

Instructions for Size 1 or 2, Type A Thermal Overload Relay, 3 Pole, Ambient Compensated or Non-Compensated

I.L. 14568F

Model J

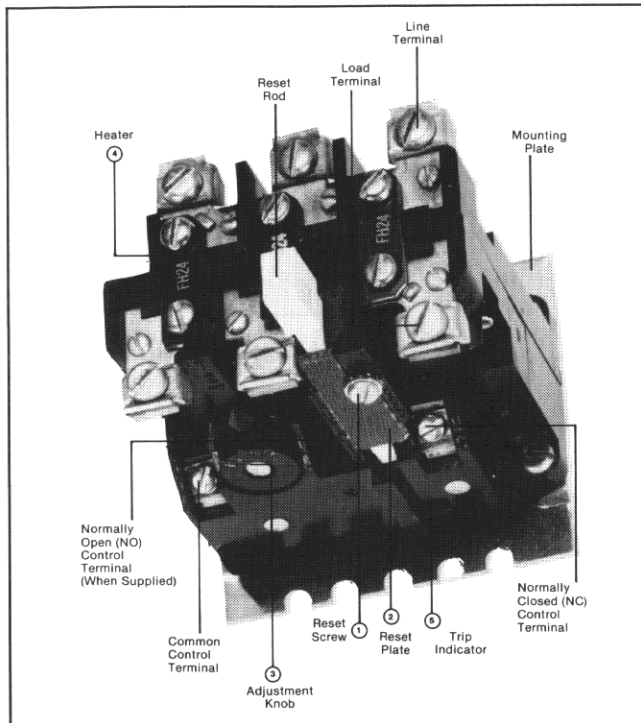


Fig. 1 Size 1 Overload Relay for Panel Mounting

THE RELAY

The Type A thermal overload relay (OLR) is a bimetallic device which, with the properly applied heaters, will provide motor protection for running and stalled rotor overloads in motor circuits. The Size 1 and 2 OLR's have a maximum current rating of 26.2 and 45.0 amperes respectively. Ambient compensated OLR's are readily distinguishable by light gray reset rods. Non-ambient compensated OLR's have red reset rods.

OPERATION

The strip bimetals in the OLR are indirectly heated by the replaceable heater elements (Item 4 in Figure 1) which carry the motor current. Excess heat is generated in these heater elements by an overloaded motor. The heated bimetals deflect to open the normally-closed (NC) 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 1	Size 2	Size 00-0-1	Size 2
Ambient Compensated	AA13P	AA23P	AA13A	AA23A
Non-Ambient Compensated	AN13P	AN23P	AN13A	AN23A
For NO/NC contacts add suffix B				

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 slightly loosening the reset screw (1) holding the reset plate (2), moving the plate to the proper position marked on the molded case (away from the panel for "Hand" reset and toward the panel for "Auto" reset) and retightening the screw. (See Figure 1.)

Automatic reset should not be used with two-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% to alleviate nuisance tripping or to gain closer protection when desired. This is accomplished by turning the adjustment knob (3) on the bottom of the relay to the respective stop position.

TRIP INDICATION

The Type A overload relay gives an immediate visible indication of trip. When an overload occurs, which causes the relay to operate, a trip indicator (5) projects out through a small opening at the bottom of the relay. (See Figure 1.)

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

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

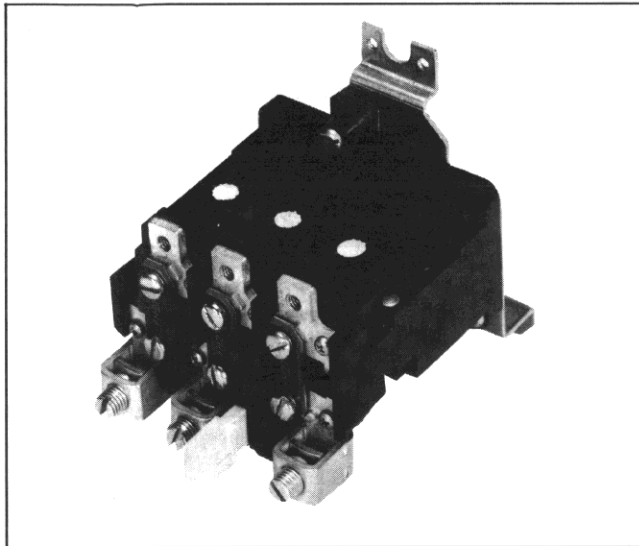


Fig. 2 Size 2 Overload Relay for A200 Controller Mounting

INSTALLATION (cont.)

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. Heater elements are supplied separately and must be properly selected and securely mounted. Three heaters must be used for either single or 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 VI.

AMBIENT COMPENSATION

Ambient compensated OLR's have substantially the same trip characteristics for ambient temperatures from -40°C to 75°C (-40°F to 167°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 auto-

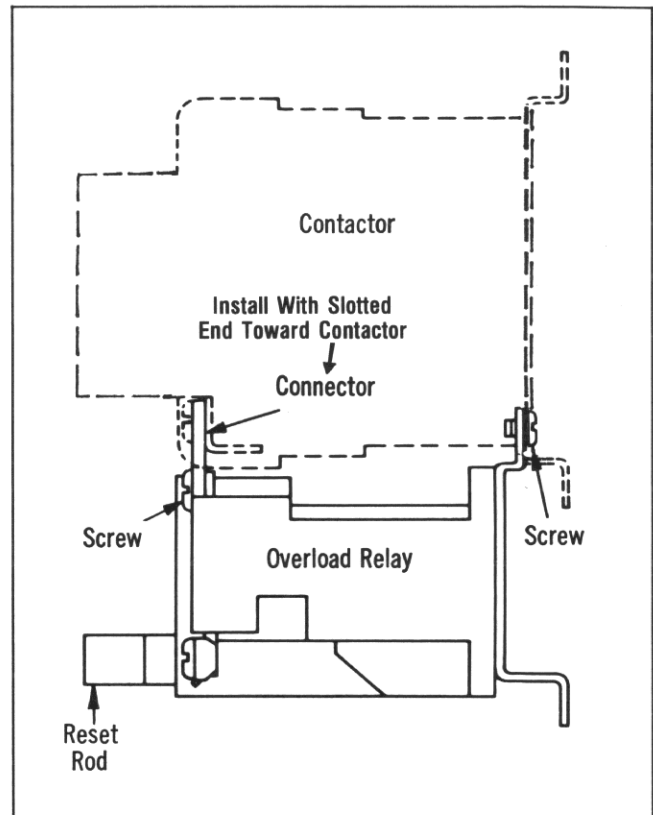


Fig. 3 Overload Relay Mounted on A200 Controller

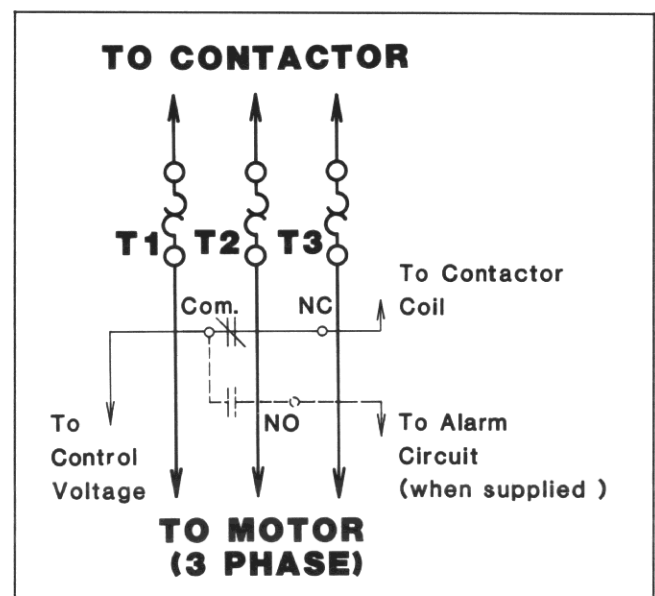


Fig. 4 Direct Connection Diagram

matic and no adjustments are required over normal fluctuations in ambient temperatures. Overload relays having ambient compensation can be identified by light gray reset rods whereas non-compensated overload relays have red reset rods.

HEATERS

Heaters are not included with the overload relay and must be ordered separately per the heater selection table and the information listed below. When installing heaters be sure that connecting surfaces are clean and heaters are 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 II or III. When tested at 600 percent of its trip rating, the relay will trip in 20 seconds or less (Class 20).

Heaters 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 heaters 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 heaters 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.

MEDIUM-VOLTAGE APPLICATIONS

The Type A OLR is used with current transformers and the "G" family of heaters for coordination with medium-voltage fuses. Since the current transformers have a limited current output under short-circuit conditions, no short-circuit protection is required in their secondary circuits supplying current to the Type "G" heaters. Wire the secondary circuits of the current transformers with #12 or #14 conductors. Divide the motor full-load current by the transformer turns ratio to determine the equivalent motor full-load current and select the appropriate heater from Table II for a service factor 1.15 medium-voltage motor.

TABLE II — TYPE G HEATERS

Code Marking	Heater Rating	Equivalent Full-Load Current
G22	2.03 A	1.63 - 1.78 Amperes
G23	2.23 A	1.79 - 1.95 Amperes
G24	2.44 A	1.96 - 2.15 Amperes
G25	2.69 A	2.16 - 2.35 Amperes
G26	2.95 A	2.36 - 2.58 Amperes
G27	3.23 A	2.59 - 2.83 Amperes
G28	3.55 A	2.84 - 3.11 Amperes
G29	3.90 A	3.12 - 3.42 Amperes
G30	4.28 A	3.43 - 3.73 Amperes
G31	4.67 A	3.74 - 4.07 Amperes
G32	5.10 A	4.08 - 4.39 Amperes
G33	5.50 A	4.40 - 4.87 Amperes
G34	6.10 A	4.88 - 5.30 Amperes

TABLE III — 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 Three Heaters Only

Code Marking	Full-Load Current of Motor (Amperes) (40°C Ambient)	Max. Protect. Device (Amp)	Load Wire Size
FH03	.25 — .27	1*	#14
FH04	.28 — .31	1*	#14
FH05	.32 — .34	1*	#14
FH06	.35 — .38	1*	#14
FH07	.39 — .42	1*	#14
FH08	.43 — .46	2*	#14
FH09	.47 — .50	2*	#14
FH10	.51 — .55	2*	#14
FH11	.56 — .62	3*	#14
FH12	.63 — .68	3*	#14
FH13	.69 — .75	3*	#14
FH14	.76 — .83	3*	#14
FH15	.84 — .91	3*	#14
FH16	.92 — 1.00	3*	#14
FH17	1.01 — 1.11	3*	#14
FH18	1.12 — 1.22	3*	#14
FH19	1.23 — 1.34	5*	#14
FH20	1.35 — 1.47	6*	#14
FH21	1.48 — 1.62	6*	#14
FH22	1.63 — 1.78	6*	#14
FH23	1.79 — 1.95	6*	#14
FH24	1.96 — 2.15	6*	#14
FH25	2.16 — 2.35	10*	#14
FH26	2.36 — 2.58	10*	#14
FH27	2.59 — 2.83	10*	#14
FH28	2.84 — 3.11	15	#14
FH29	3.12 — 3.42	15	#14
FH30	3.43 — 3.73	15	#14
FH31	3.74 — 4.07	15	#14
FH32	4.08 — 4.39	15	#14
FH33	4.40 — 4.87	15	#14
FH34	4.88 — 5.3	20	#14
FH35	5.4 — 5.9	20	#14
FH36	6.0 — 6.4	20	#14
FH37	6.5 — 7.1	25	#14
FH38	7.2 — 7.8	25	#14
FH39	7.9 — 8.5	30	#14
FH40	8.6 — 9.4	30	#14
FH41	9.5 — 10.3	35	#14
FH42	10.4 — 11.3	35	#14
FH43	11.4 — 12.4	40	#14
FH44	12.5 — 13.5	45	#14
FH45	13.6 — 14.9	45	#14
FH46	15.0 — 16.3	50	#12
FH47	16.4 — 18.0	60	#12
FH48	18.1 — 19.8	60	#12
FH49	19.9 — 21.7	70	#10
FH50	21.8 — 23.9	80	#10
FH51	24.0 — 26.2	80	#10

Above Heaters for use on Size 1

FH52	26.3 — 28.7	90	#8
FH53	28.8 — 31.4	100	#8
FH54	31.5 — 34.5	125	#8
FH55	34.6 — 37.9	125	#8
FH56	38.0 — 41.5	125	#6
FH57	41.6 — 45.0	150	#6

Above Heaters for use on Size 2

* 15 ampere protective device is permitted by NEC. Fuse size shown in table limits fault current.

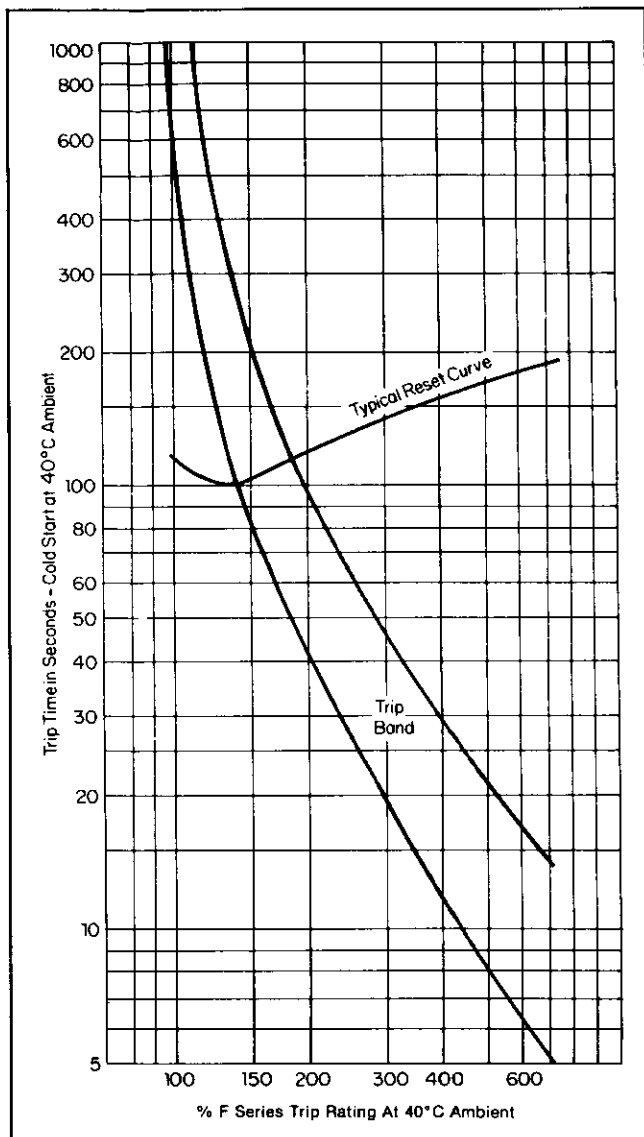


Fig. 5 Time/Current Trip and Reset Curves

The trip rating of a heater in a 40°C ambient is 1.25 times the minimum value of full-load current listed for each heater.

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.

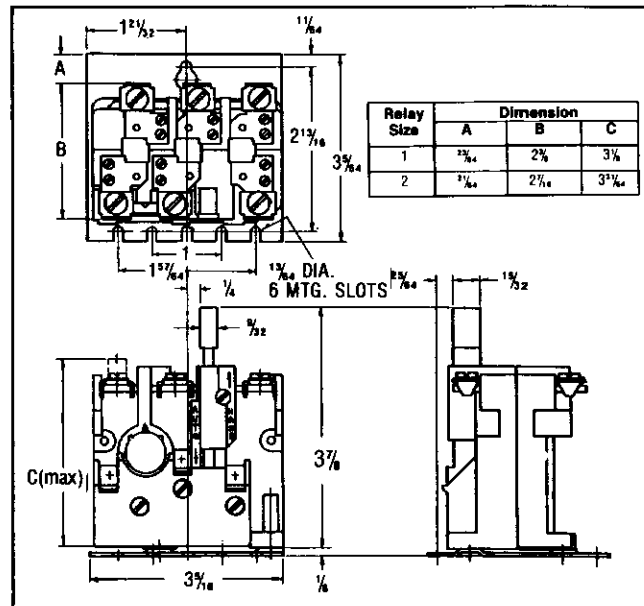


Fig. 6 Dimension Drawing (Dim. in inches)

TABLE IV — POWER CIRCUIT TERMINALS

NEMA Size	Wire Size
1	#14 — 8 AWG
2	#14 — 3 AWG
Wire with copper conductors only	

TABLE V — RECOMMENDED DRIVING TORQUE

Location (Qty.)	Driving Torque (lb.-in.)
Main Power Connections (6)	18-20 (Size 1) 45-50 (Size 2)
Control Connections (2)	8-9
Heater Mtg. Screws (2/pole)	18-20

TABLE VI — CONTROL CONTACT RATINGS

AC VOLTS	NORMALLY-CLOSED		NORMALLY-OPEN	
	MAKE	BREAK	MAKE	BREAK
24-120	20A	2A	5A	.5A
120-600	2400 VA	240 VA	600 VA	60 VA

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 a current element occurs. See Table I.