



# OWNER'S MANUAL

## Introduction

Engine Guard features:

- Displays current operating temperature at almost any given point on a vehicle, machine or device, and can be programmed to sound an alarm when a 'higher than normal' temperature is reached.
- Dual sensor model available as an optional extra or can be added at a later time.
- Displays voltage using input 2. Voltage range between 0vDC and 33vDC are shown as 0 – 330 (no decimal point- for example, 12vDC is shown as 120) An audible alarm can for set for either low or high voltage (available as an optional extra or can be added at a later time- replaces the dual sensor option)
- Can be used as an audible low oil pressure alarm on vehicles with an oil warning light (available as an optional extra or can be added at a later time)
- Can trigger other devices such as fans or water injection with the use of a relay (not supplied- see attached RELAY CIRCUIT).
- Can be set to show either degrees Celsius (°c) or Fahrenheit (°f)

Main components:

**Display Module** - usually mounted within sight of the driver or operator. It features a large LED display and also the controls that are used to adjust the settings as required.

**Sensor(s)** - 10mm diameter ring connector with a highly responsive temperature sensing device embedded in the barrel of the connector. It can be bolted to the heat source such as the engine or transmission. A 5m cable is supplied as standard on the Sensor.

**Voltage Interface** – compact external wiring loom to allow for the measurement of input voltage or for use as a low oil pressure alarm.

IMPORTANT: It should be noted that the Engine Guard is a precision digital device, and will provide long term reliability and accuracy. However, the sensor is mounted externally to the source of heat such as the engine, gearbox, transfer case, etc. Subsequently, it indicates the approximate temperature of the mechanism within. It does not show the absolute temperature at the source. For example, a petrol engine may be producing combustion temperatures of 1000+ deg C. However, the temperature at an external surface or at a point on the cooling system may be far lower. However, this external temperature typically correlates to the internal temperature.

*The temperature shown on the Display Module is only a guide and should not be considered an absolute indication of overheating.*

Additionally, the low oil pressure warning alarm relies on the factory oil pressure switch and circuitry. Under most conditions these systems will trigger at an oil pressure deemed by the manufacturers to be 'low'. It should be noted however that engine damage can *still occur at pressures at or even above this point.*

As the manufacturers of the system we do not take any responsibility for damage that may arise or occur as a result of overheating or any other mechanical defect or failure.

NOTES:

- Please read the Owner's Manual before proceeding with the installation or operation of the system, and if you are unsure about installation please contact the vehicle manufacturer, Dealer or a qualified tradesperson
- Avoid operation of the Display Unit whilst driving
- Avoid installing the system on a vehicle that has been in operation to reduce the chance of burns
- DO NOT attempt to install the sensor(s) on an operating engine- injury may occur.
- Wear appropriate protective clothing and equipment, and have fire safety in mind at all times whilst installing the system.
- This device is only to be used for the purpose for which it is intended.
- This is an independent monitoring system and does not connect to, or communicate with, any other vehicle system(s).
- DO NOT connect the Display Module to any other temperature sensors other than those supplied by ENGINE GUARD
- DO NOT connect the Display Module to any other voltage interface other than those supplied by ENGINE GUARD
- The Display Module must be mounted so as to NOT obstruct or interfere with the driver's vision and/or operation of the vehicle, and adhere to any relevant legislation.
- A 2amp fuse(s) MUST be used when connecting to the power source, ie batteries or ignition.
- Cleaning is recommended with a soft damp cloth only. No chemicals or abrasive cleaners are to be used.

# Installation of Engine Guard

(Please note: if you read this, it will save you time!)

## 1. Display

Select the location for the Display Module. The Display Module is usually located in the cabin of the vehicle, boat or machine where it is easily viewed by the operator. The location should be out of direct sunlight and in a dry, protected area. The Display Module should be within 5m of the Sensor and voltage interface as this is the standard length of the cables supplied.

The Display Module is supplied with self-adhesive tape on the rear of the enclosure, and can be mounted in different ways using this tape. For example, the rear tape can be used to mount the Display Module flush on the dashboard or surrounds (suggested). Alternatively, the Display Module can be mounted on any flat surface near the driver/operator that is within sight.

Note: The dashboard or other mounting surface must be clean and free from grease, silicon and polish. Products such as 'ArmorAll®' will prevent the self-adhesive tape from adhering- ensure that you wipe over the surface with thinners, acetone, etc.

The cable loom that exits the Display Module should be secured to the vehicle at regular intervals to reduce the possibility of damage. Cable ties or other fixing should be used to secure the cables to the vehicle as near to the Display Module as possible.

The Display Module power is supplied to the positive (red cable) and negative (black cable) and should be connected to an ignition switched 12v-24v DC supply. This supply **MUST** be fused (max 2 amp) or please use a 2 amp inline fuse (not supplied).

A 12v mini alarm buzzer is supplied connected to the loom that exits the Display Module. It can be disconnected to allow for remote installation (for example, some distance from the Display Module) but please note the correct polarity of the connections before the buzzer is removed! The buzzer is secured using 2 x self-taping screws (supplied) and two side mounting flanges. The buzzer can be mounted behind the dashboard or nearer to the operator if it is being used in a noisy environment or is some distance from the Display Module.

## 2. Temperature Sensor

Select the location that the Sensor(s) will measure temperature. The Sensor(s) can be located at any point where a temperature measurement is required, but should not be subjected to heat in excess of 125degC/257degF. In particular, the Sensor and cable should not be located on or near the exhaust manifold, exhaust downpipes or turbo. The Sensor should also be located so as to avoid impact from stones or other debris if being used on driveline components such as the transfer case. Should the Sensor cable be located where impact may occur, use a wire covering such as split loom tube.

The ideal locations vary depending on the vehicle, boat or machine. Examples are:

- Under the thermostat housing bolt heads
- Under the edge of the upper radiator hose (a second stainless hose clamp **MUST** be used in addition to the factory clamp)
- Under the rocker cover bolt heads or directly to the cylinder head using a bracket bolt, etc.
- Under the sump bolt heads in both engines and transmissions
- On both outboard motor cylinder heads on a boat with dual engines
- On both the engine and the stuffing box/stern gland on a yacht
- On the external surface of the oil filter (held by a stainless hose clamp-not supplied) to display oil temperature
- 2 inboard engines (such as marine applications)
- Engine temperature *and* oil temperature
- 2 points on one engine to assess the effect of different load, state of tune, turbo boost pressure, etc. For example, one sensor located on each bank of cylinders on a V8, or one sensor at the front of the cylinder head and one at the rear.
- 2 sensors can be used to see any change over time such as the inlet and outlet temperature of the radiator. This can be used to show reductions in efficiency in components such as the water pump, radiator, thermostat, etc

Important: Always re-torque the bolts back to the manufacturers recommended specification!

The Sensor cable should be secured at regular intervals using cable ties or similar. To protect the Sensor against damage from vibration, a cable tie or other fixing should be used to secure the cable as close to the Sensor as possible.

For maximum reliability, a cable tie should be used within the 150mm section of corrugated loom tube on the Sensor cable, securing to an engine bracket or mounting point on the engine- not the body or chassis.

Avoid running the cable near any source of extreme heat (such as exhaust manifold or turbo) or near the ignition system.

Be careful to avoid damaging the Sensor- the 'barrel' of the connector houses the sensitive component that performs the temperature measurement. Avoid holding this part of the Sensor with pliers or twisting/bending that may crush the barrel. Typically, the cable can then be run parallel to the existing engine wiring loom to the chassis or body of the vehicle.

Unwind the entire length of cable and run to the firewall, or to the Display Unit location if no firewall exists.

If applicable, run through the firewall being careful not to damage the outer PVC sheath on the cable. We suggest that you use the existing wiring loom grommets as an entry point into the cabin, or a new hole and grommet can be added to the firewall if necessary.

Re-seal around any points of entry into the cabin with an appropriate sealant. Excess cable should be wound neatly and cable-tied in a safe location on the vehicle such as behind the dashboard. This leaves the maximum cable available if the Display Unit or Sensor is to be re-located at a later time.

To connect the sensor cable to the Display Module cable, use the 3M connectors supplied, or solder and insulate with tape or heat shrink tubing (not supplied). Each sensor connection requires 2 connectors. NOTE: There is no polarity of the temperature sensor cables, and so they can be connected either way without affecting the system. However, the Voltage Interface cables are polarity sensitive and MUST be connected the correct way.

The connectors are designed to join the barred, tinned wires via the 'U' contacts once compressed, and also provide a seal against moisture using the sealant within the housing. To use the 3M connectors, carefully push the end of ONE of the pair of sensor wires into one of the ports, and push ONE of the pair of Display Module wires into the other port. Using pliers or grips, compress the orange inner housing firmly until it is flush with the outer housing- this will drive the 'U' contacts into the wires. Repeat the process with a second 3M connector for the other wires in the pair. See diagram below:



Please note: If the Engine Guard is supplied as a single sensor model, a second sensor can be added at a later time. This requires a change to the Parameters (See below).

### 3. VOLTAGE INTERFACE (optional)

For reading voltage in a circuit: connect the cables marked 'SENSOR 2' to the voltage interface cables marked 'SENSOR 2'.

Please note: the yellow cable with black trace on SENSOR 2 must be connected to the yellow with black trace on the voltage interface.

The single input cable (yellow with black trace) must then be connected to the supply (positive) cable to be monitored. For example, this can be used to show vehicle alternator charge voltage, auxiliary battery charge in a dual battery set up, etc.

For use as a low oil pressure warning alarm, in most cases the single input cable can be connected to the cable that leads to the factory oil pressure switch. This applies to single connector type oil pressure switches. These are the most common type and are found on the majority of vehicles.

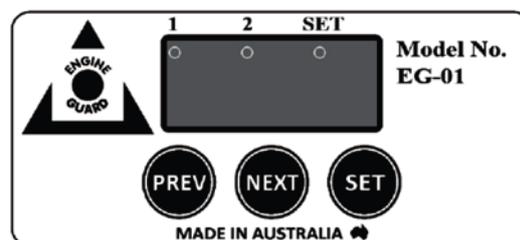
If installing with multiple connector oil pressure switches, please seek advice from a qualified auto electrician or mechanic.

## Engine Guard Operating Instructions

The Display Module is controlled by 3 press buttons:

On power up:

Software version (1.03) is displayed, then the Engine Guard cycles through the following: (Please note: if the 'alarm test on power up' is on, the alarm will sound briefly at this time. See **Parameters**)



-Single sensor/input:

- The input *type* being shown on 1 being 'deg' (degrees)
- The current set point on 1
- The Display then returns to current temperature input on 1.

#### -Dual sensor/input:

- The input *type* being shown on 1 being 'deg' (degrees)
- The current set point on 1
- The input *type* being shown on 2
  - 'deg' (degrees)
  - 'OIL' (oil pressure),
  - 'inL' (voltage / low voltage alarm)
  - 'inH' (voltage / high voltage alarm)

(\*Please note: To change input types, please refer to **Parameters**)

- If in dual temp sensor or voltage mode either the current alarm set point (in °C, °F or vDC) is shown or if no setting has been made, '- -' is shown. In OIL mode, no set point is shown.
- The Display then returns to current reading on input 1.

#### Normal operation:

#### -Single sensor/input:

- TEMP 1 is displayed (dot steady under 1)
- To show SETPOINT 1 (SP1) press NEXT (dot steady under 1 and SET)
- To return to TEMP 1, press NEXT

#### -Dual sensor input in TEMP mode:

- TEMP 1 is displayed (dot steady under 1)
- To show TEMP 2 press NEXT (dot steady under 2)
- To show SETPOINT 1 (SP1) press NEXT (dot steady under 1 and SET)
- To show SETPOINT 2 (SP2) press NEXT (dot steady under 2 and SET)
- To return to TEMP 1, press NEXT

When SP1 or SP2 are displayed, holding the SET button for 2 secs will enter adjustment mode (dot flashing under 'SET' for the displayed SP). To adjust the setting, use the PREV and NEXT buttons to increase and decrease the value respectively. Holding down the PREV or NEXT button will rapidly change the value. To save the new value, press the SET button (dot is steady).

If the temperature at either SP1 or SP2 is reached, the corresponding temperature display will flash. In addition, the 12v power supply to the buzzer will be ON and the alarm will sound. This supply can also be used to switch other devices via a relay (see Parameters).

The alarm is reset when the SET button is pressed or the SETPOINT is increased to beyond TEMP 1 or TEMP 2 respectively.

The Engine Guard has a feature to make calculating the SETPOINT simple and quick. After installation, run the engine or machinery until normal operating temperature is reached. Usually this is at highway speed/load for at least 10 minutes. The maximum temperature reached will be stored in the memory for later use.

To set, select SET POINT 1 or 2 (dot steady under 1 or 2 and under SET). Press and hold the SET button for 5 seconds- this will change the SET POINT to the current temperature reading on the relevant sensor. If the SET button is depressed for a further 5 seconds, the stored maximum temperature becomes the SET POINT. Then add between 5 -10 deg C, and use this as the initial SETPOINT.

This is a rough guide, and it is suggested that the owner experiment with the setting over time. In particular, if operating under high load conditions or higher than normal ambient temperature, the alarm may be triggered despite the vehicle or machine not 'overheating'- creating false alarms. Equally, if the SETPOINT is adjusted far beyond normal operating temperature then the effectiveness of the alarm as a warning of impending damage is reduced.

#### -Dual sensor in OIL mode:

- TEMP 1 is displayed (dot steady under 1)
- To show input 2 press NEXT (dot steady under 2). If the oil pressure is above the factory oil switch minimum, 'PrE' (pressure OK) is shown. Insufficient oil pressure is shown as 'OIL' and the display flashes with the audible alarm.
- To show SETPOINT 1 (SP1) press NEXT (dot steady under 1 and SET)  
(\*Please note: The factory default set point (6v or below) is not normally displayed in OIL mode.
- To return to TEMP 1, press NEXT.
- If 'PrE' is displayed, pressing SET for 2 seconds will change the display to show the current input voltage- normally the voltage of the factory oil pressure warning light circuit. This indicates the oil pressure switch is open. The voltage will drop below the set point (6v) when the switch is closed (earthed) indicating low oil pressure and this will trigger the audible alarm. To change the display back to 'PrE' press and hold SET again for 2 secs.

To change the factory default OIL set point, select input 2 and 'PrE' will be shown- press and hold the SET button for 2 secs until the current voltage input is shown. Press the NEXT button twice and the default set point will be shown (6V). Press SET again for 2 secs and the default set point can be changed by increasing or decreasing using the

PREV or NEXT buttons. Press SET again to exit. To return the display to 'PrE', either reboot the Display, or with input 2 displayed (showing the current voltage) press and hold the SET button for 2 secs. The new alarm set point will not be displayed unless these steps are reversed.

Other Notes:

- Temperature greater than 150 degC are displayed as 'Hi'
- Temperatures below 0 degC are displayed as 'Lo'
- Sensor faults are also displayed:
  - 'OPn' indicates no sensor or incomplete circuit
  - 'SHt' indicates short circuit in sensor or wiring

### Parameter Mode:

In Parameter mode, various parameters can be viewed and adjusted.

To enter Parameter mode, while TEMP 1 is displayed press and hold the SET button for 10 sec.

Pressing the PREV and NEXT buttons will step through each parameter in the list. (See Table below for Parameter List)

The parameter being displayed is identified by 'P#' briefly before displaying the parameter value or setting. For example, P2 can be set to allow for the alarm buzzer output to be set to steady for use as a relay power supply. To do this, P2 would be set to ON rather than the factory default OFF.

To edit the parameter, press SET and adjust the setting with the PREV or NEXT buttons. Edit mode is shown by the SET dot flashing.

After the final parameter, 'End' is displayed. To exit, press the SET button.

Exiting parameter mode also allows the user to recall the default settings. (see Table below)

To recall the default settings, press the NEXT button until 'End' is displayed. Press and hold the SET button for 5secs until '---' is displayed. The Engine Guard is now reset and the default settings are restored.

A technician can also undertake a complete reset of the Engine Guard which will erase the Calibration and other non-user resettable parameters- this should not be attempted by the Owner.

Parameters:

P1 – Input mode:	OFF – no input 2 (default) dEG – temperature OIL – low oil pressure alarm inL – low voltage alarm inH – high voltage alarm
P2 – Alarm output steady:	OFF (intermittent - default) ON (steady)
P3 – TEMP 1 Alarm Delay:.	1 sec (default – range 1-100)
P4 – TEMP 2 Alarm Delay:.	1 sec (default – range 1-100)
P5 - TEMP 1 Alarm Reset:	.5 sec (default – range 1-100)
P6 - TEMP 2 Alarm Reset:	.5 sec (default – range 1-100)
P7 - Brightness	5 (default – range 1 to 5)
P8 - Max TEMP 1 recorded	
P9 - Max TEMP 2 recorded	
P10 – TEMP units	C (default – f optional)

### Parameter Notes:

- When the system is supplied with dual temp sensors, the P1 is set to 'dEG' from the factory
- When the system is supplied with the Voltage Interface, the P1 is set to 'OIL' from the factory. If Owners intend using the voltage measurement settings, P1 must be changed to suit.
- When an external device such as fan or water injection is to be triggered when the set point is reached, P2 must reset to 'ON' being steady rather than the factory default setting of 'OFF' being intermittent. (See attached relay circuit diagram Fig 3)

## Troubleshooting

No Display on start-up: No 12v supply or reverse polarity- check input wiring and test for voltage

Alarm sounds on start-up: TEMP1 and/or TEMP2 alarm temperatures are set below the current engine temperature- increase to above current temperature.

Display is intermittent or erratic: No 12v supply or reverse polarity- check input wiring and test for Sensor wiring may be loose, or sensor is not firmly bolted to engine

Display reads 'OPn': Sensor wiring not properly connected or damaged

Display reads 'SHt': Sensor or wiring short circuit

# Engine Guard Limited Warranty

The Engine Guard system is warranted by the manufacturers to the original retail purchaser, to be free from defects in material and workmanship under normal use.

Time period

- Warranty coverage on the Display Unit for a period of 12 months from the date of purchase, while owned by the original purchaser and is not transferable.

- Warranty coverage of the Sensor(s) assembly for a period of 30 days from purchase. During each of the respective limited warranty periods, all original parts subject to this limited warranty determined to be defective in materials or workmanship, will be repaired or replaced by the manufacturers, at its option directly or through authorized resellers, free of charge except for shipping or other transportation charges. Reseller labor charges are not covered under this warranty.

### Notice

This warranty applies only where:

- The system is correctly installed as per the manufacturer's specifications and for uses that the manufacturer approves
- The system is not altered in any way or not correctly maintained
- The system is subjected to environmental conditions such as extreme heat, moisture or vibration beyond the manufacturers intended thresholds
- The system is accident damaged or deliberately damaged in any way
- The system is not used in any form of motorsport

The manufacturers shall not be responsible for incidental or consequential damages. This limited warranty is the only warranty applicable to Engine Guard systems, and is expressly in lieu of any other warranty. Any warranty implied as to fitness of purpose is not covered under this limited warranty. While every effort has been made to ensure the accuracy of the information contained herein, the purchaser should satisfy themselves of the suitability of the product for their nominated use. This limited warranty gives you specific legal rights and you may also have other rights which vary from jurisdiction to jurisdiction.



# PROUDLY MADE IN AUSTRALIA

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