C150-100-10 Communications Transducer

Features

- Centre Frequency of 150 kHz
- Wide bandwidth of 100 kHz
- Transmit response of 152 dB
- Receive response of -221 dB
- Full ocean depth
- Toroidal beam pattern
- Beamwidth of 10 degrees
- Max continuous power 200 W
- Customisation possible

Applications

- Underwater communications
- High speed modem

The C150-100-10 has the same construction as the C340-220-5 (pictured), but height is 60 mm and diameter is 100 mm.

Description

The C150-100-10 is an electroacoustic ultrasonic transducer for underwater applications. The transduction is achieved through the use of piezoelectric ceramics which allows conversion of electrical signals into ultrasonic waves (transmission mode or projector mode) as well as reverse conversion of ultrasonic waves into electrical signals (reception mode or hydrophone mode).

The C150-100-10 is a small cylindrical transducer with a centre frequency of 150 kHz and a bandwidth of 100 kHz producing an omni-directional toroidal beam pattern with a beam width of approximately 10 degrees at 150 kHz. The wide bandwidth combined with a TVR of 152 dB and OCVR of -221 dB makes this transducer very attractive for underwater communications. As the cylinder has a flooded inner space, it has a depth rating of 11 km.

This datasheet describes the transducer and its electroacoustic properties obtained from a detailed simulation model. The C150-100-10 is a scaled version of the C340-220-5 (centre frequency 340 kHz, bandwidth 220 kHz and beamwidth 5 degrees) which was fully characterised using tank test measurements.

Customisation

The C150-100-10 design can be adjusted to meet custom specifications. Please contact Callaghan Innovation. This includes centre frequency and vertical beamwidth, mounting, cable, protective coating, etc.

Technical specifications

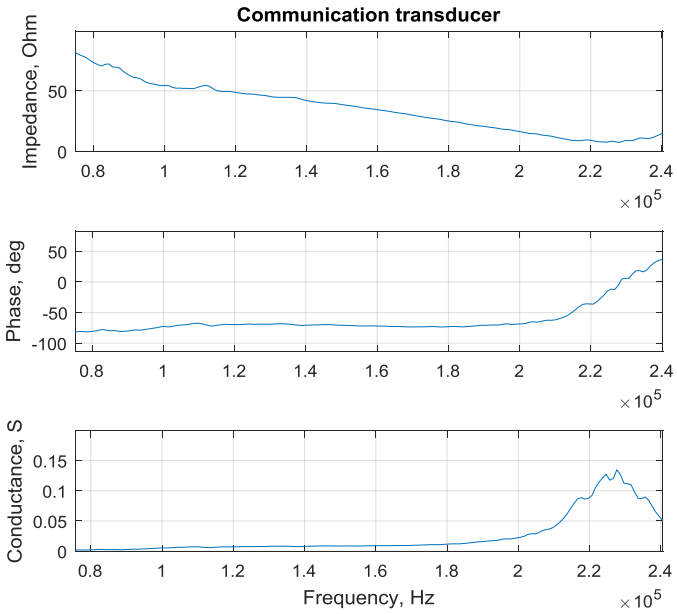
Unless otherwise noted the specifications are for 20 °C transducer and ambient water temperature. Values are with 1 metre cable attached.

Parameter	Min	Typ	Max	Unit
Centre frequency		150		kHz
Bandwidth (-3 dB)	100		200	kHz
Impedance magnitude	16	40*	50	Ohm
Impedance phase	71	70	68	deg
Transmit response (TVR)**	154	152*	152	dB
Receive response (OCVR) ***	-229	-221*	-216	dB
Beamwidth	7.5	10*	17.5	deg
Maximum peak power input			600	W
Maximum continuous power input			200	W
Maximum transducer depth			11	km
Weight without cable (in air)			1.5	kg
Storage temperature	-10		50	°C
Dimensions	Diameter 100 mm, height 60 mm			

* At the centre frequency, ** re 1 µPa per 1 V, *** Open circuit voltage response re 1 V per 1 µPa

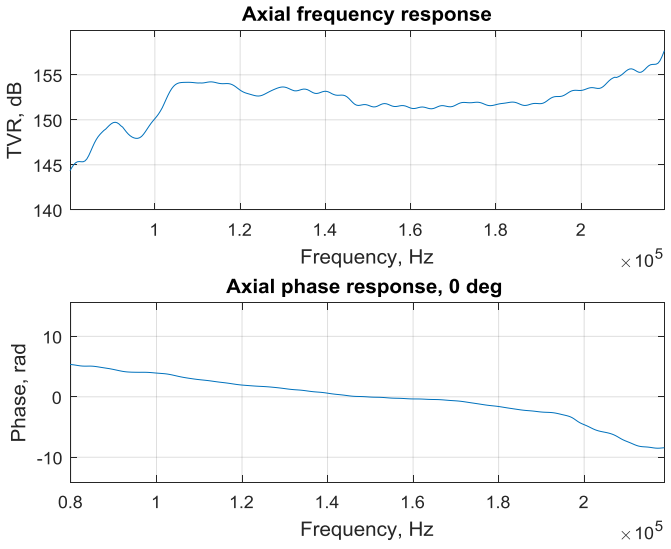
Electrical impedance and conductance

Simulated impedance and conductance



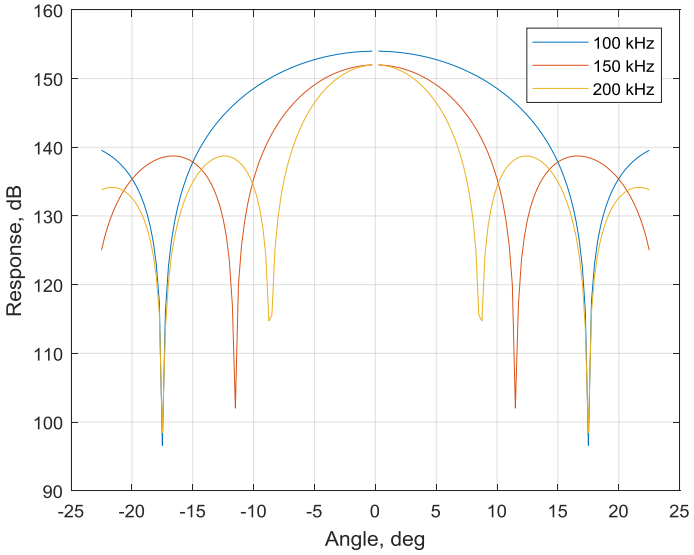
Frequency response (TVR)

Simulated TVR



Directivity patterns in vertical plane

Simulated TVR



The expected horizontal plane directivity pattern is circular with variations of approximately +/- 0.5 dB.

Revision history

Date	Version	Notes
14 May 2018	1.0	First release

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