

PBA series

Piezo switches Ø 16 mm



DISTINCTIVE FEATURES

Bushing diameter 16 (.630), 19 (.748), 22 (.866) or 30 mm (1.181)

Sealed to IP68 and IP69K (switches mounted on panel)

Easy to clean metal surface

Very long life expectancy

Ring 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 (-40 °F to + 167 °F)
- 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 200 mA 24 VAC/DC - option 1 A 24 VAC/DC
 - Function B : standard 100 mA 24 VAC/DC
- Switch resistance ON : 10 Ω max.
- Switch resistance OFF : 5 MΩ min.
- Life expectancy : 50 million cycles
- LED consumption : Illuminated dot 10 mA - Illuminated ring 20 mA (functions A-B-C)
- Power consumption for function 1 :
 - non-illuminated 10 mA - illuminated 30 mA



GENERAL SPECIFICATIONS

- Operating force : 2 to 6 N
- Torque : 2.5 Nm min. - 3 Nm max.

The company reserves the right to change specifications without notice.



PBA series

Piezo switches Ø 16 mm



MATERIALS

- Case : aluminum, anodized or stainless steel 316L
- 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

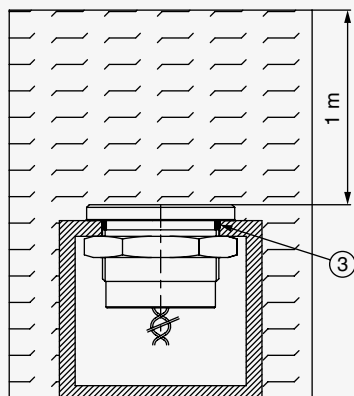
APEM products may be recycled at end-of-life for the re-claiming of valuable metal components.

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.



SEALING

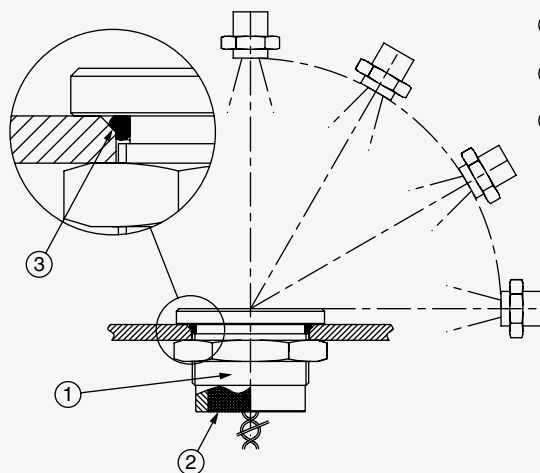
SEALING IP68



Continuous immersion in water IP68 test conditions

Continuous immersion in water
(1 m, 24 hours)

SEALING IP69K



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

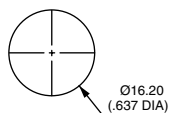
High pressure, high temperature wash down IP69K test conditions

- . Pressure : 80 - 120 bars
- . Distance : 15 cm
- . Temperature : 80 °C ± 5 °C (176 °F ± 41 °F)
- . Flow : 14 - 16 l/mn
- . Duration : 30 seconds per position



PANEL CUT-OUT

MODELS Ø16 (.630)

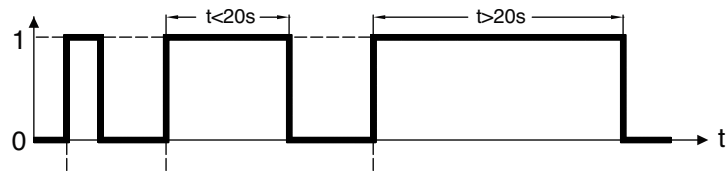




ELECTRICAL FUNCTIONS

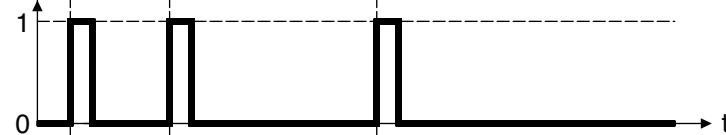
FINGER PRESSURE APPLIED TO SWITCH

1 : pressure / 0 : no pressure



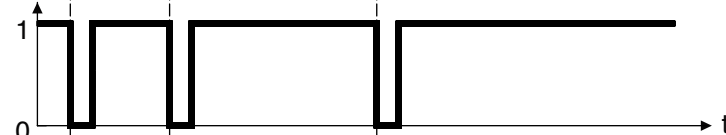
OUTPUT

1 : closed output / 0 : open output



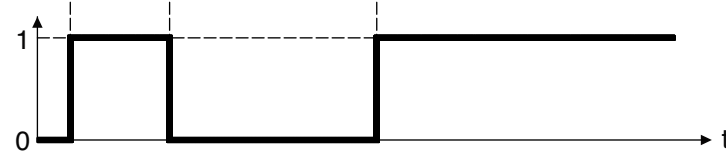
Momentary NO (pulse)

No external power supply required



Momentary NC (pulse)

No external power supply required

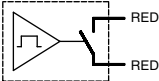
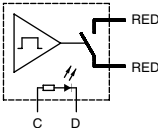
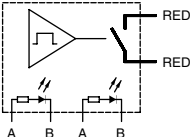
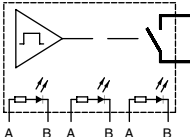
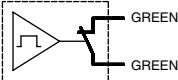
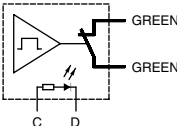
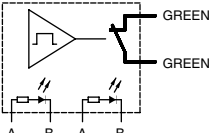
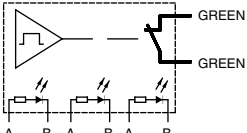
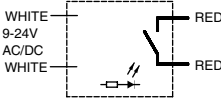


Latching (ON - OFF)

Requires external power supply



WIRING DIAGRAMS

	Non-illuminated	1 LED *	2 LEDs	3 LEDs
Momentary NO				
Momentary NC				
Latching (ON - OFF)				

Legend : C : yellow, D : blue, B : black , A : same color as LED

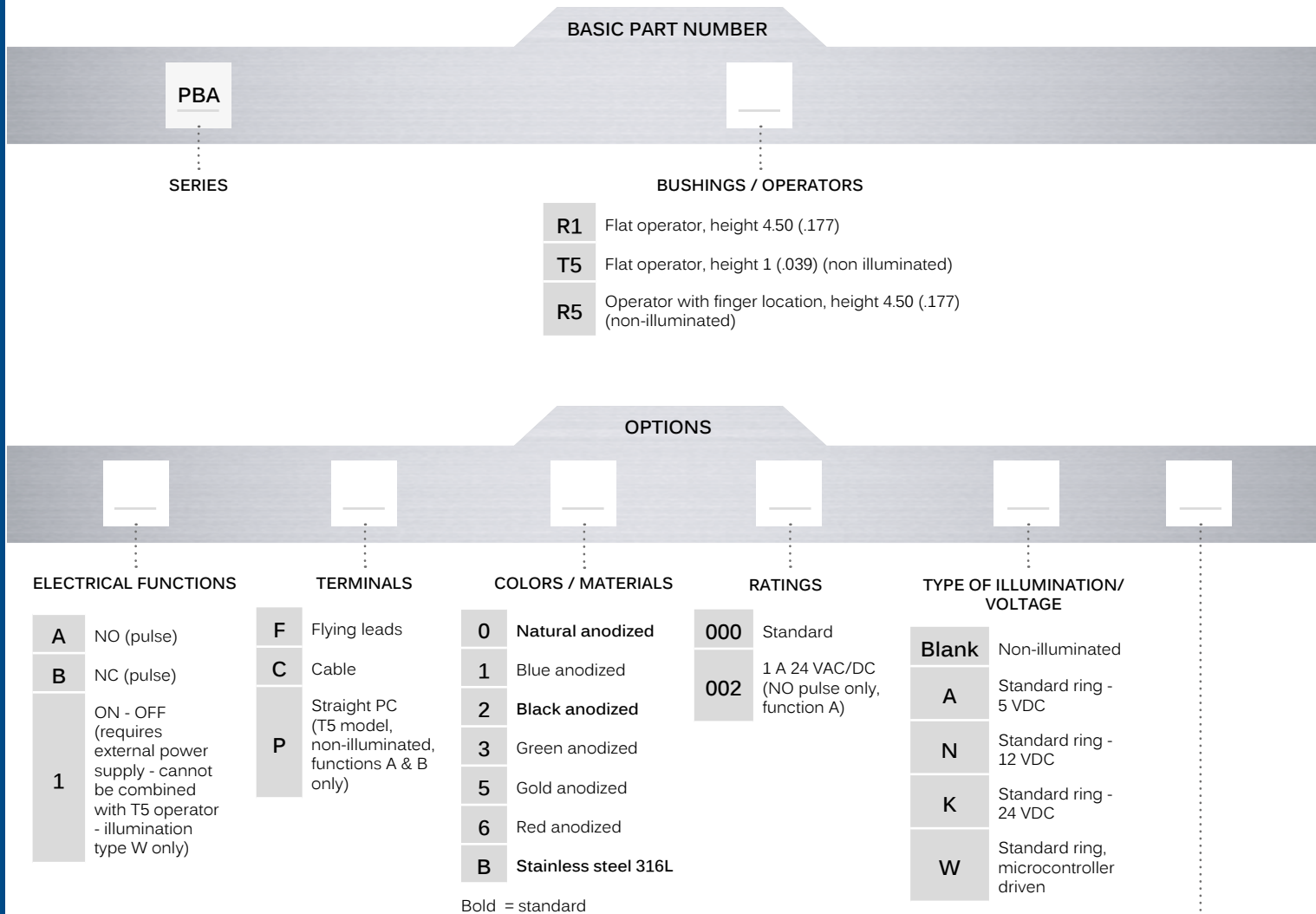
* LED color is indicated by protective resin color on bottom of unit.

PBA series

Piezo switches Ø 16 mm



BUILD YOUR PART NUMBER



LED COLORS

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

LED COLORS (CONTINUED)

2G	Green/white	3A	Red/green/blue	3H	Green/blue/ yellow
2H	Blue/yellow	3B	Red/green/yellow	3I	Green/blue/white
2I	Blue/white	3D	Red/green/white	3J	Green/yellow/ white
2K	Yellow/white	3E	Red/blue/yellow	3K	Blue/yellow/white
		3F	Red/blue/white		
		3G	Red/yellow/white		

For options not listed above, please contact APEM.



ABOUT THIS SERIES

On the following pages, you will find successively basic part numbers of switches and options in the same order as in above chart.



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 and 1 O-ring.

Always add a ground washer U5735 (Ø16 mm) when the panel is non-conductive (PVC, polycarbonate).

PBA series

Piezo switches Ø 16 mm

Ø16 (.630) - NON-ILLUMINATED OPERATOR HEIGHT 4.50 MM

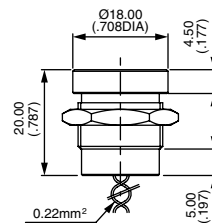


Flat

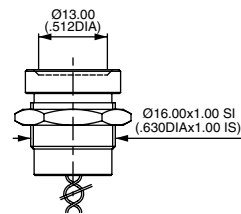
PBAR1

With finger location

PBAR5



R1



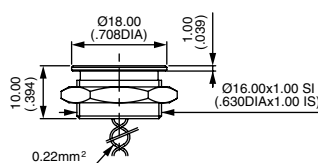
R5

Ø16 (.630) - NON-ILLUMINATED OPERATOR HEIGHT 1 MM



Flat

PBAT5

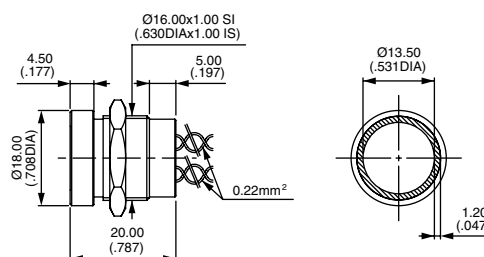


Ø16 (.630) - STANDARD ILLUMINATED RING OPERATOR HEIGHT 4.5 MM



Flat

PBAR1



PBA series

Piezo switches Ø 16 mm

ELECTRICAL FUNCTIONS

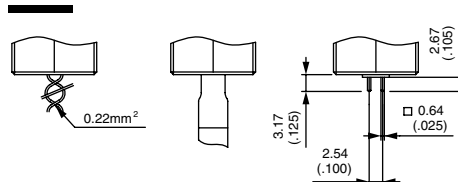


- A NO pulse
- B NC pulse
- 1 ON - OFF - Requires external power supply - Cannot be combined with T5 operator - Illumination type W only.

TERMINALS



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



CASE COLORS / MATERIALS



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

Bold = standard



0 1 2 3 5 6 B

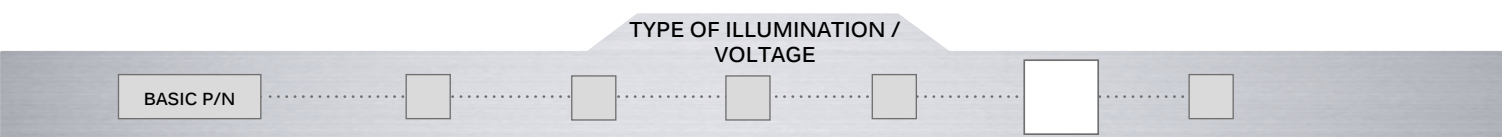
RATINGS



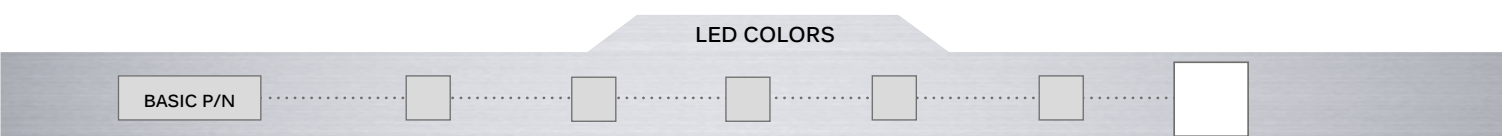
- 000 Standard
- 002 1 A 24 VAC or DC (NO pulse only, function A)

PBA series

Piezo switches Ø 16 mm



Blank	Non-illuminated
A	Thin ring - 5 VDC
N	Thin ring - 12 VDC
K	Thin ring - 24 VDC
W	Thin ring - μ controller driven



Blank Non-illuminated

Integrated LED resistor

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 color is indicated by protective resin color on bottom of unit.



0B



0G



0S



0Y



0W

PBA series

Piezo switches Ø 19 mm



DISTINCTIVE FEATURES

Bushing diameter 16 (.630), 19 (.748), 22 (.866) or 30 mm (1.181)

Sealed to IP68 and IP69K (switches mounted on panel)

Easy to clean metal surface

Very long life expectancy

Ring 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 (-40 °F to + 167 °F)
- 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 200 mA 24 VAC/DC - option 1 A 24 VAC/DC
 - Function B : standard 100 mA 24 VAC/DC
- Switch resistance ON : 10 Ω max.
- Switch resistance OFF : 5 MΩ min.
- Life expectancy : 50 million cycles
- LED consumption : Illuminated dot 10 mA - Illuminated ring 20 mA (functions A-B-C)
- Power consumption for function 1 :
 - non-illuminated 10 mA - illuminated 30 mA



GENERAL SPECIFICATIONS

- Operating force : 2 to 6 N
- Torque : 2.5 Nm min. - 3 Nm max.

The company reserves the right to change specifications without notice.



PBA series

Piezo switches Ø 19 mm



MATERIALS

- Case : aluminum, anodized or stainless steel 316L
- 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

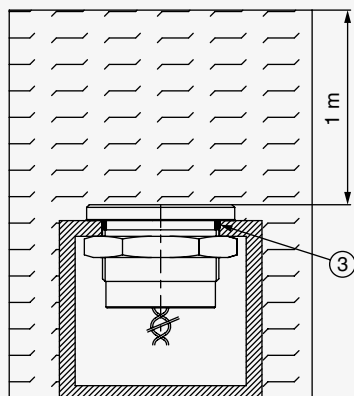
APEM products may be recycled at end-of-life for the re-claiming of valuable metal components.

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.



SEALING

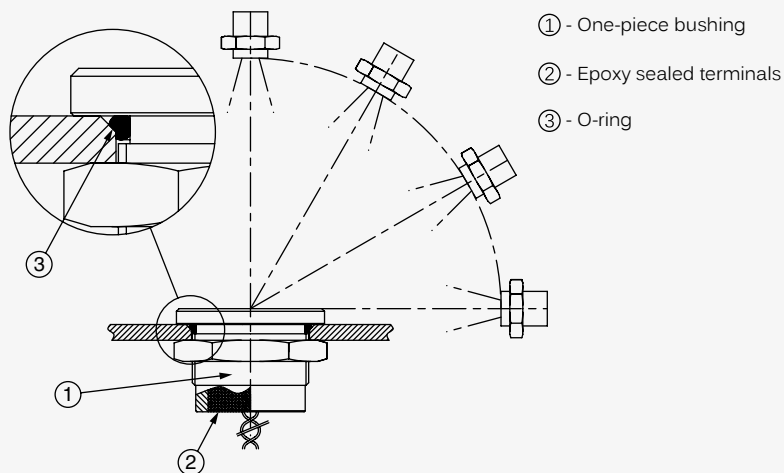
SEALING IP68



Continuous immersion in water IP68 test conditions

Continuous immersion in water
(1 m, 24 hours)

SEALING IP69K



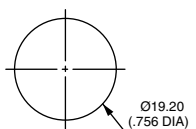
High pressure, high temperature wash down IP69K test conditions

- . Pressure : 80 - 120 bars
- . Distance : 15 cm
- . Temperature : 80 °C ± 5 °C (176 °F ± 41 °F)
- . Flow : 14 - 16 l/mn
- . Duration : 30 seconds per position



PANEL CUT-OUT

MODELS Ø19 (.748)

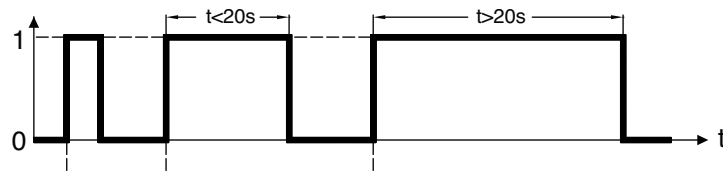




ELECTRICAL FUNCTIONS

FINGER PRESSURE APPLIED TO SWITCH

1 : pressure / 0 : no pressure

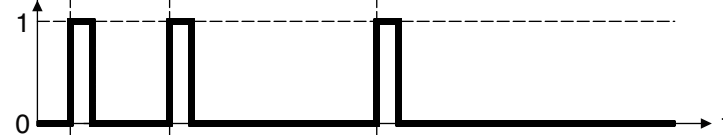


OUTPUT

1 : closed output / 0 : open output

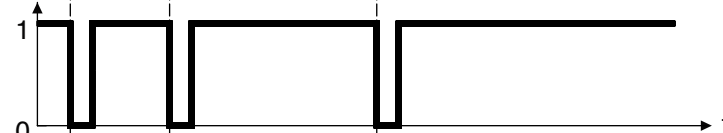
Momentary NO (pulse)

No external power supply required



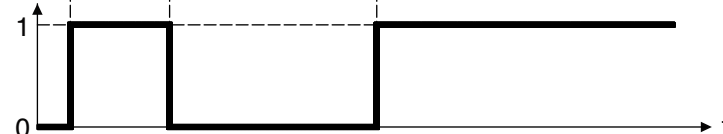
Momentary NC (pulse)

No external power supply required



Latching (ON - OFF)

Requires external power supply



WIRING DIAGRAMS

	Non-illuminated	1 LED *	2 LEDs	3 LEDs
Momentary NO				
Momentary NC				
Latching (ON - OFF)				

Legend : C : yellow, D : blue, B : black, A : same color as LED

* LED color is indicated by protective resin color on bottom of unit.

PBA series

Piezo switches Ø 19 mm



BUILD YOUR PART NUMBER

BASIC PART NUMBER

PBA

SERIES

BUSHINGS / OPERATORS

R9	Flat operator, height 3 (.118)
RA	With chamfer, height 3 (.118)

OPTIONS

ELECTRICAL FUNCTIONS

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 & B only)

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

TYPE OF ILLUMINATION/ VOLTAGE

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

LED COLORS

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

LED COLORS (CONTINUED)

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

For options not listed above, please contact APEM.



ABOUT THIS SERIES

On the following pages, you will find successively basic part numbers of switches and options in the same order as in above chart.



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 U5736 (Ø19 mm) when the panel is non-conductive (PVC, polycarbonate).

PBA series

Piezo switches Ø 19 mm

Ø19 (.748) - NON-ILLUMINATED OPERATOR HEIGHT 3 MM



Flat

PBAR9

With chamfer

PBARA

Wire colors : see "Wiring diagrams".

Ø19 (.748) - ILLUMINATED RING OPERATOR HEIGHT 3 MM



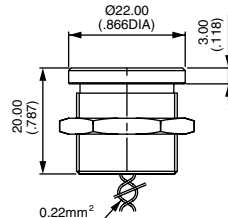
Flat

PBAR9

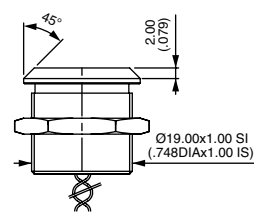
With chamfer

PBARA

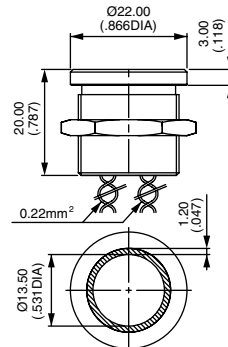
Wire colors : see "Wiring diagrams".



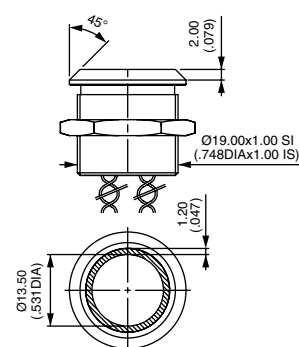
R9



RA



R9



RA

ELECTRICAL FUNCTIONS

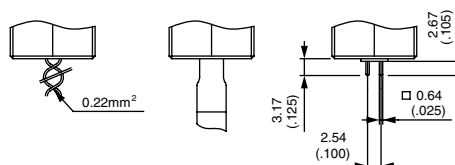
BASIC P/N

- A NO pulse
- B NC pulse
- 1 ON - OFF - Requires external power supply - Cannot be combined with T5 operator - Illumination type W only.

TERMINALS

BASIC P/N

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



PBA series

Piezo switches Ø 19 mm

CASE COLORS / MATERIALS



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

Bold = standard



RATINGS



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

TYPE OF ILLUMINATION / VOLTAGE



O

- Blank Non-illuminated
- A Thin ring - 5 VDC
- N Thin ring - 12 VDC
- K Thin ring - 24 VDC
- W Thin ring - µcontroller driven

PBA series

Piezo switches Ø 19 mm

LED COLORS

BASIC P/N

Blank Non-illuminated

Integrated LED resistor

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 color is indicated by protective resin color on bottom of unit.



0B



0G



0S



0Y



0W

PBA series

Piezo switches Ø 22 mm



DISTINCTIVE FEATURES

Bushing diameter 16 (.630), 19 (.748), 22 (.866) or 30 mm (1.181)

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 (-40 °F to + 167 °F)
- 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 200 mA 24 VAC/DC - option 1 A 24 VAC/DC
 - Function B : standard 100 mA 24 VAC/DC
- Switch resistance ON : 10 Ω max.
- Switch resistance OFF : 5 MΩ min.
- Life expectancy : 50 million cycles
- LED consumption : Illuminated dot 10 mA - Illuminated ring 20 mA (functions A-B-C)
- Power consumption for function 1 :
 - non-illuminated 10 mA - illuminated 30 mA



GENERAL SPECIFICATIONS

- Operating force : 2 to 6 N
- Torque : 2.5 Nm min. - 3 Nm max.

The company reserves the right to change specifications without notice.



PBA series

Piezo switches Ø 22 mm



MATERIALS

- Case : aluminum, anodized or stainless steel 316L
- 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

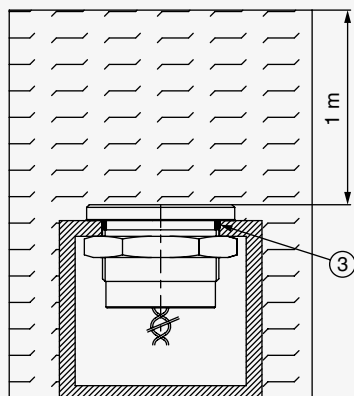
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For part numbers, see "Mounting accessories" on the following pages.



SEALING

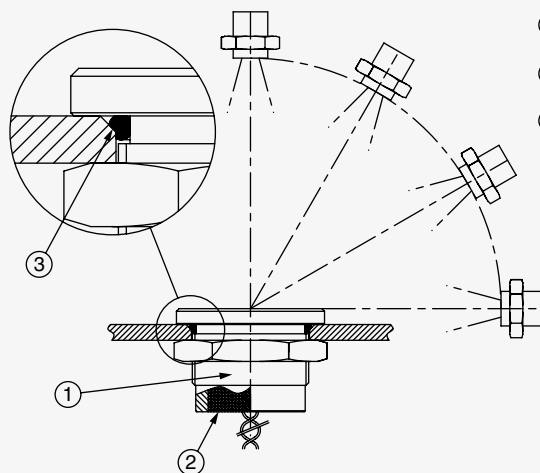
SEALING IP68



Continuous immersion in water IP68 test conditions

Continuous immersion in water
(1 m, 24 hours)

SEALING IP69K



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

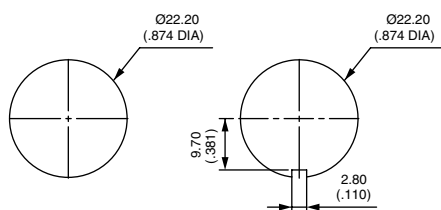
High pressure, high temperature wash down IP69K test conditions

- . Pressure : 80 - 120 bars
- . Distance : 15 cm
- . Temperature : 80 °C ± 5 °C (176 °F ± 41 °F)
- . Flow : 14 - 16 l/mn
- . Duration : 30 seconds per position



PANEL CUT-OUT

MODELS Ø22 (.866)

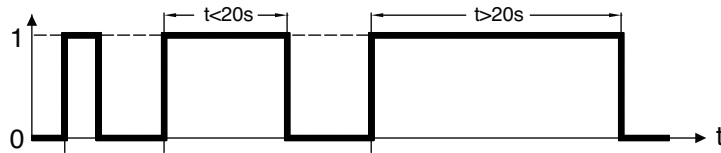




ELECTRICAL FUNCTIONS

FINGER PRESSURE APPLIED TO SWITCH

1 : pressure / 0 : no pressure

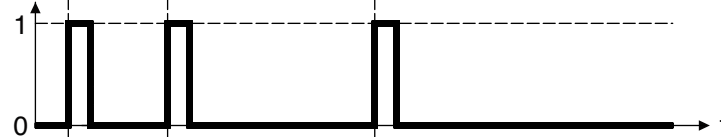


OUTPUT

1 : closed output / 0 : open output

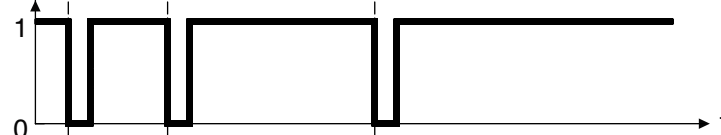
Momentary NO (pulse)

No external power supply required



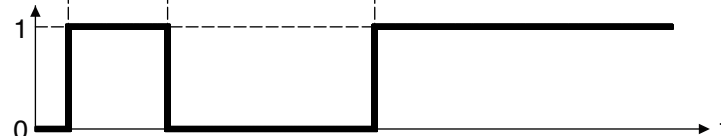
Momentary NC (pulse)

No external power supply required



Latching (ON - OFF)

Requires external power supply



WIRING DIAGRAMS

	Non-illuminated	1 LED *	2 LEDs	3 LEDs
Momentary NO				
Momentary NC				
Latching (ON - OFF)				

Legend : C : yellow, D : blue, B : black, A : same color as LED

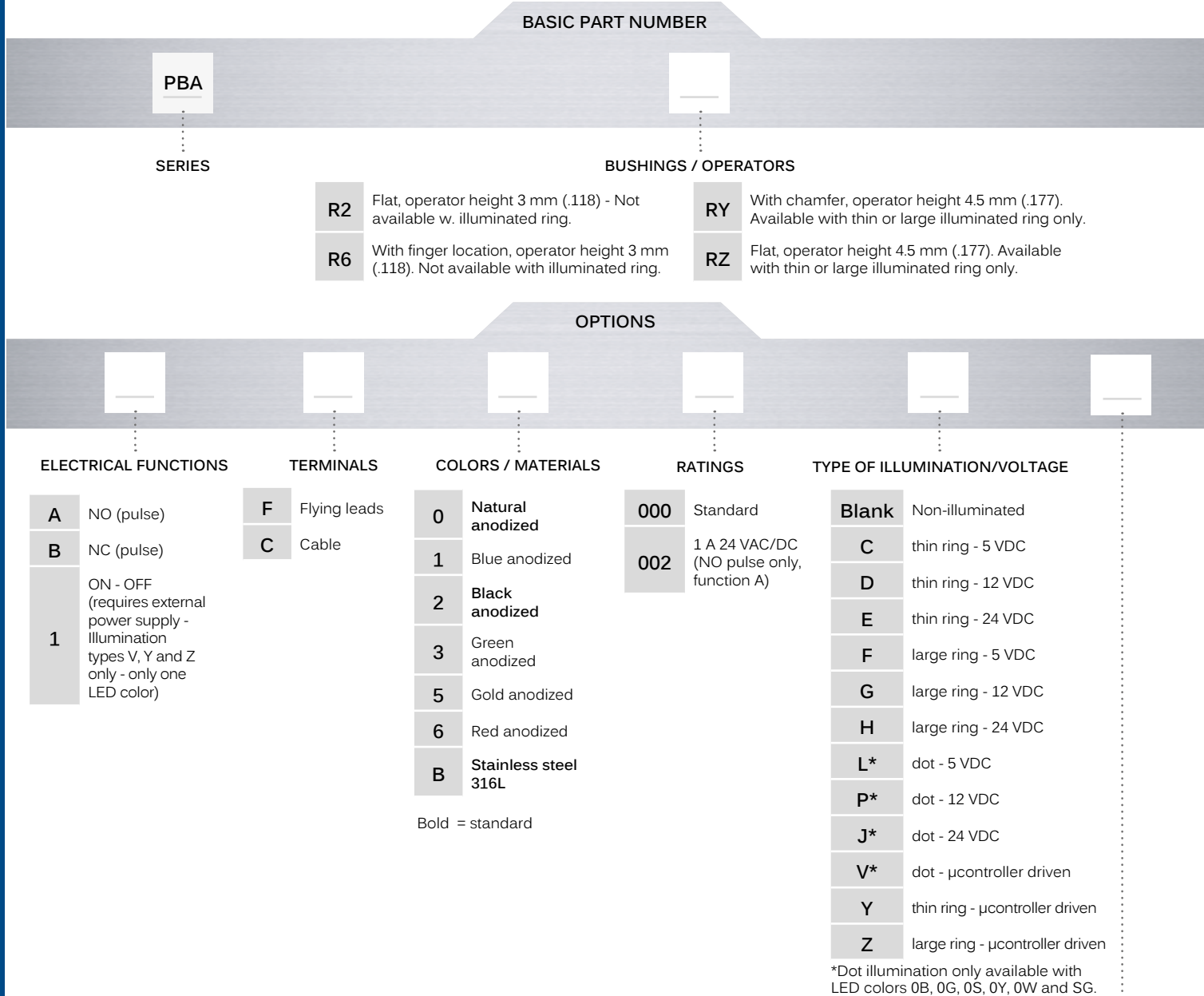
* LED color is indicated by protective resin color on bottom of unit.

PBA series

Piezo switches Ø 22 mm



BUILD YOUR PART NUMBER



LED COLORS

LED COLORS (CONTINUED)

Blank Non-illum.	SG Red/green (dot only)	2E Green/blue	3A Red/green/blue	3H Green/blue/yellow
0B Blue	2A Red/green	2F Green/yellow	3B Red/green/yellow	3I Green/blue/white
0G Green	2B Red/yellow	2G Green/white	3D Red/green/white	3J Green/yellow/white
0S Red	2C Red/blue	2H Blue/yellow	3E Red/blue/yellow	3K Blue/yellow/white
0Y Yellow	2D Red/white	2I Blue/white	3F Red/blue/white	
0W White		2K Yellow/white	3G Red/yellow/white	



ABOUT THIS SERIES

- 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).

PBA series

Piezo switches Ø 22 mm

NON-ILLUMINATED OPERATOR HEIGHT 3 MM



Flat

PBAR2

With finger location

PBAR6

WITH ILLUMINATED DOT OPERATOR HEIGHT 3 MM



Flat

PBAR2

With finger location

PBAR6

WITH THIN ILLUMINATED RING OPERATOR HEIGHT 4.50



Flat

PBARZ

With chamfer

PBARY

WITH LARGE ILLUMINATED RING OPERATOR HEIGHT 4.50

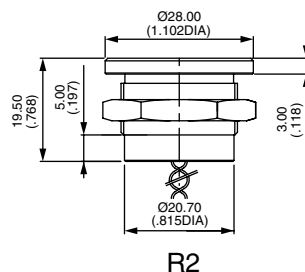


Flat

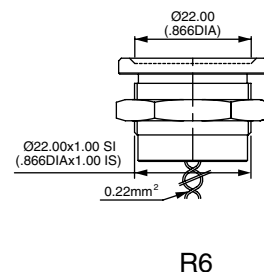
PBARZ

With chamfer

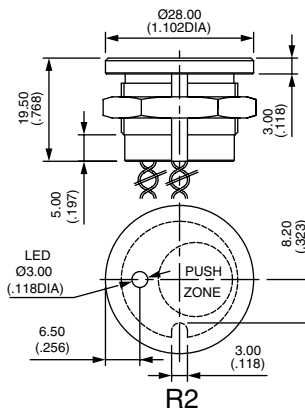
PBARY



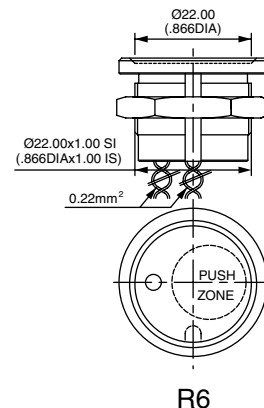
R2



R6

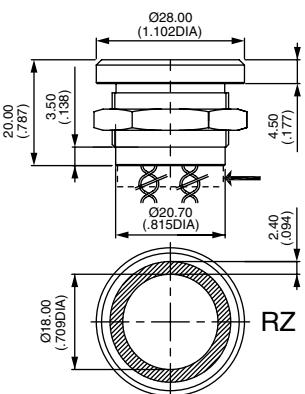


R2

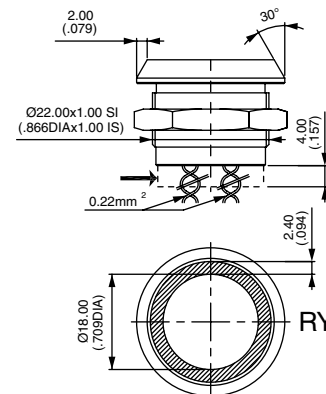


R6

→ DIMENSION OF ON-OFF MODELS

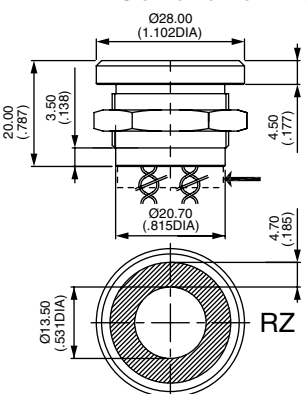


RZ

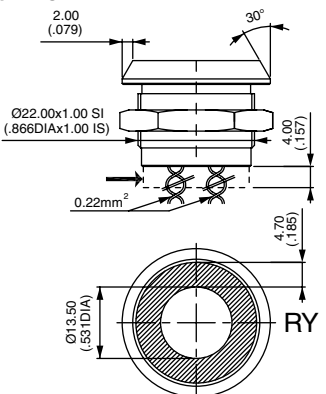


RY

→ DIMENSION OF ON-OFF MODELS



RZ



RY

PBA series

Piezo switches Ø 22 mm

ELECTRICAL FUNCTIONS

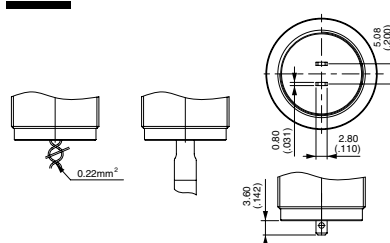


- A NO pulse
- B NC pulse
- 1 ON - OFF - Requires external power supply - Illumination types V, Y and Z only - one LED color only.

TERMINALS



- F Flying leads
- C Cable



CASE COLORS / MATERIALS



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

Bold = standard



0

1

2

3

5

6

B

RATINGS



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

PBA series

Piezo switches Ø 22 mm

TYPE OF ILLUMINATION / VOLTAGE



Blank Non-illuminated



C Thin ring - 5 VDC
D Thin ring - 12 VDC
E Thin ring - 24 VDC
Y Thin ring - μ controller driven



F Large ring - 5 VDC
G Large ring - 12 VDC
H Large ring - 24 VDC
Z Large ring - μ controller driven



L Dot - 5 VDC
P Dot - 12 VDC
J Dot - 24 VDC
V Dot - μ controller driven

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

LED COLORS



Blank Non-illuminated

Integrated LED resistor

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 color is indicated by protective resin color on bottom of unit.



0B



0G



0S



0Y



0W