ZPN/ZPHN Nuclear pressure switches

Pneumatic or hydraulic fluid control

Power generation safety equipments

Pressurized chambers control

Liquid level control

Conform to CE

K3 versions following "Design and Construction Rules Electrical equipment of Nuclear Islands" (french version RCC-E)

These instruments compare a pre-established adjustable set point to the received process pressure.

Equipped with one microswitch, they are used for controlling the process cycles, or operate an alarm when pressure reaches set point value.

Depending on options selected, adjustable differential deadband is available. Featuring possibility to adjust change on rise and change on fall limits or enabling to get rid of undesired repetitive on/off around set point.

These pressure switches are offered in a version compatible for use in standard and nuclear surroundings.

Technical Data (20 °C)

Process temperature	100 series = -15 °C to 150 °C 200 series = -50 °C to 200 °C
Ambient temperature	-10 ... 55 °C
Storage temperature	-40 ... 70 °C
Repeatability	±1% of F.S.
CE conformity	Low Voltage Directive DBT 73/23/CE Pressure Directive PED 97/23/CE
Degree of protection	IP 66, NF EN 60529

Important

Normal operation and set point adjustment are between 10 % and 90 % of the selected scale. The deadband values given in the tables (see inside pages) are defined under these conditions. The maximum overpressure values correspond to accidental over-pressures of limited duration.

All circuits must be equipped with a safety system protecting them against excess pressure.

Any pulsating circuit must be fitted with pulsation dampeners. Mechanical vibrations should be reduced by means of antivibration mounts fitted to the pressure switches.

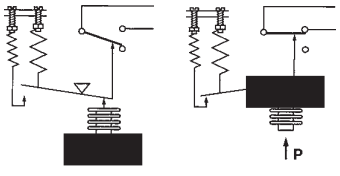
K3 approval:
- ranges 200 to 209
- microswitch CHM/SHM
- electrical out put cable or qualified connector K3
- deadband adjusted
- instrument mounting done in accordance with Baumer recommandations

Manufacturing

Cover	Beige ZAMAK protected Resistance irradiation Max. 850 kGy Captive screws for cover attachment
Case	Beige ZAMAK protected
Wall mounting	Removable bracket
Earth connection	Internal
Electrical connection	CxM: souriau 8N45 connector outlet or approved connector K3 SHM/SGM/SDM: 2m long cable outlet SCM/SEM/SRM: Internal terminal block with metallic P.E.11 (Ø cable = 6.5 mm to 10.5 mm) or metallic P.E.16 (Ø cable = 10.5 mm to 15 mm)
Microswitch characteristics	See p. 4
Pressure connection	G 1/2 for the (900 MW bearing) 1/4 NPT female or G1/2 male for 1300MW and N4 bearing
Adjustment element	External adjustment screw fitted with an antivibration system locking the set point and the deadband, protected by screwed lead seal on (option)

Operating principle

A flexing element, (bellow diaphragm or piston), actuates a microswitch by means of levers. The set point and the deadband are set by springs mounted in opposition.



Baumer

ZPN -ZPHN low pressure

ZPN100 series: Flanges = 316 L stainless steel
Diaphragm = Viton®

Scale	P max accidental	Code	Microswitch-Deadband						Dimensions
			Adjustable Deadband		Fixed deadband				
			SHM/CHM/SCM		SGM/CGM/SEM		SDM/CDM/SRM		Sensing element
			10 % of scale	90 % of scale	10 % of scale	90 % of scale	10 % of scale	90 % of scale	
mbar	bar		mbar	mbar	mbar	mbar	mbar	mbar	See figure
-50 to 0	0.15	101	6.5 to 25	7.5 to 25	0.5	0.5	2.5	3	1
-2 to 10	0.15	102	4.5 to 5	4.5 to 5	0.3	0.3	1.5	1.5	1
-5 to 50	0.15	103	5 to 15	7 to 15	0.4	0.4	1.5	2.5	1
-8 to 100	0.15	104	5 to 25	10 to 25	0.5	0.5	2	2.5	1
-200 to 0	1	151	15 to 80	15 to 80	2	3	7.5	10	5
0 to 200	1	152	15 to 80	15 to 80	2	3	7.5	10	5
0 to 400	1	153	30 to 150	35 to 150	4	6	18	25	5

ZPHN100 series: Sensing element withstanding overpressure with flanges in stainless steel
1.4404 (316 L) and Viton® diaphragm

Scale	P max accidental	Code	Microswitch-Deadband						Dimensions
			Adjustable Deadband		Fixed deadband				
			SHM/CHM/SCM		SGM/CGM/SEM		SDM/CDM/SRM		Sensing element
			10 % of scale	90 % of scale	10 % of scale	90 % of scale	10 % of scale	90 % of scale	
mbar	bar		mbar	mbar	mbar	mbar	mbar	mbar	See figure
-50 to 0	10	101	6.5 to 25	7.5 to 25	0.6	0.6	2.5	3	8
-2 to 10	10	102	4.5 to 10	4.5 to 10	0.4	0.4	1.5	1.5	8
-5 to 50	10	103	4.5 to 20	5 to 20	0.4	0.4	1.5	2.5	8
-8 to 100	10	104	5 to 25	10 to 25	0.5	0.5	2	3	8
-200 to 0	50	151	25 to 80	40 to 80	3	4	14.5	25	7
0 to 200	50	152	30 to 80	45 to 80	3.5	4	18	30	7
0 to 400	50	153	35 to 150	50 to 150	4	5.5	20.5	35	7
0 to 1000	50	154	45 to 150	60 to 150	6	7	26.5	45	7
0 to 700	100	171*	40 to 350	70 to 350	7	9	24	50	6
0 to 1500	100	172*	40 to 350	100 to 350	7	9	24	75	6
0 to 2500	100	173*	50 to 350	160 to 350	9	11	30	110	6

* G 1/4 female connection

Explosion-proof model: deadbands are multiplied by 1.5

ZPN medium and high pressure

ZPN200/600 series: Sensing element: 316L stainless steel bellow or nickel plated piston

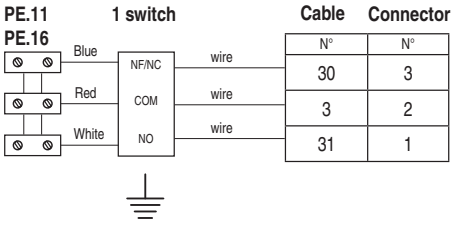
Scale	P max accidental	Code	Microswitch-Deadband						Dimensions
			Adjustable Deadband		Fixed deadband				
			SHM/CHM/SCM		SGM/CGM/SEM		SDM/CDM/SRM		Sensing element
			10 % of scale	90 % of scale	10 % of scale	90 % of scale	10 % of scale	90 % of scale	
bar	bar		mbar	mbar	mbar	mbar	mbar	mbar	See figure
-1 to 0	1.5	200	80 to 250	95 to 250	5	6	30	42	2
-1 to 2.5	7	201	150 to 1200	200 to 1200	22	25	96	120	3
0 to 0.2	1.5	202	60 to 100	65 to 100	4	5	18	24	2
0.05 to 1	1.5	203	80 to 400	95 to 400	4	5	24	30	2
0.5 to 10	30	204	650 to 3000	850 to 3000	45	50	240	300	4
3.5 to 25	30	205	750 to 5000	1300 to 5000	60	100	720	1440	4
5 to 50	65	206	2500 to 10000	3000 to 10000	150	200	1500	2500	4
5 to 100	220	207	5500 to 15000	6500 to 15000	700	900	3000	3500	4
20 to 150	220	208	5500 to 15000	6500 to 15000	700	1000	3000	4500	4
-1 to 3.5	15	209	650 to 1500	850 to 1500	45	50	200	250	4
bar	bar		bar	bar	bar	bar	bar	bar	
25 to 175	800	600 (1)	30 to 80	35 to 80	14	10	24	36	4
30 to 350	800	601 (1)	30 to 100	35 to 100	16	16	24	36	4
60 to 600	800	602 (1)	30 to 120	35 to 120	16	16	24	36	4

(1) sensing element with piston

Explosion-proof model: deadbands are multiplied by 1.5

Cable or connector identifications, current rating

Cable or connector identifications



Current rating

Microswitch type SPDT

CHM/ SHM/SCM	Standard, hermetically sealed micro contact Micro ABB R6461 R8 (CHM) Micro ABB R3917 R8 (SHM) Micro ABB R6461 R6 (SCM)	5 mA min. ; 4 Max 250 Vac max. or 220 Vdc max.
CGM/ SGM/SEM	Ultra sensitivity micro contact Micro Honeywell BZ RW 843515	0.2 A min.; 10 A max. 250 Vac max. or 30 Vdc max.
CDM/ SDM/SRM	Ultra sensitivity, hermetically sealed micro contact Micro Honeywell 1HM19 M5272216-1	0.4 A min.; 10 A max. 30 Vdc max.

Regulation: Explosion-proof

Pressure of regulator type ZPxx(E)
LCIE 03 ATEX 6231X
CE 0081

Ex II 2 G and D
Ex d IIC T6 or T5

Dust IP6X	Gases
T° surface	Class
80 °C	Ta = 60 °C / T6
95 °C	Ta = 70 °C / T5

DO NOT OPEN - LIVE VOLTAGE

All necessary measures must be taken by the user, to avoid the calorific transfer from the fluid to the apparatus head increasing the head's temperature to such that it reaches the self-ignition temperature of the gas in which it is used.

Regulation: Intrinsic safety

Pressure of regulator type ZPxx(Y)
LCIE 03 ATEX 6123X
CE 0081

Ex I M1
Ex ia I

Ex II 1 G and D
Ex ia IIC T6 or T5

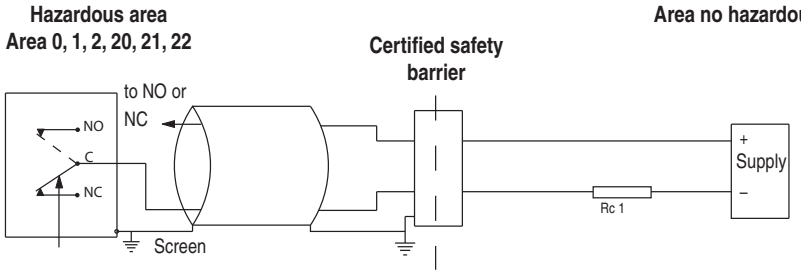
Ex II 2 D Use without certified safety barrier for area 21 or 22

Dust IP6X	Gases
T° surface	Class
80 °C	Ta = 55 °C / T6
95 °C	a = 70 °C / T5

The installation must be in accordance to U_{max} and I_{max}

All necessary measures must be taken by the user, to avoid the calorific transfer from the fluid to the apparatus head increasing the head's temperature to such that it reaches the self-ignition temperature of the gas in which it is used.

Installation requirements: Intrinsic safety



U_{max} = 28 Vdc
I_{max} = 120 mA
P = 0.8 W
$C_a > C_i + C_{cable}$; $L_a > L_i + L_{cable}$
C_i = Negligible ; L_i = Negligible

Don't forget the barrier's resistors in the determination of Rc 1.
In area 0 or 20 the loop calculation of the association transmitter with safety barrier must be approved by notified organism.

Options

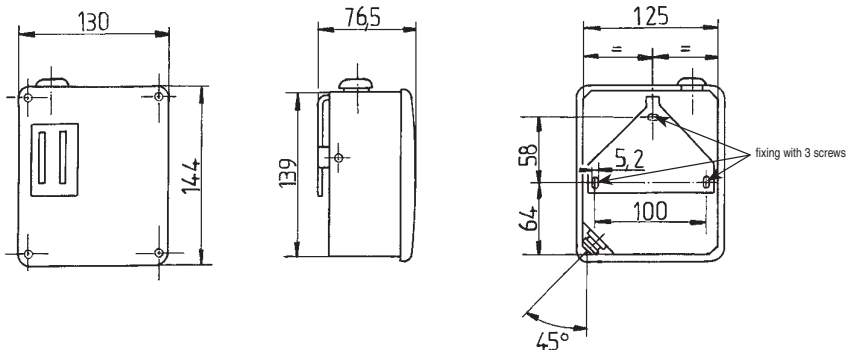
Pressure connection 1/2 NPT male
Set point adjustment Code ***SETP***
Nuclear cleanliness Code ***0838***
For versions with qualified connector = mobile plug qualified K3
ATEX versions according to Directive ATEX 94/9/CE
Explosion proof version (LCIE 03 ATEX 6231x) II 2G and D Ex d IIC T6 or 5
Intrinsic safety version (LCIE 03 ATEX 6123x) II 1 G and D Ex ia IIC T6 or 5

Accessories

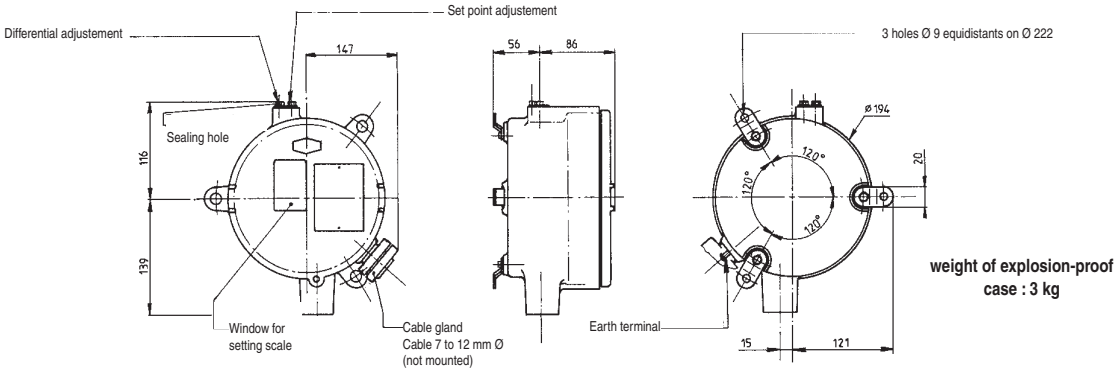
Pulsation dampener
Chemical seal
Flange connections
Cut off valve
Manifold

Dimensions (mm)

Watertight case



Explosion-proof case



weight of explosion-proof case : 3 kg

Sensing element ZPN low pressure

ZPN - 101 - 102 - 103 - 104
weight : 3 kg

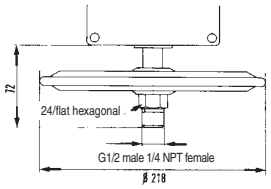


Fig. 1

ZPN - 200 - 202 - 203
weight : 2.5 kg

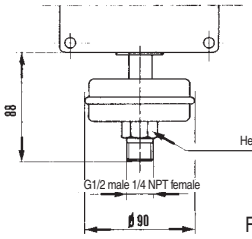


Fig. 2

ZPN - 201
weight : 2.4 kg

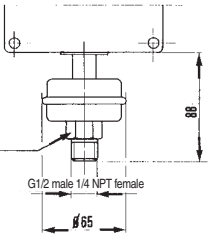


Fig. 3

ZPN - 204 - 205 - 206 - 207 - 208
209 - 600 - 601 - 602
weight : 2 kg

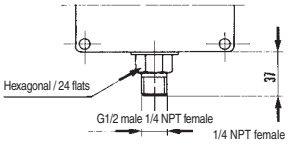


Fig. 4

ZPN - 151 - 152 - 153
weight : 2.8 kg

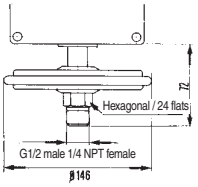


Fig. 5

Sensing element ZPHN

ZPHN - 171 - 172 - 173
weight : 7 kg

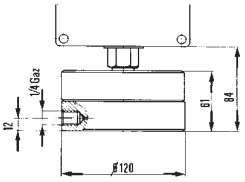


Fig. 6

ZPHN - 151 - 152 - 153 - 154
weight : 6.4 kg

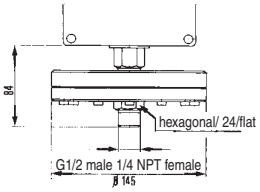


Fig. 7

ZPHN - 101 - 102 - 103 - 104
weight : 10 kg

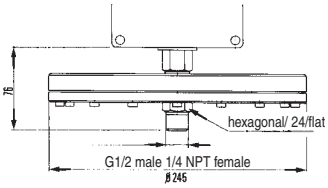


Fig. 8

Ordering Details - ZP (nuclear)

ZPxxxxxxxxx

Model	1´...2' Digit	
ZP	ZP	
Type	**3´...4' Digit**	
Normal ①	N-	
High pressure ②	HN	
Version	**5' Digit**	
Standard (K3 approval)	–	
Explosion proof	E	
Intrinsic safety	Y	
Pressure range	**6´...8' Digit**	
See table	xxx	
Electrical connection/microswitch/surrounding	**9´...11' Digit**	
Cable / Standard hermetically / Nuclear (K3 approval)	SHM	
Cable / Ultra sensitive* / Nuclear	SGM	
Cable / Ultra sensitive hermetically* / Nuclear	SDM	
Connector / Standard hermetically / Nuclear (K3 approval)	CHM	
Connector / Ultra sensitive* / Nuclear	CGM	
Connector / Ultra sensitive hermetically* / Nuclear	CDM	
Terminal block with metal cable gland / Standard hermetically / Nuclear	SCM	
Terminal block with metal cable gland / Ultra sensitive* / Nuclear	SEM	
Terminal block with metal cable gland / Ultra sensitive hermetically* / Nuclear	SRM	

*** Not allowed in intrinsic safety**

	Code			Scale in kPa
LOW PRESSURE	101	①	②	-5 ... 0 (-50 ... 0 mbar)
	102	①	②	-0.2 ... 1 (-2 ... 10 mbar)
	103	①	②	-0.5 ... 5 (-5 ... 50 mbar)
	104	①	②	-0.8 ... 10 (-8 ... 100 mbar)
	151	①	②	-20 ... 0 (-200 ... 0 mbar)
	152	①	②	0 ... 20 (0 ... 200 mbar)
	153	①	②	0 ... 40 (0 ... 400 mbar)
	154		②	0 ... 100 (0 ... 1000 mbar)
	171		②	0 ... 70 (0 ... 700 mbar)
	172		②	0 ...150 (0 ...1500 mbar)
	173		②	0 ... 250 (0 ... 2500 mbar)
MEDIUM PRESSURE	200	①		-10 ... 0 (-1 ... 0 bar)
	201	①		-10 ... 25 (-1 ... 2.5 bar)
	202	①		0 ... 20 (0 ... 0.2 bar)
	203	①		5 ...100 (0.05 ...1 bar)
	204	①		50 ...1000 (0.5 ...10 bar)
	205	①		350 ... 2500 (3.5 ... 25 bar)
	206	①		500 ... 5000 (5 ... 50 bar)
	207	①		500 ...10000 (5 ...100 bar)
	208	①		2000 ... 15000 (20 ... 150 bar)
	209	①		-100 ... 350 (-1 ... 3.5 bar)
HIGH PRESSURE	600	①		2500 ... 17500 (25 ... 175 bar)
	601	①		3000 ... 35000 (30 ... 350 bar)
	602	①		6000 ... 60000 (60 ... 600 bar)