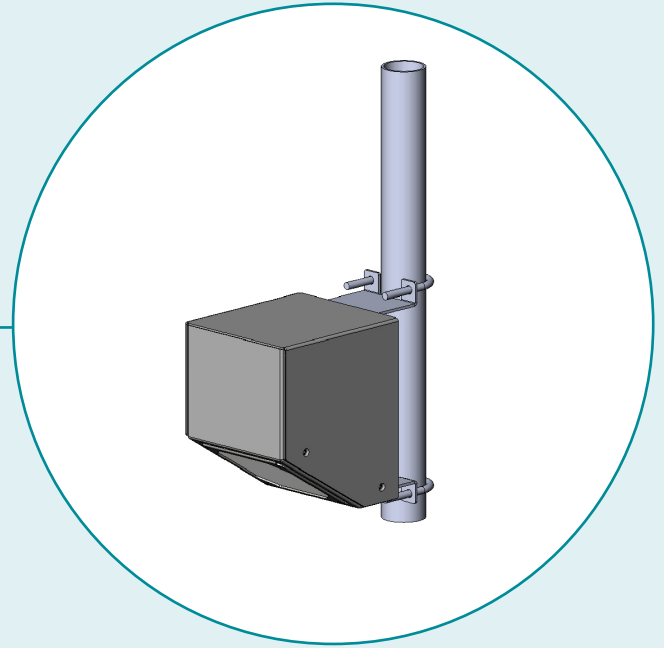


RQ-30L

Innovative radar sensor for non-contact discharge measurement of rivers, open channels and canals with the possibility to use external level data.



Features and Advantages

- ✓ Discharge measurement by use of innovative radar technology and through integration of external data (water level and cross section profil)
- ✓ Upgrading of existing measuring sites with additional surface velocity measurement
- ✓ Perfectly suitable on existing cableways
- ✓ Proven SOMMER RQ radar technology: non-contact measuring, maintenance free and flood-proof
- ✓ No structural work is necessary in the water
- ✓ Recognition of flow direction and hysteresis effects
- ✓ Measurement in tidal waters
- ✓ Measurement in backwater situations
- ✓ Measures even where weed growth prevails and in waters with high turbidity
- ✓ Measuring range from +/-0.10 to +/-15 m/s (depending on the flow conditions)
- ✓ Optional: analogue outputs from 4 to 20 mA

General

SOMMER radar technology

The radar sensors of the RQ-series measure contact-free the discharge of rivers, streams, open channels or canals. The RQ-30L in particular continuously determines the surface flow velocity. Together with the values of the actual water level and information about the cross section profile the sensor is able to calculate the discharge.

Non-contact = failsafe + low maintenance

Thanks to the non-contact measurement technology it is possible to install the sensor outside the water. Hence, the equipment is not susceptible to contamination, debris or driftwood in the water. The user further profits from very low-maintenance costs and increased system reliability, especially in situations of high water or floodings.



Fields of application

Added value at existing measuring sites

The RQ-30L is mainly applied where existing measuring sites (e.g. gauging sites) should be upgraded in terms of quality without the need for big investments. While the water level can be measured as before, the radar sensor improves the accuracy by additionally determining the surface flow velocity. Therefore the RQ-30L is a very effective extension to all sites where the water level should (or must) be measured by a separate instrument other than the RQ-30.



Special application: Installation on cableway

Favourable or existing measuring sites such as, for example, stream-gauging stations are often equipped with a cable crane system. This is also excellent for installing the RQ-30L.

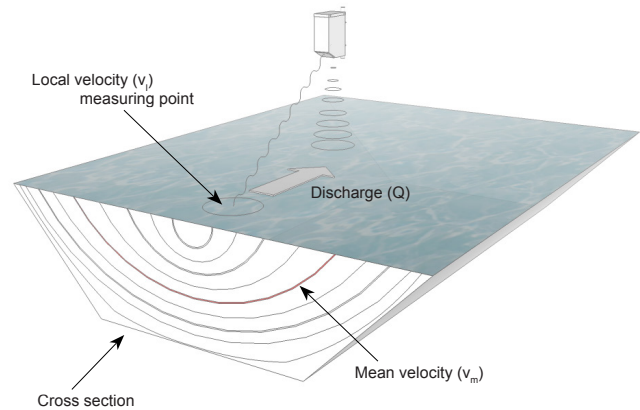
Additional installation costs can thus be avoided as far as possible and the cable crane system is even more efficiently used. The flow velocity measurement of the RQ-30L is carried out precisely and without negative influence by light rope oscillations or temperature-dependent changes of the cable length.



Measuring principle

Surface flow velocity

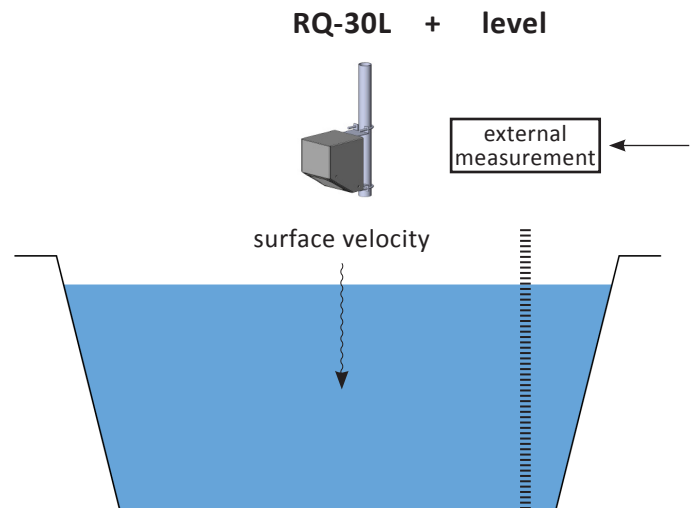
The measurement of the surface flow velocity is based on the Doppler frequency shift method: A radar signal is transmitted to the water surface at a constant frequency of 24 GHz. The sensor measures the partially reflected signal whose frequency is shifted due to the water movement. The surface velocity is determined through a spectral analysis. With a hydraulic model the sensor converts the surface velocity into the relevant mean velocity which is needed for any further discharge calculations.



Water level as external data input

In this setup the water level (water gauge) is determined by any measurement device other than the RQ-30L and provided to the same as an analogue data input for the discharge calculation. For that purpose any preferred method of water level measurement can be used, that is by means of a level logger (pressure gauge), level radar sensor, ultrasonic level measurement, bubbler system, float or others.

The external level data have to be transmitted to the RQ-30L as an electrical signal of 4 to 20 mA or alternatively of a voltage of 0 ... 2,5 V. In addition, the sensor is equipped with an isolating converter between the signals of the surface velocity and the water level in order to guarantee a failure-free and smooth operation.



Implementation on site

Installation and measuring range

The sensors can be simply mounted on bridges, on the roves of closed canals or at any other superstructure above or across the body of water. Hence, measuring sites come into consideration which otherwise maybe could not have been realised.

The sensor can be installed at a height of 130 meters at the maximum above the water surface and it has to be kept a minimum distance of 0.5 meter. The measurable flow velocity range is between 0.10 and 15 meters per second. The radar recognises the flow direction therefore measuring in tidal waters is possible, too. Contrary to acoustic Doppler current profilers the radar sensor RQ-30L delivers reliable results even where weed growth prevails and in waters with high turbidity.

Criteria for the measuring site

The most important criteria for the measuring site of the RQ-30L are the nature of the riverbed, the water surface and the flow conditions.

The bed of the water should be as stable as possible in order to warrant consistent measurements. The water surface must not be completely still (plain). However, the sensor is very sensitive and receives reflections from ripples of only 3mm. Rocks, whirlpools, steps or stagnant waves within the measuring spot have to be avoided if possible.

Technical Details

General	
Dimensions (mm)	241 x 246 x 154 2 brackets for pipe diameter of \varnothing 34 – 48 mm
Total weight	2.7 kg
Material	aluminium housing, powder coated
Protection	IP 67
Power supply	6 ... 30 V
Power consumption (at 12 V)	standby approx. 1.5 mA active operation approx. 110 mA
Operating temperature	- 35° ... 60° C
Storage temperature	- 40° ... 60° C
Lightning protection	integrated lightning protection
Surface velocity measurement	
Measurable range	0.10 ... 15 m/s (depending on the flow conditions)
Accuracy	+/- 0.01 m/s; +/- 1 % FS
Resolution	1 mm/s
Recognition of direction	+/-
Measurement time	5 ... 240 sec.
Measurement interval	8 sec. ... 5 hrs
Measurement frequency	24 GHz (K-Band)
Radar opening angle	12°
Distance to water surface	0.5 ... 130 m
Necessary minimum wave height	3 mm
Automatical vertical angle compensation	
Accuracy	+/- 1°
Resolution	+/- 0.1°
Interface	
	Interface: 1x SDI -12 1x RS 485, Modbus Transfer rate: 1.2 to 19.2 kBd Protocol: various ASCII-protocols, Output: discharge rate, flow velocity, water level, quality parameters
Input (water level values)	electrical signal of 4 ... 20 mA or 0 ... 2,5 V
Outputs	4 x analogue outputs, 4 ... 20 mA for water level, flow velocity and discharge rate

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