Marine Exhaust Temperature Alarm Model: SM008

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

52mm (2” gauge)

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.

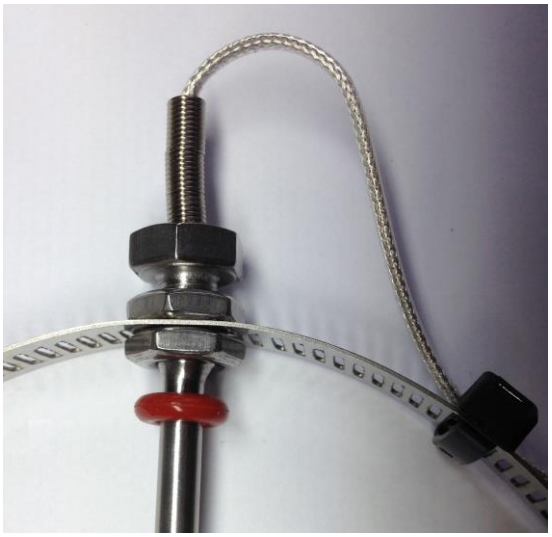
The clamp is suitable for exhaust hoses up to 6” diameter, cut the steel band to size making sure you leave enough overlap. Make sure the cut end has no burrs else it will be difficult to feed through the worm drive.

Assemble the sensor as shown, the shake proof washers should go either side of 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 silicon sealant.

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



INSTALLATION

1. Not Used
2. Not Used

3. Button Blue Wire
4. Button Red Wire

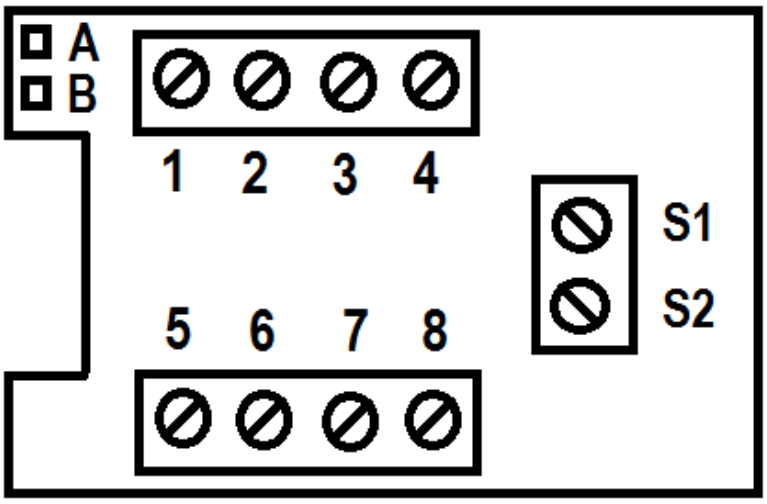
5. Battery Negative

6. External Alarm Positive
7. External Alarm Negative

8. Ignition +12v supply, Gauge Red

S1. Sensor
S2. Sensor

A. NMEA data output
B. NMEA data ground



Mount the button and gauge (if supplied) on the engine panel; the button requires a 22mm hole and the gauge 52mm.

Fit the control unit behind the panel ensuring that the cable reaches the button without stretching or needing to extend.

The supply voltage for the alarm should come from the engine ignition circuit so that it is only live when the ignition is turned on; separate black and red wires have been supplied for this purpose.

The exhaust sensor wires are connected to terminals S1 and S2 and may be connected either way round. Five meters of cable has been supplied with the kit which can be used to extend the sensor cable if necessary, if you are extending the sensor lead the joints must be soldered as a poor joint will affect the sensor reading. Heat-shrink tubing has been supplied to cover the joints.

The unit comes with an alarm which is attached to the top of the control unit. An additional external alarm is supplied with the kit for mounting at any convenient location, If you wish to add your own alarm (or even a third alarm) then please use a 12v piezo self-resonating sounder with a current consumption of less that 500mA, do not use electro mechanical buzzers as these often cause electrical interference. A low power relay may be connected to the alarm output.

Fuses; the control unit contains internal self-resetting fuses on the supply and alarm output, should an internal fuse fail it will be automatically reset when the overload is removed or the power turned off.

NMEA data output is available on connections A and B, see section below for details

INITIAL SYSTEM TESTING

When you power up the unit and you will see that the buttons illuminate for about two second then go 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. Sensors should show a resistance of about 1100 ohms at normal room temperature.

Assuming the button lights have remained off you can now test the alarm by simulating a high-temperature. Hold the button down whilst switching on, then after about 4 seconds release the button. This will simulate a high temperature of 200°C and after a short delay the internal and external alarms will sound and the button flash. To cancel the alarm and return the unit to normal operation press the button.

In normal operation without there being an over temperature alarm the lights on the buttons will remain off. The unit re-calibrates and self-checks the sensors every few second so there is no need to check the sensors by heating them to the alarm point. If however you do want to check them use hot water NOT 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 that engine for 5 seconds then release. 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. Do the same for the other engine is applicable.

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 the alarm has sounded the temperature must fall 5°C below the alarm point for the alarm to turn off.
For instance; 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.

In cold waters the cooling water temperature at the exhaust may barely show on the gauge, this is a good as it shows that you're cooling systems is working well.

NMEA DATA

The NMEA data output conforms to the NMEA 0183 Integrated Instrumentation standard.

Baud rate is 4800,N,8,1 Data sentence format: $IIXDR,C,25.0,C,75.0,C,SM008,*cs
Where 25.0 represents current temperature, 75.0 represents alarm temperature, SM008 is the model number and *cs is the checksum.

Note: The data may be inverted using the following method; Hold the button down whilst turning the unit on, then after 10 seconds release the button. The button will flash 4 times and the data will be inverted from its previous state. This may be useful if you are using an 'ebay' USB – Serial converter many of which do not include the line drivers/receivers and therefore require inverted data.

SUMMARY OF BUTTON OPERATION

On Power up

Buttons 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 for 5 seconds
Provided that there is no sensor alarm this action will set a new temperature alarm point 20°C above the current exhaust temperature.

Press and hold the button for 5 seconds whilst turning the unit power on
Alarm test; Simulates alarm condition on selected engine (200°C), the engine button will illuminate and audible alarm will sound.
Press the button to resume normal operation

Press and hold the button for 10 seconds whilst turning the unit power on
Inverts the NMEA data,

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) 80mA internal alarm sounding.
Gauges: 11 – 18v
Sensor Temperature range: -20 - + 250°C (0-200°C read range)
Temperature probe: Marine grade stainless steel with PT1000 platinum wire sensor 1.0mtr 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, 0.75A max.
Fuse: Internally fused with self-resetting fuses on power and alarm output.

Designed and Manufactured in the United Kingdom

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CE

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