currents to initiate the pick-up of the ground element and must be the actual current into the "G" terminal of the Amptector. It must be noted that when testing the Amptector for ground pick-up, the sensors may need to be disconnected in order to obtain the results in the table, otherwise higher currents may be required due to the exciting current lost to the sensors. The secondary test current is injected into a phase terminal say "A" and back out of "G".

Table A	
Ground Pick-up Values – Amperes	
(All Pick-up Values may vary $\pm 10\%$)	
Dial Settings	Secondary Current
A	1.0
B	1.5
C	1.9
D	3.0

SERVICING OF AMPTECTOR

The Amptector is the intelligence of the overcurrent protection provided by the breaker. This device is made up of many solid state components; the only moving parts are for the adjustments. All internal components and connections, including the printed circuit board, are coated to give effective environmental protection. The Amptector should give long trouble-free service.

Each Amptector includes terminal receptacles to permit easy field checking of operation and calibration with an external current source. A specially designed portable test device with a plug to match the Amptector receptacle is available and recommended to provide the utmost in simplicity for checking amptector operation. The tester can be plugged into any convenience outlet and can provide enough current to check any pick-up calibration. Short time delay can be roughly checked.

If there is any reason to suspect that the Amptector is not operating correctly, it should not be tampered with; since tampering could result in loss of vital overcurrent protection.

If the Amptector is not operating correctly a spare Amptector should be substituted and the questionable unit returned to the factory for service. Amptectors are not field repairable.

DISCRIMINATOR

The discriminator feature is included with any amptector that does not have an instantaneous element. This feature provides fixed instantaneous tripping when a breaker is closed into a fault, after the breaker has closed under normal conditions and the currents are flowing the discriminator inhibits this instantaneous feature in the amptector. The breaker will then operate with the required time delay characteristics.

RETROFIT KIT

To simplify the changeover to solid state tripping only three types of Amptector IA are available, the LIG, LSG and the LSIG. However, most applications can have a style numbered retrofit kit that will fulfill the required needs. Each styled number kit in Table B contains the appropriate Amptector, sensors, brackets and hardware.

Table B - Retrofit Kits

Type of Breaker	Type of Amptector	Sensor Ratios**	Kit Style Number
DB-15	LIG	225/150/100/5	6476C60G01
	LSG	225/150/100/5	6476C60G02
	LSIG	225/150/100/5	6476C60G03
DB-25	LIG	600/400/200/100/5	6476C60G04
	LSG	600/400/200/100/5	6476C60G05
	LSIG	600/400/200/100/5	6476C60G06
DB-50	LIG	* 200/5	6476C60G07
	LSG	* 200/5	6476C60G08
	LSIG	* 200/5	6476C60G09
DB-50	LIG	800/600/400/5	6476C60G10
	LSG	800/600/400/5	6476C60G11
	LSIG	800/600/400/5	6476C60G12
DB-50	LIG	1600/1200/1000/5	6476C60G13
	LSG	1600/1200/1000/5	6476C60G14
	LSIG	1600/1200/1000/5	6476C60G15
DB-75	LIG	3000/2500/2000/5	6476C60G16
	LSG	3000/2500/2000/5	6476C60G17
	LSIG	3000/2500/2000/5	6476C60G18
DB-100	LIG	* 4000/5	6476C60G19
	LSG	* 4000/5	6476C60G20
	LSIG	* 4000/5	6476C60G21

*Single Ratio Sensors, all others multi-ratio

**Standard kit includes 3 sensors, if a fourth sensor is required order the proper sensor separately through Switchgear Renewal Parts, East Pittsburgh, Pennsylvania.

S#1789C48G43 225/150/100/5
 S#1789C48G01 600/400/200/100/5
 S#1789C48G05 200/5
 S#1789C48G08 800/600/400/5
 S#1789C48G11 1600/1200/1000/5
 S#1789C48G13 3000/2500/2000/5
 S#1789C48G14 4000/5

Order per Style Number on W-31, Kit will contain all necessary parts.

REQUIREMENTS

Before proceeding with the conversion the following should be noted.

1. Items on hand:

Ratchet (3/8") socket set with 3/4", 9/16, 1/2, 7/16 sockets straight edge, scribe, center punch, file, screw-driver, hammer.

Electric drill, 1/8", 7/32", 11/32" #20 and #1 twist drills, 1/4-20 taps, 10-32 taps, tap holder, pliers.

Masking tape 1" wide (for DB-75, 100 only).

9 or 12 volt dry cell battery.

Test apparatus, such as Amptector Tester Style No. 140D481G02 or Multiamp tester.

2. Check items received against bill of material as listed for each type of breaker and for proper style numbered kit.

3. Check out actuator/flux transfer device by intermittently applying 12 volt D-C with correct polarity.

NOTE: Arm must be reset after each operation.

4. Review the procedure for each type of breaker involved.

5. Review the photographs to acquaint yourself with the items and location.

6. Arc chutes need not be removed and breaker should be worked on in the upright position.

7. Extreme care should be taken on DB-75 and DB-100 that none of the steel filings fall into the mechanism when drilling and tapping the holes for mounting the amptector.

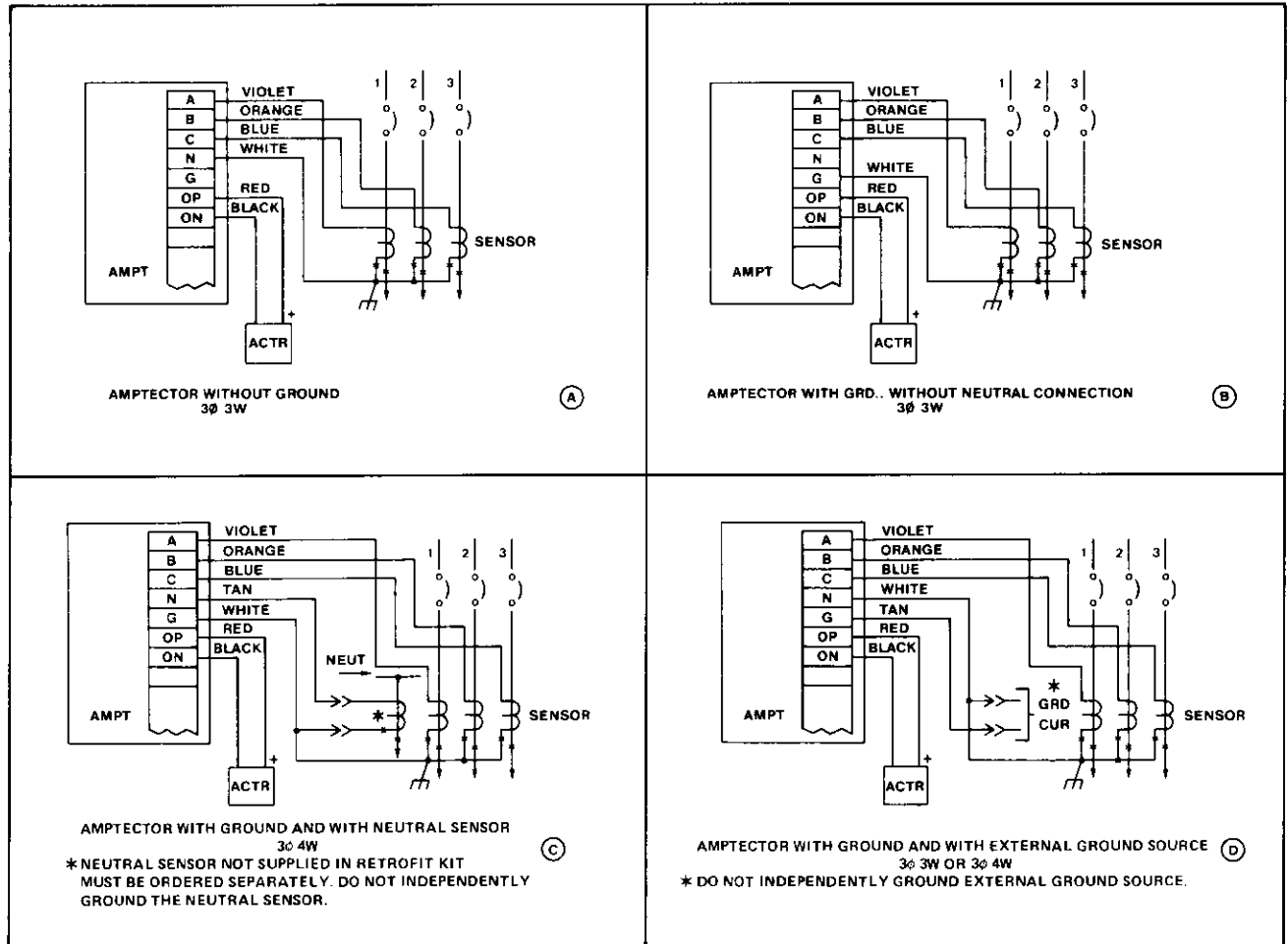


Fig. 5 Wiring Diagram

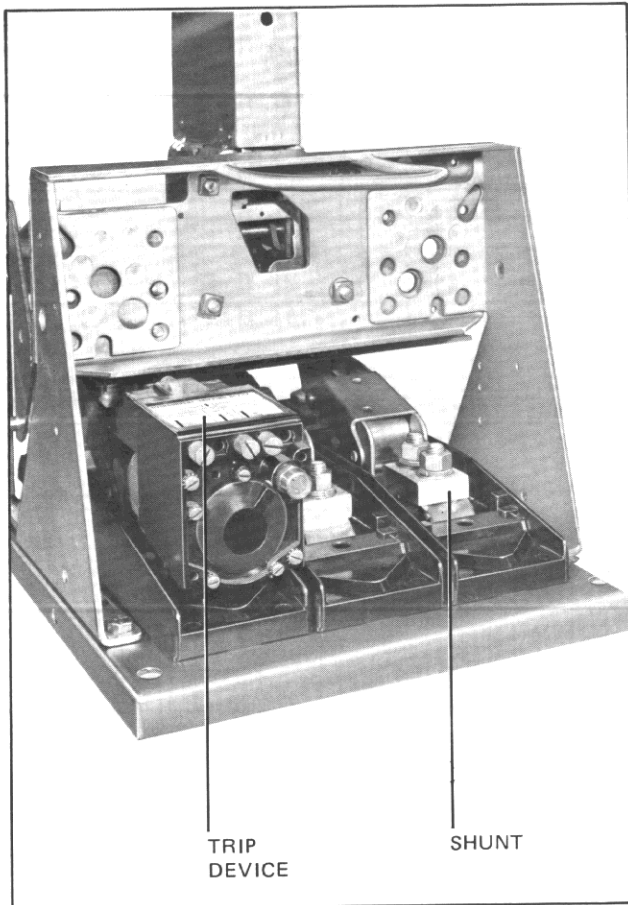


Fig. 6 Removal of Electro-Mechanical Trip Devices

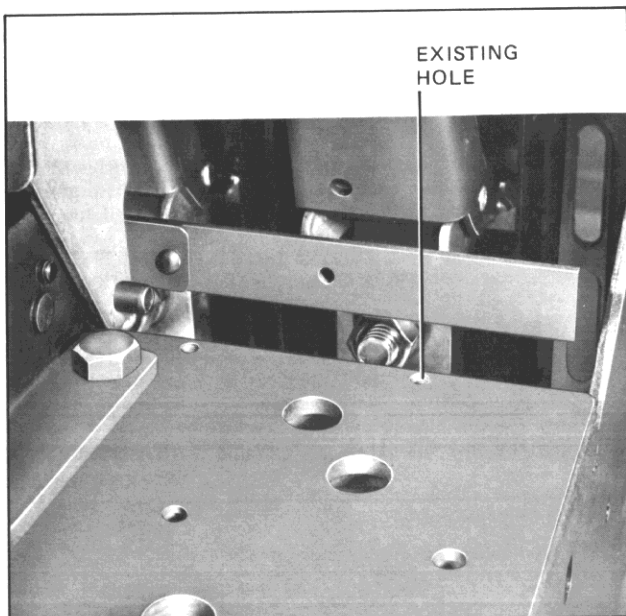


Fig. 7 Location of Existing Hole for Actuator

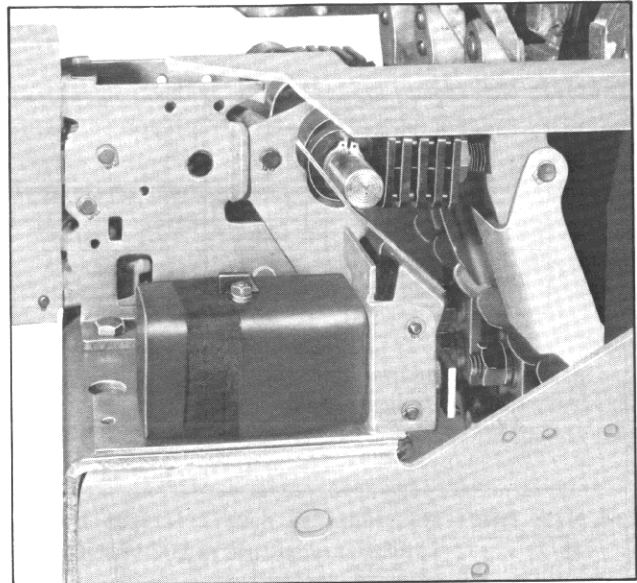


Fig. 8 Positioning of Actuator

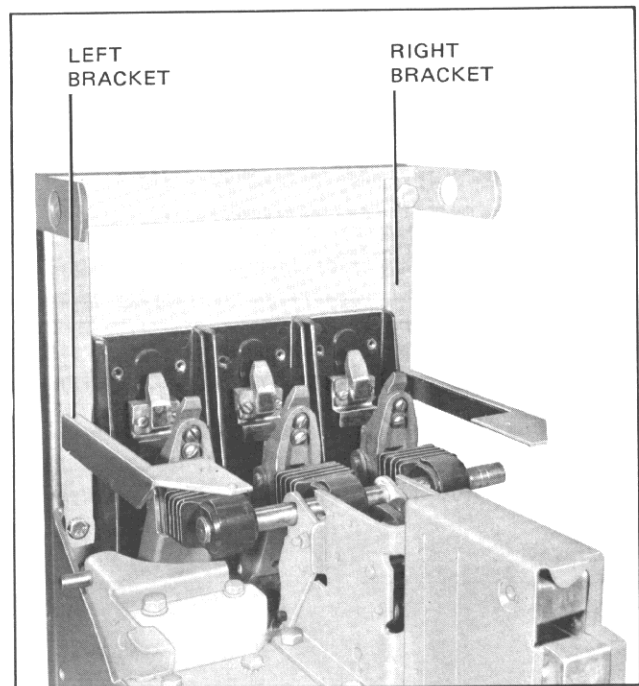


Fig. 9 Mounting of Amptector Bracket

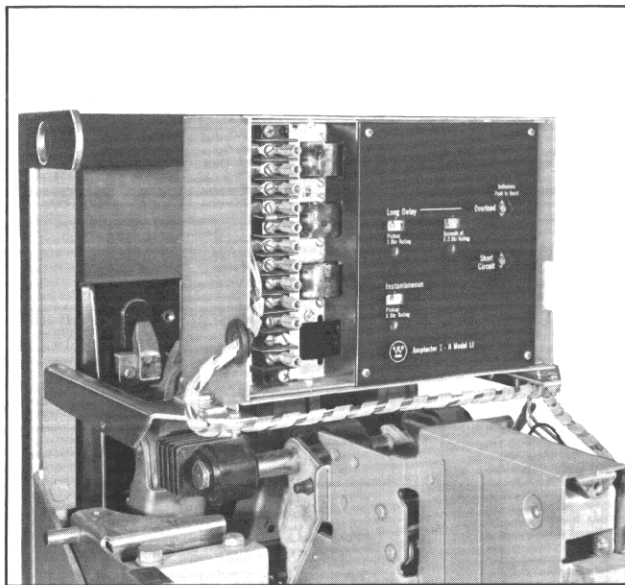


Fig. 10 *Ampdetector Mounted with Wiring Harness*

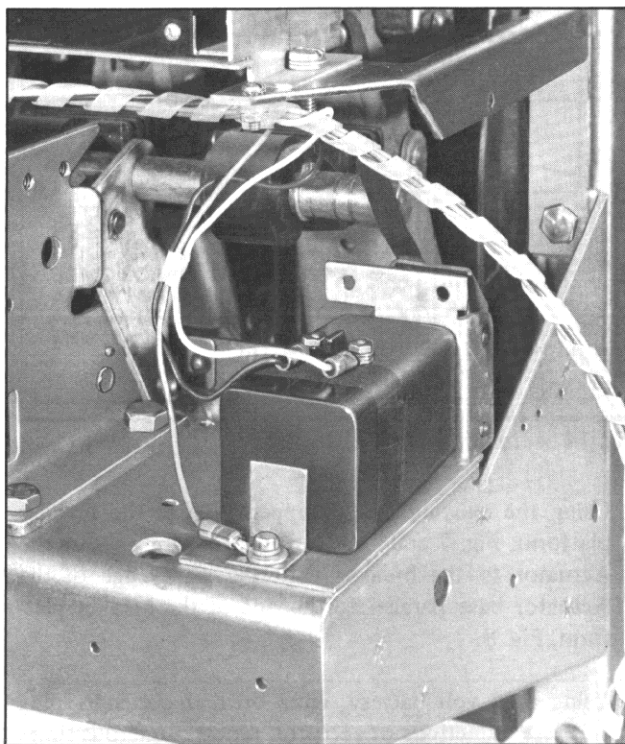


Fig. 11 *Actuator Mounted and Wired*

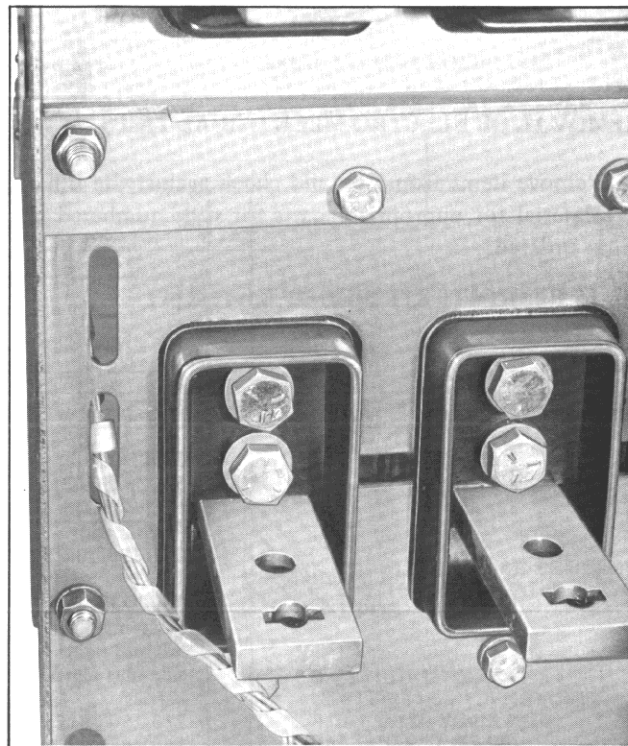


Fig. 12 *Harness Threaded Through Lower Slot
DB-15, DB-25 and DB-50*

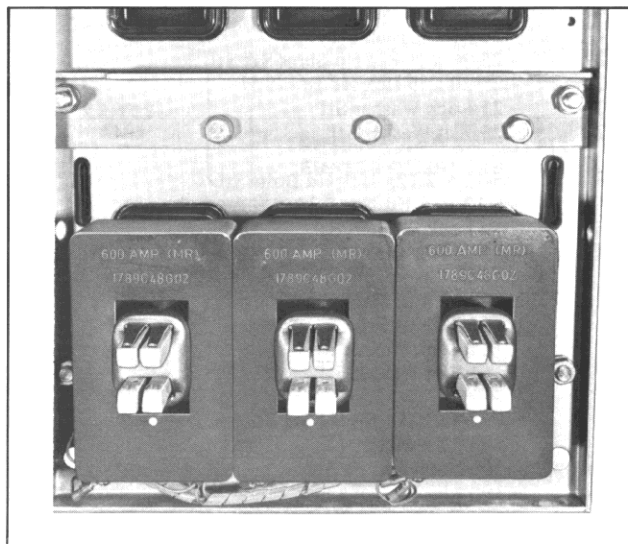


Fig. 13 *Sensors in Place DB-25, DB-50*

SECTION 2 -- INSTALLATION INSTRUCTIONS FOR DB-15 BREAKER

REMOVAL OF ELECTRO-MECHANICAL TRIPS

- A. Remove items from box and check against the Bill of Material for appropriate parts for style numbered kit as ordered.

DB-15 RETROFIT KIT BILL OF MATERIAL

Quantity per Breaker	Description	Style Number
1	Amptector	6998D02G
1	Actuator	591C326G02
3	Sensors	1789C48G43 (Multi-ratio 225/150/100/5)
1	Set Amptector Mounting Details	3500D39G03 (Two brackets, left and right side plus plastic barrier)
1	Wiring Harness	S83-1507-S12
3	Copper Jumpers	1491 435
*1	Hardware Kit consisting of:	
**1	S#3554A32H01 Bracket	
4	-.38-16 x 1.5 Hex Hd Bolts Stl	
4	-.38-16 Hex Hd Nut Stl	
4	-.38 Lock Washers Stl	
4	-.38 Flat Washer Stl	
1	-.25-20 x .5 Pan Hd Sems Scr Stl	
2	-.25-20 x .5 Hex Hd Bolt Stl	
2	-.25 Lock Washer Stl	
2	-.25 Flat Washer Stl	
6	-.5-13 x 2.125 Hex Hd Bolts Stl	
6	-.5-13 Hex Hd Nut Stl	
6	-.50 Lock Washers Stl	
6	-.50 Flat Washers Stl	
3	-.164-32 x .5 Mach Scr Stl	
3	-.164-32 Nut Stl	
3	-.164 Lock Washer Stl	
3	-.164 Flat Washer Stl	
1	-.190-32 x .75 Fil Hd Scr Stl	
1	-.190-32 Nut Stl	
1	-.190 Lock Washer Stl	
1	-.190 Flat Washer Stl	
2	-.138-32 Nut Brass	
2	-.138 Lock Washer Bronze	
2	-.138 Flat Washer Brass	
1	S#282498 Grommet	
3	S#120A842H04 Nylon Wire Clamp	

*NOTE: Kit may contain more hardware than required due to multi-purpose use.

**Bracket not required for DB-15

- B. Familiarize yourself with right hand side view of breaker, see Fig. 16.

- C. Remove the three electro-mechanical trip units and replace with three copper jumpers using .5-13 x 2.125 bolts, see Fig. 6.

PLACEMENT OF ACTUATOR

Due to space limitations, it is necessary to shorten and drill the base of the actuator as shown in Fig. 14.

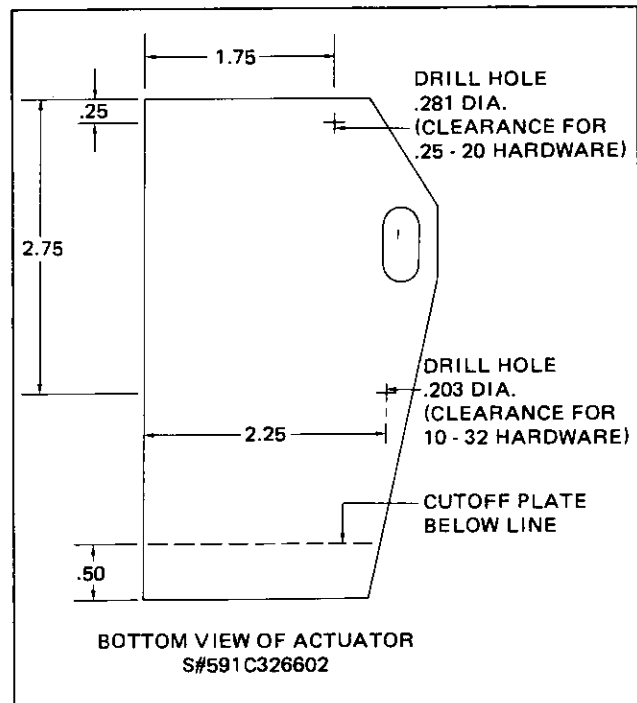


Fig. 14 Actuator Modification DB-15

1. Using the existing .25-20 tapped hole in the breaker platform, Fig. 7 and .25-20 x .5 sems screw secure the Actuator to the breaker with the right edge of the Actuator base parallel to the side of the breaker platform, Fig. 8.
2. Using a 12 volt battery, close breaker check tripping and reset functions of actuator, repeat numerous times to verify proper functioning. It may be necessary to bend reset arm for positive resetting of actuator.
3. Using the Actuator as a template, drill and tap a .190-32 hole in the breaker platform in the location of the .203 dia. hole in Actuator base. Temporarily secure Actuator to platform using .190-32 x .75 screw, nut and washers, see Fig. 15.

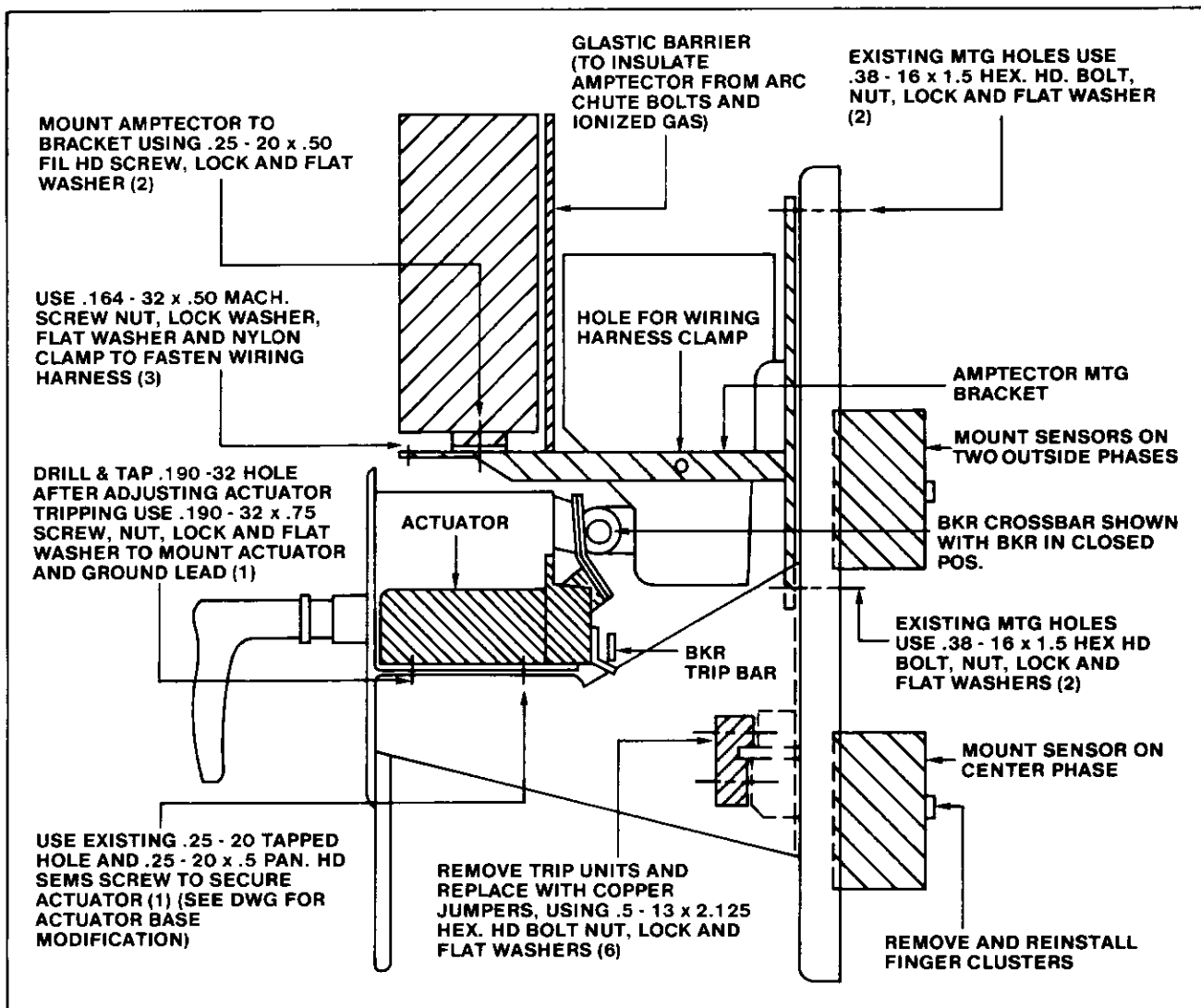


Fig. 16 Right Side View of DB-15

PLACEMENT OF AMPTECTOR

1. The Amptector mounting details consist of two (2) "T" shaped brackets, one right and one left hand which are secured to the rear frame. Remove the existing bolts at top, place bracket over lift bracket and secure with .38-16 x 1.5 bolt, using the existing hole secure the bottom end of bracket with .38-16 x 1.5 bolt, Fig. 9.
2. Once the brackets are secured the plastic barrier is mounted between them, this barrier acts as a shield between the Amptector and the front of the breaker arc chute, see Fig. 17.
3. The Amptector is now mounted between the brackets using .25-20 x .5 fil. hd. screw, washers and the .25-20 threaded hole in the bracket, Fig. 10.
6. Thread the sensor end of the harness through the lower slot in the right side of the breaker frame, viewing breaker from front, Fig. 12.
7. Remove the finger clusters from the top two outside studs, and from the middle bottom stud. Place the sensors on the top studs with the terminals of the sensors in the upright position (Fig. 18) and the bottom sensor terminal in the downward position. The lower end of the harness is slit into two groups for attaching to the sensors. The wires to the top sensors are brought upward along the frame while the portion to the lower sensor is brought down between the phases. Attach the wire ends to the sensors making positive that the polarities are correct.

Re-install the finger clusters and secure the wiring harness to the right hand Amptector mounting bracket using the nylon clamp and the .164 hardware.

WIRING HARNESS AND SENSORS

1. Dependent upon which Amptector was supplied, acquaint yourself with the appropriate wiring scheme, see Fig. 5.
2. Check each lug on the harness to ensure they are properly secured to the wires.
3. Slide the grommet over the front end of harness, connect colored wires to the Amptector per wiring diagram, then place grommet into split hole on the left side of Amptector. Attach the harness to the front of the Amptector using the nylon clamps and .164-32 x .50 mach. screws, nuts and washers, see Fig. 10.
4. Connect the red and black wires to the Actuator using the .138-32 nut lock and flat washer, see Fig. 11.
5. Connect the white wire to the .190-32 x .75 screw on the Actuator and firmly secure the Actuator to the platform. This now grounds the sensor star point, see Fig. 11.

NOTE: Some difficulty may be encountered when placing the sensors on the top studs if the breaker has secondary contacts. To correct this situation, remove secondary contacts, place sensors on the studs and reinstall secondary contacts.

TEST

Using the Amptector kit or power supply.

1. Check operation of the Amptector/Actuator system sufficient number of times to insure proper operation.
2. Set the Amptector dials to the required settings and verify that the Amptector is in calibration.
3. Record the settings to the side of the Amptector for a permanent record.

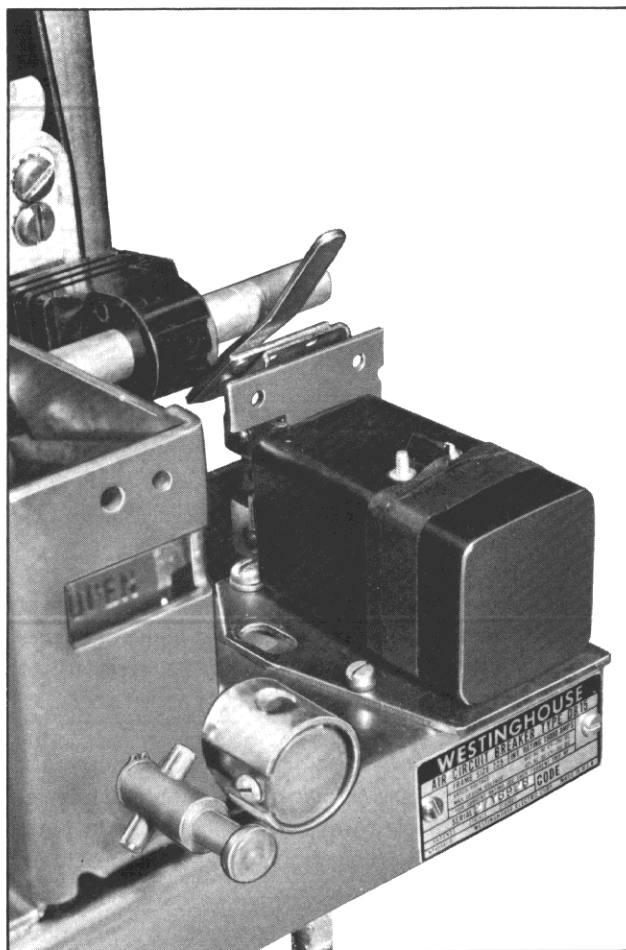


Fig. 15 Actuator Mounted on DB-15

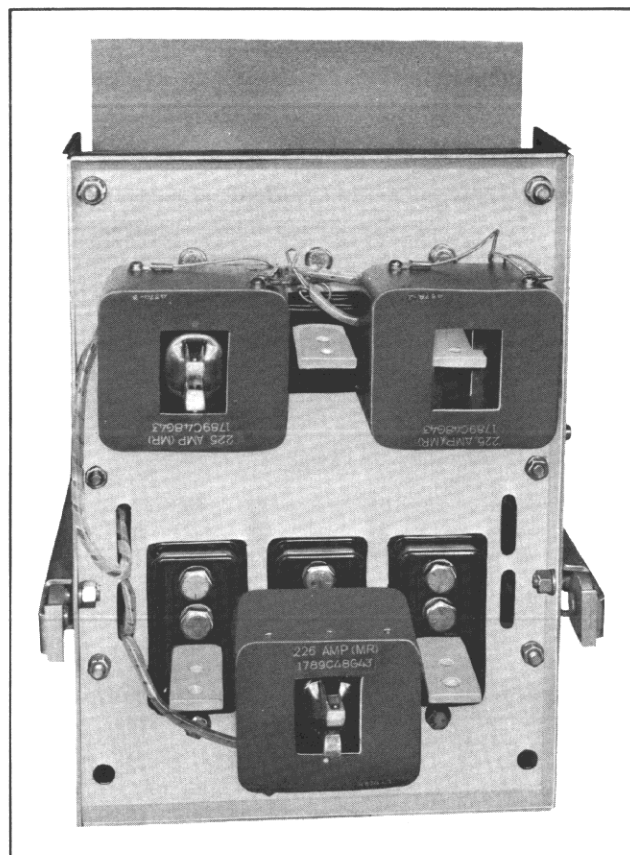


Fig. 18 Mounting of Sensors and Harness DB-15

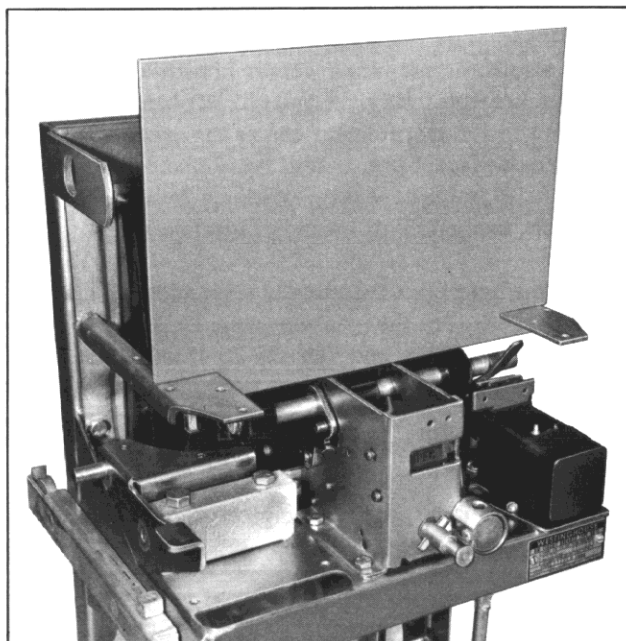


Fig. 17 Mounting of Barrier DB-15

SECTION 3 – INSTALLATION INSTRUCTIONS FOR DB-25 BREAKER

REMOVAL OF ELECTRO-MECHANICAL TRIPS

- A. Remove items from box and check against the Bill of Material for appropriate parts for style numbered kit as ordered.

DB-25 RETROFIT KIT BILL OF MATERIAL

Quantity per Breaker	Description	Style Number
1	Amptector	6998D02G
1	Actuator	591C326G01
3	Sensors	1789C48G01 (Multi-ratio 600/400/200/100/5)
1	Set Amptector Mounting Details	3500D39G02 (Two brackets left and right side)
1	Wiring Harness	3448A35G01
3	Copper Jumpers	1491 435
*1	Hardware Kit Consisting of:	
2	-.38-16 x 1.5 Hex Hd Bolt Stl	
2	-.38-16 Hex Hd Nut Stl	
2	-.38 Lock Washer Stl	
2	-.38 Flat Washer	
2	-.50-13 x 1.5 Hex Hd Bolt Stl	
6	-.50-13 x 3.0 Hex Hd Bolt Stl	
8	-.50-13 Hex Hd Nut Stl	
8	-.50 Lock Washer Stl	
8	-.50 Flat Washer Stl	
1	-.25-20 x .5 Pan Hd Sems Scr Stl	
2	-.25-20 x .5 Hex Hd Bolt Stl	
2	-.25 Lock Washer Stl	
2	-.25 Flat Washer Stl	
3	-.164-32 x .5 Mach Scr Stl	
3	-.164-32 Nut Stl	
3	-.164 Lock Washer Stl	
3	-.164 Flat Washer Stl	
1	-.190-32 x .75 Fil Hd Scr Stl	
1	-.190-32 Nut Stl	
1	-.190 Lock Washer Stl	
1	-.190 Flat Washer Stl	
2	-.138-32 Nut Brass	
2	-.138 Lock Washer Brass	
2	-.138 Flat Washer	
1	S#3554A32H01 Bracket	
3	S#120A842H04 Nylon Wire Clamp	
1	S#282498 Grommet	

*NOTE: Kit may contain more hardware than required due to multi-purpose use.

- B. Familiarize yourself with right hand side view of breaker, see Fig. 19.

- C. Remove the three electro-mechanical trip units and replace with three copper jumpers using .5-13 x 3.0 bolts, Fig. 6.

PLACEMENT OF ACTUATOR

- Using the existing .25-20 tapped hole in the breaker platform (Fig. 7) and .25-20 x .5 sems screw secure the actuator to the breaker with the right edge of the actuator base parallel to the side of the breaker platform, Fig. 8.
- Using a 12 volt battery, close breaker, check tripping and reset functions of actuator, repeat numerous times to verify proper functioning. It may be necessary to bend reset arm for positive resetting of actuator.
- Using the actuator as a template, drill and tap a .190-32 hole in breaker platform and temporarily secure actuator to platform with "L" bracket in place using .190-32 x .75 screw, nut and washers, Fig. 11.

CAUTION: When retrofitting DBL-25, make sure there is no interference between actuator tripping linkage and breaker limiter tripping screw.

PLACEMENT OF AMPTECTOR

- The amptector mounting details consist of two "T" shaped brackets, one right and one left hand which are secured to the rear frame. Remove the existing bolts at top, place bracket over the lift bracket and secure with .5-13 x 1.5 bolts, now using existing hole and .375-16 x 1.5 bolt, secure to bottom end of breaker, Fig. 9.
- Once the brackets are secure the amptector can now be mounted between the brackets using .25-20 x .5 fil. hd. screw and washers and the .25-20 threaded hole in the bracket, Fig. 10.

WIRING HARNESS AND SENSORS

- Dependent upon which amptector was supplied, acquaint yourself with the appropriate wiring scheme, see Fig. 5.

2. Check each lug on the harness to ensure they are properly secured to the wires.
3. Connect the colored wires to the amptector per the wiring diagram and slide the rubber grommet over the end and insert grommet into the split hole on the left front side of the amptector. Attach the harness to front of the amptector using the nylon clamps and .164-32 x .50 mach. screw, nuts and washers, Fig. 10.
4. Connect the red and black wires to the actuator using the .138-32 nut, lock and flat washer, Fig. 11.
5. Connect the white wire to the .190-32 x .75 screw on the actuator and firmly secure the actuator to the platform. This now grounds the sensor star point, Fig. 11.
6. Thread the sensor end of the harness through the lower slot in the right side of the breaker rear frame, viewing breaker from front, Fig. 12.
7. Remove the finger clusters from the lower studs, wire the harness leads to the sensors. Attaching the wires can be accomplished easily by having the terminals of the sensor facing upwards. Once the leads are secured the sensors can be flipped 180° and placed on the lower studs, (Fig. 20), now reinstall the finger clusters. Secure the wiring harness to the right hand amptector mounting bracket using nylon clamp and .164 hardware.

TEST

Using the amptector test kit or a power supply.

1. Check operation of the amptector/actuator system sufficient number of times to insure proper operation.
2. Set the amptector dials to the required settings, and verify that the amptector is in calibration.
3. Record the settings to the side of the amptector for a permanent record.

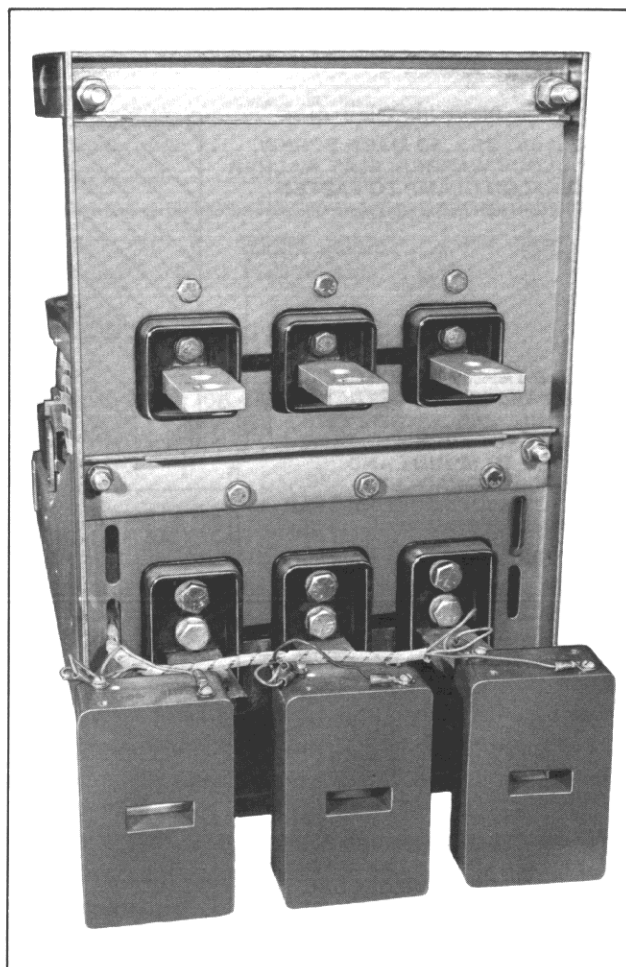


Fig. 20 *Attaching Wiring Harness to Sensors DB-25 and DB-50*

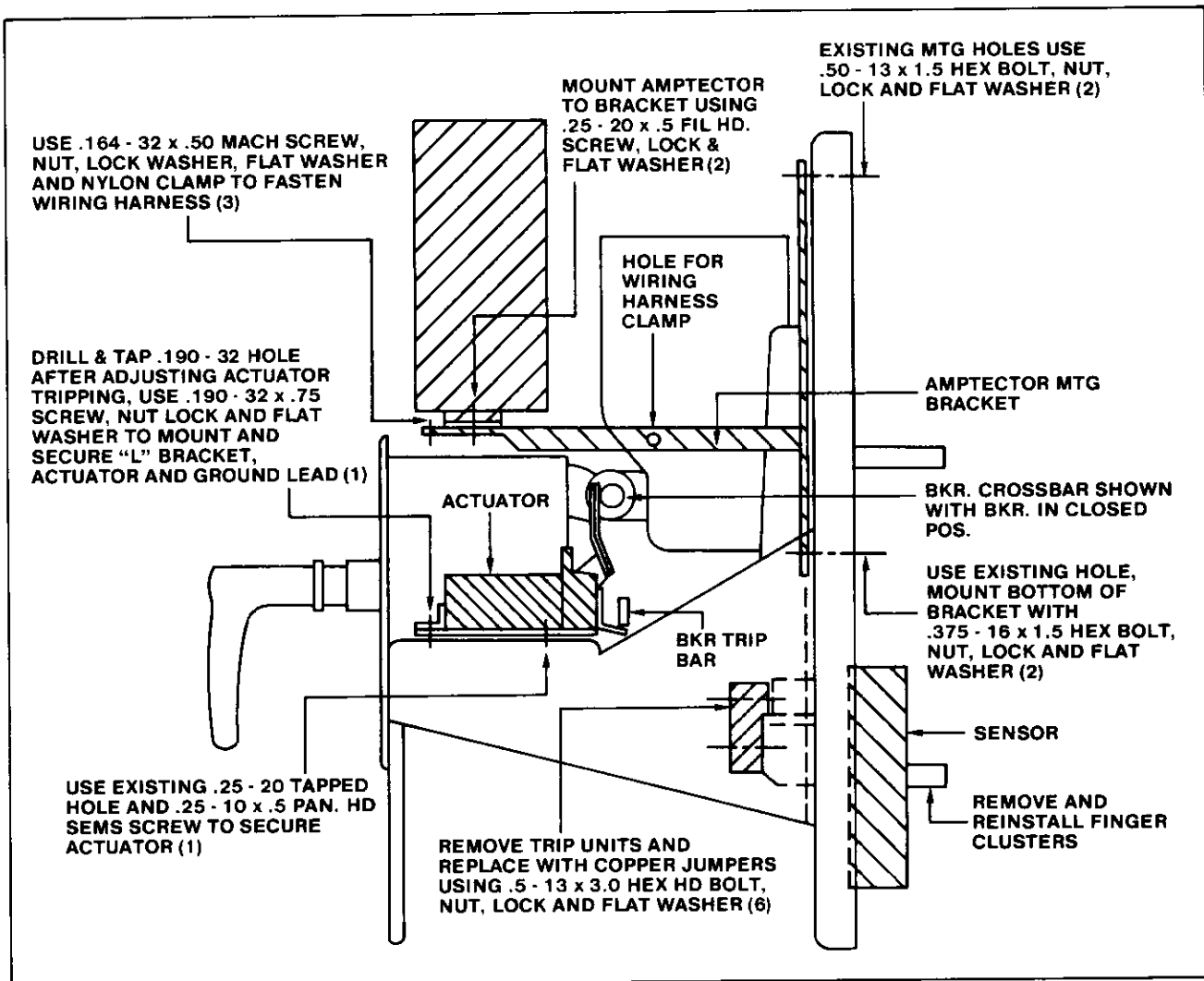


Fig. 19 Right Side View of DB-25

SECTION 4 – INSTALLATION INSTRUCTIONS FOR DB-50 BREAKER

REMOVAL OF ELECTRO-MECHANICAL TRIPS

- A. Remove items from box and check against the Bill of Material for appropriate parts of style numbered kit as ordered.

DB-50 RETROFIT KIT BILL OF MATERIAL

Quantity per Breaker	Description	Style Number
1	Amptector	6998D02G
1	Actuator	591C326G02
#3	Sensors	#See Note Below
1	Set of Amptector Mounting Details	3500D39G03 (Two Brackets and Cross Brace)
1	Wiring Harness	3448A35G03
6	Copper Jumpers	809A436H01
1	Hardware Kit Consisting of:	
4	-.50-13 x 1.5 Hex Hd Bolt Stl	
12	-.50-13 x 3.0 Hex Hd Bolt Stl	
16	-.50-13 Hex Hd Nut Stl	
16	-.50 Lock Washer Stl	
16	-.50 Flat Washer Stl	
3	-.25-20 x .5 Hex Hd Bolt Stl	
3	-.25 Lock Washer Stl	
3	-.25 Flat Washer Stl	
3	-.164-32 x .5 Mach Scr Stl	
3	-.164-32 Nut Stl	
3	-.164 Lock Washer Stl	
3	-.164 Flat Washer Stl	
1	-.190-32 x .75 Fil Hd Scr Stl	
1	-.190-32 Nut Stl	
1	-.190 Lock Washer	
1	-.190 Flat Washer	
2	-.138 Nut Brass	
2	-.138 Lock Washer Brass	
2	-.138 Flat Washer Brass	
1	S#3554A32H01 Bracket	
3	S#120A842H04 Nylon Wire Clamp	
1	S#282498 Grommet	
1	-.312-18 x .5 Fil Hd Scr Stl	
1	-.312 Lock Washer Stl	
1	-.312 Flat Washer Stl	

#Style of Sensors

1789C48G05 200/5
1789C48G08 800/600/400/5
1789C48G11 1600/1200/1000/5

- B. Familiarize yourself with the right hand side view of breaker, Fig. 21.

- C. Remove the three electro-mechanical trip units and replace with six copper jumpers, 2 per phase using .5-13 x 3.0 bolts, (12) required, Fig. 6.

PLACEMENT OF ACTUATOR

1. Scribe a line on the right side of breaker platform, parallel to front, and 3" from existing .313-18 tapped hole.
2. Using the .313-18 tapped hole secure actuator to breaker platform with .312-18 x .5 sems screw, base of actuator should be parallel with side of platform, Figs. 7 and 8.
3. With a 12 volt battery, close breaker, check tripping and reset functions of actuator, repeat several times to verify proper functioning. It may be necessary to bend reset arm for positive resetting of actuator.
4. Using the actuator as a template, drill and tap a .190-32 hole on the scribed line and temporarily secure front of actuator to platform with "L" bracket in place using .190-32 x .75 screw nut and washer, Fig. 11.

PLACEMENT OF AMPTECTOR

1. The "Amptector" mounting details consist of two (2) "T" shaped mounting arms, one left and one right and a 4" x 19" x 1/8" cross plate. Remove the existing bolts at the top of the breaker rear frame, place the mounting arm over the lift bracket and secure with .5-13 x 1.5 bolt. Now using the existing hole and .5-13 x 1.5 bolt secure bottom end of arm, Fig. 9.
2. Mount the cross plate with the two .203 holes next to the breaker arc chutes on the left hand arm using the .25-20 tapped hole, and .25-20 x .5 bolt and washers. Now mount the right hand side of the amptector to the cross plate and right hand arm with .25-20 x .5 bolt and washers, then secure left hand side of amptector to the cross plate with another .25-20 x .5 bolt and washers, Fig. 22.

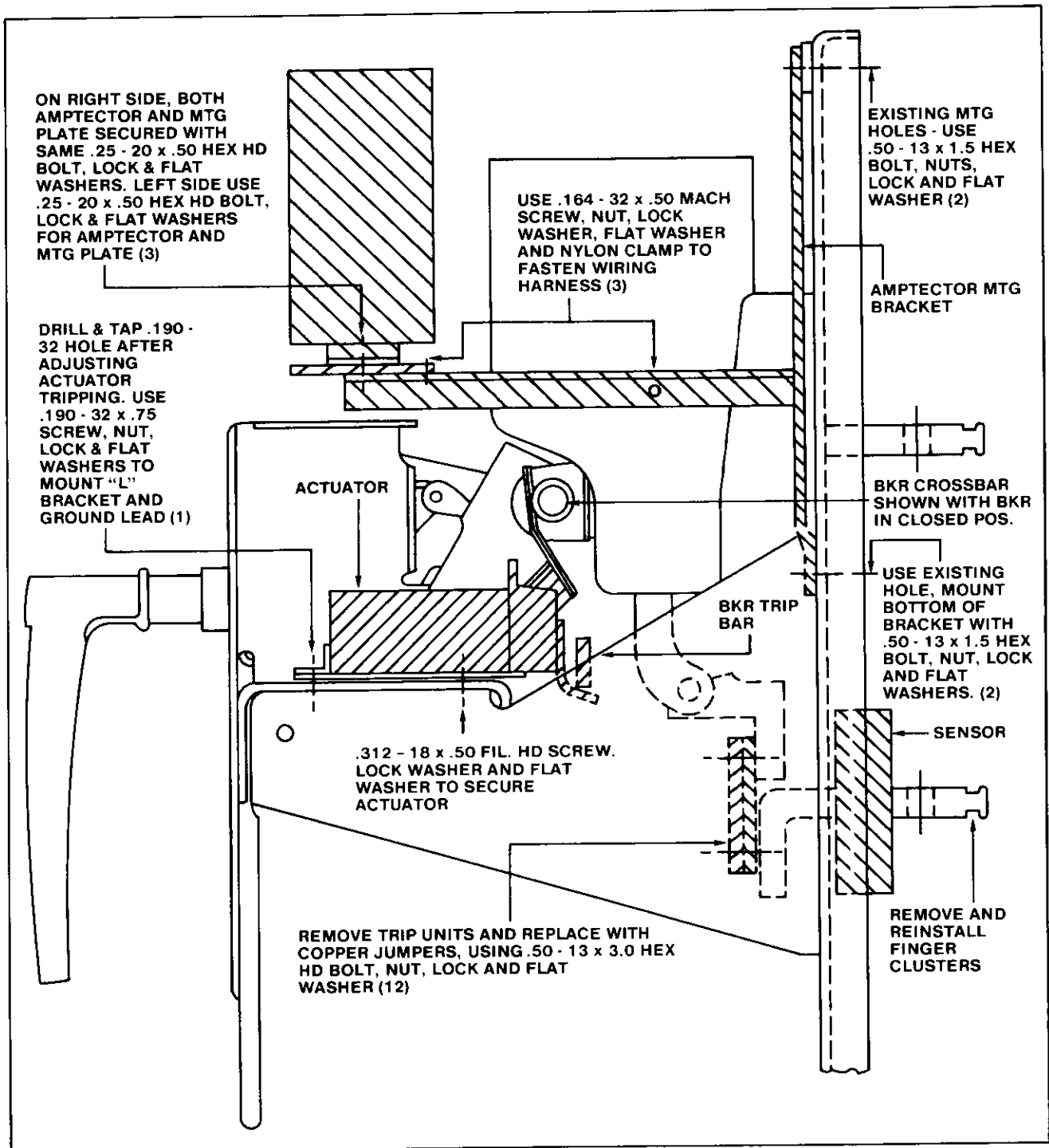


Fig. 21 Right Side View of DB-50

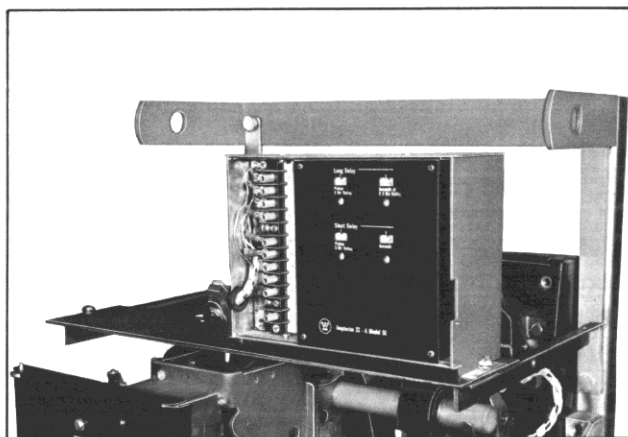


Fig. 22 *Amptector Mounted on Cross Plate DB-50*

WIRING HARNESS AND SENSORS

1. Dependent upon which amptector was supplied, acquaint yourself with the appropriate wiring scheme, see Fig. 5.
2. Check each lug on the harness to ensure they are properly secured to the wires.
3. Connect the colored wires to the amptector per the wiring diagram, and slide the rubber grommet over the end and insert grommet into the split hole on the left front side of amptector. Attach the harness to the back side of the cross plate using the two .203 dia. holes and .194-32 x .5 screw nut, washers and nylon clamps, Fig. 18.
4. Connect the red and black wires to the actuator using .138-32 nut, lock and flat washers, Fig. 11.
5. Connect the white wire to the .190-32 x .75 screw on the actuator and firmly secure the actuator to the platform. This now grounds the sensor star point, Fig. 11.
6. Thread the sensor end of the harness through the lower slot in the right hand side of the breaker rear frame, viewing breaker from the front, Fig. 12.
7. Remove the finger clusters from the lower studs, and wire the harness leads to the sensors. Attaching the wires can be accomplished easily by having the terminals of the sensors facing upwards. Once the leads are secured the sensors can be flipped 180° and placed on the lower studs, Figs. 13 and 20, now reinstall the finger clusters. Secure the wiring harness to the right hand arm which has an existing hole using the .164 hardware and nylon clamp.

TEST

Using the amptector test kit or a power supply.

1. Check operation of the Amptector/Actuator system sufficient number of times to insure proper operation.
2. Set the Amptector dials to the required settings and verify that the Amptector is in calibration.
3. Record the settings to the side of the Amptector for a permanent record.

SECTION 5 – INSTALLATION INSTRUCTIONS FOR DB-75 AND DB-100 BREAKERS

DB-75 AND DB-100 RETROFIT KIT BILL OF MATERIAL

Quantity per Breaker	Description	Style Number	
		DB-75	DB-100
1	Amptector		6998D02G
1	Actuator		591C326G03
#3	Sensors	1789C48G13	1789C48G14
1	Set of Amptector Mounting Details		2817C67G03
1	Sensor Mounting Details		2817C67G04
1	Wiring Harness	3448A35G04	3448A35G05
1	Hardware Kit Consisting of:		
6	-.25-20 x .50 Hex Hd Bolt Stl		
2	-.25-20 Hex Nut Stl		
6	-.25 Lock Washer Stl		
6	-.25 Flat Washer Stl		
6	-.50-13 x 2.25 Hex Hd Bolt Stl		
6	-.50 Lock Washer Stl		
6	-.50 Flat Washer Stl		
3	-.25-20 x .50 Pan Head Screw Stl		
1	-.312-18 x 1.0 Fil Hd Mach Scr Stl		
1	-.312-18 Nut Stl		
1	-.312 Lock Washer Stl		
1	-.312 Flat Washer Stl		
1	-.190-32 x .75 Fil Hd Stl Scr Stl		
1	-.190-32 Nut Stl		
1	-.190 Lock Washer Stl		
1	-.190 Flat Washer Stl		
2	-.164-32 x .5 Mach Scr Stl		
2	-.164-32 Nut Stl		
2	-.164 Lock Washer		
2	-.164 Flat Washer		
2	-.138-32 Nut Brass		
2	-.138 Lock Washer Brass		
2	-.138 Flat Washer Brass		
1	-.25-20 x .75 Carriage Bolt		
1	-.25-20 Elastic Stop Nut		
1	S#32B7802H19 Trip Bar Finger		
1	S#3554A32H01 Bracket		
2	S#120A842H04 Nylon Wire Clamp		
1	S#282498 Grommet for Amptector		
1	S#440298 Grommet for Platform		

REMOVAL OF ELECTRO-MECHANICAL TRIPS

- A. Remove items from box and check against Bill of Material for the appropriate parts or style numbered kit as ordered.
- B. Familiarize yourself with the right hand side view of the breaker, Fig. 23.
- C. Remove the three electro-mechanical trip units, no copper jumpers required, Fig. 6.

PLACEMENT OF ACTUATOR

1. Position and assemble trip paddle on breaker trip bar using .25-20 x .75 carriage bolt, trip bar finger and elastic nut. Left edge of paddle should be 3.12" from side of platform, Figs. 24 and 25.

NOTE: Trip paddle should not set snug against the actuator, should be about a 1/8" gap.

2. Drill a .343 hole in platform base after you have properly positioned the actuator on the platform per Fig. 24 and 26. Hole is approximately 5.18" from the front of the platform and 1.03 from the side of the platform. Secure the actuator with a .312-18 x 1.0 screw, nut and washers.
3. With a 12 volt battery, close breaker, check tripping and reset functions of actuator, repeat several times to verify proper functioning.
4. Drill and tap .190-32 hole in breaker platform 2.18 from front and 2.38 from right side of platform, Fig. 27 and temporarily secure actuator parallel to the platform with "L" bracket in place using .190-32 x .75 screw, nut and washers, Fig. 11.

#NOTE: S#1789C48G13 is a multi-ratio sensor 3000/2500/2000/5A and S#1789C48G14 for the DB-100 is a single ratio 4000/5A.

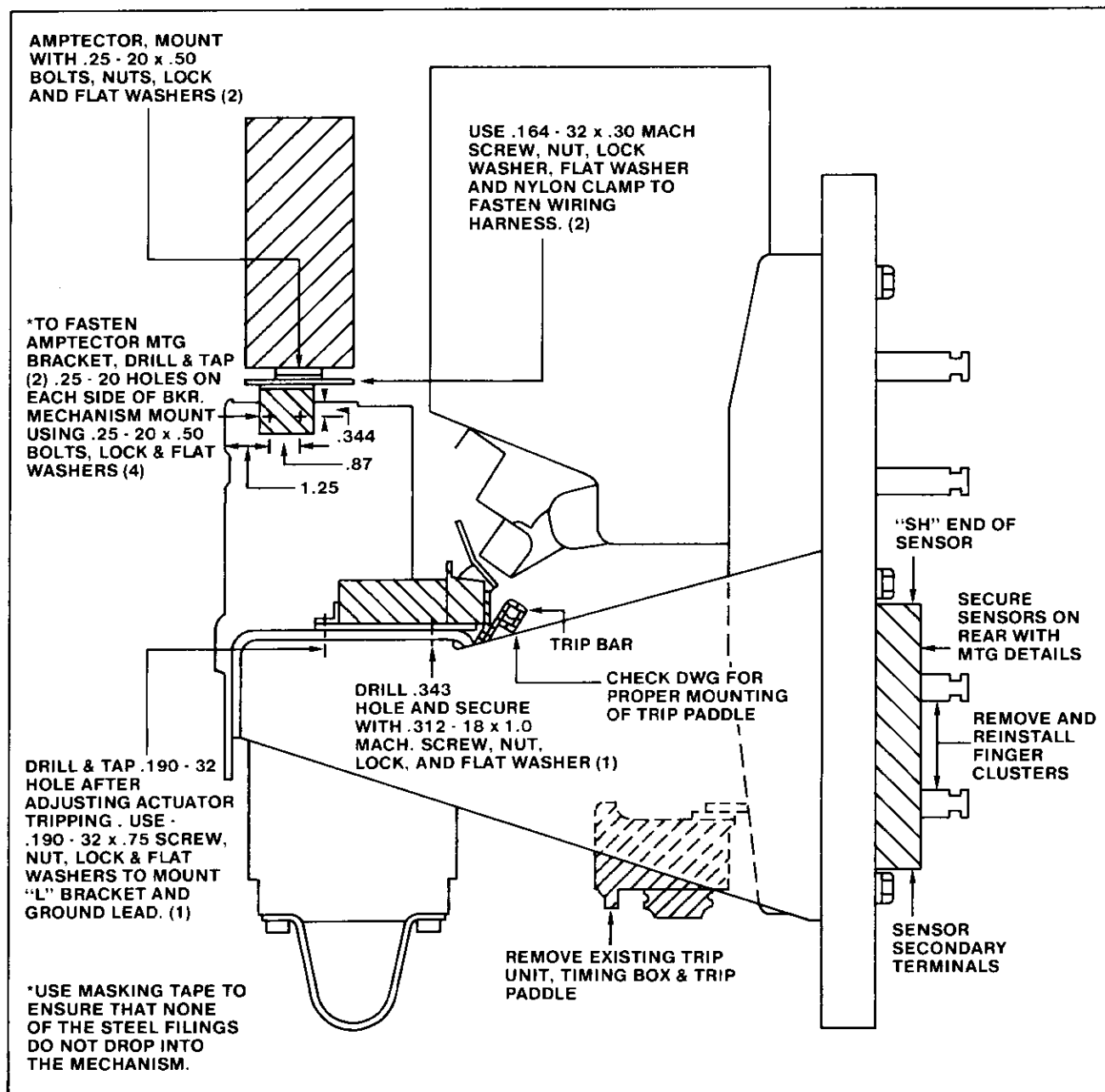


Fig. 23 Right Side View of DB-75 and DB-100

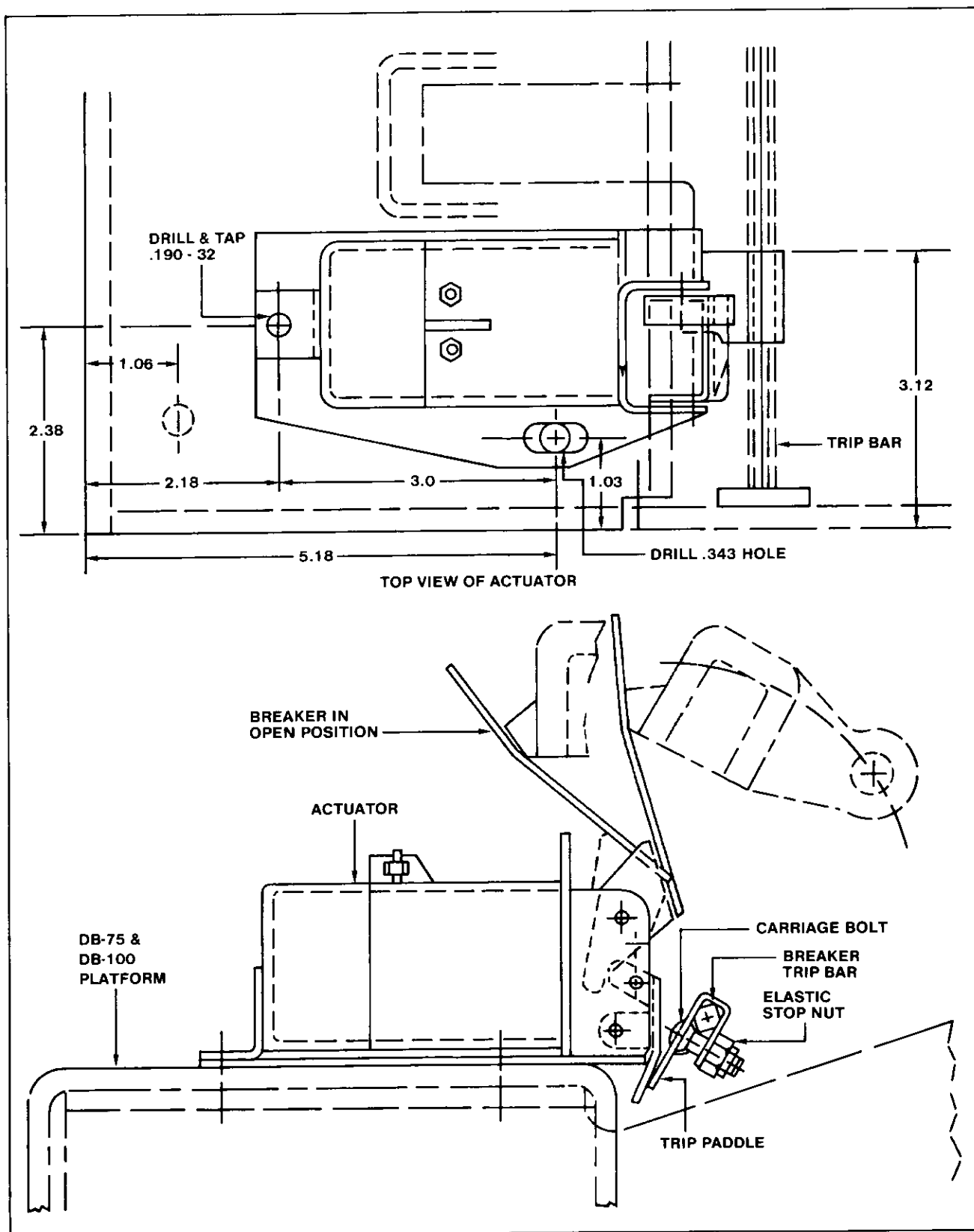


Fig. 24 Positioning of Actuator Trip Bar DB-75/100

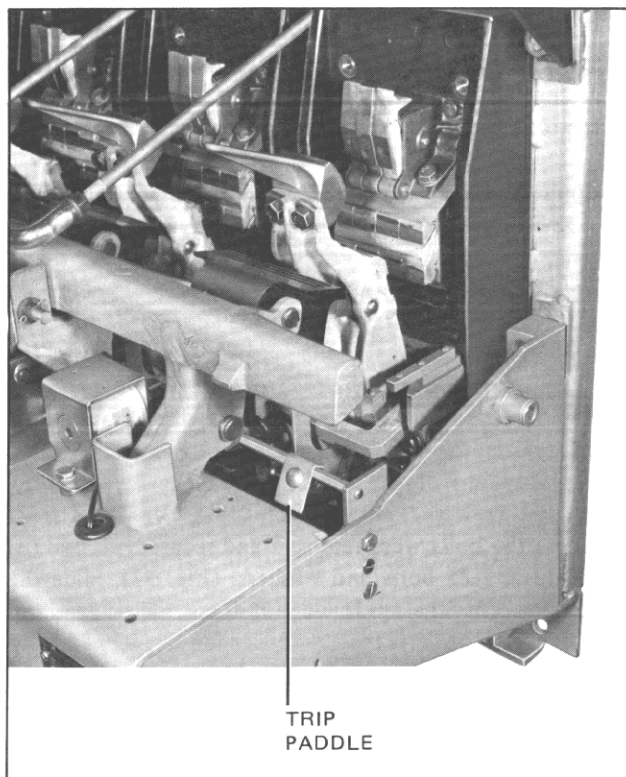


Fig. 25 Positioning of Actuator Trip Paddle DB-75/100

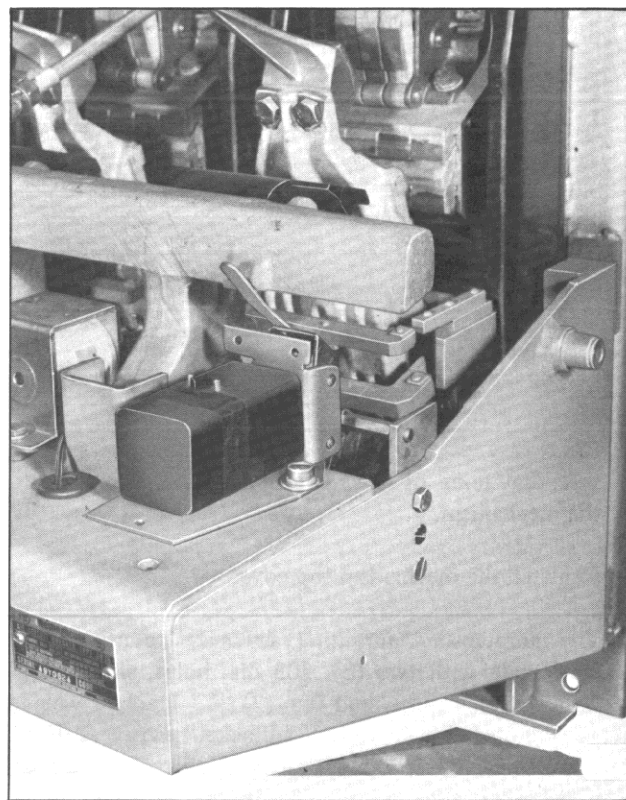


Fig. 27 Actuator in Place and Readied for Drilling
.190-32 Hole

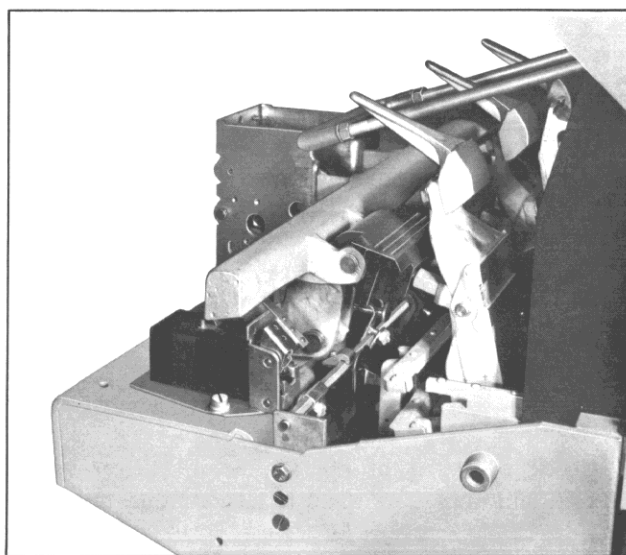


Fig. 26 Right Hand Side View of Actuator DB-75/100

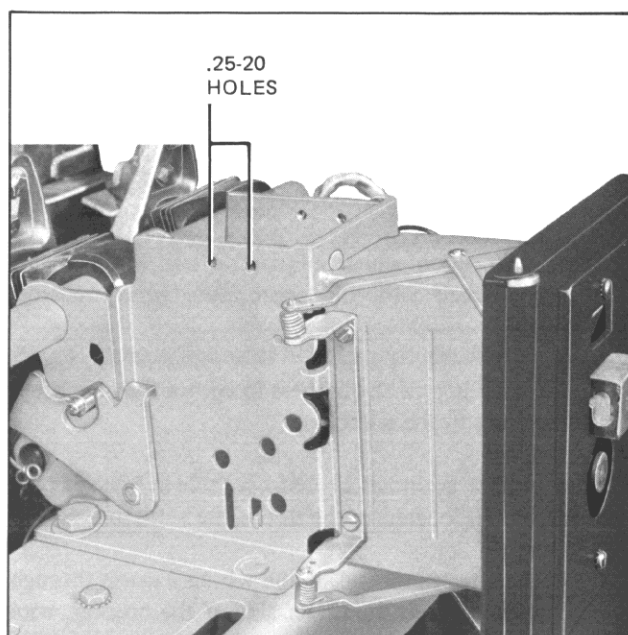


Fig. 28 Location of Holes for Amptector Bracket
DB-75/100

PLACEMENT OF AMPTECTOR

1. Remove breaker mechanism top cover, and place masking tape on the inside of the mechanism to catch any metal chips which may fall during the drilling and tapping process.
2. Drill and tap four (4) .25-20 holes, two (2) on each side .87" between centers, 1.25" from the front, and .344 from top of breaker mechanism side frames, see Figs. 23 and 28. It is recommended that .125 dia. holes be drilled first.
3. Clean burred edges and remove masking tape making sure that none of the metal chips have dropped into the mechanism.
4. Reinstall the mechanism top cover.
5. The amptector "mounting assembly" consists of a steel plate with two (2) .203 dia. holes, and two (2) 25-20 tapped holes, and two (2) "L" brackets welded to it and 4" apart. Each "L" bracket has two .281 dia. holes, which line up with the newly .25-20 tapped holes when the assembly is fitted onto the breaker, Fig. 29, secure the assembly to the breaker mechanism, with the .203 dia. holes in plate towards the arc chutes, use .25-20 x .50 bolts, lock and flat washers. **Do not use longer bolts, as they will interfere with the mechanism linkages.**
6. Mount Amptector on the steel plate with .25-20 x .50 bolts, nuts and washers, Fig. 30.
5. Place grommet onto the wiring harness and connect the leads to the amptector per wiring diagram, attach grommet to the split hole on the left front side of amptector, Fig. 10.
6. Connect the red and black wires to the actuator using .138-32 nut, lock and flat washers, Fig. 11.
7. Connect the white wire to the .190-32 x .75 screw on the actuator and firmly secure the actuator to the platform. This now grounds the sensor star point, Fig. 11.
8. Remove the finger clusters from the three lower studs, remove the two (2) .50-13 x 1.25 bolts located directly in the middle of the studs. Place the sensor mounting bracket with the nipples facing the two holes from where the bolts were removed and secure with two (2) .50-13 x 2.25 bolts and washers, (Fig. 32). Slide the sensors onto the studs, do not force the sensors on, due to close tolerances the sensor may be inched from side to side to get them properly mounted. Once the sensor is up against the back plate secure it with the mounting bracket using the .25-20 x .50 Panhead screw, (Fig. 33). The sensor must be mounted with the end marked with the letters "SH" on top. These sensors have a special shield to minimize the effect of stray flux.

NOTE: The sensors fit both the cast aluminum panels and formed panels without any modification.

WIRING HARNESS AND SENSORS

1. Dependent upon which amptector was supplied, acquaint yourself with the appropriate wiring scheme, see Fig. 5.
2. Check each lug on the harness to ensure they are properly secured to the wires.
3. Place rubber grommet in .781 dia. hole in breaker platform, hole is located to the left of the actuator.
4. Feed the amptector end of the wiring harness through the grommet from the under side of the breaker, wire should be behind the amptector, Fig. 31.

9. Wire the leads to the sensors and secure the wiring harness to the amptector mounting plate using the .203 dia. holes and .164-32 x .5 screw, nut, washers and nylon clamps, Fig. 23.

TEST

Using the amptector test kit or a power supply.

1. Check operation of the amptector/actuator system sufficient number of times to insure proper operation.
2. Set the amptector dials to the required settings and verify that the amptector is in calibration.
3. Record the settings on the side of the amptector for a permanent record.

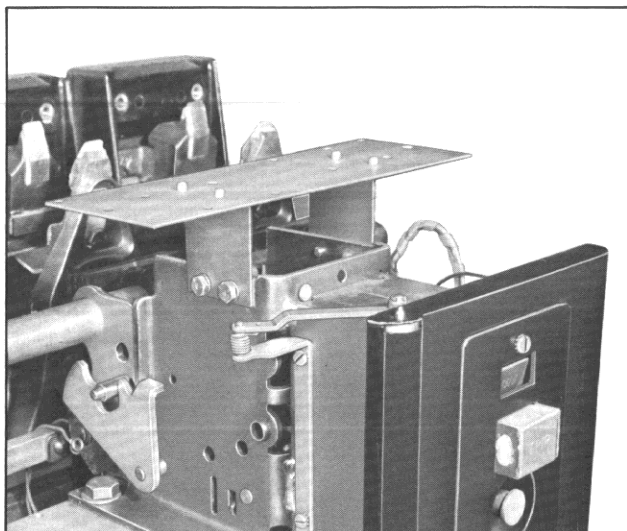


Fig. 29 Amptector Mounting Bracket DB-75/100

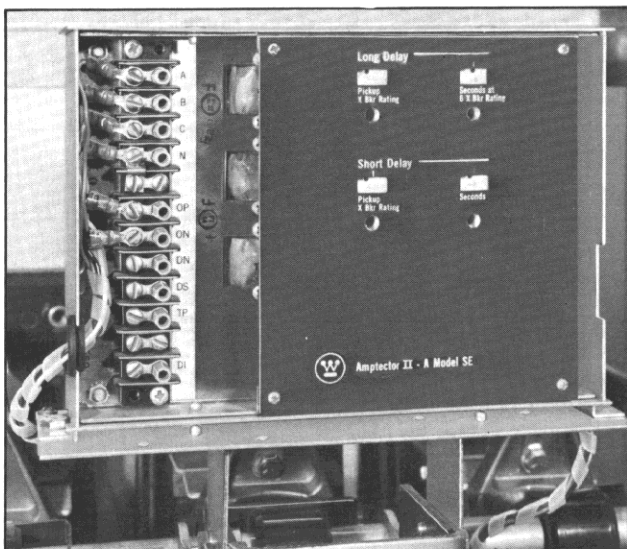


Fig. 30 Amptector Mounted on Bracket DB-75/100

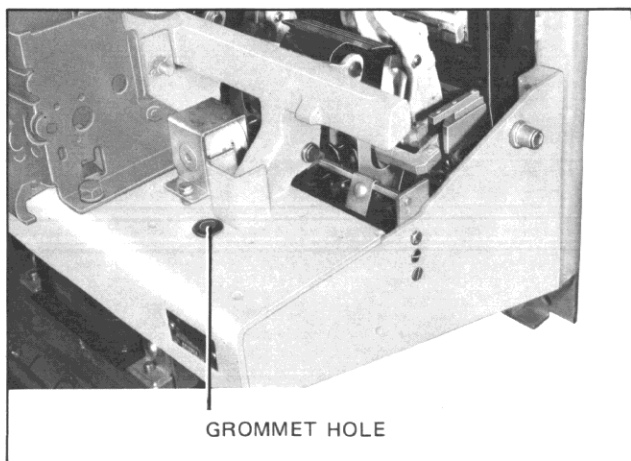


Fig. 31 Location of Grommet for Harness DB-75/100

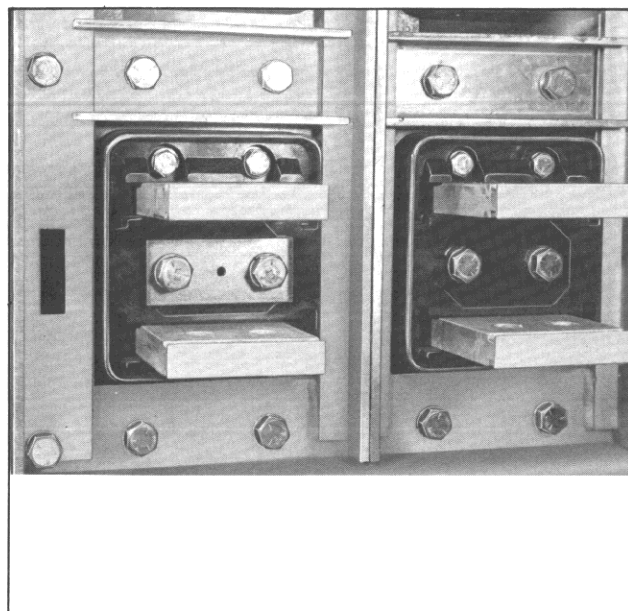


Fig. 32 Sensor Mounting Detail DB-75/100

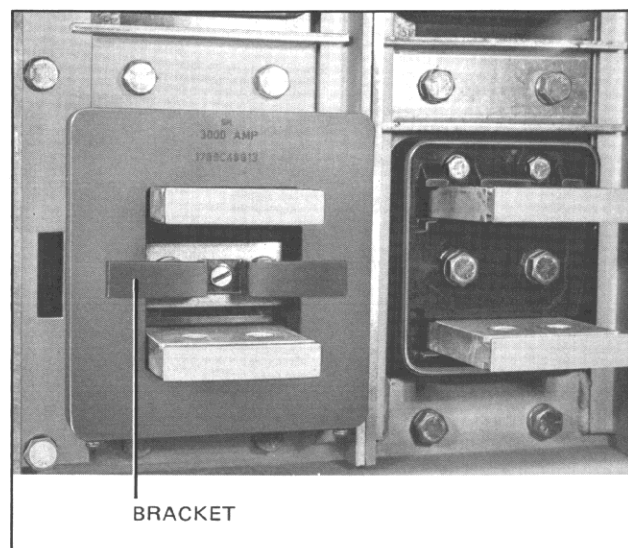


Fig. 33 Sensor Mounted in Place with Bracket

Westinghouse Electric Corporation

Switchgear Division, East Pittsburgh, Pa. 15112

I.L. 33-850-6

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