Technical **Datasheet**

delta-mobrey

Sentry Series
Differential Pressure Switch
Models: D01, D02 & D03

Key **Features**

- SPDT & DPDT Switch Outputs
- Aluminium Epoxy Coated or AISI 300 SS enclosure IP66/NEMA4X
- Weatherproof, flameproof & intrinsically safe execution
- 316 Stainless steel wetted parts as standard
- Field adjustable set-points against a reference scale
- Pressure ranges up to 10bar (160psi)
- Maximum working pressure up to 250bar (3500psi)
- Safety vented design as standard
- Suitable for use SIL 2 safety related systems
- Market leading 5 year warranty

Product **applications**

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

- Process plants
- OEM equipment

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

- General Purpose
- Zone 0 & 20 Hazardous Areas
- Zone 1 & 21 Hazardous Areas
- SIL 2 safety related systems
- Corrosive atmospheres

Series **Overview**

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

- Performance is assured by repackaging Delta Mobrey's well proven sensor technologies in a new, simple, one-piece enclosure
- Safety is maintained by a vent that prevents the enclosure becoming pressurised in the event of a sensor being damaged
- Cost is minimised through the selection of common standard options although, as with all Delta Mobrey products, a variety of optional extras are available to tailor the product to specific needs

Other products in the series include:
- Pressure Switches: Model P0
- Temperature Switches: Model T0

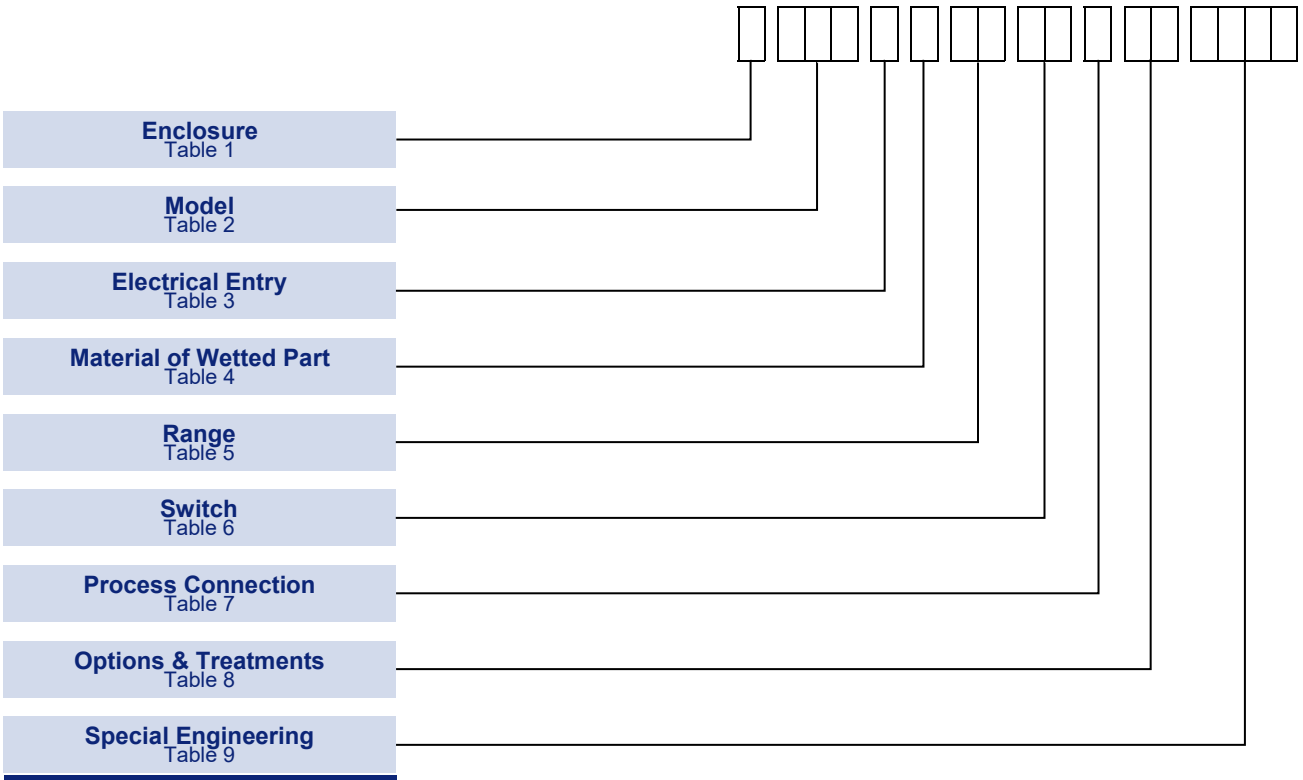
How can we **help you?**

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

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:	-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 / Intrinsically Safe.
Ingress Protection:	IP 66 / NEMA 4X
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 micro-switch (standard)
Electrical rating:	See Table 6
Terminal Block:	Suitable for wire section up to 2,5 mm2 / 14 AWG
Grounding Connection:	One internal and one external suitable for wire section up to 4 mm2 / 12 AWG
Electrical Safety Class:	Safety electrical class 1 according IEC 61298-2:2008
Process Connection:	Rc ¼ (¼ BSP Tr INT) to ISO 7/1 (standard) ¼ -18NPT INT Others via adapter (optional)
Approximate Weight:	3.2kg / 7lb - 27.8kg / 61.2lb depending on model

Enclosure

(1) Triple marking IECEx, ATEX and UKEx on the same product nameplate; EAC Ex on request

(2) Safety Parameters
Ui: 30 V; Ii: 100 mA; Pi: 0.6 W; Ci: 0; Li: 0.

TABLE 1

ENCLOSURE TYPES:	Code
WEATHERPROOF ENCLOSURE	
General Purpose Die-cast in aluminium, epoxy painted, with ingress protection IP66, NEMA type 4X	W
Aggressive Atmospheres Investment cast enclosure in austenitic stainless steel, with ingress protection IP66, NEMA type 4X	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 Die-cast in aluminium, epoxy painted, with ingress protection IP66, NEMA type 4X	H
Aggressive Atmospheres Investment cast enclosure in austenitic stainless steel with ingress protection IP66, NEMA type 4X	R
INTRINSIC SAFETY (1)(2) Approved for use in a Zone 0 & Zone 20 hazardous locations Ex ia IIC T5/T6 Ga, Ex ia IIIC T100/T85°C Db IP66 The temperature class is related to the ambient temperature range. See Approvals for more information	
General Purpose Die-cast in aluminium, epoxy painted, with ingress protection IP66, NEMA type 4X	5
Aggressive Atmospheres Investment cast enclosure in austenitic stainless steel, with ingress protection IP66, NEMA type 4X	4

Models

D01
For applications between -12.5mbar to 12.5mbar (-5.0 to 5.0 in H20), maximum working pressure 1 bar (14.5 psi).

D02
For applications up to 10 bar (160 psi), maximum working pressure 110 bar (1600 psi).

D03
For applications up to 10 bar (160 psi), maximum working pressure 250 bar (3500 psi).

TABLE 2

		Code
Differential Pressure	Diaphragm Operated **Low Pressure**	D01
Differential Pressure	Diaphragm Operated **Standard Pressure**	D02
Differential Pressure	Diaphragm Operated **High Overload Pressure**	D03

Electrical Entry

TABLE 3

Description	Code (Single Entry)	Code (Dual Entry)
M20 x 1.5-F	0	5
½ - 14 NPT-F	2	4

Material of Wetted Parts

TABLE 4

Ranges		Code
BD to EA	316 Stainless steel diaphragm. All other wetted parts fully austenitic 300 series stainless steel, PTFE and Nitrile seals.	I
BD to EA	Wetted parts Monel diaphragm, fully austenitic 300 Series stainless steel, P.T.F.E. and Viton seals all conforming 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

Setting Ranges

TABLE 5

***NOTE**: For pressure difference switches, maximum working pressure (Pmax) 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) might 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.

Model	Range			
	mbar/*bar*	Code	**in H20**/*psi*	Code
D01	**-12.5 to +12.5**	**BC***	**-5.0 to +5.0**	**BU***
D02	**6 to 40**	**BD**	**2.5 to 16**	**BY**
(D03)		**(0D)**		**(0Y)**
D02	**25 to 160**	**CB**	**10 to 64**	**CS**
(D03)		**(0B)**		**(IS)**
D02	**100 to 600**	**CE**	*1.5 to 8.5*	**CK**
(D03)		**(0E)**		**(0K)**
D02	*0.4 to 2.5*	**DC**	*6 to 40*	**DP**
D03				
D02	*0.6 to 4*	**DD**	*10 to 60*	**DT**
D03				
D02	1.6 to 10	**EA**	*25 to 160*	**EH**
D03				

* Forward overpressure is limited to 500 mbar

Switch Options

TABLE 6

CSA Rating (RESISTIVE) §SEE NOTE	IEC 947-5-1/EN 60947-5-1 RATING							Contact	Code
	Designation & Utilization	Rated operational current Ie (A) at rated operational voltage Ue	U_i	U_{imp}	VA Rating	Make	Break		
5 A,110/250V 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	00
								DPDT	01
1 A, 125V AC & §***100 mA, 30V DC*** gold alloy contacts for low voltage switching	1 A, 125 VAC RESISTIVE (IEC 1058-1/EN 61058-1)							SPDT	04
								DPDT	05
15 A, 125/250/ V AC 2 A, 30V 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	10
								DPDT	11
5 A, 250V AC and 2 A, 30V DC Hermetically sealed. Gold plated silver contacts.	AC14 D300	0.6/0.3A, 120/240V AC	250V	0.5kV	AC	432	72	SPDT	H2^
	DC13 R300	0.22/0.1A, 125/250V DC			DC	28	28	DPDT	H3†^ H6‡^

† 2 Single pole, double throw, simultaneous falling under pressure
‡ 2 Single pole, double throw, simultaneous rising under pressure
^Terminal Block supplied as standard
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.
In the absence of any verification by CSA the microswitch § manufacturer's rating is stated in ***italics and bold***.

Process Connection

TABLE 7

	Code
Rc ¼ (¼ BSP Tr INT) to ISO 7/1: Direct	A
¼ -18 NPT F: Direct	F
For diaphragm seal suitable to be assembled with instrument with adjustable range up to 1.5 bar	1
For diaphragm seal suitable to be assembled with instrument with adjustable range over 1.5 bar	2

Options & Treatments

TABLE 8

	Code
Applies when – no option is required and selection is made from special engineering (see Table 9)	00
Stainless steel permanently fixed tags	20
Stainless steel wired on tag	30

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
Low ambient temperature version (from –60°C to +80°C) for D01 and D02	0AEF

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.

Bar Units

MODELS D01, D02, D03

Range		P_{max} Bar	Model	Switching Options Switching Differential (mbar)									
Code	mbar / (bar)			00	01	10	11	04	05	08/ 0G	09/ 0H	H2	H3/ H6
BC	-12.5 to +12.5	1	D01	1.5	1	2	3	1	2	1.8	2.4	3	3
BD	6 to 40	110 250	D02 D03	5	5	5	10	3	6	8	11	15	15
CB	25 to 160	110 250	D02 D03	10	10	16	12	6	7	16	21	22	21
CE	100 to 600	110 250	D02 D03	20	10	22	20	10	10	20	27	35	32
DC	(0.4 to 2.5)	110 250	D02 D03	50	15	120	200	70	100	300	400	400	270
DD	(0.6 to 4)	110 250	D02 D03	200	100	210	270	90	140	360	480	480	480
EA	(1.6 to 10)	110 250	D02 D03	300	180	420	540	180	250	720	960	960	1200

PSI Units

MODELS D01, D02, D03

Range		P_{max} psi	Model	Switching Options Switching Differential (psi)									
Code	InH2O / (psi)			00	01	10	11	04	05	08/ 0G	09/ 0H	H2	H3/ H6
BU	-5.0 to +5.0	14.5	D01	0.6	0.4	1.2	1.2	0.4	0.8	0.7	0.9	1.2	1.2
BY	2.5 to 16	1600 3500	D02 D03	2.0	2.0	2.0	4.0	1.2	2.4	3.1	4.3	6.0	6.0
CS	10 to 64	1600 3500	D02 D03	4.0	4.0	6.4	4.8	2.4	2.8	6.2	8.2	8.8	8.4
CK	(1.5 to 8.5)	1600 3500	D02 D03	0.3	0.1	0.3	0.3	0.1	0.1	0.29	0.39	0.5	0.5
DP	(6 to 40)	1600 3500	D02 D03	0.7	0.2	1.7	3.0	1.0	1.5	4.3	5.8	5.8	4.0
DT	(10 to 60)	1600 3500	D02 D03	3.0	1.5	3.0	4.0	1.3	2.0	5.2	7.0	7.0	7.0
EH	(25 to 160)	1600 3500	D02 D03	4.4	2.6	6.1	7.8	2.6	3.6	10.4	14.0	14.0	17.4

Approvals

GLOBAL CERTIFICATION

IECEx

INTRINSICALLY SAFE Certificate No. IECEx BAS 11.0104X
- Ex ia IIC T6 Ga (-30°C≤Ta≤+65°C) or (-60°C≤Ta≤+65°C)
- Ex ia IIC T5 Ga (-30°C≤Ta≤+80°C) or (-60°C≤Ta≤+80°C)
- Ex ia IIIC T85°C Da (-30°C≤Ta≤+65°C) or (-60°C≤Ta≤+65°C)
- Ex ia IIIC T100°C Da (-30°C≤Ta≤+80°C) or (-60°C≤Ta≤+80°C)

FLAMEPROOF Certificate No. IECEx BAS 12.0081
- Ex d IIC T6 Gb (-30°C≤Ta≤+65°C) or (-60°C≤Ta≤+65°C)
- Ex d IIC T5 Gb (-30°C≤Ta≤+80°C) or (-60°C≤Ta≤+80°C)
- Ex tb IIIC T85°C Db IP66 (-30°C≤Ta≤+65°C) or (-60°C≤Ta≤+65°C)
- Ex tb IIIC T100°C Db IP66 (-30°C≤Ta≤+80°C) or (-60°C≤Ta≤+80°C)

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 12016/05

EUROPEAN DIRECTIVE

Low Voltage Directive (LVD) 2014/35/EU
Compliant to LVD
Restriction of hazardous substances (RoHS 2) 2011/65/EU
Compliant to RoHS
Pressure Equipment Directive (PED) 2014/68/EU
Compliant to PED
ATEX Directive 2014/34/EU

INTRINSICALLY SAFE Certificate No. Baseefa11ATEX0203X
- Ex ia IIC T6 Ga (-30°C≤Ta≤+65°C) or (-60°C≤Ta≤+65°C)
- Ex ia IIC T5 Ga (-30°C≤Ta≤+80°C) or (-60°C≤Ta≤+80°C)
- Ex ia IIIC T85°C Da (-30°C≤Ta≤+65°C) or (-60°C≤Ta≤+65°C)
- Ex ia IIIC T100°C Da (-30°C≤Ta≤+80°C) or (-60°C≤Ta≤+80°C)

II 1G
II 2D

FLAMEPROOF Certificate No. Baseefa12ATEX0121
- Ex d IIC T6 Gb (-30°C≤Ta≤+65°C) or (-60°C≤Ta≤+65°C)
- Ex d IIC T5 Gb (-30°C≤Ta≤+80°C) or (-60°C≤Ta≤+80°C)
- Ex tb IIIC T85°C Db IP66 (-30°C≤Ta≤+65°C) or (-60°C≤Ta≤+65°C)
- Ex tb IIIC T100°C Db IP66 (-30°C≤Ta≤+80°C) or (-60°C≤Ta≤+80°C)

II 2GD

Approvals

UK REGULATION

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

II 1G
II 2D

INTRINSICALLY SAFE Certificate No. BAS 22UKEX0174X

- Ex ia IIC T6 Ga (-30°C≤Ta≤+65°C) or (-60°C≤Ta≤+65°C)
- Ex ia IIC T5 Ga (-30°C≤Ta≤+80°C) or (-60°C≤Ta≤+80°C)
- Ex ia IIIC T85°C Da (-30°C≤Ta≤+65°C) or (-60°C≤Ta≤+65°C)
- Ex ia IIIC T100°C Da (-30°C≤Ta≤+80°C) or (-60°C≤Ta≤+80°C)

II 2GD

FLAMEPROOF Certificate No. BAS22UKEX0060X

- Ex d IIC T6 Gb (-30°C≤Ta≤+65°C) or (-60°C≤Ta≤+65°C)
- Ex d IIC T5 Gb (-30°C≤Ta≤+80°C) or (-60°C≤Ta≤+80°C)
- Ex tb IIIC T85°C Db IP66 (-30°C≤Ta≤+65°C) or (-60°C≤Ta≤+65°C)
- Ex tb IIIC T100°C Db IP66 (-30°C≤Ta≤+80°C) or (-60°C≤Ta≤+80°C)

EURASIAN CONFORMITY MARK

Hazardous Areas

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

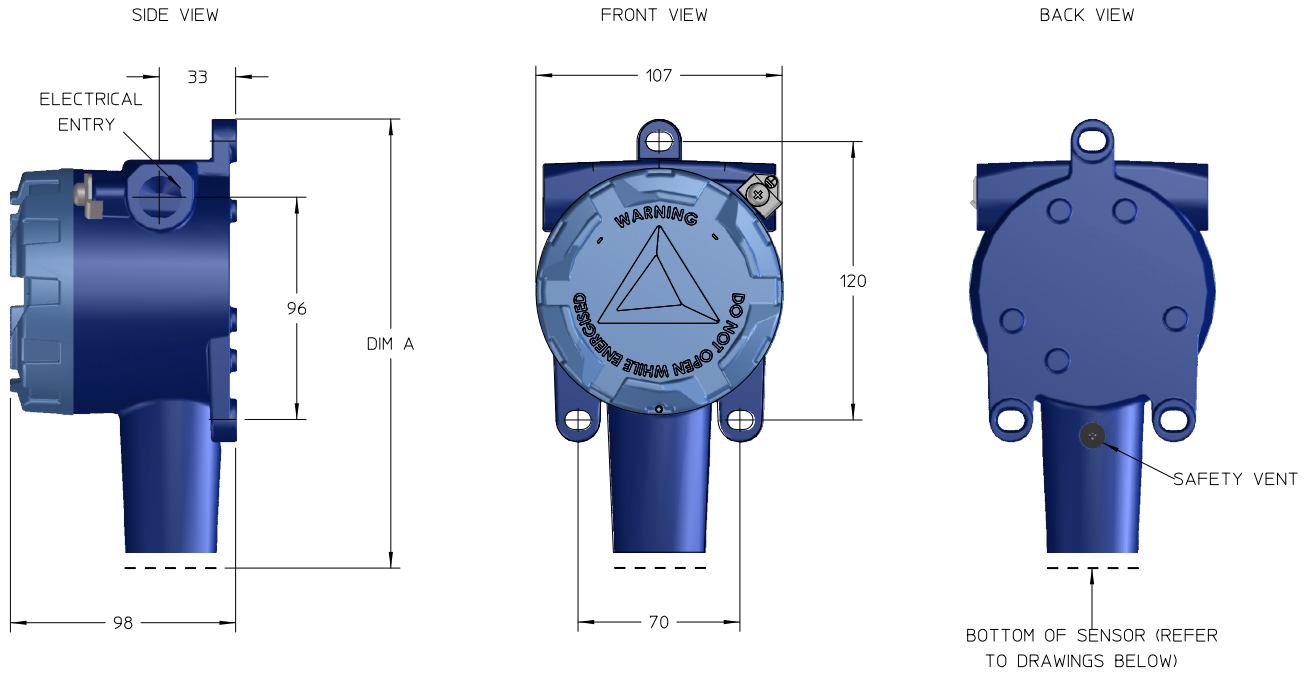
- 0 Ex ia IIC T6 Ga X (-25°C≤Ta≤+60°C) or (-60°C≤Ta≤+60°C)
- 0 Ex ia IIC T5 Ga X (-25°C≤Ta≤+80°C) or (-60°C≤Ta≤+80°C)
- Ex ia IIIC T135 °C Da X (-60°C≤Ta≤+80°C)

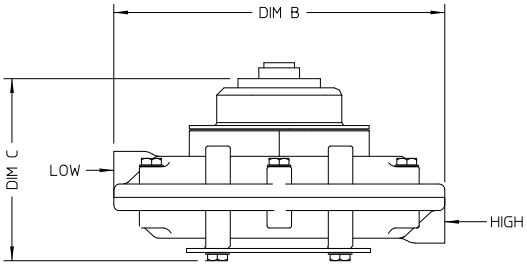
FLAMEPROOF Certificate No. . EAЭC RU C-GB.HA65.B/01199/21

- 1Ex d IIC T6 Gb X (-30°C≤Ta≤+65°C) or (-60°C≤Ta≤+65°C)
- 1Ex d IIC T5 Gb X (-30°C≤Ta≤+80°C) or (-60°C≤Ta≤+80°C)
- Ex tb IIIC T85°C Db X (-30°C≤Ta≤+65°C) or (-60°C≤Ta≤+65°C)
- Ex tb IIIC T100°C Db X (-30°C≤Ta≤+80°C) or (-60°C≤Ta≤+80°C)

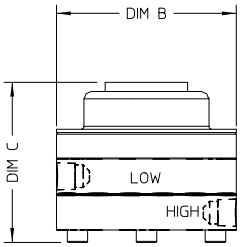
If EAC certification is required, this must be evidenced to our sales team, at ordering stage, for correct marking of the instrument.

Dimensions

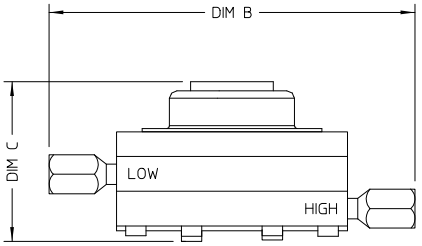




D01 SENSOR
(RANGE BC)
Pmax = 1 Bar



D02 SENSOR
(RANGES BD - EA)
Pmax = 110 Bar



D03 SENSOR
(RANGE BD - EA)
Pmax = 250 Bar

Model (weights may vary according to the range)	Weight (Kg)	Weight (lb)
WD01* / HD01* / 5D01*	3.2	7
WD02* / HD02* / 5D02*	3.2	7
WD03* / HD03* / 5D03*	3.2	7
AD01* / RD01* / 4D01*	27.8	61.2
AD02* / RD02* / 4D02*	27.8	61.2
AD03* / RD03* / 4D03*	27.8	61.2

Model	Range	DIM A	DIM B	DIM C
D01	BC	258	162	89
D02	BD - CE	246	114	77
	DC - EA	246	88	77
D03	0D - 0E	271	192	102
	DC - EA	271	166	102

Sentry Series
Models: D01, D02 & D03

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