



Wide-band Lambda Controller.

Package contents

1 x	Lambda Controller	1 x	Lambda sensor (LSU4.9)
1 x	Fuse holder	1x	LED
1 x	5 amp fuse (one spare).		

A lambda sensor, also known as an oxygen or O2 sensor, is an electronic device that measures the residual oxygen in the exhaust gas. The lambda sensor outputs a signal proportional to the air-fuel ratio. This signal can be used by the ECU for data-logging, display or closed-loop-controlled fuelling purposes.

Lambda sensors fall into two main groups, narrow-band and wide-band.

A narrow-band sensor can only accurately determine if the mixture is at lambda 1, richer than lambda 1 or leaner than lambda 1. This information is fine for most engine management systems that only need to regulate the fuelling at lambda 1 in order for a catalytic converter to work efficiently.

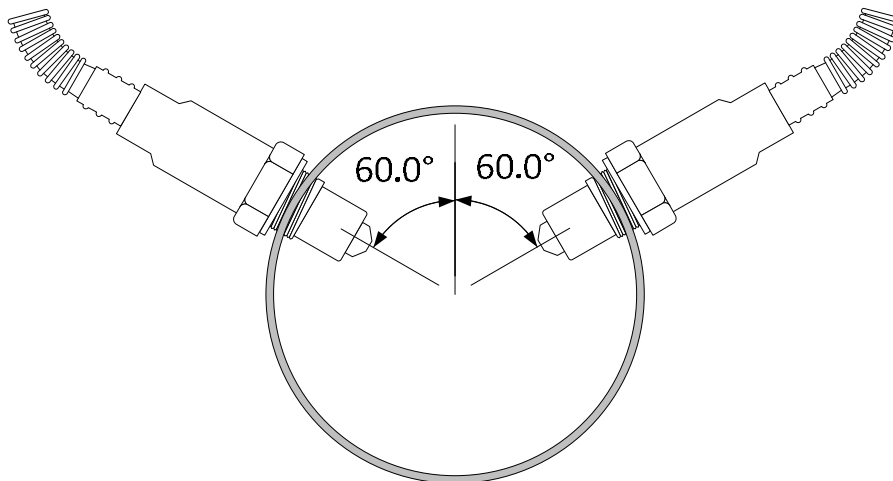
A wideband sensor can provide precise air-fuel mixture information from very rich to very lean. This information is far more useful for tuning and allows the Emerald K6 to run a closed-loop fuelling system that targets any air-fuel ratio that can vary with engine speed and load.

Exhaust Installation.

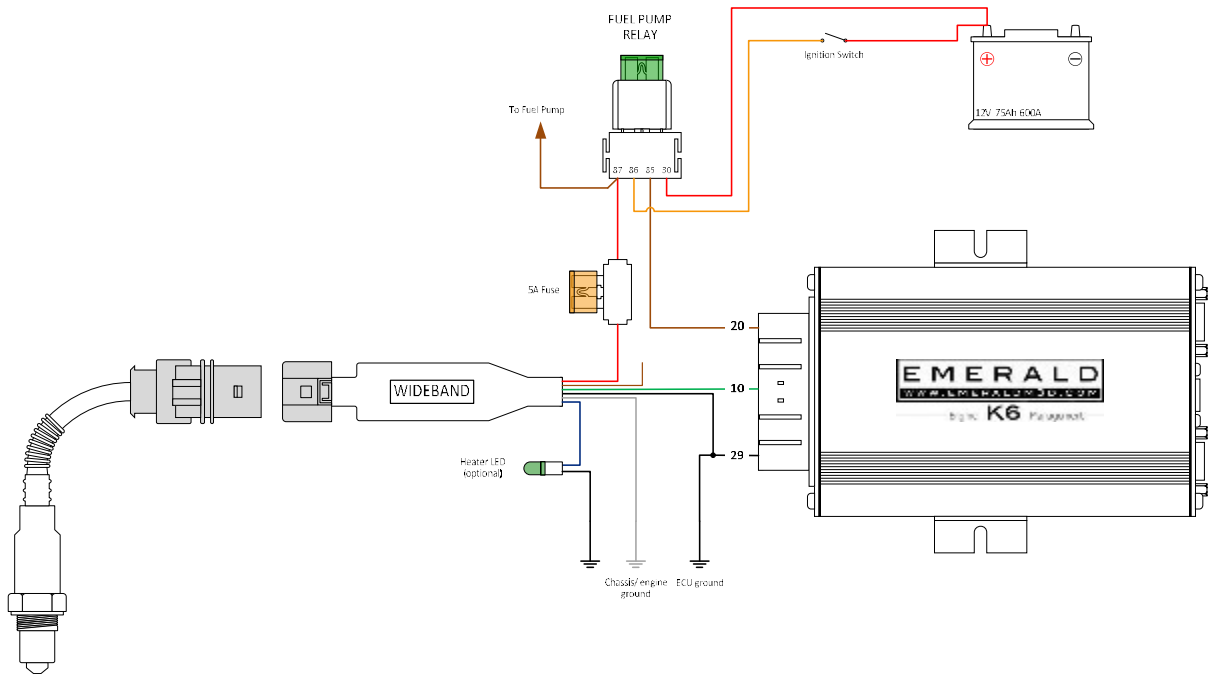
Normally aspirated engines: the wideband lambda sensor must be installed upstream (before) of the Catalytic converter and approximately 600mm from the exhaust port

Supercharged and turbocharged engines: the wideband lambda sensor must be installed downstream (after) the turbocharger unit but upstream (before) the catalytic converter; approximately 900mm from the exhaust port.

In all circumstances the wideband lambda sensor must be installed at an angle no greater than 60 degrees from the vertical. This will allow any condensate to freely drain from the sensor.



Wiring Example.



Colour	Function	Connects to	Notes
Red	Supply	Ignition +12v (5A fuse)	Only live when engine is running
White	Heater ground	Ground	Ground
Black	Sensor ground	Ground	ECU ground (pin 29)
Green	Sensor signal	EMR K6 ECU pin 10*/ Gauge	AFR signal to ECU/ gauge
Brown	Simulated Narrow-band signal	OEM ECU if O2 sensor connection is still required	N/C
Blue	LED Output	LED blue wire	When sensor temperature is: <755°, the LED will blink slowly (0.5 Hz). 755-805°C then the LED will be solid. >805°C then LED will blink fast (2 Hz).

*any spare analogue input can be used. Ensure ECU pull-up option for input used is switched off.

Wide-band Lambda Sensor Input Calibration

There are a number of options/settings that determine where the ECU looks for a lambda signal and how that signal is translated into a meaningful AFR reading.

The following data will need be entered into the AFR/ Lambda input calibration page. As in the above wiring diagram example the input source is Emerald K6 ECU pin 10 so 'AuxIn10' is set.

Input source : [3] AuxIn10

Signal smoothing: 1

	Input voltage	AFR
1	0.000	10.0
2	1.002	12.0
3	2.004	14.0
4	3.001	16.0
5	4.003	18.0
6	5.000	20.0

Live readings
Aux input : 2.556 volts
AFR : 15.0

Current ECU settings displayed