Technical **Datasheet**

Industrial Series
Vapour Pressure Temperature Switch
Model: S70



Key **Features**

- SPDT or DPDT switching and optional gold alloy contacts.
- Epoxy coated die cast zinc / aluminium or AISI 300 SS Enclosure.
- Weatherproof, Flameproof, Intrinsically Safe and Explosion proof execution.
- 316 stainless steel capillary and bulb.
- Ranges available up to 160 to 250 °C (320 to 500 °F). Maximum working temperature up to 270°C (518°F).
- Safety vented design as standard.
- Suitable for use SIL 2 safety related systems.

Series **Overview**

The Industrial Series offers exceptional performance and high build quality in a simple, safe and cost-effective package.

- Performance is assured by repackaging Delta's well-proven sensor technologies in a new, simple, one-piece enclosure.
- Safety is maintained by a vent that prevents the enclosure becoming pressurized in the event of a sensor being damaged.
- Wide range of options and engineering specials available to cover most of the customer application in field.
- Various international approvals make the Industrial Series suitable for use in both safe and hazardous areas, across the globe in Europe, North America and throughout the world.

Other products in the series include:

- Differential Pressure Switches: Model S30
- Pressure Switches: Model S20





Product **industries**

The S20 Industrial Series is suitable for a wide range of applications in:

- Oil & Gas
- Chemical
- Petrochemical
- Refining
- Power
- OEM

The choice of models available ensures that the Industrial Series is suitable for use in:

- Corrosive atmospheres
- Resistant to chemical attack

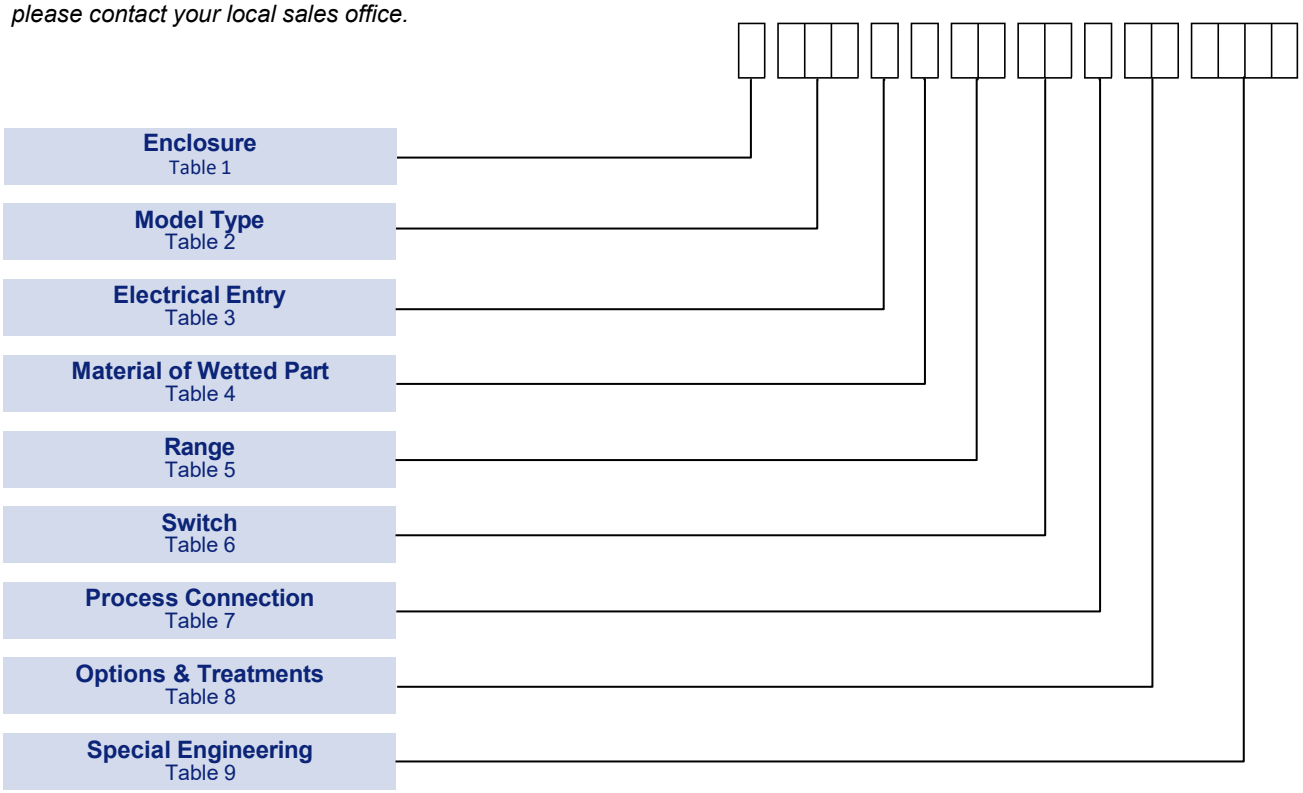
How can we **help you?**

Delta Mobrey offers fast, efficient and knowledgeable support when and where you need it. Please visit our web site 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 attribute values representing the desired features from the tables that follow. The chart below, describes how the part number 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:	-40 to +80°C / -40 to +176°F
Ambient Temperature:	-30 to +80°C / -22 to +176°F; SPECIAL ENGINEERING –60 to +80°C (-76 to 176 °F)
Maximum Process Temperature:	Subject to appropriate installation practice, the component parts withstand up to +80°C (+176° F).
Maximum Working Pressure:	System sensing probes for both the capillary and rigid stem version are designed to withstand 100 bar (1500 psi) without a thermowell
Enclosure classification:	Weatherproof / Flameproof / Intrinsic safety / Explosionproof
Ingress protection:	IP 66 / NEMA 4
Pollution degree:	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 with 2% of range). Hermetically sealed (optional)
Electrical rating:	See Table 6
Terminal Block:	suitable for wire section up to 2.5 mm^2 / 14 AWG
Grounding connection:	one internal and one external suitable for wire section up to 4 mm^2 / 12 AWG
Electrical Safety Class:	safety electrical class 1 according to IEC 61298-2:2008
Process Connection:	3/8 NPT External Sliding Gland, 1/2 - 14 NPT M Direct Mounting
Weight:	Enclosures: **"H & T"** 2.6kg/5.7lb, **"R & U" 7.1**kg/15.6lb **"W" 2.6**kg/5.7lb, **"A"** 3.9kg/8.6lb.

Enclosure

NOTE: Attribute values 4 and 5.

To be used only on switch attribute values 04/05, 0G/0H, H2/H3/H6 - See Table 6.

(1) Triple marking IECEx, ATEX and UKEx on the same product nameplate.

(2) Safety Parameters

Ui: 30 V; Ii: 300 mA; Ci: 0; Li: 0

(3) C SP US

TABLE 1

Description	Attribute value
WEATHERPROOF ENCLOSURES	
General purpose Die-cast in zinc alloy, epoxy painted, with weather protection IP66	**W**
Aggressive Atmospheres Investment cast enclosure in austenitic stainless steel with weather protection IP66	**A**
FLAMEPROOF ENCLOSURE (1) Approved for use in a Zone 1 & Zone 21 hazardous locations Ex db IIC T5/T6 Gb, Ex tb IIIC T100/T85°C Db IP66 The temperature class is related to the ambient temperature range see Approvals for more information	
General Purpose Gravity die-cast in aluminium, epoxy painted, with ingress protection IP66	**H**
Aggressive Atmospheres Investment cast enclosure in austenitic stainless steel with ingress protection IP66	**R**
INTRINSICALLY SAFE ENCLOSURES (1)(2) Approved for use in a Zone 0 hazardous locations Ex ia IIC T5/T6 Ga The temperature class is related to the ambient temperature range see Approvals for more information	
General purpose Die-cast in zinc alloy, epoxy painted, with weather protection IP66	**5**
For Aggressive Atmospheres Investment cast enclosure in austenitic stainless steel with weather protection IP66	**4**
EXPLOSIONPROOF ENCLOSURE (According NEC art. 500)(3) Approved for use in Division 1 and 2 hazardous locations Class I Groups C, D Class II Groups E, F, G. Suitable for outdoor use, NEMA Type 4, 7 and 9.	
General Purpose Gravity die-cast in aluminium, epoxy painted, with ingress protection NEMA Type 4, 7 and 9	**T**
Aggressive Atmospheres Investment cast enclosure in austenitic stainless steel with ingress protection NEMA Type 4, 7 and 9	**U**

Model Type

C SP US Applies to all models

TABLE 2

Description	Attribute Value
Fixed Switching Differential SPDT & DPDT options available. See Table 6.	S71

Electrical Entry

Adaptors are available for other popular thread sizes.

* For attribute values 3 & 6 - see approvals and Table 1 attribute values T & U.

TABLE 3

Description	Attribute Value
Enclosures W & 5: 22mm (0.86 ins) Dia clearance hole for 20mm / ¾ inch O/Dia Conduit.	1
Enclosures W & 5: M20 x 1.5 elbow adaptor to suit.	0
Enclosures W, A, 5 & 4: 3/4 - 14 NPT F elbow adaptor to suit.	3
Enclosures H, R, A & 4: M20 x 1.5 ISO thread.	0
Enclosures H & R: M20 x 1.5 ISO thread, dual entry.	5
Enclosures H & R: 1/2 - 14 NPT F (direct).	2
Enclosures H, R, T & U: 3/4 - 14 NPT F (direct).	3*
Enclosures H, R, T & U: 3/4 - 14 NPT F dual entry.	6*
Enclosures W & 5: 22mm (0.86 ins) Dia clearance hole for 20mm / ¾ inch O/Dia Conduit, dual entry.	7
Enclosures H & R: 1/2 - 14 NPT F dual entry.	4

System details

The flexible capillary version of Series S70 comprises an armoured capillary attached to the sensing bulb via a semi -rigid extension on which a 1/2"-14 NPT compression gland slides to enable various depths of thermowell (pocket) to be accommodated. All exposed parts of the thermal system are in 300 series austenitic stainless steel with the capillary and sensing bulb in 316 stainless steel.

Applies to all details in the above table.

TABLE 4

Capillary Length (K)		Semi Rigid Stem Length		Sensing Bulb Length (X)		Max Immersion Length (Y_{max})		Attribute Value
meter	feet	mm	inch	mm	inch	mm	inch	
1.86	6	250	10	83	3.3	250	10	N
1.86	6	500	20	83	3.3	500	20	P
Rigid Stem Probe				83	3.3	216	8.5	R

The rigid stem version has an integral thread for direct mounting or via a thermowell.
Material of probe 316 stainless steel.
NOTE: *Bulb diameter, all ranges 9.5mm or 0.37 inches*.

Setting Ranges

TABLE 5

Table 5A - °C

SAMA Class	RANGE	T_{max}	Attribute Value
II C (*)	-40 to +60 0 to 100 50 to 170	70 110 180	H1 K3 L5 (^)
II A	110 to 190 160 to 260	200 270	Q6 (^) U5 (^)

Table 5A - °F

SAMA Class	RANGE	T_{max}	Attribute Value
II C (*)	-40 to +140 32 to 212 120 to 340	158 230 360	HA KB LC (^)
II A	230 to 374 320 to 500	392 518	QC (^) UA (^)

T_{max} = maximum working temperature

^) Ranges L5, Q6 and U5 (LC, QC and UA) cannot be used on rigid stem models (system attribute value R).

Applies to all ranges above.

(*) For instruments SAMA IIC class with set point around ambient temperature, due to liquid/ vapour phase becomes less well defined, the dead band may increase.

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

Switch

TABLE 6 [ ] [ ][ ][ ] [ ] [ ] [ ][ ] [ ] [ ][ ] [ ][ ][ ][ ]

Model Type S71

UL/CSA RATING (RESISTIVE) see note	IEC947-5-1 / EN 60947-5-1 RATING							Contact	Attribute Value
	Designation & Utilisation Category	Rated operational current I_e (A) At rated operational voltage U_e	*Ui*	*Uimp*	VA Rating	Make	Break		
5 A, 110/250V AC Light Duty for AC only	AC14 D300 DC13 R300	0.6/0.3A, 120/240 V AC 0.22/0.1A, 125/250V DC	250V	0.8kV	AC DC	432 28	72 28	SPDT DPDT	**00** **01**
5 A, 110/250V AC and 2 A, 30V DC General purpose precision	AC14 D300 DC13 R300	0.6/0.3A, 120/240 V AC 0.22/0.1A, 125/250V DC	250V	0.8kV	AC DC	432 28	72 28	SPDT DPDT	**02** **03**
1 A, 125V AC and § ***100mA, 30V DC*** Gold Alloy contacts for low voltage switching	1A, 125 VAC RESISTIVE (IEC 1058-1/EN 61058-1)							SPDT DPDT	**04** **05**
§ ***5 A, 110/250V AC and 5 A, 30V DC*** Environmentally sealed	AC14 D300 DC13 R300	0.6/0.3A, 120/240 V AC 0.22/0.1A, 125/250V DC	250V	0.5kV	AC DC	432 28	72 28	SPDT* DPDT*	**08** **09**
§ 1 A, 30V AC and 1A, 30V DC Environmentally sealed with gold contacts	AC14 E150	0.3A, 120 V AC	125V	0.5kV	AC	216	36	SPDT* DPDT*	**0G** **0H**
5 A, 250V AC and 2 A, 30V DC Hermetically sealed. Gold plated silver contacts	AC14 D300 DC13 R300	0.6/0.3A, 120/240 V AC 0.22/0.1A, 125/250V DC	250V	0.5kV	AC DC	432 28	72 28	SPDT DPDT	**H2** **H3†, H6‡**

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

NOTE: Enclosure attribute values T and U.
Microswitch attribute values 02 and 03.
CSA rating as follows:
110/250V AC 5A 125/250V DC 0.5/0.25A

Enclosure attribute values H and R.
Microswitch attribute values 02 and 03.
CSA rating as follows:-
110/250V AC 5A 250V/125/30V DC 0.25/0.5/2A

C SA US 00, 01, 02, 03, 04, 05, H2, H3†, H6‡ microswitches

The electrical rating is dependent on the microswitch fitted to the instrument. The electrical ratings defined by each approval that the microswitch complies with and is shown on the product nameplate, ie UL/CSA, or IEC. It should be noted that the instrument must be used within the electrical rating specified from the approval you require. In the absence of any verification by UL/CSA the microswitch § manufacturer's rating is stated in ***italics and bold*. If in doubt seek guidance from the factory.**

NOTE: For low energy circuits e.g, 30V and up to 100mA, we recommend using gold alloy contact switches
Ui = rated insulation voltage Uimp = rated impulse to withstand voltage across contacts.

Process Connection

C SA US Applies to all connections in this table.

TABLE 7 [ ] [ ][ ][ ] [ ] [ ] [ ][ ] [ ][ ] [ ] [ ][ ] [ ][ ][ ][ ]

Description	Attribute value
3/8 - 18 NPT M Sliding Gland	E
1/2 - 14 NPT M Direct Mounting	J

Options & Treatments

Combinations available, apply for details.

Applies to all options and treatments in this table.

TABLE 8

Description	Attribute Value
Tropicalization High humidity atmospheres	* 1
Marine and Offshore Saline atmosphere or salt spray	* 2
Ammonia Process (wetted) parts and construction suitable for atmospheric ammonia	* 3
Oxygen Service 2: Process (wetted) parts are cleaned for oxygen	* 4
Oxygen Service 3: Process and non-process parts are cleaned for use with oxygen	* 5
Stainless Steel Pipe Mounting Bracket Permits local 2” pipe work to be utilized for mounting the instrument	1 *
Tagging - Variety of tagging methods are available	APPLY FOR DETAILS
PVC covered armoured capillary	4 *
Applies when – no option is required	0 *
Applies when – no treatment is required	* 0

All options are available to be combined where the * is indicated.

Special Engineering

Last 4 digits of part number are only used when special engineering is required such as: chemical seals, Low ambient temperature version (from -60°C to +80°C), End Of Line resistor factory wired (nominal rating might change) or any other special variation to the standard product to fit the application.

TABLE 9

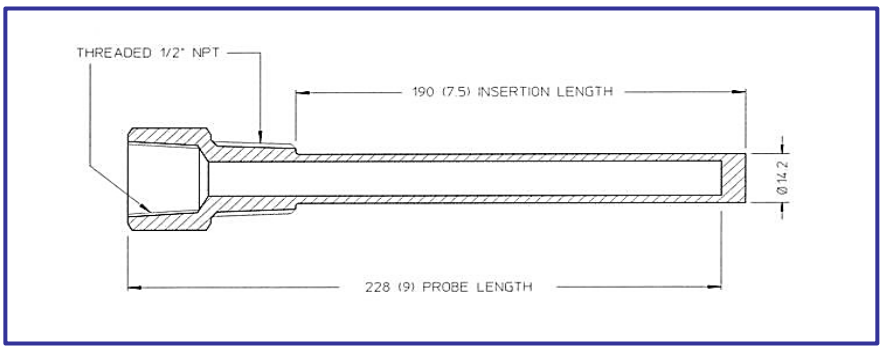
Description	Attribute value
Please consult Delta sales engineering for special requirements	**TBA**
Low ambient temperature version (from –60°C to +80°C)	0AEB

THERMOWELLS

Material 316SS.
Maximum working pressure 140bar (2000psi) at 20°C.

Thermowells can also be manufactured to customer own drawings/specification requirements.

All dimensions in mm (inches)



Performance Data

TABLE 10

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.

°C Units

Range		T_{max} °C	Switch Attribute Value - Option Switching Differential °C									
Attribute value	°C		00	01	02	03	04	05	08/ 0G	06/ 0H	H2	H3/ H6
H1	-40 to +60	70	1.5	2.5	2	4	1.5	3	6	6	8	10
K3	0 to 100	110										
L5	50 to 170	180										
Q6	110 to 190	200										
U5	160 to 260	270										

°F Units

Range		T_{max} °C	Switch Attribute Value - Option Switching Differential °F									
Attribute value	°C		00	01	02	03	04	05	08/ 0G	06/ 0H	H2	H3/ H6
HA	-40 to +140	158	2.7	4.5	3.6	7.2	2.7	5.4	10.8	10.8	14.4	18
KB	32 to 212	230										
LC	120 to 340	360										
QC	230 to 374	392										
UA	320 to 500	518										

Approvals

GLOBAL CERTIFICATION

Functional Safety Certified
Meets the requirements of IEC 61508-2:2010 for use in safety related systems.
Systematic capability: SC 2;
Random Capability: Type A element
SIL1 @ HFT 0; Route 1H and 1S
Certificate No. Sira FSP FSP 11007/05

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
INTRINSIC SAFETY: Certificate No. Baseefa05ATEX0111

II 1G
- Ex ia IIC T6 / T5 Ga (-25°C≤Ta≤+60°C) / (-60°C≤Ta≤+80°C)

FLAMEPROOF Certificate No. BAS01ATEX2113X

II 2GD

Model Type: *S71	Model Type: *S71—Low temperature version
▪Ex db IIC T6 Gb (-30°C≤Ta≤+65°C)	▪Ex db IIC T6 Gb (-60°C≤Ta≤+65°C)
▪Ex db IIC T5 Gb (-30°C≤Ta≤+80°C)	▪Ex db IIC T5 Gb (-60°C≤Ta≤+80°C)
▪Ex tb IIIC T85°C Db IP66 (-30°C≤Ta≤+65°C)	▪Ex tb IIIC T85°C Db IP66 (-60°C≤Ta≤+65°C)
▪Ex tb IIIC T100°C Db IP66 (-30°C≤Ta≤+80°C)	▪Ex tb IIIC T100°C Db IP66 (-60°C≤Ta≤+80°C)

CANADA AND UNITED STATES

The instrument is certified for Hazardous Location according to the following CSA class 3238-01 and 3238-81.

File No.: 176418, certificate No. 2064185

- Class I, Division 1 and 2, Groups C and D
- Class II, Division1 and 2, Groups E, F and G
- Class III

Approvals

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

INTRINSIC SAFETY: Certificate No**. SGS24UKEX0097**

II 1G

- Ex ia IIC T6 / T5 Ga (-25°C≤Ta≤+60°C) / (-60°C≤Ta≤+80°C)

FLAMEPROOF Certificate No. BAS22UKEX0260X

Model: *S71	Model: *S71—Low temperature version
▪ Ex db IIC T6 Gb (-30°C≤Ta≤+65°C)	▪ Ex db IIC T6 Gb (-60°C≤Ta≤+65°C)
▪ Ex db IIC T5 Gb (-30°C≤Ta≤+80°C)	▪ Ex db IIC T5 Gb (-60°C≤Ta≤+80°C)
▪ Ex tb IIIC T85°C Db IP66 (-30°C≤Ta≤+65°C)	▪ Ex tb IIIC T85°C Db IP66 (-60°C≤Ta≤+65°C)
▪ Ex tb IIIC T100°C Db IP66 (-30°C≤Ta≤+80°C)	▪ Ex tb IIIC T100°C Db IP66 (-60°C≤Ta≤+80°C)

II 2GD

EURASIAN CONFORMITY MARK

Hazardous Areas

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

- 0Ex ia IIC T6 / T5 Ga (-25°C≤Ta≤+60°C) / (-60°C≤Ta≤+80°C)

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

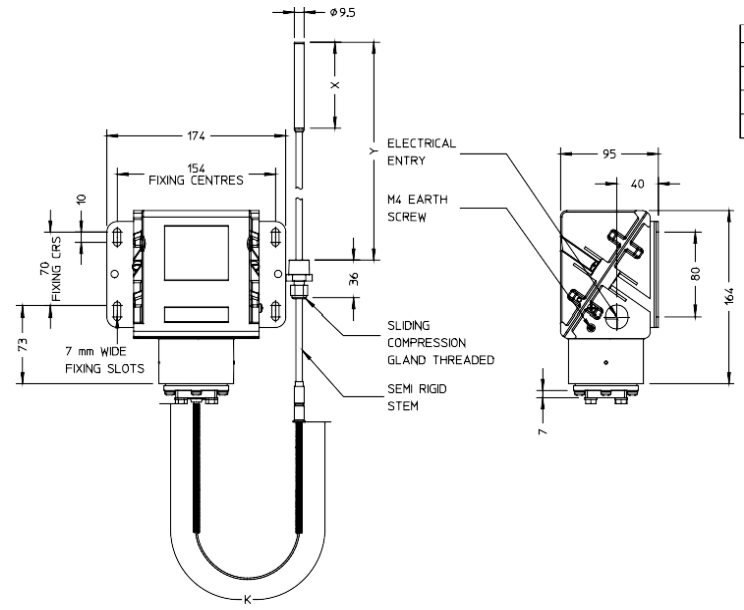
Model Type: *S71	Model Type: *S71 (Low temperature Version)
▪ 1Ex d IIC T6 Gb X (-30°C≤Ta≤+65°C)	▪ 1Ex db IIC T6 Gb X (-60°C≤Ta≤+65°C)
▪ 1Ex d IIC T5 Gb X (-30°C≤Ta≤+80°C)	▪ 1Ex db IIC T5 Gb X (-60°C≤Ta≤+80°C)
▪ Ex tb IIIC T85°C Db X IP66 (-30°C≤Ta≤+65°C)	▪ Ex tb IIIC T85°C Db X IP66 (-60°C≤Ta≤+65°C)
▪ Ex tb IIIC T100°C Db X IP66 (-30°C≤Ta≤+80°C)	▪ Ex tb IIIC T100°C Db X IP66 (-60°C≤Ta≤+80°C)

If EAC certification is required, this must be evidenced to our sales team at ordering stage for correct marking of the instrument.

Dimension

Dimension in mm

'W' ENCLOSURE



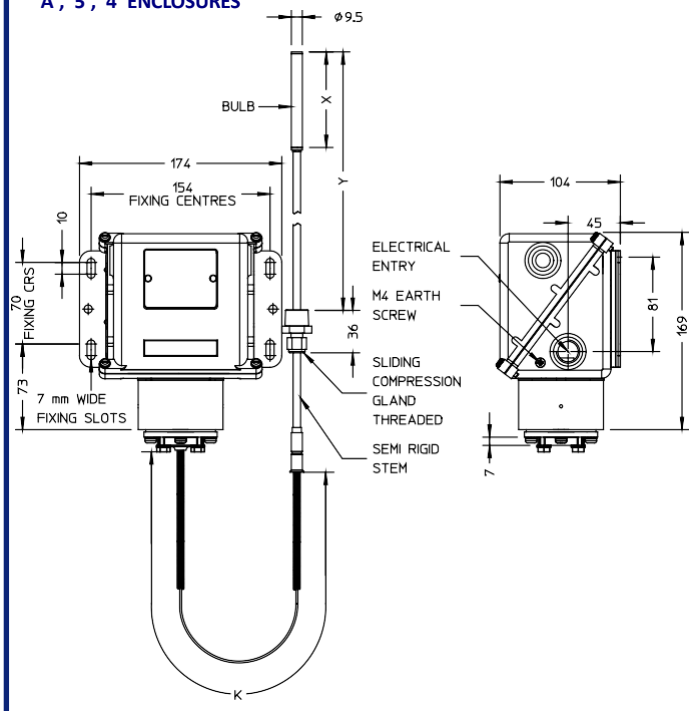
CODE		R	N	P
Immersion Length, Y min	mm	216	120	120
	inch	8	5	5
Immersion Length, Y max	mm	216	250	500
	inch	8	8	8
Capillary Length, K	mm	N/A	1860	1860
	feet	N/A	6	6
Active Length, X	mm	83	83	83
	inch	3.3	3.3	3.3

DS_22330

CAPILLARY VERSION - N & P

RIGID STEM VERSION - CODE R

'A', '5', '4' ENCLOSURES



CODE		R	N	P
Immersion Length, Y min	mm	216	120	120
	inch	8	5	5
Immersion Length, Y max	mm	216	250	500
	inch	8	8	8
Capillary Length, K	mm	N/A	1860	1860
	feet	N/A	6	6
Active Length, X	mm	83	83	83
	inch	3.3	3.3	3.3

DS_22327

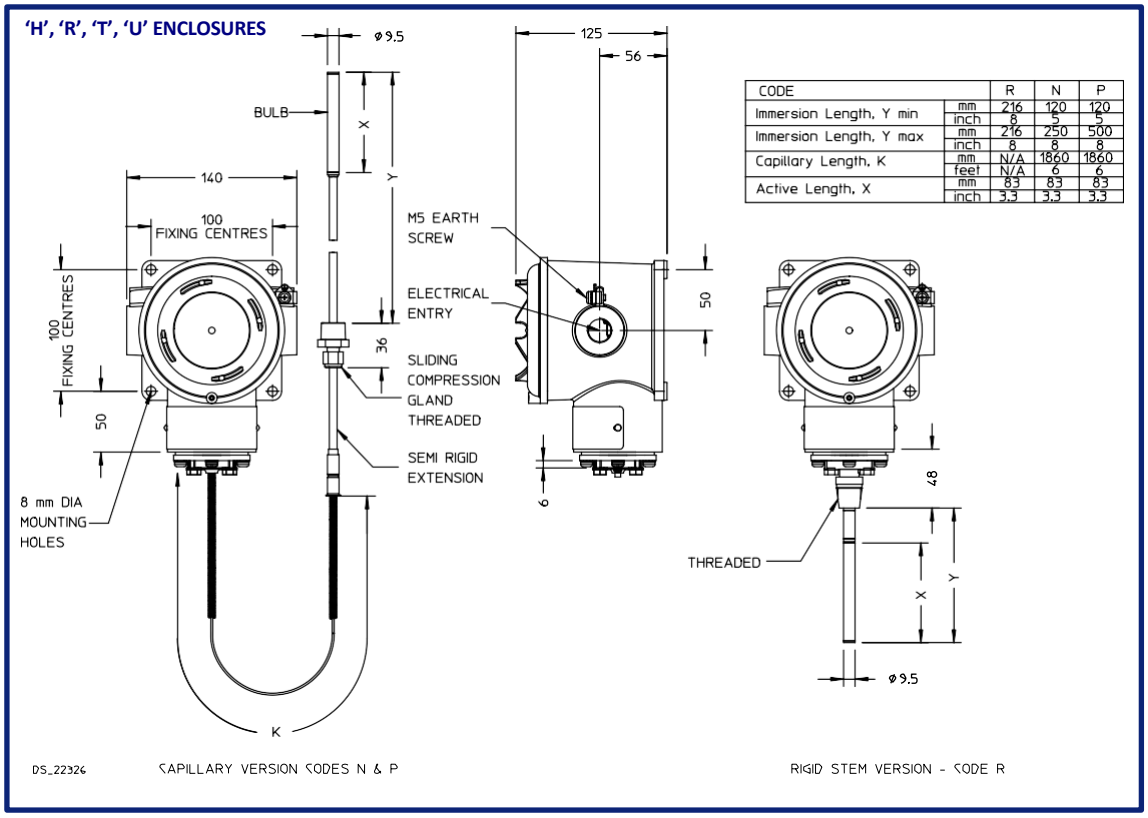
CAPILLARY VERSION - CODE N & P

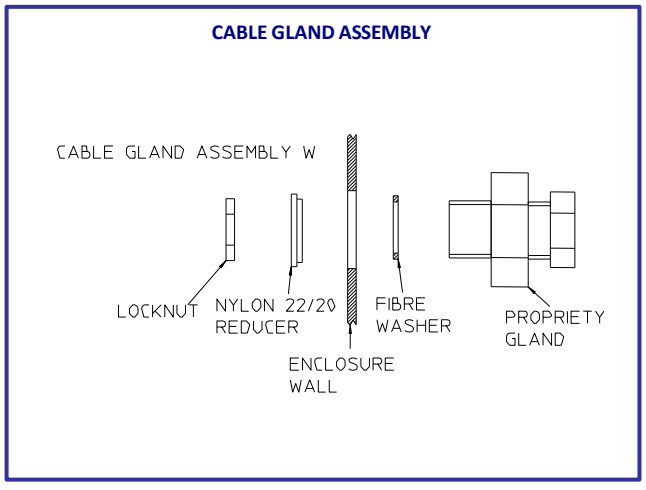
RIGID STEM VERSION - CODE R

Industrial Series
Model: S70

Dimension

Dimension in mm





In the interest of development and improvement Delta Mobrey Ltd, reserves the right to amend, without notice, details contained in this publication. No legal liability will be accepted by Delta Mobrey Ltd for any errors, omissions or amendments.

Delta Mobrey Limited
Hudson House, Albany Park, Camberley, Surrey, England, GU16 7PL United Kingdom
T+44 (0)12 5272 9140 **E** sales@delta-mobrey.com **W** www.delta-mobrey.com