

# MICRO 210 MULTIFUNCTION SPEED LOG

for  
Yachts and Power Craft



## Installation and Operating Instructions

## INTRODUCTION

The Micro 210 speed log is designed to provide much of the navigation information required by a small vessel at sea, but is small and easy to install. The key features are:—

- \* 9 FUNCTIONS
- \* DIGITAL DISPLAY
- \* WATERPROOF HOUSING DESIGNED FOR EXTERNAL SURFACE MOUNTING
- \* COMPACT SIZE — 112mm x 112mm x 35mm (4.4in x 4.4in x 1.4in)
- \* SIMPLE OWNER INSTALLATION
- \* VERY LOW CURRENT CONSUMPTION — 5mA + LIGHTING
- \* PUSH BUTTON SWITCHES FOR EACH MAJOR FUNCTION. FUNCTION IN USE INDICATED BY DISPLAY
- \* NIGHT LIGHTING — 60mA
- \* SPEED OUTPUT FOR SATELLITE NAVIGATOR
- \* ELECTRONIC PADDLE OR TRAIL TRANSDUCERS (Interchangeable)
- \* OPTIONAL WINDSPEED TRANSDUCER
- \* OPTIONAL NON—RESETTABLE MILES COUNTER

The single chip microcomputer which is the heart of the system, has a low power consumption and presents the required information on the display when the appropriate push button is selected. The log is supplied with either a trailing or a paddlewheel transducer to choice, and has speed and distance calibration when operating in paddle mode.

## OPTIONS

- \* WINDSPEED
- \* REPEATER
- \* NON—RESETTABLE ELECTRO MECHANICAL MILES COUNTER
- \* BRONZE HULL FITTINGS

**SPECIFICATION**

Electronics	4 bit microcomputer with 2K of fixed ROM	
Functions	Speed 1	0–30 knots averaged over 4 seconds (low damping)
	Speed 2	0–30 knots averaged over 16 seconds (high damping)
	Paddle stopped alarm	Audible low waterspeed alarm if speed below 0.6 knots for 15 seconds
	Log 1	0–999.9 nautical miles reset at switch-on
	Log 2	0–99.99 reset during passage if required
	Sat-Nav speed output	100 pulses per nautical mile (12 volt 40ms)
	Start timer/ Passage timer	Counts in seconds and minutes for 1st hour and minutes and hours thereafter. Audible alarm at 5 and 10 minutes.
	Peak speed	Max. recorded speed (16 sec. damping) Resettable if required
Display	LCD with 18mm (0.7in) digits and function annunciators	
Illumination	0.7 watt backlight to LCD operated from front switch panel	
Waterproof housing	Noryl glass filled thermoplastic with moulded-in window and membrane switch. Fixing by 4 x 4mm screws on to neoprene gasket. Mounting surface must be flat to within 1mm. Size – 112mm x 112mm x 35mm (4.4in x 4.4in x 1.4in)	
Wiring	Supplied with 5m of 6 way cable and terminal box 115mm x 60mm x 30mm for connection of 12v supply, transducers, etc.	
Power requirements	8–16 volts 5mA + 60mA lighting (when required)	
Calibration (Not active in trail mode)	On speed and distance simultaneously via 16 position switch 3 1/3% shift per position	

**Accuracy**Distance and speed  $\pm 3\%$  after calibrationWindspeed  $\pm 5\%$ 

Time – within 5 seconds in 24 hours

**Transducers – waterspeed**

- a) Paddle – Hall effect sensor unit moulded in glass filled thermoplastics. Dia of hole for skin fitting 45mm (1.75in). Max hull thickness 30mm (1.2in). Length of cable 10m. Normally positioned 25% along waterline length from bow, near centre line for sailing craft. (25% – 50% for power craft.)
- b) Trail – Hall effect unit with 14m cable. (8 – 10m max over side.)

**OPTIONS****WINDSPEED**

This option consists of a masthead transducer and cable providing a speed of 0–65 knots on the log unit.

Masthead transducer – lightweight, detachable with 3 cup anemometer rotor.

Mast cable – 20m 4 way with transducer mounting block.

Switching – solid state (Hall effect).

**ELECTRO–MECHANICAL MILES COUNTER**

Nautical miles indication 0–9999.99 within black plastic case.

Connected to log terminal box. Intended for flush mounting and spring clip provided. Not suitable for external mounting.

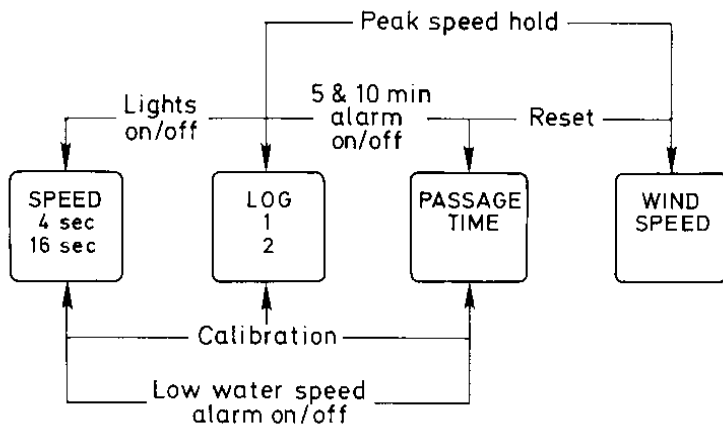
Length behind flange – 60mm.

## SECTION 1. OPERATION & FUNCTIONS AVAILABLE

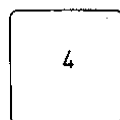
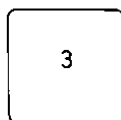
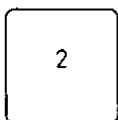
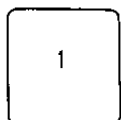
### A. PRINCIPLES OF OPERATION

The principle of operation is that all regularly used functions such as boatspeed, distance, time and wind are simply and immediately accessible via a single button push. The less commonly used functions such as alarm set, lights on/off and calibration require simultaneously pushing of up to 3 buttons. Study of the following sections of the manual will be required to master operation of these latter functions.





















































The keypad is laid out as follows:—



To assist explanation of button pushing sequences, the following button numbering will be used in the text:—



## B. SUMMARY OF FUNCTIONS.

<u>FUNCTION</u>	<u>BUTTON/S TO PRESS</u>			
SPEED 4 SEC				
SPEED 16 SEC				
LOG 1				
LOG 2				
PASSAGE TIME				
WINDSPEED				
RESET (IN TIME, PEAK SPEED HOLD, OR LOG MODE)				
PEAK SPEED HOLD				
5 & 10 MIN ALARM ON PASSAGE TIME				
LOW WATERSPEED ALARM				
LIGHTS				
CALIBRATION MODE				
TRAIL/PADDLE (IN CALIBRATION MODE ONLY)				

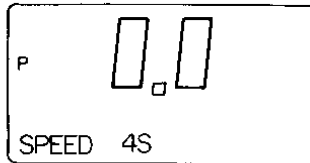
## C. FUNCTIONS – DETAILED DESCRIPTION

### Switching On

After switching on all functions are set to zero or off.

Speed 4s reads	0.0	Kts
Speed 16s reads	0.0	Kts
Log 1 reads	000.0	NM
Log 2 reads	00.00	NM
Passage Time	00:00	Mins
Windspeed	00	Kts
Peak Speed Hold	0.0	
Low waterspeed alarm	– off	
5 and 10 minute alarm	– off	
Lights	– off	

The log will be found to be in speed 4s mode (also in trail or paddle mode depending on which transducer is supplied – see calibration procedure for method of changeover).

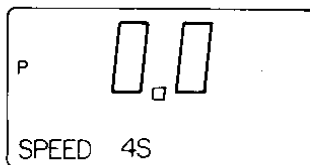


### Button Pressing

Each time a button is pressed a short 'beep' will be heard to indicate that the instrument has recognised that a button has been pressed.

### Speed 4 sec

When the log is switched on it will power up displaying speed 4 sec. If the log is set to another function, speed 4 sec is selected by pressing button 1, display will read:–

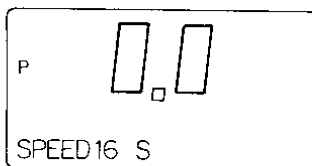


Speed 4 sec displays the boatspeed with a damping of 4 seconds. This indicates that the boatspeed is averaged over a 4 second period, although the display is updated every second.

e.g. If the current boatspeed is 0 knots and the boat suddenly begins to move at 10 knots, the display will read after 1 second – 2.5 knots, 2 seconds – 5 knots, 3 seconds – 7.5 knots, and finally 4 seconds – 10 knots. (Therefore taking 4 seconds to read the boatspeed.) Speed 4 seconds is a lightly damped readout of boatspeed used for sail trimming etc.

### Speed 16 sec

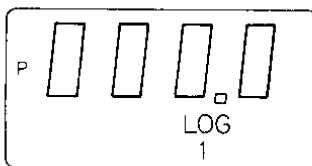
Speed 16 sec is selected by pressing button 1 once if speed 4s is being displayed or twice if any other function is shown. Display will then read:—



Speed 16 sec displays boatspeed with a damping of 16 seconds. The display in this case is updated every 16 seconds. Speed 16s is a heavily damped readout of boatspeed and therefore should be used for navigation and in heavy seas where the boat's motion is erratic and hence instantaneous speed is variable.

### Log 1

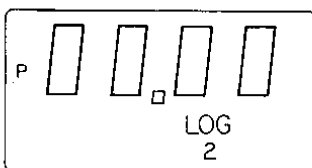
Log 1 is selected by pressing button 2. When the unit is switched on the display will read:—



Log 1 can only be reset to zero by switching off. Therefore it indicates total mileage for a race or cruise or until the power is turned off. Readout is in tenths of a nautical mile up to a total distance of 999.9NM

### Log 2

Log 2 is selected by pressing button 2 once if the unit is displaying Log 1 or twice if any other function is displayed. The display will read:—

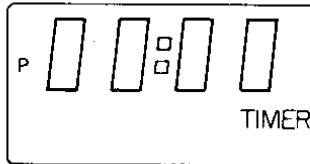




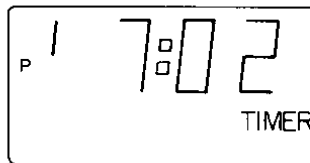
Log 2 is a trip log that can be reset to measure the distance between navigation points, and gives a readout in hundredths of a nautical mile up to 99.99. Log 2 is reset by pressing buttons 3 and 4 whilst in Log 2. Display will then read 00.00 after reset.

### Passage Time

Passage time is selected by pressing button 3, when the display will read:—



Passage time counts up in minutes and seconds for the first hour; thereafter it counts up in hours and minutes. Passage time can be reset to zero by pressing buttons 3 and 4 simultaneously when in passage time. The display will then count up from 00.00 again. If an audio alarm is required at 5 and 10 minutes, buttons 2 and 3 should be pressed simultaneously after resetting the passage time. To indicate the alarm is set, the display will show a bar as shown in the diagram below. Pressing 2 and 3 again will clear the alarm.

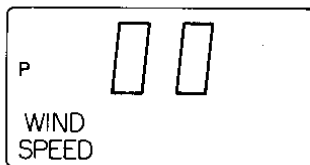


After 10 minutes the indicator bar will no longer be shown, nor will the alarm be set.

**NOTE:** Passage time is ELAPSED TIME and not real CLOCK TIME.

### Windspeed

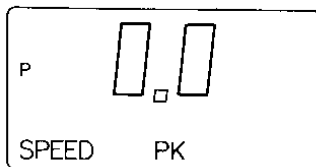
Windspeed is selected by pressing button 4, and the display should read:—



Windspeed is updated every 2.2 seconds.

## Peak Speed Hold

Peak speed hold is selected by pressing buttons 2 and 4 simultaneously, and the display will read:—



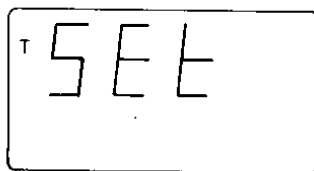
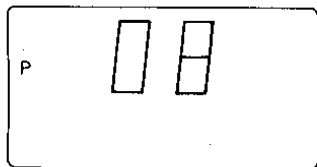
Peak speed hold shows the highest speed attained since the power was switched on (or peak speed hold was reset). The damping is over a 16 second period, therefore the peak speed displayed was maintained over at least a 16 second period. On each 16 second period the microprocessor compares the present speed with the peak speed, and if the present speed is greater it stores it as a peak speed. The function can be reset by pressing buttons 3 and 4 simultaneously whilst still in the function; the display should then read 0.0. This function can be used to compare maximum speeds attained on a particular sail point and to measure the effectiveness of sail trimming.

## Low Water Speed Alarm

Low Water Speed Alarm is selected by pressing buttons 1 and 3 simultaneously when the display will show a small bell symbol in the top left hand corner of the display to indicate the alarm is set. The alarm will sound when the speed drops to 0.6 knots and is cancelled by pressing any button. This function is to indicate that the speed has dropped to a very low level or that the transducer is stopped by weed, etc. To disable the alarm, press buttons 1 and 3 again and the symbol will clear.

## Speed/Distance Calibration

Calibration mode is selected by pressing buttons 1, 2 and 3 simultaneously. This is purposefully a difficult mode to get into and may take several attempts. When in the mode the display will read:—



The display will appear as above dependent on whether the unit was built as a Trail log or a Paddle log. If operating as a Paddle log the number on the display will indicate the calibration setting on the unit.

Calibration of speed and distance may be required in some paddle installations, but this should not be attempted unless shown to be necessary. The calibration can be adjusted by rotation of the slotted screw at the front of the instrument head. A 5mm wide screwdriver can then be used to move the shaft through any of the 16 positions. Position 8 is normal and each new position provides a shift of 3.33%. The position of the calibration switch is shown on the display during this operation. Position 00 provides the fastest reading, position 15 is the slowest.

In trail mode the calibration is set and no adjustment is possible or required.

### Calibration Table

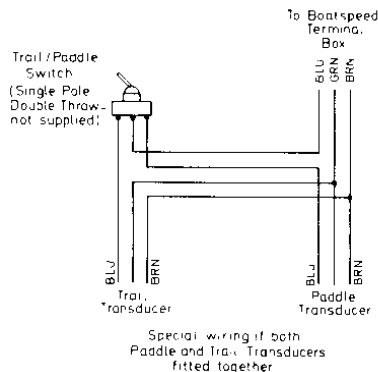
SWITCH POSITION		CALIBRATION SHIFT
0		+ 26.66%
1		+ 23.33%
2		+ 20.00%
3		+ 16.66%
4		+ 13.33%
5		+ 10.00%
6		+ 6.66%
7		+ 3.33%
8	Nominal Value	0.00%
9		- 3.33%
10		- 6.66%
11		- 10.00%
12		- 13.33%
13		- 16.66%
14		- 20.00%
15		- 23.33%

### IMPORTANT NOTE:

Calibration can be upset by hull fouling, which will cause slow readings and should be carefully guarded against at the end of the season.

## PADDLE TO TRAIL CHANGEOVER

To change over from Paddle to Trail, or vice versa, press buttons 1 and 4 whilst in calibration mode. The log will sound B—E—E—P, BEEP, BEEP and change the display accordingly. Obviously the transducers will need to be changed or switched using a simple external changeover switch as shown:—



## Lights

The lights are switched 'on' or 'off' by pressing buttons 1 and 2 simultaneously. When the lights are on, the small bulb symbol will be displayed in the lower right hand corner of the display. This is to warn the operator that the lights are 'on' in daytime, when power would be consumed unnecessarily.

## D. OPERATIONAL NOTES FOR TRANSDUCERS

### Operational Notes for Paddle Wheel Transducer

The paddle wheel transducer should be installed in the skin fitting with the cross pin pointing fore and aft, and this position should always be maintained, as incorrect alignment will cause faulty readings. Before first trials, and occasionally during use, the cleanliness and ease of rotation of the paddle wheel should be checked. Blowing on the paddle wheel should cause it to rotate rapidly, and a reading on the speed meter will be noted. During periods when the yacht is not in use, it is strongly recommended that the paddle wheel assembly is withdrawn and the blanking plug installed. This will minimise fouling of the paddle and ensure trouble free operation. (Use of a soft sponge will minimise the entry of water during operation.) Please note that weed can normally be cleared without withdrawing the transducer — rotate the transducer slowly through 180°. **DO NOT OVERTIGHTEN THE CAP NUTS** to avoid damage to them or the skin fitting.

### Operational Notes for Trailing Transducer

When operating in shallow water the length of rotator cable trailed should be reduced. Thus even when the vessel is drifting the rotator bearing cannot pick up damaging grit by being dragged over the sea bed. Accuracy will be little, if at all, diminished. When

recovering the rotator, carefully coil down the cable to a diameter of about 200mm(8in) as the rotator is pulled on board. It is important to avoid a kinked or tightly coiled cable, as this will affect ease of operation. Check operation of the rotator occasionally – this should turn absolutely freely because the accuracy of the unit is dependent on this bearing. Should foreign matter enter the bearing, this must be washed out. If necessary, the 'propellor' can be taken off by removal of the self locking nut and washer. Clean shaft and bearing and replace washer and nut most carefully to avoid loss.

**IMPORTANT NOTE:** When on passage, the normal practice of NOTING MILES READING HOURLY should be observed. Observation of the speed reading or setting of low speed alarm will give prompt warning of transducer weed fouling.

## **SECTION 2. INSTALLATION**

### **POWER SUPPLY**

The instrument should be connected to the ship's 12v supply, via a 1 amp fuse, preferably direct to the battery terminals. Connection through master switches, fuses, distribution blocks, etc. may not always provide the complete integrity required by the microcomputer unit, with risk of loss of data. The switch used for on/off control must be of good quality.

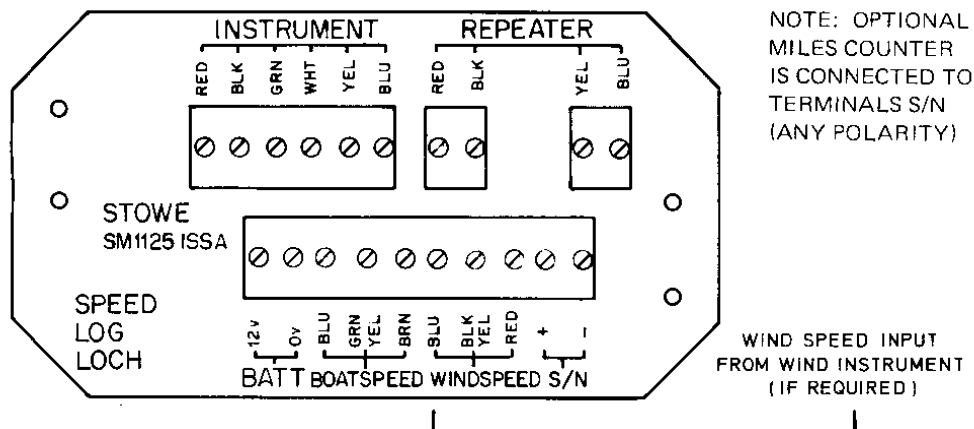
**WARNING:** Data loss can occur if the power supply drops below 9v, e.g. engine starting with a near exhausted battery.

### **INSTALLATION OF INSTRUMENT HEAD & TERMINAL BOX**

The instrument can be installed on deck or below on any clean flat surface, using 4 self tapping screws No. 6 x 1½in (38mm) or M4 bolts for fixing. The rear mounted gasket ensures sealing against water entry. Choose a location which allows good line of sight from the helm position, protected from direct contact with winch handles and wayward feet. A position within 6in (150mm) of the compass is normally acceptable, but it is important that all radio receiving equipment and aerial wires are at least 400mm (16in) away from the instrument head to minimise radio interference. Also establish a suitable sheltered position below for the terminal box within 2 metres (6ft) of the instrument. Now carefully position the paper drilling template provided and drill 4 holes 3mm (1/8in) diameter and 1 hole 10mm (3/8in) diameter. Next position the gasket behind the instrument, feed the 5m of 6 way cable along the bulkhead and attach the instrument using the 4 self tapping screws. **DO NOT FIT THE BLANKING PLUGS YET.**

The terminal box is secured using the 2 self tapping screws provided, and the 6 way cable from the instrument head connected to the marked terminal block. The cables from the paddle (or trail) transducer and the windspeed transducer (if applicable) are connected to the terminal box as indicated. Cables can be shortened if required. Carefully check all wiring before connecting the 12v supply.

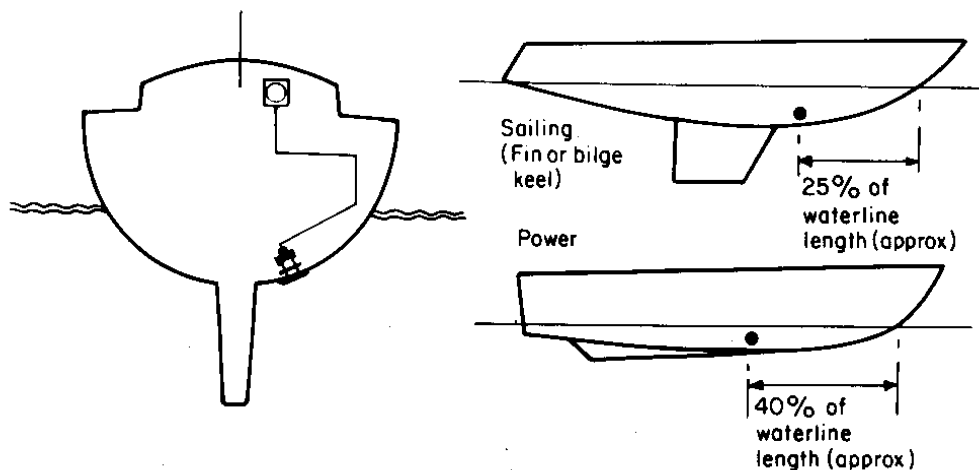
## TERMINAL BOX WIRING



## TRANSDUCER INSTALLATION

### 1. PADDLE WHEEL

The transducer positioning in the hull requires careful consideration.



The through-hull must be positioned so that it is always under water, near the centre line, but at least 160mm (6") away from the keel. In a sailing yacht a position forward of the keel is preferable.

The hole for the hull fitting should be positioned well clear of any internal frames or stringers. Ensure good access for removal of the paddle wheel assembly and clearing water spilled during this operation. Drill a small pilot hole first. Then a 44mm (1 3/4in) hole cutter in a hand brace or electric drill can be used. NOW FILE THE SMALL KEY CUT-OUT TO MATCH THE HULL FITTING.

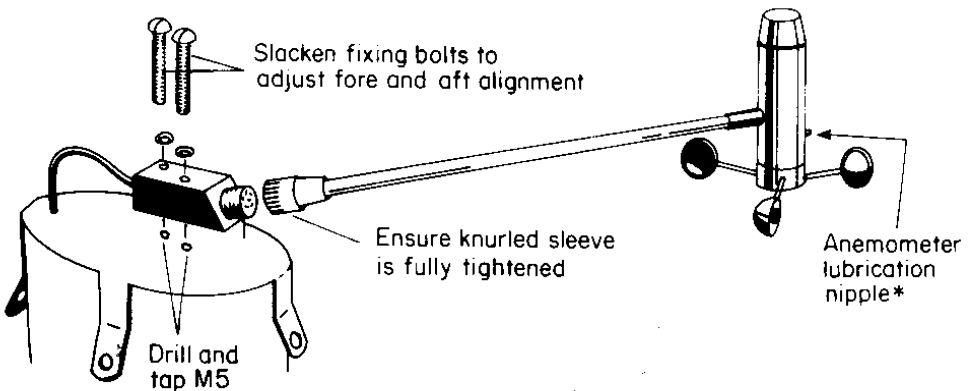
Assemble the skin fitting and nut to the hull using a good sealing compound. **DO NOT OVERTIGHTEN THE NUT.** Check that the bore of the skin fitting is absolutely clean and free from sealing compound. Now fit the sealing plug or the transducer, ensuring that the seal is correctly fitted and that the cap is only lightly tightened. When painting the hull, always ensure that the skin fitting is not coated in the bore.

The transducer cable is 10 metres long, and can be shortened if required. Avoid positioning the cable in water or near sources of electrical interference e.g. alternators or sounder wiring. Correct operation should be checked before finalising cable routing.

## 2. TRAILING ROTATOR (14 metre cable)

The transducer cable can be towed from amidships or over port or starboard counter, but must not be towed on the centre line (ie directly in the slipstream). The cable may have to pass through the structure of the vessel to reach the instrument head and 4 metres of cable is allowed for this. Ten metres of cable is then left for trailing overboard. Replacement of the rotator and cable unit in the future should be allowed for. The use of a 'waterproof' plug and socket in the rotation cable is quite possible, but it should not be installed above decks and should be very carefully maintained. All voids in the plug and socket shells must be filled with silicone grease and the contact pins and sockets kept bright clean and greased.

## OPTIONAL WINDSPEED TRANSDUCER – Fitting Instructions



**WARNING!** Disconnect 12 V supply before connecting up.

- \* Inject  $\frac{1}{4}$  cc sewing machine oil annually – keep in operating attitude for 2 hours after

The masthead cable block should be aligned on the masthead plate **WITH THE SCREWED END ACCURATELY FACING FORWARD**. Using the block as a template, mark positions for the 2 – 5mm stainless steel fastening screws. Drill these holes 4.2mm(11/64”) diameter and screw tap M5, (an M5 tap will be required for this operation). If access underneath is available the M5 nuts supplied can be fitted instead of tapping. Fit the block, bedding down with sealing compound, and feed the cable down the mast. If the mast is deck stepped, the wire must pass through the deck close to the mast and a seal should be made with silicone rubber compound. Do not use plugs and sockets etc at this point or elsewhere – the wiring must be taken direct to the instrument head terminal block for adequate reliability. However, a good quality terminal block can be used under the deckhead and the cable joined at this point.

**NOTE:** Wiring can be shortened if required.

When fitting the masthead transducer to its socket, take great care to guide the pins into their sockets to avoid damage. Tighten the locking sleeve very firmly. The pins and sockets should be treated with silicone grease, and the transducer removed to dry storage each winter. Also **GREASE THE THREAD THOROUGHLY** to minimise risk of seizure, and fit protective cap supplied.

**ALWAYS** remove masthead transducer before stepping or unstepping mast.

## **OPTIONAL**

### **MILES COUNTER INSTALLATION**

Connection is made to the two terminals marked S/N +- in the terminal box. Wiring polarity is unimportant. The counter is best sited in the navigation area and is not suitable for external mounting. Please note that counting is in increments of 1/100 of a nautical mile. It may be interesting to note that boat speed can be measured by timing the counter operations:

$$\text{boat speed} = \frac{36}{\text{count period (secs)}} \text{ knots.}$$

### **SATELLITE NAVIGATOR SPEED OUTPUT CONNECTION**

Speed log output pulses (100 per nautical mile) are available from the 2 terminals marked S/N +- in the terminal box. (Note that the optional miles counter wiring may also be present in these 2 terminals.)



### **SECTION 3. SERVICE, SPARES & TROUBLE SHOOTING**

#### **MAINTENANCE/TROUBLE SHOOTING (See also Trouble Shooting Guide)**

No maintenance is required for the instrument head, but the window should be carefully cleaned with a damp cloth occasionally.

The terminal box circuit board should be sprayed with WD40 moisture displacing fluid at the end of each season.

Trouble shooting procedures are principally to ensure that 12 volt power is correctly connected to the terminal box, and that all connections are firmly made.

**DIRTY, WET, CORRODED AND POORLY MADE CONNECTIONS** in transducer cables and power supply are a key cause of equipment failure and must be avoided.

#### **SERVICE**

Please make absolutely certain that an instrument believed to be faulty does not merely require correct power supply wiring or transducer connections.

Should the unit have to be returned, adequate packing with 80mm(3") of all round cushioning must be provided. Please quote the serial number (on rear of instrument head) in any correspondence.

#### **SPARES**

A common requirement is the trailing rotator and cable. For model identification a blue marker sleeve should be present on the cable which has 3 conductors.

#### **WARRANTY**

The instrument is fully guaranteed for 24 months from date of purchase, and claims under warranty must be accompanied by the original or a true copy of the receipt of purchase. Please include your name and address, the serial number of the instrument and the reason for return. (Outside the UK please return to retailer or country distributor.)

## OPERATIONAL CHECK LIST & TROUBLE SHOOTING GUIDE

Stowe instruments are carefully tested and proven before shipment. However, installation conditions and procedures (and very occasionally failures of components within the instruments) can cause difficulties and the following check list will direct the user to the source and remedy.

For additional assistance call the service centre hotline as follows:

**UK 01590 610071 Overseas +44 1590 610071**

**email: [info@stowemarine.com](mailto:info@stowemarine.com)**

**website: [www.stowemarine.com](http://www.stowemarine.com)**

CONDITION	PROBABLE CAUSE (in order of probability)	ACTION
Digital display completely inoperative	* No power to system	Check fuse, battery switch, battery state.
	* Battery cable/connections reversed	Check wiring polarity and connections to display head and/or terminal box.
Digital display only partly operative (eg no boat speed)	* Failed micro-processor or display	Check microprocessor and display by ensuring 'time' functions operate correctly.
	* Poorly connected or faulty boat speed; wind speed transducers	) Check each transducer as detailed below.
	* Failure of transducer interface circuits in instrument head	
No boat speed or low boat speed	* Transducer not installed in hull fitting	Replace blanking plug with transducer.
	* Transducer paddle wheel fouled	Clean paddle wheel/housing.
	* Transducer not aligned	Ensure cross pin aligned fore and aft.

CONDITION	PROBABLE CAUSE (in order of probability)	ACTION
Erratic/very high boat speed	* Engine generated electrical interference (eg alternator or spark ignition)	Check problem disappears with engine off. If so re-route or screen paddle wheel cable (or fit suppressors to source).
	* Depth sounder, water pump, auto pilot, propeller shaft, causing electrical interference	Isolate problem source by switching on and off in turn. Brake prop shaft when sailing. Re-route or screen paddle cable (or suppress source).
No wind speed	* Wiring error/damage	Check mast wiring undamaged at deck entry level. Ensure that plug and socket not fitted at this point. Check that wiring correctly enters windspeed terminal block in terminal box.
	* Anemometer rotor seized	Return to factory/service centre for bearing replacement.
	* Failed wind speed circuit in display head	Remove all wiring from 'wind speed' terminal in terminal box. Then using a short flexible wire connect 'black' to 'blue' about once per second to simulate windspeed pulses. A reading higher than 0 indicates windspeed circuit OK. If not, return display head to service centre.
	* Failed anemometer electronics	Return transducer to factory/service centre.
Erratic/high wind speed	* Poor wiring connections in wind speed cable	Check and remake
	* Poor power supply to terminal box/instrument head causing voltage fluctuation along mast cable	Connect equipment direct to battery to isolate effects of poor connections or volt drops in master switches, fuses, distribution panels.

CONDITION	PROBABLE CAUSE (in order of probability)	ACTION
Log distance and boat speed too low to be brought into calibration using calibration switch	<ul style="list-style-type: none"> <li>* Dirty paddle or hull</li> <li>* Paddle position too far aft (ie more than 30% from bow)</li> <li>* Hull form produces exceptionally low water speed over paddle</li> </ul>	<p>Clean paddle and hull as required.</p> <p>Make percentage allowance in accordance with readings established over measured distance.</p>
Distance log/time reset to zero	<ul style="list-style-type: none"> <li>* Power supply interruptions due to faulty wiring, poor connections or sudden heavy electrical loads on battery</li> </ul> <p>NOTE: Supply interruptions of less than 1/100 second can stop microprocessor running and cause data loss</p> <ul style="list-style-type: none"> <li>* Static, lightning or electrical discharge down mast via wind speed cable</li> </ul>	<p>Check all wiring and fuse connections. Wire temporarily or permanently to 12v battery to isolate cause. <b>DO NOT CONNECT TO BATTERY USED FOR ENGINE STARTING</b> if another battery is available.</p> <p>For safety of both equipment and vessel consider earthing of mast to suitable ground plate.</p>
Display data jumbled after switch on	<ul style="list-style-type: none"> <li>* Low battery voltage or poor connection causing incorrect 'power up' sequence in microprocessor</li> </ul>	<p>Check battery voltage at instrument head. Temporarily wire direct to battery if voltage OK but problem persists.</p>
Display shows all 8's or fixed digits	<ul style="list-style-type: none"> <li>* Failed microprocessor due to masthead lightning strike.</li> </ul>	<p>Return instrument head to factory or service centre.</p>

CONDITION	PROBABLE CAUSE (in order of probability)	ACTION
Electromechanical miles counter (option) will not function	<ul style="list-style-type: none"> <li>* Incorrect wiring</li> <li>* Failed or seized solenoid in counter unit</li> <li>* Drive transistor failed/damaged</li> </ul>	<p>Check correctly wired to 'Sat Nav' position – polarity unimportant.</p> <p>Try connecting counter unit across 12v supply for 1 sec MAX periods. Counter should 'click' over last digit each time.</p> <p>Return instrument head to service centre.</p>
No lighting in display	<ul style="list-style-type: none"> <li>* Faulty wiring</li> <li>* Failed bulbs</li> </ul>	<p>Check 12v supply and connections.</p> <p>Return display head to service centre.</p>