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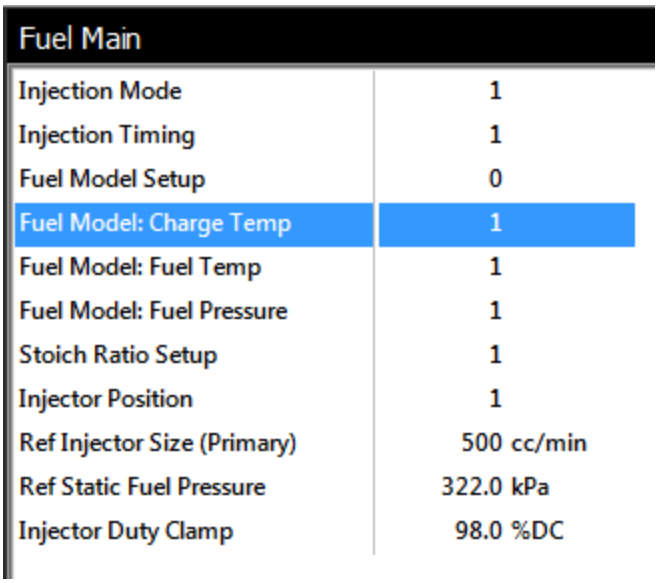
Emtron Fuel Model Features

The software format centres around multiple views. The “Config View” is where all the base engine parameters are configured. One of the more intersting menu items in the config view centres around the “Fuel Model”.

So what is the main difference to what you may be used to when tuning aftermarket engine management systems? KV Series ECU’s are a VE based system. Without going into too much detail, traditionally most aftermarket ECU’s are injector pulse width based. The Fuel Table would generate an injector pulse width typically from a master or raw injector pulse value. The fuel table essentially determined the main fueling strategy by generating a required injector pulse width generally based on a load and engine speed. The Fuel Table is now a Volumetric Efficiency Table which essentially requires the tuner to enter values to tell the ECU how well the cylinder is at filling its displaced cylinder volume. A Value of “100.0” in the VE table is not 100% of the master/base/IJPU ms pulse width normalised to the load but is now letting the ECU know that the engine is 100.0% volumetric efficient. As the ECU will already have a number of parameters available along with the VE table value at a particular load it will be able to work out the required fueling based on calculating the air mass and then opening the injector to yield the required fuel mass. The ECU needs to know how efficient the engine is at displacing air. The actual tuning process is much the same as with a classic fuel table.

Although the VE model requires a number of sensors and information to work best we understand in some applications it may be difficult to give the ECU all the information required to generate accurate values. Looking to the screeshot below the menu displayed can be selected in the Config view->Fuel ->Fuel Main. Note the “Fuel Model” settings. “Charge Temp”,”Fuel Temp” and ”Fuel Pressure”.



Given the ECU needs an air and fuel mass in order to generate an injetor pulse wdith to maintian the correct air to fuel ratio, certain inputs to the “Fuel Model” are substitited with default values if such sensors are not available. The user must enter a value of “0” in this case for each of the three (3) Fuel Model menu items. Disabling these by setting to “0” essentially forces the ECU to think the charge temp is always 20deg c, Fuel temp is 20deg c and the differential fuel pressure never changes assuming a perfect fuel system (which is actually very rare and nearly impossible in the real world). The user will then be able to simply tune the VE table and apply fueling compensations manually when required as one would normally do. It is recommended all settings be enabled to allow the ECU to perform calculations with real data. This means educating customers to install fuel pressure and fuel temperature sensors along with the normal sensors that are used. Ultimately this will result in more consistent tunes escpecially when the fuel pressure compensation is applied. If you do not regularly monitor fuel temp and fuel pressure you will be shocked to see what mose fuel systems go through.