Starting and engine for the first time

The ECU has a few sequences how to start the engine. An engine requires an initial prime pulse of fuel to start the moment the engine is cranked, then a richer mixture during cranking. Once it started, it also requires a certain amount of richer mixture than idling to get it going till normal idle settings can take over. For cold starting all these settings must be increased at a certain %. This is done automatically by the ECU by using the water temperature compensation Map. Adjust the following settings before starting and again when the engine is at normal operating temperature.

Start Prime Pulse

This setting will open the injectors for 20 milliseconds when the engine reaches 100RPM during cranking. This will ensure that the fuel is not cranked through the engine before ignition spark is started. When the engine starts look at the exhaust. If there is black smoke it is too rich. Try decreasing this value till the engine struggles to start. Then increase it slightly. If this pulse is too large, it may flood the engine.

Throttle Priming

This is a function to manually inject fuel into the engine on very cold days. The TPS must be connected for this feature. If you press the throttle more than 25%, the ECU will prime the injectors by half the value set in the Start Prime Pulse block. It will start the fuel pump for 1 second to get the fuel pressure up again. This function may be repeated if more starting fuel is required. It is handy to see if a stubborn engine requires more fuel or not.

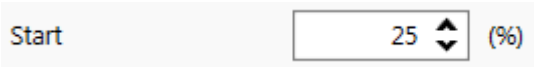
Flood Control

This is a function that clears a flooded engine. It is activated when the accelerator is pressed more than 80% during cranking. The ECU will cut the injectors and no fuel will be injected into the engine. The spark and clean air will eventually dry and ignite the remaining fuel and clear the plugs. When the throttle is released the ECU resumes normal fueling.

Cranking Fuel

This is calculated from the graph or matrix where the MAP or TPS value and RPM is at the time. In TPS matrix the block on the matrix at low RPM is used for cranking fuel. The Rotary firmware will use the prime pulse graph in expert mode as a crank fuel setting. The reason is the amount of fuel and low vacuum signal during cranking.

Start %



If you have idle control, do not press the throttle as the idle control will ensure enough air at starting. This value determines how much air the ECU must add to the starting enrichment. If you don't have idle control it helps to open the throttle slightly for starting. Do not rev the cold engine as oil pressure is still low. Rather let it heat up gradually. For cold starting you may need to keep the engine running with the throttle as it requires more air.

Start Enrichment

This setting will enrich the idle fuel after the engine has started and reached 500 RPM. It will add 0.5 milliseconds to the injector time. This value will decrease with RPM counts, and should fade in about 8 seconds at idling to zero milliseconds. If you rev the engine after starting, it would be zero in 2 seconds. Try starting with a zero value. Do not press the throttle. If the engine dies after starting, increase this value till it keeps running.

The engine is designed for a certain torque and power curve. Inadequate mixtures and timing will only reduce performance. Timing is the easiest parameter to get in the right region, as you can use timing marks on the pulley and quality timing light. Also follow the guidelines for the specific type of pickup to get it more or less in the firing zone. If you are not sure try to go for a retarded time position. This will make the least damage and not break the starter.