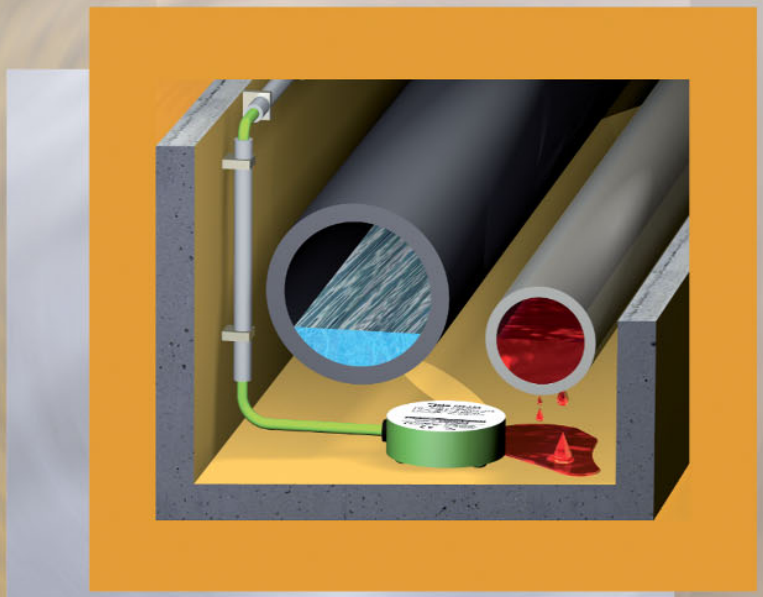
Capacitive leakage detectors of the L-Pointer range

for extra low voltage SELV or PELV, for connection to NAMUR isolation amplifier or NAMUR fieldbus terminal



Jola Spezialschalter K. Mattil & Co. KG
Klostergartenstraße 11-20 • D-67466 Lambrecht (Pfalz)
P.O.B. 1149 • D-67460 Lambrecht (Pfalz) • Germany
Phone +49 6325 188-01 • Fax +49 6325 6396
kontakt@jola-info.de • www.jola-info.de

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The units described in this documentation may only be installed, connected and started up by suitably qualified personnel!

Subject to deviations from the diagrams and technical data.

The details in this brochure are product specification descriptions and do not constitute assured properties in the legal sense.

“L-Pointer” - general information

Capacitive leakage detectors for extra low voltage SELV or PELV

- **Initiators for NAMUR circuits in line with EN 50 227 (formerly known as DIN 19234) with the option of detecting cable break, standby status, alarm status and short circuit**

- **For connection to:**
  NAMUR isolation amplifier or
  NAMUR fieldbus terminal

- **With integrated galvanic separation between sensor circuit and supply current circuit with impressed signal current**

Standard 2-wire quiescent current version:

Direct voltage supply and switching signal via a two-wire cable.

For NAMUR circuit with inverted signal evaluation.
The power consumption of the detector serves as a switching signal for the following switching statuses:

No power consumption	= cable break
Low power consumption	**= alarm status (leakage)**
High power consumption	**= standby status**
Maximum power consumption	= short circuit or false polarity

If the signal current is only to be evaluated between two switching statuses, low power consumption means alarm status and high power consumption means standby status.

On request:

2-wire working current version:

Direct voltage supply and switching signal via a two-wire cable.

For NAMUR circuit with non-inverted signal evaluation.
The power consumption of the detector serves as a switching signal for the following switching statuses:

No power consumption	= cable break
Low power consumption	**= standby status**
High power consumption	**= alarm status (leakage)**
Maximum power consumption	= short circuit or false polarity

If the signal current is only to be evaluated between two switching statuses, low power consumption means standby status and high power consumption means alarm status.

The integrated galvanic separation avoids interconnection of the sensor circuits and the formation of ground loops if more than one detector is connected to a single supply current circuit.

The compatibility of the detector and the peripheral equipment must be reviewed on case-to-case basis with regard to the extra low voltage SELV or PELV and the conformity of their signal parameters.

Capacitive “L-Pointer” in standard 2-wire quiescent current design

The capacitive leakage detectors are primarily designed for the detection of leakage of non-conductive liquids but can also be used for the detection of conductive liquids.

Connection: **Only for connection to extra low voltage SELV or PELV!**
2 wires for the supply of direct voltage; functional with correct polarity;
short circuit with false polarity

For connection to a NAMUR isolation amplifier or a fieldbus connection with NAMUR bus terminal.

With integrated galvanic separation between sensor circuit and supply current circuit with impressed signal current.

Only for extra low voltage	SELV/PELV	Cable break	I < 0.2 mA
Supply voltage	DC 7 V to 12 V	Sensor activated	I ≤ 1 mA
Preferably in line with NAMUR	DC 8.2 V	Sensor not activated	I ≥ 3 mA
Internal resistance	Ri = 1 kΩ	Short circuit or false polarity	I > 6 mA

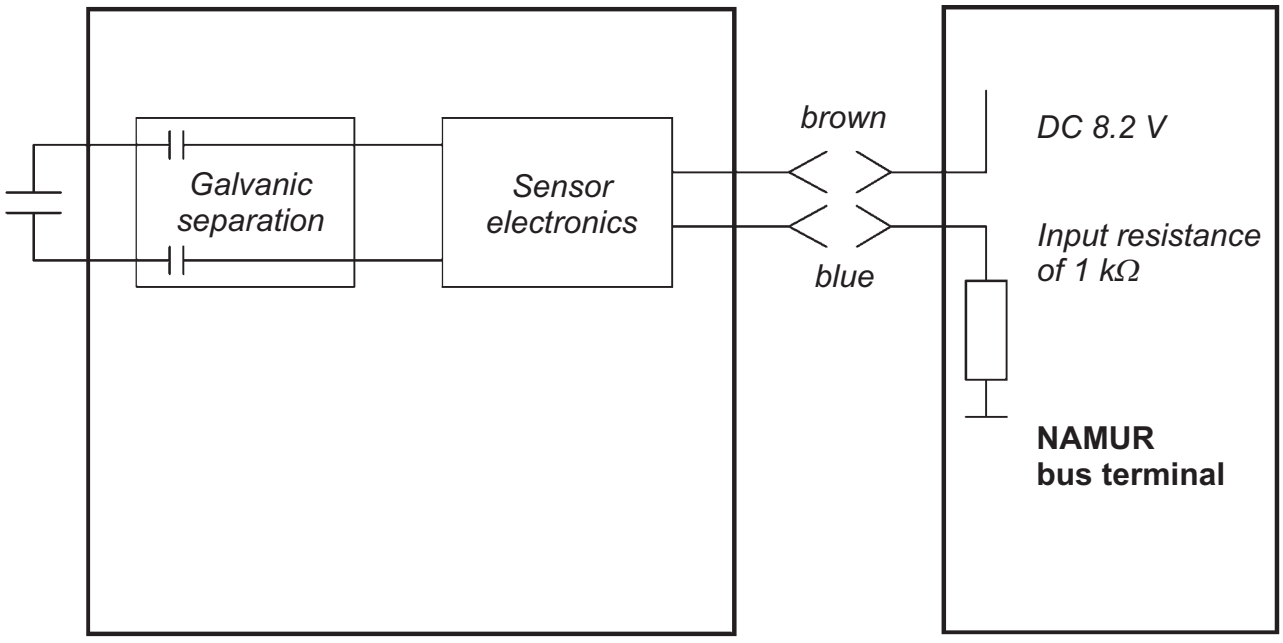
The compatibility of the detector and the peripheral equipment must be reviewed on case-to-case basis with regard to the extra low voltage SELV or PELV and the conformity of their signal parameters.

Series or parallel connection of detectors of this type is not permitted.

Application example

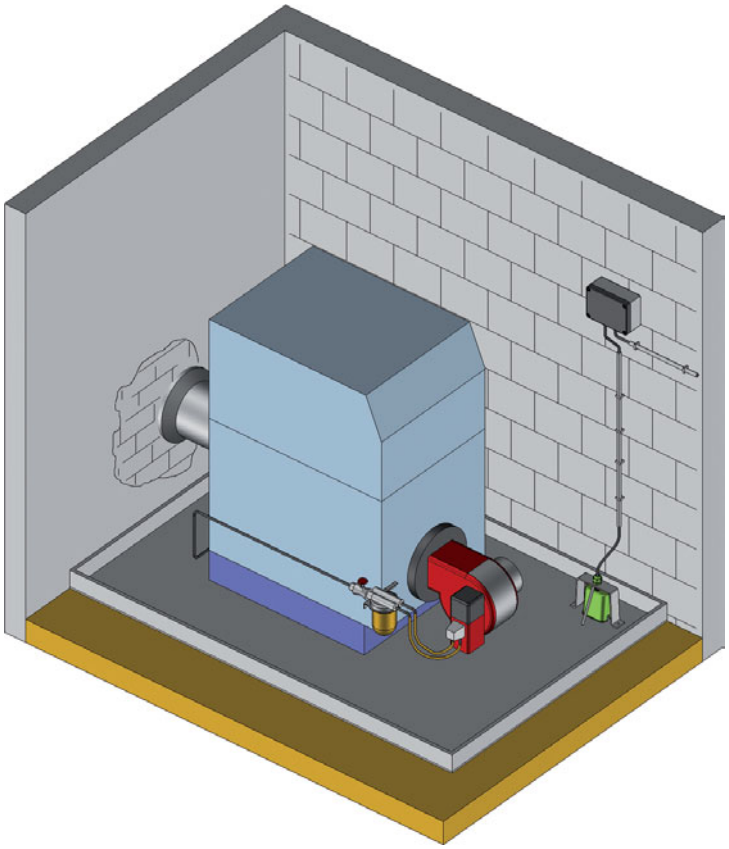
Capacitive “L-Pointer” leakage detector in standard 2-wire quiescent current design

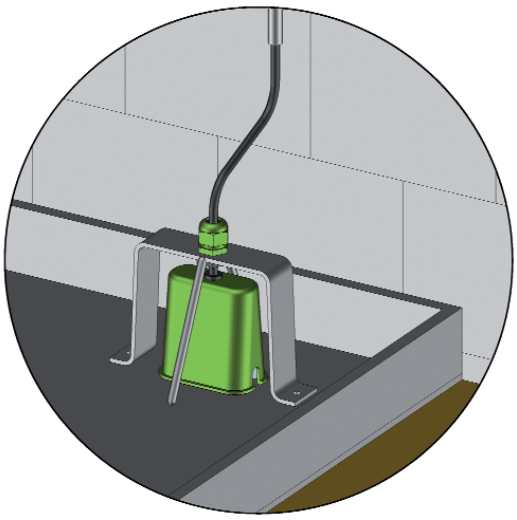
Follow-up circuit

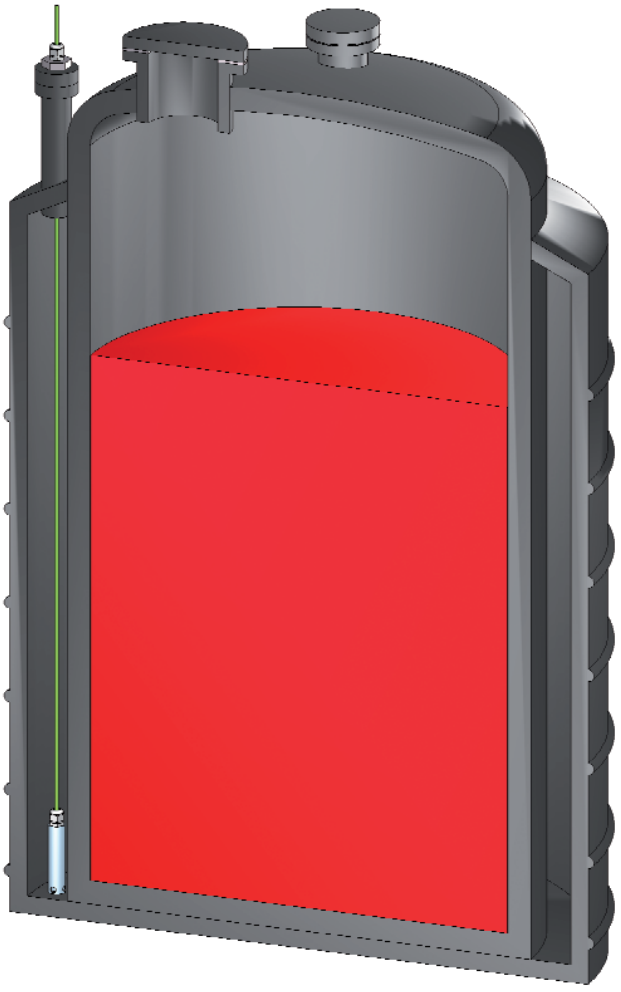


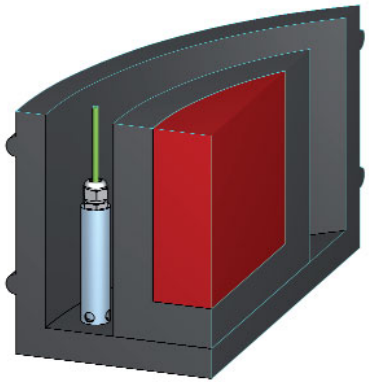
Leakage detection with “L-Pointer” capacitive sensors

Application examples



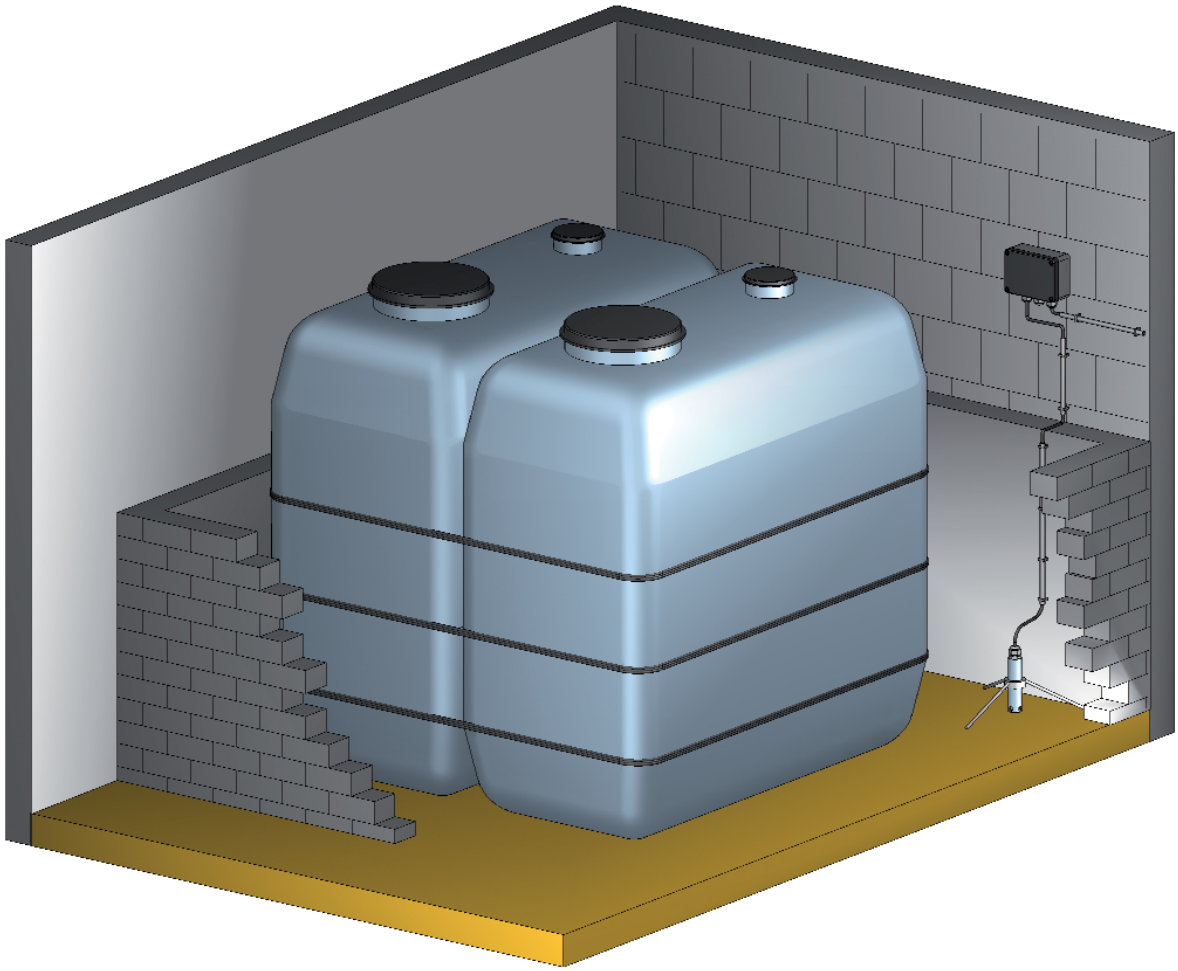


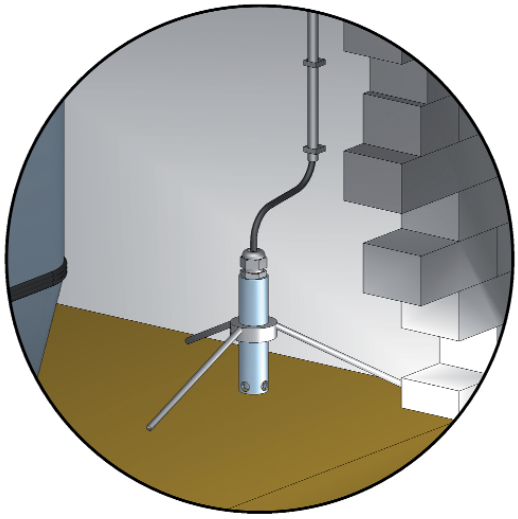




Leakage detection with “L-Pointer” capacitive suspension sensor COW-KNI with stainless steel housing

Application example





Capacitive suspension sensor COW-KNI with stainless steel housing

Capacitive leakage detector for extra low voltage SELV or PELV

- **Initiator for NAMUR circuits in line with EN 50 227 (formerly known as DIN 19234) with the option of detecting cable break, standby status, alarm status and short circuit**
- **For connection to: NAMUR isolation amplifier or NAMUR fieldbus terminal**
- **With integrated galvanic separation between sensor circuit and supply current circuit with impressed signal current**

For signalling the presence of a non-conductive or conductive liquid. Can in principle be used for all low-viscosity media – e.g. for signalling the presence of heating oil on the floor of a tank room or in a collection tub located underneath a heating oil burner.

Capacitive suspension sensors should only be used in normally dry environments.

A sensor can be installed either

- suspended freely above the floor on its cable

or

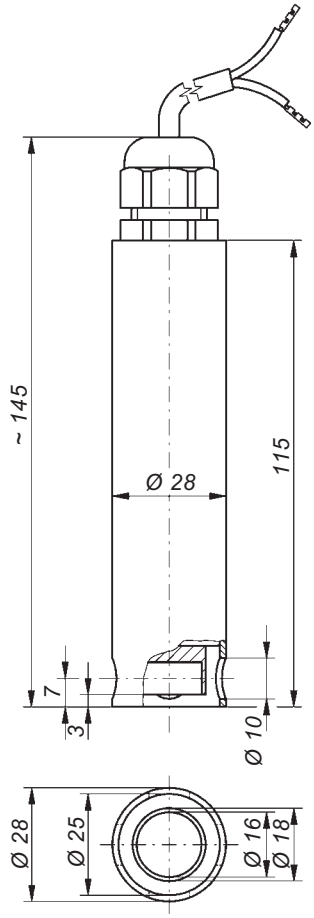
- standing upright on the floor (preferably using the optional stand from Jola).

A hollow stainless steel cylinder forming a cylindrical capacitor together with the stainless steel housing is integrated in the capacitive suspension sensor of the type COW-KNI. The stainless steel housing as screening electrode and the inner cylinder as earth electrode serve as capacitive sensor electrodes. As soon as a non-conductive liquid flows into the space between housing and inner cylinder, the capacitance between the electrodes changes and so does the switching status of the leakage detector. If a conductive liquid is present, the electrodes are conductively bridged, and this also results in a change in the switching status of the leakage detector.

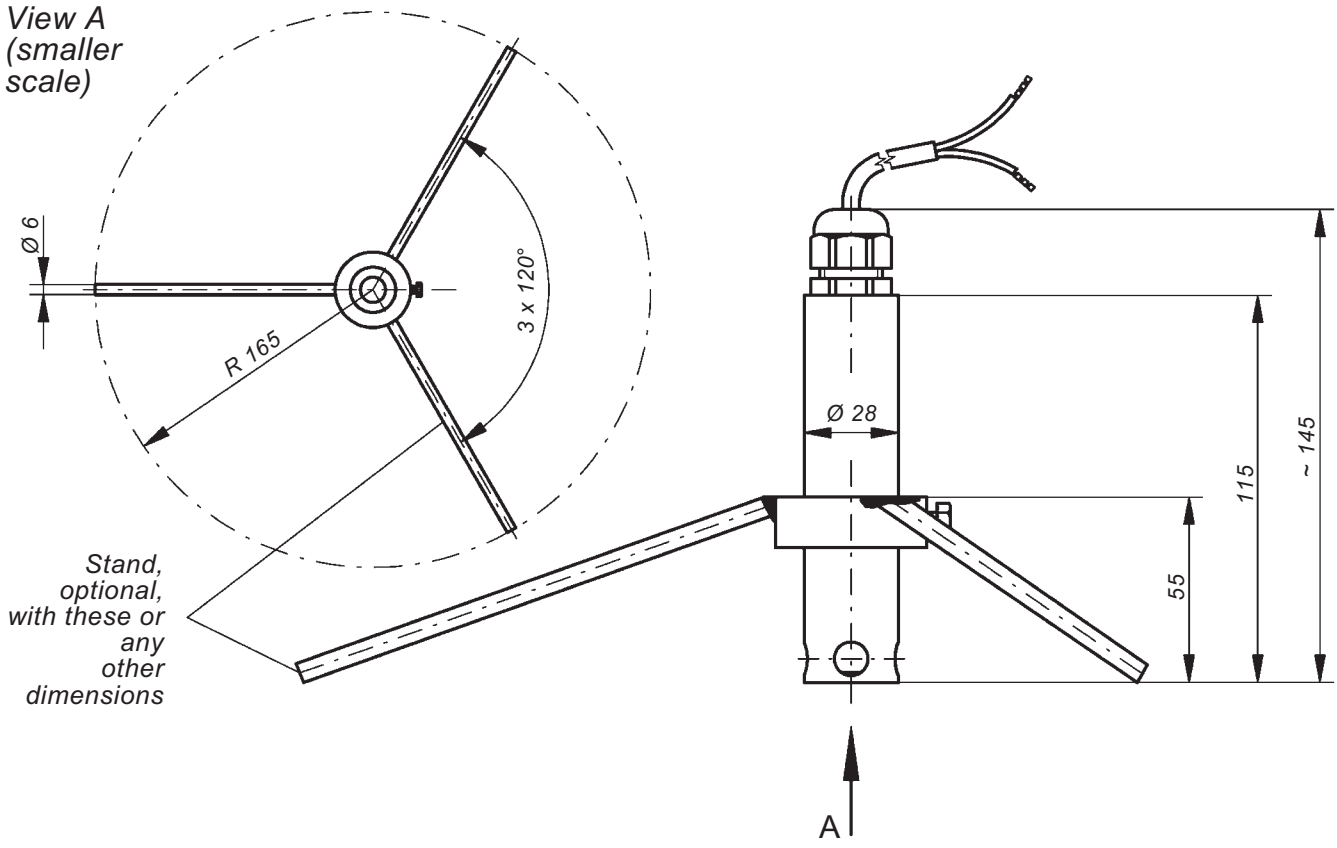
Areas of application:

All non-conductive organic and inorganic liquids with a specific dielectricity constant of 1.8 or more and all conductive liquids.

The precondition is that the ambient temperatures ensure that these liquids are present in liquid form and that the sensors used are reliably and sufficiently in contact with the liquid. The minimum liquid height is to be assumed as 12 mm from the bottom edge of the sensor housing.



Capacitive suspension sensor COW-KNI

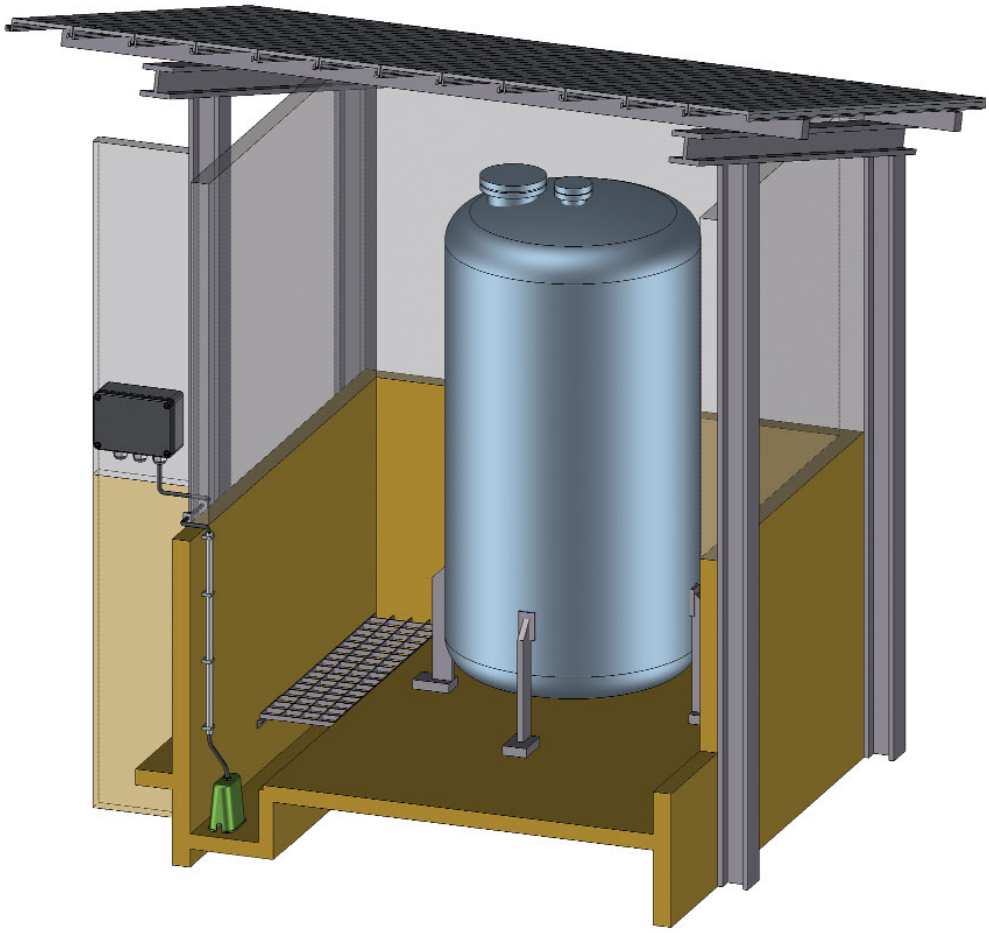


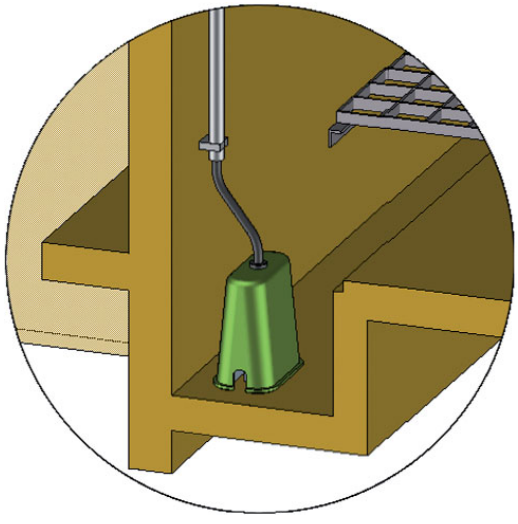
**Capacitive suspension sensor COW-KNI,
with mounting stand**

Technical data	COW-KNI
Design	leakage detector with evaluation electronics as an initiator for a NAMUR circuit in quiescent current design; power consumption high in standby status and low in alarm status
Sensor electrodes	stainless steel housing as screening electrode and inner cylinder as earth electrode serve as capacitive sensor electrodes
Housing	stainless steel 316 Ti, with PTFE insulator
Electrical connection	**two-wire connection** via connecting cable 2 x 0.75; length 5 m, longer connecting cable on request; fitted with halogen-free connecting cable on request
Supply voltage	**only for connection to extra low voltage SELV or PELV!** DC 7 V ... 12 V with internal resistance of 500 Ω to 1,200 Ω, preferably in line with NAMUR DC 8.2 V with internal resistance of 1 kΩ
Output signal	impressed current signal in the supply circuit
Mode of operation	quiescent current principle
Switching statuses based on power consumption	**cable break** **I < 0.2 mA** **alarm status** **I ≤ 1 mA** **standby status** **I ≥ 3 mA** **short circuit or false polarity** **I > 6 mA**
Galvanic separation	**only for connection to extra low voltage SELV or PELV!** voltage resistance > 500 V between sensor circuit and supply circuit with impressed signal current
Max. no-load voltage at the electrodes	5 V_{eff} ⊓⊔ 200 kHz (safety extra low voltage SELV)
Max. short-circuit current at the electrodes	0.2 mA
Min. dielectricity constant of the liquid to be detected	**1.8**
Temperature range	– 20°C to + 60°C
Max. length of connecting cable between leakage detector and follow-up circuit	generally not critical but should not exceed the line resistance of 100 Ω
EMC	for interference emission in accordance with the appliance-specific requirements for households, business and commerce as well as small companies, and for interference immunity in accordance with the appliance-specific requirements for industrial companies.

Leakage detection with “L-Pointer” capacitive suspension sensor OWE-KNI with plastic housing

Application example





Capacitive suspension sensor OWE-KNI with plastic housing

Capacitive leakage detector for extra low voltage SELV or PELV

- **Initiator for NAMUR circuits in line with EN 50 227 (formerly known as DIN 19234) with the option of detecting cable break, standby status, alarm status and short circuit**
- **For connection to: NAMUR isolation amplifier or NAMUR fieldbus terminal**
- **With integrated galvanic separation between sensor circuit and supply current circuit with impressed signal current**

For signalling the presence of a non-conductive or conductive liquid. Can in principle be used for all low-viscosity media – e.g. for signalling the presence of heating oil on the floor of a tank room or in a collection tub located underneath a heating oil burner.

Capacitive suspension sensors should only be used in normally dry environments.

A sensor can be installed either

- suspended freely above the floor on its cable

or

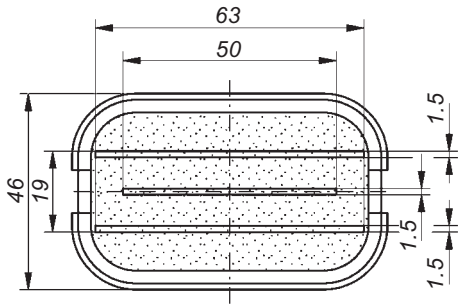
- standing upright on the floor (preferably using the optional stand from Jola).

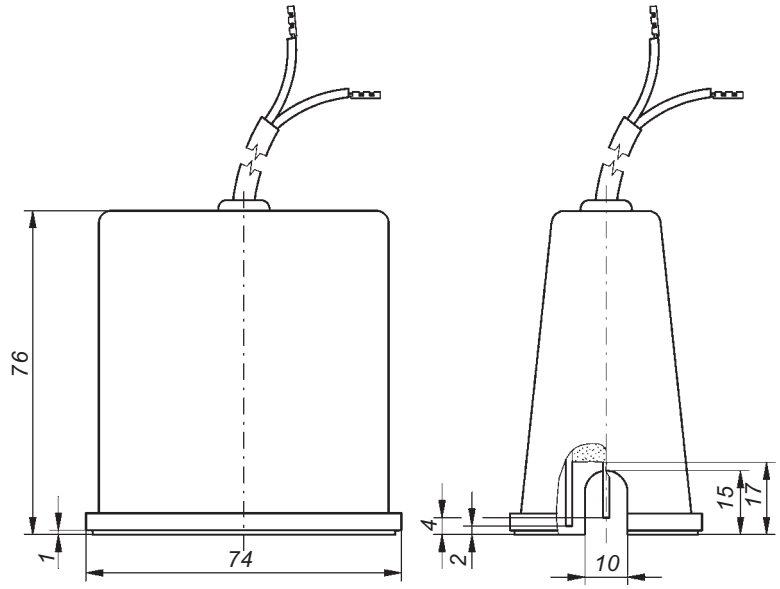
Three gold-plated PCBs are integrated in the capacitive suspension sensor of the type OWE-KNI, and these boards form a double plate capacitor. The two outer one-side-gold-plated PCBs as screening electrodes and the two-side-gold-plated inner PCB as earth electrode serve as capacitive sensor electrodes. As soon as a non-conductive liquid flows into the space between the PCBs, the capacitance between the electrodes changes and so does the switching status of the leakage detector. If a conductive liquid is present, the electrodes are conductively bridged, and this also results in a change in the switching status of the leakage detector.

Areas of application:

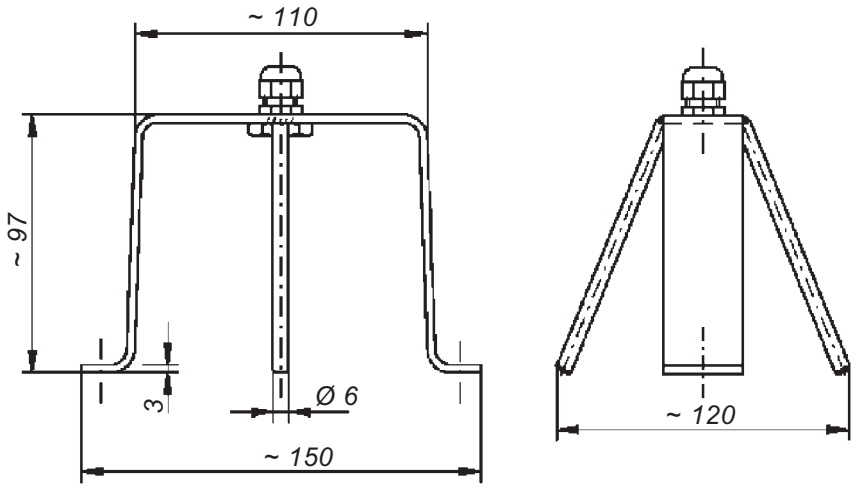
All non-conductive organic and inorganic liquids with a specific dielectricity constant of 1.8 or more and all conductive liquids.

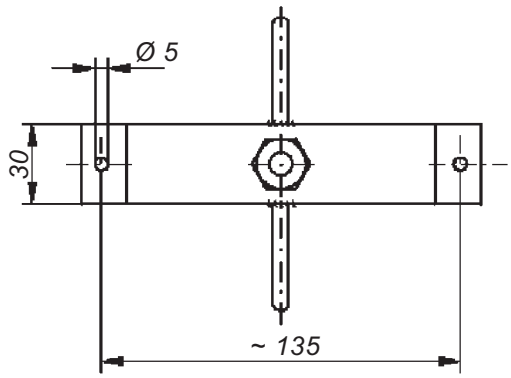
The precondition is that the ambient temperatures ensure that these liquids are present in liquid form and that the sensors used are reliably and sufficiently in contact with the liquid. The minimum liquid height is to be assumed as 12 mm from the bottom edge of the sensor housing.





Capacitive suspension sensor OWE-KNI





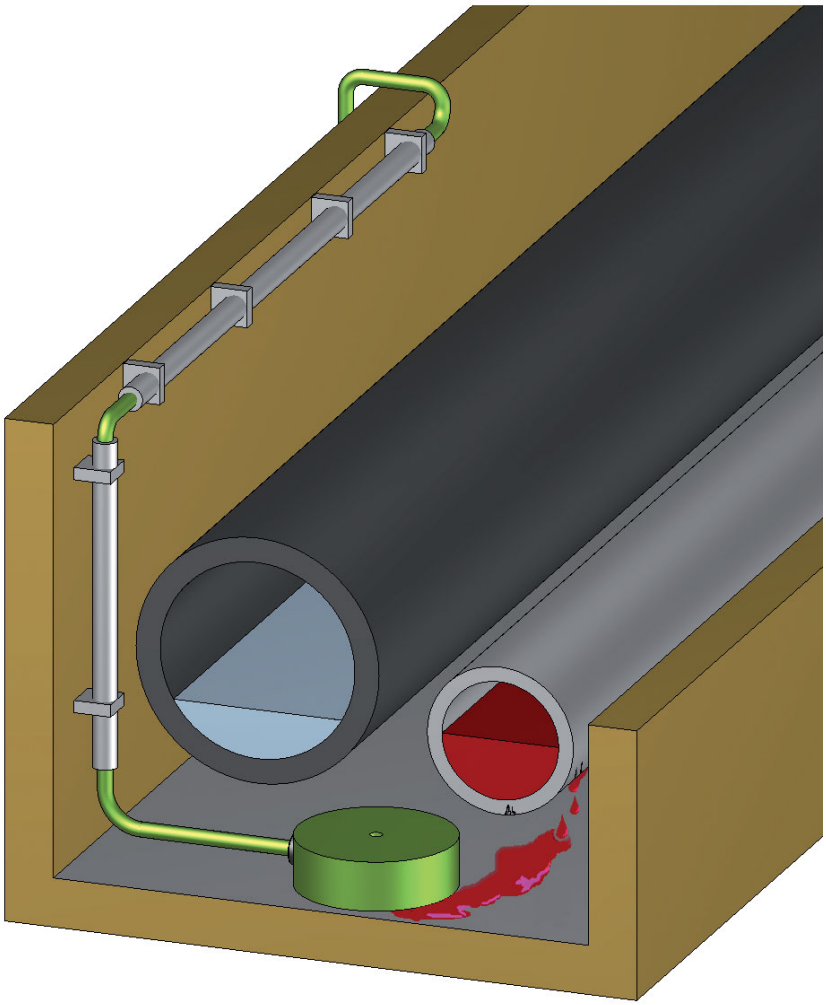
Optional: mounting stand for capacitive suspension sensor OWE-KNI

(Illustrations in a smaller scale than the drawings further above)

Technical data	OWE-KNI
Design	leakage detector with evaluation electronics as an initiator for a NAMUR circuit in quiescent current design; power consumption high in standby status and low in alarm status
Sensor electrodes	2 outer one-side-gold-plated PCBs and 1 inner two-side-gold-plated PCB serve as capacitive sensor electrodes
Housing	PP and cast resin
Electrical connection	**two-wire connection** via connecting cable 2 x 0.75; length 5 m, longer connecting cable on request; fitted with halogen-free connecting cable on request
Supply voltage	**only for connection to extra low voltage SELV or PELV!** DC 7 V ... 12 V with internal resistance of 500 Ω to 1,200 Ω, preferably in line with NAMUR DC 8.2 V with internal resistance of 1 kΩ
Output signal	impressed current signal in the supply circuit
Mode of operation	quiescent current principle
Switching statuses based on power consumption	**cable break** **I < 0.2 mA** **alarm status** **I ≤ 1 mA** **standby status** **I ≥ 3 mA** **short circuit or false polarity** **I > 6 mA**
Galvanic separation	**only for connection to extra low voltage SELV or PELV!** voltage resistance > 500 V between sensor circuit and supply circuit with impressed signal current
Max. no-load voltage at the electrodes	5 V_{eff} ⊓⊔ 200 kHz (safety extra low voltage SELV)
Max. short-circuit current at the electrodes	0.2 mA
Min. dielectricity constant of the liquid to be detected	**1.8**
Temperature range	– 20°C to + 60°C
Max. length of connecting cable between leakage detector and follow-up circuit	generally not critical but should not exceed the line resistance of 100 Ω
EMC	for interference emission in accordance with the appliance-specific requirements for households, business and commerce as well as small companies, and for interference immunity in accordance with the appliance-specific requirements for industrial companies.

Leakage detection with “L-Pointer” capacitive plate sensor CPE-KNI with plastic housing

Application example



Capacitive plate sensor CPE-KNI with plastic housing

Capacitive leakage detector for extra low voltage SELV or PELV

- **Initiator for NAMUR circuits in line with EN 50 227 (formerly known as DIN 19234) with the option of detecting cable break, standby status, alarm status and short circuit**

- **For connection to: NAMUR isolation amplifier or NAMUR fieldbus terminal**

- **With integrated galvanic separation between sensor circuit and supply current circuit with impressed signal current**

For signalling the presence of a non-conductive or conductive liquid. Can in principle be used for all low-viscosity media – e.g. for signalling the presence of heating oil on the floor of a tank room or in a collection tub located underneath a heating oil burner.

Capacitive plate sensors should only be used in normally dry environments. The capacitive plate sensor of the type CPE-KNI **is not suitable** for use in areas where temperature differentials can lead to **condensation**.

They must be installed on the floor in such a way that the sensor side faces downwards and the rating plate upwards.

A sensor can be installed either

- unsecured lying on the floor

or

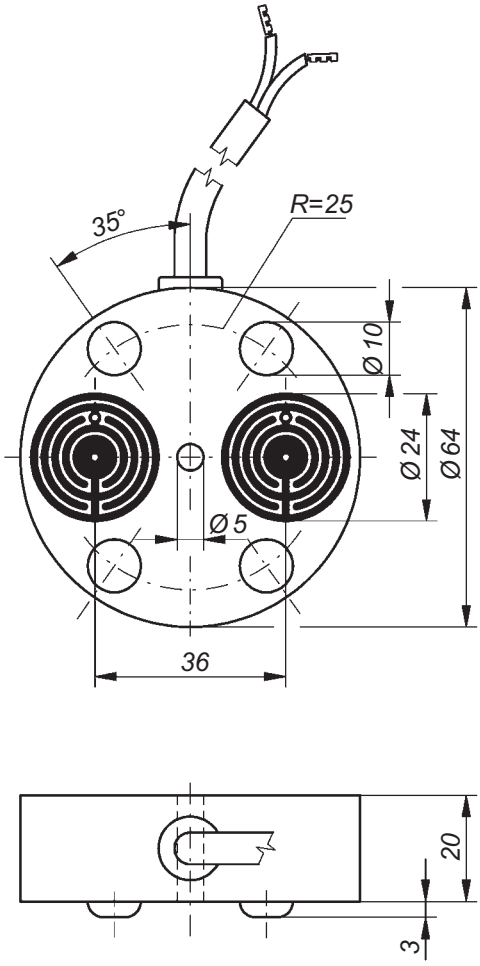
- lying on the floor and secured by a central screw in the centre of the housing.

Each capacitive plate sensor of the type CPE-KNI is equipped with two round PCBs with gold-plated concentric strip conductor rings. Rings as screening electrodes and rings as earth electrodes serve as capacitive sensor electrodes. For reasons of symmetry, there are two such capacitive sensor elements. As soon as a non-conductive liquid comes into contact with the rings and the spaces of one or both capacitive sensor elements, the capacitance between the electrodes changes and so does the switching status of the leakage detector. If a conductive liquid is present, the rings of the capacitive sensor element are conductively bridged, and this also results in a change in the switching status of the leakage detector.

Areas of application:

All non-conductive organic and inorganic liquids with a specific dielectricity constant of 2.0 or more and all conductive liquids.

The precondition is that the ambient temperatures ensure that these liquids are present in liquid form and that the sensors used are reliably and sufficiently in contact with the liquid. The minimum liquid height is to be assumed as 3 mm from the contact surface of the sensor housing.



Capacitive plate sensor CPE-KNI, sensor side

Capacitive plate sensor CPE-KNI, rating plate side

Technical data	CPE-KNI
Design	leakage detector with evaluation electronics as an initiator for a NAMUR circuit in quiescent current design; power consumption high in standby status and low in alarm status
Sensor electrodes	2 round PCBs with gold-plated concentric rings serve as capacitive sensor electrodes
Housing	PP and cast resin
Electrical connection	**two-wire connection** via connecting cable 2 x 0.75; length 5 m, longer connecting cable on request; fitted with halogen-free connecting cable on request
Supply voltage	**only for connection to extra low voltage SELV or PELV!** DC 7 V ... 12 V with internal resistance of 500 Ω to 1,200 Ω, preferably in line with NAMUR DC 8.2 V with internal resistance of 1 kΩ
Output signal	impressed current signal in the supply circuit
Mode of operation	quiescent current principle
Switching statuses based on power consumption	**cable break** **I < 0.2 mA** **alarm status** **I ≤ 1 mA** **standby status** **I ≥ 3 mA** **short circuit or false polarity** **I > 6 mA**
Galvanic separation	**only for connection to extra low voltage SELV or PELV!** voltage resistance > 500 V between sensor circuit and supply circuit with impressed signal current
Max. no-load voltage at the electrodes	5 V_{eff} ⊓⊔ 200 kHz (safety extra low voltage SELV)
Max. short-circuit current at the electrodes	0.2 mA
Min. dielectricity constant of the liquid to be detected	**2.0**
Temperature range	– 20°C to + 60°C
Max. length of connecting cable between leakage detector and follow-up circuit	generally not critical but should not exceed the line resistance of 100 Ω
EMC	for interference emission in accordance with the appliance-specific requirements for households, business and commerce as well as small companies, and for interference immunity in accordance with the appliance-specific requirements for industrial companies.