



**DESIGNED AND  
MANUFACTURED  
IN ENGLAND**

# **EML-2**

## **ELECTRO- MAGNETIC LOG**





## **INTRODUCTION.**

The EML-2 log consists of a through hull sensor and an interface box which, when correctly installed, outputs boat speed through the water, trip distance and total distance. The unit is factory set but has the facility for final in situ calibration. The output, which updates twice a second, is in the NMEA-0183 format using the sentences VHW and VLW. The trip distance is reset to zero each time the power is turned off while the total distance is cumulative and cannot be reset. The EML-2 can be used with the NASA Marine easy log display or any other compatible display.

## **HOW IT WORKS.**

The EML-2 generates an alternating magnetic field in the water below the sensor. As the sensor passes through the water it generates an alternating electric field whose amplitude is proportional to the boat's speed through the water. This field is detected by small stainless electrodes on the underside of the sensor. The interface box then amplifies this signal and converts it into speed and distance readings. An LED on the interface box flashes each time new NMEA data is sent out.

## **CHOICE OF SENSOR LOCATION.**

The sensor must remain in non-turbulent water flow at all times. Choose a position as close to the centre line as possible where the water flow is unrestricted and where the sensor is accessible for cleaning. Avoid areas around devices which could cause electrical or magnetic interference.

Ideally the sensor should be: -

- close to the boat's centre line.
- as vertical as possible.
- clear of the keel.
- clear of sources of electromagnetic interference.
- always immersed, no matter what the heel.
- internally accessible for cleaning.

## **INSTALLING THE SENSOR.**

**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 glass filled nylon 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.

Once a suitable location has been selected, with the boat out of the water, drill a 3mm pilot hole from inside the hull. Using a 51mm (2.0 inch) hole saw, cut a hole perpendicular to the hull from the outside of the boat. Using a file, make a small chamfer around the hole sufficient to accommodate the 2mm radius on the skin fitting flange. Now sand and clean the hole, inside and outside, to ensure the sealant will properly bond to the hull.

**IMPORTANT:** Ensure the hull is of constant thickness under the skin fitting flange so the nut will fit squarely against 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, the spacer washer and nut. This will ensure there is sealant in the threads to seal the hull and to hold the nut securely in place. 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 rubber washer. Then place the rubber washer over the skin fitting and bed down onto the sealant. Coat the upper face of the rubber washer with sealant and tighten down the nut taking care not to over tighten it. (see fig1)

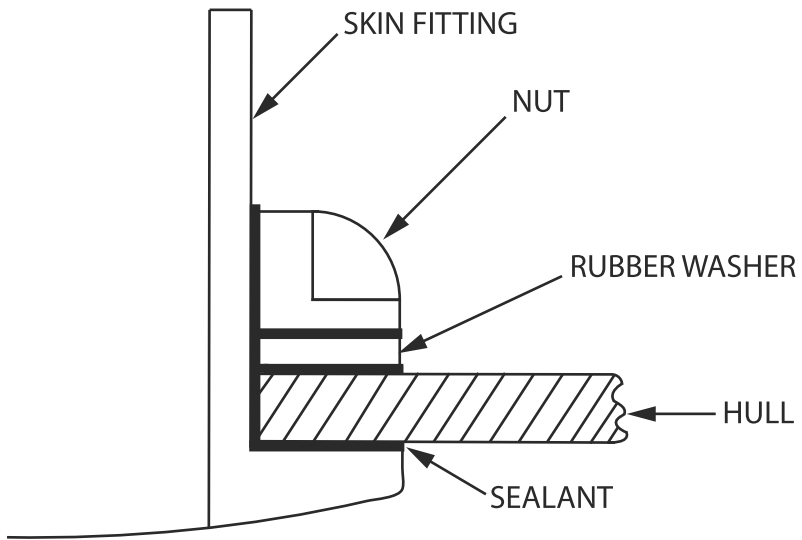


Fig 1

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 resin or sealant.

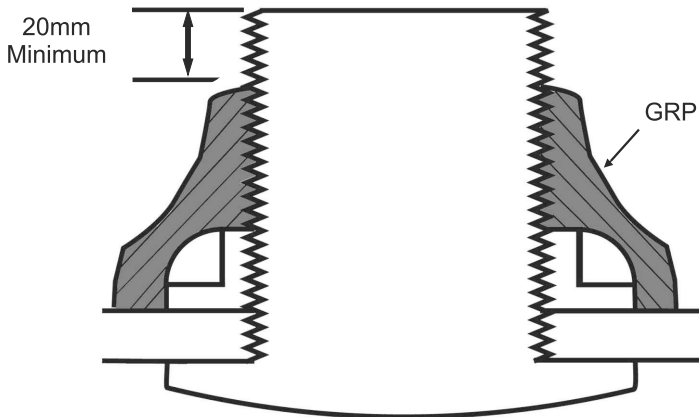


Fig 2

Before pushing the sensor into the skin fitting, ensure the lower O-ring is liberally lubricated with silicone grease. Push the sensor into the skin fitting with the arrow pointing forward and hand tighten the securing ring.

### INSTALLING THE INTERFACE BOX.

The interface box is not waterproof and should be mounted in a permanently dry location. The box can be secured using the two mounting flanges. Carefully connect the five wires of the sensor cable to appropriate terminals on the interface box as shown in fig 3. Plug in the power cable and connect it to a 12-volt DC power source. The red wire is positive and the wire with the black stripe is negative. The power cable is fitted with a 1-amp fuse. The NMEA output can now be used to drive any compatible speed log display.

### CONNECTING TO AN NMEA DEVICE

Connect the interface box BLUE/NMEA to the NMEA input of the device. Connect the interface box SILVER/NEG to the NMEA- or NMEA reference of the device. The NMEA 0183 output sentences are VHW and VLW.

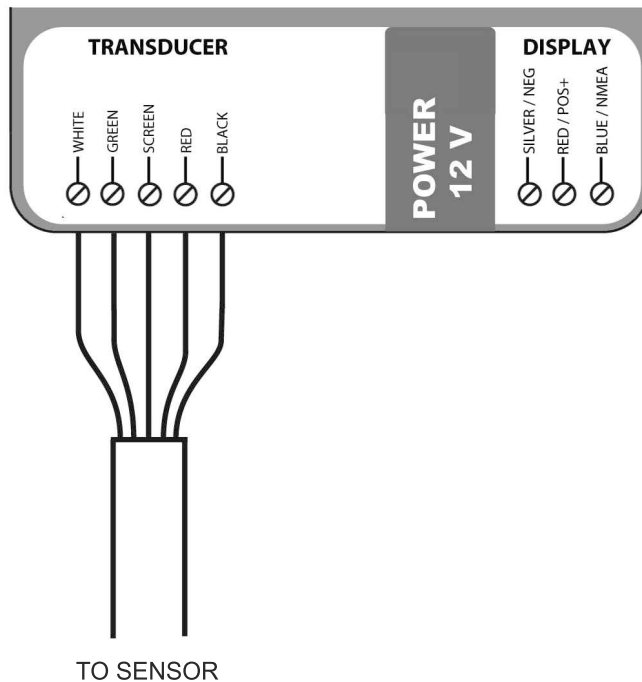


Fig 3

## CONNECTING TO THE NASA Marine EASY LOG.

The Easy log can be connected directly to the interface box as shown in fig 4. Alternatively, if a longer length of cable is required, a three-way cable and terminal block is supplied and is connected as in fig 5. Further Easy logs can be connected in parallel and function as independent repeaters. Do not attempt to extend the cable between the sensor and the interface box.

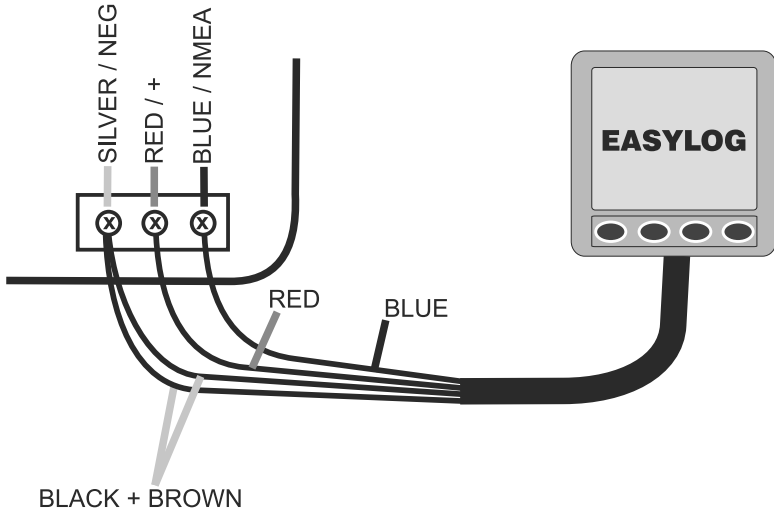


Fig 4

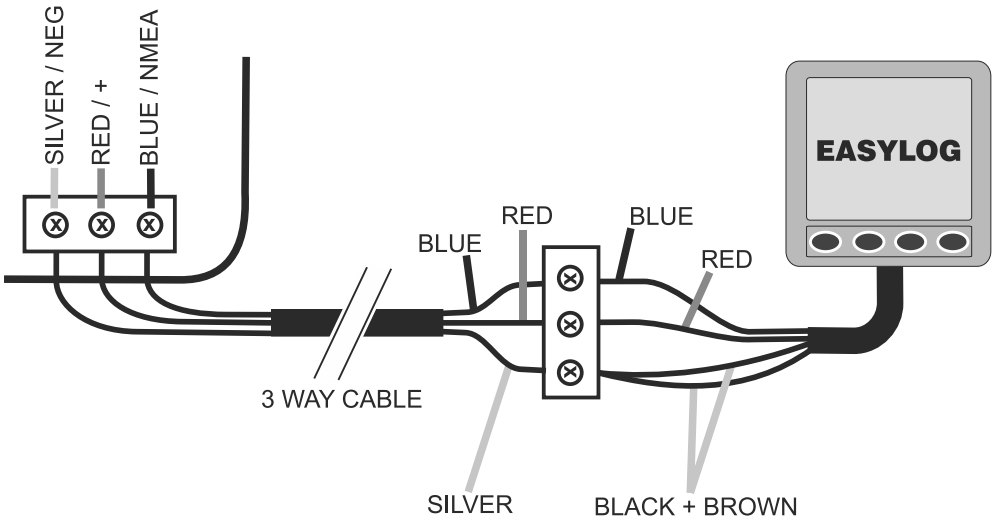


Fig 5

## **INSTALLING THE EASYLOG DISPLAY.**

Select a convenient position for the display on a panel or bulkhead. The site must be flat and the cavity behind the panel must remain dry at all times. (The cable entry is deliberately not sealed to allow ventilation and prevent misting of the display.)

Cut a hole in the panel 87mm wide and 67mm high. Unscrew and remove the wing nut on the rear of the display and remove the stainless-steel clamping bracket. Fit the O-ring seal into the groove in the mounting face of the display unit.

Fit the display unit into the panel the ensuring the O-ring seal makes good contact with the panel. This is important as it prevents water getting behind the unit and entering the cavity behind the panel. Replace the clamping bracket onto the stud and fit and tighten the wing nut, finger tight only.

It is good practice to run the cables vertically downwards from the unit. Doing so prevents any moisture that may collect on the cables from running back into the unit.

## **CALIBRATING THE EML-2.**

With the boat at rest in still water, a small (usually less than 2Kts) steady error may occur. This can be trimmed out by pressing the ZERO SET key. Only press this key when the water speed is truly zero. The setting can be cancelled by, disconnecting the power and reconnecting while the ZERO SET key is depressed.

If the speed reading requires adjustment then carefully turn the calibration control, clockwise to increase the reading or anticlockwise to reduce the reading.

**IMPORTANT:** Do not attempt to adjust the speed calibration until the ZERO SET procedure has been correctly performed.

## **USING THE EASYLOG.**

A brief press on the ILLUM key will roster the character in the lower left of the display between H and L. When showing H, a long press on the key will increase the backlighting. When showing L, a long press will reduce the lighting. Pressing SPEED will show the boat speed in knots with a symbol at the centre, bottom of the screen. When this symbol is a straight line the average speed is constant, an arrow to the right shows the average is increasing while an arrow to the left shows the average is decreasing.

Pressing trip shows the distance travelled, in nautical miles, since the unit was turned on. Pressing TOTAL shows the cumulative distance in nautical miles. Note, for clarity, the units of 1000nm are displayed at the top left of the display.



## **CLEANING THE SENSOR.**

From time to time it may become necessary to clean the face of the sensor. The sensor can be removed by unscrewing the retaining ring and pulling it out of the skin fitting. If the boat is in the water be aware that there is no valve in the fitting and a significant water flow will result. It is essential that the blanking plug should be at hand, with its O-rings well lubricated, ready to push into the skin fitting. The face of the sensor should be free from growths, paint, grease, antifouling etc. An old toothbrush can be used to scrub the surface. If the electrodes show any signs of damage they can be removed using a 2mm Allen key. Spares are available from NASA Marine. Take care, when replacing the electrodes, not to get water in the threads.

After cleaning the sensor, lubricate the O-rings with silicone grease (Taking care to avoid getting grease on the electrodes.) and re-install the sensor with the arrow pointing forward.

## **TECHNICAL SPECIFICATION**

NMEA 0183 output sentences VLW+VHW

Supply voltage 12v

Supply current 80mA

Speed Range 0.2 - 40 knots

Transducer cable length 5.0 metres

# NOTES



# IMPORTANT READ THIS BEFORE UNPACKING INSTRUMENT

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.

## 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](mailto:info@nasamarine.com)

**THIS PRODUCT IS INTENDED FOR USE ONLY ON NON SOLAS VESSELS**

