

Instructions for Installing Shunt Trip Device in Type SPB, Systems Pow-R Breakers



L.L. 15158

UL LISTED DEVICE

Shunt trip devices are listed by Underwriters' Laboratories, Inc. as a circuit breaker accessory under File E64983. Field mounting of a shunt trip device in a system Pow-R breaker does not void the breaker UL listing.

GENERAL DESCRIPTION

A conventional shunt trip device is an accessory used in a circuit breaker to provide for breaker opening from a remote control location. A S.P.D.T. auxiliary switch provides contacts that are used to cutoff the shunt trip following the breaker opening as well as for remote indication of the breaker "open" or "closed" position.

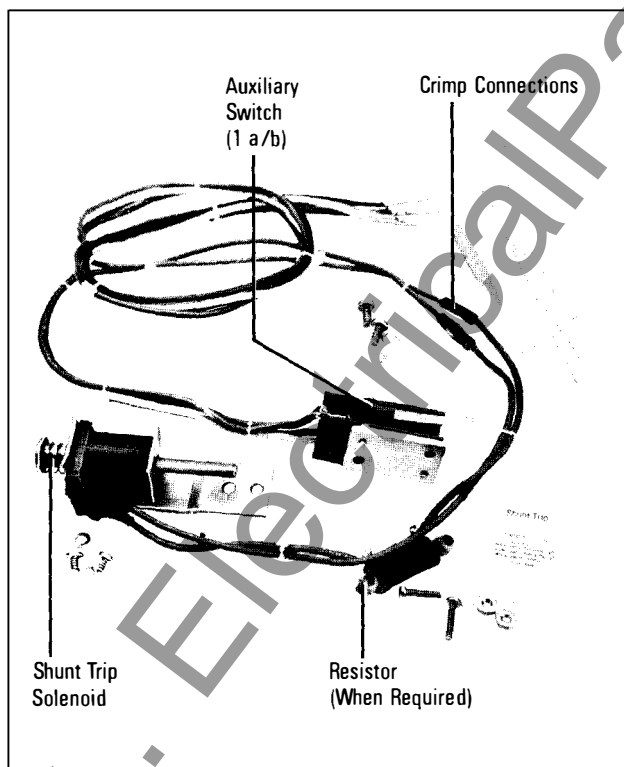


Fig. 1 Shunt Trip Device Accessory Kit

Shunt trip device is furnished in kit form for field installation as illustrated in Fig. 1 complete with all installation details including wiring harness and supplementary nameplates. All components are for mounting internally in the center pole as described in this leaflet. Complete ratings and catalog numbers are given in Table 1.

Table 1 – Shunt Trip Device Catalog Number ① ④ ⑤					
Ratings AC 50 or 60 Hz		Catalog No. SPBST (Add Suffix below)		Modular Key Code Ref.	Note
Volts	Tripping Amperes @ 0.033 Sec.	Frame Rating			
		3000A Max.	4000A		
		Cat. No. Suffix			
24	6.0	024A	024A4	J01	
48	12.5	048A	048A4	J02	
120	2.5	120A	120A4	J03	③
208	1.9	208A	208A4	J04	③
240	2.2	240A	240A4	J05	③
480	0.4	480A	480A4	J06	
600	0.5	600A	600A4	J07	
DC					
Volts	Tripping Amperes @ 0.25 Sec. ⑥				
24	8.0	024D	024D4	J09	
32	8.0	032D	032D4	J10	
48	8.0	048D	048D4	J11	②
60	1.4	060D	060D4	J12	
125	1.2	125D	125D4	J13	

① UL listed for field installation — E64983.

② Resistor (R5) included in kit.

③ Ratings shown will operate at 55% rated voltage for application with UL 1053 Class I ground fault protective devices. All others will operate at 75% of rated voltage.

④ Average breaker contact parting time after energization of shunt trip is 0.028 seconds.

⑤ Average time to shunt trip cutoff after energization of shunt trip is 0.036 seconds.

⑥ Since shunt tripping time is less than 0.25 seconds, data is calculated on E/R basis.

CAUTION: BEFORE ATTEMPTING TO INSTALL ANY CIRCUIT BREAKER ACCESSORY, THE CIRCUIT BREAKER MUST BE OPENED AND THE STORED ENERGY IN THE MECHANISM SPRINGS DISCHARGED. THE BREAKER SHOULD BE REMOVED FROM THE CELL AND TAKEN TO A SUITABLE WORK BENCH WHERE THE INSTALLATION CAN BE PROPERLY MADE AND TESTED BEFORE BEING PLACED IN SERVICE. GENERAL INSTRUCTIONS FOR OPERATING SYSTEM POW-R BREAKERS ARE PROVIDED IN I.B. 15082.

WARNING: THERE IS A HAZARD OF ELECTRICAL SHOCK OR BURN WHENEVER WORKING IN OR AROUND ELECTRICAL EQUIPMENT. ALWAYS TURN OFF POWER SUPPLYING THIS EQUIPMENT BEFORE WORKING INSIDE SWITCHBOARDS.

FRONT COVER REMOVAL

To install a shunt trip device, the manual charging handle and front cover must first be removed. To remove the manual charging handle, remove the two screws as shown in Fig. 2 and pull the handle downwards as shown in Fig. 3. Next, remove the cover mounting screws illustrated in Fig. 3. The transparent cover over the trip unit need not be removed separately, since it will be removed intact with the front cover.

CAUTION: THERE IS A SMALL PROJECTION IN THE CHARGING MECHANISM HUB THAT SERVES AS A POSITIONING GUIDE FOR INSTALLING THE FRONT COVER. IF THE MECHANISM IS MANUALLY CHARGED WITH THE FRONT COVER REMOVED, CARE SHOULD BE EXERCISED TO AVOID OVER EXTENDING THE CHARGING LEVER EITHER UPWARDS OR DOWNWARDS, WHICH COULD BREAK-OFF THE PROJECTION. WITH THE FRONT COVER IN PLACE, THE HUB STOPS AGAINST THE COVER AND THIS CONDITION WILL NOT OCCUR.

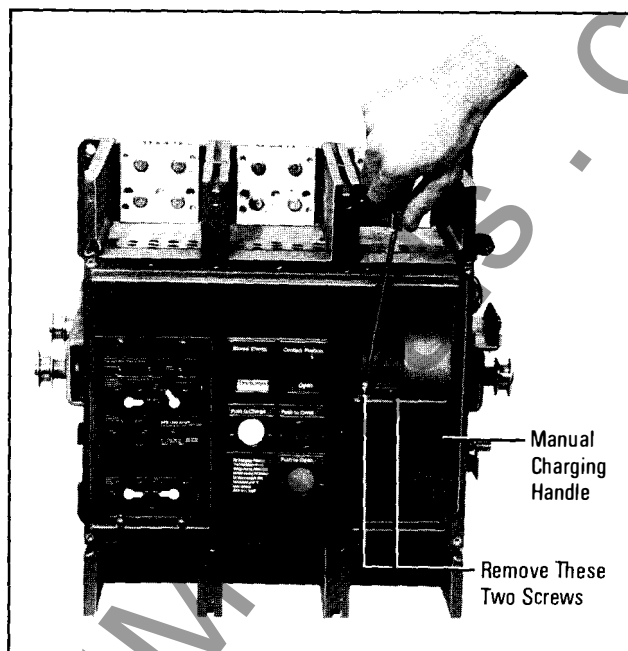


Fig. 2 Removing the Charging Handle Screws from a Typical 1600 Amp Drawout Breaker

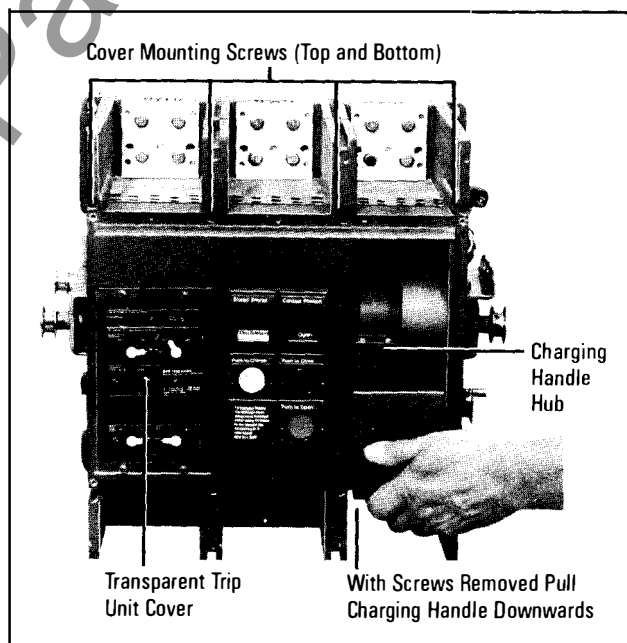


Fig. 3 Removing Charging Handle

SHUNT TRIP DEVICE INSTALLATION

1. Position the breaker in the horizontal position so that the bottom side of the operating mechanism is accessible. For convenience during accessory installations on drawout breakers, a simple frame should be used to support the breaker and prevent possible damage to the secondary disconnect blocks.

2. Mount the shunt trip solenoid to the mechanism mounting bracket, as shown in Fig. 4, using two pan head screws (0.138-32 x 0.188) and lockwashers.

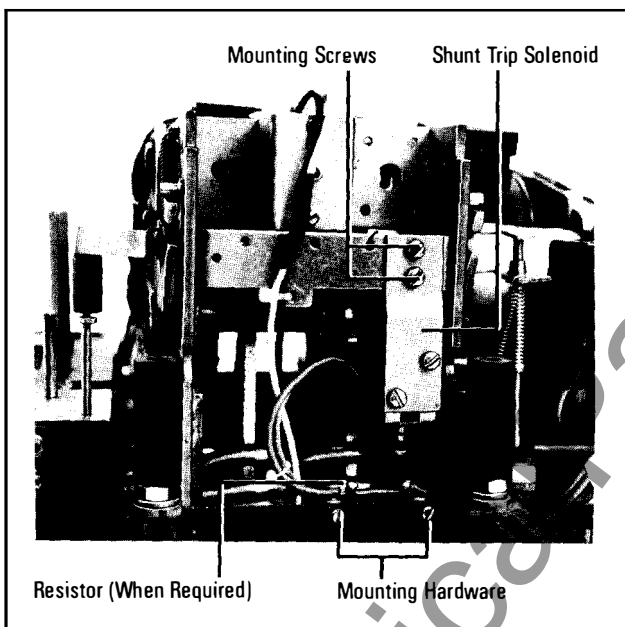


Fig. 4 *Shunt Trip Device and Resistor Installed on a Typical 1600 Amp Breaker*

3. If a resistor is provided in the kit, (refer to Table 1) attach it to the vertical barrier as shown in Fig. 4, using two pan head screws (0.086-56 x 0.375) and nuts. For the larger frame breakers, mounting provisions are provided on the horizontal center mounting barrier.

4. Route the two shunt trip control wires under the mechanism mounting frame as illustrated in Fig. 5. This routing is required in frame ratings 1600^② amp and less because of the closeness of the front cover, but an alternate path around the bottom end of the mechanism frame may be used in the large frame breakers.

^① Similar to AMP part number 45449.

^② Or 2000 amps in the 16 in. high compact frame size.

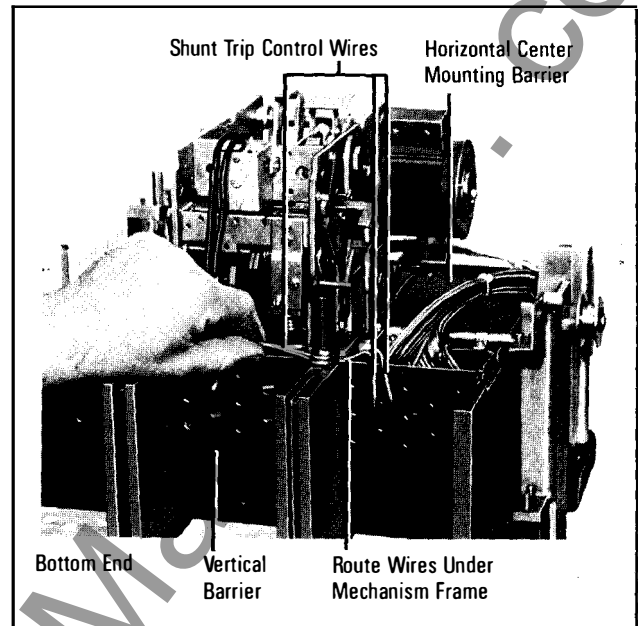


Fig. 5 *Routing Location for Shunt Trip Control Wires*

NOTE: THE TWO CRIMP CONNECTIONS SHOWN IN FIG. 1 ARE ACTUALLY SUPPLIED IN KIT FORM IN AN UNCRIMPED FASHION TO FACILITATE THE ROUTING OF THE SHUNT TRIP WIRES UNDER THE MECHANISM FRAME WHEN REQUIRED. CRIMPING WILL BE REQUIRED USING A TOOL^① SIMILAR TO THE ONE SHOWN IN FIG. 6.

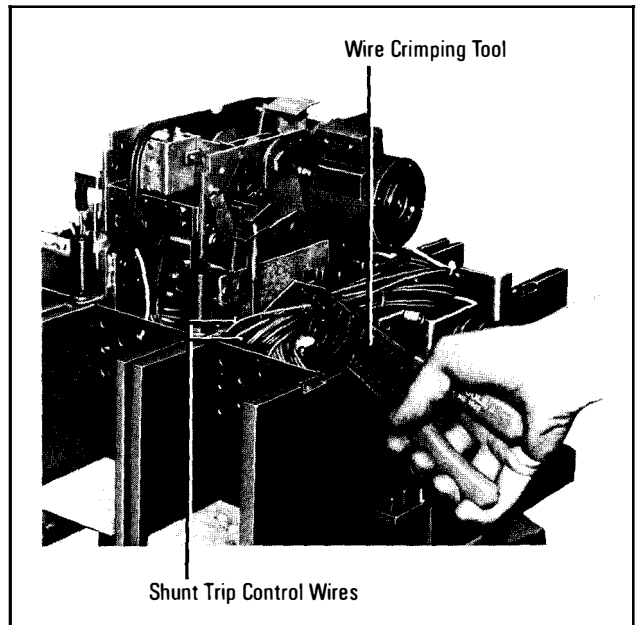


Fig. 6 *Splicing Shunt Trip Control Wires*

Exact terminal locations for both fixed mounted and drawout breakers are illustrated in Fig. 12. Amp type male pin terminations are provided for insertion into the drawout disconnect blocks. To properly insert a male pin, push it in until it snaps into position. Test by pulling - it should not be removable. For fixed mounted breakers

with side mounted terminal blocks, the male pins should be removed and the lengths of wires modified as required. A special extraction tool is required to remove the terminations from the drawout disconnect blocks. Details on this, plus other termination details, are given in Fig. 12.

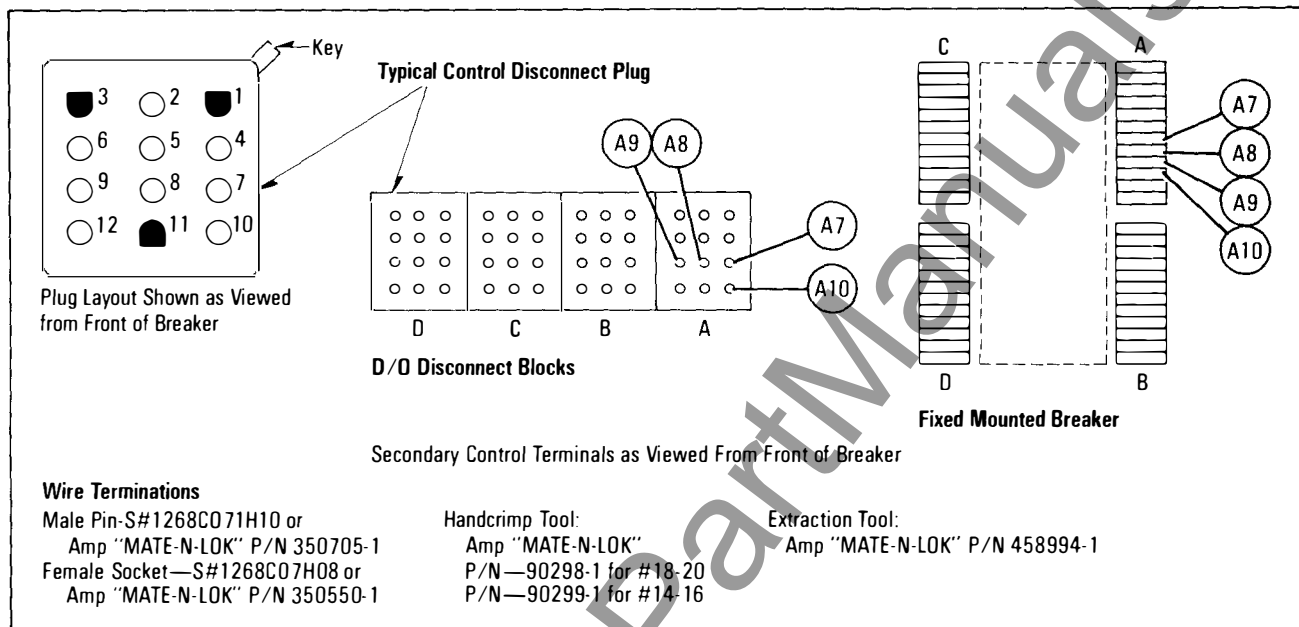


Fig. 12 Shunt Trip Device Control Wire Termination Locations

TEST OPERATION – ADJUSTMENTS

CAUTION: OBSERVE NORMAL SAFETY PRECAUTIONS TO AVOID CONTACT WITH MOVING PARTS IN THE MECHANISM AS WELL AS ENERGIZED TERMINATIONS IN THE CONTROL CIRCUIT.

Temporarily, reinstall the manual charging handle so that the proper operation of the auxiliary switches and shunt trip solenoid can be confirmed. The auxiliary switch must operate when the breaker is opened and closed. **If necessary, bend the actuator arm of the auxiliary switch to insure proper mechanical operation.**

The electrical operation should be confirmed by applying proper rated control power to the terminals as illustrated in either Figs. 10 or 11. With proper control power available, charge the mechanism manually and close the breaker by depressing the close lever on the front of the mechanism.

Energize the shunt trip. The breaker should open and the auxiliary switch must operate to cut-off the control power to the shunt trip solenoid and provide proper remote indication signals.

RETURN TO SERVICE

After proper mechanical and electrical operations are confirmed, replace the front cover and manual charging handle. Attach the shunt trip nameplate, supplied with the kit, to the side of the breaker cover adjacent to the shunt trip control wires.

Return to service as required.

NOTE: WESTINGHOUSE ASSUMES NO RESPONSIBILITY FOR DAMAGE DONE TO CIRCUIT BREAKERS DURING FIELD MOUNTING OF ANY ACCESSORY.

5. Install the shunt trip cut-off switch as illustrated in Fig. 7, using two pan head screws (0.164-32 x 0.312) and lockwashers. Mounting screw locations are illustrated in Fig. 8. Note, for DC shunt trip devices, two series connected cut-off switches are provided, the installation is identical.

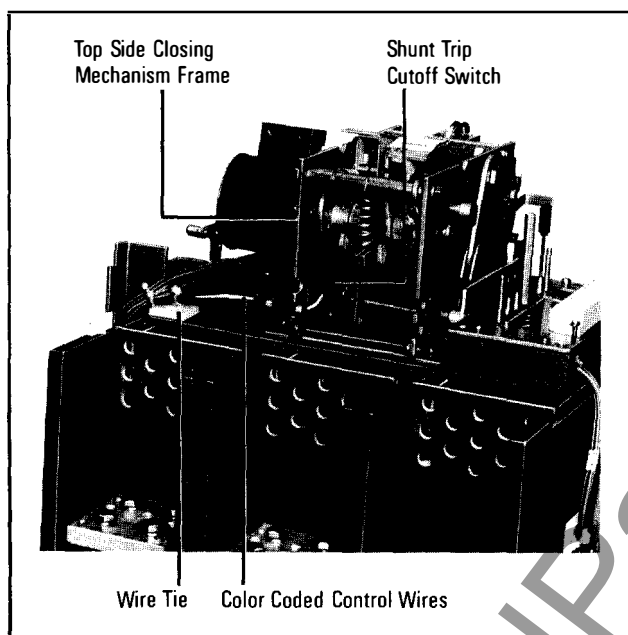


Fig. 7 *Shunt Trip Cutoff Switch Installed*

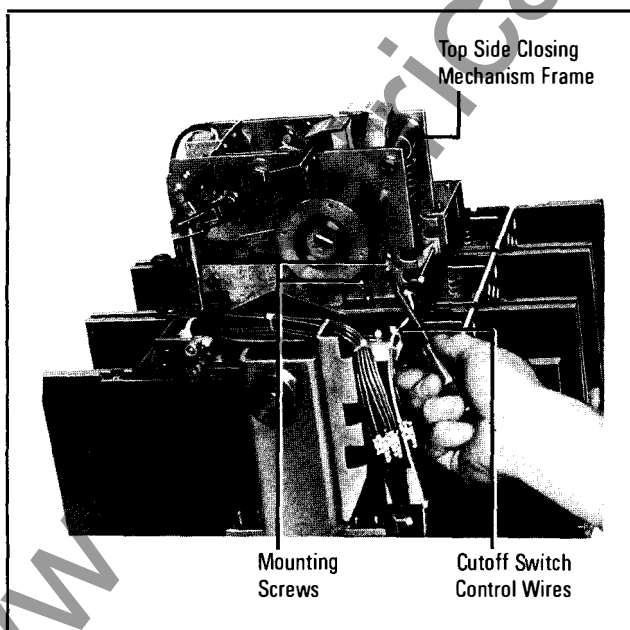


Fig. 8 *Mounting Screw Location for Shunt Trip Cutoff Switch*

6. On drawout breakers, connect the four color coded control wires (A7, A8, A9, and A10) to the secondary control disconnect blocks as illustrated in Fig. 9. On fixed mounted breaker, these should be connected to side mounted terminal blocks – when provided – or to alternate terminal blocks in the switchboard when the breaker is re-installed.

An AC shunt trip schematic diagram is provided in Fig. 10 and a DC diagram is provided in Fig. 11. The control wires should be routed and secured as illustrated in Figs. 5, 7, 8, and 9. Make sure that the control wires do not interfere with moving parts or the front cover when it is replaced.

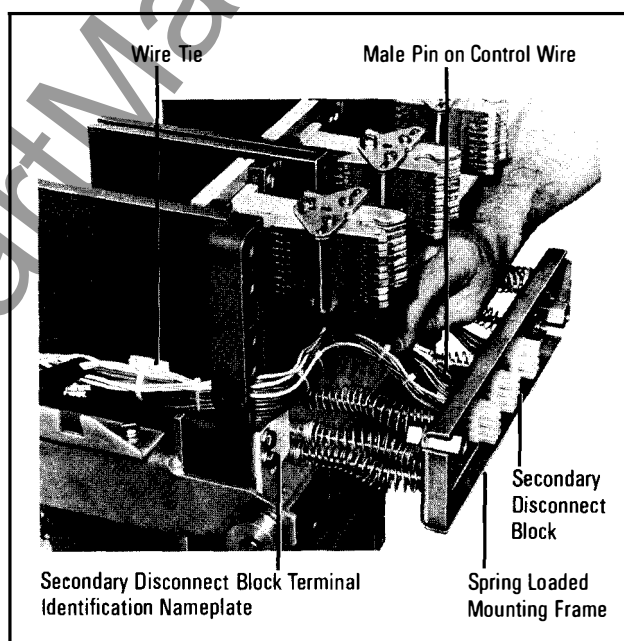


Fig. 9 *Typical Control Wire Connections to Secondary Stab Block on a Drawout Breaker*

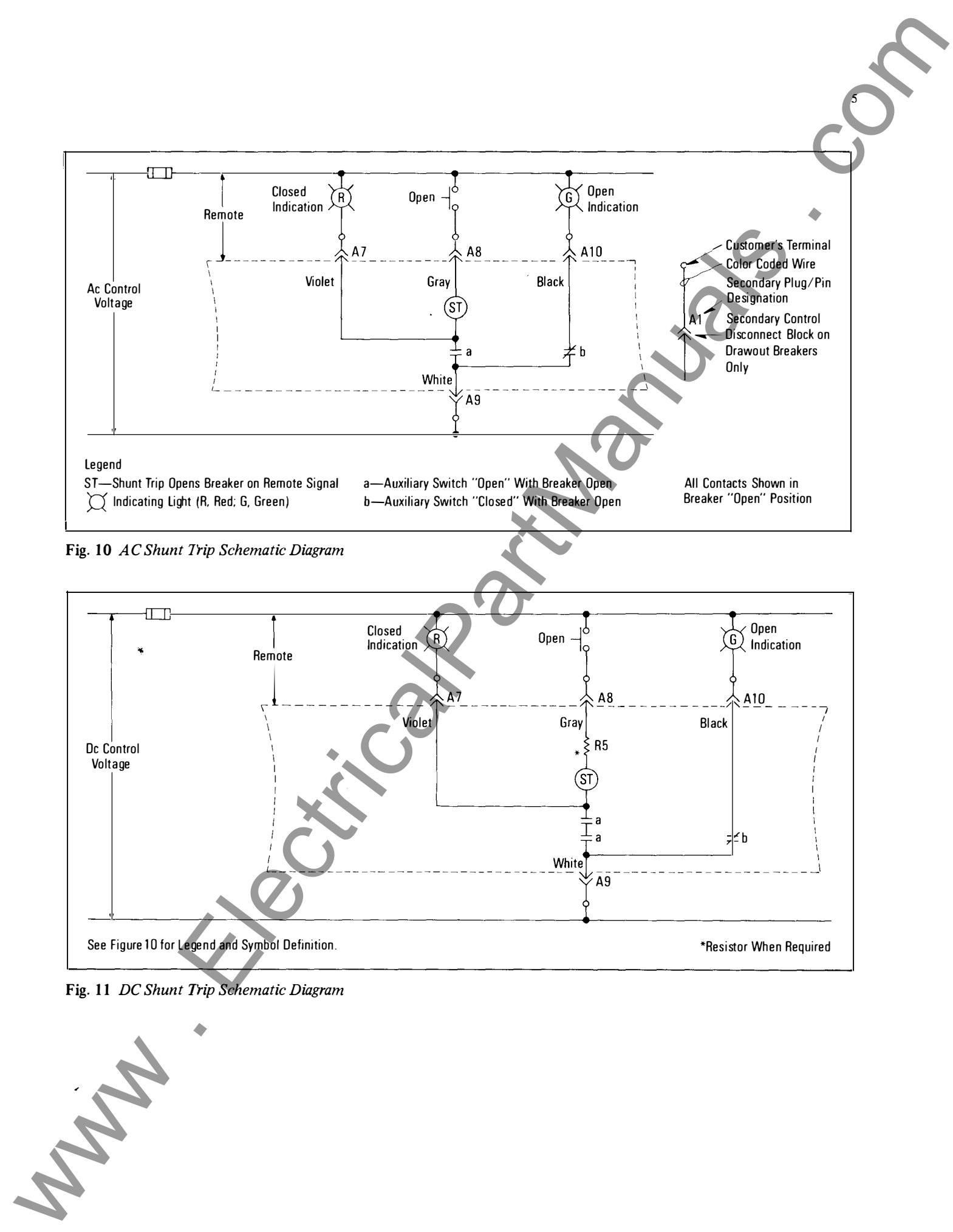


Fig. 11 *DC Shunt Trip Schematic Diagram*

