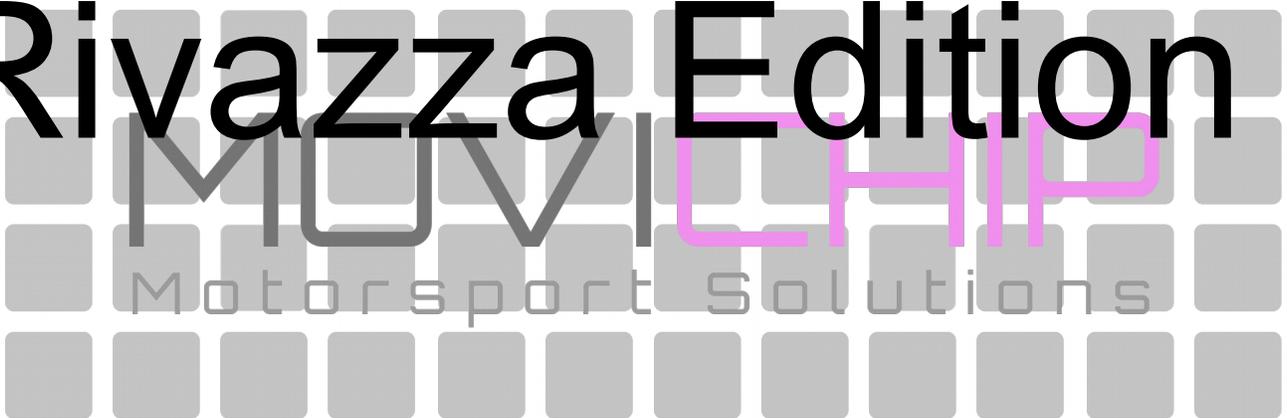


MoviChip

MAF Manager

Rivazza Edition



WARNING

MoviChip products should be used for motorsport and/or off-highway use **only**.

MoviChip products should **only** be used by persons who are experienced with automotive electrical and mechanical systems and the effects of altering such systems.

Misuse or improper tuning of MoviChip products can cause unexpected vehicle behaviour and/or failure (temporary or permanent) of existing vehicle systems e.g. limp mode, engine damage etc.

MoviChip products are **universal**. It is the responsibility of the end user to ensure MoviChip products are suitable for their specific application. MoviChip is not responsible for special, incidental or consequential damages or costs incurred due to the failure of this product.

MoviChip products are used **entirely** at the risk of the end user.



Thank you for choosing MoviChip

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MAF Manager

1. What the MAF Manager Does

The MAF Manager Rivazza manipulates the MAF signal to change engine fuelling. It works in parallel with the car's existing ECU.

The philosophy of this product is a fit and forget device that can actively monitor a wideband lambda sensor & autonomously adjust the MAF sensor signal to achieve the AFRs set by the user.

We did not want the end user to have to run wires into the cabin and we did not want the user to have to use an external controller. The Rivazza unit is mounted in the engine bay and the settings are adjusted wirelessly using the Android App and Bluetooth.

The MAF Manager Rivazza works in the background, once suitable settings have been entered into the device. The user does not need to carry a smartphone with them to use the device. A smartphone is only required to adjust the settings.

The MAF Manager is designed for fine/medium fuel tuning. It is probably not suitable for engines which have had major changes e.g. turbo conversion. How much the fuel can be changed will depend on your engine setup.

2. Installation

2.1. Sensor Specifications

The MAF Manager is designed to work with MAF sensors which output a voltage of 0-5Volts. **MAF Manager does not work with frequency based MAF sensors.**

Load, RPM and Analog Wideband Sensor signals *must* be between **0 & 5 volts**. Inputting more than 5 volts will permanently damage the Rivazza.

2.2. Wiring

The separate connector with the purple slider is stamped and numbered across the top and with letters down the side.

Image. If you look next to the "A" for example you will see "A" stamped into the plastic of the connector.



The table below mirrors the layout of the connector.

2.2.1. Bare Connector

If you have purchased a bare connector, populate the connector with wires you are using, as shown in the connector table below. Colour of wire used for each terminal is entirely up to you.

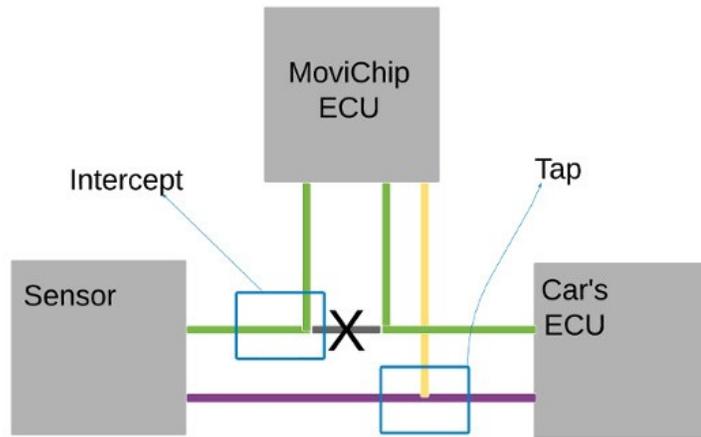
2.2.2. Pre Populated Connector

If you have purchased a premade loom, trace the wires back to their connector location to determine their purpose. The colour of the wires is **irrelevant**. The colour of the wires does **not** identify the purpose of that specific wire.

MAF Manager Pinout - Connector Reference

MM Rivazza	8	7	6	5	4	3	2	1
A			MAF SIGNAL IN	LAMBDA SIGNAL IN	MAP SIGNAL IN		SENSOR 1 Power POS 5V	SENSOR 1 GROUND
B				SENSOR2 POWER +	MAF OUT - To car ECU			IGNITION 12V +
C				SENSOR 2 GROUND		RPM SIGNAL IN - 5 volt		BATT Neg 12V -

COLOUR KEY (NOTE: WIRE COLOURS IRRELEVANT)	
	INTERCEPT
	TAP. IF USING MAF AS LOAD SIGNAL TAP BEFORE INTERCEPT
	TAP TO SENSOR GROUND EVEN IF +POWER SUPPLY NOT USED
	ADD INLINE FUSE
	OPTIONAL, USE IF REQUIRED. 0.5AMP CURRENT DRAW MAX
	OPTIONAL



2.3. Bluetooth

IMPORTANT: When Bluetooth is connected it will delay the response time of the MAF Manager & MAF Sensor signal - Do not use the app in normal driving. App is only for setup purposes. Only use the app for making adjustments and diagnostics.

Connecting to the unit to your Android device.

With the MAF Manager unit turned on i.e. with the vehicle in the ignition on position, open the "Settings" menu (not the MAF Manager app) on your Android device, go to Bluetooth, turn Bluetooth on, when "MMRiv" appears, pair your device. Password 1234.

Only then open the MAF Manager app, press the Bluetooth image and connect your Android device with the MAF Manager Rivazza.



Bar turns green when Bluetooth is connected

2.4. Check Installation Wiring

Open the "SET" menu and see that the sensors are sending data to the app. We want to see percentage values for MAP and MAF

RPM

You need to select "0.5", "1" or "2" to match your chosen RPM signal source. **(0-5 volt ONLY)**

Open the CAL menu *if* you have connected a wideband lambda sensor and check you are receiving the AFR signal.



NOTE: The RPM signal will not be 100% accurate *when* Bluetooth is connected to the MAF Manager. The Bluetooth connection interferes with the RPM signal. RPM is accurate only when Bluetooth is disconnected. The aim of the RPM field is to give you the **ball park figure** on RPM.

If you see RPM as 3000rpm but engine is idling, you have probably chosen the wrong number in the spark triggers per revolution section.

3. Initial Settings BEFORE Engine Startup

3.1. MAF Menu

Open the MAF menu and confirm MAF Lock is set to "No"

3.2. MAP Menu

Set Idle MAP and Gear MAP settings to their lowest possible level

3.2.1. Setting RPM and Load Axis

Choose the RPM & Load points you wish to use.



Press "+" or "-" then,

Press the cell you wish to update then,

Press "+" or "-" to get the value you need.

3.2.1.1. Axis Values, Exceeding Maximum - MAP Menu

The bottom Load number of "100%" can be left as it is *if* the whole range of the sensor is used, if not, adjust this number to **slightly higher** than the max signal then engine will ever see.

The right most RPM number should be set **slightly higher** than the redline of the engine.

The RPM axis and the load axis are altered in the same way. Select the cell you want to alter and then the plus or minus buttons to get the value you need.

Note: If the load signal exceeds the maximum number set in the App (Y Axis) the MAF Manager Rivazza will use the fixed multiplier in the bottom right cell.

If the RPM exceeds the maximum set in the X Axis, the MAF Manager Rivazza will use the fixed multiplier from the bottom right cell.

You may be able to use this characteristic to your advantage. For example you may want to set the maximum RPM and the maximum Load settings to your cam switching point if you are using a VVL/VTEC equipped engine. More information on using the MAF Manager Rivazza with VVL/VTEC equipped engine is included below.

3.2.2. Multipliers

The MAF Manager Rivazza app uses "multipliers".

We multiply the MAF sensor signal by the "multiplier" and this gives us the signal we will send to the car's ECU. If the multiplier is 1.05, we increase the MAF sensor signal by 5%, if the multiplier is 0.95 we reduce the MAF signal by 5%.

Before we start the engine for the first time with the Rivazza we need to enter some reasonable "fixed" multipliers, the numbers on the right side of the column



The left arrow is the "dynamic" multiplier. The right arrow is the "fixed" multiplier. The middle arrow is our AFR target.

If for example we have fitted 20% larger injectors a reasonable starting point would be to make **all** of our fixed multipliers 0.8.

If you are using an external wideband lambda gauge, create and analyse the datalog and make the adjustments to the Fixed multiplier to get the AFRs you need.

If you find the AFRs are lean, increase the multiplier in the relevant cells. If the AFRs are rich, decrease the multiplier in the relevant cells.

If you have connected the MAF Manager to an analog 0-5v sensor from a wideband lambda sensor use the autotune function. **See below for information on the autotune function**

The MAF Manager Rivazza will interpolate between cells in the fixed mode *only* and not in the autotune mode.

3.3. Pre Startup Settings Summary

This is the end of our initial setup process. To recap, we have
 In the MAF Menu - Confirmed the MAF Lock function is disabled
 In the MAP Menu - Confirmed the IDLE MAP and GEAR MAP settings are at their lowest
 In the MAP Menu - We have entered our split points in the 3x3 table for RPM and LOAD
 In the MAP Menu - We have entered reasonable numbers for the "fixed" multipliers.

These are the basic concepts of the MAF Manager Rivazza. Read on to get into the details of this product's features.

4. MAF Manager Rivazza Settings – Advanced (Optional)

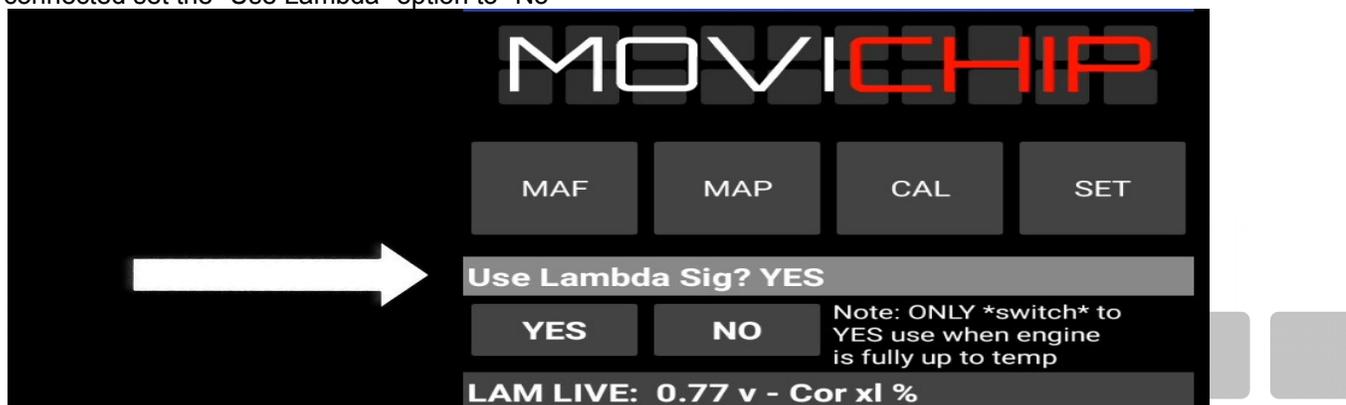
In this section we explore some of the optional settings in the Rivazza.

4.1. CAL Menu.

If you have connected a wideband lambda sensor to the MAF Manager you can use the autotune function.

The MAF Manager has been designed to be used with Innovate Motorsport products.

Turn the auto tune function on and off by pressing "Use Lambda" "Yes" or "No". If no wideband lambda sensor is connected set the "Use Lambda" option to "No"



NOTE: If the setting is set to "Yes" the auto tune function will start after the ignition has been on for 5 minutes.

If you **switch** the setting from "No" to "Yes" *while* the ignition is on, the unit will start auto tuning immediately.

NOTE: You do *not* want the auto tune function to start if the engine is *not* up to normal operating temperature.

4.1.1. Auto Tune Function - How To Use

After we have selected "Use Wideband" to "Yes" in the CAL Menu, we need to close the CAL menu, open the MAP menu and choose our AFR targets.

4.1.1.1. AFR Targets

In each of these cells we have a third number. This number is our desired AFR for this cell. This number is *only* relevant if we have connected the MAF Manager Rivazza unit to the analog output of an aftermarket wideband lambda sensor like an Innovate Motorsport product.

4.1.1.2. Dynamic Multipliers - MAP Menu

The second type of multiplier is the "**dynamic multiplier**".

This multiplier is calculated *automatically* by the MAF Manager Rivazza when it is connected to the analog output of a wideband lambda sensor such as an Innovate Motorsport product.

The "fixed" multiplier is the **base setting** for the dynamic multiplier. The AFR Rivazza will automatically adjust the Dynamic multiplier to a range +/- 0.10 from the Fixed Multiplier, to achieve the AFRs we have chosen.



4.1.1.3. Choosing the correct "Fixed" multiplier

Go for a session of say 10 minutes. When you come back to the pits, let the engine idle, open the MAF Manager Rivazza app, connect to the unit with Bluetooth, open the **MAP menu** and let it populate. Under the RPM values, look at the left most value, this is the "dynamic" multiplier.

This is the value the Rivazza was using to achieve the AFR target. Adjust the right side number to match this dynamic value. The right side number should ideally be within +/- 0.3 of the dynamic number. When you have altered the right side number, (the fixed multiplier) repeat the process, go for a session, come back in and compare the dynamically created number with your fixed values.

NOTE: The maximum the dynamic number can move away from the fixed value is +/- 0.1. This equates to a +/- 10% adjustment. This should be more than enough range to get your AFRs where you need them.

In the example above we can see the autotune function has maxed out its adjustment range. We have entered 1.19 as our fixed multiplier but the dynamic multiplier is at 1.29. From here we would alter the fixed multiplier to something like 1.39 in this case, go for another session, come back into the pits and check the dynamic multiplier again (before switching the engine off). We would ideally be looking for the dynamic multiplier, the number on the left to be between 1.35 and 1.43. This would put our 1.39 value in the centre of the adjustment range.

If we come back to the pits and the dynamic multiplier is still showing 1.29 we would alter the fixed multiplier to 1.29 also.

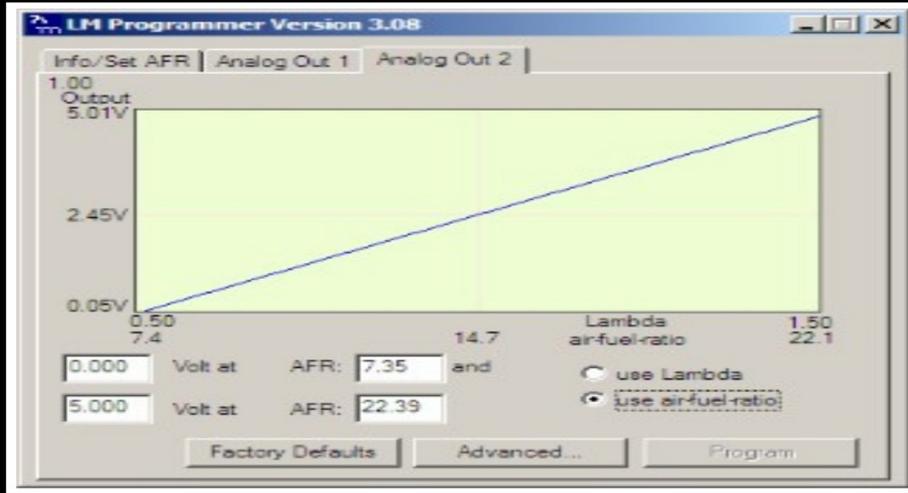
The purpose of this exercise is to get the fixed multiplier in the centre of the adjustment range that the autotune function needs to achieve our chosen AFRs

4.2. Convert Lambda Signal Voltage to AFR - CAL Menu

The MAF Manager Rivazza comes pre configured for use with an Innovate Motorsport wideband lambda sensor, specifically the default analog output settings.

If you want to change the settings to suit your lambda sensor, the following instructions show you how to do the calibration.

When you know your lambda signal voltage vs AFR specs (ask the manufacturer of your lambda sensor) **and** the lambda sensor you are using has a **linear output** we can use Linear Regression to convert the lambda voltage to an AFR number.



This image is an example of the specs you need for your lambda sensor. This is the default analog output for an Innovate Motorsport wideband lambda sensor.

In the calculation below the **X axis** will be the voltage output, eg 0.05, 2.45 and 5.01.

For the **Y axis** we use the AFR numbers, in this case 7.4, 14.7 and 22.1

For an Innovate Motorsport sensor you will bolt the following numbers into an online calculator (see below).

X Values - Y Values	
0.05	7.4
2.45	14.7
5.01	22.1

Doing the calculations

If you Google "linear regression calculator" you will find websites like this

Linear Regression Calculator

For your data, the regression equation for Y is:

$$\hat{y} = 2.9629X + 7.31621$$

As you can see the output from this calculator is fairly verbose. Mostly it should be self-explanatory, but you should note that any apparent discrepancies in calculations are because rounding is used for the purposes of display, but not for the calculations themselves.

If you wish to perform a further calculation, it is necessary to hit the reset button at the bottom of the page.

X Values	Y Values
0.05	7.4
2.45	14.7
5.01	22.1
M: 2.5033	M: 14.7333

<https://www.socscistatistics.com>

The top arrow is the formula we want to get to.

Plug in our X and Y values (shown above) and press calculate and the calculator will give you the formula.

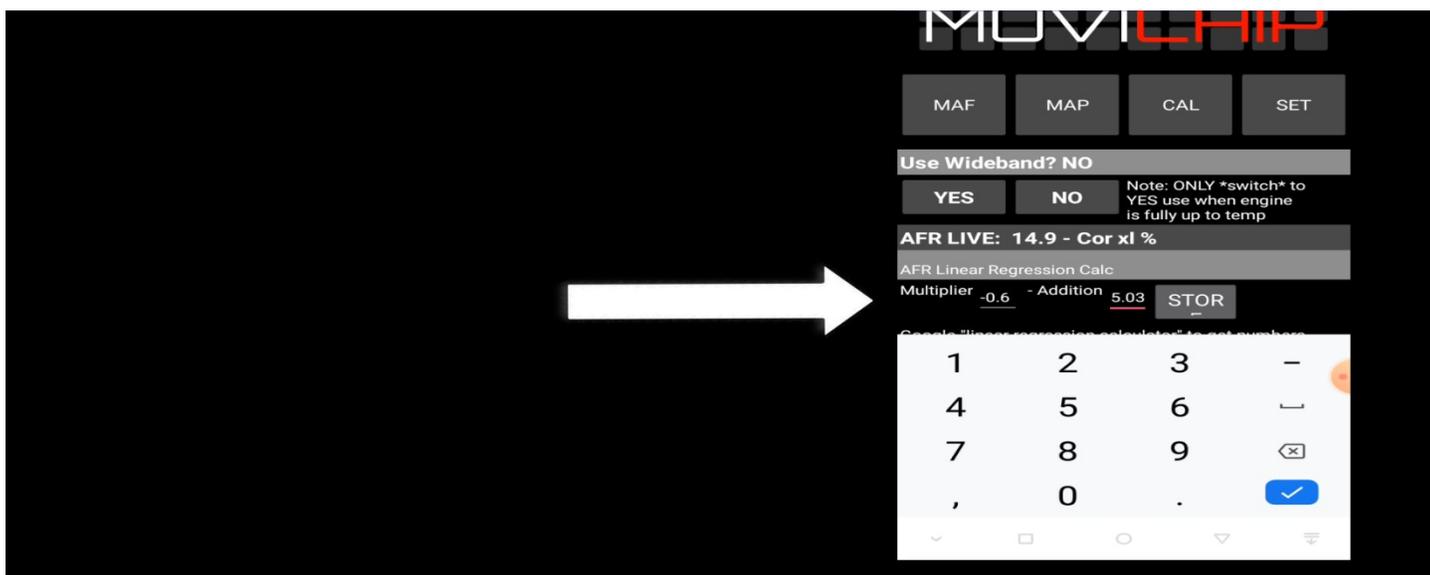
The formula shows us that the "**multiplier**" number we will enter in the app is 2.96 and 7.32 is the "**addition**" number.

We need at least three points to ensure our formula will be accurate.

When you get your "multiplier" and "addition" number, enter them into the app. And press "Store".

The lambda voltages will now be converted to AFR.

If you need to change the AFR values back to volts, change the multiplier to 1 and the addition to 0.



4.3. MAF Menu Settings

4.3.1. MAF Lock.

We can set maximum and minimum limits on the MAF signal voltage we can send to the car's ECU. This is entirely optional.

We set the voltages in the *MAF Menu* & trigger thresholds in the *MAP menu*



If you are not using the MAF Lock function, set the Idle MAP and the Gear MAP settings to the lowest setting possible e.g. 1%, 0.1v/0.05v.

NOTE: The MAF Lock function should not be used together with the auto tune function. The auto tune function may work against the numbers you set for IDLE and GEAR. This could lead to severe drivability issues. Get the fixed values set properly in the MAP menu first with the auto tune function.

Then turn off the auto tune function before enabling the MAF Lock feature.

4.3.1.1. MAX Volt.

With the MAF Lock set to “Yes” the number in the MAX Volt setting will be the highest voltage the MAF Manager will send to the car’s ECU.

If you want to set this number to 5 volts you do **not need** the MAF lock function. The MAF Manager can not send more than 5 volts to the

4.3.1.2. Clamp Voltage IDLE.

Here we can set the minimum voltage the MAF Manager will send to the car’s ECU under idle conditions.

4.3.1.3. We need to tell the MAF Manager *what* is an idle condition.

Open the MAP menu and set the percentages here.



The Idle MAP percentage should be slightly lower than you ever get an idle.

When the load number drops below the threshold **and** the MAF sensor signal drops below the clamped Idle MAF voltage setting, **the MAF lock idle voltage** will be sent to the car's ECU.

NOTE: This function is entirely optional and on a normally operating engine there should be no need to use it. This option should not be used if you are *also* using the auto tune function.

4.3.1.4. Gear Stabilisation.

This is set in the same way as the Idle MAF clamp except the load level will be set at an even **lower load than idle**.

Choose the load **threshold** in the MAP menu and set the **voltage** in the MAF menu.

To deactivate, set MAP Gear threshold to lowest possible setting e.g. 0.5% / 1%

Again, this is an entirely optional setting, it should not be used on a normally operating engine. Gear stabilisation is intended for car which use an atmospheric blow off valve with a MAF sensor. The gear threshold should help the rich mixture during gear changes.

You can set the idle & gear stabilisation load points where you wish but if you need to output a fixed voltage instead of using the MAF sensor signal, this points to a problem with the set up of the MAF sensor or with the MAF sensor itself. We have included these functions for completeness but we do not recommend using them.

4.3.1.5. VVL/VTEC

If you are using an engine with a system like VTEC or VVL ie a system which switches between two cam profiles, we recommend you set the **centre** value on the load axis and **center** value on the RPM axis point to the cam switch point. **Also** set the MAF lock function to "Yes" in the "MAF" menu. The lower right cell (in the MAP menu) will not be interpolated with neighbouring cells when MAF Lock is set to "Yes"

5. Correct MAF Sensor

The MAF Manager CANNOT compensate for a MAF sensor that has gone out of range

6. Android App - Options

At the bottom of the page in the app there is a button marker "Options"

6.1. Button Response

If you want to try and reduce the delay between pressing a button on the app and the numbers changing you can try a different clock speed.

The default number here is 50 and that is what we recommend.

It is normal for there to be a delay between pressing buttons on the app and the numbers updating/menu opening closing.

Data is sent **to** the MAF Manager unit **from** your Android device *and* then it is sent **back** to confirm the changes have been received. There is a delay in this process, **it is normal**.

6.2. Guide.

This button gives the URL of the product page on the website.

6.3. Colours

You can change the colours of the indication bars in the MAF and MAP menus and the logo colour.

6.4. When to use the App, When not to use it.

When driving the app should be closed. If you have the app open and a menu open there will be a delay in the response of the MAF Manager which can lead to jerky movements from the engine. The App should be used only for adjusting the settings it should **not** be used during driving unless for diagnostic purposes.



7. FAQ

Q.Engine is jerky, what is the problem?

Disconnect the app from the MAF Manager unit *correctly*. If not disconnected correctly, turn off ignition, wait 10 seconds and turn on again. If the MAF Manager is sending data to your Android device it will delay its response. App should **not** be open when driving except for diagnostic purposes. Product will work with a delay when Bluetooth is connected which can lead to unsteady engine response.

Q.I want to use the MAX Volt clamp feature but not the idle or gear stabilisation function is it possible?

Yes, set the trigger threshold of Idle and Gear Stabilisation to 1% in the MAP menu.

Q.The AFR on my gauge does not match the AFR shown on the MAF Manager App, what can I do?

Product is designed for use with Innovate Motorsports products. If you have a different wideband lambda sensor use linear regression to get the numbers you need and enter them in the app. [See the Linear Regression section in this manual.](#)

Q.I have running problems with my engine, I think it's the MAF, can the MAF Manager help?

The MAF Manager should be used on engine that is running normally i.e. engine without obvious problems. The MAF Manager is designed for fine tuning, it is not a band aid for a fundamental problem.

Q.Do I need to wire the MAF Manager into the cars ECU?

Yes. Follow the wiring pin out diagram at the top of this page.

Q.Where should I mount the MAF Manager?

The MAF Manager is designed to be mounted in the engine bay **away** from excess heat and away from sources of water. It should not get wet or hot/cold.

Q.Can I use a different sensor instead of MAP for load?

You can use any 0-5v sensor you wish but we recommend a MAP or a MAF signal. Note: Using a MAF signal may make it impossible to use the MAF clamp function, specifically Idle and Gear stabilisation.

Q.I was connecting the app to the unit before but now I can't connect, what can I do?

Close app manually and turn of the unit. Switch both back on and try again. If this still doesn't work, go into the settings menu in the phone, Bluetooth, click on MMRiv and click "forget". Turn of Bluetooth and re-pair the phone to the MAF Manager Rivazza unit