

## Multibeam echo sounder

### Overview

The EM 1002 multibeam echo sounder is designed for high-resolution seabed mapping. It operates effectively at a variety of depths, from shallow coastal waters to 1000 meters. The system is easy to install, even on smaller vessels. The EM 1002 has an accuracy which surpasses both present IHO standards and proposed revisions.

### Coverage

Across-track coverage is approximately 1500 meters in deep water and up to 7.4 times the depth beneath the transducer in shallow water. Normal angular coverage is adjustable up to 150°. When surveying from the bottom to the surface along: shorelines, river banks and man-made structures, the angular coverage on one or both sides of the transducer may be increased to 5° above the horizontal.

### Solid technology

EM 1002 is based on the well-proven design of the EM 1000. New, more compact electronics and improved software provide almost twice the number of beams per ping, narrower beam-widths and even higher accuracy. The operator interface has also been updated to be as user-friendly as possible.

### EM 1002S

The standard EM 1002 system has three different pulse lengths to maximize coverage in deep water. A shallow water version, the EM 1002S, which is identical (except for only being equipped with the shortest of the three pulse lengths) is a cost effective alternative when deep water capability is not required. The EM 1002S may be used at depths over 600 meters, but across-track coverage will be limited to approximately 1000 meters (and will typically be less than half that of a standard EM 1002 for depths greater than 300 meters). An EM 1002S may be later upgraded to a standard EM 1002.



### Performance

EM 1002 operates at a frequency of 95 kHz allowing the transducer to be physically compact and still provide superior range capability, even in turbulent water. Precise phase and amplitude detection provide excellent measurement accuracy under a variety of conditions and depths.

### Features

**Standard EM 1002 features include:**

- Integrated seabed acoustical imaging capability (sidescan).
- A maximum ping rate of more than 10 Hz.
- A large number of measurements per ping using 111 individual beams.
- A two-degree beam width.
- Electronic roll stabilization.

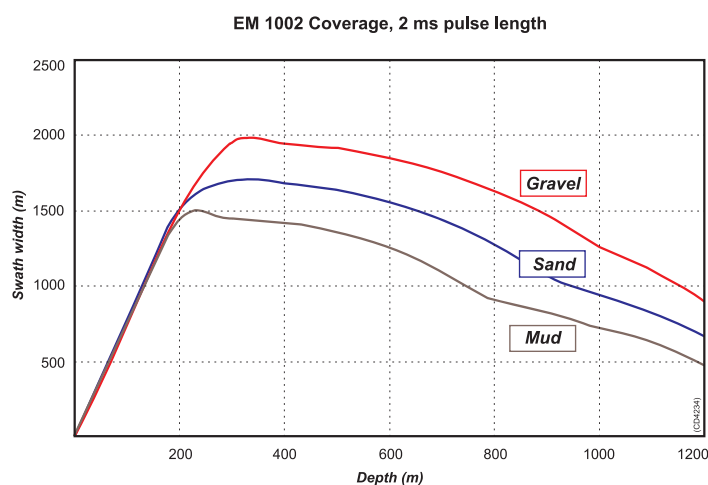
**Optional feature:**

- Mechanical pitch compensation is available with an optional hull unit.

## Specifications

Standard EM 1002 specifications include:

Frequency.....	95 kHz
Maximum ping rate.....	>10 Hz
Number of beams per ping.....	111
Beamwidth.....	2x2°
Beam spacing.....	equidistant and equiangle
Coverage sector.....	up to 150° (usable up to 190°)
Depth range from transducers.....	2 to 1000 m
Depth resolution.....	2, 4 or 8 cm
Pulse lengths.....	0.2, 0.7 and 2 ms
Range sampling rate.....	9 kHz (8 cm)
Beamforming method.....	phase interpolated



EM 1002 coverage at different depths

## Performance

The hydroacoustical transmission fan is divided into three separate sectors when the angular coverage is larger than approximately 100°. To avoid problems associated with multiple echoes due to normal incidence, specific frequencies are used for the inner and outer fan sectors respectively. Each of these sectors are transmitted sequentially within a single ping. Three different pulse lengths are available, 0.2, 0.7 and 2 milliseconds. Longer pulse lengths usually perform best at depths greater than 600 meters and shorter pulse lengths at depths less than 200 meters.

## Characteristics

An EM 1002 system consists of three main units:

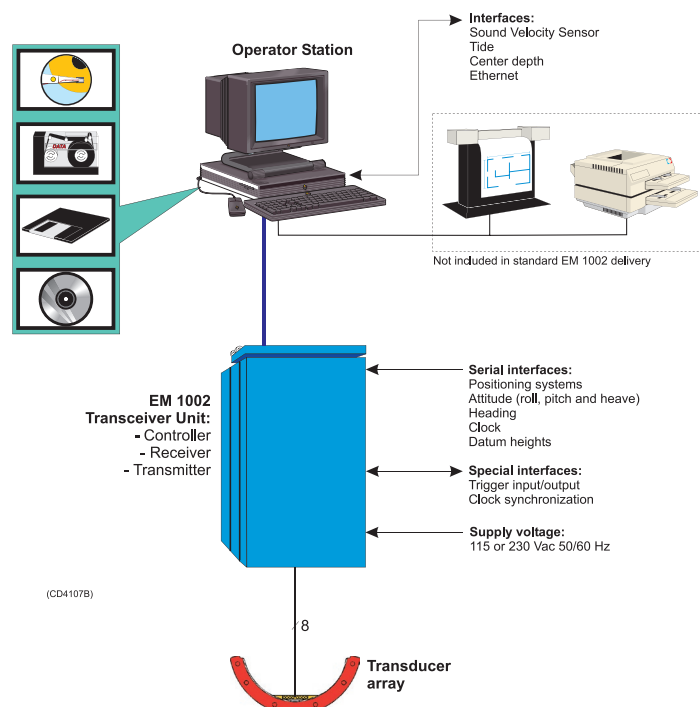
- A transducer array
- A transceiver unit
- An operator station

Normally, a complete mapping system will also include one or more of the following:

- Vessel motion sensor
- A positioning system
- A post-processing system
- Sound speed sensor

## Design

The EM 1002 transducer array is used to both transmit and receive. It has a semicircular design with a radius of 45 cm and its weight in water is approximately 90 kg. The transceiver unit contains the all electronics necessary to transmit and receive signals. The operator station is equipped with processors for beam-forming, bottom detection and parameter control as well as the main operator interface.



Due to the continuous development of its products, Kongsberg Maritime reserves the right to alter product specifications without notice. Please contact a sales representative for further information.

### Kongsberg Maritime AS

Strandpromenaden 50  
P.O.Box 111  
N-3191 Horten,  
Norway

Telephone: +47 33 02 38 00  
Telefax: +47 33 04 47 53  
**www.kongsberg.com**  
E-mail: subsea@kongsberg.com



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