

Installation, Operation & Maintenance Instructions



310/316 Series

Models 310, 316 (Differential Pressure Switches)



General

The unit is manufactured, checked and supplied in accordance with our published specification, and when installed and used in normal or prescribed applications, with the lid in place and within the parameters set for mechanical and electrical performance, will not cause danger or hazard to life or limb.



THE USERS ATTENTION IS DRAWN TO THE FACT THAT, WHEN THE UNIT IS 'LIVE' WITH RESPECT TO ELECTRICAL OR PRESSURE SUPPLIES, A HAZARD MAY EXIST IF THE UNIT IS OPENED OR DISMANTLED.



UNITS MUST BE SELECTED AND INSTALLED BY SUITABLY TRAINED AND QUALIFIED PERSONNEL IN ACCORDANCE WITH APPROPRIATE CODES OF PRACTICE SO THAT THE POSSIBILITY OF FAILURE RESULTING IN INJURY OR DAMAGE CAUSED BY MISUSE OR MISAPPLICATION IS AVOIDED.

Operating principles

A diaphragm is used to sense the difference between two pressures applied to either side of the diaphragm. The diaphragm transmits a force proportional to the applied pressure difference to an operating beam. The beam is restrained by an adjustable spring.

When the force on the beam overcomes the spring tension, the beam moves and operates a switch or switches. On reduction of the applied pressure-difference the force applied to the beam also falls, the beam is restored to its original position by the spring, and the switch resets.

INSTALLATION

Mounting (All models)

The instruments are designed to be mounted vertically with the process connection underneath as shown in Figs 4 & 5, using the mounting brackets provided. Select the mounting point so as to avoid excessive shock, vibration or temperature fluctuation. Instruments should be mounted to avoid excessive heat transfer from the process line or adjacent plant.

If sudden changes of pressure (pulsations) are likely then we recommend that snubbers are fitted between the process line and switch.



THE PROCESS CONNECTION THREAD SIZE IS Rc1/4 AVOID MISMATCHING WITH THE PROCESS CONNECTION ADAPTOR. AVOID OVER-TIGHTENING ADAPTORS OR DAMAGE MAY OCCUR.

Wiring

Wire in accordance with local and National codes. Use wire suitable for terminal screw and cup washer provided on the microswitch. Deliver electrical connection through a suitable cable gland which will maintain the IP rating of the instrument. Keep wiring tails to a minimum and check that wires do not interfere with the operating mechanism. Use the earthing points provided.

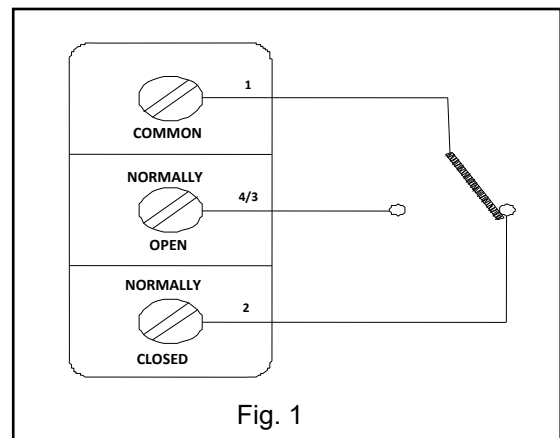


Fig. 1

Cable Glands and Adaptors

The enclosure is supplied with a through hole of 22 mm blanked with a blind grommet. Discard the grommet and fit a suitable proprietary brass or nylon M20 cable gland with thread length of 10 mm and locknut. Fit the nylon reducer provided to the inside and a fibre washer to the outside. See diagram 1.

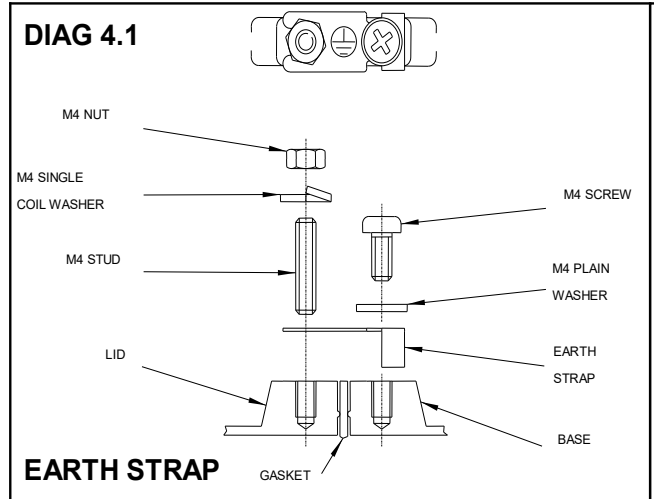
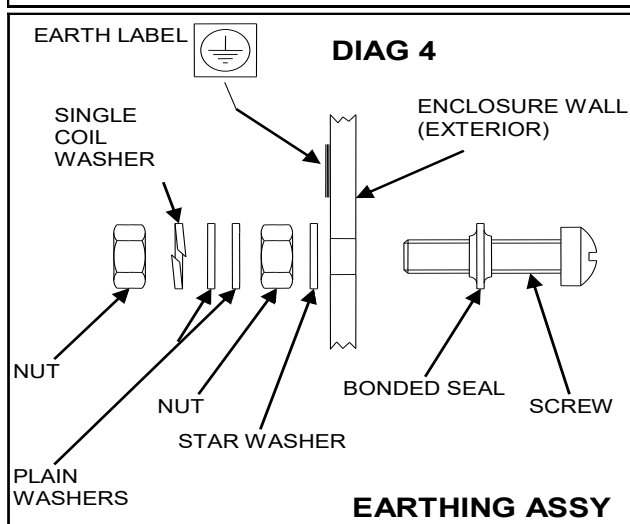
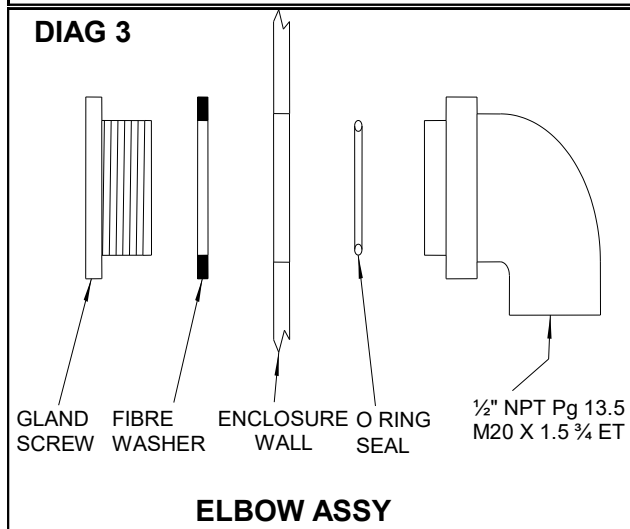
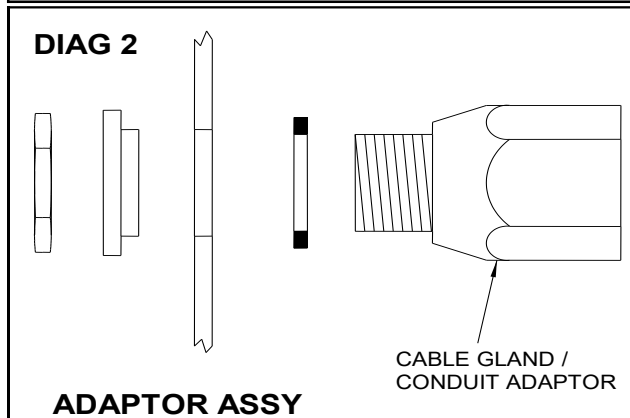
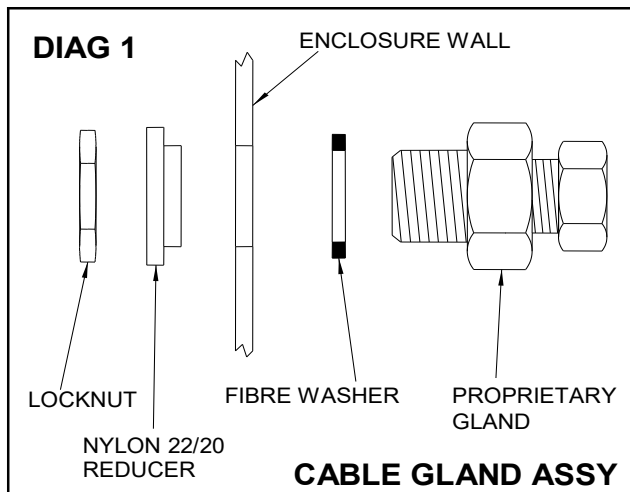
Alternately, the enclosure may be supplied from the factory with a threaded adaptor ready to accept the customer's gland or conduit system.

Alternatives:

- I. a metal or nylon adaptor may be used to accommodate other sizes of gland eg NPT, or conduit system. See diagram 2.
- II. an elbow kit may be supplied to enable the entry to be rotated axially through 90° and radially through 360°. See diagram 3.

Earthing / grounding – The user must make suitable local earthing arrangements, if required, to ensure that metal glands are earthed.

An earthing point is provided inside the enclosure. If this is disturbed in any way it must be reassembled correctly to be an effective earth and retain ingress protection. See diagram 4. When removing the lid slacken the M4 nut first and ensure it is re tightened whenever the lid is replaced. See diagram 4.1.



Earthing / Grounding of Process Connection and Mounting Brackets

All the internal dead metal work is bonded to the enclosure earthing point. Due to requirements of sealing, the process connection and mounting brackets may be isolated from the earthing point. Do not, therefore, rely on either for earthing, instead always use the earthing point provided. If required, the process connection and mounting brackets may be bonded locally. Never use the process connection or inlet pipe for locally grounding welding equipment unless it is separately earth bonded.

OPERATION

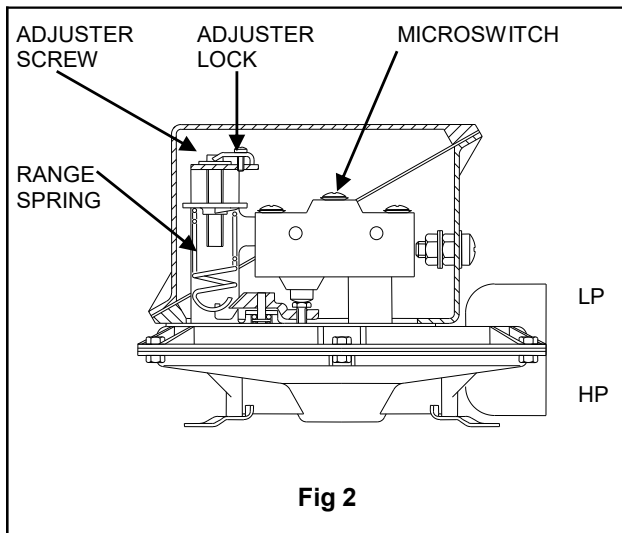
Adjustments

Pressure difference switches are supplied calibrated against falling pressure difference unless otherwise specified. Set Point adjustment refers to falling pressure difference. Switching differential is the difference between the set point and the operating value on rising pressure difference. For opening details see Fig 4 and 5.

Set Point Adjustments: (All Models, see Fig 2)

1. Isolate from process and power.
2. Remove the instrument lid.
3. Loosen locking plate by slackening the M3 hexagon screw.
4. Rotate the adjuster screw with a plain blade screwdriver to adjust the set point. Rotate clockwise to increase the set point and counter-clockwise to decrease the set point. The scale provides an approximate set value (see note).
5. Re-tighten the locking screw.
6. Replace the instrument lid (see maintenance).

NOTE: For accurate setting, a suitable pressure gauge must be used in conjunction with the above procedure. Do not attempt to set the switch outside the scale limits. Though the unit may be set anywhere within its operation range, for optimum performance, it is good practice to have a set point value between 25% and 75% of span.



Process Configurations

For normal pressure difference operation, the connections are made to the High Pressure (HP) and Low Pressure (LP) ports as appropriate. For single ended positive pressure operation the HP only is used and the LP is left open to atmosphere.

For single ended negative pressure operation the LP only is used and the HP is left open to atmosphere.

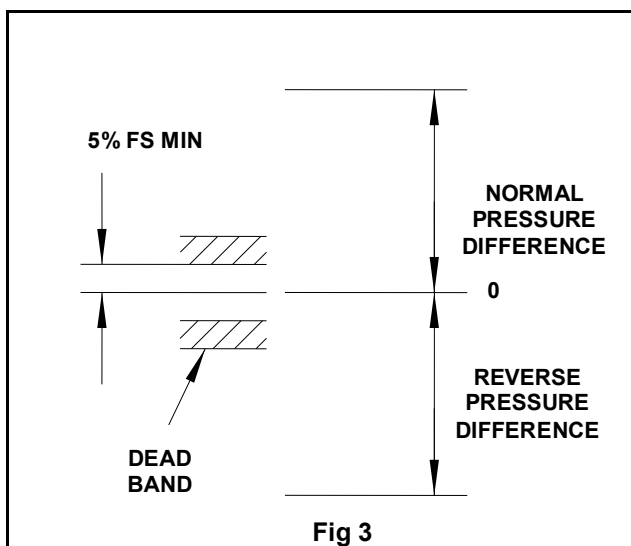
Use a breather/filler in the vacant port of single-ended operation.

Compound Ranges e.g. -2.5 to $+2.5$ mbar

For normal operation negative pressure is applied to the LP port whereby the HP port is left open to atmosphere and the set point is between 0 and $+2.5$ mbar.

For reverse operation, negative pressure may be applied to the HP port whereby the LP port is left open to atmosphere and the set point is between 0 and -2.5 mbar. For positive pressures the opposite applies.

It is recommended the minimum setting to be not less than 5% of Full Scale (FS) either side approaching zero (see Fig 3).



MAINTENANCE

Inspections should be carried out at quarterly to yearly intervals depending upon operating conditions.

Isolate the unit from process and power and remove the lid. Check all terminals for tightness. Check that cable tails are not fouled or chafed. Check for internal condensation. Rectify as necessary.

It is recommended that instruments used to provide an alarm are operated periodically to ensure they are functioning correctly.

If further maintenance is required seek advice from DELTA MOBREY before attempting repair or replacement of parts.



MOVING PARTS HAVE BEEN TREATED WITH A WATER REPELLING LUBRICANT BEFORE LEAVING THE FACTORY. OCCASIONAL INSPECTION AND THE APPLICATION OF A WATER REPELLING LUBRICANT IS RECOMMENDED TO ENSURE MOVING PARTS REMAIN FREE UNDER ALL CONDITIONS.



THE ABOVE WARNING DOES NOT APPLY TO INSTRUMENTS TREATED FOR OXYGEN SERVICE.

Replacement Parts

Use only factory authorised parts and the fitting instructions that are supplied.

Warranty

See Standard Conditions of Sale.

DIMENSIONS

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