

EM[®] 2040P MKII



KONGSBERG

MULTIBEAM ECHO SOUNDER

The EM 2040P MKII is a shallow water multibeam echo sounder based on EM 2040 technology. It is an ideal tool for any high resolution mapping and inspection application. With this release, Kongsberg Maritime has upgraded the hardware and software to increase the swath and improve the data quality of our EM 2040 series.

Key facts

The system fulfils, and even surpasses, IHO-S44 Special Order and the more stringent LINZ specification.

The EM 2040 was the first 3-sector broadband multibeam echo sounder in the market, now available as a 200 - 700 kHz system. 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 - 700 kHz for very high resolution inspection. 600 kHz wide area high frequency mapping mode offers an unprecedented 100-120° swath width. 700 kHz inspection mode provides the highest resolution available contained within a narrow 30° swath.

By alternating between the frequency modes per ping, the system is capable of providing the operator with Multi Frequency Backscatter of up to 5 frequencies in a single pass. The same functionality allows the system to alternate between a full swath mode and a high resolution mode providing full coverage while maintaining ultra high resolution over a target.

Due to the large operating bandwidth, the system has 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 (CT/2) of 10.5 mm.

The angular coverage for the 200 and 300 kHz is up to 170° with coverage up to 7.5 times water depth on a flat bottom.

Components

The basic EM 2040P MKII has three components: 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 it if it is placed on deck, and it has carrying handles on the sides. The EM 2040P MKII can be delivered with the standard processing unit or a IP67 rated (24 VDC) portable processing unit.

As an option the EM 2040P MKII can be delivered with the dual swath capability, allowing a sufficient sounding density to meet survey coverage standards along track while maintaining a high vessel speed.

For real-time motion stabilization and compensation, data input from a motion sensor, heading and a positioning system is required. A sound speed profile of the water column is also required for real-time correction. Sound speed at the transducer depth is now available fully integrated in the sonar head with AML's latest generation SVT sensor, made of monolithic titanium, providing high accuracy and easy re-calibration in a rugged package.

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

- Ultra high resolution
- Multi frequency backscatter
- Seabed image
- Wide frequency range
- Short pulse lengths, large bandwidth
- Roll, pitch and yaw stabilisation
- Transmit and receive nearfield focusing
- Depth rated to 30 m
- FM chirp
- Extra detections
- Water column display and logging
- Dual swath
- AML's latest generation SVT sensor
- Easy to install



TECHNICAL SPECIFICATIONS

Frequency range	200 to 700 kHz
Max ping rate	50 Hz
Swath coverage sector	Up to 170°
Beam patterns	Equiangular, equidistant, high density and ultra high density
No. of beams per ping	512 (single swath) / 1024 (dual swath)
Roll stabilised beams	± 15°
Pitch stabilised beams	± 10°
yaw stabilised beams	± 10°

Coverage example for EM 2040P MKII with bottom type rock (BS = - 10 dB), NL = 45 dB, FM mode

Operating mode	Cold ocean water		Cold fresh water	
	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
600 kHz	40 m	95 m	50 m	115 m
700 kHz	30 m	16 m	45 m	24 m

Pulse lengths

200 kHz		300 kHz		400 kHz	600 kHz	700 kHz
CW	FM	CW	FM	CW	CW	FM
19 to 324 µs	1.5 to 12 ms	19 to 324 µs	1.5 to 6 ms	14 to 108 µs	70 to 280 µs	70 µs

Beamwidth

Physical dimensions (excluding connectors and mounting arrangements)

200 kHz	300 kHz	400 kHz	600 kHz	700 kHz	Dimensions	Weight
1.5°	1.3°	1°	0.65°	0.6°	560 x 300 166 mm (LxWxH)	19.5 kg (1.7 kg in water)
Processing Unit (2U for 19" rack)					482.5 x 424 x 88.6 mm (WxDxH)	10.5 kg
Portable Processing Unit (IP67)					370 x 390 x 101 mm (WxDxH)	10.5 kg

Laptop, Hydrographic Work Station (HWS) and monitor can be delivered on request.

Specifications subject to change without any further notice.

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Front page image: From SAT EM 2040P, captured at Noumea, New Caledonia. Courtesy of SHOM, France.

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