

P32 Series Sensitive Differential Pressure Switch For Combustion Air Applications

Application

This 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. (See P32 Application Chart and explanations.)

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

Features

- Easy-to-read set point scale.
- Versatile mounting options.
- Durable construction.
- Set point switching repeatability.

General Description

This control senses a change in the differential pressure (either velocity pressure or pressure drop across a fixed restriction) as air flow in the flue changes.

The differential pressure, as sensed by the two sensing ports, is applied to the two sides of a diaphragm in the control. The spring loaded diaphragm moves and actuates the switch.

The P32 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 vacuum by using only the low pressure connection and leaving the high pressure connector open to ambient pressure.

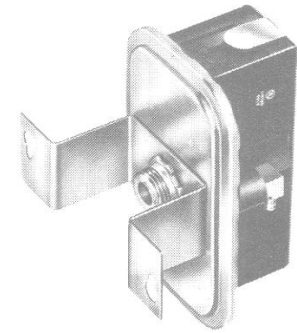


Fig. 1 -- P32 Differential Pressure Switch for Combustion Air Applications.

P32s are factory set at the bottom of their operating range with the diaphragm in a vertical plane. The setting will change if mounted in other positions.

Specifications

Product	P32	Differential Pressure Switch
Maximum Electrical Rating	UL	2 Amps., 7 Amps. Inrush at 25 VAC
	CSA	2 Amps., 7 Amps. Inrush at 25 VAC
Ambient Temperature*	Minimum	-40°F (-40°C)
	Maximum	165°F (75°C)
Maximum Pressure at Either Connection		1 PSIG (6.9 kPa)
Connectors	High Pressure	Metal, 1/8" Female NPT Inside, 1/2" NPSM Outside for Mounting
	Low Pressure	Molded, 1/8" Female NPT
Cover Material		.032" (0.8 mm) Cold Rolled Steel, Zinc Plated
Diaphragm Housing Material		.040" (1 mm) Cold Rolled Steel, Zinc Plated
Enclosure (Body and Wiring Compartment)		Molded Polycarbonate
Mounting		Direct Mount or With Optional Mounting Bracket, Normal Mounting Position is With Diaphragm in a Vertical Plane
Set Point		Normally Factory Set at Bottom of the Range With Diaphragm in a Vertical Plane, SPDT Models Normally Set Where Red to Yellow Contacts Open, Factory Setting is Made at Room Temperature
Shipping Weight	Less Bracket	Individual Pack .9 Lb. (0.41 kg) Overpack of 10 Units 10 Lb. (4.5 kg)
	With Bracket	Individual Pack 1.0 Lb. (0.45 kg) Overpack of 10 Units 11 Lb. (5.0 kg)

*Temperature at which no physical damage to the P32 results.

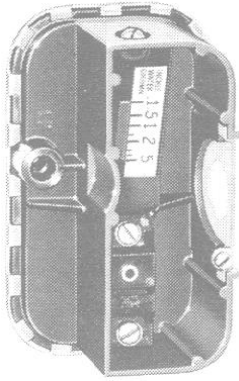


Fig. 2 -- Interior view of a P32 Differential Pressure Switch.

Mounting with the steel housing (high pressure connector) down will increase the set point by about 0.07 in. W.C. (0.017 kPa). If mounted with the steel housing up, the switch may be inoperative at minimum setting.

The P32 adjustable models may be readjusted for other than the vertical plane position specified by the Original Equipment Manufacturer. The adjusting screw must be sealed after readjustment is completed.

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

If required, the P32 can be factory set for a specific mounting position on quantity orders.

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

Optional Constructions

Accessory Kit

Kit No. FTG18A-600R for remote mounting includes a 4 in. (102 mm) sensing tube with 1/8 in. Female NPT connector

and 1-1/2 in. (38 mm) square mounting flange, 2 "L" 1/4 in. barbed x 1/8 in. Male NPT fittings, 2 #10 self-tapping screws 1/2 in. (12.7 mm) long, and a pressure sensitive gasket. (See Fig. 3.)

Connector Fitting

1/8 in. Male NPT x 1/4 in. compression for 1/4 in. metal tubing. 1/8 in. Male NPT x 1/4 in. angled barbed fitting for 1/4 in. plastic tubing and 1/8 in. Male NPT x 3/8 in. barbed fitting for 3/8 in. I.D. tubing.

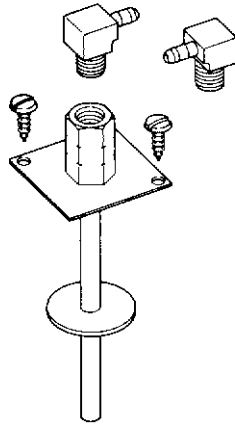
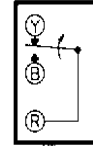


Fig. 3 — Remote sensing probe kit No. FTG18A-600R.



ACTION ON INCREASE OF DIFFERENTIAL PRESSURE

Fig. 4 — Contact action on P32 with SPDT contact action.

Contact Action

Models are available with Open High, Open Low, or SPDT contact action. (See Fig. 4.)

Mounting Bracket

Universal "L" mounting bracket No. BKT182-2, if required or channel "U" bracket, Part No. BKT229-1. (See Fig. 5.)



Fig. 5 — Optional mounting brackets.

Type Number Selection

P32	A	Adjustable Set Point, Range Scale Plate, NEMA Type 1 Enclosure
	B	Adjustable Set Point, No Scale Plate, NEMA Type 1 Enclosure
	C	Fixed Set Point, No Scale Plate, NEMA Type 1 Enclosure
	H	Adjustable Set Point, Range Scale Plate, Less Enclosure
	J	Adjustable Set Point, No Scale Plate, Less Enclosure
	K	Fixed Set Point, No Scale Plate, Less Enclosure
	G	SPST, Open Low, Screw Terminal
	H	SPST, Open High, Screw Terminals
	R	SPST, Open Low, 1/4" x .032" Quick Connect Terminals
	S	SPST, Open High, 1/4" x .032" Quick Connect Terminals
	T	SPDT, Screw Terminals
	U	SPDT, 1/4" x .032" Quick Connect Terminals

Range and Differential Specifications

Inches W.C.	kPa	Differential								
		Standard				Close				
		At Minimum Set Point	At Maximum Set Point	At Minimum Set Point	At Maximum Set Point	At Minimum Set Point	At Maximum Set Point	At Minimum Set Point	At Maximum Set Point	
		in. W.C.	kPa	in. W.C.	kPa	in. W.C.	kPa	in. W.C.	kPa	
Adjustable Set Point										
.05 to 5.0	.012 to 1.24	.04	.01	.2	.05	.025	.006	.11	.027	
.15 to 12	.037 to 2.99	.07	.017	.6	.149	.04	.01	.5	.124	
Fixed Set Point										
.05 to .5	.012 to .12	.04	.01	.05	.012	.025	.006	.03	.007	
.15 to 1.0	.037 to .25	.07	.017	.09	.022	.04	.01	.06	.015	

Scale Plate

An internal scale plate is available on adjustable models.

Wiring

All wiring is made to the terminals in the wiring enclosure. The terminals can be either screw type or 1/4 in. x .032 in. 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.

The correct model must be chosen so that all of the terminals provided are wired into the circuit.

Repairs and Replacement

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

Ordering Information

To order, specify:

1. Complete Product Number, if available.
2. If the complete Product Number is not available, specify Type Number, see "Specifications."
3. Set point, differential and mounting position. If other than standard, quantity orders only.
4. Mounting bracket, if required.
5. Any other pertinent information.

Explanation of P32 Application Chart

Column 1 concerns applications where proof of draft is required to pass a delayed electronic ignition test. A P32 used to detect induced draft or pressure in a closed combustion device must be backed up with a relay to prove actuation on every cycle.

Column 2 lists P32 applications for proof of blower operation on open combustion condensing appliances. A properly applied thermal spill switch or checking relay circuit would produce appliance shutdown in the event of P32 failure.

Column 3 is similar to Column 2 in that flue gas spillage must not occur. However, Column 2 applications attempt to prove lack of flow by detecting a decrease in pressure. Column 3 applications

prove lack of flow by detecting an increase in static pressure. This method requires the use of a P32 with **normally closed contacts**. Because the P32 will not be called upon to operate on every cycle, it is not desirable for the P32 to be used in this application. Relay checking is usually not possible because the P32 only operates intermittently in this application. A spill switch must be used to back up a P32 for blocked flue detection.

P32 Application Chart

Usage	Application		
	Column 1 Delayed Ignition	Column 2 Proof of Blower	Column 3 Blocked Flue
P32			
Without Relay Checking or Redundant Safety Device	N.A.	N.A.	N.A.
With a Redundant Safety Device Only	N.A.	Only If Delayed Ignition Tests Can Be Met At P32 Failure, N.O. Contact, SPST	Only If Delayed Ignition Tests Can Be Met At P32 Failure, N.C. Contact, SPST
With Relay Checking on Every Cycle	Yes *SPDT	Yes *SPDT	Yes *SPDT
With Relay Checking and Appropriate Spill Switch	Yes *SPDT	Yes *SPDT	Yes *SPDT

* SPDT Usage requires N.C. contact across relay contact.
N.A. — Not applicable for this use.

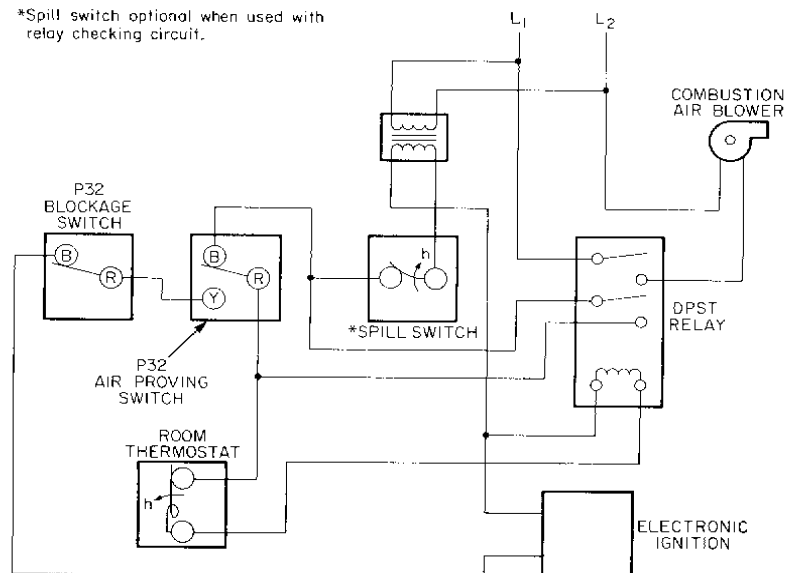
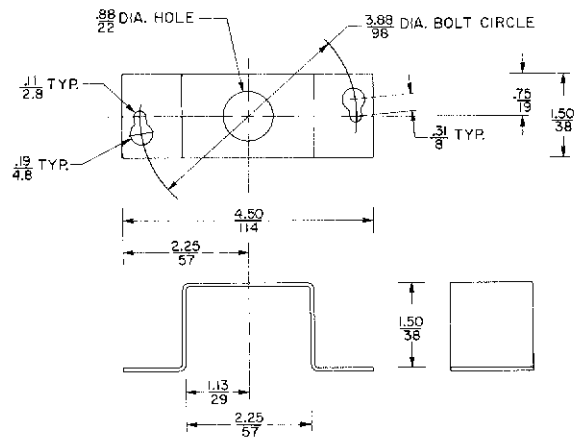
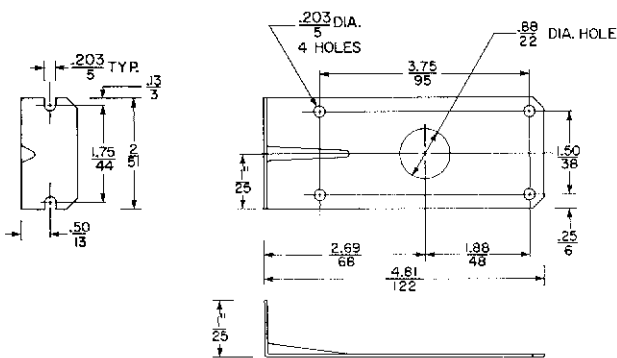
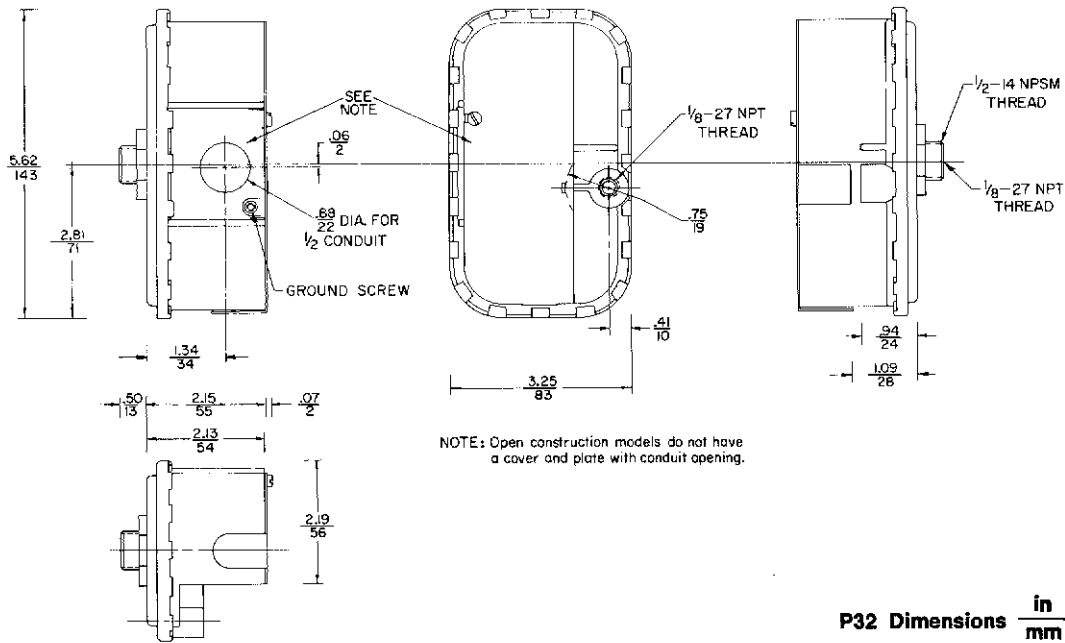


Fig. 6 — Typical wiring hookup.



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

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