Technical **Datasheet**

delta-mobrey

Compact Series
Pressure Switch
Models: CS2 & CS4

Key **Features**

- Compact and rugged design
- Stainless steel enclosure
- Hermetically sealed SPDT or DPDT microswitch
- Field adjustable set-point
- Weatherproof, Flameproof and Intrinsically Safe execution
- Ranges available between 0.25 - 700 bar (4 - 10,000 psi)
- High over-range models up to 1000 bar / 15,000 psi
- Suitable for use in SIL 3 (1oo2) and SIL 2 (1oo1) safety related systems
- NACE MR-01-75 compliant wetted parts options

Series **Overview**

The Compact Series (CS) switch has been designed to meet the specific requirements of panel applications, whether they are the Wellhead Control, Hydraulic Power Unit or Chemical Injection Skid type.

Their compact, rugged, all stainless steel construction makes them especially useful in cramped and harsh conditions which these applications demand. It is supplied as standard with hermetically sealed switch contacts and with field adjustable set-points of up to 700 bar.

The Compact Series of switches also comes with either an Intrinsically Safe or Flameproof approval for use in Zone 0 or Zone 1 hazardous areas respectively.

Product **applications**

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

- Wellhead Control
- Hydraulic Power Units
- Chemical Injection Skids
- All panel applications where compact hazloc switches are needed

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

- Corrosive atmospheres
- Resistant to chemical attack

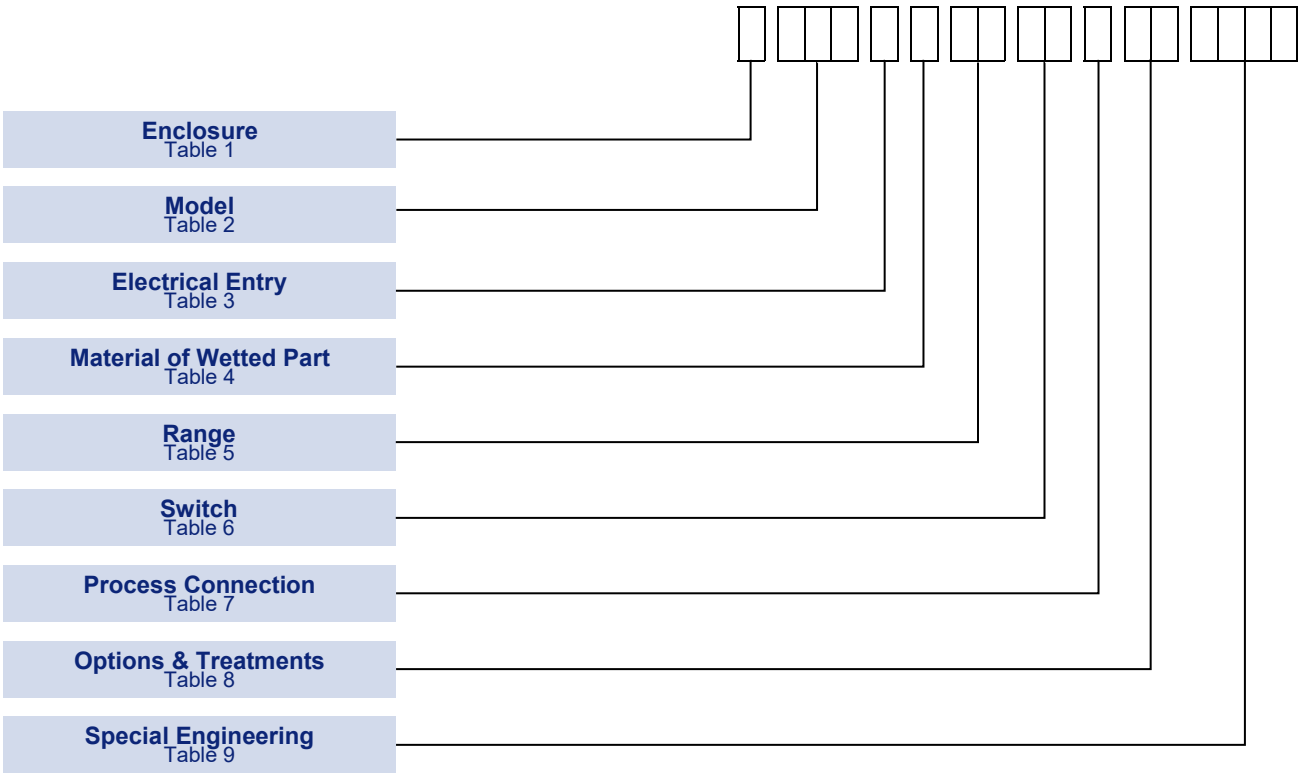
How can we **help you?**

Delta Mobrey offers fast, efficient and knowledgeable support when and where you need it. Please visit our website at www.delta-mobrey.com to find your local support centre or call us on:

+44 (0)1252 729140

How to order

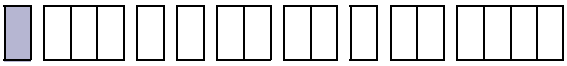
Switches can be configured by selecting codes representing the desired features from the tables that follow. The chart below, describes how the model code is built up. For assistance in configuring a switch that best suits your needs, please contact your local sales office.



Technical Specification

Set point repeatability:	1% of span.
Storage Temperature:	-40°C to +85°C / -40°F to +185°F
Ambient Temperature:	-40°C to +85°C / -40°F to 185°F -25°C to +85°C / -13°F to 185°F for Model CS4 ranges U7/UK to Y4/YF
Maximum Process Temperature:	At the process connection Up to 85°C dependent on wetted parts selection (see table 4)
Enclosure classification:	Weatherproof / Flameproof
Ingress protection:	IP 66 / NEMA 4X
Switch output:	1 x SPDT or 1x DPDT (2 SPDT Synchronised falling or rising) snap action hermetically sealed microswitch
Electrical rating:	See Table 6
Electrical connection:	Threaded with cables single core or multiple core wire cross section 18 AWG
Grounding connection:	One internal through a single core 18 AWG
Electrical Safety Class:	Safety electrical class 1 according IEC 61298-2:2008
Process Connection:	¼ -18 NPT Internal, 1/2 –14 NPT Internal, 1/2 –14 NPT External
Approximate Weight:	0.6kg / 1.32lbs to 2kg / 4.4lb depending on model

Enclosure

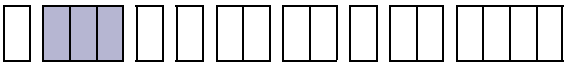
TABLE 1 

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

[2] Safety Parameters
Ui: 30 V; Ii: 300 mA; Ci: 1nF; Li: 6,3 µF.

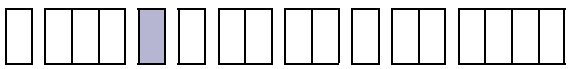
ENCLOSURE TYPES:	Code
WEATHERPROOF ENCLOSURES	
Aggressive Atmospheres Austenitic Stainless Steel with ingress protection IP66, NEMA type 4X	A
FLAMEPROOF ENCLOSURES [1] Approved for use in a Zone 1 & Zone 2 hazardous locations Ex db IIC T4/T6 Gb, Ex tb IIIC T135/T85°C Db IP66 The temperature class is related to the ambient temperature range see Approvals section for more information	
Aggressive Atmospheres Austenitic Stainless Steel with ingress protection IP66, NEMA type 4X	R
INTRINSIC SAFETY [1][2] Approved for use in a Zone 0 hazardous locations Ex ia IIC T4/T6 Ga, IP66 The temperature class is related to the ambient temperature range see Approvals for more information	
Aggressive Atmospheres Austenitic Stainless Steel with ingress protection IP66, NEMA type 4X	4

Models

TABLE 2 

	Code
Pressure Switch with Fixed Switching Differential For applications up to 100 bar / 1500 psi Over-range up to 155 bar / 2250 psi Refer Table 5	CS2
Pressure Switch with Fixed Switching Differential For applications up to 700 bar / 10,000 psi Over-range up to 1000 bar / 15,000 psi Refer Table 5	CS4

Electrical Entry

TABLE 3 

	Code
Factory Sealed Individual Flying Leads 0.45m/18in long with 1/2– 14 NPT external conduit thread for mounting into junction boxes. RoHS and REACH compliant.	A
Factory Sealed Multicore Cable 3m/120in long multicore with 1/2– 14 NPT external conduit thread for remote mounting or mounting into junction boxes. Cable consists of silicone outer sheathing and silicone insulator for individual cores. RoHS and REACH compliant and Halogen free.	O

Material of Wetted Parts

TABLE 4

WELDED CONSTRUCTION

Codes S and T

For reduced risk against leakage under extreme or unusual conditions, the diaphragm maybe welded directly to the process connection, eliminating the O-ring.

	Code
316 stainless steel diaphragm and process connection with Viton O-ring seal.	A
316 stainless steel diaphragm and process connection with Nitrile (Buna-N) O-ring seal.	G
Nickel alloy (Monel) diaphragm and 316 stainless steel process connection with Viton O-ring seal for applications as laid down in NACE MR 01-75.	K
Nickel alloy (Monel) diaphragm and 316 stainless steel process connection with Nitrile (Buna-N) O-ring seal.	P
316 stainless steel diaphragm and process connection. All welded construction.	S
Nickel alloy (Monel) diaphragm and process connection. All welded construction (suitable for NACE MR 01-75).	T

Setting Ranges

TABLE 5

5A: SI Units

Due to manufacturing tolerances the figures quoted in these tables are for guidance only.

Should the switching differential be critical for specific applications, our engineers should be consulted prior to ordering.

MODEL	RANGE CODE	P_{max} Bar	RANGE bar	SWITCHING DIFFERENTIAL - Refer table 6 mbar					
				HS	HD/HR	HP	HQ/HT	HV	HW/ HY
CS2	DB	27	0.25 to 1.6	200	260	80	104	200	260
	DC		0.4 to 2.5	320	416	128	166	320	416
	DE		1.0 to 6	280	364	206	268	280	364
	EA	70	1.6 to 10	430	450	300	390	430	450
	EB		2.5 to 16	570	741	228	297	570	741
	EC	112	4.0 to 25	1200	1560	480	624	1200	1560
	ED		10 to 40	2700	3500	1200	1560	2700	3500
	EF		16 to 75	3200	4160	1280	1664	3200	4160
	FA	155	10 to 100	4300	5600	1720	2236	4300	5600
CS4	DB	600	0.25 to 1.6	260	340	200	260	260	340
	DC		0.4 to 2.5	330	429	250	325	330	429
	DE		1.0 to 6	880	1144	680	885	880	1144
	EA		1.6 to 10	600	780	463	603	600	1144
	EB		2.5 to 16	1300	1690	1000	1300	1300	1690
	EC		4.0 to 25	1900	2470	1500	1950	1900	2470
	ED		10 to 40	4200	5460	2200	2860	4200	5460
	EF		16 to 75	4300	5590	3300	4300	4300	5590
	U7	1000	7 to 160	9400	12220	7300	9500	9400	12220
	V7		25 to 250	16000	20800	9000	11700	16000	20800
	W7		50 to 400	22000	28600	17000	22100	22000	28600
	Y4		100 to 700	37400	48620	30000	39000	37400	48620

5B: PSI Units

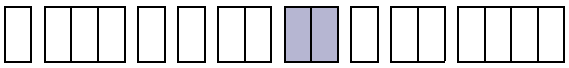
Due to manufacturing tolerances the figures quoted in these tables are for guidance only.

Should the switching differential be critical for specific applications, our engineers should be consulted prior to ordering

MODEL	RANGE CODE	P_{max} psi	RANGE psi	SWITCHING DIFFERENTIAL - Refer table 6 psi					
				HS	HD/ HR	HP	HQ/ HT	HV	HW/ HY
CS2	DK	400	4 to 25	2.9	3.8	1.2	1.5	2.9	3.8
	DP		6 to 40	4.6	6	1.9	2.4	4.6	6
	DZ		16 to 100	4.1	5.3	3	3.9	4.1	5.3
	EH	1000	25 to 160	6.2	6.5	4.4	5.7	6.2	6.5
	EM		40 to 250	8.3	10.8	3.3	4.3	8.3	10.8
	ER	1600	60 to 400	17	23	7	9	17	23
	EW		160 to 600	39	51	17	23	39	51
	EE		250 to 1000	46	60	19	24	46	60
	F6	2250	160 to 1500	62	81	25	32	62	81
CS4	DK	8700	4 to 25	3.8	4.9	2.9	3.8	3.8	4.9
	DP		6 to 40	4.8	6.2	3.6	4.7	4.8	6.2
	DZ		16 to 100	13	17	10	13	13	17
	EH		25 to 160	9	11	7	9	9	17
	EM		40 to 250	19	25	15	19	19	25
	ER		60 to 400	28	36	22	28	28	36
	EW		160 to 600	61	79	32	41	61	79
	EE		250 to 1000	62	81	48	62	62	81
	F6		160 to 1500	94	123	73	94	94	123
	UK	15000	100 to 2300	136	177	106	138	136	177
	VC		350 to 3500	232	302	131	170	232	302
	W9		800 to 6000	319	415	247	321	319	415
	YF		1600 to 10000	543	705	435	566	543	705

Switch Options

TABLE 6



The switch contacts are hermetically sealed inside a stainless steel enclosure for protection against aggressive and corrosive atmospheres.

CSA RATING	IEC947-5-1 / EN 60947-5-1 RATING						Contact	Code
	Designation & Utilisation Category	Rated operational current I_e (A) At rated operational voltage U_e	*Ui*	*Uimp*	VA Rating Make	VA Rating Break		
11 Amps @ 110/250V AC and 5/0.5 Amps @ 30V DC Silver contacts	AC14 D300	0.6/0.3A @ 120/240 V AC	250V	800V	432	72	SPDT	HS
					28	28	DPDT	HD †
	DC13 R300	0.22/0.1A @ 125/250V DC					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
					28	28	DPDT	HQ †
	DC13 R300	0.22/0.1A @ 125/250V DC					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 rising under pressure

NOTE: For low energy circuits e.g. 30V and up to 100mA, we recommend using gold alloy contact switches.
NOTE: For Enclosure codes 4, HS, HD and HR switching codes are unsuitable. Use gold contact switches.
Ui = rated insulation voltage Uimp = rated impulse to withstand voltage across contacts.

Process Connection

TABLE 7

Other thread specifications and sizes are available without using adaptors.

Adaptors are available for applications where their use is permitted. Apply for details.

	Code
1/4—18 NPT INTERNAL	F
1/2—14 NPT INTERNAL*	H
1/2—14 NPT EXTERNAL	J

**Not recommended for use over 600 bar/8700 psi. Refer to Table 5A & 5B.*

Options & Treatments

TABLE 8

Combinations available, apply for details.

	Code
No options or treatments use this code when Special Engineering is required without options and treatments	00
Tag number permanently etched onto enclosure	20
Tag Stainless steel tied to enclosure	30

Special Engineering

TABLE 9

	Code
Please consult Delta Mobrey sales engineering for special requirements	**TBA**
Additional Junction Box to suit the application	**TBA**

Approvals

GLOBAL CERTIFICATION

IECEx

INTRINSICALLY SAFE Certificate No. IECEx BAS 19.0098X

- Ex ia IIC T6 Ga (-40°C≤Ta≤+60°C)
- Ex ia IIC T4 Ga (-40°C≤Ta≤+85°C)

FLAMEPROOF Certificate No. IECEx BAS 19.0098X

Rating UP to 5A	Rating UP to 11A
■Ex db IIC T6 Gb (-40°C≤Ta≤+60°C)	■Ex db IIC T6 Gb (-40°C≤Ta≤+45°C)
■Ex db IIC T4 Gb (-40°C≤Ta≤+85°C)	■Ex db IIC T4 Gb (-40°C≤Ta≤+85°C)
■Ex tb IIIC T85°C Db IP66 (-40°C≤Ta≤+60°C)	■Ex tb IIIC T85°C Db IP66 (-40°C≤Ta≤+45°C)
■Ex tb IIIC T135°C Db IP66 (-40°C≤Ta≤+85°C)	■Ex tb IIIC T135°C Db IP66 (-40°C≤Ta≤+85°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; SIL3 @ HFT 1; Route 1_H and 1_S

Certificate No. Sira FSP 17001/03

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 as pressure accessory

ATEX Directive 2014/34/EU

INTRINSICALLY SAFE Certificate No. SGS19ATEX0113X

II 1GD

- Ex ia IIC T6 Ga (-40°C≤Ta≤+60°C)
- Ex ia IIC T4 Ga (-40°C≤Ta≤+85°C)

FLAMEPROOF Certificate No. SGS19ATEX0113X

Rating UP to 5A	Rating UP to 11A
■Ex db IIC T6 Gb (-40°C≤Ta≤+60°C)	■Ex db IIC T6 Gb (-40°C≤Ta≤+45°C)
■Ex db IIC T4 Gb (-40°C≤Ta≤+85°C)	■Ex db IIC T4 Gb (-40°C≤Ta≤+85°C)
■Ex tb IIIC T85°C Db IP66 (-40°C≤Ta≤+60°C)	■Ex tb IIIC T85°C Db IP66 (-40°C≤Ta≤+45°C)
■Ex tb IIIC T135°C Db IP66 (-40°C≤Ta≤+85°C)	■Ex tb IIIC T135°C Db IP66 (-40°C≤Ta≤+85°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 1GD **INTRINSICALLY SAFE** Certificate No. BAS21UKEX0632X

- Ex ia IIC T6 Ga (-40°C≤Ta≤+60°C)
- Ex ia IIC T4 Ga (-40°C≤Ta≤+85°C)

FLAMEPROOF Certificate No. BAS21UKEX0632X

II 2GD

Rating UP to 5A	Rating UP to 11A
■ Ex db IIC T6 Gb (-40°C≤Ta≤+60°C)	■ Ex db IIC T6 Gb (-40°C≤Ta≤+45°C)
■ Ex db IIC T4 Gb (-40°C≤Ta≤+85°C)	■ Ex db IIC T4 Gb (-40°C≤Ta≤+85°C)
■ Ex tb IIIC T85°C Db IP66 (-40°C≤Ta≤+60°C)	■ Ex tb IIIC T85°C Db IP66 (-40°C≤Ta≤+45°C)
■ Ex tb IIIC T135°C Db IP66 (-40°C≤Ta≤+85°C)	■ Ex tb IIIC T135°C Db IP66 (-40°C≤Ta≤+85°C)

EURASIAN CONFORMITY MARK

Hazardous Areas

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

- 0Ex ia IIC T6 Ga (-40°C≤Ta≤+60°C)
- 0Ex ia IIC T4 Ga (-40°C≤Ta≤+85°C)

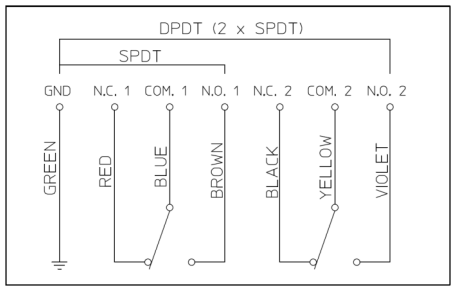
FLAMEPROOF Certificate No. EAЭC RU C-GB.HA65.B/01199/21

Rating UP to 5A	Rating UP to 11A
■1Ex d IIC T6 Gb X (-40°C≤Ta≤+60°C)	■1Ex d IIC T6 Gb X (-40°C≤Ta≤+45°C)
■1Ex d IIC T4 Gb X(-40°C≤Ta≤+85°C)	■1Ex d IIC T4 Gb X (-40°C≤Ta≤+85°C)
■Ex tb IIIC T85°C Db X IP66 (-40°C≤Ta≤+60°C)	■Ex tb IIIC T85°C Db X IP66 (-40°C≤Ta≤+45°C)
■Ex tb IIIC T135°C Db X IP66 (-40°C≤Ta≤+85°C)	■Ex tb IIIC T135°C Db X IP66 (-40°C≤Ta≤+85°C)

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

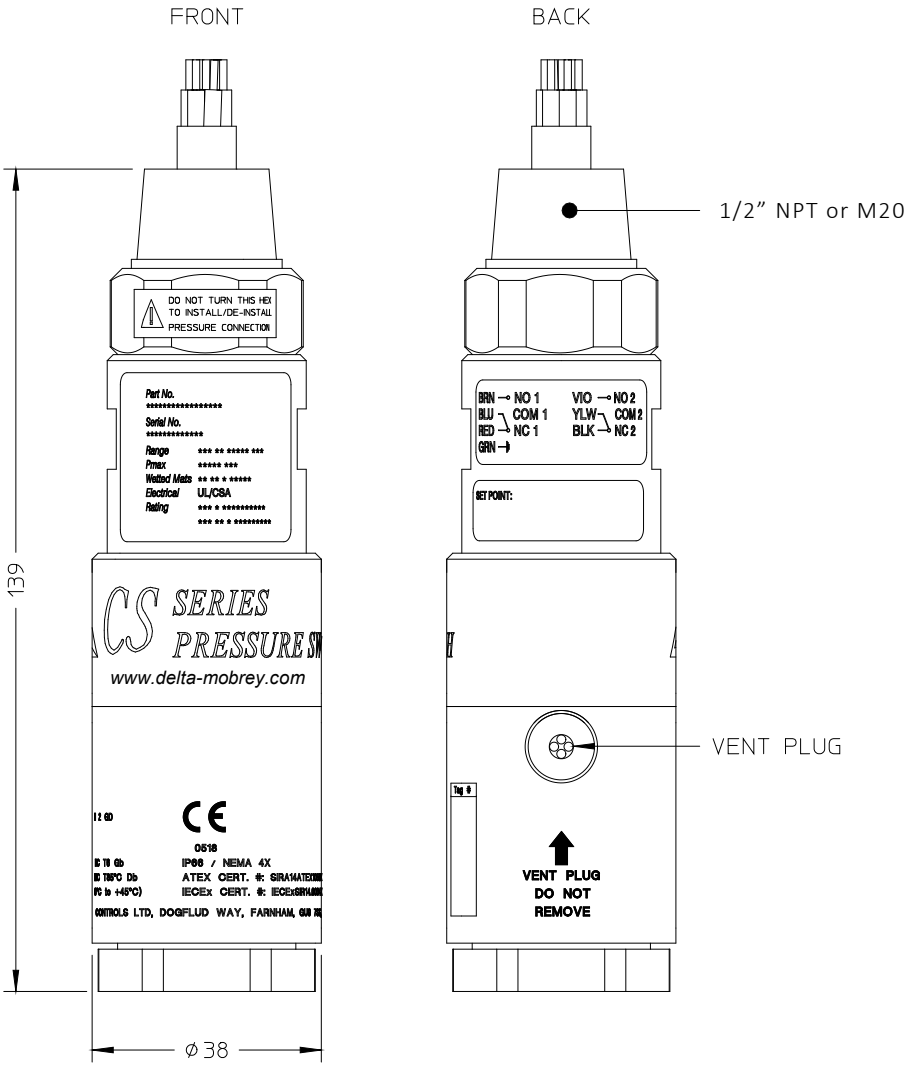
Dimensions

Wiring Diagram



Dimensions

All dimensions in mm (Inches)



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