

ST60 Depth Instrument Owner's Handbook

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Preface

Important information

Safety notices



WARNING: Product installation & operation

This equipment must be installed and operated in accordance with the Raymarine instructions provided. Failure to do so could result in personal injury, damage to your boat and/or poor product performance.



WARNING: Electrical safety

Make sure you have switched off the power supply before you start installing this product.



WARNING:

Although we have designed this product to be accurate and reliable, many factors can affect its performance. Therefore, it should serve only as an aid to navigation and should never replace commonsense and navigational judgement. Always maintain a permanent watch so you can respond to situations as they develop.

EMC conformance

All Raymarine equipment and accessories are designed to the best industry standards for use in the recreational marine environment.

The design and manufacture of Raymarine equipment and accessories conform to the appropriate Electromagnetic Compatibility (EMC) standards, but correct installation is required to ensure that performance is not compromised.

Handbook information

To the best of our knowledge, the information in this handbook was correct when it went to press. However, Raymarine cannot accept liability for any inaccuracies or omissions it may contain.

In addition, our policy of continuous product improvement may change specifications without notice. Therefore, Raymarine cannot accept liability for any differences between the product and the handbook.

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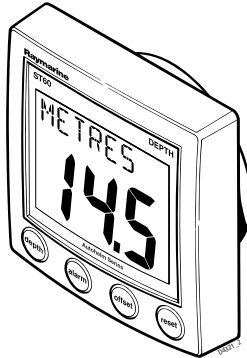
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Introduction

Thank you for purchasing a Raymarine product. We are sure your ST60 instrument will give you many years of trouble-free operation.

This handbook describes how to install and use the Raymarine ST60 Depth instrument. This instrument provides accurate depth information, in either feet, meters or fathoms, on a high quality Liquid Crystal Display (LCD). The instrument is constructed in a rugged weather-proofed case to provide reliable performance, even under the most demanding conditions.



Data inputs

The ST60 Depth instrument receives data either from an appropriate depth transducer and/or from a SeaTalk instrumentation system.

SeaTalk

SeaTalk enables a number of compatible instruments to operate as a single, integrated navigational system. Instruments in a SeaTalk system are linked by means of a single cable, which feeds both power and data. Instruments can therefore be added to the system by plugging them into the network. SeaTalk is flexible enough to adapt to any number of compatible instruments without requiring a central processor. SeaTalk can also communicate via an interface, with non-SeaTalk equipment using the internationally-accepted National Marine Electronics Association (NMEA) protocol.

In a SeaTalk system, each instrument can be either a master or dedicated repeater unit. A master instrument is directly connected to a transducer (the device that provides the raw data), and provides data and control for the service it is providing, to all other equipment on the SeaTalk network. A slave instrument is

not directly connected to a transducer but repeats information provided by other equipment in the SeaTalk network.

The ST60 Depth instrument can fulfil both master and repeater roles.

Stand alone operation

In Stand alone operation, the ST60 Depth instrument is connected only to the relevant transducer and does not display information from, or provide information to, any other instruments.

Remote control

When connected to SeaTalk, the ST60 Depth instrument can be controlled remotely by a SeaTalk Remote Keypad Unit, to provide instant remote access to the various display readouts.

Mounting options

If you do not want to surface mount your ST60 instrument, options are available for:

- Flush mounting. If you have ordered the flush mounting option a low-profile bezel and four fixing screws are provided.
- Bracket mounting.

Depth transducers

Various optional transducer types are available to suit different situations and hull types. Refer to *Chapter 3, Installation*, for details.

Parts supplied

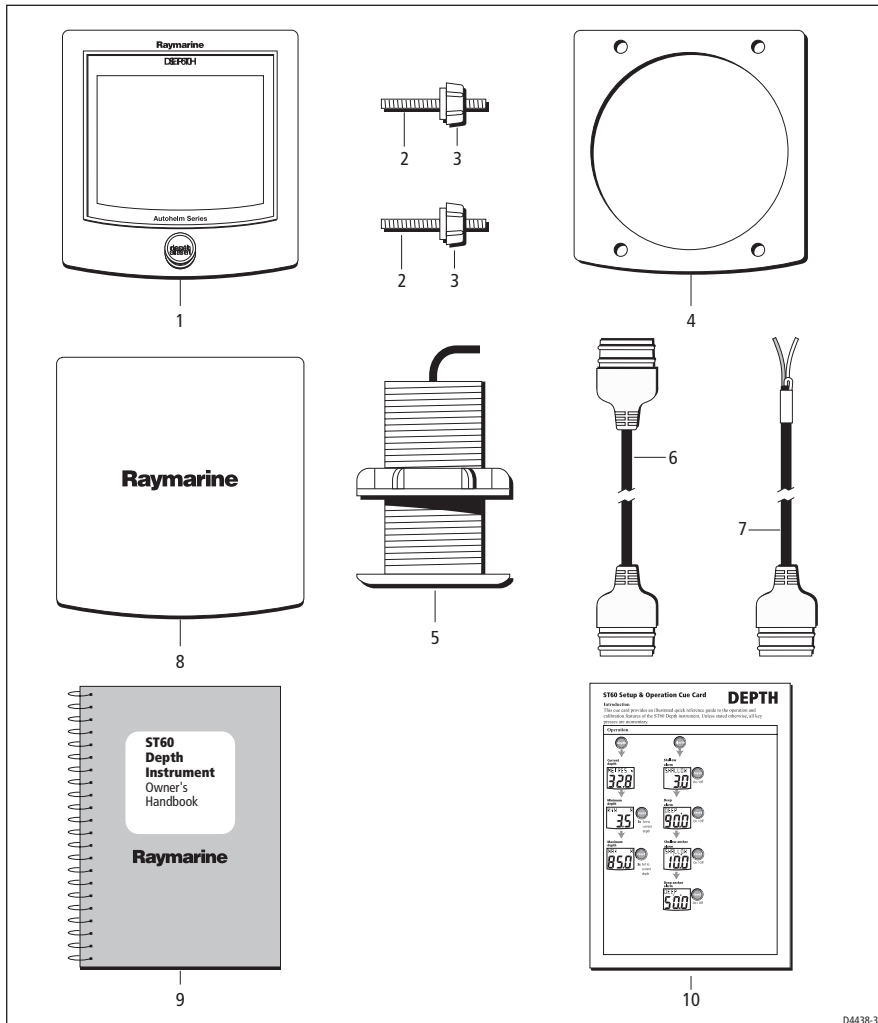
Unpack your ST60 instrument and check that the following items are present:

- Item 1, ST60 Depth instrument with standard bezel for surface mounting.
- Item 2, Fixing studs (2).
- Item 3, Thumb nuts (2).
- Item 4, Gasket.
- Item 5, Depth transducer.
- Item 6, SeaTalk interconnection cable.
- Item 7, Power cable.
- Item 8, Instrument Cover.

- Item 9, Owner's Handbook. A Warranty document and fitting templates are included in this Handbook.
- Item 10, Cue Card.

Spare spade terminals are also provided, to re-terminate the transducer cable if it has to be cut to facilitate installation.

Note: *The above packing list is for an ST60 Depth system. Where an instrument is purchased separately, a transducer is not included.*



Chapter 1: Operation

1.1 Getting started

This handbook describes how to operate, maintain and install the Raymarine ST60 Depth instrument.

CAUTION: Calibration requirement

The ST60 Depth instrument is calibrated to default settings when supplied. To ensure optimum performance on your boat, this product MUST be calibrated before use. Do NOT use the product until it has been calibrated using the procedures in Chapter 4, Calibration.

1.2 Normal operation

Use the flow charts in this Chapter to operate your ST60 Depth instrument. The flow charts show the sequence of key presses and displays for the various operating tasks. All key presses are momentary unless otherwise stated.

Depth measurement units

The depth measurement units can be either feet, meters or fathoms. The required units are selected during user calibration (see *Chapter 4, Calibration*).

Displayed information

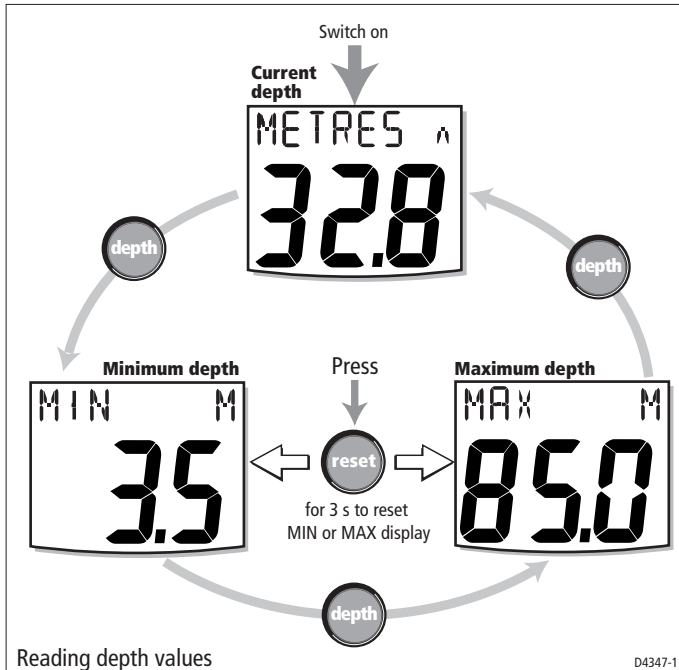
When first switched on, your ST60 Depth instrument shows the current depth. The instrument memorizes the minimum and maximum depth values encountered during the period it is switched on, and these can be recalled at any time (see the *Reading depth values* flow chart).

The display will revert to the current depth display after 8 seconds.

You can reset the MIN and MAX values by pressing the **reset** key for 3 seconds.

The current depth display provides depth-trend indicator arrows to show whether the depth is increasing or decreasing. A rising sea-bed is shown by an up arrow and a lowering sea-bed by a down arrow.

If there is no depth signal from the transducer for more than 30 seconds, the last known depth is displayed and LAST flashes at the top of the screen. If depth information is not received from the transducer or from SeaTalk, then dashes are displayed.



Alarms

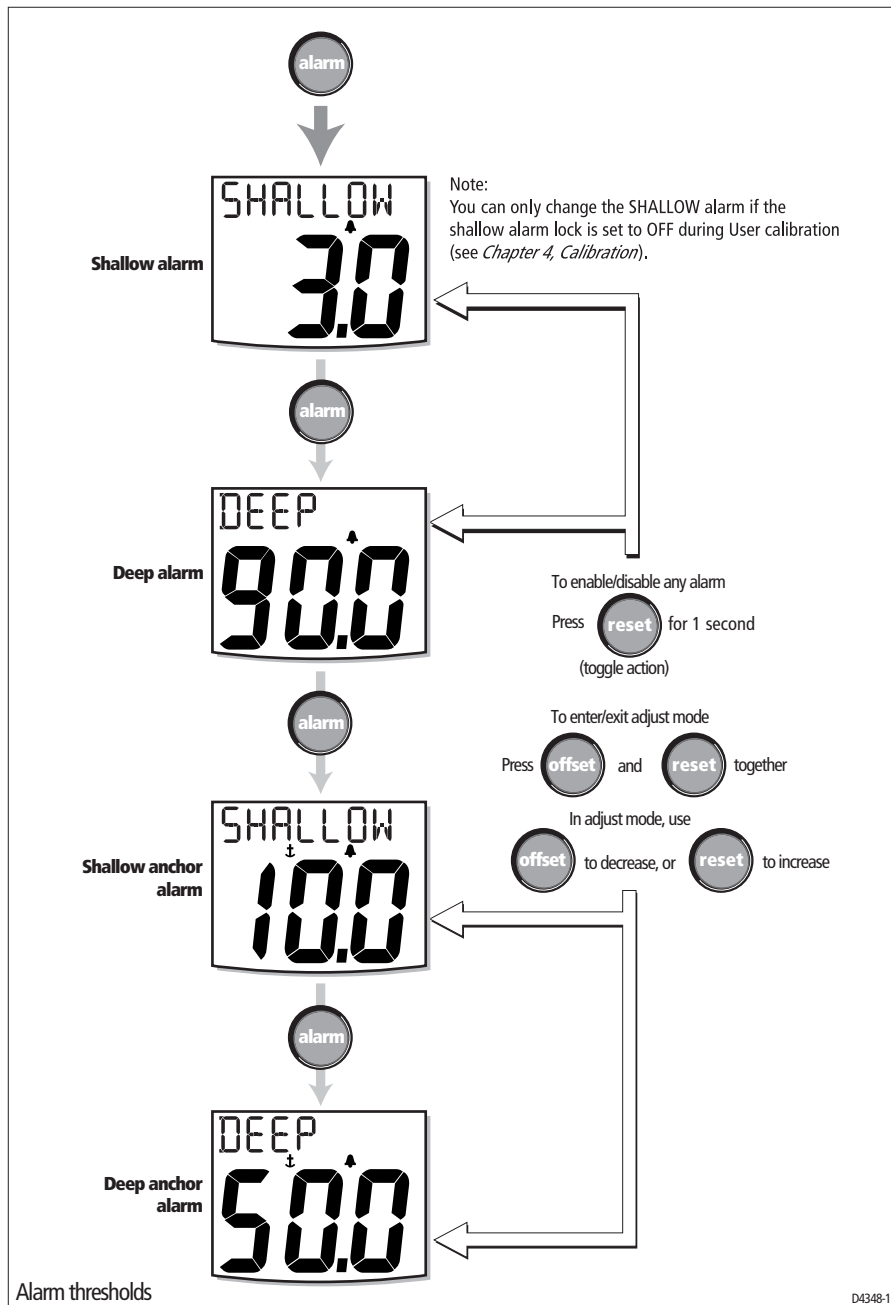
An alarm condition occurs if:

- The depth is less than the SHALLOW or SHALLOW anchor threshold.
- The depth is more than the DEEP anchor threshold.
- The DEEP threshold value is crossed, with the seabed rising or falling.

An alarm condition is indicated by an audible beep and a flashing alarm symbol on the display. The display will also show the relevant caption, either SHALLOW or DEEP, and for anchor alarms an anchor symbol.

When the instrument is operating as a master, you can check the alarm thresholds and if necessary set them up (see *Alarm thresholds* flow chart). To do this, use the alarm key to select the required alarm threshold, then:

- To enable or disable the alarm, press the **reset** key for 1 second. If an alarm is disabled, the associated screen shows an OFF legend.
- To change the value of the alarm threshold, press the **offset** and **reset** keys together to enter adjust mode, then use these keys individually to set the required value.



Offsets

Depths are measured from the transducer to the sea bed. However, offsets to the actual distances measured can be applied during calibration (see *Chapter 4, Calibration*), so that the displayed depth reading represents either the depth from the keel or the depth from the waterline (W/L).

To see the offsets applied on your vessel, press the **offset** key. If the instrument is operating as a master, the display will show the size of the offset (either positive or negative) and the appropriate legend:

- When the offset is a positive value, the legend W/L is displayed.
- When the offset is a negative value, the legend KEEL is displayed.
- When the offset is zero, the legend OFFSET is displayed. With zero offset applied, the displayed depth reading is measured from the transducer.

1.3 Display settings

Illumination

When the instrument is first powered up, the display illumination is set to its lowest (courtesy) level, to facilitate initial access to the keys. To adjust the level of illumination:

1. Hold down the **depth** key for approximately one second, to enter the illumination-adjust mode.
2. There are four preset illumination levels. Momentarily press the **depth** key to cycle through these levels until you reach the level you want.
3. Press any other key to leave the illumination-adjust mode.

Note: *The display will time out to normal operation 7 seconds after the last key press.*

Contrast

To adjust the display contrast:

1. Enter the illumination-adjust mode as described above.
2. Hold down the **depth** key for a further two seconds approximately, to enter the contrast-adjust mode.
3. There are four preset contrast settings. Momentarily press the **depth** key to cycle through these settings until you achieve optimum display quality.
4. Press any other key to leave the contrast-adjust mode.

Note: *The display will time out to normal operation 7 seconds after the last key press.*

1.4 Pop-up Pilot

A Pop-up Pilot facility enables instruments connected to SeaTalk to constantly monitor any changes to the autopilot mode and to the course settings. If one of these parameters changes, the new value is immediately displayed on the ST60 instrument for 5 seconds, after which time the display reverts to the previous display.

This facility can be enabled or disabled during User calibration (see *Chapter 4, Calibration*).

1.5 Remote control

When it is connected to SeaTalk, the ST60 Depth instrument can be controlled remotely with a SeaTalk Remote Keypad Unit. Remote control of an instrument is indicated by a REMOTE legend on the display, to indicate that the keypad has control.

Details on how to use the remote control facility can be found in the *SeaTalk Remote Keypad Owner's Handbook*.

Chapter 2: Maintenance & Troubleshooting

2.1 Maintenance

Servicing and safety

- Raymarine equipment should be serviced only by authorised Raymarine service technicians. They will ensure that servicing procedures and replacement parts used will not affect performance. There are no user-serviceable parts in any Raymarine product.
- Some products generate high voltages, and so never handle the cables/connectors when power is being applied to the equipment.
- When powered up, all electrical equipment produces electromagnetic fields. These can cause adjacent pieces of electrical equipment to interact with one another, with a consequent adverse effect on operation. In order to minimise these effects and enable you to get the best possible performance from your Raymarine equipment, guidelines are given in the installation instructions, to enable you to ensure minimum interaction between different items of equipment, i.e. ensure optimum Electromagnetic Compatibility (EMC).
- Always report any EMC-related problem to your nearest Raymarine dealer. We use such information to improve our quality standards.
- In some installations, it may not be possible to prevent the equipment from being affected by external influences. In general this will not damage the equipment but it can lead to spurious resetting action, or momentarily may result in faulty operation.

Instrument

Certain atmospheric conditions may cause condensation to form on the instrument window. This will not harm the instrument and can be cleared by increasing the illumination setting to Level 3.

Periodically clean your ST60 instrument with a soft damp cloth. Do NOT use chemical and abrasive materials to clean the instrument.

Transducer

Refer to the Installation and Maintenance instructions supplied with the transducer.

Cabling

Examine all cables for chafing or other damage to the outer shield and, where necessary, replace and re-secure.

2.2 Troubleshooting

Preliminary procedures

Changes in the electronic environment may adversely affect the operation of your ST60 equipment. Typical examples of such changes are:

- Electrical equipment has recently been installed or moved aboard your vessel.
- You are in the vicinity of another vessel or shore station emitting radio signals.

If you appear to have a problem, first ensure that the EMC requirements are still being met before further investigating the problem.

Fixing faults

All Raymarine products are subjected to comprehensive test and quality assurance programmes prior to packing and shipping. However, if a fault occurs, the following table may help to identify and rectify the problem.

Fault	Cause	Remedy
Display blank	No power supply	Check power supply. Check SeaTalk cabling and connector security Check fuse/circuit breaker
No transfer of information between SeaTalk instruments (e.g. illumination levels).	SeaTalk cable or connector fault	Check security of SeaTalk connectors. Check condition of SeaTalk cables. Isolate faulty instrument by disconnecting instruments one by one.
Failure of a group of SeaTalk instruments.	SeaTalk cable or connector fault	Check the security of SeaTalk connectors between functioning and non-functioning instruments
LAST flashing or dashes displayed continuously (depth greater than 3 ft)	Transducer cable or connector fault	Check the condition of the transducer cable and the security of the connections
LAST flashes when under way	Aerated water due to -boat wakes, propeller wash etc.	Ensure reading stabilizes when clear of disturbed water.

Technical support

Raymarine provides a comprehensive customer support service, on the world wide web and by telephone help line. Please use either of these facilities if you are unable to rectify a problem.

World wide web

Please visit the Customer Support area of our web site at:

- www.raymarine.com

As well as providing a comprehensive Frequently Asked Questions section and servicing information, the web site gives e-mail access to the Raymarine Technical Support Department and a details of the locations of Raymarine agents, worldwide.

Telephone help line

If you do not have access to the world wide web, please call our help line.

In the USA, call:

- +1 800 539 5539, extension 2444 or
- +1 603 881 5200 extension 2444

In the UK, Europe the Middle East or the Far East, call:

- +44 (0) 23 9271 4713 (voice)
- +44 (0) 23 9266 1228 (fax)

Help us to help you

When requesting service, please quote the following product information:

- Equipment type.
- Model number.
- Serial number.
- Software issue number.

The Software issue number can be ascertained by means of the Intermediate Calibration facility, see *Chapter 4, Calibration*.

Chapter 3: Installation

This chapter describes how to install the ST60 Depth instrument, and associated depth transducer. The transducer is fitted in the hull of the vessel and is connected to the rear of the instrument. The actual type of transducer depends on the type of hull in which it is to be installed.

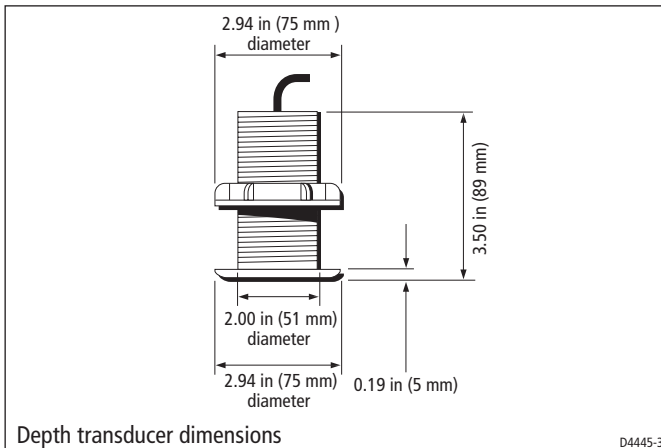
For advice, or further information regarding the installation of this equipment, please contact the Raymarine Product Support Department or your own National Distributor.

3.1 Planning your installation

Before starting the installation, spend some time considering the best positions for both transducer and instrument, such that the *Site Requirements* and the *EMC installation guidelines* (below) are satisfied.

Site requirements

Transducer

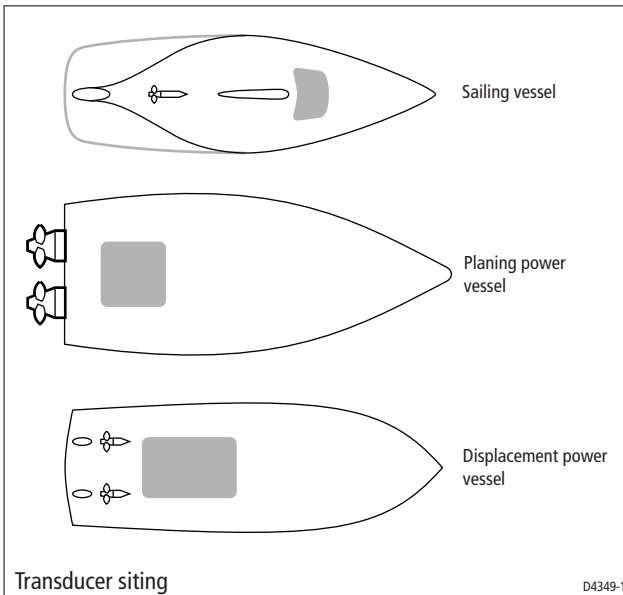


The transducer types required for the various hull types are as follows:

Hull material	Transducer type
Glass reinforced plastic (GRP)	M78713 Through hull plastic M78718 Retractable through hull
Steel	M78713 Through hull plastic M78718 Retractable through hull
Aluminium	M78713 Through hull plastic M78718 Retractable through hull
Wood	M78714 Through hull bronze M78719 Retractable through hull

Other transducer types are also available for specific requirements. For further details, contact your local Raymarine dealer.

For accurate depth readings the transducer should be sited within the clear water flow areas indicated by the shaded areas in the following diagram.

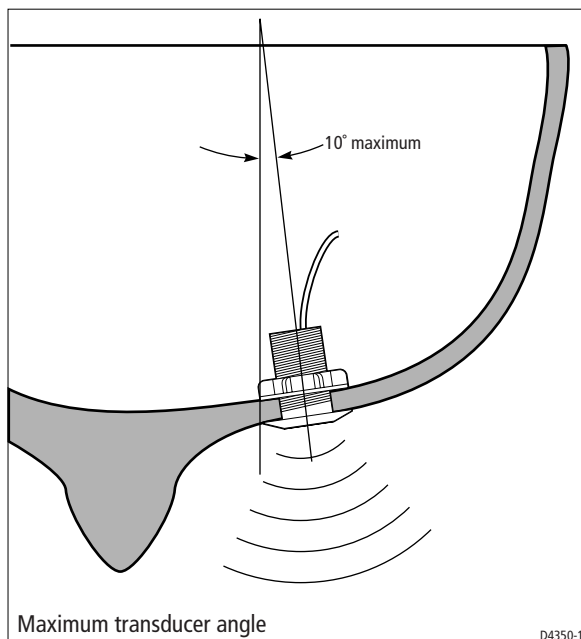


The transducer should also:

- Be ahead of the propellers (by a minimum of 10% of the water line length).
- Be at least 6 in (150 mm) away from the keel (ideally ahead of the keel if a sailing yacht).
- Be as near as possible to the center line of the vessel.

- Be clear of other through-hull fittings or projections.
- Have sufficient clearance inside the hull to fit the nut.
- Have 4 in (100 mm) of headroom to allow for withdrawal.
- Be within 10° of the vertical, forward, aft and athwart ships.

There must also be a viable route for the transducer cable to be routed to the instrument.



Instrument

CAUTION:

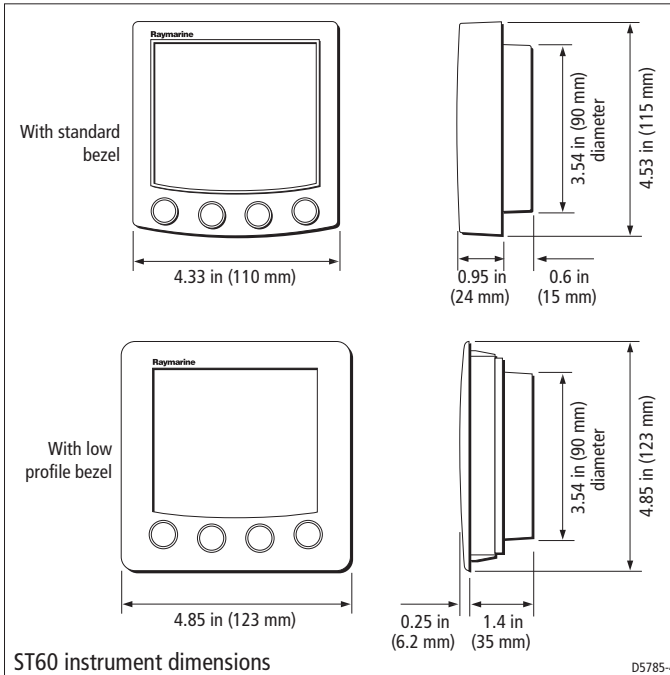
The presence of moisture at the rear of the instrument could cause damage either by entering the instrument through the breathing hole or by coming into contact with the electrical connectors.

ST60 instruments can be fitted either above or below deck, provided the rear of the instrument is sited where it is protected from contact with water.

Each instrument must also be positioned where:

- It is easily read by the helmsman.
- It is protected against physical damage.
- It is at least 9 in (230 mm) from a compass.

- It is at least 20 in (500 mm) from radio receiving equipment.
- There is reasonable rear access for installation and servicing.



EMC installation guidelines

All Raymarine equipment and accessories are designed to the best industry standards for use in the recreational marine environment.

Their design and manufacture conforms to the appropriate Electromagnetic Compatibility (EMC) standards, but correct installation is required to ensure that performance is not compromised. Although every effort has been taken to ensure that they will perform under all conditions, it is important to understand what factors could affect the operation of the product.

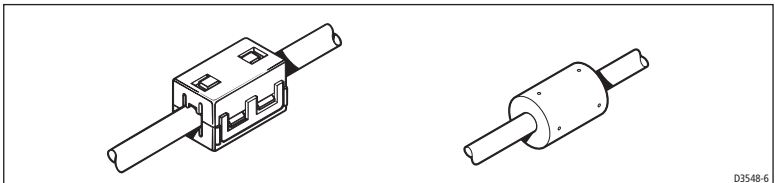
The guidelines given here describe the conditions for optimum EMC performance, but it is recognized that it may not be possible to meet all of these conditions in all situations. To ensure the best possible conditions for EMC performance within the constraints imposed by any location, always ensure the maximum separation possible between different items of electrical equipment.

For **optimum** EMC performance, it is recommended that **wherever possible**:

- Raymarine equipment and cables connected to it are:
 - At least 3 ft (1 m) from any equipment transmitting or cables carrying radio signals e.g. VHF radios, cables and antennas. In the case of SSB radios, the distance should be increased to 7 ft (2 m).
 - More than 7 ft (2 m) from the path of a radar beam. A radar beam can normally be assumed to spread 20 degrees above and below the radiating element.
- The equipment is supplied from a separate battery from that used for engine start. Voltage drops below 10 V in the power supply to our products, and starter motor transients, can cause the equipment to reset. This will not damage the equipment, but may cause the loss of some information and may change the operating mode.
- Raymarine specified cables are used. Cutting and rejoining these cables can compromise EMC performance and must be avoided unless doing so is detailed in the installation manual.
- If a suppression ferrite is attached to a cable, this ferrite should not be removed. If the ferrite needs to be removed during installation it must be reassembled in the same position.

Suppression ferrites

The following illustration shows typical cable suppression ferrites used with Raymarine equipment. Always use the ferrites supplied by Raymarine.



Connections to other equipment

If your Raymarine equipment is to be connected to other equipment using a cable not supplied by Raymarine, a suppression ferrite **MUST** always be attached to the cable near the Raymarine unit.

3.2 Procedures

As it is not possible to describe procedures for all possible installation scenarios, the procedures given here describe the broad requirements for installing depth transducers and the ST60 Depth instrument. Adapt these procedures as appropriate, to suit your individual requirement.

CAUTION:

Where it is necessary to cut holes (e.g. for cable routing and instrument mounting), ensure that these will not cause a hazard by weakening critical parts of the vessel's structure.

Unpacking

Unpack your ST60 equipment and check that the items described in the *Preface* are present.

Each ST60 instrument is supplied with a standard bezel for surface mounting. Optional mounting kits are available for flush mounting and bracket mounting the instrument. If you have ordered the flush mounting option a low-profile bezel and four fixing screws are also provided.

Fitting the instrument

The ST60 Depth instrument can be installed using one of a number of different mounting options:

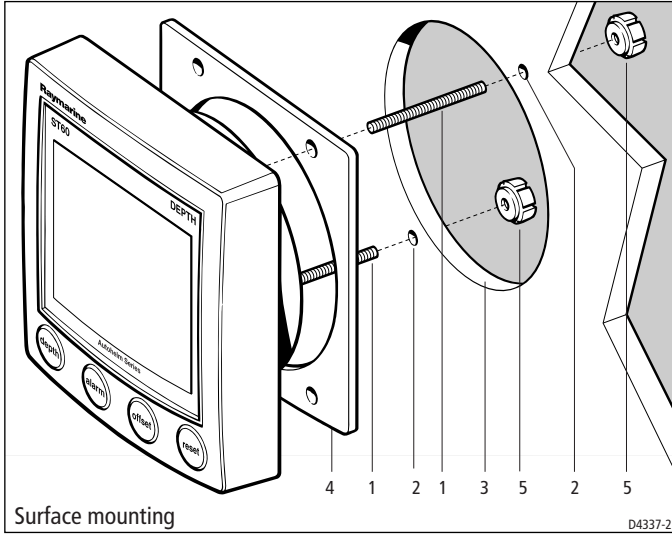
- Surface mounting. Gives a profile of approximately 0.95 in (24 mm).
- Flush mounting. Gives a profile of approximately 0.25 in (6 mm).
- Bracket mounting.

The ST60 instruments can also be mounted behind a panel with just the instrument dial and keys visible.

Surface mounting

To surface mount your ST60 instrument (see the *Surface mounting* illustration):

1. Ensure that:
 - The selected location is clean, smooth and flat.
 - There is sufficient space behind the selected location to accommodate the rear of the instrument and connectors.
2. Apply the surface mount template (supplied at the rear of this handbook) to the selected location and mark the centers for the fixing studs (1) and the aperture (3) that will take the rear casing of the instrument.



3. Drill out the two 0.2 in (5 mm) fixing stud clearance holes (2).
4. Cut out the clearance hole (3) then remove the template.
5. Peel off the protective sheet from the self-adhesive gasket (4) then stick the gasket into position on the rear of the instrument.
6. Screw the two fixing studs into the threaded sockets on the rear of the instrument.
7. Mount the assembled instrument, studs, bezel and gasket into the panel. Secure from behind with the thumb nuts (5).

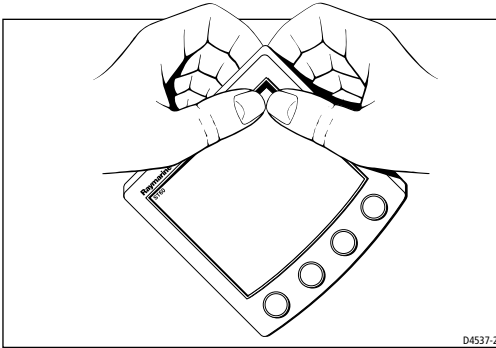
Flush mounting

The Flush Mounting Kit uses a low-profile bezel to reduce the fitted profile of the instrument, to approximately 0.25 in (6 mm) above the panel fascia.

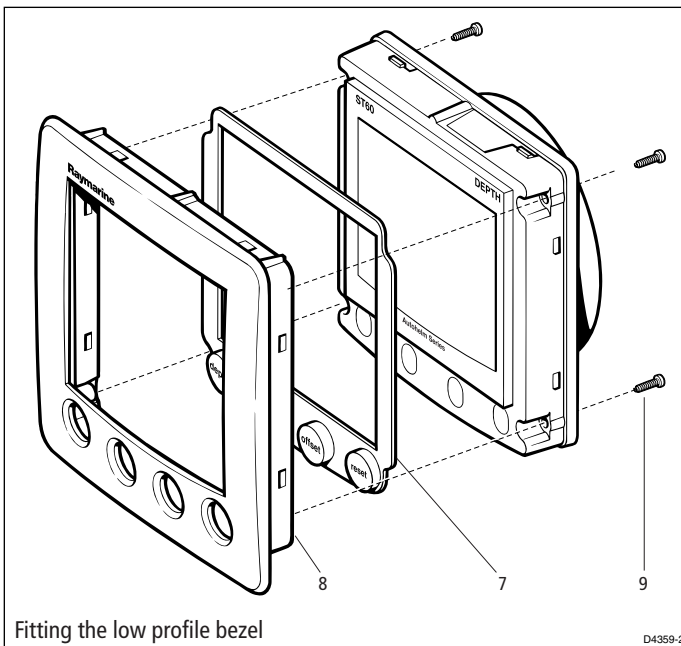
Fitting the low-profile bezel

In order to flush-mount your ST60 instrument, you must first replace the standard bezel with the low-profile bezel as follows:

1. Hold the instrument in both hands with the display towards you.
2. Using both thumbs, gently press an upper corner of the instrument from the bezel, then remove the bezel from the instrument. Retain the rubber keypad which is released when the bezel is removed.



3. Referring to the *Fitting the low-profile bezel* illustration, place the instrument face upwards on a flat surface and place the rubber keypad (7) in position around the display window (i.e. so that each key outline is located over its associated key on the instrument).



4. Snap the low-profile bezel (8) in position over the instrument, so that the rubber keys are correctly located in the holes on the bezel.

CAUTION:

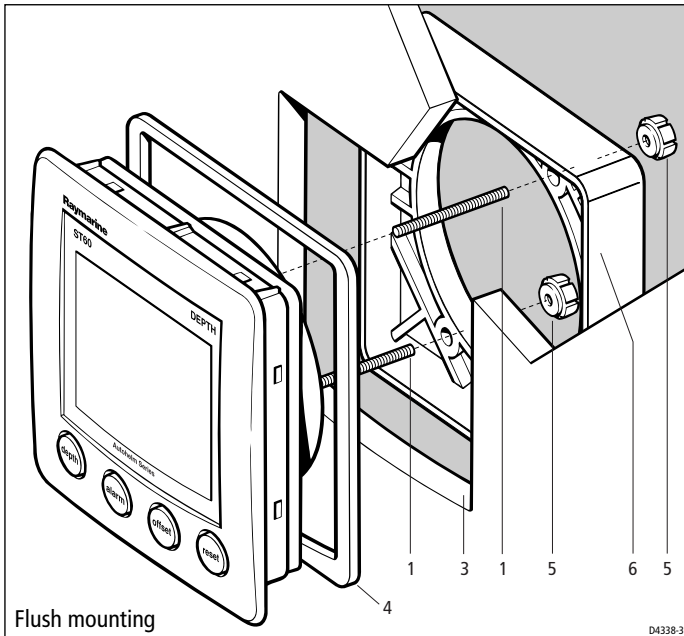
It is essential that only screws of the correct size are used to secure the instrument to the bezel. Failure to observe this caution could result in damage to both the instrument and the bezel.

- Using the four, self-tapping screws (9) provided, secure the instrument and bezel together. Fit the screws from the rear of the instrument and tighten them sufficiently to secure the instrument and bezel together. **DO NOT OVERTIGHTEN.**

Flush mounting procedure

Flush mount your instrument (see the *Flush mounting* illustration) as follows:

- Assemble the ST60 instrument and low-profile bezel as described under *Fitting the low-profile bezel*.



- Ensure that:

- The panel on which you intend to mount the instrument is between 0.12 in (3 mm) and 0.78 in (20 mm) thickness.
- The selected location is clean, smooth and flat.
- There is sufficient space behind the selected location to accommodate the rear of the instrument and connectors.

3. Apply the flush mount template (supplied at the rear of this handbook) to the selected location and mark out the aperture into which the assembled instrument and bezel will sit.
4. Cut out the aperture (3) for the assembled instrument and bezel and remove the template.
5. Peel off the protective sheet from the self-adhesive gasket (4) then stick the gasket into position on the rear of the bezel.
6. Screw the two fixing studs (1) into the threaded sockets on the rear of the instrument.
7. Mount the assembled instrument, studs, bezel and gasket into the panel.
8. Locate the flush mount bracket (6) onto the fixing studs and secure the assembly to the panel with the thumb-nuts (5).

Bracket mounting

A Control Unit Mounting Bracket (Part No. E25009) enables you to mount your ST60 instrument in locations where other forms of mounting are impractical. Although this provides a useful alternative method for securing your instrument, it is only suitable for use in positions where the instrument will not be exposed to water.

To bracket mount your ST60 instrument, do so in accordance with the Control Unit Mounting Bracket Instruction Sheet.

Fitting transducer

The ST60 Depth instrument is supplied, with a through-hull depth transducer.

The depth transducer is supplied with detailed instructions for installation and maintenance. Before attempting to install the depth transducer, read these instructions and the *Site requirements* for transducers described in this Chapter.

Once you are satisfied you can meet all the installation requirements, install the transducer in accordance with the accompanying installation instructions.

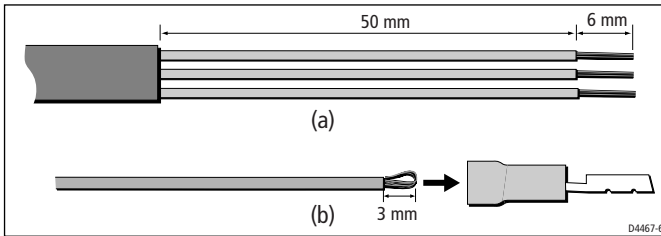
Running transducer cable

Each transducer type has a 14 m (45 ft) cable fitted with spade terminals for connection to the ST60 Depth instrument. The manner in which you run the cable will depend on the locations of the transducer and instrument.

Observing the following guidelines, run the transducer cable to the ST60 Depth instrument:

- If the cable has to be fed through the deck, always use a proprietary deck gland.

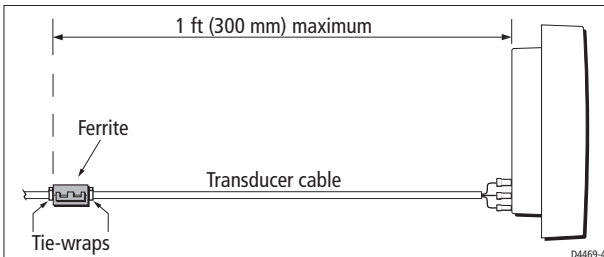
- Where cables are fed through holes, always use grommets to prevent chafing.
- Secure long cable runs so they do not present a hazard.
- Do not route the cable through bilges.
- Wherever possible, route the cable away from fluorescent lights, engines, radio transmitting equipment, as these may cause interference.
- Although the transducer cable is fitted with spade connectors for direct connection to the rear of the instrument, it may be necessary to remove these to facilitate installation, e.g. if the cable has to be routed through narrow apertures. Extra spade connectors are provided, to replace any that are removed when running the cable. When fitting spade connectors, prepare the cable as at (a) in the following illustration, then fold back the wire strands and insert into the spade connector as at (b). Ensure the wire strands do not extend beyond the rear of the spade connector insulation, then crimp the connector to the wire.



Fitting ferrite

Fit a suppression ferrite near the instrument end of the transducer cable, as follows.

1. Release the catch on the ferrite, open it up then snap it closed around the cable.
2. Position the ferrite as close as possible to the instrument end of the cable (maximum 1 foot (300 mm) from the end) and fit a tie-wrap on the cable either side of the ferrite, to hold it in position.



Connecting the instrument

Types of connection

The ST60 Depth instrument, can be connected:

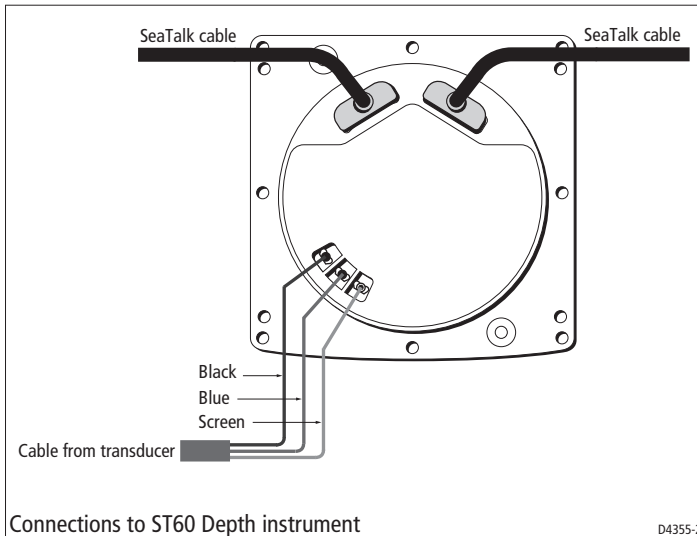
- As a stand-alone, master instrument connected directly to the depth transducer.
- As a SeaTalk repeater.

If instruments are connected to SeaTalk, no separate power connection is necessary. Where a SeaTalk system includes an autopilot, the power for the system is provided by the autopilot.

A range of Raymarine SeaTalk extension cables is available to connect separated instruments. These cables are supplied with a SeaTalk connector fitted to each end. A junction box can be used to join cables.

Signal connections

Make the necessary connections to your ST60 instrument (see the *Connections to ST60 Depth instrument* illustration).



Power supply connections

SeaTalk systems

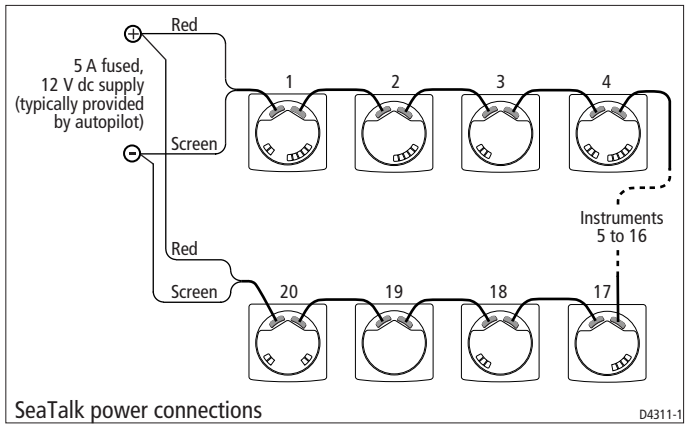
CAUTION:

When instruments are connected to SeaTalk, ensure that the power supply for the SeaTalk 12 V line is protected by a 5 A fuse.

Systems with a large number of instruments on the SeaTalk bus may require connections to the power supply from each end of the system ('ring-main' style), to maintain sufficient voltage throughout the system.

This requirement depends on the total length of the cable run and the total number of instruments in the system, as follows:

Cable run	No. of instruments	Power connections
Up to 10 m	13 maximum	1
	26 maximum	2
Up to 20 m	7 maximum	1
	13 maximum	2

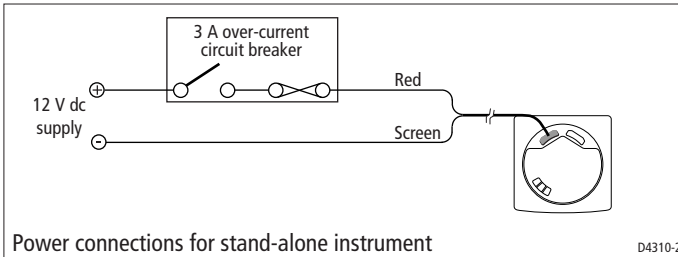


Stand alone instruments

Stand-alone instruments are not connected to SeaTalk and therefore need to be connected to an alternative 12 V power source. Power cables are available in 2 m and 9 m lengths.

To fit a power cable:

1. Ensure the intended power source is switched off.
2. Run the power cable from the instrument to a suitable 12 V dc power source.
3. If the cable has not already been trimmed at the power supply end:
 - i. Cut the cable to length and trim back an appropriate amount of the outer sheath.
 - ii. Cut back and insulate the yellow wire.
4. Connect the screen to the power supply 0 V terminal.
5. Connect the red wire via a 3 A circuit breaker to the power supply +12 V terminal.
6. Insert the power cable connector into one of the SeaTalk connectors at the rear of the instrument.



Chapter 4: Calibration

4.1 Introduction

The ST60 Depth instrument is set up with factory-programmed default settings, so in order to optimise the performance of the instrument on board a particular vessel, the procedures in this Chapter must be carried out immediately after the completion of installation, and before the equipment is used for navigational purposes.

Where practicable, the calibration procedures are presented diagrammatically to show the sequence of key presses and the resulting displays. Adjustment instructions are given where applicable.

Note: *The procedure for setting alarm threshold levels is given in Chapter 1, Operation.*

EMC conformance

Always check the installation before going to sea to make sure that it is not affected by radio transmissions, engine starting etc.

4.2 User calibration

The User calibration procedures enable you to:

- Set the required units for depth readings.
- Set the offset for depth readings, i.e. determine whether depth readings are from the keel of the vessel or from the water line.
- Lock the shallow alarm.
- Set pop-up pilot display on or off.

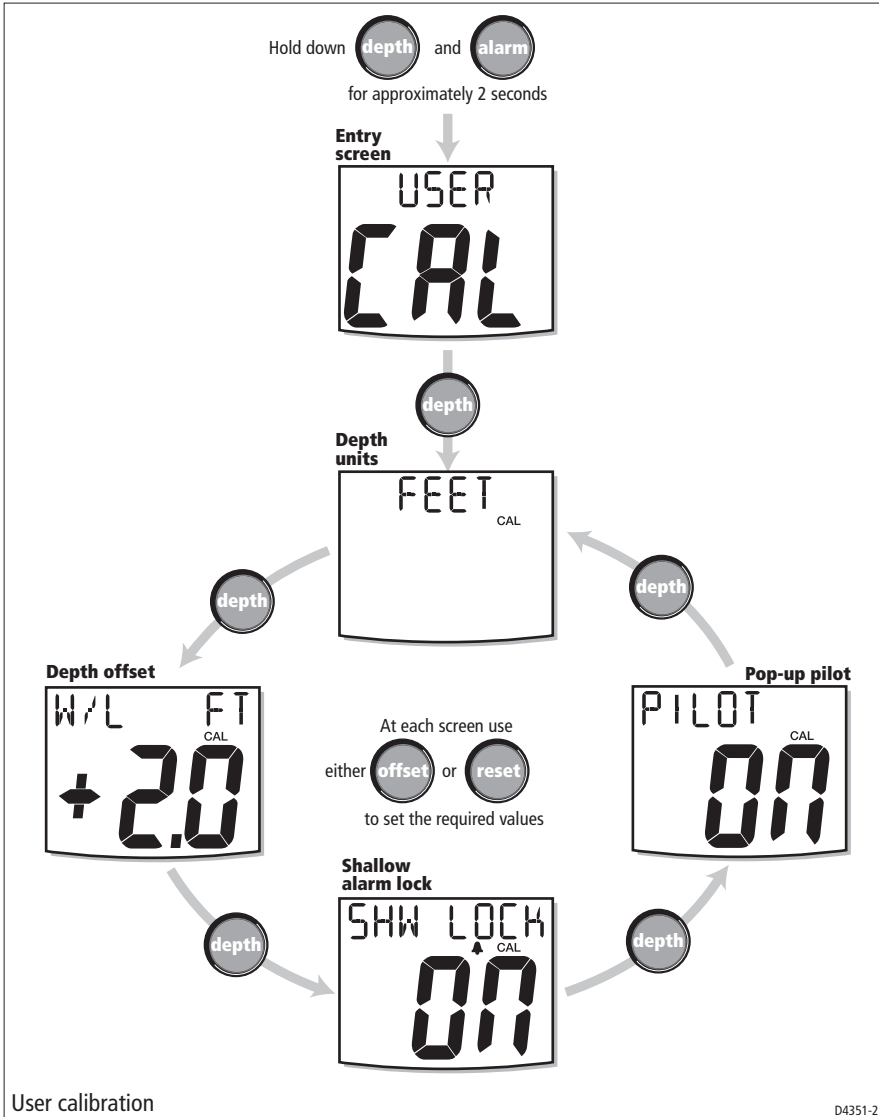
Procedure

To carry out a User calibration:

1. Power up the ST60 Depth instrument.
2. Press the **depth** and **alarm** keys for approximately 2 seconds so that the User calibration entry screen is displayed.

Note: *The User calibration entry screen will time out to the main display after 7 seconds.*

3. Referring to the *User calibration* diagram, carry out the calibration procedure. Use the **depth** key to cycle from screen to screen and the **offset** and **reset** keys to set the required values at each screen.



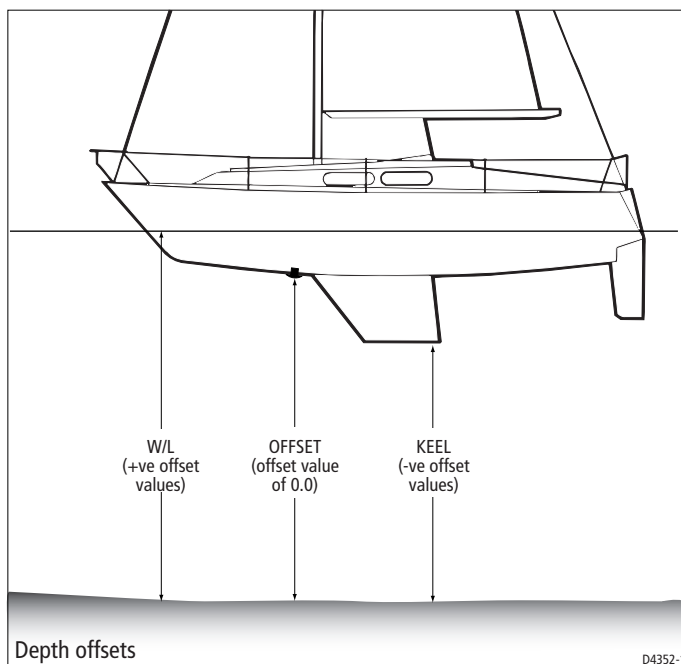
Depth units

Use this screen to select the units in which depth information is displayed. Either FEET, FATHOMS or METRES.

Depth offset

Depths are measured from the transducer to the sea bed. However, you can use the depth offset screen to apply offsets to this distance, so that the displayed depth reading represents either the depth from the keel or the depth from the water line (W/L). In order to do this, you need to know the vertical separation between the transducer position and:

- The bottom of the keel. This requires a negative offset.
- The water line. This requires a positive offset.



The legend at the top of the Depth offset screen reflects the value you set up, i.e. W/L for positive offsets, KEEL for negative offsets and OFFSET for zero offset.

Setting offset values



WARNING:

The use of incorrect offset values could result in misleading depth information being displayed with a consequent risk of running aground.

Use the **offset** (decrement) and **reset** (increment) keys to set the required offset value.

If you want to display the actual depth reading from the transducer, set a value of 0.0.

If you want to apply a W/L (water line) offset or a KEEL offset, adjust the displayed reading until the correct offset value is shown (positive for W/L ; negative for KEEL).

Shallow lock

When set to On, prevents inadvertent alteration to the shallow depth alarm setting.

Note: *The procedure for setting alarm threshold levels is given in Chapter 1, Operation.*

Pop-up pilot

Switches the pop-up pilot function on and off.

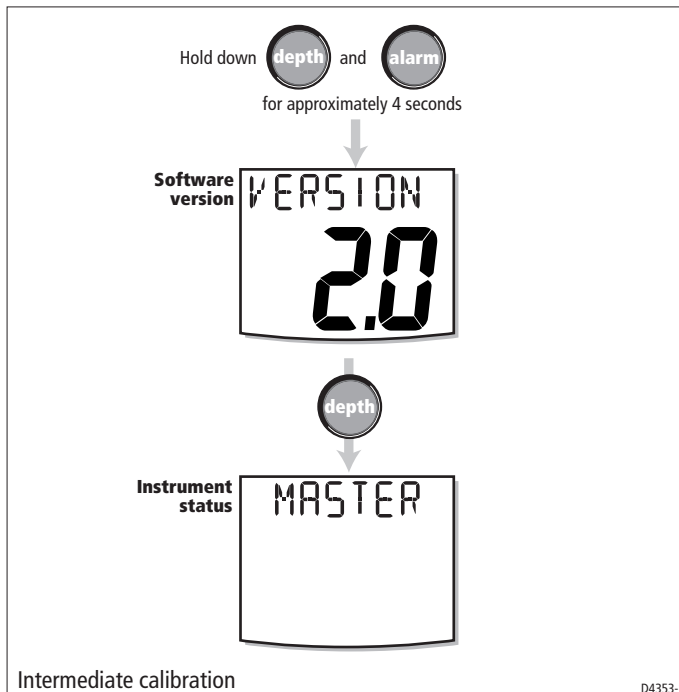
Leaving User calibration

Hold down the **depth** and **alarm** keys for 2 seconds to save your settings, exit User calibration and resume normal operation.

4.3 Intermediate calibration

Intermediate calibration enables you to:

- Check the instrument software version.
- Set the instrument status - either MASTER or REPEATER . This feature is particularly useful in preventing interference when using another product (e.g. a fishfinder) that operates at 200 kHz.



To access the Intermediate calibration screens, hold down the **depth** and **alarm** keys for approximately 4 seconds.

To set the instrument status:

1. Press the **depth** key to select the Instrument status screen.
2. Press the **offset** and **reset** keys simultaneously to enter adjust mode, then press either **offset** or **reset** to set the required status.

Note: *You must not allocate more than one MASTER depth instrument in any system.*

3. Press the **offset** and **reset** keys simultaneously again, to leave the adjust mode.

Leaving Intermediate calibration

Hold down the **depth** and **alarm** keys for 2 seconds to save your settings, exit Intermediate calibration and resume normal operation.

4.4 Dealer calibration

The Dealer calibration procedure (see *Dealer calibration* diagram) enables the following parameters to be set:

- User calibration on/off.
- Depth response.
- Boat show mode on/off.

Dealer calibration also gives access to the Factory defaults screen. This enables you to re-apply the factory settings if you want to reset the instrument to a known operating condition.

To commence Dealer calibration, hold down the **depth** and **alarm** keys together for approximately 12 seconds, to select the Dealer calibration entry page. Press the **offset** and **reset** keys together, to proceed with the calibration, then use the **depth** key to proceed from screen to screen as calibration progresses.

User calibration on/off

Use either the **offset** key or the **reset** key to switch the User calibration either ON or OFF as required. With OFF selected, User calibration and Intermediate calibration are both disabled. This feature is particularly useful aboard charter vessels, to prevent unwanted alteration of calibration settings.

Response settings

The depth response value determines the frequency at which information is updated. A low number provides a smooth response and a high number a much livelier response.

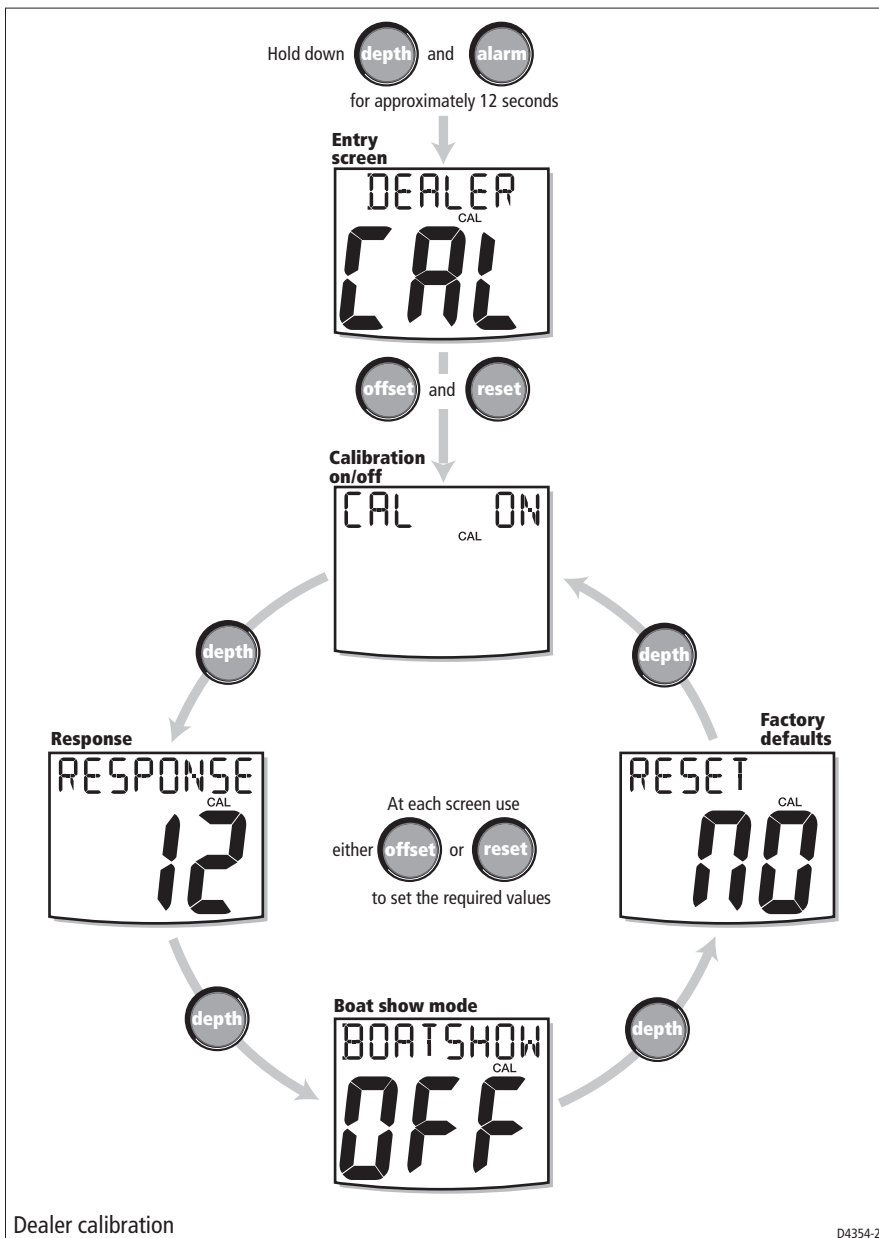
Use the **offset** (decrement) and **reset** (increment) keys to set the required value. Response values are from 1 to 15.

Boat show mode

CAUTION:

Do NOT enable this mode. It must only be used for demonstration purposes.

Ensure that the Boatshow Mode Use is set to OFF. If necessary, use the **offset** or **reset** key to achieve this.



Factory defaults

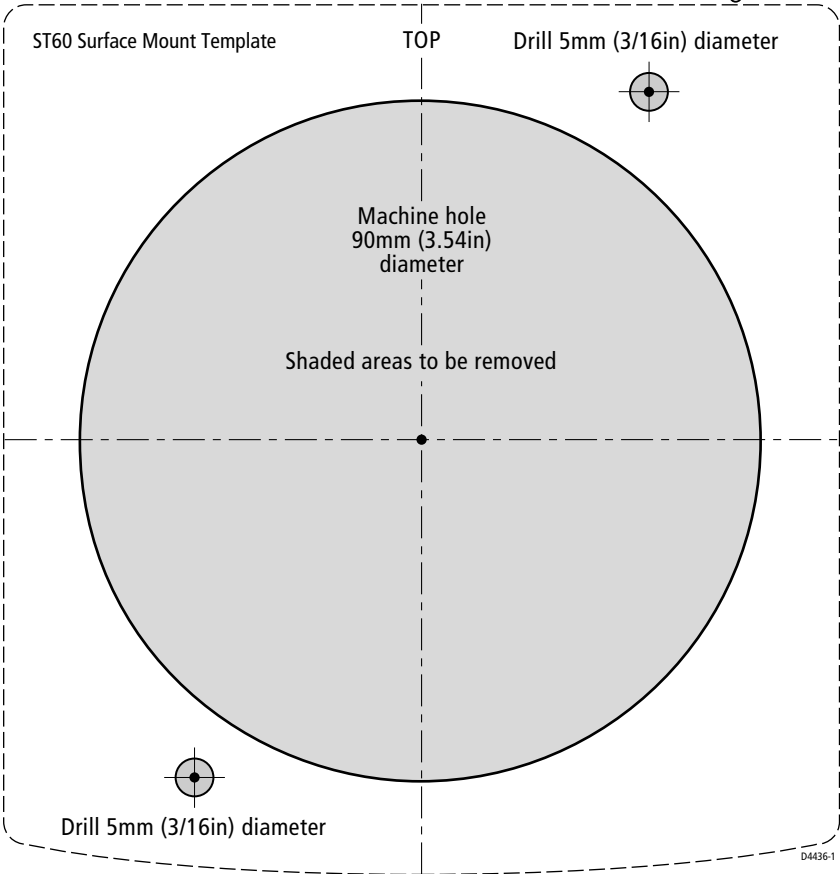
You can use this screen to reset the operating parameters to the factory default values. Use the **offset** and **reset** keys to make the required selection.

Note that the selection you make at this screen will be applied when you exit the screen, so be sure you make the correct selection.

If you want to apply the factory defaults, ensure the display shows YES , but **if you want to retain the current values, ensure that the display shows NO .**

Leaving Dealer calibration

Hold down the **depth** and **alarm** keys for 2 seconds to save your settings, exit Dealer calibration and resume normal operation.





ST60 Flush Mount Template

