

Autonics

LIQUID LEVEL SENSOR BL SERIES

M A N U A L



With binding band With protection bracket

Thank you very much for selecting Autonics products.
For your safety, please read the following before using.

Caution for your safety

※Please keep these instructions and review them before using this unit.

※Please observe the cautions that follow;

Warning Serious injury may result if instructions are not followed.

Caution Product may be damaged, or injury may result if instructions are not followed.

※The following is an explanation of the symbols used in the operation manual.

Caution: Injury or danger may occur under special conditions.

Warning

- In case of using this unit with machinery(Ex: nuclear power control, medical equipment, ship, vehicle, train, airplane, combustion apparatus, safety device, crime/disaster prevention equipment, etc) which may cause damages to human life or property, it is required to install fail-safe device.
It may cause a fire, human injury or damage to property.
- Do not disassemble or modify this unit. Please contact us if it is required.
It may cause electric shock or a fire.

Caution

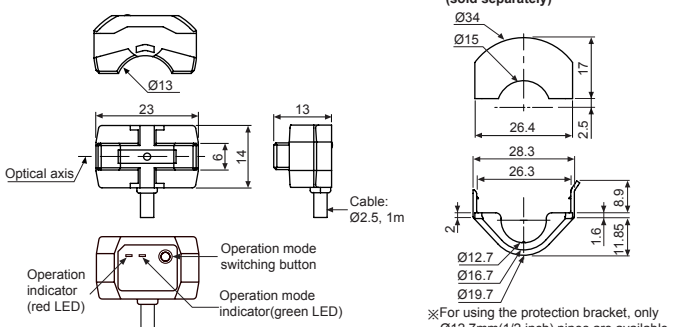
- This unit shall not be used outdoors.
It might shorten the life cycle of the product or cause electric shock.
Use this product inside only. Do not use the product outdoors or location subject to temperatures or humidity outside.(Ex: rain, dirt, frost, sunlight, condensation, etc.)
- Do not use this unit where there is flammable or explosive gas.
It may cause a fire or explosion.
- Please observe the rated specifications.
It may shorten the life cycle or damage to the product.
- Do not use this unit over rated voltage and do not supply AC power to DC power type.
It may cause a damage to the product.
- Please check the polarity of power and wrong wiring.
It may cause a damage to the product.
- Do not use this unit where there is vibration or impact.
It may cause a damage to the product.
- In cleaning the unit, do not use water or an oil-based detergent.
It may cause electric shock or a fire or damage to the product.

Ordering information

Model	Pipe diameter*1	Sensing type	Power supply	Control output
BL13-TDT	Ø6 to 13mm	Through-beam	12-24VDC ±10%	NPN open collector output
BL13-TDT-P	Ø6 to 13mm	Through-beam	12-24VDC ±10%	PNP open collector output

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

Dimensions



※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.

Specifications

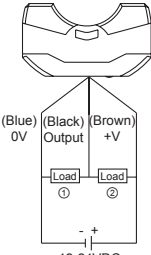
Model	BL13-TDT
PNP output	BL13-TDT-P
Sensing type	Through-beam
Applicable pipe	Using binding band: Ø6 to 13mm. Using protection bracket: Ø12.7mm(1/2 inch) transparent pipes in 1mm thickness (FEP(fluoroplastic) or with equivalent transparency)
Standard sensing target	Liquid in the pipe*1
Response time	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. 1V
Protection circuit	Reverse polarity protection circuit, output short-circuit protection circuit
Indicator	Operation indicator: Red LED, Operation mode indicator: Green LED
Insulation resistance	Min. 20MΩ(at 500VDC megger)
Noise resistance	±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 of X, Y, Z directions for 2 hours
Shock	500ms*2(Approx. 50G) in X, Y, Z directions for 3 times
Environment	Ambient illumination: Sunlight/Incandescent lamp: Max. 3,000lx for each(Receiver illumination) Ambient temperature: 10 to 55°C. Storage: -25 to 65°C Ambient humidity: 35 to 85%RH. Storage: 35 to 85%RH
Protection	IP64(IEC standards)
Material	Case: PC
Cable	Ø2.5mm, 3-wire, Length: 1m (AWG28, Core diameter: 0.08mm, Number of cores: 19, Insulator diameter: Ø0.9mm)
Accessory	Binding band 2EA, Anti-slip tube 2EA
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 is with packaging and the weight in parentheses is only unit weight.

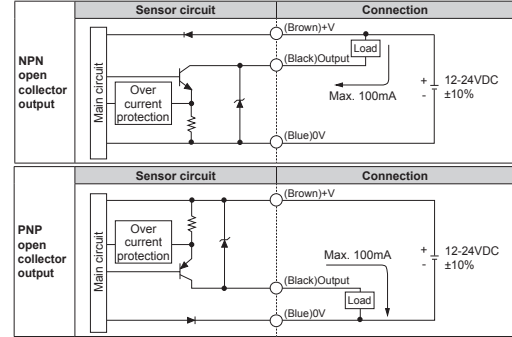
※The temperature or humidity mentioned in Environment indicates a non freezing or condensation environment.

Connections



Control output circuit diagram

Control output circuit diagram



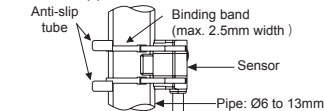
Installation

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)

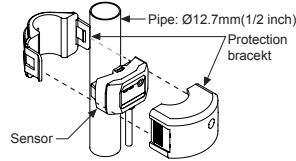
Binding band

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.



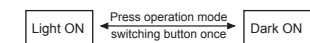
Protection bracket(sold separately)

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



Functions

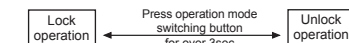
Operation mode switching



Operation mode indicator (green LED) ON

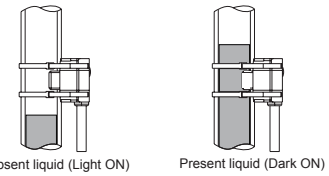
Operation mode indicator (green LED) OFF

Operation mode lock setting



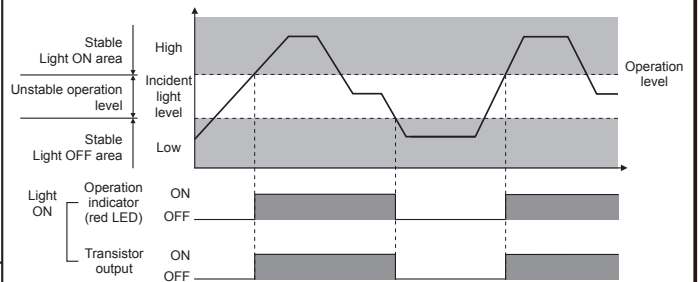
※ To lock/unlock operation mode, the operation mode indicator (green LED) flashes 3 times.

Operation mode



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

Operating timing diagram



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

Caution for using

- The sensor will be in a detectable status within 200ms after supply the power. If the power line of the load and the sensor is different, supply power voltage to the sensor first.
- Shade a strong source of light as like sunlight, spotlight not to be let in the inclination angle range of sensor directly.
- The sensor may cause malfunction under the fluorescent lamp light, be sure to use the cover or the shutter to shade the light.
- When wiring the sensor with high voltage line, power line in a same conduit, it may cause malfunction or mechanical problem, please do wire separately or use different conduit.
- Be sure that if there is water drop or bubble inner/outer wall of pipe, sensor may malfunction.
- Avoid installing the unit in place with corrosive gas, oil or dust, strong flux, noise, sunlight, strong alkali and acid.
- It is not an explosion-proof structure. Do not use this unit where there is danger of explosion.
- Do not use this unit where there is acid alkali, aromatic hydrocarbon, hydrogen fatty acid hydrocarbon which causes dissolution.
- In case of connecting relay as inductive load to output, please remove surge by using diode or varistor.
- Do not apply a tensile strength in excess of 50N to the cables or connector.
- Sensor cable shall be used as short as possible, because it may cause malfunction by noise through the cable.
- When it is stained by dirt at lens, please clean the lens with dry cloth, do not use an organic materials such as alkali, acid and chromic acid.
- When using switching mode power supply as the source of supplying power, Frame Ground (F.G.) terminal shall be grounded and a condenser for removing noise shall be installed between 0V and F.G. terminal.
- Installation environment
① It shall be used indoor ② Altitude Max. 2,000m ③ Pollution Degree 3 ④ Installation Category II

※It may cause malfunction if above instructions are not followed.

Major products

- Photoelectric sensors
- Fiber optic sensors
- Door sensors
- Door side sensors
- Area sensors
- Proximity sensors
- Pressure sensors
- Rotary encoders
- Connector/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., Nd:YAG)
- Laser welding/soldering system
- Temperature controllers
- Temperature/Humidity transducers
- SSR/Power controllers
- Counters
- Timers
- Panel meters
- Tachometer/Pulse(Rate)meters
- Display units
- Sensor controllers

Autonics Corporation
http://www.autonics.com

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■ HEAD QUARTERS:
18, Bansong-ro 513beon-gil, Haeundae-gu, Busan, Korea

■ OVERSEAS SALES:
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TEL: 82-32-610-2730 / FAX: 82-32-329-0728
E-mail: sales@autonics.com