

## ***Engine, Transmission and EGT Temperature Gauge Overview***

**Overheating can permanently damage your engine and transmission/gearbox. Monitor engine, transmission and exhaust gas (EGT) temperatures to give early warning of overheating with visual and audible alarms you can set.**

### **What are the benefits of a gauge to display and alarm engine, transmission and EGT temperatures?**

Standard temperature indicators sometimes provide engine temperature information. But if you're focused on driving, you may miss the indicator going into the **RED** until it is too late and your engine or transmission is damaged.

Often standard indicators only measure the engine coolant temperature. If your engine coolant is lost or the level drops for any reason, many indicators won't show that the engine is overheating. You may not be aware that your engine is being damaged.

Most vehicles do not have an indicator showing transmission temperature. If you are 4WD'ing or towing a caravan, boat, trailer etc, your transmission and engine will be working hard, increasing the temperature. The temperature of the transmission can also become excessive during high speed highway driving. If you are not aware of your actual transmission temperature, you have no way of knowing whether it is being damaged by excessive heating.

In addition to monitoring engine temperature, one of the most effective ways of monitoring overall engine performance is to display the exhaust gas temperature (EGT). The EGT is also useful for tuning the fuel trim on petrol or diesel engines. However most vehicles do not display the EGT at all.

The EGT temperature changes quickly depending on the vehicle speed, acceleration and load and is a very good indicator of how hard the engine is working. For example, if your vehicle is pulling a heavy load, climbing or running at high speeds, the EGT may be too high. Many drivers (especially 4WD) monitor the EGT temperature level to ensure that the overall load on the vehicle is not too high.

Excessive EGT temperature can also be an early warning of potential engine or turbocharger damage. Very high EGT temperatures are an indicator of dangerous conditions that can lead to catastrophic engine failure. For example, if your engine suddenly loses cooling, the EGT temperature rises very quickly.

This gauge allows you to monitor and set alarms for the engine block, transmission housing and EGT temperatures during all driving conditions.

The gauge uses digital technology and has a full colour screen to display temperatures settings and alarms. The engine and transmission temperature sensors are digital. The EGT sensor uses a K type thermocouple probe with digital output.

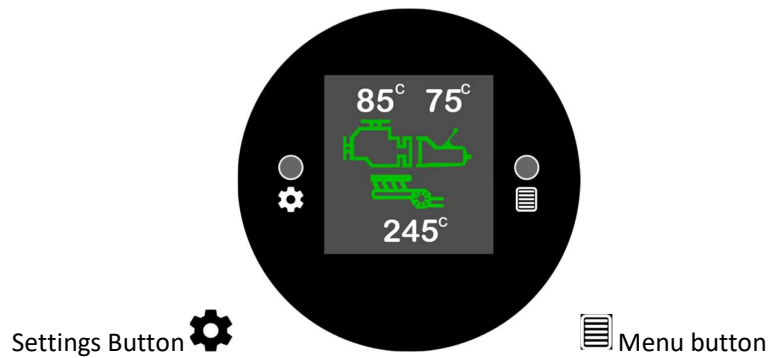
The temperature display and settings can be in Celsius or Fahrenheit (option).

You can set **SAFE** engine, transmission and EGT temperature levels which the display will show in **GREEN**. By setting the **MAXIMUM** temperature levels, an audible alarm and flashing **RED** display will be triggered if the maximum temperature is exceeded. If the temperature is above **SAFE** but below the **MAXIMUM**, the display will show an **AMBER** warning. If the engine or transmission temperatures are below freezing, the

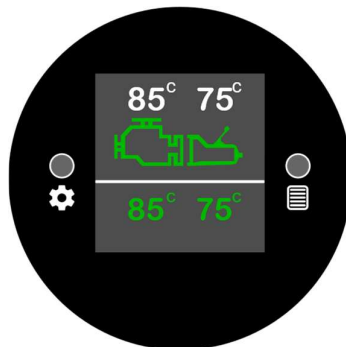
gauge display will show **BLUE**. The gauge can also show the highest engine, transmission and EGT temperatures reached since the gauge was powered on.

The gauge dimensions and bezel conform to the 52mm diameter automotive gauge standard, so the gauge can be easily mounted in gauge housings or pods.

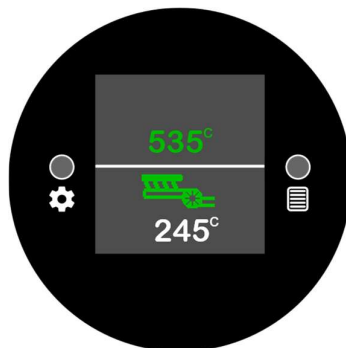
There are two gauge buttons - **Menu** and **Settings**. The steps required to set the temperature alarms, adjust the screen brightness etc are easy to follow.



Simulated gauge display showing engine, transmission and EGT temperatures are safe.

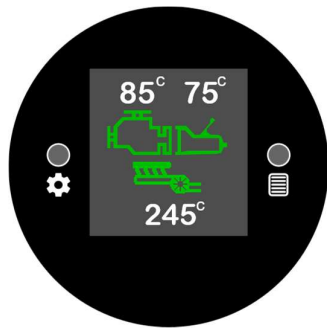


Press the Settings Button to show the highest engine and transmission temperatures reached since the gauge was powered on.

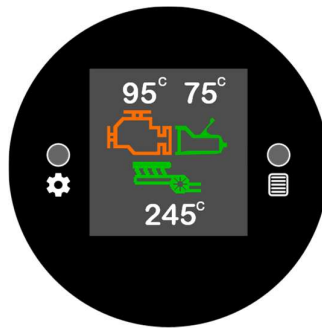


Press the Settings Button again to show the highest EGT temperature reached since the gauge was powered on.

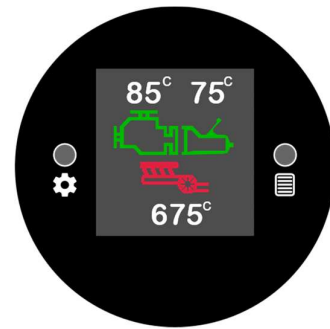
## Simulated Gauge Displays



Normal Safe Level



Warning Level



Alarm Flashing and Audible

Note: Values in the above displays can be set to your preferences

## How it Works

### Engine Block, Transmission Housing and EGT Temperatures

The gauge receives continuous engine and transmission temperature measurements from two digital temperature sensors mounted directly on the engine block and transmission housing. Each digital temperature sensor can measure temperatures from  $-55^{\circ}\text{C}$  to  $+125^{\circ}\text{C}$  ( $-67^{\circ}\text{F}$  to  $+257^{\circ}\text{F}$ ). The gauge displays temperatures in one degree increments.

The EGT sensor is capable of reading temperatures as high as  $1024^{\circ}\text{C}$  (or  $1875^{\circ}\text{F}$ ) and uses a K type thermocouple probe (with digital output) which is mounted in the exhaust pipe stream.

The gauge checks the measured temperature against two temperature levels (SAFE and MAXIMUM) which are set separately for the engine, transmission and EGT.

- SAFE temperature. An engine, transmission or EGT temperature at or below SAFE is normal operation.
- MAXIMUM temperature. An engine, transmission or EGT temperature at or above the MAXIMUM will flash a RED display and trigger the audible alarm. The alarm will also be triggered if the gauge cannot receive a temperature reading from a sensor.

The SAFE temperature setting must be lower than the MAXIMUM temperature setting. An engine, transmission or EGT temperature in the range between SAFE and MAXIMUM is displayed as a warning in AMBER. By pressing the Settings button, the gauge will display the highest engine, transmission and EGT temperatures reached since the gauge was powered on.

For example, in the 3 simulated gauge displays above, the SAFE level is  $90^{\circ}\text{C}$  and the MAXIMUM level is  $100^{\circ}\text{C}$ . The warning range is  $91^{\circ}\text{C}$  to  $99^{\circ}\text{C}$ .

The gauge display icons, settings and colours used are clear and easy to understand. One glance at the gauge and, if the display is **GREEN**, all is normal.

### **Options**

- Celsius and Fahrenheit temperature standards are supported. Please nominate the standard you require when ordering or email GaugeInnovations for advice on how to change standard.
- Two waterproof digital temperature sensors marked engine and transmission (blue stripe on the sensor) are supplied with the gauge. Replacement sensors or sensors with longer cables are also available by emailing [gauge.innovations@gmail.com](mailto:gauge.innovations@gmail.com).

If you do not want to install the EGT sensor immediately, you can set the gauge to display only the engine and transmission temperatures. This is done by leaving the EGT sensor disconnected inside the junction box and restoring the gauge to factory settings once (refer to the Menu and Settings Summary). If you install the EGT sensor later, restore the gauge to factory settings again and the gauge will display engine, transmission and EGT temperatures.

### **Warranty and Enhancements**

The gauge has been designed, developed, manufactured and extensively road tested in Australia. It is backed by a 12 month, return to manufacturer warranty against manufacturing defects.

The firmware, icons etc can also be modified to suit particular requirements. If you have a special requirement or a suggestion for improvement, contact us by email at [gauge.innovations@gmail.com](mailto:gauge.innovations@gmail.com).

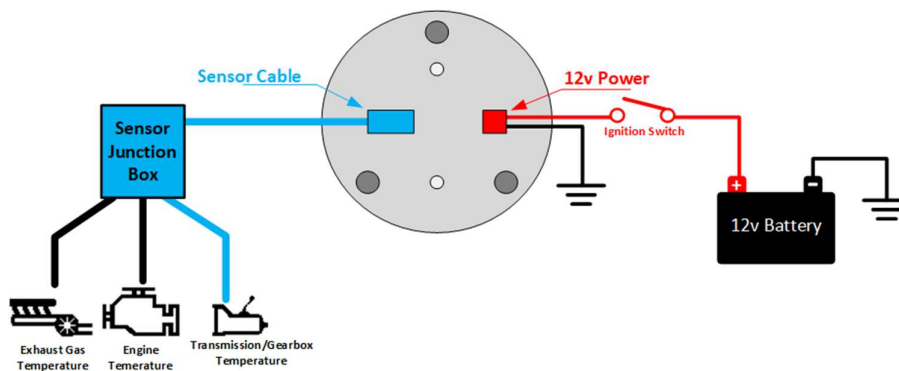
## Installation

### What's in the box

- Temperature Gauge 52mm diameter, 47mm long, bezel 57mm diameter.
- U shaped gauge mounting bracket for automotive style gauge pods and housings.
- Power connector plug and cable 12v DC. Red is positive, Black is negative chassis ground.
- Two waterproof digital temperature sensors including cables and connectors. Engine sensor ( 1 meter cable). Transmission sensor (2 meter cable marked with a **BLUE** strip).
- Junction box to mount under the vehicle bonnet.
- One EGT sensor (1 meter cable) including probe and exhaust welding bung (option mild steel or stainless).
- A cable (2.5 meters) with a plug at each end to connect the gauge to the junction box (normally through the firewall) 4 pin plug is at the gauge end, 3 pin plug at the junction box end.

Gauge installation is straightforward. Only two connections are required:

- One plug for power (2 wire, positive and negative)
- One plug for the temperature sensor junction box (single cable to run through the firewall)



Wiring Diagram (gauge rear view)

The gauge requires 12 volts DC to operate. This should be from a switched power source that is activated by the ignition key. The gauge requires less than 25mA current during normal operation.

For best viewing, avoid installing the gauge where it will often be in direct sunlight.

The cable from the gauge to the sensors will need to be run to the central junction box located under the bonnet. Normally this will be through the firewall. Loop and secure any excess cable length.

The junction box under the bonnet is secured in a convenient location where the sensor cables can be connected.

In the case of 4WD vehicles, the junction box should be located where it will not be submerged if driving through water. Alternatively, the junction box and cable entry points can be sealed using silicone or similar material.

### Engine and Transmission Temperature Sensors

The engine and transmission temperature sensors are mounted using an existing M8 bolt located on the engine block and transmission housing where the temperature will be measured. It is important that a mounting point bolt for each sensor is used which:

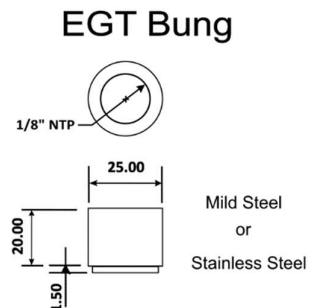
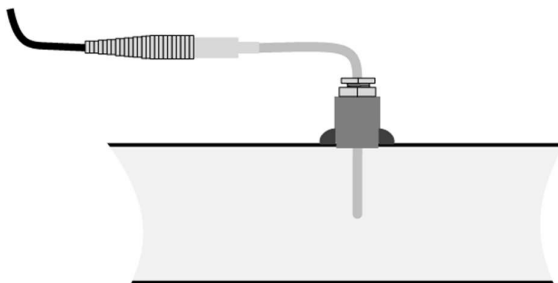
- Will provide reliable measurement of the engine block or transmission housing temperature.
- Is well away from any other sources of heat such as exhausts, turbos etc.
- Is protected from mechanical damage to the sensor or its cable
- Is well away from sources of excessive electrical noise (eg spark plugs, distributor and two-way radios)

NOTE: You should not swap the engine and transmission sensors. If you do, the engine and transmission temperature display will be reversed.

### EGT Temperature Sensor

The EGT Sensor Probe should be installed by a qualified installer:

1. Determine the best EGT probe location point on the exhaust pipe.
2. The exhaust pipe needs to be drilled and the threaded bung welded onto the exhaust pipe by a qualified installer.
3. Assemble and Install the EGT probe assembly into the welded bung (Refer to diagram below).
4. Position the EGT probe tip correctly in the centre of the exhaust stream.
5. Tighten the EGT probe compression nut and bung nut. Be careful to not over tighten.
6. Position the EGT electronics box well away from any heat source. This important for correct operation of the EGT sensor.



## Temperature Gauge Menu and Settings Summary



**Menu button** cycles through the gauge settings screens.



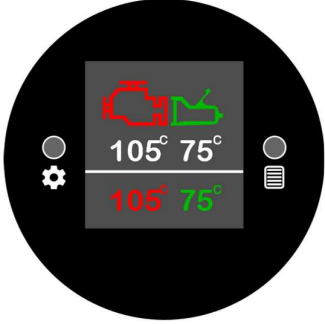
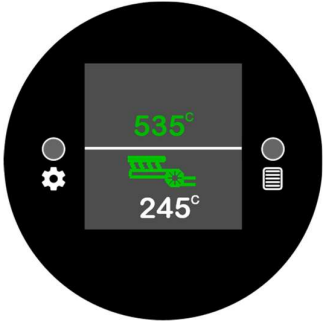
**Settings button** increases a setting. Press and hold to rapidly increase a setting. The setting value will only increase until it reaches the maximum value and then loop back to the lowest value where it will begin to increase with every press of the button.

Press the Menu or Settings button to silence an audible alarm.

	<p><b>1) SET THE HIGHEST SAFE ENGINE TEMPERATURE</b></p> <p>Press and release the Menu button.</p> <p>Press the Settings button to adjust the highest SAFE engine temperature. Range 0°C to 125°C (257°F).</p>
	<p><b>2) SET ENGINE MAXIMUM ALARM TEMPERATURE</b></p> <p>Press and release the Menu button again.</p> <p>Press the Settings button to adjust the engine MAXIMUM alarm temperature. The range will be from SAFE to 125°C (257°F).</p>
	<p><b>3) SET HIGHEST SAFE TRANSMISSION TEMPERATURE</b></p> <p>Press and release the Menu button again.</p> <p>Press the Settings button to adjust the highest SAFE transmission temperature. Range 0°C to 125°C (257°F).</p>
	<p><b>4) SET TRANSMISSION MAXIMUM ALARM TEMPERATURE</b></p> <p>Press and release the Menu button again.</p> <p>Press the Settings button to adjust the transmission MAXIMUM alarm temperature. The range will be from SAFE to 125°C (257°F).</p>

	<p><b>5) SET HIGHEST SAFE EGT TEMPERATURE</b></p> <p>Press and release the Menu button again.</p> <p>Press the Settings button to adjust the highest SAFE EGT temperature. Range 100°C to 1024°C (212-1875°F).</p>
	<p><b>6) SET EGT MAXIMUM ALARM TEMPERATURE</b></p> <p>Press and release the Menu button again.</p> <p>Press the Settings button to adjust the EGT MAXIMUM alarm temperature. The range will be from SAFE to 1024°C (212-1875°F).</p>
	<p><b>7) SET SCREEN BRIGHTNESS</b></p> <p>Press and release the Menu button again.</p> <p>Press the Settings button to adjust the screen brightness.</p>
	<p><b>8) TURN AUDIBLE ALARM ON/OFF</b></p> <p>Press and release Menu button again.</p> <p>Press the Settings button to turn the audible alarm on or off.</p> <p><b>NOTE: If the audible alarm is turned off, there will be no audible warning of engine or transmission temperature alarms. Please remember to keep the audible alarm setting on whenever you drive.</b></p>
	<p><b>9) SAVE SETTINGS AND RETURN TO MONITORING MODE</b></p> <p>Press and release the Menu button again.</p> <p>The gauge will also revert to the normal monitoring mode (temperatures display) after approximately 30 seconds of no Menu or Settings button activity.</p>



	<p><b>10) DISPLAY HIGHEST ENGINE AND TRANSMISSION TEMPERATURES</b></p> <p>Press the Settings button while the gauge is in monitoring mode to cycle on the display of the highest engine and transmission temperatures reached since the gauge was powered on. The display is colour coded safe, warning or maximum.</p> <p>It can be useful to check the highest temperatures reached during normal operation as a guide to setting the SAFE and MAXIMUM levels.</p>
	<p><b>11) DISPLAY HIGHEST EGT TEMPERATURE</b></p> <p>Press the Settings button again to cycle on the display of the highest EGT temperatures reached since the gauge was powered on. The display is colour coded safe, warning or maximum.</p> <p>It can be useful to check the highest EGT temperature reached during normal operation as a guide to setting the SAFE and MAXIMUM levels</p>



**To restore the gauge to factory default settings** - Press and hold the Settings button while the gauge is being powered on.



**To toggle between Celsius and Fahrenheit temperature standards and restore the gauge to factory default settings** hold down both the Menu and the Settings buttons while the gauge is being powered on.