Pipe-mounting Liquid Level Photomicrosensor with Built-in Amplifier

EE-SPX613

CSM_EE-SPX613_DS_E_5_2

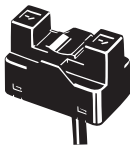
Liquid Level Photomicrosensor with operation mode and sensitivity selectors for easy application.

- Operation mode selector allows modes to be switched easily.
- Sensitivity selector is suitable for any 6- to 13-mm-diameter transparent or semi-transparent pipe with a wall thickness of 1 mm.
- Uses a clean (with no powder parting agent) cable.
- Operating voltage range: 12 to 24 VDC

For the most recent information on models that have been certified for safety standards, refer to your OMRON website.

⚠ Be sure to read *Safety Precautions* on page 3.

Ordering Information

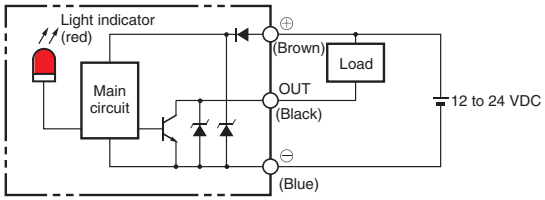
Appearance	Sensing method	Output type	Output configuration	Cable length	Model
	Through-beam type	NPN output	Dark-ON or Light-ON (selectable)	1 m	**EE-SPX613 1M**

Ratings and Specifications

Item	Models	EE-SPX613
Applicable pipe		Any 6- to 13-mm-diameter pipe with a wall thickness of 1 mm that is made of FEP or any other material as transparent as FEP.
Sensing object		Liquids in pipes (High-viscosity liquids or liquids with floating materials may not be detected.)
Light source		GaAs infrared LED with a peak wavelength of 940 nm
Indicator		Light indicator GaP (Red LED: Peak wavelength of 700 nm)
Supply voltage		12 to 24 VDC ±10%, ripple (p-p): 5% max.
Current consumption		Average: 30 mA max., Peak: 80 mA max.
Control output		NPN open collector: Load power supply voltage: 5 to 24 VDC Load current: 100 mA max. OFF current: 0.5 mA max. 100 mA load current with a residual voltage of 0.8 V max. 40 mA load current with a residual voltage of 0.4 V max.
Ambient illumination		3,000 lx max. with incandescent light or sunlight on the surface of the receiver
Ambient temperature range		Operating: −10 to +55°C Storage: −25 to +65°C (with no icing or condensation)
Ambient humidity range		Operating: 5% to 85% Storage: 5% to 95% (with no condensation)
Vibration resistance		Destruction: 10 to 500 Hz, 1.0-mm single amplitude or 150 m/s^2 in X, Y, and Z directions 3 times and for 11 min each
Shock resistance		Destruction: 500 m/s^2 for 3 times each in X, Y, and Z directions
Degree of protection		IEC 60529 IP50
Connecting method		Pre-wired (Standard length: 1 m)
Weight (packed state)		Approx. 55 g
Material	Case	Polycarbonate
	Cover	
Accessories		Support belt (2), slip protection tube (2), Instruction Manual

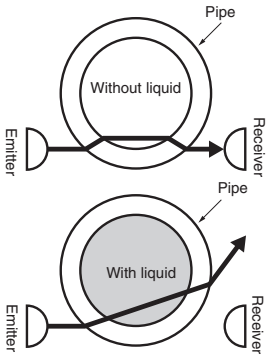
I/O Circuit Diagrams

NPN Output

Model	Output configuration	Timing charts	Operation mode selector	Output circuit
EE-SPX613	Dark-ON	Incident (with no liquid) Interrupted (with liquid) Light indicator (red) ON / OFF Output transistor ON / OFF Load (relay) Operates / Releases	D·ON (DARK ON)	
	Light-ON	Incident (with no liquid) Interrupted (with liquid) Light indicator (red) ON / OFF Output transistor ON / OFF Load (relay) Operates / Releases	L·ON (LIGHT ON)	

Operation

The EE-SPX613 detects the level of liquid by detecting the difference in refractive index between the air and liquid.



1. If there is no liquid in the pipe, the emitted beam will reach the receiver after it is refracted by the pipe. (Light incident.)

2. If there is liquid in the pipe, the emitted beam will pass through the liquid and not reach the receiver. (Light interrupted.)

Sensitivity selector (available only with EE-SPX613)

If the diameter of the pipe is close to 6 mm, some of the emitted beam may reach the receiver because the angle of refraction is small, thus making the stable operation of the EE-SPX613 difficult.
In such cases, set the sensitivity selector to Low and check that EE-SPX613 operation is stable.
If there are floating materials on the surface on the liquid, some of the emitted beam may reach the receiver after it is reflected by the floating materials, thus making the stable operation of the EE-SPX613 difficult. In such cases, set the sensitivity selector to Low to stabilize operation.
For normal use, set the sensitivity selector to High to account for reduced sensitivity caused by deterioration of the emitter due to age and stains on the pipe.

Safety Precautions

Refer to *Warranty and Limitations of Liability*.

⚠ WARNING

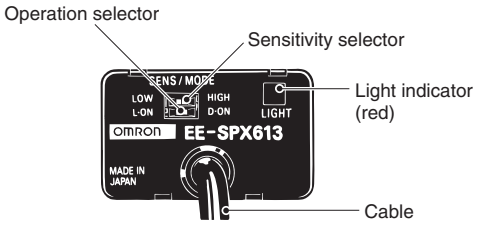
This product is not designed or rated for ensuring safety of persons either directly or indirectly.
Do not use it for such purposes.

Precautions for Correct Use

Make sure that this product is used within the rated ambient environment conditions.

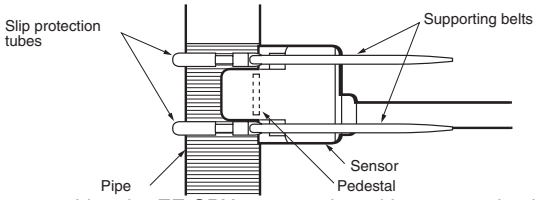
● Nomenclature

EE-SPX613



● Mounting

- The EE-SPX613 may not operate correctly if it is attached to an unsuitable pipe (e.g., opaque pipe).
- Always use the supporting belts and slip protection tubes that are provided with the EE-SPX613 when attaching the EE-SPX613 to a pipe, as shown in the following illustration, and make sure that the pipe is in the center of the sensor slot and not separated from the pedestal. When tightening the supporting belts, make sure that the pipe will not be deformed.



- When attaching the EE-SPX613 to a pipe with a supporting belt, make sure that the pipe will not be deformed.

● Wiring

- Do not impose any excessive force on the cable. Do not pull the cable with any tractive force exceeding 30 N.
- When extending the cable, use an extension cable with conductors having a total cross-section area of 0.15 mm^2. The total cable length must be 5 m maximum.

● Adjustment

- The EE-SPX613 requires 10 ms to be in stable operation after power is supplied.
  If separate power supplies are used for the EE-SPX613 and load, be sure to supply power to the EE-SPX613 before supplying power to the load.
- Make sure that smoke, air bubbles, or water droplets are not able to form either inside or outside the pipe. Otherwise, a malfunction may occur.
- Do not impose any force exceeding 5 N on the operation mode selector or sensitivity selector.

● Others

Operating Environment

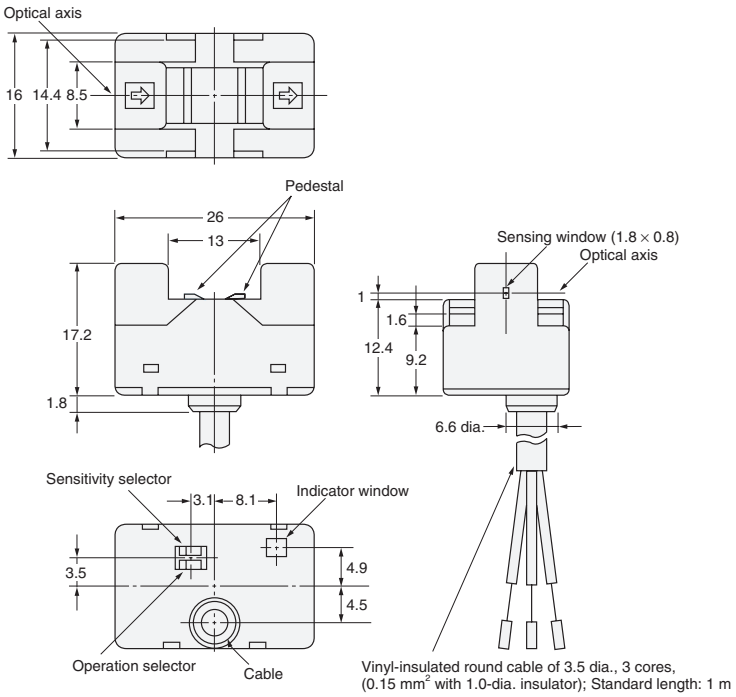
- Do not use the EE-SPX613 outdoors.
- Do not use the EE-SPX613 in places where water, oil, or chemical may be sprayed onto the EE-SPX613.
  The exterior coverings of the EE-SPX613 are made of polycarbonate. Keep the coverings away from any alkaline, aromatic hydrocarbon, or aliphatic chloride hydrocarbon solvents, all of which will damage the coverings.
- Do not use the EE-SPX613 in places where the EE-SPX613 is subject to direct sunlight, corrosive gas or salt air.

(Unit: mm)

Dimensions

Tolerance class IT16 applies to dimensions in this datasheet unless otherwise specified.

EE-SPX613



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