Using the Pectel data logging to determine basic engine functions

This is a list of typical readings that all teams should be aware of when reading the data from the engine ecu.

Rpm: This is measurement of engine revolutions per minute.

Map: This is Manifold absolute Pressure or Boost pressure. This reads in absolute or 0-5bar, with 1 bar being atmospheric pressure at sea level. So a reading of 2 bar on the data files translates to 1 bar of pressure from the turbo charger and 1 bar of atmospheric pressure it will be displayed as 2000mb.

In a Jge supercar engine will operate from 600mb minimum to 4000mb maximum.

Tps : This is the throttle position sensor. Its purpose is to monitor how much throttle is applied by the driver. In its closed position it should read 4 and fully opened 90.

Lam1: This is a measurement of the exhaust fumes used to determine the exact amount of fuel injected into the engine.

This will operate between 0.80 and 1.20.

A rich a/f ratio is a low value and a lean a/f is a high value.

Typical values for a turbo engine are:
0.82-0.86 @ full power @Map values above 2200mb@ 90 Tps.
0.94-0.96 @ engine idle @ Map 600-900mb @ 3-5 Tps.
0.88-0.90 @ Cruise-light load @ Map 1000-1500mb @ 10-30 Tps.

Ect: This is a measurement in degrees Celsius of the engines water temperature.

This will operate between starting temperature -5 to 20 depending where you are and rise quickly to a normal operating temperature of 80-90.

Engine cooling fans will normally be ON once a temperature is above 82 and OFF below 75. In some cases 1 fan will operate at lower temperatures to stop a sudden rise in engine temperature.

Temperatures above 110 will result in engine damage!

Prp: This is a measurement of Post Restrictor Pressure. This is used to monitor the vacuum inside the turbo restrictor as a means of boost control. This is measured in MB and will operate @ 600-650 @ full power. It will read similar values to the Map sensor when the engine is not running or 1000mb @ sea level.

Pressures less than 550mb will result in turbo failure!

Fp1: This is a measurement of engine fuel pressure. Fuel pressure is set to 5 bar by Jge when the engine is at idle. Fuel pressure should rise with engine boost. If the engine is producing 1 bar of boost then fuel pressure will be 5 + 1 = 6 bar fuel pressure.

Fuel pressure should operate between 4.5-8 bar. Higher or lower figures will result in engine failure.

Eop: This is a measurement of engine oil pressure. Oil pressure is set by Jge @ 5 bar. The oil pump controls this pressure by means of a valve and spring and not by the ecu. Oil pressure should be carefully monitored by the team at all times. It is normal to see slight changes in pressure as engine speeds rise and fall and changes in engine
temperatures. A safety feature is programmed into each ECU to cut ignition if oil pressure fails during cornering or acel or deceleration.

Oil pressure problems should be reported back to JGE without hesitation.

Egt: This is a measurement of Exhaust gas temperature. Its normal operating temperatures are 850-900 without ALS or 900-1000 deg C with ALS enabled. Temperatures above 1100 will result in turbo failure. JGE program a safety feature to disable the ALS if this temperature is exceeded.

Sync: This is used by the ECU to determine its position of crank and camshafts to enable a fully sequential injection pattern. On cranking this will see 360 degrees of rotation and then 720 degrees when sync mode is achieved. If a ½ engine speed sensor fails (camshaft/distributor/phase) the engine will only run in 360 mode causing a rise in Lambda figures and occasional misfires. If the crankshaft speed sensor fails and the engine will not start the 360 mode will not be reached but an engine rpm may be seen, indicating a sensor failure.