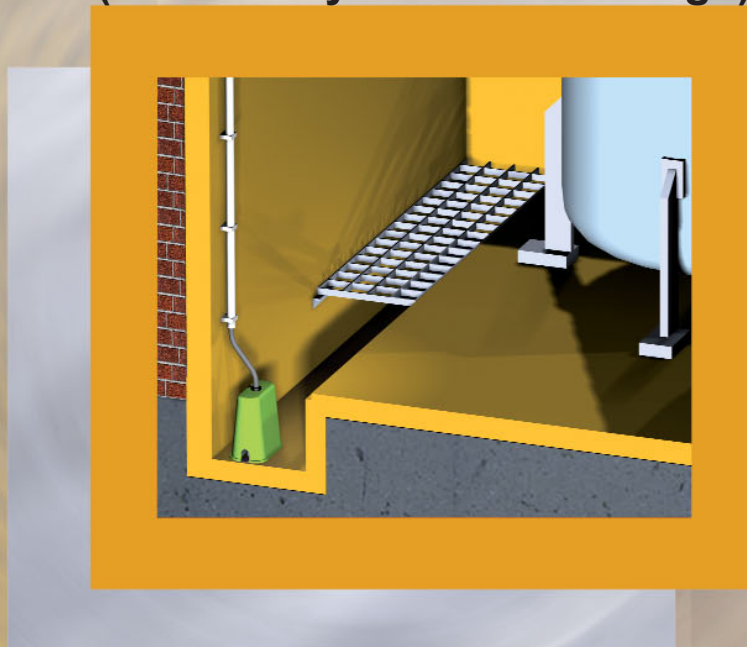




Conductive leakage detectors of the Liqui-Switch range

**for extra low voltage SELV or PELV,
with potential-free relay contact
(for switching a safety extra low voltage),
for connection to a PLC or DDC unit,
a small controller, a fieldbus connector or
a network connector,
for switching a solenoid valve
(with safety extra low voltage)**



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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.

“Liqui-Switch” - general information

Conductive leakage detectors for extra low voltage SELV or PELV

- **with potential-free relay contact
(for switching a safety extra low voltage)**
- **for connection to:
a PLC or DDC unit,
a small controller,
a fieldbus connector or
a network connector**
- **for switching a solenoid valve
(with safety extra low voltage)**
- **with integrated galvanic separation of the electrodes**

Standard 4-wire version with quiescent current contact:

2 wires for AC/DC 24 V (optional: 12 V), polarity-independent

2 wires for a 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).

A cable break in the contact loop (quiescent current loop) also activates an alarm.

On request:

4-wire version with working current contact:

2 wires for AC/DC 24 V (optional: 12 V), polarity-independent

2 wires for a 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).

A cable break in the contact line does not activate an alarm.

5-wire version with changeover contact:

2 wires for AC/DC 24 V (optional: 12 V), polarity-independent

3 wires for a 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.

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

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



Conductive “Liqui-Switch” in standard 4-wire design with quiescent current contact

The conductive leakage detectors in 4-wire technology may only be used for the detection of leakage of conductive liquids.

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 relay contact.

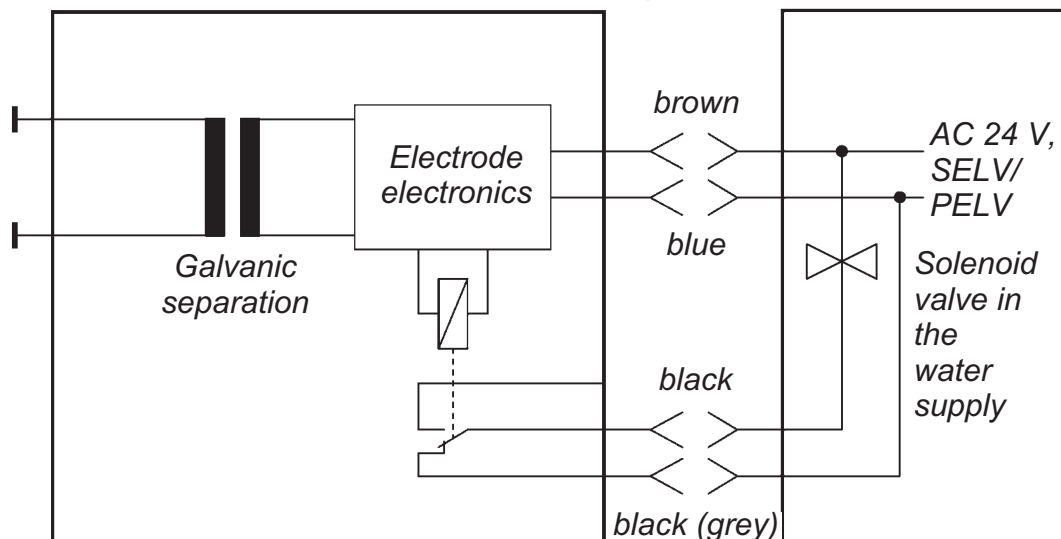
Supply voltage	SELV or PELV AC/DC 24 V ± 20 % on request: AC/DC 12 V ± 20 %		
Switching voltage	AC/DC 5 ... 24 V		
Switching current	AC/DC 1 mA ... 3 (1) A		
With integrated galvanic separation between the electrode circuit, the power supply and the potential-free output contact.			
Version	Without supply voltage	Electrodes dry	Electrodes wet
Standard 4-wire version with quiescent current contact	Output relay de-energised, contact open	Output relay energised, contact closed	Output relay de-energised, contact open
On request: 4-wire version with working current contact	Output relay de-energised, contact closed	Output relay energised, contact open	Output relay de-energised, contact closed
On request: 5-wire version with changeover contact	Output relay de-energised, changeover contact in position 1	Output relay energised, changeover contact in position 2	Output relay de-energised, changeover contact in position 1
The compatibility of the detector on the one hand and actuator, PLC, DDC unit, small controller, fieldbus connector or network connector on the other must be reviewed on case-to-case basis with regard to the extra low voltage SELV or PELV and the conformity of their signal parameters.			

Series or parallel connection of 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

Conductive “Liqui-Switch” leakage detector in standard 4-wire quiescent current design

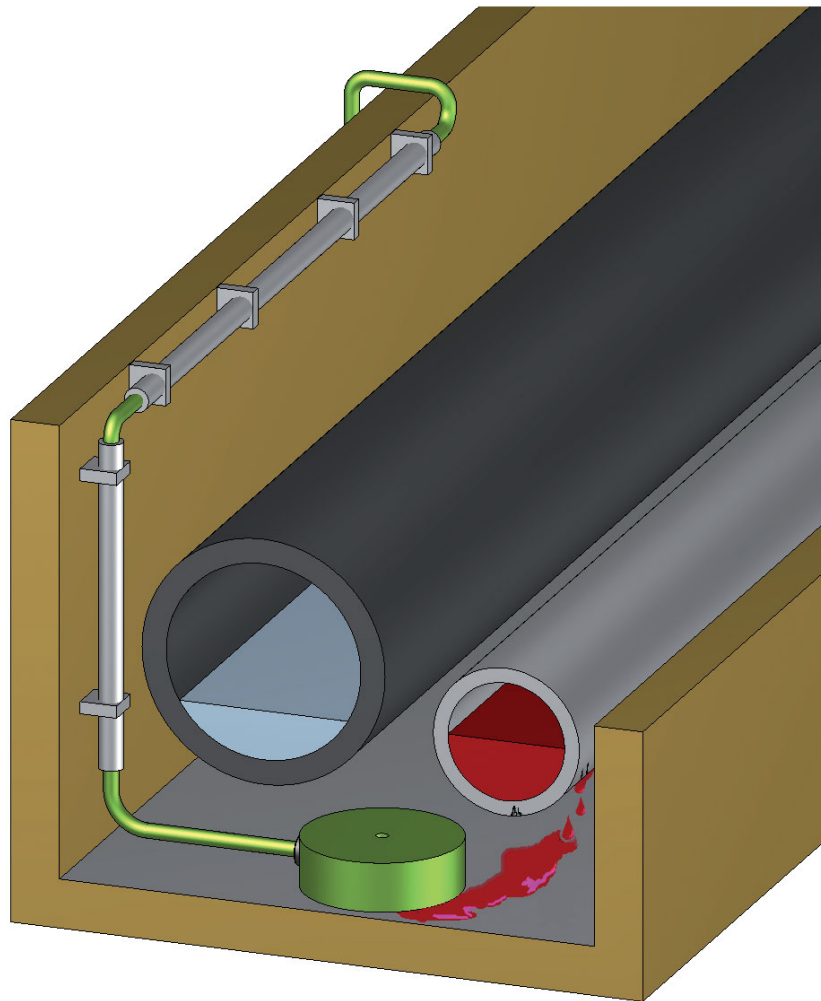
Follow-up circuit





Leakage detection with “Liqui-Switch” conductive electrodes

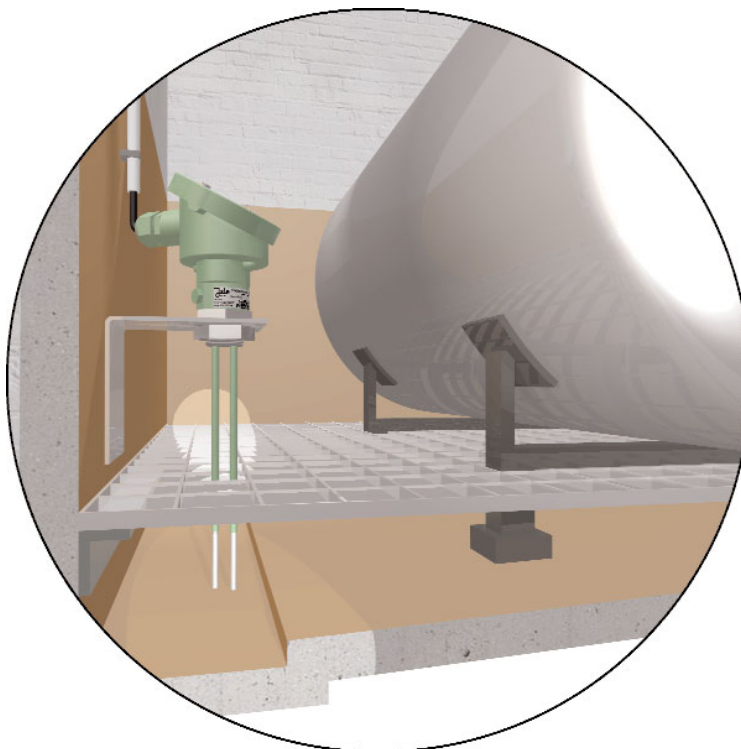
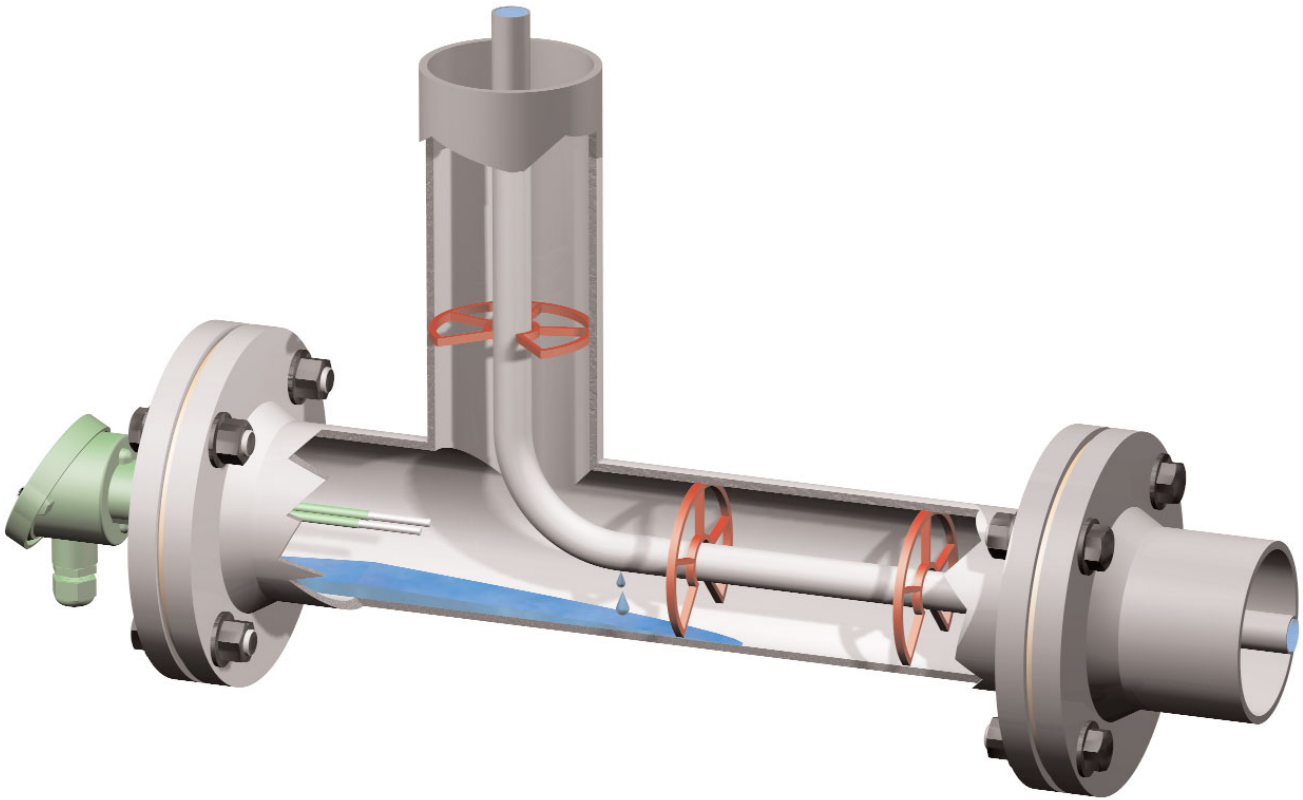
Application example for plate electrodes





Leakage detection with “Liqui-Switch”- conductive electrodes

Application examples for rod electrodes





Leakage detection with “Liqui-Switch”- conductive electrodes

Application example for suspension electrodes



Jola Plate electrode PEK-LS4

Conductive leakage detector for extra low voltage SELV or PELV

- with potential-free relay contact (for switching a safety extra low voltage)
- for connection to:
a PLC or DDC unit,
a small controller,
a fieldbus connector or
a network connector
- for switching a solenoid valve (with safety extra low voltage)
- with integrated galvanic separation of the electrodes

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

Plate electrodes 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 plate electrode PEK-LS4 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.

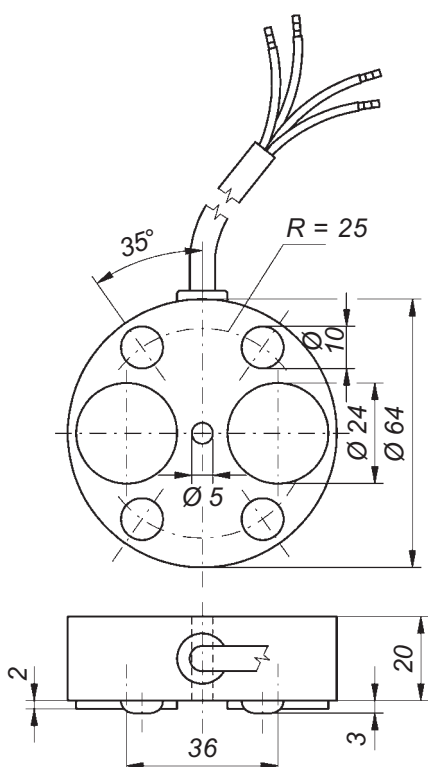



Plate electrode
PEK-LS4,
sensor side



Plate electrode
PEK-LS4,
label side

Technical data	PEK-LS4
Design	leakage detector with relay output with quiescent current contact
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 via connecting cable 4 x 0.5; five-wire connection for changeover contact output on request; 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
Power consumption	approx. 0.5 VA
Output	potential-free quiescent current contact (working current contact or changeover contact on request) 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)
Switching status with dry electrode plates	output relay energised, output contact closed
Switching status with wet electrode plates	output relay de-energised, output contact open
Switching status without supply voltage	output relay de-energised, output 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 circuit and supply circuit and output circuit
Max. no-load voltage at the electrodes	5 V _{eff}  15 kHz (safety extra low voltage SELV)
Max. short-circuit current at the electrodes	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.

Jola Plate electrode WDX-LS4

Conductive leakage detector for extra low voltage SELV or PELV

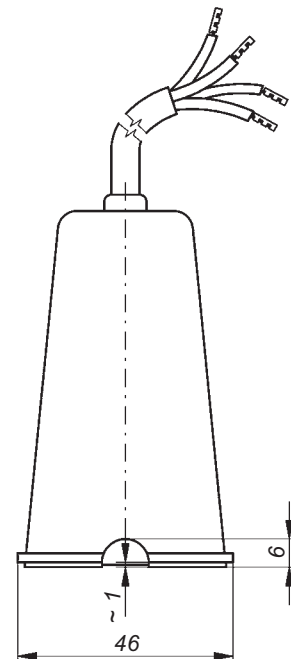
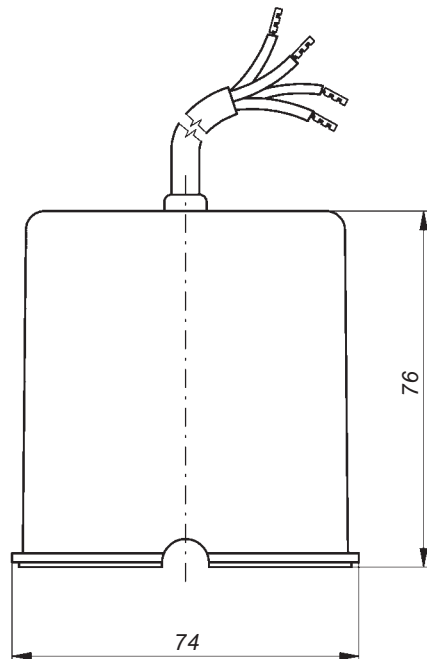
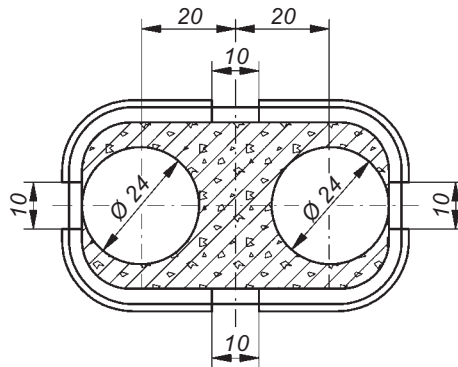
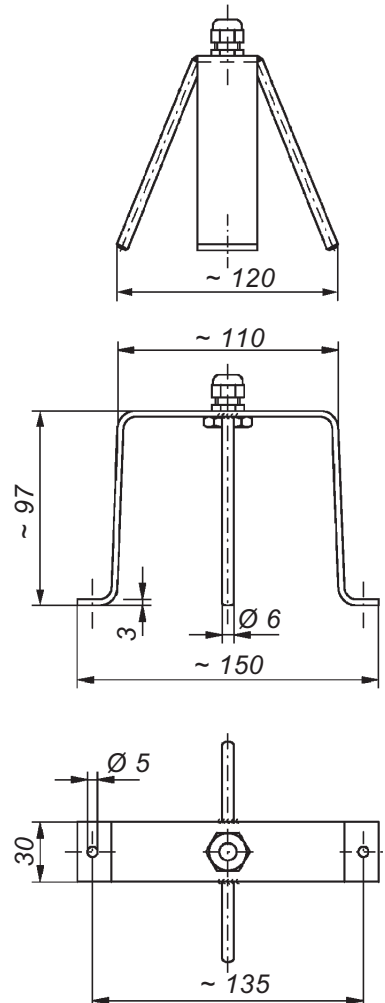
- with potential-free relay contact (for switching a safety extra low voltage)
- for connection to: a PLC or DDC unit, a small controller, a fieldbus connector or a network connector
- for switching a solenoid valve (with safety extra low voltage)
- with integrated galvanic separation of the electrodes


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

Plate electrodes 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 connection side upwards.

The plate electrode WDX-LS4 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)



Technical data	WDX-LS4
Design	leakage detector with relay output with quiescent current contact
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 via connecting cable 4 x 0.5; five-wire connection for changeover contact output on request; 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
Power consumption	approx. 0.5 VA
Output	potential-free quiescent current contact (working current contact or changeover contact on request) 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)
Switching status with dry electrode plates	output relay energised, output contact closed
Switching status with wet electrode plates	output relay de-energised, output contact open
Switching status without supply voltage	output relay de-energised, output 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 circuit and supply circuit and output circuit
Max. no-load voltage at the electrodes	5 V _{eff}  15 kHz (safety extra low voltage SELV)
Max. short-circuit current at the electrodes	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.

Jola Wall-mounted electrode WAE1-LS4

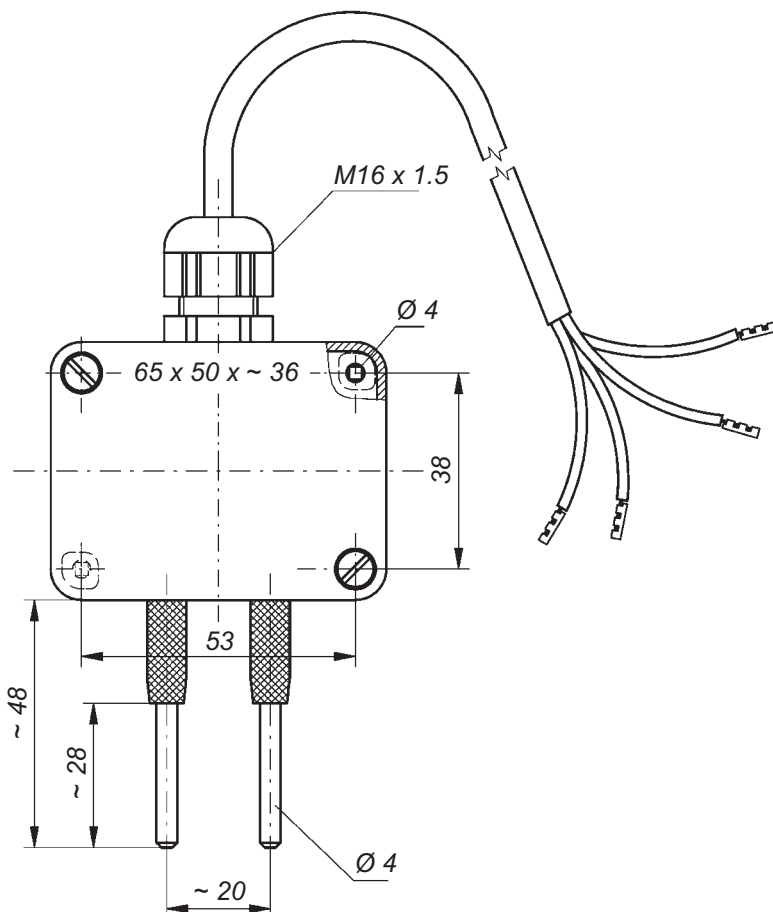
Conductive leakage detector for extra low voltage SELV or PELV


- with potential-free relay contact (for switching a safety extra low voltage)
- for connection to:
a PLC or DDC unit,
a small controller,
a fieldbus connector or
a network connector
- for switching a solenoid valve (with safety extra low voltage)
- with integrated galvanic separation of the electrodes

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

Wall-mounted electrodes 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 wall-mounted electrode WAE1-LS4 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-LS4
Design	leakage detector with relay output with quiescent current contact
Electrode rods	2 rods made of stainless steel 316 Ti, each with 4 mm dia.
Housing	PC or PP
Electrical connection	four-wire connection via connecting cable 4 x 0.5; five-wire connection for changeover contact output on request; 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
Power consumption	approx. 0.5 VA
Output	potential-free quiescent current contact (working current contact or changeover contact on request) 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)
Switching status with dry electrode rods	output relay energised, output contact closed
Switching status with wet electrode rods	output relay de-energised, output contact open
Switching status without supply voltage	output relay de-energised, output 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 circuit and supply circuit and output circuit
Max. no-load voltage at the electrodes	$5 V_{\text{eff}}$  15 kHz (safety extra low voltage SELV)
Max. short-circuit current at the electrodes	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.



Rod electrodes S 2 M/PP-LS4, S 2 M/PVDF-LS4 and S 2 AM-LS4

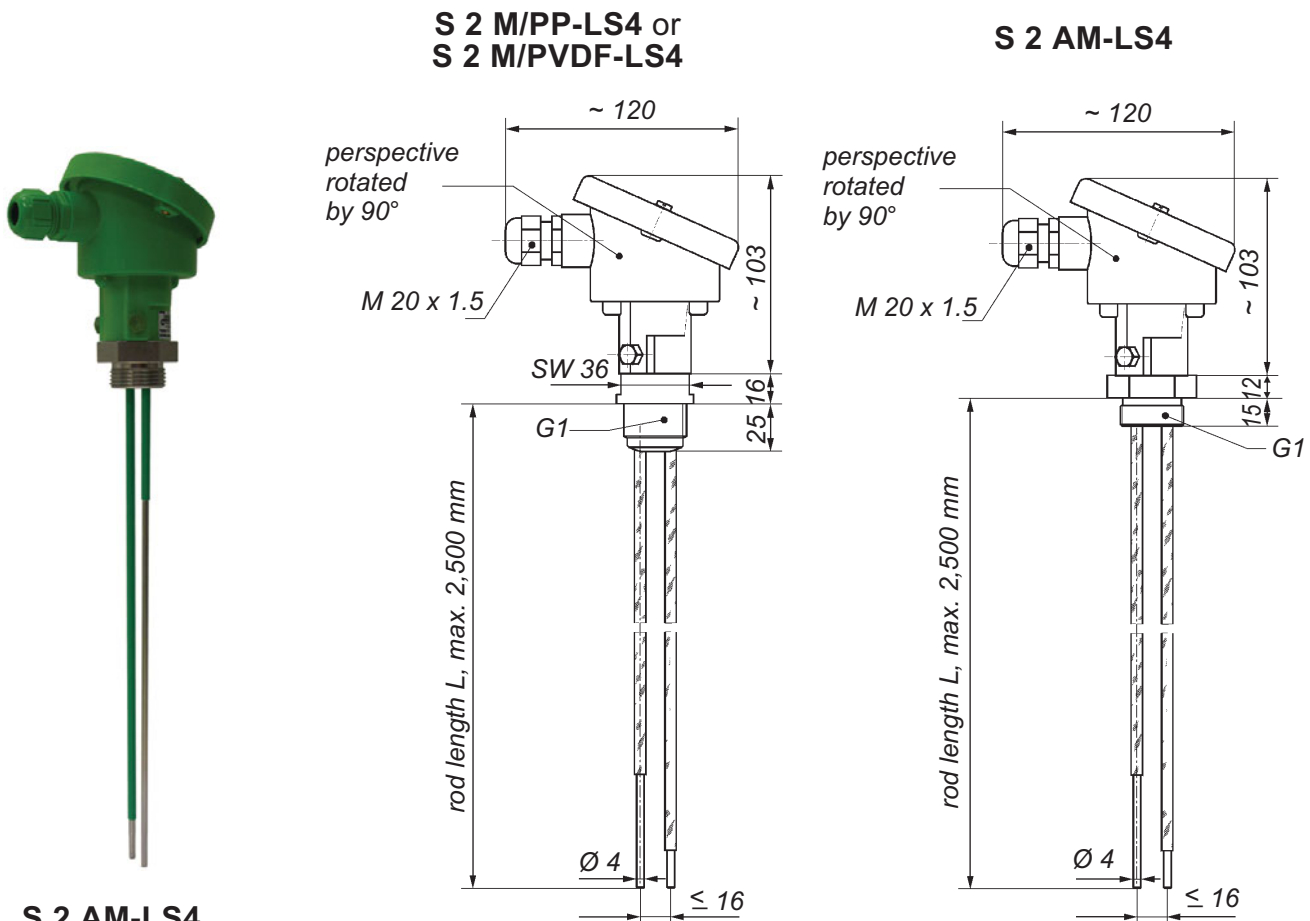
Conductive leakage detectors for extra low voltage SELV or PELV

- with potential-free relay contact
(for switching a safety extra low voltage)
- for connection to:
a PLC or DDC unit,
a small controller,
a fieldbus connector or
a network connector
- for switching a solenoid valve
(with safety extra low voltage)
- with integrated galvanic separation of the electrodes


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

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 rod electrodes S 2 M/PP-LS4, S 2 M/PVDF-LS4 and S 2 AM-LS4 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 AM-LS4

Technical data	S 2 M/PP-LS4, S 2 M/PVDF-LS4 and S 2 AM-LS4
Design	leakage detectors with relay output with quiescent current 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 polyolefin shrinkdown tubing (shrinkdown tubing made of PVDF or PTFE on request)
Lengths	on request (measured from nipple sealing surface)
Max. lengths	2,500 mm
Screw-in nipple	S 2 M/PP-LS4: PP, G1; S 2 M/PVDF-LS4: PVDF, G1; S 2 AM-LS4: stainless steel 316 Ti, other materials on request, G1
Electrical connection	four-wire connection via 4-pole terminal block for max. 2.5 mm ² in the PP connection head with cable entry M 20 x 1.5, protection class IP 54 five-wire connection for changeover contact output 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	approx. 0.5 VA
Output	potential-free quiescent current contact (working current contact or changeover contact on request) max. load AC/DC 5 ... 24 V (extra low voltage SELV or PELV only); AC/DC 1 mA ... 3 (1) A
Switching status with dry electrode rods	output relay energised, output contact closed
Switching status with wet electrode rods	output relay de-energised, output contact open
Switching status without supply voltage	output relay de-energised, output 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 circuit and supply circuit and output circuit
Max. no-load voltage at the electrodes	5 V _{eff}  15 kHz (safety extra low voltage SELV)
Max. short-circuit current at the electrodes	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.

Jola Suspension electrodes EHE-LS4 and EHW3-LS4

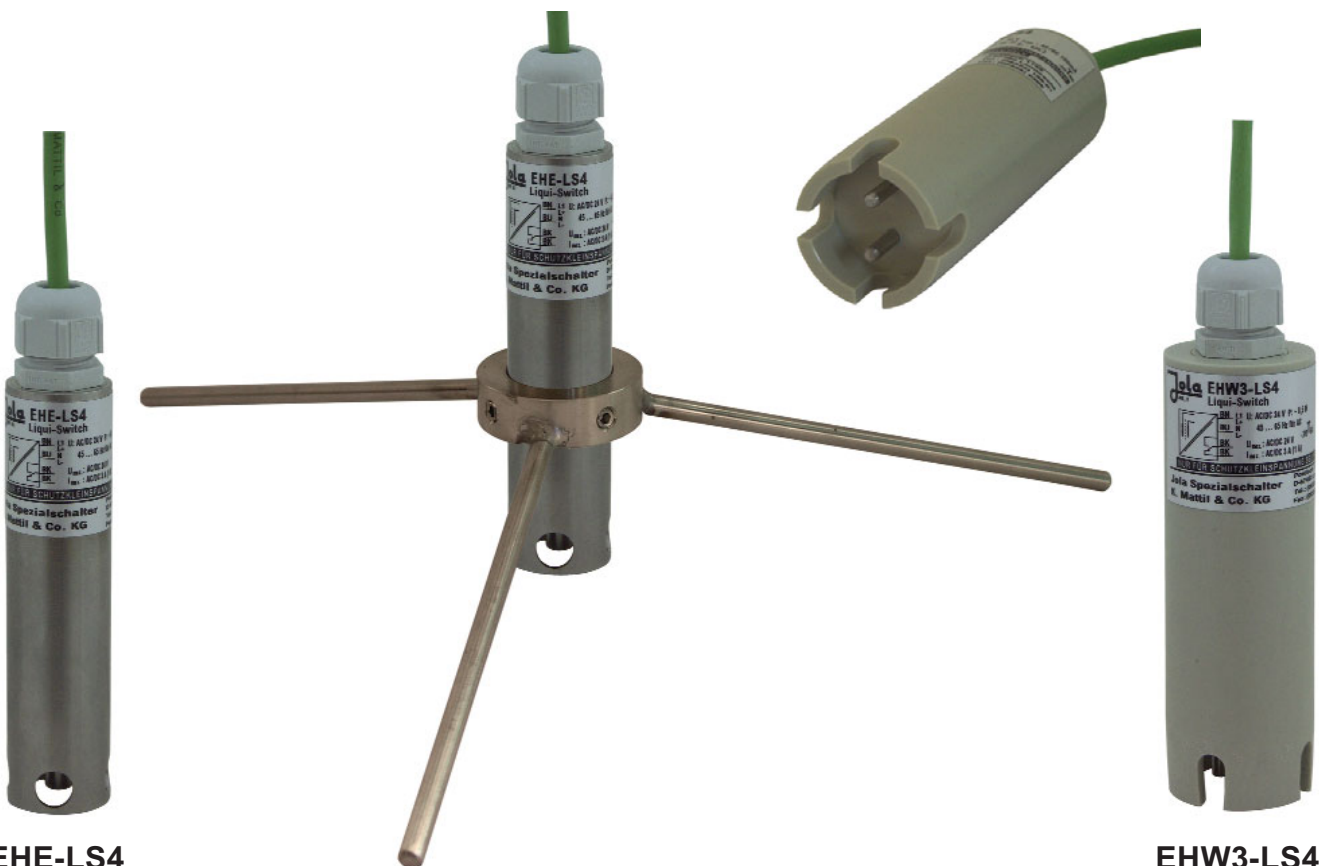
Conductive leakage detectors for extra low voltage SELV or PELV

- with potential-free relay contact
(for switching a safety extra low voltage)
- for connection to:
a PLC or DDC unit,
a small controller,
a fieldbus connector or
a network connector
- for switching a solenoid valve
(with safety extra low voltage)
- with integrated galvanic separation of the electrodes

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


Suspension electrodes 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-LS4 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.

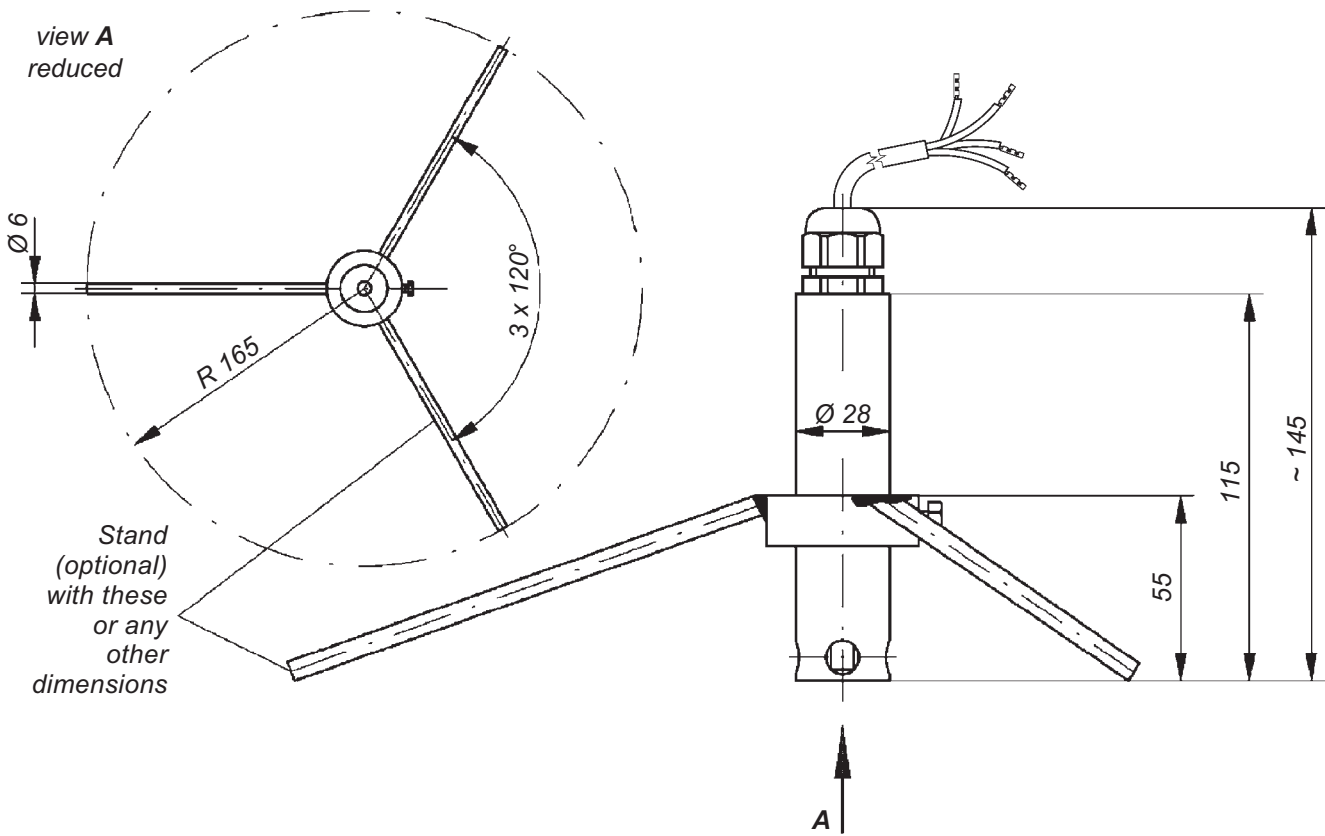
In the suspension electrode EHE-LS4, the metal housing and a concentrically positioned electrode rod in the housing form an electrode pair; the suspension electrode EHW3-LS4 is fitted with two separate electrodes in the form of two electrode rods: 1 control electrode and 1 earth electrode. As soon as a conductive liquid creates a conductive path between the control electrode and the earth electrode, the switching status of the leakage detector changes.



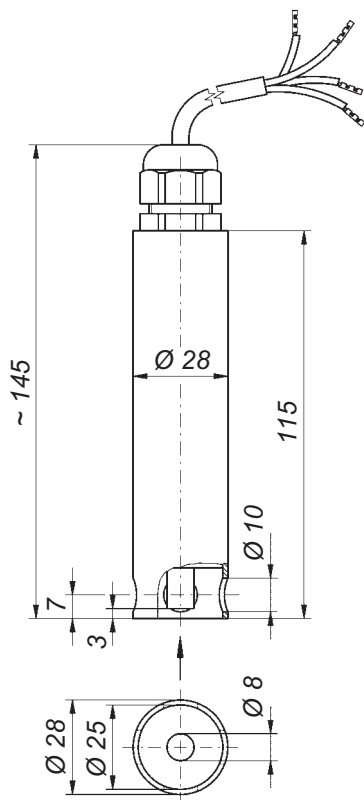
EHE-LS4

EHW3-LS4

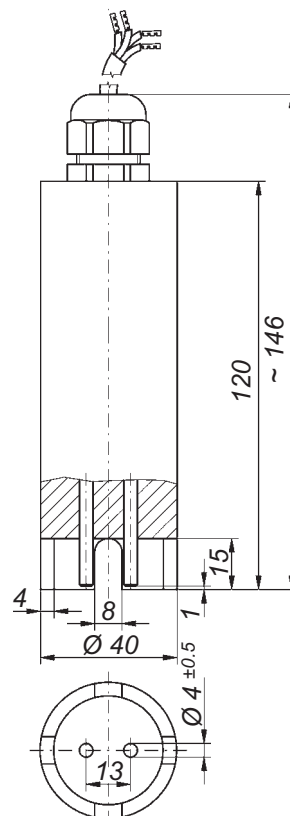
Technical data	EHE-LS4	EHW3-LS4
Design	leakage detectors with relay output with quiescent current contact	
Electrode rod(s)	1 rod made of stainless steel 316 Ti,	2 rods made of stainless steel 316 Ti, other materials (e.g. titanium, Hastelloy, Monel or tantalum) on request
Housing	stainless steel 316 Ti and PTFE	PP, other materials (e.g. PVDF or PTFE) on request
Electrical connection	four-wire connection via connecting cable 4 x 0.5; five-wire connection for changeover contact output on request; 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	
Power consumption	approx. 0.5 VA	
Output	potential-free quiescent current contact (working current contact or changeover contact on request) 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)	
Switching status with dry electrode rod(s)	output relay energised, output contact closed	
Switching status with wet electrode rod(s)	output relay de-energised, output contact open	
Switching status without supply voltage	output relay de-energised, output 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 circuit and supply circuit and output circuit	
Max. no-load voltage at the electrodes	5 V _{eff}  15 kHz (safety extra low voltage SELV)	
Max. short-circuit current at the electrodes	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.	



EHE-LS4 with mounting stand



EHE-LS4



EHW3-LS4



Central unit group alarm relay Selektor 5

- For max. 5 sensors of the Jola “Leckwatcher” leakage detection system in the version ...-SPS3 or the sensors of the “Liqui-Switch” system
- Selective signalling via LEDs
- Group alarm output via potential-free changeover contact



For more information, please see pages 35-1-0 et seq.