



BII7000 Series Omnidirectional Spherical Hydrophone

BII's spherical hydrophones provide omnidirectional responses up to 700kHz and offer excellent acoustic characteristics of low noise and durability, which make these hydrophones ideal for a wide range of oceanography applications. Bespoke built-in preamplifiers allow the hydrophones to be used with long extension cables with no loss in sensitivity. The customized built-in filters increase Signal-to-Noise Ratio, reject unwanted noises, and avoid saturation.

Typical Applications

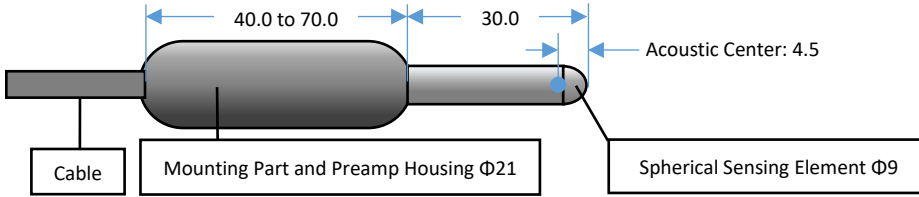
Sonobuoy, Dipping Hydrophone. LBL, SBL, USBL Positioning. Parabolic Antennas Underwater. Reference Hydrophone, Noise Measurement.	Detection of Ultrasonic Cavitation Noise, Thermoacoustics in Gas. Passive Acoustic Monitoring (PAM System). Array Element, Vector Hydrophone Element. Marine Bioacoustics, Phantom-power Hydrophone, Sound Recording.
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SPECIFICATION

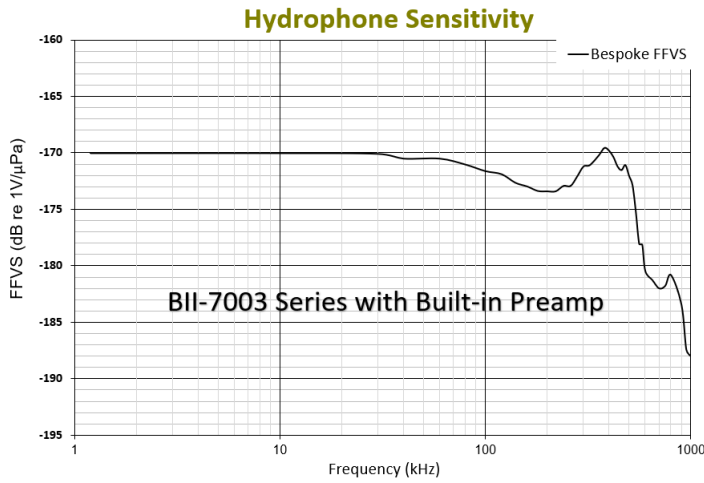
Part Number:	BII7003FG	BII7003PG
Sensitivity @ 1 kHz:	(-211 + Preamp Gain) dB V/μPa. Variation: ± 2dB	
Free-field Voltage Sensitivity:	Refer to Graph of FFVS vs. Frequency .	
Usable Frequency in Water:	1 Hz ~ 560 kHz at ±3dB V/μPa	
Usable Frequency in Air:	1 Hz ~ 20 kHz at -3dB V/μPa	
Directivity Pattern:	Omnidirectional, Refer to Graph of Beam Pattern .	
Pressure Noise Density:	Refer to Graph of Pressure Noise Density , Referred to Input (RTI), in μPa/√Hz.	
Bespoke Preamp Gain (dB):	Fixed Gain Preamp: 1. Default 40 dB. 2. Customized: -40 to +60 dB available.	Programmable Gain Preamp: 1. Default: 0, 20, 40, 60 dB. -3dB Bandwidth: ≤40dB: 1MHz, 60dB: 350kHz. 2. Bespoke: 20, 40, 60, 80 dB. -3dB Bandwidth: ≤60dB: 1MHz, 80dB: 350kHz.
Gain Selection Voltage: (Programmable Gain Preamp)	N/A	CMOS/TTL Compatible Logic Low 0: Gain Selection Wire to COM or 0 to +0.8VDC. Logic High 1: Gain Selection Wire Open or +2.4 to Vs.
Built-in Filters:	Bespoke High Pass or Band Pass filter.	
Output Type:	Single Ended or Differential, specify when ordering.	
Maximum Output V_{omax}:	Maximum Output of the built-in preamplifier, in Vpp.	
Overload Pressure Level:	211 or $[20 \cdot \log(V_{omax}/2.828) - \text{Sensitivity}]$, whichever is less. in dB μPa.	
Acceleration Sensitivity:	130.8 dB μPa/(m/s ²)	
Maximum Operating Depth:	300 m, and limited by the cable length if the cable has wire leads or a non-waterproof connector.	
Mounting Options:	1. Free Hanging (FH) 2. Free-hanging with Male Underwater Connector (FHUWC) 3. Thru-hole Mounting with Single O-ring (THSO) 4. Thru-hole Mounting with Double O-ring (THDO) 5. Bolt Fastening Mounting (Plastics) (BFMP) 6. Bolt Fastening Mounting (Stainless Steel) (BFMSS) Please refer to online document AcousticSystem.pdf for a complete list of Mounting Options and more details.	
Cable:	Four Conductor Shielded Cable (SC)	Six Conductor Shielded Cable (SC)
Cable Length:	1. Default: 10 m. 2. Custom-fit Cable Length up to 305 m.	
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. 1/8" (3.5mm) TRS Plug (TRS35) (Max. Diameter Φ10.5 mm) 6. XLR (pin) (XLR) (Max. Diameter Φ20.2 mm) 7. MIL-5015 Style (pin) (5015) (Max. Diameter Φ30 mm with 3 contacts) 8. LEMO (Plug Male Pins) (LEMO) (Max. Diameter Φ9.5 mm with 3 contacts) 9. Underwater Mateable Connector (pin) (UMC) (Max. Diameter Φ21.5 to Φ35 mm) 10. +9VDC Battery Snap (BS) (Exclusive to preamplified hydrophone) 11. 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.	
Supply Voltage Vs:	+4.5 to +30 VDC, Preamplifier dependent.	
Suggested DC Supply:	+9VDC Battery, Marine Battery, Automobile Battery, Fixed DC Linear Power Supply, Not Included. DO NOT use variable power supply whose maximum supply voltage is higher than the rated voltage. DO NOT use switching mode DC power supply.	
Current (Quiescent):	0.4 to 12 mA, Preamplifier dependent.	
Size:	ΦD = Φ21mm and Φ9 mm, Length ≥ 70 mm and actual length depends on Mounting Parts.	
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.	

Wiring of Fixed-gain Hydrophone					
Wiring of Single Ended Output:	Wire Leads	BNC Male and 9V Battery Snap	Underwater Connector	XRL Plug and 9V Battery Snap	TRS Plug and 9V Battery Snap
+VDC	Red	Female Snap	Pin 3	Battery Female Snap	Battery Female Snap
Common	Black	Male Snap	Pin 1	Battery Male Snap	Battery Male Snap
Signal	White	BNC Center Pin	Pin 2	XRL Pin 2	TRS Tip and Ring
Signal Common	Blue or Green	BNC Shield	Pin 4	XRL Pin 1 and Pin 3	TRS Sleeve
Shielding	Shield	N/A	N/A	XRL Metal Shell	N/A
Wiring of Differential Output:	Wire Leads	Underwater Connector		XRL + 9V Battery Snap	TRS + 9V Battery Snap
+VDC	Red	Pin 3		Battery Female Snap	Battery Female Snap
Common	Black	Pin 1		Battery Male Snap	Battery Male Snap
Signal+	White	Pin 2		XRL Pin 2	TRS Tip
Signal-	Blue or Green	Pin 4		XRL Pin 3	TRS Ring
Signal Common	N/A	N/A		XRL Pin 1	TRS Sleeve
Shielding	Shield	N/A		XRL Metal Shell	N/A
Wiring Information of Hydrophones with Two-bit Programmable Gain Preamps:					
Wiring of Single Ended Output:	Wire Leads	9V Battery Snap and BNC Male/SMA/SMC	Underwater Connector	XLR Plug + 9V Battery Snap	TRS Plug + 9V Battery Snap
+VDC	Red	Battery Female Snap	Pin 3	Battery Female Snap	Battery Female Snap
Common	Black	Battery Male Snap	Pin 1	Battery Male Snap	Battery Male Snap
Digital Common		Black		Black	
Digital A1 (Gain Selection)	Yellow or Brown	Yellow or Brown	Pin 5	Yellow or Brown	Yellow or Brown
Digital A0 (Gain Selection)	Blue	Blue	Pin 6	Blue	Blue
Output Signal	White	BNC/SMA/SMC Center	Pin 2	XLR Pin 2	TRS Tip
Output Signal Common	Green	BNC/SMA/SMC Shield	Pin 4	XLR Pin 1 and Pin 3	TRS Ring and Sleeve
Shielding	Shield	Shield	N/A	XLR Metal Shell	N/A
Wiring of Differential Output:	Wire Leads	Underwater Connector	XLR Plug + 9V Battery Snap		TRS Plug + 9V Battery Snap
+VDC	Red	Pin 3	Battery Female Snap		Battery Female Snap
Common	Black	Pin 1	Battery Male Snap, XLR Pin 1.		Battery Male Snap, TRS Sleeve.
Digital Common			Black		Black
Digital A1 (Gain Selection)	Yellow or Brown	Pin 5	Yellow or Brown		Yellow or Brown
Digital A0 (Gain Selection)	Blue	Pin 6	Blue		Blue
Output Signal +	White	Pin 2	XLR Pin 2		TRS Tip
Output Signal -	Green	Pin 4	XLR Pin 3		TRS Ring
Shielding	Shield	N/A	XLR Metal Shell		N/A
Selecting Sensitivity FFVS of Two-bit Digitally Programmable					
Gain Selection Wire A1	Gain Selection Wire A0		Hydrophone Sensitivity at 1 kHz		
0 (Logic Low)	0 (Logic Low)		-211 + 0 or 20 dB V/μPa		
0 (Logic Low)	1 (Logic High)		-211 + 20 or 40 dB V/μPa		
1 (Logic High)	0 (Logic Low)		-211 + 40 or 60 dB V/μPa		
1 (Logic High)	1 (Logic High)		-211 + 60 or 80 dB V/μPa		

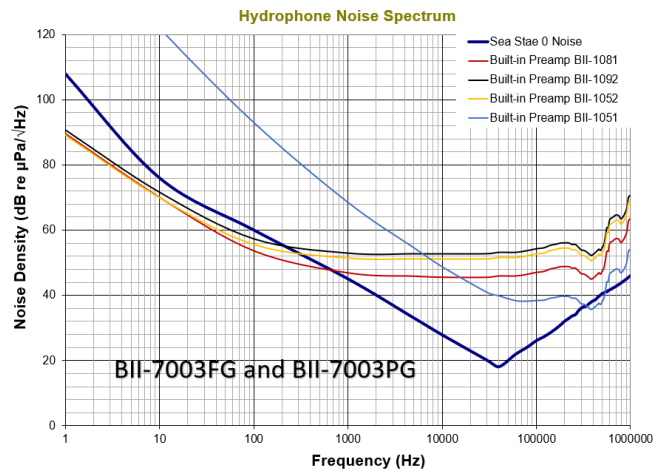
Physical Size (Dimensional Unit: mm): The overall length varies with the length of the built-in preamplifier.



Free-field Voltage Sensitivity (FFVS):



Pressure Noise Density (RTI, referred to the input):



Directivity Pattern:

