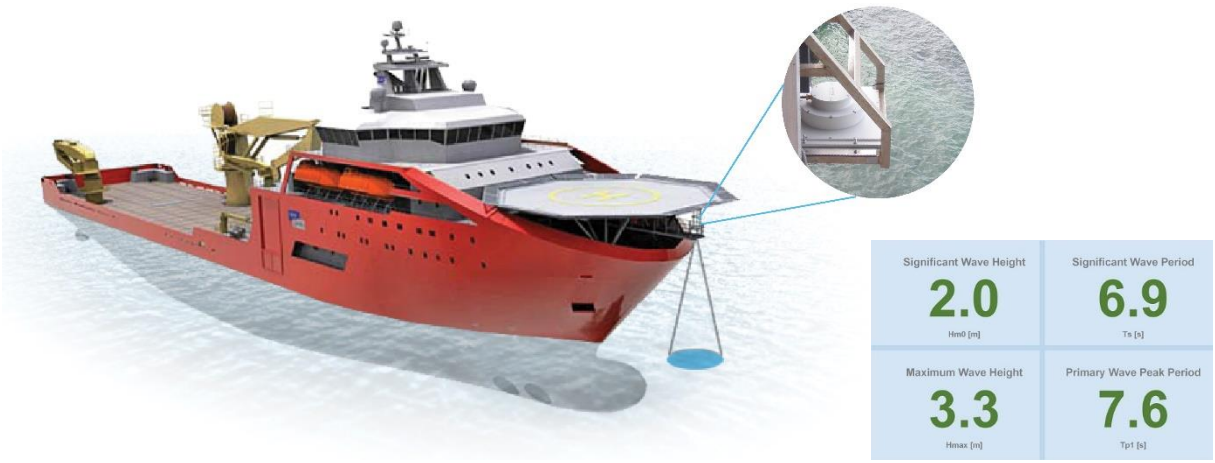
SM-140 WaveFinder



The ultimate stand-alone sensor for Wave, Draught and Air Gap measurements from vessels and floating installations.

The new SM-140 WaveFinder™ is purpose made for accurate wave-measurements from vessels and floating installations. It is based on the SM-140 RangeFinder and its market-leading range and accuracy specifications, complemented with an integral high-precision motion reference unit. The 5° narrow-beam antenna gives a small footprint on the sea surface, enabling the sensor to measure shorter wave-periods from a longer distance than sensors with 10° antennas. Wave variables are calculated both from timeseries data and from the wave spectrum.

The SM-140 WaveFinder is a stand-alone sensor with embedded processing and storage, enabling data to be easily and securely accessible both locally and remotely by utilizing modern IoT technologies.

It is compact and easy to install. Only a network connection and power are required. The narrow beam antenna enables a more flexible installation alongside the hull.

The sensor has proved its ruggedness and reliability through many years of service in extreme weather conditions, all over the world.

Key Features:

- Embedded data processing and browser-based user interface
- IoT enabled, for easy data access, locally and remotely
- Easy to install
- No parts submerged in water
- Low maintenance cost

Essential For:

- Accurate air gap and draught measurements
- Accurate non-directional wave measurements, calculated from both wave spectrum and timeseries.
- Accurate wave profiling
- Weather-critical maritime operations
- Asset integrity verification

SM-140 WaveFinder – stand-alone sensor for motion compensated wave monitoring

The FMCW (Frequency Modulated Continuous Wave) microwave sensor accurately measures the distance to the water surface and heave. Draught is calculated relative to a user defined reference level. Wave variables are calculated both from the motion compensated wave point spectrum and from time-series analysis[1].

The sensor is a self-contained, network connected device with an integrated web-based user interface.

The SM-140 WaveFinder is an IoT-enabled device that can be easily and securely integrated both with local and remote systems. It can also be complimented with various value-adding cloud services from Miros such as web displays, database integration, data processing and device management services.

SPECIFICATIONS

SM-140/NWF/02 WaveFinder

Data	Range	Resolution	Accuracy[2]
Distance (air-gap)	3 – 95 m [3]	1 mm	<5 mm
Heave motion (real time)	±20 m	1 mm	Greater of 5 cm or 5%
Wave height	< 40 m [4]	1 cm	Greater of 5 cm or 5% [5]
Wave period	2 – 64 s [4]	0.1 s	0.1 s

Internal sampling rate: 50 – 200Hz, depending on range.

Interfaces:

Standard interface:	TCP/IP over CAT5e or better
Alternative interface	Serial, RS-422/232[7]
Display / GUI:	
Data, status and configuration:	Web GUI [6] (up to 10 simultaneous users)
Output Interfaces:	
Sensor data and status:	NMEA, proprietary formats JSON over HTTP and Cloud
Data output rate:	Up to 50Hz via TCP/IP or serial
Input Interfaces:	
Position:	NMEA - GGA/GLL
Date/Time:	NTP

Electrical Data:

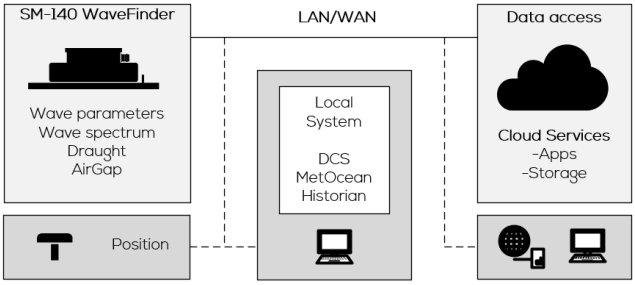
Frequency of operation:	9.4 – 9.8 GHz, Triangular FM
Transmitted power:	2 dBm ± 3 dB (nominal 1.6 mW)
Beam width;	5° (-3dB one way)
Supply voltage:	12 – 36 VDC (Nominal 24 VDC)
Power consumption:	< 12 W
EMC:	RED 2014/53/EU (pending)

Environmental specifications:

Temperature:	-30°C to +50°C
Humidity:	0 – 100 %RH
Ingress Protection:	IP 67 (IEC/EN 60529)

Physical Specifications:

Dimensions, H x W x D:	136 x 500 x 440 [mm]
Weight:	SM-140/NWF/02: 11 kg
Material:	Al. EN AW 5052 / EN AW 6082
Finish / Colour:	Enameled / Grey RAL 7035



Versions:

SM-140/NWF/02/90:	Range 3 – 95 m, see note 3
SM-140/NWF/02/90/RSxxx [6]	Serial-line, RS422 or RS232

Accessories and options:

MP-327	Mounting Bracket
EA-116/xx	Junction Box
Cloud services	

Notes

1. Wave point spectrum (range 0.0078 – 0.5 Hz, 0.0078 Hz resolution)
   A selection of wave parameters from the wave spectrum:
   - Significant wave height, H_{m0}
   - Maximum wave height, H_{max} (most likely value in 30 min interval)
   - Peak period, T_p
   - Average period, T_{m02}

   Wave parameters from time-series analysis (8Hz sampling for 128sec):
   - Significant wave height, H_s
   - Maximum wave height, H_{max}
   - Significant wave period, T_S
   - Period of wave with max. height, T_{hmax}
2. The accuracy (standard deviation) of water level and wave variables, like Hs and Hm0, is mainly determined by the sea surface statistics, sensor data integration time (user selectable) and sensor site-specific properties. The speed of vessels in transit will impact the wave period measurements.
3. Configurable: 3-23 m, 3-45 m or 3-95 m.
4. Depending on sensor elevation above sea level and selected sensor range.
5. Certified for DNV offshore standard H101, «Marine Operations General».
6. WEB GUI with real-time and historical data, operational alarms, sensor status and sensor configuration.
7. For the serial-line output version:
   - RS-422 or RS-232 (4.8 – 115.2kB).
   - No WEB GUI or position/time inputs available.
   - MirLog06 and MirUtil01 software utilities are included.

Specifications are subject to change without prior notice.