Technical manual BA 0617

Filling level

SST

Electrode probe

for conductive limit level detection
in electrical conductive liquids

Detects up to six limit values simultaneously

Useable
- for leakage or overflow protection in container
- for minimum, maximum resp. multilevel detection in container
- as pump protection, resp. dry run protection in pipelines
- for two-position-control of pumps

Wide application range
- for conductivities higher than 1 µS/cm
- for process temperatures from -10 °C to +120 °C
- materials also for aggressive filling material

Integrated wire break monitoring

ACS-CONTROL-SYSTEM
know how mit system

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Application field

The electrode probe **SST**, in combination with a suitable evaluation device, is used for conductive limit value detection in electrically conductive filling materials.

Depending on the application, the electrode ropes can have a length of up to 15 m.

With up to seven contact electrodes multiple tasks can be fulfilled simultaneously. Among these tasks are e.g. leakage and overflow protection, minimum / maximum protection resp. multilevel detection in container, pump protection in pipelines and also the two-position-control of pumps.

The electrode probes are designed for a wide application range.
The conductivity also of aggressive filling materials, with 1 µS/cm and higher can be detected, at process temperatures from -10 °C to +120 °C.

Function

The electrode probe is mounted directly in the wall of the container or of the pipe by using the respective process connection or installed over the filling material by using a suitable mount.

The alternating voltage, that is generated by a suitable evaluation electronic is applied between the electrode ropes.

As soon as the electrically conductive filling material makes a connection between the electrodes a measurable current flows, that causes a reaction of the connected evaluation device.

Due to the use of a alternating voltage the corrosion at the electrode and the electrolytic decomposition of the filling material is avoided.

At the electrode probes an additional module (diode module LBM) for the wire supervision can be installed inside the housing.
In the case of a wire break between electrode probe and a suitable evaluation device, the evaluation device can output a corresponding warning signal.

Safety notes

Operational safety

The device is safely built and tested according to state-of-the-art technology and has left the factory in perfect condition as regards technical safety.

The device meets the legal requirements of all relevant EC directives. This is confirmed by attaching the CE mark.

Installation, connection, commissioning, operation

Installation, electrical connection, commissioning and operation of the device must be made by a qualified and authorized expert according to the information’s in this technical manual and the relevant standards and rules. This expert must have read and understood this technical manual and especially the safety notes.

The device may only be used within the permitted operation limits that are listed in this technical manual. Every use besides these limits as agreed can lead to serious dangers.

The materials of the device must be checked for compatibility with the respective application requirements (contacting materials, process temperature) before use. An unsuitable material can lead to damage, abnormal behavior or destruction of the device and to the resulting dangers.

The sensors may not be used as sole device for prevention of dangerous conditions in machines and plants.

Using the device in a manner that does not fall within the scope of its intended use, disregarding this instruction, using under-qualified personnel, or making unauthorized alterations releases the manufacturer from liability for any resulting damage. This renders the manufacturer‘s warranty null and void.

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Installation

The isolation of the electrode rope may not be damaged resp. removed excepted at the electrode tip.

The cutting of the rope is made at the side of the connection housing. Unscrew the fixation ring of the rope inside the connection housing and pull out the rope to the needed rope length. After that, fix the rope by screwing the fixation ring. Cut the rope with a tong and remove 10 mm of the isolation.

Installation notes
Drive the system pressure free prior installation resp. deinstallation of the device and avoid high temperatures to avoid injuries.

Consider enough installation space outside the container, to insert the electrode probe into the plant without the use of force.

Install the device if necessary into a bypass if dense heavy foam, wild turbulences or foamed liquids can occur.

Install the electrode probe in such a position in the container, where no strong forces to the side, like e.g. by mixer or near fill-in openings, can have an effect to the electrode ropes.
This is especially important for especially long electrode ropes.

The non-isolated electrode tips, when mounted, may not make a contact to the wall of the container, if this is made of metal or electrically conductive plastic.

Electrode ropes are not suitable for side mounting.

The tightening of the process connection may only be done at the hexagon by a suitable spanner.
The maximum permitted torque strength is 100 Nm.
The screw in of the process connection by using the connection housing is not permitted.

Maintenance

The device is free of maintenance.

The isolation of the electrodes should be checked regularly and also a possible coating at the electrode tips should be removed.

A non-conductive coating at the metallic electrode tip can effect error behaviour because no current can flow although the electrically conductive filling material makes a connection.

Repair

A repair may only be carried out by the manufacturer.

If the device must be sent back for repair, the following informations must be enclosed:

- An exact description of the application.
- The chemical and physical characteristics of the product.
- A short description of the occurred error.

Before returning the device for repair, the following measures must be proceeded:

- All stick product residues must be removed. This is especially important, if the product is unhealthily, e.g. caustic, toxic, carcinogenic, radioactive etc.
- A returning must be refrained, if it is not possible by 100% to remove the unhealthily product completely, because e.g. it is penetrate into cracks or is diffused through plastic.

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Electrical connection

The electrical connection of the device must be carried out according to the respective country specific standards. Incorrect installation or adjustment could cause applicationally conditioned risks.

Use only suitable cables with max. 25 Ω per wire, that fulfills the requirements e.g. regarding temperature, resistance or laying at the place of installation.

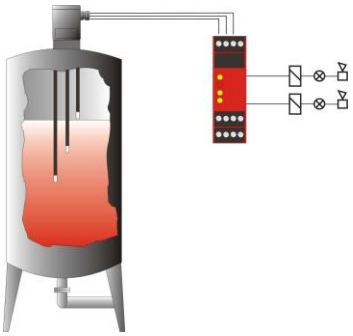
The cable gland is suitable for cable diameters from 3,5 to 8 mm. After installation of the cable the cable gland must be fix screwed to ensure the tightness of the connection housing.

Use only shielded signal and measurement wires and install these wires separated from power leading wires. At strong electromagnetic irradiation use principally a cable with shield. Connect the cable shield only at one side to earth.

A suitable evaluation device must by connected by the connection cable with the electrode ropes inside the connection housing.
The connection of the cable to the electrode ropes is made by terminals for wire cross-cuts up to 2,5 mm^2 or by screw connections inside the connection housing. For the connection use isolated thimbles.

At electrode probes an additional module (diode module LBM) for the wire supervision can be installed inside the housing. This must always be connected between the shortest rope and the longest rope.
A connection polarity is not relevant. When using evaluation devices resp. transmitter, that does not support a wire supervision, this module may not be installed.

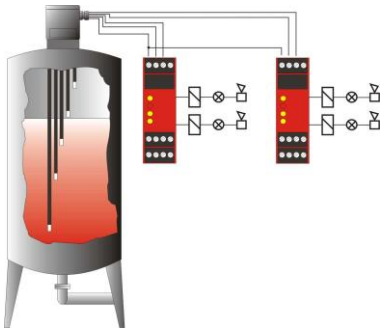
For inauguration it is suggested to switch off all connected control devices to avoid unintended control actions.



Two-position-control

For a two-position-control, a electrode probe with three ropes must be used, where the longest rope represents the reference electrode.

Here the container wall represents the reference electrode.
The evaluation device with a function for two-position-control keeps the filling material level between the upper and the lower limit level.



Four-level-detection

For a four-level-detection a electrode probe with five ropes must be used, where the longest rope represents the reference electrode.

For the evaluation two two-channel-evaluation-devices are used, whose both reference connection must be connected with the longest electrode.

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Technical data

Materials

Electrode rope:
(medium contact)
Steel 1.4404 (AISI316L) resp. 1.4571 (AISI316Ti)

Electrode rope isolation:
(medium contact)
PTFE

Process connection:
(medium contact)
POM / PP / PTFE

Terminal enclosure:
POM / PP / PTFE

Cable gland:
Enclosure PA / gasket CR, NBR

Gaskets:
Medium contact: NBR
Others: NBR, FPM

Environmental conditions

Environmental temperature:
Maximum – 10°C...+100°C, observe limitations

Limitation by material	Environmental temperature range
Connection housing PP	+5...+100°C

Process temperature:
maximum – 10°C...+120°C, observe limitations

Limitation by material	Process temperature range
Process connection POM	-40...+110°C
Process connection PP	+5...+100°C

Process pressure:
Pressure less

Conductivity:
≤ 1 MΩ resp. ≥ 1 µS/cm, depends on connected evaluation device

Protection classification:
IP65 EN/IEC 60529

Weight:
Depends on
- material / size of terminal enclosure resp.
- material / style of process connection resp.
- number / length of the electrodes

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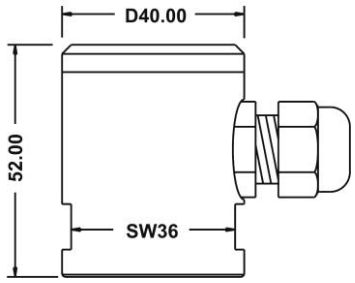
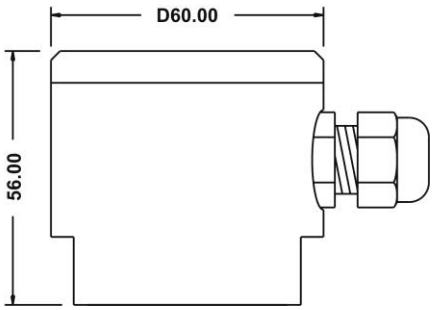
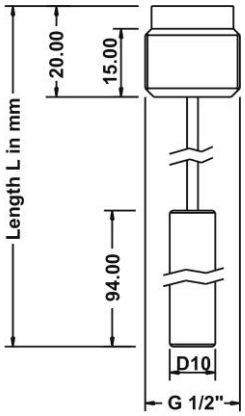
Dimension drawings



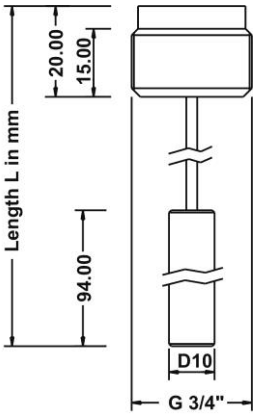
connection housing
∅ 40mm



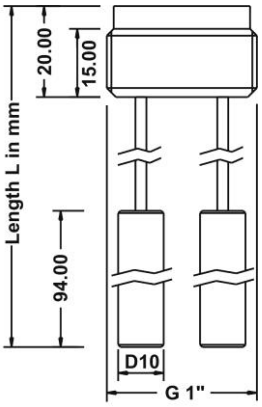
connection housing
∅ 60mm (only material POM)



process connection
G12 – G ½“

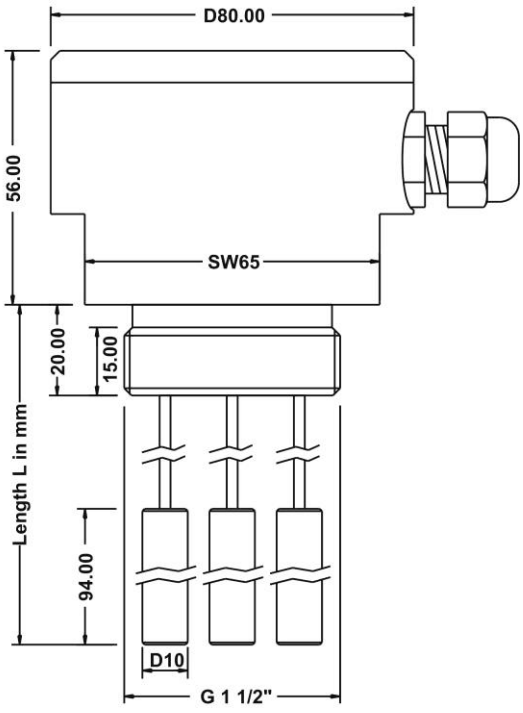


process connection
G34 – G ¾

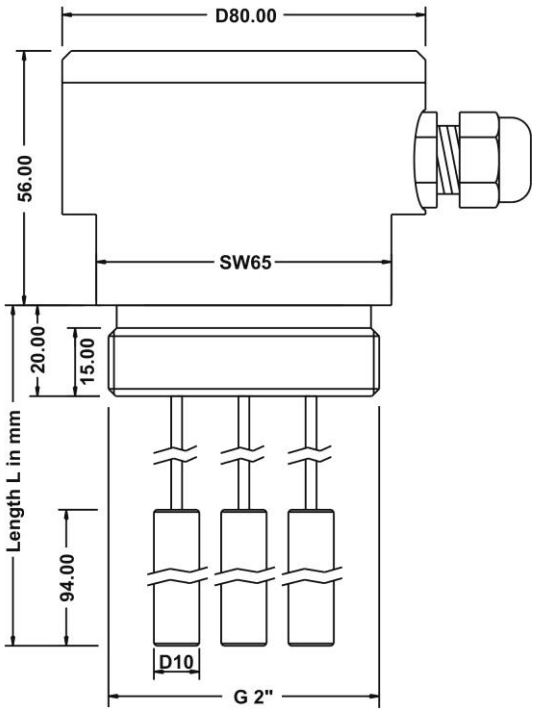


process connection
G10 – G 1“

with connection housing ∅ 40mm or ∅ 60mm (only material POM)



process connection
G15 – G 1 ½“



process connection
G20 – G 2“

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Order code overview

Type:
0 Standard

Electrode number:
1 1 electrode rope
2 2 electrode ropes
3 3 electrode ropes
4 4 electrode ropes
5 5 electrode ropes
6 6 electrode ropes
7 7 electrode ropes

Process connection
G12 Thread ISO 228-1 – G ½“ – 1-rope
G34 Thread ISO 228-1 – G ¾“ – 1…2- ropes
G10 Thread ISO 228-1 – G 1“ – 1…3- ropes
G15 Thread ISO 228-1 – G 1½“ – 1…4- ropes
G20 Thread ISO 228-1 – G 2“ – 1…7- ropes

Material electrode rope (medium contact)
A CrNi-steel
Y others

Material process connection / terminal enclosure (medium contact)

D	POM	∅ 40 mm for G ½“ / G ¾“ / G 1“ resp. ∅ 80 mm for G 1½“ / G 2“
E	POM	∅ 60 mm for G ½“ / G 1“
P	PP	∅ 40 mm for process connection G ½“ / G 1“
M	PP	∅ 80 mm for process connection G 1½“ / G 2“
T	PTFE	∅ 40 mm for process connection G ½“ / G ¾“ / G 1“
L	PTFE	∅ 80 mm for process connection G 1½“ / G 2“

Material electrode isolation (medium contact)
H PTFE

Wire break monitoring
A without
B Diode module LBM

Length L electrode rope in mm, max. 15000 mm

SST 0 _ _ _ _ H _ _ mm

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