Technical **Datasheet**

delta-mobrey

GR Series
Vapour Pressure Temperature Switch
Models: GR7

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
- AISI 316 Stainless steel capillary and bulb.
- Set point adjustable between –40°C to +350°C (-40°F to 660°F).
- 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
- Differential Pressure Switches: Model GR3-GR6

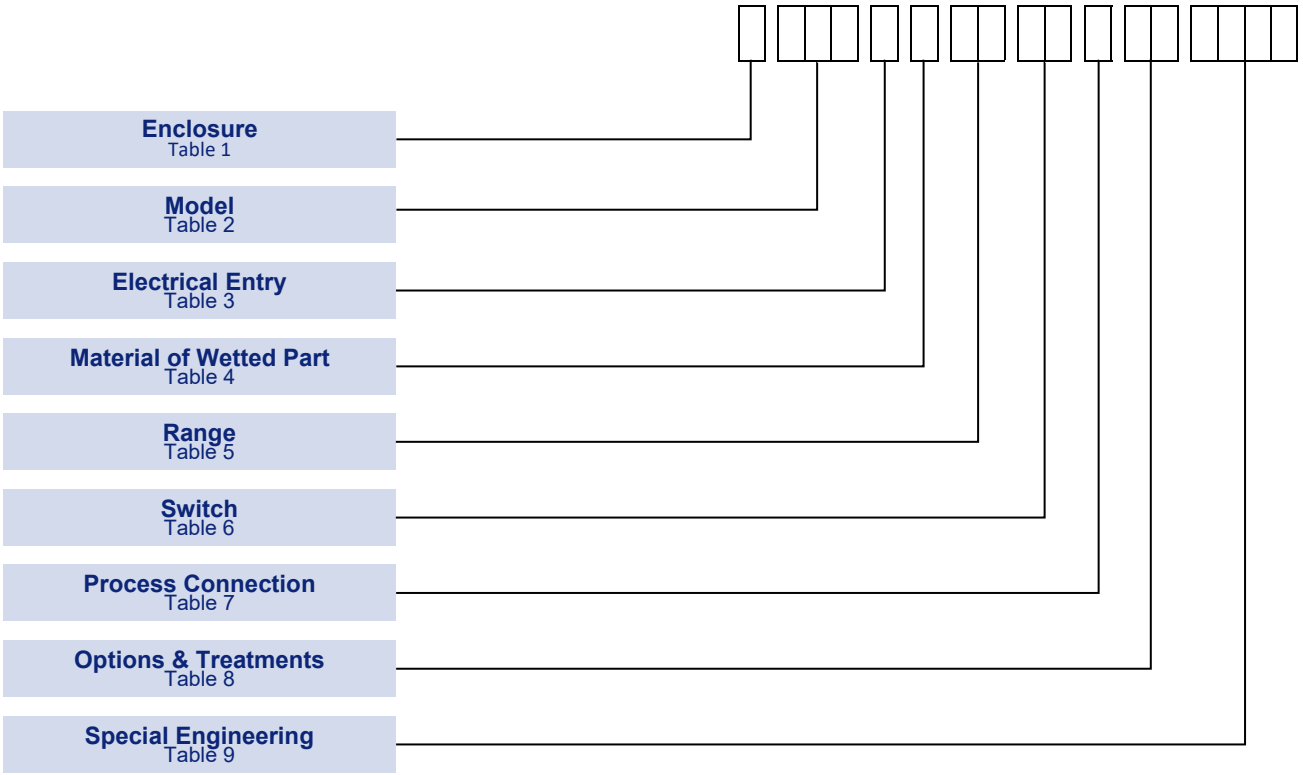
How can we **help you?**

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 read the junction box suppliers' Operating Manual
Ambient Temperature:	Flying leads. -40 to +85°C (-40 to +185°F) Pre-wired junction box: please also read the junction box suppliers' Operating Manual
Maximum Process Temperature:	See Table 5
Enclosure classification:	Weatherproof / Flameproof / Intrinsically Safe / Explosion Proof
Ingress protection:	Flying leads. IP 66 / NEMA 4X
Pollution degree:	Flying leads: pollution degree 3 according 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 within 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 IEC 61298-2:2008
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. Pre-wired junction box codes in Table 3 "**C**", "**D**", "**V**" & "**W**" add 0.3kg/0.66lb, "**J**" add 1.1kg/2.42lb, "**K**" add 0.5kg/1.1lb.

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 (3) Approved for use in a Zone 1 hazardous locations Ex db IIC T6/T4 Gb, 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	H
Aggressive Atmospheres Enclosure in austenitic stainless steel with ingress protection IP66, NEMA type 4X	R
INTRINSIC SAFETY (3)(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 350°C / 660 °F. Over-range up to 360 °C / 680 °F. Refer to Table 5.	GR7

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

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 (4)
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 (4)
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

System Details

TABLE 4

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.

Capillary Lengths		Lengths of Semi-Rigid Extension		Semi Rigid Stem Length		Code
Meters	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 5

T_{max} = maximum working temperature
Ranges L4, S4, TH V9 (LB, 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 5A - °C

SAMA Class	T_{max}	Range	Code
IIC	70	-40 to +60	H1
	110	10 to 100	K4
IIA	130	50 to 120	L4
	230	120 to 220	S4
	280	150 to 270	TH
	360	230 to 350	V9

Table 5B - °F

SAMA Class	T_{max}	Range	Code
IIC	158	-40 to +140	HA
	230	50 to 212	KC
IIA	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	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 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	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

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

	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

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

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

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.

Celsius Units (°C)

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

Celsius Units (°F)

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

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

Optional Extras

Thermowells
Flanged or threaded thermowells manufactured or barstock type are available for a correct installation of the instrument .

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

ATEX Directive 2014/34/EU

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

INTRINSICALLY SAFE

Certificate No. Baseefa06ATEX0091X

Ⓔx 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

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

In case of a pre-wired junction box please also see also the suppliers' certificate for 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

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. SGS24UKEX0056X

Ⓔx 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

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

In case of a pre-wired junction box please also see also the suppliers' certificate for 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 see also the suppliers' certificate for the junction box

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

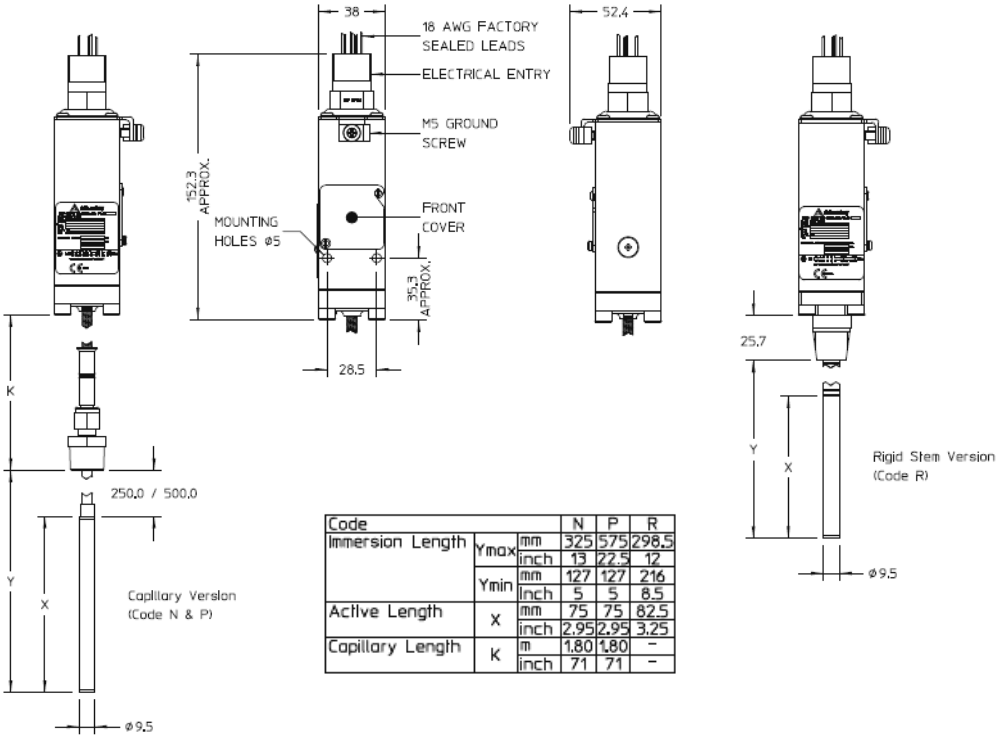
Dimensions

ALL DIMENSIONS mm (inches)

Drawing ref: DS_22025 Rev. A and DS_10156 Rev. A

Figure 1

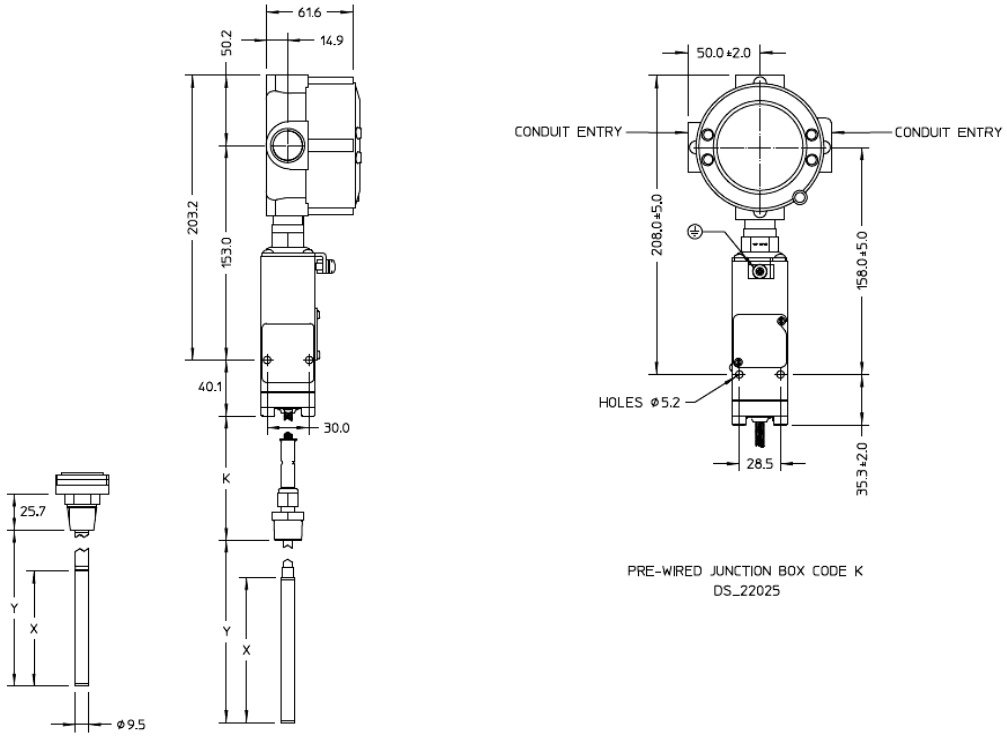
Model GR7 (see table 3 code A and U), Capillary (see Codes N & P, table4) & Rigid Stem Version (Code R)



Code			N	P	R
Immersion Length	Ymax	mm	325	575	298.5
		inch	13	22.5	12
	Ymin	mm	127	127	216
		inch	5	5	8.5
Active Length	X	mm	75	75	82.5
		inch	2.95	2.95	3.25
Capillary Length	K	m	1.80	1.80	–
		inch	71	71	–

Figure 2

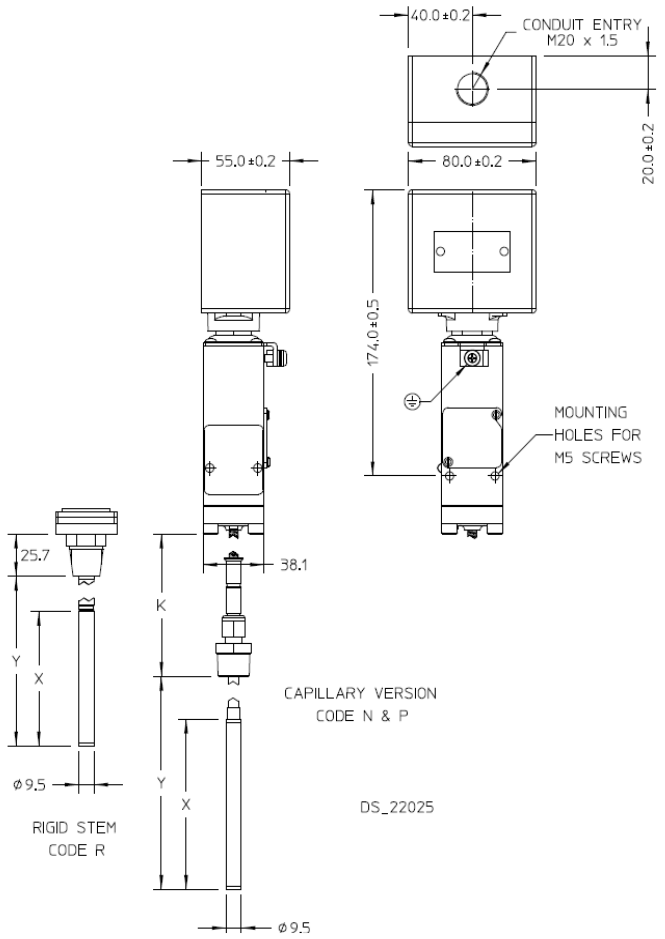
Model GR7 Pre wired Junction box (See Code K table 3), Capillary (Codes N & P table 4) & Rigid Stem Version (Code R)



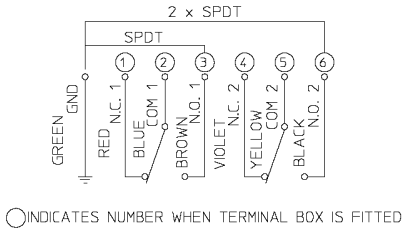
GR Series

Dimensions

Model GR7 Pre wired Junction box (See Code C, D,V and W table 3), Capillary (Codes N & P table 4) & Rigid Stem Version (Code R)



Wiring Diagram



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