



BII7110 Series Flush-Mounting Hydrophone

BI17110 series hydrophones mount through a hole or counterbore hole cut in the housing of underwater instruments, apparatus, vehicles (or towed streamlined body) or the wall of swimming pools. The flush-mounting design of these transducers minimizes surface discontinuity between the transducer and the mounting wall (or hull), and allows for smooth water flow over the surfaces, resulting in much lower induced acoustic noise (hydrodynamic noise, flow noise), less drag/resistance, avoidance of accidental collision and better acoustic performance for the underwater devices in motion such as towed fish/bodies, ROV/AUV/UUV, robots, etc... Low-profile flush installation protrudes only 4.75mm outside the housing with streamlined flange.

The hydrophone can be mounted on different materials such as woods, plastics, fiber glass, ceramics and metals. Marine sealants shall be used for sealing, bedding and installation. The depth rating is limited by the sealing performance of the cured marine sealants.

Sound Excitation by Turbulence: $\frac{1}{c^2} \frac{\partial^2 p}{\partial t^2} - \Delta p = \rho \frac{\partial^2 v_i v_k}{\partial x_i \partial x_k}$; v-Velocity of Turbulence Flow; c-Sound Speed in Fluid. p-Pressure; ρ -Fluid Density; x-Position.

Typical Applications

Towed Sonar/Bodies, Vessels in Motion, Sonobuoy	LBL/SBL/USBL Positioning System
Studies of Ocean Turbulence and Flow, Marine Hydrodynamics	Communication/Remote Control/Telemetry
Monitoring Aquarium/Pool Safety/Alarm System/Underwater Security	Process Measurement and Control, Leaking Detection

Specification

[illegible]

Sidelobe Level:	< -20 dB when $f > f_c$. No side lobe when $f \leq f_c$.			
Depth Rating:	100 m to 300 m, limited by the performance of the sealing materials. For deeper underwater deployment (maximum 300m), one option is that O-ring grooves are cut on the mounting wall and O-rings are used besides marine sealants or casting sealants. The surface finish of the flange against the mounting wall: 50.8 microns Ra, Linear tolerance +/-0.12mm.			
Flush Mounting (FSM):	Counterbore hole or through-hole shall be drilled or cut on the wall or hull to install hydrophones. Please refer to Table 1. Flush Mounting (Marine Sealant or Gasket) (FSM) .			
Marine Sealants or Gaskets:	BII does NOT provide sealing materials such as marine sealants and gaskets. Buyer may buy these materials from buyer's local stores of adhesives, boats, automobiles, and industry suppliers.			
Cable Options:	Single Ended Signal: 1. Coax RG174/U (RG174) 2. Coax RG178/U (RG178), up to 200°C. 3. Coax RG58/U (RG58)			
	Differential Signal: 4. Shielded Cable with Twisted Pair and PVC Jacket, $\Phi D=3.6$ mm (SC36) 5. Shielded Cable with Twisted Pair and PVC Jacket, $\Phi D=6$ mm (SC60) 6. Shielded Cable with Twisted Pair and Teflon (PTFE) Jacket, $\Phi D=3.2$ mm (SC32), up to 200°C. Non-Waterproof.			
Cable Length:	0.15 m (6")			
	Preamps, DAQ, and/or Signal Conditioning Devices should be close to hydrophones to avoid signal loss over cable.			
Connector:	Wire Leads (WL), No Connector.			
Size ($\Phi D \times H$):	Refer to Table 1.			
Weight:	300 grams	295 grams	90 grams	60 grams
Operation Temperature:	1. Default: -10°C to to 60°C, or 14°F to 140°F. 2. Bespoke High Temperature: -10°C to 120°C, or 14°F to 248°F. Append HT to part number.			
Storage Temperature:	-20 to 60 °C, or -4 to 140 °F.			
Underwater Projector Application: for 50Ω BNC/SMC/SMA connector, it is buyer's sole responsibility to make sure that the BNC/SMC/SMA shield of the signal source is firmly grounded for operating safety before hooking up transducer/hydrophone to the signal source. Coax with BNC/SMC/SMA is not intended for hand-held use at voltages above 30Vac/60Vdc.				
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.				

Table 1. Flush Mount (Marine Sealant or Gasket) (FSM) (Dimension Unit: mm)

Acoustic Aperture	Material	Thread	Housing Length L	Flange Diameter ΦD	Mounting Wall Thickness	Fastening Torque
$\leq \Phi 5$ mm	Stainless Steel	M10x1.5	24.75	$\Phi 18$	$\leq (L - 14)$	≤ 10 Nm
$\leq \Phi 10$ mm	Anodized Aluminum	M14x1.5	26.75	$\Phi 22$	$\leq (L - 16)$	≤ 10 Nm
$\leq \Phi 27$ mm	Anodized Aluminum	M35x1.5	29.75	$\Phi 59$	$\leq (L - 13)$	≤ 14 Nm
$\leq \Phi 27$ mm	Anodized Aluminum	M36x4	29.75	$\Phi 59$	$\leq (L - 13)$	≤ 14 Nm
Hex Nut: Included, for dry use ONLY. Material: Steel. Moisture-Resistant Grease is recommended to resist moisture to prevent corrosion if necessary.						
BII does NOT provide sealing materials such as marine sealants and gaskets. Buyer may buy these materials from buyer's local stores of adhesives, boats, automobiles, and industry suppliers.						
Threadlockers are recommended to prevent threaded fasteners from loosening due to shock and vibration. NOT provided by BII.						

How to Order Standard Hydrophones. BII Keeps Standard Products in Stock.

Hydrophone Part Number	-Cable Length in Meter	-Cable Type	-Connector Type
BII7111DF BII7112DF	0.15m (6")	Shielded Cable with Twisted Pair SC60	WL: Wire Leads.
Example:	Description		
BII7111DF-0.15m-SC60-WL	BII7111DF Hydrophone, 0.15m Shielded Cable with Twisted Pair SC60, Wire Leads.		
BII7112DF-0.15m-SC60-WL	BII7112DF Hydrophone, 0.15m Shielded Cable with Twisted Pair SC60, Wire Leads.		

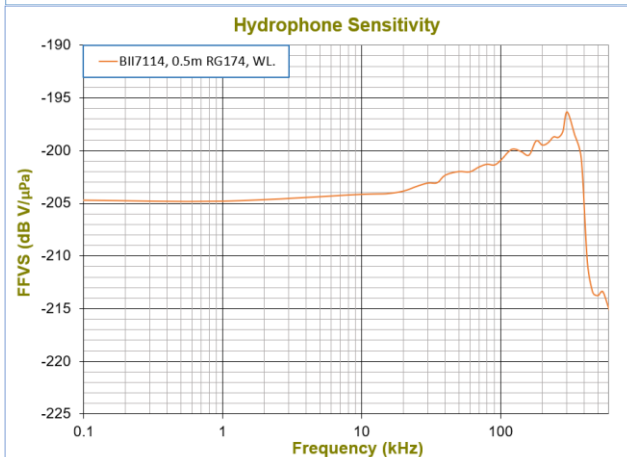
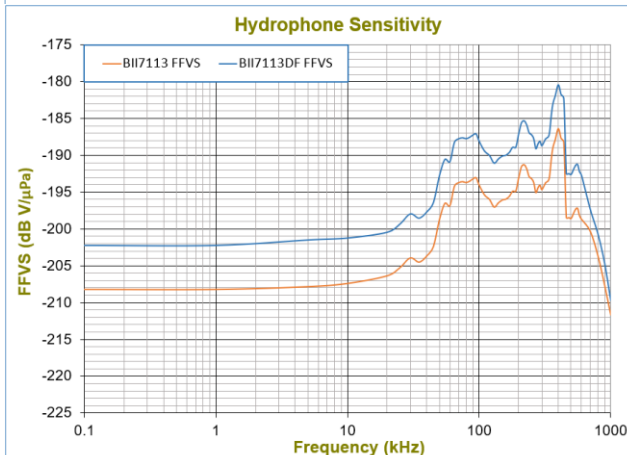
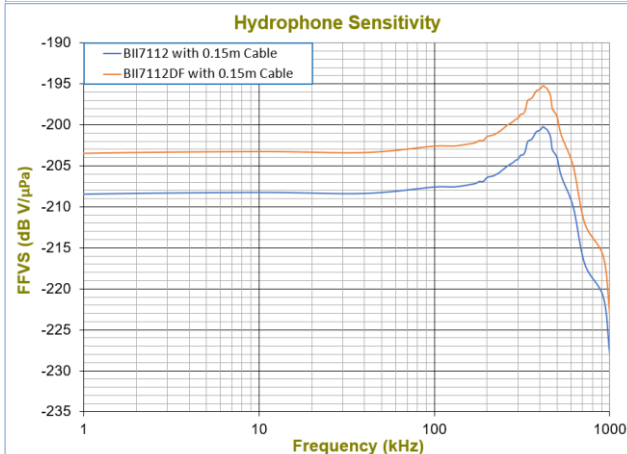
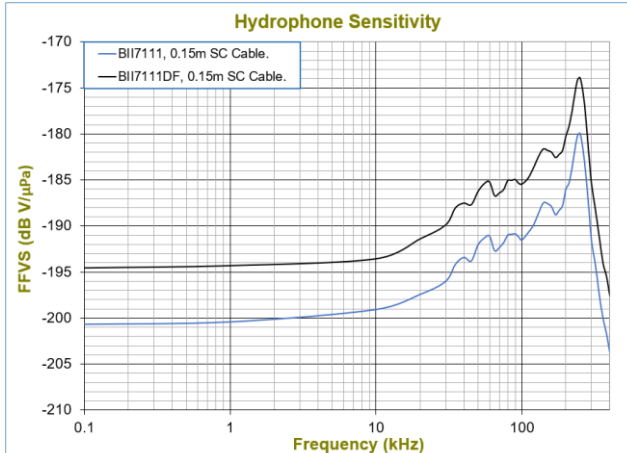
How to Order Bespoke Hydrophones. Non-stock.

Hydrophone Part Number	-Cable Length in meter	-Cable Type	-Connector Type
BII7111, BII7111DF, BII7112, BII7112DF, BII7113, BII7114.	Refer to Sensitivity Loss .	Refer to Cable Options .	WL: Wire Leads
Example:	Description		
BII7111DF-3m-SC36-WL	BII7111DF Hydrophone, 3m Shielded Cable with Twisted Pair SC36, Wire Leads.		
BII7111-3m-RG58-WL	BII7111 Hydrophone, 3m Coax RG58/U (RG58), Wire Leads.		

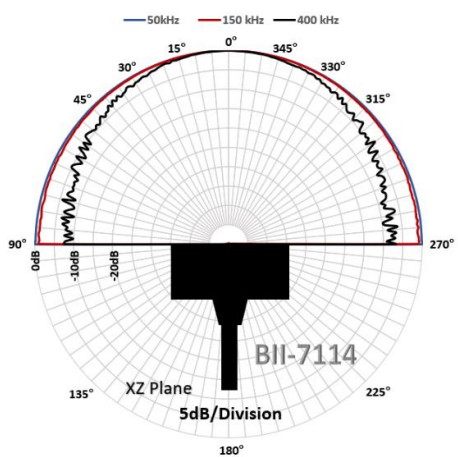
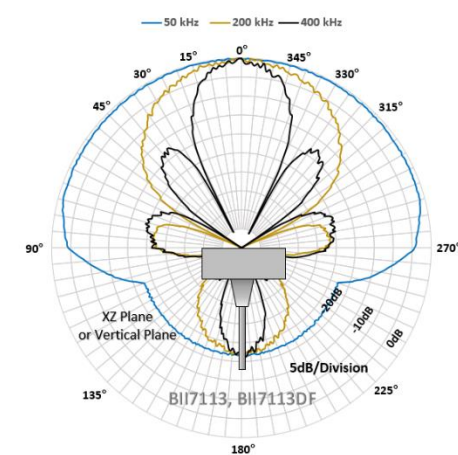
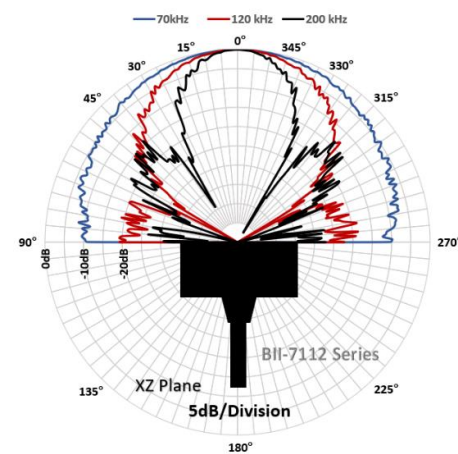
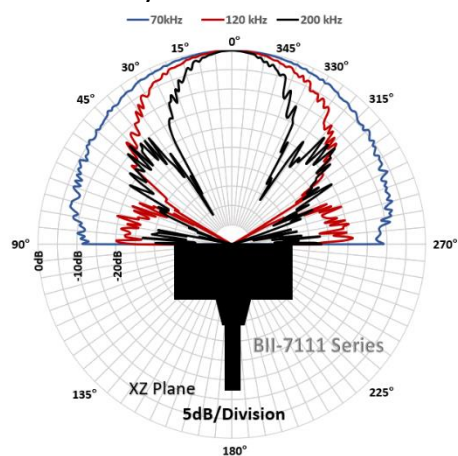
Wirings

Differential Output:	Wire Leads	
Signal +	White or Red	Red
Signal -	Black	White
Common & Shielding	Shield	Shield
Single Ended Output:	Coax with Wire Leads	
Signal	Coax Center Contact	
Signal Common	Coax Shield	
Shielding	Coax Shield	

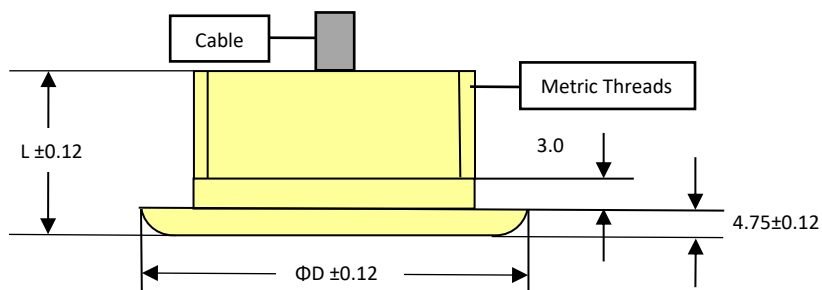
FFVS (Free-field Voltage Sensitivity)



Directivity Pattern

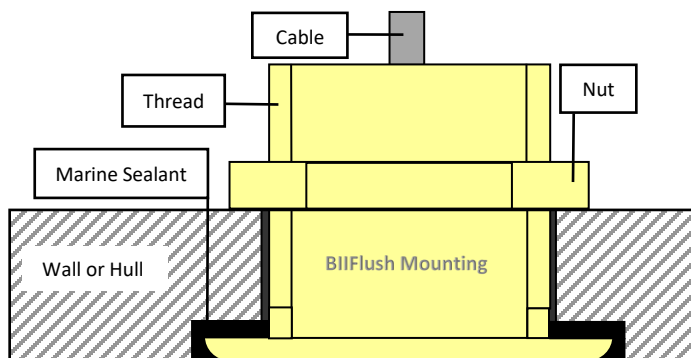


Physical Size (Dimensional Unit: mm): Nut is included with shipment.



Installation/Mounting

Flush Mounting with Counterbore Hole.



Low-profile Flush Mounting

