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Operating Instructions

FK10

Conductive Level Switch

1. Design:

The fundamental principle of design remains the same for a wide variety of liquids by selection of the materials used in construction. An electrically conductive electrode, insulated from the tank and process connections, forms the main components of the system. Instruments can be supplied with a terminal box or a direct cable connection. Electrodes can be used for the following media:

- Acids
- Alkaline solutions
- Water, waste water
- Food media
- etc.

2. Functional description:

Electrodes are electrically conducting rods which can be used for the monitoring and control of filling levels. Electrodes work on the principle of electrical conduction in connection with level controllers. If the electrodes are immersed in a electrically conducting liquid, a control current flows through the liquid. By means of this control current, a high voltage relay with a potential-free change-over contact will be activated via a measurement signal amplifier.
The signal current circuit is isolated from the main power, and is operated using protective low voltage. In order to prevent electrolytic action at the electrodes, the latter are operated with alternating voltage. Depending on the type of electrode and level controller used, these controllers are suitable for:

- high or low level alarms
- full and empty pumping
- opening / closing valves or pumps
- dry-run protection

3. Application:

Electrode controllers can be used in the following industrial ranges:

- Food manufacturers
- Water treatment
- Machine construction
- Heating-, ventilation-, air conditioning systems
- Chemical- and pharma-industry

4. Assembly:

An electrode can be installed for each control level and instruments are supplied completely assembled. Fitting being either a screw fitting or flange fitting as options.

When using an accessory control unit from the PKP range, the corresponding mounting and installation instructions should be followed.

5. Hazard notices:

- It is not allowed to make a temporary installation, if components or whole instruments are faulty or wrong, particularly if components are missing.
- Instruments and their accessory parts should not be used to secure lifting gear, to act as foot rests or any other mechanical aids that could damage the installation.
- Where there is a hazard or danger present, warning signs have to be displayed according to the local and national standards. Any isolation device fitted must also comply with these standards.
- The operators have to wear protection clothes according to the local circumstances and regulations. The operators have to be trained and given instructions as well as to be in possession of the technical data.
- The operator is responsible, to ensure that unauthorized persons do not have access to the installations or instruments and these operations.
- If passing the instruments and installations on to a third party, all documentation has to be included indicating the correct mounting procedures, operational details and hazards.

Precautions are necessary for:

- heat radiation from outsite on to the instruments.
- heat radiation from the instruments to the surroundings.
- electrical heating systems.
- exposure to medium, gas, mist or steam.

6. Electrical connection:

The electrical connection must comply with the safety regulations for installing electrical systems and equipment that apply in the country where the unit is installed and this work may only be undertaken by qualified personnel.
For instruments with a terminal box, the cable is passed through the cable gland and sealed. Ensure the lid of the terminal box is properly sealed.

7. Caution:

- The user has to ensure, that instruments, which have an earthing connection, are properly earthed.
- Instruments with connecting cable are not earthed and in case of malfunction they can become live. Those instrument must be operated with extra-low voltage.
- Instruments which are used in plants and have an inside coating, have to be provided with a earthing bracket or a screw outside the terminal box that must be electrically bonded to the equipment earth.
- The power supply should be adequate and correct for the application.

8. Maintenance:

The units must be installed and commissioned in accordance with the generally accepted rules of engineering practice. When in service, the units do not require any maintenance providing that parameters such as the type of medium, density, temperature and pressure are complied with. The material of the instrument has to be chosen according to the medium and has to be resistant to chemical attack.

9. Functional test:

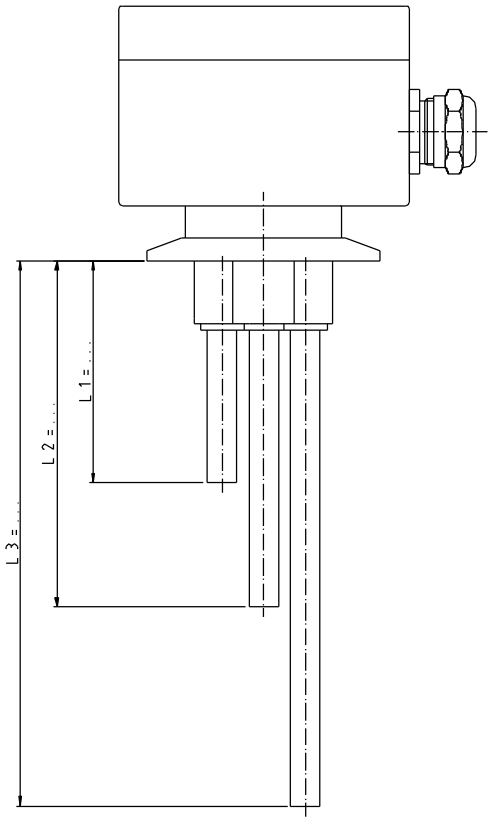
The user is responsible for periodically carrying out a functional test or a visual check. The function of the electrode can be tested with the unit in situ or removed. Care must be taken to ensure that the functional test does not trigger any process operations.
A visual check is made of components in the unit that are exposed to the liquid stored in the tank, its vapours or condensate to as certain whether any signs of corrosion exist. This inspection can only be carried out from inside the storage tank or after the unit has been removed.

10. Notices:

- The electrode must not be subjected to any heavy mechanical loads, vibrations or shock influences. If these loads are existing, supporting or protecting elements have to be used.
- Mechanical shocks transmitted through the medium to the instrument is not allowed.
- Disposal of instruments should be according to regional and national directions and guidelines. By disposal it is possible that residues of the medium remain on the instrument.

TRANSPORTATION SPECIFICATIONS:

These instruments should be packed with respect to the delicate nature of some of the parts. Outer packing such as wooden cases should be marked with fragile or similar signs to help protect the instrument.



FK10

Conductive Level Switch

- **easy mounting**
- **robust plastic housing or stainless steel housing**
- **electrode rods made of st. steel, titanium, Hastelloy B or C**
- **length up to max. 2500 mm**
- **single or multiple electrodes (up to 7 switching points)**
- **low-cost- OEM version available**
- **max. pressure: 20 bar (st. steel version as well vacuum suitable)**
- **max. temperature: 150 °C**

Description:

In conjunction with the FKE electrode relays, the conductive level switches of the FK10 series are used to detect the level of conductive liquids.
An alternating voltage is applied to an electrode insulated from the vessel If this electrode is wetted by the medium, a small current flows from the electrode through the medium to the vessel wall (for plastic vessels to a separate ground electrode). This current flow is detected by the electrode relay and output as a switching signal.

Typical applications:

- for point level detection in vessels with conductive liquids
- full or empty message
- level control between two filling levels
- overflow safety
- dry-run protection
- vertical or horizontal installation possible

Advantages:

- no mechanically moving parts
- independent of the specific weight of the medium

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Models:

FK10.1: single or multiple electrode with fixed screw-in thread in plastic housing, stainless steel housing with plastic or stainless steel screw connection

Technical Data:

Max. pressure: 10 bar plastic version
20 bar stainless steel version
(vacuum-suitable)

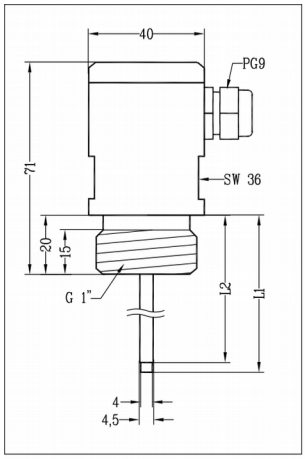
Max. medium-temperature: -20 °C… +90 °C plastic version
-20 °C…+100 °C stainless steel version
-40 °C...+150 °C stainless steel + ECTFE

Prot. class: IP65 (FK10.1)

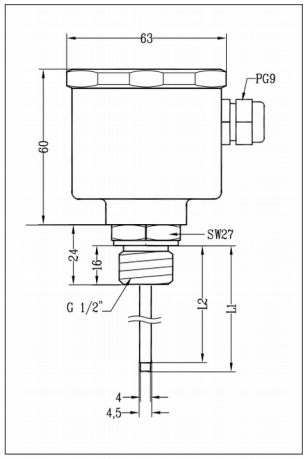
Materials:

Connection housing:	POM, polypropylene, PTFE, stainless steel 1.4571
Process connection:	POM, polypropylene, PTFE, stainless steel 1.4571
Probe rod:	stainless steel 1.4404 Hastelloy C, titanium
Coating:	polyamide, E-CTFE, ETFE
Sealing:	NBR (for coating with PA) FPM (for coating with E-CTFE or ETFE)

Dimensions:



FK10.1.1.15.1… (plastic)



FK10.1.6 .15.1… (stainless steel)

Order Code:

Order number:	FK10.	1.	1.	15.	1.	1.	1.	1.	LA.	0.

Conductive level switch

Model:
1 = standard

Material connection housing / process connection:
1 = POM Ø 40 mm (standard)*
2 = POM Ø 80 mm (standard)**
3 = POM / st. steel 1.4571, Ø 60 mm
4 = PP Ø 40 mm*
5 = PP Ø 80 mm**
6 = PP / st. steel 1.4571, Ø 60 mm
7 = PTFE Ø 40 mm*
8 = PTFE Ø 80 mm**
9 = PTFE / st. steel 1.4571, Ø 60 mm
10 = st. steel 1.4571, Ø 60 mm

Process connection:
15 = G 1/2 (max. 1 electrode)
25 = G 1 (max. 3 electrodes)
32 = G 1 1/4 (only for devices with st. steel connection, max. 4 electrodes)
40 = G 1 1/2 (max. 5 electrodes)
50 = G 2 (max. 7 electrodes)
F50 = DIN flange DN 50 / PN 16

Number of electrodes:
1-5 or 7

Electrode material:
1 = stainless steel 1.4404 (standard)
3 = Hastelloy C (diameter 4 mm only)***
4 = titanium (diameter 4, 8 mm)***

Diameter of the electrode(s):
1 = 4 mm (standard)
3 = 8 mm

Electrode isolation:
1 = polyamide (standard)
2 = E-CTFE
3 = ETFE

Electrode length (from sealing edge):
LA = length 500 mm
LB = length 1000 mm
LS = customer specific (up to max. 2500 mm)
data example: $L_1$300 / $L_2$400 / $L_3$500 etc.

Options:
0 = without
1 = please specify in plain text

* only G 1/2 and G 1
** only G 1 1/2 and G 2
*** only with electrode insolation made of E-CTFE

Accessory:

FKE Electrode relay for conductive level switch

Level

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