INSTALLATION AND USER INSTRUCTIONS for

Cruiser

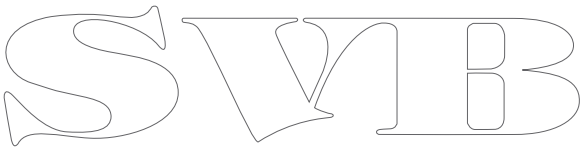
CONTEMPORARY STYLED INSTRUMENTS FOR CABIN MOUNTING

SVB

LOG, DEPTH WIND & COMPASS

NASA MARINE INSTRUMENTS

NASA MARINE LTD
BOULTON ROAD
STEVENAGE
HERTS. SG1 4QG
(01438) 354033


SVB

1: INTRODUCTION

Cruiser instruments are designed to operate from a 12 volt battery supply and are supplied complete with sensors, displays and display mounting kits.

Prior to unpacking this instrument read and fully understand the installation instructions. Only proceed with the installation if you are competent to do so. Nasa Marine Ltd. will not accept any responsibility for injury or damage caused by, during or as a result of the installation of this product. Any piece of equipment can fail due to a number of causes. Do not install this equipment if it is the only source of information and its failure could result in injury or death. Instead return the instrument to your retailer for full credit. Remember this equipment is an aid to navigation and not a substitute for proper seamanship. This instrument is used at your own risk, use it prudently and check its operation from time to time against other data. Inspect the installation from time to time and seek advice if any part thereof is not fully seaworthy.

The surface of Cruiser has an acrylic finish chemically bonded to a tough plastic. To keep it looking good clean only with a damp cloth. Do not use abrasive cleaners or solvents.

2: INSTALLING THE DISPLAY

Although waterproof cruiser instruments are designed for cabin mounting.

Select a convenient position for the display on a panel or bulk head.

The site must be flat and the cavity behind the panel must remain dry at all times. (The cable entry boss is not sealed to allow free passage of air to and from the unit. This prevents misting of the display.)

The positions for the fixing holes can be marked on the panel using the drill template which is an integral part of the packing carton. Before drilling check that there is sufficient space behind the panel to route the cables and to allow access to tighten up the wing fixing nuts.

Drill the five holes and check that the unit fits. It may be wise to connect the cables before finally fixing the unit in position.

A sponge rubber seal is provided which should be fitted into the slot in the back of the instrument.

Fit the instrument into the panel and tighten the four wing nuts finger tight only.

It is important that the sponge rubber seal makes good contact with the panel or water may get behind the unit and enter the cavity behind the panel.

It is always good practice to take the cables vertically down from the unit.

3: ECHO SOUNDER

3:1 INSTALLING THE TRANSDUCER

The transducer can be mounted in one of three ways:

(a) The transducer face can be bonded directly to the inside of the hull. (Some energy is lost to the hull but the loss in performance is, for most G.R.P, hulls, hardly noticeable).

(b) A transom mount is available from your dealer.

(c) The transducer can be positioned inside a GRP hull by means of an In Hull Transducer kit.

This method of installation has the dual advantage that no hole is made in the vessels hull and that the echo sounder and transducer can easily be removed for examination or installation elsewhere. It should be mentioned however, that although the accuracy will in no way be affected by installing the transducer inside the hull, the maximum range sensitivity may be reduced, depending on the thickness and quality of the glass fibre. The In Hull Kit is available direct from NASA Marine or your local chandler. Whichever is selected the best location still has to be found.

Select a position below the water level where the transducer will point substantially towards the sea bed and where the transducer and cable are kept well clear of interference generating equipment. This position should be well clear of large masses of bubbles or cavitation which would disrupt the signal.

To test the suitability of the location, press a little sticky chewing gum on the surface of the transducer and stick it down to the inside of the hull (remove dirt and oily residue first). The unit can then be tested. If the location is satisfactory the chewing gum can be removed and the transducer mounted using one of the methods described previously. (Note: Do NOT shorten the transducer cable).

It is important that the face of the transducer is thoroughly bonded down to the hull. A single air bubble will cause a considerable loss in performance.

The transducer and the place of mounting must be kept entirely free of any antifouling compound as this can also effect the performance of the unit.

3:2 NOTES ON ELECTRICAL INTERFACE

External electrical interference is characterised by persistent, random numbers on the display which obscure the true depth reading on the depth sounder.
This is caused by large amplitude voltage "spikes" generally associated with the engine's alternator and/or ignition system which has not been properly suppressed. These "spikes" may find their way into the sensitive amplifier section of the depth sounder in two ways:

(a) Through the craft's common power supply or

(b) Through direct radiation from the source of interference.

To reduce the possibility of induced interference from the engine's generator and/or ignition system choose a position as far away from the engine as possible and run the cable from the transducer as far as practicable from the engine.
Do NOT cut the transducer cable, but stow excess away from any possible source of electrical interference.

3:3 CONNECTING THE DISPLAY

Connect the black wire to the negative supply and the red wire to the positive via a 250 milli-amp fuse. The red wire of the alarm is also connected to the positive supply whilst the black wire connects to the green wire from the display unit. The alarm is not watertight and must be mounted in a protected position. Plug the transducer into the socket on the display unit.

3:4 SOUNDER OPERATION

Various operational parameters need to be set into the memory prior to use to get the best from your Cruiser depth sounder. Once set, these parameters are permanent and are not likely to require adjustment.
Most depth sounders measure the depth below the transducer. It is often more convenient to display the depth below the keel. A facility has been included where the vertical distance between the transducer face and the bottom of the keel (the keel offset) can be programmed into the unit. The unit then reads the true depth below the keel. (On delivery the keel offset is zero so the unit will read the depth below transducer).

BACK LIGHT:
A quick press of the ENTER key will turn on the back light. A further quick press of the ENTER key will turn the back light off.

TO SET THE KEEL OFFSET

Put the unit into engineering mode. (This is achieved by turning off the power supply to the unit and turning the power back on whilst the ENTER key is depressed). The word 'ENG' will appear until the ENTER key is released. Now use the up ▲ and down ▼ keys to enter the required keel offset. A long press on the ENTER key will return to normal echo sounder operation.

SELECTING THE OPERATING UNITS (FEET or METRES)

Put the unit into engineering mode (see above). A short press on the ENTER key will swap the units from feet to metres. A long press on the ENTER key will return to normal echo sounder operation.

SETTING THE SENSITIVITY THRESHOLD

Echoes received from near objects will clearly be larger than from more distant objects. Echoes from keels or turbulence under the boat may be substantially greater than echoes from the sea-bed and may cause the sounder to alternate between the sea-bed and something more local. To overcome this problem, the Cruiser sounder is fitted with variable swept gain. This reduces the sensitivity for local objects, progressively increasing the sensitivity as depth increases The point at which the gain starts to rise is called the sensitivity threshold. The sensitivity of the unit at depths below the sensitivity threshold will be considerably reduced whilst above the sensitivity threshold the unit rapidly becomes more sensitive with increasing depth.

The sensitivity threshold is factory enter to 0.0 metres. To view the sensitivity threshold press ENTER The value can be altered by using the up ▲ and down ▼ keys. The value is then fixed in memory by pressing ENTER.

USING THE ALARMS

The alarm will sound if an echo is received which is shallower than the upper alarm setting or deeper than the lower alarm setting. To view the setting of the upper (Shallow) alarm, press the up ▲ key. Return to sounder by pressing ENTER. To view the setting of the lower (Deep) alarm, press the down ▼ key. The setting can be altered by using the up ▲ and down ▼ keys. The new value is entered and the unit returned to the echo sounder by pressing the ENTER key. To enable the alarm, press the up ▲ and down ▼ keys simultaneously. A 'bell' symbol will appear to show the alarm is activated. When an alarm condition is apparent the bell symbol will flash and the audible alarm will sound. Pressing up ▲ and down ▼ keys again will disable the alarm. All parameters set into the unit are held in memory even when the power is removed.

4: LOG

4:1 INSTALLING THE PADDLEWHEEL UNIT

The paddle wheel should be installed at a point in the hull where:-

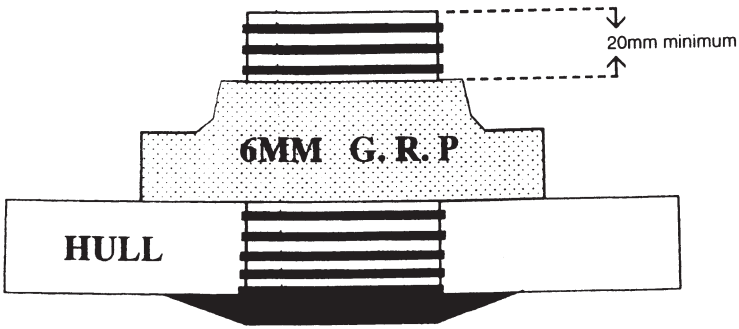
1) It is immersed at all attitudes under power or sail.

2) The blades of the paddle wheel are presented with a smooth flow of water corresponding to the vessels speed through the water. On displacement hulls this is usually about amidships , but on planing hulls it should be as far aft as possible.

3) It should be easily accessible in the bilges for cleaning and laying up. A blanking cap is provided to seal the skin fitting when the paddle wheel is removed.

4) It is not vulnerable to damage from unforgiving surfaces such as trailers and lifting slings.

Drill a hole of 42mm diameter to take the skin fitting and use conventional methods for sealing. It is advisable to avoid the use of mastic materials - use a form of proprietary silicon sealant. The securing nut has a groove on its underside which should also be filled with sealing compound. Finger tighten this nut only. After the sealing compound has enter wipe off the excess and encapsulate the whole assembly in G.R.P. as shown in the diagram. Take care to ensure that a minimum of 20mm of thread is left uncovered. The paddle wheel unit can now be slid into the housing, with the arrow pointing along the centre line of the vessel. It is recommended that a little silicon grease be smeared over the rubber "O" ring to keep the unit free.



4:2 CONNECTING THE DISPLAY

Connect the black wire to the negative supply and the red wire to the positive via a 250 milli-amp fuse. Plug the paddle wheel unit into the socket on the display unit.

4:3 LOG OPERATION

When switched on the display will momentarily display the total distance and then revert to reading speed. The speed is shown in nautical miles per hour and is reliable up to 25.0 knots. (At higher speeds cavitation around the paddlewheel may reduce accuracy.)

A short press of the SPEED key will turn the backlight on and off.

A short press of the TRIP key will display the Trip distance. To reset the trip to zero first select trip by pressing the TRIP key. When the trip distance is shown press and hold the TRIP key until the display shows ' F '. The trip is then reset to zero. The trip distance is shown in tenths of nautical miles up to 99.9nm and in single miles up to 999nm thereafter.

A short press of the TOTAL key will display the total distance. The unit will display the total distance travelled to 999 nautical miles. This counter cannot be reset.

A long press of the SPEED key will return to the Speed display

CALIBRATION

The calibration is preset in the factory. The type of hull and the position of the paddlewheel may affect the performance of the unit. If the log under or over reads then the calibration factor can be adjusted to compensate.

Enter the Engineering mode by first turning off the power supply to the instrument. Press and hold the SPEED key whilst the power supply is turned back on. The word ENG will appear on the display. Press either the TRIP or TOTAL keys to display the calibration setting. This is normally 100 (%) when it leaves the factory. Press TRIP to increase or TOTAL to decrease the number. Each press will increment or decrement the number by 1%. When the desired calibration factor is attained a long press of the SPEED key will return the unit to normal operation. Both speed and distance are calibrated simultaneously. The calibration factor is stored in a non-volatile memory and is retained when power is off.

5: COMPASS

5:1 INSTALLING THE SENSOR.

The sensor measures the direction of the Earth's weak magnetic field, and so is sensitive to other magnetic fields which can affect the unit's accuracy. It should therefore be positioned carefully. Select a position as far as possible away from large ferrous objects such as engines, and items such as DC motors or loud-speakers which have powerful permanent magnets in them. Check also for small ferrous objects close to the mounting location such as screws, nails, hinges etc. These can become magnetised and cause errors. When a likely location has been found, a check for reasonable accuracy can be made with a hand bearing compass to confirm its suitability.

The magnetic sensor itself is gimballed within the housing. To accommodate pitch and roll motions most effectively, mount the sensor as near to horizontal as possible. For best performance in rough weather conditions, it is also advisable to mount the sensor in a position (usually amidships) that minimises lateral accelerations due to pitch and roll. Avoid mounting the sensor high above the water line because doing so also increases pitch and roll accelerations. The sensor is waterproof to CFR-46 standard. Ensure the sensor does not become submerged.

Position the sensor and mark and drill pilot holes for the mounting screws to allow the sensor to be rotated to align it exactly with the vessel's axis. Now mount the sensor carefully in position using non-magnetic screws. The rotational position of the sensor should be chosen to ensure that the arrow points as close as possible fore-and-aft.

5:2 CONNECTING THE DISPLAY

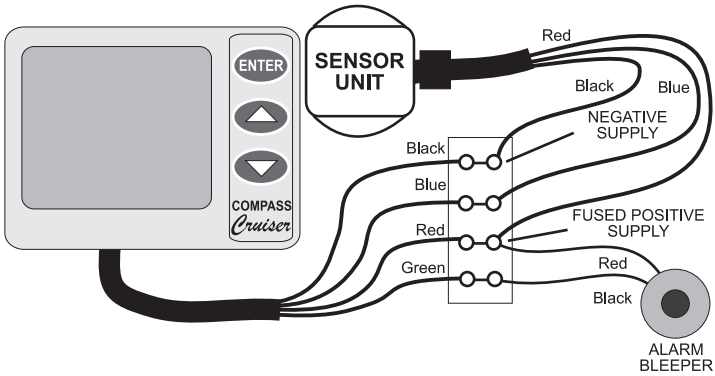


Figure 1

5:3 COMPASS OPERATION

When power is applied to the Cruiser Compass, it executes a comprehensive internal test routine. It then displays the heading. When first powered up, the displayed heading may not be correct until the Compass alignment is done. A typical display is shown on Figure 2.

SWITCHING THE BACKLIGHTING
Backlighting is provided to allow the unit to be seen at night. The backlighting is switched on and off by a single press of ENTER.

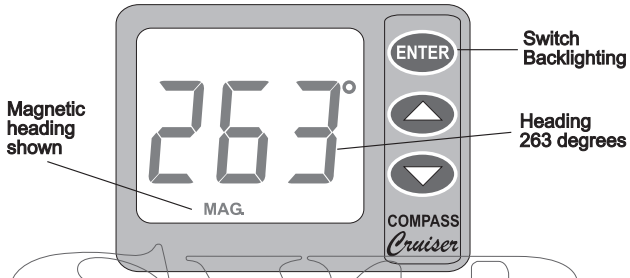


Figure 2 - Normal operation display

CHANGING THE DAMPING
When the vessel is affected by rapid variations of heading in rough seas, a more heavily damped display can be selected instead of the normal lightly damped display. Press ENTER and up ▲ together to switch between heavily and lightly damped modes. The display shows “L” (for Light damping), “A” (for Average damping), or “H” (for Heavy damping) for two seconds after the keys are released to indicate which mode has been selected. Successive presses of the two keys switches between the three damping settings.

ASSISTED STEERING
Assisted steering means using the Cruiser Compass to show errors from a chosen heading, and the direction to steer to bring the vessel back to the chosen heading, which is marked by the lubber line at all times.

When the vessel’s heading is within the pre-set error limits, the dead-ahead indicator is lit to show that all is well (see Figure 3), and no steering adjustment is required. This is the display when assisted steering is started.

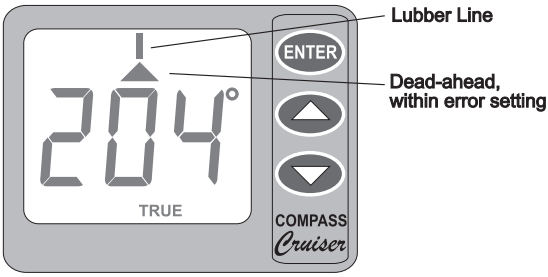


Figure 3 - Dead-ahead indication.

Steering chevrons light whenever the heading error is greater than 3°. As the error builds up, more steering chevrons are lit to indicate the increasing strength of steering needed to correct the heading error. Three are shown on Figure 4a. If the error exceeds 21°, the central chevrons clear in sequence to indicate how far "0ff the Scale" the steering correction is needed. 30° of error are shown on Figure 4b.

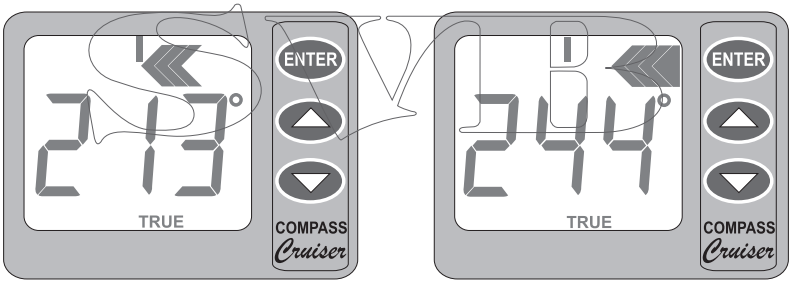


Figure 4a & 4b - Three and ten-chevron Steering indications

If the error increases beyond 180°, the error display reverses to show that the shortest route back to the desired heading is now using the opposite tiller.

SETTING THE DESIRED HEADING

Bring the Vessel to the desired heading, and press up ▲ and down ▼ together to log that heading. The display changes as shown on Figure 3. The logged heading is the heading shown when the up ▲ and down ▼ buttons are FIRST pressed.

The dead-ahead symbol indicates that the vessel's heading is within the error setting.

SWITCHING ASSISTED STEERING OFF

At any time, while Assisted Steering is operating, pressing up ▲ and down ▼ together switches it off.

HEADING ALARM

When Assisted Steering is in operation, an alarm can be set to sound whenever the heading exceeds a pre-set amount from a chosen heading. The chosen heading is the heading logged when assisted steering was selected. Alarm operation is inhibited when Assisted Steering is off. The alarm, when set, sounds whenever the heading is at or outside the alarm setting to port or starboard.

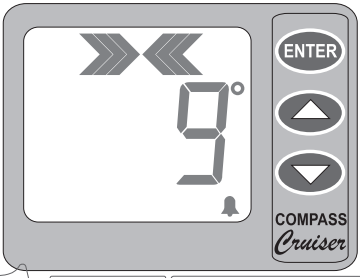


FIGURE 5 - Alarm Boundaries set at +/- 9°

The alarm setting can altered at any time during normal operation by pressing up ▲ to increase its value, or down ▼ to decrease it. The alarm boundaries are shown by the steering chevrons, as shown on Figure 5, for two seconds when the key is released, whereupon the display returns to the normal steering display.

SETTING OR STOPPING THE ALARM

During assisted steering, press up ▲ to switch the alarm on and down ▼ to switch it off. The bell symbol shows when the alarm is on.

Whenever the alarm is on, and the heading during assisted steering is outside the boundaries set at the desired heading, the alarm sounds, and the bell symbol flashes.

ENGINEERING

Engineering settings means those adjustments which seldom need changing, but which affect how the unit operates. The settings (as are all those which can be selected in normal operation too) are stored even when the power is disconnected. There are three operating characteristics which can be set in Engineering: Magnetic or True heading display; Magnetic Variation; and Compass error (deviation) compensation settings.

Engineering mode is entered by holding down the ENTER button while turning on the power. The Engineering mode displays “En” (for Engineering) for two seconds when the button is released. When the two seconds is up, the Magnetic variation is shown in degrees. The present set-up is shown as “MAG.” (for magnetic readings) or “TRUE” (for true readings). Note that the magnetic variation affects only true readings, and need not be corrected as described below if magnetic bearing readings are required.

Any of the following settings can be done when in Engineering. If more than one different setting is to be done, it is necessary only to return via the “En” display between different adjustments or settings, as described below.

ADJUSTING MAGNETIC VARIATION

The Earth’s magnetic variation varies from year to year, and from place to place. The appropriate variation value can be found by reference to Almanacs, maps, or charts. The variation is the offset of magnetic North from true North. If the Magnetic North (the variation) is West of true North, enter it as a positive number. Conversely, if it is quoted as East of true North, enter a negative variation value.

If not already in Engineering (“En” displayed), hold down the ENTER button while turning on the power to put the unit into the Engineering mode. The display shows “En” (for Engineering) for two seconds. The display then changes as shown in Figure 6 to show the stored magnetic variation and whether the unit is operating in Magnetic or true modes (Figure 6 shows Magnetic operation, and an Eastward variation of 6.3°).

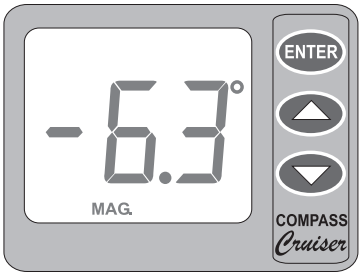


FIGURE 6 - Magnetic Variation Display

Positive numbers represent Westward variations, and negative numbers (as shown on Figure 6) represent Eastward variations. Each press of up ▲ or down ▼ alters the stored variation in steps of 0.1°. If the total variation is greater than ± 9.9°, the fractional part of the angle is altered, but cannot be shown.

Press up ▲ or down ▼ to change the stored variation value to the correct value. Note that changing the magnetic variation has no effect on the accuracy of the compass's compensation (see page 7).

If it is desired to end Engineering adjustments, press ENTER to return to normal heading indication, using the revised magnetic variation value.

MAGNETIC OR TRUE READOUT

If not already in Engineering ("En" displayed), hold down the ENTER button while turning on the power to put the unit into the Engineering mode.

Press ENTER and up ▲ together to switch between Magnetic and True display of the compass readings. When True is selected "TRUE" is displayed, and the variation shown is used to correct the readings made by the sensor. When Magnetic is selected, "MAG." is displayed as shown on Figure 6. In Magnetic indication mode the variation value is ignored.

If it is desired to end Engineering adjustments, press ENTER to return to normal heading indication.

COMPASS ERROR (DEVIATION) CORRECTIONS

In common with all magnetic compasses, the presence of magnetic objects in the vessel distorts the earth's magnetic field nearby, and can affect the accuracy of readings by different amounts at various points of the compass.

Detecting and correcting these errors is known as "Compass Swinging". Compass swinging in the Cruiser Compass is achieved by sailing the vessel in a circle at a constant turn rate in still water, so it is best to select calm conditions. During the constant-rate turn, the errors are detected in the instrument and logged. When a full set of values from a 360° turn are available, the corrections - the compass deviations - are calculated and permanently stored. The factory default deviation settings are all zero, so if it is found that there are significant errors at some points of the compass, these errors should be compensated by swinging the compass.

Compass swinging in the Cruiser Compass has two phases:

- establishing a constant turn rate

- continuing at the same rate to log the deviations

Compass swinging is an Engineering function. To enter Engineering, hold down the ENTER button while turning on the power. The display shows "En" (for Engineering) for two seconds, and then the stored magnetic variation. Now press all three keys together to start Compass swinging.

The swing must be performed by sailing CLOCKWISE in a circle at a constant rate. (If the turn is anticlockwise, the turn bars all point left, to indicate that correct results cannot be achieved.) The display shows the turn rate in degrees per second. Any fixed value between 0.5˚ and 2˚/second is acceptable, and the most important thing to achieve is a CONSTANT rate within this range. It can usually be achieved with a fixed throttle setting and a fixed rudder setting. If the rate of turn is too fast, the steering bars flow to the left (to indicate “slow down”), whereas they flow to the right (“speed up”) if the rate of turn is too slow. When a rate between 0.5˚ and 2˚/second is settled on, the turn bars return to their rest position, without moving, to indicate that the turn rate is satisfactory. At 0.5˚/second, a full 360˚ degrees will, of course, take 12 minutes to execute, and at 2˚/second a full 360˚ will take only 3 minutes. The accuracy of the compensation is better at lower turn rates.

When a steady turn rate has been established, press ENTER to enter the error logging phase. The display changes to show a rotating symbol and a progress count, starting at 9. All the previous compensation values are immediately cleared. If it desired simply to clear the settings, simply press any key during the swing to return to Engineering.

As the constant-rate turn proceeds, the progress indication counts down. It is vital to maintain the previously-chosen constant turn rate during this phase. When the progress indication falls to zero (after turning just over 360˚), the swing is complete, and the compass deviation values are automatically calculated and stored. The display returns to normal Compass mode to show that swinging is finished and that it is no longer necessary to continue the constant-rate turn.

HEADING ADJUSTMENT
It may be necessary to make a minor adjustment to the sensor alignment to ensure that the Compass correctly measures the vessel’s heading. If an adjustment is found to be needed, accurately point the vessel to a known heading. Either MAG. or TRUE is displayed to remind the user which physical alignment of the vessel is to be used.

If the display does not show the known heading, the sensor unit must be rotated slightly to bring the display into alignment. Slacken the sensor unit’s mounting screws sufficiently to allow the unit to be turned, and rotate it until the display shows the known heading. Then re-tighten the sensor unit’s mounting screws to lock the compass calibration at that position.

6: WIND

6:1 PRE-TEST OF INSTRUMENT

Before mounting check that the instrument is complete and undamaged. Plug the sensor into the display unit and apply 12 volts. Gently spin the wind cups and the wind vane and check the operation of the display.

6:2 INSTALLING THE MASTHEAD UNIT

The masthead sensor unit is designed for mast mounting and is supplied with 20 metres of cable. Choose a position where the masthead unit can receive an unobstructed flow of air from all directions. The masthead unit must be substantially horizontal, however the orientation with respect to the boat is unimportant. Four mounting blocks together with four stainless steel self tapping screws are supplied to screw the masthead unit to a metal mast. If the masthead unit is to be fitted to a wooden mast suitable screws should be used.

After the masthead unit is securely fitted run the cable to the display unit and plug into the socket on the display. Do not reduce any excess length of the cable by cutting off the plug, but stow the excess neatly. If the cable is not long enough, 5 or 20 metre extension cables are available.

6:3 CONNECTING THE DISPLAY

Connect the black wire to the negative supply and the red to the positive via a 250 milli-amp fuse. Plug the masthead unit into the socket on the display unit.

6:4 WIND OPERATION

The Cruiser wind system can display wind speed measurements in miles per hour (MPH), nautical miles per hour (knots, shown as KTS), and metres per second (m/s). Press ENTER and up ▲ together to switch between knots, miles per hour, and meters per second. The choice is always saved so the unit operates as set whenever it is powered up again.

WINDVANE DEAD-AHEAD ALIGNMENT

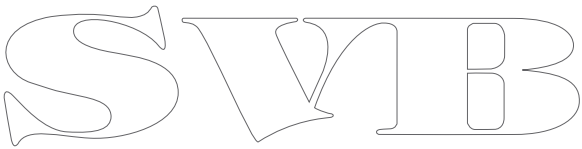
It is always necessary to enter the dead-ahead position of the vane when it is first installed on the vessel so the display shows the relative wind direction correctly. Setting the dead-ahead alignment is achieved by pressing all three buttons together when the vane is aligned with the stainless steel tip pointing forward along the axis of the vessel. The reading is stored when the last button is released, and so it is important that the vane is correctly aligned at that moment.

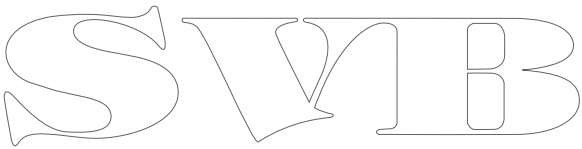
CHANGING THE POINTER STYLE

The pointer style can be either a block or “windex” style. Press up ▲ and down ▼ together to switch between the styles. When the block pointer is displayed, up ▲ increases its width and down ▼ decreases its width. The up ▲ and down ▼keys have no effect when the “windex” pointer style is displayed. As with the speed setting, the final setting is stored so the unit operates as set when ever it is powered up again.

Backlight

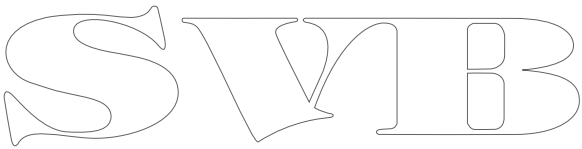
The backlight is switched by pressing ENTER alone.

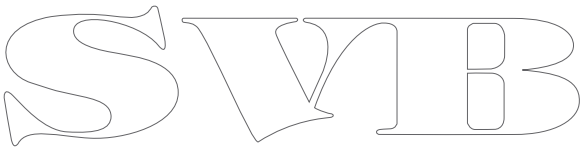

SVB


SVB

LIMITED WARRANTY

Nasa Marine Ltd. warrants this instrument to be substantially free of defects in both materials and workmanship for a period of one year from the date of purchase. Nasa Marine Ltd. will, at its discretion, repair or replace any components which fail in normal use within the warranty period. Such repairs or replacements will be made at no charge to the customer for parts and labour. The customer is however responsible for transport costs. This warranty excludes failures resulting from abuse, misuse, accident, or unauthorised modifications or repairs. In no event shall Nasa Marine Ltd. be liable for incidental, special, indirect or consequential damages, whether resulting from the use, misuse, the inability to correctly use the instrument, or from defects in the instrument. If any of the above terms are unacceptable to you then return the instrument unopened and unused to your retailer for full credit.




SVB