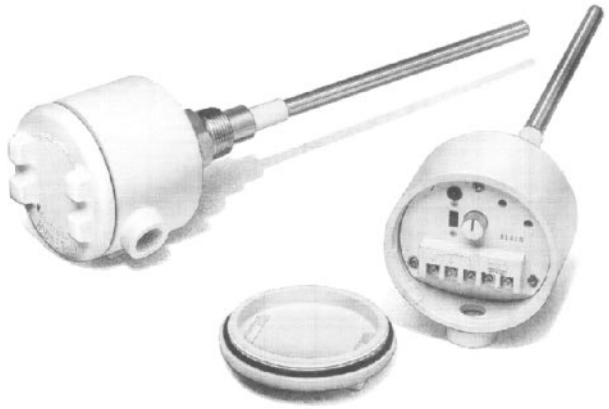
Capacitive Level Sensor
TLB-KSR

Easy-to Use Capacitive Level Sensor with Built-in Power Supply

- Ideal for sensing powder, grain, or viscous fluid.
- High switching capacity: 10 A, 230 VAC.
- Sensitivity adjuster and HIGH/LOW selector switch provided.
- Rugged construction with glass-reinforced, heat-resistive plastic housing (IP65).



Ordering Information

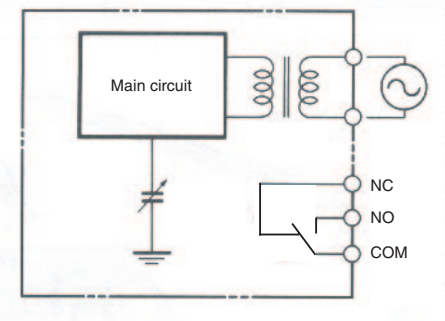
■ List of Models

Mounting-thread and conduit entry	Adjustable sensitivity range	Supply voltage
		100/110 VAC, 200/220 VAC, 240/260 VAC, or 24 VAC
RI (DIN Standard 2999) (PG 13.5)	0 to 40 pF	TLB-KSR

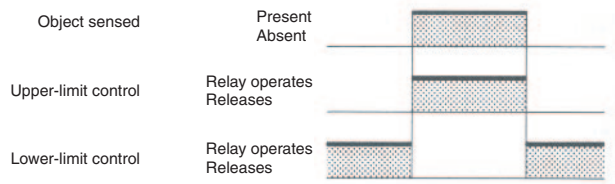
Specifications

Item	TLB-KSR	Remarks
Materials sensed	Liquid, powder, grain and lumps	The specific resistance of the liquid to be sensed should be equal to or more than that of water.
Operating voltage	100/110, 200/220, 240/260 VAC, or 24 VAC	---
Power consumption	5 VA max.	---
Control output contact	Resistive load: 10 A at 230 VAC Inductive load (cos φ = 0.4): 7.5 A at 230 VAC	---
Output form	Upper- or lower-limit control (switch-selectable)	---
Sensitivity	0 to 40 pF (adjustable)	---
Stable operation sensitivity	5 pF	Capacitance generated by material to be sensed.
Variation due to fluctuation in temperature	2 pF or less	Temperature fluctuation within –10° to 55°C at the circuit unit.
Variation due to fluctuation in voltage	0.5 pF or less	Voltage fluctuation within ±10% of the rated operating voltage.
Indicator	OPERATION indicator	---
Pressure resistivity (electrode)	10 kg/cm^2	---
Degree of protection	IEC IP65	---
Ambient temperature	Operating: –20°C to 55°C	---

Output Stage Circuit Diagram

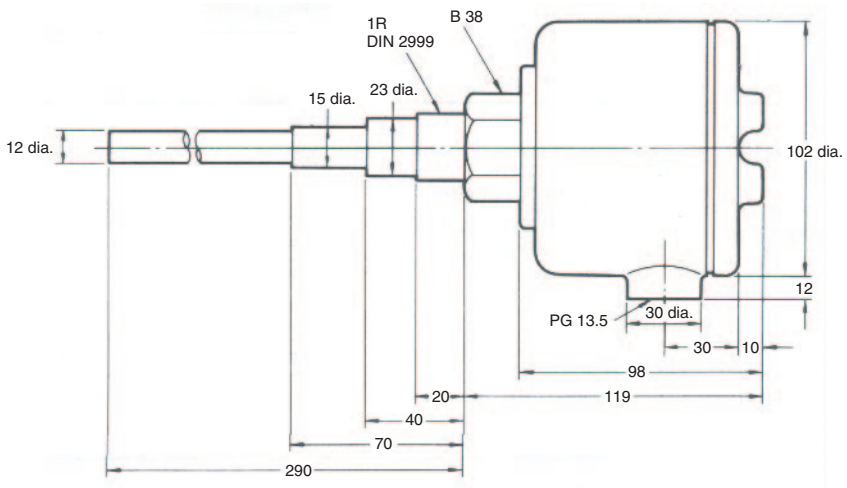


Timing Chart



Dimensions

Weight: approx. 1,300 g



Installation of Electrode

Horizontal Installation

The electrode installation thread is a tapered thread for pipe.
When installing the electrode directly on a tank, use a socket (connecting pipe) as an installation boss, and screw the electrode into the socket.
Make sure that the insulated portion of the electrode is projected inside the tank at least 10 to 20 mm, as shown in Fig. 6-a.

Vertical Installation

1. Even viscous materials that would otherwise stick to the electrode considerably can be sensed without physical contact (upper-limit control only). In this case, changes in the capacitance of the materials are largely sensed by the auxiliary disc electrode (Fig. 6-b). Confirm the pickup distance through an experiment in advance.
2. If the diameter of the tank is too small to install the electrode horizontally, install it vertically, as shown in Fig. 6-c.
3. If the specific resistance of the object to be controlled is less than that of water (about 10 kΩ/cm), install the electrode on the upper surface of the object only.
   Do not connect the non-sensitive probe; it may result in malfunctioning.

Mutual Distance (S in Fig. 6-d) between Electrodes

When two or more Level Sensors are installed in a tank, provide a distance of at least 500 mm between them to prevent mutual interference.

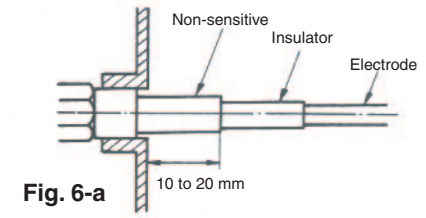


Fig. 6-a

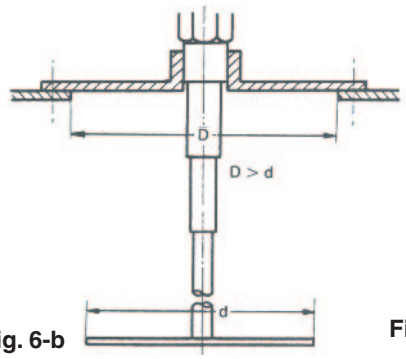


Fig. 6-b

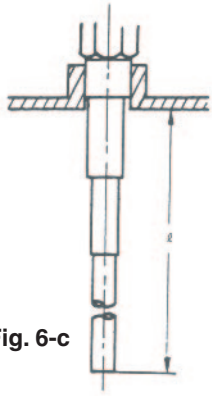


Fig. 6-c

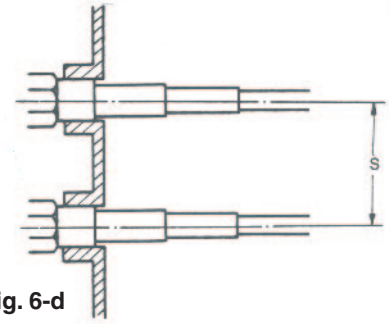


Fig. 6-d

Fig. 6 Methods of Installation

Operation Conditions

1. Use a 4-conductor (or 5-conductor) vinyl-insulated cable having a cross-sectional area of 1.25 mm^2.
2. The electrode strength varies depending on the environment.
3. Since the Level Sensor is not water-proof, put a cover on it when using it outdoors to protect it from raindrops and temperature rises caused by the sun.
4. When the Level Sensor is used in equipment using a vibrator, such as a hopper, install it as far away as possible from the vibrator.

Connections and Wiring

To connect the Level Sensor, use a 4-conductor (or 5-conductor) vinyl-insulated cable measuring 8 to 10 mm in outer diameter to assure water-proofness of the connector.
Performing wiring, referring to the wiring diagram in Fig. 7.

Note: 1. When the TLB-KSR Level Sensor is connected as shown in the Fig. 7, its relay operates (or releases) when an object comes into contact with the electrode of the Level Sensor.

2. Use a sealed connector to protect the internal circuit from penetration of water.

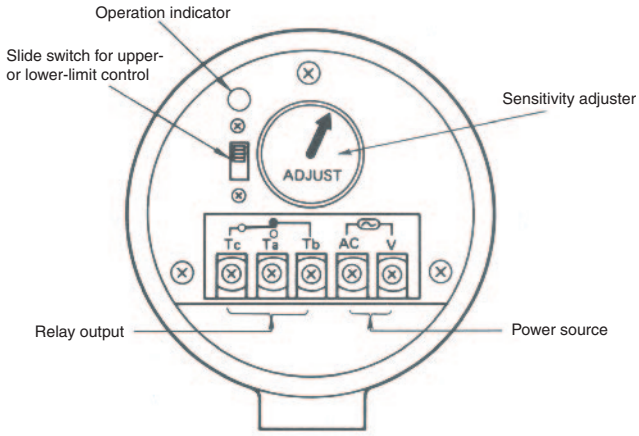


Fig. 7 Connections and Wiring

Sensitivity Adjustment

1. The output signal of the Level Sensor can be checked by testing with a VOM whether the circuit between terminals T_C and T_A or between T_C and T_B conducts. When the output signal is normal, the pilot lamp (LED) lights.

2. The sensitivity can be adjusted by turning the sensitivity adjuster, For example, when the Level Sensor is used to detect the upper limit of an object, find two points (X and Y) as described below, and set the adjuster to the midpoint between X and Y.

Point X: Where the relay releases though the level of the object has reached the electrode.

Point Y: Where the relay operates though the level of the object is below the electrode.

3. When point X is not available within the adjustable range of the adjuster (range from L to H), use point L as X (such as when the object, like water, has a high εs).

4. Point Y may not be fixed and may vary, especially after the Level Sensor has been operated for some time, from the point set immediately after installation. This is because the object to be controlled may have adhered to the electrode, changing the sensitivity of the Level Sensor. It is therefore necessary to readjust point Y some time after the Level Sensor has been operated.

ALL DIMENSIONS SHOWN ARE IN MILLIMETERS.
To convert millimeters into inches, multiply by 0.03937. To convert grams into ounces, multiply by 0.03527.

Cat. No. F056-E1-01