

# RD(E) Differential pressure switches explosion proof RA80

Pneumatics or hydraulic fluid control

Power generation safety equipments

Pressurized chambers control

Level measurement

LCIE 03 ATEX 6231X

CE 0081



II 2 G and D  
EEx d IIC T6 or T5

Hazardous areas : 1, 2, 21, 22

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

Equipped with one or two snap action microswitches, 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.



## Technical Data (20 °C)

<b>Operating ambient temperature</b>	See pages 2 and 3
<b>Storage temperature</b>	From - 40...70 °C
<b>Reproducibility</b>	± 2 % of F.S.
<b>Reading accuracy</b>	± 5 % of full scale
<b>Conform to CE</b>	Low Voltage Directive DBT 73/23/CE Directive ATEX 94/9/CE (EN50014, EN50018, EN50281-1-1)
<b>Degree of protection</b>	IP 65, NF EN 60529

### 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.

### Manufacturing

<b>Explosion-proof housing</b>	Epoxy painted aluminium housing
<b>Wall mounting</b>	M8 x 3
<b>Earth connection</b>	Via internal or external terminal block
<b>Electrical connection</b>	Via internal terminal block with P.G. certified ATEX for cable 7 to 12 mm dia
<b>Pressure connection</b>	G 1/2 or female 1/4 NPT
<b>Adjustment element</b>	External adjustment screw for the set point and the deadband, lead seal on (option) Internal mechanism of bichromate treated galvanized steel

**BOURDON  
HAENNI**

made to measure



## Operating ranges

### RDDP - RDPN - RDPH - RDHN low pressure

**RDDP :** standard sensing element with treated steel flanges and diaphragm according.

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

Scale	Code	Maxi $\Delta P$	static P Maxi	MICROSWITCH								DIMENSIONS  See figures below
				Adjustable deadband				Max Fixed deadband				
				N (Tropicalized) At 10 % of scale	A (SI) At 90 % of scale	M (Gold) At 90 % of scale	C (SH) At 10 % of scale	E (GS) At 10 % of scale	D (GSH) At 90 % of scale	E (GS) At 90 % of scale	D (GSH) At 90 % of scale	
mbar		mbar	bar	mbar	mbar	mbar	mbar	mbar	mbar	mbar	mbar	
-2.5 to +2.5	<b>110</b>	5	0.15					0.45	0.6			Fig. 1
2 to 10	<b>111</b>	10	0.15	1.8 to 15	2.4 to 15	6.7 to 15	6.7 to 15	0.45	0.6	2.25	3	Fig. 1
2 to 50	<b>121</b>	50	0.15	2.6 to 45	3.3 to 45	7.5 to 45	7.5 to 45	0.6	0.75	3	4.5	Fig. 1
2 to 100	<b>131</b>	100	0.15	2.6 to 60	3.7 to 60	8.2 to 60	15 to 60	0.75	1.05	3	4.5	Fig. 1
10 to 200	<b>156</b>	200	1	12 to 120	15.5 to 120	37 to 120	60 to 120	3.75	5.1	15	19.5	Fig. 2
10 to 400	<b>157</b>	400	1	22 to 225	30 to 225	45 to 225	67 to 225	6.75	9	27	36	Fig. 2

**RDPH :** sensing element with standing overpressures with treated steel flanges and diaphragm according.

**RDHN :** sensing element with standing overpressure with 1.4404 (316L) stainless steel flanges and diaphragm according to (1), (3).

Scale	Code	Maxi $\Delta P$	static P Maxi	MICROSWITCH								DIMENSIONS  See figures below
				Adjustable deadband				Max Fixed deadband				
				N (Tropicalized) At 10 % of scale	A (SI) At 90 % of scale	M (Gold) At 90 % of scale	C (SH) At 10 % of scale	E (GS) At 10 % of scale	D (GSH) At 90 % of scale	E (GS) At 90 % of scale	D (GSH) At 90 % of scale	
mbar		mbar	bar	mbar	mbar	mbar	mbar	mbar	mbar	mbar	mbar	
2 to 10	111 <sup>(3)</sup>	10	0 to 5	1.8 to 15	2.4 to 15	6.7 to 15	6.7 to 15	0.45	0.6	2.25	3	Fig. 3
2 to 20	112 <sup>(3)</sup>	50	0 to 5	2.6 to 30	3.3 to 30	7.5 to 30	8 to 30	0.6	0.75	3	4.5	Fig. 3
2 to 50	121 <sup>(3)</sup>	50	0 to 5	2.6 to 40	3.3 to 40	7.5 to 40	8 to 40	0.6	0.75	3	4.5	Fig. 3
2 to 100	131 <sup>(3)</sup>	100	0 to 5	2.6 to 60	3.7 to 60	8.2 to 60	15 to 60	0.75	1.05	3	4.5	Fig. 3
10 to 200	156 <sup>(1)</sup>	200	5.5 to 50	12 to 120	15.5 to 120	52 to 120	67 to 120	3.75	5.1	15	19.5	Fig. 4
10 to 400	157 <sup>(1)</sup>	400	5.5 to 50	22 to 225	30 to 225	60 to 225	75 to 225	6.75	9	27	36	Fig. 4
10 to 1000	158 <sup>(1)</sup>	1000	5.5 to 50	27 to 225	33 to 225	67 to 225	90 to 225	7.5	10.5	33	40	Fig. 4
10 to 700	161 <sup>(1)(2)</sup>	700	5.5 to 80	30 to 300	45 to 300	90 to 525	135 to 525	9	12	36	54	Fig. 5
10 to 1500	162 <sup>(1)(2)</sup>	1500	5.5 to 80	30 to 450	45 to 450	90 to 525	150 to 525	9	12	36	54	Fig. 5
10 to 2000	163 <sup>(1)(2)</sup>	2000	5.5 to 80	45 to 450	90 to 450	135 to 525	300 to 525	13	18	54	108	Fig. 5

(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 : SII (2 x SI), GSS (2 x GS), SHH (2 x SH), GSHH (2 x GSH)

Warning : in this case, deadbands are multiplied by 1.5

For microswitches G : consult us.

## Operating ranges

### RDPW - RDWN low pressure, RDDP - RDPN medium pressure

**RDPW :** standard sensing element, treated steel flanges, Viton diaphragm not perturbed by static pressure variations.

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

Scale	Code	Maxi $\Delta P$	static P Maxi	MICROSWITCH								DIMENSIONS
				Adjustable deadband				Max Fixed deadband				
				N (Tropicalized) At 10 % of scale	A (SI) At 90 % of scale	M (Gold) At 90 % of scale	C (SH) At 10 % of scale	At 90 % of scale	E (GS) At 10 % of scale	At 90 % of scale	D (GSH) At 10 % of scale	
mbar		mbar	bar	mbar	mbar	mbar	mbar	mbar	mbar	mbar	mbar	
10 to 200	156	200	20	12 to 120	15.5 to 120	52 to 120	67 to 120	3.75	5.1	15	19.5	Fig. 6
10 to 400	157	400	20	22 to 225	30 to 225	60 to 225	75 to 225	6.75	9	27	36	Fig. 6
10 to 1000	158	1000	20	27 to 225	33 to 225	67 to 225	90 to 225	7.5	10.5	33	40	Fig. 6
10 to 700	161*	700	20	45 to 375	67 to 375	195 to 675	225 to 675	19.5	22.5	54	81	Fig. 7
10 to 1500	162*	1500	20	45 to 450	67 to 450	195 to 675	225 to 675	19.5	22.5	54	81	Fig. 7
10 to 2000	163*	2000	20	67 to 450	135 to 450	270 to 675	450 to 675	27	37.5	81	162	Fig. 7

T° fluid : - 15... 150 °C

\* G 1/4 : female connection

T° ambient : - 10... 55 °C

**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	Maxi $\Delta P$	static P Maxi	MICROSWITCH								DIMENSIONS
				Adjustable deadband				Max Fixed deadband				
				N (Tropicalized) At 10 % of scale	A (SI) At 90 % of scale	M (Gold) At 90 % of scale	C (SH) At 10 % of scale	At 90 % of scale	E (GS) At 10 % of scale	At 90 % of scale	D (GSH) At 10 % of scale	
bar		bar	bar	bar	bar	bar	bar	mbar	mbar	bar	bar	
0.05 to 0.5	211	0.5	7	0.13 to 0.45	0.15 to 0.45	0.22 to 0.6	0.3 to 0.6	37.5	45	0.17	0.18	Fig. 1
0.05 to 1	221	1	7	0.13 to 0.45	0.15 to 0.45	0.22 to 0.75	0.33 to 0.75	37.5	45	0.17	0.18	Fig. 1
0.15 to 0.5	214*	0.5	15	0.22 to 0.75	0.27 to 0.75	-	-	82.5	90	0.26	0.33	Fig. 2
0.15 to 1	224*	1	15	0.22 to 0.9	0.3 to 0.9	-	-	82.5	90	0.26	0.36	Fig. 2
0.15 to 4	234*	4	15	0.22 to 2.2	0.37 to 2.2	0.97 to 3	1.2 to 3	82.5	97.5	0.26	0.4	Fig. 2
0.8 to 4	235	4	30	1 to 3.7	1.6 to 3.7	1.12 to 3.7	1.6 to 3.7	105	150	1.26	2.03	Fig. 2
0.8 to 10	245	10	30	1 to 3.7	1.6 to 3.7	1.12 to 37	1.6 to 3.7	105	150	1.26	2.03	Fig. 2
1.5 to 10	246	10	65	1.8 to 7.5	3.7 to 7.5	3.7 to 9	5.2 to 9	270	360	2.18	4.5	Fig. 2
1.5 to 20	256	20	65	1.8 to 7.5	3.7 to 7.5	3.7 to 9	5.2 to 9	270	360	2.18	4.5	Fig. 2
2.5 to 20	257**	20	220	3.7 to 20	5.2 to 20	9 to 20	10 to 20	1200	1500	4.5	6.3	Fig. 2
2.5 to 30	258**	30	220	4.5 to 30	6 to 30	9 to 20	10 to 30	1275	1500	5.4	7.2	Fig. 2
15 to 120	651	120	600	22 to 100	37 to 100	37 to 100	52 to 100	18 bar	22.5 bar	27	45	Fig. 2

\* 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 : - 20... 55 °C (all versions)

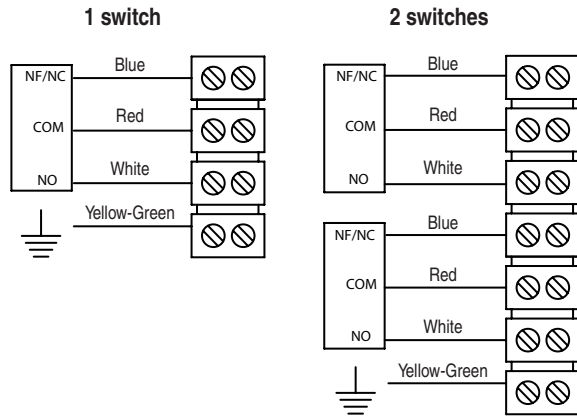
These microswitches can be implemented with two simultaneous contacts : SII (2 x SI), GSS (2 x GS), SHH (2 x SH), GSHH (2 x GSH)

Warning : in this case, deadbands are multiplied by 1.5

For microswitches : consult us.

## Cable identification, current rating

### Cable identification



### Current rating

#### Microswitch typ SPDT


A	1 Standard changeover switch Adjustable deadband	0.1 A min.; 10 A max. 250 Vac max. or 220 Vcc max.
B	2 Simultaneous changeover switches Adjustable deadband	0.1 A min.; 10 A max. 250 Vac max. or 220 Vcc max.
C	Hermetically changeover switches Adjustable deadband	5 mA min.; 4A max. 250 Vac max. or 220 Vcc max.
W	2 Hermetically changeover switches Adjustable deadband	5 mA min.; 4A max. 250 Vac max. or 220 Vcc max.
E	1 Ultra sensitive changeover switches Fixed deadband	0.2 A min.; 10A max. 250 Vac max. or 30 Vcc max.
F	2 ultra sensitive changeover switches Fixed deadband	0.2 A min.; 10A max. 250 Vac max. or 30 Vcc max.
G	2 movable changeover switches Fixed deadband	0.2 A min.; 10A max. 250 Vac max. or 30 Vcc max.
D	1 hermetically scaled ultra sensitive changeover switches Fixed deadband	0.4 A min.; 10A max. 30 Vcc max.
V	2 hermetically scaled ultra sensitive changeover switches Fixed deadband	0.4 A min.; 10A max. 30 Vcc max.
M	Gold contact Adjustable deadband	10 mA min.; 50 mA max. 250 Vac max. or 220 Vcc max.
K	Gold 2 contacts Adjustable deadband	10 mA min.; 50 mA max. 250 Vac max. or 220 Vcc max.
N	Tropicalized Adjustable deadband	0.1 A min.; 10A max. 250 Vac max. or 48 Vcc max.
T	Tropicalized 2 contacts Adjustable deadband	0.1 A min.; 10A max. 250 Vac max. or 48 Vcc max.

## Regulation

Differential pressure regulator type RD(E)

LCIE 03 ATEX 6231X

CE 0081

 II 2 G and D  
EEx d IIC T6 or T5

Poussière / Dust IP6X	Gaz / 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.

### 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)

### Explosion-proof case



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

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

24 /flat hexagonal  
G 1/2 mâle 1/4 NPT female

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

24 /flat hexagonal  
G 1/2 mâle 1/4 NPT fem.

**Fig.3**  
RDPH / RDHN - 111 - 112 - 121 - 131  
weight : 10 kg

24 /flat hexagonal  
G 1/2 mâle 1/4 NPT female

**Fig.4**  
RDPH / RDHN - 156 - 157 - 158  
weight : 6.4 kg

24 /flat hexagonal  
G 1/2 mâle 1/4 NPT female

**Fig.5**  
RDPH / RDHN - 161 - 162 - 163  
weight : 7 kg

2 holes G 1/4

**Fig.6**  
RDPW / RDWN - 156 - 157 - 158  
weight : 6.6 kg

G 1/2 mâle 1/4 NPT female

24 /flat hexagonal

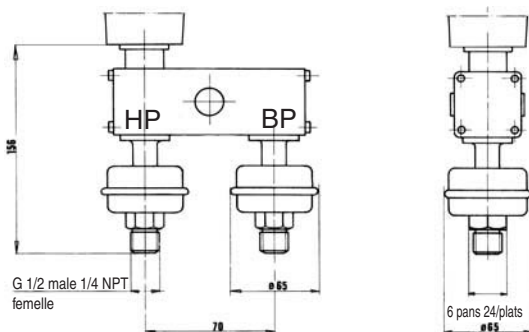
**Fig.7**  
RDPW / RDWN - 161 - 162 - 163  
weight : 7 kg

2 holes G 1/4

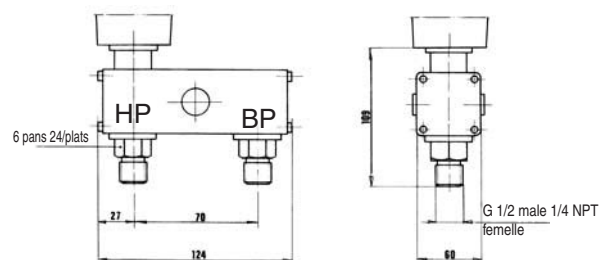
## Dimensions (mm)

### Sensing element 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

All stainless steel construction for aggressive environments (screws and sensing element).  
 French electricity (EDF) version  
 (consult SEPTEN ZDP, ZDPH, ZDPW leaflet)  
 Specific connection.

Cleanliness for oxygen service **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(E)

RDExxxxxx	
Model	1'...3' digit
Pressure switch	RDE
Type	4' digit
<b>Code 110 to 163</b>	
DDP	1
DPH	2
DPW	3
DPN	4
DPHN	5
DPWN	6
<b>Code 211 to 651</b>	
DDP	7
DPN	8
Microswitch **	5' digit
1 standard changeover switch	A
2 Simultaneous changeover switches	B
1 hermetically changeover switch	C
1 hermetically ultra sensitive changeover switch	D
1 ultra sensitive changeover switch	E
2 ultra sensitive changeover switches	F
2 movable changeover switches	G
2 gold contacts changeover switch	K
1 tropicalized contact changeover switch	N
2 hermetically ultra sensitive changeover switches	V
2 hermetically changeover switches	W
1 gold contact changeover switch	M
2 tropicalized changeover switches	T
Other changeovers (option)	x
Hydraulic 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

Code	range in mbar	RDDP RDPN	RDPH RDHN	RDPW RDWN
110*	-2.5 + 2.5	X		
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

\* microswitch E only for Code 110  
 (others are not allowed)

\*\* SPDT microswitches only

Electronuclear versions : ZDP-SHM or CHM-ADF, ZDPHN-SHM or CHM-ADF, ZDPW-SHM or CHM-ADF,

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