

Air Relay Switch

INSTALLATION AND OPERATING INSTRUCTIONS

Construction

The air relay switch is housed in a diecast aluminium enclosure which conforms to IP66 protection factor. For calibrated models a scale, visible through a window, is provided. The pressure capsule, at the bottom of the switch, comprises a pressure housing (of SS316), a disc, nylon reinforced rubber / metal diaphragm and a plunger or bellows.

Principle of Operation

Air relay switches are used where pneumatic logic is required e.g. in extremely hazardous areas. The output is an air supply (or an absence of it), in place of an electrical signal as in pressure switches. The input is air or inert gas (not more than 7 bar pressure).

The process pressure is sensed by the pressure capsule of the pressure switch. Depending on the setpoint and the pneumatic valve logic chosen, a lever operates a pneumatic valve closing / opening it.

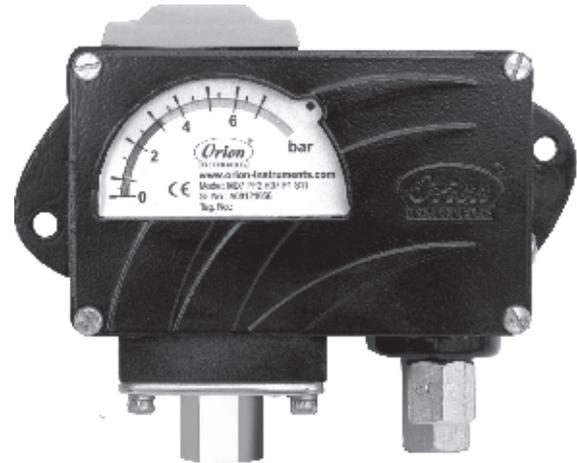


Fig. 1

Mounting

The Air Relay pressure switches can be mounted in any direction. It is advised to mount them in such a way that the diaphragm is vertical.

- 1) Connect the process pressure tubing to the pressure port. The pressure port size is generally 1/4" B.S.P. female, unless specially ordered otherwise. Other sizes can be obtained via adaptors.

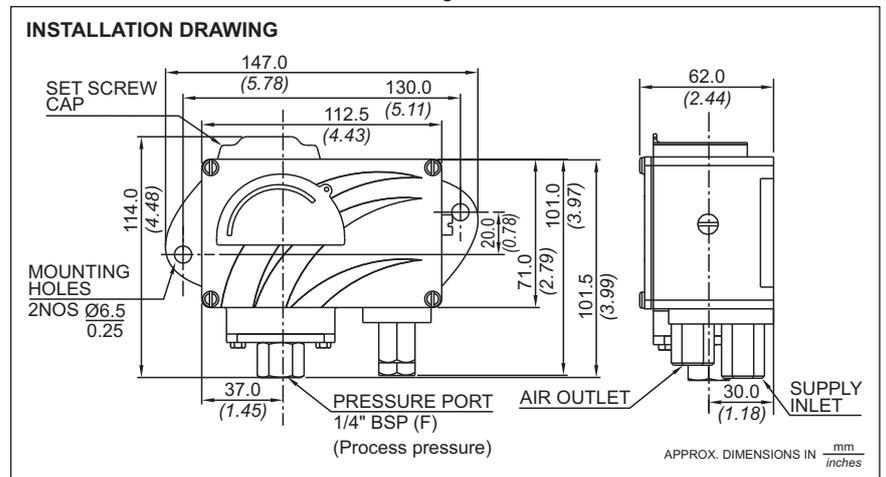


Fig. 2

Pneumatic valve specifications

NO valve (P2) = air flows when process pressure < set point
NC valve (P1) = air flows when process pressure > set point

Supply pressure of air/inert gas = 7 bar max

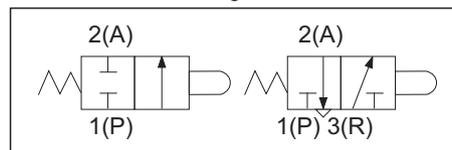


Fig. 3

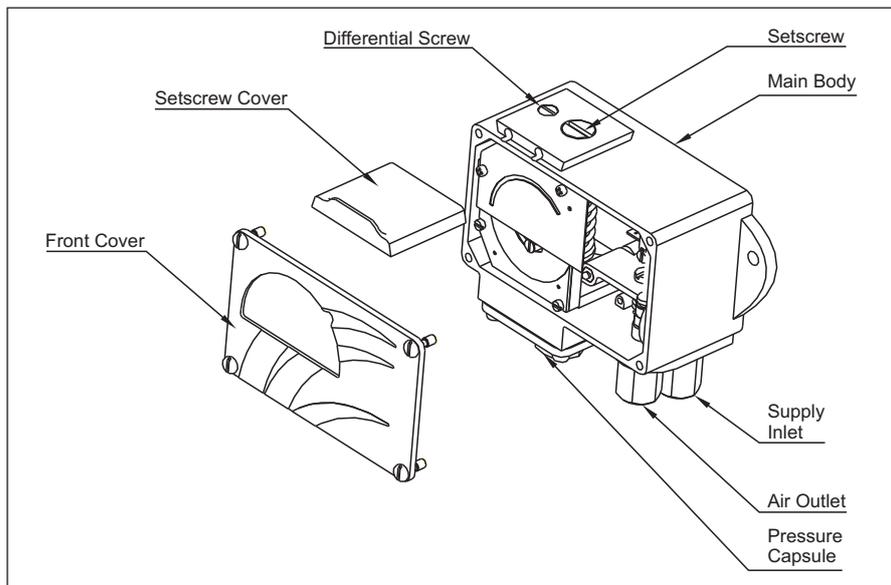
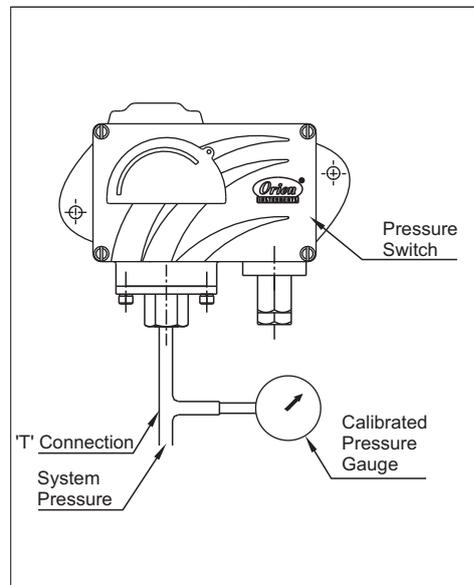


Fig. 4



Set Point Adjustment (Refer figure 3)

For switches with fixed differentials

- 1) Remove the setscrew cover.
- 2) i) MD UNCALIBRATED Models : Turn the setscrew to the extreme negative end.
- ii) MD CALIBRATED Models : Adjust the desired setpoint on the scale.
- 3) Apply the desired cutin (lower) / cutout (higher) pressure to the air relay switch.
- 4) i) MD UNCALIBRATED Models : Increase the pressure setting by turning the set screw till contacts changeover.
- ii) MD CALIBRATED Models : proceed to Step 5
- 5) Some minor adjustment will be required to achieve the exact cutin (lower) / cutout (higher) point, which can be checked with the help of a proper pressure measurement device.
- 6) Replace the setscrew cover.

Tip : The air relay switches are factory set at half the setpoint range (unless otherwise specified in a Purchase Order). Step 2 can be omitted if the desired set point is more than the factory setting. for MD uncalibrated models

For adjustable differential models

1. Decide the cut-in (lower) pressure P1 & the cut-out (upper) pressure P2. The differential will be (P2 - P1).
2. Remove the set screw cover.
3. a) For UNCALIBRATED models
 - i) Turn the setscrew to the extreme negative end.
 - ii) Turn the differential screw to the extreme negative end.
 - iii) Apply the desired cutin (lower) pressure to the switch.
 - iv) Increase the pressure setting by turning the setscrew till contacts changeover.
- b) For CALIBRATED models
 - i) set the cut-in point on the main-scale with the help of the set-screw.
4. Turn the differential screw to the extreme positive end.
5. Apply the desired cutout (higher) pressure to the switch
6. Decrease the differential pressure setting by turning the differential screw till contacts changeover.
7. Some minor adjustment will be required to achieve the exact cutin (lower) / cutout (higher) point, which can be checked with the help of a proper pressure measurement device.
8. Replace the setscrew cover.

Trouble Shooting Tips

Generally no problems are observed if the air relay switch selection and the setpoint is proper. For a switch selection procedure, please consult our sales office.

For properly selected air relay switches, if following symptoms are observed, the likely causes and remedies are as stated below.

Symptom 1: Switch does not operate

- 1) Pressure does not reach the pressure port.
 - a) Check if the entry to the pressure capsule is not blocked by frozen process or scales or impurities in the process.
 - i) If this is the case, try freeing the blocked path by a blunt tool in case of scales or impurities.
 - ii) For frozen process, it is advisable to use chemical seals.

DO NOT OPEN THE PRESSURE CAPSULE IN ANY EVENT.

If the cause is none of the above mentioned probabilities, proceed as per the following steps.

- b) Check the system pressure & set point of switch. For use of switch for falling setpoints, system pressure has to be greater than cutin point. For use of switch for rising setpoints, the system pressure may not be reaching / exceeding the cutout point.
 - i) For adjustable differential models turn the differential screw to the extreme negative end.
 - ii) Use 'T' connection & connect calibrated pressure gauge to the 'T' connection as shown in the figure 4.
 - iii) Adjust the setpoint such that the system pressure is greater than the cut-out point of the pressure switch.
 - iv) If the switch still does not operate, remove the switch physically and should be returned to the factory.

Symptom 2: Leakage

In case leakage is observed, the pressure switch has to be returned to the factory without opening the pressure capsule. Check for the following likely causes and use a new switch taking proper precautions.

- a) System pressure is greater than working pressure : Use an overrange protector or a switch with appropriate maximum working pressure.
- b) Incompatible wetted parts : The working medium may not be compatible with wetted parts, which damages the sealing of the process from working parts. Use a chemical seal for the pressure switch or use proper compatible wetted parts.
- c) Excessive process temperature : Process temperature may exceed maximum allowable temperature, which in turn damages the diaphragms. Use an impulse tubing of proper length for cooling the process temperature. There may be a pressure drop depending on length of the impulse tube used. Adjust the setpoint of the pressure switch accordingly.

Symptom 3: Chattering

1) Check the system pressure for surges. Chattering is observed where the system pressure is close to the cutin / cutout point and the surge pressure exceeds the on-off differential. Use a pressure switch with an adjustable differential or use surge dampers in your system.

Symptom 4 : Air leakage from the valve

- 1) The opening of the pneumatic valve is gradual. So the air output pressure will gradually increase / decrease with increase / decrease in process pressure. This is normal. ■