

MAF Calibrator (MAF CAL)

MAF Sensor Calibration
System



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Disclaimer

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.



Introduction

MoviChip MAF CAL is a device to calibrate the MAF sensor by increasing/decreasing the signal from the MAF sensor before it is fed into the engine ECU. The purpose of MAF CAL is to reduce fuel trim corrections on engines using a wideband lambda sensor. Or to achieve the target air fuel ratio on engine using a narrowband lambda sensor.

MAF CAL is intended for use on engines which had an optimised engine map but whose intake system was changed/adjusted (different MAF sensor, different MAF housing, performance intake etc) leading to an inaccurate signal being fed to the engine ECU.

MAF CAL is supplied with:

The **MAF CAL unit**

Main unit connector with crimps terminals & boot. *User makes their own wiring loom.*

Build sheet detailing software and hardware versions and password for Bluetooth connection.

Instruction manual can be downloaded from the MoviChip website, it is **not** sent with the product.

The **Android app** can be downloaded from the MoviChip website.

Not Included

Wires (User makes their own loom)

Set Up

To get MAF CAL up and running there are six main steps.

1. Build the wiring loom and wire unit into car (pin plans below).
2. Pair MAF CAL to the Android device that will program MAF CAL. This should be done before opening MAF CAL app. Ignition needs to be on, engine not running.
3. Install MAF CAL app onto Android device.
4. Check the wiring using the in-built Diagnostic function in the app, with unit powered and engine **not** running.
5. Datalog fuel trims (wideband cars)/AFRs (narrowband cars) vs MAF voltage and identify what changes need to be made to MAF signal.
6. Program changes into MAF CAL and repeat Step 5 until goals have been achieved.

This manual will go through each of these five steps.

Wiring

Unit can be mounted in engine bay but away from sources of heat and moisture.

Connector Pin Plan - (photo of connector below)

MAF CAL	8	7	6	5	4	3	2	1
A			CHANNEL 2 IN	MAF IN	MAP/TPS In		5 Volt +	Ground
B			CHANNEL 2 OUT	MAF OUT	CHANNEL 3 OUT		12 Volt+ Power	Power ACC 12V+ (1 AMP)
C							Ground	Battery Negative 12V

COLOUR KEY (NOTE: WIRE COLOURS IRRELEVANT)	
Red	INTERCEPT
Yellow	TAP. Connect to ground if unused
Blue	ADD INLINE FUSE
Green	UNUSED
Orange	OPTIONAL, USE IF REQUIRED. 0.5AMP CURRENT DRAW MAX
Purple	OPTIONAL

Figure 1 - Looking at connector from wiring/loom side



Figure 2 - Around the holes where we insert the wire into the connector, the columns and rows are marked/indented into the plastic. Characters are small.

Wiring Notes

A4 - Load Signal - Input, 0-5v

B1 - Power Positive 12v - Input (Powered when ignition on)

A4 - Bridge to A1 ground *if* Load Signal is not required

Power inputs should be fused as detailed above.

Load signal should be TPS or MAP

Use the Diagnostics function in the app to confirm wiring is correct and sensors and adjustment are working correctly.



The MAF CAL Android App

The Android app is where we program the MAF CAL unit.

Pairing MAF CAL to Android device

First we need to pair the MAF CAL to your Android device.

After wiring in the MAF CAL unit to the car. With ignition on, open the settings menu of your Android device, go to Bluetooth settings, add new device, when MAF CAL shows, pair your device with the MAF CAL unit. Password for the MAF CAL unit will be written on the build sheet included with the MAF CAL.

Now we can download the MAF CAL app from the MoviChip website. **Use the software version written on your build sheet.**

Configuring MAF CAL with Android App - Overview

Download the Android App from the MoviChip website.

This is the process to get started with MAF adjustments:

1. After confirming unit wired correctly (detailed above), we set the multiplier value to 1 for all MAF input voltages.
2. Using external logging software like Car Scanner or logging software in engine ECU, we datalog fuel trims (engine ECUs using wideband lambda)/AFRs (narrowband lambda engine, with external wideband lambda sensor) vs MAF voltage.
3. Identify where fuel needs to be added/removed at each MAF voltage step. Make adjustment. Repeat Step 2 until targets achieved.

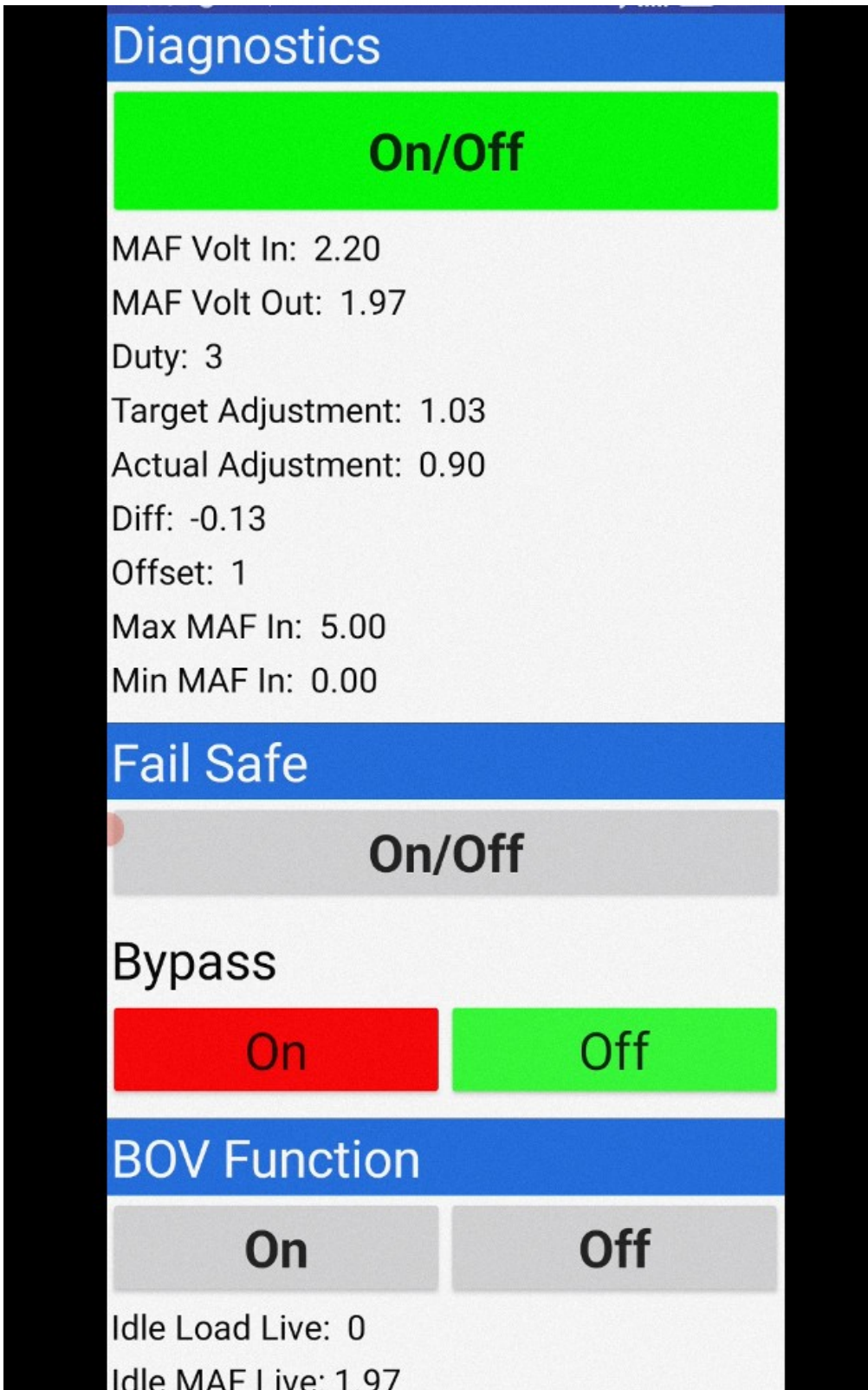


Figure 3 - Use Diagnostics function to confirm wiring correct and that data makes sense

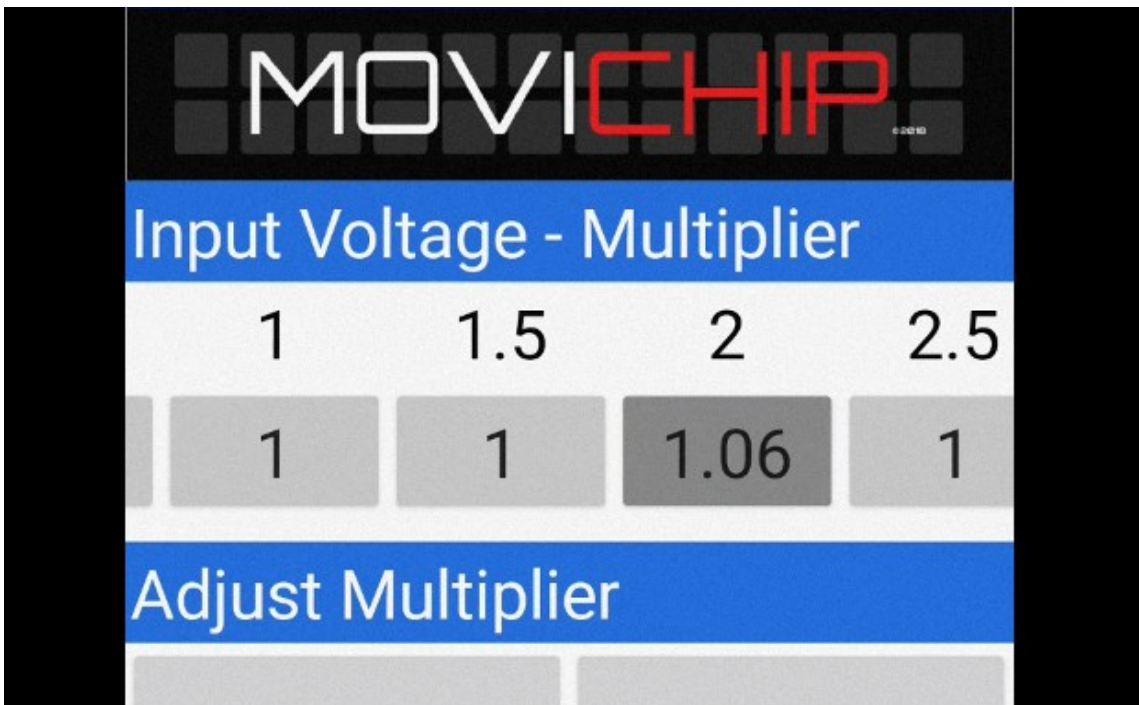


Figure 4 - Adjust multiplier of MAF input voltage to achieve fuel targets

Failsafe

MAF CAL has a failsafe function whereby if power to the MAF CAL unit is cut or if the difference between commanded output voltage and actual output voltage is greater than +/- 30%, the MAF CAL unit will be bypassed and engine ECU will be connected directly to MAF sensor.

To switch this feature on click the "On/Off" button in the Failsafe section. Red means option is disabled, green, enabled.



Manual Bypass

We can manually bypass the MAF CAL unit if we wish. Click the On (bypass MAF CAL) or Off (MAF CAL not bypassed) buttons.

BOV Assist

The BOV assist function is designed to reduce overfuelling when using a pull-through MAF **and** an aftermarket BOV that is venting to **atmosphere**. The overfuelling caused by this setup can cause excessive fuel consumption, engine damage and engine stalling. The BOV assist function is intended to *reduce* this problem.

NOTE: This function may or may not be compatible with your engine. This manual details how the function works, user must decide if this will work for their setup. BOV should be closed when engine is idling.

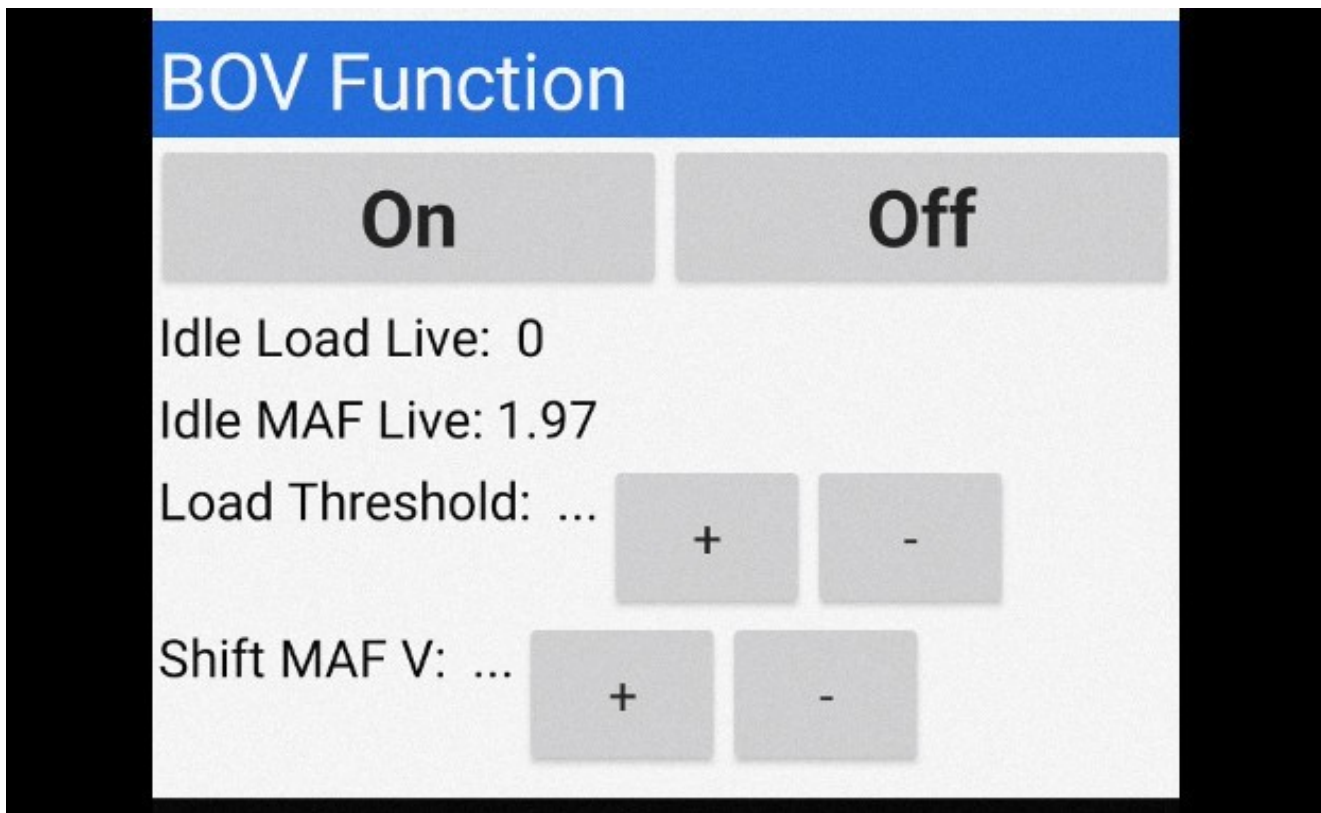


Figure 5 - Setting up the BOV assist function

Warning

The BOV assist function is for BOVs which are opened by inlet manifold vacuum **ONLY**, not electronically. **Very important.**



Electronically controlled, non factory, atmospheric BOVs can open at any engine load causing overfueling and potentially stalling. **Under no circumstances** control an aftermarket **atmospheric venting** BOV electronically using the same system as the factory pressure release valve. Only use inlet manifold vacuum to open an aftermarket BOV venting to atmosphere (for the reasons listed above).

Valve must be closed at idle.

This BOV assist function has been tested on engines where factory electronic pressure release valve has been disabled and replaced with an aftermarket BOV (Greddy/Tial/HKS etc) which is opened by inlet manifold vacuum.

*NOTE: It **may** be possible to run factory recirculating pressure relief valve **and** aftermarket BOV venting to atmosphere together but we have **not** tested a setup like this.*

Setup

We enable or disable the BOV assist function using the "On" "Off" buttons.

When using the function we first need to set a load threshold (engine vacuum) below which a fixed voltage is sent to engine ECU. Try a load threshold below idle. We do not want a fixed voltage being sent to engine ECU when engine is idling.

"Shift MAF V" is the fixed voltage we will send to the ECU when engine vacuum is bigger (larger vacuum) than at idle eg during gearshift with throttle closed. This voltage will probably need some trial and error, start with idle MAF voltage and go from there.

More Information

Check the product page on the MoviChip website for more information including videos on MAF CAL