

Optical Bubble Sensor

BE-A SERIES



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!

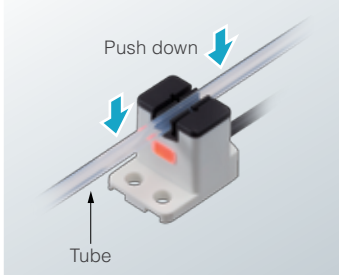
New proposals for ease of use

One-touch attachment

Simply attach the sensor with your hand!

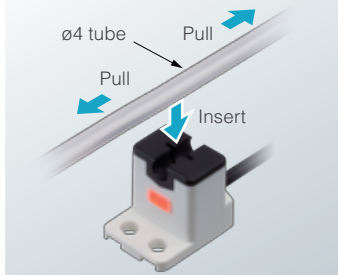
Hassle-free one-touch attachment without using tools!

In the case of BE-A201□ / BE-A301□



Push down the tube into the sensor.

In the case of BE-A401□



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



Model No. : **BE-A201** (NPN output type)
BE-A201P (PNP output type)
Applicable tube : Transparent resin tube (PFA equivalent)
Outer diameter ø2 mm × inner diameter ø1 mm
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□ 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

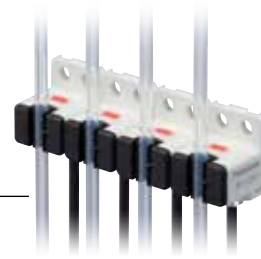
Can be used immediately after installation by built-in amplifier.
Equipped with two outputs, Liquid-absent-ON and Liquid-present-ON.

Allows for
close proximity
attachment

Staggered pattern
(10 mm pitch)



Parallel pattern
(15.5 mm pitch)



ø3 mm
tube type



Model No. : **BE-A301** (NPN output type)
BE-A301P (PNP output type)
Applicable tube : Transparent resin tube
(PFA equivalent)
Outer diameter ø3 mm ×
inner diameter ø2 mm
Output operation: Liquid-absent-ON / Liquid-present-ON
(equipped with two outputs)

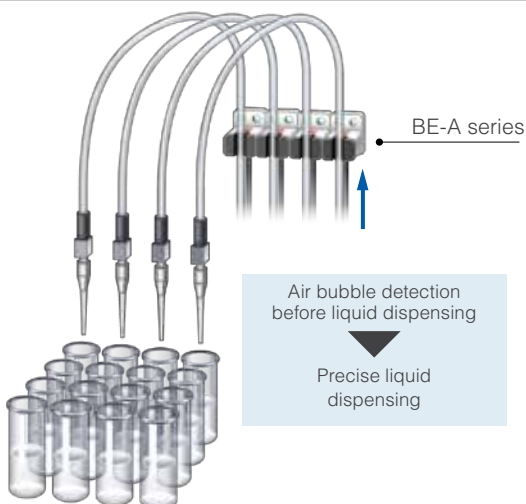
ø4 mm
tube type



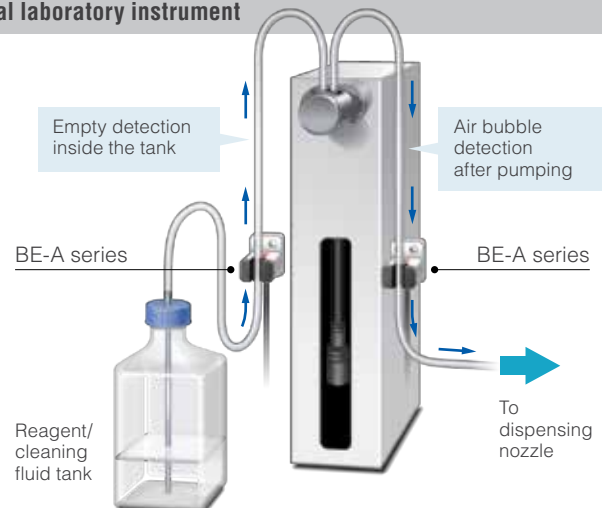
Model No. : **BE-A401** (NPN output type)
BE-A401P (PNP output type)
Applicable tube : Transparent resin tube
(equivalent to flexible PVC)
Outer diameter ø4 mm ×
inner diameter ø2.4 mm
Output operation: Liquid-absent-ON / Liquid-present-ON
(equipped with two outputs)

Applications

Liquid dispensing instrument



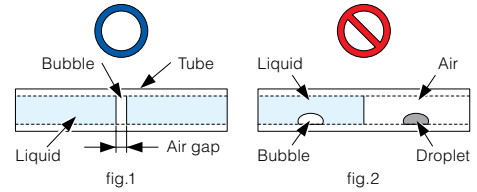
Clinical laboratory instrument



SPECIFICATIONS

Item	Model No.	Type	for ø2 mm tube	for ø3 mm tube	for ø4 mm tube
		NPN output	BE-A201	BE-A301	BE-A401
		PNP output	BE-A201P	BE-A301P	BE-A401P
Detectable air gap (note 2)		0.8 mm or more			
Sensing object		Liquid (note 3)			
Applicable tube dia. (OD×ID)(note 4)		ø2 mm × ø1 mm		ø3 mm × ø2 mm	ø4 mm × ø2.4 mm
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: max. 30 V DC (between output and + V) • Residual voltage: max. 2 V (source current at 50 mA) max. 1 V (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			
Protection		IP40 (IEC)			
Environmental resistance	Ambient temperature (note 6)	-25 to +55 °C (No dew condensation or icing allowed), Storage: -30 to +80 °C			
	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 double amplitude or maximum acceleration 49 m/s ² , in X, Y and Z directions for two hours each			
	Shock resistance	100 m/s ² acceleration in X, Y, and Z directions three times each			
Emitter element		Infrared LED(Peak emission wavelength: 855 nm, non-modulated)			
Material		Enclosure: PBT, Tube holder: Polyamide, Indicator: Polycarbonate			
Cable		0.09 mm ² 4-core cabtyre cable 1 m			
Cable extension (Note 7)		Extension up to total 100 m is possible with 0.3 mm ² , or more, cable.			
Clamping torque		max. 0.5N•m			
Weight		Net weight: 15 g approx., Gross weight: 25 g approx.			
Compliant regulation		EMC Directive compliance, RoHS Directive compliance			

- Notes: 1. Where measurement conditions have not been specified precisely, the conditions used were an ambient temperature of +23°C.
 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 4.5V when using an extension of over 20m.



DIMENSIONS (Unit: mm)

The CAD data can be downloaded from our website.

