Panasonic

For small diameter tubes

Optical Bubble Sensor

BE-A SERIES

CE

Fits perfectly with applicable tube sizes!

Detects liquid and air bubbles without fail!

Experience its ease of use!

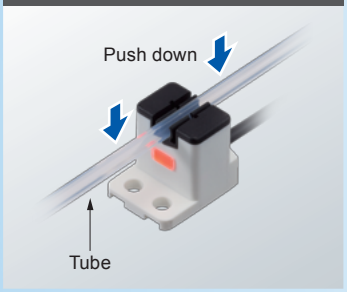
Optical bubble sensor is handy, simple, and precise!

New proposals for ease of use **One-touch attachment**

Simply attach the sensor with your hand!

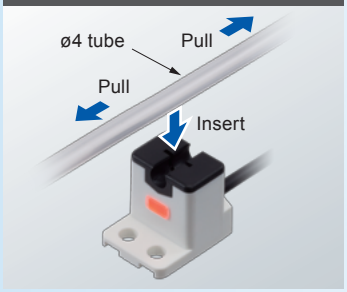
Hassle-free one-touch attachment without using tools!

In the case of BE-A201(P) / BE-A301(P)



●Push down the tube into the sensor.
*Tube: Equivalent to PFA

In the case of BE-A401(P)



●Stretch the tube and insert it into the sensor.
*ø4 tube: Equivalent to flexible PVC

New proposals for ease of use **For small diameter tubes**

For ø2 mm, ø3 mm, ø4 mm tubes

Perfect fit into applicable tubes without obstructing flow rate.
Compatible with tubes in inch size

ø2 mm tube type	ø3 mm tube type	ø4 mm tube type
		
BE-A201(P)	BE-A301(P)	BE-A401(P)

ø2 mm ø0.078 in tube type

Model No. : **BE-A201** (NPN output type)
BE-A201P (PNP output type)
Applicable tube : Transparent resin tube
(Equivalent to PFA)
Outer diameter : ø2 mm ±0.2 mm
ø0.078 in ±0.008 in
Inner diameter : ø1 mm ±0.2 mm
ø0.039 in ±0.008 in
Output operation: Liquid-absent-ON / Liquid-present-ON
(equipped with two outputs)

New proposals for ease of use **High speed response time**

High speed detection

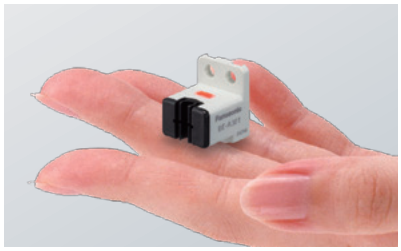
0.8 mm 0.032 in air gaps are reliably detected by optical technology at a response time of 20 µs*.
Ideal for traceability of the analysis process.

*Refer to the specifications for detection conditions,
BE-A201(P) has a response time of 30 µs.

New proposals for ease of use **Ultra compact**

Fingertip size

Allows for installation in a narrow space.



New proposals for ease of use **For a wide-range of power supply voltages**

5 to 24 V DC compliant

Allows for direct power supply from PC board.

New proposals for ease of use **Built-in Amplifier**

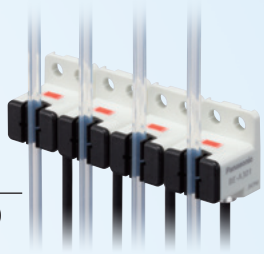
No requirement of sensitivity adjustment

Can be used immediately after installation by built-in amplifier.
Equipped with two outputs,
Liquid-absent-ON and Liquid-present-ON.

Allows for close proximity attachment

Staggered pattern
(10 mm 0.394 in pitch)

Parallel pattern
(15.5 mm 0.610 in pitch)



ø3 mm ø0.125 in tube type

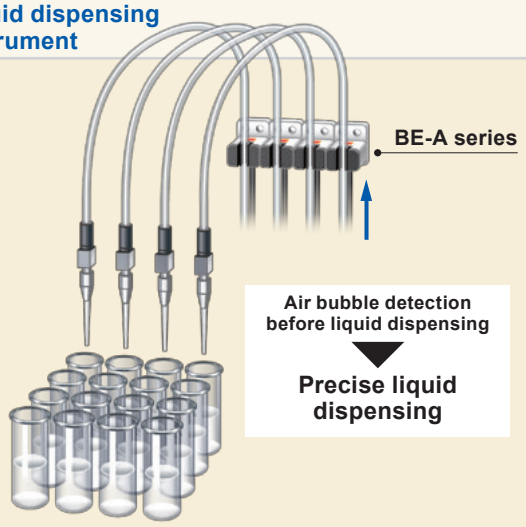
Model No. : **BE-A301** (NPN output type)
BE-A301P (PNP output type)
Applicable tube : Transparent resin tube
(Equivalent to PFA)
Outer diameter: ø3 mm ±0.2 mm
ø1/8 in ±0.008 in
Inner diameter: ø2 mm ±0.2 mm
ø1/16 in ±0.008 in
Output operation: Liquid-absent-ON / Liquid-present-ON
(equipped with two outputs)

ø4 mm ø0.156 in tube type

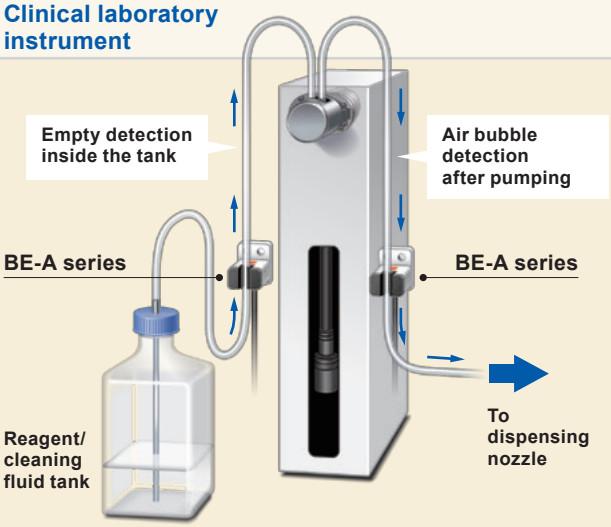
Model No. : **BE-A401** (NPN output type)
BE-A401P (PNP output type)
Applicable tube : Transparent resin tube
(equivalent to flexible PVC)
Outer diameter: ø4 mm ±0.15 mm
ø5/32 in ±0.006 in
Inner diameter: ø2.4 mm ±0.1 mm
ø3/32 in ±0.004 in
Output operation: Liquid-absent-ON / Liquid-present-ON
(equipped with two outputs)

Applications

Liquid dispensing instrument



Clinical laboratory instrument



SPECIFICATIONS

Item \ Model No.		for ø2 mm ø0.078 in tube	for ø3 mm ø0.125 in tube	for ø4 mm ø0.156 in tube
Type	NPN output	**BE-A201**	**BE-A301**	**BE-A401**
	PNP output	**BE-A201P**	**BE-A301P**	**BE-A401P**
Regulatory compliance		EMC Directive, RoHS Directive		
Detectable air gap (Note 2)		0.8 mm 0.032 in or more		
Sensing object		Liquid (Note 3)		
Applicable tube dia. (Note 4)	Outer dia.	ø2 mm ±0.2 mm ø0.078 in ±0.008 in	ø3 mm ±0.2 mm ø1/8 in ±0.008 in	ø4 mm ±0.15 mm ø5/32 in ±0.006 in
	Inner dia.	ø1 mm ±0.2 mm ø0.039 in ±0.008 in	ø2 mm ±0.2 mm ø1/16 in ±0.008 in	ø2.4 mm ±0.1 mm ø3/32 in ±0.004 in
Applicable tube type (Note 4)		Transparent resin tube (equivalent to PFA)		Transparent resin tube (equivalent to flexible PVC)
Supply voltage		5 to 24 V DC ±10 % Ripple P-P 10 % or less		
Current consumption		15 mA or less		
Output (Incorporated with 2 outputs)		<NPN output type> NPN open-collector transistor •Maximum sink current: 50 mA •Applied voltage: 30 V DC or less (between output and 0 V) •Residual voltage: 2 V or less (sink current at 50 mA) 1 V or less (sink current at 16 mA)		<PNP output type> PNP open-collector transistor •Maximum source current: 50 mA •Applied voltage: 30 V DC or less (between output and + V) •Residual voltage: 2 V or less (source current at 50 mA) 1 V or less (source current at 16 mA)
	Output operation	Switchable either Liquid-absent-ON or Liquid-present-ON		
	Short-circuit protection	Incorporated		
Response time (Note 5)	When detecting bubble	30 µs or less	20 µs or less	
	When detecting liquid	80 µs or less		
Operation indicator		Orange LED (lights up with absent liquid)		
Protection circuits		Power supply reverse polarity protection , Output reverse polarity protection		
Environmental resistance	Protection	IP40 (IEC)		
	Ambient temperature (Note 6)	-25 to +55 °C -13 to +131 °F (No dew condensation or icing allowed), Storage: -30 to +80 °C -22 to +176 °F		
	Ambient humidity	35 to 85 % RH, Storage: 35 to 85 % RH		
	Ambient illuminance	Fluorescent light: 1,000 ℓx at the light-receiving face		
	Voltage withstandability	1,000 V AC for between one min. between all supply terminals connected together and enclosure		
	Insulation resistance	20 MΩ, or more, with 250 V DC megger between all supply terminals connected together and enclosure		
	Vibration resistance	10 to 150 Hz frequency, 0.75 mm 0.030 in double amplitude or maximum acceleration 49 m/s², in X, Y and Z directions for two hours each		
	Shock resistance	100 m/s² acceleration in X, Y, and Z directions three times each		
Emitter element		Infrared LED(Peak emission wavelength: 855 nm 0.034 mil, non-modulated)		
Material		Enclosure: PBT, Tube holder: Polyamide, Indicator: Polycarbonate		
Cable		0.09 mm² 4-core cabtyre cable 1 m 3.280 ft		
Cable extension (Note 7)		Extension up to total 100 m 328.084 ft is possible with 0.3 mm², or more, cable.		
Clamping torque		0.5N•m or less		
Weight		Net weight: 15 g approx., Gross weight: 25 g approx.		

Notes: 1) Where measurement conditions have not been specified precisely, the conditions used were an ambient temperature of +23 °C +73.4 °F.
2) Sensing air gap refers to the width of an air bubble formed in the entire area of the inner diameter of the tube. Please note that this product cannot sense very small air bubbles or water drops. Refer to the figure 1 and 2.
3) Sensing is affected by dirt or residues adhered to the inner wall of the tube. Please maintain the tube regularly.
4) When using a tube out of specifications or it doesn't have a smooth surface, please test sensing on the actual machine before use.
5) Actual response time may differ from specification (typical example using applicable tube) due to dimension, light transmission or surface state of test tube in use.
6) Liquid being detected should also be kept within the rated ambient temperature range.
7) Confirm that the power supply voltage at the end of cable is more than 4.5 V when using an extension of over 20 m 65.167 ft.

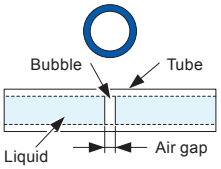


fig.1

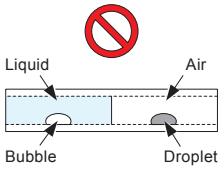
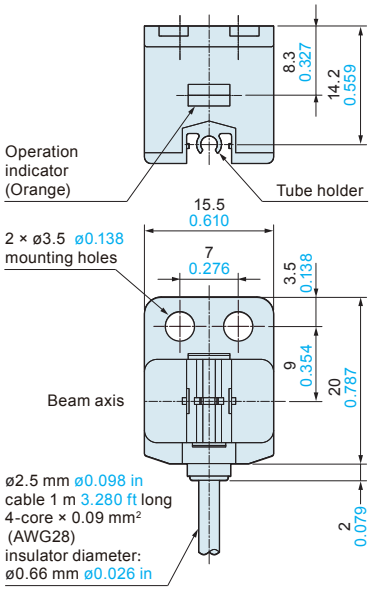


fig.2

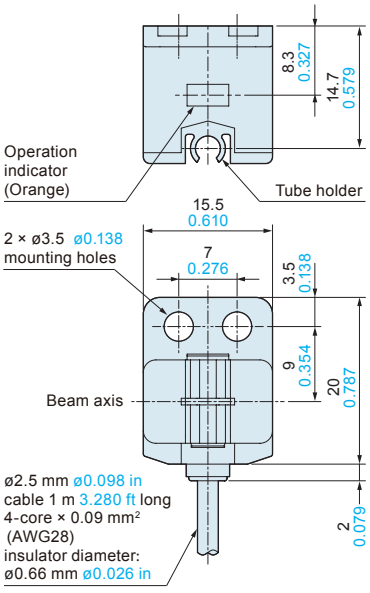
DIMENSIONS (Unit: mm in)

The CAD data can be downloaded from our website.

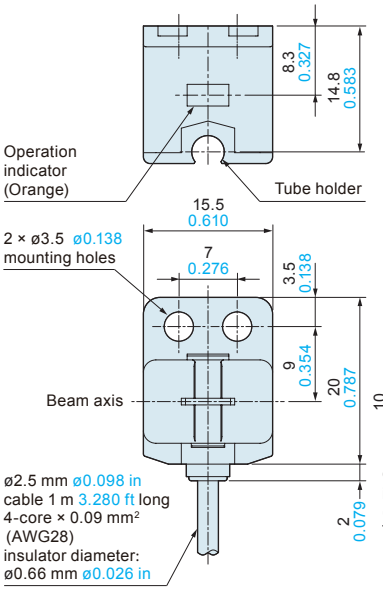
BE-A201(P) For ø2 mm ø0.078 in tube



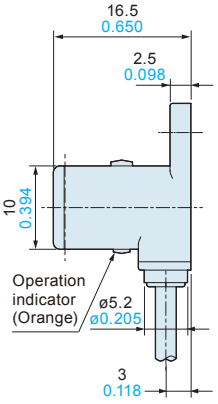
BE-A301(P) For ø3 mm ø0.125 in tube



BE-A401(P) For ø4 mm ø0.156 in tube



Right side dimension (in common)



●If you have any question about Optical Bubble Sensor, please contact us by E-mail .
USA customers : usa-bmpj@ml.jp.panasonic.com
EURO customers : euro-bmpj@ml.jp.panasonic.com

Panasonic Corporation
■ 1006, Oaza Kadoma, Kadoma-shi, Osaka 571-8506, Japan
Industrial Device Business Division