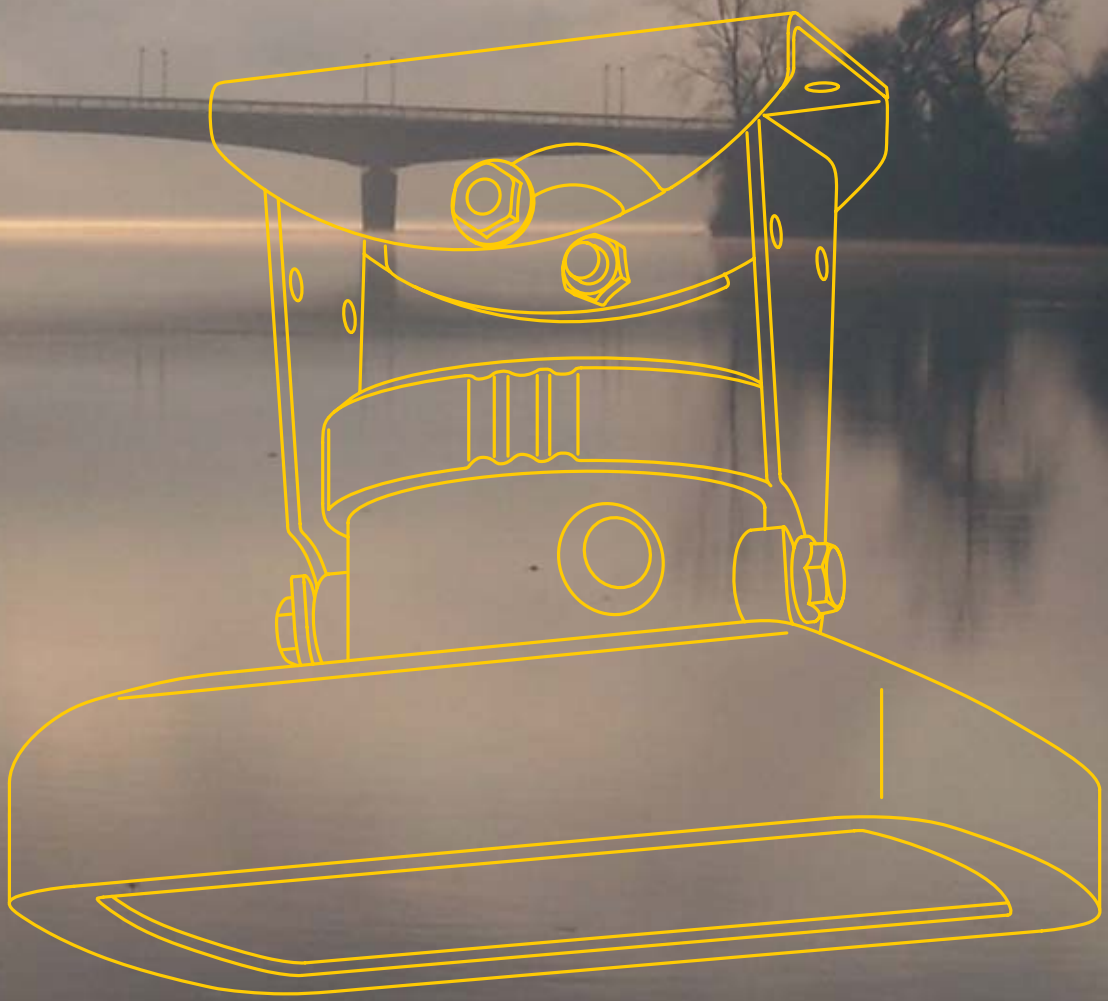
OTT RLS
Radar Level Sensor

Low power radar technology for non-contact water level measurement



Efficient radar technology with a robust design

The OTT RLS (Radar Level Sensor) is a radar sensor for non-contact water level measurement at surface water locations. The sensor uses impulse radar technology to determine the water level. This energy-efficient, non-contact measurement method means the OTT RLS operates with no effect from temperature gradients, water pollution or sediment load and ensures exact measurements.

Flexibility built-in

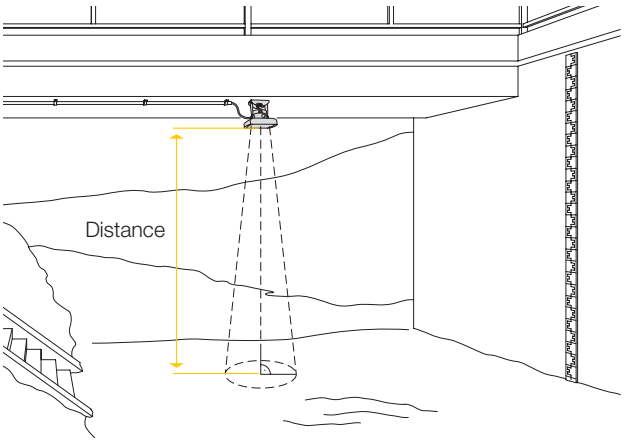
Its extremely low energy consumption (active: < 12 mA at 12 V), the large power supply range and standardized interfaces make the OTT RLS very flexible for different applications. It can easily be connected to any data logger and remote data transmission system. With a large measurement range of up to a maximum of 35 m the RLS also allows the measurement of large ranges.

Simple to install

So that the transmitted radar pulses reach the water level surface being measured the OTT RLS is mounted directly above the water surface to be measured, e.g. on bridges or auxiliary constructions. Its solid, relatively light and water-proof housing is easy to install. The universal joint mounting (gimbal mounting) allow the sensor to be easily aligned, even at sites that are not level. There is no requirement for complex construction, such as stilling wells or float shafts, as the OTT RLS determines the water level measurements in a measurement cycle that compensates for wave or other rapid water level movement.

Measurement principle

The OTT RLS uses energy-efficient impulse-radar technology for measuring water levels. In its housing above the front plate there are two flat antennae: a transmitting and a receiving antenna. During each measurement the transmitting antenna sends radar pulses down to the water surface, the pulses are then reflected from the surface of the water and detected by the receiving antenna of the OTT RLS.



The time from transmission until reception of the reflected pulse (time delay) is longer the further the OTT RLS is from the water surface and thus the lower the water level. This correlation is used by the OTT RLS to determine the time delay and calculate the distance to the water surface (distance value).

Compensation for wave movements

The OTT RLS carries out approximately 16 individual measurements per second. After the measurement time is complete for a cycle, it calculates an average from all measurements made in this time cycle and then transmits the result. By calculating the mean, the influence of wave movements on the measurement is minimised and the result gives measurements that are directly comparable to level measurements taken in stilling wells.

Data loggers and OTT RLS

The data logger determines the measurement interval and initiates the measurement. In the opposite direction, the OTT RLS passes the measurement back to the data logger, where the water level is determined from the distance value and the measurement reference point specified at installation. The data is finally associated with a date and time stamp and then saved to memory.

Water level measurement on surface water - practical and reliable with the OTT RLS

Potential applications

The OTT RLS is specifically designed for use in open air locations. The flat antenna construction, its minimal energy consumption, the wide range of supply voltages and its compact, water-proof housing offer the user a system that is optimised for use at sites that have no requirement for mains power supply. The radar sensor is unbeatable at locations that suffer from abrasive and difficult to measure locations, due to its non-contact measuring method.

As a result, the OTT RLS is ideally suited for:

- Channels that suffer from high levels of flotsam and sediment load
- Locations that have high levels of in-channel weed growth
- Isolated, remote sites that are powered using alternative energy supplies
- Areas subject to flooding (in addition to existing sensors)

OTT RLS – advantages at a glance

Simple and reliable initial setup

- Light, compact housing - weighs only 2.1 kg
- Easy to rotate Gimbal mount – easy alignment of the front plate (antenna side)
- Sensor is away from the water, making the installation safer to achieve
- Influence of waves are compensated mathematically – no requirement for the use of structures

Uncomplicated system integration

- Standard interfaces for communication with data loggers and other peripheral devices (SDI-12 and RS-485 interface plus 4 - 20 mA signal output)
- Extremely low power consumption – can be easily used at remote locations
- RS-485 interface – allows a connection cable length of up to 1,000 m, allowing data logger and power source to be situated further away
- Wide range of power supply from 9.6 - 28 V (typically 12 - 24 V) – allows differing power supplies such as solar panel, battery or grid

Reliable operation

- Non-contact measurement – ideal for flood measurement
- Sensor is outside the water - hydrological conditions remain unaffected
- Flat antenna means that insect and spider infestation is not a problem - no impairment of measurement
- Compact and solid design – long sensor life with with minimal maintenance
- Housing design uses the diving bell principle
- Inconspicuous design – does not attract the attention of vandals

Technical Data

Water level measurement	
Measuring range	0.8 - 35 m
Measurement accuracy	±3 mm
Measuring time	20 seconds (SDI 12) or 30 seconds (4 - 20 mA)
Beam angle of antenna (width of beam)	12 °
Transmit frequency	24 GHz (pulsed radar)
Electrical data	
Power supply	9.6 - 28 V DC, typically 12/24 V DC
Power consumption during measurement operation	<140 mW (<12 mA at 12 V)
Power consumption in rest mode	<1 mW (<0.5 mA at 12V)
Interfaces	4 - 20 mA, SDI-12, RS-485, two-wire (SDI-12 protocol)
Dimensions and weight	
Dimensions L x W x H	222 mm x 152 mm x 190 mm
Weight (including mounting)	approx. 2.1 kg
Operational environment	
Operating temperature	– 40 - +60 °C
Storage temperature	– 40 - +85 °C
Relative humidity	0 - 100 %
Materials	
Housing	ABA (UV-stabilized ABS)
Radom (front plate)	TFM PTFE
Mounting	1.4301 (V2A)
Rotation range of gimbal mounting	
Lateral axis	±90 °
Longitudinal axis	±15 °
Cable gland sealing range	
with inlet (min. Ø - max. Ø)	4.0 - 7.0 mm
without inlet (min. Ø - max. Ø)	7.0 - 11.0 mm
Connection capacity of screw terminal strip	
Solid conductor	0.25 - 2.5 mm^2 (AWG 24 to 12)
Wire with end sleeve and plastic collar	0.25 - 1.5 mm^2
Type of protection	
With horizontal mounting	IP 67 (submersion depth max. 1 m; submersion duration max. 48 h)
EMC limits and radio approvals	
EMC for low-power radio devices	ETSI EN 301 489-3
Low-voltage device safety	EN 60950-1
Radio approval for low power radio devices *; Europe	ETSI EN 300 440
Radio approval for low power radio devices *; USA	FCC 47 CFR Part 15
Radio approval for low power radio devices *; Canada	RSS 210 Issue 7

* Short Range Device (SRD)

OTT – Your partner for:

- Water level measurement in ground and surface water
- Discharge measurement
- Precipitation measurement
- Water quality measurement
- Data management and communication
- HydroService: consulting, training, installation and maintenance

We reserve the right to make technical changes and improvements
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