TYPES TA-5 AND TA-23 THERMAL OVERLOAD RELAYS

RENEWAL PARTS DATA

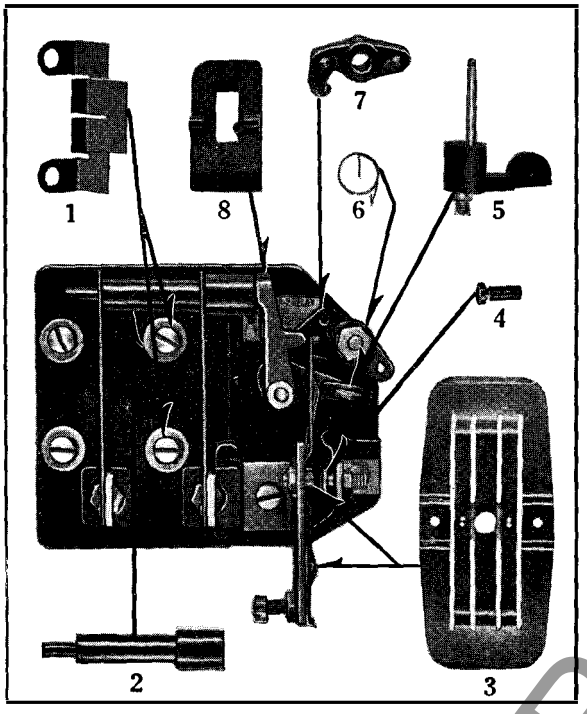

FIG. RENEWAL PARTS FOR TYPES TA-5 AND TA-23 THERMAL OVERLOAD RELAYS

RECOMMENDED HEATER RATINGS FOR TYPE TA-5 AND TYPE TA-23 RELAYS

Motor Amps. per Terminal	Heater Rating Amps.	Heater Style No. ††
.72 to .89	N 1.0	817427-A
.90 to 1.04	N 1.25	817428-A
1.05 to 1.19	N 1.45	817429-A
1.20 to 1.44	N 1.6	817430-A
1.45 to 1.69	N 1.9	817431-A
1.70 to 2.04	N 2.1	883449
2.05 to 2.44	N 2.8	817432
2.45 to 2.89	N 3.4	817433
2.90 to 3.39	N 4.0	817434
3.4 to 4.1	N 4.7	817435
4.2 to 4.7	N 5.7	817436-A
4.8 to 5.4	N 6.5	817437-A
5.5 to 6.5	N 7.4	817438
6.6 to 7.4	N 9.1	817439
7.5 to 8.4	N 10.0	817440
8.5 to 9.9	N 11.5	817441
10.0 to 12.1	N 13.5	817442
12.2 to 14.1	N 17.0	817443
14.2 to 16.1	N 18.5	817444
16.2 to 18.4	N 22.0	817445
18.5 to 21.9	N 25.0	817446
22.0 to 25.9	N 30.0	817447
26.0 to 28.9	N 34.0	817448
29.0 to 35.9	N 40.0	816929
36.0 to 44.0	N 49.0	831442
45.0 to 54.0	N 62.0	831443
55.0 to 64.0	N 74.0	831444
65.0 to 74.0	N 81.0	831445
75.0 to 85.0	N 95.0	831446

††Two required for TA-5 Relay.
Three required for TA-23 Relay.

(Based on Terminal Current Marked on Motor Name Plate)

Note:—The table is for convenience and applies to standard open type motors on average applications. For special motors or standard motors under special conditions the recommended heater may not be the best.

RECOMMENDED STOCK OF RENEWAL PARTS

This list of Renewal Parts is given only as a guide. When continuous operation is a primary consideration, additional insurance against shutdowns is desirable. Under such conditions more renewal parts should be carried, considering the severity of the service and the time required to secure replacements.

ORDERING INSTRUCTIONS

When ordering Renewal Parts, always specify the name and reference number of the part wanted as shown on the illustration in this Instruction Leaflet, giving Shop Order or Style Number, and the type of apparatus as shown on the name plate.

To avoid delays and misunderstandings, note carefully the following points:

1. Send all correspondence and orders to the nearest Sales Office of the Company.

2. State whether shipment is to be made by freight, express or parcel post. In the absence of instructions, goods will be shipped at our discretion. Parcel post shipments will be insured only on request. All shipments are at purchaser's risk.

3. Small orders should be combined so as to amount to a value of at least $1.00 net. Where the total of the sale is less than this, the material will be invoiced at $1.00.

TYPE OF RELAY		TYPE TA-5 Two-Pole		TYPE TA-23 Three-Pole		No. Per Relay	Contactors in Use	
CHARACTERISTICS AND STYLE NUMBER OF RELAYS—WITHOUT HEATERS		Without Mounting Studs, 808734, A	With Mounting Studs, 808735, A 897641	Without Mounting Studs, 808724, A	With Mounting Studs 808725, A		1	5
Ref. No.	Description of Part	STYLE NUMBER OF PART					Recommended For Stock	
†1	Heater	†	†	.....	.....	2	2	4
†1	Heater	.....	.....	†	†	3	3	6
2	Latch Push Rod	597587	597587	808728	808728	1	0	0
‡3	Moving Contact	541356	541356	541356	541356	1	‡	‡
§	Moving Contact Support	597588	597588	597588	597588	1	0	0
‡4	Stationary Contact and Holder	548397	548397	548397	548397	1	‡	‡
§	Stationary Contact Support	597589	°597589	597589	597589	1	0	0
§	Stationary Contact Support for Style No. 897641	.....	920321	.....	.....	1	0	0
5	Calibrating Lever	597584	597584	597584	597584	1	0	0
6	Latch Spring	597590	597590	597590	597590	1	0	0
7	Latch	597585	597585	597585	597585	1	0	0
8	Operating Lever	597586	597586	597586	597586	1	0	0
§	Retaining Ring for Operating Lever	547004	547004	547004	547004	1	0	0
‡§	Thermal Strip—$\frac{1}{32}$" Hole	816884	816884	816884	816884	1	‡	‡
‡§	Thermal Strip—$\frac{13}{32}$" Hole	816885	816885	816885	816885	1	‡	‡
‡§	Thermal Strip—Slotted End	.....	.....	850712	850712	1	‡	‡
§	Mounting Screw for Heater and Thermal Strip (#10-32 x $\frac{3}{8}$" Fil. Head Brass Machin e Screw)	**	**	**	**	1 Set	0	0
§	Contact Terminal Stud	.....	361705	.....	361705	2	0	0
§	Heater Terminal Stud	.....	492837	.....	.....	4	0	0
§	Heater Terminal Stud	.....	.....	.....	492837	6	0	0

**Standard Hardware. §Not illustrated. °Used only on Relay Style No. 808735.
†When ordering Heaters, specify style number obtained from table of Heaters. (See above)
‡When Moving Contact, Stationary Contact and Holder or Thermal Strips must be renewed, the complete relay should be sent to our Works or nearest service shop, as accurate recalibration is necessary when any change in contacts is made. These contacts and thermal strips may be renewed by the customer, but at the risk of a possible change in relay calibration.

TYPES TA-5 AND TA-23 THERMAL OVERLOAD RELAYS

INSTRUCTIONS

Application

The Type TA-5 and Type TA-23 Thermal Overload Relays make use of bimetallic thermal elements heated by electric heaters, to operate a contact in the coil circuit of a contactor or circuit-breaker, for the disconnection of power on overload. The Type TA-5 relay has two thermal elements which operate a single contact. The Type TA-23 relay is similar except that it has three thermal elements.

Both relays are used in A-C. or D-C. circuits within a current range of 1 to 95 amperes at voltages not to exceed 600 volts. Above 95 amperes A-C. one special current transformer for each heater is required. The contacts will make and break currents up to 6.0 amperes maximum in A-C. circuits, but in D-C. circuits the current should not exceed 0.8 ampere for 115 volts, 0.35 ampere for 230 volts, and 0.07 ampere for 600 volts.

The relay will give protection against abnormal load conditions up to the locked current of the motor. For accidental short-circuits which greatly exceed this figure the relay itself may be damaged by the overcurrent before it has time to act. **To protect against short-circuits, fuses having a rating equal to four times the motor rating or a quick acting circuit-breaker should be used** in addition to the relay.

Construction

Two or three bimetallic thermostat strips are mounted parallel to each other on a moulded insulating base. The free ends of the strips are in line and act upon a pushrod which transmits their motion to the moving contact. The insulating base is of heat resisting composition and carries two metal posts adjacent to each bimetal which support a heater in close proximity to the bimetal. The heaters are the only parts which vary with the rating.

The contacts have a novel construction employing a specially shaped piece of flat spring metal to give a quick-break action. The moving contact opens suddenly at the tripping temperature of the bimetal and closes suddenly after the bimetal has partially cooled.

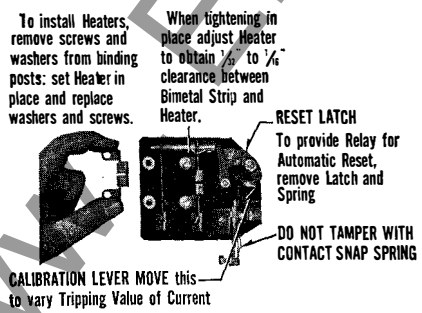

FIG. 2—THERMAL RELAY, SHOWING HOW HEATERS ARE INSTALLED

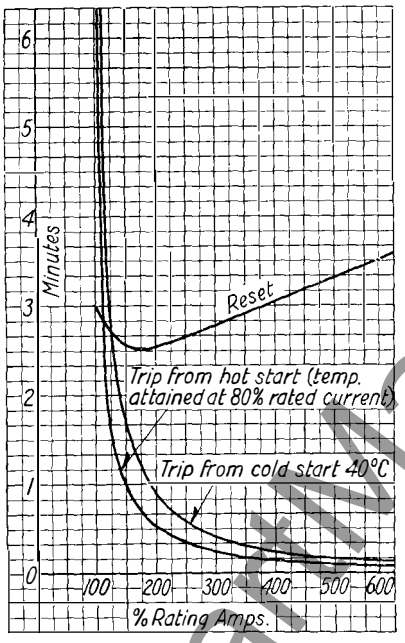

FIG. 3—TIME-CURRENT CURVES

Reset Latch—All relays are supplied with a hand reset latch in place. To use the relay as an automatic reset relay it is necessary to remove the latch and latch spring so that the contact spring will be free to close itself when the relay has cooled sufficiently.

A calibration lever which changes the position of a link in the pushrod motion allows the relay rating to be varied from 90% to 120% of the rating stamped on the heater. Any single bimetal will operate the contacts alone for single phase protection.

Operation

When the power circuit is closed, current flowing through the heaters heats the bimetallic strips. When heated, one side of the bimetallic strip expands more than the other, causing the strip to bend or warp. The movement of the bimetals is transmitted through the pushrod mechanism to the free end of the contact spring. When free, the contact spring holds the contacts closed and normal motor current passing through the heaters does not cause sufficient motion to affect the contacts. When an overcurrent causes the warping of the bimetals to increase to a certain degree the contact spring buckles and the contacts snap open. When the relay has cooled sufficiently the contacts snap closed.

The control of both the opening and closing of the contacts by action of the thermal element alone constitutes "automatic resetting" which is an added convenience not obtainable on other bimetallic overload relays. A latch is provided on every relay which is arranged to hook the contact in the open position if "hand reset" is desired and a pull string attached to the latch, is used for resetting.

Time required for the relay to trip depends upon the size of the overload. The greater the overload the shorter the time. The time lag allows the motor starting currents to be passed without tripping the relay but much smaller overload currents long-continued will trip it. The relay will trip more quickly already heated up than when it starts cold. A short time must elapse before the relay can be reset after an overload trip has occurred. The approximate times to be expected are expressed by the curves of Fig. 3.

Installation and Maintenance

To Mount Heaters—(See Fig. 2), remove screws from the heater supports. Place heater so that the U-opening straddles the bimetal strip and the heater lugs rest on the heater supports. See that the tops of the heater supports and the contact surfaces of the lugs are clean. Replace 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 may alter the rating. **Heater mounting screws must be tight. Periodic inspection is recommended.**

Reset Latch—No oiling or other attention is necessary except to reset after overload when the hand reset latch is used.

Heaters

Each heater is stamped with the letter "N" followed by numerals. The letter is a type designation and the number expresses the heater rating, which is the current that will trip the relay ultimately at 40°C. air temperature, at 100% adjustment. At other air temperatures the rating does not apply exactly but the error is small.

For ordinary applications using open type motors it is safe to choose a heater whose minimum tripping current is 125% of the motor current rating, and this percentage allows utilization of the reserve capacity of the motor to the maximum degree consistent with Underwriters Rules. The effective rating of any heater may be varied from 90% to 120% of the marked value by moving the adjusting lever.

For motors which are unusually close rated, such as some totally enclosed motors, it is advisable to choose the heater rating and set the relay adjustment as close to the motor rating as the normal operating peaks will allow.

For very long starting times saturated current transformers can be supplied to fit the exact conditions.

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