



Hydrostatic sensor
HS-1S

Operation and Maintenance Manual

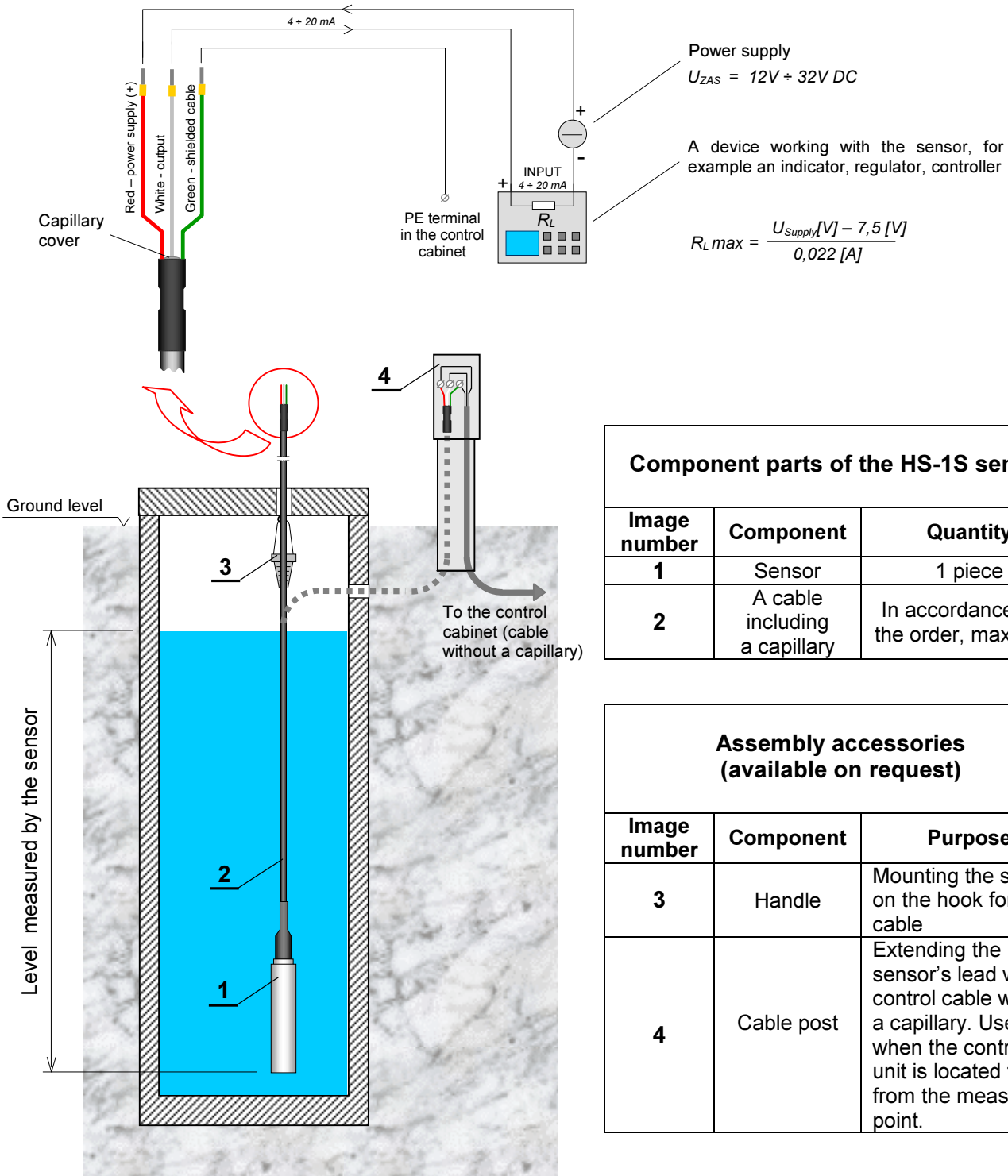
Version: v1.9 En (03.2017)

1. The purpose and operation principle of the sensor

The sensor is designed to measure the level of municipal and industrial wastewater in open tanks such as wastewater pumping stations, sedimentation tanks. The device may also be used to measure the level of pure water.

The sensor processes the hydrostatic pressure in the measurement location into a $4 \div 20$ mA signal. Thanks to the capillary build-in the probe's lead, the measured pressure is referred to the atmospheric pressure, which results in that it does not impact the result of the measurement. The probe includes an anti-surge system, increasing its reliability.

2. Components of the probe and assembly accessories



Img.1

3. Assembly

3.1 Mechanical assembly

Place the sensor at the bottom of the tank or hang it by its lead. It is advised to hang the sensor using the dedicated equipment (**Img.1 – pos. 3**).

3.2 Electrical assembly

- Connect the sensor to the control unit. The sensor cable should be routed from the tank to control cabinet in the casing pipe. Avoid the lead's angulation at a radius less than 4 cm.
- In case of the need to extend the sensor's lead in the ground, use a cable post (**Img.1 – pos. 4**). The sensor cable should be routed from the tank to cable post in the casing pipe. The extension over the cable post – control cabinet, should be executed with a shielded control cable, with the minimum diameter of the conductors at 0,75 mm².
- Connect the sensor's cables in accordance with the schematic diagram in **Img.1**.

ATTENTION:

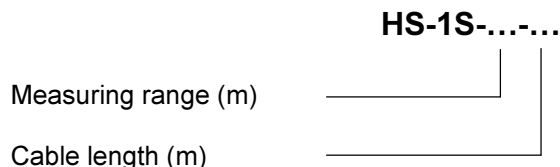
- The sensor may work in any position. In order to minimize waste sedimentation on the measuring element, it is advised for the sensor to function vertically, with the membrane pointing down (as in **Img.1**).
- In the case of turbulent flows, place the sensor in a shielding pipe.
- Avoid covering the casing of the capillary by the sensor's connecting cables, with water or other liquids. When conducting installation works, it is advised to shield the end of the sensor's lead, for example with insulating tape.
- The sensor includes protection against a too high supply voltage. A supply voltage above 32 V DC forefends the correct functioning of the device, and may lead to damaging devices working with the sensor. Powering the sensor with a reverse polarity voltage does not damage the sensor, or the devices working with it.

4. Operational inspections

The frequency of inspections should be adjusted to the specifics of the facility and media, with which the device is working. During the inspection, the sensor should be taken out of the tank, and cleaned of impurities. It is allowed to use sediment solvents.

!! Do not touch or mechanically clean the sensor's membrane !!

5. Ordering method



Available measuring ranges: 0 ÷ 2, 0 ÷ 4, 0 ÷ 6, 0 ÷ 8, 0 ÷ 10 m H₂O

Example:

HS-1S-4-10 – a hydrostatic sensor with a measuring range of 0 ÷ 4 meters H₂O and a 10 m long cable

6. Parameters

Parameter	min.	typical	max
Accuracy	≤ 0,5% of the measuring range		
Temperature error	≤ 0,03%/ 1 ^o C		
Repeatability	0,25% of the measuring range		
Hysteresis	0,1% of the measuring range		
Range of temperature compensation	0 ÷ 60 ^o C		
Range of operational temperatures (medium) - freezing unacceptable	-20 ÷ +85 ^o C		
Overload	600% of the measuring range		
Output signal	4 ÷ 20 mA		
Power voltage	12V DC	24V DC	32V DC
Load resistance R _L [Ω]	0	-	$\frac{U_{Supply} [V] - 7,5 [V]}{0,022 [A]}$
Length of the lead with the capillary	-	10 m	30 m
Dimensions of the sensor's casing (length x diameter)	110 x 26 mm		
The sensor's and membrane's casing material	Stainless steel 316L		
The sensor's cable sheath material	PE		
The sensor's weight (with a 10 m long cable)	844 g		
The protection degree of the sensor's casing in accordance with PN-EN 60529:2003/A2:2014-07 norm	IP68		
Product declarations and marking	EU Declaration of conformity, CE marking		

7. Warranty

The producer guarantees the correct functioning of the device for 24 months from the purchasing date, and provides warranty and post warranty service. The sensor's purchase invoice, which includes the device's serial number, serves as the warranty card.

8. Related directives and norms

Directive 2014/30/EU of the European Parliament and of the Council of 26 February 2014 on the harmonisation of the laws of the Member States relating to electromagnetic compatibility

Directive 2011/65/EU of the European Parliament and of the Council of 8 June 2011 on the restriction of the use of certain hazardous substances in electrical and electronic equipment

PN-EN 61010-1:2011 norm Safety requirements for electrical equipment for measurement, control, and laboratory use – Part 1: General requirements.

PN-EN 60529:2003/A2:2014-07 norm Degrees of protection provided by enclosures (IP code)