Liquid level sensor for pipe mounting(through-beam)

▣ Features

- Detects liquid in transparent/semitransparent pipes diameter Ø6 to 13mm, thickness 1mm
- Compact size: W23×H14×L13mm
- Selectable Light ON/Dark ON operation mode by operation mode switching button
- Easy to check operation status by operation mode indicator [green LED(Light ON: ON, Dark ON: OFF)], operation indicator [red LED]
- Built-in reverse polarity and output short-circuit protection circuits
- Minimizes the impact of the external environment by the protection bracket(sold separately) [Ø12.7mm (1/2 inch) pipe]
- IP64 of protection structure(IEC standards)


With binding band

With protection bracket

⚠ Please read "Caution for your safety" in operation manual before using.

CE

▣ Model

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				PNP open collector output

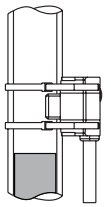
※1: For using the protection bracket, only Ø12.7mm (1/2 inch) pipes are available.

▣ 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. 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		500m/s²(Approx. 50G) in each of 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℃, storage: -25 to 65℃
	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)

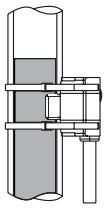
※1: This may not detect the liquid with low transparent, with high viscosity, or with floating matters.
※2: The weight is with packaging and the weight in parentheses is only unit weight.
※The temperature or humidity mentioned in Environment indicates a non freezing or condensation environment.

▣ Operation mode



Absent liquid(Light ON)

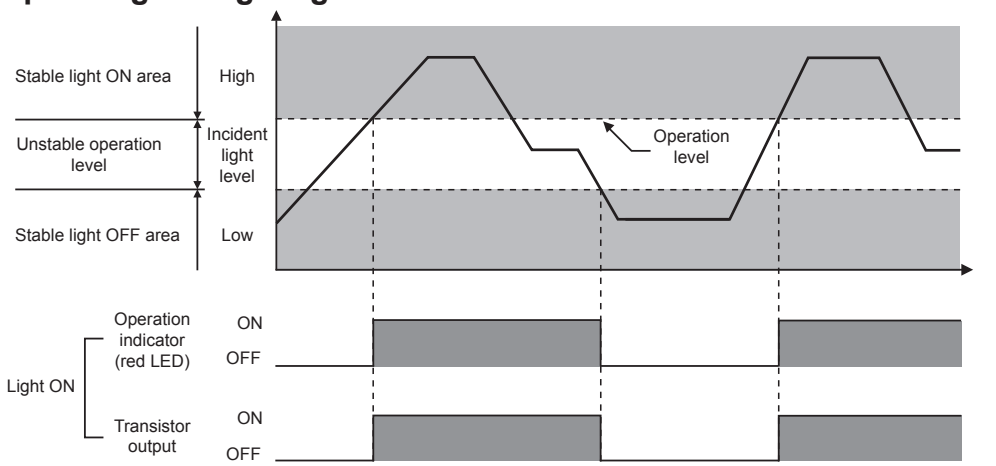
Light ON	Receiver operation	Received light / Interrupted light
	Operation indicator (red LED)	ON / OFF
	Transistor output	ON / OFF



Present liquid(Dark ON)

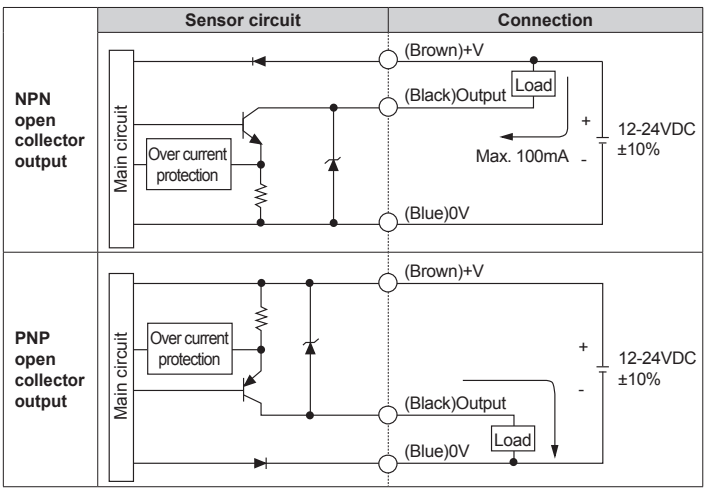
Dark ON	Receiver operation	Received light / Interrupted light
	Operation indicator (red LED)	ON / OFF
	Transistor output	ON / OFF

▣ Operating timing diagram

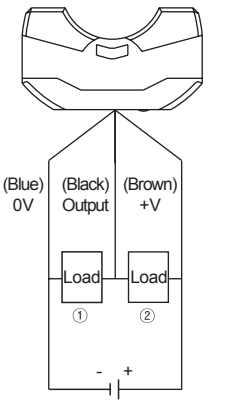


※The waveforms of 'Operation indicator' and 'Transistor output' are for Light ON operation. They are reversed for Dark ON operation.

▣ Control output circuit diagram



▣ Connection



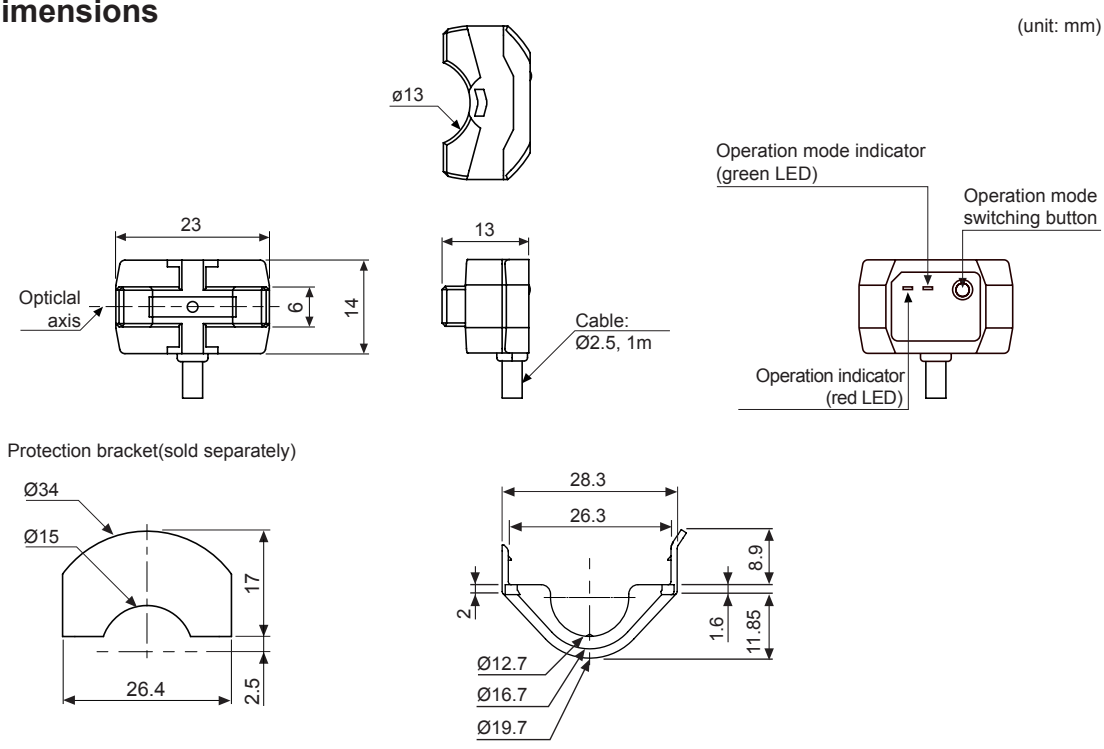
12-24VDC

①Load connection for PNP output

②Load connection for NPN output

▣ Dimensions

(unit: mm)



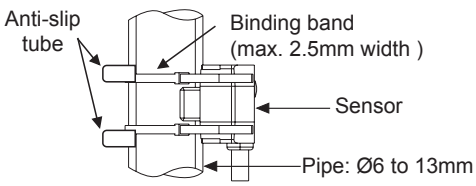
◎ Protection bracket(sold separately)

▣ 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)

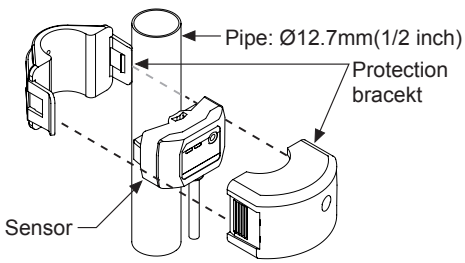
◎Binding band

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.



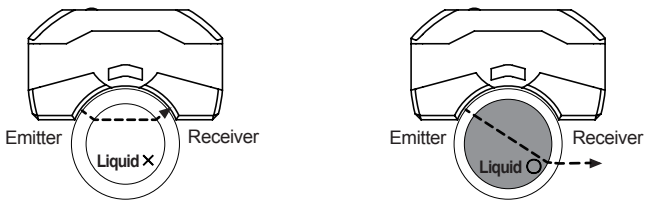
◎Protection bracket(sold separately)

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



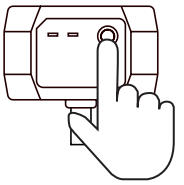
※Principle of operation

It detects whether there is liquid or not in a pipe by refractive index of light.



▣ Functions

● Operation mode switching

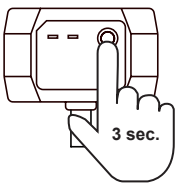


Light ON ⟷ Press operation mode switching button once ⟷ Dark ON

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 3 sec. ⟷ Unlock operation mode

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