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02-03/2021 Rev:0



## HRH-9

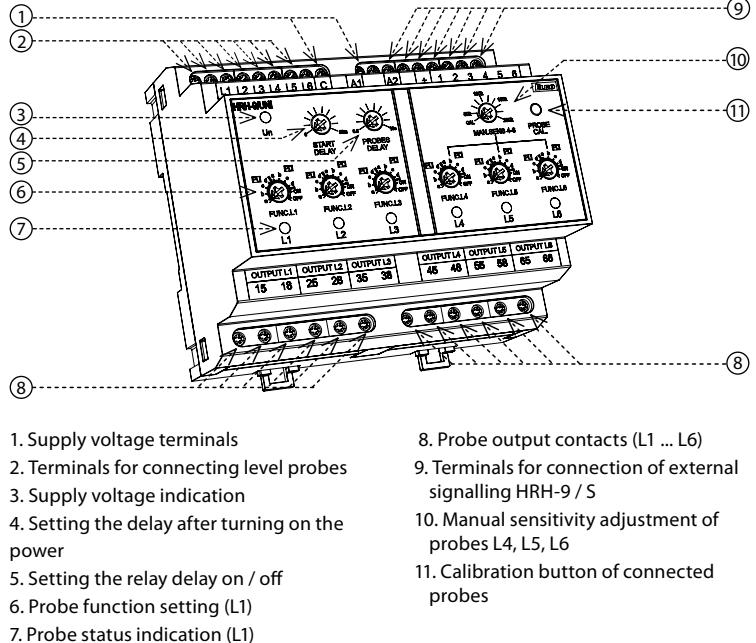
Universal level switch  
 for monitoring 1 to 6 levels



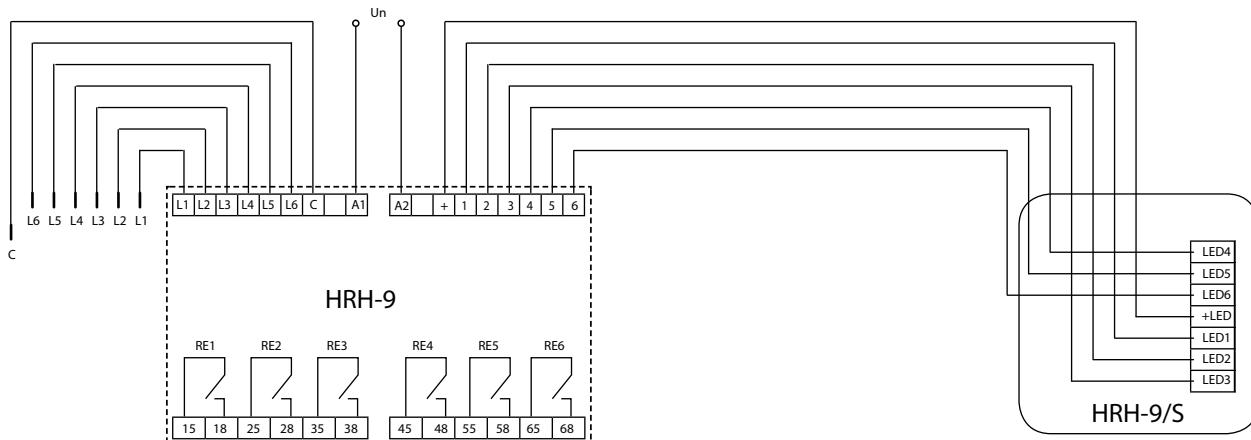
### Characteristics

- the relay is designed to control the level of conductive liquids in wells, sumps, tanks, pools, tankers, reservoirs...
- galvanically separated power supply and monitoring circuits
- With the 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 (PROBES DELAY) - common for all probes
- automatic calibration of the sensitivity of the probes according to the conductivity of the monitored liquid
- for probes L4, L5, L6 there is the possibility of manual sensitivity adjustment
- a monitoring frequency of 10 Hz prevents polarization of the liquid and increases the resistance to mains frequency interference

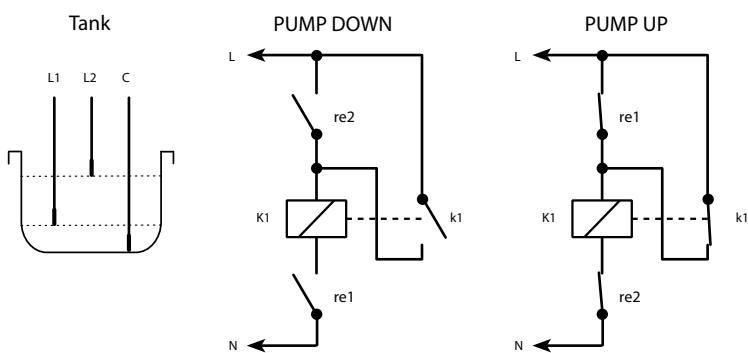
### Description



### Connection



### Wiring example:



### Level probes in the tank:

- The common probe C is positioned so that it is always immersed. If the tank used is made of conductive material, the tank itself can be used as a common probe C.
- 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 is running)
- 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)

## Technical parameters

### HRH-9

#### Power supply

Power terminals:	A1 - A2
Power voltage:	AC/DC 24...240V (AC 50-60Hz)
Supply voltage tolerance:	-15 %; +10 %
Galvanic power separation:	yes
Power consumption max.:	4 VA, 2W
Max. dissipated power (Un + terminals):	10W
Power indication:	green LED

#### Monitor circuit

Number of level probes:	6 + 1 common
Adjustable probe function:	PUMP UP, PUMP DOWN, ON, OFF
Probe voltage:	5V AC max. / 10Hz
Time reaction:	1,1s
Probe response time response: (PROBES DELAY):	adjustable 0.5...10s
Max. kapacita kabelu sondy:	500nF (sensitivity 10kΩ) 16nF (sensitivity 470kΩ)
Probe sensitivity calibration range:	10kΩ... 470kΩ
Sensitivity range of probes manually (for probes 4, 5, 6):	50kΩ... 200kΩ
Time delay after switching on (START DELAY):	ajustable 0...30min
Probe status indication:	red LED + external LED switching

#### Output

Number of contacts:	6x changeover (AgSNO <sub>2</sub> )
Rated current:	10A (AC1)
Switching voltage max.:	250V AC
Switching power max.:	2500VA
Mechanical life:	10 000 000 operations
Electrical life (AC1):	100 000 operations

#### 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:	
power supply - probes	AC 4 kV
power supply - relay contacts	AC 4 kV
adjacent relay contacts	AC 4 kV
Operating position:	any
Mounting:	DIN rail EN 60715
Protection degree:	IP40 from front panel / IP20 terminals
Overtoltage category:	III.
Pollution degree:	2
Max. cable size (mm <sup>2</sup> ):	
probe / power supply signalling:	max. 1x 2.5, max. 2x1.5 / with sleeve max. 1x 1.5
output part:	max. 1x 2.5, max. 2x1.5 / with sleeve max. 1x 2.5
Dimensions:	90 x 105 x 65 mm
Weight:	252g
Related standards:	EN 60255-1, EN 60255-26, EN 60255-27, EN 60669-1, EN 60669-2-1

#### Warning

Device is constructed for connection for 1-phase main or DC circuits (according to types, it is necessary to observe voltage ranges) and must be installed in accordance with regulations and standards applicable in a country of use. Installation, connection and setting can be done only by a person with an adequate electro-technical qualification which has read and understood this instruction manual and product functions. The device contains protections against over-voltage peaks and disturbing elements in the supply main. To ensure correct function of these protection elements it is necessary to front-end other protective elements of higher degree (A, B, C) and screening of disturbances of switched devices (contactors, motors, inductive load etc.) as it is stated in a standard. Before you start with installation, make sure that the device is not energized and that the main switch is OFF. Do not install the device to the sources of excessive electromagnetic disturbances. By correct installation, ensure good air circulation so the maximal allowed operational temperature is not exceeded in case of permanent operation and higher ambient temperature. While installing the device use screwdriver width approx. 2 mm. Keep in mind that this device is fully electronic while installing. Correct function of the device is also depended on transportation, storing and handling. In case you notice any signs of damage, deformation, malfunction or missing piece, do not install this device and claim it at the seller. After operational life treat the product as electronic waste.

## Function

Green LED UN:

- START DELAY flashes during the delay time after switching on the power - during this time the device does not respond to the level of level probes
- after timing START DELAY the green LED is still on

#### START DELAY driver:

- sets the delay START DELAY in the range of 0 ... 30 minutes

#### Level probe function switch func. L1 (L2 ... L6):

A total of 6 level probes L1 ... L6 + common probe C can be connected to the device. Each probe has its function switch, which sets the functions PUMP UP, PUMP DOWN, relay permanently released relays.

- Positions 1 - 4 = pump up
- Positions 5 - 8 = pump down
- Position 9 = on (relay permanently on, red led is on)
- Position 10 = off (relay open, red led off)

Each of the pump up, pump down functions has 4 response delay setting options:

- a - functions without delay
- b - ON DELAY - delayed relay closure
- c - OFF DELAY - delayed relay opening
- d - ON / OFF DELAY - delayed switching off and relay opening

Each probe then controls its output relays depending on the function switch setting. If any probe is not used, its switch must be set to OFF or ON.

#### DELAY PROBES driver:

- sets the delay of the relay response to the change of level probes
- the delay is common to all probes - range 0.5 ... 10s

#### LED probe status indication L1 ... L6:

each probe has its red LED, indicating the probe status + output for external LED addtinal signaling, which copies the internal red LED status:

- probe not submerged- red LED is off
- probe is submerged, delay is not running - red LED is on
- probe just joined and running delay - red LED flashing (shorter pulse)
- probe just jested and running delay - red LED flashing (longer pulse)
- calibration error - red LED flashes fast

#### Output relay:

each probe has its output relay, which switches on or offs depending on the probe function switch setting:

- PUMP UP - probe not submerged - relay is closed
- PUMP UP - probe is submerged - relay is open
- PUMP DOWN - probe not submerged - relay is open
- PUMP DOWN - probe is submerged - relay is closed

each relay has a switching contact that is designed to switch the contactor (for pump control) or to connect other circuits (eg valves, alarms).

#### CALIBRATION OF LEVEL PROBES:

Probe calibration is used to automatically adjust the optimum sensitivity of each probe for a specific monitored liquid.

The condition of correct calibration is submission of all used probes in the monitored liquid.

#### Calibration process:

- long press of the PROBE CAL button. (cca 4s)
- green LED is extinguishing and then lit up - calibration is completed
- if the probe is not submerged or the conductivity of the monitored liquid is very low, the red LED indicates a calibration error

#### Driver MAN.SENS 4-6:

- Used to manually set the sensitivity of level probes L4, L5, L6
- In the CAL position, the sensitivity of the probes is calibrated using the PROBE CAL calibration button.
- Outside the CAL position it is possible to set the sensitivity of the probes 50 ... 200kΩ

## Accessories

Any measuring probe suffices. Due to constant contact with fluid we recommend:

#### Measuring probes:

- Level probe SHR-1-M - brass probe,
- Level probe SHR-1-N - stainless steel probe
- Level probe SHR-2
  - stainless steel probe certified for drinking water
  - in plastic case sealed with bushing P67
- Level probe SHR-3
  - stainless steel designed for use in harsh and industrial environments, designed to be secured to the wall or tank lid with screws.
- Three-wire cable D03VV-F 3x0.75/3.2
  - cable for probes SHR-1 and SHR-2, 3x 0.75 mm<sup>2</sup> certified for drinking water, 1 m
- Wire D05V-K 0.75/3.2
  - wire for probes SHR-1 and SHR-2, 1x 0.75 mm<sup>2</sup> certified for drinking water, 1 m