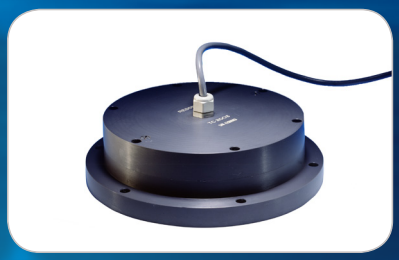
Teledyne RESON

Broadband Reference Hydrophones, Transducers, and Accessories



TELEDYNE RESON
Everywhereyoulook™

Hydrophone and Transducer Product Line

Teledyne RESON extensive line of Hydrophones and Transducers are divided into the following product groups:

1000 series
Hemispherical, broadband, low to mid frequency. Typically used for transponders, pingers, acoustic telemetry, tracking, and positioning.

2000 series
Directional low/mid/high frequencies, broadband. Typically used for echosounders, side scan systems, and backscatter measurements.

3000 series
Directional high frequency, 500 kHz to 2 MHz. Typically used for sound velocity probes, custom sonar design, and short range distance measurements.

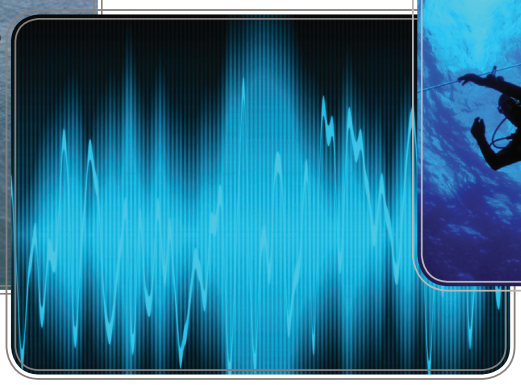
4000 series
Typically used for precision reference measurement hydrophones, reference projectors, passive arrays, positioning systems, and tracking systems.

Flexibility, Responsiveness & Service

Our Sales, Service, and R&D departments are dedicated to providing solutions for customer needs. In addition to maintaining a product line of standard transducers and hydrophones, our experienced team of Acoustic Engineers also design and manufacture customer-specific sensors.

We are also flexible to discuss modification of our Commercial of the Shelf (COTS) products to better fit specific system integration requirements for higher quantities. Teledyne RESON is dedicated to your solutions.

Hydrophone TC4013 net array



Quality

The corporate headquarters in Denmark, Teledyne RESON, is quality certified in accordance with ISO 9001:2008, which ensures that all Teledyne RESON products are manufactured according to the strictest quality requirements for reliable long term, continuous operation. The complete manufacturing process is monitored, from development through production and shipping.

Our Production and Calibration facility includes two large tanks where we can perform calibration measurements of our products, and a high-pressure test tank with pressure range up to 700 bar.

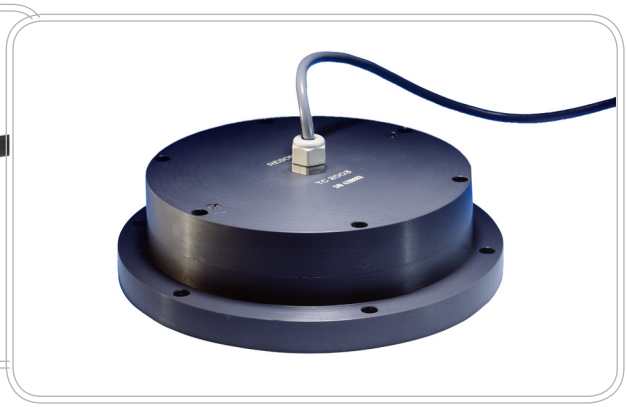
AT A GLANCE

- Broadband (0.1Hz to 1MHz)
- Small size
- Linear Receive Response
- Omnidirectional
- Individually calibrated
- Low self noise below SSθ
- Balanced Differential and Single-ended output
- NBR for long term deployment
- Resistance to hydrocarbons
- Modular designs

TELEDYNE RESON PROVIDES

- Quality
- Performance
- Precision
- Uniformity
- Reliability
- Durability
- Responsiveness
- Flexibility
- Options

Teledyne RESON Solutions



Teledyne RESON has over 30 years proven reliability in underwater acoustics. Over the years we have worked with internationally recognized laboratories and industries on the development of acoustic standard references and advanced sensor designs. The result of this work is an expansive, comprehensive line of precision reference hydrophones, projectors, and transducers covering frequencies from 0.1Hz to the MHz band.

Every hydrophone and transducer leaving production is individually calibrated. Teledyne RESON provides calibrations consistent with international standards established at the National Physical Laboratory, UK.

Teledyne RESON reference hydrophones are designed for precision underwater acoustic measurements, signal detection, and/or calibrated reference acoustic projection. Our hydrophones are internationally trusted for quality acoustic measuring in scientific research, navy, and environmental monitoring.

Teledyne RESON is also an OEM supplier of hydrophones and transducers for many industrial and commercial products.

HYDROPHONES AND TRANSDUCERS

NAVAL

- Acoustic Signature Analysis
- Ship, flow, turbulance noise measurements
- Low signal-level detection
- Acoustic tracking
- Range arrays

ACOUSTIC RESEARCH

- Underwater acoustic measurements
- Ambient measurements
- Environmental measurements
- Marine Biological Research
- Whale Audio Recording
- Dolphin echo-location Research
- Air-gun and seismic Research
- Near and far field acoustic measures

UNDERWATER INSTRUMENTATION

- Acoustic telemetry
- Offshore structure monitoring
- Underwater positioning/ navigation
- Underwater modems and telephones
- Pinger/transponder systems
- High resolution distance measurement
- Echo sounding
- Sonar design

Hydrophones

Model	Usable Bandwidth	Receive Sensitivity	Transmit Sensitivity at Resonance	Depth rating	Size (max OD/Length in millimeters)	
TC4013	1 Hz to 180 kHz	-211dB re. 1V/µPa	135dB re. 1µPa/V	700 m	OD 10mm Length 63mm	
TC4033	1 Hz to 160 kHz	-203dB re. 1V/µPa	145dB re. 1µPa/V	900 m	OD 25mm Length 138mm	
TC4034	1 Hz to 470 kHz	-218dB re. 1V/µPa	145dB re. 1µPa/V	900 m	OD 16mm Length 138mm	
TC4038	50 kHz to 800 kHz (>1MHz)	-228dB re. 1V/µPa	137dB re. 1µPa/V	20 m	OD 4mm Length 58mm	
TC4040	1 Hz to 120 kHz	-206dB re. 1V/µPa	138dB re. 1µPa/V	400 m	OD 21mm Length 120mm	
With Internal Preamplifiers						
TC4014	15 Hz to 480 kHz	-186dB -180dB differential re. 1V/µPa	-	900 m	OD 38mm Length 273mm	
TC4032	5 Hz to 120 kHz	-170dB -164dB differential re. 1V/µPa	-	600 m	OD 38mm Length 284mm	
TC4035	10 kHz to 800 kHz	-214dB re. 1V/µPa	-	300 m	OD 10mm Length 169mm	
TC4037	1 Hz to 100 kHz	-193dB re. 1V/µPa	-	>2,000 m	OD 36mm Length 75mm	
TC4042	5 Hz to 85 kHz	-173dB -167dB differential re. 1V/µPa	-	1,000 m	OD 36mm Length 220mm	

Cable for Hydrophones

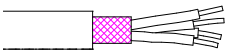
Cable description for Hydrophones with integrated cables

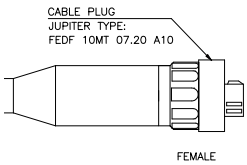
Cable	Details	Standard length
TC4013	Integrated Coax cable with BNC termination	6m, 10m,20m,30m,40m,50m
TC4033	Integrated TSP DSS-2/MIL-C-915 cable with BNC termination	10m,20m,30m,40m,50m
TC4034	Integrated TSP DSS-2/MIL-C-915 cable with BNC termination	10m,20m,30m,40m,50m
TC4038	Integrated Coax cable with BNC termination	2m,10m
TC 4040	Integrated TSP DSS-2/MIL-C-915 cable with BNC termination	10m,20m,30m,40m,50m

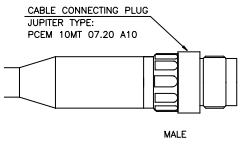
*Longer cables and/or non- standard length on request.

The below models use TL8140, TL8142 or TL8144 cable options

Cable	Cable options
TC4014	TL8140 - PIGTAIL is supplied with wires, you will need to attached your own connector. Use the pigtail cable to access differential output.
TC4032	TL8144 - a female/ Female JUPITER cable to be used with EC options.
TC4042	TL8142 - is a male and female extension cable, to go in-between the hydrophone and male/ female JUPITER TL8144 end cable.







Accessories

TC4013

TC4033

TC4034

TC4038

TC4040

EC6061 Voltage Preamplifier

- Hi-Pass filters 0.1Hz-50kHz
- Output gain 0-32dB
- 1MHz Bandwidth
- 9-18VDC
- 100M-Ω input impedance / 10 Ω output impedance
- Splash proof and portable

EC6081 Voltage Preamplifier with Band Pass Filters

- Hi-Pass filters 1Hz-250kHz
- Lo-Pass filters 1kHz-1MHz
- Output gain 0-50dB
- 1MHz Bandwidth
- 10-30VDC
- 100M-Ω input impedance /10 Ω output impedance
- Splash proof and portable

EC6067 Condition Charge Amplifier

- Adjustable input capacitance for long cable runs
- Input resistance settings to set Hi-Pass filters
- Output gain 0-32dB
- 1MHz Bandwidth
- 12-24VDC
- 3.3Ω to 1GΩ input impedance / 20 Ω output impedance
- Splash proof and portable

TC4014

TC4032

TC4035

TC4042

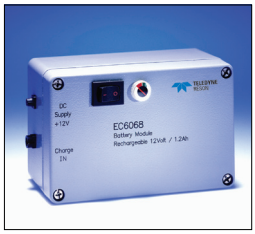
EC6073 Input Module

- Hassel-Free Plug-and-Play system
- Provides input for 7-pin female Jupiter
- Provides input for LEMO (4 pin)
- Live level signal output via BNC
- Input for VDC to power the preamplifier
- Input for calibration tone
- Power cables included
- Splash proof and portable

EC6070 Audio Amplifier

- Audio amplifier for monitoring underwater acoustic signals
- Built-in envelope sonar detector for dolphin echo clicks
- Bandwidth up to 700kHz
- Total signal amplification up to 90dB
- Hi-Pass filtering
- Built-in landspeaker and headphone amplifiers
- Input/Output via BNC and MMI jacks

Optional Battery Packs for Teledyne RESON Preamplifiers



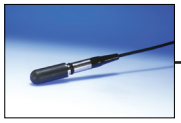
EC6068
12 VDC rechargeable power supply , to be used with EC6072 (you need both)

EC6072
Battery charger for EC6068, direct DC power supply to VP1000, VP2000, CCA-1000 or EC6073 input module

EC6069
18VDC dry-cell power supply, 2x 9V batteries

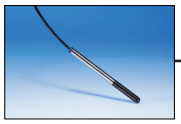
Diagram on Accessories

Hydrophones | **Preamplifiers** | **DC-Supply** | **Charger**


TC4013


TC4033


TC4034


TC4038


TC4040

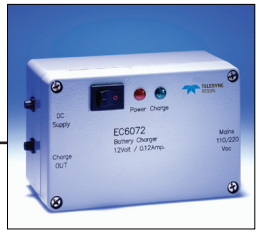

VP1000


VP2000


CCA1000


EC6068


EC6069

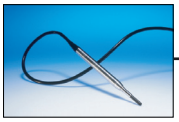

EC6072

Hydrophones with integrated preamplifiers

Hydrophones | **Input Module** | **DC-Supply** | **Charger**


TC4014


TC4032


TC4035


TC4042

TL8144 cable


EC6073

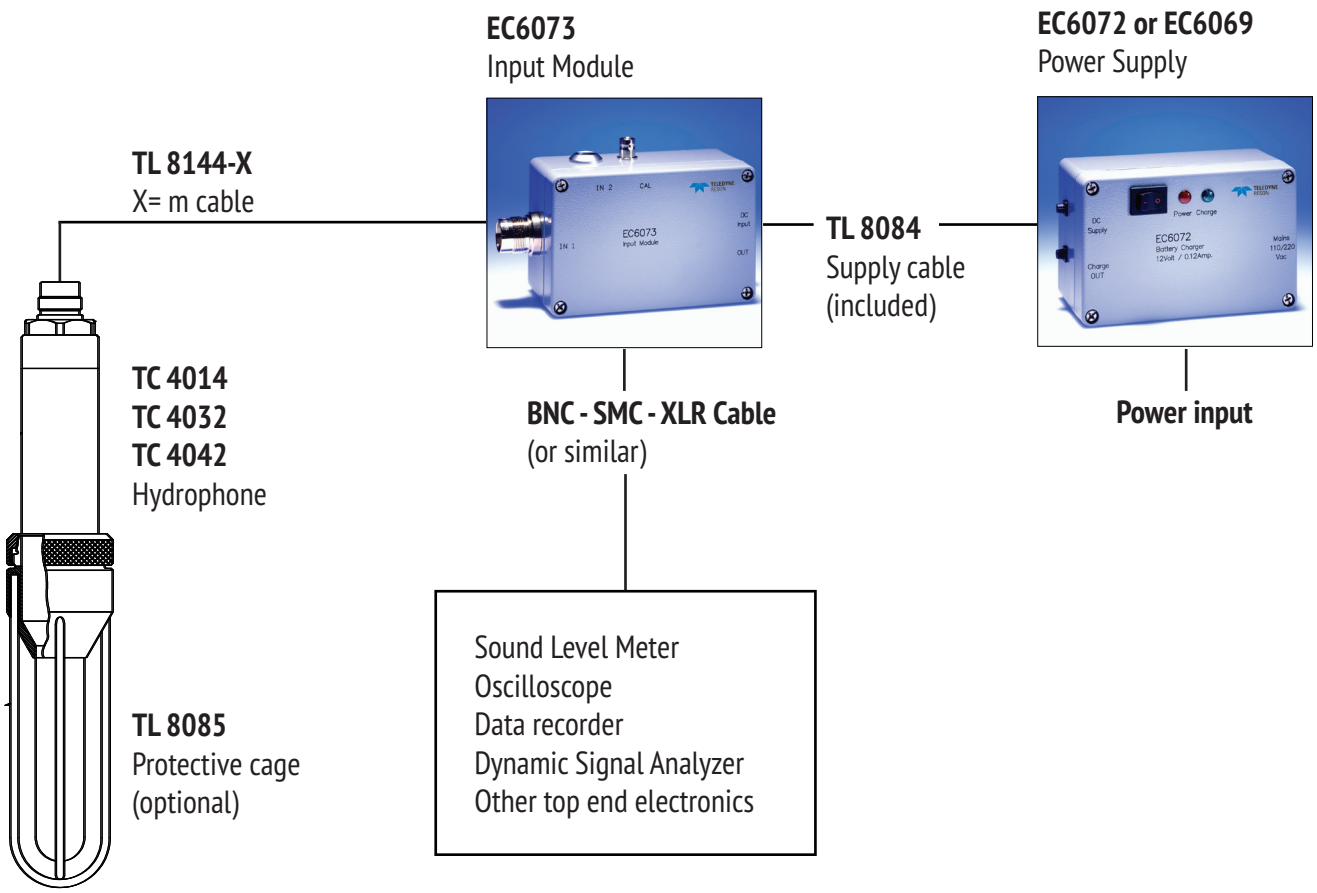

EC6068

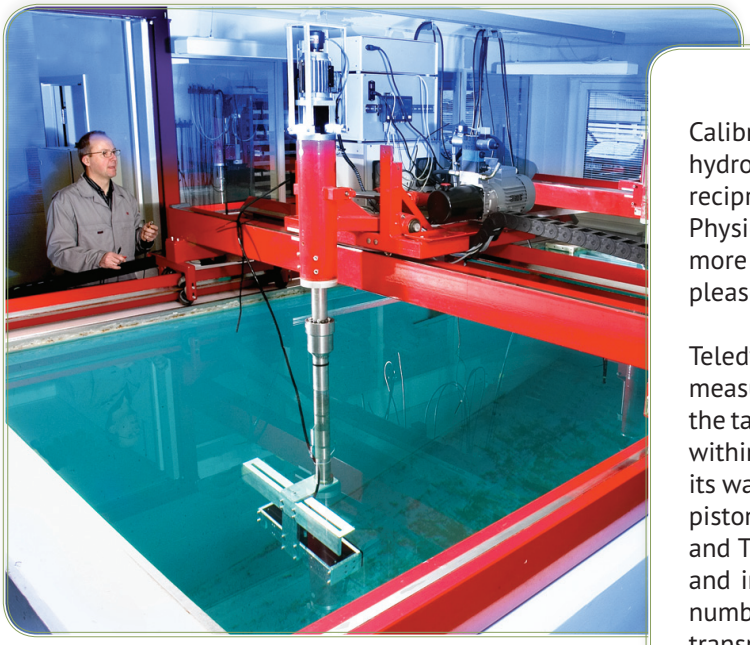

EC6069


EC6072

*For use of differential output mode (where available) do not use EC6073 based setup as shown above. Use TL8140 pigtail cable and terminate as required.

Example set up





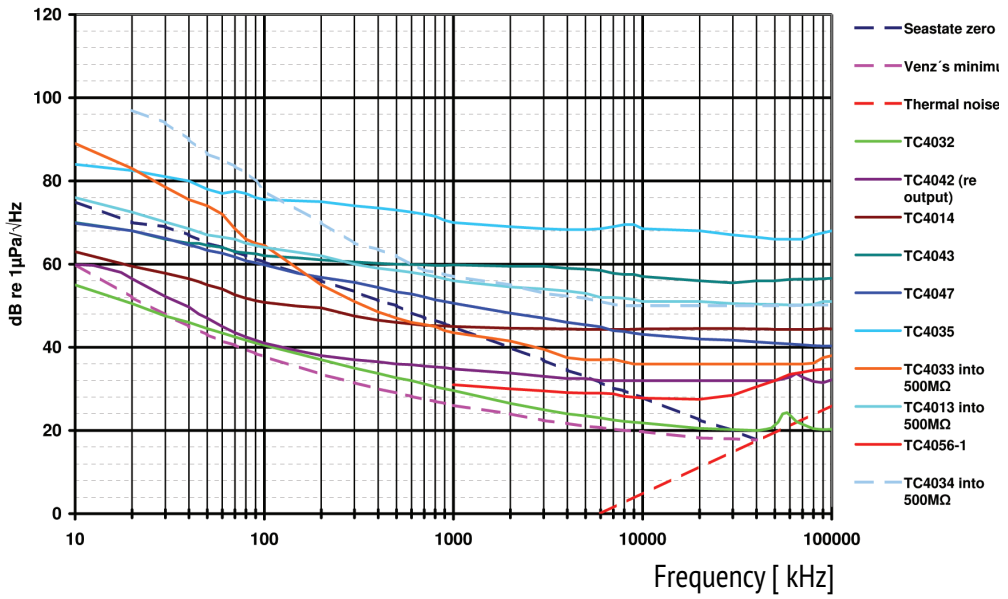
Teledyne RESON Calibration facility

Calibrations are done with respect to a reference hydrophone. The reference hydrophone is calibrate by the reciprocity method and this is undertaken by the National Physical Laboratory (NPL) in the United Kingdom. For more details on calibrations and related uncertainties please see *www.teledyne-reson.com/calibration*

Teledyne RESON calibrations use pulse-gated measurement techniques are used to avoid reflections in the tank. Voltage, current, and impedance are all measured within the same gated pulse. The pulse width is limited by its wavelength and the size of the tank. We also perform a pistonphone calibration test at 250Hz. Every Hydrophone and Transducer that leaves our facility is quality checked and individually calibrated. Each unit has its own serial number and ships with its own receive, impedance and transmit (when applicable) calibration plots.

Performance

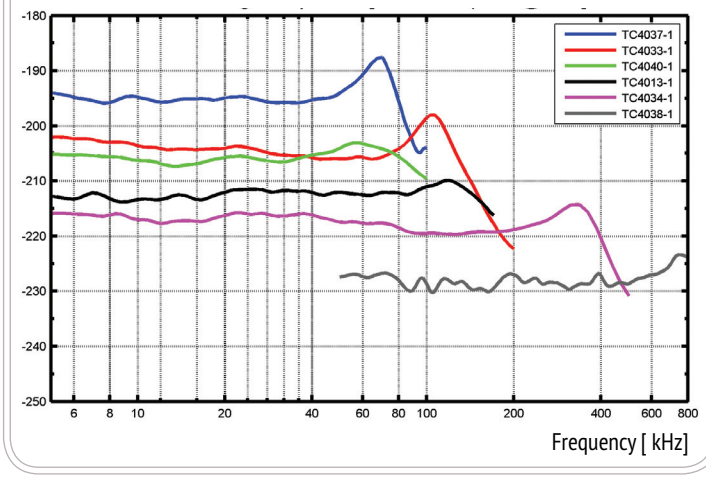
Equivalent Spectral Noise Pressure Curves for Teledyne RESON Hydrophones



Find detailed information about our hydrophones at
www.teledyne-reson.com/hydrophones

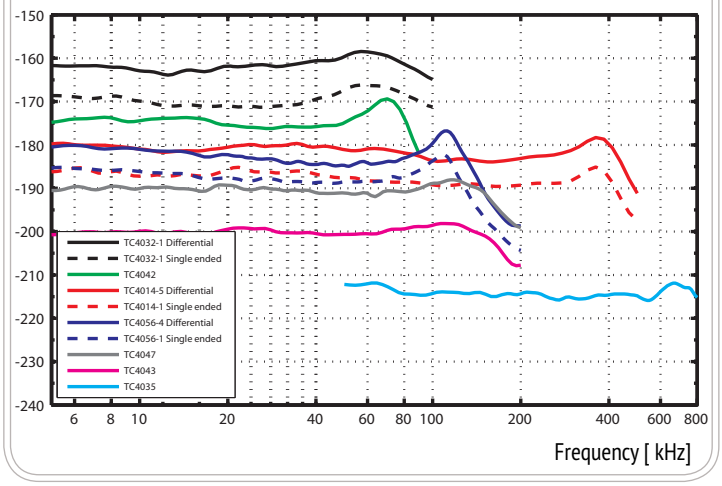
Receiving Response Teledyne RESON Hydrophone without preamplifiers

[dB re. 1V/µPa @ 1m]



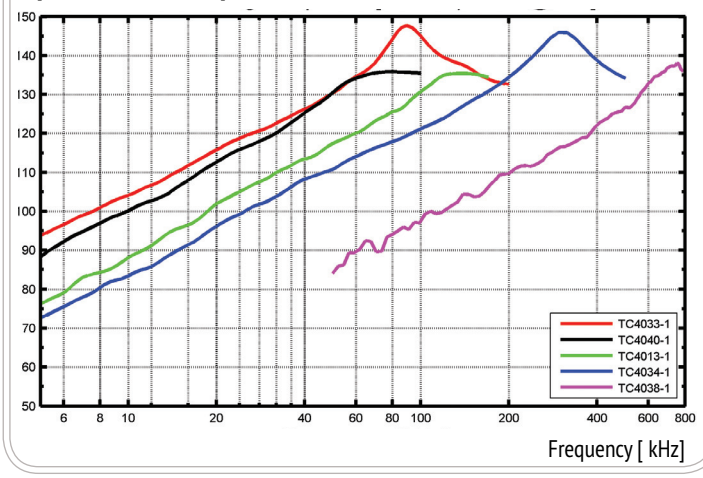
Receiving Response Teledyne RESON Hydrophone with built in preamplifiers

[dB re. 1V/µPa @ 1m]

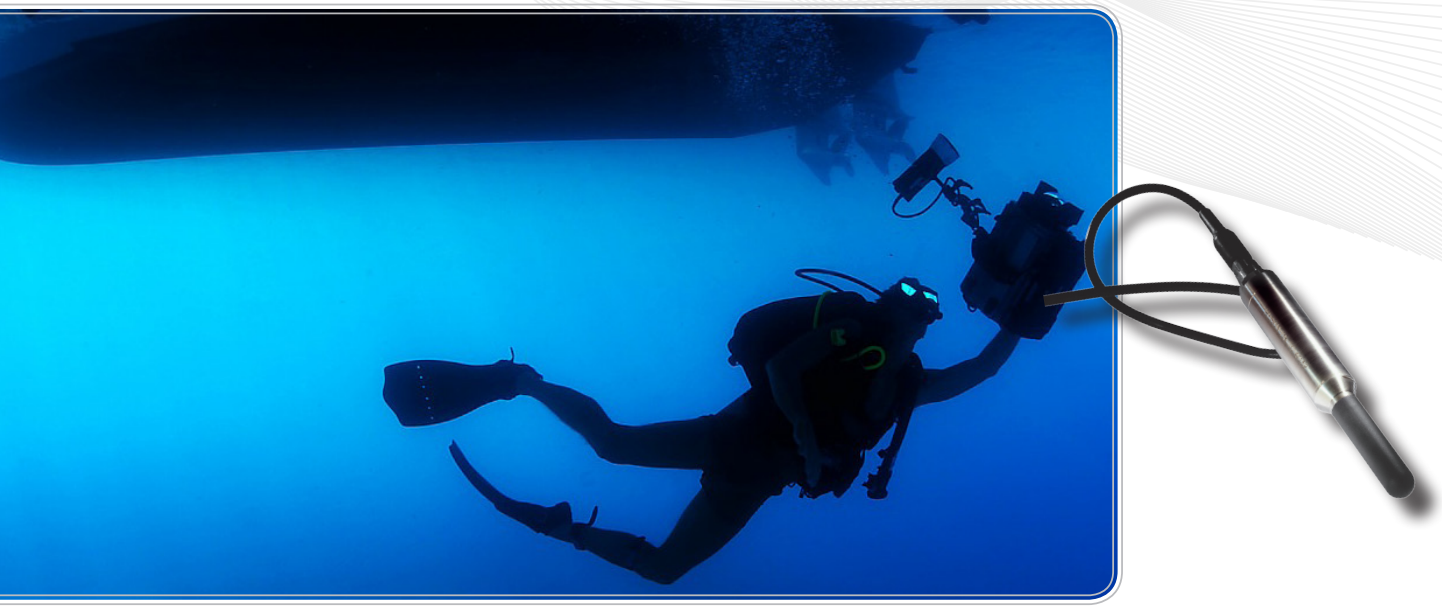


Transmitting Voltage Response Teledyne RESON Reference Hydrophone

[dB re. 1V/µPa @ 1m]



Notes



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www.teledyne-reson.com/hydrophones

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