PBA series

Piezo switches

- ❑ **Bushing diameter 16 mm, 19 mm or 22 mm**
- ❑ **Sealed to IP68 and IP69K (switches mounted on panel)**
- ❑ **Easy to clean metal surface**
- ❑ **Very long life expectancy**
- ❑ **Ring or dot illumination**

ENVIRONMENTAL SPECIFICATIONS

- Sealing : IP68 per IEC 529, IP69K per DIN 40050-9 (switches mounted on panel)
- Vibration resistance : 10-500 Hz / 10 g per IEC 60068-2-6
- Operating temperature : -40°C to +75°C
- EMC compatibility according to EN 61058-1 for the whole range
- EMC compatibility according to EN 61000-4 & EN61000-6-2 for model 1A (code 002)

MATERIALS

- Case : aluminium, anodized or stainless steel 316L
- Multi-wire leads section 0,22 mm^2 length 300 mm, twisted by pair
- Cable, length 300 mm, section depending on switch model
- PC terminals : bronze, tin plated

Note : to maintain the ESD performance, always add a ground washer when the panel is made of non-conductive material (PVC, polycarbonate).
For part numbers, see «Mounting accessories» on the following pages.
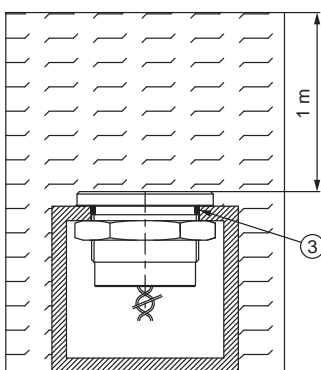
ELECTRICAL AND GENERAL SPECIFICATIONS

- Max. current/voltage rating :
  - Function A : standard 200mA 24VAC/DC - option 1A 24VAC/DC
  - Function B : standard 100mA 24VAC/DC
- Switch resistance ON : 10Ω max.
- Switch resistance OFF : 5MΩ min.
- Operating force : 2 to 6N
- Life expectancy : 50 million cycles
- LED consumption : Illuminated dot 10mA - Illum. ring 20mA (functions A-B-C)
- Power consumption for function 1 : non-illum.10mA - illuminated 30mA

SEALING IP68	SEALING IP69K

① One-piece bushing
② Epoxy sealed terminals
③ O-ring

Continuous immersion in water

IP68 test conditions

Continuous immersion in water (1m, 24 hours)
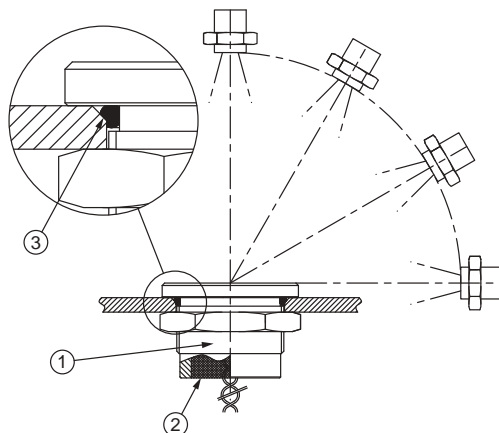
High pressure, high temperature wash down

IP69K test conditions

. Pressure : 80 - 120 bars
. Distance : 15 cm
. Temperature : 80°C ± 5°C
. Flow : 14 - 16 l/mn
. Duration : 30 seconds per position

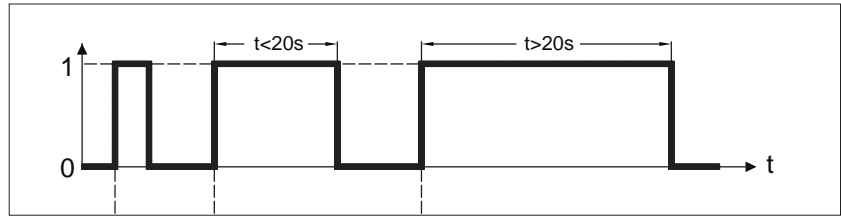The company reserves the right to change specifications without notice.
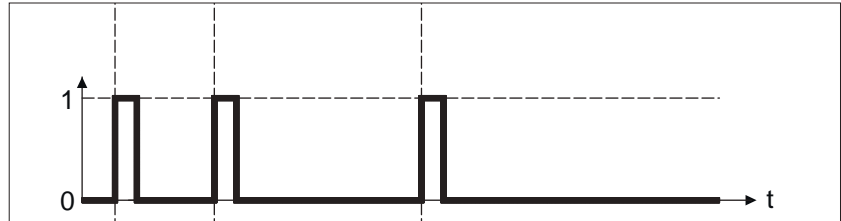
PBA series

Piezo switches

Electrical functions

B2

FINGER PRESSURE applied to switch

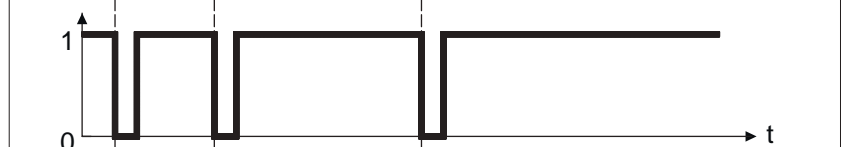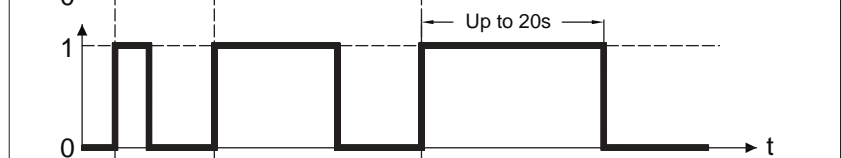*1 = pressure*
0 = no pressure

t<20s   t>20s

OUTPUT

- Momentary NO (pulse)
No external power supply required

- Momentary NC (pulse)
No external power supply required

- Momentary NO prolongated pulse
No external power supply required

Up to 20s

- Latching (ON - OFF)
Requires external power supply
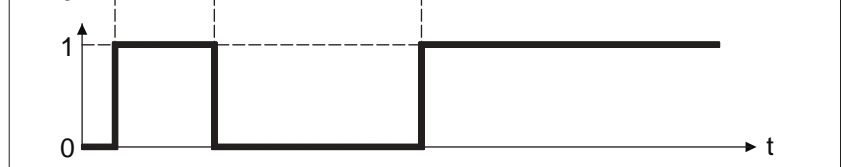
1 = closed output   0 = open output

Wiring diagrams

	Non-illuminated	1 LED *	2 LEDs	3 LEDs
Momentary NO	RED RED	RED RED C D	RED RED A B A B	RED RED A B A B A B
Momentary NC	GREEN GREEN	GREEN GREEN C D	GREEN GREEN A B A B	GREEN GREEN A B A B A B
Momentary NO prolongated pulse	WHITE WHITE	WHITE WHITE C D	WHITE WHITE A B A	
Latching (ON - OFF)	WHITE 9-24V AC/DC WHITE — RED RED	WHITE 9-24V AC/DC WHITE — RED RED		

Legend : C = yellow, D = blue, B = black, A = same colour as LED   * LED colour is indicated by the bottom of the product.

PBA □ □ □ □ □ □ □

SERIES

Bushing / operator

All models with Ø 16 bushing

R1 Flat operator, height 4,50 (.177)

T5 Flat operator, height 1 (.039) (non illuminated)

R5 Operator with finger location, height 4,50 (.177) (non-illuminated)

Terminals

F Flying leads
C Cable
P Straight PC (T5 model, non-illuminated, functions A & B only)

Ratings

000 Standard
002 1A 24VAC/DC (NO pulse only, function A)

LED colours

Blank Non-illum.
0B Blue
0G Green
0S Red
0Y Yellow
0W White
2A Red/green
2B Red/yellow
2C Red/blue
2D Red/white
2E Green/blue
2F Green/yellow
2G Green/white
2H Blue/yellow
2I Blue/white
2K Yellow/white

B2

Colours / Materials

0 **Natural anodized**
1 Blue anodized
2 **Black anodized**
3 Green anodized
5 Gold anodized
6 Red anodized
B **Stainless steel 316L**

Type of illumination/ voltage

Blank Non-illuminated
A Standard ring - 5VDC
N Standard ring - 12VDC
K Standard ring - 24VDC
W Standard ring, microcontroller driven

LED colours (continued)

3A Red/green/blue
3B Red/green/yellow
3D Red/green/white
3E Red/blue/yellow
3F Red/blue/white
3G Red/yellow/white
3H Green/blue/yellow
3I Green/blue/white
3J Green/yellow/white
3K Blue/yellow/white

Electrical function

A NO (pulse)
B NC (pulse)
C NO prolongated pulse (ground connector compulsory)
1 ON - OFF (requires external power supply - cannot be combined with T5 operator - illumination type W only)

For options not listed above, please contact APEM.

Dimensions : first dimensions are in mm while inches are shown as bracketed numbers.

⚠ **NOTICE** : please note that not all combinations of above numbers are available. Refer to the following pages for further information.

Mounting accessories : standard hardware supplied :1 hex nut 10-621 (19 mm ac. flats) and 1 O-ring. Always add a ground washer U5735 when the panel is non-conductive (PVC, polycarbonate).
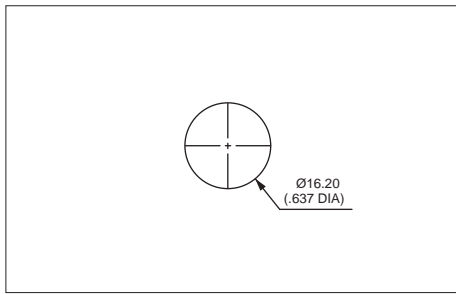
Packaging unit : 20 pieces (flying lead terminals) or 25 pieces (cable terminals)
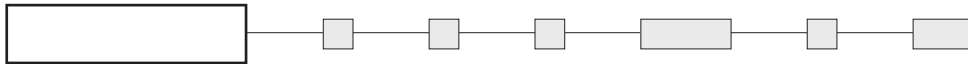
PBA series

Piezo switches Ø 16 (.630)

Illuminated or non-illuminated

Ø16.20
(.637 DIA)

• Operator Ø 18 mm (.708)

Shown with flying lead terminals.

MODEL STRUCTURE

Non-illuminated, operator height 4,50 mm (.177)
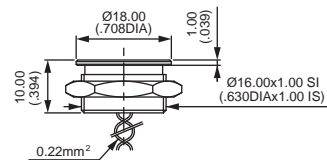
Flat
PBAR1

With finger location
PBAR5

PBAR1AF2000

Ø18.00
(.708DIA)

4.50
(.177)

20.00
(.787)

5.00
(.197)

0.22mm²

R1

Ø13.00
(.512DIA)

Ø16.00x1.00 SI
(.630DIAx1.00 IS)
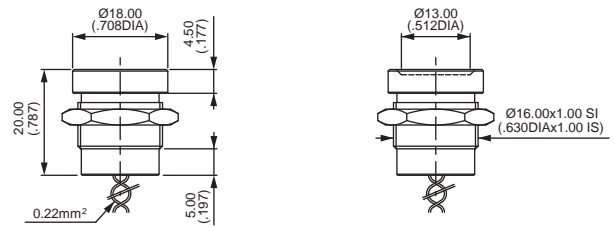
R5

Non-illuminated, operator height 1 mm (.039)

Flat
PBAT5

PBAT5AF0000

Ø18.00
(.708DIA)

1.00
(.039)

10.00
(.394)

Ø16.00x1.00 SI
(.630DIAx1.00 IS)

0.22mm²

With standard illuminated ring

Flat operator, height 4,50 (.177)
PBAR1

PBAR1AF000A0B

Ø16.00x1.00 SI
(.630DIAx1.00 IS)

4.50
(.177)

5.00
(.197)

Ø18.00
(.708DIA)

20.00
(.787)

0.22mm²

Ø13.50
(.531DIA)

1.20
(.047)

Wire colours : see "Electrical functions"

ELECTRICAL FUNCTION
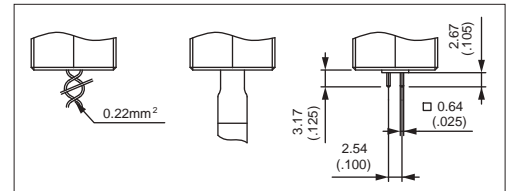

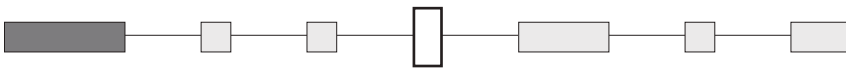|	
A	NO pulse
B	NC pulse
C	NO prolongated pulse - Ground connector U5735 compulsory, supplied with the switch.
1	ON - OFF - Requires external power supply - Cannot be combined with T5 operator. Illumination type W only.

TERMINALS
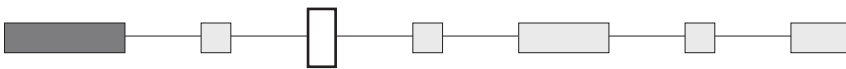
F	Flying leads
C	Cable
P	Straight PC (T5 model, non-illuminated, functions A and B only)

CASE COLOURS / MATERIALS

Code	Colour
0	**Natural anodized aluminium**
1	Blue anodized aluminium
2	**Black anodised aluminium**

Code	Colour
3	Green anodized aluminium
5	Gold anodized aluminium
6	Red anodised aluminium

Code	Colour
B	**Stainless steel 316L**

0	1	2	3	5	6	B

RATINGS
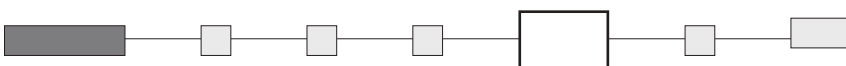
000	Standard
002	1A 24VAC or DC (NO pulse only, function A)

PBA series

Piezo switches Ø 16 (.630)

Options
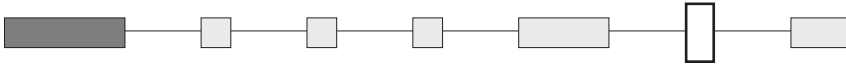

TYPE OF ILLUMINATION / VOLTAGE

Blank : non-illuminated

	5VDC	12VDC	24VDC	Microcontroller driven
◯	A	N	K	W

LED COLOURS

Integrated LED resistor

Blank : non-illuminated

| 0B | 0G | 0S | 0Y | 0W |

Illuminated 1 LED *
0B : blue - **0G** : green - **0S** : red - **0Y** : yellow - **0W** : white

Illuminated 2 LEDs
2A : red/green - **2B** : red/yellow - **2C** : red/blue - **2D** : red/white - **2E** : green/blue - **2F** : green/yellow - **2G** : green/white
2H : blue/yellow - **2I** : blue/white - **2K** : yellow/white
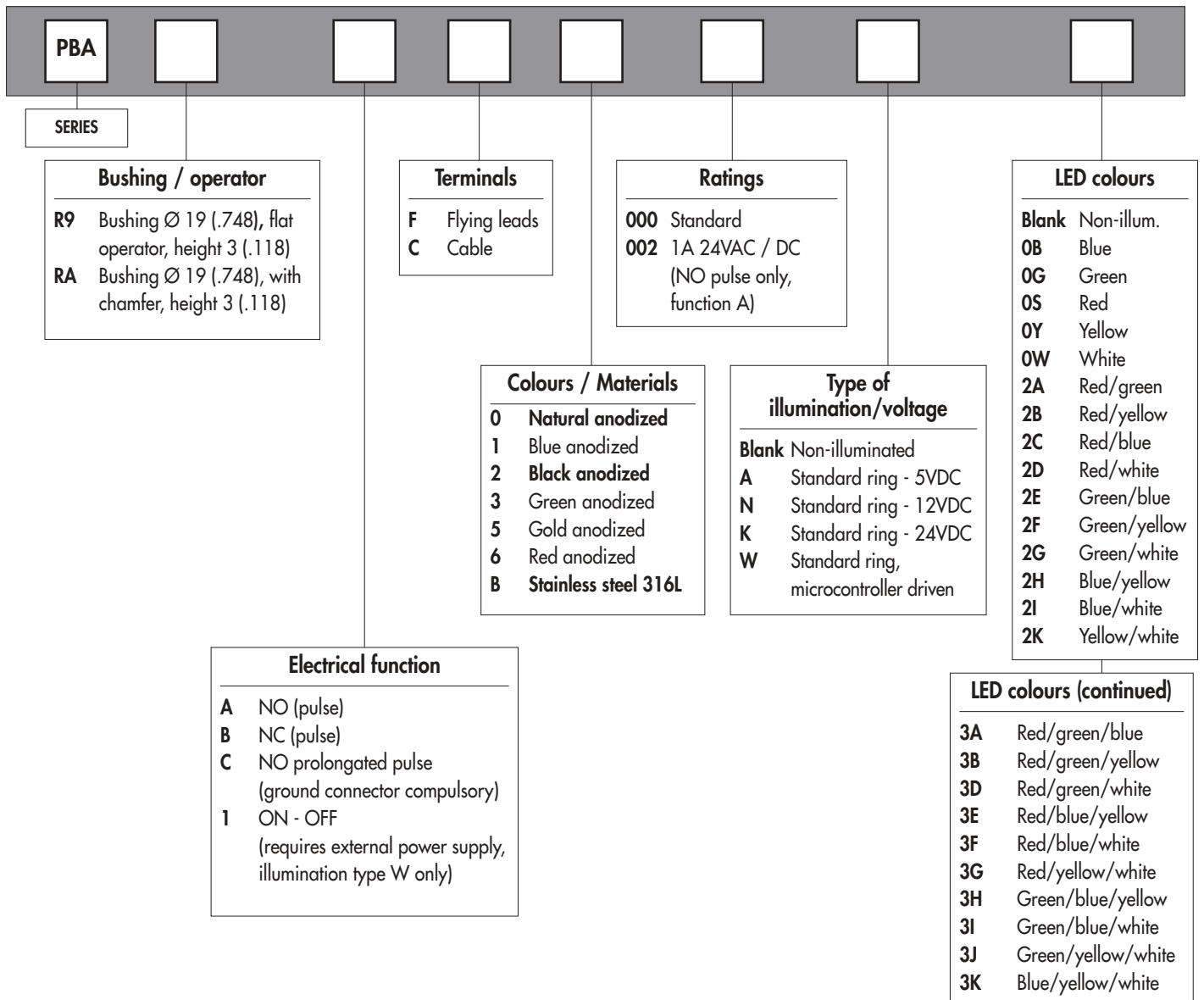
Illuminated 3 LEDs
3A : red/green/blue - **3B** : red/green/yellow - **3D** : red/green/white - **3E** : red/blue/yellow - **3F** : red/blue/white
3G: red/yellow/white - **3H** : green/blue/yellow - **3I** : green/blue/white - **3J** : green/yellow/white - **3K** : blue/yellow/white

* LED colour is indicated by the bottom of the product.

B2

PBA							

SERIES

Bushing / operator

R9	Bushing Ø 19 (.748)**,** flat operator, height 3 (.118)
RA	Bushing Ø 19 (.748), with chamfer, height 3 (.118)

Terminals

F	Flying leads
C	Cable

Ratings

000	Standard
002	1A 24VAC / DC (NO pulse only, function A)

LED colours

Blank	Non-illum.
0B	Blue
0G	Green
0S	Red
0Y	Yellow
0W	White
2A	Red/green
2B	Red/yellow
2C	Red/blue
2D	Red/white
2E	Green/blue
2F	Green/yellow
2G	Green/white
2H	Blue/yellow
2I	Blue/white
2K	Yellow/white

B2

Colours / Materials

0	**Natural anodized**
1	Blue anodized
2	**Black anodized**
3	Green anodized
5	Gold anodized
6	Red anodized
B	**Stainless steel 316L**

Type of illumination/voltage

Blank	Non-illuminated
A	Standard ring - 5VDC
N	Standard ring - 12VDC
K	Standard ring - 24VDC
W	Standard ring, microcontroller driven

LED colours (continued)

3A	Red/green/blue
3B	Red/green/yellow
3D	Red/green/white
3E	Red/blue/yellow
3F	Red/blue/white
3G	Red/yellow/white
3H	Green/blue/yellow
3I	Green/blue/white
3J	Green/yellow/white
3K	Blue/yellow/white

Electrical function

A	NO (pulse)
B	NC (pulse)
C	NO prolongated pulse (ground connector compulsory)
1	ON - OFF (requires external power supply, illumination type W only)

For options not listed above, please contact APEM.

Dimensions : first dimensions are in mm while inches are shown as bracketted numbers.

⚠ **NOTICE** : please note that not all combinations of above numbers are available. Refer to the following pages for further information.

Mounting accessories : standard hardware supplied :1 hex nut 10-855-0 (22 mm ac. flats) and 1 O-ring Always add a ground washer U5736 when the panel is non-conductive (PVC, polycarbonate).
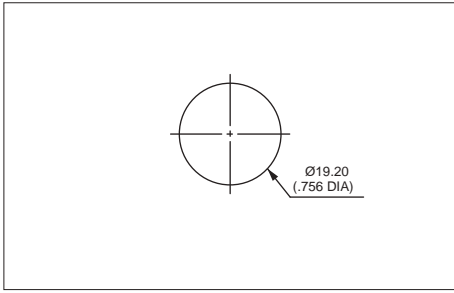
Packaging unit : 20 pieces (flying lead terminals) or 25 pieces (cable terminals)
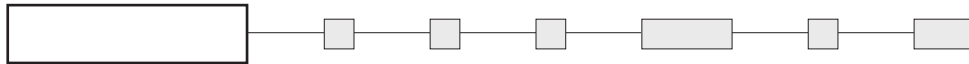
PBA series

Piezo switches Ø 19 (.748)

Illuminated or non-illuminated

Ø19.20
(.756 DIA)

- Operator Ø 22 mm (.866)

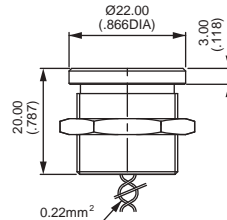Shown with flying lead terminals.

MODEL STRUCTURE
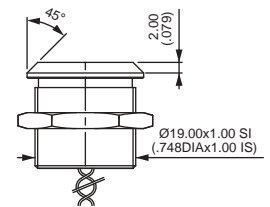

Non-illuminated - operator height 3 mm (.118)
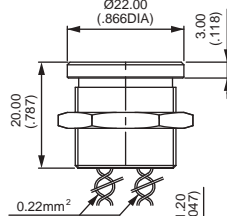

PBARAAF1000

Flat
PBAR9

With chamfer
PBARA

Ø22.00
(.866DIA)
3.00
(.118)

20.00
(.787)

0.22mm²

45°
2.00
(.079)

Ø19.00x1.00 SI
(.748DIAx1.00 IS)

R9   RA

With standard illuminated ring - operator height 3 mm

PBAR9AF0000A0S

Flat
PBAR9

With chamfer
PBARA

Ø22.00
(.866DIA)
3.00
(.118)

20.00
(.787)

0.22mm²
1.20
(.047)

Ø13.50
(.531DIA)

45°
2.00
(.079)

Ø19.00x1.00 SI
(.748DIAx1.00 IS)

1.20
(.047)

Ø13.50
(.531DIA)
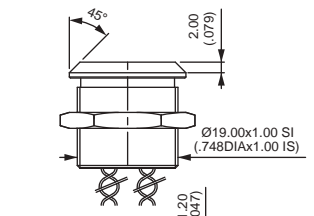
R9   RA

Wire colours : see "Electrical functions".

ELECTRICAL FUNCTIONS
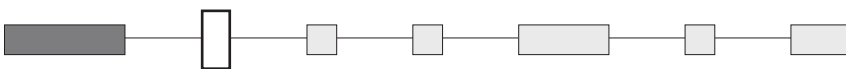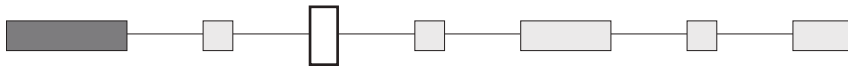
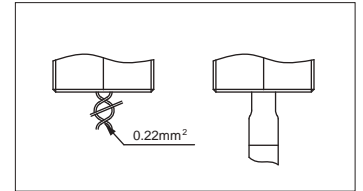|	
A	NO pulse
B	NC pulse
C	NO prolongated pulse - Ground connector U5736 compulsory, supplied with the switch.
1	ON - OFF - Requires external power supply - Illumination type W only.

TERMINALS

F	Flying leads
C	Cable

0.22mm²

CASE COLOURS / MATERIALS

Code	Colour
0	**Natural anodized aluminium**
1	Blue anodized aluminium
2	**Black anodised aluminium**

Code	Colour
3	Green anodized aluminium
5	Gold anodized aluminium
6	Red anodised aluminium

Code	Colour
B	**Stainless steel 316L**

0	1	2	3	5	6	B

RATINGS

000	Standard
002	1A 24VAC or DC (NO pulse only, function A)

TYPE OF ILLUMINATION / VOLTAGE

	5VDC	12VDC	24VDC	Microcontroller driven
◯	A	N	K	W

PBA series

Piezo switches Ø 19 (.748)

Options

LED COLOURS

Integrated LED resistor

Blank : non-illuminated

| 0B | 0G | 0S | 0Y | 0W |

Illuminated 1 LED *
0B : blue - **0G** : green - **0S** : red - **0Y** : yellow - **0W** : white

Illuminated 2 LEDs
2A : red/green - **2B** : red/yellow - **2C** : red/blue - **2D** : red/white - **2E** : green/blue - **2F** : green/yellow - **2G** : green/white
2H : blue/yellow - **2I** : blue/white - **2K** : yellow/white
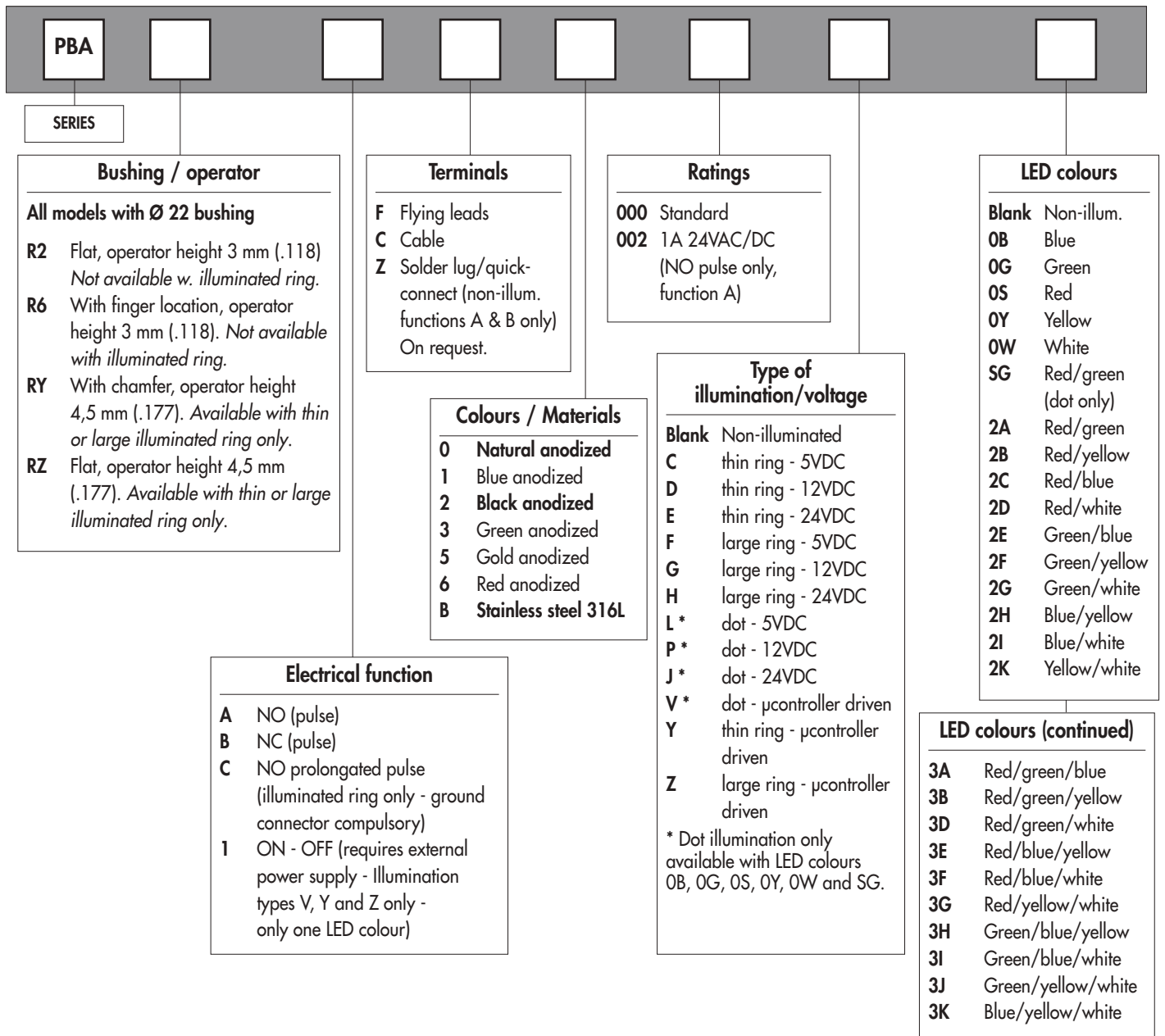
Illuminated 3 LEDs
3A : red/green/blue - **3B** : red/green/yellow - **3D** : red/green/white - **3E** : red/blue/yellow - **3F** : red/blue/white
3G: red/yellow/white - **3H** : green/blue/yellow - **3I** : green/blue/white - **3J** : green/yellow/white - **3K** : blue/yellow/white

* LED colour is indicated by the bottom of the product.

B2

PBA

SERIES

Bushing / operator

All models with Ø 22 bushing

R2 Flat, operator height 3 mm (.118). *Not available w. illuminated ring.*

R6 With finger location, operator height 3 mm (.118). *Not available with illuminated ring.*

RY With chamfer, operator height 4,5 mm (.177). *Available with thin or large illuminated ring only.*

RZ Flat, operator height 4,5 mm (.177). *Available with thin or large illuminated ring only.*

Terminals

F Flying leads

C Cable

Z Solder lug/quick-connect (non-illum. functions A & B only) On request.

Ratings

000 Standard

002 1A 24VAC/DC (NO pulse only, function A)

LED colours

Blank Non-illum.

0B Blue

0G Green

0S Red

0Y Yellow

0W White

SG Red/green (dot only)

2A Red/green

2B Red/yellow

2C Red/blue

2D Red/white

2E Green/blue

2F Green/yellow

2G Green/white

2H Blue/yellow

2I Blue/white

2K Yellow/white

Colours / Materials

0 **Natural anodized**

1 Blue anodized

2 **Black anodized**

3 Green anodized

5 Gold anodized

6 Red anodized

B **Stainless steel 316L**

Type of illumination/voltage

Blank Non-illuminated

C thin ring - 5VDC

D thin ring - 12VDC

E thin ring - 24VDC

F large ring - 5VDC

G large ring - 12VDC

H large ring - 24VDC

L * dot - 5VDC

P * dot - 12VDC

J * dot - 24VDC

V * dot - µcontroller driven

Y thin ring - µcontroller driven

Z large ring - µcontroller driven

* Dot illumination only available with LED colours 0B, 0G, 0S, 0Y, 0W and SG.

Electrical function

A NO (pulse)

B NC (pulse)

C NO prolongated pulse (illuminated ring only - ground connector compulsory)

1 ON - OFF (requires external power supply - Illumination types V, Y and Z only - only one LED colour)

LED colours (continued)

3A Red/green/blue

3B Red/green/yellow

3D Red/green/white

3E Red/blue/yellow

3F Red/blue/white

3G Red/yellow/white

3H Green/blue/yellow

3I Green/blue/white

3J Green/yellow/white

3K Blue/yellow/white

B2

For options not listed above, please contact APEM.

⚠ **NOTICE** : please note that not all combinations of above numbers are available. Refer to the following pages for further information.

Mounting accessories : standard hardware supplied :1 hex nut 10-856-0 (25 mm ac. flats) and 1 O-ring Always add a ground washer U5737 when the panel is non-conductive (PVC, polycarbonate).
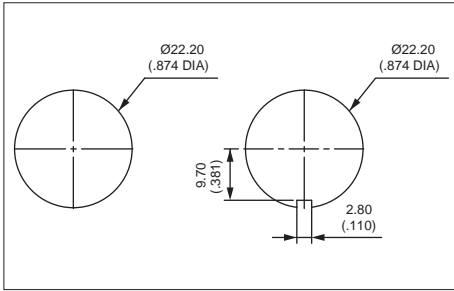
Packaging unit : 20 pieces (flying lead terminals) or 25 pieces (cable terminals)
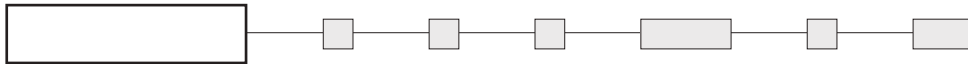
PBA series

Piezo switches Ø 22 (.866)

Illuminated or non-illuminated

Ø22.20
(.874 DIA)

Ø22.20
(.874 DIA)

9.70
(.381)

2.80
(.110)

• Operator Ø 28 mm (1.102)

**MODEL
STRUCTURE**

Wire colours : see "Electrical functions".

Non-illuminated - operator height 3 mm (.118)
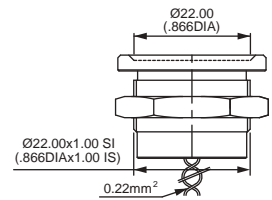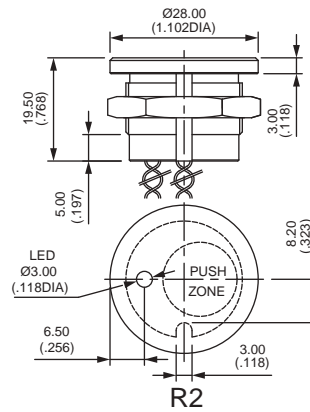
Flat
PBAR2

With finger location
PBAR6

PBAR2AF6000

Ø28.00
(1.102DIA)

5.00
(.197)

19.50
(.768)

3.00
(.118)

Ø20.70
(.815DIA)

R2

Ø22.00
(.866DIA)

Ø22.00x1.00 SI
(.866DIAx1.00 IS)
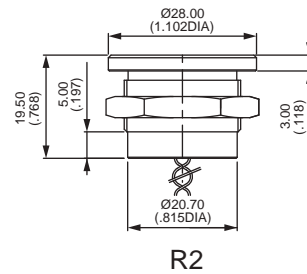
0.22mm²

R6

With illuminated dot - operator height 3 mm (.118)

Flat
PBAR2

With finger location
PBAR6

PBAR6AF6000L0G

Ø28.00
(1.102DIA)

19.50
(.768)

3.00
(.118)

5.00
(.197)

LED
Ø3.00
(.118DIA)

PUSH
ZONE

6.50
(.256)

8.20
(.323)

3.00
(.118)

R2

Ø22.00
(.866DIA)

Ø22.00x1.00 SI
(.866DIAx1.00 IS)

0.22mm²

PUSH
ZONE
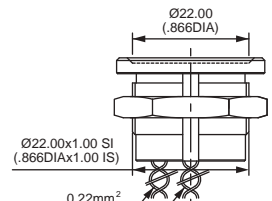
R6

With thin illuminated ring - operator height 4,50 (.177)

Flat
PBARZ

With chamfer
PBARY

PBARYAF0000C0B

Ø28.00
(1.102DIA)

3.50
(.138)

20.00
(.787)

4.50
(.177)

Ø20.70
(.815DIA)

2.40
(.094)

Ø18.00
(.709DIA)

RZ

2.00
(.079)

30°

Ø22.00x1.00 SI
(.866DIAx1.00 IS)

0.22mm²

4.00
(.157)

2.40
(.094)

Ø18.00
(.709DIA)

RY

→ Dimension of ON-OFF models

With large illuminated ring - operator height 4,50 (.177)

Flat
PBARZ

With chamfer
PBARY

PBARYAF0000F0B

Ø28.00 (1.102DIA)
2.00 (.079)
30°
20.00 (.787)
3.50 (.138)
4.50 (.177)
Ø22.00x1.00 SI (.866DIAx1.00 IS)
4.00 (.157)
0.22mm²
Ø20.70 (.815DIA)
4.70 (.185)
4.70 (.185)
Ø13.50 (.531DIA)
RZ
Ø13.50 (.531DIA)
RY

→ Dimension of ON-OFF models

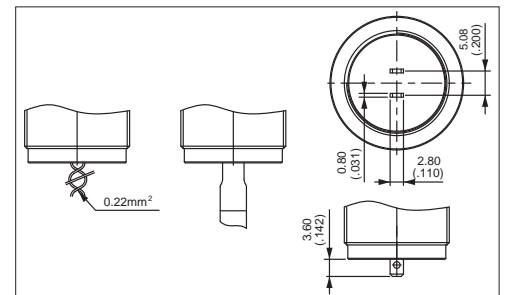**B2**

ELECTRICAL FUNCTIONS

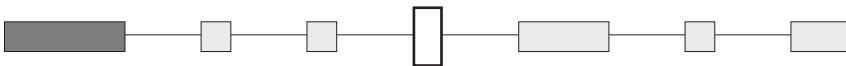| A	NO pulse
B	NC pulse
C	NO prolongated pulse (illuminated ring only) - Ground connector U5737 compulsory, supplied w. the switch.
1	ON - OFF - Requires external power supply - Illumination types V, Y and Z only - one LED colour only.

TERMINALS
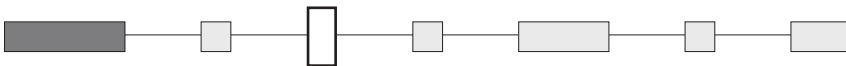
F	Flying leads
C	Cable
Z	Solder lug / quick-connect (non-illuminated, functions A and B only) On request.

5.08 (.200)
0.80 (.031)
2.80 (.110)
0.22mm²
3.60 (.142)

CASE COLOURS / MATERIALS

Code	Colour
0	**Natural anodized aluminium**
1	Blue anodized aluminium
2	**Black anodised aluminium**

Code	Colour
3	Green anodized aluminium
5	Gold anodized aluminium
6	Red anodised aluminium

Code	Colour
B	**Stainless steel 316L**

| 0 | 1 | 2 | 3 | 5 | 6 | B |

PBA series

Piezo switches Ø 22 (.866)

Options

RATINGS
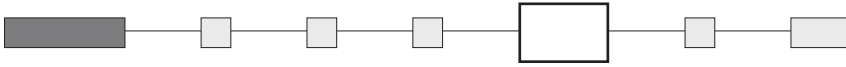
000   Standard
002   1A 24VAC or DC (NO pulse only, function A)

TYPE OF ILLUMINATION / VOLTAGE
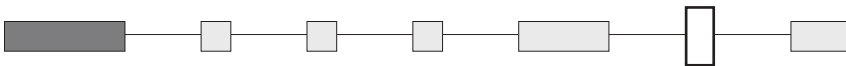
	5V	12V	24V	Microcontroller driven
◯	C	D	E	Y
◍	F	G	H	Z
•	L	P	J	V

⚠ Dot illumination only available with LED colours 0B, 0G, 0S, 0Y, 0W and SG.

LED COLOURS
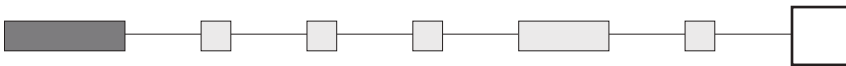
    Integrated LED resistor

Blank : non-illuminated

     0B   0G   0S   0Y   0W

Illuminated 1 LED *
0B : blue - **0G** : green - **0S** : red - **0Y** : yellow - **0W** : white
SG : red/green (reversed polarity LED - for dot illumination only)

Illuminated 2 LEDs
2A : red/green - **2B** : red/yellow - **2C** : red/blue - **2D** : red/white - **2E** : green/blue - **2F** : green/yellow - **2G** : green/white
2H : blue/yellow - **2I** : blue/white - **2K** : yellow/white

Illuminated 3 LEDs
3A : red/green/blue - **3B** : red/green/yellow - **3D** : red/green/white - **3E** : red/blue/yellow - **3F** : red/blue/white
3G: red/yellow/white - **3H** : green/blue/yellow - **3I** : green/blue/white - **3J** : green/yellow/white - **3K** : blue/yellow/white

 * LED colour is indicated by the bottom of the product.

B2

❑ **Approved according to the ATEX 94/9/CE directive**

❑ **Sealed to IP66 (mounted on panel)**

❑ **Easy to clean metal surface**

❑ **Long life**

❑ **Illuminated models**

ELECTRICAL SPECIFICATIONS

- Rated voltage : 5V to 24 VAC/DC max.
- Rated current : 200mA max. at 6VAC/DC
  50mA max. at 24VAC/DC
  (power limited to 1,2W for user group II)
- Contact resistance (ON) : 10Ω max.
- Insulation resistance (OFF) : 5MΩ min.
- Make impulse time : depending on actuating force and speed
- LED : 5VDC, 10mA to 20mA depending on model

GENERAL SPECIFICATIONS

- Operating force : 2 to 6N
- Torque : 2,5 Nm max.
- Life expectancy : 50 million cycles
- Operating temperature : -40°C to +55°C
- EMC compatibility according to EN 61058-1
- In accordance with EN 60079-0, EN 60079-11, EN 61241-0,
  EN 61241-11, EN 60079-26 and EN 50303
- Sealing : IP66 per IEC 60529 (switches mounted on panel)

MATERIALS

- Case : 316L stainless steel
- Terminals : multi-wire leads
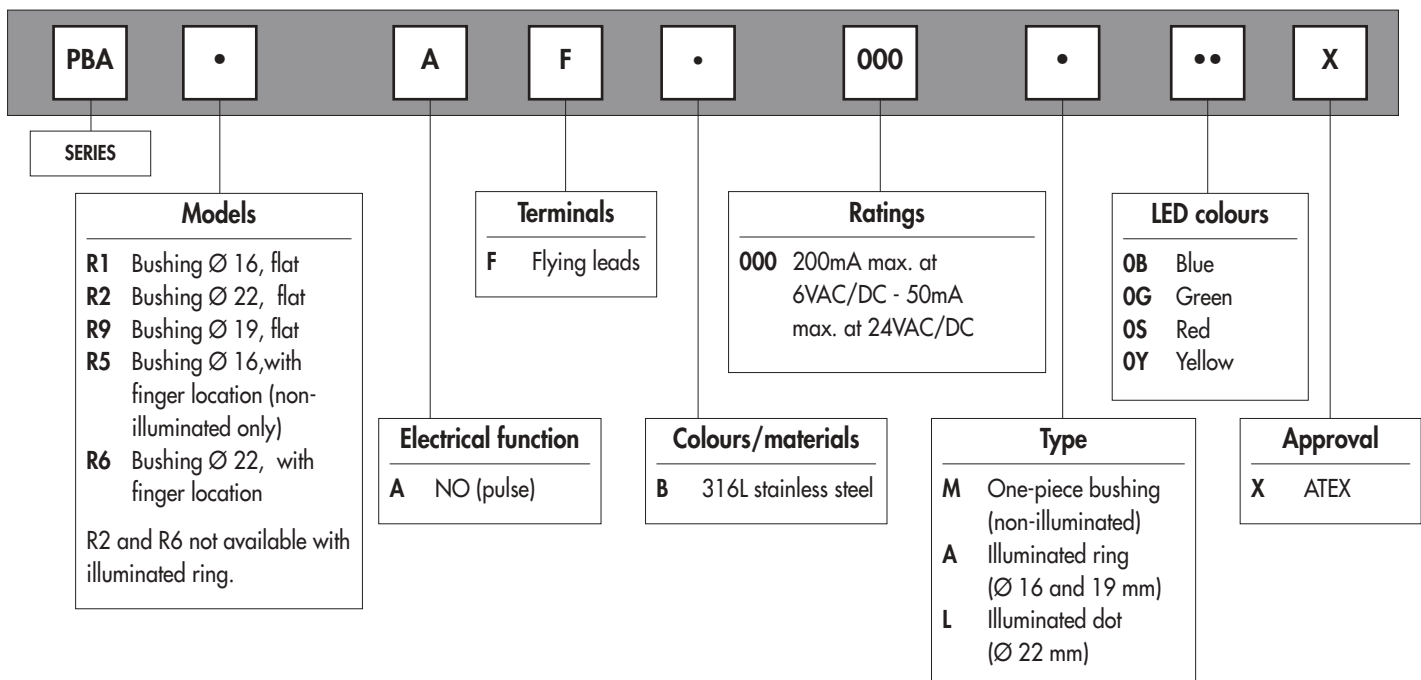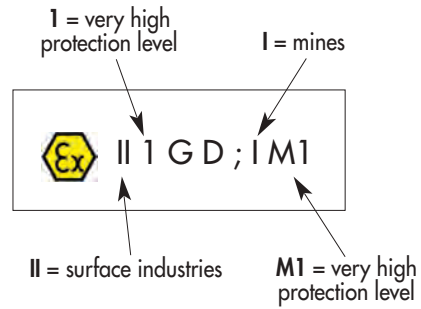 0,22 mm^2, length 300 mm (11.81)

Standard hardware supplied: 1 hex nut 10-621 (19 mm ac. flats), 10-855-0 (22 mm ac. flats) or 10-856-0 (25 mm ac. flats), 1 O-Ring and 1 ground connector U5735, U5736 or U5737.

Packaging units : 20 pieces

Instructions for use :
see instruction notice NTPBA007.

PBA	•	A	F	•	000	•	••	X

SERIES

Models

R1	Bushing Ø 16, flat
R2	Bushing Ø 22, flat
R9	Bushing Ø 19, flat
R5	Bushing Ø 16, with finger location (non-illuminated only)
R6	Bushing Ø 22, with finger location

R2 and R6 not available with illuminated ring.

Terminals

F	Flying leads

Electrical function

A	NO (pulse)

Ratings

000	200mA max. at 6VAC/DC - 50mA max. at 24VAC/DC

Colours/materials

B	316L stainless steel

Type

M	One-piece bushing (non-illuminated)
A	Illuminated ring (Ø 16 and 19 mm)
L	Illuminated dot (Ø 22 mm)

LED colours

0B	Blue
0G	Green
0S	Red
0Y	Yellow

Approval

X	ATEX

PBA series

ATEX approved piezo switches

Illuminated or non-illuminated

- **Highest classifications**
- **Universal**

1 = very high protection level

I = mines

Ex   II 1 G D ; I M 1

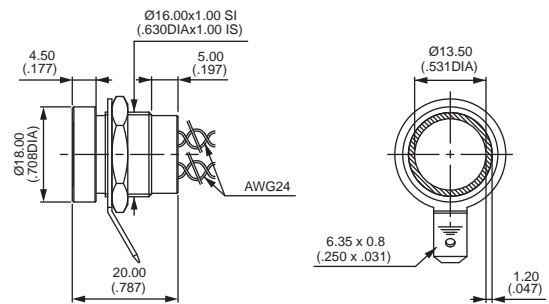**II** = surface industries

M1 = very high protection level

Usage : mines full of fire damp and potentially explosive atmospheres of groups IIC,IIB et IIA in T4 temperature class and/or in the presence of combustible dust (T135°C).
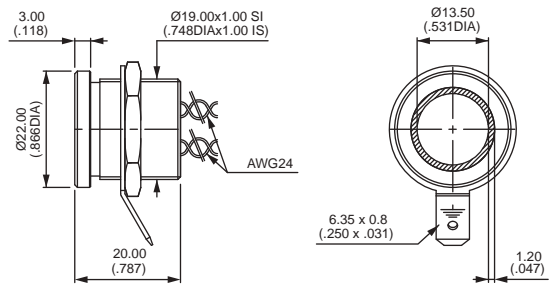
B2

Dia. 16 (.630) bushing - illuminated ring

Stainless steel 316L, blue LED
PBAR1AFB000A0BX

Dia. 19 (.748) bushing - illuminated ring

Stainless steel 316L, blue LED
PBAR9AFB000A0BX

Dia. 22 (866) bushing - non-illuminated

Stainless steel 316L
PBAR2AFB000MX