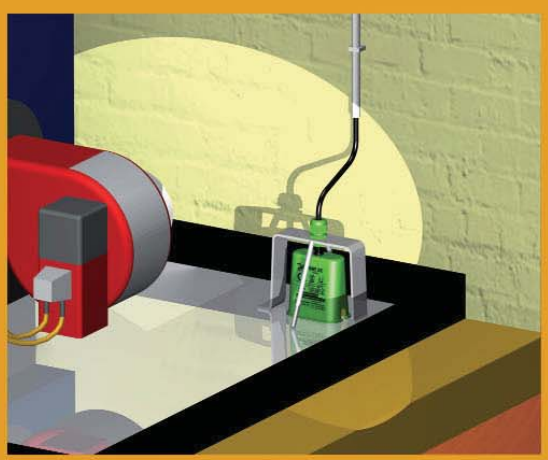
Capacitive leakage detectors

Leckwatcher range
Liqui-Switch range
L-Pointer range

for connection to a PLC or DDC unit or a NAMUR circuit



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Contents

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.

Capacitive leakage detectors for extra low voltage SELV or PELV

With integrated galvanic separation:
- **avoids interconnection of the electrode circuits**
- **avoids the formation of ground loops if more than one detector is connected to a common supply current circuit.**

Leckwatcher

- **Leakage detectors for connection to:**
  a PLC or DDC unit,
  a small controller,
  a fieldbus connector or a network connector
- **with integrated galvanic separation of the sensor electronics**

The detectors are designed in line with the peripheral interface standard for electronic controllers (power supply and binary interfaces).

The compatibility of the detector on the one hand and the PLC, DDC unit, small controller, fieldbus connector or network connector on the other must be reviewed on a case-to-case basis with regard to the extra low voltage SELV or PELV and the conformity of their signal parameters.

Liqui-Switch

- **Leakage detectors for connection to:**
  a PLC or DDC unit,
  a small controller,
  a fieldbus connector or a network connector
- **with potential-free relay contact (for switching e.g. a solenoid valve with extra low voltage SELV or PELV)**
- **with integrated galvanic separation of the sensor electronics**

The compatibility of the detector on the one hand and the actuator, PLC, DDC unit, small controller, fieldbus connector or network connector on the other must be reviewed on a case-to-case basis with regard to the extra low voltage SELV or PELV and the conformity of their signal parameters.

L-Pointer

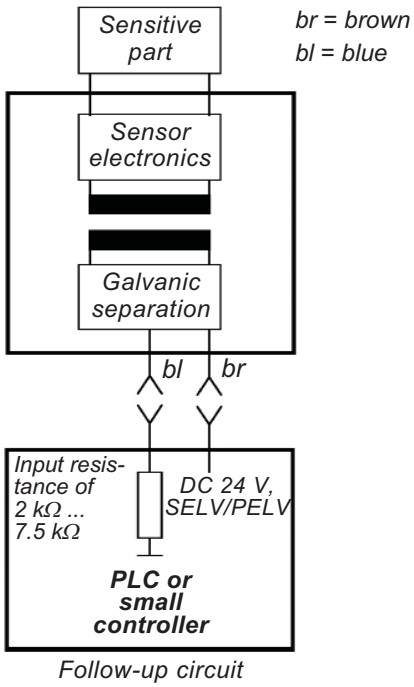
- **Leakage detectors for NAMUR circuits in line with EN 50 227 (formerly known as DIN 19 234) with the option of detecting cable break, standby status, alarm status and short-circuit**
- **for connection to:**
  NAMUR isolation amplifier or
  NAMUR fieldbus terminal
- **with integrated galvanic separation between sensor circuit and supply current circuit with impressed signal current**

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

Leckwatcher

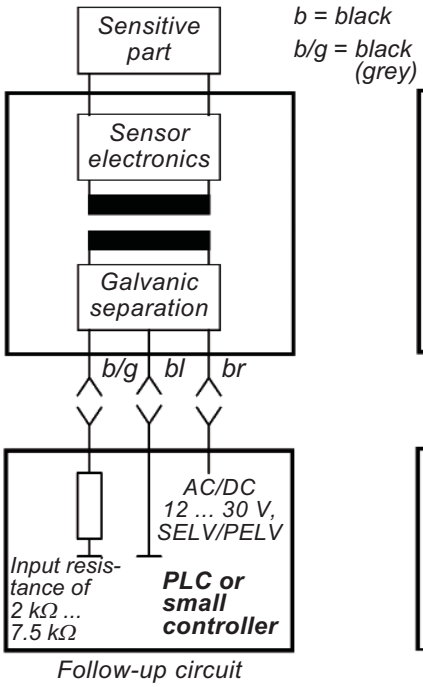
2-wire version: -SPS2	3-wire version: -SPS3 (with PNP transistor output)	4-wire version: -SPS4 (with potential-free reed contact output)
Connection: Only for connection to extra low voltage SELV or PELV!		
2 wires for the supply of direct voltage, fully functional with any polarity and short-circuit proof.	2 wires for the supply of direct or alternating voltage; fully functional with any polarity; 1 wire for the PNP transistor output, reverse polarity protected and short-circuit proof.	2 wires for the supply of direct or alternating voltage; fully functional with any polarity; 2 wires for the potential-free reed contact output.
Power consumption differs depending on whether the detector is in activated or non-activated status.	The PNP transistor output is in a different switching status depending on whether the detector is in activated or non-activated status.	The reed contact is open or closed depending on whether the detector is in activated or non-activated status.
This differential is used to generate the corresponding binary switching signal at the input resistance of the follow-up circuit.	With a Low signal, there is no voltage at the PNP transistor output; with a High signal, the rectified supply voltage is present at the output. This binary switching signal is implemented accordingly at the input resistance of the follow-up circuit.	The reed contact is an NO (make) contact, and its switching status is implemented in the follow-up circuit.
The input resistance must be in the range from 2 kΩ to 7.5 kΩ.	The input resistance must be in the range from 2 kΩ to 7.5 kΩ.	
Series or parallel connection of detectors of this type is not permitted.	Series or parallel connection of detectors of this type is not permitted.	Series or parallel connection of these detectors is possible, also in combination with other potential-free contacts.

Application example



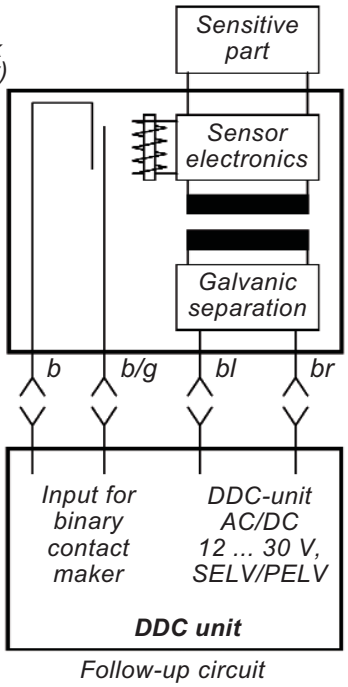
Follow-up circuit

Application example



Follow-up circuit

Application example



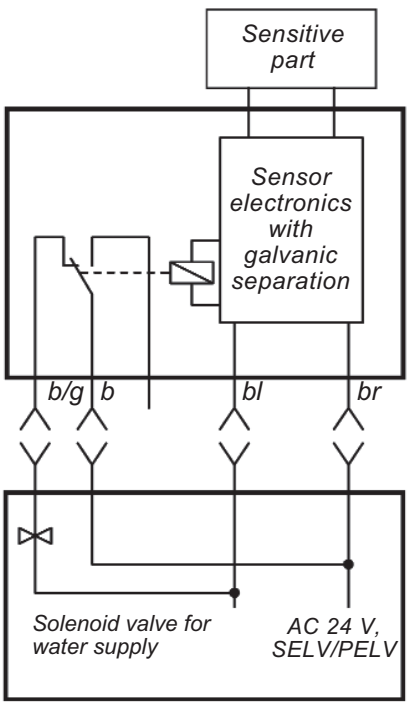
Follow-up circuit

Liqui-Switch

4-wire version with quiescent current contact: -LS4 (standard version)	4-wire version with working current contact: -LS4/A	5-wire version with changeover contact: -LS5
Connection: Only for connection to extra low voltage SELV or PELV!		
2 wires for the supply of direct or alternating voltage, fully functional with any polarity;		
2 wires for the potential-free quiescent current contact which is closed in standby status and open in the event of an alarm (leakage alarm, cable break in the voltage-supply line, failure of the supply voltage).	2 wires for the potential-free working current contact which is open in standby status and closed in the event of an alarm (leakage alarm, cable break in the voltage-supply line, failure of the supply voltage).	3 wires for the potential-free changeover contact. The output relay with the changeover contact is energised in standby status and de-energised in the event of an alarm.
A cable break in the contact loop (quiescent current loop) also activates an alarm.	A cable break in the contact line does not activate an alarm.	

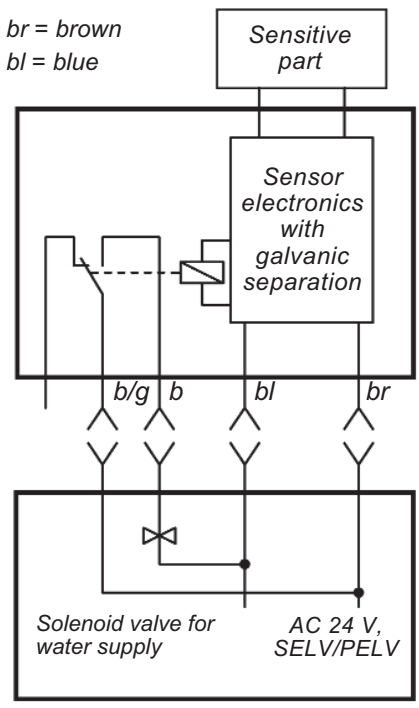
Series or parallel connection of these detectors is possible, also in combination with other potential-free contacts. In such cases, you must observe the relevant technical data and safety regulations.

Application example



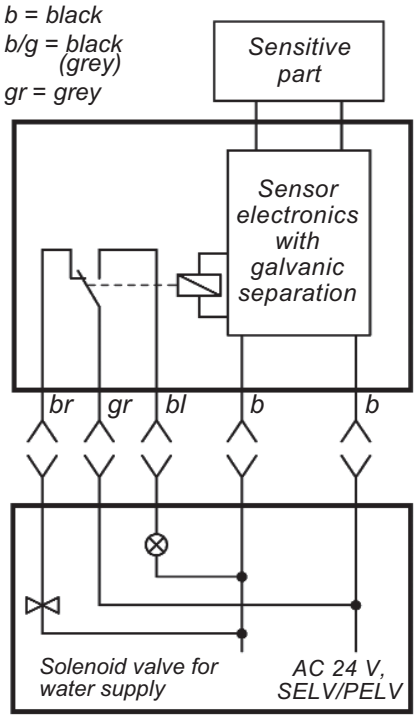
Follow-up circuit

Application example



Follow-up circuit

Application example



Follow-up circuit

Contact shown in standby status

L-Pointer

2-wire quiescent current version: -KNI (standard version)	2-wire working current version: -KNI/A

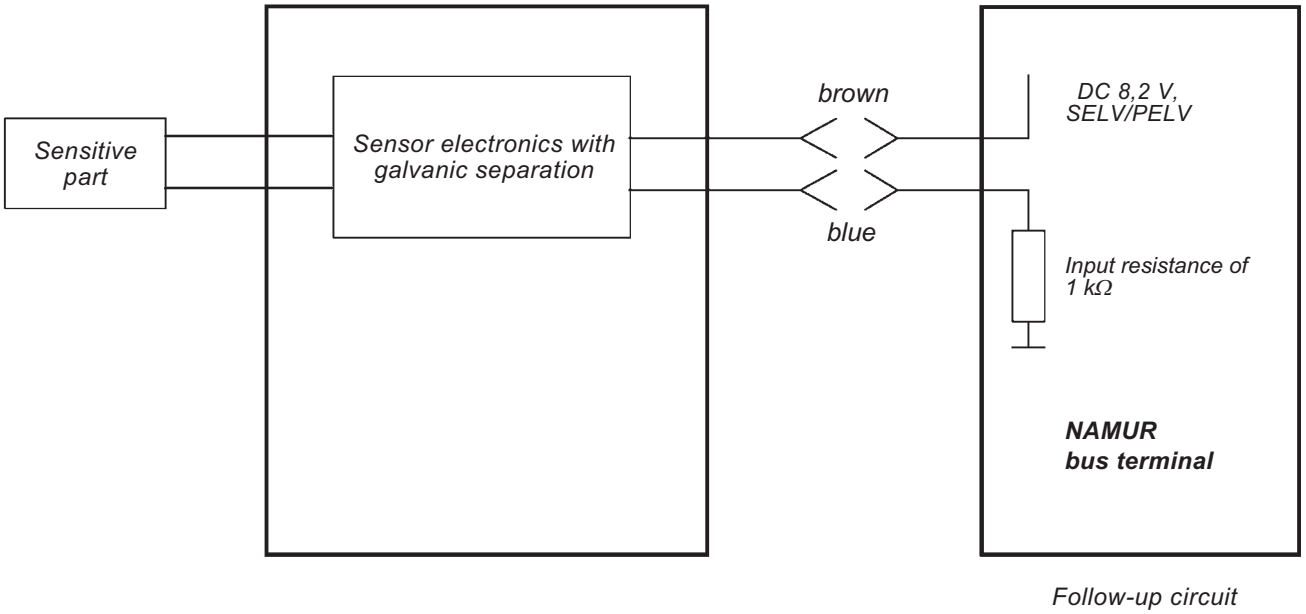
Connection: Only for connection to extra low voltage SELV or PELV!

2 wires for the supply of direct voltage;
functional with correct polarity; short circuit with false polarity

For NAMUR circuit with inverted signal evaluation.	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 = alarm status (leakage) • High power consumption = standby status • Maximum power consumption = short circuit or false polarity	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 alarm status and high power consumption means standby status.	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.

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

Application example



Follow-up circuit

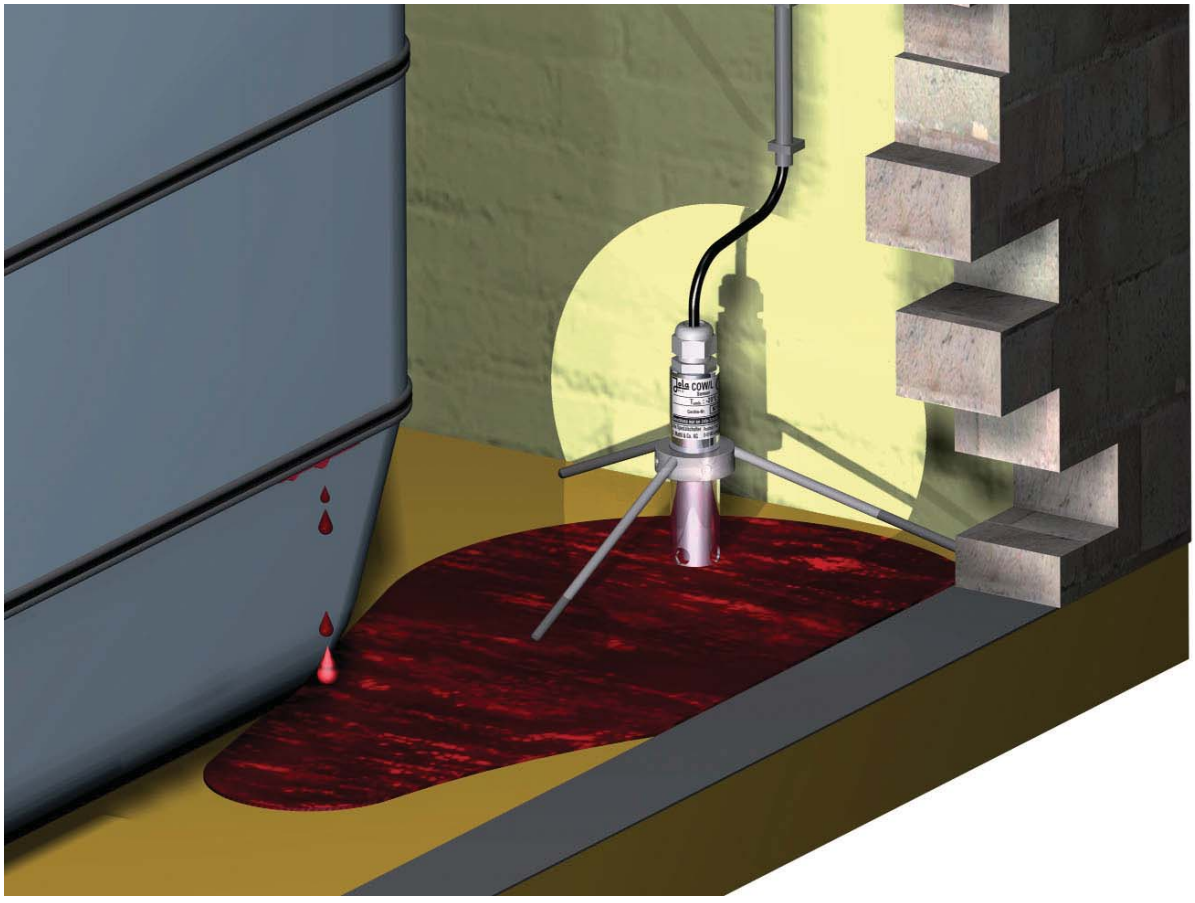
The capacitive measuring principle

The capacitive measuring principle is mainly used for the detection of **electrically non-conductive (insulating) liquids**, but it can also be used to detect electrically conductive liquids.

Electrically non-conductive liquids are generally organic liquids like oils and solvents. An electrode assembly forms a measuring capacitor, and the dielectric is either air or liquid. The dielectric constant of air is 1. The dielectric constant of the liquid to be detected is higher. For our capacitive sensors, the dielectric constant has to be higher than 2 (types CPE) or 1.8 (types OWE and COW).

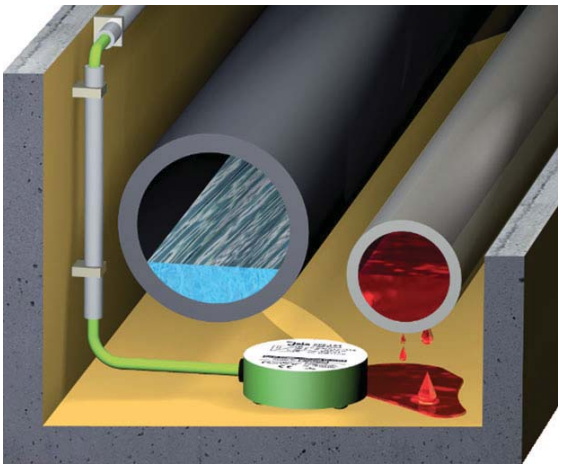
The capacitive leakage detector recognises a change in the dielectric constant at the measuring capacitor and an alarm signal is emitted. The design of the measuring capacitor allows direct mounting on the floor and generally rules out the possibility of interference effects due to different subsurfaces. The capacitive leakage detector has an integrated electronic evaluation unit with galvanically separated circuits. This prevents interconnection of the sensor circuits and the formation of ground loops if more than one of these leakage detectors is connected and where the detected liquid is conductive.

Application example: detection of a heating oil leakage



Capacitive plate sensors CPE-...

Leckwatcher	Liqui-Switch	L-Pointer
• Leakage detectors for connection to: a PLC or DDC unit, a small controller, a fieldbus connector or a network connector	• Leakage detectors for connection to: a PLC or DDC unit, a small controller, a fieldbus connector or a network connector	• Leakage detectors 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
	• with potential-free relay contact (for switching e.g. a solenoid valve with extra low voltage SELV or PELV)	• for connection to: NAMUR isolation amplifier or NAMUR fieldbus terminal
• with integrated galvanic separation of the sensor electronics	• with integrated galvanic separation of the sensor electronics	• with integrated galvanic separation between sensor circuit and supply current circuit with impressed signal current



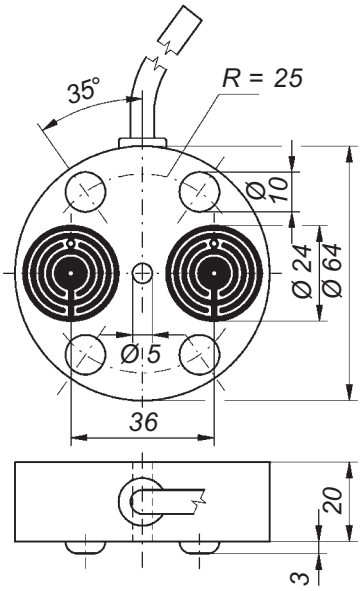
Designed to signal the presence of a **non-conductive or conductive liquid** caused, for example, by burst pipes.

Capacitive plate sensors CPE-... should only be used in normally dry environments. They must be installed on the floor in such a way that the sensor side faces downwards and the label side upwards.

Each capacitive plate sensor of the type CPE-... is equipped with two round PCBs with gold-plated concentric strip conductor rings. Rings as screening electrodes and rings as measuring electrodes form 1 detection capacitor per PCB. 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.

Plate sensor CPE-..., sensor side

Plate sensor CPE-SPS4, label side



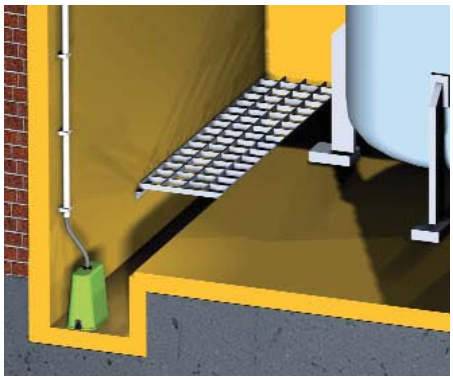
Technical data	CPE-SPS2	CPE-SPS3	CPE-SPS4
Design	leakage detector with quiescent current / NC (break) contact		
Detection capacitors	2 round PCBs with gold-plated concentric strip conductor rings form 2 detection capacitors		
Housing	PP and cast resin		
Electrical connection	**two-wire connection** via connecting cable 2 x 0.75	**three-wire connection** via connecting cable 3 x 0.75	**four-wire connection** via connecting cable 4 x 0.5
	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 24 V ± 20 % via input resistance 2 kΩ ... 7.5 kΩ	AC/DC 12 ... 30 V; wire colours: brown and blue	AC/DC 12 ... 30 V; wire colours: brown and blue
Power consumption	max. 0.5 W	max. 0.5 VA	max. 0.5 VA
Output	evaluation based on the magnitude of power consumption	PNP transistor output; to be wired via the input resistance of the follow-up circuit of 2 kΩ ... 7.5 kΩ; wire colour: black	potential-free reed contact with protective resistance 62 Ω, max. load AC/DC 30 V, 100 mA, 3 W; wire colours: black and black
Short circuit protection	present, I_k < 30 mA	at transistor output, I_k < 30 mA	reed contact at output short circuit proof for short periods via integrated protective resistance of 62 Ω; however, the reed contact is open if the supply voltage of the sensor is incorrectly connected
Switching status without supply voltage	Low signal	Low signal	reed contact open
Switching status both detection capacitors not activated	power consumption > 2 mA, generates High signal at input resistance of follow-up circuit	PNP transistor output carries rectified supply voltage = High signal	reed contact closed
Switching status one or two detection capacitor(s) activated	power consumption < 0.7 mA, generates Low signal at input resistance of follow-up circuit	PNP transistor output carries no voltage = Low signal	reed contact open
Cable break monitoring of connecting cable	cable break monitoring due to the quiescent current		
Galvanic separation	**only for connection to extra low voltage SELV or PELV!** voltage resistance > 500 V between capacitor circuit and		
	supply circuit	supply circuit and transistor output	supply circuit and output circuit
Max. no-load voltage at the detection capacitors	5 V_{eff} ⊓⊔ 40 kHz (safety extra low voltage SELV)		
Max. short circuit current at the detection capacitors	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	depends on the technical data of the follow-up circuit		
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.		

Technical data	CPE-LS4	CPE-LS4/A	CPE-LS5
Design	leakage detector with relay output		
Detection capacitors	2 round PCBs with gold-plated concentric strip conductor rings form 2 detection capacitors		
Housing	PP and cast resin		
Electrical connection	**four-wire connection**	**four-wire connection**	**five-wire connection**
	via connecting cable		
	4 x 0.5	4 x 0.5	5 x 0.5
	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!** AC/DC 24 V ± 20 %, on request AC/DC 12 V ± 20 %		
	wire colours: brown and blue	wire colours: brown and blue	wire colours: black and black
Power consumption	approx. 0.5 VA		
Output	potential-free quiescent current (NC) contact	potential-free working current (NO) contact	potential-free changeover (CO) contact
	max. load AC/DC 5 ... 24 V (extra low voltage SELV or PELV only); AC/DC 1 mA ... 3 (1) A		
	wire colours: black and black (grey)		wire colours: brown, grey a. blue
Switching status without supply voltage	output relay de-energised, output contact open	output relay de-energised, output contact closed	output relay de-energised, changeover in pos. 1 (grey and blue)
Switching status both detection capacitors not activated	output relay energised, output contact closed	output relay energised, output contact open	output relay energised, changeover in pos. 2 (grey and brown)
Switching status one or two detection capacitor(s) activated	output relay de-energised, output contact open	output relay de-energised, output contact closed	output relay de-energised, changeover in pos. 1 (grey and blue)
Cable break monitoring of connecting cable	cable break monitoring due to the quiescent current	—	—
Galvanic separation	**only for connection to extra low voltage SELV or PELV!** voltage resistance > 500 V between capacitor circuit, supply circuit and output circuit		
Max. no-load voltage at the detection capacitors	5 V_{eff} ⊓⊔ 40 kHz (safety extra low voltage SELV)		
Max. short circuit current at the detection capacitors	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	depends on the technical data of the follow-up circuit		
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		

Technical data	CPE-KNI	CPE-KNI/A
Design	leakage detector with evaluation electronics as an initiator for a NAMUR circuit	
Detection capacitors	2 round PCBs with gold-plated concentric strip conductor rings form 2 detection capacitors	
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	working current principle
Switching status in case of cable break	I < 0.2 mA	I < 0.2 mA
Switching status one or two detection capacitor(s) activated	I ≤ 1 mA	I ≥ 3 mA
Switching status both detection capacitors not activated	I ≥ 3 mA	I ≤ 1 mA
Switching status in case of short circuit or false polarity	I > 6 mA	I > 6 mA
Galvanic separation	**only for connection to extra low voltage SELV or PELV!** voltage resistance > 500 V between capacitor circuit and supply circuit with impressed signal current	
Max. no-load voltage at the detection capacitors	5 V_{eff} ⊓⊔ 200 kHz (safety extra low voltage SELV)	
Max. short circuit current at the detection capacitors	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 the line resistance should not exceed 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.	

Capacitive suspension sensors OWE-...

Leckwatcher	Liqui-Switch	L-Pointer
• Leakage detectors for connection to: a PLC or DDC unit, a small controller, a fieldbus connector or a network connector	• Leakage detectors for connection to: a PLC or DDC unit, a small controller, a fieldbus connector or a network connector	• Leakage detectors 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
	• with potential-free relay contact (for switching e.g. a solenoid valve with extra low voltage SELV or PELV)	• for connection to: NAMUR isolation amplifier or NAMUR fieldbus terminal
• with integrated galvanic separation of the sensor electronics	• with integrated galvanic separation of the sensor electronics	• with integrated galvanic separation between sensor circuit and supply current circuit with impressed signal current

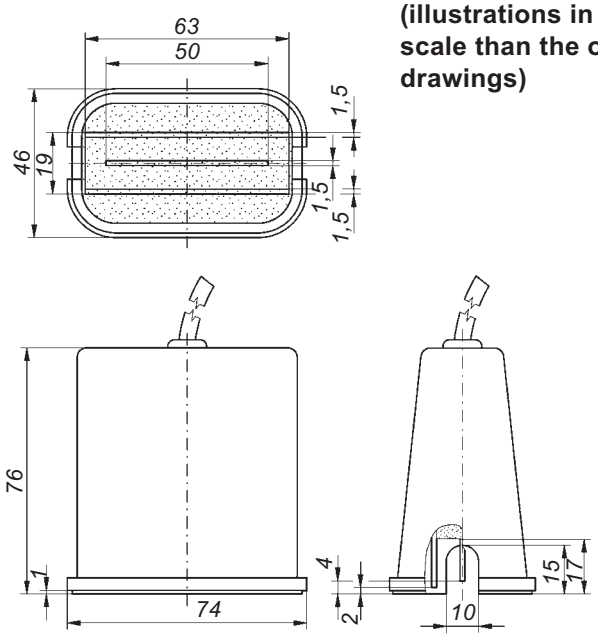


Designed to signal the presence of a **non-conductive or conductive liquid** caused, for example, by burst pipes.

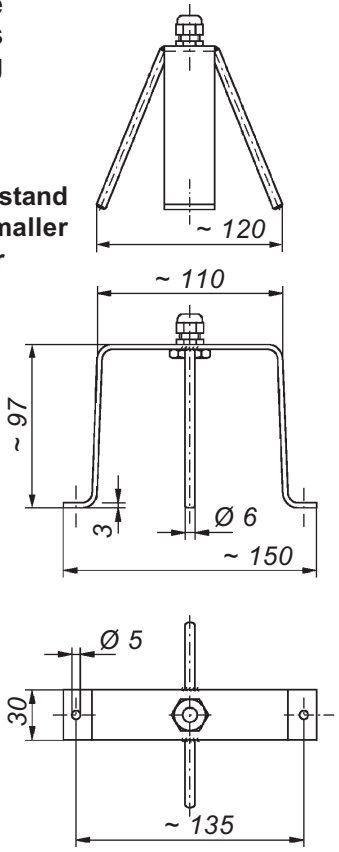
Capacitive suspension sensors OWE-... should only be used in normally dry environments. They must be installed in such a way that the sensor side points downwards.

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

Suspension sensor OWE-LS4



Optional: mounting stand (illustrations in a smaller scale than the other drawings)



Technical data	OWE-SPS2	OWE-SPS3	OWE-SPS4
Design	leakage detector with quiescent current / NC (break) contact		
Detection capacitor	2 outer one-side-gold-plated PCBs and 1 inner two-side-gold-plated PCB form a double plate capacitor		
Housing	PP and cast resin		
Electrical connection	**two-wire connection** via connecting cable 2 x 0.75	**three-wire connection** via connecting cable 3 x 0.75	**four-wire connection** via connecting cable 4 x 0.5
	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 24 V ± 20 % via input resistance 2 kΩ ... 7.5 kΩ	AC/DC 12 ... 30 V; wire colours: brown and blue	AC/DC 12 ... 30 V; wire colours: brown and blue
Power consumption	max. 0.5 W	max. 0.5 VA	max. 0.5 VA
Output	evaluation based on the magnitude of power consumption	PNP transistor output; to be wired via the input resistance of the follow-up circuit of 2 kΩ ... 7.5 kΩ; wire colour: black	potential-free reed contact with protective resistance 62 Ω, max. load AC/DC 30 V, 100 mA, 3 W; wire colours: black and black
Short circuit protection	present, I_k < 30 mA	at transistor output, I_k < 30 mA	reed contact at output short circuit proof for short periods via integrated protective resistance of 62 Ω; however, the reed contact is open if the supply voltage of the sensor is incorrectly connected
Switching status without supply voltage	Low signal	Low signal	reed contact open
Switching status detection capacitor not activated	power consumption > 2 mA, generates High signal at input resistance of follow-up circuit	PNP transistor output carries rectified supply voltage = High signal	reed contact closed
Switching status detection capacitor activated	power consumption < 0.7 mA, generates Low signal at input resistance of follow-up circuit	PNP transistor output carries no voltage = Low signal	reed contact open
Cable break monitoring of connecting cable	cable break monitoring due to the quiescent current		
Galvanic separation	**only for connection to extra low voltage SELV or PELV!** voltage resistance > 500 V between capacitor circuit and		
	supply circuit	supply circuit and transistor output	supply circuit and output circuit
Max. no-load voltage at the detection capacitor	5 V_{eff} ⊓⊔ 40 kHz (safety extra low voltage SELV)		
Max. short circuit current at the detection capacitor	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	depends on the technical data of the follow-up circuit		
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.		

Technical data	OWE-LS4	OWE-LS4/A	OWE-LS5
Design	leakage detector with relay output		
Detection capacitor	2 outer one-side-gold-plated PCBs and 1 inner two-side-gold-plated PCB form a double plate capacitor		
Housing	PP and cast resin		
Electrical connection	**four-wire connection**	**four-wire connection** via connecting cable	**five-wire connection**
	4 x 0.5	4 x 0.5	5 x 0.5
	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!** AC/DC 24 V ± 20 %, on request AC/DC 12 V ± 20 %		
	wire colours: brown and blue	wire colours: brown and blue	wire colours: black and black
Power consumption	approx. 0.5 VA		
Output	potential-free quiescent current (NC) contact	potential-free working current (NO) contact	potential-free changeover (CO) contact
	max. load AC/DC 5 ... 24 V (extra low voltage SELV or PELV only); AC/DC 1 mA ... 3 (1) A		
	wire colours: black and black (grey)		wire colours: brown, grey a. blue
Switching status without supply voltage	output relay de-energised, output contact open	output relay de-energised, output contact closed	output relay de-energised, changeover in pos. 1 (grey and blue)
Switching status detection capacitor not activated	output relay energised, output contact closed	output relay energised, output contact open	output relay energised, changeover in pos. 2 (grey and brown)
Switching status detection capacitor activated	output relay de-energised, output contact open	output relay de-energised, output contact closed	output relay de-energised, changeover in pos. 1 (grey and blue)
Cable break monitoring of connecting cable	cable break monitoring due to the quiescent current	—	—
Galvanic separation	**only for connection to extra low voltage SELV or PELV!** voltage resistance > 500 V between capacitor circuit, supply circuit and output circuit		
Max. no-load voltage at the detection capacitor	5 V_{eff} ⊓⊔ 40 kHz (safety extra low voltage SELV)		
Max. short circuit current at the detection capacitor	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	depends on the technical data of the follow-up circuit		
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.		

Technical data	OWE-KNI	OWE-KNI/A
Design	leakage detector with evaluation electronics as an initiator for a NAMUR circuit	
Detection capacitor	2 outer one-side-gold-plated PCBs and 1 inner two-side-gold-plated PCB form a double plate capacitor	
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	working current principle
Switching status in case of cable break	I < 0.2 mA	I < 0.2 mA
Switching status detection capacitor activated	I ≤ 1 mA	I ≥ 3 mA
Switching status detection capacitor not activated	I ≥ 3 mA	I ≤ 1 mA
Switching status in case of short circuit or false polarity	I > 6 mA	I > 6 mA
Galvanic separation	**only for connection to extra low voltage SELV or PELV!** voltage resistance > 500 V between capacitor circuit and supply circuit with impressed signal current	
Max. no-load voltage at the detection capacitor	5 V_{eff} ⊓⊔ 200 kHz (safety extra low voltage SELV)	
Max. short circuit current at the detection capacitor	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 the line resistance should not exceed 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.	

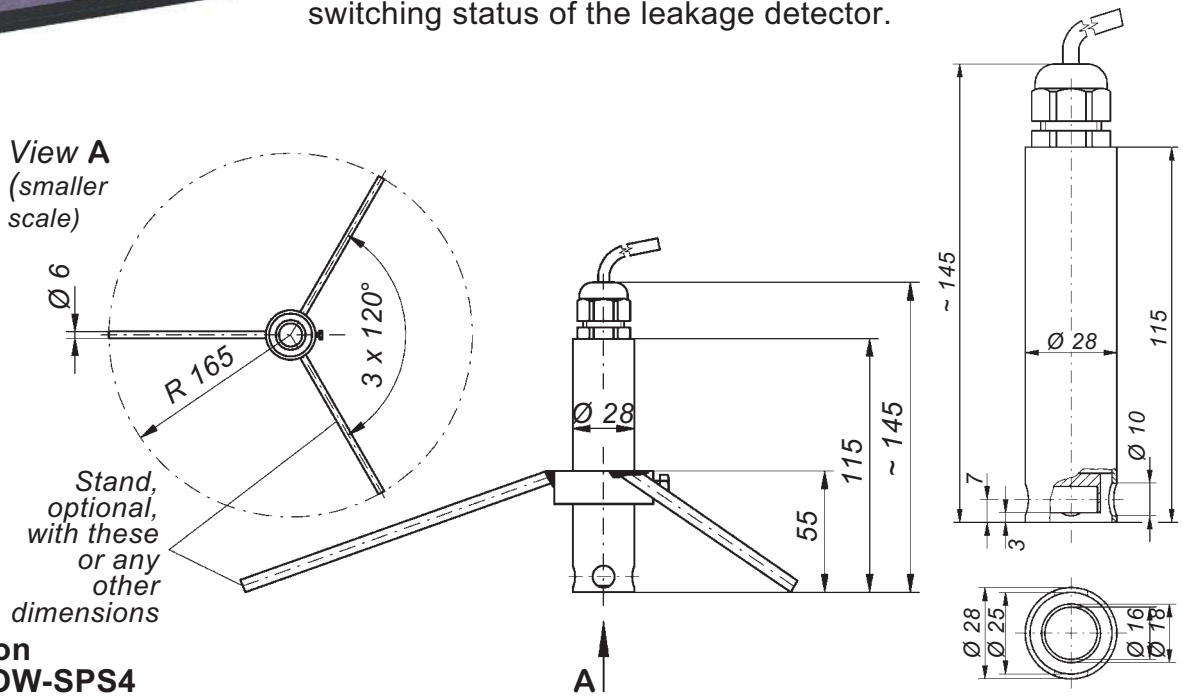
Capacitive suspension sensors COW-...

Leckwatcher	Liqui-Switch	L-Pointer
• Leakage detectors for connection to: a PLC or DDC unit, a small controller, a fieldbus connector or a network connector	• Leakage detectors for connection to: a PLC or DDC unit, a small controller, a fieldbus connector or a network connector	• Leakage detectors 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
	• with potential-free relay contact (for switching e.g. a solenoid valve with extra low voltage SELV or PELV)	• for connection to: NAMUR isolation amplifier or NAMUR fieldbus terminal
• with integrated galvanic separation of the sensor electronics	• with integrated galvanic separation of the sensor electronics	• with integrated galvanic separation between sensor circuit and supply current circuit with impressed signal current

Designed to signal the presence of a **non-conductive or conductive liquid** caused, for example, by burst pipes.

Capacitive suspension sensors COW-... should only be used in normally dry environments. They must be installed in such a way that the sensor side points downwards.

A hollow stainless steel cylinder is integrated in the capacitive suspension sensor of the type COW-.... The stainless steel housing as screening electrode and the hollow inner cylinder as measuring electrode form 1 detection capacitor. As soon as a non-conductive liquid flows into the space between housing and inner cylinder, the capacitance between housing and inner cylinder changes and so does the switching status of the leakage detector. If a conductive liquid is present, the housing and the inner cylinder are conductively bridged, and this also results in a change in the switching status of the leakage detector.



Suspension sensor COW-SPS4

Technical data	COW-SPS2	COW-SPS3	COW-SPS4
Design	leakage detector with quiescent current / NC (break) contact		
Detection capacitor	stainless steel housing as screening electrode and inner cylinder as measuring electrode form 1 detection capacitor		
Housing	stainless steel 316 Ti with PTFE insulator		
Electrical connection	**two-wire connection** via connecting cable 2 x 0.75	**three-wire connection** via connecting cable 3 x 0.75	**four-wire connection** via connecting cable 4 x 0.5
	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 24 V ± 20 % via input resistance 2 kΩ ... 7.5 kΩ	AC/DC 12 ... 30 V; wire colours: brown and blue	AC/DC 12 ... 30 V; wire colours: brown and blue
Power consumption	max. 0.5 W	max. 0.5 VA	max. 0.5 VA
Output	evaluation based on the magnitude of power consumption	PNP transistor output; to be wired via the input resistance of the follow-up circuit of 2 kΩ ... 7.5 kΩ; wire colour: black	potential-free reed contact with protective resistance 62 Ω, max. load AC/DC 30 V, 100 mA, 3 W; wire colours: black and black
Short circuit protection	present, I_k < 30 mA	at transistor output, I_k < 30 mA	reed contact at output short circuit proof for short periods via integrated protective resistance of 62 Ω; however, the reed contact is open if the supply voltage of the sensor is incorrectly connected
Switching status without supply voltage	Low signal	Low signal	reed contact open
Switching status detection capacitor not activated	power consumption > 2 mA, generates High signal at input resistance of follow-up circuit	PNP transistor output carries rectified supply voltage = High signal	reed contact closed
Switching status detection capacitor activated	power consumption < 0.7 mA, generates Low signal at input resistance of follow-up circuit	PNP transistor output carries no voltage = Low signal	reed contact open
Cable break monitoring of connecting cable	cable break monitoring due to the quiescent current		
Galvanic separation	**only for connection to extra low voltage SELV or PELV!** voltage resistance > 500 V between capacitor circuit and		
	supply circuit	supply circuit and transistor output	supply circuit and output circuit
Max. no-load voltage at the detection capacitor	5 V_{eff} ⊓⊔ 40 kHz (safety extra low voltage SELV)		
Max. short circuit current at the detection capacitor	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	depends on the technical data of the follow-up circuit		
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.		

Technical data	COW-LS4	COW-LS4/A	COW-LS5
Design	leakage detector with relay output		
Detection capacitor	stainless steel housing as screening electrode and inner cylinder as measuring electrode		
	form 1 detection capacitor		
Housing	stainless steel 316 Ti with PTFE insulator		
Electrical connection	**four-wire connection**	**four-wire connection**	**five-wire connection**
	via connecting cable		
	4 x 0.5	4 x 0.5	5 x 0.5
	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!** AC/DC 24 V ± 20 %, on request AC/DC 12 V ± 20 %		
	wire colours: brown and blue	wire colours: brown and blue	wire colours: black and black
Power consumption	approx. 0.5 VA		
Output	potential-free quiescent current (NC) contact	potential-free working current (NO) contact	potential-free changeover (CO) contact
	max. load AC/DC 5 ... 24 V (extra low voltage SELV or PELV only); AC/DC 1 mA ... 3 (1) A		
	wire colours: black and black (grey)		wire colours: brown, grey a. blue
Switching status without supply voltage	output relay de-energised, output contact open	output relay de-energised, output contact closed	output relay de-energised, changeover in pos. 1 (grey and blue)
Switching status detection capacitor not activated	output relay energised, output contact closed	output relay energised, output contact open	output relay energised, changeover in pos. 2 (grey and brown)
Switching status detection capacitor activated	output relay de-energised, output contact open	output relay de-energised, output contact closed	output relay de-energised, changeover in pos. 1 (grey and blue)
Cable break monitoring of connecting cable	cable break monitoring due to the quiescent current	—	—
Galvanic separation	**only for connection to extra low voltage SELV or PELV!** voltage resistance > 500 V between capacitor circuit, supply circuit and output circuit		
Max. no-load voltage at the detection capacitor	5 V_{eff} ⊓⊔ 40 kHz (safety extra low voltage SELV)		
Max. short circuit current at the detection capacitor	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	depends on the technical data of the follow-up circuit		
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.		

Technical data	COW-KNI	COW-KNI/A
Design	leakage detector with evaluation electronics as an initiator for a NAMUR circuit	
Detection capacitor	stainless steel housing as screening electrode and inner cylinder as measuring electrode form 1 detection capacitor	
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	working current principle
Switching status in case of cable break	I < 0.2 mA	I < 0.2 mA
Switching status detection capacitor activated	I ≤ 1 mA	I ≥ 3 mA
Switching status detection capacitor not activated	I ≥ 3 mA	I ≤ 1 mA
Switching status in case of short circuit or false polarity	I > 6 mA	I > 6 mA
Galvanic separation	**only for connection to extra low voltage SELV or PELV!** voltage resistance > 500 V between capacitor circuit and supply circuit with impressed signal current	
Max. no-load voltage at the detection capacitor	5 V_{eff} ⊓⊔ 200 kHz (safety extra low voltage SELV)	
Max. short circuit current at the detection capacitor	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 the line resistance should not exceed 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.	