### HRH-5
Simple version,
2 functions, galvanically separated supply voltage UNI 24 to 240 V AC/DC.
page 117

### HRH-7
Suitable to operate in harsh conditions due to the high degree of protection IP65. Switch monitors the level changes in wells, reservoirs, tanks, tankers etc.
page 118

### HRH-8
8 functions, advanced setting for various combinations, galvanically separated supply AC 230 V or AC/DC 24 V,
2 output contacts/
2 PDT 16 A.
page 120

### HRH-9
The relay allows monitoring of up to 6 levels in one tank, while each probe has its own output contact, sensitivity range 10 - 470 kΩ
page 122

### HRH-6
Device monitors 5 levels by using six probes.
Supply voltage: 12-24 V DC or galvanically separated 230 V AC.
page 124

### HRH-9/S
Additional probe status signaling to HRH-9.
page 122
str. XY

## Level sets

### HRH-4
A set of level relay HRH-5 and a contactor VS425.
For automatic operation 1-phase and 3-phase pumps. 2 functions. IP55.
page 126

## Accessories

### SHR
Level sensors
SHR-1(M, N) - for monitoring flooding.
SHR-2- for level detection.
SHR-3 - for demanding and industrial environment.
page 128

### Cable, wire
D03VV-F 3x0,75/3,2 - cable to SHR-1 and SHR-2 probes.
D05V-K 0,75/3,2 - wire to SHR-1 and SHR-2 probes.
page 129

| Type | Design | Supply voltage | Secure variables | | Settings | | | Description | Page |
|---|---|---|---|---|---|---|---|---|---|
| | | | Level max. | Level min. | Delay | Sensitivity Probe | Function | | |
| HRH-5 | 1-M | AC/DC 24-240 V | • | • | • | • | • | Measuring the frequency of 10 Hz will protect liquid from polarisation and measuring probes from increased oxidation. Galv. separated power supply. | 117 |
| HRH-7 | IP65 BOX | AC/DC 24-240 V | • | • | • | • | • | Suitable to work in harsh conditions due to the high degree of protection IP65. | 118 |
| HRH-8/230 V<br>HRH-8/110 V<br>HRH-8/400 V<br>HRH-8/24 V | 3-M | AC 230 V<br>AC 110 V<br>AC 400 V<br>AC/DC 24 V | • | • | • | • | • | Sensitivity adjustable by potentiometer. Galvanically separated power supply. | 120 |
| HRH-9 | 6-M | AC/DC 24-240 V | • | • | • | • | • | It monitors up to 6 level levels, each with its own output contact. Optional filling/draining function for each probe separately incl. delay options. Sensitivity can be set automatically or manually. | 122 |
| HRH-6/AC<br>HRH-6/DC | IP65 BOX | AC 230 V<br>AC/DC 12-24V | • | • | • | • | • | * Devices mainly designated for monitoring water level in fire-engine tanks. | 124 |
| HRH-4/230 V<br>HRH-4/24 V | IP65 BOX | AC 230 V<br>AC/DC 24 V | • | • | • | • | • | Unit with no protection devices - adequate protection element needs to be integrated before the unit. Ingress protection of the assembly is IP65. | 126 |

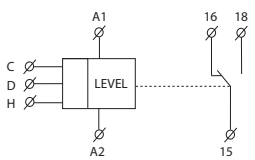
- Relay is designed for monitoring levels in wells, basins, reservoirs, tanks,...
- In one device you can choose the following configurations:
  - One-level switch of conductive liquids (by connecting H and D)
  - Two-level switch of conductive liquids.
- One-state device monitors one level, two-state device monitors two levels (switches on one level and switches off on another level).
- Adjustable time delay on the output (0.5 - 10s).
- Sensitivity adjustable by a potentiometer (5 - 100 kΩ).
- Measuring frequency 10 Hz prevents polarization of liquid and raising oxidation of measuring probes.
- Galvanically separated supply voltage UNI 24 to 240 V AC/DC.

EAN code
HRH-5: 8595188136396

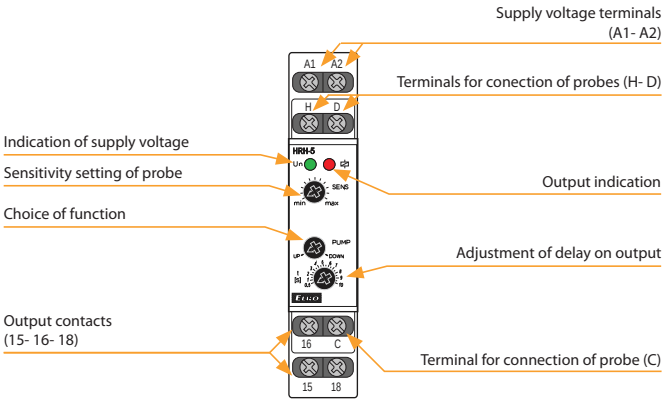
| Technical parameters | HRH-5 |
|---|---|
| Functions: | 2 |
| Supply terminals: | A1 - A2 |
| Voltage range: | AC/DC 24 - 240 V (AC 50-60 Hz) |
| Input: | max. 2 VA/1.5 W |
| Max. dissipated power (Un + terminals): | 2 W |
| Toleration of voltage range: | -15 %; +10 % |
| **Measuring circuit** | |
| Sensitivity (input resistance): | adjustable in range 5 kΩ - 100 kΩ |
| Voltage n electrodes: | max. AC 3.5 V |
| Current in probes: | AC < 0.1 mA |
| Time response: | max. 400 ms |
| Max. capacity of probe cable:* | 800 nF (sensitivity 5 kΩ), 100 nF (sensitivity 100 kΩ) |
| Time delay (t): | adjustable, 0.5 -10 sec |
| Time delay after switching on (t1): | 1.5 sec |
| **Accuracy** | |
| Accuracy in setting (mech.): | ± 5 % |
| **Output** | |
| Number of contacts: | 1x changeover/SPDT (AgNi/Silver Alloy) |
| Current rating: | 8 A/AC1 |
| Switching voltage: | 2000 VA/AC1, 240 W/DC |
| Switched voltage: | 250 V AC/24 V DC |
| Mechanical life (AC1): | 60.000.000 ops. |
| Electrical life: | 150.000 ops. |
| **Other information** | |
| Operational temperature: | -20 °C to 55 °C (-4 °F to 131 °F) |
| Storing temperature: | -30 °C to 70 °C (-22 °F to 158 °F) |
| Dielectrical strenght: | 2.5 kV (supply - sensors) |
| Operational position: | any |
| Mounting: | DIN rail EN 60715 |
| Protection degree: | IP40 from font panel/IP10 terminals |
| Overvltage category: | II. |
| Pollution degree: | 2 |
| Profile of connecting wires (mm²): | max. 2x 2.5, max. 1x 4/ with sleeve max. 1x 2.5, max. 2x 1.5 (AWG 12) |
| Dimensions: | 90 x 17.6 x 64 mm (3.5˝ x 0.7˝ x 2.5˝) |
| Weight: | 73 g (2.6 oz.) |
| Standards: | EN 60255-1, EN 60255-26, EN 60255-27, EN 60669-1, EN 60669-2-1 |
| Recommended measuring probes: | see pg. 128 |

* Max. line length is limited by the capacity between the individual cable cores.

## Symbol

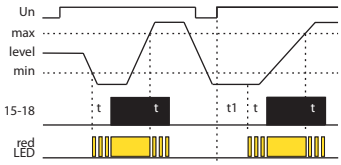



## Device description

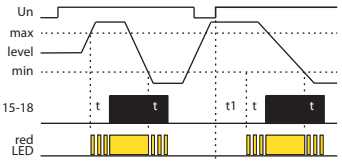



## Function

Function PUMP UP



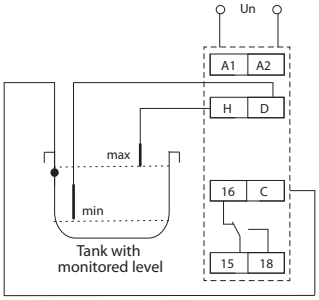

Function PUMP DOWN



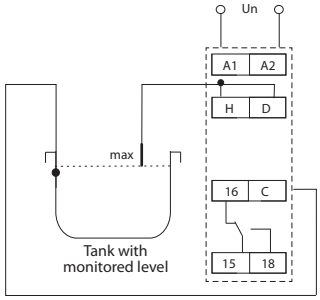

Relay is designated for monitoring of levels of conductive liquids with possibility of functions: PUMP UP or PUMP DOWN. To prevent polarization and liquid electrolysis of liquid, and undesirable oxidation of measuring probes, alternating current is used. For measuring use three measuring probes: H- upper level, D- lower level, C - common probe. In case you use a tank made of a conductive material, you can use it as probe C. In case you require monitoring of one level only, it is neccessary to connect inputs H and D and connect them to one probe - in this case sensitivity is lowered by half (2.5 to 50 kΩ). Probe C can be connected with a protective wire of supply system (PE). To prevent undesirable switching out output contacts by various influences (sediment on probes, humidity,...) it is possible to set sensitivity of the device according to conductivity of monitored liquid (corresponding to "resistance" of liquid) range 5 up to 100 kΩ. To reduce infuences of undesirable switching of output contacts by liquid gorgle in tanks, it is possible to set delay of output reaction 0.5 - 10 s.

## Connection

Monitoring of two levels




Monioring of one level



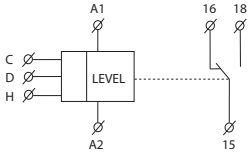
# HRH-7 | Level switch for monitoring 1 or 2 levels in increased protection




EAN code
HRH-7: 8595188149471

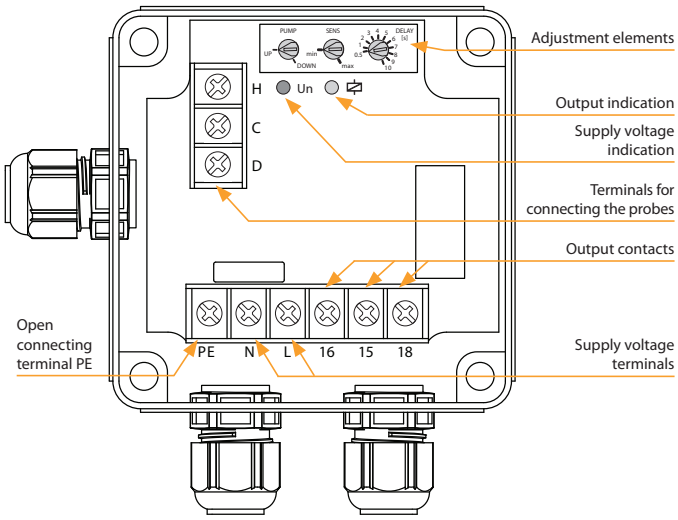
| Technical parameters | HRH-7 |
|---|---|
| Function: | 2 |
| Supply terminals: | A1 - A2 |
| Supply voltage: | AC/DC 24 - 240 V (AC 50-60 Hz) |
| Burden: | max. 2 VA/1.5 W |
| Max. dissipated power (Un + terminals): | 3 W |
| Supply voltage tolerance: | -15 %; +10 % |
| Max. value of overcharge protection: | 16 A |
| **Measuring circuit** | |
| Sensitivity (input resistance): | adjustable from 5 kΩ - 100 kΩ |
| Voltage on electrodes: | max. AC 3.5 V |
| Current on probes: | AC < 0.1 mA |
| Time response: | max. 400 ms |
| Max. capacity of probe cable: | 800 nF (sensitivity 5kΩ), 100 nF (sensitivity 100 kΩ) |
| Time delay (t): | adjustable, 0.5 -10 sec |
| Time delay (t1): | 1.5 sec |
| **Accuracy** | |
| Setting accuracy (mechanical): | ± 5 % |
| **Output** | |
| Number of contacts: | 1x changeover/DPDT ($AgSnO_2$) |
| Current rating: | 16 A/AC1 |
| contact NO: | 15-18: 6 A/AC3 |
| contact NC: | 15-16: 3 A/AC3 |
| Switching capacity: | 4000 VA/AC1, 384 W/DC |
| Switching voltage: | 250 V AC/24 V DC |
| Mechanical life: | 30.000.000 ops. |
| Electrical life (AC1): | 100.000 ops. |
| **Other information** | |
| Operating temperature: | -20 °C to 55 °C (-4 °F to 131 °F) |
| Storage temperature: | -30 °C to 70 °C (-22 °F to 158 °F) |
| Dielectrical strength: | 3.75 kV (supply - sensor) |
| Operating position: | any |
| Protection: | IP65 |
| Overvoltage category: | III. |
| Contamination degree: | 2 |
| Cable size ($mm^2$): | max. 2x 2.5/ with sleeve max. 2x 1.5 (AWG 12) |
| Dimension: | 139 x 139 x 56 mm (5.5" x 5.5" x 2.2") |
| Weight: | 241 g (8.5 oz.) |
| Related standards: | EN 60255-1, EN 60255-26, EN 60255-27, EN 60669-1, EN 60669-2-1 |
| Recommended measuring probes: | see pg. 128 |

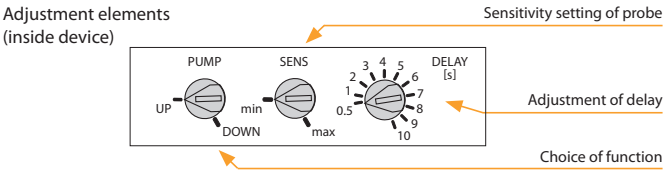
## Symbol




- Suitable to operate/work in harsh conditions due to the high degree of protection IP65.
- Swich monitors the level changes in wells, reservoirs, tanks, tankers etc.
- It is possible to select the following configurations:
  - one-level switch of conductive liquids monitors one level (by connecting H and D)
  - two-level switch of conductive liquids monitors two levels (switches on at one level and switched off at another level).
- Adjustable time delay of output (0.5 - 10 s).
- Adjustable sensitivity using potentiometer (5 -100 kΩ).
- Measuring frequency 10 Hz prevents liquid polarization and increased oxidation of measuring probes.
- Measuring circuits are galvanically separated from the power source of the product and circuits of the relay contact by enhanced insulation according to EN 60664-1 for overvoltage category III.

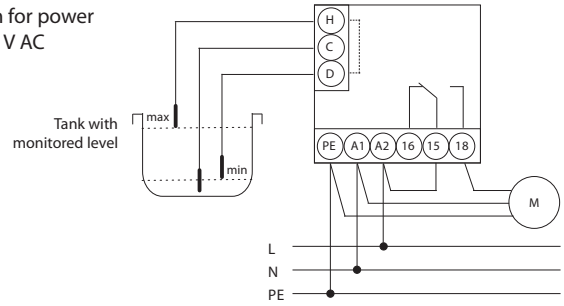
## Device description



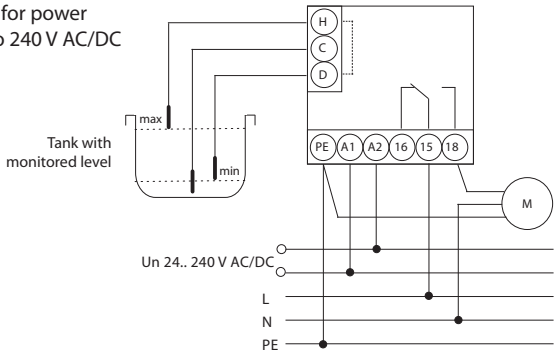




## Connection

connection for power supply 230 V AC



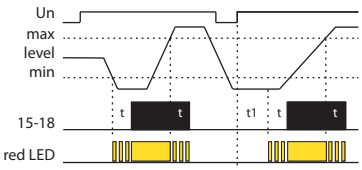

connection for power supply 24 to 240 V AC/DC



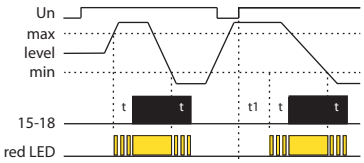
# **HRH-7** | Level switch for monitoring 1 or 2 levels in increased protection

## Function

Function PUMP-UP




Function PUMP-DOWN




An AC current is used for measuring to prevent polarization and electrolysis of fluid and unwanted oxidation of measuring probes. Three probes are used for measuring: H - upper level, D - lower level and C - common probe. If using a tank made from conductive material, it is possible to use the tank itself as probe C.

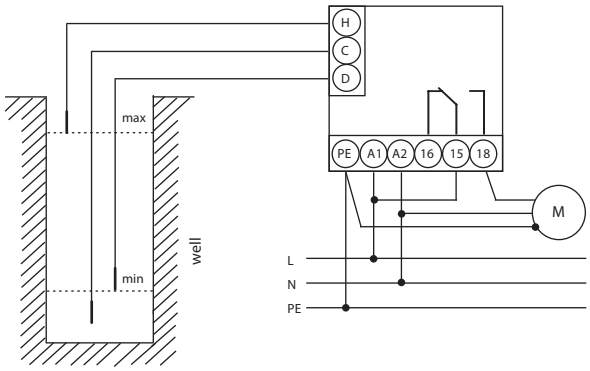
If it is necessary to monitor only one level, there are two connection options:

1. Inputs H and D are connected to a single probe - in this case the sensitivity is decreased to half (2.5 to 50 kΩ).
2. Inputs H and C are connected and the probe is connected to input D - in this case, the original sensitivity remains (5 to 100 kΩ).

It is also possible to connect probe C with a protective conductor of the power system (PE).

## Example of connecting the level switch to a 1-phase pump at a well, borehole

wiring for supply 230 V AC (for monitoring two levels)




**Monitoring TWO LEVELS of the FLUID LEVEL minimum/maximum - DRAINING function - (PUMP DOWN)**

Description of draining function:

This function is used in a well or borehole, where the difference between the upper and lower probes determines, how much water the pump can pump out and protect against running dry.

After detecting the maximum level, the set reaction delay begins running. After this period, the output contact immediately switches on the pump, until the minimum level is reached, when the set delay begins running once again. The pump then switches off.

**Monitoring TWO LEVELS minimum/maximum - REPLENISHING function - (PUMP UP)**

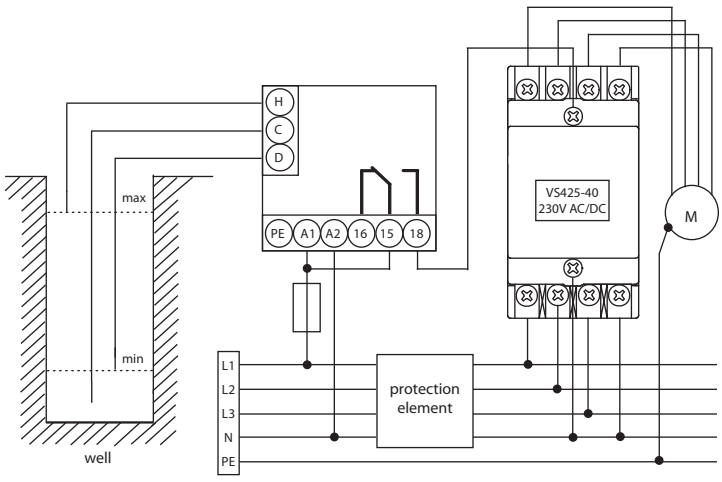
Description of replenishing function:

This function is used when you need to regularly pump in water to a well or borehole, which is leaking.

After detecting the minimum level, the set reaction delay begins running. After this period, the output contact immediately switches on the pump for the period, until it reaches the maximum level, where the set delay begins running once again. The pump then switches off.

## Example of connecting the level switch to a 3-phase pump at the well, borehole

wiring for supply 230 V AC (for monitoring two levels)




**Monitoring TWO LEVELS minimum/maximum - DRAINING function - (PUMP DOWN)**

Description of draining function:

The function is used to protect against overflows and flooding of areas. After detecting the maximum level, the set reaction delay begins running. After this period, the output contact immediately switches on the 3-phase pump, until the minimum level is reached, when the set delay begins running once again. The pump then switches off.

# HRH-8 | Multifunction level switch for monitoring 1 or 2 levels



EAN code
HRH-8/110V: 8595188156387
HRH-8/230V: 8595188155427
HRH-8/24V: 8595188155564
HRH-8/400V: 8595188171199

- Relay is designed to control the level of conductive liquids in wells, tanks, pools, tankers, reservoirs,... (replacement HRH-1).
- Galvanically isolated supply and guard circuits.
- Within one device, the following configurations can be selected:
  - 2x one-level monitoring (in separate tanks)
  - 1x two-level monitoring (in one tank)
  - pumping from one tank to another.
- DIP switch selection on the front panel (8 functions).
- Adjustable probe sensitivity (for each probe separately).
- Adjustable relay switching delay (for each probe separately).
- 10 Hz watch frequency prevents polarization of the liquid and increases resistance to interference by network frequency.

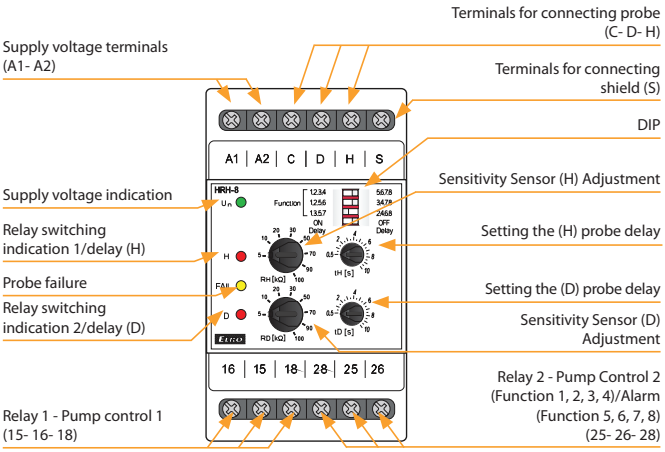
| Technical parameters | HRH-8 |
|---|---|
| Function: | 8 |
| Supply terminals: | A1 - A2 |
| Voltage range: | AC 110 V, AC 230 V, AC 400 V or AC/DC 24V galvanicaly separated (AC 50-60Hz) |
| Burden max.: | 2.5 W/5 VA (AC 230 V, AC 110 V, AC 400 V), 1.4 W/2 VA (AC/DC 24 V) |
| Max. dissipated power (Un + terminals): | 4 W (110 V, 230 V, 400 V); 3 W (24 V) |
| Supply voltage tolerance: | -15 %; +10 % |
| **Measuring circuit** | |
| Hysteresis (input - opening): | in an adjustable range 5 kΩ - 100 kΩ |
| Voltage on electrode: | max. AC 3.5 V |
| Current in probes: | AC < 1 mA |
| Time reaction: | max. 400 ms |
| Max. cable capacity: | 800 nF (sensitivity 5kΩ), 100 nF (sensitivity 100 kΩ) |
| Time delay t: | adjustable 0.5 -10 sec |
| **Accuracy** | |
| Setting accuracy (mech.): | ± 5 % |
| **Output** | |
| Number of contacts: | 2x changeover/SPDT (AgNi/Silver Alloy) |
| Current rating: | 16 A/AC1 |
| Breaking capacity: | 4000 VA/AC1, 384 W/DC |
| Inrush current: | 30 A/< 3 s |
| Switching voltage: | 250 V AC/24 V DC |
| Output indication: | red LED |
| Mechanical life: | 10.000.000 ops. |
| Electrical life (AC1): | 100.000 ops. |
| **Other information** | |
| Operating temperature: | -20 °C to 55 °C (-4 °F to 131 °F) |
| Storage temperature: | -30 °C to 70 °C (-22 °F to 158 °F) |
| Dielectric strength: | 4 kV (supply - output) |
| Operating position: | any |
| Mounting: | DIN rail EN 60715 |
| Protection degree: | IP40 from front panel/IP20 terminals |
| Overvoltage category: | III. |
| Pollution degree: | 2 |
| Max. cable size ($mm^2$): | solid wire max. 1x 2.5 or 2x1.5/with cavern max. 1x 1.5 (AWG 12) |
| Dimensions: | 90 x 52 x 65 mm (3.5˝ x 2˝ x 2.6˝) |
| Weight: | 247 g/8.7 oz (110 V, 230 V, 400 V); 145 g/5.1 oz (24 V) |
| Standards: | EN 60255-1, EN 60255-26, EN 60255-27, EN 60669-1, EN 60669-2-1 |
| Measuring sensors: | see pg. 128 |

## Measuring probes

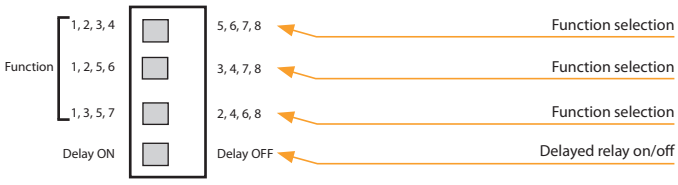
There can be any measuring probe (any conductive contact, it is recommended to use brass or stainless steel).
The probe wire does not need to be shielded, but it is recommended.
When using a shielded wire, the shielding is connected to terminal S.

## Description

HRH-8/24V

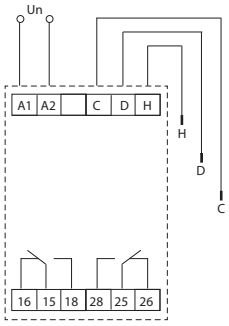



## Description and importance of DIP switches

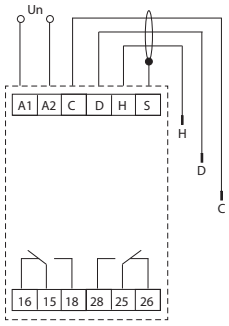



## Connection

HRH-8 (110V, 230V, 400V)

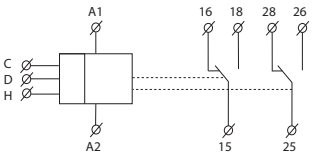



HRH-8/24V

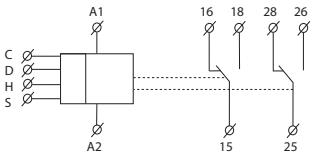



## Symbol

HRH-8 (110V, 230V, 400V)

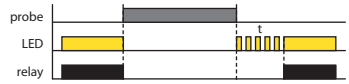



HRH-8/24V

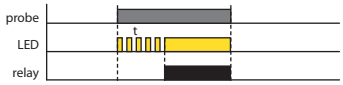


## Functions

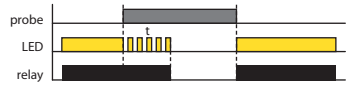
PUMP UP, ON DELAY (Function 1,3,4)




PUMP DOWN, ON DELAY (Function 2,3,4)

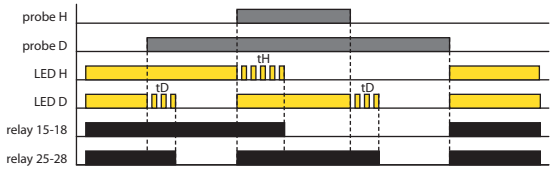



PUMP UP, OFF DELAY (Function 1,3,4)

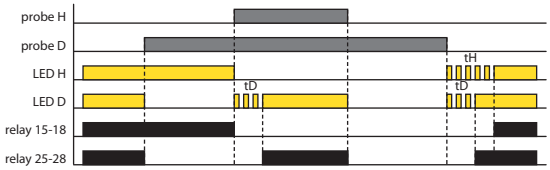



PUMP DOWN, OFF DELAY (Function 2,3,4)

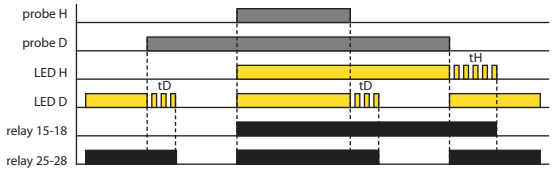

PUMP UP, OFF DELAY (Function 5)



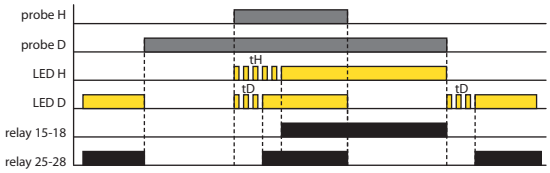

PUMP UP, ON DELAY (Function 5)



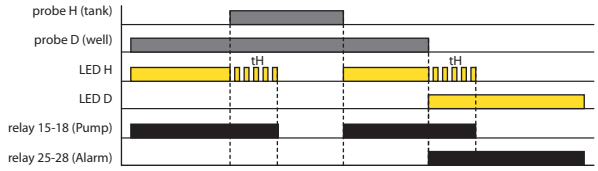

PUMP DOWN, OFF DELAY (Function 6)



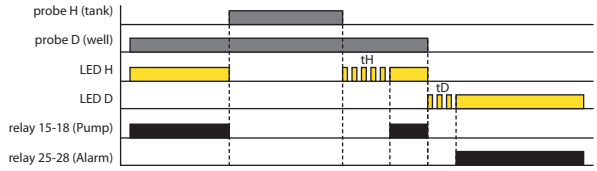

PUMP DOWN, ON DELAY (Function 6)



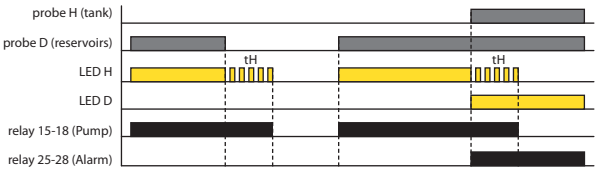

WELL - TANK, OFF DELAY (Function 7)



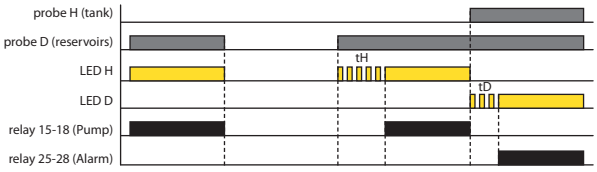

WELL - TANK, ON DELAY (Function 7)




RESERVOIRS - TANK, OFF DELAY (Function 8)




RESERVOIRS - TANK, ON DELAY (Function 8)




The relay is designed to monitor the level of conductive liquids with a choice of 8 functions:

1) - 2 separate tanks (each with 1 probe) - both PUMP UP (filling)
2) - 2 separate tanks (each with 1 probe) - both PUMP DOWN (emptying)
3) - 2 separate tanks (each with 1 probe) - H PUMP DOWN probe, D PUMP UP probe
4) - 2 separate tanks (each with 1 probe) - H PUMP UP probe, probe D PUMP DOWN
5) - both probes in one tank - PUMP UP - maintain level between probes H and D (as HRH-5), relay 1 switches on the pump, relay 2 alarm (level is not between probes H and D)
6) - Both probes in one tank - PUMP DOWN - maintaining the level between probes H and D (as HRH-5), relay 1 switches on the pump, relay 2 alarm (the level is not between probes H and D)
7) - Pumping from the well to the tank - probe D in the well, probe H in the tank. The pump only runs if the probe D is flooded (enough water in the well) and the tank is not full (probe H). The alarm reports a lack of water in the well (probe D is not flooded).
8) - Pumping from the sump to the tank - probe D in the sump, probe H in the tank. The pump only runs if the probe D is flooded (full tank) and the tank is not full (probe H). The alarm reports the status of full tank and sump (both probes are flooded).

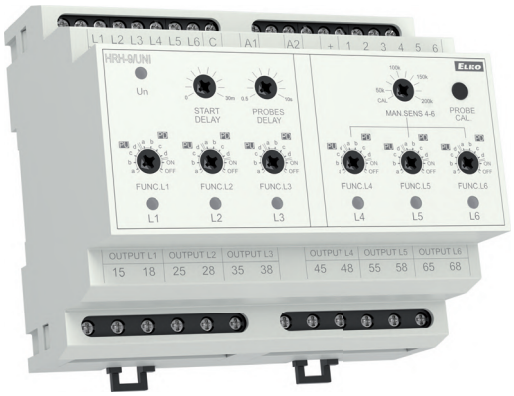
LED indication:
The red LED lights up - the corresponding relay is switched on
Red LED flashes - delay timing
The yellow LED indicates probe failure - Functions 5, 6 probe H is flooded and probe D is not. At the same time both red LEDs flash.

To prevent polarization and electrolysis of the liquid and undesirable oxidation of the monitoring probes, an AC current of 10 Hz is used for monitoring. The low frequency has a positive effect on suppression of interference by 50 (60) Hz. Three probes are used to monitor the level: H - upper level, D - lower level and C - common probe. In the case of the use of a conductive material tank, it is possible to use the tank itself as a C probe. Probe C can also be connected to the protective conductor of the power supply system (PE). To prevent undesired switching by various influences (soiling of dips, moisture ...), the sensitivity of the device can be set according to the conductivity of the liquid being monitored (corresponding to the "resistance" of the liquid) in the range of 5 to 100 kΩ. To limit the effect of undesired switching of output contacts by raising the liquid level in the tank, it is possible to set the output response delay 0.5 - 10 s.

# HRH-9 | Universal level switch for monitoring up to 6 levels



NEW

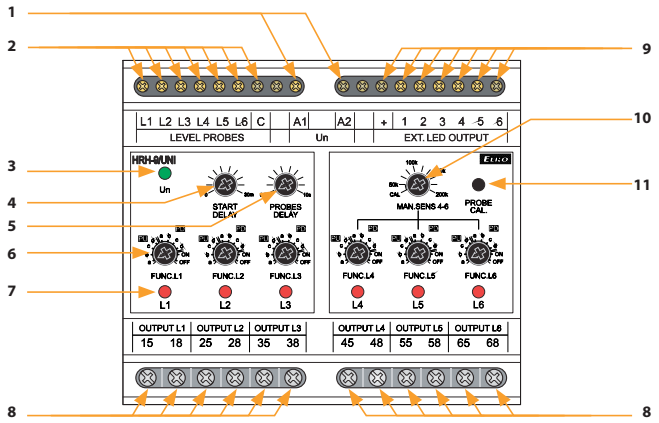


EAN code
HRH-9: 8595188181334
HRH-9/S: 8595188181853

- The relay is designed to control the level of conductive liquids in wells, sumps, tanks, pools, tankers, reservoirs ...
- Galvanically separated power and monitoring circuits.
- Possibility to connect up to 6 level probes (+ one common probe).
- Each probe has its own output relay function selection for each probe separately.
- Adjustable delay after power on (START Delay).
- Adjustable relay closing delay (Probe Delay) - common for all probes.
- Automatic calibration of the sensitivity of the probes according to the conductivity of the monitored liquid.
- For probes 4, 5, 6 possibility of manual sensitivity adjustment.
- A monitoring frequency of 10 Hz prevents polarization of the liquid and increases the resistance to mains frequency interference.

| Technical parameters | HRH-9 |
|---|---|
| **Supply** | |
| Supply terminals: | A1 - A2 |
| Supply voltage: | AC/DC 24 to 240V (AC 50-60Hz) |
| Supply voltage tolerance: | -15% +10% |
| galvanicaly separated voltage: | yes |
| Burden max.: | 2W, 4VA |
| Max. dissipated power (Un + terminals): | 10 W |
| Power indication: | green LED |
| **Measuring circuit** | |
| Number of level probes: | 6 + 1 common |
| Adjustable probe function: | PUMP UP, PUMP DOWN, ON, OFF |
| Voltage on probes: | 5V AC max./10Hz |
| Time reaction in probes: | 1,1s |
| Time delay (PROBE DELAY): | adjustable 0.5 - 10s |
| Max. capacity of probe cable: | 16nF (sensitivity 470 kΩ), 500nF (sensitivity 9,1 kΩ) |
| Probe sensitivity calibration range: | 10kΩ to 470kΩ |
| Sensitivity range of probes manually (for probes 4, 5, 6): | 50kΩ to 470 kΩ |
| Time delay (START DELAY): | adjustable 0 to 30min |
| Probe status indication: | red LED + external LED |
| **Output** | |
| Number of contacts: | 6x switching ($AgSnO_2$) |
| Current rating: | 10A (AC1) |
| Switching voltage max.: | 250V AC |
| Breaking capacity max.: | 2500VA |
| Mechanical life: | 10.000.000 ops. |
| Electrical life (AC1): | 100.000 ops. |
| **Other information** | |
| Operating temperature: | |
| Storage temperature: | -20 to +55°C (-4 to 131 °F) |
| Dielectrical strength: | -30 to +70°C (-22 to 158 °F) |
| power supply - probes | AC 4kV |
| power supply - relay contacts | AC 4kV |
| contacts of adjacent relays | AC 4kV |
| Operating position: | any |
| Mounting: | DIN rail EN 60715 |
| Protection degree: | IP40 from front panel/IP20 terminals |
| Overvoltage category: | III. |
| Pollution degree: | 2 |
| Max. cable size ($mm^2$) | |
| probes/power supply/signaling: | solid wire max. 1x 2.5 or 2x1.5/with cavern max. 1x 1.5 (AWG 12) |
| output part: | solid wire max. 1x 2.5 or 2x1.5/with cavern max. 1x 1.5 (AWG 12) |
| Dimensions: | 90 x 105 x 65mm (3.5˝ x 4.1˝ x 2.6˝) |
| Weight: | 252 g (8.9 oz.) |
| Standards: | EN 60255-1, EN 60255-26, EN 60255-27, EN 60669-1, EN 60669-2-1 |

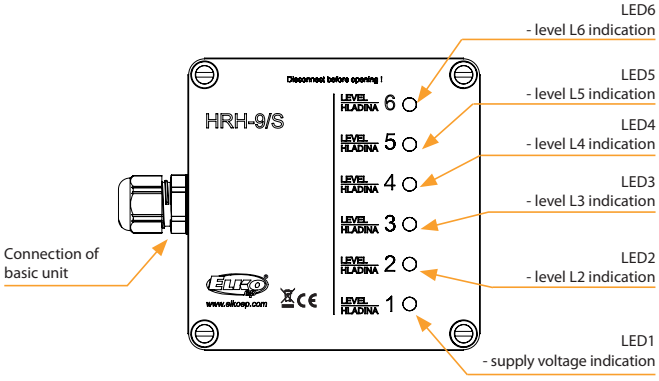
## Description




1 Supply voltage terminals
2 Terminals for probes connection
3 Supply voltage indication
4 Setting delay after switching on
5 Delay setting relay closing
6 Probe function setting (L1)
7 Probe status indication (L1)
8 Probe output contact (L1)
9 Terminals for connecting external signaling HRH-9/S
10 Manual adjustment of probe sensitivity L4,L5, L6
11 Calibration button of connected probes

## Function

HRH-9/S



## Function

Green LED Un:
- Flashes for START DELAY after the power is turned on
- During this time the device does not respond to the state of the level probes
- After START DELAY, the green LED lights up permanently

START DELAY control:
- sets the START DELAY, delay in the range 0 to 30 minutes

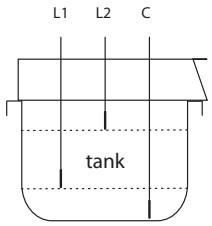
Level probe function switch FUNC. L1 (L2 to L6):
A total of 6 level probes L1 to L6 + common probe C can be connected to the device. Each probe has its own function switch, which sets the functions PUMP UP, PUMP DOWN, ON - permanently
Relay closed, OFF - permanently open relay.
- Positions 1 - 4 = PUMP UP
- Positions 5 - 8 = PUMP DOWN
- Position 9 = ON (relay permanently closed, red LED lit)
- Position 10 = OFF (relay open, red LED not lit)

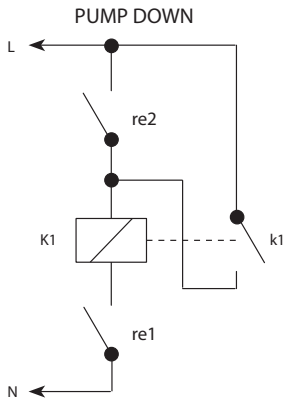
Each of the PUMP UP, PUMP DOWN functions has 4 response delay setting options:
a - function without delay
b - ON DELAY - delayed closing of the relay
c - OFF DELAY - delayed opening of the relay
d - ON/OFF DELAY - delayed closing and opening of the relay

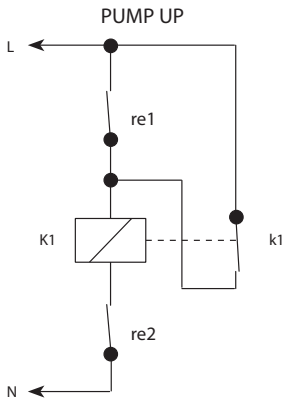
Each probe then controls its output relay depending on the function switch setting. If a probe is not used, its switch must be set to OFF or ON.
PROBES DELAY control:
- sets the delay of the relay response to the change of the state of the level probes
- Delay is standard for all probes - range 0.5 to10s

LED indication of the status of probes L1 to L6:
Each probe has its own red LED, indicating the status of the probe + output for external LED additional signalling, which copies the status of the internal red LED:
- Probe is not immersed - the red LED is off
- Probe is immersed, the delay is not running - the red LED is lit.
- Probe has just been immersed and the delay is running - red LED flashes (shorter pulse)
- Probe has just surfaced and a delay is running - red LED flashes (longer pulse)
- Calibration error - red LED flashes quickly

## Wiring example



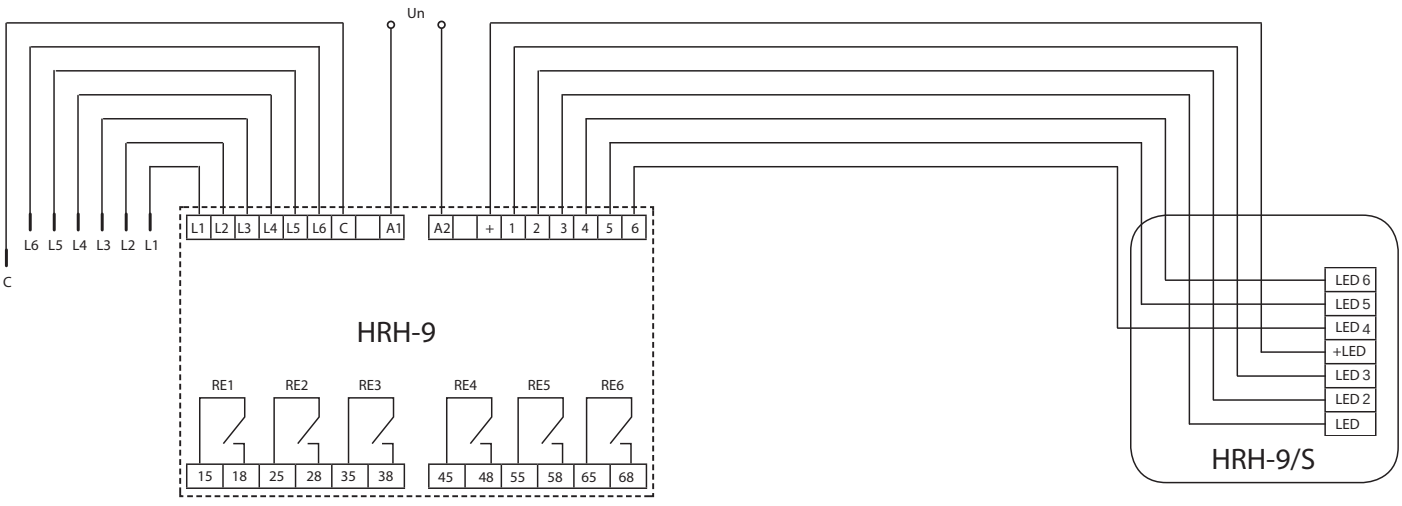




Level probes in the tank:
- the common probe C is positioned so that it is always immersed
- the position of the L1 probe determines the lower level, the position of the L2 probe determines the upper level
- the connection is used to maintain the level between the L1 and L2 probes

Description of the PUMP DOWN function:
- if the tank is empty, both probes L1 and L2 are not immersed, both relays re1 and re2 are open. Contactor K1 controlling the pump is also open (pump stopped)
- if the tank is filled, after reaching the L1 level the relay re1 closes and the state does not change further
- after reaching the level L2 the relay re2 closes and at the same time the contactor K1 closes (the pump works)
- when the level drops below L2, relay re2 opens, but the contactor remains closed via its switching contact k1
- when the level drops below L1, relay re1 opens and at the same time contactor K1 opens (pump stops)

Description of the PUMP UP function:
- if the tank is empty, both probes L1 and L2 are not immersed, both relays re1 and re2 are closed. Contactor K1 controlling the pump is closed (pump is running)
- if the tank is filled, after reaching the level L1 the relay re1 opens - the state does not change - the contactor remains closed via its switching contact k1
- after reaching the level L2, the relay re2 opens and at the same time the contactor K1 (the pump stops)
- when the level drops below L2, relay re2 closes and the state does not change further
- when the level drops below L1, relay re1 closes and at the same time contactor K1 closes (pump starts)

## Connection with additional signalization HRH-9/S



# HRH-6 | Level switch for monitoring 5 levels in increased protection

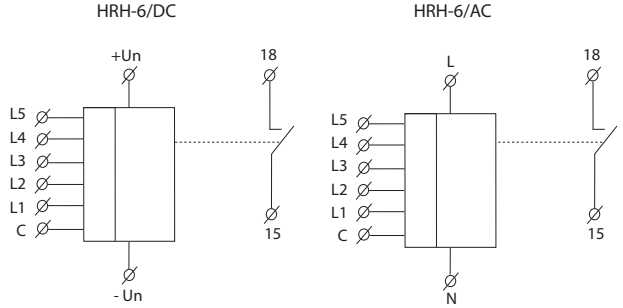



EAN code
HRH-6/AC: 8595188136990
HRH-6/DC: 8595188137409

| Technical parameters | HRH-6/DC | HRH-6/AC |
|---|---|---|
| Function: | 2 | |
| Voltage range: | 12 to 24 V DC | 230 V AC (50-60 Hz) |
| Burden: | max. 1.8 W | max. 3.8 VA |
| Max. dissipated power (Un + terminals): | 3 W | |
| Supply tolerance: | ± 20% | -20 %; +10 % |
| **Measuring circuit** | | |
| Sensitivity adjustable in the range*: | min. 10 kΩ<br>max. 200 kΩ | |
| Voltage on probes: | max. 3 V AC | |
| Probe cable maximum capacity: | 500 nF (for min. sensitivity),<br>50 nF (for maximum sensitivity) | |
| Time delay: | adjustable 1 to 10 s | |
| **Output** | 6x LED (1x red, 1x yellow, 4x green) | |
| Number of contacts: | 1x NO-SPST (AgNi/Silver Alloy ) | |
| Current rating: | 10 A/AC1 | |
| Switching voltage: | 2500 VA/AC1, 200 W/DC | |
| Peak current: | 16 A/< 3 s | |
| Switching voltage: | 250 V AC/24 V DC | |
| Mechanical life (AC1): | 10.000.000 ops. | |
| Electrical life: | 100.000 ops. | |
| **Other information** | | |
| Operating temperature: | -20 °C to 55 °C (-4 °F to 131 °F) | |
| Storage temperature: | -30 °C to 70 °C (-22 °F to 158 °F) | |
| Diel. strength (supply - probes): | x | 3.75 kV |
| Operating position: | any | |
| Protection degree: | IP65 | |
| Overvoltage category: | x | III. |
| Pollution degree: | 2 | |
| Dimensions: | 110 x 130 x 72 mm (4.3˝ x 5.1˝ x 2.8˝) | |
| Weight: | 288 g (10.2 oz.) | 385 g (13.6 oz.) |
| Standards: | EN 60255-1, EN 60255-26, EN 60255-27, | |
| Recommended measuring probe: | EN 60669-1, EN 60669-2-1 | |
| | see pg. 128 | |

* Note: sensitivity is higher at both ends of a range of values.

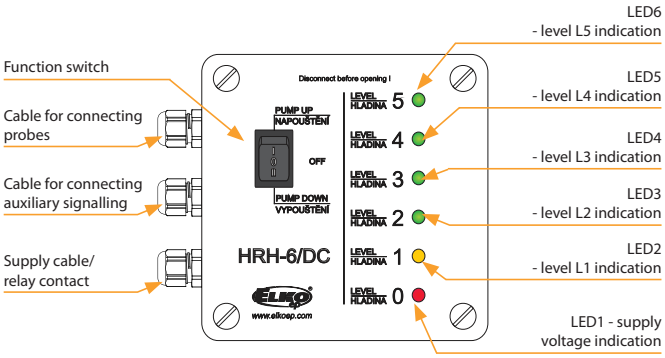
## Connection



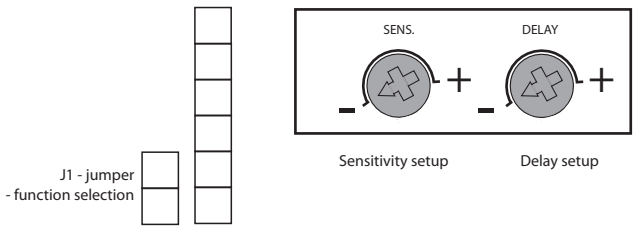

- Function 1 monitors minimal and maximal level depth, for example in fire engine cars, tanks etc.
- Function 2 monitors level depth in water collectors, basins, pools etc.
- Selection of particular function is made by jumper on the front panel.
- Device monitors 5 levels by using six probes (one probe is common).
- Level indicationby six LED's on the front panel of the device.
- Measuring frequency 10 Hz to prevent polarization of liquid.
- Supply voltage 12 to 24 V DC (to be used in fire-engines) or galvanically separated 230 V AC for general use.
- Contact relay 10 A for signalization of full/empty tank (according to a chosen function).
- Choice of functions PUMP UP/OFF/PUMP DOWN by a switch located on the front panel of the device.

## Description

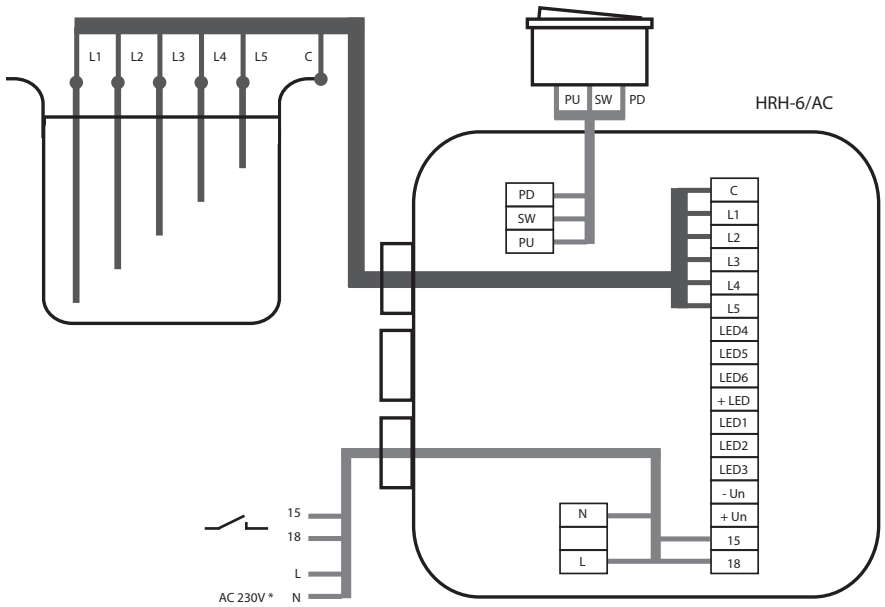
HRH-6/DC Basic unit




## Setup elements (inside basic unit)

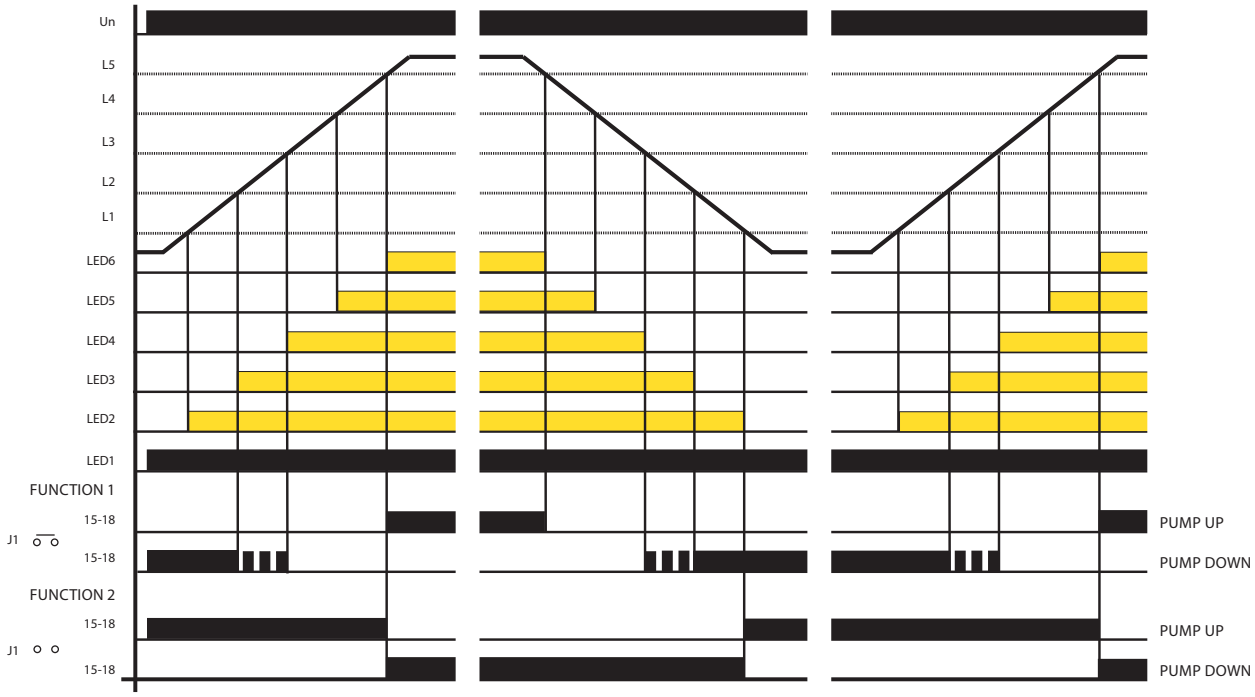


## HRH-6 block connecting




* In case of HRH-6/DC, incoming supply is connected on terminals +Un and - Un.

## Functions




This device monitors level of a conuctive liquid in a tank by using six single probes or one 6-fold probe. In case you use a tank made of a conductive material, it is possible to use it as a common probe C.

This common probe is connected to a pole of supply (for fire-engines it means its body) in case of supply voltage 12 to 24 V DC.

In case of supply voltage 230 V AC, the circuits are galvanically separated from the main.

The device is controlled by a three-position switch PUMP UP/OFF/PUMP DOWN. After switching into a position PUMP UP or PUMP DOWN, red LED1 shines and then also LED2 to LED6 according to liquid level. Output relay has 2 selectable functions.

Funtion setting is done by a jumper on basic board of HRH-6.

**Function 1:** (for use in fire-engines) - jumper is applied. In case of function PUMP UP and level reaching L5, the relay controlling e.g. acustic signalization, permanently closes and indicated full tank. In case of PUMP DOWN function and level dropunder level L3, relay priodically switches and under L2 it switches permanently (indicates almost empty tank).

**Function 2:** (for keeping liquid level) - jumper is not applied. In case of PUMP UP, sensor is switched until liquid reaches level L5. Then relay opens and switches again in case the liguid level falls under level L1. In case of PUMP DOWN - relay is switched until liquid falls under level L1. Then relay opens and switches again on level L5.

To eliminate LED flashing while level gurgle it is possible to delay reaction of probes (set delay 1 to 10 s). According to conductivity of liquid it is possible to set sensitivity of probes (corresponding to "resistance" of liquid).

# **HRH-4** | Set of level switch HRH-5 and contactor VS-425




EAN code
HRH-4/230V: 8595188117517
HRH-4/24V: 8595188117500

- In an easy way it automates operations of pumps depending on level.
- Control of level in wells, tanks, reservoirs,...
- It is delivered as a connected set - easy installation.
- Possibility to monitor level of any type of conductive liquid.
- It serves for an automatic operation in 1-phased and 3-phased pumps.
- Set of level switch HRH-5 and a contactor VS425.
- Function choice - pumping up or down.
- Unit requires incoming over-current protection.
- Protection degree of the set is IP65.
- There is a possibility of 4 types of probes in a various design (they are not a part of this set, it is possible to deliver).
- Unit is placed in a plastic box with dimensions 160 x 135 x 83 mm (6.3"x 5.3"x 3.3").

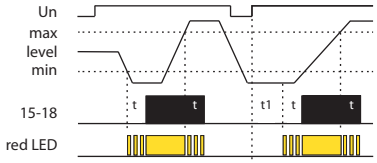
| Technical parameters | HRH-4 |
|---|---|
| Function: | 2 |
| Voltage range: | AC/DC 230 V or AC/DC 24 V (AC 50-60 Hz) |
| Burden: | max. 7 VA/1.5 W |
| Max. dissipated power (Un + terminals): | 4 W |
| Operating range: | -15 %; +10 % |
| **Measuring circuit** | |
| Sensitivity (input resistance): | adjustable in range 5 kΩ - 100 kΩ |
| Voltage on electrodes: | max. AC 3.5 V |
| Current on probes: | AC < 0.1 mA |
| Time response: | max. 400 ms |
| Max. capacity of probe cable: | 800 nF (sensitivity 5 kΩ), 100 nF (sensitivity 100 kΩ) |
| Time delay (t): | adjustable, 0.5 - 10 sec |
| Time delay (t1): | 1.5 sec |
| **Accuracy** | |
| Setting accuracy (mech.): | ± 5 % |
| **Output** | |
| Number of contacts: | 4x switching |
| Rated thermal current: | 25 A |
| Loading in AC3: | 4 kW/400 V |
| Mechanical life: | 6.000.000 ops. |
| Electrical life (AC1): | 150.000 ops. |
| **Other information** | |
| Operation temperature: | -20 °C to 55 °C (-4 °F to 131 °F) |
| Storage temperature: | -30 °C to 70 °C (-22 °F to 158 °F) |
| Dielectrical strength (supply-output): | 3.75 kV, galvanically insulated |
| Operating position: | any |
| Protection degree: | IP55 |
| Pollution degree: | 2 |
| Dimensions: | 160 x 135 x 83 mm (6.3˝ x 5.3˝ x 3.3˝) |
| Weight: | 743 g (26.2 oz.) |
| Standards: | EN 60255-1, EN 60255-26, EN 60255-27, EN 60669-1, EN 60669-2-1 |
| Recommended measuring probes: | see pg. 128 |

## Function description

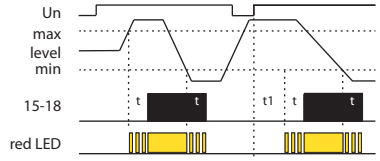
1) PUMP UP - in case the level falls under a lower limit (sensor D), a relay switches and a pump pumps a liquid up until it reaches an upper limit (probe H), then a relay opens and a pump stops pumping. When a level reaches a lower limit again, all process is repeated. After the device is energized, 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.

## Function

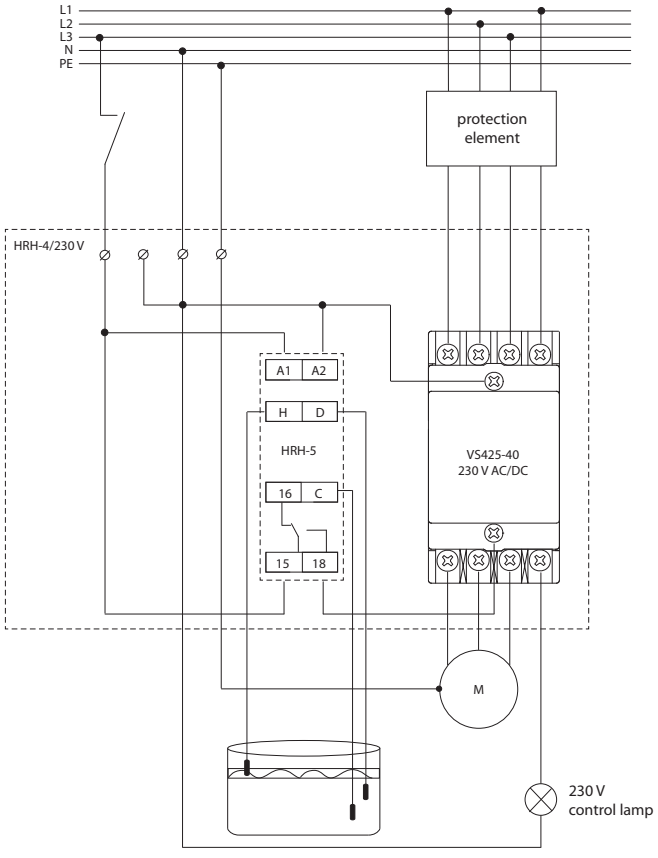
Function PUMP UP




Function PUMP DOWN




## Connection



## SHR-1-M, SHR-1-N


**SHR-1-M:** brass sensor
**SHR-1-N:** stainless steel sensor

- Sensor to control flooding.
- Electrode with diametr 4 mm (0.2") is placed in plastic cover.
- Panel or to holder mounting.
- Suitable for use in drinking water.
- Conductor is connected to terminal board, shrink bushing for feeder place insulation is a part of device.
- Max. wire profile: 2.5 mm$^2$ (AWG10).
- 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 (0.3 oz.)
- Operating temperature: -25 °C to +60 °C (-13 °F to 140 °F)
- Total sensor lenght: 65.5 mm (2.58")

EAN code
SHR-1-M: 8595188110105
SHR-1-N: 8595188111379

## SHR-2

Level probe **SHR-2**

- Detection sensor is electrode, which in connection with switchable device is used for level detection for example in wells, tanks,...
- To be ued in electric conductive fluids and mechanically polluted fluids with temperature: 1°C to 80°C (33.8 °F to 176°F).
- Suitable for use in drinking water.
- Stainless steel one-pole electrode reside in PVC cover, intended for tank wall mounting or mounting by socket.
- To ensure corret 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$^2$ (AWG 10).
- Recomended wire D05V-K0.75/3.2.
- Installation:
  - conductor wire is connected by feazing of two brass screws to stainless steel electrode,
  - conductor is caulked by bushing Pg7 with protection degree IP68.
- Weight: 48.6 g (1.7 oz.)
- Dimensions: max. diameter 21 mm (0.8"), lenght 96 mm (3.8")

SHR-2 in open state

EAN code
SHR-2: 8595188111263

## SHR-3

Level probe **SHR-3**

- Stainless probe to be used into demanding industrial environments, designated for screwing into tank wall or cover.
- The probe is installed in horisontal, 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 24 mm (1") screw. It is necessary to use an adequate torque with regards to a seal and operational overpressure in a tank.
- Sensor has connecting wire - lenght 3 m, which is connected to sensor to scan electrode and sensor bushing connecting wire is double-wire PVC AWG 18 (0.75 mm$^2$), connection of wires: brown - scan electrode, blue - sensor bushing.
- Connection M18x1.5 screw.
- Protection degree IP67.
- Sensor weight without cable: 100 g (3.3 oz.).
- Operating surroundings: place without the danger of detonation, temperature on screw: max. 95°C (203°F).
- Pressure immunity: on 25 °C (77 °F) 4 MPa, on 95 °C (203 °F) 1.5 MPa.
- Weight: 239 g (8.4 oz.).
- Material: bushing and sean electrode: stainless steel W.Nr. 1.4301, insulation insert of electrode: PTFE.
- Internal material: self - extinguishing epoxide resin.
- Operating temperature: -25 °C to 60 °C (-13 °F to 140 °F).
- Total sensor lenght: 65.5 mm (2.58 ").

EAN code
SHR-3: 8595188111270

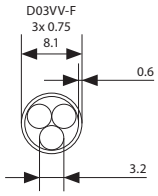
## **D03VV-F** | Cables 3x 0.75 mm²

- Cable to probes SHR-1 and SHR-2, 3x 0.75 mm² (AWG 18), 1m (39.37´).
- Suitable for use in drinking water.
- Construction:
  - bright copper stranded core of hole
  - core insulation of special PVC
  - sheath of special PVC.
- Technical specifications and usage:
  - usable up to 70 °C (158 °F)
  - suitable for submersible conductivity probes for the boreholes, wells and tanks
  - suitable for probes used for level detection of conductive liquids
  - cable capacity is max. 12.3 nF/100 m (328´).

EAN code
D03VV-F 3x0.75/3.2: 8595188165884

| Technical parameters | D03VV-F 3x0.75/3.2 |
|---|---|
| Rated voltage: | 300/300 V |
| Test voltage: | 2 kV |
| Capacity: | max. 12.3 nF/100 m (328´) |
| Core diameter with insulation: | 3.2 mm (0.12″) |
| Overall diameter of cable: | 8.1 mm (0.31″) |
| Section: | 0.75 mm² (AWG 18) |
| Length: | 1 m (39.37″) |

**Cross-section**




## **D05V-K** | Cables and wires suitable

- Cable to probes SHR-1 and SHR-2, 3x 0.75 mm² (AWG 18), 1m (3.4´).
- Suitable for use in drinking water.
- Construction:
  - bright copper stranded core of hole
  - insulation of special PVC.
- Technical specifications and usage:
  - usable up to 70 °C (158 °F)
  - suitable for probes used for level detection of conductive liquids.

EAN code
D05V-K 0.75/3.2: 8595188165945

| Technical parameters | D05V-K 0.75/3.2 |
|---|---|
| Rated voltage: | 300/500 V |
| Test voltage: | 2 kV |
| Capacity: | max. 12.3 nF/100 m (328´) |
| Core diameter with insulation: | 3.2 mm (0.12″) |
| Section: | 0.75 mm² (AWG 18) |
| Length: | 1 m (3.4´) |