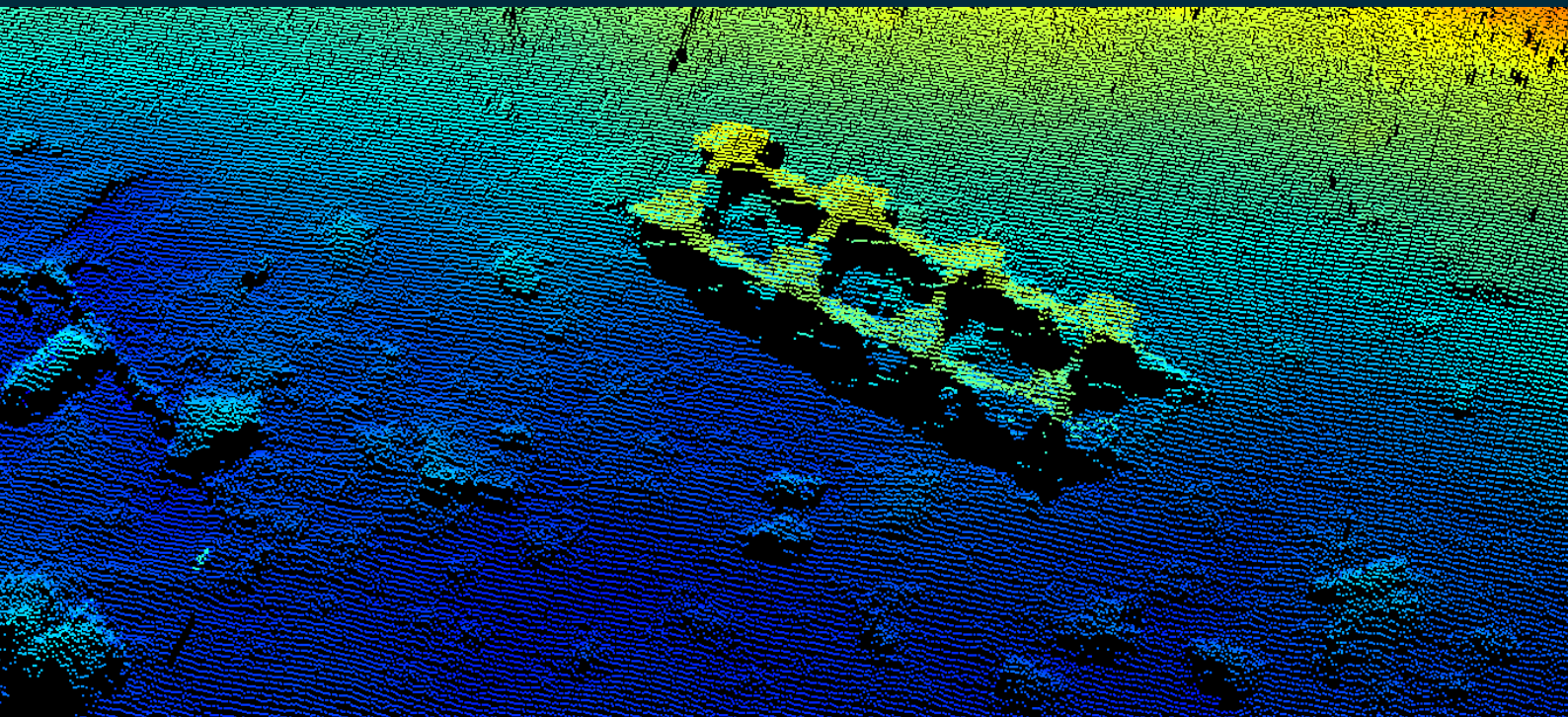


EM[®] 2040



KONGSBERG



MULTIBEAM ECHO SOUNDER

The EM2040 is a true wide band high resolution shallow water multibeam echosounder, an ideal tool for any high resolution mapping and inspection application. It has a modular design, allowing the user to tailor the beamwidths and coverage to the operational requirements. The system fulfils and even surpasses the IHO-S44 special order and the more stringent LINZ specification.

Key facts

The EM 2040 receiver is 0.7 degrees, two transmitters are available: 0.4 and 0.7 degrees. The transmit fan is divided into three sectors pinging simultaneously at separate frequencies. This ensures a very strong and beneficial dampening of multibounce interference. The EM 2040 has dual swath capability, allowing a sufficient sounding density alongtrack at a reasonable vessel speed.

The operating bandwidth available on the EM 2040 is 200 to 400 kHz. Due to the very large operating bandwidth available, the system will have an output sample rate up to 58.8 kHz. The system can effectively operate with very short pulse lengths. The shortest pulse is 14 microseconds, which gives a raw range resolution ($c\tau/2$) of 10.5 mm. For maximum range and high resolution FM chirp is used.

The standard depth rating of the EM 2040 subsea parts is 6000 m. The system is ideal for operation on subsea vehicles such as ROVs or AUVs.

Components

The basic EM 2040 has four units, a transmit transducer, a receive transducer, a processing unit, and a workstation.

The EM 2040 is a modular system, fully prepared for upgrading to cater for more demanding applications. The transmit trans-

ducer has an angular coverage of 200° ($\pm 100^\circ$) as standard, allowing a coverage of 5.5 times water depth when matched with a single receive transducer. Adding a second receive transducer allows surveying to the water surface or up to 10 times water depth on flat bottoms. With two sets of transmit and receive transducers it is possible to avoid having a transducer at the keel. Also for pipeline inspections a dual TX and RX configuration gives the possibility to inspect the pipe from two different angles. The transducers are separate units with titanium housings.

Operational modes

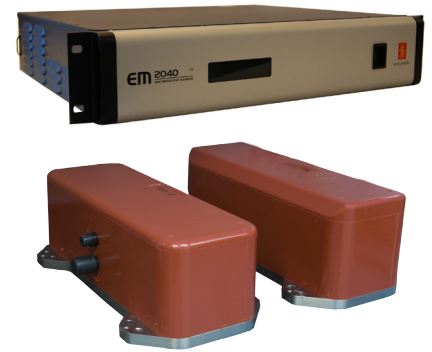
The EM 2040 has a frequency range of 200-400 kHz. The single transmitter configuration with either one or two receivers has three standard modes. 300 kHz is used for normal operation, giving an optimum balance between high resolution, depth capability and tolerance of detrimental factors such as water column sediments. 200 kHz is available for meeting requirements to operate at the standard hydrographic single beam frequency, but also to achieve the best depth capability. 400 kHz is provided for inspection work with the utmost resolution.

The specialised dual transmitter and receiver configuration has a mapping mode with two frequency coded sectors and user selectable frequency in steps of 10 kHz from 200 to 400 kHz.

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 6000 m
- Easy to install

- Options:
- Water column logging
 - Extra detections
 - Dual swath
 - Dual RX
 - Dual TX



TECHNICAL SPECIFICATIONS

Coverage example for EM 2040 with bottom type rock (BS = - 10 dB), NL = 45 dB, FM mode						
Operating mode	Cold ocean			Cold fresh water		
EM 2040-04:	Max depth	Max coverage single RX	Max coverage dual RX	Max depth	Max coverage single RX	Max coverage dual RX
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 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
	200 - 400 kHz CW in 10 kHz step			200 - 400 kHz FM in 10 kHz step		
Dual TX model	14, 27, 54, 135, 324 and 918 µs			3 and 12 ms		

Max no. of soundings 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 deg	0.5 deg	0.4 deg	727 x 142 x 150 mm (LxWxH)	45 kg
Tx EM 2040-07	1.5 deg	1 deg	0.7 deg	407 x 142 x 150 mm (LxWxH)	23 kg
Rx	1.5 deg	1 deg	0.7 deg	407 x 142 x 136 mm (LxWxH)	22 kg
Processing Unit (2U 19" rack)*				482.5 x 424 x 88.6 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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