

Transducer Specification

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| Part Number: | BII-7528 |
| Signal Type: | Pulsed SINE, Chirp, PSK, FSK, Pulsed Square Waveform, etc. |
| Directivity Pattern: | Omnidirectional |
| -3dB Beam Width: | Refer to Directivity Response . |
| Side Lobe Level: | No side lobes |
| Free Capacitance Cr: | 5.5 nF ± 10% @ 1 kHz, 10 m cable. |
| Dissipation D: | 0.004 @ 1 kHz, 10 m cable. |
| Resonant Frequency f_s : | 130 kHz ± 5% 1. Efficiency is low in the frequency range far from f_s, so it is NOT recommended to operate transducer at frequency far from f_s. 2. Transducer can operate in low power at frequency far from f_s, the input power P_i should be much less than 1% MCIP at f_s. |
| Quality Factor Q_m : | 3.5 to 4.5 |
| TVR at f_s : | 143.0 ± 2 dB μ Pa/V@1m, Transmitting Voltage Response. |
| Radiation Sound Level SL: | SL = 20*log V_i + TVR, dB μ Pa@1m. Driving Voltage V_i is in unit of V_{rms} . |
| Admittance (G and B): | refer to G-B Graph . |
| Transducer without Impedance Matching Unit | |
| Driving Voltage V_i at f_s : | Pulsed Driving Signal and Duty Cycle D < 100%: Maximum V_i , $V_{imax} = \sqrt{(MIPP/G_{max})}$ or 200 , whichever is less, in V_{rms} . Continuous Operation at 100% Duty Cycle: Maximum V_i , $V_{imax} = \sqrt{(MCIP/G_{max})}$, in V_{rms} . To achieve higher sound level, built-in impedance matching is recommended to step up driving voltage inside the transducer. |
| Transducer with Impedance Matching Unit | |
| Driving Voltage V_i at f_s : | Pulsed Driving Signal and Duty Cycle D < 100%: $V_{imax} = \sqrt{(MIPP * Z)}$, in V_{rms} . Z is impedance with Impedance Matching Unit at f_s . Continuous Operation at 100% Duty Cycle: Maximum V_i , $V_{imax} = \sqrt{(MCIP * Z)}$, in V_{rms} . |
| Input Power P_i : | $P_i = V_i^2 * G$. Refer to G-B Graph : G is conductance, G_{max} is maximum G at f_s . |
| MIPP at f_s : | 130 Watts. |
| MPW at MIPP and f_s : | 4 Seconds, Maximum Pulse Width. |
| MCIP at f_s : | 21 Watts, Maximum Continuous Input Power. |
| How to determine pulse width, duty cycle and off-time with input pulse power (peak power) at f_s: | |
| <ol style="list-style-type: none"> 1. Determine the input pulse power (IPP, peak power) with sound intensity required by the project. IPP MUST be less than MIPP. 2. Pulse Width $\leq (MIPP * MPW * (120^\circ C - T) / 103^\circ C) / IPP$. T: Water Temperature in $^\circ C$. 3. Duty Cycle $D \leq MCIP * (120^\circ C - T) / 103^\circ C / IPP$. 4. Off-time $\geq PW * (1 - D) / D$. | |
| FFVS at f_s : | -208.0 ± 2 dB V/ μ Pa @ f_s , and -205.7 ± 2 dB V/ μ Pa @ $f \leq 25$ kHz. Free-field Voltage Sensitivity. $Sensitivity\ Loss\ over\ extension\ cable\ at\ f_s\ (dB) = 20 * \log \{ (1 + 2\pi f_s C_c / B) / \sqrt{[G^2 + (B + 2\pi f_s C_c)^2] / (G^2 + B^2)} \}$ G: Conductance at f_s ; B: Susceptance at f_s ; C_c : Capacitance of Extension Cable. Cable is of 100 pF/meter roughly. |
| Receiving Sound Level SL: | SL = 20*log V_o - FFVS, dB μ Pa. Receiving Voltage V_o is in unit of V_{rms} . |
| Operating Depth: | Maximum, 700 m and Limited by the cable length if the cable has wire leads or a non-waterproof connector. |
| Mounting Options: | <ol style="list-style-type: none"> 1. Default: Free Hanging (FH) 2. Thru-hole Mounting with Single O-ring (THSO) 3. Thru-hole Mounting with Double O-ring (THDO) 4. Bolt Fastening Mounting (Stainless Steel) (BFMSS) 5. End-face Mounting (EFM) 6. Flange Mounting (FGM) Please refer to online document AcousticSystem.pdf for a complete list of Mounting Options and more details. |
| Cable: | <ol style="list-style-type: none"> 1. Two Conductor Shielded Cable (SC), Rubber or PVC Jacket. 2. 50 Ω RG58 Coax (RG58) 3. 50 Ω RG174/U Coax (RG174) 4. 50 Ω RG178/U Coax (RG178) (Operating Temperature Range: -70°C To +200°C) 5. Shielded Cable with Twisted Pair and Teflon (PTFE) Jacket, $\Phi D=3.2$ mm (SC32), up to 200°C, AWG26 Conductors. 6. Shielded Cable with Twisted Pair and Teflon (PTFE) Jacket, $\Phi D=4.0$ mm (SC40), up to 200°C, AWG20 Conductors. 7. Two Conductor Unshielded Cable (USC) Handling: Do not use the cable to support transducer weight in air and water if the transducer has a mounting part. Do not bend the cable. |
| Cable Length: | <ol style="list-style-type: none"> 1. Default: 1 m. 2. Custom. |
| Connector: | <ol style="list-style-type: none"> 1. Default: Wire Leads (WL) 2. Male BNC (BNC) (Max. Diameter $\Phi 14.3$ mm) 3. SMA (Plug, Male Pin) (SMA), Voltage Rating: 335 VRMS Continuous. (Max. Diameter $\Phi 9.24$ mm) 4. SMC (Plug, Female Socket) (SMC), Voltage Rating: 335 VRMS Continuous. (SMC) (Max. Diameter $\Phi 6.4$ mm) 5. MIL-5015 Style (pin) (5015) (Max. Diameter $\Phi 30$ mm with 3 contacts) 6. LEMO (Plug Male Pins) (LEMO) (Max. Diameter $\Phi 9.5$ mm with 3 contacts) 7. Underwater Mateable Connector (pin) (UMC) (Max. Diameter $\Phi 21.5$ to $\Phi 35$ mm) 8. Customized, buyer specifies the connector. (Custom) Note: Underwater Mateable Connector is for uses underwater. Other connectors and wire leads are for dry uses and are not waterproofed. |
| Size: | $\Phi 19 \times 38$ mm with Free Hanging. Refer to Mechanical Drawing. |
| Weight in Air: | 429 grams with 10 m cable and Free Hanging. |

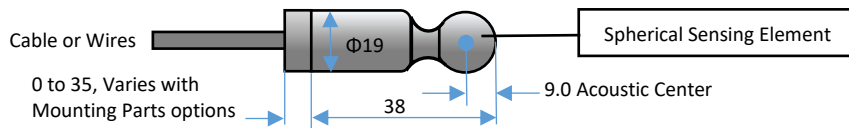
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| Operation Temperature: | 1. Default: -10 °C to +60 °C or 14 °F to 140 °F. 2. Bespoke High Temperature Transducer: -10 °C to 120 °C, or 14 °F to 248 °F. Append HT to part number. |
| Storage Temperature: | -20 °C to +60 °C or -4 °F to 140 °F. |
| Impedance Matching: | BII-6000 Bespoke Impedance Matching between transducers and power amplifiers. Order Separately. Append IM to the part number for integrating BII-6000 in the transducer, and specify impedance in Ω . For example, BII-xxxxIM50 Ω : BII-xxxx transducer with built-in Impedance Matching unit as a 50 Ω load. |
| TR Switch: | BII-2100 Transmitting & Receiving Switch. Not Included. Order Separately, Append TR to part number (BII-xxxxTR). |
| Temperature Sensor: | 1. Default: No built-in temperature sensor. 2. Built-in temperature sensor. Append TS to part number (BII-xxxxTS) for integrating a temperature sensor in the transducer. |

WARNING: DANGER — HIGH VOLTAGE on wires. Wires shall be insulated for safety. DO NOT TOUCH THE WIRES BEFORE THE DRIVING SIGNAL IS SHUT DOWN. Cable shield must be grounded firmly for safety.

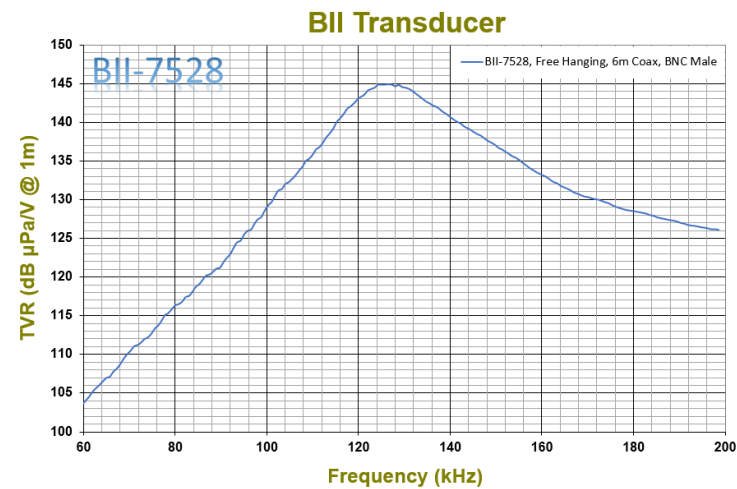
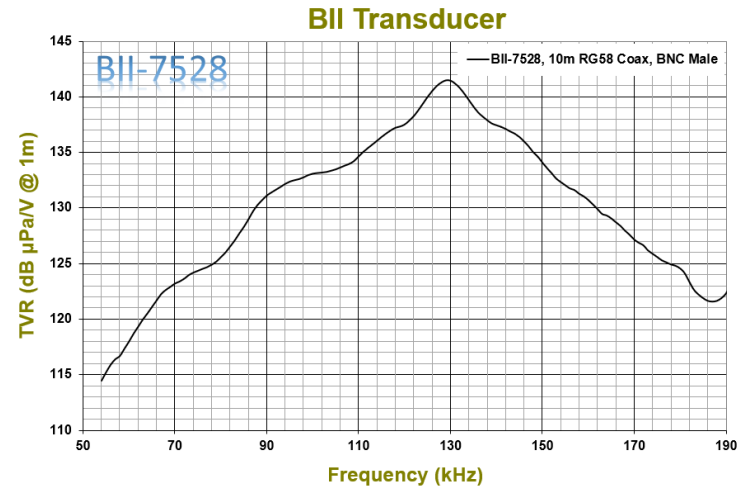
for 50 Ω BNC/SMA/SMC connector, it is buyer's sole responsibility to make sure that the BNC/SMA/SMC shield of the signal source is firmly grounded for operating safety before hooking up transducer/hydrophone to the signal source. Coax with BNC/SMA/SMC is not intended for hand-held use at voltages above 30Vac/60Vdc.

| Transducer Wiring: | Two Conductor Shielded Cable | Coax/BNC/SMA/SMC | Underwater Connector | MIL-5015 Connector |
|-------------------------|------------------------------|------------------|----------------------|--------------------|
| Signal | White or Red | Center Contact | Contact 2 | Contact C |
| Signal Common | Black | Shield | Contact 1 | Contact B |
| Shielding and Grounding | Shield | Shield | Contact 3 | Contact A |

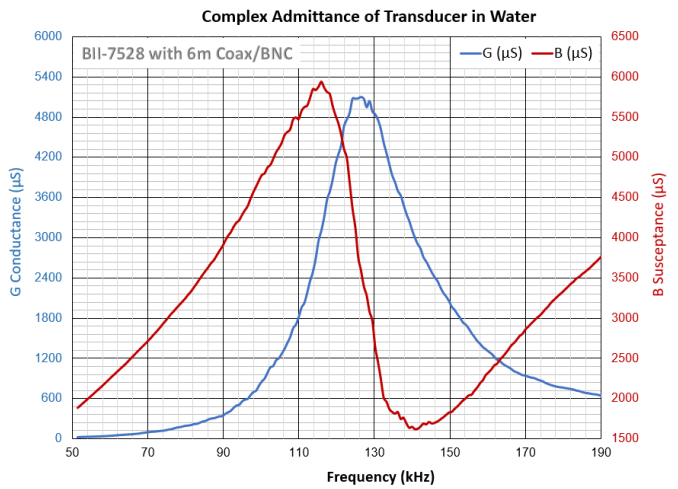
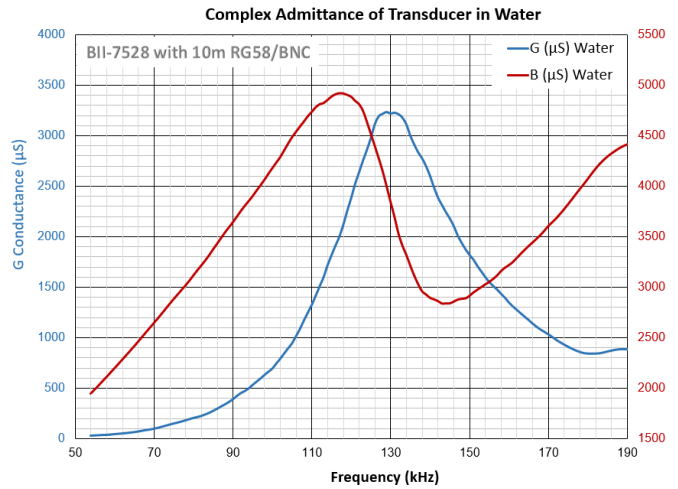
Physical Size (unit: mm):



Transmitting Voltage Response (TVR):



Admittance



Directivity Response:

