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HRH-7

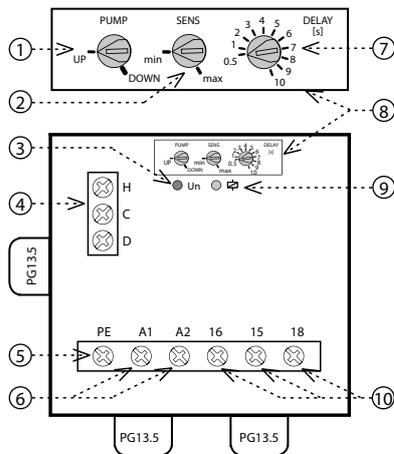
Level switch

02-20/2017 Rev:0

Characteristics

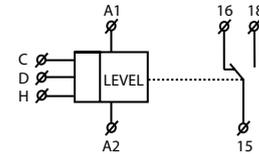
- high IP65 protection makes it ideal for use in demanding conditions
- the switch monitors the level in wells, reservoirs, tanks, tankers, containers, etc.
- in one device you can choose the following configurations:
 - single switch with single-state monitoring
 - single switch with double-state monitoring
- selection function of: pump up (filling) or pump down (emptying)
- adjustable time delay of output (0.5 - 10 s)
- adjustable hysteresis (5 - 100 k Ω)
- measuring frequency 10 Hz prevents polarization of liquid and raising 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.
- output contact 1x changeover 16 A / 250 V AC1

Description

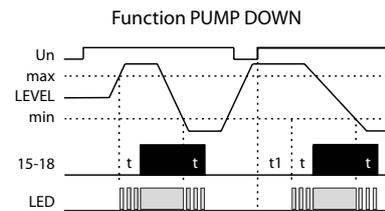
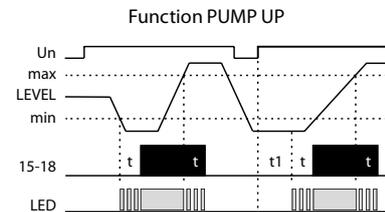


1. Selection of function
2. Probe sensitivity settings
3. Supply voltage indication
4. Terminals for connecting probes
5. Open connecting terminal PE
6. Supply voltage terminals
7. Delay setting
8. Adjustment elements (inside device)
9. Output indication
10. Output contacts

Symbol



Function



The relay is designed for monitoring the level of conductive fluids with the option of selecting functions: replenishing and draining (PUMP UP or 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.

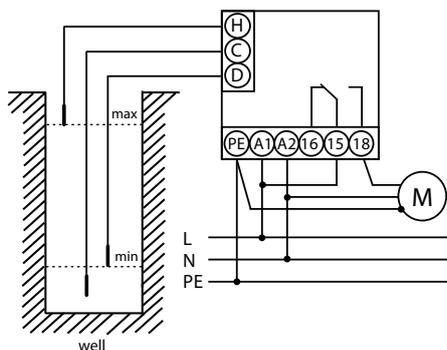
If it is necessary to monitor only one level, there are two connection options:

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

It is also possible to connect probe C with a protective conductor of the power system (PE). To limit undesirable switching by various influences (contamination of probes with deposits, moisture, etc.), it is possible to set the device sensitivity based on the conductivity of the monitored fluid (corresponding „resistance“ of the fluid) in a range of 5 to 100 k Ω . To limit the influence of unwanted switching of output contacts caused by swirling of the fluid surface in the tank, it is possible to set a delay in the output reaction from 0.5 - 10 s.

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

Monitoring TWO LEVELS of the FLUID LEVEL minimum / maximum - DRAINING function - PUMP DOWN (REPLENISHING function - PUMP UP) - wiring for supply 230 V AC (for monitoring two levels)



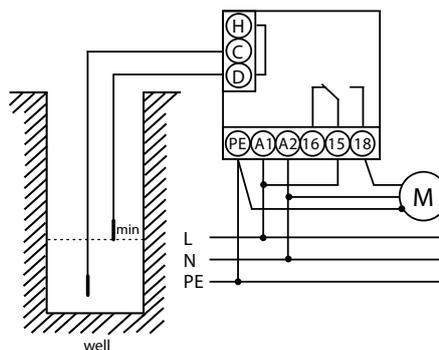
• Description of draining function:
This function is used in a well or borehole where the difference between the upper and lower probes determines how much water the pump can pump out and protect against running dry. After detecting the maximum level, the set reaction delay begins running. After this 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.

• 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.

- Description of wiring and settings:
- On terminals A1-A2 (product HRH-7) connect the supply voltage in a range of 24 - 240 V AC or DC.
 - At terminal H, connect the red wire of the 3-wire cable (D03VV-F 3x0.75/3.2 see accessories) and connect the probe SHR-2 at the end. Install this probe in the well at a height where it will monitor the MAXIMUM level.
 - At terminal D, connect the black wire of the 3-wire cable (D03VV-F 3x0.75/3.2 see accessories) and connect the probe SHR-2 at the end. Install this probe in the well at a height where it will monitor the MINIMUM level.
 - At terminal C, connect the gray wire of the 3-wire cable (D03VV-F 3x0.75/3.2 see accessories) and connect the probe SHR-2 at the end. Place this probe in a well at a height where it will be BELOW THE MINIMUM level, because it is a common probe.
 - On terminal 15 (of the output contact), apply voltage using a jumper between A1 and 15. It is used to bring potential to the contact for switching the pump on.
 - Connect the pump to terminal 18 (output contact) and the neutral.
 - Using potentiometer SENS for the HRH-7, set the probe reaction sensitivity (halfway is recommended).
 - Using potentiometer PUMP, set to PUMP DOWN = draining (set to PUMP UP = replenishing).
 - Using potentiometer DELAY, set the reaction delay for switching on the pump to eliminate unwanted powering upon fluctuations in the level. If the tank is stable, set the minimum for immediate switching on of the pump.

Note: you can also replace the 3-wire cable (D03VV-F 3x0.75/3.2) with a 1-wire wire D05V-K0.75/3.2 (separately for each probe).

Monitoring ONE LEVEL - function DRAINING - (PUMP DOWN) - wiring for supply 230 V AC (for monitoring one level)



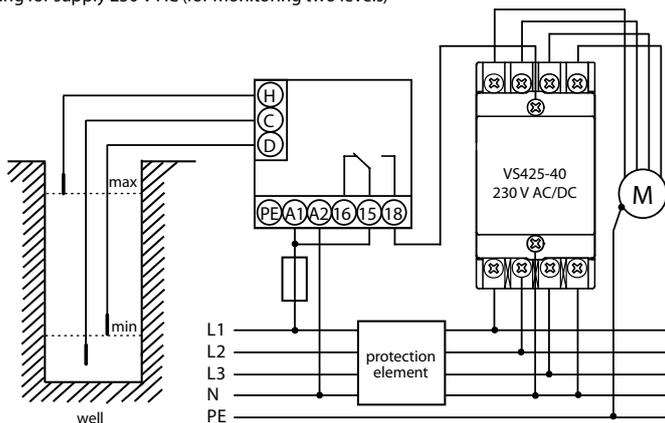
• Description of draining function:
The function is used to protect the pump against running on empty. After detecting the minimum level, the set reaction delay begins running. After this period, the output contact immediately switches off the pump until a level is reached above the minimum level, where the set delay begins running once again. The pump then switches on.

- Description of wiring and settings:
- On terminals A1-A2 (product HRH-7) connect the supply voltage in a range of 24 - 240 V AC or DC.
 - On terminal D, connect the wire (see accessories) and connect the probe SHR-2 at the end. Place this probe in a well at a height where it will monitor the MINIMUM level.
 - Interconnect terminals H and D, because this involves monitoring a single level.
 - Connect the wire to terminal C (see accessories) and connect the probe SHR-2 at the end. Place this probe in a well at a height where it will be BELOW THE MINIMUM level, because it is a common probe.
 - On terminal 15 (of the output contact), apply voltage using a jumper between A1 and 15. It is used to bring potential to the contact for switching the pump on.
 - Connect the pump to terminal 18 (output contact) and the neutral.
 - Using potentiometer SENS for the HRH-7, set the probe reaction sensitivity (halfway is recommended).
 - Set potentiometer PUMP to PUMP DOWN = draining
 - Using potentiometer DELAY, set the reaction delay for switching on the pump. In this case, we recommend setting the time to 5 s to avoid frequent switching.

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

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

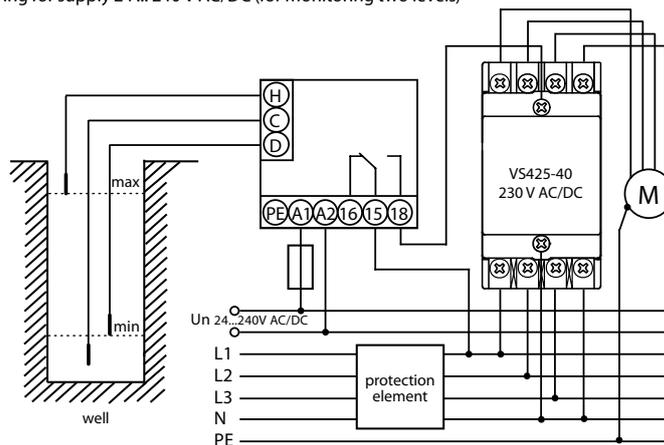
- wiring for supply 230 V AC (for monitoring two levels)



• 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.

- Description of wiring and settings:
- On terminal A1 (product HRH-7), connect the phase (230 V AC). On terminal A2 connect the neutral.
 - At terminal H, connect the red wire of the 3-wire cable (D03VV-F 3x0.75/3.2 see accessories) and connect the probe SHR-2 at the end. Install this probe in the well at a height where it will monitor the MAXIMUM level.
 - At terminal D, connect the black wire of the 3-wire cable (D03VV-F 3x0.75/3.2 see accessories) and connect the probe SHR-2 at the end. Install this probe in the well at a height where it will monitor the MINIMUM level.
 - At terminal C, connect the gray wire of the 3-wire cable (D03VV-F 3x0.75/3.2 see accessories) and connect the probe SHR-2 at the end. Place this probe in a well at a height where it will be BELOW THE MINIMUM level, because it is a common probe.
 - Connect the power supply to the contactor (we recommend VS-425-40) = connect the contactor terminal A1 to terminal A2 on the level switch (HRH-7) or directly to N (neutral). Connect the contactor terminal A2 to the output contact of the level switch (HRH-7) of terminal 18.
 - On terminal 15 (of output contact HRH-7), apply voltage using a jumper between A1 and 15. It is used to bring potential to the contact for switching the pump on.
 - Connect the (1-phase) pump to contactor terminals 2, 4, 6. Also connect the pump to a grounding wire or terminal PE.
 - Connect contactor terminals 1, 3, 5, 7 through a circuit breaker for each phase L1, L2, L3 (see image).
 - Using potentiometer SENS for the HRH-7, set the probe reaction sensitivity (halfway is recommended).
 - Set potentiometer PUMP to PUMP DOWN = draining.
 - Using potentiometer DELAY, set the reaction delay for switching on the pump to eliminate unwanted powering upon fluctuations in the level. If the tank is stable, set the minimum for immediate switching on of the pump.

- wiring for supply 24 ... 240 V AC/DC (for monitoring two levels)



HRH-7

Function:	2
Supply terminals:	A1 - A2
Supply voltage:	24.. 240 V AC/ DC (AC 50 - 60 Hz)
Consumption:	max. 2 VA
Supply voltage tolerance:	-15 %; +10 %
Max. value of overcharge protection:	16 A

Measuring circuit

Sensitivity (input - opening):	adjustable from 5 kΩ - 100 kΩ
Voltage on electrode:	max. AC 3.5 V
Current in probes:	AC < 0.1 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
Time del. after switching on (t1):	1.5 sec

Accuracy

Setting accuracy (mech.):	± 5 %
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Output

Number of contacts:	1x changeover / DPDT (AgSnO ₂)
Rated current:	16 A / AC1
- contact NO:	15-18: 6A / AC3
- contact NC:	15-16: 3A / AC3
Switching capacity:	4000 VA / AC1, 384 W / DC
Switching voltage:	250 V AC / 24 V DC
Mechanical life (AC1):	3x10 ⁷
Electrical life:	0.7x10 ⁵

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)
Electrical strength:	3.75 kV (supply - sensor)
Operating position:	any
Protection degree:	IP65
Overvoltage category:	III.
Pollution degree:	2
Max. cable size (mm ²):	max. 1x 4, max. 2x 2.5 / with sleeve max. 1x 2.5, 2x 1.5 (AWG 12)
Dimensions:	114 x 114 x 56 mm (4.5 x 4.5 x 2.2")
Weight:	234 g (8.3 oz.)
Standards:	EN 60255-6, EN 61010-1, EN 60664-1

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
- probes designed for monitoring flooding
- Level probe SHR-2
- stainless steel probe certified for drinking water, which in combination with an adequate assessment device used for detecting levels e.g. in wells, boreholes, tanks
- 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 mm² certified for drinking water, 1 m
- Wire D05V-K 0.75/3.2
- wire for probes SHR-1 and SHR-2, 1x 0.75 mm² certified for drinking water, 1 m

Warning

Device is constructed for connection in 1-phase main alternating current and must be installed according to norms valid in the state of application. 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.