

P29 Series Low Pressure Cutout Control With Time Delay Relay

Application

The P29 combines a pressure sensing mechanism with a time delay. A drop in pressure energizes the time delay relay which opens a contact after a predetermined time period.

There are two principal applications for this control:

1. Chiller Low Temperature

Cutout: Pressure element is connected to the suction side of a chiller refrigeration system and the time delay relay is wired to the compressor control circuit. Prolonged low suction pressure, such as pressure caused by a low temperature condition, will cause the control to shut down the refrigeration compressor.

2. Industrial Equipment, Oil Pressure Lubrication

Cutout: On any electrically driven machine with a forced oil system, the pressure element is connected to the lube oil system and the time delay relay is wired in the control circuit. The control time delay allows oil pressure to build up to normal on start-up or recover from temporary fluctuations. A sustained loss of oil pressure will cause the control to shut down the machine.

CAUTION: Use P29 pressure controls only in normal indoor environments or outdoors where it is protected from direct exposure to weather.



Fig. 1 -- P29 Low Pressure Cutout Control with 1/4 in. flare nut (Style 13).

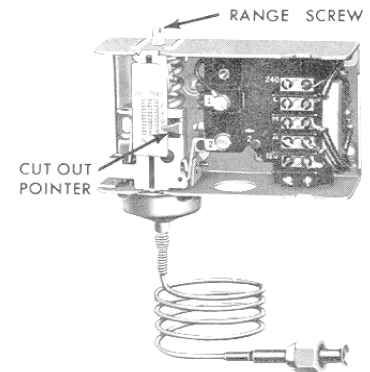


Fig. 2 -- Interior view of a P29.

Specifications

Product	P29AC	Auto Recycle, 120/240 VAC
	P29NB	Manual Reset, 120 VAC
	P29NC	Manual Reset, 120/240 VAC
	P29NF	Manual Reset, 120/240 VAC, Alarm Terminal
Time Delay Shutdown Range, "Heater On"		20" Hg Vacuum to 100 PSIG (-70 to 700 kPa)
Additional Pressure to Avoid Shutdown, "Heater Off"		2.2 ± 1.5 PSI (15.2 ± 10.3 kPa)
Maximum Allowable Test Overpressure		325 PSIG (2241 kPa)
Ambient Temperature	Minimum	32°F (0°C)
	Maximum	104°F (40°C)
Material	Case	.062" (1.6 mm) Cold Rolled Steel
	Cover	.025" (0.6 mm) Cold Rolled Steel
Finish		Gray Baked
Pressure Contact Units		Enclosed Snap-Acting Contacts
Wiring Connections		Screw Type Terminals
Mounting		Mounts to Flat Surface or With a 271-51 Universal Mounting Bracket
Shipping Weight	Complete Control	Individual Pack — 3.0 lb (1.36 kg) Overpack of 25 Units — 77 lb (35 kg)
	Time Delay Switch	0.5 lb (.23 kg)

All series P29 controls are designed for use *only* as operating controls. Where an operating control failure would result in personal injury and/or loss of property, it is the responsibility of the installer to add devices (safety, limit controls) or systems (alarm, supervisory systems) that protect against, or warn of, control failure.

Features

- Heavy duty low profile pressure elements withstand excessively high overrun pressure that may be encountered in system testing.
- Time delay relay incorporates trip-free manual reset.
- The timing mechanism (time delay relay and terminal board) may be easily removed and replaced in the field.
- Ambient compensation minimizes the effect of temperature variations at the control location.
- Simple, single pointer scale indicates cutout pressure.
- Enclosed pressure actuated contacts.
- Single unit mounting and wiring saves installation time and material.

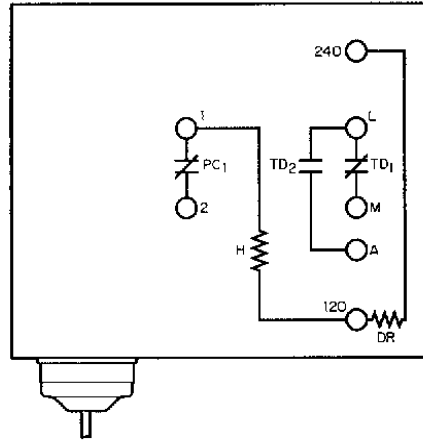
Operation

When the equipment is started, the time delay heater is energized. If the gage pressure does not build up to the "heater-off" value within the required time limit, the time delay relay trips to stop the equipment.

If the gage pressure rises to the "heater-off" value within the required time limit, the time delay relay will not trip and the equipment will continue to run. The equipment will be shut down on subnormal pressures longer than the time setting of the time delay relay.

Time Delay Relay

The time delay relay is a thermal expansion device. "Trip-free" manual reset models are available with factory set and sealed 60 second time delay.



PC₁ - PRESSURE ACTUATED CONTACTS CLOSE ON PRESSURE DROP TO ACTUATE TIME DELAY HEATER.

TD₁ - TIME DELAY RELAY CONTACTS OPEN AFTER FACTORY SET TIME DELAY IF PRESSURE FAILS TO RISE ABOVE CUTOFF OF PRESSURE ACTUATED SWITCH.

TD₂ - CONTACTS CLOSE SIMULTANEOUSLY AS TD₁ CONTACTS OPEN (ALARM CIRCUIT).

DR - VOLTAGE DROPPING RESISTOR.

H - HEATER FOR TIME DELAY RELAY.

CONNECT L AND M TERMINALS IN CONTROL CIRCUIT AS SINGLE POLE SWITCH.

CONNECT 2 AND 240 V OR 120 V TERMINALS SO THAT CIRCUIT IS ENERGIZED ONLY WHEN THE MOTOR STARTER CONTACTS ARE CLOSED. SEE TYPICAL WIRING DIAGRAMS FOR DETAILS.

Fig. 3 — Internal wiring for 120/240 VAC models.

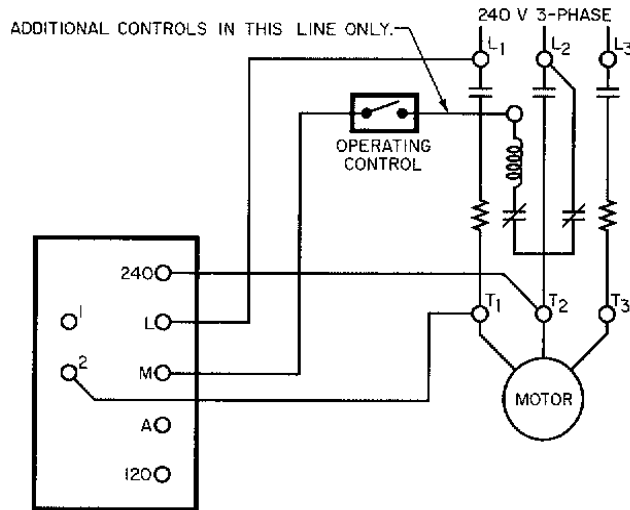


Fig. 4 — Typical wiring diagram for the P29 when used on 240 volt system with 240 volt magnetic starter coil.

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

For applications using a 208 volt control circuit, it is suggested that one leg of the 208 volt control circuit and a neutral or ground wire be used to power the 120 volt circuit of the time delay heater.

When a P29 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 P29 time delay relay.

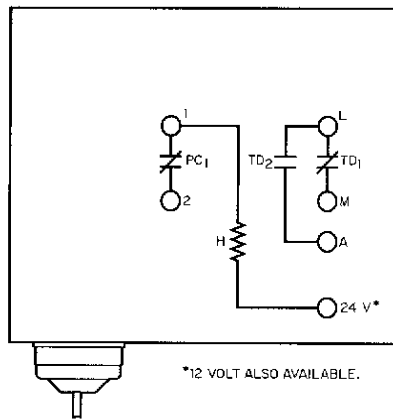
Electrical Power Required for Time Delay Relay

Timing in Seconds	Voltage	
	12, 24 or 120 V	240 V*
10	30 VA	60 VA
30, 45, 60, 90 or 120	15 VA	30 VA

*Includes dropping resistor wattage.

Time Delay Relay Selection

The time delay relay assembly (timer and terminal board) may be removed and replaced in the field. The complete replacement time delay relay may be ordered by Part Number only from the Selection chart.



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TD₁ - TIME DELAY RELAY CONTACTS OPEN AFTER FACTORY SET TIME DELAY IF PRESSURE FAILS TO RISE ABOVE CUTOFF OF PRESSURE ACTUATED SWITCH.

TD₂ - CONTACTS CLOSE SIMULTANEOUSLY AS TD₁ CONTACTS OPEN (ALARM CIRCUIT).

H - HEATER FOR TIME DELAY RELAY.

CONNECT L AND M TERMINALS IN CONTROL CIRCUIT AS SINGLE POLE SWITCH.

CONNECT TERMINAL L SO THAT CIRCUIT IS ENERGIZED ONLY WHEN THE OPERATING CONTROL AND OVERLOAD CONTACTS ARE CLOSED.

Fig. 5 — Internal wiring diagram for low voltage models.

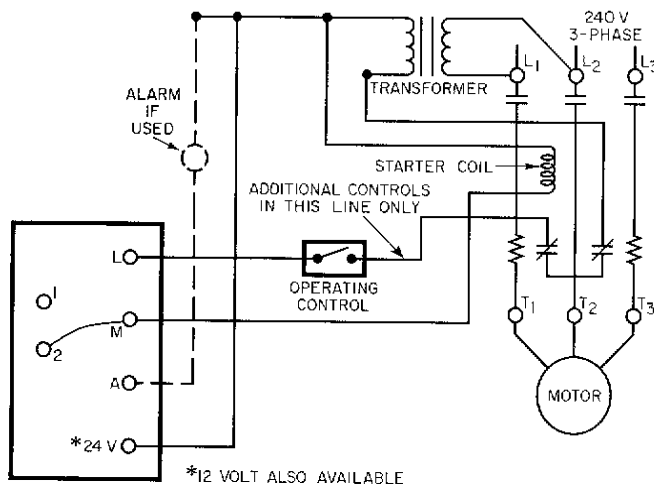


Fig. 6 — Wiring diagram for P29 where 24 volt control circuit power is obtained from a step-down transformer. Jumper between "2" and "M" must be installed in the field.

Optional Constructions

Pressure Connectors

Standard controls are supplied with 36 in. capillary with 1/4 in. sweat section (Style 34), or 1/4 in. FNPT connector (Style 15) may be supplied on quantity orders, when specified. (See Power Element Style, Fig. 7.)

Standard pressure controls are regularly supplied for non-corrosive refrigerants (fluorinated hydrocarbons). Available for ammonia service and industrial equipment oil service with 1/4 in. - 18 FNPT connector. (See Style 15, Fig. 7.)

Automatic Recycling

Available with automatic recycle for electric interlock circuits, specify P29 with automatic recycle when ordering.

Shutdown Alarm Circuit

When specified, Shutdown Alarm Circuit is supplied at extra cost.

Time Delay Heater Circuit

Standard controls are supplied with 120/240 volt time delay heater circuit. Time delay heater circuits for operation on 12 volts AC/DC, 24 volts AC/DC are available at extra cost.

Time Delay

30, 45, 60, 90 or 120 seconds timing available at no extra cost.

Mounting Bracket

Universal Mounting bracket, Part Number 271-51, is available when required.

Fungus Proofing

Fungus proofing is supplied at extra cost when specified. It conforms to government specifications MIL-V-173A.

Repairs and Replacement

Field repairs must not be made except for replacement of the time delay relay assembly. The time delay relay assembly (timer and terminal board) may be replaced or interchanged in the field. For a replacement control or time delay relay assembly, contact the nearest Johnson Controls distributor.

Ordering Information

To order, please specify:

1. Quantity required.
2. Product Number, if available, and time delay.
3. If Product Number is not available, Specify P29 and:
 - a. Type of refrigerant application.
 - 1) Non-corrosive
 - 2) Ammonia
 - b. Style of connector required on power element. (See Fig. 7.)

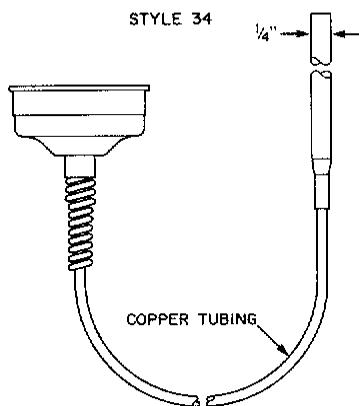
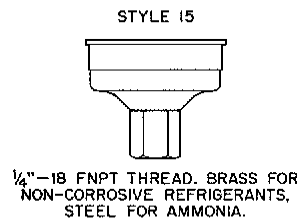
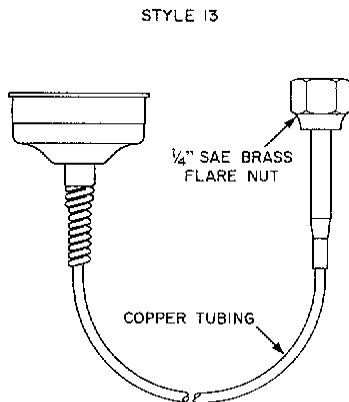
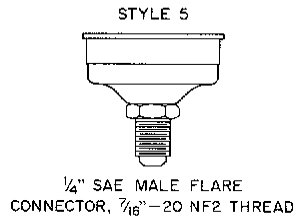


Fig. 7 — Power element styles available for the P29.

Replacement Time Delay Relay Assemblies

Part Number	Voltage	Type of Reset	Timing in Seconds	Alarm Circuit
RLY13A-600R	120/240 VAC	Manual	60	No
RLY13A-602R	120/240 VAC	Manual	90	No
RLY13A-608R	120/240 VAC	Automatic	90	No
RLY13A-610R	120/240 VAC	Manual	30	No
RLY13A-616R	120/240 VAC	Manual	120	No
RLY13A-617R	120/240 VAC	Manual	45	No

Electrical Ratings — Pilot Duty

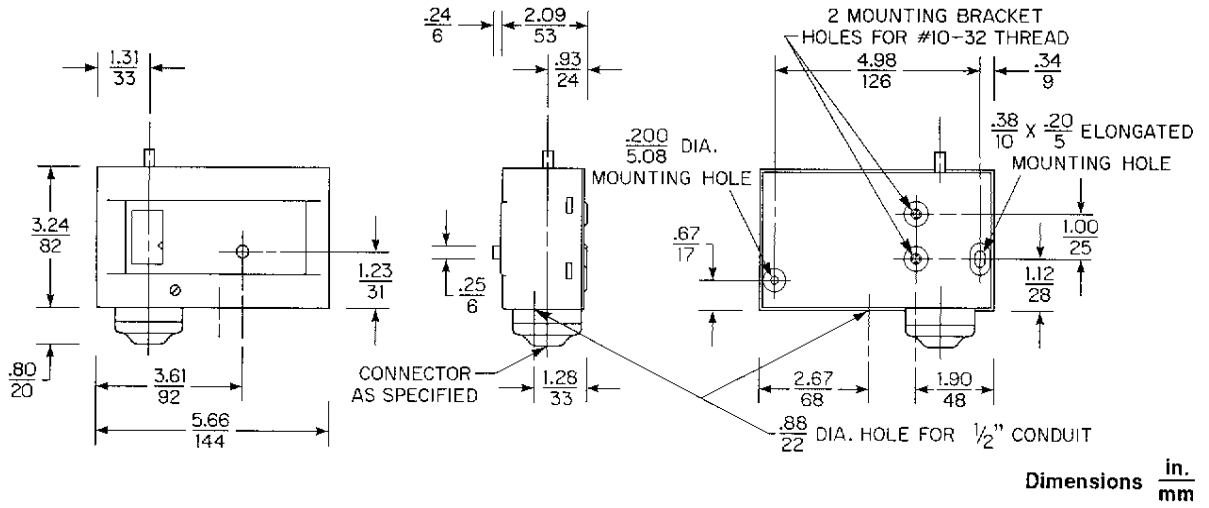
Time Delay Heater Circuit	Pilot Circuit	Alarm Circuit *	Contact Rating**
120/240 VAC	750 VA, 120/240 VAC	125 VA, 120/240 VAC 10 W Tungsten	10 Amp, 120 VAC 5 Amp, 240 VAC
12 VAC or DC	125 VA, 24 VAC 57.5 VA, 24 VDC	125 VA, 24 VAC 57.5 VA, 24 VDC	10 Amp, 24 VAC 10 Amp, 24 VDC
24 VAC or DC	125 VA, 24 VAC 57.5 VA, 24 VDC	125 VA, 24 VAC 57.5 VA, 24 VDC	10 Amp, 24 VAC 10 Amp, 24 VDC

*Must be same voltage as pilot circuit.

**Must be same voltage as time delay heater circuit.

- c. Type of time delay.
 - 1) Manual reset
 - 2) Automatic recycle
- d. Timing in seconds (10, 30, 45, 60, 90 or 120).

Note: 10 second timing for automatic recycle only.
- e. Time delay heater circuit voltage.
 - 1) 120/240 VAC
 - 2) 12 VAC or DC
 - 3) 24 VAC or DC
- f. Special features.
 - 1) Alarm circuit
 - 2) Part Number 271-51 mounting bracket, if required.



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

UL Guide No. SDFY
 File SA516
 CSA Class No. 1222 01
 File LR948

Notes

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Printed in U.S.A.