

**INSTALLTATION AND
USER INSTRUCTIONS
for**

Cruiser

**CONTEMPORARY STYLED INSTRUMENTS
FOR CABIN OR COCKPIT MOUNTING**

**LOG, DEPTH
&
COMPASS**

NASA→
MARINE INSTRUMENTS

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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

Cruiser instruments are waterproof when panel mounted and are designed for open cockpit 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 up 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.

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 through hull mount is available from your dealer or direct from www.nasamarine.com.

(c) The transducer can be positioned inside a GRP hull by means of an In Hull Transducer kit available from your dealer or direct from www.nasamarine.com

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 truth 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 or 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 1/4 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

INSTALLING THE PADDLE WHEEL UNIT.

IMPORTANT: Read and fully understand the installation instructions and only proceed if you possess the required skills and correct tools.

WARNING: Always wear safety glasses and a dust mask when installing to avoid personal injury.

WARNING: Immediately check for leaks when the boat is put back in the water.

WARNING: The O-rings must be intact and, the lower one, properly lubricated to make a watertight seal.

CAUTION: Never use solvents or products that contain solvents which could attack the plastic.

IMPORTANT: The sensor is manufactured from high impact polymer and is designed for use on the outer skin of a fibre glass hull. Never install the sensor in a wooden hull, since swelling of the wood could fracture the plastic.

IMPORTANT: Ensure the hull is of constant thickness under the skin fitting flange so the nut will fit squarely against the hull.

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 vessel's 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.

Once a suitable location has been selected, with the boat out of the water, drill a 42mm hole perpendicular to the hull from the outside of the boat. Now sand and clean the hole, inside and outside, to ensure the sealant will properly bond to the hull.

Using a proprietary brand of marine silicone sealant, apply about 2mm of sealant around the skin fitting flange where it contacts the hull and also up the sidewall to a distance 3mm higher than the combined thickness of the hull and the securing nut. This will ensure there is sealant in the threads to seal the hull and to hold the nut securely in place. The nut has a groove on its underside which should also be filled with silicone. From the outside of the hull, push the housing into the mounting hole using a twisting motion to squeeze out excess sealant. With someone outside holding the skin fitting in position, from the inside apply a 2mm thick layer of sealant around the hole equal to the diameter of the securing nut. Carefully tighten down the nut taking care not to over tighten it, just over finger tight is enough.

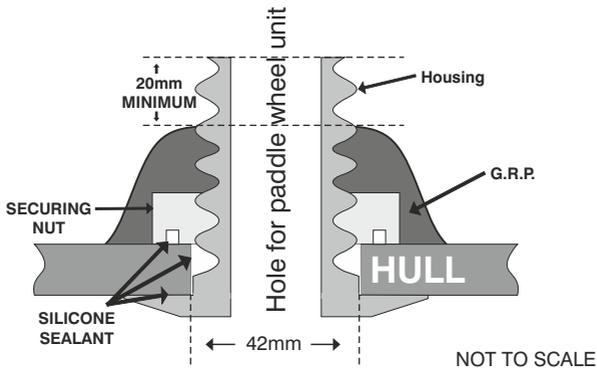


Figure 2 - Paddle Housing Installation (Sectioned view)

Carefully remove all surplus sealant from the inside and outside of the hull and leave until the sealant has cured. It is recommended that the area around the skin fitting is thoroughly cleaned and the whole assembly be fibre glassed into the hull as shown in fig 2. ensuring that the top 20mm of thread remains free of sealant.

4:2 CONNECTING THE DISPLAY

Connect the black wire to the negative supply and the red wire to the positive via a 1/4 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 paddle wheel 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

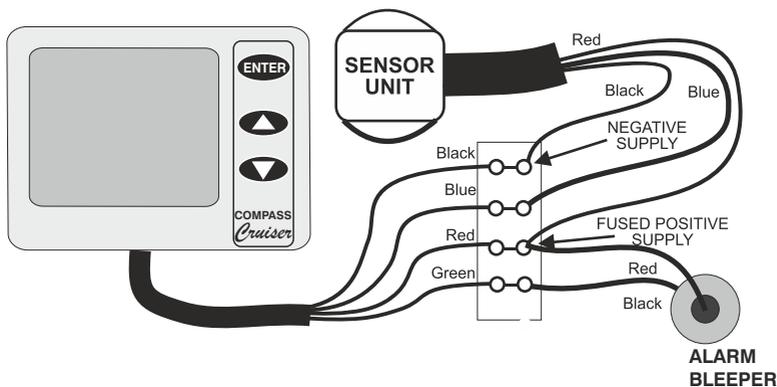


Figure 1

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.

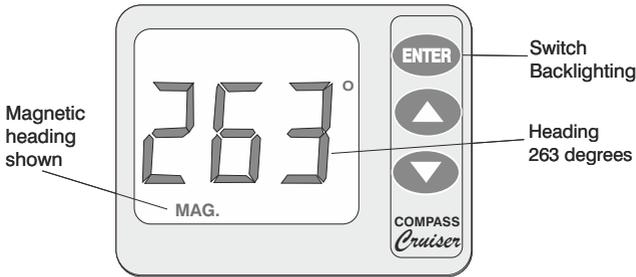


Figure 2 - Normal operation display

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 DOWN 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.

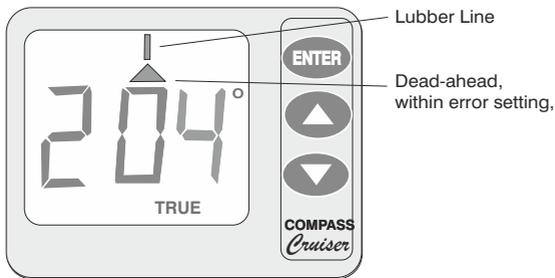


Figure 3 - Dead-ahead indication.

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 “off the scale” the steering correction is needed. 30° of error are shown on Figure 4b.

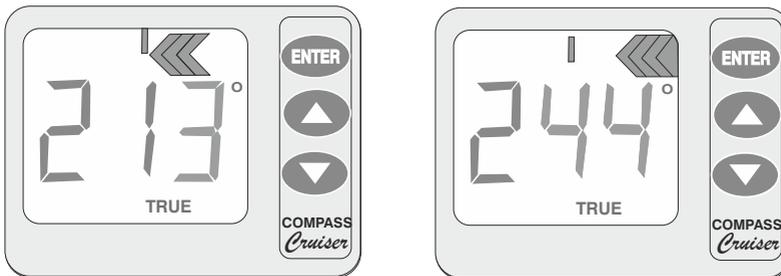


Figure 4a & 4b - Three and ten-chevron Steering indications

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 ENTER and UP together to log that heading. The display changes as shown on Figure 3. The logged heading is the heading shown when the ENTER and UP 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.

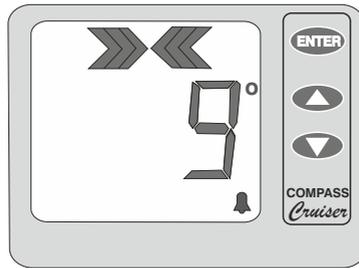


FIGURE 5 - Alarm Boundaries set at +/-9

The alarm setting can be 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 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°).

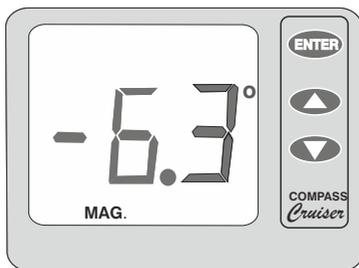


FIGURE 6 - Magnetic Variation Display

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 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.

HEADING ADJUSTMENT

It is important that the sensor is aligned with the vessel and reads North (0°) when the vessel is pointing North. This should be verified before doing any error corrections as described later. If the display does not correctly show the 0° heading, the sensor unit must be rotated slightly to bring it 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

COMPASS ERROR CORRECTIONS

In common with all magnetic compasses, the presence of magnetic objects in the vessel can distort the earth's magnetic field nearby, and affect the accuracy of the detection of magnetic North, and the accuracy of readings at other points of the compass. The errors are known as compass deviations. However, compensation at these other points of the compass is seldom necessary if a good position for the sensor head has been chosen which has no field distortion by external magnetic objects.

These errors can be compensated automatically in the Target/Cruiser Compass if the vessel can be pointed accurately in particular directions by reference to known geographical features. Compensation is done by logging the actual readings when the vessel is correctly aligned at the principal directions 45° (North-East), 90° (East), 135° (South-East), and so on. The logging is done automatically, with the compensations calculated and permanently stored in the unit's memory. In normal operation of the compass, corrections at intermediate angles are in proportion to the compensation values logged at the eight principal directions.

CLEARING THE COMPASS COMPENSATION VALUES

If it is desired to return all the compensation values to the factory defaults, put the unit into the Engineering mode as described in SELECTING ENGINEERING MODE above. Press ENTER, UP, and DOWN together (this three-key requirement is to ensure that the clear is not done by accident). The word "clr" is displayed for two seconds to indicate that all the factory compensation settings have been restored.

SETTING THE COMPASS COMPENSATION VALUES

It is important to decide before setting the compass compensation how the alignment of the vessel is to be achieved. If a hand bearing reference compass is to be used, set the unit to display Magnetic. If maps or chart references are to be used, set the unit to display True, and ensure that the magnetic variation is correctly set (see above). It is important that the correct magnetic variation is set before doing the compass setting, because the magnetic variation is always allowed for before the true heading is displayed.

Compass errors can be compensated as follows:

1. Put the unit into the Engineering mode as described in SELECTING ENGINEERING MODE above. Then put the unit into compensation mode by pressing UP and DOWN together. The first display is 45°, representing North-East. Bring the vessel to 45° bearing and wait at least 10 seconds for the sensor value to settle. Press ENTER to log the bearing. "At" is displayed to indicate that the value is logged.
2. Press INC again to move the indicated bearing to the next bearing, and repeat the process at each 45° step until the 315° bearing has been logged.
3. When all the errors have been logged, press UP and DOWN together to return to Engineering mode.
4. To exit Engineering press ENTER
5. As a final test, the vessel can be swung to confirm that the compass is operating satisfactorily with all errors correctly compensated.

Note that it is not necessary to do all the settings in sequence as described. If the error at a particular angle is known to be negligible, there is no need to align the vessel and log the compensation at that position. Additional corrections can be added at different visits if a convenient alignment is achieved.

IMPORTANT READ THIS BEFORE UNPACKING INSTRUMENT

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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.

Name _____

Address _____

Dealer Name _____

Address _____

Date of Purchase _____

Proof of purchase may be required for warranty claims.

**Nasa Marine Ltd.
Boulton Road, Stevenage, Herts SG1 4QG England**

EU Declaration of Conformity

This declaration is issued under the sole responsibility of NASA Marine Ltd. This product is in conformity with the relevant Union harmonisation Legislation. Harmonised standards applied: EU directive 2014/30/EU (Electromagnetic compatibility) EN60945:2002-08

The original Declaration of Conformity certificate can be requested at info@nasamarine.com

