GEH-4821 INSTALLATION INSTRUCTIONS

300-Line
Thermal Overload Relays CR324 Series

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’s CR324C, D, E, and F thermal overload relays, AC or DC, consist of 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.

CR324 overload relays incorporate a dial for ±10% field adjustment of tripping current, so that it is no longer necessary to change heaters to eliminate such problems as nuisance tripping in hot weather.

The ultimate tripping current of an installed relay heater can be adjusted ±10% by using the adjustment dial. Turn the dial clockwise to reduce ultimate tripping current and counterclockwise to increase ultimate tripping current.

Non-compensated relays are identified by a black reset arm and ambient compensated relays by a red reset arm. The ambient compensated relays incorporate a temperature compensating bimetal to maintain an essentially constant tripping current regardless of ambient temperature.

Overload relays are available with either 1 NC relay contact, or with external 1 NC and 1 NO isolated contact for diagnostic use.

To insure against welded overload relay contacts in the tripped condition, perform the “Check for Welded Contacts” as described on this page. Separate motor branch circuit overcurrent protection against electrical faults should be supplied in accordance with the National Electrical Code.

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 NC 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.

The exclusive manual contact operation check gives positive assurance that contacts have not welded due to short circuits in the control wiring.

Operation
The motor current is carried through a heater element of a resistance material. The overloaded motor increases the current through the heater and generates sufficient heat to deflect the bimetal strip. The deflected strip causes the relay contacts (normally connected in the control circuit of the magnetic contactor with which the relay is used) to open, de-energizing the control circuit, thereby disconnecting the motor from the line. The average time-current curves are shown in Figure 2.

Heater Selection
The heaters are of the removable type and may be interchanged or replaced by loosening heater mounting screws and inserting proper heaters for a particular application. A sufficient number of sizes are

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Figure 1. Typical CR324 overload relay with side cover removed

Figure 2. Average time-current characteristics for CR324 overload relay in 40°C ambient

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 problems arise which are not covered sufficiently for the Purchaser’s purposes, the matter should be referred to the nearest ABB Sales Office.
available to permit selection of the proper heater for any value of motor full-load current within the range indicated in the heater table. CR123C and CR123F forms of heaters are used on both ambient compensated and standard overload relays. The heaters provide approximately 115 to 125% protection when selected from the heater tables supplied with the relay.

Heaters should not be selected for motor currents in excess of the rating of the controller with which the relay is used.

The heaters will ultimately trip the relay in a 40°C ambient, with a current which is approximately the minimum value of motor full-load current listed in the table, multiplied by 1.25.

Application And Installation

The relay, and the controller with which it is used, should be protected from excessive currents that might result from a short circuit by the use of fuses, the rating of which should not exceed the maximum fuse size listed in the heater table supplied with the device. In place of fuses, other branch circuit protective devices can be used in accordance with the National Electrical Code.

The relay contacts will carry ten amperes continuously and make momentarily 30 amperes, but should not be used to interrupt currents in excess of those listed below.

<table>
<thead>
<tr>
<th>AC Volts</th>
<th>DC (Inductive)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Amperes</td>
</tr>
<tr>
<td>115</td>
<td>3</td>
</tr>
<tr>
<td>230</td>
<td>1.5</td>
</tr>
<tr>
<td>460</td>
<td>0.75</td>
</tr>
<tr>
<td>575</td>
<td>0.6</td>
</tr>
</tbody>
</table>

The relay should be installed in the vertical position as shown in Figure 1. Heater(s) for these relays are ordinarily shipped separately and should be mounted as shown in Figure 3 and 4. Mount the heater(s) using the heater mounting screws and securely tighten them once the heaters are in place.

Pressure type terminals are provided for wiring. The control circuit terminals are suitable for #12 AWG maximum. The maximum wire size for the power terminals are:

- CR324C (Size 1) - #8
- CR324D (Size 2) - #4
- CR324E (Size 3) - #1/0
- CR324F (Size 4) - #3/0

Adjustments should not be attempted on the relay other than that of changing heaters or setting of adjustment dial. The bimetal strip should not be tampered with under any circumstances. With the exception of heater(s), which should be ordered by Catalog Number, it is not recommended that renewal parts be supplied.

Select heater(s) from table which is supplied with the relay.

For continuous rated motors with service factor of 1.15 to 1.25, select heater with maximum motor amperes equal to or immediately greater than the motor full load current (provides a maximum of 125% protection). For continuous rated motors with no service factor, multiply the full load current of motor by 0.90 and use this value to select heater.

To protect the heater and starter during short circuits, provide Motor Branch Circuit Protection in accordance with the National Electrical Code but not to exceed the maximum fuse rating shown in heater tables supplied with the device.

![Figure 3. Typical CR324C overload relay](image)

![Figure 4. Typical CR324E overload relay](image)