Technical **Datasheet**

Industrial Series
Differential Pressure Switch
Model: S30



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 Explosionproof execution.
- Pressure ranges available up to 10 bar (160 psi).
- Maximum working pressure up to 250 bar (3500 psi).
- Safety vented design as standard.
- Suitable for use of SIL 2 safety related systems.
- NACE MR-01-75 compatibility.

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:

- Temperature Switches: Model S70.





Product **industries**

The S30 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

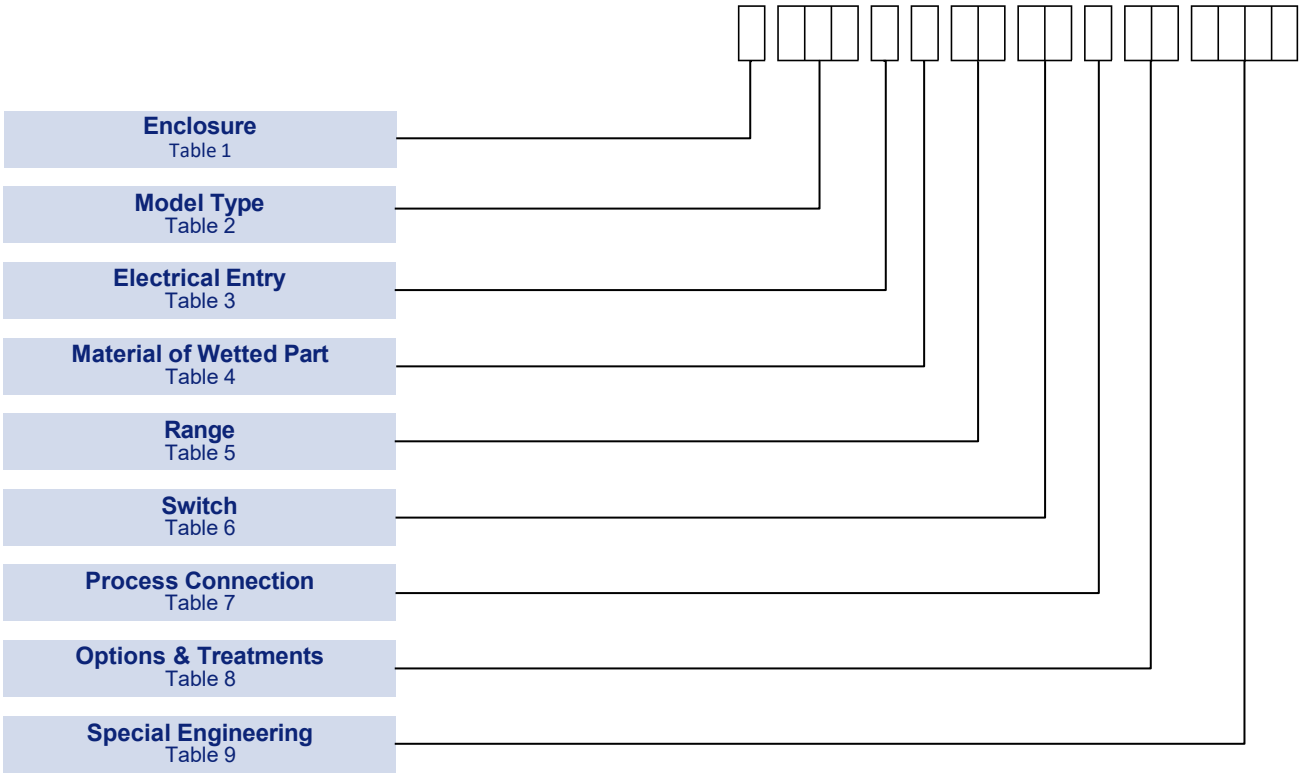
How can we **help you?**

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:	at the process connection, the component parts withstand up to +80°C (+176°F). *For higher media temperatures, refer to Operating Instruction for installation practice or contact your local sales office*
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) snap action microswitch (standard).
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:	Rc 1/4 (BSP), 1/4 NPT Internal, 1/2 NPT Internal, 1/2 NPT External
Weight:	Enclosures: **"H & T"** 4.0kg/8.8lb to 8.6kg/19.0lb, **"R & U"** 8.7kg/19.2lb to 13.1kg/29.9lb, **"W"** 4.0kg/8.8lb to 8.6kg/19.0lb, **"A"** 5.5kg/12.1lb to 9.9kg/21.8lb depending on model type.

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) Double marking ATEX and UKEx on the same product nameplate.
EAC Ex on request

(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**
For 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

S31
Maximum working pressure 1.0 bar (14.5 psi) / 110 bar (1600 psi). See Table 5.

S34
Maximum working pressure 250 bar (3,500 psi). See Table 5.

C SP US Applies to all models

TABLE 2

Description	Attribute Value
Fixed Switching Differential SPDT& DPDT options available. See Table 6.	S31
Fixed Switching Differential SPDT & DPDT options available. See Table 6.	S34

Electrical Entry

Adaptors are available for other popular thread sizes.

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

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-NPT INT. 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-NPT INT. (direct).	2
Enclosures H, R, T & U: 3/4-NPT INT. (direct).	3*
Enclosures H, R, T & U: 3/4-NPT INT. 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-NPT INT. dual entry.	4

Material of Wetted Parts

For aluminium flanges (Attribute value D) select only from enclosures attribute values H, T and W. For Cast Iron flanges (Attribute value E) select only from enclosure attribute values R, U or A. See Table 1.

TABLE 4

Ranges	Description	Attribute Value
BD-EA	316 Stainless steel diaphragm. All other wetted parts fully austenitic 300 Series stainless steel, PTFE and Nitrile seals.	I
	For wetted parts required to conform with Sour Gas or Sour Crude, applications as laid down in NACE standard MR-01-75.	L
BC	Nitrile diaphragm and seal with aluminium flanges.	D
	Nitrile diaphragm and seal with cast iron flanges.	E

Setting Ranges

NOTE: For pressure difference switches maximum working pressure (P_{max}) and maximum static/line pressure mean the same.

Forward overpressure up to max static/line pressure (i.e., to low pressure connection with high pressure connection open to atmosphere) will be contained without failure.

The diaphragm on ranges BD to EA (BY to EH) will however have been distorted, leading to a degradation of performance and a shortening of the service life.

If the instrument is submitted to continuous forward overpressure/full vacuum contact our sales office for special construction.

When ordering, please state units required. Range and set point will be in units preference. Unless otherwise stated, units will be in bar/mbar.

Applies to all ranges.

TABLE 5

Model Type	P_{max}		Range			
	bar	psi	mbar/bar	Attribute value	in H_20/psi	Attribute value
S31	1.0	14.5	-12.5 to +12.5	BC*	-5.0 to +5.0	BU*
S31 (S34)	110 (250)	1600 (3500)	6 to 40	BD (0D)	2.5 to 16	BY (0Y)
S31 (S34)	110 (250)	1600 (3500)	25 to 160	CB (0B)	10 to 64	CS (IS)
S31 (S34)	110 (250)	1600 (3500)	100 to 600	CE (0E)	1.5 to 8.5	CK (0K)
S31 S34	110 250	1600 3500	0.4 to 2.5	DC	6 to 40	DP
S31 S34	110 250	1600 3500	0.6 to 4	DD	10 to 60	DT
S31 S34	110 250	1600 3500	1.6 to 10	EA	25 to 160	EH

*Forward overpressure is limited to 500 mbar.

Switch

TABLE 6

Model Type S21/4

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 ***& 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 ***1 A, 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 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 are 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 by 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

TABLE 7

NOTE: Range attribute value BC (BU) can only be supplied with integral Rc1/4 or 1/4 NPT process connections. For other thread sizes specify adaptors

NOTE: Range attribute value BC/BU for CSA can only be supplied with process connections Attribute value A

C US Applies to all connections in this table.

Description	Attribute value
Rc 1/4 (1/4 BSP tr INT) to (ISO 7/1)	**A**
1/4 - 18 NPT F	**F**
1/2 - 14 NPT F	**H**
1/2 - 14 NPT M	**J**
G1/2 B	**K**

Options & Treatments

TABLE 8

Combinations available, apply for details.

Applies to all options and treatments in this table.

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
Applies when – when no option is required	0 *
Applies when – when no treatment is required	* 0

All options are available to be combined where the * is indicated.
† Not available on range BC/BU

Special Engineering

TABLE 9

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

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

Performance Data

TABLE 10

DIFFERENTIAL
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.

Bar Units

Attribute Value	Range mbar/***bar***	P_{max} bar	Model Type	Switch Attribute Value - Option Switching Differential mbar									
				00	01	02	03	04	05	08/0G	09/0H	H2	H3/H6
BC	12.5 to 12.5	1	S31	0.6	1	2	2.5	1	1.5	1.8	2.4	2.4	2.4
BD	6 to 40	110	S31	1.3	2	4	6	2	3	8	11	10	10
CB	25 to 160	110	S31	2.6	4	9	12	4	6	16	21	18	21
CE	100 to 600	110	S31	3.3	5	12	15	6	9	20	27	30	32
DC	***0.4 to 2.5***	110 250	S31 S34	50	75	120	160	70	100	300	400	200	270
DD	***0.6 to 4***	110 250	S31 S34	60	90	210	270	90	140	360	480	350	480
EA	***1.6 to 10***	110	S31	120	180	420	540	180	250	720	960	800	1200

PSI Units

Attribute Value	Range In H_2O ***psi***	P_{max} psi	Model Type	Switch Attribute Value - Option Switching Differential In H_2O / ***psi***									
				00	01	02	03	04	05	08/0G	09/0H	H2	H3/H6
BU	-5.0 to +5.0	14.5	S31	0.2	0.4	0.8	1.0	0.4	0.6	0.7	0.9	0.9	0.9
BY	2.5 to 16	1600 3500	S31 S34	0.5	0.9	1.6	2.3	0.8	1.2	3.1	4.3	3.9	3.9
CS	*10 to 64*	1600 *3500*	S31 *S34*	*1.0*	*1.6*	*3.5*	*4.7*	*1.6*	*2.3*	*6.2*	*8.2*	*7.2*	*8.2*
CK	***1.5 to 8.5***	*1600* *3500*	*S31* *S34*	***0.05***	***0.07***	***0.17***	***0.21***	***0.08***	***0.13***	***0.29***	***0.39***	***0.43***	***0.46***
DP	***6 to 40***	*1600* *3500*	*S31* *S34*	***0.72***	***1.1***	***1.7***	***2.3***	***1.0***	***1.4***	***4.3***	***5.8***	***2.9***	***3.9***
DT	***10 to 60***	*1600* *3500*	*S31* *S34*	***0.87***	***1.3***	***3.0***	***3.9***	***1.3***	***2.0***	***5.2***	***7.0***	***5.1***	***7.0***
EH	***25 to 160***	*1600* *3500*	*S31* *S34*	***1.7***	***2.6***	***6.1***	***7.8***	***2.6***	***3.6***	***10.4***	***13.9***	***11.6***	***17.4***

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
SIL2 @ HFT 0; Route 1_H and 1_S
Certificate No. Sira FSP 11006

Low Voltage Directive (LVD) 2014/35/EU

Compliant to LVD

Pressure Equipment Directive (PED) 2014/68/EU

Compliant to PED as pressure accessory

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: *S3*	Model Type: *S3*—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

II 2GD

Model Type: *S3*	Model Type: *S3*—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)

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)

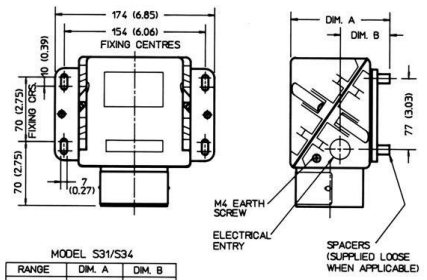
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Model Type: *S3*	Model Type: *S3* (Low temperature Version)
▪ 1Ex d IIC T6 Gb X (-30°C≤Ta≤+65°C)	▪ 1Ex db IIC T6 Gb X (-60°C≤Ta≤+65°C)
▪ 1Ex d IIC T5 Gb X (-30°C≤Ta≤+80°C)	▪ 1Ex db IIC T5 Gb X (-60°C≤Ta≤+80°C)
▪ Ex tb IIIC T85°C Db X IP66 (-30°C≤Ta≤+65°C)	▪ 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)

Dimension

All dimensions mm (inches)

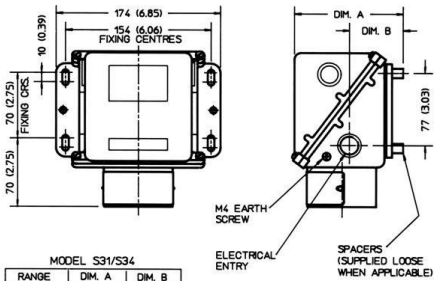
W ENCLOSURE



MODEL S31/S34

RANGE	DIM. A	DIM. B
BD, CB, CE	108 (4.25)	54 (2.12)
DC, DD, EA	95 (3.74)	41 (1.61)

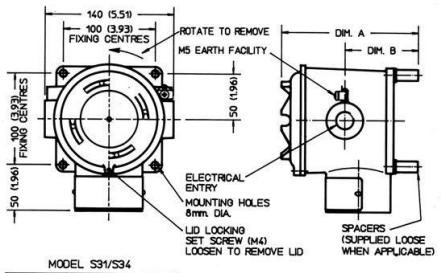
A ENCLOSURE



MODEL S31/S34

RANGE	DIM. A	DIM. B
BD, CB, CE	115 (4.52)	57 (2.24)
DC, DD, EA	103 (4.05)	45 (1.77)

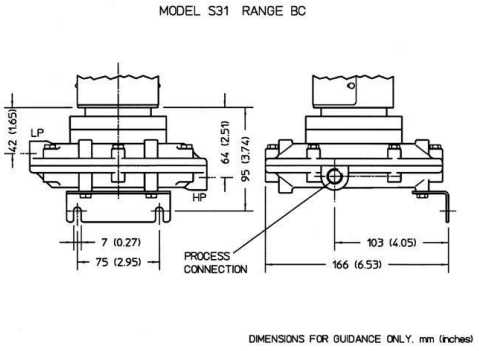
H, R, T & U ENCLOSURES



MODEL S31/S34

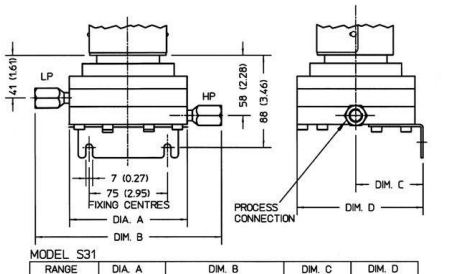
RANGE	DIM. A	DIM. B
BD, CB, CE	149 (5.86)	80 (3.14)
DC, DD, EA	136 (5.35)	67 (2.63)

MODEL TYPE S31 PROCESS CONNECTIONS RANGE BC/BU



DIMENSIONS FOR GUIDANCE ONLY. mm (inches)

MODEL TYPE S31 PROCESS CONNECTIONS

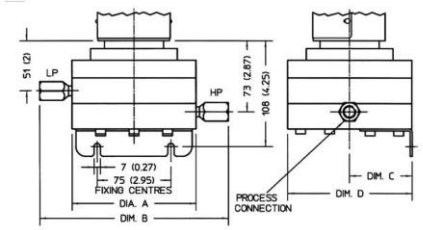


MODEL S31

RANGE	DIA. A	DIM. B	DIM. C	DIM. D
BD, CB, CE	113 (4.44)	179 (7.04) CODE A & F 205 (8.07) CODE H 195 (7.67) CODE J	65 (2.55)	121 (4.76)
DC, DD, EA	88 (3.46)	154 (6.06) CODE A & F 180 (7.08) CODE H 170 (6.69) CODE J	52 (2.04)	96 (3.77)

DIMENSIONS FOR GUIDANCE ONLY. mm (inches)

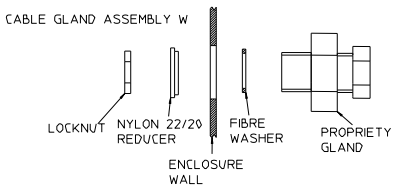
MODEL TYPE S34 PROCESS CONNECTIONS



MODEL S34

RANGE	DIA. A	DIM. B	DIM. C	DIM. D
BD, CB, CE	126 (4.96)	192 (7.55) CODE A & F 216 (8.58) CODE H 208 (8.18) CODE J	63 (2.48)	126 (4.96)
DC, DD, EA	100 (3.93)	166 (6.35) CODE A & F 192 (7.55) CODE H 182 (7.16) CODE J	52 (2.04)	102 (4.01)

DIMENSIONS FOR GUIDANCE ONLY. mm (inches)



Industrial Series
Model: S30

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.

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