TRA Relay and Control Panel

INSTRUCTIONS

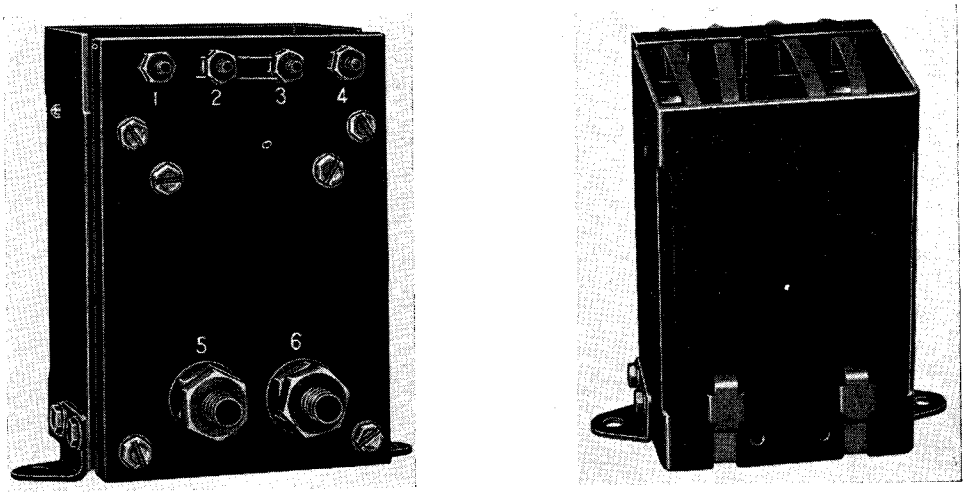

FIG. 1—TYPE TRA RELAY

GENERAL

TRA Relay

The TRA relay is a temperature-operated device which, when applied to a Type ASL transformer, permits full utilization of the inherent short time overload capacity of the transformer. The relay provides protection against sustained excessive overloads and possible damage to the transformer due to operation at exceedingly high temperatures. The TRA relay also protects the transformer from damage due to short circuits. The operating temperature of the relay is coordinated with the hot spot temperature of the transformer windings. A bimetal thermal tripping device is heated by the hot air from the coil cooling ducts, and also by current from the secondary of a current transformer in the load circuit. First, one bimetal arm trips and closes a signal circuit to indicate that the transformer is approaching its limiting operating temperature; then the other bimetal trips at a slightly higher temperature and closes a trip circuit which can be made to operate the circuit breakers and remove the load from the transformer. The relay is shown in Fig. 1.

Control Panel

The TRA control panel is always used with the TRA relay. The control panel serves the following purposes:

1. It has two auxiliary relays to isolate the operator's signal and trip circuits from the relay contacts.
2. It provides sealing contacts to hold the signal and trip circuits closed until reset manually.
3. It provides reset switches.
4. It provides convenient terminal board connections for operator's circuits.
5. It provides means for changing signal and trip contacts from normally open to normally closed. The control panel is shown in Fig. 2.

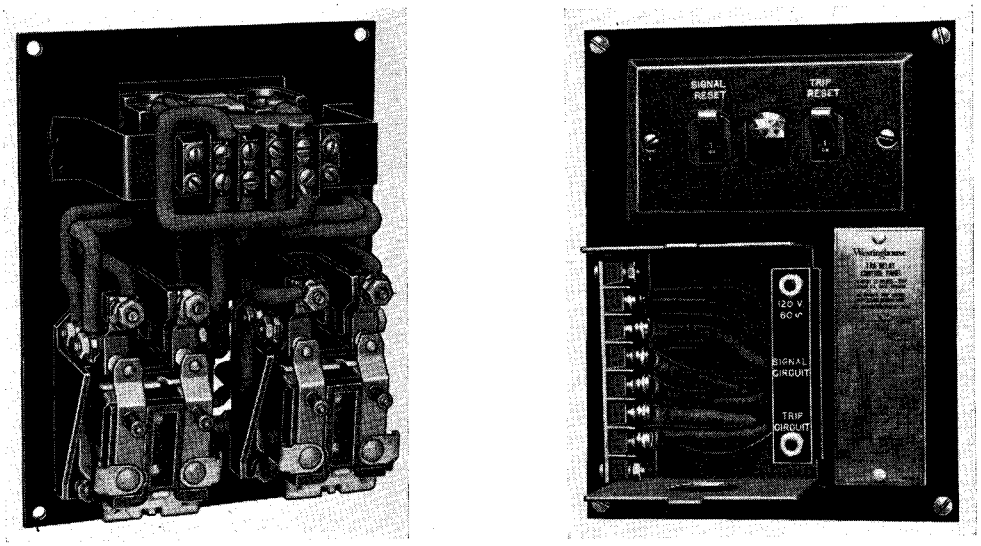

FIG. 2—CONTROL PANEL FOR TYPE TRA RELAY

TRA Relay and Control Panel—Continued

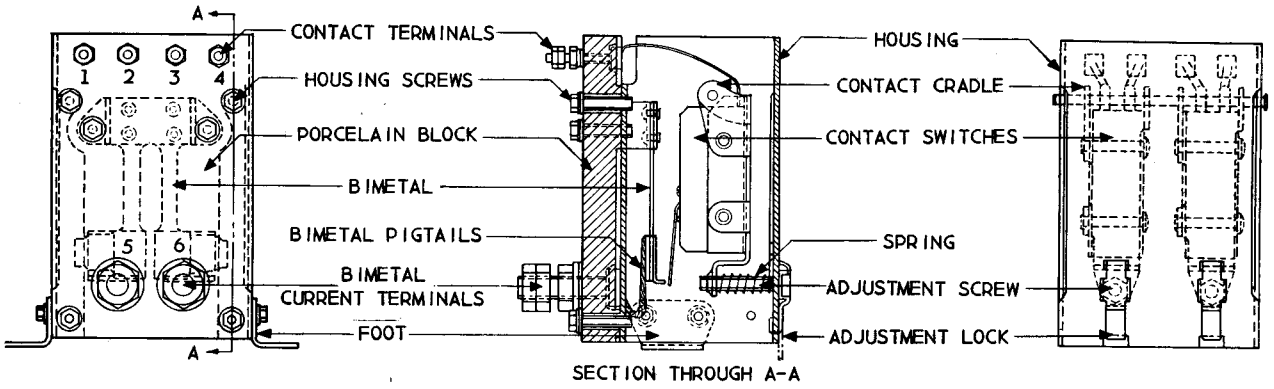

FIG. 3—ASSEMBLY OF TRA RELAY

Current Transformer

In addition to the relay and its control panel, each transformer equipped with a "TRA" relay has a current transformer to supply current to the relay bimetal. In most cases this will be a ring type transformer mounted on the cover around the lower end of one of the bushings. For extremely low currents a wound type current transformer will be mounted inside the transformer case.

CONSTRUCTION

The relay mechanism consists of a porcelain block on which is mounted a metal housing, terminals, and two bimetal strips. The two contacts are low energy switches which are operated by the bimetal strips. The relay is simple and rugged, as shown in Fig. 3.

The relay control consists of a metal panel, on the front of which is mounted a terminal box with provision for a ¾ inch conduit connection and a six point terminal block. The signal light and two reset switches for the auxiliary relays are also mounted on the front of the panel. On the rear of the panel are mounted the auxiliary relays and a terminal board for connecting the wires from the TRA relay. The construction of the control panel is shown in Fig. 4. A wiring diagram is shown in Fig. 5.

OPERATION OF THE TRA RELAY

The TRA relay consists of two low energy switches, and two bimetal strips, arranged so that a rise in temperature in the bimetal strips causes them to deflect and close the switches. The temperature at which the bimetal strip closes the switch is calibrated by adjusting the distance between the bimetal strip and the switch. This adjustment is made and locked at the factory.

The relay is mounted directly above the transformer coils so that hot air from the coil cooling ducts passes over and heats the bimetal strips. Additional heating in the bimetal strips is obtained

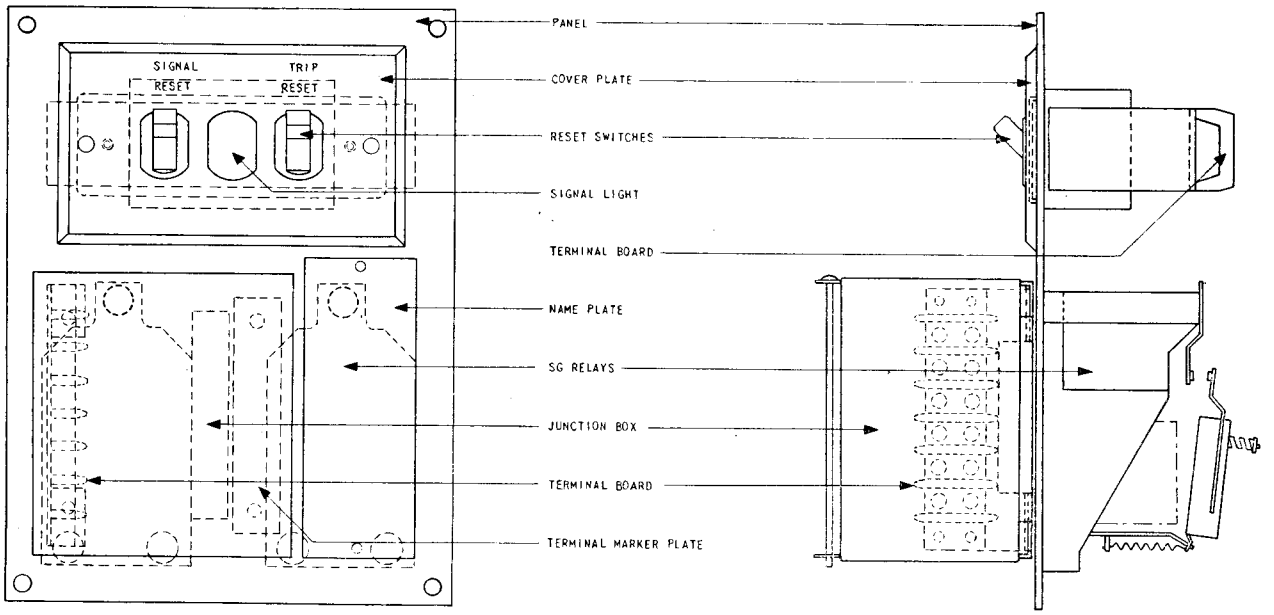

FIG. 4—ASSEMBLY OF THE TRA RELAY CONTROL PANEL

TRA Relay and Control Panel—Continued

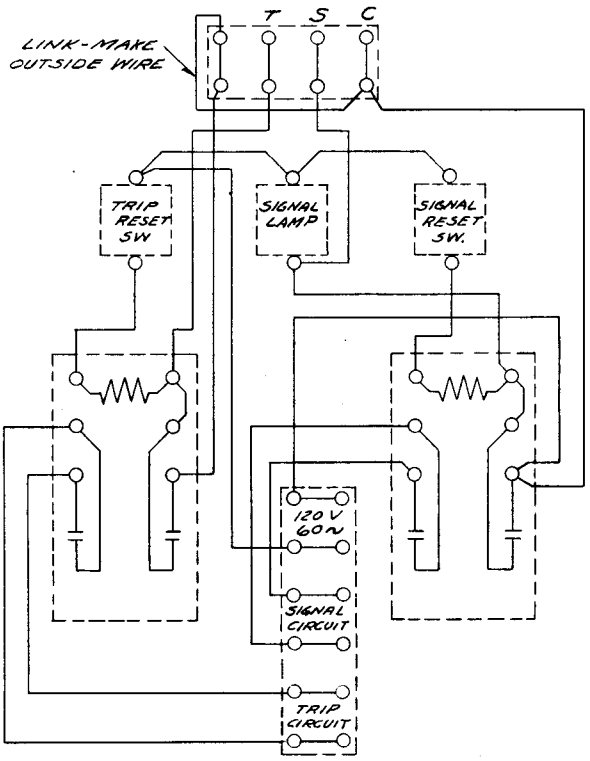

FIG. 5—CONTROL PANEL WIRING DIAGRAM—REAR VIEW

by circulating a current through them which is proportional to the load current. Circulating current for the bimetal is obtained by the current transformer supplied with the apparatus. With this arrangement the temperature acquired by the bimetal strips is a function of the ambient temperature and also of the load on the transformer. The limiting load which the TRA relay allows the transformer to carry is, by this means, set by the hot spot temperature of the windings.

The relay control panel which is normally supplied with the relay gives two control circuits to operate signal and protective equipment. These control circuits are normally open. They close when the TRA contacts close. A typical installation would be an alarm bell or signal light operating off the signal circuit, and the trip coil of the protecting circuit breaker operating off the trip circuit.

The control contacts are self-sealing and will hold closed, once they have operated, until reset by the operator. The signal indication means that the transformer is approaching its temperature limit or that it has been near its limit; but not close enough to cause the breakers to trip. Normally the trip circuit contacts will also seal in, but the operator may operate the control panel with the trip contacts non-sealing by removing the link on the rear terminal block.

The operator may require a normally closed circuit for his signal and trip circuits. The regular TRA control panel can be made to have normally closed signal and tripping contacts by reversing the stationary contacts on the auxiliary relays.

INSTALLATION

The TRA relay is mounted above the coils on the upper pressure ring so that the hot air from the coils passes directly over the bimetal strips. The relay control panel is normally mounted on the low voltage side of the transformer case. The complete relay, control panel and internal wiring is installed at the factory. The relay is calibrated at the factory to signal and trip at the correct temperature and transformer load. These adjustments should not be changed.

The operator must connect an independent 60 cycle voltage supply to the proper terminals on the terminal board with the proper voltage and connections as shown on the instruction plate which is mounted on the control panel.

MAINTENANCE

The TRA relay will operate infrequently. The current handled by its contacts is very small compared to their rating and they should last indefinitely.

The current rating of the auxiliary relay contacts is more than ample for average signal and trip circuit requirements. These contacts will carry 10 amperes continuously and will interrupt 30 amperes at 120 volts, 60 cycles.

An occasional inspection is all that is necessary to make sure the auxiliary relay contacts are not pitted.

RENEWAL PARTS

If the TRA relay becomes inoperative return relay to Sharon Works for repairs. If renewal parts, for the control panel, are required, indicate part needed.

State serial number, and stock order or L-Spec. number, as are given on the transformer instruction plate, when ordering parts. Order parts from nearest Westinghouse Electric & Manufacturing Company office or from the Sharon, Pennsylvania, Works.

Westinghouse Electric & Manufacturing Company

Sharon, Pennsylvania

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