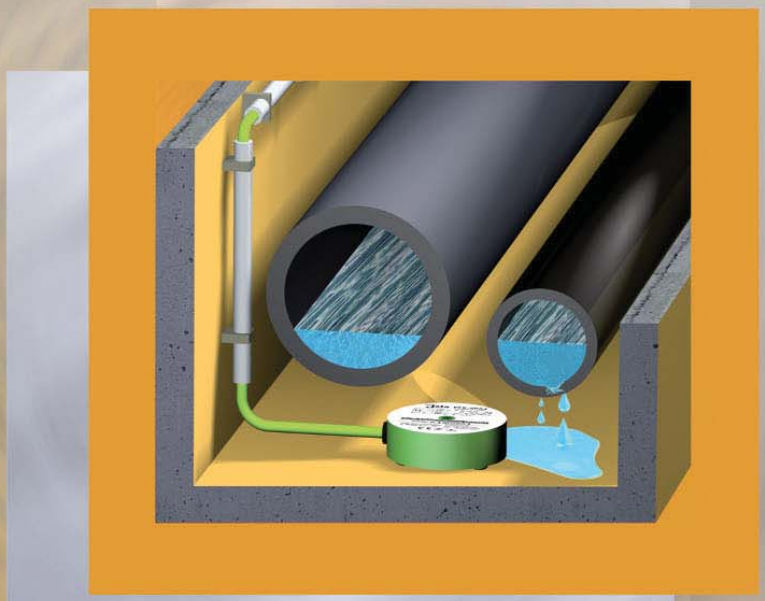
Conductive leakage detectors

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.

Conductive 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

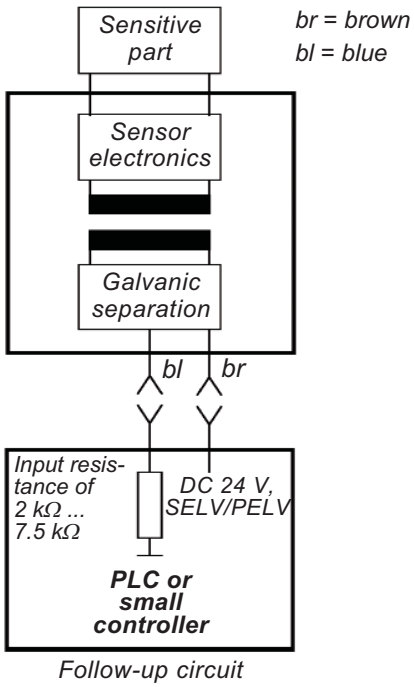
- **Leakage detectors for NAMUR circuits in line with EN 50 227 (formerly known as DIN 19 234) with the option of detecting cable break, standby status, alarm status and short-circuit**
- **for connection to:**
  NAMUR isolation amplifier or
  NAMUR fieldbus terminal
- **with integrated galvanic separation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

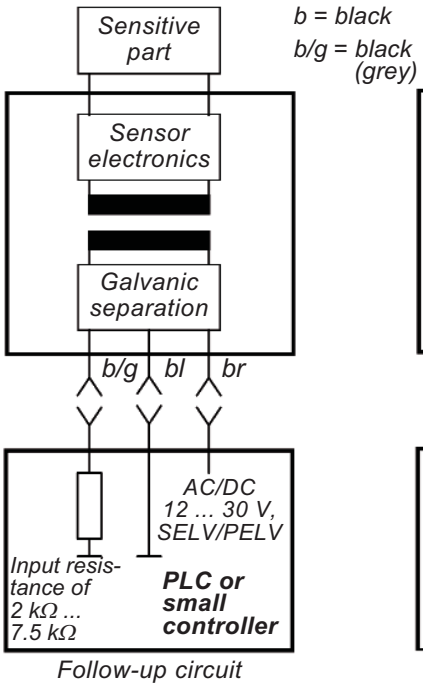
2-wire version: -SPS2	3-wire version: -SPS3 (with PNP transistor output)	4-wire version: -SPS4 (with potential-free reed contact output)
Connection: Only for connection to extra low voltage SELV or PELV!		
2 wires for the supply of direct voltage, fully functional with any polarity and short-circuit 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



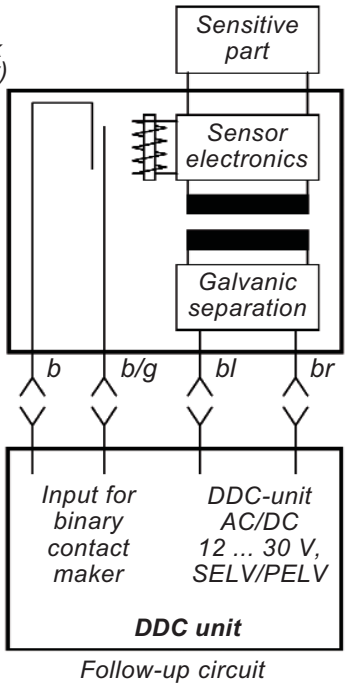
Follow-up circuit

Application example



Follow-up circuit

Application example



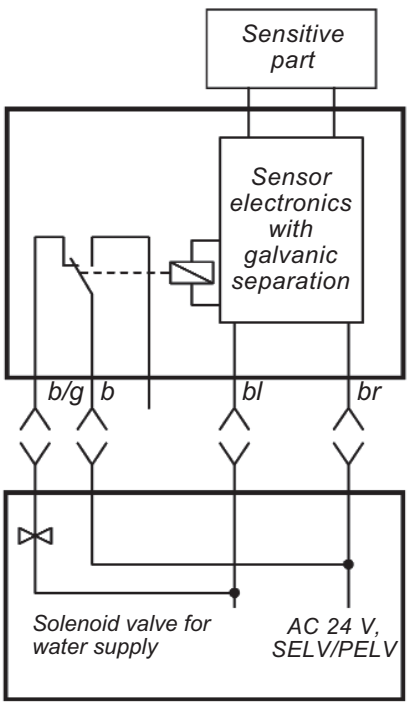
Follow-up circuit

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.	

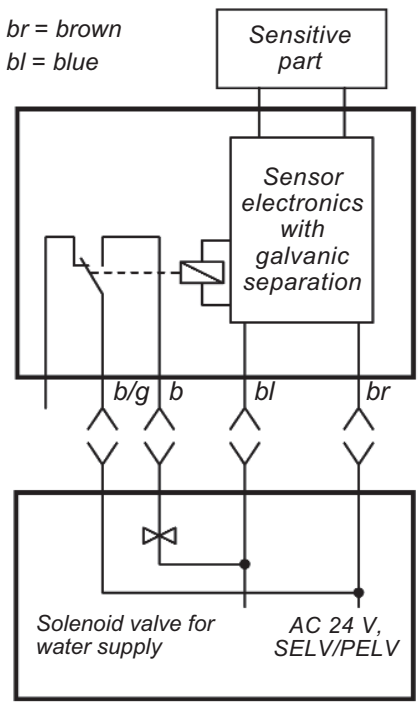
Series or parallel connection of these detectors is possible, also in combination with other potential-free contacts. In such cases, you must observe the relevant technical data and safety regulations.

Application example



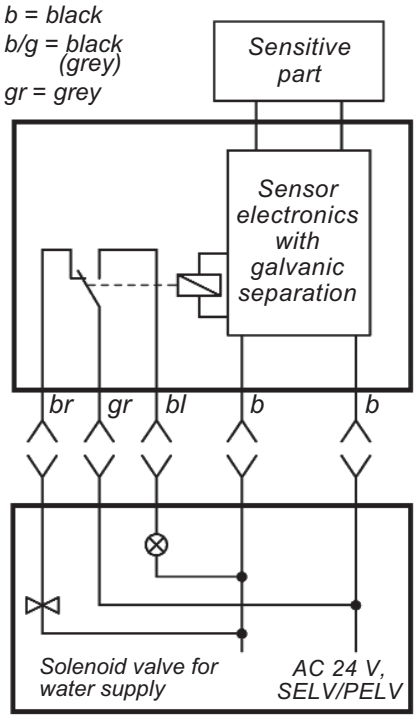
Follow-up circuit

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

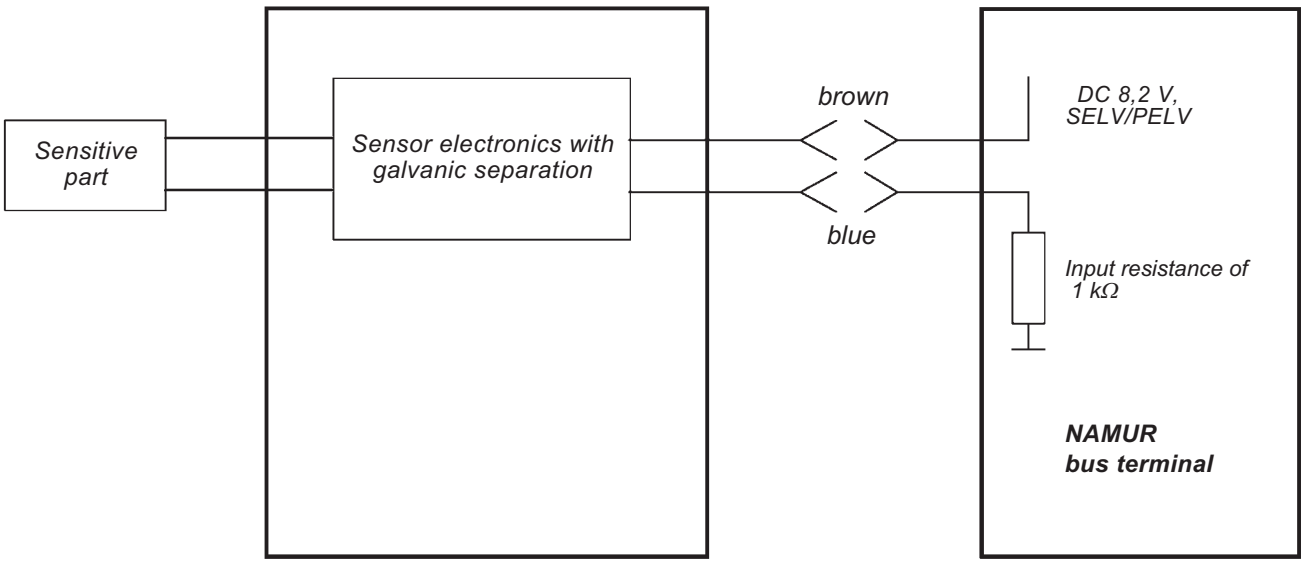
Connection: Only for connection to extra low voltage SELV or PELV!

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 conductive measuring principle

The conductive measuring principle is used for the detection of **electrically conductive liquids**. It is not suitable for the detection of electrically non-conductive liquids.

Electrically conductive liquids are generally aqueous solutions of salts, acids or alkalis. The molecules of these substances dissociate in water into positive and negative ions which give the aqueous solution its electrical conductivity. The conductive leakage detector detects the presence of an electrically conductive liquid and an alarm signal is then emitted.

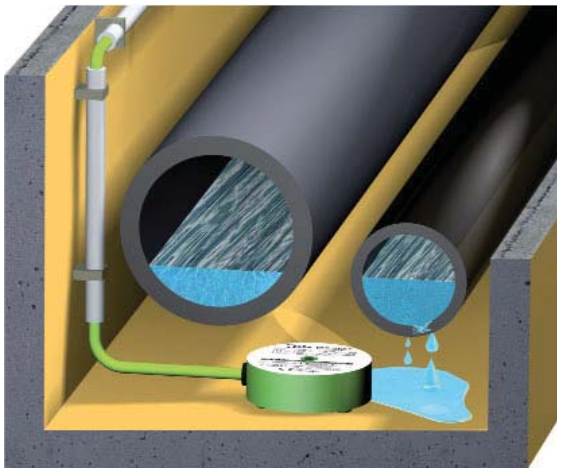
The measurement process uses alternating current to ensure exact response sensitivity and to prevent galvanic processes at the electrodes. The conductive leakage detector has an integrated electronic evaluation unit with galvanically separated circuits. This prevents interconnection of the electrode circuits and the formation of ground loops if more than one of these leakage detectors is connected.

Reliable detection of liquids with poor electrical conductivity such as condensate or demineralised water is ensured by the ex-factory setting for the response sensitivity of the conductive leakage detector.

Application example:
monitoring of a false floor in a server room using a cable electrode as well as a plate electrode in the adjacent room.

Conductive plate electrodes PEK-...

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



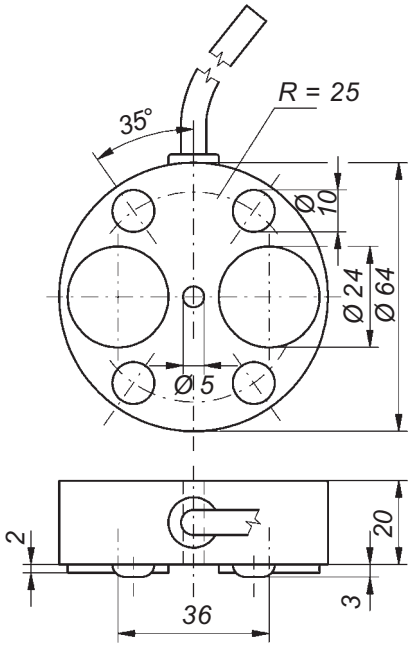
Designed to signal the presence of a **conductive liquid** caused, for example, by burst pipes.

Conductive plate electrodes PEK-... 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.

The conductive plate electrode PEK-... is fitted with two separate electrodes in the form of two electrode plates: 1 control electrode and 1 earth electrode. As soon as a conductive liquid creates a conductive path between the two electrode plates, the switching status of the leakage detector changes.

Plate electrode PEK-..., sensor side

Plate electrode PEK-KNI, label side



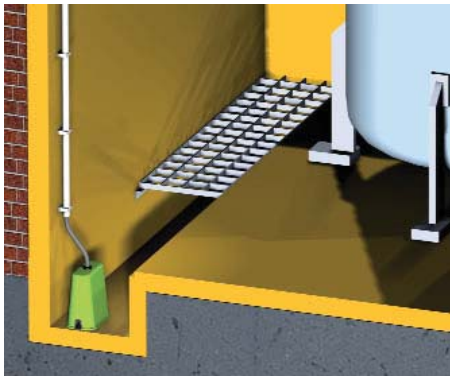
Technical data	PEK-SPS2	PEK-SPS3	PEK-SPS4
Design	leakage detector with quiescent current / NC (break) contact		
Electrode plates	2 plates made of stainless steel 316 Ti, each with 24 mm dia.		
Housing	PP and cast resin		
Electrical connection	**two-wire connection** via connecting cable 2 x 0.75	**three-wire connection** via connecting cable 3 x 0.75	**four-wire connection** via connecting cable 4 x 0.5
	length 2 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 with dry electrode plates	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 with wet electrode plates	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 electrode plate circuit and		
	supply circuit	supply circuit and transistor output	supply circuit and output circuit
Max. no-load voltage at the electrode plates	5 V_{eff} ⊓⊔ 600 Hz		
Max. short circuit current at the electrode plates	0.2 mA		
Response sensitivity	approx. 30 kΩ or approx. 33 µS (conductance)		
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	PEK-LS4	PEK-LS4/A	PEK-LS5
Design	leakage detector with relay output		
Electrode plates	2 plates made of stainless steel 316 Ti, each with 24 mm dia.		
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 2 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 with dry electrode plates	output relay energised, output contact closed	output relay energised, output contact open	output relay energised, changeover in pos. 2 (grey and brown)
Switching status with wet electrode plates	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 electrode plate circuit, supply circuit and output circuit		
Max. no-load voltage at the electrode plates	5 V_{eff} ⎍ 15 kHz (safety extra low voltage SELV)		
Max. short circuit current at the electrode plates	0.2 mA		
Response sensitivity	approx. 30 kΩ or approx. 33 µS (conductance)		
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	PEK-KNI	PEK-KNI/A
Design	leakage detector with evalutation electronics as an initiator for a NAMUR circuit	
Electrode plates	2 plates made of stainless steel 316 Ti, each with 24 mm dia.	
Housing	PP and cast resin	
Electrical connection	**two-wire connection** via connecting cable 2 x 0.75; length 2 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 with wet electrode plates	I ≤ 1 mA	I ≥ 3 mA
Switching status with dry electrode plates	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 electrode plate circuit and supply circuit with impressed signal current	
Max. no-load voltage at the electrode plates	5 V_{eff} ⊓⊔ 15 kHz (safety extra low voltage SELV)	
Max. short circuit current at the electrode plates	0.2 mA	
Response sensitivity	approx. 30 kΩ or approx. 33 µS (conductance)	
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.	

Conductive plate electrodes WDX-...

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 **conductive liquid** caused, for example, by burst pipes.

Conductive plate electrodes WDX-... 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 cable upwards.

The conductive plate electrode WDX-... is fitted with two separate electrodes in the form of two electrode plates: 1 control electrode and 1 earth electrode. As soon as a conductive liquid creates a conductive path between the two electrode plates, the switching status of the leakage detector changes.

Optional: mounting stand
(diagrams with smaller scale compared to below drawings)

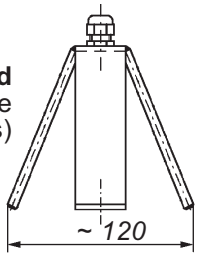
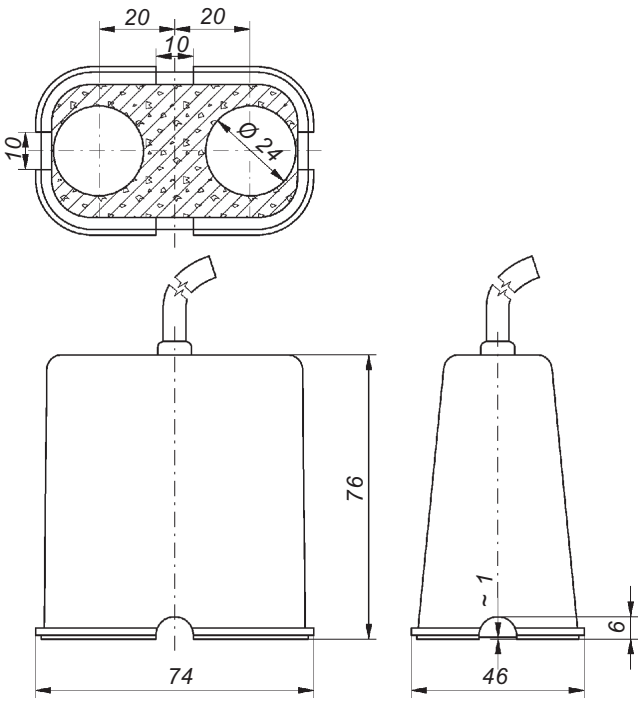
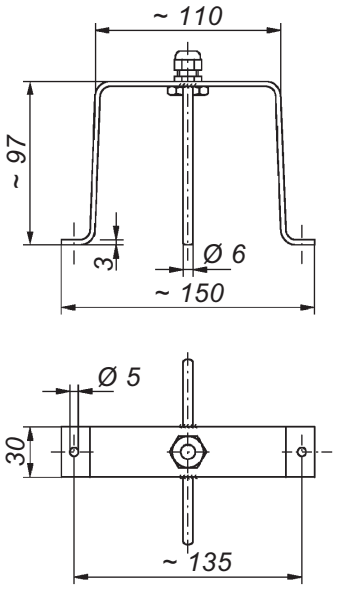


Plate electrode WDX-KNI





Technical data	WDX-SPS2	WDX-SPS3	WDX-SPS4
Design	leakage detector with quiescent current / NC (break) contact		
Electrode plates	2 plates made of stainless steel 316 Ti, each with 24 mm dia.		
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 2 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 with dry electrode plates	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 with wet electrode plates	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 electrode plate circuit and		
	supply circuit	supply circuit and transistor output	supply circuit and output circuit
Max. no-load voltage at the electrode plates	5 V_{eff} ⊓⊔ 600 Hz		
Max. short circuit current at the electrode plates	0.2 mA		
Response sensitivity	approx. 30 kΩ or approx. 33 µS (conductance)		
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	WDX-LS4	WDX-LS4/A	WDX-LS5
Design	leakage detector with relay output		
Electrode plates	2 plates made of stainless steel 316 Ti, each with 24 mm dia.		
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 2 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 with dry electrode plates	output relay energised, output contact closed	output relay energised, output contact open	output relay energised, changeover in pos. 2 (grey and brown)
Switching status with wet electrode plates	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 electrode plate circuit, supply circuit and output circuit		
Max. no-load voltage at the electrode plates	5 V_{eff} ⊓⊔ 15 kHz (safety extra low voltage SELV)		
Max. short circuit current at the electrode plates	0.2 mA		
Response sensitivity	approx. 30 kΩ or approx. 33 µS (conductance)		
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	WDX-KNI	WDX-KNI/A
Design	leakage detector with evalutation electronics as an initiator for a NAMUR circuit	
Electrode plates	2 plates made of stainless steel 316 Ti, each with 24 mm dia.	
Housing	PP and cast resin	
Electrical connection	**two-wire connection** via connecting cable 2 x 0.75; length 2 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 with wet electrode plates	I ≤ 1 mA	I ≥ 3 mA
Switching status with dry electrode plates	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 electrode plate circuit and supply circuit with impressed signal current	
Max. no-load voltage at the electrode plates	5 V_{eff} ⊓⊔ 15 kHz (safety extra low voltage SELV)	
Max. short circuit current at the electrode plates	0.2 mA	
Response sensitivity	approx. 30 kΩ or approx. 33 µS (conductance)	
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.	

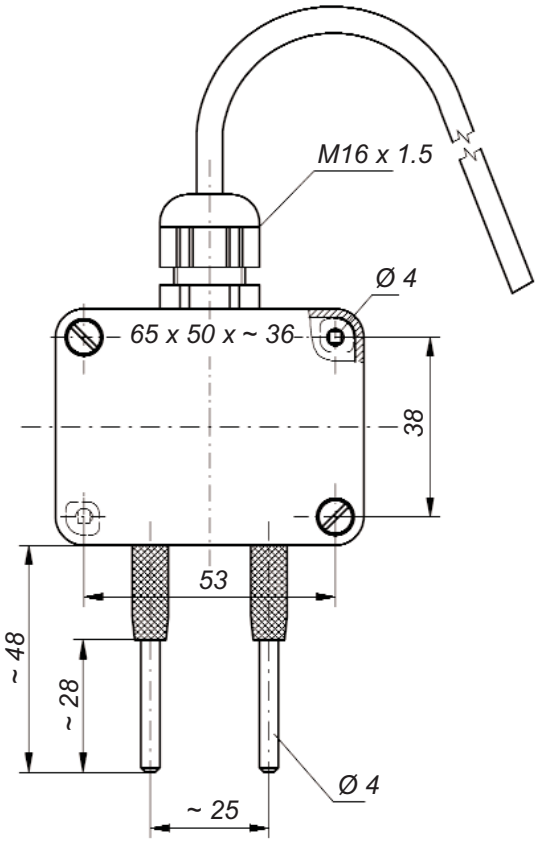
Conductive wall-mounted electrodes WAE1-...

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 • with potential-free relay contact (for switching e.g. a solenoid valve with extra low voltage SELV or PELV)	• 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 • 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 **conductive liquid** caused, for example, by burst pipes.

Conductive wall-mounted electrodes WAE1-... should only be used in normally dry environments. They must be mounted on the wall in such a way that the electrode rod tips are just slightly above the floor to be monitored.

The conductive wall-mounted electrode WAE1-... is fitted with two separate electrodes in the form of two electrode rods: 1 control electrode and 1 earth electrode. As soon as a conductive liquid creates a conductive path between the two electrode rods, the switching status of the leakage detector changes.



Technical data	WAE1-SPS2	WAE1-SPS3	WAE1-SPS4
Design	leakage detector with quiescent current / NC (break) contact		
Electrode rods	2 rods made of stainless steel 316 Ti, each with 4 mm dia.		
Housing	PC or PP		
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 2 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; 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 with dry electrode rods	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 with wet electrode rods	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 electrode rod circuit and		
	supply circuit	supply circuit and transistor output	supply circuit and output circuit
Max. no-load voltage at the electrode rods	5 V_{eff} ⊓⊔ 600 Hz		
Max. short circuit current at the electrode rods	0.2 mA		
Response sensitivity	approx. 30 kΩ or approx. 33 µS (conductance)		
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	WAE1-LS4	WAE1-LS4/A	WAE1-LS5
Design	leakage detector with relay output		
Electrode rods	2 rods made of stainless steel 316 Ti, each with 4 mm dia.		
Housing	PC or PP		
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 2 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 with dry electrode rods	output relay energised, output contact closed	output relay energised, output contact open	output relay energised, changeover in pos. 2 (grey and brown)
Switching status with wet electrode rods	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 electrode rod circuit, supply circuit and output circuit		
Max. no-load voltage at the electrode rods	5 V_{eff} ⊓⊔ 15 kHz (safety extra low voltage SELV)		
Max. short circuit current at the electrode rods	0.2 mA		
Response sensitivity	approx. 30 kΩ or approx. 33 µS (conductance)		
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	WAE1-KNI	WAE1-KNI/A
Design	leakage detector with evalutation electronics as an initiator for a NAMUR circuit	
Electrode rods	2 rods made of stainless steel 316 Ti, each with 4 mm dia.	
Housing	PC or PP	
Electrical connection	**two-wire connection** via connecting cable 2 x 0.75; length 2 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 with wet electrode rods	I ≤ 1 mA	I ≥ 3 mA
Switching status with dry electrode rods	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 electrode rod circuit and supply circuit with impressed signal current	
Max. no-load voltage at the electrode rods	5 V_{eff} ⊓⊔ 15 kHz (safety extra low voltage SELV)	
Max. short circuit current at the electrode rods	0.2 mA	
Response sensitivity	approx. 30 kΩ or approx. 33 µS (conductance)	
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.	

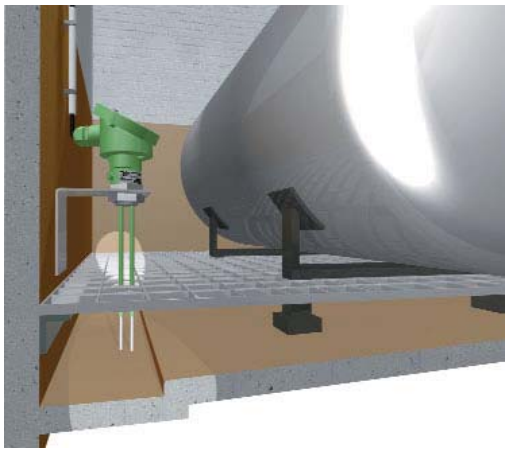
Conductive rod electrodes S 2 M/PP..., S 2 M/PVDF-... and S 2 AM-...

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 • with potential-free relay contact (for switching e.g. a solenoid valve with extra low voltage SELV or PELV)	• 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 • 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

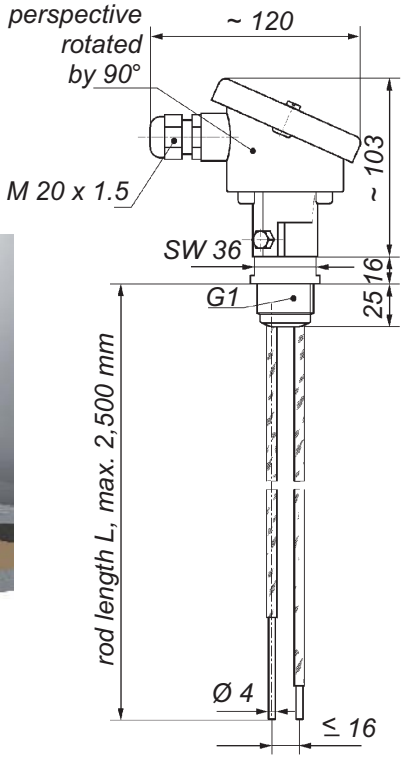
Designed to signal the presence of a **conductive liquid** caused, for example, by burst pipes.

Conductive rod electrodes should only be used in normally dry environments. They can be installed from the top or from the side. In both cases, it must be ensured that the electrode rod tips are just slightly above the floor to be monitored.

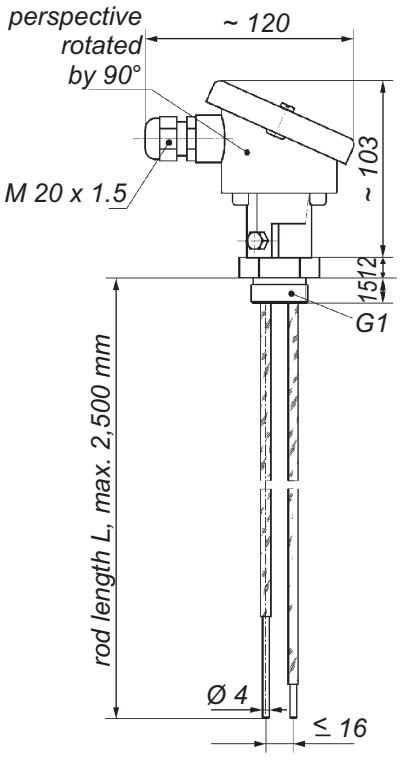
The conductive rod electrodes S 2 M/PP-..., S 2 M/PVDF-... and S 2 AM-... are fitted with two separate electrodes in the form of two electrode rods: 1 control electrode and 1 earth electrode. As soon as a conductive liquid creates a conductive path between the two electrode rods, the switching status of the leakage detector changes.



S 2 M/PP-...
or **S 2 M/PVDF-...**



S 2 AM-...



Technical data	S 2 M/PP-SPS2 S 2 M/PVDF-SPS2 S 2 AM-SPS2	S 2 M/PP-SPS3 S 2 M/PVDF-SPS3 S 2 AM-SPS3	S 2 M/PP-SPS4 S 2 M/PVDF-SPS4 S 2 AM-SPS4
Design	leakage detector with quiescent current / NC (break) contact		
Electrode rods	2 rods made of stainless steel 316 Ti; other materials (e. g. titanium, Hastelloy, Monel or tantalum) on request; each with 4 mm dia., covered with shrinkdown tubing made of polyolefin (S 2 M/PP-SPS. and S 2 AM-SPS.) or PVDF (S 2 M/PVDF-SPS.)		
Length	on request (measured from nipple sealing surface)		
Max. lengths	2,500 mm		
Screw-in nipple	G1; S 2 M/PP-SPS.: PP; S 2 M/PVDF-SPS.: PVDF; S 2 AM-SPS.: stainless steel 316 Ti, other materials on request		
Electrical connection	**two-wire connection** via 2-pole terminal block for max. 2.5 mm²	**three-wire connection** via 3-pole terminal block for max. 2.5 mm²	**four-wire connection** via 4-pole terminal block for max. 2.5 mm²
	in the PP connection head with cable entry M 20 x 1.5, protection class IP 54		
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	AC/DC 12 ... 30 V
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	potential-free reed contact with protective resistance 62 Ω, max. load AC/DC 30 V, 100 mA, 3 W;
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 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 with dry electrode rods	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 with wet electrode rods	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 electrode rod circuit and		
	supply circuit	supply circuit and transistor output	supply circuit and output circuit
Max. no-load voltage at the electrode rods	5 V_{eff} ⊓⊔ 600 Hz		
Max. short circuit current at the electrode rods	0.2 mA		
Response sensitivity	approx. 30 kΩ or approx. 33 µS (conductance)		
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	S 2 M/PP-LS4 S 2 M/PVDF-LS4 S 2 AM-LS4	S 2 M/PP-LS4/A S 2 M/PVDF-LS4/A S 2 AM-LS4/A	S 2 M/PP-LS5 S 2 M/PVDF-LS5 S 2 AM-LS5
Design	leakage detector with relay output		
Electrode rods	2 rods made of stainless steel 316 Ti; other materials (e. g. titanium, Hastelloy, Monel or tantalum) on request; each with 4 mm dia., covered with shrinkdown tubing made of polyolefin (S 2 M/PP-LS... and S 2 AM-LS...) or PVDF (S 2 M/PVDF-LS...)		
Length	on request (measured from nipple sealing surface)		
Max. lengths	2,500 mm		
Screw-in nipple	G1; S 2 M/PP-LS...: PP; S 2 M/PVDF-LS...: PVDF; S 2 AM-LS...: stainless steel 316 Ti, other materials on request		
Electrical connection	**four-wire connection** via 4-pole terminal block		**five-wire connection** via 5-pole terminal block
	for max. 2.5 mm² in the PP connection head with cable entry M 20 x 1.5, protection class IP 54		
Supply voltage	**only for connection to extra low voltage SELV or PELV!** AC/DC 24 V ± 20 %, on request AC/DC 12 V ± 20 %		
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		
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 position 1
Switching status with dry electrode rods	output relay energised, output contact closed	output relay energised, output contact open	output relay energised, changeover in position 2
Switching status with wet electrode rods	output relay de-energised, output contact open	output relay de-energised, output contact closed	output relay de-energised, changeover in position 1
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 electrode rod circuit, supply circuit and output circuit		
Max. no-load voltage at the electrode rods	5 V_{eff} ⊓⊔ 15 kHz (safety extra low voltage SELV)		
Max. short circuit current at the electrode rods	0.2 mA		
Response sensitivity	approx. 30 kΩ or approx. 33 µS (conductance)		
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	S 2 M/PP-KNI S 2 M/PVDF-KNI S 2 AM-KNI	S 2 M/PP-KNI/A S 2 M/PVDF-KNI/A S 2 AM-KNI/A
Design	leakage detector with evalutation electronics as an initiator for a NAMUR circuit	
Electrode rods	2 rods made of stainless steel 316 Ti; other materials (e.g. titanium, Hastelloy, Monel or tantalum) on request; each with 4 mm dia., covered with shrinkdown tubing made of polyolefin (S 2 M/PP-KNI... and S 2 AM-KNI...) or PVDF S 2 M/PVDF-KNI...)	
Length	on request (measured from nipple sealing surface)	
Max. length	2,500 mm	
Screw-in nipple	G1; S 2 M/PP-KNI...: PP; S 2 M/PVDF-KNI...: PVDF; S 2 AM-KNI...: stainless steel 316 Ti, other materials on request	
Electrical connection	**two-wire connection** via 2-pole terminal block for max. 2,5 mm² in the PP connection head with cable entry M 20 x 1.5, protection class IP 54	
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 with wet electrode rods	I ≤ 1 mA	I ≥ 3 mA
Switching status dry electrode rods	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 electrode rod circuit and supply circuit with impressed signal current	
Max. no-load voltage at the electrode rods	5 V_{eff} ⊓⊔ 15 kHz (safety extra low voltage SELV)	
Max. short circuit current at the electrode rods	0.2 mA	
Response sensitivity	approx. 30 kΩ or approx. 33 µS (conductance)	
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.	

Conductive suspension electrodes EHE-... and EHW3-...

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 • with potential-free relay contact (for switching e.g. a solenoid valve with extra low voltage SELV or PELV)	• 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 • 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

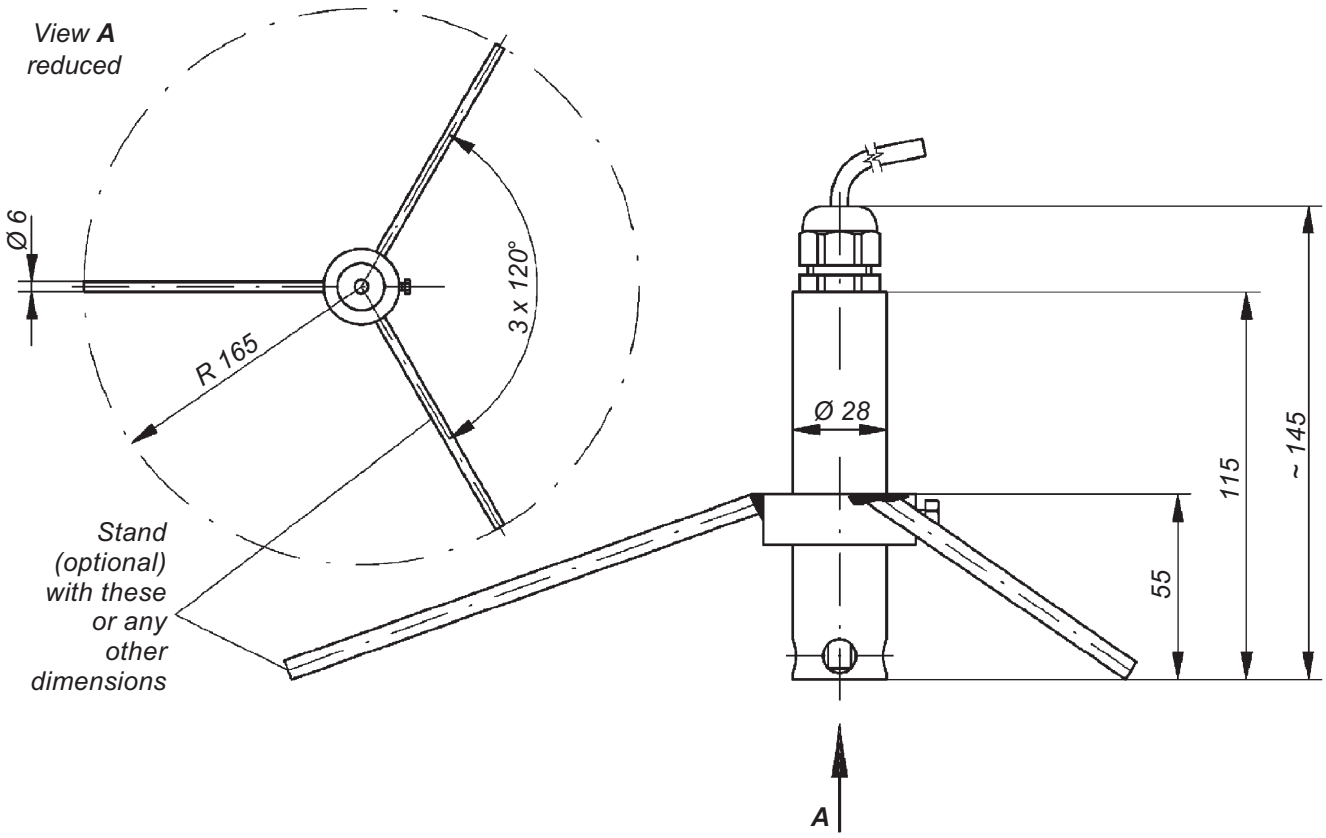
Designed to signal the presence of a **conductive liquid** caused, for example, by burst pipes.

Conductive suspension electrodes EHE-... and EHW-... should only be used in normally dry environments. They must be mounted in suspended mode from above (or in the case of the type EHE-... in an upright position using a mounting stand) in such a way that the sensor electrodes are just slightly above the floor to be monitored.

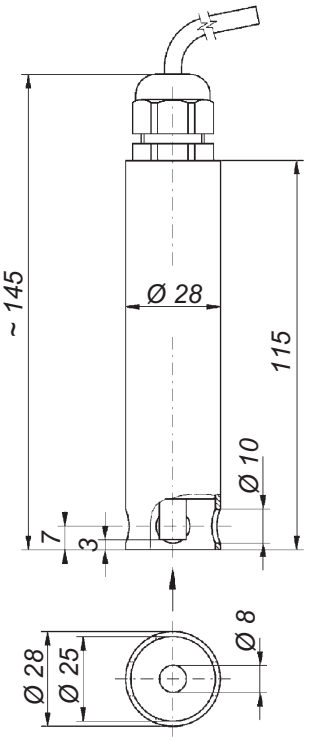
In the conductive suspension electrode EHE-..., the metal housing and a concentrically positioned electrode rod in the housing form an electrode pair; the conductive suspension electrode EHW3-... is fitted with two separate electrodes in the form of two electrode rods: 1 control electrode and 1 earth electrode. As soon as a conductive liquid creates a conductive path between the control electrode and the earth electrode, the switching status of the leakage detector changes.

EHE-SPS. with mounting stand

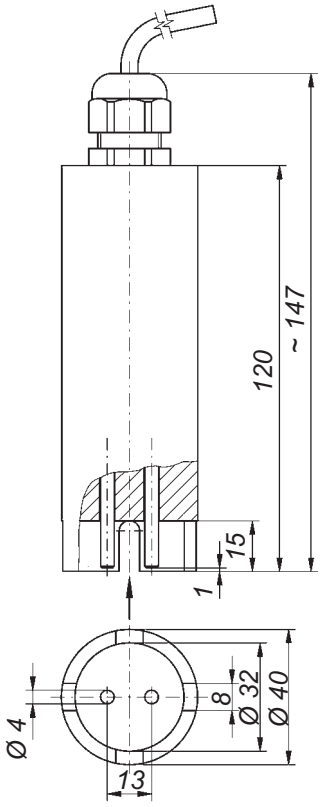
EHW3-SPS.



EHE-... with mounting stand



EHE-...



EHW3-...

Technical data	EHE-SPS2	EHE-SPS3	EHE-SPS4
Design	leakage detector with quiescent current / NC (break) contact		
Electrode rod	stainless steel 316 Ti, with 8 mm dia.		
Housing	stainless steel 316 Ti and PTFE		
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 2 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 with dry electrode rod + housing	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 with wet electrode rod + housing	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 electrode rod + housing circuit and		
	supply circuit	supply circuit and transistor output	supply circuit and output circuit
Max. no-load voltage at electrode rod + housing	5 V_{eff} ⊓⊔ 600 Hz		
Max. short circuit current at electrode rod + housing	0.2 mA		
Response sensitivity	approx. 30 kΩ or approx. 33 µS (conductance)		
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	EHW3-SPS2	EHW3-SPS3	EHW3-SPS4
Design	leakage detector with quiescent current / NC (break) contact		
Electrode rods	2 rods made of stainless steel 316 Ti, each with 4 mm dia., other materials (e. g. titanium, Hastelloy, Monel or tantalum) on request		
Housing	PP; other materials (e. g. PVC, PVDF or PTFE) on request		
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 2 m, longer connecting cable on request; connecting cable made of CM or PTFE 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 with dry electrode rods	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 with wet electrode rods	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 electrode rod circuit and		
	supply circuit	supply circuit and transistor output	supply circuit and output circuit
Max. no-load voltage at the electrode rods	5 V_{eff} ⊓⊔ 600 Hz		
Max. short circuit current at the electrodes rods	0.2 mA		
Response sensitivity	approx. 30 kΩ or approx. 33 µS (conductance)		
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	EHE-LS4 EHW3-LS4	EHE-LS4/A EHW3-LS4/A	EHE-LS5 EHW3-LS5
Design	leakage detector with relay output		
Electrode pair	**EHE-...:** 1 rod made of stainless steel 316 Ti, with 8 mm dia., and a housing made of stainless steel 316 Ti **EHW3-...:** 2 rods made of stainless steel 316 Ti, other materials (e. g. titanium, Hastelloy, Monel or tantalum) on request		
Housing	**EHE-...:** stainless steel 316 Ti and PTFE **EHW3-...:** PP, other materials (e. g. PVDF or PTFE) on request		
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 2 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 with dry electrode pair	output relay energised, output contact closed	output relay energised, output contact open	output relay energised, changeover in pos. 2 (grey and brown)
Switching status with wet electrode pair	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 electrode pair circuit, supply circuit and output circuit		
Max. no-load voltage at the electrode pair	5 V_{eff} ⊓⊔ 15 kHz (safety extra low voltage SELV)		
Max. short circuit current at the electrode pair	0.2 mA		
Response sensitivity	approx. 30 kΩ or approx. 33 µS (conductance)		
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	EHE-KNI EHW3-KNI	EHE-KNI/A EHW3-KNI/A
Design	leakage detector with evalutation electronics as an initiator for a NAMUR circuit	
Electrode pair	**EHE-...:** 1 rod made of stainless steel 316 Ti, with 8 mm dia., and a housing made of stainless steel 316 Ti **EHW3-...:** 2 rods made of stainless steel 316 Ti, other materials (e. g. titanium, Hastelloy, Monel or tantalum) on request	
Housing	**EHE-...:** stainless steel 316 Ti and PTFE **EHW3-...:** PP, other materials (e. g. PVDF or PTFE) on request	
Electrical connection	**two-wire connection** via connecting cable 2 x 0.75; length 2 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 with wet electrode pair	I ≤ 1 mA	I ≥ 3 mA
Switching status with dry electrode pair	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 electrode pair circuit and supply circuit with impressed signal current	
Max. no-load voltage at the electrode pair	5 V_{eff} ⊓⊔ 15 kHz (safety extra low voltage SELV)	
Max. short circuit current at the electrode pair	0.2 mA	
Response sensitivity	approx. 30 kΩ or approx. 33 µS (conductance)	
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.	

Conductive cable electrodes KE-SPS.

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

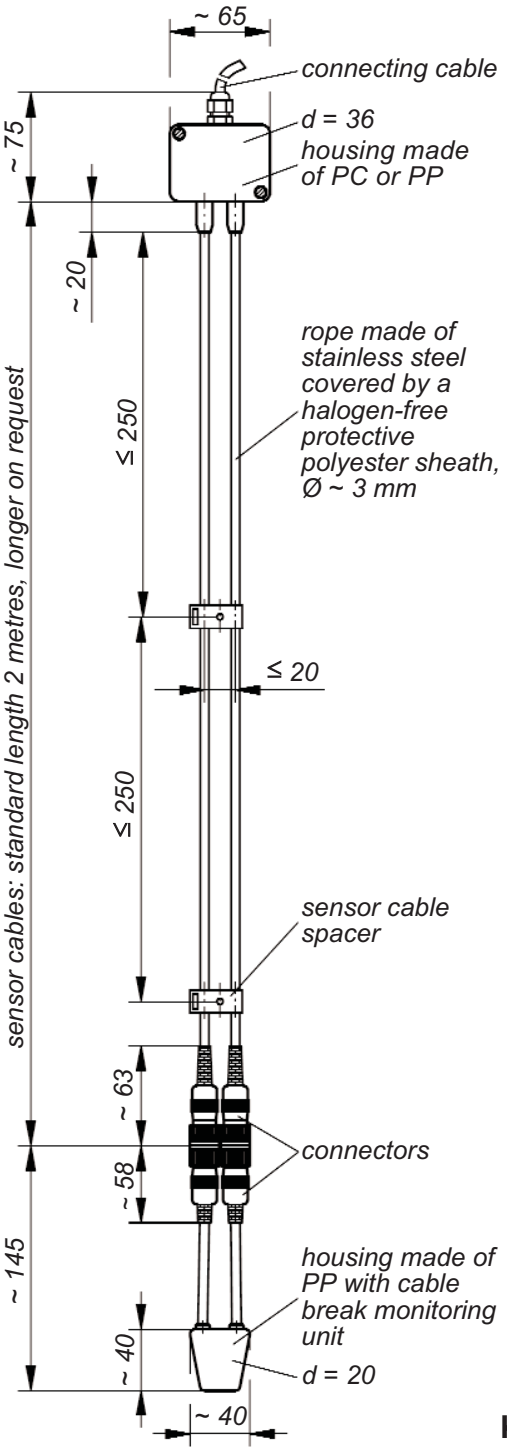
Designed to signal the presence of a **conductive liquid** caused, for example, by burst pipes.

Conductive cable electrodes KE-SPS. should only be used in normally dry environments. They can be used on floors, false ceilings, alongside pipes or in double-pipe systems. They should be installed at the lowest point of the potential hazard area which they are intended to monitor.

The conductive cable electrodes KE-SPS. are fitted with two separate electrodes in the form of two sensor cables: 1 control electrode and 1 earth electrode. As soon as a conductive liquid creates a conductive path between the two sensor cables, the switching status of the leakage detector changes.

Each of the two sensor cables consists of a stainless steel rope core and a protective sheath made of polyester. This protective sheath is designed to prevent contact of the stainless steel ropes with one another or with an electrically conductive surface (e.g. steel tub, steel pipe etc.) and thus to avoid false alarms, whilst allowing leakage liquid to penetrate throught to the stainless steel ropes.

The two sensor cables of the cable electrode must be mounted parallel to one another at a distance ≤ 2 cm using the sensor cable spacers, as a greater or lesser spacing affects the response level of the system in the event of leakage.



KE-SPS.

Technical data	KE-SPS2	KE-SPS3	KE-SPS4
Design	leakage detector with quiescent current / NC (break) contact		
Sensor cables	2 ropes made of stainless steel 316 Ti, each with 3 mm dia., each covered by a halogen-free protective polyester sheath; length: 2 m each, longer on request		
Max. length of sensor cables when laid in a relatively straight line	**100 metres; if the sensor cables are wound around a pipe or tank, the possible length may be considerably shorter depending on the type and method of laying**		
Electrode head	PC or PP		
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 2 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 with dry sensor cables	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 with wet sensor cables	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 sensor cables	via cable break monitoring unit Z-4V7 at the end of the sensor cables		
Switching status with break in sensor cables line	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 sensor cable circuit and supply circuit	supply circuit and transistor output	supply circuit and output circuit
Max. no-load voltage at the sensor cables	10 V_{eff} ⊓⊔ 60 Hz		
Max. short circuit current at the sensor cables	0.1 mA		
Response sensitivity	approx. 30 kΩ or approx. 33 µS (conductance)		
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	see page 32-1-26		

Conductive tape electrodes BAE-SPS.

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

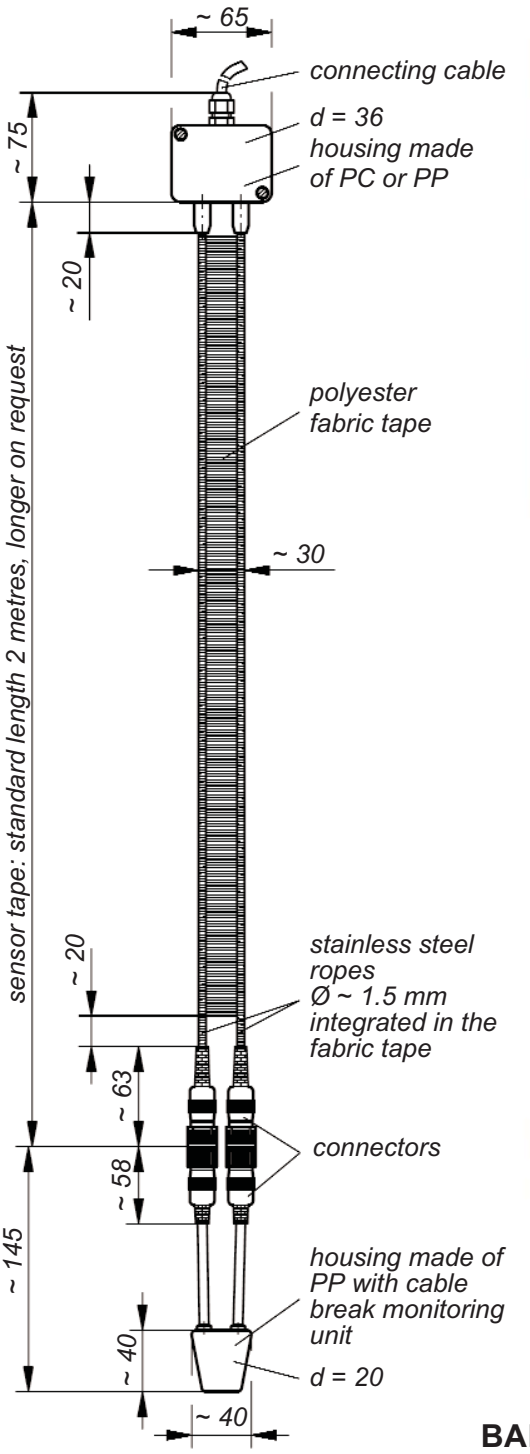
Designed to signal the presence of a **conductive liquid** caused, for example by burst pipes.

Conductive tape electrodes BAE-SPS. should only be used in normally dry environments. They can be used on floors, false ceilings, alongside pipes or in double-pipe systems. They should be installed at the lowest point of the potential hazard area which they are intended to monitor.

The conductive BAE-SPS. tape electrodes are fitted with two separate electrodes in the form of two stainless steel ropes: 1 control electrode and 1 earth electrode. As soon as a trace of a conductive liquid creates a conductive path between the two stainless steel ropes, the switching status of the leakage detector changes.

In contrast to the cable electrodes on the previous pages, the tape electrodes are **not fitted with** two **separate** sensor cables. The two stainless steel ropes are integrated in a halogen-free polyester fabric tape which ensures that the spacing between them remains constant. This polyester fabric tape is designed to prevent contact of the stainless steel ropes with one another or with an electrically conductive surface (e.g. steel tub, steel pipe etc.) and thus to avoid false alarms, whilst allowing leakage liquid to penetrate through to the stainless steel ropes.

To avoid false alarms, it is essential that the surroundings of the tape electrodes are absolutely dry under normal circumstances, as the tape electrodes have the ability to bind moisture (including high levels of air humidity), and this can lead to false alarms in environments that are not absolutely dry, particularly with long tape electrodes.



BAE-SPS.

Technical data	BAE-SPS2	BAE-SPS3	BAE-SPS4
Design	leakage detector with quiescent current / NC (break) contact		
Sensor tape	2 ropes made of stainless steel 316 Ti or 316, each with 1.5 mm dia., woven into a halogen-free approx. 30 mm-wide polyester fabric tape at a spacing of approx. 24-25 mm; length: 2 m, longer on request		
Max. length of sensor tape when laid in a relatively straight line	**30 metres; if the sensor tape is wound around a pipe or tank, the possible length may be considerably shorter depending on the type and method of laying**		
Electrode head	PC or PP		
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 2 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, Ik < 30 mA	at transistor output, Ik < 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 with dry sensor tape ropes	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 with wet sensor tape ropes	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 sensor tape ropes	via cable break monitoring unit Z-4V7 at the end of the sensor tape ropes		
Switching status with break in sensor tape ropes line	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 sensor tape rope circuit and supply circuit	supply circuit and transistor output	supply circuit and output circuit
Max. no-load voltage at the sensor tape ropes	10 V_{eff} ⎍⎍ 60 Hz		
Max. short circuit current at the sensor tape ropes	0.1 mA		
Response sensitivity	approx. 30 kΩ or approx. 33 µS (conductance)		
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	see page 32-1-26		

Conductive carpet electrodes TE-SPS. Conductive sleeve electrodes MAE 6-SPS.

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

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

Conductive carpet electrodes are designed for use in normally dry rooms. They can be installed on floors or in collection tanks.

Each TE-SPS. carpet electrode is made up of 88 individual electrodes - 44 of which are connected as control electrodes and the other 44 as earth electrodes. An earth electrode is positioned next to a control electrode, which is in turn next to an earth electrode and so on. The spacing between two stainless steel ropes is approx. 10 mm. The carpet electrode is of fabric design to ensure a gap between the stainless steel ropes and therefore to prevent contact between a control and an earth electrode activating an alarm without any leakage being present. The aforementioned stainless steel ropes from the warp, while the weft consists of insulating plastic threads that are also woven in a matrix of approx. 10 mm.

As soon as an electrically conductive liquid creates a connection between two adjacent stainless steel ropes of the carpet electrode, the switching status of the leakage detector changes.

Technical data:
see BAE-SPS.

Conductive sleeve electrodes should only be used in normally dry environments. They can be wrapped fully around pipes or small tanks.

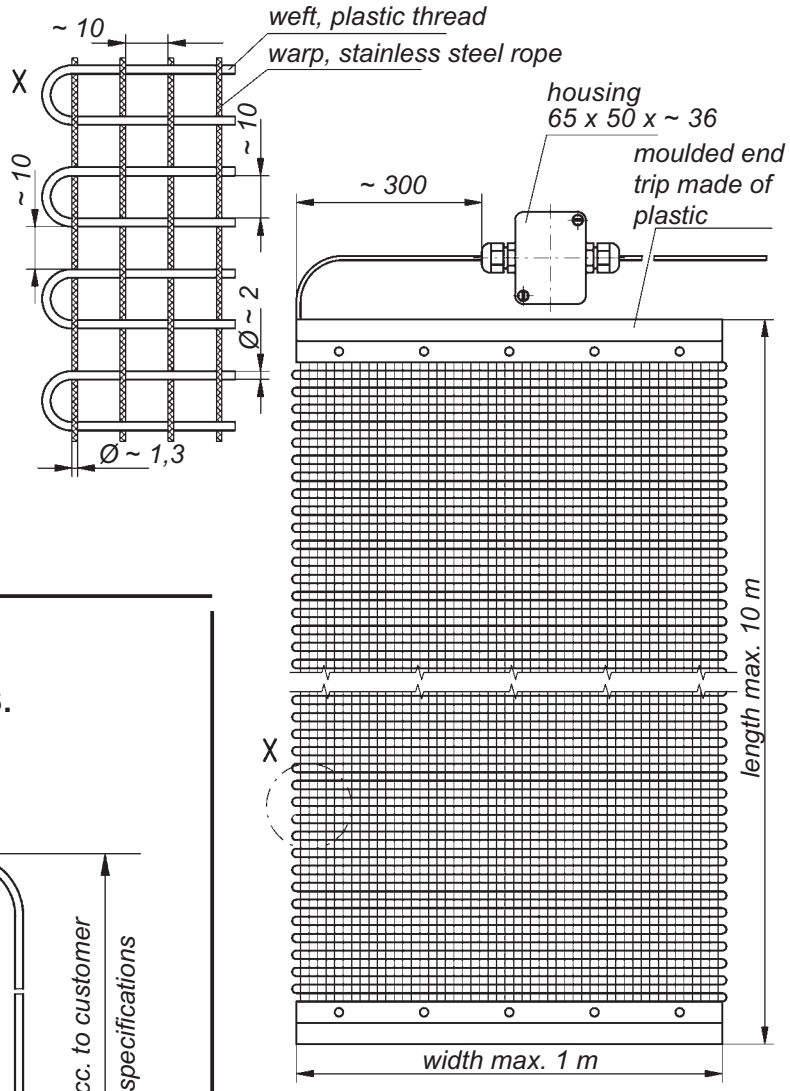
Sleeve electrodes allow full-surface pipe monitoring not only underneath the pipes in question (e.g. in collection tubs) but also **directly on the pipe in question**. Sleeve electrodes have a halogen-free polyester fabric structure with good capillary effect. Sensor cables are fitted in this polyester fabric as part of the warp; half of them are connected as control electrodes, the other half as earth electrodes.

The conductive sleeve electrodes MAE 6-SPS. are each fitted with 6 separate electrodes in the form of 6 stainless steel ropes: 3 control electrodes and 3 earth electrodes. An earth electrode is always positioned next to a control electrode, a control electrode next to an earth electrode and so on. As soon as a trace of a conductive liquid creates a conductive path between a control electrode and an earth electrode, the switching status of the leakage detector changes.

The 6 stainless steel ropes of the sleeve electrode are woven into a halogen-free, approx. 30 cm wide polyester fabric as part of the warp, and the polyester fabric keeps them permanently equidistant from one another. This polyester fabric is designed to almost totally prevent contact of the stainless steel ropes with one another or with an electrically conductive surface (e.g. steel pipe etc.) and thus to avoid false alarms, whilst allowing leakage liquid to penetrate through to the stainless steel ropes.

To avoid false alarms, it is essential that the surroundings of the sleeve electrodes are absolutely dry under normal circumstances, as the sleeve electrodes have the ability to bind moisture (including high levels of air humidity), and this can lead to false alarms in environments that are not absolutely dry, particularly with long sleeve electrodes.

Dimensions TE-SPS.



Dimensions MAE 6-SPS.