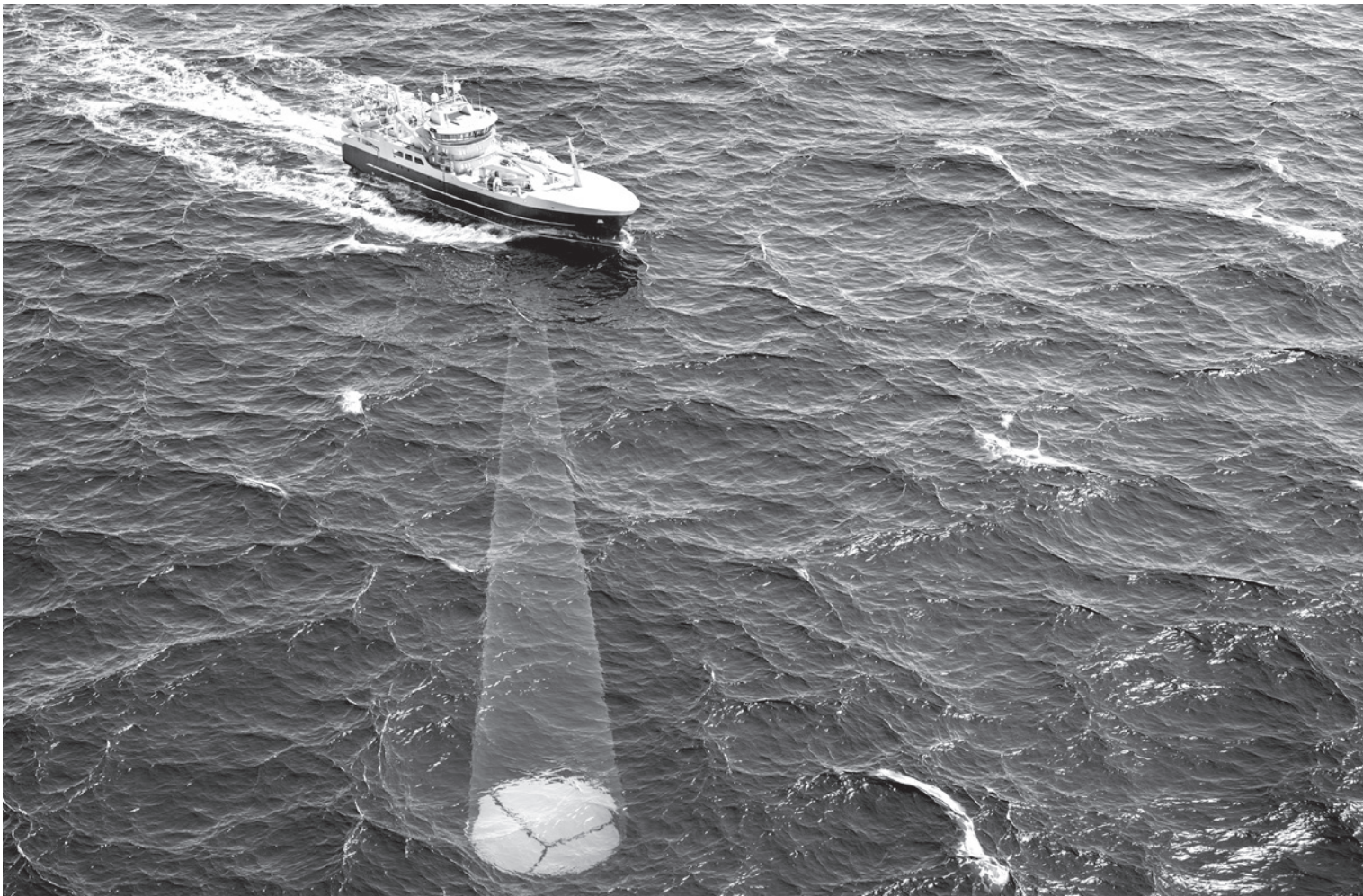


# SIMRAD

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## Echosounders

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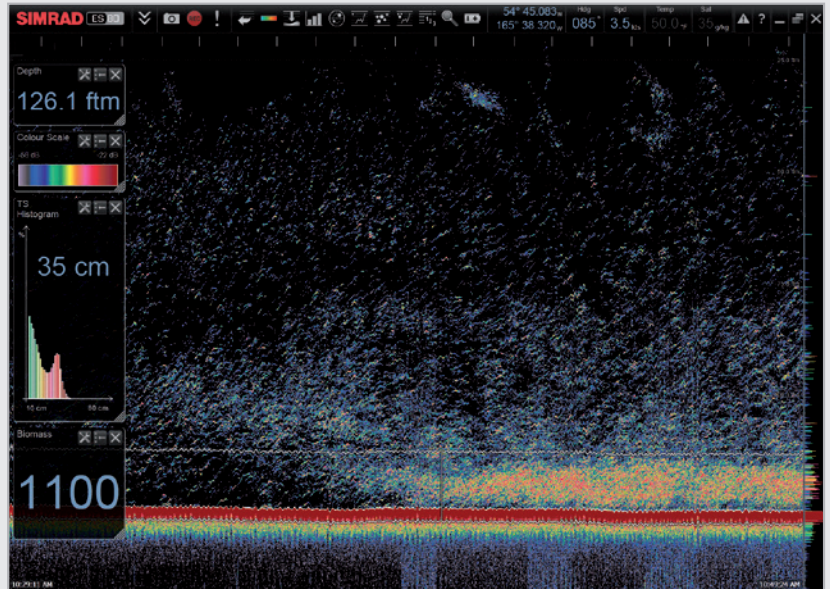


TECHNOLOGY FOR SUSTAINABLE FISHERIES

## ES80 ECHOSOUNDER

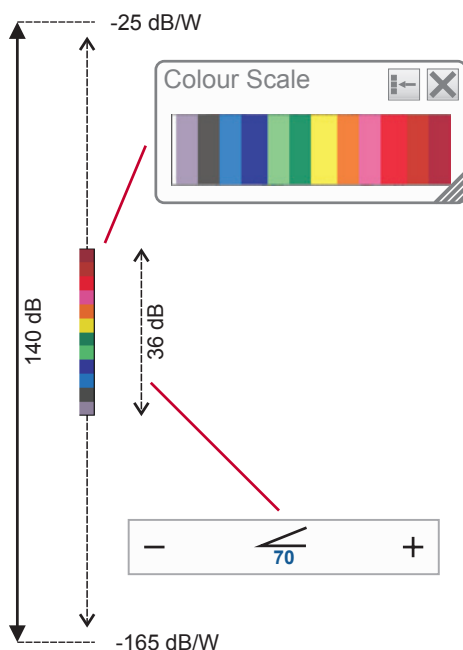
SIMRAD has manufactured fishfinders for more than 70 years and has 25 years of experience using Split beam technology. The first Split beam fishfinder, a 38 kHz model, came on the market in 1984, quickly followed by a 70 kHz model. Today, SIMRAD has a wide range of frequencies from 18 kHz, used for detecting deep water species, up to 333 kHz used for measuring plankton. The Simrad ES80 is the fifth generation Split beam fishfinder where the latest in computer and signal processing technology is used to satisfy the increasing need from our demanding customers: "Top performance at any depth and easy to operate".

The ES80 is a wideband echosounder able to operate at a frequency range of 10-500 kHz. With a suitable broadband transducer, the ES80 can sweep (chirp) in a range of frequencies giving increased resolution on longer range. Also, the ES80 will have a TS response curve making it easier to determine the species you are looking at.



The ES80 delivers unprecedented resolution on all ranges. This example underlines the statement, details make the difference and give the user much more information to take the correct decision. Both economically and environmentally.

### DID YOU KNOW...?



The ES80 echosounder has a dynamic range of 140 dB. This means that the sounder can receive both very strong and very weak echoes. Actually, the ES80 will detect echoes from plankton to whales, bottom on most depths, and present the information free from distortion.

Naturally, we cannot present all these echoes on the display simultaneously, as this would create a mess of colours. So we create a 36 dB section and give each colour a 3 dB (12 colours) or 0,5 dB strength (64 colours).

The colour range goes from grey to brown. Grey is used for the weakest echoes, while the strongest echoes are brown. All echoes stronger than brown will still be brown, while echoes weaker than grey will not be shown.

As a comparison, our old echosounders ES380 and ET100 had -using analogue TVG- a dynamic range corresponding to approximately 65 dB. The old paper sounders had a dynamic range of 12 dB in their printouts using the "colours" from light grey to black.

The dynamic range in the ES80 colour presentation is thus a lot larger; 24 dB or 250 times.

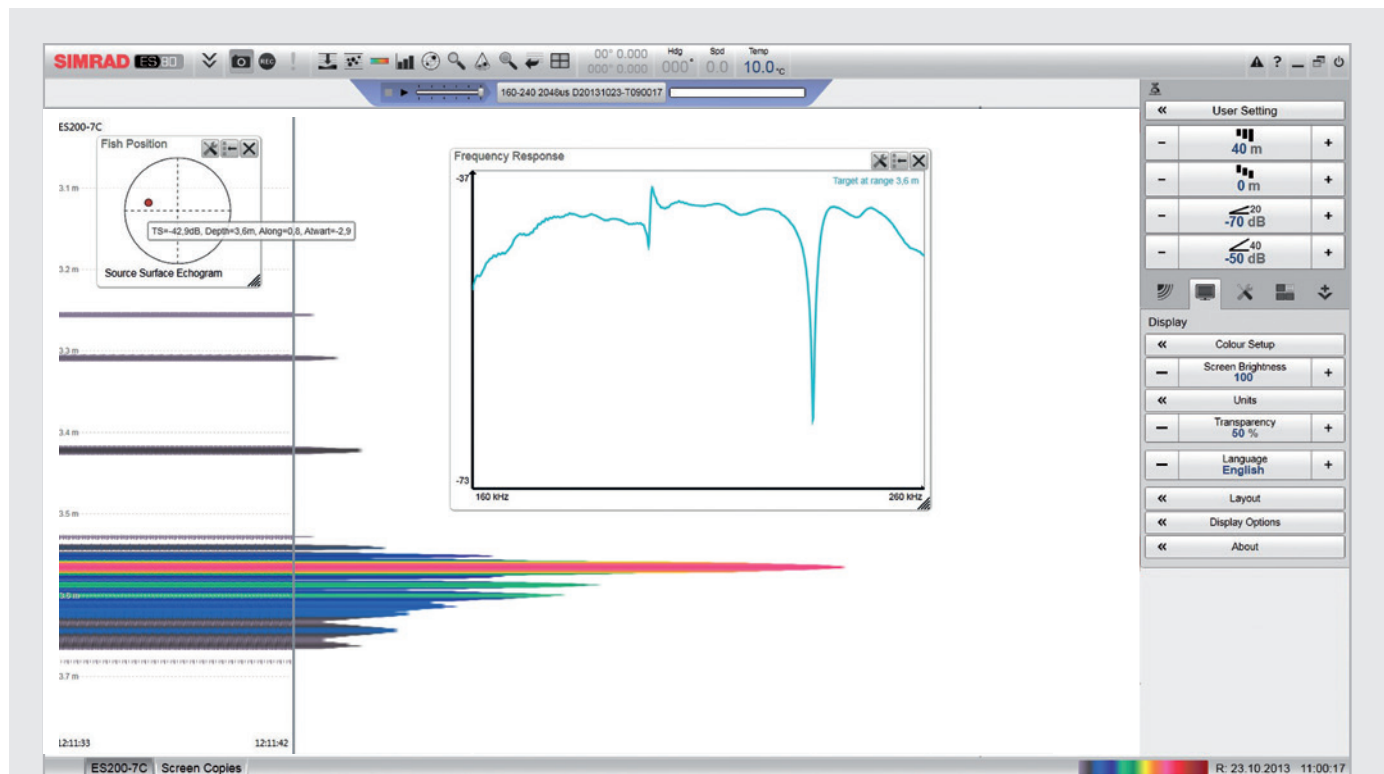
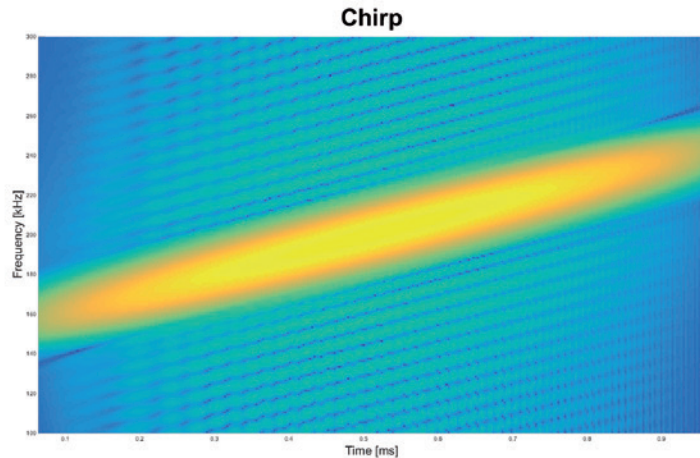


# WIDEBAND ECHOSOUNDERS

The new series of ESs have wideband capabilities. That means that you can transmit a signal that varies in frequency across the transmission. The most common way to operate the sounder is to use linear FM, or chirp. In an ES80 chirp transmission you utilize the effective frequency band of your transducer, starting low and continuing higher until you reach the frequency where the transducer efficiency drops off.

Due to advanced matched filtering techniques you can correlate the returned signal with what you sent out, and the result is improved range resolution of single targets. The improved range resolution is obtained when you have targets that are in comparable size. When you have very weak targets in the near vicinity of strong ones, such as small fish close to bottom, you might want to use a different pulse shape. A dolphin's click is shorter, but still spans over a large bandwidth and might be better

suited for such environments. The ES80 has this capability and, as the SW continues to be developed, new functions would be available.



Range resolution and target ID are improved. Echo from a 38,1 mm tungsten sphere is measured, and you can clearly see how the target strength changes with frequency. This frequency response is unique to this particular target, and corresponds well with the theoretical curves. Resolution is excellent, and you can clearly see the knot on the fishing line where the suspended sphere is attached to the line, around 10 cm from the sphere itself.

## ES80 DETAILS MAKE THE DIFFERENCE

The ES80 comes standard with digital CW transmission. This is the transmission form that has been used since SIMRAD, as the industry first, digitized the echosounder back in the mid 80's. Then it is possible to add a FM transmission module to the system, making the ES80 a true chirp echosounder. The advantage of chirp is that it is possible to transmit with a very short pulse length at very long ranges giving maximum resolution. What determines a good chirp echosounder, is how long range it gets on the shortest pulse.

In addition to this, with the long experience SIMRAD has making scientific echosounders, the ES80 also has a calibrated real time TS (target strength) curve. This will give the user information about the target strength and frequency response of the return echo. Having a system with multiple frequencies, it is now easier to determine the species you are fishing by comparing the target frequency response on different frequencies.

**1** The ES80 has unprecedented performance with very high resolution on long ranges using a composite transducer. All the popular functions from the previous ES70 have been implemented plus more unique features.

**2** The Sv curve (power vs. frequency) will give you the target strength of what you are passing over. Knowing that most species have a “frequency signature” this can be a very helpful tool to identify what species you are looking at. This, along with the size distribution, biomass indication and extreme resolution on all ranges enable a profitable and sustainable fishery.



## WIDEBAND TRANSCEIVER (WBT)

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The Wideband Transceiver (WBT) is designed for applications where performance is the top priority. The WBT has four 500 W channels that can either work independently with single beam transducers, or together with a split beam transducer.

The WBT transceiver is capable of operating on entire band from 10 kHz to 500 kHz, only limited by the transducer's bandwidth. The WBT is operated by the ES80 SW, and depending on the settings it can be used either in narrowband or wideband mode. The WBT itself is capable of doing CW, FM and also user defined signals.



### ABOUT TRANSDUCERS

In general any Simrad transducer can be used with the ES80, as long as it operates within the 10-500 kHz band. However, the effective bandwidth will vary with transducers.

The Simrad composite transducers have more bandwidth than transducers based on the tonpilz elements. Because of that, for frequencies of 50 kHz and higher we always recommend these with an ES80 system.



# ECHOSOUNDERS SPECIFICATIONS

	ES80 SINGLE BEAM	ES80 SPLIT BEAM
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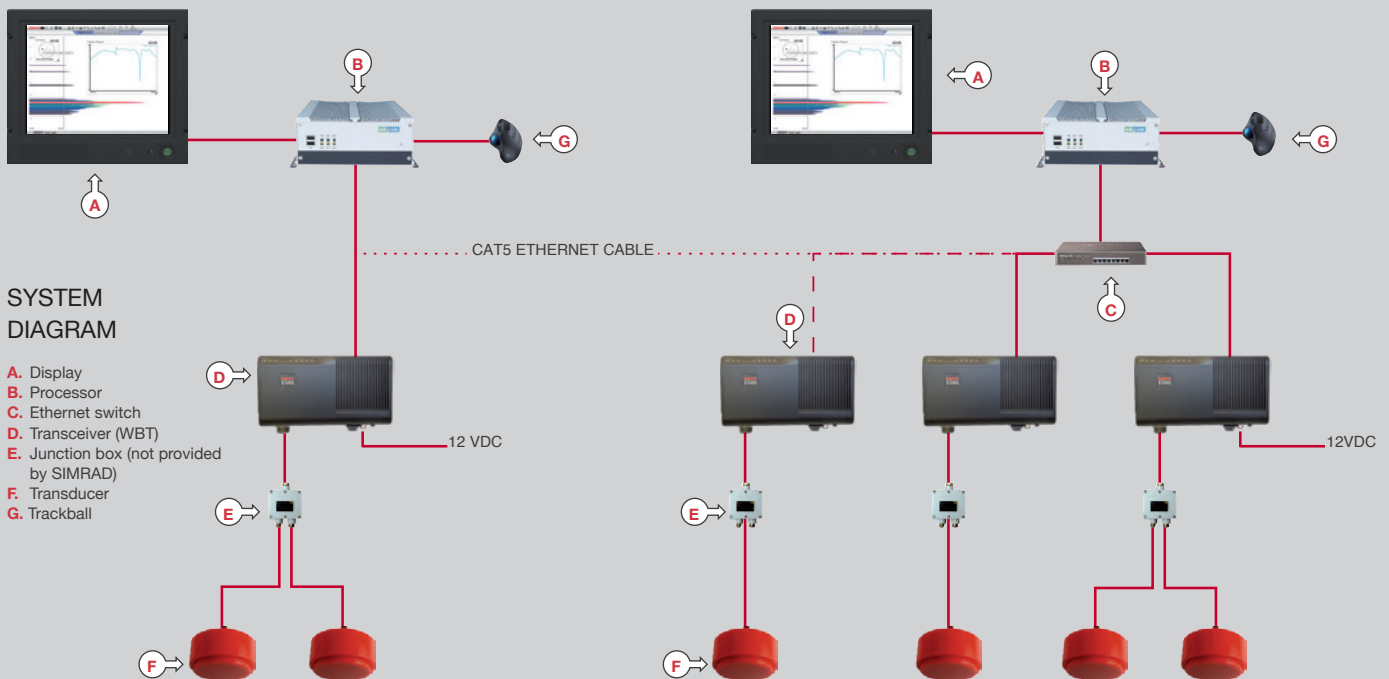
Operational frequency transceiver	10-500 kHz
Operational mode	Active, Passive
Transmit mode	CW, Chirp
Pulse duration (depends on frequency)	64-16384 $\mu$ s
Split beam capability	Yes
Max. number of channels per transceiver	4
DC voltage	12V
AC voltage	100-240V
Average power consumption active	20 W
Power consumption inactive	4 W
Requires processing unit during operation	Yes
Ethernet interface	Yes
Data Format	RAW (Complex)
Built-in multiplexer	No

## TRANSCEVER UNIT

Voltage	12 VDC
Consumption	100 W
Interface Input	Navigation, Motion sensor, Annotation, TX synchronization and Temperature
Interface Output	Survey Line, Remote power and TX synchronization
Ethernet interface	One

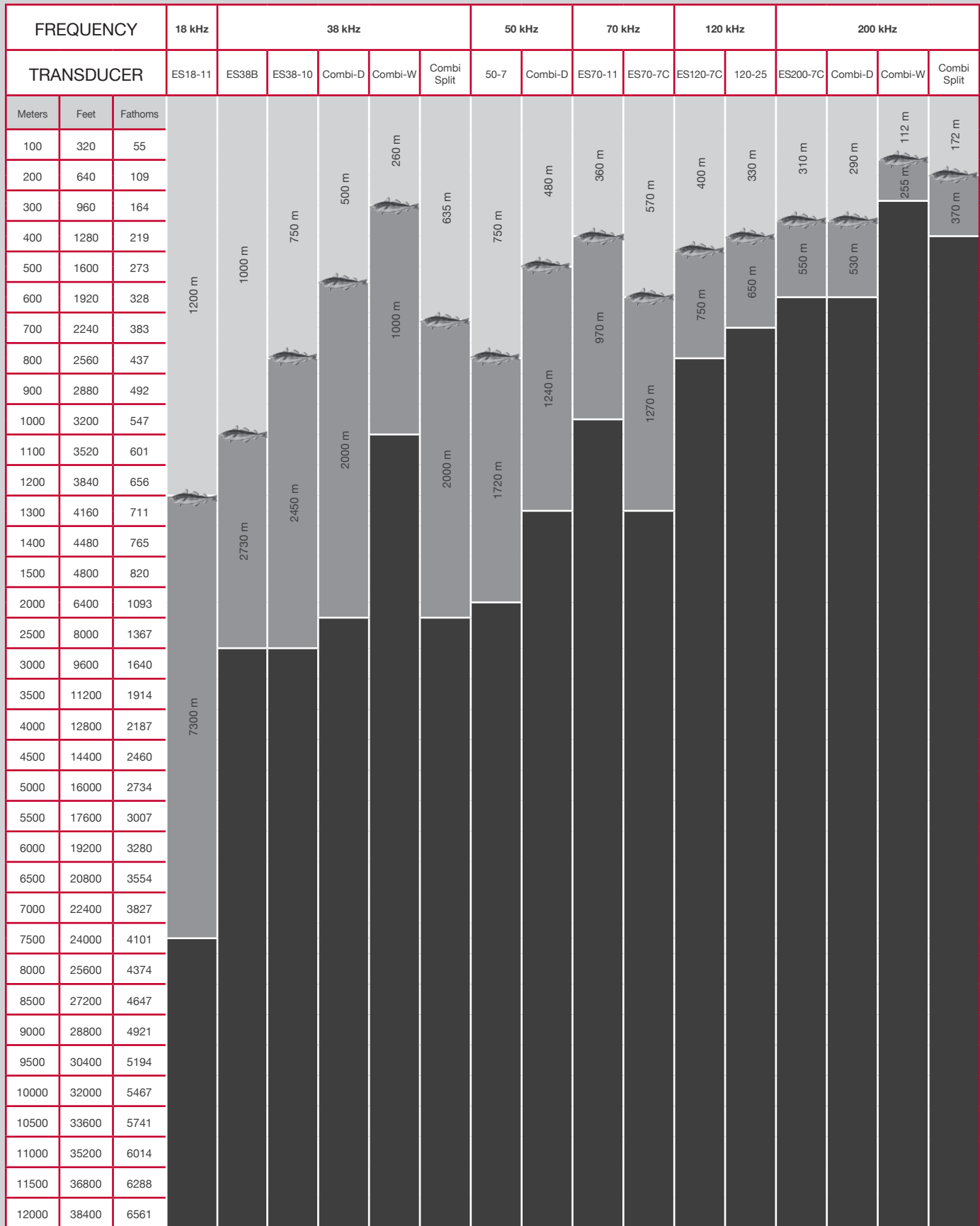
## SOFTWARE OPTIONS

Biomass	Optional	Included
Fish sizing	N/A	Included
Bottom hardness	Optional	
FM Transmission	N/A	Optional



**Note!** In Split Beam configuration only one transducer can be connected to the WBT

# DETECTION DEPTHS



Note: For TS = -32dB in salt water 35ppt and 10° C at 38 kHz this relates to a cod of length 60cm. Bottom Sb = -30dB/m²



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