Square D Solid-State Overload & Phase-Loss Relay in ELLIOTT CONTROLLERS

SCOPE This bulletin describes the Square D Class 9065 Solid-state Overload & Phase-Loss Relay optionally included in Type 230 and 230-PM controllers. The bulletin discusses trip functions and dial settings, then tabulates applications for various current transformer selections and full load amps. Portions of this bulletin are extracted or paraphrased from Square D literature.

RELAY DESCRIPTION The relay is Square D Class 9065 SFC20, Selectable Trip Class 20 or 10, with 3-9-amps adjustment dial and a tamper guard for the adjustment dial. This relay is a current-powered, current-sensing device with a normally-closed, trip contact. The relay protects a three-phase AC motor from running overload currents, phase-loss, and phase-unbalance. In Elliott controllers, the current-sensing elements are arranged so that one or two loops of wire may be installed to give two current ranges. The relay includes a Trip Class 20 or 10 selector switch and a yellow trip indicator for overload, phase loss or phase unbalance. The mechanical-trip arrangement is available for field tests.

APPLICATION In Elliott controllers, the relay is designated “OLP” on schematic diagram. The relay current-sensing elements are connected to the 5-amp secondaries of line current transformers. Current transformers are usually selected so that the full load current will read as high as practical on the ammeter, as shown in CT Ratio table for one loop turn in relay. The relay’s normally-closed trip contact is connected to the master control relay of the controller. The relay is coordinated with current-limiting main fuses which interrupt fault currents exceeding any likely running overload or stalled rotor current. The relay is mounted on the inside of the controller door and equipped with an external reset and with a terminal block for current leads. For Class I, Division 2 applications, the relay is mounted in an explosion-proof enclosure.

PHASE LOSS/PHASE UNBALANCE The relay initiates a trip within three seconds if one of the 3 phase currents is not present or if the current unbalance is 75% or more.. As phase unbalance increases, the internal circuitry adjusts the motor thermal model to simulate the increased heating and accelerates tripping of the relay.

OVERLOAD TRIP The time to trip depends on selected Nominal Trip Class, current magnitude, and length of time since last trip. Overload trip time is inversely related to current magnitude, as shown in Time-Current Curve Bulletin 9-31672-TC. Default Trip Class is Class 20. At currents that are 600% or more of the dial setting, the relay trips in approximately 20 seconds for Class 20 and approximately 10-seconds for Class 10.

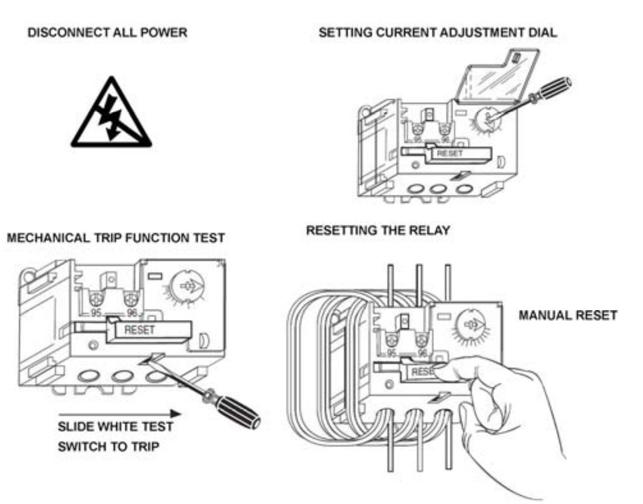
OVERLOAD DIAL SETTING The dial setting is based upon rated full load current (FLA), motor service factor (SF), and current transformer turns (CTR). While the dial range is 3 9 amps, for more accurate settings, the preferred dial settings are 3 5 amps with one loop turn or 3 6 amps with two loop turns. When current transformers are selected so that the full load current will read as high as practical on the ammeter, one loop turn is used in relay. Select dial setting in range of 3-5-amps --

- For a 1.15 service factor motor & One Loop Turn,
  Setting = FLA / CTR
- For a 1.0 service factor motor & One Loop Turn,
  Setting = 0.90 X FLA/CTR

When current transformers are selected so that FLA/CTR is less than 3-amps, two loop turns are used in relay. When two loop turns are used, select dial setting in range of 3 6-amps --

- For a 1.15 service factor motor & Two Loop Turns,
  Setting = 2 X FLA/CTR
- For a 1.0 service factor motor & Two Loop Turns,
  Setting = 1.80 X FLA/CTR

SETTING, TRIP TEST, & RESETTING



CT STYLE		FLA RANGES FOR RELAY			
		WITH ONE LOOP TURN		WITH TWO LOOP TURNS	
CT	CTR	FLA,1.15SF	FLA,1.00SF	FLA, 1.15SF	FLA, 1.00SF
50:5	10	30-45	33-50	15-30	17-33
75:5	15	45-65	50-75	23-45	25-50
100:5	20	60-90	67-100	30-60	33-66
150:5	30	90-130	100-150	45-90	50-100
200:5	40	120-180	133-200	60-120	67-133
300:5	60	180-260	200-300	90-180	100-200
400:5	80	240-360	267-360	120-240	133-267