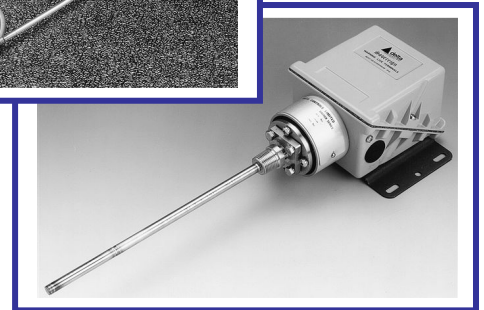


Vapour Pressure Temperature Switches: **Industrial S71 Series**

**S71
Issue H**

- Field set point adjustment against a reference scale.
- SPDT or DPDT switching.
- Terminal block for easy field wiring.
- Hermetically sealed microswitch options.
- Optional gold alloy contacts.
- 316 stainless steel capillary and bulb.
- Ranges available up to 260°C (500°F).
- Explosionproof NEMA 4, 4X, 7, 9
- Flameproof EEx d IIC - ATEX.



Performance **characteristics**

Enclosure

- IP66 Protection

Thermal System details

- All exposed parts of the thermal system are in 300 stainless steel with the capillary and sensing bulb in 316 stainless steel.

Standard Electrical ratings – Refer to Table 6

- 1 Amp with gold contacts.
- 5 Amps – general purpose, environmentally sealed and hermetically sealed.

Process connection

- ½" NPT External – Sliding gland or Direct mounting option.

Unit weight

- Between 2.6 kg – 7.1 kg (5.7lb – 15.6lb).

Accuracy

- Set point repeatability $\pm 1\%$ of span at 20°C ambient.

Product **applications**

The S71 Industrial Series is suitable for a wide range of applications in many

Industry sectors:

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

The choice of models available ensures that the S71 Industrial 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

Enclosures

TABLE 1







INTRINSIC SAFETY

Because of the low voltages and currency of I.S. circuits, we recommend using gold and/or sealed contacts. Temperatures in Table 1 refer to limitations for certified enclosures. See **TECHNICAL DATA**.

NOTE: Codes T and U – to increase gas class see Table 6 NOTE 2.

NOTE: Codes H, T for 4X
Aluminium Enclosure protected by quality epoxy paint system. Performance of enclosure requires careful installation and sealing of cable gland connection in situ. Assembly requires to be built for Marine use, See Table 8, Code 02.

FLAMEPROOF ENCLOSURES (ZONE 1)	Code
EExd IIC T6(-60 to +65°C) T5 (-60 to+80°C) Gravity die-cast enclosure in aluminium-silicon alloy, epoxy painted internally and externally certified to CENELEC EN 50 014 and EN50 018 II2GD. Weatherproof to NEMA type 4, 4X, IP66. See Note. 	H
For Aggressive Atmospheres EExd IIC T6(-60 to +65°C) T5 (-60 to+80°C) Investment cast enclosure in austenitic stainless steel certified to CENELEC EN 50 014 and EN50 018 II2GD. Weatherproof to NEMA type 4X, IP66. 	R
Aluminium Alloy NEC 500, NEMA 7,9 Gravity die-cast enclosure in aluminium-silicon alloy. Class I, Groups C and D, Class II, Groups E, F and G, Div 1 & 2 Weatherproof to NEMA type 4, 4X, IP66. 	T
For Aggressive Atmospheres NEC 500, NEMA 7,9 Investment cast enclosure in austenitic stainless steel. Class 1, Groups C and D, Class II, Groups E, F and G, Div.1 & 2. Weatherproof to NEMA type 4X, IP66. 	U
WEATHERPROOF ENCLOSURES	
General Purpose The basic enclosure is pressure die-cast in zinc alloy, epoxy painted, with weather protection not less than NEMA type 4, IP66.	W
For Aggressive Atmospheres Investment cast enclosure in austenitic stainless steel with weather protection not less than NEMA type 4X, IP66.	A

Models

TABLE 2



	Code
Fixed Switching Differential. SPDT & DPDT options available. See Table 6.	S71



Applies to all models

Electrical Entry

TABLE 3



Adaptors are available for other popular thread sizes.



*For codes 3 & 6 only – see Approvals and Table 1

	Code
Enclosure W: Clearance for 20mm (3/4 in) outside dia conduit.	1
Enclosure W: M20 x 1.5 elbow adaptor to suit.	0
Enclosure W: 3/4-NPT Internal, elbow adaptor to suit.	3
Enclosures H, R & A: M20 x 1.5 ISO thread.	0
Enclosures H, R & A: M20 x 1.5 ISO thread, dual entry.	5
Enclosures H, R & A: 1/2" NPT Internal	2
Enclosures H, R, T & U: 3/4-NPT Internal (direct)	3*
Enclosures H, R, T & U: 3/4-NPT Internal. Dual entry	6*

Material of Wetted Parts

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" 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.

TABLE 4

Capillary Length		Semi Rigid Stem Length		Sensing Bulb Length		Code
Metres	Feet	mm	inches	mm	inches	
1.86	6	250	10	75	2.95	N
1.86	6	500	20	75	2.95	P
Rigid Stem Probe Total Length 216mm (8.5ins)				75	2.95	R



APPLIES TO ALL DETAILS IN THE ABOVE TABLE.

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 5A - °C

TABLE 5

T_{max}	RANGE	Code
70	-40 to +60	H1
110	0 to 100	K3
180	50 to 170	L5
200	110 to 190	Q6
270	160 to 260	U5

Table 5B - °F

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

T_{max} = maximum working temperature

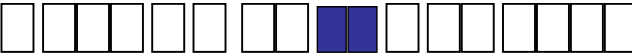
T_{max}	RANGE	Code
158	-40 to +140	HA
230	32 to 212	KB
360	120 to 340	LC
392	230 to 374	QC
518	320 to 500	UA



APPLIES TO ALL RANGES IN THE ABOVE TABLE.

Switching Options

TABLE 6



Model S71									
UL/CSA RATING (RESISTIVE) see note	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		
5 Amps @ 110/250 V AC Light Duty for AC only	AC14 D300 DC13 R300	0.6/0.3A @ 120/240V AC 0.22/0.1A @ 125/250V DC	250V	0.8kV	AC DC	432 28	72 28	SPDT DPDT	00 01
5 Amps @ 110/250 V AC & 2 Amps @ 30 V DC General purpose precision	AC14 D300 DC13 R300	0.6/0.3A @ 120/240V AC 0.22/0.1A @ 125/250V DC	250V	0.8kV	AC DC	432 28	72 28	SPDT DPDT	02 03
1 Amp @ 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 Amps @ 110/250V AC & 5 Amps @ 30V DC Environmentally sealed	AC14 D300 DC13 R300	0.6/0.3A @ 120/240V AC 0.22/0.1A @ 125/250V DC	250V	0.5kV	AC DC	432 28	72 28	SPDT* DPDT*	08 09
§ 1 Amp @ 30V AC and 30V DC Environmentally sealed with gold contacts	AC14 E150	0.3A @ 120V AC	125V	0.5kV	AC	216	36	SPDT* DPDT*	0G 0H
5 Amps @ 250V AC and 2 Amps @ 30V DC Hermetically sealed. Gold plated silver contacts.	AC14 D300 DC13 R300	0.6/0.3A @ 120/240V 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 rising under pressure



00, 01, 02, 03, 04 & 05 microswitches

NOTE 1 : Enclosure Codes T and U. Enclosure Codes H and R.
Microswitch Codes 02 and 03.
UL/CSA rating as follows:-
110/250V AC 5A 250V/125V DC 0.25/0.5A

Microswitch Codes 02 and 03.
UL/CSA rating as follows:-
110/250V AC 5A 250V/125/30V DC 0.25/0.5/2A

NOTE 2 : Using Codes H2, H3, H6 increases the Gas Class to:
Class 1, Groups A, B, C and D, Div 2., for Enclosures T and U.



H2, H3 † & H6 ‡ microswitches



00, 01, 02, 03, 04, 05, H2, H3† & H6‡ microswitches

UL recognised component for use in Hazardous areas
Class 1, Div 2, Groups A, B, C and D. Class II Groups F
And G. When used in enclosure T and U.

CSA accepted component for use in hazardous
areas Class 1, Div 2, Groups A, B, C and D.
When used in enclosures T and U.

The electrical rating is dependent on the microswitch fitted to the instrument. The electrical ratings defined by each approval that the micro switch 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. This table lists the actual IEC ratings against the Designation & Utilization Category marked on the nameplates. 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.
 U_i = rated insulation voltage: U_{imp} = rated impulse withstand voltage across contacts.

Process Connection

TABLE 7



Applies to codes
in this table



	Code
3/8 NPT EXT Sliding Gland	E
1/2 – 14NPT EXT Direct Mounting	J

Options and 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 2: Process (wetted) parts are cleaned for oxygen.	04
Oxygen Service 3: Process and non-process parts are cleaned for use with oxygen.	05
Stainless Steel Pipe Mounting Bracket Permits local 2" pipe work to be utilised for mounting the instrument.	10
Tagging - Variety of tagging methods are available	APPLY FOR DETAILS
Applies when – no option is required and selection is made from special engineering.	00
PVC covered armoured capillary	40



APPLIES TO ALL OPTIONS AND TREATMENTS IN TABLE ABOVE. SEE APPROVALS.

Special Engineering

TABLE 9

FEATURE	Code
Please consult Delta sales engineering for special requirements	TBA



Refer to engineering

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.

CELSIUS UNITS													
Code	Range	T_{max} °C	Microswitch – Option Switching Differential °C										
	°C		00	01	02	03	04	05	08/0G	09/0H	H2	H3/H6	
H1	-40 to +60	70											
K3	0 to 100	110											
L5	50 to 170	180	1.5	2.5	2	4	1.5	3	6	6	8	10	
Q6	110 to 190	200											
U5	160 to 260	270											

FARENHEIT UNITS												
Code	Range	T_{max} °F	Microswitch – Option Switching Differential °F									
	°F		00	01	02	03	04	05	08/0G	09/0H	H2	H3/H6
HA	-40 to +140	158										
KB	32 to 212	230										
LC	120 to 340	360	2.7	4.5	3.6	7.2	2.7	5.4	10.8	10.8	14.4	18
QC	230 to 374	392										
UA	320 to 500	518										

Technical Data

ACCURACY

Set point repeatability $\pm 1\%$ of span at 20°C ambient.

AMBIENT TEMPERATURE RANGE

Certified Enclosures – Refer to Table 1 for limitations of use.

All models suitable for operating continuously between -25 + 60°C

Operation

Ranges H1, K3 and Q6 are suitable for operating within a range of ambient temperature from -60 to +80°C (-76 to +176°F).

Range U5 cannot be used in ambient temperatures below -25°C to avoid filling medium freezing.

ELECTRICAL CONNECTIONS

Terminal Block

Cable entry is to a non-pinching terminal block made of a non-hygroscopic thermosetting plastic, suitable for cables up to 2.5mm²/14AWG.

Earthing/Grounding

An earthing facility is provided inside all weatherproof enclosures, adjacent to the entry. External earthing is standard on flameproof versions.

Dielectric Strength

The electrical assembly is capable of withstanding *2kV between live parts and earth/ground and 500V between open contacts.

*1.2kV for micro switch Codes H2, H3 and H6. Refer to Table 6.

Electrical Entry

Standard options are listed in Table 3. Other threads can be accommodated by adaptors. Dual entry available, see Table 3.

MAXIMUM WORKING PRESSURE

System sensing probes for both the capillary and rigid stem version are designed to withstand 100bar (1500psi) without a thermowell.

UNIT WEIGHTS (Approx)

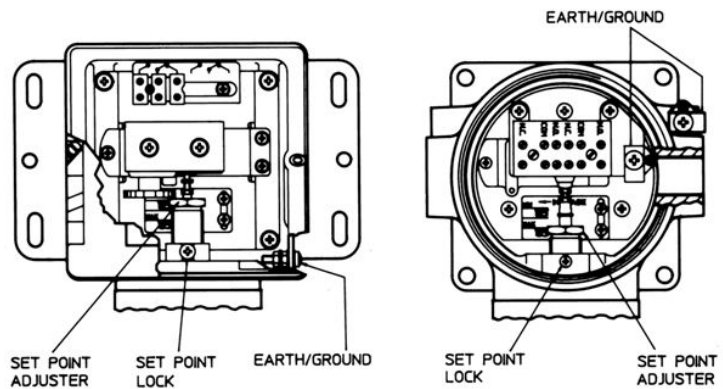
'H', 'T' enclosures	2.6kg/5.7lb
'R', 'U' enclosures	7.1kg/15.6lb
'W' enclosure	2.6kg/5.7lb
'A' enclosure	3.9kg/8.6lb

Operation / Installation

Mounting/Position / Location / Installation

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

TYPICAL INTERNAL ARRANGEMENT



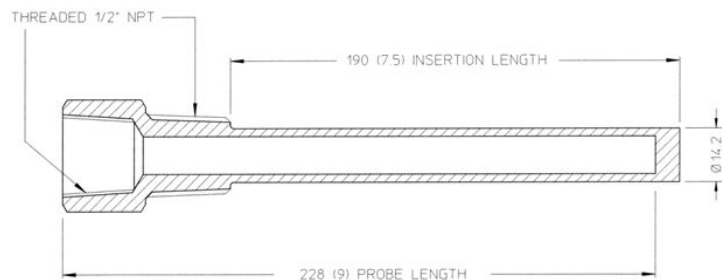
THERMOWELLS

Material 316SS

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

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

All dimensions in mm (inches)



Approvals

INTRINSIC SAFETY

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

CENELEC/ATEX II 2 G D

Certified to CENELEC EN50 014 and EN50 018.

For use in Zone 1 hazardous areas EEx d IIC T6 (-60° to +65°C)
T5 (-60° to +85°C)



Enclosure Codes H and R and all models (see Table 1)

Certificate number BASEEFA 01ATEX02113X

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
E156672



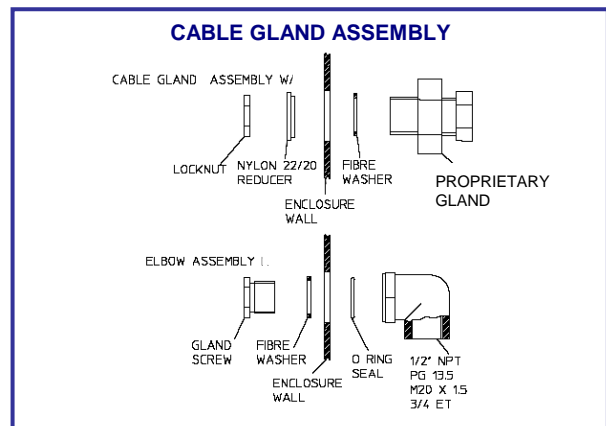
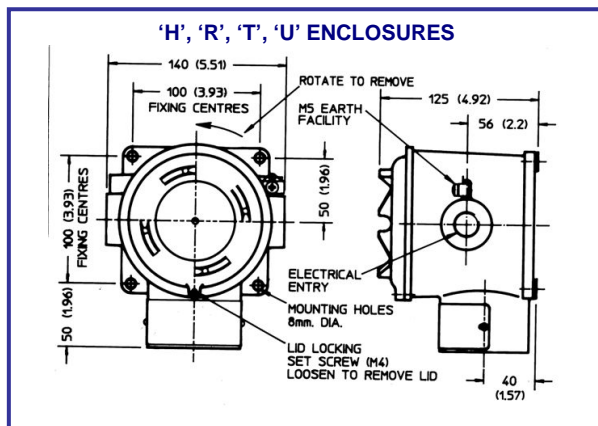
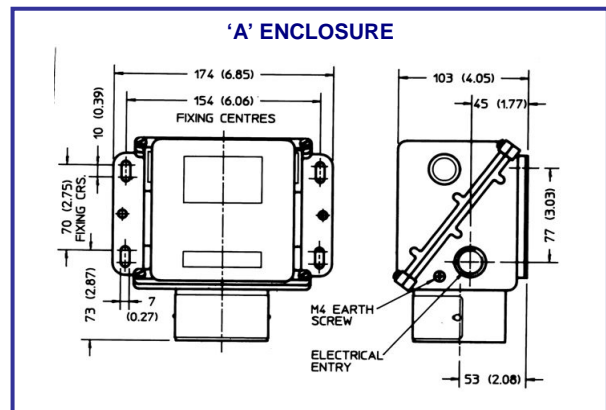
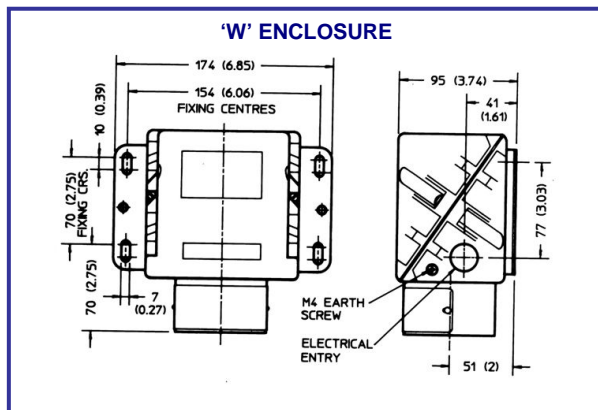
CANADIAN STANDARDS ASSOCIATION

Snap switches for use in Hazardous Locations.

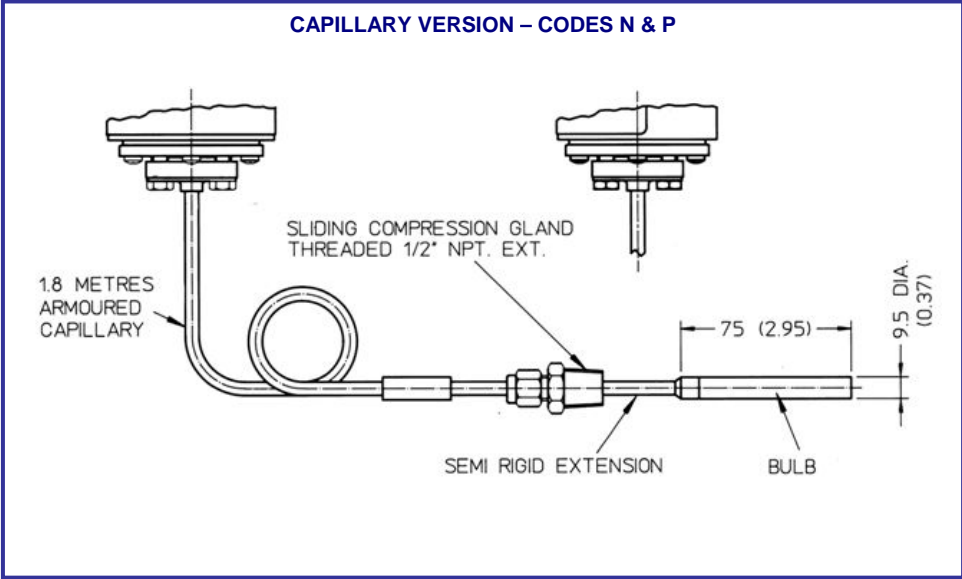
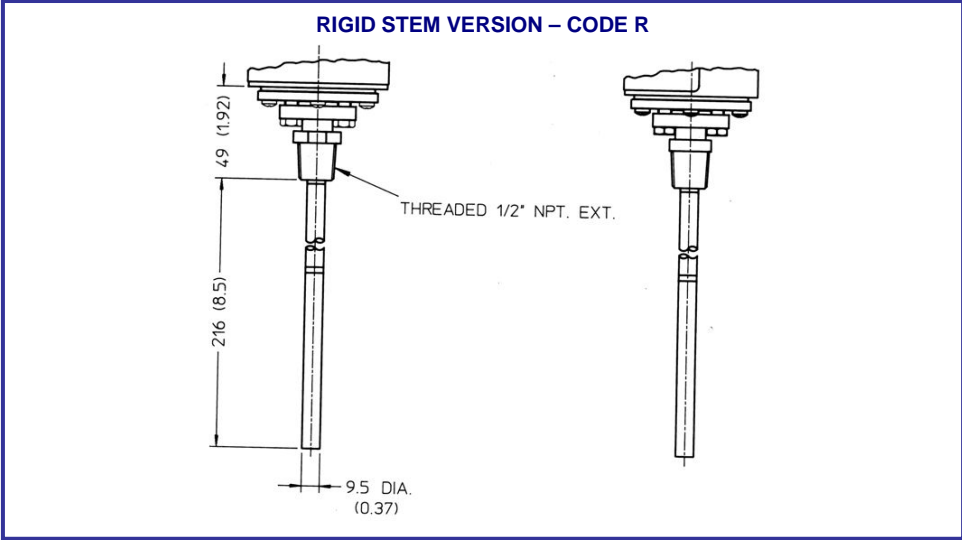
Class 1, Groups A, B, C, D Class II, Groups E, F, G Division 1 and 2
LR94185



Dimensions



Dimensions



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