P45 and P145 Series Oil Pressure Cutout Controls With Built-In Time Delay Relay

Application

The P45 and P145 Series controls provide dependable economical low lube oil pressure cutout for pressure lubricated refrigeration compressors. The factory set pressure adjustment provides operation to the compressor manufacturer's specification.

The P45 and P145 controls measure the net oil pressure available to circulate oil through the lubrication system. Net oil pressure is the difference between the oil gage pressure and the refrigerant pressure in the crankcase.

A built-in time delay relay, compensated for ambient temperature, allows for pressure pickup on start and avoids nuisance shutdowns on short duration pressure losses during the running cycle.

Important: Use P45 and P145 controls to control equipment under normal operating conditions. Use P45 and P145 controls only as an operating control. Where failure or malfunction of the controls could lead to personal injury or property damage to the controlled equipment or other property, additional precautions must be designed into the control system. Incorporate and maintain other devices, such as supervisory or alarm systems or safety or limit controls, intended to warn of or protect against failure or malfunction of the control.

Features

- The P45 and P145 are interchangeable in mounting and wiring with most Penn P28 and P128 controls.
- Proven reliable pressure sensing elements -- several million in use.
- Time delay relay incorporates trip-free manual reset.
- Ambient compensation gives uniform time delay regardless of temperature variations at control location.
- Enclosed pressure actuated contacts are protected against wiring interference.
- Single unit mounting and wiring -- saves installation time and materials.

Fig. 1: Exterior of P145 Series

A power element connection with 1/4 in. flare nut (Style 13) is standard.

Optional constructions

Pressure connectors

Standard controls supplied with 36 in. (914 mm) capillary tubing with 1/4 in. flare nut (Style 13). Controls with 1/4 in. SAE male connector (Style 5) or 36 in. (914 mm) capillary and 1/4 in. sweat connection (Style 34) may be supplied on quantity orders, when specified. See Fig. 3.

Time delay heater circuit

For voltage applications other than listed in Table 2, consult Customer Service. For applications using a 208 V control circuit, it is suggested that one leg of the 208 V circuit and a neutral or ground wire be used to power the 120 V circuit of the time delay heater.

When a P45 control is installed on a 440 or 550 VAC system, use an external step-down transformer to provide either 120 or 240 volts to the pilot and time delay relay circuits. The transformer must be of sufficient volt-ampere capacity to operate the motor starter and the P45's time delay relay.

Mounting bracket

You can purchase universal bracket part number 271-51 separately.

Outdoor enclosure

Available on quantity orders, when specified.

Time delay relay

The time delay relay is a trip-free, thermal expansion device. Manual reset models are available with factory set and sealed time delays of 30, 45, or 120 seconds.

The time delay relay is compensated to minimize the effect of ambient temperature variations. Timing is affected by voltage variations.

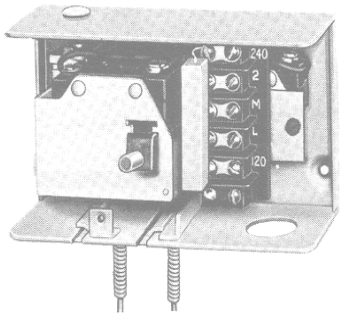


Fig. 2: P45 Control without cover, with convenient wiring terminals

Table 1: Electrical power required for time delay relay

Timing in seconds	Voltage	
	24 or 120	240
30, 45, or 120	15 VA	30 VA

Note: 240 V includes dropping resistor wattage.

Repairs and replacement

Field repairs must not be made. For a replacement control contact the nearest Johnson Controls® wholesaler.

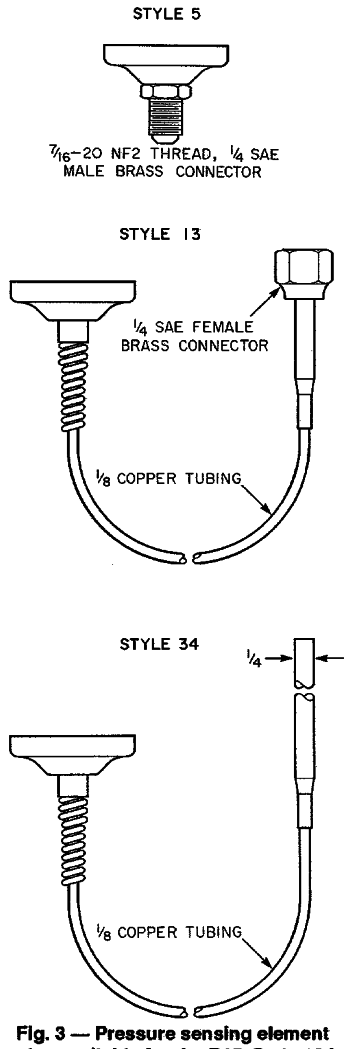


Fig. 3 — Pressure sensing element styles available for the P45. Style 13 is standard.

Ordering information

To order, specify the following:

- Quantity required.
- Factory setting -- pressure differential below which the time delay circuit is energized.
- The Complete Product Number if available.
- If the Product Number is not available, specify the Type Number and the following:

  a. Connector Style 5, Style 13 or Style 34. See Fig. 3.

  b. Timing in seconds (30, 45, 120).

  c. Time delay heater circuit voltage.

  1) 120/240 dual voltage.
  2) 24 VAC or DC

Wiring diagrams

Connect Terminals L and M in the control circuit as a single-pole switch.

Connect Terminals 2 and V1 so that the circuit only energizes when the motor starter is closed.

Standard external wiring diagrams (Form 3646) are available upon request.

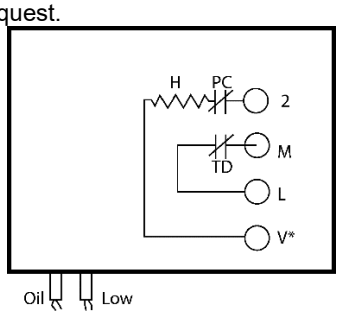


Fig. 4 — P45NAA, single voltage

*V: 120 VAC, 208 VAC, 240 VAC or 24 VAC

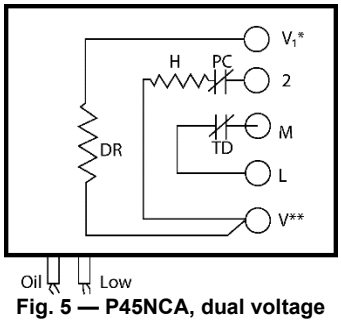


Fig. 5 — P45NCA, dual voltage

*V_1: 240 V
**V: 120 V

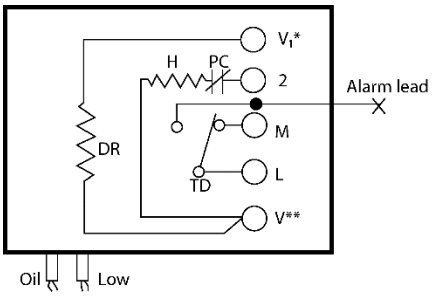


Fig. 6 — P45NCB, dual voltage with alarm circuit

*V_1: 240 V
**V 120 V

Note: In the P45 and P145 controls with an alarm lead, the TD switch is single-pole double-throw (SPDT). The contacts between Terminals L and M operate as the TD which is outlined above. When these contacts are open, the contacts between L and the alarm lead wire are closed.

Wiring diagram definitions

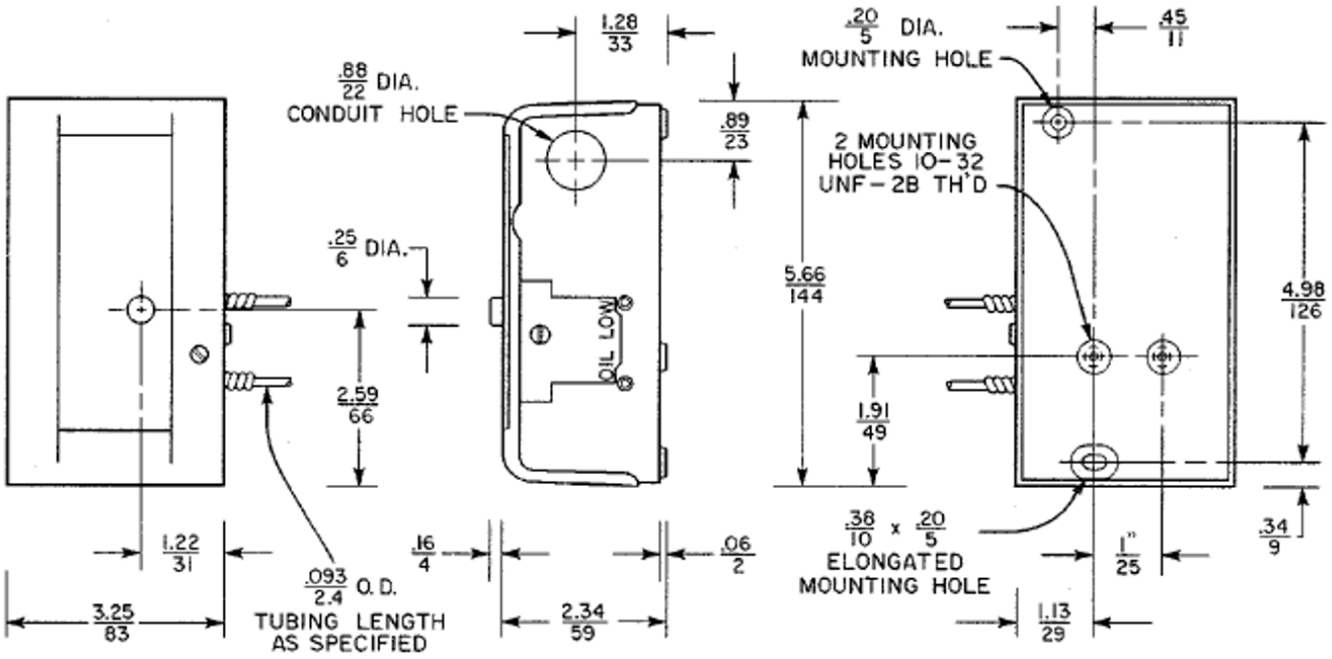
PC: Pressure-actuated contacts. The contacts open on an increase in pressure difference between oil and low-pressure connectors. The contacts make and break the time delay heater circuit.

TD: Heater-actuated time delay contacts. The contacts open after the factory-set time delay interval if either of the following happens:

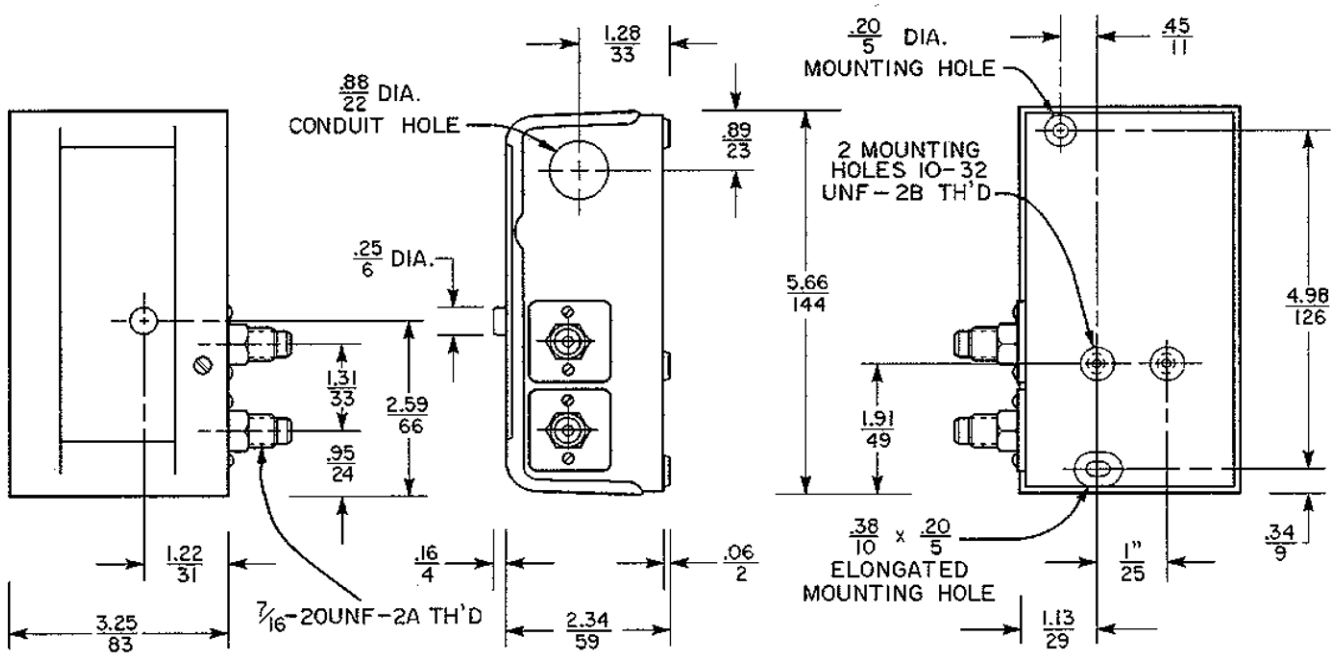
- PC closes when the differential pressure drops below the setpoint.
- The differential pressure fails to increase to 3 psi (21 kPa) above the setpoint after the machine starts.

DR: Voltage-dropping resistor for dual voltage models.

H: Heater for time delay relay.



P45 Dimensions, in. (mm) with Style 13 and 34 elements



P145 Dimensions, in. (mm) with Style 5 elements

The performance specifications appearing herein are nominal and are subject to accepted manufacturing tolerances and application variables.

Technical specifications

Table 2: P45 technical specifications

Specification		Description
Type number	P45NAA	Manual reset, 24 VAC
	P45NCA P145NCA	Manual reset, 120/240 VAC
	P45NCB P145NCB	Manual reset, 120/240 VAC, 30 in. (762 mm) wire lead on alarm
Range		7/60 psi (50/400 kPa) time delay shutdown range **Note:** The time delay heater de-energizes at 3 psi (21 kPa) pressure difference above the setting.
Refrigerant		Non-corrosive, all-range
Maximum allowable overrun pressure		425 psig (2930 kPa)
Electrical rating, pilot duty	Time delay heater circuit	120/240 VAC
		24 VAC
	Pilot circuit	750 VA, 120/240 VAC
		120 VA, 24 VAC
		57.5 VA, 24 VDC
Switch		Enclosed, dust-protected Pennswitch
Finish		Black, baked enamel
Material	Case	0.062 in. (1.6 mm) cold rolled steel
	Cover	0.025 in. (0.6 mm) cold rolled steel
Shipping weight	Individual pack	3 lb (1.4 kg)
Purpose of control		Pressure operating controls
Method of mounting the control		Flat surface or with universal mounting bracket (Part No. 271-51)
Method of grounding the control		Wiring binding screw terminal
Type 1 or Type 2 action		Type 1.C (micro-interruption)
External pollution situation		Pollution degree 3
Rated impulse voltage		4,000 VAC

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