Windmaster Instrument

♦ **Windmaster**

Instruction Booklet

ECHOPILOT™

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ECHOPILOT™

Thank you for purchasing this Echopilot instrument.

Your new EchoPilot instrument has been manufactured to the highest standards by the dedicated staff of a company with many years of experience in marine electronics. You have invested in the most up to date technology available and in a product rigorously tested in the laboratory and at sea.

All goods of our manufacture are backed by a 2 year warranty. Expert advice and guidance is always available by Telephone 01425-476211 - just ask for customer service. If you are outside the UK you can still call us or any of our overseas distributors. We welcome the opportunity to talk to our customers.

Nobody enjoys reading manuals, but please continue to read this one! Installing your instrument correctly is vital to get the maximum performance, pleasure and safety from your equipment, so please take the time to read the instructions.

Contents

Operating Instructions **4**

Switching on 4
Selecting the Display 5
Changing the Unit Settings 9

Installation Instructions **13**

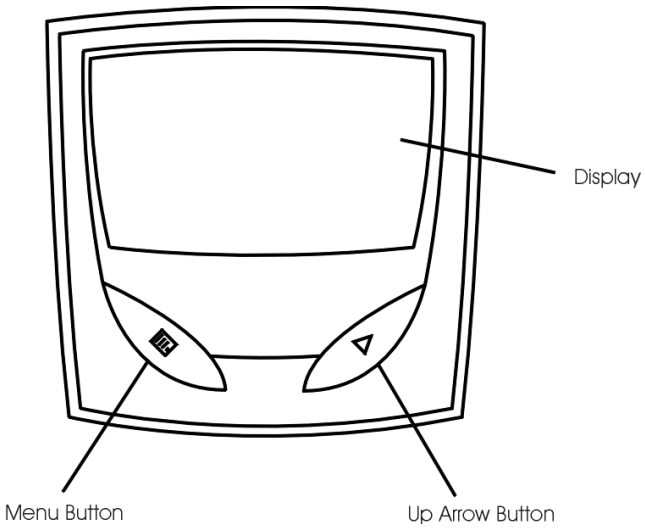
Fitting the Display 13
Ultrasonic Wind Sensor Installation 14
Log Transducer Installation 14
Other Manufacturer's Transducers 15
Connecting NMEA Wind/Log Transducer/Power 16
Connection Diagram 18

Fault Finding **21**

Fault Diagnosis Using Test Mode 21
Some Common Faults 23

Technical Specification **24**

Windmaster Operating Instructions



Switching On

There is no on/off switch on the Windmaster. The unit is switched on as soon as power (12 Volts) is applied to the unit via the 8 pin mini-din flying lead provided. See the section on **Windmaster Installation** for further details on connecting up the Windmaster.

The Windmaster will power up with a welcome introduction display that includes the software version, followed by the normal display. The screen displayed will be one of the information displays available and will be the display that was selected before the unit was last switched off.

Windmaster Operating Instructions

Selecting the Display

The Windmaster provides a number of useful displays for showing information available to the unit. The following information can be be displayed:-

Wind Displays:-

- Close Hauled Display 60° - 0 - 60° & Wind Speed (App or True)
- Reaching Display 120° - 0 - 120° & Wind Speed (App or True)
- Full 360° Display & Wind Speed (App or True)
- Digital Display - Apparent and True Wind Speed/Direction
- Digital Display - Max Wind Speed/Boat Speed/Velocity Made Good (VMG)

GPS Displays (requires NMEA combiner):-

- Current position (Lat/Long)
- UTC time (with offset if required)
- Bearing and distance to waypoint
- Course and speed over the ground
- Direction to steer/Cross track error

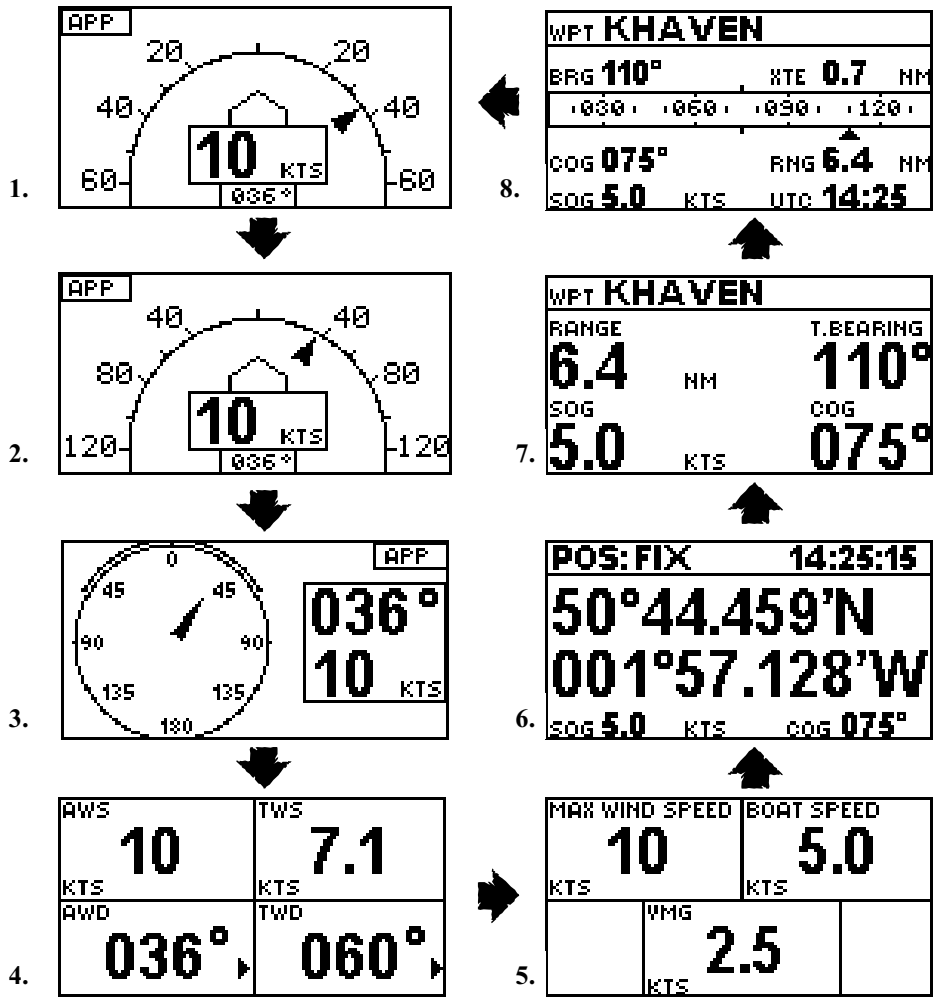
Important Notes:-

- True wind and VMG calculations require a speed input from either an EchoPilot paddle wheel or a GPS input (GPS input can only be obtained if an NMEA combiner is used). It should also be noted that the paddle wheel will provide speed through water and the GPS will give speed over the ground. These two types of speed will give different true wind readings depending on tides/ currents etc. Care must be taken when interpreting the true wind.

- To receive GPS and Wind NMEA data simultaneously, an NMEA combiner will be required to combine the output of the wind sensor and the output of the GPS with the resulting NMEA sentence connected to the unit via the single NMEA input.

To change the current display, press the **UP ARROW** button. This will cycle through all the displays available. Some of these screens can be be turned off by the user, should it be required (see **Changing the Unit Settings** on how to do this).

Windmaster Operating Instructions



Windmaster Operating Instructions

1. Close Hauled Display 60° - 0 - 60° & Wind Speed (App or True)
2. Reaching Display 120° - 0 - 120° & Wind Speed (App or True)

Displays the current wind speed and direction on either a 'close hauled' (0 to 60°) or 'reaching' (0 to 120°) display, depending on which display is selected. If NMEA wind is being received by the instrument, 'NMEA' will be displayed in the top right hand corner of the display. If no NMEA data is received, the 'NMEA' in the top right hand corner will flash at 1 second intervals.

If the wind direction is out of the range of the selected scale, a down arrow pointer will be displayed on either the left or right of the angle readout box, depending on whether the angle is less than 180° (pointer will appear on the right) or more than 180° (pointer will appear on the left).

True or Apparent Wind can be selected either from the menu, or by pressing and holding the **MENU** button while in normal display mode for approximately 3 seconds - until a second beep is heard. This will toggle between 'TRUE' and 'APP' displayed in the top left hand corner of the display. If there is no speed input to the instrument, the true wind reading will be the same as the apparent wind reading.

3. Full Circle Display 0 - 360° & Wind Speed (App or True)

Displays the current wind speed and direction on a full circular (0 to 360°) display. If NMEA wind is being received by the instrument, 'NMEA' will be displayed in the top right hand corner of the display. If no NMEA data is received, the 'NMEA' in the bottom right hand corner will flash at 1 second intervals.

The close hauled section is indicated by the double line in the 0 - 60° regions.

True or Apparent Wind can be selected either from the menu, or by pressing and holding the **MENU** button while in normal display mode for approximately 3 seconds - until a second beep is heard. This will toggle between 'TRUE' and 'APP' displayed in the top left hand corner of the display. If there is no speed input to the instrument, the true wind reading will be the same as the apparent wind reading.

Windmaster Operating Instructions

4. Digital Display - Apparent and True Wind Speed/Direction

This screen displays both true and apparent wind speed/direction in digital form simultaneously. If each of the NMEA wind values are being received by the instrument, 'NMEA' will be displayed in the top right hand corner of each box. If no NMEA data is received by each box, the 'NMEA' in the top right hand corner will flash at 1 second intervals.

If there is no speed input to the instrument, the true wind reading will be the same as the apparent wind reading.

5. Digital Display - Max Wind Speed/Boat Speed/Velocity Made Good (VMG)

This screen displays the maximum recorded wind speed by the instrument and also the current boat speed and velocity made good (VMG).

The maximum recorded wind speed will be either true or apparent, depending on whether true or apparent is selected. The maximum speed can be reset in the menu (see **Changing the Unit Settings** on how to do this). The boat speed will only be displayed if a speed (paddle wheel or GPS) is connected to the instrument. VMG also requires a speed input and will display 0 if speed is not available.

6. & 7. GPS Position & Waypoint Information

Two screens displaying current GPS position, UTC, course over ground, speed over ground, waypoint name and distance/bearing to waypoint. The UTC time displayed includes a time zone offeset that can be set by the user in the menu.

8. Steer Direction Indicator

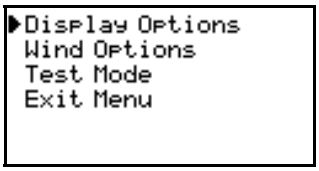
This screen also displays waypoint information (name, bearing and distance) but also includes a 'direction indicator' to provide a visual aid to help steer towards a waypoint.

The direction indicator displays a 126° sector, centred around the current course over ground. The steering indicator is an upwards pointing arrow showing the bearing to waypoint. If the up arrow (i.e. desired bearing) is to the left of the centre then the course must be adjusted to the left to achieve the desired bearing. The reverse applies when the arrow is to the right of centre (steering to the right is required). If the waypoint bearing is off the scale, the arrow will appear at edge of the scale, pointing left or right to show the direction required to achieve the desired course.

Windmaster Operating Instructions

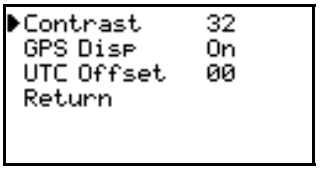
Changing the Unit Settings

A simple menu system allows you to change the unit's settings. To access the menu press the **MENU** button and this will call up a main menu showing the available options.:-

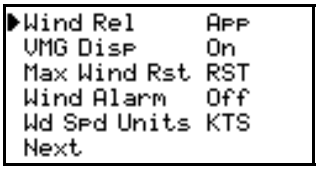


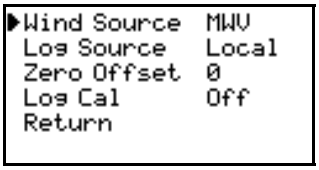
The desired sub-menu option is chosen using the **MENU** button. When the arrow cursor is alongside 'Display Options' or 'Wind Options', pressing the **UP ARROW** button enters into another sub-menu. If 'Test Mode' is selected, pressing the **UP ARROW** button enters this mode (see later section) and if 'Exit Menu' is selected, pressing the **UP ARROW** button returns the user to the main display.

The 'Display Options' and 'Wind Options' sub-menus are shown below:-



Display Options





Wind Options

Windmaster Operating Instructions

The desired menu option is chosen using the **MENU** button. When the arrow cursor is alongside the appropriate option, pressing the **UP ARROW** button changes the setting. The unit will return to the main display after 10 seconds if no buttons are pressed within that time. Alternatively, the user can return to the main display at any time by pressing and holding the **MENU** button for 3 seconds until a second beep is heard.

Display Options

Contrast

The Contrast can be set between 20 (min. contrast) and 50 (max. contrast). The **UP ARROW** button increases the value and upon reaching the maximum value, cycles round to the minimum value. The default setting is 30. Pressing and holding the **UP** button increases the rate at which the setting is changed.

GPS Displays

The GPS displays can be turned off if the GPS repeater function is not required. The **UP ARROW** button changes the setting to 'ON' or 'OFF'.

UTC Offset

An offset can be applied to reflect the current time zone with reference to GMT. The UTC Offset can be set from -12 to +12 hours. The **UP ARROW** button increases the setting by 1 hour. When +12 hours is reached, the setting returns to -12 hours.

Windmaster Operating Instructions

Wind Options

Wind Rel
Wind Rel selects whether apparent or true wind is displayed. The **UP ARROW** button changes the setting from 'App' to 'True' and vice versa.

VMG Display
The VMG/Max Wind/ Boat Speed display can be turned off if it is not required. The **UP ARROW** button changes the setting to 'On' or 'Off'.

Max Wind Reset
Pressing the **UP ARROW** resets the maximum recorded wind speed to 0.

Wind Alarm
The Wind Alarm can be set to Off, 5 Knots to 100 Knots. The **UP ARROW** button increases the setting by 1 Knot. When 100 Knots is reached, the setting returns to 'Off'. When the wind speed reaches this setting, an alarm will sound (1 second on, 1 second off). The alarm setting is retained after power down. Pressing and holding the **UP ARROW** button increases in the rate at which the setting is changed.

Wind Speed Units
Knots, Metres/Sec (MPS), or Beaufort Scale can be selected as the Wind Units using the **UP ARROW** button.

Wind Source
At present, only MWV (NMEA) can be selected as the Wind Source. Using the **UP ARROW** button will have no effect.

Log Source
'Local' (connected transducer), 'VHW' (NMEA - speed through water), 'VTG' (NMEA - speed over ground), 'RMA' (NMEA - speed over ground) or 'RMC' (NMEA - speed over ground) can be selected as the Log Source using the **UP ARROW** button.

Windmaster Operating Instructions

Zero Offset

The Zero Offset is applied to the wind direction reading and allows for any angle deviation introduced by the wind sensor installation. The offset can be set from -180° to +180°. The **UP ARROW** button increases the setting by 1°. When +180° is reached, the setting returns to -180°. If the offset is positive, the set offset will be added to the wind direction. If the offset is negative, the set offset will be subtracted from the wind direction. Pressing and holding the **UP ARROW** button increases in the rate at which the setting is changed.

Log Calibration

The Log Calibration can be set from 20% (speed x 0.2) to 250% (speed x 2.5). A 100% setting is 'no calibration' (i.e. speed x 1). The **UP ARROW** button increases the setting by 1%. When 250% is reached, the setting returns to 20%. The wide range of calibration allows log transducers with different pulse rates to be used with the unit (other than the EchoPilot log transducer which is 10,000 pulse per NM). Pressing and holding the **UP ARROW** button increases in the rate at which the setting is changed.

Backlight

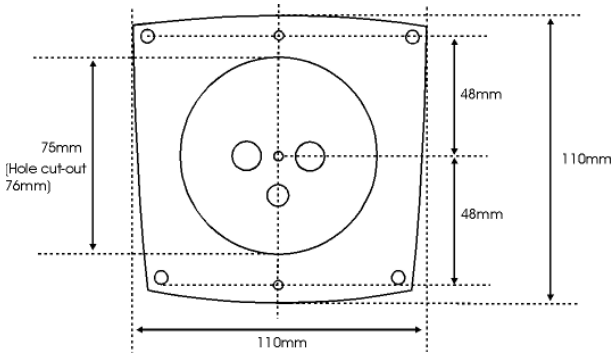
The backlight can easily be switched on and off by pressing and holding the MENU button while in normal display mode for approximately 3 seconds - until a third beep is heard. This toggle the backlight on or off as desired.

Windmaster Installation Instructions

Fitting the Display

The Windmaster is designed to be flush mounted on an instrument panel or bulkhead.

- Select a suitable site, visible by the helmsman. If in doubt, try temporarily wiring to a 12 volt supply and switching on the display.
- Cut a circular hole of diameter 76mm.
- If the security studs and knurled nuts are required, drill 4mm holes, 48mm directly above and below the centre of the large hole (as shown below).



- Fit the instrument on the panel using the supplied gasket. If required, use the two studs & knurled wheels to secure. **Do not** over tighten the knurled wheels.

<u>Important Note:</u> It is very important to protect the rear cable entry points from water ingress.

Windmaster Installation Instructions

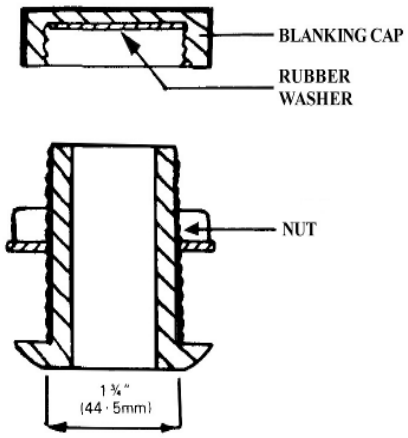
Ultrasonic Wind Sensor Installation

Please refer to the CV3F Ultrasonic Wind Sensor instruction booklet for installation instructions of the wind sensor itself. However, instructions for connecting the sensor to the Windmaster display instrument can be found on page 16 of this manual.

Log Paddle Wheel Installation

The Transducer should be immersed in an area free from turbulent aerated water, and where there is least risk of external damage. Accurate readings can be only obtained when there is a flow of water across the face of the transducer and where this flow represents the speed of the boat through the body of water.

Avoid the bow and stern area where the ships contours modify the water velocity, and in power boats anywhere in the vicinity of the propellers.



Do not choose a position close to the toilet, bilge or cooling outlets, or earthing plates. On most power and sailing craft a convenient position about midships, immersed as deeply as possible, will usually be found suitable. On planing craft mount as far aft as possible. When the position has been determined the hull should be pierced and the skin fitting assembled as shown in the sketch. Drill a 44.5mm (1.75'') hole in a suitable position off set from the centre line but as deep as possible. Insert the flanged fitting through the hole after a generous application of bedding compound and secure with the nut on the inside. Do not overtighten.

Windmaster Installation Instructions

Leave enough room inside the hull (and enough cable) to permit withdrawal of the transducer for cleaning purposes. This does not result in much water being shipped if undertaken afloat (but not underway). More care is necessary if the transducer is deeply immersed i.e. over lm (3 feet) and a second person should be present in case of accidents. The cable should run clear of the bilges along a protected route and be secured at regular intervals. The 'O' rings should be kept greased at all times with waterproof grease.

Log transducers are available in 2 forms. Low speed transducers have a 16mm wide impeller blade and cover the range 0.1 - 28 knots. For faster boats the high speed transducer has an 8mm wide impeller blade and will record speeds of 1 - 40+ knots. High speed transducers must be fitted with the point on the handle facing forward.

Using Other Manufacturers Transducers

The flexibility of the Windmaster allows the possibility of other manufacturers log transducers to be connected directly to the Windmaster unit. As there are a range of transducers available, it is advised that before any installation is carried out, EchoPilot should be contacted to ensure compatibility of equipment.

Other manufacturers instructions should be followed when installing their transducers.

Windmaster Installation Instructions

Connecting the NMEA Wind Sensor/Log Transducer/ Power

An 8-pin Mini Din short flying lead is provided for connecting power (12 V), the wind sensor, a log transducer and other NMEA devices (providing an NMEA combiner is used) to theWindmaster. The 8 pin Mini Din plug of the flying lead is plugged directly into the 8-pin Mini Din socket on the rear of the instrument.

To facilitate the insertion of the plug, the 'O' ring in the socket must be greased. **Silicon grease must be used for this purpose**. Any petroleum based grease, such as vaseline, will cause the 'O' ring to swell and prevent correct insertion of the plug. Vegetable oil should also not be used.

The individual cores of the flying lead have the following functions:-

NMEA cable colour	Description / Label
Screen	-ve battery terminal
Green	+ve battery terminal (12 V)
Brown	NMEA output +ve
White	NMEA output -ve/signal gnd
Orange	Log signal input
Red	Log supply (5 V)
Black	NMEA input +ve
Yellow	NMEA input -ve

The wiring diagrams shown on pages 18 and 19 show how to connect power, the log transducer, an NMEA device (GPS and/or wind sensor) and another unit (as a repeater).

Note:- For customers using an older EchoPilot Log transducer, please refer to the table on the page opposite for connection details.

Windmaster Installation Instructions

Connecting Older EchoPilot Log Transducers

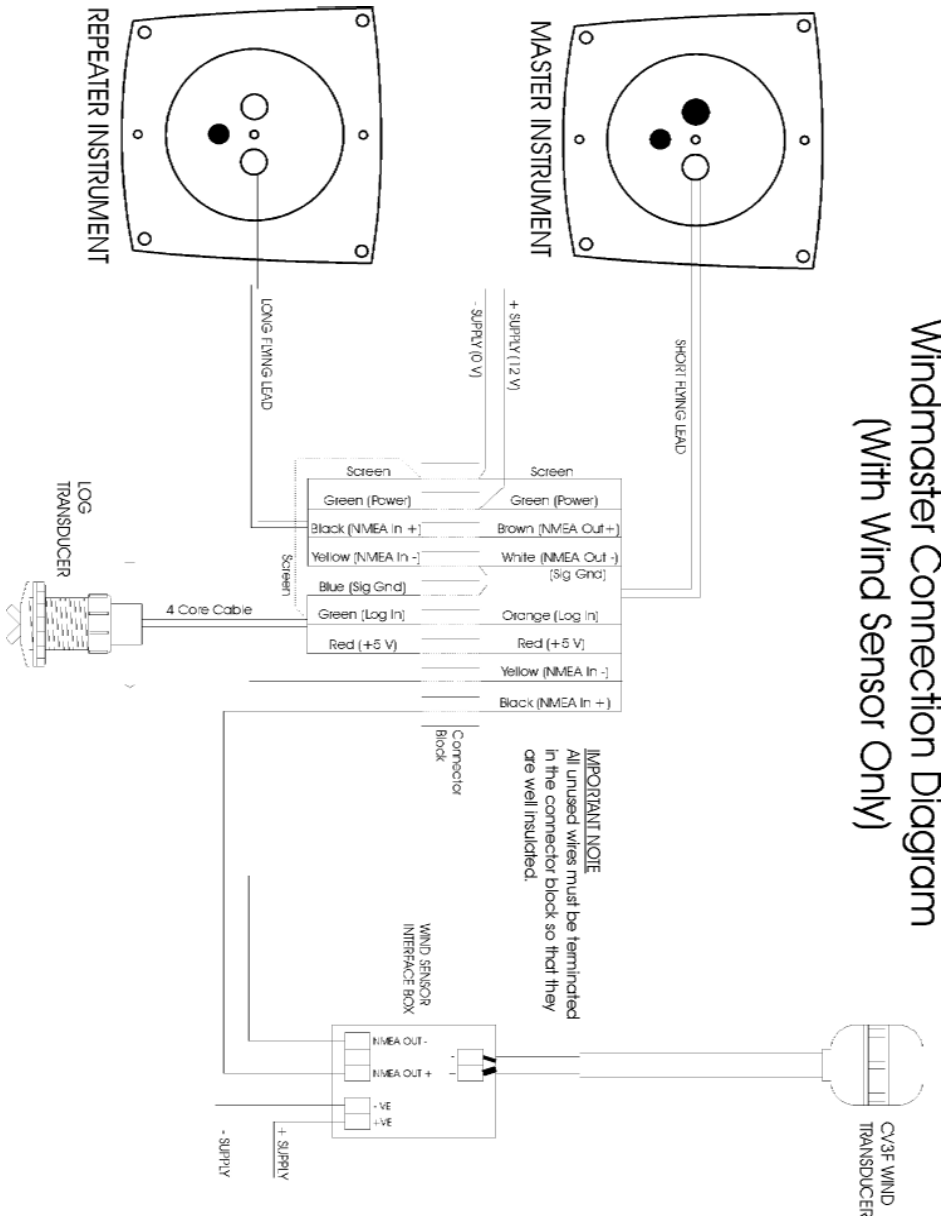
An older EchoPilot log transducer will have a plug that was previously used to connect to the display instrument. The plug needs to be removed and the cable stripped back. By using the table below, the appropriate core colours need to be identified by the plug type and number of cores within the cable.

Once the colours have been established for the 3 three required connections (+5V, Log Signal & Gnd), Connect the wires as shown on the connection diagram, substituting in the new colours obtained from the table. Ensure that unused wires are well insulated.

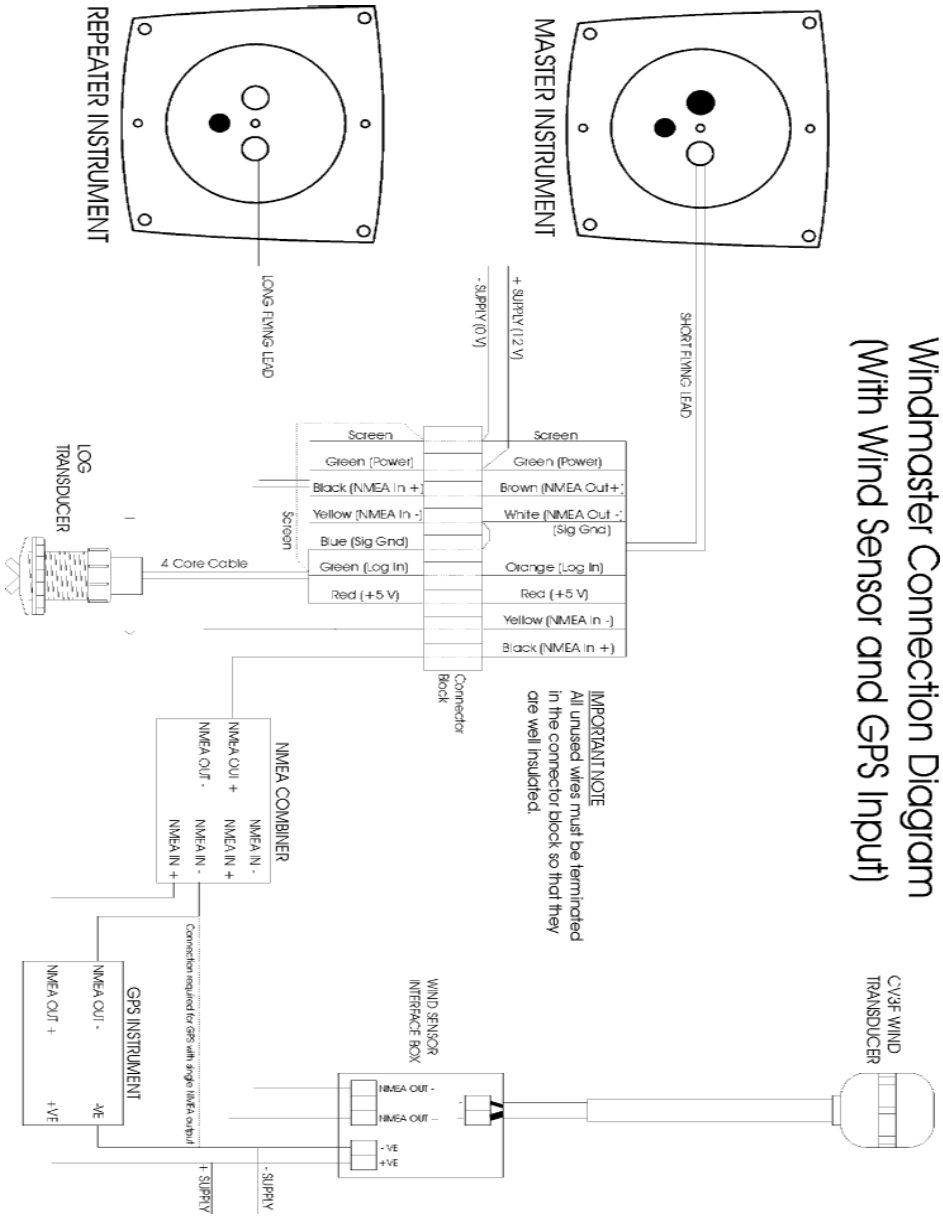
Log Transducer Type Cable Colour/Diameter	No of Cores	Colour for +5V	Colour for Log Signal	Colour for Signal Gnd
3 Pin Connector Grey/4.8 mm	2	Red	Black	Shield
8 Pin Mini-Din Connector Black/5.8 mm	6	Red	Orange	Shield
8 Pin Mini-Din Connector Black/3.5 mm	6	Red	White	Shield
8 Pin Mini-Din Connector Black/6.1 mm	8	Red	Orange	White
8 Pin Mini-Din Connector Black/6.2 mm	8	Red	Violet	White
8 Pin Mini-Din Connector Black/4.1 mm	3	Red	Green	Blue
4 Core Flying Lead Grey/4.5 mm (current)	4	Red	Green	Blue

Important Note:-
Log cables that use their 'Shield' as 'Signal Ground' should have the Shield connected to the White (NMEA Out -ve/Signal Ground) core of the 'Short Flying Lead' which is plugged into the Bronze+ instrument. Do not connect it to the 'Screen' of the Short Flying Lead.

Windmaster Installation Instructions



Windmaster Installation Instructions



Windmaster Installation Instructions

Connecting Power

The Windmaster will run on 9-14 volts DC and is reverse voltage protected. Therefore if the battery voltage is connected incorrectly no damage will occur, but the unit will not turn on.

The instrument will switch on as soon as power is applied to these wires. If the user wishes to be able to switch off their instrument, a suitable switch should be connected in line with the positive supply.

Using the Windmaster as a Repeater

As the Windmaster will receive and transmit NMEA data, a second unit may be used as a repeater. This requires the NMEA outputs of the designated master unit being connected to the NMEA inputs on the repeater unit (this is shown on the wiring diagram). Wind, Log and GPS information will be passed from the master unit to the repeater unit. The Wind and Log sources must be set to NMEA on the repeater unit.

Maintenance

Keep 'O' rings and transducer locking ring threads well greased with a silicone grease. Protect plugs and cables from chafe. Avoid long term exposure of the LCD to direct sunlight.

Windmaster Fault Finding

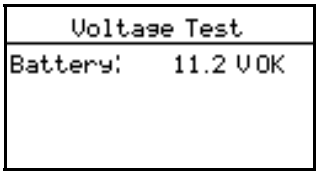
Fault Diagnosis Using Test Mode

Test Mode allows the user to run some simple diagnostic tests on the unit in case a fault should occur either within the display unit or the transducer.

Voltage Test:-

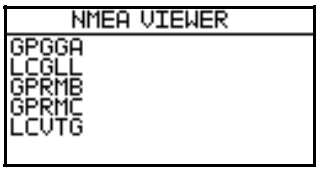
Once Test Mode is entered from the menu, the user is presented with the 'Voltage Test' screen. This test monitors the battery supply voltage to the instrument.

A low voltage on the supply will indicate a "LOW" indication on the display.



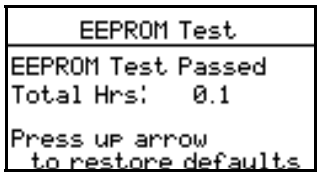
NMEA Viewer:-

Pressing the **MENU** button will change the display to the 'NMEA Viewer'. This screen allows the NMEA sentences being received by the unit to be viewed. This enables the user to check that the NMEA input connection is OK and to ensure that the appropriate sentences are being received to display desired information.



Windmaster Fault Finding

EEPROM Test:-
Pressing the **MENU** button will change the test to the 'EEPROM Test'. This test checks the non-volatile memory that stores the user settings. This screen also displays the total running time of the instrument.



The EEPROM test will result in either a pass or a failure. If the test fails, the non-volatile memory device is faulty and will not be able to store the user settings (this also includes the total running time). In this case, all settings will return to their default values when the unit is switched off.

The unit settings can be reset to their default settings by pressing the **UP ARROW** button twice.

Pressing the **MENU** button will return the unit to the main display.

Windmaster Fault Finding

Some Common Faults

Display doesn't switch on:-
- Battery not connected (or reverse polarity)
- Battery voltage too low

No display once switched on:-
- LCD Faulty
- Eyes shut

No valid Wind (i.e. NMEA flashing):-
- Wind sensor not connected (or not connected properly)
- Damaged sensor cable
- Incorrect wind source selected
- Appropriate NMEA sentences not being received (if NMEA source selected)

Incorrect Wind Displayed :-
- Wind sensor not aligned with bow
- Excess heal of transducer (not vertical)

No valid speed (reads 0.0, wrong speed or NMEA flashing)
- Log transducer not connected (or not connected properly)
- Damaged transducer cable
- Incorrect log source selected
- Appropriate NMEA sentences not being received (if NMEA source selected)
- Calibration set too high or too low
- Log transducer's impeller is fouled up
- Impeller's magnets are missing (fast rotation due to pressure washing can cause magnets to fly out!)

No GPS data displayed
- GPS instrument not connected (or not connected properly)
- GPS NMEA output not enabled
- Appropriate NMEA sentences not being received

Windmaster Technical Specifications

Specification	Bronze+
Voltage	12v DC
LCD type	Transflective, LED Backlighting
Viewing Area	81 x 45 mm 126 x 64 pixels
Wind Direction	0 - 360°, 60°-0-60°, 120°-0-120°
Wind Speed	0 - 100 Knots
Built-in Test Facility	Yes
Repeater Option	Yes
Alarms	Wind speed alarm
Wind Sensor	CV3F Ultrasonic sensor, or other NMEA compatible sensor
Log Transducers	EchoPilot Log transducer Option for other manufacturer's log transducers

NMEA 0183 (ver 2.0) Accepted Input Sentences

Formatter	Description
MWV	Wind Speed and Angle
BWC	Bearing and Distance to Waypoint
BWR	Bearing and Distance to Waypoint, Rhumb Line
GGA	Global Positioning System Fix Data
GLL	Geographic Position, Latitude/Longitude
RMA	Recommended Minimum Specific Loran-C Data
RMB	Recommended Minimum Navigation Information
RMC	Recommended Minimum Specific GPS/TRANSIT Data
VHW	Water Speed and Heading
VTG	Track Made Good and Ground Speed
ZDA	Time and Date

Windmaster Technical Specifications

NMEA 0183 (ver 2.0) Output Sentences

All sentences accepted by the Windmaster are also output.

Wind sentences (MWV) are output at 0.5 second intervals and GPS sentences are output at 2.5 second intervals.

We hope you enjoy using your EchoPilot Windmaster
WE ARE ALWAYS PLEASED TO TALK TO OUR CUSTOMERS.

Author: Paul Beeston (Senior Dogs Body)
Last Updated: 20.9.05

For up to date information and advice, please telephone, browse our Website, or send us an E-Mail.

E-Mail: info@echopilot.com
Website: www.echopilot.com