NEPTUNE SONAR

TRANSDUCER PRODUCT CATALOGUE

HYDROPHONES • PROJECTORS • ECHO-SOUNDERS • SIDE-SCANS • COMMUNICATIONS

NEPTUNE SONAR LTD

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INTRODUCTION

An introduction to Neptune Sonar Ltd, Its products and facilities.

HYDROPHONES

SPHERICAL HYDROPHONES

Industry standards for measuring marine mammal, air gun, boomer and general underwater sound.

MINIATURE HYDROPHONES

Miniature high frequency laboratory standards.

HYDROPHONE WITH PRE-AMPLIFIER

Remote monitoring where higher sensitivities are required.

SHOCK GAUGE

Underwater Explosive shock monitoring.

PROJECTORS

BROADBAND PROJECTORS

Omni-directional wide-band Projector Transducers with 3dB wide-band matching.

SPHERICAL PROJECTORS

Where high power, omni-directional broad-band signals and wide-band noises are required.

LOW FREQUENCY TRANSDUCERS

Long range, high power sound sources for active sonar and seabed penetration.

DUAL FREQUENCY TRANSDUCERS

Available in three housing shapes for over-side, hull or external mounting, these transducers have applications in surveying, geophysical and fish stock assessments.

DUAL BEAM TRANSDUCERS

Dual Beam Transducers are adaptable to a wide range of seabed depths and target resolutions. Over-side hull and external mounting are available in a choice of frequencies.

ECHO-SOUNDERS

SINGLE BEAM TRANDUCERS

These transducers are useful where single directional beam patterns are required. Orignally intended for hull mounted echo-sounders many of the designs can be operated at depth in towed bodies. Applications include commerical fishing and navigation.

SIDE-SCANS

SIDESCAN TRANSDUCERS

This section features a number of sidescan transducers that are direct replacements for the most popular systems already established in the commercial market.

COMMUNICATIONS

COMMUNICATION TRANSDUCERS

Toroidal and Hemispherical beam pattern for range tracking, acoustic release systems and transponder / data communication.

THE COMPANY

A leading company in underwater transducer technology; Neptune Sonar Ltd offers one of the world's largest and most comprehensive range of undersea defence and commercial transducers.

Specified by many of the leading OEM companies Neptune's transducers feature in a wide range of commercial equipment, ranging from echo sounders and side scan sonar to sea floor mapping and positioning systems.

Neptune's military transducers have been supplied to navies and defence establishments around the world and are key components in Intercept, low frequency active, submarine tracking and communication systems.
Based in the UK East Yorkshire, Neptune's manufacturing facility includes a 60,000 square metre trials lake and a floating calibration laboratory. The site provides an extensive range of facilities supporting every aspect of acoustic transducer development, from modelling and design to final product acceptance.

Quality Assurance
As an ISO 9001:2015 company the "on site" calibration facility ensures that Neptune's production transducers are supplied to the highest quality standards using a monitored programme of free-field acoustic testing on a continuous basis.

For further information please contact:
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Catalogue Guide
This catalogue provides technical specifications for a selection of popular transducers from Neptune's range of over 1000 different designs. The catalogue is arranged in sections with the transducers grouped by their normal application.

The header on each page carries the description of the application and the transducer model number. Where transducers are described as a "Series" they are available in a choice of different frequency options.

The index pages are sub-divided into the different applications and lists the usual frequency range against the model.

OUR TEAM

ENGINEERING DESIGN TEAM

Mechanical CAD Design
Consisting of qualified mechanical design engineers and a document controller, maintaining all designs, drawings and documentation.

Acoustic Design
Responsible for all new design ideas, product development and costing. Utilising a combination of analytical models and finite element modelling the team can design new transducer elements to meet the most demanding of applications.

Electronics Design Team
Consisting of qualified electronics design engineers, and an software engineer. Responsible for development and product up-keep.

- ***ALTIUM PCB DESIGN SOFTWARE***
- ***FE MODELLING SOFTWARE***
- ***PROTOTYPING WORKSTATIONS***
- ***DEVELOPMENT TOOLS & EQUIPMENT***
- ***SOLIDWORKS CAD SOFTWARE***
- ***PDM VERSION CONTROL SOFTWARE***

ADMINISTRATION TEAM

Administration Team
Consisting of qualified and experienced managers, supporting all aspects of the business from sales, production and purchasing to quality , finance and HR.

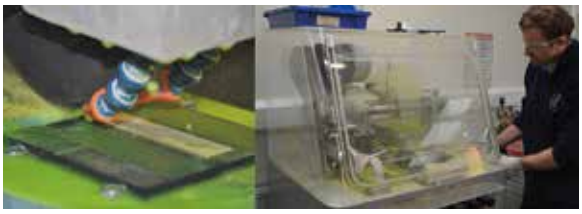
- ***COMMERCIAL MANAGER***
- ***PRODUCTION MANAGER***
- ***FINANCE DIRECTOR***
- ***QA MANAGER***
- ***HR / H&S MANAGER***
- ***PURCHASING MANAGER***

OUR TEAM

MANUFACTURING FACILITIES, PRODUCTION TEAM & EQUIPMENT

Machine Shop & Tool Room
Consisting of time-served tool-makers and machinists:

- *CNC MILL VM1P*
- *CMC LATHE TM6*
- *BRIDGE PORT MILLING MACHINE*
- *COLCHESTER LATHE*



1-3 Piezo-Composite Machining Department
Consisting of time-served Tool-Makers and Machinist:

- *MEYER + BERGER TS3 SLICING MACHINE*
- *JONES & SHIPMAN 540 SURFACE GRINDER*
- *FUME CUPBOARDS*
- *CURING OVENS*

Moulding Department
In-house trained moulding technicians, highly skilled in polyurethane and epoxy processing:

- *FUME CUPBOARDS*
- *VACUUM MIXING MACHINE DAC600*
- *CALIBRATED SCALES*
- *CURING OVENS*

Monolithic & 1-3 Piezo-Composite Assembly Laboratory
Highly skilled team of assembly technicians and a new facility which opened March 2018 with the capability of up to 16 workstations:

- *FUME CUPBOARD*
- *CURING OVENS*
- *TEST AND MEASUREMENT EQUIPMENT*
- *SOLDERING STATIONS*

Acoustic Calibration Facility
Highly skilled acoustic calibration engineers, operating Neptune's bespoke calibration software developed for the UK Navy/MoD.

- *BESPOKE CALIBRATION SOFTWARE*
- *AGILENT IMPEDANCE ANALYSER 4192A*
- *AGILENT 15MHZ WAVEFORM GENERATOR 33120A*
- *AGILENT VECTOR SIGNAL ANALYSER 89410A*
- *BRUEL & KJAER POWER AMPLIFIER 2713*
- *STEPPER MOTOR & CONTROLLER*

ACOUSTIC CALIBRATION SERVICE

The largest privately owned acoustic calibration laboratory of its type in the UK, equipped with the most technically advanced instrumentation and software designed to provide engineers and scientists with the capability of performing accurate underwater acoustic measurements on a wide range of underwater equipment.

Manufacturers and end-users alike will find the facility invaluable whether calibrating a single hydrophone or establishing the underwater performance of a complex sonar system.

The measurement laboratory is constructed on a floating platform 17 by 10 metres and connected to the shore by a 40 metre long by 2 metre wide gang-way. The ease of access provided by this walkway offers significant benefits over the use of boats, simplifying the movement and deployment of heavy equipment and reducing health and safety risks.

The calibration laboratory has a fully automated test equipment design for measuring:

- ***COMPLEX IMPEDANCE***
- ***BEAM PATTERNS***
- ***TRANSMIT SENSITIVITY***
- ***RECEIVE SENSITIVITY***
- ***SOURCE LEVELS***
- ***PHASE***

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THE LABORATORY INCLUDES:

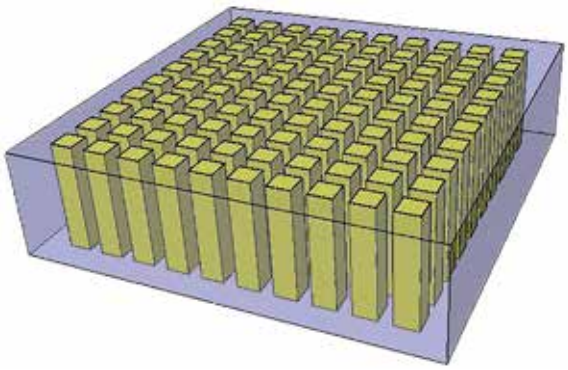
- ***ACOUSTIC MEASUREMENT FULLY TRACEABLE TO NATIONAL STANDARDS***
- ***RANGE OF REFERENCE HYDROPHONES AND PROJECTORS***
- ***AVERAGE WATER DEPTH 10M***
- ***MOON POOL SIZE 4.9 X 2.3 METRES***
- ***CRANES AND HANDLING EQUIPMENT***
- ***LABORATORY AND STORAGE AREA***
- ***SHORE BASED SUPPORT FACILITIES***
- ***POWER SUPPLY 20 AMP 3 PHASE 50HZ SUPPLY***
- ***QUIET, RURAL LOCATION***
- ***WIDE CHOICE OF LOCAL ACCOMMODATION***

PIEZO-COMPOSITE TECHNOLOGY

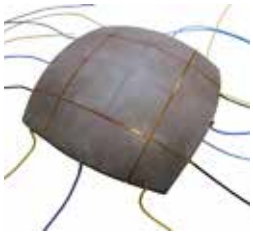
Neptune Sonar have a long history of producing reliable and cost effective transducer designs, we now offer increased design flexibility with the addition of piezo-composite technology to our existing manufacturing capabilities.

Piezo-composite is a modified form of standard PZT where diced ceramic pillars are encapsulated into a polymer matrix to form a homogenised acoustic material with adjustable properties. These materials are inherently broadband with good sensitivity and acoustic coupling efficiencies.

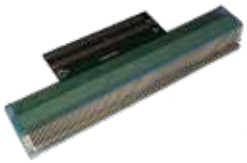
The unique properties of composites offer greater range in transducer performance and can be readily formed into 3 dimensional shapes.



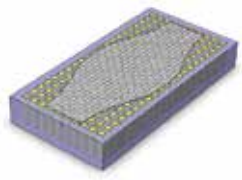
CURVED ARRAYS



SPHERICAL PROJECTORS



LINEAR ARRAYS



GEOMETRY SHADING

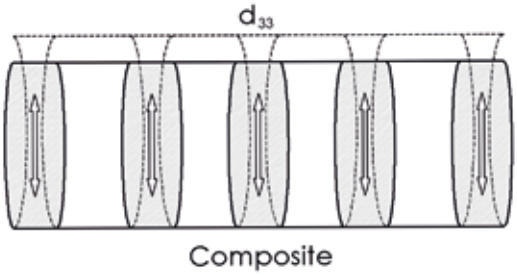
Neptune Sonar uses a dice and fill technique in the manufacture of composite ceramic. This provides the ability to optimise ceramic geometry to best suit the application.

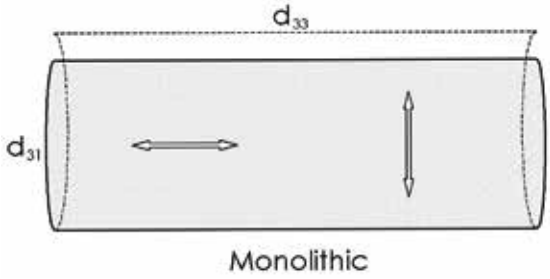
APPLICATIONS

- ***BROADBAND HYDROPHONES***
- ***EFFICIENT BROADBAND TRANSMITTERS***
- ***MULTI-BEAM TRANSMIT AND RECEIVE ARRAYS***
- ***MINE-HUNTING***
- ***SEA FLOOR MAPPING***
- ***ROV SCANNING ARRAYS***

PIEZO-COMPOSITE TECHNOLOGY

BACKGROUND





AMPLITUDE GAIN

The accumulation of lateral displacement within solid ceramic (d31) restricts the amplitude in the thickness mode (d33). Conversely in 1-3 composite the relatively small lateral displacements can be taken up within the compliant polymer matrix surrounding each pillar. Hence there is more displacement energy available in the thickness mode.

SENSITIVITY GAIN

By reducing the area of ceramic for a given aperture (volume fraction) it is possible to increase the strain energy within each pillar compared to its solid ceramic counterpart. The less ceramic and the more compliant the matrix material is, more strain energy is exerted on the pillars. Gains in excess of 5dB are not uncommon.

TRANSDUCER CHARACTERISTIC COMPARISON

Unwanted frequency modes can be reduced to near zero values in composites by the internal damping properties of the polymer matrix. The multiple resonant frequencies that are normally seen in monolithic ceramic require electrical and / or acoustic filtering to achieve equivalent performances.

For linear and curved phased arrays, there are advantages that can be gained to offset the additional manufacturing costs of composite. Principally, there is improved electro-acoustic uniformity with less crosstalk between channels and a reduction in the number of individual components per transducer array.

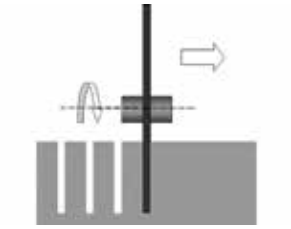
TRANSMISSION EFFICIENCY GAIN

Due to the reduction in ceramic content within the composite the resultant acoustic impedance is more closely matched to that of water at 1.5 Mrayl. Hence there are less internal reflection losses than in solid ceramic (assuming no matching layers).

	MONOLITHIC	COMPOSITE
ACOUSTIC IMPEDANCE	≈ 25 MRAYLS	≈ 6.5 MRAYLS
COUPLING COEFFICIENT (KT)	0.47	0.65

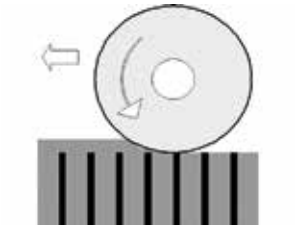
PIEZO-COMPOSITE TECHNOLOGY

PROCESS

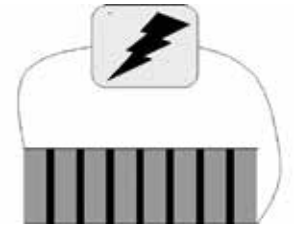


DICING

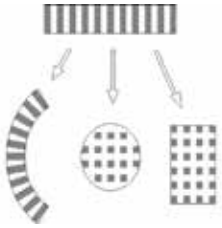
FILLING



GRINDING



ELECTRODING



FORMING

ADVANTAGES

- UNIMODAL FREQUENCY RESPONSE ACROSS OPERATIONAL BAND – DESIGN SIMPLICITY
- FREQUENCY INDEPENDENT STAVE GEOMETRY – APERTURE DESIGN FLEXIBILITY
- IMPROVED CURVED ARRAY PERFORMANCE – SMOOTH RADIUS OF CURVATURE
- HIGH SENSITIVITY / HIGH PULSE AMPLITUDE – GOOD SIGNAL TO NOISE RATIO
- BROAD BANDWIDTH – Q = 4 TO 5 (TYPICAL)
- INCREASED RANGE RESOLUTION – SHORT PULSE LENGTHS POSSIBLE
- IMPROVED PHASE UNIFORMITY AT RESONANCE – GOOD ANGULAR RESOLUTION
- IMPROVED COUPLING EFFICIENCY – GOOD ACOUSTIC MATCH TO WATER
- READILY FORMED INTO 3 DIMENSIONAL SHAPES – E.G. CYLINDRICAL AND SPHERICAL

DISADVANTAGES

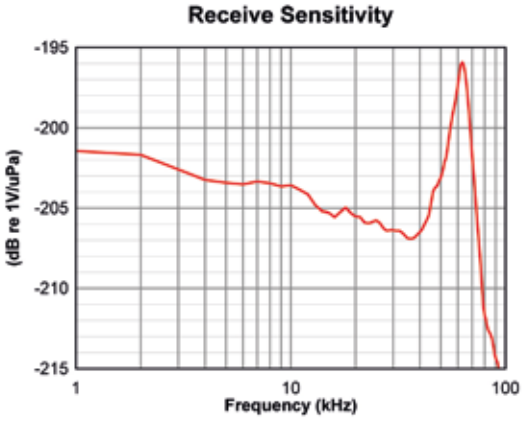
- REDUCTION IN CAPACITANCE – PERCENTAGE LOSS OF CERAMIC AREA
- HIGHER MANUFACTURING COSTS – MORE PROCESSING REQUIRED
- THERMALLY INSULATING – POWER AND DUTY CYCLE LIMITED
- PERFORMANCE COMPROMISES AT HIGHER DEPTH RATING – MATERIAL COMPLIANCE ISSUES

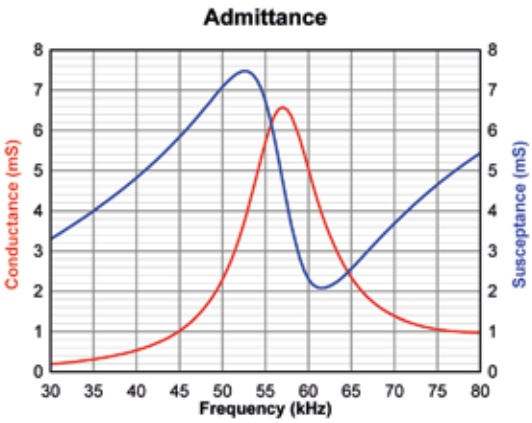
MODEL D/60

- OMNI-DIRECTIONAL RESPONSE
- LOW NOISE PERFORMANCE
- ACOUSTIC REFERENCE STANDARD
- BROADBAND OPERATION
- AIR GUN & BOOMER MONITOR
- MARINE MAMMAL AUDIO SENSOR

A versatile transducer with a wide range of transmitting and receiving applications the D/60 is equally at home as a cost effective, general purpose hydrophone or as a precision, acoustic sensor in a scientific measurement system.

The D/60 is available with or without acoustic calibration which is traceable to National Standards.

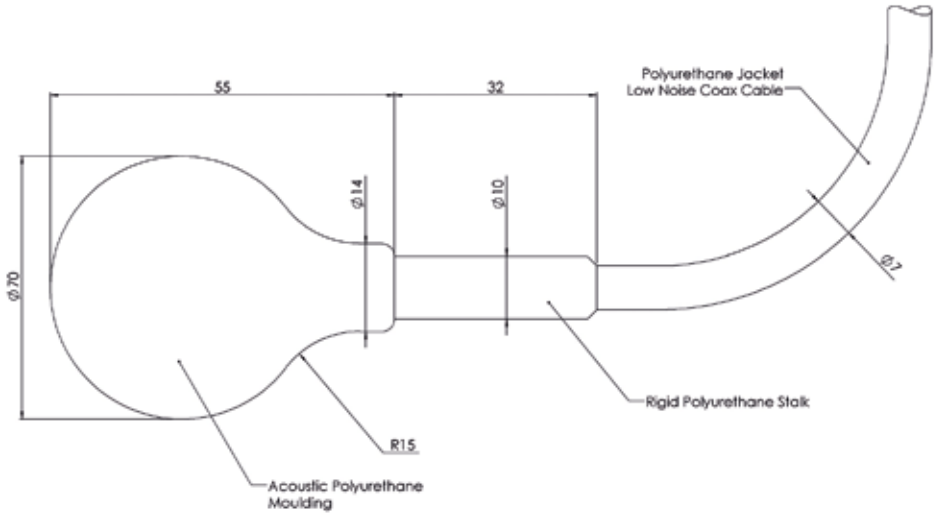




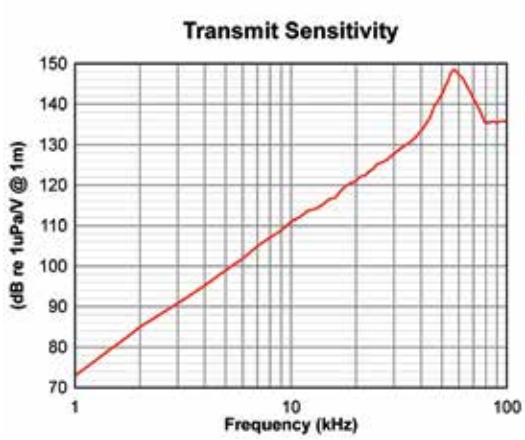
TECHNICAL SPECIFICATION

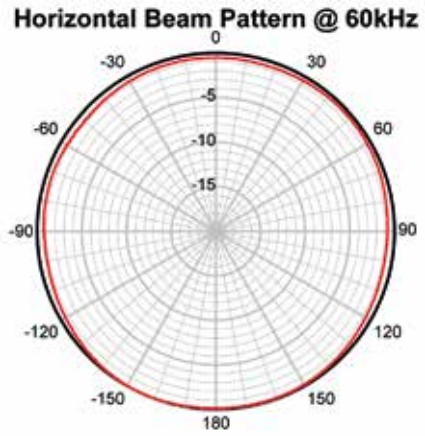
Resonant Frequency (Nominal)	60 kHz
Beam Pattern	Omni ± 2 dB up to 70 kHz
Receive Sensitivity	-201 dB re 1V/µPa
Transmit Sensitivity	148 dB re 1µPa/V @ 1m
Capacitance at 1 kHz (with 10m cable)	11,000 pF
Transmit Voltage (Max)	150 Vrms
Transmit Voltage / Duty Cycle (Max)	150 Vrms at 10% 40 Vrms at 100%

MODEL D/60



All dimensions in mm





MECHANICAL SPECIFICATION

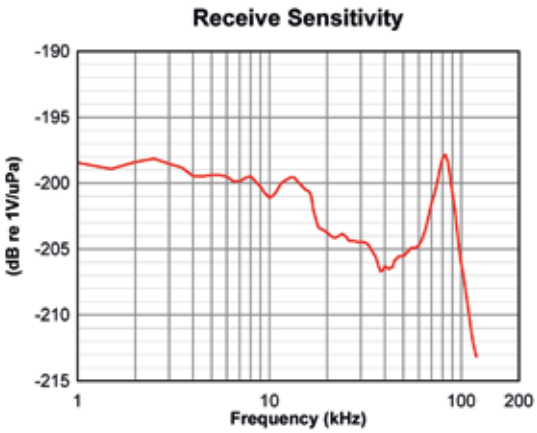
Operating Depth	900m Standard (Optional 4000m - may require an export license)
Weight Air/Water (including 10m cable)	0.68 kg / 0.25 kg
Operating Temperature	-5 to +40 °C
Storage Temperature	-40 to +80 °C
Cable Type	Polyurethane Ø7mm Low Noise Coaxial (Optional Ø7mm Polyurethane Screened Twisted Pair)
Cable Length	10 metres standard (Additional lengths supplied to order)
Connector	Not fitted as standard (Optional BNC or Customer Specific)

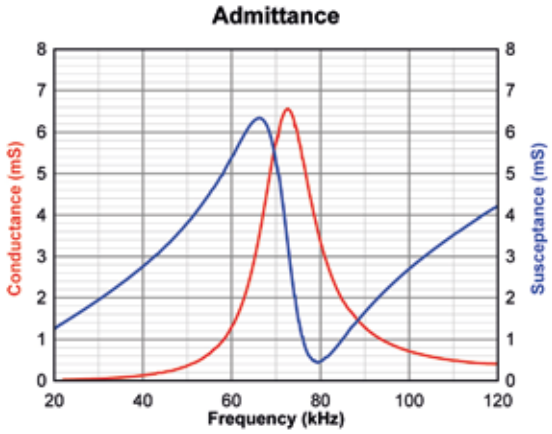
MODEL D/70

- *OMNI-DIRECTIONAL RESPONSE*
- *LOW NOISE PERFORMANCE*
- *ACOUSTIC REFERENCE STANDARD*
- *BROADBAND OPERATION*
- *AIR GUN & BOOMER MONITOR*
- *MARINE MAMMAL AUDIO SENSOR*

The all moulded construction and inherent strength of the PZT ceramic sphere achieves a robust, light weight, corrosion free design making it the ideal choice as a monitor hydrophone for air gun, boomer and other environments where high levels of shock are experienced.

The D/70 is available with or without acoustic calibration which is traceable to National Standards.

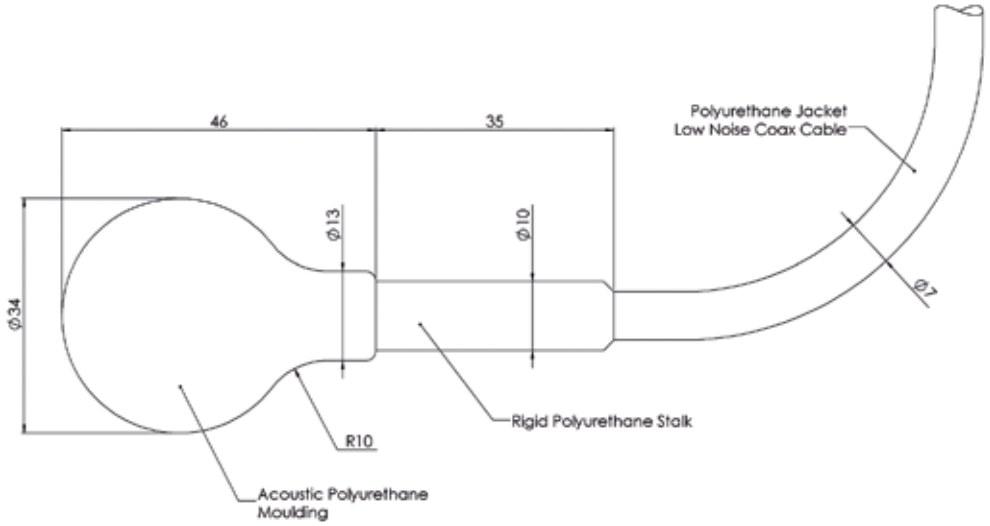




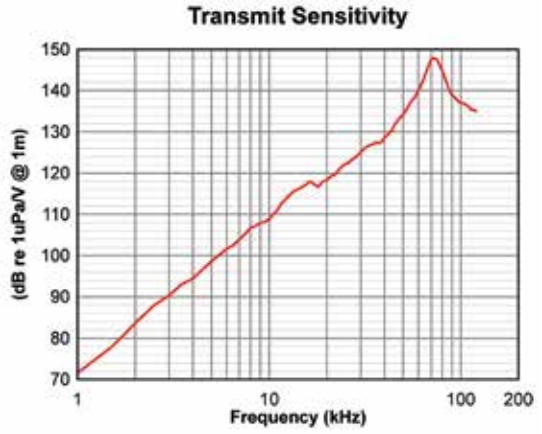
TECHNICAL SPECIFICATION

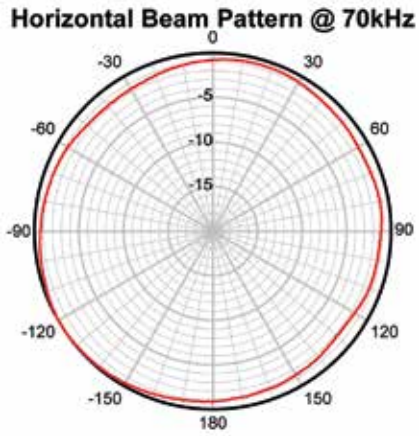
Resonant Frequency (Nominal)	70 kHz
Beam Pattern	Omni ± 2 dB up to 80 kHz
Receive Sensitivity	-199 dB re 1V/µPa
Transmit Sensitivity	148 dB re 1µPa/V @ 1m
Capacitance at 1 kHz (with 10m cable)	9,900 pF
Transmit Voltage (Max)	100 Vrms
Transmit Voltage / Duty Cycle (Max)	100 Vrms at 10% 30 Vrms at 100%

MODEL D/70



All dimensions in mm





MECHANICAL SPECIFICATION

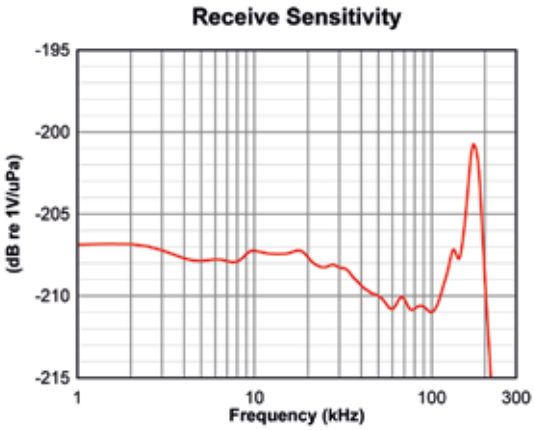
Operating Depth	900m Standard (Optional 1500m - may require an export license)
Weight Air/Water (including 10m cable)	0.64 kg / 0.23 kg
Operating Temperature	-5 to +40 °C
Storage Temperature	-40 to +80 °C
Cable Type	Polyurethane Ø7mm Low Noise Coaxial (Optional Ø7mm Polyurethane Screened Twisted Pair)
Cable Length	10 metres standard (Additional lengths supplied to order)
Connector	Not fitted as standard (Optional BNC or Customer Specific)

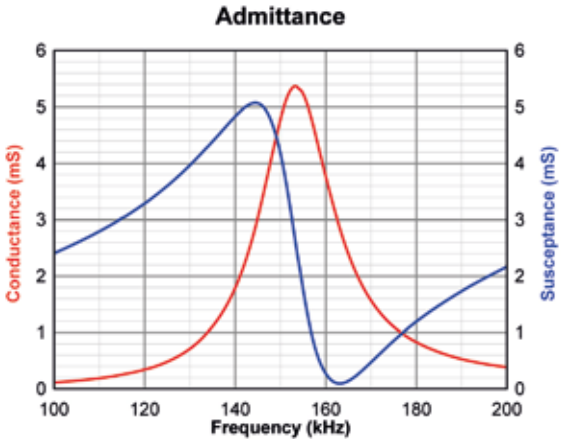
MODEL D/140

- *OMNI-DIRECTIONAL RESPONSE*
- *LOW NOISE PERFORMANCE*
- *ACOUSTIC REFERENCE STANDARD*
- *BROADBAND OPERATION*
- *AIR GUN & BOOMER MONITOR*
- *MARINE MAMMAL AUDIO SENSOR*

The D/140 is one of a group of spherical transducers exhibiting a combination of broadband frequency response, omni-directional beam pattern and high sensitivity.

The D/140 is available with or without acoustic calibration which is traceable to National Standards.

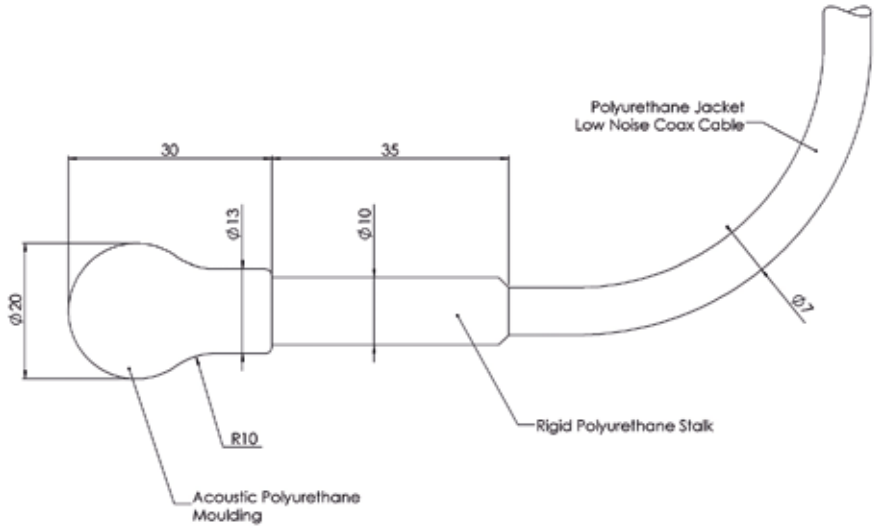




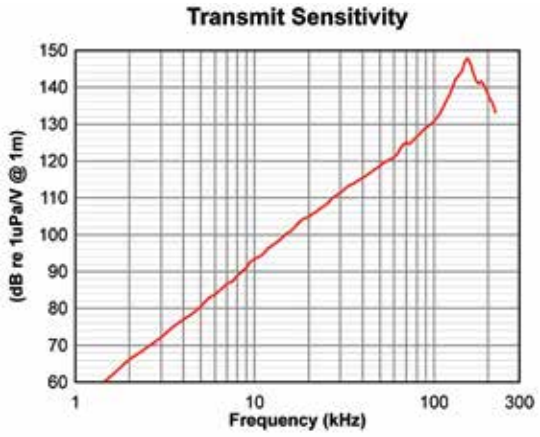
TECHNICAL SPECIFICATION

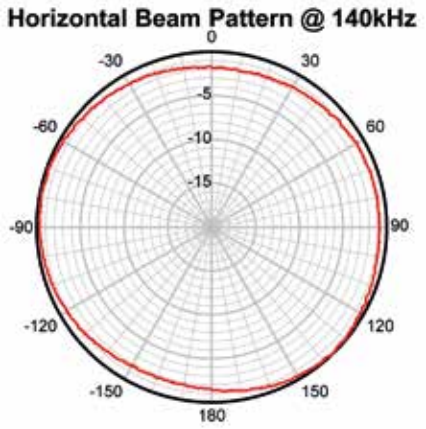
Resonant Frequency (Nominal)	150 kHz
Beam Pattern	Omni ± 2 dB up to 160 kHz
Receive Sensitivity	-207 dB re 1V/µPa
Transmit Sensitivity	148 dB re 1µPa/V @ 1m
Capacitance at 1 kHz (with 10m cable)	3,200 pF
Transmit Voltage (Max)	100 Vrms
Transmit Voltage / Duty Cycle (Max)	75 Vrms at 10% 20 Vrms at 100%

MODEL D/140



All dimensions in mm





MECHANICAL SPECIFICATION

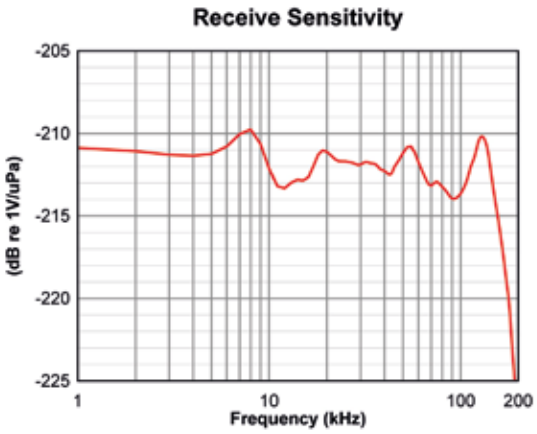
Operating Depth	900m Standard (Optional 1500m - may require an export license)
Weight Air/Water (including 10m cable)	0.59 kg / 0.2 kg
Operating Temperature	-5 to +40 °C
Storage Temperature	-40 to +80 °C
Cable Type	Polyurethane Ø7mm Low Noise Coaxial (Optional Ø7mm Polyurethane Screened Twisted Pair)
Cable Length	10 metres standard (Additional lengths supplied to order)
Connector	Not fitted as standard (Optional BNC or Customer Specific)

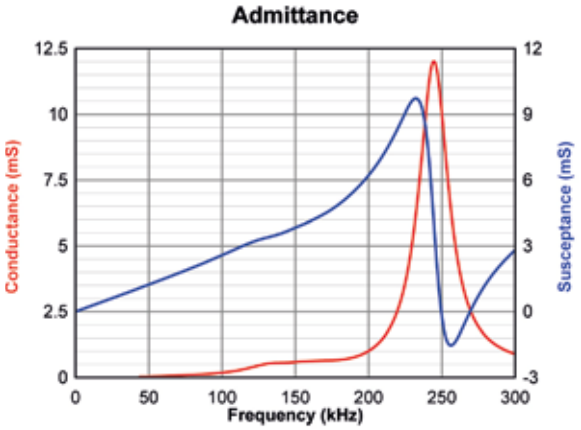
MODEL B/200

- ***WIDE BAND RESPONSE***
- ***LOW NOISE PERFORMANCE***
- ***ACOUSTIC REFERENCE STANDARD***
- ***OMNI BEAM PATTERN***
- ***HIGH PERFORMANCE***
- ***DOUBLE-SCREENED CABLE***

The B/200 miniature hydrophone has been designed by Neptune to achieve the optimum combination of frequency, physical size and receive sensitivity. This has resulted in a hydrophone with a wide variety of applications ranging from marine mammal sound studies to the analysis of near field pressure patterns.

The B/200 is available with or without acoustic calibration which is traceable to National Standards.

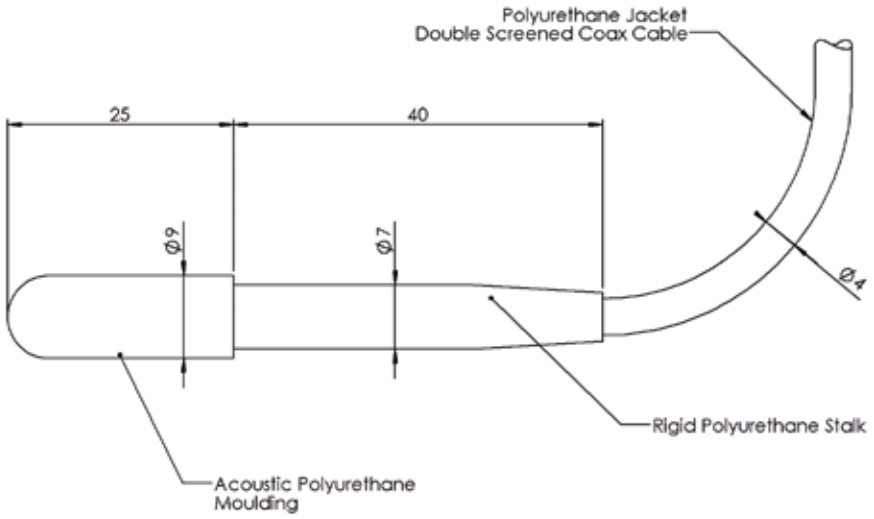




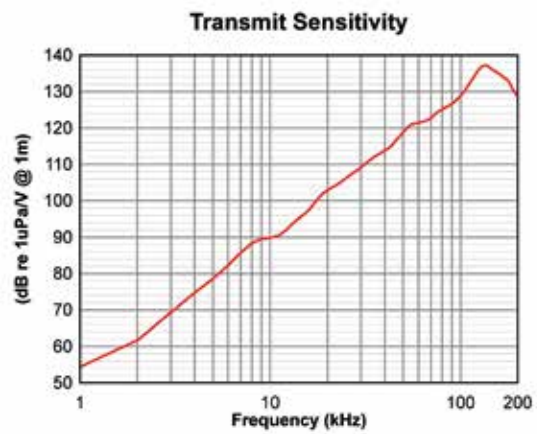
TECHNICAL SPECIFICATION

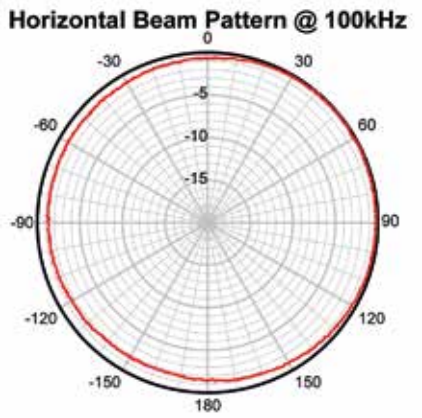
Resonant Frequency (Nominal)	170 kHz
Beam Pattern Horizontal	Omni ± 2 dB at 100kHz
Beam Pattern Vertical	270° ± 3 dB at 100kHz
Receive Sensitivity	-212 dB re 1V/µPa
Transmit Sensitivity	136 dB re 1µPa/V @ 1m
Capacitance at 1 kHz (with 10m cable)	3,900 pF
Transmit Voltage (Max)	50 Vrms
Transmit Voltage / Duty Cycle (Max)	50 Vrms at 10% 15 Vrms at 100%

MODEL B/200



All dimensions in mm





MECHANICAL SPECIFICATION

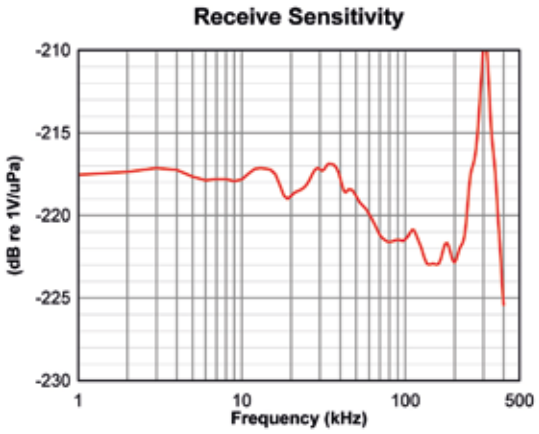
Operating Depth	700m
Weight Air/Water (with 10m cable)	0.16 kg / 0.03 kg
Operating Temperature	-5 to +40 °C
Storage Temperature	-40 to +80 °C
Cable Type	Polyurethane Ø4mm Double Screened LNC (Optional Ø3mm Single Screened LNC)
Cable Length	10 metres standard (Additional lengths supplied to order)
Connector	10-32 UNF M (Optional adaptor 10-32 UNF F to BNC M)

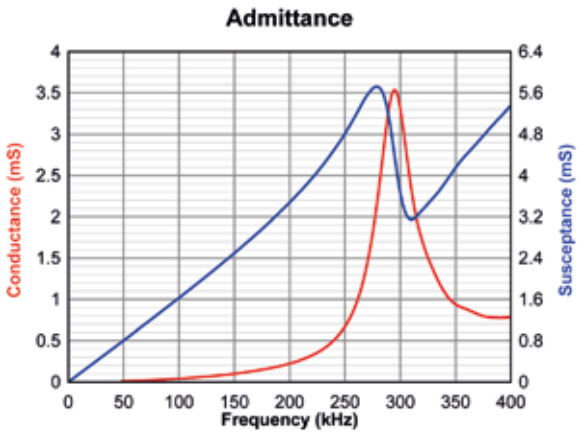
MODEL D/300

- ***TRUE SPHERICAL RESPONSE***
- ***LOW NOISE PERFORMANCE***
- ***ACOUSTIC REFERENCE STANDARD***
- ***HIGH PERFORMANCE***
- ***RESPONSE UP TO 400 KHZ***

The D/300 miniature high frequency hydrophone is a versatile acoustic sensor, the spherical ceramic element retains an excellent spherical beam pattern up to 350 kHz. The robust construction of the D/300 enables it to operate at depths down to 700 metres.

The D/300 is available with or without acoustic calibration which is traceable to National Standards.

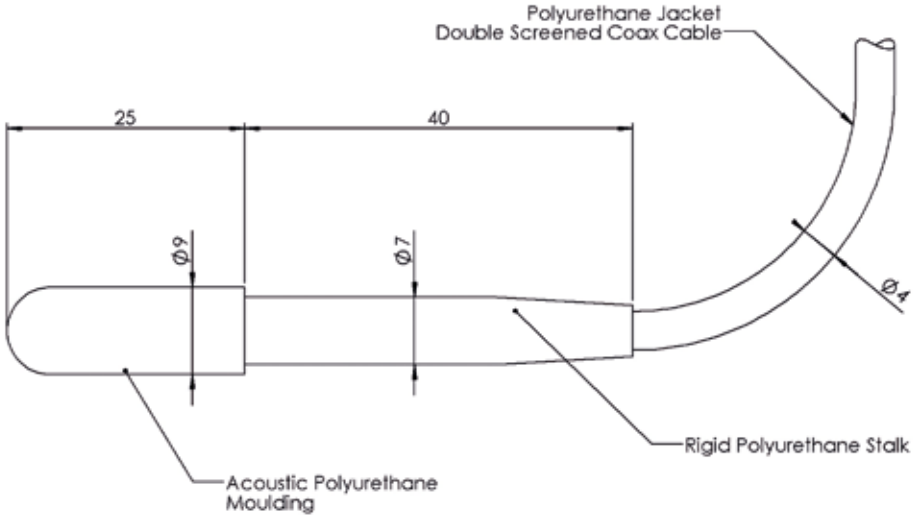




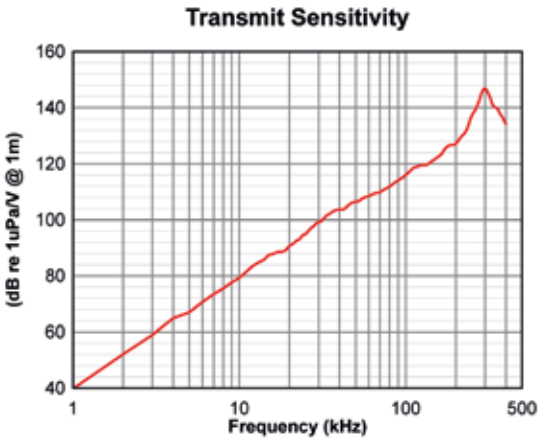
TECHNICAL SPECIFICATION

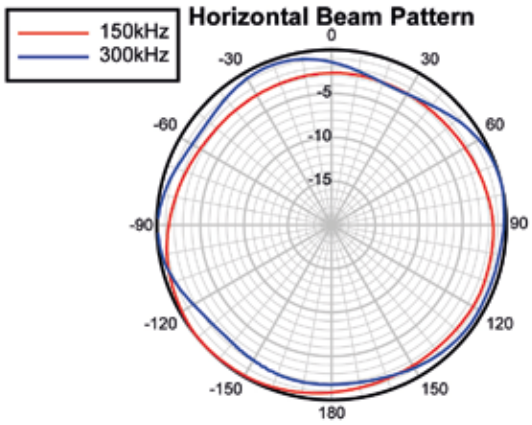
Resonant Frequency (Nominal)	300 kHz
Beam Pattern Horizontal	Omni ± 2 dB at 150kHz
Beam Pattern Vertical	270° ± 3 dB at 150kHz
Receive Sensitivity	-217 dB re 1V/µPa
Transmit Sensitivity	143 dB re 1µPa/V @ 1m
Capacitance at 1 kHz (with 10m cable)	2,500 pF
Transmit Voltage (Max)	25 Vrms
Transmit Voltage / Duty Cycle (Max)	25 Vrms at 10% 5 Vrms at 100%

MODEL D/300



All dimensions in mm





MECHANICAL SPECIFICATION

Operating Depth	700m
Weight Air/Water (with 10m cable)	0.16 kg / 0.03 kg
Operating Temperature	-5 to +40 °C
Storage Temperature	-40 to +80 °C
Cable Type	Polyurethane Ø4mm Double Screened LNC (Optional Ø3mm Single Screened LNC)
Cable Length	10 metres standard (Additional lengths supplied to order)
Connector	10-32 UNF M (Optional adaptor 10-32 UNF F to BNC M)

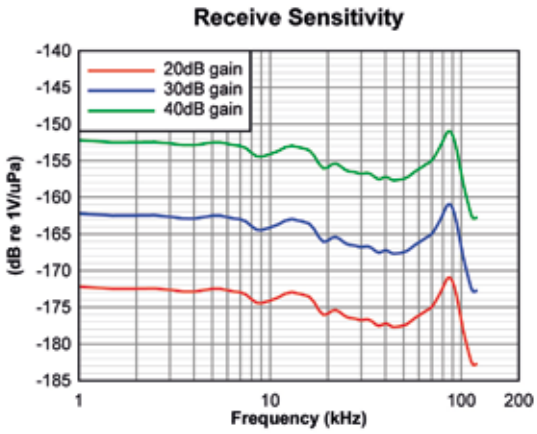
MODEL D/70/H

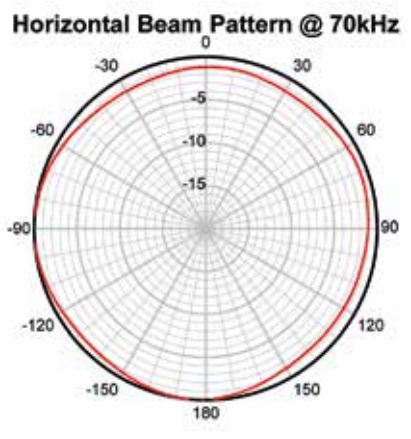
- ***INTEGRAL PRE-AMPLIFIER***
- ***MAXIMUM CABLE LENGTH 500M***
- ***OMNI-DIRECTIONAL RESPONSE***
- ***LOW NOISE PERFORMANCE***
- ***BROADBAND OPERATION***
- ***MARINE MAMMAL AUDIO SENSOR***

The D/70/H is a true spherical balanced element combined with a low noise differential pre-amplifier. Signals can be transmitted along cable lengths up to 500m, without any degradation. The preamplifier gain options of 20, 30 and 40 dB (are pre-set during manufacture) to suit the customer requirements.

A differential to single ended 'Surface Receiver' (Type T400) which includes additional filter and gain settings, can be supplied separately.

The D/70/H is available with or without acoustic calibration which is traceable to National Standards.

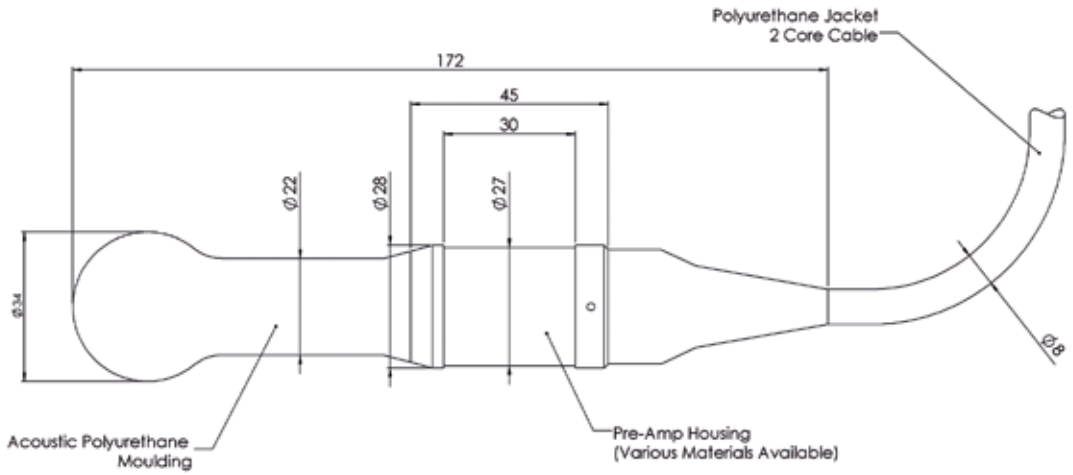




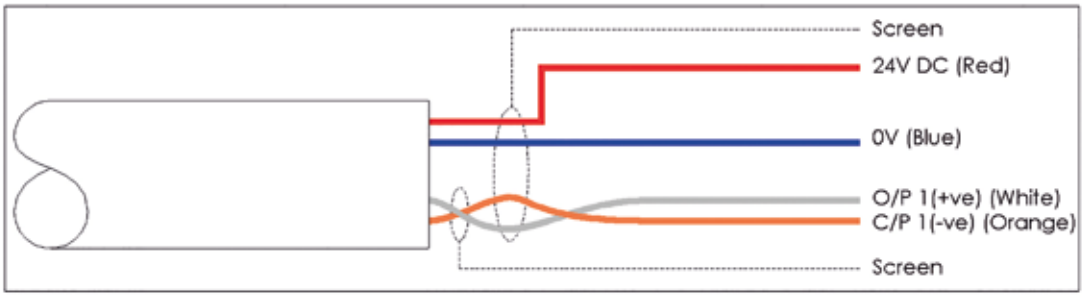
TECHNICAL SPECIFICATION

Resonant Frequency (Nominal)	70 kHz
Usable Frequency Range	5 Hz to 100 kHz
Beam Pattern Horizontal	Omni ±2 dB at 80kHz
Beam Pattern Vertical	240° ±3 dB at 80kHz
Output	Differential, 100Ω Impedance
Receive Sensitivity Gain is pre-set and cannot be adjusted.	-173 dB re 1V/µPa with 20dB gain -163 dB re 1V/µPa with 30dB gain -153 dB re 1V/µPa with 40dB gain
Power Supply	+20 to +30 Volts dc @ <100mA 25mA quiescent, 100mA (Max)
Noise	<3nV/√Hz RTI

MODEL D/70/H



All dimensions in mm



MECHANICAL SPECIFICATION

Operating Depth	900m Standard (Optional 1500m - may require an export license)
Weight Air/Water (with 10m cable)	0.80 kg / 0.22 kg
Operating Temperature	-5 to +40 °C
Storage Temperature	-40 to +80 °C
Cable Type	Polyurethane Ø8mm Twisted Pair (power) and Screened Twisted Pair (signal)
Cable Length	10 metres standard (Additional lengths supplied to order)
Connector	Not fitted as standard (Souriau type if used with T400 Surface Receiver)

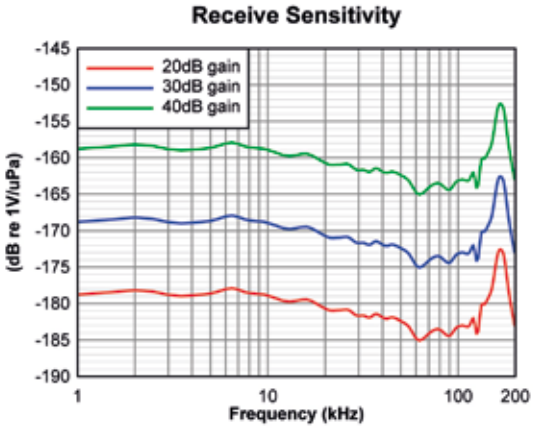
MODEL D/140/H

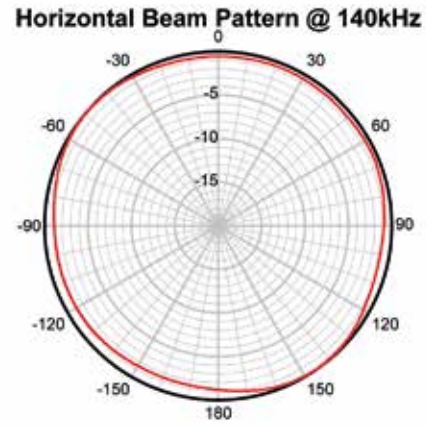
- ***INTEGRAL PRE-AMPLIFIER***
- ***OMNI-DIRECTIONAL RESPONSE***
- ***LOW NOISE PERFORMANCE***
- ***BROADBAND OPERATION***
- ***MARINE MAMMAL AUDIO SENSOR***
- ***MAXIMUM CABLE LENGTH 250 M***

The D/140/H is a true spherical balanced element combined with a low noise differential pre-amplifier. Signals can be transmitted along cable lengths up to 250m, without any degradation. The preamplifier gain options of 20, 30 and 40 dB (pre-set during manufacture) are to suit customer requirements.

A differential to single ended 'Surface Receiver' (Type T400) which includes additional filter and gain settings, can be supplied separately.

The D/140/H is available with or without acoustic calibration which is traceable to National Standards.

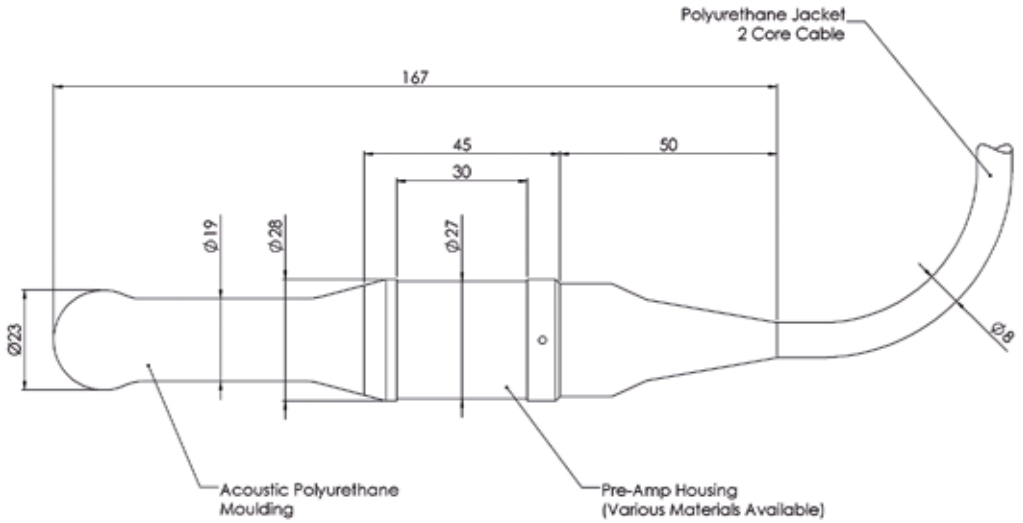




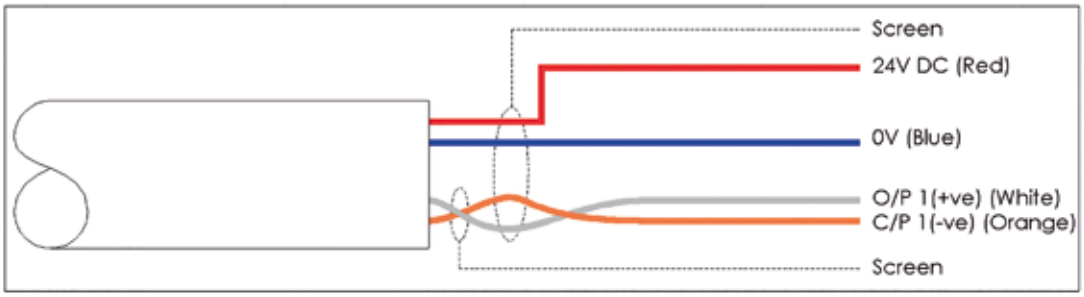
TECHNICAL SPECIFICATION

Resonant Frequency (Nominal)	150 kHz
Usable Frequency Range	10 Hz to 200 kHz
Beam Pattern Horizontal	Omni ±2 dB at 160kHz
Beam Pattern Vertical	240° ±3 dB at 160kHz
Output	Differential, 100Ω Impedance
Receive Sensitivity Gain is pre-set and cannot be adjusted.	-178 dB re 1V/µPa with 20dB gain -168 dB re 1V/µPa with 30dB gain -158 dB re 1V/µPa with 40dB gain
Power Supply	+20 to +30 Volts dc @ <100mA 25mA quiescent, 100mA (Max)
Noise	<3nV/√Hz RTI

MODEL D/140/H



All dimensions in mm



MECHANICAL SPECIFICATION

Operating Depth	900m Standard (Optional 1500m - may require an export license)
Weight Air/Water (with 10m cable)	0.76 kg / 0.18 kg
Operating Temperature	-5 to +40 °C
Storage Temperature	-40 to +80 °C
Cable Type	Polyurethane Ø8mm Twisted Pair (power) and Screened Twisted Pair (signal)
Cable Length	10 metres standard (Additional lengths supplied to order)
Connector	Not fitted as standard (Souriau type if used with T400 Surface Receiver)

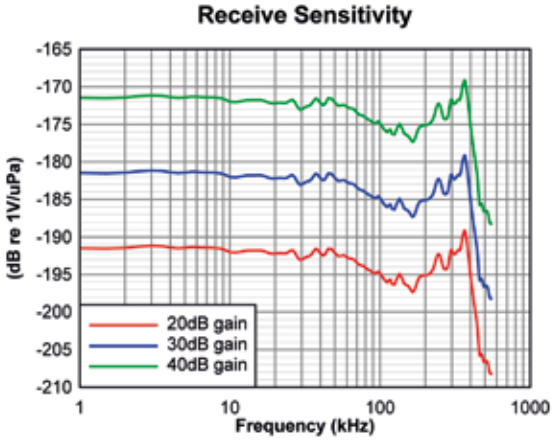
MODEL D/300/H

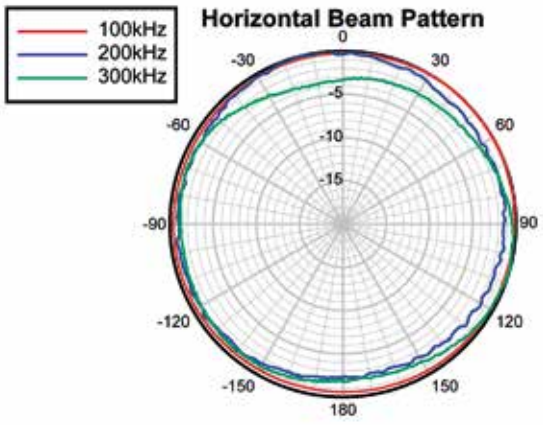
- ***INTEGRAL PRE-AMPLIFIER***
- ***MAXIMUM CABLE LENGTH 100M***
- ***OMNI-DIRECTIONAL RESPONSE***
- ***LOW NOISE PERFORMANCE***
- ***BROADBAND OPERATION***
- ***MARINE MAMMAL AUDIO SENSOR***

The D/300/H is a true spherical balanced element combined with a low noise differential pre-amplifier. Signals can be transmitted along cable lengths up to 100m, without any degradation. The preamplifier gain options of 20, 30 and 40 dB (are pre-set during manufacture) to suit the customer requirements.

A differential to single ended 'Surface Receiver' (Type T400) which includes additional filter and gain settings, can be supplied separately.

The D/300/H is available with or without acoustic calibration which is traceable to National Standards.

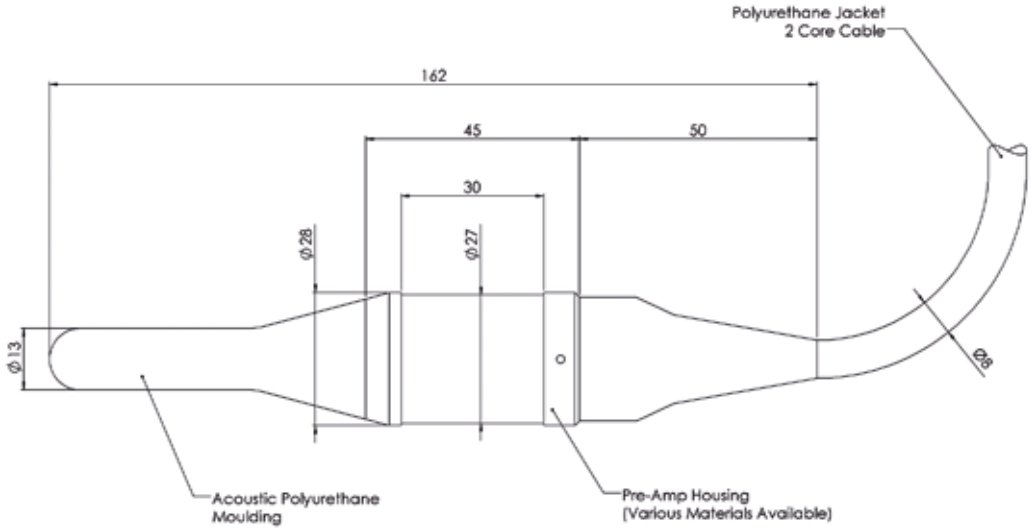




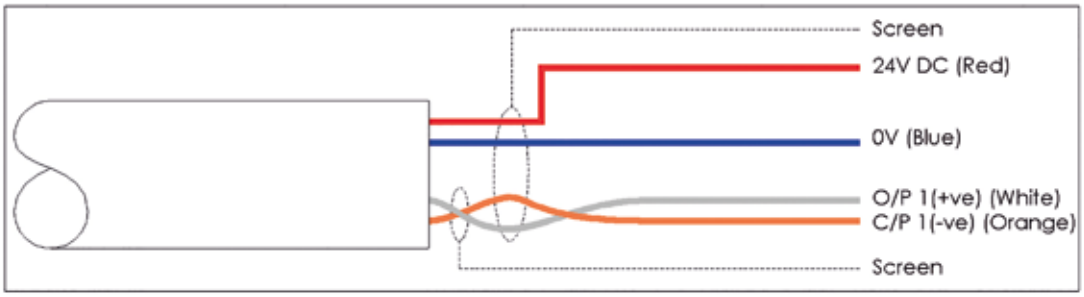
TECHNICAL SPECIFICATION

Resonant Frequency (Nominal)	300 kHz
Usable Frequency Range	10 Hz to 450 kHz
Beam Pattern Horizontal	Omni ±2 dB at 150kHz Omni ±3 dB at 300kHz
Beam Pattern Vertical	240° ±3 dB at 300kHz
Output	Differential, 100Ω Impedance
Receive Sensitivity Gain is pre-set and cannot be adjusted.	-192 dB re 1V/µPa with 20dB gain -182 dB re 1V/µPa with 30dB gain -172 dB re 1V/µPa with 40dB gain
Power Supply	+20 to +30 Volts dc @ <100mA 25mA quiescent, 100mA (Max)
Noise	<3nV/√Hz RTI

MODEL D/300/H



All dimensions in mm



MECHANICAL SPECIFICATION

Operating Depth	700m Standard
Weight Air/Water (with 10m cable)	0.72 kg / 0.16 kg
Operating Temperature	-5 to +40 °C
Storage Temperature	-40 to +80 °C
Cable Type	Polyurethane Ø8mm Twisted Pair (power) and Screened Twisted Pair (signal)
Cable Length	10 metres standard (Additional lengths supplied to order)
Connector	Not fitted as standard (Souriau type if used with T400 Surface Receiver)

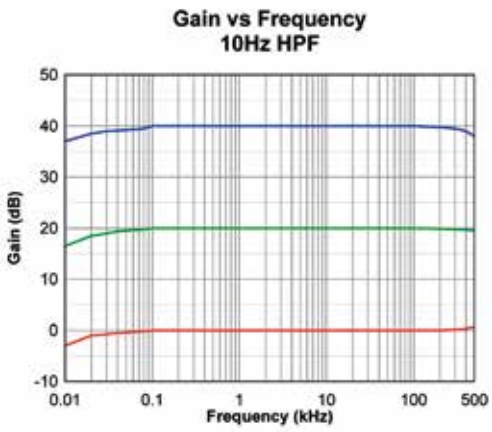
MODEL T400

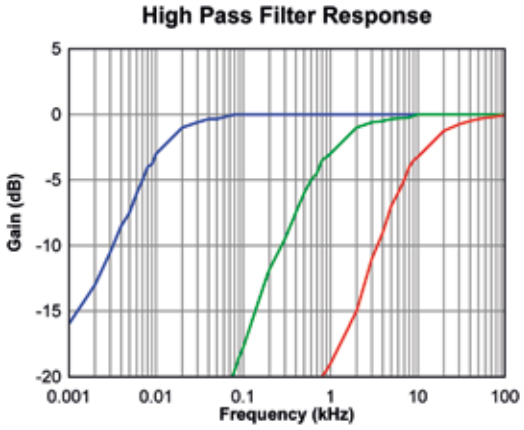
- ***SURFACE RECEIVER UNIT***
- ***DIFFERENTIAL INPUT***
- ***SINGLE ENDED OUTPUT***
- ***GAIN/FILTER SWITCH***
- ***HEADPHONE OUTPUT***

The T400 'Surface Receiver' is designed to interface to Neptune's hydrophones that include integral pre-amplifiers.

The hydrophone signal is converted from a differential to single ended output, with a standard BNC connector.

The preamplifier has selectable gain options of 0, 20 and 40 dB and high-pass filter options of 10 Hz, 1 kHz and 10 kHz.



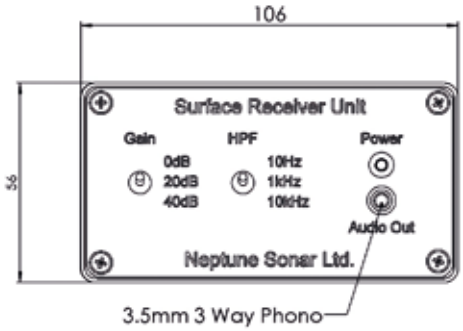


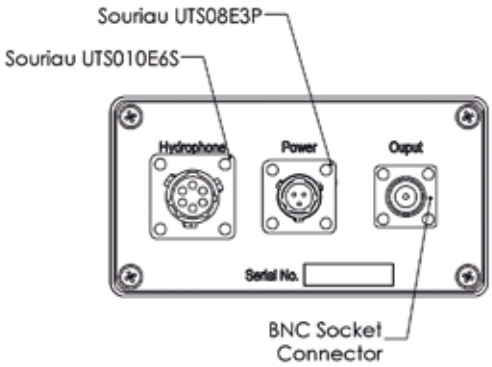
TECHNICAL SPECIFICATION

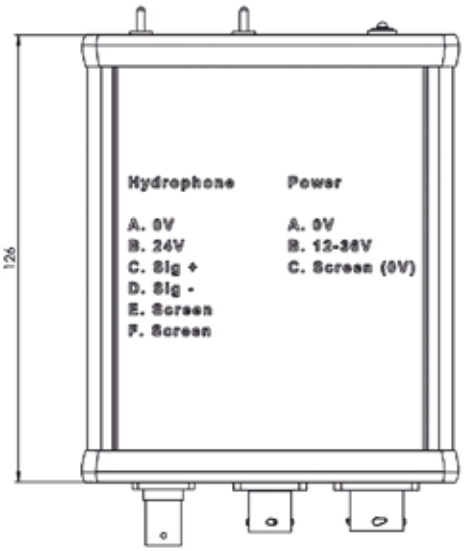
Usable Frequency Range	5 Hz to 500 kHz
Gain Settings	0, 20 and 40 dB
High-Pass Filter Settings	10 Hz, 1 kHz and 10 kHz
Power Supply (Input)	24 Vdc Nominal (12 to 36 Vdc) 15 mA quiescent, 40 mA with hydrophone 150 mA (max) signal and load dependant
Input	Differential, 10kΩ Impedance
Output	BNC - Single Ended, 50Ω Impedance 3.5mm Jack - Headphones
Noise	<20nV/√Hz RTI

MODEL T400

MECHANICAL SPECIFICATION







BNC Socket Connector	
Pin	**Function**
Centre	Single ended signal
Outer	GND

Power - Souriau UTS08E3P		
Pin	**Wire Colour**	**Function**
A	Green/Screen	0V/GND
B	Red	+24V DC
C	Green/Screen	0V/GND

Hydrophone - Souriau UTS010E6S		
Pin	**Wire Colour**	**Function**
A	Blue/Screen	GND
B	Red	TXDR V+
C	White	Sig -
D	Orange	Sig +
E	Blue/Screen	GND
F	Blue/Screen	GND

All dimensions in mm

MODEL T11

- ***STANDARD SENSOR FOR UK MOD***
- ***FAST TRANSIENT RESPONSE***
- ***REFERENCE STANDARD***
- ***HIGH OPERATIONAL ENDURANCE***
- ***LOW COST***

The T11 is a miniature transducer designed to measure underwater explosive shock levels and pressure transients in fluids.
The hydrophone is based upon a piezoelectric tourmaline crystal connected to a miniature low noise coaxial cable.

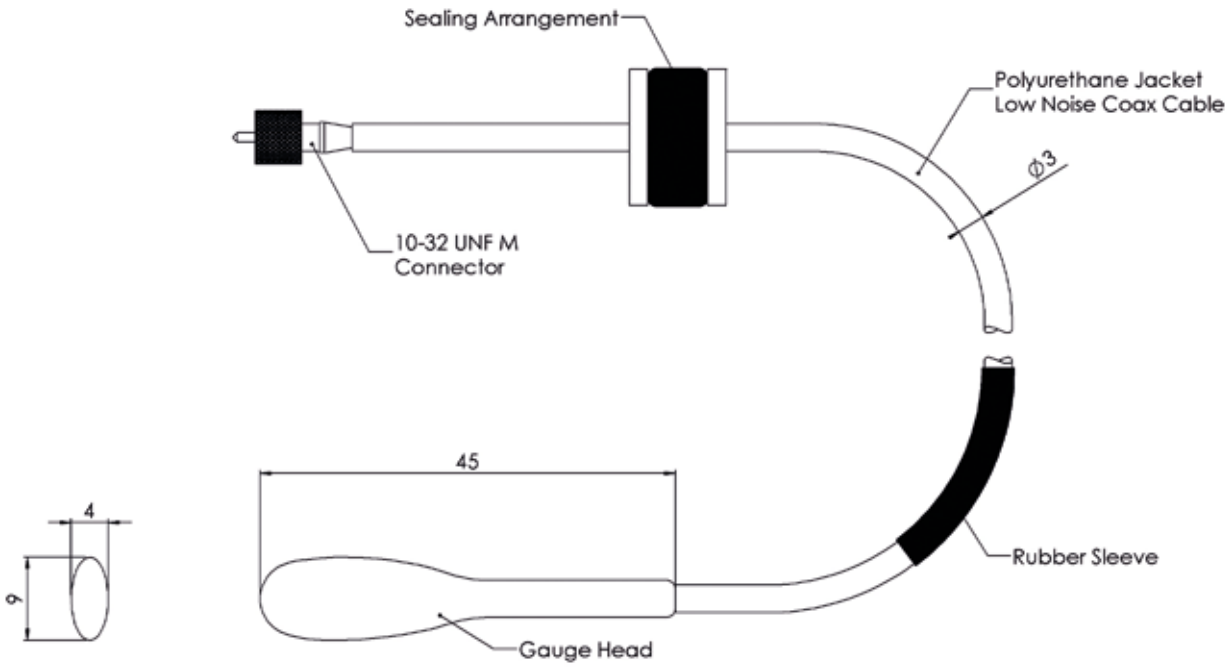
With a rise time of less than 4µs and a dynamic pressure range of 0-275 MPa this transducer is intended to measure pressure levels and profiles from underwater explosions.

The T11 is available with or without a certified calibration based upon a dead weight tester.

ACOUSTIC SPECIFICATION

Measurement Pressure Range	0 – 275 Mpa 0 – 40,000 psi
Nominal Charge Sensitivity	0.07 pC / Kpa 0.5 pC / psi
Insulation Resistance	10^5 M Ohms
Rise Time	< 4µs

MODEL T11



All dimensions in mm

MECHANICAL SPECIFICATION

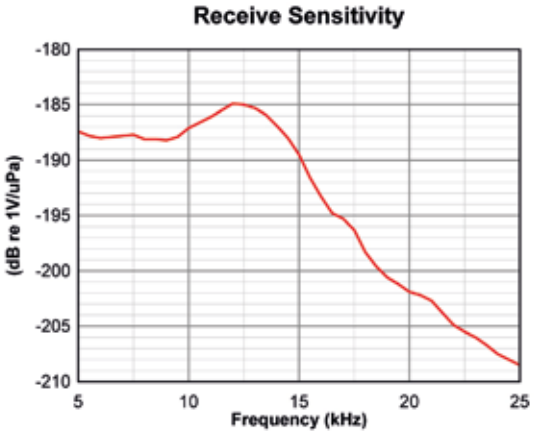
Measurement Pressure Range	0 – 275 Mpa 0 – 40,000 psi
Weight Air/Water (with 10m cable)	0.12 kg / 0.08 kg
Operating Temperature	-5 to +40 °C
Storage Temperature	-40 to +80 °C
Cable Type	Ø3mm Single Screened LNC
Cable Length	10 metres standard (Additional lengths supplied to order)
Connector Type	10-32 UNF M (Optional adaptor 10-32 UNF F to BNC M)

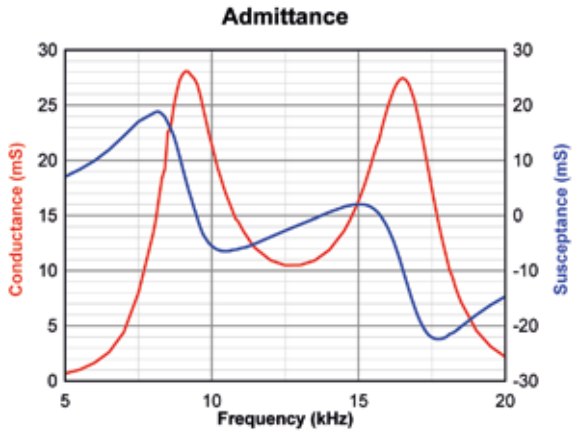
MODEL D/11/BB

- NEAR OCTAVE BANDWIDTH
- OMNI-DIRECTIONAL RESPONSE
- EFFICIENT TRANSMITTER
- HIGH POWER PROJECTOR
- DEEP WATER CAPABILITY

The D/11/BB is a wide band, highly efficient, omni-directional transmit and receive transducer, with a 3dB bandwidth from 8 kHz to 18 kHz. The robust, corrosion free construction enables the transducer to operate in extreme underwater environments. The over-moulded design enables the D/11/BB to be mechanically robust and suitable for harsh environments.

The D/11/BB is available with or without acoustic calibration which is traceable to National Standards.

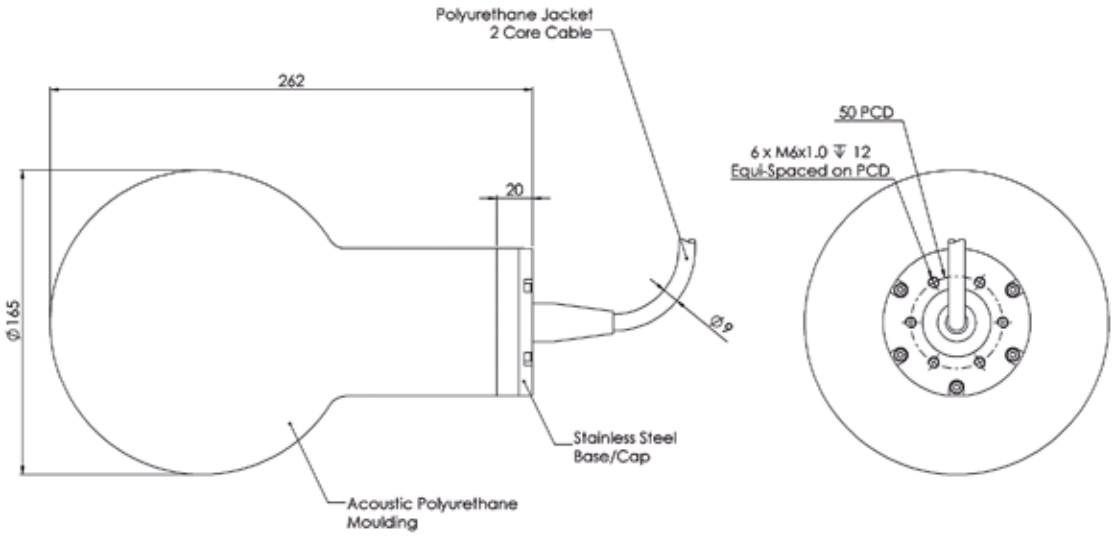




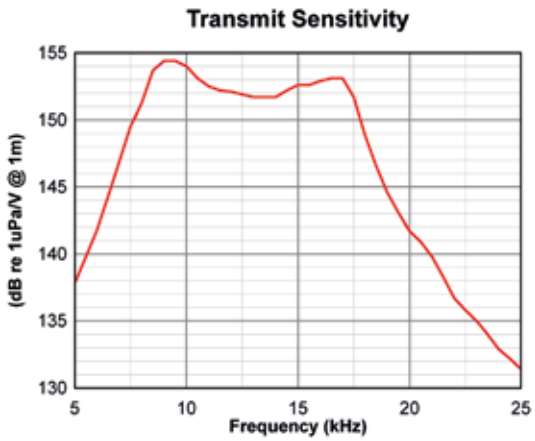
TECHNICAL SPECIFICATION

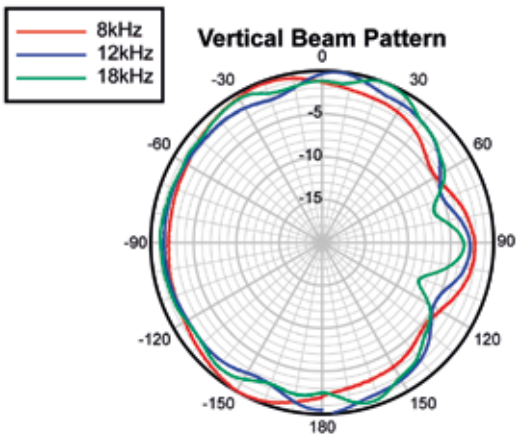
Resonant Frequency (Nominal)	9 / 16.5 kHz
Useful Operating Band	8 kHz to 18 kHz
Beam Pattern (Horizontal)	Omni ± 2 dB
Beam Pattern (Vertical)	Hemispherical (See Graph)
Receive Sensitivity	-185 dB re 1V/µPa
Transmit Sensitivity	153 dB re 1µPa/V @ 1m
Transmit Voltage (Max)	300 Vrms @ f > 5kHz 700 Vrms @ f < 5kHz
Transmit Voltage / Duty Cycle (Max)	300 Vrms at 10% 80 Vrms at 100%

MODEL D/11/BB



All dimensions in mm





MECHANICAL SPECIFICATION

Operating Depth	2000m Standard (May require an export licence)
Weight Air / Water (with 10m cable)	7.7 kg / 4.2 kg
Operating Temperature	-5 to +40 °C
Storage Temperature	-40 to +80 °C
Cable Type	Ø9mm Polyurethane Jacket, Screened Twisted Pair
Cable Length	10 metres standard (Additional lengths supplied to order)
Connector	Not fitted as standard (Optional BNC or Customer Specific)

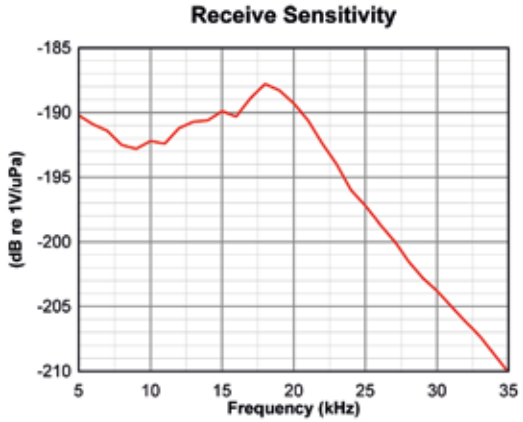
MODEL D/17/BB

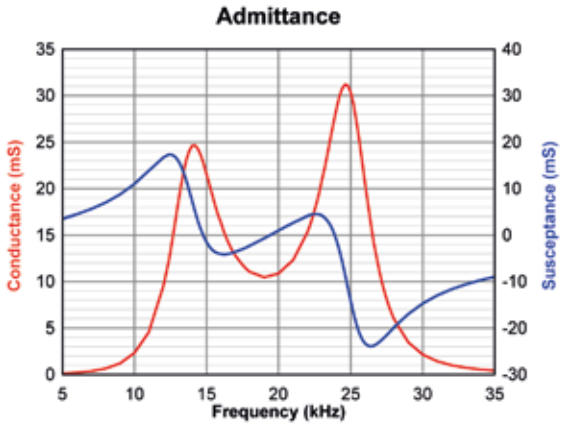
- NEAR OCTAVE BANDWIDTH
- OMNI-DIRECTIONAL RESPONSE
- EFFICIENT TRANSMITTER
- HIGH POWER PROJECTOR
- DEEP WATER CAPABILITY

The D/17/BB is a highly efficient omni-directional transducer with a 3dB bandwidth from 12 kHz to 27 kHz. The D/17/BB transducer is ideally suited for use in broadband noise systems, long-range transponder and voice/ data communications.

The robust construction enables the transducer to operate in extreme underwater environments.

The D/17/BB is available with or without acoustic calibration which is traceable to National Standards.

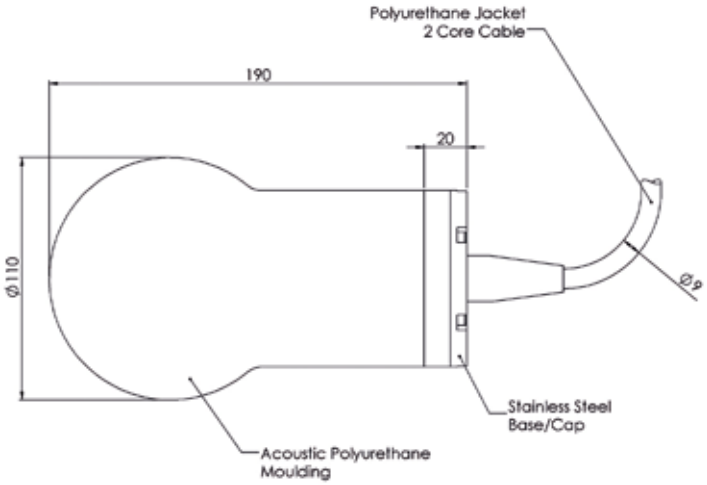


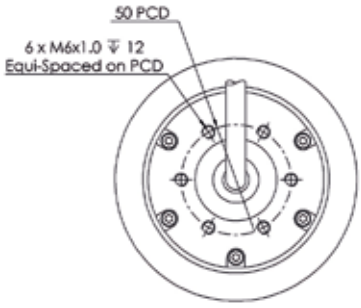


TECHNICAL SPECIFICATION

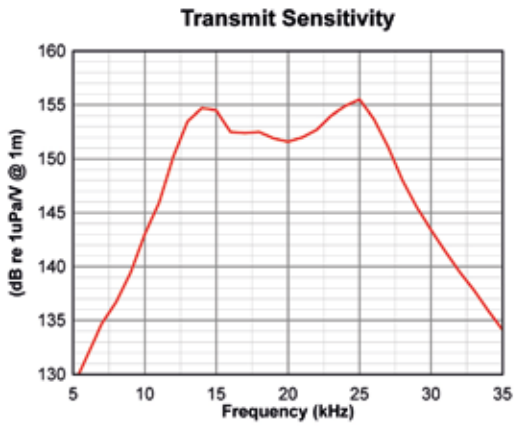
Resonant Frequency (Nominal)	14 / 25 kHz
Useful Operating Band	12 kHz to 27 kHz
Beam Pattern (Horizontal)	Omni ± 2 dB
Beam Pattern (Vertical)	Hemispherical (See Graph)
Receive Sensitivity	-188 dB re 1V/µPa
Transmit Sensitivity	155 dB re 1µPa/V @ 1m
Transmit Voltage (Max)	300 Vrms
Transmit Voltage / Duty Cycle (Max)	300 Vrms at 10% 80 Vrms at 100%

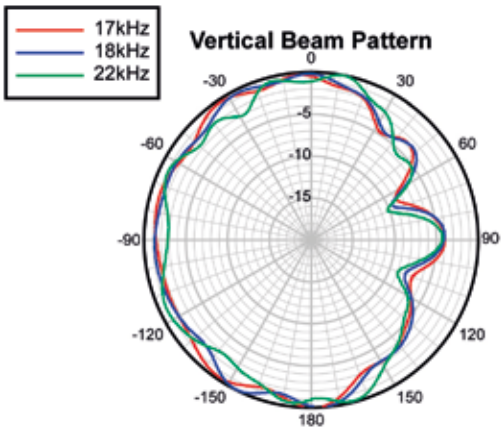
MODEL D/17/BB





All dimensions in mm





MECHANICAL SPECIFICATION

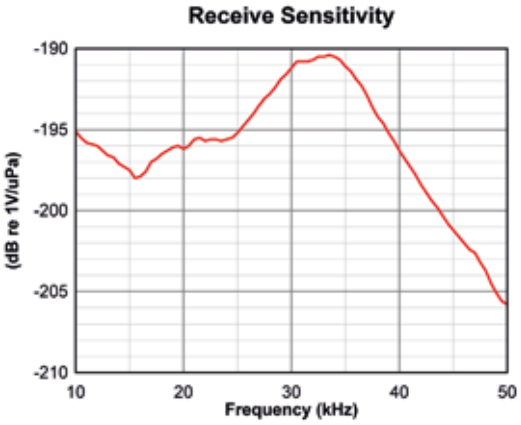
Operating Depth	2000m Standard (May require an export licence)
Weight Air / Water (with 10m cable)	3.4 kg / 1.6 kg
Operating Temperature	-5 to +40 °C
Storage Temperature	-40 to +80 °C
Cable Type	Ø9mm Polyurethane Jacket, Screened Twisted Pair
Cable Length	10 metres standard (Additional lengths supplied to order)
Connector	Not fitted as standard (Optional BNC or Customer Specific)

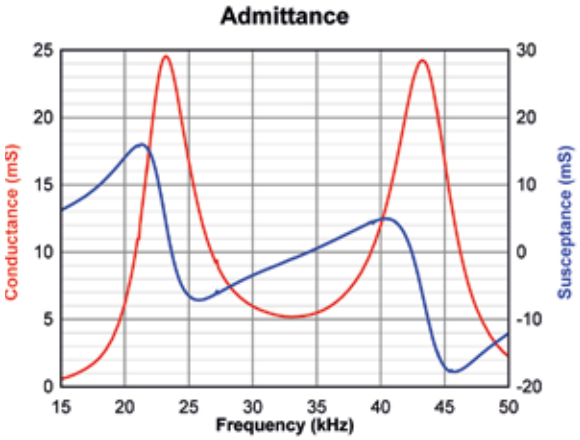
MODEL D/26/BB

- NEAR OCTAVE BANDWIDTH
- OMNI-DIRECTIONAL RESPONSE
- EFFICIENT TRANSMITTER
- HIGH POWER PROJECTOR
- DEEP WATER CAPABILITY

The D/26/BB is a highly efficient, omni-directional transmit and receive transducer, with a 3dB bandwidth from 21 kHz to 47 kHz. Ideally suited for use in low frequency noise systems, long-range transponder applications and long range voice and data communication. The robust construction enables the transducer to operate in extreme underwater environments.

The D/26/BB is available with or without acoustic calibration which is traceable to National Standards.

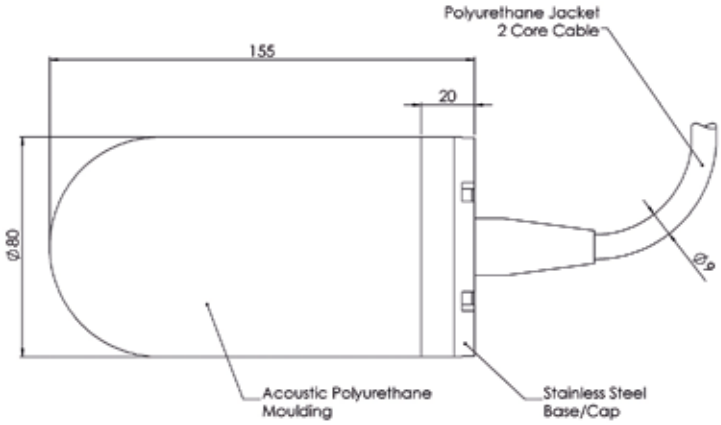


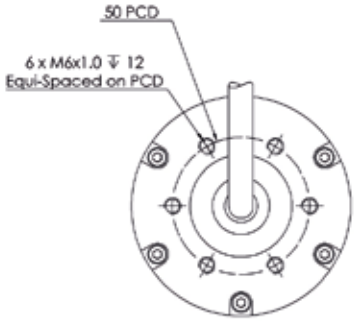


TECHNICAL SPECIFICATION

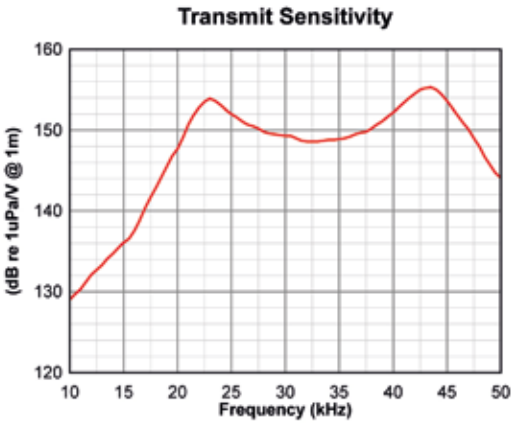
Resonant Frequency (Nominal)	23 / 43 kHz
Useful Operating Band	21 kHz to 47 kHz
Beam Pattern (Horizontal)	Omni ± 2 dB
Beam Pattern (Vertical)	Hemispherical (See Graph)
Receive Sensitivity	-191 dB re 1V/µPa
Transmit Sensitivity	154 dB re 1µPa/V @ 1m
Transmit Voltage (Max)	200 Vrms
Transmit Voltage / Duty Cycle (Max)	200 Vrms at 10% 60 Vrms at 100%

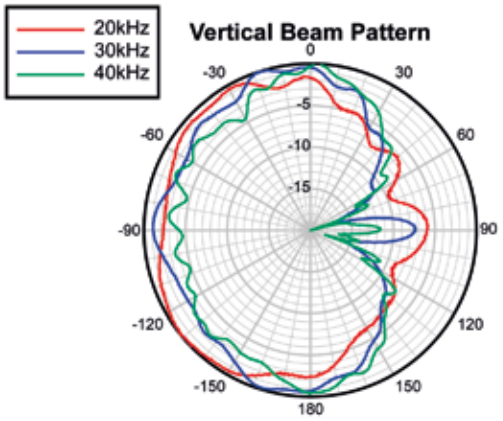
MODEL D/26/BB





All dimensions in mm





MECHANICAL SPECIFICATION

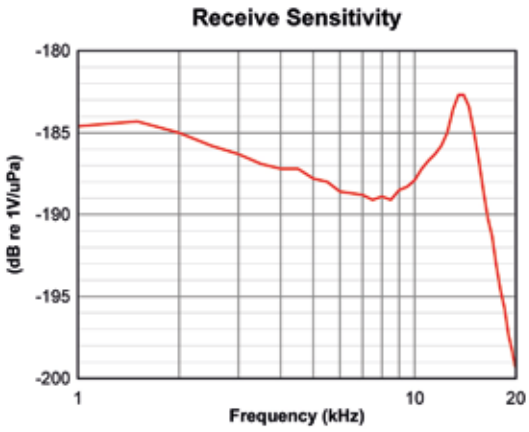
Operating Depth	2000m Standard (May require an export licence)
Weight Air / Water (with 10m cable)	2.7 kg / 1.4 kg
Operating Temperature	-5 to +40 °C
Storage Temperature	-40 to +80 °C
Cable Type	Ø9mm Polyurethane Jacket, Screened Twisted Pair
Cable Length	10 metres standard (Additional lengths supplied to order)
Connector	Not fitted as standard (Optional BNC or Customer Specific)

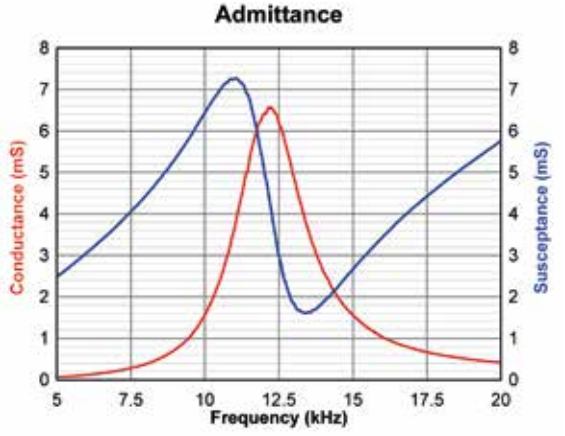
MODEL D/11

- ***OMNI-DIRECTIONAL RESPONSE***
- ***BROADBAND OPERATION***
- ***HIGH POWER PROJECTOR***
- ***DEEP WATER CAPABILITY***

The D/11 spherical transducer is a highly efficient, omni-directional device and is particularly suitable as a broadband noise source or for long range voice and data communications systems. The transducer is extremely robust and able to withstand severe levels of underwater explosive shock.

The D/11 is available with or without acoustic calibration which is traceable to National Standards.

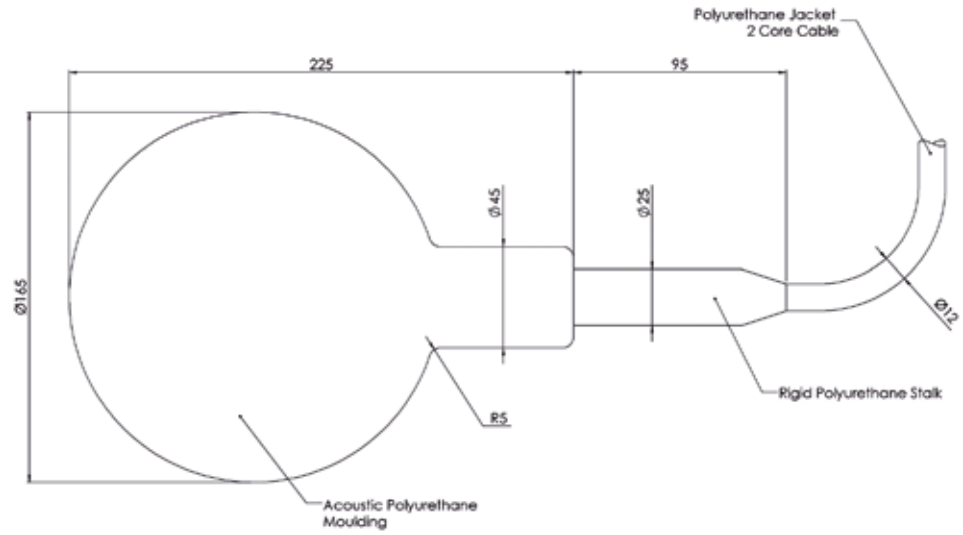




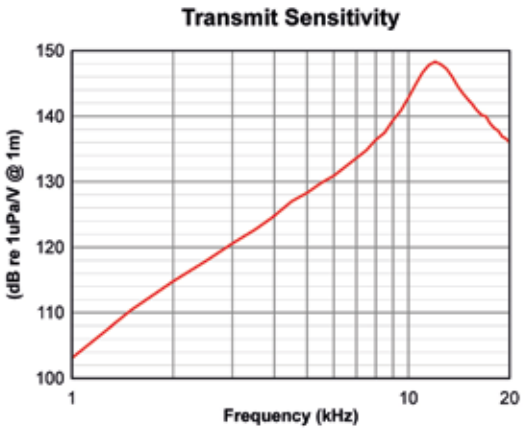
TECHNICAL SPECIFICATION

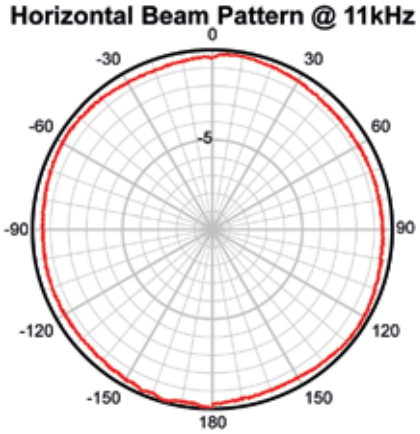
Resonant Frequency (Nominal)	11.5 kHz
Beam Pattern	Omni ± 2 dB up to 18 kHz
Receive Sensitivity	-184 dB re 1V/µPa
Transmit Sensitivity	148 dB re 1µPa/V @ 1m
Capacitance at 1 kHz (with 10m cable)	83,000 pF
Transmit Voltage (Max)	750 Vrms
Transmit Voltage / Duty Cycle (Max)	750 Vrms at 10% 225 Vrms at 100%

MODEL D/11



All dimensions in mm





MECHANICAL SPECIFICATION

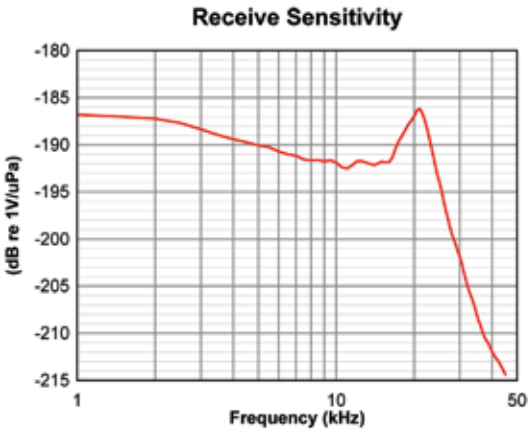
Operating Depth	2000m Standard (Optional 4000m – both may require an export license)
Weight Air / Water (with 10m cable)	6.9 kg / 3.3 kg
Operating Temperature	-5 to +40 °C
Storage Temperature	-40 to +80 °C
Cable Type	Ø12mm Polyurethane Jacket, Screened Twisted Pair
Cable Length	10 metres standard (Additional lengths supplied to order)
Connector	Not fitted as standard (Optional BNC or Customer Specific)

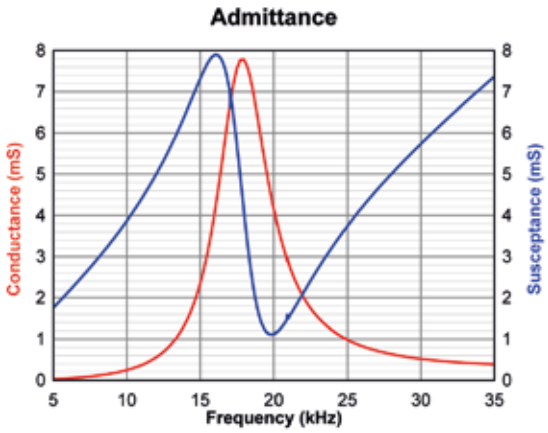
MODEL D/17

- ***OMNI-DIRECTIONAL RESPONSE***
- ***EFFICIENT TRANSMITTER***
- ***BROADBAND OPERATION***
- ***HIGH POWER PROJECTOR***
- ***DEEP WATER CAPABILITY***

The D/17 spherical transducer is a versatile design providing an omni-directional transmit and receive beam pattern. With a large operating bandwidth and capable of achieving source levels of 201 dB when operated below 10m water depth. It is particularly suitable as a high-power noise source or communications transducer.

The D/17 is available with or without acoustic calibration which is traceable to National Standards.

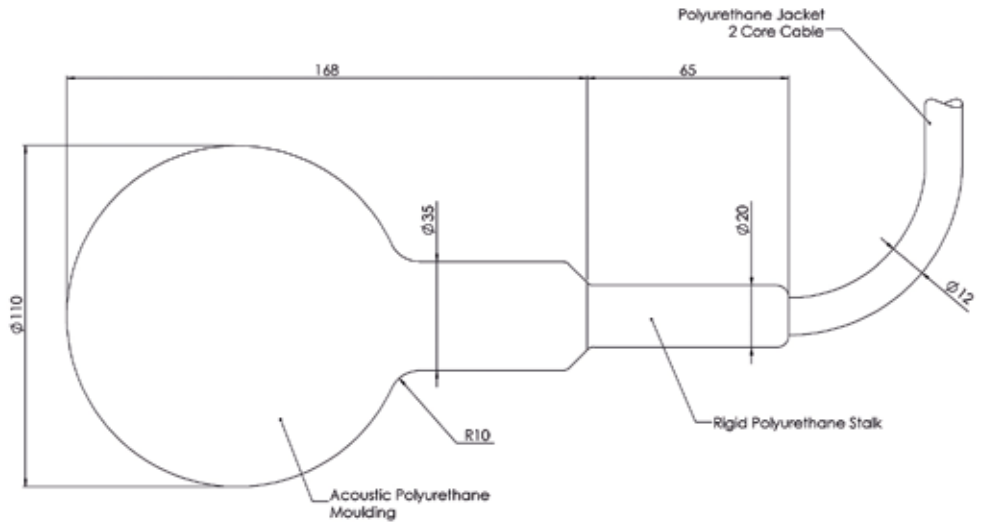




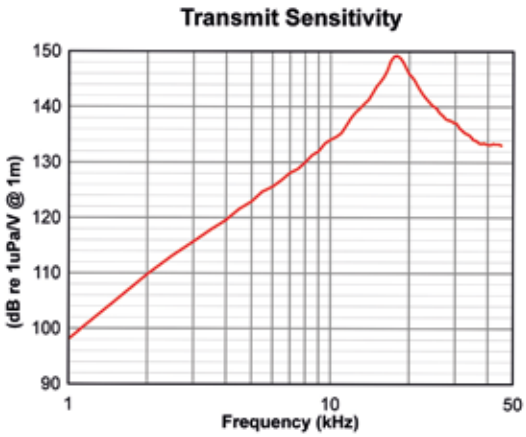
TECHNICAL SPECIFICATION

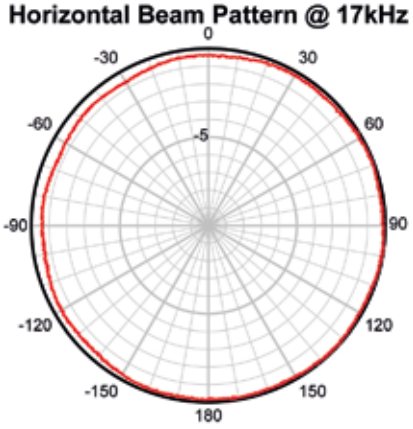
Resonant Frequency (Nominal)	17 kHz
Beam Pattern	Omni ± 2 dB up to 30 kHz
Receive Sensitivity	-187 dB re 1V/µPa
Transmit Sensitivity	148 dB re 1µPa/V @ 1m
Capacitance at 1 kHz (with 10m cable)	54,000 pF
Transmit Voltage (Max)	600 Vrms
Transmit Voltage / Duty Cycle (Max)	600 Vrms at 10% 190 Vrms at 100%

MODEL D/17



All dimensions in mm





MECHANICAL SPECIFICATION

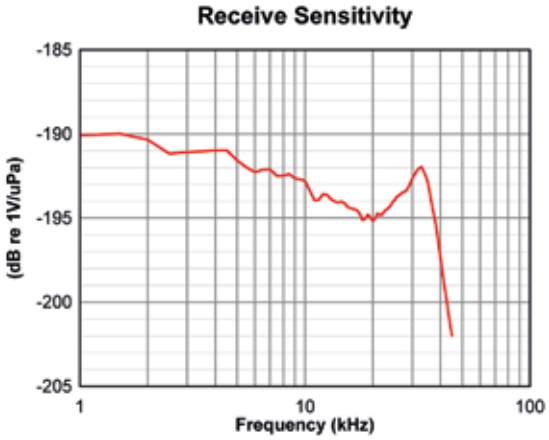
Operating Depth	2000m Standard (Optional 4000m – both may require an export license)
Weight Air / Water (with 10m cable)	2.6 kg / 0.7 kg
Operating Temperature	-5 to +40 °C
Storage Temperature	-40 to +80 °C
Cable Type	Ø12mm Polyurethane Jacket, Screened Twisted Pair
Cable Length	10 metres standard (Additional lengths supplied to order)
Connector	Not fitted as standard (Optional BNC or Customer Specific)

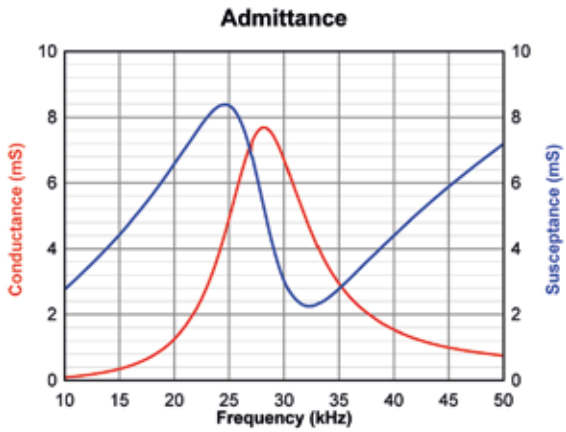
MODEL D/26

- ***OMNI-DIRECTIONAL RESPONSE***
- ***HIGH POWER PROJECTOR***
- ***EFFICIENT TRANSMITTER***
- ***BROADBAND OPERATION***
- ***DEEP WATER CAPABILITY***

The D/26 spherical transducer is a versatile design providing omni-directional transmit and receive characteristics over a wide frequency band. The all moulded construction coupled with the inherent strength of the PZT ceramic sphere achieves a robust, lightweight and corrosion free design making it the ideal choice as a high-power projector.

The D/26 is available with or without acoustic calibration which is traceable to National Standards.

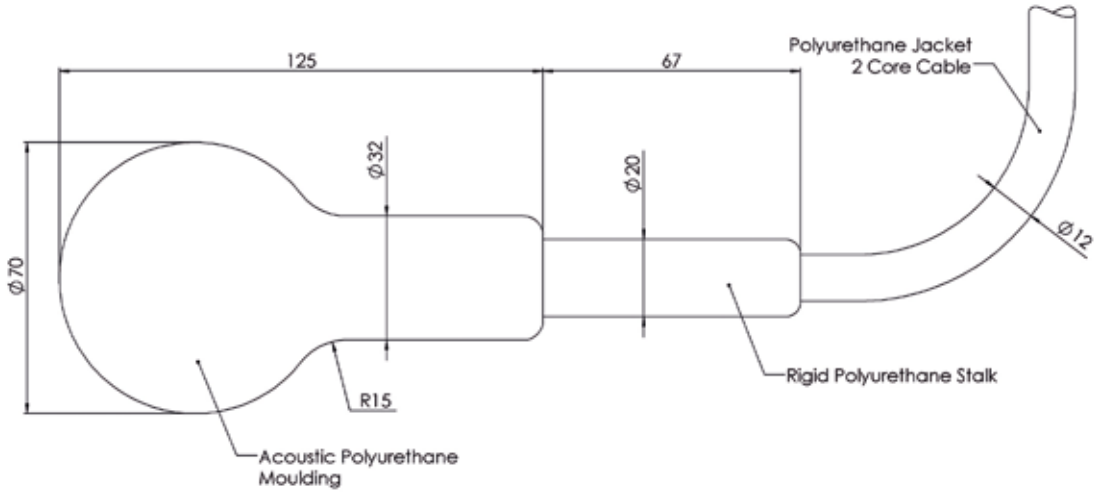




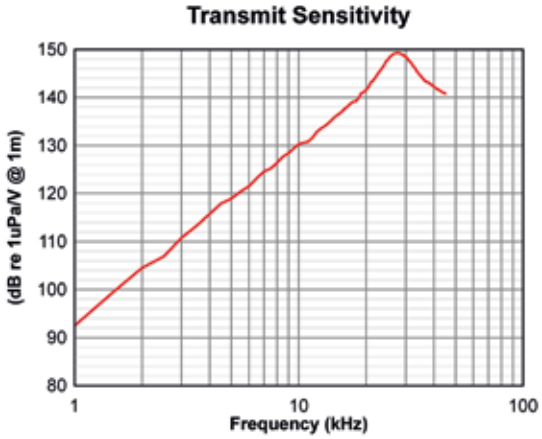
TECHNICAL SPECIFICATION

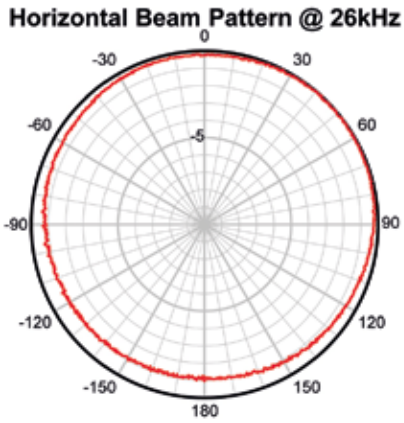
Resonant Frequency (Nominal)	26 kHz
Beam Pattern	Omni ± 2 dB up to 35 kHz
Receive Sensitivity	-190 dB re 1V/µPa
Transmit Sensitivity	148 dB re 1µPa/V @ 1m
Capacitance at 1 kHz (with 10m cable)	42,000 pF
Transmit Voltage (Max)	450 Vrms
Transmit Voltage / Duty Cycle (Max)	450 Vrms at 10% 150 Vrms at 100%

MODEL D/26



All dimensions in mm





MECHANICAL SPECIFICATION

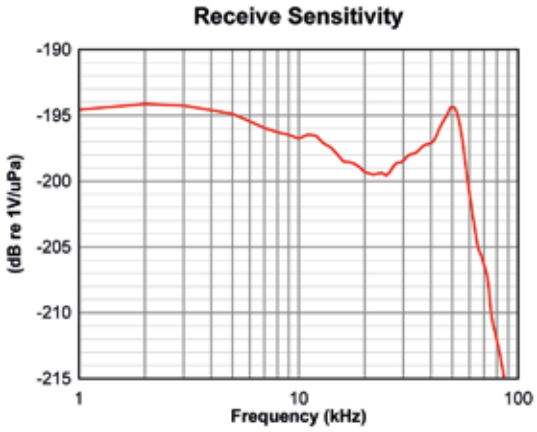
Operating Depth	2000m (Optional 4000m – both may require an export license)
Weight Air / Water (with 10m cable)	1.9 kg / 0.5 kg
Operating Temperature	-5 to +40 °C
Storage Temperature	-40 to +80 °C
Cable Type	Ø12mm Polyurethane Jacket, Screened Twisted Pair
Cable Length	10 metres standard (Additional lengths supplied to order)
Connector	Not fitted as standard (Optional BNC or Customer Specific)

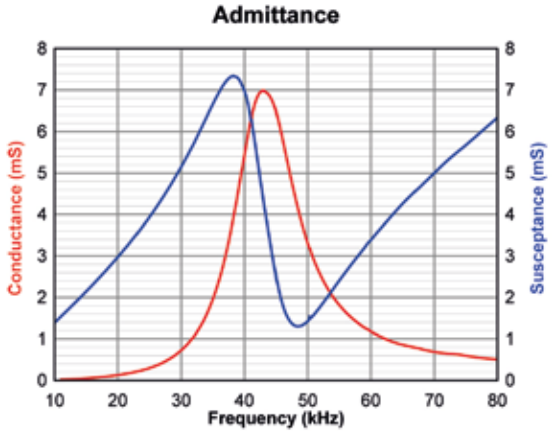
MODEL D/45

- ***OMNI-DIRECTIONAL RESPONSE***
- ***HIGH POWER PROJECTOR***
- ***EFFICIENT TRANSMITTER***
- ***BROADBAND OPERATION***
- ***DEEP WATER CAPABILITY***

The D/45 spherical transducer is a versatile design providing omni-directional transmit and receive characteristics over a wide frequency range. The all moulded construction coupled with the inherent strength of the PZT ceramic sphere achieves a robust, lightweight and corrosion free design making it the ideal choice as a high-power projector.

The D/45 is available with or without acoustic calibration which is traceable to National Standards.

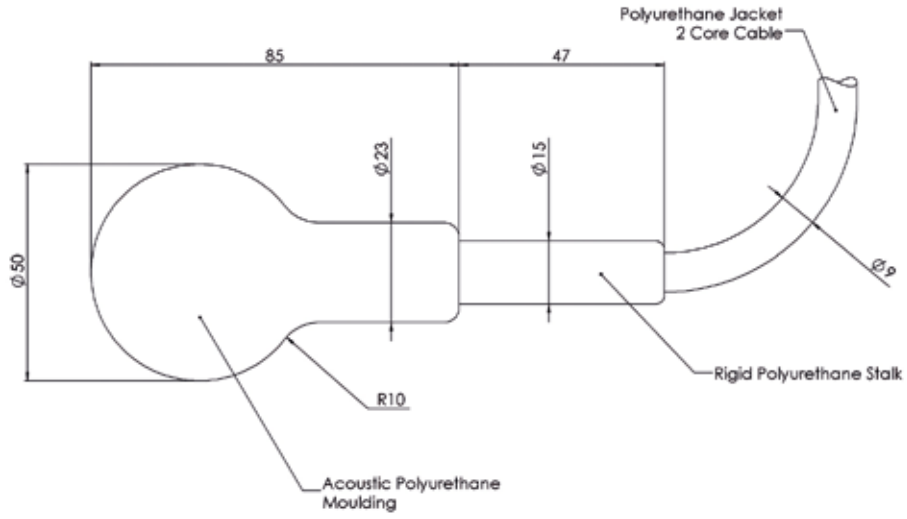




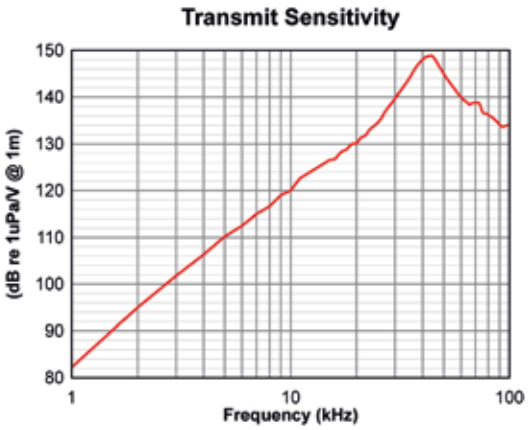
TECHNICAL SPECIFICATION

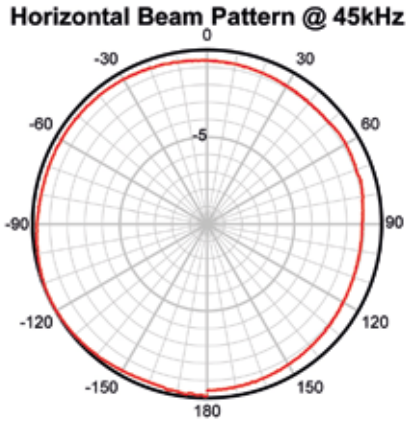
Resonant Frequency (Nominal)	45 kHz
Beam Pattern	Omni ± 2 dB up to 55 kHz
Receive Sensitivity	-194 dB re 1V/µPa
Transmit Sensitivity	148 dB re 1µPa/V @ 1m
Capacitance at 1 kHz (with 10m cable)	22,000 pF
Transmit Voltage (Max)	300 Vrms
Transmit Voltage / Duty Cycle (Max)	300 Vrms at 10% 90 Vrms at 100%

MODEL D/45



All dimensions in mm





MECHANICAL SPECIFICATION

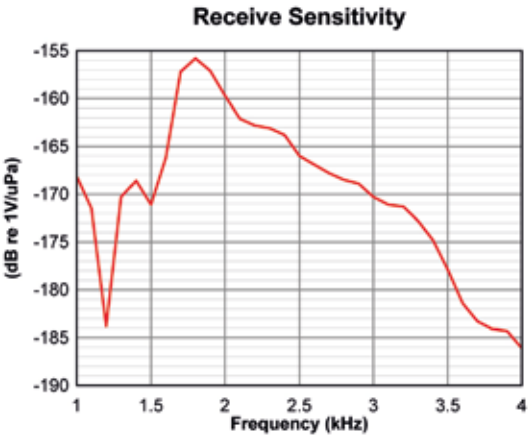
Operating Depth	2000m Standard (Optional 4000m – both may require an export license)
Weight Air / Water (with 10m cable)	1.1 kg / 0.4 kg
Operating Temperature	-5 to +40 °C
Storage Temperature	-40 to +80 °C
Cable Type	Ø9mm Polyurethane Jacket, Screened Twisted Pair
Cable Length	10 metres standard (Additional lengths supplied to order)
Connector	Not fitted as standard (Optional BNC or Customer Specific)

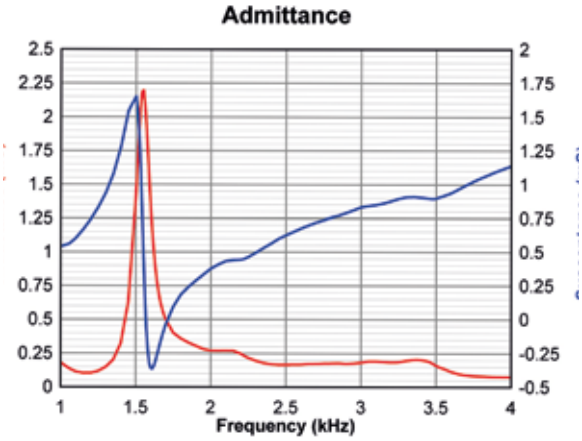
MODEL T161

- *1.6 KHZ FREE FLOODED RING*
- *BROADBAND*
- *HIGH POWER*
- *OMNI-DIRECTIONAL BEAM PATTERN*
- *UNLIMITED DEPTH*
- *LONG RANGE TRANSMISSION*

The T161 is one of a range of high power, low frequency transducers developed by Neptune Sonar. Based upon the standard Free Flooded Ring (FFR) concept, the transducer utilises the latest technology to achieve a highly efficient projector capable of operating down to full ocean depth.

The T161 is available with or without acoustic calibration which is traceable to National Standards.

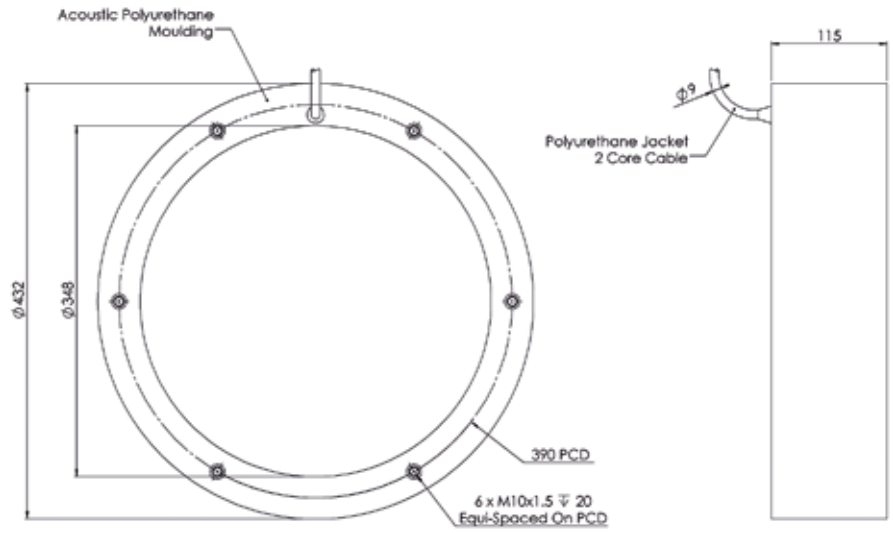




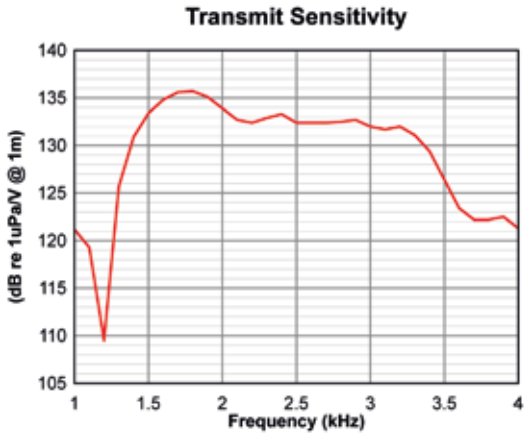
TECHNICAL SPECIFICATION

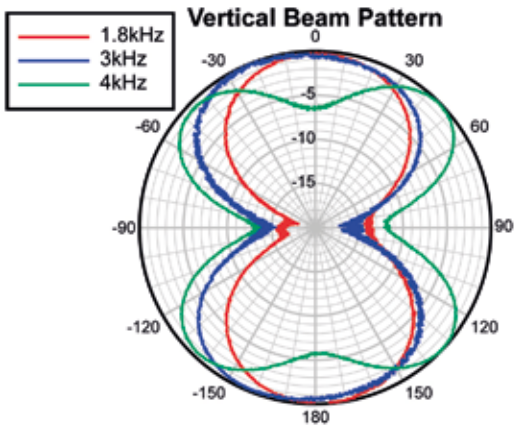
Resonant Frequency (Nominal)	1.6 kHz
Useful Operating Band	1.3 kHz to 4 kHz
Beam Pattern (Horizontal)	Omni ± 2 dB up to 4 kHz
Beam Pattern (Vertical)	Toroidal (See Graph)
Receive Sensitivity	-155 dB re 1V/µPa
Transmit Sensitivity	135 dB re 1µPa/V @ 1m
Capacitance at 1 kHz (with 10m cable)	88,000 pF
Transmit Voltage (Max)	1000 Vrms (Minimum 10m depth)
Transmit Voltage / Duty Cycle (Max)	1000 Vrms at 10% 320 Vrms at 100%

MODEL T161



All dimensions in mm





MECHANICAL SPECIFICATION

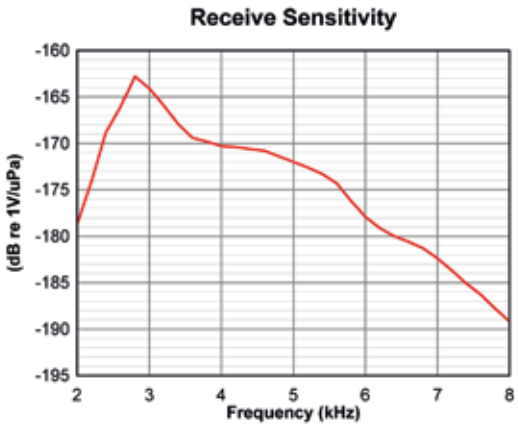
Operating Depth	Unlimited
Weight Air / Water (with 10m cable)	17.1 kg / 10.6 kg
Operating Temperature	-5 to +40 °C
Storage Temperature	-40 to +80 °C
Cable Type	Ø9mm Polyurethane Jacket, Screened Twisted Pair
Cable Length	10 metres standard (Additional lengths supplied to order)
Connector	Not fitted as standard (Optional BNC or Customer Specific)

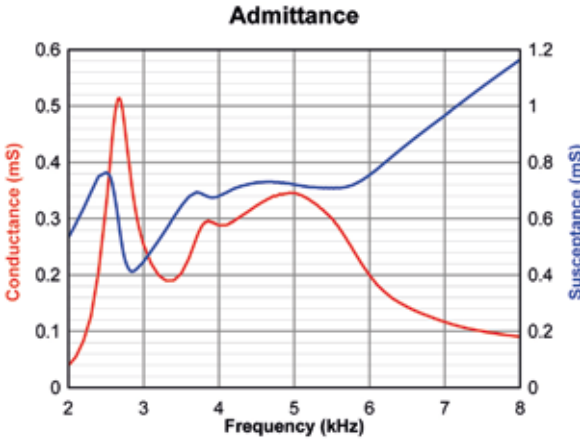
MODEL T160

- *2.8 KHZ FREE FLOODED RING*
- *BROADBAND*
- *HIGH POWER*
- *OMNI-DIRECTIONAL BEAM PATTERN*
- *UNLIMITED DEPTH*
- *LONG RANGE TRANSMISSION*

The T160 is one of a new range of high power, low frequency transducers recently developed by Neptune Sonar. Based upon the standard Free Flooded Ring (FFR) concept, the transducer utilises the latest technology to achieve a highly efficient projector capable of operating down to full ocean depth.

The T160 is available with or without acoustic calibration which is traceable to National Standards.

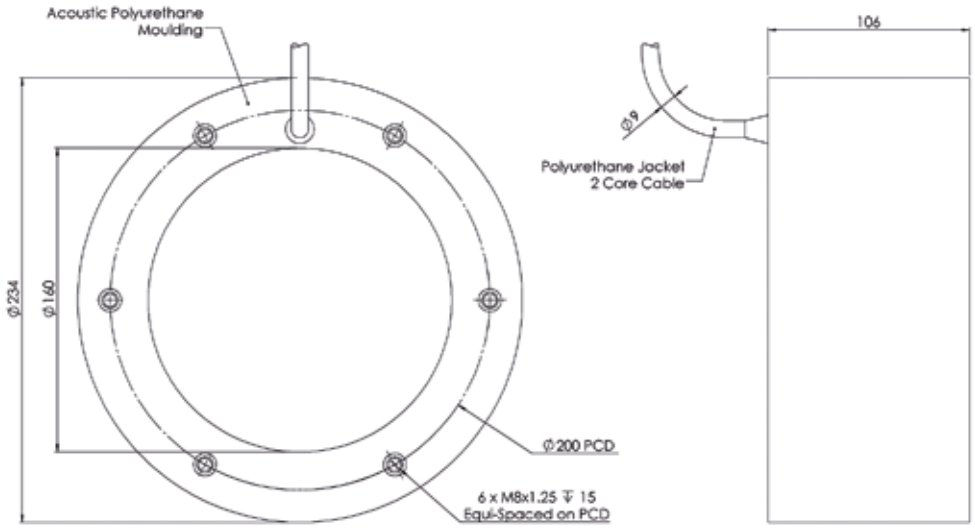




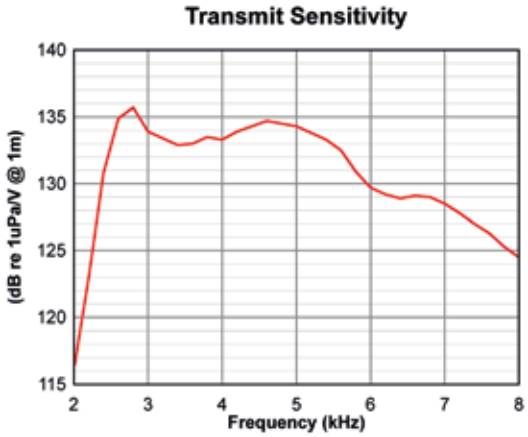
TECHNICAL SPECIFICATION

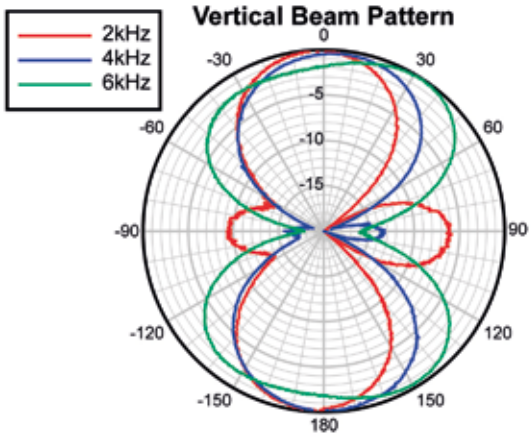
Resonant Frequency (Nominal)	2.8 kHz
Useful Operating Band	2.5 kHz to 6 kHz
Beam Pattern (Horizontal)	Omni ± 2 dB up to 6 kHz
Beam Pattern (Vertical)	Toroidal (See Graph)
Receive Sensitivity	-165 dB re 1V/µPa
Transmit Sensitivity	134 dB re 1µPa/V @ 1m
Capacitance at 1 kHz (with 10m cable)	38,000 pF
Transmit Voltage (Max)	750 Vrms (Minimum 10m depth)
Transmit Voltage / Duty Cycle (Max)	750 Vrms at 10% 250 Vrms at 100%

MODEL T160



All dimensions in mm





MECHANICAL SPECIFICATION

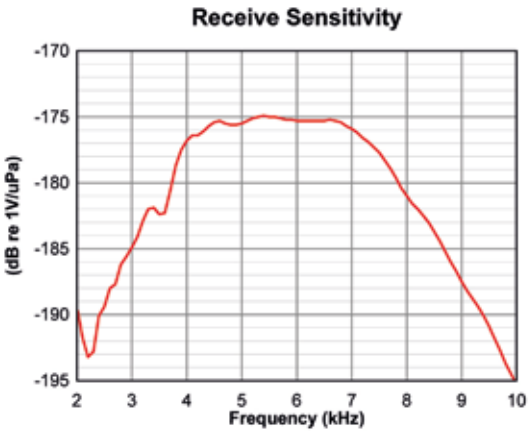
Operating Depth	Unlimited
Weight Air / Water (with 10m cable)	5.7 kg / 2.6 kg
Operating Temperature	-5 to +40 °C
Storage Temperature	-40 to +80 °C
Cable Type	Ø9mm Polyurethane Jacket, Screened Twisted Pair
Cable Length	10 metres standard (Additional lengths supplied to order)
Connector	Not fitted as standard (Optional BNC or Customer Specific)

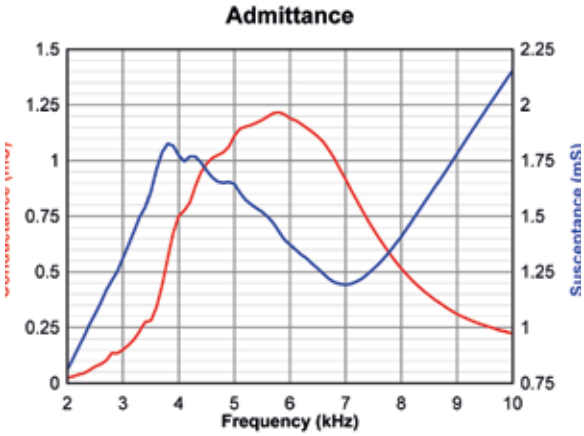
MODEL T170

- *6 KHZ FREE FLOODED RING*
- *BROADBAND*
- *HIGH POWER*
- *OMNI-DIRECTIONAL BEAM PATTERN*
- *UNLIMITED DEPTH*
- *LONG RANGE TRANSMISSION*

The T170 is one of a range of Free Flooded Ring transducers recently introduced by Neptune. Utilising the latest ceramic technology, the FFR concept is ideally suited for high power, broadband, low frequency sound generation. Another advantage of the design is its ability to operate down to full ocean depth at maximum efficiency.

The T170 is available with or without acoustic calibration which is traceable to National Standards.

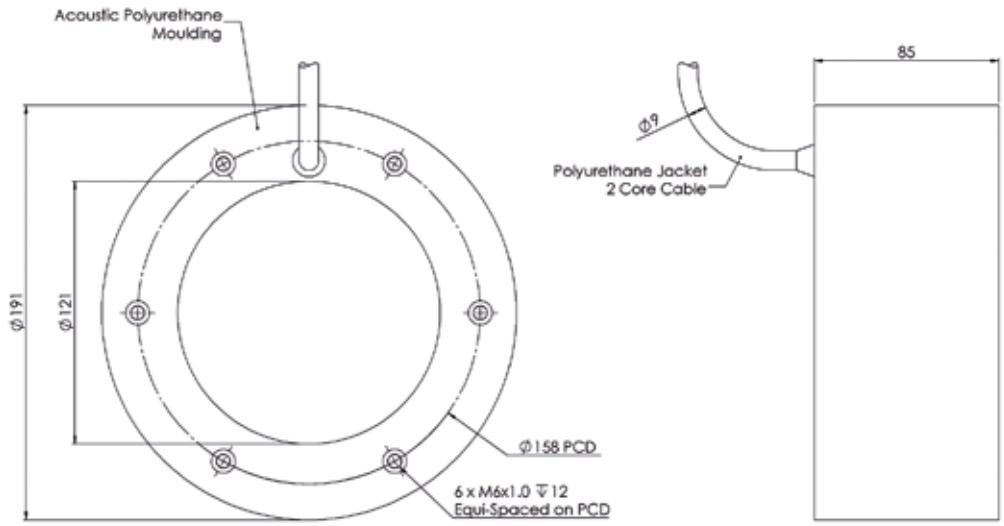




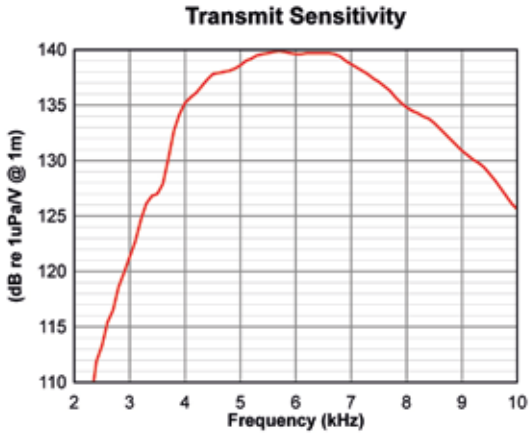
TECHNICAL SPECIFICATION

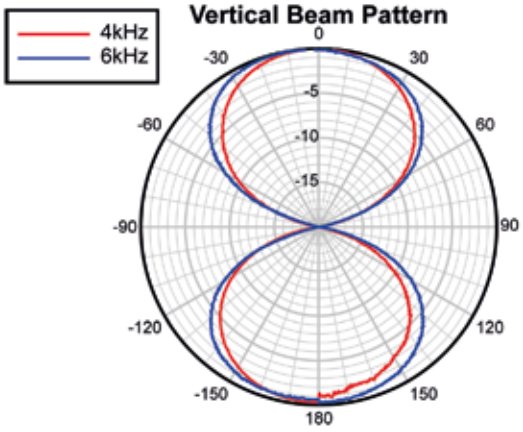
Resonant Frequency (Nominal)	6 kHz
Useful Operating Band	4 kHz to 8 kHz
Beam Pattern (Horizontal)	Omni ± 2 dB up to 8 kHz
Beam Pattern (Vertical)	Toroidal (See Graph)
Receive Sensitivity	-175 dB re 1V/µPa
Transmit Sensitivity	140 dB re 1µPa/V @ 1m
Capacitance at 1 kHz (with 10m cable)	68,000 pF
Transmit Voltage (Max)	750 Vrms (Minimum 10m depth)
Transmit Voltage / Duty Cycle (Max)	750 Vrms at 10% 250 Vrms at 100%

MODEL T170



All dimensions in mm





MECHANICAL SPECIFICATION

Operating Depth	Unlimited
Weight Air / Water (with 10m cable)	4.7 kg / 2.6 kg
Operating Temperature	-5 to +40 °C
Storage Temperature	-40 to +80 °C
Cable Type	Ø9mm Polyurethane Jacket, Screened Twisted Pair
Cable Length	10 metres standard (Additional lengths supplied to order)
Connector	Not fitted as standard (Optional BNC or Customer Specific)

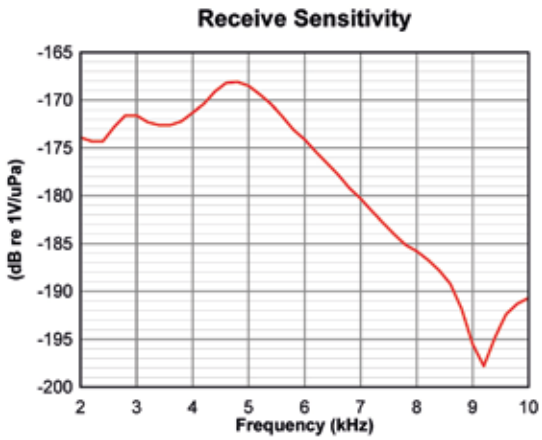
MODEL T335

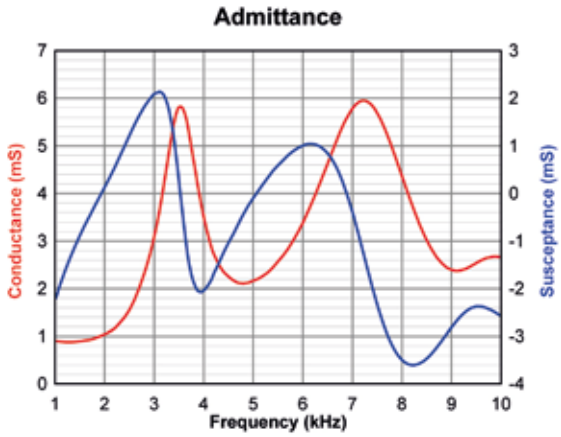
- *3.5 / 7.0 KHZ BROADBAND PROJECTOR*
- *HIGH POWER*
- *DIRECTIONAL BEAM PATTERN*
- *HIGH PERFORMANCE*
- *LONG RANGE TRANSMISSION*

The T335 is a single tonpilz transducer offering a high power, broadband performance. With a nominal operating frequency range from 3 kHz to 8 kHz transducers can be configured to form half lambda spaced arrays. The robust design is tolerant of both dynamic and static pressure making it particularly suitable for both commercial and military applications.

The T335 is fitted with a standard internal tuning network to achieve a broadband transmit response.

The T335 is available with or without acoustic calibration which is traceable to National Standards.

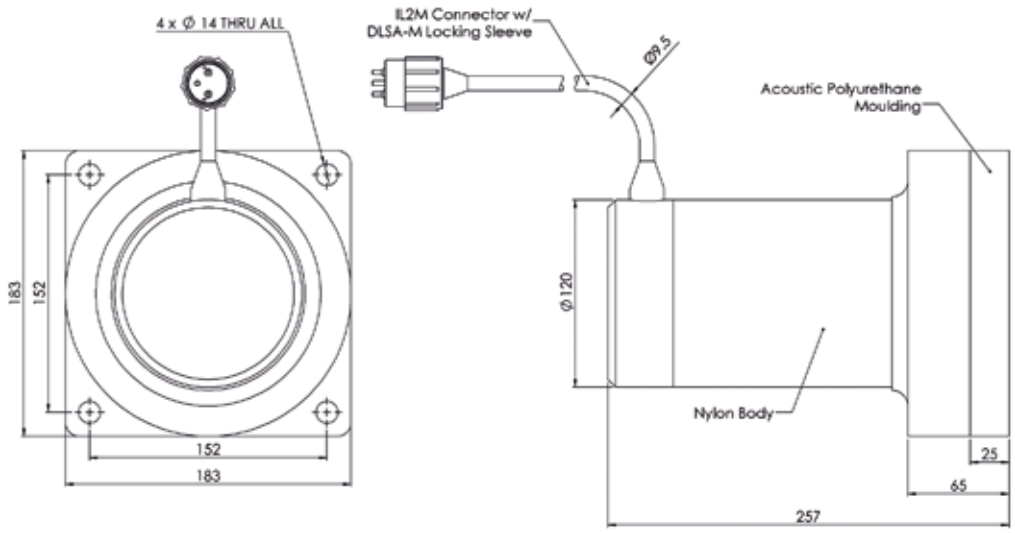




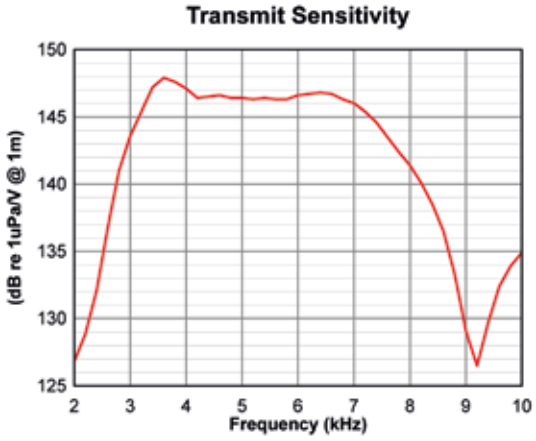
TECHNICAL SPECIFICATION

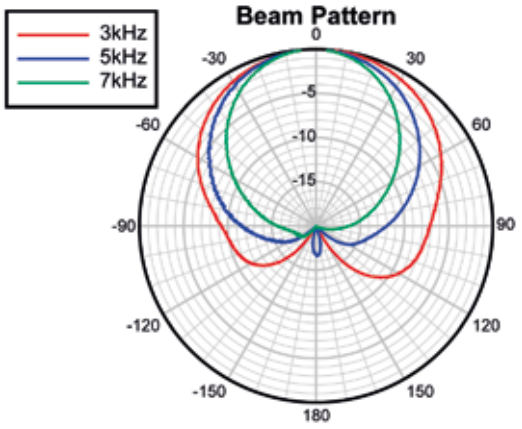
Resonant Frequency (Nominal)	3.5 / 7.0 kHz
Useful Operating Band	3 kHz to 8 kHz
Nominal Impedance	160 Ω
Beam Pattern	Conical (See Graph)
Receive Sensitivity	-168 dB re 1V/µPa
Transmit Sensitivity	146 dB re 1µPa/V @ 1m
Transmit Voltage (Max)	750 Vrms
Transmit Voltage / Duty Cycle (Max)	750 Vrms at 1% 400 Vrms at 10% 100 Vrms at 100%

MODEL T335



All dimensions in mm





MECHANICAL SPECIFICATION

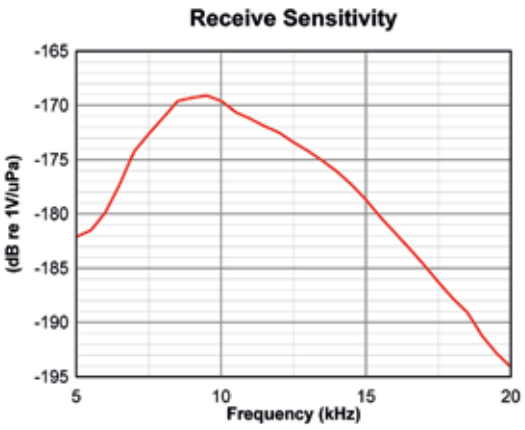
Operating Depth	600m
Weight Air / Water	11.4 kg / 6.7 kg
Operating Temperature	-5 to +40 °C
Storage Temperature	-40 to +80 °C
Cable Type	Ø9.5mm Chloroprene Rubber Twisted Pair (Optional Ø9mm Polyurethane, Screened Twisted Pair)
Cable Length	0.1m standard (Additional lengths supplied to order)
Connector	SubConn IL2M with DLSA-M Locking Sleeve
Extension Cable / Connector	Ø9mm Polyurethane, Screened Twisted Pair with SubConn IL2F with DLSA-F Locking Sleeve

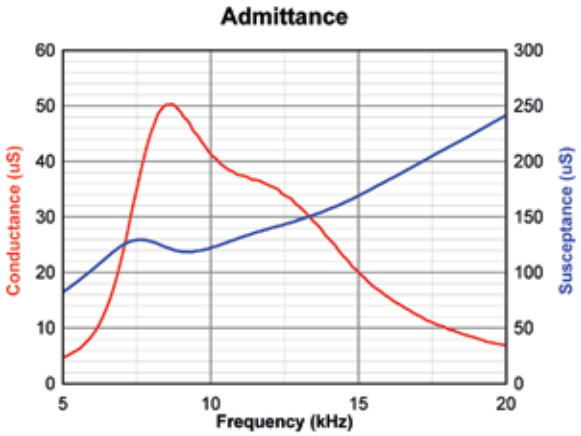
MODEL T406

- *9 KHZ FREE FLOODED RING*
- *BROADBAND*
- *HIGH POWER*
- *OMNI-DIRECTIONAL BEAM PATTERN*
- *UNLIMITED DEPTH*
- *LONG RANGE TRANSMISSION*

The T406 is one of a range of Free Flooded Ring transducers recently introduced by Neptune. Utilising the latest ceramic technology, the FFR concept is ideally suited for high power, broadband, low frequency sound generation. Another advantage of the design is its ability to operate down to full ocean depth at maximum efficiency.

The T406 is available with or without acoustic calibration which is traceable to National Standards.

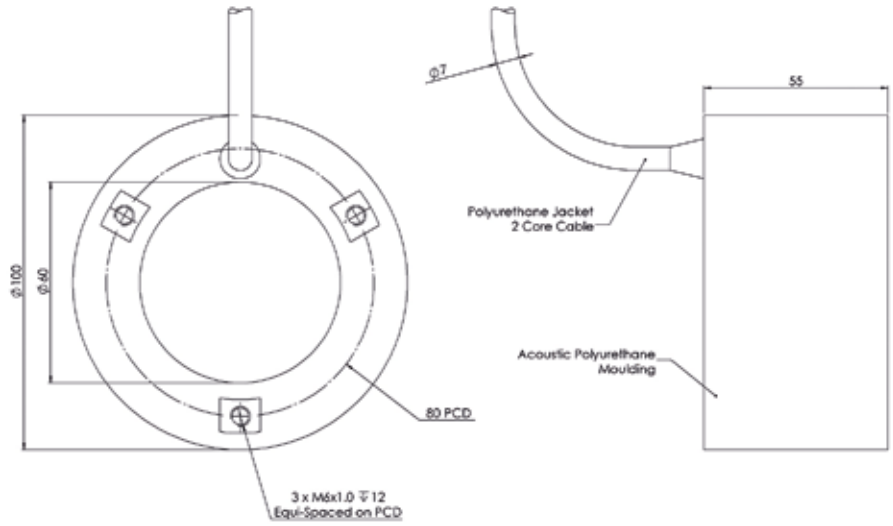




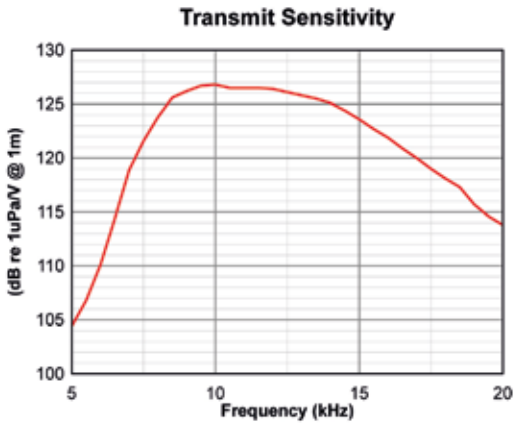
TECHNICAL SPECIFICATION

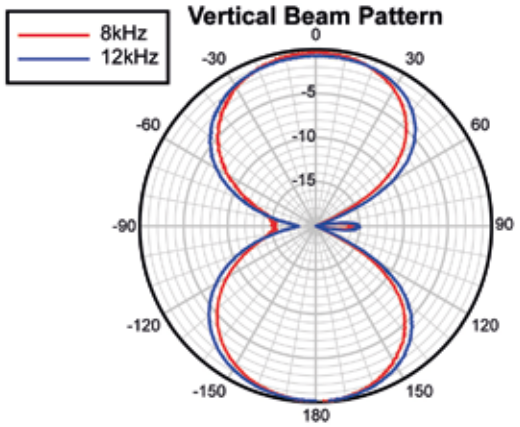
Resonant Frequency (Nominal)	9 kHz
Useful Operating Band	8 kHz to 15 kHz
Beam Pattern (Horizontal)	Omni ± 2 dB up to 12 kHz
Beam Pattern (Vertical)	Toroidal (See Graph)
Receive Sensitivity	-170 dB re 1V/µPa
Transmit Sensitivity	127 dB re 1µPa/V @ 1m
Capacitance at 1 kHz (with 10m cable)	2,400pF
Transmit Voltage (Max)	1500 Vrms (Minimum 20m depth)
Transmit Voltage / Duty Cycle (Max)	1500 Vrms at 10% 450 Vrms at 100%

MODEL T406



All dimensions in mm





MECHANICAL SPECIFICATION

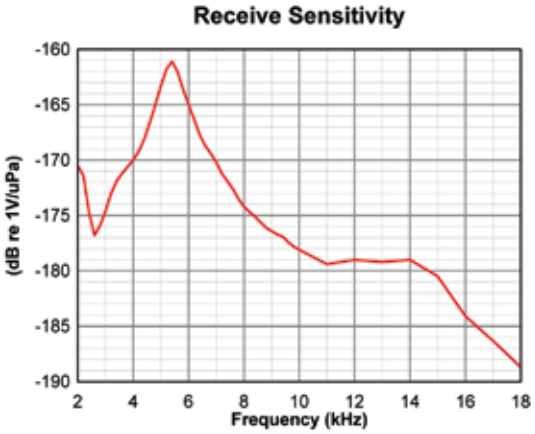
Operating Depth	Unlimited
Weight Air/Water (with 10m cable)	1.5 kg / 0.55 kg
Operating Temperature	-5 to +40 °C
Storage Temperature	-40 to +80 °C
Cable Type	Ø7mm Polyurethane Jacket, Screened Twisted Pair
Cable Length	10 metres standard (Additional lengths supplied to order)
Connector	Not fitted as standard (Optional Customer Specific)

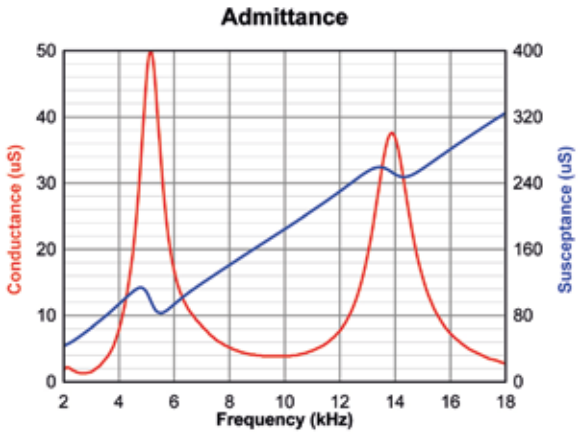
MODEL T420

- *5 KHZ BROADBAND PROJECTOR*
- *HIGH POWER*
- *DIRECTIONAL BEAM PATTERN*
- *HIGH PERFORMANCE*
- *LONG RANGE TRANSMISSION*

The T420 is a single tonpilz transducer offering a high power, broadband performance. With a nominal operating frequency range from 4.5 kHz to 14 kHz transducers can be configured to form half lambda spaced arrays. The robust design is tolerant of both dynamic and static pressure making it particularly suitable for both commercial and military applications.

The T420 is available with or without acoustic calibration which is traceable to National Standards.

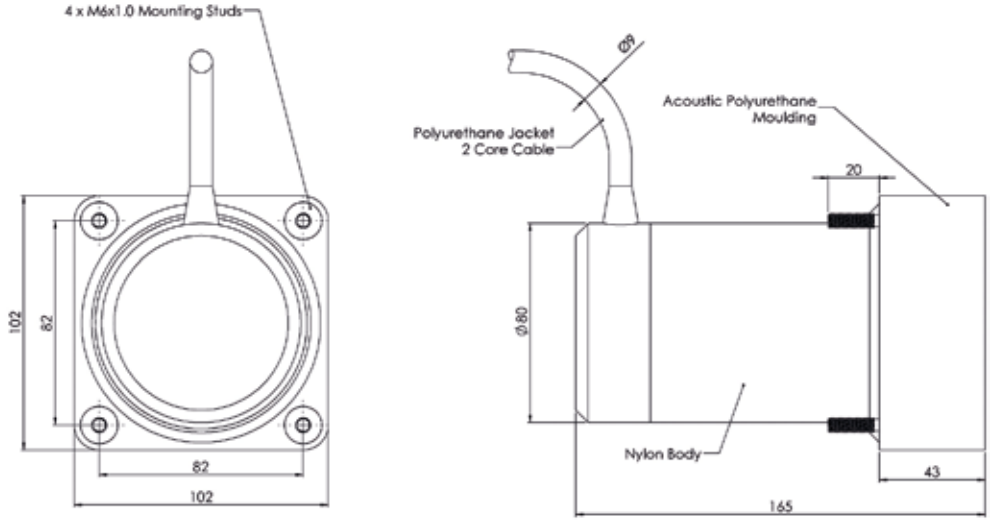




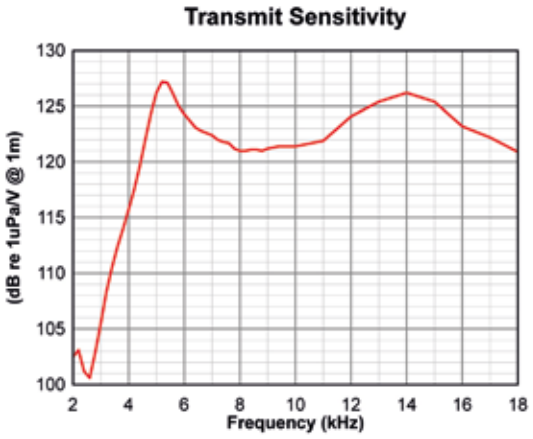
TECHNICAL SPECIFICATION

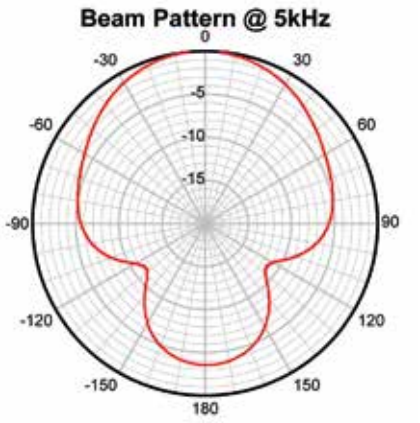
Resonant Frequency (Nominal)	5 kHz
Useful Operating Band	4.5 kHz to 14 kHz
Nominal Impedance	20 kΩ
Beam Pattern @-3dB	Conical (See Graph)
Receive Sensitivity	-163 dB re 1V/µPa
Transmit Sensitivity	126 dB re 1µPa/V @ 1m
Transmit Voltage (Max)	2,000 Vrms
Transmit Voltage / Duty Cycle (Max)	2000 Vrms at 10% 600 Vrms at 100%

MODEL T420



All dimensions in mm

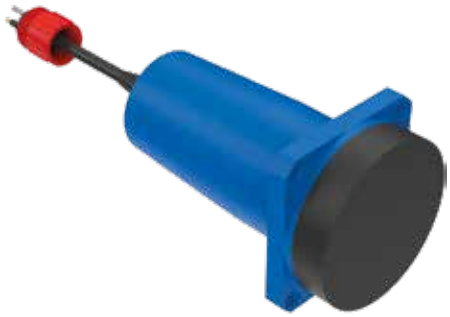




MECHANICAL SPECIFICATION

Operating Depth	600m
Weight Air/Water	3.8 kg / 2.1 kg
Operating Temperature	-5 to +40 °C
Storage Temperature	-40 to +80 °C
Cable Type	Ø9mm Polyurethane, Screened Twisted Pair
Cable Length	10m standard (Additional lengths supplied to order)
Connector	Not fitted

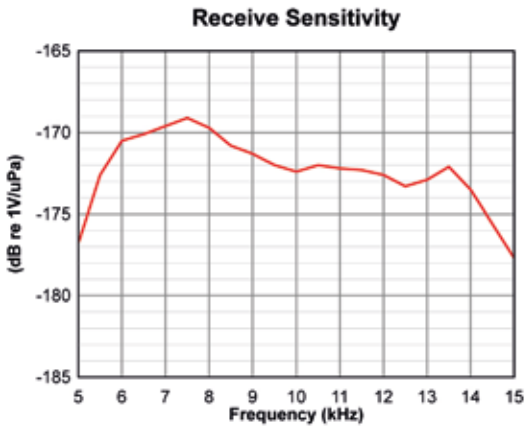
MODEL T444

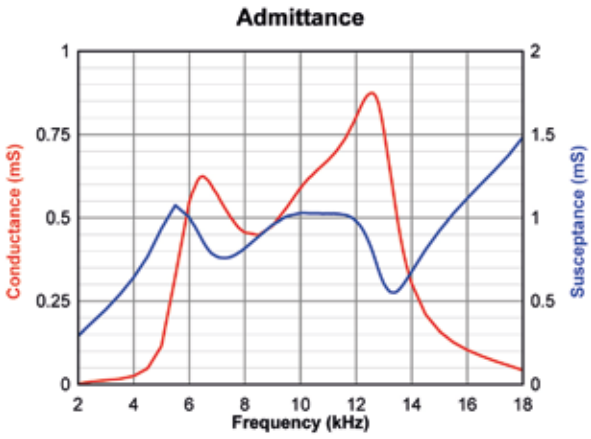


- ***6.5 KHZ BROADBAND PROJECTOR***
- ***HIGH POWER***
- ***DIRECTIONAL BEAM PATTERN***
- ***HIGH PERFORMANCE***
- ***LONG RANGE TRANSMISSION***

The T444 is a single tonpilz transducer offering a high power, broadband performance. With a nominal operating frequency range from 5.5 kHz to 14 kHz transducers can be configured to form half lambda spaced arrays. The robust design is tolerant of both dynamic and static pressure making it particularly suitable for both commercial and military applications.

The T444 is available with or without acoustic calibration which is traceable to National Standards.

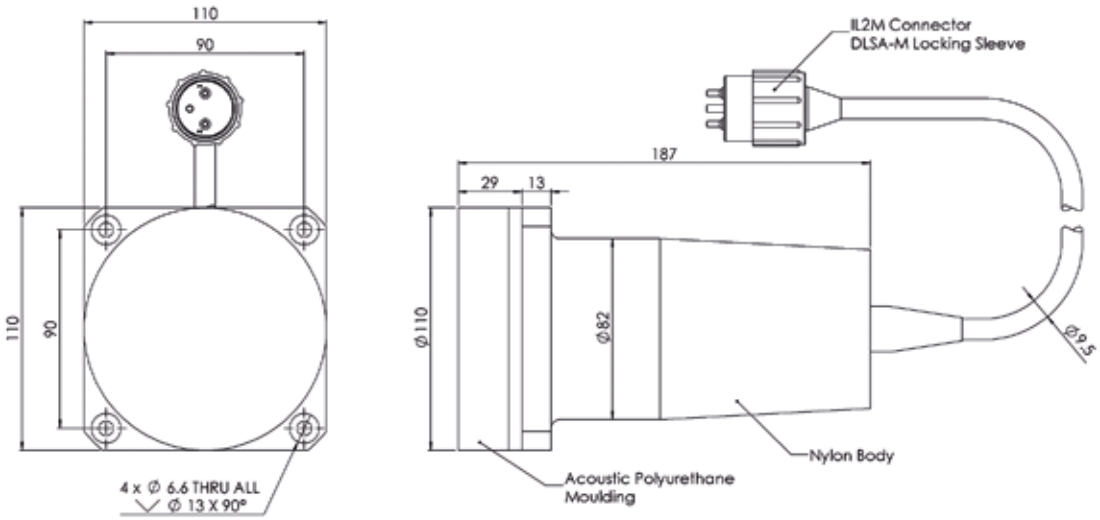




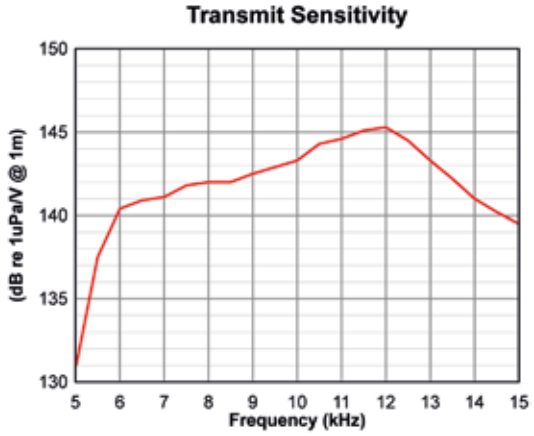
TECHNICAL SPECIFICATION

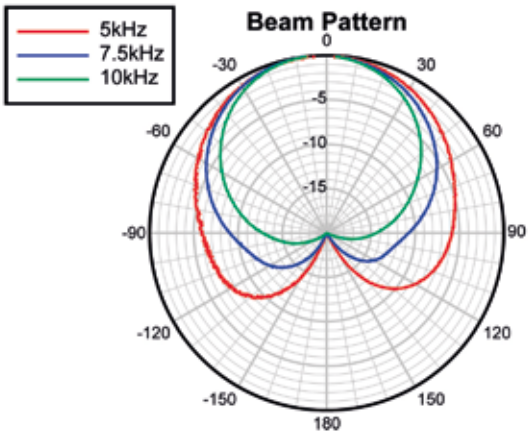
Resonant Frequency (Nominal)	6.5 kHz
Useful Operating Band	5.5 kHz to 14 kHz
Nominal Impedance	1500 Ω
Beam Pattern	Conical (See Graph)
Receive Sensitivity	170 dB re 1V/µPa
Transmit Sensitivity	143 dB re 1µPa/V @ 1m
Transmit Voltage (Max)	750 Vrms
Transmit Voltage / Duty Cycle (Max)	750 Vrms at 10% 350 Vrms at 100%

MODEL T444



All dimensions in mm





MECHANICAL SPECIFICATION

Operating Depth	600m
Weight Air / Water	2.8 kg / 1.6 kg
Operating Temperature	-5 to +40 °C
Storage Temperature	-40 to +80 °C
Cable Type	Ø9.5mm Chloroprene Rubber Twisted Pair (Optional Ø9mm Polyurethane, Screened Twisted Pair)
Cable Length	0.1m standard (Additional lengths supplied to order)
Connector	SubConn IL2M with DLSA-M Locking Sleeve
Extension Cable / Connector	Ø9mm Polyurethane, Screened Twisted Pair with SubConn IL2F with DLSA-F Locking Sleeve

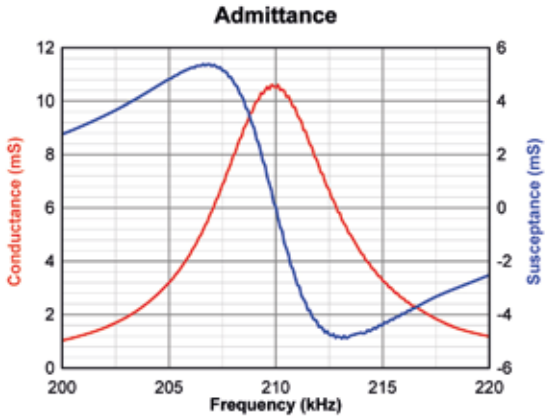
MODEL T141

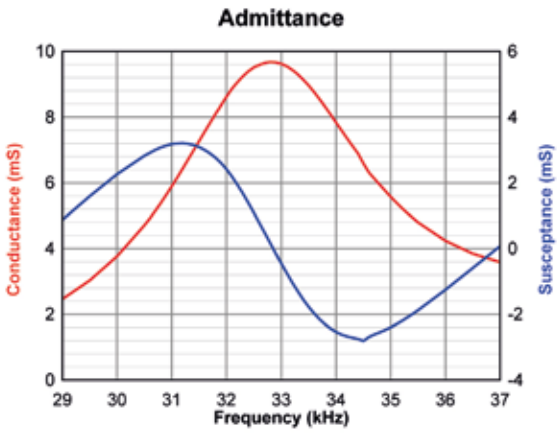
- ***DUAL FREQUENCY 33 & 210 KHZ***
- ***DUAL BEAM 210 KHZ***
- ***SHALLOW WATER SURVEYING***
- ***OVER-SIDE OR HULL MOUNTING***
- ***FULLY OVER-MOULDED***
- ***HIGH PERFORMANCE / LOW COST***

The T141 is both a dual frequency and dual beam transducer and is fully compatible with many OEM hydrographic echo-sounder systems. The over-moulded polyurethane housing provides a mechanically robust, corrosion free transducer for over-side or hull mounting.

The beam is selected by the supplied switch box, which contains the tuning transformers for both frequencies. Electrical connection to the transducer is by a multi-core screened cable.

The T141 is available with or without acoustic calibration which is traceable to National Standards.



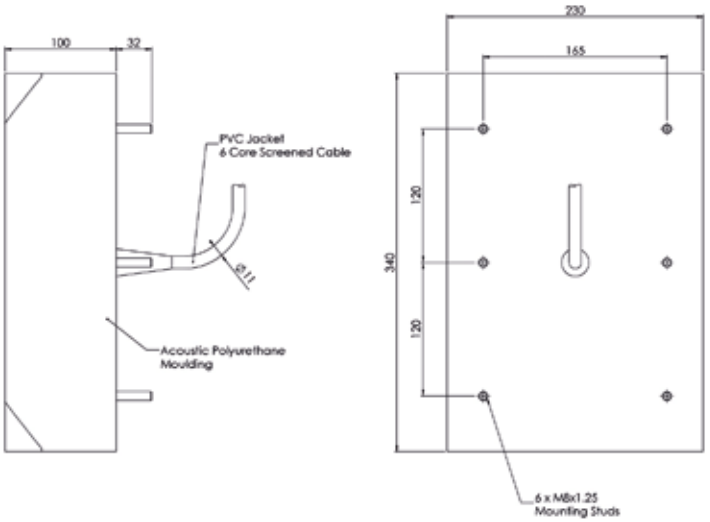


ACOUSTIC SPECIFICATION

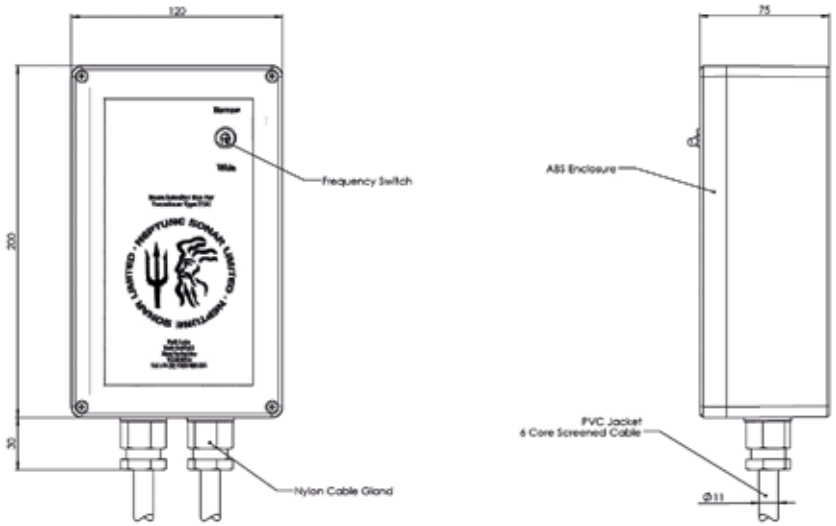
Frequency Options	33	210	210	kHz
Beam	**Single**	**Wide**	**Narrow**	**Selectable**
Beam Angle (-3dB)	22	8	2	Degrees
Transmit Sensitivity	166	173	178	dB re 1µPa/V @ 1m
Receive Sensitivity	-178	-187	-183	dB re 1V/µPa
Bandwidth	4	7.5	8	kHz
Transmit Voltage / Duty Cycle (Max)	325	300	400	Vrms at 10%
Nominal Impedance	100	100	100	Ohms

Transducer impedance can be adjusted to suit customers specification

MODEL T141



All dimensions in mm

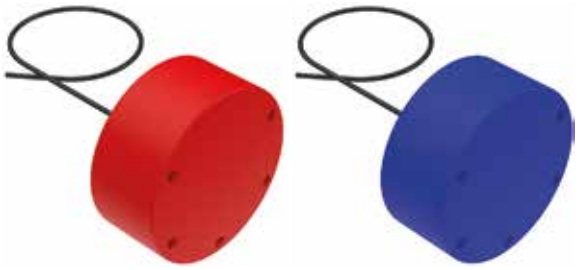


All dimensions in mm

MECHANICAL SPECIFICATION

Operating Depth	300m Standard
Weight Air/Water (with 10m cable)	12.3 kg / 3.6 kg
Operating Temperature	-5 to +40 °C
Storage Temperature	-40 to +80 °C
Cable Type	Ø11mm Polyvinyl Chloride Jacket, Screened 6 Core
Cable Length	10 metres standard (Additional lengths supplied to order)
Connector	Not fitted as standard (Optional Customer Specific)
Optional	Beam Selection Switch Box

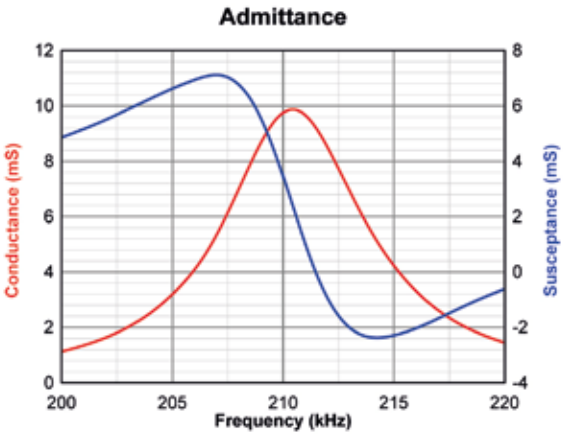
MODEL T196 & T197

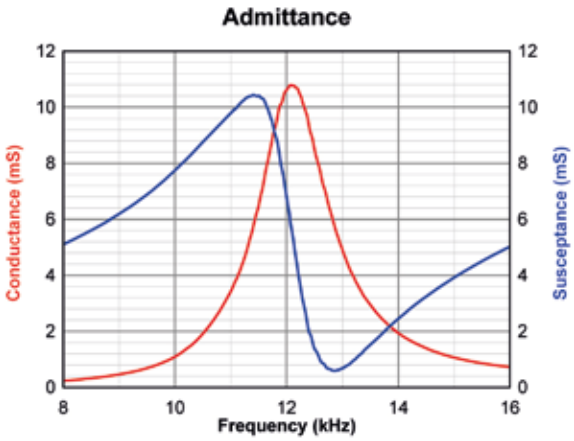


- ***DUAL FREQUENCY***
- ***NAVIGATION & SURVEYING***
- ***LOW SIDE LOBES***
- ***LONG RANGE ECHO SOUNDER***
- ***TOWED BODY CAPABILITY***
- ***FULLY OVER-MOULDED***

The T196 & T197 are both high performance, dual frequency transducers offering a versatile sounding system with high resolution and excellent range performance. The design features both high and low frequencies combined within a single over-moulded housing. Allowing a hydrographer the flexibility to select a system to meet the desired survey requirements of resolution, range, silt penetration and beam pattern. The over-moulded polyurethane housing provides a mechanically robust, corrosion free transducer for hull or over-side mounting.

The T196/T197 is available with or without acoustic calibration which is traceable to National Standards.



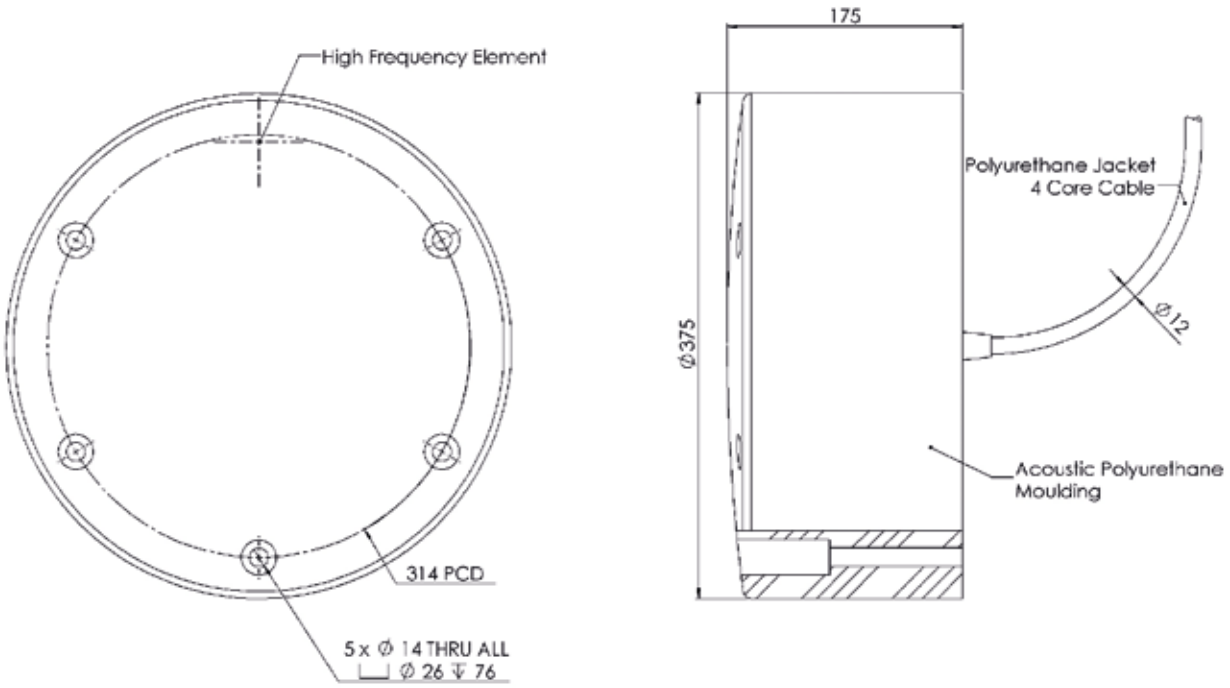


ACOUSTIC SPECIFICATION

Model Number	T196		T197		
Frequency Options	**12**	**210**	**12**	**200**	**kHz**
Beam Angle (-3dB)	20	7.5	20	8	Degrees Conical
Transmit Sensitivity	167	174	167	175	dB re 1µPa/V @ 1m
Receive Sensitivity	-173	-187	-173	-186	dB re 1V/µPa
Bandwidth	1.5	28	1.5	20	kHz
Nominal Impedance	100	100	100	100	Ohms
Transmit Voltage / Duty Cycle (Max)	750	175	750	175	Vrms at 10%

Transducer impedance can be adjusted to suit customers specification

MODEL T196 & T197



All dimensions in mm

MECHANICAL SPECIFICATION

Operating Depth	300m Standard
Weight Air/Water including 10m cable	33.6 kg / 14 kg
Operating Temperature	-5 to +40 °C
Storage Temperature	-40 to +80 °C
Cable Type	Ø12mm Polyurethane Jacket, Screened 4 Core
Cable Length	10 metres standard (Additional lengths supplied to order)
Connector	Not fitted as standard (Optional Customer Specific)

MODEL 76 SERIES

- ***DUAL FREQUENCY***
- ***30 LF / HF COMBINATIONS***
- ***FISHING, NAVIGATION & SURVEYING***
- ***HULL MOUNTING***
- ***LOW SIDE-LOBES***
- ***ROBUST NYLON HOUSING***

The 76 SERIES over-side mounted dual frequency transducers, combining both high and low frequency sections in a single unit. The ability to specify any combination of frequencies in the same basic unit provides the echo sounder manufacturer and hydrographer with a versatile sounding system combining high resolution with good range performance.

The high impact strength nylon body provides a mechanically robust and corrosion free transducer.

The 76 SERIES is available with or without acoustic calibration which is traceable to National Standards.

ACOUSTIC SPECIFICATION - LOW FREQUENCY SECTION

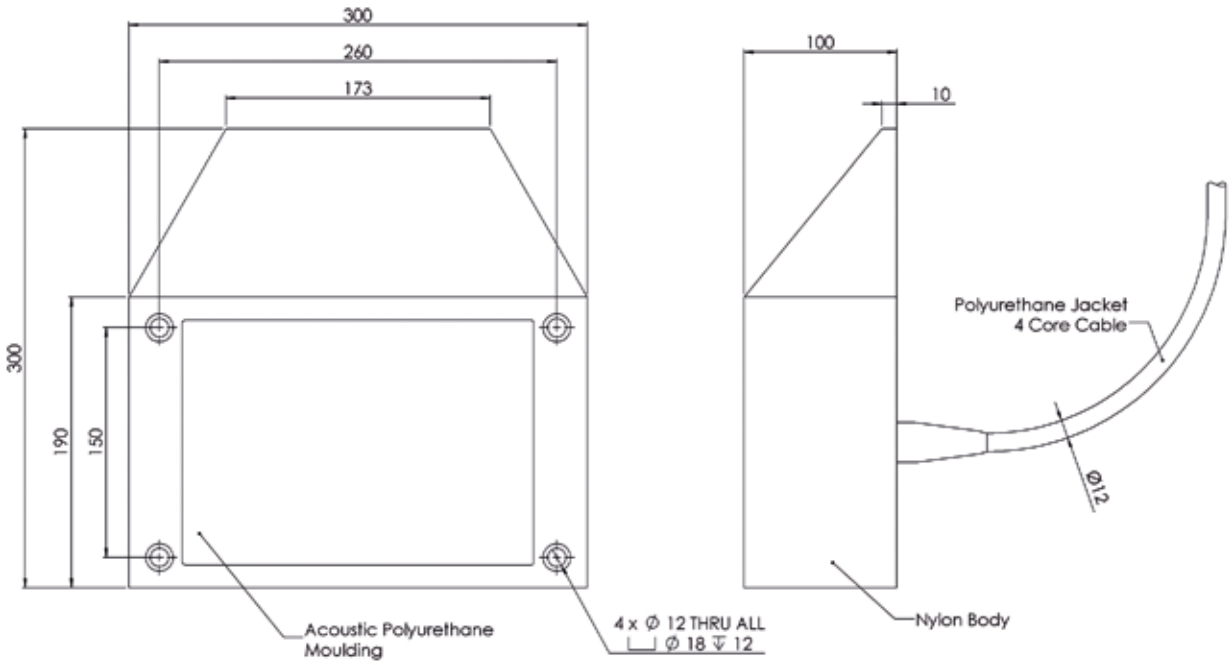
Frequency Options	24	28	30	33	38	50	kHz
Beam Angle (-3dB)	23	19	18	16.5	14	11	Degrees Conical
Transmit Sensitivity	167	168	168	167	166	171	dB re 1µPa/V @ 1m
Receive Sensitivity	-173	-173	-175	-175	-176	-178	dB re 1V/µPa
Transmit Voltage / Duty Cycle (Max)	300	300	325	325	325	300	Vrms at 10%
Bandwidth	2.5	2.8	3.0	3.5	3.5	6.0	kHz
Nominal Impedance	75	75	100	100	100	75	Ohms

ACOUSTIC SPECIFICATION - HIGH FREQUENCY SECTION

Frequency Options	160	200	210	300	600	-	kHz
Beam Angle (-3dB)	12	8	7.5	7	5	-	Degrees Conical
Transmit Sensitivity	173	170	170	172	172	-	dB re 1µPa/V @ 1m
Receive Sensitivity	-191	-193	-193	-193	-193	-	dB re 1V/µPa
Transmit Voltage / Duty Cycle (Max)	150	150	175	150	150	-	Vrms at 10%
Bandwidth	24	15	15	45	90	-	kHz
Nominal Impedance	70	70	100	75	75	-	Ohms

Transducer impedance can be adjusted to suit customers specification

MODEL 76 SERIES

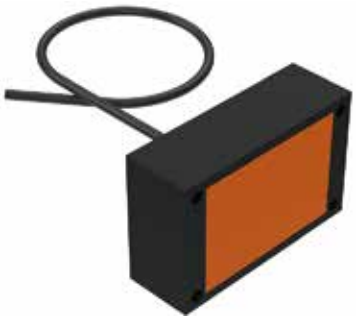


All dimensions in mm

MECHANICAL SPECIFICATION

Operating Depth	300m Standard
Weight Air/Water including 10m cable	12.5 kg / 4.2 kg
Operating Temperature	-5 to +40 °C
Storage Temperature	-40 to +80 °C
Cable Type	Ø12mm Polyurethane Jacket, Screened 4 Core
Cable Length	10 metres standard (Additional lengths supplied to order)
Connector	Not fitted as standard (Optional Customer Specific)

MODEL 77 SERIES



- ***DUAL FREQUENCY***
- ***30 LF / HF COMBINATIONS***
- ***FISHING, NAVIGATION & SURVEYING***
- ***HULL MOUNTING***
- ***LOW SIDE-LOBES***
- ***ROBUST NYLON HOUSING***

The 77 SERIES hull-mounted dual frequency transducers offers both high and low frequency sections combined in a single unit. The ability to specify a wide combination of frequencies in the same basic unit provides the echo sounder manufacturer and hydrographer with the flexibility to select a system to meet the desired survey requirements of resolution, range, silt penetration and beam pattern. The high impact strength nylon body provides a mechanically robust and corrosion free transducer.

The 77 SERIES is available with or without acoustic calibration which is traceable to National Standards.

ACOUSTIC SPECIFICATION - LOW FREQUENCY SECTION

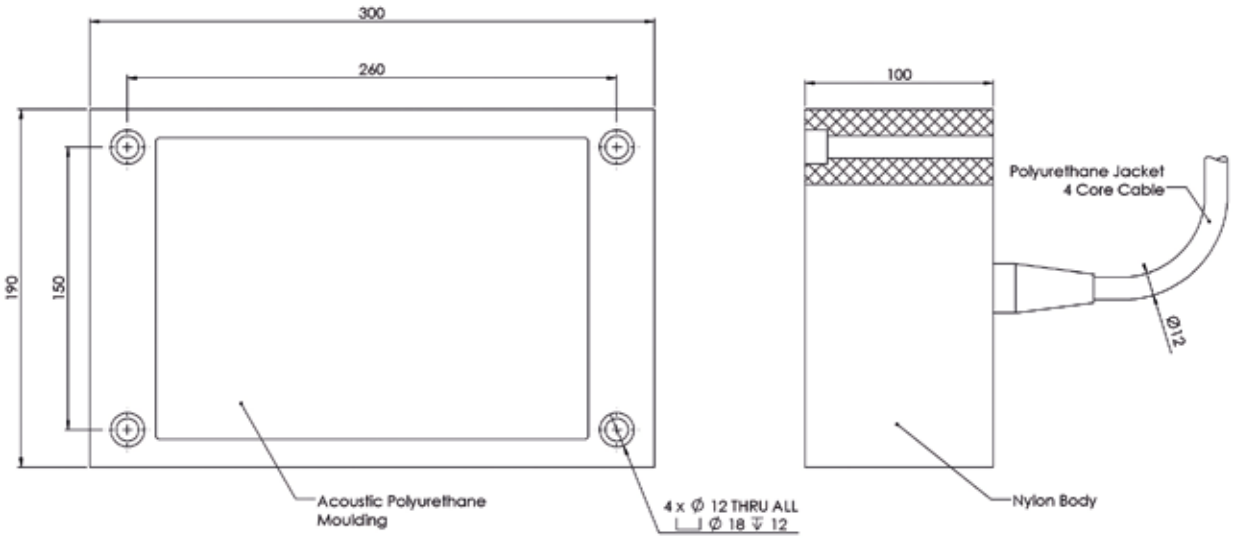
Frequency Options	24	28	30	33	38	50	kHz
Beam Angle (-3dB)	23	19	18	16.5	14	11	Degrees Conical
Transmit Sensitivity	167	168	168	168	166	171	dB re 1µPa/V @ 1m
Receive Sensitivity	-173	-173	-175	-175	-176	-178	dB re 1V/µPa
Transmit Voltage / Duty Cycle (Max)	300	300	325	325	325	300	Vrms at 10%
Bandwidth	2.5	2.8	3.0	3.5	3.5	6.0	kHz
Nominal Impedance	75	75	100	100	100	75	Ohms

ACOUSTIC SPECIFICATION - HIGH FREQUENCY SECTION

Frequency Options	160	200	210	300	600	-	kHz
Beam Angle (-3dB)	12	8	7.5	7	5	-	Degrees Conical
Transmit Sensitivity	173	170	170	172	172	-	dB re 1µPa/V @ 1m
Receive Sensitivity	-191	-193	-193	-193	-193	-	dB re 1V/µPa
Transmit Voltage / Duty Cycle (Max)	150	150	175	150	150	-	Vrms at 10%
Bandwidth	24	15	15	45	90	-	kHz
Nominal Impedance	70	70	100	75	75	-	Ohms

Transducer impedance can be adjusted to suit customers specification

MODEL 77 SERIES



All dimensions in mm

MECHANICAL SPECIFICATION

Operating Depth	300m Standard
Weight Air/Water including 10m cable	10.4 kg / 3.6 kg
Operating Temperature	-5 to +40 °C
Storage Temperature	-40 to +80 °C
Cable Type	Ø12mm Polyurethane Jacket, Screened 4 Core
Cable Length	10 metres standard (Additional lengths supplied to order)
Connector	Not fitted as standard (Optional Customer Specific)

MODEL 340 SERIES

- ***DUAL FREQUENCY TRANSDUCER***
- ***30 LF / HF COMBINATIONS***
- ***HULL OR OVER-SIDE MOUNTING***
- ***FULLY OVER-MOULDED***
- ***FISHING, NAVIGATION & SURVEY***
- ***LOW COST***

The 340 SERIES is a high performance over-moulded, dual frequency transducer featuring both high and low frequency sections combined in a single unit. Compatible with a wide range of echo-sounders the piston elements are configured to achieve optimum echo-sounder performance. The ability to specify a wide combination of frequencies in the same basic unit, provides the echo sounder manufacturer and operator with the flexibility to configure a system and beam pattern to match the desired survey requirements of resolution, range and silt penetration. The polyurethane housing provides a mechanically robust, corrosion free transducer, suitable for hull or over-side mounting.

The 340 SERIES is available with or without acoustic calibration which is traceable to National Standards.

ACOUSTIC SPECIFICATION - LOW FREQUENCY SECTION

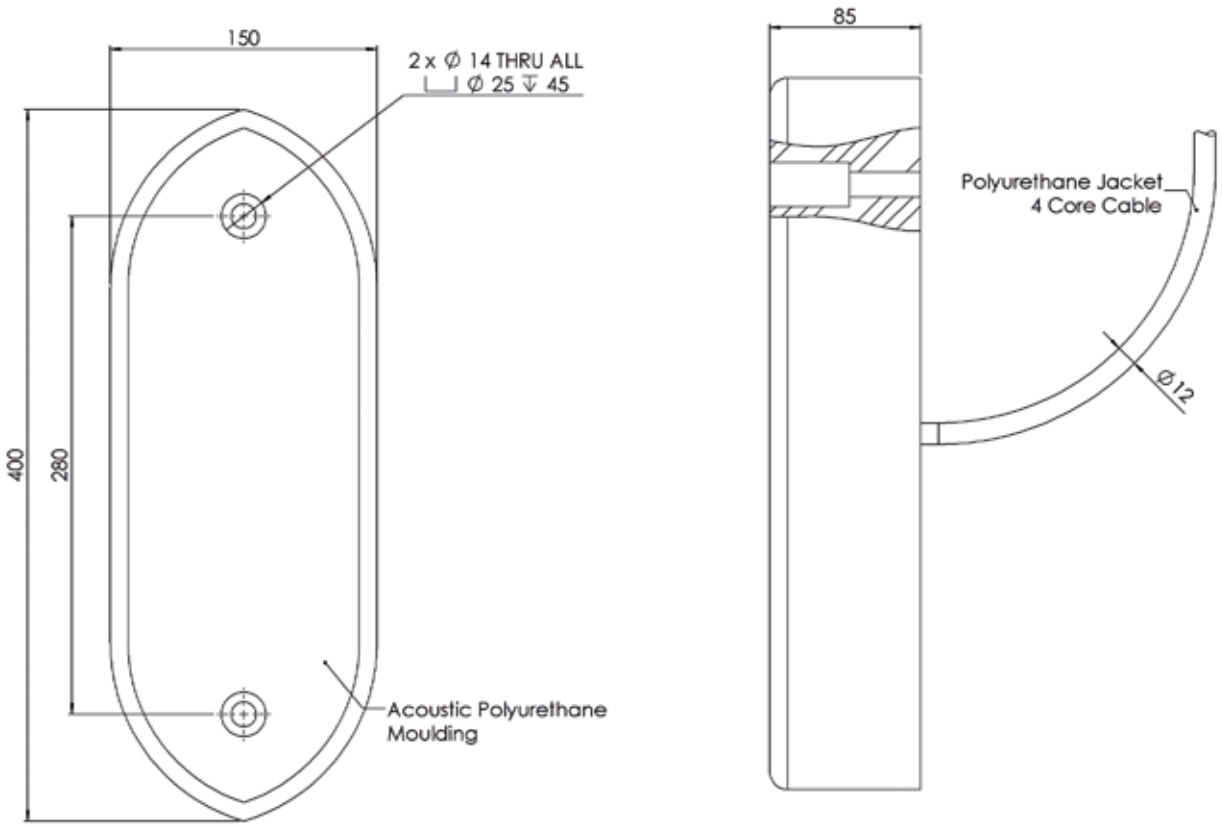
Frequency Options	24	28	30	33	38	50	kHz
Beam Angle (-3dB)	23x34	19x30	18x27	16.5x25	14x22	16x16	Degrees Conical
Transmit Sensitivity	167	168	168	168	166	171	dB re 1µPa/V @ 1m
Receive Sensitivity	-173	-173	-175	-175	-176	-178	dB re 1V/µPa
Transmit Voltage / Duty Cycle (Max)	300	300	325	325	325	300	Vrms at 10%
Bandwidth	2.5	2.8	3.0	3.5	3.5	6.0	kHz
Nominal Impedance	75	75	100	100	100	75	Ohms

ACOUSTIC SPECIFICATION - HIGH FREQUENCY SECTION

Frequency Options	160	200	210	300	600	-	kHz
Beam Angle (-3dB)	12	8	7.5	7	5	-	Degrees Conical
Transmit Sensitivity	173	170	170	172	172	-	dB re 1µPa/V @ 1m
Receive Sensitivity	-191	-193	-193	-193	-193	-	dB re 1V/µPa
Transmit Voltage / Duty Cycle (Max)	150	150	175	150	150	-	Vrms at 10%
Bandwidth	24	15	15	45	90	-	kHz
Nominal Impedance	70	70	100	75	75	-	Ohms

Transducer impedance can be adjusted to suit customers specification

MODEL 340 SERIES



All dimensions in mm

MECHANICAL SPECIFICATION

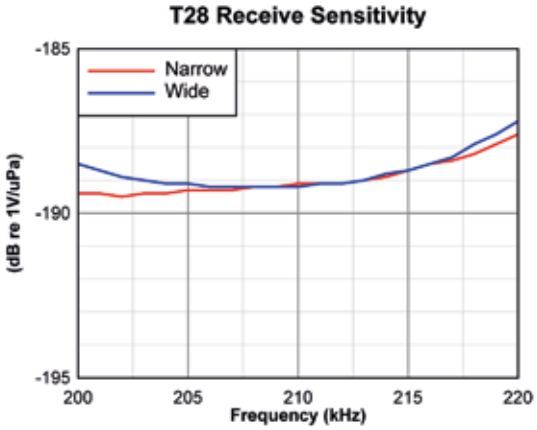
Operating Depth	300m Standard
Weight Air/Water including 10m cable	6.4 kg / 1.1 kg
Operating Temperature	-5 to +40 °C
Storage Temperature	-40 to +80 °C
Cable Type	Ø12mm Polyurethane Jacket, Screened 4 Core
Cable Length	10 metres standard (Additional lengths supplied to order)
Connector	Not fitted as standard (Optional Customer Specific)

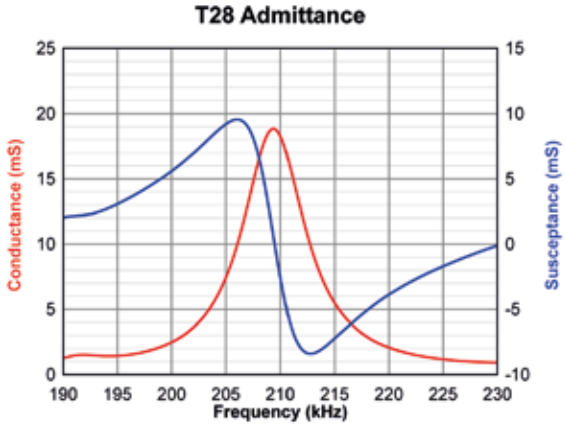
MODEL T28 & T37

- *210 OR 200 KHZ DUAL BEAM*
- *NAVIGATION, FISHING & SURVEYING*
- *HIGH PERFORMANCE*
- *SCIENTIFIC ECHO SOUNDER*
- *HULL OR TOWED BODY*
- *ROBUST NYLON HOUSING*

The T28 and T37 are precision echo sounder transducers designed for use in hydrographic or scientific applications where accurately defined beam patterns are needed. The pattern is configured to achieve conical beams both for wide and narrow beam widths and are switched using a beam selection switch box which can be supplied separately.

The T28 and T37 is available with or without acoustic calibration which is traceable to National Standards.



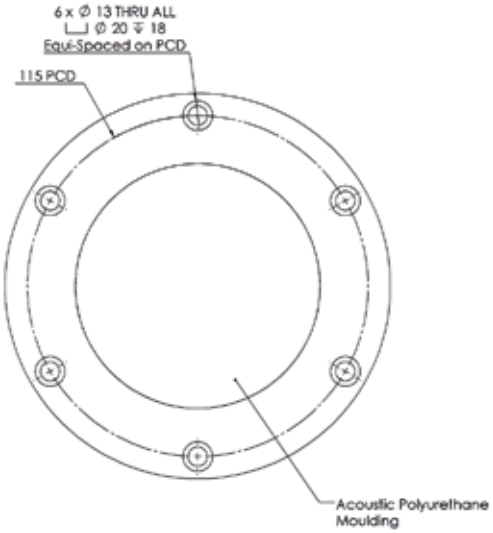


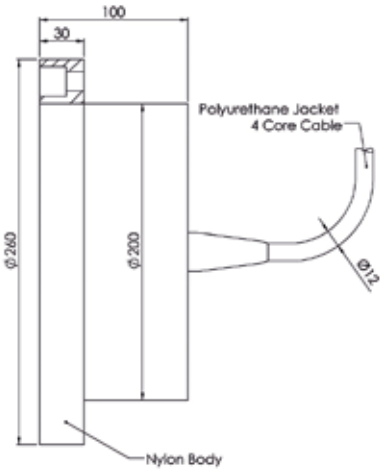
ACOUSTIC SPECIFICATION

Model Number	T28		T37		
Resonant Frequency	210		200		kHz
Beam Width	Wide	Narrow	Wide	Narrow	Selectable
Horizontal Beam (-3dB)	5.7	2.9	6.0	3.1	Degrees Conical
Transmit Sensitivity	177	178	177	178	dB re 1µPa/V @ 1m
Receive Sensitivity	-188	-188	-188	-188	dB re 1V/µPa
Transmit Voltage / Duty Cycle (Max)	300	400	300	400	Vrms at 10%
Bandwidth	10	10	10	10	kHz
Nominal Impedance	50	50	50	50	Ohms

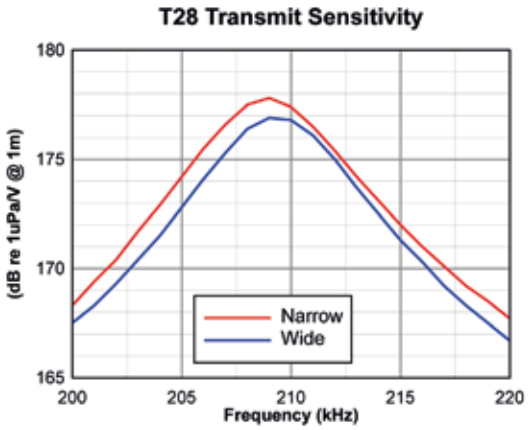
Transducer impedance can be adjusted to suit customers specification

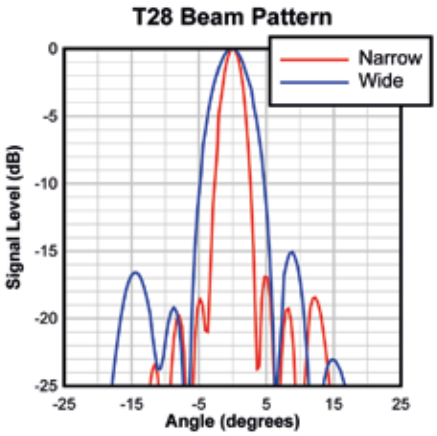
MODEL T28 & T37





All dimensions in mm





MECHANICAL SPECIFICATION

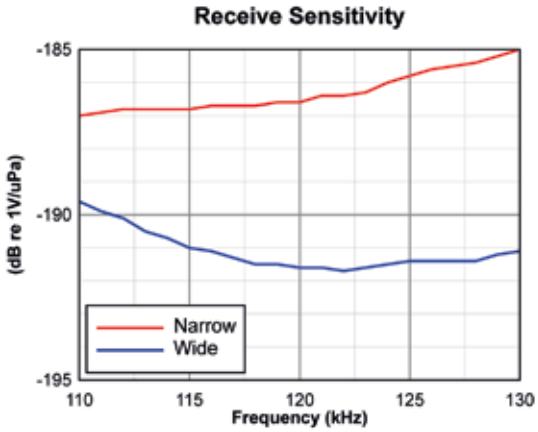
Operating Depth	300m Standard
Weight Air/Water including 10m cable	6.1 kg / 1.2 kg
Operating Temperature	-5 to +40 °C
Storage Temperature	-40 to +80 °C
Cable Type	Ø12mm Polyurethane Jacket, Screened 4 Core
Cable Length	10 metres standard (Additional lengths supplied to order)
Connector	Not fitted as standard (Optional Customer Specific)
Optional	Beam Selection Switch Box

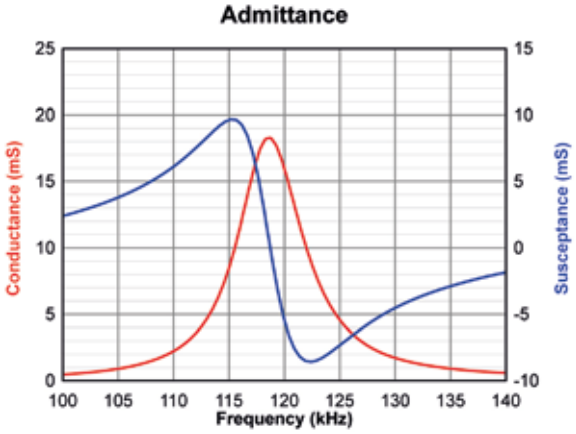
MODEL T38

- *120 KHZ DUAL BEAM*
- *NAVIGATION, FISHING & SURVEYING*
- *HIGH PERFORMANCE*
- *SCIENTIFIC ECHO SOUNDER*
- *HULL OR TOWED BODY*
- *ROBUST NYLON HOUSING*

The Type T38 is a precision echo sounder transducer designed for use in hydrographic or scientific applications where an accurately defined, narrow beam pattern is required. Operating at 120 kHz the multi-element array is configured to achieve two, highly directional, conical beam patterns with low side lobe levels. The transducer enables the beams to be switched between wide and narrow using a beam selection box which can be supplied separately.

The T38 is available with or without acoustic calibration which is traceable to National Standards.



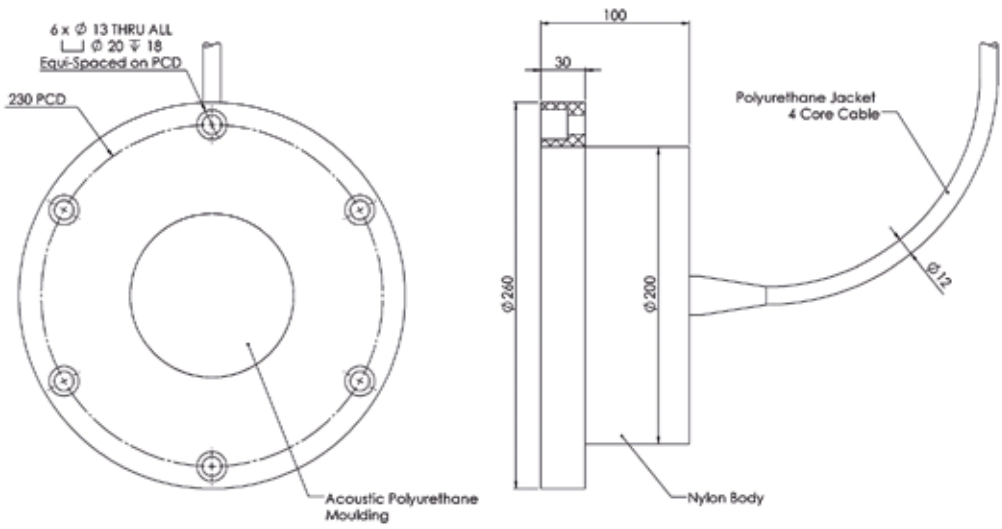


ACOUSTIC SPECIFICATION

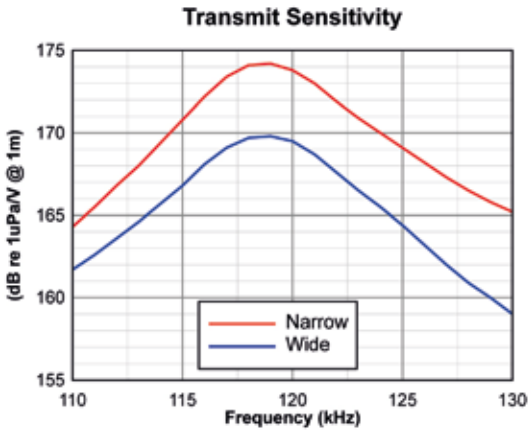
Beam Width	Wide	Narrow	Selectable
Horizontal Beam (-3dB)	18	10	Degrees Conical
Transmit Sensitivity	170	174	dB re 1µPa/V @ 1m
Receive Sensitivity	-192	-187	dB re 1V/µPa
Transmit Voltage / Duty Cycle (Max)	300	400	Vrms at 10%
Bandwidth	8	8	kHz
Nominal Impedance	50	50	Ohms

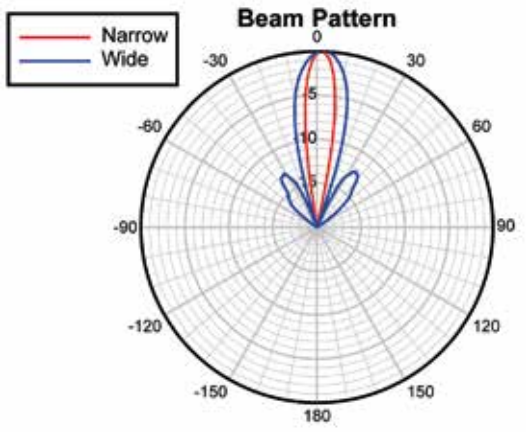
Transducer impedance can be adjusted to suit customers specification

MODEL T38



All dimensions in mm





MECHANICAL SPECIFICATION

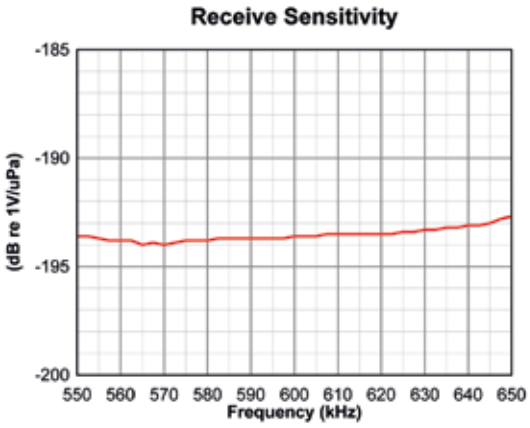
Operating Depth	300m Standard
Weight Air/Water including 10m cable	6.2 kg / 1.3 kg
Operating Temperature	-5 to +40 °C
Storage Temperature	-40 to +80 °C
Cable Type	Ø12mm Polyurethane Jacket, Screened 4 Core
Cable Length	10 metres standard (Additional lengths supplied to order)
Connector	Not fitted as standard (Optional Customer Specific)
Optional	Beam Selection Switch Box

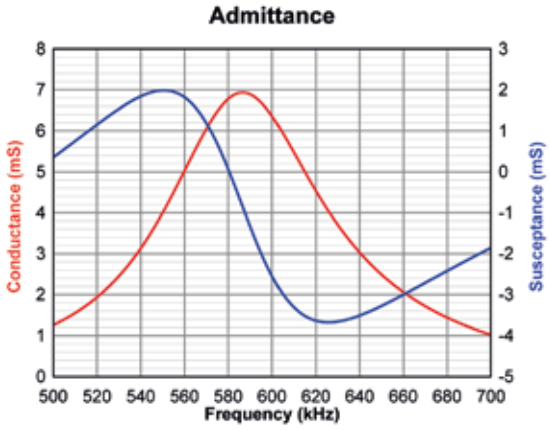
MODEL 142 SERIES

- *5 FREQUENCY OPTIONS*
- *FISHING, NAVIGATION & SURVEYING*
- *HULL OR OVER-SIDE MOUNTING*
- *LOW SIDE-LOBES*
- *ROBUST NYLON HOUSING*

Available in a choice of five different frequencies, the 142 SERIES transducers are intended for short range, narrow beam echo sounding applications. The 142 SERIES transducers are designed to be compatible with a wide range of echo sounder models. It is also possible to modify the impedance to match any customer values with a simple factory adjustment to the integral transformer. The high impact strength nylon body provides a mechanically robust, corrosion free transducer designed for thru-hull, tank or over-side mounting.

The 142 SERIES is available with or without acoustic calibration which is traceable to National Standards.



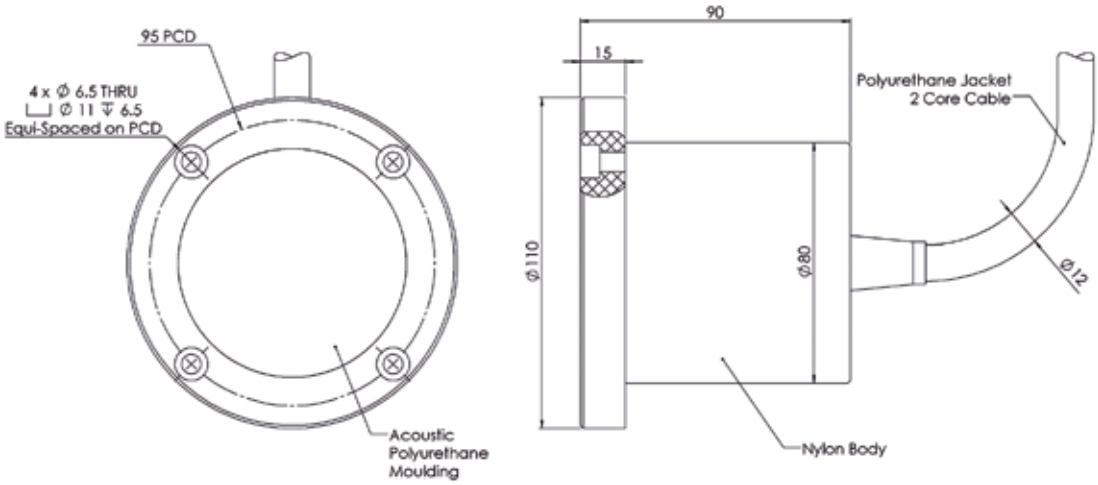


ACOUSTIC SPECIFICATION

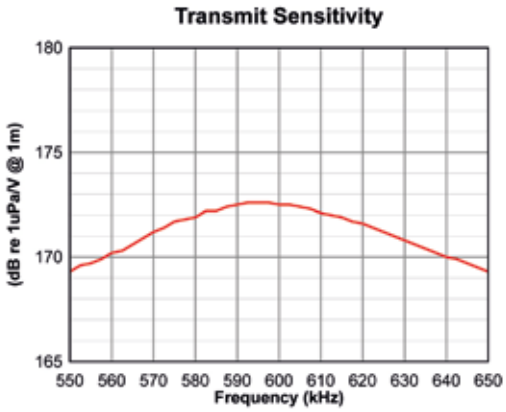
Frequency Options	160	200	210	300	600	kHz
Beam Angle (-3dB)	12	8	7.5	7	5	Degrees Conical
Transmit Sensitivity	173	170	170	172	172	dB re 1µPa/V @ 1m
Receive Sensitivity	-191	-193	-193	-193	-193	dB re 1V/µPa
Transmit Voltage / Duty Cycle (Max)	150	150	175	150	150	Vrms at 10%
Bandwidth	25	15	15	45	90	kHz
Nominal Impedance	70	70	100	75	75	Ohms

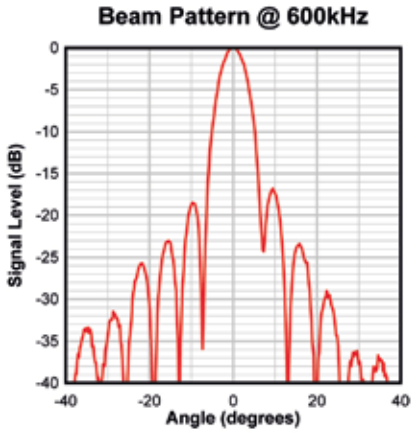
Transducer impedance can be adjusted to suit customers specification

MODEL 142 SERIES



All dimensions in mm





MECHANICAL SPECIFICATION

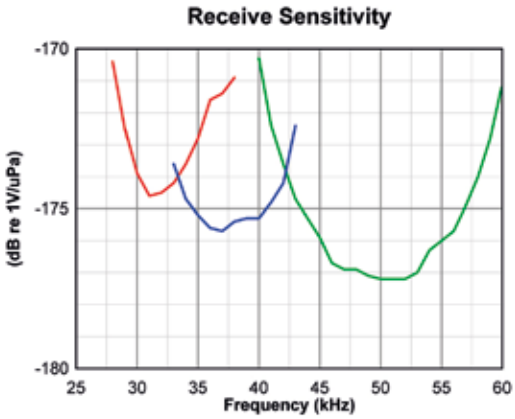
Operating Depth	300m Standard
Weight Air/Water including 10m cable	2.3 kg / 0.64 kg
Operating Temperature	-5 to +40 °C
Storage Temperature	-40 to +80 °C
Cable Type	Ø12mm Polyurethane Jacket, Screened Twisted Pair
Cable Length	10 metres standard (Additional lengths supplied to order)
Connector	Not fitted as standard (Optional Customer Specific)

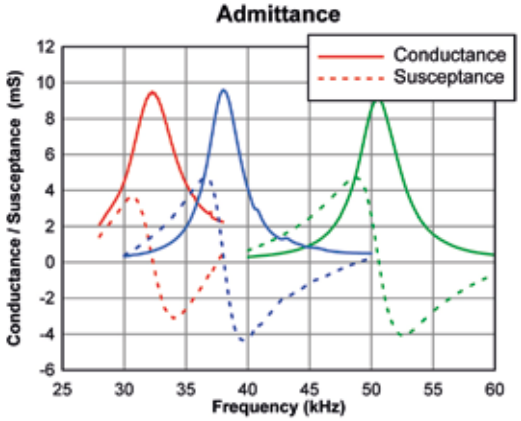
MODEL 172 SERIES

- *6 FREQUENCY OPTIONS*
- *ROBUST NYLON HOUSING*
- *FISHING, NAVIGATION & SURVEYING*
- *HULL OR OVER-SIDE MOUNTING*
- *LOW SIDE-LOBES*

Available in a choice of six different frequencies, the 172 SERIES is designed to be compatible with a wide range of vertical depth finding echo-sounders. With seven tonpilz elements and internal matching transformer the 172 SERIES offers a high performance at a low cost. The high impact strength nylon body provides a mechanically robust, corrosion free transducer suitable for tank, hull or over-side mounting.

The 172 SERIES is available with or without acoustic calibration which is traceable to National Standards.



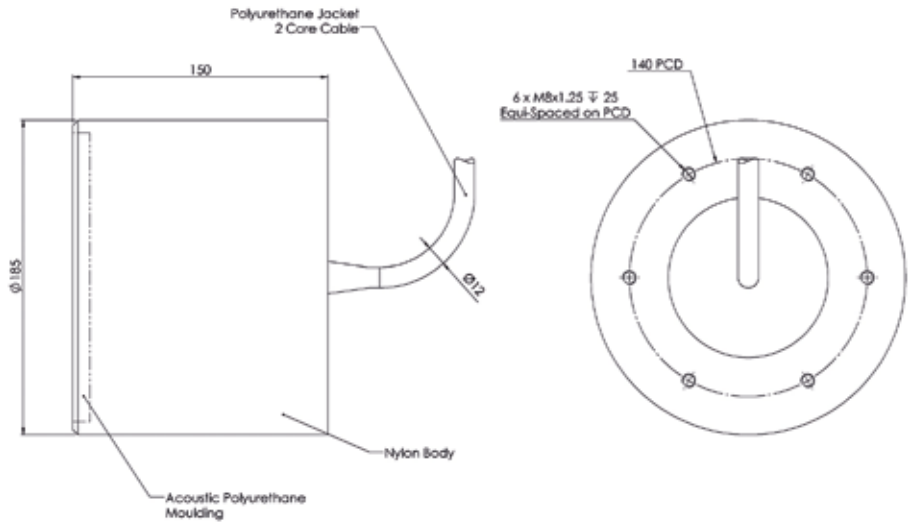


ACOUSTIC SPECIFICATION

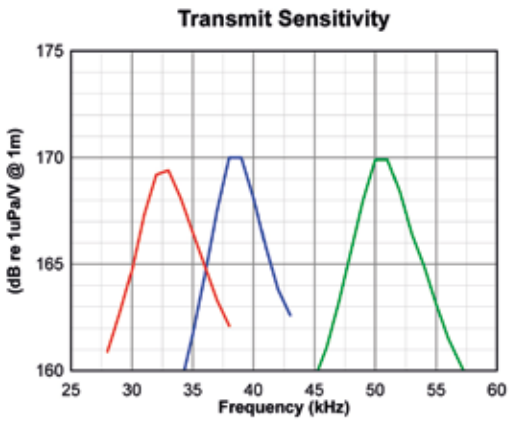
Frequency Options	24	28	30	33	38	50	kHz
Beam Angle (-3dB)	23	19	18	16.5	14	11	Degrees Conical
Transmit Sensitivity	167	168	168	168	166	171	dB re 1µPa/V @ 1m
Receive Sensitivity	-173	-173	-175	-175	-176	-178	dB re 1V/µPa
Transmit Voltage / Duty Cycle (Max)	300	300	325	325	325	300	Vrms at 10%
Bandwidth	2.5	2.8	3.0	3.5	3.5	6.0	kHz
Nominal Impedance	75	75	100	100	100	75	Ohms

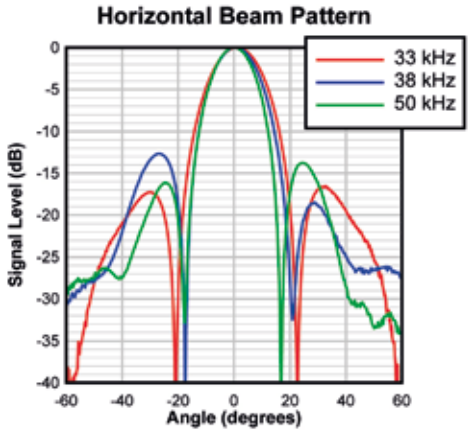
Transducer impedance can be adjusted to suit customers specification

MODEL 172 SERIES



All dimensions in mm





MECHANICAL SPECIFICATION

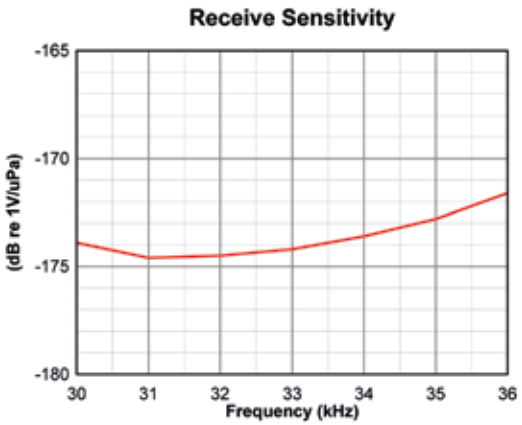
Operating Depth	300m Standard
Weight Air/Water including 10m cable	7.3 kg / 2.1 kg
Operating Temperature	-5 to +40 °C
Storage Temperature	-40 to +80 °C
Cable Type	Ø12mm Polyurethane Jacket, Screened Twisted Pair
Cable Length	10 metres standard (Additional lengths supplied to order)
Connector	Not fitted as standard (Optional Customer Specific)

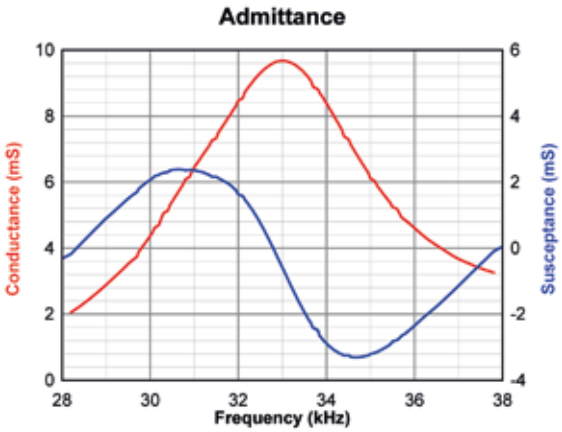
MODEL 320 SERIES

- ***ECHO SOUNDER***
- ***FISHING, NAVIGATION & SURVEYING***
- ***6 FREQUENCY OPTIONS***
- ***HULL OR OVER-SIDE MOUNTING***
- ***LOW COST***

The 320 SERIES continues the company's successful policy of providing a range of frequencies in the same transducer shape. Compatible with a wide range of echo-sounders the piston elements are configured to achieve optimum echo-sounder performance. The over-moulded polyurethane housing provides a mechanically robust, corrosion free transducer for hull or over-side mounting, offering maximum flexibility at minimum cost.

The 320 SERIES is available with or without acoustic calibration which is traceable to National Standards.



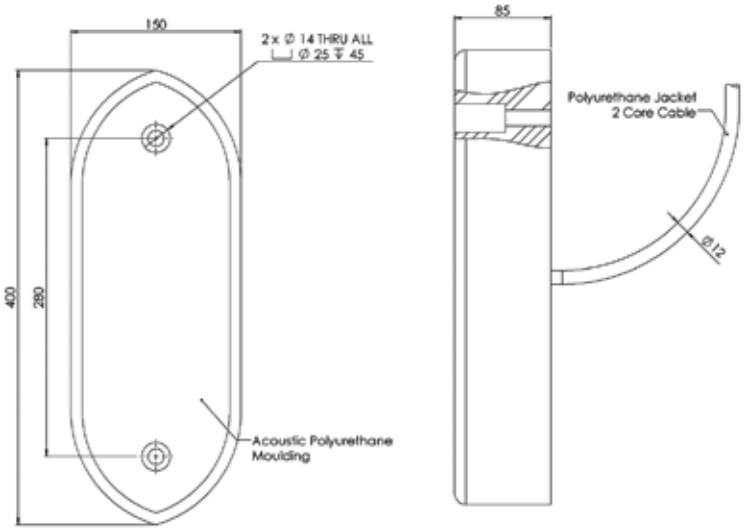


ACOUSTIC SPECIFICATION

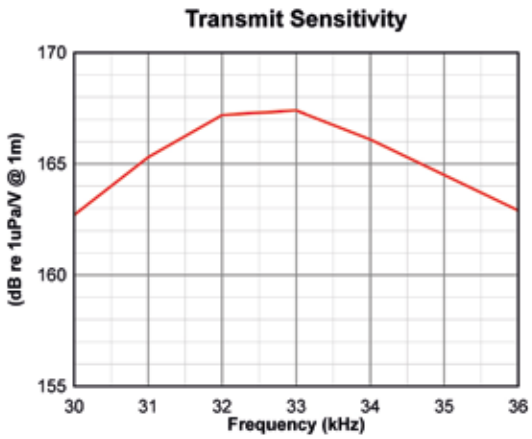
Frequency Options	24	28	30	33	38	50	kHz
Beam Angle (-3dB)	19x34	16x30	15x27	14x25	12x22	16x16	Degrees Conical
Transmit Sensitivity	166	167	167	167	165	170	dB re 1µPa/V @ 1m
Receive Sensitivity	-173	-173	-175	-175	-176	-178	dB re 1V/µPa
Transmit Voltage / Duty Cycle (Max)	300	300	325	325	325	300	Vrms at 10%
Bandwidth	2.5	2.8	3.0	3.5	3.5	6.0	kHz
Nominal Impedance	75	75	100	100	100	75	Ohms

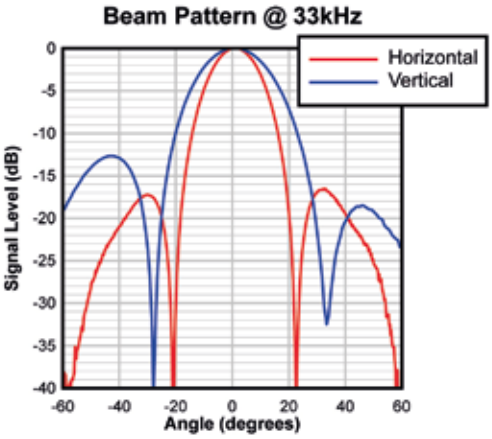
Transducer impedance can be adjusted to suit customers specification

MODEL 320 SERIES



All dimensions in mm





MECHANICAL SPECIFICATION

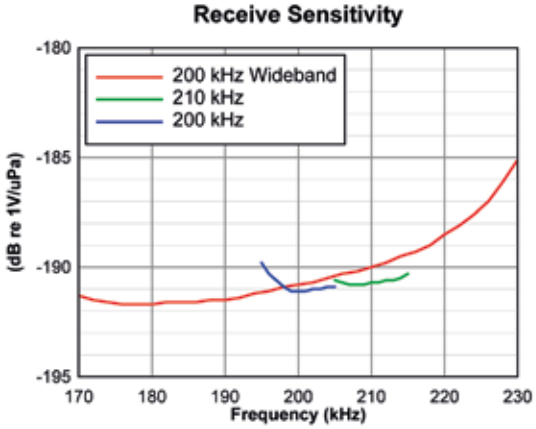
Operating Depth	300m Standard
Weight Air/Water including 10m cable	6.3 kg / 1.2 kg
Operating Temperature	-5 to +40 °C
Storage Temperature	-40 to +80 °C
Cable Type	Ø12mm Polyurethane Jacket, Screened Twisted Pair
Cable Length	10 metres standard (Additional lengths supplied to order)
Connector	Not fitted as standard (Optional Customer Specific)

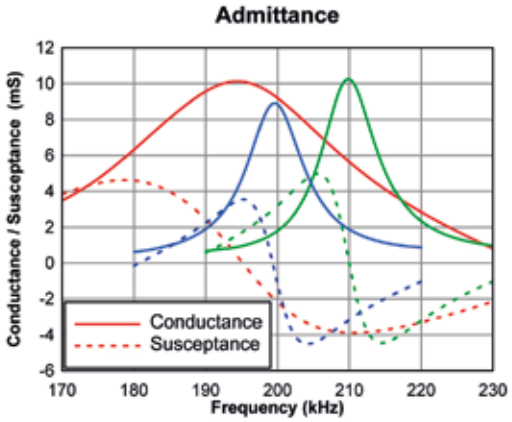
MODEL 390 SERIES

- ATLAS SW6014 EQUIVALENT
- 5 FREQUENCY OPTIONS
- FISHING, NAVIGATION & SURVEYING
- HULL OR OVER-SIDE MOUNTING
- FULLY OVER-MOULDED

Available in a choice of five different frequencies, the 390 SERIES transducer is intended for vertical depth sounding applications. The frequencies selected for the 390 SERIES are compatible with a wide range of echo-sounder types. The polyurethane housing provides a mechanically robust, corrosion free transducer, suitable for tank, thru-hull or over-side mounting.

A wideband version of the 200 kHz is available upon request. The 390 SERIES is available with or without acoustic calibration which is traceable to National Standards.



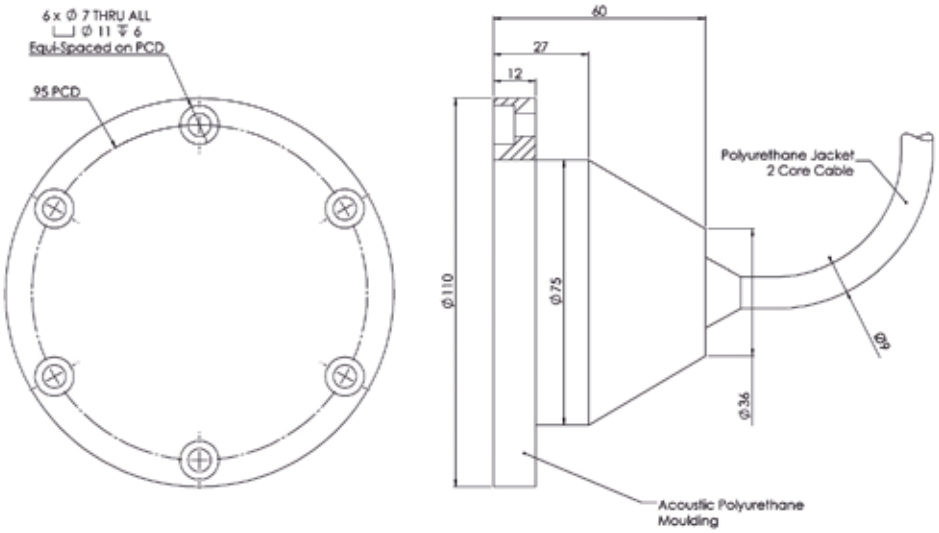


ACOUSTIC SPECIFICATION

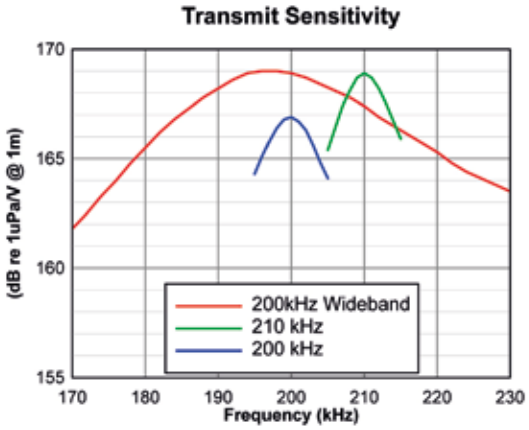
Frequency Options	160	200	200WB	210	300	600	kHz
Beam Angle (-3dB)	12	8	8	7.5	7	5	Degrees Conical
Transmit Sensitivity	173	170	169	170	172	172	dB re 1µPa/V @ 1m
Receive Sensitivity	-191	-193	-192	-193	-193	-193	dB re 1V/µPa
Transmit Voltage / Duty Cycle (Max)	150	150	150	175	150	150	Vrms at 10%
Bandwidth	24	15	35	15	45	90	kHz
Nominal Impedance	70	70	100	100	75	75	Ohms

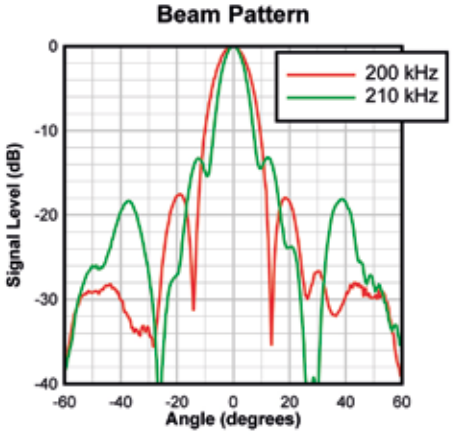
Transducer impedance can be adjusted to suit customers specification

MODEL 390 SERIES



All dimensions in mm





MECHANICAL SPECIFICATION

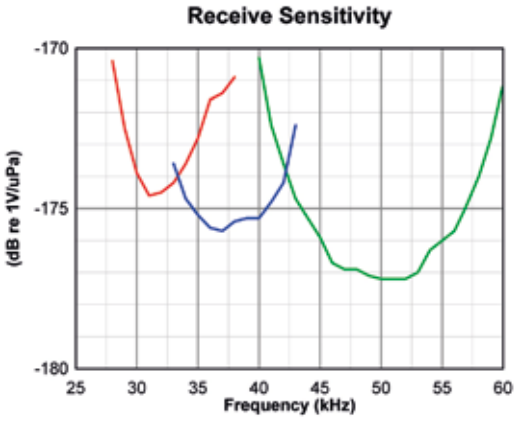
Operating Depth	300m Standard
Weight Air/Water including 10m cable	1.4 kg / 0.5 kg
Operating Temperature	-5 to +40 °C
Storage Temperature	-40 to +80 °C
Cable Type	Ø9mm Polyurethane Jacket, Screened Twisted Pair
Cable Length	10 metres standard (Additional lengths supplied to order)
Connector	Not fitted as standard (Optional Customer Specific)

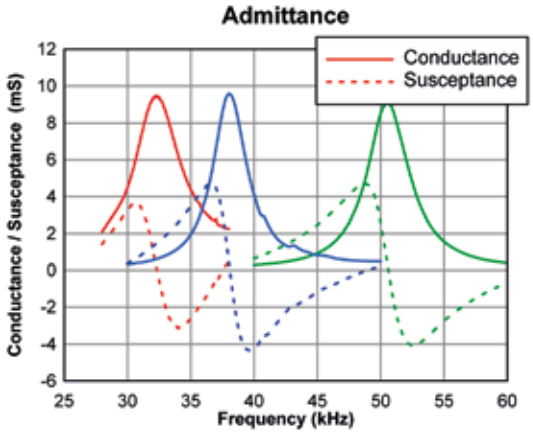
MODEL 395 SERIES

- ATLAS SW6028 EQUIVALENT
- 6 FREQUENCY OPTIONS
- FULLY OVER-MOULDED
- FISHING, NAVIGATION & SURVEYING
- HULL MOUNTING

Available in a choice of six different frequencies, the 395 SERIES transducer is intended for vertical depth sounding applications. The frequencies selected are compatible with a wide range of echo-sounder types. The concentric element arrangement generates a conical beam pattern with low side lobes. The polyurethane housing provides a mechanically robust, corrosion free transducer, suitable for tank, thru-hull or over-side mounting.

The 395 SERIES is available with or without acoustic calibration which is traceable to National Standards.



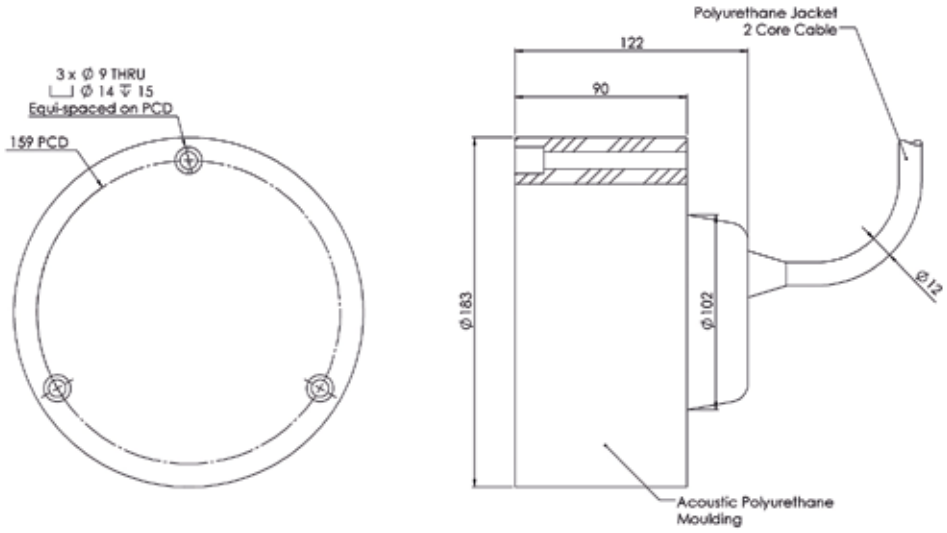


ACOUSTIC SPECIFICATION

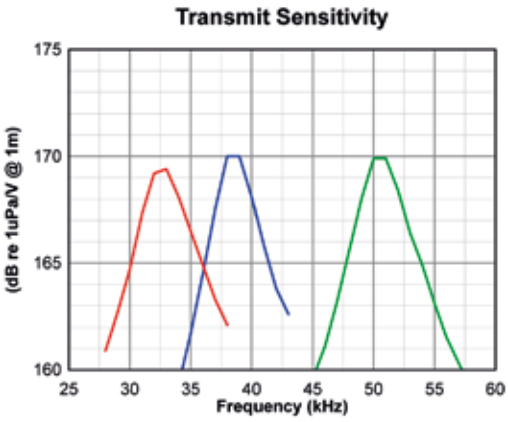
Frequency Options	24	28	30	33	38	50	kHz
Beam Angle (-3dB)	23	19	18	16.5	14	11	Degrees Conical
Transmit Sensitivity	167	168	168	168	166	171	dB re 1µPa/V @ 1m
Receive Sensitivity	-173	-173	-175	-175	-176	-178	dB re 1V/µPa
Transmit Voltage / Duty Cycle (Max)	300	300	325	325	325	300	Vrms at 10%
Bandwidth	2.5	2.8	3.0	3.5	3.5	6.0	kHz
Nominal Impedance	75	75	100	100	100	75	Ohms

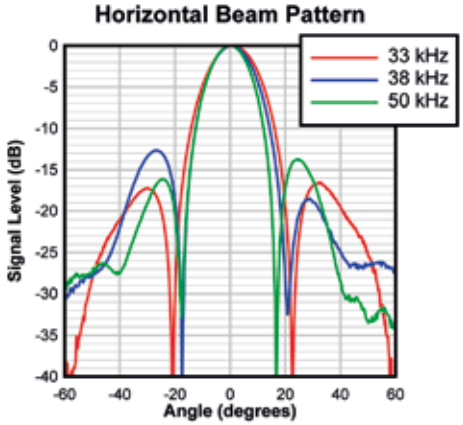
Transducer impedance can be adjusted to suit customers specification

MODEL 395 SERIES



All dimensions in mm





MECHANICAL SPECIFICATION

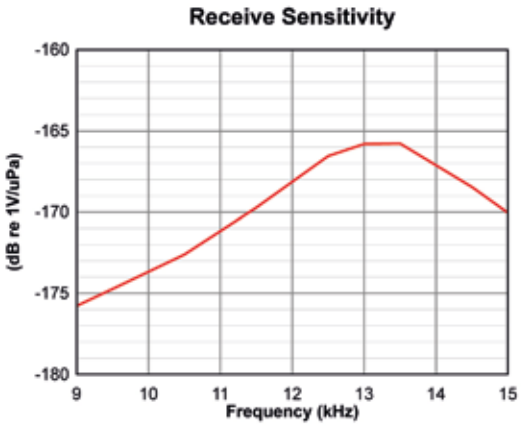
Operating Depth	300m Standard
Weight Air/Water including 10m cable	5.2 kg / 1.5 kg
Operating Temperature	-5 to +40 °C
Storage Temperature	-40 to +80 °C
Cable Type	Ø12mm Polyurethane Jacket, Screened Twisted Pair
Cable Length	10 metres standard (Additional lengths supplied to order)
Connector	Not fitted as standard (Optional Customer Specific)

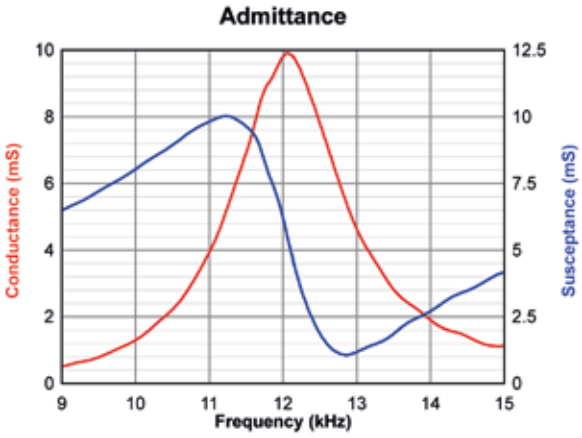
MODEL T198

- *12 KHZ TRANSDUCER*
- *SINGLE NARROW BEAM*
- *LOW SIDE LOBE*
- *LONG RANGE ECHO SOUNDER*
- *TOWED BODY CAPABILITY*
- *FULLY OVER-MOULDED*

The T198 transducer is a high power, long range directional array operating at 12 kHz. Originally designed for over-side installation, the T198 can also be hull mounted. The nodal mounted tonpilz elements are extremely robust, capable of withstanding high slamming forces, highly efficient and provide an excellent front to back ratio. An external transformer can be supplied to accommodate any impedance matching. The transducer housing is an over-moulded, robust and corrosion free transducer body.

The T198 is available with or without acoustic calibration which is traceable to National Standards.

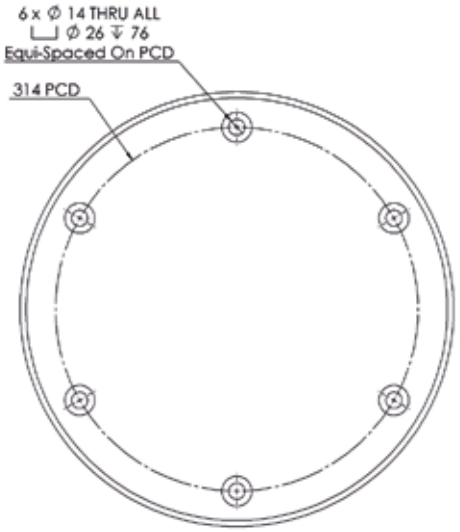


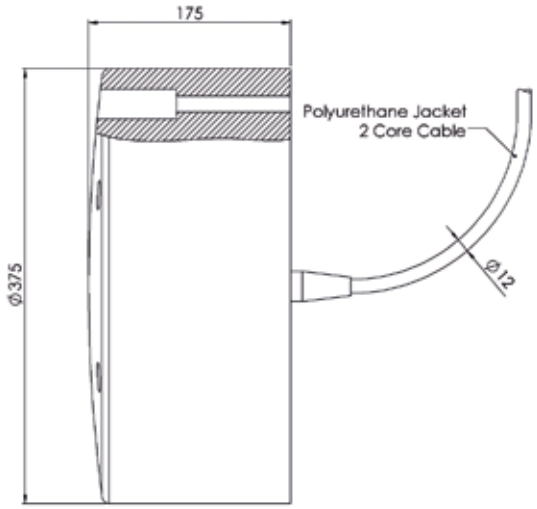


TECHNICAL SPECIFICATION

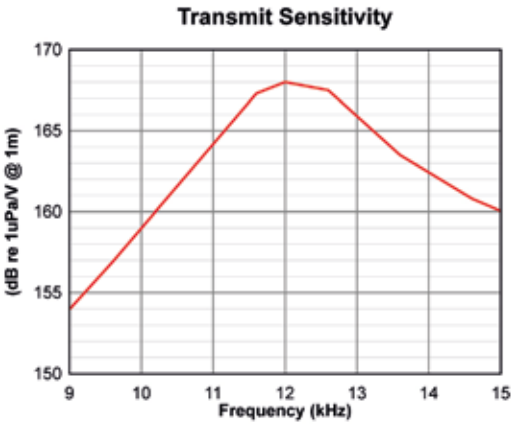
Resonant Frequency (Nominal)	12 kHz
Beam Angle (-3dB)	20 Degrees Conical
Side Lobe Level	> -15dB
Front / Back Ratio	> -20dB
Receive Sensitivity	-166 dB re 1V/µPa
Transmit Sensitivity	167 dB re 1µPa/V @ 1m
Bandwidth	1.5 kHz
Capacitance at 1 kHz (with 10m Cable)	86,000 pF
Transmit Voltage / Duty Cycle (Max)	750 Vrms at 10%
Nominal Impedance	100 Ohms

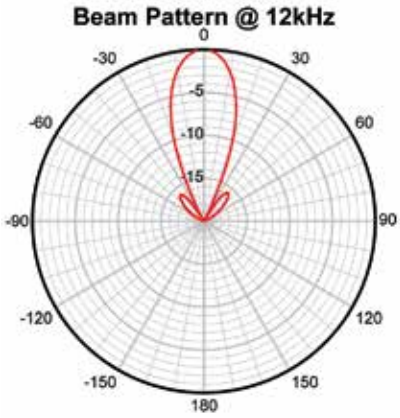
MODEL T198





All dimensions in mm





MECHANICAL SPECIFICATION

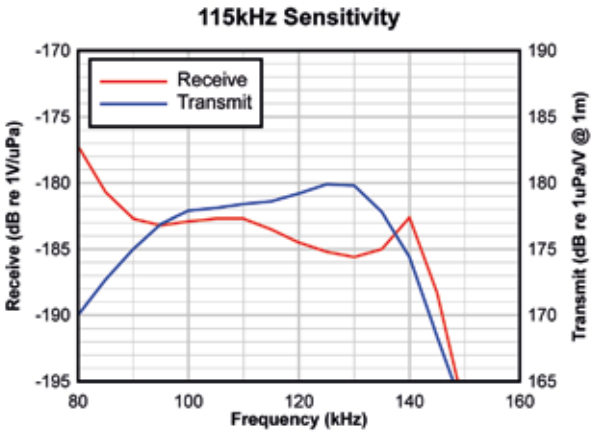
Operating Depth	600m Standard (Optional 1500m - may require an export license)
Weight Air/Water including 10m cable	35 kg / 15.6 kg
Operating Temperature	-5 to +40 °C
Storage Temperature	-40 to +80 °C
Cable Type	Ø12mm Polyurethane Jacket, Screened Twisted Pair
Cable Length	10 metres standard (Additional lengths supplied to order)
Connector	Not fitted as standard (Optional Customer Specific)

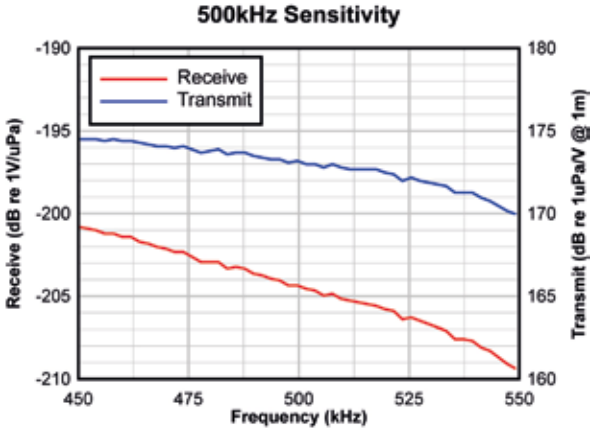
MODEL 230 SERIES

- ***FREQUENCY 115/500 KHZ***
- ***SIDESCAN TRANSDUCER***
- ***SEAFLOOR MAPPING***
- ***DEEP WATER CAPABILITY***
- ***AUV, HULL OR TOW-FISH***

The dual frequency 230 SERIES sidescan is a robust fully moulded construction, operating at 115 and 500 kHz the sidescan has a very wide bandwidth. With a narrow beam in the along-track axis and wide beam in the across-track axis, suitable for most sea-floor mapping and other high directivity applications. The company's extensive transducer expertise has created products that are of high performance and substantially lower cost. A deep-water version, capable of operating down to 2000 metres is available to special order.

The 230 SERIES is available with or without acoustic calibration which is traceable to National Standards.

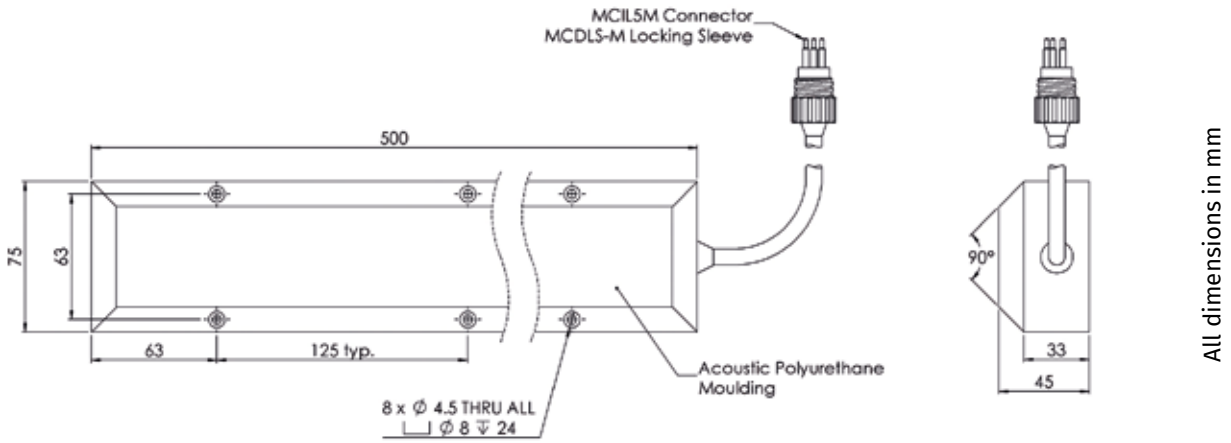




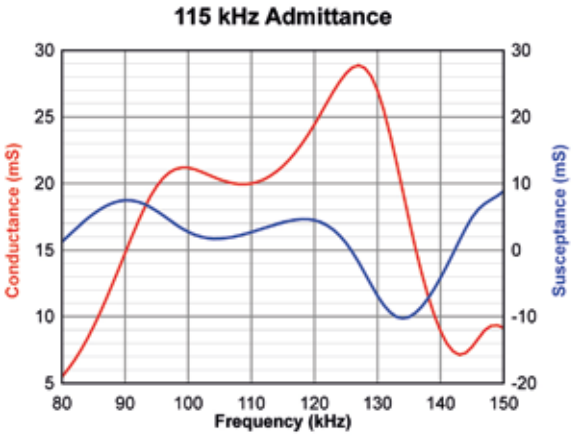
ACOUSTIC SPECIFICATION

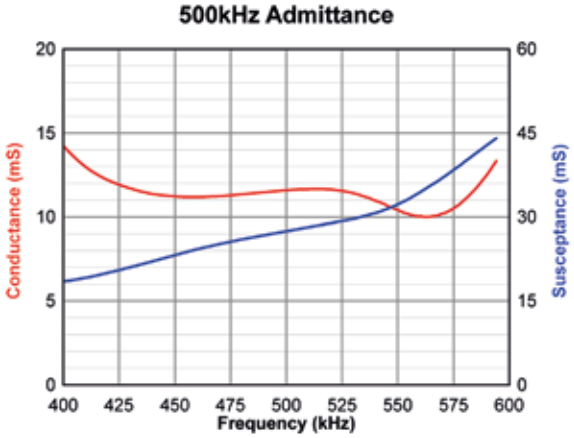
Frequency	115	500	kHz
Horizontal Beam (-3dB)	1.5	0.4	Degrees
Vertical Beam (-3dB)	50	50	Degrees
Receive Sensitivity	-183	-204	dB re 1V/uPa
Transmit Sensitivity	178	173	dB re 1uPa/V @ 1m
Bandwidth	40	100	kHz
Transmit Voltage / Duty Cycle (Max)	500	300	Vrms at 10%

MODEL 230 SERIES



All dimensions in mm





MECHANICAL SPECIFICATION

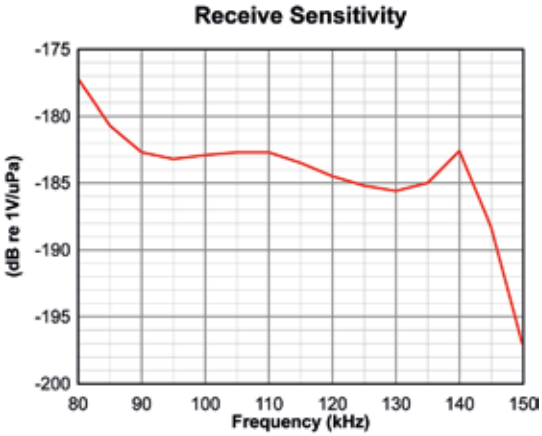
Operating Depth	600m Standard (Optional 2000m – both may require an export license)
Weight Air/Water (with 10m cable)	3.9 kg / 1.8 kg
Operating Temperature	-5 to +40 °C
Storage Temperature	-40 to +80 °C
Cable Type	Ø8mm Chloroprene Rubber (Optional Ø9mm Polyurethane, Screened Twisted Pair)
Cable Length	0.2m standard (Additional lengths supplied to order)
Connector	SubConn MCIL5M with MCDLS-M Locking Sleeve
Extension Cable/Connector	Ø9mm Polyurethane, Screened Twisted Pair with SubConn MCIL5F with MCDLS-F Locking Sleeve

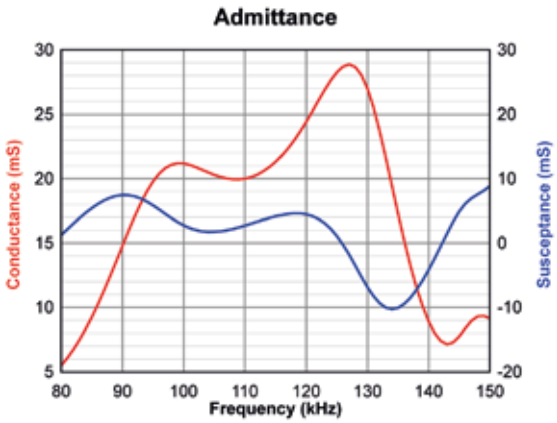
MODEL 250 SERIES

- ***FREQUENCY 115 KHZ***
- ***SIDESCAN TRANSDUCER***
- ***SEAFLOOR MAPPING***
- ***DEEP WATER CAPABILITY***
- ***HULL OR TOW-FISH***

The 250 SERIES sidescan is a robust fully moulded construction, operating at 115 kHz the sidescan has a very wide bandwidth. With a narrow beam in the along-track axis and wide beam in the across-track axis, suitable for most sea-floor mapping and other high directivity applications. The company's extensive transducer expertise has created products that are of high performance and substantially lower cost. A deep-water version, capable of operating down to 2000 metres is available to special order.

The 250 SERIES is available with or without acoustic calibration which is traceable to National Standards.

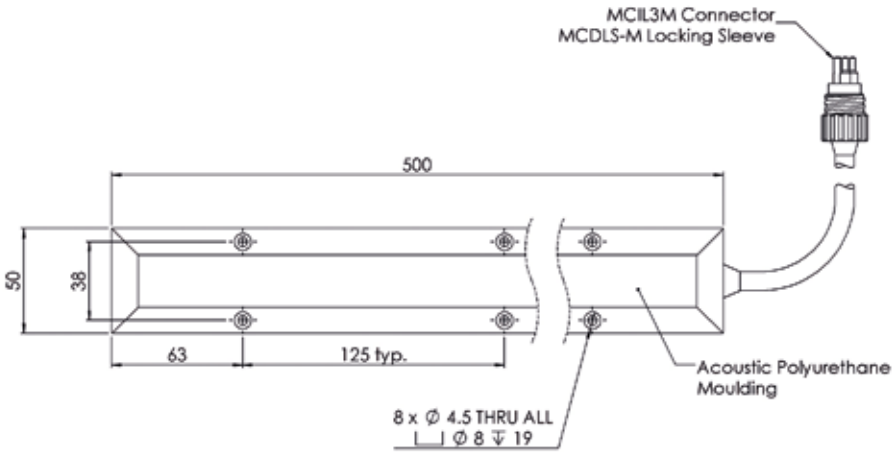




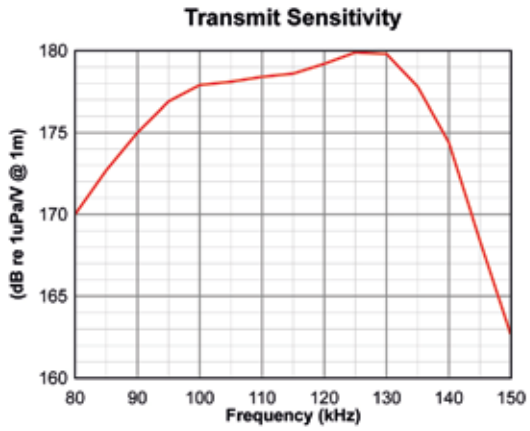
ACOUSTIC SPECIFICATION

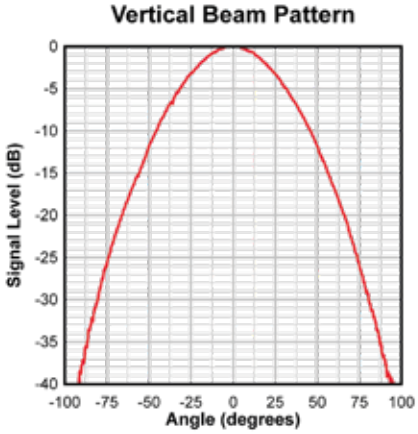
Resonant Frequency (Nominal)	115 kHz
Horizontal Beam (-3dB)	1.5 Degrees
Vertical Beam (-3dB)	50 Degrees
Receive Sensitivity	-183 dB re 1V/µPa
Transmit Sensitivity	178 dB re 1µPa/V @ 1m
Bandwidth	40 kHz
Transmit Voltage / Duty Cycle (Max)	500 Vrms at 10%

MODEL 250 SERIES



All dimensions in mm





MECHANICAL SPECIFICATION

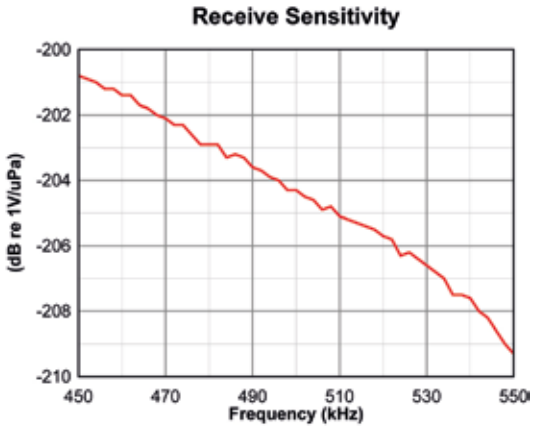
Operating Depth	600m Standard (Optional 2000m – both may require an export license)
Weight Air/Water (with 10m cable)	3.8 kg / 1.6 kg
Operating Temperature	-5 to +40 °C
Storage Temperature	-40 to +80 °C
Cable Type	Ø8mm Chloroprene Rubber (Optional Ø9mm Polyurethane, Screened Twisted Pair)
Cable Length	0.2m standard (Additional lengths supplied to order)
Connector	SubConn MCIL3M with MCDLS-M Locking Sleeve
Extension Cable/Connector	Ø9mm Polyurethane, Screened Twisted Pair with SubConn MCIL3F with MCDLS-F Locking Sleeve

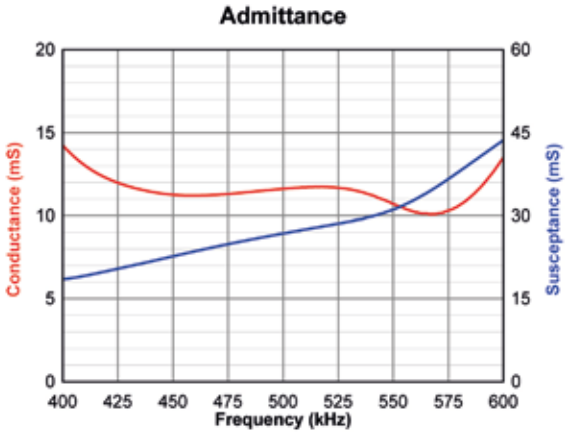
MODEL 260 SERIES

- ***FREQUENCY 500 KHZ***
- ***SIDESCAN TRANSDUCER***
- ***SEAFLOOR MAPPING***
- ***DEEP WATER CAPABILITY***
- ***HULL OR TOW-FISH***

The 260 SERIES sidescan is a robust all moulded construction, operating at 500 kHz the sidescan has a very wide bandwidth. With a narrow beam in the along-track axis and wide beam in the across track axis suitable for most sea-floor mapping and other high directivity applications. The company's extensive transducer expertise has created products that are of high performance and substantially lower cost. A deep-water version, capable of operating down to 2000 metres is available to special order.

The 260 SERIES is available with or without acoustic calibration which is traceable to National Standards.

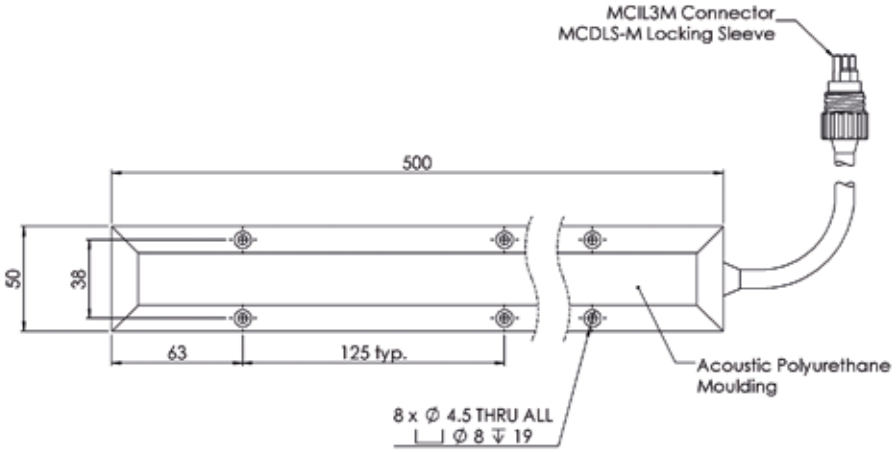




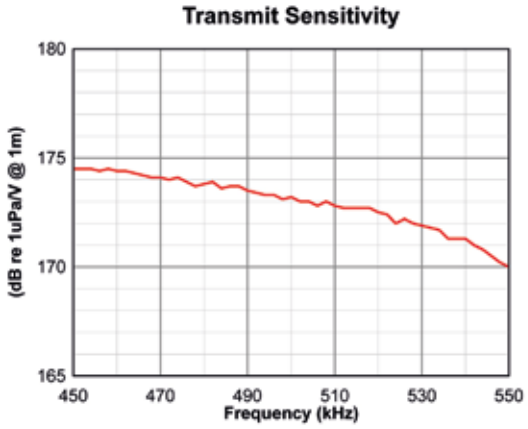
ACOUSTIC SPECIFICATION

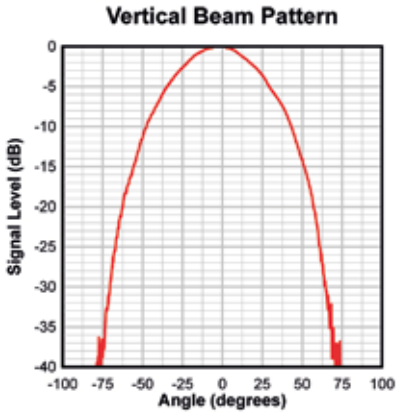
Resonant Frequency (Nominal)	500 kHz
Horizontal Beam (-3dB)	0.4 Degrees
Vertical Beam (-3dB)	50 Degrees
Receive Sensitivity	-204 dB re 1V/µPa
Transmit Sensitivity	173 dB re 1µPa/V @ 1m
Bandwidth	100 kHz
Transmit Voltage / Duty Cycle (Max)	300 Vrms at 10%

MODEL 260 SERIES



All dimensions in mm





MECHANICAL SPECIFICATION

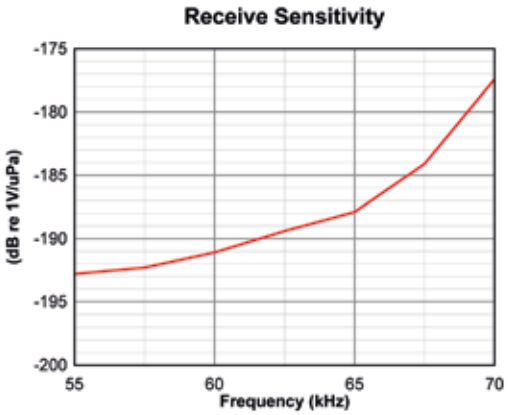
Operating Depth	600m Standard (Optional 2000m – both may require an export license)
Weight Air/Water (with 10m cable)	3.5 kg / 1.3 kg
Operating Temperature	-5 to +40 °C
Storage Temperature	-40 to +80 °C
Cable Type	Ø8mm Chloroprene Rubber (Optional Ø9mm Polyurethane, Screened Twisted Pair)
Cable Length	0.2m standard (Additional lengths supplied to order)
Connector	SubConn MCIL3M with MCDLS-M Locking Sleeve
Extension Cable/Connector	Ø9mm Polyurethane, Screened Twisted Pair with SubConn MCIL3F with MCDLS-F Locking Sleeve

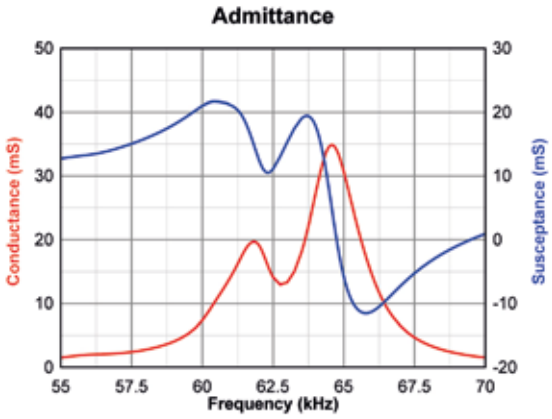
MODEL 270 SERIES

- ***FREQUENCY 65 KHZ***
- ***SIDESCAN TRANSDUCER***
- ***SEAFLOOR MAPPING***
- ***DEEP WATER CAPABILITY***
- ***HULL OR TOW-FISH***

The 270 SERIES sidescan is a robust fully moulded construction, operating at 65 kHz the sidescan has a very wide bandwidth. With a narrow beam in the along-track axis and wide beam in the across-track axis suitable for most sea-floor mapping and other high directivity applications. The company's extensive transducer expertise has created products that are of high performance and substantially lower cost. A deep-water version, capable of operating down to 2000 metres is available to special order.

The 270 SERIES is available with or without acoustic calibration which is traceable to National Standards.

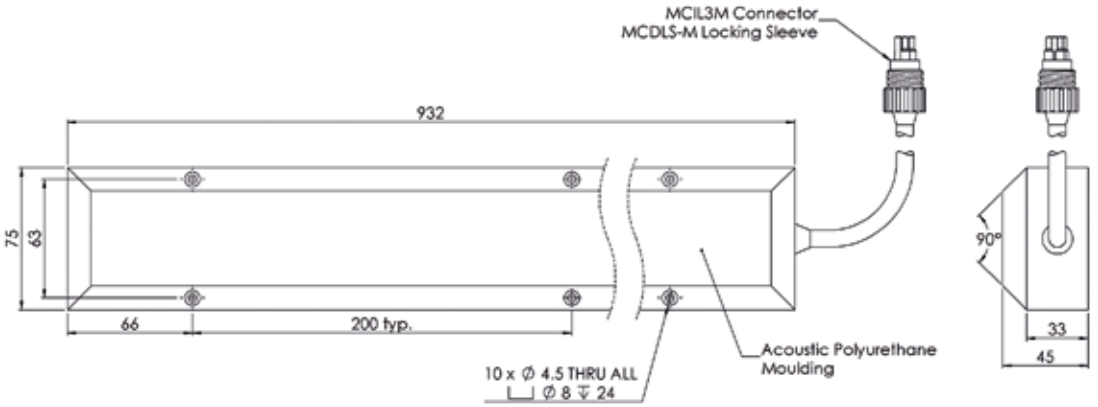




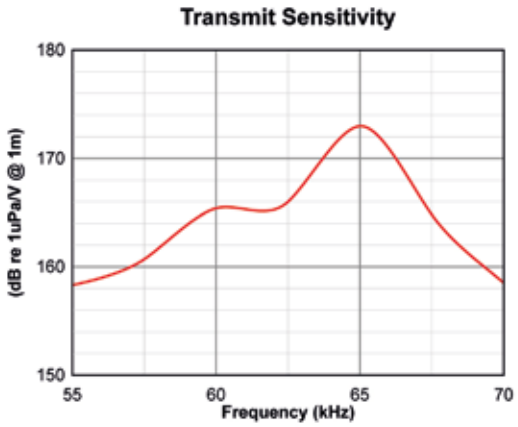
ACOUSTIC SPECIFICATION

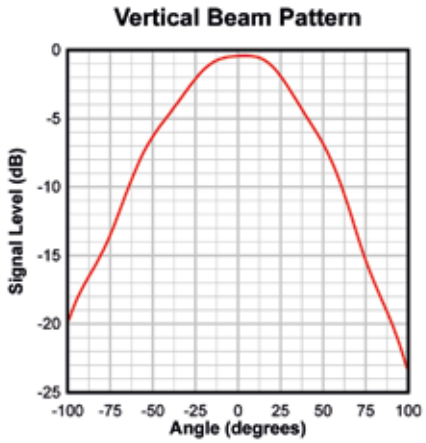
Resonant Frequency (Nominal)	65 kHz
Horizontal Beam (-3dB)	2.6 Degrees
Vertical Beam (-3dB)	50 Degrees
Receive Sensitivity	-187 dB re 1V/µPa
Transmit Sensitivity	174 dB re 1µPa/V @ 1m
Bandwidth	5 kHz
Transmit Voltage / Duty Cycle (Max)	500 Vrms at 10%

MODEL 270 SERIES



All dimensions in mm





MECHANICAL SPECIFICATION

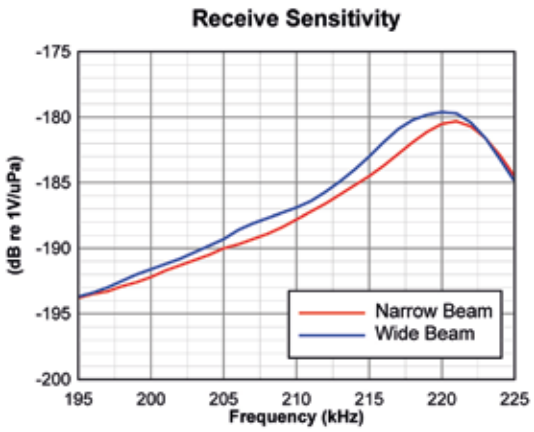
Operating Depth	600m Standard (Optional 2000m – both may require an export license)
Weight Air/Water (with 10m cable)	7.7 kg / 3.6 kg
Operating Temperature	-5 to +40 °C
Storage Temperature	-40 to +80 °C
Cable Type	Ø8mm Chloroprene Rubber (Optional Ø9mm Polyurethane, Screened Twisted Pair)
Cable Length	0.2m standard (Additional lengths supplied to order)
Connector	SubConn MCIL3M with MCDLS-M Locking Sleeve
Extension Cable/Connector	Ø9mm Polyurethane, Screened Twisted Pair with SubConn MCIL3F with MCDLS-F Locking Sleeve

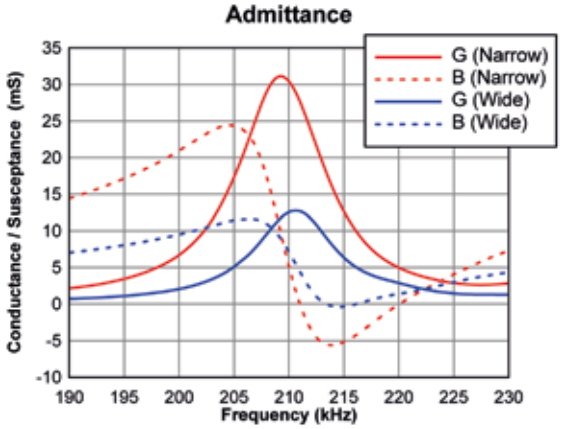
MODEL T403 & T404

- ***FREQUENCY 200 & 210 KHZ***
- ***SIDESCAN TRANSDUCER***
- ***SHALLOW WATER SURVEYING***
- ***HULL MOUNTED***
- ***TOW FISH OPTION***

The T403 and T404 transducers have been designed to complement shallow water echo sounder surveying operations typically carried out by Port and River Authorities. Eliminating the need to deploy a tow fish, these sidescan transducers can be mounted directly onto the hull and inclined downwards away from the surface, to provide useful "fill-in data" between adjacent survey runs.

Both transducer types are available with or without calibration which is traceable to National Standards.

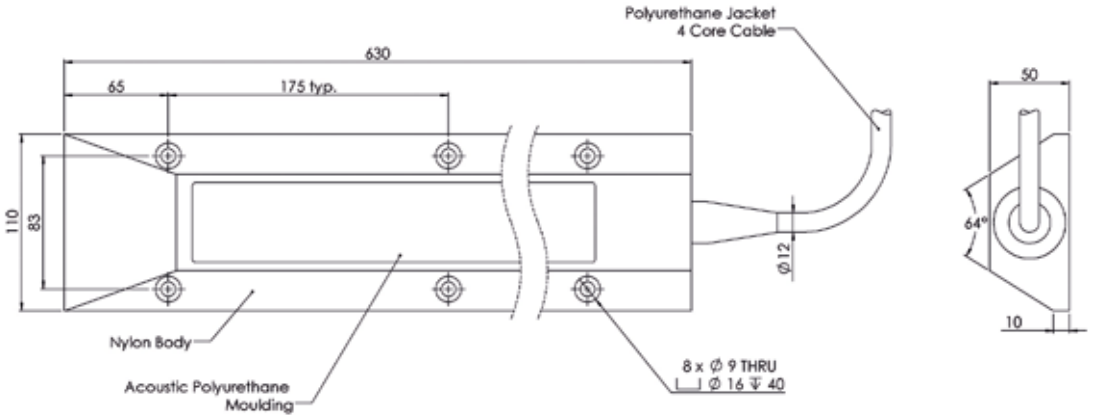




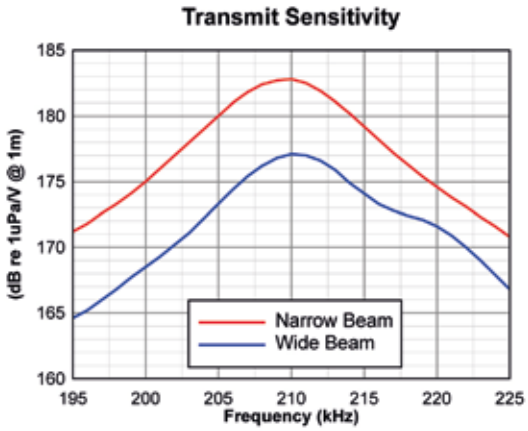
ACOUSTIC SPECIFICATION

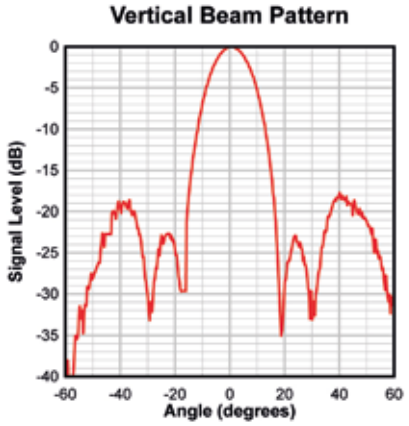
Model Number	T403		T404		
Resonant Frequency (Nominal)	200		210		kHz
Beam Pattern	Wide	Narrow	Wide	Narrow	Selectable
Horizontal Beam (-3dB)	1.6	0.9	1.5	0.8	Degrees
Vertical Beam (-3dB)	16.0	16.0	16.0	16.0	Degrees
Transmit Sensitivity	177	182	177	182	dB re 1uPa/V @ 1m
Receive Sensitivity	-187	-187	-187	-187	dB re 1V/uPa
Transmit Voltage / Duty Cycle (Max)	750	750	750	750	Vrms at 10%
Bandwidth	10	10	10	10	kHz
Nominal Impedance	75	75	75	75	Ohms

MODEL T403 & T404



All dimensions in mm





MECHANICAL SPECIFICATION

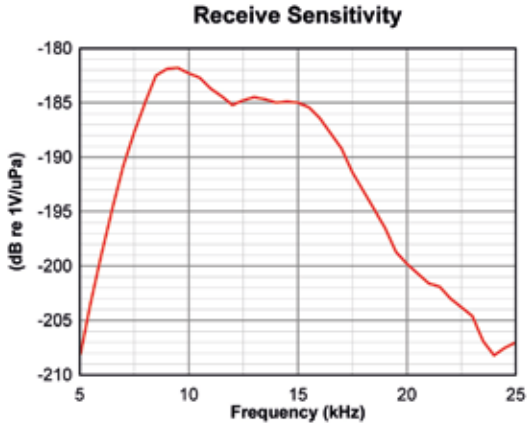
Operating Depth	600m Standard (Optional 2000m – both may require an export license)
Weight Air/Water (with 10m cable)	5.2 kg / 1.4 kg
Operating Temperature	-5 to +40 °C
Storage Temperature	-40 to +80 °C
Cable Type	Ø12mm Polyurethane Jacket, Screened 4 Core
Cable Length	10 metres standard (Additional lengths supplied to order)
Connector	Not fitted as standard (Optional Customer Specific)
Optional	Beam Selection Switch Box

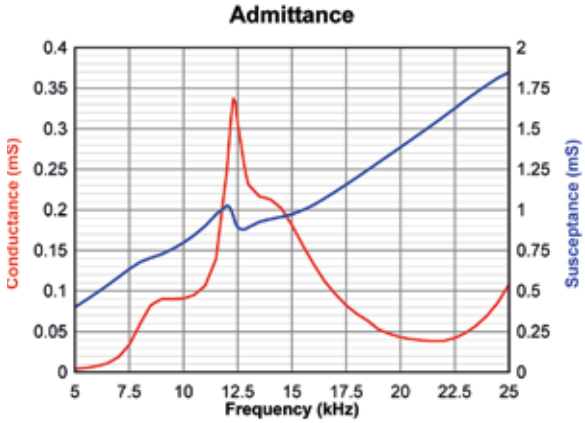
MODEL T313

- ***HEMISPHERICAL BEAM PATTERN***
- ***BROADBAND OPERATION***
- ***HIGH PERFORMANCE***
- ***LONG RANGE TRANSMISSION***
- ***LOW COST***

Designed for use in transponder beacons, data communication, acoustic release mechanisms and long-range base line systems, the T313 is a versatile transducer combining broadband transmission and reception over a hemispherical beam pattern. The over-moulded design onto an anodised aluminium base is lightweight and mechanically robust.

The T313 is available with or without acoustic calibration which is traceable to National Standards.

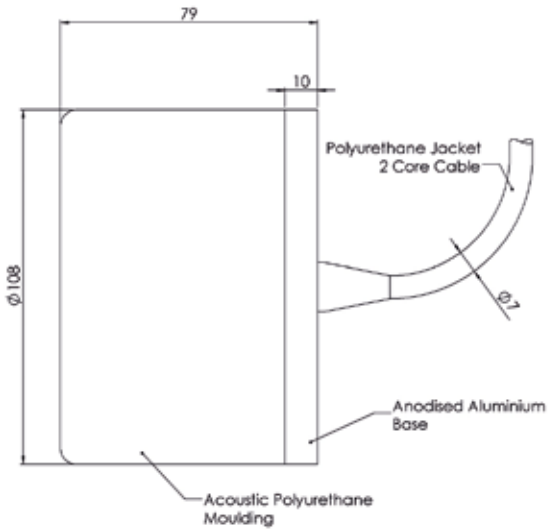


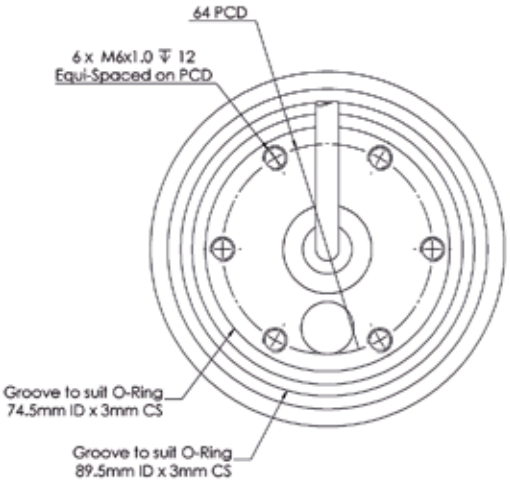


TECHNICAL SPECIFICATION

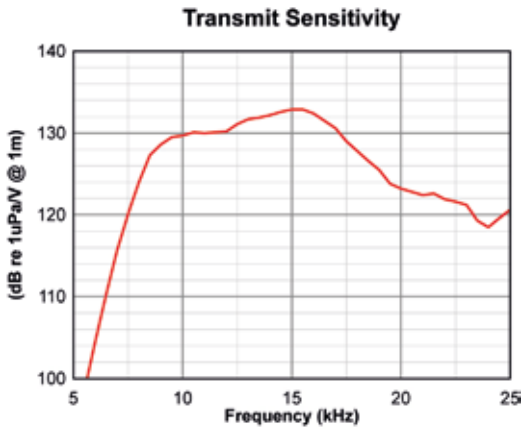
Resonant Frequency (Nominal)	9 / 15 kHz
Useful Operating Band	7 kHz to 17 kHz
Beam Pattern (Horizontal)	Omni ± 2 dB
Beam Pattern (Vertical)	Hemispherical / Toroidal (See Graph)
Receive Sensitivity	-183 dB re 1V/µPa
Transmit Sensitivity	130 dB re 1µPa/V @ 1m
Capacitance at 1 kHz (with 1m cable)	14,000 pF
Transmit Voltage (Max)	1200 Vrms
Transmit Voltage / Duty Cycle (Max)	1200 Vrms at 10% 350 Vrms at 100%

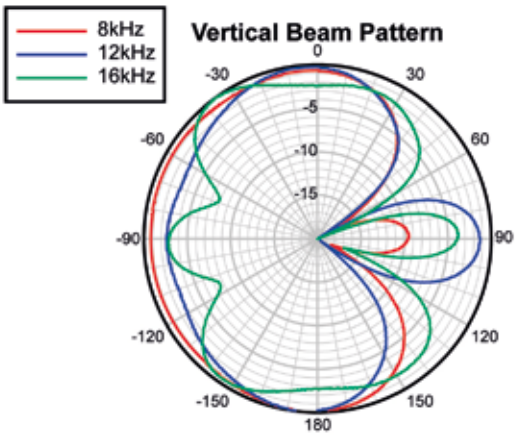
MODEL T313





All dimensions in mm





MECHANICAL SPECIFICATION

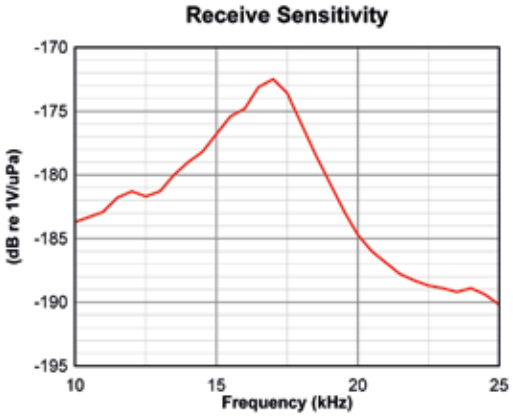
Operating Depth	1500m
Weight Air/Water (with 1m cable)	1.3 kg / 0.6 kg
Operating Temperature	-5 to +40 °C
Storage Temperature	-40 to +80 °C
Cable Type	Ø7mm Polyurethane Jacket, Screened Twisted Pair
Cable Length	1m standard (Additional lengths supplied to order)
Connector	Not fitted as standard (Optional Customer Specific)

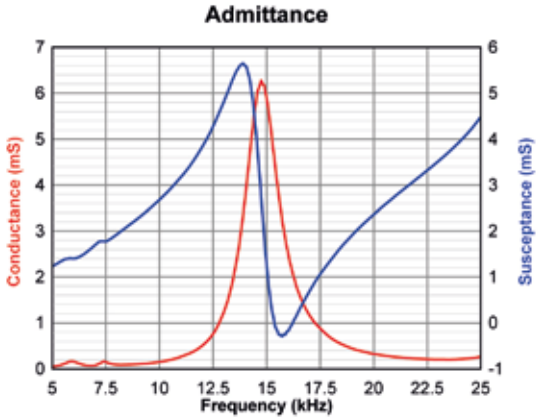
MODEL T279

- ***HEMISPHERICAL BEAM PATTERN***
- ***BROADBAND OPERATION***
- ***DEEP WATER CAPABILITY***
- ***TRANSPONDER***
- ***RANGE TRACKING***
- ***COMMUNICATIONS***

The T279 is one of a group of transducers available from Neptune that have been designed for use in transponder beacons, tracking systems, acoustic release mechanisms and data communication systems. A versatile transducer the T279 combines efficient broadband transmission and reception with an hemispherical beam pattern. The transducer is moulded onto a stainless steel base which achieves a design that is compact and robust.

The T279 is available with or without acoustic calibration which is traceable to National Standards.

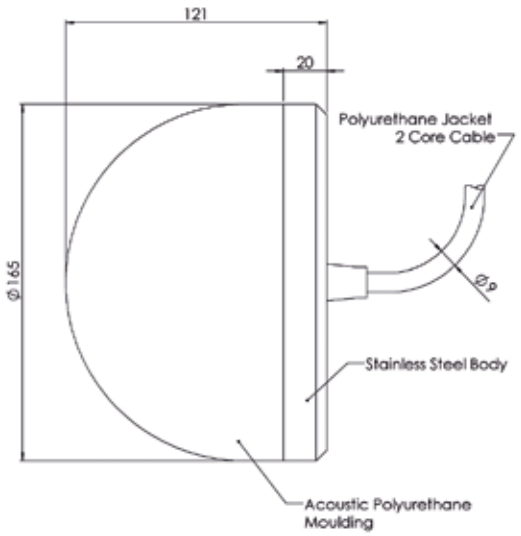


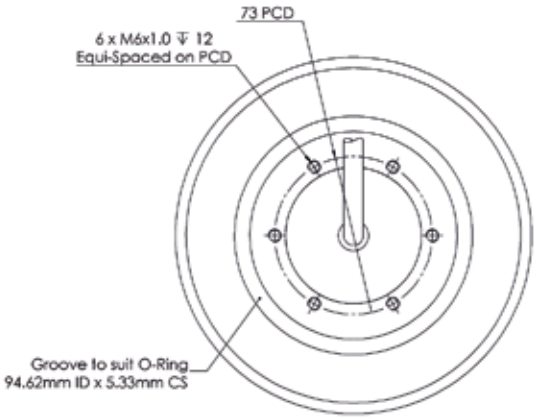


TECHNICAL SPECIFICATION

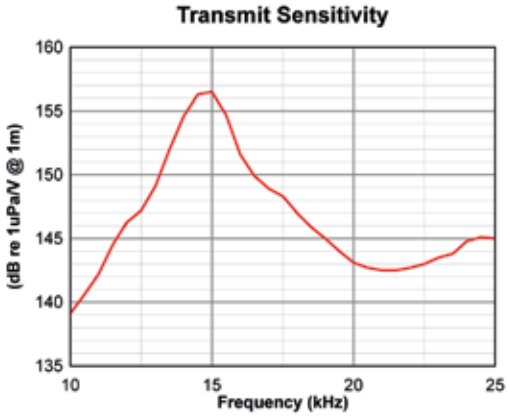
Resonant Frequency (Nominal)	15 kHz
Useful Operating Band	12 kHz to 19 kHz
Beam Pattern (Vertical)	Conical (See Graph)
Receive Sensitivity	-173 dB re 1V/µPa
Transmit Sensitivity	156 dB re 1µPa/V @ 1m
Capacitance at 1 kHz (with 1m cable)	37,000 pF
Transmit Voltage (Max)	750 Vrms
Transmit Voltage / Duty Cycle (Max)	750 Vrms at 10% 225 Vrms at 100%

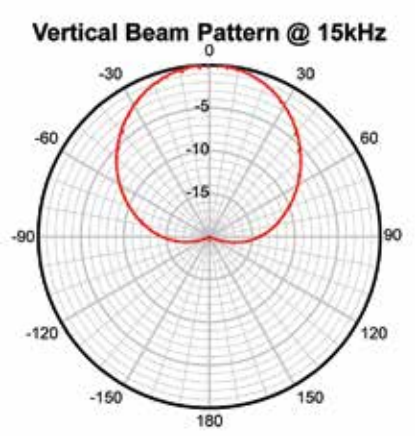
MODEL T279





All dimensions in mm





MECHANICAL SPECIFICATION

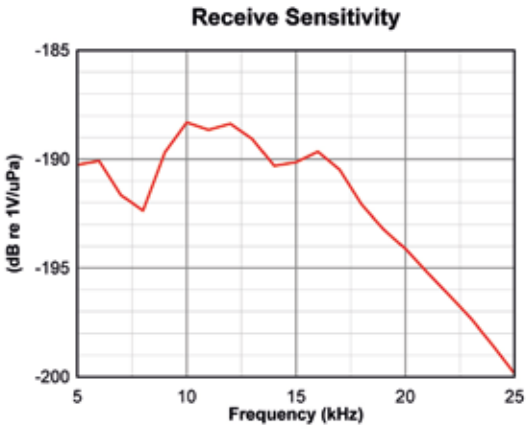
Operating Depth	6000m
Weight Air/Water (with 1m cable)	6.3 kg / 3.7 kg
Operating Temperature	-5 to +40 °C
Storage Temperature	-40 to +80 °C
Cable Type	Ø9mm Polyurethane Jacket, Screened Twisted Pair
Cable Length	1m standard (Additional lengths supplied to order)
Connector	Not fitted as standard (Optional Customer Specific)

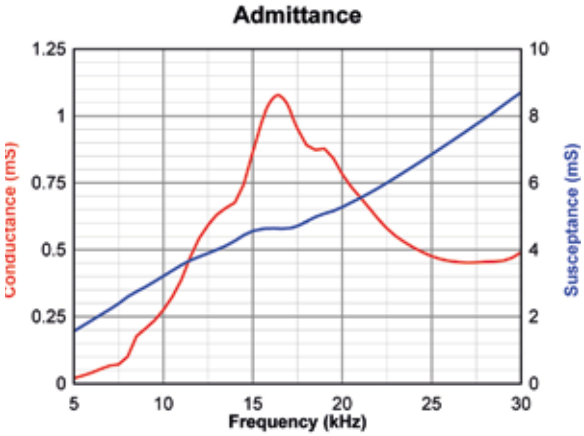
MODEL T235

- *17 KHZ CYLINDRICAL TRANSDUCER*
- *BROADBAND TRANSMISSION*
- *TRANSPONDER*
- *RANGE TRACKING*
- *COMMUNICATIONS*

The Type T235 is one of a series of underwater transducers available from Neptune that are designed for use in transponders, beacons, acoustic release mechanisms and data communication systems. The nylon base incorporates threaded fastenings and an 'O' ring seal allowing simple and direct mounting onto equipment or pressure housings.

The T235 is available with or without acoustic calibration which is traceable to National Standards.

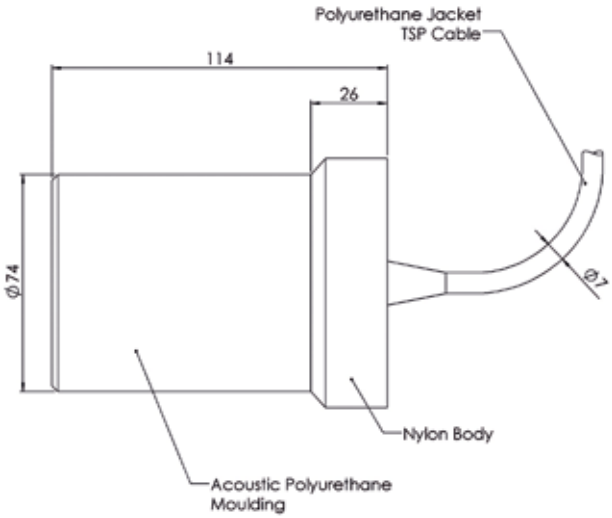


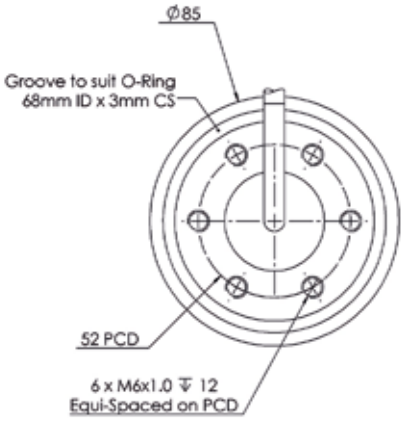


TECHNICAL SPECIFICATION

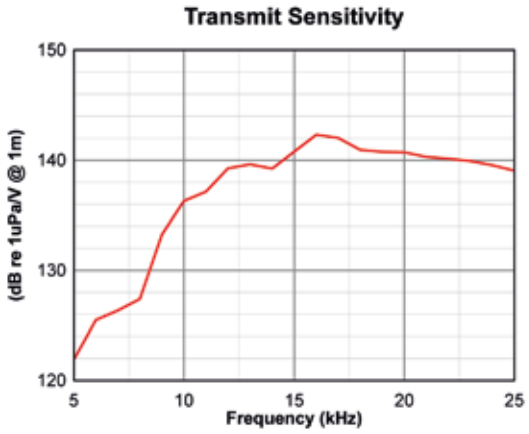
Resonant Frequency (Nominal)	17 kHz
Useful Operating Band	10 kHz to 25 kHz
Beam Pattern (Horizontal)	Omni ± 2 dB
Beam Pattern (Vertical)	Toroidal (See Graph)
Receive Sensitivity	-190 dB re 1V/µPa
Transmit Sensitivity	141 dB re 1µPa/V @ 1m
Capacitance at 1 kHz (with 1m cable)	48,000 pF
Transmit Voltage (Max)	600 Vrms
Transmit Voltage / Duty Cycle (Max)	600 Vrms at 10% 180 Vrms at 100%

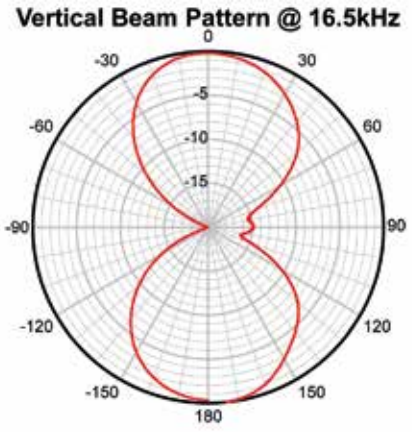
MODEL T235





All dimensions in mm





MECHANICAL SPECIFICATION

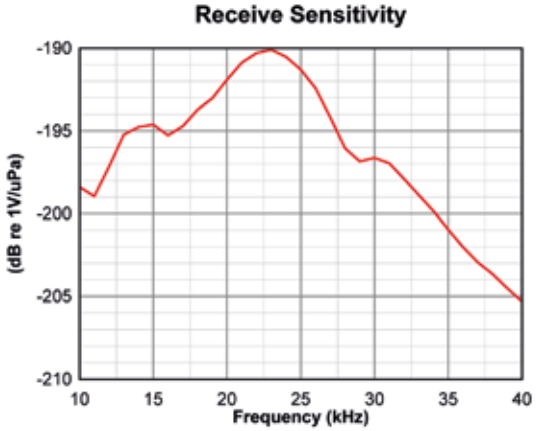
Operating Depth	1500m
Weight Air/Water (with 1m cable)	1.4 kg / 0.5 kg
Operating Temperature	-5 to +40 °C
Storage Temperature	-40 to +80 °C
Cable Type	Ø7mm Polyurethane Jacket, Screened Twisted Pair
Cable Length	1m standard (Additional lengths supplied to order)
Connector	Not fitted as standard (Optional Customer Specific)

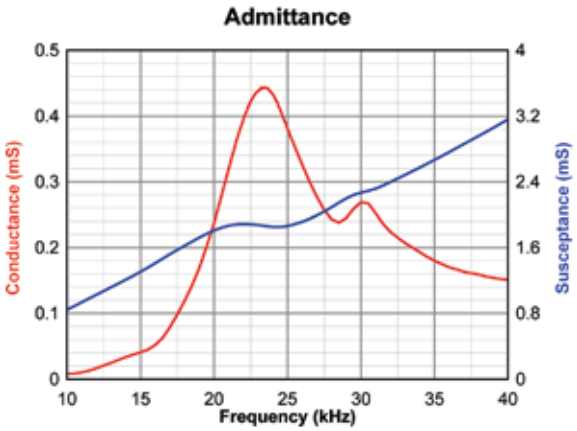
MODEL T257

- ***24 KHZ CYLINDRICAL TRANSDUCER***
- ***BROADBAND TRANSMISSION***
- ***TRANSPONDER***
- ***RANGE TRACKING***
- ***COMMUNICATIONS***

The Type T257 is one of a series of underwater transducers available from Neptune that are designed for use in transponders, beacons, acoustic release mechanisms and data communication systems. The nylon base incorporates threaded fastenings and an 'O' ring seal allowing simple and direct mounting onto equipment or pressure housings.

The T257 is available with or without acoustic calibration which is traceable to National Standards.

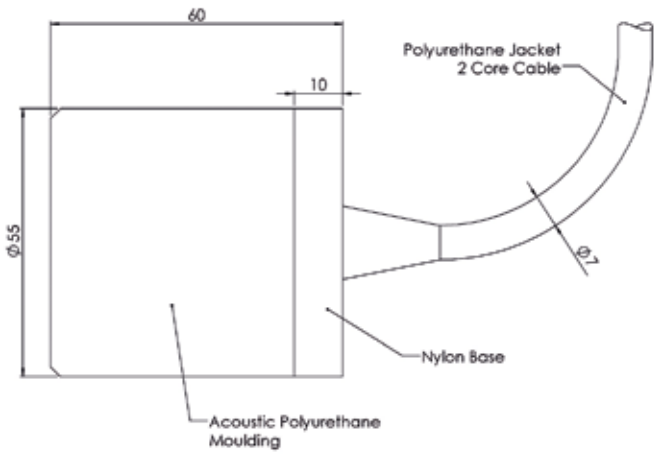


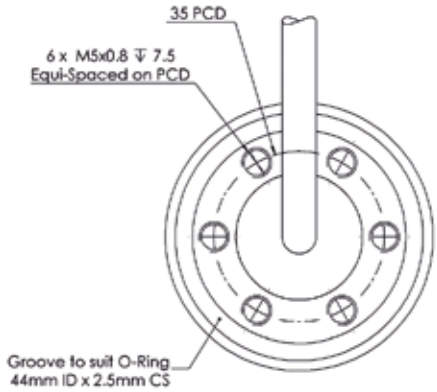


TECHNICAL SPECIFICATION

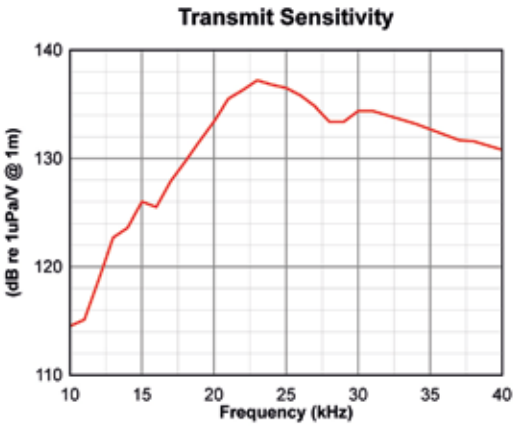
Resonant Frequency (Nominal)	24 kHz
Useful Operating Band	16 kHz to 30 kHz
Beam Pattern (Horizontal)	Omni ± 2 dB
Beam Pattern (Vertical)	Toroidal (See Graph)
Receive Sensitivity	-190 dB re 1V/µPa
Transmit Sensitivity	136 dB re 1µPa/V @ 1m
Capacitance at 1 kHz (with 1m cable)	12,000 pF
Transmit Voltage (Max)	600 Vrms
Transmit Voltage / Duty Cycle (Max)	600 Vrms at 10% 180 Vrms at 100%

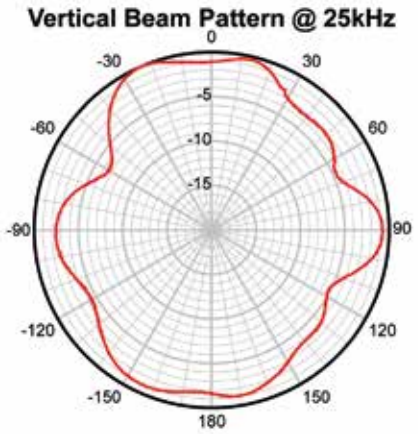
MODEL T257





All dimensions in mm





MECHANICAL SPECIFICATION

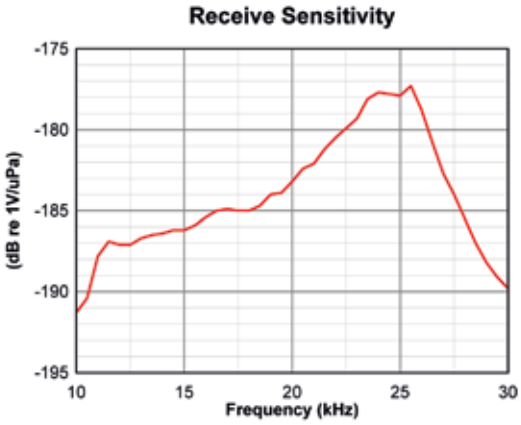
Operating Depth	2000m
Weight Air/Water (with 1m cable)	0.78 kg / 0.25 kg
Operating Temperature	-5 to +40 °C
Storage Temperature	-40 to +80 °C
Cable Type	Ø7mm Polyurethane Jacket, Screened Twisted Pair
Cable Length	1m standard (Additional lengths supplied to order)
Connector	Not fitted as standard (Optional Customer Specific)

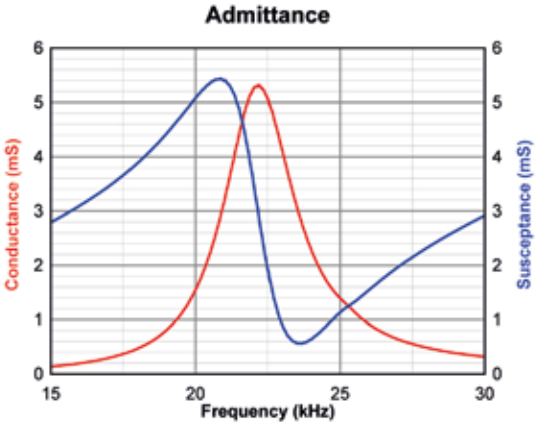
MODEL T218

- ***HEMISPHERICAL BEAM PATTERN***
- ***BROADBAND TRANSMISSION***
- ***DEEP WATER CAPABILITY***
- ***TRANSPONDER***
- ***RANGE TRACKING***
- ***COMMUNICATIONS***

The T218 is one of a group of transducers available from Neptune that have been designed for use in transponder beacons, tracking systems, acoustic release mechanisms and data communication systems. A versatile transducer the T218 combines efficient broadband transmission and reception with an hemispherical beam pattern. The over moulded construction achieves a design that is compact, lightweight and robust.

The T218 is available with or without acoustic calibration which is traceable to National Standards.

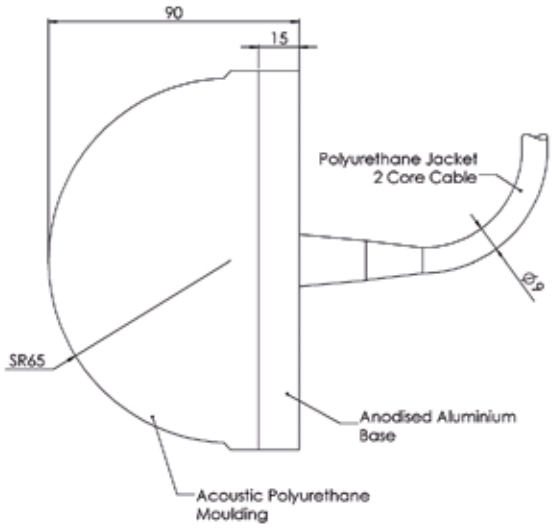


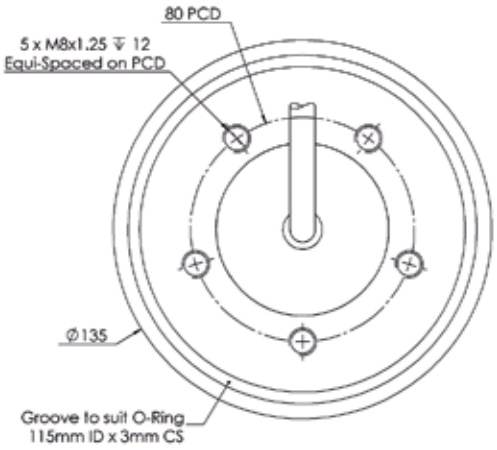


TECHNICAL SPECIFICATION

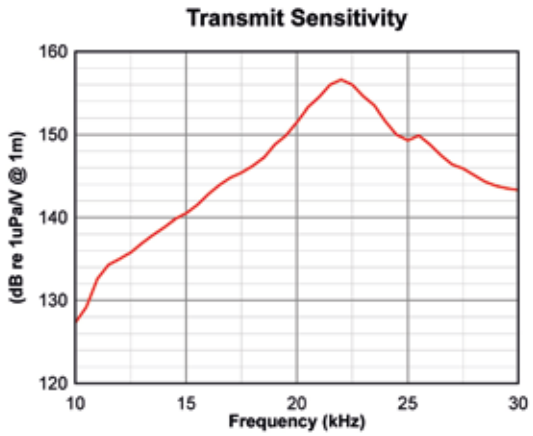
Resonant Frequency (Nominal)	22 kHz
Useful Operating Band	16 kHz to 30 kHz
Beam Pattern	Conical (See Graph)
Receive Sensitivity	-178 dB re 1V/µPa
Transmit Sensitivity	155 dB re 1µPa/V @ 1m
Capacitance at 1 kHz (with 1m cable)	25,000 pF
Transmit Voltage (Max)	600 Vrms
Transmit Voltage / Duty Cycle (Max)	600 Vrms at 10% 190 Vrms at 100%

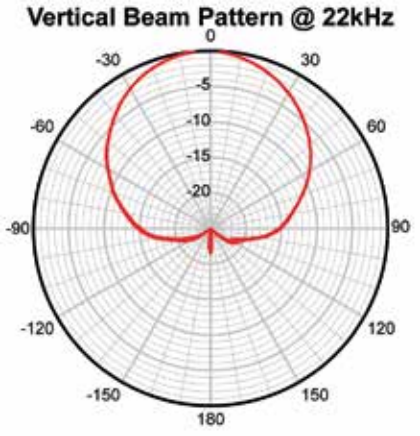
MODEL T218





All dimensions in mm





MECHANICAL SPECIFICATION

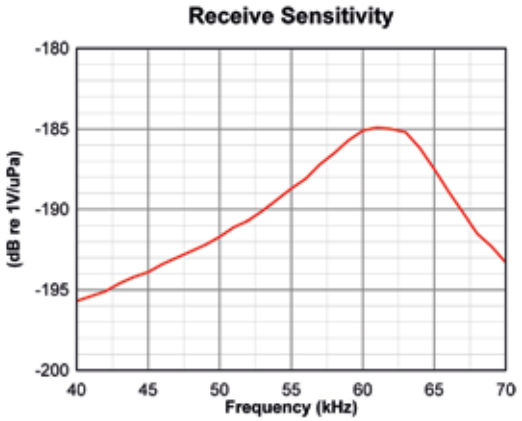
Operating Depth	6000m
Weight Air/Water (with 1m cable)	2.9 kg / 1.3 kg
Operating Temperature	-5 to +40 °C
Storage Temperature	-40 to +80 °C
Cable Type	Ø9mm Polyurethane Jacket, Screened Twisted Pair
Cable Length	1m standard (Additional lengths supplied to order)
Connector	Not fitted as standard (Optional Customer Specific)

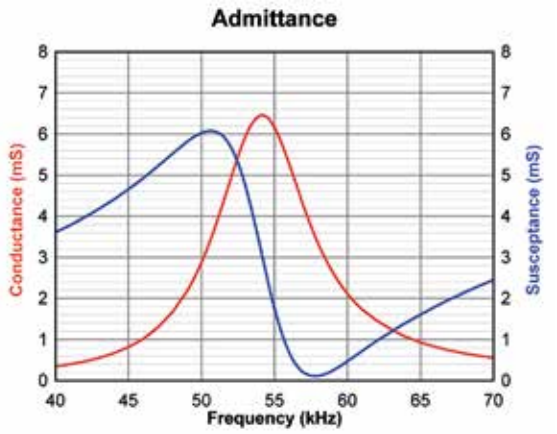
MODEL T204

- ***HEMISPHERICAL BEAM PATTERN***
- ***BROADBAND TRANSMISSION***
- ***DEEP WATER CAPABILITY***
- ***TRANSPONDER***
- ***RANGE TRACKING***
- ***COMMUNICATIONS***

The T204 is one of a series of transducers available from Neptune that have been designed for use in transponder beacons, tracking systems, acoustic release mechanisms and data communication systems. The anodised aluminium base incorporates a threaded fastening and 'O' ring seal allowing simple and direct mounting onto equipment or pressure housings, washer and nut provided.

The T204 is available with or without acoustic calibration which is traceable to National Standards.

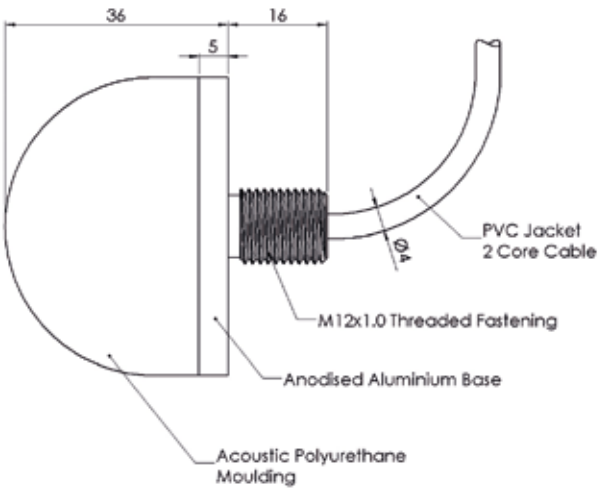


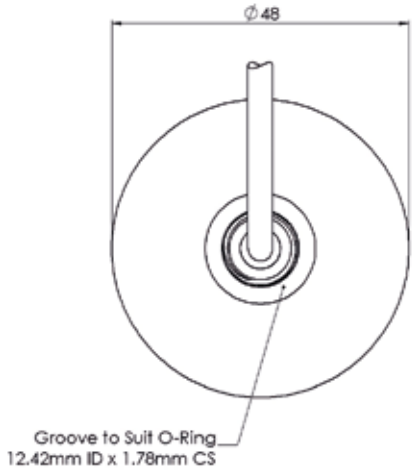


TECHNICAL SPECIFICATION

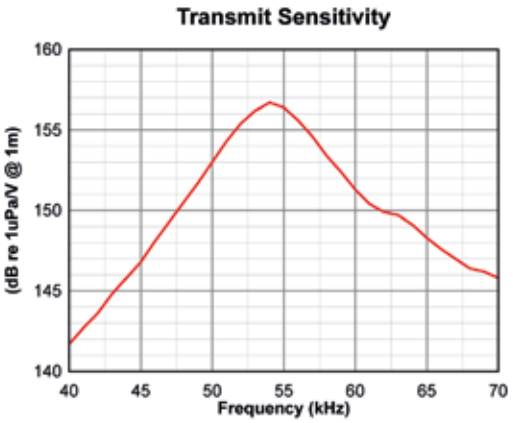
Resonant Frequency (Nominal)	55 kHz
Useful Operating Band	47 kHz to 62 kHz
Beam Pattern	Conical (See Graph)
Receive Sensitivity	-185 dB re 1V/µPa
Transmit Sensitivity	156 dB re 1µPa/V @ 1m
Capacitance at 1 kHz (with 1m cable)	12,000 pF
Transmit Voltage (Max)	250 Vrms
Transmit Voltage / Duty Cycle (Max)	250 Vrms at 10% 80 Vrms at 100%

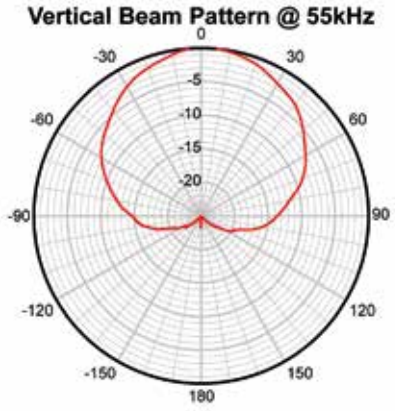
MODEL T204





All dimensions in mm





MECHANICAL SPECIFICATION

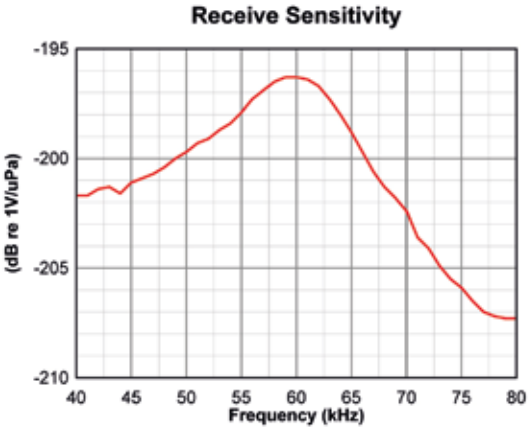
Operating Depth	1500m
Weight Air/Water (with 1m cable)	0.17 kg / 0.10 kg
Operating Temperature	-5 to +40 °C
Storage Temperature	-40 to +80 °C
Cable Type	Ø4mm Polyvinyl Chloride Jacket, Screened Twisted Pair
Cable Length	1m standard (Additional lengths supplied to order)

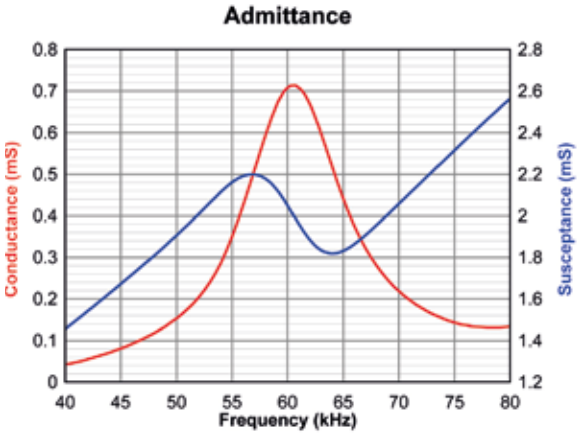
MODEL T216

- *60 KHZ CYLINDRICAL TRANSDUCER*
- *BROADBAND TRANSMISSION*
- *TRANSPONDER*
- *RANGE TRACKING*
- *COMMUNICATIONS*

The Type T216 is one of a series of underwater transducers available from Neptune that are designed for use in transponders, beacons, acoustic release mechanisms and data communication systems. This versatile transducer combines efficient broadband transmission and reception suited to tracking applications on underwater vehicles and range trials. The anodised aluminium base incorporates a threaded fastening and 'O' ring seal allowing simple and direct mounting onto equipment or pressure housings, washer and nut provided.

The T216 is available with or without acoustic calibration which is traceable to National Standards.

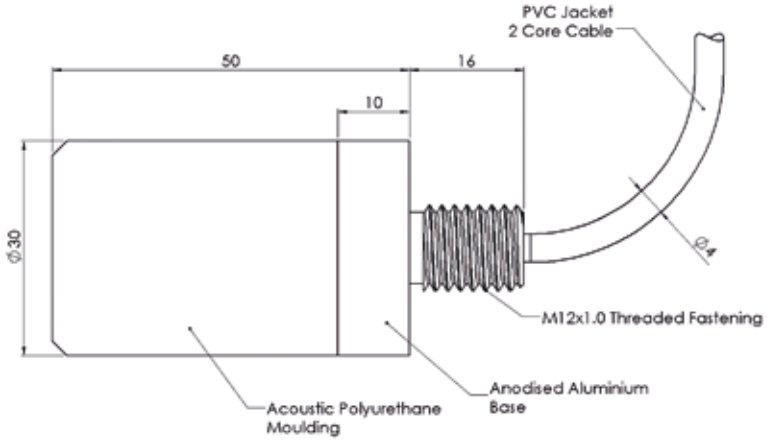




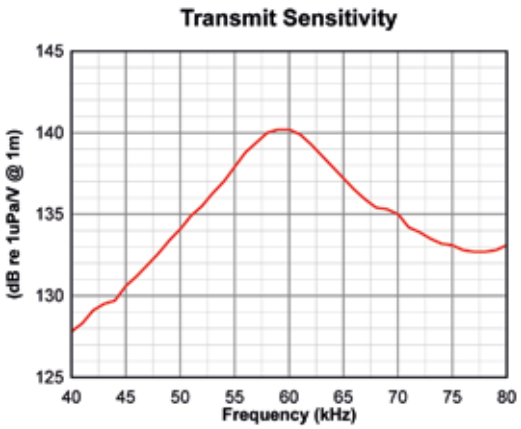
TECHNICAL SPECIFICATION

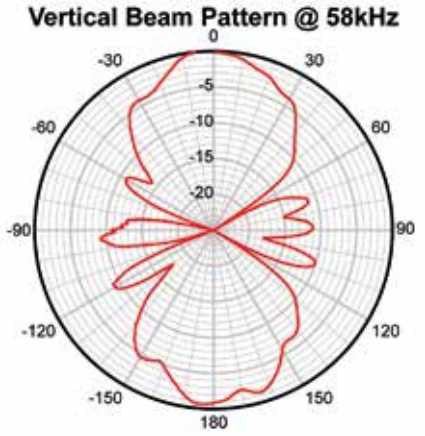
Resonant Frequency (Nominal)	60 kHz
Useful Operating Band	50 kHz to 70 kHz
Beam Pattern (Horizontal)	Omni ± 2 dB
Beam Pattern (Vertical)	Toroidal (See Graph)
Receive Sensitivity	-197 dB re 1V/µPa
Transmit Sensitivity	140 dB re 1µPa/V @ 1m
Capacitance at 1 kHz (with 1m cable)	5,000 pF
Transmit Voltage (Max)	600 Vrms
Transmit Voltage / Duty Cycle (Max)	600 Vrms at 10% 150 Vrms at 100%

MODEL T216



All dimensions in mm





MECHANICAL SPECIFICATION

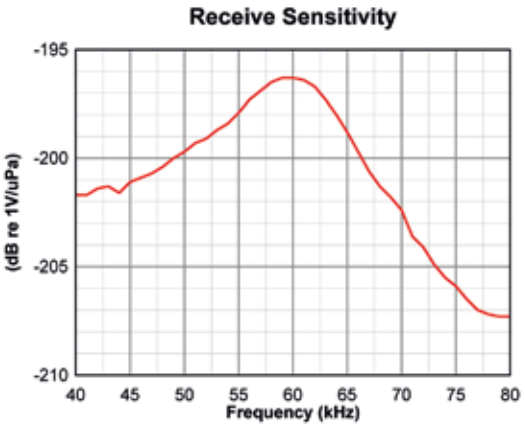
Operating Depth	1500m
Weight Air/Water (with 1m cable)	0.12 kg / 0.07 kg
Operating Temperature	-5 to +40 °C
Storage Temperature	-40 to +80 °C
Cable Type	Ø4mm Polyvinyl Chloride Jacket, Screened Twisted Pair
Cable Length	1m standard (Additional lengths supplied to order)

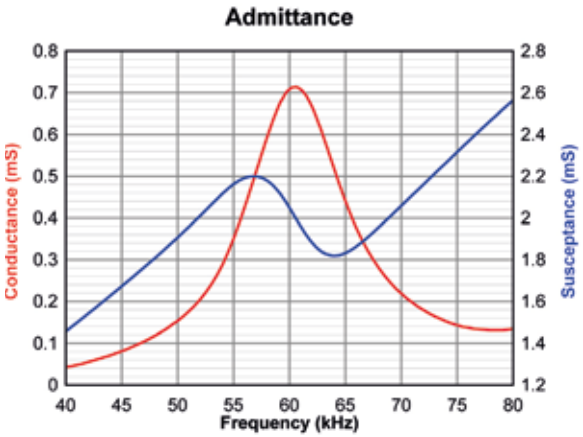
MODEL T226

- ***58 KHZ CYLINDRICAL TRANSDUCER***
- ***BROADBAND TRANSMISSION***
- ***TRANSPONDER***
- ***RANGE TRACKING***
- ***COMMUNICATIONS***

The Type T226 is one of a series of underwater transducers available from Neptune that are designed for use in transponders, beacons, acoustic release mechanisms and data communication systems. The anodised aluminium base incorporates 6 x M4 tapped holes and an 'O' ring seal allowing simple and direct mounting onto equipment or pressure housings.

The T226 is available with or without acoustic calibration which is traceable to National Standards.

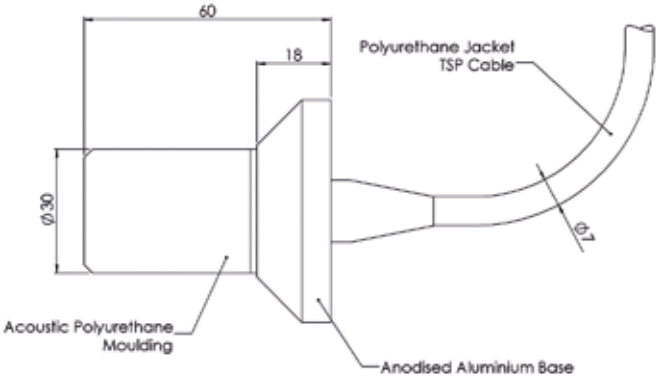


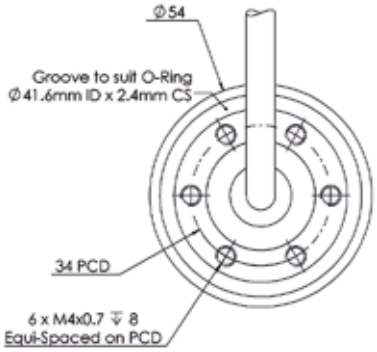


TECHNICAL SPECIFICATION

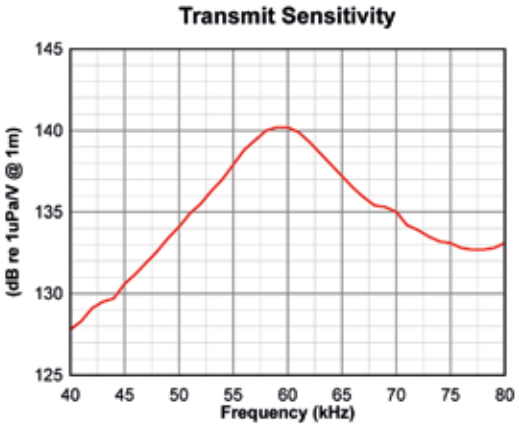
Resonant Frequency (Nominal)	60 kHz
Useful Operating Band	50 kHz to 70 kHz
Beam Pattern (Horizontal)	Omni ± 2 dB
Beam Pattern (Vertical)	Toroidal (See Graph)
Receive Sensitivity	-197 dB re 1V/µPa
Transmit Sensitivity	140 dB re 1µPa/V @ 1m
Capacitance at 1 kHz (with 1m cable)	5,100 pF
Transmit Voltage (Max)	600 Vrms
Transmit Voltage / Duty Cycle (Max)	600 Vrms at 10% 150 Vrms at 100%

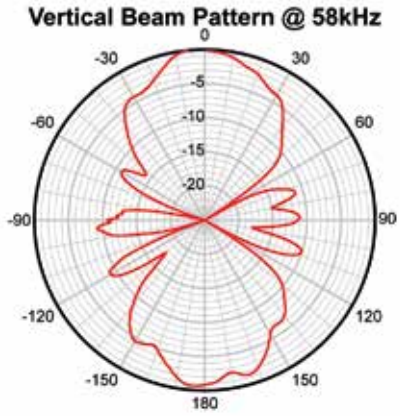
MODEL T226





All dimensions in mm





MECHANICAL SPECIFICATION

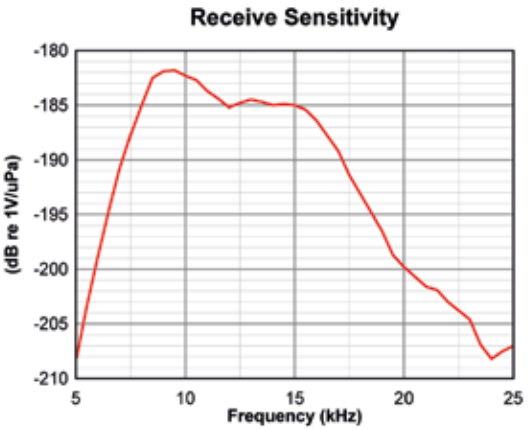
Operating Depth	1500m
Weight Air/Water (with 1m cable)	0.17 kg / 0.1 kg
Operating Temperature	-5 to +40 °C
Storage Temperature	-40 to +80 °C
Cable Type	Ø7mm Polyurethane Jacket, Screened Twisted Pair
Cable Length	1m standard (Additional lengths supplied to order)

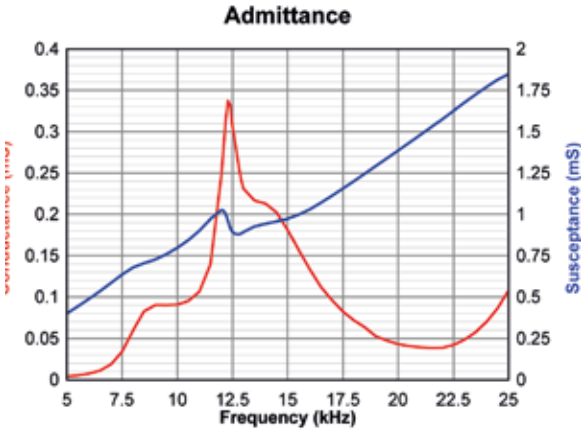
MODEL T413

- ***HEMISPHERICAL BEAM PATTERN***
- ***BROADBAND OPERATION***
- ***HIGH PERFORMANCE***
- ***LONG RANGE TRANSMISSION***
- ***LOW COST***

Designed for use in transponder beacons, data communication, acoustic release mechanisms and long-range base line systems, the T413 is a versatile transducer combining broadband transmission and reception over a hemispherical beam pattern. The over-moulded design onto an anodised aluminium base is lightweight and mechanically robust.

The T413 is available with or without acoustic calibration which is traceable to National Standards.

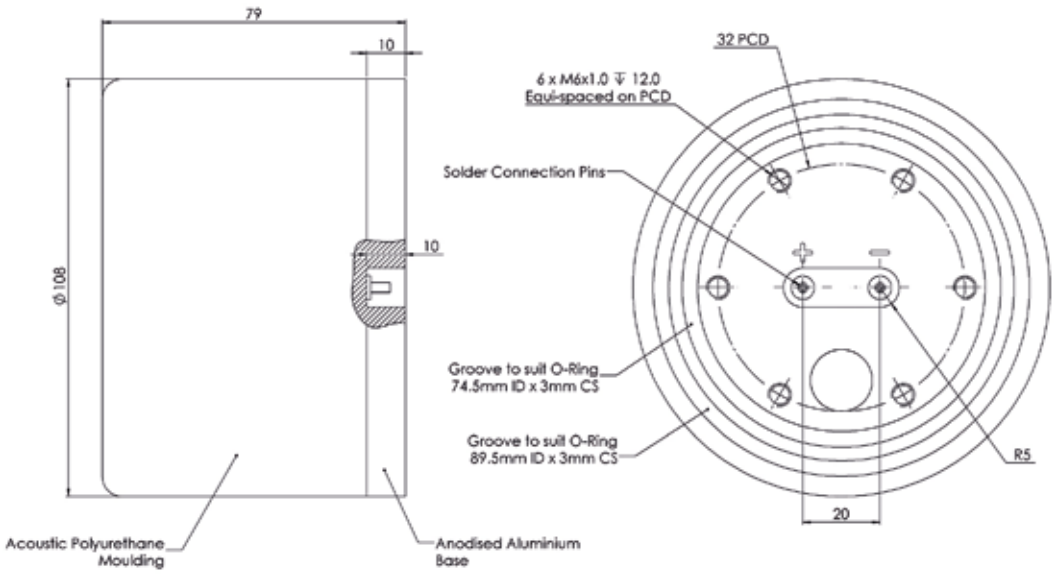




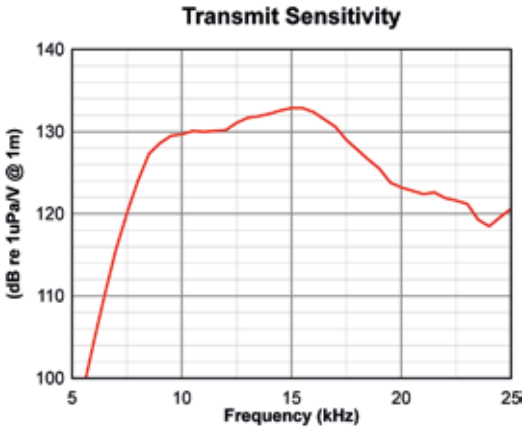
TECHNICAL SPECIFICATION

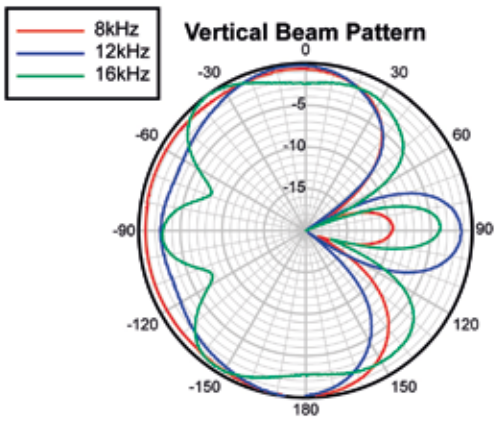
Resonant Frequency (Nominal)	9 / 15 kHz
Useful Operating Band	7 kHz to 17 kHz
Beam Pattern (Horizontal)	Omni ± 2 dB
Beam Pattern (Vertical)	Hemispherical / Toroidal (See Graph)
Receive Sensitivity	-183 dB re 1V/µPa
Transmit Sensitivity	130 dB re 1µPa/V @ 1m
Capacitance at 1 kHz (with 1m cable)	14,000 pF
Transmit Voltage (Max)	1200 Vrms
Transmit Voltage / Duty Cycle (Max)	1200 Vrms at 10% 350 Vrms at 100%

MODEL T413



All dimensions in mm





MECHANICAL SPECIFICATION

Operating Depth	1500m
Weight Air/Water (with 1m cable)	1.3 kg / 0.6 kg
Operating Temperature	-5 to +40 °C
Storage Temperature	-40 to +80 °C
Connection	2 x Solder Connection Pins

NEPTUNE SONAR

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