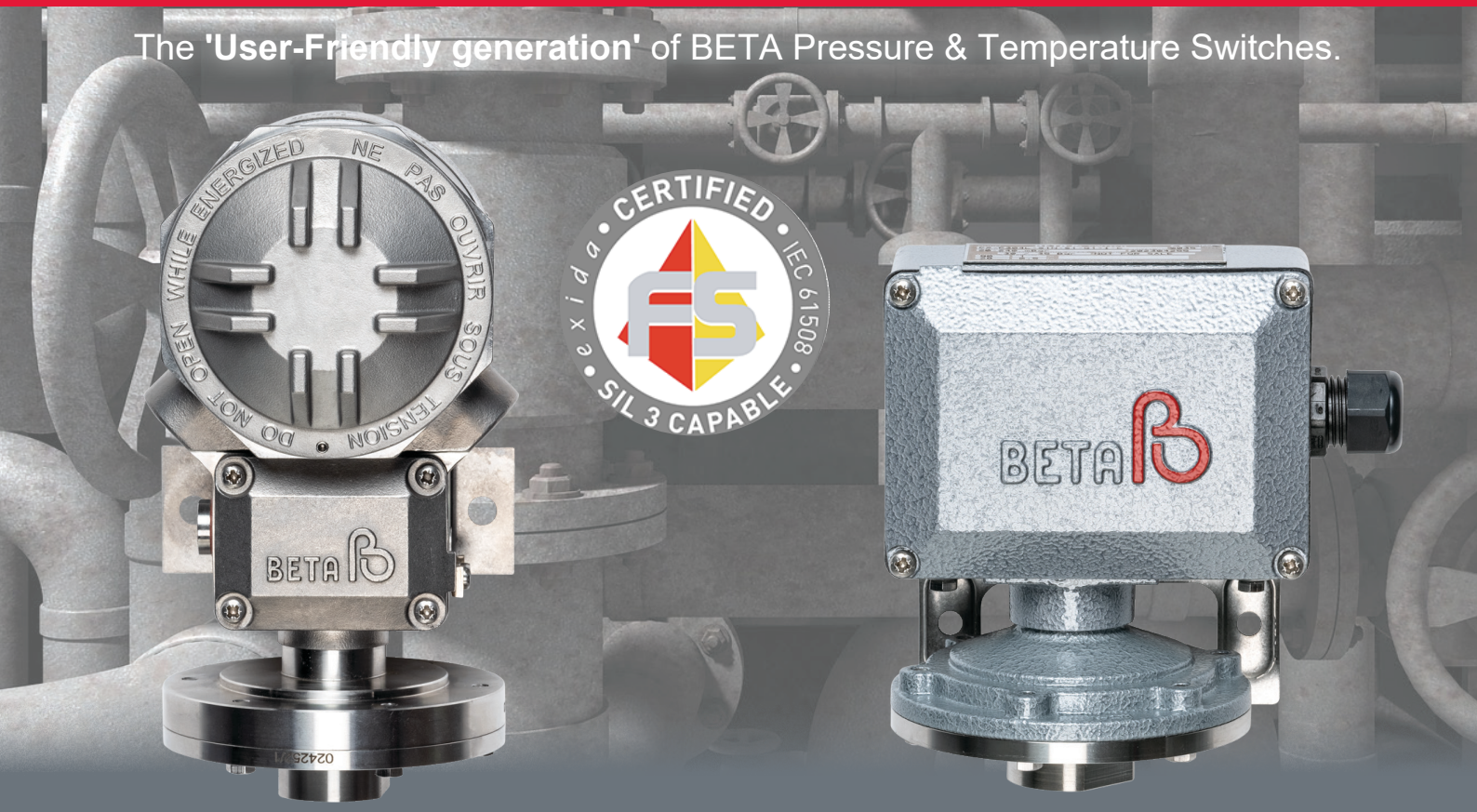
BETA®
PRESSURE & TEMPERATURE SWITCHES

Pressure & Temperature
C & W - Series
Switches

The **'User-Friendly generation'** of BETA Pressure & Temperature Switches.



Safety:
- Safe, secure electrical hookup by clamp terminals.
- Standard earth terminal.
- IP 66 enclosure (NEMA 4X).
- Solid cover with gasket and captive screws.

Reliability:
- Highest overrange protection.
- Spring loaded piston, excellent resistance against shock and vibration.
- Flexible stainless steel mounting bracket to avoid. pipe strains on the instrument to cause shift of setpoint.

Product Approvals:
- Complete W-Series is explosion safe certified in EU (ATEX), in USA (FM), in Canada (CSA), world wide IECEx. C-series Option i is intrinsically safe certified in EU, in USA (FM), and world wide IECEx. All switches are certified acc. PED. All switches are SIL 3 certified.

Quality and Factory approvals:
- DNV certified Quality Assurance according to ISO 9001 – 2015 and ISO 14001 - 2015, covers all switch manufactuing, engineering and design.
- TÜV: PED Module D, cert. CE 0035.
- DEKRA: ATEX Annex VII, 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 might be a standard for us. Please contact us to discuss your requirements*

- "We will be pleased to advise you" -

MANAGEMENTSYSTEEM CERTIFICATIE DNV ISO 9001

THE "USER FRIENDLY" GENERATION

The BETA principle:

"A high quality, self-aligning springloaded/- piston sensor is the heart of each BETA switch. The limited piston travel transmits pressure at the process diaphragm directly to the microswitch, with no intervening linkages or mechanisms while providing full protection against high overrange pressure".

"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 (3) are the only process wetted parts and are available in an extensive range of materials."(*)

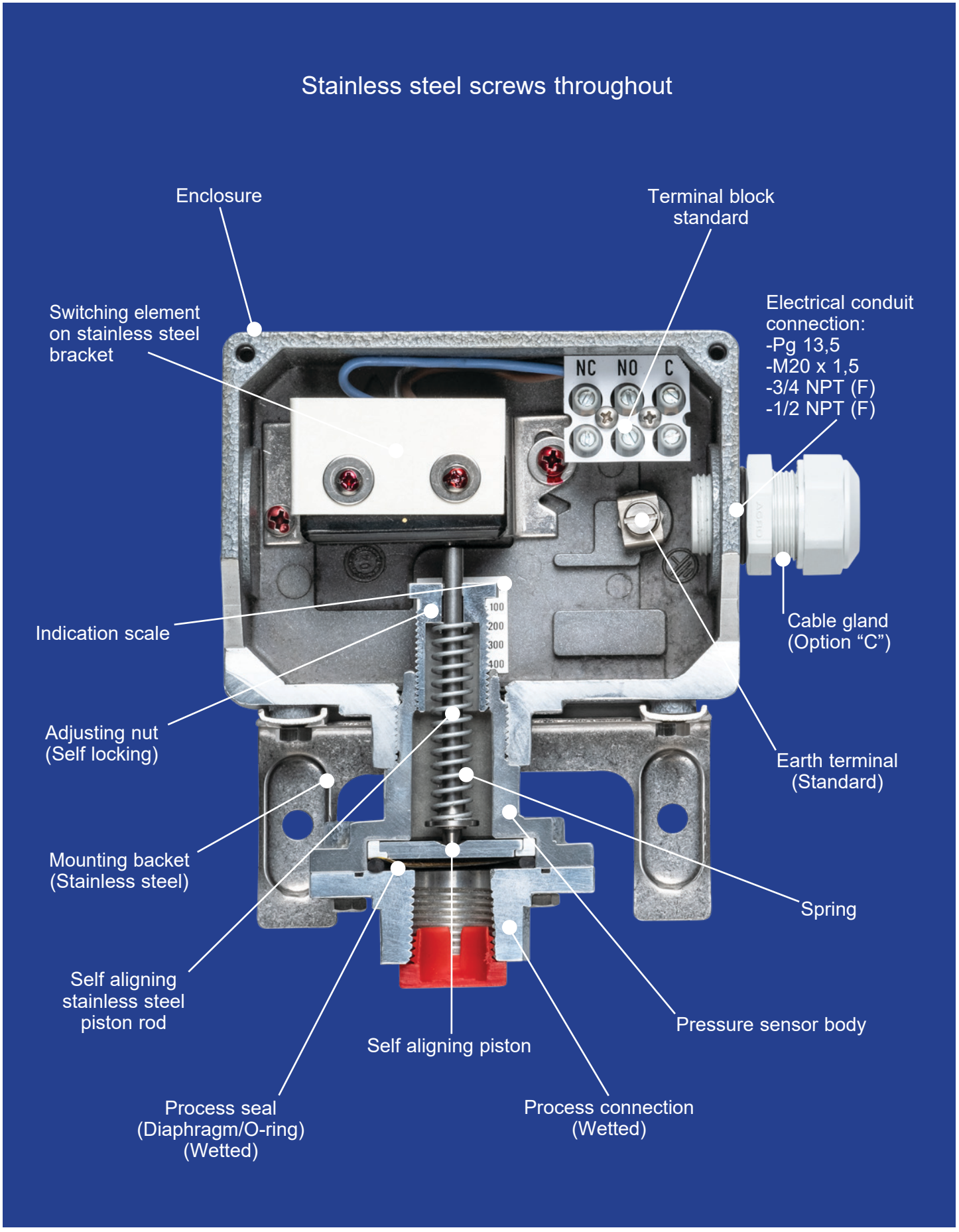
(*) A BETA vacuum switch contains also a vacuum piston and spring (SS 316) on the wetted parts side.

> The BETA switch has "designed-in" reliability <

- The "**User Friendly Generation**" is no idle boast.
  BETA can – *and always will* – 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 virtually all known switch applications.
- Major users all over the world, in all areas of industry, already enjoy the benefits of

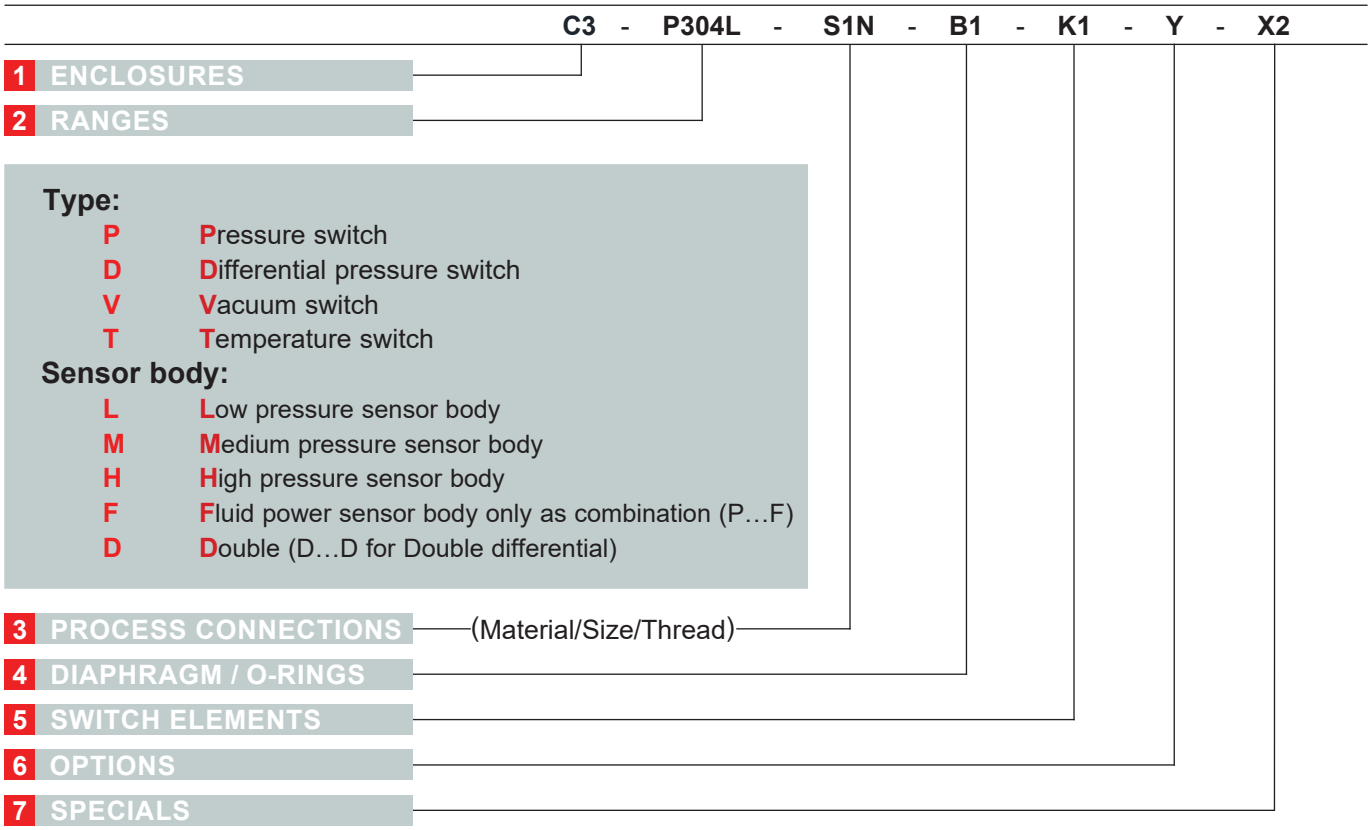
BETA's "User Friendly" Switches.

BETA SWITCH PRINCIPLE



Guide Of How To Select Your BETA Switch:

BETA uses a simple and logical **modelcode** system for easy, accurate product specification, project coordination, efficient document handling and after sales service.



To Select Your Switch:

Follow section 1 through 5

If required: For *"Optional"* and *"Special"* accessories Follow section 6 or 7 .

Ambient temperature:

Standard: -30 to +80°C

W-Series for T5 - **Ex d:** -60 to +70°C CSA/FM: -40 to +80°C :

W-Series for T6 - **Ex d:** -60 to +70°C CSA/FM: -40 to +70°C :

C-Series - **Ex i:** -60 to +70°C

Repeatability:

± 0.2% of Full Range* (measured at 68°F ambient temperature acc. to ANSI/I.S.A.-S51.1-1979).

Tagging & Setting:

BETA will free of charge, add your tag no. (Max. 14 digits) on the nameplate and set the pressure switches at desired setpoint if this is requested on your order.

Temperature switches can also be set at an additional charge.

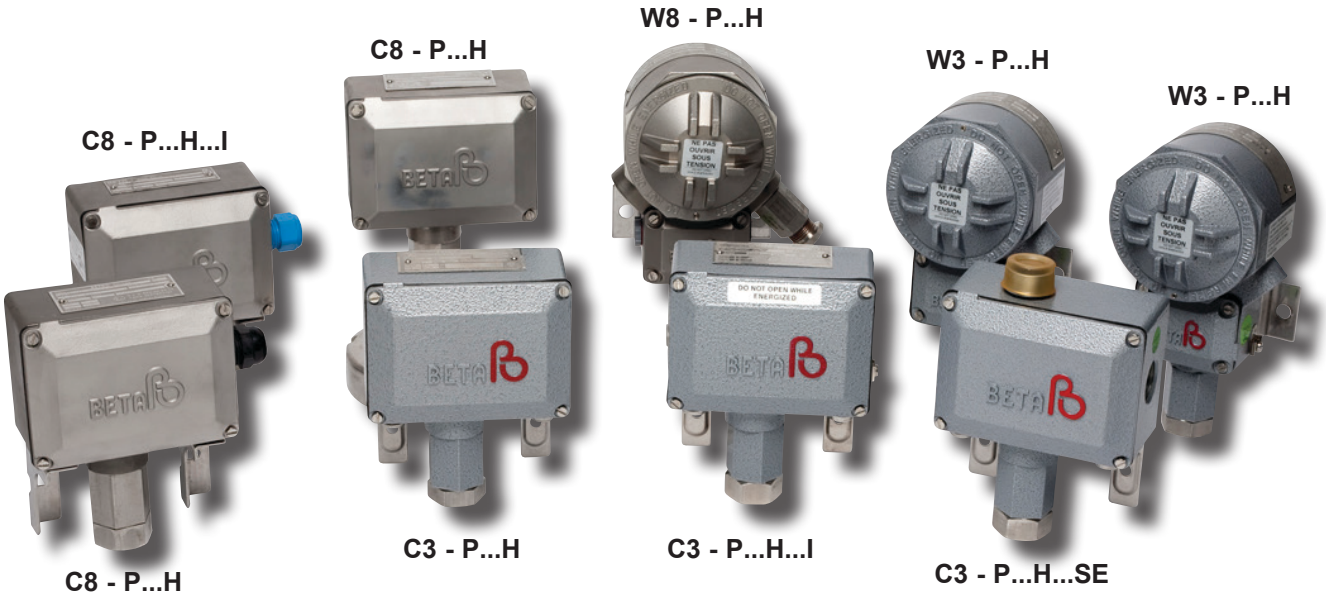
Limited Factory Warranty:

36 months from Ex-Works date Rijswijk/ - The Netherlands excluding any wetted parts

** For standard BETA switch with "K1" switching element and "B1" Diaphragm/ O-ring*

1 Enclosure:

C3 - P304L - S1N - B1 - K1 - Y - X2



ENCLOSURE CODE	CLASSIFICATION	ELECTRIAL COND. CONN.	MATERIAL	EARTH TERMINAL	TERM. BLOCK	TYPE OF SENSOR				
						Press.	Fluid P.	Vacuum	Diff.	Temp.
C1 3)	Weathertight (IP66) Intrinsically safe (with Option "I") Ex ia / ib	PG 13,5 2)	Aluminium	Standard (Internal)	Standard	√	√	√	√	√
C2 3)		M20 x 1,5								
C3 3)		3/4" NPT (F)								
C4 3)		1/2" NPT (F)								
C8		M20 x 1,5	1) 316 SS							
C9		3/4" NPT (F)								
W3 3)	Weathertight (IP66) Explosion-proof	3/4" NPT (F)	Aluminium	Standard In- & External	Standard	√	√	√	√	√
W8		M20 x 1,5	1) 316 SS							
W9		3/4" NPT (F)								

*** 2" Pipe mount bracket sets available, see page 31.*

1) Includes SS 316 sensor body and adjusting nut.

2) All differentials except D..D - type

3) Powder coated acc. to BETA SP025,
dry film thickness approx. 70 microns finish hammertone silver/grey high gloss.
Due to the nature of hammertone finish color difference might be visible and cannot be avoided.

NOTE:
BETA also manufactures an OEM modelrange called, B2 BETAMINI,
ask for our separate catalogue (SP.240).

Or check our website www.beta-b.nl / - at the download section.

2 RANGES for Pressure switches:

C3 - **P304L** - S1N - B1 - K1 - Y - X2

"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 max. possible values for a standard micro switch & diaphragm/ O-ring combination. Deadband and varies nearly linear with setpoint between indicated limits of range and should be multiplied by deadband multipliers as given in section 4 and 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.

RANGE CODE	ADJUSTABLE RANGE		MAX. 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** -micro switch element.

RANGES for Fluid power switches:

RANGE CODE	ADJUSTABLE RANGE		MAX. 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.

RANGES for Vacuum switches:

RANGE CODE	ADJUSTABLE RANGE (Incr. VAC. to Press.) 1)		MAX. DEADBAND (VAC. / PRESS.)		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**	[80/80/250]	[mbar]	-1	**bar**	+200	**bar**	+600	**bar**

1) For setpoint around 0 bar gauge, please consult your local representative.

2) **Stability of setpoint around 0 bar gauge, is not guaranteed.**

2 RANGES for Differential switches:

C3 - **D352H** - S1N - B1 - K1 - Y - X2

RANGE CODE	ADJUSTABLE RANGE DIFF. RANGE 1)		TYPICAL DEADBAND 1)		MAX. STATIC PRESSURE		MAX. OVERRANGE PRESSURE		PROOF PRESSURE	
P 301 L-..-D 6)	[2 - 15] 2)	[mbar]	[1,1-1,97]	[mbar]	10	**bar**	10 4)	**bar**	15	**bar**
D 302 L	[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]						

RANGES for Bi-Directional:

D 356 D	[100 - 1500]	[mbar]	[35 - 65]	[mbar]	200	**bar**	200 5)	**bar**	200	**bar**
D 358 D	[100 - 3500]	[mbar]	[45 - 115]	[mbar]						

NOTES:

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 differential pressure P-Low max. 1 bar above P-High.

4) P 301L...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.
- For more details, page 16.

The following table show the **INFLUENCE** for **INCREASING STATIC PRESSURE:**

SENSOR	SETPOINT	DEADBAND
P301L-...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 Diff. setpoint: 1 bar (1000 mbar).
If static pressure increases 10 bar then the differential setpoint will be:
(10 times – 2 mbar) = 20 mbar - 1000 mbar = 980 mbar.

NOTE:
For differential application outside above ranges consult your BETA Representative.

3 Process Connections:

C3 - P304L - **S1N** - B1 - K1 - Y - X2

PROCESS CONNECTION SIZE/ CODE	WITH SENSOR 1)	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				
Not for vacuum 2) 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**
"**M**"edium & "**H**"igh pressure sensor body : **S1N or S1B**
"**F**" luid power pressure sensor body : **B1N or B1B**
Differential switches: **D...H**, **D...D**, **D...M** : **S1N or S1B**
D...L : **A1N or A1B; For Low side only**
HIGH side: **Only "L"-sensor connections**

2) **Vacuum switches**: Process connection size max. 1/2". Vacuum piston & spring (both wetted) standard in 316 SS.

NOTES:
> Process connection according to NACE standards are available, consult your BETA Representative.

Materials such as PVC, Hastelloy, Titanium, special sensor sizes and Teflon lined flanged connections are available on request.

4 Diaphragm/ O-rings:

C3 - P304L - S1N - **B1** - K1 - Y - X2

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
E6	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 permeativr gases and non-acid liquids. Select O-ring as required.	2.0
T2		Viton-A 5)		
T3		Neoprene		
T4		PTFE 4)		
T5		Kalrez		
V2	Viton-A	Viton-A 2) 5)	Process temperature NOT below minus 10°C. 7)	1.5
S0	SS 316 Welded diaphragm	None 3)	Highly permeative gases. 7)	3.0
M0	Monel Welded diaphragm			

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 temperatures beyond these limits please contact your BETA Switch Representative.

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

3) Only for 1/4" & 1/2" process connections. Not available on vacuum switches. For other sizes and materials, consult your BETA Switch Representative.

4) PTFE O-ring **not suitable** for vacuum switches or vacuum surge conditions.
(Wetted internal spring of Co-Cr-Ni-Mo alloy, comparable with Elgiloy).

5) For process temperature > 100°C, consult your BETA Switch Representative.

6) Other diaphragm materials like Hastelloy available, consult your BETA Switch Representative.

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

4 Diaphragm/O-rings:

C3 - D352H - S1N - **P1** - K1 - Y - X2

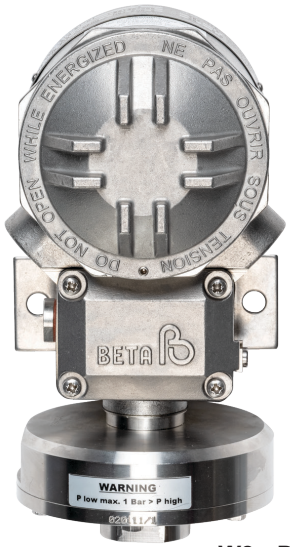
C2 - D...M

C3- D...H

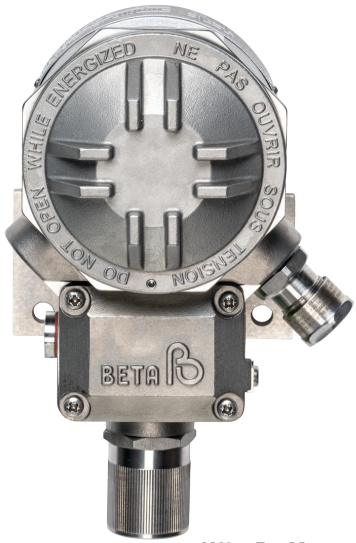
Differential Pressure Switches include a similar type of Diaphragm/O-ring combinations as for Pressure Switches, but the following must be considered:

TYPE	STANDARD	FOLLOWING COMBINATIONS ARE POSSIBLE:
P301L/ 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.



W8 - D...L



W3 - D...M

W3 - D...L

5 Switching Elements:

C3 - P304L - S1N - B1 - **K1** - Y - X2

SWITCHING ELEMENT CODE 1)	USE		MAX. RATINGS (RES.)		DEADBAND MULTIPLIER	
			VAC.	VDC 8)	S.P.D.T.	D.P.D.T.
H1 (SL)	Herm. sealed	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 (Ex)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 (IP 67). 2)	250/ 0.1A	30/ 0.1A	3.0	4.5
N1 10)	Silver contacts	Environmental proof (IP 67).	250/ 2A	30/ 2A	3.0	4.5
Z1 10)	For higher (amb.) temp.	Nickel Alloy spring. For corrosive environment.	250/ 5A	125/ 0.3A	3.0	4.5
R1	Ex. Proof.	ATEX approved.	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)		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		Consult BETA Switch Rep.	Single Only
SB 3)		Normally open (NO).				

1) For D.P.D.T. action second code figure should be specified as “2” (Example: K1 = S.P.D.T ./ K2 = D.P.D.T.).

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 ask your BETA representative for Air Relay documentation.

8) For DC rating resistive loads are stated.

9) In “W...” Enclosure max 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. Consult your BETA Switch Representative.

Note:

> Micro switches 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 modelcode 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 similar model, the reset switching point can vary.

> Proper application of SR and SP micro switches requires accurate statement of values to the setpoint and required reset setpoint.

If you have any specific question or requirement contact us at: **2sales@beta-b.nl**

5 Switching Elements vs. Enclosures:

C3 - P304L - S1N - B1 - **K1** - Y - X2

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

POSSIBLE

NOT POSSIBLE

"**SA**" / "**SB**" only
with **C3** enclosure, pneumatic connection (Brass) and **C8** enclosure with SS316 connection.

The standard switching elements are:

- "**K1**" for C- and W- enclosures.
- "**L1**" for P301L/ P302L/ D302L range.

6 Options:

C3 - P304L - S1N - B1 - K1 - **Y** - X2

CODE:		DESCRIPTION:
B	1)	Industrial cleaning of "wetted" parts for oxygen services.
C		Cable gland (Weather proof IP66, Ex e, Ex d, Ex t in acc. with classification of enclosure).
I	5)	Intrinsically safe application Ex i. Only on "C"-Series.
M	2)	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	3)	Stainless steel Tag key ringed to enclosure. Tag has 2 lines (16 characters per line).
V		Fungicidal varnish coating (internal).
Y	4)	Epoxy coating of switch (external). Only in combination with SS 316 process connection. SS Parts are not coated.

Option C:

C-enclosure:	**ENTRY SIZE:**	**CLAMPING RANGE** (IN MM)**:**
	PG13,5	8 - 11 MM
	M20	6 - 12 MM
	1/2"NPT	6 - 12 MM
	3/4"NPT	9 - 16 MM

W-enclosure:	**ENTRY SIZE:**	**CLAMPING RANGE** (IN MM)**:**
	M20 Ex d	6,5 - 11,9 MM
	3/4"NPT Ex d	10 - 14,3 MM

Note:
BETA`s standaard Cable Gland as supplied per (option "C") does not include special(s)

1) Option **B** - Oxygen cleaning acc. SP19.
Not possible for D..H ranges/ for G3-P301L-..D and D..L ranges on Hi-side connection only.

2) Option **M** - Is only to intend to provide a limited protection against surge/ vacuum conditions, as which can occur during start-up conditions or repetitive applications (pumps/ compressor). So short occurances over a limited period of time.
It is not intended for continous surge/ (full) vacuum conditions over an extended period of time.

Indication:

RANGE:	Max. Surge Pressure:	Approx. period of time: (minutes)
P3..L	-200 mBarg	60
P4..M	-200 mBarg	60
P5-7-8-9..H	-600 mBarg	90

- Values stated here for indicative purpose only, they do not constitute any true value or any kind of warranty.
- **Option M** - is considered as wetted part and as such is explicitly excluded from the BETA factory warranty.

Tag no. space on nameplates are added free of charge

3) 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.
Option **"S"** : 2 lines with 16 characters or spaces.
Only if explicitly stated on your purchase order. If not it will be left blanc

4) Air dried system acc. to BETA procedure, dry film thickness approx. 200 µm, finish pearl grey gloss.

5) **Ex I certification** is under review due changing standard.
To become applicable 2nd half 2024.
* *Consult factory in case needed*

7 Specials:

C3	-	P304L	-	S1N	-	B1	-	K1	-	Y	-	X2

We can incorporate many specials to meet your requirements.
These special requirements are indicated by the letter "**X**" in the modelcode positioned or at the end of the model number, followed by a figure showing the number of specials.

Example:

"X1" at the end of modelcode reference means one special.

"X2" at the end of the modelcode 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).
  In case of **Option I** - 47 Kilo-ohm (kΩ) ≥ higher.
- Hirschmann or Harting Connector.
- Moisture inhibitor.
- Chemical seals.

RECAPTURE: HOW TO SELECT YOUR BETA SWITCH

1 ENCLOSURES

C3	-	P304L	-	S1B	-	S2	-	K1	-	Y	-	X2

See section **1. Enclosure** on page 5.

2 RANGES

C3	-	**P304L**	-	S1B	-	S2	-	K1	-	Y	-	X2

See section **2. Range** on page 6, and 7.

3 PROCESS CONNECTIONS (Material / Size / Thread)

C3	-	P304L	-	**S1B**	-	S2	-	K1	-	Y	-	X2

See section **3. Process connections** on page 8.

4 DIAPHRAGM /O-RINGS

C3	-	P304L	-	S1B	-	**S2**	-	K1	-	Y	-	X2

See section **4. Diaphragm / O-rings** on page 9 and 10.

5 SWITCHING ELEMENTS

C3	-	P304L	-	S1B	-	S2	-	**K1**	-	Y	-	X2

See section **5. Switching Elements** on page 11 and 12.

Selection of your switch is now completed.

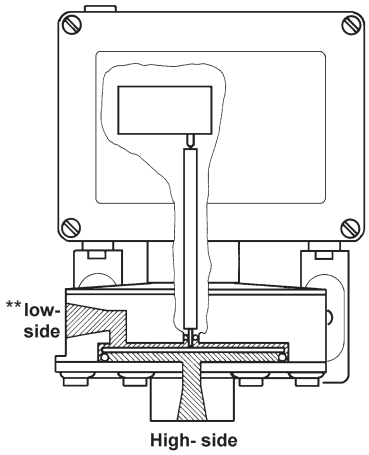
If required: For **"Optional"** and **"Special"** requirements
Options : See section "**6. Options**" on page 14.

Specials: See section "**7. Specials**" on page 14.

DIFFERENTIAL PRESSURE SWITCHES

The "User Friendly" generation of BETA switches offers you,
a complete range of - Differential Pressure Switches.

LOW RANGE — "D...L"- SERIES



Principle: As pressure switch, with sealed Aluminium sensorbody (optional in 316 SS).

Range: 12 - 1250 mbar.
Max. Static Pressure: 30 bar.

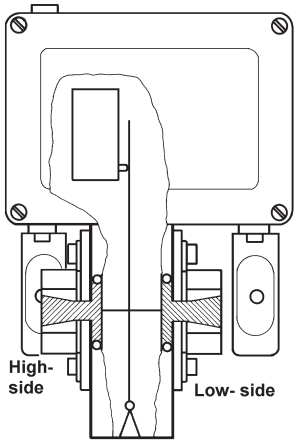
Application: Dry clean air, inert gases and clean non-corrosive fluids and gases.

Execution: Weathertight IP 66 (C-enclosure),
Ex i a/b (C-enclosure + option I),
Ex d, Ex t (W-enclosure).

*** Low side only available in 1/4 NPT/ BSP F aluminium or 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.

GENERAL PURPOSE — "D...M"- SERIES



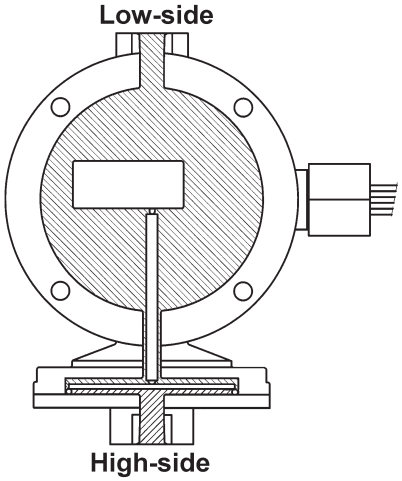
Principle: 2 x piston/diaphragm type with seperate sealing for High and Low.

Range: 0.3 - 70 bar.
Max. Static Pressure: 140 bar.

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

Execution: Weathertight IP 66 (C-enclosure),
Ex i a/b (C-enclosure + option I),
Ex d, Ex t (W-enclosure).

VERY LOW RANGE — "P301L- .. - D"- SERIES



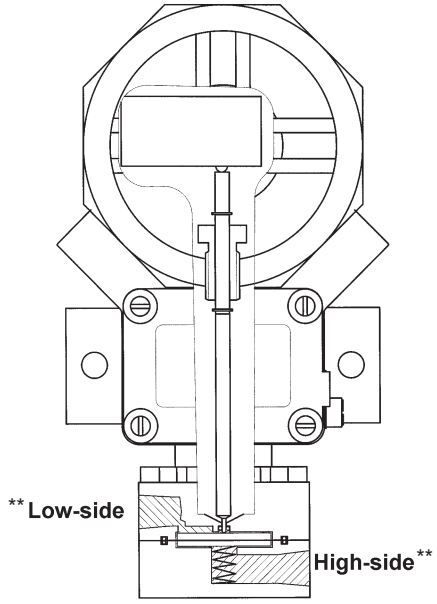
Principle: As pressure switch in sealed. Aluminium enclosure.

Range: 2 - 15 mbar. (With "L1" micro only).
Max. Static Pressure: 10 bar.

Application: Dry clean air inert gases (Low side only).

Execution: Weathertight IP 66,
(G3 enclosure only) with potted wire leads.

LOW RANGE / HIGH STATIC "D... H"- SERIES



Principle: Piston type with single diaphragm, sealed in 316 SS sensorbody.

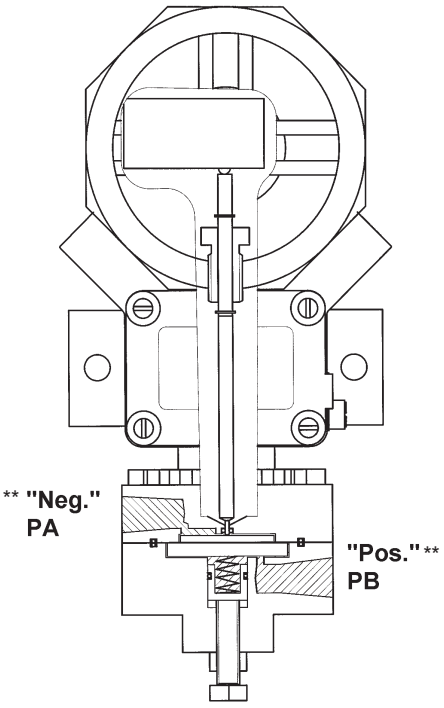
Range: 80 – 3450 mbar
Max. Static Pressure: 200 bar

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

Execution:
Weathertight IP 66 C-enclosure,
Ex i a/b C-enclosure + option I,
Ex d, Ex t W-enclosure

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

LOW RANGE / HIGH STATIC "D...D"- SERIES



Bi-Directional Differential Pressure Switch

Principle: Piston type with single diaphragm, sealed in 316 SS sensorbody.

Range: 0,1 – 3,5 bar
Max. 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 IP 66 C-enclosure,
Ex i a/b C-enclosure + option I,
Ex d, Ex t W-enclosure.

*** Neg./ Pos. 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.

TEMPERATURE SWITCHES

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 increases simultaneously.

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.
- In weathertight and explosion proof models (ATEX approved).
- Fits into most standard thermowells (10,5 mm bore).
- No need for ambient temperature compensation (No setpoint shift).
- Excellent repeatability/small dead-band.
- All 316 stainless steel sensor and capillary (SS armored).
- Filling system of gas/liquid acc. to SAMA-Class II C.

“C”- Series with Direct mount type sensor.

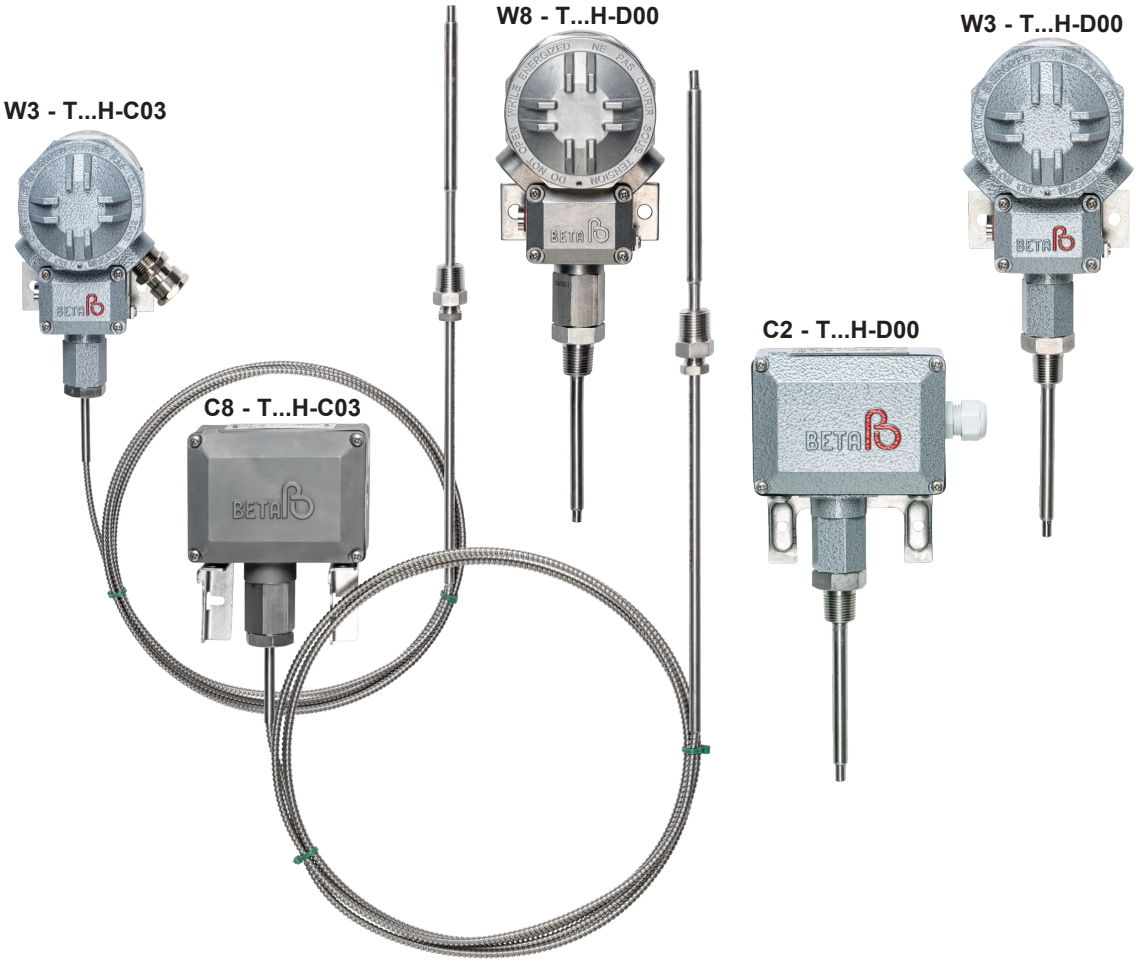
EXPLOSION-PROOF TEMPERATURE SWITCH

With the W-enclosure or the C-enclosure Option i,
the BETA Temperature Switch is approved for
ATEX, IECEx, FM, CSA and several more,
acc. EN 60079 standards

“W”- Series with Capillary type sensor.

1 Enclosures:

C3 - T548H - D00 - S0 - K1 - Y - X2

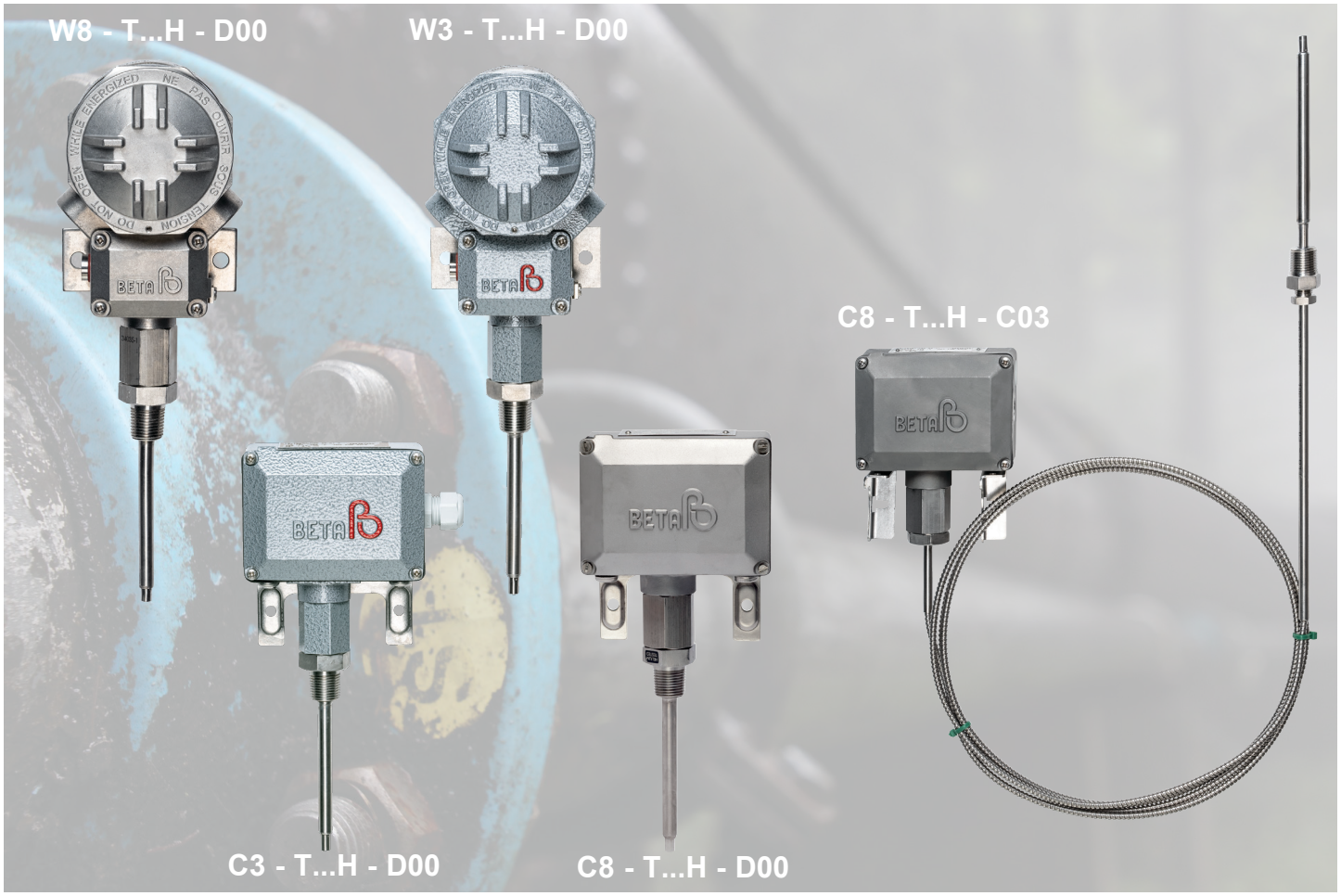


SENSOR CODE:	CLASSIFICATION:	ELECTRIAL COND. CONN.:	MATERIAL:	EARTH TERMINAL:	TERM. BLOCK:
C1	Intrinsically safe (with **Option "I"**) Ex ia/ ib	PG 13.5	Aluminium	Standard (Internal)	Standard
C2		M20 x 1.5			
C3		3/4" NPT (F)			
C4		1/2" NPT (F)			
C8		M20 x 1.5	SS 316 1)		
C9		3/4" NPT (F)			
W3	Explosion-proof ATEX & IECEx: Ex db Ex tb	3/4" NPT (F)	Aluminium	Standard In- & External	Standard
W8		M20 x 1.5	SS 316 1)		
W9		3/4" NPT (F)			

1) Includes SS 316 sensor body and adjusting nut.

2 Ranges:

C3 - **T548H** - D00 - S0 - K1 - Y - X2



RANGE CODE	ADJUSTABLE RANGE		MAX TYPICAL. DEADBAND 3)		MAX. TEMPERATURE		PROOF TEMPERATURE		MAX. PROCESS PRESSURE	
T 528 H	-40 / +40	**°C**	3	**°C**	+125	**°C**	+200	**°C**	175	**bar**
T 548 H	0 / +80	**°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 > 130°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, consult your BETA representative.

NOTE:
All SS316 sensor/ extension rod/ capillary and sliding nut with compression fitting, SS304 armouring tube.

The BETA temperature sensor is to used in combination with a thermowell or pocket tube,
in order to avoid leakage as sliding/ compression nut adjustment is not considered to be leak tight.

3 Sensor Bulbs:

C3 - T548H - **D00** - S0 - K1 - Y - X2

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

Note: All SS 316 stainless steel sensor, capillary (SS 304 armored) and compression fitting.

1) Not in combination with range T588H (+160/+300 ˚C), not recommended with T568H in case of process temperature >130 ˚C.

2) Length of capillary should be specified, consult your BETA Switch Representative. (Max.:15 mtr.)

*** Thermowells available, see page 30.*

4 Diaphragm/O-rings:

C3 - T548H - D00 - **S0** - K1 - Y - X2

All temperature switches have "S0" welded diaphragm.

5 Switching Elements:

C3 - T548H - D00 - S0 - **K1** - Y - X2

The standard Switching elements are: "K1" for C - and W - enclosures

Deadband Multiplier micro switch element similar as for pressure switch.
For other available switching elements and additional technical information see **5** on pages 11 and 12.

6 Options:

C3 - T548H - D00 - S0 - K1 - **Y** - X2

OPTION CODE	DESCRIPTION
C	Cable gland (weather proof IP66), Ex d, Ex t, Ex e in acc. with classification of enclosure).
I 3)	Intrinsically safe application (Ex i). Only on "C"-Series.
S 1)	Stainless steel Tag key attached to enclosure. Tag has 2 lines (16 characters per line).
V	Fungicidal varnish coating (internal).
Y 2)	Epoxy coating of enclosure and sensorbody (external).

Option C:
For additional details (on the clamping ranges), see page 13.

Tag no. space on nameplates __ added free of charge

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.
Option **"S"** : 2 lines with 16 characters or spaces.
Only if explicitly stated on your purchase order. If not it will be left blanc

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

3) Ex i certification is under review due changing standard.
To become applicable 2nd half 2024.
** Consult factory in case needed*

7 Specials:

C3 - T548H - D00 - S0 - K1 - Y - **X2**

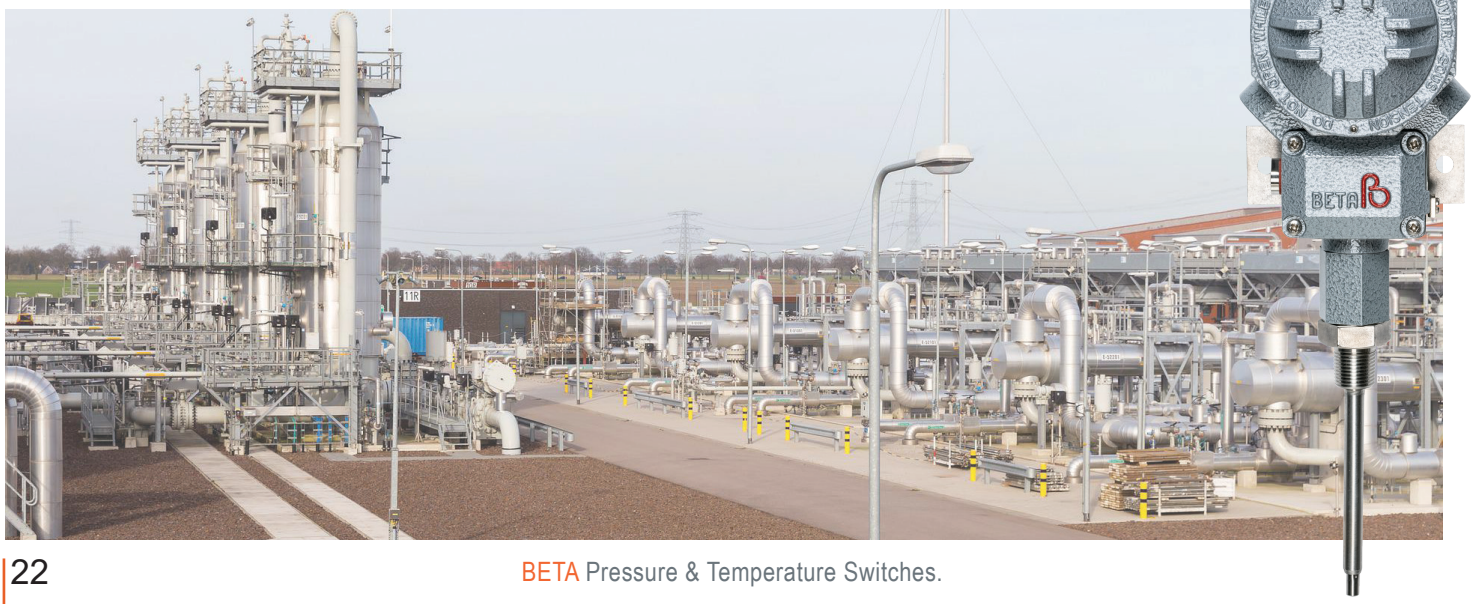
BETA can incorporate many specials to meet your requirements.
These special requirements are indicated by the letter "**X**" in the model code or at the end of the model number, followed by a figure showing the number of specials.

Example:

"X1" at the end of modelcode reference means **one** special.

"X2" at the end of modelcode reference means **two** specials have been incorporated.

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



BETA offers complete line of switches for (classified) hazardous area!

The “BETA Switch” is a safety instrument and adds an extra dimension to industrial safety because a wide selection of switches is available - up to safety level Category 2 - for hazardous areas (e.g. ATEX, IECEx)

Benefits:

- Worldwide agency approvals.
- “User Friendly” Modifications – Standard features incorporated for your safety.
- Minimal amount of wetted parts - minimal maintenance needed.
- 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	T6 -60°C ≤ Tamb ≤ +70°C / T5 -60°C ≤ Tamb ≤ +80°C
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 T6/ -40 to +70°C, T5/-40 to +80°C
Class II, III, Div.1, Groups E, F and G
Ex d IIC T6...T5
Enclosure Type 4X, IP65

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
Amb. Temp.: -60°C to +80°C

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

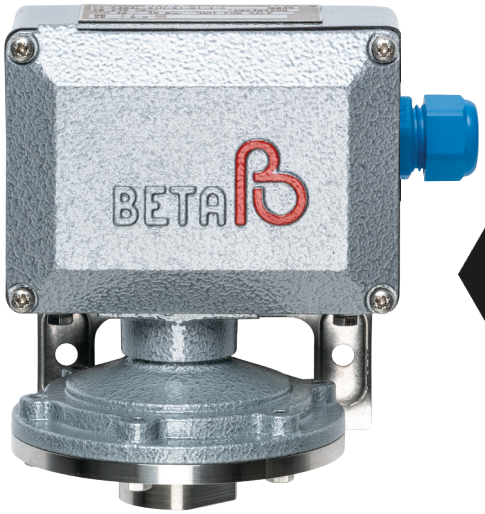
FM: Cert. No. 3031247
IS Class I, II and III, Div. 1, Groups A, B, C, D, E, F, G
Class I, Zone 0, AEx ia IICT6, -40°C <Ta < +80°C
Enclosure Type 4x

- ATEX, IECEx, CSA & FM approved.

See page 26, for more available certifications

BETA "C"- Series with option "I" for intrinsically safe systems.

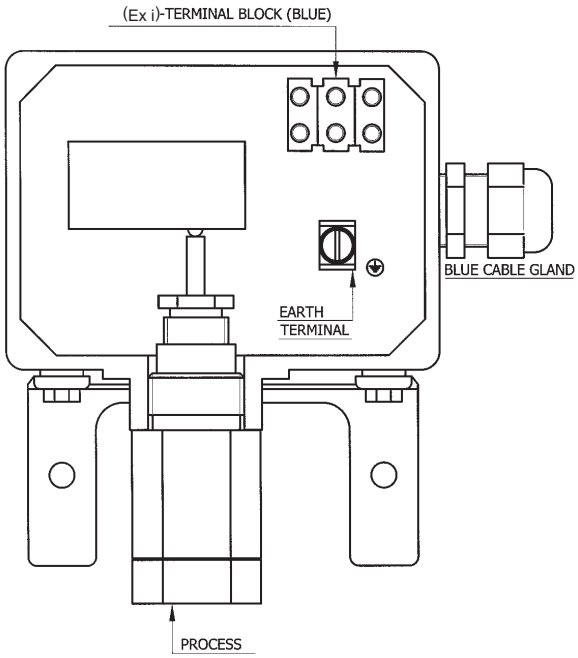
(See also page 22)



"**C**" - Series

Intrinsically Safe

BETA has its "**C**"-Series switches with option "**I**" certified by KIWA acc. to NEN EN 60079-0 / EN 60079-11 for,



"C"- Series (Intrinsically safe application (Ex i).

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

ATEX approved	**: KIWA 15 ATEX 0023X**	(-60 to +80°C)
IECEx approved	**: KIWA 15.0011X**	(-60 to +80°C)
CSA approved	**: Cert.No.: 1891054**	(-40 to +80°C)
FM Approved	**: Cert. No.: 3031247**	(-40 to +80°C)

(For more information see also page 23)

This option includes all required installation materials including a blue colored EEx e approved terminal block and the (standard) earth terminal.

Option "I" in accordance with art. 9 of the ATEX Directive 2014/34/EU (Ex ia/ib IIC) which are related to insulation, clearance, creepage distances and enclosure type whereby a max. peak voltage of 90 V or 3,3A is allowed.

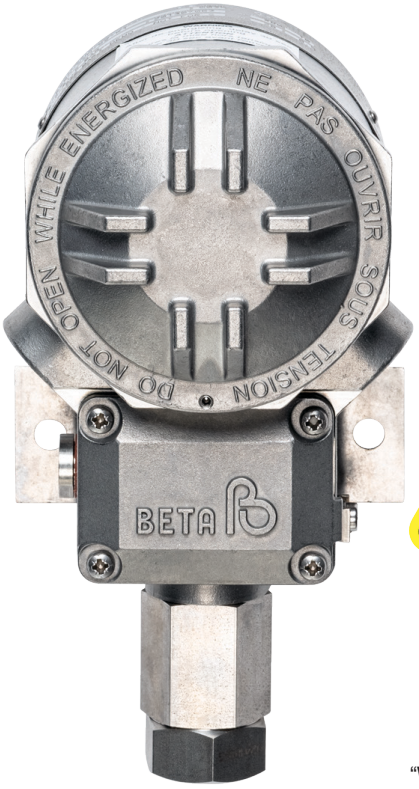
Please note the following:

When a switch is ordered with cable gland (option "C") BETA will automatically install the Ex e 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").

- ATEX, IECEx, CSA & FM approved.

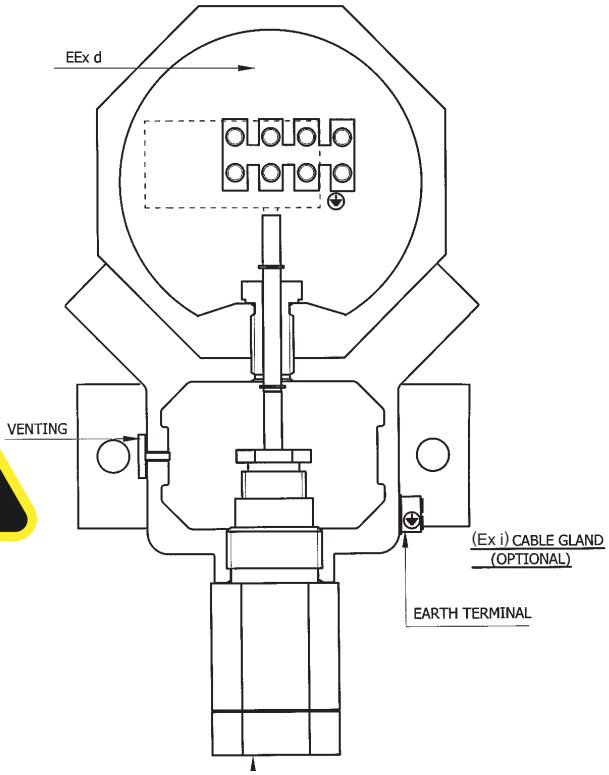
See page 26, for more available certifications

The "W"- Series is a worldwide best seller.



"**W**" - Series

Explosion Proof



"The 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 T100°C Db

IECEx: IECEx ITS 17.0019 X
Ex db IIC T6....T5 Gb
Ex tb IIIC T 100°C Db

(For more information see also page 23)

- Aluminium with Extremely rugged powder coated enclosure which is suitable for tough offshore applications. (1000 hrs. Salt spray test acc. to DIN 50021, IEC 60068-2-11 or ASTM B117-90) or 316 SS enclosure.
- Separate adjustment compartment.
- Available as Pressure-, Hydraulic-, Vacuum-, Differential pressure- and Temperature switch.
- All ranges available.
- Highest overrange protection.
- Excellent for field mounting (2" Pipe SS mounting bracket available). see page 31.
- Epoxy coating optional.
- Also available in SS316.

SIL 3 certification:

In order to state SIL3 compliance based on the standard IEC 61508:2010, please consider the following conditions:

Always read the BETA installation, Operation, 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 I.O.S 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:

2024

Due to current restrictions and international embargoes,
we cannot offer/ or supply Russian related items
.

Korean Market

KC Korea Certification
Certicate for explosion safety

Japan

JIS

China

Nepsi	Cert No.: 21 1839 x Ex d IIC T5/T6 Gb	
CCC	**C-Series** Ex ia IIC T6 Ga EX ia IIIC T200_ 85°C Da,	**W-Series** Ex db IIC T6/T5 Gb Ex tb IIIC T100°C Db

Other Certifications:

Europe

2014/68/EU	Pressure Equipment Directive (PED)
C-and W-series	Type approval module B
QA system	Module D CE 0035

2024

Due to current restrictions and international embargoes,
we cannot offer/ or supply Russian related items.

Marine Approval

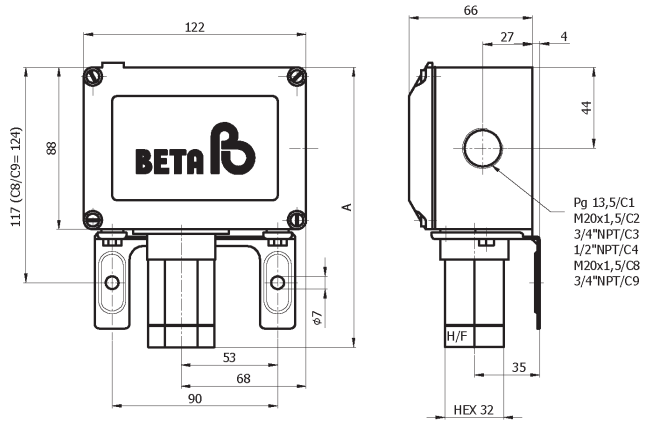
B-, C- and W-series type approval
DNV rules for classification:
DNV-GL-CG-U339

Pressure switches	: TAA 0000 2VB
Temperature switches	: TAA 0000 2VC

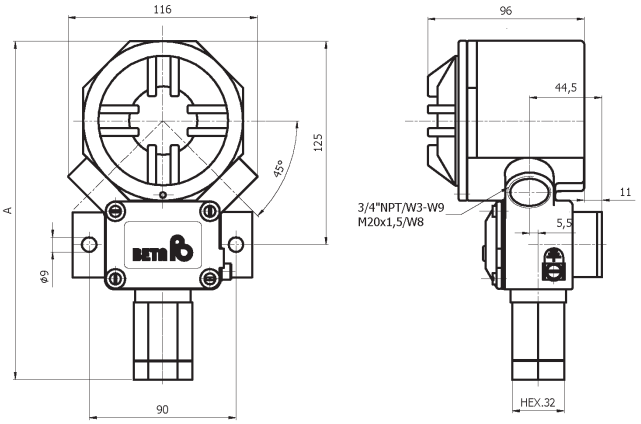
More certificates/ reports are available. Please consult your BETA Switch Representative.

DIMENSIONS:

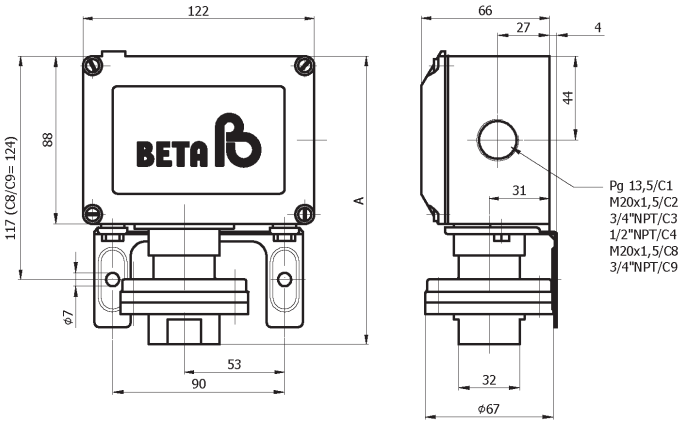
"C"- Series: Pressure & Vacuum **"P...V/H"**



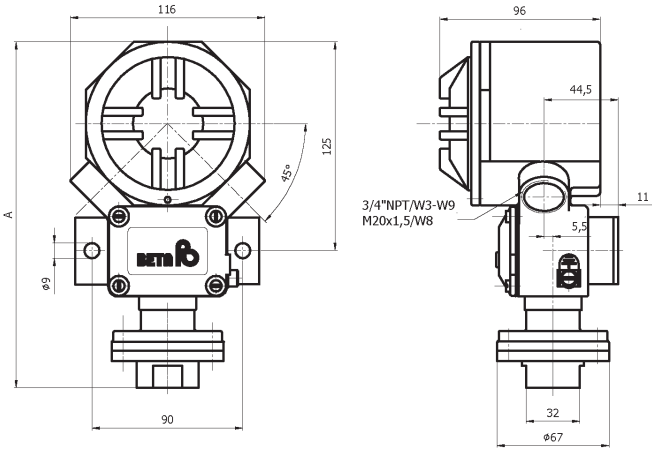
"W"- Series: Pressure & Vacuum **"P...V/H"**



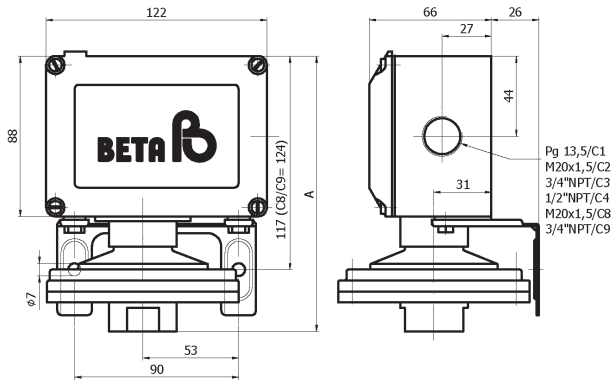
"C"- Series: Pressure & Vacuum **"P...V/M"**



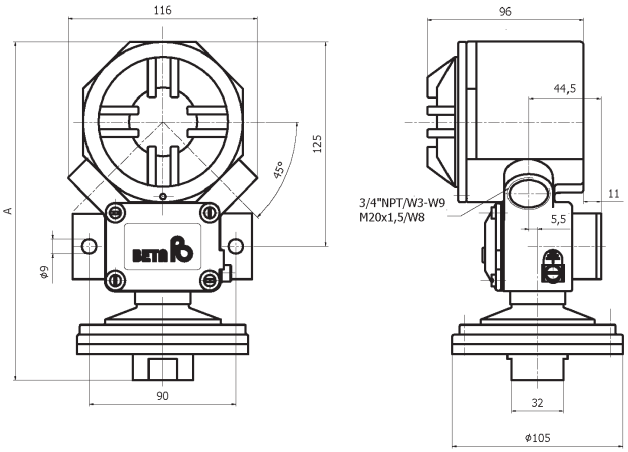
"W"- Series: Pressure & Vacuum **"P...V/M"**



"C"- Series: Pressure & Vacuum **"P...V/L"**



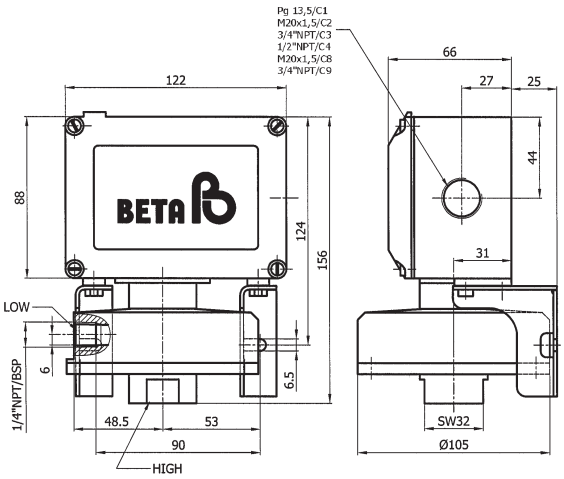
"W"- Series: Pressure & Vacuum **"P...V/L"**



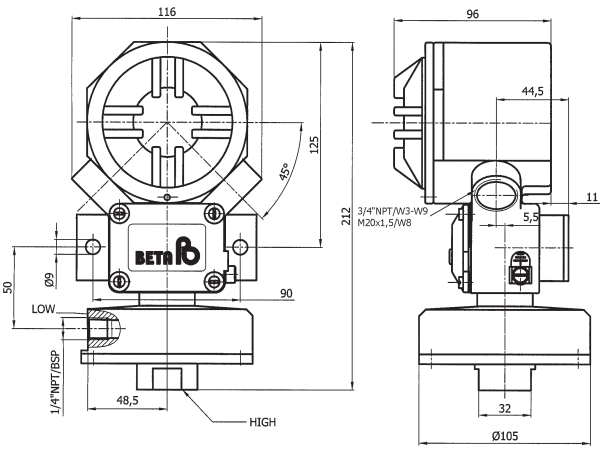
** For specific details about the dimension "A" please consult your BETA representative.

DIMENSIONS:

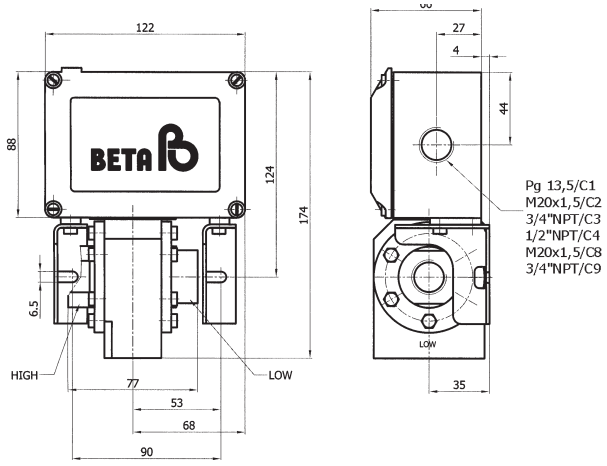
“C”- Series: Differential “D...L”



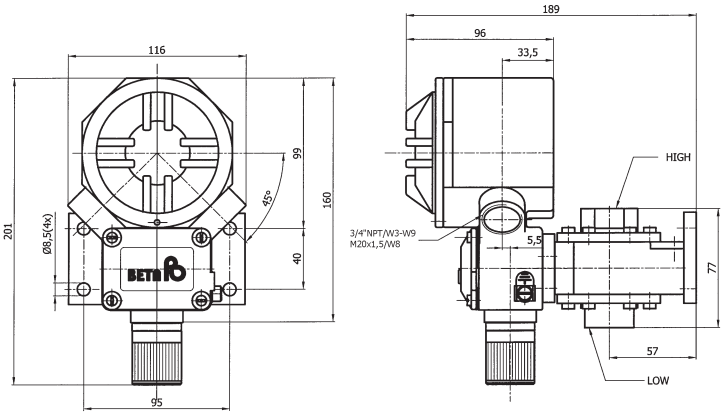
“W”- Series: Differential “D...L”



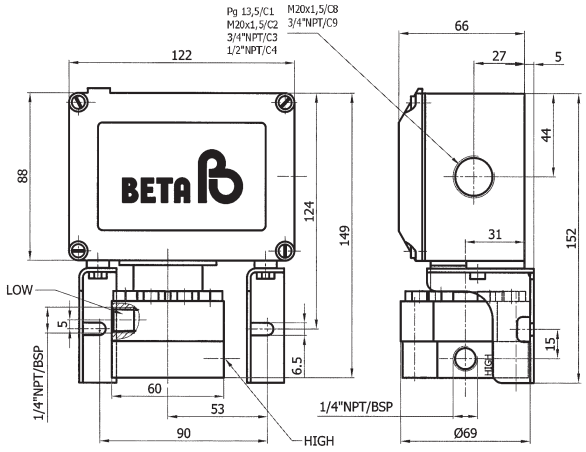
“C”- Series: Differential “D...M”



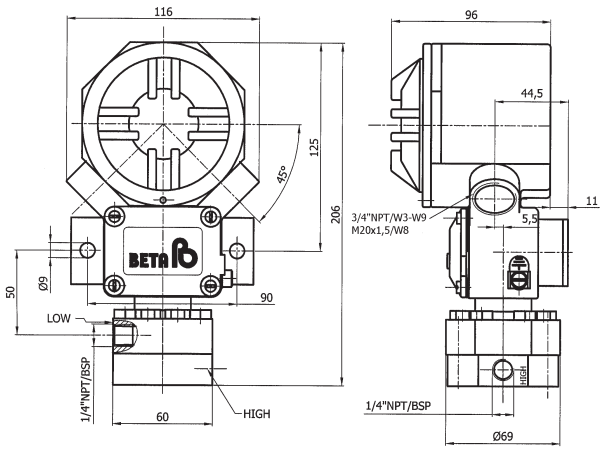
“W”- Series: Differential “D...M”



“C”- Series: Differential “D...H”

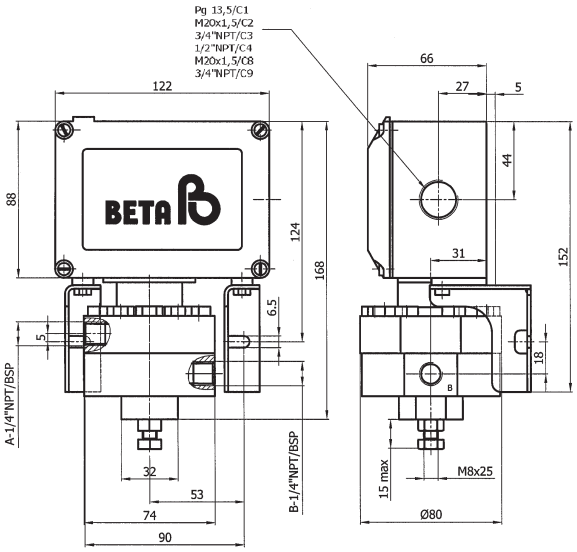


“W”- Series: Differential “D...H”

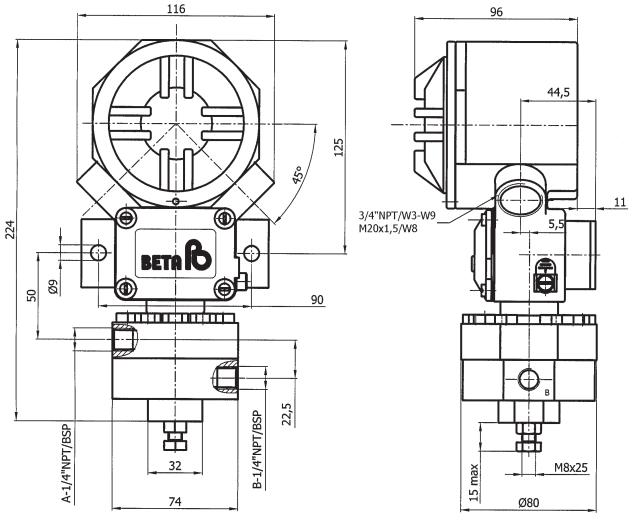


DIMENSIONS:

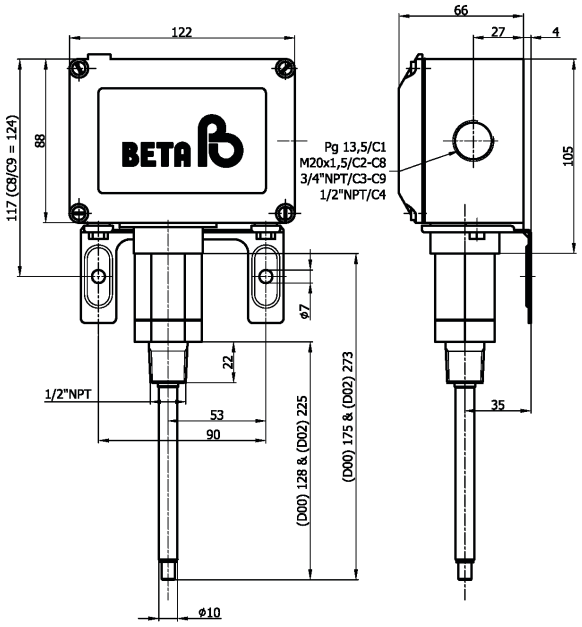
"C"- Series: Bi-directional Differential **"D...D"**



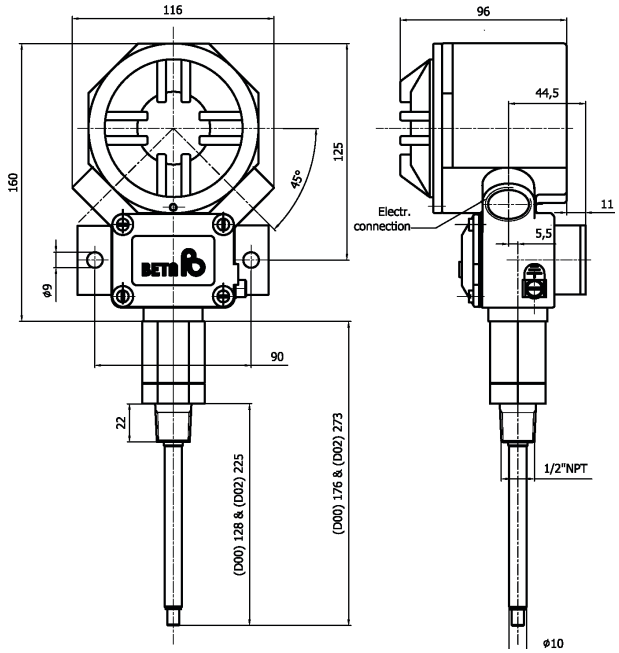
"W"- Series: Bi-directional Differential **"D...D"**



"C"- Series: Temperature **"T..H - D"**

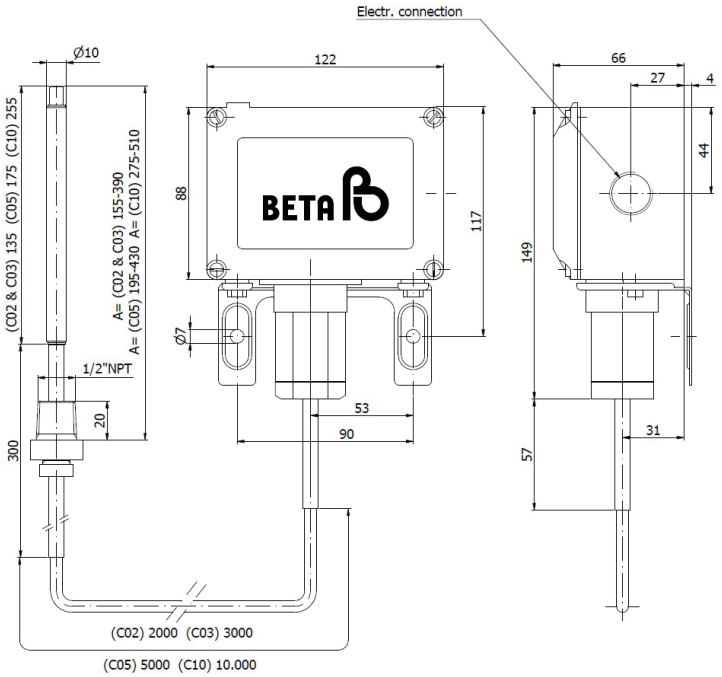


"W"- Series: Temperature **"T..H - D"**

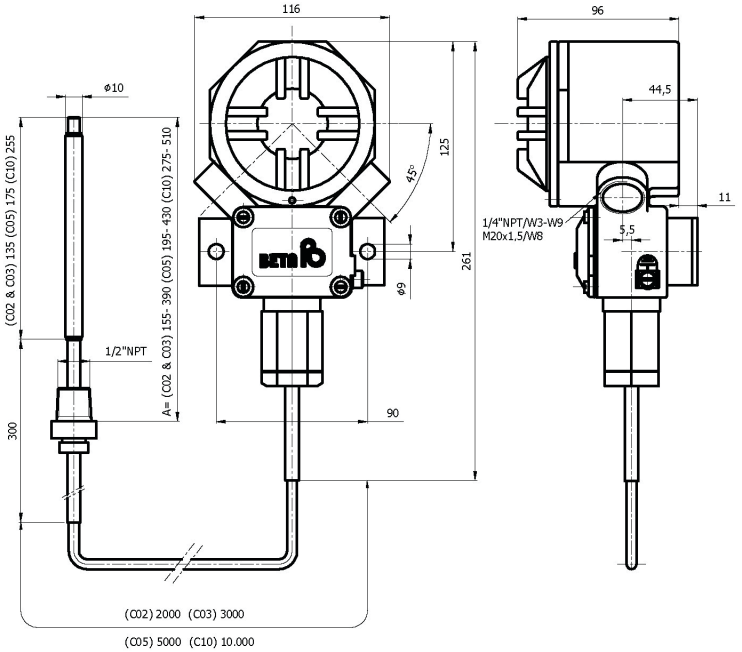


DIMENSIONS:

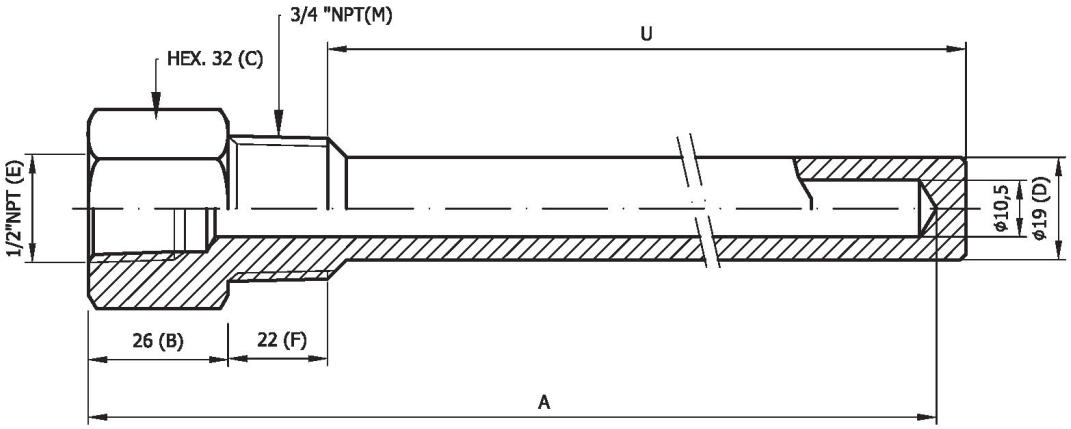
"C"- Series: Temperature "T..H-C"



"W."- Series: Temperature "T..H-C"



ACCESSORIES: Thermowell (SS 316)



Standard BETA Thermowell

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	D02, C02, C03, C05
TW 19	190	228	C02, C03, C05

Notes:

- BETA Thermowells to be ordered as a separate item.
- **Special Thermowell possible.** Consult your BETA Switch Representive.

**** Do not include Thermowell code into the switch code.**

2” Pipe mount bracket:

Contents:

W - enclosure

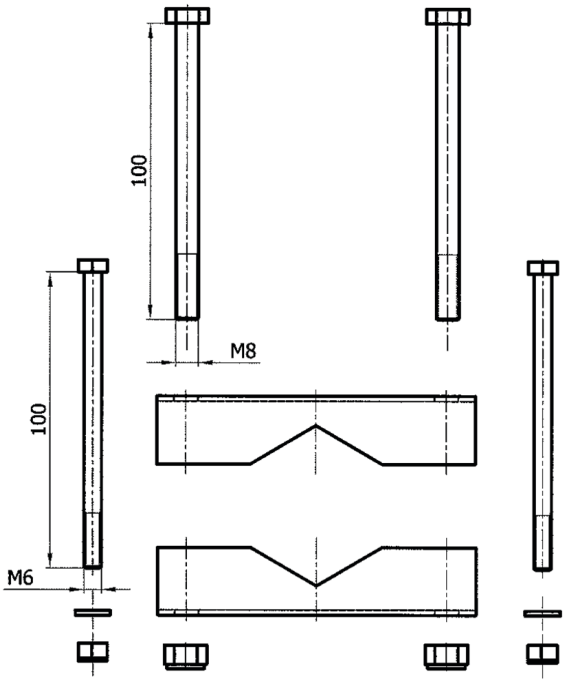
2 x Bracket +
2 x bolts M8 x 100 mm + nut

or

C - enclosure

2 x bolts M6 x 100 mm + washer + nut
**(Size: +/- 1,5 mm tolerance)*

- Material: **SS 304**

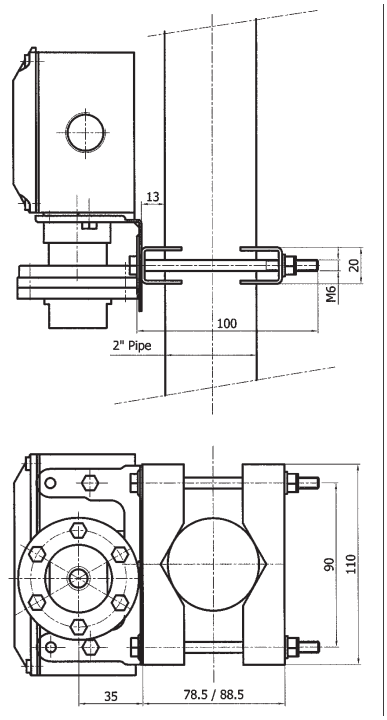


Disclaimer:
This pipe mount bracket is solely intended for use in combination with BETA Pressure & Temperature Switches.

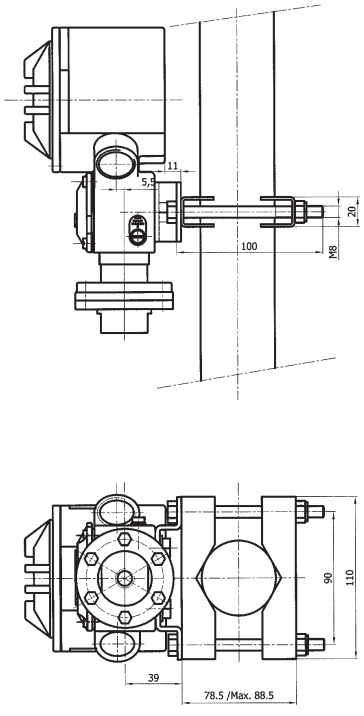
Foundation vibrations, as well as process vibrations, can disturb the proper functioning of the mounted instrument, the use of this bracket does not prevent or diminishes such occurrence.

2” Pipe Mount Set Configuration Examples:

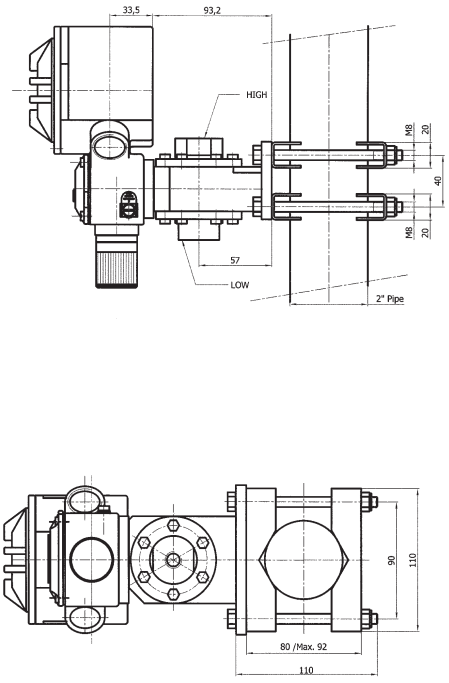
“C.”- Series Enclosure on 2” Pipe



“W.”- Series Enclosure on 2” Pipe



“W.”- Series Enclosure “D...M” on 2” Pipe



Dimensions given here are for 1/4” and 1/2” (F) process connections:
For “H”-sensor with 1/2” (F) add 4 mm on “A” dimension.
Sizes in mm, tolerances ± 1,5 mm.

Pressure & Temperature
C & W - Series
Switches

Contact:

“Quick shipment” – *Available* –

Contact your local BETA representative.

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