Instructions for
Type A Thermal Overload Relays
Size 3 and 4, 2 or 3 Pole
Non-Compensated or Ambient Compensated

I.L. 13299A

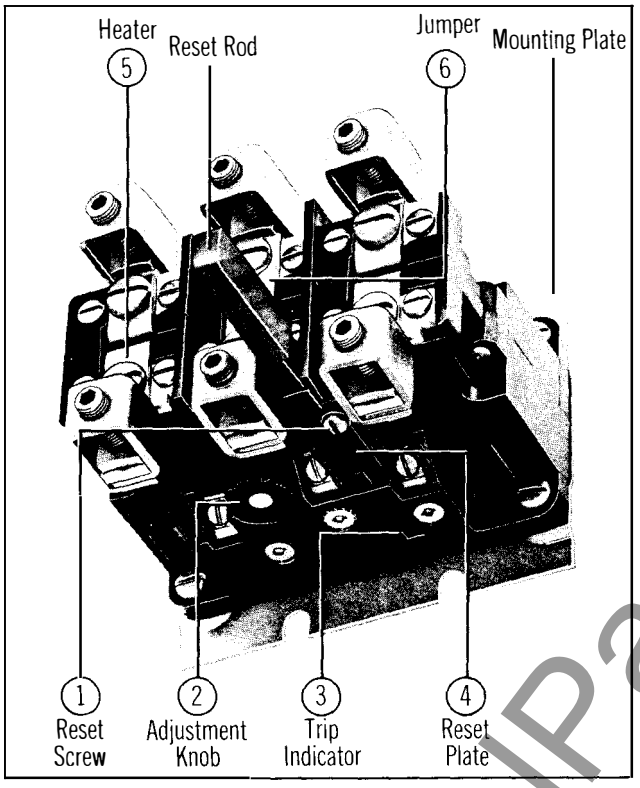

Figure 1 - Size 4, 2, or 3 Pole Overload Relay for Panel Mounting

Installation

The Westinghouse Type A, 2 or 3 Pole Overload Relay, Figure 1, must be installed in a vertical position with the adjustment knob (2) 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 for the application and all wires should be securely fastened to the relay.

The relay is available either for panel mounting or for mounting on an A/200 Series Motor Controller. Overload relays for controller mounting have the necessary hardware and connectors included and should be installed as shown in Figure 3 with the connectors (7) and screw retainers (8) having their slotted ends toward the controller.

General

The Type A, 2 or 3 Pole Overload Relay is a bimetallic overload relay. The following ratings, Table I, apply:

Table I - Bimetallic Overload Relay Ratings

Size	Catalog Number		Maximum Amperes
	Non-Compensated	Ambient Compensated	
3	AN32P, AN32A	AA32P, AA32A	110
4	AN42P, AN42A	AA42P, AA42A	161

The bimetal elements, see Figure 2, are electrically heated by a series of small replaceable heating elements connected directly in the circuit to be protected. Thermal actuation of this device operates a SPDT contact arrangement, opening the contacts in the coil circuit of a contactor or relay, which results in the disconnection of power to the overloaded circuit, and closing contacts which may be used to electrically operate an alarm to give a remote indication of an overloaded circuit. With replaceable thermal elements for motors having full load currents of 19 to 135 amperes in approximately 10% steps (See Heater Application Table page 4), the relays may be used on A-C or D-C circuits of not more than 600 volts. The relay control contacts are rated as shown in Table II.

Table II - Control Contacts Ratings

A.C. Volts	A.C. Amperes (N.C.)		A.C. Amperes (N.O.)	
	Make	Break	Make	Break
120	20	2	6	1.0
240	10	1	3	.5
480	5	.5	1.5	.25
600	4	.4	1.2	.2
Max. Make Capacity 20 Amps AC			Max. Make Capacity 6 Amps AC	

Effective July, 1966. Supersedes I.L. 13299, Dated August, 1966.

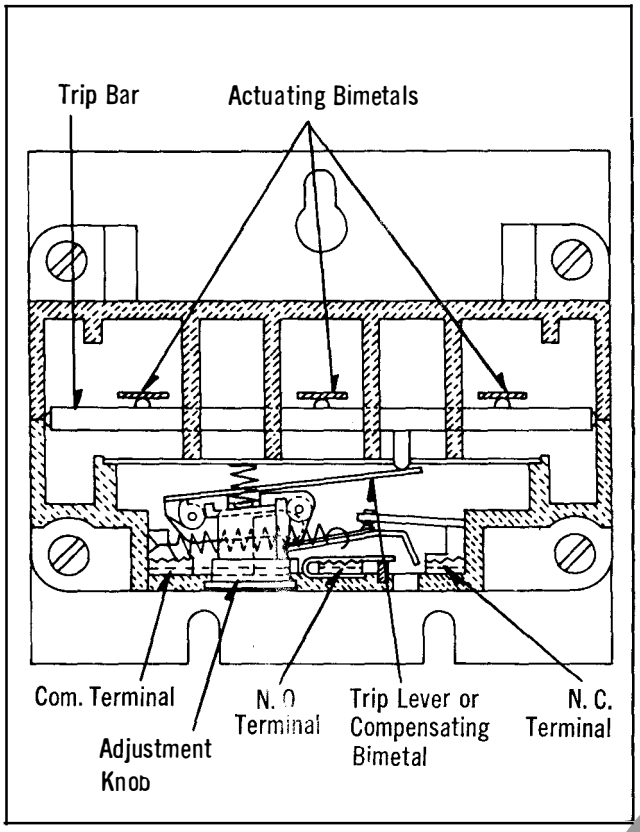

Figure 2 - Parts Identification

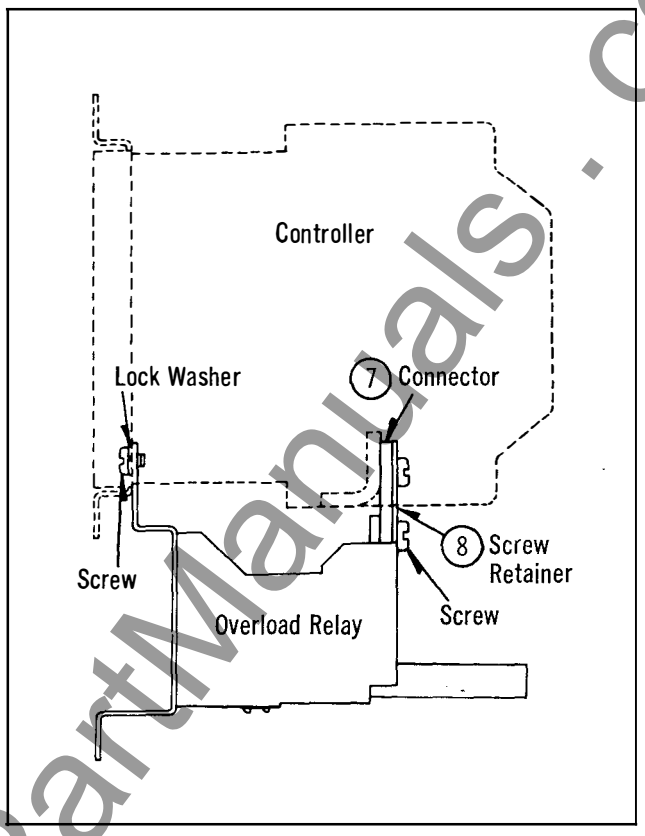

Figure 3 - Overload Relay Mounted on A/200 Motor Controller

The relay will provide protection against abnormal load conditions to current values exceeding normal locked rotor current. The relay should be protected against short circuits by fuses rated at not more than four times the rated motor current. In place of fuses, other branch circuit protective devices can be used in line with the National Electric Code.

Construction Features

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 screw (1) holding the reset plate (4), moving the plate to the proper position marked on the molded case and retightening the screw. (See Figure 1). Automatic reset should not be used with 2-wire master switch or where automatic resetting of the overload relay would restore power to the motor endangering either personnel or equipment.

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 (2) on the bottom of the relay to the respective stop position. With replaceable heaters (5) in approximately 10% current increments the relay is capable of being adjusted over this 10% range to permit the desired close protection.

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 (3) 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 in the

calibration and tampering therewith may cause changes in trip characteristics.

Positive Contact Break - A follow through contact is provided on the stationary contact terminal of the snap action control switch. This contact provides reliable electrical continuity during toggling of the snap switch, thus eliminating "false" trips sometimes prevalent with thermally operated switches. This contact also allows contact wipe for further reliability.

2 or 3 Pole Protection - Overload relays are suitable for either two or three pole protection. Two pole overload relays can be converted to three pole protection by removing the jumper (6) in the center pole and inserting the correct heater.

Ambient Compensation - Overload relays are available with substantially the same trip characteristics for ambient temperatures from -40°C to 75°C (-40°F to 167°F). Due to the inclusion 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 wide 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.

Operation and Performance

The current of an overloaded motor increases the heat generated in the heaters sufficiently to cause the actuating bimetals to bend. The bimetals bend against a common trip bar which in turn operates the control switch. The time required for the overload relay to trip depends upon the magnitude of the overload, the greater the overload, the shorter the time to trip. This is indicated in the characteristic curve, Figure 4. This curve is based on the heater ampere rating at 40°C being 125% of the minimum full load motor current determined by the heater application table. The curve applies over a wide range of ambient temperatures to overload relays having ambient compensation. For non-compensated overload relays the curve applies at ambient temperature of 40°C and at temperatures other than 40°C if the heater ampere rating is increased by 1% for each degree Centigrade below 40°C and decreased by 1% for each degree Centigrade above 40°C. The performance of the relay is such that it will allow motor starting currents to flow during the normal starting period, but will trip when subjected to smaller sustained overloads. After tripping has occurred, a short time must elapse before the relay can be reset by depressing the reset rod.

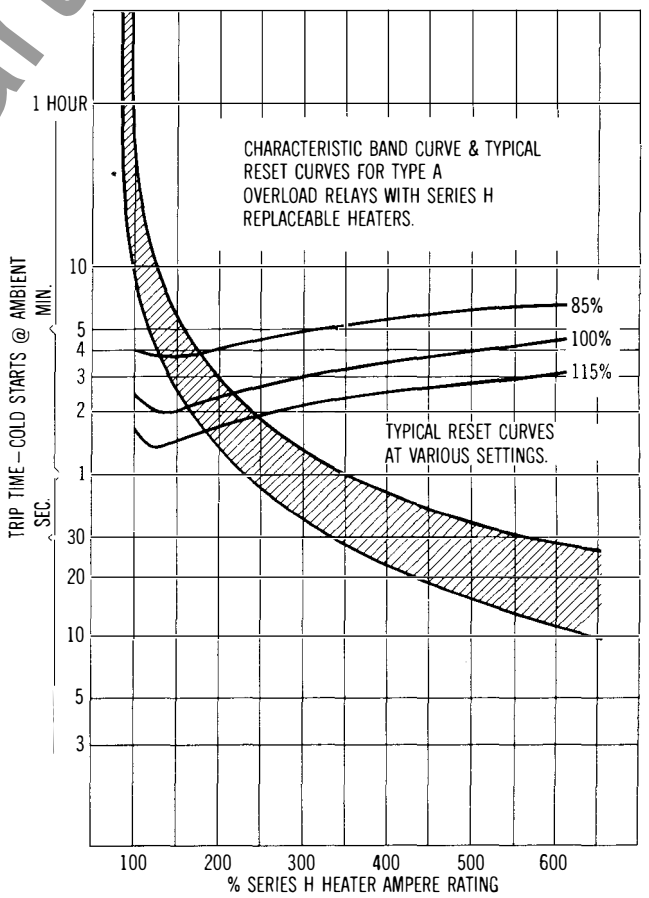

Figure 4 - Time-Current Trip and Reset Curves

Heaters

Each heater is identified by a code marking stamped on one terminal. The heater application table indicates the range of full load motor current to which a given heater may be applied. Heaters should be applied based on motor nameplate rating. This range is so selected that the current to produce ultimate tripping of the relay will be approximately 105% to 125% of rated motor current. The rating of a heater is 125% of the minimum full load current. Heaters are not included with the relays and must be ordered separately per heater application table. When installing heaters be sure that connecting surfaces are clean and heaters are attached securely in the proper location with the screws provided. (See Figure 1).

Table III - H Series Heater Application Table

Code Marking	Full Load Current of Motor (Amperes) (40°C Ambient)
H72	19.0 - 20.8
H73	20.9 - 22.9
H74	23.0 - 25.2
H75	25.3 - 27.8
H76	27.9 - 30.6
H77	30.7 - 33.5
H78	33.6 - 37.5
H79	37.6 - 41.5
H80	41.6 - 46.3
H81	46.4 - 50
H82	51 - 55
H83	56 - 61
H84	62 - 66
H85	67 - 73
H86	74 - 79
H87	80 - 87
H88	88 - 95
ABOVE HEATERS FOR USE ON SIZE 3	
H89	96 - 105
H90	106 - 116
H91	117 - 128
H92	129 - 135
ABOVE HEATERS FOR USE ON SIZE 4	

Westinghouse Electric Corporation
Standard Control Division, Beaver, Pa.

Printed in U.S.A.