

Technical Datasheet



GR Series Temperature Switch

Models: GR7

Key Features

- Compact and rugged design.
- Weatherproof IP66/NEMA 4.
- ATEX Flameproof CENELEC Ex d IIC option.
ATEX Intrinsically Safe ATEX Ex ia IIC option.
- Stainless steel body option NEMA 4X rating.
- Optional weatherproof, ATEX Ex e, ATEX Ex ia or ATEX.
Flameproof Ex d IIC terminal enclosures.
- 316 Stainless steel capillary and bulb.
- Ranges available up to 350°C (660°F)
Maximum working temperature up to 360°C (680°F)
- Field adjustable.
- Hermetically sealed snap switch CSA listed.

Series Overview

- Launched in the mid-1990s, the Compact Series temperature switches provide users with a compact, 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 GR2/4
- Differential Pressure Switches: Model GR3/6



Product applications

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

- Wellhead Control
- Hydraulic Power Units
- Chemical Injection Skids
- All panel applications where compact hazloc switches are needed

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?

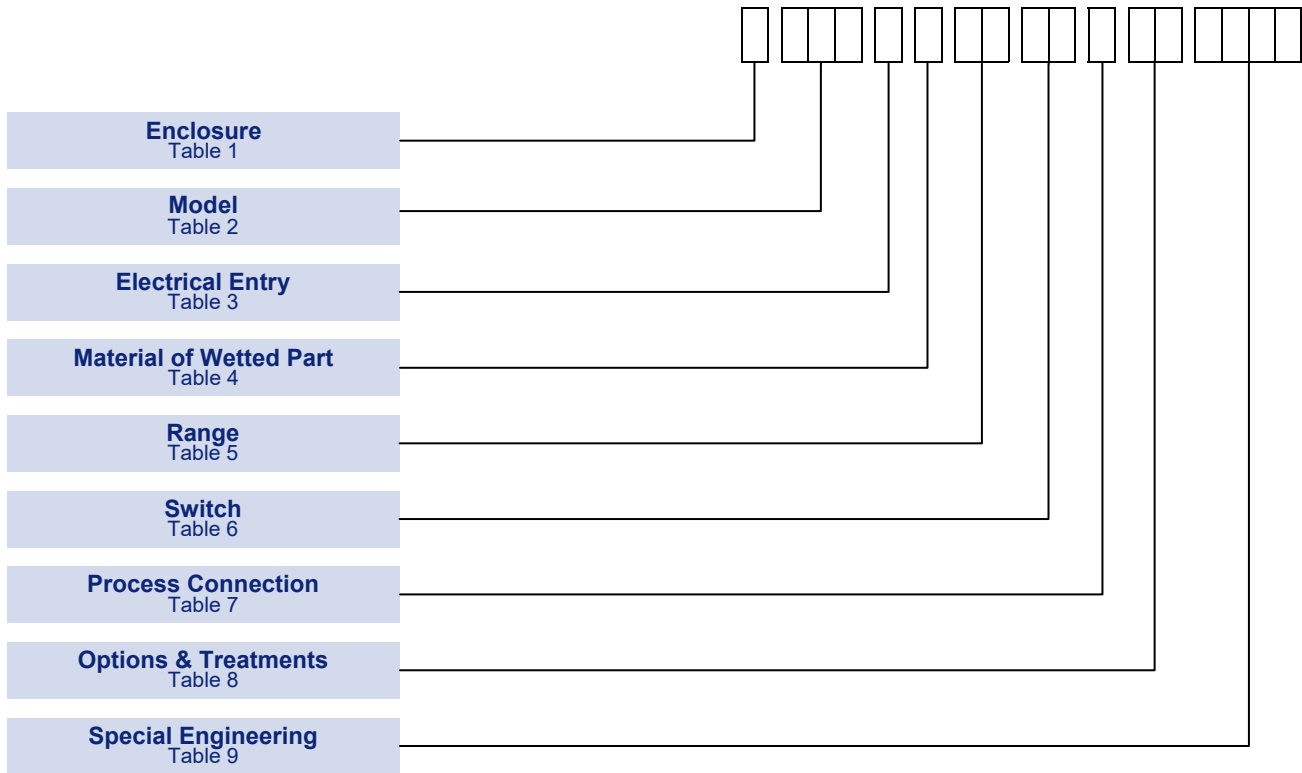
Delta Mobrey offers fast, efficient and knowledgeable support when and where you need it. Please visit our website at www.delta-mobrey.com to find your local support centre or call us on:

+44 (0) 1252 729140

GR Series
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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.



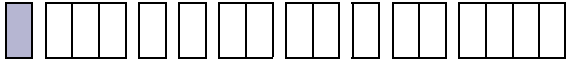
NOTE: Options shaded in the following tables are the most common options and are available on the quickest lead-times and at the lowest cost.

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

GR Series Models: GR7	Accuracy:	Set point repeatability $\pm 1\%$ of span at 20°C / 68°F ambient
	Storage Temperature:	-40 to +60°C / -40 to +140°F
	Ambient Temperature:	Certified Enclosures. Refer to Approvals and Tables 1 & 3 for limitations of ambient use.
	Maximum Process Temperature:	See Table 5
	Enclosure classification:	IP66 / NEMA 4X / Flameproof Ex d
	Switch output:	SPDT or DPDT snap action microswitch (standard) Hermetically sealed (optional)
	Electrical rating:	See Table 6
	Process Connection:	1/2 NPT External Sliding Gland, 1/2 NPT External Direct Mounting
	Approximate Weight:	Enclosure Code "H", "W" & "5" 0.9kg/1.98lb, "R", "A" & "4" 1.2kg/2.67lb. Terminal Enclosure Code "C", "D", "V" & "W" add 0.3kg/0.66lb, "J" add 1.1kg/2.42lb, "K" add 0.5kg/1.1lb. *For Rigid Stem System Code R Table 4 deduct 0.25kg (0.5lb)

Enclosure







TABLE 1 

FINISH

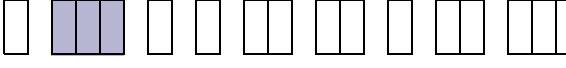
Enclosures W, H and T are clear anodized aluminium; Epoxy paint is optional see Code 50 in Table 8. A and R are natural finish stainless steel.

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.

ENCLOSURE TYPES	Code
Weatherproof Enclosures	
General Purpose The basic enclosure offers weather protection not less than NEMA 4 / IP66.	W
For Aggressive Atmospheres Stainless steel with weather protection less than NEMA 4X / IP66.	A
Flameproof Enclosures (Zone 1)	
ATEX Ex d IIC T6 (-40 to 65°C) or T4 (-40 to 85°C) II 2 G Aluminium enclosure, suitable for outdoor use, IP66 / NEMA 4,7,9  II 2G	H
ATEX Ex d IIC T6 (-40 to 65°C) or T4 (-40 to 85°C) II 2 G Stainless Steel enclosure, suitable for outdoor use, IP66 / NEMA 4,7,9  II 2G	R
NEC 500, NEMA 4, 7, 9 Anodized aluminium. Weatherproof to NEMA 4 / IP66 	T
NEC 500, NEMA 4X, 7, 9 Austenitic Stainless Steel. Weatherproof to NEMA 4X / IP66. 	U
Intrinsically Safe Enclosures (Zone 0)	
ATEX Ex ia IIC T6 Ga Ex ia IIIC T85°C Da IP6x (-40 to +60°C) or T4 Ga Ex ia IIIC T135°C Da IP6x (-40 to 85°C) II 1GD As code "W" but Ex ia. Weatherproof to NEMA 4 / IP66 	5
ATEX Ex ia IIC T6 Ga Ex ia IIIC T85°C Da IP6x (-40 to +60°C) or T4 Ga Ex ia IIIC T135°C Da IP6x (-40 to +85°C) II 1GD As code "A" but Ex ia. Weatherproof to NEMA 4X / IP66 	4

Models

TABLE 2 

	Code
Fixed Switching Differential For applications up to 350°C / 660 °F. Over-range up to 360 °C / 680 °F. Refer to Table 5.	GR7

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Electrical Entry

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

NOTE 1:

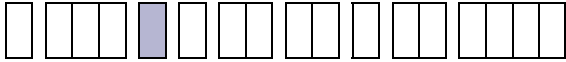
Other lengths available—please contact sales for engineering code







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

TABLE 3 

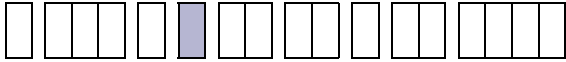
	Code
Factory Sealed Flying Lead. See fig 1.1 and 1.2 Class 1, Groups A, B, C, D. Class II Groups E, F, G. 0.45m/18in. long flying lead (Note 1) With 1/2-14 NPT external conduit thread. <div style="text-align: right;"></div>	A
Integral Weatherproof Terminal Enclosure. See fig 2. Glass filled polyester with weather protection to IP66/NEMA 4. Conduit entry tapped M20 x 1.5 (Note 2) Ambient temperature -20°C to +40°C.	C
Integral 'Increased Safety' Terminal Enclosure. See fig 2. Ex e IIC T6 (-20 to +40°C) Glass filled polyester, With weather protection not less than IP66 / NEMA 4. Conduit entry tapped M20 x 1.5. <div style="text-align: right;"> II 2G</div>	D
Integral 'Increased Safety' Terminal Enclosure. See fig 3. Ex e IIC T6 (-20 to +40°C) Hawke type PL612 Glass filled polyester, with weather protection not less than IP66 / NEMA 4. Conduit entry tapped M20 x 1.5. <div style="text-align: right;"> II 2G</div>	J
Explosionproof Terminal Enclosure. See fig 4. CENELEC Exd IIC T6 (-20 to +40°C) Die cast aluminium alloy. Weather protection not less than IP65 / NEMA 4 Conduit entry tapped 1/2-14 NPT. <div style="text-align: right;"> II 2G</div>	K
Intrinsically Safe Terminal Enclosure-With Screw Terminals. See fig 2. Ex ia IIC T6 (-20 to +40°C) Glass filled polyester, with weather protection not less than IP66 / NEMA 4. <div style="text-align: right;"> II 1GD</div>	V
Intrinsically Safe Terminal Enclosure-With DIN Rail Mounted Terminals. See fig 2. Ex ia IIC T6 (-20 to +40°C) Glass filled polyester , with weather protection not less than IP66 / NEMA 4. <div style="text-align: right;"> II 1GD</div>	W

System Details

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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 Lengths		Lengths of Semi-Rigid Extension		Semi Rigid Stem Length		Code
		mm	Inches	mm	Inches	
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

Table 5A - °C

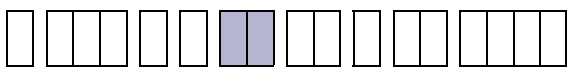
Table 5B - °F

T_{max}= maximum working temperature

Ranges L4, 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.

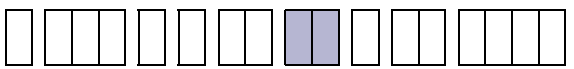
When ordering, please state units required. Range and set point will be in units of preference.

TABLE 5 

T _{max}	RANGE	Code
70	-40 to +60	H1
110	10 to 100	K4
130	50 to 120	L4
230	120 to 220	S4
280	150 to 270	TH
360	230 to 350	V9

T _{max}	RANGE	Code
158	-40 to +140	HA
230	50 to 212	KC
270	120 to 250	LB
450	250 to 430	SE
540	300 to 518	TQ
680	450 to 660	V0


Switch Options

TABLE 6 

Model GR7								
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	Break		
11 Amps @ 110/250V AC and 5/0.5 Amps @ 30/125V DC Silver contacts	AC14 D300	0.6/0.3A @ 120/240 V AC	250V	800V	432 28	72 28	SPDT	HS
	DC13 R300	0.22/0.1A @ 125/250V DC					DPDT	HD † 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 28	72 28	SPDT	HP
	DC13 R300	0.22/0.1A @ 125/250V DC					DPDT	HQ † 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 DPDT DPDT	HV HW † HY ‡

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

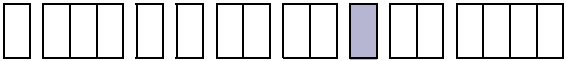
The switch contacts are hermetically sealed inside a stainless steel enclosure for protection against aggressive and corrosive atmospheres.

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

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Process Connection

TABLE 7 

	Code
1/2 - 14 NPT EXT Sliding Gland (System Code N, P)	J
1/2 - 14 NPT EXT Direct Mounting (System Code R)	J

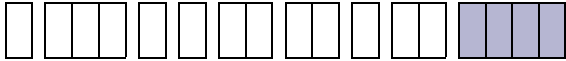
Options & Treatments

Combinations available, apply for details.

TABLE 8 

	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.	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 

Last 4 digits of model code only used when special engineering is required.

	Code
Please consult Delta sales engineering for special requirements	TBA

Performance Data

TABLE 10

Celsius Units (°C)

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.

Range Code	Range	SPDT OPTIONS		DPDT OPTIONS		
		HP	HS/HV	HD/HR	HQ/HT	HW/HY
H1	-40 to +60	2.8	4	6	3.2	6
K4	10 to 100	2.8	4	6	3.2	6
L4	50 to 120	2.8	4	6	3.2	6
S4	120 to 220	2.8	4	6	3.2	6
TH	150 to 270	3.5	5	7.5	4	7.5
V9	230 to 350	4.2	6	9	4.8	9

Fahrenheit Units (°F)

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

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

Range Code	Range	SPDT OPTIONS		DPDT OPTIONS		
		HP	HS/HV	HD/HR	HQ/HT	HW/HY
HA	-40 to +140	4.9	7	10.5	5.6	10.5
KC	50 to 212	4.9	7	10.5	5.6	10.5
LB	120 to 250	4.9	7	10.5	5.6	10.5
SE	250 to 430	4.9	7	10.5	5.6	10.5
TQ	300 to 518	6.3	9	13.5	7.2	13.5
V0	450 to 660	7.7	11	16.5	8.8	16.5

Electrical Connection

Flying Lead

High Duty PVC insulated 1.19mm²/18AWG factory sealed flying leads. Rated insulation voltage CSA 600V.

Terminal Enclosure

Suitable for conductor sizes up to 2.5mm²/14AWG non-pinching, clamped.

Earthing/Grounding

An earthing facility is provided. Flying lead versions have separate earth/ground conductor. Terminal enclosures have additional internal earthing/grounding facilities.

Diaelectric Strength

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

Optional Extras

Mounting Position/Location/Installation

Vertical as shown, IN DIMENSIONS, taking care to avoid siting in locations that transmit excessive shock or vibration. For further advice contact our engineers.

Pollution degree (EN60947-5-1)

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

Electrical Isolation

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

Approvals

EUROPEAN DIRECTIVES



Low voltage Directive (LVD) 2014/35/EU.
Compliant to LVD

ATEX Directive 2014/34/EU:



INTRINSIC SAFETY:
Certificate No. BASEEFA06AATEX0091X
EN 60079-0, EN 60079-11, EN 60079-26, EN 61241-0, EN 61241-11

For Zone 0 models (**Enclosure code 4/5, see table 1**)

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

II 1 GD	Ex ia IIC T6 Ga Ex ia IIIC T85° Da IP6x (Tamb -40°C to +60°C) or T4 Ga
II 1 GD	Ex ia d IIIC T135°C Da IP6x (Tamb -40°C to +85°C)

FLAMEPROOF:
Certificate No. BASEEFA02ATEX0214X
EN 60079-0 + A11, EN 60079-1

For Zone 1 models (**Enclosure code H/R, see table 1**)

II 2 G	Ex d IIC T6 (Tamb -40°C to +65°C)
II 2 G	Ex d IIC T4 (Tamb -40°C to +85°C)

INTEGRAL INCREASED SAFETY TERMINAL
Certificate No. BASEEFA03ATEX0089X
EN 60079-0:2006, EN 60079-7:2006

For Terminal Enclosures code J, see table 3

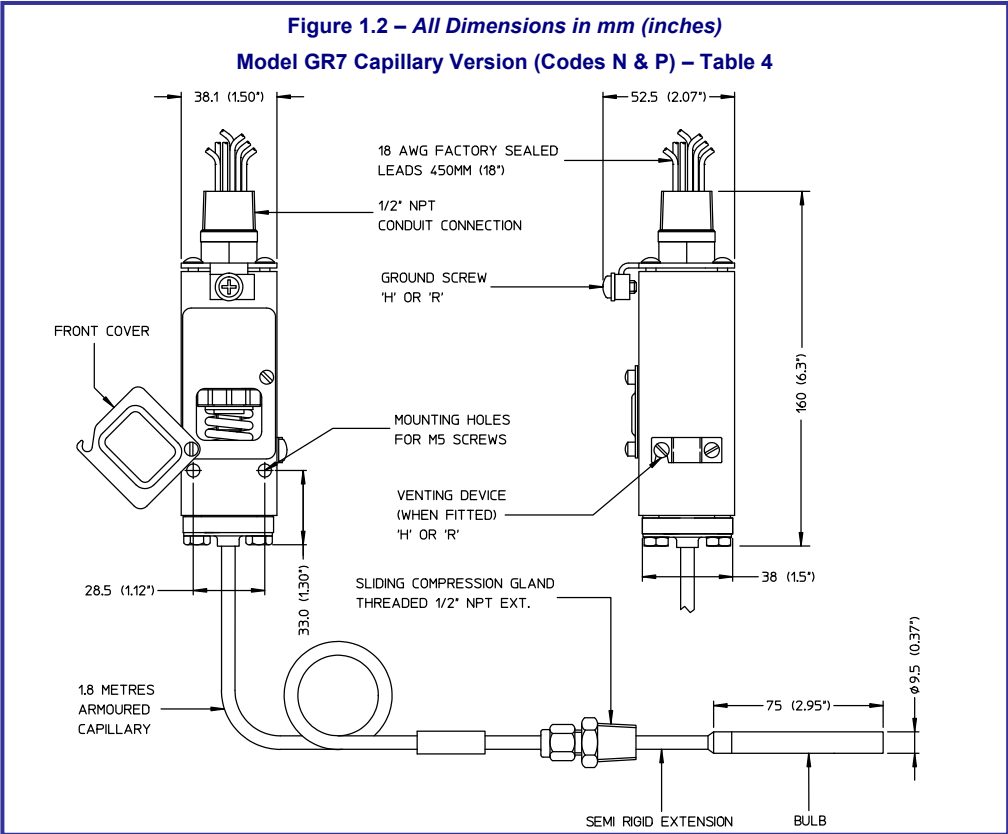
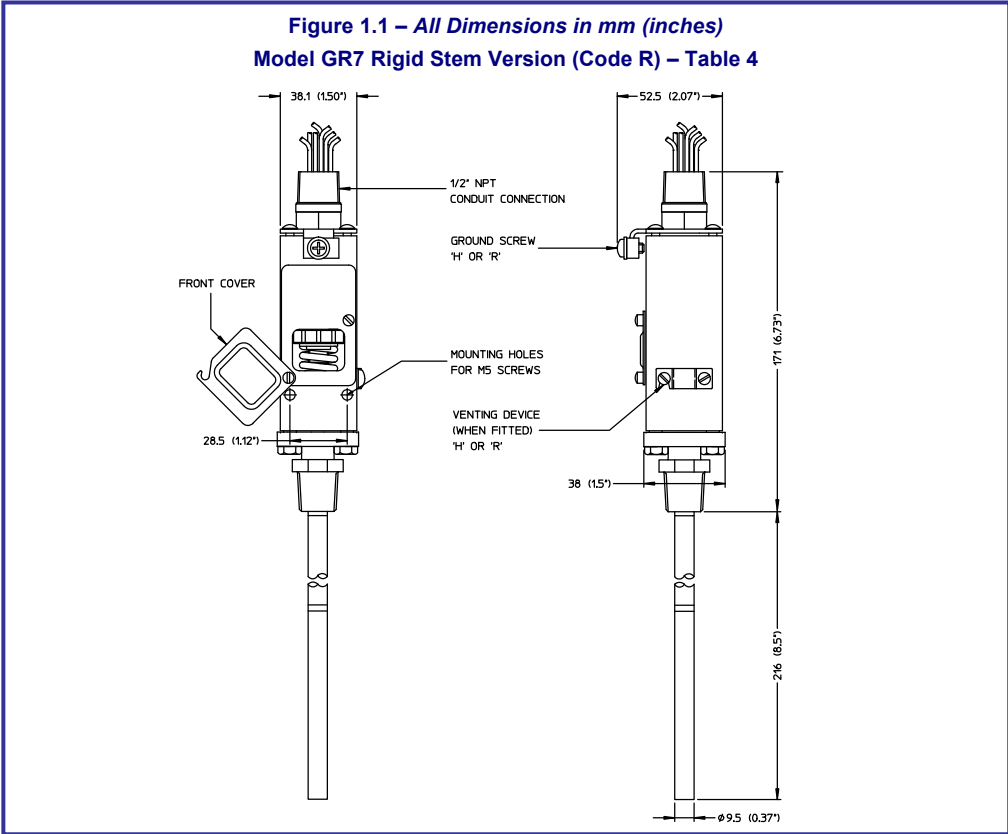
II 2 G	Ex e II T6
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GLOBAL CERTIFICATION



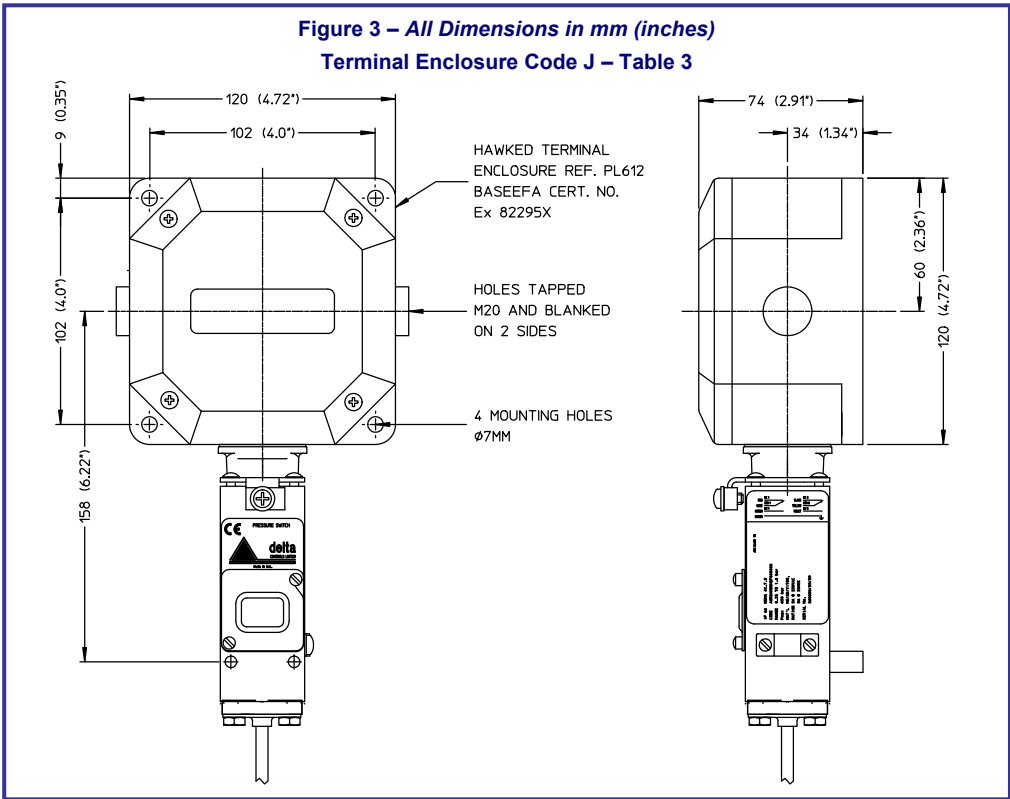
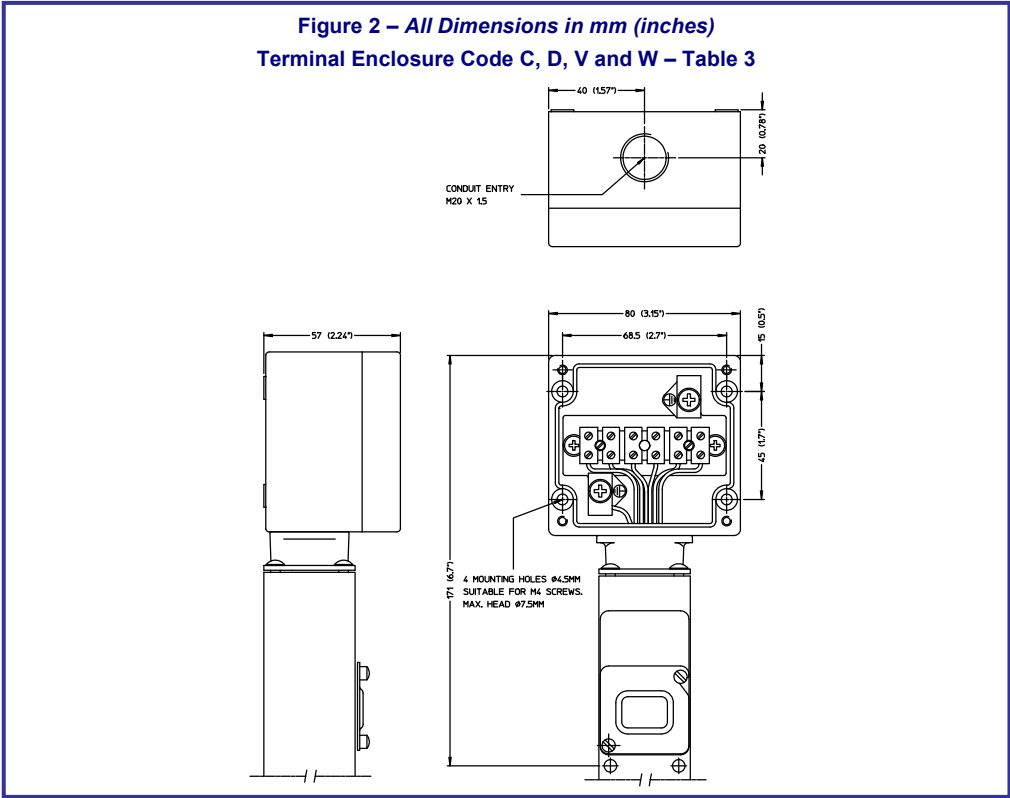
CANADIAN STANDARDS ASSOCIATION
Snap switches for Hazardous locations
Enclosure codes T & U.
Terminal enclosure code A.
Class 1, Groups A, B, C & D Class II, Groups E, F, G.
LR67110-5

Dimensions



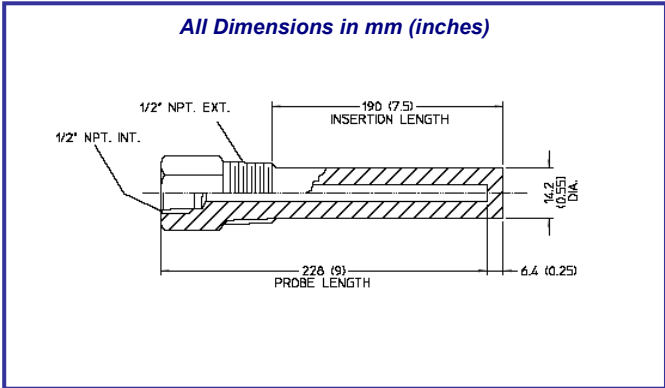
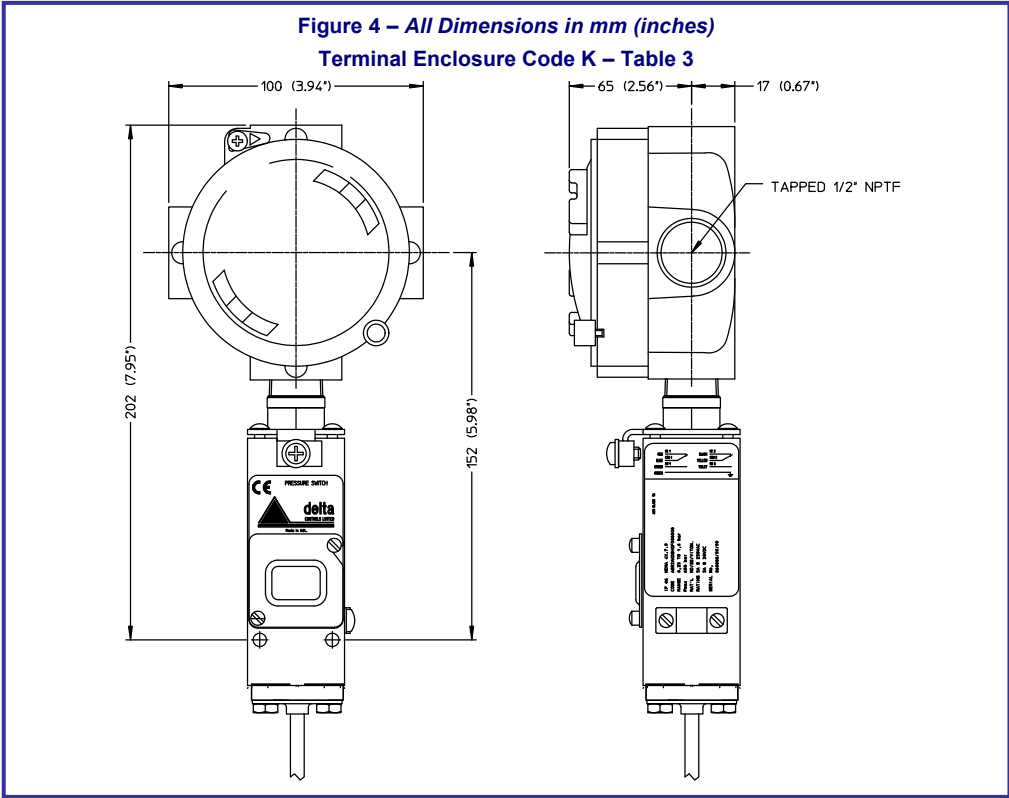
GR Series
Models: GR7

Dimensions



GR Series
 Models: GR7

Dimensions



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.

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Delta Mobrey Limited
Hudson House, Albany Park Camberley Surrey, GU16 7PL, UK.
T+44 (0)1252 729140 F+44 (0)1252 729168 E sales@delta-mobrey.com W www.delta-mobrey.com

