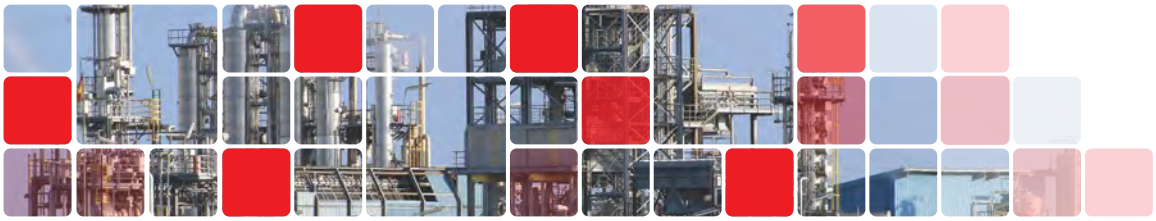
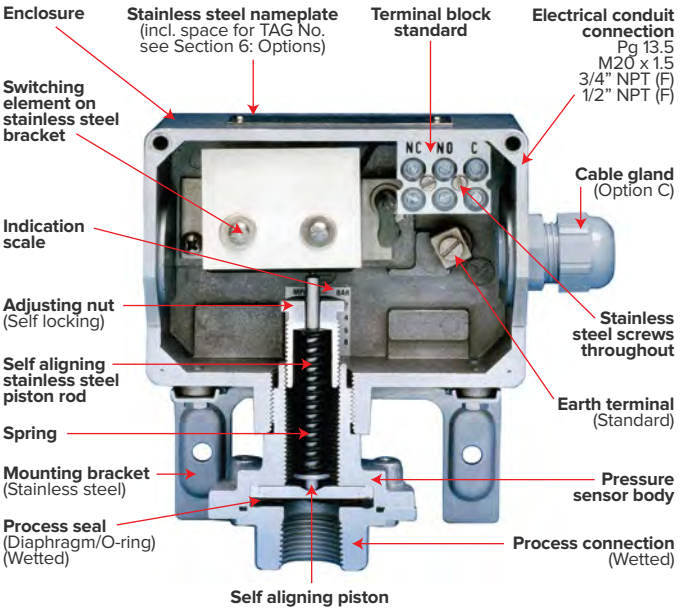
WHGood Automation

BETA PRESSURE & TEMPERATURE SWITCHES



THE BETA SWITCH PRINCIPLE

A high quality, self-aligning spring-loaded/piston sensor is the heart of each BETA switch. The piston sensor is isolated from the process fluid by a diaphragm and static o-ring seal and retained by a process connection port. These wetted parts are available in an extensive range of materials. Vacuum switches contain a vacuum piston and a spring (SS 316) as wetted parts too.



- BETA will always supply the best instrumentation for the given conditions
- Many years of close attention to our customer's requirements have resulted in a vast experience of many switch applications
- BETA manufacture high quality instruments to meet all of your requirements

C, W and Z Series Switches

Safety
- Standard earth terminal
- IP66 enclosure (NEMA 4X)
- Solid cover with gasket and captive screws
- Safe, secure electrical hookup by clamp terminals

Reliability
- High overrange protection
- Spring loaded piston, excellent resistance against shock and vibration
- Flexible stainless steel mounting bracket to avoid pipe strains on the instrument

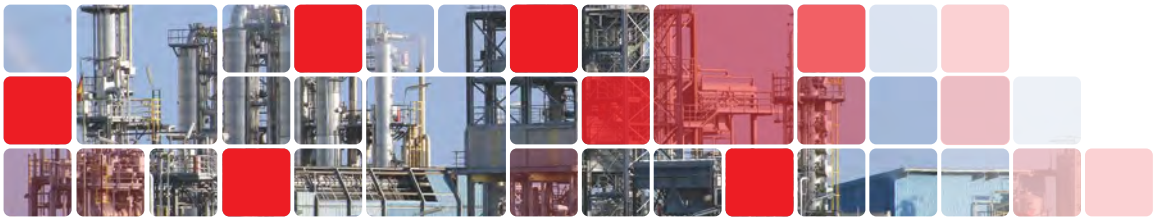
Product Approvals
- EXIDA: SIL2 certified
- ATEX: **W** series and **C** series intrinsically safe
- IECEx: **W** series and **C** series intrinsically safe
- FM: **W** series and **C** series intrinsically safe
- CSA: **W** series, **C** series and **C** series intrinsically safe

Quality & Factory Approvals
- SGS Certified Quality Assurance according to ISO 9001-2015 and ISO 14001-2015
- TÜV: PED certificate CE 0035
- DEKRA: ATEX certificate CE 0344

Economy
- A wide range of wetted process materials enable proper selection for any application

Service
- The international BETA sales network backs up this high quality product with equally high quality service

Benefits
- Our products are distinguished by highest reliability and are used in virtually any sector of industry. Highest quality and worldwide certification of our products for safety-critical applications ensure reliable monitoring of your plant, equipment or installation.
- BETA safety switches are assembled according to your requirements and are available in more than 10 million versions. Your 'special request' may be a standard for us.



HOW TO SELECT YOUR BETA SWITCH

BETA uses the following **model code** for easy, accurate product selection and specification.

C3 - P 304 L - S1N - B1 - K1 - Y - X2

1: ENCLOSURE

2: RANGE

TYPE
- **P** Pressure switch
- **D** Differential pressure switch
- **V** Vacuum switch
- **T** Temperature switch

SENSOR BODY
- **L** Low pressure sensor body
- **M** Medium pressure sensor body
- **H** High pressure sensor body
- **F** Fluid power sensor body (only as combination P...F)
- **D** Double (D...D for double differential)

3: PROCESS CONNECTION

4: DIAPHRAGM / O-RINGS

5: SWITCH ELEMENT

6: OPTIONS

7: SPECIALS

Select your switch by following **section 1** through **5**. Select an option, follow **sections 6** and **7** for options and specials. Leave the 'options' portion blank if no options are needed.

Ambient temperature specifications

Standard: -30 to +80°C
For ambient temperatures beyond these limits, please contact us.

EAC:	-40 to +80°C:	**C** series
ATEX:	-60 to +70°C:	**W** series for T6
	-60 to +80°C:	**W** series for T5
	-55 to +65°C:	**Z** series for T6
Ex i:	-60 to +80°C:	**C** series

Repeatability (FS)

±0.2 FS, at 20°C ambient temperature for a standard BETA pressure switch with K1 micro switching element and B1 diaphragm/O-ring.

Tagging and setting for free

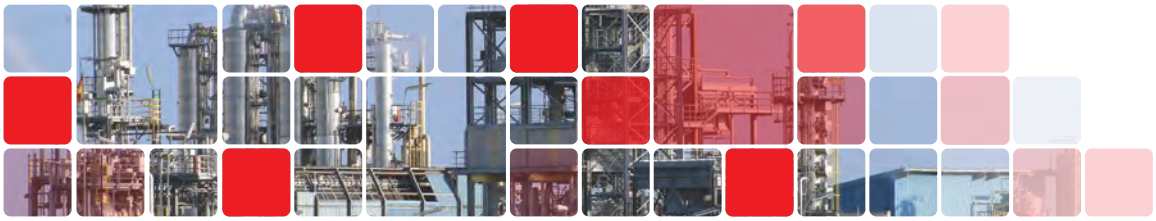
- Add your tag no. free of charge (14 digits max.) on the nameplate
- BETA will set your pressure switch at a defined setpoint for free

Please state the desired pressure setpoint, increasing or decreasing, on your order. Temperature switches set at your desired setpoint will be charged separately.

Factory warranty

Use the BETA switch within BETA factory specifications, if not applied correctly, all warranty or claim expires.

BETA offer a 36 month limited factory warranty from ex-works date Rijswijk (NL) excluded wetted parts.



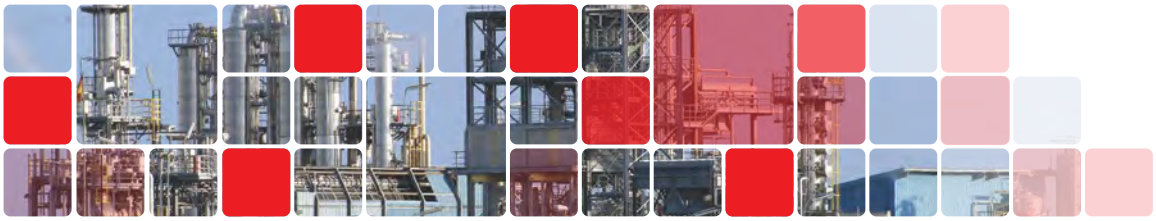
BETA PRESSURE SWITCHES

C3 - P 304 L - S1N - B1 - K1 - Y - X2

1: ENCLOSURE

ENCLOSURE CODE	CLASSIFICATION	ELECTRICAL COND. CONN.	MATERIAL	EARTH TERMINAL	TERMINAL BLOCK	TYPE OF SENSOR				
						PRESS	FLUID P.	VACUUM	DIFF	TEMP
B2 (1)	Weathertight (4) Miniature (IP65)	Hirschmann (4) Plug conn. (DIN 43650-A)	Aluminium	Standard (via plug)	N/A	✓	✓	✓	–	✓
C1 (5)	Weathertight (IP65) Intrinsically safe (with Option "I")	PG 13.5	Aluminium	Standard (Internal)	Standard	✓	✓	✓	✓	✓
C2 (5)		M20 x 1.5								
C3 (5)		3/4" NPT (F)								
C4 (5)		1/2" NPT (F)								
C8		M20 x 1.5	SS 316 (2)							
C9		3/4" NPT (F)								
W3 (5)	Explosion-proof ATEX & IECEx: Ex d II C T6...T5 Ex tD A21 T100°C IP66	3/4" NPT (F)	Aluminium	Standard (Internal & External)	Standard	✓	✓	✓	✓	✓
W8		M20 x 1.5	SS 316 (2)							
W9		3/4" NPT (F)								
Z1 (5)	Explosion-proof Ex de IIC T6 (IP66) 02 ATEX 2187X	PG 13.5	Aluminium	Standard (Internal & External)	Standard EEx e	✓	✓	✓	✓ (3)	✓
Z2 (5)		M20 x 1.5								
Z3 (5)		3/4" NPT (F)								
Z4 (5)		1/2" NPT (F)								
Z8		M20 x 1.5	SS 316 (2)							
Z9		3/4" NPT (F)								

(1) See BETAMINI product range
(2) Includes SS 316 sensor body and adjusting nut
(3) All differentials except D...D - type
(4) EN 175301-803 / ISO4400
(5) Powder coated acc. to BETA SP025, dry film thickness approx. 70 microns finish hammertone silver/grey high gloss. Due to the nature of hammerstone finish colour difference might be visible and cannot be avoided.



BETA PRESSURE SWITCHES

C3 - P 304 L - S1N - B1 - K1 - Y - X2

2: RANGE

Ranges given here are valid for setpoints at **increasing pressures** (also vacuum) of the **high end** of the range and **decreasing** for the **low end** of the range.

The **'deadband'** values are the maximum possible values for a standard micro switch and diaphragm/O-ring combination and varies nearly linear with setpoint between indicated limits of range and should be multiplied by deadband multipliers as given in sections **4** & **5**, where appropriate. For fluid power multiplier acc. to section **5** only.

Selection of other than standard micro switch may influence the lower end of range.

PRESSURE SWITCHES

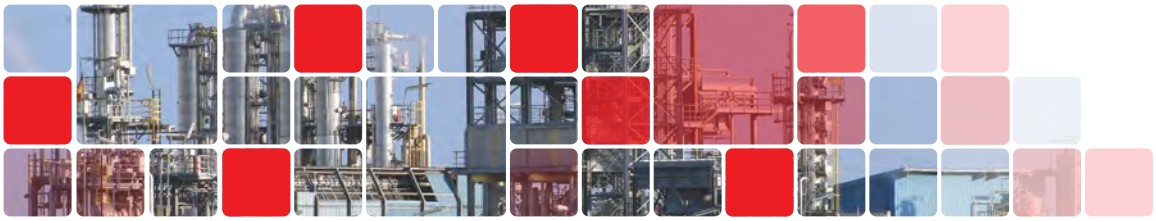
RANGE CODE	ADJUSTABLE RANGE		MAXIMUM DEADBAND		MAX. OVERRANGE PRESSURE	PROOF PRESSURE
P 301 L (1)	[2 - 15]	mbar	[1.1 - 1.9]	mbar	10 **bar**	15 **bar**
P 302 L (1)	[10 - 100]	mbar	[2.5 - 3.5]	mbar	30 **bar**	35 **bar**
P 304 L	[20 - 240]	mbar	[6 - 9]	mbar		
P 306 L	[20 - 560]	mbar	[6 - 12]	mbar		
P 308 L	[25 - 1300]	mbar	[7 - 15]	mbar		
P 402 M	[100 - 400]	mbar	[15 - 20]	mbar	125 **bar**	140 **bar**
P 404 M	[100 - 950]	mbar	[15 - 30]	mbar		
P 406 M	[120 - 2300]	mbar	[16 - 50]	mbar		
P 408 M	[150 - 5400]	mbar	[16 - 90]	mbar		
P 502 H	0.3 - 1.6	**bar**	[65 - 95]	mbar	200 **bar**	600 **bar**
P 504 H	0.4 - 3.5	**bar**	[65 - 160]	mbar		
P 506 H	0.5 - 9.0	**bar**	[65 - 330]	mbar		
P 508 H	0.7 - 21.5	**bar**	[70 - 810]	mbar		
P 706 H	2.5 - 32	**bar**	0.3 - 1.65	**bar**		
P 708 H	3.0 - 76	**bar**	0.3 - 3.75	**bar**		
P 808 H	4.0 - 170	**bar**	0.8 - 9.5	**bar**	300 **bar**	
P 908 H	10 - 300	**bar**	2.0 - 19.5	**bar**	400 **bar**	
P 909 H	10 - 350	**bar**	2.0 - 25	**bar**		

(1) Only available with **L1** microswitch element

FLUID POWER SWITCHES

RANGE CODE	ADJUSTABLE RANGE		MAXIMUM DEADBAND		MAX. OVERRANGE PRESSURE	PROOF PRESSURE
P 904 F	12 - 55	**bar**	3.5 - 6.0	**bar**	650 **bar**	700 **bar**
P 906 F	16 - 130	**bar**	4.0 - 8.5	**bar**		
P 908 F	20 - 300	**bar**	6 - 12	**bar**		
P 918 F	30 - 540	**bar**	15 - 31	**bar**		

Fluid Power switches are to be used on clean, lubricating fluids only



BETA PRESSURE SWITCHES

C3 - P 304 L - S1N - B1 - K1 - Y - X2

2: RANGE

VACUUM SWITCHES

RANGE CODE	(1) ADJUSTABLE RANGE (INCR. VAC. to PRESS.)		MAXIMUM DEADBAND (VACUUM / PRESSURE)		MAX. VACUUM		MAX. OVERRANGE PRESSURE		PROOF PRESSURE	
V 301 L (2)	[-10 to -3]	[mbar]	[1]	[mbar]	[-500]	[mbar]	+10	bar	+15	bar
V 304 L	[-60/0/+150]	[mbar]	[4/4/6.5]	[mbar]	[-500]	[mbar]	+30	bar	+35	bar
V 404 M	[-400/0/+400]	[mbar]	[16/16/25]	[mbar]	-1	[bar]	+125	bar	+140	bar
V 406 M	[-980/0/+1000]	[mbar]	[30/30/40]	[mbar]						
V 506 H	-1/0/+6	bar	[80/80/25]	[mbar]	-1	[bar]	+200	bar	+600	bar

(1) For setpoint around 0 bar gauge, please contact us

(2) Stability of setpoint around 0 bar gauge is not guaranteed

DIFFERENTIAL PRESSURE SWITCHES

RANGE CODE	(1) ADJUSTABLE RANGE DIFFERENTIAL RANGE		(1) TYPICAL DEADBAND		MAX. STATIC VACUUM		MAX. OVERRANGE PRESSURE		PROOF PRESSURE	
P 301 L-...-D	[2 - 15] (2)	[mbar]	[1,1-1,97]	[mbar]	10	bar	10 (4)	bar	15	bar
D 302 L (6)	[12 - 75] (2)	[mbar]	[7]	[mbar]	30	bar	30 (3)	bar	35	bar
D 304 L	[22 - 180]	[mbar]	[8]	[mbar]						
D 306 L	[25 - 450]	[mbar]	[11]	[mbar]						
D 309 L	[35 - 1250]	[mbar]	[15]	[mbar]						
D 402 M	0.3 - 1.0	bar	0.15	bar	10	bar	140 (5)	bar	140	bar
D 404 M	0.5 - 2.5	bar	0.2	bar	50	bar				
D 406 M	1.0 - 6.0	bar								
D 408 M	1.0 - 14.5	bar								
D 506 M	5 - 20	bar	0.8	bar	100	bar				
D 508 M	10 - 50	bar								
D 608 M	10 - 70	bar	1.5	bar	140	bar				
D 352 H	[80 - 160]	[mbar]	[25]	[mbar]	200	bar	200 (5)	bar	200	bar
D 354 H	[100 - 500]	[mbar]	[35]	[mbar]						
D 356 H	[120 - 1450]	[mbar]	[50]	[mbar]						
D 359 H	[150 - 3450]	[mbar]	[75]	[mbar]						

(1) Ranges and deadbands are given at 50% of max. static pressure. **All differential pressure sensors are sensitive to static pressure, both for setpoint and deadband.**

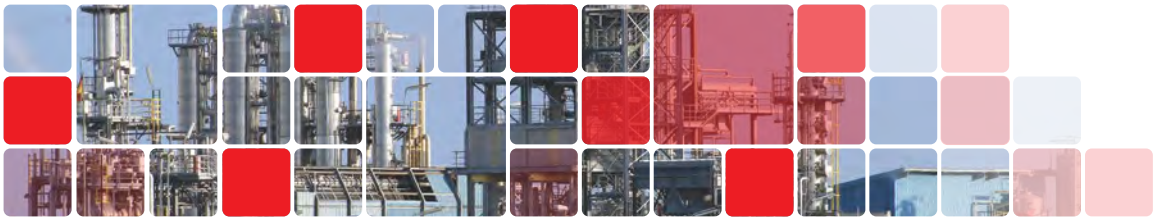
(2) Range only with L1 micro switch

(3) D...L can withstand a diff. pressure P-low max. 1 bar above P-high

(4) P 301 L...D can withstand a differential pressure P-low max. 100 mbar above P-high

(5) D...M, D...H and D...D can sustain full high and low-side reversal

(6) Only available with G3-enclosure



BETA PRESSURE SWITCHES

C3 - P 304 L - S1N - B1 - K1 - Y - X2

2: RANGE

BI-DIRECTIONAL SWITCHES

RANGE CODE	ADJUSTABLE RANGE DIFFERENTIAL RANGE		TYPICAL DEADBAND		MAX. STATIC VACUUM		MAX. OVERRANGE PRESSURE		PROOF PRESSURE	
D 356 D	[100 - 1500]	[mbar]	[35 - 65]	[mbar]	200	bar	200 ❶	bar	200	bar
D 358 D	[100 - 3500]	[mbar]	[45 - 115]	[mbar]						

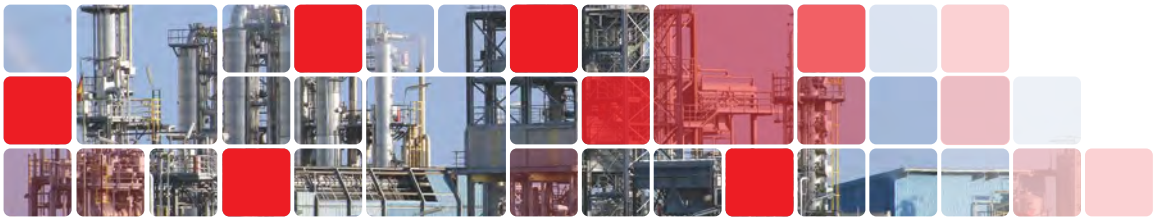
❶ D...M, D...H and D...D can sustain full high and low-side reversal

The following table shows the influence for **increasing static pressure**:

SENSOR	SETPOINT	DEADBAND
P 301 L-..-D	= + 0.1 mbar/bar	= + 0.1 mbar/bar
D ... L	- 0.7 mbar/bar	= - 0.1 mbar/bar
D ... M	= + 3 mbar/bar	+ 10 mbar/bar
D ... H	- 2 mbar/bar	= - 0.4 mbar/bar

EXAMPLE
D...H - type differential setpoint: 1 bar (1000 mbar).
If static pressure increases 10 bar differential setpoint will be (10 x - 2 mbar) = -20 mbar less = 980 mbar.

NOTE
For differential applications outside the above ranges, please contact us for details.



BETA PRESSURE SWITCHES

C3 - P 304 L - S1N - B1 - K1 - Y - X2

3: PROCESS CONNECTION

PRESSURE SWITCHES

PROCESS CONN. SIZE/CODE		① WITH SENSOR	ALUMINIUM		SS 316		MONEL		BRASS	
			NPT	BSP	NPT	BSP	NPT	BSP	NPT	BSP
1/4" F		F			S1N	S1B			B1N	B1B
		L					M1N	M1B		
		D...L (Low side)	A1N	A1B						
		D...L (High side)								
		H / M / D...M								
		D...H / D								
1/2" F		F			S2N	S2B			B2N	B2B
		L D...L (High side)					M2N	M2B		
		H / M / D...M								
1/2" M		L, M & H D...L / M (High side)			S7N	S7B	M7N	M7B		
1/2" Gauge Connection		H L & M				S7G				
② Not for vacuum	1" F	L & D...L (High side)			S4N	S4B				
	2" F	L & D...L (High side)			S6N	S6B			B6N	B6B
	1" M	M & H D...M			S8N	S8B				

① (Standard) process connection for **L**ow pressure sensor body: **S1N** or **S1B**

Medium & **H**igh pressure sensor body: **S1N** or **S1B**

Fluid power pressure sensor body : **B1N** or **B1B**

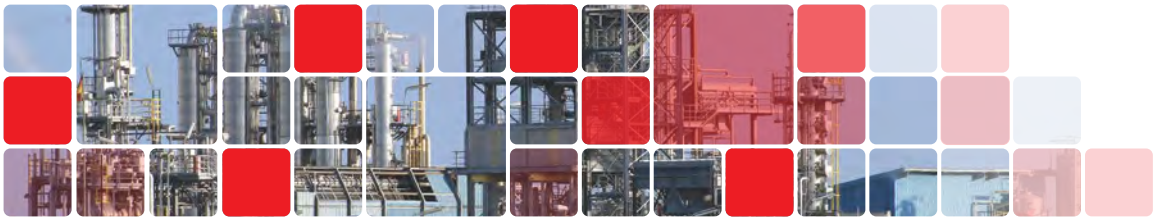
Differential switches: **D...H**, **D...D**, **D...M**: **S1N** or **S1B** only

D...L: **A1N** or **A1B**; **for Low side only**

High side: Only L-sensor connections

② **Vacuum switches**
- Process connection size maximum 1/2"
- Vacuum piston and spring (both wetted) standard in SS 316

NOTES
- Process connection according to NACE standards are available, please contact us for details
- Materials such as PVC, Hastelloy, Titanium, special sensor sizes and Teflon lined flanged connections are available on request



BETA PRESSURE SWITCHES

C3 - P 304 L - S1N - **B1** - K1 - Y - X2

4: DIAPHRAGM / O-RINGS

PRESSURE SWITCHES

DIAPHRAGM / O-RING CODE	DIAPHRAGM (6)		O-RING	USE (1)	DEADBAND MULTIPLIER
B1	Buna-N		Buna-N (2)	Standard water / oil (-30°C to +80°C)	1.0
E1	EPDM		EPDM (2)	Some hydraulic fluids, steam condensate	1.0
K5	Kalrez		Kalrez (2)	Highly corrosive fluids	1.5
M1	Monel		Buna-N (5)	Seawater	2.0
M2			Viton-A (4)	Process temperature NOT below minus 10°C (7)	
M4			PTFE	Corrosive acids	
M5			Kalrez	Highly corrosive and permeative acids	
N3	Neoprene		Neoprene (2)	When required	1.0
P1	PTFE (Polyimide coated with PTFE)		Buna-N	Oil / air / water	1.5
P2			Viton-A (5)	Process temperature NOT below minus 10°C (7)	
P4			PTFE (4)	Corrosive acids	
P5			Kalrez	Corrosive acids	
S1	SS 316		Buna-N	Permeative gases	2.0
S2			Viton-A (5)	Process temperature NOT below minus 10°C (7)	
S3			Neoprene	Permeative refrigerant gases	
S4			PTFE (4)	Corrosive acids	
S5			Kalrez	Highly corrosive and permeative acids	
S6			EPDM	Steam (not for steam condensate)	
T1	Tantalum		Buna-N	Highly corrosive and permeative gases and non-acid liquids Select o-ring as required	2.0
T2			Viton-A (5)		
T3			Neoprene		
T4			PTFE (4)		
T5			Kalrez (2) (5)		
V2	Viton-A		Viton-A	Process temperature NOT below minus 10°C (2)	1.5
S0	SS 316	Welded diaphragm	None (3)	Highly permeative gases (NOT below -10°C)	3.0
M0	Monel				

(1) Wetted parts are suggested for use on the service indicated. However they do not constitute a guarantee to be suitable for a given process against corrosive or permeation since processes vary from plant to plant. Empirical experience by users should be the final guide. The diaphragm/o-ring combinations are for process temperatures of -30°C to +80°C, unless otherwise indicated. **For process temps. beyond these limits contact us.**

(2) Switches for fluid power applications are limited to these options (o-ring only with SS 316 piston)

(3) Only for 1/4" & 1/2" process connections. Not available on vacuum switches. For other sizes and materials, contact us.

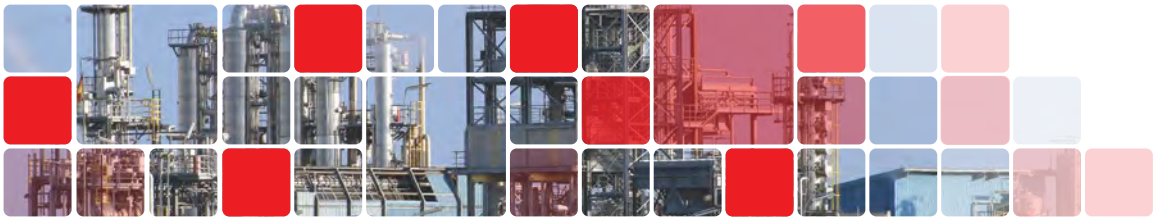
(4) PTFE o-ring **unsuitable** for vacuum switches or vacuum surge

(5) For process temperature > 100°C, please contact us

(6) Other diaphragm materials like Hastelloy available, contact us

(7) High temperature refers to **max. 130°C** at process connection

Wetted parts are not guaranteed against corrosion or permeation since processes vary from plant and concentration of harmful fluids, gases or solids vary from time to time in a given process. Empirical experience by users should be the final guide and alternate materials based on this are generally available.



BETA PRESSURE SWITCHES

C3 - P 304 L - S1N - **B1** - K1 - Y - X2

4: DIAPHRAGM / O-RINGS

Differential pressure switches include a similar type of diaphragm / o-ring combinations as for pressure switches, but the following must be considered:

W3 - D...L

C3 - D...L

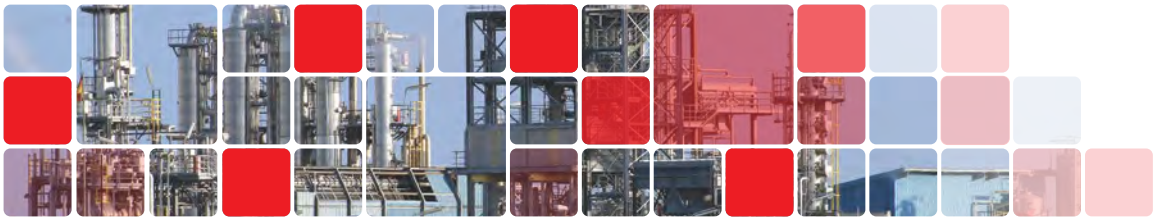
C8 - D...L

W8 - D...L

DIFFERENTIAL PRESSURE SWITCHES

TYPE	STANDARD	THE FOLLOWING COMBINATIONS ARE POSSIBLE
P 301 L / D...L	**B1**	All except with PTFE o-ring and welded diaphragm
D...M	**B1**	All diaphragm and o-ring combinations
D...H	**P1**	Metal + TCP
D...D	**P1**	Metal + TCP

NOTE: Deadband multiplier for diaphragm / o-ring and switching element are similar as for a pressure switch.



BETA PRESSURE SWITCHES

C3 - P 304 L - S1N - B1 - K1 - Y - X2

5: SWITCH ELEMENT

ALL SWITCHES

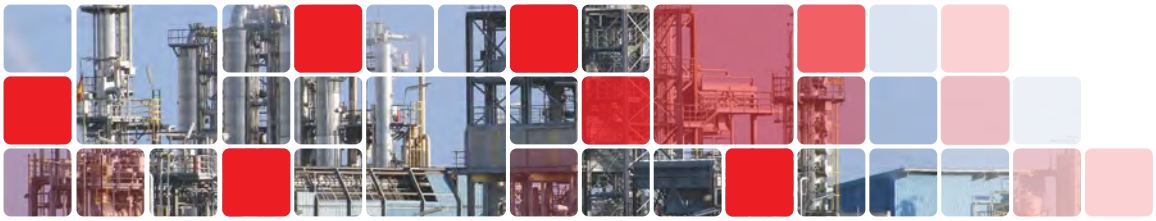
SWITCHING ELEMENT CODE (1)	USE		MAX. RATINGS (RES) VAC	MAX. RATINGS (RES) VDC (8)	DEADBAND MULTIPL. SPDT	DEADBAND MULTIPL. DPDT
H1 (SL)	Herm. sealed	(Inert gas filled) dusty, corrosive environment	125 / 1A	28 / 15A	5.0	6.5
K1 (4 9)	General service	Standard	480 / 15A	28 / 0.5A**	1.0	1.5
L1 (4)		**Standard for P/D301L & P/D302L ranges**	480 / 10A	28 / 0.5A	1.0	-
M1 (10)		Standard DPDT configuration on W series when required	250 / 5A	30 / 5A	1.5	3.5
U1 (9)		Normal DC-service	480 / 15A	125 / 0.5A	2.5	4.0
G1 (4)	Low voltage circuit (Gold contacts)	For use in H_2S environment and/or for (EEx)i applications (2)	125 / 1A	28 / 0.5A**	1.5	2.0
Y1 (10)			125 / 0.1A	30 / 0.1A	3.0	4.5
O1 (10)	Gold contacts	Environmental proof (IP67) (2)	250 / 0.1A	30 / 0.1A	3.0	4.5
N1 (10)	Silver contacts	Environmental proof (IP67)	250 / 2A	30 / 2A	3.0	4.5
Z1 (10)	For higher (ambient) temp.	Nickel alloy spring for corrosive environment	250 / 5A	125 / 0.3A	3.0	4.5
R1	Ex. Proof.	ATEX approved (standard on Z series)	250 / 5A	250 / 0.25A	2.5	4.5
SP	Adjustable deadband	Small adjustable deadband	250 / 15A	-	1 to 3	S.P.D.T. only
SR (3 5 6 9)		Wide adjustable deadband	480 / 20A	-	2 to 6	
SE (3)	Manual reset	Actuates automatic on increasing pressure	480 / 15A	125 / 0.5A	1.5	
SG (3)	Manual reset	Actuates automatic on decreasing pressure	480 / 15A	125 / 0.5A	1.5	
SV (3)	DC-service	High DC cap. magnetic blow out	125 / 10A	125 / 10A	5.0	
SA	Pneumatic AIR Relay (7)	Normally closed (NC)	For use in explosive atm. Ex II 2G c T6 KEMA 04ATEX4060		(Contact us)	Single only
SB (3)		Normally open (NO)				

1. For D.P.D.T. action second code figure should be specified as '2' (Example: K1 = SPDT / K2 = DPDT)
2. Actual capacitive or inductive load under VDC may influence the setpoint repeatability
3. Not on differential pressure switches (except for **SR** micro in '**W**' enclosure)
4. VDE certified acc. to DIN EN 61 058-1:1992+A1:1993
5. **SR** and **H1** micro switches, with high multiplier, can affect the low end of a range
6. **SR** micro in combination with metal diaphragm: standard with option '**P**'
7. For pneumatic element (select **C1** or **C8** enclosure) or please contact us for air relay documentation
8. For DC rating resistive loads are stated
9. In '**W**' enclosure maximum 10A current rating allowed, will be stated on the nameplate
10. Subminiature microswitch, only possible with selection for DPDT configuration for '**W**' enclosure

** DC rating not U.L. listed, although experience and third party testing confirm the DC voltage ratings. Please contact us.

NOTES

- Microswitches both for single and double action respectively SPDT and DPDT, are intended to be set for one setpoint and one direction only.
- The deadband reset value is a result of the complete model code selection and actual switch asssembly, so except for the **SR**/**SP** microswitch, the reset switching point is fixed and cannot be controlled by the manufacturer.
- Please keep in mind that even within a series of a similiar model, the reset switching point can vary.
- Proper application of **SR** and **SP** microswitches requires accurate statement of values to the setpoint and required reset setpoint.



BETA PRESSURE SWITCHES

C3 - P 304 L - S1N - B1 - **K1** - Y - X2

5: SWITCH ELEMENT

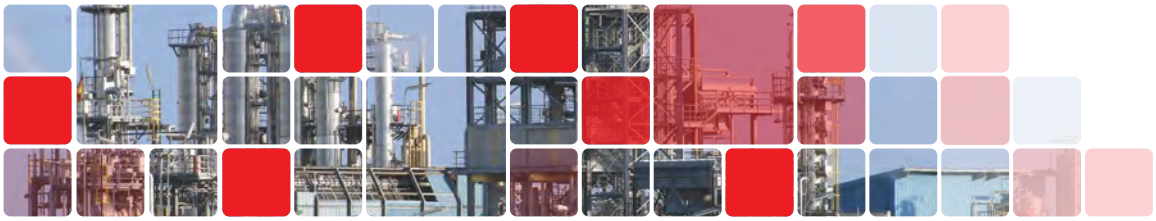
SWITCHING ELEMENTS vs. ENCLOSURES

SWITCHING ELEMENT		ENCLOSURE		
		C1, C2, C3, C4, C8, C9	W3, W8, W9	Z1, Z2, Z3, Z4, Z8, Z9
		Internal Earth Ground Terminal	Int. & Ext. Earth Ground Terminal	Int. & Ext. Earth Ground Terminal
SPDT SINGLE POLE DOUBLE THROW	SE	3-WAY TERMINAL BLOCK		
	SG			
	SP			
	SR			
	SV		4-WAY TERMINAL BLOCK	
	G1 H1 (SL) K1 L1 U1 O1 N1			
	R1			3-WAY TERMINAL BLOCK
	M1 Y1 Z1	3-WAY TERMINAL BLOCK	4-WAY TERMINAL BLOCK	
DPDT DOUBLE POLE DOUBLE THROW	R2			2X3-WAY TERMINAL BLOCK
	M2 Y2 Z2	2X3-WAY TERMINAL BLOCK	7-WAY TERMINAL BLOCK	
	G2 H2 K2 U2	2X3-WAY TERMINAL BLOCK		
	O2 N2		7-WAY TERMINAL BLOCK	
	SA SB (1)	1/4" NPT (F) CONNECTIONS		

(1) **SA & SB only** with **C3 enclosure**, pneumatic connection (brass) and **C8 enclosure** with SS 316 connection

POSSIBLE NOT POSSIBLE

NOTE
The standard switching elements are:
K1 for **C** and **W** enclosures (**L1** for P301L / P302L / D302L range)
R1 for **Z** enclosures



BETA PRESSURE SWITCHES

C3 - P 304 L - S1N - B1 - K1 - Y - X2

6: OPTIONS

ALL OPTIONS

OPTION CODE	DESCRIPTION
B	Industrial cleaning of wetted parts for oxygen services
C	Cable gland (Weatherproof IP66, EExe, EExi or EExd in acc. with classification of enclosure)
I	Intrinsically safe application (EEx)i. Only on C series (90V / - 3.3A)
M	Vacuum protector plate (Not on vacuum, fluid power, D...H and D...D switch) (Standard on D...L)
P	Recommended on strong process pulsations. Only on H sensors. Not in combination with EPDM, Neoprene, Viton-A and Kalrez diaphragms.
S 1	Stainless steel tag key ringed to enclosure. Tag has 2 lines (16 characters per line)
V	Fungicidal varnish coating (internal)
Y 2	Epoxy coating of switch (external). Only in combination with SS 316 process connection. Stainless steel parts are not coated.

1 **Standard nameplate:**
- **C series**: 2 lines with 16 characters or spaces + 1 line with 14 characters or spaces
- **W series**: 1 line with 16 characters or spaces
- **Z series**: 1 line with 12 characters or spaces

2 Air dried system acc. to BETA procedure, dry film thickness approx. 200um, finish pearl grey gloss.

Tag no. space on nameplates added free of charge

C3 - P 304 L - S1N - B1 - K1 - Y - X2

7: SPECIALS

We can incorporate many specials to meet your requirements.

These **special requirements** are indicated by the letter **X** in the model code positioned or at the end of the model number, followed by a figure showing the number of specials.

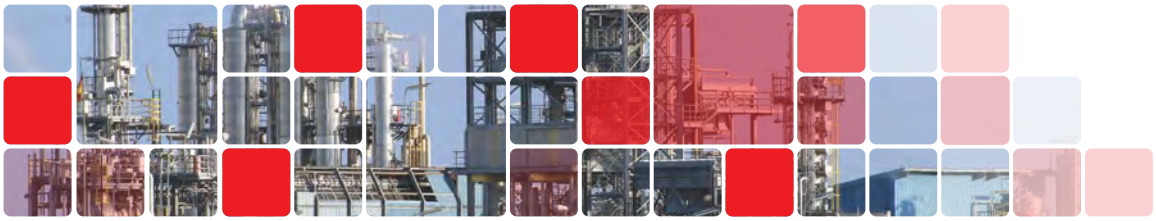
EXAMPLE:

- **X1** at the end of model code reference means **one** special
- **X2** at the end of the model code reference means **two** specials have been incorporated

Details of each special must be specified completely on enquiries and orders.

Example for specials for BETA switches are:

- Flanged connection 3/4" to 3" (ANSI or DIN)
- Range indication in Pa, Kg/cm², mm H20 or mmHg
- Breakwire resistor acc. E12 range for line monitoring (only for C-enclosure)
- Hirschmann or Harting connector
- Moisture inhibitor
- Chemical seals



BETA DIFFERENTIAL PRESSURE SWITCHES

Low Range - '**D...L**' Series

Principle
As pressure switch, with sealed aluminium sensor body (SS 316 optional).

Range
12 - 1250 mbar

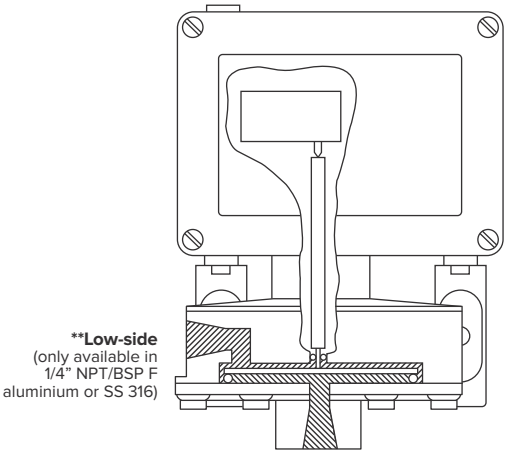
Maximum static pressure
30 bar

Application
Dry clean air, inert gases and clean non-corrosive fluids and gases.

Execution

Weathertight IP66:	**C** enclosure
Ex i a/b:	**C** enclosure + option **I**
Ex d:	**W** enclosure
Ex de:	**Z** enclosure

Clean fluids and gases, must be free of particles > 40µm, filters (not included) are recommended in case of contaminated medium. A differential pressure switch is a 'dead end' instrument, so a simple filter with fine mesh will work.



General Purpose - '**D...M**' Series

Principle
2 x piston / diaphragm type with separate sealing for high and low.

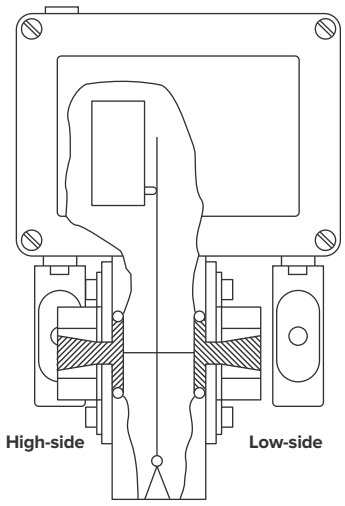
Range: 0.3 - 70 bar

Maximum static pressure: 140 bar

Application
Fluid and gas applications which are chemically compatible and are within the switch range.

Execution

Weathertight IP66:	**C** enclosure
Ex i a/b:	**C** enclosure + option **I**
Ex d:	**W** enclosure
Ex de:	**Z** enclosure



Very Low Range - '**P301L-..-D**' Series

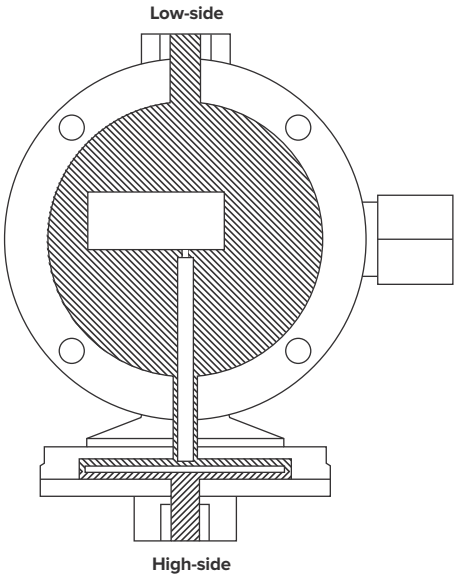
Principle
As pressure switch in sealed aluminium enclosure

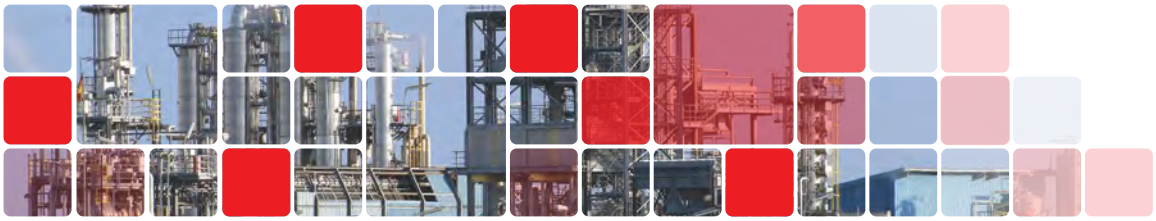
Range: 2 - 15 mbar (with '**L1**' micro only)

Maximum static pressure: 10 bar

Application
Dry clean air inert gases (low side only)

Execution
Weathertight IP66: **G3** enclosure only with potted wire leads





BETA DIFFERENTIAL PRESSURE SWITCHES

Low Range / High Static - '**D...H**' Series

Principle
Piston type with single diaphragm, sealed in SS 316 sensor body.

Range
80 - 3450 mbar

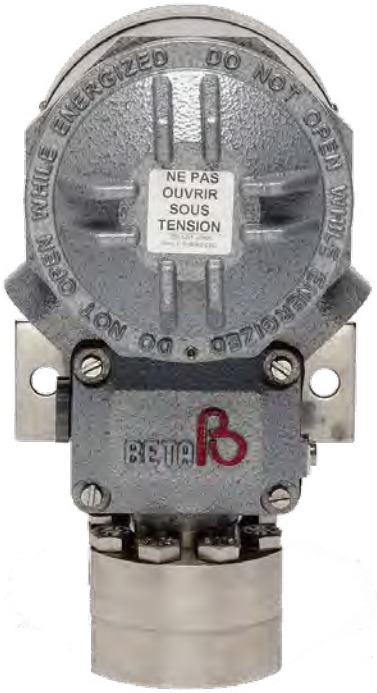
Maximum static pressure
200 bar

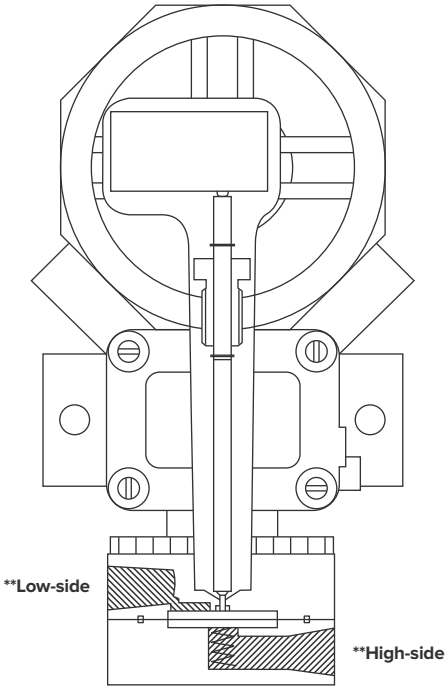
Application
Clean fluids and gases*, provided acceptable choice of wetted parts is within our range.

Execution

Weathertight IP66	**C** enclosure
Ex i a/b	**C** enclosure + option **I**
Ex d	**W** enclosure
Ex de	**Z** enclosure

**Low and High side, only available in 1/4" NPT / BSP F, SS 316.





Low Range / High Static - '**D...D**' Series

Principle
Piston type with single diaphragm, sealed in SS 316 sensor body.

Range
0.1 - 3.5 bar

Maximum static pressure
200 bar

Application
Clean fluids and gases*, provided acceptable choice of wetted parts is within our range.

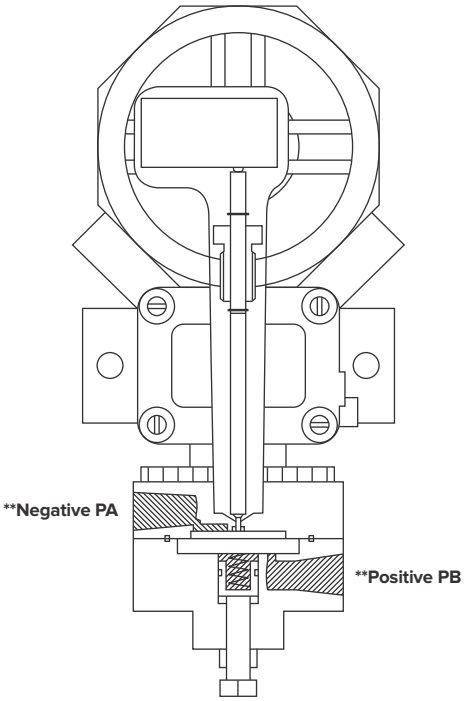
Typical application
Natural gas pipelines, safe guarding high pressure pipeline valves against being opened at too high differential pressure from either side.

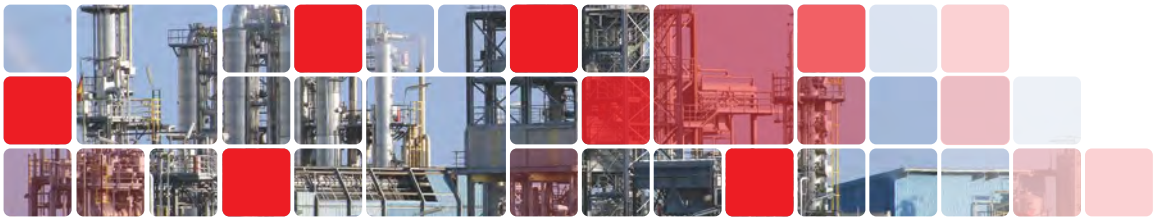
Execution

Weathertight IP66	**C** enclosure
Ex i a/b	**C** enclosure + option **I**
Ex d	**W** enclosure
Ex de	**Z** enclosure

** Negative/positive side only available in 1/4" NPT / BSP F, SS 316.

* Clean fluids and gases, must be free of particles > 40µm, filters (not included) are recommended in case of contaminated medium. A differential pressure switch is a 'dead end' instrument, so a simple filter with fine mesh will work.





BETA TEMPERATURE SWITCHES

Temperature Switch

The BETA Temperature Switch is a pressure switch enclosure incorporating a sealed 2-phase (vapor/liquid) temperature sensor. When the temperature of the process increases, the vapor pressure of the liquid also increases. If this vapor pressure exceeds the pre-adjusted setpoint of the pressure switch, it will actuate the switching element.

- Available as direct or capillary mount sensor
- Weathertight and explosion proof models (ATEX)
- Fits into most standard thermowells (10.5mm bore)
- No need for ambient temp. compensation
- Excellent repeatability/small dead-band
- All SS 316 sensor and capillary
- Filling system of gas/liquid acc. to SAMA-Class II C

Explosion-Proof Temperature Switch

ATEX, IECEx, CSA & FM approved up to the highest classification. With the '**C**' and '**W**' enclosures the BETA temperature switch is approved by ATEX, IECEx, according to NEN EN IEC 60079 standards.

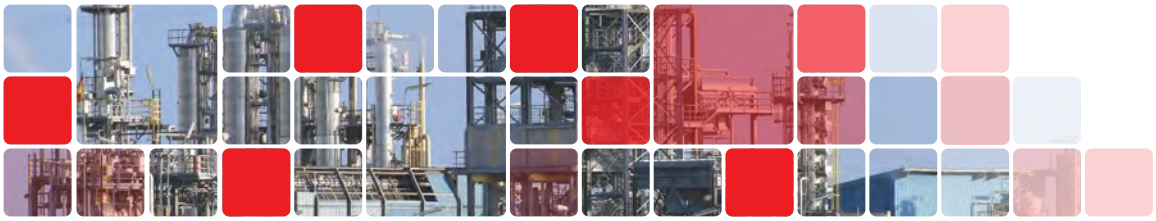
C3 - **T 548 H** - **D00** - **S0** - **K1** - **Y** - **X2**

1: ENCLOSURE

ENCLOSURE CODE	CLASSIFICATION	ELECTRICAL COND. CONN.	MATERIAL	EARTH TERMINAL	TERMINAL BLOCK
B2	Weathertight Miniature (IP65)	Hirschmann Plug conn. (DIN 43650-A) ❷	Aluminium	Standard (via plug)	N/A
C1	Weathertight (IP65) Intrinsically safe (with Option "I")	PG 13.5	Aluminium	Standard (Internal)	Standard
C2		M20 x 1.5			
C3		3/4" NPT (F)			
C4		1/2" NPT (F)			
C8		M20 x 1.5	SS 316 ❶		
C9		3/4" NPT (F)			
W3	Explosion-proof ATEX & IECEx: Ex d II C T6...T5 Ex tD A21 T100°C IP66	3/4" NPT (F)	Aluminium	Standard (Internal & External)	Standard
W8		M20 x 1.5	SS 316 ❶		
W9		3/4" NPT (F)			
Z1	Explosion-proof Ex de IIC T6 (IP66) 02 ATEX 2187X	PG 13.5	Aluminium	Standard (Internal & External)	Standard EEx e
Z2		M20 x 1.5			
Z3		3/4" NPT (F)			
Z4		1/2" NPT (F)			
Z8		M20 x 1.5	SS 316 ❶		
Z9		3/4" NPT (F)			

❶ Includes SS 316 sensor body and adjusting nut

❷ EN175301-803 / ISO 4400



BETA TEMPERATURE SWITCHES

C3 - T 548 H - D00 - S0 - K1 - Y - X2

2: RANGE

TEMPERATURE SWITCHES

RANGE CODE	ADJUSTABLE RANGE		MAXIMUM TYPICAL DEADBAND (3)		MAXIMUM TEMPERATURE		PROOF TEMPERATURE		MAX. PROCESS PRESSURE	
T 528 H	-40 / +40	°C	3	°C	+125	°C	+200	°C	175	bar
T 548 H	0 / +95	°C			+200	°C	+250	°C		
T 568 H (1)	+60 / +180	°C			+300	°C	+350	°C		
T 588 H (2)	+160 / +300	°C	3.5	°C	+400	°C	+450	°C		

(1) In case process temperature > 140°C, direct mount sensing bulb is not recommended
(2) Not in combination with direct mount sensing bulb
(3) For deadband calculation in combination with '**SR**' and '**SP**' micro, please contact us

C3 - T 548 H - D00 - S0 - K1 - Y - X2

3: SENSOR BULB

PROCESS CONNECTION	SENSOR CODE	TYPE OF TEMPERATURE SENSING BULB	
1/2" NPT (M)	D00	Direct mount (1)	128mm length
	D02		225mm length
	C02	Capillary mount	2m capillary length
	C03		3m capillary length
	C05		5m capillary length
	C10		10m capillary length
	CXX		Special capillary length (2)

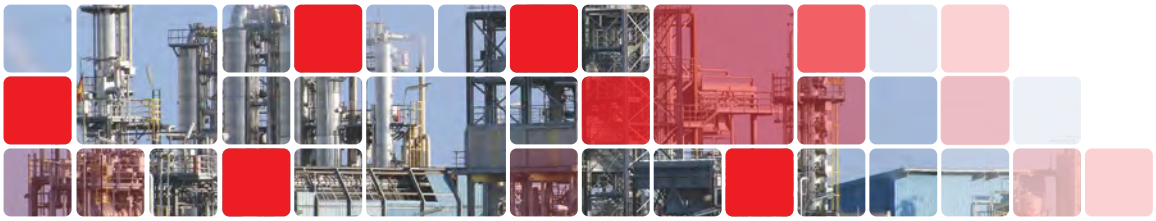
(1) Not in combination with range T588H (+160 / +300˚C), not recommended with T568H in case of process temperature > 140˚C
(2) Length of capillary should be specified, contact us (maximum 15m)

NOTE
All SS 316 stainless steel sensor, capillary (SS 304 armored) and compression fitting. Thermowells are available, see page 25.

C3 - T 548 H - D00 - S0 - K1 - Y - X2

4: DIAPHRAGM / O-RING

All temperature switches have '**S0**' welded diaphragm.



BETA TEMPERATURE SWITCHES

C3 - T 548 H - D00 - S0 - **K1** - Y - X2

5: SWITCHING ELEMENT

The standard switching elements are: '**K1**' for **C** and **W** enclosures
'**R1**' for **Z** enclosures

Deadband multiplier microswitch element similar as for pressure switch. For other available switching elements see pages 10 and 11.

C3 - T 548 H - D00 - S0 - K1 - **Y** - X2

6: OPTIONS

OPTION CODE	DESCRIPTION
C	Cable gland (weatherproof IP66, Exe, Exi or Exd in acc. with classification of enclosure)
I	Intrinsically safe application (EEx)i, only on '**C**' series
S	Stainless steel tag key attached to enclosure. Tag has 2 lines (16 characters per line)
V	Fungicidal varnish coating (internal)
Y	Epoxy coating of enclosure and sensor body (external)

Tag no. space on nameplates added free of charge:

- **C series**: 2 lines with 16 characters or spaces + 1 line with 14 characters or spaces
- **W series**: 1 line with 16 characters or spaces
- **Z series**: 1 line with 12 characters or spaces

C3 - T 548 H - D00 - S0 - K1 - Y - **X2**

7: SPECIALS

We can incorporate many specials to meet your requirements.

These **special requirements** are indicated by the letter **X** in the model code positioned or at the end of the model number, followed by a figure showing the number of specials.

EXAMPLE:

- **X1** at the end of model code reference means **one** special
- **X2** at the end of the model code reference means **two** specials have been incorporated

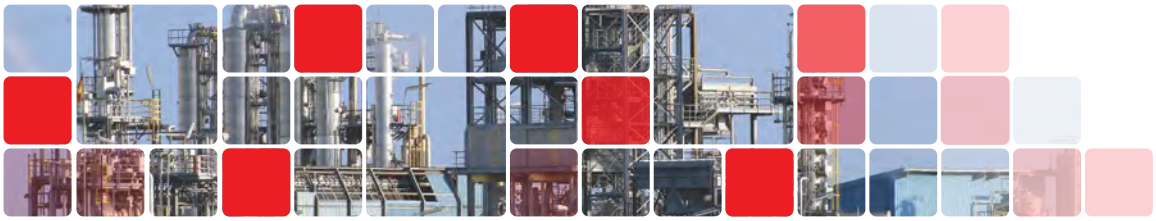
Details of each special must be specified completely on enquiries and orders.

W3 - T...H - D00

C8 - T...H - D00

C3 - T...H - D00

W3 - T...H - C03



BETA SWITCHES FOR HAZARDOUS AREA

BETA offer a complete line of switches for classified hazardous area. The BETA switch is a safety instrument which adds an extra dimension to industrial safety because a wide selection of switches are available up to safety level category 2 for hazardous areas (e.g. ATEX, IECEx).

Benefits:

- Worldwide agency approvals
- Minimal amount of wetted parts - minimal maintenance needed
- User friendly modifications - standard features incorporated for your safety
- High overrange pressures allowed without setpoint shift or damage of functional parts
- Designed for reliability over the full life cycle time

W Series

ATEX: ITS 17ATEX 101854 X
Ex II 2 G Ex db IIC T6...T5 Gb -60°C ≤ Tamb ≤ +70°C (T6), -60°C ≤ Tamb ≤ +80°C (T5)
Ex II 2 D Ex tb IIIC T 100°C Db -60°C ≤ Tamb ≤ +80°C

IECEx: IECEx ITS 17.0019 X
Ex db IIC T6 Gb -60°C ≤ Tamb ≤ +70°C
Ex db IIC T5 Gb -60°C ≤ Tamb ≤ +80°C
Ex tb IIIC T 100°C Db -60°C ≤ Tamb ≤ +80°C

CSA: CERT: 1873316 acc. to Class 2258-02
Class I, Div. 1, Groups B, C, D -40 to +70°C (T6), -40 to +80°C (T5)
Class II, III, Div. 1, Groups E, F & G
Ex d IIC T6...T5
Enclosure Type 4X, IP66

FM: CERT: 3028962
Class I, Div. I, Groups A, B, C and D, T6 Ta = -40 to +70°C, T5 T1 = -40 to +80°C
Class I, Zone I, AEx d IIC, T6 Ta = +70°C, T5 Ta = +80°C

DIP: Class II/III, Div. 1, Groups E, F and G, T6 Ta = +70°C, T5 Ta = +80°C
Enclosure Type 4X, IP66

C Series Intrinsically Safe

ATEX: CERT: KIWA 15 ATEX 0023X
Ex II 1 G Ex ia IIC T4...T6 Ga or
Ex II 2 G Ex ib IIC T4...T6 Gb
Ex II 1 D Ex ia IIIC T 85°C Da or
EX II 2 D Ex ib IIIC T 85°C Db
Ambient Temperature: -60 to +80°C

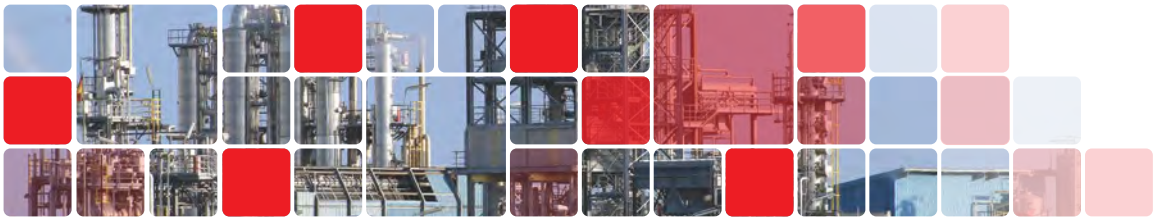
IECEx: CERT: KIWA 15.0011X
Type of protection: Exia
Ex ia IIC T6 Ga
Ex ia IIIC T 85°C Da

FM: Cert. No. 3031247
IS Class I, II and III, Div. 1, Groups A, B, C, D, E, F, G
Class I, Zone 0, AEx ia IICT6, -40°C <Ta < +80°C
Enclosure Type 4x

CSA: CERT: 1891054 acc. to Class 2258-04
IS Class I, II, III, Div. 1, Groups A, B, C, D, E, F, G
Ex ia IIC T6 T85°C
Ambient Temperature: -40 to +80°C
Enclosure Type 4X

Z Series

ATEX: CERT: KEMA 02ATEX 2187
Ex II 2 G Ex de IIC T6
(-55 to +65°C)



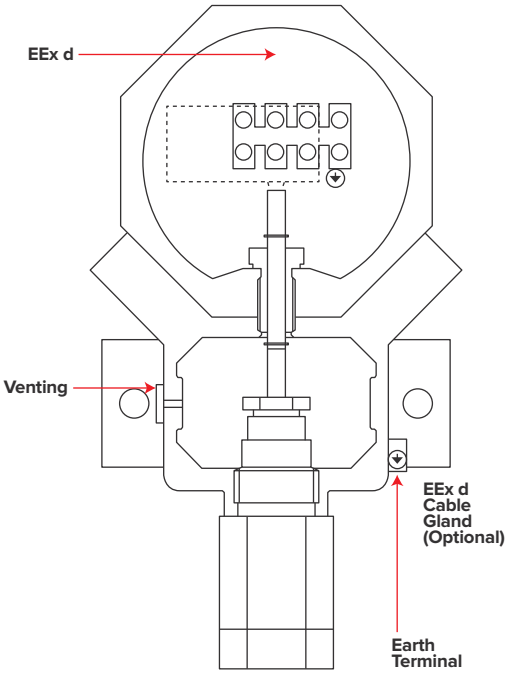
BETA SWITCHES FOR HAZARDOUS AREA

W Series - ATEX, IECEx, CSA & FM approved

The '**W**' series is a world-wide best seller. A separate adjustment compartment allows easy field calibration.

Due to the wide selection of materials and components parts, virtually all applications can be covered.

ATEX approved:	ITS 17ATEX 101854 X
For gas:	Ex II 2 G Ex db IIC T6...T5 Gb
For dust:	Ex II 2 D Ex tb IIIC T 100°C Db
IECEx approved:	IECEx ITS 17.0019 X
For gas:	Ex db IIC T6....T5 Gb
For dust:	Ex tb IIIC T 100°C Db



- Separate adjustment compartment
- All ranges available
- Highest overrange protection
- Epoxy coating optional
- Also available in SS 316
- Aluminium with extremely rugged powder coated enclosure which is suitable for tough off-shore applications (1000 hours, salt spray test acc. to DIN 50021, IEC 60068-2-11 or ASTM B117-90) or SS 316 enclosure
- Available as pressure, hydraulic, vacuum, DP and temperature switch
- Excellent for field mounting (2" pipe stainless steel mounting bracket available)

C Series (Intrinsically Safe) - ATEX, IECEx, CSA & FM approved

The '**C**' series with option '**I**' for intrinsically safe systems. Certified by KIWA acc. to NEN EN 60079-0 / EN 60079-11 for:

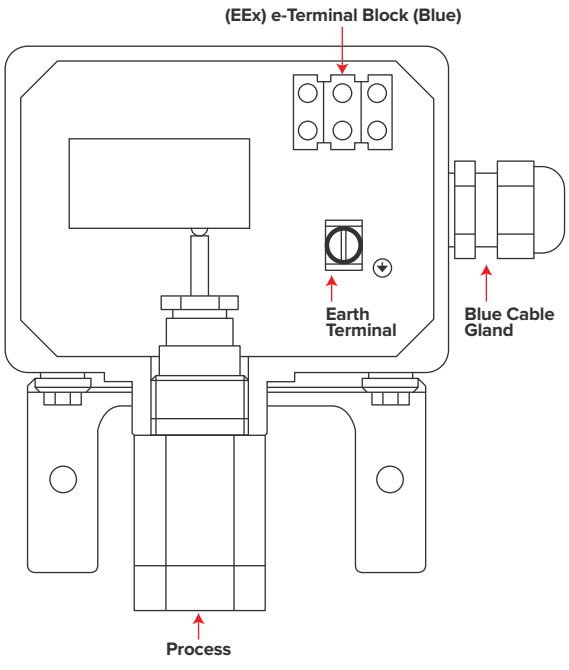
- II 1 G Ex ia IIC-T4...T6 Ga
- II 2 G Ex ib IIC-T4...T6 Gb
- II 1 D Ex ia IIIC T85°C Da
- II 2 D Ex ib IIIC T85°C Db

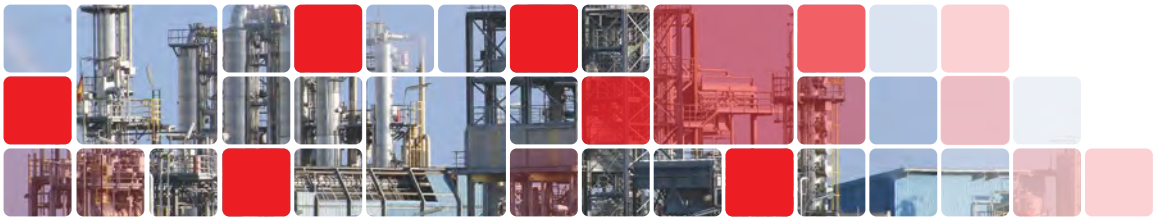
ATEX approved:	KIWA 15 ATEX 0023X	(-60 to +80°C)
IECEx approved:	KIWA 15.00IIX	(-60 to +80°C)
CSA approved:	Cert. No: 1891054	(-40 to +80°C)
FM approved:	Cert. No: 3031247	(-40 to +80°C)

This option includes all required installation materials including a blue coloured EExe approved terminal block and the standard earth terminal.

Option '**I**' in accordance with article 9 of the ATEX Directive 94/9/EC (Ex ia/ib IIC) which are related to insulation, clearance, creepage distances and enclosure type whereby a max. peak voltage of 90V or 3.3A is allowed.

Please note the following:
When a switch is ordered with cable gland (option 'C') BETA will automatically install the EEx i blue cable gland (see drawing). Due to low current used in intrinsically safe systems we recommend the use of switching elements with gold contacts (code **G1, O1** or **Y1**).





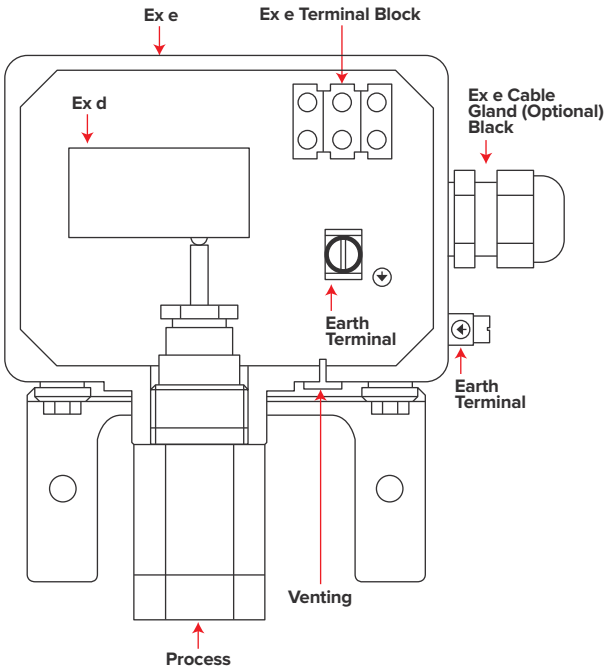
BETA SWITCHES FOR HAZARDOUS AREA

Z Series - ATEX, IECEx, CSA & FM approved

The '**Z**' series - The Ex.ed explosion-proof switch.

- Certified acc. to NEN EN 60079-0/ NEN EN 60079/1 NEN EN 60079-7
- **ATEX** approved: KEMA 02ATEX 2187 (-55°C to + 85°C / T6)

- Available in aluminium or SS 316 (for off-shore applications)
- Available as pressure, hydraulic, vacuum, differential pressure (not on 'D..D' series) and temperature switch
- All ranges available **except for P301L** and **P302L**
- Limited to '**R1** / **R2**' switching element
- High overrange protection
- Standard electrical connection



Pressure & Temperature Switch Certifications

SIL 2 Certification
In order to state SIL 2 compliance based on the standard IEC 61508, please consider the following conditions:

Always read the BETA SIL safety manual before installation, setting and testing is started installation, setting and testing may only be performed by qualified personnel using calibrated equipment and based on the approved SIL Safety Manual Instruction.

BETA is not responsible for changes in settings out of BETA production.

EXPLOSION-PROOF CERTIFICATIONS

Besides the already mentioned explosion-proof certificates, also available are:

Russian market (Russia, Kazakhstan, Belarus)
- CU TR 012-2011 Ex Safety Directive
- C series Ex iaD 20 T 85
  Ex ibD 21 T 85
- W series DIP A21 Ta 100

Korean market
- Korea Industrial Technology Institute
- Certicate for explosion safety

Japan
- JIS

China
- Nepsi Cert NO GYJ17 1038X
- Ex d IIC T5/T6 Gb

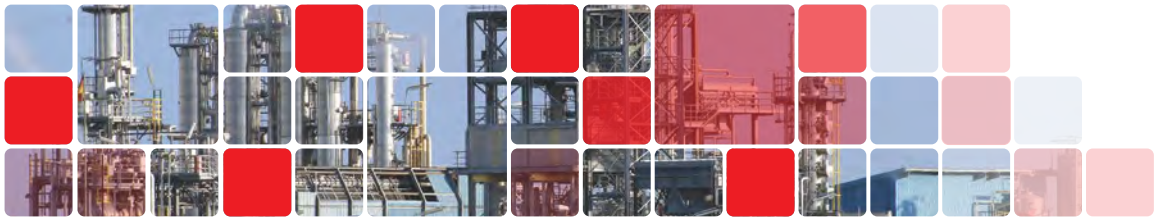
OTHER CERTIFICATION

Europe
- 2014/68/EU Pressure Equipment Directive
- C & W series Module B CE 0035
- BETA Mini Module B CE 0035
- QA system Module D CE 0035

Russian market (Russia, Kazakhstan, Belarus)
- CU TR 004-2011 Low Voltage Directive
  Cert No. 0705132

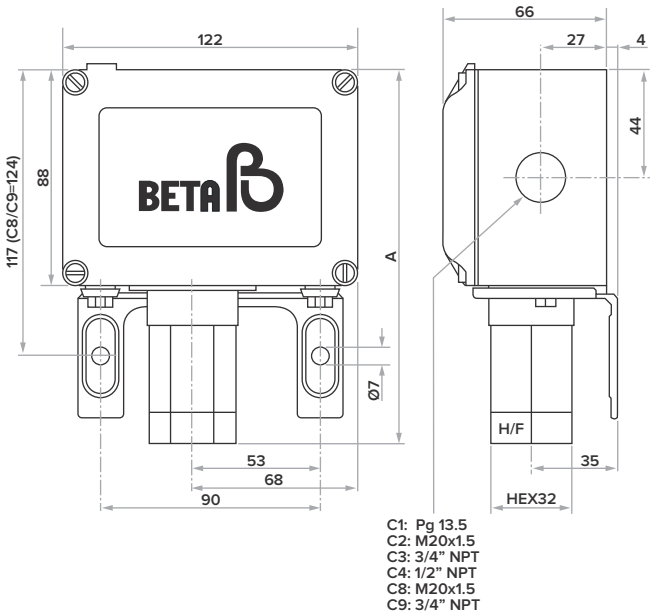
Marine appoval
- BETA Mini & C series (Limited pressure ranges) RINA

More certificates/reports are available.

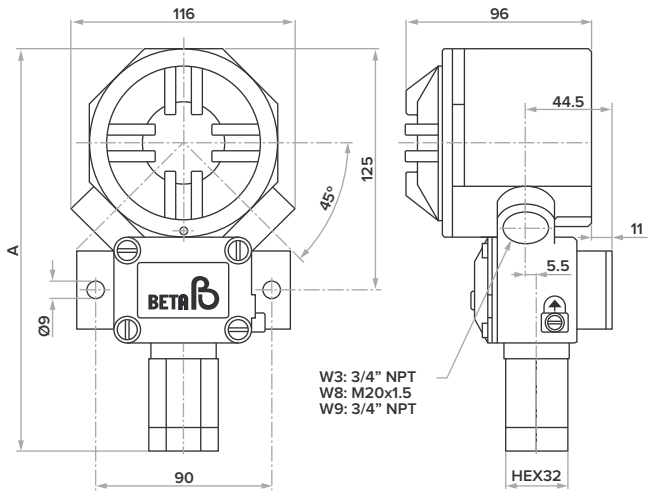


DIMENSIONS

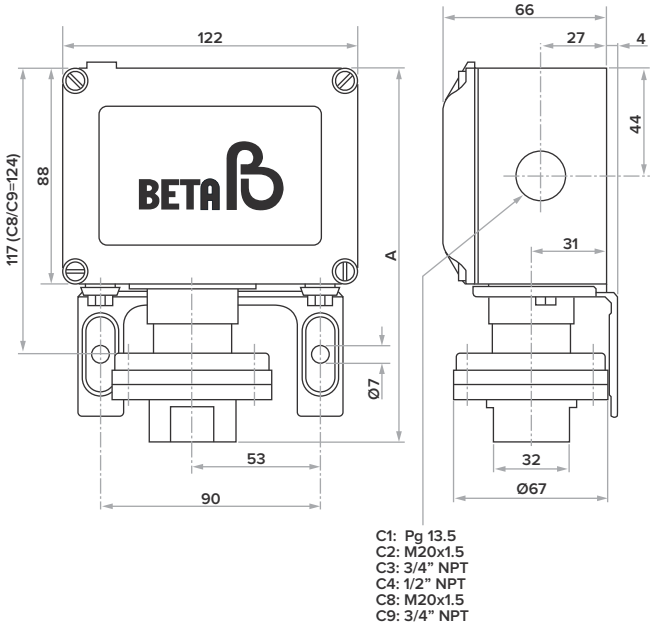
C & Z Series: Pressure & Vacuum 'P...H'



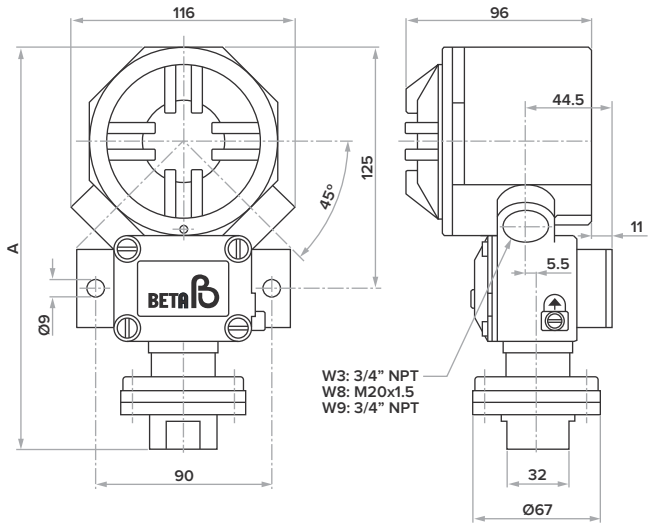
W Series: Pressure & Vacuum 'P...H'



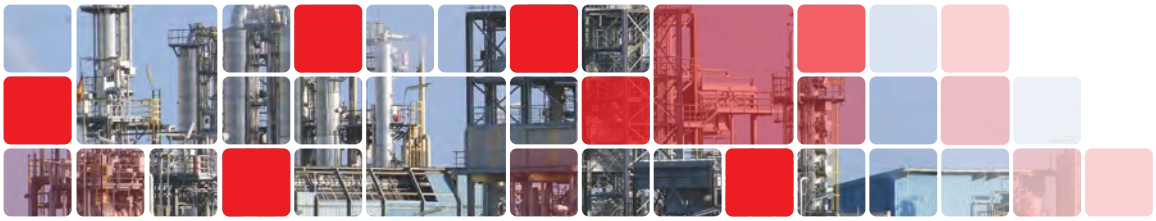
C & Z Series: Pressure & Vacuum 'P...M'



W Series: Pressure & Vacuum 'P...M'

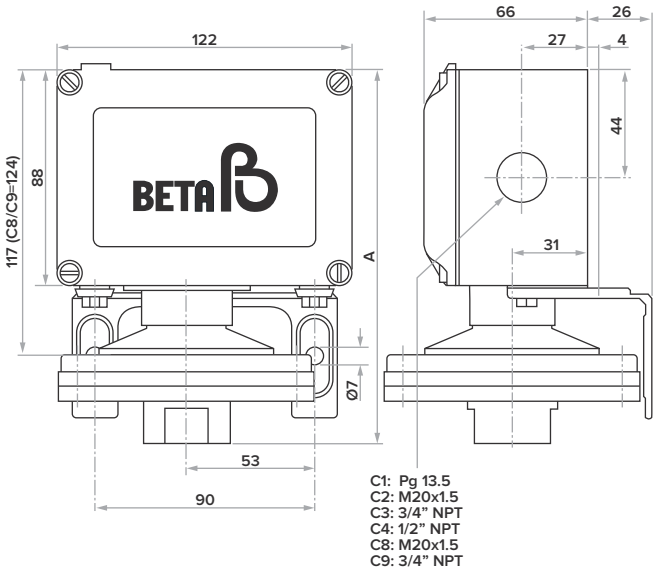


For specific details about the dimension 'A', please contact us

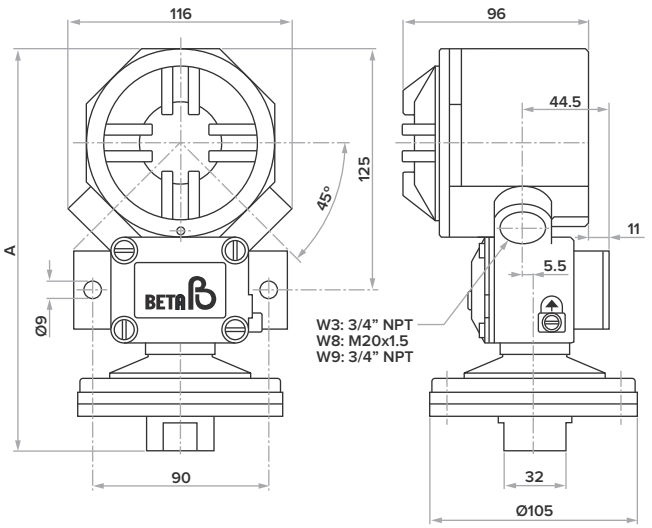


DIMENSIONS

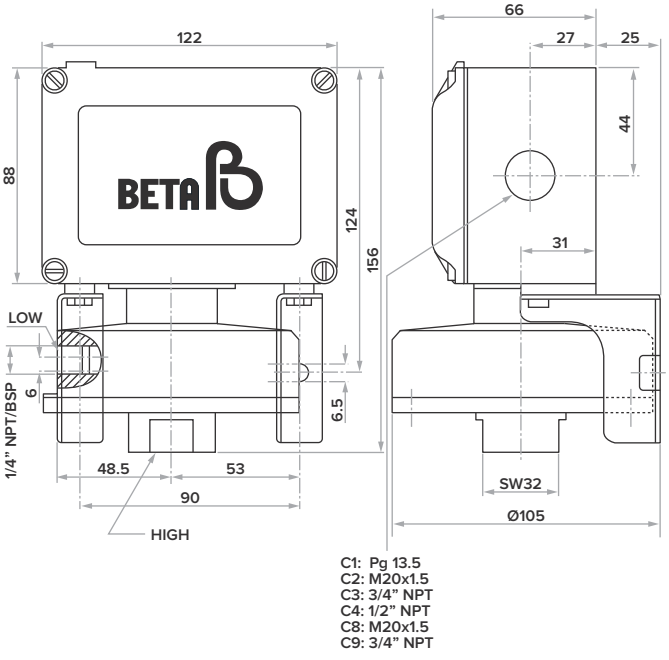
C & Z Series: Pressure & Vacuum 'P...L'



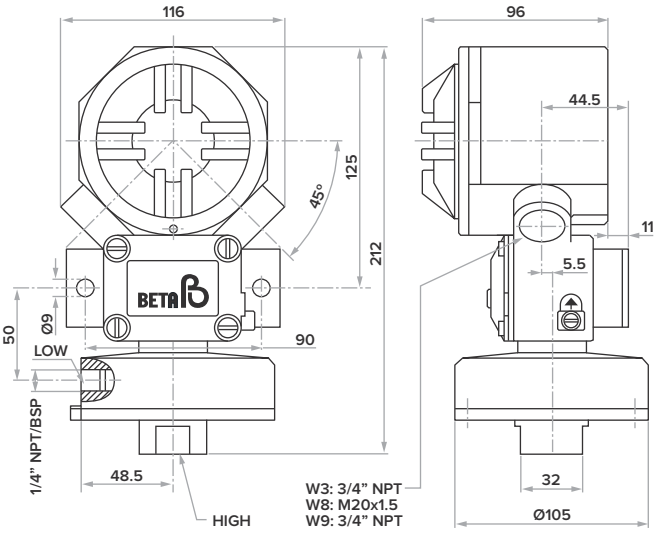
W Series: Pressure & Vacuum 'P...L'



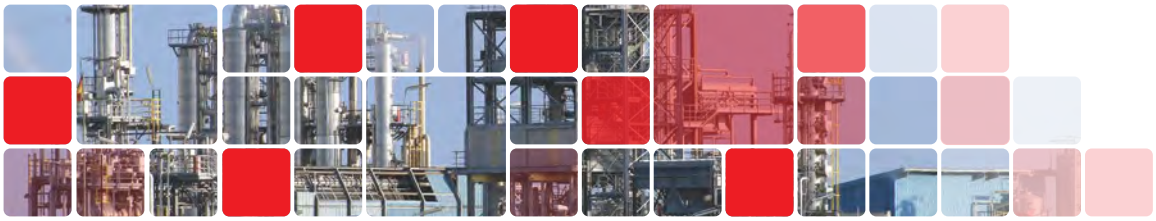
C & Z Series: Differential 'D...L'



W Series: Differential 'D...L'

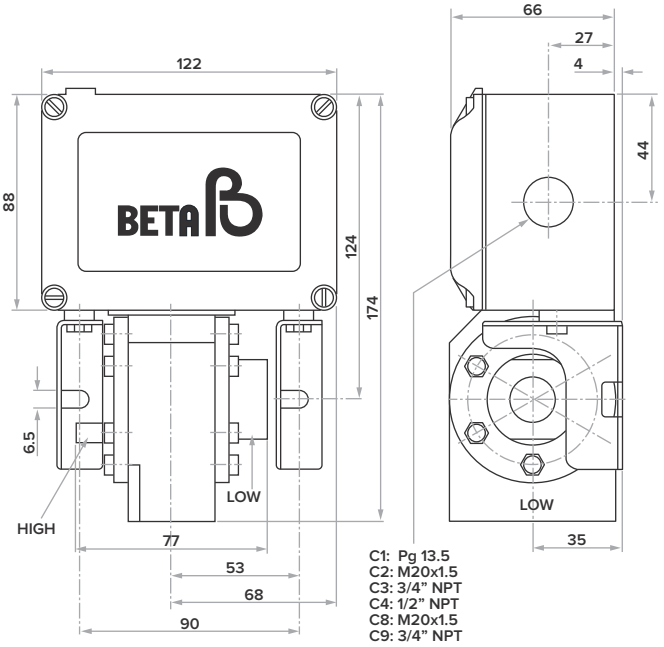


For specific details about the dimension 'A', please contact us

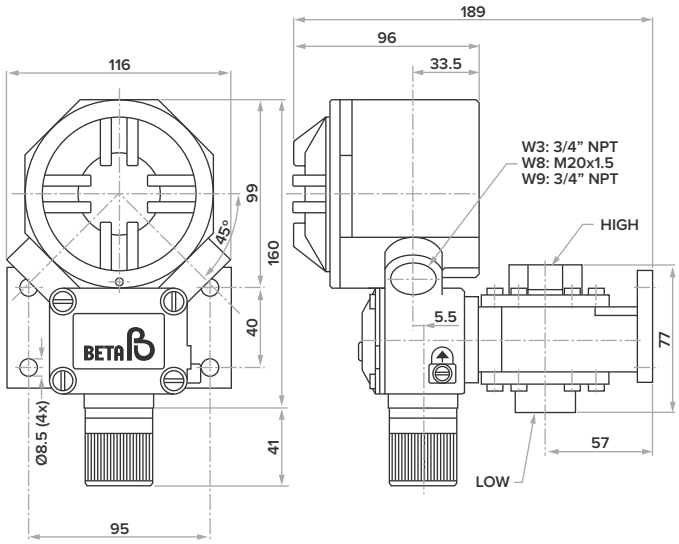


DIMENSIONS

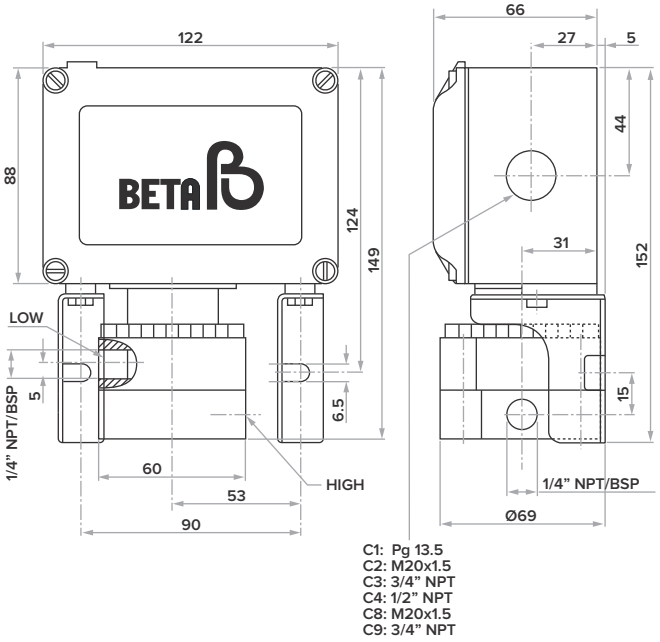
C & Z Series: Differential 'D...M'



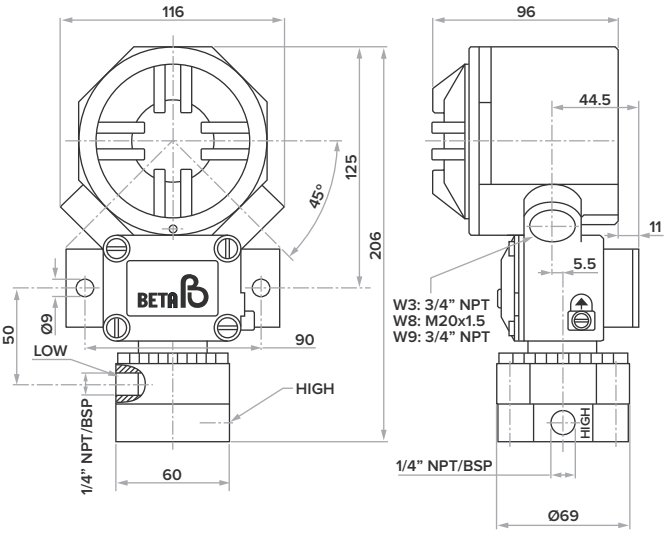
W Series: Differential 'D...M'

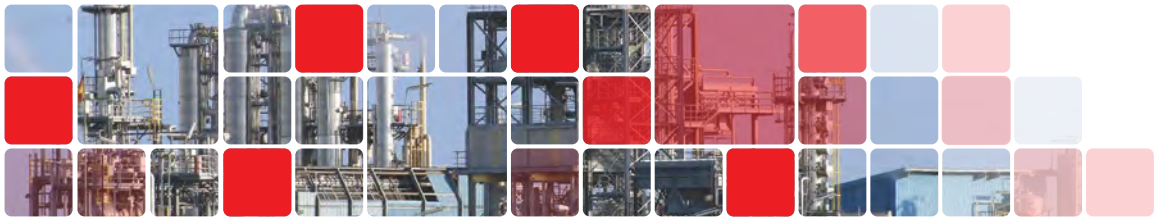


C & Z Series: Differential 'D...H'



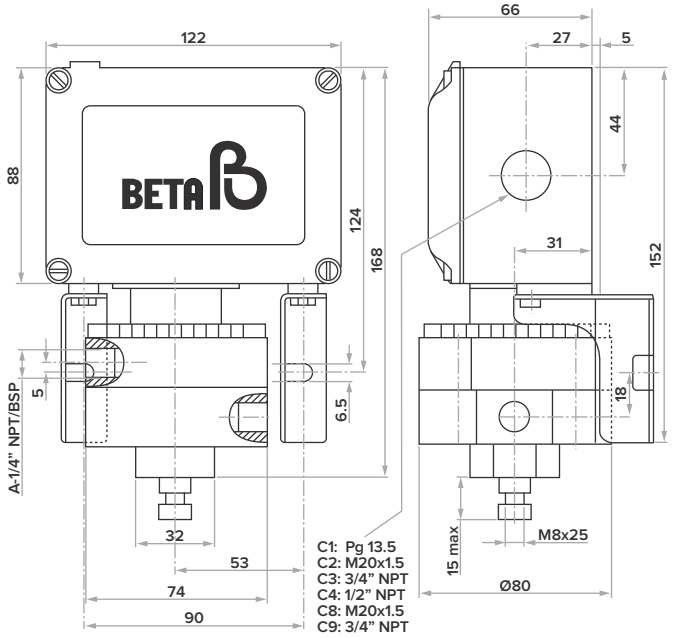
W Series: Differential 'D...H'



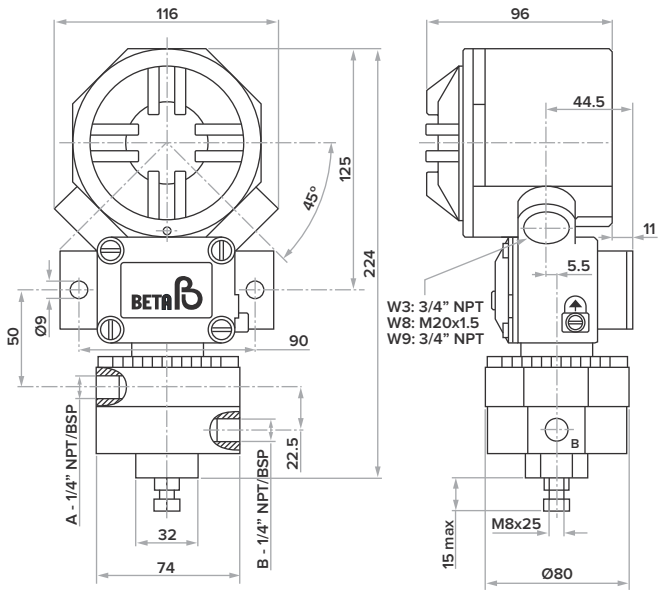


DIMENSIONS

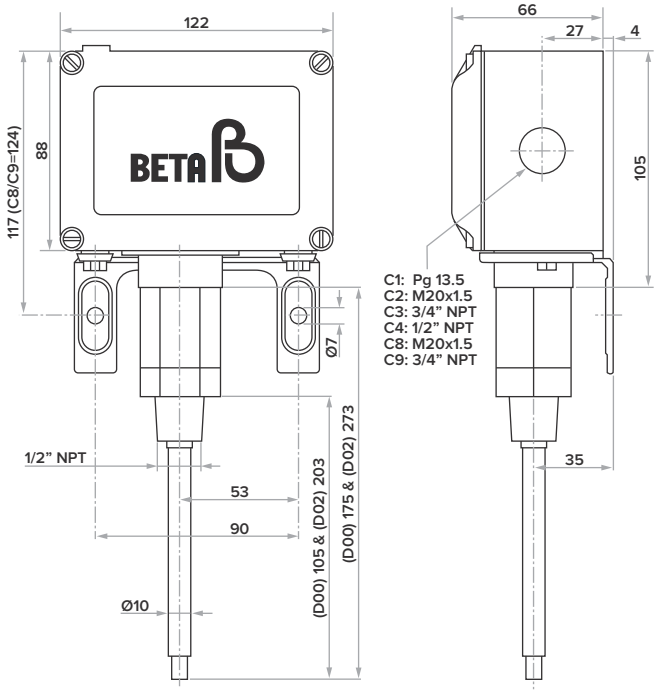
C & Z Series: Bi-directional Differential 'D...D'



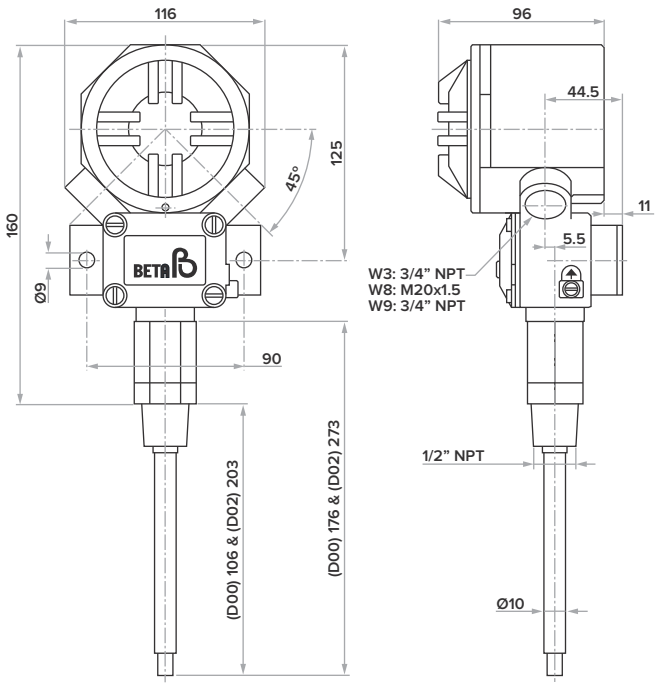
W Series: Bi-directional Differential 'D...D'

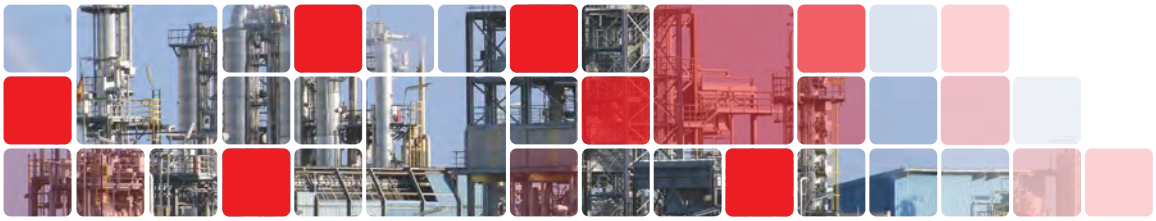


C & Z Series: Temperature 'T...H - D'



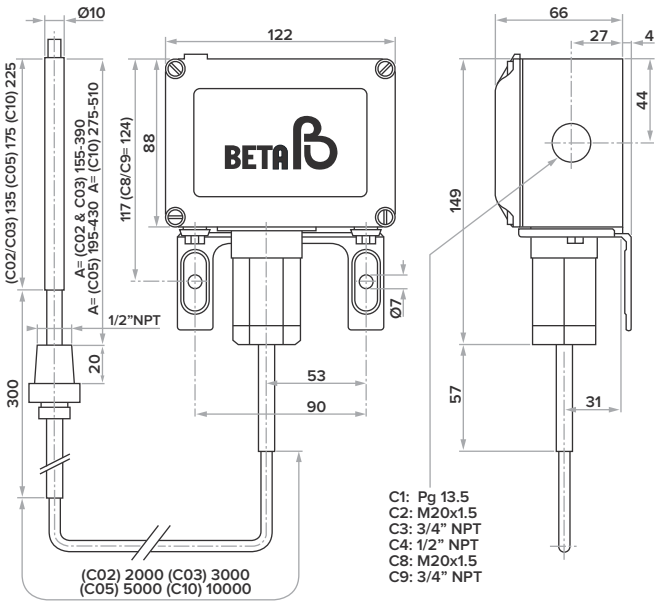
W Series: Temperature 'T...H - D'



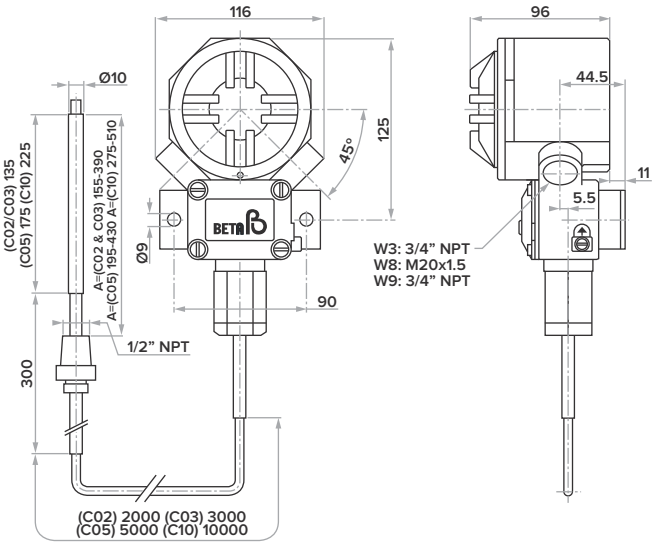


DIMENSIONS

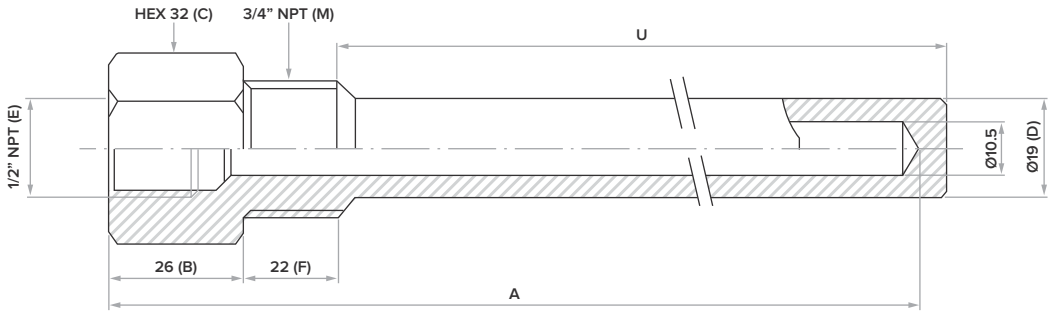
C Series: Temperature 'T...H - C'



W Series: Temperature 'T...H - C'



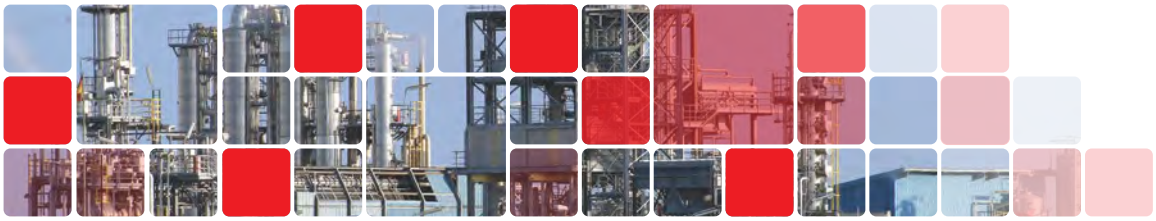
Accessories - Thermowell SS 316



CODE	INSERTION LENGTH U (MM)	INSERTION ELEMENT LENGTH A (MM)	FIT TO BETA TEMPERATURE SENSING BULB
TW 11	115	155	D00, C02, C03
TW 15	155	195	C02, C03, C05
TW 19	190	228	D02, C02, C03, C05

NOTES

- BETA thermowells to be ordered as a separate item
- Do not include thermowell code into the switch code
- Special thermowell possible, please contact us



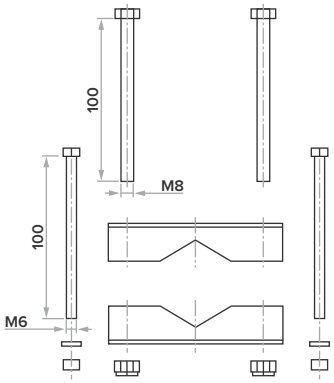
2” PIPE MOUNT BRACKET (SS 304)

Pipe Mount Bracket Contents

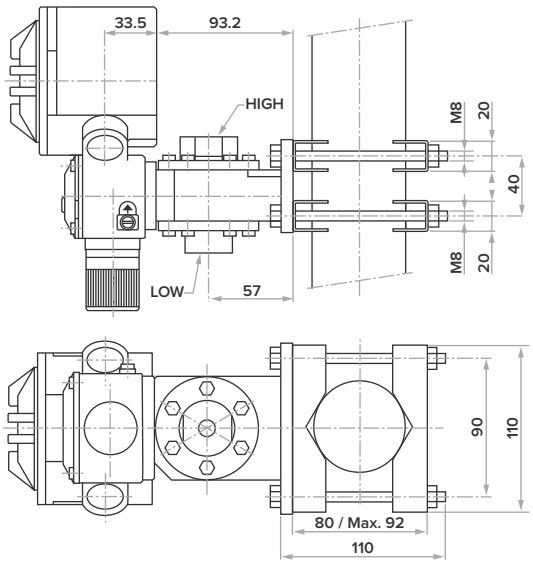
Contents
1. 2 x brackets +
2. 2 x bolts M8 x 100mm + nut (**W3**)
   or
   2 x bolts M6 x 100mm + washer + nut (**C**/**Z**)
   Size: +/- 1.5mm / material SS 304

Disclaimer
This pipe mount bracket is solely intended for use in combination with BETA pressure and temperature switches.

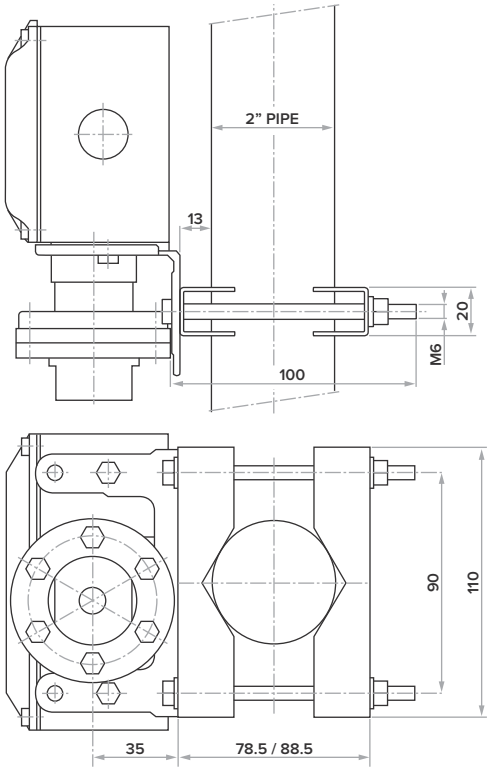
Foundation vibrations, as well as process vibrations, can disturb the proper functioning of the mounted instrument, the use of this bracket does not prevent or diminishes such occurrence.



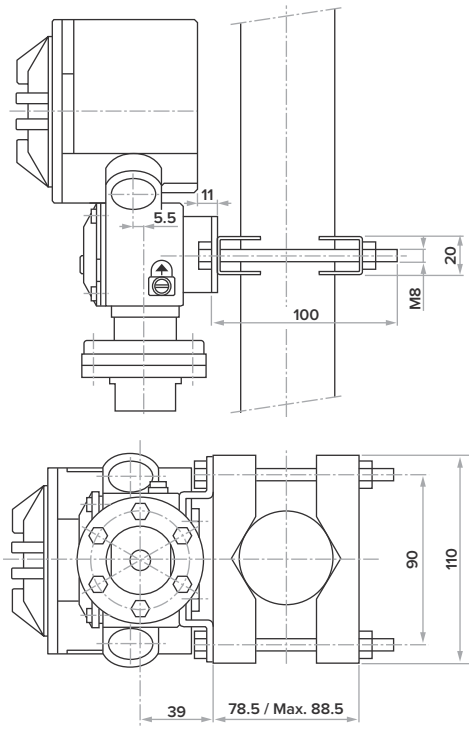
W Series Enclosure ‘**D**...**M**’ on 2” Pipe



C Series Enclosure on 2” Pipe



W Series Enclosure on 2” Pipe



Dimensions given here are for 1/4” and 1/2” (F) process connections: For ‘H’ sensor with 1/2” (F) add 4mm on ‘A’ dimension. Sizes in mm, tolerances ± 1.5mm.

W H Good Automation Ltd
Carrs Industrial Estate
Haslingden
Rossendale
Lancashire
BB4 5JT

Tel 01706 216667
Email instruments@whgood.co.uk
Web whgood.co.uk