

300-Line Magnetic Reversing Starter

CR309 NEMA Size 2

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

Warning: Disconnect power before installing or servicing.

Description

The various forms of the CR309 size 2 magnetic reversing controllers consist of two CR305 mechanically and electrically interlocked contactors either alone or in combination with 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 which is located to the right of the reset arm, and is visible when the overload relay is tripped. (Series A forms will not have this trip indicator feature.) To insure against welded overload relay contacts in the tripped condition, perform the *Check For Welded Contacts In Overload Relay* as described on reverse side.

Ratings

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, 600 volts maximum.

Provide motor branch and control circuit over-current protection in accordance with the National Electrical Code.

Installation

Before connecting the starter:

1. Remove all packing.
2. Clean magnet mating surfaces of any dirt or foreign matter.
3. Select and install heater(s) in accordance with heater table, which accompanies each starter unit.
4. Operate movable magnet and operating arm by pressing on the armature to assure free movement.
5. Mount starter on a sturdy vertical support.
6. Make the electrical connections.
7. The overload relay can be reset manually

by depressing and releasing the reset arm. The optional normally open contact on overload relays is electrically isolated from the normally closed contact

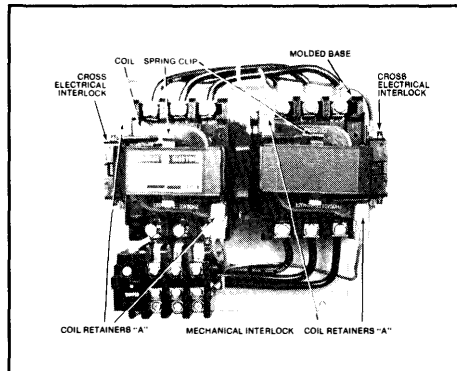


Figure 1. Typical CR309 magnetic reversing controller.

Maintenance

300-Line starters and contactors require virtually no corrective maintenance. Preventive maintenance will assure many years of dependable on-line service.

1. Always remove power from device before performing any maintenance.
2. Keep magnet mating surfaces 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 is exposed. DO NOT FILE the contacts. Filing or otherwise dressing the contacts only results in lost tip material and reduces contactor or starter life.
5. The ultimate tripping current of the installed relay heater can be adjusted $\pm 10\%$ by using adjustment dial.
6. The mechanical interlock has been factory adjusted and normally should never have to be readjusted. If readjustment is ever needed, the following 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 interlock 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 slots as possible.

D. With both arms adjusted, there should be a very slight gap ($\frac{1}{16}$ " approximate) 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.

Coil Removal

The encapsulated coil is impervious to moisture, contaminants and oil. It resists mechanical damage and failures due to high humidity. No tools are required to remove coil.

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 Removal

Movable contacts can be inspected and replaced in seconds – without tools.

1. Perform steps 1 through 5 under *COIL REMOVAL*.
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, spring and spring seat from movable arm.

- 6 Remove screws holding stationary contacts in place and remove stationary contacts.
- 7. Reassemble device by reversing procedure.

Note: Do not attempt to remove or replace Arc Traps in Arc Chute Cover.

When reassembling, note that the Arc Chute Cover will only fit one way and is marked TOP in upper right-hand corner. Magnet and movable arm will fit either way but will be quieter if reassembled the same way they were taken apart.

Check For Welded Contacts In Overload Relay

This feature permits the maintenance person to check for welded contacts. With power disconnected from the device, disconnect the control wiring from the terminals of the relay and place a bell set or resistance measuring instrument across the relay terminals. Depress and release the reset arm to insure the relay is reset. In the tripped condition the circuit between the terminals should be open indicating the contacts are operating normally. Remove the bell set or resistance measuring

apparatus, rewire the relay terminals and reset the relay for normal operation.

The exclusive manual contact-operation

check gives positive assurance that contacts have not welded due to short circuits in the control wiring.

Coil Data

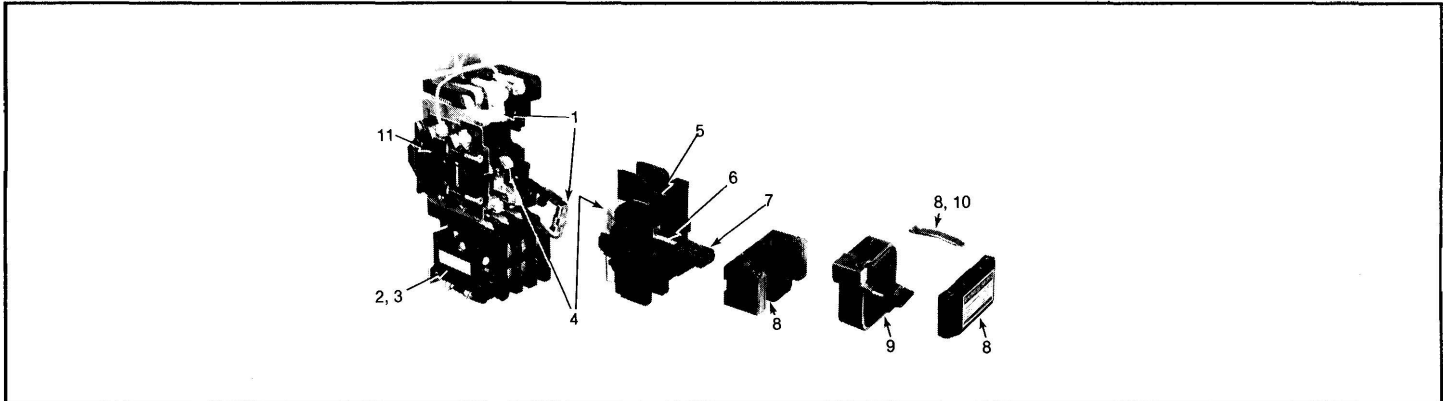
For two- and three-pole devices, order Cat. No. 15D22G plus number in table.
For four- and five-pole devices, order Cat. No. 15D23G plus number in table.

| Frequency | 115V | 200/ 208V | 230V | 460V | 575V | 600V |
|-----------|------|--------------|------|------|------|------|
| 60 Hertz | 002 | 023 | 003 | 004 | 005 | 006 |
| Frequency | 110V | 220V | 380V | 440V | 550V | 600V |
| 50 Hertz | 007 | 008 | 064 | 009 | 010 | 011 |

Use 022 for 120V, 60 Hertz / 110V, 50 Hertz coil.

Accessory Kits

| | |
|--|---------------------|
| Additional NO aux. contact for all forms | CR305X100D |
| Additional NC aux. contact for all forms | CR305X100E |
| Push button | CR305X220N |
| Selector switch | CR305X230N |
| Indicating light | CR305X250N |
| Control circuit fuse | CR305X241A, B, C, D |



Principal Renewal Parts

| Ref. No. | Description | Catalog Number | Quantity Required | |
|----------|--|----------------|-------------------|-------|
| | | | CR305 | CR306 |
| 1 | Coil retainer assembly | 546A780G052 | 2 | 2 |
| 2 | Overload relay (3-heater, non-compensated form, 1 NC contact) | CR324D310F | - | 1 |
| 3 | Overload relay (3-heater, non-compensated form, 1 NO-1 NC contacts) | CR324D360F | - | 1 |
| 4 | Set of stationary and movable contacts with springs and screws for 3 poles | 546A780G051 | 1 | 1 |
| 5 | Molded cover for stationary and movable contacts | 546A780G054 | 1 | 1 |
| 6 | Return spring for movable contact support | 547A524G001 | 1 | 1 |
| 7 | Molded movable contact support for 2, 3 poles | 188D700P001 | 1 | 1 |
| 8 | Armature and frame (magnet) with retainer | 546A780G053 | 1 | 1 |
| 9 | Operating coil for 2- and 3-pole forms | 15D22G*** | 1 | 1 |
| 10 | Spring retainer for armature | 546A627P001 | 1 | 1 |
| 11 | Cross electrical interlock | CR305X200C | 1 | 1 |

*** Add suffix numbers for particular coil rating required. See COIL TABLE above.

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 further information be desired or 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.

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