

Data Sheet

SM-094/2 Range Finder

The MIROS Range Finder is designed for measurement of:

- Airgap and draught
- Ocean wave profiles and tidal variations
- Water level in dams, rivers, canals, lakes etc.
- Bridge clearance



The sensor emits a microwave FM chirp signal and receives the echo from the water surface. The signal propagation delay given by the distance from the antenna to the water surface causes a beat signal in the receiver. By means of advanced signal processing the beat frequency is converted to an accurate distance.

The planar patch antenna results in small physical dimensions and low weight.

The FM chirp is generated by a digitally synthesized frequency sweep oscillator with absolute frequency linearity and high stability. The sensor therefore provides accurate range measurements and high long term stability.

Due to the low frequency of operation (compared to laser sensors), fog, rain and water spray will not cause measurement problems.

The sensor signal processing is performed by a micro-controller. The sensor provides the measured range as well as an averaged range with 1 mm resolution. Averaging time constant may be selected by user.

The signal output may either be continuous at selected rate, or single measurements in response to user request.

SM-094 is available in different range versions with different antenna beam width.

Specifications

Microwave Transceiver

Modulation: Triangular FM
Frequency: 9.4 - 9.8 GHz
Output power: 0.25 mW (-6 dBm)

Wide Beam Antenna

Beam width: 10° (-3 dB one way)
Gain: > 18 dB
Range: SM-094/10: 1 - 10 m
SM-094/20W: 1 - 20 m

Narrow Beam Antenna

Beam width: 5° (-3 dB one way)
Gain: > 24 dB
Range: SM-094/20N: 3 - 20 m
SM-094/50: 3 - 50 m
SM-094/85: 3 - 85 m

Measurement Error

Individual measurements: < 1 cm
Averaged measurements: < 1 mm

Power Requirements

Voltage: 9 - 36 VDC (nominal 24 VDC)
Current: 0.2 A

Environmental

Temperature: -30 - +50 °C
Humidity: 10 - 100 %RH

Housing

Material: Aluminium AL57S
Finish: Enamelled
Colour: Gray, RAL 7035
Ingress protection: Designed to meet IEC IP66

Physical

Dimensions: 70 x 510 x 420 mm (HxWxD)
Weight: 7 kg

Digital Signal Output

Interface: RS-422 (optionally RS-232)
Code: ASCII
Baud rate: 9600 (Factory settings, user programmable)
Data bits: 8
Stop bits: 1
Parity: None
Sampling interval: 20 - 60 000 ms (0.016 - 50 Hz) or polling mode
Data format: aa.aaa<HT>hh.hhh<CR><LF>
both aa.aaa and hh.hhh are measured range [m]
with individually selectable averaging time periods

Specifications are subject to change without prior notice.

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