Technical **Datasheet**

Compact Diaphragm Operated Pressure Switches **GR Series**

GR2/4
ISSUE E

- **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).**
- **Variety of wetted parts including NACE MR-01-75 compatibility option.**
- **Optional weatherproof, ATEX EEx e, ATEX Ex ia or ATEX Flameproof EEx d IIC terminal enclosures.**
- **Field adjustable.**
- **Accuracy 1%**

Performance **characteristics**

Enclosure options

- IP66 Protection. Nema 4 (Standard)
- Option Nema 4X

Wetted parts options

- 316 Stainless Steel (Viton or Nitrile O-ring seals). NACE
- Nickel alloy (Monel) with Viton O-ring. NACE
- All welded construction

Standard Electrical ratings – Refer to Table 6

- 11 Amps silver contacts
- 5 Amps silver contacts
- 1 Amp gold contacts

Process connection

- Rc ¼ (BSP), ¼ NPT Internal, ½ NPT Internal, ½ NPT External.

Unit weight

- Between 0.6 kg – 2kg (1.32lb – 4.4lb) see end of datasheet for different instrument weights.

Accuracy

- Set point repeatability ± 1% of span at 20 °C / 68 °F ambient.

Product **applications**

The GR series is suitable for a wide range of applications in many Industry sectors:

- 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 Controls' range of reliable pressure and temperature measurement instruments can be customised to meet individual requirements. For technical advice or to discuss your application please contact us on +44 (0) 20 8939 3500

Enclosure

TABLE 1

FINISH
Enclosures W and H are clear anodised 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 For outdoor industrial use IP66/NEMA 4.	W
Stainless Steel Weatherproof For outdoor aggressive atmospheres e.g. marine NEMA type 4X/IP66	A
FLAMEPROOF ENCLOSURES	
Aluminium Weatherproof/Explosionproof IP66/NEMA 4 With CENELEC approval EEx d IIC. II 2 G for Zone 1 See approvals. Ex II 2G	H
Stainless Steel Weatherproof/Explosionproof IP66/NEMA 4X For use in aggressive atmospheres e.g. marine. With CENELEC approval EEx d IIC. II 2 G for Zone 1 See approvals. Ex II 2G	R
INTRINSICALLY SAFE ENCLOSURES	
Stainless Steel Weatherproof/Explosionproof IP66/NEMA 4 With ATEX approval Ex ia IIC. II 1 G/D for Zone 0 See approvals. Ex II 1GD	4
Aluminium Weatherproof/Explosionproof IP66/NEMA 4X For use in aggressive atmospheres e.g. marine. With ATEX approval Ex ia IIC. II 1 G/D for Zone 0 See approvals. Ex II 1GD	5

Models

TABLE 2

	Code
Fixed Switching Differential For applications up to 100 bar/1500 psi. Over-range up to 155 bar/2250 psi Refer to Table 5.	GR2
Fixed Switching Differential For applications up to 100 bar/1500 psi. Over-range up to 600 bar/8700 psi Refer to Table 5.	GR4
Fixed Switching Differential For applications up to 700 bar/10000 psi. Over-range up to 1000 bar/15000 psi Refer to 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. Class 1, Groups A, B, C, D. Class II Groups E, F, G. 0.45m/18in. long flying lead (Note 1). With 1/2-14 NPT external conduit thread.	A
Integral Weatherproof Terminal Enclosure. See fig 2. Glass filled polyester with weather protection to IP66/NEMA 4. Conduit entry tapped M20 x 1.5 (Note 2) Ambient temperature –20° to 86°C.	C
Integral 'Increased Safety' Terminal Enclosure. See fig 2. 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. II 2 G	D
Integral 'Increased Safety' Terminal Enclosure. See fig 3. 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. CENELEC EExd IIC T6 (-20 to +40°C) Diecast aluminium alloy. Conduit entry tapped 1/2-14 NPT. Weather protection not less than IP65/NEMA 4 II 2 G	K
Intrinsically Safe Terminal Enclosure-With Screw Terminals 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 1 G D	V
Intrinsically Safe Terminal Enclosure-With DIN Rail Mounted Terminals 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 1 G D	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. All welded construction.	S
Nickel alloy (Monel) diaphragm and process connection. All welded construction (suitable for NACE MR 01-75).	T

Setting Ranges & Performance Data

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 to 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 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 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	155	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 psi	SWITCHING DIFFERENTIAL – Refer to table 6 psi					
				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

Switching 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	IEC 947-5-1/EN 60947-5-1 Rating						Contact	Code
	Designation & Utilization Category	Rated operational current I_e (A) at rated operational voltage U_e	U_i	U_{imp}	VA Rating Make	VA Rating Break		
11 Amps @ 110/250V AC & 5/0.5 Amps @ 30/125V DC Silver contacts	AC14 D300	0.6/0.3A @ 120/240V AC	250V	800V	432	72	SPDT DPDT	HS HD †
	DC13 R300	0.22/0.1A @ 125/250V DC			28	28	DPDT	HR ‡
5 Amps @ 250V AC & 2 Amps @ 30V DC Silver contacts with gold flash	AC14 D300	0.6/0.3A @ 120/240V AC	250V	500V	432	72	SPDT DPDT	HP HQ †
	DC13 R300	0.22/0.1A @ 125/250V DC			28	28	DPDT	HT ‡
1 Amp @ 125V AC & 1 Amp @ 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 rising 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.

U_i = rated insulation voltage U_{imp} = rated impulse 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 – 18NPT INTERNAL	F
1/2 – 14NPT INTERNAL*	H
1/2 – 14NPT 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 environment	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 utilised for mounting the instrument. Details on application.	10
Tag Stainless steel **fixed** to enclosure.	20
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

Special Engineering

TABLE 9

FEATURE	Code
Consult Delta Sales Engineering for special requirements	TBA

Unit Weights

(Approx.) – Refer to Table 1 and Table 3	
Enclosure Code 'H', 'W' and '5' fig 1	0.6kg/1.32lb
Enclosure Code 'R', 'A' and '4' fig 1	0.9kg/1.98lb
Terminal Enclosure 'C', 'D', 'V' and 'W' fig2	Add 0.3kg/0.66lb
Terminal Enclosure 'J' fig 3	Add 1.1kg/2.42lb
Terminal Enclosure 'K' fig 4	Add 0.5kg/1.1lb

Technical Specifications

ACCURACY
Set point repeatability ± 1% of span at 20°C/68°F ambient.

AMBIENT TEMPERATURE RANGE
Certified enclosures
Refer to **Approvals** and Tables 1 & 3 for limitations of ambient use.

OPERATING AMBIENT
Model GR2 and GR4 (Ranges DB to FA/DK to F6.)
Suitable for operating within a range of ambient temperatures from -40° to +85°C (-40° to +185°F).

Model GR4 (Ranges U7 to Y4/UK to YF) limited by materials used in sensing element but suitable for operating within a range of ambient temperatures from -25° to + 60°C (-13° to +140°F).

ELECTRICAL CONNECTIONS

Flying Lead – Table 3 Code A
High Duty PVC insulated 1.19mm^2/18 AWG factory sealed flying leads. Rated insulation voltage UL/CSA 600 V.

Terminal Enclosures – Table 3 Code C, D, J, K, V & W
Suitable for conductor sizes up to 2.5mm^2/14AWG non-pinching, clamped.

Dielectric Strength
The electrical assembly is capable of withstanding *1.5kV between live parts and earth/ground and 500V between open contacts.

Earthing/Grounding
Flying lead versions have separate earth/ground conductor. Terminal enclosures have additional internal earthing/grounding facility.

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

Pollution Degree
All switches rated IP66 are suitable for use in pollution degree 3.
Ref IEC 947-5-1

OPTIONAL EXTRAS

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

Mounting Position/Location/Installation
(Vertical as shown) Avoid sitting in locations that transmit excessive shock or vibration. For further advice contact our engineers.

Pipe Mounting Bracket
See Table 8.

Tagging
See Table 8.

Approvals

INTRINSIC SAFETY
Because of the low voltages and currents of intrinsically safe circuits, we recommend using gold contacts. Refer to Table 6.

CENELEC/BASEEFA
Certified to CENELEC EN50 014 and EN50 018.
For use in Zone 1 hazardous areas EEx d IIC T6 (-40° to +60°C)
T4 (-40° to +85°C)
Enclosure Codes H and R and all models (see Table 1)
Certificate number BASEEFA ATEX0214X
II 2 G

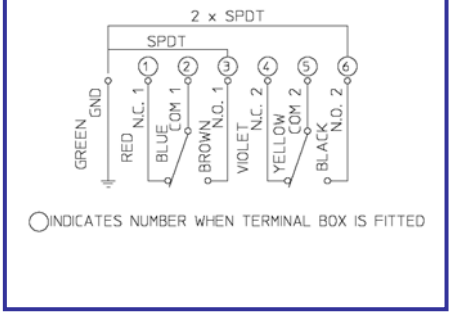
CENELEC/BASEEFA
Certified to ATEX EN60079:2004, EN50020:2002, EN60079-26:2004, IEC 61241-0:2004 and EN61241-11:2005.
For use in Zone 0 hazardous areas Ex ia IIC T6 (-40° to +60°C)
T4 (-40° to +85°C)
Ex iaD 20 T85 (-40° to +60°C)
T135 (-40° to +85°C)
Enclosure Codes 4 and 5 and all models (see Table 1)
Certificate number BASEEFA06ATEX0091X
II 1 G D

UNDERWRITER LABORATORIES INC.
Snap switches for use in Hazardous Locations.
Class 1, Groups A, B, C, D Class II, Groups E, F, G Division 1 and 2
E105842

CANADIAN STANDARDS ASSOCIATION
Snap switches for use in Hazardous Locations.
Class 1, Groups A, B, C, D Class II, Groups E, F, G Division 1 and 2
LR67110-5

Dimensions

Wiring Diagram

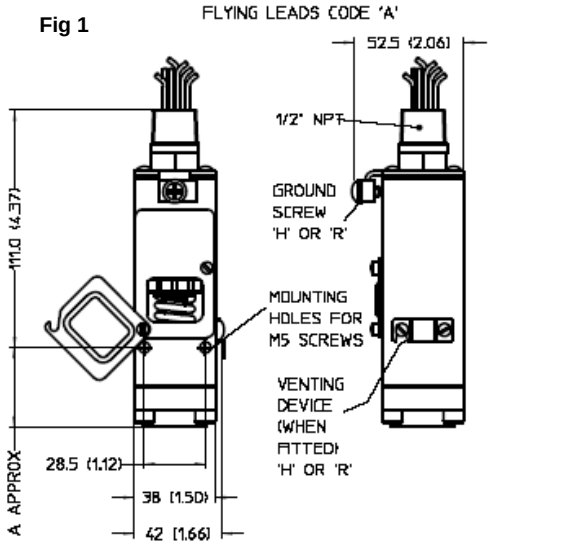


Dimensions

All dimensions mm (Inches)

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

Fig 1



PROCESS CONNECTOR	units	A
½" NPT MALE	Inches	2.15
	mm	55
OTHERS	Inches	1.46
	mm	37

ENCLOSURES CODES W,A,H,R,4 &,5 TABLE 1 WITH TERMINAL CODE C,D,V,W TABLE 3

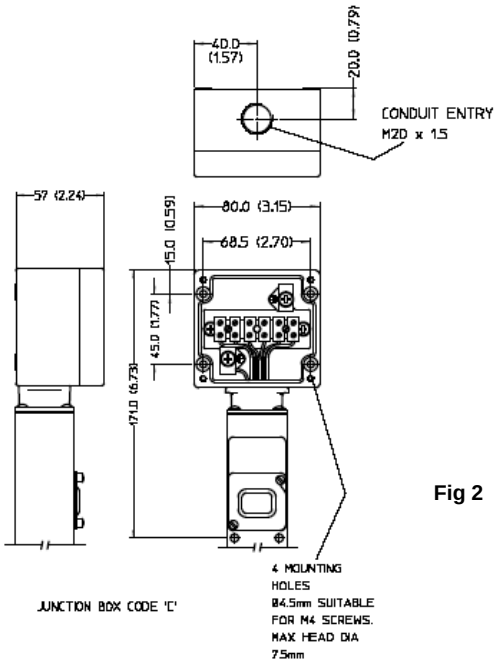
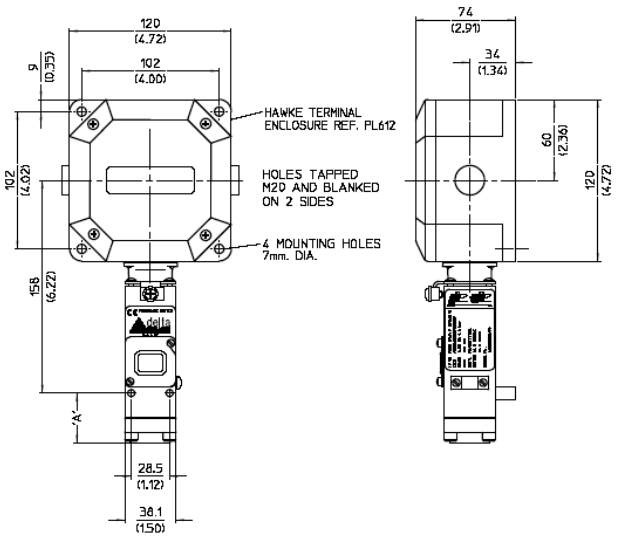


Fig 2

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

Fig 3



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

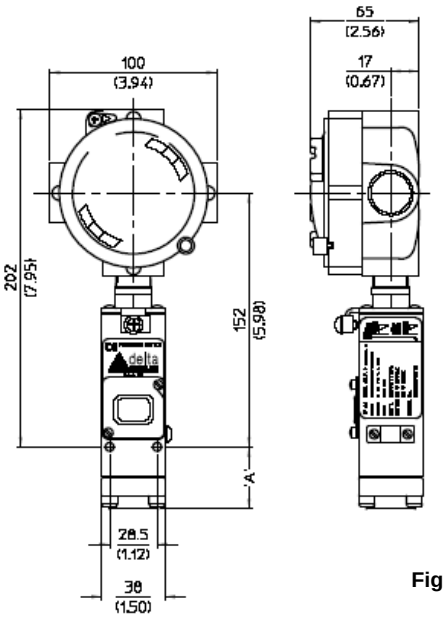


Fig 4

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