



## GEH-3202 Installation Instructions

# Lighting Contactors

Mechanically Held CR160MB Series A & CR160MC

**Caution:** Before installing in a nuclear application, determine that the product is intended for such use.

**Warning:** Disconnect power before installing or servicing.

### Description

CR160MB Series A and CR160MC lighting contactors are mechanically held for applications requiring quiet operation. These contactors provide effective control of all lighting loads and general use (0.75 to 1.0 pf) loads. Contactor forms are available with ratings from 30 amperes through 200 amperes (CR160MB) and from 30 amperes through 225 amperes (CR160MC), 600 V ac maximum. Built in electrical interlocks permit control from either momentary or maintained pilot devices. Pushbuttons or toggle operated switches with double-throw circuitry are examples of pilot devices.

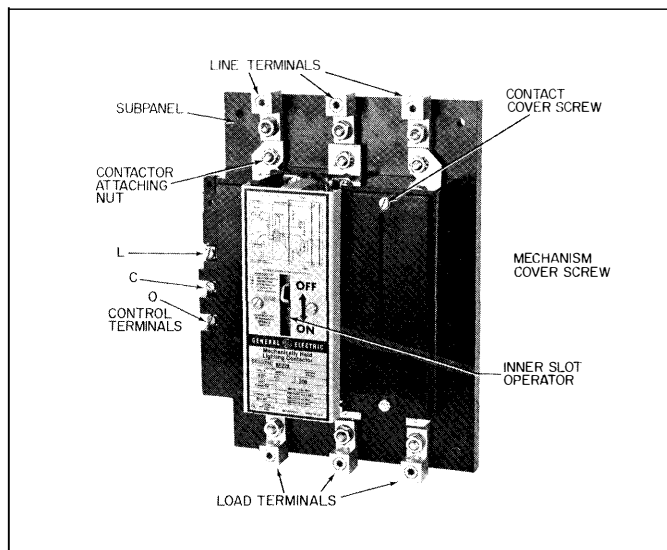


Figure 1. Typical CR160MC with subpanel

### Installation

1. Remove all packing material from contactor.
2. Operation of contacts can be checked before mounting by inserting a screwdriver blade into inner slot and pulling.
3. Remove power from all lines which are to be connected to contactor.
4. Mount contactor and connect control voltage leads to L (Line), C (Closing), and O (Opening) terminals.
5. Line and Load connections:
  - A. On bus mounting form of the contactors, provision is made for bolting device directly to line and load bus bars.
  - B. Contactors with subpanels have pressure connector type terminals at top of device for line connections and at bottom of device for load connections.

C. Type 1 enclosed forms also have pressure connector type terminals at top and bottom of device for line and load connections.

### Operation

1. When control voltage is applied to terminals L and C, the bottom (closing) solenoid will be energized. The main contacts will be closed and the lighting load will be energized. A built-in electrical interlock will instantly deenergize the closing solenoid, but the main contacts will be held closed mechanically.
2. Application of control voltage to terminals L and O will actuate the upper (opening) solenoid. Main contacts will be opened and the lighting load deenergized. The opening solenoid will be instantly deenergized by its built-in electrical interlock. However the main contacts will be held open mechanically.

### Maintenance

1. Keep solenoid magnet mating surfaces free of dirt accumulation. Inspection may be made by removing mechanism cover after power has been disconnected. When cover is replaced, attaching screws should be tightened with fingers and then torqued to 16-inch pounds.
2. Do not oil or grease the mating surfaces of the solenoid magnets.
3. The silver cadmium oxide contacts need only be replaced when nearly all tip material is gone and tip support material is exposed. Do not file the contacts. Filing or otherwise dressing these contacts results only in lost tip material and reduces life.

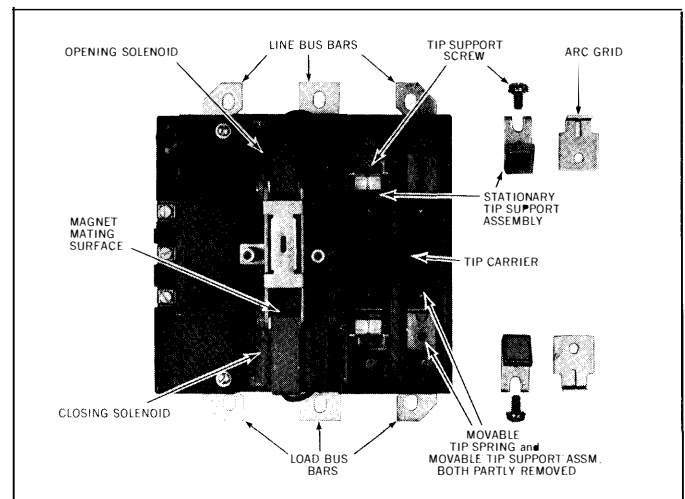


Figure 2. Removal of contacts-CR160MB forms

### Replacement of Contacts-CR160MB Forms

1. With the movable tip spring held in position on the new moveable tip support, place one end of the tip support in the tip carrier window. Install green spring on single pole side of arm as shown in

Figure 3.

- Depress the spring and slide tip support and spring into position. When the tip support is centered in the carrier, it will drop against the carrier slightly. The outward end of the spring should also be centered to drop over a retaining seat.

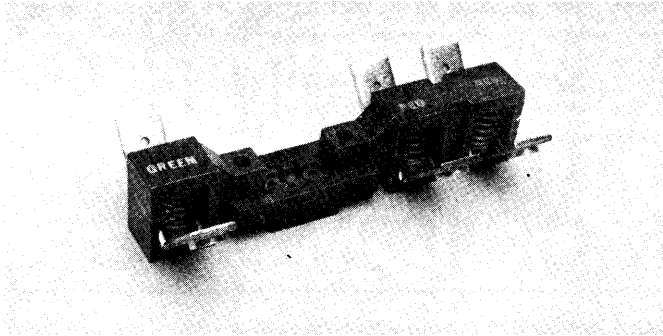


Figure 3. Movable contact assembly-CR160MB forms

- New stationary tip supports can be installed by reversing the procedure of steps 1 and 2 under *Removal Of Contacts*.
- Install contact covers with right side cover keyed for proper assembly to contactor.

**Control Line-CR160MB Forms**

Any electromechanical device has definite maximum control line wire distance limitations between the device and its remote control station. This maximum control line distance should not be exceeded or reliable operation of the remote controlled contactor will be impaired.

The allowable control line distance is determined primarily by the minimum safe operating voltage of the contactor which is directly affected by control line resistance.

Maximum control line distance between one CR160MB Series A contactor and remote control station with line voltage at 90% of normal is shown in table below.

Contactor Size	Wire Size AWG.#	Approx. Resistance of Single Conductor Copper Wire OHM's/1000 ft	Max. Control Line Distance <sup>①</sup>	
			115V-60 Hz	230V-60 Hz
30-200A	10	1	1000 ft	3000 ft
	12	1.6	630 ft	1900 ft
	14	2.5	400 ft	1200 ft

① The use of two contactors on one remote control station would reduce the maximum control line distance to ½ the specified table value, etc.

**Coil Inrush Current and Recommended Control Circuit Fuse Size-CR160MB Forms**

Volts-60 Hz	Inrush Amperes	NEC Fuse Size Amperes
115	20	6
230	10	3
240	9	3
277 <sup>②</sup>	8	3
460 <sup>②</sup>	5	1.5
480 <sup>②</sup>	4.5	1.5

② Above 250 volts a separately mounted fuse block is required.

**Renewal Parts-CR160MB Forms**

Contacts: A complete set of stationary and movable contacts, springs, and screws for three poles may be ordered by using the appropriate catalog number for contactor current rating shown below.

Description	Catalog Number
Three poles, 30 amperes	55-176451G031
Three poles, 60 amperes	55-176451G032
Three poles, 75 amperes	55-176451G036
Three poles, 100 amperes	55-176451G033
Three poles, 150 amperes	55-176451G034
Three poles, 200 amperes	55-176451G035

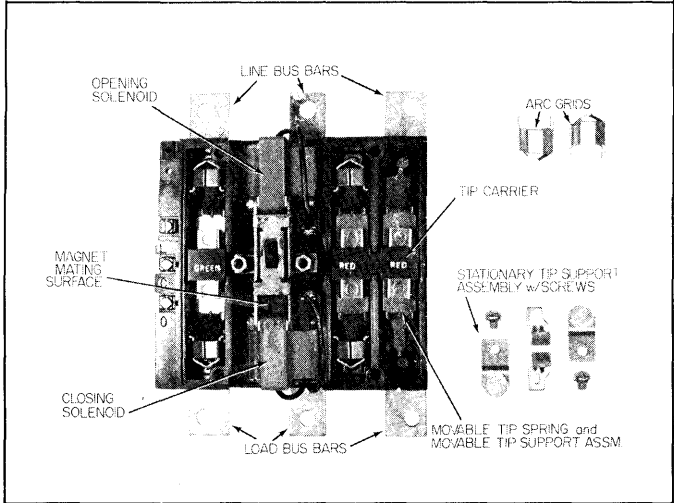


Figure 4. Removal of contacts (CR160MC forms)

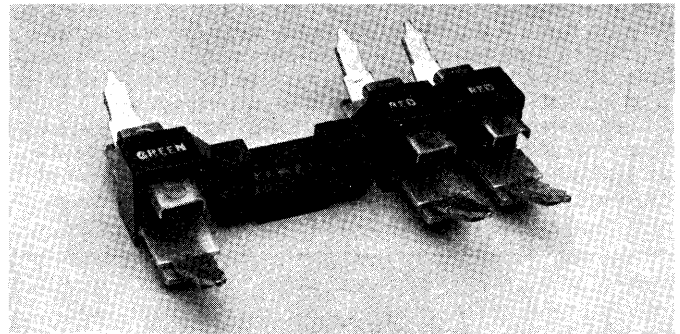


Figure 5. Movable contact assembly (CR160MC forms)

**Control Line-CR160MC Forms**

Any electromechanical device has definite maximum control line wire distance limitations between the device and its remote control station. This maximum control line distance should not be exceeded or reliable operation of the remote controlled contactor will be impaired.

The allowable control line distance is determined primarily by the minimum safe operating voltage of the contactor which is directly affected by control line resistance.

Maximum control line distance between one CR160MC contactor and remote control station with line voltage at 90% of normal is shown in table below.

Contactor Size	Wire Size AWG #	Approx. Resistance Of Single Conductor Copper Wire OHM's/1000 ft	Max. Control Line Distance <sup>③</sup>	
			115V-60 Hz	230V-60 Hz
30-200A	10	1	500 ft	1500 ft
	12	1.6	315 ft	950 ft
	14	2.5	200 ft	600 ft

③ The use of two contactors on one remote control station would reduce the maximum control line distance to ½ the specified table value, etc.

**Coil Inrush Current and Recommended Control Circuit Fuse Size-CR160MC Forms**

Volts-60 Hz	Inrush Amperes	NEC Fuse Size Amperes
115	26	6-8
230	13	3-4
240	12	3-4
277 <sup>④</sup>	10	3-4
460 <sup>④</sup>	7	1.5-2
480 <sup>④</sup>	6	1.5-2

④ Above 250 volts a separately mounted fuse block is required.

## Renewal Parts—CR160MC Forms

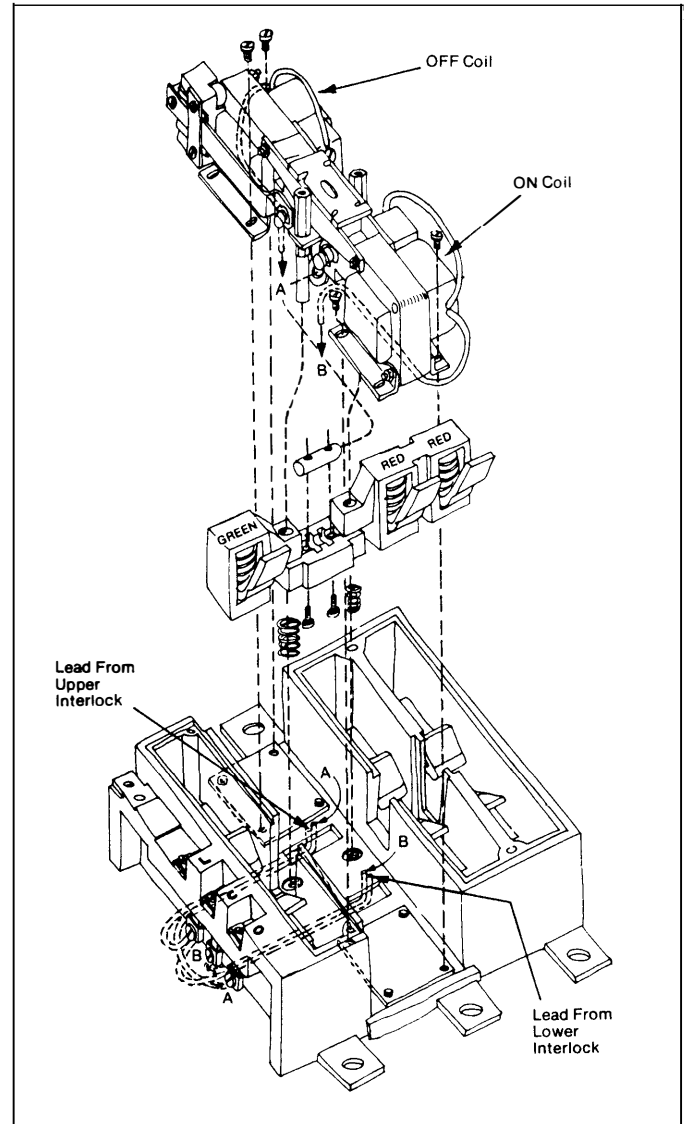
Description	Catalog Number
Three poles, 30 amperes	55-212091G001
Three poles, 60 amperes	55-212091G002
Three poles, 75 amperes	55-212091G003
Three poles, 100 amperes	55-212091G004
Three poles, 150 amperes	55-212091G005
Three poles, 200 amperes	55-212091G006
Three poles, 225 amperes	55-212091G007
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Two poles, 30 amperes	55-212091G008
Two poles, 60 amperes	55-212091G009
Two poles, 75 amperes	55-212091G010
Two poles, 100 amperes	55-212091G011
Two poles, 150 amperes	55-212091G012
Two poles, 200 amperes	55-212091G013
Two poles, 225 amperes	55-212091G014

## Removal Of Contacts—CR160MC Forms

1. Remove power from all lines.
2. Remove mechanism cover.
3. Remove the two black covers on left and right side of contactor.  
Each contact cover is held by one screw at top and one screw at bottom. *Note: Right side of cover is keyed for proper assembly.*
4. Remove paper insulation and arc grids (if required).
5. Loosen the four wires beneath the "L", "C", and "O" terminals.
6. Remove the four screws holding the switch mechanism assembly.
7. Remove switch mechanism assembly.
8. Remove movable contact and arm assembly by removing the two screws in the bottom of the movable contact carrier arm.
9. Remove the screw which clamps the stationary tip support to the contactor bus bar. It is not necessary to remove the adjacent screw which passes through the black housing material. Stationary tip support can easily be lifted out.
10. Remove the screw which clamps the stationary arcing contact tip support to the contactor bus bar through the black housing material. Lift out stationary tip supports.

## Replacement Of Contacts—CR160MC Forms

11. New stationary tip supports can be installed by reversing the procedure of steps 9 and 10 under *Removal Of Contacts*.
12. Install new movable contact assembly into switch mechanism and confirm switch mechanism is in the OFF position.
13. Install new switch mechanism assembly while threading coil lead wires through the base housing as shown in Figure 2. Confirm that return springs are seated into housing recesses.
14. Tighten four mechanism screws.
15. Connect coil wires per Figure 1 as follows:
  - A. Lead "A" connect to underneath portion of terminal "O".
  - B. Lead "B" connect to underneath portion of terminal "C".
  - C. Coil interlock wires. Connect both wires to underneath portion of terminal "L".
16. Replace insulator, arc grids, two black covers with right side cover keyed for proper assembly to contactor, and mechanism cover. (Take care to start self-tapping screws by hand to assure proper thread engagement.)
17. Operate device mechanically and leave in the OFF position.
18. Install control connections.
19. Install power connections.
20. Verify no hazardous condition exists, apply power and assure proper operation.



**CAUTION:** Never apply simultaneous ON, OFF signals to terminals "O" and "C". Simultaneous ON, OFF signals will result in coil and contactor burnout. You must prevent simultaneous ON, OFF signals in all applications, but extra care is required when this contactor is used with energy management systems or multiple control stations. The use of control modules may prevent such a condition.

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