Spherical Sector Directivity Transducer

BII-7760 series transducers are high power spherical sector beam transducers with a wide range of frequencies available (up to 2 MHz) to insonify and listen wide field of interest in water or liquids, or to insonify the R & D subject as ultrasonic sources.

Typical Applications

Wide Beam Ultrasonic Source Directional Underwater Communication Navigation/Obstacle Avoidance/Fishery Sonar Pinger/Locator/Transponder

Specification

Transducer:		**BII-7762/200**	**BII-7762/400**	**BII-7762/600**	**BII-7760Q/1000**	**BII-7760Q/2000**
Signal Type:		Pulsed SINE, Chirp, PSK, FSK, Pulsed Square Waveform, Continuous Wave, etc.				
Resonant Frequency fs:		200 kHz	400 kHz	600 kHz	1 MHz	2 MHz
		1. In stock: 100, 120, 150, 200, 250, 300, 400, 500, 600 kHz, 1 MHz, 2 MHz. 2. Customized: 100 kHz to 2 MHz. Note: the transducer can operate at its 3rd harmonics.				
Quality Factor:	High Q_m	Not Available		≥ 10 for fs > 500 kHz		
	Low Q_m	≤ 4 to 6 for fs ≤ 500 kHz		≤ 6 for fs > 500 kHz		
	Note	-3dB Bandwidth=fs/Q_m. 1. Default: high Q_m is ONLY for fs > 500 kHz Transducers. 2. Customization: append **LQ** to Part Number for Low Q_m transducer (fs > 500 kHz). For example, BII-7760Q/1000LQ is 1MHz transducer with Q_m ≤ 6.				
TVR @fs µPa/V@1m	High Q_m	Not Available	Not Available	163.0 dB at high Q_m	165.0 dB at high Q_m	168.3 dB at high Q_m
	Low Q_m	148.0 dB	151.0 dB	158.5 dB at low Q_m	160.0 dB at low Q_m	164.0 dB at low Q_m
FFVS @fs (V/µPa):		-196 dB	-199 dB	-202 dB	-212.5 dB	-216 dB
		Sensitivity Loss over Extension Cable (dB) = 20*log[C_h/(C_h+C_c)]. C_h: Hydrophone Capacitance; Cc: Capacitance of Extension Cable. Cable is of 100 pF/meter roughly. Valid for a transducer without preamplifier.				
-3dB Beamwidth at fs:		60°	60°	40°	23°	27°
		Customized: up to 120°. Transducer size varies with -3dB Beamwidth, and maximum diameter: 0.25m.				
Main Lobe Fluctuation:		≤ ± 2 dB				
Directivity Pattern:		Spherical Sector				
Side Lobe Level:		≤ -20 dB				
Free Capacitance:		4.8 nF	6.3 nF	7.65 nF	2.0 nF	0.93 nF
Dissipation:		0.008	0.008	0.005	0.005	0.003
Admittance at fs:		G=6.8mS, B=5.6mS.	G=9.0 mS, B=8.5 mS	G=10.1mS, B=15.2mS.	G=19.5mS, B=6.68mS.	G=26.0mS, B=7.0mS.
Driving Voltage:		≤ 600 V_{rms}	≤ 600 V_{rms}	≤ 600 V_{rms}	≤ 500 V_{rms}	≤ 210 V_{rms}
		Higher MIPP can be achieved with built-in impedance matching network which amplifies the driving voltage inside transducer.				
MIPP at f_s:		850 W	400W	960 W	470 W	450 W
MPW at MIPP and f_s:		4 Seconds	3 Seconds	2.0 Seconds	0.62 Seconds	0.35 Seconds
MCIP at f_s:		20 W	20 W	25 W	7.7 W	9.5 W
MIPP: Maximum Input Pulse Power at f_s; MPW: Maximum Pulse Width at MIPP and at f_s; Maximum Continuous Input Power at f_s. **How to determine pulse width, duty cycle and off-time with input pulse power (peak power) at f_s:** 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.						
Operating Depth:		≤ 100 m	≤ 100 m	≤ 50 m	≤ 50 m	≤ 50 m
		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) 5. End-face Mounting (EFM) 6. Flange Mounting (FGM) 7. Flush Mounting (FSM) 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.				

	7. Custom Cable (Custom).
	Handling: Do not use the cable to support transducer weight in air and water if the transducer has mounting part. Do not bend cable.
Cable Length:	1. Default: 1 m. 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 ΦDxH (mm):	Φ60 x 35 | Φ60 x 35 | Φ60 x 35 | Φ27 x 35 | Φ27 x 35 1. Length L ≥ 35. Actual length depends on Mounting Parts. 2. **Transducer size varies with customized -3dB Beamwidth.**
Weight:	≥ 0.55 kg with 10 m cable. Actual weight depends on Mounting Parts, Cable Types and Length.
Operation Temperature:	-10 °C to +60 °C or 14 °F to 140 °F.
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 listed above for integrating BII-6000 in the transducer, and specify impedance in Ω. For example, BII-7760IM50Ω: BII-7760 transducer with built-in Impedance Matching unit as a 50 Ω load.
Temperature Sensor:	1. Default: No built-in temperature sensor. 2. Built-in temperature sensor. Append **TS** to part number (BII-7760TS) 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 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.

Transducer Wiring:

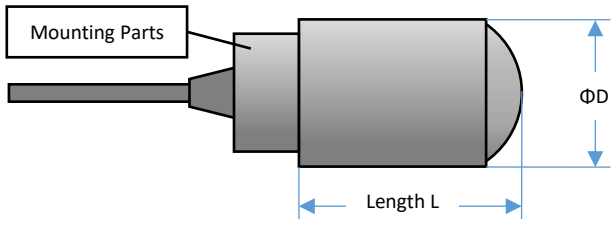
Wiring:	**Two Conductor Shielded Cable**	**BNC, SMC, or SMA**	**Underwater Connector**	**MIL-5015 Connector**	**LEMO Connector**
Signal	White or Red	Center Contact	Contact 2	Contact C	Contact 2
Signal Common	Black	Shield	Contact 1	Contact B	Contact 1
Shielding and Grounding	Shield	Shield	Contact 3	Contact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

How to Order Customized Transducers. Ignore the parameter for default value or option if it is not needed for your application.

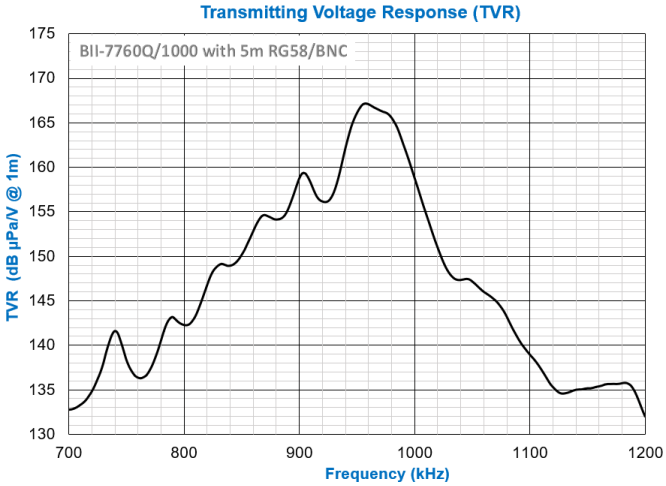
Part Number	**TS and/or IM**	**/fs**	**-BW**	**-Q_m**	**-Mounting**	**-Cable Length**	**-Cable**	**-Connector**
Transducer	Temperature Sensor Impedance Matching	in kHz	-3dB Beamwidth	LQ if available	Refer to specs.	in meter	Refer to specs.	

Example of Part Number:	**Description**
BII-7760/200kHz-40°-FH-10m-SC-WL	BII-7760 transducer, 200kHz, -3dB Beamwidth: 40°, Free Hanging, 10m Shielded Cable, Wire Leads.
BII-7760Q/1000LQ-FH-10m-SC-WL	BII-7760 transducer, 1000kHz, low Q_m, Free Hanging, 10m Shielded Cable, Wire Leads.
BII-7760IM50Ω/200kHz-40°-FH-10m-SC-WL	BII-7760 transducer, built-in Impedance Matching unit as 50Ω load, 200kHz, -3dB Beamwidth: 40°, Free Hanging, 10m Shielded Cable, Wire Leads.
BII-7760TSIM50Ω/200kHz-40°-FH-10m-SC-WL	BII-7760 transducer, built-in temperature Sensor, built-in Impedance Matching unit as 50Ω load, 200kHz, -3dB Beamwidth: 40°, Free Hanging, 10m Shielded Cable, Wire Leads.

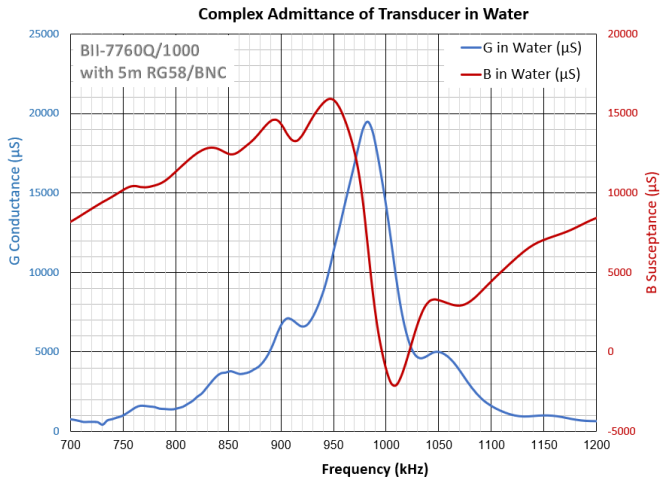
Physical Size (Dimensional Unit: mm)

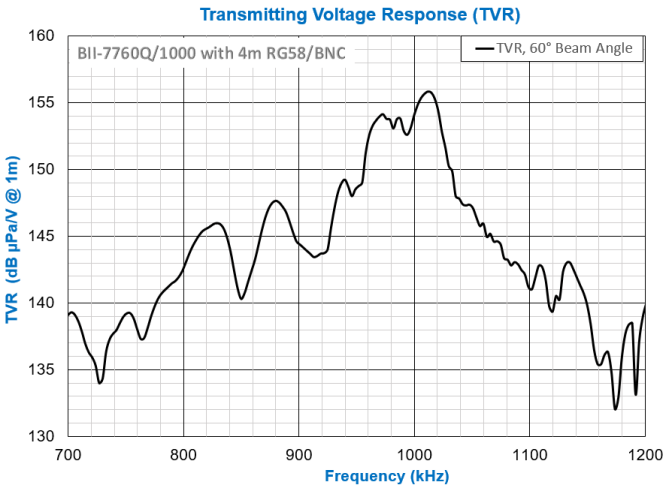


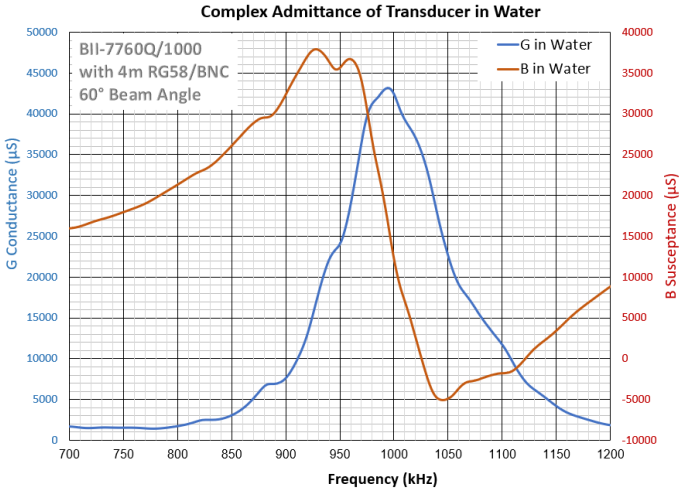
TVR (Customized High $Q_m \geq 10$)



Admittance: (Customized High $Q_m \geq 10$)







Directivity Pattern (Customized):