

## GEH-5190 Installation Instructions

# NEMA Size 00, 0, & 1 - CR305, CR306, CR309 Magnetic Contactors, Starters, & Reversers

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

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

### Description

ABB 300-Line full-voltage motor starters include a magnetic contactor and a three-leg block overload relay, providing motor protection against running and stalled motor overloads.

The overload relay is provided with a yellow trip indicator located to the right of the reset arm, and is visible when the overload relay is tripped.

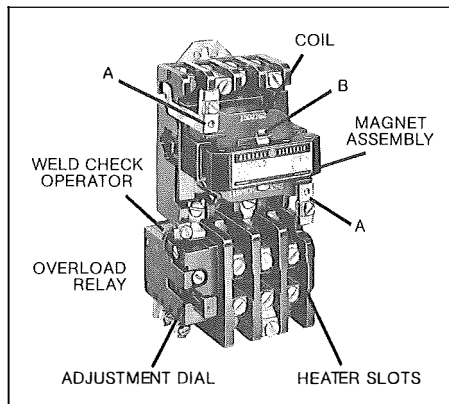


Figure 1. Typical 300-Line magnetic starter.

### Ratings—600 V Maximum

Starter Maximum Current Rating	Contactor Maximum Current Rating	AC Volts	Maximum Hp For AC Motors	
			Single-phase	Poly-phase
9 ampere (open and enclosed)	10 ampere (open) 9 ampere (enclosed)	115 200 230 460-575	1/3 — 1 —	— 1 1/2 1 1/2 2

#### Size 00

9 ampere (open and enclosed)	10 ampere (open) 9 ampere (enclosed)	115 200 230 460-575	1/3 — 1 —	— 1 1/2 1 1/2 2
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#### Size 0

18 ampere (open and enclosed)	20 ampere (open) 18 ampere (enclosed)	115 200 230 460-575	1 — 2 —	— 3 3 5
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#### Size 1

27 ampere (open and enclosed)	30 ampere (open) 27 ampere (enclosed)	115 200 230 460-575	2 — 3 —	— 7 1/2 7 1/2 10
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Motor branch circuit and control circuit overcurrent protection should be supplied in accordance with the National Electrical Code. CR305 contactors are suitable for use on a circuit capable of delivering not more than 5,000 RMS symmetrical amperes, 600 volts maximum when protected by H, J, K1, K5, RK1, RK5 class fuses, or a circuit breaker having an interrupting rating not less than 5,000 RMS symmetrical amperes.

### Installation

Before connecting controller to power supply:

1. Remove all packing.
2. Clean magnet mating surfaces of any dirt or foreign matter.
3. Select and install heaters in accordance with heater table.
4. Operate movable magnet and operating arm by pressing on the nameplate to assure free movement.
5. Mount on a sturdy vertical support.
6. Make the electrical connections.

7. The starter overload relay may be reset manually by depressing and releasing the reset arm.

### Coil Replacement

1. Remove power from device.
2. Press against coil while pulling up slightly on coil retainers (A—Figure 1) and move retainers away from coil.
3. Withdraw magnet assembly, coil, molded cover, and movable arm from device.
4. Withdraw spring clip (B—Figure 1) and remove armature from movable arm.
5. Remove coil from magnet.
6. Replace coil.
7. Reassemble device by reversing procedure.

### Contact Replacement

1. Perform steps 1 through 5 under *Coil Replacement*.
2. Remove magnet from molded cover and movable arm.
3. Remove return spring from center of movable arm.
4. Remove molded cover from movable arm.
5. Depress and slide movable contact and spring from movable arm.
6. Remove screws holding stationary contacts in place and remove stationary contacts.
7. Reassemble device by reversing procedure.

**Note:** For starters with one or more normally closed contacts, perform steps 1 and 2 shown under *Coil Replacement*. Withdraw spring clip (B—Figure 1) and remove armature, coil, and magnet from device. Remove return spring from center of movable arm. Remove molded cover and stationary contacts before lifting movable arm from device.

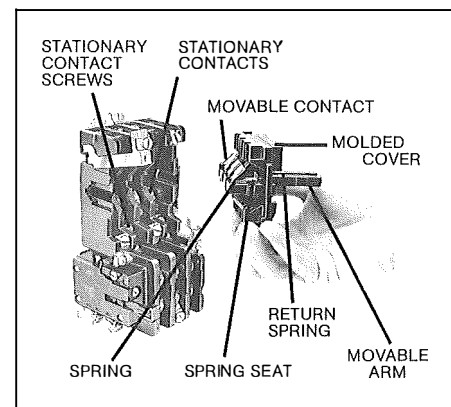


Figure 2.

### Normally Closed Contacts

The contacts may be converted from normally open to normally closed with no additional parts. Perform steps 1 through 4 shown under *Coil Replacement*. Lift coil and magnet from movable arm. Remove return spring from center of movable arm. Depress movable contact spring and spring seat against movable contact and rotate these parts 1/2 turn without removing them from window. Remove the stationary contacts. Install the movable arm in the device. Install the stationary contacts so that their silver pads face the movable contact silver pads.

Reassemble the device. To change contacts from normally closed to normally open position, reverse the above procedure.

### Check For Welded Contacts In Overload Relay

With power disconnected, disconnect the control wiring from the relay terminals. Place a bell set or resistance measuring instrument across the

relay terminals. Depress and release reset arm to insure relay is reset. In this condition there should be continuity between the terminals. Depress white manual check operator to trip the relay. In the tripped condition the circuit between the terminals should be open indicating the contacts are operating normally. Rewire the terminals and reset the relay for normal operation.

### Maintenance

1. Always remove power from device before performing any maintenance.
2. Keep magnet mating surface free of accumulated dirt or dust.
3. *Do Not Oil Or Grease* the magnet mating surfaces.
4. Contacts are carefully designed for maximum life. They need only be replaced when nearly all the silver tip is gone and the contact tip support is exposed. *Do Not File* the contacts. Filing or dressing the contacts only results in lost tip material and reduces life.
5. The ultimate tripping current of the installed relay heater can be adjusted  $\pm 10\%$  by using the adjustment dial, shown in Figure 1.
6. On reversing and two-speed starters, the mechanical interlock has been factory adjusted and normally should never have to be readjusted. If readjustment is ever needed, these steps should be followed:
  - A. Close one contactor by hand by pushing down on armature.
  - B. Using the other hand, loosen the nut on opposite contactor in-

terlock arm and slide it towards the top of the elongated slot until all gap is taken up between the two arms. Follow the same procedure with the opposite contactor and interlock arm.

- C. Best adjustment is usually obtained when both mechanical interlock arm assemblies are as far up in the elongated slot as possible.
- D. With both arms adjusted, there should be a very slight gap (approximately  $\frac{1}{16}$ -inch) between the arms with both contactors open. Neither arm should overlap the other with both contactors open.

**Caution:** Before adjusting or operating reverser, make sure the mechanical interlock arm is engaged with movable contact arm.

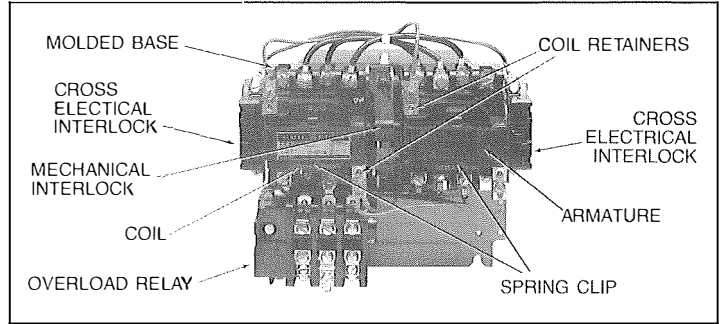
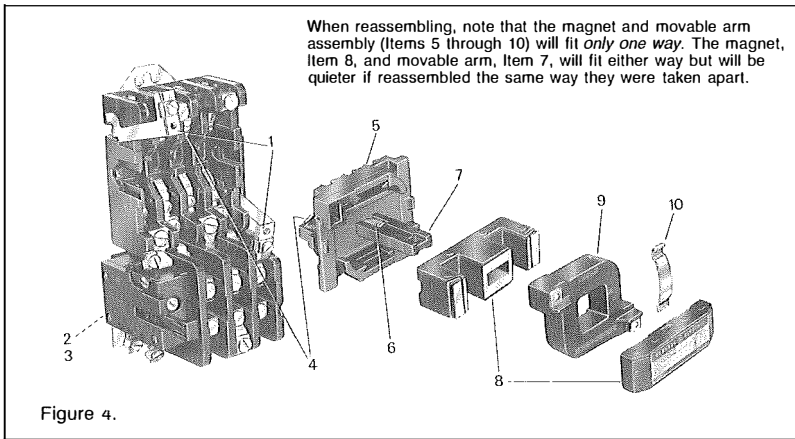


Figure 3. Typical CR309 magnetic reversing controller.



### \*\*\* Coil Suffix Table

(Order 15D21G plus coil suffix number below)

60 Hertz	115-120V	200-208V	230-240V	---	460-480V	575-600V
50 Hertz	110V	---	220V	380V	440V	550V
Coil Suffix	002	023	003	064	004	005

### Accessory Kits

First NO aux. cont. for CR305, CR306	CR305X100A
First NC aux. cont. for CR305, CR306	CR305X100B
First NO-NC aux. cont. for CR305, CR306	CR305X100C
Additional NO aux. cont. for all forms	CR305X100D
Additional NC aux. cont. for all forms	CR305X100E
Push button	CR305X120N
Selector switch, H-O-A	CR305X130N
Selector switch, OFF-ON	CR305X130P
Indicating light	CR305X150N
Fifth pole	CR305X111B
Control circuit fuse	CR305X141A, B, C, D

### Principal Renewal Parts

Ref. No. Figure 4	Description	Catalog Number	Quantity Required			
			CR305	CR306	CR309, Left Cont.	CR309, Right Cont.
1	Coil retainer assembly	546A301G050	2	2	2	2
2	Overload relay (3-heater, non-compensated form, 1 NC contact)	CR324C310F	—	1	1†	‡
3	Overload relay (3-heater, non-compensated form, 1 NO-1 NC contact)	CR324C360F	—	1	1†	‡
4	Set of stationary and movable contacts with springs and screws for four-poles: NEMA Size 00 NEMA Size 0 NEMA Size 1	55-152313G009 546A300G002 546A301G053	1	1	1	1
5	Molded cover for stationary and movable contacts	188D711P001	1	1	1	1
6	Return spring for movable contact support	541A278P001	1	1	1	1
7	Molded movable contact support for 2-, 3-, 4-pole	187D350P001	1	1	1	1
8	Armature and frame (magnet)	546A301G054	1	1	1	1
9	Operating coil	15D21G***	1	1	1	1
10	Spring retainer for armature	546A588P001	1	1	1	1
11	Overload relay for 2-speed single-winding controller (1 NC contact)	CR324C310G	—	—	1	—
12	Overload relay for 2-speed single-winding controller (1 NO-1 NC contact)	CR324C360G	—	—	1	—

\*\*\* Add coil suffix number from above table to complete the catalog number. Example: Cat. No. 15D21G002 has ratings of 115-120V, 60 Hz and 110V, 50 Hz.

† Omitted on 2-speed single-winding controller.

‡ Quantity one for multi-speed controller.

These instructions do not purport to cover all details or variations in equipment nor to provide for every possible contingency to be met in connection with installation, operation, or maintenance. Should particular problems arise which are not covered sufficiently for the Purchaser's purposes, the matter should be referred to the nearest ABB sales office.