Transducer Installation & Placement

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Serving the Marine Electronics Industry

- 600 members, 40 countries
- Safe interconnection of electronic equipment
- Minimize confusion between manufacturers
- Educational training
- Accredited Standards NMEA 0183, 2000
- Marine Electronics Journal Magazine
Seminar Overview

- Transducer Styles
- Installation & Placement
- Troubleshooting
- *Share your issues & ask questions!*
- *Most all installation locations are a compromise (especially on smaller vessels)*
Importance of a vertical beam

Regardless of mounting style, a properly installed transducer delivers a vertical beam that aims straight down toward the bottom, resulting in strong echo returns and accurate depth readings.
Flush Mount Transducers

- Designed for Boat builders
- No fairing block to cut or install.
- Low-profile housing mounts nearly flush to the hull.
- No affect on the boats running performance.
- Models available for wood, fiberglass & metal hulls
- Can be used with inboard, I/O, OB and jet drive systems
- Transducer can rest on trailer rollers or bunks.
- High speed performance over 30 knots
The ceramic element(s) is tilted inside the housing, which compensates for the boat’s deadrise.

This aims the transducer beam straight toward the bottom, resulting in stronger echo returns and more accurate depth readings.
Tilted Element™ Benefits

- Available in 0°, 12°, or 20° Tilts

With Tilt

Without Tilt

Transducer beam profile of a Tilted Element™, low-profile housing installed on a vessel with more than 8° of hull deadrise angle. The tilted ceramic aims the beam straight down resulting in strong bottom echo returns and accurate depth readings at any speed.

Transducer beam profile of a Non-Tilted Element™, low-profile housing installed on a vessel with more than 8° of hull deadrise angle. The angled beam out to the side of the vessel will return a weak bottom echo resulting in poor depth readings.
Delivers the great performance because the transducer face is in contact with the water.

For stepped, planing or displacement hulls.

Models available for wood, fiberglass, aluminum or steel hulls.

Can be used with inboard, I/O, OB and jet drive propulsion systems.

Excellent high speed results with use of high-performance fairings.

For hull dead rise angles up to 25°
Maintain smooth flow, significantly reducing drag on the hull and lessening the chance of intake and prop cavitation. This installation works great over 30 kts.
In-Hull Transducers

- For *solid fiberglass* stepped, planing or displacement type hulls.
- Entire installation is done from inside the hull
- Can be installed while boat is in the water.
- Can be used with single or twin inboard, I/O, OB and jet drive propulsion
- For deadrise angles up to 30 degrees
- Can be mounted port/ starboard or bow/stern
Transom-Mount Transducers

- Easy to install
- Can be used on wood, fiberglass, aluminum or steel hulls
- Can be used with single or twin I/O, OB
  Good high speed performance can be achieved with careful installation
- Easy maintenance designs
Internal construction varies with model

<table>
<thead>
<tr>
<th>PHOTO</th>
<th>POWER</th>
<th>CERAMIC ARRAY</th>
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<tbody>
<tr>
<td><img src="image1" alt="Photo" /></td>
<td>600 W</td>
<td>50/200 kHz</td>
</tr>
<tr>
<td><img src="image2" alt="Photo" /></td>
<td>1 kW</td>
<td>50/200 kHz</td>
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<tr>
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<td>1 kW</td>
<td>50 kHz, 200 kHz</td>
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<tr>
<td><img src="image5" alt="Photo" /></td>
<td>2 to 3 kW</td>
<td>Low-Frequency, High-Frequency</td>
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NMEA 0183 & 2000® Smart Sensors

- All signal processing is done inside the transducer
- Operates at 235kHz
- No interference with onboard 50/200 kHz sounder
- Provides digital depth, speed, and temperature
- Separate models for NMEA 0183 and NMEA 2000
Transducer Calibration?

- Analog (fish finder) transducers have no intelligence.

- Depth & temperature offsets are adjusted on the fish finder display, not in the transducer.

- Smart transducers (NMEA 0183 & NMEA 2000) have a built-in PCB and offsets performed on the display are saved in the transducer.

- Speed Through Water (Paddlewheel Speed) can be calibrated on NMEA 2000 sensors to closely match GPS speed.
Installation & Troubleshooting
Transducer Selection Considerations

- Vessel Style & Hull Design-
  - Planing Hull, Displacement Hull?

- Hull Material
  - Fiberglass, Cored? Metal, Wood?

- Vessel Operational Speeds
  - Is drag an issue?

- Application- Fishing, Cruising, Sailing?
Transducer Selection Considerations
Always a compromise

• Choose a location with a minimum deadrise angle.

• Choose an accessible spot inside the vessel with adequate headroom for the height of the housing, tightening the nuts, and removing the insert.

• Try to choose a location away from interference caused by sources such as propeller shafts, engines & generators, other machinery and cable runs.

• The lower the overall noise level around the transducer and cable, the higher the gain setting that can be used, resulting in more screen detail.
Location selection

Transducer placement should be aft and close to the centerline. It needs to be located low enough that the transducer is in the water at all times.
Location selection

Consider items such as the lifting strap placement and dry-dock blocking.

Also consider trailer bunks and rollers if it is a trailered vessel.
Location selection

Select a mounting location that is not directly behind any strakes, hull fittings or sources of turbulence.

The water flowing over the face of the transducer must be turbulent free.
Location selection

Be sure that the transducer signal will not intersect the prop shaft(s), keel or any other hull projections, and that it is not directly in-line with the prop(s)
Installation Guidelines

- Bow thrusters, live well or cooling intakes as well as chines, steps and strakes can all introduce aerated water into the path of the transducer.

- Remember to always inspect all the way to the bow of the vessel to see if there will be any interference in front of the transducer’s mounting location.

- If there is an intake 50 feet ahead, in line with the transducer, it *will* effect performance at higher vessel speeds.
Stepped Hull Installations

Transducers used on stepped hull vessels **must** be located in front of the first step and low to the keel to operate properly.
Transducer Installation

- Drilling-Hole Saw
- Surface Preparation-Clean, Dry, Dust Free
- Epoxy any exposed fiberglass before installing transducer (inside edges of drilled hole)
- Sealing Between All Surfaces
  - Below the waterline sealant
  - More is better than less
  - Transducer Threads
  - Screw Holes
Final Steps- Installation

- Remove excess sealant
- Hand-Tighten all nuts & screws
- Leave blank plug nearby & secure with string. (if applicable)
- Lightly Sand transducer face & Paint with Water-based Anti-fouling paint.
- Check for leaks hourly after installation is complete and boat is launched.
Cored Hull- Installations

• Top fiberglass layer & coring must be removed.

• Apply fiberglass resin to bring area back to normal hull thickness.

• Create a small area where the transducer will mount that is 100% solid fiberglass.
Display Screen Interference

- If screen interference appears at a specific rpm or when the boat is put in and out of gear, this could be a sign of electrical interference on the sounder’s power line. Try powering the sounder directly from a stand-alone battery.

- If the screen interference increases proportional to vessel speed this usually indicates that the transducer face is exposed to aerated water.
This installation looks good, however notice the strake 10 feet directly in front of the transducer. This causes turbulence and air bubbles making the transducer stop reading bottom at 12 knots.
Bad Installation

Side View
This intake shown in the photos above will cause turbulence and send air bubbles over the transducer face as vessel speed increases. The transducer will work great when the vessel is drifting, but will not work well at speed.
This transducer is mounted too far aft and will be affected by the turbulent water that the starboard propeller will create at any speed.
This is a excellent thru-hull installation. There are no hull protrusions in front or alongside the transducer. The transducer is also installed away from the keel so that the beam is not shaded. An installation like this will give clear bottom readings up and above 30 knots.
Testing for depth function

Tests depth function of all transducers including commercial models. Precise digital readout shows exact frequency and impedance at resonance.
With meter set to OHMS the reading should be in the 10,000 ohm range at 77 degrees F. The resistance increases as the temp decreases. The sensor will read correctly in or out of water.
Testing for speed function

Use a 9 volt or 12 volt cordless drill battery to apply battery voltage to red and bare wires. Attach meter test leads between the green and bare wires.
Testing for *speed* function

Turn the paddlewheel slowly by hand. The volt meter should toggle between zero volts and the input voltage with each 90 degrees of rotation.
In-Hull Transducers; Fiberglass Hulls

Mounting:
Sand/grind the fiberglass until rough. Clean the fiberglass, then mount with:
Fiberglass Resin (best choice for long-term adhesion) or
3M 4200 / 5200

Filling the tank:
Use non-toxic Marine & RV Coolant or anti-freeze
Mount so that the bow of the sensor is slightly higher than the stern of the sensor and the sensor projects below the hull, otherwise aeration will occur.

Sea trial the vessel and adjust the transducer mounting height to achieve clear screen images at speed.
Transom location selection

Before installation, run the boat at speed and watch the water flow over the back of the transom. Locate the transducer in an area which you observed clean flow.
Transom location selection

Best results are achieved when the flow from the prop comes over the top of the transducer. Typically this is on the starboard side of the transom.
Transom location selection

For twin OB or I/O applications best results are achieved by mounting the transducer between the two drives, either on or just off of the centerline.
Questions?

Thank You