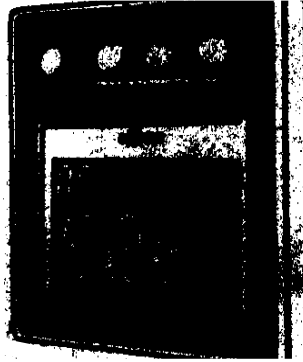


DATABOX

FOR
INSTRUCTION & INSTALLATION MANUAL

Dateline

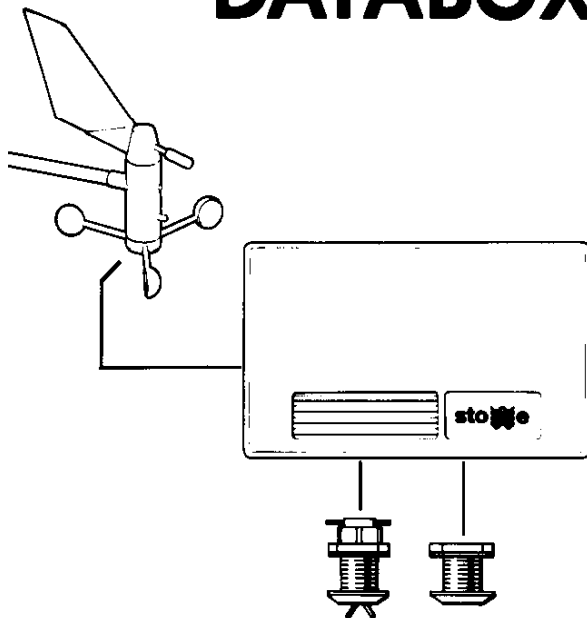


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Dataline

INSTRUCTION & INSTALLATION MANUAL
FOR

DATABOX



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1. INTRODUCTION TO DATALINE

DATALINE is a major advance in marine instrumentation.

Conceived by Stowe, a world leader in the manufacture of marine instruments, DATALINE fully utilises all the skill and experience acquired over 8 years manufacturing products such as the internationally acclaimed Navigator and Micro ranges of sail and powerboat instruments.

DATALINE takes all the recognised Stowe hallmarks of quality, ruggedness and reliability and combines them with the technological and visual appeal needed to satisfy the many and varied demands of today's yacht and powerboat owners.

Most significantly, though, DATALINE achieves this in a way that brings unprecedented benefits not only to the end user, but also to the boatbuilder and electronic installation specialist.

This is how it works:

The DATALINE system, as the name implies, is based on a single cable which carries both the power and the data round the boat on a serial Databus using a communication language called NMEA 0183.

This language is the established industry standard and since DATALINE provides both NMEA 0183 inputs and outputs, compatibility is achieved with other navigational aids, such as Satnavs, compasses, plotters and autopilots, which use the same language. By adopting the industry standard the boat's information system is not subject to the 'closed system' constraints of some manufacturers' products so you are free to interface with other compatible navigational aids, irrespective of manufacturer.

The signal is generated from the DATABOX which is installed in a safe, dry environment below deck near the mast, or behind the chart table, or perhaps in the engine compartment of a powerboat. All sensors are wired to the DATABOX.

The DATALINE itself is then THE ONLY WIRE that runs to the instruments, which are simply linked together in a 'daisy chain' in whatever order suits the installation.

The DATALINE system has the capability of linking from one up to 15 instruments and remains as flexible and as viable for any installation, big or small, power or sail.

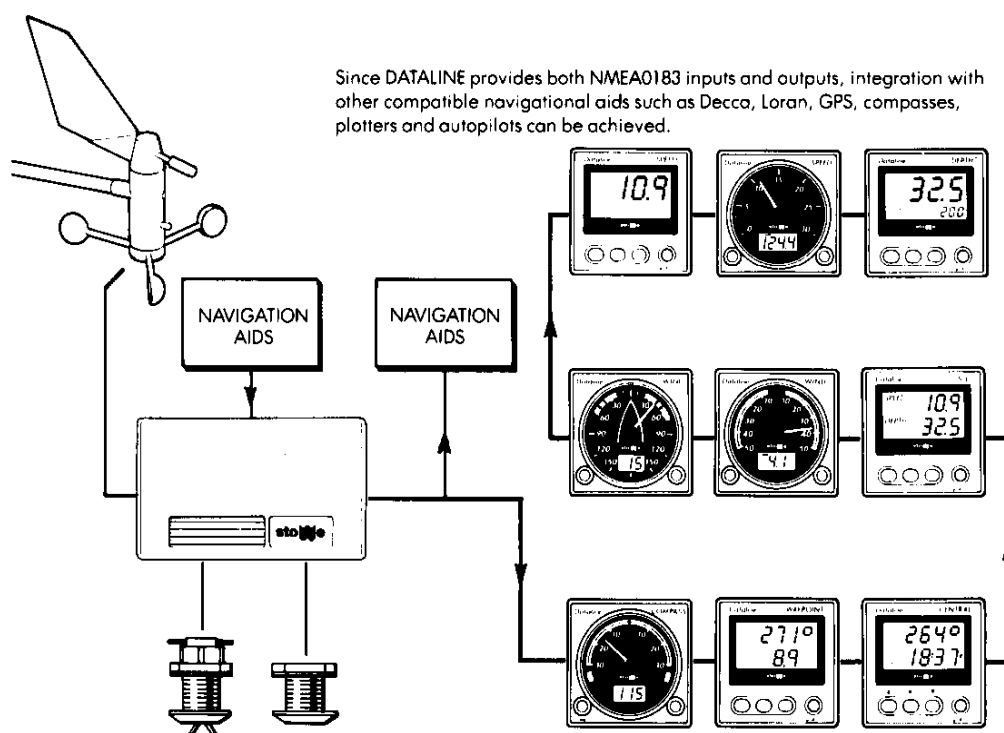
Since the DATABOX contains the total capability of the system any additional instrument head can be simply connected into the line without any upgrade to the electronics.

A complete range of analogue and digital instrument heads provides unparalleled flexibility for use in cockpit, flybridge, chart table, or indeed any location on the boat.

In addition to the advances and benefits inherent in the DATALINE system concept, the instrument heads themselves incorporate design features that place DATALINE many years ahead of any comparable instrument system. These include an integral moulded window for water tightness and damage resistance, removable dessicant pack and replaceable clip on cover.

2. DATALINE SYSTEM DIAGRAM

The DATALINE range of yacht instruments includes SPEED multifunction, DEPTH, WIND, WIND PLUS, WAYPOINT Decca/Loran repeater, S/D speed/depth dual display and CENTRAL multifunction instrument.



3. DATABOX TECHNICAL SPECIFICATION

Boatspeed	0 to 99.99 knots, resolution 0.01 knot, accuracy $\pm 3\%$
Windspeed	0 to 99.9 knots, resolution 0.1 knot, accuracy $\pm 5\%$
Windangle	0° to 359°, resolution to 1°, accuracy $\pm 3\%$
Depth	0.8m to 120m, resolution 0.1m, accuracy $\pm 5\%$
	or 2.6ft to 394ft, resolution 0.1ft, accuracy $\pm 3\%$
Distance Log	Cumulative 0 to 9999.9 Nm, resolution 0.1Nm, accuracy $\pm 3\%$
	Trip 0 to 999.99 Nm, resolution 0.01 Nm, accuracy $\pm 3\%$
Engine Hours	0 to 9999.9 hours, resolution 0.1 hours (6 mins), accuracy $\pm 1\%$
Water Temperature	-10° to 40°C, resolution 1°C, accuracy $\pm 2^\circ\text{C}$
Battery Voltage	10V to 16V, resolution 0.1V, accuracy $\pm 0.2\text{V}$
Operating Voltage	10V to 16V DC
Operating Current	130mA + requirements for each instrument head (see specific manuals)
Size	212 × 122 × 25mm 8 $\frac{3}{8}$ × 4 13/16 × 1 inches

Transducer Specification

Boatspeed	Hall effect type
(incl. temperature sensor)	Max Speed Standard paddle 25 knots
	High Speed Paddle 45 knots
	Sizes (plastic or bronze) 45mm diameter (1 $\frac{3}{4}$ inches)
Windspeed	Hall effect type 1 pulse per revolution
Windangle	3-phase potentiometer (dessyn) 360° rotation
Depth	Operating frequency 205 KHz
	Sizes (plastic or bronze) 45mm diameter (1 $\frac{3}{4}$ inches)

4. DATABOX INSTALLATION

The Databox is the sensory centre of the System. All the transducer inputs are fed into the Databox and all the information is transmitted out on the the single Dataline cable.

The Databox case is made of rugged thermoplastic and its compact dimensions and structural characteristics enable installation at either the chart table, on a bulkhead at the mast or close to the engine compartment of a powerboat. However, the location must be dry.

The Databox should be mounted on a flat surface with the screws provided. The location should be selected for easy access to the terminal blocks for the connection of additional equipment and terminal block maintenance (see page 7). Note that the cables should be supported with clips close to the terminal blocks.

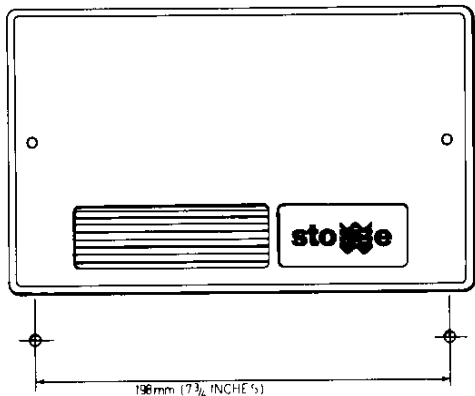
The 12 volt power supply cabling should be 5 amp 2 core and connected to a 5 amp fuse or circuit breaker.

WARNING Do not overtighten the Databox fixing screws.

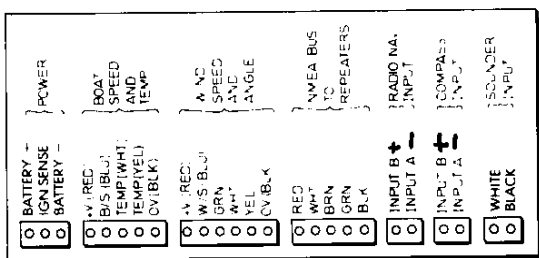
ENGINE HOURS CONNECTION

If you require the Engine Hours function, the single wire from the Databox power terminal marked 'IGN' should be connected to the ignition switch auxiliary output connection, or alternatively to the D+ terminal on some alternators.

NOTE: If any doubts exists with regards to wiring this function, a reputable marine electrician should be consulted.



Drill two 3mm (1/8") holes and fit Databox with No. 6 self tapping screws provided.



NOTE: The Databox inputs and outputs are protected against incorrect connections, but care should be taken when wiring up to avoid any delay!

MAINTENANCE

The Databox has been designed using the very best materials and very little maintenance is required. Following installation, and at the end of each season, the Databox connections should be checked and the terminal blocks coated with a liberal amount of silicone grease, vaseline, WD40 (or similar corrosion inhibitor). These materials will not harm any Databox components.

5. LOG TRANSDUCER INSTALLATION

The transducer must be positioned so that it is always under water, near the centre line, but at least 150mm (6") away from the keel. In a sailing yacht a position 150mm forward of the keel is preferable in order to minimise tack to tack speed inaccuracies caused by flow round the leading edge.

The hole for the hull fitting should be positioned well clear of any internal frames or stringers. Ensure good access for removal of the paddlewheel assembly, and clearing water spilled in this operation. Drill a small pilot hole first, check the location inside and out, then a 45mm (1 3/4") cutter in a hand held brace or electric drill can be used.

NOW FILE A SMALL KEYHOLE CUT TO MATCH THE HULL SKIN FITTING. Assemble the skin fitting and nut into the hull using a good sealing compound.

DO NOT OVERTIGHTEN THE NUT.

Check that the bore of the skin fitting is absolutely free of sealing compound. Now fit the blanking plug or transducer, ensuring that the seals are correctly fitted, and that the cap is only lightly tightened. When transporting or antifouling the hull, always ensure that the blanking plug is fitted, to ensure that the skin fitting is not coated in the bore. It is important to antifoul the skin fitting as well as the hull of the boat, as weed growth around the skin fitting can cause the log to under-read or stop.

NOTE: The skin fitting, blanking plug and transducer should be checked for leaks immediately the vessel is launched, and rechecked within 8 to 24 hours.

LOG TRANSDUCER CABLE ROUTING

The transducer cable should be routed away from all the other cables to the DATABOX via the shortest practical route. The cable must not be included in the main wiring loom. If the most direct route is near sources of interference such as engine, fluorescent lights, etc. then a longer route away from these sources should be chosen. It may not be possible to route the paddlewheel and depth sounder transducer cables via different routes - do not tie these cables together at any point along their length. A 10mm (1/2") gap should be maintained between these cables wherever possible.

6. SOUNDER TRANSDUCER INSTALLATION

To ensure maximum performance to meet design specifications the transducer should be mounted through the hull, i.e. with the face of the transducer in direct contact with the water.

The position should be well below the waterline in an area of minimum turbulence, e.g. not behind an under hull projection or outlet pipe likely to generate air bubbles. The transducer face should be as near horizontal as possible and certainly within 18° to maintain range. On a yacht a position ahead of the keel is ideal. In a fast power craft a position aft is preferable - see section 'Installation Transducer'. If the transducer head cannot be flush with the hull, a wooden fairing block will be required, with a matching block inside the hull. The transducer should be seated on silicone rubber or mastic compound to ensure watertightness.

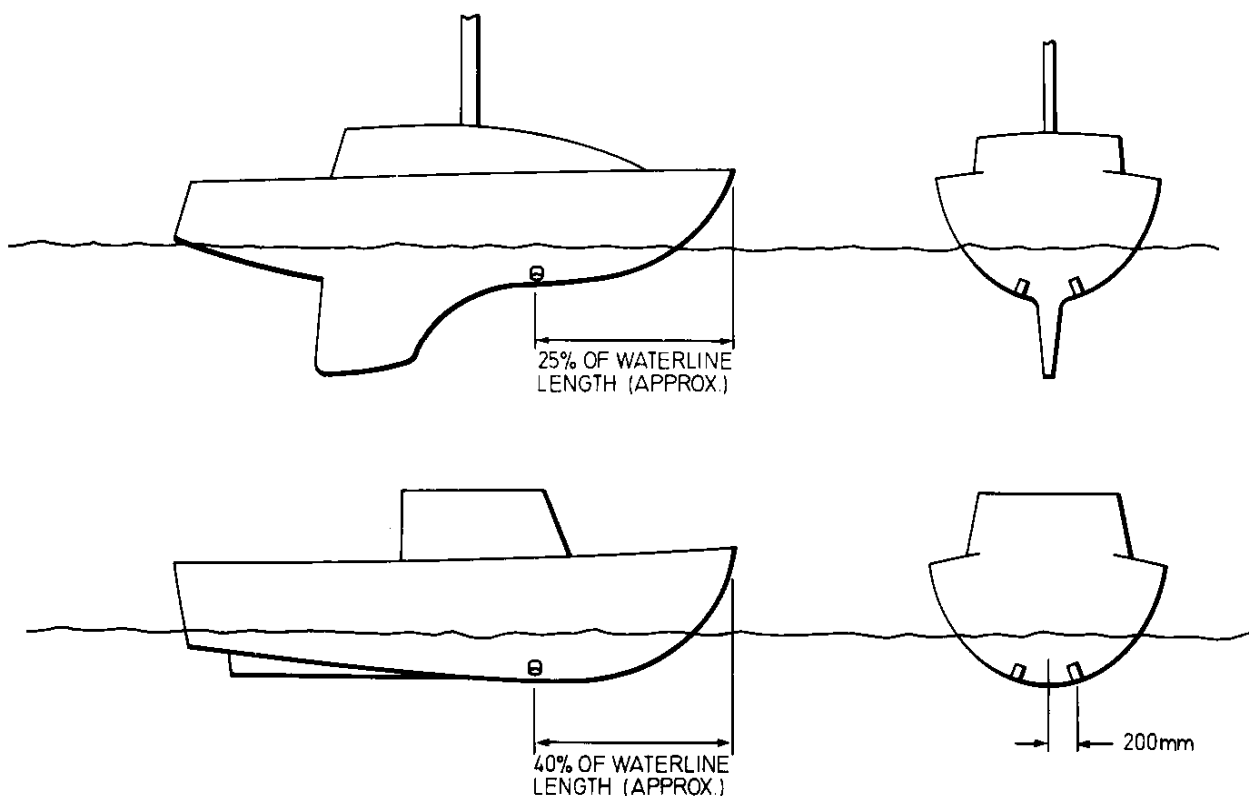
DO NOT OVERTIGHTEN THE SECURING NUT - little more than finger tightening is necessary. Check for leaks immediately the vessel is launched and recheck within 8 to 24 hours.

Antifouling should be limited to one thin coat of MICRON CSC or similar soluble antifouling over the face. The transducer cable must be routed well clear of sources of electrical interference, e.g. alternators and ignition wiring.

IT SHOULD NOT BE RUN OR BUNDLED WITH THE LOG PADDLE TRANSDUCER CABLE, as it may itself receive log interference, and correct operation should be checked before final fixing.

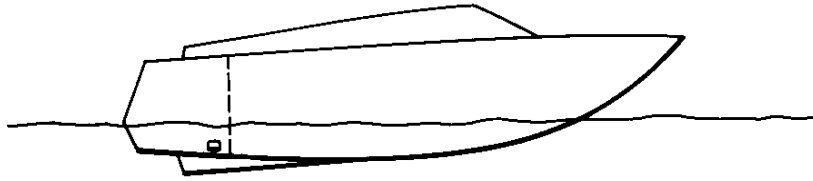
DO NOT SHORTEN the transducer cable more than 2m (6ft) - excess cable should be coiled and secured and kept well away from sources of electrical noise such as alternators and main battery leads.

LOG AND SOUNDER — TRANSDUCER INSTALLATION



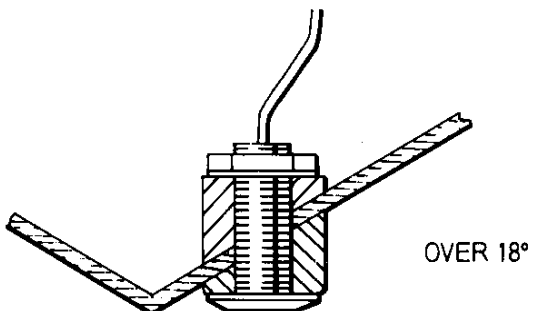
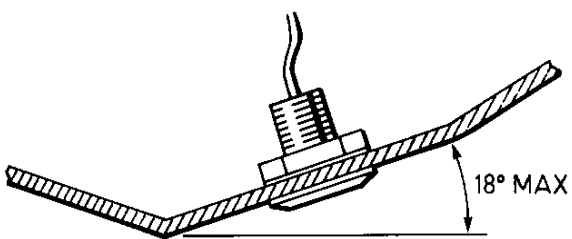
TRANSDUCER INSTALLATION (continued)

OVER 14 KNOTS (12 MPH)

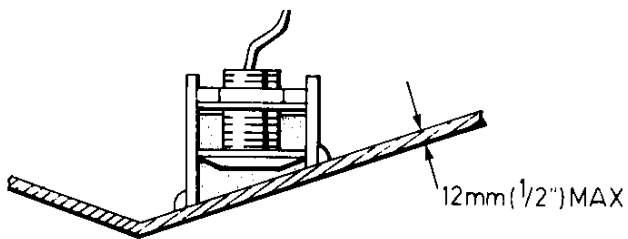


Transducers are positioned one each side as shown on page 10, and just ahead of engines for access, minimal electrical interference and correct function at speed.

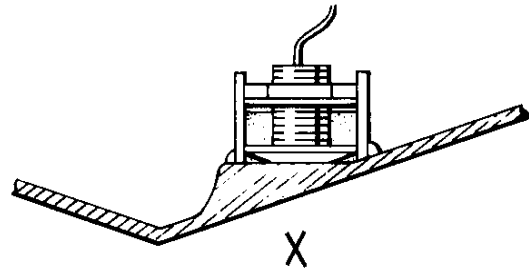
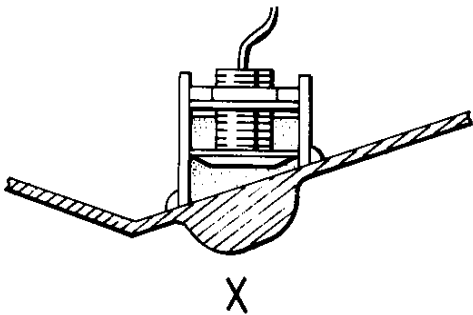
SOUNDER TRANSDUCER INSTALLATION



Where the hull deadrise angle exceeds 18° from the horizontal then a fairing block may be used with a long transducer.



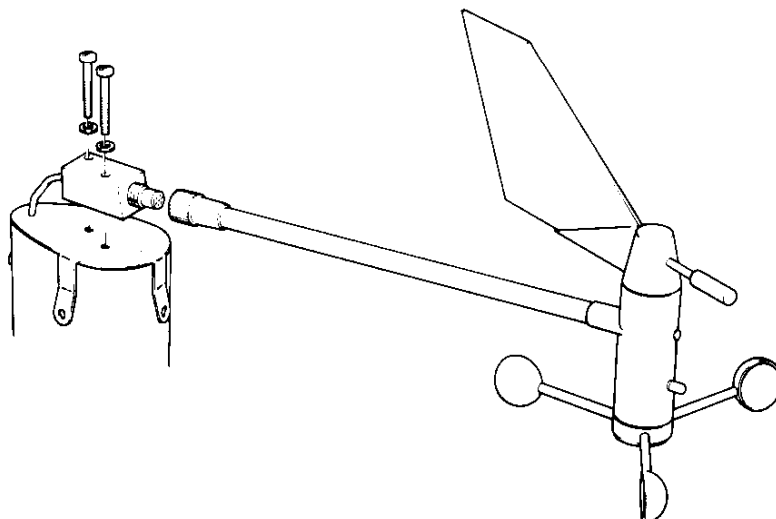
The transducer may be mounted in hull using a wet box made from 68mm (2½") PVC pipe and filled with oil or water. The pipe should be cut to match the hull angle to ensure the transducer is mounted vertical. It should be noted that the signal leaves the hull approximately normal to the hull surface and deadrise angles greater than 18° will give rise to reduced depth performance and some inaccuracy.

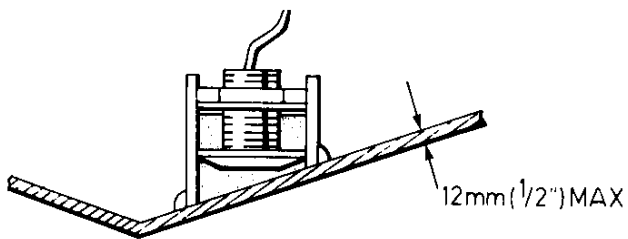


7. WINDSPEED AND WINDANGLE TRANSDUCER INSTALLATION

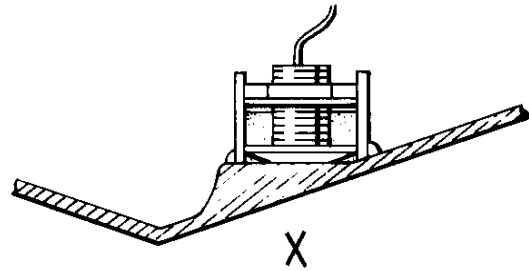
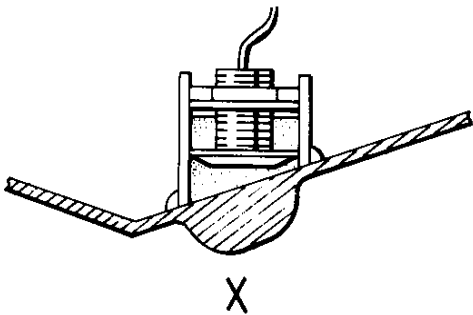
The masthead block should be aligned on the masthead plate with the screwed end normally facing forward. Accuracy is not important as there is a $\pm 180^\circ$ calibration range. Using the block as a template, mark out the centre positions for the attachment bolts. Drill 2 small pilot holes, and then open up to 4.2mm (11/64") diameter and screw tap the mast plate with an M5 hand tap. Fit mast block with sealing compound and the M5 stainless steel screws and washers provided. The M5 nuts are provided for use if there is access under the mast plate.

NOTE: If the boat's rigging will not allow the wind transducers to be mounted forward, then the transducers can be mounted at any other convenient angle and the calibration adjusted accordingly. It should be noted, however, that the sail up draughts could reduce wind speed and wind angle accuracy at any angles other than forward.





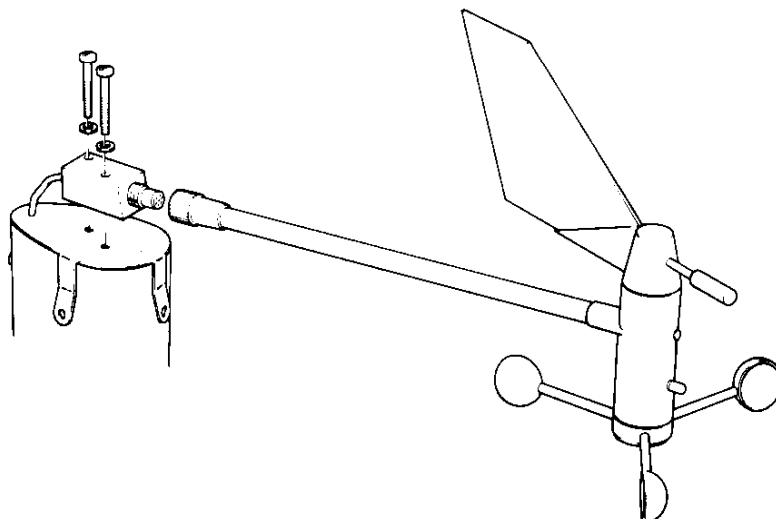
The transducer may be mounted in hull using a wet box made from 68mm (2½") PVC pipe and filled with oil or water. The pipe should be cut to match the hull angle to ensure the transducer is mounted vertical. It should be noted that the signal leaves the hull approximately normal to the hull surface and deadrise angles greater than 18° will give rise to reduced depth performance and some inaccuracy.



7. WINDSPEED AND WINDANGLE TRANSDUCER INSTALLATION

The masthead block should be aligned on the masthead plate with the screwed end normally facing forward. Accuracy is not important as there is a $\pm 180^\circ$ calibration range. Using the block as a template, mark out the centre positions for the attachment bolts. Drill 2 small pilot holes, and then open up to 4.2mm (11/64") diameter and screw tap the mast plate with an M5 hand tap. Fit mast block with sealing compound and the M5 stainless steel screws and washers provided. The M5 nuts are provided for use if there is access under the mast plate.

NOTE: If the boat's rigging will not allow the wind transducers to be mounted forward, then the transducers can be mounted at any other convenient angle and the calibration adjusted accordingly. It should be noted, however, that the sail up draughts could reduce wind speed and wind angle accuracy at any angles other than forward.



8. OPERATIONAL NOTES ON THE USE OF PADDLEWHEEL TRANSDUCERS

The paddlewheel transducer should be installed in the skin fitting with the stainless steel cross pin pointing fore and aft. This position should always be maintained as incorreced alignment will cause faulty readings.

Before first trials and occasionally during use, the cleanliness and ease of rotation of the paddlewheel should be checked. Blowing on the paddlewheel should cause it to rotate rapidly. When cleaning the paddlewheel it is important to clean the housing above the paddlewheel very thoroughly. This can be done by carefully inserting soft material such as tissue or cotton wool between 2 blades to wipe the upper part of the housing.

Alternatively the sail paddlewheel can be removed by partial withdrawal of the bearing pins using a 2mm wide bladed screwdriver.

With the paddlewheel removed, first clean the body hemisphere and then paint with a thin coat of Micron CSC or similar soluble antifouling. This process can also be applied to the paddlewheel, but care should be taken to ensure the bearing holes are kept clean of paint.

During periods when the vessel is not in use, it is strongly recommended that the paddlewheel assembly is withdrawn, and the blanking plug is installed. This will minimise the fouling of the paddlewheel and ensure trouble free operation. Please note that weed can often be cleared by rotating the transducer through 180° whilst the vessel is under way.

DO NOT OVERTIGHTEN THE CAP NUT. This may damage the cap nut or skin fitting.

It may be found that different speed readings are achieved on opposite tacks. This is due to different water flow over the transducer. The problem may sometimes be overcome or reduced by turning the transducer slightly, so that it points towards the centre line of the boat. If a suitable position is found which gives equal speeds on both tacks, then mark this position on the hull so that it may be repeated in the future.

HIGH SPEED TRANSDUCER

A high speed paddlewheel transducer should be used if the boat is capable of more than 28 knots. If a high speed transducer is used, it is important that the flat of the blade, or the BLUE marker on the stainless steel cross pin, points to the front of the boat.

REMOVAL OF THE PADDLEWHEEL TRANSDUCER

Before proceeding with the removal of the paddlewheel, make sure that the blanking plug (supplied) is close at hand. It is also advisable to have a large sponge to minimise water ingress and to mop up later.

When the top cap nut is rotated freely, the paddlewheel transducer can be removed. Water is prevented from entering the boat in this position by the lower 'O' ring seal. Quickly remove the paddlewheel transducer and place the sponge over the hole. Put the paddlewheel transducer down in the hull and pick up the blanking plug with your free hand. Quickly slide the sponge or hand from the skin fitting and at the same time move the blanking plug across the skin fitting, inserting it into the hole. The cap nut can then be lightly tightened.

The paddlewheel transducer can then be examined and, if necessary, cleaned. See the Operational Notes above for correct cleaning procedure.

9. DATALINE NMEA OUTPUT DETAILS

The following NMEA 0183A sentences are transmitted along the Dataline.

OUTPUTS:

1. WIND ANGLE AND SPEED (Output 5 times a second)
\$IIVWR,XXX,X,XX.X,N,,,, <CR> <LF>
 2. HEADING AND BOAT SPEED (Output 3 times a second)
\$IIVHW,,,XXX,M,XX.XX,N,, <CR> <LF>
 3. DEPTH BELOW KEEL (Output 2 times a second)
\$IIDBK,A,XXXX.X,F,,,, <CR> <LF>
- NB. The underlined character in the Depth sentence is a non-standard NMEA 0183 character and is either:
A when Depth is correct, and
V when Depth is the last depth measured.
4. ENGINE TIME (Output every second)
\$PSTCE,XXXX.XX,H <CR> <LF>
 5. DISTANCE LOGS (Output every 2 seconds)
\$IIVLW,XXXX.X,N,XXX.XX,N <CR> <LF>
 6. WATER TEMPERATURE (Output every 2 seconds)
\$IIMTW, - XX,C <CR> <LF>

7. BATTERY VOLTS (Output every 2 seconds)
\$PSTOB,XX.X,V <CR> <LF>
8. DEPTH BELOW TRANSDUCER (Output every 2 seconds)
\$IIDBT,XXXX.X,F,,,, <CR> <LF>

INPUTS / OUTPUTS:

9. COMPASS HEADING
\$HCHDM,XXX,M <CR> <LF>
10. ARRIVAL ALARM
\$XXAAM,XXX,F,A,A,CCCC <CR> <LF>
11. AUTOPILOT FORMAT A
\$XXAPA,A,A,XX.X,L,N,A,A,XXX,M,CCCC <CR> <LF>
12. BEARING TO WAYPOINT
\$XXBOD,XXX,T,XXX,M,CCCC,CCCC <CR> <LF>
13. BEARING AND DISTANCE TO WAYPOINT (GREAT CIRCLE)
\$XXBWC,XXXXXX,XXXX.XX,N,XXXXX.XX,W,XXX,T,XXX,M,XXX.X,N,CCCC <CR> <LF>
14. BEARING AND DISTANCE TO WAYPOINT (RHUMB LINE)
\$XXBWR,XXXXXX,XXXX.XX,N,XXXXX.XX,W,XXX,T,XXX,M,XXX.X,N,CCCC <CR> <LF>

15. GLOBAL LATITUDE AND LONGITUDE
\$XXGLL,XXXX.XX,N,XXXXX.XX,E <CR> <LF>
16. GENERIC NAVIGATION INFORMATION
\$XXRMB,A,X.XX,L,CCCC,CCCC,XXXX.XX,N,XXXXX.XX,W,XXX.X,XXX,XX.X,A*XX <CR> <LF>
17. COURSE AND VELOCITY MADE GOOD
\$XXVTG,XXX,T,XXX,M,XX.X,N,XX.X,K <CR> <LF>
18. DISTANCE TO WAYPOINT
\$XXWDC,XXX.XX,N,CCCC <CR> <LF>
19. WAYPOINT LOCATION
\$XXWPL,XXXX.XX,N,XXXXX.XX,W,CCCC <CR> <LF>
20. CROSS TRACK ERROR
\$XXXTE,A,A,X.XX,L,N <CR> <LF>
21. TIME TO WAYPOINT
\$XXZTG,XXXXXX,XXXXXX,CCCC <CR> <LF>

10. OPERATIONAL CHECKLIST & 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 your local agent listed at the rear of the manual.

CONDITION	PROBABLE CAUSE	ACTION
No boat speed or low boat speed	● Transducer not installed in hull fitting	Replace blanking plug with transducer.
	● Transducer paddlewheel fouled	Clean paddlewheel/housing.
	● Transducer not aligned	Ensure cross pin aligned fore and aft.
Display shows '00' or '00' flashing continuously	● Transducer not connected	Check and correct.
	● Marine growth on transducer face	LIGHTLY scrub or sand.
	● Poor 12V connection or loose fitting fuse	Check all connections and fuses.

CONDITION	PROBABLE CAUSE	ACTION
	<ul style="list-style-type: none"> ● Bonding broken (in-hull mounting only) 	Check.
Display works normally but occasionally shows very low depth	<ul style="list-style-type: none"> ● Moving slowly over weed or fish repeated low readings may be accepted by microprocessor in depths of less than approx. 30ft. ● Water aeration e.g. ferry wash 	No action possible. Avoid or slow down.
Display begins to show low readings in very deep water	<ul style="list-style-type: none"> ● Depth outside theoretical maximum range. signal received after receiver has 'timed out' and next 'receive' cycle has started. 	Switch to highest depth range and check charted position.
Poor depth capability (last depth will be shown flashing)	<ul style="list-style-type: none"> ● In-hull transducer (worsened by poor bonding, thick or poorly laid up GRP decreasing output signal or receive sensitivity). 	Consider re-bonding in another location or through-hull mounting.

CONDITION	PROBABLE CAUSE	ACTION
	<ul style="list-style-type: none"> ● Poor bottom reflectivity, e.g. thick mud 	Check with charted conditions.
Depth reading lost at higher speeds e.g. over 18 knots	<ul style="list-style-type: none"> ● Poor transducer fairing causing aeration ● Poor in-hull bonding 	Mount transducer flush with hull or improve fairing. Check for air bubbles in bonding/hull.
No wind speed	<ul style="list-style-type: none"> ● Wiring error/damage 	Check mast wiring is undamaged at deck level and no plug and socket fitted at this point. Check blue wire is correctly connected at mast base junction box (if fitted) and at Databox.
No wind speed	<ul style="list-style-type: none"> ● Seized anemometer rotor 	Return masthead transducer to service centre for bearing replacement.
High/erratic wind speed	<ul style="list-style-type: none"> ● Poor wiring connections in mast cable 	check and remake.

CONDITION	PROBABLE CAUSE	ACTION
Wind angle display seriously inaccurate OR not functioning in one sector OR not functioning at all	<ul style="list-style-type: none"><li data-bbox="528 259 778 282">● Wiring error/damage <li data-bbox="528 398 847 506">● Failed or damaged potentiometer in masthead transducer OR faulty pointer servo motor in display head	<p data-bbox="916 259 1418 365">Check mast wiring is undamaged and correctly connected. In particular check that white, yellow and green (which each control 120° of movement) are not transposed or disconnected.</p> <p data-bbox="916 398 1418 533">Identification of faulty item for return can only be firmly established by substitution of known good masthead transducer or display head. NOTE: However pointer servo motor failures in display head are comparatively rare.</p>