Ultra*System* Series II

INSTALLATION MANUAL

Manual ref: 02-12-2013

CONTENTS

IMPORTANTION INFORMATION

The ultrasonic transducers are fitted on the inside of the hull, therefore it is not necessary to penetrate the hull. The system can be installed with the boat in or out of the water.

The Ultra*System* has taken several years of careful research and develop to optimise and make it fully effective. **PLEASE READ AND FOLLOW THESE INSTRUCTIONS CAREFULLY.** This system must be installed in accordance with the instructions in this handbook. Failure to do so could result in poor product performance, personal injury or damage to the vessel.

WARNING: Risk of injury. Ensure appropriate tools are used and safety gear worn when undertaking the installation.

WARNING: Risk of electrical shock. Ensure the power supply is isolated during the installation. Electrical work for DC and AC voltages should be carried out by a competent and qualified person.

IF IN DOUBT SEEK PROFESSIONAL ADVICE

Ultrasonic Antifouling support team:
T: +44 (0) 1202 606 185 **E:** info@ultrasonic-antifouling.com

PLANNING THE INSTALLATION

Planning the installation will allow best use of time. It is suggested to follow the schedule below, points 1 to 8.

1. Read this manual in full to understand what is required. Make notes if necessary.

2. Plan the layout of the system and decide on:

   a) Where the transducer(s) will be positioned.
   Positioning of the transducer(s) is absolutely critical because incorrect positioning can make the system less effective. Please refer to page 4 for positioning of transducers.

   b) Where to mount the control unit.
   The control unit should be in a dry and ventilated locker or compartment above water line level. It must be mounted vertically to allow cooling through the vents at the top and bottom of the housing. These vents must not be covered or blocked.

   Consideration should be made for the transducer cables lengths that will connect from the control box to the transducer(s). Cable length supplied:

   Ultra 10 system: 1 x 4m Ultra 20 System: 1 x 4m plus 1 x 8m

   Extension cables are available if required in 4, 8 and 10m lengths.

   c) Power supply.
   The Ultra*System* requires a permanent supply from the boat's DC system 12v or 24v. When the boat's batteries are isolated, the Ultra*System* must continue to operate! Take the supply from a live buz or directly from one battery.

3. Install the transducer mounting ring(s).
   Undertake the fitting of the ring first. This will allow more time for the epoxy to cure before inserting the transducer.
4. Install the control unit.
5. Run the power and transducer cables.
6. Make the electrical connections.
7. Install the transducer into the mounting ring.
8. Make final checks and switch on.

TRANSDUCER POSITIONING

It is very important to ensure transducers are correctly positioned on the inside of the hull. ***For a guide to positioning, please look at the configurations shown on the next pages (5 – 8) depending on the boat length and type the system is being installed on.***

The measurements given on this page are approximate and intended for general guidance. The final position of a transducer will depend on the access and surrounding structures of the hull, such as bulkheads, stringers and supporting / strengthened areas for 'P' brackets and the keel. Avoid positioning the transducer close to these structures, it is better to move further away from the centreline and any structures, in order to install the transducer on an area of original solid hull where no additional tabbing layers have been applied to support these hull parts or strengthen the hull.

Single transducer installations (ULTRA 10 System)
The transducer is installed in the stern area of the hull near the propeller and at least 200mm off the centre line to one side.

Twin transducer installations (ULTRA 20 System)
One transducer is installed in the stern area of the hull near the propeller and at least 200mm off the centre line to one side. The second transducer should be installed approximately one third of the way back from the bow or just behind the bow thruster or forward of the keel on a sail boat.

Multiple transducer installations (Combination of ULTRA 10 and ULTRA 20 Systems)
Transducers should be positioned with the same considerations as described above and as shown in the relevant system configuration drawings for the boat.

Notes for installations to Powerboats:

a) Where a twin transducer system (Ultra 20) has been selected to provide additional protection at the stern of a twin drive power boat, place one transducer in the proximity of each propeller.

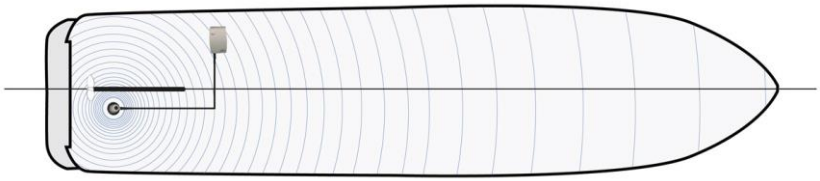
b) Powerboats with Stern Drive units, position the transducer near the transom, approximately 150mm away, and at least 200mm off the centre line. If this is not possible due to restricted access, a position at the front of the engine can be selected.

DO NOT INSTALL THE TRANSDUCER ON ANY FALSE FLOOR AND INTERNAL SKIN OR LINER.
If the hull is cored (Balsa/Foam) known as sandwich construction, the transducer must make contact with the external skin of the hull. Additional work will be required to remove a 150mm diameter section of the core then filling in with new laminate and epoxy to strengthen and seal. It is imperative that the new layers are compressed and no air is trapped in the layers. Ultrasound does not work through air!

POSITIONING FOR POWERBOATS

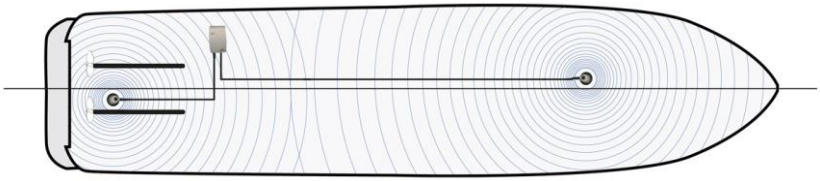
Hull waterline length (LWL) up to 10m

1 x ULTRA 10 System



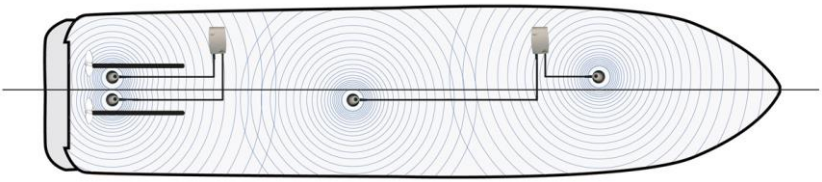
Hull waterline length (LWL) 10m to 16m

1 x ULTRA 20 System



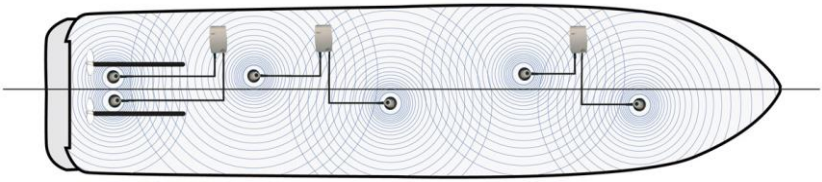
Hull waterline length (LWL) 16m to 22m

2 x ULTRA 20 System



Hull waterline length (LWL) 22m to 28m

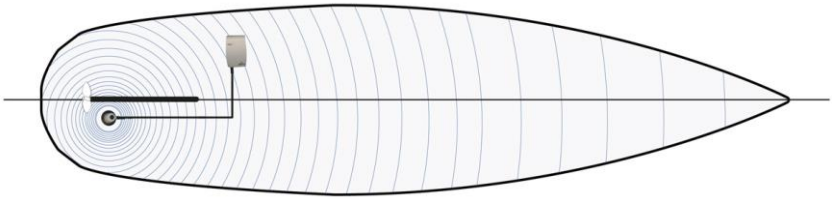
3 x ULTRA 20 System



POSITIONING FOR SAIL BOATS

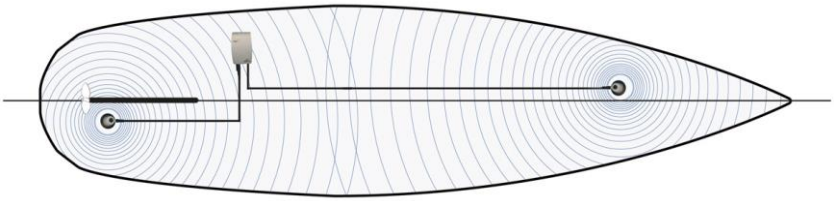
Hull waterline length (LWL) up to 10m

1 x ULTRA 10 System



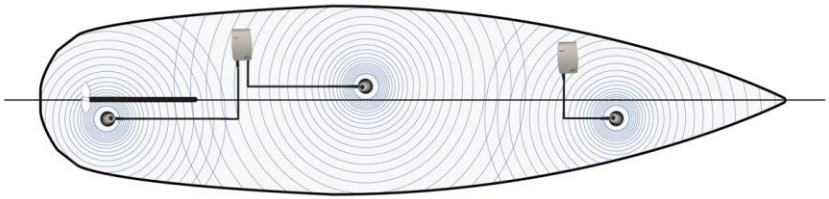
Hull waterline length (LWL) 10m to 16m

1 x ULTRA 20 System



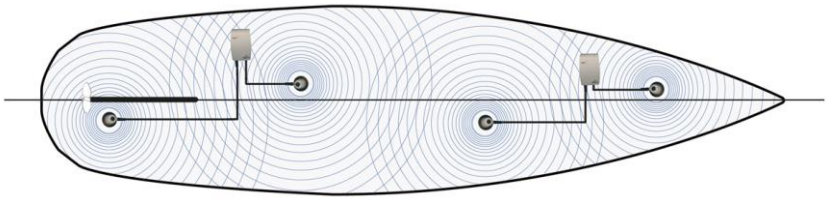
Hull waterline length (LWL) 16m to 22m

1 x ULTRA 20 System + 1 x ULTRA 10 System



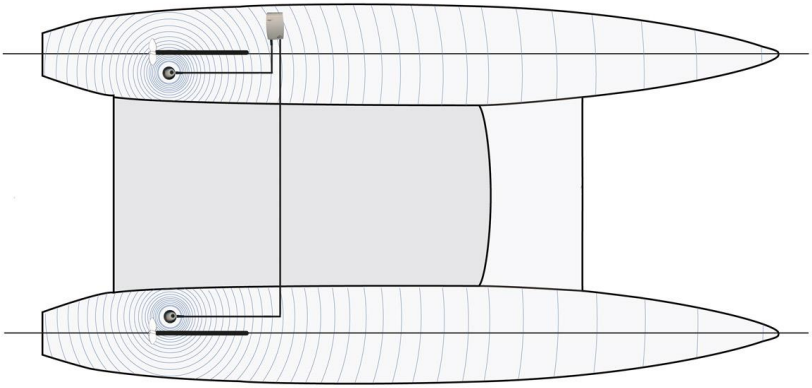
Hull waterline length (LWL) 22m to 28m

2 x ULTRA 20 System



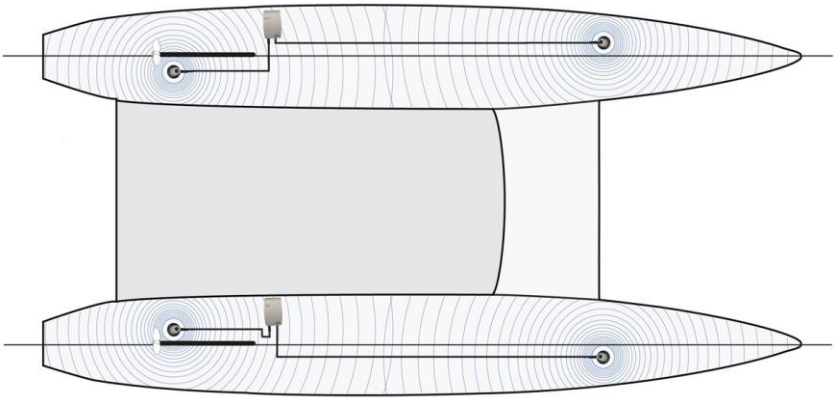
Hull waterline length (LWL) up to 10m

1 x ULTRA 20 System

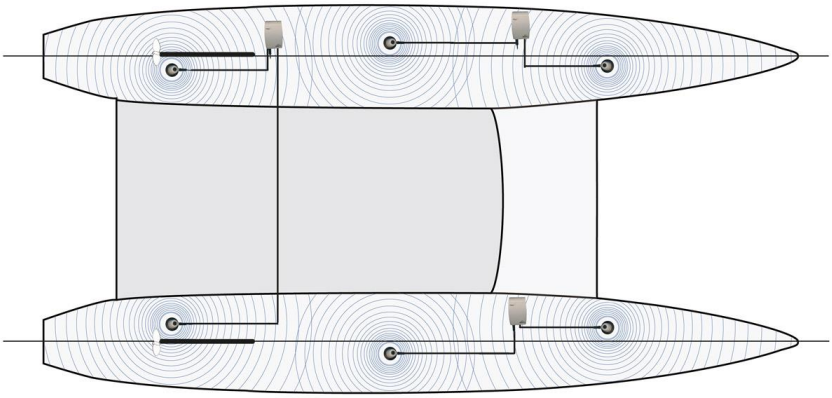


Hull waterline length (LWL) 10m to 18m

2 x ULTRA 20 System



Hull waterline length (LWL) 18m to 24m
3 x ULTRA 20 System

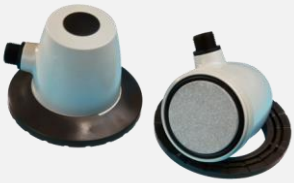


Trimarans

For a Trimaran multi-hull it is the centre hull that requires Ultrasonic protection as it the hardest to maintain against fouling, while the two outer hulls have very little surface area in contact with the water, these can be easily accessed and cleaned with a light brush.

Install the Ultra*System* in the same way as one catamaran hull which is shown in the drawings of this section.

TRANSDUCER INSTALLATION



DO NOT fit transducers thru-hull. Install on the inside surface of the hull.

DO NOT install transducers outside of the hull in the water.

DO NOT install the transducers where they will become submerged on a regular basis.

Correct installation of the mounting ring and transducer is critical to the systems successful operation. The direct contact of the transducer face to the hull transmits the signal into the hull form, allowing the sound waves to resonate.

Guide notes:

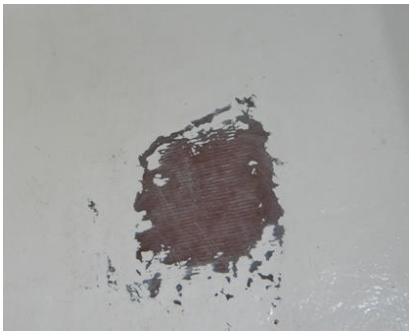
a) You are looking to achieve 100% contact of the transducer face to the hull. So the better you prepare the surface, the better the effect.
b) Ensure your chosen position is not difficult to work on. It is critical to make a good job of the fitting, than making a poor effort due to working restrictions.
c) Do not install on or close to the centre line. Keep off by a least 200mm.
d) Keep at least 200mm away from stringers, bulkheads and other areas that have additional laminate layers applied.
e) The transducer must be below the hull's waterline.
f) Ensure the surface is prepared flat and smooth before bonding the mounting ring.
g) Ultrasound does not transmit through air, the supplied silicone grease allows any minor air pockets between the transducer face and hull surface to be expelled.
h) The transducer face must make a direct scratch contact to the hull. Too much silicone grease will prevent this.
i) Do not over tighten the transducer.

Failure to follow the installation procedure on pages 10 and 11 correctly will reduce the resonance and reduce the effectiveness of the system.

TRANSDUCER INSTALLATION

Preparing the hull's inner surface and fitting the transducer mounting ring.

Stage 1 *image: prepared surfaced*



Stage 2 *image: sanding ring flange*

Stage 3 *image: applying the epoxy*

Stage 1 - Preparing the hull surface.
Carefully prepare the location of the transducer using an 80grit sand paper and sanding block. An electric sander can also be used. If the surface is very uneven, starting with a 40 grit paper will make it easier. Prepare a **flat and smooth** surface. With GRP (fibreglass) hulls, sand down to the laminate removing any coating such as gel wash or other bilge paint. For steel and aluminium hulls remove any coating to expose the bare metal.

The mounting ring should sit absolutely flat on the prepared area.

Clean the whole area with acetone and make sure it is dry and free from grease and dust.

Stage 2 - Preparing the mounting ring.
Abrade the underside of the ring flange thoroughly using 80 grit sand paper to achieve a rough surface to aid the adhesion.

Keep the flange surface free from grease and water.

Stage 3 - Bonding the transducer ring to the hull.
Using rubber gloves to protect your hands, mix a good quality epoxy (i.e. Araldite Rapid set) and apply a layer of about 2.0mm thickness to the underside of the ring flange. *Too much may result in excess epoxy entering into the centre contact area and prohibit the transducer face making contact!*

Locate the ring onto the prepared area of the hull and hold it firmly down until it feels secure. To avoid the ring moving from its position, tape down.

Leave for 24 hours to allow the epoxy to set before fitting the transducer.

image: Mounting ring bonded inside the hull. The inner contact area is free of debris and excess epoxy.

Fitting the transducer into the mounting ring.

1. Check for any debris or excess epoxy inside the ring area that would prevent the transducer face making direct contact to the hull.

2. Apply a small amount of silicone grease (supplied) to the transducer face. Spread over the entire face to form a fine layer of approximately 0.5 to 1.0mm thickness.

3. Slowly turn the transducer down into the ring using only fingertip pressure until it stops where the face has come into contact with the hull.

4. After 30 minutes or so when any trapped air has escaped through the threads, it may be possible to turn the transducer in a little more to ensure contact has been achieved.

5. Connect the transducer cable.

6. Cover the surrounding prepared surface with a suitable bilge paint, flow coat or other coating.

image: silicone grease is applied to the transducer face. This forms a gasket to eliminate any small air pockets.

image: transducer installed to the hull.

CONTROL UNIT INSTALLATION

CAUTION: Water ingress.
To prevent the ingress of water and consequent damage to the control unit, mount to a solid bulkhead above the waterline in a dry locker or engine compartment away from any external vents.

WARNING: Do not remove the lid and open the control unit.
This is not necessary for the installation and will void the warranty.

MOUNTING THE CONTROL UNIT

1. Vertical mounting is required to effect cooling by convection.
2. Using the mounting bracket or the template enclosed, drill 3 holes using a 3mm bit.
3. Secure the mounting bracket with 8 gauge pan head self-tapping stainless steel screws. The screw length should be appropriate for the thickness of the panel.
4. Clip the control unit into place on the mounting bracket. (push in and slide down to click)

For cabling and electrical connections refer to pages 12 and 13.

AC MODULE INSTALLATION – DUAL Voltage units

CAUTION: Water ingress.
To prevent the ingress of water and consequent damage to the control unit, mount to a solid bulkhead above the waterline in a dry locker or engine compartment away from any external vents.

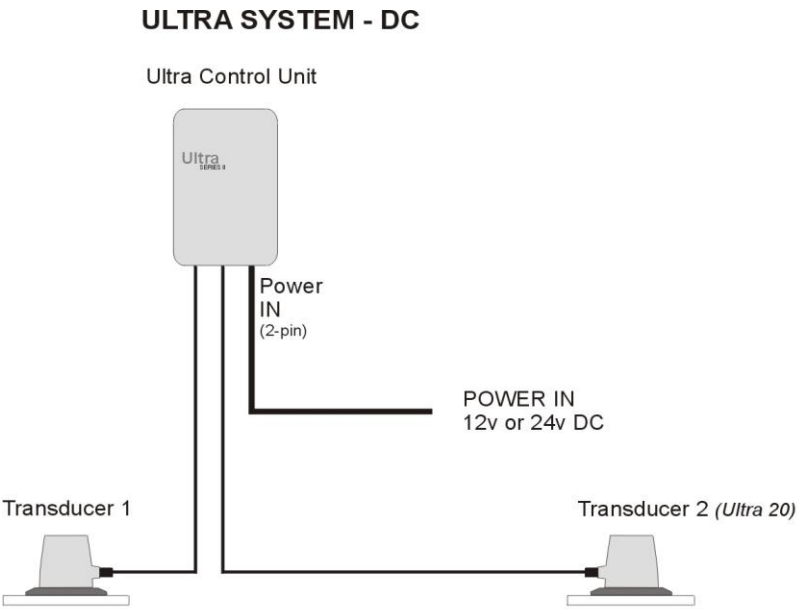
WARNING: Do not remove the lid and open the control unit.
This is not necessary for the installation and will void the warranty.

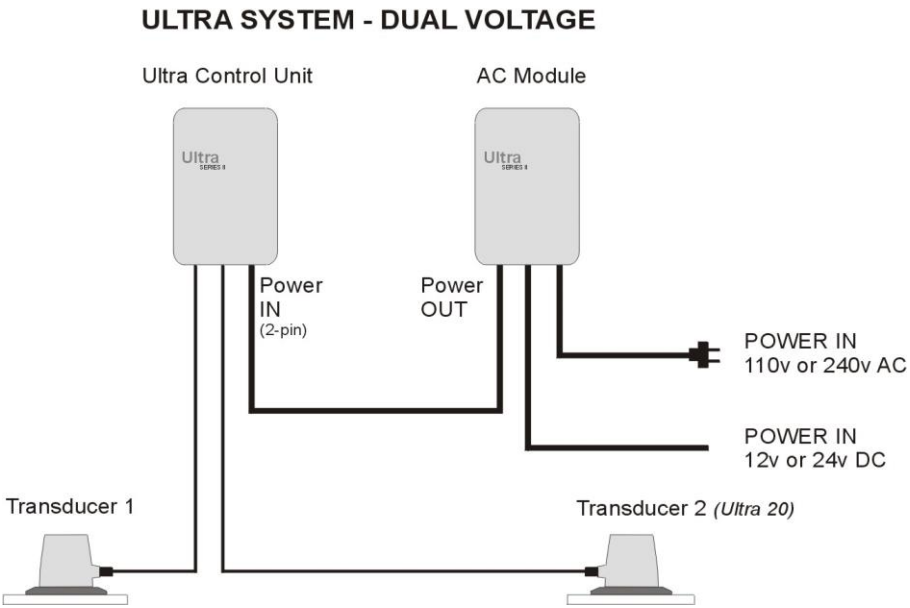
MOUNTING THE AC MODULE

1. Vertical mounting is required to effect cooling by convection.
2. Using the mounting bracket or the template enclosed, drill 3 holes using a 3mm bit.
3. Secure the mounting bracket with 8 gauge pan head self-tapping stainless steel screws. The screw length should be appropriate for the thickness of the panel.
4. Clip the control unit into place on the mounting bracket. (push in and slide down to click)

For cabling and electrical connections refer to pages 12 and 13.

SYSTEM SCHEMATIC DIAGRAM





CABLE LAYOUT and ELECTRICAL CONNECTIONS

CABLE LAYOUT

Plan the cable layout for both the power and transducer cables. All cables should be adequately secured, protected from physical damage and excessive vibration. Use existing conduits where possible and protect exposed cables with new conduit i.e. cables in the bilge area running to transducers. Although the ultrasonic cable is waterproof (IP68) and oil and fire resistant, avoid running them in bilge areas that are permanently wet, or close to moving and hot items.

DO NOT CUT AND RE-JOIN TRANSDUCER CABLE. If it is necessary to run a transducer cable through a bulkhead, a 20mm drill bit or hole saw should be used to accommodate the plug. Always check the other side of the bulkhead before drilling to ensure it is clear and safe avoiding damage to other items. Use a rubber grommet to protect the cable from chaffing around the area of the hole.

DO NOT COIL SURPLUS TRANSDUCER CABLE. Coiling up cable can affect the output. Lay excess cable out over its own length and tie together.

ELECTRICAL CONNECTIONS – DC VOLTAGE

The Ultra*System* will automatically operate on the boat's 12v and 24v DC system. The operational voltage range is 12 - 32v DC.

NOTE: the power supply must be a permanent supply to enable the system to operate continuously and when the batteries are isolated. Connect the DC (+) cable directly to the battery source, either to the (+) terminal or live terminal of the battery switch. A permanently live (+) BUS Bar can also be used. The negative (-) cable connects to any common 0 volt terminal or BUS Bar.

NOTE: the positive (+) cable must be protected by a fuse or circuit breaker rated to 5 amps.

DO NOT REVERSE THE POLARITY ON CONNECTION! The polarity must be checked.

Brown (+) positive 12v / 24v DC
Blue (-) negative 0v

ELECTRICAL CONNECTIONS – DUAL VOLTAGE (AC and DC) – AC MODULE

The DC operating voltages and connection of the Module DC cable is the same as above. The AC operating voltage is 110v – 240v AC (50/60 Hz).

Connect the Module AC cable and plug into an AC supply socket. The AC plug can be removed for connection to the boat's AC panel or circuit. The supply must be protected by a fuse or circuit breaker rated to 5 amps. **NOTE: It is not permitted to open the unit and remove the AC cable. Warranty will be void.**

FINAL CHECKS AND SWITCHING ON

FINAL CHECKS

1. **Check the power cable connections:** correct polarity and protected by fuse/breaker.
2. **Check the transducer cable:** connected at both the transducer and control unit.
3. **Check the transducer:** tight down and no further turn can be made….in good contact!

SWITCHING ON

With the installation checked, switch on the DC power supply to the Ultra*System.* Switch on the DC and AC power supplies for the DUAL Voltage version.

The control unit(s) LED status lights will show.

THE ULTRASONIC SYSTEM IN OPERATION

ULTRA 10 and 20 Control Unit

Two LED status lights will be visible at the top of the control unit. Note: these lights are located under the housing and will shine through at each point as follows:

LED: #1 'ON' : system is on.

Light flashes (every one second) at the beginning of every new programme cycle.

LED: #2 'SIG' : ultrasound signal output.

Light will continuously flash as it runs the sequence.

A very slight double-clicking sound will be heard at the transducer. This is normal and also an indication of its operation. *The ability to hear this depends on the person's hearing.*

The Ultra system should be in operation continuously. For power saving, a minimum operation period of 15 hours per day (daylight hours) can be programmed via an optional timer device.

THE ULTRASONIC SYSTEM IN OPERATION

AC Module - models 10 and 20 *(Dual Voltage option only)*

When the two power supplies are connected and switched on, three LED status lights will be visible at the top of the AC Module unit. Note: these lights are located under the housing and will shine through at each point as follows:

LED #1: 'AC' : AC power source available

LED #2: 'DC' : DC power source available

LED #3: *(not in use)*

LED #4: 'PWR' : DC power OUTPUT to Ultra System control unit.

The LED lights on the AC Module do not flash in their operation.

MAINTENANCE / ROUTINE CHECKS

The Ultra*System* does not require any maintenance, but it is recommended transducers are checked to ensure they remain in good contact with the hull. Simply hold the transducer to see if it has become a little loose in the mounting ring and turn in to re-adjust.

Check the system is on, the LED lights on the control unit show the operational status.

Note: It is possible to find growth appearing around the waterline and this is very normal. This area around the hull is intermittently exposed to the ultrasound due to the lapping of water. The ultrasound disperses into air at the point when it reaches the surface.

TROUBLE SHOOTING GUIDE

There is no output from the Ultra control unit!

- Check LED status lights - Green 'Power on and start of new frequency cycle' and Red flashing 'Frequency output' - both should be on.

If no green LED on.....

- Check DC battery supply and any fuse or circuit breaker fitted.
- Check AC power supply (optional AC Module only) and any fuse or circuit breaker fitted.

Growth is attaching and the control box is operating (Red and Green LED lights are on)!

- Can a clicking sound be heard at the transducer? The clicking sound indicates an output from the control box to the transducer.
- Has the transducer become loose, can it be turned down anymore?
- Is the transducer making good (100%) face contact with the hull? Is there any debris or epoxy inside the mounting ring area preventing this? Remove the transducer to check the markings on the face.
- Was the inside hull surface prepared correctly to a flat and smooth finish with either the laminate or bare metal exposed?
- Is there any gel on the transducer face? Is there too much? (a skim/thickness of approximately 0.5 -1.0mm is recommended)
- In the case of fibreglass hulls, is the area below the waterline a balsa/foam cored sandwich construction? If yes, the inner core here should be removed to expose the outer skin.
- Is the transducer off the centre line and away from other areas of the hull which have strengthening boards or additional layers of laminate applied to support equipment attached to the hull i.e. 'P' brackets, sail drives etc. If not, establish a suitable position following our guidelines.
- Is the transducer to close to a stringer and on the layers that bonds it to the hull? If yes, reposition away from this area.
- Is the unit getting a reliable power supply - battery going flat, power failures or shore power being unplugged?

If you cannot resolve any issue you have or require further assistance, please contact the technical team at Ultrasonic Antifouling Ltd.

PRODUCT WARRANTY

The Ultra Series II product is warranted by the Manufacturer Flexidal bvba for a period of three years from the original purchase date against material and construction errors. The warranty comprises spare parts and labour. Flexidal bvba do not cover travel and/or expedition expenses. Repairs under warranty will only be accepted if it can be proven (e.g. by means of a purchase invoice) that the day on which the complaint was filed is within the warranty period. The warranty does not cover damage resulting from accident, unreasonable use, negligence or modifications or repairs made by unauthorised personnel.

The warranty is a Manufacturer's Return-To-Base-Warranty, not an effectiveness guarantee, if the Ultra system should fail due to a manufacturer's defect within the specified warranty period the system should be delivered prepaid to Ultrasonic Antifouling Ltd at the following address:

Ultrasonic Antifouling Ltd
Arena Business Centre
Holyrood Close
Poole, BH17 7JF
UNITED KINGDOM

T: +44 (0) 1202 606185
E: info@ultrasonic-antifouling.com

If the Ultra system is deemed to have a manufacturer's defect and is under warranty it will be repaired, fully serviced and returned free of charge to the nominated address.

The warranty does not include the labour and material costs associated with all other services within the warranty period, or any freight charge for "return to base" support, which are chargeable to the customer at Ultrasonic Antifouling Ltd.'s or an Approved Dealer or other third party agent's current time and materials rate.

NOTES

Serial number:

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