

P32 Series Sensitive Differential Pressure Switch For Combustion Air Applications

Application

The P32 differential pressure switch is for use in combustion applications where a proof of air flow is needed for proper system operation.

Typical applications include:

- Pulse combustion appliances.
- Appliances with power vented exhaust.
- Any appliance that requires proof of flow before initiating burner operation.

In all combustion applications, the P32 **must** be used in conjunction with a backup device to either check the P32's operation each time the appliance cycles, or to operate independently of the P32 to de-energize the burner circuit should improper appliance operation occur.

All Series P32 switches 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) that protect against, or systems (alarm, supervisory systems) that warn of control failure.

Operation

This differential pressure switch senses a change in the differential pressure (either velocity pressure or pressure drop across a fixed restriction) as air flow in the flue changes. This differential pressure, as sensed by the two sensing ports, is applied to the two sides of a diaphragm in the switch.

The spring loaded diaphragm moves and actuates the switch when the air pressure difference reaches the set point.

This switch can also be used to detect small positive gage pressure by using only the high pressure connection and leaving the low pressure connector open, or to detect a vacuum by using only the low pressure connection and leaving the high pressure connector open to ambient pressure.

The P32 should be used only in conjunction with a redundant safety device such as a spill switch and self-checking relay circuit, and only on open combustion equipment. Closed combustion units require a self-checking relay circuit. (See Fig. 6.)

Installation

Follow equipment manufacturer's instructions, if available.

Locating

Select a location near the blower or flue where vibration is minimal and the terminal screws are accessible. Ambient temperature should be within the range of -40 to 165°F (-40 to 74°C) to avoid physical damage to the pressure switch. Because the factory setting of the P32 is made at room temperature, the P32 should be mounted in a location with temperatures as close as possible to room temperature.

Mounting

The P32 is normally mounted with the diaphragm in a vertical plane. It may be fastened to any flat surface which has minimal

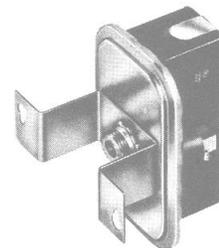


Fig. 1 -- P32 Differential Pressure Switch with "U" mounting bracket assembled.

vibration. Do not mount the P32 directly to the flue or any hot surface.

Note: If the switch is mounted in a position other than the position in which it was factory set, the setting will change. If the switch is factory set with the diaphragm in a vertical position but is mounted in a horizontal position with the steel housing (high pressure connector) down, the set point will increase by about 0.07 in. W.C. (.017 kPa). If mounted with the steel housing up, the switch may be inoperative at minimum setting. Adjustable models can be re-adjusted for this mounting position and minimum set point on the job as follows:

1. Mount the switch securely.
2. Make sure no pressure is applied to either connector.
3. Turn the adjusting screw clockwise until the switch operates and then at least an additional 1/3 turn.

Panel mounting with the high pressure connector

1. Cut or drill a 7/8 in. (22 mm) diameter hole.
2. Install tubing in the 1/8 in. Female NPT high pressure (metal) connector, if required.

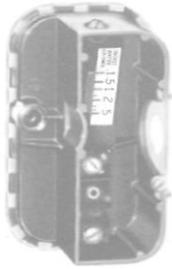


Fig. 2 -- Interior view of P32 Differential Pressure Switch.

- Place the metal connector in the hole.
- Use a 1/2 in. conduit lock nut on the connector and secure in place.

Remote mounting with "L" bracket No. BKT182-2 or channel "U" bracket No. BKT229-1

- Use the bracket as a guide and drill or punch the mounting screw holes.
- Determine the correct mounting bracket position and secure it to the switch with the 1/2 in. conduit locknut. (There may be installations where the bracket must be installed before fastening it to the switch.)

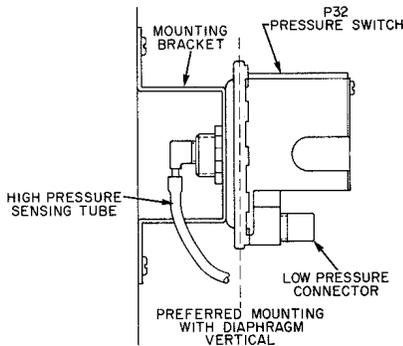


Fig. 3 — Typical installation for a P32 mounted on a panel using Part No. BKT229-1 bracket.

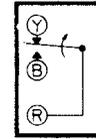
- Use FTG18A-600R remote mounting probe kits for remote sensing locations. Run plastic or copper tubing from the high and/or low pressure connectors to the sensing point. Use tubing with at least .170 in. I.D. (1/4 in. O.D.).

CAUTION: When turning the fitting into the plastic low pressure port, do not overtighten and crack the threaded boss. Turn fitting in finger-tight, then an additional 1 to 1-1/2 turns (approximately 15 to 20 in.-lbs.). Sealing compound or tape is not required for the plastic low pressure port.

Wiring

CAUTION: Disconnect electrical power supply before wiring switch into circuit to avoid possible electrical shock or damage to equipment.

Make all wiring connections using copper conductors only, and in accordance with the National Electrical Code and local regulations.



ACTION ON INCREASE OF DIFFERENTIAL PRESSURE

Fig. 4 — Contact action on a P32 switch.

Refer to job wiring diagrams for proper hookup. If not available, refer to diagrams in this sheet.

All wiring is made to terminals in the wiring enclosure. The terminals can be either screw type or 1/4 in. x .032 in. male quick connect type. The SPDT models have color coded wiring terminals. The Red terminal is common. The Red to Yellow circuit opens on a differential pressure decrease and the Red to Blue circuit closes. Models are available with SPST open low contact action and also with SPST open high contact action. The correct model must be chosen so that all of the terminals provided are wired into the circuit.

Note: Use the terminal screws furnished (8-32 x 1/4 in. binder head). Substitution of other screws may cause problems in making proper connections.

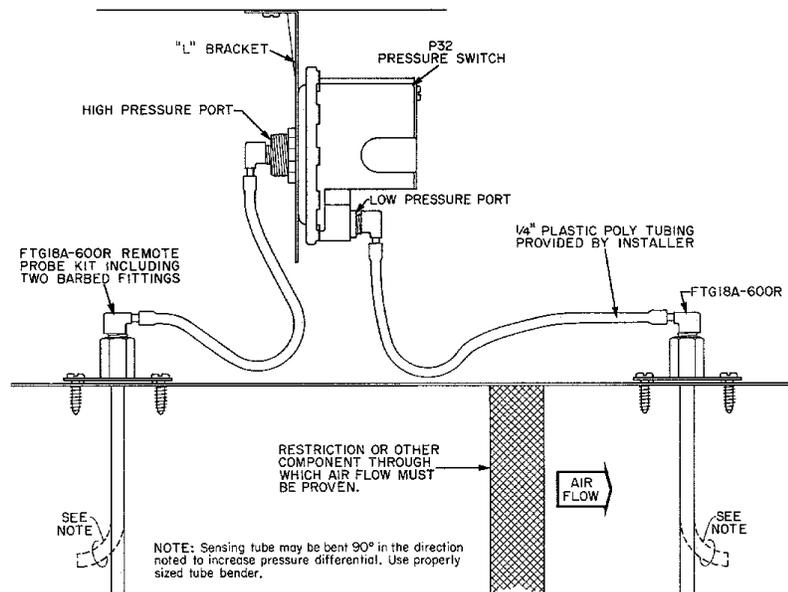


Fig. 5 —The P32 may be mounted on either a vertical or horizontal surface using an "L" bracket and two FTG18A-600R remote mounting probe kits.

Adjustments

The field adjustable switch has an adjusting screw located under the cover. Some models have a scale plate for adjusting convenience.

To adjust:

1. Remove cover.
2. Turn adjusting screw CW to increase the set point.
3. Turn adjusting screw CCW to decrease the set point.
4. If the high or low adjustment stop is reached, turn adjusting screw the other way at least 1/6 turn from the stop.
5. The factory setting must be sealed by the OEM if the original factory setting is altered.

The adjusting screw must be sealed. If this is not done at the factory, then it must be sealed at the equipment's point of manufacture by the Original Equipment Manufacturer.

Checkout Procedure

Before leaving the installation, observe at least three complete operating cycles to be sure that all components are functioning correctly.

Repairs and Replacement

Field repairs must not be made. These controls must be replaced with an exact replacement. For a replacement P32, contact the nearest Johnson Controls wholesaler or the manufacturer of the appliance.

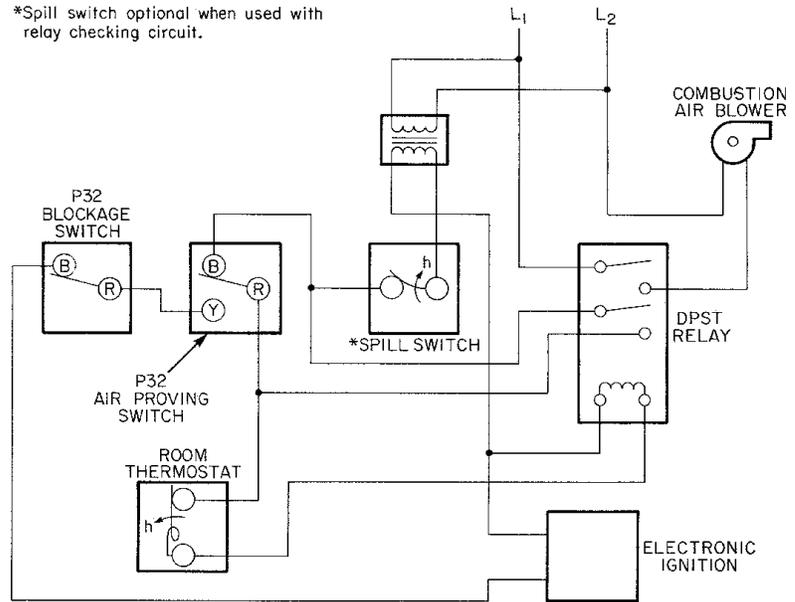


Fig. 6 — Typical wiring hookup.

Notes



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