Startup Procedure

This procedure is very important as this is a universal ECU that can cater for many combinations of engines. Setting incorrect values here may damage the ECU or some of the engine components permanently. The Maps supplied by the agents are a guideline and not guaranteed to be set up correctly for your application. It is your responsibility to make sure it is setup correctly. Common failures are short circuited wires in the installation. Coil drivers are set incorrectly for internal or external coils, resulting in damaged coils or ECU drivers. Injectors stuck in open condition causing fuel to flood a cylinder and resulting in bent connecting rods. Too large fuses resulting in damaged electrical components.

Engine and system preparation.

Before connecting the ECU check the following:

1. Install new spark plugs on engines that was standing for a long time.
2. Service and test the injectors to ensure they all have the same fuel delivery and that the filters on them are clean.
3. First ensure that the installation is correct according to the Hardware Installation manual.
4. Test the electrical wiring with a multi meter according to the Installation Testing Procedure.
5. Power up the fuel pump by loosening the fuel pump positive from the relay circuit and connecting it to 12V battery positive. Check the fuel pressure is around 3.5 Bar and check for fuel leaks. Reconnect to the relay.

Connecting the ECU for the first time

Now you can proceed with the following steps. If any steps do not correlate with the ECU operation, stop and look for the faults. **Ensure that the ECU is earthed!!!**

1. Remove all the fuses. If it is an easy install harness with a common fuse on the main lead then disconnect the coils, injectors, fuel pump etc. from the power relay.
2. Ensure that the Jumper Settings are correct for that ECU.
3. Connect only the input connector P1 connector leaving the output connectors open. Switch the Ignition on. Do not start the engine. The yellow LED on the ECU must come on. Also the blue LED on the idle stepper control unit must come on, if it is installed. If the yellow LED does not come on switch the ECU off immediately as there may be a short on the 5 Volt output that will damage the ECU in time.
4. Now switch the Ignition off and connect the Laptop with the USB cable to the unit. Switch the ignition on. Start the PC software and connect to the ECU. The engine data like the water and air temperature sensors should be displayed. It should read more or less correctly for the cold engine.
5. Go through the setup pages one by one and ensure that all the settings are correct for this engine.

6. Ensure that the crank and cam angle sensors from the distributor or crank are set up correctly. Also, their angle level selection must be rising or falling edge.

7. Check the Rotor Fazing if you have a distributor system. This will make electrical interference on the ECU and Laptop if it is set incorrectly.

8. Calibrate the TPS and Map sensors and save the calibration as described under active sensors.

9. Set the maximum RPM range and Map sensor type and range. Set the coil charge times to a lower setting if you are not sure what is required. Star with 2.0 min and 2.5 max.

10. The Map sensor value should be reading the atmospheric pressure of your region. Check the Altitude chart for the correct pressure in your area.

11. Make sure the Test function next to the crank sensor is on.

12. You may now crank the engine without the other connectors. Look at the RPM signal on the timing map. It should show 200 to 300 RPM constantly. If it shows erratic and runs wild, do not proceed. First find the fault. It must be constant with no errors. The vacuum bar should move slightly to the left of the graph while cranking at closed throttle.

13. Look if any error code is displayed at the bottom. If there are errors remedy the fault condition.

14. Save the data to the ECU if it has been changed.

15. Switch the ignition off and connect the other connectors.

16. Remove all the fuses. If it is an easy install harness disconnect the power on the injectors, coils fuel pump etc. Switch the ignition on. The relays will come on for three seconds then switch off again. If not, check the relay wire according to the drawing. If you have electronic relays, check that the LED on them must come on. **Note** on Mercury2 there are 3 relays with a free-wheel diode on pin 85 and 86.

17. Switch the ignition off and insert the fuel pump fuse. Start with 5A. If it blows check the wiring and try 7.5A as some pumps draw more power than others. Do not go to larger amp fuses as there may be a short somewhere.

18. Switch the ignition on, the fuel pump must start for three seconds and switch off.

19. Switch the ignition off and insert the coil fuses of 5A. If it blows check the wiring.

20. Now crank the engine with a timing light and check if the spark timing is in the 10°BTDC region. If not see the Calibrate Timing chapter for the correct setup. Do not attempt to start if the timing is not right or erratic. You may need to loosen the plug wire and make a small gap so that the timing light picks up the pulse of the spark plug. For coils that are bolted onto the plug, try using the trigger wire from the ECU. If this does not work, take a separate wire and wound it three times around the inductive pickup of the timing light and then insert this wire between the trigger wire and the coil input. This will amplify the signal three times so that it will trigger the timing light. Set the timing light to zero timing as wasted spark systems read double the degrees. This means if the timing light is adjusted to 20 degrees it is actually 10 degrees timing on the engine.

21. Switch the ignition off and insert the injector fuses of 5A. If it blows check the wiring.

22. Crank the engine. It should start. If the engine backfires or misses stop and do some checks. See the Trouble Shooting chapter to guide as to what the symptoms may be.

23. If your setup is correct the engine should start and idle smoothly.

24. Make sure the RPM is constant before revving the engine. If it jumps more than 300 rpm intervals, recheck the angle sensor's polarity. It must be steady. If it was error free during cranking without coils, it means the interference is now generated by the coils. See the precautions section on wiring tips.

25. Look at the exhaust. If there is black smoke, it is very rich. Try leaning it out on the water temp graph by lowering the dot closest to the yellow bar. The bar is interpolated.

26. Once the engine idles, calibrate the timing so that the Timing value on the software and the timing light on the engine is on the same degrees.

27. During the heating up faze, blip the accelerator from time to time. If the engine has a flat spot, it may be lean and need some more fuel. Adjust the Fuel Graph till the flat spot reduces.

28. The blue LED in the idle control should go off once the target RPM is reached. If it keeps on flashing, then the ECU is trying to control the idling but nothing happens. It means the fault is on the idle side or motor. It may be a wiring fault or sticky stepper motor. It may also be a blocked airway or the throttle opening is too large. Remember for every 15% of enrichment on the water correction graph, the ECU will raise the set RPM's by 100.

29. As the engine heats up, the water sensor value must increase. Adjust the mixture on the water graph or by lowering the Fuel Graph till the engine is at normal temperature.

30. The water graph should now be around 85°C with no fuel enrichment. If it is not, you can calibrate the water sensor slightly on the setup page. The engine should rev up smoothly. If it has a flat spot, it requires more fuel. Increase the Fuel Graph slightly till the flat spot is nearly gone. Also check that the timing is not the result of the flat spot. Check with the timing light that the timing increases as the software indicates.

31. Let the engine idle and adjust the Fuel Graph till it idles smoothly. Always try to make the mixture as lean as possible because it is difficult to see when it is too rich.

32. Save the data to the ECU. Also save a copy to the laptop at this stage. The car may stutter and die. Restart again and proceed with tuning.