## Hydrophone Specification

<table>
<thead>
<tr>
<th>Part Number:</th>
<th>BII-7075</th>
<th>BII-7076</th>
<th>BII-7077</th>
<th>BII-7078</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sensitivity @ 1kHz:</td>
<td>-198.5+Preamp Gain</td>
<td>-195.5+Preamp Gain</td>
<td>-195.0+Preamp Gain</td>
<td>-194.5+Preamp Gain</td>
</tr>
<tr>
<td>Usable Frequency:</td>
<td>20 Hz to 300 kHz</td>
<td>10 Hz to 300 kHz</td>
<td>3 Hz to 300 kHz</td>
<td>1 Hz to 300 kHz</td>
</tr>
<tr>
<td>-3dB Beam Width:</td>
<td>9900°/f(kHz)</td>
<td>4650°/f(kHz)</td>
<td>3200°/f(kHz)</td>
<td>1700°/f(kHz)</td>
</tr>
<tr>
<td>fc:</td>
<td>212 kHz</td>
<td>95 kHz</td>
<td>69 kHz</td>
<td>34.6 kHz</td>
</tr>
<tr>
<td>fn:</td>
<td>282 kHz</td>
<td>127 kHz</td>
<td>92 kHz</td>
<td>46 kHz</td>
</tr>
<tr>
<td>Size (ΦDxH):</td>
<td>Φ21x50 mm</td>
<td>Φ27x50 mm</td>
<td>Φ33x50 mm</td>
<td>Φ60x30 mm</td>
</tr>
</tbody>
</table>

Free-field Voltage Sensitivity: Refer to Graph of FFVS vs. Frequency.

Pressure Noise Density: Refer to Graph of Pressure Noise Density.

Preamp Gain (dB): Specify when ordering:
1. Bespoke Fixed Gain Preamp: Default 40 dB. -40 to +60 dB is available. Appending FG to the part number.
2. Programmable Gain Preamp: Default 0/20/40/60 dB. 20/40/60/80 dB is available. Appending PG to the part number.

Gain Selection Voltage: (Programmable Gain Preamp)
- Logic Low 0: Gain Selection Wire to COM or 0 to +0.8VDC;
- Logic High 1: Gain Selection Wire Open or +2.4 to Vcc.

Built-in Bandpass Filter: Customized High Pass filter and Low Pass Filter. Specify when ordering.

Output Type: Single Ended or Differential, depending on output type of the built-in preamp.


Overload Pressure Level: 20*log(Vomax/2.828) - Sensitivity, in dB µPa.

Receiving Face: Circular Planar Face

Directivity Pattern: Conical Beam

Sidelobe Level:
1. Default: < -17.8 dB when f > fc; No side lobe when f ≤ fc.
2. Bespoke Sidelobe Suppression is available upon request for BII-7078B: ≤-30 dB. Main lobe is about 1.1 to 1.28 times wider.

Cable Orientation:
1. Default: Perpendicular to end face of hydrophone.
2. Customization: Perpendicular to side wall of hydrophone (Generally, this is used to reduce the overall length of hydrophone, and depth rating of the hydrophone ≤ 100m), Appending SW to the part number.

Cable:
1. Fixed Sensitivity Hydrophone: Two or Four Conductor Shielded Cable (SC).

Cable Length:
1. Default: 10 m.
2. Custom-fit Cable Length.

Connector:
1. Default: Wire Leads (WL)
2. BNC Male (BNC)
3. 3.5 mm (⅛") TRS Plug (TRS35)
4. ¼" (6.35 mm) TRS Plug (TRS635)
5. XLR Plug (XLR)
6. Underwater Mateable Connector (UMC)
7. MIL-5015 Style (5015)
8. +9VDC Battery Snap (BS)
9. Custom (custom)

Mounting Options:
1. Free Hanging (FH)
2. Free-hanging with Male Underwater Connector (FHUC)
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. End Face Mount (O-ring Sealing) (EFMS)

Maximum Operating Depth: 300 m, limited by cable length with wire leads.

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.

Weight: ≥ 0.6 kg with 10 m cable. Extra Cable: about 60 grams/meter.

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

### Two-Wire Hydrophone

<table>
<thead>
<tr>
<th>Two Conductor Shielded Cable</th>
<th>Coax</th>
</tr>
</thead>
<tbody>
<tr>
<td>+VDC and Signal</td>
<td>White or Red</td>
</tr>
<tr>
<td>Signal Common</td>
<td>Black</td>
</tr>
<tr>
<td>Shielding</td>
<td>Shield</td>
</tr>
</tbody>
</table>

### Wiring of Single Ended Output:

<table>
<thead>
<tr>
<th>Wire Leads</th>
<th>BNC Male and 9V Battery Snap</th>
<th>Underwater Connector</th>
<th>XLR Plug and 9V Battery Snap</th>
<th>TRS Plug and 9V Battery Snap</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shield (Connected to Common inside hydrophone or floating)</td>
<td>Shield</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Physical Size (Dimensional Unit: mm):

The overall length varies with the length of the built-in preamplifier and mounting parts. Please refer to online information of BII preamplifiers and mounting options. To reduce the length, the cable can be customized to come out from side wall.

#### a. General Size Information

- **Mounting Part**:
  - OD
  - L

- **Hexagonal Wrenching Flats**: 22mm

- **Receiving Face**:
  - \( \Phi 24.5 \times 15 \)
  - 50 or 30

#### b. Size Information of Free Hanging

- **Cable**:
  - OD: \( \Phi 24.5 \)
  - \( \Phi 21 \) (BII-7075)
  - \( \Phi 27 \) (BII-7076)
  - \( \Phi 33 \) (BII-7077)
  - \( \Phi 60 \) (BII-7078)
  - \( \Phi 50 \) or \( 30 \)

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### Wiring of Single Ended Output: (Digitally Programmable)

<table>
<thead>
<tr>
<th>Wire Leads (Shielded Cable)</th>
<th>9V Battery Snap and Wire Leads</th>
<th>Wire/Cable Bundle</th>
</tr>
</thead>
<tbody>
<tr>
<td>+VDC</td>
<td>+9V/DC Battery Female Snap</td>
<td>Red Wire</td>
</tr>
<tr>
<td>Common</td>
<td>+9V/DC Battery Male Snap</td>
<td>Black Wire</td>
</tr>
<tr>
<td>Digital Common</td>
<td>Black Wire</td>
<td></td>
</tr>
<tr>
<td>Digital A1 (Gain Selection)</td>
<td>Brown or Yellow</td>
<td></td>
</tr>
<tr>
<td>Digital A0 (Gain Selection)</td>
<td>Blue</td>
<td></td>
</tr>
<tr>
<td>Output Signal</td>
<td>White</td>
<td>White wire of Shielded Cable</td>
</tr>
<tr>
<td>Output Signal Common</td>
<td>Green</td>
<td>Black wire of Shielded Cable</td>
</tr>
<tr>
<td>Shielding</td>
<td>Shield</td>
<td>Shield of Shielded Cable</td>
</tr>
</tbody>
</table>

### Selecting Sensitivity of Digitally Programmable Sensitivity Hydrophone

<table>
<thead>
<tr>
<th>Gain Selection Wire A1</th>
<th>Gain Selection Wire A0</th>
<th>BII-7075, BII-7076 Sensitivity</th>
<th>BII-7077, BII-7078 Sensitivity</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 (Logic Low)</td>
<td>0 (Logic Low)</td>
<td>-201.5 + 0 or 20 dB V/μPa</td>
<td>-195.5 + 0 or 20 dB V/μPa</td>
</tr>
<tr>
<td>0 (Logic Low)</td>
<td>1 (Logic High)</td>
<td>-201.5 + 20 or 40 dB V/μPa</td>
<td>-195.5 + 20 or 40 dB V/μPa</td>
</tr>
<tr>
<td>1 (Logic High)</td>
<td>0 (Logic Low)</td>
<td>-201.5 + 40 or 60 dB V/μPa</td>
<td>-195.5 + 40 or 60 dB V/μPa</td>
</tr>
<tr>
<td>1 (Logic High)</td>
<td>1 (Logic High)</td>
<td>-201.5 + 60 or 80 dB V/μPa</td>
<td>-195.5 + 60 or 80 dB V/μPa</td>
</tr>
</tbody>
</table>

### Critical Frequency \( f_c \): Side lobes exist in the case of operating frequency \( f > f_c \); The hydrophone has no side lobe in the case of \( f \leq f_c \).

### ±90° Sidelobe Frequency \( f_n \): First Side Lobes exist at ±90° normal to acoustic axis in the case of operating frequency \( f \approx f_n \).

### AE (Acoustic Emission) Applications: These hydrophones are tested and calibrated in water. It is buyer’s responsibility and liability to calibrate and maintain the AE sensors according to the acoustic emission national standards of buyer’s country.

### Sound Measurement in Air: The hydrophones can be used to detect ultrasonic sounds in air. Receiving sensitivities in air and water are different. These hydrophones are calibrated in water at BII in default. It is buyer’s responsibility and liability to calibrate the hydrophone in air at buyer’s cost, or contact BII for sensitivity calibration in air at extra cost.
C. Size information of Customized Cable Orientation: Side Wall.

- **Housing ODxL:**
  - Φ21x50 (BII-7075)
  - Φ27x50 (BII-7076)
  - Φ33x50 (BII-7077)
  - Φ60x30 (BII-7078)

Free-field Voltage Sensitivity (FFVS):

![Hydrophone Sensitivity Graph]

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

Noise Density of the hydrophone varies with the built-in preamplifier. Please refer to noise density of respective BII preamplifiers.

![Hydrophone Noise Spectrum Graphs]

- Built-in BII-1081 Preamp
- Built-in BII-1092 Preamp