# Technical **Datasheet**

## GR Series - Flameproof
Pressure Switch
Models: GR2 & GR4

### Key **Features**

- Compact and rugged design.
- Hermetically sealed snap switch UL and CSA listed.
- ATEX Flameproof CENELEC EEx d IIC option.
- ATEX—Intrinsically Safe ATEX Ex ia IIC option.
- Weatherproof IP66/NEMA 4.
- Stainless steel body option NEMA 4X rating.
- High over-range models up to 1000 bar / 15,000 psi.
- Ranges available between 0.25—700 bar (4—10,000 psi).

### Series **Overview**

The Sentry Series offers exceptional performance and high build quality in a simple, safe and cost-effective package.

- Performance is assured by repackaging Delta's well proven sensor technologies in a new, simple, one-piece enclosure.
- Safety is maintained by a vent that prevents the enclosure becoming pressurized in the event of a sensor being damaged.
- Cost is minimised through the selection of common standard options although, as with all Delta products, a variety of optional extras are available to tailor the product to specific needs.

Other products in the series include:
- Differential Pressure Switches: Model D0
- Temperature Switches: Model T0

### Product **applications**

**The GR Series is suitable for a wide range of applications in:**

- Oil & Gas
- Chemical
- Petrochemical
- OEM

**The choice of models available ensures that the GR Series is suitable for use in:**

- Corrosive atmospheres
- Resistant to chemical attack

### How can we **help you?**

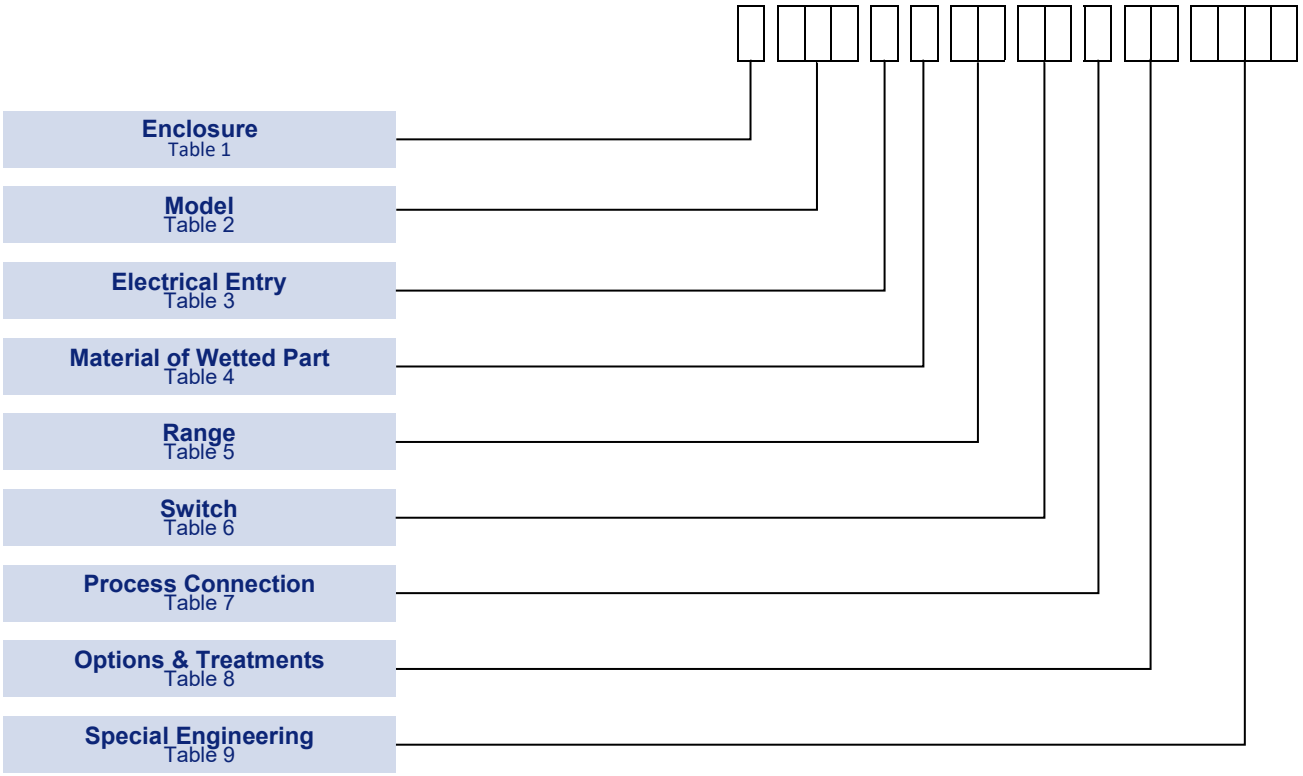
Delta Mobrey offers fast, efficient and knowledgeable support when and where you need it. Please visit our web site at www.delta-mobrey.com to find your local support centre or call us on:

+44 (0) 1252 729 140

Sentry Series - Flameproof
Models: HP01, HP02 & HP03

## How to order

*Switches can be configured by selecting codes representing the desired features from the tables that follow. The chart below, describes how the model code is built up. For assistance in configuring a switch that best suits your needs, please contact your local sales office.*




***NOTE**: Options shaded in the following tables are the most common options and are available on the quickest lead-times and at the lowest cost.*

***NOTE:** Only the most common options are shown in this data sheet. Should you require a feature that is not shown, please contact your local sales office for further details.*

## Technical Specification

Sentry Series - Flameproof
Models: HP01, HP02 & HP03

| | |
|---|---|
| **Accuracy:** | Set point repeatability ± 1% of span at 20°C / 68°F |
| **Storage Temperature:** | -40 to +60°C / -40 to +140°F |
| **Ambient Temperature:** | -25 to +60°C / -13 to +140°F |
| **Maximum Process Temperature:** | Subject to appropriate installation practice, the component parts withstand up to +60°C (+140°F). For process temperatures up to +120°C (+248°F), order WETTED PARTS Code A or S (Table 4). For higher temperatures, refer to SPECIAL ENGINEERING. |
| **Enclosure classification:** | IP66 / NEMA 4X / Weatherproof Ex ia |
| **Switch output:** | SPDT or DPDT snap action microswitch (standard)<br>Hermetically sealed (optional) |
| **Electrical rating:** | See Table 6 |
| **Process Connection:** | Rc ¼ (BSP), ¼ NPT Internal, 1/2 NPT Internal, 1/2 NPT External |
| **Weight:** | 0.6kg / 1.32lb to 2kg / 4.4lb depending on model |

## Enclosure

TABLE 1

**FINISH**

Enclosures W and H are clear anodized aluminium; Epoxy paint is optional see Code 50 in Table 8. A and R are natural finish stainless steel.

All are suitable for use in hazardous areas as defined by NEC Article 500, Class 1 Groups A, B, C, D Class II Groups E, F, G Division 1 and 2.

See Table 3 Code A.

| WEATHERPROOF ENCLOSURES | Code |
|---|---|
| **Aluminium General Purpose Weatherproof**<br>For outdoor industrial use IP66/NEMA 4. | W |
| **Stainless Steel Weatherproof**<br>For outdoor aggressive atmospheres<br>e.g. marine NEMA type 4X/IP66 | A |
| FLAMEPROOF ENCLOSURES | |
| **Aluminium Weatherproof/Explosionproof IP66/NEMA 4**<br>With CENELEC approval EEx d IIC. II 2 G for Zone 1<br>See approvals. II 2G | H |
| **Stainless Steel Weatherproof/Explosionproof IP66/NEMA 4**<br>For use inaggresive atmospheres e.g. marine<br>With CENELEC approval EEx d IIC. II 2 G for Zone 1<br>See approvals. II 2G | R |
| INTRINSICALLY SAFE ENCLOSURES | |
| **Stainless Steel Weatherproof/Explosionproof IP66/NEMA 4**<br>With ATEX approval Ex ia IIC. II 1 G/D for Zone 0<br>See approvals. | 4 |
| **Aluminium Weatherproof/Explosionproof IP66/NEMA 4**<br>For use in aggressive atmospheres e.g. marine.<br>With ATEX approval Ex is IIC. II 1 G/D for Zone 0<br>See approvals. | 5 |

## Models

TABLE 2

| | Code |
|---|---|
| **Fixed Switching Differential**<br>For applications up to 100 bar / 1500 psi<br>Over-range up to 155 bar / 2250 psi<br>Refer Table 5 | GR2 |
| **Fixed Switching Differential**<br>For applications up to 100 bar / 1500 psi<br>Over-range up to 600 bar / 8700 psi<br>Refer Table 5 | GR4 |
| **Fixed Switching Differential**<br>For applications up to 700 bar / 10,000 psi<br>Over-range up to 1000 bar / 15,000 psi<br>Refer Table 5 | GR4 |

## Electrical Entry

TABLE 3

See **TECHNICAL DATA** and **DIMENSIONS** fig 1 to 4.

**NOTE 1:**

Other lengths available—please contact sales for engineering codes

**NOTE 2:**

Weatherproof terminal enclosure Code C can only be combined with Table 1 Enclosure Codes W and A

**NOTE 3:**

Intrinsically Safe terminal enclosure Code V and W can only be combined with Table 1 Enclosure Codes 4 and 5

| | Code |
|---|---|
| **Factory Sealed Flying Lead.** See fig 1.<br>Class 1, Groups A, B, C, D. Class II Groups E, F, G.<br>0.45m/18in. Long flying lead (Note 1).<br>With 1/2-14 NPT external conduit thread. | A |
| **Integral Weatherproof Terminal Enclosure.** See fig 2.<br>Glass filled polyester with weather protection to IP66/NEMA 4.<br>Conduit entry tapped M20 x 1.5 (Note 2)<br>Ambient temperature –20°C to 86°C. | C |
| **Integral 'Increased Safety' Terminal Enclosure.** See fig 2.<br>EEx e IIC T6 (-20 to +40°C) Glass filled polyester certified to CENELEC EN50 014/EN50 019<br>With weather protection not less than IP66/NEMA 4. II 2G | D |
| **Integral 'Increased Safety' Terminal Enclosure.** See fig 3.<br>EEx e IIC T6 (-20 to +40°C) Glass filled polyester certified to CENELEC EN50 014/en50 019, with weather protection not less than IP66/NEMA 4. | J |
| **Explosionproof Terminal Enclosure.** See fig 4.<br>CENELEC EExd IIC T6 (-20 to +40°C) Diecast aluminium alloy.<br>Conduit entry tapped 1/2-14 NPT.<br>Weather protection not less than IP66/NEMA 4 II 2G | K |
| **Intrinsically Safe Terminal Enclosure-With Screw Terminals.**<br>See fig 2.Ex ia IIC T6 (-20 to +40°C) Glass filled polyester certified to EN60079:2004, EN50020:2002, EN60079-26:2004, IEC 61241-0:2004 and EN61241-11:2005, with weather protection not less than IP66/NEMA 4. II 2G | V |
| **Intrinsically Safe Terminal Enclosure-With DIN Rail Mounted Terminals.** See fig 2.<br>Ex ia IIC T6 (-20 to +40°C) Glass filled polyester certified to EN60079:2004, EN50020:2002, EN60079-26:2004, IEC 61241-0:2004 and EN61241-11:2005, with weather protection not less than IP66/NEMA 4. II 2G | W |

## Material of Wetted Parts

TABLE 4

**WELDED CONSTRUCTION**

**Codes S and T**

For reduced risk against leakage under extreme or unusual conditions, the diaphragm may be welded directly to the process connection, eliminating the O-ring.

| | Code |
|---|---|
| 316 stainless steel diaphragm, process connection and Viton O-ring seal. | A |
| 316 stainless steel diaphragm, process connection and Nitrile (Buna-N) O-ring seal | G |
| Nickel alloy (Monel) diaphragm, 316 stainless steel process connection and Viton O-ring seal for applications as laid down in NACE MR 01-75 | K |
| Nickel alloy (Monel) diaphragm, 316 stainless steel process connection and Nitrile (Buna-N) O-ring seal | P |
| 316 stainless steel diaphragm and process connection.<br>All welded construction. | S |
| Nickel alloy (Monel) diaphragm and process connection.<br>All welded construction (suitable for NACE MR 01-75) | T |

## Setting Ranges

TABLE 5

## 5A: SI Units

Due to manufacturing tolerances the figures quoted in these tables are for guidance only.

Should the switching differential be critical for specific applications, our engineers should be consulted prior to ordering

| MODEL | RANGE CODE | P Max Bar | RANGE bar | SWITCHING DIFFERENTIAL—Refer table 6 mbar | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | HS | HD/ HR | HP | HQ/HT | HV | HW/ HY |
| GR2 | DB | 27 | 0.25 to 1.6 | 200 | 260 | 80 | 104 | 200 | 260 |
| | DC | | 0.4 to 2.5 | 320 | 416 | 128 | 166 | 320 | 416 |
| | DE | | 1.0 to 6 | 280 | 364 | 206 | 268 | 280 | 364 |
| | EA | 70 | 1.6 to 10 | 430 | 450 | 300 | 390 | 430 | 450 |
| | EB | | 2.5 to 16 | 570 | 741 | 228 | 297 | 570 | 741 |
| | EC | 112 | 4.0 to 25 | 1200 | 1560 | 480 | 624 | 1200 | 1560 |
| | ED | | 10 to 40 | 2700 | 3500 | 1200 | 1560 | 2700 | 3500 |
| | EF | | 16 to 75 | 3200 | 4160 | 1280 | 1664 | 3200 | 4160 |
| | FA | 115 | 10 to 100 | 4300 | 5600 | 1720 | 2236 | 4300 | 5600 |
| GR4 | DB | 600 | 0.25 to 1.6 | 260 | 340 | 200 | 260 | 260 | 340 |
| | DC | | 0.4 to 2.5 | 330 | 429 | 250 | 325 | 330 | 429 |
| | DE | | 1.0 to 6 | 880 | 1144 | 680 | 885 | 880 | 1144 |
| | EA | | 1.6 to 10 | 600 | 780 | 463 | 603 | 600 | 1144 |
| | EB | | 2.5 to 16 | 1300 | 1690 | 1000 | 1300 | 1300 | 1690 |
| | EC | | 4.0 to 25 | 1900 | 2470 | 1500 | 1950 | 1900 | 2470 |
| | ED | | 10 to 40 | 4200 | 5460 | 2200 | 2860 | 4200 | 5460 |
| | EF | | 16 to 75 | 4300 | 5590 | 3300 | 4300 | 4300 | 5590 |
| | FA | | 10 to 100 | 6500 | 8450 | 5000 | 6500 | 6500 | 8450 |
| | U7 | 1000 | 7 to 160 | 9400 | 12220 | 7300 | 9500 | 9400 | 12220 |
| | V7 | | 25 to 250 | 16000 | 20800 | 9000 | 11700 | 16000 | 20800 |
| | W7 | | 50 to 400 | 22000 | 28600 | 17000 | 22100 | 22000 | 28600 |
| | Y4 | | 100 to 700 | 37400 | 48620 | 30000 | 39000 | 37400 | 48620 |

## 5B: PSI Units

| MODEL | RANGE CODE | P Max Psi | RANGE bar | SWITCHING DIFFERENTIAL—Refer table 6 mbar | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | HS | HD/ HR | HP | HQ/ HT | HV | HW/ HY |
| GR2 | DK | 400 | 4 to 25 | 2.9 | 3.8 | 1.2 | 1.5 | 2.9 | 3.8 |
| | DP | | 6 to 40 | 4.6 | 6 | 1.9 | 2.4 | 4.6 | 6 |
| | DZ | | 16 to 100 | 4.1 | 5.3 | 3 | 3.9 | 4.1 | 5.3 |
| | EH | 1000 | 25 to 160 | 6.2 | 6.5 | 4.4 | 5.7 | 6.2 | 6.5 |
| | EM | | 40 to 250 | 8.3 | 10.8 | 3.3 | 4.3 | 8.3 | 10.8 |
| | ER | 1600 | 60 to 400 | 17 | 23 | 7 | 9 | 17 | 23 |
| | EW | | 160 to 600 | 39 | 51 | 17 | 23 | 39 | 51 |
| | EE | | 250 to 1000 | 46 | 60 | 19 | 24 | 46 | 60 |
| | F6 | 2250 | 160 to 1500 | 62 | 81 | 25 | 32 | 62 | 81 |
| GR4 | DK | 8700 | 4 to 25 | 3.8 | 4.9 | 2.9 | 3.8 | 3.8 | 4.9 |
| | DP | | 6 to 40 | 4.8 | 6.2 | 3.6 | 4.7 | 4.8 | 6.2 |
| | DZ | | 16 to 100 | 13 | 17 | 10 | 13 | 13 | 17 |
| | EH | | 25 to 160 | 9 | 11 | 7 | 9 | 9 | 17 |
| | EM | | 40 to 250 | 19 | 25 | 15 | 19 | 19 | 25 |
| | ER | | 60 to 400 | 28 | 36 | 22 | 28 | 28 | 36 |
| | EW | | 160 to 600 | 61 | 79 | 32 | 41 | 61 | 79 |
| | EE | | 250 to 1000 | 62 | 81 | 48 | 62 | 62 | 81 |
| | F6 | | 160 to 1500 | 94 | 123 | 73 | 94 | 94 | 123 |
| | UK | 15000 | 100 to 2300 | 136 | 177 | 106 | 138 | 136 | 177 |
| | VC | | 350 to 3500 | 232 | 302 | 131 | 170 | 232 | 302 |
| | W9 | | 800 to 6000 | 319 | 415 | 247 | 321 | 319 | 415 |
| | YF | | 1600 to 10000 | 543 | 705 | 435 | 566 | 543 | 705 |

## Switch Options

TABLE 6

The switch contacts are hermetically sealed inside a stainless steel enclosure for protection against aggressive and corrosive atmospheres. UL & CSA listing applies to the explosionproof hermetically sealed switch which is suitable for use in hazardous areas as defined by NEC Article 500, Class I Groups A, B, C, D Class II Groups E, F, G Division 1 and 2.

| UL/CSA RATING | IEC947-5-1 / EN 60947-5-1 RATING | | | | | | Contact | Code |
|---|---|---|---|---|---|---|---|---|
| | Designation & Utilisation Category | Rated operational current $I_e$ (A) At rated operational voltage $U_e$ | *Ui* | *Uimp* | VA Rating Make | VA Rating Break | | |
| 11 Amps @ 110/250V AC and 5/0.5 Amps @ 30V DC Silver contacts | AC14 D300 | 0.6/0.3A @ 120/240 V AC | 250V | 800V | 432 | 72 | SPDT | HS |
| | DC13 R300 | 0.22/0.1A @ 125/250V DC | | | 28 | 28 | DPDT | HD † |
| | | | | | | | DPDT | HR ‡ |
| 5 Amps @ 250V AC and 2 Amps @ 30V DC Silver contacts with gold flash | AC14 D300 | 0.6/0.3A @ 120/240 V AC | 250V | 500V | 432 | 72 | SPDT | HP |
| | DC13 R300 | 0.22/0.1A @ 125/250V DC | | | 28 | 28 | DPDT | HQ † |
| | | | | | | | DPDT | HT ‡ |
| 1 Amp @ 125V AC and 1 Amp @ 30V DC Gold Alloy contacts—see note | AC14 E150 | 0.3A @ 120VAC | 125V | 500V | 216 | 36 | SPDT | HV |
| | | | | | | | DPDT | HW † |
| | | | | | | | DPDT | HY ‡ |

† 2 Single pole, double throw, simultaneous falling under pressure
‡ 2 Single pole, double throw, simultaneous falling under pressure

NOTE: For low energy circuits e.g. 30V and up to 100mA, we recommend using gold alloy contact switches.
NOTE: For Enclosure codes 4 and 5, HS, HD and HR switching codes are unsuitable. Use gold contact switches.
Ui = rated insulation voltage Uimp = rated impulse to withstand voltage across contacts.

## Process Connection

TABLE 7

Other thread specifications and sizes are available without using adaptors.

Adaptors are available for applications where their use is permitted. Apply for details.

| | Code |
|---|---|
| Rc 1/4 (1/4 BSP tr INT) to (ISO 7/1) | A |
| 1/4—18 NPT INTERNAL | F |
| 1/2—14 NPT INTERNAL | H |
| 1/2—14 NPT EXTERNAL | J |

**Not recommended for use over 600 bar/8700 psi. Refer to Table 5A & 5B.*

## Options & Treatments

TABLE 8

Combinations available, apply for details.

| | Code |
|---|---|
| **Tropicalisation** High humidity atmospheres | 01 |
| **Marine and Offshore** Saline atmosphere or salt spray | 02 |
| **Ammonia** Process (wetted) parts and construction suitable for atmospheric ammonia | 03 |
| **Oxygen Service** Process (wetted) parts are cleaned for oxygen and are oil free | 04 |
| **Pipe mounting Bracket** Permits local 2” pipework to be utilized for mounting the instrument. Details on application. | 10 |
| **Tag** Stainless steel **fixed** to enclosure.<br>**Tag** Stainless steel **tied** to enclosure. | 20<br>30 |
| **No options or Treatments** Use this code when Special Engineering is required without options and treatments | 00 |
| **Epoxy Paint** for aluminium enclosures W, H in Table 1 | 50 |

## Special Engineering

TABLE 9

| | Code |
|---|---|
| Please consult Delta sales engineering for special requirements | **TBA** |

## Approvals

**EUROPEAN**

**Low voltage Directive (LVD) 2006/95/EC.**
Compliant to LVD

**Pressure Equipment Directive (PED) 2014/68/EU:**
This product has a process connection size <=DN25 and is therefore categorised as sound engineering practice under Article 4 (3)

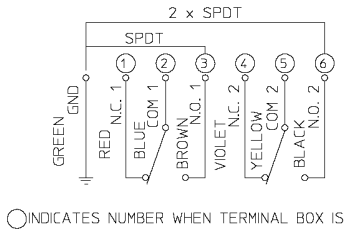
**ATEX Directive 94/9/EC:**

II 2GD Ex d IIC T6 / T5
Ex tb IIIC T85°C / T100°C Gb IP66
T6 / T85°C (Tamb –30°C to +65°C)

Certificate No. Baseefa12ATEX0121
IEC 60079-0, EN 60079-1, EN 60079-31

## Dimensions

**Wiring Diagram**

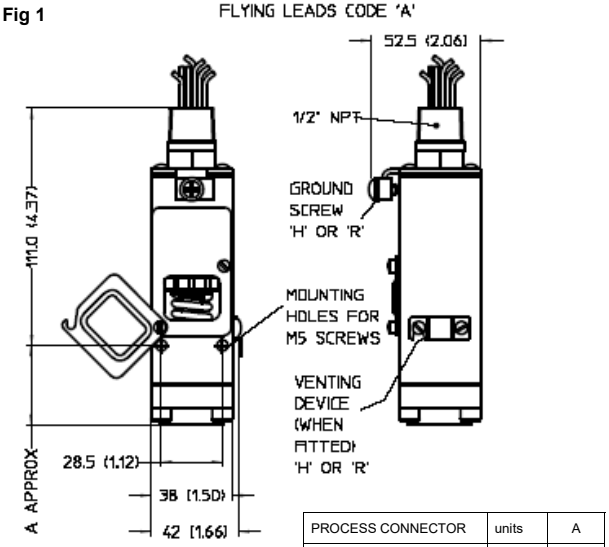


# Dimensions

*All dimensions in mm (Inches)*

ENCLOSURES CODES W, A, H, R, 4 & 5 TABLE 1 WITH FLYING LEAD CODE A

**Fig 1**




| PROCESS CONNECTOR | units | A |
|---|---|---|
| 1/2 " NPT MALE | Inches | 2.15 |
| | Mm | 55 |
| OTHERS | Inches | 1.46 |
| | mm | 37 |

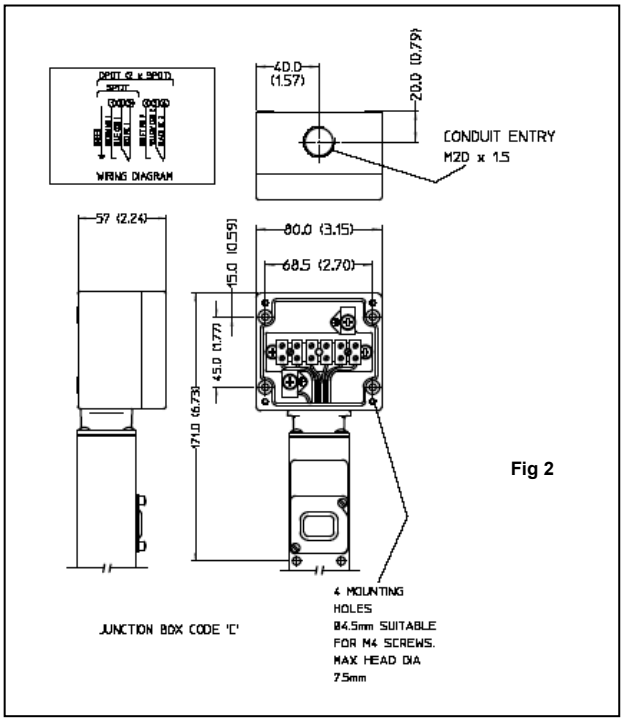
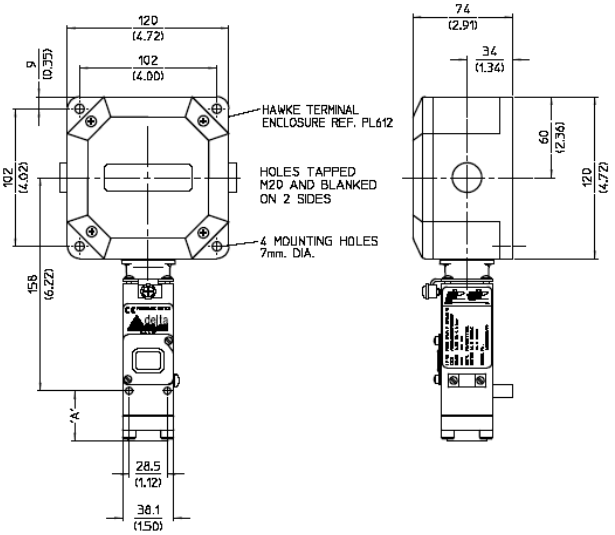



**Fig 2**

ENCLOSURES CODES H, R TABLE 1 TERMNAL ENCLOSURE CODE J TABLE 3

**Fig 3**




ENCLOSURES CODES H, R TABLE 1 WITH TERMINAL ENCLOSURE CODE K TABLE 3

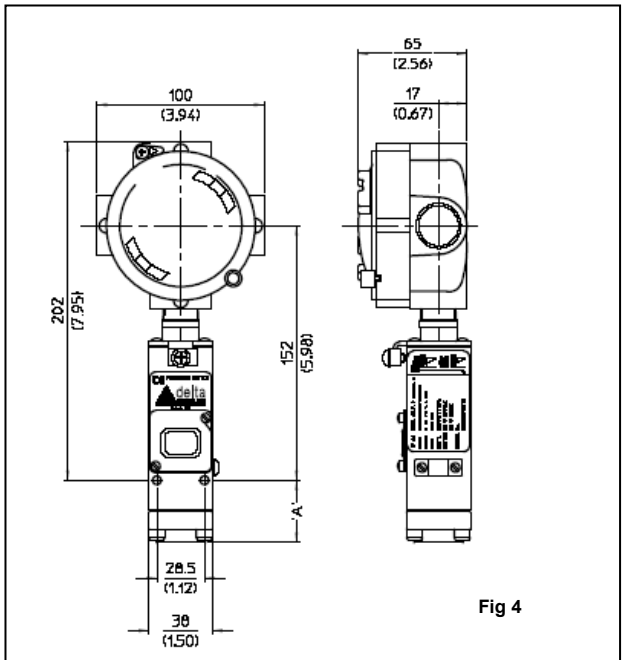



**Fig 4**

Sentry Series - Flameproof
Models: HP01, HP02 & HP03

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