RD(Y) Intrinsically safe differential pressure switches

Pneumatics or hydraulic fluid control

Power generation safety equipment

Pressurized chamber control

Level measurement

LCIE 03 ATEX 6123X

CE 0081

I M 1
EEx ia I

II 1 G and D
EEx ia IIC T6 or T5

II 2 D

Hazardous areas : 0,1, 2, 20, 21, 22

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

Equiped with one or two snap action microswitches, they are used for controlling the process cycles, or operate an alarm when pressure reaches a set point value.

Depending on the options selected, adjustable differential deadband is available which provides the possibility to adjust the change on rise and fall limits providing the ability the reduce 'bounce' around the set point which causes a constant on/off of the switch.

Technical data (20°C)

Operating temperature	See pages 2 and 3
Storage temperature	From -40...70°C
Reproducibility	±2% of F.S.
Reading accuracy	±5% of F.S.
Conforms to CE	Low Voltage Directive DBT 73/23/CE Directive ATEX 94/9/CE (EN50014, EN50020, EN50281-1-1)
Degree of protection	IP 65, NF EN 60529

Manufacturing

Cover	Blue ZAMAK protected Captive screws for cover attachment
Case	Black ZAMAK protected
Wall mounting	Removable bracket
Earth connection	Internal
Electrical connection	Via internal terminal block with P.E. 11 for cable 7 to 10.5 mm dia
Pressure connection	G 1/2 male and 1/4 NPT female
Adjustement element	External adjustment screw fitter with an antivibration system locking the set point and the deadband, protected by screwed lead seal on.

Important

Normal operation is between 10 % and 90 % of the selected scale. Deadband values given in the table (see overleaf) are defined under these conditions.

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

All pulsating circuits must be fitted with pulsation dampeners. When mechanical vibrations are present, these should be reduced as much as possible by installing the pressure switches on antivibration mounts. For the switch to be correctly calibrated, the operating static pressure must be known.

BOURDON HAENNI
made to measure

Operating range

RDDP - RDPN - RDPH - RDHN low pressure

RDDP : standard sensing element with treated steel flanges and diaphragm in Viton

RDPN : standard sensing element with lower flange in stainless steel 1.4404 (316 L) and diaphragm in Viton.

Scale	Code	P Maxi	P statique Maxi	MICROSWITCH Adjustable deadband N (tropicalized) at 10 % of scale	N (tropicalized) at 90 % of scale	M (gold) C (SH) at 10 % of scale	C (SH) at 90 % of scale	DIMENSIONS Sensing element See figure	Max Fixed deadband S (or) at 10 % of scale	S (or) at 90 % of scale
mbar		mbar	bar	mbar	mbar	mbar	mbar		mbar	mbar
2 to 10	**111**	10	0.15	1.2 to 10	1.6 to 10	4.5 to 10	4.5 to 10	Fig. 1	0,7	1,2
2 to 50	**121**	50	0.15	1.7 to 30	2.2 to 30	5 to 30	5.5 to 30	Fig. 1	0,9	1,4
2 to 100	**131**	100	0.15	1.7 to 40	2.5 to 40	5.5 to 40	10 to 40	Fig. 1	1,2	2
10 to 200	**156**	200	1	8 to 80	10.5 to 80	25 to 80	40 to 80	Fig. 2	5,8	9,5
10 to 400	**157**	400	1	15 to 150	20 to 150	30 to 150	45 to 150	Fig. 2	10,5	17

RDPH : sensing element with standing overpressure with treated steel flanges and EPDM diaphragm.

RDHN : sensing element with standing overpressure with lower flange in stainless steel 1.4404 (316 L) and diaphragm according to (1), (3)

Scale	Code	P Maxi	P statique Maxi	MICROSWITCH Adjustable deadband N (tropicalized) at 10 % of scale	N (tropicalized) at 90 % of scale	M (gold) C (SH) at 10 % of scale	C (SH) at 90 % of scale	DIMENSIONS Sensing element See figure	Max Fixed deadband S (or) at 10 % of scale	S (or) at 90 % of scale
mbar		mbar	bar	mbar	mbar	mbar	mbar		mbar	mbar
2 to 10	111(3)	10	0 to 5	1.2 to 10	1.6 to 10	4.5 to 10	4.5 to 10	Fig. 3	0,7	1,2
2 to 20	112(3)	50	0 to 5	1.7 to 20	2.2 to 20	5 to 20	5.5 to 20	Fig. 3	0,9	1,4
2 to 50	121(3)	50	0 to 5	1.7 to 30	2.2 to 30	5 to 30	5.5 to 30	Fig. 3	0,9	1,4
2 to 100	131(3)	100	0 to 5	1.7 to 40	2.5 to 40	5.5 to 40	10 to 40	Fig. 3	1,2	2
10 to 200	156(1)	200	5.5 to 50	8 to 80	10.5 to 80	35 to 80	45 to 80	Fig. 4	5,8	9,5
10 to 400	157(1)	400	5.5 to 50	15 to 150	20 to 150	40 to 150	50 to 150	Fig. 4	10,5	17
10 to 1000	158(1)	1000	5.5 to 50	18 to 150	22 to 150	45 to 150	60 to 150	Fig. 4	11,5	19,6
10 to 700	161(1)	700	5.5 to 80	20 to 200	30 to 200	60 to 350	90 to 350	Fig. 5	18,5	22,5
10 to 1500	162(1)	1500	5.5 to 80	20 to 300	30 to 300	60 to 350	100 to 350	Fig. 5	18,5	22,5
10 to 2000	163(1)	2000	5.5 to 80	30 to 300	60 to 300	90 to 350	200 to 350	Fig. 5	20,7	33,6

(1) Viton diaphragm
(3) Nitrile, Butyl rubber diaphragm

T° fluid : -15...150° C
T° ambient : -10... 55° C
} RDDP / RDPN / RDPH / RDHN

These microswitches can be implemented with two simultaneous contacts : W (2xC)
Warning : in this case, deadbands are multiplied by 1.5

Operating range

RDPW - RDWN low pressure, RDDP - RDPN medium pressure

RDPW : standard sensing element with treated steel flanges, Viton diaphragm not upset by static pressure variations

RDWN : standard sensing element, 1.4404 (316L) stainless steel flanges and Viton diaphragm, not upset by static pressure variations.

Scale	Code	P Maxi	P statique Maxi	MICROSWITCH Adjustable deadband N (tropicalized) at 10 % of scale	N (tropicalized) at 90 % of scale	M (gold) at 10 % of scale	M (gold) at 90 % of scale	DIMENSIONS Sensing element See figure	Max Fixed deadband S (or) at 10 % of scale	S (or) at 90 % of scale
mbar		mbar	bar	mbar	mbar	mbar	mbar		mbar	mbar
10 to 200	**156**	200	20	8 to 80	10.5 to 80	35 to 80	45 to 80	Fig. 6	5,8	9,5
10 to 400	**157**	400	20	15 to 150	20 to 150	40 to 150	50 to 150	Fig. 6	10,5	17
10 to 1000	**158**	1000	20	18 to 150	22 to 150	45 to 150	60 to 150	Fig. 6	11,5	19,6
10 to 700	**161***	700	20	30 to 250	45 to 250	130 to 450	150 to 450	Fig. 7	27,5	34
10 to 1500	**162***	1500	20	30 to 300	45 to 300	130 to 450	150 to 450	Fig. 7	27,5	34
10 to 2000	**163***	2000	20	45 to 300	90 to 300	180 to 450	300 to 450	Fig. 7	31	50

T° fluid : -15... 150° C
T° ambient : -10... 55° C

* G 1/4 female connection

RDDP : standard sensing element with brass base plate, Tombac bellow or nickel-plated piston.

RDPN : standard sensing element with stainless steel base plate, stainless steel bellow or nickel plated piston.

Scale	Code	P Maxi	P statique Maxi	MICROSWITCH Adjustable deadband N (tropicalized) at 10 % of scale	N (tropicalized) at 90 % of scale	M (gold) at 10 % of scale	M (gold) at 90 % of scale	DIMENSIONS Sensing element See figure	Max Fixed deadband S (or) at 10 % of scale	S (or) at 90 % of scale
bar		bar	bar	bar	bar	bar	bar		mbar	mbar
0.05 to 0.5	**211**	0.5	7	0.09 to 0.3	0.1 to 0.3	0.15 to 0.4	0.2 to 0.4	Fig. 1	0,06	0,09
0.05 to 1	**221**	1	7	0.09 to 0.3	0.1 to 0.3	0.15 to 0.4	0.22 to 0.4	Fig. 1	0,06	0,09
0.15 to 0.5	**214***	0.5	15	0.14 to 0.5	0.18 to 0.5	-	-	Fig. 2	0,12	0,18
0.15 to 1	**224***	1	15	0.14 to 0.6	0.20 to 0.6	-	-	Fig. 2	0,12	0,18
0.15 to 4	**234***	4	15	0.14 to 1.5	0.25 to 1.5	0.65 to 2	0.8 to 2	Fig. 2	0,12	0,18
0.8 to 4	**235**	4	30	0.7 to 2.5	1.1 to 2.5	0.75 to 2.5	1.1 to 2.5	Fig. 2	0,16	0,28
0.8 to 10	**245**	10	30	0.7 to 2.5	1.1 to 2.5	0.75 to 2.5	1.1 to 2.5	Fig. 2	0,16	0,28
1.5 to 10	**246**	10	65	1.2 to 5	2.5 to 5	2.5 to 6	3.5 to 6	Fig. 2	0,42	0,68
1.5 to 20	**256**	20	65	1.2 to 5	2.5 to 5	2.5 to 6	3.5 to 6	Fig. 2	0,42	0,68
2.5 to 20	**257****	20	220	2.5 to 20	3.5 to 20	6 to 20	7 to 20	Fig. 2	1,85	2,80
2.5 to 30	**258****	30	220	3 to 20	4 to 20	6 to 20	7 to 20	Fig. 2	1,95	2,80
15 to 120	**651**	120	600	15 to 100	25 to 100	25 to 100	35 to 100	Fig. 2	12	20

* Static P maxi = 30 bar for stainless steel version
** measuring element in stainless steel only

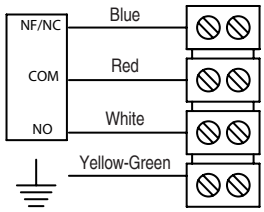
T° fluid : -50... 80° C (RDDP)
-50... 200° C (RDPN)
T° ambient : -25... 55° C

These microswitches can be implemented with two simultaneous contacts : W (2xC)
Warning : in this case, deadbands are multiplied by 1.5

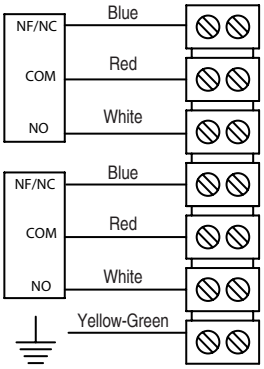
Cable identification, current rating

Cable identification

1 switch



2 switches



Current rating

Microswitch type SPDT

C	Hermetic Adjustable deadband	5 mA min.; 0.12 A max. 28 Vdc max.
M	Gold Contact Adjustable deadband	10 mA min.; 50 mA max. 28 Vdc max.
K	2 gold contacts Adjustable deadband	10 mA min.; 50 mA max. 28 Vdc max.
N	Tropicalized Adjustable deadband	0.1 A min.; 0.12 A max. 28 Vdc max.
T	Tropicalized 2 contacts Adjustable deadband	0.1 A min.; 0.12 A max. 28 Vdc max.
W	2 hermetically contacts Adjustable deadband	5 mA min.; 0.12 A max. 28 Vdc max.
S	Fixed low deadband Fixed deadband	10 mA min.; 50 mA max. 28 Vdc max.

Regulation

Differential pressure regulator type RD
LCIE 03 ATEX 6123X
CE 0081

I M 1
EEx ia I

II 1 G and D
EEx ia IIC T6 or T5

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

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

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

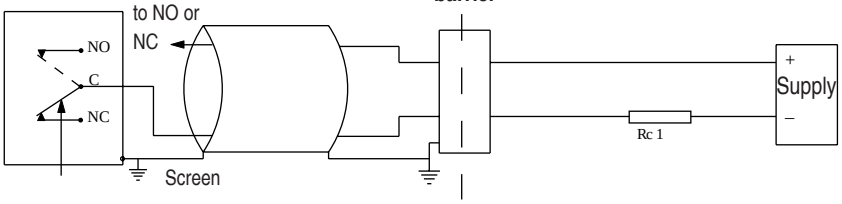
All necessary measures must be taken by the user, to avoid the calorific transfer from the fluid to the apparatus head increasing the head's temperature to such that it reaches the self-ignition temperature of the gas in which it is used.

Installation requirements

Hazardous area
Area 0, 1, 2, 20, 21, 22

Certified safety barrier

Area no hazardous



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 a notified body.

Operating principle

An element which is sensitive to a differential pressure actuates one or two microswitches via levers. The set point and the deadband are adjusted by springs.

HP < BP HP > BP

Dimensions (mm)

Watertight case

Sensing element RDDP / RDPN / RDPH / RDHN / RDPW / RDWN low pressure

Fig.1
RDDP / RDPN - 110 - 111 - 121 - 131
weight : 3 kg

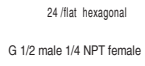


Fig. 2
RDDP / RDPN - 156 - 157
weight : 2.8 kg

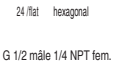


Fig. 3
RDPH / RDHN - 111 - 121 - 131
weight : 10 kg

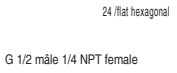


Fig. 4
RDPH / RDHN - 150
weight : 6.4 kg

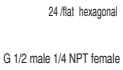


Fig. 5
RDPH / RDHN - 160
weight : 7 kg

Fig. 6
RDPW / RDWN - 150
weight : 6.6 kg

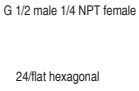


Fig. 7
RDPW / RDWN - 160
weight : 7 kg

Dimensions (mm)

Sensing elemennt RDDP / RDPN medium pressure

Fig. 1
RDDP / RDPN 211 - 221
weight : 3 kg

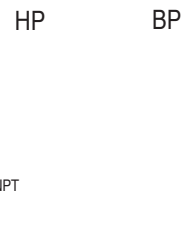
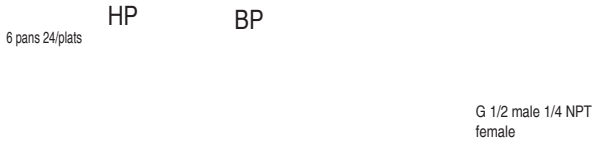


Fig. 2
RDDP / RDPN 214 - 224 - 234 - 235 - 245 - 246 - 256 - 257 - 258 - 651
weight : 3 kg



Accessories

Adaptor for welded connection : in steel ZRM1
or stainless steel ZRMN1

Ring siphon steel or 1.4401 (AISI 316) stainless steel

Chemical seal (code 221 to 651)

ISOLATING valve

Manifold

Pulsation dampener

Options

Other cables glands
All stainless steel construction for agressive environments
(screws and sensing element)
French electricity (EDF) version
(consult SEPTEN ZDP, ZDPH, ZDPW leaflet)

Specific connection.
Oxygen application ***Code 0765***
Stainless steel tag plate and wire ***Code 9941***
Connection on pipe 2 " dia. ***Code 0407***
Adjustment of the set point ***Code SETP***

Ordering Details - RD

		RDYxxxxxx
Model	**1´...3´ digit**	
Pressure switch		RD
Protection	**3´ digit**	
IS - Intrinsically safe		Y
Type	**4´ caractère**	
Code 110 to 163		
DDP		1
DPH		2
DPW		3
DPN		4
DPHN		5
DPWN		6
Code 211 à 651		
DDP		7
DPN		8
Type of microswitch **	**5´ digit**	
1 hermetically changeover switch		C
2 gold contact changeover switches		K
1 gold contact changeover switch		M
1 tropicalized changeover switch		N
2 hermetically changeover switches		W
1 gold contact changeover switch, fixed low deadband		S
2 tropicalized changeover switches		T
Other changeover (option)		x
Pressure connection	**6´ digit**	
G 1/4 female (161, 162, 163 only)		H
G 1/2 male		3
1/2 NPT male		6
1/4 NPT female		8
Pressure range	**7´...9´ digit**	
See codes in table		xxx

** *SPDT microswitches only*

Code	range in bar	RDDP RDPN	RDPH RDHN	RDPW RDWN
111	2 + 10	X	X	
112	2 + 20		X	
121	2 + 50	X	X	
131	2 + 100	X	X	
156	10 + 200	X	X	X
157	10 + 400	X	X	X
158	10 + 1000		X	X
161	10 + 700		X	X
162	10 + 1500		X	X
163	10 + 2000		X	X

Code	range in bar	RDDP RDPN
211	0,05 + 0,5	X
221	0,05 + 1	X
214	0,15 + 0,5	X
224	0,15 + 1	X
234	0,15 + 4	X
235	0,8 + 4	X
245	0,8 + 10	X
246	1,5 + 10	X
256	1,5 + 20	X
257	2,5 + 20	X
258	2,5 + 30	X
651	15 + 120	X

Electronuclear versions: ZDP-SHM or CHM, ZDPH-SHM or CHM, ZDPW-SHM or CHM