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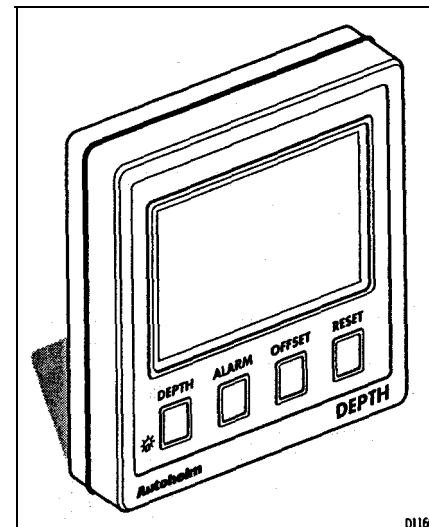are owned by the
Raytheon Company.

Autohelm®

ST 50

PLUS

DEPTH
Operation and
Installation

Autohelm®

Package   Contents

The following items are included in the ST50 Plus Depth package:

1.   ST50 Pius Depth control head

2.   Fixing studs (2 off)

3.   Thumb nuts (2 off)

4. Fitting template

5. Power cable

6.   Depth transducer (through hull) with 14m (45ft) of cable

7.   Control head cover

8.   Operation and Installation handbook

9.   Worldwide Service Centre handbook

10.   Warranty   document

11.   Security code sticker

Contents

Introduction

The ST50 Plus Depth is a SeaTalk compatible, multifunction instrument that employs a powerful echo sounder to give excellent performance over a wide range of sea conditions.

Deep, shallow, anchor watch alarms can be set to provide visual and audible warnings when the water depth reaches selected thresholds.

The ST50 Plus Depth can be configured to operate as a master unit or a dedicated repeater. All settings are stored in permanent memory and retained even when the power source is disconnected.

The ST50 Plus Depth also incorporates a securii feature to protect instruments mounted in vulnerable areas such as the cockpit, helm or mast.

Thank you for purchasing an Autohelm product May we take this opportunity to wish you years of trouble free operation.
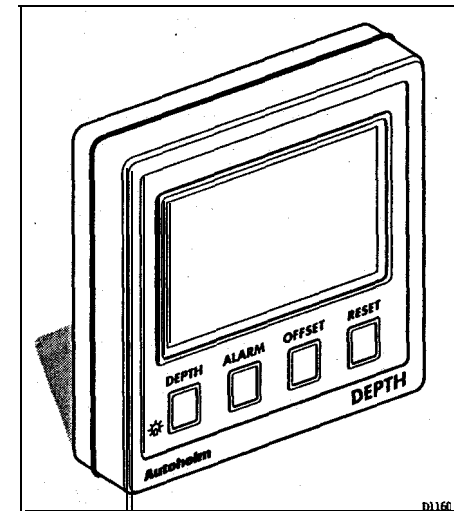
Chapter 1: Control Head Installation
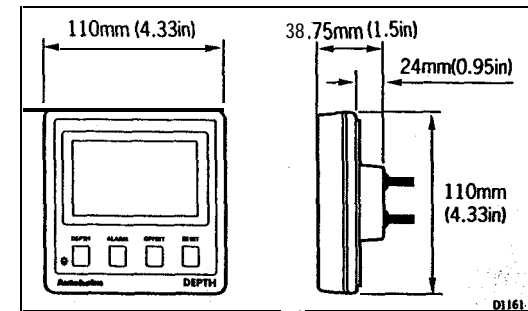
1.1 Sing

The ST50 Plus Depth is designed for above or below deck installation where it is:

- Easily readable by the helmsman

- Protected against physical damage

- At least 230mm (9in) from a compass

- At least 500mm (20in) from radio receiving equipment

- Accessible from behind for ease of installation and cable running

Caution:
To prevent moisture forming on the display window, the ST50 Plus Depth 'breathes' through a small vent in the cable boss. Therefore, the control head must be sited where the rear case is protected from contact with water.
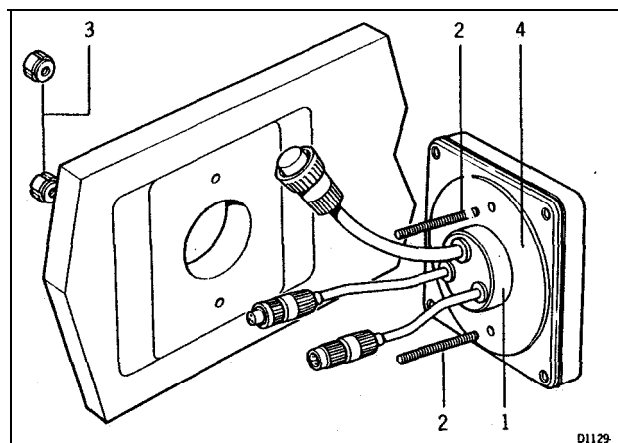
1 Cable boss 2 Fiiing studs **3 Thumb** nuts **4 Gasket**

1.2 Mounting Procedure

1. Make sure that the selected location is clean, smooth and flat.

2. Apply the self-adhesive template (supplied) to the selected location and mark the centres for the fixing studs (2) and the cable boss (1).

3. Drii two 4mm (5/32in) clearance holes for the fixing studs (2) through the bulkhead. Remove the template.

4. Cut the clearance hole for the cable boss (1) using a 50mm (2in) diameter cutter.

5. Screw the two fixing studs (2) into the control head.

6. Pass the SeaTalk cable and transducer tails through the cable-boss (1) clearance hole.

7. Assemble the control head to the bulkhead and secure from behind using the thumb nuts (3).

Note:
The rear case is fitted with a foam gasket to form a water-tight seal between the instrument and the selected installation face. Under no circumstances must silicone greases be applied to this gasket as an additional method of sealing-the silicone will expand and distort the rear case.

Bracket Mounting

The ST50 Plus Depth can, as an alternative, be bracket mounted using the Autohelm Mounting Kit.
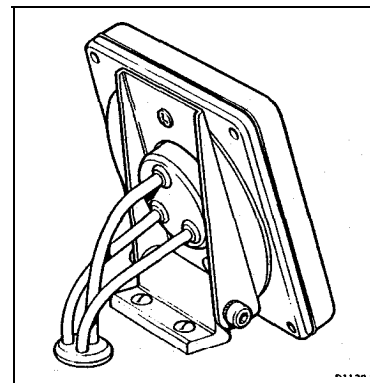
Flush Mounting

A flush mounting kii is available for installations where a flush mount is required or more desirable. Full installation instructions are provided with the kit.

1.3 Power Supply (stand-alone operation)
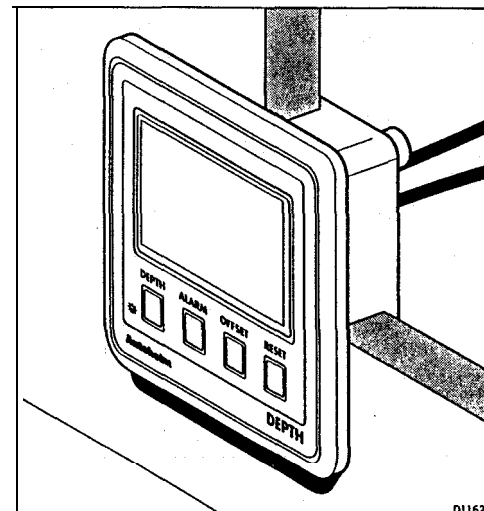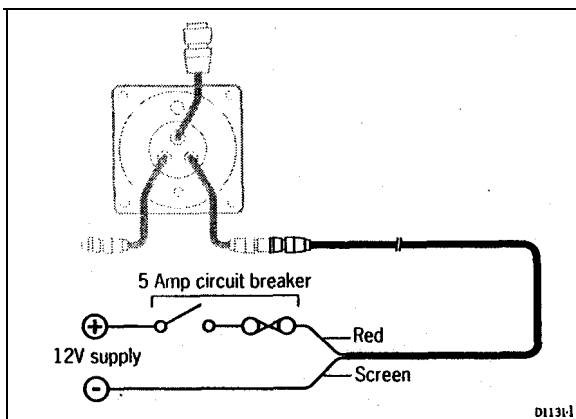

1. Connect the 2m (6ft.) power supply cable directly to the distribution panel.

2. Cut the cable to length and connect the red wire to the +12V terminal and screen to the OV terminal.

3. Cut back and insulate the yellow wire.

4. Protect the circuiiwith a 5A circuit breaker.

Longer runs to the power supply can be made using the 9m (30ft) SeaTalk Extension Cable (D131).

1.4 Power Supply (SeaTalk operation)

All instruments in a SeaTalk system receive power and information from the SeaTalk bus. Each instrument has two SeaTalk connectors (3 pin) on 150mm (6in) tails. To supply power and information to the instrument simply plug adjacent tails into the ST50 Plus Depth tails.
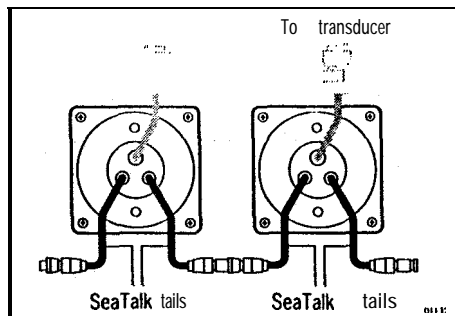
1.5 Connection of Separated Instruments

Separated instruments can be connected using one of the range of SeaTalk Extension Cables. These cables are supplied with a SeaTalk connector fitted to each end. Ajunction box can be used to join the cable if it is cutforeasier routing or shortening.

If preferred, any 2 core, screened cable conforming the following specification may be used instead of the SeaTalk cable.

• 22 AWG, 2 core screened cable with a minimum copper area of 0.5mm².
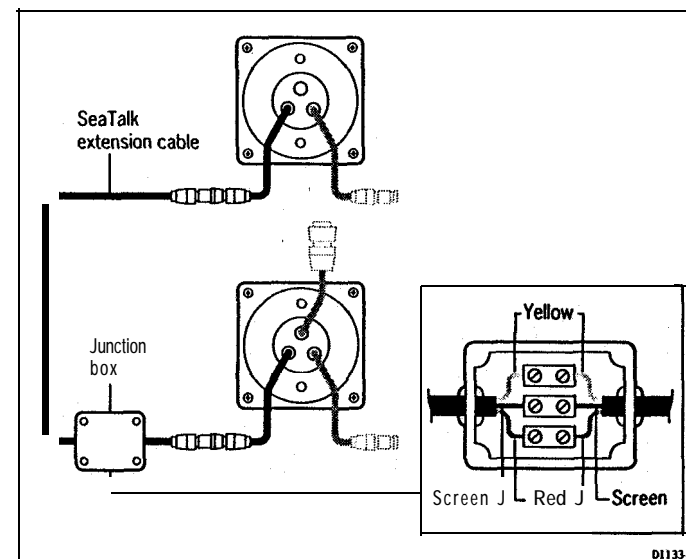
1.6 Ring Connection

Installations with large numbers of instruments on a SeaTalk bus may require a second ring-main connection to the power supply breaker to prevent excessive voltage drops. Refer to the following list to determine whether a second ring main is necessary.

Cable run upto 10m (33ft)

Single connection:	13 instruments maximum
Second connection:	26 instruments maximum

Cable run upto 20m (66ft)

Single connection:	7 instruments maximum
Second connection:	13 instruments maximum

The second ring-main should be connected to the spare lead on the last instrument in the chain and directed back to the circuit breaker.

1.7 Connection to SeaTalk Compatible Autopilots

If the installation includes a SeaTalk compatible Autopilot the ST50 instruments may be connected to the SeaTalk bus at any point. No independent connection to the 12V power supply is necessary as the instruments receive power from the Autopilot course computer.

To autopilot
SeaTalk BUS
Connection

To any further
ST50 Instruments
or Autopilot
Control Units
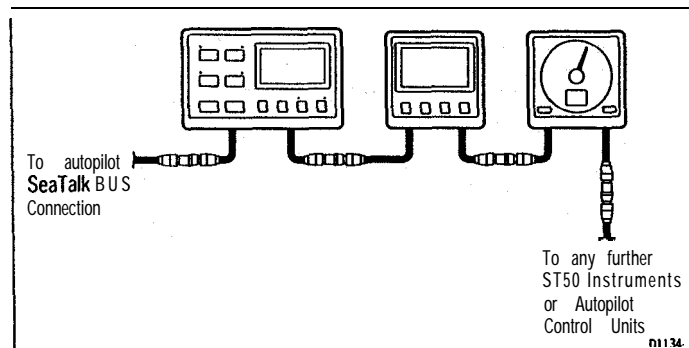
Chapter 2: Transducer Installation

2.1 Connection to the Control Head

The depth transducer is supplied, as standard, with a through hull fitting and 14m (45ft) of cable. The cable is equipped with a SeaTalk connector that plugs into a control head connector.
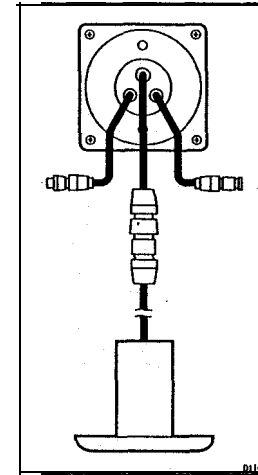
2.2 Transducer Selection

The type of depth transducer used is governed by the hull material. The following list shows the appropriate transducer for hull type.

Transducer Type	Hull Material
Z091 Through Hull Plastic:	GRP (Glass Reinforced **Plastic),** Steel and Aluminium
Z118 Through Hull Bronze:	Wood
2120 Retractable througb hull:	GRP (Glass Reinforced Plastic), Steel and Aluminium

2.3 Transducer Installation

All depth transducers are supplied with detailed installation and maintenance instructions.

These instructions, together with the following notes, should be read thoroughly before attempting to install the transducer.

Siting

For accurate depth readings the transducer should be sited within the shaded clear flow areas.
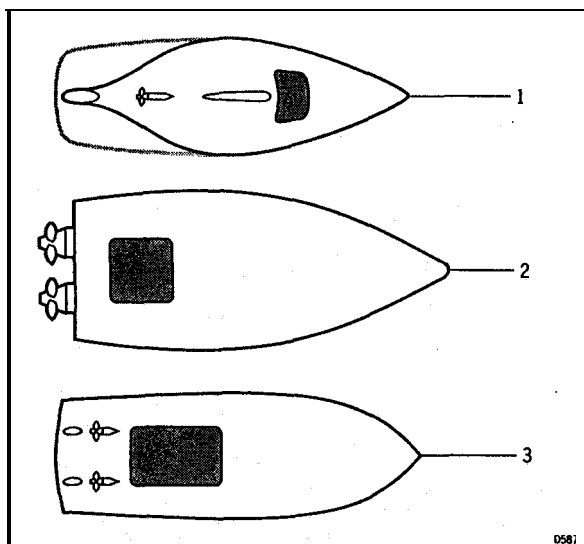
1 Sail 2 Planning power 3 Displacement power

The transducer should also:

- be ahead of the propeilers (10% W.L. length minimum)
- be at least 150mm (6in) away from the keel (ideally ahead of the keel if a sailing yacht)
- be as near as possible the centreline of the vessel
- be clear of other throughhull fittings or projections
- have sufficient clearance inside the hull to fit the nut
- have 100mm (4in) of headroom to allow for withdrawal
- within 10° of the vertical, forward, aft and athwart shiis.
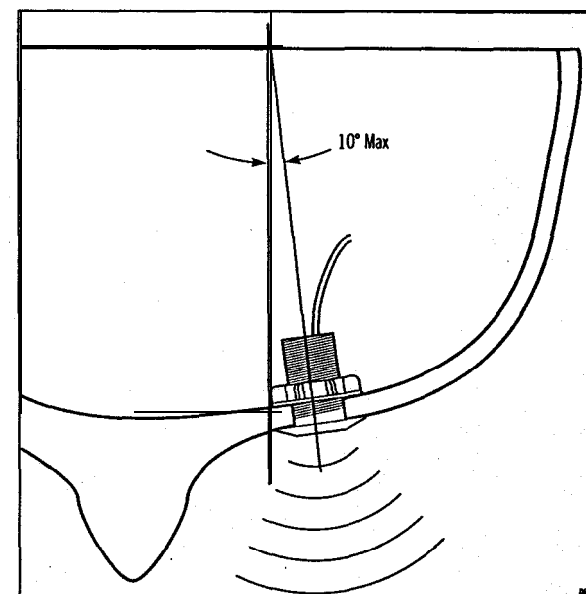
Cabling

1.   Run the cable back to the control head.

Note:
Avoid fluorescent lights, engines, radio transmitting equipment etc. as these may cause interference. Also, keep the transducer cable clear of the bilge and secure at regular intervals.

2.   Fit the transducer and instrument cable connectors together. To lock the connectors, push and rotate the ring on the transducer cable connector towards the control head connector.

Chapter 3: Fault Finding and Maintenance

3.1 Fault Finding

All Autohelm products are, prior to packing and shipping, subjected to comprehensive test and quality assurance programmes. However, if a fa arises with the ST50 Flus Depth, the following table will help to identify the probable cause and provide the most likely cure.

Fault	Cause	Action
Instrument display blank.	No supply.	Check supply. Check cabling and security of SeaTalk connectors. Check fuse/breaker. Return unit for repair
Instrument displays 'CODELOCK set', ENTER CODE.	The 'CODE Lock feature has been set.	Enter correct code number.
No exchange of information between SeaTalk instruments (ie, illumination levels).	SeaTalk cabling problem.	Check security of SeaTalk connectors. Remove instruments one by one to isolate faulty unit.
Failure of a group of instruments in SeaTalk chain.	SeaTalk cabling/connector problem.	Check security of SeaTalk connectors between functioning and nonfunctioning instruments.
Depth reading continuously flashes (Depth greater than 3 feet).	Transducer cable/connector problem.	Check cabling and securii of transducer connector.
Depth reading flashes while underway.	Aereated water, boat wakes, propellor wash etc.	Normal reading will return when clear of disturbed water.

3.2 Maintenance

Instrument

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

Chemical and abrasive materials must not be used to clean the control head; if it is dirty, clean with a soft, damp cloth.

Transducer

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

Cabling

Examine all cables for chafing or damage to the outer shield and, where necessary, replace and resecure.

Advice

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

Chapter 4: Operation

As it leaves the factory the ST50 Plus Depth is set with:

- 'depth units in feet
- transducer off set set to 0 feet
- shallow alarm set to 10 feet
- deep alarm set to 100 feet
- low anchor alarm set to 50 feet
- high anchor alarm set to 50 feet

These settings can be changed in calibration, Chapter 6.

When the unit is powered up for the first time water depth will be displayed.

Note:
If during a 10 second period no valid echoes are received, the deep legend will flash (if the depth is greater than 100ft) after a 10 second delay to indicate that the display 'is not being updated and that the currently displayed value was the last valid echo.

4.1 Depth Key
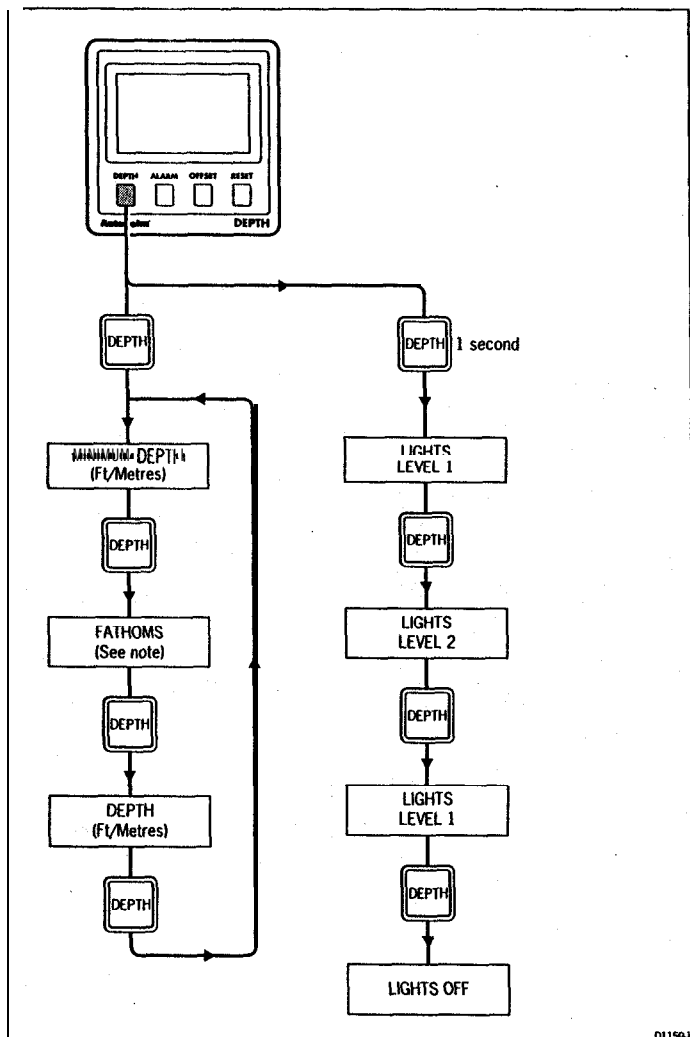
Depth Key Notes

Minimum Depth

Minimum depth can be reset by pressing **RESET.**

Minimum depth returns to current depth after 8 seconds.

Display Contrast

The display contrast is automatically adjusted when the tights are turnedon.

Fathoms

When the units of measure are set to feet, fathoms will be displayed before minimum depth.

4.2 Alarm Key

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Alarm Notes

Shallow Alarm

The shallow alarm has priority over all alarms.

The shallow alarm will sound until it is silenced, however, the shallow alarm legend continues to flash until the depth rises above the set threshold.
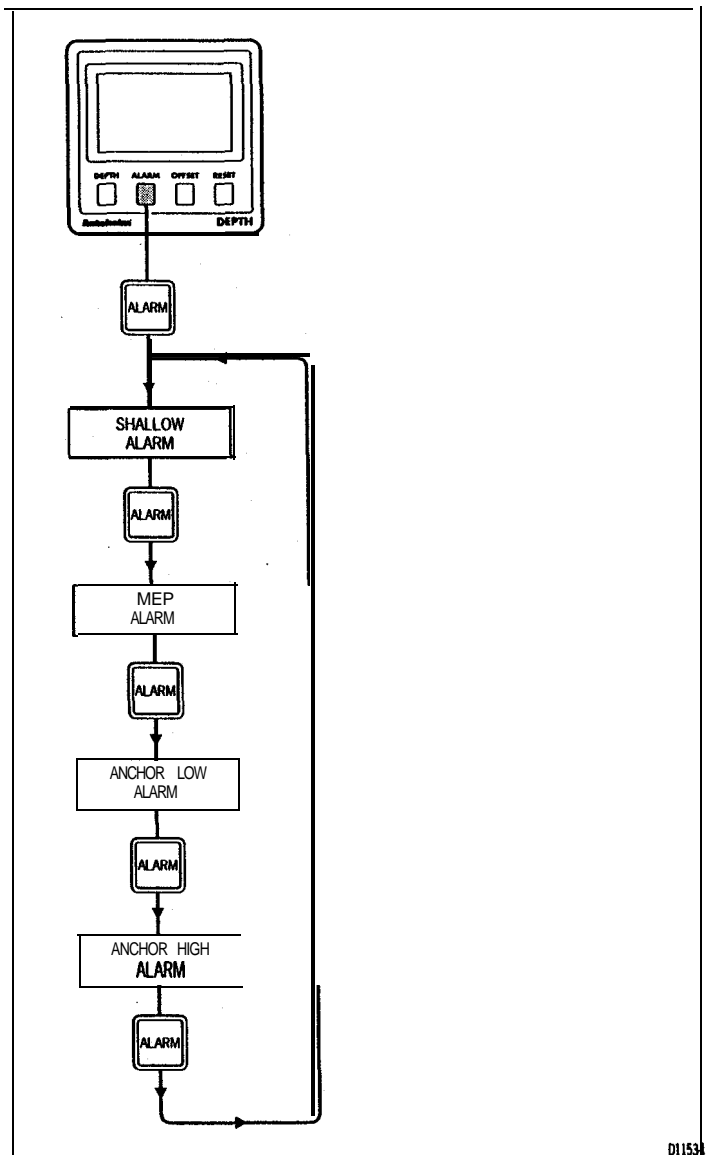
Deep/Alarm

The deep alarm is triggered when crossing the set threshold going from shallow to deep and deep to shallow waters.

Unless it is silenced, the deep alarm sounds for 30 seconds.

Anchor Alarms

The anchor alarms provide visual and audible warnings when the water reaches critical low or high levels when the vessel is anchored.

These alarms can be silenced, however, the visual alarm will continue to flash until a safe water depth has been reached.

Silencing Audible Alarms

Audible alarms can be silenced by pressing any key.

Enabling and Disabling Alarms

All alarms can be disabled. For further details, please refer to the calibration section.

4.3 Offset Key
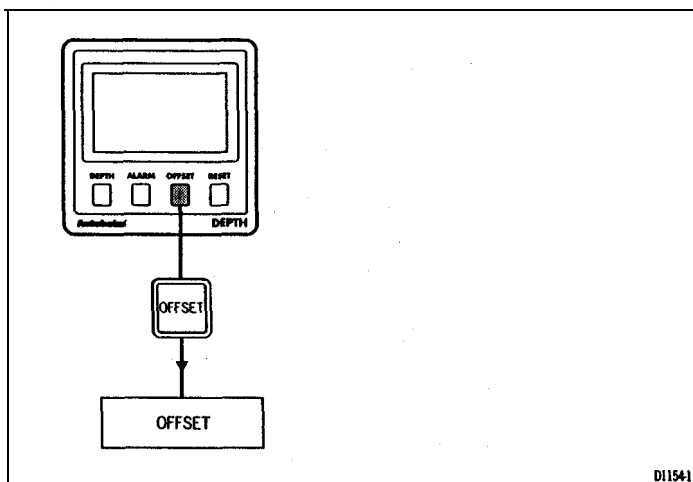
Offset Key Notes

The off set value can be positive or negative: depth measured from the keel is negative and depth to the waterline positive.

The offset display will return to water depth 8 seconds after the last key press

4.4 Reset Key
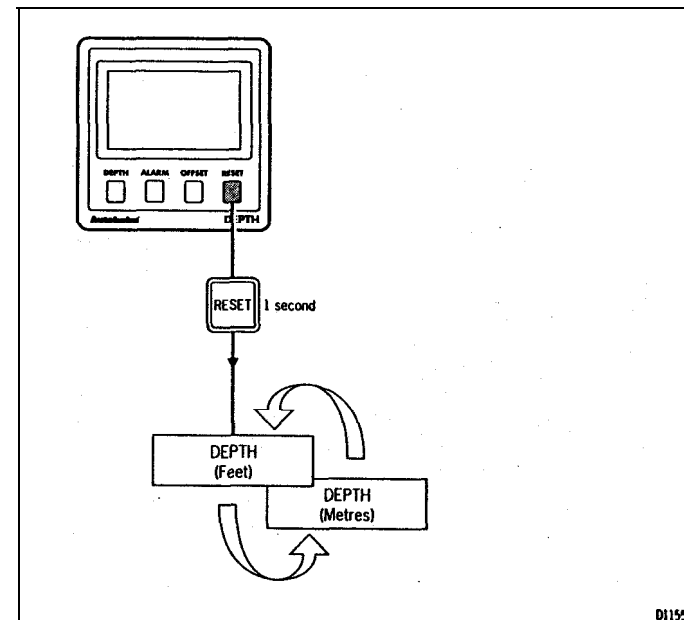
Reset Key Notes

This feature allows the depth units to be switched between feet and metres. However, the units can only be toggled when the current water depth is displayed.

4.5 Display Contrast

The contrast can be adjusted to achieve optimum legibility at any angle.

1. Momentarily press **DEPTH** and **ALARM** together.

2. Press OFFSET or RESET to increase or decrease the contrast setting (the range being between 1 and 15).

Note:
A high setting will suit installations where the control head will be viewed from above.
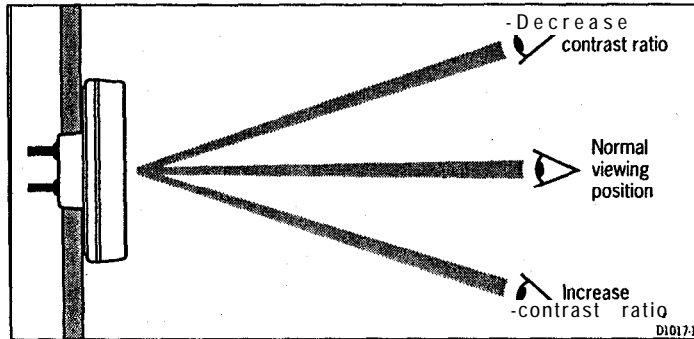
3. Press DEPTH and **ALARM** together momentarily to store the contrast setting.

Chapter 5: CODE Lock Security

The ST50 Plus range incorporates an anti-theft feature called 'CODE Lock'. Designed to protect individual instruments or complete systems ir vulnerable areas, 'CODE Lock is a four digit number that you programme into the permanent memory of a selected 'master' instrument.

Note:
A 'master' instrument is a digital unit on which the code number can be entered, and then, if part of an integrated system, transmitted to other ST50 Plus instruments.

This facility means that, should a CODE Locked instrument be removed from a vessel without the owners permission, it cannot be operated without the four digit security number.

CODE Lock' can be used in one of three modes:

Mode 1: Off

As it leaves the factory 'CODE Lock' is set to off. In this mode the instrument will operate normally when it is switched on, however, the unit will not be protected by the anti-theft feature.

Mode 2: CODE Lock Once-Only Entry (page 25)

This mode is designed for systems with a digital ST50 Plus instrument in -a safe, belowdecks location. This instrument can then be used as a 'master' to enter the four digit code number, and automatically transmit the code to all the instruments in the system when the power is switched on. The advantage of this mode is that, with the master safely below deck, code entry via the keypad is a once-only operation on installation.
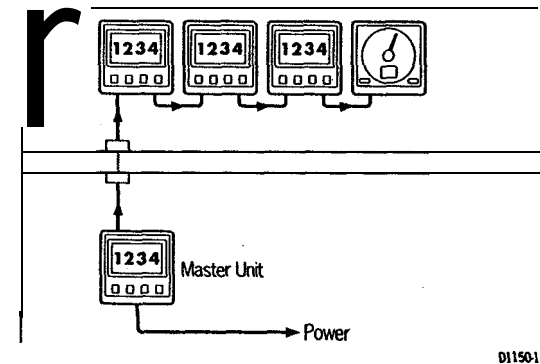
Once 'CODE Lock' is set the system will operate normally as soon as the power is switched on. In other words, the 'CODE Lock' securii number is invisible.

Mode 3: CODE Lock input at Power-On (page 26)

In the 'Power& mode', the ST50 Plus is configured so that you have to enter the four digit number on the master instrument every time the system is switched on. **Until this number is entered the instrument(s)willnotoperate.**

This mode is particularly useful when you are unable to position a 'master' instrument below decks and, therefore, all the vessels valuable instrumentation is left in a vulnerable area.

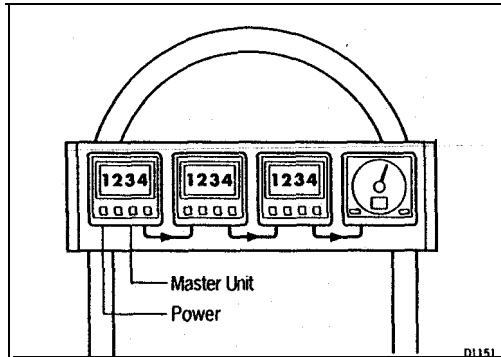Should a CODE Locked instrument be removed from the system, it will not operate until the correct four digit security number is entered or received.

If your selected master instrument fails for any reason, the security code number can be entered via another ST50 Plus instrument in the system. However, until another instrument is set as a master or the existing master is replaced, the security code will have to be entered every time the system is switched on.

Note:

A warning sticker is provided with each instrument. If you have set 'Code Lock', position this warning sticker in a prominent location to deter potential thieves.

Setting Up the Security Code

When the ST50 Plus Depth is switched-on for the first time the security feature is set to off. To turn the 'CODE Lock' feature on, proceed as follows:

Once Only Entry

	Action	Display Shows
1	Press and DEPTH and ALARM together for 4 seconds	CAL after 2 seconds and VER X.X after 4 seconds
2	Press DEPTH twice	CODELOCK Cal. Off
3	4 seconds after CODELOCK Cal. Off	ENTER CODE
4	Press ALARM	⌐⌐ — — —
5	Press OFFSET or RESET to select first number	1 — — —
6	Press ALARM to accept number	1'_'_
7	Press OFFSET or RESET to select second number	1 2 — —
8	Press ALARM to accept number	1 2'_'_
9	Press OFFSET or RESET to select third number	1 2 3 _
10	Press ALARM to accept third number	12 3'_'
11	Press OFFSET or RESET to select fourth number	1 2 3 4
12	Press ALARM to accept code	' 1 2 3 4
13	Press ALARM	FWR ON?
14	Leave PWR ON? flashing for 10 seconds	CODELOCK Cal. set
15	To save code, press DEPTH and ALARM together for 2 seconds	Normal operation, eg. depth display

If you do not exit 'CODELOCK Cal. set' within 10 seconds, the display will change to CANCEL CODE. You now have the option of cancelling the code, by pressing **ALARM** to return to the ▬ ▬ — display, or exit as described in action 15 above.

Your Code Number

For future reference, enter your chosen code number in the following box.

For obvious reasons, please store this handbook in a safe place.

Operation

Once only 'CODE Lock' entry is invisible once it has been set.

On Power-Up

	Action	Display Shows
1	Press and DEPTH and ALARM together for 4 seconds	CAL after 2 seconds and VER X.X after 4 seconds
2	Press DEPTH twice	CODELOCK Cal. Off
3	4 seconds after CODELOCK Cal. Off	ENTER CODE
4	Press ALARM	'_'- - -
5	Press OFFSET or RESET to select first number	1 _ _ _
6	Press ALARM to accept number	1'_ _ _
7	Press OFFSET or RESET to select second number	1 2 _ _
a	Press ALARM to accept number	1 2'_'_
9	Press OFFSET or RESET to select third number	1 2 3 _
10	Press ALARM to accept third number	1 2 3'_'
11	Press OFFSET or RESET to select fourth number	1 2 3 4
12	Press ALARM to accept code	' 1 2 3 4
13	Press ALARM	PWR ON?
14	Press ALARM within 10 seconds	CODELOCK Cal. set
15	To save code, press DEPTH and ALARM together for 2 seconds	Normal operation, eg. depth display

T112-1

If you do not exit 'CODELOCK Cal. set' within 10 seconds, the display will change to CANCEL CODE. You now have the option of cancelling the code, by pressing **ALARM** to return to the __ _ _ display, or exit as described in action 15 above.

Your Code Number

For future reference, enter your chosen code number in the following box.

For obvious reasons, please store this handbook in a safe place.

Operation

When the unit is powered on you are prompted to enter the code number. To enter the number, carry out actions 4 to 12 and press **ALARM.**

Chapter 6: Calibration

As it leaves the factory the ST50 Plus Depth is set to display depth units in feet. These settings, together and other navigational features, can be changed (e.g., Feet to Metres) as described in this section.

6.1 Initial Calibration

D11561
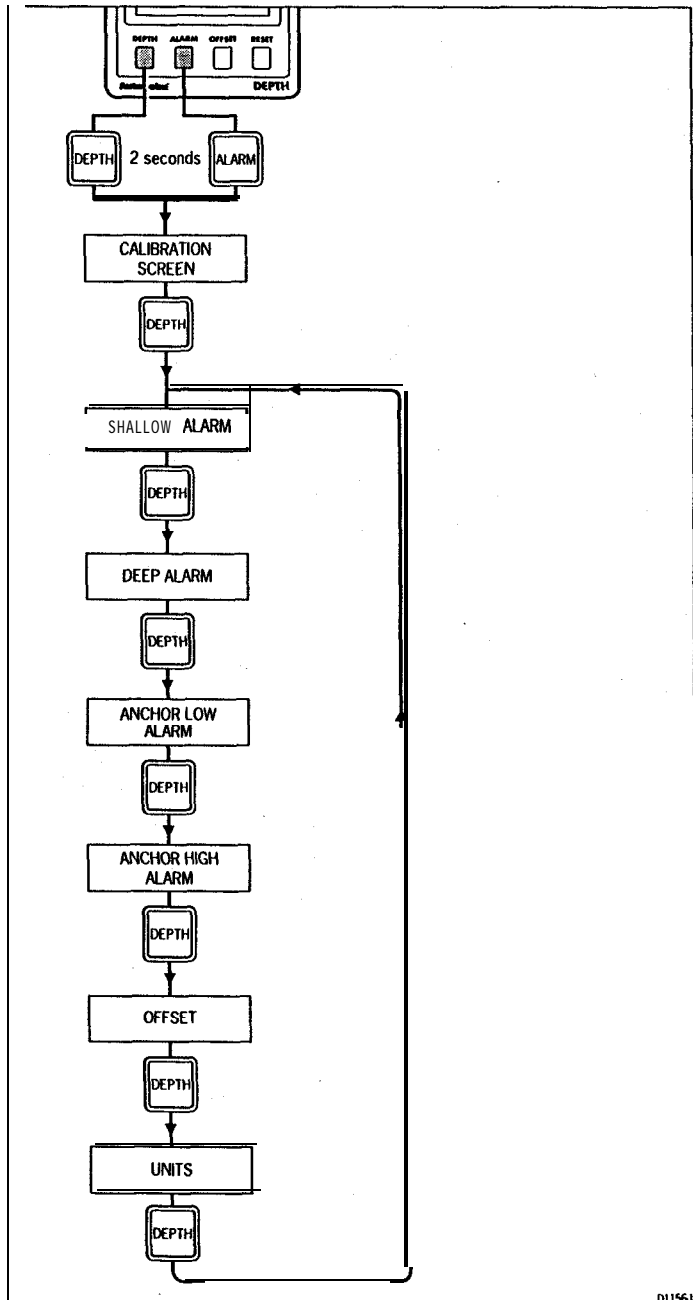
Initial Calibration Notes

Alarms

The shallow, deep, low anchor, high anchor and offset displays can be adjusted using the **OFFSET** and **RESET** keys.
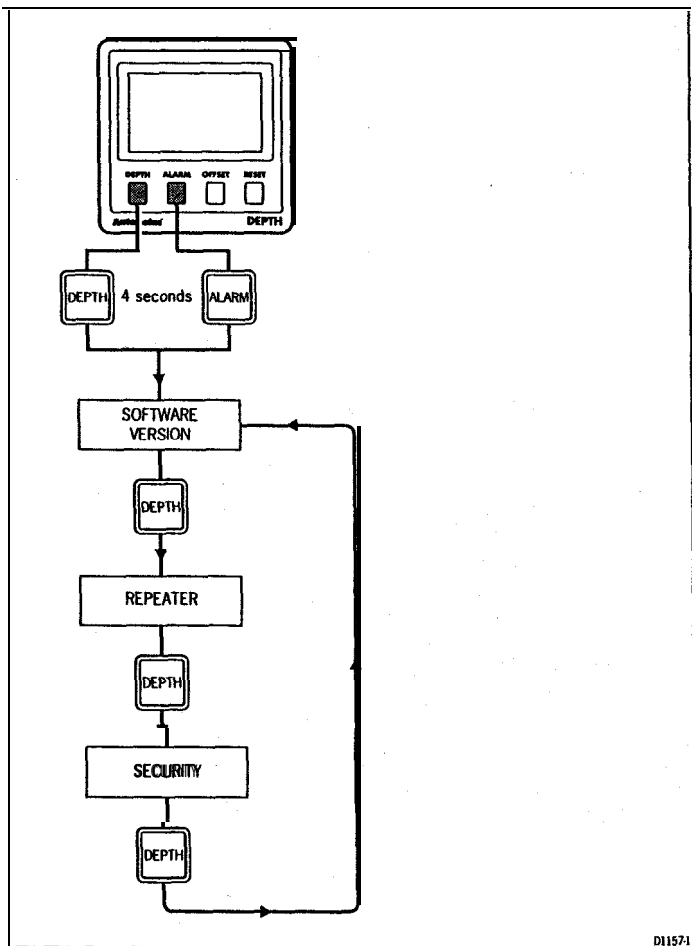
The **ALARM** key is used to enable/disable the alarms.

Units

Alternating between feet and metres is achieved by pressing **RESET.**

Exii Initial Calibration

To exit initial calibration and store the new settings, press DEPTH and **ALARM** together for 2 seconds.

6.2 Intermediate Calibration

D1157-1

Intermediate Calibration Notes

Repeater Mode

Repeater mode allows the ST50 Plus Depth to repeat speed related data already on the SeaTalk bus. There are two settings:

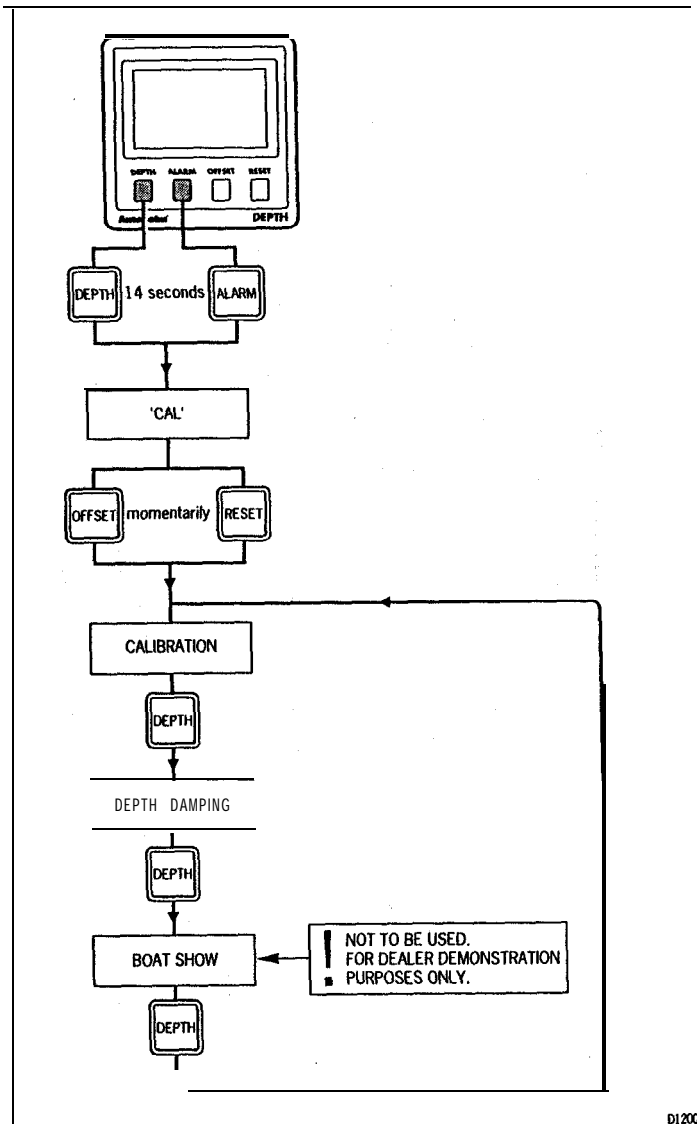0=disabled and 1 =enabled.

Note:
Initial calibration cannot be accessed when the unit is configured as a repeater.

Exit Intermediate Calibration

To exii intermediate calibration and store the new settings, press DEPTH and ALARM for 2 seconds.

Extended Calibration Notes

All of the extended calibration screens are adjusted using the OFFSET and/or RESET keys.

Calibration

Calibration allows you to protect your selected settings. When calibration is enabled the initial and intermediate calibration settings cannot be modified.

CAL 0 = Calibration locked, i.e. no access

CAL 1 = Calibration unlocked, i.e. normal access

Once locked, calibration can be unlocked by entering extended calibration and selecting 1, calibration unlocked.

Depth Damping

Depth damping adjusts the rate at which the display is updated. The default setting is 4 seconds, however, the selectable range is 1 to 15.

Boat Show

The 'Boat Show' mode is a dealer demonstration program only. Under no circumstances must this program be engaged when this unit is installed onboard your vessel.

Exii Extended Calibration

To store the extended calibration settings, press DEPTH and ALARM for 2 seconds.

Chapter 7: General Specification

Dimensions:	110x110mm (4.33x4.33in)
Power supply:	10 to 16V
Power consumption:	50ma (normal) 100ma (illumination on)
Temperature range:	0 to 70 deg.C
Depth:	0 to 600 feet (0 to 180 metres)
Shallow alarm:	3 to 33 feet (1 to 10 metres)
Deep alarm:	10 to 400 feet (3 to 120 metres)
Offset:	-9.9 to 9.9 feet (-4 to 4 metres)
Anchor alarm:	0 to 600 feet (0 to 180 metres)
Minimum depth function:	Reset on power-up
Units:	Software programmable feet/fathoms or metres
Damping:	1 to 15 seconds
Repeater capability:	Software programmable
Illumination:	3 levels plus off