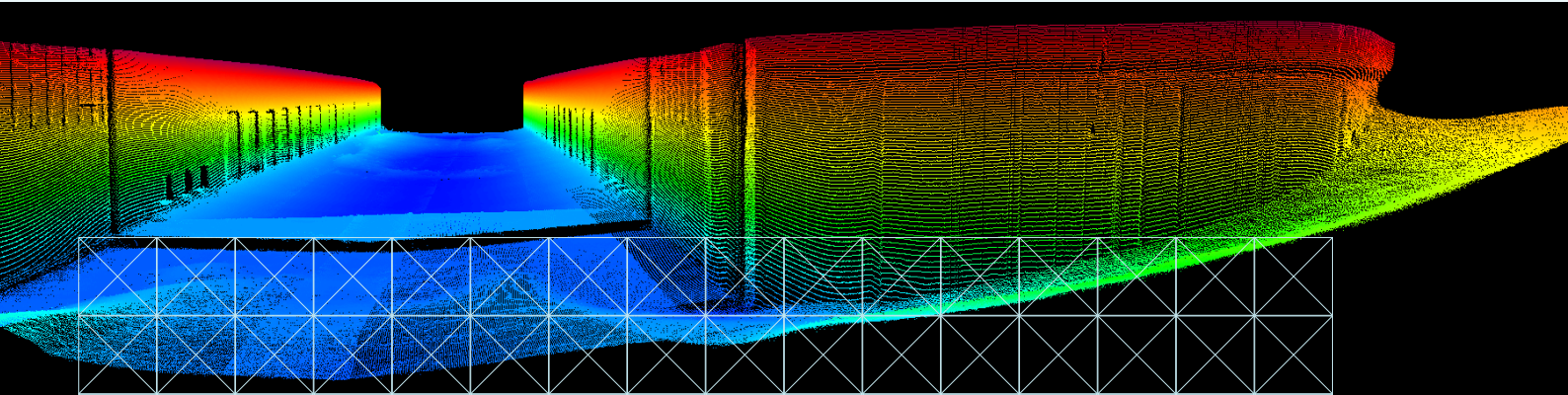


EM[®] 2040 MKII



KONGSBERG



MULTIBEAM ECHO SOUNDER

The EM 2040 MKII is a true wide band high resolution shallow water multibeam echo sounder, an ideal tool for any high resolution mapping and inspection application. With the release of the EM 2040 MKII series 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 operating frequency range of the EM 2040 MKII is 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 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 being 14 microseconds giving a raw range resolution (CT/2) of 10.5 mm.

By utilizing both CW and FM chirp pulses, the system can achieve long range capability with a high resolution giving the system a maximum depth range in cold ocean water of 600 m at 200 kHz and a swath width up to 900m.

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. For a dual transducer system, 200° angular coverage or 10 times the water depth is achieved on a flat bottom.

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

Components

The EM 2040 MKII is a modular system, fully prepared for upgrading to cater for more demanding applications. The basic system has four units: a transmit transducer, a receive transducer, a processing unit and a hydrographic workstation.

The EM 2040 MKII receiver is 0.7° and is delivered with a 0.4° or 0.7° transmitter(s). The transmit fan is divided into three sectors pinging simultaneously at separate frequencies ensuring a strong and beneficial dampening of multibounce interference.

A single transmitter with dual receiver setup fully exploits the unique angular coverage of our three-sector transmitter for full 200° angular coverage per ping. The specialised dual transmitter and receiver setup is ideal where mounting requires a large separation of receivers, where mounting the transmitter at the keel is not an option or for ROV pipeline surveying and free span detection. This configuration transmits on a single sector per transmitter with selectable frequency in steps of 10 kHz from 200 to 400 kHz.

The standard depth rating of the EM 2040 MKII transducers is 6000 m, making it ideal for operation on subsea vehicles such as ROVs or AUVs.

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
- Seabed image
- Depth rated to 6000 m
- Easy to install

Options:

- Water column logging
- Water column display
- Extra detections
- Dual swath
- Dual RX
- Dual TX



TECHNICAL SPECIFICATIONS

Frequency range	200 to 400 kHz
Max ping rate	50 Hz
Swath coverage sector	Up to 170° (single receiver) / 200° (dual receiver)
Beam patterns	Equiangular, equidistant and high density
No. of beams per ping	400 (Single RX)/800 (Single RX, Dual Swath)/1600 (Dual RX, Dual Swath)
Roll stabilised beams	± 15°
Pitch stabilised beams	± 10°
Yaw stabilised beams	± 10°

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

Operating mode	Cold ocean water			Cold fresh water		
	Max depth	Max coverage single RX	Max coverage dual RX	Max depth	Max coverage single RX	Max coverage dual RX
EM 2040-04:						
200 kHz	635 m	920 m	980 m	1360 m	1990 m	2110 m
300 kHz	480 m	670 m	760 m	740 m	1100 m	1270 m
400 kHz	315 m	410 m	430 m	430 m	570 m	610 m
EM 2040-07:						
200 kHz	600 m	880 m	930 m	1300 m	1870 m	2000 m
300 kHz	465 m	640 m	725 m	700 m	1050 m	1200 m
400 kHz	300 m	385 m	410 m	375 m	540 m	570 m

Pulse lengths	200 kHz mode		300 kHz mode		400 kHz mode	
	CW	FM	CW	FM	CW	FM
Normal mode	38, 108 & 324 µs	3 & 12 ms	38, 108 & 324 µs	2 & 6 ms	27, 54 & 108 µs	N/A
Single sector mode	19, 38 & 81 µs	1.5 ms	19, 38 & 81 µs	1.5 ms	14, 27 & 54 µs	N/A
	200 - 400 kHz CW in 10 kHz step			200 - 400 kHz FM in 10 kHz step		
Dual TX model	14, 27, 54, 135, 324 & 918 µs			3 & 12 ms		

Max no. of beams per ping	Single swath	Dual swath
Single RX	400	800
Dual RX	800	1600

	Beamwidth			Physical dimensions (excluding connectors and mounting arrangements)	
	200 kHz	300 kHz	400 kHz	Dimensions	Weight
TX EM 2040-04	0.7°	0.5°	0.4°	727 x 142 x 150 mm (LxWxH)	45 kg
TX EM 2040-07	1.5°	1°	0.7°	407 x 142 x 150 mm (LxWxH)	23 kg
RX	1.5°	1°	0.7°	407 x 142 x 136 mm (LxWxH)	22 kg
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, HWS and monitor can be delivered on request.

Specifications subject to change without any further notice.

EM® is a registered trademark of Kongsberg Maritime AS in Norway and other countries.

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