FiTech Fuel Injection

Handheld Controller Feature Definitions

Basic Settings: These values and options allow

Engine CID = Total Engine cubic inches

Cam Mild-Wild 1-4 = This is the way to select a specific volumetric efficiency table that is specially tailored to the characteristics of typical engine configurations.

Rev Limit RPM = At this RPM, the fuel and spark will be cut off, to limit the engine speed.

Idle Speed Warm = The idle speed of the engine when it's fully warmed up.

Fault Clear = Set this to 1 to clear the recorded faults out of the system.

Reset All Learn = Set this to 1 to set all fuel learning values to 100, and all idle air learning to a default value, and TPS closed position learning to a default position.

Reset Fuel Learn = Set this to 1 to set all fuel learning values to 100

Reset IAC Learn = Set this to 1 to set all idle air learning values to a default value (16 steps)

Reset TPS Learn = Set this to 1 to set the TPS learn value to a high default position (the TPS closed position will re-learn any new value that is consistently lower than this).

AFR Targets: The AFR table is a 3x3 matrix – the AFR is interpolated between these breakpoint values. This means that if you're breakpoints are 45kPa at 14:1 and 95kPa at 12:1, operating at 70kPa will result in 13:1 target.

Idle AFR Target = Target AFR of fuel control when the engine is at Idle. Most engines will tolerate as rich as 12.7:1, and some will "like" 14:1.

1100 45kPa = AFR at 1100 RPM and 45kPa – this is typically just "off-idle" with very low throttle opening. Different cams will require different AFRs at this point. A stock cam will work fine at 14.5:1. A lumpy cam might like 13.3:1 or 14.5:1.

Handheld Controller Feature Definitions

<u>3000 45kPa Cruise</u> = AFR at 3000 RPM and 45kPa – typical of a light cruise, but not, for example, overdrive cruising at lower RPMs and higher loads. Suggested range 13.4 – 14.7:1.

<u>6000 45kPa</u> = AFR at 6000 RPM and 45kPa – this is only used in free-rev, or something like autocrossing in a low gear and throttle is just barely open. Suggested range 12.5 – 13.8:1 (richer to keep parts a little cooler, and so that the tip in to full throttle is starting from rich.

<u>WOT 1100 95kPa</u> = AFR at approximately 25-100% throttle at low RPM. Intake manifolds are not very good at cylinder to cylinder distribution, so, there might not be a "perfect" AFR for here, but, 12.6 is a typical good enough AFR.

<u>WOT 3000 95kPa</u> = AFR at approximately 45-100% throttle at 3000 RPM. Intake manifolds are not very good at cylinder to cylinder distribution, so, there might not be a "perfect" AFR for here, but, 12.6 is a typical good enough AFR.

<u>WOT 6000 95kPa</u> = AFR at approximately 75-100% throttle at 6000 RPM. Intake manifolds are not very good at cylinder to cylinder distribution, so, there might not be a "perfect" AFR for here, but, 12.6 is a typical good enough AFR. But, sustained time at this RPM can put a lot of heat into the exhaust valves, and richer might be needed to keep temperatures in check (at the expense of some horsepower).

<u>Boost 1100 180kPa</u> = This is full throttle but with a supercharger or turbocharger boosting to about 11.6 psi. If no intercooler is used, the engine may require as rich as 11.0:1. If an intercooler, other charge cooling device or a fuel with plenty of octane is used, leaner can be tolerated. Richer than 12.5:1 is recommended.

<u>Boost 3000 180kPa</u> = This is full throttle but with a supercharger or turbocharger boosting to about 11.6 psi. If no intercooler is used, the engine may require as rich as 11.0:1. If an intercooler, other charge cooling device or a fuel with plenty of octane is used, leaner can be tolerated. Richer than 12.5:1 is recommended.

<u>Boost 6000 180kPa</u> = This is full throttle but with a supercharger or turbocharger boosting to about 11.6 psi. If no intercooler is used, the engine may require as rich as 11.0:1. If an intercooler, other charge cooling device or a fuel with plenty of octane is used, leaner can be tolerated. Richer than 12.5:1 is recommended.

FiTech® Fuel Injection

Handheld Controller Feature Definitions

SPARK MAP: The spark advance uses a 3x3 matrix table to allow flexible spark advance control. This can allow distributor simulation, locked timing, boost retards, high RPM advancing and other strategies to optimize the ignition spark advance angle. The distributor must be locked out. Spark advance during cranking will happen at or after the VR tooth crosses the sensor. Above cranking, spark advance will only be equal to or more than the base advance, regardless of the value entered in the handheld for timing.

Distrib Base deg = Adjust this to get the timing light timing to match the displayed Spark Advance at low RPM. It's recommended to set this as high as possible, because the amount of advance range from min to max is limited due to the rotor and cap being in a fixed relationship.

VR Advance 4000 = Adjust this to get the timing light timing to match the displayed Spark Advance at 4000 RPM. This is adjustment for the small lag inherent in VR signals. It can add up at high RPM.

Idle Advance = The spark advance desired at idle.

1100 45kPa = Spark advance used just after throttle opens from idle. This value shouldn't be much more than the Idle Advance, for this reason.

3000 45kPa Cruise = Spark Advance used in a light cruise at 3000 RPM and throttle barely open.

6000 45kPa = Spark Advance used in a high free-rev condition, perhaps also seen when autocrossing and just tipping-in in a low gear at high RPM.

WOT 1100 95kPa = Spark Advance at low RPM and "full load" – perhaps the throttle is as low as 20% to see this much load. Spark is based on MAP, and MAP (and thus "load") can get pretty high even with low throttle openings at low RPMs.

WOT 3000 95kPa = Spark Advance at high loads and 3000 RPM. This could easily be deemed "total" timing when comparing to a distributor, but due to the flexibility of a 3x3 matrix, this doesn't limit you as such.

Handheld Controller Feature Definitions

WOT 6000 95kPa = Spark Advance at high loads and 6000 RPM. At high RPM, some engines require more or less spark advance than at 3000 RPM. This allows you to set the timing there.

Boost 1100 180kPa = This is full throttle but with a supercharger or turbocharger boosting to about 11.6 psi. If no intercooler is used, the engine may require very little spark advance. Remember that timing less than the base advance "Distr Base Deg" is not allowed, so choose the base timing carefully.

Boost 3000 180kPa = This is full throttle but with a supercharger or turbocharger boosting to about 11.6 psi. If no intercooler is used, the engine may require very little spark advance. Remember that timing less than the base advance "Distr Base Deg" is not allowed, so choose the base timing carefully.

Boost 6000 180kPa = This is full throttle but with a supercharger or turbocharger boosting to about 11.6 psi. If no intercooler is used, the engine may require very little spark advance. Remember that timing less than the base advance "Distr Base Deg" is not allowed, so choose the base timing carefully.

ACCEL PUMP: Intake manifolds are going to get wet with fuel while running. This wetness changes with temperature, engine vacuum, and air flow speeds. This wetness also must be supplied in addition to the fuel that is intended to reach the cylinders. This wet film of fuel on the surface is much thicker at cold engine (fuel doesn't evaporate well when cold), and also varies greatly with vacuum (bigger at high loads, smaller at low loads). The software has a strategy to supply that fuel and compensate for the changing size of the film. However, different manifolds have different characteristics, so some adjustments may be necessary to give the proper fuel during a "transient" event (transient is a term used to describe moving the throttle and changing the load). The fuel added during a transient has to be added in a special way to cause the wetness to build correctly over several injections. It starts out large, and decays to 0. The decay adjustments shape that curve. A larger decay value causes the accel "pump" amount to be ended sooner, and a smaller decay value allows the fuel to extend a little longer. It's a fine art of calibration to get this perfect, requiring a super-fast reading of a lambda sensor. It's recommended to only adjust these values when you notice it's a problem. It also shouldn't be adjusted much until the fuel learning has had plenty of time to adapt to the engine. The Accel fuel calculation uses 2 different signals that work mostly independently determine how much fuel to add/subtract. The MAP is directly used for "Accel Pump" fuel. The Alpha-N MAP is used for the "Fast Accel" fuel. Alpha-N uses the TPS and RPM to calculate a secondary "MAP" signal in case of the MAP

Handheld Controller Feature Definitions

fault. That value is also used to calculate the “Fast Accel” fuel, because it responds slightly faster than the real MAP signal.

Accel Pump 20F = Adjusts the fuel film compensation when very cold. 0 means it uses the default calibration directly.

Accel Pump 65F = Adjusts the fuel film compensation when cold. 0 means it uses the default calibration directly.

Accel Pump 170F = Adjusts the fuel film compensation when warm. 0 means it uses the default calibration directly. The default calibration already has a background table that is set up to work pretty good “out of the box” but it may be too lean or too rich during quick tip-ins for certain engines.

Accel Decay 20F = A larger decay will shorten the amount of time that the injectors are adding fuel during a transient. A smaller decay will extend the time. 0 will use the default values that are in the default calibration.

Accel Decay 65F = Same, but for 65F.

Accel Decay 170F = Same, but for warm engine.

Fast Accel 20F = Adjusts the fuel film compensation when very cold. 0 means it uses the default calibration directly.

Fast Accel 65F = Adjusts the fuel film compensation when cold. 0 means it uses the default calibration directly.

Fast Accel 170F = Adjusts the fuel film compensation when warm. 0 means it uses the default calibration directly.

Fast Decay 20F = A larger decay will shorten the amount of time that the injectors are adding fuel during a transient. A smaller decay will extend the time. 0 will use the default values that are in the default calibration.

Fast Decay 65F = Same, but for 65F.

Fast Decay 170F = Same, but for warm engine.

Handheld Controller Feature Definitions

dTPS Acc Gain = In order to "help" the acceleration fuel be large enough to handle a sudden throttle snap open, the speed of throttle opening is used as a bit of a helper to make it bigger as the speed of the throttle is opened faster. A larger number here will make it more sensitive to throttle opening speed.

dTPS Acc Max = The dTPS fuel gain multiplier is limited to this amount. 100 means that no help is given by this function. 199 means that the Fast Accel fuel is nearly doubled if the throttle is moved quickly enough.

Tipout -20F = "Tipout" is the term used to describe when the throttle is closing. The MAP drops rapidly, which means vacuum increases rapidly, and the fuel suddenly vaporizes off of the wall, and the injected fuel quantity is less. The wall film of fuel will decrease greatly, and thus if the injection rate is kept the same, the engine will be very rich. The software compensates this using a default calibration for the wall film, but the adjustments provided here can allow more precise adjustment for the varying engine configurations.

Tipout 0F = same

Tipout 40F = same

Tipout 70F = same

Tipout 120F = same

Tipout 150F = same

Tipout 185F = same

Tipout 215F = same

FUEL CONTROL: A speed density algorithm is used to calculate the fuel injection pulsewidth. The temperature used is called the "In Cylinder Temperature" which is calculated as being somewhere between the coolant temperature and the air temperature, depending on the air flowrate. However, this may not be perfect for the engine configuration when combined with the "warm up" and "start up" fuel multipliers, and thus the below adjustments are provided to fine tune the system at various temperatures. The speed density calculation does not apply when the engine is Cranking (speed below about 450 RPM). After combustion starts and the speed picks up above about 500 RPM, the engine begins the speed density calculation, along with the "Warm Up" and "Afterstart" fuel. **Warm Up** fuel is using a default table (more enrichment at colder engine) that can be tweaked here if needed – warm up fuel works at all operating conditions above cranking, but is 0 at a fully warm engine. **Afterstart fuel** enrichment has the special purpose of building the wall fuel films in manifold and cylinder is decreased with the number of revolutions as the film builds and the parts warm up rapidly – most of Afterstart fuel is gone within about 800 revolutions. The adjustments provided here can help fine tune it to the particular application.

Fuel -20F Cyl = This affects all of the fuel at this In-Cylinder temperature, except the cranking fuel.

Fuel 5F Cyl = This affects all of the fuel at this In-Cylinder temperature, except the cranking fuel.

Fuel 32F Cyl = This affects all of the fuel at this In-Cylinder temperature, except the cranking fuel.

Fuel 70F Cyl = This affects all of the fuel at this In-Cylinder temperature, except the cranking fuel.

Fuel 85F Cyl = This affects all of the fuel at this In-Cylinder temperature, except the cranking fuel.

Fuel 105F Cyl = This affects all of the fuel at this In-Cylinder temperature, except the cranking fuel.

Fuel 130F Cyl = This affects all of the fuel at this In-Cylinder temperature, except the cranking fuel.

Fuel 195F Cyl = This affects all of the fuel at this In-Cylinder temperature, except the cranking fuel.

Afterstart 20F = This affects the fuel at this Coolant Temperature, just after cranking, and lasts for just a few seconds.

Afterstart 65F = This affects the fuel at this Coolant Temperature, just after cranking, and lasts for just a few seconds.

Afterstart 170F = This affects the fuel at this Coolant Temperature, just after cranking, and lasts for just a few seconds.

Warmup 20F = This affects all of the fuel at this Coolant Temperature, except the cranking fuel.

Handheld Controller Feature Definitions

Warmup 65F = This affects all of the fuel at this Coolant Temperature, except the cranking fuel.

REV LIMIT DECEL CUT: During certain situations, the injectors can be turned off. At high RPM, the injectors and spark can be cut off at the **Rev Limit RPM** in order to prevent the engine from over-speeding and causing engine damage. This can be a fairly sudden jerking feeling, and shouldn't be used to hold an RPM point. **DFCO** stands for Deceleration Fuel Cut Off. When decelerating in gear, the MAP is very low, which means the fuel pulsewidths are very small. The engine also has a very high amount of internal EGR, which causes combustion to be very difficult. Also, torque is not even desired, so, fuel can be cut off. This will appear as a very lean condition, but don't worry – it's far from any kind of danger – there's no fuel at all! When the throttle is opened, or the RPMs approach idle, or some other thing causes more load on the engine, the fuel injection returns. Because the manifold will be dried out during the time of no injection, extra fuel "**Dfco Return Fuel**" is needed to re-wet it, to avoid a long lean out period. Because there are distribution rings in the path of the injection spray, the voids in that ring need to be re-filled as well before fuel will flow steadily out of the discharge holes - **Dry Ring Fill PW** is used in this situation.

Rev Limit RPM = Above this engine speed, the fuel and spark will be turned off.

Dfco Enable Temp = Above this temperature, Deceleration Fuel Cutoff can be used.

Dfco Cut Fuel MAP = Below this MAP, Deceleration Fuel Cutoff can be used.

Dfco Return MAP = Above this MAP, Deceleration Fuel Cutoff will be exited, and fuel injection returned.

Dfco Return Fuel = When the fuel injection returns, extra fuel is required to wet the intake manifold walls, to avoid going lean.

Dry Ring Fill PW = The fuel distribution rings need to be re-filled – since they don't change size, this value should be correct in the default calibration.

Handheld Controller Feature Definitions

Max drpm Drop rate = If the RPM is dropping very quickly, such as when shifting gears or other clutched event in a manual transmission, Deceleration Fuel Cutoff will be exited early, and fuel injection will return.

Fault Rev Limit = In the case of some sensor faults, the rev limit can be reduced to act as a protection and as a warning in case the driver wasn't aware of a fault.

CRANKING FUEL: The fuel requirements during cranking are very far from the speed density calculated amount. Thus, the fuel is not using that equation during the time between stall and about 450 RPM. The main factor determining the amount of fuel needed is the engine temperature (very cold requires several times as much fuel as a warm engine), as the fuel wall film needs to be applied, and the cold engine parts will cause most of the fuel to cling to them as a liquid, and not take part in the in-cylinder combustion. The various intake manifolds and engine sizes are also going to affect the amount of fuel required. In order to help the engine start much more quickly, the system also injects a large squirt "**Prime Shot**" from all of the injectors a few moments after the key is turned on. If the prime shot is not desired, such as if just the radio is to be turned on – pressing the throttle fully open prior to and while the key is turned on and while the fuel pump primes, will cause the Prime Shot to be cancelled.

Prime Fuel Mult = The prime injection will fire the injectors after key on to help make starting much quicker.

Crank Open TPS Mult = If the throttle is opened above this (and below about 50% for clearing flooded engines), the fuel injection is increased. This is to help start the car if the calibration is not yet finalized for starting. Also, the open throttle lets in much more air than just a closed throttle, so the extra fuel is sometimes needed to balance the extra air to deliver a burnable mixture to the cylinders.

Prime Shot Delay = If the engine is not cranked directly after key on, the software will wait a few seconds before injecting the Prime Fuel to allow time for the fuel pump to purge the throttle body of vapors, and get full fuel pressure to the injectors.

FiTech®
Fuel Injection

Handheld Controller Feature Definitions

Prime Crank Revs = If the engine is cranked directly after key on, the software will wait a few revolutions to allow time for the fuel pump to purge the throttle body of vapors, and get full fuel pressure to the injectors.

CRANK IAC Mult = The IAC is opened an extra amount during cranking to allow more air into the engine for faster starting, and extra torque to spin the engine against thicker cooler oil. Adjust this to get good starting without excessive overshooting after starting.

Crank Fuel 20F = At cold engines, the default calibration increases the fuel injected by a very large amount. However, different engines and manifolds will show different needs. Adjust this to get good starting response.

Crank Fuel 65F = At cold engines, the default calibration increases the fuel injected by a large amount. However, different engines and manifolds will show different needs. Adjust this to get good starting response.

Crank Fuel 170F = At warm engines, the default calibration decreases the fuel injected by a large amount. However, different engines and manifolds will show different needs. Adjust this to get good starting response.

Afterstart 20F = This is the exact same value that is found in the Fuel Control section. It's here again to help find it quickly when adjusting the fueling just after the engine is started.

Afterstart 65F = This is the exact same value that is found in the Fuel Control section. It's here again to help find it quickly when adjusting the fueling just after the engine is started.

Afterstart 170F = This is the exact same value that is found in the Fuel Control section. It's here again to help find it quickly when adjusting the fueling just after the engine is started.

Warmup 20F = This is the exact same value that is found in the Fuel Control section. It's here again to help find it quickly when adjusting the fueling after the engine is started and the engine is cold.

Warmup 65F = This is the exact same value that is found in the Fuel Control section. It's here again to help find it quickly when adjusting the fueling after the engine is started and the engine is cold.

Handheld Controller Feature Definitions

AFR CLOSED LOOP: The system can sense the lambda in the exhaust system from the wideband sensor. The lambda is converted to an approximate AFR (Air Fuel Ratio) assuming that lambda 1 = 14.7:1 AFR. The AFR Targets are used to give the fuel trim (fast closed loop fuel adjustment) a target and a multiplier. The Fuel Trim will increase or decrease the injected pulse width in response to the sensed AFR – if it senses too rich, it will reduce the fuel, and if too lean, increase the fuel. The Fuel Trim acts extremely quickly. If there is a consistent amount of fuel trim needed in a particular area, the fuel learning will adapt to that amount, so that the Fuel Trim can work near zero adjustment. The Fuel Learn is saved in the computer's memory, and can only be cleared by setting the "Reset Fuel Learn" to 1, and then turning off the engine.

Fuel Trim Max = This limits how much extra fuel can be added by the fuel trim.

Fuel Trim Min = This limits how much fuel can be removed by the fuel trim.

AFR Loop Speed = This adjusts how quickly the fuel trim increases and decreases the fuel to achieve the target AFR.

Idle Trim Rate Pos = At Idle, the fuel trim can be slowed to improve the stability of the AFR and engine speed. This value adjusts how quickly fuel is increased (towards richer).

Idle Trim Rate Neg = At Idle, the fuel trim can be slowed to improve the stability of the AFR and engine speed. This value adjusts how quickly fuel is decreased (towards leaner).

Idle Trim Jump Pos = Fuel trim works in a saw-tooth pattern – for example if the engine is rich, there is a slow decrease until lean, followed by a sudden jump rich. This is to keep the actual AFR close to the target – because the fuel film causes a transport delay of the fuel from the throttle body to the cylinder.

Idle Trim Jump Neg = Fuel trim works in a saw-tooth pattern – for example if the engine is lean, there is a slow increase until rich, followed by a sudden jump lean. This is to keep the actual AFR close to the target – because the fuel film causes a transport delay of the fuel from the throttle body to the cylinder.

FiTech® Fuel Injection

Handheld Controller Feature Definitions

Fuel Learn rate = The fuel learn can be set to quickly or slowly learn the fuel trim adjustments.

Idle fuel Learn rate = At idle, there is a specific learn value that can be learned more slowly than the normal operation learn rate.

Fuel Learn Max = This value limits how much the fuel learn can learn upwards.

Fuel Learn Min = This value limits how much the fuel learn can learn downwards.

Fuel Learn OFF 1 = This control value will disable fuel learning if it's set to 1.

Fuel Loop OFF 1 = This control value will disable fuel trim closed loop if it's set to 1.

Reset Fuel Learn = This control value will reset all fuel learning to 0, if it's set to 1. The clearing of the learn will happen when the key is turned off and the system is allowed to fully power down.

Display AFR filter = The AFR value displayed in the Dashboard and Data Logging is "filtered" meaning that it shows changes a little slower than it really senses them, to make the value appear more smooth. If more resolution is desired, increase this number to make changes appear more quickly. This value only applies to AFR's displayed while the throttle is OPEN.

Disp AFR filt idle = The AFR value displayed in the Dashboard and Data Logging is "filtered" meaning that it shows changes a little slower than it really senses them, to make the value appear more smooth. If more resolution is desired, increase this number to make changes appear more quickly. This value only applies to AFR's displayed while the throttle is CLOSED.

IDLE CONTROL: An Idle Air Control (IAC) stepper motor valve is used to open or close a passage in small increments (called "Steps") that adjusts the amount of AIR going through the throttle. The fuel calculation automatically senses the extra air and AFR, so there's extra torque produced at idle to increase idle speed or decrease idle speed if the RPM doesn't match the Target Idle RPM. The amount of steps needed is also learned, in order to improve the idle control

Warm Idle Speed = This is the Target Idle RPM for when the engine temperature reaches 170 degrees Fahrenheit.

Handheld Controller Feature Definitions

Reset Idle Learn = The Idle Air Learning can be reset to a default value (16 steps) – by setting this control value to 1, and turning the key off and waiting for the system to completely power down. This can be done if the IAC learned incorrect values from an improper throttle adjustment, or other situation that caused the learning to be wrong.

Idle Learn MAX = This is the maximum number of steps that can be learned up. There is a default base table that is used to automatically increase the IAC when cold. There are also 3 learn values for idle air: 20F, 65F, and 170F – this can help the cold engine idle be correct and

Idle Learn MIN = This is the number of steps that can the learning can learn in the closed direction from the base default table.

Loop Rate UP = The IAC uses a PID (actually just PI) closed loop control that adjusts the steps to achieve the desired idle speed. This value controls how quickly it can open the IAC in response to a lower RPM, using the "I" (integrator) of the PID.

Loop Rate Down = The IAC uses a PID (actually just PI) closed loop control that adjusts the steps to achieve the desired idle speed. This value controls how quickly it can close the IAC in response to a higher RPM, using the "I" (integrator) of the PID.

Fan RPM Adder = When the electric fan(s) is(are) turned on, the RPM can be increased by this amount to help both the coolant flow and the alternator speed to generate more voltage for the electrical system.

Fan Idle Steps = When the electric fan(s) is(are) turned on, the RPM can be increased to help both the coolant flow and the alternator speed to generate more voltage for the electrical system. This adjusts how many IAC steps are automatically added when the fan is on so that the loop and learning don't need to do the work.

Decel Open IAC = When the throttle is opened, the IAC is also opened by several steps in preparation for when the throttle closes. This open IAC helps reduce engine braking during deceleration which can give a smoother drive feeling. However, too much can cause the RPM to jump a bit too much when the throttle is cracked open, or cause the engine to have positive torque for a moment after the throttle is closed.

Handheld Controller Feature Definitions

Decel RPM Decay = When the throttle is closed, and the engine is returning to idle speeds, the Idle Closed loop will use Target RPM to control the speed during that period. The Target RPM will decay to the normal idle speed in a controlled manner. A smaller “Decel RPM Decay” value will be SLOWER.

Decel IAC Decay = When the throttle is closed, and the engine is returning to idle speeds, the “Decel Open IAC” steps will need to be removed in a manner that nearly matches the “Decel RPM Decay” of the Target RPM. This value is the fraction of a step that is decayed per 100 milliseconds (10 times per second).

CRANK IAC = Cranking needs extra air to help the engine spin to a higher RPM and to generate very full cylinders for maximum power to fire up the engine against the cold oil. However, at warm engines, the thin oil and easy combustion doesn’t need as much air to achieve a successful start, and too much will cause a very large flare of the RPMs just after starting.

FAN SETTINGS: The Electric cooling fans can be controlled separately. Just a reminder – the system only controls a RELAY. DO NOT CONNECT DIRECTLY TO THE FAN – THE ECU COULD BE DAMAGED, AND DEFINITELY THE FAN WILL NOT WORK. The ECU provides a grounding signal for the control solenoid of the relay, which energizes the relay and allows the battery to supply voltage to the cooling fan.

Fan 1(2) ON Temp = Above this temperature, the electric cooling fan will be turned on.

Fan 1(2) OFF Temp = Below this temperature, the electric cooling fan will be turned off. Make sure to set this temperature below the Fan ON Temp.

Option Fan1(2) Enable = If you are not using an electric cooling fan that is controlled by the FiTech ECU, set this to Disabled. If you are controlling the electric cooling fan with the system, set it to Enabled. Leaving the fan in enabled mode, but without connecting a fan relay will result in a Fan Fault Code, and also some minor RPM fluctuations at idle when the ECU attempts to turn on the cooling fan.

FUEL PUMP CONTROL: The FiTech ECU for Go EFI systems has a special driver circuit that will drive the fuel pump directly, which means that an external relay is not needed. This driver circuit allows both

Handheld Controller Feature Definitions

PWM control (pulse width modulated), and direct internal relay drive of the fuel pump. This allows the voltage to be reduced when the fuel demand is low, such as at idle and light cruise.

Pump Prime time = At Key On, the pump is turned on for this much time, which allows the throttle body to be purged of air pockets, and for the pressure to be built up to the normal operating pressure.

TPS for PUMP ON = If the throttle is opened above this position, the internal relay is turned on to supply full power to the fuel pump.

RPM for PUMP ON = If the RPM is above this speed, the internal relay is turned on to supply full power to the fuel pump.

PWM Low Flow = When the fuel flowrate is low, and all of the other conditions for allowing PWM control to be met, this is the percentage of duty cycle that is used. Set this such that fuel pressure doesn't drop below the rated fuel pressure of the system.

LEARN DATA: The ECU has several functions that "Learn" what the required settings are based on sensor signals. The fuel learns how much correction is needed to achieve the target AFR, at steady state.

Cal No-Save 196 = Sometimes, the changes made to the calibration DON'T want to be saved – to prevent saving at Key Off, set this value to 196.

TPS Zero Count = This is FYI only – it's not 'adjustable' in the calibration. It shows the learned value of the TPS when it's fully closed.

Fault Clear 1 = Set this to 1 in order to clear any recorded faults. This can be used if a repair has been made, or perhaps if a false fault has been detected, or fault diagnostics are being done to solve a problem.

Reset All Learn = Set this to 1 to return all learned values to the default values. This clears the fuel learning, idle air learning, and closed throttle position learned value.

Reset Fuel Learn = Set this to 1 to clear the fuel learning.

Reset IAC Learn = Set this to 1 to clear the IAC learning.

FiTech® Fuel Injection

Handheld Controller Feature Definitions

Reset TPS Learn = Set this to 1 to clear the TPS closed position learning.

OPTION Coil Drive: These are the primary things to adjust to set up the ignition control system.

Distrib Base deg = Adjust this so that the displayed timing matches the actual timing seen on a timing light at low RPM, such as idle, or adjust the distributor so that the timing light matches the display. It's important to keep this about 10-25 degrees. At cranking, the spark will happen at this value. The system also cannot advance very many degrees above this value – approximately only 20 degrees advance above this value is available at high RPM.

Tach or 2Wire+Coil = If the RPM signal input is using a 2 wire distributor to control the ignition advance with the FiTech ECU, set this to "VRCoil". The system MUST BE TURNED OFF AFTER MAKING THIS CHANGE – special settings are set up at the software initialization, and it will not work without this complete power off to power on cycle. If just using the coil negative from a single fire distributor (non-CDI) or tachometer signal from a distributor or CDI box, set this to "Tach."

VR Advance 4000 = A VR signal, the filtering hardware, and cam chain stretch can lead to some amount of retarding at high RPM. This error can be corrected here, so that the timing light at low RPM matches the displayed value for spark advance, and the spark advance at high RPM, specifically at 4000 RPM matches the timing light.