

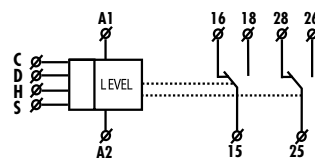
# Level switch HRH-1



- serves for level monitoring in wells, tanks, pools, reservoirs....
- options:
  - single switch with single-state monitoring
  - single switch with double-state monitoring
  - 2 independent switches with single-state switching
- one-state monitors one liquid level ( full or empty), two-state monitors two levels ( switches at one level and switches off at another)
- selectable by DIP switch:
  - drain in
  - drain away
  - combination
- adjustable time delay when activated by level change, type selectable by DIP switch
- sensitivity adjustable by potentiometer
- frequency 50 Hz prevents liquid polarization and increased oxidation of measuring probes
- supply AC 230 V or AC/DC 24 V galvanically separated
- output contact: 2x changeover 16 A /250 V AC1

Technical parameters	HRH-1
Function:	4
Supply terminals:	A1 - A2
Supply voltage:	AC/DC 230 V, AC/DC 24 V, AC 110 V, (galvanically separated)
Consumption:	max. 4.5 VA
Supply voltage tolerance:	-15 %; +10 %
Measuring circuit	
Hysteresis (input - opening):	in an adjustable range 5 kΩ- 100 kΩ
Voltage on electrode:	max. AC 5 V
Current in probes:	AC <1 mA
Time reaction:	max. 400 ms
Max. cable capacity:	4 nF
Length of supply wire to probes:	max. 100 m
Time delay tD:	adjustable 0.5 -10 sec
Time delay tH:	adjustable 0.5 -10 sec
Accuracy	
Setting accuracy (mech.):	± 5 %
Output	
Number of contacts:	2x changeover (AgNi)
Rated current:	16 A / AC1
Breaking capacity:	4000 VA / AC1, 384 W / DC
Inrush current:	30 A / < 3 s
Switching voltage:	250 V AC1 / 24 V DC
Min. breaking capacity DC:	500 mW
Mechanical life:	3x10 <sup>7</sup>
Electrical life (AC1):	0.7x10 <sup>9</sup>
Other information	
Operating temperature:	-20 .. +55 °C
Storage temperature:	-30 .. +70 °C
Electrical strength:	4 kV (supply - output)
Operating position:	any
Mounting:	DIN rail EN 60715
Protection degree:	IP 40 from front panel
Overvoltage category:	III.
Pollution degree:	2
Max. cable size:	solid wire max.1x 2.5 or 2x1.5/ with cavern max. 1x1.5
Dimensions:	90 x 52 x 65 mm, see page 90-92
Weight:	240 g
Standards:	EN 60255-6, EN 61010-1
Measuring sensors:	see page 67

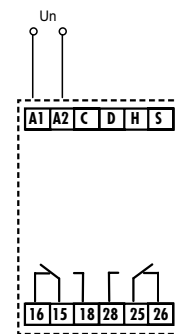
## Symbol



### Terminals description:

- A1, A2 - supply voltage
- C - wire for both probes
- D - wire of bottom probe E2
- H - wire of upper probe E1
- S - earth terminal for possible screening of cable
- 15-16-18 output contact relay 1
- 25-26-28 output contact relay 2

## Connection

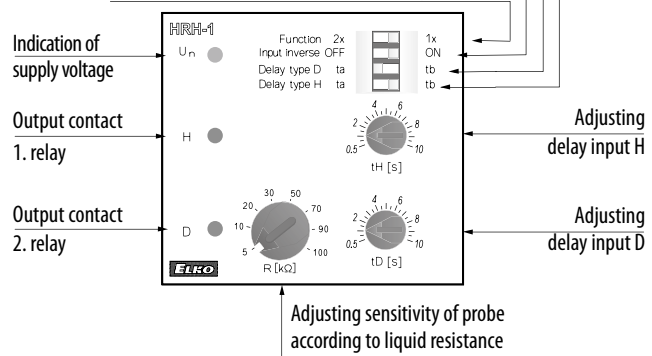


### Selection of delay type of input H

### Selection of delay type of input D

### Inversion of function of input D

### Function selection: double/single level relay



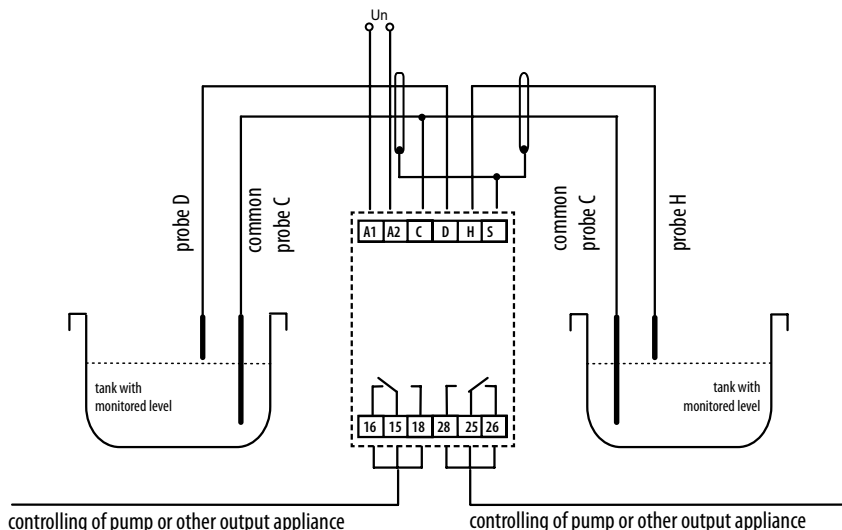
## Funktion description

It is a relay to control levels of conductive liquids (water, chemical solutions, foodstuff. etc.) It means measuring of liquids by measuring probes. AC voltage 5V / 50 Hz is used as a measuring signal. Using this AC signal prevents increased oxidation of probes and undesirable polarization and electrolysis of liquid. It is possible to control two independent levels or to use a combined function for one level control. It depends on DIP switch setting (see also diagram of functions). Relay is equipped by sensitivity regulation that applies to liquid resistance. When the sensitivity is set according to particular conditions it is possible to eliminate some undesirable switching (e.g. pollution of probes, sediments, humidity etc.) It is also possible to set a delay for each probe in range 0.5 - 10 s and by using. DIP switch also the type of delay (when the relay is switched on/off, the choice dependson particular application.

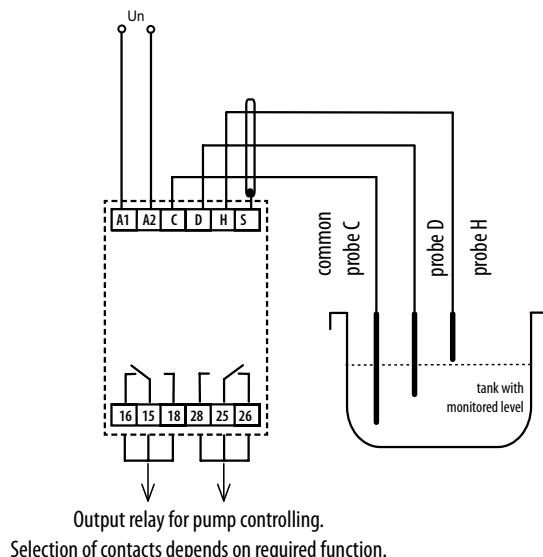
## Measuring probes

Measuring probe can be arbitrary (whatever conductive contact, recommended is using of brass or stainless-steel material). Conductor doesn't need to be screened, but it is recommended according EMC reports. In application of screened conductor is this contacted to terminal S (the earth potential).

monitoring 2 independent containers



monitoring level with combination of upper and bottom probe

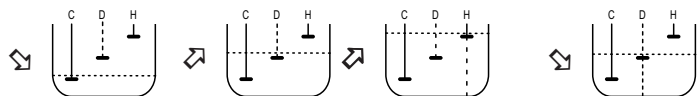


Output relay for pump controlling.  
Selection of contacts depends on required function.

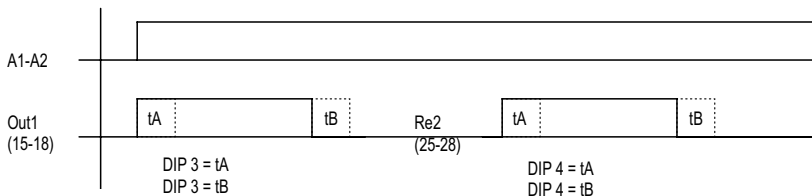
**Note:**

a tank or metal tube, etc. can be used as a common probe. Due probes that are galvanically separated from supply voltage and monitoring voltage up to 5V, is possible to use standard communication cables for connection

**Function**

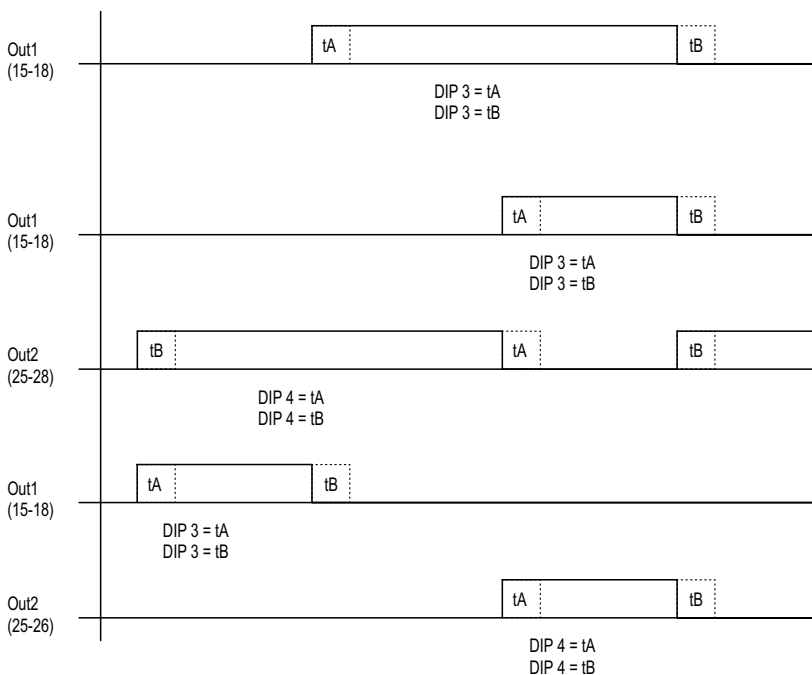


**Level monitoring in two tanks**



2 independent single level switches.  
Relay closed when container is empty.  
DIP 1 = 1x  
DIP 2 = ON

**Level monitoring in one tank**



Input D is inverted when DIP 2 is in position OFF, relay is closed when the container is full. DIP2 = OFF  
Function H is the same as in previous adjustment.

Both probes in one container.  
DIP 1 = 2x  
DIP 2 = ON  
Relay 1 - closed when container is full  
- opened when bottom probe is disconnected  
Relay 2 - closed when bottom probe is disconnected  
- opened when upper probe is closed

Monitoring liquid in container.  
DIP 1 = 1x  
DIP 2 = ON  
Relay 1 closed when bottom probe is disconnected (liquid is being pumped in).  
Relay 2 closed (break contact used), when upper probe is connected (liquid is being pumped out).

# Level switch HRH-2

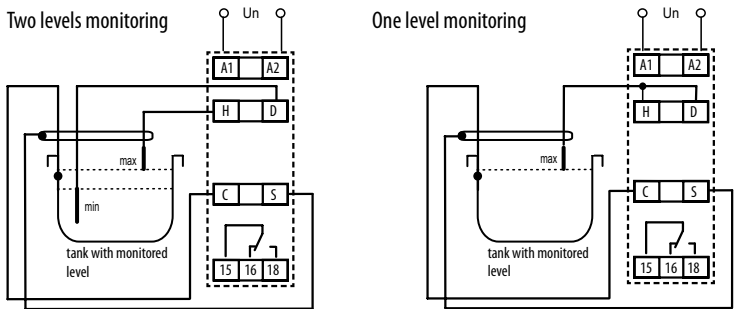
1M



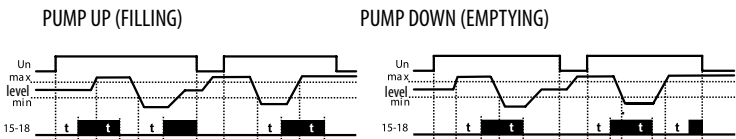
- to control levels in wells, basins, reservoirs, pools, tankers...
- options:
  - single switch with single-state monitoring
  - single switch with double-state monitoring
- one-stated monitors one level, two-stated monitors two levels ( switches on one level and breaks on another)
- selection function of: pump up (filling) or pump down (emptying)
- adjustable time delay of output (1 - 10 s)
- adjustable hysteresis (5 - 100 kΩ)
- frequency 50 Hz avoid liquid polarization and oxidation of measuring probes
- supply AC/DC 230 V, AC/DC 24 V or AC/DC 110 V galvanically separated
- Output kontakt 1x changeover 16 A / 250 V AC1
- 1-MODULE, DIN rail mounting

Technical parameters	HRH-2
Function:	2
Supply terminals:	A1 - A2
Supply voltage:	AC/DC 230 V, AC/DC 24 V or AC 110 V
Consumption:	max. 2.5 VA
Supply voltage tolerance:	-15 %; +10 %
<b>Measuring circuit</b>	
Hysteresis (input resistance):	in an adjustable range 5 kΩ- 100 kΩ
Voltage on electrode:	max. AC 5 V
Current in probes:	AC <0.5 mA
Time reaction:	max. 400 ms
Max. probe capacity:	3 nF
Time delay	adjustable 0-10 sec
<b>Accuracy</b>	
Setting accuracy (mech):	± 5 %
<b>Output</b>	
Number of contacts:	1x changeover (AgNi)
Rated current:	16 A / AC1
Breaking capacity:	4000 VA / AC1, 384 W / DC
Inrush current:	30 A / < 3 s
Switching voltage:	250 V AC1 / 24 V DC
Min. breaking capacity DC:	500 mW
Mechanical life:	3x10 <sup>7</sup>
Electrical life (AC1):	0.7x10 <sup>5</sup>
<b>Other information</b>	
Operating temperature:	-20.. +55 °C
Storage temperature:	-30.. +70 °C
Electrical strength:	3.75 kV (supply - sensor)
Operating position:	any
Mounting:	DIN rail EN 60715
Protection degree:	IP 40 from front panel
Overvoltage category:	III.
Pollution degree:	2
Max. cable size (mm <sup>2</sup> ):	solid wire max. 1x 2.5 or 2x1.5/ with cavern 1x2.5
Dimensions:	90 x 17.6 x 64 mm, see page 90-92
Weight:	76 g
Standards:	EN 60255-6, EN 61010-1
Measuring sensors:	see page 72

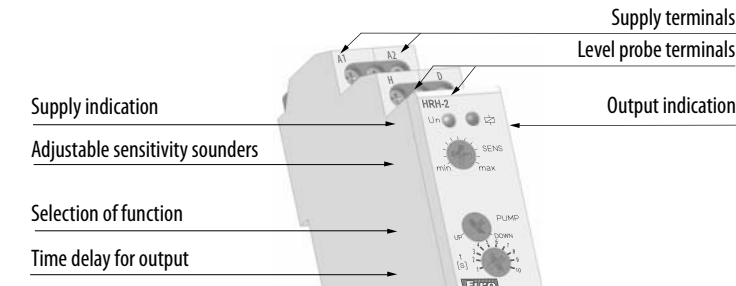
## Connection



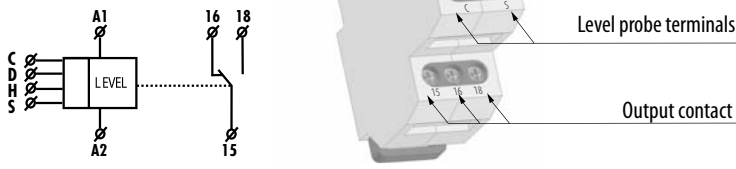
## Function



## Description



## Symbol



## Function description

The HRH-2 is conductive liquid level control relay. The HRH-2 can be used with two probes if the chassis of the holding tank is metal, on non conductive tanks is required a third probe. There are used three probes for measuring: H- high level, D - down level, C - common probe. C-probe is also connectable with protective conductor of supply system (PE). The HRH-2 is selectable for pump up or pump down (filling or emptying). It is possible to set device sensitivity according to liquid conduction (appropriate to liquid resistance in range 5Kohms to 100Kohms). When requested controlling of only one level inputs H+D, must be connected and link to sole sensor. When the HRH-2 is set for pump up (filling) on connection of the auxiliary supply and the level is between the min and max probes the output relay will be de-energised. When the level falls below the min probe the relay output will energise after the set time delay. When the HRH-2 is set for pump down (emptying) on connection of the auxiliary supply and the level is between the min and max probes the output relay will be de-energised. For unwanted switching of output contacts due to level swirling is possible to adjust output delay of 1 - 10 sec. There is recommended screened cable on probes when requested higher immunity against industry interference.

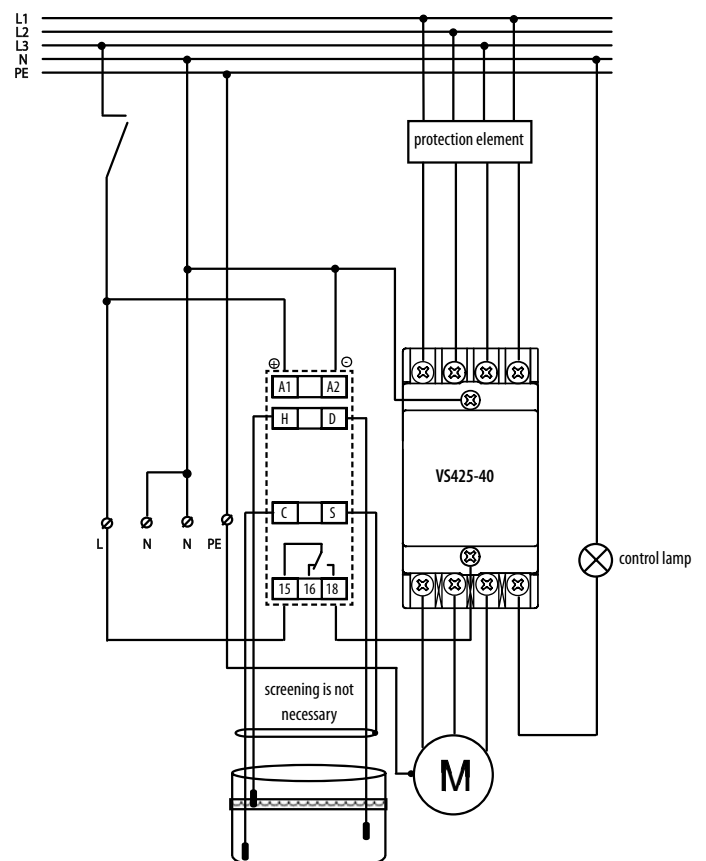
# Level set HRH-4



- in an easy way automatizes operation of pumps depending on level
- control of level in wells, tanks, pools, reservoirs...
- delivered as a connected set – easy installation
- possibility to monitor level of any type of conductive liquid
- designated for an automatic operation in 1-phased and 3-phased pumps
- set of level switch HRH-2 and a contactor VS-425
- function choice – pumping up or down
- unit doesn't have its own protection- it is necessary to ad a suitable protection element
- protection degree of the set is IP55
- there is a possibility of 4 types of probes in a various design (they are not a part of this set)
- unit is placed in a plastic box with dimensions 160x135x83

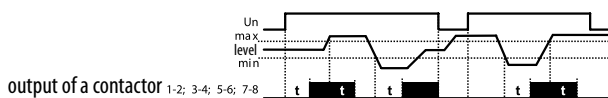
Technical parameters	HRH-4
Function:	2
Supply voltage:	AC/DC 230 V or AC/DC 24 V
Consumption:	7 VA
Supply voltage tolerance:	-15 %; +10 %
<b>Measuring circuit</b>	
Hysteresis (input resistance):	in an adjustable range 5 kΩ- 100 kΩ
Voltage on electrode:	AC 5 V / 50 Hz
Current in probes:	AC <0.5 mA
Max.length of sensor wires:	max. 100 m of unscreened wire
Time reaction:	max. 400 ms
Max. probe capacity:	3 nF
Time delay:	adjustable 0-10 sec
<b>Accuracy</b>	
Setting accuracy (mech):	± 5 %
<b>Output</b>	
Number of contacts:	4x switching
Rated thermal current:	25 A
Loading in AC3:	5.5 kW / 400 V
Mechanical life:	3x10 <sup>6</sup>
<b>Other information</b>	
Operation temperature:	-20... +55 °C
Storage temperature:	-30... +70 °C
Electrical strength (supply-output):	4 kV, galvanically insulated
Operating position:	any
Protection degree:	IP 55
Pollution degree:	2
Dimensions:	160x135x83
Weight:	834 g
Standards:	EN 60255-6, EN 61010-1
Measuring sensors:	see page 72

## Connection

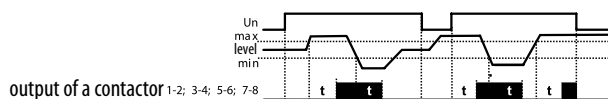


MONITORING RELAYS

### 1. function PUMP UP



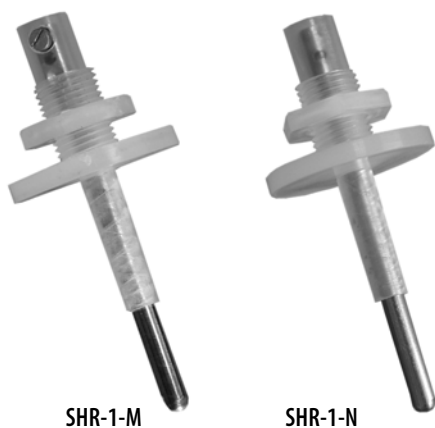
### 2. function PUMP DOWN



## Funktion description

- 1) PUMP UP** - in case the level falls under a lower limit ( sensor D), a relay switches and a pump pumps a liquid up until it reaches an upper limit ( probe H), then a relay opens and a pump stops pumping. When a level reaches a lower limit again, all process is repeated. After the device is energized, relay automatically closes and a pump pumps liquid to upper limit.
- 2) PUMP DOWN** - in case a level reaches over an upper limit, a relay closes and a pump pumps liquid down. In case a level reaches a lower limit, a relay opens and a pump stops pumping.. When energized, a relay is in an open state and a pump operates only after an upper limit is exceeded.
- 3) In case you combine inputs H and D and connect them to one probe, the device will keep only one level (upper and lower limit will become one).**  
 In function PUMP UP relay closes in case the level falls under a probe level. A pump pumps liquid up and in case the level reaches a probe level, a relay opens and a pump stops.  
 The level is kept in a small range around the probe.  
 In function PUMP DOWN relays closes in case a level reaches a probe level. A pump pumps down until the level reaches a probe, then relay opens and pump stops.

# Level sensors SHR - Level switches accessories



SHR-1-M

SHR-1-N

## SHR-1-M: brass sensor

## SHR-1-N: stainless steel sensor

- sensor to control flooding
- electrode with diameter 4 mm is placed in plastic cover with 12 mm screw with nut panel or to holder mounting
- conductor is connected to terminal board, shrink bushing for feeder place insulation is a part of device
- max. wire profile: 2.5 mm<sup>2</sup>
- installation: after connecting a wire to the sensor, run the shrink bushing over the wire onto the sensor. Heat the sensor and by shrinking the connection of sensor and wire will be hermetical
- weight: 9.7 g
- operating temperature: - 25...+60 ° C
- total sensor length: 65.5 mm



## SHR-2

- detection sensor is electrode, which in connection with switchable device is used for level detection for example in wells, tanks,...
- to be used in electric conductive fluids and mechanically polluted fluids with temperature: +1...+80 ° C
- stainless steel one-pole electrode reside in PVC cover, intended for tank wall mounting or mounting by socket
- to ensure correct function of the sensor, it is necessary to have the electrode without dirt which could disable the connection of the electrode and fluid and thus lead to malfunction
- max. wire profile: 2.5 mm<sup>2</sup>, recommended wire ÖLFON FEP 1x1.0 BK
- installation:
  - conductor wire is connected by fastening of two brass screws to stainless steel electrode
  - conductor is caulked by bushing Pg7 with protection degree IP68
- weight: 48.6 g
- dimensions: max. diameter 21 mm, length 96 mm

## SHR-2 in open state



## SHR-3

- stainless probe to be used into demanding industrial environments, designated for screwing into tank wall or cover
- the probe is installed in horizontal, vertical or in sidelong position on tank side or in tank cover. Installation is done by soldering or by fixing nut. It is necessary to use 24mm screw. It is necessary to use an adequate torque with regards to a seal and operational overpressure in a tank
- sensor has connecting wire - length 3 m, which is connected to sensor to scan electrode and sensor bushing
- connecting wire is double-wire PVC 2 x 0.75 mm<sup>2</sup>, connection of wires: brown - scan electrode, blue - sensor bushing
- connection M18x1.5 screw
- protection degree IP 67,
- sensor weight without cable: 100 g
- operating surroundings: place without the danger of detonation, temperature on screw: max. 95 ° C, pressure immunity: on 25 ° C 4 MPa, on 95 ° C 1.5 MPa
- weight: 239 g
- material: bushing and scan electrode: stainless steel W.Nr. 1.4301, insulation insert of electrode: PTFE,
- internal material: self-extinguishing epoxide resin

## Dimensions

