Silicon Marine

Marine Exhaust Temperature Alarm. Model: SM0017

INTRODUCTION

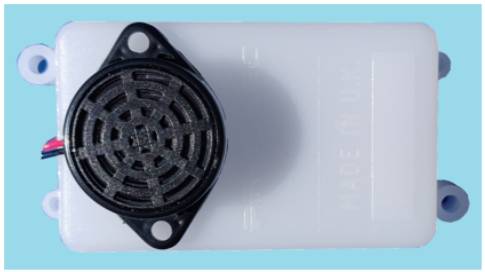
Marine water cooled exhaust systems are designed to withstand temperatures of up to about 120°C. However the exhaust gases from the engine may reach in excess of 450°C. In order to protect the exhaust system it needs a continuous flow of cooling water from the engine, should this flow be interrupted 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



Kit Components

(Cables and connectors not shown)

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 and make sure the cut end has no burrs else it will be difficult to feed through the worm drive.

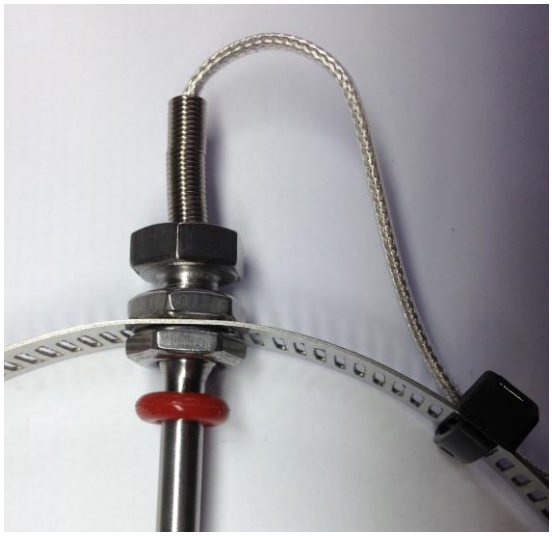
Assemble the sensor as shown, tighten the nuts firmly. No thread should protrude below bottom nut (see picture).

Select a point on the hose about 150mm or more 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.

Type ‘A’ (in-Hose)



SENSOR INSTALLATION Continued…….

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

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 in the picture, tighten the nut firmly.

Select a point on the riser about 150mm downstream from the water injection point and tighten the band to secure firmly.

Use a cable tie to secure the cable to the hose clamp for strain relief.

Type ‘B’ External

This sensor is intended for engine block temperature monitoring.

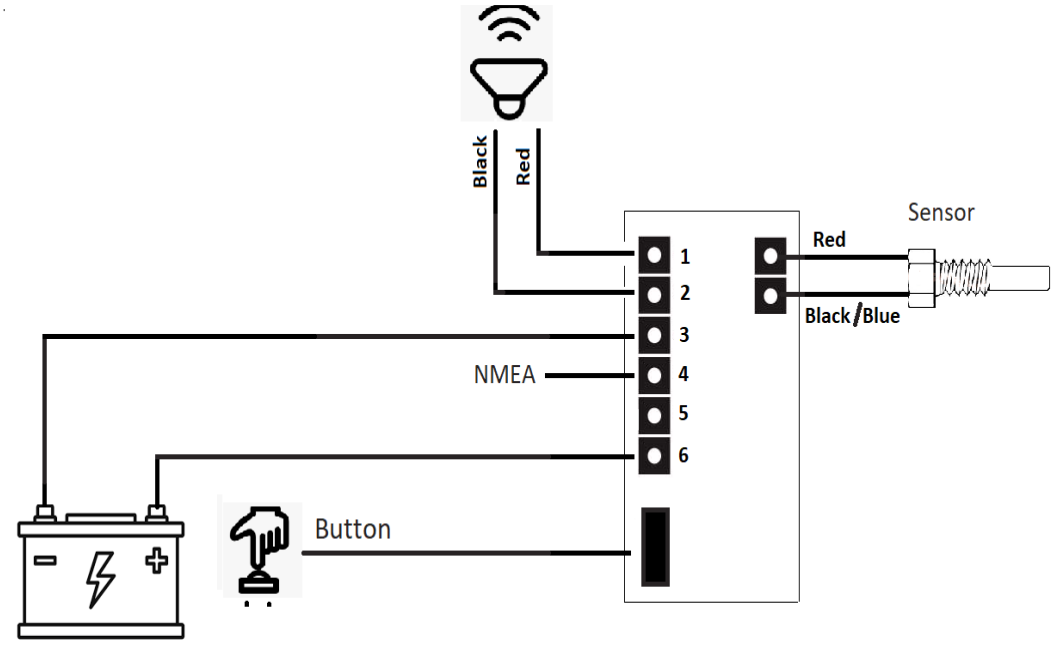
When choosing a position for the sensor you should find a location associated with the water circulation, i.e. thermostat, heat-exchanger, pipes, water-pump (not the sea water pump), these contain coolant water and therefore when the engine is running normally should remain well under the 200c display limit else the water would have already turned to steam and the alarm should be sounding. The sensor is an M8 ring that is designed to be held in place by an existing engine bolt.

Use a cable tie to secure the cable for strain relief.

Note:
The maximum temperature that the displays can read is 200c although this is not the maximum that the sensors can withstand. There are parts of the engine which during normal operation can exceed these temperatures, for instance the exhaust manifold. The sensor must not be attached to any of these areas.

Type ‘C’ Engine Bolt-on

INSTALLATION



Notes:

- If NMEA is unused leave disconnected.
- The button is suitable for outside mounting, however the buzzer should be mounted behind the panel in the dry.

The buzzer is often attached to the top of the junction box useing the adhesive pad on the back.

The external button requires a 22mm hole.

When the alarm sounds the buzzer (Connector 2) is pulled to ground via an internal 350mA self-resetting fuse. If you add your own buzzer or an addition buzzer then please ensure that it is **piezo buzzer and not a mechanical buzzer** and that it draws less than 350mA.

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 control unit contains two internal self-resetting fuses on the power input and alarm output, if you wish to install an additional in-line fuse this should be 1A.

INITIAL SYSTEM TESTING

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

Wait about 10 seconds, the button light 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 operation 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 housing. 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 *immediately after powering up*, 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.

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:

- When the alarm sounds the temperature must fall 5°c below the alarm setting for the alarm to turn off.
- You can suppress an alarm by pressing the button, if after 2 minutes the temperature is still too high the alarm will sound again.

Operation with a temperature gauge

The SM017 kit may be retro fitted with an analogue temperature gauge.
Unfortunately because there is no standard for temperature gauges any gauge will appear to work but it cannot be guaranteed that it will display the correct temperature. The correct gauge is available from Silicon Marine.

The software operation changes when it detects a gauge, refer to the SM017G manual for installation and operation.

NMEA

The alarm outputs NMEA 0183 data containing the current exhaust temperature in centigrade.
It also 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

Note: If there is a sensor error then no data is output.

Specifications

Supply Voltage: 8 – 28v DC, 48mA (no alarm)

Two internal self-resetting fuse

Sensor Temperature range: -50 - + 250°C

Gauge Range: 40-120°C

Alarm Range: 40-120°C

Temperature probe: A4 Marine grade stainless steel with PT1000
Platinum wire sensor 5.0mtr cable.

NMEA Calibration: +/- 1°C
Gauge Movement +/- 5°C

NMEA: NMEA 0183, 4800,N,8,1

Alarm Output: Ground connection, 350mA max, internal self-resetting fuse

Designed and Manufactured in the United Kingdom

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CE

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SM017B2.pdf