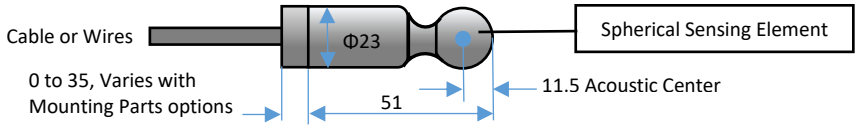
Transducer Specification

Part Number:	BII-7527
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 C_f:	10.6 nF ± 10% @ 1kHz, 1m cable.
Dissipation D:	0.004 @ 1kHz, 1m cable.
Resonant Frequency f_s:	90 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 fs, the input power P_i should be much less than 1% MCIP at f_s.
Quality Factor Q_m:	4.2
TVR at f_s:	148.0 dB µPa/V@1m, Transmitting Voltage Response.
Radiation Sound Level SL:	SL = 20*logV_i + TVR, dB µPa@1m. Driving Voltage V_i is in unit of V_{rms}.
Admittance (G and B):	G_{max} = 7.7 mS, B = 5.4 mS @ fs
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} = √(MIPP/G_{max}) or 300, whichever is less, in V_{rms}.
	Continuous Operation at 100% Duty Cycle: Maximum V_i, V_{imax} = √(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} = √(MIPP * |Z|), in V_{rms}. Z is impedance with Impedance Matching Unit at fs.
	Continuous Operation at 100% Duty Cycle: Maximum V_i, V_{imax} = √(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:	300 Watts, Maximum Input Pulse Power.
MPW at MIPP and f_s:	8 Seconds, Maximum Pulse Width.
MCIP at f_s:	47 Watts, Maximum Continuous Input Power.
How to determine pulse width, duty cycle and off-time with input pulse power (peak power) at fs: 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 ≤ (MIPP * MPW*(120°c-T)/103°c)/IPP. T: Water Temperature in °c. 3. Duty Cycle D ≤ MCIP*(120°c-T)/103°c)/IPP. 4. Off-time ≥ PW*(1-D)/D.	
FFVS at f_s:	Free-field Voltage Sensitivity: -202.3 dB V/µPa @ f ≤ 40 kHz; and -205.8 dB V/µPa @ fs.
	$Sensitivity\ Loss\ over\ extension\ cable\ at\ f_s\ (dB) = 20 * \log\{(1 + 2\pi f_s C_c/B)/\sqrt{[G^2 + (B + 2\pi f_s C_c)^2]/(G^2 + B^2)}\}$ 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*logV_o - FFVS, dB µPa. Receiving Voltage V_o is in unit of V_{rms}.
Operating Depth:	Maximum, 600 m and Limited by the cable length if the cable has wire leads or a non-waterproof connector.
Mounting Options:	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) Please refer to online document **AcousticSystem.pdf** for a complete list of Mounting Options and more details.
Cable:	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, ΦD=3.2 mm (SC32), up to 200°C, AWG26 Conductors. 6. Shielded Cable with Twisted Pair and Teflon (PTFE) Jacket, ΦD=4.0 mm (SC40), up to 200°C, AWG20 Conductors.
	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:	1. Default: 1m 2. Custom
Connector:	1. Default: Wire Leads (WL) 2. Male BNC (BNC) (Max. Diameter Φ14.3 mm) 3. SMA (Plug, Male Pin) (SMA), Voltage Rating: 335 VRMS Continuous. (Max. Diameter Φ9.24 mm) 4. SMC (Plug, Female Socket) (SMC), Voltage Rating: 335 VRMS Continuous. (SMC) (Max. Diameter Φ6.4 mm) 5. MIL-5015 Style (pin) (5015) (Max. Diameter Φ30 mm with 3 contacts) 6. LEMO (Plug Male Pins) (LEMO) (Max. Diameter Φ9.5 mm with 3 contacts) 7. Underwater Mateable Connector (pin) (UMC) (Max. Diameter Φ21.5 to Φ35 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:	Refer to Mechanical Drawing.
Weight in Air:	430 grams with 10 m cable.
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.

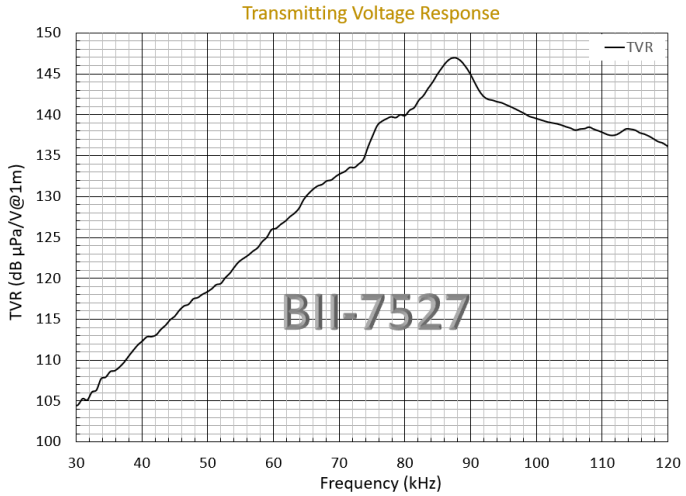
Impedance Matching:	BII-6000 Bespoke Impedance Matching between transducers and power amplifiers. Order Separately. Append **IM** to the part number for integrating BII-6000 in the transducer, and specify impedance in Ω. For example, BII-xxxxIM50Ω: BII-xxxx transducer with built-in Impedance Matching 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.
Potable Transmitter:	BII-8030 series portable acoustic transmitters.
Portable T/R System:	BII-8080 series portable transmit and receive systems.
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 50Ω 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.	

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

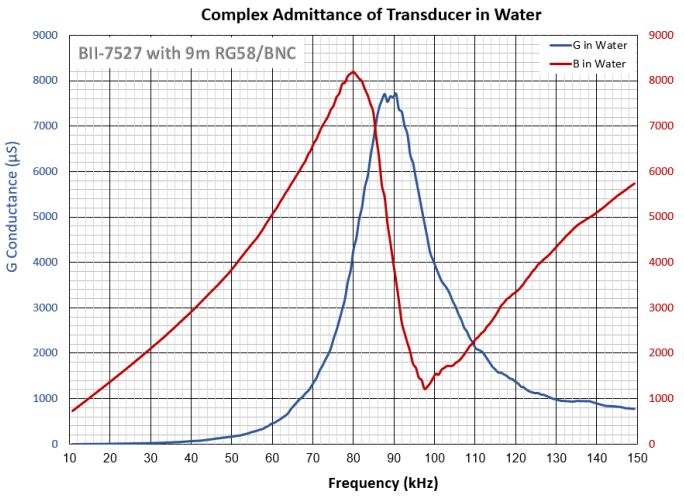
Physical Size (unit: mm):



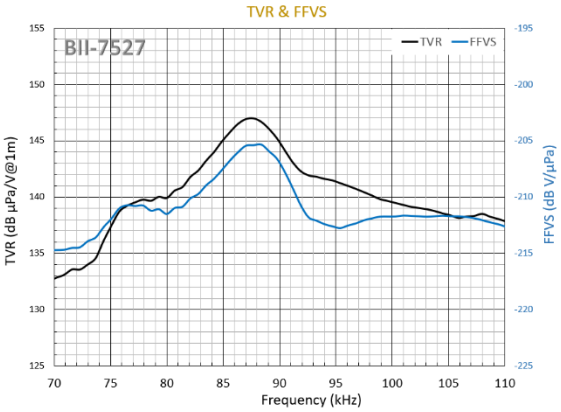
Transmitting Voltage Response (TVR):



Admittance in Water:



TVR and FFVS around fs:



Directivity Pattern: