Silicon Marine

Marine Exhaust Temperature Alarm. Model: SM0014

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.

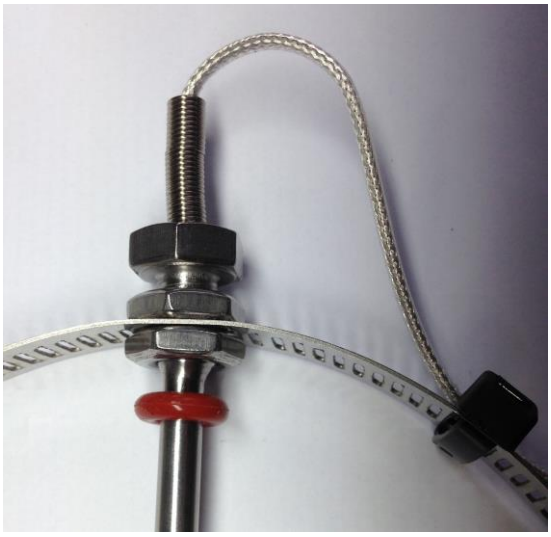
The clamp is suitable for exhaust hoses up to 6” diameter, cut the steel band to size making sure you leave enough overlap and make sure the cut end has no burrs else it will be difficult to feed through the worm drive.

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

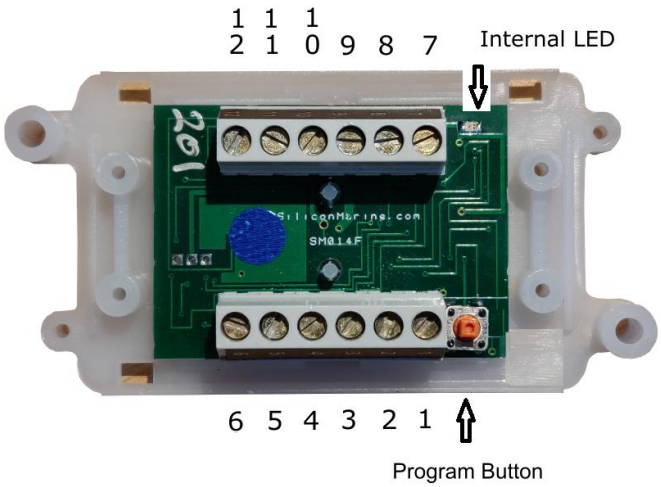
Select a point on the hose about 150mm or more downstream from the water injection point. Drill a 4mm hole avoiding the steel reinforcement rings (If you have a horizontal hose it is preferable to mount the sensor on the top). Push the sensor through the hole into the exhaust pipe and secure firmly.

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.



INSTALLATION



1. Gauge Black
2. Battery Positive supply
3. Battery Negative supply
4. Gauge Red
5. Gauge Blue
6. NMEA (NMEA Data output)
7. Button Red (Positive)
8. Button Blue (Negative)
9. Buzzer Black (Negative)
10. Buzzer Red (Positive)
11. Sensor (Any colour)
12. Sensor (Any Colour)

Both the gauge and button are suitable for outside mounting, however the junction box should be mounted somewhere dry.

The gauge is standard size and requires a 2” (51mm) hole, the external button a 12mm hole.

It is not essential to fit the external button/light as the gauge alarm temperature can be programmed using the button in the connector box. If you do fit the button it will provide a convenient method to adjust the alarm temperature, to provide a warning light and also allow you silence the alarm.

The buzzer is not water proof it can be mounted on top of the connector box or somewhere behind the panel. When the alarm sounds the buzzer (black wire connector 9) is pulled to ground via an internal 350mA self-resetting fuse. If you add your own buzzer please ensure that it is **piezo buzzer and not a mechnical 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.

1m of cable has been supplied for connecting the power to the connector box, you may choose to include a fuse in the power line however the gauge includes three internal self-resetting fuses on the power line, alarm output and gauge + connection.

The gauge orange wire is the positive supply for the gauge backlight, if you wish the backlight to be permanently on when the gauge is powered then connect this to Connector 2 (Battery positive) alternatively this could be connected to another source that controls the backlight for your other instruments.

INITIAL SYSTEM TESTING

When you power up the unit the gauge will first display the current ***alarm*** temperature and the button/light will illuminate. After a few seconds the light will go out and the gauge will return to zero, the gauge will then start to display the current exhaust temperature. (If it is cold then the gauge may remain at zero)

People are often surprised at how low the exhaust temperature is when the cooling system is working effectively, especially in cold northern waters. It is not uncommon for the gauge to barely move

During normal operation the button/light and internal LED should remain off, if either show a steady red then it indicates a sensor error and you need to check the sensor wiring. A sensor error is also indicated by the gauge needle pulsing between 40°C and 60°C. 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.

To test the alarm press either the internal button or the external button/light *immediately after powering up*. To cancel the alarm press the button again after waiting at least 5 seconds.

ADJUSTING THE ALARM TEMPERATURE

The gauge is supplied with the alarm temperature set to 95°C which is ok for most engines, however setting the temperature closer to the actual maximum running temperature is preferred as this will give a quicker response and it can also detect small changes in temperature such as losing an impeller blade. It is recommended that you set the alarm temperature at least 20°C above the engines normal working temperature to prevent false alarms.

When setting the temperature first run the engine until you believe that it is up to its normal working temperature and make a note of the gauge reading, the alarm temperature should then be set to 20°C above this.

The alarm temperature can be set by using either the external button/light or the internal program button, the operation is the same for both.

To set the alarm temperature press and hold the button, after about 5 seconds the gauge will display the current alarm temperature and the buzzer will beep once. (If you don't want to change the value release the button at this stage). Keep holding the button down and after a few more seconds the gauge will start to increment in 5°C steps, when the gauge reaches maximum it will reset to 40°C and then start to increment again. When the gauge is displaying the required alarm temperature release the button. After a few seconds the LED will flash rapidly to indicate that the new alarm temperature has been set and the gauge will then return to normal operation.

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 internal or external button/light, if after 2 minutes the temperature is still too high the alarm will sound again.

NMEA

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

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CE

Specifications

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

Spares
Description
SM5082: Temperature Sensor
SM5028: Temperature Sensor Retaining Clip
SM5091: Illuminated Button
SM5019: Gauge Silver
SM5020: Gauge Black