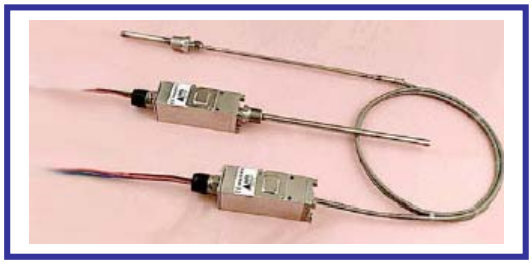
Technical **Datasheet**

Compact Temperature Switches
GR Series

GR7
ISSUE C



- **Compact and rugged design.**
- **Hermetically sealed switch UL and CSA listed.**
- **ATEX - Flameproof CENELEC EEx d IIC option.**
- **Weatherproof IP66/NEMA 4.**
- **Stainless steel body option NEMA 4X rating.**
- **Ranges available up to 350 °C (660°F)**
- **316 Stainless steel capillary and bulb.**
- **Optional weatherproof, ATEX EEx e or ATEX - Flameproof EEx d IIC terminal enclosures.**
- **Easy Field adjustable.**
- **Accuracy 1%**

Performance **characteristics**

Enclosure options
- IP66 Protection NEMA 4
- Option NEMA 4X

System options
- 1.8 metre capillary with 250mm or 500mm semi rigid stem. (Bulb length 75mm / 2.95 inches)
- Rigid stem – length 216mm / 8.5 inches.
- Other capillary lengths available as specials – please consult sales engineering.

Standard Electrical ratings – Refer to Table 6
- 11 Amps silver contacts
- 5 Amps silver contacts.
- 1 Amp gold contacts

Process connection
- ½" NPT External Sliding Gland, ½" NPT External Direct Mounting.

Unit weight
- Between 0.9 kg – 3.3kg (1.98lb – 5.09lb) 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 4X/IP66	A
Aluminium Weatherproof/Explosionproof IP66/NEMA 4, 7, 9 With CENELEC approval EEx d IIC. See approvals. Ex II 2 G	H
Stainless Steel Weatherproof/Explosionproof IP66/NEMA 4X, 7, 9 For use in aggressive atmospheres e.g. marine. With CENELEC approval EEx d IIC. See approvals. Ex II 2 G	R

Models

TABLE 2

Fixed Switching Differential Set point field adjustable over full range. SPDT & DPDT options available	GR7

Electrical Entry

TABLE 3

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

Factory Sealed Flying Lead. See fig. 1.1 and 1.2 Class I, Groups A, B, C, D; Class II Groups E,F,G. 0.45m/18 in. long flying lead (other lengths available) 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. Ambient temperature -20 to +40ºC	C
Integral 'Increased Safety' Terminal Enclosure. See fig.2. EEx e IIC T6 (-20 to +40ºC) Glass filled polyester certified to CENELEC EN50 014/EN50 019, with weather protection not less than IP66/NEMA 4. Conduit entry tapped M20 x 1.5. Ex II 2 G	D
Integral 'Increased Safety' Terminal Enclosure. See fig.3. EEx e IIC T6 (-20 to +40ºC) Glass filled polyester certified to CENELEC EN50 014/EN50 019, with weather protection not less than IP66/NEMA 4. Conduit entry tapped M20 x 1.5. Ex II 2 G	J
Explosionproof Terminal Enclosure. See fig.4. CENELEC EExd IIC T6(-20 to +40ºC) Die cast aluminium alloy. Conduit entry tapped ½ -14 NPT. Weather protection not less than IP65/NEMA4 Ex II 2 G	K

System Details

The flexible capillary version of Model GR7 comprises an armoured capillary attached to the sensing bulb via a semi-rigid extension on which a compression gland slides to enable various depths of thermowell (pocket) to be accommodated. All parts of thermal system are in 300 series stainless steel with the capillary and sensing bulb in 316 stainless steel.

The rigid stem version has an integral thread for direct mounting or via a thermowell. Material of probe 316 stainless steel.

TABLE 4

Capillary Length		Length of Semi-rigid Extension		Semi Rigid Stem Length		Code
Metres	Feet	mm	inches	mm	inches	
1.8	6	250	10	75	2.95	N
1.8	6	500	20	75	2.95	P
Rigid Stem Probe Total Length 216mm (8.5ins)				75	2.95	R

Setting Ranges & Performance Data

Figures given in tables are typical maxima for mid-range setting and are for guidance only. Value will vary across the range i.e. lower at or near the bottom of the range and higher at or near the top of the range. Should the switching differential be critical for specific applications, our engineers should be consulted prior to ordering.

Ranges L5, S4, TH, V9 (LC, SE, TQ, V0) are not recommended for use on rigid stem models (system code 'R') without special engineering. Limitations due to heat conduction causing an unacceptable rise in surface temperature. See Table 1.

TABLE 5

T_{max}		Range		Switching	Differential	Code	
°C	°F	°C	°F	°C	°F	°C	°F
70	158	-40 to +60	-40 to +140	4	7	H1	HA
110	230	10 to 100	50 to 212	4	7	K4	KC
180	360	50 to 170	120 to 340	4	7	L5	LC
230	450	120 to 220	250 to 430	4	7	S4	SE
280	540	150 to 270	300 to 518	5	9	TH	TQ
360	680	230 to 350	450 to 660	6	11	V9	V0

Switching Differential Values given are for switch options HS & HV.
For HD & HN. Multiply Switching Differential values by 1.5
For HP. Multiply Switching Differential values by 0.7
For HN. Multiply Switching Differential values by 0.8

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	HV HW †
							DPDT	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.

U_I = rated insulation voltage U_{imp} = rated impulse withstand voltage across contacts.

Process Connection

TABLE 7

	Code
½ - 14 NPT EXT Sliding Gland (System Code N, P)	J
½ - NPT EXT Direct Mounting (System Code R)	J

Options & Treatments

TABLE 8

	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 3 (Capillary System Code N & P Table 4)*	
Enclosure Code 'H' and 'W'	0.9kg (1.98lb)
Enclosure Code 'R' and 'A'	1.2kg (2.67lb)
Terminal Enclosure 'C' and 'D'	Add 0.3kg (0.66lb)
Terminal Enclosure 'J'	Add 1.1kg (2.42lb)
Terminal Enclosure 'K'	Add 0.5kg (1.1lb)

* For Rigid Stem System Code R Table 4 deduct 0.25kg (0.5lb)

Technical Specifications

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

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

OPERATION
Suitable for operating within a range of ambient temperatures from -40° to +80°C (-40° to 176°F)

ELECTRICAL CONNECTIONS

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

Terminal Enclosures
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 ground.

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 for purposes of safety.

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

OPTIONAL EXTRAS

Mounting Position/Location/Installation
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 BASEEFA02ATEX0214X
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

Figure 1.1 – *All Dimensions in mm (inches)*
Model GR7 Rigid Stem Version (Code R) – Table 4

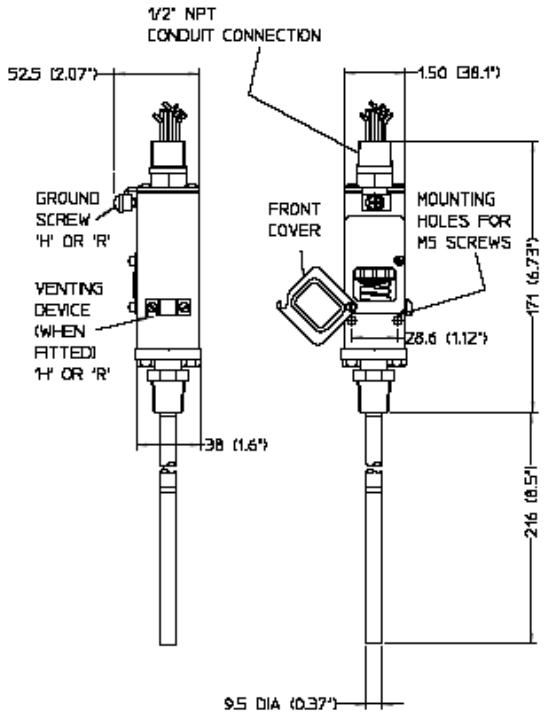
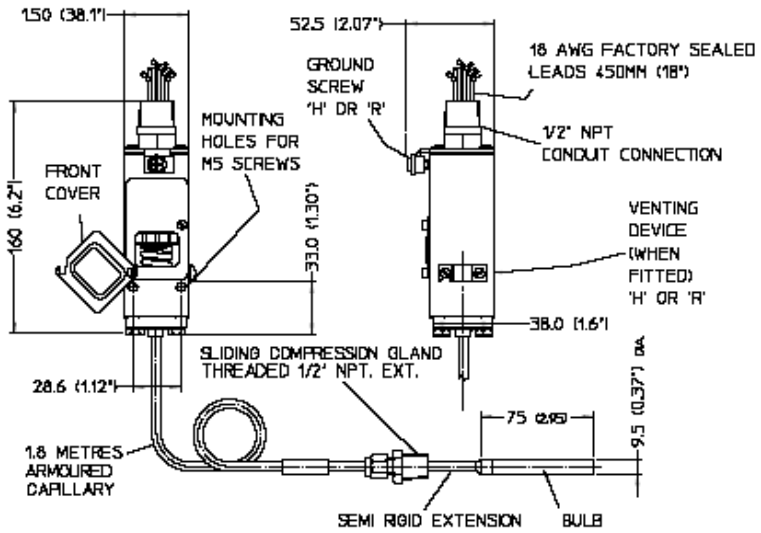


Figure 1.2 – *All Dimensions in mm (inches)*
Model GR7 Capillary Version (Codes N & P) – Table 4



Dimensions

Wiring Diagram

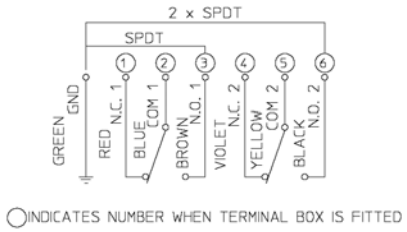
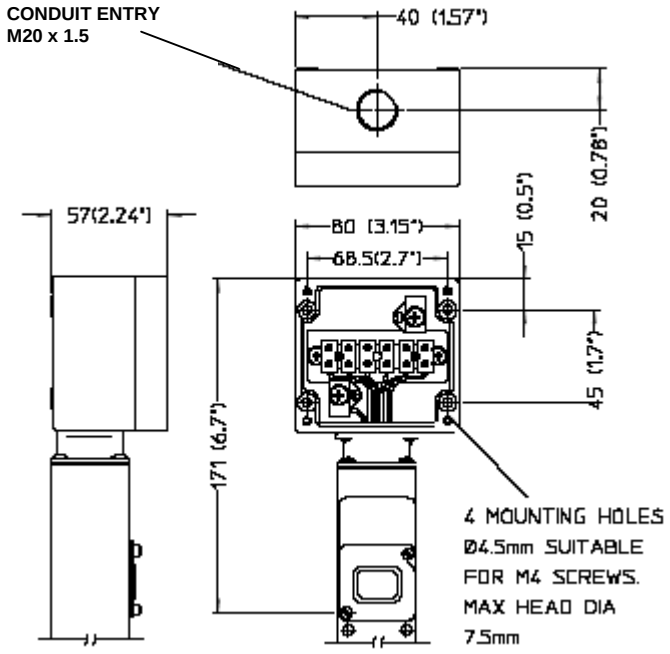
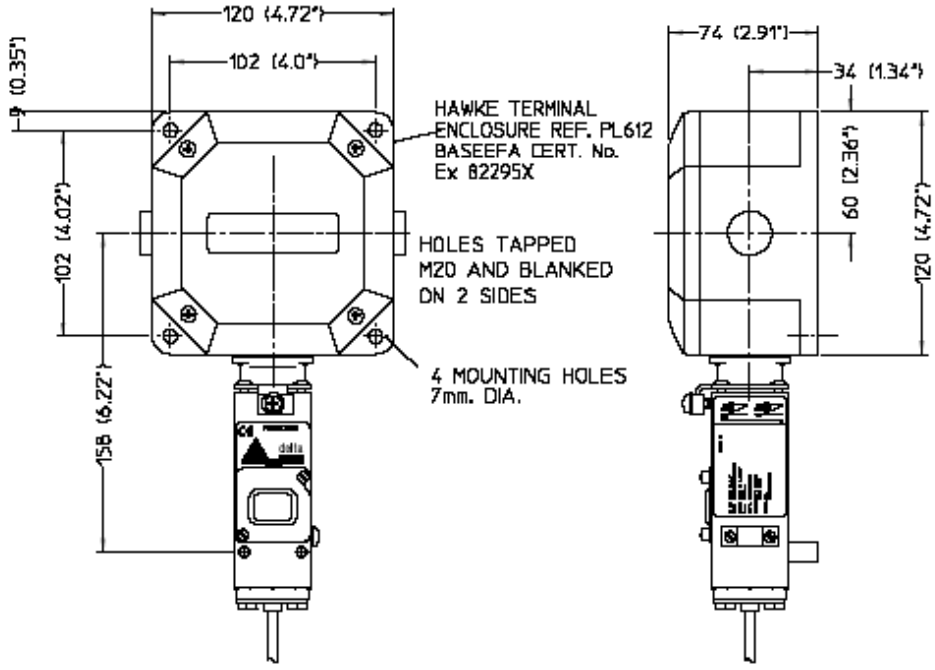


Figure 2 – *All Dimensions in mm (inches)*
Terminal Enclosure Code C, D – Table 3



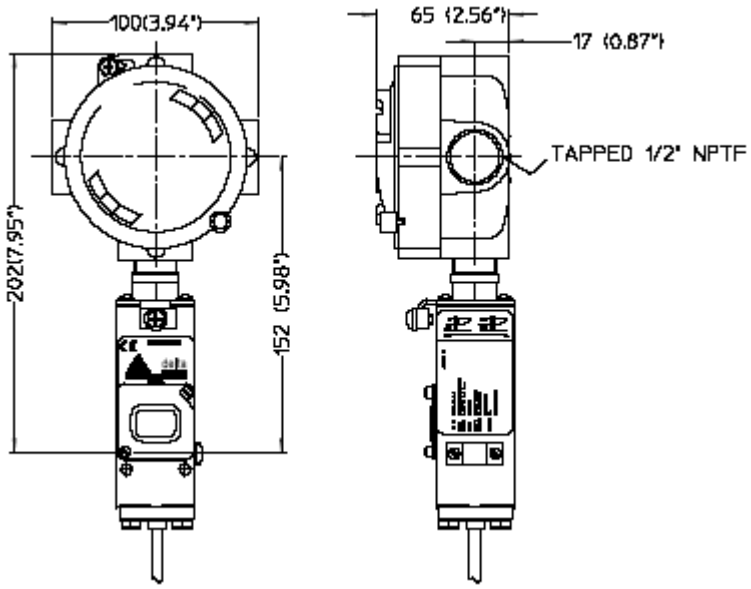
Dimensions

Figure 3 -*All Dimensions in mm (inches)*
Terminal Enclosure J – Table 3

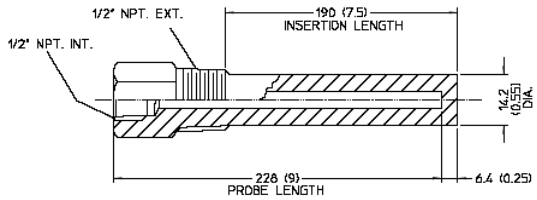


Dimensions

Figure 4 – *All Dimensions in mm (inches)*
Terminal Enclosure K – Table 3



All Dimensions mm (inches)



THERMOWELL

Material 316 SS

Max. Working Pressure
140 bar (2000 psi) at 20°C

Thermowells can also be manufactured to customers own drawing specification requirements.

delta-controls

Delta Controls Limited
Island Farm Avenue, West Molesey, Surrey KT8 2UZ, UK.
T+44 (0)20 8939 3500 **F**+44 (0)20 8783 1163 **E** sales@delta-controls.com **W** www.delta-controls.co