

Hemispherical Hydrophone

BII7040 Series Hemispherical Hydrophone

The BII7040 series hydrophones provide 60° directivity response approximately at fs resonance, which is designed to detect known sound sources with wide beam angle and provide omnidirectional directivity response in low frequency range in which the wavelength is much greater than the physical size of the hydrophone. With Hemispherical Hydrophones, noises at certain directions are reduced, and maximum response to signals is at acoustic axial direction. Hemispherical hydrophones are optimum wide beam acoustic receiving apertures for being installed on underwater platforms.

Typical Applications

Directional hydrophone, Sonobuoy Underwater Communication Thermoacoustics in Gas	LBL, SBL, USBL Positioning, Array Element Underwater Sound Recording, Marine Bioacoustic Research Passive Acoustic Monitoring (PAM System)
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Specification

Part Number:	BII7043	BII7043HT
Sensitivity @ 1kHz:	-211.0 dB V/μPa + Sensitivity Loss over Cable. Variation: ± 2 dB. Sensitivity Loss over Extension Cable (dB) = 20*log[(C _n +C _c)/C _n]. C _n : Hydrophone Capacitance; C _c : Capacitance of Extension Cable. Cable is of 100 pF/meter roughly. Valid for hydrophone without preamplifier.	
FFVS:	Refer to Graph of FFVS vs. Frequency . Free-field Voltage Sensitivity.	
Usable Frequency in Water:	1 Hz ~ 650 kHz at ±3dB V/μPa	
Usable Frequency in Air:	1 Hz ~ 20 kHz at -3dB V/μPa	
Capacitance C _n @ 1kHz:	0.81 nF ± 10% without cable.	
Dissipation @ 1kHz:	0.0044	
Directivity Pattern:	Omnidirectional at Low Frequency to 60° at High Frequency, Refer to Graph of Beam Pattern .	
Noise Density at f << fs: dB μPa/√Hz	40.5 – 10*log f 1. f in kHz; fs: Resonance Frequency which is close to the frequency of maximum FFVS. 2. Noise densities in this datasheet are calculated values with transducer parameters being measured in water. 3. As hydrophones works with preamps or data acquisition modules, total noise density is determined by all noise sources. Generally, the total noise density is much higher than the ones stated in this datasheet.	
Output Type:	Single Ended	
Acceleration Sensitivity:	136.8 dB μPa/(m/s ²)	
Underwater Projector:	Yes. Do NOT use the hydrophone as a sound projector in the air otherwise the hydrophone will be damaged.	
Resonance fs:	400 kHz	
Maximum Drive Voltage:	300 Vpp	
Maximum Pulse Length:	100 mS at Maximum Drive Voltage	
Duty Cycle in Water:	10% at Maximum Drive Voltage. 100% ≤ 30 Vpp or 10.6 Vrms.	
Operating Depth:	500 m or 5 MPa, Maximum.	50 m or 0.5 MPa, Maximum.
	Limited by the cable length if the cable has wire leads or a non-waterproof connector.	
Mounting Options:	1. Default: 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-M12x1.5) 6. Bolt Fastening Mounting (Stainless Steel) (BFMSS)	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 Options:	1. Default: Coax RG174/U (RG174) 2. Coax RG58/U (RG58) 3. Shielded Cable with Rubber Jacket, ΦD=6.5 mm (SC65).	1. Default: Coax RG178/U (RG178). 2. Shielded Cable with Twisted Pair, PTFE Jacket. ΦD=3.2 mm (SC32). Non-waterproof, dry use ONLY.
Cable Length:	Default: 6 m. Custom-fit Cable Length.	Default: 2 m.
Connector:	1. Default: Wire Leads (WL). 2. Male BNC (BNC). Max. Diameter Φ14.3 mm. BNC with RG178 Coax: Service Temperature up to 165°C or 329°F. 3. SMA (Plug, Male Pin) (SMA). Voltage Rating: 335 V _{RMS} Continuous. Max. Diameter Φ9.24 mm. 4. SMC (Plug, Female Socket) (SMC). Voltage Rating: 335 V _{RMS} Continuous. Max. Diameter Φ6.4 mm. 5. Underwater Mateable Connector (pin) (UMC). Max. Diameter Φ21.5 to Φ35 mm. (ONLY for -10°C to +60°C or 14°F to 140°F.) Underwater Mateable Connector is for uses underwater. Other connectors and wire leads are for dry uses and are not waterproofed.	
Size:	ΦD = Φ9 mm, Length ≥ 15 mm and actual length depends on Mounting Parts.	
Weight:	≥ 0.09 kg with 6m cable. Actual weight depends on Mounting Parts, Cable Types and Length.	
Operation Temperature:	-10°C to +60°C or 14°F to 140°F.	-10°C to 120°C, or 14°F to 248°F.
Storage Temperature:	-20 °C to +60 °C or -4 °F to 140 °F.	

Underwater Projector Application: 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.

Do NOT use the hydrophone as a sound projector in the air otherwise the hydrophone will be damaged.

Sound Measurement in Air: The hydrophones can be used to detect sounds in air. The sensitivity in air is same to the one in water in low frequency range.

How to Order Hydrophones

Part Number	-Mounting Part	-Cable Length in Meter	-Cable Type	-Connector Type
Example:	Description			
BII7043-FH-6m-RG174-BNC	BII7043 Hydrophone, Free Hanging, 6m RG174 Coax, Male BNC.			
BII7043HT-FH-6m-RG178-BNC	BII7043HT Hydrophone, Service Temperature: -10 °C to 120 °C, or 14 °F to 248 °F. Free Hanging, 6m RG178 Coax, BNC Male.			

Question:

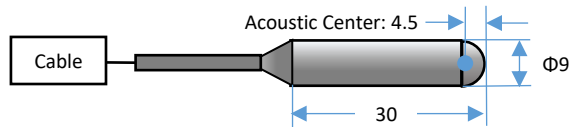
What if the mating connector of my DAQ module or recording device is NOT available from BII?

1. Buyer may order BII products with wire leads, and buyer assembles the mating connector to the cable end.
2. A connector adaptor might be assembled by BII by customization, and BII ships the adaptor to buyer as accessory of the device. Please contact BII for customizations.
3. Many adaptors for standard connectors are available in worldwide electronic suppliers such as BNC to SMA, BNC to SMC, XLR to TRS, etc. Check out your local suppliers.

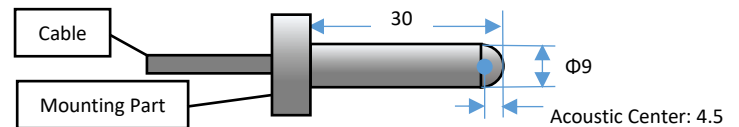
Wirings

Single Ended Output:	Wire Leads	Underwater Connector	BNC/SMA/SMC	Coax with Wire Leads	TRS Unbalanced mono
Signal	White or Red	Pin 2	Center Contact	Coax Center Contact	Tip
Signal Common	Black	Pin 1	Shield	Coax Shield	Ring & Sleeve
Shielding	Shield	Pin 3	Shield	Coax Shield	Ring & Sleeve

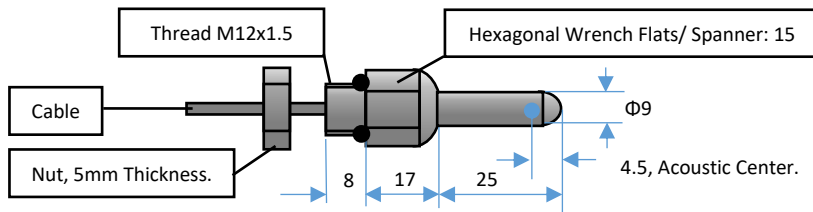
Physical Size (Dimensional Unit: mm) of Free Hanging:



Physical Size (Dimensional Unit: mm) with Mounting Part:



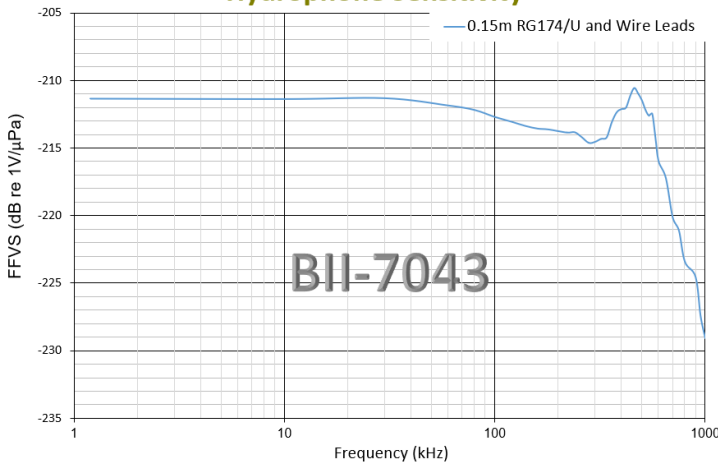
Bolt-fastening Mounting (Plastics) BFMP (300m Depth or 3MPa Ratings) or Thread Mounting into a submersible enclosure (IP68, tighten with o-ring).



Bolt-Fastening Mount (Plastics) (BFMP-M12x1.5)
Thread: M12x1.5, Lock nut: included.
Maximum Depth: 300 m.
Mounting Hole: Φ12.1 to Φ13.0 mm.
Fastening Torque: ≤ 1.5 Nm.
Mounting Wall Thickness: ≤ 3 mm.

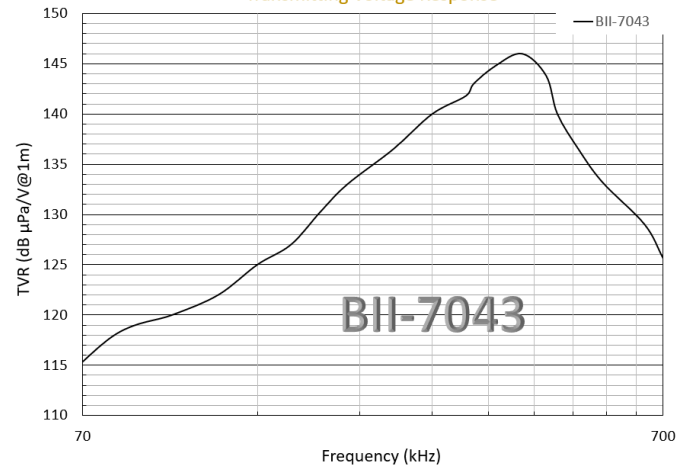
Free-field Voltage Sensitivity (FFVS):

Hydrophone Sensitivity



Transmitting Voltage Response (TVR):

Transmitting Voltage Response



Beam Pattern

