

## Hemispherical Hydrophone

### BII7040 Series Hemispherical Hydrophone

The BII7040 series hydrophones provide 60° directivity response approximately at  $f_s$  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

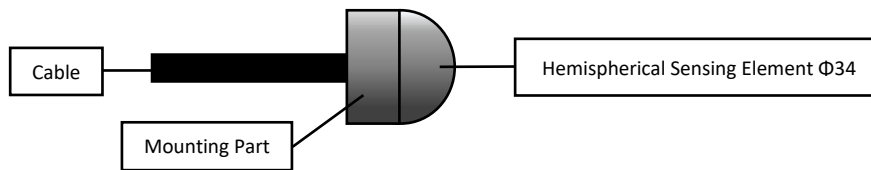
Directional hydrophone, Sonobuoy Underwater Communication Thermoacoustics in Gas	LBL, SBL, USBL Positioning, Array Element Underwater Sound Recording, Marine Bioacoustic Research Passive Acoustic Monitoring (PAM System)
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### Specification

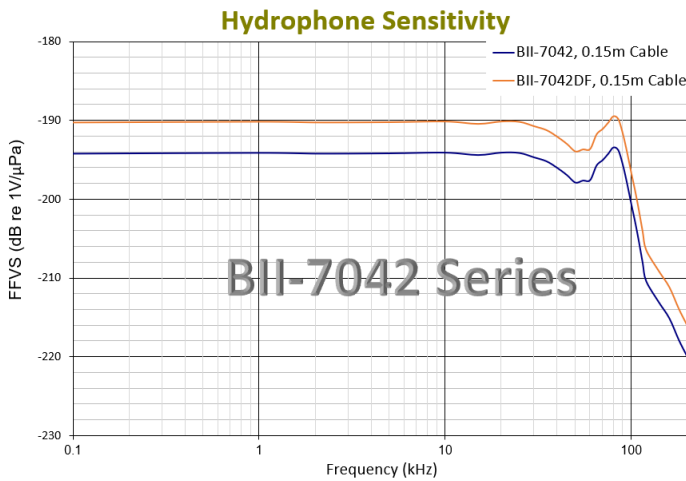
Part Number:	BII7042	BII7042DF
Sensitivity @ 1kHz:	-194.0 dB V/ $\mu$ Pa $\pm$ 2dB	-190 dB V/ $\mu$ Pa $\pm$ 2dB
	Sensitivity Loss over Extension Cable (dB) = $20 \cdot \log[C_h / (C_h + C_c)]$ . $C_h$ : Hydrophone Capacitance; $C_c$ : Capacitance of Extension Cable. Cable is of 100 pF/meter roughly. Valid for hydrophone without preamplifier.	
Free-field Voltage Sensitivity:	Refer to Graph of <b>FFVS vs. Frequency</b>	
Usable Frequency in Water:	0.1 Hz ~ 100 kHz at $\pm$ 3dB V/ $\mu$ Pa	
Usable Frequency in Air:	0.1 Hz ~ 3.2 kHz at -3dB V/ $\mu$ Pa	
Capacitance $C_h$ @ 1kHz:	3.8 nF $\pm$ 10%	3.6 nF $\pm$ 10%
Dissipation @ 1kHz:	0.003	0.008
Noise Density at $f \ll f_s$ : dB $\mu$ Pa/VHz	16.5 - $10 \cdot \log f$	17.8 - $10 \cdot \log f$
	1. $f$ in kHz; $f_s$ : 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 <b>Beam Pattern</b> .	
Output Type:	Single Ended	Differential
Acceleration Sensitivity:	143.0 dB $\mu$ Pa/(m/s <sup>2</sup> )	
Underwater Projector:	Yes.	No
Resonance $f_s$ :	80 kHz	N/A
Maximum Drive Voltage:	560 Vpp	N/A
Maximum Pulse Length:	100 mS at Maximum Drive Voltage	N/A
Duty Cycle in Water:	10% at Maximum Drive Voltage. 100% at $\leq$ 30 Vpp or 10.6 Vrms.	N/A
Maximum Operating Depth:	200 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 <a href="#">AcousticSystem.pdf</a> for a complete list of Mounting Options and more details.	
Cable Options:	1. Coax RG174/U (RG174) (for Single Ended Output ONLY) 2. Coax RG178/U (RG178) (for Single Ended Output ONLY) 3. Coax RG58/U (RG58) (for Single Ended Output ONLY) 4. Shielded Cable with Twisted Pair, $\Phi$ D=3.6 mm (SC36) 5. Shielded Cable with Rubber Jacket, $\Phi$ D=6.5 mm (SC65)	
Cable Length:	1. Default: 0.15 m. 2. Custom-fit Cable Length.	
Connector:	1. Default: Wire Leads (WL) 2. Male BNC (BNC) 3. SMC (Plug, Female Socket) (SMC) 4. 1/8" (3.5mm) TRS Plug (TRS35) 5. 1/4" (6.35mm) TRS Plug (TRS635) 6. XLR (pin) (XLR) 7. MIL-5015 Style (pin) (5015) 9. Underwater Mateable Connector (pin) (UMC) Note: Underwater Mateable Connector is for uses underwater. Other connectors and wire leads are for dry uses and are not waterproofed.	
Size:	$\Phi$ D = $\Phi$ 34 mm, Length $\geq$ 40 mm and actual length depends on Mounting Parts.	
Weight:	$\geq$ 0.55 kg with 10m 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 <b>HT</b> to part number. <b>Maximum Operating Depth at 120°C or 248°F: 50 m.</b>			
Storage Temperature:	-20°C to +60°C or -4°F to 140°F.			
<b>Wiring of Differential Output:</b>	<b>Wire Leads</b>	<b>Underwater Connector</b>	<b>TRS Plug (Balanced Mono)</b>	<b>XLR Plug (Balanced Audio)</b>
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.
<b>Wiring of Single Ended Output:</b>	<b>Wire Leads</b>	<b>Underwater Connector</b>	<b>Coax with BNC Male</b>	<b>Coax with Wire Leads</b>
Signal	White or Red	Pin 2	BNC Center Contact	Coax Center Contact
Signal Common	Black	Pin 1	BNC Shield	Coax Shield
Shielding	Shield	Pin 3	BNC Shield	Coax Shield
<b>Underwater Projector Application:</b> for 50Ω BNC Male connector, it is buyer's sole responsibility to make sure that the (female) BNC shield of the signal source is firmly grounded for operating safety before hooking up transducer/hydrophone to the signal source. Coax with BNC is not intended for hand-held use at voltages above 30Vac/60Vdc.				
<b>Do NOT use the hydrophone as a sound projector in the air otherwise the hydrophone will be damaged.</b>				
<b>Sound Measurement in Air:</b> 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.				

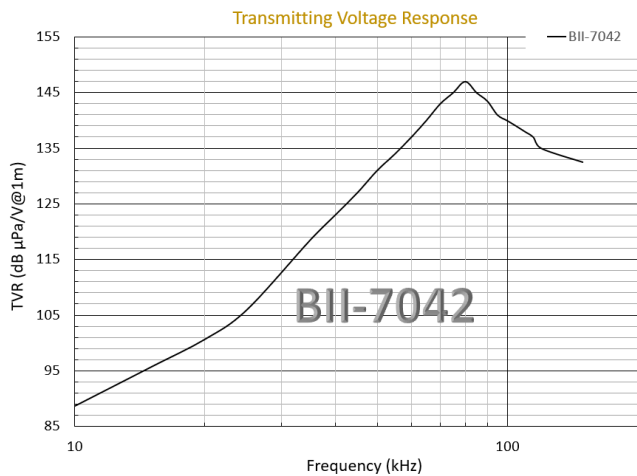
**Physical Size (Dimensional Unit: mm):**



**Free-field Voltage Sensitivity (FFVS):**



**Transmitting Voltage Response (TVR):**



**Beam Pattern:**

