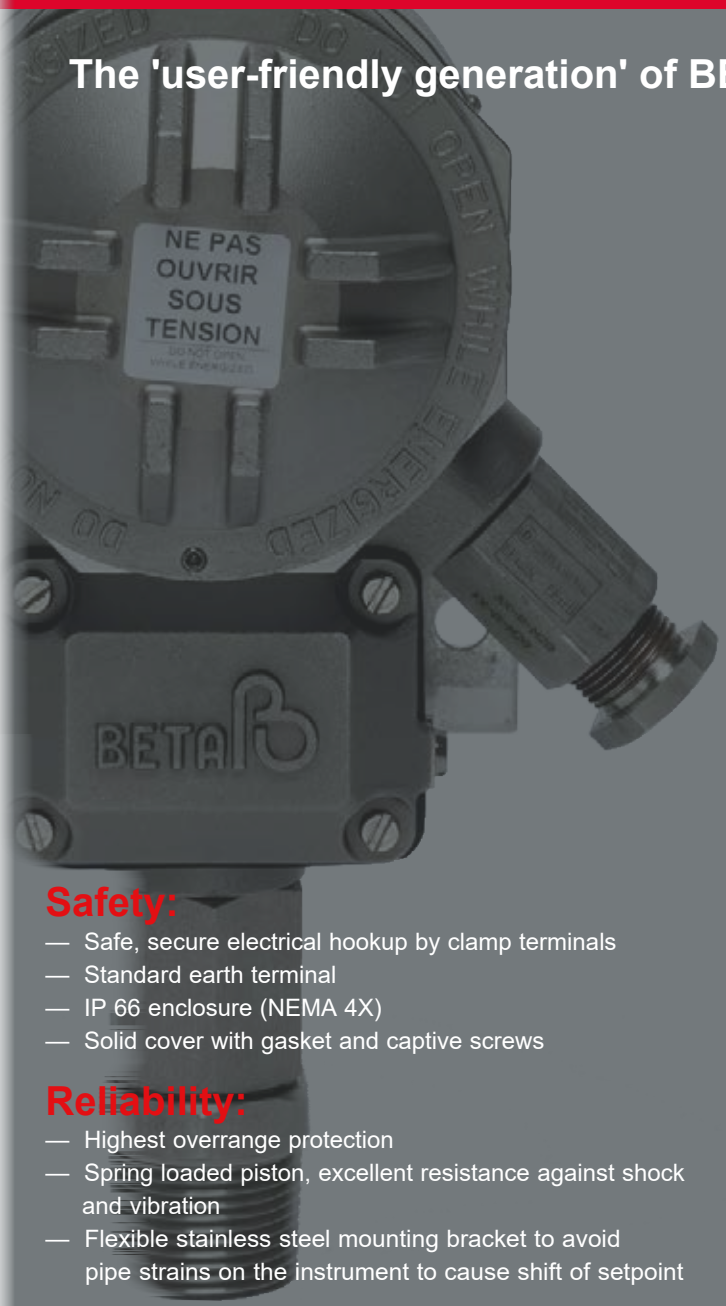
BETA®
PRESSURE &
TEMPERATURE SWITCHES

Pressure and Temperature Switches
C, W and Z series switches

The 'user-friendly generation' of BETA Pressure and 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:
- EXIDA: SIL2 Certified
- ATEX: W - Z - Series and C-Series Intrinsically Safe
- IECEx: W-Series and C-Series Intrinsically Safe
- CSA: W-Series, C-Series and C-Series Intrinsically Safe
- FM: W-Series, C-Series Intrinsically Safe

Quality and Factory approvals:
- SGS certified Quality Assurance according to ISO 9001 – 2015 and ISO 14001 - 2015, covers all switch manufacturing,engineering and design.
- 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.

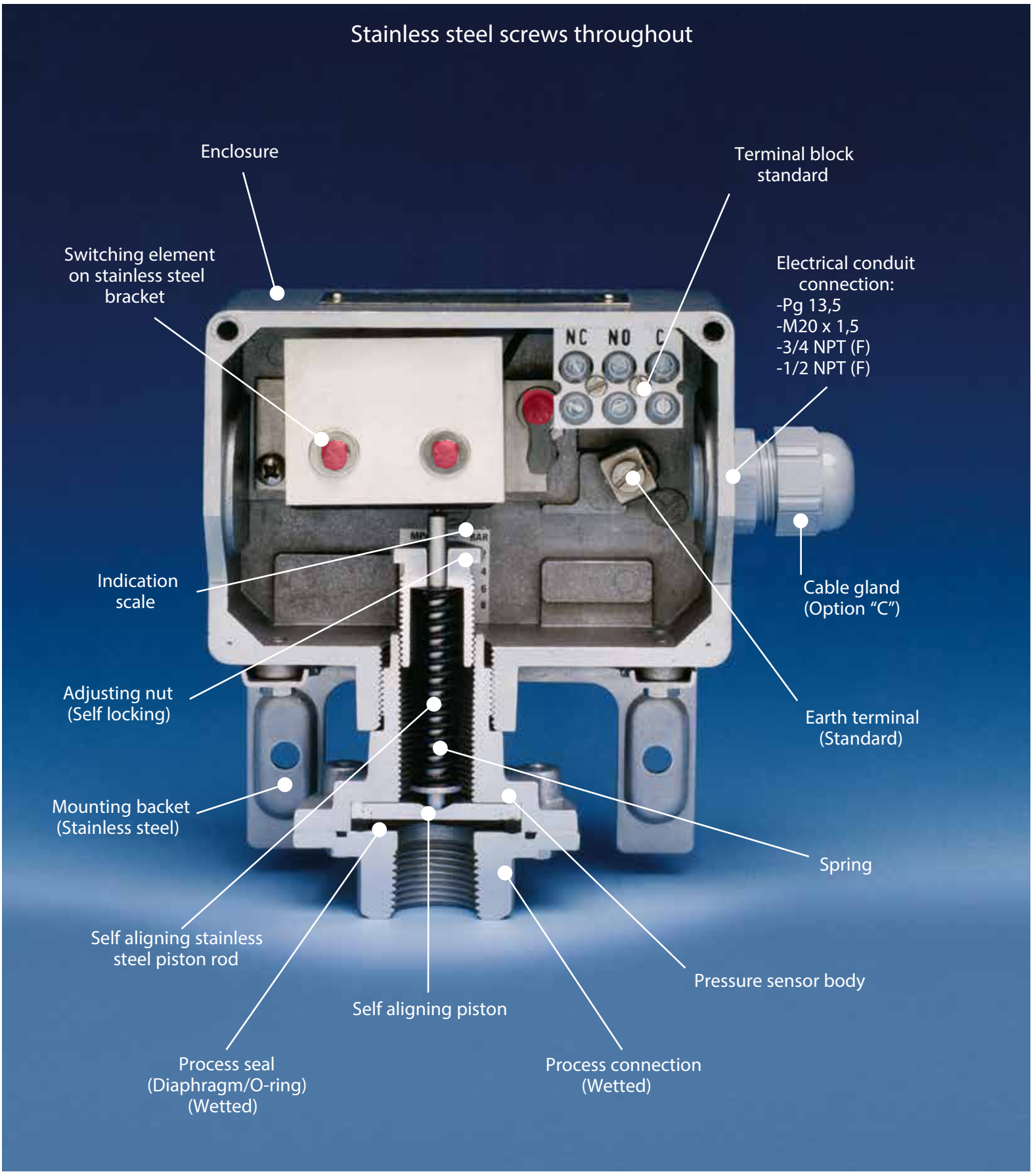
Benefits:
- Our products are distinguished by highest reliability and are used in virtually any sector of industry. Highest quality and worldwide certification of our products for safety-critical applications ensure reliable monitoring of your plant, equipment or installation.

- *BETA safety switches are assembled according to your requirements and are available in more than 10 million versions. Your special request might be a standard for us. Please contact us to discuss your requirements*

- "we will be pleased to advise you" -

IEC 61508
SIL 2
Certified

BETA SWITCH PRINCIPLE



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

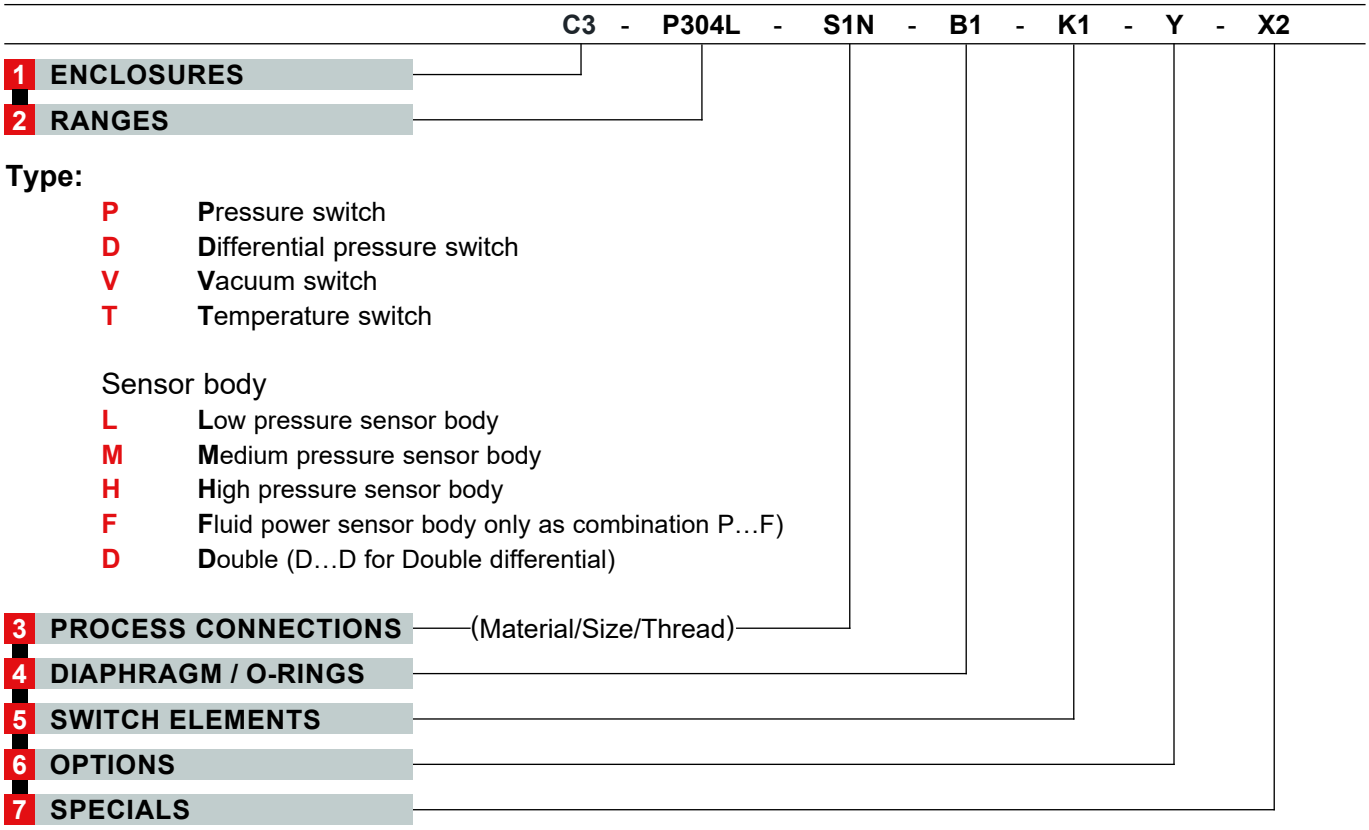
The BETA SWITCH has “DESIGNED-IN“ **reliability.**

- 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** manufactures **high quality instruments** to meet **all of your requirements.**

GUIDE OF HOW TO SELECT YOUR BETA SWITCH

BETA uses a simple and **logical model code 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
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:

± 0.2% of Full Range* (measured at 20°C 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.

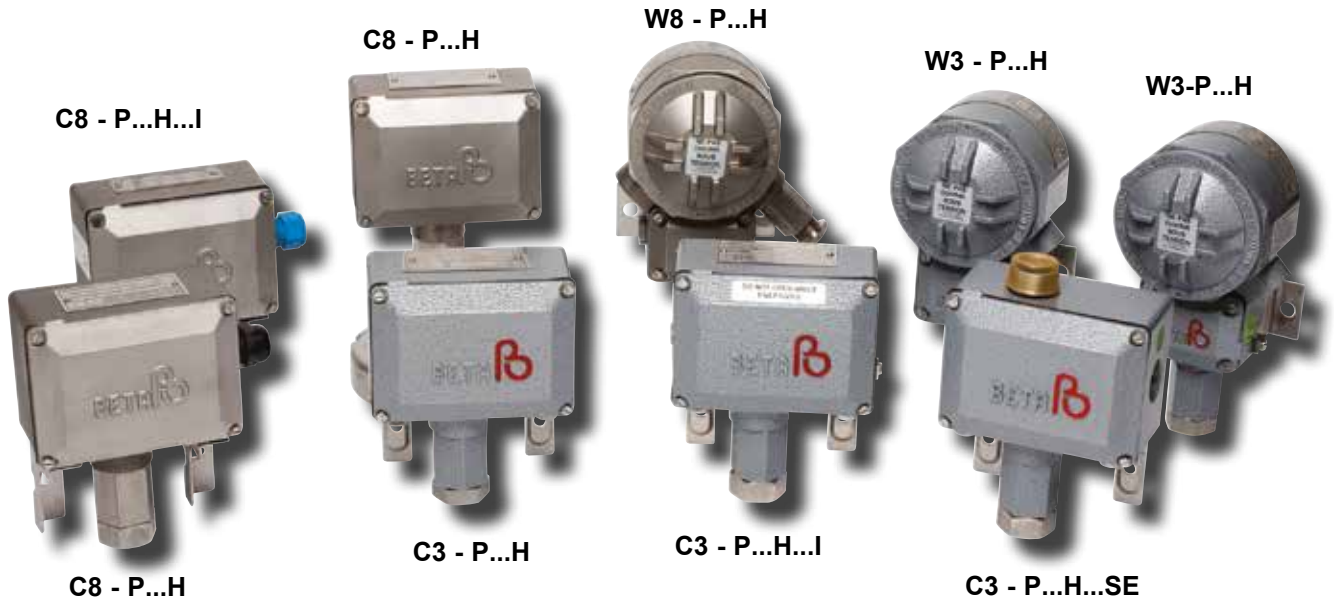
Limited Factory Warranty:

36 months from Ex-Works date Rijswijk/ - The Netherlands. (excl. “wetted parts”).

* For standard BETA switch (Switch with “**K1**” switching element and “**B1**” diaphragm/ O-ring).

1 ENCLOSURES

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.
B2 1)	Weathertight 4) Miniature (IP65)	Hirschmann 4) Plug conn. (DIN 43650-A)	Aluminium	Standard (Via plug)	Not applicable	√	√	√	-	√
C1 5)	Weathertight (IP66) 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	316 SS 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 (In- & External)	Standard	√	√	√	√	√
W8		M20 x 1,5	316 SS 2)							
W9		3/4" NPT (F)								
Z1 5)	Explosion-proof Ex de IIC T6 (IP 66) 02 ATEX 2187X	PG 13,5	Aluminium	Standard (In- & external)	Standard EEx e	√	√	√	√ 3)	√
Z2 5)		M20 x 1,5								
Z4 5)		3/4" NPT (F)								
Z3 5)		1/2" NPT (F)								
Z8		3/4" NPT (F)	316 SS 2)							
Z9		M20 x 1,5								

1) See separate brochure BETAMINI for ranges, Process Connections etc.

2) Includes SS 316 sensor body and adjusting nut.

3) All differentials except D..D - type

4) EN 175301-803/ ISO4400

5) Are powder coated acc. SP025, dry film thickness aprox. 70 microns finnish hamertone silver/grey high gloss. Due to the nature of hammertone finnish some color difference might be visible, and cannot be avoided. *- This has no effect on the integrity of the enclosure protection. -*

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

2 RANGES for Pressure switches

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

"Ranges" given here are valid for setpoints at **increasing pressures** (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 & diaphragm/ O-ring 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 may influence lower end of range.

RANGE CODE	ADJUSTABLE RANGE		MAX. DEADBAND		MAX. OVERRANGE-PRESSURE	PROOF PRESSURE
		bar [mbar]		**bar** [mbar]	**bar**	**bar**
P 301 L 1)	[2 - 15]	[mbar]	[1.1 - 1.9]	[mbar]	10	15
P 302 L 1)	[10 - 100]	[mbar]	[2.5 - 3.5]	[mbar]	30	35
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	140
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	600
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**		
P 908 H	10 - 300	**bar**	2.0 - 19.5	**bar**	400	
P 909 H	10 - 350	**bar**	2.0 - 25	**bar**		

1) Only available with L1 -microswitch element. K1 possible consult factory).

RANGES for Fluid power switches

RANGE CODE	ADJUSTABLE RANGE		MAX. DEADBAND		MAX. OVERRANGE PRESSURE	PROOF PRESSURE
		bar		**bar**	**bar**	**bar**
P 904 F	12 - 55	**bar**	3.5 - 6.0	**bar**	650	700
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 RANGE1) (INCR. VAC. TO PRESS.)		MAX. DEADBAND (VAC. / PRESS.)		MAX. VACUUM		MAX. OVERRANGE PRESSURE		PROOF PRESSURE	
		bar [mbar]		[mbar]		**bar** [mbar]		**bar**		**bar**
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 zero bar gauge, consult factory.

We cannot guarantee stability of setpoint around zero bar gauge.

2 RANGES for Differential switches

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

RANGE CODE	ADJUSTABLE RANGE 1) DIFF. RANGE		TYPICAL 1) DEADBAND		MAX. STATIC PRESSURE		MAX. OVERRANGE PRESSURE		PROOF PRESSURE	
	[mbar] **bar**		[mbar] **bar**		**bar**		**bar**		**bar**	
P 301 L-..-D 5)	[2 - 15] 2)	[mbar]	[1,1-1,97]	[mbar]	10	**bar** 3)	10	**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 4)	**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 4)	**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	**bar** 4)	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. 0,1 bar above P-High.

4) D…M, D…H and D…D can sustain full High and Low-side reversal.

5) Only available with **G3**-enclosure.
- For more details, page 15.

IN THE FOLLOWING TABLE THE ESTIMATED INFLUENCE FOR INCREASING STATIC PRESSURE IS GIVEN.

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 Diff.setpoint will be (10 x – 2 mbar) = - 20 mbar less = 980 mbar.

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

3 PROCESS CONNECTIONS

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

	PROCESS CONNECT SIZE/ CODE	AVAILABLE ON 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 2) 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**
"**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 only**
D…L : **A1N or A1B; For Low side only**
High side: Only "L"-sensor connections

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

NOTES:

- NPT connections are tapered; BSP are parallel threaded.
- Process connection according to NACE standards are available, consult your BETA Switch Representative.

Other materials such as P.V.C., Hastelloy, 316 SS Ti, Titanium etc. and other sizes and (Teflon lined) flanged connections are available.

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)	High temperature NOT below -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)	High temperature NOT below -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)	High temperature NOT below -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 2) 5)		
V2	Viton-A		Viton-A	High temperature NOT below -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 too 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 316 SS 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 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.**

Note:
Wetted parts are not guaranteed against corrosion or permeation since processes vary from plant and concentration of harmful fluids, gasses 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.

4 DIAPHRAGM / O-RINGS

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

Differential Pressure Switches can use the same Diaphragm/O-ring combinations as Pressure Switches but we have to consider following:

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 microswitch element is the same as for pressure switch.

5 SWITCHING ELEMENTS

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

SWITCHING ELEMENT CODE 1)	USE		MAX. RATINGS (RES.)		DEADBAND MULTIPL.	
			VAC.	VDC 8)	S.P.D.T.	D.P.D.T.
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 (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. (Std. on Z-series)	250/ 5A	250/ 0.25A	2.5	4.5
SP	Adjustable deadband	Small adjustable deadband.	250/ 15A	-	1 to 3	
SR 3)5)6)9)		Wide adjustable deadband.	480/ 20A	-	2 to 6	S.P.D.T. only
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 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 may influence the low end of range.

6) “SR”-micro in combination with metal diaphragm: standard with option “P”.

7) For pneumatic element (select **C1** or **C8** enclosure) or ask for our separate 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, only possible selection for D.P.D.T. 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, in single **(S.P.D.T.** : example **“K1”**) or double (**D.P.D.T**. action : example **“K2”**) selection, are only intended to be set for one (1) set point in one (1) direction.
Either **Increasing** (rising) or **Decreasing** (falling).
In case of differential switches the static pressure needs to be added.

The deadband / reset value is a result of the complete model code selection, and actual assembly, so except for the **SR** / **SP** micro , the reset value is a given value and cannot be controlled by us.

Please note that in connection with this, that even within a quantity of similar model codes the reset value can vary. Proper application of **SR** and **SP** micro switches requires accurate statement of values to set point and required reset point.

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	Z1, Z2, Z3, Z4, Z8, Z9
		Internal Earth Ground Terminal	Internal & External Earth Ground Terminal	Internal & External Earth Ground Terminal
S. P. D. T. (SINGLE SWTCHING ELEMENT)	SE	3-WAY TERMINAL BLOCK		
	SG			
	SP			
	SR		4-WAY TERMINAL BLOCK	
	SV			
	G1 H1 (SL) K1 L1 U1 O1 N1			
	R1			3-WAY TERMINAL BLOCK
	M1 Y1 Z1	3-WAY TERMINAL BLOCK	4-WAY TERMINAL BLOCK	
D. P. D. T. (DOUBLE SWITCHING LEMENT)	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 *	1/4 NPT. (F) CONNECTIONS		

POSSIBLE

NOT POSSIBLE

* "SA" / "SB" only with **C1- / C8-enclosure**. (connection Brass/ SS316)

The standard switching elements are:

"**K1**" for C- and W- enclosures. ("**L1**" for P301L/P302L/D302L range).
"**R1**" for Z- enclosures.

6 OPTIONS

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

OPTION CODE	DESCRIPTION
B	Industrial cleaning of “wetted” parts for oxygen services.
C	Cable gland (weather proof 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 SS 316 process connection. SS Parts are not coated.

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.
Z-Series : 1 line with 12 characters or spaces.

2) Air dried system acc. SP026, dry film thickness approx. 200 microns, finnish pearl grey gloss.

7 SPECIALS

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

We can incorporate numerous 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 model reference means one special.

“X2” at the end of the model reference means two specials have been incorporated.

Details of each special must always 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 mm Hg.
- Breakwire resistor acc E12 range for line monitoring (Only for C-enclosure).
- Hirschmann or Harting Connector.
- Moisture inhibitor.
- Chemical seals, send us complete specifications if required.

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-ring** 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"** accessories

Options : See section "**6. Options**" on page 13.

Specials: See section "**7. Specials**" on page 13.

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

The “BETA Switch”, well known as a safety instrument,
adds an extra dimension to industrial safety by having area approval up to the highest classification by **ATEX, IECEx,**

- Worldwide agency approvals.
- “User Friendly” Modifications – Standard features incorporated for your safety.
- Very wide rangeability with 100% accuracy over the full range –
  Fewer switches required to meet customers specifications / requirements / needs.
- Only 3 process wetted parts.
- Very high overrange pressures – No setpoint shift or damage to sensor.
- No maintenance.
- Wetted parts to NACE standard available.

For **W**-Series

ATEX: ITS 17ATEX 101854 X
Ex II 2 G Ex db IIC T6 Gb -60°C ≤ Tamb ≤ +70 °C
Ex db IIC T5 Gb -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, 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

For **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: Exia
Ex ia IIC T6 Ga
Ex ia IIIC T 85°C Da

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

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
Type 4x

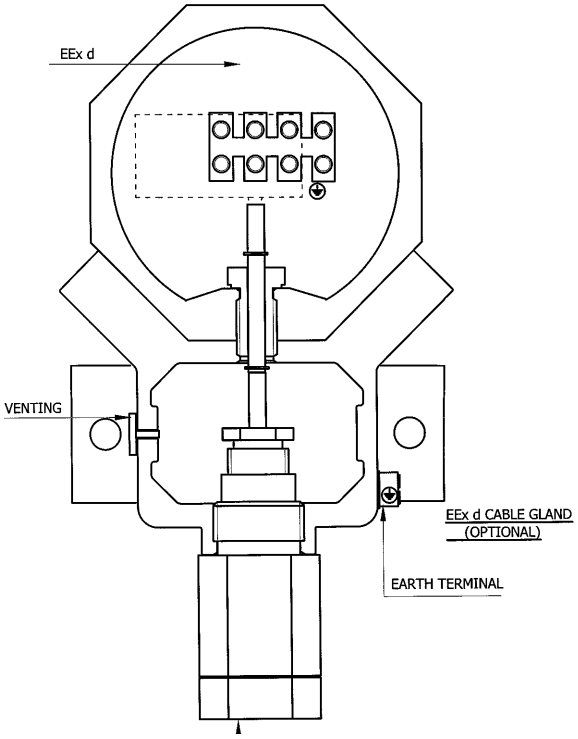
For **Z**-Series

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

W-Series -ATEX, IECEx, CSA and FM approved.

The “W”-series is a worldwide best seller.

“**W**” - Series



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 22)

- 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 30.
- Epoxy coating optional.

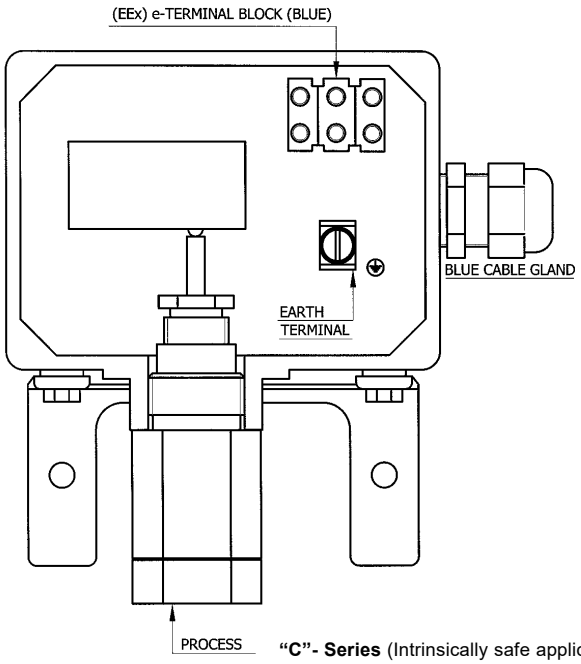
C-Series (Intrinsically safe) - ATEX, IECEx, CSA and FM approved.

(See also page 22)

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

“**C**” - Series

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 EEx 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 15.00IIX**	(-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 22)

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

Option “I” in accordance with art. 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 90 V or 3,3A is allowed.

Please note the following:

When switch is ordered with cable gland (option “C”) we will automatically install the EEx i blue cable gland (see drawing). Due to low current used in I.S. systems we recommend the use of switching elements with gold contacts (code “G1,” “O1” or “Y1”). It is how ever not mandatory.

Z-Series - ATEX, IECEx, CSA and FM approved.

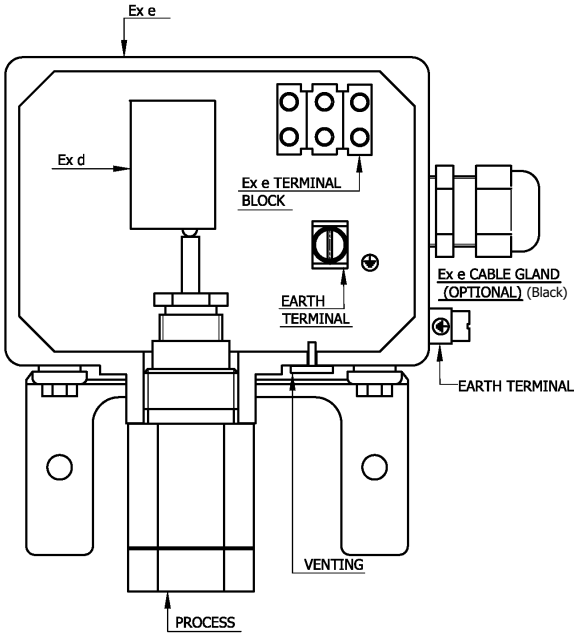
(See also page 22)

BETA "Z" - Series, - The Economical Explosion-Proof Switch - .

"**Z**" - Series

BETA has its "**Z**"- Series switches, **ATEX approved: KEMA 02ATEX 2187**

(-55 °C to + 65 °C/ T6)



"Z"- Series (II 2 G Ex d e IIC T6)

Acc. to NEN EN 60079-0 / NEN EN 60079-1/
NEN EN 60079-7 for **II 2 G Ex de IIC T6.**

- Available in Aluminium or SS 316 (for offshore applications).
- Available as Pressure-,Hydaulic-, Vacuum-, Differential pressure
  (not on "D..D"- serie) and temperature switch.
- All ranges available (except for P301L and P302L).
- Limited to "R1/ R2" switching element.
- High overrange.
- Simple and quick electrical connection.

EXPLOSIONPROOF CERTIFICATIONS

ATEX –	Ex II 2 G Ex d IIC T6...T5 Gb	for **W**-Series.
	Ex II 2 D Ex tb IIIC T 100 °C Db	
ATEX –	Ex II 1 G Ex ia IIC T4...T6 Ga	for **C**-Series (intrinsically safe).
	Ex II 2 G Ex ib IIC T4...T6 Gb	
	II 1D Ex ia IIIC T85°C Da	
	II 2D Ex ib IIIC T85°C Db	
ATEX –	Ex II 2 G Ex de IIC T6	for **Z**-Series.
ATEX –	Ex II 2 G c T6	for **Air Relay** SA/SB.
FM –	AEx d IIC T6...T5	for **W**-Series.
CSA –	Ex d IIC T6...T5	for **W**-Series.
CSA –	Ex ia IIC T6 T85 °C	for **C**-Series (intrinsically safe).
FM –	A Ex ia IIC T6	for **C**-Series (intrinsically safe).
IECEx –	Ex db IIC T6...T5 Gb	for **W**-Series.
	Ex tb IIIC T 100 °C Db	
IECEx –	Zone 0 Ex ia IIC T6 Ga	for **C**-Series intrinsically safe.
	Ex ia IIIC T85 °C Da	

And more available for different countries like Japan, Korea, South-Africa, Russia etc..
Safety SIL2 capable.

SIL 2 certification:

The BETA UF generation carries the SIL2 approval, however in order to state SIL2 compliance , the standard IEC 61508, requires the following :

- Each and every unit to be explicitly SIL2 compliant needs to be factory ordered **with a setting**, preferably with a Final Test Certificate A.
- An Xn needs to be added to the modelcode : SIL2 compliance and a sticker will be added to the enclosure.
- The setting will then be BETA factory executed and recorded with the original sales order
- The adjusting nut will be **BETA factory sealed with red-paint**
- Should the setting be altered (red seal broken) after Ex Works BETA : the SIL2 compliance will be obsoleted / non valid.
- Only way to maintain compliance is to return the unit to BETA for re-adjustment as that will be recorded into our records and again the adjusting nut will be sealed.
- Third party adjustment is not acceptable unless that third party is acknowledged by BETA BV after an in-factory training at BETA, carries a valid ISO 9001 certification has a calibration records of the used and applicable calibration equipment.
- The third party will inform BETA on any adjustment , requiring SIL2 compliance, by e-mail stating **each model code / serial number / set point setting / date of setting** to enable BETA to enter that data in our records, only after that entry the respective unit is re-validated as SIL2 compliant.
  It will be confirmed to the respective third party.
- Above procedure is subjected to any change according IEC 61508 without prior notice

MARINE APPROVALS

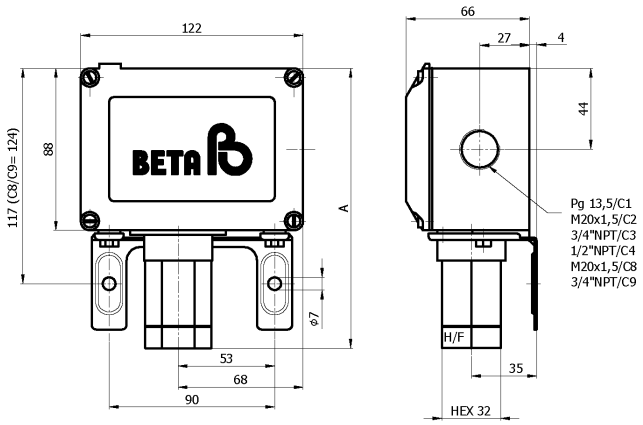
RINA for **B**- and **C**-Series (Limited Ranges).

FOR GAS, FUEL, WATER AND STEAM

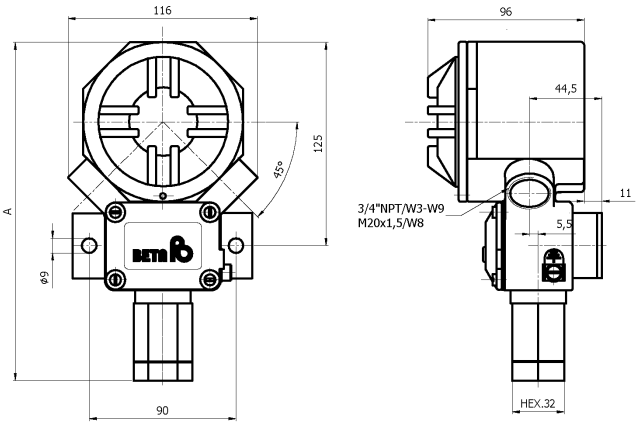
PED CE 0035 - **C**-and **W**-Series (Only Pressure sensor / - range).

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

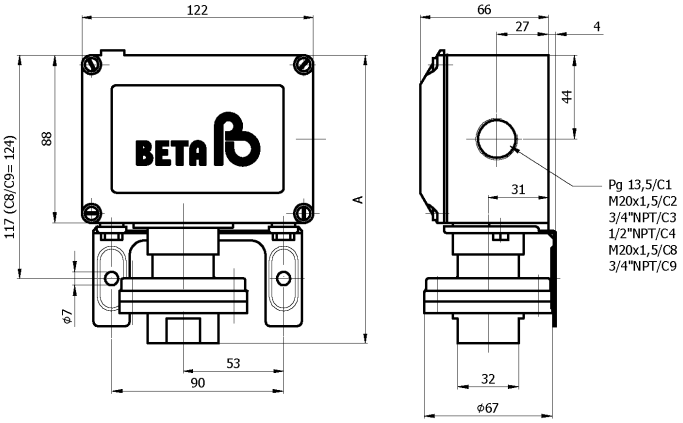
“C - Z”- Series: Pressure & Vacuum “**P**...**H**”



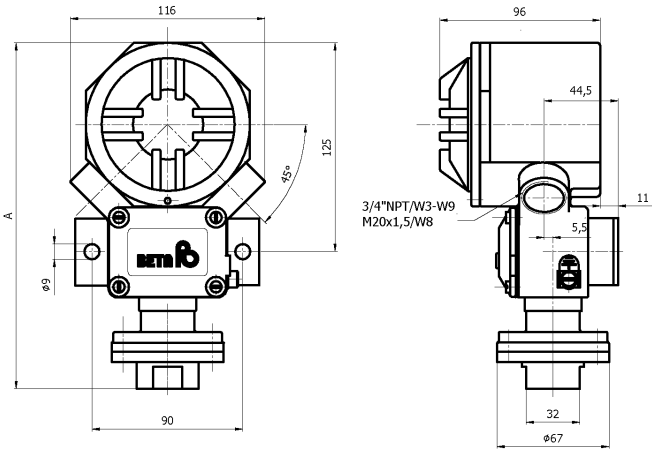
“W.”- Series: Pressure & Vacuum “**P**...**H**”



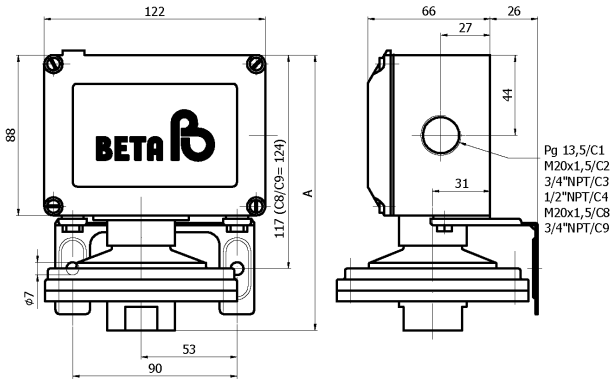
“C - Z”- Series: Pressure & Vacuum “**P**...**M**”



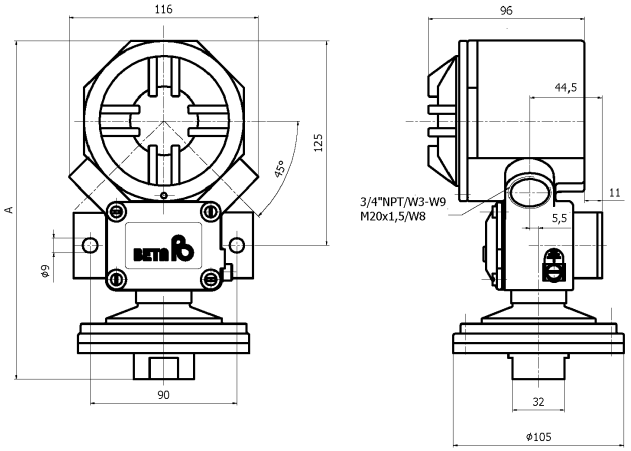
“W.”- Series: Pressure & Vacuum “**P**...**M**”



“C -Z”- Series: Pressure & Vacuum “**P**...**L**”



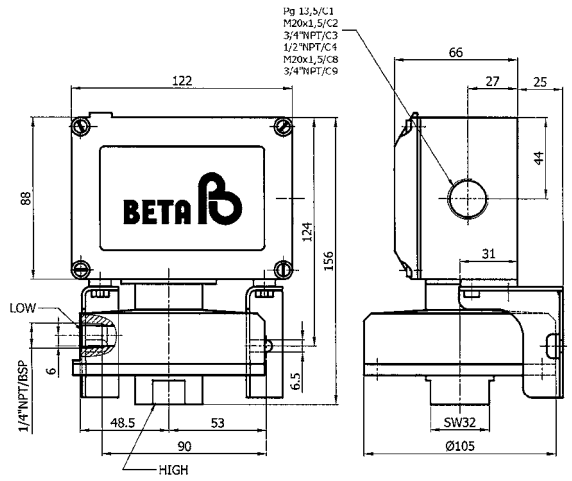
“W.”- Series: Pressure & Vacuum “**P**...**L**”



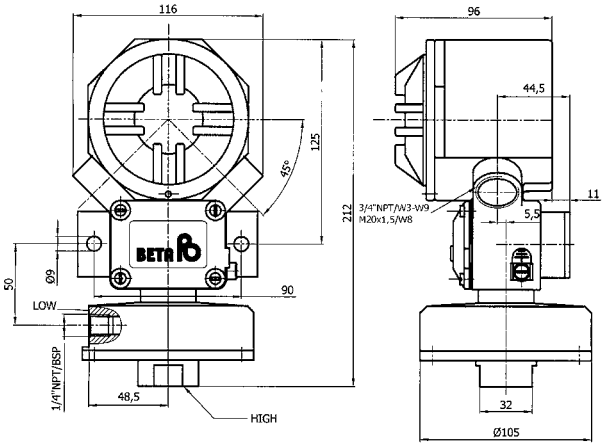
** For specific details about the dimension “A” consult factory.

DIMENSIONS

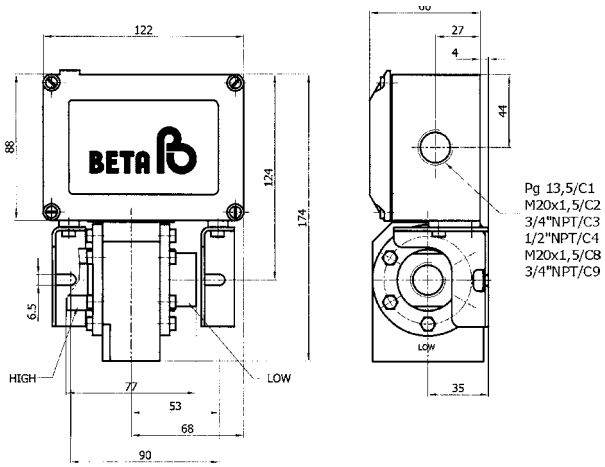
“C - Z”- Series: Differential “**D**...**L**”



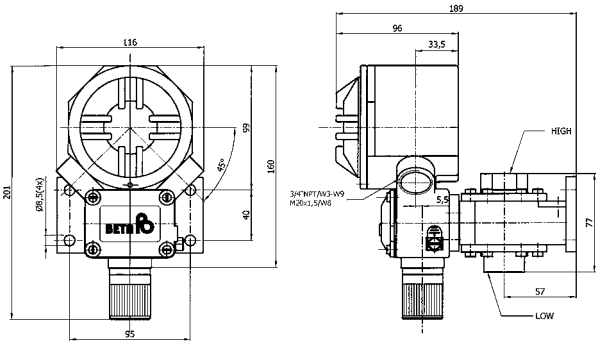
“W.”- Series: Differential “**D**...**L**”



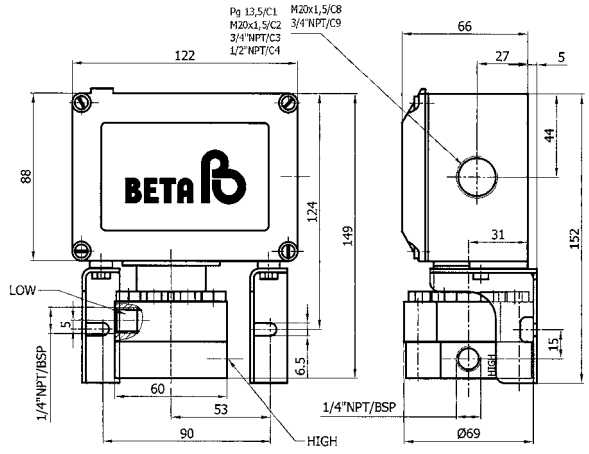
“C - Z”- Series: Differential “**D**...**M**”



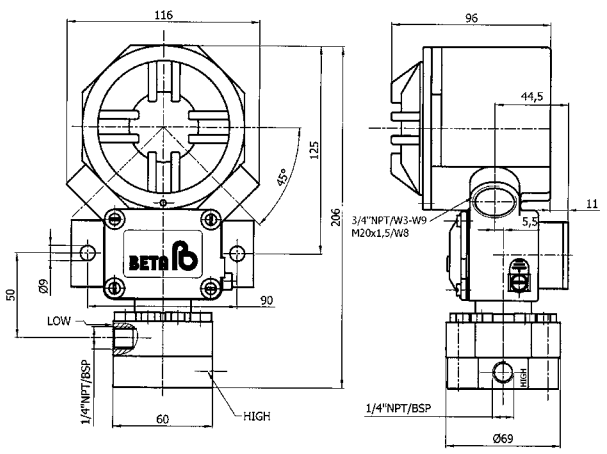
“W”- Series: Differential “**D**...**M**”



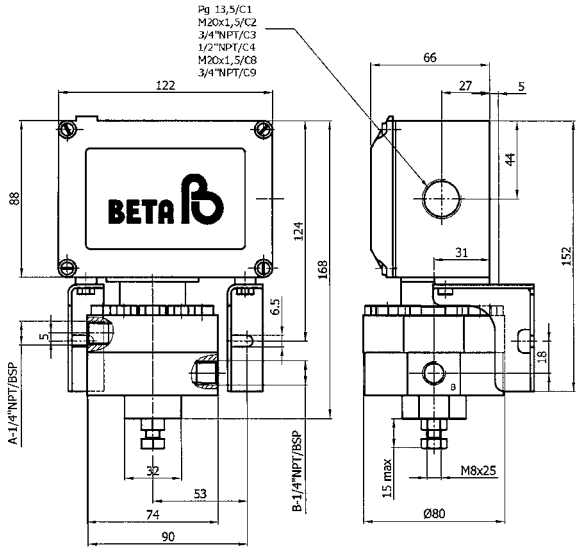
“C - Z”- Series: Differential “**D**...**H**”



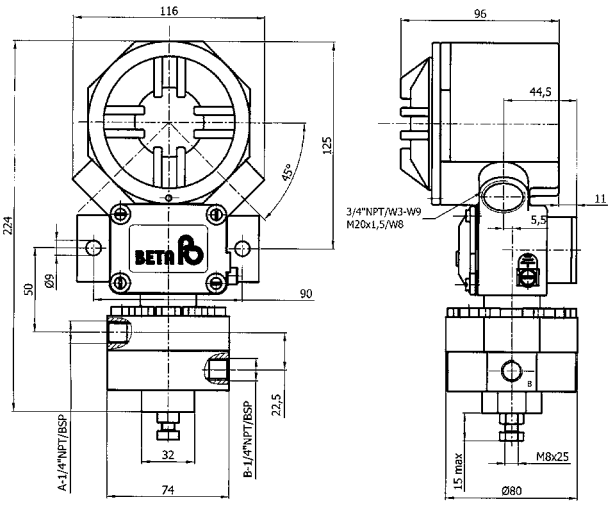
“W”- Series: Differential “**D**...**H**”



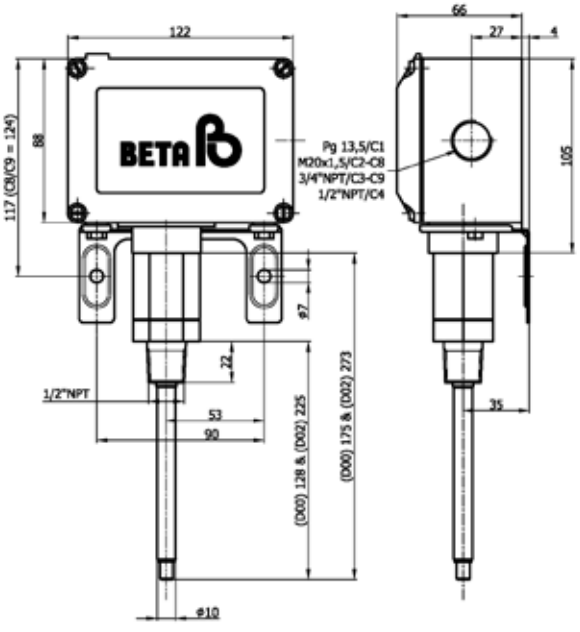
“C - Z”- Series: Bi-directional Differential “**D**...**D**”



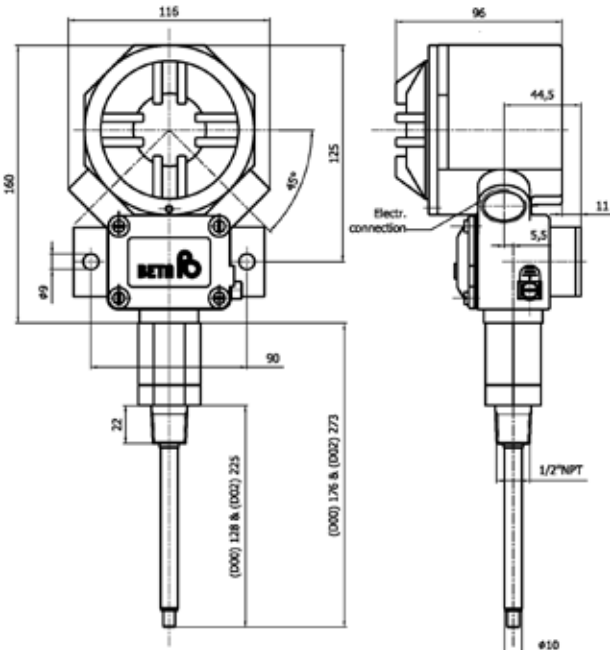
“W.”- Series: Bi-directional Differential “**D**...**D**”



“C - Z”- Series: Temperature “**T**..**H** - **D**”

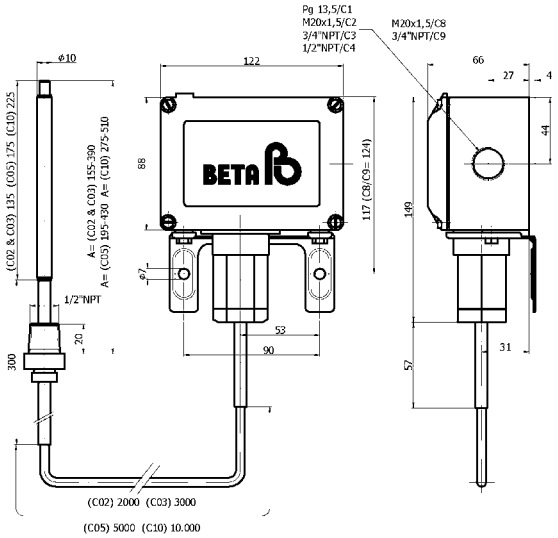


“W.”- Series: Temperature “**T**..**H** - **D**”

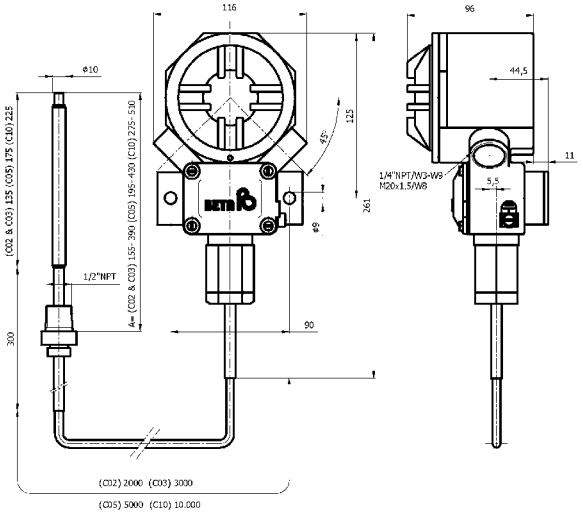


DIMENSIONS

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

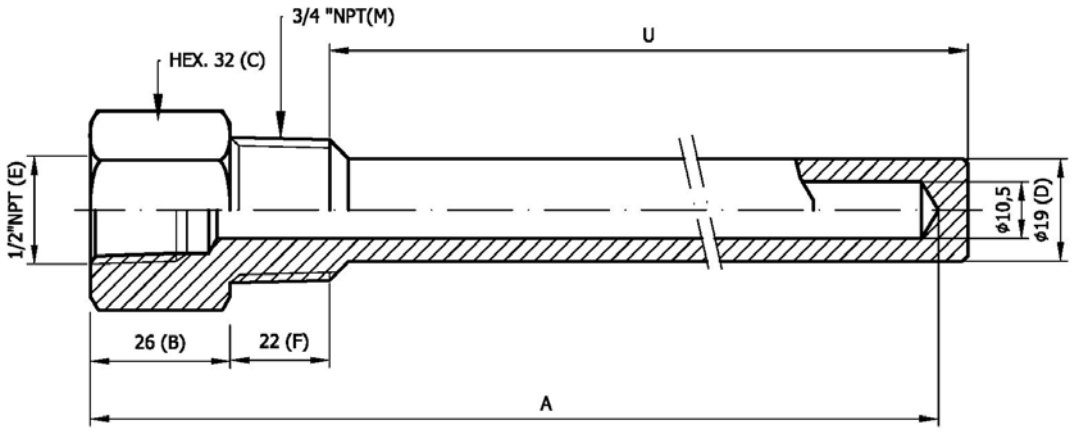


"W."- Series: Temperature "**T..H-C**"



ACCESSORIES

Thermowell (SS 316)



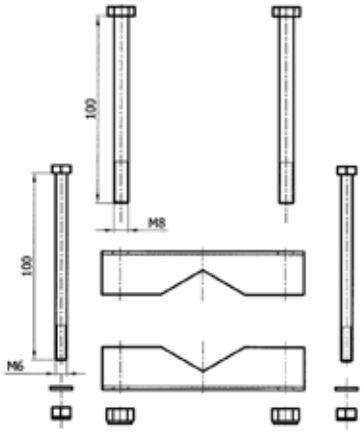
Standard BETA Thermowell

CODE	INSERTION LENGTH U (MM)	INSERTION ELEMENT LENGHT A (MM)	FIT TO BETA TEMP. 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:

1. BETA Thermowells to be ordered as separate item.
2. Special Thermowell possible. Consult your BETA Switch Representive.

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



Contents :

1. 2 x Bracket +
2. 2 x bolts M8 x 100 mm + nut (W3)

OR

3. 2 x bolts M6 x 100 mm + washer + nut (C/Z)

Size +/- 1,5 mm / Material SS 304

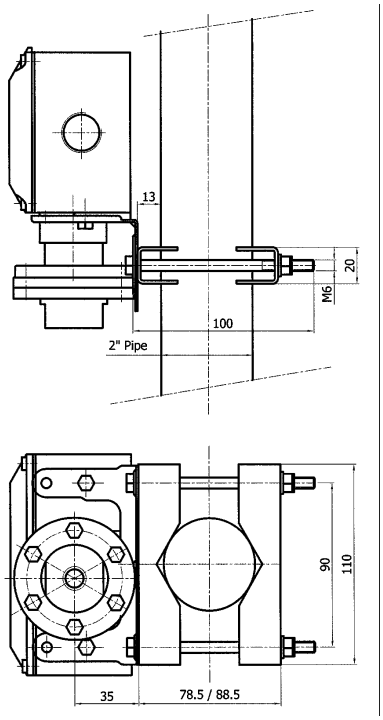
Disclaimer :

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

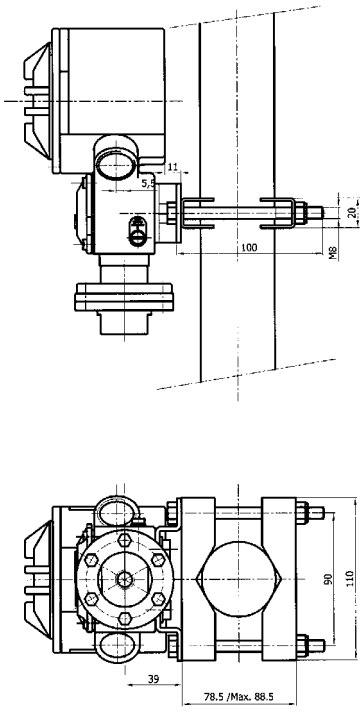
Foundation vibrations, as well as process vibrations, can disturb the proper functioning of the mounted instrument, the use of this bracket does not prevent or diminishes such occurrence.

2” Pipemount Set (SS 304) Configuration Examples

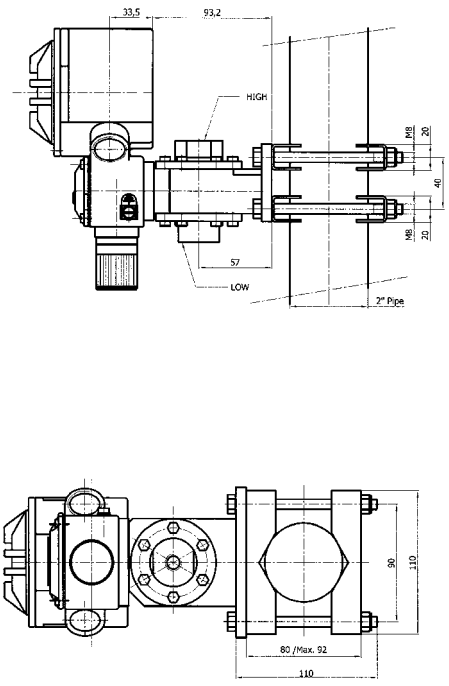
“C.”- Series Enclosure on 2” Pipe



“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 and Temperature Switches
C, **W** and **Z** series switches

Contact:

OFFICE:

Verrijn Stuartlaan 22
2288 EL Rijswijk
The Netherlands

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