

# 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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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 pro- tected 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 tran- sistor output; with a High sig- nal, the rectified supply volt- age 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 imple- mented in the follow-up circuit.
The input resistance must be in the range from 2 k $\Omega$ to 7.5 k $\Omega$ .	The input resistance must be in the range from 2 k $\Omega$ to 7.5 k $\Omega$ .	
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 possi- ble, also in combination with other potential-free contacts

**Application example Application example Application example** b = blackbr = brown Sensitive Sensitive Sensitive part bl = blue part b/g = black part (grey) Sensor Sensor Sensor electronics electronics electronics Galvanic Galvanic Galvanic separation separation separation bl br b/g bl br b b/g bl br Input resis-DĊ 24 V, SELV/PELV AĊ/DC 12 ... 30 V, SELV/PELV tance of Input for DDC-unit 2 kΩ ... 7.5 kΩ binary AC/DC 12 ... 30 V, contact Input resis-SELV/PELV maker PLC or PLC or tance of small small 2 kΩ ... 7.5 kΩ controller controller DDC unit Follow-up circuit Follow-up circuit 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 voltagesupply 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 voltagesupply 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.



Follow-up circuit

Follow-up circuit

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 sup functional with correct p	ply of direct voltage; olarity; short circuit with false polarity		
For NAMUR circuit with inverted signal evaluation.	For NAMUR circuit with non-inverted signal evaluation.		
<ul> <li>The power consumption of the detector serves as a switching signal for the following switching statuses:</li> <li>No power consumption = cable break</li> <li>Low power consumption = alarm status (leakage)</li> <li>High power consumption = standby status</li> <li>Maximum power consumption = short circuit or false polarity</li> </ul>	<ul> <li>The power consumption of the detector serves as a switching signal for the following switching statuses:</li> <li>No power consumption = cable break</li> <li>Low power consumption = standby status</li> <li>High power consumption = alarm status (leakage)</li> <li>Maximum power consumption = short circuit or false polarity</li> </ul>		
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.





# Output Conductive plate electrodes PEK-...

### 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

### 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

#### **L-Pointer**

- 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 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 s	stainless steel 316 Ti, ead	ch 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, fitted with hal	longer connecting cable ogen-free connecting cab	on request; ble on request
Supply voltage	only for connect	tion to extra low voltage	e SELV or PELV!
Description	DC 24 V $\pm$ 20 % via input resistance 2 k $\Omega$ 7.5 k $\Omega$	AC/DC 12 30 V; wire colours: brown and blue	AC/DC 12 30 V; wire colours: brown and blue
Power consumption	max. U.5 W	Max. 0.5 VA	max. 0.5 VA
Output	the magnitude of power consumption	to be wired via the input resistance of the follow-up circuit of 2 k $\Omega$ 7.5 k $\Omega$ ; 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⊧ < 30 mA	at transistor output, I⊧ < 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
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 n	nonitoring due to the quie	
Galvanic separation	voltage resistance	> 500 V between electro	de 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 <sub>eff</sub> - 🖵 600 Hz	
Max. short circuit current at the electrode plates		0.2 mA	
Response sensitivity	approx. 30 k $\Omega$ 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 th	ne technical data of the fo	bllow-up circuit
EMC	for interference emis	sion in accordance with t	he 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	leakag	e detector with relay	output
Electrode plates Housing	2 plates made of stainless steel 316 Ti, each with 24 mm dia. PP and cast resin		
Electrical connection	four-wire connection	four-wire connection	five-wire connection
	4 x 0 5		5 x 0 5
	length 2 m lo	nder connecting cab	le on request:
	fitted with halog	jen-free connecting c	able 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 %		
Power consumption	wire colours: brown and blue	brown and blue	wire colours: black and black
	notential-free	approx. 0.5 VA	notential-free
Output	quiescent current (NC) contact	working current (NO) contact	changeover (CO) contact
	ma	x. load AC/DC 5 2	4 V
	(extra low	voltage SELV or PE	ELV only);
	wire c	ACIDE I MA 3 (I) I	H wire colours:
	black and b	black (grey)	brown, grey a. blue
Switching status without			
supply voltage	output relay	output relay	output relay
	de-energised,	de-energised,	de-energised, changeover in pos 1
	open	closed	(grey and blue)
Switching status with			
dry electrode plates	output relay	output relay	output relay
	output contact	output contact	changeover in pos. 2
	closed	open	(grey and brown)
Switching status with			
wet electrode plates	de-energised	de-energised	de-energised
	output contact	output contact	changeover in pos. 1
	open	closed	(grey and blue)
Cable break monitoring	cable break		
or connecting cable	monitoring due to		
	the quiescent		
Columnia concertion	current		
Galvanic separation	voltage resistance supp	> 500 V between ele ly circuit and output of	ctrode plate circuit,
Max. no-load voltage			
at the electrode plates	5 V <sub>eff</sub> ⊐ L⊢ 15 k	<hz (safety="" extra="" low<="" td=""><td>voltage SELV)</td></hz>	voltage SELV)
Max. short circuit current		0.2 mA	
Response sensitivity	approx. 30 kg	$\Omega$ or approx. 33 µS (c	conductance)
Temperature range		$-20^{\circ}$ C to $+60^{\circ}$ C	,
Max. length of connecting			
cable between leakage			
EMC	for interference on	ission in accordance	with the appliance
	specific require	ments for household	s, business and
	commerce as well a	as small companies,	and for interference
	immunity in acc	cordance with the appropriate the second sec	pliance-specific
	requirem	ients for industrial CO	mpanies.

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 o	cast resin	
Electrical connection	<b>two-wire connection</b> 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 $\Omega$ to 1,200 $\Omega$ , preferably in line with NAMUR DC 8.2 V with internal resistance of 1 k $\Omega$		
Output signal	impressed current sign	nal 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	$I \leq 1 mA$	$I \ge 3 \text{ mA}$	
Switching status with dry electrode plates	$I \ge 3 mA$	$I \leq 1 mA$	
Switching status in case of short circuit or false polarity	I > 6 mA	l > 6 mA	
Galvanic separation	only for connection to extra voltage resistance > 500 V b and supply circuit with i	<b>I low voltage SELV or PELV!</b> etween electrode plate circuit mpressed signal current	
Max. no-load voltage at the electrode plates	5 V <sub>eff</sub> -ି∏r 15 kHz (safet	y extra low voltage SELV)	
Max. short circuit current at the electrode plates	0.2	mA	
Response sensitivity	approx. 30 k $\Omega$ or appro	x. 33 μS (conductance)	
Temperature range	– 20°C t	o + 60°C	
Max. length of connecting cable between leakage detector and follow-up circuit	it 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.		



# <u>ola</u> 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	<ul> <li>Leakage detectors for connection to: a PLC or DDC unit, a small controller, a fieldbus connector or a network connector</li> </ul>	<ul> <li>Leakage detectors for NAMUR circuits in line with EN 50 227 (formerly known as DIN 19234) with the option of detecting cable break, standby</li> </ul>
		<ul> <li>with potential-free relay contact (for switching e.g. a solenoid valve with extra low voltage SELV or PELV)</li> </ul>	<ul> <li>status, alarm status and short circuit</li> <li>for connection to: NAMUR isolation amplifier or NAMUR fieldbus terminal</li> </ul>
•	with integrated galvanic separation of the sensor electronics	<ul> <li>with integrated galvanic separation of the sensor electronics</li> </ul>	<ul> <li>with integrated galvanic separation between sensor circuit and supply current circuit with impressed signal current</li> </ul>



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.



Technical data	WDX-SPS2	WDX-SPS3	WDX-SPS4
Design	leakage detector with quiescent current / NC (break) contact		
Electrode plates Housing	2 plates made of stainless steel 316 Ti, each with 24 mm dia. 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, fitted with hal	longer connecting cable ogen-free connecting cab	on request; ble on request
Supply voltage	only for connect	tion to extra low voltage	e SELV or PELV!
Davian aanaa ina	DC 24 V $\pm$ 20 % via input resistance 2 k $\Omega$ 7.5 k $\Omega$	AC/DC 12 30 V; wire colours: brown and blue	AC/DC 12 30 V; wire colours: brown and blue
Power consumption	max. U.5 W	BND transistor output:	max. 0.5 VA
Ουτρωτ	the magnitude of power consumption	to be wired via the input resistance of the follow-up circuit of 2 k $\Omega$ 7.5 k $\Omega$ ; wire colour: black	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⊧ < 30 mA	at transistor output, I⊧ < 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	Lave size al	Law size at	
supply voltage	Low signal	Low signal	reed contact open
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 n	tion to extra low voltage	escent current
Galvanic Separation	voltage resistance	> 500 V between electro	de 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 <sub>eff</sub> - 🖵 600 Hz	
Max. short circuit current		0.2 mA	
Response sensitivity	approx. 30	$k\Omega$ or approx. 33 µS (co	nductance)
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 emis	sion in accordance with t	he 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	leakag	e detector with relay	output
Electrode plates	2 plates made of stainless steel 316 Ti, each with 24 mm dia.		
Electrical connection	four-wire   four-wire   five-wire		
	connection	connection	connection
	4 x 0 5	Via connecting cable	5 x 0 5
	length 2 m, lo	nger connecting cab	le on request;
	fitted with halog	jen-free connecting c	able on request
Supply voltage	only for connectio	on to extra low volta	<b>ge SELV or PELV!</b>
	wire colours:	wire colours:	wire colours:
Devenue tien	brown and blue	brown and blue	black and black
Power consumption	notential-free	approx. 0.5 VA	notential-free
Culput	quiescent current	working current	changeover
	(NC) contact	(NO) contact	(CO) contact
	extra low	voltage SELV or PE	4 v LV onlv):
	A	C/DC 1 mA 3 (1) A	A
	wire co black and b	olours:	wire colours:
Switching status without	Didok and L		brown, grey a. blue
supply voltage	output relay	output relay	output relay
	de-energised, output contact	de-energised,	de-energised, changeover in pos 1
	open	closed	(grey and blue)
Switching status with	output rolay		
dry electrode plates	energised,	energised,	energised,
	output contact	output contact	changeover in pos. 2
Switching status with	ciosed	open	(grey and brown)
wet electrode plates	output relay	output relay	output relay
	de-energised,	de-energised,	de-energised,
	open	closed	(grey and blue)
Cable break monitoring	apple break		
of connecting cable	monitoring due to		
	the quiescent		
Galvanic senaration	current	n to extra low volta	ge SELV or PELVL
	voltage resistance	> 500 V between ele	ctrode plate circuit,
Max no load voltage	supp	ly circuit and output o	circuit
at the electrode plates	5 V <sub>eff</sub> – 🖵 15 I	kHz (safety extra low	voltage SELV)
Max. short circuit current			0 /
at the electrode plates	annray 20 kg	0.2 mA	anductones)
Temperature range	approx. 50 kg	$-20^{\circ}$ C to + 60°C	conductance)
Max. length of connecting			
cable between leakage			
EMC	for interference em	ission in accordance	with the appliance-
•	specific require	ments for household	s, business and
	commerce as well a	as small companies, a cordance with the app	and for interference
	requirem	ents for industrial co	mpanies.

Technical data	WDX-KNI	WDX-KNI/A	
Design	leakage detector with evaluta for a NAN	ition electronics as an initiator IUR circuit	
Electrode plates	2 plates made of stainless steel 316 Ti, each with 24 mm dia.		
Housing	PP and o	cast resin	
Electrical connection	<b>two-wire connection</b> 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 $\Omega$ to 1,200 $\Omega$ , preferably in line with NAMUR DC 8.2 V with internal resistance of 1 k $\Omega$		
Output signal	impressed current sign	nal 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	$I \leq 1 mA$	$I \ge 3 mA$	
Switching status with dry electrode plates	$I \ge 3 mA$	$I \leq 1 mA$	
Switching status in case of short circuit or false polarity	I > 6 mA	l > 6 mA	
Galvanic separation	only for connection to extra voltage resistance > 500 V b and supply circuit with i	<b>t low voltage SELV or PELV!</b> etween electrode plate circuit mpressed signal current	
Max. no-load voltage at the electrode plates	5 V <sub>eff</sub> -ି∏r 15 kHz (safet	y extra low voltage SELV)	
Max. short circuit current at the electrode plates	0.2	mA	
Response sensitivity	approx. 30 k $\Omega$ or appro	ox. 33 μS (conductance)	
Temperature range	– 20°C t	o + 60°C	
Max. length of connecting cable between leakage detector and follow-up circuit	it 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.		



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

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 / N	IC (break) contact
Electrode rods Housing	2 rods made of stainless steel 316 Ti, each with 4 mm dia. 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, fitted with hal	longer connecting cable ogen-free connecting cab	on request; ble on request
Supply voltage	only for connect	tion to extra low voltage	e SELV or PELV!
	DC 24 V $\pm$ 20 % via input resistance 2 k $\Omega$ 7.5 k $\Omega$	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 k $\Omega$ 7.5 k $\Omega$ ; 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⊧ < 30 mA	at transistor output, I⊧ < 30 mA	reed contact at output short circuit proof for short periods via integrated protective resistance of $62 \Omega$ ; 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 n	nonitoring due to the quie	escent current
Galvanic separation	only for connect voltage resistance	tion to extra low voltage e > 500 V between electro	e SELV or PELV! ode 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 <sub>eff</sub> - 🖵 600 Hz	
Max. short circuit current at the electrode rods	0.2 mA		
Response sensitivity	approx. 30 k $\Omega$ or approx. 33 $\mu$ S (conductance)		
Temperature range Max. length of connecting cable between leakage		– 20°C to + 60°C	
detector and follow-up circuit	depends on th	e technical data of the fo	ollow-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	leakag	e detector with relay	output
Electrode rods Housing	2 rods made of sta	inless steel 316 Ti, e PC or PP	ach with 4 mm dia.
Electrical connection	four-wire connection	four-wire connection	five-wire connection
	4 x 0.5	$4 \times 0.5$	$5 \times 0.5$
	length 2 m, lo fitted with haloo	nger connecting cab	le on request;
Supply voltage	only for connection AC/DC 24 V ± 2	on to extra low volta 20 %, on request AC/I	<b>ge SELV or PELV!</b> DC 12 V ± 20 %
Power consumption	wire colours: brown and blue	wire colours: brown and blue	wire colours: black and black
Output	notential-free	approx. 0.5 VA	notential-free
Output	quiescent current (NC) contact	working current (NO) contact	changeover (CO) contact
	ma	x. load AC/DC 5 2	4 V
	(extra low	voltage SELV or PE	ELV only);
	wire c	olours <sup>.</sup>	n wire colours:
	black and b	black (grey)	brown, grey a. blue
Switching status without			
supply voltage	output relay	output relay	output relay
	de-energised,	de-energised,	de-energised,
	open	closed	(grey and blue)
Switching status with	·		
dry electrode rods	output relay	output relay	output relay
	output contact	output contact	changeover in pos 2
	closed	open	(grey and brown)
Switching status with			
wet electrode rods	output relay	de-energised	de-energised
	output contact	output contact	changeover in pos. 1
	open	closed	(grey and blue)
Cable break monitoring	aabla braak		
of connecting cable	monitoring due to		
	the quiescent		
O a base is a second to se	current		
Galvanic separation	voltage resistance	a) to extra low volta e > 500 V between ele ly circuit and output of	ectrode rod circuit,
Max. no-load voltage			
at the electrode rods	5 V <sub>eff</sub>	<hz (safety="" extra="" low<="" td=""><td>voltage SELV)</td></hz>	voltage SELV)
Max. short circuit current		0 2 mA	
Response sensitivity	approx. 30 kg	$\Omega$ or approx. 33 µS (c	conductance)
Temperature range		$-20^{\circ}$ C to $+60^{\circ}$ C	,
Max. length of connecting			
cable between leakage	den en de en the		felless on since it
EMC	for interforence on	iechnical data of the	with the appliance
	specific require	ments for household	s, business and
	commerce as well a	as small companies,	and for interference
	immunity in acc	cordance with the apport	pliance-specific
	requirem	ients for industrial CO	mpanies.

Technical data	WAE1-KNI	WAE1-KNI/A	
Design	leakage detector with evaluta for a NAM	tion electronics as an initiator IUR circuit	
Electrode rods	2 rods made of stainless steel 316 Ti, each with 4 mm dia.		
Housing	PC o	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 $\Omega$ to 1,200 $\Omega$ , preferably in line with NAMUR DC 8.2 V with internal resistance of 1 k $\Omega$		
Output signal	impressed current sign	nal 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	$I \ge 3 \text{ mA}$	
Switching status with dry electrode rods	$I \ge 3 mA$	$I \le 1 \text{ mA}$	
Switching status in case of short circuit or false polarity	I > 6 mA	I > 6 mA	
Galvanic separation	only for connection to extra voltage resistance > 500 V k and supply circuit with i	<b>low voltage SELV or PELV!</b> Detween electrode rod circuit mpressed signal current	
Max. no-load voltage at the electrode rods	5 V <sub>eff</sub> -Ū_⊢ 15 kHz (safet	y extra low voltage SELV)	
Max. short circuit current at the electrode rods	0.2	mA	
Response sensitivity	approx. 30 k $\Omega$ or appro	x. 33 μS (conductance)	
Temperature range	– 20°C t	o + 60°C	
Max. length of connecting cable between leakage detector and follow-up circuit	t 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.		



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

•	Leckwatcher Leakage detectors for connection to: a PLC or DDC unit, a small controller, a fieldbus connector or a network connector	<ul> <li>Liqui-Switch</li> <li>Leakage detectors for connection to: a PLC or DDC unit, a small controller, a fieldbus connector or a network connector</li> <li>with potential-free relay contact (for switching e.g. a solenoid valve with extra low voltage SELV or PELV)</li> <li>with integrated galvanic</li> </ul>	<ul> <li>L-Pointer</li> <li>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</li> <li>for connection to: NAMUR isolation amplifier or NAMUR fieldbus terminal</li> <li>with integrated galvanic</li> </ul>
•	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.



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 guiescent current / N	IC (break) contact	
Electrode rods Length Max. lengths Screw-in nipple	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.) on request (measured from nipple sealing surface) 2,500 mm 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	three-wire connection	four-wire connection	
	via 2-pole via 3-pole via 4-p terminal block terminal block terminal for max. 2.5 mm <sup>2</sup> for max. 2.5 mm <sup>2</sup> for max. 2 in the PP connection head with cable entry M 20 x 1.5 protection class IP 54			
Supply voltage	only for connect DC 24 V ± 20 % via input resistance 2 kΩ 7.5 kΩ	AC/DC 12 30 V	<b>SELV or PELV!</b> AC/DC 12 30 V	
Power consumption Output	max. 0.5 W evaluation based on the magnitude of power consumption	max. 0.5 VA PNP transistor output; to be wired via the input resistance of the follow-up circuit of 2 k $\Omega$ 7.5 k $\Omega$	max. 0.5 VA potential-free reed contact with protective resistance 62 Ω, max. load AC/DC 30 V, 100 mA, 3 W;	
Short circuit protection	present, I⊧ < 30 mA	at transistor output, I⊧ < 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	aabla braak n	ponitoring due to the quic	acont ourront	
Galvanic separation	cable break monitoring due to the quiescent current only for connection to extra low voltage SELV or PELV! voltage resistance > 500 V between electrode rod circuit and supply circuit supply circuit and output circuit			
Max. no-load voltage at the electrode rods Max. short circuit current at the electrode rods Response sensitivity	5 V <sub>eff</sub> - ີ _ 600 Hz 0.2 mA approx. 30 kΩ or approx. 33 μS (conductance)		nductance)	
Max. length of connecting cable between leakage detector and follow-up circuit	depends on th	e technical data of the fo	llow-up circuit	
EMC	for interference emise requirements for hou small companies, and the appliance-spe	depends on the technical data of the follow-up circuit iterference emission in accordance with the appliance-specifi urements for households, business and commerce as well as I companies, and for interference immunity in accordance with the appliance-specific requirements for industrial companies		

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 Am mtia covered with shrinkdown tubing made of polyolefin (S 2 MPPLS and S 2 AM-LS) or DPC (S 2 MPVDF-LS) on request (measured from nipple sealing surface) 2.500 mm           Screw-in nipple         51 S 2 MPPLS PP, S 2 MPVDF-LS: PVDF; S 2 AM-LS stainless steel 316 Ti, other materials on request four-wire connection           Supply voltage         61; S 2 MPPLS PP; S 2 MPVDF-LS: PVDF; S 2 AM-LS stainless steel 316 Ti, other materials on request four-wire connection to extra low voltage SELV or PELV! ACIDC 24 V 1 20 %, on request ACIDC 12 V 2 20 % approx. 05 VA           Switching status without supply voltage         output relay de-energised, output contact         potential-free working current (NC) contact         potential-free working current (NO) contact         output relay de-energised, output contact         ou	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
Electrode rods       2 rods made of stainless steel 316 Tr, other materials         Length       (e.g. titanium, Hastelloy, Monel or tantalum) on request;         Length       (s.g. titanium, Hastelloy, Monel or tantalum) on request;         Screw-in nipple       2,500 mm         Electrical connection       2,500 mm         Electrical connection       2,500 mm         Supply voltage       2,500 mm         Supply voltage       61; S 2 MIPL-LS PP); S 2 MIPUDF-LS PVDF;         Supply voltage       61; S 2 MIPL-S and S 2 AM-LS) or PVDF (S 2 MIPUF-LS PVDF;         Supply voltage       61; S 2 MIPL-S The PP connection head with cable entry M 20 X 1.5, protection class IP 54         Output       only for connection to extra low voltage SELV or PELVI         AC/DC 24 V 12 0%, on request AC/DC 12 V 120%       approx. 0.5 VA         Output       potential-free yotential-free working current (NO) contact       potential-free yotential-free devergised, output relay de-energised, output relay de-energised, output relay de-energised, output relay energised, output contact closed       output relay de-energised, output relay de-energised, output relay de-energised, output contact closed       output relay de-energised, output relay de-energised, output relay de-energised, output contact closed       output relay de-energised, output relay de-energised, output relay de-energised, output contact closed       output relay de-energised, output relay de-energised, output relay de-energised, output contact closed	Desian	leakag	e detector with relav	output
(e.g. titanium, Hastelloy, Monel or tantalum) on request; each with A mm dia, covered with shrinkdown tubing made of polyolefin (S 2 M/PPLS and S 2 AMLS) or PVDF (S 2 M/PVDFLS)         Length Max. lengths Screw-in nipple       G1; S 2 M/PLS: PPLS: PVDF; S 2 AMLS is tainless steel 316 Ti, other materials on request four-wire connection         Electrical connection       G1; S 2 M/PLS: PVDF; S 2 AMLS is tainless steel 316 Ti, other materials on request four-wire connection to extra low voltage SELV or PELV! AC/DC 24 V ± 20 %, on request AC/DC 12 V ± 20 % approx. O5 VA         Supply voltage       only for connection to extra low voltage SELV or PELV! AC/DC 24 V ± 20 %, on request AC/DC 12 V ± 20 % approx. O5 VA         Output       output relay de-energised, output contact       output relay de-energised, output contact       output relay de-energised, output contact         Switching status with dry electrode rods       output relay energised, output contact       output relay de-energised, output contact       output rela	Electrode rods	2 rods made of s	stainless steel 316 Ti	: other materials
Length       covered with 4 mm dia.         Length       covered with 5 hrinkdown tubing made of polyolefin         Strew-in nipple       S2 M/PE-LS and S2 AM-LS) or PVDF (S2 M/PVDF-LS) on request (measured from nipple sealing surface)         Electrical connection       2,500 mm         G1; S2 M/PP-LS Strew-in nipple       S2 M/PL-LS Statilises steel 316 Ti, other materials on request 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 PELVI AC/DC 24 V ± 20 %, approx. 0.5 VA         Power consumption       potential-free quiescent current (NC) contact       potential-free (CA) contact         Moutput       potential-free quiescent current (NC) contact       potential-free (CA) contact       potential-free (CA) contact         Switching status without supply voltage       output relay de-energised, output contact closed       output relay de-energised, output relay de-energised, output contact closed       output relay de-energised, output relay de-energised, output contact closed       output relay de-energised, output relay de-energised, output contact closed       changeover in position 1         Switching status with wet electrode rods       output relay de-energised, output relay		(e.g. titanium, Ha	stelloy, Monel or tant	alum) on request;
Length Max. lengths Screw-in nipplecovered with shrinkdown tubing made of polyolefin (\$ 2 M/PVDF-LS) or VDF (\$ 2 M/PVDF-LS) on request (measured from nipple sealing surface) 2,500 mm Screw-in nippleElectrical connection Image: Section of the sealing surface)G1: \$ 2 M/PL-LS: PP; \$ 2 M/PVDF-LS: PVDF; S 2 M/PLS: PDF; S 2 M/PVDF-LS: PVDF; S 2			each with 4 mm dia.,	, , ,
Length       (S 2 M/PL.S) or request (measured from nipple sealing surface)         Screw-in nipple       2.500 mm         Electrical connection       G1; S 2 M/PL.S: PP; S 2 M/PVDF-LS: PVDF;         Supply voltage       5 2 AM-LS: stainless steel 316 Ti, other materials on request         Supply voltage       only for connection       five-wire 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 PELVI AC/DC 24 V ± 20 %, on request AC/DC 12 V ± 20 % approx. 0.5 VA       potential-free quiescent current (NC) contact       potential-free quiescent current (NC) contact       potential-free quiescent current (NC) contact       potential-free changeover (CO) contact         Switching status without supply voltage       output relay de-energised, output contact closed       output relay de-energised, output contact       output relay de-energised, output relay de-energised, output contact       output relay de-energised, output contact       output relay de-energised, output relay de-energised, output contact       output relay de-energised, output relay de-energised, output relay de-energised, output contact       output relay de-energised, output relay de-energised, output contact       output relay de-energised, output rel		covered with sh	nrinkdown tubing mae	de of polyolefin
Length Max. lengths Screw-in nipple       on request (measured from nipple sealing surface) 2.500 mm         Electrical connection       G1; 52 M/P-LS: PP: 52 M/P/DF-LS: PUDF; S 2 M/PLS: stainless steel 316 Ti, other materials on request four-wire connection via 4-pole terminal block       ive-wire four-wire connection via 5-pole         Supply voltage       only for connection to extra low voltage potential-free quiescent current (NC) contact       output relay de-energised, output relay de-energised, output contact       potential-free changeover (NC) contact       potential-free changeover (NC) contact       potential-free changeover (NC) contact       potential-free changeover (NC) contact       potential-free changeover changeover (NC) contact       potential-free changeover changeover changeover changeover changeover changeover changeover changeover changeover changeover in position 1         Switching status with dry electrode rods       output relay de-energised, output contact open       output relay energised, output contact       output relay energised, output contact       output relay de-energised, output contact       output relay de-energised, output contact         Switching status with wet electrode rods       cable break monitoring due to the quiescent current       output relay de-energised, output contact       output relay de-energised, output contact       output relay de-energised, output contact       output relay de-energised, output contact         Switching status with wet electrode rods       output relay de-energised, output contact       output relay de-energised, output contact       output relay de-		(S 2 M/PP-LS and	S 2 AM-LS) or PVDF	= (S 2 M/PVDF-LS)
Max. lengths     2.500 mm       Screw-in nipple     G1; S 2 M/PPLS: PP; S 2 M/PVDF-LS: PVDF;       Electrical connection     four-wire connection       iva 4-pole terminal block     for max. 2.5 mm² in the PP connection to eatra low voltage       Supply voltage     only for connection to extra low voltage       Power consumption     Dottential-free quiescent current (NC) contact     potential-free quiescent current (NC) contact     potential-free quiescent current (NC) contact       Switching status without supply voltage     output relay de-energised, output relay de-energised, output contact     output relay de-energised, output contact     output relay energised, output contact       Switching status with wet electrode rods     output relay de-energised, output contact     output relay energised, output contact     output relay energised, output contact     output relay energised, output contact       Galvanic separation     cable break monitoring of connection to extra low voltage SELV or PELVI voltage resistance > 500 V between electrode rods     for connection to extra low voltage SELV or PELVI voltage resistance > 500 V between electrode rods       Max. no-load voltage at the electrode rods deberod per des sensitivity     Sty or T_L = 15 kHz (safety extra low voltage SELV)       Max. no-load voltage at the electrode rods deberod rods     Sty or T_L = 15 kHz (safety extra low voltage SELV)       Max. no-load voltage at the electrode rods deberod rods     supply circuit and output circuit for interference emission in accordance with the appliance-specific requirements f	Length	on request (me	asured from nipple s	ealing surface)
Screw-in nipple       S 2 MIPP-LS: PP: S 2 MIPUP-LS: PVDF;         Electrical connection       S 4M-LS: stanless steel 316 Ti, other materials on request four-wire connection via 4-pole terminal block       rew-wire connection via 5-pole terminal block         Supply voltage       only for connection to extra low voltage SELV or PELVI AC/DC 24 V ± 20 %, on request AC/DC 12 V ± 20 %         Power consumption       potential-free quiescent current (NC) contact       potential-free potential-free consection to extra low voltage SELV or VELV only; AC/DC 1 mA 3 (1) A         Switching status without supply voltage       output relay de-energised, output contact open closed       output relay de-energised, output contact copen closed       output relay de-energised, output relay de-energised, output contact copen closed       output relay de-energised, output relay de-energised, output contact copen closed       output relay de-energised, output relay de-energised, output contact copen closed       output relay de-energised, output relay de-energised, output contact copen closed       output relay de-energised, output relay de-energised, output contact copen closed       output relay de-energised, output relay de-energised, output contact copen closed       output relay de-energised, output relay de-energised, output relay de-energised, output contact copen closed       output relay de-energised, output relay de-energised, output contact copen closed       output relay de-energised, output relay de-energised, output contact copen closed       output relay closed         Switching status with wet electrode rods       output relay de-energised, output relay de-energised, output re	Max. lengths		2,500 mm	
Electrical connection       52 AWPLOS	Screw-In nipple	G1; S Z M/PP-	LS: PP; SZM/PVDF	LS: PVDF;
Liechter     Doubletter       via 4-pole terminal block     connection via 5-pole terminal block       via 4-pole terminal block     via 4-pole terminal block       Supply voltage     only for connection to extra low voltage SELV or PELVI AC/DC 24 V ± 20 %, on reguest AC/DC 12 V ± 20 %       Power consumption     potential-free quiescent current (NC) contact     potential-free working current (NC) contact     potential-free quiescent current (NC) contact     potential-free changeover (ND) contact       Switching status without supply voltage     output relay de-energised, output contact     output relay de-energised, output contact     output relay de-energised, output contact     output relay energised, output contact       Switching status with dry electrode rods     output relay de-energised, output contact     output relay energised, output contact     output relay energised, output contact     output relay energised, output contact     output relay energised, output contact       Switching status with wet electrode rods     output relay de-energised, output contact     output relay de-energised, output contact     output relay de-energised, output contact     output relay de-energised, output contact       Galvanic separation     OIN for connection to extra low voltage SELV or PELVI voltage resistance > 500 V between electrode rod circuit, supply circuit and output circuit       Max. no-load voltage at the electrode rods Response sensitivity     5 V <sub>et</sub> - 1r 15 kHz (safety extra low voltage SELV)       Response sensitivity     aprox. 30 kΩ or approx. 30 kΩ or a	Electrical connection	5 Z AIVI-LO Stairlies	s sleer 510 11, other	
via 4-pole terminal block     via 5-pole terminal block       Supply voltage     for max. 2.5 mm² in the PP connection head with cable entry M 20 × 1.5, protection class IP 54.       Supply voltage     only for connection to extra low voltage SELV or PELVI AC/DC 24 V ± 20 %, on request AC/DC 12 V ± 20 % approx. 0.5 VA       Output     potential-free quiescent current (KC) contact     potential-free working current     output relay de-energised, output contact     output relay de-energised, output relay de-energised, output contact     output relay de-energised, output re	Liectrical connection		Junection	connection
Supply voltage       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 PELVI         Power consumption       potential-free         Quiput       potential-free         quiescent current       working current         (NC) contact       potential-free         quiescent current       potential-free         quiescent current       changeover         (NC) contact       (NO) contact         Switching status without       output relay         output relay       output relay         de-energised,       output relay         de-energised,       output relay         output contact       output relay         de-energised,       output relay         de-energised,       output relay         de-energised,       output relay         de-energised,       o		via 4-pole terminal block via 5-pole		
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 PELVI AC/DC 24 V ± 20 %, on request AC/DC 12 V ± 20 %         Power consumption       output         Output       approx. 0.5 VA         potential-free quiescent current (NC) contact       potential-free working current (NC) contact       potential-free working current (NC) contact       potential-free changeover (CO) contact         Switching status without supply voltage       output relay de-energised, output contact       output relay				terminal block
Supply voltage       only for connection to extra low voltage SELV or PELVI         Power consumption       potential-free quiescent current       potential-free working current (NO) contact       potential-free (NO) contact       potential-free changeover (NO) contact       potential-free (NO) contact       potential-free changeover (NO) contact       potential-free (NO) contact       potential-free changeover (NO) contact       output relay de-energised, output contact       output relay energised, output contact       output relay energised, output contact       output relay de-energised, out		for max. 2.5 mm <sup>2</sup> in	the PP connection h	ead with cable entry
OutputOne of the contraction of the control of the cont	Supply voltage	NI 20 X	(1.5, protection class	GIP 54 Ge SELV or PELVI
Power consumptionapprox. 0.5 VAOutputpotential-free quiescent current quiescent current (NC) contactpotential-free working current (NO) contactpotential-free changeover (CO) contactSwitching status without supply voltageoutput relay de-energised, output contact openoutput relay de-energised, output relay de-energised, output contact closedoutput relay de-energised, output contact closedoutput relay de-energised, output contact closedoutput relay de-energised, output contact closedoutput relay de-energised, output contact closedoutput relay de-energised, output contact closedoutput relay energised, output contact closedoutput relay de-energised, output relay de-energised, output relay de-energised, output relay de-energised, output relay de-energi	Cuppiy Voltage	$AC/DC 24 V \pm 2$	20 %, on request AC/[	$OC 12 V \pm 20 \%$
Outputpotential-free quiescent current (NC) contactpotential-free working current (NO) contactpotential-free changeover (CO) contactSwitching status without supply voltageoutput relay de-energised, output contactoutput relay de-energised, output contactoutput relay de-energised, output contactoutput relay de-energised, output contactoutput relay de-energised, output contactSwitching status with dry electrode rodsoutput relay energised, output contactoutput relay de-energised, output contactoutput relay energised, output contact	Power consumption		approx. 0.5 VA	
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$ \begin{array}{ c c c c } \hline \text{output contact} & \text{output contact} & \text{output contact} & \text{changeover} \\ \hline \text{in position 1} \\ \hline \text{Cable break monitoring cable} & \hline \text{cable break} & & \\ \hline \text{Cable break monitoring due to} & & \text{the quiescent} \\ \hline \text{current} & \hline \text{current} & \hline \text{current} & \hline \text{current} \\ \hline \text{Galvanic separation} & \hline \text{only for connection to extra low voltage SELV or PELV!} \\ \hline \text{Voltage resistance} > 500 V between electrode rod circuit, supply circuit and output circuit \\ \hline \text{Max. no-load voltage} \\ \text{at the electrode rods} \\ \hline \text{Max. short circuit current} \\ \text{at the electrode rods} \\ \hline \text{Response sensitivity} \\ \hline \text{Temperature range} \\ \hline \text{Max. length of connecting cable between leakage} \\ \hline \text{detector and follow-up circuit} \\ \hline \text{EMC} \\ \hline \text{MC} \\ \hline \end{array} \begin{array}{c} \text{output contact} \\ \text{output contact} \\ \text{output contact} \\ \text{output contact} \\ \text{closed} \\ \hline \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \$		de-energised,	de-energised,	de-energised,
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at the electrode rods0.2 mAResponse sensitivityapprox. 30 kΩ or approx. 33 μS (conductance)Temperature range $-20^{\circ}$ C to $+60^{\circ}$ CMax. length of connecting cable between leakage detector and follow-up circuitdepends on the technical data of the follow-up circuitEMCfor 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.	Max. short circuit current		0.0	
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Max. length of connecting cable between leakage detector and follow-up circuit EMC depends on the technical data of the follow-up circuit 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.	Temperature range	approx. 50 Ks	$_{-2}$ or approx. 35 µS (C $_{-2}$	conductance)
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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.	detector and follow-up circuit	depends on the	technical data of the	follow-up circuit
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.	EMC	for interference em	ission in accordance	with the appliance-
immunity in accordance with the appliance-specific requirements for industrial companies.		specific require	ments for households	s, business and
requirements for industrial companies.		immunity in acc	s small companies, a	
		requirem	ents for industrial co	mpanies.

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 fro	om nipple sealing surface)	
Max. length	2,50	0 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	<b>two-wire connection</b> via 2-pole terminal block for max. 2,5 mm <sup>2</sup> 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 $\Omega$ to 1,200 $\Omega$ , preferably in line with NAMUR DC 8.2 V with internal resistance of 1 k $\Omega$		
Output signal	impressed current signal in the supply circuit		
Mode of operation	quiescent current principle   working current princ		
Switching status in case of cable break	I < 0.2 mA	I < 0.2 mA	
Switching status with wet electrode rods	$I \le 1 \text{ mA}$	l≥3 mA	
Switching status dry electrode rods	$I \ge 3 \text{ mA}$	$I \le 1 \text{ mA}$	
Switching status in case of short circuit or false polarity	I > 6 mA	I > 6 mA	
Galvanic separation	only for connection to extra voltage resistance > 500 V I and supply circuit with i	a low voltage SELV or PELV! between electrode rod circuit mpressed signal current	
Max. no-load voltage at the electrode rods	5 V <sub>eff</sub> -ି∏⊤ 15 kHz (safety	/ extra low voltage SELV)	
Max. short circuit current at the electrode rods	0.2	mA	
Response sensitivity	approx. 30 k $\Omega$ or appro	ox. 33 μS (conductance)	
Temperature range	– 20°C t	$o + 60^{\circ}C$	
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 a specific requirements for commerce as well as small co immunity in accordance w requirements for in	ccordance with the appliance- households, business and ompanies, and for interference with the appliance-specific dustrial companies.	



# <u>©la</u> Conductive suspension electrodes EHE-... and EHW3-...

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









Technical data	EHE-SPS2	EHE-SPS3	EHE-SPS4	
Design	leakage detector	with quiescent current / N	IC (break) contact	
Electrode rod	stainless steel 316 Ti, with 8 mm dia.			
Housing	stai	nless steel 316 Ti and P	TFE	
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, fitted with hal	longer connecting cable ogen-free connecting cab	on request; ble on request	
Supply voltage	only for connect	tion to extra low voltage	e SELV or PELV!	
Description	DC 24 V $\pm$ 20 % via input resistance 2 k $\Omega$ 7.5 k $\Omega$	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 k $\Omega$ 7.5 k $\Omega$ ; 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⊧ < 30 mA	at transistor output, I⊧ < 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	L eur einnel	L eur einnel		
supply voltage	Low signal	Low signal	reed contact open	
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 n	nonitoring due to the quie	escent current	
Galvanic separation	voltage resistance > 50	00 V between electrode ro	d + 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 <sub>eff</sub> - 🖵 600 Hz		
Max. short circuit current at electrode rod + housing		0.2 mA		
Response sensitivity	approx. 30	$k\Omega$ or approx. 33 µS (co	nductance)	
Temperature range		- 20°C to + 60°C	, , , , , , , , , , , , , , , , , , ,	
Max. length of connecting cable between leakage detector and follow-up circuit	depends on th	ne technical data of the fo	bllow-up circuit	
EMC	for interference emiss requirements for hou small companies, and the appliance-spe	sion in accordance with t useholds, business and c d for interference immuni cific requirements for ind	he appliance-specific commerce as well as ty in accordance with ustrial companies.	

Technical data	EHW3-SPS2	EHW3-SPS3	EHW3-SPS4
Design	leakage detector	with quiescent current / N	IC (break) contact
Electrode rods Housing	2 rods made of stainless steel 316 Ti, each with 4 mm dia., other materials (e.g. titanium, Hastelloy, Monel or tantalum) on request PP: other materials (e.g. PVC, PVDF or PTFE) on request		
Electrical connection	<b>two-wire connection</b> via connecting cable 2 x 0.75	three-wire connection via connecting cable 3 x 0.75	<b>four-wire connection</b> via connecting cable 4 x 0.5
	length 2 m, connecting c	longer connecting cable able made of CM or PTF	on request; E on request
Supply voltage	only for connect	tion to extra low voltage	e SELV or PELV!
	DC 24 V $\pm$ 20 % via input resistance 2 k $\Omega$ 7.5 k $\Omega$	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 k $\Omega$ 7.5 k $\Omega$ ; 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⊧ < 30 mA	at transistor output, I⊧ < 30 mA	reed contact at output short circuit proof for short periods via integrated protective resistance of $62 \Omega$ ; 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 n	nonitoring due to the guie	escent current
Galvanic separation	only for connect voltage resistance supply circuit	tion to extra low voltage > 500 V between electro supply circuit	e SELV or PELV! ode rod circuit and
	copp.y chount	and transistor output	and output circuit
Max. no-load voltage at the electrode rods		5 V <sub>eff</sub> - 🖵 600 Hz	
Max. short circuit current at the electrodes rods		0.2 mA	
Response sensitivity	approx. 30	$k\Omega$ or approx. 33 $\mu$ S (cor	nductance)
Temperature range		– 20°C to + 60°C	7
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 emiss	ion in accordance with th	ne 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	EHE-LS4/A	EHE-LS5	
	EHW3-LS4	EHW3-LS4/A	EHW3-LS5	
Design	leakad	e detector with relay	output	
Electrode pair	<ul> <li>EHE: 1 rod made of stainless steel 316 Ti, with 8 mm dia., and a housing made of stainless steel 316 Ti</li> <li>EHW3: 2 rods made of stainless steel 316 Ti, other materials</li> <li>(e. g. titanium, Hastellov, Monel or tantalum) on request</li> </ul>			
Housing	EHE: s	tainless steel 316 Ti EHW3: PP, s (e. g. PVDF or PTF	and PTFE	
Electrical connection	four-wire	four-wire	five-wire	
	connection 4 x 0.5	via connection via connecting cable 4 x 0.5	connection 5 x 0.5	
	length 2 m, lo	nger connecting cab	le on request;	
Supply voltage	fitted with halog	en-free connecting c	able on request	
	only for connection	n to extra low volta	ge SELV or PELV!	
Devenue	wire colours:	wire colours:	wire colours:	
	brown and blue	brown and blue	black and black	
Output	potential-free	potential-free	potential-free	
	quiescent current	working current	changeover	
	(NC) contact	(NO) contact	(CO) contact	
	ma	x. load AC/DC 5 2	4 V	
	extra low)	voltage SELV or PE	ELV only);	
	/	AC/DC 1 mA 3 (1) /	A	
	wire co	olours:	wire colours:	
	black and b	plack (grey)	brown, grey a. blue	
supply voltage	output relay	output relay	output relay	
	de-energised,	de-energised,	de-energised,	
	output contact	output contact	changeover in pos. 1	
	open	closed	(grey and blue)	
Switching status with dry electrode pair	output relay	output relay	output relay	
	energised,	energised,	energised,	
	output contact	output contact	changeover in pos. 2	
	closed	open	(grey and brown)	
Switching status with wet electrode pair	output relay	output relay	output relay	
	de-energised,	de-energised,	de-energised,	
	output contact	output contact	changeover in pos. 1	
	open	closed	(grev and blue)	
Cable break monitoring of connecting cable	cable break monitoring due to the quiescent current	_		
Galvanic separation	only for connection	on to extra low volta	ge SELV or PELV!	
	voltage resistance	> 500 V between ele	ectrode pair circuit,	
	supp	ly circuit and output of	circuit	
Max. no-load voltage at the electrode pair Max. short circuit current at the electrode pair Response sensitivity	5 V <sub>eff</sub> - □_ 15 k	KHz (safety extra low 0.2 mA	voltage SELV)	
Temperature range Max. length of connecting cable between leakage detector and follow-up circuit	ting $e$ depende on the technical data of the follow w			
EMC	it depends on the technical data of the follow-up circuit 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	<b>EHE:</b> 1 rod made of stainless steel 316 Ti, with 8 mm dia., and a housing made of stainless steel 316 Ti		
	<b>EHW3:</b> 2 rods made of stainless steel 316 Ti, other materials (e.g. titanium, Hastelloy, Monel or tantalum) on request		
Housing	EHE: stainless st	eel 316 Ti and PTFE	
	EHW3- other materials (e.g. PV	: PP, /DF or PTFE) on request	
Electrical connection	<b>two-wire connection</b> 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 $\Omega$ to 1,200 $\Omega$ , preferably in line with NAMUR DC 8.2 V with internal resistance of 1 k $\Omega$		
Output signal	impressed current signal in the supply circuit		
Mode of operation	quiescent current principle working current princ		
Switching status in case of cable break	I < 0.2 mA	I < 0.2 mA	
Switching status with wet electrode pair	$I \le 1 \text{ mA}$	$I \ge 3 \text{ mA}$	
Switching status with dry electrode pair	$I \ge 3 \text{ mA}$	l ≤ 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 voltage resistance > 500 V b and supply circuit with in	<b>low voltage SELV or PELV!</b> etween electrode pair circuit mpressed signal current	
Max. no-load voltage at the electrode pair	5 V <sub>eff</sub> -∏_⊢ 15 kHz (safety	extra low voltage SELV)	
Max. short circuit current at the electrode pair	0.2	mA	
Response sensitivity	approx. 30 k $\Omega$ or approx	x. 33 µS (conductance)	
Temperature range	– 20°C to	o + 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 a specific requirements for commerce as well as small co immunity in accordance v requirements for in	ccordance with the appliance- households, business and ompanies, and for interference with the appliance-specific dustrial companies.	



#### 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  $\leq 2$  cm using the sensor cable spacers, as a greater or lesser spacing affects the response level of the system in the event of leakage.



Technical data	KE-SPS2	KE-SPS3	KE-SPS4		
Design Sensor cables Max. length of sensor cables when laid in a	leakage detector with quiescent current / NC (break) contact 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				
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 Electrical connection	two-wire connection via connecting cable 2 x 0.75	PC or PP <b>three-wire connection</b> via connecting cable 3 x 0.75	<b>four-wire connection</b> via connecting cable 4 x 0.5		
•	fitted with hal	ogen-free connecting cable	ble on request		
Supply voltage	only for connect DC 24 V ± 20 % via input resistance 2 kΩ 7.5 kΩ max 0 5 W	AC/DC 12 30 V; wire colours: brown and blue	AC/DC 12 30 V; wire colours: brown and blue		
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 k $\Omega$ 7.5 k $\Omega$ ; 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⊧ < 30 mA	at transistor output, I⊧ < 30 mA	reed contact at output short circuit proof for short periods via integrated protective resistance of $62 \Omega$ ; however, the reed contact is open if the supply voltage of the sensor is incorrectly connected		
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 monito	oring unit Z-4V7 at the en	d 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	cable break n	nonitoring due to the quie	scent current		
Galvanic separation	only for connect voltage resistance supply circuit	e > 500 V between senso supply circuit and transistor output	e SELV or PELV! r cable circuit and supply circuit and output circuit		
Max. no-load voltage at the sensor cables Max. short circuit current at the sensor cables Response sensitivity	approx 30	10 V <sub>eff</sub> - Γ_ 60 Hz 0.1 mA kΩ or approx - 33 uS (co	nductance)		
Temperature range Max. length of connecting cable between leakage detector and follow up circuit	depende en th	$-20^{\circ}$ C to $+60^{\circ}$ C			
EMC	depends on tr	see page 32-1-26	οισαιτουτ		



#### 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.



Technical data	BAE-SPS2	BAE-SPS3	BAE-SPS4
Design Sensor tape Max. length of sensor tape	<ul> <li>leakage detector with quiescent current / NC (break) contact</li> <li>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</li> <li>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</li> </ul>		
when laid in a relatively straight line			
Electrical connection	<b>two-wire connection</b> via connecting cable 2 x 0.75	three-wire connection via connecting cable 3 x 0.75	<b>four-wire connection</b> 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 connect DC 24 V $\pm$ 20 % via input resistance 2 k $\Omega$ 7.5 k $\Omega$	AC/DC 12 30 V; wire colours: brown and blue	SELV or PELV! AC/DC 12 30 V; wire colours: brown and blue
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 k $\Omega$ 7.5 k $\Omega$ ; 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 $62 \Omega$ ; 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 connect voltage resistance supply circuit	tion to extra low voltage > 500 V between sensor ta supply circuit and transistor output	SELV or PELV! ape rope circuit and supply circuit and output circuit
Max. no-load voltage at the sensor tape ropes Max. short circuit current at the sensor tape ropes Response sensitivity	10 V <sub>eff</sub> - C = 60 Hz 0.1 mA approx. 30 kΩ or approx. 33 μS (conductance) – 20°C to + 60°C		
Temperature range Max. length of connecting cable between leakage detector and follow-up circuit			
EMC	see page 32-1-26		

# Ola 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.

