

INTRODUCTION

Marine water cooled exhaust systems are designed to withstand temperatures of up to about 120°C. However the exhaust gases from the engine may reach in excess of 450°C. In order to protect the exhaust system it needs a continuous flow of cooling water from the engine, should this flow be interrupted by debris being sucked into the intake or by a problem with the water pump or simply forgetting to open the seacock then the exhaust temperature will start to rise immediately. Depending on the extent of the blockage the increased temperature can cause seriously damage the exhaust system and water lock. The engine water temperature and/or oil temperature alarms will eventually alert you, however there can be a considerable time lag especially if the engine has been started from cold which means that damage may already have be done.

In order to protect the exhaust components and provide the earliest possible warning you need measure the temperature **INSIDE** the exhaust. Systems which measure the outside temperature will inevitably be delayed as the heat has to make its way through the exhaust components.

This product uses a quality stainless steel in-exhaust probe containing a platinum wire sensor. The control unit allows the exhaust temperature to be monitored and the alarm point set to a temperature appropriate for your engine.

Note: Exhaust temperature alarms protect the exhaust system components not the engine; you will still need the engine water/oil temperature alarm.

COMPONENTS



22mm Hole



Max: 6" diameter. cut to size

SENSOR INSTALLATION

The sensor has been designed so that it can be fitted without the need to dismantle any of the exhaust system components.

The clamp is suitable for exhaust hoses up to 6" diameter, cut the steel band to size making sure you leave enough overlap. Make sure the cut end has no burrs else it will be difficult to feed through the worm drive.

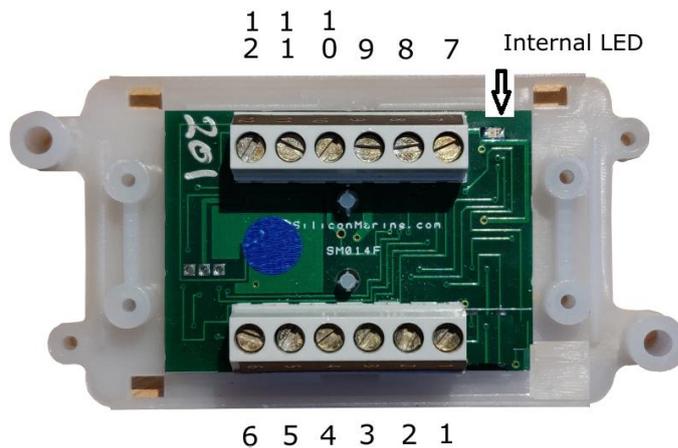
Assemble the sensor as shown, the shake proof washer should go above the steel band, tighten the nuts firmly. No thread should protrude below bottom nut (see picture) .

Select a point on the hose about 150mm downstream from the water injection point. Drill a 4mm hole avoiding the steel reinforcement rings (If you have a horizontal hose it is preferable to mount the sensor on the top). Push the sensor through the hole into the exhaust pipe and secure firmly.

The sealing O ring should make a good waterproof seal; if in doubt add a little silicone sealant.

Use a cable tie to secure the cable to the hose clamp as shown.





- | | |
|----------------------------|----------------------------|
| 1. Not used | 7. Button Red (Positive) |
| 2. Battery Positive supply | 8. Button Blue (Negative) |
| 3. Battery Negative supply | 9. Buzzer Black (Negative) |
| 4. Not used | 10. Buzzer Red (Positive) |
| 5. Not used | 11. Sensor (Any colour) |
| 6. NMEA (NMEA Data output) | 12. Sensor (Any Colour) |

The button is suitable for outside mounting, however the junction box should be mounted somewhere dry.

Mount the button on the engine panel, the button requires a 22mm hole.

Fit the control unit behind the panel ensuring that the cable reaches the button without stretching.

The supply voltage for the alarm should ideally come from the engine ignition circuit so that it is only live when the ignition is turned on, 1m of cable has been supplied for this purpose. You may choose to include a fuse in the power line however the gauge includes two internal self-resetting fuses on the power line and alarm output.

The sensor wires are not polarity sensitive and therefore may be connected either way round. If you extend the sensor wires then it is important that the joints are soldered as a poor joint will affect the temperature reading..

The alarms has a self-adhesive pad for attaching to the top of the control unit. If you wish to add your own alarm then please use a 12v piezo self-resonating sounder with a current consumption of less than 350mA, do not use electro mechanical buzzers as these often cause electrical interference.

INITIAL SYSTEM TESTING

When you power up the unit you will see that the button illuminates for about two second then goes off, this indicates that the unit has powered up.

Wait about 10 seconds, the button lights should remain off. If a button shows a steady red then it indicates a sensor error and you need to check the sensor wiring. To check the sensor use an ohm meter, the resistance should be about 1100 ohms at 25°C and there should be no continuity between the sensor wires and the sensor case. If you want to check the sensor by heating it then use hot water never use a flame.

Assuming the button light has remained off you can now test the alarm, hold the button down whilst switching the unit on, the alarm will sound and the button will flash. To cancel the alarm wait a few seconds then press the button again.

In normal operation without there being an over temperature alarm the light on the button will remain off.

If you want to check the alarm operation heat the sensor with hot water never use a flame.

ADJUSTING THE ALARM TEMPERATURE

Determining the alarm point for an engine that gives the fastest response whilst eliminating false alarms can be difficult. Most exhaust temperature alarms don't attempt to do it and simply use a 'one size fits all' approach. These will normally sound the alarm when the temperature is about to reach critical normally requiring you to switch the engine off immediately.

Being able to set the alarm temperature lower gives you more time to respond and warns you well before exhaust damage has started to occur.

The unit is supplied pre-configured and ready to use with the exhaust alarm temperature set to 95°C, however it is recommended that you adjust this to suit your engine.

To adjust the alarm temperature, follow this simple procedure...

Run the engine long enough until you believe that it has reached its 'normal' working temperature and you are sure that the exhaust cooling is functioning normally.

Press and hold the button for a few seconds until the alarm beeps once, now release the button. The button light will flash several times and then go out this indicates that the alarm temperature has been set to 20°C above the current operating temperature.

The alarm temperature can be reset as many times as required, but you must always ensure that the engine is operating normally before doing so.

Note: After an alarm has sounded the temperature must fall 5°C below the alarm point for the alarm to turn off.
Example; if the alarm temperature is set to 60°C the alarm will sound at => 60°C and turn off when it falls below 56°C.

NMEA DATA

The gauge outputs NMEA data containing the current exhaust temperature in centigrade.

It includes the MTW format as you may wish to substitute sea water temperature for exhaust temperature on your instrumentation as not many displays can use the XDR format.

\$IIXDR,C,25.0,C,SM014,*xx <CR> <LF> where 25.0 is the temperature, C is Centigrade and xx is the checksum.

\$--MTW,25.0% d.0,C,*xx <CR> <LF> where 25.0 is the temperature, C is Centigrade and xx is the checksum.

Baud rate: 4800,N,8,1

SUMMARY OF BUTTON OPERATION

On Power up

Button will flash then go off and remain off.

Steady lit button with no alarm

Sensor error; Sensor is either open circuit/ short circuit.

Flashing button alarm sounding

Over temperature alarm; Audible alarm can be cancelled by pressing the button.

Flashing button, no audible alarm

Over temperature alarm; Audible alarm has been cancelled, if over temperature persists the audible alarm will reactivate after 2 minutes

Press and hold button until the alarm beeps once.

Provided that there is no sensor error this action will set a new temperature alarm point 20°C above the current exhaust temperature.

Press and hold the button whilst turning the unit power on

Alarm test; Simulates alarm condition the button will illuminate and audible alarm will sound.

Press the button to resume normal operation

Spares

Part Number	Description
SM008	Complete Marine Exhaust Temperature Alarm Kit
SM006/1	Temperature Sensor
SM006/2	Temperature Sensor Retaining Clip
SM006/3	Illuminated Button
SM008/4	Control Unit

Specifications

Supply Voltage: 9 – 28v DC, 10mA (no alarm) 70mA.

Sensor Temperature range: -20 - + 250°C (0-200°C read range)

Temperature probe: Marine grade stainless steel with PT1000 platinum wire sensor
5.0mtr cable.

Calibration: +/- 1°C self-calibrating.

Alarm range: 0 - 199°C user adjustable in 1°C steps.

NMEA: NMEA 0183 Integrated Instrumentation standard.

Alarm Output: Ground connection, 350mA max.

Fuse: Internally fused with self-resetting fuses on power and alarm output.

Designed and Manufactured in the United Kingdom



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