Technical **Datasheet**

GR Series
Pressure Difference Switch
Models: GR3 & GR6

Key **Features**

- Compact and rugged design.
- Hermetically sealed snap switch SPDT & DPDT
- Aluminum alloy or Stainless Steel body
- Field adjustable set point
- Weatherproof, flameproof, Explosion proof and intrinsically safe execution
- Ranges available between 0.025—10 bar (1—160 psi).
- Maximum Working (Static or line) Pressure up to 250 Bar / 3500 psi
- Optional weatherproof, flameproof and intrinsically safe pre wired terminal enclosures.

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

Series Overview

Launched in the mid-1990s, the GR Compact Series provides users with a robust and hermetically sealed switch for use in safe and hazardous areas.

- The GR Series switches are all housed in a compact and rugged enclosure making them particularly suitable for panel mounting in harsh environments
- All models in the Compact Series come with hermetically sealed switch contacts and flying leads as standard

Other products in the series include:

- Pressure Switches: Model GR2-GR4
- Temperature Switches: Model GR 7

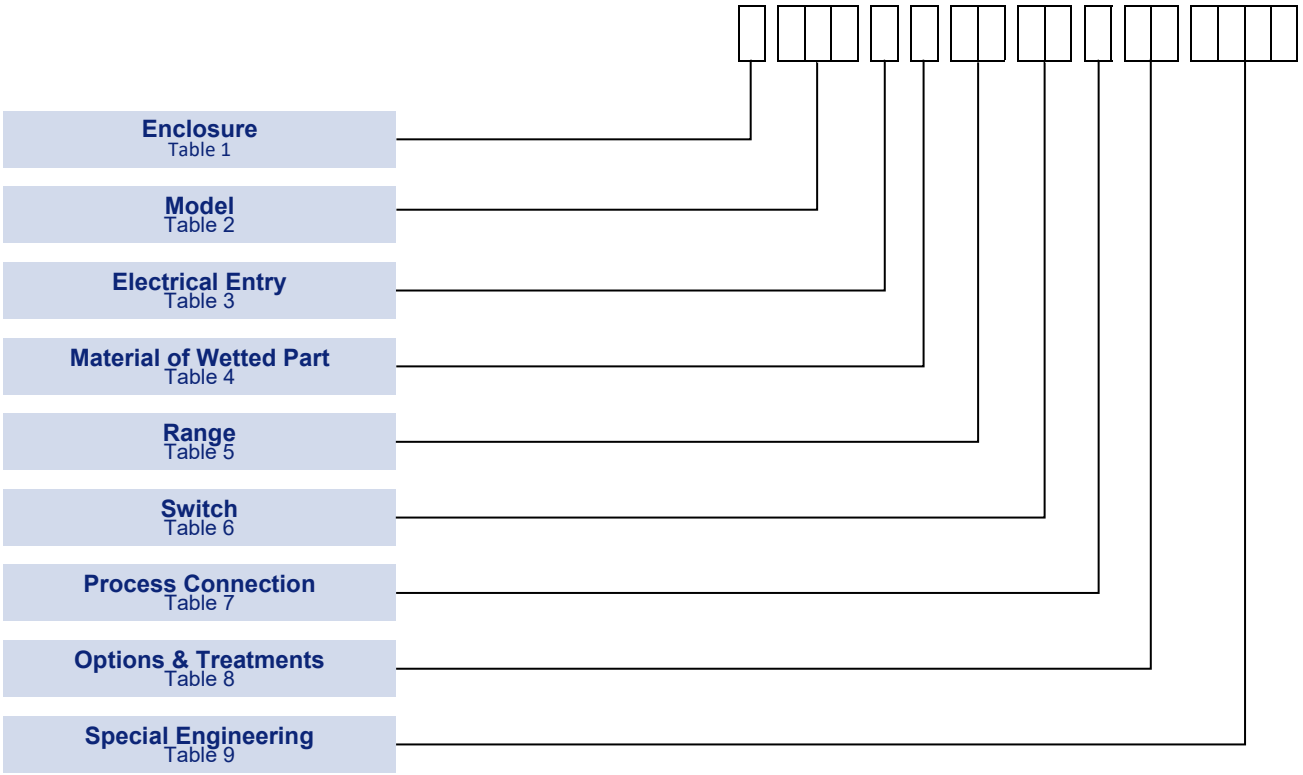
How can we **help you?**

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

+44 (0) 1252 729 140

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.



Technical Specification

Set point repeatability:	1% of span
Storage Temperature:	Flying leads. -40 to +85°C (-40 to +185°F) Pre-wired junction box: please also see the junction box Operating Manual
Ambient Temperature:	Flying leads. -40 to +85°C (-40 to +185°F) Pre-wired junction box: please also see the junction box Operating Manual
Maximum Process Temperature:	At the process connection, the component parts can withstand up to +85°C (+185°F). For higher media temperatures, refer to the installation Operating Instructions for installation guidance or contact your local sales office.
Enclosure classification:	Weatherproof / Flameproof / Intrinsically Safe / Explosion proof
Ingress Protection:	Flying leads: IP 66 / NEMA 4X
Pollution Degree:	Flying leads: pollution degree 3 according to EN60947-5-1 (For extreme conditions where condensation may readily form, then sealed contacts should be used)
Switch output:	1 x SPDT or 1 x DPDT (2 SPDT Synchronized with 2% of span) snap action hermetically sealed microswitch
Electrical rating:	See Table 6
Electrical connection:	Flying leads: threaded with single core wire 18 AWG High Duty PVC insulated. Rated insulation voltage CSA 600Va.c. Pre wired junction box. Refer to Table 3
Grounding connection:	Flying leads: one internal through a single core 18 AWG and one external suitable for wire section up to 4 mm^2 / 12 AWG
Electrical Safety Class:	Flying leads: safety electrical class 1 according to IEC 61298-2:2008
Process Connection:	Rc ¼ (BSP), 1/4 NPT Internal, 1/2 NPT Internal & 1/2 NPT External
Weight:	Enclosures “H, T & W” 2.7kg/6lb to 6.8kg/15lb;“R, A & U” 3.5kg/7.7lb to 7.3kg/16lb. Pre-wired junction box codes in Table 3 **"C"**, **"D"**, **"V"** & **"W"** add 0.3kg/0.66lb; **J”** 1.1kg/2.4lb; “**K”** add 0.4kg/0.88lb.

Enclosure

TABLE 1 | ■ | | | | | | | | | | | | | |

FINISH

Enclosures W, H, 5 and T, aluminium; Epoxy paint is optional see Code 50 in Table 8.
Enclosures A, R, 4 and U are natural finish stainless steel.

[1] Approved by CSA to CANADIAN & NORTH AMERICAN standards

[2] Safety Parameters

Ui: 30 V; Ii: 300 mA; Pi: 0.6 W; Ci: 0; Li: 0.

[3] Double marking ATEX and UKEx on the same product nameplate; EAC Ex on request

ENCLOSURE TYPES (BODY):	Code
WEATHERPROOF ENCLOSURE	
General Purpose Enclosure in clean anodized aluminium with ingress protection IP66, NEMA type 4	W
Aggressive Atmospheres Enclosure in austenitic stainless steel, with ingress protection IP66, NEMA type 4X	A
FLAMEPROOF ENCLOSURE [1] Approved for use in a Zone 1 hazardous locations Ex db IIC T6/T4 Gb, The temperature class is related to the ambient temperature range see Approval section for more information	
General Purpose Enclosure in clean anodized aluminium with ingress protection IP66, NEMA type 4	H
Aggressive Atmospheres Enclosure in austenitic stainless steel with ingress protection IP66, NEMA type 4X	R
INTRINSIC SAFETY [1][2] Approved for use in a Zone 0 & Zone 20 hazardous locations Ex ia IIC T6/T4 Ga, Ex ia IIIC T85/T135°C Db IP66 The temperature class is related to the ambient temperature range see Approval section for more information	
General Purpose Enclosure in clean anodized aluminium with ingress protection IP66, NEMA type 4	5
Aggressive Atmospheres Enclosure in austenitic stainless steel, with ingress protection IP66, NEMA type 4X	4
EXPLOSION PROOF, HERMETICALLY-SEALED ELECTRICAL ASSEMBLY [1] Approved for use in Division 1 and 2 hazardous locations Class I Groups A, B, C, D Class II Groups E, F, G **only available with Electrical Entry code A**	
General Purpose Enclosure in clean anodized aluminium with ingress protection IP66, NEMA type 4	T
Aggressive Atmospheres Enclosure in austenitic stainless steel, with ingress protection IP66, NEMA type 4X	U

Models

TABLE 2 | | ■ | ■ | ■ | | | | | | | | | | |

	Code
Fixed Switching Differential For applications up to 10 bar / 160 psi Over range up to 110 bar / 1600 psi See Tables 5	GR3
Fixed Switching Differential For applications up to 10 bar / 160 psi Over range up to 250 bar / 3500 psi See Tables 5	GR6

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 junction box 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

NOTE 4:

For these version, will be supplied the instrument with flying leads configuration with standard certification, assembled with junction box with original manufacturer's certification.

Delta's Declaration of conformity will cover the whole assembly

	Code
Male conduit thread	
Factory Sealed Flying Lead with 1/2-14 NPT - M external conduit thread. See fig 1. 0.45m/18in. Long flying lead (Note 1).	A
Factory Sealed Flying Lead with M20x1,5 - M external conduit thread. See fig 1. 0.45m/18in. Long flying lead (Note 1).	U
Pre-wired Junction Box	
Weatherproof IP66/NEMA 4 pre-wired Junction Box. See fig 2. Bartec type 07-5177 glass filled polyester. Conduit entry tapped M20 x 1.5 (Note 2) Ambient temperature –20°C to +40°C.	C
Increased Safety IP66/NEMA 4 pre-wired Junction Box. See fig 2. Bartec type 07-5106 glass filled polyester. Conduit entry tapped M20 x 1.5 (Note 2) Ex eb IIC Gb (T_{amb} -20°C to +40 °C)	D
Flameproof pre-wired Junction Box. See fig 4. Cortem Group type SX16 die cast aluminium alloy **IP66/NEMA 4**. Conduit entry tapped 1/2-14 NPT - F Ex db IIC T6/T5 (T_{amb} -40 to +40°C) or (Tamb –40°C to +65 °C) Ex tb IIIC T85/T100 (T_{amb} -40 to +40°C) or (Tamb –40°C to +65 °C)	K
Intrinsically Safe pre-wired Junction Box with screw terminals. See fig 2. Bartec type 07-5185 or 07-5184 Glass filled polyester IP65/NEMA 4. Conduit entry tapped M20 x 1.5 Ex ia IIC T6 (T_{amb} -20 to +40°C)	V
Intrinsically Safe pre-wired Junction Box with DIN rail mounted terminals. See fig 2. Bartec type 07-5185 or 07-5184 Glass filled polyester IP65/NEMA 4. Conduit entry tapped M20 x 1.5 Ex ia IIC T6 (T_{amb} -20 to +40°C)	W

Material of Wetted Parts

TABLE 4

RANGES	See Fig. 2 to 4 for dimensions	Code
BD-EA	316 Stainless steel diaphragm. All other wetted parts fully austenitic 300 series stainless steel. PTFE and Nitrile seals	I
	316 Stainless steel diaphragm. All other wetted parts fully austenitic 300 series stainless steel. PTFE and Viton seals.	R
	For wetted parts required to conform with Sour Gas or Sour Crude applications as laid down in NACE standard MR-01-75.	L
BC	Nitrile diaphragm and seal with aluminium flanges	D
	Nitrile diaphragm and seal with cast iron flanges	E

Setting Ranges

TABLE 5

P_{max} = maximum working pressure

When ordering, please state units required. Range and set point will be in units preference. Unless otherwise stated, units will be in bar/mbar.

The instrument will sustain, without loss of performance, a continuous forward over pressure equal to the maximum static pressure and/or full vacuum.

NOTE: For pressure difference switches maximum working pressure (P_{max}) and maximum static/line pressure mean the same.

Model	P_{max}		Range			
	bar	psi	**mbar**/bar	**Code**	**in H_20**/psi	**Code**
GR3	1.0	14.5	**-12.5 to +12.5**	**BC***	**-5.0 to +5.0**	**BU***
GR3 (GR6)	110 (250)	1600 (3500)	**6 to 40**	**BD (0D)**	**2.5 to 16**	**BY (0Y)**
GR3 (GR6)	110 (250)	1600 (3500)	**25 to 160**	**CB (0B)**	**10 to 64**	**CS (IS)**
GR3 (GR6)	110 (250)	1600 (3500)	**100 to 600**	**CE (0E)**	1.5 to 8.5	**CK (0K)**
GR3 GR6	110 250	1600 3500	0.4 to 2.5	**DC**	6 to 40	**DP**
GR3 GR6	110 250	1600 3500	0.6 to 4	**DD**	10 to 60	**DT**
GR3 GR6	110 250	1600 3500	1.6 to 10	**EA**	25 to 160	**EH**

*Forward overpressure is limited to 500 mbar

Maximum static/line pressure applied in the reverse direction (i.e., to low pressure connection with high pressure connection open to atmosphere) will be contained without failure. The diaphragm on ranges BD to EA (BY to EH) will however have been distorted, leading to a degradation of performance and a shortening of the service life.

For applications where regular reversals of pressure are inevitable, a special engineering facility is available, see Table 9.

Switch Options

TABLE 6

Model GR3/6

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

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

The switch contacts are hermetically sealed inside a stainless steel enclosure for protection against aggressive and corrosive atmospheres.

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.

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.
(1) 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 F	F
1/2 - 14 NPT F	H
1/2 - 14 NPT M	J

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 **tied** to enclosure.	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
End line resistor for pre-wired Junction Box code V and W see table 3	

Special Engineering

TABLE 9

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

Performance Data

TABLE 10

bar 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

Code	Range **mbar** / bar	Pmax bar	Model	Microswitch - Option Switching Differential in mbar					
				HS	HD/HR	HP	HQ/HT	HV	HW/HY
BC	**12,5 to 12,5**	1	GR3	1,5	3,0	2,5	3,5	1,5	3,0
BD	**6 to 40**	110	GR3	7,5	14,0	11,0	14,0	7,5	14,0
		250	GR6						
CB	**25 to 160**	110	GR3	16,5	20,5	19,0	23,0	16,5	20,5
		250	GR6						
CE	**100 to 600**	110	GR3	40	40	20	20	40	40
		250	GR6						
DC	0,4 to 2,5	110	GR3	150	200	180	280	150	200
		250	GR6						
DD	0,6 to 4	110	GR3	350	400	250	200	350	400
		250	GR6						
EA	1,6 to 10	110	GR3	800	1000	400	560	800	1000
		250	GR6						

psi 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

Code	Range **inc H2O** / psi	Pmax psi	Model	Microswitch - Option Switching Differential in **inc H2O** / psi					
				HS	HD/HR	HP	HQ/HT	HV	HW/HY
BU	**-5,0 to +5,0**	14,5	GR3	**0,6**	**1,2**	**1,0**	**1,4**	**0,6**	**1,2**
BY	**2,5 to 16**	1600	GR3	**3,0**	**5,6**	**4,4**	**5,6**	**3,0**	**5,6**
		3500	GR6						
CS	**10 to 64**	1600	GR3	**6,6**	**8,2**	**7,6**	**9,2**	**6,6**	**8,2**
		3500	GR6						
CK	1,5 to 8,5	1600	GR3	0,6	0,6	0,3	0,3	0,6	0,6
		3500	GR6						
DP	6 to 40	1600	GR3	2,2	3,0	2,6	4,0	2,2	3,0
		3500	GR6						
DT	10 to 60	1600	GR3	5,0	6,0	3,6	2,9	5,0	6,0
		3500	GR6						
EH	25 to 160	1600	GR3	11,6	14,5	5,8	8,0	11,6	14,5
		3500	GR6						

Electrical Connection

Terminal Enclosure
Suitable for conductor sizes up to 2,5mm2/14AWG non-pinching, clamped.

Optional Extras

Chemical Seals
Chemical seals of our own or proprietary manufacture can be fitted when required.

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

Approvals

EUROPEAN DIRECTIVE

Low Voltage Directive (LVD) 2014/35/EU

Compliant to LVD

Restriction of hazardous substances (RoHS 2) 2011/65/EU

Compliant to RoHS

Pressure Equipment Directive (PED) 2014/68/EU

Compliant to PED as pressure accessory

ATEX Directive 2014/34/EU

Factory Sealed Flying Lead version (Table 3 Code A or U)

INTRINSICALLY SAFE

Certificate No. Baseefa06ATEX0091X

Ex II 1GD
- Ex ia IIC T6 / T4 Ga (-40°C≤Ta≤+60°C) / (-40°C≤Ta≤+85°C)
- Ex ia IIIC T_{200}85°C / T_{200}135°C Da (-40°C≤Ta≤+60°C) / (-40°C≤Ta≤+85°C)

FLAMEPROOF

Certificate No. Baseefa02ATEX0214X

Ex II 2G
- Ex d IIC T6 / T4 Gb (-40°C≤Ta≤+60°C) / (-40°C≤Ta≤+85°C)

In case of pre-wired junction box see also the certificate of the supplier of the junction box

UK REGULATIONS

Electrical Equipment (Safety) Regulations 2016

Conform to UK SI 2016 No 1101 regulation

Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment Regulations 2012

Conform to UK SI 2012 No. 3032

Pressure Equipment (Safety) Regulations 2016

Conform to UK SI 2016 No 1105 regulation

Equipment and Protective Systems Intended for use in Potentially Explosive Atmospheres Regulations 2016

Conform to UK SI 2016 No 1107 regulation

Factory Sealed Flying Lead version (Table 3 Code A or U)

INTRINSICALLY SAFE

Certificate No. No. SGS24UKEX0056X

Ex II 1GD
- Ex ia IIC T6 / T4 Ga (-40°C≤Ta≤+60°C) / (-40°C≤Ta≤+85°C)
- Ex ia IIIC T_{200}85°C / T_{200}135°C Da (-40°C≤Ta≤+60°C) / (-40°C≤Ta≤+85°C)

FLAMEPROOF

Certificate No. BAS21UKEX0636X

Ex II 2G
- Ex d IIC T6 / T4 Gb (-40°C≤Ta≤+60°C) / (-40°C≤Ta≤+85°C)

In case of pre-wired junction box see also the certificate of the supplier of the junction box

Approvals

CANADA AND UNITED STATES

The instrument includes an explosion proof, hermetically-sealed electrical assembly snap switch for Hazardous Location CSA Class 6248-01 & 6248-81
File No: 176418

- Class I, Division 1 and 2, Groups A, B, C & D; Group E,F & G

EURASIAN CONFORMITY MARK

Hazardous Areas

Factory Sealed Flying Lead version (Table 3 Code A or U)

INTRINSICALLY SAFE

Certificate No. EAЭC RU C-GB.HA65.B/01199/21

- 0Ex ia IIC T6 / T4 Ga X (-40°C≤Ta≤+60°C) / (-40°C≤Ta≤+85°C)
- Ex ia IIIC T85°C / T135°C Da X (-40°C≤Ta≤+60°C) / (-40°C≤Ta≤+85°C)

FLAMEPROOF

Certificate No. EAЭC RU C-GB.HA65.B/01199/21

- 1Ex d IIC T6 / T4 Gb X (-40°C≤Ta≤+60°C) / (-40°C≤Ta≤+85°C)

In case of a pre-wired junction box please also refer to the supplier's own certificate for the junction box

If EAC certification is required, this must be made known to our sales team at the time of order for the correct marking of the instrument.

Dimensions

ALL DIMENSIONS mm (inches)

Drawing ref: DS_22023 Rev A

MODEL GR3 / 6 WITH FLYING LEADS CODES A & U. Table 3

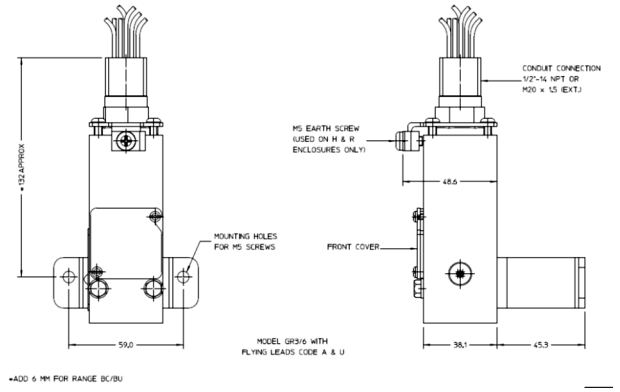


Fig 1

MODEL GR3 RANGES BC/BU Table 5

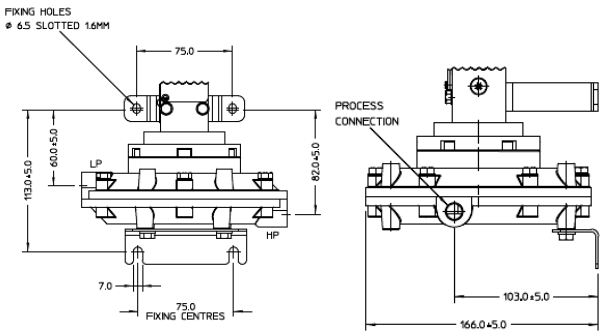
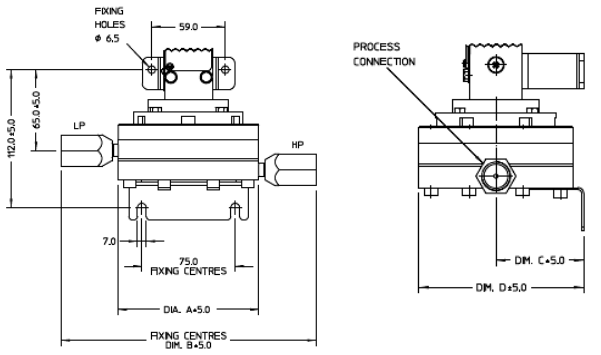


Fig 2

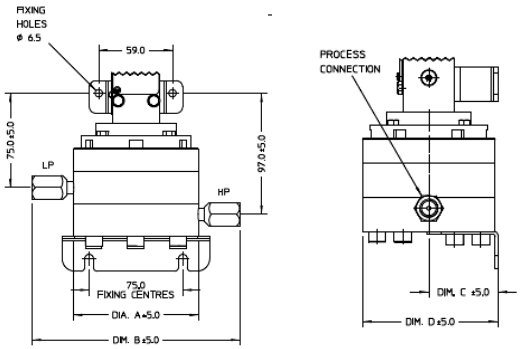
MODEL GR3 RANGES BD TO EA / 0D TO EA (0Y TO EH) Table 5



RANGE	DIA. A [mm]	DIM. B [mm]	DIM. C [mm]	DIM. D [mm]
BD, CB, CE	113	179 (CODE A & F) 205 (CODE H) 195 (CODE J)	55	121
DC, DD, EA	88	154 (CODE A & F) 180 (CODE H) 170 (CODE J)	52	96

Fig 3

MODEL GR6 RANGES BD TO EA / 0D TO EA (0Y TO EH) Table 5



RANGE	DIA. A [mm]	DIM. B [mm]	DIM. C [mm]	DIM. D [mm]
BD, CB, CE	126	192 (CODE A & F) 218 (CODE H) 208 (CODE J)	63	126
DC, DD, EA	100	166 (CODE A & F) 192 (CODE H) 182 (CODE J)	52	102

Fig 4

MODEL GR3/6 WITH PRE-WIRED JUNCTION BOX CODE "K" Table 3

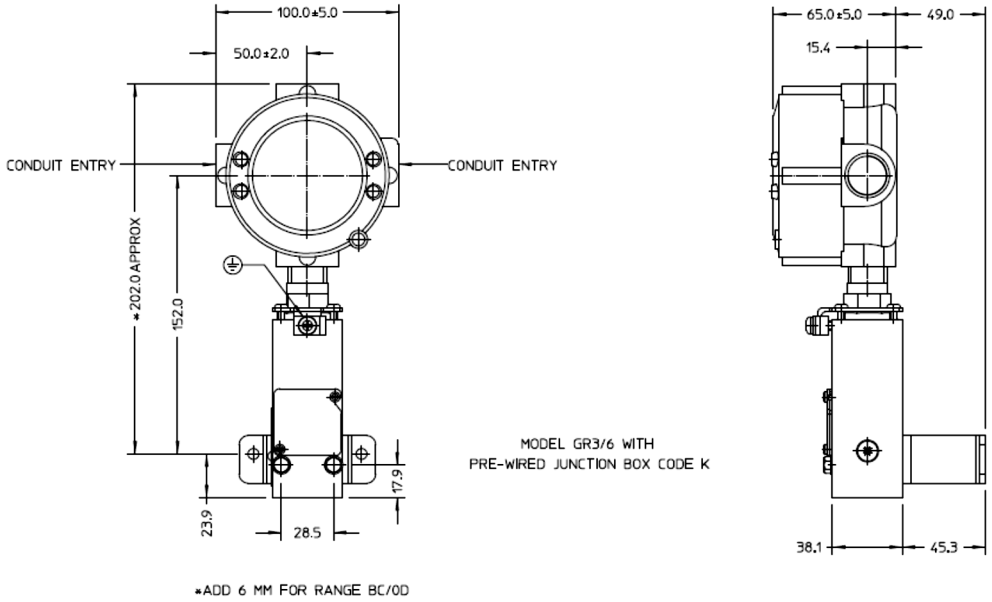


Fig 5

MODEL GR3/6 WITH PRE-WIRED JUNCTION BOX CODE "C"; "D"; "V" and "W" Table 3

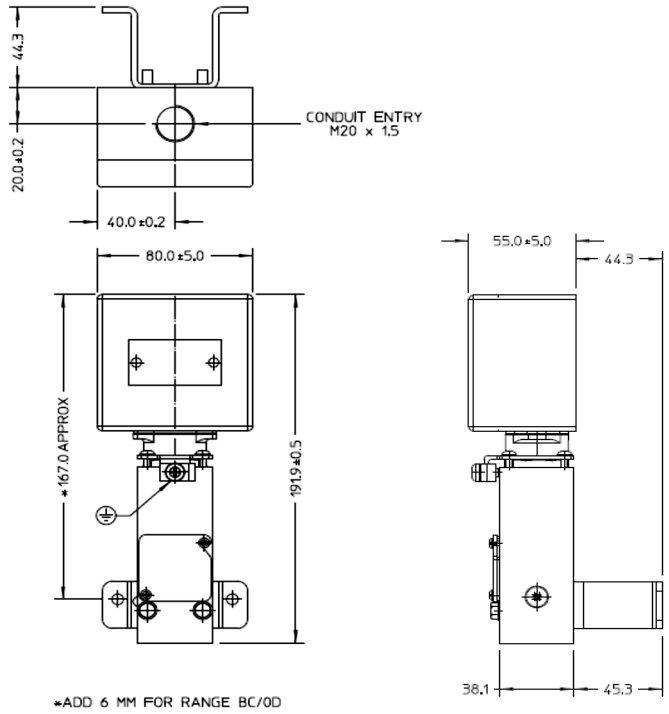


Fig 6

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