

Westinghouse

Type TA Thermal Overload Relay

Instructions

Principles of Operation

Heaters are located in the circuit leading to the motor and are in close proximity to bimetal strips. When heated, one side of the bimetal strip expands more than the other causing the strip to curl or bend. The movement of the bimetal is transmitted through the push rod to the free end of the latch arm which holds the relay contacts closed. When the latch arm is raised a certain amount, the end falls through an opening in the reset lever, allowing the reset lever to be moved quickly to the left by a spring. The contact finger is thus moved away from the stationary contact, breaking the control circuit. Normal motor current passing through the heater will not generate sufficient heat to cause the bimetal to bend enough to trip the relay, but an overload of appreciable duration will cause the bending necessary to trip the latch arm.

A definite period of time is required for the relay to trip depending on the magnitude of the overload. The greater the overload the shorter the time. This time delay is sufficient to allow the motor to be started with the relay in the circuit, but with sustained overload the relay will trip. A short time must elapse before the relay can be reset after an overload trip has occurred. The curve (Fig. 2) shows these characteristics.

The relay will not protect the motor from short-circuit. Fuses must be used having a current rating equal to five times that of the heater.

Rating

The rating stamped on the heater is the current that will trip the relay in 15 to 20 minutes at 40°C. air temperature. The heater rating should be 110 to 120% of the motor rating. The relay rating may be varied from 80% to 120% of the value stamped on the heater by moving the calibration lever along the calibration scale. If a change in rating greater than 20% is desired, other heaters may easily be applied.

The relay has been designed in two styles. These styles are used for different ranges of current ratings. The relay with bimetal strips .030" thick is used in connection with heaters rated from 1 to 40 amperes. The relay with bimetal strips .040" thick is used

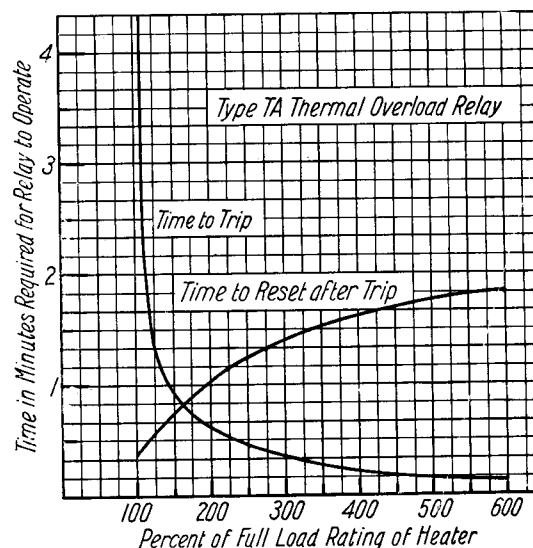


Fig. 2—40° C. Ambient Temperature Readings Taken at 3-Minute Intervals from Reset

in connection with heaters rated from 41 to 95 amperes. The proper selection of relay and heater is explained below.

Heaters should be used with relays as follows:

Heater Rating	Relay Style No.
1 to 40 amperes.....	S#489129
1 to 40 amperes.....	S#468487 (with cover)
41 to 95 amperes.....	S#489130
41 to 95 amperes.....	S#475485 (with cover)

When used in circuits having normal currents above 95 amperes, transformers are used with the relay. These transformers are specially designed for this use to give more time delay on heavy overloads than that shown on the curve.

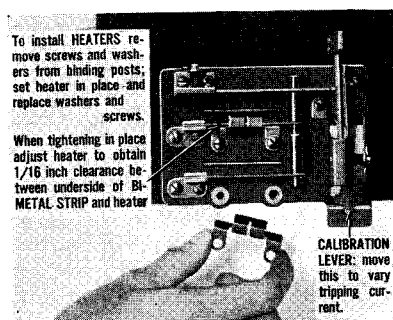


Fig. 1—Type TA Thermal Relay Showing How Heaters Are Installed

Style No. 2 Req.	Ampere Rating	Style No. 2 Req.	Ampere Rating
511342	1.0	474420	13.0
511341	1.4	474421	15.0
511263	1.7	474422	17.0
511264	1.9	502915	20.0
511265	2.1	474425	23.0
511261	2.3	474426	26.0
511262	2.6	474427	29.0
511269	3.1	501695	32.0
511266	3.6	—	—
511267	4.2	474429	36.0
511268	4.7	474431	40.0
511257	5.7	501694	41.0
511258	6.7	502916	48.0
511259	7.7	502916	48.0
511259	7.7	474432	58.0
511260	8.4	474433	68.0
511343	9.0	474434	71
474419	11.0	474436	8
		539018	

Table 1—Standard Heater Elements

Instructions—Cont'd

To Mount Heaters

To mount heaters, (see Fig. 1), remove screws and washers from the heater supports. Place heater so that the U opening straddles the bimetal strip and heater lugs rest on heater supports. Replace washers and screws, and adjust heater to give $\frac{1}{32}$ " to $\frac{1}{16}$ " clearance between heater and bimetal. Do not bend or change position of bimetal in any way as this will alter the rating.

To Reset Relay after Overload Trip

To reset by hand move the reset lever to the right until latch arm falls out of hole in reset lever. At the same time the contact on the right is closed and is held so by the latch arm.

Application

The relay will operate in both A-C. and D-C. circuits up to 600 volts with current ratings from 1 to 95 amperes. When used in air temperatures that are much different from 40°C., a slight adjustment of the calibration lever will be necessary. When mounted on an open panel the style provided with a cover should be used.

No oiling or attention is necessary except to reset when an overload trip occurs.

If relay trips too frequently the calibrating lever should be set at a higher point on the scale. If the motor is overloaded too heavily without a trip, the lever should be set at a lower point.

Renewal Parts

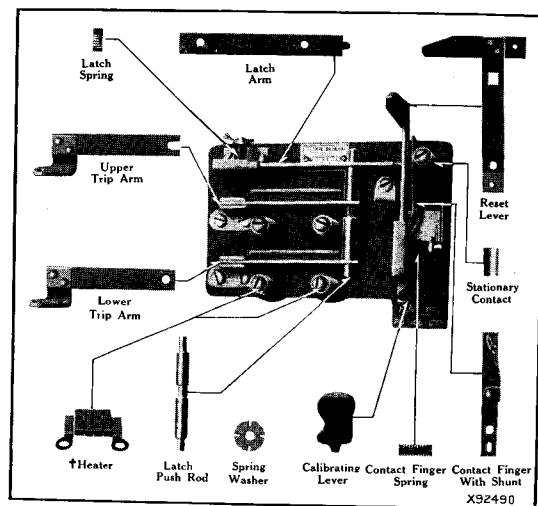


Fig. 3—Type TA Thermal Relay Renewal Parts

†Select heaters according to ampere rating from Table 1.

Ordering Instructions

Quick shipments from district office stock and prompt replies to inquiries, without the necessity of referring to the works for information, are possible only when complete identifying information for the part is given. Careful observance of the following points on inquiries or orders are essential for correct shipments and prompt service.

1. Name the part, using the name shown on the illustration in Fig. 3 and state quantity desired.

2. Specify the relay style number shown on the name plate.

3. Shipment will be made by parcel post. Shall we insure the shipment?

4. Send all orders or correspondence to the nearest district office of the company.

5. Small orders should be combined so as to amount to a value of at least one dollar, as shipping expenses prevent us from billing a smaller amount.

Westinghouse Electric & Manufacturing Company

East Pittsburgh Works

East Pittsburgh, Pa.

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NOV 7 1917



TYPE TA THERMAL OVERLOAD RELAY

INSTRUCTIONS

Construction

The type "TA" thermal overload relay makes use of bimetallic elements, to break a circuit when an overload occurs. It has been designed in two sizes, to obtain different ranges of current ratings. The relay with bimetal strips .030" thick is used in connection with heaters rated from 1 to 40 amperes. The relay with bimetal strips .040" thick is used in connection with heaters rated from 41 to 95 amperes.

When used in circuits having normal currents above 95 amperes, transformers are used with the relay. These transformers are specially designed to allow for the longer time required to accelerate larger motors to full speed.

Installation

To Mount Heaters—To mount heaters (see Fig. 1), remove screws and washers from the heater supports. Place heater so that the U opening straddles the bimetal strip and heater lugs rest on heater supports. Replace washers and screws, and adjust heater to give $\frac{1}{32}$ " to $\frac{1}{16}$ " clearance between heater and bimetal. Do not bend or change position of bimetal in any way as this will alter the rating.

Heater screws must be kept tight. Periodic inspection is advised to keep these heater screws tight at all times.

Rating

The relay will operate in both A-C. and D-C. circuits up to 600 volts with current ratings from 1 to 95 amperes.

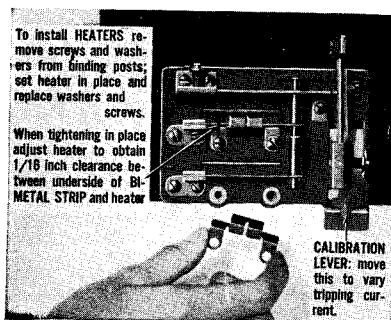


FIG. 1—TYPE TA THERMAL OVERLOAD RELAY SHOWING HOW HEATERS ARE INSTALLED

When used in air temperatures that are much different from 40°C., a slight adjustment of the calibration lever will be necessary.

The rating stamped on the heater is the current that will trip the relay in 15 to 20 minutes at 40°C. air temperature. The heater rating should be 115% to 130% of the motor rating. The relay rating may be varied from 80% to 120% of the value stamped on the heater by moving the calibration lever along the calibration scale. If a change in rating greater than 20% is desired, other heaters may easily be applied.

It is desirable to have relay heaters of such a size that relay will trip at as near to 80% setting on the desired overload as possible.

Operation

Heaters are located in the circuit leading to the motor and are in close proximity to bimetal strips. When heated, one side of the bimetal strip expands more than the other causing the strip to curl or bend. The movement of the bimetal is transmitted through the push rod to the free end of the latch arm which holds the relay contacts closed. When the latch arm is raised a certain amount, the end falls through an opening in the reset lever, allowing the reset lever to be moved quickly to the left. The contact finger is thus moved away from the stationary contact, breaking the control circuit. Normal motor current passing through the heater will not generate sufficient heat to cause the bimetal to bend enough to trip the relay, but an overload of appreciable duration will cause the bending necessary to trip the latch arm.

A definite period of time is required for the relay to trip, depending on the magnitude of the overload. The greater the overload, the shorter the time. This time delay is sufficient to allow the motor to be started with the relay in the

circuit, but with sustained overload the relay will trip. A shorter time must elapse before the relay can be reset after an overload trip has occurred. The curve (Fig. 2) shows these characteristics.

If relay trips too frequently, the calibrating lever should be set at a higher point on the scale. If the motor is overloaded too heavily without a trip, the lever should be set at a lower point.

To Reset Relay After Overload Trip—

To reset by hand, move the reset lever to the right until latch arm falls out of hole in reset lever. At the same time, the contact on the right is closed and is held so by the latch arm.

No oiling or attention is necessary, except to reset when an overload trip occurs.

The relay will not protect the motor from a short-circuit. Fuses, having a current rating equal to four times the heater rating are recommended.

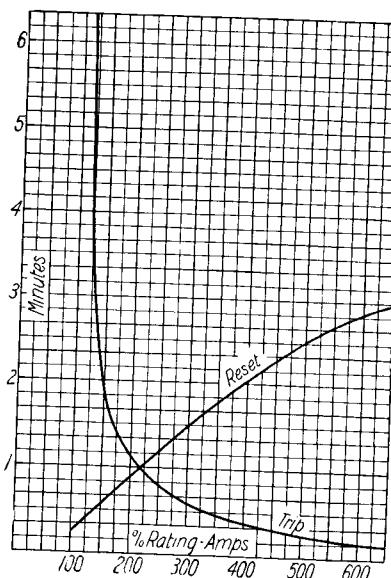
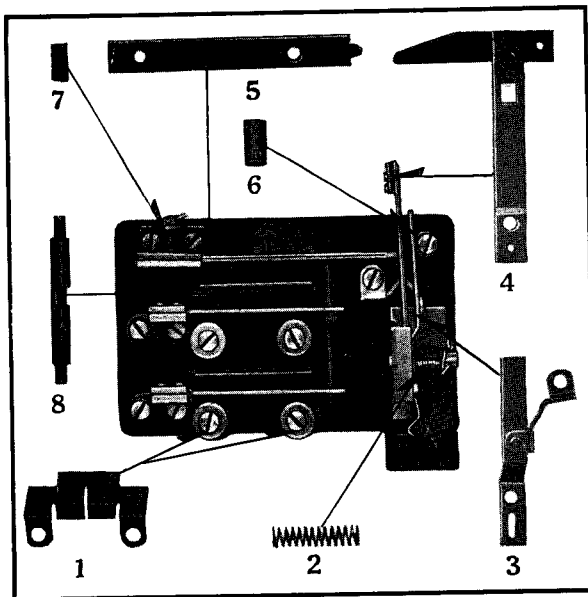


FIG. 2—28°C. AMBIENT TEMPERATURE READINGS TAKEN AT 5-MINUTE INTERVALS FROM RESET

*To be filed as an Instruction Leaflet and as Renewal Parts Data; for Renewal Parts Data, see reverse side of this sheet.



TYPE TA THERMAL OVERLOAD RELAY RENEWAL PARTS DATA



Below is a list of the Renewal Parts and the quantities of each that we recommend should be stocked by the user of this apparatus to minimize interrupted operation caused by breakdowns. The parts recommended are those most subject to wear in normal operation or those subject to damage or breakage due to possible abnormal conditions.

This list of Renewal Parts is given only as a guide. When continuous operation is a primary consideration, additional insurance against shut-downs is desirable. Under such conditions more Renewal Parts should be carried, the amount depending upon the severity of the service and the time required to secure renewals.

ORDERING INSTRUCTIONS

Name the part and give its style number. Give the complete name plate reading. State whether shipment is desired by express, freight or by parcel post. Send all orders or correspondence to nearest sales office of the Company. Small orders should be combined so as to amount to a value of at least one dollar, as order-handling and shipping expenses prevent us from billing a smaller amount.

RECOMMENDED STOCK OF RENEWAL PARTS

Characteristics of Relays.....				Standard Relays			Oil Immersed Relays		Glass Covered Relays			
Style Numbers of Relays (Without Heaters).....				468488-A	468487-E	525526-C	532328-C	705904	584324	666494		
				468489	475485-E		532329-C	705905	584325	666495		
				470414-D				710139	666493	666497		
				475486-A				710140-A	666496	666498		
				475487					715692-B	715693-B		
				482440-D					715694-A	715695-A		
				489129-F								
				489130-G								
				546344								
				546345								
				576241-A								
				576242-B								
For Relays in use up to and including.....				1	5							
Ref. No.	Name of Part	No. Per Relay	Recommended For Stock		Style Number of Part							
1†	Heater.....	2	2	4	†.....	†.....	†.....	†.....	†.....	†.....	†.....	
2	Contact Finger Spring.....	1	0	1	526597	526597	526597	526597	526597	526597	526597	
3	Contact Finger with Shunt.....	1	0	2	490053	490053	490053	532333	532333	695606	490053	
4	Reset Lever.....	1	0	0	490052	490051	547279	490052	700918	695605	695605	
5	Latch Arm.....	1	0	0	478776	478776	478776	478776	478776	478776	478776	
6	Stationary Contact.....	1	0	2	467961	467961	467961	467961	467961	457961	467961	
7	Latch Spring.....	1	0	0	485926	485926	485926	485926	485926	485926	485926	
8	Latch Push Rod.....	1	0	0	478778	478778	478778	478778	478778	478778	478778	

†When ordering Heaters, specify style number obtained from Table of Heater Ratings.

TABLE OF HEATER RATINGS

Based on Terminal Current Marked on Motor Name Plate					
Motor Amps. per Terminal	Relay Rating Amperes	Heater Style No. 2 Req'd.	Motor Amps. per Terminal	Relay Rating Amperes	Heater Style No. 2 Req'd.
.70 to .90	1.0	511342	9.60 to 11.0	13	474420
.91 to 1.20	1.4	511341	11.10 to 13.0	15	474421
1.21 to 1.45	1.7	511263	13.10 to 14.5	17	474422
1.46 to 1.65	1.9	511264	14.60 to 17.5	20	502915
1.66 to 1.80	2.1	511265	17.60 to 20.0	23	474425
1.81 to 2.00	2.3	511261	20.1 to 22	26	474426
2.01 to 2.25	2.6	511262	22.1 to 25	29	474427
2.26 to 2.70	3.1	551944	25.1 to 27	32	501695
2.71 to 3.10	3.6	551941	27.1 to 31	36	474429
3.15 to 3.65	4.2	551942	31.1 to 35	40	474431
3.70 to 4.10	4.7	551943	32.0 to 35	41	501694
4.20 to 9.90	5.7	551937	35.1 to 42	48	760593
5.00 to 5.80	6.7	551938	42.1 to 50	58	474432
5.90 to 6.70	7.7	551939	50.1 to 58	68	474433
6.80 to 7.30	8.4	551940	58.1 to 62	71	474434
7.40 to 7.80	9.0	511343	62.1 to 70	81	474436
7.90 to 9.50	11.0	474419	70.1 to 83	95	539018

*To be filed as Renewal Parts Data and as an Instruction Leaflet; for Instructions, see reverse side of this sheet.