

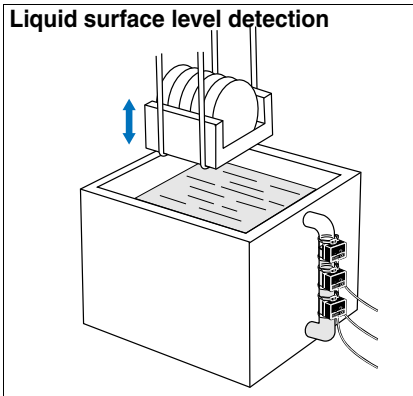
Liquid Level Sensor

E2K-L

- Installation on pipes.
- Sensing by means electrostatic capacity and is not influenced by the color of the pipe or liquid.
- Available in 8 to 11 mm dia. and 12 to 26 mm dia. models to enable sensing for a wide range of pipe diameters.
- Built-in amplifier for space-saving.



Applications



Ordering Information

Sensor type	Applicable pipe diameters	Shape	Output form		Model
Electrostatic capacity method	8 to 11 mm dia.		NPN open-collector output	NO	E2K-L13MC1
	12 to 26 mm dia.				E2K-L26MC1

E2K-L

Rating/Performance

Item		Model		E2K-L13MC1	E2K-L26MC1
Applicable pipes	Material		Non-metal		
	Size	External diameter	8 to 11 mm dia.		12 to 26 mm dia.
		Wall thickness	1 mm max.		1.5 mm max.
Sensing object			Liquid (see note)		
Repetition precision			±0.2 mm max.		
Response difference (reference value only; varies with pipe size and solution)			0.6 to 5 mm		0.3 to 3 mm
Supply voltage (operating voltage range)			12 to 24 VDC, 10% max. ripple (10.8 to 30 VDC)		
Current consumption			12 mA max.		
Control output	Switching capacity		100 mA max.		
	Residual voltage		1 V max. (under load current of 100 mA with cable length of 2 m)		
Detection position of liquid surface			Notch position (For details, refer to Sensitivity Adjustment on next page.)		
Indicator lamp			Operation indicator (orange)		
Ambient temperature			Operating: 0 to 55°C; Storage: -10 to 65°C (with no icing or condensation)		
Ambient humidity			Operating/storage: 25% to 85% (with no condensation)		
Temperature influence			In the range 0 to 55°C: Detection level at 23°C 4 mm (with distilled water or 20 % salt water concentration) (±6 mm with E2K-L13MC1 for distilled water in pipe of 8 mm diameter)		
Voltage influence			At the rated power supply voltage ±10%: Detection level at rated supply voltage ±0.5 mm		
Insulation resistance			50 M min. (at 500 VDC) between energized parts and case		
Dielectric strength			500 VAC 50/60 Hz for 1 min between energized part and case		
Vibration resistance			10 to 55 Hz, 1.5 mm double amplitude for 2 hours each in X, Y, and Z directions		
Shock resistance			500 m/s ² for 3 times each in X, Y, and Z directions		
Protective structure			IEC 60529 IP66		
Connection method			Pre-wired models (standard length: 2 m)		
Weight (Packed state)			Approx. 70 g		
Material	Case, cover		Heat-resistant ABS resin		
	Cable clamp		NBR		
Accessories			2 binding bands, 4 nonskid tubes, instruction manual		

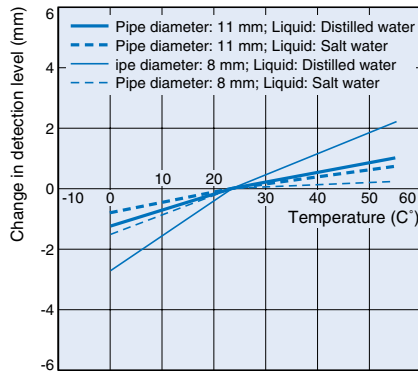
Note: In the following cases, stable detection may not be possible and ensure to confirm correct operation in the actual installation before use.

1. If the dielectric constant or conductivity of the liquid is low.
2. If the capacity of the liquid is small, or if the pipe diameter is so small or the pipe walls are so thick that the amount by which the capacity changes relating to the liquid level is small.
3. In case of an increased gassing or a highly viscous liquid firm residue on the inside walls of the pipe, or a dirt clogging on the inner or outer walls of the pipe.

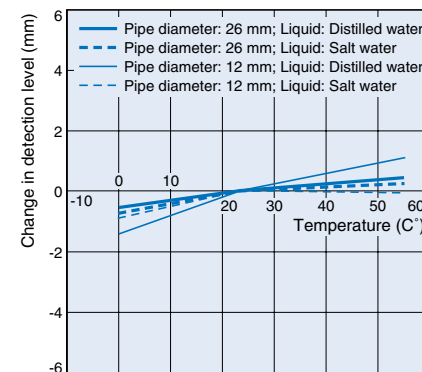
Characteristic data (typical)

Influence of Temperature on Detection Level

E2K-L13MC1



E2K-L26MC1



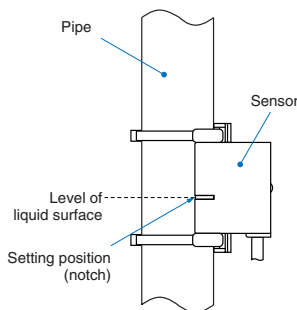
Output Circuit Diagram

Output form	Model	Timing chart	Output circuit
NO	E2K-L13MC1 E2K-L26MC1	Liquid surface Load (brown-black) Operation indicator (orange) Yes No Operates Releases ON OFF	* 100 mA max. (load current)

Operation

Sensitivity adjustment

1. Install the Sensor with the setting position (notch) in line with the liquid level to be detected.

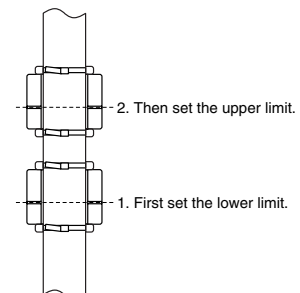


2. After Sensor installation adjust the detecting sensitivity using the (12-step) sensitivity adjuster in the way shown below.

Status of the indicator when the liquid level is aligned with the setting position	Sensitivity adjuster	Adjustment procedure
Not lit		Turn the sensitivity adjuster clockwise using a screwdriver until the indicator lights.
Lit		Turn the sensitivity adjuster counterclockwise using a screwdriver until the indicator turns OFF. Then, turn the sensitivity adjuster clockwise until the indicator lights up again.

Note: 1. During sensitivity adjustment do not put your hand on the Sensor and make sure that the cable is properly secured. Failure to observe these points may affect the detection level.

2. When using more than one Sensor (e.g., to detect for upper and lower limits), adjust the sensitivity of the Sensors in order starting from the bottom. Adjusting the sensitivity of a Sensor may affect the detection level of the Sensor above it.



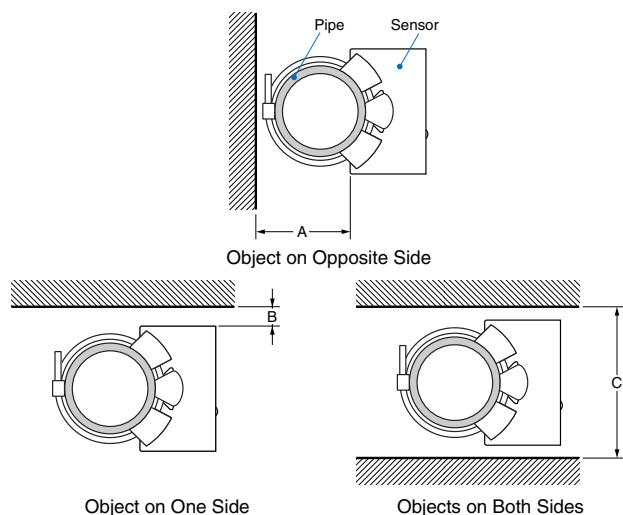
Precautions

Correct Use

Design

Influence of Surrounding Objects

Performance may be adversely affected by conductive objects (e.g., metals) in the vicinity of the Sensor. Ensure that any conductive objects are separated from the Sensor and set at a minimum distance as shown below.

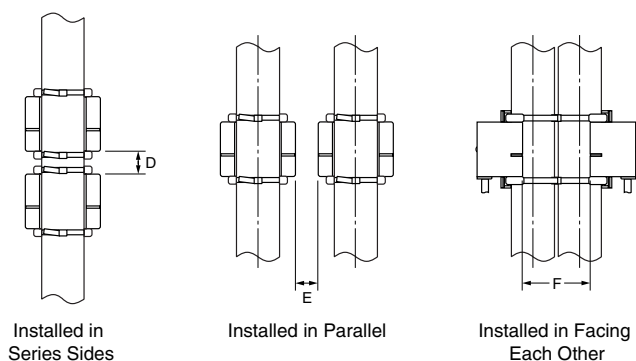


Influence of Surrounding Objects (Units: mm)

Shape	Length	A	B	C
E2K-L13MC1		25	5	45
E2K-L26MC1			0	40

Mutual Interference

When installing 2 or more Sensors in series, in parallel, or facing each other, be sure that they are separated by at least the distances shown below.



Mutual Interference

(Unit: mm)

Shape	Length	D (see note)	E	F
E2K-L13MC1		10	10	25
E2K-L26MC1				30

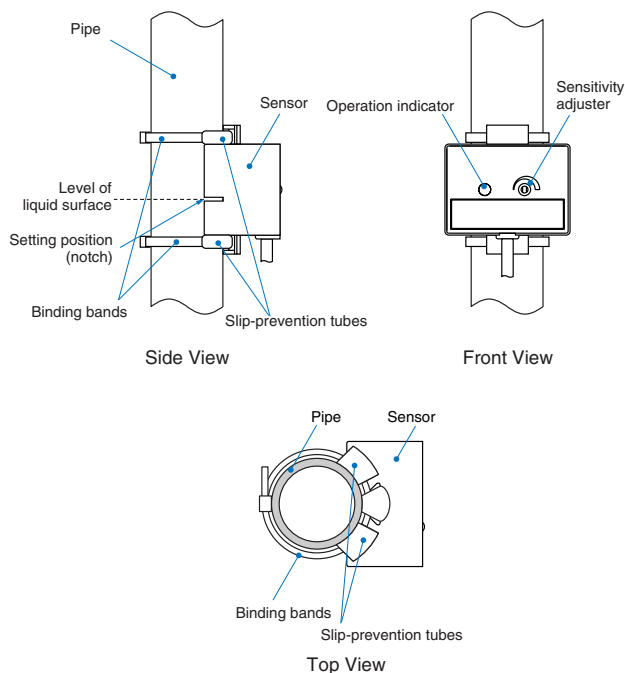
* The detection level for the top Sensor may change when the detection level for the bottom Sensor is set. Be sure to set the detection level for the bottom Sensor first.

Installation

Sensor installation

Attach the Sensor securely to the pipe using the 2 binding bands and the 4 nonskid tubes provided (2 tubes per band) in the way shown below.

Install the Sensor in such manner that the pipe is in contact with the entire sensing face of the Sensor with the pipe and Sensor in parallel.



Wiring Considerations

Power Supply

- If separate power supplies are used for Sensor and load, be sure to turn on the Sensor power supply first.
- If a commercially available switching regulator is used, the Sensor may malfunction because of switching noise. Connect the frame ground and ground terminals to ground.

● Operating Environment

Ambient Conditions

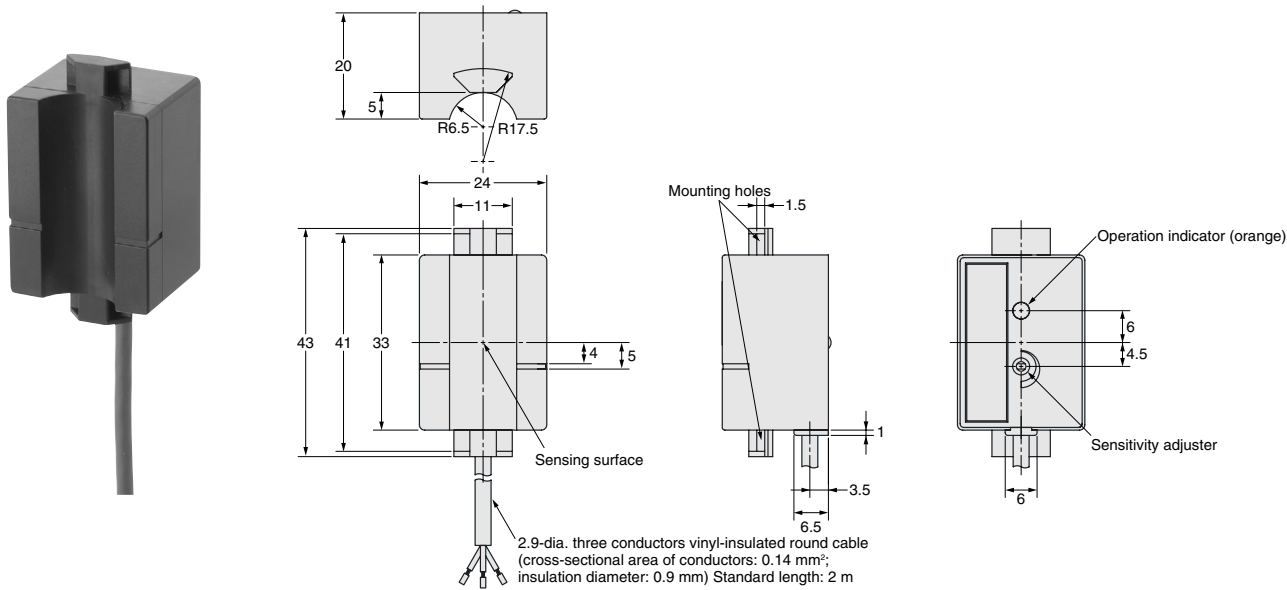
- Although this product has waterproof specifications, do not use it in locations where it may have a direct contact with liquids (e.g., water or cutting oil). Such locations can interfere with the electrostatic capacity method used by the Sensor.
- Even if the Sensor is used within the specified temperature range, do not subject it to sudden changes in temperature because this will shorten the service life.

Miscellaneous

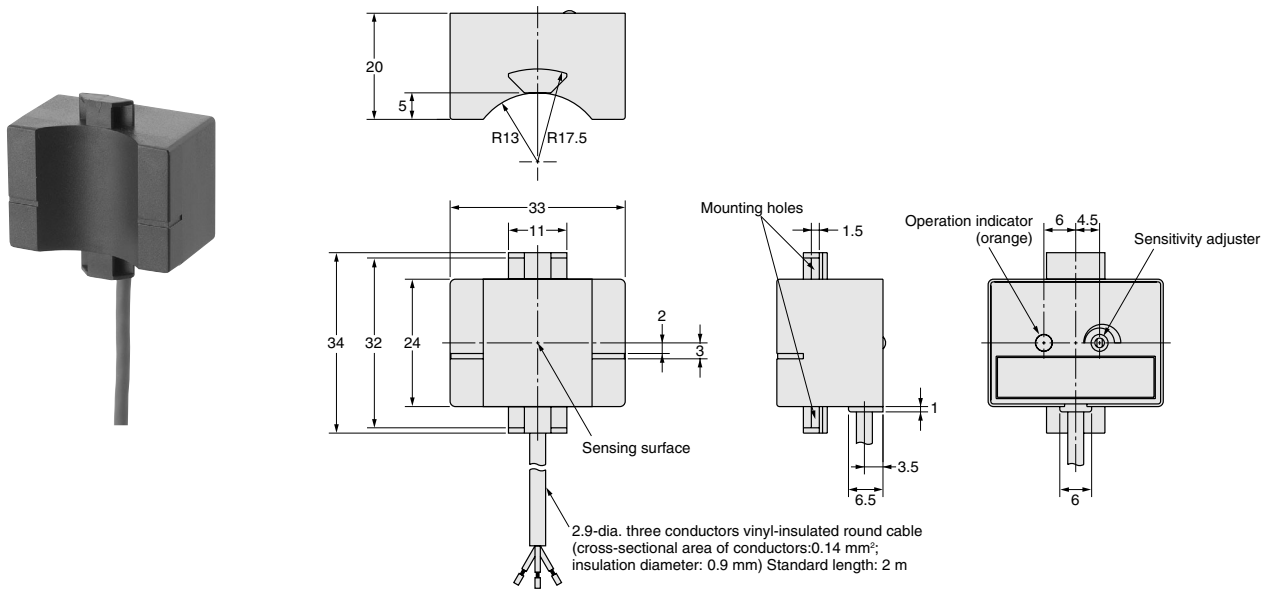
Drift may occur when the power supply is turned ON. If the dielectric constant of the liquid is low, the detection level of the liquid may be 2 to 3 mm higher than the set level for approximately 20 minutes after power is turned ON.

Dimensions (Unit: mm)

E2K-L13MC1



E2K-L26MC1



ALL DIMENSIONS SHOWN ARE IN MILLIMETERS.

To convert millimeters into inches, multiply by 0.03937. To convert grams into ounces, multiply by 0.03527.