Technical Description

**Leak detector conductive electrode type ELH... , EF2…,
Conductive plate electrode type EP... ,
Measuring transducer types ER-107..., ER-110…, ER-145..., XR-..., ET-4... and
OAA-200…; OAA-300…, OAA-500…**

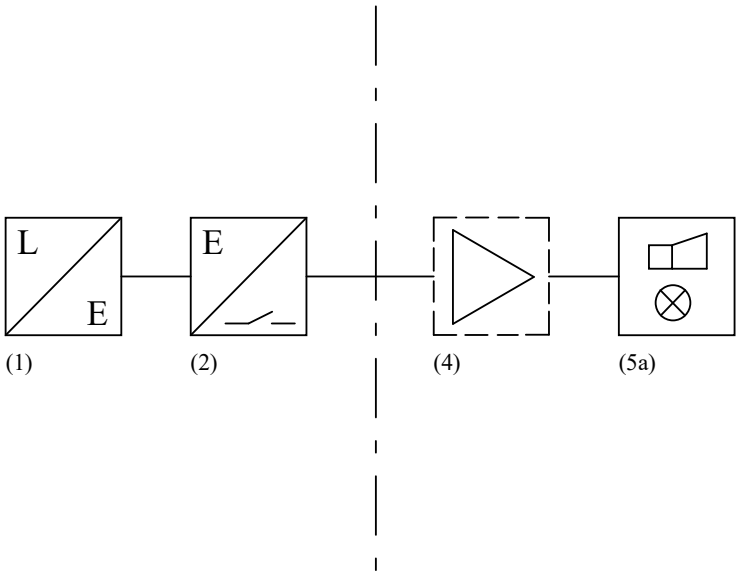
1. Construction of the Leak Prevention Device

The leak prevention device consists of a leak detector (1) and a separate measuring transducer (2) (ER-107...; ER-110…, ER-145..; ER-117...; ER-217..., XR-...) or a leak detector (1) with an integrated measuring transducer (2) (ET-45..., ET-46…, ET-47..., ET-48..), which supplies a binary switching signal at the outlet.
This binary signal can be supplied directly or with the aid of a signal amplifier (4) to the signalling device (5a) or the control unit (5b) with its actuator (5c).
In the leak prevention devices consisting of the level sensor (1) with a downstream alarm signal (OAA-200…; OAA-300… and OAA-500…), the warning device (5a) is integrated as an added feature in the measuring transducer (2).

The leak prevention system components that have not been tested, such as the signal amplifier (4), the warning device (5a) or the control unit (5b) with the actuator (5c), must meet the requirements of sections 3 and 4 of the approval principles for overfill protection systems (ZGÜS).

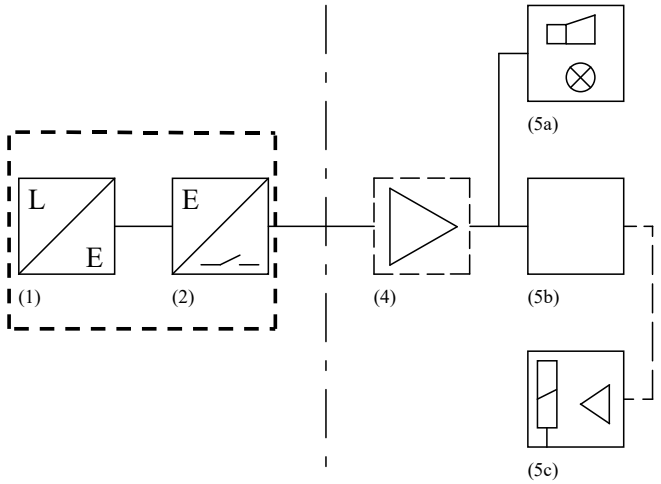
1.1 Schematic Configuration of the Leak Prevention Device

1.1.1 Leak Prevention Device (1), Separate Measuring Transducer (2)



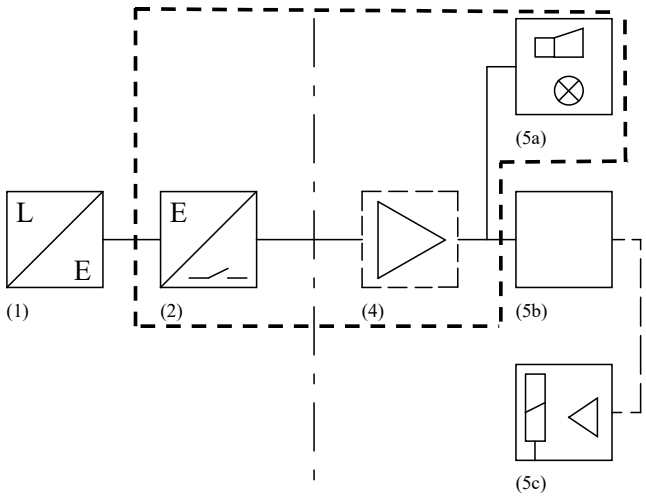
(1) Leak detector (electrode)
(2) Measuring transducer (The measuring transducers in series ET-4xx are integrated in the probes)
(4) Signal amplifier
(5a) Warning device (with horn and signal light)

1.1.2 Leak Prevention Device (1) with Integrated Measuring Transducer (2)



(1) Level sensor (cond. electrode)
(2) Measuring transducer integrated
(4) Signal amplifier
(5a) Warning device (with horn and signal light)
(5b) Control unit
(5c) Actuator

1.1.3 Leak Prevention Device (1), Separate Measuring Transducer (2) with Integrated Warning device (5a)



(1) Level sensor (cond. electrode)
(2) Measuring transducer integrated
(4) Signal amplifier
(5a) Warning device (with horn and signal light)
(5b) Control unit
(5c) Actuator

1.2 Functional Description

The measuring transducers supply a measuring voltage which allows an operating current to flow in the measuring circuit. The operating current is limited by a resistance in the connected leak detector. A significant reduction in this operating current due to a line interruption is recognised by the measuring transducer, indicated on the LEDs and the output relay is switched into the alarm position.

The current flowing in the measuring circuit increases if the electrodes become moist due to a rise in the level of leakage. This is recognised by the measuring transducer, indicated on the LEDs and the output relay is switched to the alarm setting.

If the degree of leakage drops and the electrodes are no longer wet, the LEDs and the output relay are reset to the basic position immediately in the measuring transducers without a button.
In the measuring transducers with a button – alarm saving – the button must be pressed to cancel the alarm.

The measuring transducers must be adjusted to suit the conductivity of the fluid being monitored. The setting is done at the potentiometer on the front of the measuring transducers or at the DIP switches on the printed circuit board.

The measuring transducer works in quiescent current mode, the alarm setting of the output contacts corresponds to that in a device disconnected from power. For that reason, not only will a line interruption or a filling alarm lead to an alarm signal, an operating voltage failure in the measuring transducer will do so too.

For applications in hazardous (potentially explosive) areas only the devices approved for such areas may be used. Furthermore, the relevant regulations for setting up and operating electrical systems must be observed).

Signalling Table

	ER-107 / ER-110 / ER-145 / ET-48x		ER-117/217/XR-..		
LED	**green**	**red**	**green**	**yellow**	**red**
Mains OFF	●	●	●	●	●
Operation	☼	●	☼	●	●
Line fault	●	☼	☼	☼	☼
Filling alarm	☼	☼	☼	☼	●

	ET- 440		ET- 45x / ET- 46x / ET- 472	ET- 470..	
LED	**green**	**yellow E1**	**green**	**green**	**red**
Mains OFF	●	●	●	●	●
Operation	☼ ●	☼	☼	☼	●
Line fault	☼	●	●	●	☼
Filling alarm	☼ ●	●	●	☼	☼

LED off:●, LED on: ☼, LED flashing ca. 1 Hz ☼ ●

Signalling Table OAA-200 ...

LED	Channel LED, 3 coloured			Summary alarm		Horn
Mains OFF, resp. no sensor connected			●		●	Off
Operation, sensor connected	green	☼			●	Off
Line error	red	☼		☼	●	On
Line error acknowledged	red	☼	●	☼	●	Off
Filling alarm, Leak alarm	yellow	☼		☼	●	On
Filling alarm, Leak alarm acknowledged	yellow	☼	●	☼	●	Off
Error rectified	green	☼	●	☼	●	Off
Rectified error acknowledged	green	☼			●	Off

LED off: ●, LED on: ☼, LED flashes: ☼ ●.

Signalling Table OAA-300 ...

LED	Channel LED, 3-colour			Group-alarm		Horn
Mains OFF or no sensor connected			●		●	Off
Operation, sensor connected	green	☼			●	Off
Line fault	red	☼		☼	●	On
Line fault acknowledged	red	☼	●	☼	●	Off
Fault rectified	green	☼	●	☼	●	Off
Rectified fault acknowledged	green	☼			●	Off
Filling alarm, leakage alarm	yellow	☼		☼	●	On
Filling alarm, leakage alarm acknowledged	yellow	☼	●	☼	●	Off
Fault rectified	green	☼	●	☼	●	Off
Rectified fault acknowledged	green	☼			●	Off

LED off: ●, LED on: ☼, LED flashing: ☼ ●.

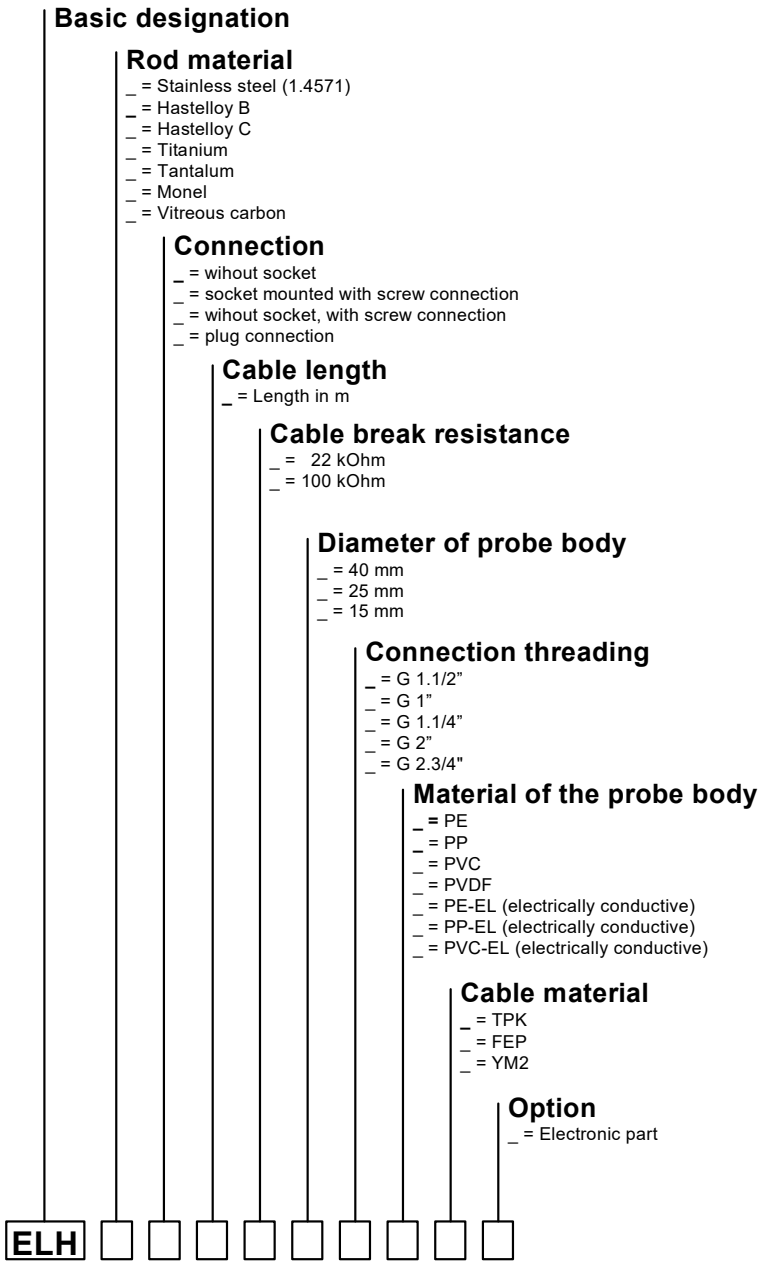
Signalling Table OAA-500 ...

LED	Channel LED, 3-colour			Group-alarm		Horn
Mains OFF or no sensor connected			●		●	Off
Operation, sensor connected	green	☼			●	Off
Line fault	red	☼		☼	●	On
Line fault acknowledged	red	☼	●	☼	●	Off
Filling alarm, leakage alarm	yellow	☼		☼	●	On
Filling alarm, leakage alarm acknowledged	yellow	☼	●	☼	●	Off
Fault rectified	green	☼	●	☼	●	Off
Rectified fault acknowledged	green	☼			●	Off

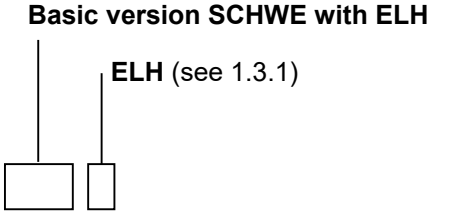
LED off: ●, LED on: ☼, LED flashing: ☼ ●.

1.3 Type code

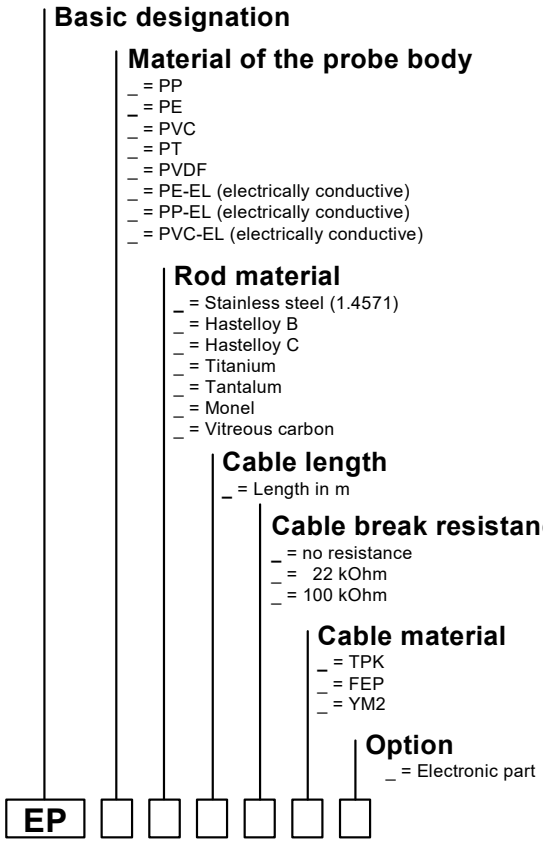
1.3.1 Leakage Detector Hanging Electrode



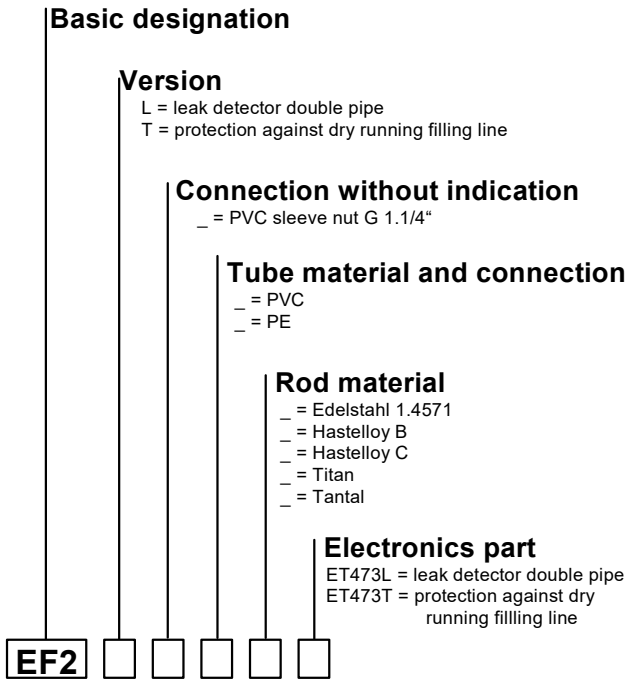
1.3.2 Interface measurement

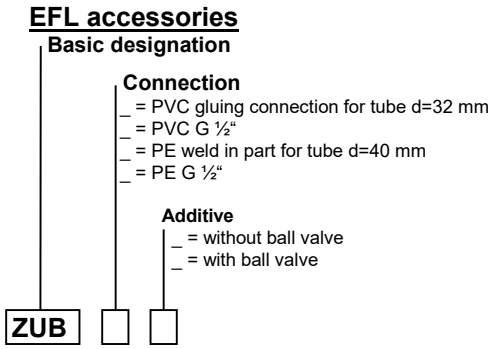


1.3.3 Leakage Detector Plate Electrode

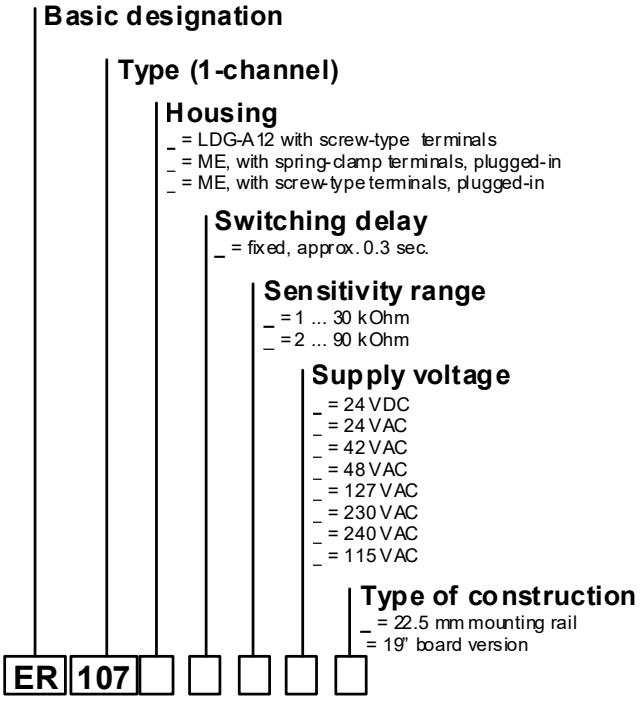


1.3.4 Pipe monitoring

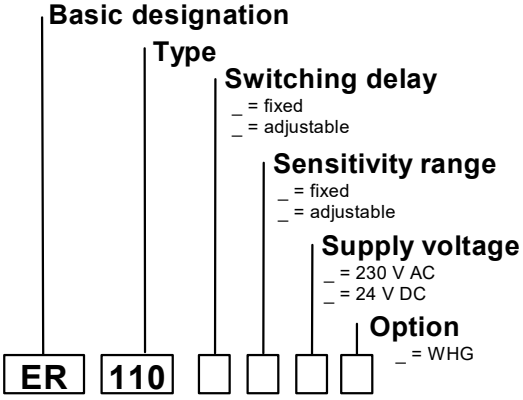




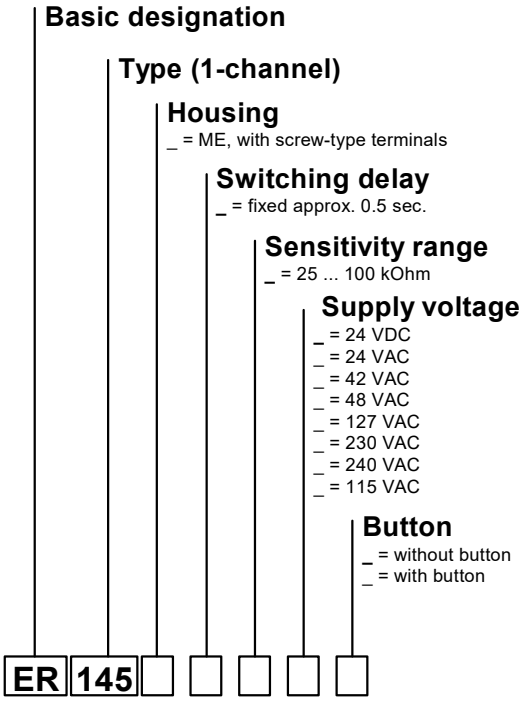
1.3.5 Measuring Transducer ER-107...



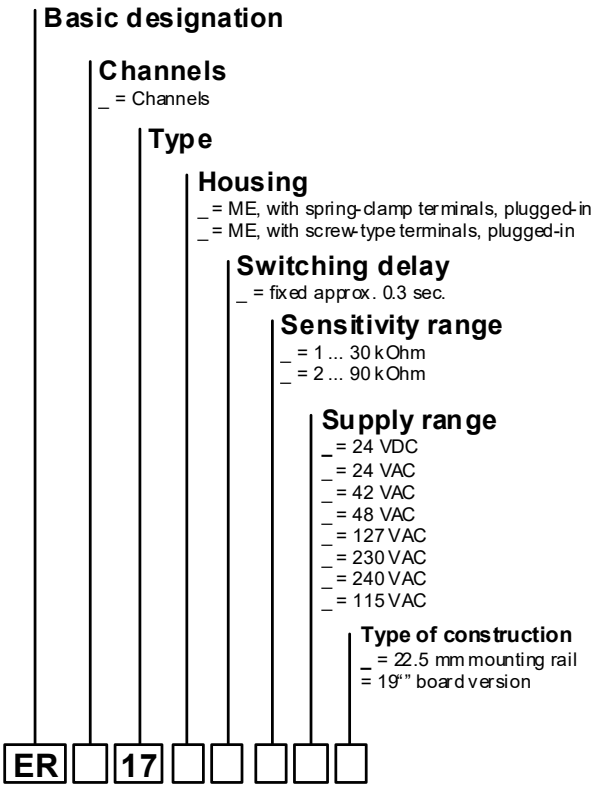
1.3.6 Measuring Transducer ER-110...



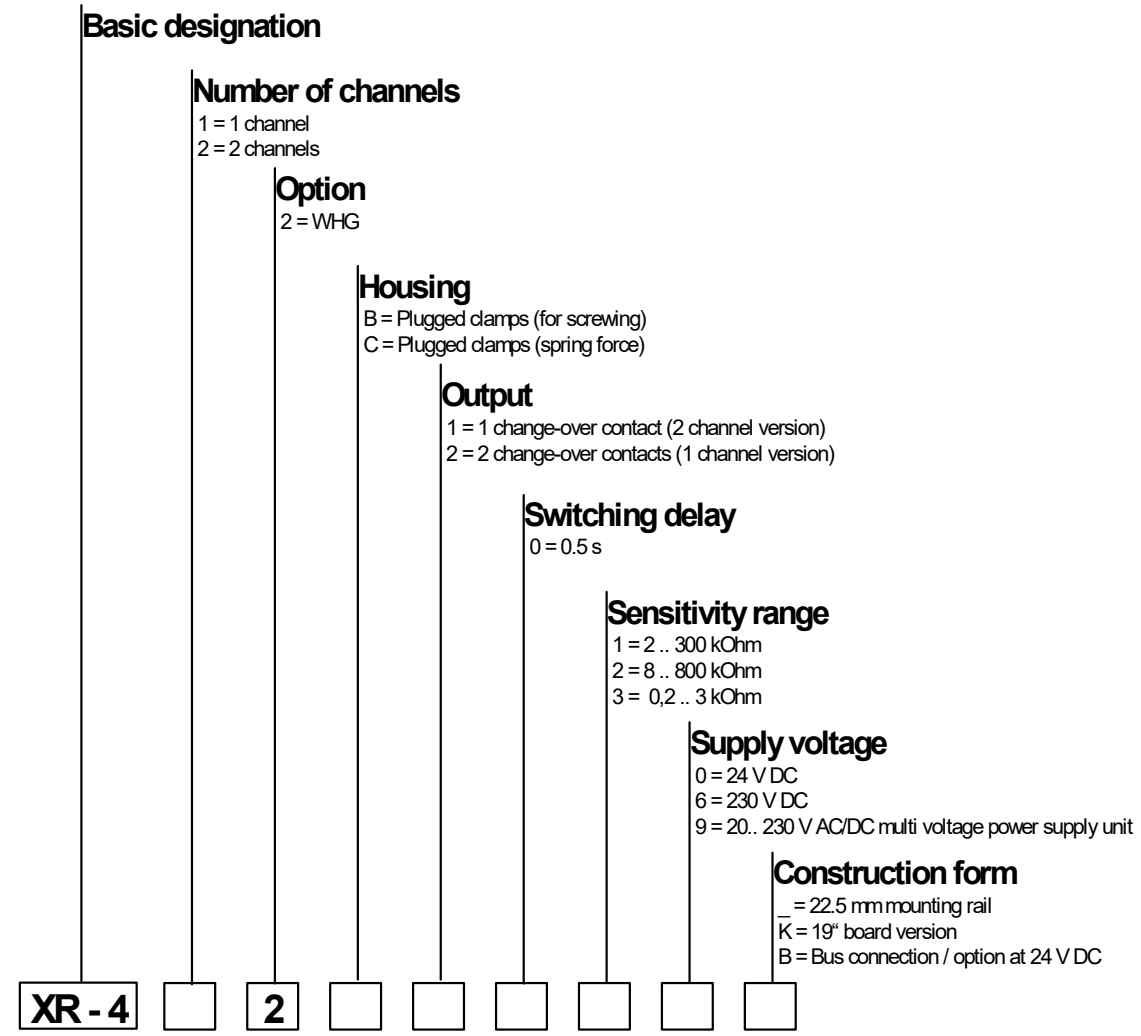
1.3.7 Measuring Transducer ER-145...



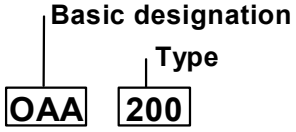
1.3.8 Measuring Transducer ER-117... and ER-217... resp.



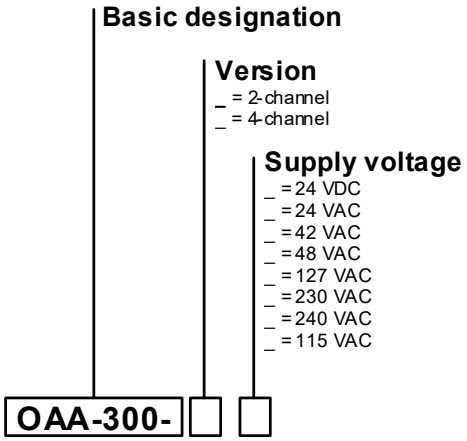
1.3.9 Measuring Transducer XR-...



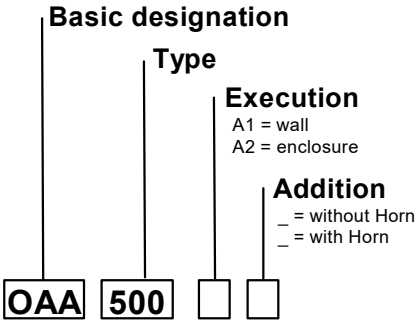
1.3.10 Measuring Transducer OAA-200-... with warning device



1.3.11 Measuring Transducer OAA-300-... with warning device



1.3.12 Measuring Transducer OAA-500-... with warning device

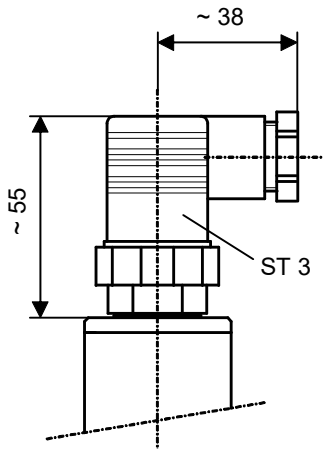


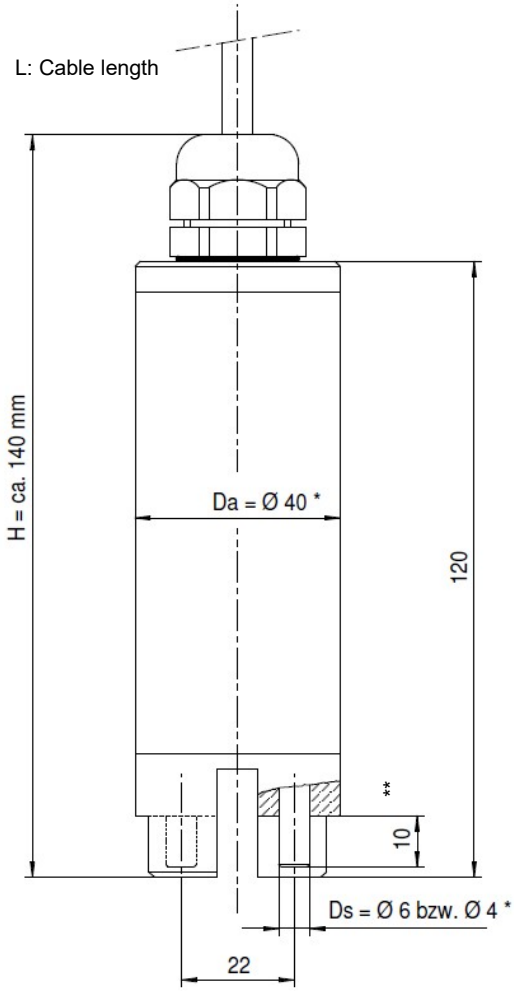
1.4 Dimension Sheets for the Leakage Detector (1)

1.4.1 Leakage electrode hanging ELH...

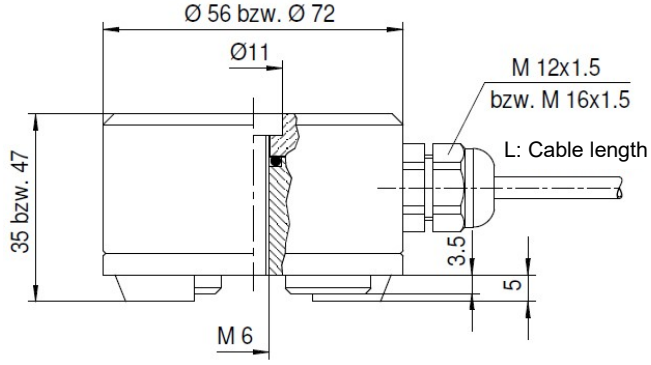
*	Da	Ds	H
	40 mm	6 bzw. 4 mm	140mm
	25mm	6 bzw. 4 mm	140mm
	15mm	3mm	140mm

** version for SCHWE: rod length 50mm

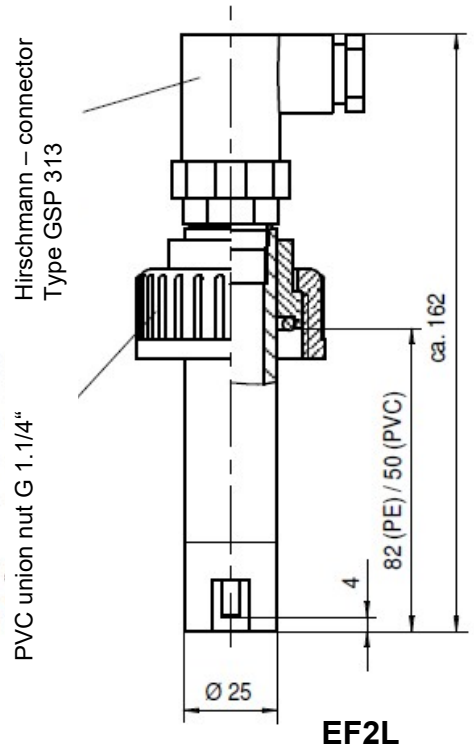




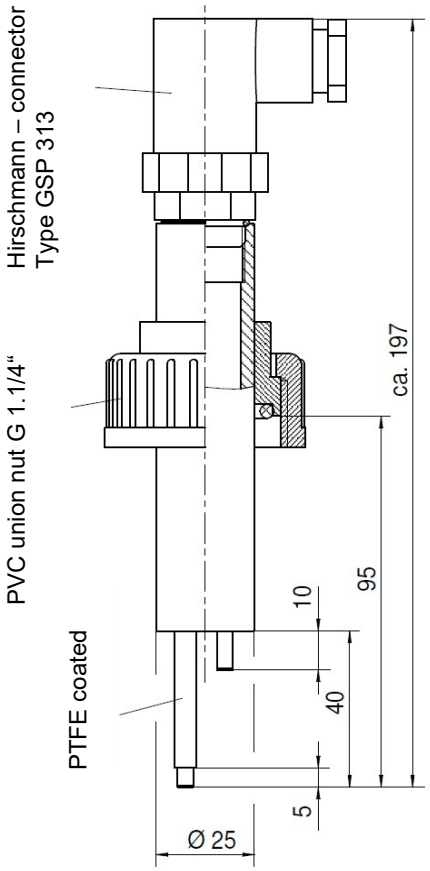
1.4.2 Plate electrode EP...



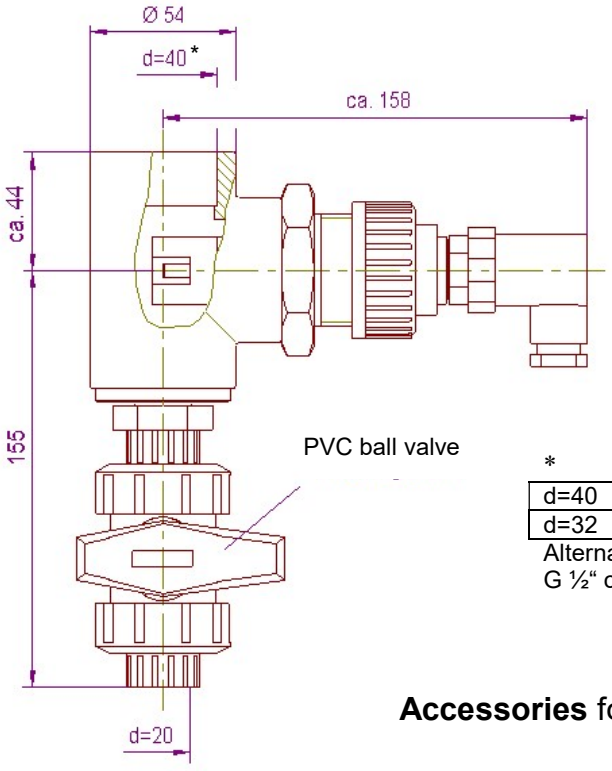
1.4.3 Pipeline monitoring



EF2L



EF2T



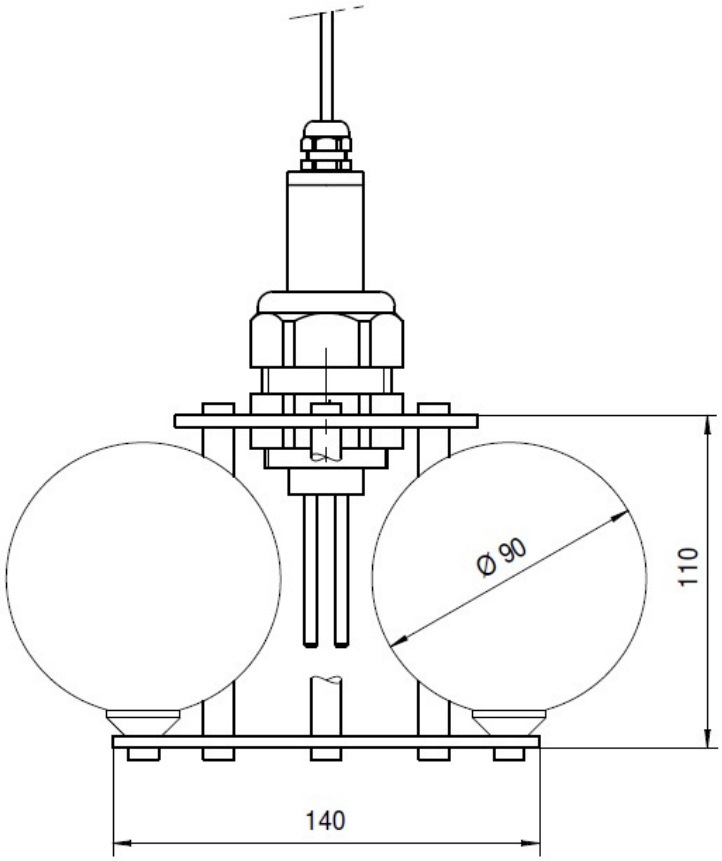
*

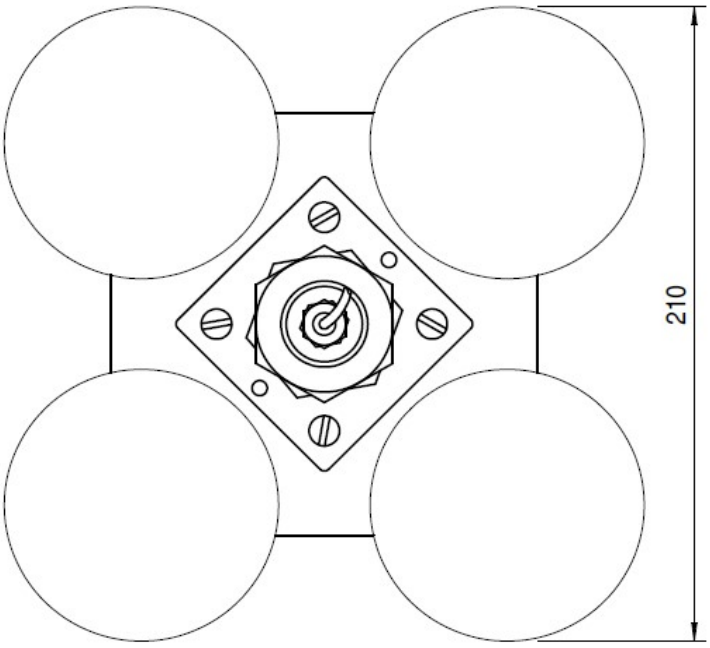
d=40	PE
d=32	PVC

Alternatively to d=40 or d=32:
G ½“ connection

Accessories for **EF2L or EF2T**

1.4.4 Schwimmerelektrode SCHWE 90 (with Elektrode ELH)

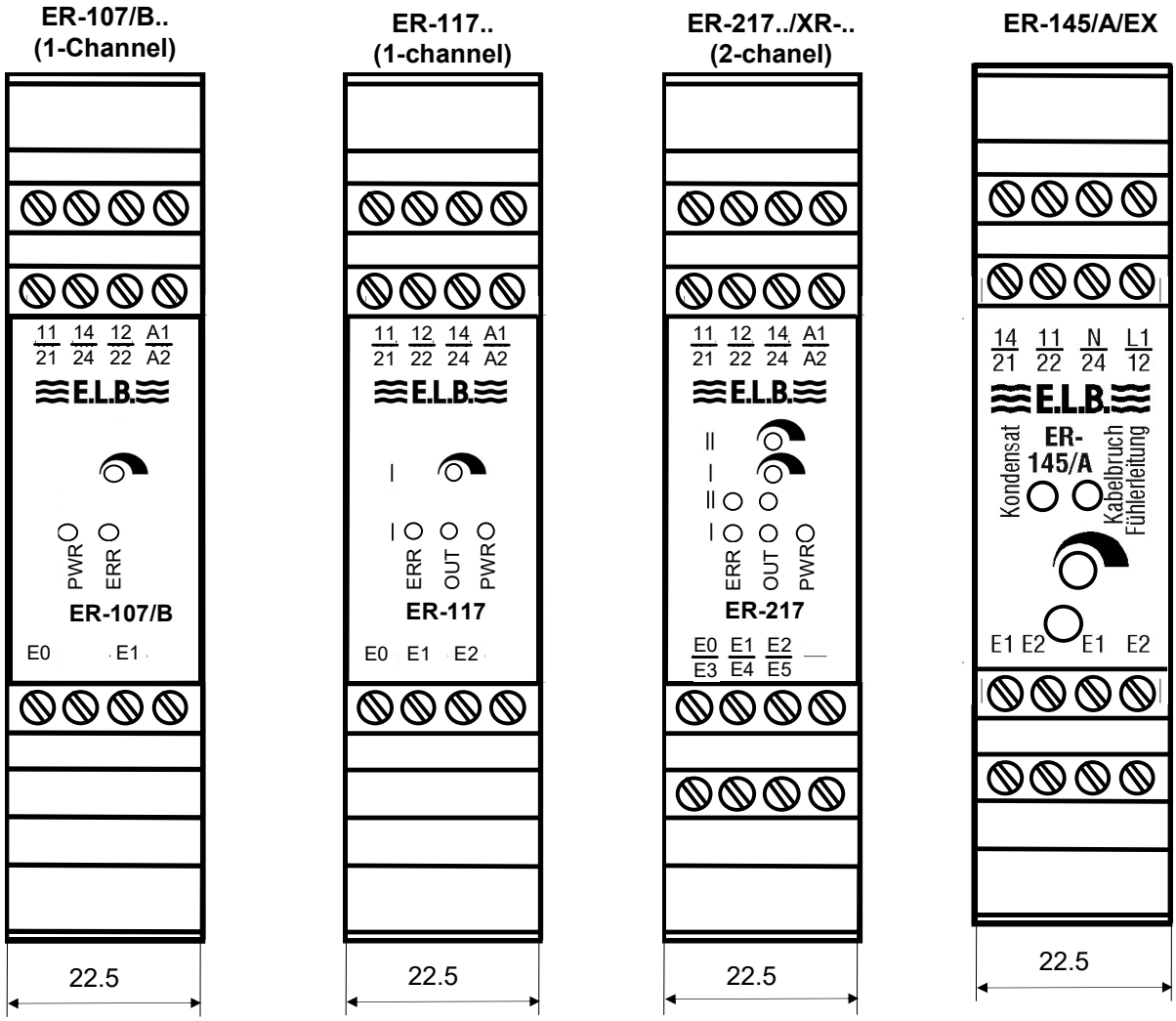




1.5 Dimension Sheets for the Measuring Transducer (2)

1.5.1 Measuring Transducer Electrode Relay

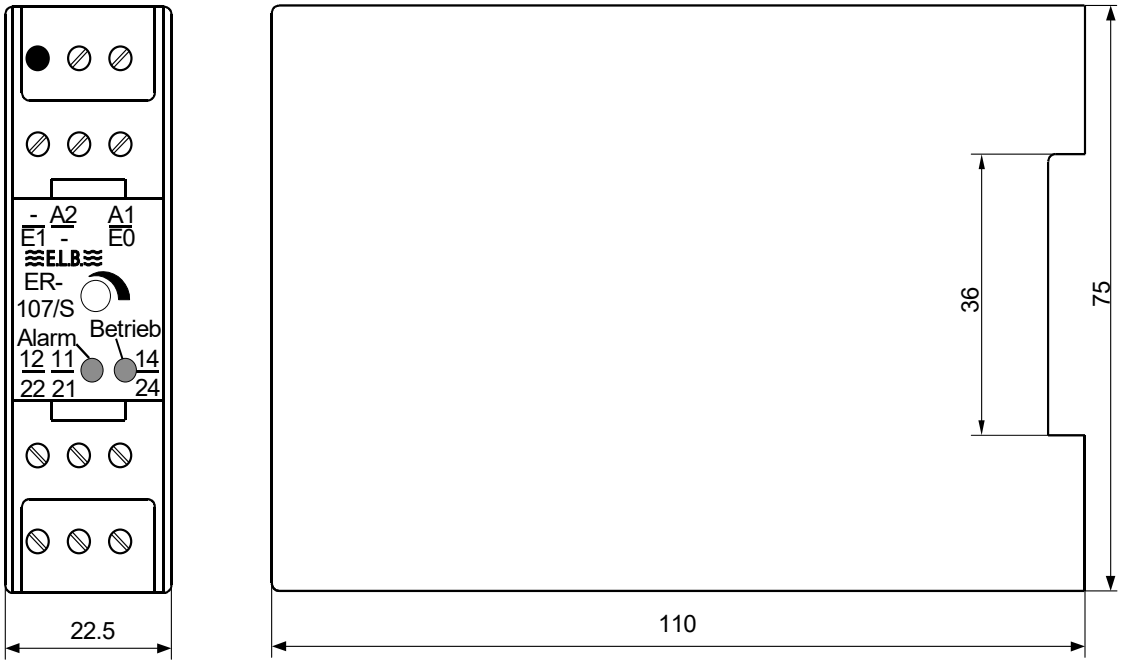
ER-145/A/EX..; ER-107/B...; ER-117.. and ER-217..; XR-..



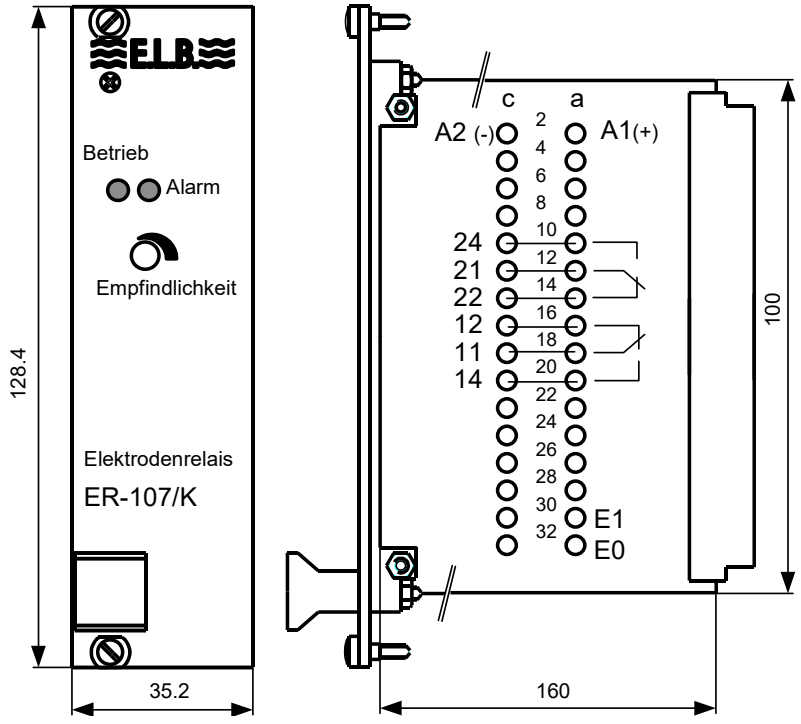
* ERR = lead fault, OUT = electrode wet, PWR = mains

Housing dimensions: Height 120 mm x Width 22.5 mm x Depth 100 mm

1.5.2 Measuring Transducer Electrode Relay ER-107/S..

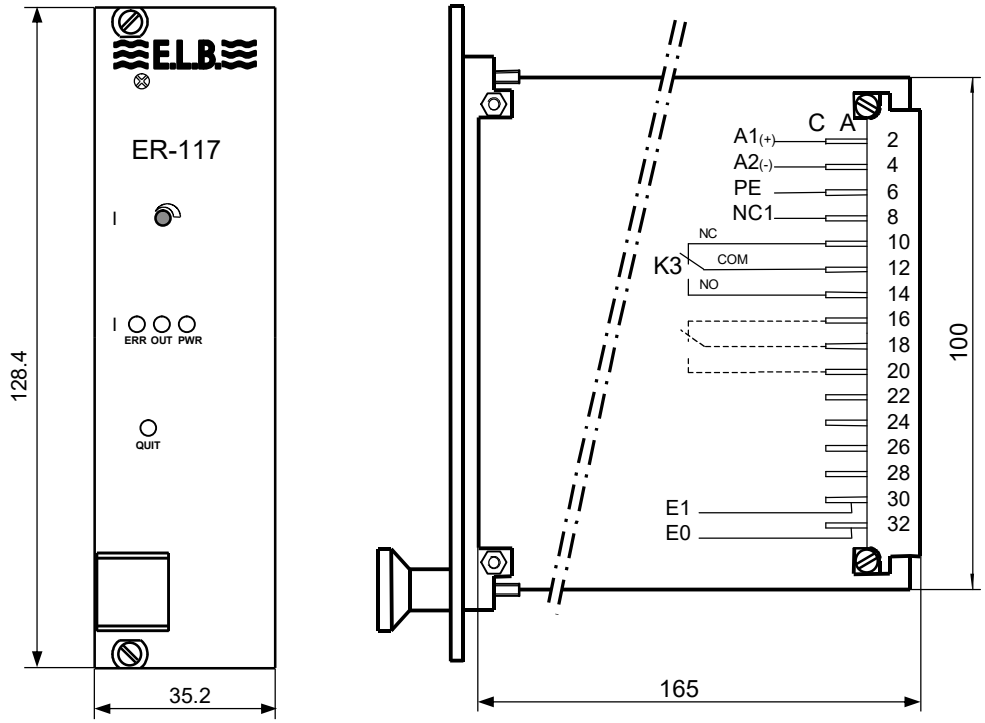


1.5.3 Measuring Transducer Electrode Relay ER-107/...K



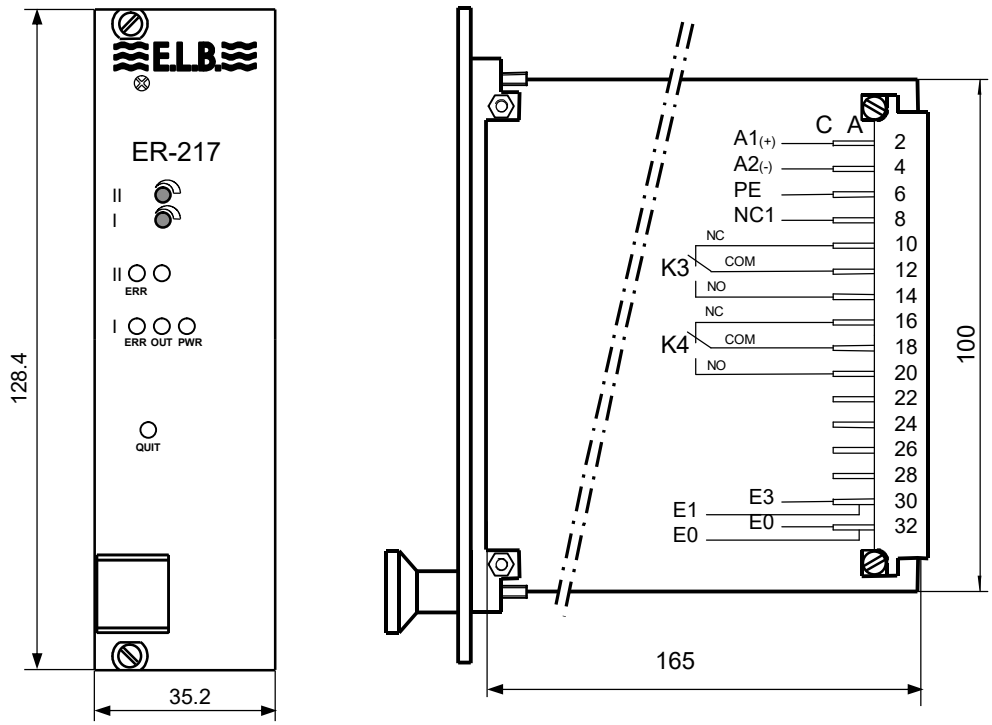
Betrieb = operation / Empfindlichkeit = sensitivity / Elektrodenrelais = electrode relay

1.5.4 Measuring Transducer Electrode Relay ER-117/...K



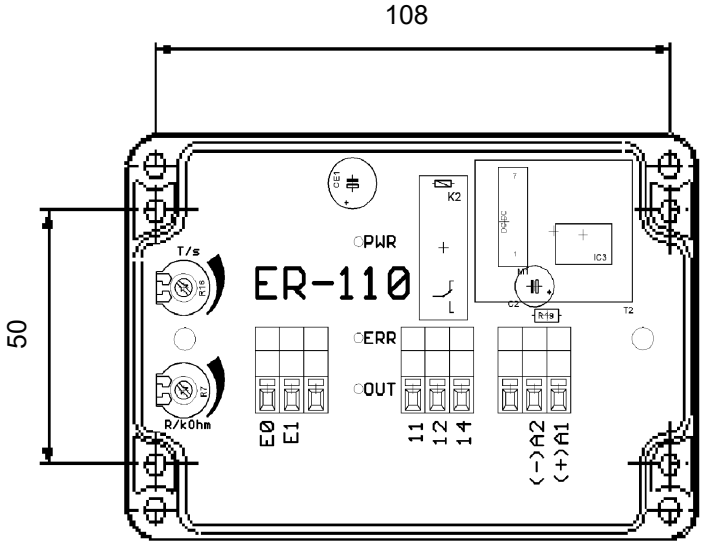
* ERR = lead fault, OUT = Electrode wet, PWR = mains

1.5.5 Measuring transducer electrode relay ER-217/...K



* ERR = lead fault, OUT = electrode wet, PWR = mains

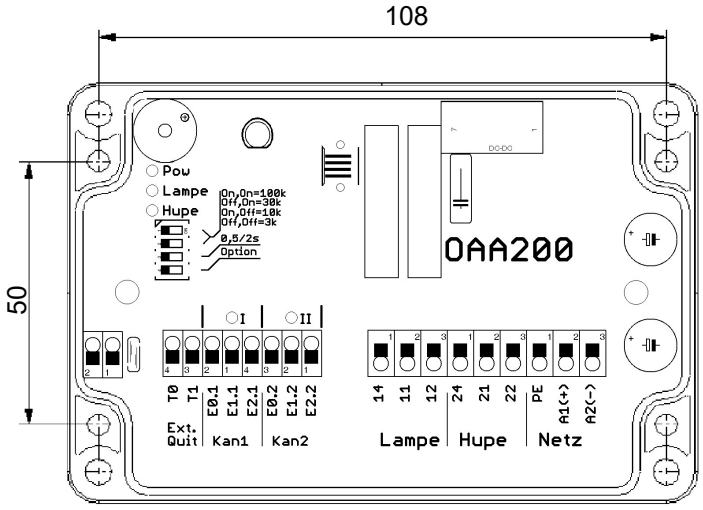
1.5.6 Measuring Transducer Electrode Relay ER-110…



housing dimensions:

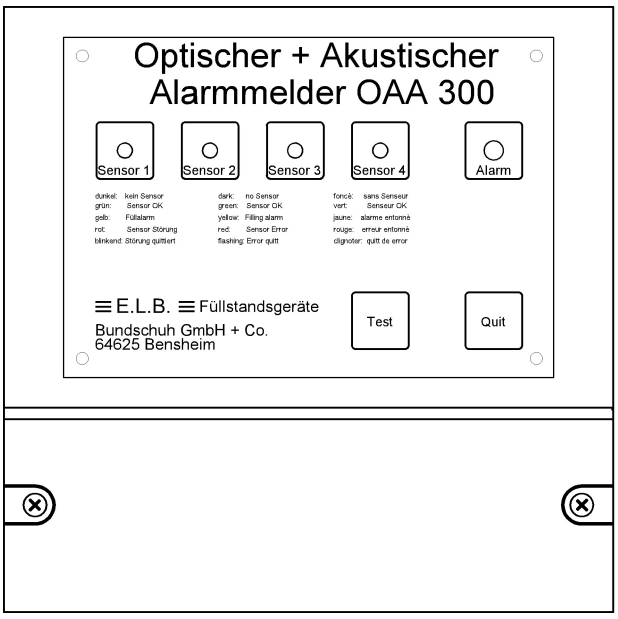
120 mm x 80 mm x 57 mm

1.5.7 Alarm detector OAA-…

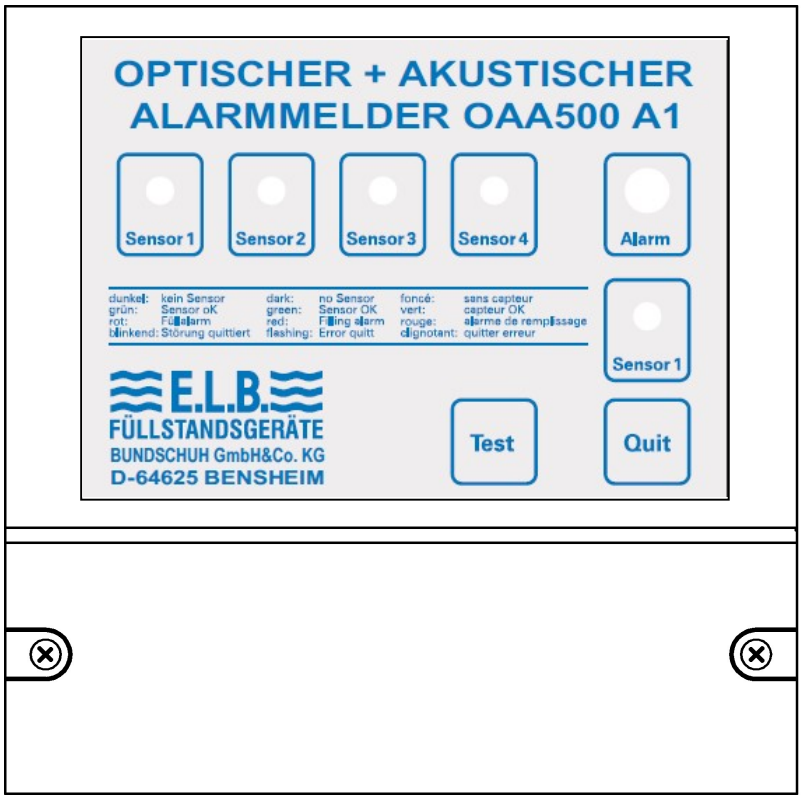


housing dimensions:

120 mm x 80 mm x 57 mm

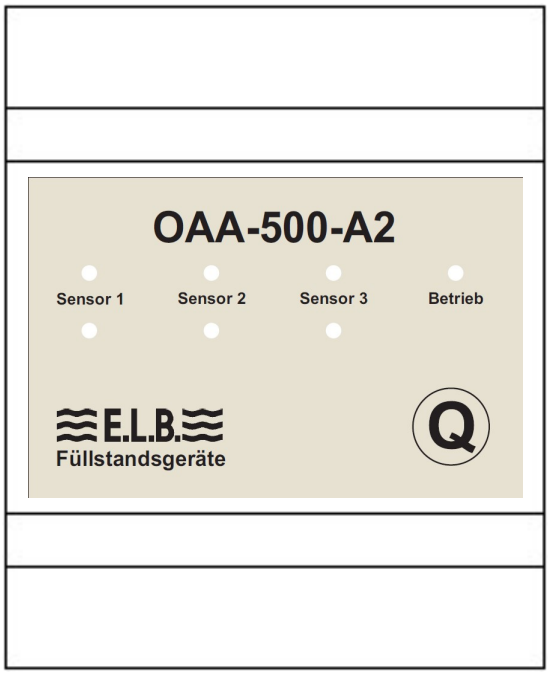


housing dimensions: 170 x 165 x 85 mm



housing dimensions:

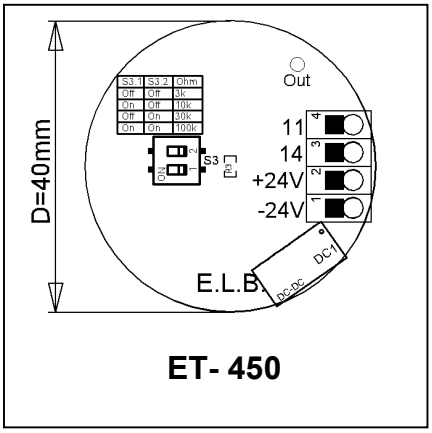
137 mm x 186 mm (without cable glands) x 103 mm



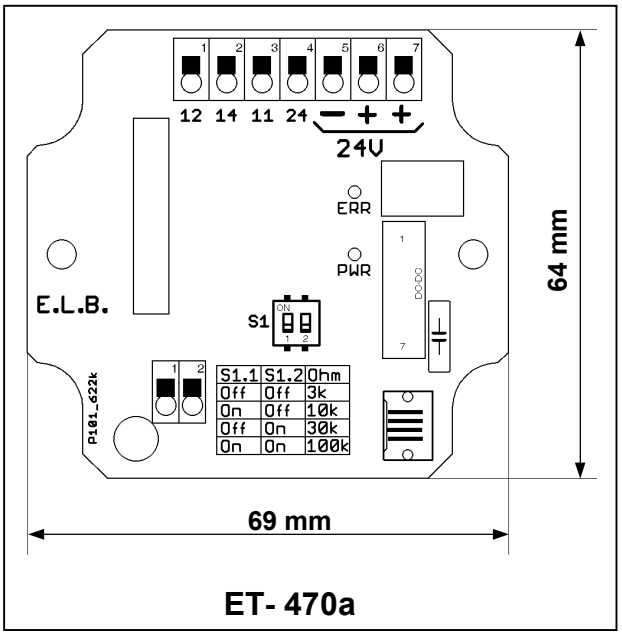
housing dimensions:

86 mm x 70 mm x 60 mm

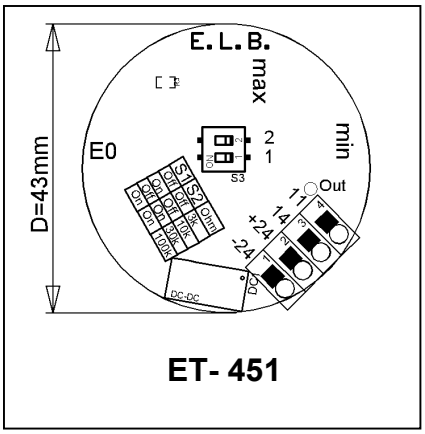
1.5.8 Electronic Parts ET-4..



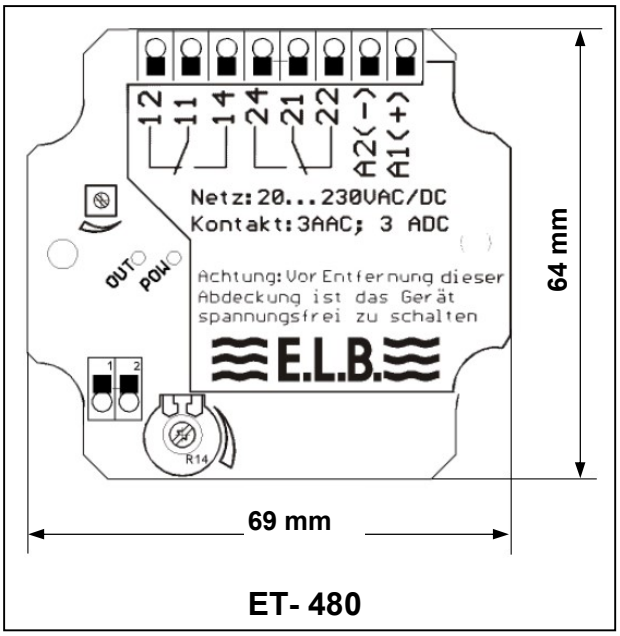
ET- 450



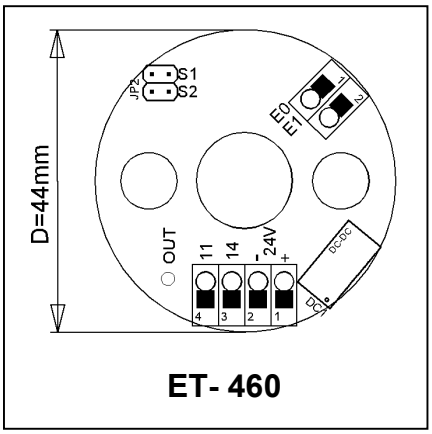
ET- 470a



ET- 451



ET- 480



ET- 460

1.6 Technical Data

1.6.1 Leak detector (1)

1.6.1.1 Plate electrode EP...

Material of the non-metallic parts that are in contact with media	Suitable plastic
Type of conductor	Suitable conductor material
Conductor length	on request
Operating temperature / operating pressure	atmospheric conditions
Level of resistance for line monitoring:	22kΩ / 100kΩ depending on the version
Material of the metallic parts (sensing rods)	Stainless steel (1.4571) / tantalum / glassy carbon
Degree of protection in conformance to EN 60529	IP 68

1.6.1.2 Hanging Electrode ELH...

Material of the non-metallic parts that are in contact with the media	∅ 40mm: PP, PE, PVC, PVDF ∅ 25mm: PP, PE ∅ 15mm: PP, PE, PVC Screw connection: PVDF
Type of conductor	Suitable conductor material
Conductor length	on request (standard 3m)
Operating temperature / operating pressure	atmospheric conditions
Level of resistance for the line monitoring:	22kΩ / 100kΩ depending on the version
Material of the conductive parts (sensing rods)	Stainless steel (1.4571), Hastelloy B, Hastelloy C, titanium, tantalum, glassy carbon or suchlike
Degree of protection acc. to EN 60529	IP 68

Addition Lightning Protection Device BL-100

Housing	aluminium
Degree of protection acc. to EN 60529	IP 65
Ambient temperature	-20 ... 70°C
Signal conductors	max. 4 mm² single-wire max. 2.5 mm² fine-wire
Equipotential bonding outside:	max. 2 x 4 mm²; min. 4 mm²;
Equipotential bonding inside:	2 x 4 mm²

Pipeline monitoring

Integrated electronics	20 .. 35 V DC
Electr. connection	Hirschmann connector GSP 313
Rod material	1.4571, HB, HC, TI, TA, KO
Parts in contact with media	PE and PVC
Mech. connection	a) union nut G 1.1/4“ b) sleeve welding d=40 or d=32 orG ½“ shut-off valve (PVC) d=20
Ambient temperature	-20 ... 60°C

1.6.2 Technical Data for the Measuring Transducer (2):

Type	ET – 45., -46., -472	ET – 470..	ET - 473	ET – 48..
Mains supply:				
Rated voltage	24 (20...35) VDC	24 (20...35) VDC	24 (20...35) VDC	20..230 V AC/DC
Power consumption	≤ 1 W	≤ 1 W	≤ 1 W	≤ 1 W
Output:				
Output contacts	1 NC-contact	1 change-over cont., 1 NC-cont., common root	NC-contact or NO-contact	2 floating change-over contacts
Switching voltage	max. 35 VAC / VDC	max. 35 VAC / VDC	max. 24 VDC	max. 250 VAC/DC
Switching current	max. 0,12 AAC / ADC	max. 0,12 AAC / ADC	200 mA DC	max. 5 A
Switching voltage (terminals 11, 12, 14)	——	max. 250 VAC max. 150 VDC	——	——
Switching current (terminals 11, 12, 14)	——	max. 5 A	——	——
Switching capacity	——	max. 500 VA / W (30VDC) 10 W	max. 5 W	max. 500 VA / W (30VDC) 10 W
Input:				
Open-circuit voltage	< 10 V	< 10 VAC	< 10 V	< 10 V
Short-circuit voltage	< 5 mA	< 5 mA	< 5 mA	< 5 mA
Operating temper.	-20 ... + 60°C	-20 ... + 60°C	-20 ... + 60°C	-20 ... + 60°C
Degree of prot. acc. to EN 60529	IP 00	IP 00	IP 00	IP 00

Type	**ER-107..**	**ER-110 ..**	**ER–145/A/Ex..**	**ER-117.. / ER-217..**	**XR-…**
Mains supply:					
Rated oper. volt.	230 VAC (+10% / -15%)	230 VAC (+10% / -15%)	230 VAC (+10% / -15%)	230 VAC (+10% / -15%)	20 .. 230VAC/DC
on request: (± 10 %)	24; 42; 48; 110; 115; 127; 240; VAC	24; 42; 48; 110; 115; 127; 240; VAC	24; 42; 48; 110; 115; 127; 240; VAC	24; 42; 48; 110; 115; 127; 240; VAC	24 V DC 230 V AC
Rated frequency	48 ... 62 Hz	48 ... 62 Hz	48 ... 62 Hz	48 ... 62 Hz	max. 62 Hz
Power consumption	≤ 1 VA	≤ 1 VA	≤ 1 VA	≤ 1 VA	≤ 2 VA / W
on request:	24 (20...35) VDC	24 (20...35) VDC	24 (20...35) VDC	24 (20...35) VDC	
Power consumption	≤ 1 W	≤ 1 W	≤ 1 W	≤ 1 W	
Output:					
Output contacts	2 floating change-over contacts	floating change-over contact	2 floating change-over contacts	floating change-over contact	2 floating change-over contacts
Switching voltage	max. 250 VAC max. 150 VDC	max. 250 VAC max. 150 VDC	max. 250 VAC max. 150 VDC	max. 250 VAC max. 150 VDC	max. 250 V
Switching current	max. 6 A	max. 5 A	max. 5 A	max. 5 A	max. 5 A
Switching capacity	max. 500 VA / W (30VDC) 10 W	max. 500 VA / W (30VDC) 10 W	max. 100/50 VA / W (30VDC) 10 W	max. 500 VA / W (30VDC) 10 W	max. 100 VA ; max. 50 W
Input:					
Open-circ. voltage	< 10 VAC	< 10 VAC	< 13.1 V	< 10 VAC	max. 14.8 VDC
Short-circ. current	< 5 mA	< 5 mA	< 5 mA	< 5 mA	max. 5.6 mA
Switching delay	< 0.5 s	< 0.5 s	< 0.5 s	< 0.5 s	ca. 0.5/2/2.5/10 s
Operating temp.	-20 ... + 60°C	-20 ... + 60°C	-20 ... + 60°C	-20 ... + 60°C	-20 ... + 60°C
Degree of prot. to EN 60529	Terminals: IP 20 Housing: IP 40	Housing IP 65	Terminals: IP 20 Housing: IP 40	Terminals: IP 20 Housing: IP 40	Terminals: IP 20 Housing: IP 40

Type	OAA–200..	OAA–300..	OAA–500..
Mains supply:			
Rated oper. volt.	24 .. 230 V AC/DC	230 VAC (+10% / -15%)	42…253 VAC 20 …60 VDC
on request: (± 10 %)		24; 115; 240; VAC	
Rated frequency		48 ... 62 Hz	48 ... 62 Hz
Power consumption	max. 2 VA / W	≤ 3 VA	≤ 3 VA / W
on request:		24 (20...35) VDC	
Power consumption		≤ 3 W	
Output:			
Output contacts	2 floating change-over contacts	6 floating change-over contacts	2 floating change-over contacts
Switching voltage	max. 250 V AC/DC	max. 250 VAC max. 150 VDC	max. 250 VAC max. 115 VDC
Switching current	max. 5 A	max. 3 A	max. 3 A
Switching capacity	max. 1250 VA max. 50 W	max. 500 VA / W (30VDC) 10 W	max. 500 VA / W (30VDC) 10 W
Input:			
Open-circ. voltage	max. 3.3 VAC	< 10 VDC	< 24 VDC
Short-circ. current	max. 1 mA	< 10 mA	< 20 mA
Switching delay		< 0.5 s	< 0.5 s
Operating temp.	-20 ... + 60°C	-20 ... + 60°C	-20 ... + 60°C
Degree of prot. to EN 60529	Housing IP 65	Housing IP 65	version A1: IP 65 version A2: IP 20

2. Materials in the Leak Detectors

The parts of the level sensor that are in contact with the fluid, its vapours or condensate are made of stainless steel, titanium, Hastelloy or of plastics that are suitable for the application.
The materials used for the electrode rods are stainless steel austenitic CrNiMo rods, Hastelloy, titanium, tantalum, Monel or glassy carbon.
The electrode rods are insulated with a PTFE shrink tubing.

3. Areas of Use for the Leak detectors

The leak detectors may be operated under atmospheric temperatures and pressures.
They may be used only for electrically conductive fluids with a specific resistance of up to 10^6 Ω/cm (measurement in conformance to DIN EN 62631-3…). If non-conductive deposits are to be expected, the electrodes must be checked more frequently than at the annual inspections and cleaned if necessary.

4. Fault Messages, Error Messages

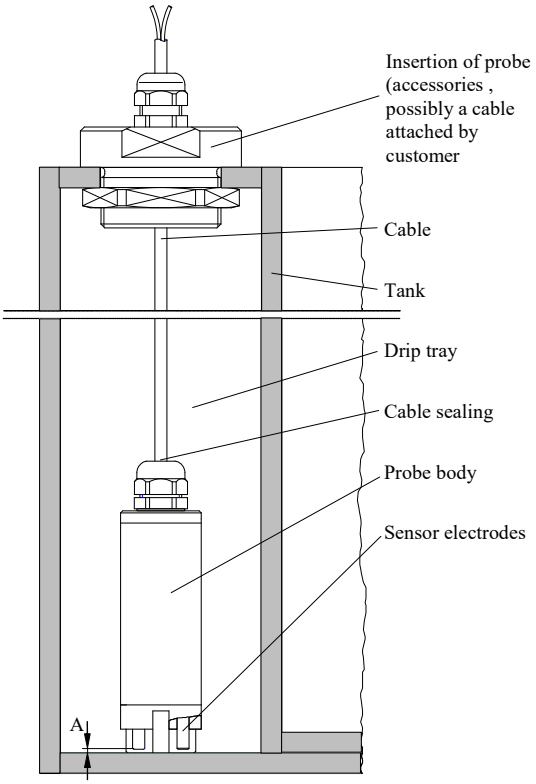
Due to the quiescent current principle employed, both an interruption or short-circuit in the signal line between the leak detector and the electrode relay and a mains failure have the effect of causing the output relay to drop out into an “alarm state".

See **1.2. Functional Description and the Signalling Table f**or details.

5. Installation and Connection Instructions

5.1 Installation of the Leak Detector

ELH... type

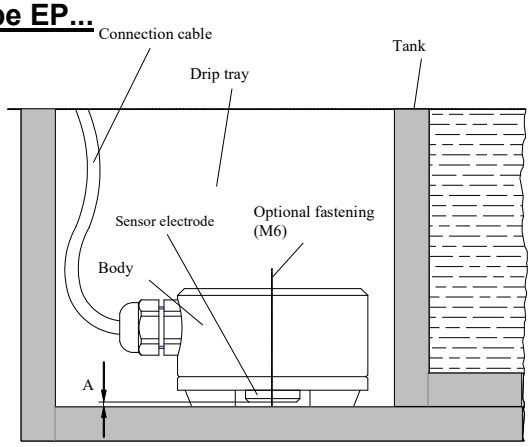


The ELH... leak detector must be lowered carefully along the lead at the deepest point, e.g. into the tank's drip tray. Care must be taken here that when the leak detector reaches the bottom of the drip tray, it is straight and touches the bottom in an upright position. Gently pull the lead upwards without letting it sag and on the other hand without raising the leak detector.

In addition to its function of establishing an electrical connection, the lead serves to stabilise the upright position of the leak detector.

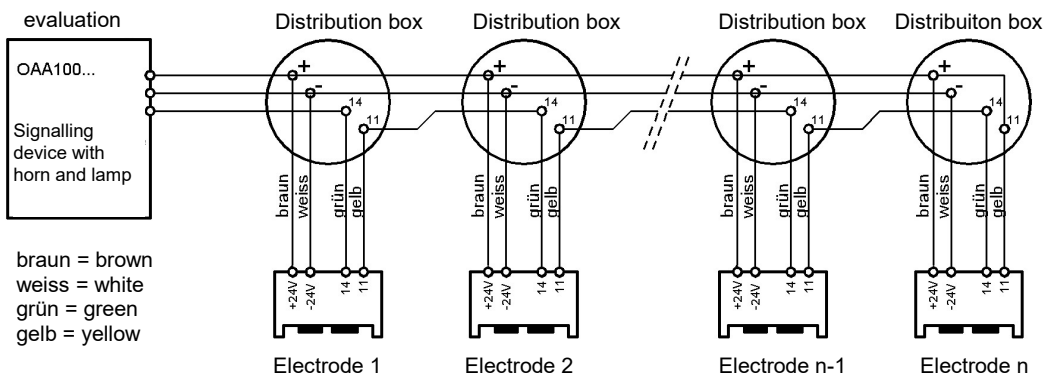
The probe lead must be attached/run either with our accessories or with the customer's.

Type EP...



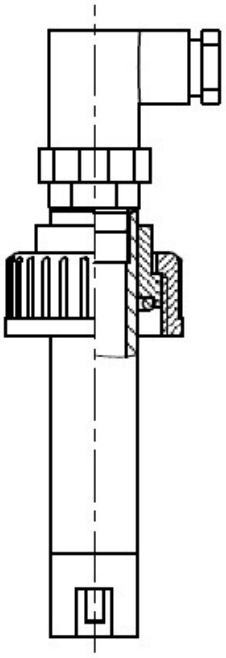
The EP... leak detector is positioned at the deepest point of the area to be monitored. It is important here to make sure it is horizontal. It is also important to make sure that the position cannot be altered unintentionally. Where there are several electrodes connected in series in an area, the test resistor may be fitted only at the last electrode in the chain.
The connection lead should be loose at the last stretch near the electrode to prevent the electrode being raised.
There is also the optional possibility of screwing the electrode on at an appropriate point.

Multiple EP-.. Application



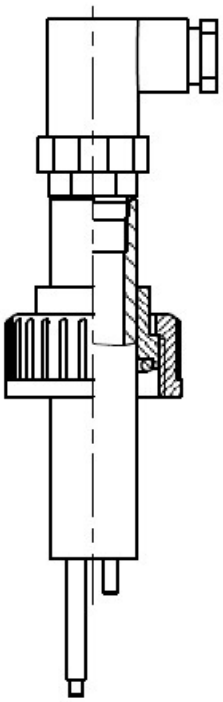
Pipeline monitoring

Typ EF2L...



The conductive probes EF2L and T with integrated electronics ET-473L and ET-473T are used to monitor double pipes and/or filling pipes.
Version EF2L… with integrated electronics part ET-473L, sets off an alarm in the event of leaks in double-walled pipelines.
Version EF2T… with integrated electronics part ET-473T, sets off an alarm if air instead of medium is present in the filling pipe.
The electronis part is integrated directly into the probe tube. An optional NC or NO contact (closer or opener) is present at the connector port.
The probes are installed – from the side or from above – using the union nut.

Typ EF2T...



5.2 Connection of the Level Sensor to the Electrode Relay

The electrode relay must be installed, connected and put into operation in conformance to the relevant VDE/EN standards and directives. The electrode relay connections must be assigned in accordance with the wiring diagrams. The measuring transducers must be installed with due consideration to the max. permissible conductor length. Provide over-current protection, such as a fuse (250 mA) or circuit breaker, to limit fault currents on supply wiring. The resistor supplied with the relay must be installed parallel to the fluid sensor -if possible in the connection head for the electrodes. Connect warning devices and/or control units to the potential-free output contacts as required.

XR-.. / 1-channel and 2-channel versions *(Fig. 1)*:

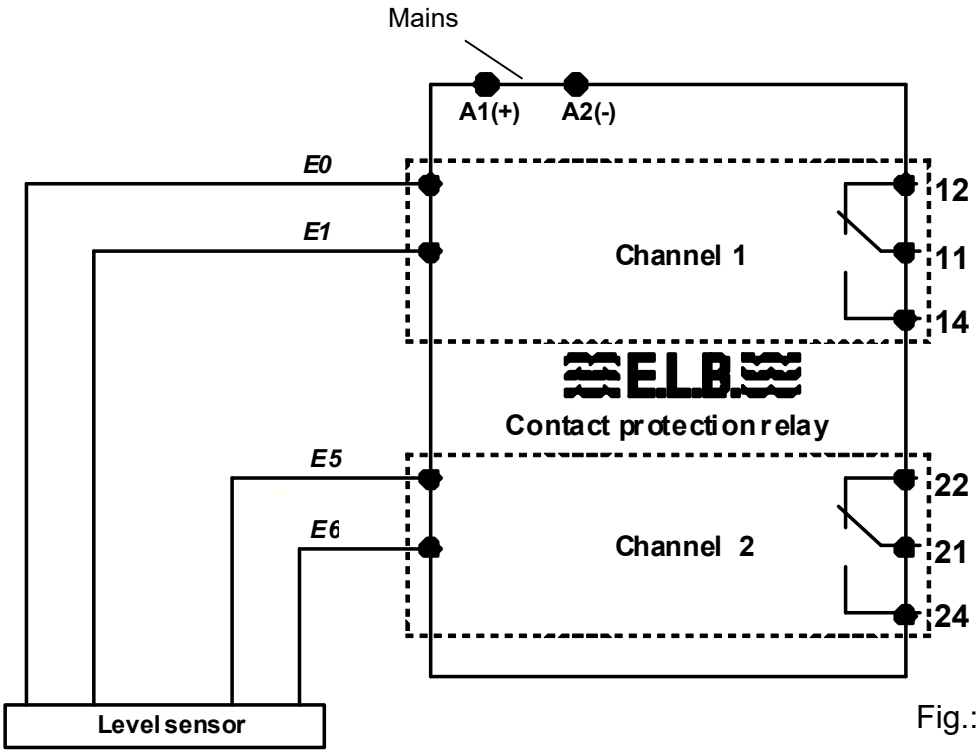


Fig.: 1

Connect the level sensor (1) to the measuring transducer (2) at the terminals marked "**E0"**, "**E1**" and "**E5"**, "**E6**" resp. The mains supply for the XR-.. measuring transducer must be connected to the terminals marked "**A1"** and "**A2**.

ER-107.. *(Fig. 2)*:

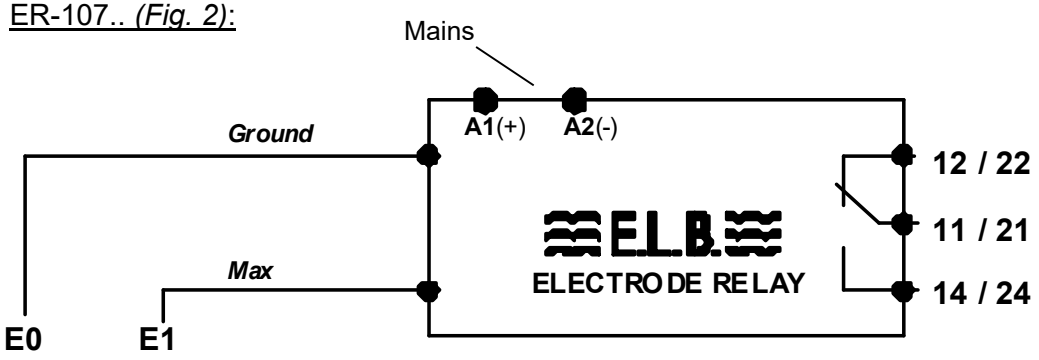


Fig.: 2

Connect the signal line to the two connections inside the leakage sensor (plug connection at connections 1 and 2). The measuring transducers must be installed with due consideration to the max. permissible conductor length (cable break resistance = 22k : ℓ < 200m / cable break resistance = 100k : ℓ < 75m) of the signal line. The leakage sensor (1) must be connected to the measuring transducer (2) at the terminals marked "**E0"** and "**E1"**. Connect the mains supply for the ER-107.. measuring transducer to the terminals marked "**A1"** and "**A2"**.

ER-110.. / 1-channel version *(Fig. 3)*:

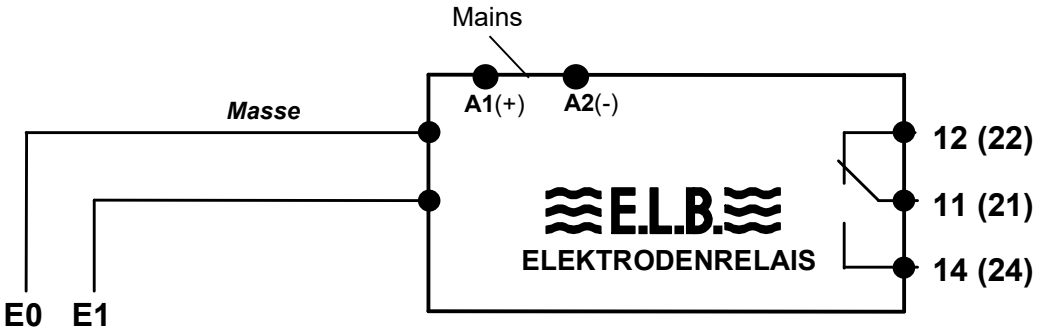


Fig.: 3

Connect the signal line to the two connections inside the leakage sensor (plug connection at connections 1 and 2). The measuring transducers must be installed with due consideration to the max. permissible conductor length (cable break resistance = 22k : ℓ < 200m) of the signal line. The leakage sensor (1) must be connected to the measuring transducer (2) at the terminals marked "**E0"** and "**E1"**. Connect the mains supply for the ER-110.. measuring transducer to the terminals marked "**A1"** and "**A2"**.

ER-217.. / 2-channel version *(Fig. 4)*:

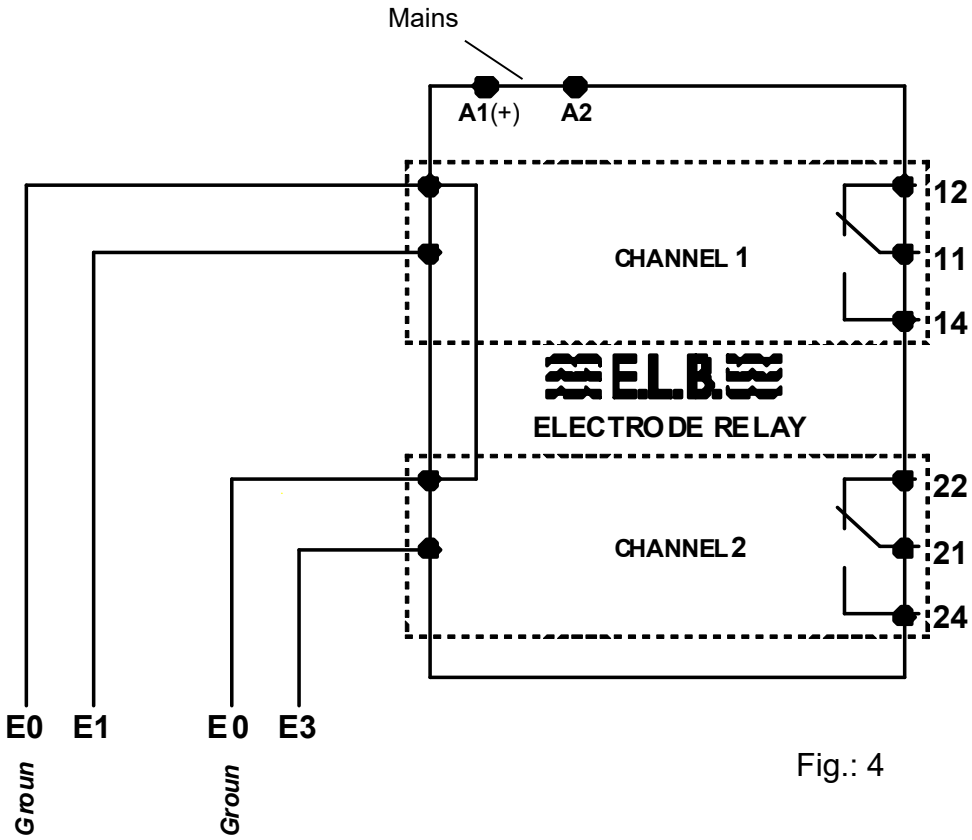


Fig.: 4

ER-117.. / 1-channel version *(Fig. 5)*:

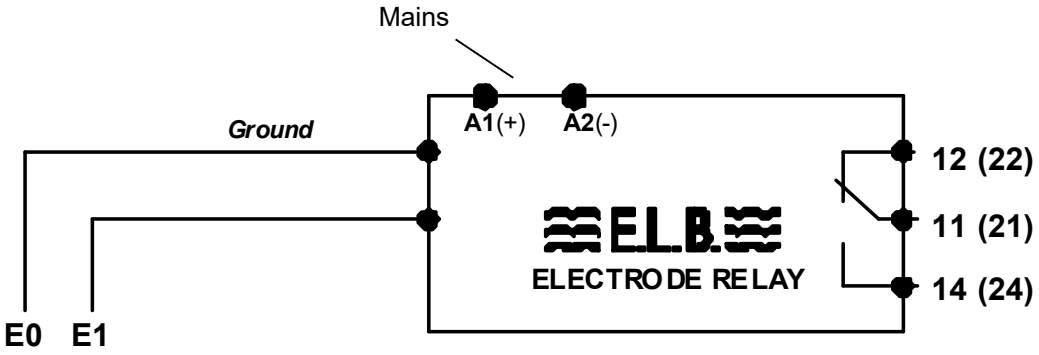


Fig.: 5

The leakage sensor (1) must be connected to the measuring transducer (2) at the terminals marked "**E0"**, "**E1"** or "**E3".** The mains supply for the ER-117.. or ER-217.. measuring transducer must be connected to the terminals marked "**A1"** and "**A2**.

ER-145.. *(Fig. 6)*:

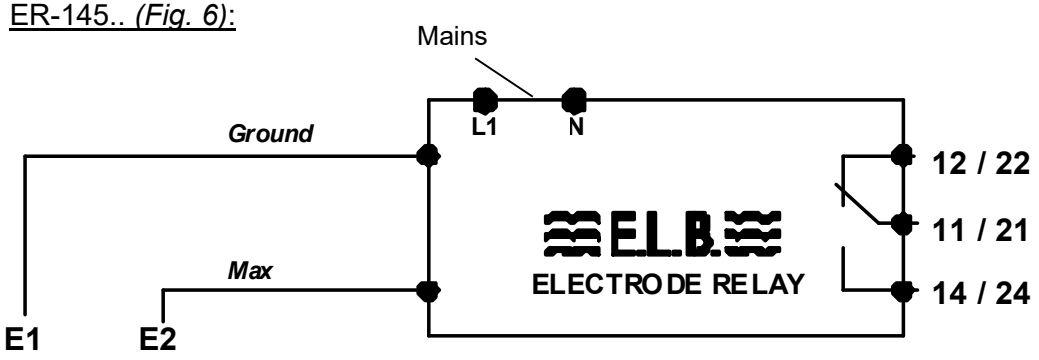


Fig.: 6

The measuring sensor/leakage sensor (1) must be connected to the terminals marked "**E1" and "E2"**. Consideration must be given to the highest permissible levels of conductor resistance of R = 50 Ω (including the forward and return line) and of the capacitance c_0 and inductance l_0. The levels are specified in the technical data and on the type plate on the right-hand side of the device. Connect electric power to the terminals marked **L1** and **N** (**AC** transmission lines) as indicated on the imprint on the cover of the housing.

ET – 45x 1-channel version *(Fig. 7, 8)*:

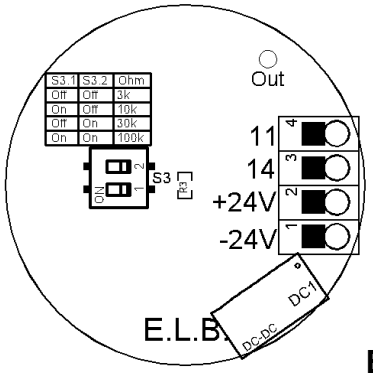


Fig.: 7

ET- 450

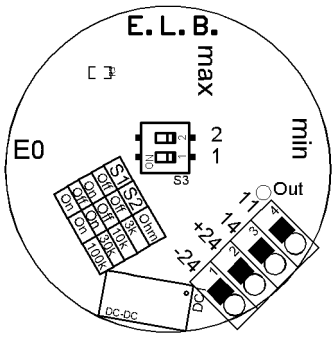


Fig.: 8

ET- 451

The mains supply for the ET-45x.. measuring transducer must be connected therefore to terminals marked "**+24V"** and "**-24V"** (20 ... 35VDC). The output relay works in the quiescent current mode, connection to the terminals **11** and **12**.

ET – 46x Plate Electrode *(Fig. 9)*:

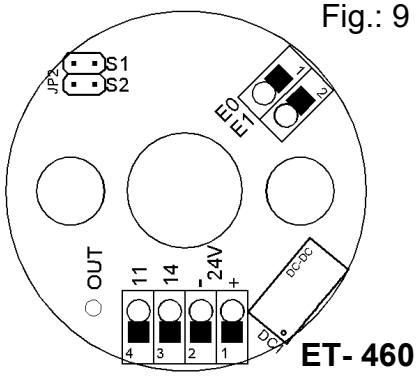


Fig.: 9

The mains supply for the ET-460. measuring transducer must be connected to the soldering points marked "**+24V"** and "**-24V"** (20 ... 35VDC).
The output relay works in the quiescent current mode, connection to the soldering points **11** and **14**.
The plate electrodes are usually supplied with an unconnected cable end, the conductor colours are assigned to the soldering points as follows:
brown = +24V; white = -24V;
yellow = 11 and green = 14

ET – 470.. 1-channel version *(Fig. 10)*:

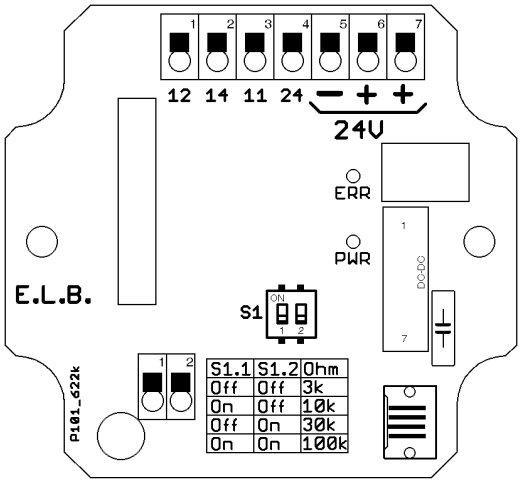


Fig.: 10

The mains supply must be connected to the ET-470.. measuring transducer at the terminals marked "**+24V"** and "**-24V"** (20 ... 35VDC).
The output relay works in the closed-circuit current version, connection terminals **11, 12 and 14.**

Alternatively, the semi-conductor output can be used with terminals **11** and **24**.

ET - 473 1-channel version *(Fig. 11)*:

The mains supply for the ET-473 measuring transducer must be connected to terminal 1 (- 24 VDC) and terminal 2 (+ 24 VDC) (20 ... 35 VDC). The semi-conductor output works in the quiescent current mode, terminal 3.

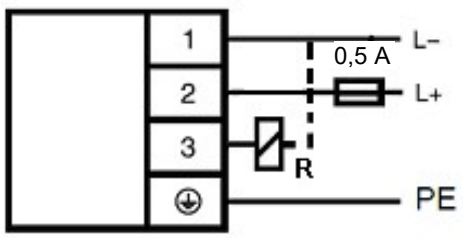
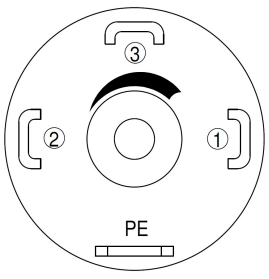


Fig.: 11



2 .. 30 kΩ

ET – 472 1-channel version *(Fig. 12)*:

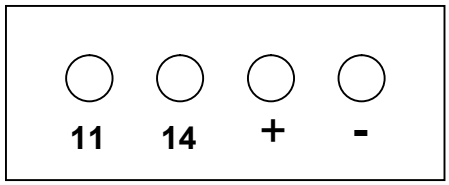


Fig.: 12

The mains supply must be connected to the ET-47x measuring transducer at the terminals marked "**+**" and "-" (20 ... 35VDC). The semi-conductor output works in a closed-circuit current version, connection terminals **11** and **14.**

ET – 480 *(Fig. 13)*:

The mains supply for the ET-480. measuring transducer must be connected to terminal 1 ("**+**") and terminal 2 ("**-**") (20 ... 230 V).

Change over switch1: Terminal 3 = N/C
Terminal 4 = COM
Terminal 5 = N/O

Change over switch2: Terminal 6 = N/C
Terminal 7 = COM
Terminal 8 = N/O

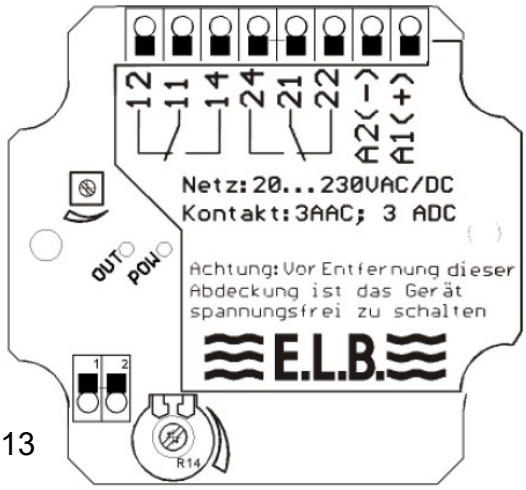


Fig.: 13

OAA-200.. Optical and Acoustic Warning Device *(Fig.14)*

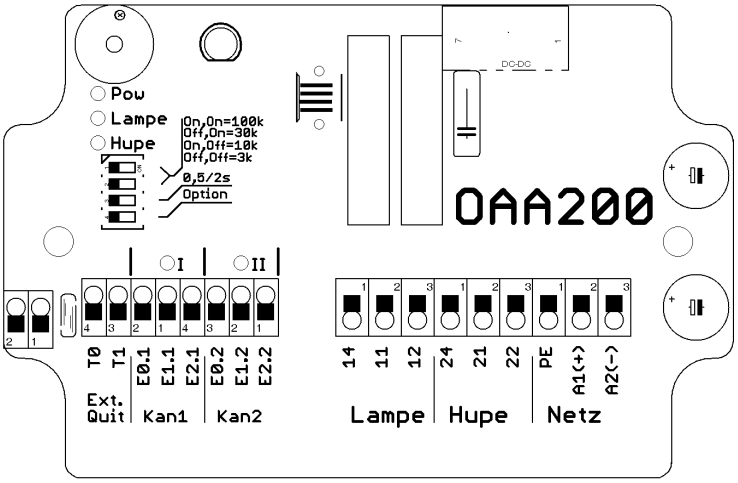


Fig.: 14

Terminal assignment OAA-200			
The mains connection	PE	A2 = L (+)	A1 = N (-)
Output relay lamp	11 = COM	12 = NC	14 = NO
Output relay horn	21 = COM	22 = NC	24 = NO
Channel 1		E 0.1	E 1.1
Channel 2		E 0.2	E 1.2
Input ext. acknowledgem.	TO, T1 pot.-free contact		

If the alarm is on, the horn can be turned off by pressing the side button. Further alarm messages turn the horn again. The collective interference lamp cannot be turned off with the side button until there are no more alarm messages left.

The alarm can be acknowledged externally also by means of a potential-free contact.

OAA-300.. Optical and Acoustic Warning Device *(Fig.15)*

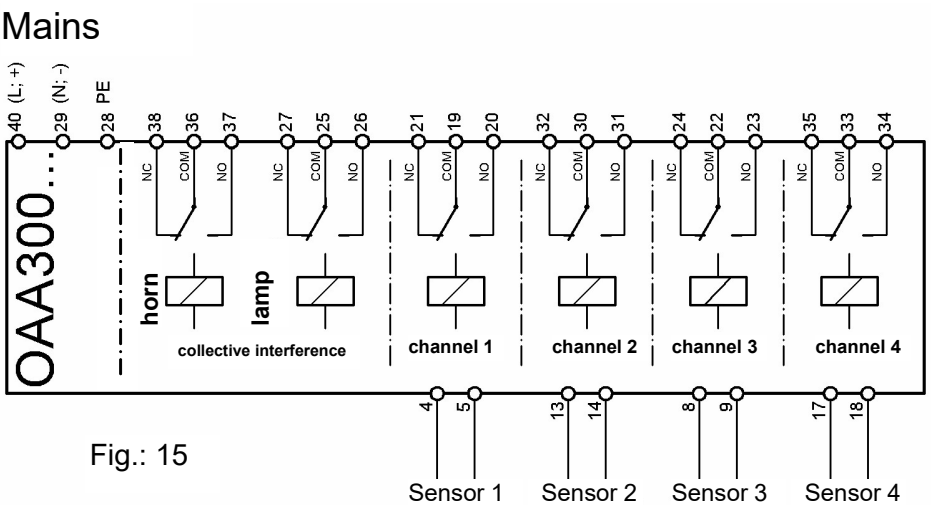


Fig.: 15

Terminal assignment OAA-300				
The mains connection	28, 39 = PE	29 = N (-)	40 = L (+)	
Output relay Channel 1	19 = COM	20 = NO	21 = NC	
Output relay Channel 2	30 = COM	31 = NO	32 = NC	
Output relay Channel 3	22 = COM	23 = NO	24 = NC	
Output relay Channel 4	33 = COM	34 = NO	35 = NC	
Output relay horn	36 = COM	37 = NO	38 = NC	
Output relay lamp	25 = COM	26 = NO	27 = NC	
Sensor 1		4 = E0	5 = E1	
Sensor 2		13 = E0	14 = E1	
Sensor 3		8 = E0	9 = E1	
Sensor 4		17 = E0	18 = E1	
Input ext. acknowledgem.	1, 10 pot.-free contact			

If the alarm is on, the horn can be turned off by pressing the *Quit* button. Further alarm messages turn the horn again. The collective interference lamp cannot be turned off with the *Quit* button until there are no more alarm messages left. The alarm can be acknowledged externally also by means of a potential-free contact.

OAA-500-… Optical and Acoustic Warning Device *(Fig. 16, 17)*:

OAA- 500-A1

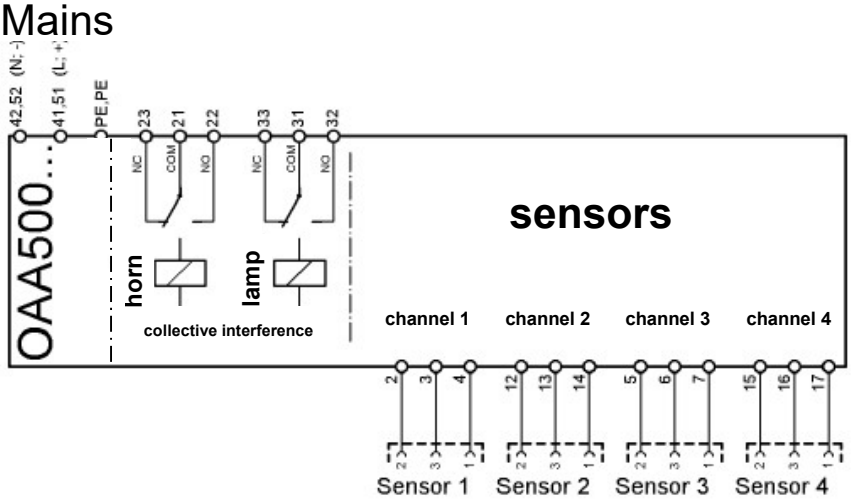


Fig.: 16

Terminal assignment OAA-500-A1			
The mains connection	PE	41, 51 = L (+)	42, 52 = N (-)
Output relay lamp	31 = COM	32 = NO	33 = NC
Output relay horn	21 = COM	22 = NO	23 = NC
Sensor 1	2 = + 12 VDC	3 = Input (12 VDC)	4 = GND (-)
Sensor 2	12 = + 12 VDC	13 = Input (12 VDC)	14 = GND (-)
Sensor 3	5 = + 12 VDC	6 = Input (12 VDC)	7 = GND (-)
Sensor 4	15 = + 12 VDC	16 = Input (12 VDC)	17 = GND (-)
Input ext. acknowledgem.	1, 11 pot.-free NO-contact		

OAA-500-A2

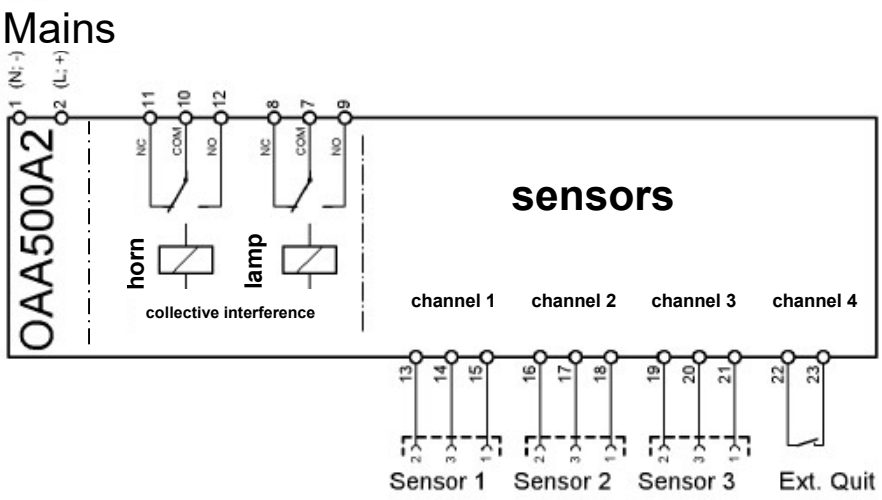


Fig.: 17

Terminal assignment OAA-500-A2			
The mains connection		2 = L (+)	1 = N (-)
Output relay lamp	7 = COM	9 = NO	8 = NC
Output relay horn	10 = COM	12 = NO	11 = NC
Sensor 1	13 = + 12 VDC	14 = Input (12 VDC)	15 = GND (-)
Sensor 2	16 = + 12 VDC	17 = Input (12 VDC)	18 = GND (-)
Sensor 3	19 = + 12 VDC	20 = Input (12 VDC)	21 = GND (-)
Input ext. acknowledgem.	22, 23 pot.-free NO-contact		

6. Setting Instructions

The leak detector (Fig. 18 + 19) must be inserted with due consideration to the conditions specified in the respective country's ordinances on installations for handling water-polluting substances.

Thanks to their design, the leak detectors guarantee that a signal indicating a leakage fluid will be given once a response height of max. 5 mm is reached. It is therefore not necessary to set the response height.

Sensitivity of the measuring transducer:

After connecting the electrodes and the supply voltage, the electrode relay can be set to suit the media to be monitored once **the electrode sensors have been immersed into the fluid requiring monitoring**. For this purpose the **response sensitivity** must be set to the lowest level (turn the potentiometer in an anti-clockwise direction as far as it will go).

Now turn the potentiometer in a clockwise direction until the **output relay drops out** (**ER-107: "Alarm", lights up in red**; **ER-145..., ER-145/A/EX: "Condensate" green goes out and ER-117/-217 "OUT" lights up in yellow**). Once this position is reached, turn the potentiometer another **10°-15° further (by 1 revolution in the ER-117/-217)** to allow for fluctuations in conductivity.

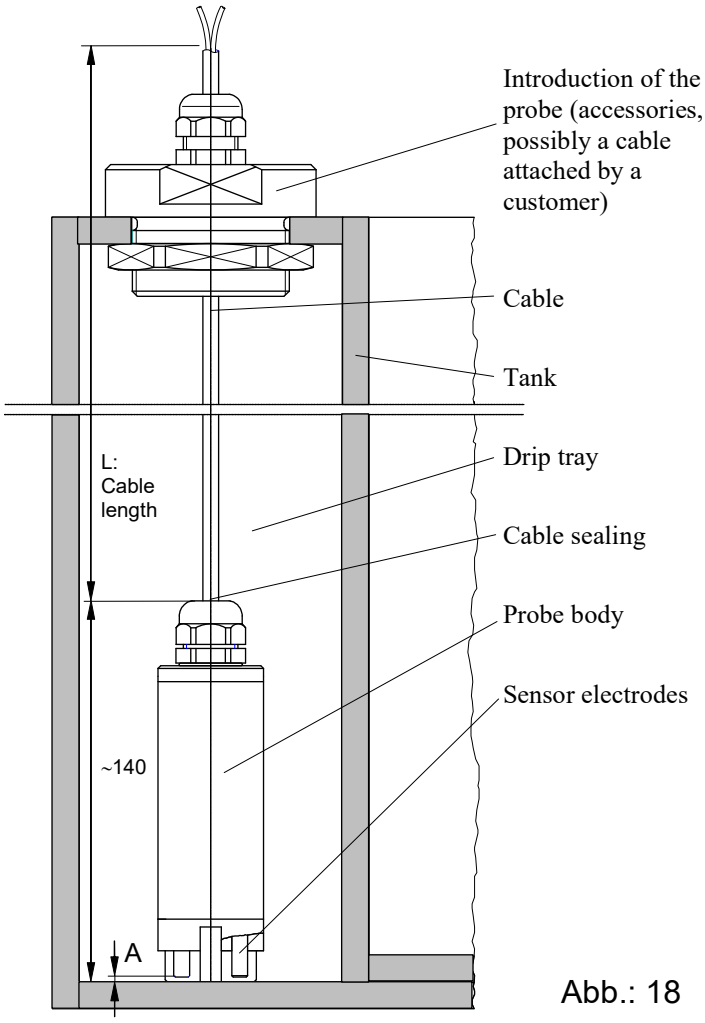


Abb.: 18

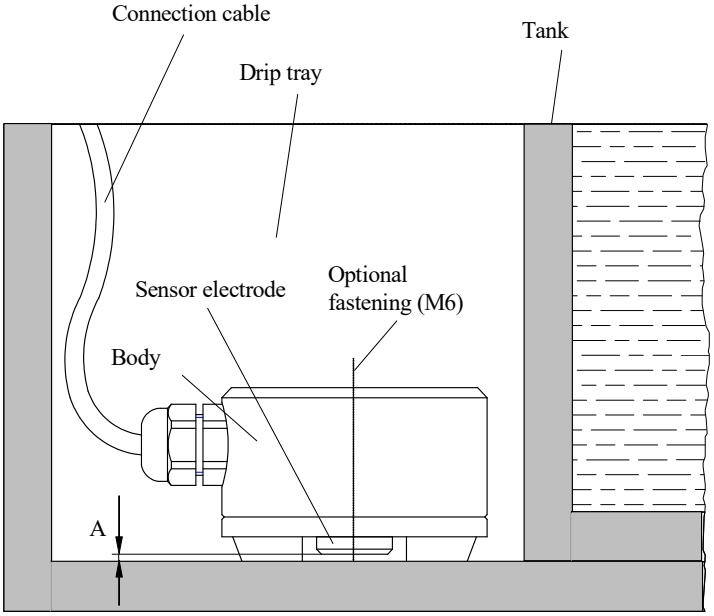


Abb.: 19

7. Operating Instructions

The leak prevention device, consisting of the conductive electrode and the electrode relay, does not require maintenance if it is used in accordance with its intended purpose.

Warning devices must be placed downstream of the system parts of the leak prevention device in accordance with this description. The separated change-over contacts of the output relay can be used at the same time for this purpose. The general operating instructions for the downstream devices must be observed here.

8. Periodic Inspections

The leak prevention devices must be tested for correct functioning by the owner/managing operator at regular intervals, at least once a year.
The test for correct functioning must be performed in a way that will verify the perfect functioning of the leak prevention device in interaction with all components.
The leak detector must be lowered along the lead into the appropriate storage tank. Alternatively, the test can also be conducted in a suitable test vessel with storage fluid. Once the electrode sensor is immersed into the storage fluid, the leakage message must appear. Care must be taken that only the leak detector and not the lead is immersed into the fluid.
Testing the fault: the signal line is interrupted and then short-circuited. In both cases the fault message and the leakage message must appear.
If the ability of the leak prevention device and the measuring transducer to function properly is recognisable in another way (exclusion of function-inhibiting faults), the test can also be done by simulating the corresponding output signal. Further instructions for the testing methodology can be found in e.g. Directive VDI/VDE 2180, page 4.