

Overview and Identification

The BAPI Differential Pressure Switch is ideal for air filter monitoring, static pressure proving, airflow proving or auxiliary fan actuation. The setpoint is field adjustable from 0.1" to 40" WC (20 to 10,000 Pa), and the unit can measure positive pressure, vacuum or true differential pressure. The six pressure ranges are field selectable by changing a color-coded spring. The spring for the range that you order is preinstalled, and the other five springs are shipped with the unit so that you can change ranges in the field if you choose.

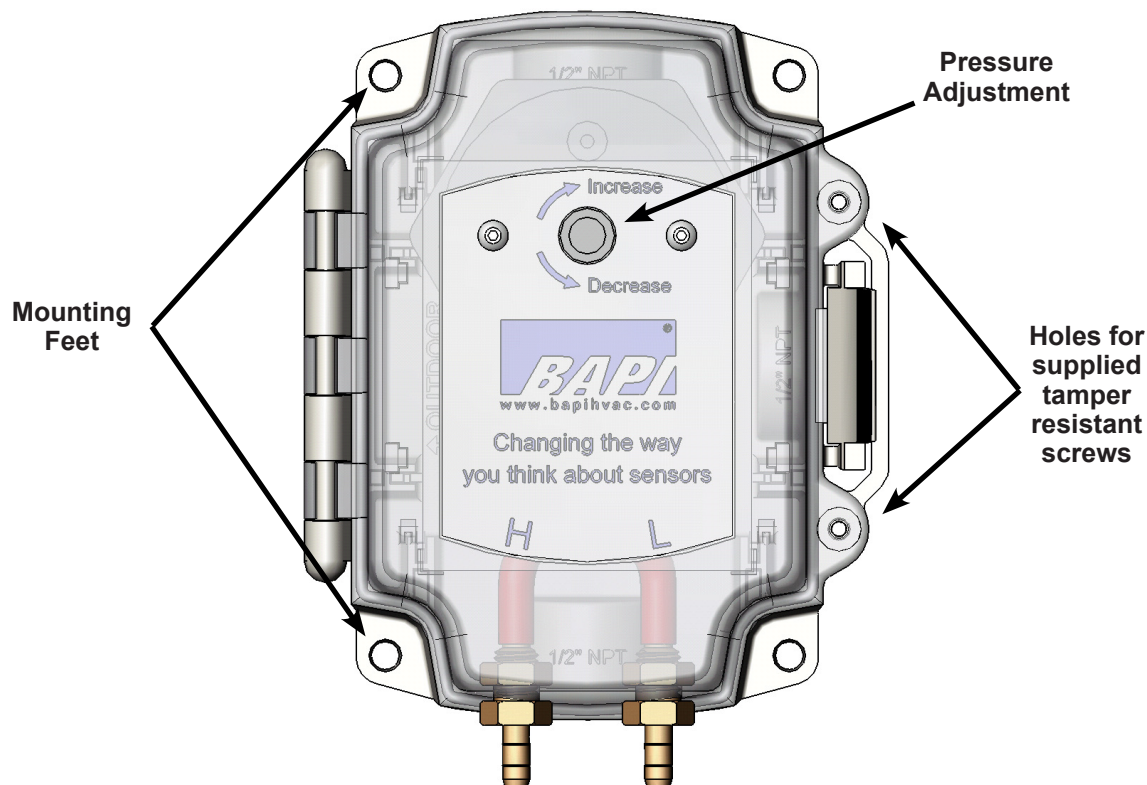


Fig. 1: Differential Pressure Switch

Specifications

Measurement Media:

Air, Combustion Gases

Operating Environment:

-40 to 185°F (-40 to 85°C)

5 to 95% RH non-condensing

Note: Not intended for outdoor use

Contact Ratings:

5 Amp Resistive, 125 VAC

Proof Pressure:

100" W.C. (3.6 PSI, 24,900 Pa)

Pressure Ports:

1/4" Barbed Fittings

Switch Type:

SPDT (Silver Contacts)

Repeatability:

<10% of Setting

Wiring:

1/4" (6.4mm) Quick-Disconnect Terminals

Agency:

RoHS

Warranty:

5 Years

Specifications subject to change without notice.

Mounting

1. Hold the unit vertical in its mounting location and mark the holes in the mounting feet or use the actual size mounting template shown in Fig. 3 below. (Note: If unit is mounted outside, it must be oriented so water cannot accumulate in the electrical ports and potentially freeze and crack the enclosure.)
2. Using # 10 screws attach the box to the mounting surface.

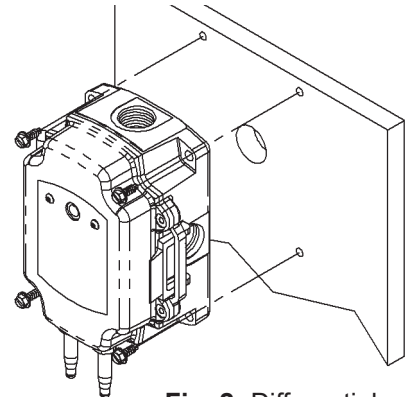


Fig. 2: Differential Pressure Switch Mounting

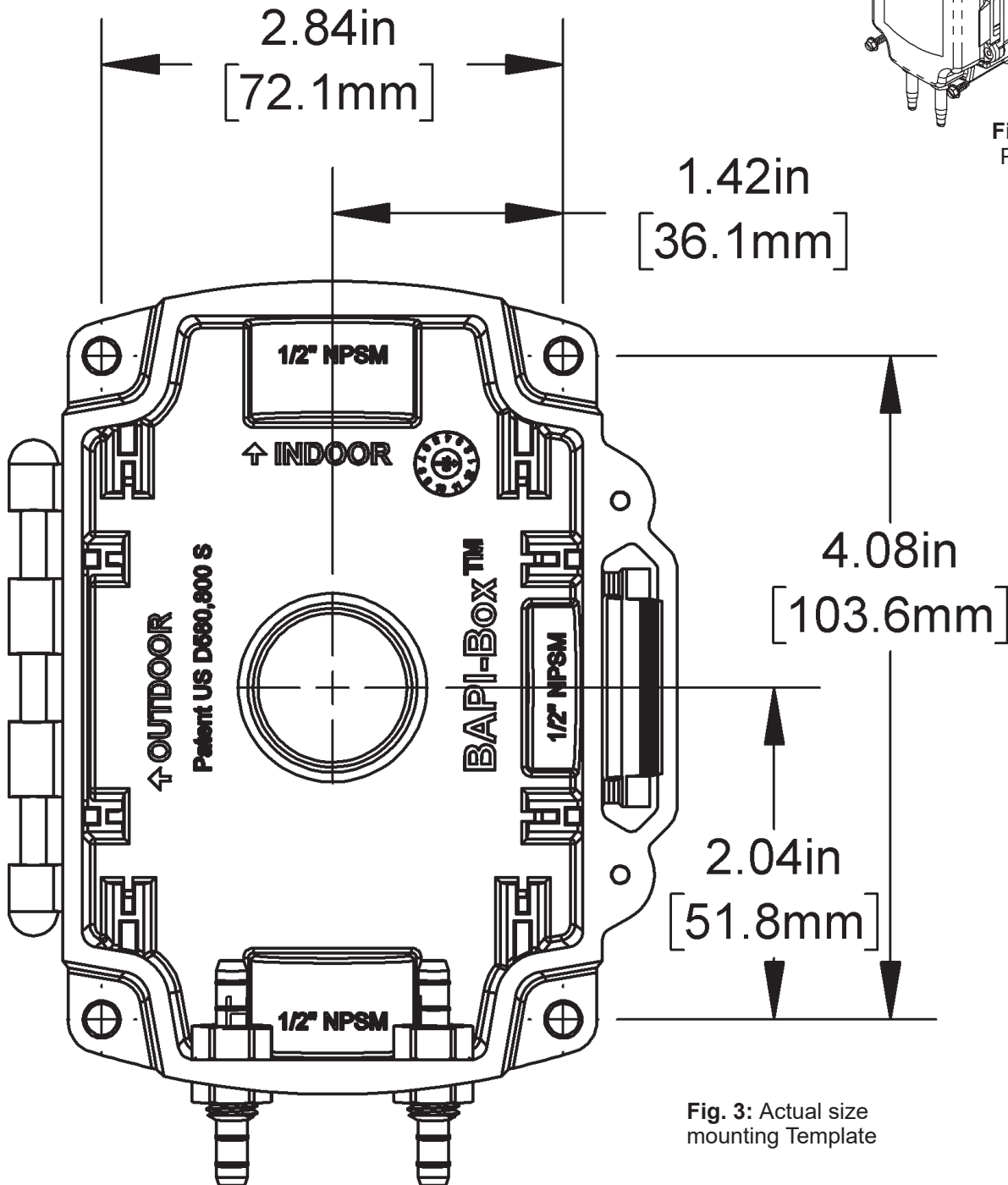


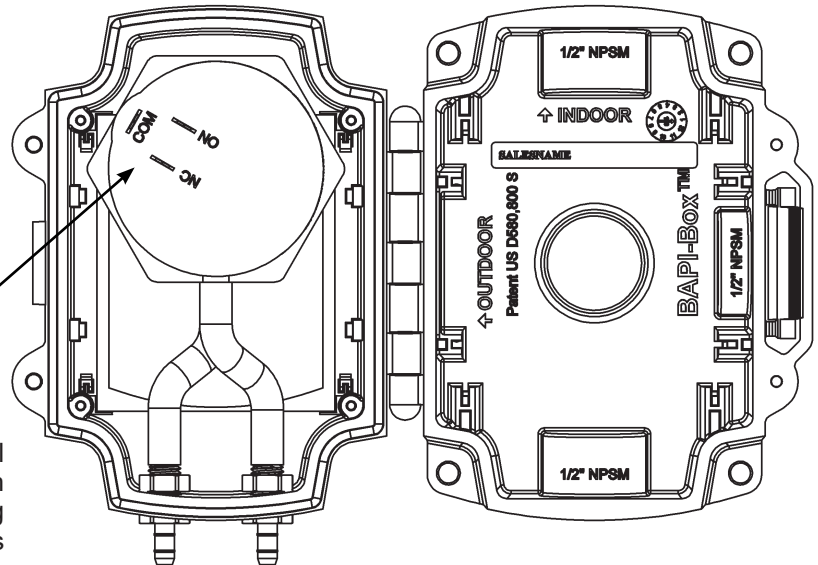
Fig. 3: Actual size mounting Template

Termination

1. Attach wire to the wiring terminals using supplied crimp terminals, close the cover and push on the cover until it latches closed.
2. Secure cover with tamper resistant screws if desired.

1/4" (6.4mm)
Quick Connect
Wiring Terminals

Fig. 4: Differential Pressure Switch open showing wiring connections



Pressure Adjustment

The Differential Pressure Switch comes adjusted as shown in the table below.

Model	Spring Color	Setpoint range	Approx. setpoint change per turn	Initial factory setpoint $\pm 10\%$
BA/SW1A	Brown	0.1" to 0.8" WC (20 to 200 Pa)	0.4" WC (100 Pa)	0.44" WC (110 Pa)
BA/SW2A	Natural	0.5" to 1.2" WC (120 to 300 Pa)	0.2" WC (50 Pa)	0.84" WC (210 Pa)
BA/SW3A	Orange	0.7" to 2.2" WC (180 to 550 Pa)	0.8" WC (200 Pa)	1.5" WC (375 Pa)
BA/SW5A	Blue	3.2" to 10.4" WC (800 to 2600 Pa)	2.6" WC (650 Pa)	6.8" WC (1700 Pa)
BA/SW6A	Red	8.8" to 24" WC (2200 to 6000 Pa)	5.5" WC (1350 Pa)	16.5" WC (4100 Pa)
BA/SW7A	Purple	12" to 40" WC (3000 to 10000 Pa)	12.5" WC (3100 Pa)	26.1" WC (6500 Pa)

Insert an SQ1 square bit (0.110 inches, 2.8mm) into the pressure adjustment screw and turn clockwise to increase the pressure at which the switch closes. Turn counterclockwise to decrease the pressure at which the switch closes.

CHANGING PRESSURE RANGES

Change pressure ranges by replacing the spring behind the pressure adjustment screw. Turn the pressure adjustment counterclockwise to remove it; be careful not to drop the screw. Using a small wire hook (paper clip), remove the pressure regulation spring. Place the spring into the plastic bag with the other springs.

Place an Ohmmeter or indicating lamp across the common and normally closed switch (NC) contacts, the switch should indicate open (High resistance or no light). Install the spring for the pressure range you need into the spring hole. Replace the pressure adjustment screw and slowly turn it clockwise. Somewhere between three and six turns the switch will close (low resistance or light turns on), this is the low end of the switches working pressure. Use Table 1 to set the desired initial pressure. DO NOT OVERTIGHTEN. Doing so may damage the spring and cause the switch to malfunction.

PROPER ADJUSTMENT PROCEDURES

Make all adjustments slowly. There is a restriction orifice built into the switch that acts as a pressure snubber. The snubber filters out transient pressure spikes that would ordinarily cause nuisance pressure switch actuations. The snubber slows down the air entering the switch's pressure chamber. At low differential pressures it can take a couple of seconds for the pressure switch chambers to fill with air.

This switch, like most pressure switches, has a pressure deadband between where the switch activates and deactivates. Take that into consideration when making you final adjustments.

Applications

AIR FILTER MONITORING

The static pressure on each side of a filter is compared and the output contacts close when the pressure across the filter exceeds a predetermined value. Ideally a BAPI Static Pressure Probe (ZPS-ACC07) is placed one duct diameter upstream of the filter and another Static Pressure Probe one duct diameter downstream of the filter. Connect the upstream static pressure probe to the high port on the Differential Pressure Switch and the downstream probe to the low port on the Differential Pressure Switch.

To set the pressure trip point, remove the tubing from the Differential Pressure Switch. Connect a manometer and a pressure source to the high pressure port on the Differential Pressure Switch. Use the manometer to measure the pressure. Set the pressure as described in the Proper Adjustment Procedures section above. Reconnect tubing when finished.

An alternative way to adjust the pressure setpoint is;

1. Place a new, clean filter into the duct.
2. Turn on the fan.
3. Cut a piece of cardboard approximately 1/2 the face area of the filter.
4. Place the cardboard against the filter on the upstream side.
5. Set the pressure as described in the Proper Adjustment Procedures section above.
6. Remove the cardboard.

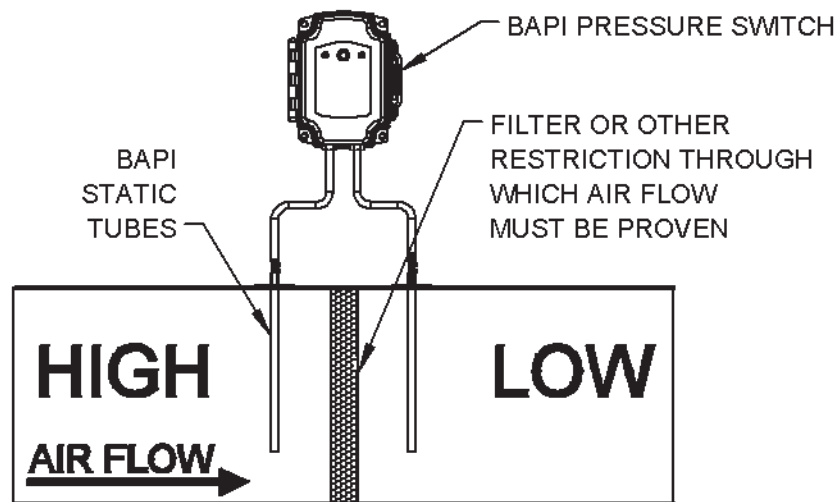


Fig. 5: Differential Pressure Switch monitoring an air filter



Differential Pressure Switch

Installation & Operating Instructions

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Applications continued...

STATIC PRESSURE PROVING

Static pressure proving compares the static pressure in a monitored space to the static pressure in a reference space. The BAPI Differential Pressure Switch contacts close when the pressure exceeds the setpoint. The BAPI Differential Pressure Switch is independent of any static pressure control; it is an independent monitor and alarm if the control condition is not met.

For example, you do not wish the odors in a school chemistry laboratory to get out into the hallway. The lab is the monitored space and the hallway is the reference space. Place a Static Pressure Pickup Port (ZPS-ACC01) into the space you wish to monitor and place another Static Pressure Pickup Port into the reference space.

If you want the reference space to be higher pressure, connect the reference space to the Differential Pressure Switch high port and the monitored space to the low port.

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To set the pressure trip point, remove the tubing from the BAPI Differential Pressure Switch. Connect a manometer and a pressure source to the high pressure port on the BAPI Differential Pressure Switch. Use the manometer to measure the pressure. Set the pressure as described in the Proper Adjustment Procedures section above. Don't forget to reconnect the tubing.

Another example is making sure that the static pressure in a duct is different from the static pressure in your plenum. The duct is the monitored space and the plenum is the reference space. Place a Static Pressure Probe (ZPS-ACC07) into the duct you wish to monitor and a Static Pressure Pickup Port (ZPS-ACC01) in the plenum. Connect the sensor tubes as explained above.

AIR FLOW PROVING

Place a Pitot Tube Assembly (ZPS-ACC11 or ZPS-ACC12) into the duct you wish to monitor. Connect the Differential Pressure Switch's high port to the total pressure probe and the low port to the static probe. Set the pressure trip point to the desired airflow.

Flow Rate		Pressure	
Feet/Min	Meter/Sec	Inches WC	Pascals
1000	5.08	0.062	15.4
2000	10.16	0.25	62.2
3000	15.24	0.56	139
4000	20.32	1	249

To set the pressure trip point, remove the tubing from the Differential Pressure Switch. Connect a manometer and a pressure source to the high pressure port on the Differential Pressure Switch. Use the manometer to measure the pressure. Set the pressure as described in the "Proper Adjustment Procedures" section on page 4. Reconnect tubing when finished.

AUXILIARY FAN ACTUATION

Many appliances, clothes driers, range hoods or bathroom exhaust fans, do not have enough fan power to force sufficient air through long duct lengths. Auxiliary exhaust fans are often placed at the end of the duct to draw the exhaust air through the duct. Turning on these auxiliary fans can be difficult if the appliance does not have auxiliary fan output contacts.

You can use BAPI's Differential Pressure Switch to easily turn on the auxiliary fan. Place a Static Pressure Probe (ZPS-ACC07) in the exhaust duct and a Static Pressure Pickup Port (ZPS-ACC01) in the space with the appliance. Connect the exhaust duct to the high port on the Differential Pressure Switch. Connect the appliance space to the low port on the Differential Pressure Switch. Set the pressure trip point so that the switch contacts close whenever the appliance is turned on. Use the switch contacts to control the power to the auxiliary fan.

Diagnostics

Possible Problems:

Cannot calibrate switch pressure

Possible Solutions:

- Make sure that the correct spring is selected
- Make sure that the high and low pressure tubes are not swapped
- Make sure that the high and low pressure tubes are connected to the proper locations and are not kinked