

# Instructions for Size 3 or 4 Type A Thermal Overload Relay, 1 Pole, Ambient Compensated or Non-Compensated

I.L. 14569C  
Model A

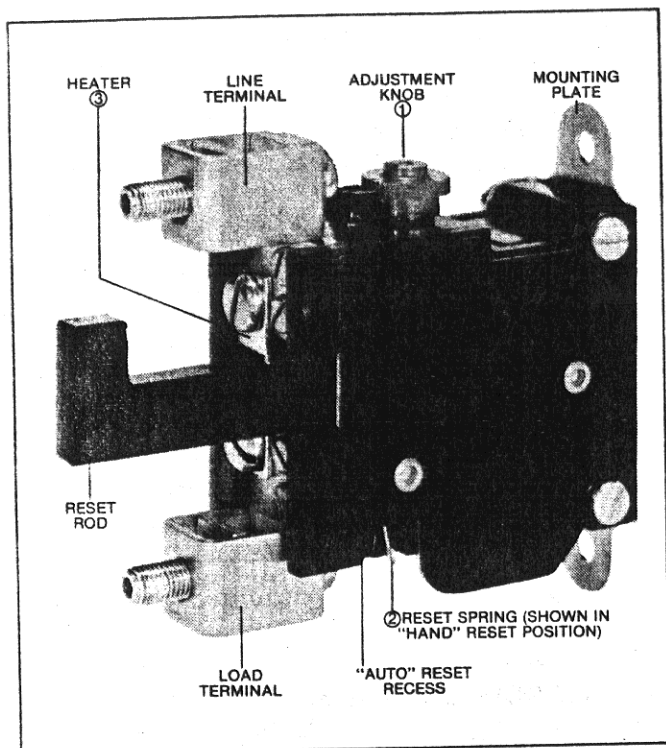


Fig. 1 Size 4 Overload Relay for Panel Mounting

## THE RELAY

The Type A single pole thermal overload relay (OLR) is a bimetallic device which, with the properly selected wire and heaters, will provide motor protection for running and stalled rotor overloads in motor circuits not exceeding 600 volts. The Size 3 and 4 OLR's have a maximum current rating of 90.0 and 133 amperes respectively. Ambient compensated OLR's are readily distinguishable by black reset rods. Non-ambient compensated OLR's have red reset rods.

## OPERATION

The strip bimetal in the OLR is indirectly heated by the replaceable heater element (Item 3 in Figure 1) which carries the motor current. Excess heat is generated in this heater element by an overloaded motor. The heated bimetal deflects to open the normally closed contact, thereby opening the coil circuit of a magnetic contactor which disconnects the overloaded motor from the line. After approximately 2 minutes, the relay if hand reset may be reset by pressing the reset rod. For relays in the auto position, resetting occurs automatically.

TABLE I — CATALOG NUMBERS

Type	Panel Mounted		A200 Controller Mounted	
	Size 3	Size 4	Size 3	Size 4
Ambient Compensated	AA31P	AA41P	AA31A	AA41A
Non-ambient Compensated	AN31P	AN41P	AN31A	AN41A
For NO/NC contacts add suffix B				

## INSTALLATION

The OLR must be installed on a vertical surface with the control terminals at the bottom. The relay is accurately calibrated at the factory and should not be tampered with. Installation should be made with the proper wire size (see heater selection table) for the application and all wires must be securely fastened. Preferably, the OLR should be located in the same ambient as the motor to be protected and in an area free of drafts. The heater element is supplied separately and must be properly selected and securely mounted. One heater is used on each OLR. One OLR is used for single phase applications. Three separate OLR's are required for three phase applications.

This industrial type control is designed to be installed, operated, and maintained by adequately trained workmen. These instructions do not cover all details, variations, or combinations of the equipment, its storage, delivery, installation, check out, safe operation, or maintenance. Care must be exercised to comply with local, state, and national regulations, as well as safety practices, for this class of equipment.

## CONTROL CIRCUIT CONTACTS

The normally closed (NC) control circuit contact is to be connected in series with the coil of a magnetic contactor. This NC contact is equipped with a follow contact which provides reliable electrical continuity during a tripping condition. A factory installed normally open (NO) control circuit contact (single pole double throw — Form C) is available for remote trip indication applications. AC contact ratings are listed in Table II. See Figure 5 for identification of control terminals.

TABLE II — CONTROL CONTACT RATINGS

AC VOLTS	NORMALLY CLOSED		NORMALLY OPEN	
	MAKE	BREAK	MAKE	BREAK
24-120	30A	3A	10A	1A
120-600	3600 VA	360 VA	1200 VA	120 VA

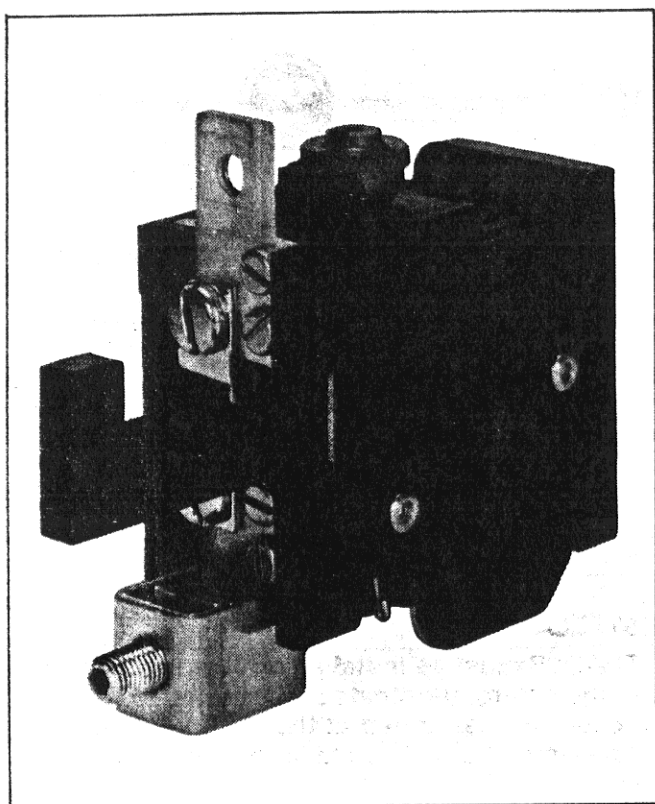


Fig. 2 Size 4 Overload Relay for A200 Controller Mounting

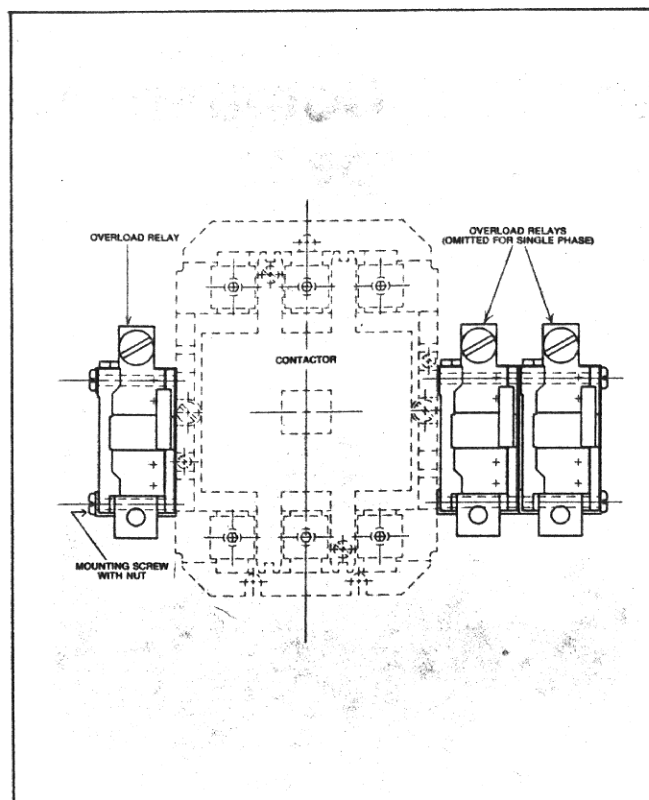


Fig. 3 Overload Relays Mounted on A200 Controller

## MANUAL OR AUTOMATIC RESET

The overload relay is normally furnished set for "HAND" reset operation. The relay may be set for either "HAND" or "AUTO" reset by positioning the reset spring (2) in the proper marked recess in the molded case as shown in Figure 1.

Automatic reset should not be used with 2-wire control circuits where automatic starting of the motor may be hazardous.

## ADJUSTABLE TRIP

The trip rating of a specific heater element can be adjusted over a range of approximately 85% to 115%. This is accomplished by turning the adjustment knob (1) on the top of the relay to the respective stop position. This to alleviate nuisance tripping; or conversely, to gain closer protection when desired.

## TRIP INDICATION

An immediate visible indication of trip is standard on the Type A overload relay. When an overload occurs, which causes the relay to operate, a trip indicator projects out through a small opening at the bottom of the relay. (See Figure 5.)

**IMPORTANT:** Do not tamper with this trip indicator as it is an integral part in the calibration and tampering therewith may causes changes in trip characteristics.

## AMBIENT COMPENSATION

Ambient compensated OLR's have substantially the same trip characteristics for ambient temperatures from  $-40^{\circ}\text{C}$  to  $75^{\circ}\text{C}$  ( $-40^{\circ}\text{F}$  to  $167^{\circ}\text{F}$ ). Because of a compensating bimetal, which maintains a constant travel to trip distance independent of ambient conditions, operation of this bimetallic relay is responsive only to heat generated by the motor overcurrent passing through the heater element. The compensating feature is fully automatic and no adjustments are required over normal fluctuations in ambient temperatures. Overload relays having ambient compensation can be identified by black reset rods whereas non-compensated overload relays have red reset rods.

TABLE III — POWER CIRCUIT TERMINALS	
NEMA Size	Wire Size
3	#8 — 2/0 AWG
4	#6 — 4/0 AWG
Wire with copper conductors only	

TABLE IV — RECOMMENDED DRIVING TORQUE	
Location (Qty.)	Driving Torque (lb.-in.)
Main Power Connections (2)	90 — 100
Control Connections (2)	8 — 9
Heater Mtg. Screws (2)	45 — 50

## HEATERS

A Heater is not included with the overload relay and must be ordered separately per the heater selection table and the information listed below. When installing the heater be sure that connecting surfaces are clean and the heater is attached securely to the relay in the proper location with the screws provided. The trip rating of a heater in a 40°C Ambient is 125% of the minimum full load current shown in Table V. When tested at 600 percent of its trip rating, the relay will trip in 20 seconds or less (class 20).

The heater should be selected on the basis of the actual full load current and service factor as shown on the motor nameplate or in the manufacturer's published literature. When the service factor of the motor is 1.15 to 1.25, select the heater from the heater application table. If the service factor of the motor is 1.0, or there is no service factor shown, or a maximum of 115% protection is desired, select one size smaller heater than indicated. When motor and overload relay are in different ambients and when using non-compensated overload relays, select the heater from the table using adjusted motor currents as follows: decrease rated motor current 1% for each °C motor ambient exceeds controller ambient. Increase rated motor current 1% for each °C controller ambient exceeds motor ambient. For ambient compensated overload relays no adjustment in heater selection is necessary for normal variations in ambient temperatures.

## SHORT CIRCUIT PROTECTION

The relay will provide protection against abnormal load conditions to current values exceeding normal locked rotor current; however, to protect the relay from short circuit currents, branch circuit protection must be provided per the National Electric Code. Protective device ratings should not exceed the maximum values listed in the heater application table. The relays, as protected, are suitable for use on a circuit capable of delivering not more than 5000 rms symmetrical amperes (10000 amps for Size 4), 600 volts maximum.

## MAINTENANCE

Other than the normal tightening of all wire and heater connections, no maintenance should be attempted on the unit. Complete replacement of the unit must be made in the event of damage.

**WARNING:** To provide continued protection against fire and shock hazard, the complete overload relay must be replaced if burnout of the current element occurs. See Table I.

**TABLE V — F SERIES HEATER SELECTION**

For compensated OLR's in any size enclosure, and non-compensated OLR's in enclosures with volume not less than 5500 cu. in. Wire with 75°C wire.

For Use With One or Three Phase Application

Code Marking	Full Load Current of Motor (Amperes) (40°C Ambient)	Max. Protect. Device (Amp)	Load Wire Size
FH72	19.0 — 20.8	80	#10
FH73	20.9 — 22.9	90	#10
FH74	23.0 — 25.2	100	#10
FH75	25.3 — 27.8	100	#10
FH76	27.9 — 30.6	110	#8
FH77	30.7 — 33.5	125	#8
FH78	33.6 — 37.5	150	#8
FH79	37.6 — 41.5	150	#6
FH80	41.6 — 46.3	175	#6
FH81	46.4 — 50	200	#6
FH82	51 — 55	200	#4
FH83	56 — 61	225	#4
FH84	62 — 66	250	#4
FH85	67 — 73	250	#3
FH86	74 — 78	250	#3
FH87	79 — 84	300	#2
FH88	85 — 92	350	#2
<b>ABOVE HEATERS FOR USE ON SIZE 3 (90 AMPS MAX.)</b>			
FH89	93 — 101	350	#00
FH90	102 — 110	350	#00
FH91	111 — 122	400	#000
FH92	123 — 129	400	#000
FH93	130 — 133	400	#0000
<b>ABOVE HEATERS FOR USE ON SIZE 4</b>			



**Fig. 5 Dimension Drawing (Dim. in inches)**

