

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.

HEALTH AND SAFETY AT WORK ACT 1974

WARNINGS

1. **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.**

2. **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 MIS-APPLICATION IS AVOIDED.**

3. TYPE W AND A ENCLOSURES HAVE A SAFETY BLOW-OUT DISC FITTED IN THE REAR OF THE ENCLOSURE TO PREVENT DANGEROUS PRESSURISATION OCCURRING IN THE EVENT OF A SEAL FAILURE. THIS MUST NOT BE OBSTRUCTED DURING INSTALLATION. DO NOT REMOVE OR REPLACE WITH ANY OTHER DEVICE NOT APPROVED BY DELTA CONTROLS.

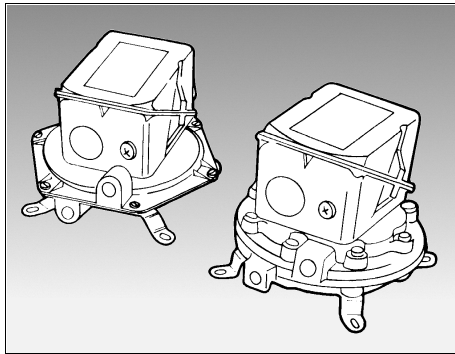
CAUTIONS

- Maximum single-ended or out-of balance pressure or vacuum;
Ranges B3, B5, C2, C5 = 60 mbar
Range D5 = 100 mbar
Ranges D2, D8, F1, G0, G8 = 7 bar

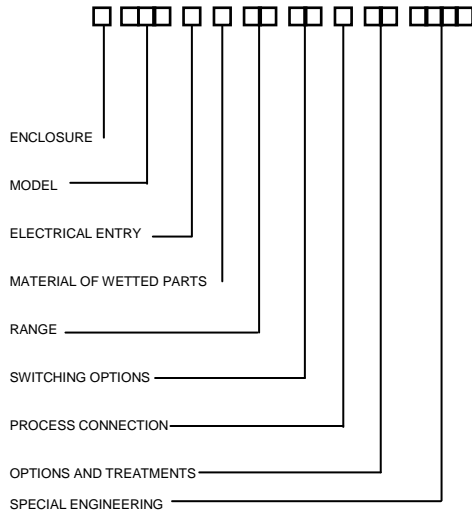
All model 310 ranges are only suitable for dry gaseous mediums. Impulse lines should be sized and installed to avoid condensation build up affecting accuracy.

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.



PRODUCT CODE



INSTALLATION

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.

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

WIRING (Fig 1)

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.

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 CONTROLS before attempting repair or replacement of parts.

CAUTION

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.

WARNING: DOES NOT APPLY TO OXYGEN SERVICE.

OPERATION

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 Adjustment: Models 310, 316 (Fig 2)

- Isolate from process and power.
- Remove the instrument lid.
- Loosen locking plate by slackening the M3 hexagon screw.
- 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).
- Re-tighten the locking screw.
- Replace the instrument lid (see maintenance).

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 eg -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).

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. Thought 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.

REPLACEMENT PARTS

Use only factory authorised parts and procedures. The only parts recommended for site replacement is the microswitch.

WARRANTIES – SEE CONDITIONS OF SALE.

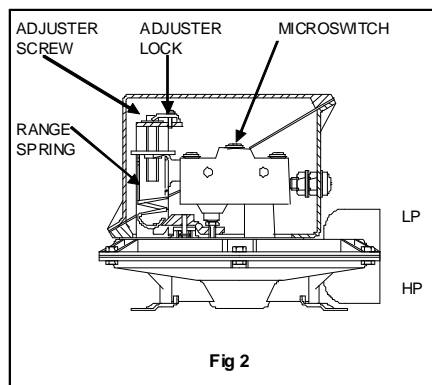


Fig 2

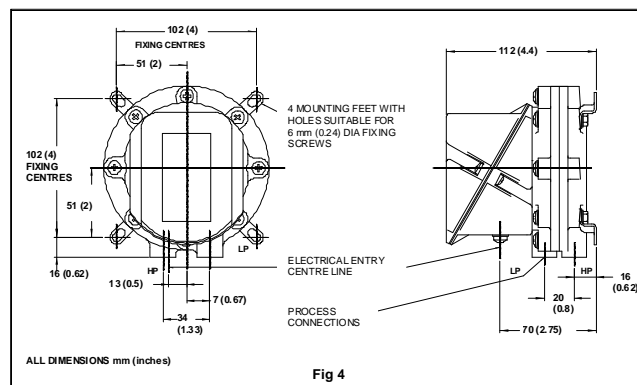


Fig 4

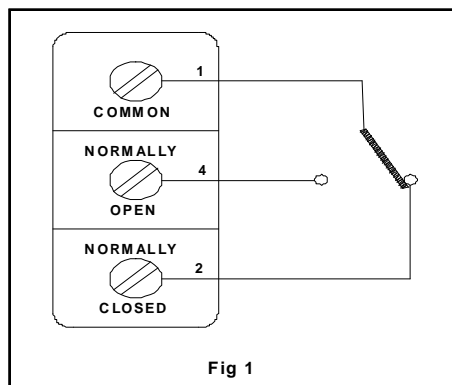


Fig 1

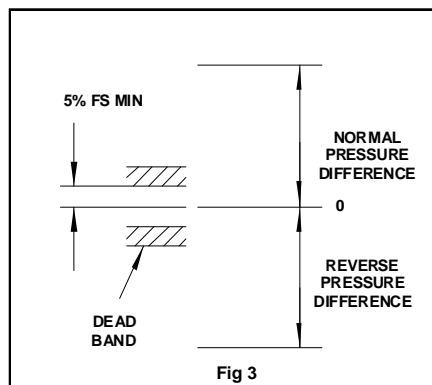


Fig 3

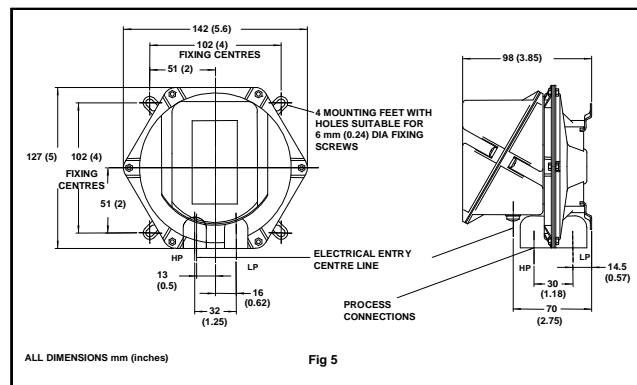


Fig 5

In the interest of development and improvement Delta Controls Ltd, reserve the right to amend without notice, details contained in this publication. No legal liability will be accepted by Delta Controls Ltd, for any errors, omissions or amendments.

YOUR TRUSTED PARTNER IN PROCESS INSTRUMENTATION

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CE Low Voltage Directive (LVD) – 2006/95/AC. Switch products with enclosure codes 'W' and 'A' supplied CE-marked must be installed and used in accordance with the main instructions and this addendum supplied with each product. Products rated lower than 50V ac and 75 V dc are outside the scope of the LVD, and therefore, do not require CE-marking under this directive. The LVD does not apply to products with enclosure codes 'H', 'K', 'R', 'M', 'N' for use in hazardous areas. Switch products with enclosure codes 'H', 'K', 'R', 'M', 'N', are covered by the Explosive Atmospheres Directive ATEX – 94/9/EC and when CE-marked will indicate compliance with this directive alone. The following directives do not apply to switch products manufactured by Delta Controls:
Electromagnetic Compatibility EMC – 2004/108/EC
Machinery Safety Directive MSD – 2006/42/EC

WIRING

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.

Declaration of Conformity



We: Delta Controls Ltd
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West Molesey
Surrey, UK
KT8 2UZ

As the manufacturers of the apparatus listed, declare under our sole responsibility that the products listed below:

Pressure, Pressure Difference, Temperature & Flow switches series "W" or "A":
201, 202, 203, 281, 204, 207, 208, 209, 231, 232, 233, 234, S21, S22, S24, GR2, GR4, VM2, VM4.
301, 303, 304, 381, 384, 306, 386, 310, 316, S31, S34, GR3, GR6.
721, 731, 771, 722, 732, 772, 723, 733, 773, 781, 734, 774, 741, 742, 743, 744, S71, GR7.
131.

To which this declaration relates are in conformity with the following relevant standards or parts thereof:

- EN 60947-1:1992 Low voltage switch gear and control-gear-general rules.
- EN 60947-5-1:1992 Low voltage switch gear and control-gear-control circuit devices and switching elements.
- EN 60529:1991 Specification for classification of degrees of protection provided by enclosures.
- EN 60950:1992 Safety of information technology equipment including electrical business equipment: section 2.5.
- BS 6134:1991 Specification for pressure and vacuum switches.

And thereby conforms to the requirements of the Low Voltage Directive 73/23/EC amended by 93/68/EEC.

Signed:

R. Harrison
Managing Director

Original dated 22nd June 2000
Rev. B dated 12th August 2009

SWITCH CODE	UL / CSA MICROSWITCH RATING (RESISTIVE) *SEE NOTE	IEC 947-5-1 / EN 60947-5-1 RATING		Designation & Utilisation Category	VA			
		U _{imp}	U _i		Make	Break		
00	5A @ 110 / 250 VAC	0.8k V	250 V	0.6/0.3A @ 120/240 VAC	AC 14 / D300	A C	432	72
				0.22/0.1A @ 125/250 VDC	DC 13 / R300	DC	28	28
02	5A @ 110 / 250 VAC 2A @ 30 VDC	0.8k V	250 V	0.6/0.3A @ 120/240 VAC	AC 14 / D300	AC	432	72
				0.22/0.1A @ 125/250 VDC	DC 13 / R300	DC	28	28
04	1A @ 125 VAC *100mA @ 30 VDC	1A @ 125 VAC RESISTIVE (IEC 1058-1/EN 61058-1)						

The electrical rating is dependent on the microswitch fitted to the instrument. The electrical rating is defined by each approval that the microswitch complies with and is shown on the product nameplate, ie UL / CSA, or IEC. It should be noted that the switch must be used within the electrical rating specified from the approval you require. Table A lists the actual IEC ratings against the Designation & Utilisation Category marked on the nameplate. In the absence of any verification by UL / CSA the microswitch *manufacturer's rating is specified in **bold italics**. If in doubt, seek guidance from factory.

Pollution degree – all products are suitable for use in pollution degree 3.

Electrical isolation – These products are not suitable for electrical isolation. Always isolate circuit separately to carry out any electrical work.

