

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

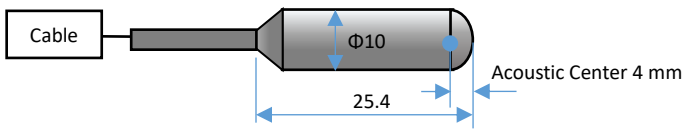
Directional hydrophone, Sonobuoy Underwater Communication Thermoacoustics in Gas	LBL, SBL, USBL Positioning, Array Element Underwater Sound Recording, Marine Bioacoustic Research Passive Acoustic Monitoring (PAM System)
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Specification

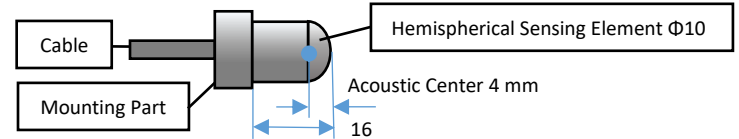
Part Number:	BII-7045
Sensitivity FFVS at 1 kHz:	-205.0 dB V/μPa ± 2dB with 0.15m shielded cable/Wire Leads. Sensitivity Loss over Extension Cable (dB) = 20*log[C _h /(C _h +C _c)]. Valid for hydrophone without preamplifier. C _h : Hydrophone Capacitance; C _c : Capacitance of Extension Cable. Cable is of 100 pF/meter roughly.
Free-field Voltage Sensitivity:	Refer to Graph of FFVS vs. Frequency .
Usable Frequency in Water:	1 Hz ~ 480 kHz. Please refer to FFVS graph for the FFVS variation vs. Frequency. Minimum Usable Frequency depends on -3dB high pass filter $f_{-3dB} = 1/(2\pi R_i C_h)$. R _i : Input Resistance or Impedance of Preamp. C _h : Capacitance of hydrophone at 1 kHz.
Usable Frequency in Air:	1 Hz ~ 12 kHz at -3dB V/μPa.
Capacitance C _h at 1 kHz:	0.23 nF ± 10% with 0.15m Shielded Cable/Wire Leads.
Dissipation D at 1 kHz:	0.006
Noise Density at f << fs: dB μPa/√Hz	$42.1 - 10 \cdot \log f$ 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.
Directivity Pattern:	Omnidirectional at Low Frequency to 60° at High Frequency, Refer to Graph of Directivity Pattern .
-3dB Beam Width:	Refer to Graph of Directivity Pattern .
Side Lobe Level:	No side lobes.
Signal Output Type:	Differential.
Acceleration Sensitivity:	139.4 dB μPa/(m/s ²)
Underwater Projector:	No. the hydrophones can NOT be used as sound projectors.
Maximum Operating Depth:	500 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) 7. Custom-fit Please refer to online document AcousticSystem.pdf for a complete list of Mounting Options and more details.
Cable Options:	1. Shielded Cable with Polyurethane Jacket, ΦD=2.6 mm (SC26) 2. Shielded Cable with Twisted Pair and Teflon (PTFE) Jacket, ΦD=3.2 mm (SC32), up to 200°C. 3. Shielded Cable with Twisted Pair and PVC Jacket, ΦD=3.6 mm (SC36) 4. Shielded Cable with Twisted Pair and Polyurethane Jacket, ΦD=4.7 mm (SC47) 5. Shielded Cable with Rubber Jacket, ΦD=6.5 mm (SC65) 6. Custom-fit.
Cable Length:	1. Default: 0.15 m. 2. Custom-fit Cable Length.
Connector:	1. Default: Wire Leads (WL) 2. 1/8" (3.5mm) TRS Plug (TRS35) (Max. Diameter Φ10.5 mm). 3. XLR (pin) (XLR) (Max. Diameter Φ20.2 mm). 4. MIL-5015 Style (pin) (5015) (Max. Diameter Φ30 mm with 3 contacts). 5. LEMO (Plug Male Pins) (LEMO) (Max. Diameter Φ9.5 mm with 3 contacts). 6. Underwater Mateable Connector (pin) (UMC) (Max. Diameter Φ21.5 to Φ35 mm). 7. 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:	ΦD = Φ10.0 mm, Length ≥ 18 mm and actual length depends on Mounting Parts.
Weight:	≥ 0.03 kg with 0.15 m cable. Actual weight depends on Mounting Parts, Cable Types and Length.

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. Depth Rating at 120 °C, or 248 °F: 100 m.			
Storage Temperature:	-20 °C to +60 °C or -4 °F to 140 °F.			
Wiring of Differential Output:	Wire Leads	Underwater Connector	TRS Plug (Balanced Mono)	XLR Plug (Balanced Audio)
Signal +	White or Red	Pin 2	Tip, Positive/Hot	Pin 2, Positive/Hot.
Signal -	Black	Pin 1	Ring, Negative/Cold	Pin 3, Negative/Cold.
Common & Shielding	Shield	Pin 3	Sleeve, Ground/Common	Pin 1, Cable Shield/Chassis Ground.
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.				

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

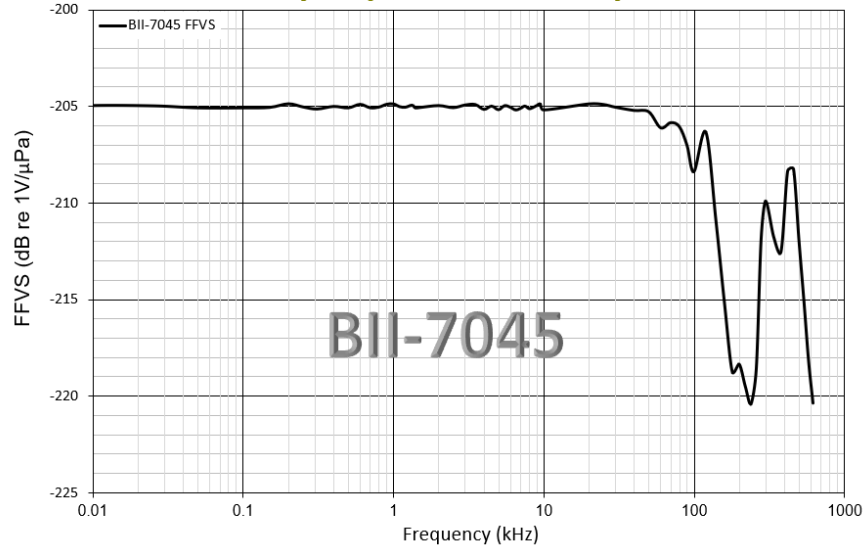


Physical Size (Dimensional Unit: mm) with Mounting Part:



Free-field Voltage Sensitivity (FFVS):

Hydrophone Sensitivity



Directivity Pattern:

