

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

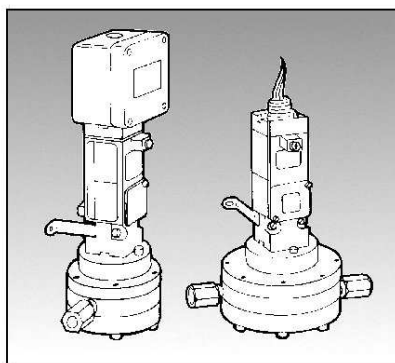
WARNINGS

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.

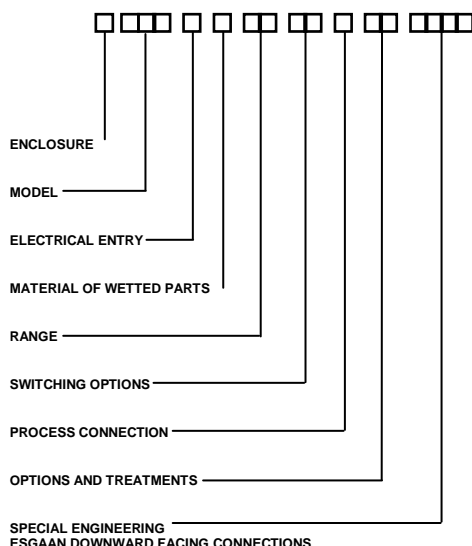
2. UNITS MUST BE SELECTED AND INSTALLED BY SUITABLY TRAINED AND QUALIFIED PERSONNEL IN ACCORDANCE WITH APPROPRIATE CODES OF PRACTICE SO THAT THE POSSIBILITY OF FAILURE RESULTING IN INJURY OR DAMAGE CAUSED BY MISUSE OR MISAPPLICATION IS AVOIDED.

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 a push rod. The rod is restrained by an adjustable spring. When the force on the rod overcomes the spring tension the rod moves and operates a switch or switches. On reduction of the applied pressure difference the force applied to the rod also falls, the rod is restored to its original position by the spring, and the switch or switches reset.



PRODUCT CODE



INSTALLATION

The instruments are designed to be mounted vertically. They can be mounted either direct to process or to a wall or panel using the backplate 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 lines or adjacent plant.

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

Use a spanner to support the process connection when fitting the instrument. DO NOT OVERTIGHTEN.

WARNING: CHECK THE CONNECTION THREAD SIZE AND SPECIFICATION ON THE UNIT TO AVOID MISMATCHING WITH THE PROCESS CONNECTION ADAPTOR. SEE DIGIT 11 OF PRODUCT CODE.

WIRING (Fig 1)

Terminal Enclosure Version (Fig 4)
Wire in accordance with local and national codes. Use cables no larger than 2.5 mm² (14 AWG). Deliver electrical connection through a suitable cable gland, which will maintain the IP rating of the instrument. Insert bare wires fully into the terminal block and tighten securely. Keep wiring tails to a minimum.

Flying Lead Version

The leads are factory sealed so it is unnecessary to seal the conduit to the conduit nipple. However, flying leads must be terminated in accordance with local and national codes. Each conductor is provided with an identity tag. If these become detached refer to the colour code in the wiring diagram.

CERTIFIED ENCLOSURES

All Series GR Pressure Difference Switches can be supplied with BASEEFA certified enclosures to the following standards:

Zone 1 (Div 1) IEC 79-1

BS 5501: Parts 1 and 5: EN 50 014 and EN 50 018 CENELEC. Codes 'H' for aluminium and 'R' for stainless steel EExd IIC T6.

All enclosures are suitable for outdoor use and the majority of products are rated IP66. Refer to the product label and/or leaflet. Only operation, maintenance or repair procedures either contained herein or approved by Delta Controls may be used, to avoid rendering the equipment unsafe in operation and / or nullifying the Certification. NO MODIFICATIONS ARE PERMITTED.

Special Conditions for Safe Use

The integral wires shall be suitably protected against mechanical damage and be terminated within a terminal or junction facility suitable for the conditions of use.

Electrical Adaptors

Zone 1. Use only certified adaptors for Zone 1. EExe for increased safety installations and EExd for Flameproof installations.

References for Selection and Installation

BSEN60079-14 Part 4 for all Enclosure Codes (Intrinsic Safety)
BSEN 50014 Part 1 for Enclosure Codes H, R
BSEN60529 IP RATING (Ingress Protection)

MAINTENANCE

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

Where a terminal enclosure is fitted, 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.

Note: Should the diaphragm fail the process will vent to atmosphere via a control orifice without pressurising the switch enclosure. Periodically ensure the vent area does not become blocked and the vent plug has not degraded. Ensure that the vent area is not obstructed.

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.

Set Point Adjustment: Models GR3/6 (fig 3)

- 1 Isolate the instrument from the process.
- 2 Adjustment may be carried out with the unit live.
- 3 Loosen both cover screws.
- 4 Rotate cover anti-clockwise to allow access.
- 5 Using a screwdriver rotate the adjuster to obtain the desired setting. Turn right to left to increase the setting. An appropriate setting is shown by pointer against reference scale.
- 6 Rotate cover clockwise to close and tighten screws.

NOTE: For accurate setting, a suitable 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 (RANGE BC)

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

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

COMPOUND RANGE eg -12.5 to +12.5 mbar (RANGE BC)

For normal operation, negative pressure may be applied to the LP port, whereby the HP port is left open to atmosphere and the set point is between 0 and +12.5 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 -12.5 mbar.

For positive pressures the opposite applies.

It is recommended that the minimum setting is to be not less than 5% of FS either side approaching zero (see fig 2).

TERMINAL ENCLOSURE CODE K (Fig 4 & 9) – INSTALLATION

Terminal enclosure is rated IP65 for outdoor use. This is a certified enclosure Zone 1 (Div 1) IEC 79-1 BS 5501: Parts 1 and 5: EN 50 014 and EN 50 018 EExd IIC T6.

Instrument enclosure is certified to Zone 1 (Div 1) IEC 79-1 BS 5501: Parts 1 and 5: EN 50 014 and EN 50 018 Cenelec.

WARNING: Lid and adaptors. It is a safety requirement that at least 5 full threads are engaged when the unit is in operation. Never operate the unit unless this condition is met. Do not use greases or lubricants not compatible with the environment, process or aluminium.

REPLACEMENT PARTS

Use only factory authorised parts and procedures. The only parts normally recommended for site replacement are the microswitches. However, in some circumstances other spares kits are available. Apply for details quoting the serial number and full product code.

WARRANTIES – SEE CONDITIONS OF SALE

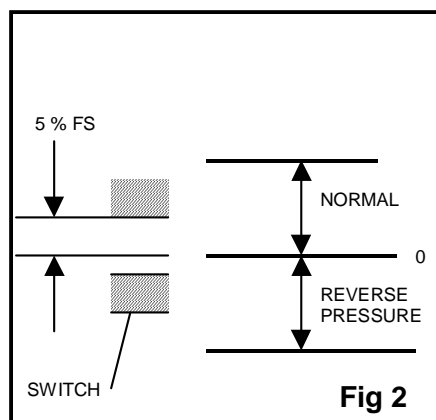


Fig 2

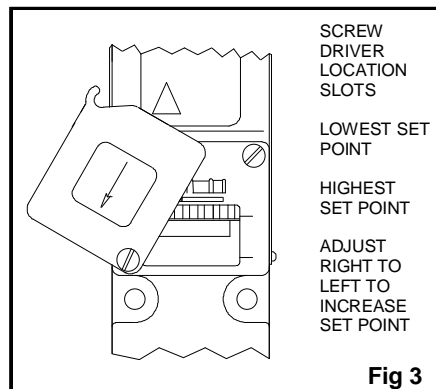


Fig 3

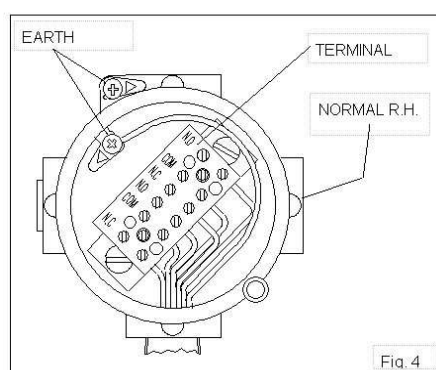
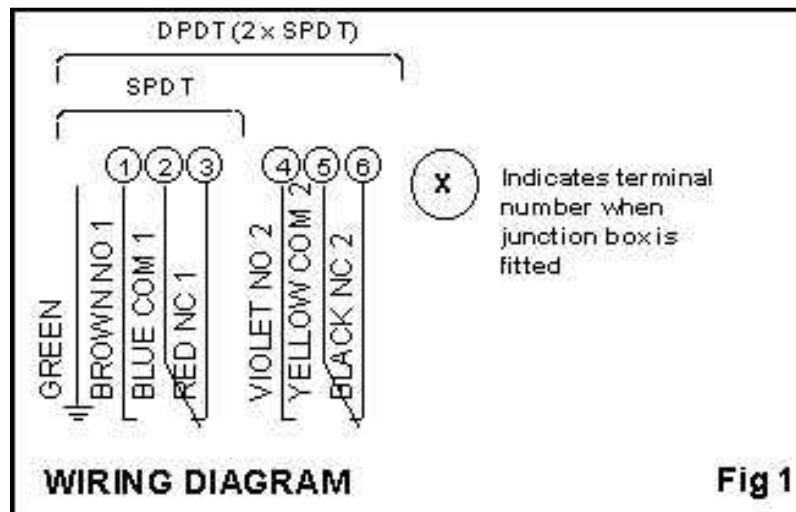
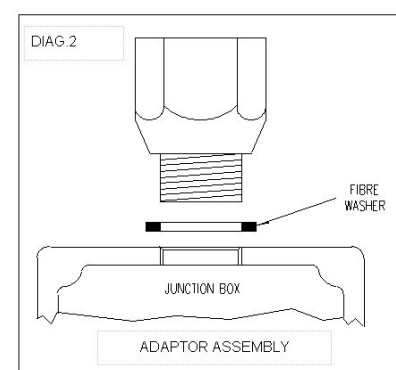
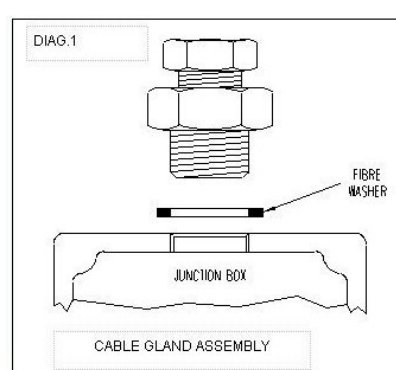


Fig. 4



WIRING DIAGRAM

Fig 1



CE Low Voltage Directive (LVD) – 2006/95/AC. 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. The LVD does not apply to products with enclosure codes 'H' and 'R', for use in hazardous areas. Such products 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

Junction box cable glands and adaptors. Optional Junction box code 'C' is supplied with an M20 x 1.5 tapped hole blanked with a red plug. Discard the red plug and fit a suitable proprietary brass or nylon M20 cable gland with thread length of 10 mm. Fit a fibre washer to the outside. See diagram 1. Alternately the junction box may be supplied from the factory with a threaded adaptor ready to accept the customer's gland or conduit system.

Alternatives:

1) a metal or nylon adaptor may be used to accommodate other sizes of gland eg NPT, or conduit system. See diagram 2.

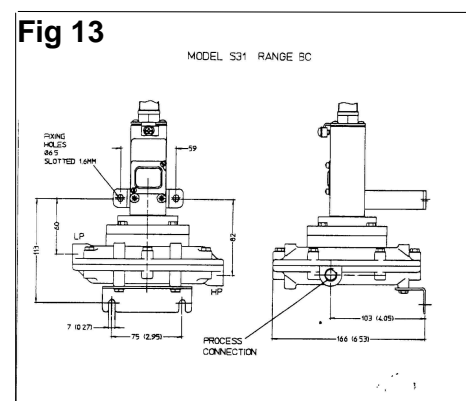
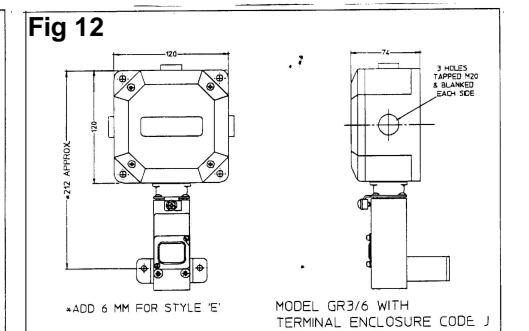
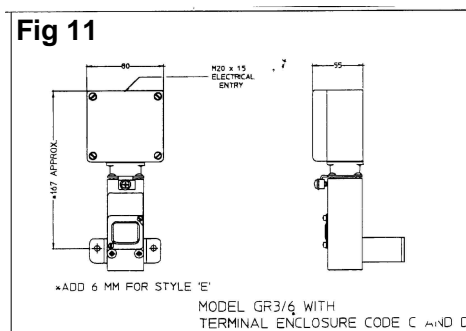
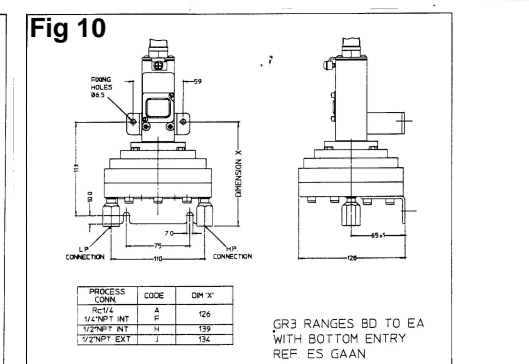
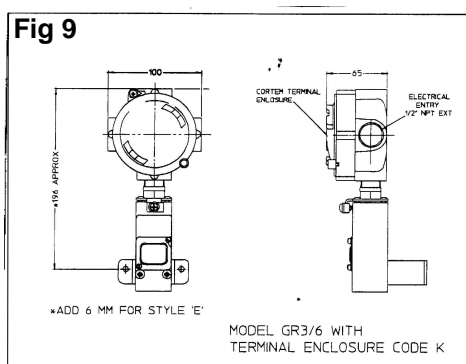
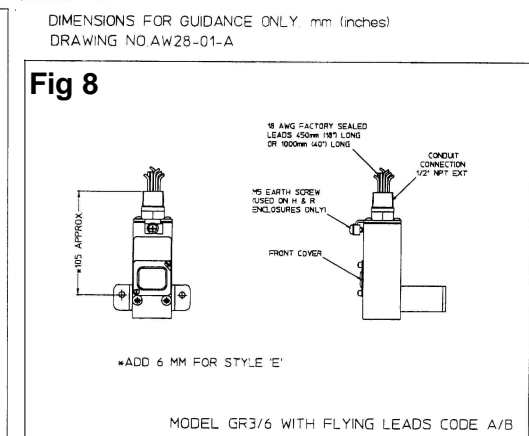
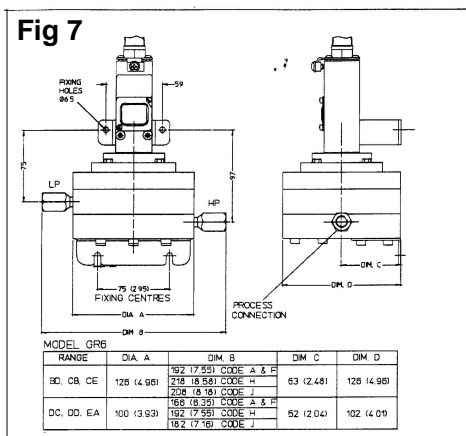
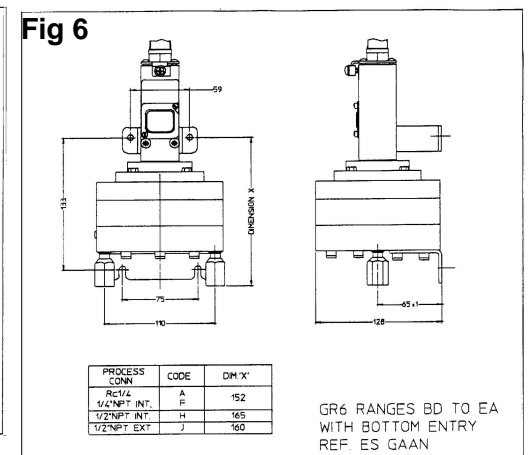
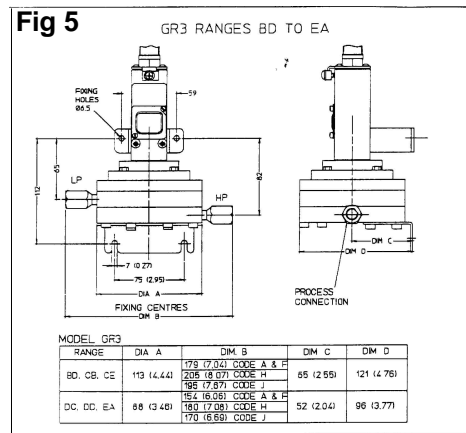
Earthing / grounding – Use earthing point provided inside the junction box (when fitted). The user must make suitable local earthing arrangement, if required, to ensure that metal glands / adaptors are earthed.

Pollution degree – all products are suitable for use in pollution degree 3. Ref EN60947-5-1

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

SWITCH CODE (type)	UL/CSA MICROSWITCH RATING (Resistive) *See Note	TABLE A – MICROSWITCH RATINGS						
		IEC 947-5-1/EN 60947-5-1 RATING				VA		
		U _{imp}	U _i	RATING (I _e /U _e)	Designation & Utilization Category	MAKE	BREAK	
HS, HD, HR	11A @ 110/250 VAC	0.8kV	250V	0.6/0.3A @ 120/240 VAC	AC14/D300	AC	432	72
	5/0.5 @ 30/125 VDC			0.22/0.1A @ 125/250VDC	DC13/R300	DC	28	28
HP, HQ, HT	5A @ 250 VAC	0.5kV	250V	0.6/0.3A @ 120/240 VAC	AC14/D300	AC	432	72
	2A @ 30 VDC			0.22/0.1A @ 125/250VDC	DC13/R300	DC	28	28
HV, HW, HY	1A @ 125 VAC	0.5kV	120V	0.3A @ 120 VAC	AC14/E150	AC	216	36
	*1A @ 30 VDC							

The electrical rating is dependent on the microswitch fitted to the switch. 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 and Utilisation Category marked on the nameplate. If in doubt, seek guidance from factory.



Declaration of Conformity



We: Delta Controls Ltd
 Island Farm Avenue
 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

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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