



SEAFARER 700

ECHO SOUNDER

Installation and Operating Instructions

RY0008

SEAFARER NAVIGATION INTERNATIONAL LIMITED

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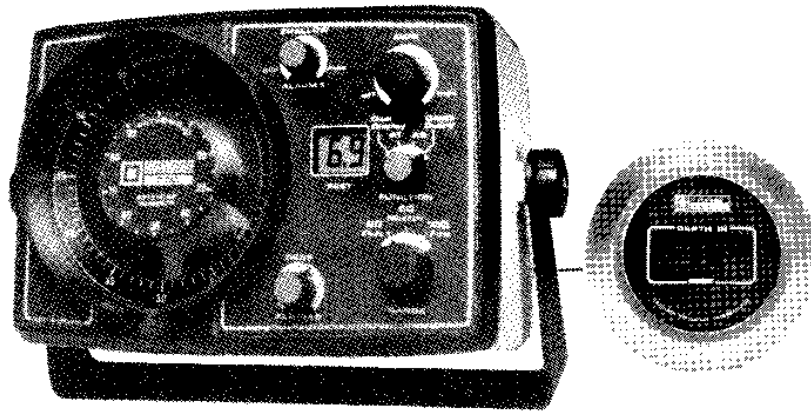
Telex: 41169

Cables: Seatronics, Poole

Aloha Owners Association note: Seafarer went out of business in the late 1980s or early 1990s. Another English company initially took over responsibility for providing spares, but we believe they now advise that these units are beyond economical repair and recommend they should be replaced if they fail.

SEAFARER 700

Echo Sounder



CONGRATULATIONS

You have become the owner of a Seafarer 700 Echo Sounder. If you follow the installation instructions carefully and carry out routine maintenance as recommended, then this quality product will give you many years of trouble free service.

INSTALLATION AND OPERATING INSTRUCTIONS

INTRODUCTION

The Seafarer echo sounder operates by measuring the time interval between transmission and reception of ultra-sonic pulses from the sea bed via a piezo electric transducer fitted in the hull of the boat.

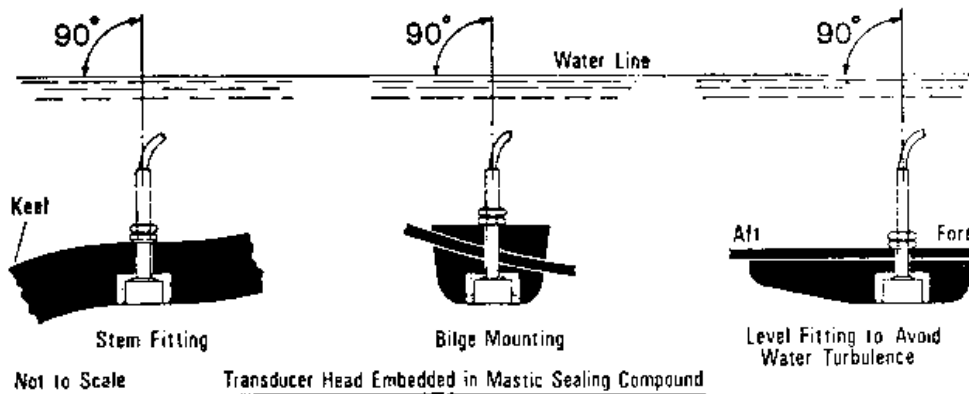
The depth is displayed on a circular dial by a brilliant yellow Light Emitting Diode (LED) on three range scales. Ranges are 0—20m, 0—60m and 0—200m on metric model or, 0—60ft, 0—60 metres and 0-100 fathoms on Feet/Fathoms model. In addition, the instrument is fitted with two variable depth alarms (audible and visual) which operate between a minimum of 2.7 feet and maximum of 29 metres (nominal).

TRANSDUCER INSTALLATION

WARNING: The co-axial cable is sealed into the stem of the transducer and if damaged in any way cannot be reconnected. The transducer lead has a nominal length of 24 feet (7.3 metres) and should not be extended or cut without the advice of a service engineer. Any excess cable should be coiled away from excessive heat or sources of electrical interference. Transducers with longer cable can be supplied to special order. For full depth performance the transducer stem should be mounted as near vertical as possible. Install the transducer in a part of the hull which is as clear as possible from aerated or turbulent water and where accidental damage is unlikely to occur. Normally a position slightly aft of amidships is preferable. For fin-keel sailing boats it may be preferable to fully recess the transducer into the stem so that the face is completely flush. It should be remembered that the beam angle of the transducer is $\pm 22\frac{1}{2}$ and care should be taken that a false echo is not created by the keel. If a single transducer is installed on the centre line of the boat depth readings will be obtained up to an heel angle of $22\frac{1}{2}$. If two transducers are required, to avoid fin-keels for instance, then each should be fitted in opposite bilges facing outward at an angle of approximately 15° . By using an automatic change over switch (optional extra) available from all good chandlers, a twin transducer installation will enable the Seafarer 5 and 700 to give accurate depth readings to an heel angle of $37\frac{1}{2}$.

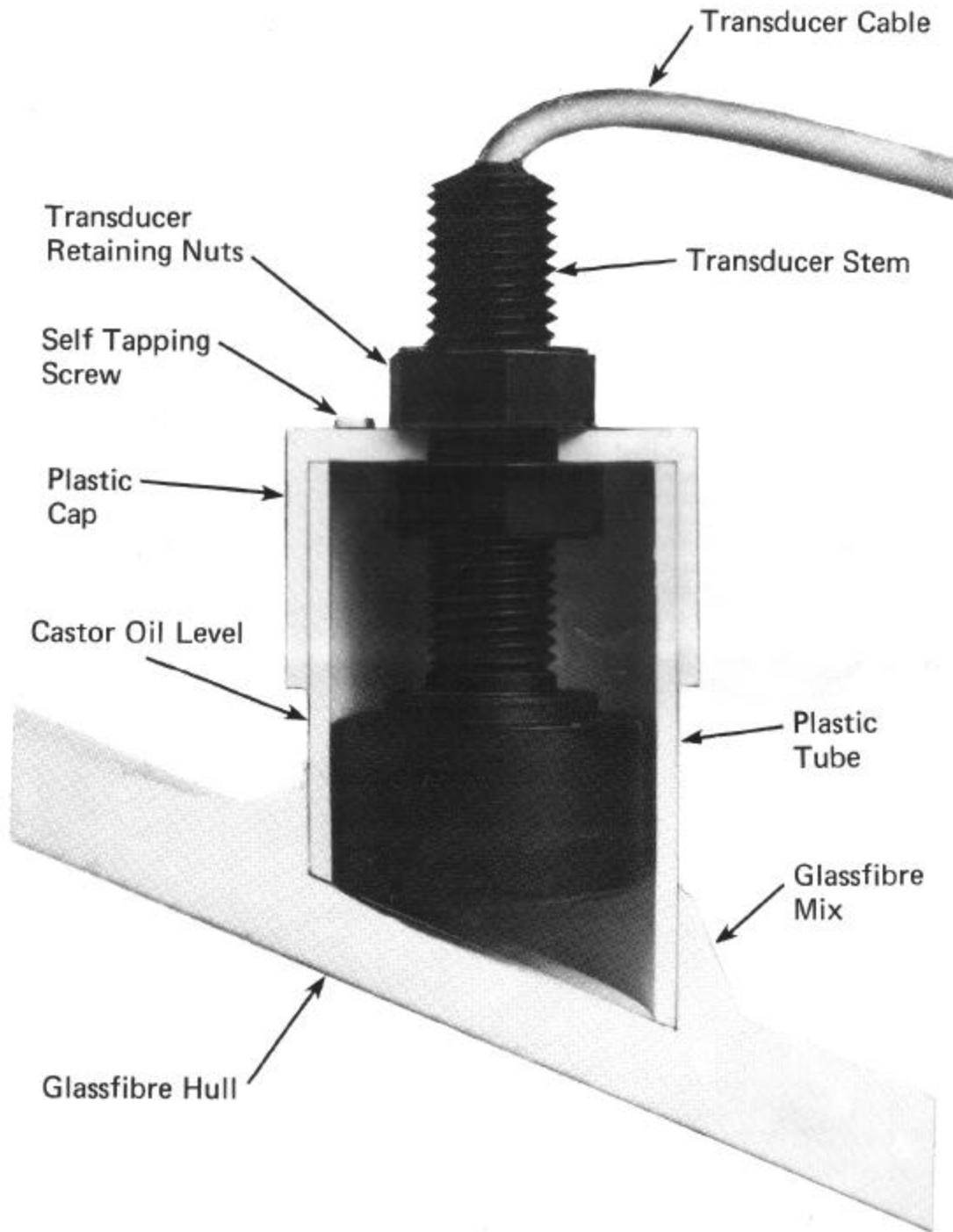
The following illustration indicates typical transducer installations using a wooden fairing block outside the hull. The fairing block has been carefully bored, carved and sanded to a streamlined shape avoiding the creation of turbulent water which may reduce or even prevent depth indication when the boat is travelling at a speed. In one of the examples shown, an internal fairing block has been used for strength and sealing and to allow for hull curvature. The installation should be carefully rendered watertight by using a sealing compound between all mating surfaces. Do not over-tighten the nuts on the transducer stem.

Fig 1



TRANSDUCER INSTALLATION DIAGRAM

Fig 2



In Hull Transducer

TRANSDUCER ANTI-FOULING

Following installation the water exposed face of the transducer may be painted with one thin coat of hard Antifouling, carefully applied so that the paint does not form or trap air bubbles. Care should be taken not to damage the transducer face or the piezo electric crystal that it protects. Accidental damage to this sealed unit cannot be repaired.

WITHIN HULL (GRP) TRANSDUCER INSTALLATION (Optional)

As an alternative to mounting the transducer through the hull with the face in direct contact with the water, it may be positioned inside a glass-fibre hull by means of an In Hull Transducer Kit as shown in Fig. 2. The In Hull Transducer Kit is available from most Chandlers and Boatyards, as an optional extra. The end cap of the In Hull Transducer Kit is provided with a push-out insert making it suitable for the stem diameter of both the Seafarer 5 and 700 transducers. This method of installation has the dual advantage that no hole is made in the vessel's hull and that the echo sounder and transducer can easily be removed for examination or installation elsewhere. It should be mentioned however, that although the accuracy will in no way be affected by installing the transducer inside the hull, the maximum range sensitivity may be reduced depending upon the thickness and quality of the glass-fibre. We do not recommend this method of installation if the thickness of the glass-fibre exceeds three-quarters of an inch. Neither do we recommend its use in hulls of wood, steel or aluminium, although this method of installation has been found acceptable with these materials in some cases. Full installation details are supplied with the In Hull Transducer Kit and copies are available on request to Seafarer Navigation International Limited.

INSTRUMENT INSTALLATION

WARNING: The location of the instrument should be at least 2 feet (61 cms) from a magnetic compass.

Repeat meter 1 foot (30 cms).

With the bracket provided the instrument may be mounted in any position, as the bracket can be rotated through 360g. (The bracket is designed to be slightly undersized to ensure a good grip on the case). This means that it can be facing down from a cabin roof, or on top of an instrument panel or console, or side mounted by the chart table. If the instrument is mounted outside or in a cockpit, a sheltered position should be chosen, since although the instrument is water resistant it is not fully waterproof. For this reason it is advisable to provide a cover or some additional protection against extreme climatic conditions.

FLUSH MOUNTING

An alternative method of mounting is to fully recess the instrument into a panel or bulkhead using a flush mounting flange. The template provided with the operating booklet may be used for making the appropriate cutout in the bulkhead. Remove the two plastic side mounting knobs and cut the projecting screw threads back to the metal flange on each side of the instrument case. Fit the plastic mounting bezel to the instrument by slacking the four fixing screws at the rear of the case sufficient to allow the bezel (which is in two halves) to be slipped in between the front panel and the case. Re-tighten the four screws trapping the bezel in position. The instrument can now be pushed into the cutout in the bulkhead from the front and secured with eight countersunk screws in the bezel. The outline dimensions of the Seafarer for mounting purposes are shown in Fig. 3.

POWER SUPPLY

The instrument may be powered by either an internal battery or ship's supply of nominal 12/24 or 32 volts D.C. without adjustment. The rear battery compartment cover must be removed to allow access to the connections. If the instrument is to be powered from the ship's supply, attention is drawn to the fact that the internal battery terminals **MUST** remain stowed in their stowage position. The unit will not operate on an external supply unless the battery terminals are in the stowage position.

Internal Batteries. The recommended battery is the Ever Ready PP9 or Vidor VT9 or its international equivalent:

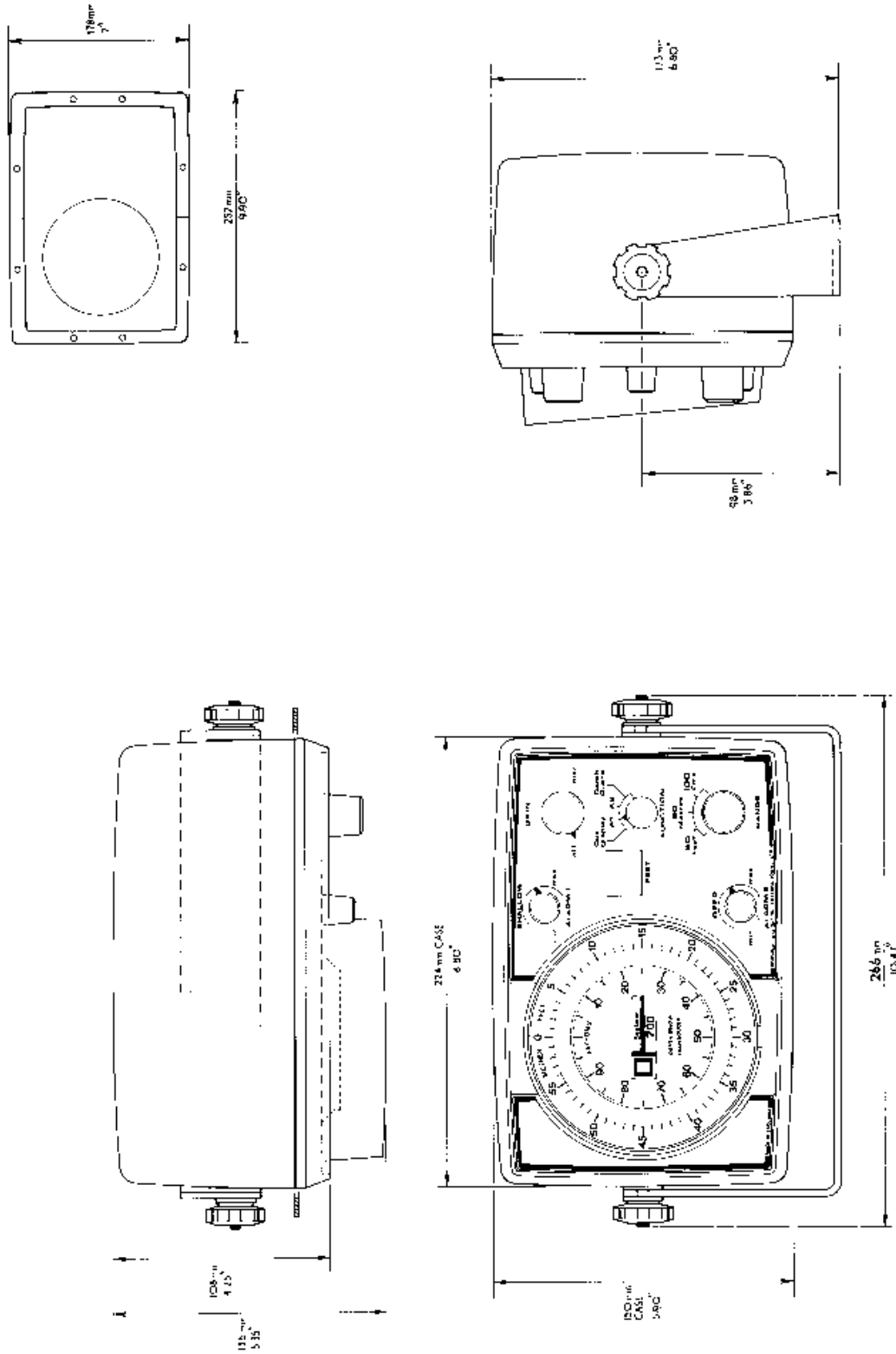
Berec PP9	Diamon 339
Ever Ready 276	Petrix 439
Mazda RO 617	Superpila 995 Tudor 9T1

Remove the battery clips (red and black leads) from their stowage position and clip them on to the battery in the correct polarity. Red to positive (+VE) and black to negative (—VE).

As an alternative two 4.5 volt flat flashlight batteries of the type with two brass contact strips at the top may be used with an appropriate adaptor. During the Season, periodically check the battery or batteries for signs of corrosion and always remove them at the end of the Season. Should the instrument ever need servicing, remove the battery before posting.

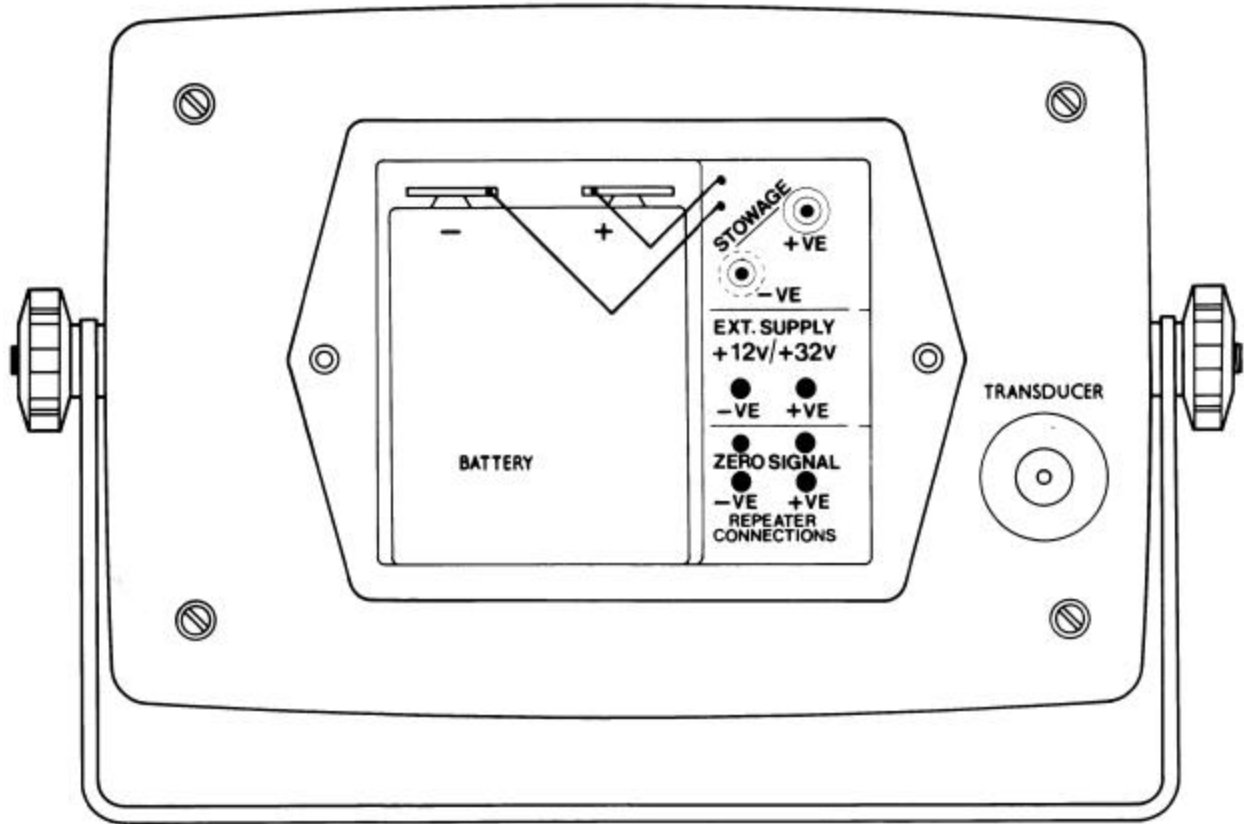
Ships Supply. The instrument will accept any nominal ships supply of 12, 24 or 32 volts D.C. without adjustment. Damage, however, will be sustained if a higher voltage is connected or if the ships supply produces "peaks" in excess of 35 volts. To connect the instrument, remove the battery compartment cover and make a small hole in the sealing grommet marked "external supply" in the back cover. Thread the power supply cables through the grommet and connect the negative supply to the screw terminal on the instrument marked —VE and the positive supply to the screw terminal marked +VE. The internal battery terminals **MUST** remain clipped in their stowage position when the ships supply is connected. If the polarity is inadvertently reversed no damage will be sustained, but the instrument will not work until the correct polarity is connected. Check the correct operation of the instrument before re-fitting the rear cover.

Fig 3



OUTLINE DIMENSIONS FOR SEAFARER '700'

Fig 4



REAR VIEW WITH COVER REMOVED

SEAFARER 700 & 5

GENERAL OPERATION

(All tests must be carried out with the transducer lead plug inserted into the back of the set and with the vessel afloat. Meaningful tests cannot be carried out with the transducer operating in air or in a water container.)

With the set turned 'on', the Seafarer 700 offers six forms of depth information or Depth Guard facilities. These are:

1. Dual Display

With the function switch in the 'ON' position and the range switch in the '60 feet' (or 0—20 metres in the metric version of the Seafarer 700) position, the set will present a water depth by yellow LED on the dial and by LCD in the digital display panel. The gain control should be adjusted so that multiple depth echoes on the dial are eliminated and one steady reading is obtained. It should be noted that the LCD display reads in feet only, even if the range switch is turned to the 60 metres or 100 fathoms positions. (On the metric version of the Seafarer 700, the dial and LCD display depth readings are in metres at all times.) The digital display presents a depth from 2.6 feet to 9.9 feet and then automatically changes to 10 feet, up to a maximum of 99 feet. (0.8 metres to 99 metres on the metric version.) Below 2.6 feet (0.8 metres) with the gain control turned too high, a reading of double the true depth may be seen. Thus, in conditions of very shallow water it is advisable to take the depth reading from the dial display, ignoring the second echo. As the depth of water beneath the transducer increases, the gain control should be gradually turned up so that a steady reading is obtained on both the dial and the digital display.

2. Shallow Water Alarm "A1"

By moving the function switch to "A1", the shallow water alarm setting may be activated. Upon moving the shallow water alarm control from Minimum, a red LED will be indicated on the dial. Adjustment of this LED to a position on the dial to the depth at which it is desired that the alarm buzzer within the set will operate, is confirmed by the LCD in the display panel. In practice, when the depth of water drops to the setting selected, the alarm will sound. The minimum depth at which the alarm will operate is 2 feet 6 inches (0.8 metres).

3. Deep Water Alarm "A2"

By moving the function switch to "A2", the deep water alarm setting may be activated. Upon moving the deep water alarm control from minimum, a red LED will be indicated on the dial and its position confirmed on the LCD display panel. The deep water alarm setting maximum is 95 feet (29 metres on the metric version). (Whilst this adjustment is carried out, the previous shallow water alarm setting is retained in electronic memory.)

4. Shallow and Deep Water Alarms

After selecting the desired shallow and deep water alarm settings as described above, the function switch may be moved back to the "Dual Display" position. The Seafarer 700 will now display the depth of water by yellow LED on the dial, and also by LCD in the display panel. The previously selected positions of the shallow and deep water alarms will be confirmed by red LEDs on the dial.

5. Depth Guard (Active)

With the position of both the shallow and deep water alarms having been set as above, the function control switch may be moved to the "Depth Guard" position, with the alarm settings retained in the electronic memory. When this has been done, the rotor on the dial will cease to rotate but the yellow and red LEDs mounted on the rotor will flash intermittently, indicating that both depth, and alarm settings, are being monitored. The depth of water will be indicated on the LCD display. In this mode, the Seafarer uses approximately one eighth of its normal current consumption.

6. Depth Guard (Inactive)

With the function switch in the "Depth Guard" position and the shallow and deep water alarm controls turned to minimum, both alarm systems are de-activated. Since the rotor on the dial ceases to rotate, the depth of water reading has to be taken from the LCD display. Because of the saving in current consumption in this mode, it is ideal for normal cruising purposes although it must be remembered that the LCD cannot present a depth greater than 99 feet (or 99 metres on the metric version).

DIGITAL REPEAT METER (Optional Extra)

A digital repeat meter is available as an optional extra. This instrument is suitable for use with Seafarer 5 or Seafarer 700 echo sounders. The meters are single range and can be supplied calibrated to read in feet or metres. The "metric" model reads from 0.8 metres to 119.9 metres and the "feet" model from 2.7 feet to 599.9 feet. WITH THE SEAFARER 700 SET IN THE 'DEPTH GUARD' MODE, THE REPEAT METER WILL CONTINUE TO INDICATE TRUE DEPTH, WELL BEYOND THE MAXIMUM RANGE OF THE ECHO SOUNDER. UNDER IDEAL CONDITIONS, THE MAXIMUM RANGE OF THE REPEAT METER WOULD BE 999.9 FEET.

The calibration of the repeat meter is independent of the echo sounder and it will continue to read in its factory set units, whichever echo sounder model (foot/fathom or metric) it is used with. Depth is indicated on a four digit liquid crystal display which is fitted with red, LED edge lighting for night use.

INSTALLATION

The repeat meter may be flush mounted in the cockpit or other suitable position for use by the Helmsman or Navigator. It requires only a single hole fixing of 87mm (3.4in) diameter. Whilst the front face of the meter is weather-proofed, a suitable sealing compound should be used to ensure a watertight seal between the bulkhead and the meter flange.

Inter-connection between the repeat meter and the echo sounder is via a 4-core screened cable of 6m length. If required, this may be extended by using a terminal block and extra cable of the same (or very similar) type. The screen must be disconnected and separated from the wire and solder tag to which it is connected. The screen and four wires are then connected via the terminal block to the extension cable. The end of the extension cable to be connected to the echo sounder must be made up with the screen and wire connected together at the solder tag. However, care must be taken to ensure that the joint is fully protected against ingress of water. The cable is an integral part of the repeat meter and is supplied with it. To connect to the instrument, remove the battery compartment cover and make a hole in the repeat meter cable entry grommet. Thread the cable through the grommet and connect each lead to the appropriate terminal following the diagram supplied. Finally, replace battery compartment cover. If display illumination is required, then a 12 volt D.C. (ships supply) should be connected to the terminals at the rear of the meter. For 24 volt systems, connect a resistor (180 ohm 1 watt) in series with the supply. To provide a variable level of illumination, a potentiometer (1 Kohm) should be fitted in series with the supply. In which case the 180 ohm resistor should be omitted.

REPEAT METER OPERATION

The repeat meter will start to operate as soon as the Echo Sounder is switched on. However, if the gain' control is set too low, colon in the middle of the display will flash. This "missing echo" indication will continue until a satisfactory echo has been obtained from the sounder. The minimum reading on the repeat meter is 0.8 metres (or 2.7 feet) and has been set by a bubble suppression circuit. This is to prevent false readings which could be caused by aeration at the interface between boat and water.

GUARANTEE AND SERVICE

The Seafarer 5 and 700 are fully guaranteed under the conditions as stated on the guarantee card supplied with the instrument. After the guarantee expires, or if problems arise which are not covered by the terms of the guarantee, your instrument will be repaired in the United Kingdom by the manufacturers or by one of their officially authorised main distributors. Unauthorised or inexperienced persons should not attempt to service the instrument since this is not only likely to worsen whatever fault has arisen, but will immediately nullify the Guarantee. Should it ever be necessary to return the instrument for service it is essential that the internal battery be removed and that the instrument be carefully packed and insured for transit. A brief note (giving your name and address) and the symptoms of failure is of great assistance to service engineers in locating a fault.

Routine Maintenance

The transducer should be examined periodically and if fitted outside the hull a thin coat of hard anti-fouling paint should be applied to the face of the transducer with a soft brush, care being taken not to trap air bubbles under the paint. A build-up of barnacles and other marine encrustation on the face of the transducer will cause progressive deterioration of the instrument maximum depth capability. Barnacles should be removed by crushing between a pair of pliers and not tugged off as the transducer face may become irreparably damaged. Particles of imbedded shell can be dissolved by applying a 20% solution of dilute hydrochloric acid, and be rinsed off with fresh water. If an internal battery is fitted, this should be examined periodically for acid leakage and replaced as necessary. The battery should be removed if the instrument is not used for an extended period.

The transducer co-axial plug and socket connections should be kept clean and protected against sea water. The transducer cable should be examined periodically for damage, particularly where the cable emerges from the plastic transducer stem.

The instrument should be carefully protected at all times from salt water and the seals examined to ensure that water is not allowed to penetrate the instrument.

Accessories and Spares

Additional or spare transducers as well as automatic change-over, switches, repeat meters, mounting brackets and visors are always readily available from Yacht Chandlers, Dealers or Boatyards.

If you encounter a supply problem, please contact Seafarer Navigation International Limited directly.

SEAFARER 700

TECHNICAL DATA

Depth Scales:

	Foot/Fathom Model	Metric Model
Shallow Range	0—60 feet	0—20 metres
Mid Range	0—60 metres	0—60 metres
Deep Range	0—∞ fathoms	0—200 metres

Analogue Presentation:

Brilliant Yellow Light Emitting Diode (LED) Flash on Clock Face Dial with up to 350 viewing angle.

Accuracy:

Better than ±2% of depth reading within operating temperature range -10°C to +50°C.

Digital Presentation (LCD):

Metric model reads from —
0.8 metres to 99 metres.

Foot/Fathom model reads from —
2.7 feet to 99 feet.

Power Supply:

9 volt, PP9 Battery (or equivalent) not supplied. OR. External supply 10.8v to 32v D.C. (reverse polarity protected).

Power Consumption:

On internal battery, nominally 105 mA on shallow range and 65 mA on deep range. On ship's supply, : maximum of 120 mA on all ranges. Nominally 15mA in "Depth Guard" modes.

Power Output:

Typically 100 watts peak to peak pulse power on both ranges.

Compass Safe Distance:

Not less than 2ft (61cms).

Transducer:

Short stem with Lead Zirconate Titanate piezo electric disc. Supplied with 24ft (7.3m) cable. Nominal frequency 150KHz.

Shallow Water Alarm (Red LED)

Can be set to minimum depth of 2.7 feet (0.8 metres).

Deep Water Alarm (Red LED)

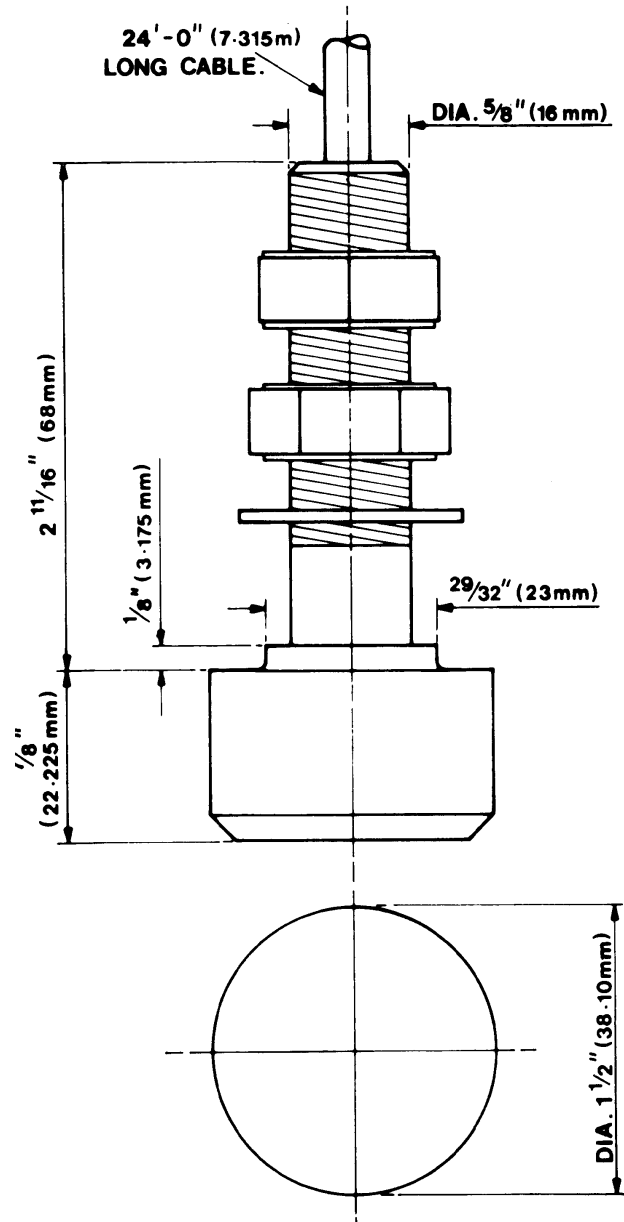
Can be set to a maximum depth of 95 feet nominally.

Dimensions:

Instrument Only	224x 150x 136mm
With Mounting Bracket Fitted	266x 173x 136mm

Weight:

1.5kg (excluding battery and transducer).



TRANSDUCER DIMENSIONS

DIGITAL REPEAT METER TECHNICAL DATA

Depth reading:

Feet Model 2.7ft to 599.9 (single range)
Metres Model 0.8m to 119.9 (single range)

Display:

4 digit Liquid Crystal with provision for edge lighting.

Power Supply:

5 volts D.C. from main instrument.

Power Consumption:

Less than 1mA.

Working Temperature Range:

-15°C to +65°C.

Accuracy

±0.5± 1 LSD.

Case Style:

Circular, flush mounted, supplied with 6 metres of cable.

Weight:

0.52kg unpacked. 0.62kg packed.

Case Dimensions:

Flange Diameter: 116mm.

Body Diameter: 85mm

Body Depth: 55mm (minimum).

Display Edge Lighting:

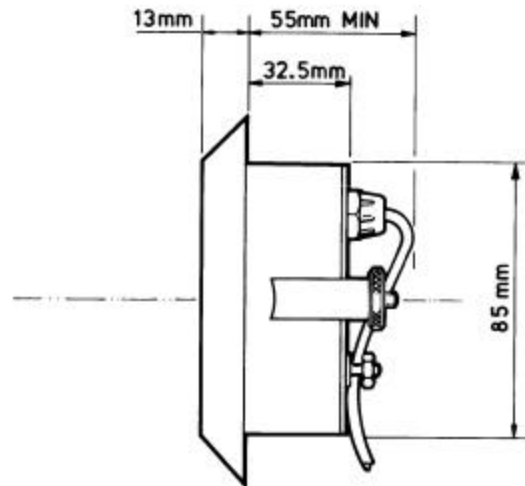
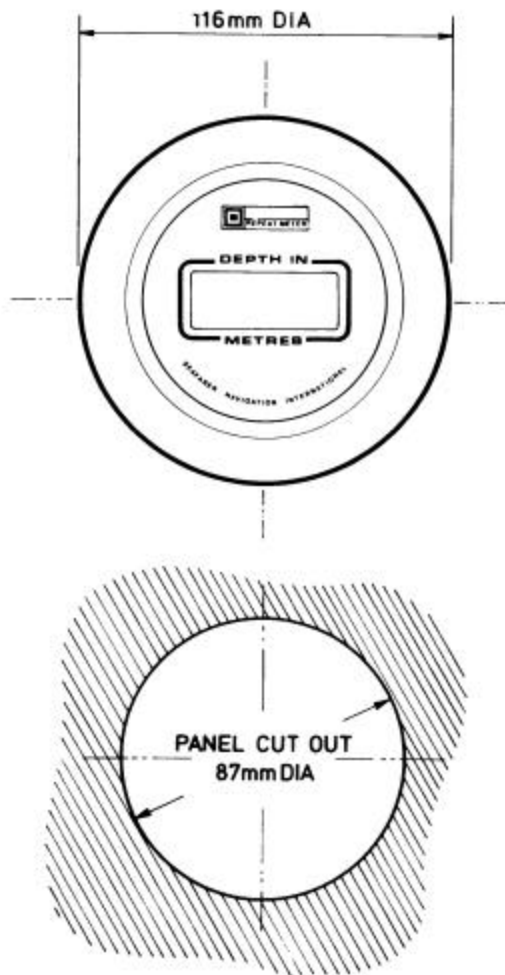
From external supply of between 10v to 16v D.C.

For 24v D.C. systems, fit a 180 ohm, 1 watt series resistor, or 1 Kohm potentiometer if dimming is required.

Typical current consumption: 60mA at 12v.

Missing Echo Indication

If Echo is lost for any reason (e.g. gain too low) colon in centre of display will flash; last good reading remains displayed.



OUTLINE DIMENSIONS OF REPEATER METERS FOR SEAFARER 5 AND 700 DEPTH SOUNDERS

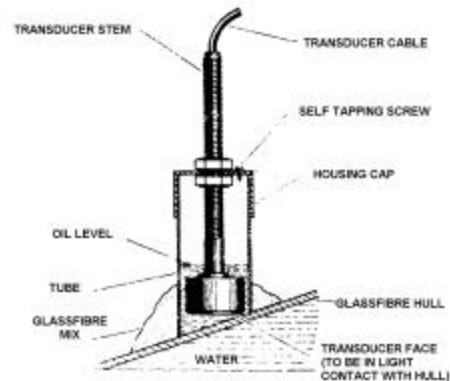
INBOARD TRANSDUCER HOUSING KIT

This kit contains the necessary parts and materials to install a transducer within the hull of a glassfibre vessel. It should be noted that whilst the accuracy of the Seafarer echo sounder will in no way be affected by installing the transducer inboard, the deep-water range will be restricted. The loss of deep-water performance can vary from between 15 and 50%, and is dependent not only upon the thickness but also the quality of the glassfibre hull.

It is not recommended that the transducer be installed where it is known the thickness of glassfibre exceeds $\frac{3}{4}$ ", nor is it recommended for use on hulls of steel, aluminium or wood, although this method of installation has been known to operate on these materials with acceptable results.

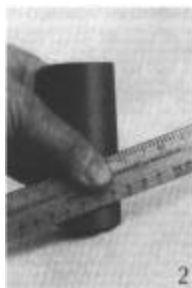
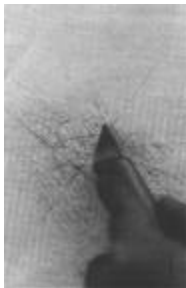
CONTENTS OF KIT

1. Tube 4" long.
2. Housing cap with self tapping screw.
3. Bottle or sachet of oil.
4. Adhesive filler kit.



METHOD OF INSTALLATION

1. With the boat in 20—30 feet of water, determine a position from inside the hull where the Seafarer gives a reading of the correct depth with the transducer-face pushed hard against the inside of the hull and the instrument gain-control turned to maximum (it will be necessary to wet the face of the transducer with water during this test to provide a good interface between the transducer and the hull). Operate the engine(s) during the test to see that there is no electrical interference, keeping the co-axial transducer cable away from the engine(s) and associated electrical equipment. If minimal or no interference is displayed by the Seafarer, mark the chosen transducer position inside the hull.
2. The preparation of the chosen position to fix the transducer is most important. The surface must be clean and dry, and it is essential to remove dirt, oil, grease, paint etc. Only then can assembly commence. To prepare, take a sharp, hard tool (the sharp edge of a hand file or pointed knife is ideal). Scratch into the surface of the hull in all directions until rough, and then sand with coarse emery cloth, sandpaper or similar. Remove the dust particles formed. *See illustration 1*



3. Next take the tube supplied, and with a rule or straight edge, holding the tube upright, mark the tube to match the angle of the hull. *See illustration 2*. The tube can then be cut with a fine blade saw to the required angle. *See illustration 3*.
4. Take the tube and with the side of the sawblade, or with coarse sandpaper, roughen all around the tube on the end you have cut for $1\frac{1}{2}$ inches (40 mm) along the tube. *See illustration 4*.

- Next a small amount of adhesive filler is to be mixed (Plastic Padding or similar).

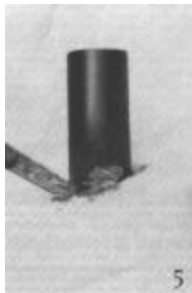
IMPORTANT

The effectiveness of filler is not improved by using increased amount of hardener; therefore do not exceed the stated amount. (If the hardener tube is used up before the large tube, then a considerable excess of hardener has been used).

DO NOT MIX MORE FILLER THAN CAN BE USED IN 5 MINUTES.

Punch a hole in the nozzle of the small tube marked "Hardener" by using the reverse side of the cap. (Do not enlarge the hole). Squeeze out an equal length from each tube onto a piece of glass, hardboard or similar, and mix thoroughly. (See illustration 1 and 2 on the side of the large tube).

Locate tube in the chosen position and apply filler with a knife blade in 3 or 4 places around the tube. See illustration 5. Leave to set hard, 15 minutes approximately.



- When the tube has set rigid, mix further filler to instructions and with a firm pressure apply to the hull around the tube. See illustration 6. Then repeat the process around the tube itself on the previously roughened surface. See illustration 7. A further mix is then required to complete the fixing of the tube by building up a fillet all around as shown in illustration 8.
- Take the transducer, remove the top nut from the threaded stem taking it over the plug at the end of the co-axial cable. Place the transducer into the tube and adjust the remaining nut level with the top of the tube. See illustration 9. Remove the transducer from the tube and pass the co-axial plug through the inside of the top cap, and pass it over the transducer stem. Next pass the co-axial plug through the nut previously removed and thread it down the transducer stem until it reaches the top cap, and tighten, holding the inner nut to stop it turning. See illustration 10.



- Pour the oil into the tube fixed to the hull so that it is not more than half full. Check that there are no oil leaks from the moulding that joins the tube to the hull. Push the transducer SLOWLY into the tube, having first removed the self-tapping screw from the housing cap. When the transducer is in place with the face touching the inside of the hull, replace the self-tapping screw. Push the co-axial transducer plug firmly into the back of the Seafarer. The system is now ready for use. See illustrations 11 & 12.

NOTES

- By adopting the above method of in-hull echo sounding the pattern of ultrasonic sound emitted by the crystal in the transducer remains at a p proximately 45 in a conical shape. If the transducer and its tube housing are installed vertically, therefore, accurate depth indication will be given up to a heel angle of 22½ (dependent upon the thickness and quality of hull material).

/continued

NOTES (Continued)

- b. If it is found necessary to take the transducer from the tube housing, first remove the self-tapping screw to allow air into the tube, thus facilitating withdrawal.
- c. During the season, periodically check the oil level in the tube and top up as necessary. Use of other liquids may damage the transducer, for which the manufacturers will accept no responsibility.
- d. When under way a constant stream of aerated water passes across the hull of a vessel. The thickness of this aerated water generally increases with speed. A point may therefore be reached when no ultrasonic sound wave can penetrate the stream of air bubbles with the result that no single depth indication will be given but the indicator unit will present random flashes around the dial.

SPECIAL NOTE

With some Echo Sounders the transducer has a larger diameter stem than the hole in the housing cap. When this happens, push out the insert in the housing cap. This will increase the hole size to 16.5mm diameter.