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INSTRUCTION LEAFLET 3487-C
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GENERAL PURPOSE CONTROL DIVISION

Type TI-2 Relay

INSTRUCTIONS

Application

The type TI-2 relay is a panel mounted, single pole D-C. overload relay. It has a single spring closed contact, which trips with thermal time delay on low and medium overloads, and trips instantaneously on high overloads, to open the coil circuits of magnetic contactors which open the power circuit. The relay can be set to latch out after operating if desired. It can be provided with an auxiliary shunt connected magnet for electric reset. By reversing the mounting of this magnet, it may be arranged to reset either by energizing or by deenergizing the magnet.

Type TI-2 relays are applied according to the rule that the minimum tripping current for the relay is approximately 120% of the continuous motor rating or of the nominal current rating of the motor when it is applied on intermittent loads above its continuous rating. Time delay curves for a typical application according to this rule are shown in Fig. 1. The contacts will open D-C. magnet circuits carrying .2 ampere at 250 volts or .1 ampere at 600 volts.

Construction

The relay is made up of magnetic and mechanical parts mounted on a moulded base to form a unit which is common to all ratings, on which are assembled coils and heaters which vary with the rating.

The relay operates according to a combination of magnetic and thermal principles. A clapper type magnet is magnetized by a series coil and carries a horizontal armature, the free end of which may take an upper or lower position depending on the magnetic and thermal conditions. The armature is normally biased to its lower position where it is held by the magnetic attraction of a strip of nickel-iron alloy called "Invar". Under tripping conditions, the lockout effect of the Invar strip is neutralized or overpowered and the armature is drawn to its upper position by the magnetic attraction of an upper pole formed by the bent end of the rear frame. In moving upward, the armature lifts a push rod which opens a normally closed contact at the top of the relay. A spring is arranged to engage a notch in the push rod in its upper position and thus hold the contact open for "Hand Reset" operation until the latch is disengaged by depressing the Reset Push Button. If "Automatic Reset" operation is wanted the spring latch is permanently held out of engagement by depressing the Reset push button and giving it one-quarter turn clockwise.

The time delay features of the relay depend on the special physical property of Invar by which it loses its magnetic permeability at a temperature of about 240°C. This property is utilized by connecting the Invar lockout strip or "heater" in series or parallel to the coil and passing the load current or a fraction of it through the heater. On moderate sustained overloads the internally generated heat is sufficient to raise the temperature of the heater to its demagnetization point, and the lockout effect of the heater is neutralized allowing the relay to trip. For overloads which exceed the "Instantaneous Trip" setting of the relay, a vertical auxiliary armature, attracted toward the coil, strikes the horizontal armature, raises it from the Invar $\frac{1}{32}$ to $\frac{1}{16}$ inch. which is sufficient to break the lockout allowing it to trip.

Adjustment

The relay has two adjustments—(1) to vary the rating and (2) to vary the instantaneous tripping current.

The adjustment for rating is made by turning an adjusting plate attached to the horizontal armature, so that the lockout pin registers with a hot spot (low current rating) at the right or with a cool spot (high current rating) at the left of its motion. The change of current rating which may be expected between "low" and "high" adjustments is about 12% for large current heaters and 20% for small ones. A change of this adjustment is accomplished by loosening a screw as shown in Fig. 2.

A nut adjustment is provided for varying the spring tension on the auxiliary armature to vary the percent overload at which instantaneous trip occurs. The adjustment is set at the factory to give instantaneous trip at 300 to 400%.

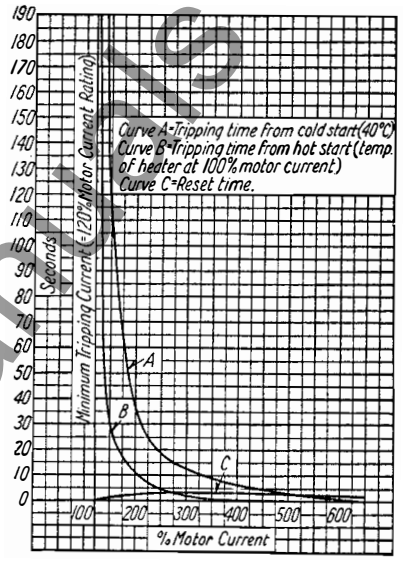

FIG. 1—RATING CHARACTERISTICS

Maintenance

The heater should be kept free from dust accumulations which might interfere with proper seating of the armature. All joints must be maintained clean and tight to avoid local heating which would change the tripping range of the relay. In case it is necessary to remove the coils the front frame with armature attached can be removed by removing the core bolt and the coils and heaters are then easily removable.

When installing or replacing heaters mount the heater with the style marking to the left and upward.

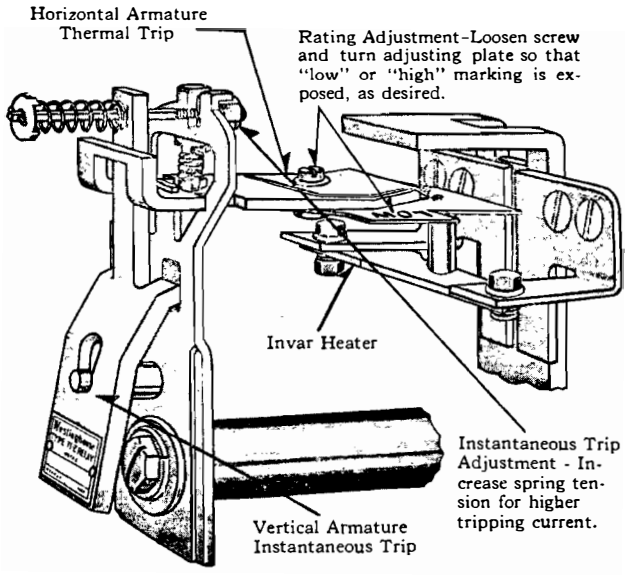

FIG. 2—INSTANTANEOUS TRIP ADJUSTMENT

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