Autonics

LIQUID LEVEL SENSOR
BL SERIES

INSTRUCTION MANUAL

With binding band With protection bracket

Thank you for choosing our Autonics product.
Please read the following safety considerations before use

▣ Safety Considerations

※Please observe all safety considerations for safe and proper product operation to avoid hazards.
※⚠ symbol represents caution due to special circumstances in which hazards may occur.

⚠ **Warning** Failure to follow these instructions may result in serious injury or death.
⚠ **Caution** Failure to follow these instructions may result in personal injury or product damage.

⚠ Warning

1. **Fail-safe device must be installed when using the unit with machinery that may cause serious injury or substantial economic loss. (e.g. nuclear power control, medical equipment, ships, vehicles, railways, aircraft, combustion apparatus, safety equipment, crime/disaster prevention devices, etc.)**
   Failure to follow this instruction may result in fire, personal injury, or economic loss.
2. **Do not disassemble or modify the unit.**
   Failure to follow this instruction may result in fire.
3. **Do not connect, repair, or inspect the unit while connected to a power source.**
   Failure to follow this instruction may result in fire.
4. **Check 'Connections' before wiring.**
   Failure to follow this instruction may result in fire.

⚠ Caution

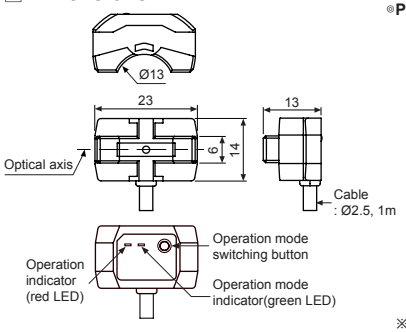
1. **Use the unit within the rated specifications.**
   Failure to follow this instruction may result in fire or product damage.
2. **Use dry cloth to clean the unit, and do not use water or organic solvent.**
   Failure to follow this instruction may result in fire.
3. **Do not use the unit in the place where flammable/explosive/corrosive gas, humidity, direct sunlight, radiant heat, vibration, impact, or salinity may be present.**
   Failure to follow this instruction may result in fire or explosion.

▣ Model

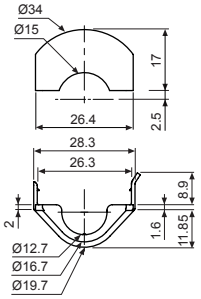
Model	Pipe diameter	Sensing type	Power supply	Control output
BL13-TDT	Ø6 to 13mm	Through-beam	12-24VDC ±10%	NPN open collector output
BL13-TDT-P				PNP open collector output

▣ Dimensions

(unit: mm)



◎**Protection bracket (sold separately)**



※For using the protection bracket, only Ø12.7mm (1/2 inch) pipes are available.

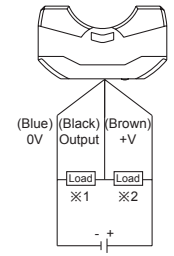
※The above specifications are subject to change and some models may be discontinued without notice.
※Be sure to follow cautions written in the instruction manual and the technical descriptions (catalog, homepage).

▣ Specifications

Model	NPN open collector output	**BL13-TDT**
	PNP open collector output	**BL13-TDT-P**
Sensing type		Through-beam
Applicable pipe		●Using binding band: Ø6 to 13mm, ●Using protection bracket: Ø12.7mm(1/2 inch) transparent pipes in 1mm thickness (FEP (fluoroplastic) or with equivalent transparency)
Standard sensing target		Liquid in a pipe※1
Response time		Max. 2ms
Power supply		12-24VDC⎓ ±10% (ripple P-P: max. 10%)
Current consumption		Max. 30mA
Light source		Infrared LED (950nm)
Operation mode		Light ON/Dark ON switching by operation mode switching button
Control output		NPN or PNP open collector output ●Load voltage: max. 30VDC⎓ ●Load current: max. 100mA ●Residual voltage: max. 1VDC⎓
Protection circuit		Reverse polarity protection circuit, output short over current protection circuit
Indicator		Operation indicator: red LED, Operation mode indicator: green LED
Insulation resistance		Over 20MΩ (at 500VDC megger)
Noise immunity		±240V the square wave noise (pulse width: 1μs) by the noise simulator
Dielectric strength		1,000VAC 50/60Hz for 1 minute (between all terminals and case)
Vibration		1.5mm amplitude at frequency of 10 to 55Hz in each X, Y, Z direction for 2 hours
Shock		500m/s² (approx. 50G) in each X, Y, Z direction for 3 times
Environment	Ambient illumination	Sunlight/Incandescent lamp: max. 3,000lx for each (receiver illumination)
	Ambient temperature	10 to 55℃, storage: -25 to 65℃
	Ambient humidity	35 to 85%RH, storage: 35 to 85%RH
Protection structure		IP64 (IEC standard)
Material		Case: Polycarbonate
Cable		Ø2.5mm, 3-wire, 1m (AWG28, Core diameter: 0.08mm, Number of cores: 19, Insulator diameter: Ø0.9mm)
Accessory		Binding band: 2, Anti-slip tube: 2
Approval		CE
Weight※2		Approx. 50g (approx. 13g)

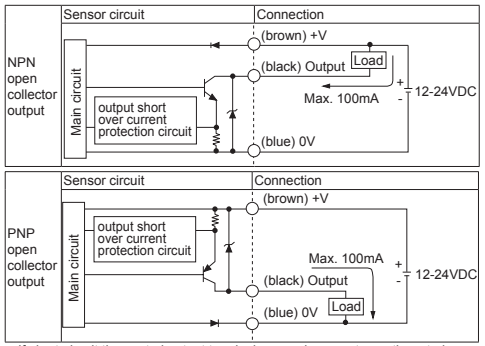
※1: This may not detect the liquid with low transparent, with high viscosity, or with floating matters.
※2: The weight includes packaging. The weight in parenthesis is for unit only.
※The temperature or humidity mentioned in Environment indicates a non freezing or condensation environment.

▣ Connections



※1: Load connection for PNP output
※2: Load connection for NPN output

▣ Control Output Circuit Diagram



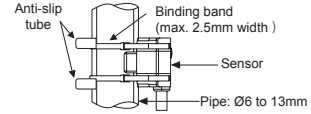
※If short-circuit the control output terminal or supply current over the rated specification, normal control signal is not output due to the output short over current protection circuit.

▣ Installation

If installing this unit at opaque pipes, it is impossible to detect accurately. Install this unit at the rated pipes.
Using binding band: Ø6 to 13mm, Using protection bracket: Ø12.7mm(1/2 inch)

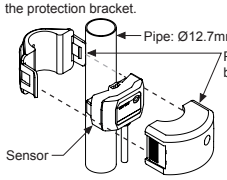
◎**Binding band**

Fix the pipe and the sensor tightly with binding bands and anti-slip tubes as the right figure and cut the spare part of binding bands with scissors or a knife.
When connecting binding bands, be careful not to transform the pipe.



◎**Protection bracket (sold separately)**

Choose a location on the pipe and attach the sensor and the protection bracket.



※Be sure that if there is water drop or bubble inner/outer wall of the pipe, it may result in malfunction.
※Do not pull the cable with a tensile strength of 30N or over. It may result in fire due to the broken wire.
※When using photoelectric sensors closely over two units, it may result in malfunction due to mutual interference.

▣ Functions

◎**Operation mode switching**

Light ON ⟷ (Press operation mode switching button once) ⟷ Dark ON

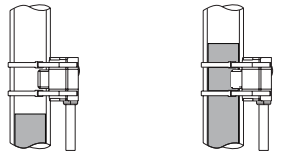
Operation mode indicator (green LED) ON — Operation mode indicator (green LED) OFF

◎**Operation mode lock setting**

Lock operation mode ⟷ (Press operation mode switching button for over 3sec.) ⟷ Unlock operation mode

※ To lock/unlock operation mode, the operation mode indicator (green LED) flashes 3 times.

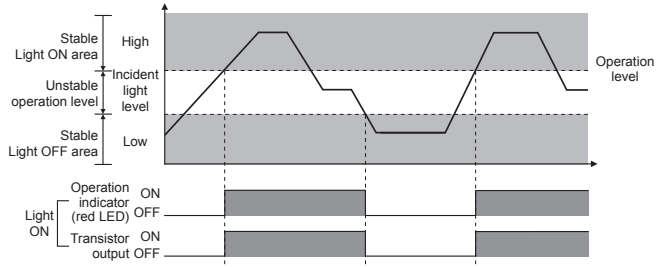
▣ Operation Mode



Absent liquid (Light ON) Present liquid (Dark ON)

Operation mode	Light ON	Operation mode	Dark ON
Receiver operation	Received light / Interrupted light	Receiver operation	Received light / Interrupted light
Operation indicator (red LED)	ON / OFF	Operation indicator (red LED)	ON / OFF
Transistor output	ON / OFF	Transistor output	ON / OFF

▣ Operating Timing Diagram



※The waveforms of "Operation Indicator" and "Transistor Output" are for Light ON operation. They are reversed for Dark ON operation.

▣ Cautions during Use

1. Follow instructions in 'Cautions during Use'. Otherwise, it may cause unexpected accidents.
2. When connecting a DC relay or other inductive load to the output, remove surge by using diodes or varistors.
3. Use the product, 0.2 sec after supplying power.
   When using separate power supply for the sensor and load, supply power to sensor first.
4. 12-24VDC power supply should be insulated and limited voltage/current or Class 2, SELV power supply device.
5. Wire as short as possible and keep away from high voltage lines or power lines, to prevent inductive noise.
6. When using switching mode power supply to supply the power, ground F.G. terminal and connect a condenser between 0V and F.G. terminal to remove noise.
7. When using sensor with the equipment which generates noise (switching regulator, inverter, servo motor, etc.), ground F.G. terminal of the equipment.
8. This unit may be used in the following environments.
   ①Indoors (in the environment condition rated in 'Specifications')
   ②Altitude max. 2,000m
   ③Pollution degree 3
   ④Installation category II

▣ Major Products

- Photoelectric Sensors
- Fiber Optic Sensors
- Door Sensors
- Door Side Sensors
- Area Sensors
- Proximity Sensors
- Pressure Sensors
- Rotary Encoders
- Connectors/Sockets
- Switching Mode Power Supplies
- Control Switches/Lamps/Buzzers
- I/O Terminal Blocks & Cables
- Stepper Motors/Drivers/Motion Controllers
- Graphic/Logic Panels
- Field Network Devices
- Laser Marking System (Fiber, CO_2, Nd: YAG)
- Laser Welding/Cutting System
- Temperature Controllers
- Temperature/Humidity Transducers
- SSRs/Power Controllers
- Counters
- Timers
- Panel Meters
- Tachometer/Pulse (Rate) Meters
- Display Units
- Sensor Controllers

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