Instructions for Type A Thermal Overload Relays, Size 0, 1 and 2, Single Pole Non-Compensated or Ambient Compensated

I.L. 13063-E

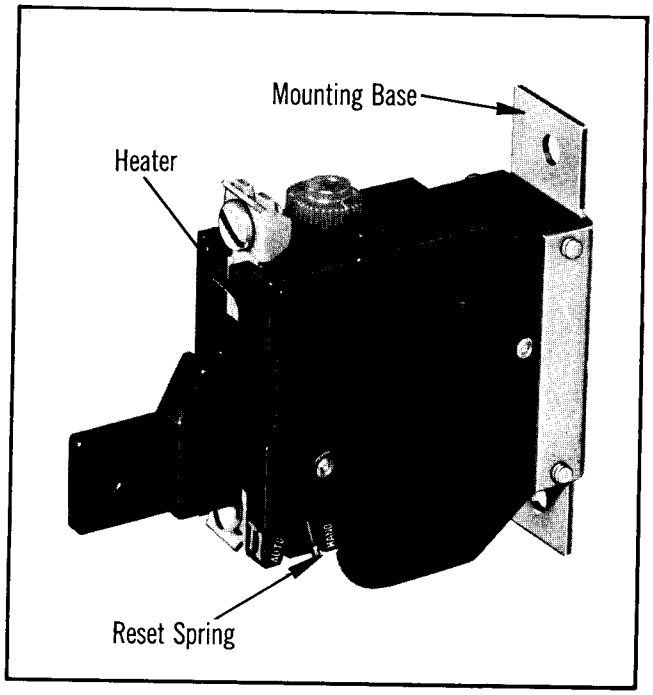

Figure 1 - Size 1 Overload Relay

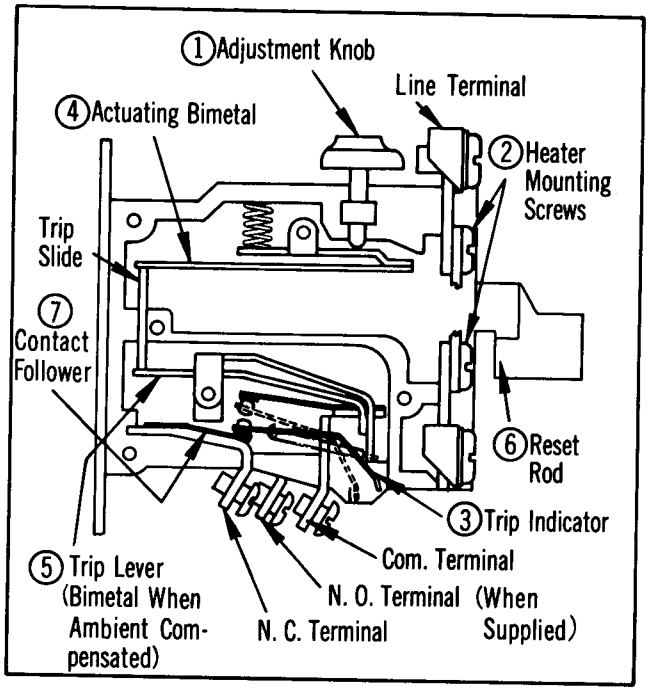

Figure 2 - Parts Identification

Installation

The Westinghouse Type A Single Pole Overload Relays must be installed in a vertical position with the adjustment knob (1) Figure 2, at the top. Each 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.

General

The Type A Single Pole Overload Relay is a bimetallic overload relay. The following ratings apply:

SIZE	TYPE* NON COMPENSATED	TYPE* AMBIENT COMPENSATED	MAXIMUM AMPERES
0, 1	AN11P	AA11P	32
2	AN21P	AA21P	56

*Panel mounted, normally closed control circuit only

The bimetal element is electrically heated by a series of small replaceable heating elements connected directly in the circuit to be protected. Thermal actuation of this device opens a pair of contacts in the coil circuit of a contactor or relay which results in the disconnection of power to the overloaded circuit. With replaceable thermal elements covering motor full load currents from .29 to 56 amperes in approximately 10% steps (See Heater Application Table, page 3) the relays may be used on circuits of not more than 600 volts. The relay control contacts are rated as standard pilot duty per the following.

VOLTS AC	AC AMPS (N.C.) BREAK	AC AMPS (N.C.) MAKE	AC AMPS (N.O.) BREAK	AC AMPS (N.O.) MAKE
120	3	30	1	10
240	1.5	15	.5	5
480	.75	7.5	.25	2.5
600	.6	6	.2	2
MAX. MAKE CAPACITY (N.C.) - 30 AMP. AC				

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File 7000

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 providing branch circuit protection per National Electric Code, but not to exceed the maximum fuse ratings listed in the heater application table no. 1.

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 positioning the control spring in the proper marked recess in the molded case, as shown in 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 red adjusting knob (1) on top of the relay (see Figure 2) to the respective stop position. With replaceable heaters (see (2), Figure 2) in approx. 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 2) and thus shows positive visual indication of trip.

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

Positive Contact Break - A follow-thru contact (7) is provided on the stationary 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.

Optional Construction Features

Ambient Compensation - Motor Overload protection can be provided with substantially the same trip characteristics in ambient temperatures from -40°C to 75°C (-40°F to 167°F). Due to a mechanism 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. Compensated relays are identified by black reset rods.

SPDT Control Switch - A normally open circuit which closes on relay operation can also be incorporated in the design of this relay. This circuit can be used to electrically operate an alarm to give a remote indication of an overloaded circuit.

Operation and Performance

The current of an overloaded motor increases the heat generated in the heater sufficiently to cause the actuating bimetal (4) to bend. This bending, results in the operation of the control switch which in turn causes the motor to be disconnected from the line. When ambient compensated, two bimetals operate thermally in parallel. The differential movement between these two bimetals due to an overloaded motor electrically heating the actuating bimetal again results in the operation of the control switch. The time required for the relays to trip depends upon the size of the overload, the greater the overload the shorter being the trip time. This is indicated in the characteristic curve, Figure 3. This curve applies when operating over wide variations in ambient when using ambient compensated overload relays and using the heater ratings

as determined by the heater application table. This curve also applies for the noncompensated relay at a 40°C ambient. 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. A short time must elapse before relays can be reset by means of reset rod (6).

Heaters

Each heater is identified by a code marking stamped on one terminal. When installing heaters, be sure that connecting surfaces are clean and heaters are attached securely in the proper location with the screws provided. Heaters are not included with the relays and must be ordered separately. The trip rating of a heater at 40°C ambient is 125% of the minimum full load current shown in heater application table no. 1.

Heater Selection

Heaters should be selected on the basis of the actual motor full load current. When motor and overload relay are in the same

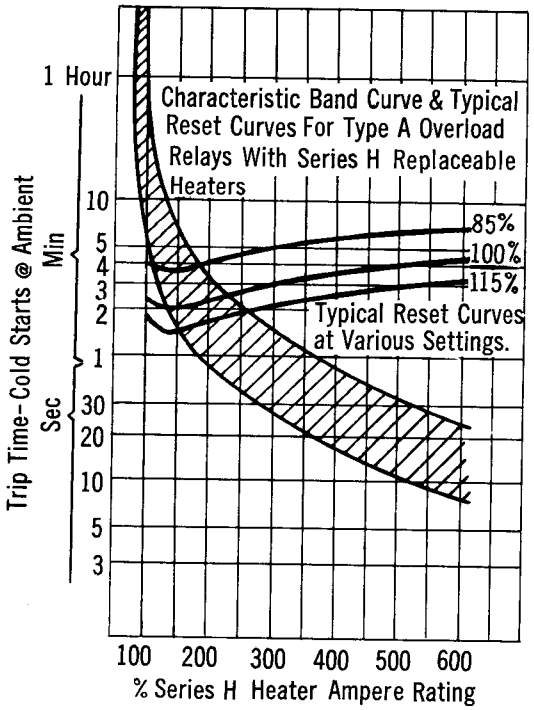

Figure 3 - Time-Current Trip and Reset Curves

"H" SERIES HEATER APPLICATION
Table No. 1

Code Marking	Full Load Current of Motor (Amperes) (40°C Ambient)	MAX. FUSE
H03	.29 - .31	1
H04	.32 - .35	3
H05	.36 - .39	3
H06	.40 - .43	3
H07	.44 - .48	3
H08	.49 - .53	3
H09	.54 - .58	3
H10	.59 - .64	3
H11	.65 - .71	3
H12	.72 - .79	3
H13	.80 - .87	3
H14	.88 - .96	6
H15	.97 - 1.06	6
H16	1.07 - 1.16	6
H17	1.17 - 1.28	6
H18	1.29 - 1.41	6
H19	1.42 - 1.55	6
H20	1.56 - 1.71	6
H21	1.72 - 1.87	6
H22	1.88 - 2.06	8
H23	2.07 - 2.26	8
H24	2.27 - 2.48	8
H25	2.49 - 2.72	9
H26	2.73 - 2.99	9
H27	3.00 - 3.28	12
H28	3.29 - 3.60	12
H29	3.61 - 3.95	15
H30	3.96 - 4.31	15
H31	4.32 - 4.71	15
H32	4.72 - 5.14	20
H33	5.15 - 5.6	20
H34	5.7 - 6.2	20
H35	6.3 - 6.8	25
H36	6.9 - 7.5	30
H37	7.6 - 8.2	30
H38	8.3 - 9.0	35
H39	9.1 - 9.9	35
H40	10.0 - 10.8	40
H41	10.9 - 11.9	45
H42	12.0 - 13.1	50
H43	13.2 - 14.3	50
H44	14.4 - 15.7	60
H45	15.8 - 17.2	60
H46	17.3 - 18.9	70
H47	19.0 - 20.8	80
H48	20.9 - 22.9	90
H49	23.0 - 25.2	100
H50	25.3 - 27.6	110
H51	27.7 - 30.3	110
H52	30.4 - 33.3	125
Above Heaters for use on Size 1 (32 Amps. Max.)		
H53	33.4 - 36.4	125
H54	36.5 - 39.9	150
H55	40.0 - 43.9	175
H56	44.0 - 48.2	175
H57	48.3 - 52.7	200
H58	52.8 - 58.0	200
Above Heaters for use on Size 2		

ambient, the data listed in table no. 1 provide 40°C rated motors or those with a service factor of 1.15 to 1.25 with 115% to 125% protection. For 50°C or 55°C rated motors, or those with a 1.00 service factor or where a maximum of 115% protection is desired, select one size smaller heater than indicated. When non-compensated overload relays are used and the motor and relay ambients differ, select heaters from the table using adjusted motor current as follows: Decrease rated motor current 1% for each °C motor ambient exceeds relay ambient; increase rated motor current 1% for each °C relay ambient exceeds motor ambient. For ambient compensated overload relays, select heaters according to the table and selection data above, regardless of the ambient.

Instructions for Installing Third Overload Relay Kit to Type A/200 Size 00, 0, 1 and 2 Non-Reversing Horizontal Motor Controllers

1. Remove type A motor controller complete.

2. Disconnect red control wire (A), see Figure 4, from front terminal only of RH overload relay. (This wire is omitted on starters wired for separate control.)

3. Disconnect black wire (C) from contactor to overload relay and discard.

4. Remove RH overload relay and discard screws only.

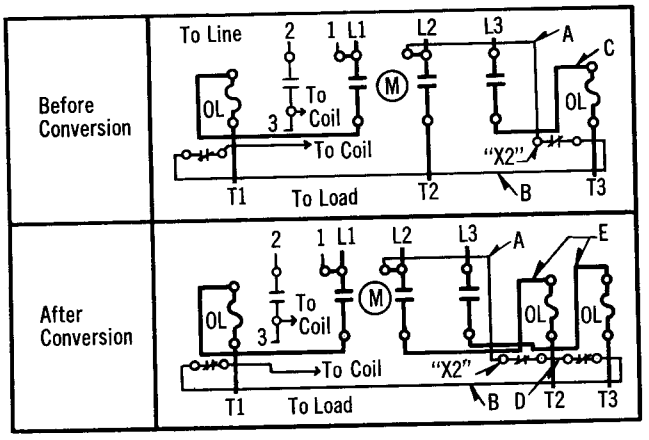

Figure 4 - Wiring Diagram

5. Move existing RH overload relay to outboard RH side (starter should still have red control wire (B) connected) and insert the third overload relay from kit (with adjusting knob up) where RH overload relay was mounted. Mount both relays to contactor base using long screws (2) from kit and lock washers and nuts removed in (4) above.

6. Connect red wire (A) and short red wire (D) from kit as shown in Figures 4 and 6.

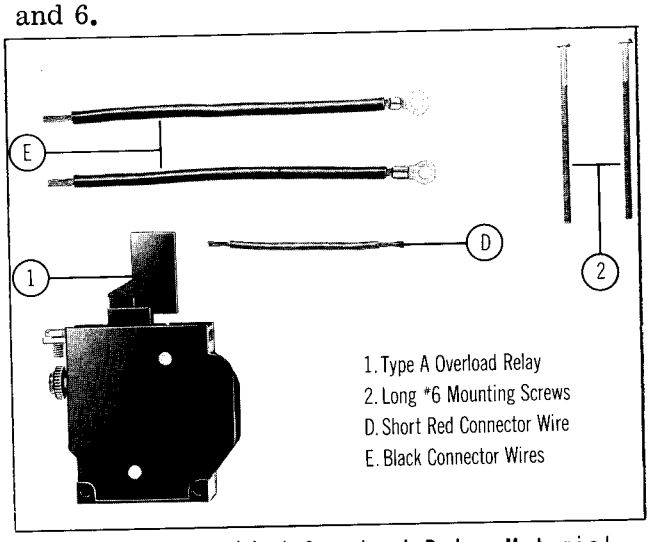

Figure 5 - Third Overload Relay Material

7. Connect black wires (E) from kit between top (line) terminals of the RH overload relays to the bottom (load) terminals of the contactor as shown in wiring diagram, Figure 4.

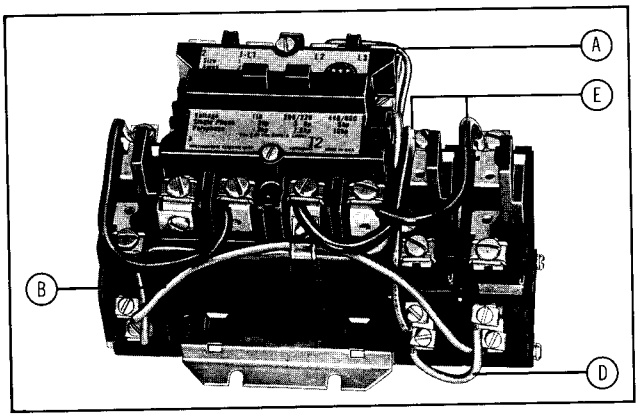

Figure 6 - Typical Installation - Size 0, 1 and 2 Motor Controller

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