Technical **Datasheet**

delta-mobrey

Compact Series
Pressure Switch
Models: CS2 & CS4

Key **Features**

- Compact and rugged design.
- Stainless steel weatherproof enclosure IP66 / NEMA 4X
- Hermetically sealed SPDT or DPDT microswitch
- ATEX / IECEx Flameproof Ex d.
- ATEX / IECEx Intrinsically Safe Ex ia.
- High over-range models up to 1000 bar / 15,000 psi.
- Ranges available between 0.25 - 700 bar (4 - 10,000 psi).
- NACE compliant wetted parts options
- Field adjustable set-point.
- Suitable for use in SIL 3 (1oo2) and SIL 2 (1oo1) safety related systems.

Series **Overview**

- The Compact Series switch has been designed to meet the specific requirements of panel applications, whether they be of the Wellhead Control, Hydraulic Power Unit or Chemical Injection Skid type.
- Their compact, rugged, all stainless steel construction make them especially useful in the cramp and harsh environmental conditions that these applications demand. Supplied as standard with hermetically sealed switch contacts and with field adjustable set-points up to 700 bar, the Compact Series Switches also come with either Intrinsically Safe or Flameproof approvals 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

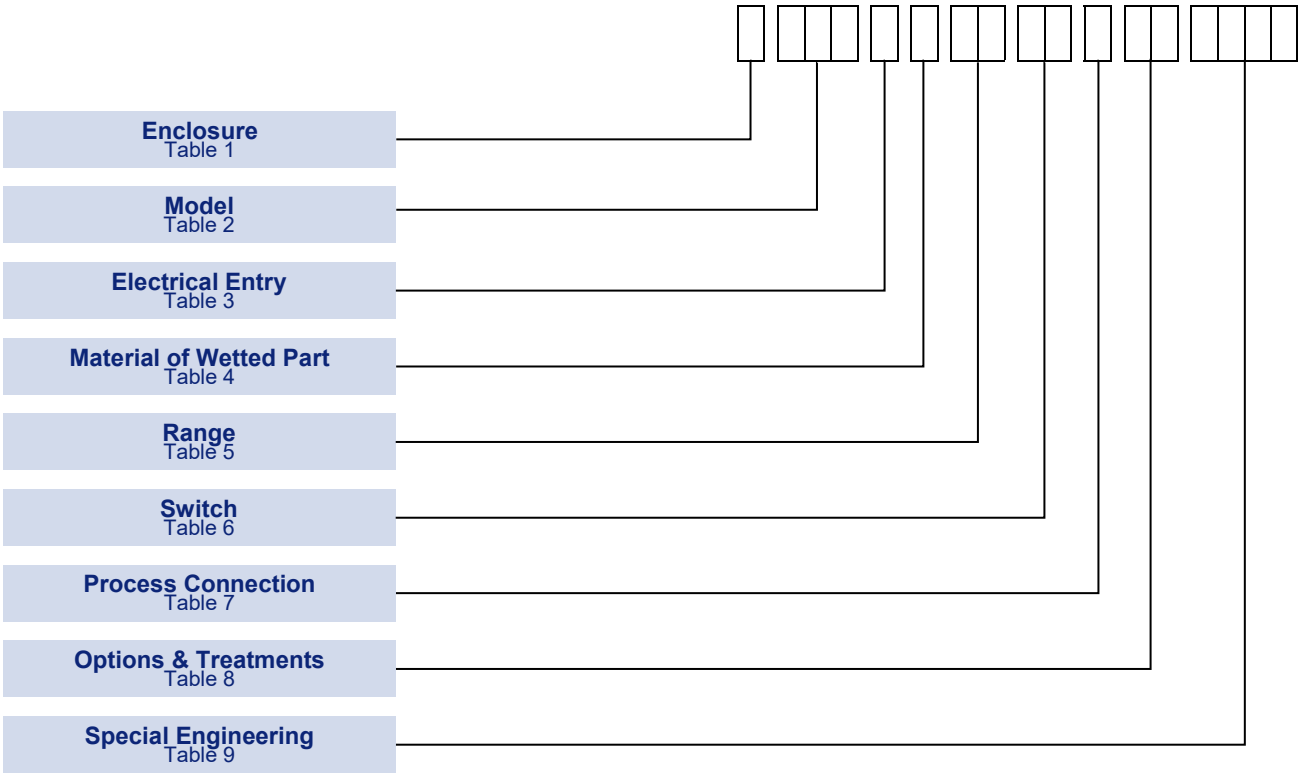
How can we **help you?**

Delta Mobrey offers fast, efficient and knowledgeable support when and where you need it. Please visit our web site at www.delta-controls.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.



***NOTE**: Options shaded in the following tables are the most common options and are available on the quickest lead-times and at the lowest cost.*

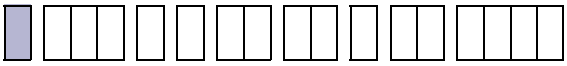
***NOTE:** Only the most common options are shown in this data sheet. Should you require a feature that is not shown, please contact your local sales office for further details.*

Technical Specification

Compact Series
Models: CS2, CS4

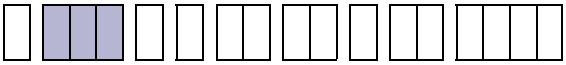
Accuracy:	Set point repeatability ± 1% of span at 20°C / 68°F
Storage Temperature:	-40°C to +60°C / -40°F to +140°F
Ambient Temperature:	-40°C to +60°C / -40°F to 140°F (weatherproof model) -25°C to +60°C / -13°F to 140°F for Model CS4 (ranges U7/UK to Y4/YF) Certified Enclosures, refer to Approvals section for limitation of ambient use.
Maximum Process Temperature:	Up to 120°C dependent on wetted parts selection (see table 4)
Enclosure classification:	IP66 / NEMA 4X
Switch output:	SPDT or DPDT snap action hermetically sealed microswitch
Electrical rating:	See Table 6
Process Connection:	¼ NPT Internal, 1/2 NPT Internal, 1/2 NPT External
Approximate Weight:	0.6kg / 1.32lbs to 2kg / 4.4lb depending on model

Enclosure

TABLE 1 

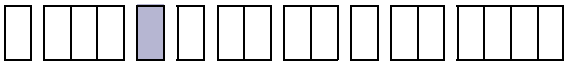
	Code
Stainless Steel Weatherproof Enclosure IP66 / NEMA 4X For outdoor aggressive atmospheres	A
Stainless Steel Flameproof Enclosure ATEX / IECEx approved for use in Zone 1 and Zone 21 hazardous locations. See approvals section for full details.	R
Stainless Steel Intrinsically Safe Enclosure ATEX / IECEx approved for use in Zone 0 hazardous locations. See approvals section for full details.	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 may be welded directly to the process connection, eliminating the O-ring.

Maximum process temperature

For code G & P: 60°C
For code A, K, S & T: 120°C

	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
	FA		10 to 100	6500	8450	5000	6500	6500	8450
	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 sales engineering for special requirements	**TBA**

Approvals

EUROPEAN DIRECTIVES

Low Voltage Directive (LVD) 2014/35/EU
Compliant to LVD

Pressure Equipment Directive (PED) 97/23/EC:
This product has a process connection size ≤ DN25 and is therefore categorised as Sound Engineering Practice (SEP) under Cat 3.3

ATEX Directive 2014/34/EU
FLAMEPROOF
Certificate No. SGS19ATEX0113X
EN 60079-0, EN 60079-1, EN 60079-31

For Zone 1 models **(Enclosure code R, see Table 1)**

II 2GD — Ex db IIC T*°C Gb (Tamb –40°C to +*°C)
Ex tb IIIC T*°C Db (Tamb –40°C to +*°C) see below

Rating	Gas/Dust	Ambient Temperature
Up to 11A	T6/T85°C	-40°C to + 45°C
	T4/T135°C	-40°C to + 85°C
Up to 5A	T6/T85°C	-40°C to + 60°C
	T4/T135°C	-40°C to + 85°C

INTRINSICALLY SAFE
Certificate No. SGS19ATEX0113X
EN 60079-0, EN 60079-11, EN 60079-31

For Zone 0 models **(Enclosure code 4, see Table 1)**

II 1G — Ex ia IIC T6 Ga (Tamb -40°C to +60°C)
Ex ia IIC T4 Ga (Tamb -40°C to +85°C)

GLOBAL CERTIFICATION

IECEx Certified
FLAMEPROOF
Certificate No. IECEx BAS 19.0098X
IEC 60079-0, IEC 60079-1, IEC 60079-31

Ex db IIC T*°C Gb (Tamb –40°C to +*°C)
Ex tb IIIC T*°C Db (Tamb –40°C to + *°C) (Tamb –40°C to +*°C)

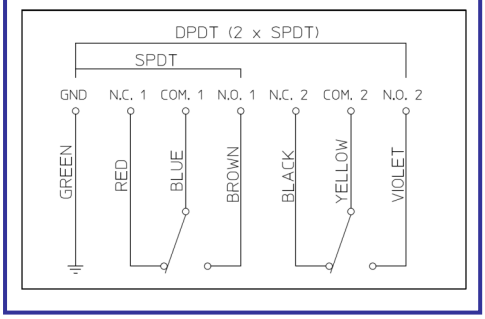
Rating	Gas/Dust	Ambient Temperature
Up to 11A	T6/T85°C	-40°C to + 45°C
	T4/T135°C	-40°C to + 85°C
Up to 5A	T6/T85°C	-40°C to + 60°C
	T4/T135°C	-40°C to + 85°C

INTRINSICALLY SAFE
Certificate No. IECEx BAS 19.0098X
IEC 60079-0, IEC 60079-11, IEC 60079-31

Ex ia IIC T6 Ga (Tamb -40°C to +60°C)
Ex ia IIC T4 Ga (Tamb -40°C to +85°C)

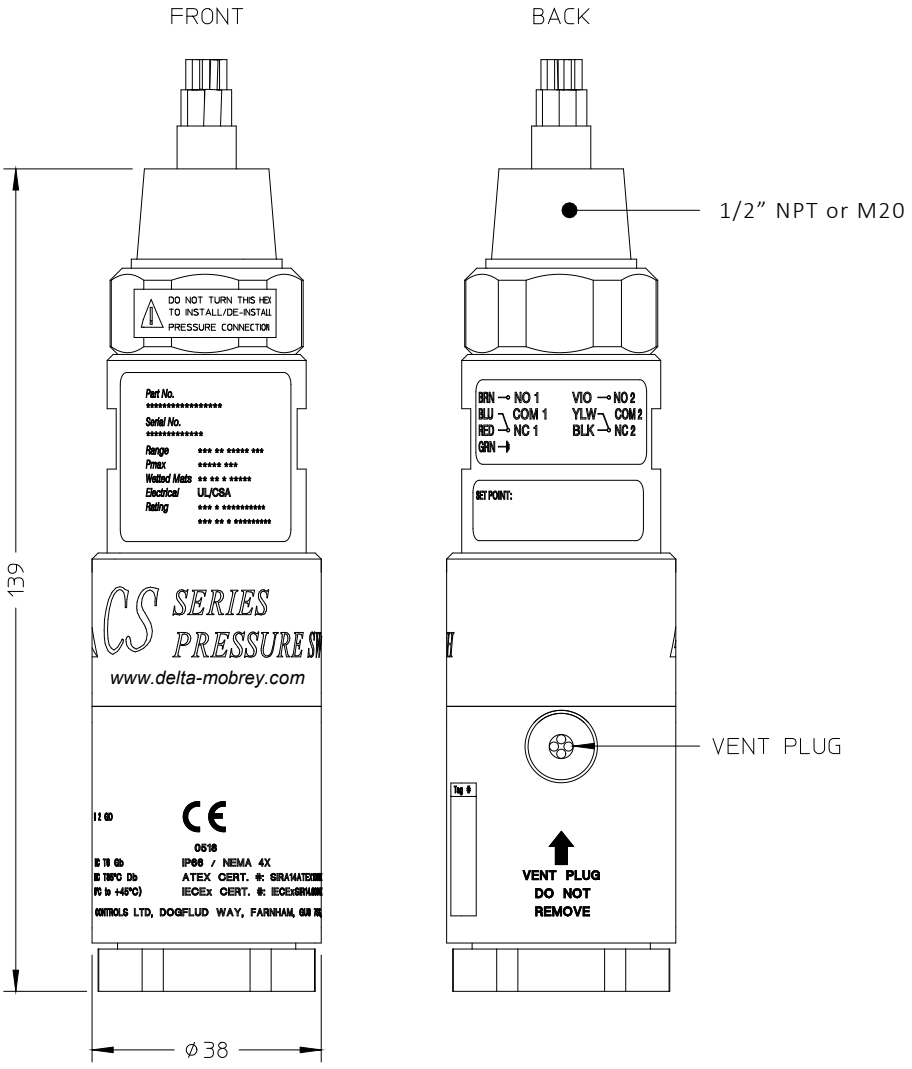
Dimensions

Wiring Diagram



Dimensions

All dimensions in mm (Inches)



Compact Series
Models: CS2, CS4

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