SONI-HULL
ULTRASONIC ANTI-FOULING SYSTEM

Ultrasonic Antifouling System

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THE PROBLEM...
For hundreds of years mariners have been plagued with the same old problem of marine growth on the hull, power train and steering gear for their yachts. With this comes:

- Reduced speed due to extra drag.
- Increased fuel consumption, estimated at as much as 20%.
- Propeller cavitation (which in turn causes extensive damage to propellers).
- Expensive annual haul outs and repainting costs.

THE SOLUTION...
Sonihull is a cost effective antifouling product that works alongside a conventional antifouling paint with additional benefits.

In addition to reducing annual haul out costs, Sonihull reduces growth on hull, stern gear, and bow thrusters. A clean hull will substantially reduce fuel costs while keeping the boat performing as it should.
HOW DOES IT WORK?

Sonihull systems produce multiple bursts of ultrasonic energy in a range of targeted ultrasonic pulse frequencies. This produces a pattern of alternating positive and negative pressure, whereby the microscopic bubbles that are created during the negative pressure are imploded when positive pressure is applied. This implosion has a cleansing effect that destroys algae, the first link of the food chain, making the surface less attractive to other marine life that feed on the algae. This microscopic movement of water also prevents barnacle and mussel larvae from embedding.

THE BENEFITS

Sonihull will save you money!

✓ A clean hull and drivetrain can reduce fuel bills by 20%-30%.
✓ Reduced vibration and improved performance.
✓ Reduce maintenance costs and expensive haul outs.
✓ Suppress diesel bug and keep stored water fresher.

ENVIRONMENTALLY FRIENDLY

Reduce your carbon foot print!

With new environmental regulations set to substantially reduce the effectiveness of traditional antifouling paints, PYI Inc. offers Sonihull Ultrasonic Antifouling Systems as a credible addition to traditional antifouling methods. Using the latest in digital electronics and transducer technology, Sonihull has made a quantum leap forward over the competitors to fill the needs of the marine industry.

Tests have demonstrated that electronic antifouling products have no adverse effect to fish and marine mammals. The ultrasonic frequencies stay very close to the hull structure and it is demonstrable that the signal does not stray into open water.
SONIHULL SYSTEMS

The Sonihull Ultrasonic Antifouling System offers superior performance and reliability with a combination of features not offered by any competitor.

- Each transducer is powered by a dedicated signal generator, offering a continual signal to all transducers.
- Transducers and their cable connections are rated for submerged operations.
- Transducers have no exposed metal.

- AC/DC power option defaulting to AC.
- Automatic shut off in Low Voltage DC power situation to protect batteries.
- Remote system status monitor.
- Manufactured “In House” for the best possible quality control.
- Virtually undetectable to the human ear with no need for a “sleep switch”.

TECHNICAL SPECS

<table>
<thead>
<tr>
<th>Power Supply Approvals</th>
<th>UL and CE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Voltage</td>
<td>100-240v AC 50/60Hz 12-24v DC</td>
</tr>
<tr>
<td>Power</td>
<td>Mono: 3.6w Duo: 7.2w</td>
</tr>
<tr>
<td>Pulse Frequency</td>
<td>19.5 - 55 kHz</td>
</tr>
<tr>
<td>Control Box Rating</td>
<td>IP65</td>
</tr>
<tr>
<td>Transducer Rating</td>
<td>IP68</td>
</tr>
<tr>
<td>Transducer Cable Length</td>
<td>21 ft.</td>
</tr>
<tr>
<td>Weight</td>
<td>9 lbs.</td>
</tr>
<tr>
<td>Dimensions</td>
<td>7” x 5” x 3”</td>
</tr>
<tr>
<td>Warranty</td>
<td>2 years</td>
</tr>
</tbody>
</table>

WHAT’S INCLUDED

- Control Unit: x1
- Transducer
  - Mono: x1
  - Duo: x2
- Mains Cable: x1
- Marine Grade Epoxy: x1
- Vaseline: x1
WHICH SONIHULL SYSTEM?
The Sonihull System is available in a single transducer “Mono”, or a two transducer “Duo”. Which Sonihull System, or the number of transducers needed is determined by the waterline length of the boat. This chart shows what combination of Mono, and Duo systems are needed to protect you boat.

Transducers are placed near the vessel centerline and about twelve inches or more away from structures like primary bulkheads. As the beam of a boat approaches 20 feet the transducers will need to be positioned further outboard while reducing the fore & aft separation. A distance of 25 – 35 feet apart will provide effective and efficient hull protection.

WHERE TO POSITION THE TRANSDUCERS?
These diagrams show you the approximate positioning for optimal performance for a Sonihull Mono and Sonihull Duo systems.

Contact PYI if your yacht is larger than 55’ or BWL is greater than 16’.
STERN DRIVE AND SAILDRIVE ADAPTOR

Stern drives have always been problematic in terms of fouling. Due to the many different metals they are composed of, their moving parts and soft bellows, conventional copper impregnated antifouling paints are not an option.

Sonihull coupled with the Stern Drive Adaptor offers great protection to this most important part of the boat that is prone to fouling. Results show an impressive average of 80% reduction in fouling.

This device enables a Sonihull transducer to be simply screwed in, so that ultrasonic signals can be directly injected into the stern drive. The Sonihull Stern Drive Adaptor mounts via the 16-18mm bolt found in the fixed end of the stern drive leg steering ram.
SONISHAFT

Protection For Prop Shafts & Propellers

The world’s first ultrasonic antifouling solution for prop shaft driven vessels. Sonishaft used in conjunction with the standard Sonihull transducer, clamps directly into the prop shaft, suppressing barnacle and bio-growth on the prop-shaft, propeller and anodes.

Typically you would expect to see a reduction in growth by about 80% or more. Plus the additional benefits of maintaining performance, smoother ride and reduced wear and tear. All this while saving about 20% on your fuel bills!

- 20% saving on fuel consumption
- Good acceleration
- Maintain performance
- Reduced vibration
- Permanent installation
- Reduced wear and tear
- Very low maintenance
- Galvanically isolated

JETDRIVE PROTECTION

Following extensive tests with both jet manufacturers and military vessels, Sonihull has proven to be the most effective solution for protection from marine growth on marine water jet drives.

Sonihull now offers a proven and effective solution for water jets. Here’s a few examples:

- Rolls Royce
- Marine Jet Power (MJP)
- Hamilton’s
- Alamarin-Jet

Recommended Sonihull Transducer Locations

- One transducer located in the center of the impeller housing.
- One transducer located on the intake housing in line with the impeller shaft.
PROTECT YOUR SEA CHEST!

Proven around the world on commercial, military and private vessels as a most valuable addition to the protection of inlets and pipework.

Protection against growth and scaling, maximizing flow for intakes, filters, pipework, valves and heat exchangers.

With no expensive anodes to replace, no corrosion and completely safe for use on both steel and aluminium vessels. The Sonihull systems have proven themselves as the most credible antifouling alternative to suppressed current/cathodic protection systems.

This protection has not only been demonstrated in boats, but also in fixed installations, such as pumping stations, fire pumps, oil rigs, bunkering, desalination and more.

PIPE ADAPTOR

Fouling in pipe work can be a major problem. It doesn’t take long before fouling can start to restrict the flow of water, which can lead to engines and generators being destroyed as a result of over heating and water pumps wearing out due to the sharp increase in pressure.

The PA (Pipe Adaptor) for the Sonihull transducer simply bonds to the side of the pipe, allowing the ultrasonic pulses to be transmitted directly into the pipe wall, suppressing the build up of bio film and inhibiting barnacle larva and other critters from embedding. Maintenance free, with no expensive anodes to replace, and completely safe on steel and aluminium vessels.

PART NUMBERS

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Size</th>
<th>Description</th>
</tr>
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<tbody>
<tr>
<td>PA-50</td>
<td>2”</td>
<td>Sonihull adaptor for 50mm</td>
</tr>
<tr>
<td>PA-80</td>
<td>3”</td>
<td>Sonihull adaptor for 80mm</td>
</tr>
<tr>
<td>PA-100</td>
<td>4”</td>
<td>Sonihull adaptor for 100mm</td>
</tr>
<tr>
<td>PA-150</td>
<td>6”</td>
<td>Sonihull adaptor for 150mm</td>
</tr>
<tr>
<td>PA-200</td>
<td>8”</td>
<td>Sonihull adaptor for 200mm</td>
</tr>
<tr>
<td>PA-250</td>
<td>10”</td>
<td>Sonihull adaptor for 250mm</td>
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*Other sizes made to order.

SUITABLE FOR ALL RIGID PIPES!

- ✔ STEEL
- ✔ ALUMINUM
- ✔ STAINLESS STEEL
- ✔ TITANIUM
- ✔ FIBERGLASS
- ✔ RIGID PLASTIC
SONIHULL OVERVIEW

- **LED Color Normal Status Fault Status Comments**
- **Power On**
  - Red ON Flashing Flashing is normal due to incorrectly seated transducers
- **Output 1**
  - Green ON OFF OFF when not connected or in fault
- **Output 2**
  - Green ON OFF OFF when not connected or in fault
- **Status OK**
  - Green ON OFF Fault indication, check power and transducers

Status output 2 core connector providing +5vDC output in normal condition, and OV in fault condition

**TRANSDUCER OVERVIEW**

- **Output Cable**
- **Transducer**
- **Transducer Ring**
- **Mass 1**
- **Piezoelectric Element 1**
- **Electrode**
- **Insulator**
- **Mass 2**
- **PFM**
- **Compression Bolt**
EASY INSTALLATION

No Through Hulls!

- Transducers are simply bonded to the inside of the hulls outer skin.
- For vessels up to 30' transducers should be installed in the rear 3rd of the yacht.
- For vessels up to 50' transducers should be installed 1/3 and 2/3 along the length of the yacht hull.
- For larger vessels, the Sonihull is a modular solution, please contact PYI to discuss your requirements.

MOUNTING THE CONTROL BOX

Find a suitable dry location above the waterline, with suitable access to either mains or battery power. Remove the lid to expose mounting holes for the control box.

NOTE:

Locate the transducer in a non-cored part of a laminated hull. (The Sonihull does not work with wood hulls)

INSTALLATION TIPS

Location Location Location!

The transducer needs to be mounted to an obstruction free area below the waterline and on the inside of the external skin. To enable the transducer to create resonation it must be away from any bulk heads, bracing and ribs etc, ideally in the center of a panel and not closer than 12 inches from any obstruction. Compare this to the skin of a drum, to make the best noise you would hit in the middle, not at the edges, transducers need the same consideration. It is also common to place one transducer very close to, and sometimes on a Bow Thruster tunnel.

Installing The Transducer Mounting Ring

The transducer needs complete face to face transmission, and that means flat, not curved, bowed or rough, only flat will work. Also ensure that there are no drips of glue inside the ring. A little pimple of glue splash can hold the transducer off the surface by just 1mm. That air gap is enough to stop any signal transmission. If there are any concerns that the surface is not flat, follow the manual for using the aluminum disk as a problem solver.

Applying Vaseline

The transducer needs to have a smear of Vaseline on the face to ensure correct transmission, just a smear. Do not put too much that the signal is insulated, as the transducer face will not get close to the surface. As good practice when you first screw in the transducer, tighten it up firmly by hand, (not overly tight). Then remove the transducer and observe the swirl marks of the Vaseline on the face of the transducer, and look for the wetting on the hull inside the ring. This will give you a clear indication of the quality of the surface contact.
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