

# EM<sup>®</sup> 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 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 system fulfils, and even surpasses, IHO-S44 Special Order and the more stringent LINZ specification. 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 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.

By utilizing both CW and FM chirp pulses, the system can achieve long range capability with a high resolution. The maximum depth range in cold ocean water is 600 m at 200 kHz with a swath width up to 830 m. 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 the 400 kHz mode the angular coverage is 120°

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.

### 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.

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.

The sonar head 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 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
- Seabed image
- Depth rated to 30 m
- Easy to install

### Options:

- Water column logging
- Water column display
- Extra detections
- Dual swath
- AML's latest generation SVT sensor



## TECHNICAL SPECIFICATIONS

|                        |   |
|------------------------|---|
| Frequency range        | 200 to 400 kHz                            |
| Beam width             | 1x1° at 400 kHz                           |
| Max ping rate          | 50 Hz                                     |
| Swath coverage sector  | Up to 170°                                |
| Beam patterns          | Equiangular, equidistant and high density |
| No. of beams per ping  | 400 (single swath) / 800 (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        |

| 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 and 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 |

### Physical dimensions (excluding connectors and mounting arrangements)

| Component                         | Dimensions (mm)            | Weight (kg)                  | Depth rating (m) |
|-----------------------------------|----------------------------|------------------------------|------------------|
| Sonar head                        | 560 x 300 x 166 (LxWxH)    | 19.5 kg<br>(1.7 kg in water) | 30               |
| Processing unit (2U for 19" rack) | 482.5 x 424 x 88.6 (WxDxH) | 10.5 kg                      | N/A              |
| Portable Processing Unit          | 370 x 390 x 101 (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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Front page image: From SAT EM 2040P, captured at Noumea, New Caledonia. Courtesy of SHOM, France.

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