

ProECU Tuning Manual Supplement: RaceROM Flex Fuel



VEHICLE TUNING TECHNOLOGY

ProECU Nissan/Infiniti VR30DDTT

v1.4

ProECU Tuning Manual Supplement: RaceROM Flex Fuel

- ProECU Nissan/Infiniti VR30DDTT
- ProECU Tuning Manual Supplement: RaceROM Flex Fuel
- Intro:
- Flex Fuel
- Typical Tuning Steps
 - Boost Limit Fuel Cut Blend
 - Boost Limit Fuel Cut Ethanol
 - FF Boost Target Blend
 - FF Cranking Multiplier
 - FF Cranking Multiplier Decay Rate
 - FF Cranking RPM Threshold
 - FF Ethanol Content Hold Engine Load
 - FF Ethanol Content Hold RPM
 - FF Ethanol Content Override Percent
 - FF Ignition Timing Addition Blend
 - FF Ignition Timing Max Addition
 - FF Knock Threshold Addition Blend
 - FF Knock Threshold Addition Max
 - FF Quantity Multiplier
 - FF Target AFR Addition Blend
 - FF Target AFR Addition Max
 - Flex Fuel Enable
 - Sensor Calibration
 - FF Sensor Default
 - FF Sensor Max
 - FF Sensor Min
 - FF Sensor Scaling
 - FF Sensor Smoothing
 - Flex Fuel Sensor Setup/Wiring
- Update Revision Log
 - v3.6?
 - Contact Us:

Intro:

EcuTek RaceROM is a package of special software features that can be installed into the ECU of the supported vehicles. You simply open your ECU ROM file using EcuTek software, apply the RaceROM Feature File (Patch) to it, adjust the RaceROM maps as necessary, and then program the ROM file into the vehicle. Please read the ProECU Tuning RaceROM Feature File Guide for info on how RaceROM works, how to install and uninstall RaceROM feature files, and further hints and tips. Please also see our website for various videos and webinars for further information.

Flex Fuel

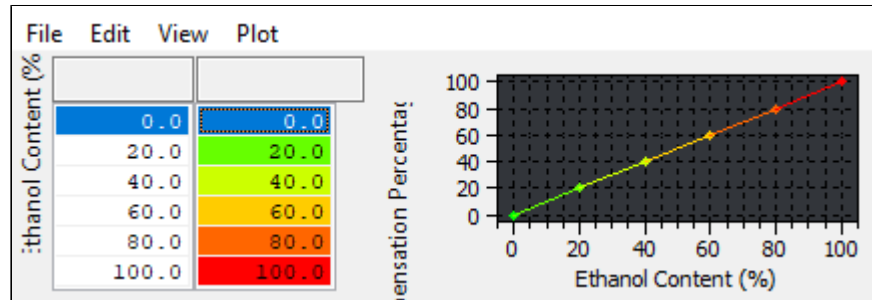
FlexFuel support was added as an integral part of the Phase 3 RaceROM upgrade. It uses a similar strategy to BRZ/GT86 and Nissan GT-R. This strategy utilizes ignition and AFR target modifier maps for 100% E85 as well as 2d maps to determine how much of that modification is applied. The difference in base fuel requirement is taken care by the FlexFuel Quantity Multiplier map and a 2d blend map. Typically, ~40% extra fuel will be required for 100% E85 to maintain the same Lambda (therefore the same reported petrol AFR), and the transition will be quite linear. The change in ignition advance will probably more readily be applied with most, if not all of the additional advance added by 50% E85. Currently the patch is supplied with typical values used in the FlexFuel Quantity Multiplier map so that any car with a FlexFuel sensor added should start and run reasonably well when E85 fuel is added. Remaining correction maps for ignition and AFR target are blank, and the FlexFuel Target Boost map has default values identical to those found in the Target Boost map.

Typical Tuning Steps

If the vehicle has already been tuned on E10, you can likely math out what your values should be on E0 and E100 knowing the increased fueling demands and knock resistance of ethanol. Being relatively conservative with the fueling and ignition timing changes at first is typically the safe course. After you've confirmed the car runs safely on E10 with the changes you made, increasing the ethanol content up to ~50% and then verifying it's operation again prior to adjusting fueling/ignition timing.

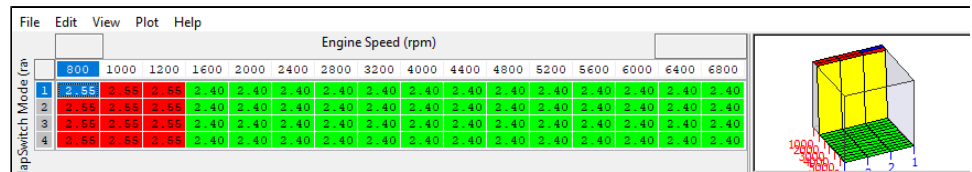
Boost Limit Fuel Cut Blend

Percentage modifier to the boost limit where fuel cut will occur based on the ethanol content.



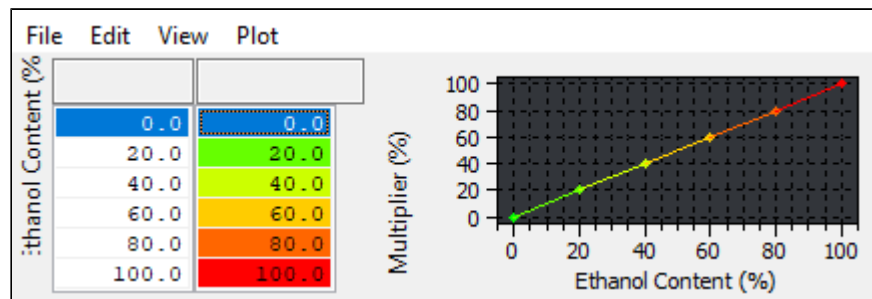
Boost Limit Fuel Cut Ethanol

Boost limit in Bar. This parameter is modified by the value in the **Boost Limit Fuel Cut Blend** set by map slot. Set this value in order to run a different boost limit when running flex fuel.



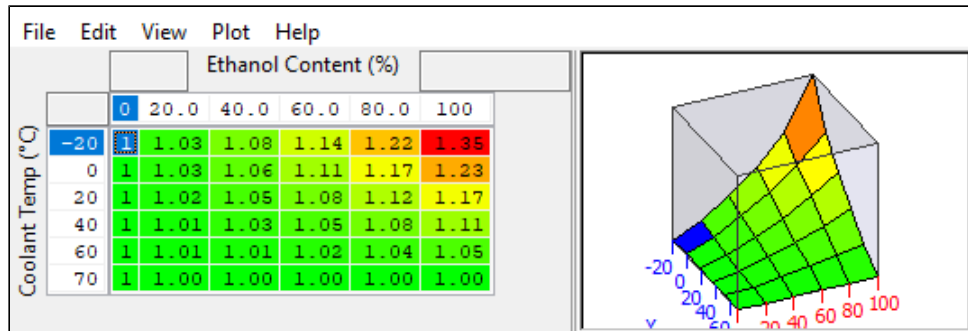
FF Boost Target Blend

Percentage modifier to the boost target based on the ethanol content. Typically set so that a higher percentage of the boost target is used as the ethanol content increases.



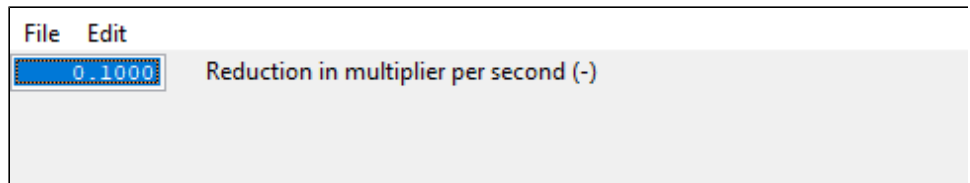
FF Cranking Multiplier

The fuel quantity at cranking will be affected by the **Flex Fuel Cranking Quantity Multiplier** map. Due to the characteristics of the fuel, it may be required to change the fueling further at low temperatures when cranking. This map is 0-2 scalar and will multiply the base fueling only during cranking based on coolant temperature, it is not unusual to need additional E85 when cold due to some unburnt fuel going through the engine.



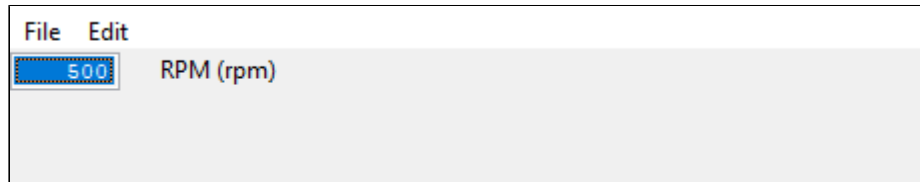
FF Cranking Multiplier Decay Rate

This decay rate applies a gradual reduction to the **FF Cranking Multiplier** value amount per second. As such it reduces the **FF Cranking Multiplier** by a set amount every second starting from the beginning of the start cycle.



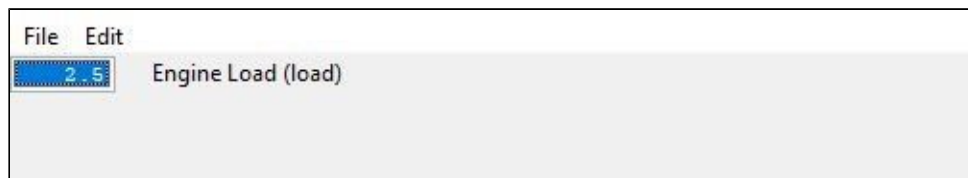
FF Cranking RPM Threshold

Once your engine has exceeded this RPM level, the additional fuel added during cranking by the **FF Cranking Multiplier** will start decaying as designated by the **FF Cranking Multiplier Decay Rate**.



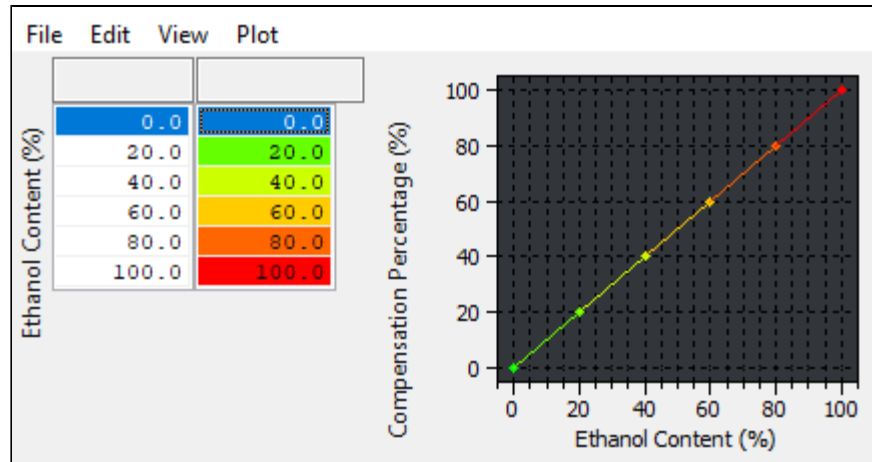
FF Ethanol Content Hold Engine Load

Particularly with direct-injected vehicles it's not unusual to a slight fluctuation in your sensor readings due to aeration of the fuel. To minimize the impact of this on your vehicle's operation, the ethanol content employed by the flex fuel strategy can be temporarily locked when your vehicle is operating under high load conditions. This map sets a load limit. When this limit as well as the engine RPM level in the **FF Ethanol Content Hold RPM** map is exceeded, the flex fuel ethanol content will be fixed until one of the two thresholds are no longer met.



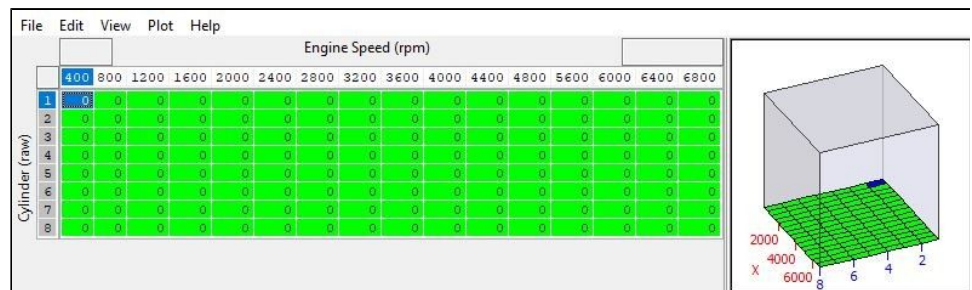
FF Knock Threshold Addition Blend

A percentage adjustment value for the **FF Knock Threshold Addition Max** before adding it to final values.



FF Knock Threshold Addition Max

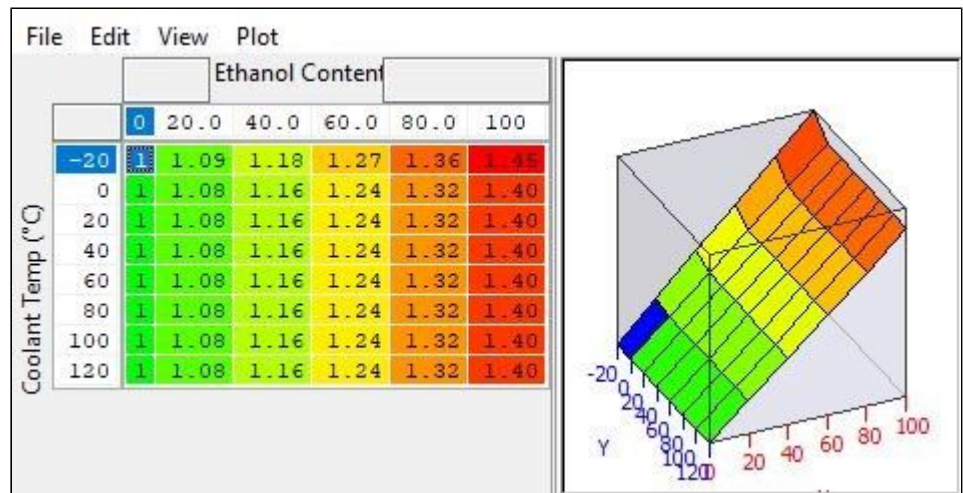
Adjustment table for the knock threshold when running flex fuel. Modified based on the **FF Knock Threshold Addition Blend** percentage.



FF Quantity Multiplier

This dictates the additional fuel based on ethanol content (0-100%) and coolant temperature. It would not be unusual to need to add additional E85 when cold due to some unburnt fuel going through the engine. Pure Ethanol typically requires 40% more fuel to maintain the same lambda (or apparent AFR) as gasoline. There are no significant changes to injector flowrates when using E85.

If you want to run a richer or leaner AFR when using E85 do not try and compensate with this map as the ECU will use fuel corrections to hit the same target AFR target, instead use **FF Target AFR Addition Max**.

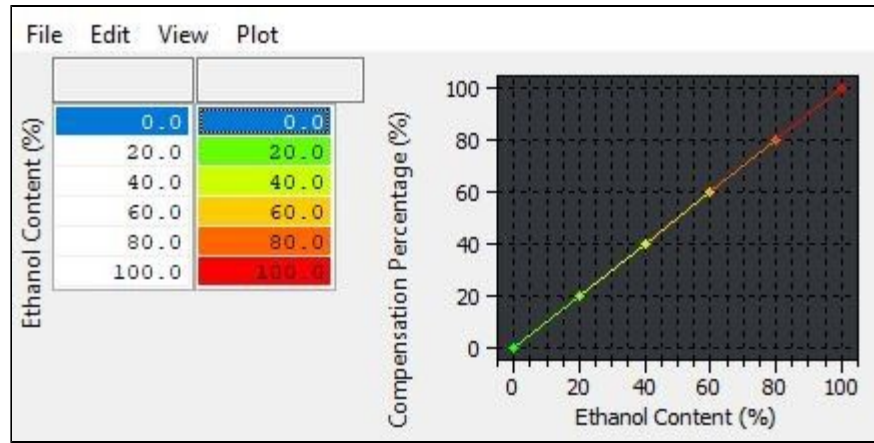


FF Target AFR Addition Blend

This map dictates how much of the AFR change is used for a given Ethanol content. The resulting AFR Target is defined as:

$$\text{Final AFR Target} = \text{Target} + (\text{FF})$$

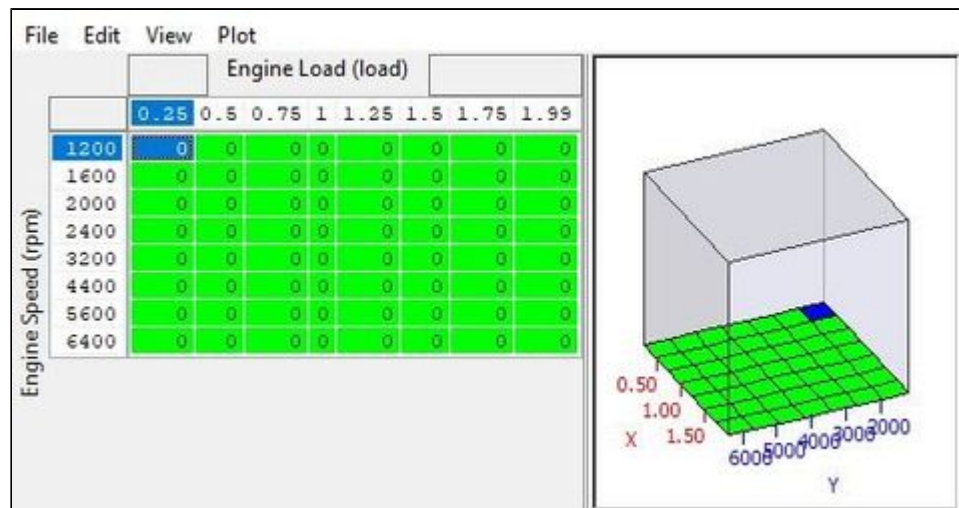
Target AFR Blend x FF Target AFR Addition Max)



FF Target AFR Addition Max

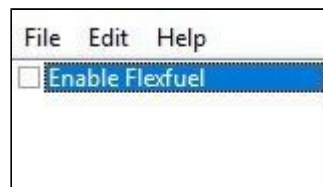
This map utilizes units of AFR as the units. Use of a positive number will add to the preceding target AFR resulting in a leaner final AFR. Left blank by default, the pictured table uses +.5 at high load in order to lean out the AFR from (for example) 11:1 at very high load on pump fuel to a cleaner and crisper 11.5:1. However if the base map is made already using a good fuel or even a race fuel that would typically run closer to 12.2:1 then it would be entirely possible to want to lower the target AFR when using high levels of E85.

The final AFR target is the result of this map weighted by the result of **FF Target AFR Addition Blend**



Flex Fuel Enable

Simple toggle to enable the flex fuel system



Sensor Calibration

FlexFuel Ethanol Content		
<input type="checkbox"/>	FF Sensor Default	Beginner RaceROM
<input type="checkbox"/>	FF Sensor Max	Beginner RaceROM
<input type="checkbox"/>	FF Sensor Min	Beginner RaceROM
<input type="checkbox"/>	FF Sensor Scaling	Advanced RaceROM
<input type="checkbox"/>	FF Sensor Smoothing	Beginner RaceROM

FF Sensor Default

In the event of a sensor or wiring

failure, the ethanol content value specified in this table will be used.



FF Sensor Max

The maximum voltage output of the ethanol content sensor. Set this to the value specified by your ethanol kit's manufacturer.



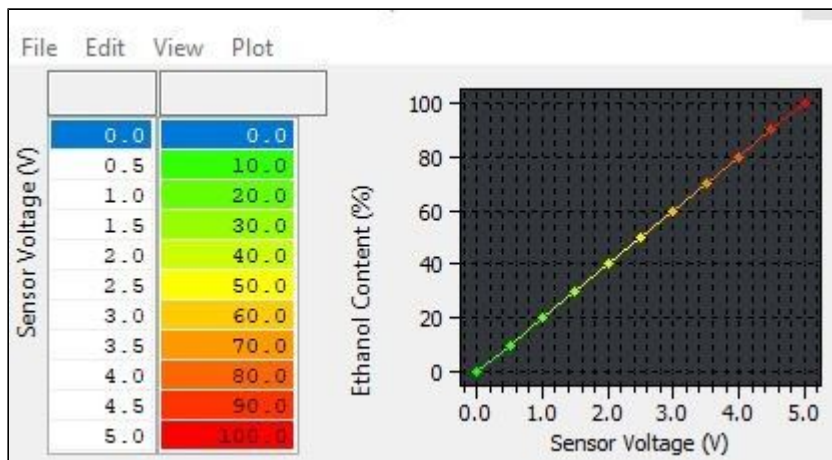
FF Sensor Min

The Minimum voltage output of the ethanol content sensor. Set this to the value specified by your ethanol kit's manufacturer.



FF Sensor Scaling

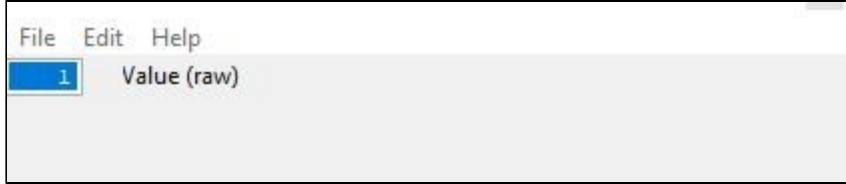
The scaling specified by your ethanol kit's manufacturer for voltage for a given ethanol content percentage.



FF Sensor Smoothing

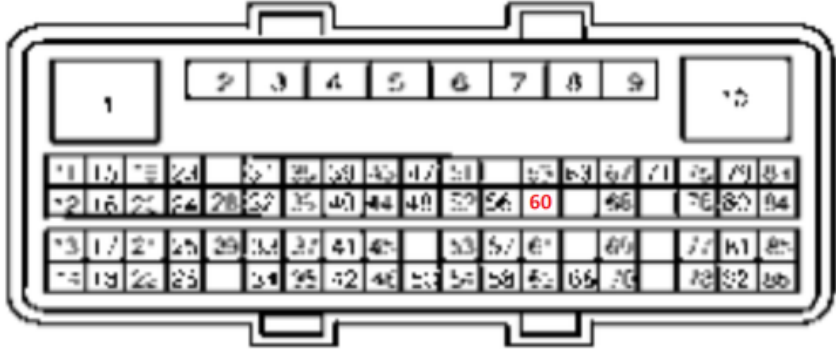
A smoothing value to be applied to the output of the ethanol sensor to

reduce the impact of the minor fluctuation in content seen by most ethanol sensors.



Flex Fuel Sensor Setup/Wiring

Unlike other platforms, we were able to find an unused ECU channel into which we were able to input a signal from an ethanol content sensor. To do so you'll need to pin it into the ECU. While the placement of the wiring and ethanol sensor may vary based on the manufacturer of the kit, it will need to be input through the same point in order to work properly with our software.



You'll want to add the 0-5v signal outputted from your sensor or gauge to pin 60 of connector F143 on the ECU.

EcuTek ProECU tuning tools should only be used by experienced tuners who understand the product and engine calibration. If you do not fully understand this product then you WILL damage your engine, ECU or your vehicle. Please ensure you fully read all EcuTek manuals BEFORE attempting to use ProECU with your laptop or your vehicle. Use with extreme caution and understanding at all times, if in doubt then do not proceed. EcuTek accepts no responsibility for any damage to the engine, ECU or any part of the vehicle that results directly or indirectly from using the product.

**** If you are in any doubt that you do NOT have the experienced required to use this product then you should NOT USE IT ****

Retail customers

**** If you have any doubt that you do NOT have the experienced required to use this product then you should NOT USE IT, you should simply contact your EcuTek Master Tuner shown clearly on the top of your Programming Kit or visit your preferred tuning shop to have a professional tuner to use it for you ****

Update Revision Log

v3.6?

- Added RaceROM Flex Fuel
- RaceROM Map Switching via cruise control buttons (before only possible via EcuConnect App)
- Valet Mode Enable/Disable via cruise control buttons (before only possible via EcuConnect App)
- Separately Scalable Manifold Pressure Sensor Scaling (Previously scaling was shared with the pre-throttle boost sensors)
- Quality of life improvements
 - Fans switched off during programming
 - No more delay for reading EEPROM data i.e. saved map switch mode.

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Open Hours

Monday to Friday 9:00am - 5:00pm BST (British Summer Time)

(4am-1230pm Eastern Standard Time US)

Visitors by appointment only

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