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TOP EDGE BLEED

MASK FOR
2 COLOUR
SEATALK
LOGO

Autohelm®

ST 30

BIDATA
Operation and
Installation

Autohelm®

A **Raytheon** Company

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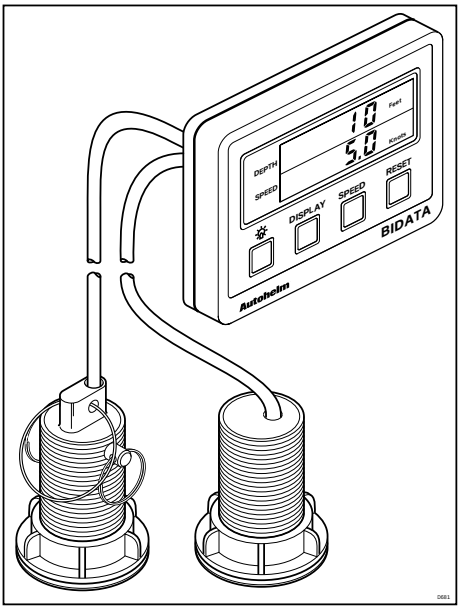
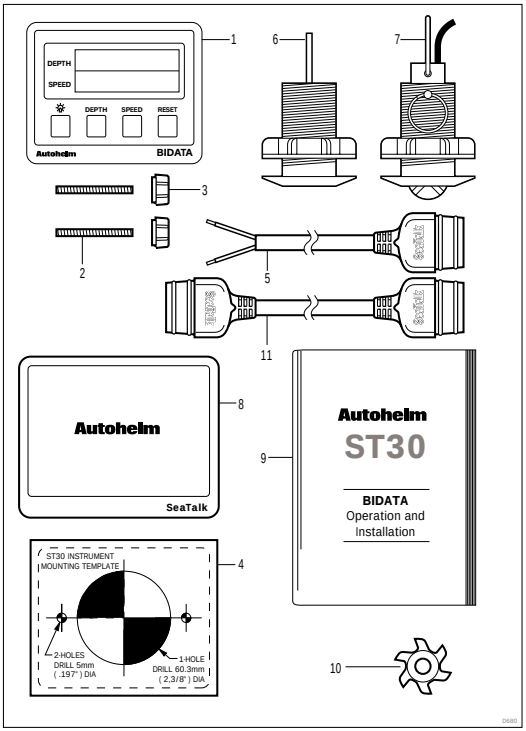


Package Contents

The following items are included in the ST30 Bidata package:

1. ST30 Bidata instrument
2. Fixing studs (2 off)
3. Thumb nuts (2 off)
4. Mounting template
5. 1m power cable
6. Depth transducer (through hull) with 10m cable and 1/8in spade connectors
7. Speed transducer (through hull) with 10m cable and 1/8in spade connectors (0 to 32 knots)
8. Instrument cover
9. Operation and installation handbook
10. High speed paddle wheel (2 to 45 knots)
11. Daisy-chain cable



Contents

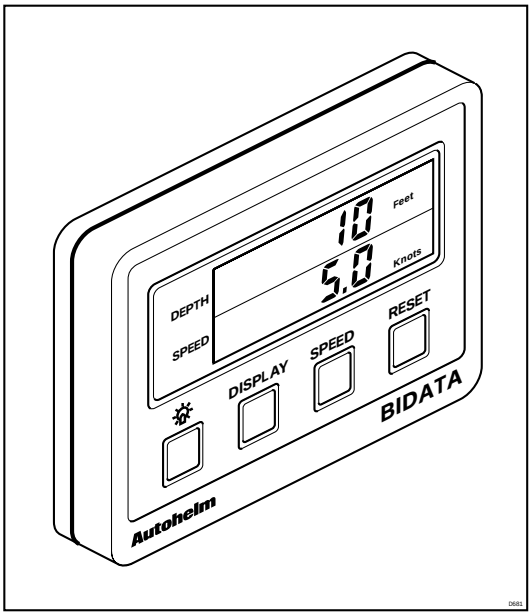
Contents (cont.)

Introduction

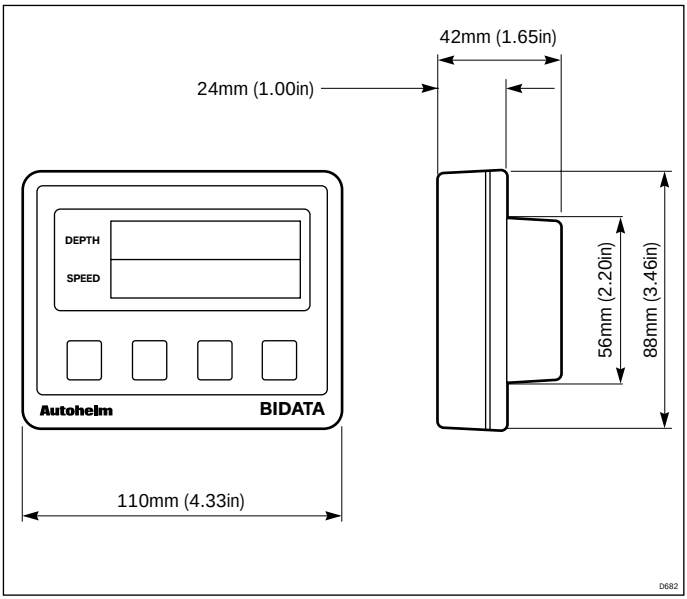
Designed for above or below deck installation, the ST30 Bidata can be used as a stand-alone master instrument or set to repeat depth and speed information from the SeaTalk bus.

The ST30 Bidata will display the following information:

- Water depth
- Shallow water alarm
- Deep water alarm
- Keel/Waterline offset
- Minimum depth
- Boat speed
- Log
- Trip
- Maximum speed
- Average boat speed
- Illumination level



Chapter 1: Control Head Installation



1.1 Siting

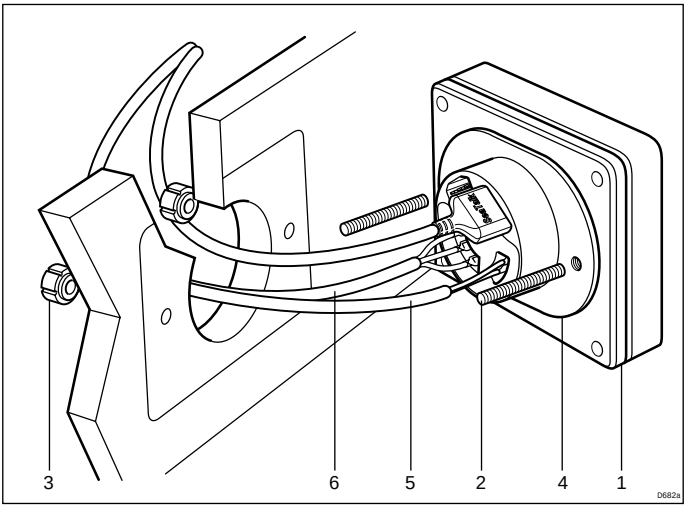
The ST30 Bidata instrument may be installed above or below deck where it is:

- easily read by the helmsman (normally viewed at eye level)
- protected from 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

Notes: To prevent the build-up of moisture, the instrument breathes through the back cover. The instrument must, therefore, be mounted where the back cover is protected from direct water.

The rear case is fitted with a foam gasket to form a water-tight seal between the instrument and the installation face.

1.2 Mounting procedure



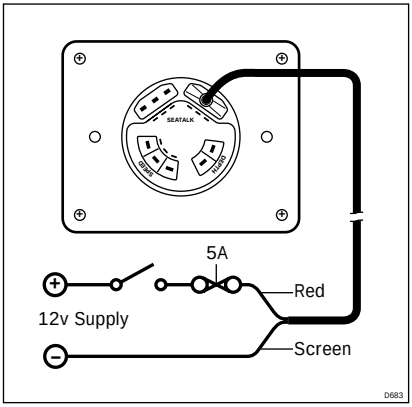
1 Instrument **2** Fixing studs **3** Thumb nuts **4** Sealing gasket
5 Depth transducer cable **6** Speed transducer cable

1. Make sure the surface to which the instrument (1) is to be mounted is smooth and flat.
2. Use the fitting template (supplied) to mark the centres for the two fixing holes and the instrument connector boss.

   Note: To allow for the fitting of protective covers, adjacent instruments must have a 6mm (1/4in) gap between them (116mm centre to centre min.).
3. Drill two 5mm (0.2in) diameter holes for the fixing studs (2).
4. Using a 60mm (2 3/8in) diameter cutter, drill a location hole for the instrument connector boss.
5. Connect the power supply and transducer cables to the back of the instrument (1) (see relevant installation sections).
6. Screw the two fixing studs (2) into the back cover.
7. Install the instrument (1) and secure with the thumb nuts (3) provided.

1.3 Power supply (Stand-alone operation)

Caution: The ST30 Bidata must be connected to a 12V supply only.

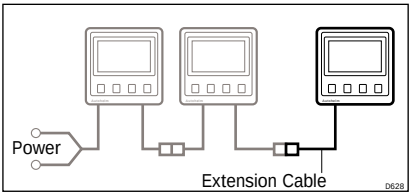


For stand-alone operation, use the standard 1m cable supplied.

1. Connect the moulded power plug to either 'SeaTalk' connection on the rear of the instrument. Run the free end back to the vessel's distribution panel.
2. Cut the cable to length and connect the red wire to 12V and the screen to 0V. Protect the circuit with a 5A fuse/circuit breaker.

1.4 Power supply (SeaTalk system)

The ST30 Bidata can be connected to an existing SeaTalk system using a Standard SeaTalk Extension or Interface Cable.



1.5 Connection to adjacent ST30 Instruments

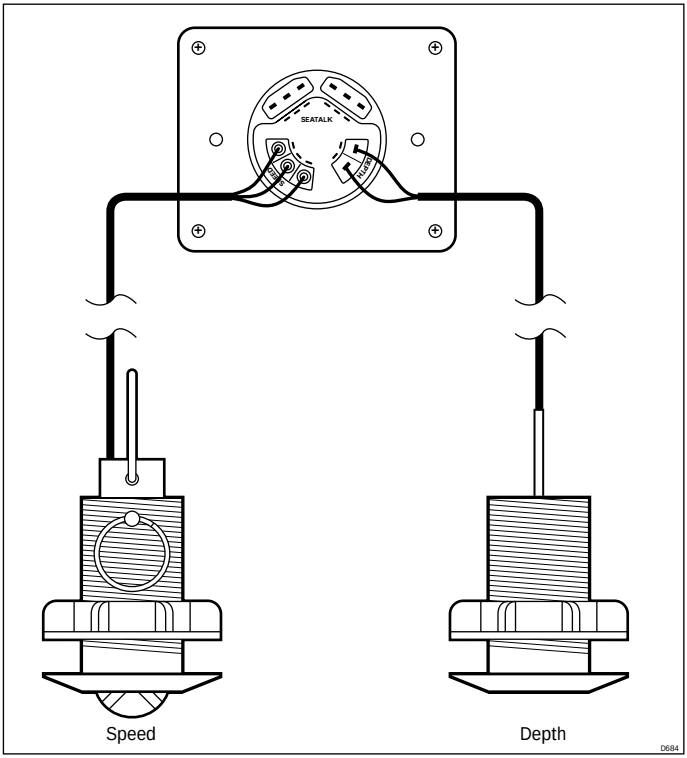
The ST30 Bidata is supplied with a daisy-chain cable that allows adjacent ST30 instruments to be linked together. The daisy-chain cable supplies power to adjacent instruments and allows data to be transmitted and received via the SeaTalk bus.

The daisy-chain cable plugs into one of the SeaTalk ports on the back cover.

Chapter 2: Transducer Installation

2.1 Connection to instrument

The depth and speed transducers are supplied with 10m (32.5ft) of cable. These cables are fitted with female spade connectors that plug directly into the back of the ST30 Bidata instrument.



2.2 Transducer type

The ST30 Bidata system is supplied (as standard) with plastic through hull transducers. These are suitable for use with Glass Reinforced Plastic (GRP), Steel and Aluminium hulls.

Alternative transducers are available for wooden hull and transom mount installations.

Depth

Hull material or location	Transducer
GRP, Steel, Aluminium	Standard through hull
Wood	Bronze (Z118)
GRP, Steel, Aluminium	Retractable depth (Z120)
In hull	In hull puck (Z117)

Speed

Hull material or location	Boat speed	Transducer
GRP, Steel, Aluminium	Up to 32kts	Standard through hull
GRP, Steel, Aluminium	Up to 45kts	Standard and high speed paddle
Wood	Up to 45kts	Bronze (Z116)
Transom	Up to 60kts	Transom mount with bracket (Z119)

Speed and depth

Hull material or location	Transducer
Transom	Biducer (Z183)

Caution: Plastic through hull transducers must not be used on vessels with wooden hulls.

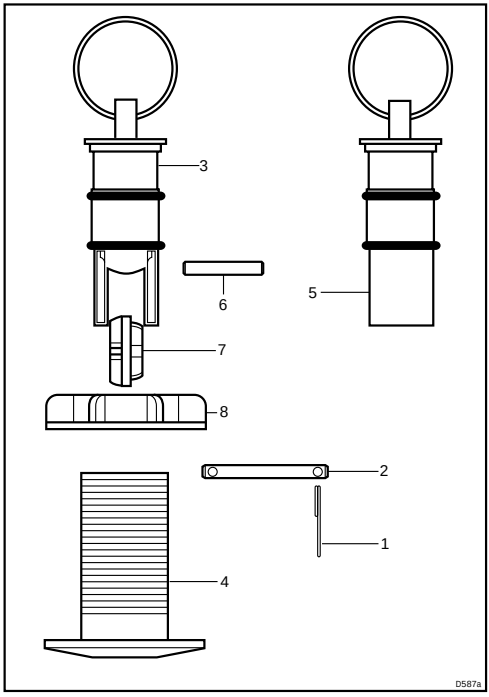
Note: The ST30 Speed transducers are fitted with standard paddlewheels designed for speeds up to 32 knots. For vessels that will exceed this speed, please refer to section 2.3 which contains instructions on how to fit the high speed paddlewheel (supplied).

2.3 Paddlewheel replacement

If the high speed paddlewheel (supplied) is to be fitted, or the existing paddlewheel to be replaced, proceed as follows:

1. Remove the retaining rings (1) and pin (6) from the speed transducer (3).
2. Withdraw the speed transducer (3) from the through hull fitting (4).
3. If replacing a worn paddlewheel and if the vessel is still in the water, replace the speed transducer (3) with the plug (5).
4. Remove the pin (6) that retains the paddlewheel (7) in the speed transducer (3). This is a simple press fit into the transducer housing.
5. Fit the high speed/replacement paddlewheel (7) to the speed transducer (3) and retain with the pin (6).

   Note: The paddlewheel is correctly orientated when the working (flat) surfaces of each paddle are facing forwards.
6. Assemble the speed transducer (3) to the through hull fitting (4) and secure with the retaining rings (1) and pin (2).

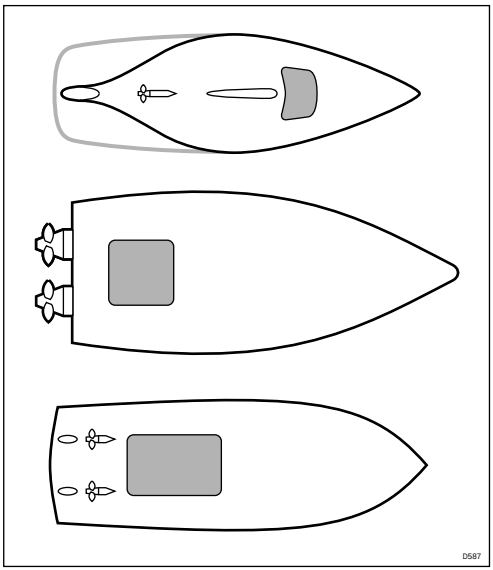


2.4 Installation

The depth and speed transducers are supplied with detailed installation and maintenance instructions. These instructions, together with following notes, should be read thoroughly before attempting to install the transducers.

Speed transducer (through hull)

For accurate speed readings, locate the speed transducer in the shaded ''clear flow' areas as shown.



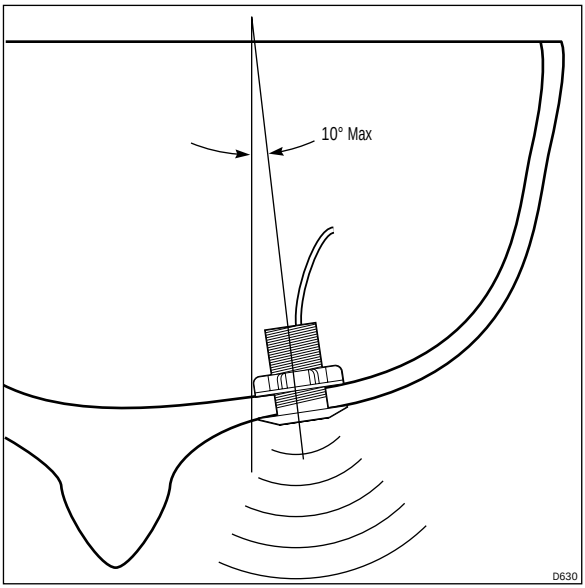
The transducer should also be:

- ahead of propellers (10% W.L. length minimum)
- at least 150mm (6in) from the keel (with sailing yachts siting should be forward of the keel)
- near the centreline of the vessel
- clear of other through hull fittings or projections
- have sufficient clearance inside the hull to allow the nut to be fitted
- have 100mm (4in) clearance above the through hull fitting for withdrawal

Note: The speed transducer can, if required, be shortened. However, new 1/8in spade connectors must be crimped to the shortened cable.

Siting of depth transducer (Standard through hull)

The depth transducer must be vertical to within 10°, forward, aft and athwart ships.



2.5 Cabling

Run the transducer cable back to the instrument. Avoid fluorescent lights, engines, radio transmitting equipment and, in the case of the depth transducer, avoid the speed transducer cable. The cables should also be kept clear of the bilgeÕs and be secured at regular intervals.

Note: **The depth transducer cable must not be shortened. Shortening of the cable will affect the performance of the transducer. For further information, please contact Autohelm or an authorised Autohelm agent.**

If any of the following transducers are to be used;

- Bronze through hull depth (Z118)
- In hull puck (Z117)
- Retractable depth (Z120)
- Bronze through hull speed (Z116)
- Transom mount speed (Z119)
- Bronze through hull triducer (Z093)
- Transom mount Biducer (Z183)

the following modification must be carried out to the transducer leads.

1. Using a pair of wire cutters, remove the moulded plug from the end of cable.
2. Strip the outer cable back 38mm (1.5in)
3. Using a pair of cable strippers, remove 10mm (3/8in) of insulation from each wire.
4. Using a suitable crimping tool, attach a 1/8in spade connector (supplied) to each of the wires.
5. Connect the wires to the instrument in accordance with the following table.

Transducer type	**Colour coding (cable to unit)**
Bronze through hull (Z118)	Blue Đ red terminal Black & screen Đ white terminal
In-hull puck (Z117)	Blue Đ red terminal Black & screen Đ white terminal
Retractable depth (Z120)	Blue Đ red terminal Black & screen Đ white terminal
Bronze through hull speed (Z116)	Brown & white Đ cut back Green Đ green terminal Screen Đ white terminal Red Đ red terminal
Transom mount speed (Z119)	As above

Transducer type	**Colour coding (cable to unit)**
Bronze through hull triducer (Z093)	Brown & white Ð cut back Red Ð red speed terminal Screen Ð white speed terminal Green Ð green speed termina Blue Ð red depth terminal Black & screen Ð white dept terminal
Biducer (Z183)	Red Ð red speed terminal Screen Ð white speed terminal Green Ð green speed termina Blue Ð red depth terminal Black & screen Ð white dept terminal

Chapter 3: Fault Finding

All Autohelm products are, prior to packing and shipping, subject to comprehensive test and quality assurance programmes. However, in the unlikely event that a fault does occur with the ST30 Bidata, the following table will help to identify the probable cause and provide the most likely cure.

Fault	Cause	Action
Instrument display blank	No supply to instrument	Check supply Check cabling and security of connectors Check circuit breaker Return ST30 Bidata for repair
No speed information	Transducer cable problem	Check transducer connections
	Transducer fouled	Clean paddlewheel
No depth information	Aereated water, boat wakes or propeller wash	Depth reading will return to normal once clear of disturbed water
	Transducer cable problem	Check transducer connections
Speed/log information inaccurate	Unit not calibrated correctly	Calibrate unit as described in the Log Calibration section
Feet/metres display flashes continuously	Transducer cable or connector fault	Check cabling and security of transducer connector
No exchange of information between SeaTalk instruments	SeaTalk cabling or connector problem	Check security of SeaTalk connectors Remove instruments one by one to isolate faulty unit

Fault	Cause	Action
Failure of a group of instruments in a chain	Cabling or connector problem	Check the security of the connectors between functioning and non-functioning instruments
Unable to enter calibration	Calibration locked	Refer to Calibration lock/unlock section

Note: After installation, poor performance may be experienced if the surface of the depth transducer has not been 'wetted'. Wetting can take up to 24 hours under normal conditions. The transducer can be wetted prior to launch by applying a mild detergent to the external face.

Chapter 4: Maintenance

4.1 Instrument

Atmospheric conditions may cause condensation to appear on the instrument window. This will not harm the instrument and can be cleared by increasing the illumination setting to level 3.

Chemical and abrasive materials must not be used to clean the ST30 Bidata instrument; if the instrument is dirty, clean with a soft, damp cloth.

4.2 Transducers

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

4.3 Cabling

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

4.4 Advice

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

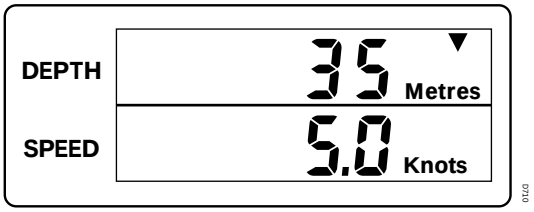
Chapter 5: Operation

The ST30 Bidata is set in the factory to:

- display depth in feet
- display speed in knots
- operate with the depth alarms switched off
- operate in Master mode

These settings can be changed in calibration (section 6.1).

When the ST30 Bidata is switched on, depth information (upper display) and speed information (lower display) is shown in the units set up in calibration.

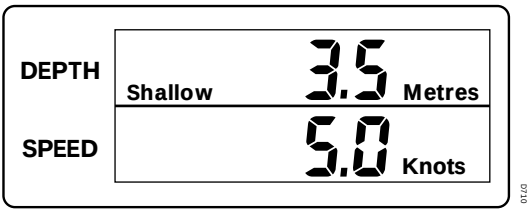


Note: The trend arrows (▲) decreasing (▼) increasing, shown in the above display, indicate whether the trend is towards deep or shallow water.

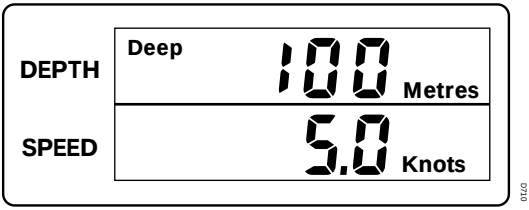
5.1 Depth Key

Each press of **Depth** cycles the following menu:

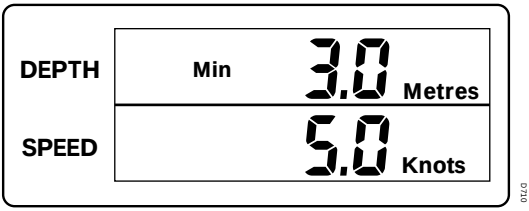
- **Shallow** alarm



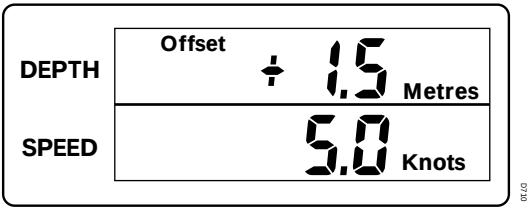
• **Deep** alarm



• **Minimum** depth



• **Offset** Keel/Waterline

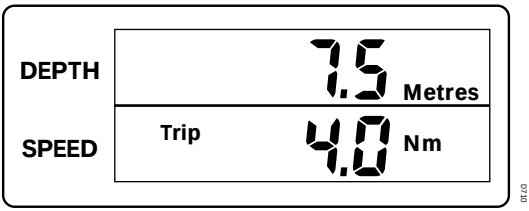


A further press of **Depth** will return the unit to current Depth. **The above menu will automatically return to current Depth after 8 seconds if there are no further key commands.**

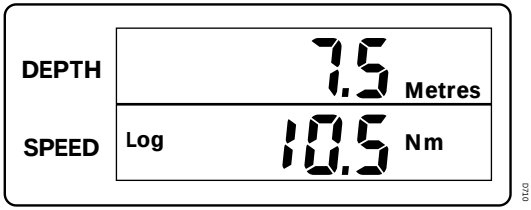
5.2 Speed Key

Each press of **Speed** cycles the following menu:

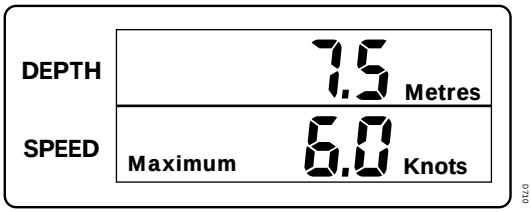
• **Trip** Distance



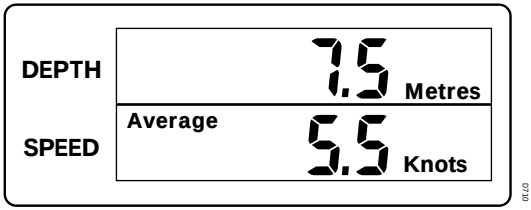
- **Log**



- **Maximum** Speed



- **Average** Speed

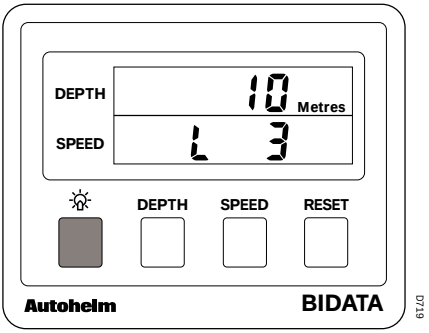


A further press of **Speed** will return the unit to current boat speed.

Note: Log distances over 999nm or miles are displayed in thousands, hundreds and tens (e.g., 1th 510nm).

5.3 Light Key

☼ Cycles the level of instrument illumination. There are 3 levels with level 3 the brightest.



The display returns to current speed after 8 seconds or when speed key is pressed.

Note: When the ST30 Bidata is used in a SeaTalk system, illumination may be adjusted from any instrument.

5.4 Alarms

The ST30 Bidata is equipped with visual and audible shallow water and deep water alarms.

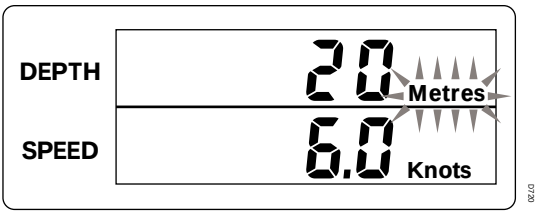
Both of these alarms are set in calibration (see section 6.1).

Any button press will silence the 'Shallow' alarm. However, the 'Shallow' indicator will continue to flash until the depth exceeds the alarm value.

The 'Deep' alarm sounds when the 'Deep' setting is crossed either when going from shallow to deep or deep to shallow waters. Any button press will silence the alarm.

Loss of signal

The 'feet or metres' legend flashes whenever the depth signal is lost.

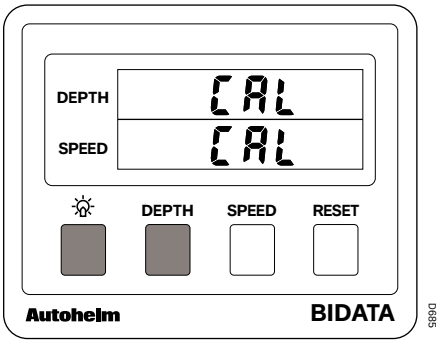


Chapter 6: Calibration

6.1 Depth calibration

The ST30 Bidata can be programmed to display depth information in feet or metres, set alarms for shallow and deep water and allow for keel or waterline offsets.

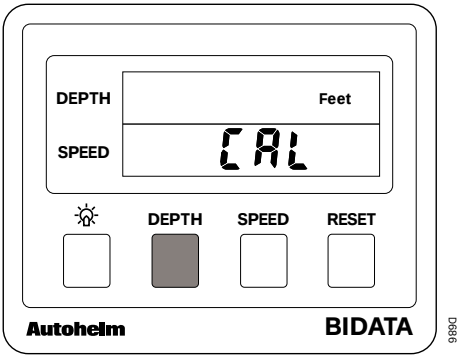
To select the calibration menu, press and hold ☼ and **Depth**. After 2 seconds the display will show CAL.



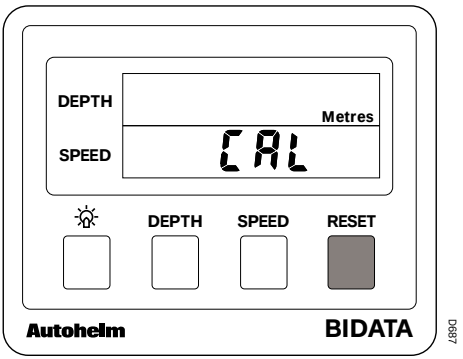
Each press of **Depth** will cycle the unit through the depth calibration menu.

Units selection – depth

1. Cycle **Depth** until the display shows feet or metres.

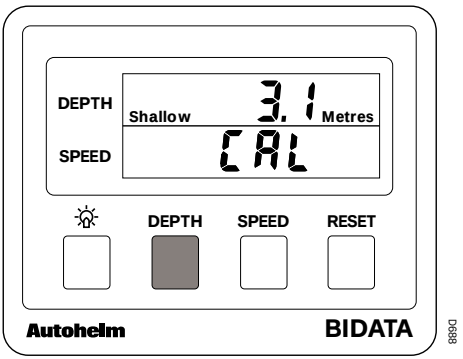


2. Select feet or metres, as required, using **Reset**.

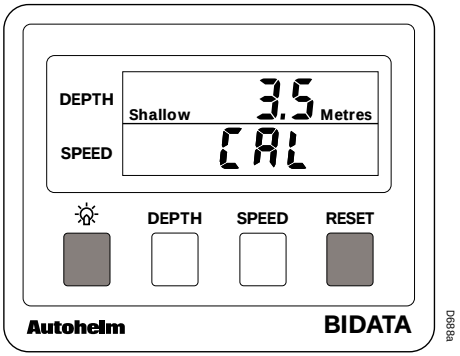


Shallow alarm

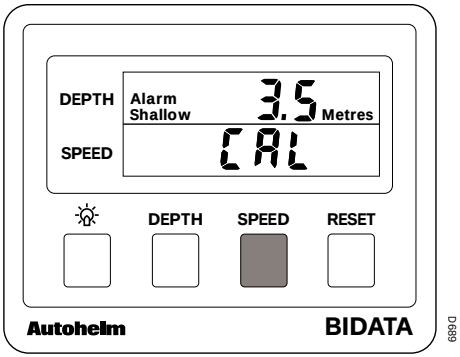
1. Cycle **Depth** until the 'Shallow' alarm is displayed.



2. Press **Reset** or ☼ to set the required depth.

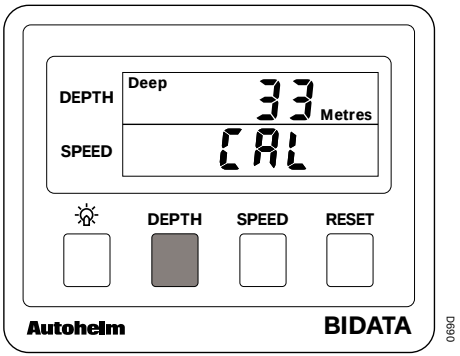


3. The Shallow Alarm is enabled by pressing **Speed**. When the alarm is on the 'Alarm' legend is displayed.

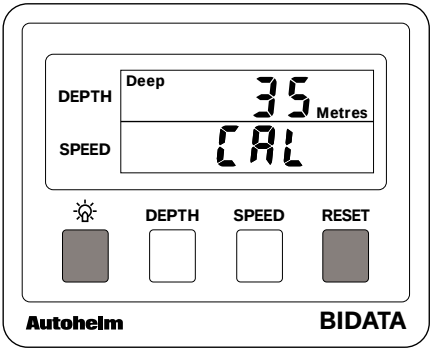


Deep alarm

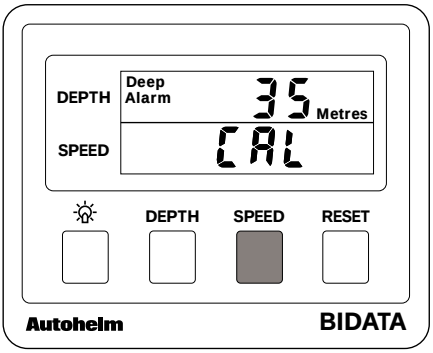
1. Cycle **Depth** until 'Deep' alarm is displayed.



2. Press **Reset** or ☼ to set the required depth.

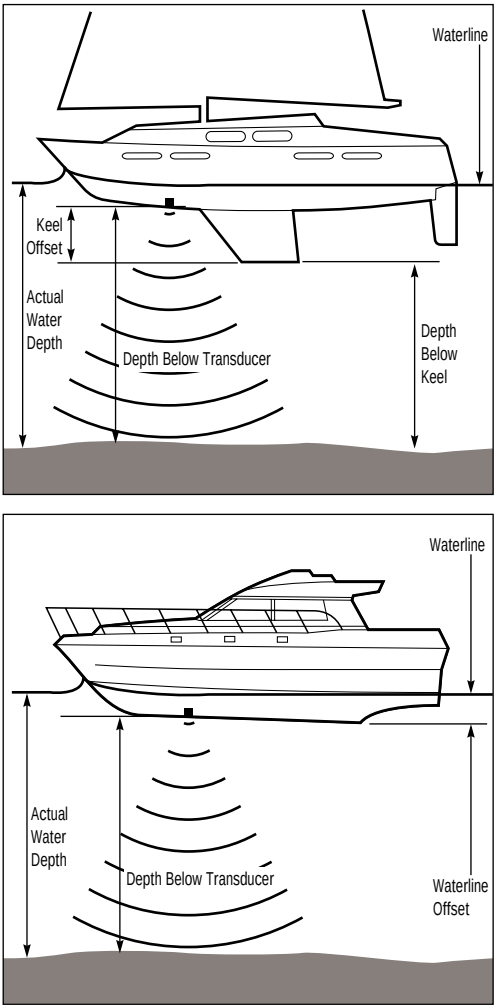


3. The 'Deep' alarm is enabled by pressing **Speed**. When the alarm is on the 'Alarm' legend is displayed.

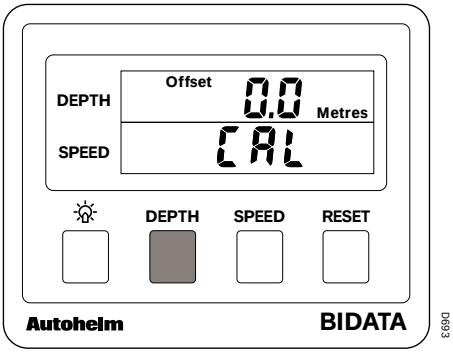


Offset

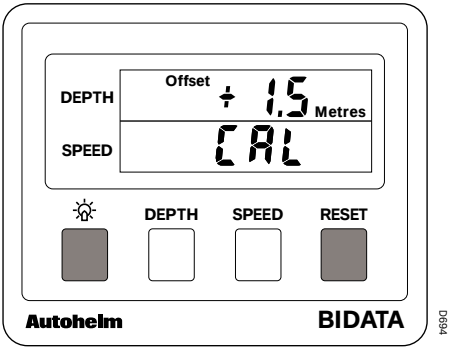
The instrument measures the water depth below the transducer. To display water depth below the keel or to the surface an offset must be set up. A negative offset is used to reduce the displayed value to give water depth below the keel. A positive offset will give water depth to the surface.



1. Press **Depth** until 'Offset' is selected.



2. Press **Reset** or ☼ until the required offset is displayed.



Exit depth calibration

To exit depth calibration and return to depth mode, press and hold ☼ and **Depth** for 2 seconds.

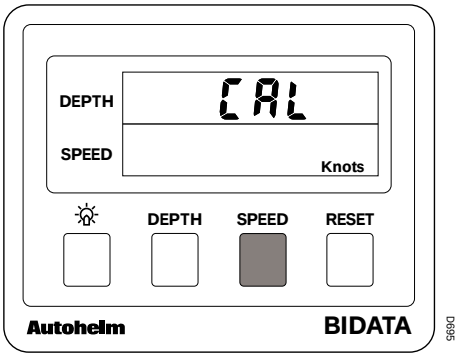
6.2 Speed calibration

The ST30 Bidata can be set to display speed in knots or mph and trip and total distance in nm or miles. The most important speed calibration feature is Log Calibration; this calibrates the transducer paddlewheel to the vessel's hull so that accurate speed/log related information is displayed.

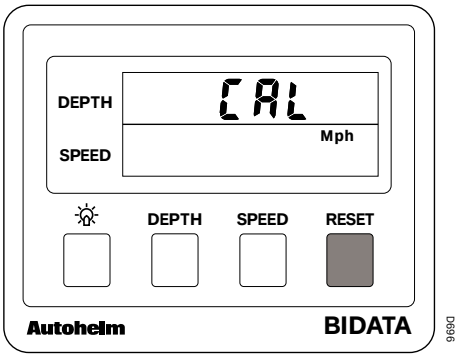
Press and hold ☼ and **Depth** for 2 seconds until **CAL** is displayed.

Units selection – speed

1. Cycle **Speed** until knots or mph is displayed.

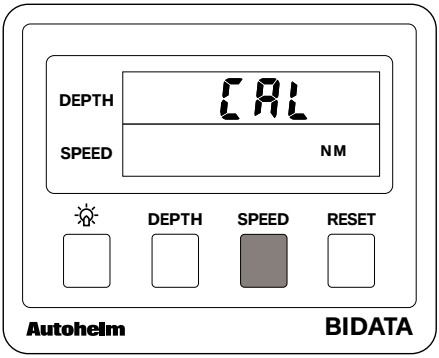


2. Press **Reset** to change between knots and mph.

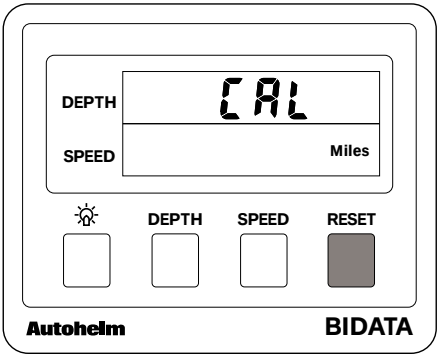


Units selection – log

1. Cycle **Speed** until the display shows nm or miles.

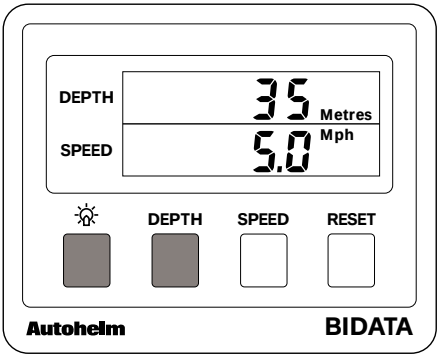


2. Press **Reset** to select nm or miles.



Exit calibration

Press and hold ☼ and **Depth** for 2 seconds.

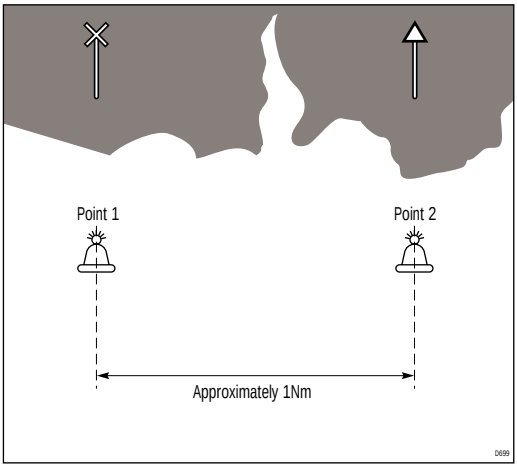


Log calibration

The ST30 Bidata should not be used for navigational purposes until the transducer paddlewheel has been calibrated to suit the characteristics of the vessel.

This is a simple operation and is carried out as follows:

1. Choose two charted points that are approximately 1nm apart.

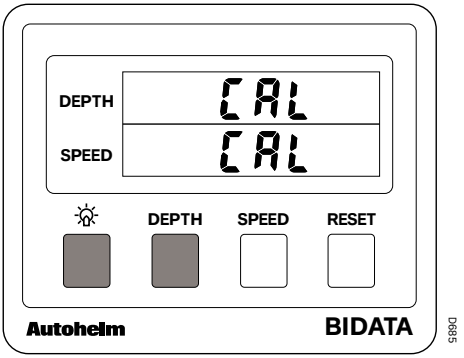


2. Choosing a time when the tidal flow is at a minimum, go from point 1 to point 2 and record the ST30 Bidata trip distance.
3. Go from point 2 to point 1 and record the trip distance.
4. Add the two distances together and divide by two to obtain an average distance.
5. Measure the distance between the two points on a chart.
6. The correction factor (CF) can now be calculated.

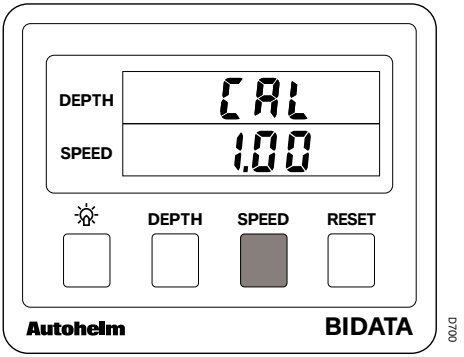
$$CF = \frac{\textbf{Charted Distance}}{\textbf{Average Distance}}$$

Enter correction factor (CF)

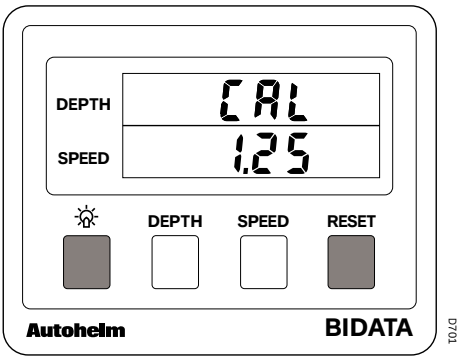
1. Press and hold ☼ and **Depth**. After 2 seconds the display will show **CAL**.



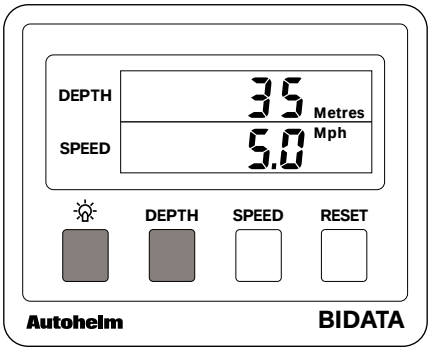
2. Press **Speed** 3 times to select 'Log Calibration'.



3. Set the calculated correction factor (CF) using **Reset** or ☼ **.**



4. To exit calibration and return to 'Speed and Depth' mode, press and hold ☼ and **Depth** for 2 seconds.

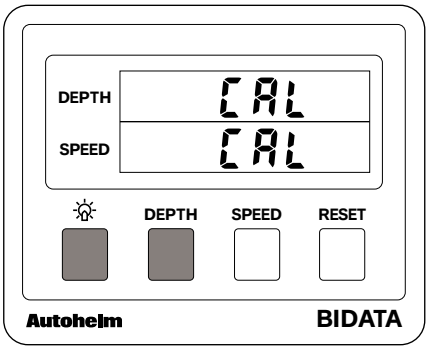


6.3 Calibration Lock/Unlock

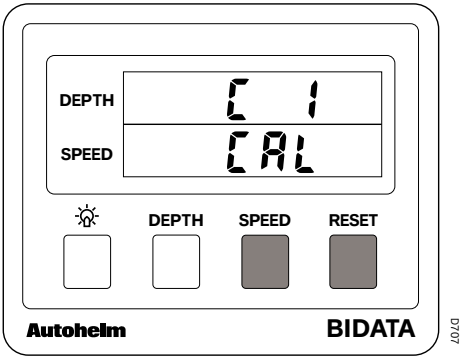
The lock/unlock feature removes the risk of accidentally changing the calibration values set for log calibration, shallow alarm etc.

For security, the calibration lock/unlock feature is accessed by an extended hold down of ☼ and **Depth** as follows;

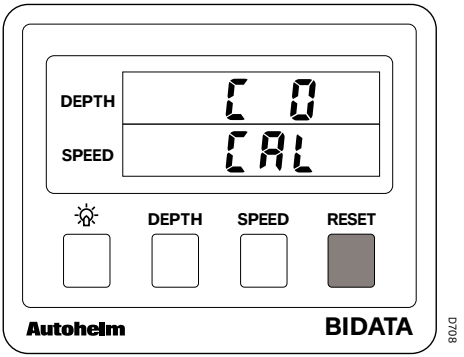
1. Press ☼ and **Depth** for 14 seconds until CAL is displayed for the second time.



2. Press **Speed** and **Reset** momentarily



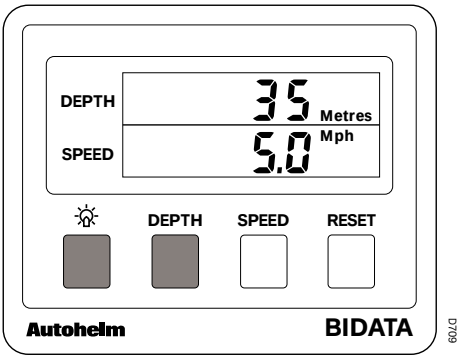
3. Calibration Lock/Unlock is switched on or off using **Reset.**



C0 = Calibration Locked, i.e. no access

C1 = Calibration Unlocked, i.e. normal access

4. To exit 'Calibration Lock/Unlock', press and hold ☼ and **Depth** for 2 seconds.

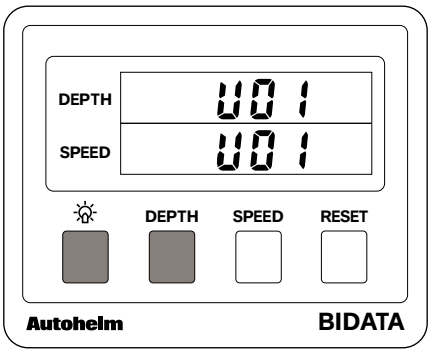


6.4 Master/Repeater mode

As it leaves the factory, the ST30 Bidata is set to operate in master mode. In this mode the instrument is connected to speed and depth transducers, and transmits data onto the SeaTalk Bus. The Bidata can be set as a repeater, to repeat depth and speed information already on the SeaTalk bus.

Repeater mode is set up as follows:

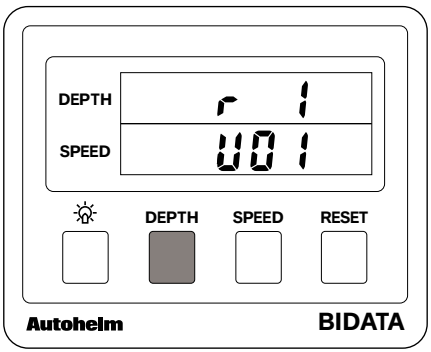
1. Press and hold ☼ and **Depth** for 5 seconds until the display shows U and a two figure number.



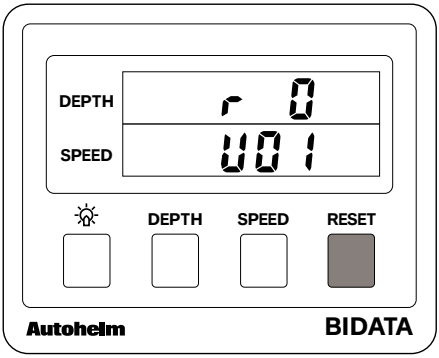
2. Press **Depth** to display operating mode:

   r0 = Master mode

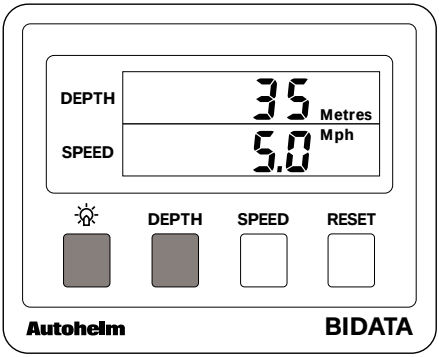
   r1 = Repeater mode



3. Press **Reset** to change between modes



4. To exit calibration, press and hold ☼ and **Depth** for 2 seconds.



Note: **When the Bidata is set to Repeater mode access to calibration is inhibited.**

Chapter 7: Specification

Detailed Specification:

Power Consumption:	60mA (normal) 100mA (illuminated)
Depth transmitted power:	50W
Receiver sensitivity:	0.5mV
Depth operating frequency:	200kHz
Voltage range:	10 to 16V
Operating temperature:	0 to 70°C
Calibration lock/unlock:	Software programmable
Illumination:	3 selectable levels
Repeater capability:	Software programmable

Depth:

Depth:	0 to 120m (0.1 increments) 0 to 400ft (0.1 increments)
Shallow alarm:	1 to 10m (0.1 increments) 3 to 33ft (1ft increments)
Deep alarm:	3 to 120m (1m increments) 10 to 400ft (10ft increments)
Offset:	–4 to +4m (0.1 increments) –9.9 to +9.9ft (0.1 increments)
Minimum depth:	Reset on power-up
Units:	Software programmable selection in metres (m) or feet (ft) – stored in EEPROM

Speed:

Boat speed:	0 to 99.9 knots or mph (0.1 increments)
Trip distance:	0 to 999nm or miles (0.01 increments to 9.99, 0.1 to 99.9 and 1.0 to 999).
Log (non resetable):	0 to 5999nm or miles (0.1 increments to 99.9 and 1.0 to 5999).
Average speed:	0 to 99.9 knots or mph (0.1 increments)
Maximum speed:	0 to 99.9 knots or mph (0.1 increments)
Units:	Software programmable selection of knots or mph (stored in EEPROM) and programmable selection of nm or miles independent of knots or mph.
Manual log calibration:	0.25 to 1.50 (multiplication factor)

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