

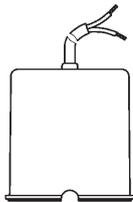
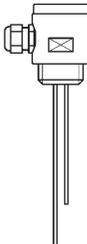
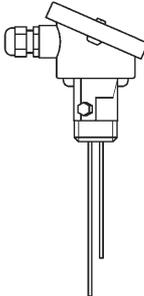


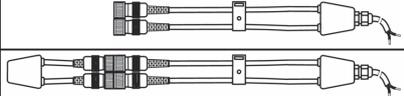
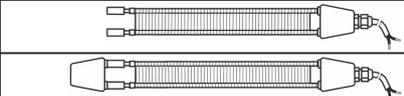
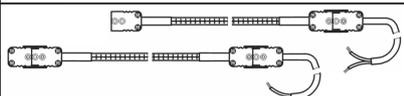
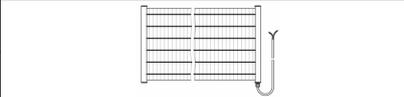
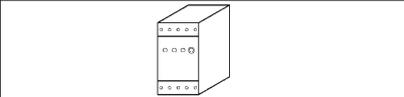
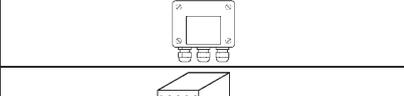
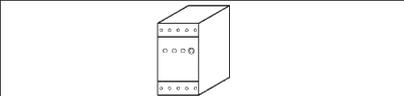
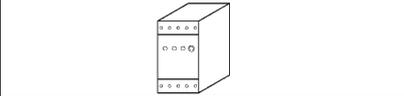
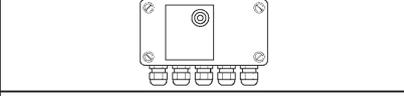
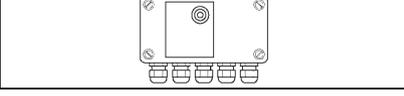
# Conductive Leakage detectors of the Leckstar range

with electrode and relay

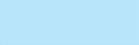
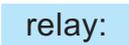
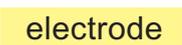
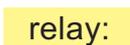


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#### Explanation of the colours used:

-  = **without** cable break monitoring
-  = **with** cable break monitoring
-  = with  relay: **without** cable break monitoring or
- = with  electrode +  relay: **with** cable break monitoring

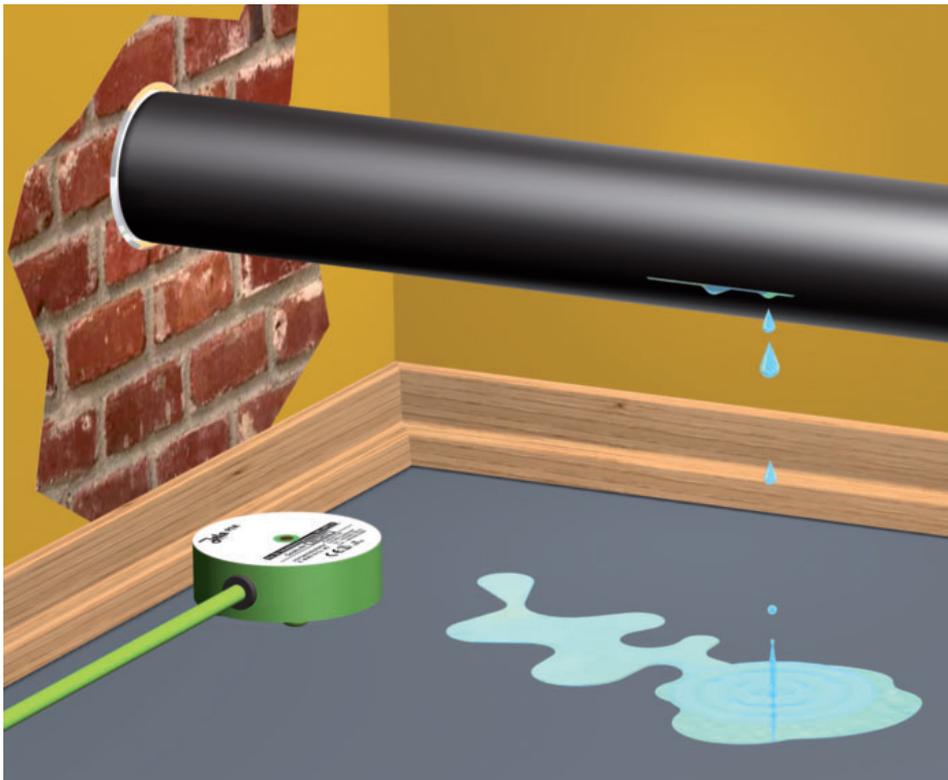
## The conductive measuring principle

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 (e.g. oils, diesel, fuel oil, demineralised water ...).**

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 of the Leckstar range consists of the combination of a conductive electrode and a conductive electrode relay. This combination detects the presence of an electrically conductive liquid at the electrodes, 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.



**Use of a plate electrode for leakage detection of an electrically conductive liquid under a pipe**

## Examples of electrically conductive liquids

**Accumulator acid**, 32 %  
**Acetic acid**, 70 %  
**Acrylic acid**, 70 %  
**Adipic acid** \*  
**Aluminium chloride** \*  
**Aluminium potassium sulphate**:  
 see alums  
**Aluminium salts from mineral acids**: see alums  
**Aluminium sulphate** \*  
**Alums (Me(I)-Me(III) sulphates)** \*  
**Ammonia water**  
 (ammonia solution), 25 %  
**Ammonium acetate** \*  
**Ammonium bromide** \*  
**Ammonium carbonate** \*  
**Ammonium chloride** \*  
**Ammonium fluoride** \*  
**Ammonium nitrate** \*  
**Ammonium phosphate** \*  
**Ammonium sulphate** \*  
**Ammonium sulphide**, 40 %  
**Ammonium thiosulphate** \*  
**Anodic oxidation bath**  
 (HNO<sub>3</sub>-30 %, H<sub>2</sub>SO<sub>4</sub>-10 %)  
**Anticalcium**: see antiliming agent (sulfamic acid)  
**Antiliming agent (sulfamic acid)**,  
 50 g/l of H<sub>2</sub>O  
**Aqua regia**, nitrohydrochloric acid, 1 : 1

**Barium carbonate** \*  
**Barium chloride** \*  
**Barium hydroxide** \*  
**Barium nitrate** \*  
**Bicarbonate of ammonia** \*  
**Borax (sodium tetraborate)** \*  
**Borofluoric acid**  
 (tetra boro fluoric acid), 35 %  
**Bromine water** \*

**Cadmium chloride** \*  
**Cadmium sulphate** \*  
**Calcium acetate** \*  
**Calcium bromide** \*  
**Calcium chloride** \*  
**Calcium fluoride** \*  
**Calcium hydroxide** \*  
**Calcium hypochlorite** \*  
**Calcium sulphate**  
**Caustic potash solution**  
 (potassium hydroxide) \*  
**Caustic soda**, 32 %  
**Chlorine water** \*  
**Chloroacetic acid**, saturated  
**Chlorsulfon acid**, > 97 %  
**Chromic acid**, 5 %  
**Chromic sulfuric / acid mixture**  
**Citric acid** \*  
**Cupric chloride** \*  
**Cupric cyanide** \*  
**Cupric nitrate** \*  
**Cupric sulphate** \*

**Electroplating bath**,  
 AgNO<sub>3</sub>/KCN  
**Ethylen diamine tetra acetic acid** (trilon B)

**Ferric (III) chloride** \*  
**Ferrous (II) sulfate**  
**Formaldehyde**, 40 %  
**Formic acid**, 80 %

**Glycol acid**, 50 %

**Hydrazine hydrate**, 80 %  
**Hydrobromic acid**,  
 aqueous solution \*  
**Hydrochloric acid**, 37 %  
**Hydrofluoric acid**  
 (fluohydric acid), 40 %  
**Hydrogen peroxide**, 30 %

**Javel water / bleaching lye**:  
 see sodium hypochloride

**Liquid fertilizer application**:  
 see manuring salts

**Magnesium chloride** \*  
**Magnesium hydroxide carbonate** (magnesium carbonate) \*  
**Magnesium sulphate** \*  
**Manuring salts / saline manure**  
**Mercury nitrate** \*  
**Mercury sulphate** \*

**Naphtalene sulphonic acid** \*  
**N-butyric acid**, 70 %  
**Nickel chloride** \*  
**Nickel nitrate** \*  
**Nitrating acid mixture**: see aqua regia, nitrohydrochloric acid  
**Nitric acid** (not fuming),  
 approx. 65 %  
**Nitrolotriacetic acid** (Trilon A) \*  
**Nitrosylsulphuric acid**, 30 %

**Oleum**: see sulfuric acid,  
 fuming

**Phenidone**  
 (1-Phenyl-3-Pyra-zolidinone)  
**Phosphoric acid**, concentrated  
**Photographic developer**, pure  
**Picric acid** \*  
**Potassium bicarbonate** \*  
**Potassium borate** \*  
**Potassium bromide**  
**Potassium bromide** \*  
**Potassium carbonate** (potash) \*  
**Potassium chlorate** \*  
**Potassium chloride** \*  
**Potassium cyanide** \*  
**Potassium ferrocyanide** and  
**potassium ferricyanide** \*

**Potassium iodide** \*  
**Potassium nitrate** \*  
**Potassium sulphate** \*  
**Propionic acid**, 80 %

**Salicylic acid** \*  
**Silver nitrate**, 2 % solution  
**Sodium acetate** \*  
**Sodium aluminium sulphate**:  
 see alums  
**Sodium bisulphite** \*  
**Sodium bromide** \*  
**Sodium carbonate** \*  
**Sodium chlorate** \*  
**Sodium chloride** \*  
**Sodium cyanide** \*  
**Sodium dichromate** \*  
**Sodium dithionite** \*  
**Sodium hydrogen carbonate** \*  
**Sodium hydrogen sulphate** \*  
**Sodium hypochlorite** (up to  
 30°C; 150 g/l of active chlor)  
**Sodium nitrate** \*  
**Sodium nitrite** \*  
**Sodium peroxide** \*  
**Sodium phosphate** \*  
**Sodium silicate** \*  
**Sodium sulfide** \*  
**Sodium sulphate** \*  
**Sodium sulphite** \*  
**Sodium tetraborate**: see Borax  
**Sodium thiosulphate** \*  
**Sulfuric acid**, 20 %  
**Sulfuric acid**, 96 - 98 % \*\*  
**Sulfuric acid**, fuming (oleum),  
 65 % SO<sub>3</sub> \*\*  
**Sulfurous acid**, 5 - 6 % SO<sub>2</sub>

**Tartaric acid** \*  
**Tin(II) chloride** \*  
**Trichloroacetic acid**

**Water** (tap water)

**Zinc chloride** \*  
**Zinc nitrate** \*  
**Zinc sulphate** \*

\* Saturated solution

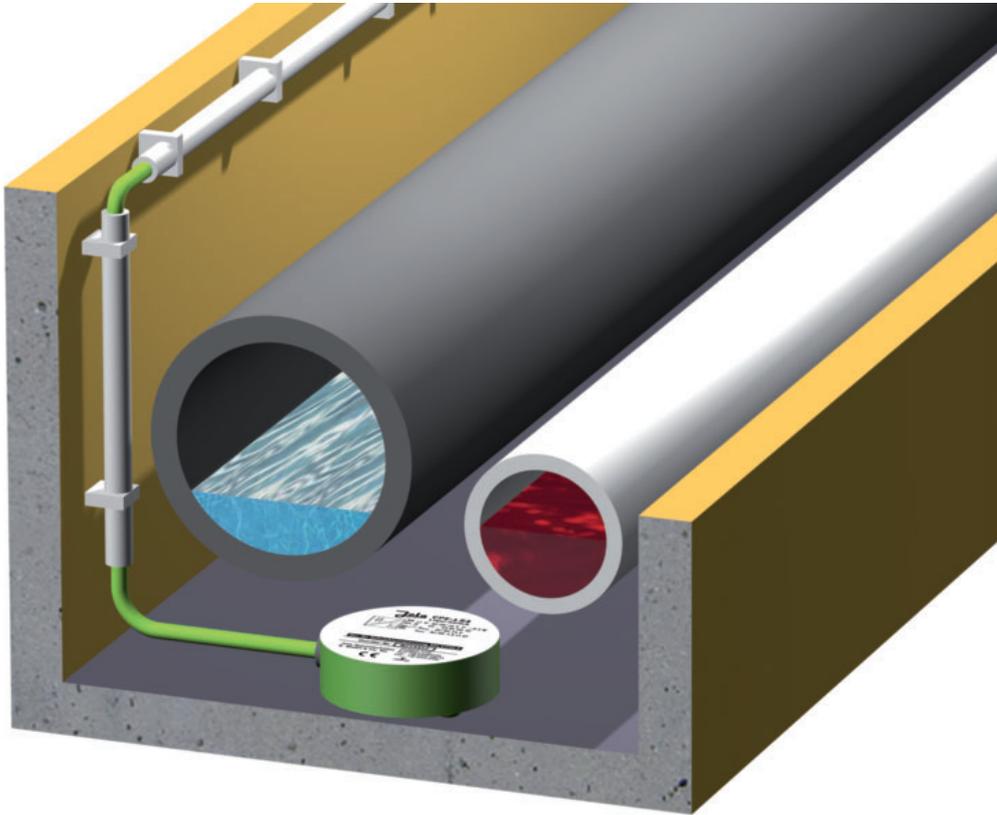
\*\* Only suitable for point sensors, because the line and surface sensors have a too long reaction period

A reliable detection of electrically poor conductive liquids (compared to the above-mentioned liquids) can be achieved by adaption of the sensitivity of the conductive electrode relay in our works (on request).



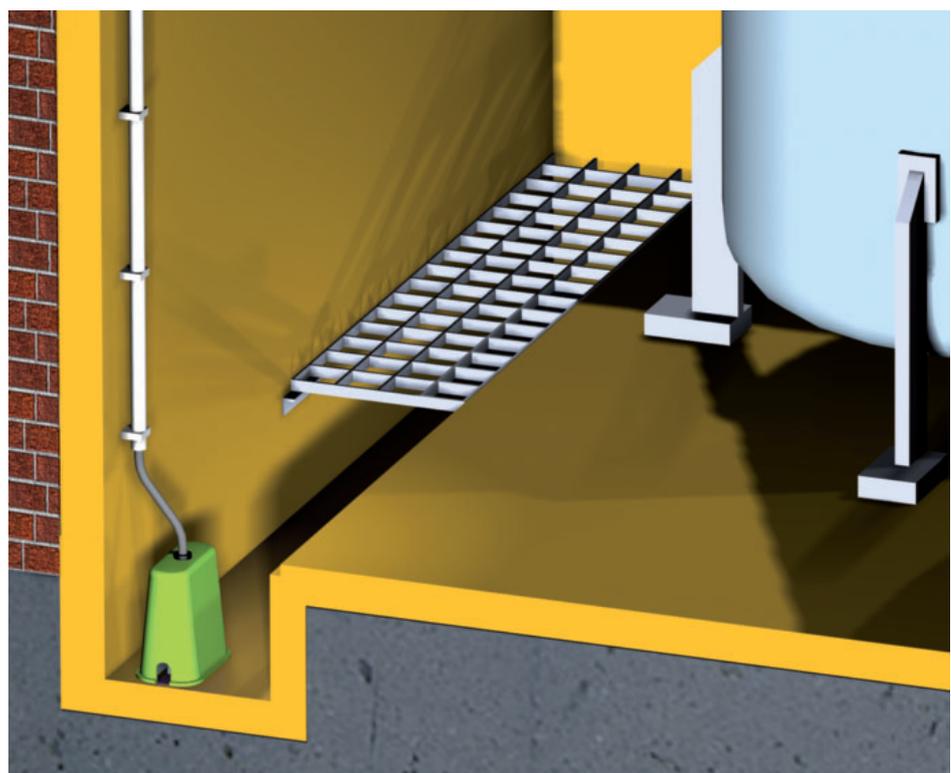
# Leakage detection with conductive “Leckstar” point sensors

## Application examples with conductive plate electrodes



Use of a plate electrode for leakage detection of an electrically conductive liquid in a pipe duct

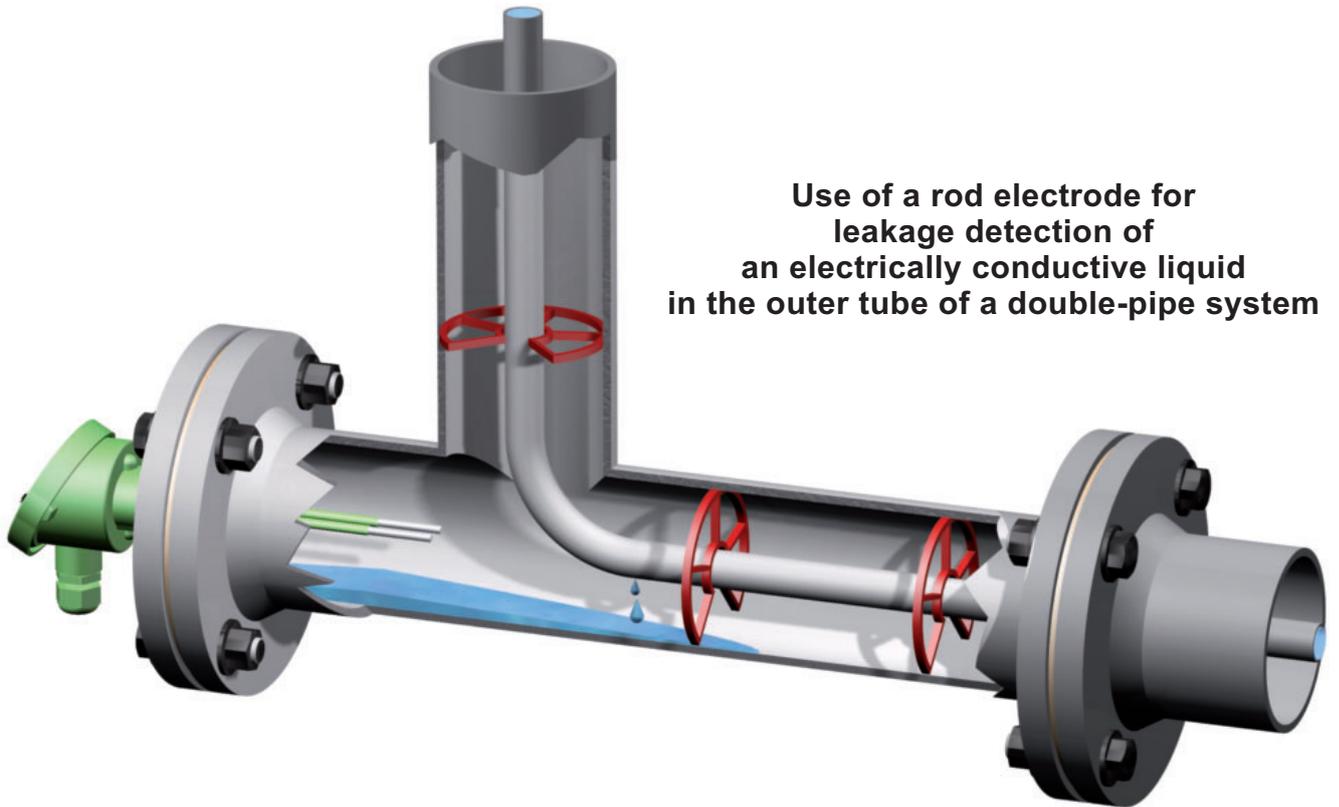
Use of a plate electrode for leakage detection of an electrically conductive liquid at the lowest point (groove in the picture) of a collection room





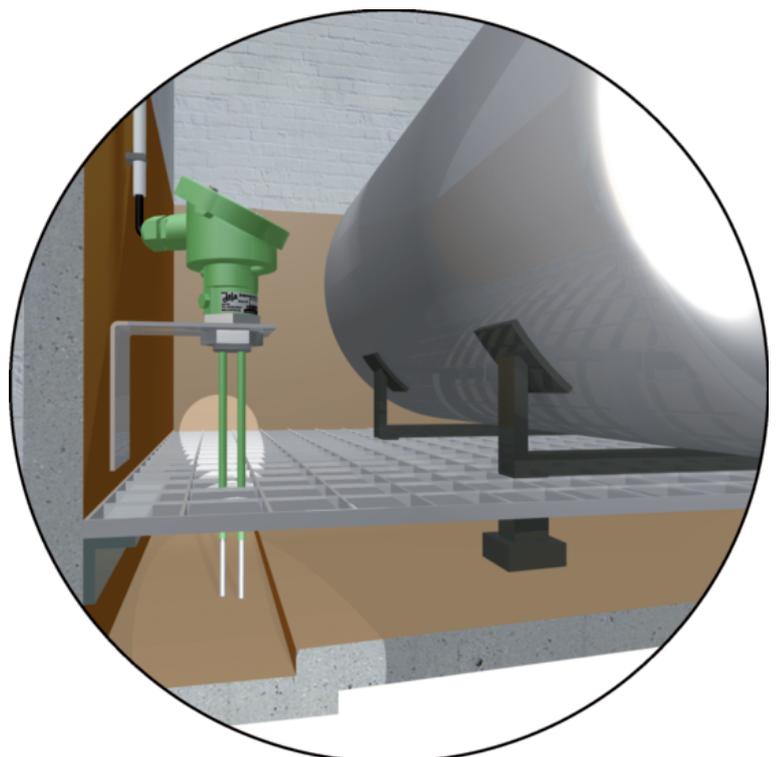
# Leakage detection with conductive “Leckstar” point sensors

## Application examples with conductive rod electrodes



Use of a rod electrode for leakage detection of an electrically conductive liquid in the outer tube of a double-pipe system

Use of a rod electrode for leakage detection of an electrically conductive liquid at the lowest point (groove in the picture) of a collection room



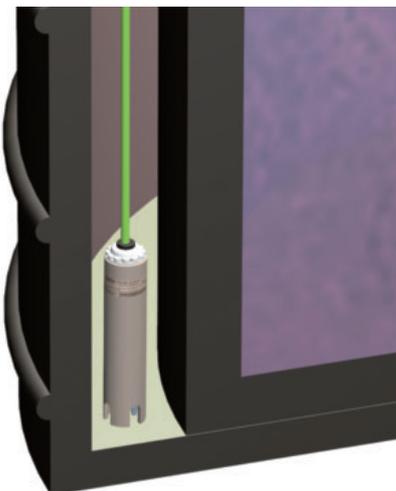


# Leakage detection with conductive “Leckstar” point sensors

Application example with  
a conductive suspension electrode



Use of a suspension electrode  
for leakage detection of  
an electrically conductive liquid  
in the collection tub of a storage tank  
for water-polluting liquids





# PE... and WDX... conductive plate electrodes

Conductive plate electrodes are designed to signal via a connected conductive electrode relay the presence of an electrically conductive liquid caused, for example, by burst pipes.

Conductive 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.

The conductive plate electrodes are fitted with two sensitive elements in the form of two electrode plates: 1 control electrode and 1 ground electrode. If the two electrode plates come into contact with an electrically conductive liquid (e.g. water, acid etc.), an electrical contact is made and an alarm signal given.



PE-Z10



PE



WDX-4



PEK-4



PEK-2/2



WDX... sensor side



PE...  
sensor side



PEK-Z10

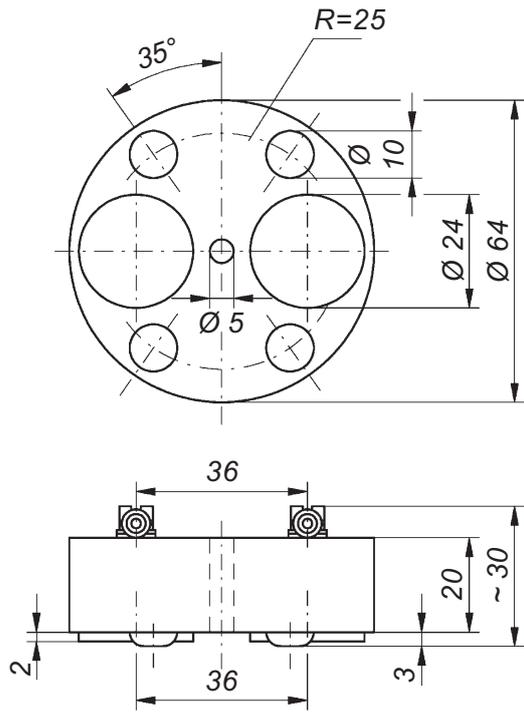


WDX-Z10

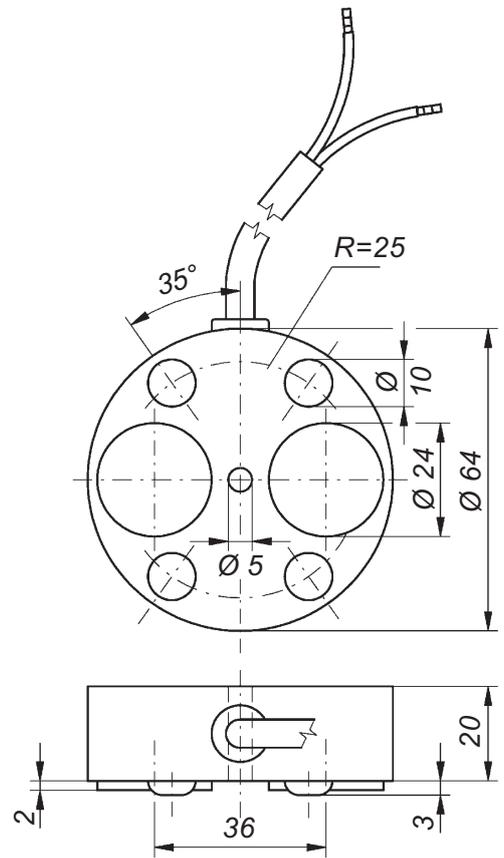


# PE... conductive plate electrodes

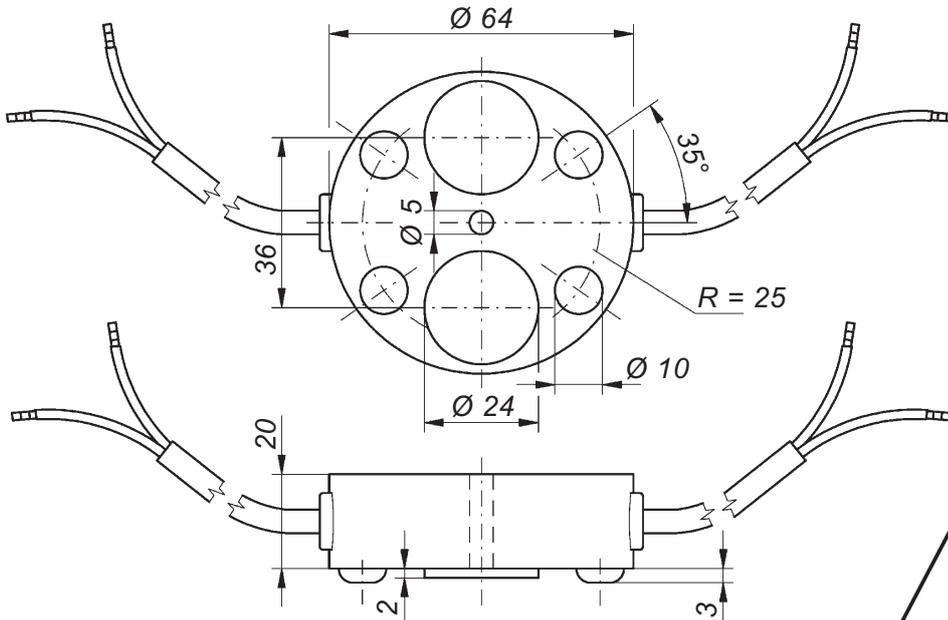
Technical data	PEK	PE	PEK-2/2	PEK-4	PE-Z10	PEK-Z10
Design	1 control electrode and 1 ground electrode					
Sensitive elements	2 electrode plates made of stainless steel 316 Ti, each 24 mm in dia.					
Housing	PP and cast resin					
Electrical connection	connecting cable* 2X0.75	screw-type / crimp connection	connecting cable* 2 x 2X0.75	connecting cable* 4X0.75	screw-type / crimp connection	connecting cable* 2X0.75
	* length 2 m, on request: • longer • halogen-free					
Temperature range	- 20°C to + 60°C, higher temperatures on request					
Cable break monitoring	without	without	without	without	with	with
	integrated Z10 cable break monitoring unit					
Classification	connection to one of the following conductive electrode relays					
• with cable break monitoring unit, with DIBt certificate No. Z-65.40-203	X		<b>Leckstar 101</b> or <b>Leckstar 101/S:</b> one PE-Z10 or one PEK-Z10			
			One or several PE, PEK-2/2 and/or PEK-4 may be connected in parallel between a PE-Z10 or PEK-Z10 and one of these relays.			
• with cable break monitoring unit, without DIBt certificate	X		<b>Leckstar 171/1</b> or <b>Leckstar 171/2:</b> one PE-Z10 or one PEK-Z10 <b>Leckstar 155:</b> max. five PE-Z10 or PEK-Z10			
			One or several PE, PEK-2/2 and/or PEK-4 may be connected in parallel between a PE-Z10 or PEK-Z10 and one of these relays.			
• without cable break monitoring unit, without DIBt certificate	<b>Leckstar 5</b> or <b>Leckstar 5/G:</b> any number of PEK, PE, PEK-2/2 and/or PEK-4 may be connected in parallel to either one of these relays.			X		
Max. length of connecting cable	1,000 m between electrode relay and last electrode					



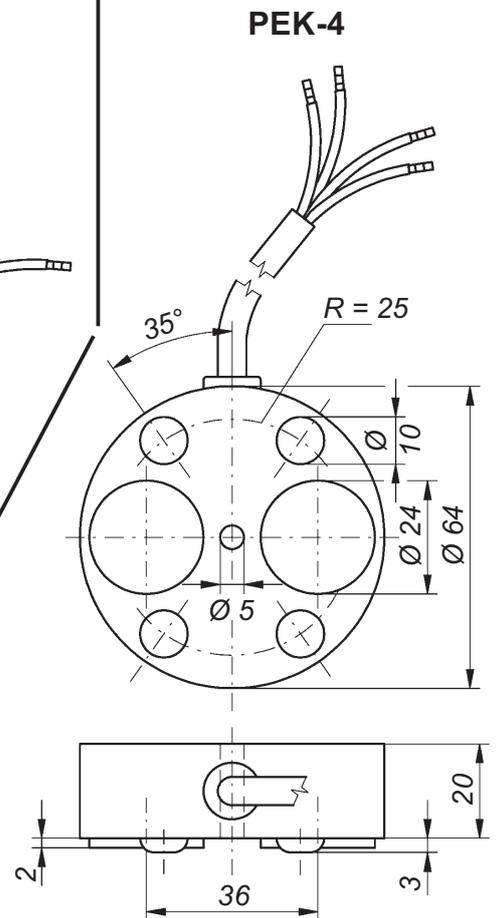
**PE(-Z10)**



**PEK(-Z10)**



**PEK-2/2**



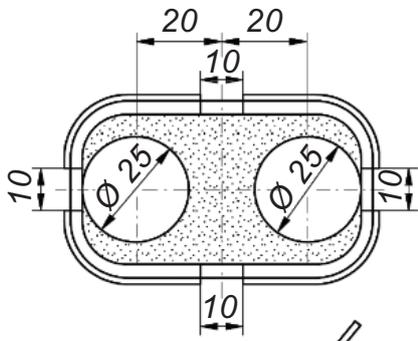
**PEK-4**

Dimensions in mm

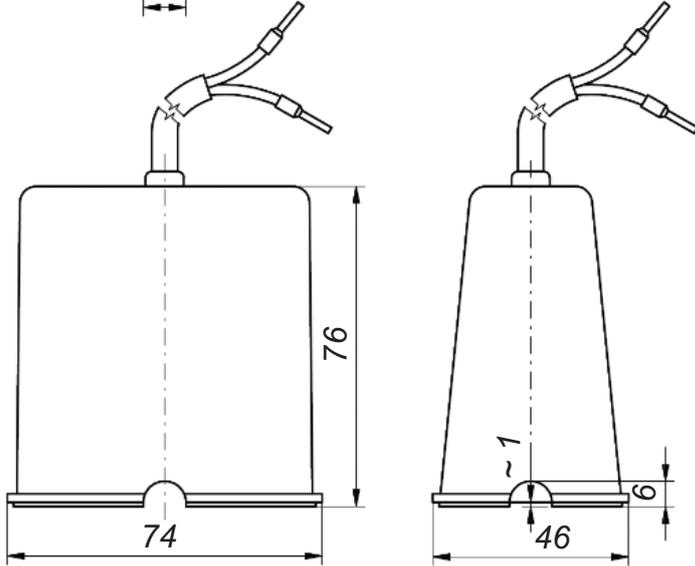
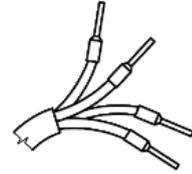


# WDX... conductive plate electrodes

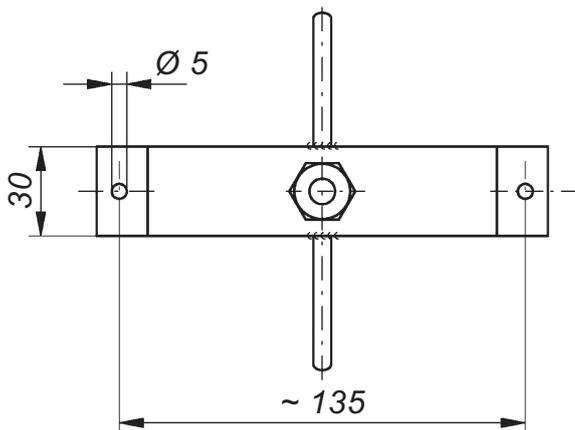
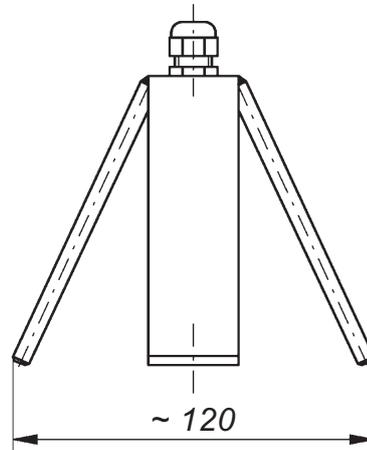
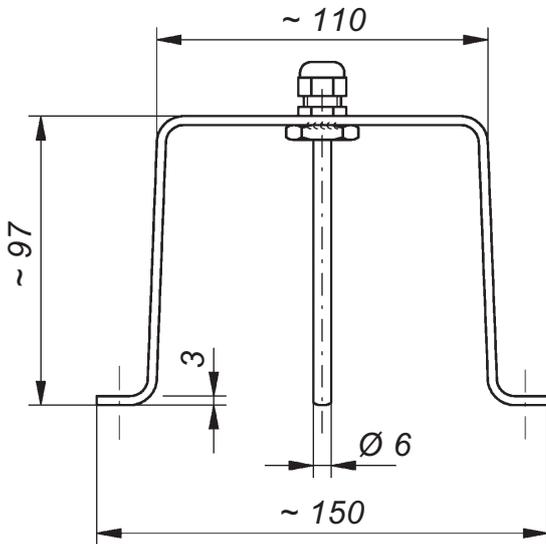
Technical data	WDX	WDX-4	WDX-Z10
Design	1 control electrode and 1 ground electrode		
Sensitive elements	2 electrode plates made of stainless st. 316 Ti, each 25 mm in dia.		
Housing	PP and cast resin		
Electrical connection	2X0.75	connecting cable 4X0.75 length 2 m, on request: • longer • halogen-free	2X0.75
Temperature range	– 20°C to + 60°C, higher temperatures on request		
Cable break monitoring	without	without	with
	integrated Z10 cable break monitoring unit		
Classification	connection to one of the following conductive electrode relays		
• <b>with</b> cable break monitoring unit, <b>with</b> DIBt certificate No. Z-65.40-203	X	X	<b>Leckstar 101 or Leckstar 101/S:</b> one WDX-Z10
			One or several WDX-4 may be connected in parallel between a WDX-Z10 and one of these relays.
• <b>with</b> cable break monitoring unit, <b>without</b> DIBt certificate	X	X	<b>Leckstar 171/1 or Leckstar 171/2:</b> one WDX-Z10
			<b>Leckstar 155:</b> max. five WDX-Z10
	One or several WDX-4 may be connected in parallel between a WDX-Z10 and one of these relays.		X
• <b>without</b> cable break monitoring unit, <b>without</b> DIBt certificate	<b>Leckstar 5 or Leckstar 5/G:</b> any number of WDX and/or WDX-4 may be connected in parallel to either one of these relays.		
Max. length of connecting cable	1,000 m between electrode relay and last electrode		
Mounting accessory	stand (option)		



**WDX-4 version**



**WDX(-Z10)**



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

*Dimensions in mm*



## SE ... and S 2 ... conductive rod electrodes

Conductive rod electrodes are designed to signal via a connected conductive electrode relay the presence of an electrically 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 rod tips are just slightly above the floor to be monitored.

The conductive rod electrodes are fitted with two sensitive elements in the form of two electrode rods: 1 control electrode and 1 ground electrode. If the two non-insulated electrode rod sensor surfaces come into contact with an electrically conductive liquid (e.g. water, acid etc.), an electrical contact is made and an alarm signal given.

Rod electrodes fitted or not with a Z10 cable break monitoring unit have the same appearance.

SE 2<sup>3/4</sup>"/M-Z10



SE 2 M-Z10



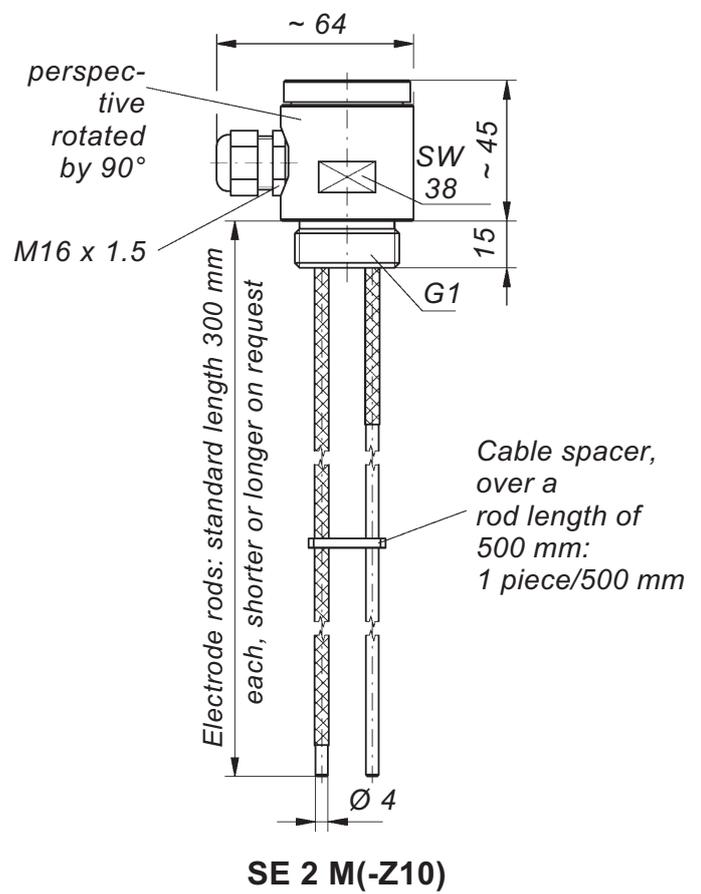
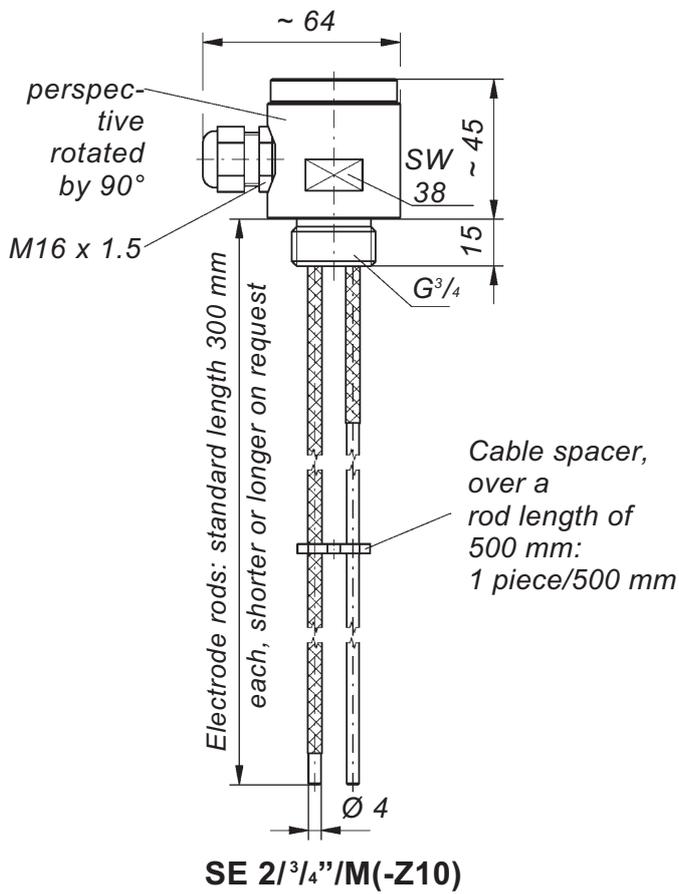
S 2 M/PP-Z10



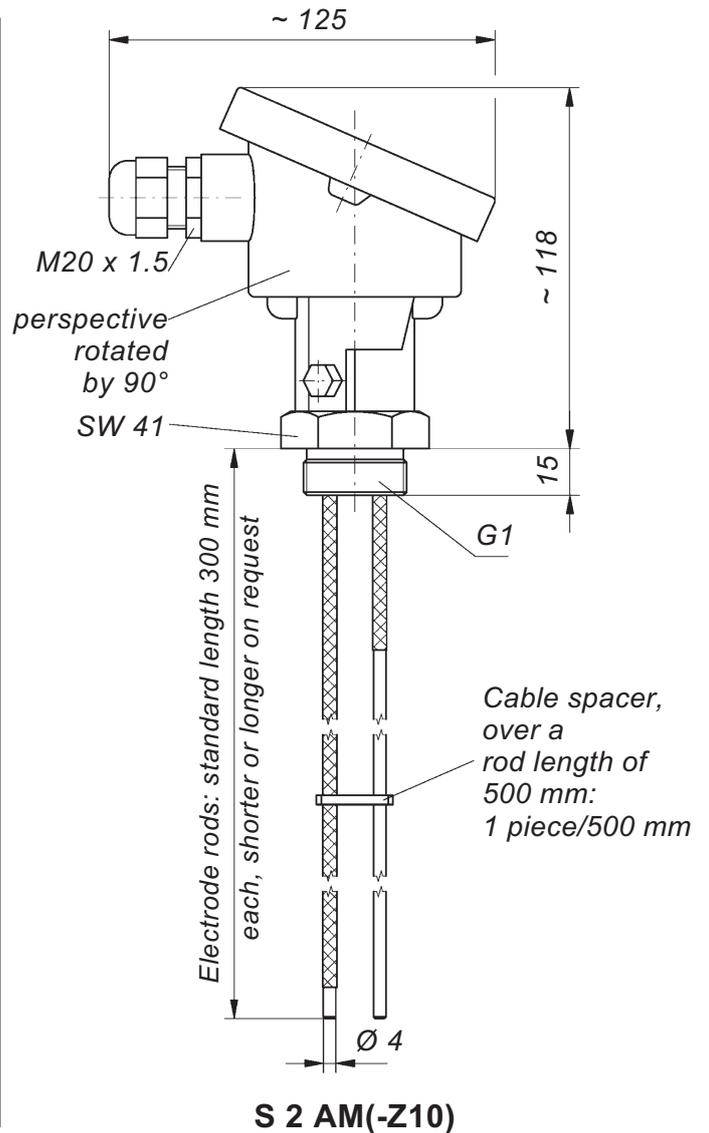
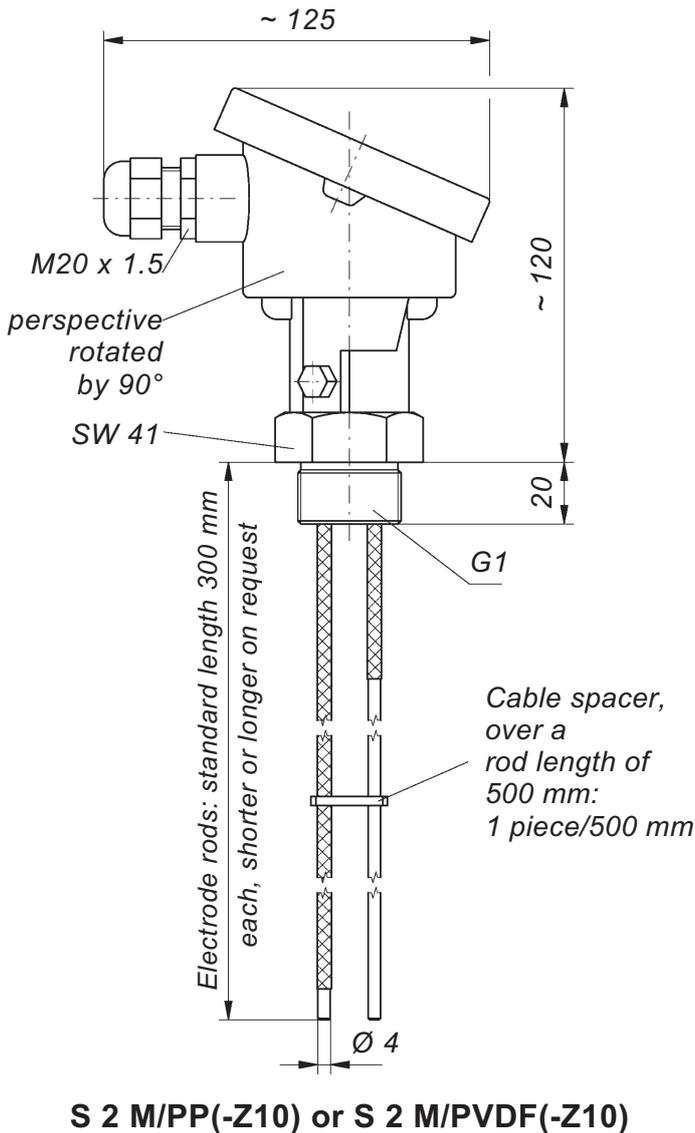
S 2 M/PVDF-Z10



S 2 AM-Z10



Dimensions in mm





# SE ... and S 2 ... conductive rod electrodes

Technical data	SE 2 <sup>3/4</sup> "/M	SE 2 M	S 2 M/PP	S 2 M/PVDF	S 2 AM
Design	1 control electrode and 1 ground electrode				
Sensitive elements	2 electrode rods made of stainless steel 316 Ti, each 4 mm in dia., covered with polyolefin shrinkdown tubing, standard length: 300 mm each, on request: <ul style="list-style-type: none"> <li>• other materials: e. g. titanium, Hastelloy, Monel or tantalum</li> <li>• other shrinkdown tubing: e. g. PVDF or PTFE</li> <li>• shorter or longer rods</li> </ul>				
Max. rod lengths	approx. 1,000 mm		approx. 2,500 mm		
Screw-in nipple	PP, on request: PVDF or PTFE G <sup>3/4</sup>   G1, on request: G1 <sup>1/4</sup> , G1 <sup>1/2</sup> or G2		PP G1	PVDF G1	stainless steel 316 Ti G1, on request: G1 <sup>1/4</sup> , G1 <sup>1/2</sup> or G2
Electrical connection	connection head made of the material of the screw-in nipple, protection class IP55		connection head made of PP, protection class IP54; on request: connection head made of cast aluminium, protection class IP54		
Temperature range	- 20°C to + 60°C, higher temperatures on request				
Cable break monitoring	<b>without</b>				
Classification	connection to one of the following conductive electrode relays				
<ul style="list-style-type: none"> <li>• <b>without</b> cable break monitoring,</li> <li><b>without</b> DIBt certificate</li> </ul>	<b>Leckstar 5 or Leckstar 5/G:</b> any number of the above mentioned electrodes may be connected in parallel to either one of these relays.				
Max. length of connecting cable	1,000 m between electrode relay and last electrode				



# SE ...-Z10 and S 2 ...-Z10 conductive rod electrodes

Technical data	SE 2 <sup>3/4</sup> "/M-Z10	SE 2 M-Z10	S 2 M/PP-Z10	S 2 M/PVDF-Z10	S 2 AM-Z10
Design	1 control electrode and 1 ground electrode				
Sensitive elements	2 electrode rods made of stainless steel 316 Ti, each 4 mm in dia., covered with polyolefin shrinkdown tubing, standard length: 300 mm each, on request: <ul style="list-style-type: none"> <li>• other materials: e. g. titanium, Hastelloy, Monel or tantalum</li> <li>• other shrinkdown tubing: e. g. PVDF or PTFE</li> <li>• shorter or longer rods</li> </ul>				
Max. rod lengths	approx. 1,000 mm		approx. 2,500 mm		
Screw-in nipple	PP, on request: PVDF or PTFE G <sup>3/4</sup>	G1, on request: G1 <sup>1/4</sup> , G1 <sup>1/2</sup> or G2	PP  G1	PVDF  G1	stainless steel 316 Ti  G1, on request: G1 <sup>1/4</sup> , G1 <sup>1/2</sup> or G2
Electrical connection	connection head made of the material of the screw-in nipple, protection class IP55		connection head made of PP, protection class IP54; on request: connection head made of cast aluminium, protection class IP54		
Temperature range	- 20°C to + 60°C, higher temperatures on request				
Cable break monitoring	<b>with</b> integrated Z10 cable break monitoring unit				
Classification	connection to one of the following conductive electrode relays				
	<ul style="list-style-type: none"> <li>• <b>with</b> cable break monitoring unit, <b>with</b> DIBt certificate No. Z-65.40-203</li> </ul>				
	<ul style="list-style-type: none"> <li>• <b>with</b> cable break monitoring unit, <b>without</b> DIBt certificate</li> </ul>				
Max. length of connecting cable	1,000 m between electrode relay and last electrode				



# LWZ and EHW ... conductive suspension electrodes

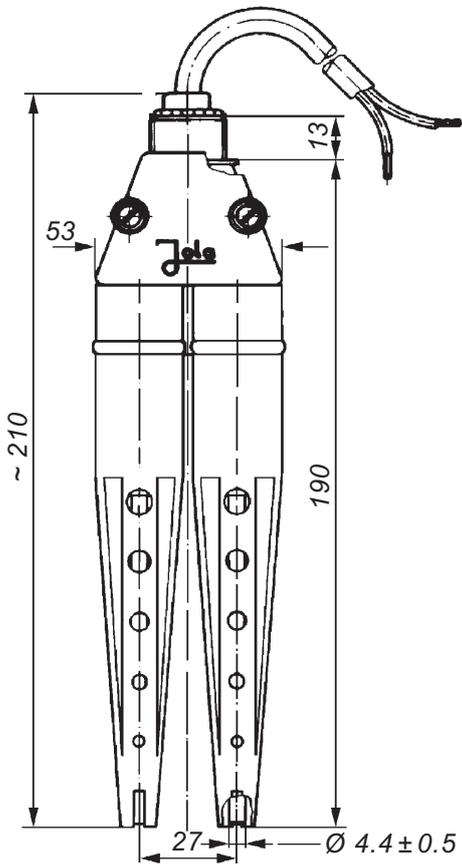
Conductive suspension electrodes are designed to signal via a connected conductive electrode relay the presence of an electrically conductive liquid caused, for example, by burst pipes.

Conductive suspension electrodes should only be used in normally dry environments. They must be mounted in suspended mode from above in such a way that the electrode rods are just slightly above the floor to be monitored.

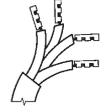
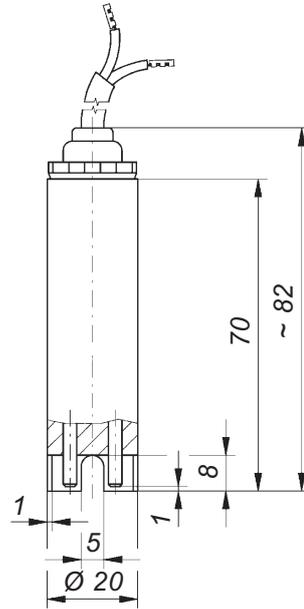
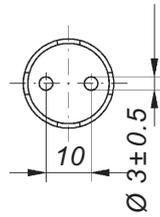
The conductive suspension electrodes are fitted with two sensitive elements in the form of two electrode rods: 1 control electrode and 1 ground electrode. If the two electrode rods come into contact with an electrically conductive liquid (e.g. water, acid etc.), an electrical contact is made and an alarm signal given.

Suspension electrodes fitted or not with a Z10 cable break monitoring unit have the same appearance.





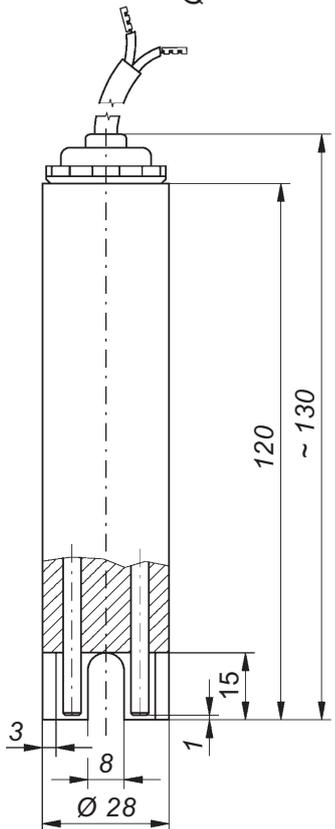
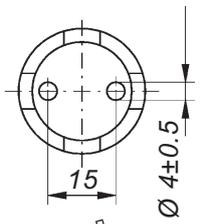
**LWZ**



**EHW 1-4 version**

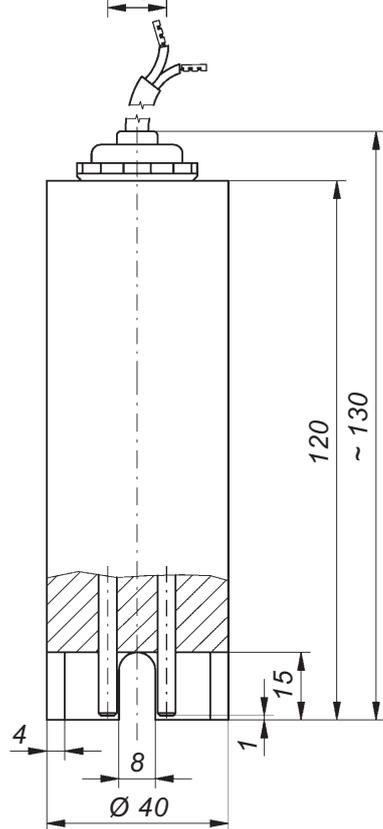
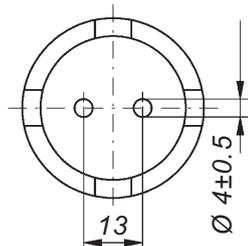
**EHW 1(-Z10)**

*Dimensions in mm*



**EHW 2-4 version**

**EHW 2(-Z10)**



**EHW 3-4 version**

**EHW 3(-Z10)**



# LWZ and EHW . conductive suspension electrodes

Technical data	LWZ	EHW 1	EHW 2	EHW 3
Design	1 control electrode and 1 ground electrode			
Sensitive elements	2 electrode rods made of stainless steel 316 Ti on request: other materials (e.g. titanium, Hastelloy, Monel or tantalum)			
Housing	PP on request: other materials (e.g. PVDF or PTFE) 2 x 27 mm Ø x approx. 210 mm   20 mm Ø x approx. 82 mm   28 mm Ø x approx. 130 mm   40 mm Ø x approx. 130 mm			
Electrical connection	connecting cable 2X0.75 length 2 m, on request: • longer • made of CM or PTFE			
Temperature range	– 20°C to + 60°C, higher temperatures on request			
Cable break monitoring	<b>without</b>			
Classification	connection to one of the following conductive electrode relays			
• <b>without</b> cable break monitoring, <b>without</b> DIBt certificate	<b>Leckstar 5 or Leckstar 5/G:</b> any number of LWZ and/or EHW . may be connected in parallel to either one of these relays.			
Max. length of connecting cable	1,000 m between electrode relay and last electrode			
Mounting accessories	stuffing glands, housings with integrated stuffing gland and flanges with stuffing gland on request			



# EHW .-4 and EHW .-Z10 conductive suspension electrodes

Technical data	EHW 1-4	EHW 2-4	EHW 3-4	EHW 1 -Z10	EHW 2 -Z10	EHW 3 -Z10
Design	1 control electrode and 1 ground electrode					
Sensitive elements	2 electrode rods made of stainless steel 316 Ti; on request: other materials (e.g. titanium, Hastelloy, Monel or tantalum)					
Housing	PP on request: other materials (e.g. PVDF or PTFE)					
	20 mm Ø x approx. 82 mm	28 mm Ø x approx. 130 mm	40 mm Ø x approx. 130 mm	20 mm Ø x approx. 82 mm	28 mm Ø x approx. 130 mm	40 mm Ø x approx. 130 mm
Electrical connection	connecting cable 4X0.75     2X0.75 length 2 m, on request: • longer • made of PTFE     • made of CM or PTFE					
Temperature range	- 20°C to + 60°C, higher temperatures on request					
Cable break monitoring	<b>without</b>	<b>without</b>	<b>without</b>	<b>with</b>	<b>with</b>	<b>with</b>
	integrated Z10 cable break monitoring unit					
Classification	connection to one of the following conductive electrode relays					
<ul style="list-style-type: none"> <li>• <b>with</b> cable break monitoring, <b>with</b> DIBt certificate No. Z-65.40-203</li> </ul>	One or several EHW .-4 may be connected in parallel between a EHW .-Z10 and one of these relays.			<b>Leckstar 101 or Leckstar 101/S:</b> one EHW .-Z10		
<ul style="list-style-type: none"> <li>• <b>with</b> cable break monitoring, <b>without</b> DIBt certificate</li> </ul>				<b>Leckstar 171/1 or Leckstar 171/2:</b> one EHW .-Z10  <b>Leckstar 155:</b> max. five EHW .-Z10		
<ul style="list-style-type: none"> <li>• <b>without</b> cable break monitoring, <b>without</b> DIBt certificate</li> </ul>	<b>Leckstar 5 or Leckstar 5/G:</b> any number of EHW .-4 may be connected in parallel to either one of these relays.					
Max. length of connecting cable	1,000 m between electrode relay and last electrode					
Mounting accessories	stuffing glands, housings with integrated stuffing gland and flanges with stuffing gland on request					

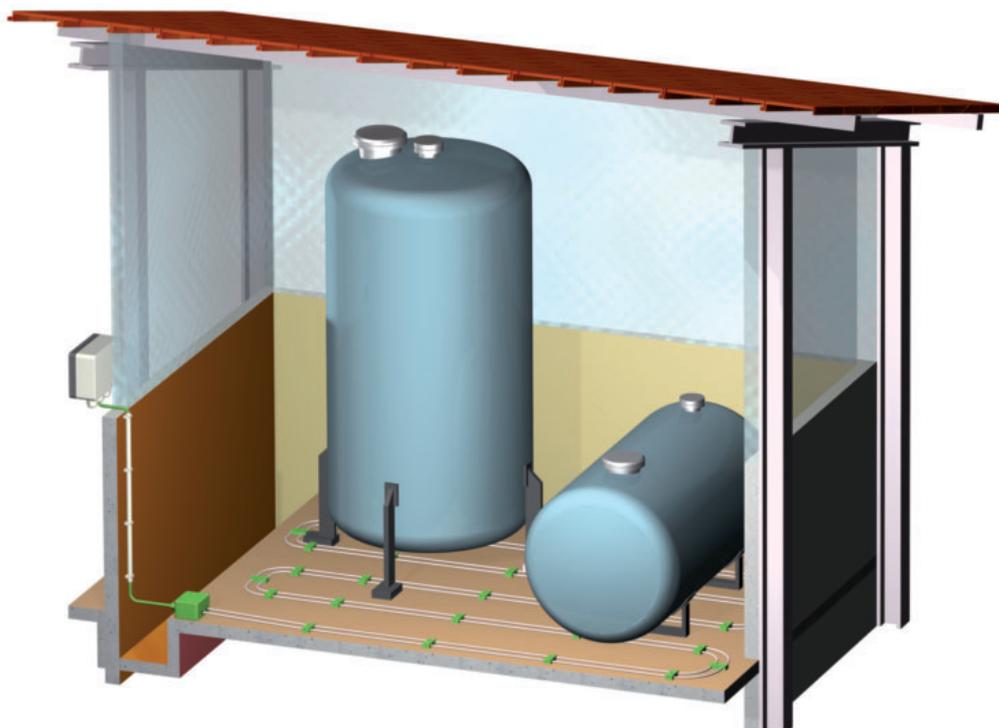


# Leakage detection with conductive “Leckstar” line sensors

Application examples with conductive cable electrodes



Monitoring of a false floor in a server room for the presence of an electrically conductive liquid using a cable electrode as well as a plate electrode in the adjacent room

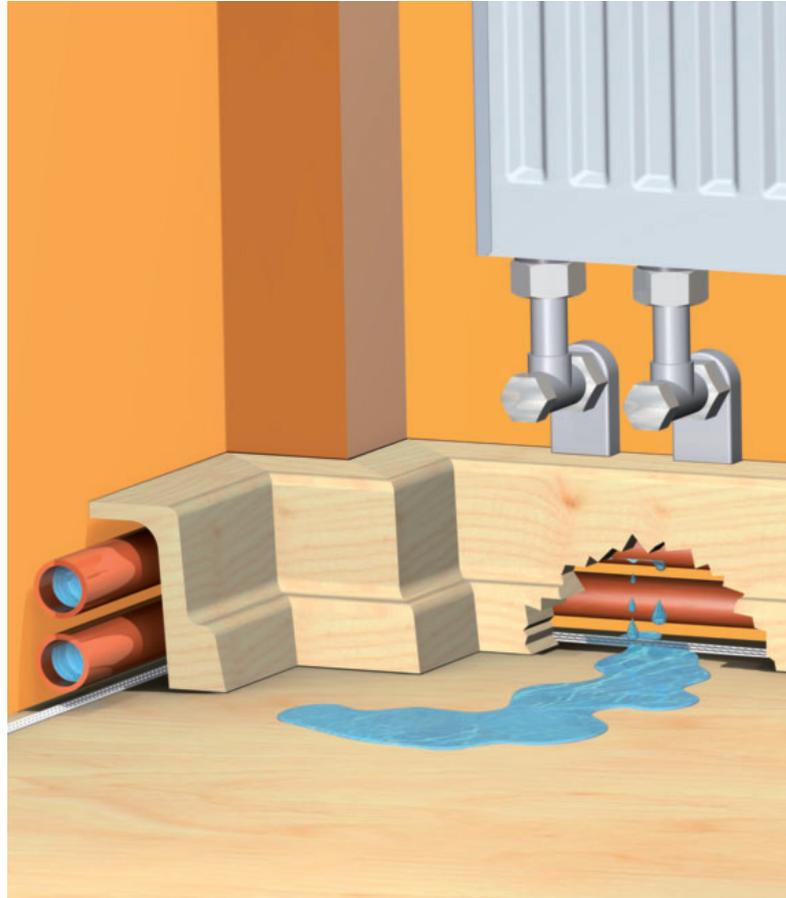


Use of a cable electrode for leakage detection of an electrically conductive liquid in a storeroom

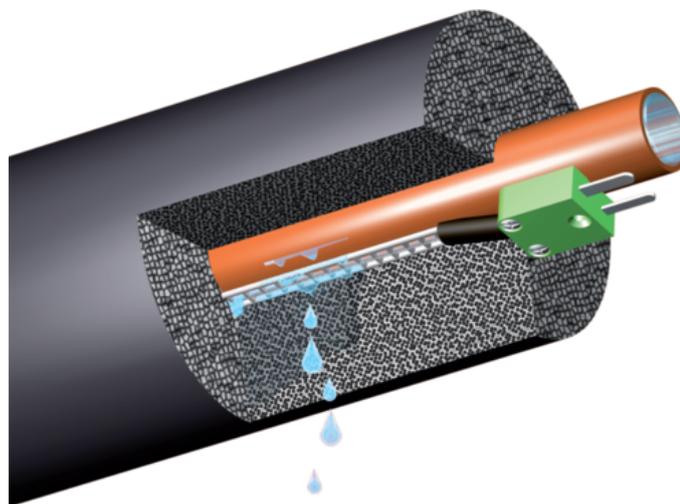


# Leakage detection with conductive “Leckstar” line sensors

Application examples with conductive twin electrodes



Use of a twin electrode for leakage detection of electrically conductive heating water under a skirting board behind which pipes are routed



Use of a twin electrode for leakage detection of electrically conductive water inside the insulation of a heating or cooling pipe (use preferably with Leckstar 255 relay)



# KE..., BAE..., ZE... conductive cable, tape and twin electrodes

Conductive cable, tape and twin electrodes are designed to signal via a connected conductive electrode relay the presence of an electrically conductive liquid caused, for example, by burst pipes.

Conductive cable, tape and twin electrodes 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 in any case in the way that leakage-liquid could reach the two sensor cables of the cable, tape or twin electrode immediately after a leakage.

The preferred application of twin electrodes is inside the insulation of heating and cooling pipes in server rooms or other sensitive areas.

Thanks to their compact design, the twin electrodes can also be used under skirting boards behind which pipes are routed or in joints in the floor.

Conductive cable, tape and twin electrodes are fitted with two sensitive elements in form of two sensor cables: 1 control electrode and 1 ground electrode. As soon as an electrically conductive liquid (e.g. water, acid etc.) creates a conductive path between the two sensor cables, a control current flows from the corresponding conductive electrode relay. The latter is then energized and a contact made.

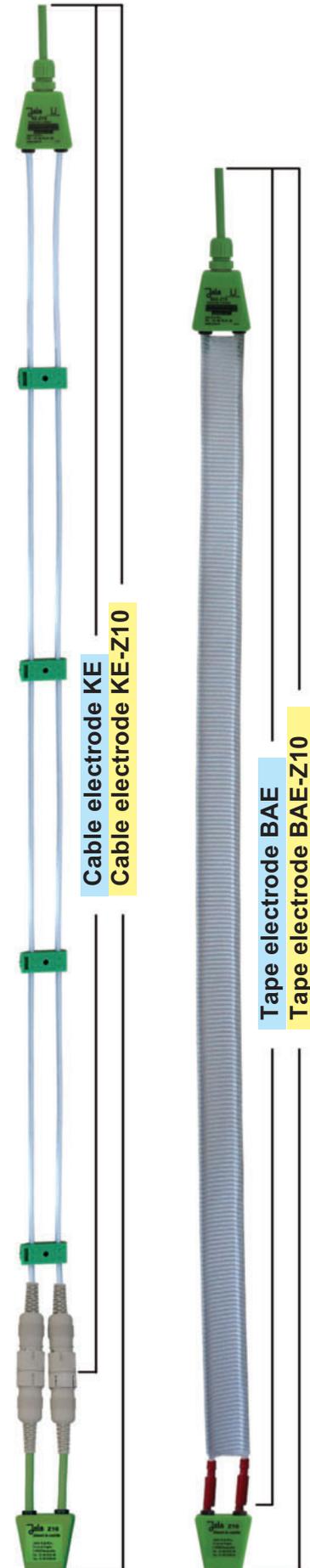
## KE... conductive cable electrode

Each of the two sensor cables consists of a stainless steel rope core and a protective braiding made of polyester. This protective braiding 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 as far as possible false alarms, whilst allowing leakage liquid to penetrate through to the stainless steel ropes.

## BAE... conductive tape electrode

In contrast to the above mentioned cable electrode, the tape electrode is 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 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 as far as possible 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) causing false alarms particularly with long tape electrodes.

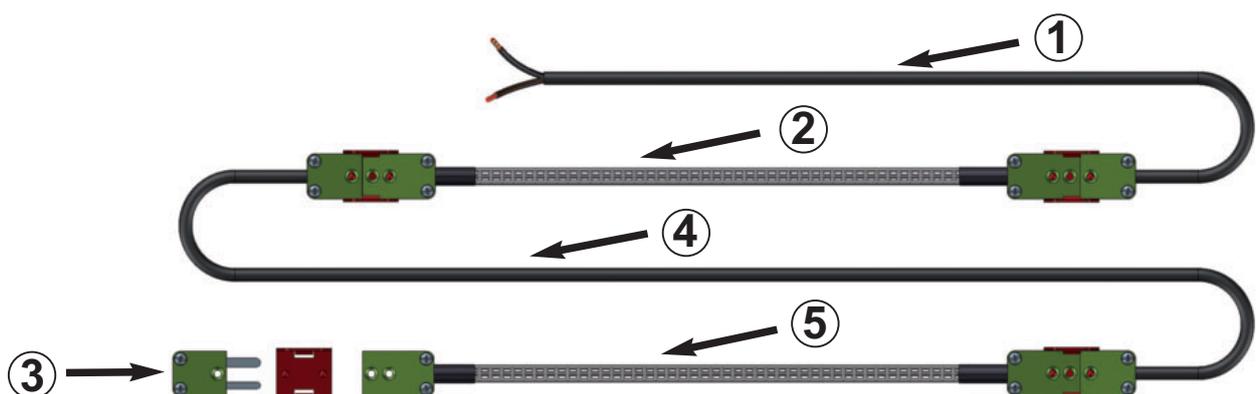


## ZE... conductive twin electrode

Each of the two sensor cables consists of a stainless steel rope core and a protective braiding made of polyester. There is a wire with plastic insulation between the two ropes serving as a spacer. These three adjacent "ropes" are held together by a polyester braiding to form a flat tape structure.

The protective polyester braiding 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 as far as possible false alarms, whilst allowing leakage liquid to penetrate through to the stainless steel ropes. There are holes in the outer braiding. This ensures that the braiding performs its holding function, but only a small amount of absorbent material is woven between the stainless steel ropes to ensure that the electrode dries quickly following a leakage incident.

Basic versions of		Components	No.	Technical data
ZE-Z10 twin electrode	ZE twin electrode	Connecting cable with bushing and fixing clip	①	Connecting cable 2X0.75, length 2 m, on request: longer and/or halogen-free Temperature range: - 20°C to + 60°C, higher temperature resistance on request
		Basic twin electrode with plug connector, bushing and fixing clip	②	2 ropes made of stainless steel 316, each 0.8 mm in dia., each with polyester protective braiding, and 1 insulating spacer in between in the form of a flat cable with polyester braiding Length 2 m, longer on request (to max. 100 m)
		Plug connector with Z10 end unit	③	Cable break monitoring unit to monitor the entire signalling line
Extension options		Connecting cable with plug connector, bushing and fixing clip	④	Technical data as under No. 1
		Extension twin electrode with plug connector, bushing and fixing clip	⑤	Technical data as under No. 2





# KE and KE-Z10 conductive cable electrodes

Technical data	KE	KE-Z10
Design	1 control electrode and 1 ground electrode	
Sensitive elements	2 sensor cables in form of 2 ropes made of stainless steel 316, each 3 mm in dia., each covered by a halogen-free protective polyester braiding, length 2 m each, shorter or longer on request	
Max. length of the sensor cables	100 m, 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.	
Supplied mounting accessories	4 sensor cable spacers made of PP per metre of sensor cable	
Electrical connection	connecting cable 2X0.75 length 2 m, on request: <ul style="list-style-type: none"> <li>• longer</li> <li>• halogen-free</li> </ul>	
Temperature range	– 20°C to + 60°C, higher temperatures on request	
Cable break monitoring to monitor the connecting cable and the sensor cables	<b>without</b>	<b>with</b> integrated Z10 cable break monitoring unit (removable for test purpose)
Classification	connection to one of the following conductive electrode relays	
<ul style="list-style-type: none"> <li>• <b>with</b> cable break monitoring unit, <b>with</b> DIBt certificate No. Z-65.40-203</li> </ul>		
<ul style="list-style-type: none"> <li>• <b>with</b> cable break monitoring unit, <b>without</b> DIBt certificate</li> </ul>		
<ul style="list-style-type: none"> <li>• <b>without</b> cable break monitoring unit, <b>without</b> DIBt certificate</li> </ul>	<b>Leckstar 5 or Leckstar 5/G:</b> any number of KE may be connected in parallel to either one of these relays.	
Max. length of connecting cable	1,000 m including the length of the sensor cable pair, between electrode relay and electrode end	

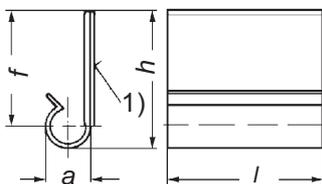
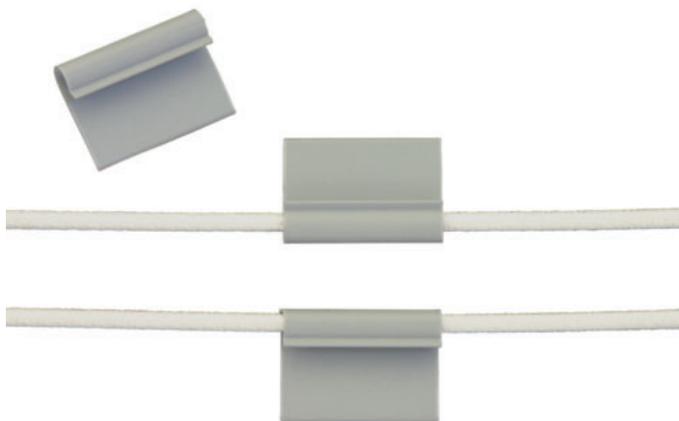
## Supplied mounting accessories

### Sensor cable spacers



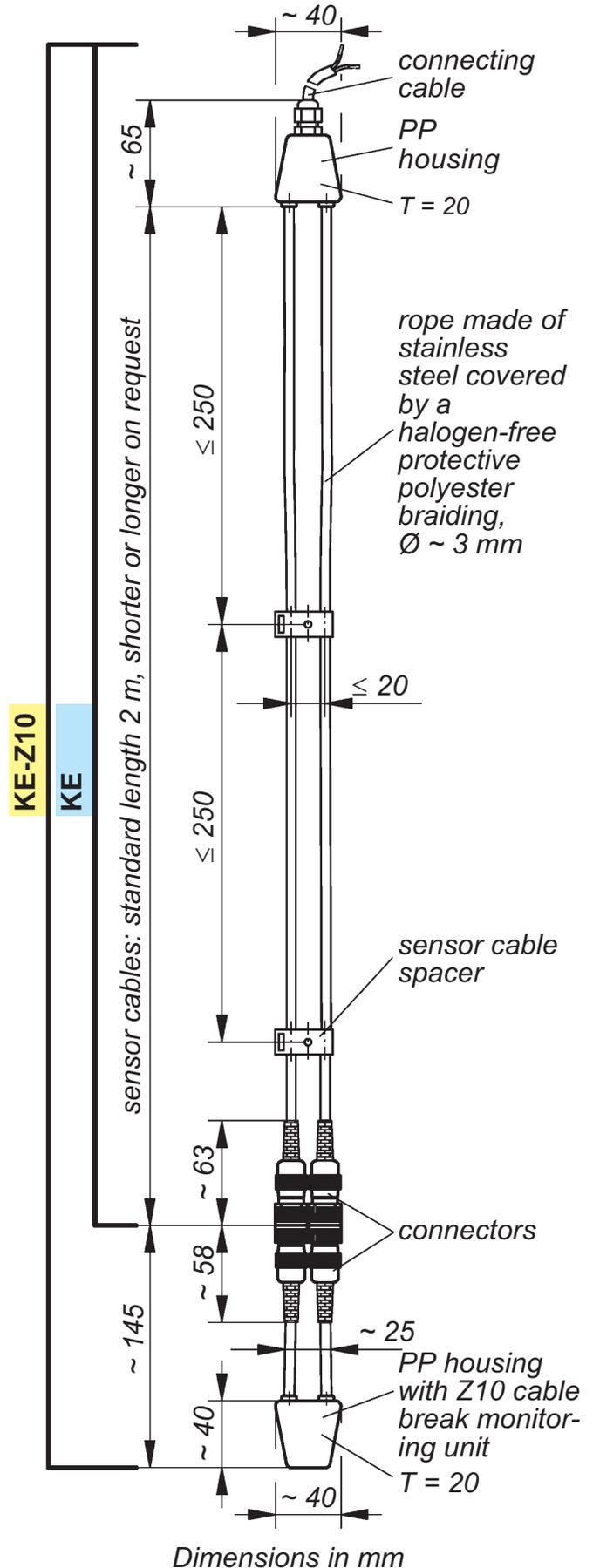
## Optional mounting accessories

### Self-adhesive sensor cable fastening clips



$$\begin{aligned} a &= 7.6 \text{ mm} \\ f &= 19.6 \text{ mm} \\ h &= 22.6 \text{ mm} \\ l &= 31.8 \text{ mm} \end{aligned}$$

1) Self-adhesive foil



## Mode of installation of the KE... cable electrode

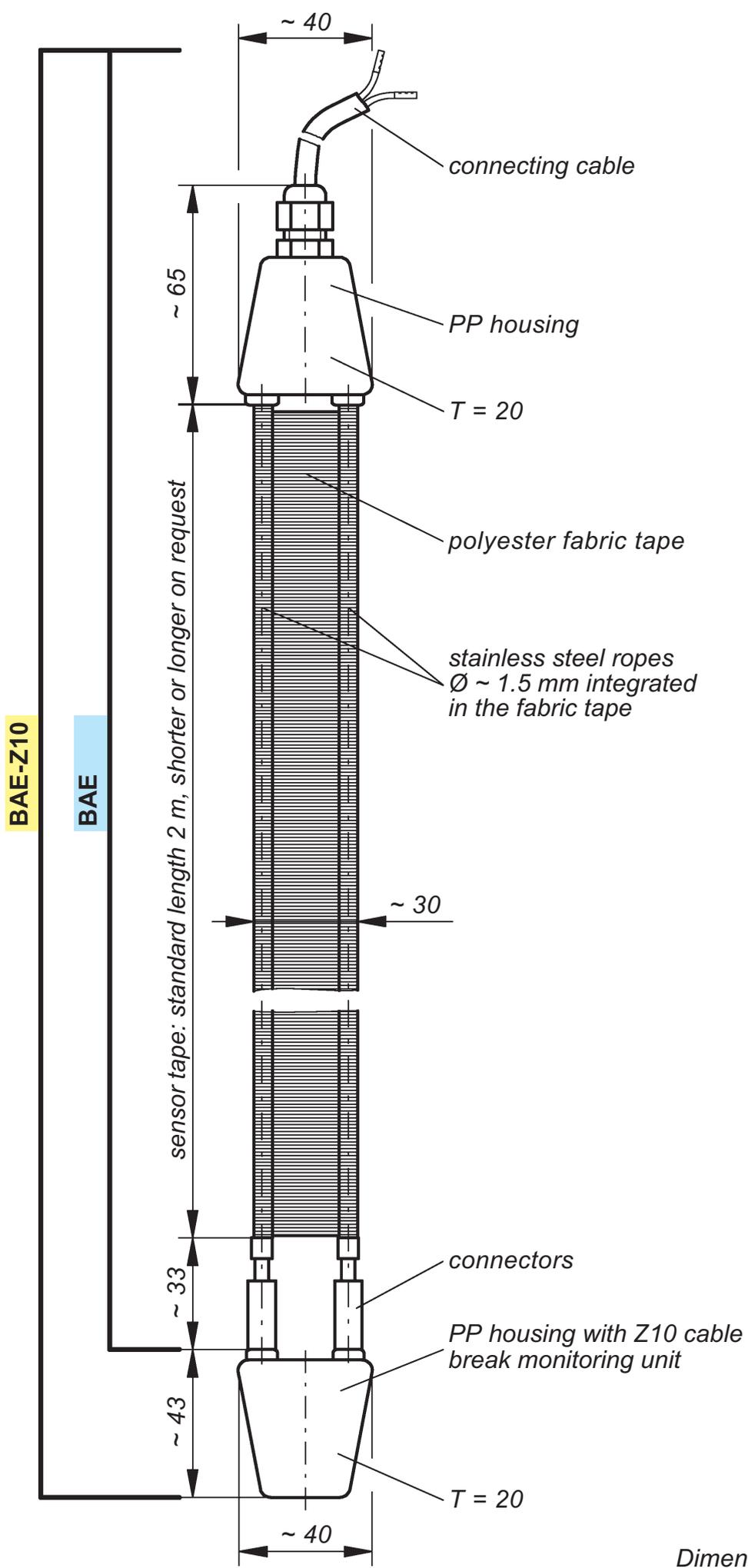
The two sensor cables of the cable electrode must be mounted parallel to one another at a distance of approx. 2 cm using the sensor cable spacers, as a greater or lesser spacing affects the response level of the system in the event of leakage.

Only electrically non-conductive materials (e.g. cable ties, insulated cable clips etc.) must be used for installation of the sensor cables.



# BAE and BAE-Z10 conductive tape electrodes

Technical data	BAE	BAE-Z10
Design	1 control electrode and 1 ground electrode	
Sensitive elements	2 sensor cables in form of 2 ropes made of stainless steel 316, each 1.5 mm in dia., woven into a halogen-free approx. 30 mm wide polyester fabric sensor tape at a spacing of approx. 24-25 mm, length: 2 m, shorter or longer on request	
Max. length of the sensor tape	30 m, 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.	
Electrical connection	connecting cable 2X0.75 length 2 m, on request: <ul style="list-style-type: none"> <li>• longer</li> <li>• halogen-free</li> </ul>	
Temperature range	– 20°C to + 60°C, higher temperatures on request	
Cable break monitoring to monitor the connecting cable and the sensor cables	<b>without</b>	<b>with</b> integrated Z10 cable break monitoring unit (removable for test purpose)
Classification <ul style="list-style-type: none"> <li>• <b>with</b> cable break monitoring unit, <b>with</b> DIBt certificate No. Z-65.40-203</li> <li>• <b>with</b> cable break monitoring unit, <b>without</b> DIBt certificate</li> <li>• <b>without</b> cable break monitoring unit, <b>without</b> DIBt certificate</li> </ul>	connection to one of the following conductive electrode relays	
		<b>Leckstar 101 or Leckstar 101/S:</b> one BAE-Z10
		<b>Leckstar 171/1 or Leckstar 171/2:</b> one BAE-Z10 <b>Leckstar 155 or Leckstar 255:</b> max. five BAE-Z10
	<b>Leckstar 5 or Leckstar 5/G:</b> any number of BAE may be connected in parallel to either one of these relays.	
Max. length of connecting cable	1,000 m including the length of the sensor tape, between electrode relay and electrode end	



Dimensions in mm

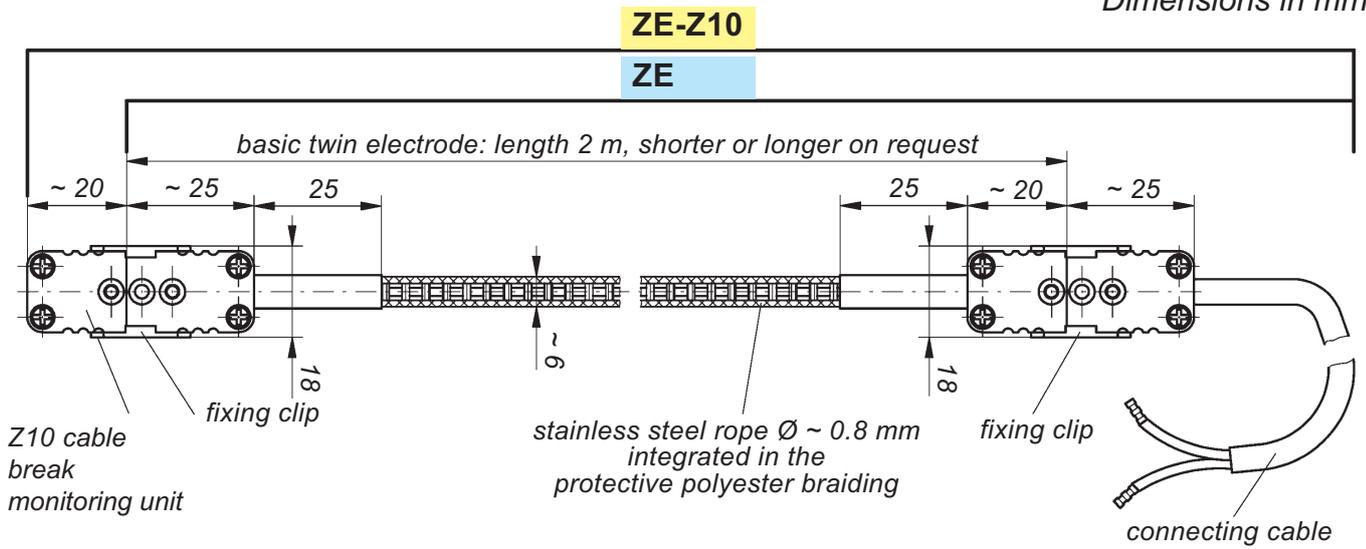


# ZE and ZE-Z10 conductive twin electrodes

Technical data	ZE	ZE-Z10
Design	1 control electrode and 1 ground electrode	
Sensitive elements	2 sensor cables in form of 2 ropes made of stainless steel 316, each 0.8 mm in dia., each with polyester protective braiding and 1 insulating spacer in between in the form of a flat tape structure with polyester braiding, with plug connector, bushing and fixing clip length 2 m, shorter or longer on request	
Max. length of the sensor tape	100 m, 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.	
Electrical connection	connecting cable 2X0.75 with bushing and fixing clip, length 2 m, on request: <ul style="list-style-type: none"> <li>• longer</li> <li>• halogen-free</li> </ul>	
Temperature range	- 20°C to + 60°C, higher temperatures on request	
Cable break monitoring to monitor the connecting cable and the sensor cables	<b>without</b>	<b>with</b> integrated Z10 cable break monitoring unit (removable for test purpose)
Classification	connection to one of the following conductive electrode relays	
<ul style="list-style-type: none"> <li>• <b>with</b> cable break monitoring unit, <b>without</b> DIBt certificate</li> </ul>		
<ul style="list-style-type: none"> <li>• <b>with</b> cable break monitoring unit, <b>without</b> DIBt certificate</li> </ul>		
<ul style="list-style-type: none"> <li>• <b>without</b> cable break monitoring unit, <b>without</b> DIBt certificate</li> </ul>	<b>Leckstar 5 or Leckstar 5/G:</b> any number of ZE may be connected in parallel to either one of these relays.	
Max. length of connecting cable	1,000 m including the length of the basic twin electrode and the extension options, between electrode relay and electrode end	

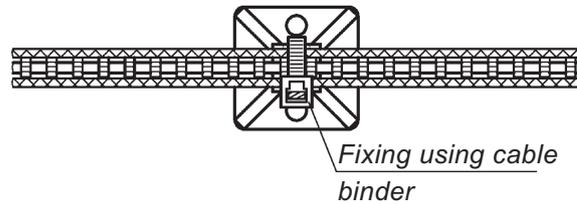
# Dimensional drawing of the ZE or ZE-Z10 basic twin electrode

Dimensions in mm

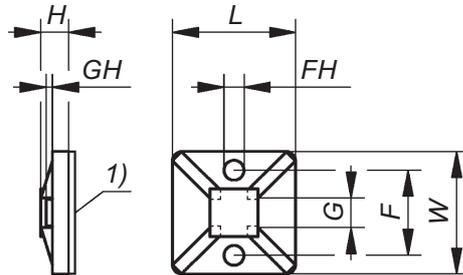


## Optional mounting accessories: self-adhesive fixing holders

### Type EB/84a

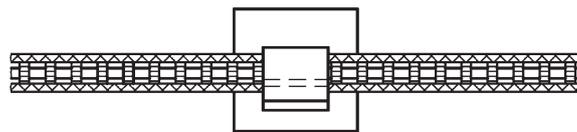


This fixing holder is especially practical if the twin electrode shall be permanently fixed.

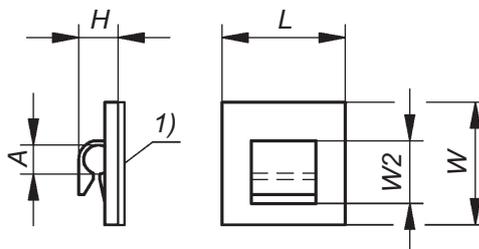


- F = 13.2 mm
- FH = Ø 3.1 mm
- G = cable binder width max. 4.1 mm
- GH = cable binder width max. 1 mm
- H = 4.3 mm
- L = 19 mm
- W = 19 mm
- 1) = self-adhesive foil t = 1 mm

### Type EZ/61a

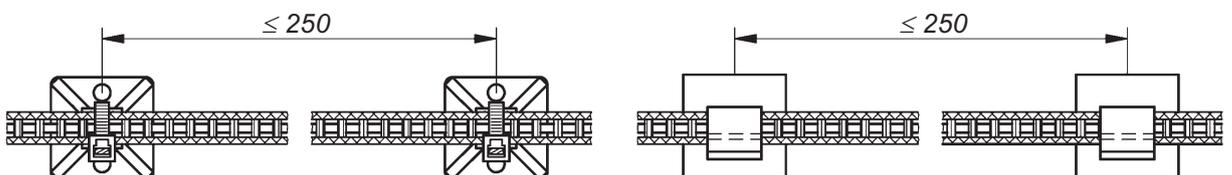


This fixing holder is especially practical if the twin electrode needs to be removed, e.g. for cleaning purpose.



- A = max. Ø 5 mm
- H = 6 mm
- L = 19 mm
- W = 19 mm
- W2 = 9.7 mm
- 1) = self-adhesive foil t = 1 mm

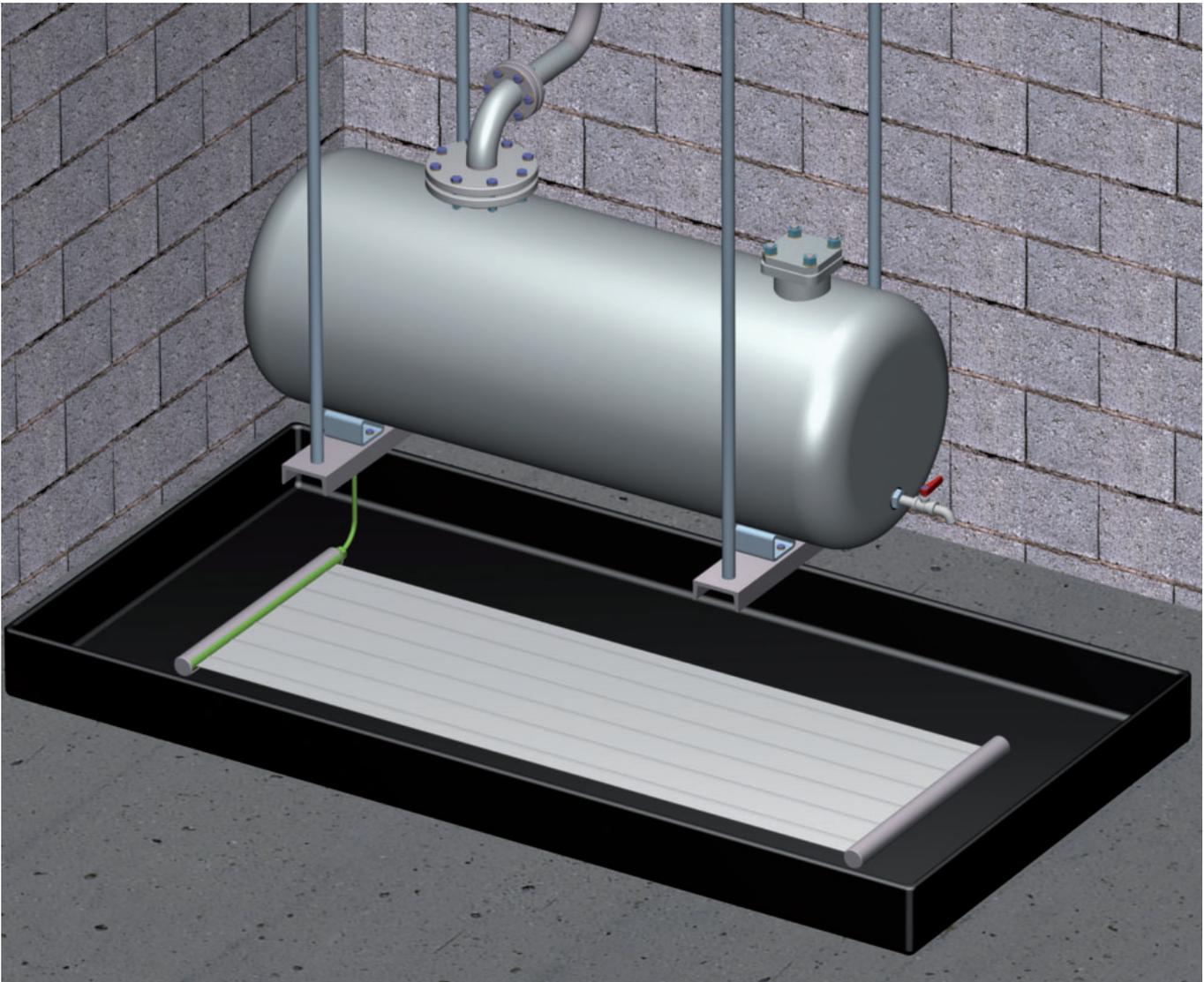
The fixing holders must be fixed at a distance of approx. 250 mm





# Leakage detection with conductive “Leckstar” surface sensors

Application example with a conductive mat electrode



Use of a mat electrode for leakage detection of an electrically conductive liquid  
in a collection tub



## MEL 6 and MEL 6-Z10 conductive mat electrodes

Conductive mat electrodes are designed to signal via a connected conductive electrode relay the presence of an electrically conductive liquid caused, for example, by burst pipes.

Conductive mat electrodes should only be used in normally dry environments. They can be installed on the floor or in a collection tub below pipelines or small tanks.



MEL 6(-Z10)

**The conductive MEL 6... mat electrode** is fitted with 6 sensitive elements in form of 6 sensor cables: 3 control electrodes and 3 ground electrodes. A ground electrode is always positioned next to a control electrode, a control electrode next to a ground electrode and so on. As soon as an electrically conductive liquid (e.g. water, acid etc.) creates a conductive path between a control electrode and a ground electrode, a control current flows from the corresponding conductive electrode relay. The latter is then energised and a contact made.

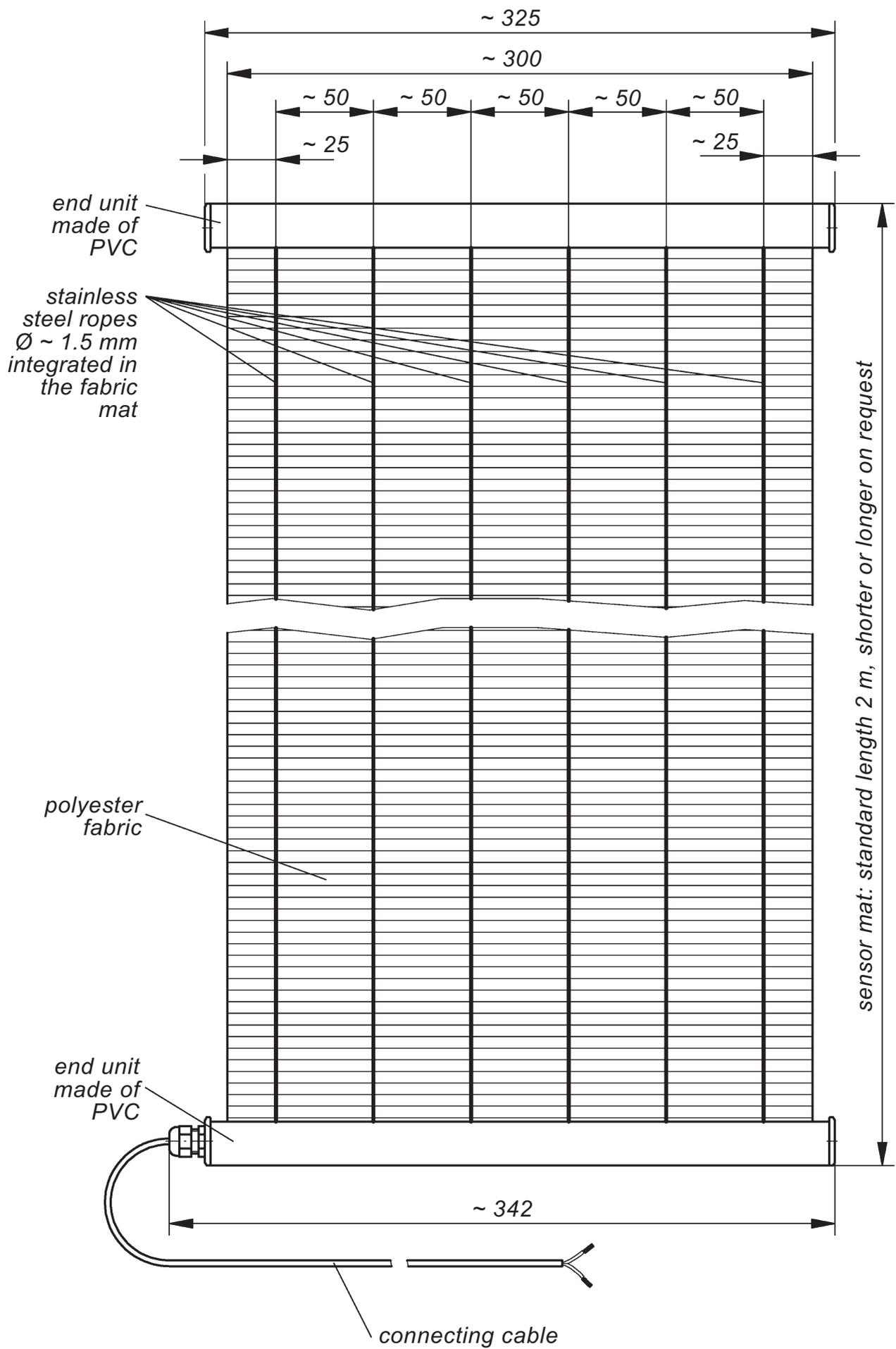
The 6 sensor cables of a MEL 6... mat electrode in form of 6 stainless steel ropes are woven into an approx. 30 cm wide polyester fabric as part of the warp, and the polyester fabric keeps them permanently equidistant from one another. This polyester fabric is designed to prevent contact of the stainless steel ropes with one another or with an electrically conductive surface (e.g. steel tub, steel pipe etc.) and thus to avoid as far as possible 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 mat electrodes are absolutely dry under normal circumstances, as the mat electrodes have the ability to bind moisture (including high levels of air humidity) causing false alarms particularly with long mat electrodes.**



# MEL 6 and MEL 6-Z10 conductive mat electrode

Technical data	MEL 6	MEL 6-Z10
Design	3 control electrodes and 3 ground electrodes	
Sensitive elements	6 sensor cables in form of 6 ropes made of stainless steel 316, each 1.5 mm in dia., woven into an approx. 300 mm wide polyester fabric sensor mat at a spacing of approx. 50 mm, end units of the sensor mat made of PVC length 2 m, shorter or longer on request	
Max. length of the sensor mat	10 m, if the sensor mat is wound around a pipe or tank, the possible length may be considerably shorter depending on the type and method of laying.	
Electrical connection	connecting cable 2X0.75 length 2 m, on request: <ul style="list-style-type: none"> <li>• longer</li> <li>• halogen-free</li> </ul>	
Temperature range	– 20°C to + 60°C	
Cable break monitoring to monitor the connecting cable and the sensor cables	<b>without</b>	<b>with</b> integrated Z10 cable break monitoring unit
Classification • <b>with</b> cable break monitoring unit, <b>without</b> DIBt certificate  • <b>without</b> cable break monitoring unit, <b>without</b> DIBt certificate	connection to one of the following conductive electrode relays	
		<b>Leckstar 101 or Leckstar 101/S:</b> one MEL 6-Z10  <b>Leckstar 171/1 or Leckstar 171/2:</b> one MEL 6-Z10  <b>Leckstar 155 or Leckstar 255:</b> max. five MEL 6-Z10
Max. length of connecting cable	1,000 m between electrode relay and mat electrode minus 3 x the length of the mat electrode	



Dimensions in mm





# Leckstar 5/G conductive electrode relay

without DIBt certificate

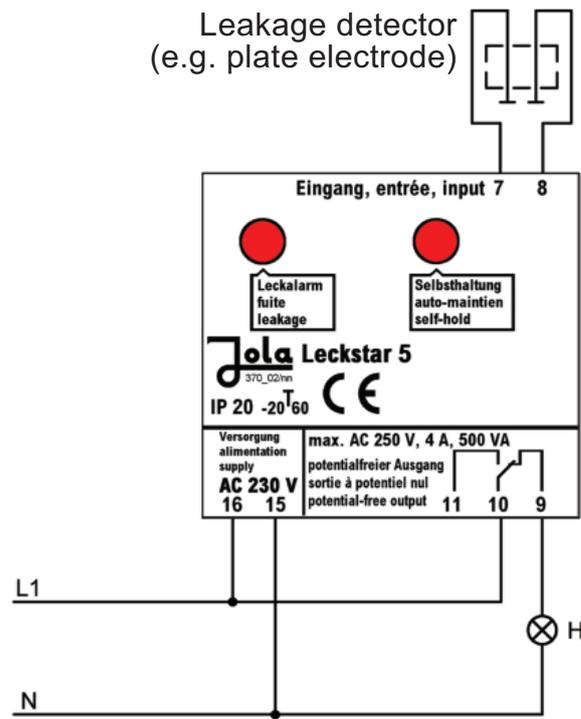
- without cable break monitoring feature
- for the connection of all conductive electrodes without cable break monitoring unit
- with 1 potential-free changeover contact at the output

Electrode relay in surface-mount housing  
with transparent cover,  
with 1 LED for mains monitoring indication and  
1 LED for signalling the alarm status, inside the housing



Technical data	Leckstar 5/G
Supply voltage (AC versions: terminals 1 and 2; DC versions: • terminal 1: – • terminal 2: +)	AC 230 V, on request: AC 240 V, AC 115 V, AC 24 V, DC 24 V } only for connection to a safety low voltage DC 12 V } according to the safety regulations relating to the application or further supply voltages
Mains monitoring indication	via 1 green LED
Power consumption	approx. 3 VA
Electrode circuit (terminals 6 and 7)	2 terminals (under safety extra low voltage SELV), acting on 1 output relay without self-hold
No-load voltage	18 V <sub>eff</sub> $\square$ 10 Hz (safety extra low voltage SELV)
Short-circuit current	max. 0.5 mA <sub>eff</sub>
Response sensitivity	approx. 30 k $\Omega$ or approx. 33 $\mu$ S (electric conductance)
Power circuit (terminals 3, 4, 5)	1 single-pole potential-free changeover contact based on the quiescent current principle
Switching status indication	1 red LED lights when electrode is wet / output relay is not energized
Switching voltage	max. AC 250 V
Switching current	max. AC 4 A
Switching capacity	max. 500 VA
Housing	insulating material, with 3 cable entries (dimensions see page 31-1-38)
Connection	internal terminals
Protection class	IP54
Mounting	surface mounting using 4 screws
Mounting orientation	any
Temperature range	– 20°C to + 60°C
Max. length of connecting cable	1,000 m between electrode relay and electrode(s)
CEM	<ul style="list-style-type: none"> <li>• for interference emission in accordance with the appliance-specific requirements for households, business and commerce as well as small companies</li> <li>• for interference immunity in accordance with the appliance-specific requirements for industrial companies</li> </ul>

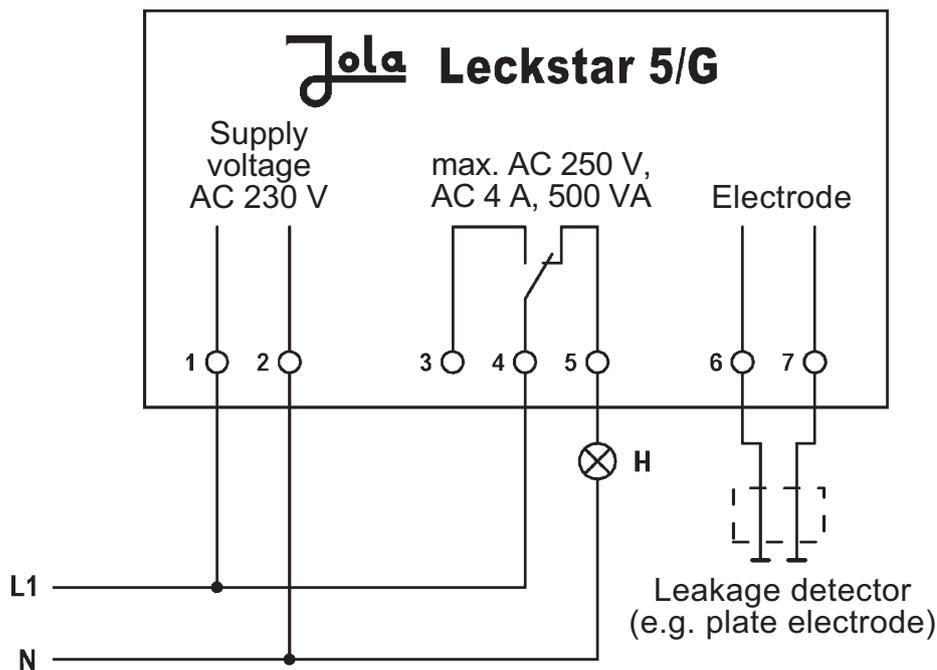
## Connection diagram of Leckstar 5 electrode relay



Position of contact when Leckstar 5 is

- without voltage supply
- or
- with normal mains operation and with activated electrode (alarm)

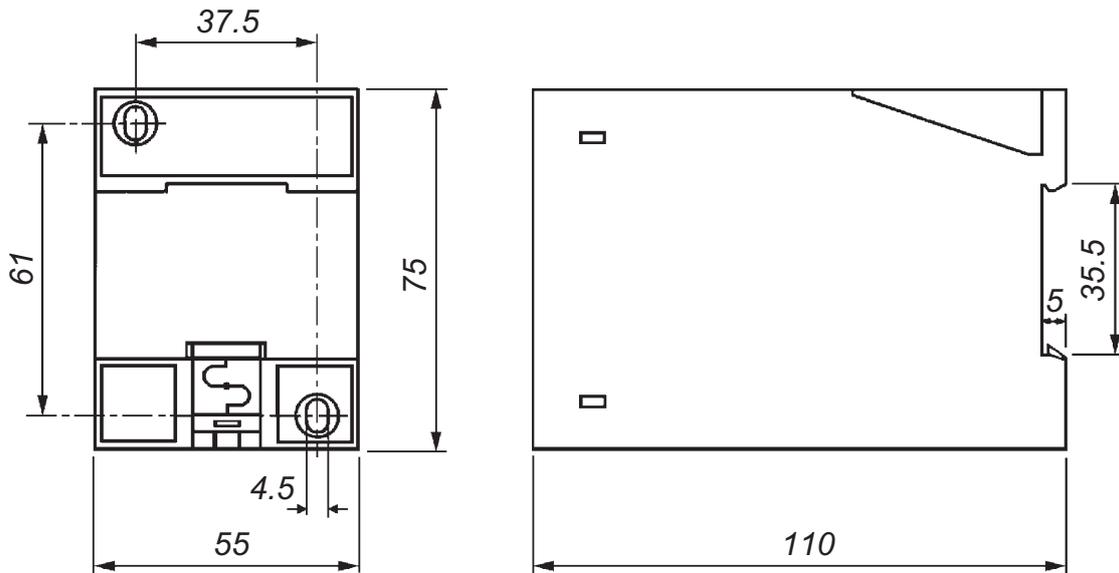
## Connection diagram of Leckstar 5/G electrode relay



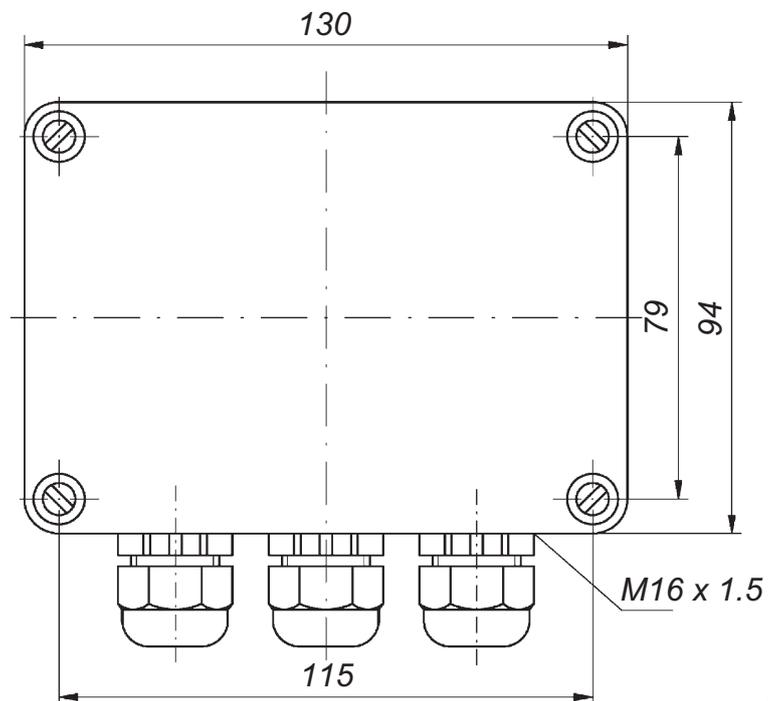
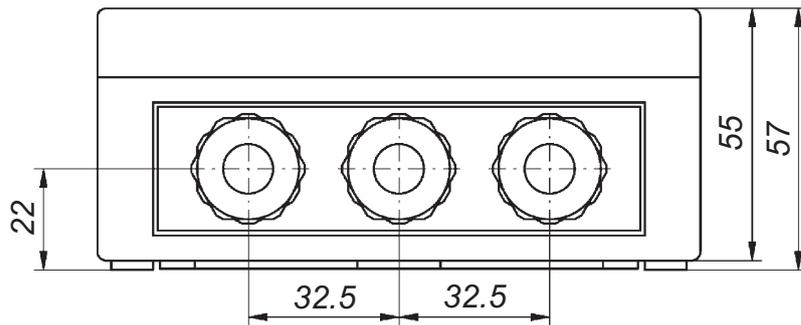
Position of contact when Leckstar 5/G is

- without voltage supply
- or
- with normal mains operation and with activated electrode (alarm)

## Dimensional drawings

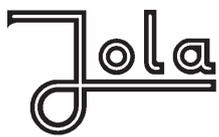


**Leckstar 5, Leckstar 101 and Leckstar 101/S**



**Leckstar 5/G**

*Dimensions in mm*



# Leckstar 101 conductive electrode relay with DIBt certificate no. Z-65.40-203

- with cable break monitoring feature and switchable self-hold
- for connection of 1 conductive electrode with Z10 cable break monitoring unit
- with 1 potential-free changeover contact at the output

Electrode relay for DIN rail mounting or fastening via 2 boreholes, with connection terminals on top and with 3 LEDs for signalling the operating statuses

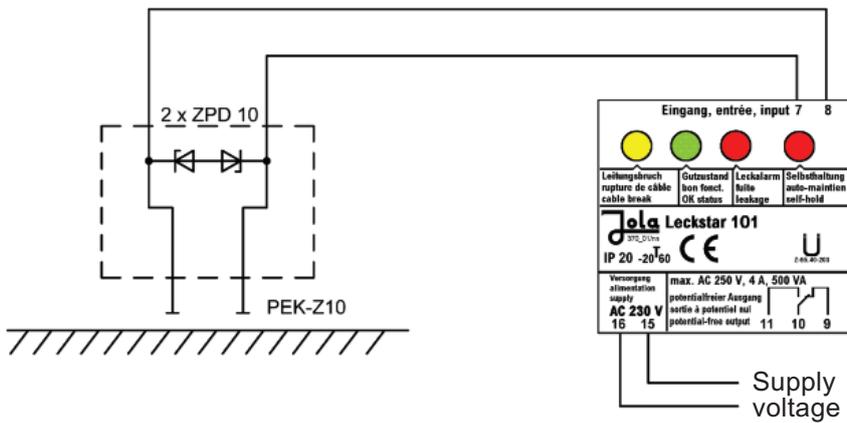
## Self-hold:

- If the switch **for self-hold is switched on, an alarm is stored.** The relay continues to signal the alarm even if the cause of the alarm (e.g. the presence of water or a cable break) is no longer present – in other words, if the sensor is dry again or if the line has contact. The alarm is acknowledged by switching off the switch for self-hold.
- If the switch **for self-hold is not switched on, the alarm is not maintained** when the cause of the alarm has been remedied but is terminated.



Technical data	Leckstar 101
Supply voltage (AC versions: terminals 15 and 16; DC versions: • terminal 15: – • terminal 16: +)	AC 230 V, on request: AC 240 V, AC 115 V, AC 24 V, DC 24 V } only for connection to a safety low voltage DC 12 V } according to the safety regulations relating to the application or further supply voltages approx. 3 VA
Power consumption	
Electrode circuit (terminals 7 and 8)	2 terminals (under safety extra low voltage SELV) acting on 1 output relay with switchable self-hold 18 V <sub>eff</sub> $\square$ 10 Hz (safety extra low voltage SELV)
No-load voltage	max. 0.5 mA <sub>eff</sub>
Short-circuit current	approx. 30 k $\Omega$ or approx. 33 $\mu$ S (electric conductance)
Response sensitivity	
Power circuit (terminals 9, 10, 11)	1 single-pole potential-free changeover contact based on the quiescent current principle
Switching status indication	via 3 LEDs (see page 31-1-40)
Switching voltage	max. AC 250 V
Switching current	max. AC 4 A
Switching capacity	max. 500 VA
Housing	insulating material, 75 x 55 x 110 mm (dimensions see page 31-1-38)
Connection	terminals on top of housing
Protection class	IP20
Mounting	on 35 mm DIN rail or fastening via 2 boreholes
Mounting orientation	any
Temperature range	– 20°C to + 60°C
Max. length of connecting cable	1,000 m between electrode relay and Z10 cable break monitoring unit
CEM	<ul style="list-style-type: none"> <li>• for interference emission in accordance with the appliance-specific requirements for households, business and commerce as well as small companies</li> <li>• for interference immunity in accordance with the appliance-specific requirements for industrial companies</li> </ul>

## Connection diagram of Leckstar 101 electrode relay



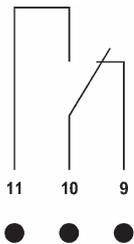
Due to the design of the unit, only one electrode cable can be monitored for cable break.

If several electrodes are to be connected to a common Leckstar 101 electrode relay, only one electrode (the last one) may be fitted with the Z10 cable break monitoring unit. All other electrodes are to be used without integrated Z10 cable break monitoring unit (see right-hand circuit diagram below).

Position of contact when Leckstar 101 without voltage

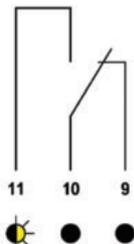
## Position of output contact of the Leckstar 101 electrode relay

relay Leckstar 101  
without voltage



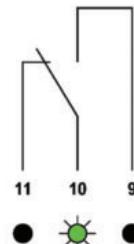
**LEDs dark:**  
output relay  
not energized

cable break



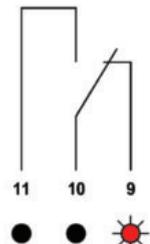
**yellow LED flashes:**  
electrode cable break,  
output relay  
not energized

Leckstar 101 under voltage  
standby



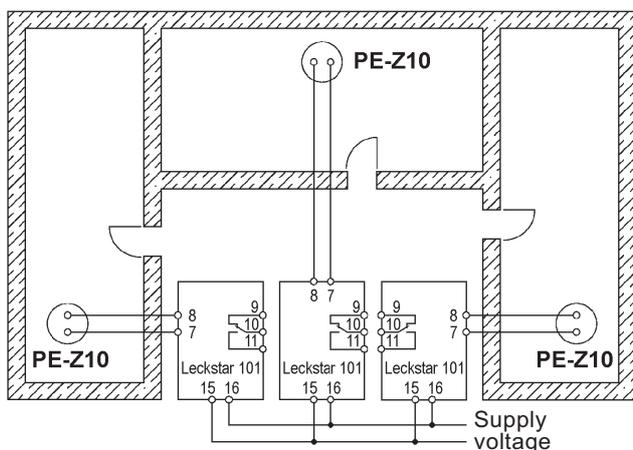
**green LED lights:**  
electrode dry,  
output relay  
energized

leakage

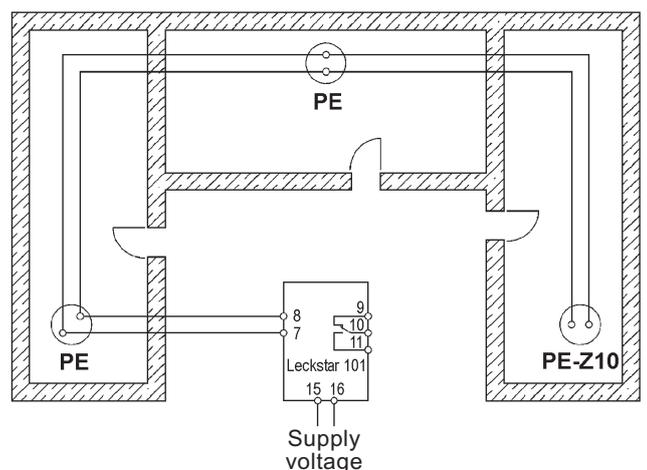


**red LED lights:**  
electrode wet,  
output relay  
not energized

## Circuit diagrams (position of contacts when Leckstar 101 without voltage)



**Connection of several plate electrodes  
to several Leckstar 101 electrode  
relays – separate alarms**



**Connection of several plate electrodes  
to one Leckstar 101 electrode relay –  
group alarm**

The unit is designed for switch cabinet mounting or installation in a suitable protective housing and may therefore only be mounted / installed in these locations. It is suitable for use in clean environments only.



# Leckstar 101/S conductive electrode relay with DIBt certificate no. Z-65.40-203

- with cable break monitoring feature and switchable self-hold
- with separately routed cable break monitoring output
- for connection of 1 conductive electrode with Z10 cable break monitoring unit
- with 2 potential-free break (NC) contacts at the output

Electrode relay for DIN rail mounting or surface mounting, with connection terminals on top and with 3 built-in LEDs for signalling the operating statuses

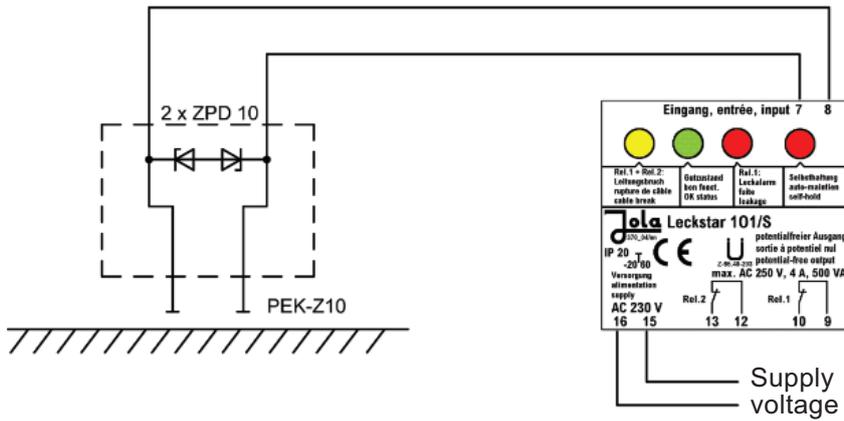
### Self-hold:

- If the switch for self-hold is switched on, an alarm is stored. The relay continues to signal the alarm even if the cause of the alarm (e.g. the presence of water or a cable break) is no longer present – in other words, if the sensor is dry again or if the line has contact. The alarm is acknowledged by switching off the switch for self-hold.
- If the switch for self-hold is not switched on, the alarm is not maintained when the cause of the alarm has been remedied but is terminated.



Technical data	Leckstar 101/S
Supply voltage (AC versions: terminals 15 and 16; DC versions: • terminal 15: – • terminal 16: +)	AC 230 V, on request: AC 240 V, AC 115 V, AC 24 V, DC 24 V } only for connection to a safety low voltage DC 12 V } according to the safety regulations relating to the application or further supply voltages
Power consumption	approx. 3 VA
Electrode circuit (terminals 7 and 8)	2 terminals (under safety extra low voltage SELV), acting on 2 output relays with switchable self-hold
No-load voltage	18 V <sub>eff</sub> $\square$ 10 Hz (safety extra low voltage SELV)
Short-circuit current	max. 0.5 mA <sub>eff</sub>
Response sensitivity	approx. 30 k $\Omega$ or approx. 33 $\mu$ S (electric conductance)
1 <sup>st</sup> power circuit (terminals 9, 10)	1 single-pole potential-free break (NC) contact based on the quiescent current principle for signalling leakage or cable break
2 <sup>nd</sup> power circuit (terminals 12, 13)	1 single-pole potential-free break (NC) contact based on the quiescent current principle for additional signalling in the event of a cable break
Switching status indication	via 3 LEDs (see page 31-1-42)
Switching voltage	max. AC 250 V
Switching current	max. AC 4 A
Switching capacity	max. 500 VA
Housing	insulating material, 75 x 55 x 110 mm (dimensions see page 31-1-38)
Connection	terminals on top of housing
Protection class	IP20
Mounting	on 35 mm DIN rail or fastening via 2 boreholes
Mounting orientation	any
Temperature range	– 20°C to + 60°C
Further technical data	see Leckstar 101, page 31-1-39

## Connection diagram of Leckstar 101/S electrode relay

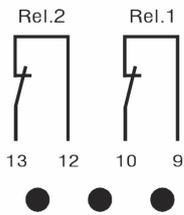


Position of contact when Leckstar 101/S without voltage

Due to the design of the unit, only one electrode cable can be monitored for cable break. If several electrodes are to be connected to a common Leckstar 101/S electrode relay, only one electrode (the last one) may be fitted with the Z10 cable break monitoring unit. All other electrodes are to be used without integrated Z10 cable break monitoring unit (see right-hand circuit diagram below).

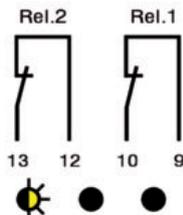
## Position of output contact of the Leckstar 101/S electrode relay

relay Leckstar 101/S without voltage



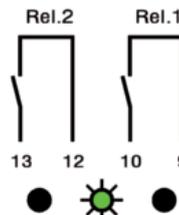
**LEDs dark:**  
both output relays  
not energized,  
output contacts closed

Leckstar 101/S under voltage  
cable break



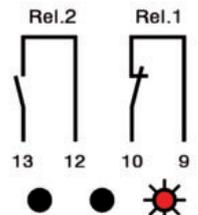
**yellow LED flashes:**  
electrode cable break,  
both output relays  
not energized,  
output contacts closed

Leckstar 101/S under voltage  
standby



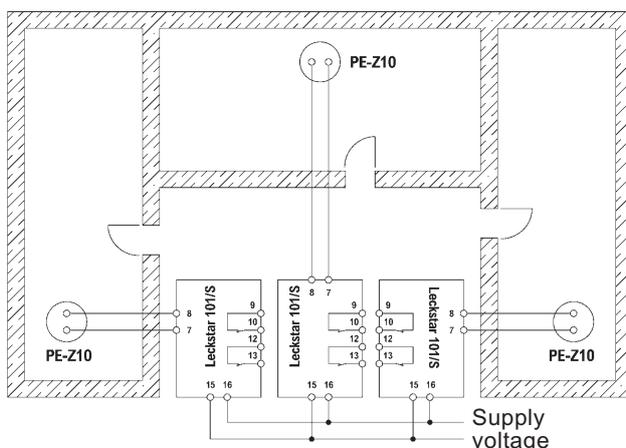
**green LED lights:**  
electrode dry,  
both output relays  
energized,  
output contacts open

leakage

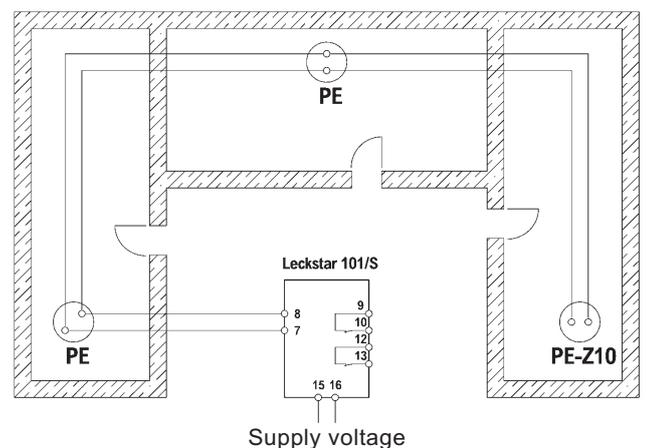


**red LED lights:**  
electrode wet,  
output relay 1 not energized,  
output contact 1 closed,  
output relay 2 energized,  
output contact 2 open

## Circuit diagrams (position of contacts when Leckstar 101/S without voltage)



Connection of several plate electrodes to several Leckstar 101/S electrode relays – separate alarms



Connection of several plate electrodes to one Leckstar 101/S electrode relay – group alarm

The unit is designed for switch cabinet mounting or installation in a suitable protective housing and may therefore only be mounted / installed in these locations. It is suitable for use in clean environments only.



# Leckstar 171/1 and Leckstar 171/2 conductive electrode relays

without DIBt certificate

- with cable break monitoring feature
- for connection of 1 conductive electrode with Z10 cable break monitoring unit
- with built-in accumulator for emergency power supply in the event of a mains failure
- with 2 potential-free changeover contacts at the output
- with integrated buzzer
- with 1 horn power circuit

Electrode relay in surface-mount housing, with 3 built-in LEDs for signalling the operating statuses



## • Optical indication

The operating status (mains operation, accumulator operation, fuse defective) is indicated by a bi-colour LED.

2 LEDs are built into the electrode relay for signalling leakage or cable break.

Operating status	Type of optical indication
<b>Supply voltage</b>	Optical indication <b>without</b> effect on the active power circuits: Bi-colour LED
	lights green: mains operation, accumulator fuse OK flashes green: mains failure and accumulator operation
	lights red: mains operation and defective or absent accumulator fuse
<b>Cable break</b>	Optical indication <b>with</b> effect on the power circuits: yellow LED flashes: current cable break alarm yellow LED lights: cable break alarm acknowledged, alarm reason still present or alarm reason no longer present and acknowledged alarm in self-hold
	Optical indication <b>with</b> effect on the power circuits: rote LED flashes: current leakage alarm rote LED lights: leakage alarm acknowledged, alarm reason still present or alarm reason no longer present and acknowledged alarm in self-hold

• **Power circuits**

A buzzer is integrated in the electrode relay for the purpose of acoustic signalling at predetermined intervals in the event of an alarm. An optional external horn (DC 12 V, max. 1 A) may be installed additionally. It is fed in the event of an alarm via an internal relay contact with the supply voltage of DC 12 V generated in the electrode relay as a permanent signal.

Two potential-free changeover contacts are available at the output for the connection of additional signalling devices. The switching function of these contacts is different in the two unit versions.

<b>Power circuits</b>	<b>Leckstar 171/1</b>	<b>Leckstar 171/2</b>
<b>Output relay 1 based on the quiescent current principle</b>	for cable break alarm, with self-hold, can be acknowledged when the reason for the alarm is no longer present	for group alarm, with self-hold, can be acknowledged when the reason for the alarm is no longer present
<b>Output relay 2 based on the quiescent current principle</b>	for leakage alarm, with self-hold, can be acknowledged when the reason for the alarm is no longer present	for group alarm, with self-hold, can always be acknowledged
<b>Optional external Horn based on the working current principle</b>	for group alarm, with self-hold, can always be acknowledged	

• **Alarm acknowledgement**

A built-in acknowledgement button is fitted for the acknowledgement of the cable break alarm or the leakage alarm.

If a repeat alarm is emitted, all power circuits are once again set to alarm status with additional optical signal, regardless of whether an alarm has already been acknowledged.

If acknowledgement has also to be possible via an external acknowledgement button, an external acknowledgement button must be connected in parallel to the built-in acknowledgement button to terminals 11 and 12.

**N.B.**

**The fuse next to the connecting terminals serves to protect the accumulator circuit.**

**If this fuse is defective or missing, the accumulator is not charged during mains operation and is not available as an emergency power supply in the event of a mains failure. Moreover, problems may occur with the operation of horns with higher loudness levels. You should therefore always ensure that a functioning fuse (1 A fast) is inserted.**

**In the event of mains failure, the built-in accumulator permits operation of the electrode relay for approx. 24 hours in standby status. Operating times when the alarm is sounding depend on the power consumption of the connected external horn. The accumulator capacity is 1.8 Ah. The life of the accumulator is approx. 4 to 5 years.**

**In non-connected status (unit not connected to the mains supply), the fuse located next to the connecting terminals is to be removed, as the accumulator will otherwise discharge via the electrode relay, thereby reducing its service life.**

**N.B.!**  
**Fully disconnect the unit from the mains voltage before inserting or replacing the fuse!**  
**When the fuse is inserted, the unit is operated off the accumulator: a false alarm may be activated, and buzzer and optional external horn may sound!**  
**Increased risk of accident "due to fright"!**

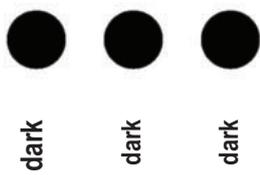
Technical data	Leckstar 171/1	Leckstar 171/2
Supply voltage (terminals 1 and 2)  Optical indication showing the type of power supply  Power consumption	AC 230 V, other supply voltage, e.g. DC 24 V, on request  via a bi-colour LED without effect on the power circuits: • lights green = mains operation, accumulator fuse OK • flashes green = mains failure and accumulator operation • lights red = mains operation and defective or absent accumulator fuse approx. 3 VA	
Electrode circuit (terminals 13 and 14)  No-load voltage Short circuit current Response sensitivity	2 terminals (under safety extra low voltage SELV), acting on the 2 potential-free changeover contacts, the buzzer circuit and the circuit of the optional external horn 14 V <sub>eff</sub> $\square$ 10 Hz (safety extra low voltage SELV) max. 0.5 mA <sub>eff</sub> approx. 30 k $\Omega$ or approx. 33 $\mu$ S (electric conductance)	
1 <sup>st</sup> power circuit (output relay 1 – terminals 3, 4, 5)	1 single-pole potential-free changeover contact based on the quiescent current principle for cable break alarm,   for group alarm, with self-hold, can be acknowledged when the reason for the alarm is no longer present	
2 <sup>nd</sup> power circuit (output relay 2 – terminals 6, 7, 8)	1 single-pole potential-free changeover contact based on the quiescent current principle for leakage alarm,   for group alarm, with self-hold, can be acknowledged when the reason for the alarm is no longer present   can always be acknowledged	
Electrical values of the potential-free changeover contacts: • switching voltage • switching current • switching capacity	max. AC 250 V max. AC 4 A max. 500 VA	
3 <sup>rd</sup> power circuit (internal buzzer and optional external horn – terminals 9, 10)	• internal buzzer in interval mode • optional external horn without interval mode for group alarm, with self-hold, can always be acknowledged	
Electrical values for the optional external horn: • supply voltage • current consumption	DC 12 V max. 1 A	
Accumulator: • capacity • service life	1.8 Ah  approx. 4 - 5 years	

Technical data	Leckstar 171/1	Leckstar 171/2
Switching status indication • yellow and red LED dark	via 2 LEDs functioning voltage supply output relay 1 and 2 energized	
• yellow LED flashes output relay 1 output relay 2	cable break alarm not energised   not energised energised   not energised	
• yellow LED lights output relay 1 output relay 2	internal buzzer and optional external horn active cable break alarm acknowledged, alarm reason still present or alarm reason no longer present and acknowledged alarm in self-hold not energised   not energised energised   energised	
• red LED flashes output relay 1 output relay 2	leakage alarm energised   not energised not energised   not energised	
• red LED lights output relay 1 output relay 2	internal buzzer and optional external horn active leakage alarm acknowledged, alarm reason still present or alarm reason no longer present and acknowledged alarm in self-hold energised   not energised not energised   energised	
Housing Connecting terminals	internal buzzer and optional external horn inactive insulating material, approx. 190 x 167 x 72 mm screw terminals: supply voltage and power circuits for max. 4 mm <sup>2</sup> solid or max. 2.5 mm <sup>2</sup> flexible cable; electrode circuit for max. 2.5 mm <sup>2</sup> solid or max. 1.5 mm <sup>2</sup> flexible cable	
Mounting orientation / Protection class	any position: IP40, vertical: IP41; to maintain the protection class, optional cable entries that are not used are to be sealed using the supplied sealing plugs, and the optionally double-used cable entry has to be fitted with the supplied double sealing insert	
Temperature range Max. length of connecting cable	0°C to + 50°C 1,000 m between electrode relay and Z10 cable break monitoring unit	
EMC	<ul style="list-style-type: none"> <li>• for interference emission in accordance with the appliance-specific requirements for households, business and commerce as well as small companies</li> <li>• for interference immunity in accordance with the appliance-specific requirements for industrial companies</li> </ul>	

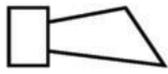
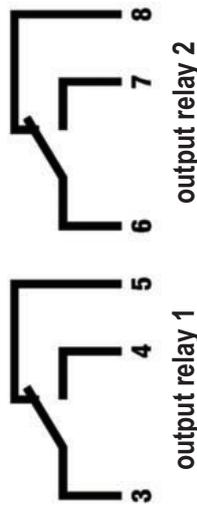
### External opt. horn for connection to Leckstar 171/1 or Leckstar 171/2 electrode relay

Technical data	HU 1
Application	dry rooms
Supply voltage	DC 12 V
Current consumption	DC 120 mA
Power consumption	1.44 W
Noise level at a distance of 1 m	approx. 92 dB
Dimensions	Ø approx. 70 x 170 mm
Protection class	IP43

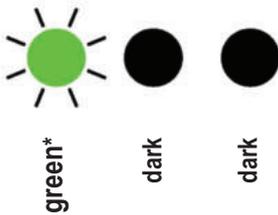
**Currentless status  
(and no accumulator operation)**



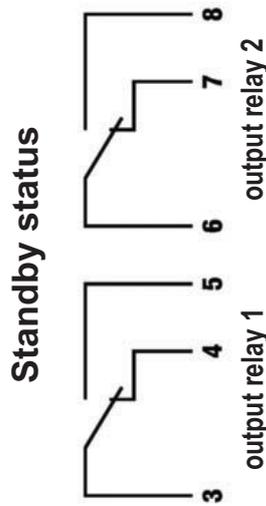
dark  
dark  
dark



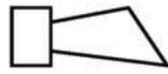
buzzer and  
optional  
external horn



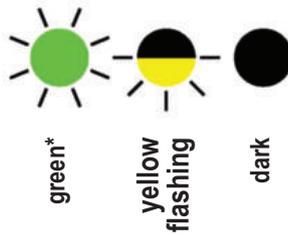
green\*  
dark  
dark



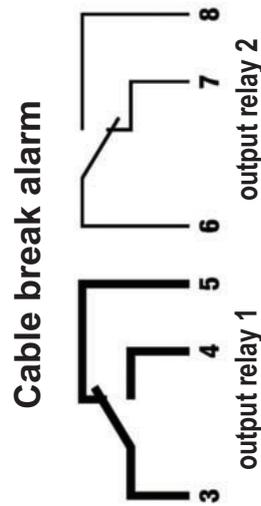
**Standby status**



buzzer and  
optional  
external horn



green\*  
yellow  
flashing  
dark

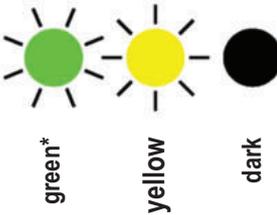


**Cable break alarm**

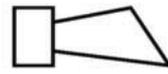
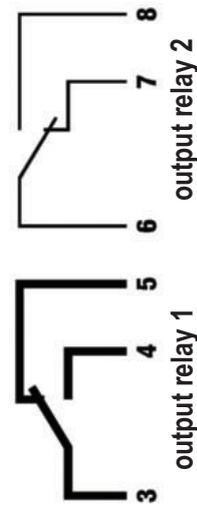


buzzer and  
optional  
external horn

Cable break alarm acknowledged, alarm reason still present or alarm reason no longer present and acknowledged alarm in self-hold



green\*  
yellow  
dark



buzzer and  
optional  
external horn

Depiction of switching statuses of the

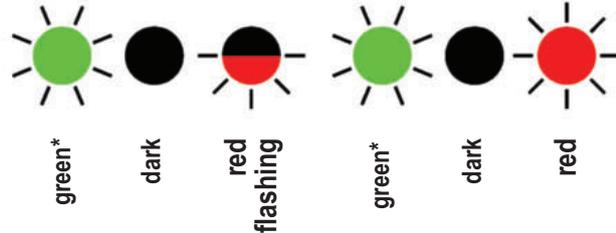
**Leckstar 1711/1**

symbols in bold indicate alarm status

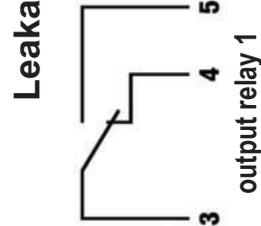
\* lights green with mains operation and accumulator fuse OK, but:

flashes green in the event of mains failure and accumulator operation or

lights red in the event of mains operation and defective or absent accumulator fuse



green\*  
dark  
red  
flashing  
green\*  
dark  
red

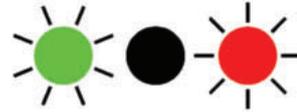


**Leakage alarm**

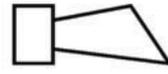
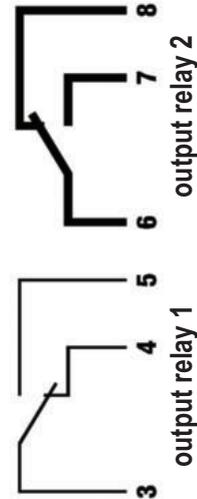


buzzer and  
optional  
external horn

Leakage alarm acknowledged, alarm reason still present or alarm reason no longer present and acknowledged alarm in self-hold



green\*  
dark  
red



buzzer and  
optional  
external horn

# Depiction of switching statuses of the

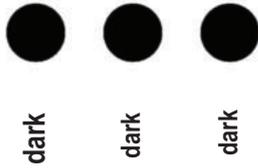
## Leckstar 171/2

symbols in bold indicate alarm status

\* lights green with mains operation and accumulator fuse OK, but:

flashes green in the event of mains failure and accumulator operation or lights red in the event of mains operation and defective or absent accumulator fuse

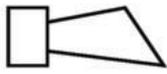
### Currentless status (and no accumulator operation)



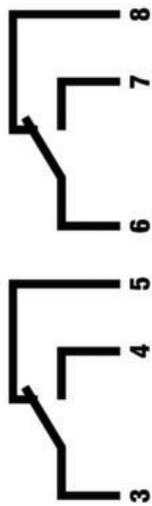
dark

dark

dark

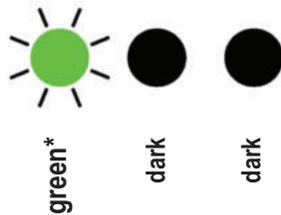


buzzer and optional external horn



output relay 1

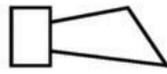
output relay 2



green\*

dark

dark



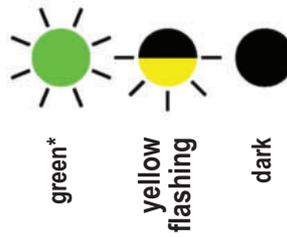
buzzer and optional external horn

### Standby status



output relay 1

output relay 2



green\*

yellow flashing

dark



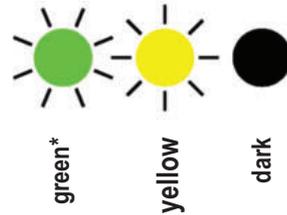
buzzer and optional external horn

### Cable break alarm



output relay 1

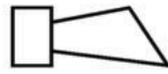
output relay 2



green\*

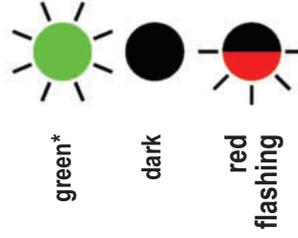
yellow

dark



buzzer and optional external horn

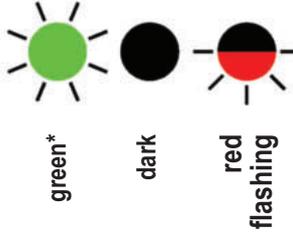
Cable break alarm acknowledged, alarm reason still present or alarm reason no longer present and acknowledged alarm in self-hold



green\*

dark

red flashing



green\*

dark

red



buzzer and optional external horn

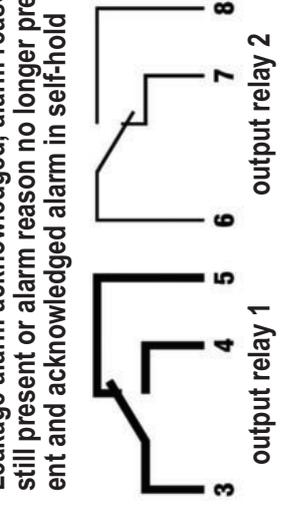
### Leakage alarm



output relay 1

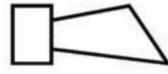
output relay 2

Leakage alarm acknowledged, alarm reason still present or alarm reason no longer present and acknowledged alarm in self-hold



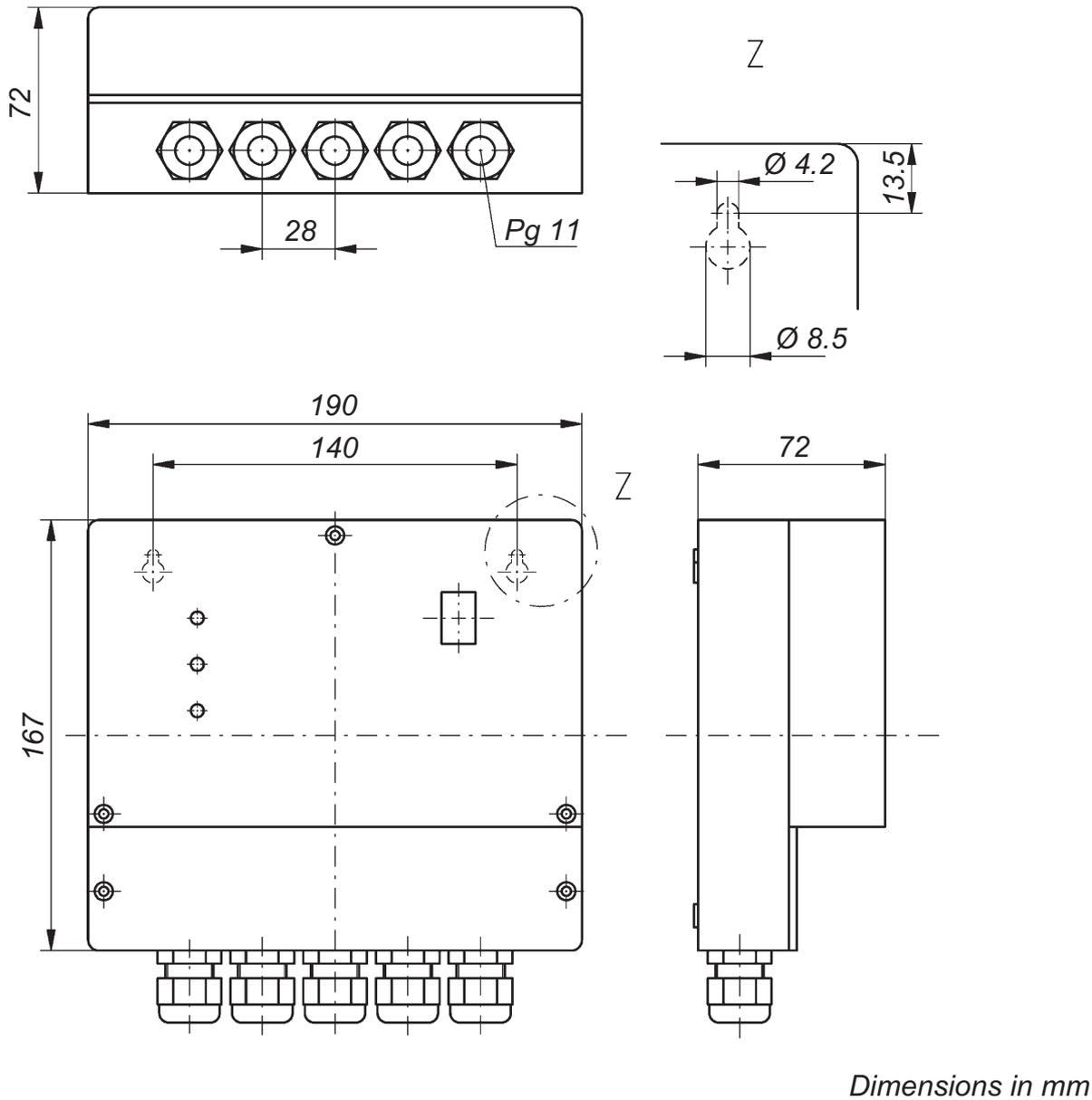
output relay 1

output relay 2

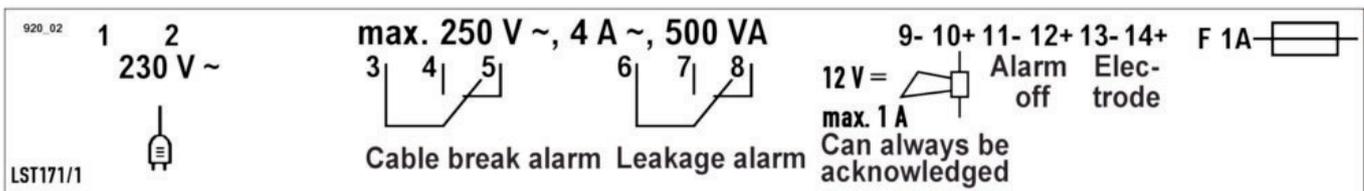


buzzer and optional external horn

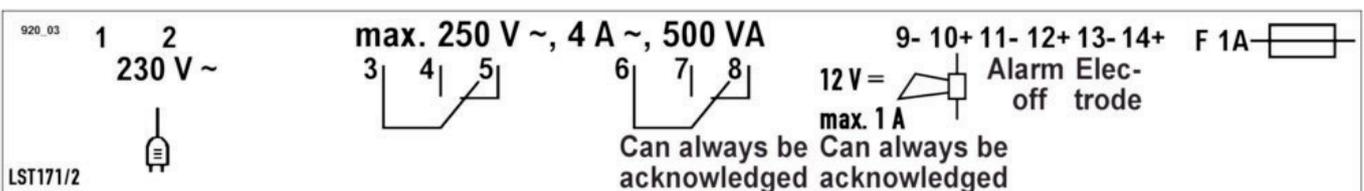
## Dimensional drawing of Leckstar 171/1 / Leckstar 172/2



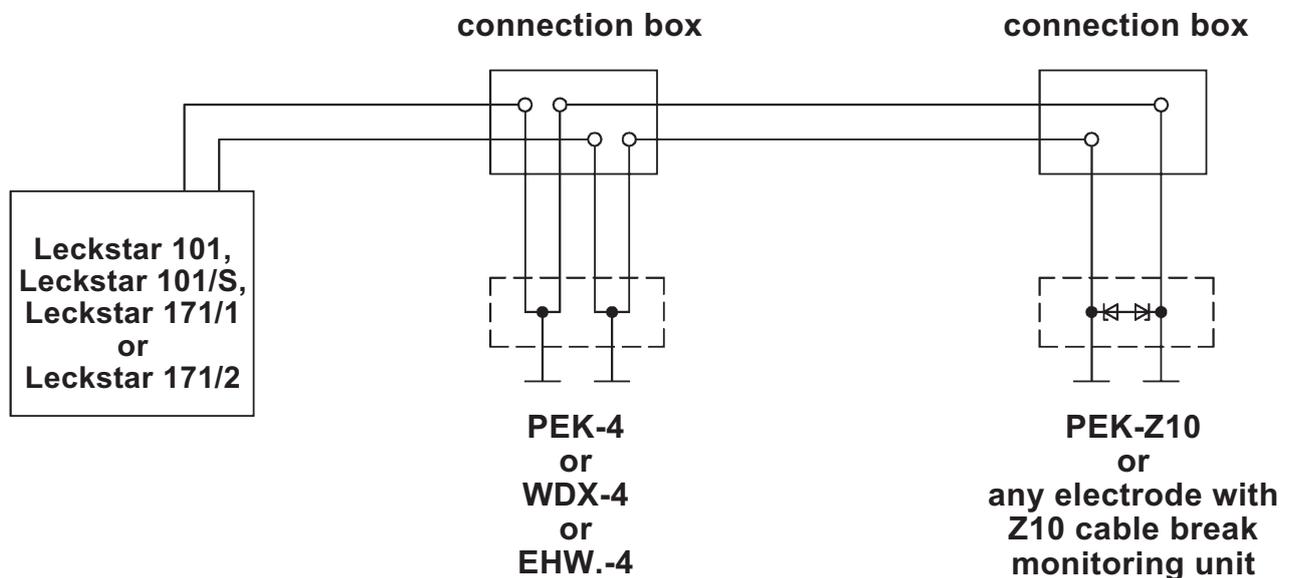
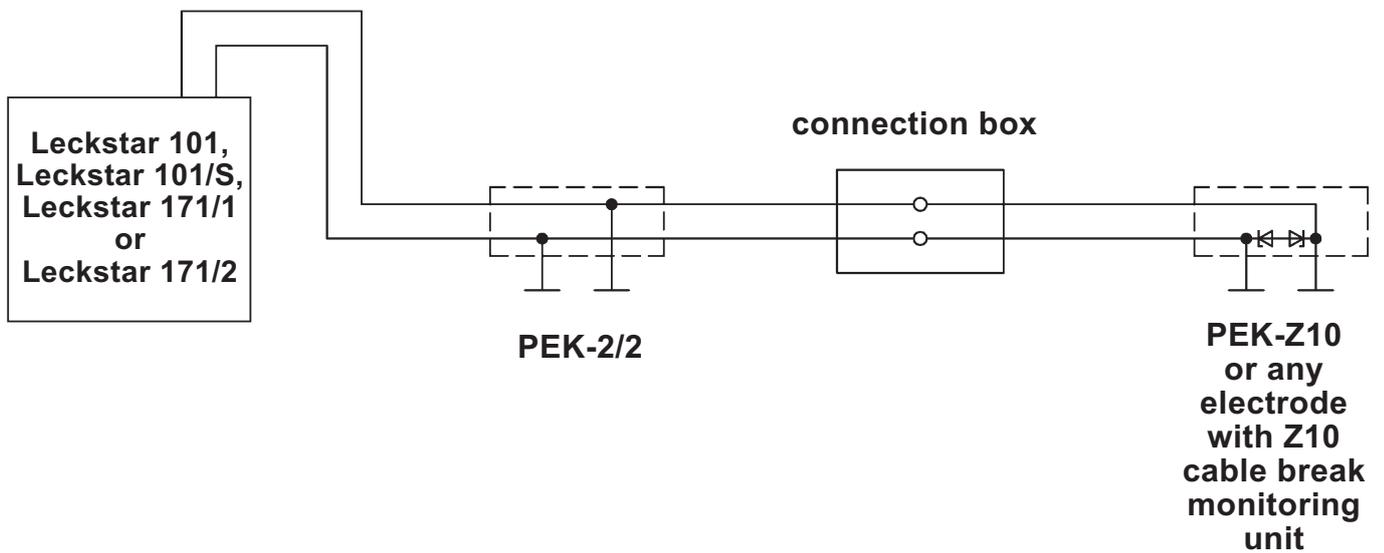
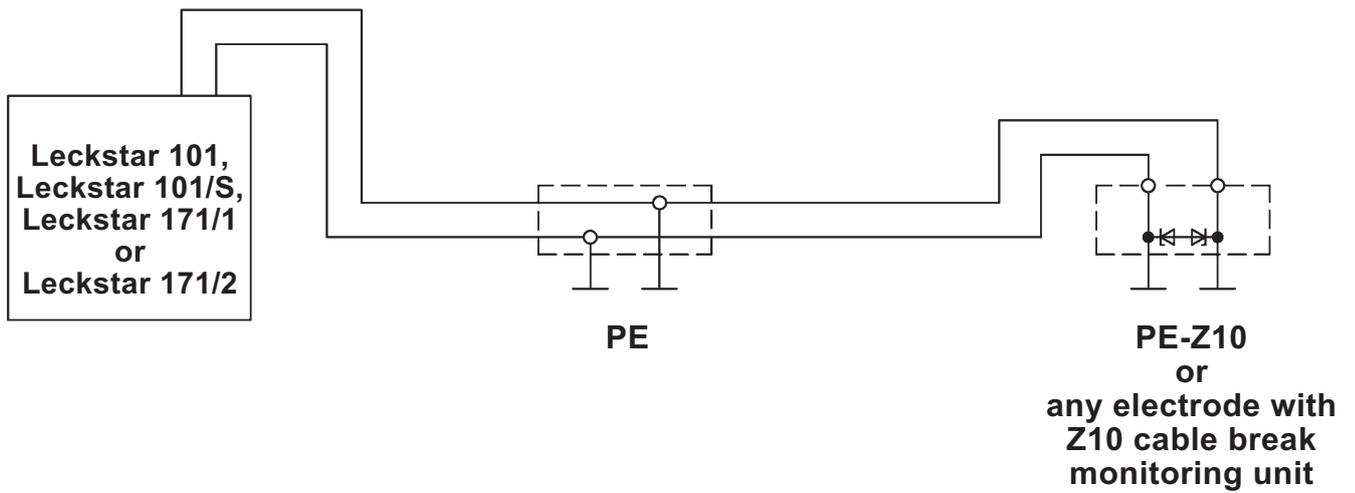
### Connection diagram of Leckstar 171/1



### Connection diagram of Leckstar 171/2



**Connection diagrams:  
 Connection of several electrodes to one  
 Leckstar 101, Leckstar 101/S, Leckstar 171/1 or Leckstar 171/2 electrode relay**





# Leckstar 155 conductive electrode relay without DIBt certificate

- with cable break monitoring feature
- for the connection of 5 conductive electrodes with Z10 cable break monitoring unit
- with touch sensor button for alarm acknowledgement
- with 2 potential-free changeover contacts at the output and
- with 5 status signal outputs DC 20 V for the building control system

Electrode relay in surface-mount housing, with transparent cover, with 5 x 3 LEDs for operating status indication and with 1 LED for acknowledgement status indication, inside the housing



- 5 signalling lines with common system ground

The Leckstar 155 electrode relay possesses inputs for the connection of 5 signalling lines.

A signalling line consists of one or more conductive electrodes. If electrodes designed for this purpose are used, it is possible to connect several electrodes one after the other to permit cable break monitoring at any point along the line route. At the end of each signalling line there is an electrode with integrated Z10 cable break monitoring unit. None of the other electrodes in the signalling line may be equipped with an integrated cable break monitoring unit.

In principle, the conductive electrodes consist of a pair of sensitive elements in the form of electrode plates, electrode rods or electrode ropes. One electrode is the control electrode and the other the ground electrode.

The electrode circuits are supplied with a safety extra low voltage generated in the Leckstar 155 which is reliably galvanically separated from the mains circuit and the potential-free changeover contacts of the two output relays.

**All 5 signalling lines have a common system ground, which means there is no galvanic separation of the signalling lines. This factor must always be taken into account in the case of long signalling lines extending into different parts of the building and in particular with the use of cable, tape, twin or mat electrodes. There is a risk of formation of ground loops if the electrodes are mounted in such a way that an electrode can take on ground potential. It may be necessary to perform local potential equalisation in order to avoid potential equalisation currents via the signalling lines.**

- Activation of the individual signalling lines

If not all 5 signalling lines are to be used, the signalling lines 2 to 5 can be activated (dip switch in active position) or deactivated (dip switch in inactive position) individually via 4 dip switches. Channel 1 is always activated. **Activation / Deactivation may only be performed in currentless status.**

• **Type of indication**

A group of 3 LEDs of different colours is assigned to each signalling line.

<b>Operating status</b>	<b>Type of indication of each signalling line</b>
<b>Power supply</b>	When the supply voltage is switched on, one of the three LEDs on each activated signalling line lights up to indicate the operating status of the activated signalling line in question
<b>Leakage</b>	Red LED lights, if the corresponding activated signalling line reports leakage <ul style="list-style-type: none"> <li>• with effect on the two power circuits</li> <li>• with effect on the corresponding DC 20 V status signal output for the building control system</li> </ul>
<b>Standby</b>	Green LED lights, if the corresponding activated signalling line reports standby <ul style="list-style-type: none"> <li>• with effect on the corresponding DC 20 V status signal output for the building control system</li> </ul> Only if <b>all</b> activated signalling lines indicate standby <ul style="list-style-type: none"> <li>• with effect on the two power circuits</li> </ul>
<b>Cable break</b>	Yellow LED flashes, if the corresponding activated signalling line reports cable break <ul style="list-style-type: none"> <li>• with effect on the two power circuits</li> <li>• with effect on the corresponding DC 20 V status signal output for the building control system</li> </ul>
<b>Signalling line switched to inactive</b>	None of the 3 LEDs in the deactivated signalling line (signalling line 2 to 5) lights up.

• **Power circuits**

Two potential-free changeover contacts are available at the output, one of which reacts based on the working current principle and the other on the quiescent current principle. In addition, there is a DC 20 V binary status output signal based on the quiescent current principle for each signalling line for the building control system. The potential-free changeover contact based on the working current principle can be acknowledged via a touch sensor button acting through the housing cover of the unit.

<b>Power circuits</b>	<b>Switching statuses</b>
<b>Output relay 1 in working current principle</b>	Output relay 1 is not energised in currentless status of the Leckstar 155 and in the standby status of all activated signalling lines. In the event of leakage or cable break in one or more activated signalling lines, output relay 1 is energised if the alarm has not been acknowledged. Output relay 1 can be acknowledged / reset using the touch sensor button.
<b>Output relay 2 in quiescent current principle</b>	Output relay 2 is energised in standby status of all activated signalling lines. Output relay 2 is not energised in currentless status of the Leckstar 155 and in the case of leakage or cable break in one or more activated signalling lines.
<b>5 status signal outputs (DC 20 V) for the building control system</b>	A DC 20 V binary switching status output signal in quiescent current principle is available for each of the 5 signalling lines: High signal, DC 20 V = standby status of the activ. signalling line Low signal, DC 0 V = <ul style="list-style-type: none"> <li>• currentless status of the Leckstar 155</li> <li>or</li> <li>• leakage or cable break in the activated signalling line or</li> <li>• signalling line that is switched inactive</li> </ul> The 5 outputs are short circuit-protected and have a common reference ground.

Technical data	Leckstar 155
Supply voltage (terminals 1 and 2)	AC 230 V, other supply voltage, e.g. DC 24 V, on request
Power consumption	approx. 3 VA
Electrode circuit (one of the two ground terminals = ground and E1 to E5 = control inputs)	<p>5 terminals under safety extra low voltage, for 5 signalling lines without mutual galvanic separation, with a common ground connection</p> <p>Connection of the signalling lines is to be made via a 6-core cable and an additional VK 1/5 connection box (see page 31-1-64).</p> <p>Local potential equalisation is to be performed to avoid ground loops in critical installations (see page 31-1-51).</p> <p>18 V<sub>eff</sub>  10 Hz (safety extra low voltage SELV)</p> <p>max. 0.5 mA<sub>eff</sub></p> <p>approx. 30 kΩ or approx. 33 μS (conductance), other response sensitivities for special applications on request</p>
No-load voltage Short circuit current Response sensitivity	
1 <sup>st</sup> power circuit (output relay 1 - terminals 3, 4, 5)	1 single-pole potential-free changeover contact based on the working current principle, for group alarm in the event of leakage or cable break, can be acknowledged via the touch sensor button
2 <sup>nd</sup> power circuit (output relay 2 - terminals 6, 7, 8)	1 single-pole potential-free changeover contact based on the quiescent current principle, for group alarm in the event of leakage or cable break
Electrical values of the potential-free changeover contacts:	<ul style="list-style-type: none"> <li>• switching voltage</li> <li>• switching current</li> <li>• switching capacity</li> </ul>
Status signal outputs for the building control system (one of the two ground terminals = ground and A1 to A5 = control outputs)	<p>5 terminals under safety extra low voltage for DC 20 V binary switching status output signal of each of the 5 signalling lines, without mutual galvanic separation, with a joint ground connection.</p> <p><b>For connection to the building control system (e.g. PLC) opto-couplers should be fitted for the purpose of galvanic separation.</b></p> <p>Standby of the signalling line: High signal (DC 20 V)</p> <p>Leakage/cable break/deactivated line: Low signal (DC 0 V)</p>
No-load voltage	DC 20 V (sufficient for 24 V inputs, as at least 15 V are normally required for High signal)
Short circuit protection	short circuit current limitation with ≤ 30 mA

Technical data	Leckstar 155
Switching status indication for the activated signalling lines	optical indication for each of the 5 activated signalling lines by 3 differently coloured LEDs in each case
<ul style="list-style-type: none"> <li>the red LED of one or more signalling lines lights up</li> </ul>	<p style="text-align: center;"><b>Leakage</b></p> <p style="text-align: center;">output relay 1 is energised (working current principle)  output relay 2 is not energised (quiescent current principle)  output signal of the corresponding signalling line(s) for the building control system is at Low signal (quiescent current principle)</p>
<ul style="list-style-type: none"> <li>the green LED of each signalling line lights up</li> </ul>	<p style="text-align: center;"><b>Standby</b></p> <p style="text-align: center;">output relay 1 is not energised (working current principle)  output relay 2 is energised (quiescent current principle)  output signals of all signalling lines for the building control system are at High signal (quiescent current principle)</p>
<ul style="list-style-type: none"> <li>the yellow LED of one or more signalling lines flashes</li> </ul>	<p style="text-align: center;"><b>Cable break</b></p> <p style="text-align: center;">output relay 1 is energised (working current principle)  output relay 2 is not energised (quiescent current principle)  output signal of the corresponding signalling line(s) for the building control system is at Low signal (quiescent current principle)</p>
Housing	insulating material, approx. 180 x 94 x 57 mm,
Connection	with 5 cable entries
Protection class	inside terminals
Mounting	IP54
Mounting orientation	surface mounting using 4 screws
Temperature range	any
Max. length of signalling lines	– 20°C to + 60°C
EMC	each 1,000 m between electrode relay and Z10 cable break monitoring unit
	<ul style="list-style-type: none"> <li>for interference emission in accordance with the appliance-specific requirements for households, business and commerce as well as small companies</li> </ul>
	<ul style="list-style-type: none"> <li>for interference immunity in accordance with the appliance-specific requirements for industrial companies</li> </ul>

• **Acknowledgement via touch sensor button**

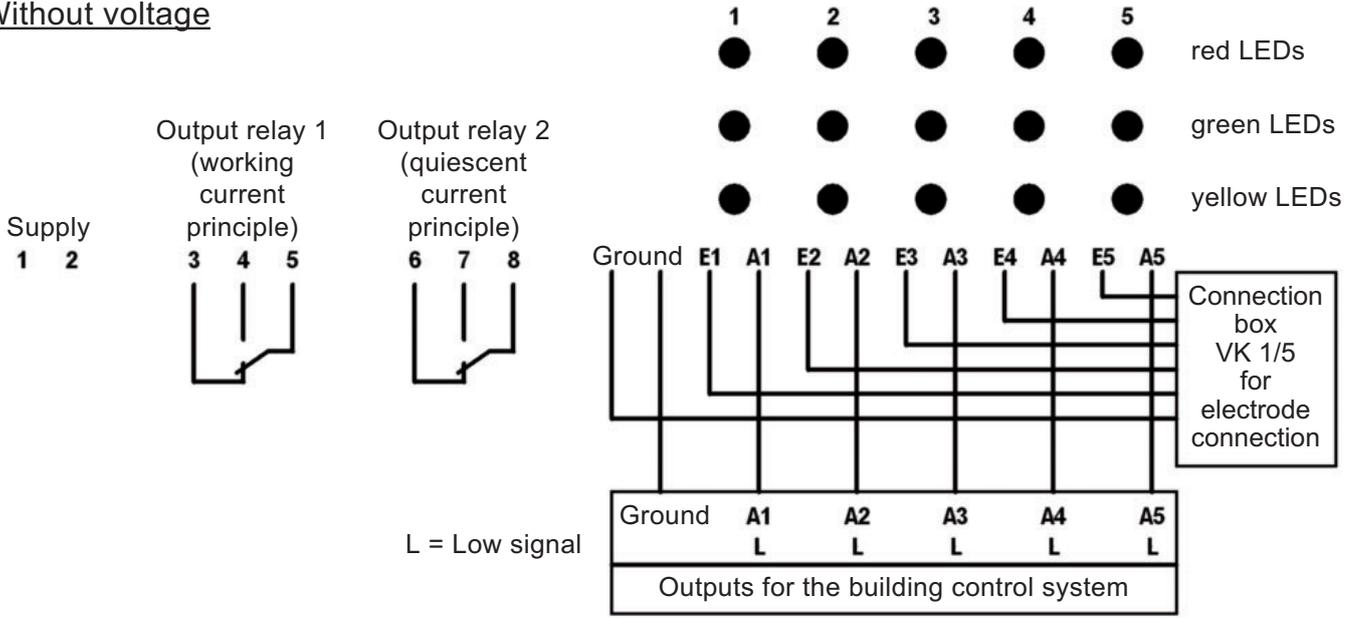
In the event of leakage or cable break in one of more activated signalling lines, output relay 1 is energised and the red LED on the touch sensor button flashes. The operator has to touch the sensor button panel if he wants to acknowledge the signal. Output relay 1 is then de-energised and the red LED reverts to steady.

In this status, new alarms from other signalling lines are signalled only via the optical indicators and the status signal outputs for the building control system of the affected signalling lines. In these cases, however, output relay 1 is not re-activated.

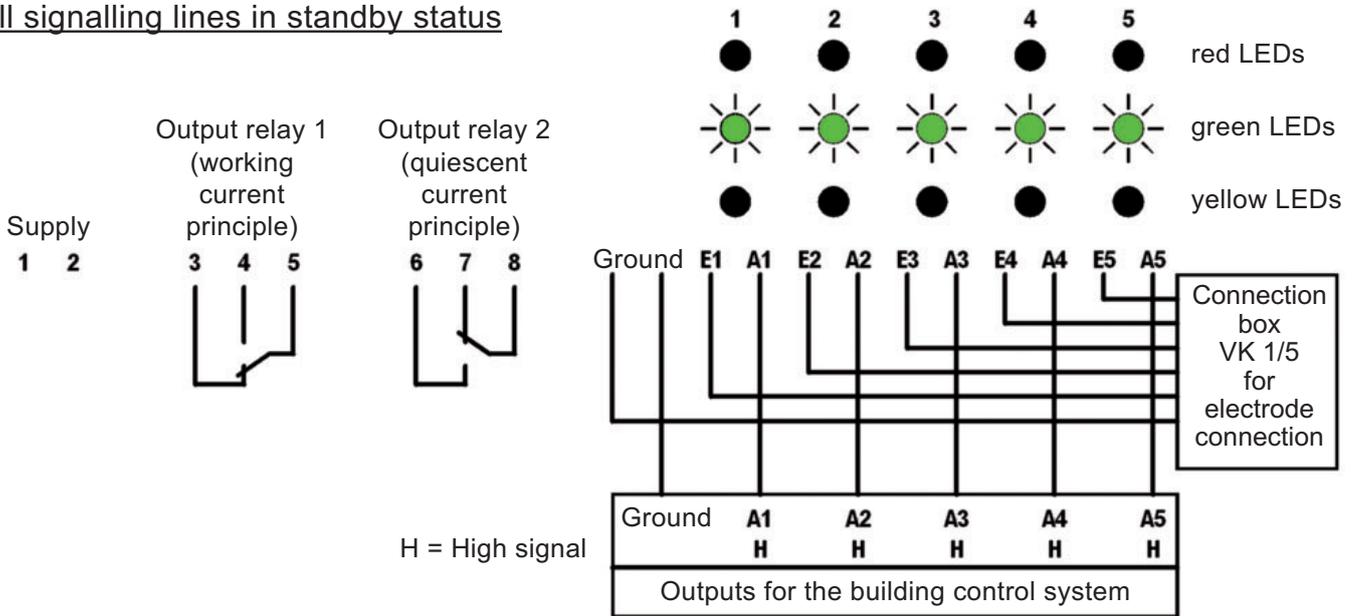
Acknowledgement has no effect whatsoever on output relay 2.

## Position of the output contacts of the Leckstar 155 electrode relay

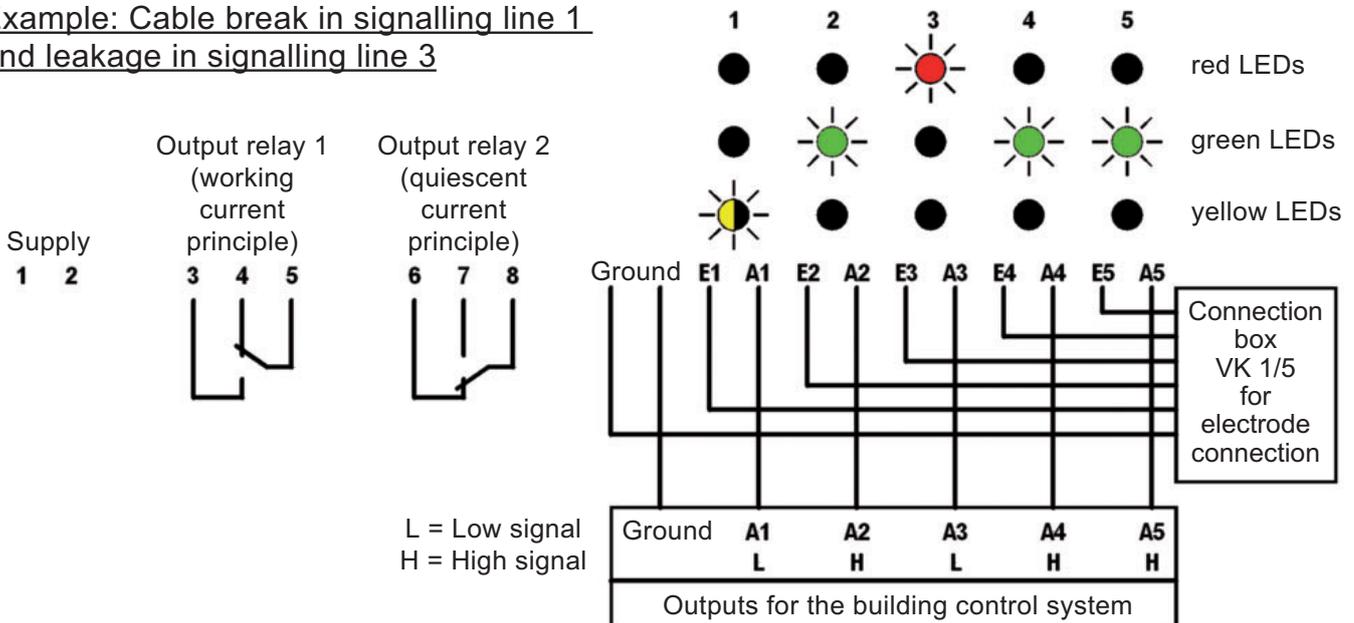
### Without voltage



### All signalling lines in standby status



### Example: Cable break in signalling line 1 and leakage in signalling line 3







# Leckstar 255 conductive electrode relay

without DIBt certificate  
with optical insulation fault / moisture status indicators

- with cable break monitoring feature
- for the connection of 5 conductive electrodes with Z10 cable break monitoring unit
- with touch sensor button for alarm acknowledgement
- with 2 potential-free changeover contacts at the output and
- with 5 status signal outputs, DC 20 V, for the building control system

Electrode relay in surface-mount housing, with transparent cover, with 5 x 4 LEDs for operating status indication and with 1 LED for acknowledgement status indication, inside the housing

Due to its response sensitivity of 3 k $\Omega$  (333  $\mu$ S), the Leckstar 255 electrode relay may only be connected to conductive line or surface sensors (types KE-Z10, BAE-Z10, ZE-Z10 and MEL6-Z10).

### Attention:

If conductive point sensors are to be installed in a signalling line (types PE..., WDX..., SE...-Z10, S...-Z10 or EHW...), the electrode relay must be provided with a response sensitivity of 30 k $\Omega$  (33  $\mu$ S).

This must be specified in the order or the relay has to be sent back to Jola for modification.



- 5 signalling lines with common system ground

The Leckstar 255 electrode relay possesses inputs for the connection of 5 signalling lines.

A signalling line consists of one or more conductive electrodes. If electrodes designed for this purpose are used, it is possible to connect several electrodes one after the other to permit cable break monitoring at any point along the line route. At the end of each signalling line there is an electrode with integrated Z10 cable break monitoring unit. None of the other electrodes in the signalling line may be equipped with an integrated cable break monitoring unit.

In principle, the conductive electrodes to be normally used consist of at least 1 pair of electrode ropes (at least 1 control electrode and 1 ground electrode).

The electrode circuits are supplied with a safety extra low voltage generated in the Leckstar 255 which is reliably galvanically separated from the mains circuit and the potential-free changeover contacts of the two output relays.

**All 5 signalling lines have a common system ground, which means there is no galvanic separation of the signalling lines. This factor must always be taken into account in the case of long signalling lines of cable, tape, twin or mat electrodes extending into different parts of the building. There is a risk of formation of ground loops if the electrodes are mounted in such a way that an electrode can take on ground potential. It may be necessary to perform local potential equalisation in order to avoid potential equalisation currents via the signalling lines.**

- Activation of the individual signalling lines

If not all 5 signalling lines are to be used, the signalling lines 2 to 5 can be activated (dip switch in active position) or deactivated (dip switch in inactive position) individually via 4 dip switches. Channel 1 is always activated. **Activation / Deactivation may only be performed in currentless status.**

• **Type of indication**

A group of 4 LEDs of different colours is assigned to each signalling line.

<b>Operating status</b>	<b>Type of indication of each signalling line</b>
<b>Power supply</b>	When the supply voltage is switched on, one or two of the four LEDs on each activated signalling line light up to indicate the operating status of the activated signalling line in question
<b>Leakage</b>	Red LED lights, if the corresponding activated signalling line reports leakage <ul style="list-style-type: none"> <li>• with effect on the two power circuits</li> <li>• with effect on the corresponding DC 20 V status signal output for the building control system</li> </ul>
<b>Insulation fault/ Moisture</b>	Bi-colour LED (in addition to the green LED) dark: OK status flashes / lights green: transition phase / uncritical status flashes green + red: transition phase lights red: critical status <ul style="list-style-type: none"> <li>• without effect on the two power circuits</li> <li>• without effect on the corresponding DC 20 V status signal output</li> </ul>
<b>Standby</b>	Green LED lights, if the corresponding activated signalling line reports standby <ul style="list-style-type: none"> <li>• with effect on the corresponding DC 20 V status signal output for the building control system</li> </ul> Only if <b>all</b> activated signalling lines indicate standby <ul style="list-style-type: none"> <li>• with effect on the two power circuits</li> </ul>
<b>Cable break</b>	Yellow LED flashes, if the corresponding activated signalling line reports cable break <ul style="list-style-type: none"> <li>• with effect on the two power circuits</li> <li>• with effect on the corresponding DC 20 V status signal output for the building control system</li> </ul>
<b>Signalling line switched to inact.</b>	None of the 4 LEDs in the deactivated signalling line (signalling line 2 to 5) lights up.

• **Power circuits**

Two potential-free changeover contacts are available at the output, one of which reacts based on the working current principle and the other on the quiescent current principle. In addition, there is a DC 20 V binary status output signal based on the quiescent current principle for each signalling line for the building control system. The potential-free changeover contact based on the working current principle can be acknowledged via a touch sensor button acting through the housing cover of the unit.

<b>Power circuits</b>	<b>Switching statuses</b>
<b>Output relay 1 in working current principle</b>	Output relay 1 is not energised in currentless status of the Leckstar 255 and in the standby status of all activated signalling lines. In the event of leakage or cable break in one or more activated signalling lines, output relay 1 is energised if the alarm has not been acknowledged. Output relay 1 can be acknowledged / reset using the touch sensor button.
<b>Output relay 2 in quiescent current principle</b>	Output relay 2 is energised in standby status of all activated signalling lines. Output relay 2 is not energised in currentless status of the Leckstar 255 and in the case of leakage or cable break in one or more activated signalling lines.
<b>5 status signal outputs (DC 20 V) for the building control system</b>	A DC 20 V binary switching status output signal in quiescent current principle is available for each of the 5 signalling lines: High signal, DC 20 V = standby status of the activ. signalling line Low signal, DC 0 V = <ul style="list-style-type: none"> <li>• currentless status of the Leckstar 255 or</li> <li>• leakage or cable break in the activated signalling line or</li> <li>• signalling line that is switched inactive</li> </ul> The 5 outputs are short circuit-protected and have a common reference ground.

Technical data	Leckstar 255
Supply voltage (terminals 1 and 2)	AC 230 V, other supply voltage, e.g. DC 24 V, on request
Power consumption	approx. 3 VA
Electrode circuit (one of the two ground terminals = ground and E1 to E5 = control inputs)	<p>5 terminals under safety extra low voltage, for 5 signalling lines without mutual galvanic separation, with a common ground connection</p> <p>Connection of the signalling lines is to be made via a 6-core cable and an additional VK 1/5 connection box (see page 31-1-64).</p> <p>Local potential equalisation is to be performed to avoid ground loops in critical installations (see page 31-1-57).</p> <p>18 V<sub>eff</sub>  10 Hz (safety extra low voltage SELV)</p> <p>max. 0.5 mA<sub>eff</sub></p> <p>approx. 3 kΩ or approx. 333 μS (conductance), other response sensitivities for special applications on request</p>
No-load voltage Short circuit current Response sensitivity	
1 <sup>st</sup> power circuit (output relay 1 - terminals 3, 4, 5)	1 single-pole potential-free changeover contact based on the working current principle, for group alarm in the event of leakage or cable break, can be acknowledged via the touch sensor button
2 <sup>nd</sup> power circuit (output relay 2 - terminals 6, 7, 8)	1 single-pole potential-free changeover contact based on the quiescent current principle, for group alarm in the event of leakage or cable break
Electrical values of the potential-free changeover contacts:	
• switching voltage	max. AC 250 V
• switching current	max. AC 4 A
• switching capacity	max. 500 VA
Status signal outputs for the building control system (one of the two ground terminals = ground and A1 to A5 = control outputs)	<p>5 terminals under safety extra low voltage for DC 20 V binary switching status output signal of each of the 5 signalling lines, without mutual galvanic separation, with a joint ground connection.</p> <p><b>For connection to the building control system (e.g. PLC) opto-couplers should be fitted for the purpose of galvanic separation.</b></p> <p>Standby of the signalling line: High signal (DC 20 V)</p> <p>Leakage/cable break/deactivated line: Low signal (DC 0 V)</p>
No-load voltage	DC 20 V (sufficient for 24 V inputs, as at least 15 V are normally required for High signal)
Short circuit protection	short circuit current limitation with ≤ 30 mA

Technical data	Leckstar 255
Switching status indication for the activated signalling lines	optical indication for each of the 5 activated signalling lines by 4 differently coloured LEDs in each case
<ul style="list-style-type: none"> <li>the red LED of one or more signalling lines lights up</li> </ul>	<p style="text-align: center;"><b>Leakage</b></p> <p>output relay 1 is energised (working current principle)  output relay 2 is not energised (quiescent current principle)  output signal of the corresponding signalling line(s) for the building control system is at Low signal (quiescent current principle)</p>
<ul style="list-style-type: none"> <li>the bi-colour LED of one or more signalling lines flashes/lights up (in addition to the green LED of the signalling line in question)</li> </ul>	<p style="text-align: center;"><b>Insulation fault/Moisture</b></p> <p>without effect on the two power circuits and the status signal outputs for the building control system  dark: OK status  flashes green: transition phase  lights green: uncritical status  flashes green + red: transition phase  lights red: critical status</p>
<ul style="list-style-type: none"> <li>the green LED of each signalling line lights up</li> </ul>	<p style="text-align: center;"><b>Standby</b></p> <p>output relay 1 is not energised (working current principle)  output relay 2 is energised (quiescent current principle)  output signals of all signalling lines for the building control system are at High signal (quiescent current principle)</p>
<ul style="list-style-type: none"> <li>the yellow LED of one or more signalling lines flashes</li> </ul>	<p style="text-align: center;"><b>Cable break</b></p> <p>output relay 1 is energised (working current principle)  output relay 2 is not energised (quiescent current principle)  output signal of the corresponding signalling line(s) for the building control system is at Low signal (quiescent current principle)</p>
Housing	insulating material, approx. 180 x 94 x 57 mm,
Connection	with 5 cable entries
Protection class	inside terminals
Mounting	IP54
Mounting orientation	surface mounting using 4 screws
Temperature range	any
Max. length of signalling lines	– 20°C to + 60°C
EMC	each 1,000 m between electrode relay and Z10 cable break monitoring unit
	<ul style="list-style-type: none"> <li>for interference emission in accordance with the appliance-specific requirements for households, business and commerce as well as small companies</li> </ul>
	<ul style="list-style-type: none"> <li>for interference immunity in accordance with the appliance-specific requirements for industrial companies</li> </ul>

### • Acknowledgement via touch sensor button

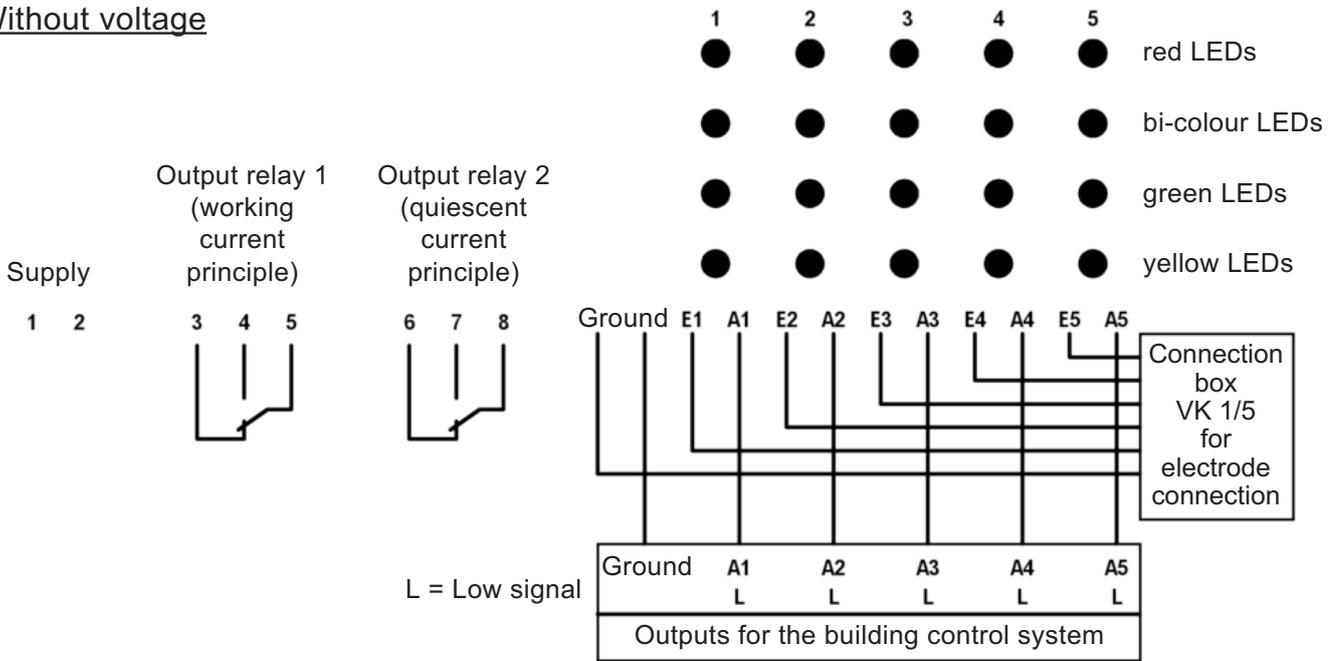
In the event of leakage or cable break in one or more activated signalling lines, output relay 1 is energised and the red LED on the touch sensor button flashes. The operator has to touch the sensor button panel if he wants to acknowledge the signal. Output relay 1 is then de-energised and the red LED reverts to steady.

In this status, new alarms from other signalling lines are signalled only via the optical indicators and the status signal outputs for the building control system of the affected signalling lines. In these cases, however, output relay 1 is not re-activated.

Acknowledgement has no effect whatsoever on output relay 2.

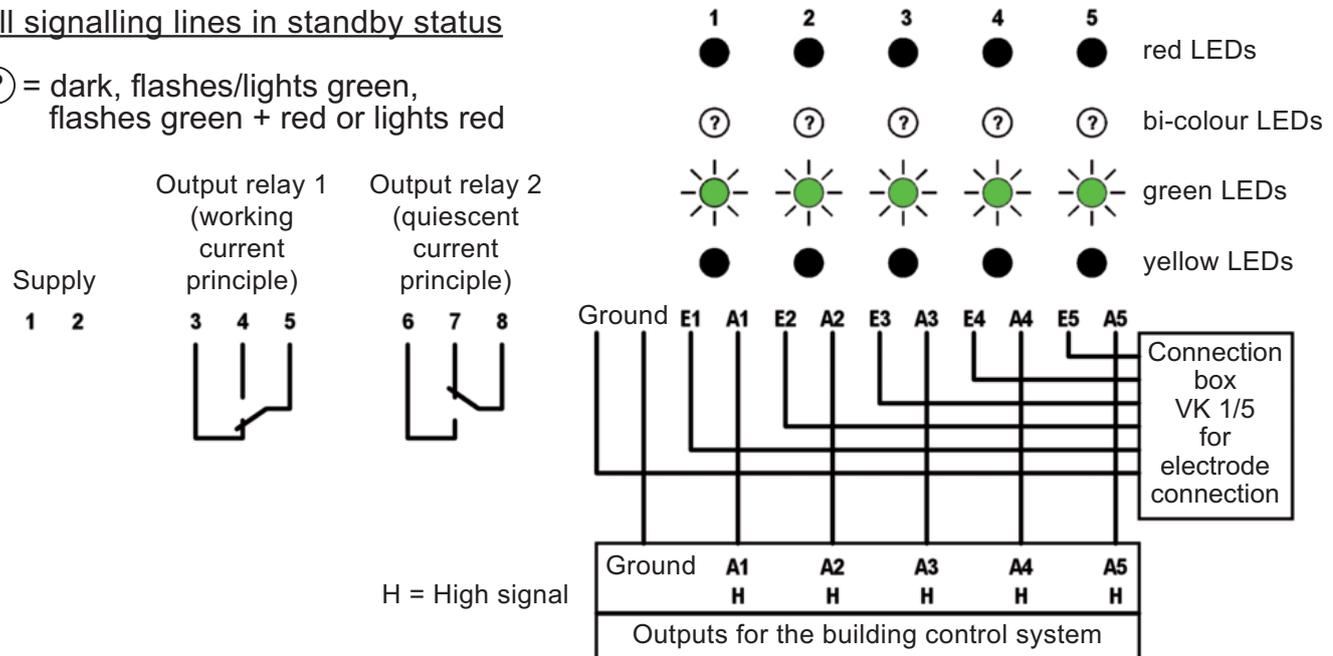
## Position of output contacts of the Leckstar 255 electrode relay

### Without voltage



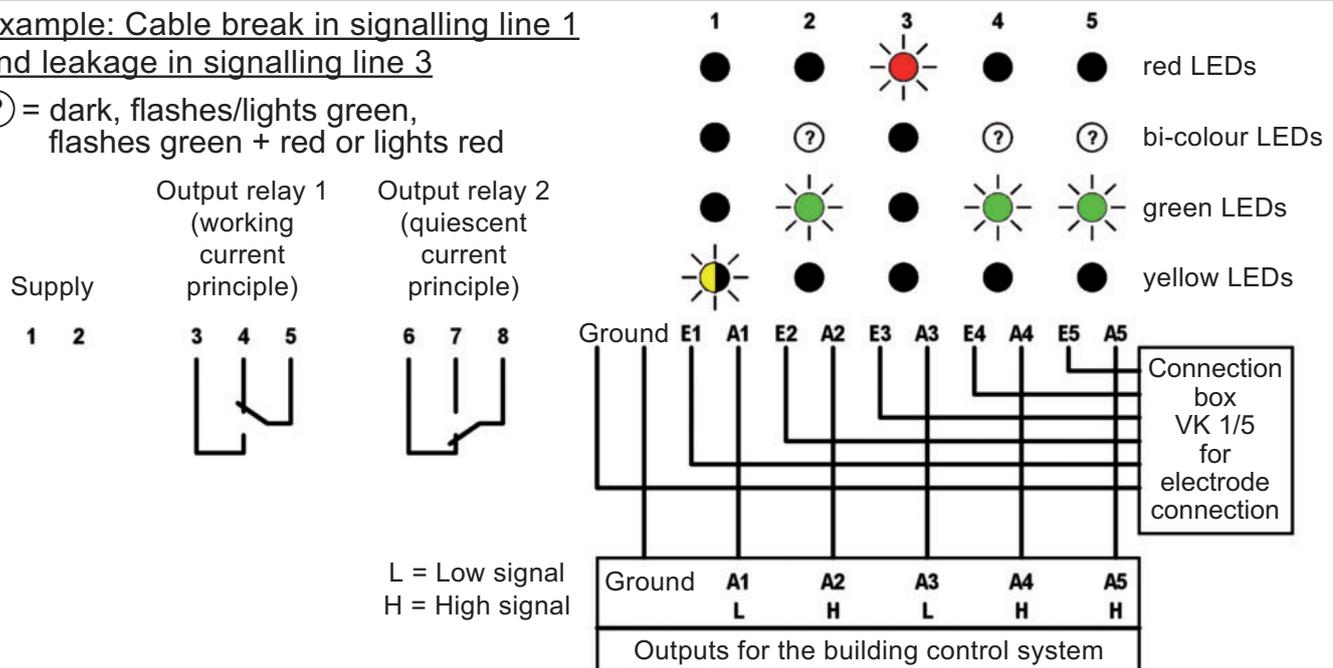
### All signalling lines in standby status

⊙ = dark, flashes/lights green, flashes green + red or lights red

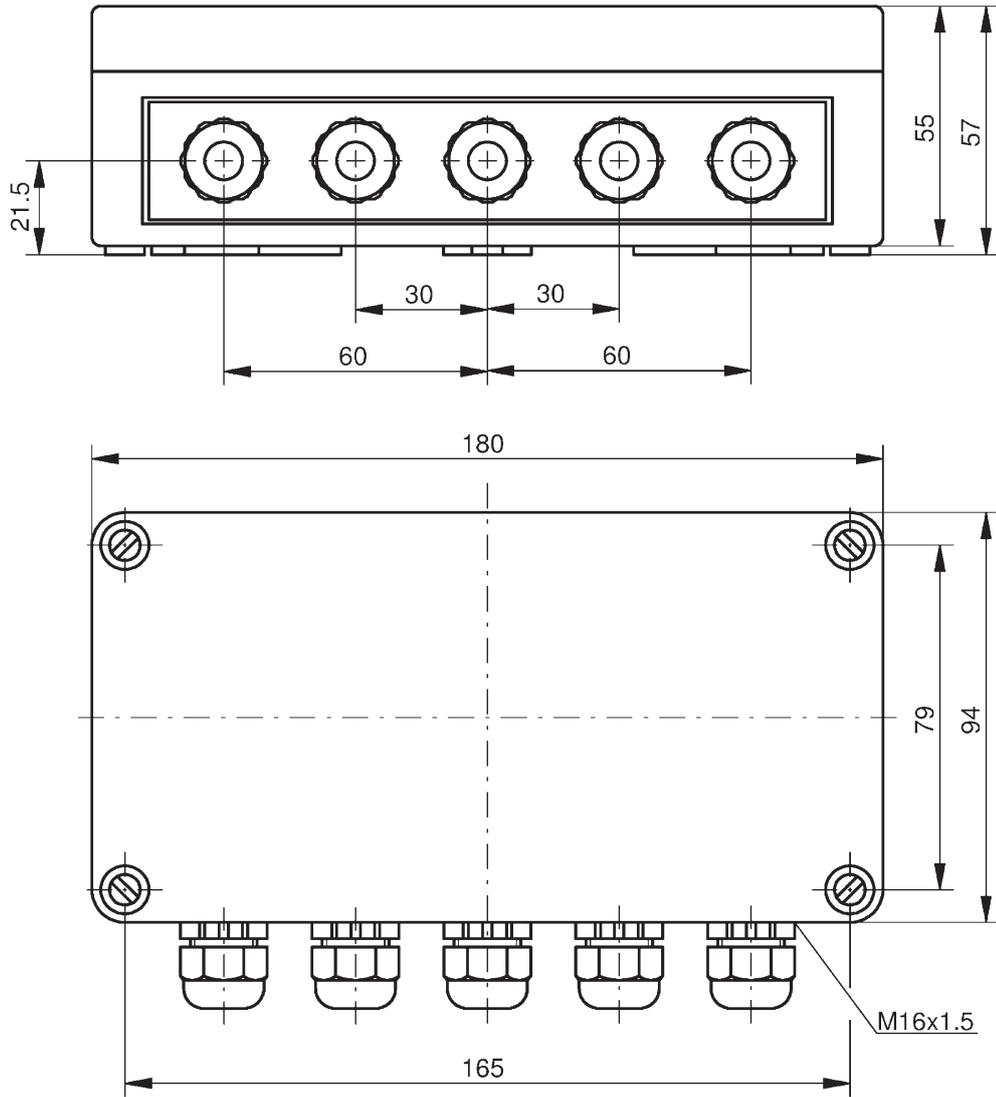


### Example: Cable break in signalling line 1 and leakage in signalling line 3

⊙ = dark, flashes/lights green, flashes green + red or lights red

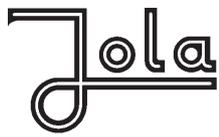


# Dimensions Leckstar 155 or Leckstar 255



*Dimensions in mm*





# VK 1/5 connection box

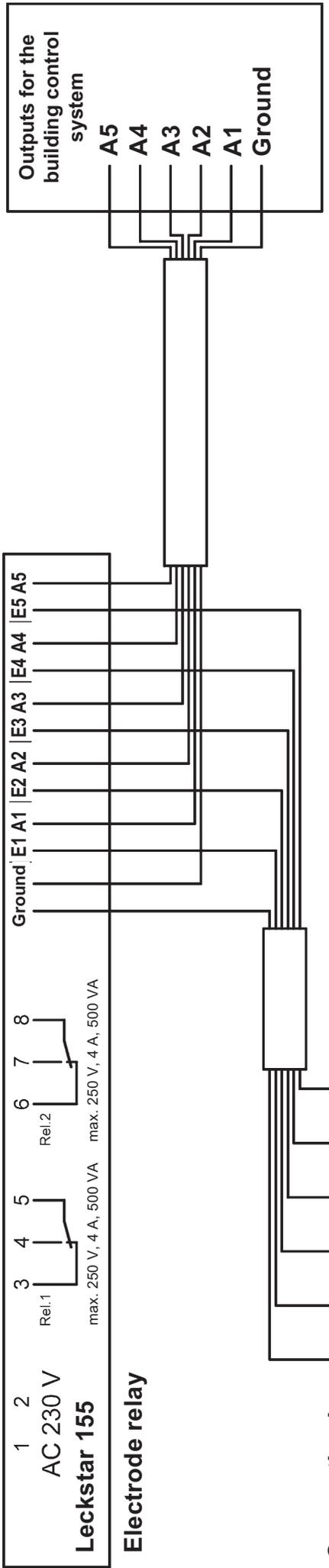


Technical data	VK 1/5
Application	for fast and easy connection of up to 5 electrodes to a Leckstar 155 or Leckstar 255 electrode relay
Supply voltage	only for safety extra low voltage SELV or PELV
Housing	insulating material, approx. 180 x 94 x 57 mm, with 6 cable entries
Connection	to the screw terminals on the board
Protection class	IP54
Mounting	surface mounting using 4 screws
Mounting orientation	any
Temperature range	- 20°C to + 60°C

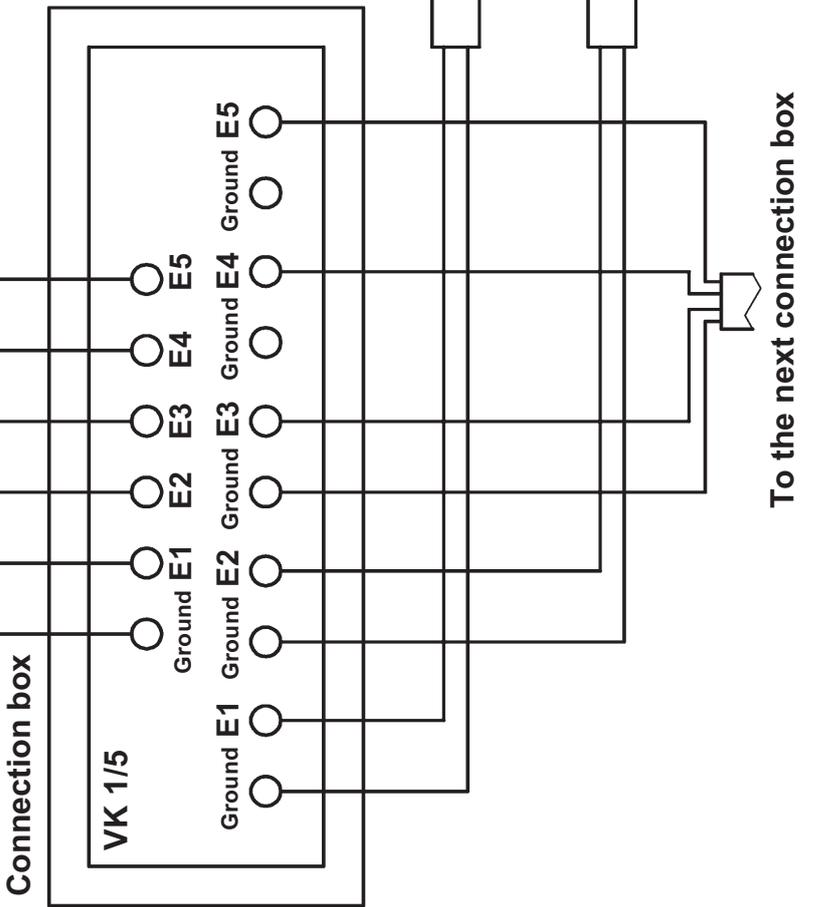
# Example for the connection of electrodes in connection boxes VK 1/5

Supply      Output relay 1 (working current principle)      Output relay 2 (quiescent current principle)

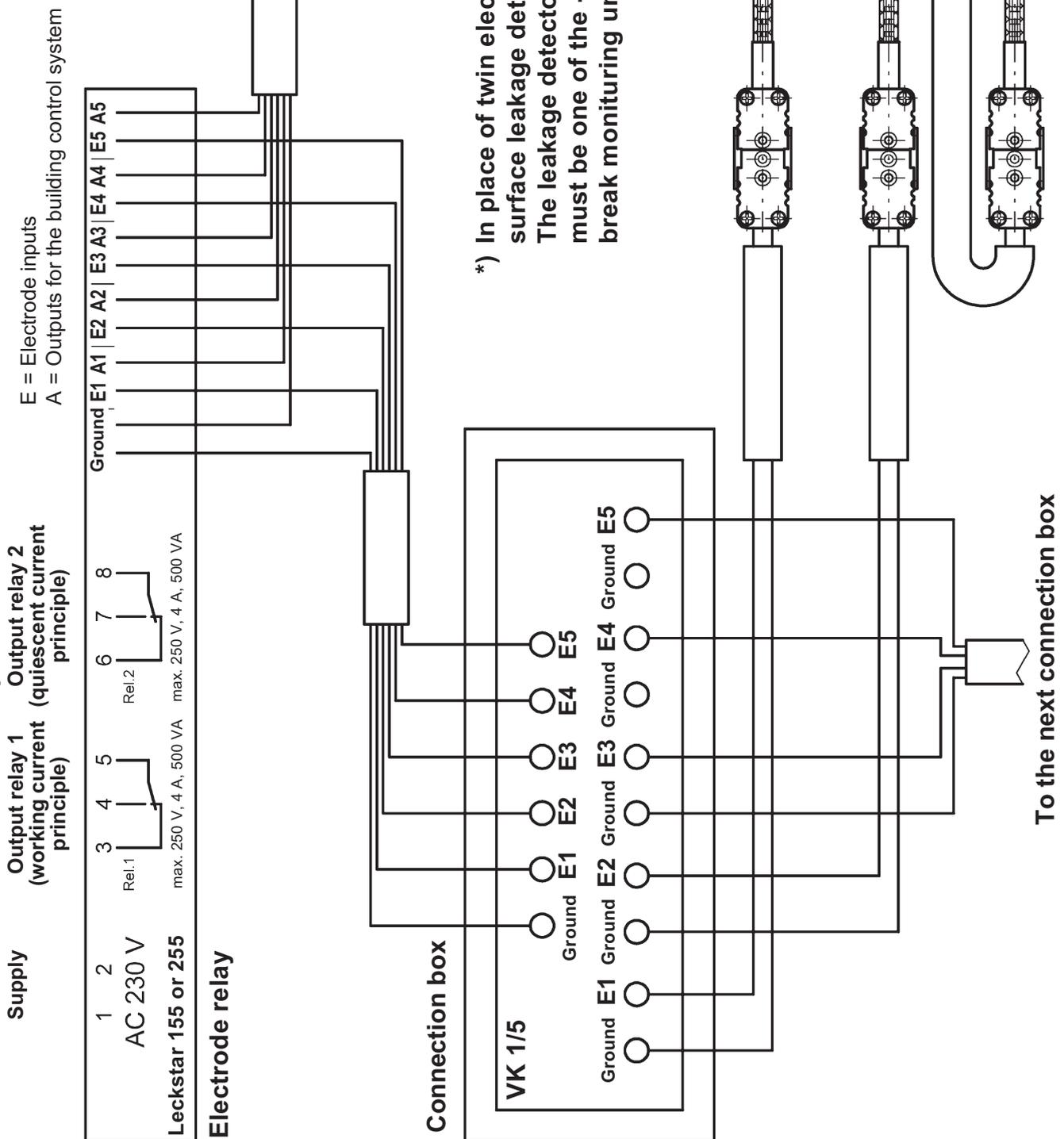
E = Electrode inputs  
A = Outputs for the building control system



\*) In place of plate electrodes, other conductive leakage detectors can be installed. The leakage detector placed at the end of a signalling line must be one of the -Z10 types with integrated Z10 cable break monitoring unit.



### Example for the connection of electrodes in connection boxes VK 1/5



**Jola Spezialschalter GmbH & Co. KG  
sells only business-to-business (B2B).**

**The units described in this documentation  
may only be installed, connected,  
started up, serviced and replaced  
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.**