



## MULTIBEAM ECHO SOUNDER

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The EM 2040P is a shallow water multibeam echo sounder based on the EM 2040 technology, an ideal tool for any high resolution mapping and inspection application.

The receiver and transmitter are integrated in a common sonar head. The system fulfils, and even surpasses, the IHO-S44 special order and the more stringent LINZ specification.

### Key facts

The operating frequency range is from 200 to 400 kHz. The operator can on the fly choose the best operating frequency for the application: 300 kHz for near bottom, 200 kHz for deeper waters and 400 kHz for very high resolution inspection. Due to the very large operating bandwidth available, the system will have an output sample rate up to 60 kHz. The system can effectively operate with very short pulse lengths. The shortest pulse is 14 microseconds, which gives a raw range resolution ( $\sigma/2$ ) of 10.5 mm.

By utilizing both CW and FM chirp pulses, the system can achieve a much longer range capability with a high resolution. The maximum depth range in cold ocean water is 600 m at 200 kHz with a swath with up to 830 m. The angular coverage for the 200 and 300 kHz is 140 degrees, allowing coverage of 5.5 times water depth. For the 400 kHz mode the angular coverage is 120 degrees.

As an option the EM 2040P can be delivered with the dual swath capability, allowing a sufficient sounding density along track at a high vessel speed.

### Components

The basic EM 2040P has three units: A sonar head, a processing unit and a workstation.

The sonar head has bumpers in the corners of the face of the transducer to protect the it if it is placed on deck, and it has carrying handles on the sides.

The EM 2040P can be delivered with the standard processing unit or with a splash proof (24 VDC) portable processing unit.

For completeness, data input from a motion sensor and a positioning system is required. As is the sound speed profile of the water column between the transducer and the bottom. Sound speed at the transducer depth is an optional input.

Optionally, the sonar head can be delivered with mounts for motion sensor and sound speed sensor, factory aligned for ease of mounting.

All electronics are contained in the sonar head which is interfaced to the processing unit via GBit Ethernet. The processing unit also supplies 48 V power via the same cable. Operator control, data quality inspection and data storage is handled by the hydrographic workstation running SIS software or by 3rd party software.

## FEATURES

- High resolution
- Wide frequency range
- FM chirp
- Roll, pitch and yaw stabilisation
- Nearfield focusing - both on transmit and receive
- Short pulse lengths, large bandwidth
- Water column display
- Seabed image
- Depth rated to 30 m
- Easy to install

### Options:

- Water column logging
- Extra detections
- Dual swath



## TECHNICAL SPECIFICATIONS

Frequency range:	200 to 400 kHz
Beam width:	1 * 1 degree at 400 kHz
Max ping rate:	50 Hz
Swath coverage sector:	Up to 140 degrees
Sounding patterns:	Equiangular, equidistant and high density
No. of soundings per ping:	400 (single swath) 800 (dual swath)
Roll stabilised beams:	+/-15 degrees
Pitch stabilised beams:	+/-10 degrees
Yaw stabilised beams:	+/-10 degrees

Coverage example for EM 2040P with bottom type rock (BS = - 10 dB), NL = 45 dB, FM mode				
	Coald ocean		Cold fresh water	
Operating mode	Max depth	Max coverage	Max depth	Max coverage
200 kHz	600 m	830 m	600 m	1770 m
300 kHz	450 m	610 m	600 m	1000 m
400 kHz	270 m	360 m	380 m	500 m

Pulse lengths	200 kHz mode		300 kHz mode		400 kHz mode	
	CW	FM	CW	FM	CW	FM
Normal mode	38, 108 and 324 µs	3 and 12 ms	38, 108 and 324 µs	2 and 6 ms	27, 54 and 108 µs	N/A
Single sector mode	19, 38 and 81 µs	1.5 ms	19, 38 and 81 µs	1.5 ms	14, 27 and 54 µs	N/A

Physical dimensions (excluding connectors and mounting arrangements)			
Sonar head	482 x 298 x 166 mm (LxWxH)	19.5 kg (1.7 kg in water)	Depth rating 30 m
Processing unit (2U 19" rack)	482.5 x 424 x 88.6 mm (WxDxH)	10.5 kg	NA
Processing unit - Splash proof	370 x 390 x 101 mm (WxDxH)	10.5 kg	IP67

Laptop, HWS and monitor can be delivered on request.

Specifications subject to change without any further notice.  
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