

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



II M 1
Ex ia I



II 1 G and D
Ex ia IIC T6 or T5
Ex iaD A20 T80°C or T95°C IP6X



II 2 D
Ex tD A21 T80°C or T95°C IP6X

Hazardous areas : 0,1, 2, 20, 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 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 to 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 | ±1% of F.S. |
| Conforms to CE | Low Voltage Directive DBT 73/23/CE Directive ATEX 94/9/CE (EN 60079-0, EN 60079-11, EN 61241-0, EN 61241-1, EN 61241-11) |
| Protection class | IP 66, 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.



Baumer

Operating range

RDPN - RDHN low pressure

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

| Scale | Code | Δ P Maxi | P statique Maxi | MICROSWITCH | | | | DIMENSIONS | Max Fixed deadband | | |
|-----------|------|-------------|--------------------|--|------------------------------------|--|-----------|------------|--------------------|---------------------|---------------------|
| | | | | Adjustable deadband | | | | | Sensing element | S (or) | |
| | | | | N (tropicalized) at 10 % of scale | M (gold) at 90 % of scale | C (SH) at 10 % of scale at 90 % of scale | | | | at 10 % of scale | 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 | |

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

| Scale | Code | Δ P Maxi | P statique Maxi | MICROSWITCH | | | | DIMENSIONS | Max Fixed deadband | | |
|------------|--------------------|-------------|--------------------|--|------------------------------------|--|------------|------------|--------------------|---------------------|---------------------|
| | | | | Adjustable deadband | | | | | Sensing element | S (or) | |
| | | | | N (tropicalized) at 10 % of scale | M (gold) at 90 % of scale | C (SH) at 10 % of scale at 90 % of scale | | | | at 10 % of scale | 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®-FKM diaphragm

(3) Nitrile, Butyl rubber diaphragm

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

These microswitches can be implemented with two simultaneous contacts : W (2xC)

Warning : in this case, deadbands are multiplied by 1.5

Operating range

RDWN low pressure, RDPN medium pressure

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

| Scale | Code | Δ P Maxi | P statique Maxi | MICROSWITCH | | | | DIMENSIONS | Max Fixed deadband | |
|------------|------|-------------|--------------------|--|------------------------------------|---|------------|---------------|--------------------|---------------------|
| | | | | Adjustable deadband | | | | | Sensing element | S (or) |
| | | | | N (tropicalized) at 10 % of scale | M (gold) at 90 % of scale | C (SH) at 10 % of scale at 90 % of scale | | See figure | | at 10 % of scale |
| mbar | | mbar | bar | 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

* G 1/4 female connection

T° ambient : -10... 55° C

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

| Scale | Code | Δ P Maxi | P statique Maxi | MICROSWITCH | | | | DIMENSIONS | Max Fixed deadband | |
|-------------|-------|-------------|--------------------|--|------------------------------------|---|-------------|---------------|--------------------|---------------------|
| | | | | Adjustable deadband | | | | | Sensing element | S (or) |
| | | | | N (tropicalized) at 10 % of scale | M (gold) at 90 % of scale | C (SH) at 10 % of scale at 90 % of scale | | See figure | | at 10 % 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 | 30 | 0.14 to 0.5 | 0.18 to 0.5 | - | - | Fig.2 | 0,12 | 0,18 |
| 0.15 to 1 | 224* | 1 | 30 | 0.14 to 0.6 | 0.20 to 0.6 | - | - | Fig.2 | 0,12 | 0,18 |
| 0.15 to 4 | 234* | 4 | 30 | 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 |

T° fluid : -50... 200° C (RDPN)

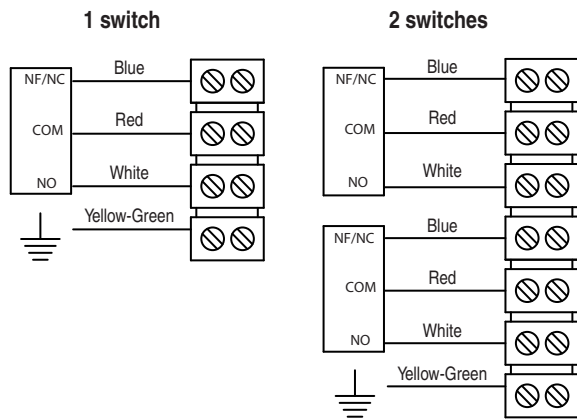
T° ambient : -25... 55° C

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



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



IM 1
Ex ia I



II 1 G and D
Ex ia IIC T6 or T5



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

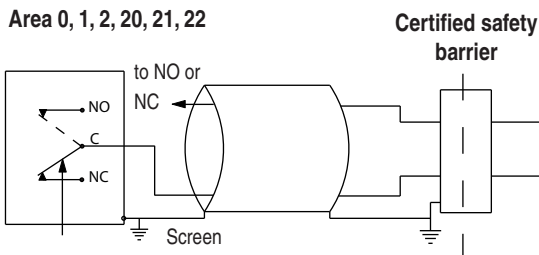
| Poussière / Dust IP6X | Gaz / Gases |
|-----------------------|----------------|
| T° surface | Class |
| 80°C | Ta = 55°C / T6 |
| 95°C | Ta = 70°C / T5 |

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



Area no hazardous

$$U_{max} = 28 \text{ Vdc}$$

$$I_{max} = 120 \text{ mA}$$

$$P = 0.8 \text{ W}$$

$$C_a > C_i + C_{cable}; L_a > L_i + L_{cable}$$

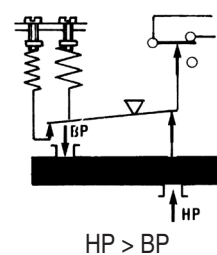
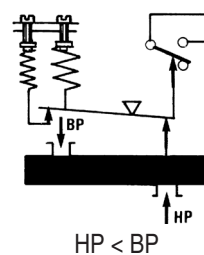
$$C_i = \text{Negligible}; L_i = \text{Negligible}$$

Don't forget the barrier's resistors in the determination of $R_c 1$.

In area 0 or 20 the loop calculation of the association transmitter with safety barrier must be approved by a notified body.

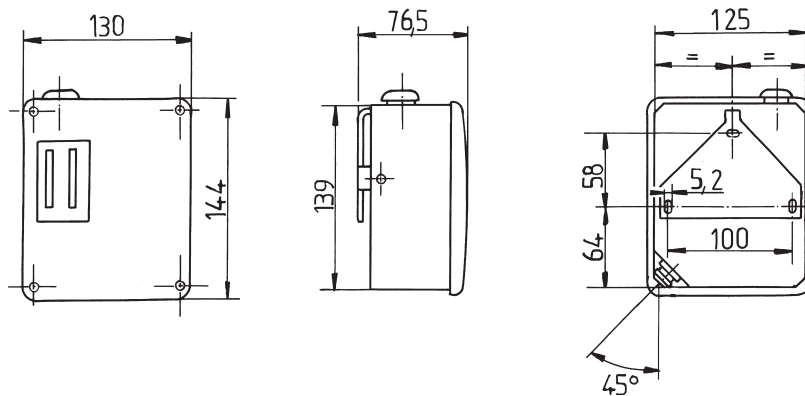
Operating principle

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.

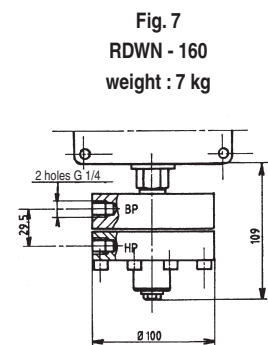
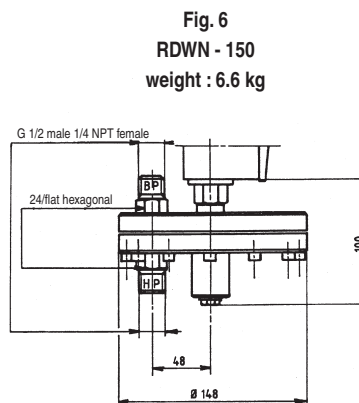
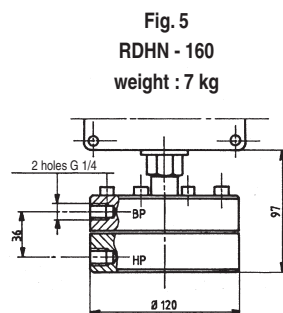
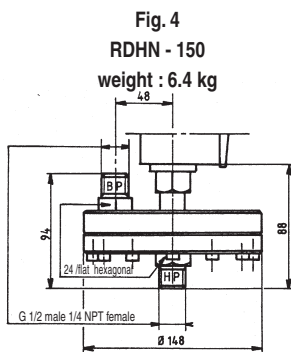
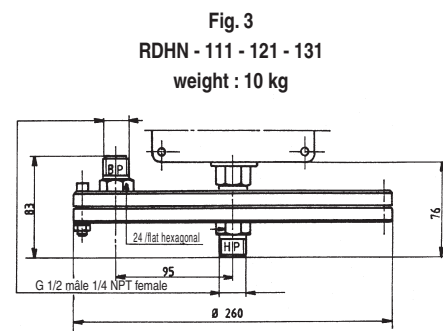
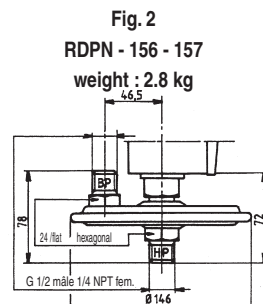
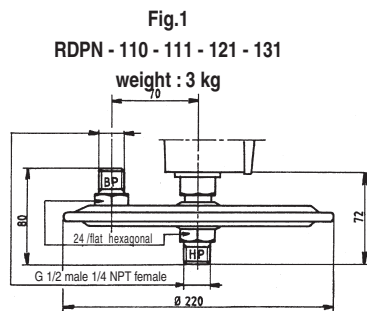


Dimensions (mm)

Watertight case

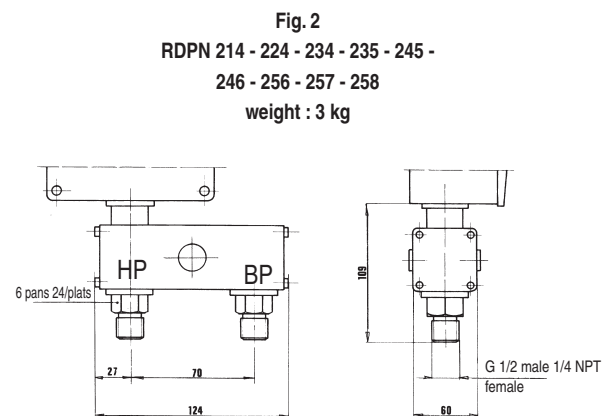
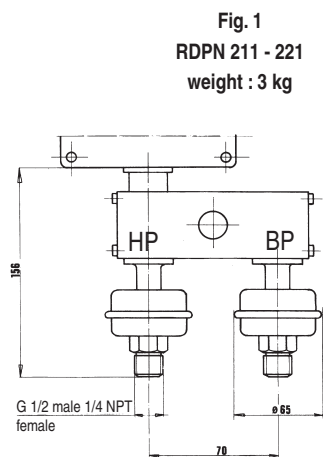


Sensing element RDPN / RDHN / RDWN low pressure



Dimensions (mm)

Sensing element RDPN medium pressure



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 aggressive 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'...2' digit | | | | |
| Pressure switch | | RD | | | |
| Protection | 3' digit | | | | |
| IS - Intrinsically safe | | | Y | | |
| Type | 4' caractère | | | | |
| Code 111 to 163 | | | | | |
| DPN | | | 4 | | |
| DHN | | | 5 | | |
| DWN | | | 6 | | |
| Code 211 to 258 | | | | | |
| 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 | |

| Code | range in mbar | RDPN | RDHN | 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 | 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 |

** SPDT microswitches only

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

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