



## GEH6290 INSTALLATION INSTRUCTIONS

# Cable Operator Mechanisms for E150, SE150, SF250, and SG600 Spectra RMS™ Circuit Breakers

Type SCH1/1X, SCH2/2X Flange-Mounted Handle Assemblies, Cable Series SC3L–SC10L and Type SCOM1A, SCOM1EF, and SCOM1G Breaker-Mounted Operating Mechanisms

### General

ABB Cable Operating Mechanisms are suitable for application with ABB circuit breakers mounted in a wide variety of flanged enclosure types and sizes.

Flange-mounted handle assemblies are available for NEMA Type 1, 3R, 12, or 13 enclosures in either 6-inch, Model SCH1, or 10-inch handle lengths, Model SCH2. Corresponding assemblies, SCH1X and SCH2X, are available for NEMA Type 4/4X enclosures. Handle assemblies are suitable for either left or right flange operation.

The handle assembly is combined with one of eight operating cables, with lengths from 3 to 10 feet, to cover a broad range of breaker mounting locations in the enclosure. The cable links the handle assembly to the breaker-mounted operating mechanism and transmits the mechanical force and motion of the handle mechanism to the breaker-mounted mechanism. The force and motion is transmitted independently of the breaker mounting plane or location relative to the location of the handle assembly, provided only that the bending radius of the cable is no less than 3 inches. No mounting reinforcement of the breaker or enclosure flange is required.

The breaker operating mechanism mounts directly to the face of the breaker and does not involve any mounting interface with the enclosure. Standard breaker mounting screws for tapped holes are furnished with each mechanism to mount the breaker in the enclosure.

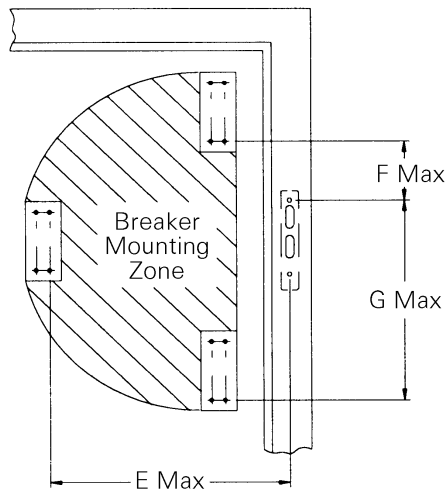
Examine Table 1 to ensure that the handle assembly, cable, and breaker operating mechanism you have are correct for the job. Check Table 2 to ensure that the cable is long enough to reach the breaker and that the 3-inch minimum bending radius requirement is not violated.

Installation of the handle assembly onto the enclosure flange can be performed independently from installation of the breaker operating mechanism onto the circuit breaker and from installation of the circuit breaker in the enclosure. Installation of the cable between the handle assembly and the breaker mechanism should be the final step. The breaker operating mechanism is to be installed onto the circuit breaker after the breaker has been mounted in the enclosure.

Table 1. Mechanism Selection Guide

Circuit Breaker Type	Handle Operating Mechanism Cat. No.		Breaker Operating Mechanism Cat. No.	Operating Cable Cat. No. Series	Cable Operator Mechanism Installation Instruction
	NEMA 1, 3R, 12, 13	NEMA 4/4X			
E150	SCH1  SCH2	SCH1X  SCH2X	SCOM1A	SC3L– SC10L	GEH-6290
SE150			SCOM1EF		
SF250					
SG600			SCOM1G		
SK1200	SCH2K	SCH2KX	SCOM1K	SC3H–SC10H	GEH-6291

Table 2. Circuit Breaker Mounting-Zone Dimensions



To determine maximum mounting dimensions for 60-inch through 120-inch-long operating cables, add the respective additional lengths to the 48-inch cable maximum dimensions. (For example, add 12 inches to E, F, and G dimensions for 60-inch cable length.)

Maximum Dimensions in Inches

Enclosure Depth	36" Cable			48" Cable		
	E*	F	G	E*	F	G
8	13.5	4.0	15.0	25.5	16.0	27.0
10	13.0	5.0	14.8	25.0	17.0	26.8
12	12.8	6.0	14.5	24.8	17.0	26.5
16	10.5	4.5	14.2	22.5	16.5	26.2
18	8.5	3.5	12.6	20.5	15.5	24.6
20	—	0.5	10.0	22.0	15.0	24.0
24	—	—	—	19.5	14.0	22.0

\* Maximum E dimension only if F = 4.5".

When cable is installed, the minimum cable bend radius should not be less than 3 inches. The minimum cable bending requirement must be met to ensure a safe operating environment.

Table 3. Circuit Breaker Mounting Dimension

Breaker Type	A	B	C	D	Tap Size
E150	1.38	4.88	0.72	6.31	8-32
SE150	1.38	4.88	0.72	6.51	10-32
SF250	1.38	7.75	1.19	10.12	12-24
SG600	1.81	7.75	1.19	13.62	12-24

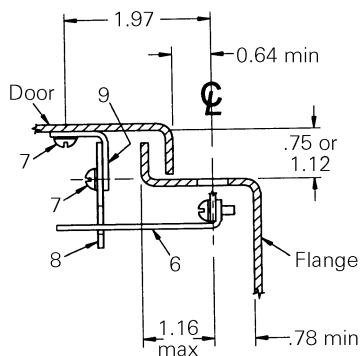


Figure 1. End view of flange and cover (right end shown).

Table 4. Handle Dimensions (see Figure 3)

NEMA 12 Handle Cat. No.	NEMA 4/4X Handle Cat. No.	L	H
SCH1	SCH1X	6.04	2.38
SCH2, SCH2K	SCH2X, SCH2KX	9.38	3.00

Tapped Holes 4 Places

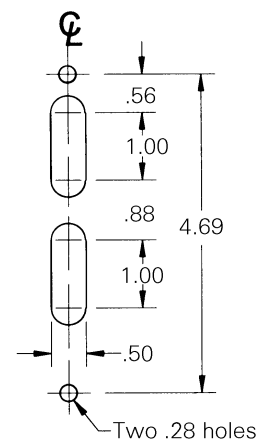
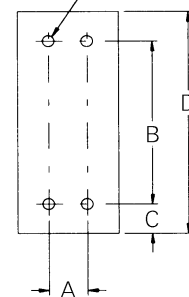


Figure 2. Flange details.

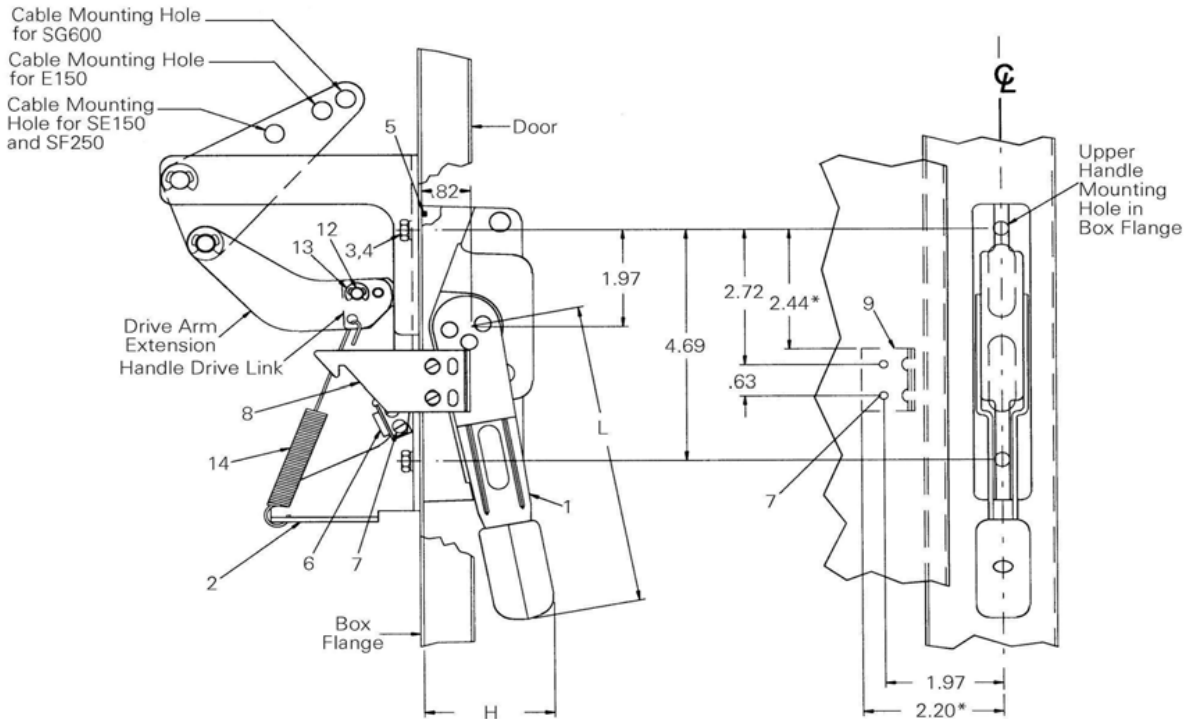


Figure 3. Handle Installation.

## Handle Installation

- Referring to Figure 1, Figure 2, and Figure 3, determine the location of the handle on the flange of the enclosure. The handle can be mounted on either the right or left side of the enclosure.
- If the flange is not provided with handle holes and slots, drill these as shown in Figures 1 and 2. Remove any burrs.
- Position the O-ring [5] in the groove in the handle. Assemble the handle [1] and the cable adapter assembly [2] to the flange of the enclosure with two 1/4-20 x 5/8" hex-head screws [3] and lock washers [4]. Tighten the screws to 35-45 in-lb.
- Assemble the interlock blade [6] to the handle with two #8-32 sems screws [7], as shown in Figure 1.
- Assemble the drive arm extension to the handle drive link with the connecting pin [12]. Secure the connection with an E-ring [13], as shown in Figure 3.
- Attach one end of the handle-return spring [14] to the hole in the drive link and the drive arm extension. Attach the other end to the hole in the lower flange of the cable adapter assembly, as illustrated in Figure 3.
- Drill and tap two #8-32 holes in the cover, as shown in Figures 1 and 3. Assemble the interlock bracket [9] to the cover with two #8-32 sems screws [7] from inside the door. Alternatively, the bracket may be welded to the cover, using the dimensions noted with an asterisk (\*) in Figure 3, to locate the upper-left corner of the bracket, as illustrated in Figure 1.
- Assemble the interlock hook [8] to the interlock bracket [9] with two #8-32 sems screws [7]. Use the lower set of holes in the hook for a door with a 3/4-inch turned edge (as shown) or the upper set of holes if the door has a 1 1/8-inch turned edge.
- With the handle in the OFF position, attempt to close the door. If the interlock blade interferes with the interlock hook, DO NOT force the door closed. Loosen the two #8-32 screws [7] and move the interlock hook upward. The door should close without interference. Attempt to turn the handle ON; if the handle turns ON, loosen the two #8-32 screws [7], secure the interlock hook, and move the hook toward the bottom of the enclosure to provide more depression of the interlock blade, thus preventing the handle from engaging.
- As the handle is moved to the ON position, the interlock hook should engage the interlock blade, preventing the door from opening unless the handle interlock is manually disengaged by rotating (clockwise) the interlock defeat button with a flat-blade screw driver on the handle [1]. If the door can be opened with the handle in the ON position without having to defeat the interlock blade, readjust the interlock hook downward and repeat steps 9 and 10.
- Turn the handle to the OFF position. You should be able to open the door. Note that if vault-type interlock hardware (Cat. No. TDV1) or a similar assembly has been installed, the door hardware must first be defeated.
- Proceed with installation of the drive cable and the breaker operating mechanism per the instructions.

Figure 4. Installation of SCOM1A

Install the E150 circuit breaker in the panel with two #8-32 x 2 3/4" screws [19] on the line end of the circuit breaker.

Place the spacers [15] into the counter bore on the load end of the E150 breaker mounting holes. With the breaker in the OFF position, place the breaker operating mechanism [16] on top of the breaker cover with the breaker handle extending through the mechanism pivot plate. Secure the operating mechanism to the breaker on the line side with two thread-cutting screws [17]. Secure the operating mechanism and the circuit breaker on the load side to the panel surface with two #8-32 x 4" screws [18].

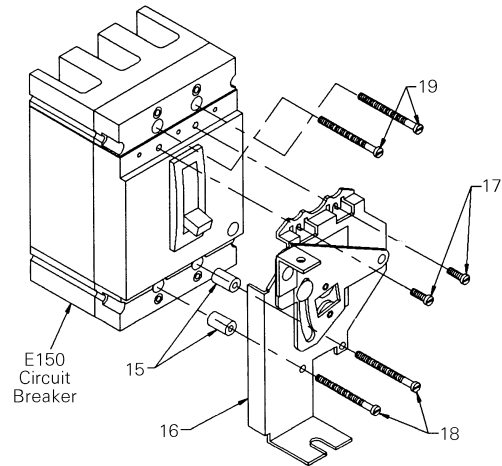


Figure 5. Installation of SCOM1EF

Install an SE150 circuit breaker in the panel with four #8-32 x 2 3/4" screws [24]. Install an SF250 circuit breaker in the panel with four #12-24 x 3 3/4" screws [25].

Thread the spacers [20] into the counter bore (5/16"-dia. holes) on the load end of the SE150 or SF250 circuit breaker. Remove the two breaker cover screws on the line end of the breaker, as shown, and discard. With the circuit breaker in the OFF position, place the breaker operating mechanism [21] on top of the breaker cover with the breaker handle extending through the mechanism pivot plate. Secure the operating mechanism to the breaker line side with two 3.5 x 10 mm metric screws [22]. Secure the mechanism on the load side with two #8-32 screws [23], threading them into the spacers [20].

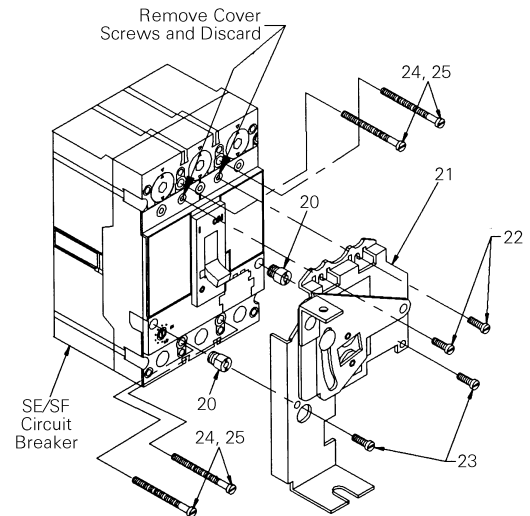
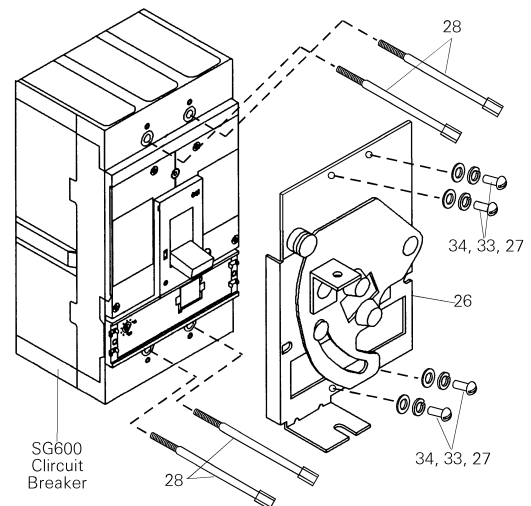


Figure 6. Installation of SCOM1G

1. Mount the circuit breaker to the panel using the four special mounting bolts [28]. Thread size is #10-32.
2. Secure the mechanism to the breaker using four #10-32 screws [27], lock washers [33], and flat washers [34].



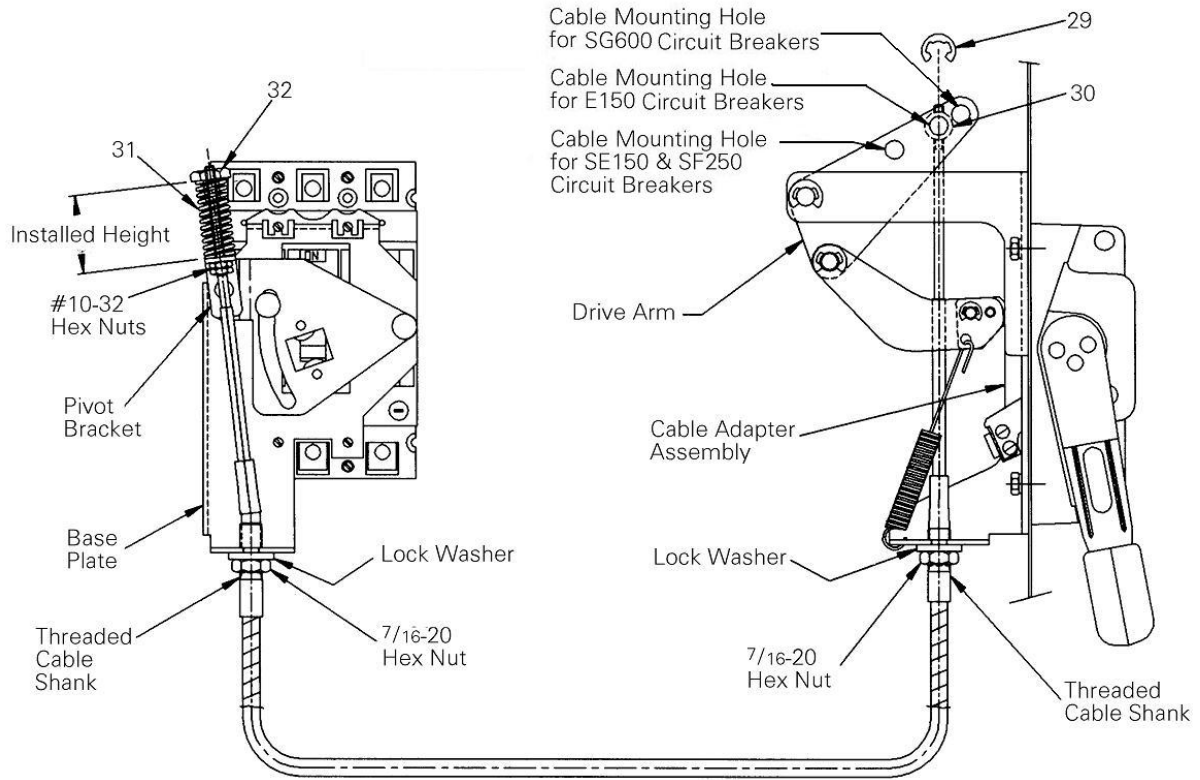


Figure 7. Cable Installation

## Cable Installation



**WARNING:** Danger of electrical shock or injury. Turn OFF power ahead of the device before accessory installation. DO NOT remove circuit protective devices until the power is turned OFF.

Use the following procedure to first install one end of the operating cable to the operating handle, then the other end to the breaker operating mechanism.

1. Slide a 7/16-20 hex nut onto the end of the cable with the #10-32 x 7/8" thread. Install the nut onto the threaded cable shank beyond the groove at the middle of the shank. Install a 7/16" lock washer onto the hex nut. Screw the cable guide pin [30] onto the same end of the cable all the way. Do not tighten.
2. Place the operating handle in the OFF position. Position the cable behind the handle drive arm linkage. Insert the groove of the cable (middle of the cable shank threads) into the slot at the bottom of the cable operator assembly. Tighten the 7/16" hex nut against the cable adapter assembly until it is snug. Insert the cable guide pin [30] into the proper mounting hole in the drive arm, as shown in Figure 7. Snap an E-ring [29] into the groove of the guide pin [30].
3. Slide a 7/16-20 hex nut over the cable end with the #10-32 x 3" thread. Install the nut onto the threaded cable shank beyond the groove at the middle of the shank.
4. Verify that the power to the circuit breaker has been turned off. Move the operating handle on the circuit breaker to the ON position. Place the spring [31] over the cable end. Thread the spring retainer [32] onto the end of the cable and tighten to the installed height of 17/16". Do not over tighten the retainer.
5. Move the operating handle ON and then OFF. If the breaker does not turn ON, then, with the handle in the OFF position, adjust the #10-32 hex nut toward the pivot bracket until the breaker turns ON.
6. Trip the circuit breaker by pushing the TRIP button. Move the operating handle to the OFF/RESET position, then to ON. If the breaker resets, set the spring retainer to the installed height of 17/16". Lock both #10-32 hex nuts against the pivot bracket.
7. If the breaker does not reset, back off the #10-32 hex nuts, tighten the spring retainer, and repeat steps 5, 6, and 7.

### Parts List for SCH1, 1X, and SCH2, 2X

Item No.	Description
1	Handle Assembly
2	Cable Adapter Assembly
3	1/4-20 x 5/8" Hex-Head Screw
4	1/4" Lock Washer
5	O-Ring
6	Interlock Blade
7	#8-32 Sems Screws
8	Interlock Hook
9	Interlock Bracket
12	Connecting Pin
13	E- Ring ( 1/4" Shaft Dia.)
14	Handle Return Spring
29	E- Ring (3/8" Shaft Dia.)
30	Cable Guide Pin (#10-32)

Refer to Figures 3 and 7.

### Parts List for SCOM1EF

Item No.	Description
20	Spacer
21	SE/SF Breaker Operating Mechanism
22	M3.5 x 10 mm Metric Screw
23	#8-32 x 3/8" Screw
24	#10-32 x 2 7/8" Screw (SE150)
25	#12-24 x 3 3/4" Screw (SF250)
31	Spring
32	Spring Retainer

Refer to Figures 5 and 7.

### Parts List for SCOM1A

Item No.	Description
15	Spacer
16	E150 Breaker Operating Mechanism
17	#6-20 Thread-Cut Screw
18	#8-32 x 4" Screw
19	#8-32 x 2 3/4" Slotted RH Screw
31	Spring
32	Spring Retainer

Refer to Figures 4 and 7.

### Parts List for SCOM1G

Item No.	Description
20	Spacer
26	SG600 Breaker Operating Mechanism
27	#10-32 x 3/8" Screw
28	MOM Mounting Bolt
31	Spring
32	Spring Retainer
33	#10 Lock Washer
34	#10 Flat Washer
35	#10-32 Hex Nut

Refer to Figures 6 and 7.

### Replacement Parts

Description	Part Number	Quantity
O-Ring	343L889G15	1
Interlock Blade	343L889G2	1
Interlock Hook	343L889G3	1
Interlock Bracket	343L889G4	1

These instructions do not cover all details or variations in equipment nor do they provide for every possible contingency that may be met in connection with installation, operation, or maintenance. Should further information be desired or should particular problems arise that are not covered sufficiently for the purchaser's purposes, the matter should be referred to the ABB Company.