SIEMENS

Technical Instructions

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QBM81-…

Differential Pressure Switch

Description

Differential pressure switch for monitoring air pressure in HVAC systems.

Features

- Monitors air filters, airflow and fan belts
- Can be used to monitor pressure in clean rooms, kitchens, etc.
- Easy to mount

Application

The QBM81-... Differential Pressure Switches are used to monitor differential pressure, underpressure and overpressure in HVAC installations. By measuring differential pressure, they monitor the state of air filters, prevailing airflows, damaged fan belts and overpressure in clean rooms, kitchens, etc. They are also used to monitor differential pressure and positive and negative relative pressure in HVAC systems.

Product Numbers

There are three differential pressure switches available that measure various pressure ranges:

Table 1. Product Numbers.

Product Number	Pressure Range (Inches WC)
QBM81-3	0.08 to 1.20
QBM81-5	0.20 to 2.00
QBM81-10	0.40 to 4.00

Ordering

If required, FK-PZ... duct probes must be ordered separately.

When placing an order, specify the quantity, product number and description.

Example:

1 QBM81-5 Differential Pressure Switch and one set of FK-PZ2 duct probes

Operation

The differential pressure between the two pressure connections deflects a spring-loaded diaphragm. This special diaphragm ensures long-term stability of switching points.

Each type is engraved with individual scales for highly accurate adjustment. The options for adjustment are shown in Figure 2.

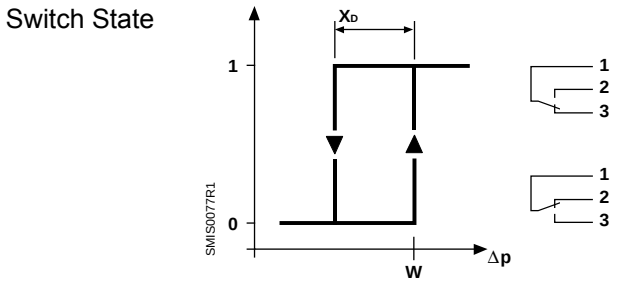
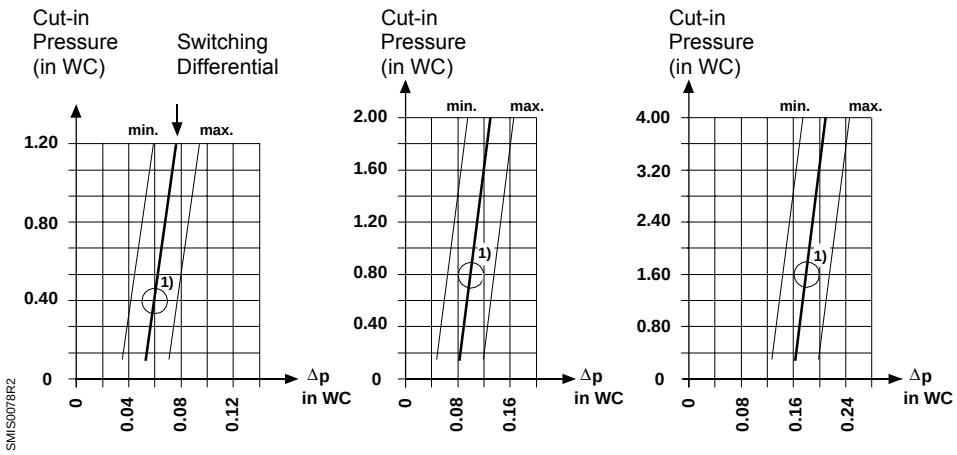


Figure 1. Operation Diagram.

Switching Points



Pressure Range 0.08 to 1.20" WC

Pressure Range 0.20 to 2.00" WC

Pressure Range 0.40 to 4.00" WC

1. Factory Setting

Figure 2. Switching Points.

Mechanical Design

The QBM81-... Differential Pressure Switch consists of:

- Housing and cover
- Diaphragm
- One sheet-steel mounting bracket

Connection kit (supplied with each switch) consists of:

- Two duct adapters
- Four fixing screws
- 6.6 feet (2 m) tubing, ø 0.25 inch

Accessories

For difficult conditions or cases where high-precision measurements are required, two other kits are available:

FK-PZ1 Set of two duct probes (nickel-plated iron) with rubber grommet

FK-PZ2 Set of two duct probes (aluminum) with aluminum mounting rosettes and four mounting screws

Mounting Notes

Mounting instructions are enclosed with the pressure switch.

NOTE: Mounting positions other than vertical affect the cut-in pressure. See *Commissioning Notes*.

The pressure switch is suitable for mounting on air ducts or walls. The recommended orientation is vertical, but any orientation is acceptable. The pressure connection tubes can be of any length, but the response time will increase if they are longer than 6.6 feet (2 meters).

The pressure switch should be mounted so that it is above the pressure connection points. To prevent the accumulation of condensation, the tubing must be routed so that there is a gradual incline from the pressure connection points to the pressure switch (no looping).

Commissioning Notes

The required setpoint can be selected on the setpoint knob located under the cover. See *Dimensions*, *Item 5*.

NOTE: The setpoint scale provided with the unit is metric.

The pressure switch is factory-calibrated in the vertical position. If installed horizontally, this will affect the switching point as follows:

- With cover facing upwards: Switching point is 0.044" WC higher than scale.
- With cover facing downwards: Switching point is 0.044" WC lower than scale.

Specifications

Electrical Interface	Type of switch	Single-pole change-over, multi-layer contact
	Contact rating	24 Vac/dc, >0.01 A 250 Vac Maximum 5 A resistive Maximum 3 A inductive, cos φ >0.6 (0.8 A starting current sixfold, cos φ > 0.6
	Operating voltage	Maximum 250 Vac
	Switching differential (Δp)*	Adjustable
	Reset	Automatic
	Service life	>1,000,000 switching operations
Product Data	Measuring range	See *Product Numbers*
	Repeatability	
	Range 0.08 to 1.20 in WC	<± 0.10 in. WC
	Range 0.20 to 4.00 in WC	<± 0.02 in. WC
	Maximum overload on one side	20.07 in. WC
	Admissible media	Air and non-corrosive gases

Specifications, Continued

Materials	Housing	Fiberglass reinforced polycarbonate
	Cover	Polycarbonate
	Diaphragm	Silicone (low-swell rubber, no ABS)
	Mounting bracket	Sheet-steel (galvanized)
	Duct adapters	ABS
	Tubing	PVC, soft
Connections	Electrical connection	3 screw terminals
	Cable entry	PG11 cable gland
	Pressure connections	Male, ø 0.24-inch
Weight and Dimensions	Weight (including packaging)	0.42 lb. with mounting bracket
	Dimensions	See Figures 5 and 6
General Ambient Conditions	Ambient temperature	
	Operation	–4°F to 185°F (–20°C to 85°C)
	Storage	–40°F to 185°F (–40°C to 85°C)
	Ambient humidity	<90% rh (non-condensing)
Mounting	Orientation	Any. See *Commissioning Notes.*
Agency Approvals	Protection class	Class 2
	Protection standard	IP54 to IEC529
	Combustion class	to UL94
	Pressure casing and housing	V-0
	Cover	HB
	Plastic tubing	V-2
	Duct adapters	HB
	Conforms to CE requirements	

* The switching differential is factory-set to a fixed value (See Figure 2), and the adjustment screw is sealed with paint (approximately one turn counterclockwise from the end-stop).

Wiring Terminals

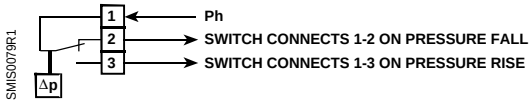
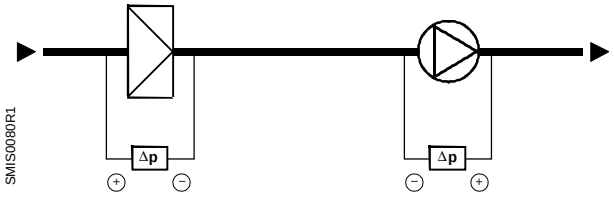


Figure 3. Wiring Terminals.

Application Examples



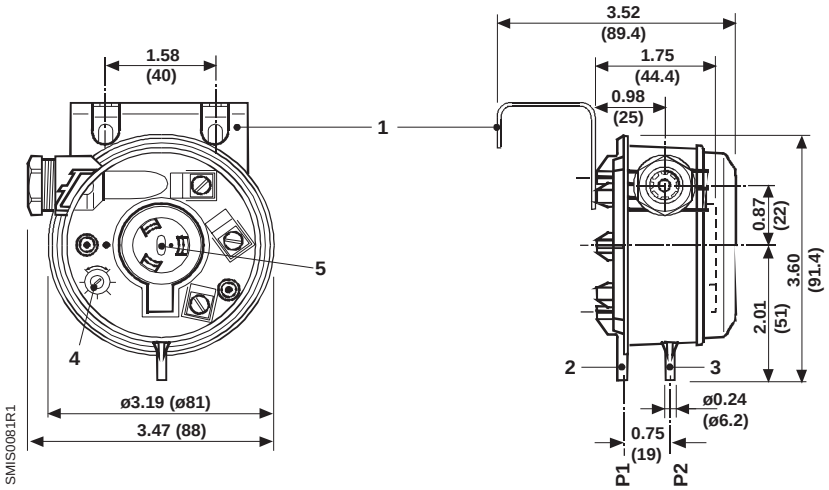
\+ Pressure upstream of filter
– Pressure downstream of filter

\+ Pressure downstream of filter
– Pressure upstream of fan on inlet side or open to atmospheric pressure. With radial fans, locate at inlet center

Figure 4. Application Diagram.

Dimensions

All dimensions in inches (millimeters)



Legend:

1 Mounting bracket
2 P1 connection, higher pressure
3 P2 connection, lower pressure
4 Pressure differential scale (factory-sealed with paint)
5 Setpoint knob

Figure 5. QBM81-… Differential Pressure Switch Dimensions.

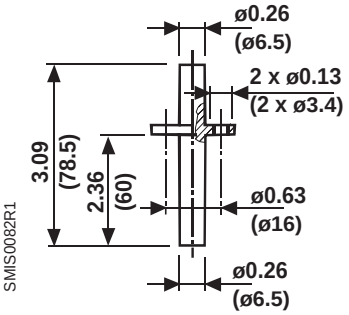


Figure 6. Duct Adapter Dimensions.

NOTE: Two duct adapters are supplied with the pressure switch.