

# EX-1

## INSTALLATION AND USER INSTRUCTIONS



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## **INTRODUCTION.**

It is common practice to inject cooling water into marine engine exhaust systems. This cooling reduces the exhaust gas temperature to a level where rubber and polymer exhaust components can be used.

Such "wet exhaust" systems perform reliably and have a good life expectancy as long as the cooling water is always present. A failure of cooling water, even for a short period, can lead to catastrophic damage of the exhaust system components which, in turn, can lead to fires, leaks of toxic gasses and reduced exhaust life expectancy.

A cooling water failure can be caused by a temporary blockage of the raw water inlet by a plastic bag or other debris or it could result from a burst pipe or poorly performing water pump. Either way an engine temperature gauge will not give adequate warning. The temperature of the engine block, full of water, will rise very slowly whilst the exhaust gas temperature will rise from a few tens of degrees centigrade to a few hundred degrees centigrade in a matter of seconds.

To give advanced warning of cooling water problems, either restrictions or complete failure, requires an exhaust temperature sensor. Some sensors measure the temperature of the outside of the exhaust hose. Unfortunately, as rubber exhaust hoses conduct heat poorly, by the time a warning is given the internal temperature may have already exceeded the manufactures recommended maximum. A further problem with such a device is that the user has no way of knowing if it will actually work when needed.

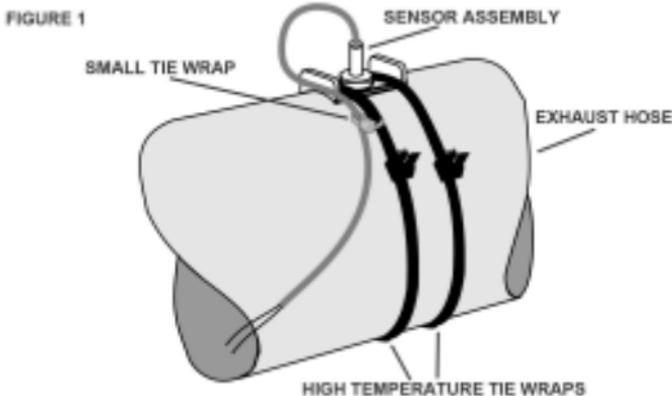
The EX-1 measures the exhaust gas temperature directly and displays it in degrees centigrade or fahrenheit. Once the normal working temperature has been established a maximum temperature, a few degrees higher, can be programmed into the EX-1 which will then sound an audible alarm if that temperature is exceeded.

Even a small rise in temperature can indicate a potential problem such as a minor blockage, leak or failing pump which can be corrected before a complete failure occurs.

## INSTALLING THE SENSOR.

Select a position on the rubber exhaust hose about 150mm back from the water injection point and drill a 5mm hole in the top taking care to avoid the steel reinforcing wire.

Push the tip of the sensor probe through the hole and use the high temperature tie wraps to secure the red mounting bracket. Tighten the tie wraps until the sensor is secure but do not over tighten. To prevent excessive stress on the sensor, the cable should be clipped to one of the large tie wraps using a small tie wrap as shown in fig. 1.



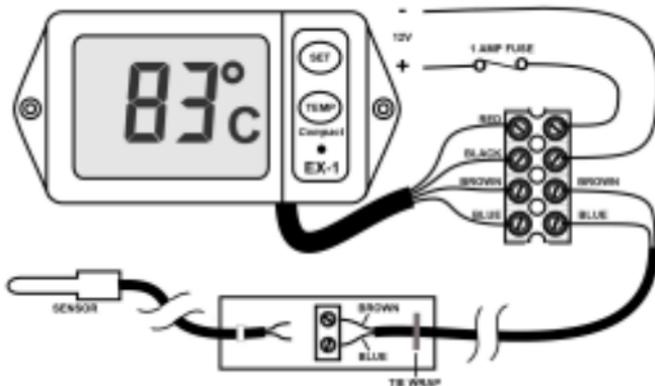
Connect the 5 meter cable into the terminal block on the sensor junction board. Use a small tie wrap to retain the cable to the board then clip the box around the assembly. Run the 5 meter cable to the display. You can shorten or extend this cable as required.

## INSTALLING THE DISPLAY.

The display unit is not watertight and must be mounted in a dry area. Select a convenient position and screw it to a flat bulkhead. The wires can be arranged to pass directly through the bulkhead or exit through the slot at the bottom of the display.

Connect the wires into the four way junction box as shown in fig. 2. The blue and brown wires go to the sensor probe, the black and red wires go to the 12 volt supply. (black negative and red positive) For convenience the supply can be taken from the engine switch. It is recommended that a 1 amp fuse is fitted in the positive line

FIGURE 2



### USING THE EX-1.

When power is first connected to the EX-1 it will display the temperature of the tip of the stainless steel sensor in degrees centigrade, also the display backlight will illuminate for a period of two minutes.

Pressing any key will turn the backlight on for a further two minutes.

Pressing both keys simultaneously will change the scale from Centigrade to Fahrenheit and vice versa.

On pressing the SET key the unit will display the alarm threshold temperature together with the word SET. (The factory default setting is 85 degrees centigrade.)

Pressing the TEMP key will return to the normal monitoring mode.

Alternatively, if the key is not pressed, the unit will return to its normal monitoring mode after a period of thirty seconds.

If the tip of the sensor exceeds the alarm threshold temperature then the word HOT will appear on the display, the alarm will sound and the back light will flash rapidly.

If the sensor temperature subsequently falls below the threshold temperature then the alarm will clear and the unit will return to its normal mode. Should the alarm condition continue then the alarm can be cancelled by pressing either key. This will return the unit to monitoring mode. However, if the temperature of the sensor fails to fall below the threshold temperature after two minutes the alarm will sound again.

## **CHANGING THE ALARM THRESHOLD TEMPERATURE.**

It is normal practice to run up the engine to full load and note the maximum exhausted temperature. The alarm threshold temperature can then be set a few degrees (Usually about 10 degrees centigrade) higher. It is important however that the threshold temperature does not exceed the manufacturer's recommended limits for any part of the exhaust system.

To adjust the alarm threshold temperature press SET, to display the current alarm threshold, then depress the SET key for a period of about ten seconds until the word CHAnge is displayed. The SET and TEMP keys can now be used to increment or decrement the threshold. When the desired alarm threshold has been selected wait thirty seconds and the display will then revert to normal operation.

## **ERROR MESSAGES.**

If a sensor wire becomes disconnected the back light will flash and the word OPEN will scroll across the display to indicate that the sensor is open circuit. If the sensor wires become shorted together then the backlight will flash and the word SHORT will scroll across the display. If either of these messages occur then check the sensor wiring.

## **EX-1 SPECIFICATION.**

Voltage 8 to 15 volts DC.

Current < 1.5 mA.

Temperature range -30 to +170 degrees Centigrade.

Threshold range -30 to +170 degrees Centigrade.

( -22 to +338 degrees Fahrenheit.)

## 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.**

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