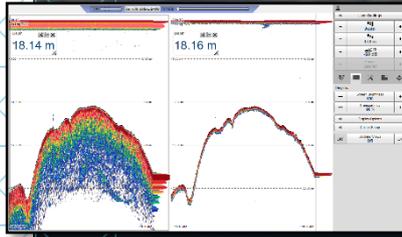


EA440



KONGSBERG

APPLICATION NOTE

EA440 depth observations

EA440

- High performance hydrographic depths from 30 kHz to 500 kHz
- Sidescan sonar application from 100 kHz to 500 kHz
- Sub-bottom profiler application from 10 kHz to 30 kHz
- Available with high power output from 30 kHz to 50 kHz
- Extensive range of transducer interfaces, both Kongsberg transducers and third-party transducers
- Splash proof all-in-one hardware setup available

- CW and FM pulse forms
- True raw data logging
- World class bottom detection

- New map display to track your coverage

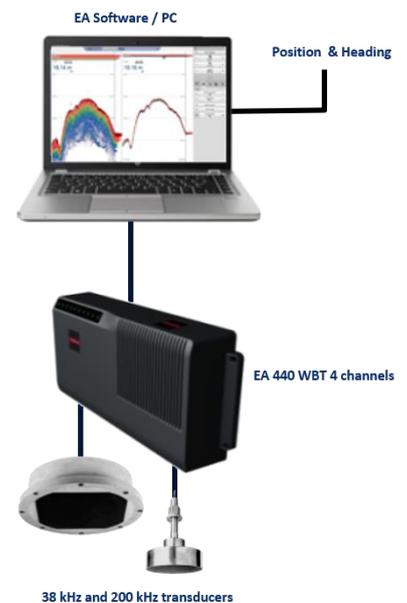
EA440 is a high performance hydrographic wide band single beam echo sounder. The echo sounder is developed for hydrographic use in shallow to medium depth waters. It also supports portable and hull mounted sidescan sonar and sub-bottom profiling functionality for shallow waters.

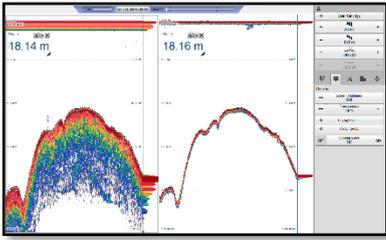
EA440 for depth measurements

The primary functionality of a single beam echo sounder is to measure accurate depths. The EA440 provides high-precisions depth measurements from very shallow waters down to approximately 3000 water depths. Range and accuracy depend on selection of transducers.

The standard WBT allows for 4 individual transducers that each can be monitored and logged separately. The WBT standard output power is max 500W. To achieve the detection at the greatest depths the WBT high power, may be used for the low frequency transducers. The WBT high-power provides 2 channels with up to 2000W output power each.

The EA440 provides world class bottom detection algorithms, and with applying both CW and FM pulses best possible range, as well as best possible accuracy are both achieved





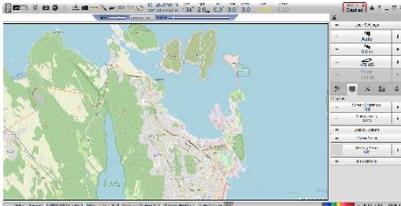
EA440 38 kHz and 200 kHz echogram view



A wide variety of transducers with different frequencies and properties can be simultaneously used for depth observations.



The WBT, the wideband transceiver: Two WBTs, allowing for up to 8 simultaneous depth observations can be used with EA440.



Map display for tracking of vessel coverage (for WBT users only)

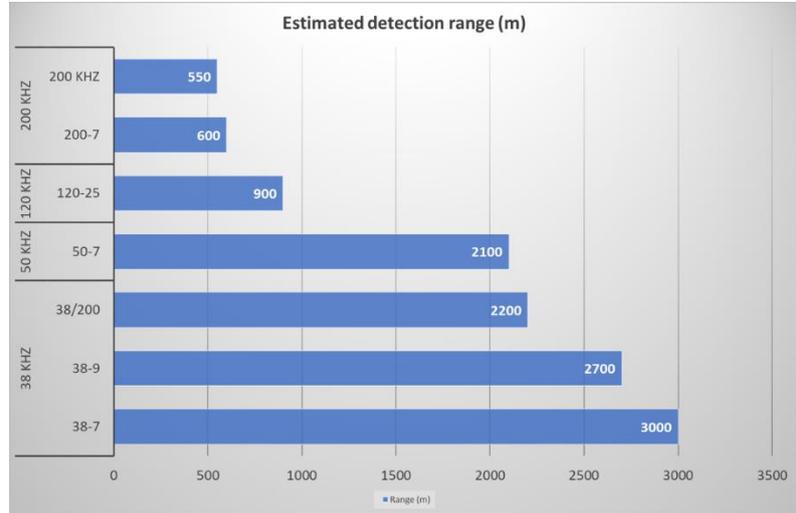


Up to 8 channels can be connected, allowing for simultaneous depth observations at different locations of your installation



EA440 detection ranges

Below table provides an overview of expected detection ranges using the different transducers. Note that range will depend on transmit power, which for frequencies at 50 kHz and above is limited to 500 Watts. The 38 kHz transducer can for EA440 be delivered with the high power WBT, delivering 2 kW on each of two available channels. Estimated range then reaches 3000m of water. Note also that FM wave form may provide better resolution.



Assumptions: FM pulses, salinity 3.5%, temperature +10°C, average bottom, max pulse length use.

For shallow depths the high frequency transducers are capable of providing depth observations down to less than 1m.

EA440 depth accuracy

The EA440 depths can be determined to an accuracy depending on minimum pulse length and sampling rate. Note that absolute depth accuracy depends in addition of external input such as position, heading, attitude, sound velocity, etc.

- 500 kHz: CW 32 to 512 μs, 0.3 cm
- 200 kHz: CW 64 to 1024 μs, 0.6 cm
- 38 kHz: CW 256 to 4096 μs, 2.4 cm
- 15 kHz: CW 512 to 8192 μs, 4.9 cm
- 10 kHz: CW 1 to 16 ms, 9.8 cm

The EA440 software

- The EA440 software is an intuitive and user-friendly software. You can set up the display to suit your special needs. You can choose different presentations on the screen for echograms, **map view**, digital depth and other features. Save user settings for different operations and you can use these at your ease.
- EA440 offers internal storage of all raw sample data. This includes all external input sensor data for replay purposes.
- Depth data can be output to external system on various NMEA and other data formats