

# **Forward Looking Sonars Standard & Professional**

## **◆ FLS Bronze Instruction Booklet**

**ECHOPILOT**  <sup>TM</sup>

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# ECHOPILOT ™

Thank you for purchasing this Echopilot instrument.

Your new EchoPilot instrument has been manufactured to the highest standards by the dedicated staff of a company with many years of experience in marine electronics. You have invested in the most up to date technology available and in a product rigorously tested in the laboratory and at sea.

All goods of our manufacture are backed by a 2 year warranty. Expert advice and guidance is always available by Telephone 01425-476211/2 - just ask for customer service. If you are outside the UK you can still call us or any of our overseas distributors. We welcome the opportunity to talk to our customers.

**Nobody enjoys reading manuals, but please continue to read this one! Installing your instrument correctly is vital to get the maximum performance, pleasure and safety from your equipment, so please take the time to read the instructions.**

## **Please observe the following warnings:**

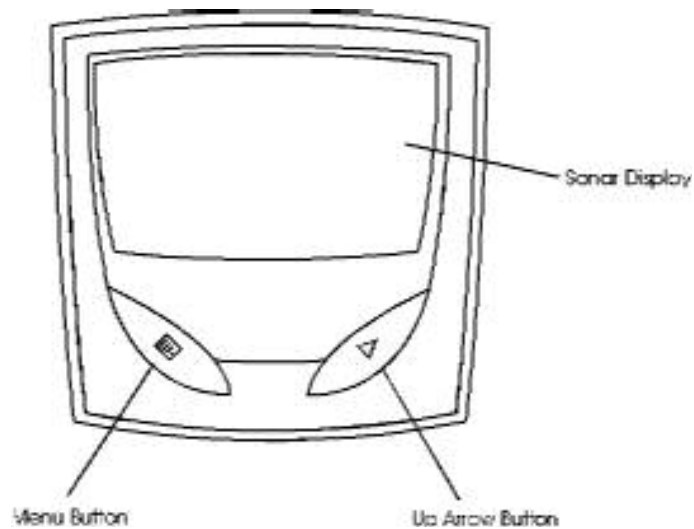
**Please do not cut the transducer cables** - they are fine threaded multi-core cable matched to the transducer.

**Please do not remove the transducer plug from its cable** - if a hole is too small make the hole bigger! Any join in the cable will reduce sensitivity / performance.

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## **FLS Bronze Operating Instructions**



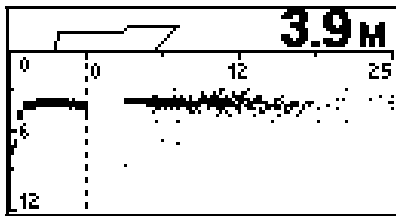
### **Switching On**

There is no on/off switch on the FLS Bronze. The unit is switched on as soon as power (12-24 Volts) is applied to the unit via the brown (+ve) and blue (-ve) wires from the rear of the instrument.

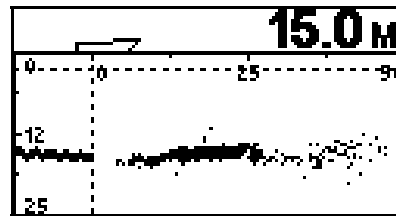
The FLS Bronze will power up with a welcome introduction display that includes the instrument software version, followed by the normal working screen.

The sonar data displayed on the screen will depend on the sea bed below the transducer and the range selected.

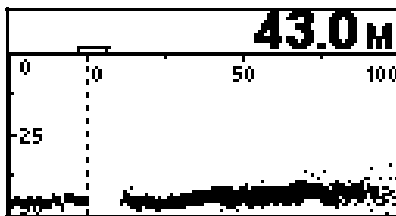
## FLS Bronze Operating Instructions



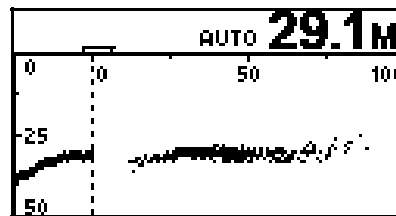
*4m depth shown on 25m range*



*15m depth shown on 50m range*



*43m depth shown on 100m range*



*Auto Range Selected*

### **Changing Range**

If you wish to change range, press the **UP ARROW** button. This will cycle through four range settings: 25m, 50m, 100m and Auto (or 80, 160, 320 feet and Auto).

When Auto range is selected, the range will automatically be set, based on the current digital depth (displayed in top right hand corner). If the digital depth is invalid due to a poor sonar signal (indicated by the depth figure flashing) the range will remain on the last selected range for a valid depth. The word "AUTO" will appear to left of the digital depth readout when this mode is selected.

### **History Display**

The FLS Bronze displays a 20 second history to the left of the dotted vertical line on the sonar display. The history plot is based on the digital depth readout and gives the user a little more information about the shape of the seabed.

As the history plot is the last 20 seconds of seabed, the area of seabed covered will depend on the speed of the vessel. For example, if the vessel speed is 5 knots (2.5 metres per second), then the history plot will cover a distance of 50m. Higher speeds will give greater distances but with less accuracy.

# **FLS Bronze Operating Instructions**

## **Demonstration Mode**

The FLS Bronze contains a demonstration mode to enable the user to view some typical sea bed images. To enter Demonstration Mode, press and hold the **MENU** button for 3 seconds until a second beep is heard.

Pressing the **UP ARROW** button will cycle round 8 sample seabed images. The menu is fully operational and the user can change any settings as normal. It should be noted however that although the shallow alarm can be set, the alarm **WILL NOT** sound in this mode.

To return to normal operation, press and hold the **MENU** button for 3 seconds until a second beep is heard.

## **Changing the Unit Settings**

A simple menu system allows you to change the unit's settings. To access the menu

▶ Contrast	35
Alarm	Off
Backlight	On
Units	Metres
Language	English
Test Mode	

The desired menu option is chosen using the **MENU** button. When the arrow cursor is alongside the appropriate option, pressing the **UP ARROW** button changes the setting. If "Test Mode" is selected, pressing the **UP ARROW** button enters this mode.

The unit will return to the sonar display after 10 seconds if no buttons are pressed within that time. Alternatively, the user can return to the sonar display by pressing and holding the **MENU** button for 3 seconds until a second beep is heard.

## **FLS Bronze Operating Instructions**

### **Contrast**

The Contrast can be set between 20 (min. contrast) and 50 (max. contrast). The **UP ARROW** button increases the value and upon reaching the maximum value, cycles round to the minimum value. The default setting is 35.

### **Alarm (Shallow)**

The Shallow Alarm can be set to Off, 2m, 4m or 6m. The **UP ARROW** button cycles round the 4 settings. When set, the alarm will appear on the screen as a horizontal dotted line. If more than a certain number of pixels are visible above this line the alarm will sound. It is not suitable for use when there are echoes from turbulence etc. near the surface. The alarm setting is retained after power down.

### **Backlight**

The Backlight can either be switched on or off using the **UP ARROW** button.

### **Units (Depth)**

Metres or Feet can be selected as the Depth Units using the **UP ARROW** button.

### **Language**

English, German, French, Swedish, Finnish or Spanish can be selected using the **UP ARROW** button.

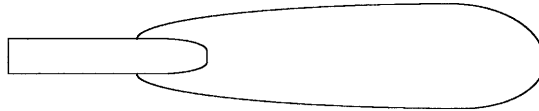
### **Test Mode**

Test Mode allows the user to run some simple diagnostic tests on the unit in case a fault should occur either within the unit or the transducer. It will also allow the unit's supply voltage to be monitored and will help the user identify any power or transducer connection problems. See section on **Fault Diagnosis Using Test Mode** for details.

## **How FLS Technology Works**

The EchoPilot FLS is a unique and patented invention. It can see through a full arc of 90 degrees, from straight ahead to straight down.

The transducer has a fairly narrow beam of approximately 18 degrees. In practice, as sensitivity reduces with distance (especially at the edges of the beam), the polar diagram looks more like an elongated balloon.



*Forward Beam*

### **Distance Ahead**

The distance ahead that the FLS can see depends on the depth of water below the vessel, and the laws of physics. The transmit 'ping' radiates at all angles down and out from the vessel, hits the sea bed and some of it is returned to the transducer's receiver.

As the 'ping' travels further away from the boat, it hits the sea bed at an increasingly acute angle. At a certain point the angle will be so acute that the 'ping' is not returned, and the sea bed information is lost - this determines the maximum view ahead or to the side.

When on a flat muddy bottom (e.g. river or estuary) the FLS will show the seabed up to three to five times the depth away from the boat. This ratio increases to eight to nine times if the seabed shoals upward - a more dangerous position AND you can see further. Rocky bottoms are better targets than muddy ones, and hard vertical surfaces like quay walls, rocks or coral reefs will often be seen at 100m.

## **Tips and Guidance on Use**

### **The Digital Depth Display**

This ADDITIONAL depth information is **the derived AVERAGE depth** over the first (left hand) third of the screen on display. Therefore, for good results do not select a deep long range when in shallow water, or a shallow short range when in deep water. Try to fill the screen with the sea bed echoes for the best results with this digital display.

**NOTE:** All depths are from the transducer.

### **Practice**

When learning to interpret the screen practise with clear targets, e.g. a quay wall. Try moving around an obstruction very gently to see what the maximum range is that different targets become visible.

### **!!!! WARNING !!!!**

If approaching a target select a range longer than you think you need. Most people (including us!) seriously underestimate distances to quays, buoys, walls etc.

Note that going astern can push turbulence past the transducer reducing sensitivity or sometimes obliterating all the picture so take care! Manoeuvre with the minimum use of astern (reverse) power, especially with the propeller (on twin screw vessels) on the side of the transducer.

Turbulence from other vessels, especially in shallow water can also adversely affect performance. Algae (normally in spring), Plankton and pollution can all show up as 'noise' on the LCD screen.

### **Operating the FLS Bronze at Speed**

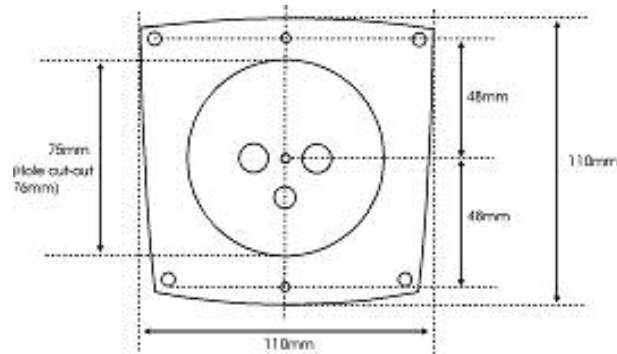
Ultrasonic signals travel well through solids and liquids but are greatly attenuated in air. It follows that a stream of turbulence and air bubbles will limit the performance of the FLS system, or any depth system for that matter. However, if a place can be found on the hull where there is a clear flow of water, even when the vessel is pitching, then good results can be obtained even at speed.

## **FLS Bronze Installation Instructions**

### **Fitting the display**

The FLS Bronze is designed to be flush mounted on an instrument panel or bulkhead.

- Select a suitable site, visible by the helmsman. If in doubt, try temporarily wiring to a 12/24 volt supply and using demonstration mode.
- Cut a circular hole of diameter 76mm.
- If the security studs and knurled nuts are required, drill 4mm holes, 48mm directly above and below the centre of the large hole (as shown below).



- Fit the instrument on the panel using the gasket or V.H.B (Very High Bond) tape supplied, covering the four cross head screws. If required, use the two studs & knurled wheels to secure. **Do not** over tighten the knurled wheels.

**Note:** It is very important to protect the rear cable entry points from water ingress.

# **FLS Bronze Installation Instructions**

## **Transducer Installation**

The choice of transducer position will have a major effect on final performance so please consider carefully all factors and if in any doubt, telephone the factory.

## **Motor Boats**

On a planing hull fit as far aft as reasonably possible. On V drive and stern drive boats (inboard /outboard), typically fit just in front of the engine(s). On a shaft driven boat (not V drive) forward of the shaft log or stern gland, but behind the gearbox.

Keep inboard of the spray rail if possible.

If possible do not fit downstream of any other through hull fittings (for example intakes, log, toilet sea cocks, etc.).

The transducer should ideally be vertical in both planes at displacement trim. If it leans forward, the sea bed appears to creep up, and if it rakes aft too much surface clutter may show. Port/starboard heel will affect performance so avoid this if possible.

Avoid the temptation to fit the transducer too far forward. The transducer may leave solid water when at speed, or when pitching. Also remember the transducer looks down as well as out, so when manoeuvring in confined waters you may wish to see there is water for the propellers and rudders.

## **Sailing Boats**

On a fin keeled boat, alongside the keel (perhaps 60 cm or 2 feet out) is often a well protected position (but **not** on a boat with a winged keel or a large bulb). Just forward of the keel is an alternative, but take care when hoisting the boat in a sling!

Resist the temptation to fit the transducer too far forward. The transducer will come out of the water when pitching. Remember that the transducer looks out as well as down - you will need to see what is under your boat as well as what is ahead. When manoeuvring in confined spaces, you wish to know what is under the keel or rudder.

A long keel boat however, is harder.....

Choose the position with the minimum angle of deadrise (i.e. the flattest area), fit the transducer with a wedge shaped chock if necessary to make the transducer as near to vertical as possible with the boat upright.

## **FLS Bronze Installation Instructions**

In all cases, ensure the body of the hull does not obscure the forward or side view up to and above the horizontal.

### **Fitting the Skin Fitting**

A hole in the boat must be taken seriously! - If in doubt use an experienced shipwright.

- For the Standard plastic skin fitting - cut a 45 mm (1 <sup>3</sup>/<sub>4</sub>" ) diameter hole.
- For the Professional bronze skin fitting - cut a hole 60 mm (2 <sup>1</sup>/<sub>2</sub>" ) in diameter.
- Fit the skin fitting with reinforcing pads if needed or wedges if required to ensure the transducer is as near to vertical as possible (in fore **and** aft planes).
- Use plenty of underwater sealant, but take care to clean off the thread thoroughly afterwards.
- Secure with the nut on the inside. Do not use excessive force on the nut.
- If the vessel will be floated **before** the transducer is fitted, the blanking cap provided must be fitted to seal the skin fitting. (N.B. for our American customers, for "skin fitting" read "thru-hull fitting").

### **Fitting the Transducer**

With care, this may be done afloat. However, if you have never done this before, please phone us first!

- If the vessels is afloat, place the FLS transducer close to hand near the skin fitting, remove the blanking cap and quickly :
- Place the transducer into the skin fitting, making sure that the **sharp** pointed **end** of the bronze handle is pointing **towards** the vessels **bow**. Using only your hand, screw down the securing nut onto the top of the skin fitting.
- Connect the plug of the transducer cable to the back of the instrument.

### **Safety**

The transducer provided is designed to shear off (in the event of a severe impact), flush with the hull, leaving the solid epoxy filled portion in the through hull fitting, and thus poses no risk of water ingress.

## **FLS Bronze Installation Instructions**

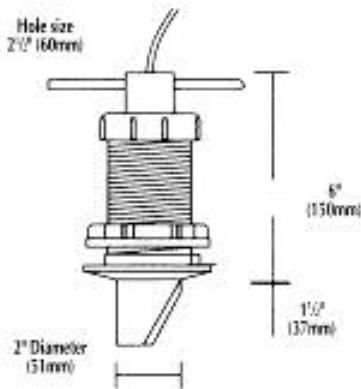
**Maximum hull thickness:  
75 mm (3")**

### **FLS Transducers**

#### **Professional or Standard?**

The professional (Grey) transducer has a narrower beam, which gives a more accurate representation of the seabed. However, the standard (Red) transducer can appear better simply because it is collecting data from a wider sea bed area.

A thick hull or one with a steep dead rise will usually require the professional transducer as the bronze skin fitting has 75 mm (3") of useable thread whereas the Glass Filled Polypropylene one has 25 mm (1") of useable thread.



**Professional  
Transducer**

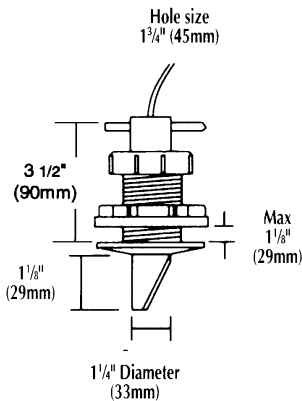
**Maximum hull thickness:  
25 mm (1")**

#### **Transducer cable extension**

The standard cable length is 12 metres, but this can be extended in multiple's of 8 metres.

The transducer is of an active design, that is to say that it requires power from the display unit to operate its transmitter and receiver circuitry. This has the advantage of allowing greater cable runs than were possible with the old passive type of FLS transducer.

There is obviously a small, but additive loss of performance on any cable length of 20 metres or more. The maximum cable length possible does depend on the area that the vessel will be operating in: with hard seabed's, and shallower maximum depths allowing for longer cable runs.



**Standard  
Transducer**

## **FLS Bronze Installation Instructions**

### **Connecting the Transducer**

The 8-pin Mini Din plug of the transducer is plugged directly into the 8-pin Mini Din socket on the rear of the instrument.

To facilitate the insertion of the plug, the 'O' rings in the socket must be greased. **Silicon grease must be used for this purpose.** Any petroleum based grease, such as vaseline, will cause the 'O' ring to swell and prevent correct insertion of the plug. Vegetable oil should also not be used.

### **Connecting Power**

The FLS Bronze will run on 12 or 24 volts DC and is reverse voltage protected. Therefore if the battery voltage is connected incorrectly no damage will occur, but the unit will not turn on.

The battery power is connected using the 2-core flying lead from the instrument. Connect the **Brown** wire of this cable to the positive supply from the battery, and the **Blue** wire to the negative.

The instrument will switch on as soon as power is applied to these wires. If the user wishes to be able to switch off their instrument, a suitable switch should be connected in line with the positive supply.

### **Interference**

**Other depth sounders that operate at 200 kHz must be wired so they can be switched off** if interference occurs. (This may appear as 'submarine' like echoes coupled with a reduction in sensitivity).

### **Maintenance**

Keep transducer 'O' rings and locking ring thread well greased with a silicone grease. Protect plugs and cables from chafe. Clean the transducer face regularly and check for barnacles etc. With care, this may be done afloat. If you have never done this before, phone us first! You may anti-foul the transducer. Avoid long term exposure of the LCD to direct sunlight.

## Fault Finding

### **Fault Diagnosis Using Test Mode**

Test Mode allows the user to run some simple diagnostic tests on the unit in case a fault should occur either within the display unit or the transducer.

#### **Voltage Test:-**

Once Test Mode is entered from the menu, the user is presented with the “Voltage Test” screen. This test monitors the battery supply voltage to the instrument and also the supply voltage to the transducer.

Low voltages on either supply will indicate a “LOW” indication on the display. It should be noted however that if the battery voltage goes below 12 Volts, the transducer voltage will decrease and will reduce transducer performance.

VOLTAGE TEST	
BATTERY:	13.4 V OK
TRANSDUCER:	12.0 V OK

#### **Receiver Test:-**

Pressing the **MENU** button will change the test to the “Receiver Test”. This test provides a simple check on the receiver and, should a fault occur, helps the user to establish whether there is a fault with the transducer or the display unit - or even a poor transducer connection.

RECEIVER TEST		
CH1 RECEIVE LEVEL:	101	OK
CH2 RECEIVE LEVEL:	101	OK
CH3 RECEIVE LEVEL:	100	OK
TRANSDUCER: NOT CONNECTED		

The display shows the output level of each of the 3 receive channels measured during the test. The display unit will analyse these levels and provide a diagnosis. It will decide whether or not it thinks the transducer is connected and then decide whether or not the receive level is acceptable for each channel and display “OK” or “LOW” accordingly.

## Fault Finding

One of the four messages will be displayed:-

- *Transducer: Connected* - If the transducer really is connected and all levels are “OK” then in most cases there should be no problem. If the transducer is not connected and this message is displayed, please contact EchoPilot.
- *Transducer: Check Connection* - If the transducer is connected and one or two channels only are “LOW” then check the transducer plug is firmly pushed into the socket (ensure the ‘O’ ring is greased!). If the connection is definitely OK, then unplug the transducer and check that the display unit is OK (see message below).
- *Transducer: Not Connected* - If the transducer is not connected and all levels are “OK” then in most cases there is no problem with the display unit. If the unit is functioning incorrectly with the transducer plugged in but this test passes with the transducer disconnected - then the problem is most likely to be in the transducer or the transducer connection.

If the transducer is not connected and one or more of the levels are “LOW” then the problem is within the display unit. Please contact EchoPilot.

If this message is displayed and the transducer is connected - unplug the transducer in order to check the display unit. If the display unit is OK - then the problem is most likely to be in the transducer or the transducer connection.

If in any doubt, please contact EchoPilot who will happy to assist in the diagnosis.

### **EEPROM Test:-**

Pressing the **MENU** button will change the test to the “EEPROM Test”. This test checks the non-volatile memory that stores the user settings. This screen also

EEPROM TEST
EEPROM TEST PASSED
RUNNING TIME: 6.8 HRS
PRESS UP ARROW TO RESTORE DEFAULTS

## **Fault Finding**

The EEPROM test will result in either a pass or a failure. If the test fails, the non-volatile memory device is faulty and will not be able to store the user settings (this also includes the total running time). In this case, all settings will return to their default values when the unit is switched off.

The unit settings can be reset to their default settings by pressing the **UP ARROW** button twice.

Pressing the **MENU** button will return the unit to the sonar display.

### **Some Common Faults**

#### **Display doesn't switch on:-**

Battery not connected  
Battery voltage too low

#### **No display once switched on:-**

- LCD Faulty
- Eyes shut

#### **No seabed visible:-**

- Transducer not connected (or not connected properly) - use Test Mode
- Incorrect range selected (try using the 'Auto' setting!)

#### **Poor seabed picture or excessive noise:-**

- Suitable range not selected (try to fill screen with seabed)
- Poor connection of transducer
- Battery voltage low - use Test Mode
- Transducer mounted at an angle
- Turbulence at transducer location
- Interference from other 200KHz sounders (same boat or other boats)
- Turbulence/wake from other boats
- Polluted water or Plankton bloom (usually early summer)
- Dirty transducer/covered with barnacles
- Choppy sea state - can cause surface noise

## **FLS Bronze Technical Specifications**

<b>Specification</b>	<b>FLS Bronze</b>
Voltage	12v or 24v DC
Current Consumption	20 mA with backlight off, up to 100 mA with backlight on
Operating frequency	200 kHz
LCD type	Transflective, LED Backlighting
Viewing Area	81 x 45 mm 126 x 64 pixels
Forward Range	25 to 100 metres
Maximum Depth Range	12 to 50 metres
Display Update Rates	1-2 updates / sec
Demonstration Mode	Yes
Built-in Test Facility	Yes
Second Station	No
Alarm	Shallow
Transducers	FLS Standard or Professional (12m), with 8m extension cable if necessary.

**We hope you enjoy using your EchoPilot FLS Bronze  
WE ARE ALWAYS PLEASED TO TALK TO OUR CUSTOMERS.**

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**Protected by USA Patent 5530680 and European (UK) Patent 0624253**

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