PBA series
Piezo switches
Specifications

- 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 60529, 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)

ELECTRICAL SPECIFICATIONS
- Max. current/voltage rating with resistive load :
  - 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.
- 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

Continuous immersion in water
IP68 test conditions
Continuous immersion in water (1m, 24 hours)

SEALING IP69K

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/min
- Duration : 30 seconds per position

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.

The company reserves the right to change specifications without notice.
FINGER PRESSURE
applied to switch

1 = pressure
0 = no pressure

OUTPUT

- Momentary NO (pulse)
  No external power supply required

- Momentary NC (pulse)
  No external power supply required

- Momentary NO prolongated pulse - On request
  No external power supply required

- Latching (ON - OFF)
  Requires external power supply

1 = closed output  0 = open output

Wiring diagrams

<table>
<thead>
<tr>
<th></th>
<th>Non-illuminated</th>
<th>1 LED *</th>
<th>2 LEDs</th>
<th>3 LEDs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Momentary NO</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Momentary NC</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Momentary NO</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Momentary NO</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Latching (ON - OFF)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Legend: C = yellow, D = blue, B = black, A = same colour as LED  * LED colour is indicated by the bottom of the product.
PBA series
Piezo switches Ø 16 (.630)

Overview

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)

Colours / Materials
0 Natural anodized
1 Blue anodized
2 Black anodized
3 Green anodized
5 Gold anodized
6 Red anodized
8 Stainless steel 316L
Bold = standard

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
Blank Non-illuminated
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

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)
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

• 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

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

Flat PBAT5

With standard illuminated ring

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

Wire colours: see “Electrical functions”
PBA series
Piezo switches Ø 16 (.630)

Options

ELECTRICAL FUNCTION

A  NO pulse
B  NC pulse
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
3  | Green anodized aluminium
5  | Gold anodized aluminium
6  | Red anodised aluminium
B  | Stainless steel 316L

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

<table>
<thead>
<tr>
<th></th>
<th>5VDC</th>
<th>12VDC</th>
<th>24VDC</th>
<th>Microcontroller driven</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>A</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>N</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>K</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>W</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Blank**: non-illuminated

#### LED COLOURS

**Blank**: non-illuminated

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

**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.
PBA series
Piezo switches Ø 19 (.748)

Overview

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)

Colours / Materials
- 0: Natural anodized
- 1: Blue anodized
- 2: Black anodized
- 3: Green anodized
- 5: Gold anodized
- 6: Red anodized
- B: Stainless steel 316L

Electrical function
- A: NO (pulse)
- B: NC (pulse)
- 1: ON - OFF (requires external power supply, illumination type W only)

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
- Blank: Non-illuminated
- 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

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

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

- Operator Ø 22 mm (.866)
  
  Shown with flying lead terminals.

**MODEL STRUCTURE**

![Diagram](image)

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

- Flat
  
  PBAR9

- With chamfer
  
  PBARA

**With standard illuminated ring - operator height 3 mm**

- Flat
  
  PBAR9

- With chamfer
  
  PBARA

Wire colours: see “Electrical functions”.

**ELECTRICAL FUNCTIONS**

![Diagram](image)

- A  NO pulse
- B  NC pulse
- 1  ON - OFF - Requires external power supply - Illumination type W only.

---

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PBA series
Piezo switches Ø 19 (.748)

Options

TERMINALS

F
Flying leads
C
Cable

CASE COLOURS / MATERIALS

<table>
<thead>
<tr>
<th>Code</th>
<th>Colour</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>Natural anodized aluminium</td>
</tr>
<tr>
<td>1</td>
<td>Blue anodized aluminium</td>
</tr>
<tr>
<td>2</td>
<td>Black anodised aluminium</td>
</tr>
<tr>
<td>3</td>
<td>Green anodized aluminium</td>
</tr>
<tr>
<td>5</td>
<td>Gold anodized aluminium</td>
</tr>
<tr>
<td>6</td>
<td>Red anodised aluminium</td>
</tr>
<tr>
<td>B</td>
<td>Stainless steel 316L</td>
</tr>
</tbody>
</table>

RATINGS

<table>
<thead>
<tr>
<th>Rating</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>000</td>
<td>Standard</td>
</tr>
<tr>
<td>002</td>
<td>1A 24VAC or DC (NO pulse only, function A)</td>
</tr>
</tbody>
</table>

TYPE OF ILLUMINATION / VOLTAGE

<table>
<thead>
<tr>
<th>Voltage</th>
<th>Microcontroller driven</th>
</tr>
</thead>
<tbody>
<tr>
<td>5VDC</td>
<td>W</td>
</tr>
<tr>
<td>12VDC</td>
<td>K</td>
</tr>
<tr>
<td>24VDC</td>
<td>N</td>
</tr>
</tbody>
</table>

Bold = standard
**PBA series**

Piezo switches Ø 19 (.748)

**Options**

### LED COLOURS

- **Blank**: non-illuminated

- **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.
PBA series
Piezo switches Ø 22 (.866)

Overview

Bushings / operators
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

Colours / Materials
0 Natural anodized
1 Blue anodized
2 Black anodized
3 Green anodized
5 Gold anodized
6 Red anodized
B Stainless steel 316L
Bold = standard

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

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.

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

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

• Operator Ø 28 mm (1.102)

MODEL STRUCTURE

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

Flat PBAR2

With finger location PBAR6

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

Flat PBAR2

With finger location PBAR6

With thin illuminated ring - operator height 4.50 (.177)

Flat PBARZ

With chamfer PBARY

Wire colours: see “Electrical functions”.

Dimension of ON-OFF models
With large illuminated ring - operator height 4,50 (.177)

**Flat**

PBARZ

With chamfer

PBARY

**ELECTRICAL FUNCTIONS**

A  NO pulse
B  NC pulse
I  ON - OFF - Requires external power supply - Illumination types V, Y and Z only - one LED colour only.

**TERMINALS**

F  Flying leads
C  Cable

**CASE COLOURS / MATERIALS**

<table>
<thead>
<tr>
<th>Code</th>
<th>Colour</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
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<td>1</td>
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<td>6</td>
<td>Red anodised aluminium</td>
</tr>
<tr>
<td>B</td>
<td>Stainless steel 316L</td>
</tr>
</tbody>
</table>
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

<table>
<thead>
<tr>
<th>5V</th>
<th>12V</th>
<th>24V</th>
<th>Microcontroller driven</th>
</tr>
</thead>
<tbody>
<tr>
<td>C</td>
<td>D</td>
<td>E</td>
<td>Y</td>
</tr>
<tr>
<td>F</td>
<td>G</td>
<td>H</td>
<td>Z</td>
</tr>
<tr>
<td>L</td>
<td>P</td>
<td>J</td>
<td>V</td>
</tr>
</tbody>
</table>

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

LED COLOURS

Blank: non-illuminated

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
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.
APEM www.apem.com

PBA series

ATEX approved piezo switches

Distinct features - Specifications - Overview

- Approved according to the ATEX 2014/34/EU 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 60079-0:2009*, EN 60079-2:2007,
- Sealing: IP66 per IEC 60529 (switches mounted on panel)

* Changes to the latest standards EN 60079-0:2012 do not affect compliance
  with the essential requirements.

MATERIALS

- Case: 316L stainless steel
- Terminals: multi-wire leads
  0,22 mm², 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.

<table>
<thead>
<tr>
<th>PBA</th>
<th>A</th>
<th>F</th>
<th>B</th>
<th>000</th>
<th>•</th>
<th>••</th>
<th>X</th>
</tr>
</thead>
<tbody>
<tr>
<td>Series</td>
<td>Models</td>
<td>Terminals</td>
<td>Ratings</td>
<td>LED colours</td>
<td>Type</td>
<td>Approval</td>
<td></td>
</tr>
</tbody>
</table>

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

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

LED colours
- 0B Blue
- 0G Green
- 0S Red
- 0Y Yellow

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

Approval
- X ATEX
PBA series
ATEX approved piezo switches
Illuminated or non-illuminated

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).