Panasonic® INSTRUCTION MANUAL

Optical Bubble Sensor BE-A Series

MJEC-BEA No.0056-04V

Thank you very much for purchasing Panasonic products. Please read this Instruction Manual carefully and thoroughly for the correct and optimum use of this product. Kindly keep this manual in a convenient place for quick reference.

⚠ WARNING

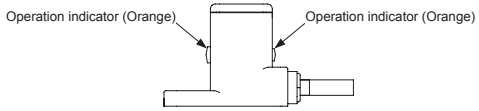
- Never use this product as a sensing device for personnel protection.
- In case of using sensing devices for personnel protection, use products which meet laws and standards, such as OSHA, ANSI or IEC etc., for personnel protection applicable in each region or country.

1 COMPLIANT STANDARDS / REGULATIONS

- This product complies with the following standards and regulations:

<EU Directives>
EMC Directives CE

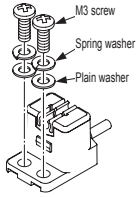
2 PART DESCRIPTION



3 MOUNTING

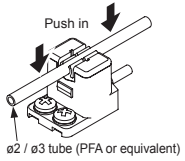
Product Mounting

- When securing the main body with screws, use M3 screws with tightening torque of 0.5N·m or less.
- Use plain washers of small round type (ø6mm).
- Please prepare M3 screws and spring washers, plain washers separately.



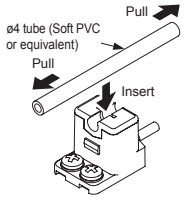
Mounting the ø2 / ø3 Tube

- When mounting a ø2 tube (PFA or equivalent) on **BE-A201**□ or ø3 tube (PFA or equivalent) on **BE-A301**□, push the tube in place as shown on the right.

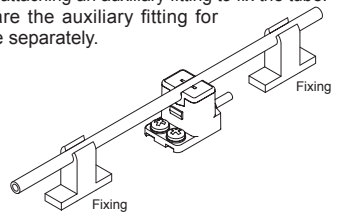


Mounting the ø4 Tube

- When mounting a ø4 tube (soft PVC or equivalent) on **BE-A401**□, pull the tube as you push it in place.
- Do not use hard tubes.

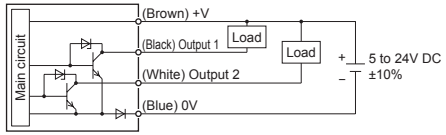


- Be sure to mount the tube in close contact with the sensing element. Otherwise, the product may malfunction. If the tube is brought up or slips off, take additional measures such as attaching an auxiliary fitting to fix the tube.
- Please prepare the auxiliary fitting for fixing the tube separately.

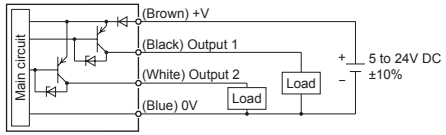


4 I/O CIRCUIT DIAGRAM

NPN output type



PNP output type



<Operation indicator and output operation>

Sensing condition	Operation indicator (Orange)	Output	
		Output 1	Output 2
Liquid is absent (bubble)	ON	ON	OFF
Liquid is present	OFF	OFF	ON

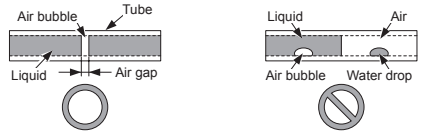
5 CAUTIONS

- This product has been developed / produced for industrial use only.
- Make sure to carry out wiring in the power supply OFF condition.
- Take care that if a voltage exceeding the rated range is applied, or if an AC power supply is directly connected, the product may get burnt or damaged.
- Take care that short circuit of the load or wrong wiring may burn or damage the product.
- Do not run the wires together with high-voltage lines or power lines, or put them in the same raceway. This can cause malfunction due to induction.
- Verify that the supply voltage variation is within the rating.
- If power is supplied from a commercial switching regulator, ensure that the frame ground (F.G.) terminal of the power supply is connected to an actual ground.
- In case noise generating equipment (switching regulator, inverter motor, etc.) is used in the vicinity of the mounting part of this product, connect the frame ground (F.G.) terminal of the equipment to an actual ground.
- Do not use during the initial transient time (50ms) after the power supply is switched ON.
- Take care that the sensor is not directly exposed to fluorescent lamp from a rapid-starter lamp, a high frequency lighting device or sunlight etc., as it may affect the sensing performance.
- Extension up to total 100m (each emitter and receiver of thru-beam type), or less, is possible with 0.3mm^2, or more of conductor area cable. However, in order to reduce noise, make the wiring as short as possible.
- Make sure that stress by forcible bend or pulling is not applied to the sensor cable joint.
- This product is suitable for indoor use only.
- Avoid dust, dirt, and steam.
- Take care that the product does not come in contact with oil, grease, organic solvents such as thinner, etc., strong acid or alkaline.
- This product cannot be used in an environment containing inflammable or explosive gasses.
- Never disassemble or modify the product.
- Do not use this product for opaque tubes.
- This product is not resistant to water, oil, or chemicals. Avoid locations with a risk of spilling water, oil, or chemicals.

6 SPECIFICATIONS

Type		ø2 tube type	ø3 tube type	ø4 tube type
Model No.	NPN output	**BE-A201**	**BE-A301**	**BE-A401**
	PNP output	**BE-A201P**	**BE-A301P**	**BE-A401P**
Sensing objects (Note 1)		Liquid		
Applicable tube diameter (O.D. × I.D.) (Note 2)		ø2.0mm × ø1.0mm	ø3.0mm × ø2.0mm ø1/8in × ø1/16in	ø4.0mm × ø2.4mm ø5/32in × ø3/32in
Applicable tube type (Note 2)		Transparent resin tube (PFA or equivalent)		Transparent resin tube (Soft PVC or equivalent)
Sensing air gap (Note 3)		0.8mm or more		
Supply voltage		5 to 24V DC±10% Ripple P-P 10% or less		
Current consumption		15mA or less		
Output		<NPN out put type> NPN open-collector transistor • Maximum sink current: 50mA • Applied voltage: 30V or less (between output and 0V) • Residual voltage: 2V or less (at 50mA sink current) 1V or less (at 16mA sink current)		<PNP out put type> PNP open-collector transistor • Maximum source current: 50mA • Applied voltage: 30V or less (between output and +V) • Residual voltage: 2V or less (at 50mA source current) 1V or less (at 16mA source current)
Output operation		Two output types are provided: On when liquid is absent / On when liquid is present		
Short-circuit protection		Incorporated		
Response time (Note 4)	Bubble detected	30µs or less	20µs or less	
	Liquid detected	80µs or less	80µs or less	
Ambient temperature (Note 5)		-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: 1,000lx or less at the light-receiving surface		
Emitting element		Infrared LED (Peak emission wavelength: 855nm, unmodulated)		
Material		Enclosure: PBT, Tube securing part: Polyamide Indicator: Polycarbonate		
Cable		0.09mm^2 4-core cabtyre cable, 1m long		
Weight (Main body only)		Approx. 15g		

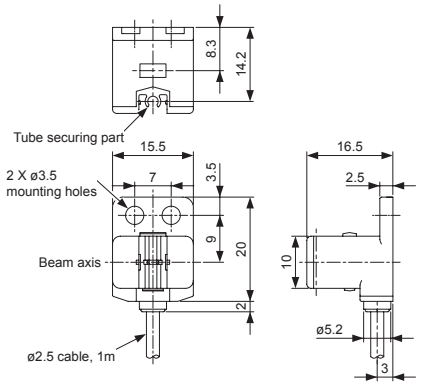
Notes: 1) Sensing is affected by dirt or residues adhered to the inner wall of the tube. Please maintain the tube regularly.
2) When using a tube out of specifications or it doesn't have a smooth surface, please test sensing on the actual machine before use.
3) Sensing air gap refers to the width of 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.



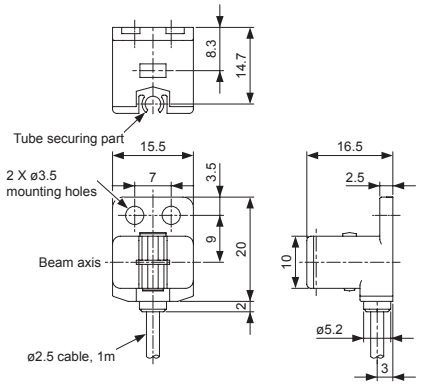
4) The response time is a typical example for applicable tubes. The time will vary depending on the dimensions, light transmittance, surface state, and other conditions of the tube used.
5) The temperature of sensing liquid must be within the ambient temperature range as well.

7 DIMENSIONS (Unit: mm)

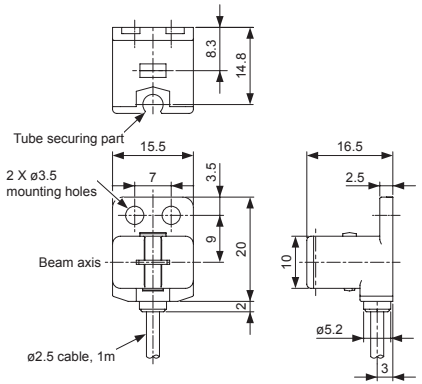
- **BE-A201**□



- **BE-A301**□



- **BE-A401**□



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