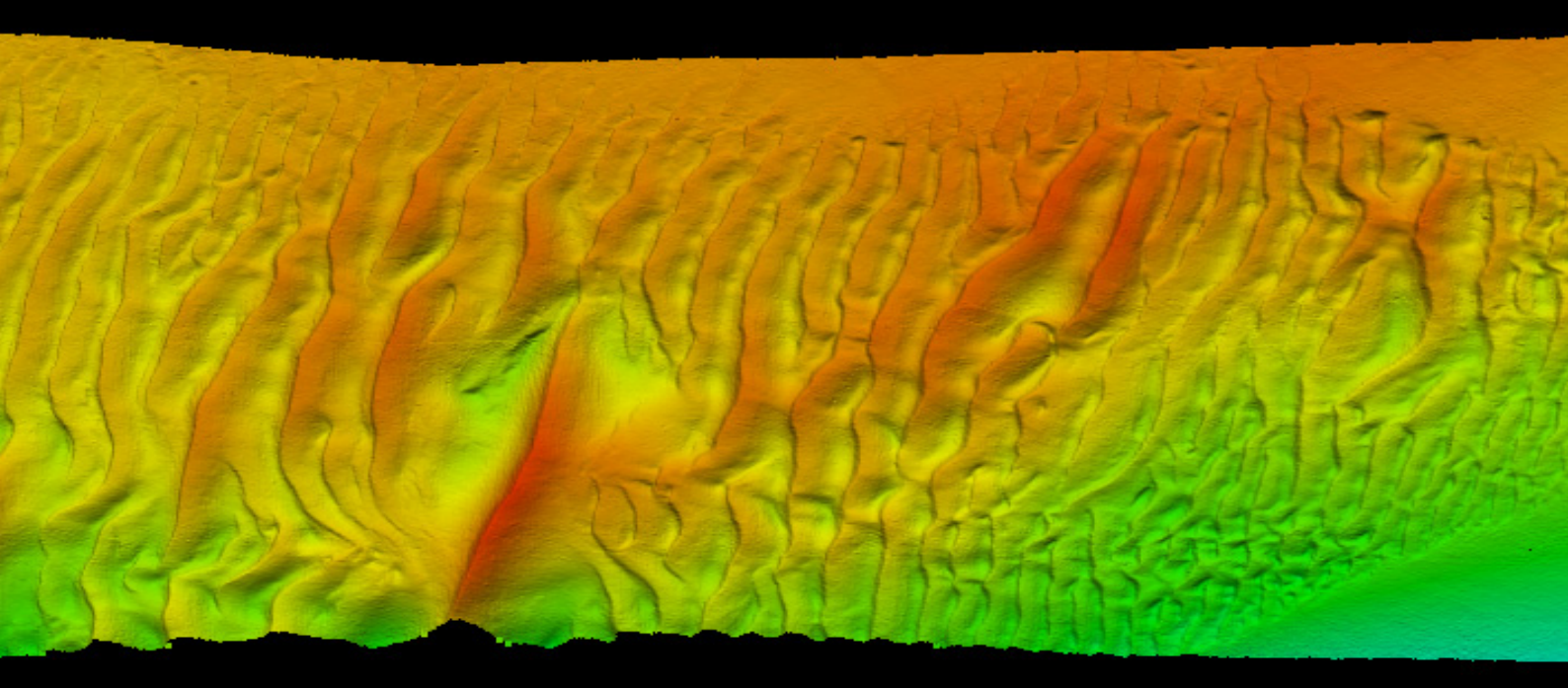


# EM<sup>®</sup> 2040C



KONGSBERG



## MULTIBEAM ECHO SOUNDER

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The EM 2040C (C for Compact) 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, with the same dimensions as its predecessor EM 3002. 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 with frequency selection in steps of 10 kHz, enabling the user to choose on the fly the best operating frequency for the application. 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.

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 for a dual head system in cold ocean water is 520 m at 200 kHz with a swath with up to 700 m.

The angular coverage for 200 to 320 kHz is 130 degrees with one sonar head, allowing coverage of 4.3 times water depth. With two sonar heads tilted 35-40 degrees to each side, 200 degrees can be covered. This allows surveying to the water surface or up to 10 times water depth on flat bottoms. For frequencies above 320 kHz the angular coverage per head is gradually decreasing to 70 degrees at 400 kHz.

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

### Components

The basic EM 2040C has three units: a sonar head, a processing unit and a hydrographic workstation. 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 transducers and the bottom. Sound speed at the transducer depth is an optional input and is highly recommended, especially for a dual head system.

Optionally, the sonar head(s) may be delivered mounted on a frame together with the motion sensor and a sound speed sensor, factory aligned for ease of mounting.

All electronics are contained in the sonar head(s) which is interfaced to the processing unit via GBit Ethernet. The processing unit also supplies 48 VDC 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.

The EM 2040C is available in an EM 2040CX version where the subsea part has a depth rating of 1500 m for operation on ROV or AUV.

## FEATURES

- High resolution
- Wide frequency range
- FM chirp
- Roll and pitch stabilisation
- Yaw stabilisation - for dual head
- Nearfield focusing both on transmit and receive
- Short pulse lengths, large bandwidth
- Water column display
- Seabed image
- Depth rated to 50 m
- Easy to install

- Options:
- Water column logging
  - Extra detections
  - Dual swath
  - Depth rated to 1500 m (EM 2040CX)
  - Dual Head (EM 2040CD)



## TECHNICAL SPECIFICATIONS

|                            |  |
|----------------------------|--|
| Frequency range:           | 200 to 400 kHz in steps of 10 kHz  |
| Beam width:                | 1 * 1 degree at 400 kHz  |
| Max ping rate:             | 50 Hz  |
| Swath coverage sector:     | Up to 130 degrees (single head) / 200 degrees (dual head)  |
| Sounding patterns:         | Equiangular, equidistant and high density  |
| No. of soundings per ping: | 400 (single head, single swath)<br>800 (single head, dual swath)<br>1600 (dual head, dual swath) |
| Roll stabilised beams:     | +/-15 degrees  |
| Pitch stabilised beams:    | +/-10 degrees  |
| Yaw stabilised beams:      | +/-10 degrees (Dual head)  |

| Coverage example for EM 2040C in cold ocean water with bottom type rock (BS = - 10 dB), NL = 45 dB, FM mode |           |                     |           |
|---|-----------|---------------------|-----------|
| Operating frequency   | Max depth | Max coverage across |           |
|   |           | Single head         | Dual head |
| 200 kHz   | 520 m     | 580 m               | 700 m     |
| 300 kHz   | 450 m     | 580 m               | 670 m     |
| 350 kHz   | 400 m     | 510 m               | 600 m     |
| 400 kHz   | 350 m     | 375 m               | 530 m     |

|               | 200 - 400 kHz in 10 kHz step    | 200 - 400 kHz in 10 kHz step |
|---------------|---------------------------------|------------------------------|
|               | CW                              | FM                           |
| Pulse lengths | 14, 27, 54, 135, 324 and 918 µs | 3 and 12 ms                  |

| Physical dimensions (excluding connectors and mounting arrangements) |                               |                           |                     |
|--|-------------------------------|---------------------------|---------------------|
| Sonar head EM 2040C  | 332 x 119 (diameter x height) | 18.8 kg (8.4 kg in water) | Depth rating 50 m   |
| Sonar head EM 2040CX   | 332 x 122 (diameter x height) | 26.1 kg (17 kg in water)  | Depth rating 1500 m |
| Processing Unit (2U 19" rack)  | 482.5 x 424 x 88.6 mm (WxDxH) | 10.5 kg                   | NA                  |

Laptop, HWS and monitor can be delivered on request.

Specifications subject to change without any further notice.  
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