Watch your water flow

Gilbert Park installs a temperature monitor and alarm to prevent costly exhaust hose damage in the event of impeller failure

Gilbert Park's Mitchell 28 Classique *Argus* had a history of impeller failure that damaged the rubber exhaust hose

Cooling water is driven around the engine by a pump impeller, along the way often cooling the oil in the engine and possibly the gearbox as well as the engine itself.

The last part cooled by the water are the exhaust gases. There is usually a metal elbow on a diesel engine where cooling water is injected so that when the cooled gases meet the flexible rubber exhaust hose they don't melt it. Overheating usually sounds an alarm, but only several minutes after the impeller has failed.

When diesel engines are first started careful skippers can be seen peering over the stern to ensure water is coming out of the exhaust. I check mine intermittently underway, but not continuously.

I've had an impeller fail on a previous boat and fortunately it was fitted with a temperature monitor in the exhaust hose and this stopped me from causing any damage. Looking through the receipts for my current boat (a Mitchell 28) before buying it I found that one of its engines had had the same failure but the lack of alarm meant damage was caused to the rubber exhaust hose. A continuous monitor, with an alarm, was needed.

Having searched the Internet and read a few reviews, I decided on the one made by Silicon Marine for dual engines. It was easy to install, looked to be effective and was good value for money at £129.

When the kit arrived it seemed to have almost everything I would need to install it. I read the well written instruction and thought the most difficult part was going to be threading the sensor wires.

INSET ABOVE The continuous monitor with an alarm by Silicon Marine for dual engines comes with good instructions and almost everything required – just add cable ties and silicon sealant

Where to begin

I started off by installing the sensors. The first job was to cut the hose clamp to the right length. I could have cut straight across the clamp, but instead cut the clamp at an angle on both sides so any damaged edges would be gradually fed in rather than trying to thread it all at once.

Once the clamp was the right size it was time to drill a 4mm hole between the reinforcing wires in the hose. Ideally this should be about 150mm from the water injection port on a piece of hose that runs vertically. If access to this part of the exhaust system is difficult then the sensor can be inserted into a horizontal part of the exhaust hose, so long as the sensor is placed on the top of the hose. If you're anxious about drilling holes in your exhaust Silicon Marine has an alternative external sensor and one for the engine.

The sensor should be fixed to the hose clamp by putting a nut and locking washer onto the sensor, the sensor then being pushed through the hole in the clamp and another nut put on the sensor so that it is fully engaged on the sensor thread. The first nut can then be locked down onto the second, clamping the clip tightly.

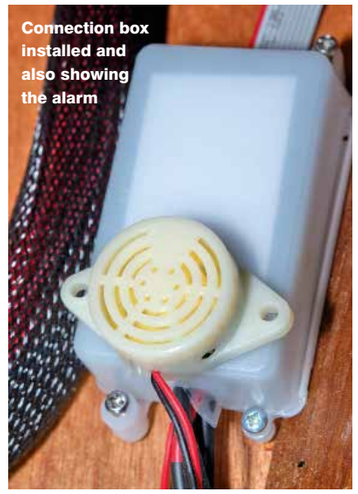
An O-ring is supplied that seals the sensor in the exhaust hose. Some silicon sealer can be put on the O-ring if wished. The sensor is pushed through the hole, the hose clamp connected and tightened. A cable tie is used to secure the sensor wire to the hose clamp.

The two sensor wires are fed to the area where the display is going to be fitted. Longer wires can be supplied if needed.

The wires from the sensors, power, alarm and NMEA 0183 output all meet in a control box. The lid clearly shows which wires go where.

Having worked out the best position for the bulkhead display that has four mounting screws I marked up where the centre of the sturdy drilling template should go then stuck it in place with tape. I also marked the centre point of the hole to cut out for the connector.

Sensor fitted to the port engine exhaust hose



Connection box installed and also showing the alarm

Silicon Marine

The sensor fitted through a Jubilee clip

RIGHT Display switched on showing all is functioning before the engines are started

'At sea it was fascinating to see was how variable the temperature difference between the two exhausts was at slow speeds'

Display fitting

Once the five holes had been drilled it was time to fit the display. Four bolts and nuts along with washers are provided. In addition wing nuts are also provided for installations where access to the back is limited. I decided to use the wing nuts.

I understand that future units can be obtained with GoPro-type clip-in mounts.

Once it was all tightened up it was time to switch it on! It worked. The next step was to take the boat out to sea and see the temperatures with the engines in use.

At sea the display was easy to see and read. What was fascinating was how variable the temperature difference between the two exhausts was at slow speeds. Once out at sea for a longer time the difference became more stable. The port engine always being about 10C° higher than the starboard one (50°C versus 40°C).

Silicon Marine recommends setting the alarm at 20°C higher than the upper limit on both engines, so I set them to 70°C and 60°C respectively. I did try to link the temperatures from the engines to my Raymarine Axiom Pro chartplotter using the NMEA 0183 connection but could not get it to connect. I'll try again another day, but it's not a problem as the display is easily seen.

One final job was to add an extra column to my log book for the exhaust temperature for each engine.

ABOUT THE AUTHOR

Gilbert Park has been a keen sailor for the past 45 years. Before retirement he was an Intensive Care Consultant in London, and a Director of Intensive Care. He held many other positions including non-executive director of the organisation's Organ Donation and Transplantation, Chairman of Drugs and Therapeutics and was also in the Royal Army Medical Corps.

Installing an exhaust alarm

1 Impeller failure can be caused by a closed or blocked inlet. The engine overheat alarm will eventually sound, but by then hot exhaust gases may have damaged the rubber exhaust hose.

2 In the Silicon Marine box there was almost everything I needed, including well written and illustrated instructions. All I had to add was some cable ties and a little silicon sealant.

3 The hose clamp provided is very long – too long for most applications – and will need shortening down to an appropriate size to fit your boat's exhaust hose.

Step by step

4 I cut the hose clamp diagonally on both sides of one of the slots. This resulted in the cut end being easy to feed into the worm drive of the hose clamp, even if the cut is a bit ragged. Cleaning up the cut end with a file will help if it doesn't want to feed in easily.

5 The first nut is put on so as to allow just enough thread for the bottom nut to be put fully on and tightened. All the nuts are the same size and you'll need two spanners. Once the nuts are tight the silicon sealing washer should be put onto the sensor.

6 The sensor needs to be inserted on the top of the hose if access to the vertical part is limited. There will be a difference in temperature between one placed near the exhaust elbow to one further away, but the alarms can be set to cope with this.

7 This shows the sensor installed on the starboard side near the exhaust elbow. The instructions say the O-ring is usually sufficient to seal but I used some high temperature silicon sealant as well.

8 All parts of the system meet in the connection box and the lid shows what each of the connections are for. I found it easiest to do all the connections then screw the box to a bulkhead.

9 I lined up the drilling template centred on the battery monitor above it. I also marked the centre of the oblong-shaped connector block hole to drill a round hole the size of the oblong.

10 I found it easiest to fit the threads into the display and then feed them through the bulkhead, securing them on the back with the supplied wing nuts.

11 Switched on, both sensors are shown to be working by green LEDS. Red would indicate a sensor fault and flashing red would indicate an alarm.

12 At sea the port engine exhaust ran hotter than starboard on a long run. The alarms are at their defaults of 95°C here but were easy to change.