USER GUIDE FOR

DATALINE-X™

RUDDER

Stowe Marine Ltd. www.stowemarine.com Tel +44(0)1590 610071

Dataline-X Rudder Manual, Part Number 06027SM, 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.

CE 1996

CONTENTS

CONTENTS

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 Rudder Angle display, known as **Dataline-X RUDDER**, used within the Dataline-X System.

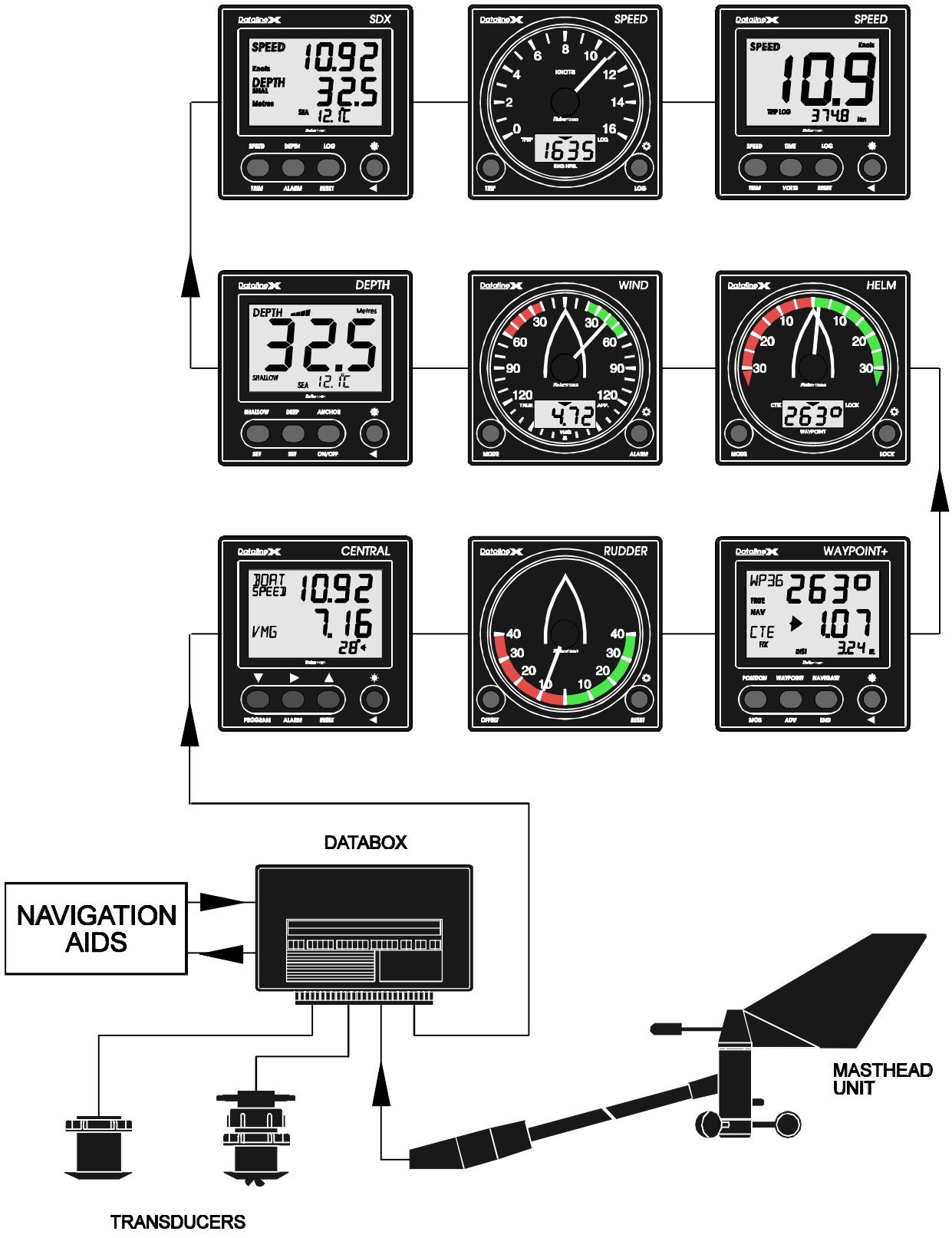

Figure 1.1 - Dataline-X System Diagram

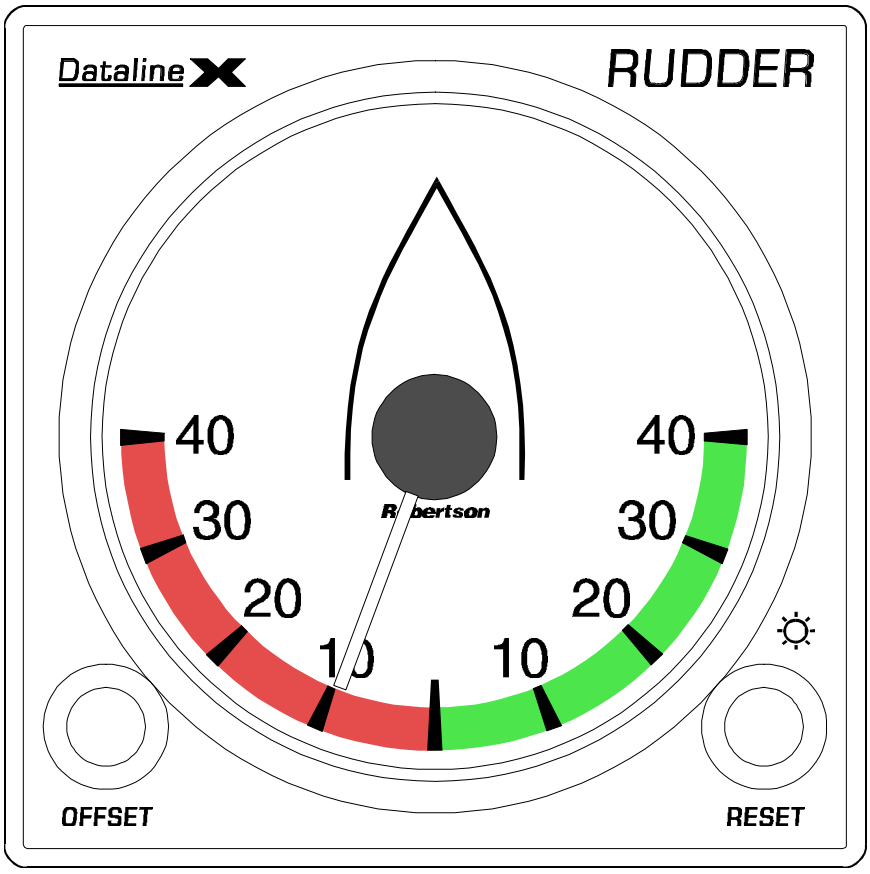

Figure 1.2 - Dataline-X RUDDER Instrument

1.2 Dataline-X RUDDER Specification

Rudder Angle Functions

Rudder Angle Display	0 to 40° Port / Stbd
Rudder Angle Precision	1°
Rudder Offset Facility	0 to 40° Port / Stbd

Additional Functions

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.

General

Power Requirement	10 to 16V, 70 mA, (100 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	225 grams
Environmental Rating	IP65
Temperature Range	0°C to 70°C
Rudder Angle Sensor	Robertson AP300/AP3000 or other NMEA compatible Autopilot

Alternative Transducers

If any of the system transducers are not fitted to the Databox, but there is alternative speed, log, or sea temperature NMEA data being transmitted from another sensor to the Databox, then this alternative data will be used.

CONTENTS

2.1 General Description

The display is an analogue pointer movement. It is controlled by two buttons, 'OFFSET' and 'RESET'. The rudder angle data is provided by a Robertson AP300 or AP3000 Autopilot, or any other NMEA compatible Autopilot.

2.1.1 The Dialplate

The pointer normally shows the vessels rudder angle relative to the normal dead ahead position. If desired, it can, however, show the angle about a fixed offset.

2.1.2 The Buttons

The word below the button indicates the main function for that button.

The OFFSET button zeroes the pointer at the current rudder angle. All subsequent angles will be shown relative to this. This can be a reference if, for instance, one engine in a two engine installation is not running, or if trawling.

The RESET button (this button has a ✸ symbol above it) restores the pointer to displaying the rudder angle about the normal dead ahead position. If this button is held down, it sets the lighting level.

After selecting a function, a BEEP will be heard to confirm correct operation.

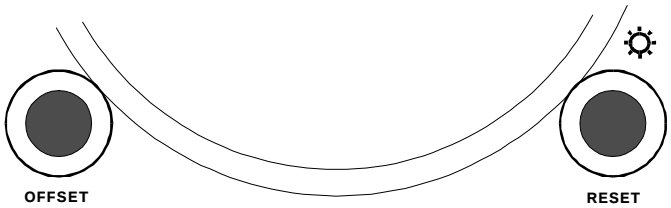

Figure 2.1 - The Buttons

2.2 Powering Up

When powering up the instrument, it will beep, the pointer will move to the zero position.

The display will then show the current rudder angle about dead centre.

2.3 The Rudder Offset Facility

If it is desired to add an offset into the rudder angle display, and reference it about the current rudder angle, then press the OFFSET button. This will zero the pointer at the current rudder angle.

In order to restore the pointer to displaying the rudder angle about the normal dead ahead position, press the RESET button.

2.4 To Set Display Backlighting

1. Press the RESET 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 RESET button (Note this will also reset any rudder offset). 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.).

Notes

1. The AP3000 Autopilot Displays work in bank 1.

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

CONTENTS

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.

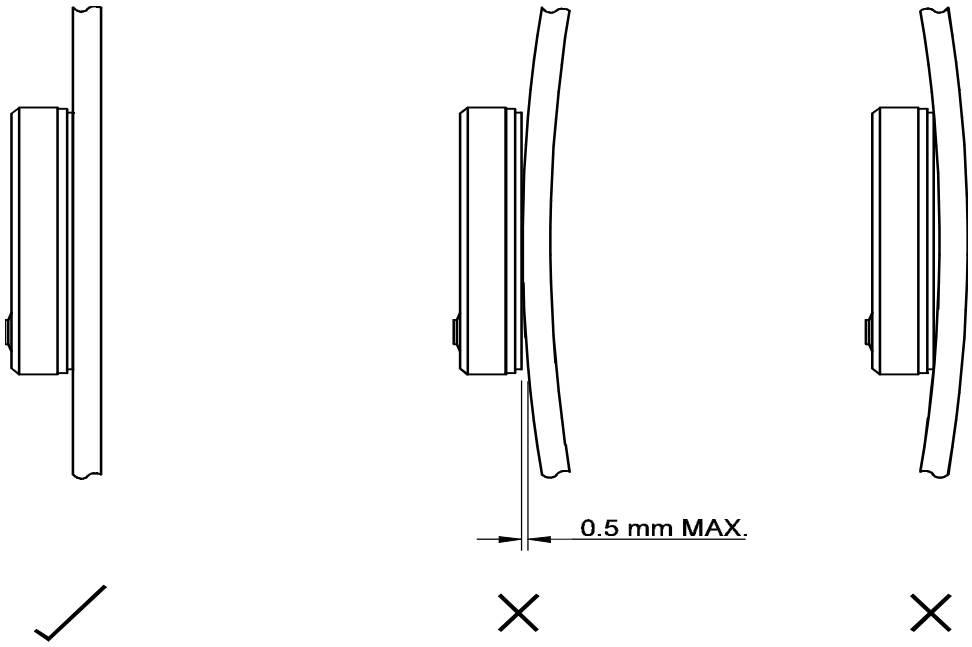

Figure 3.1 - Installation

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.

1. Drill the four fixing holes using a 2.5 mm (3.32 ins.) drill.

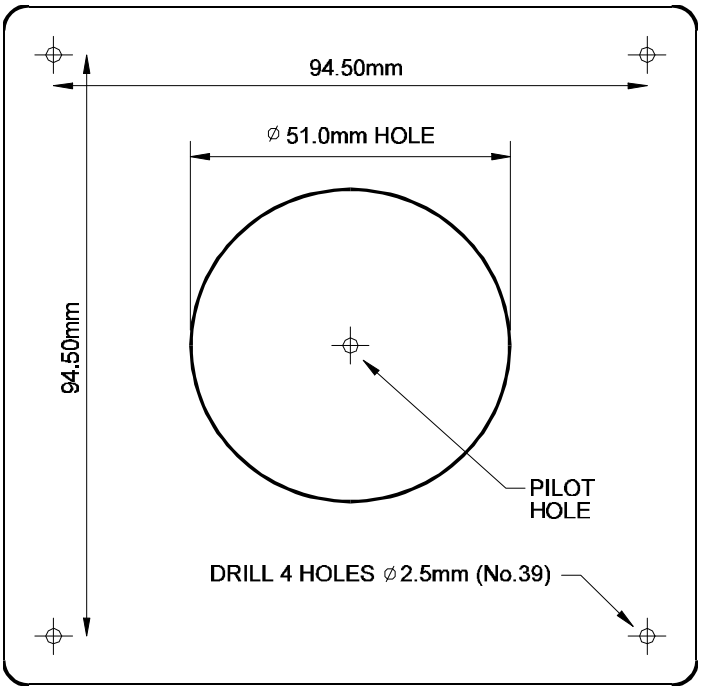

Figure 3.2 - Mounting Details (Not To Scale)

2. 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 directly to a Robertson AP3000 or AP300 Autopilot Junction Box, then the connections are as below:

   Red = 'Dataline' Red.

   White = 'Dataline' Wht.

   Brown = 'Dataline' Brn.

   Green = 'Dataline' Grn.

   Black = 'Dataline' Blk.

c. 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 used.

   Green = NMEA Reference In (B / - / Negative).

   Black = 0V Power In.

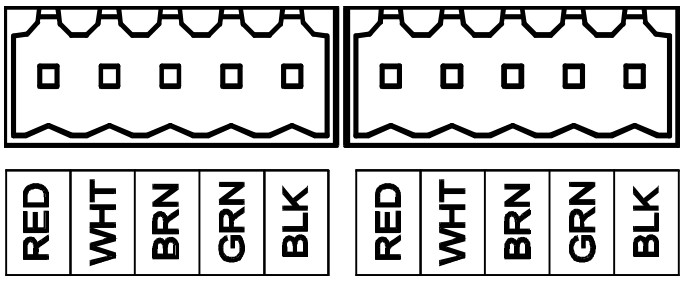

Figure 3.3 - Electrical Connections

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.

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.

CONTENTS

4.1 System Calibration

After installation, the system may be calibrated to take into account the physical position of and type of transducers installed.

4.2 Calibration Mode

To enter Calibration Mode:

1. Press both buttons together and hold for more than 3 seconds until the lighting comes on (if it is not already on), and the pointer moves to a fixed position on the display.

2. Pressing both buttons together 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)*

The option marked with '*' performs no function if the display is not part of the 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 both buttons together, and hold for more than 3 seconds, until the lighting comes on (if it is not already on), and the pointer moves to a fixed position on the display.

2. The display should indicate the current lighting colour by the pointer position, and will light to show this. The pointer positions are as below:

Yellow Lighting	=	Pointer Vertical up or down
Red Lighting	=	Pointer on Port side of display
Green Lighting	=	Pointer on Starboard side of display

3. Press the OFFSET button to select the desired colour.

4. Return to the main display by pressing both buttons together.

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 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 both buttons together, and hold for more than 3 seconds, until the lighting comes on (if it is not already on), and the pointer moves to a fixed position on the display.

2. The display should indicate the current lighting bank by the pointer position, and will light to show this. The pointer positions are as below:

   Bank One = Pointer below the horizontal (pointing at the normal rudder display area).

   Bank Two = Pointer above the horizontal (not pointing at the normal rudder display area).

3. Press the RESET button to select the desired lighting bank.

4. Return to the main display by pressing both buttons together.

CONTENTS

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. For additional assistance, call your local dealer.

5.2 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

Condition	Probable Cause	Action

All instruments have blank displays.	No 12V Power Supply.	Check the instrument system fuse(s) or circuit breaker(s) are not blown / tripped. Check the power supply wiring to the Databox. 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.) Check the power supply wiring from the Databox to the instruments (the Red and Black 'Dataline' wires). Check for the Dataline-X instruments powering up, if not connected to the Databox, but directly to the power supply. Contact your dealer.
Condition	Probable Cause	Action
One or more, but not all, instruments have blank displays.	There is no 12V power supply to the affected instrument (s).	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. Contact your dealer.
All instruments always show '----', with the pointers of analogue instruments at their zero positions.	No data is reaching any of the instruments.	Check that the battery voltage at the Databox Power Input terminals is greater than 10V. 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.) Contact your dealer.

One or more, but not all, instruments always show '----', with the pointers of analogue instruments at their zero positions.	No data is reaching the affected instrument(s).	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.) Contact your dealer.
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. Or: All instruments show question marks after setting any other data values.	The lighting level or other data is not reaching the Databox.	Check the return signal wiring to the Databox (the Brown 'Dataline' wire). Contact your dealer.

Condition	Probable Cause	Action
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. Or: One or more instruments show question marks after setting any other data values.	The lighting level or other data is not reaching the Databox from the affected instrument(s).	Check the return signal wiring from the affected instruments to the Databox (the Brown 'Dataline' wire). Contact your dealer.

Heading and Autopilot Display Faults

Condition	Probable Cause	Action
There are no Heading or Wind Direction displays.	The required data is not being received from the Heading Sensor or Autopilot.	Check that the Heading Sensor is turned on. Check the Heading Sensor NMEA output specification against the instruments input specification. (See Appendix A). Check the Heading Sensor power supply wiring. Check the signal wiring from the Heading Sensor to the Databox. Check that the Heading Sensor is driving other remote displays correctly. Contact your dealer.
There is no Autopilot Set Course display, even though the Heading display is working.	The required data is not available from the Autopilot.	Check the Autopilot NMEA output specification against the instruments input specification. (See Appendix A). Make checks as for 'no heading or wind direction displays' above. Contact your dealer.

Condition	Probable Cause	Action
All Headings are incorrect, by the same amount. Note : When checking a Compass ensure that the check is against a deviated magnetic card compass, or against magnetic bearings, or against a good hand held compass held well away from any magnetic or ferrous objects.	The Heading Sensor is not aligned correctly.	Consult the manufacturers instructions.

Some or all Headings are incorrect, by different amounts. Note : When checking a Compass ensure that the check is against a deviated magnetic card compass, or against magnetic bearings, or against a good hand held compass held well away from any magnetic or ferrous objects.	The Heading Sensor hasn't been deviation compensated. Magnetic or ferrous objects have been moved into or away from the vicinity of the Heading Sensor. The location of the Sensor is unsuitable.	Recalibrate the Sensor. Check for possible objects that may affect the Sensor, e.g., a portable radio. If the change is permanent then recalibrate the Sensor. Check that the location of the Sensor is suitable, if not then resite it. Contact your dealer.

Navigation Display Faults

Condition	Probable Cause	Action
There are no Navigation displays, even though the Navigation Receiver is working.	The required data is not being received from the Navigation Receiver	Check that the Navigation Receiver has a position fix. Check that the Navigation Receiver's NMEA output is set-up correctly. Check the Navigation Receiver's NMEA output specification against the instrument's input specification. (See Appendix A). Check the signal wiring from the Navigation Receiver to the Databox. Check that the Navigation Receiver is driving other remote displays correctly. Contact your dealer.
There are no Waypoint Data displays, even though the Course Over Ground display is working.	The required data is not available from the Navigation Receiver.	Check that the Navigation Receiver has a destination Waypoint. Make other checks as for 'no navigation displays', above.
There is no Cross Track Error display, even though the Waypoint and Course Over Ground displays are working.	The required data is not available from the Navigation Receiver.	Check that the Navigation Receiver is in Navigate Mode. Make other checks as for 'no waypoint displays', above.
Rhumb Line/Great Circle selection changes independently, and/or the desired data is not shown, even though the other format is available.	Data of the required format is not being transmitted by the Navigation Receiver.	Check that the Navigation Receiver is set to the same navigation mode, and is set up to transmit the correct navigation format. Contact your dealer.
True / Magnetic Course Over Ground and Waypoint Bearing data is not shown, even though the other format is available.	Data of the required format is not being transmitted by the Navigation Receiver.	Check that the Navigation Receiver is set to the same navigation mode, and is set up to transmit the correct navigation format. Contact your dealer.

Other Faults

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

CONTENTS

6.1 General Maintenance

The instrument head will require no maintenance apart from occasional cleaning. Do this using 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.

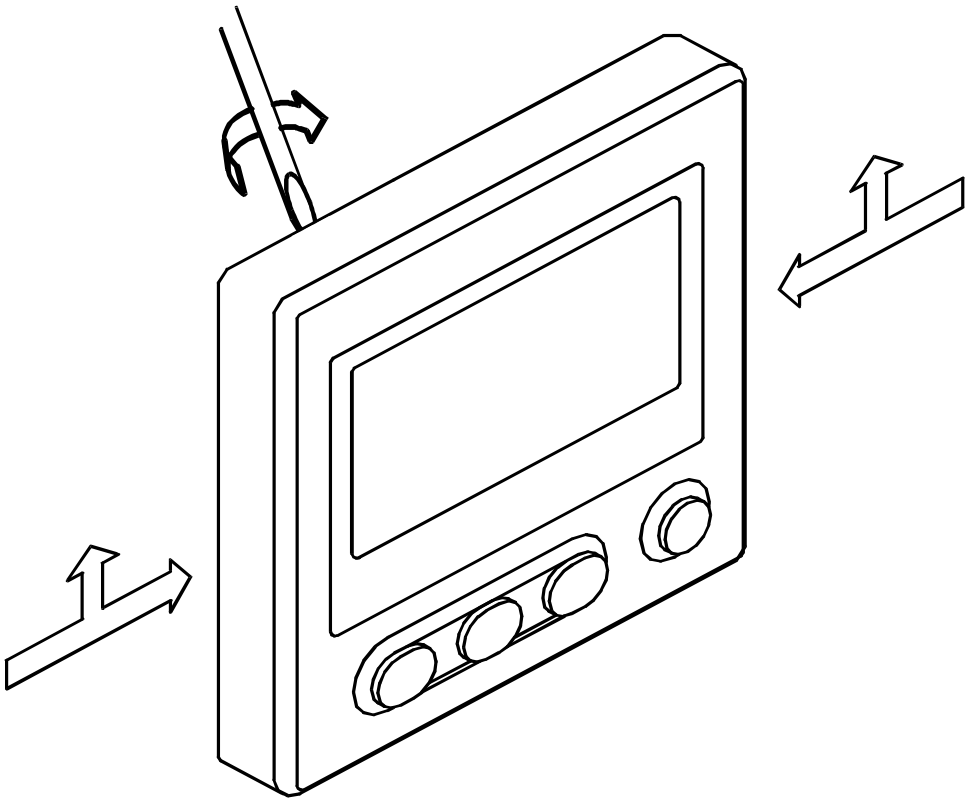

Figure 6.1 - Removal of Instrument

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 it's 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.

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

RSA = Rudder Angle (Single or Starboard Sensor Fields)