Speeduino Compatible Motronic 1.3 ECU

User Guide

For more detailed information, troubleshooting, and advanced tuning options, consult the Speeduino documentation (wiki.speeduino.com) and user community (speeduino.com/forum/).
Note: This guide is intended for informational purposes only. Always consult the Speeduino documentation and seek professional assistance if you encounter difficulties during installation or tuning. EFI Customs does not take any responsibility for any damage that can occur to electronics, wiring or engines. By using our ECU you accept the risks associated with incorrect configuration and user error.

Disclaimer

By purchasing and using the Speeduino Compatible Motronic 1.3 ECU ("the Product") from EFI Customs, the buyer/user ("You") agrees to and understands the following:

1. **Proper Use and Installation**: The Product is designed for specific purposes and must be installed, configured, and used according to the manufacturer's guidelines and instructions. You are solely responsible for ensuring that the Product is correctly installed and configured.
2. **No Liability for Misconfiguration or Damage**: EFI Customs assumes no responsibility or liability for any damages, malfunctions, or performance issues related to the Product which are a result of misconfiguration, improper installation, misuse, or any alterations made to the Product by the user or a third party.
3. **Vehicle and Property Damage**: EFI Customs is not responsible for any damage caused to vehicles, engines, or any other property as a result of using the Product. It is your responsibility to monitor the performance of your vehicle or property and ensure that the Product is functioning as intended.
4. **Warranty Limitations**: This disclaimer does not affect any manufacturer warranties that may come with the Product. However, EFI Customs' liability is strictly limited to the repair, replacement or refund of the Product, subject to applicable laws and any terms and conditions of sale.
5. **User Responsibility**: It is your responsibility to frequently check for updates, notices, and instructions related to the Product. Ignorance or unawareness of any guidelines, updates, or advisories does not exempt you from the responsibilities set out in this disclaimer.

By continuing with the purchase and/or use of the Product, you acknowledge that you have read, understood, and agreed to the terms outlined in this disclaimer.

For more detailed information, troubleshooting, and advanced tuning options, consult the Speeduino documentation (wiki.speeduino.com) and user community (speeduino.com/forum/).
Note: This guide is intended for informational purposes only. Always consult the Speeduino documentation and seek professional assistance if you encounter difficulties during installation or tuning. EFI Customs does not take any responsibility for any damage that can occur to electronics, wiring or engines. By using our ECU you accept the risks associated with incorrect configuration and user error.

Welcome to the world of enhanced engine control with your Speeduino compatible ECU! This user guide will help you get your ECU up and running smoothly with your BMW Motronic 1.1/1.3 wiring harness. Please follow these steps carefully to ensure a successful installation.

Before connecting the ECU to your vehicle

While the ECU you have purchased is designed to be as easy-to-install as possible, the Motronic wiring harness is quite outdated and the ECU has been built with upgradeability in mind. There are a few pins on the ECU that are used for new functionality, and a few things that are recommended to be done first.

For more details, please check out our GitHub documentation by following this QR code:

Cylinder ID Sensor

If your engine has a cylinder ID sensor - Pins 8 and 31 on the engine harness ECU connector socket, and its plug is usually positioned right next to the Crank Position Sensor plug in the engine bay - disconnect it. The ECU has repurposed this connector for a potential Camshaft Position Sensor which unlocks sequential injection/ignition (4 cylinder engine only), this is covered in External Connectors on page 6.

AFM

If you are intending to **not remove** the AFM from your engine please disconnect the AFM Plug and either de-pin the two middle pins on the AFM Plug and re-connect or run two new wires from pins 1 & 4 from the plug to the AFM.

For more detailed information, troubleshooting, and advanced tuning options, consult the Speeduino documentation (wiki.speeduino.com) and user community (speeduino.com/forum/).
Note: This guide is intended for informational purposes only. Always consult the Speeduino documentation and seek professional assistance if you encounter difficulties during installation or tuning. EFI Customs does not take any responsibility for any damage that can occur to electronics, wiring or engines. By using our ECU you accept the risks associated with incorrect configuration and user error.

The ECU has repurposed the two middle AFM Plug pins to run an External MAP sensor. Please refer to ECU Connector Pinout on page 8 - these two pins correlate to Pins 7 and 12 on the ECU connector.

In most cases, removing the AFM is the best option as it removes an airflow restriction. In place of the internal AFM temperature sensor, it's suggested to use something like the GM Open Element IAT sensor (part number 25036751) and connect its pins/wires to pins 1 & 4 of your existing AFM Plug. This is purely a recommendation and you can run any two-wire air temperature sensor that has published calibration tables.

TPS

The original TPS on a Motronic 1.3 harness is actually a 3 position switch and cannot be repurposed for a variable position sensor.
It is recommended to use an M50 TPS (Part number: 13 63 1 721 456).
Using a TPS enables you to utilise features such as Flood Clearing, Conditional map switching, Launch Control and Flat shifting, Alpha-N tuning as well as many others.
To complete the wiring portion of the M50 TPS conversion, you will need to swap pins 1 (Brown/Blue) & 2 (Brown) on the TPS Plug. This can be done by pulling the rubber boot back on the TPS Plug to expose the wires. You can either use a de-pinning tool to switch them or cut and crimp them.
There are 3 wires in total and their purpose is as follows on the factory ECU:

Pin	**Wire Colour**	**Purpose**
1	Brown/Blue	Closed Throttle
2	Brown	Ground
3	Brown/Black	Wide Open Throttle

The Speeduino Motronic 1.3 ECU is expecting the following pinout:

Pin	**Wire Colour**	**Purpose**
1	Brown	Ground
2	Brown/Blue	Signal (Previously Closed Throttle)
3	Brown/Black	5v ref (the ECU already caters for this so no modification is required)

For more detailed information, troubleshooting, and advanced tuning options, consult the Speeduino documentation (wiki.speeduino.com) and user community (speeduino.com/forum/).
Note: This guide is intended for informational purposes only. Always consult the Speeduino documentation and seek professional assistance if you encounter difficulties during installation or tuning. EFI Customs does not take any responsibility for any damage that can occur to electronics, wiring or engines. By using our ECU you accept the risks associated with incorrect configuration and user error.

Injectors

In all Motronic 1.3 engines, the injectors are configured in a batched manner. Speeduino firmware does not support batched injection so if you don't wish to modify your wiring, configure your Injector Staging in the Engine Constants setting in TunerStudio to be simultaneous and 1-3 squirts per engine cycle.You may need to play around with the squirts per cycle value depending on the observed behaviour of the engine after adjusting the fuel table. This will roughly mimic the stock ECU behaviour but you may find it more difficult to tune your fuel map. This is because the injector firing is based on the TDC of cylinder 1. Due to this the first cylinder receives best fuel timing and the rest will occur at various stages which will impact fuel consumption/efficiency. Quite often you will find that the vehicle will run rich.

The M40 motor requires swapping wiring of injectors 3 and 4 for paired injection to function correctly. The factory ECU pairs odd and even cylinders in separate channels but we want to configure our injectors to be opposing each other to match the firing order (**1**,*3*,**4**,*2*).
If you are upgrading to semi/sequential the ECU can accommodate individual injector control by utilising the external connector (camshaft sensor is required for full sequential).

On 6 cylinder motors, the injection is batched in two channels. Our recommendation is to convert your injector wiring to be three pairs of two injectors (usually 1&6, 2&5, 3&4 but do your own research on your preferred approach). This configuration is covered in our GitHub documentation which you can access via the QR code on the third page of this guide.

Ignition

The Speeduino ECU supports distributor ignition which requires no wiring modification. In the Engine Constants section of TunerStudio you simply need to define how many cylinders you have. If you are retaining your distributor ignition system, you will have to set your trigger angle to 50 degrees After Top Dead Center on 6 cylinder models.

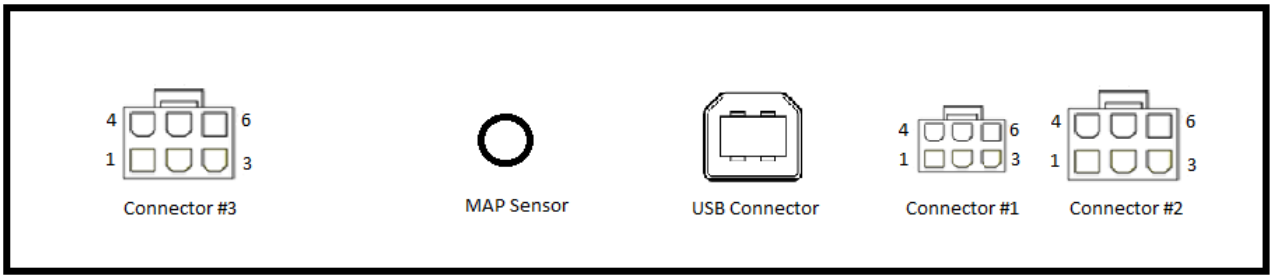
Though it is recommended to verify your trigger angle with a timing light.

For wasted spark configuration and wiring, check the GitHub documentation which you can access via the QR code on the third page of this guide.

For more detailed information, troubleshooting, and advanced tuning options, consult the Speeduino documentation (wiki.speeduino.com) and user community (speeduino.com/forum/).
Note: This guide is intended for informational purposes only. Always consult the Speeduino documentation and seek professional assistance if you encounter difficulties during installation or tuning. EFI Customs does not take any responsibility for any damage that can occur to electronics, wiring or engines. By using our ECU you accept the risks associated with incorrect configuration and user error.

External Connectors

Your ECU has a total of 5 connectors located on the sides and back side.



Please note: The connectors may have physical numbering on the plastic, please disregard this numbering and refer to the numbering of the above diagram and below table.

Connector #1

Pin	Purpose
1	Clutch Input
2	Wideband Input
3	Spare output 3
4	Flex fuel Input
5	Spare output 4
6	Spare output 2

Connector #2

Pin	Purpose
1	Injector 3 Output
2	Injector 2 Output
3	Injector 1 Output
4	Fan Output
5	Boost Output
6	Injector 4 Output

Connector #3

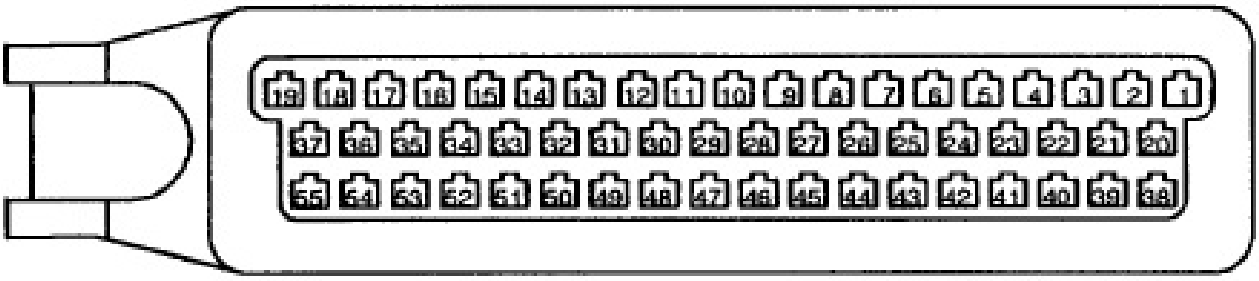
Pin	Purpose
1	Ignition 3.2/4 Output
2	Ignition 2.1 Output
3	Ignition 1.1 Output
4	Ignition 3.1 Output
5	Ignition 2.2 Output
6	Ignition 1.2 Output

For more detailed information, troubleshooting, and advanced tuning options, consult the Speeduino documentation (wiki.speeduino.com) and user community (speeduino.com/forum/).
Note: This guide is intended for informational purposes only. Always consult the Speeduino documentation and seek professional assistance if you encounter difficulties during installation or tuning. EFI Customs does not take any responsibility for any damage that can occur to electronics, wiring or engines. By using our ECU you accept the risks associated with incorrect configuration and user error.

Engine Cylinder Count	Ignition Type	Outputs
4	Single Channel	55 pin ECU connector pin 1
4	Wasted Spark	Channel 1 (cyl 1,4) -> 1.1 Channel 2 (cyl 2,3)-> 2.1
4	Wasted COP/Semi Seq	Cylinder 1 -> 1.1 Cylinder 2 -> 2.1 Cylinder 3 -> 2.2 Cylinder 4 -> 1.2
4	Sequential (needs cam input) Solder Joint 5 (SJ5) needs pins 1 and 2 bridged	Cylinder 1 -> 1.1 Cylinder 2 -> 3.1 Cylinder 3 -> 3.2/4 Cylinder 4 -> 2.1
6	Single Channel	55 pin ECU connector pin 1
6	Wasted Spark	Channel 1 (cyl 1,6) -> 1.1 Channel 2 (cyl 2,5) -> 2.1 Channel 3 (cyl 4,3) -> 3.1
6	Wasted COP Solder Joint 5 (SJ5) needs pins 2 and 3 bridged	Cylinder 1 -> 1.1 Cylinder 2 -> 2.1 Cylinder 3 -> 3.1 Cylinder 4 -> 3.2 Cylinder 5 -> 2.2 Cylinder 6 -> 1.2

For more detailed information, troubleshooting, and advanced tuning options, consult the Speeduino documentation (wiki.speeduino.com) and user community (speeduino.com/forum/).
Note: This guide is intended for informational purposes only. Always consult the Speeduino documentation and seek professional assistance if you encounter difficulties during installation or tuning. EFI Customs does not take any responsibility for any damage that can occur to electronics, wiring or engines. By using our ECU you accept the risks associated with incorrect configuration and user error.

ECU Connector Pinout



Pin	Purpose	Pin	Purpose
1	Ignition Coil Output (Channel 1 - 1.1)	**18**	Battery +12V
2	Ground	**19**	Ground
3	Fuel Pump Relay Control	**20**	N/A
4	Idle Out	**21**	N/A
5	N/A	**22**	Idle Out
6	Tachometer Output	**23**	N/A
7	External Map Signal In	**24**	Ground
8	Cam Hall Sensor Signal In	**25**	N/A
9	N/A	**26**	Ground
10	N/A	**27**	Ignition signal from key
11	N/A	**28**	N/A
12	+5V Rail	**29**	Vehicle Speed Input from cluster->JP1
13	N/A	**30**	N/A
14	Ground	**31**	Cam Hall Sensor Power
15	Check Engine Light	**32**	N/A
16	Injector Channel 1 Out (Factory Cyl 1,3,5)	**33**	N/A
17	Injector Channel 2 Out (Factory Cyl 2,4,6)	**34**	N/A

For more detailed information, troubleshooting, and advanced tuning options, consult the Speeduino documentation (wiki.speeduino.com) and user community (speeduino.com/forum/).

Note: This guide is intended for informational purposes only. Always consult the Speeduino documentation and seek professional assistance if you encounter difficulties during installation or tuning. EFI Customs does not take any responsibility for any damage that can occur to electronics, wiring or engines. By using our ECU you accept the risks associated with incorrect configuration and user error.

35	N/A	**46**	N/A
36	DME Relay Output	**47**	Crank In +
37	12V In	**48**	Crank In -
38	N/A	**49**	N/A
39	N/A	**50**	N/A
40	N/A	**51**	N/A
41	AC In Idle Up Signal	**52**	+5V
42	N/A	**53**	TPS Signal
43	N/A	**54**	N/A
44	Intake Air Temperature In	**55**	N/A
45	Coolant Temperature In		

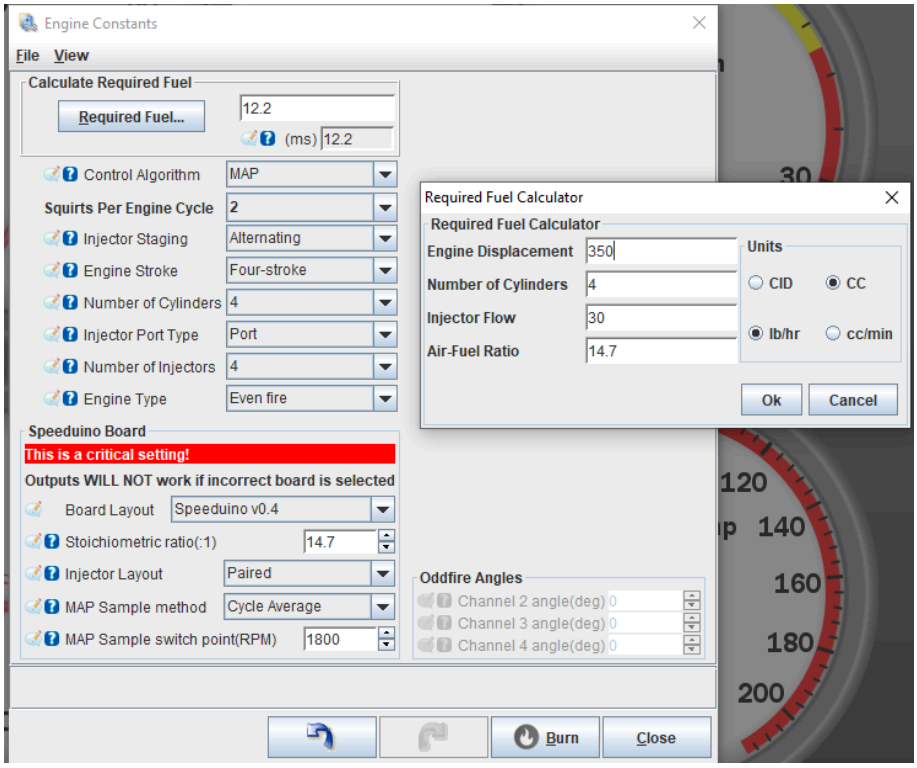
For more detailed information, troubleshooting, and advanced tuning options, consult the Speeduino documentation (wiki.speeduino.com) and user community (speeduino.com/forum/).
Note: This guide is intended for informational purposes only. Always consult the Speeduino documentation and seek professional assistance if you encounter difficulties during installation or tuning. EFI Customs does not take any responsibility for any damage that can occur to electronics, wiring or engines. By using our ECU you accept the risks associated with incorrect configuration and user error.

ECU Setup

The ECU you have received has a standard Speeduino base tune applied to it so that all the values are within a normal range. This is usually enough of a starting point, but we also have M20 base tunes available by using the QR code on page 3.
Please note that a base tune is not designed to immediately fire up your engine and drive. These are merely used for accelerating your configuration and **you should do your due diligence to double check all values before attempting to start your car.**
While you've got the ECU disconnected from a car, use this opportunity to configure all of your settings beforehand.

Engine Constants

Before starting the engine for the first time, you need to configure your Engine Constants.
Click on **Settings** -> **Engine Constants**



Before performing the **Required Fuel** calculation, please populate/update everything else first.

From here you can configure what **Load Control Algorithm** you want to use. This is where you can change it from the standard MAP to TPS for Alpha-N or Intake MAP/Exhaust MAP. The first two are the most common control algorithms.

For more detailed information, troubleshooting, and advanced tuning options, consult the Speeduino documentation (wiki.speeduino.com) and user community (speeduino.com/forum/).
Note: This guide is intended for informational purposes only. Always consult the Speeduino documentation and seek professional assistance if you encounter difficulties during installation or tuning. EFI Customs does not take any responsibility for any damage that can occur to electronics, wiring or engines. By using our ECU you accept the risks associated with incorrect configuration and user error.

Injector Staging will determine how to trigger injector signals. If you have set it to **Simultaneous** then the injector layout section below will be ignored.

Number of cylinders and **number of injectors** will determine how many signals to fire per single engine rotation so ensure this is set correctly to prevent potential engine damage.

The remainder of the settings are self explanatory and have helpful tooltips (click on the question mark icon for more information).

The **Speeduino Board** setting is very critical. In the case of the Motronic 1.3 ECU you have purchased, the board layout should be set to **Speeduino v0.4**.

Stoichiometric ratio should match what you've configured in the **Required Fuel** section.

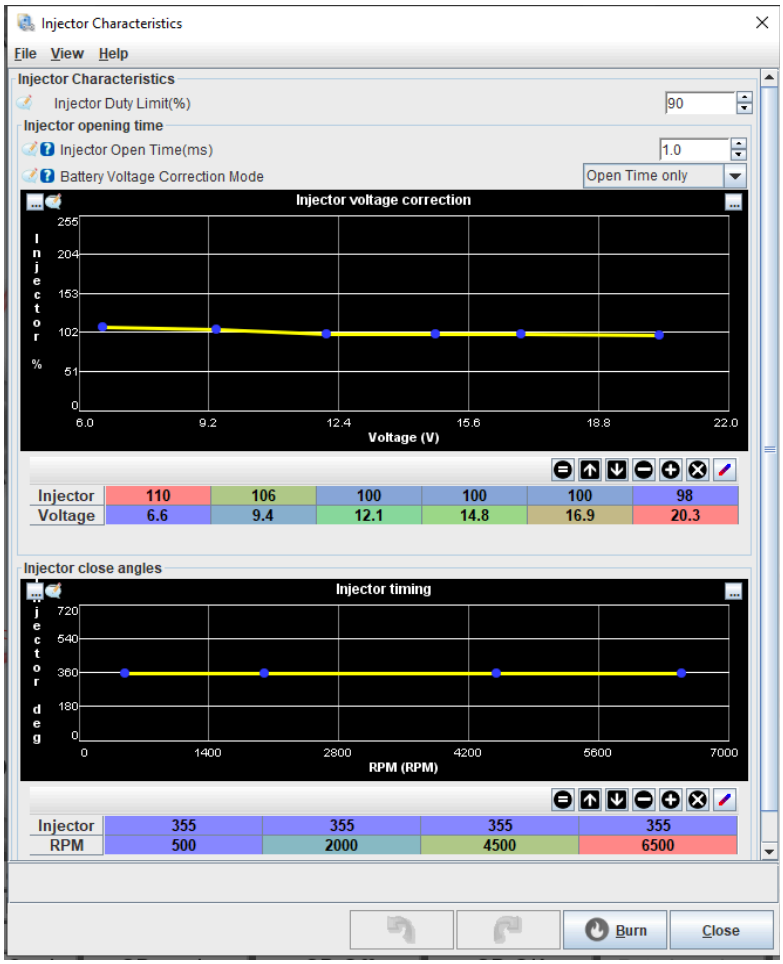
Injector layout as we've mentioned previously will stay in paired mode unless you have specifically wired up your vehicle for semi/sequential injection.
It should be noted that semi-sequential injector layout requires each individual injector wired into the ECU but the firmware will run them in a paired manner.

MAP Sample method can be set to **Cycle Average** for most vehicles. Vehicles with ITB's commonly use **Cycle Minimum** if utilising a mixed TPS/MAP fuel map.
MAP Sample switch point can stay at the default 1800 RPM value. This setting will get instantaneous values from the MAP sensor which tends to help getting a smoother idle.

Lastly, select **Required Fuel** which will open a pop-up as shown above. In this pop-up you can populate the specific details about your engine displacement, cylinder count, injector flow etc. Populate your relevant details and click **Ok**. This will recalculate your required fuel and you should see the (ms) number change.

For more detailed information, troubleshooting, and advanced tuning options, consult the Speeduino documentation (wiki.speeduino.com) and user community (speeduino.com/forum/).
Note: This guide is intended for informational purposes only. Always consult the Speeduino documentation and seek professional assistance if you encounter difficulties during installation or tuning. EFI Customs does not take any responsibility for any damage that can occur to electronics, wiring or engines. By using our ECU you accept the risks associated with incorrect configuration and user error.

Injector Characteristics



Injector Open Time is identical to terms such as dead time and latency. So enter the dead time of your injectors and provide the voltage correction.
To view the table cells, click on the three-dot icon on the top right of each respective graph.

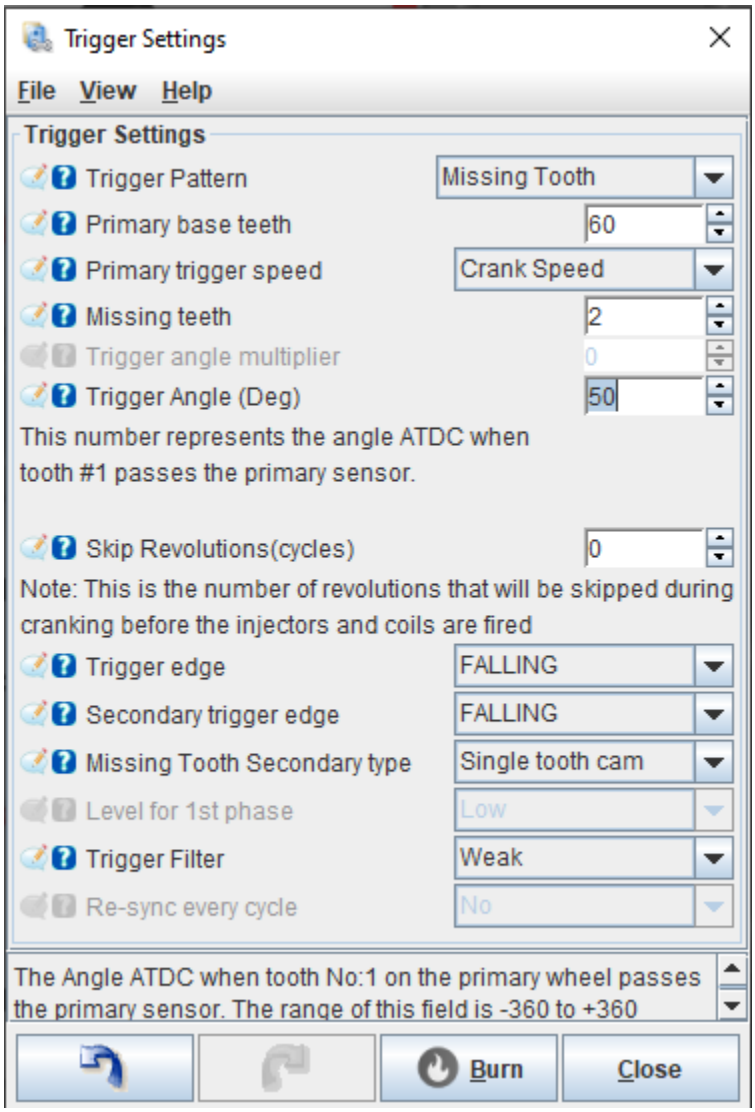
Unless you know the dead times of your injectors, for stock M1.3 injectors you can provide a value of 1.0ms and a voltage correction table of:

Injector %	255	201	133	91	60	37
Voltage	7.0	8.0	10.0	12.0	14.0	16.0

The above table shows values that offer a starting point for most setups.

For more detailed information, troubleshooting, and advanced tuning options, consult the Speeduino documentation (wiki.speeduino.com) and user community (speeduino.com/forum/).
Note: This guide is intended for informational purposes only. Always consult the Speeduino documentation and seek professional assistance if you encounter difficulties during installation or tuning. EFI Customs does not take any responsibility for any damage that can occur to electronics, wiring or engines. By using our ECU you accept the risks associated with incorrect configuration and user error.

Trigger Setup



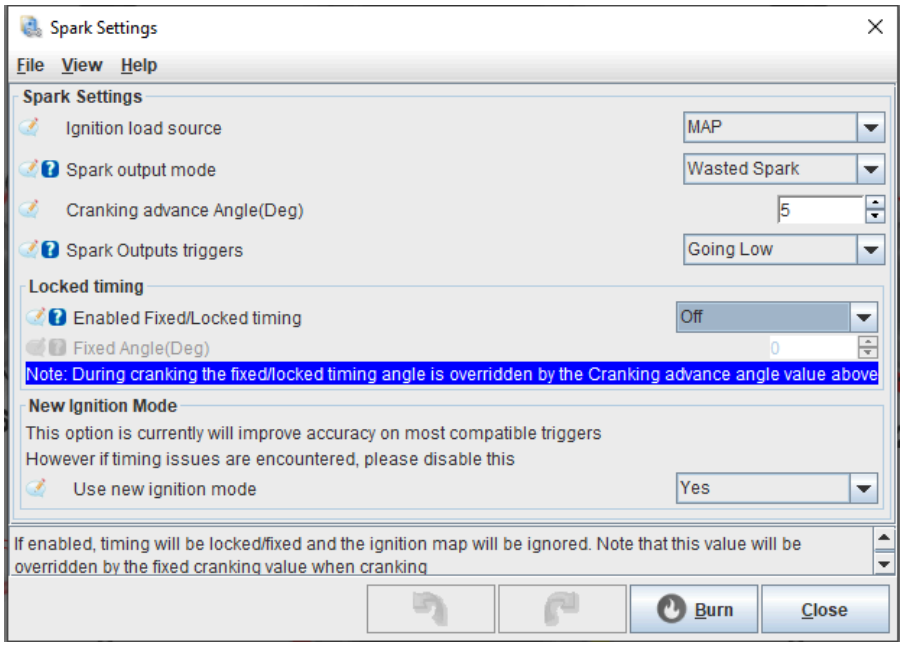
For Motronic 1.3 engines your:
Trigger Pattern should be **Missing Tooth**,
Primary base teeth set to **60** and **Missing teeth** set to **2**.
Primary trigger speed is set to **Crank Speed**.
Trigger Angle is covered in the section below.
Trigger Edge for most VR sensors is **FALLING**, this includes the factory VR sensors on Motronic 1.3 engines.
Secondary trigger edge, **Missing Tooth Secondary Type** are both there for the optional camshaft sensor.

For more detailed information, troubleshooting, and advanced tuning options, consult the Speeduino documentation (wiki.speeduino.com) and user community (speeduino.com/forum/).
Note: This guide is intended for informational purposes only. Always consult the Speeduino documentation and seek professional assistance if you encounter difficulties during installation or tuning. EFI Customs does not take any responsibility for any damage that can occur to electronics, wiring or engines. By using our ECU you accept the risks associated with incorrect configuration and user error.

Trigger Filter is used to reduce any potential interference that can arise either from a noisy wire, or an out of shape trigger wheel. With the licensed version of TunerStudio you can use the high speed logger to detect the Trigger Wheel signal and determine if filtering is required.

Trigger Angle

You can perform this step before or after commencing your conversion to the standalone ECU. Though this is easier to do with your new ECU.
In TunerStudio software click on the **Spark** tab -> **Spark Settings** and in the **Locked timing** section use the first dropdown to toggle locked timing and in the text box below it, set the degrees to **0**. Ensure that **Cranking advance Angle** is also set to **0**.



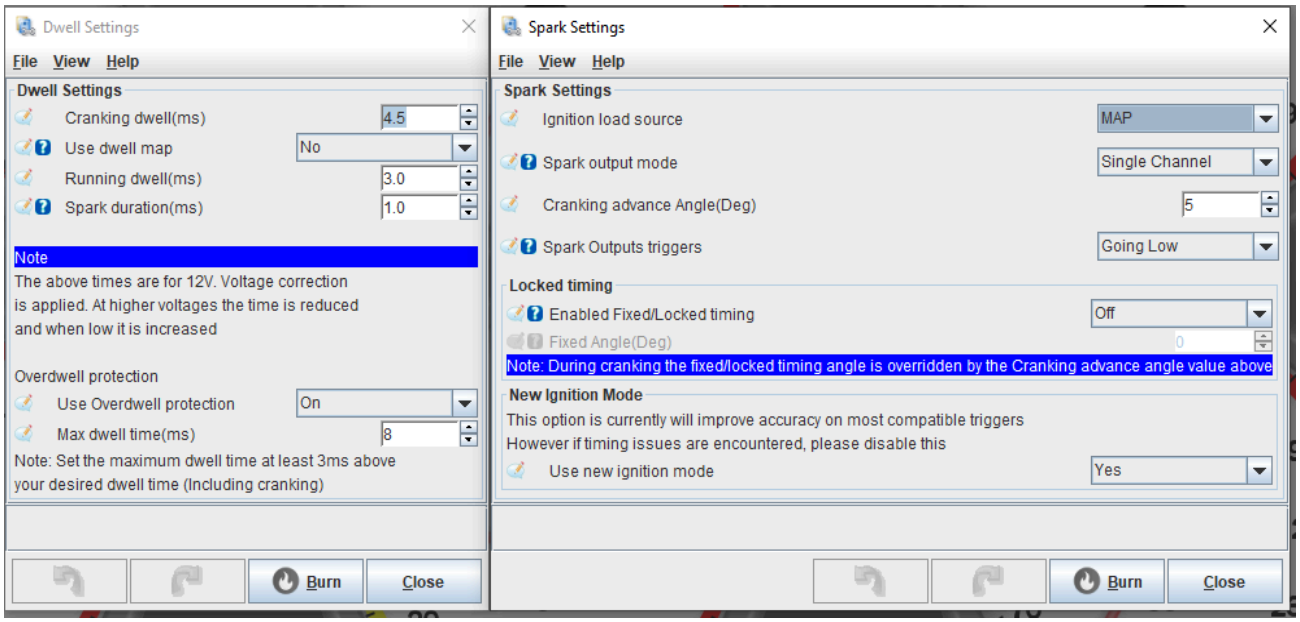
Next, remove your fuel relay and/or disconnect the injectors so we only trigger sparks, we don't want to accidentally damage anything due to wrong timing values.
Using a timing light, verify the trigger angle of your motor in degrees before top dead center.

Speeduino trigger angle is defined in degrees AFTER TOP DEAD CENTER, this is unlike other ECU's such as the Megasquirt that define in degrees BEFORE TOP DEAD CENTER.

Please ensure you're subtracting the measured trigger angle from 360 to get your ATDC value.
If using distributor ignition on a 6 cylinder engine the trigger angle on Speeduino is typically set to 50 ATDC, and on wasted spark this value can vary between 272-278 ATDC.
M40's are typically near 244 degrees ATDC.

For more detailed information, troubleshooting, and advanced tuning options, consult the Speeduino documentation (wiki.speeduino.com) and user community (speeduino.com/forum/).
Note: This guide is intended for informational purposes only. Always consult the Speeduino documentation and seek professional assistance if you encounter difficulties during installation or tuning. EFI Customs does not take any responsibility for any damage that can occur to electronics, wiring or engines. By using our ECU you accept the risks associated with incorrect configuration and user error.

Spark and Dwell Settings



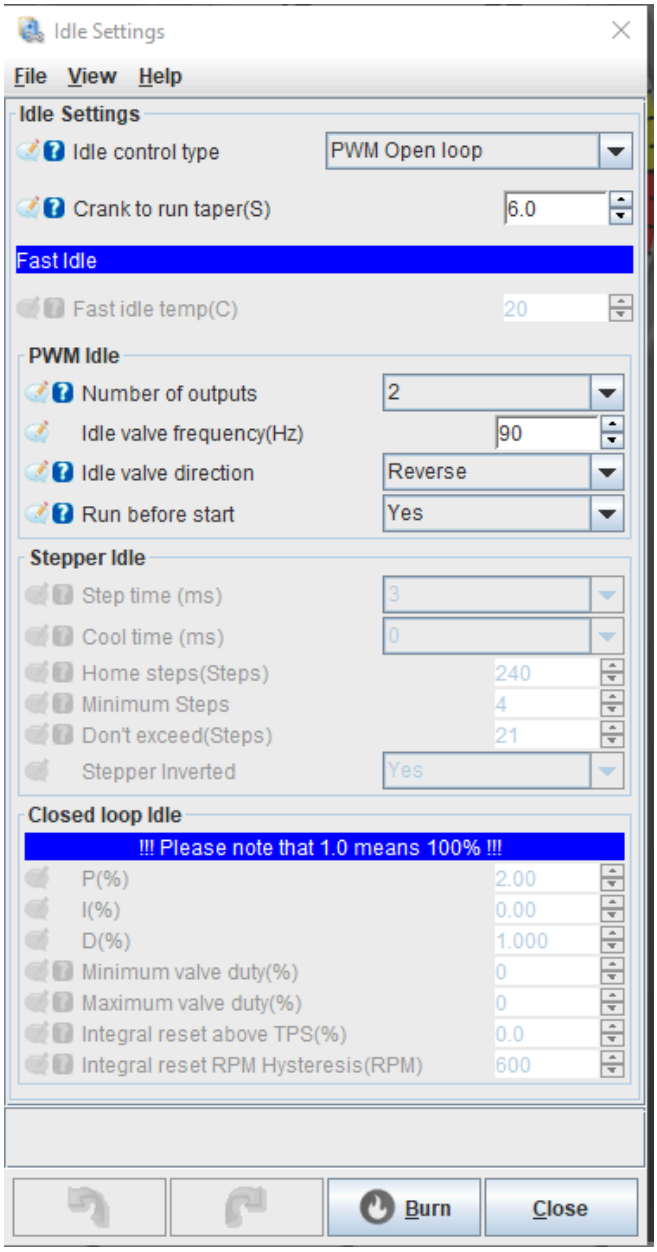
Go into **Spark Settings**. In TunerStudio software click on the **Spark** tab -> **Spark Settings**.
Ignition load source should usually match the **Control Algorithm** defined in the Engine Constants on page 10.
If you're running a factory distributor, **Spark Output mode** should be set to **Single Channel**.
If you're running wasted spark ignition, **Spark Output mode** should be set to **Wasted Spark**.
Cranking advance Angle depends on your engine, and can vary between 5-15 degrees.
Spark Output trigger is almost always **Going Low** on Speeduino ECU's. This depends on the coils you use. BMW Coils up to and including M54 engines will use this setting. If you are using other coils, then please do your research before burning this setting to prevent damaging your coils.
Use new ignition mode should be set to **Yes**

Now let's go into **Dwell Settings**. In TunerStudio software click on the **Spark** tab -> **Dwell Settings**.
A stock Motronic 1.3 coil pack can safely run at 2-3ms of dwell.
Cranking can be set to 3ms, running at 2-2.5ms and a duration of 1ms.
Overdwell protection should be on and set to roughly 5-6ms depending on your dwell settings.

For more detailed information, troubleshooting, and advanced tuning options, consult the Speeduino documentation (wiki.speeduino.com) and user community (speeduino.com/forum/).
Note: This guide is intended for informational purposes only. Always consult the Speeduino documentation and seek professional assistance if you encounter difficulties during installation or tuning. EFI Customs does not take any responsibility for any damage that can occur to electronics, wiring or engines. By using our ECU you accept the risks associated with incorrect configuration and user error.

Idle Settings

Using a factory Motronic 1.3 ICV the following settings can be used:



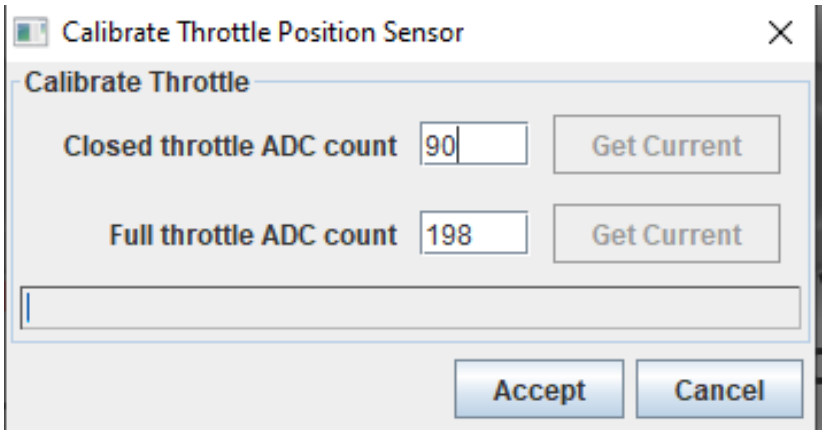
You may need to switch the Idle valve direction from reverse to normal. This isn't going to damage anything.

For more detailed information, troubleshooting, and advanced tuning options, consult the Speeduino documentation (wiki.speeduino.com) and user community (speeduino.com/forum/).
Note: This guide is intended for informational purposes only. Always consult the Speeduino documentation and seek professional assistance if you encounter difficulties during installation or tuning. EFI Customs does not take any responsibility for any damage that can occur to electronics, wiring or engines. By using our ECU you accept the risks associated with incorrect configuration and user error.

Calibration

TPS Calibration

To calibrate the TPS, on the top of TunerStudio click on the **Tools** tab -> **Calibrate TPS**.



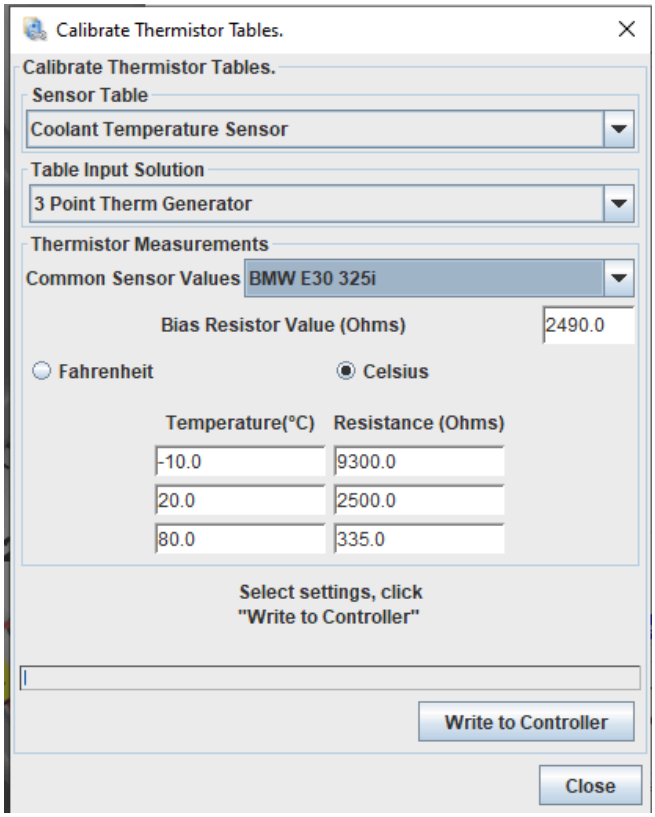
To correctly calibrate the TPS, firstly depress the throttle pedal and click on **Get Current** on the **Closed throttle ADC count** section. Then press the throttle pedal all the way down and click on **Get Current** on the **Full throttle ADC count**. Click **Accept** and (if you have used the standard TunerStudio dashboard) you should now see the TPS gauge move around between 0-100% as you press/depress the pedal.

For more detailed information, troubleshooting, and advanced tuning options, consult the Speeduino documentation (wiki.speeduino.com) and user community (speeduino.com/forum/).
Note: This guide is intended for informational purposes only. Always consult the Speeduino documentation and seek professional assistance if you encounter difficulties during installation or tuning. EFI Customs does not take any responsibility for any damage that can occur to electronics, wiring or engines. By using our ECU you accept the risks associated with incorrect configuration and user error.

Temperature Sensor Calibration

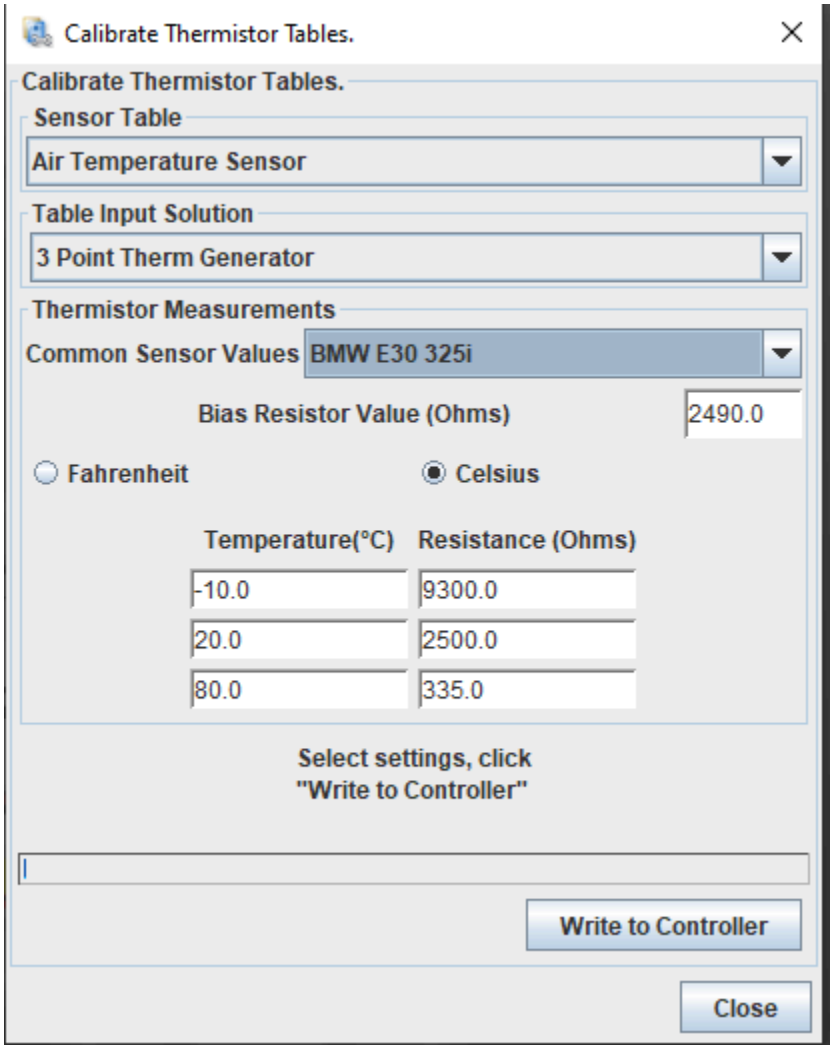
To calibrate the TPS, on the top of TunerStudio click on the **Tools** tab -> **Calibrate Temperature Sensors**.

Select **Coolant Temperature Sensor** and you will see a list of common sensors, as well as an option to provide a custom one.
If you have retained the factory coolant temperature sensor, you can select **BMW E30 325i** and then **Write to Controller**.



For more detailed information, troubleshooting, and advanced tuning options, consult the Speeduino documentation (wiki.speeduino.com) and user community (speeduino.com/forum/).
Note: This guide is intended for informational purposes only. Always consult the Speeduino documentation and seek professional assistance if you encounter difficulties during installation or tuning. EFI Customs does not take any responsibility for any damage that can occur to electronics, wiring or engines. By using our ECU you accept the risks associated with incorrect configuration and user error.

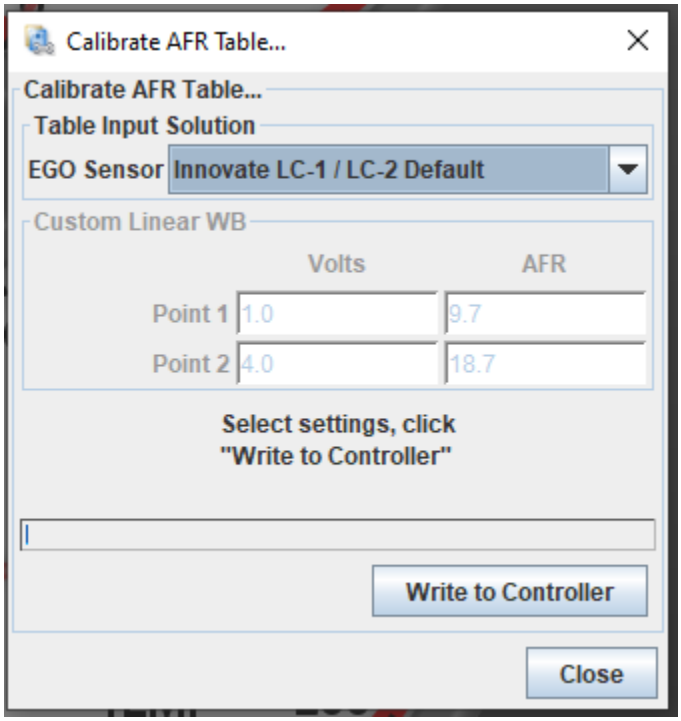
Now select **Air Intake Temperature Sensor** and you will see the same user interface.
If you have retained the factory air temperature sensor in the AFM, you can select **BMW E30 325i** and then **Write to Controller**.



For more detailed information, troubleshooting, and advanced tuning options, consult the Speeduino documentation (wiki.speeduino.com) and user community (speeduino.com/forum/).
Note: This guide is intended for informational purposes only. Always consult the Speeduino documentation and seek professional assistance if you encounter difficulties during installation or tuning. EFI Customs does not take any responsibility for any damage that can occur to electronics, wiring or engines. By using our ECU you accept the risks associated with incorrect configuration and user error.

Wideband Calibration

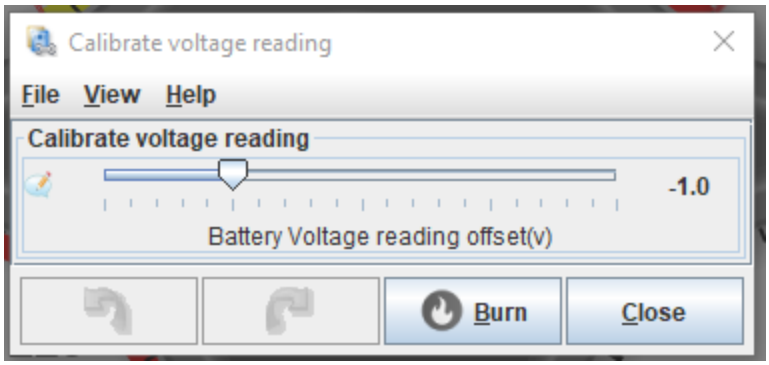
To calibrate the TPS, on the top of TunerStudio click on the **Tools** tab -> **Calibrate AFR Sensor**.



From the **EGO sensor** list, select the wideband controller you are using and click **Write to Controller**. If your wideband controller is not on the list, you should use the custom selection and manually enter the values according to the manufacturer's specification.

Voltage Reading Calibration

The easiest method of calibrating your voltage reading is to use an accurate multimeter at the 12V input pin on the ECU connector (Pin 37) and adjusting the slider until the gauge in TunerStudio displays the expected value.



For more detailed information, troubleshooting, and advanced tuning options, consult the Speeduino documentation (wiki.speeduino.com) and user community (speeduino.com/forum/).
Note: This guide is intended for informational purposes only. Always consult the Speeduino documentation and seek professional assistance if you encounter difficulties during installation or tuning. EFI Customs does not take any responsibility for any damage that can occur to electronics, wiring or engines. By using our ECU you accept the risks associated with incorrect configuration and user error.

Noteworthy Miscellaneous Items

Getting Started with TunerStudio

Visit the following links for getting started with TunerStudio
https://wiki.speeduino.com/en/Connecting_to_TunerStudio
Configuring TunerStudio project options | Speeduino Manual

Firmware Updates

Speeduino undergoes continuous development, so make sure you keep checking in for firmware updates on the Speeduino website. It is recommended to use SpeedyLoader to update/load firmware and connect to your ECU via USB cable. It is also strongly recommended to unplug the ECU from your vehicle prior to updating the firmware as it may unexpectedly trigger certain outputs during the installation. After completing the update, double check your tune settings before starting your engine.
https://wiki.speeduino.com/en/Installing_Firmware

Relay Outputs

Relay outputs on the Speeduino work via grounding.

USB Connection

Make sure to use a USB 2.0 Type B cable for the ECU connection. It's not recommended to use lengths over 5m to ensure there's minimal interference. Depending on your vehicle, the straight connector cable provided with PNP kits may not clear. In those situations it may be required to purchase a separate 90 degree angle cable.

Bluetooth

Please note that you cannot use USB and Bluetooth at the same time. To use USB you have to unpair the Bluetooth device and to use Bluetooth you must unplug the USB cable.
To connect your ECU via Bluetooth, the ECU must be connected to your vehicle and turned on via 12V. Using your PC/Tablet/Phone look for new Bluetooth devices. It will be called SPEEDUINO. Attempt to connect to it, and provide the PIN 3251.
On PC connections via Bluetooth, choose the appropriate COM port and tick the **Bluetooth Port** checkbox.
For more details please visit: https://wiki.speeduino.com/en/Bluetooth

For more detailed information, troubleshooting, and advanced tuning options, consult the Speeduino documentation (wiki.speeduino.com) and user community (speeduino.com/forum/).
Note: This guide is intended for informational purposes only. Always consult the Speeduino documentation and seek professional assistance if you encounter difficulties during installation or tuning. EFI Customs does not take any responsibility for any damage that can occur to electronics, wiring or engines. By using our ECU you accept the risks associated with incorrect configuration and user error.