

USER GUIDE FOR

DATALINE-X™

SPEED

Stowe Marine Ltd.

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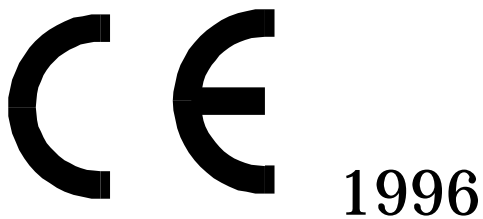
Tel +44(0)1590 610071

Dataline-X Speed Manual, Part Number 05687SM, Issue 2, Dec 1995.

Warning

The equipment to which this manual applies must only be used for the purpose for which it was designed. Improper use or maintenance may cause damage to the equipment and/or injury to personnel. The user must be familiar with the contents of the manual before attempting to operate or work on the equipment.

Simrad Ltd disclaims any responsibility for damage or injury caused by improper installation, use or maintenance of the equipment.



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1.1 The Dataline-X System

The Dataline-X System, as its name implies, uses a single cable to carry both power and data around the vessel to each instrument. This is done using a NMEA 0183 serial digital communication link, which is an established industry standard. Because of this, instruments from other manufacturers may be interfaced to the Dataline-X System - assuming that they have a NMEA output or input.

This User Guide describes the combined **SPEED, LOG** and **TIME** digital display, known as **Dataline-X SPEED**, used within the Dataline-X System.

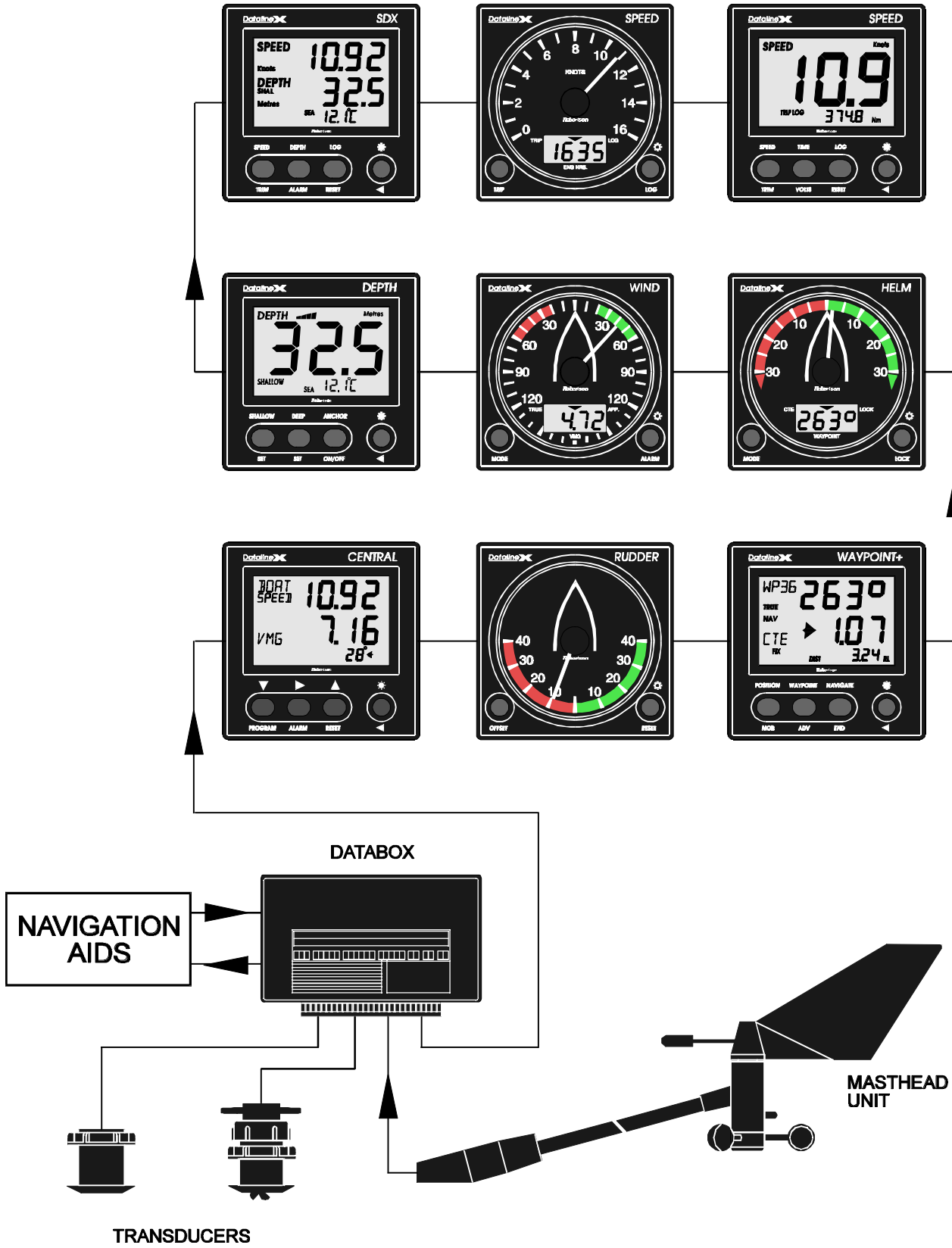


Figure 1.1 - Dataline-X System Diagram

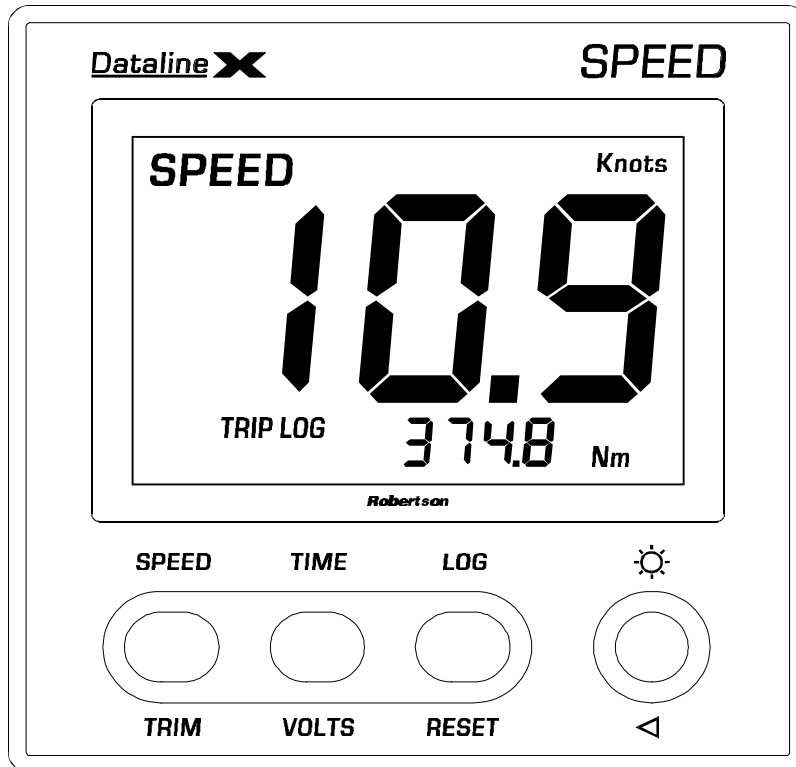


Figure 1.2 - Dataline-X SPEED Instrument

1.2 Dataline-X SDX SpecificationSpeed Functions

Speed Display	0 to 99.9 Knots (see Note 1)
Speed Units	Knots/MPH/KMH
Speed Precision	0.1 or 0.01 units
Display Damping	3 damping levels (default level 2)
Average Speed Display	(over trip distance)
Speed Trim	(changes in speed to 0.1/0.01 Knots)
Speed Over Ground Display	(with suitable radio nav input)

Sea Temperature Functions

Sea Temperature	0 to 40° C, ± 0.1° C
Sea Temperature Units	°C/°F
Sea Temperature Precision	To 1°C/°F or to 0.1°C

Timing Functions

Passage Time	0 to 99.59 hours (resettable) (see Note 3)
Race Timer	10 and 5 minute countdown

Log Functions

Log	To 9999 Nm (permanently saved)
Trip Log	To 9999 Nm (resettable/saved)
Race Log	To 999.9 Nm (over race distance)
Log Units	Nautical miles/kilometres
Log Precision	1, 0.1 or 0.01 units as appropriate (4 digits)

Additional Functions

Engine Hours Counter (2 inputs)	0 to 9999 hrs, ± 0.1 hr
Battery Voltage (2 inputs)	0 to 30V, ± 0.1V (see Note 2)
System Calibration Facility	
Display Backlighting Levels	Seven levels plus Off
Display Backlighting Colours	Three colours, (Red, Green, Yellow)
Display Backlighting Control	Two independent lighting banks
Sat Nav Output	(via Databox)

General

Power Requirement	10 to 16V, 14 mA, (50 mA max with lighting)
Size	110 x 110 x 18 mm (above panel)
Mounting Hole Size	50 mm (2 inches)
Total Depth Below Panel Front	32 mm
Weight	210 grams
Environmental Rating	IP65
Temperature Range	0°C to 70°C

Notes:

1. The maximum speed given relates to the display, the speed transducer installed will determine the actual maximum speed for the system. With a Speed Over Ground data input, the speed will continue to be accurate above the normal maximum high speed paddlewheel speed of approximately 45 knots.
2. The Battery voltage range is dependent on the power supply voltages supplied to the Databox - i.e., the 12 volt Databox will measure over the range 10V to 16V, while the 24 volt Databox will measure over the range 20V to 30V.
3. Upto 1 hour the time is displayed in minutes and seconds.

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2.1 General Description

The LCD display is generally controlled by the three oval buttons. These buttons move up, down, or sideways through the groups of display screens that are available.

2.1.1 The LCD Display

The LCD is divided into two sections, the large section is the 'Speed Display' and is generally controlled by the 'SPEED' button. The smaller lower section is the 'Log Display' and is controlled by the 'TIME' and 'LOG' buttons.

2.1.2 The Buttons

The word above the button (in white) indicates the main function for that button.

The word below the button (in grey) indicates an additional function which can only be selected when that button is used in conjunction with the round * button. Both must be pressed together or the * button may be pressed first.

For some functions, such as setting the display backlighting with the * button, the button must be held for greater than 3 seconds.

When a function has been selected, a BEEP will be heard to confirm correct operation.

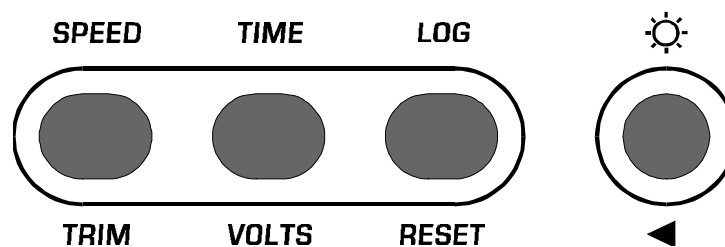


Figure 2.1 - The Buttons

2.2 Powering Up

When powering up the instrument, it will beep and will show all the LCD segments for approximately one second.

The display will then show the current operating values for Speed and Trip Log.



Figure 2.2 - Display on Power Up

2.3 Speed Display

Each successive push of the SPEED button will cause the speed display to indicate the following:

- Speed →
- Average Speed →
- Trim Speed →
- Speed Over Ground →
- Speed and Course Over Ground →
- Speed Over Ground

Select as required.

Notes:

1. The Speed Units may be set to either Knots, Mph or Km/h. The units are permanently displayed. (See Part 4 for details.)
2. Trim Speed will only be indicated if it has been reset.

3. Speed Over Ground (SOG) will only be indicated if a suitable Radio Nav input is present.
4. If a suitable Radio/Nav input is present, then above a set speed, the Speed Over Ground (SOG) display, will replace the normal paddwheel speed display. See Part 4, 'Setting Up', to change the change over speed from the default of 35 knots.
5. The Course Over Ground (COG) is shown on the 'Log' Display. To return this display to normal press any of the SPEED, TIME or LOG buttons as appropriate.
6. If there is no Speed transducer fitted but there is an alternative NMEA speed input to the Databox then this alternative data will be displayed.

2.4 To Set Trim

Press the TRIM and * buttons together. This will set the Trim Base Speed as the Current Speed. The Trim display will then show changes up or down.

To remove TRIM from the display, select TRIM using the SPEED button and then press the TRIM and * buttons together.

To reset the TRIM Base speed, select the TRIM display and then press the * and RESET buttons together.

2.5 To Set Speed Precision

The speed display may be shown to 1 or 2 decimal points of precision.

1. Press the TIME and LOG buttons together. Each successive depression will change the precision of the display.

Note: The selection on Power Up can be set to either precision (see Part 4).

2.6 To Set Speed Display Damping

The Speed Display Damping will determine how quickly the display reacts to changes of speed. Three damping levels may be set, indicated on the display as d1, d2 or d3.

1. Press the SPEED button and hold. The Display will cycle through d1, d2 and d3.
2. Release the button to select the desired damping level.

Note: On powering up, Level d2 is always selected.

2.7 Log Display - Time Button

Depending on the system's set-up (see Part 4), each successive push of the TIME button will cause the lower part of the LCD to indicate the following:

If Set Up for Two Engines (and no Race Time) - This is the default

Passage Time →
Eng Run Time Port →
Eng Run Time Stbd →
Trip Time

If Set Up for One Engine (with Race Time)

Passage Time →
Race Time 10 min →
Race Time 5 min →
Eng Run →
Trip Time

Notes:

1. Setting the 5 or 10 min race timer ON will enable a RACE LOG to be displayed. This automatically gives the distance covered after the race start.
2. The Race Time can be independently selected or omitted in any of the above systems. See Part 4. The default is for it to be omitted.

3. If a suitable GPS data input is available, then the display will also give a TIME display of the time of the day in 24 hour format. This is shown after the 'Trip Time' display. The GPS system runs on Universal Co-Ordinated Time (UTC), which is the same as Greenwich Mean Time (GMT). This can be corrected to Local Time, see Part 4.
4. Note that the Dataline-X system does not need to be powered in order to record the Engine Run Time. As long as the Engine Ignition Input is above 10 volts when the engine is running, this will always be recorded.
5. If there is no Speed transducer fitted, but there is alternative NMEA Log or Sea Temperature inputs to the Databox, then this data will be shown.
6. The Battery voltage range is dependent on the power supply voltages supplied to the Databox - i.e., the 12 volt Databox will measure over the range 10V to 16V, while the 24 volt Databox will measure over the range 20V to 30V.
7. The Timers are all independent on each display and are not system wide.
8. The Timers show minutes and seconds up to one hour, and then show hours and minutes.

2.8 To Reset Passage Time to Zero

1. Press the TIME button to select 'TRIP TIME' on the display.
2. Press the RESET and * buttons together.

2.9 To Start The Race Timer

1. Press the TIME button to select 'RACE TIME 10:00' or 'RACE TIME 5:00' on the display (as required).
2. Start the timer and add the RACE LOG to the display loop by pressing the * button. The timer will count down with audible alarms at times as below:

5 minutes	BEEP	
1 minute	BEEP	BEEP
5 seconds	BEEP	
4 seconds	BEEP	
3 seconds	BEEP	
2 seconds	BE.....EP	→ GO

3. After the Race Timer is started, the RACE LOG display (next function) will start to register the distance covered during the race.

2.10 To Reset the Race Timer and Race Log

1. Press the TIME or LOG button to select 'RACE TIME' or 'RACE LOG' on the display.
2. Press the RESET and * buttons together.

This will stop the timer at the previous start time, and will clear the race log. The race log is also cleared when the power is turned off.

Note: The Race Timer and Race Log will be reset if they are running when an attempt is made to calibrate the speed in Cal mode.

2.11 Log Display - LOG Button

Depending on the system's set-up (see Part 4), each successive push of the LOG button will cause the lower part of the LCD to indicate the following:

If the Race Timer is not running - This is the default

Trip Log →

Log →

Trip Log

If the Race Timer is running

Trip Log →
Race Log →
Log →
Trip Log

Notes:

1. The LOG and TRIP LOG are system wide and are the same on all displays.
2. The RACE LOG is independent on each display.

2.12 To Reset Trip Log to Zero

1. Press the LOG button to select 'TRIP LOG' on the display.
2. Press the RESET and * buttons together.

Note: This log is not reset when the power is turned off.

2.13 Log Display - Volts Button

Depending on the system's set-up (see Part 4), each successive push of the VOLTS and * buttons will cause the lower part of the LCD to indicate the following:

If Set Up for Two Engines - This is the default

Eng Batt Volts Port →
Eng Batt Volts Stbd →
Sea Temp →
Eng Batt Volts Port

If Set Up for One Engine

Eng Batt Volts →
Domestic Batt Volts →
Sea Temp →
Eng Batt Volts

If Set Up for the Sat Nav Output

Eng Batt Volts →

Sea Temp →

Eng Batt Volts

2.14 To Set Sea Temperature Precision

1. Press the VOLTS button to select 'SEA TEMP' on the display.
2. Press the TIME and LOG buttons together to select precision of 1 or 2 decimal places.

Note: The selection on power up can be set to either precision (see Part 4).

2.15 To Set The Display Backlighting

1. Press the * button and hold. The display backlighting will change from 0 to level 7, then level 6, then level 5, and so on to level 0. If the button is still held, the level will then increase back to 7 again.
2. At the desired display backlighting release the * button. This will set the lighting on ALL displays on the Dataline-X system, which are in the same Lighting Bank. The Dataline-X system has two lighting banks, so that the internal lighting on a power boat may be set differently to that on the flybridge, or the cockpit lighting may be set differently to the chart table or mast display lighting on a yacht. All displays are supplied set to bank 1 (See Part 4 for the bank set-up information.)

Note: On some Dataline Systems (not Dataline-X) only lighting levels 0, 3, 5 and 7 are available.

2.16 Demonstration Mode

The Demonstration Mode allows the user to familiarise himself/herself with all the functions of the instrument with the device removed from the system. Demonstration software within the instrument produces realistic values for the display.

A +12V power supply will be required to be connected as follows:

0V to the BLACK (far right) terminal
+12V to the RED (far left) terminal.

To enter the Demonstration Mode, press the * button whilst applying power to the instrument.

To leave the Demonstration Mode, switch off and re-apply power.

Notes:

1. The display will leave demonstration mode if any data is received.
2. The display can be set to automatically enter 'Shop' demonstration mode every time it is powered up. See Part 4.

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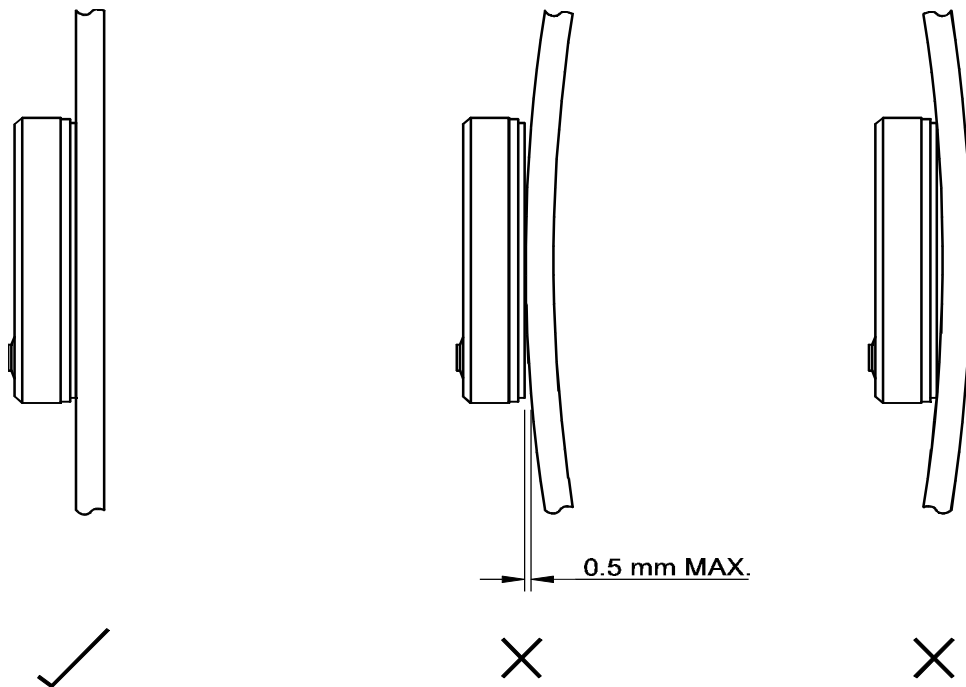
- 3.1 General
- 3.2 Installation
- 3.3 Choosing the Cable Routes
- 3.4 Securing the Cable

3.1 General

The instrument head is fully waterproof and can, therefore, be installed on deck or below. The connections should be protected from water penetration and should, if possible, allow rear access to remove the desiccant pack, if required. The position selected should, in the first instance, meet the requirements of the helmsman, or crew.

The selected surface for the instrument head must be flat and even to within 0.5 mm.

Before installation, note the Serial Number of the unit and keep it in a safe place.



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Figure 3.1 - Installation

3.2 Installation

1. Carefully position the self-adhesive template provided on the surface where the instrument is to be mounted.
2. Drill a small pilot hole first, and then check the location on the other side of the panel or bulkhead to confirm suitability.
3. Open out the pilot hole to 50 mm (2 ins.) using a cutter in a hand-held brace, or electric drill.
4. Drill the four fixing holes using a 2.5 mm (3.32 ins.) drill.

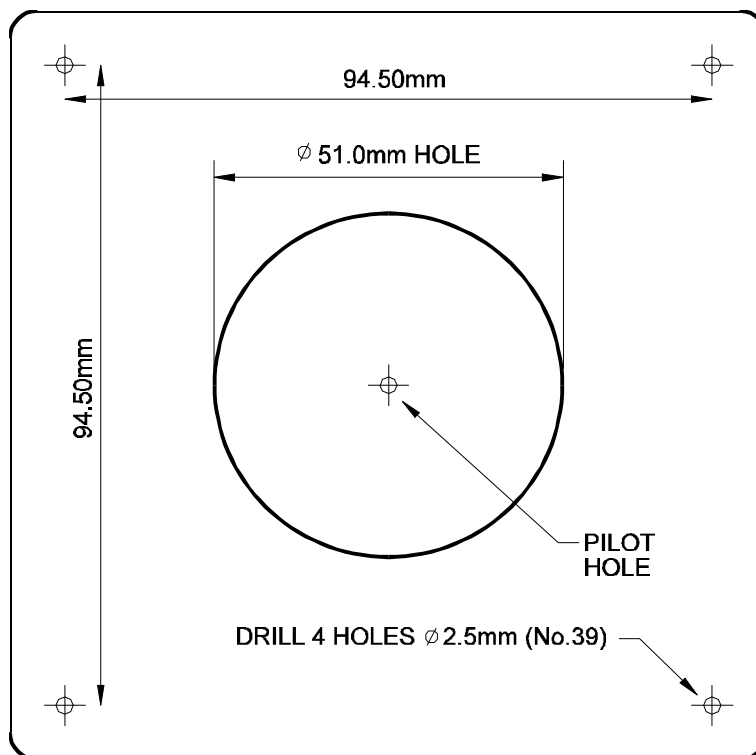


Figure 3.2 - Mounting Details (Not To Scale)

1. The instrument should next be wired into the system. The wiring should be carried out as in the 'Choosing the Cable Routes' and 'Securing the Cable' Sections below.

- a. If the instrument is being connected to a Dataline-X system, then connect it to the Dataline wire. This can normally be done simply by using the 'Dataplug' connector and cable supplied to connect the display to the Databox or to any adjacent display.

If the cable routing cannot be made with the Dataplug connector attached, then simply disconnect it from the cable. The cable may then be run through holes of down to 6 mm (0.25 ins.) diameter before reconnecting the Dataplug connector, making sure that the colours are correctly wired to the terminals. The correct positions for the different coloured wires are shown on the rear label of the instrument.

- b. If the instrument is being connected to another instrument system then the connections are as below:-

Red	=	+12V Power In (Fused 1A).
White	=	NMEA Signal In (A / + / Positive).
Brown	=	Not Connected.
Green	=	NMEA Reference In (B / - / Negative).
Black	=	0V Power In.

If fitted, the external alarm sounder should be connected between the Alarm Output and 0V.

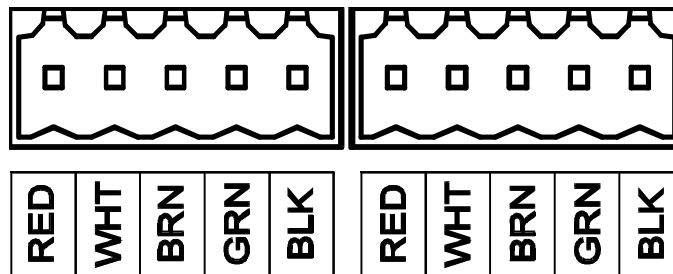


Figure 3.3 - Electrical Connections

6. Check that the instrument functions correctly.
7. Temporarily disconnect the Dataplug connectors and coat the terminals and wires with silicone grease or petroleum jelly. These products will not harm the instrument.
8. Make sure the 'dovetail' lugs are free from grease and securely located into the rear of the instrument when replacing the Dataplugs.

9. Secure the instrument using the four, No 4 self-tapping screws provided. Ensure that the sealing gasket is correctly located.
10. Replace the front cover, the installation of the instrument is complete.

CAUTIONS

DO NOT OVER-TIGHTEN FIXING SCREWS.

DO NOT USE SEALING COMPOUND ON THE INSTRUMENT BACK.

DO NOT USE WD40 OR ANY SOLVENT ON ANY PART OF THE INSTRUMENT.

3.3 Choosing the Cable Routes

After you have decided on the system and started to mount the components of the Dataline-X System, the next step in the installation process is to route the cables between the various parts of the system and to the power supply. When routing the cables, choose the most direct paths while avoiding the following hazards:-

- Sharp Bends or Kinks in the Cable
- Hot Surfaces (Exhaust Manifolds or Cooking Equipment)
- Rotating or Reciprocating Equipment
- Sharp or Abrasive Surfaces
- Door and Window Jambs
- Corrosive Fluids or Gases

3.4 Securing the Cable

After the ideal cable routing has been established, use tie-wraps, 'P'- clips or other fixings to secure the cables along the routings.

Notes:

1. Install protection for the cable jackets where the cables pass through bulkheads, or past sharp edges. This will prevent the cables from chafing.

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2. Secure the cable near to the terminals. This serves as a strain relief.
 3. Secure the cable ends with enough slack to allow for easy connection.
 4. Cut any spare wire ends to an appropriate length.

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4.1 System Calibration

After installation, the system may be calibrated to take into account the physical position of and type of transducers installed. Additionally, such things as display units and precision may be selected.

4.2 Calibration Mode

To enter Calibration Mode:

1. Press the SPEED and LOG buttons together, and hold for more than 3 seconds, until 'LiTE' is shown on the display.
2. For each successive press of the LOG button, the display will step through the calibration menu. To step through backwards, press the SPEED button.
3. The menu function may be changed immediately by pressing the TIME button, or this may cause the value to flash, depending on the function.
4. The SPEED and LOG buttons may be used to decrement or increment values, which are flashing. When the value is correct, press the TIME button again to save it.
5. Depressing the * button will return the instrument to its normal working mode.

The following calibration functions are available:

- Lighting Colour (select Yellow, Red or Green)
- Lighting Bank (select Bank One or Bank Two)*
- LCD Contrast (value entry, Level 1 to Level 9)
- Auto Log Cal Run Distance (value entry, 0.20 to 2.99 Nm)*
- Auto Log Calibration (select run 1, run 2, run 3, run 4)*
- Auto GPS Log Calibration (select run)*
- Log Calibration (value entry, -97.5% to + 97.5%)*
- Speed Units (select, Knots, MPH or KMH)

- Speed Precision (select, 0.1 or 0.01)
- Paddlewheel to SOG Change-Over Speed (value entry, 0 to 99 Knots)
- Log Units (select, Nautical Miles, Kilometres)
- Race Time On/Off (select, On, Off)
- Local Time Offset from UTC/GMT (value entry, \pm 12 Hours)
- Two Engines / One Engine / Sat Nav Output (select)*
- Sea Temperature Units (select, °C, °F)
- Sea Temperature Precision (select, 1°, 0.1°)
- Test Mode entry screen (select, On, Off)
- Shop Demo Mode Selection (select On, Off)

The options marked with '*' perform no function if the display is not part of a Dataline-X system.

4.3 Lighting Colour Selection

This function enables the colour of the backlighting on the display to be set to Yellow, Red, or Green. This is independent of all other displays.

1. Press the SPEED and LOG buttons together, and hold for more than 3 seconds, until 'LItE' is shown on the display.
2. The display should indicate the current lighting colour and light to show this.
3. Press the TIME button to change to the desired colour, 'rEd' (Red), 'Grn' (Green) or 'YEL' (Yellow).
4. Return to the main display by pressing the * button.

4.4 Lighting Bank Selection

The Dataline-X instrument system can have two separate banks of instruments. Setting the lighting level on one display will set all the other displays in that bank to the same level, but will not effect any displays in the other bank. For instance, the lighting level can be independently controlled for:

1. The cockpit and chart table displays of a yacht.
2. The cockpit and mast displays on a yacht.
3. The cabin and flybridge of a motor yacht.

This is independent of the display colour, so that displays in the same bank may have different colours if desired.

1. Press the SPEED and LOG buttons together, and hold for more than 3 seconds, until 'LiTE' is shown on the display.
2. Press the LOG button once until the LCD indicates 'LiTE-1-' (or 'LiTE-2-').
3. Select the required lighting bank, either 1 or 2, by pressing the TIME button.
4. Return to the main display by pressing the * button.

4.5 LCD Contrast Setting

The LCD on Dataline-X Series instruments can be set to one of two or more contrast levels to best suit the viewing angle of the particular installation. This display has nine contrast levels.

The default level (level 8) is suitable for a wide range of viewing angles and will probably not require alteration. However, for viewing from below the display, it may be useful to increase the setting to level 9 to obtain the darkest digits. If viewing the display from above, the contrast level may be lowered to reduce the 'ghosting' of the parts of the display which are turned off. The lighting is illuminated when setting the contrast to highlight the display.

1. Press the SPEED and LOG buttons together, and hold for more than 3 seconds, until 'LiTE' is shown on the display.

2. Press the LOG button twice until the LCD indicates 'LCd' and the current contrast level.
3. Press the TIME button to start to set the LCD contrast, the value will start to flash.
4. Increase the contrast value using the LOG button.
5. Decrease the contrast value using the SPEED button.
6. Return to the calibration menu by pressing the TIME button, and return to the main display by pressing the * button.

4.6 Log Calibration

4.6.1 Automatic GPS Log Calibration

A quick and easy way to calibrate the log in slack water is to match the displayed boat speed to the Speed Over Ground from a GPS or other form of Radio Navigator. If Speed Over Ground is available, the display will do this automatically with the Automatic GPS Log Calibration function.

1. Press the SPEED and LOG buttons together, and hold for more than 3 seconds, until 'LiTE' is shown on the display.
2. Press the LOG button until the LCD indicates 'LOG CAL GPS'.
3. Press the TIME button to enter the calibration mode. The display will show 'LOG CAL' and the speed through the water. Start motoring at a steady speed across the slack water. Wait until the speed through the water is stable, and the Radio Navigator shows the Speed Over Ground to be stable, then press the TIME button. The display will calculate the correct log calibration factor and show it.
4. Press the TIME button to save the new log calibration factor, and return to the Calibration menu.
5. Return to the main display by pressing the * button.

4.6.2 Automatic Log Calibration Distance Setting

In order to automatically calibrate the Log, first enter the known distance into the display.

1. Press the SPEED and LOG buttons together, and hold for more than 3 seconds, until 'LiE' is shown on the display.
2. Press the LOG button until the LCD indicates 'LOG CAL AUtO'.
3. Press the TIME button to start to set the Run Distance; the initial value of 1.0 Nautical miles will start to flash.
4. Press LOG to increase the distance value.
5. Press SPEED to decrease the distance value.
6. Press the TIME button to enter the run distance and step to the Log Calibration run screen, the display will show 'LOG run?'

4.6.3 The Automatic Log Calibration Runs

First set the actual run distance as above, then carry out the actions below:

1. Motor towards the first mark, as the mark is passed, press either the SPEED button or the LOG button. The display will now show 'LOG run1'.
2. Motor to the second mark, and as it is passed, press either the SPEED button or the LOG button. The display will now show 'LOG run?'.
3. Turn around and motor back towards the second mark, as it is passed again, press either the SPEED button or the LOG button. The display will now show 'LOG run2'.
4. Motor back to the first mark, as it is passed again press either the SPEED button or the LOG button. The display will now show 'LOG run?'.
5. You may now step on to the next screen to display the calculated log calibration value by pressing the TIME button. Alternatively, the above process may be repeated over two more runs to improve the accuracy. These screens will be shown as 'run3' and 'run4' respectively.
6. Return to the calibration menu by pressing the TIME button again, or to the main display by pressing the * button twice.

4.6.4 Manual Log Calibration

This function enables the LOG function to be calibrated manually by comparing the measured distance against a known distance (e.g., a measured nautical mile). (See Appendix B for details on making the calculations).

1. Press the SPEED and LOG buttons together, and hold for more than 3 seconds, until 'LiTE' is shown on the display.
2. Press the LOG button until the LCD indicates 'CAL LOG'.
3. Press the TIME button to enable the calibration value to be entered. Use the SPEED and LOG buttons to change the CAL setting. The value will start to flash. This will change in steps of 2.5%.
4. Return to the calibration menu by pressing the TIME button, or to the main display by pressing the * button twice.

4.7 Speed Units Selection

Displayed SPEED units may be set to either knots, mph or km/h.

1. Press the SPEED and LOG buttons together, and hold for more than 3 seconds, until 'LiTE' is shown on the display.
2. Press the SPEED button until the LCD indicates 'SPEED UNIT'.
3. Select required units by pressing the TIME button.
4. Return to the main display by pressing the * button.

4.8 Speed Precision Default Setting

This function enables the precision on power up of the Speed and Trim Speed displays to be selected to either 0.1 unit or 0.01 unit.

1. Press the SPEED and LOG buttons together, and hold for more than 3 seconds, until 'LiTE' is shown on the display.
2. Press the LOG button ten times until the LCD indicates 'SPEED -.-' (or 'SPEED -.-').
3. Press the TIME button to select the desired precision.
4. Return to the main display by pressing * button.

4.9 Water Speed to Speed Over Ground Change Over Setting

The Speed that is displayed by the Dataline-X SPEED can either be the boats speed through the water, or its speed over the ground; or it can be chosen to switch from speed through the water to speed over the ground at a set point. The display always shows which data is being used. The speed through the water can be measured by the Databox using a paddlewheel or trail sensor, or it can be provided by another system, while the speed over the ground can be provided by any radio or satellite navigation system, such as GPS.

This function sets the speed at which the display changes from (low speed) water speed to (high speed) speed over the ground. In order to always use speed through the water set the change over point to above the vessels maximum speed. In order to always use the speed over the ground, set the change over point to zero. To use both sets of data, set the change over point to a speed below which the paddlewheel (or other water speed sensor) starts to be affected by cavitation and turbulence, and high enough that the radio navigator's speed over the ground is acceptably accurate. This speed will depend on the hull form, transducer siting, and navigator used. However, the default is set to 35 knots, which is suitable for most applications. In the absence of the desired Speed or Speed Over Ground data, the other data will always be used if available.

This change over speed is always set in knots, regardless of the units that are selected for speed display.

1. Press the SPEED and LOG buttons together, and hold for more than 3 seconds, until 'LiTE' is shown on the display.
2. Press the SPEED button nine times until the LCD indicates 'SPEED SOG'.
3. Press the TIME button to start to set the change over speed, the value will start to flash.
4. Increase the change over speed using the LOG button.

5. Decrease the change over speed using the SPEED button.
6. Return to the calibration menu by pressing TIME or to the main display by pressing the * button twice.

4.10 LOG Units Select

The displayed LOG units may be set to either Nautical Miles or Kilometres.

1. Press the SPEED and LOG buttons together, and hold for more than 3 seconds, until 'LiTE' is shown on the display.
2. Press the SPEED buttons until the LCD shows 'LOG UNIT'.
3. Select the required units by pressing the TIME button. For Nautical Miles 'Nm' is shown and for Kilometres 'Km' is shown.
4. Return to the main display by pressing the * button.

4.11 Race Timer Selection

The display may be set to either offer a race timer or not to, the default is for this not to be offered. This allows the 'Time' functions to be simplified if a race timer is not wanted.

1. Press the SPEED and LOG buttons together, and hold for more than 3 seconds, until 'LiTE' is shown on the display.
2. Press the SPEED button until the LCD indicates 'RACE TIME OFF' (or ON).
3. Set the timer to be offered (ON) or not to be offered (OFF) by pressing the TIME button.
4. Return to the main display by pressing the * button.

4.12 Local Time Offset from UTC

The display will show the local time if the time is received from an attached GPS. The GPS system works on 'Universal Co-Ordinated Time' (UTC), which is the same as 'Greenwich Mean Time' (or 'GMT'). So, to correct the time display, enter in the local time offset from GMT. For instance the offset for British Summer Time is +1 hours.

1. Press the SPEED and LOG buttons together, and hold for more than 3 seconds, until 'LiTE' is shown on the display.
2. Press the SPEED button until the LCD indicates 'TIME 0 Hours' (or similar).
3. Press the TIME button to start to set the Local Time Offset, the value will start to flash.
4. Increase the Local Time Offset by the LOG button.
5. Decrease the Local Time Offset using the SPEED button.
6. Return to the calibration menu by pressing TIME or return to the main display by pressing the * button twice.

4.13 Sat Nav Output/Engine Hours/Battery Volts Selection

The display can show one or two battery voltages, and one or two engine hour counts, and the Databox may have a SatNav Output of 100 or 200 pulses per Nautical Mile or it may have no output. This depends on the set up of the 'AUX' and 'IGN' terminals on the Databox.

The options are as below:

'2ENG' =

- i. Two Engine Hour Inputs (IGN = Port, AUX = Stbd)
- ii. Two Battery Voltage measurements, one for each engine's battery bank (IGN = Port, AUX = STBD)
- iii. No Sat Nav Output

'1ENG' =

- i. One Engine Hour Input (IGN)
- ii. Two Battery Voltage Measurements (IGN = the engine ignition bank, AUX = the second battery bank)
- iii. No Sat Nav Output

'SAAt1' =

- i. One Engine Hour Input (IGN)

One Battery Voltage Measurement (IGN = the engine ignition battery bank)

- ii. A 100 Pulse Per Nautical Mile Sat Nav Output (AUX)

'SAAt2' =

- i. One Engine Hours Input (IGN)

One Battery Voltage Measurement (IGN = the engine ignition battery bank)

- ii. A 200 Pulse Per Nautical Mile Sat Nav Output (AUX)

1. Press the SPEED and LOG buttons together, and hold for more than 3 seconds, until 'LiTE' is shown on the display.
2. Press SPEED until the LCD indicates 'SEt 2ENG' (or similar).
3. Select the required functions for the IGN and AUX Databox terminals by pressing the TIME button.
4. Return to the main display by pressing the * button.

Note: All four options will not be available with all Databoxes. If the option 'SAAtN' is shown then this is the same as 'SAAt1'. With some Databoxes 'SAAt2' and 1ENG' will be offered, but will return to 'SAAt1' or '2ENG' after power down.

4.14 Sea Temperature Units Selection

Displayed temperature units may be set to either °F or °C.

1. Press the SPEED and LOG buttons together, and hold for more than 3 seconds, until 'LiTE' is shown on the display.
2. Press the SPEED button until the LCD indicates °C UNIt or °F UNIt.
3. Select required units by pressing the TIME button.
4. Return to main display by pressing the * button.

4.15 Sea Temperature Precision Default Selection

Displayed temperature units may be set to either 1° or 0.1° precisions.

1. Press the SPEED and LOG buttons together, and hold for more than 3 seconds, until 'LiTE' is shown on the display.
2. Press the SPEED button until the LCD indicates '--.-C' or '-.-C' (or '--.-F' or '-.-F').
3. Select required units by pressing the TIME button.
4. Return to main display by pressing the * button.

4.16 Test Mode Entry Screen

The Test Mode will test all the display functions (See Part 5 for further details).

1. Press the SPEED and LOG buttons together, and hold for more than 3 seconds, until 'LiTE' is shown on the display.
2. Press the SPEED button twice until the LCD indicates 'TEST OFF'.
3. Press the TIME button to switch test ON, * button to start.

4.17 Shop Demo Mode Setting

The instrument can be set to always power up in demonstration mode by setting 'Shop Demo' Mode On (this function is for use by dealers only).

1. Press SPEED and LOG buttons together, and hold for more than 3 seconds, until 'LiTE' is shown on the display.
2. Press SPEED once so that the display shows 'SHOP OFF' (or ON).
3. Press the TIME button to set Shop Demo Mode ON or OFF as desired.
4. Return to main display by pressing the * button.

Note: After power up, the instrument will always return from Shop Demo Mode to showing data if any data is received.

4.18 Leaving Calibration Mode

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To return to the main display from Calibration Mode the Calibration Mode End Screen has to be selected.

1. From any Calibration Mode menu screen press either the **LOG** or the ***** button repeatedly until the LCD shows 'End?'. This is the Calibration Mode End Screen.
2. Return to the main display by pressing both buttons together.

CONTENTS

- 5.1 General
- 5.2 Test Mode
- 5.3 Fault Finding Chart

5.1 General

This instrument has been tested before shipment. However, installation conditions and procedures are outside the control of the manufacturer and can sometimes produce faults. The following check list is provided to assist the user in diagnosing such faults and suggests remedial action to be taken. The built in Test Mode will also help diagnose faults. For additional assistance, call your local dealer.

5.2 Test Mode

The Test Mode will test all the display functions.

1. Press the SPEED and LOG buttons together, and hold for more than 3 seconds, until 'LItE' is shown on the display.
2. Press the SPEED button twice until the LCD indicates 'TEST OFF'.
3. Press the TIME button to switch test ON, * button to start.

Test Mode

First the display will show the software code version and the word 'COdE'. The display will then go through six tests. In order to move on to the next test, press any one of the oval buttons. In order to leave test mode, press * button.

LCD Segments Test

After showing the code version, the display will show 'tEst - 1 -', and start the LCD test. This will light every one of the segments on the LCD one by one. They will then all be turned off one by one until they are all off again. This will be repeated until a button is pressed.

LCD Contrast Test

After the LCD Segment test, the display will show 'tEst - 2 -' and start to cycle through the nine LCD contrast levels, showing 'Lcd' and the contrast level. This will continue until a button is pressed.

Lighting Test

After the LCD Contrast Test, the display will show 'tEst - 3 -' and start to cycle through the various lighting levels and colours. There are four red lighting levels (r8, r4, r2, r1), three green levels (G4, G2, G1) and three yellow levels (L4, L2, L1). This will continue until a button is pressed.

NMEA Input Test

After the lighting test, the display will show 'tEst - 4 -' and start to monitor its NMEA input. It will show 'IN' and a count of the successful inputs up to five, when it will automatically step onto the next test.

If the display is receiving NMEA data, the count should happen without any actions on the user's part. If the display is powered up on its own, then its NMEA input (White) may be connected to the 12V power (Red) five times to simulate an input.

NMEA Output Test

After the NMEA Input test, the display will show 'tEst - 5 -' and step onto the NMEA output test. If the display is connected to a Databox, then it will automatically transmit messages to the Databox and monitor the NMEA input for correct replies. This will count up from 1 to 5 while showing 'OUT'. (A failure here could be a wiring or Databox problem, however.) If the display is not on a Databox, then its NMEA Output (Brown) should be connected to the NMEA Input (White) and the display will transmit directly to itself.

After a successful test, the display will automatically step on to the next test.

Button Test

After the NMEA Output test, the display will show 'tEst - 6 -', then test each of the buttons in turn, prompting with the button number. After a successful test of all four buttons, the display will automatically return to normal mode.

The buzzer should beep on every button test.

5.3 Fault Finding Chart

This chart assumes that the instrument is part of a Dataline-X instrument system. If it is connected to another instrument system then perform the equivalent checks on that system.

General Display and Communications Faults

<u>Condition</u>	<u>Probable Cause</u>	<u>Action</u>
All instruments have blank displays.	No 12V Power Supply.	<p>Check that the ships instrument system fuse(s) or circuit breaker(s) are not blown / tripped.</p> <p>Check the power supply wiring to the Databox.</p> <p>Check the 2.5A fuse inside the Databox. (This is the leftmost of the two fuses inside the Databox when it is viewed with the connectors at the lower edge, with the top cover removed. In order to remove the top cover to the Databox first remove the four screws in its corners.)</p> <p>Check the power supply wiring from the Databox to the instruments (the Red and Black 'Dataline' wires).</p> <p>Check for the Dataline-X instruments powering up, if not connected to the Databox, but directly to the power supply.</p> <p>Contact your dealer.</p>
One or more, but not all, instruments have blank displays.	There is no 12V power supply to the affected instrument (s).	<p>Check the power supply wiring to the affected instrument(s) (the Red and Black 'Dataline' wires). This is almost certainly the problem if more than one instrument is not functioning.</p> <p>Contact your dealer.</p>

<u>Condition</u>	<u>Probable Cause</u>	<u>Action</u>
<p>All instruments always show '----', with the pointers of analogue instruments at their zero positions.</p>	<p>No data is reaching any of the instruments.</p>	<p>Check that the battery voltage at the Databox Power Input terminals is greater than 10V.</p> <p>Check the signal wiring from the Databox to the instruments (the White and Green 'Dataline' wires). (If the lighting on any instrument can be controlled from another instrument then this is not the problem.)</p> <p>Contact your dealer.</p>
<p>One or more, but not all, instruments always show '----', with the pointers of analogue instruments at their zero positions.</p>	<p>No data is reaching the affected instrument(s).</p>	<p>Check the signal wiring to the affected instrument(s) (the White and Green 'Dataline' wires). This is almost certainly the problem if more than one instrument is affected. (If the lighting on any affected instrument can be controlled from another instrument then this is not the problem.)</p> <p>Contact your dealer.</p>
<p>All instruments show question marks on their display after they are used to set the lighting level, and the lighting level soon returns to Off, but other data is correct.</p> <p>Or:</p> <p>All instruments show question marks after setting any other data values.</p>	<p>The lighting level or other data is not reaching the Databox.</p>	<p>Check the return signal wiring to the Databox (the Brown 'Dataline' wire).</p> <p>Contact your dealer.</p>
<p>One or more instruments show question marks on their display after they are used to set the lighting level, and the lighting level soon returns to the previous level, but other data is correct, and other instruments can set the lighting level correctly.</p> <p>Or:</p> <p>One or more instruments show question marks after setting any other data values.</p>	<p>The lighting level or other data is not reaching the Databox from the affected instrument(s).</p>	<p>Check the return signal wiring from the affected instruments to the Databox (the Brown 'Dataline' wire).</p> <p>Contact your dealer.</p>

Speed and Temperature Display Faults

<u>Condition</u>	<u>Probable Cause</u>	<u>Action</u>
There are no Boat Speed or Sea Temperature displays, or these displays always show '----'.	The speed transducer is not connected to the Databox properly.	<p>Check the speed transducer's connections to the Databox (especially the White and Yellow 'Speed' wires).</p> <p>Check that the speed transducer cable is not damaged.</p> <p>Contact your dealer.</p>
The Boat Speed display always shows '0.0', but the Sea Temperature display is shown.	<p>The speed transducer is not installed in the hull fitting.</p> <p>The speed transducer is not connected to the Databox properly.</p> <p>Jammed paddle wheel.</p> <p>Damaged paddle wheel or transducer body.</p>	<p>Check, and replace the blanking plug with the transducer if necessary.</p> <p>Check the speed transducers connections to the Databox (especially the Red, Blue and Black 'Speed' wires).</p> <p>Check that the speed transducer cable is not damaged.</p> <p>Clean the paddle wheel and transducer as required.</p> <p>Check that the paddle wheel and transducer is not damaged, and that there are not 'holes' at the end of any of the paddle wheels vanes.</p> <p>Contact your dealer.</p>
The Boat Speed is too low, when it was previously correct.	<p>Dirty paddle wheel or hull.</p> <p>Damaged paddle wheel or transducer body.</p> <p>The paddle wheel is not aligned fore / aft within the skin fitting.</p>	<p>Clean the paddle wheel and / or the hull as required.</p> <p>Check that the paddle wheel and transducer is not damaged, and that there are not 'holes' at the end of any of the paddle wheels vanes.</p> <p>Check, and if necessary turn the transducer within the skin fitting so that the cross pin is aligned with the centre line of the vessel.</p> <p>Make other checks as for 'always showing 0.0' above.</p>
The Boat Speed has always been too low or too high.	The speed transducer is not calibrated.	<p>Calibrate the speed transducer. (Using another instrument.)</p> <p>Make other checks as for 'the speed is too low when it was previously correct' above.</p>

<u>Condition</u>	<u>Probable Cause</u>	<u>Action</u>
The Boat Speed is too low or too high and cannot be corrected by calibrating the speed transducer.	The hull form produces exceptionally low or high water speed over the paddle.	Check the siting of the speed transducer. Contact your dealer.
The Boat Speed is different on each tack.	The hull form and transducer siting produces different water flow rates over the paddle wheel on each tack.	Turn the speed transducer slightly so that the cross pin is not aligned directly fore / aft, and recheck for the same speed display on both tacks. Repeat this until the correct angle is found for the same reading on each tack, and then recalibrate the transducer. (Using another instrument.)
The Sea Temperature display is incorrect.	The speed transducer is not connected to the Databox properly.	Check the speed transducers connections to the Databox (especially the White and Yellow 'Speed' wires). Check that the speed transducer cable is not damaged. Check that the Sea Temperature is in fact incorrect by comparing with another temperature sensor. Contact your dealer.

Other Faults

<u>Condition</u>	<u>Probable Cause</u>	<u>Action</u>
The external alarm does not sound.	<p>The alarm is not turned on, or the values are not as desired.</p> <p>The external alarm sounder is not connected to the Databox properly.</p> <p>The external alarm sounder is not suitable.</p> <p>The external alarm sounder is not working.</p>	<p>Check that the desired alarm is turned on and has the correct value.</p> <p>Check the alarms' connections to the Databox.</p> <p>Check that the alarm sounder does not require more current or a higher voltage than is available.</p> <p>Check with the alarm sounder driven directly from a suitable power supply.</p> <p>Contact your dealer.</p>
There are missing Engine Hour or Battery Voltage displays, or the Engine Hour counts don't work, or these displays always show '----'.	<p>The engine hour / sat nav set ups are incorrect.</p> <p>The engine hour / battery voltage inputs are not connected to the Databox properly.</p>	<p>Check the set up, and correct if necessary. (Using another instrument.)</p> <p>Check the connections to the Databox, and correct if necessary.</p> <p>Check that the engine inputs are active when the engines are turned on.</p> <p>Contact your dealer.</p>
Condensation forms inside the instrument.	Slight internal moisture.	Turn the lights to Level 7 and leave on until cleared.

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CONTENTS

- 6.1 General Maintenance
- 6.2 Annual Maintenance
- 6.3 Removal of Instrument
- 6.4 Return for Service

6.1 General Maintenance

The instrument head will require no maintenance apart from occasional cleaning. This may be done using a little fresh water and a mild soap solution (not a detergent).

CAUTION

DO NOT USE ANY ABRASIVES, CHEMICAL CLEANERS, PETROL OR DIESEL TO CLEAN THIS UNIT.

6.2 Annual Maintenance

1. Check all connections to the instrument and, if necessary, cover with silicone grease or petroleum jelly.

6.3 Removal of Instrument

1. If rear access is possible unplug the Dataplug connectors from the rear of the instrument. If the connection needs to be made up then the two wires may be joined using one of the connectors as a terminal block.
2. Remove the outer cover. This can be done by squeezing the instrument sides between finger and thumb and applying an upward pressure. At the same time, place a flat-bladed screwdriver between the bulkhead (or panel) and the cover, and carefully rotate.
3. Remove the cover and the four corner fixing screws.
4. Pull the instrument free from the surface, being careful not to strain the wiring if the connectors have not yet been removed.

5. If they are not yet removed, unplug the Dataplug connectors from the rear of the case, and make up the cable if necessary.

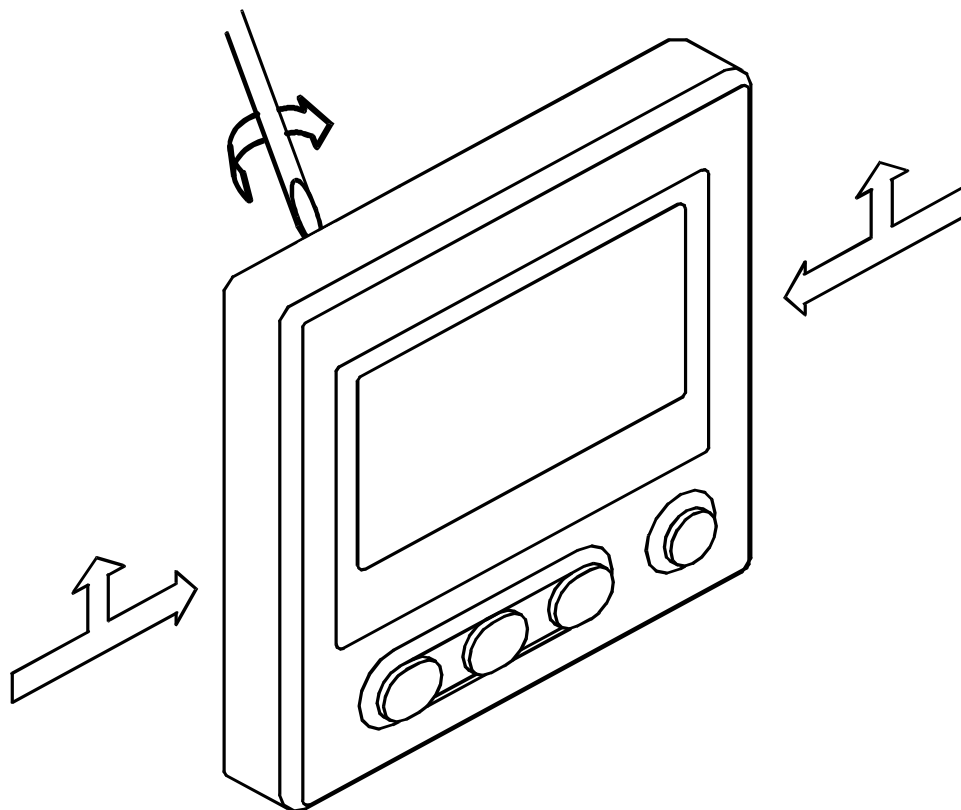


Figure 6.1 - Removal of Instrument

6.4 Return for Service

Please ensure that an instrument that is believed to be faulty is correctly installed, the wiring is in good condition and correct, that all connections are secure, and that a 12V supply is present at its power input terminals.

Should the unit have to be returned to your dealer, adequate packing must be used. Please ensure that your name, telephone number, return address, a clear fault description, and if possible a copy of the receipt of purchase are included with any returned equipment. Simrad Ltd. and their representatives are not responsible for any equipment lost in transit.

Please quote the instrument's serial number in all correspondence. This may be found on the rear of the instrument.

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The NMEA 0183 messages that are received by the SPEED display are as below:

VHW = Boat Speed (Knots Field)

VLW = Permanent Log, Trip Log

MTW = Sea Temperature

VTG
RMA = Speed Over Ground (all messages used)
RMC

RMC
GGA = Universal Co-Ordinated Time (all messages used)
BWR
BWC

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Introduction

The preferred method of calibration is to make two runs (in opposite directions) between points which are a known distance apart (measured off a map or chart). Ideally, the runs should be made in slack water, following the same track, one immediately following the other, should be over at least half a mile, and preferably more than one mile, at typical speeds for the vessel.

The display can calculate the correction factor automatically, but Manual Calibration may be done if desired. See Part 4.

Manual Calibration Procedure

1. Make sure the calibration setting is 0%.
2. As the vessel passes the first marker, reset the TRIP LOG then maintain an approximately constant speed, until the second marker is reached, and on passing, record the TRIP LOG reading (L1).
3. Turn the vessel round and repeat Paragraph (2), only in the opposite direction. Record the TRIP LOG (L2).
4. Calculate the Average Distance Recorded ($L = (L1 + L2)/2$).
5. Calculate Log Error (LE):
6. $LE = \frac{(\text{Actual Distance} \times 100)}{L} - 100\%$
7. Manually enter the log calibration factor. See Part 4.
8. Return to main display by pressing the * button twice.

Example Calculation

Distance recorded on Run 1 = 1.21 Nm

Distance recorded on Run 2 = 1.18 Nm

Actual distance on chart = 0.80 Nm

Average distance (L) = $\frac{1.21 + 1.18}{2} = 1.195$ Nm

Error (LE) = $\frac{0.80 \times 100}{1.195} - 100 = -33.054\%$

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A calibration factor of -32.5% (the nearest available value) should be entered into the instrument.