Wide range of custom options

- For hostile environments
- High sealing performance
- Easy to clean

PBA series Piezo switches
**VERTICAL INTEGRATION**

From raw material transformation to finished products, APEM controls all phases of production, including screw machining, moulding, plating, marking and reliability testing. Product tooling, assembly machinery and test equipment are manufactured in-house by APEM’s manufacturing engineering team.

**HIGH TECHNICAL EXPERTISE**

With over 50 years of switch design and manufacturing experience, APEM has developed into a world leader in the field of switching. APEM’s R&D and design engineering departments develop new and custom products using the leading CAD/CAM software (AutoCAD, CATIA, Pro/ENGINEER...).

APEM’s vertical integration and engineering expertise have led to the development of custom piezo switches, designed to specific customer specifications. All APEM’s piezo switches are produced in-house using high speed screw machining, allowing the manufacture of an endless array of shapes with minimum investment.
**Product description**

PBA piezo switches are based on the principle of piezoelectricity. The piezoelectric effect is the ability of some materials to generate an electric potential in response to an applied mechanical stress. The piezoelectric effect is also reversible; when an electric field is applied, a strain is produced. This technology is at the core of many high-end applications, including laser mirror alignment, fuel injectors and ultrasonic submarine detectors.

In APEM piezo switches, a force applied to the switch surface transfers to the piezo disk creating an electrical pulse. This electrical signal is converted to an expected electrical output through a customizable electronic circuit. The duration of the electrical signal depends on the speed, force and duration of actuation.

The output of the switch is closed for a specified pulse duration depending on the electrical function chosen (see next page).

**Advantages**

APEM piezo switches are based on a solid-state output allowing for a very long life expectancy (more than 50 millions cycles), ideal for demanding applications where reliability is most important.

The flat actuation surface is completely closed, preventing the intrusion of liquids or other contaminants, perfect for surface cleaning required in the medical and food-processing industries.

**High performance sealing** (IP68 and IP69K) is achieved due to the one-piece construction of the switch.

**No external power supply** is required.

The screw-machined metal housing construction and APEM’s vertical integration allow for the manufacture of a variety of shapes.

**A few applications**

- Medical (sealing, no retention area)
- Bath (sealing)
- Mining (ATEX versions)
- Food-processing (IP69K sealing)
**PBA series**

**Piezo switches**

**Electrical functions**

**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 prolonged pulse**
  No external power supply required

- **Latching (ON - OFF)**
  Requires external power supply

\[
\begin{align*}
1 &= \text{closed output} \quad 0 &= \text{open output}
\end{align*}
\]

**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>![Diagram]</td>
<td>![Diagram]</td>
<td>![Diagram]</td>
<td>![Diagram]</td>
</tr>
<tr>
<td>Momentary NC</td>
<td>![Diagram]</td>
<td>![Diagram]</td>
<td>![Diagram]</td>
<td>![Diagram]</td>
</tr>
<tr>
<td>Momentary NO</td>
<td>![Diagram]</td>
<td>![Diagram]</td>
<td>![Diagram]</td>
<td>![Diagram]</td>
</tr>
<tr>
<td>prolonged pulse</td>
<td>![Diagram]</td>
<td>![Diagram]</td>
<td>![Diagram]</td>
<td>![Diagram]</td>
</tr>
<tr>
<td>Latching (ON - OFF)</td>
<td>![Diagram]</td>
<td>![Diagram]</td>
<td>![Diagram]</td>
<td>![Diagram]</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.
Due to a modular construction, custom configurations can be produced using the following options, combined or not with standard elements, to meet your requirements.

- **Shapes**

- **Materials, colours**
  - Violet or dark grey anodized aluminium, gold plated...
  - Other: on request

- **Marking**
  - Laser etching on stainless steel and anodized aluminium
  - Other: on request

- **Illumination**
  - Other LED colours (pink, ice blue...)
  - Custom illumination control
  - (LED connected to the load, blinking LED)
  - High intensity LEDs
  - Specific LED voltage
  - AC LED power supply
PBA series
Piezo switches
Custom configurations

- **Electrical functions**
  - Programmed pulse duration
    
    ![Graph](image1)
    
    FINGER PRESSURE
    applied to switch
    
    OUTPUT
    
    \[ t_0 = X_0 \]
    
    \[ t = X_0 \]
    
    1 = pressure,
    0 = no pressure
  
  - Other : on request

- **Terminals**
  
  Screw or quick-connect/solder
  Different wire lengths and colours
  Cables and connectors on specifications (for example teflon)

- **Anti-vandal piezo switches**
  Impact resistance up to IK10

- **Specific mounting**
  Rear mounting, for flush version
### ENVIRONMENTAL SPECIFICATIONS

- **Sealing**: IP68 per IEC 529, IP69K per DIN 40050-9 (switches mounted on panel or not)
- **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 AND GENERAL SPECIFICATIONS

- **Max. current/voltage rating**: 1A 24VAC/DC or 200mA 24VAC/DC depending on version
- **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 - Illuminated ring: 20mA

### MATERIALS

- **Case**: aluminium, anodized - or stainless steel 316L or brass, chrome plated
- **Multi-wire leads section**: 0,22 mm² length 300 mm, twisted by pair
- **Cable**: length 300 mm, section depending on switch model
- **PC terminals**: bronze, tin plated

### SEALS

- **Sealing IP68**: 1 m
- **Sealing IP69K**:
  - One-piece bushing
  - Epoxy sealed terminals
  - 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/min
- Duration: 30 seconds per position

---

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

**Tolerance**: The general tolerance for dimensions in this brochure is ± 0.3 (0.012).

Dimensions, specifications and data shown in this brochure are subject to change without notice.
# 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 (non-illuminated functions A & B only)

### Ratings
- 000: 200mA 24VAC/DC (standard)
- 002: 1A 24VAC/DC (NO pulse only)

### 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

### 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
- 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 prolonged pulse (non-illuminated only - ground connector compulsory)
- 1: ON - OFF (requires external power supply - cannot be combined with T5 operator.)

---

For options not listed above, please refer to our “Custom configurations” pages.

**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 U4116 (19 mm ac. flats) and 1 O-ring

**Packaging unit:** 20 or 40 pieces
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” page.
### ELECTRICAL FUNCTION

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>NO pulse</td>
</tr>
<tr>
<td>B</td>
<td>NC pulse</td>
</tr>
<tr>
<td>C</td>
<td>NO prolonged pulse (non-illuminated models only) - Ground connector U5735 compulsory, order separately.</td>
</tr>
<tr>
<td>1</td>
<td>ON - OFF - Requires external power supply - Cannot be combined with T5 operator.</td>
</tr>
</tbody>
</table>

### TERMINALS

- **F** Flying leads
- **C** Cable
- **P** Straight PC (non-illuminated models - functions A and B only)

### 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>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>000</td>
<td>200mA 24VAC or DC (standard)</td>
</tr>
<tr>
<td>002</td>
<td>1A 24VAC or DC (NO pulse only)</td>
</tr>
</tbody>
</table>
**Piezo switches Ø 16 (.630)**

**Options**

### TYPE OF ILLUMINATION / VOLTAGE

<table>
<thead>
<tr>
<th></th>
<th>5VDC</th>
<th>12VDC</th>
<th>24VDC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blank</td>
<td>A</td>
<td>N</td>
<td>K</td>
</tr>
</tbody>
</table>

**LED COLOURS**

<table>
<thead>
<tr>
<th></th>
<th>Blank: non-illuminated</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Integrated LED resistor</td>
</tr>
</tbody>
</table>

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

- **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.
**PBA series**

**Piezo switches Ø 19 (.748)**

**Overview**

<table>
<thead>
<tr>
<th>Terminals</th>
<th>Ratings</th>
<th>Bushing / operator</th>
<th>LED colours</th>
</tr>
</thead>
<tbody>
<tr>
<td>F Flying leads</td>
<td>000 200mA 24VAC/DC (std)</td>
<td>R9 Bushing Ø 19 (.748), flat operator, height 3 (.118)</td>
<td>Blank Non-illum.</td>
</tr>
<tr>
<td>C Cable</td>
<td>002 1A 24VAC / DC (NO pulse only)</td>
<td>RA Bushing Ø 19 (.748), with chamfer, height 3 (.118)</td>
<td>0B Blue</td>
</tr>
</tbody>
</table>

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

**Type of illumination/voltage**
- Blank Non-illuminated
- A Standard ring - 5VDC
- N Standard ring - 12VDC
- K Standard ring - 24VDC

**Electrical function**
- A NO (pulse)
- B NC (pulse)
- C NO prolonged pulse (non-illuminated only - ground connector compulsory)
- 1 ON - OFF (requires external power supply)

**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 refer to our “Custom configurations” pages.

**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 U6450 (22 mm ac. flats) and 1 O-ring

**Packaging unit**: 20 pieces
PBA series
Piezo switches Ø 19 (.748)

Illuminated or non-illuminated

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

MODEL STRUCTURE

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

Flat
PBAR9

With chamfer
PBARA

PBARAAF1000

With standard illuminated ring - operator height 3 mm

Flat
PBAR9

With chamfer
PBARA

PBAR9AF0000A0S

ELECTRICAL FUNCTION

A NO pulse
B NC pulse
C NO prolonged pulse (non-illuminated models only) - Ground connector U5736 compulsory, order separately.
I ON - OFF - Requires external power supply.
PBA series
Piezo switches Ø 19 (.748)

Options

**TERMINALS**

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>F</td>
<td>Flying leads</td>
</tr>
<tr>
<td>C</td>
<td>Cable</td>
</tr>
</tbody>
</table>

**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 anodized aluminium</td>
</tr>
<tr>
<td>B</td>
<td>Stainless steel 316L</td>
</tr>
</tbody>
</table>

**RATINGS**

<table>
<thead>
<tr>
<th>Code</th>
<th>Rating Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>000</td>
<td>200mA 24VAC or DC (standard)</td>
</tr>
<tr>
<td>002</td>
<td>1A 24VAC or DC (NO pulse only)</td>
</tr>
</tbody>
</table>

**TYPE OF ILLUMINATION / VOLTAGE**

<table>
<thead>
<tr>
<th>5VDC</th>
<th>12VDC</th>
<th>24VDC</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>N</td>
<td>K</td>
</tr>
</tbody>
</table>
LED COLOURS

Blank: non-illuminated

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

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.
### PBA series

**Piezo switches Ø 22 (.866)**

**Overview**

<table>
<thead>
<tr>
<th>PBA SERIES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overview</td>
</tr>
</tbody>
</table>

#### Bushing / operator

- **All models with Ø 22 bushing**
- **R2** Flat, operator height 3 mm (.118). Not available with 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-illuminated functions A & B only)

#### Colours / Materials

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

#### Ratings

<table>
<thead>
<tr>
<th>Code</th>
<th>Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>000</td>
<td>200mA 24VAC/DC (std)</td>
</tr>
<tr>
<td>002</td>
<td>1A 24VAC/DC (no pulse only)</td>
</tr>
</tbody>
</table>

#### 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

#### LED colours

- **Blank** Non-illuminated
- **OB** Blue
- **OG** Green
- **OS** Red
- **OY** Yellow
- **OW** 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/white/white
- **3H** Green/blue/yellow
- **3I** Green/blue/white
- **3J** Green/white/white
- **3K** Blue/yellow/white

---

For options not listed above, please refer to our "Custom configurations" pages.

**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 U6440 (25 mm ac. flats) and 1 O-ring

**Packaging unit:** 20 pieces
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

PBAR2AF6000

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

Flat
PBAR2

With finger location
PBAR6

PBAR6AF6000LOG

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

Flat
PBARY

With chamfer
PBARY

PBARYAF0000C0B

Wire colours: see “Electrical functions” page.
PBA series
Piezo switches Ø 22 (.866)
Illuminated or non-illuminated

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

Flat
PBARZ

With chamfer
PBARY

ELECTRICAL FUNCTION

A  NO pulse
B  NC pulse
C  NO prolonged pulse (non-illuminated only) - Ground connector U5737 compulsory, order separately.
1  ON - OFF - Requires external power supply

TERMINALS

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

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>
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</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>

PBARYAF0000F0B
**PIEZO SWITCHES Ø 22 (.866)**

**Options**

**RATINGS**

<table>
<thead>
<tr>
<th></th>
<th>000</th>
<th>002</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>200mA 24VAC or DC (standard)</td>
<td>1A 24VAC or DC (NO pulse only)</td>
</tr>
</tbody>
</table>

**TYPE OF ILLUMINATION / VOLTAGE**

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

**LED COLOURS**

- **Blank**: non-illuminated
- **Illuminated 1 LED** *
  - 0B: blue - 0G: green - 0S: red - 0Y: yellow - 0W: white
- **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.
PBA series
ATEX approved piezo switches

Distinctive features - Specifications - Overview

- 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: bright chrome plated brass or 316L stainless steel
- Terminals: multi-wire leads 0.22 mm², length 300 mm (11.81)

**Standard hardware supplied:**
- 1 hex nut U4116 (19 mm ac. flats), U6450 (22 mm ac. flats) or U6440 (25 mm ac. flats), 1 O-Ring and 1 ground connector U5735, U5736 or U5737.

**Packaging units:**
- bushing Ø 16: 40 pieces
- illuminated bushing Ø 16: 20 pieces
- bushing Ø 19: 20 pieces
- bushing Ø 22: 20 pieces

**Instructions for use:**
see instruction notice NTPBA006.

### 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

### Colours/materials
- **A** Bright chrome plated brass
- **B** 316L stainless steel

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

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

- Highest classifications
- Universal

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

II = surface industries
I = mines
M1 = very high protection level
1 = very high protection level
PBA series
ATEX approved piezo switches

Certificate

(2)

Equipment or Protective Systems Intended for use in Potentially explosive atmospheres
Directive 94/9/EC

(1)

PRODUCTION QUALITY ASSURANCE NOTIFICATION

(3) Notification number : INERIS C8ATEXQ408

(4) Equipment or Components as listed : Electrical Equipment of categories 1 and M1 intended to be used in gaseous dust explosive atmospheres.

(5) Manufacturer : APEM
55, avenue Edouard Herriot
BP 1
F-82303 CAUSSADE CEDEX

(6) Place of production : APEM
55, avenue Edouard Herriot
BP 1
F-82303 CAUSSADE CEDEX


(8) This notification is based on audit report N°P99823 issued on October 30th, 2008. Results of periodical re-assessment of the quality system are a part of this notification.

(9) This notification is valid until October 1st, 2011 and can be withdrawn if the manufacturer no longer satisfies the requirements of annex IV.

(10) According to Article 10(1) of the Directive 94/9/EC, the CE marking shall be followed by the identification Number 0080 identifying the notified body involved in the production control stage.

Verneuil-en-Halatte, 2008.21.11

The Director of the Organisation Certified,
By delegation
D. CHARPENTIER
Deputy Manager of Certification

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Etablissement public à caractère industriel et commercial : RCS Soissons 8 381 984 425 - Siret 381 984 521 00019 - APE 7438
PBA series
Piezo switches
Main applications

Shower (IP68 sealing)

Home automation (design, customization)

Bath (IP68 sealing, customization)

Car wash (IP68 sealing, long life)

Marine (IP68 sealing, design)

Medical (easy to clean surface, no retention area)

Food processing (IP69K sealing)

Mining (ATEX versions)
The APEM group is one of the world’s largest manufacturers of switches, LED indicators, joysticks and switch panels. APEM manufactures switch products for multiple industrial markets including: instrumentation, medical, security, communications, industrial automation, military and transport.

Other APEM metallic products

- **Stainless steel keypads**
  Stainless steel keypads and keyboards are particularly resistant to harsh environments: extreme climatic conditions, vandalism, stains...
  They meet EMC international standards and feature good tactile feedback and IP65 front face sealing.

- **Custom switch panels**
  APEM provides custom solutions to specific panel requirements. Custom panels incorporate several technologies such as LED illumination and backlighting, ESD and EMC protection, IP67 sealing, custom mounting...
  Applications for these products include transport and utility vehicles, agricultural equipment and boats.

- **AV pushbutton switches**
  The AV series is a range of very robust pushbutton switches consisting of 2 families: anti-vandal and security pushbutton switches. This range features a large variety of models, with different bushing diameters, numerous materials and many electrical functions. Marking and illumination options are also available.

Addresses of sales subsidiaries and distributors network on [www.apem.com](http://www.apem.com)