

# MAF Translator

For 2G Mitsubishi DSM Vehicles

and

Mitsubishi 3000GT / Dodge Stealth

# MAF Translator 2G3S

Software Rev 1.3

## Kit Contents

- 1-MAF Translator
- 1-Male spade terminal
- 1-TAP connector
- 1-instruction manual

## Introduction:

The MAF Translator is a conversion interface to allow the use of late model GM Mass AirFlow (MAF) sensors on Second Generation Mitsubishi DSM (Eclipse,Talon,Laser) and "3S" (3000/Stealth) vehicles. The late model GM MAF sensors offer lower intake restriction than stock which boosts horsepower and improves turbo response. Inside the Translator there are several user adjustments which permits tuning of the airflow signal to the ECU (Engine Control Unit). Increasing or decreasing the airflow signal sent to the ECU will cause the ECU to deliver more or less fuel to the engine. The controls in the Translator allow adjustments under different operating conditions (idle, cruise, boost) to allow the tuner to tune for optimum horsepower. The Translator also has a Fuel Cut Limiter to prevent the ECU from cutting off fuel delivery at high boost, and an AUX adjustment for controlling fuel differently when a trigger wire is energized (to compensate for other fueling equipment such as N2O, Propane, or Alcohol injection)

## Installation on a 2G DSM and 3S

The Translator is a straightforward plug-in installation. Follow these steps:

1. Remove the factory AirFilter/MAS, unplugging the wiring harness.
2. Install the new Air Filter on the new MAF.
3. Install the MAF+Filter in place of the original AirFilter/MAS. Some MAFs will require an adapter or a different pipe to the turbo. Orient the new MAF such that the internal divider is vertical.
4. Plug the Translator MAF plug into the new MAF making sure the latch engages correctly.
5. Use the supplied TAP and SPADE connectors to connect the white Translator wire to a TACH signal.

***The best place to get this signal is the white wire found at:***

3K/ Stealth ECU 91-93 pin 101, 94-95 pin 58, 96-97 pin 51, 98-99 pin 45 , Power transistor pin 5.
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2G DSM ECU pin 58 or Power Transistor pin 4.
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***Route this wire AWAY from spark plug and injector wires.***

6. Plug the Translator into the vehicle wiring harness. This plug is not a perfect fit so some patience is required to ensure that the plug mates correctly and no pins are pushed out. Ensure the connectors mate fully. Ensure the PINK wire from the Translator lines up with the RED wire in the vehicle harness.
7. Locate the Translator box in a location that is away from direct heat or water spray/splash/drip. Wrapping the plugs in electrical tape is suggested. Vehicle harness tape (high temperature) is the best for this.
8. Remove the Translator cover (4 screws), When the vehicle is Keyed-On, the 2 LEDs in the Translator will turn on for about 1 sec then go back off.

## Controls:

The Translator has the following controls:

MODE SWITCH – a 4 section “dip switch” for setting the basic vehicle/translator parameters.

BASE – this 16 position (0-F) dial is used to set the general airflow scaling. This adjustment affects the entire operating range and is generally used to match the Translator and MAF to the selected injector size.

IDLE – This 16 position (0-F) dial is used to adjust the airflow signal during engine idle conditions. It can also be used to compensate for modified PCV (crankcase vent), fuel pressure setups.

MID - This 16 position (0-F) dial is used to adjust the airflow signal during moderate acceleration conditions. This mode is active between 1 and 8 psi boost (approximate)

WOT – (WOT=WideOpenThrottle) This 16 position (0-F) dial is used to adjust the airflow signal during heavy acceleration conditions. This mode is active above 8 psi boost (approximate)

AUX - This 16 position (0-F) dial is used to adjust the airflow signal during heavy acceleration conditions when the purple TRIGGER wire is activated. This mode is active above 8 psi boost (approximate)

### Green LED

OFF = idle

DIM = Part throttle/cruise

ON = MID

Flashing = The Translator has detected a loss of RPM signal.

### Red LED

OFF = No WOT modes are operating

DIM= WOT mode

ON = WOT mode **and** AUX Trigger is activated.

The Red LED will blink when the controls are adjusted to indicate the unit accepted the adjustment

## Initial setup:

Set the MODE switch to match the vehicle configuration.

MODE SWITCH: set as follows

1 – OFF for 3” MAF(DSM) ON for 3.5” MAF(DSM)

1 – OFF for 3.5” MAF(3/S) ON for 3.75” MAF(3/S)

2 – OFF for a 2G DSM vehicle ON for a 3000GT / Stealth vehicle

3 – OFF for NO Fuel Cut Limiter, ON to PREVENT FUEL CUT

4 – OFF for **Flat** AUX fuel control, ON for **Contoured** AUX fuel mode.

Set the BASE dial according to the table to match the installed injectors.

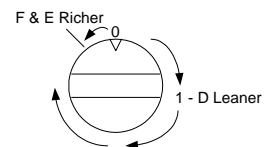
If the vehicle ECU is equipped with a ‘CHIP’ that compensates for larger injectors, then calculate the BASE setting as follows.

$$\% \text{ change} = (1 - (\text{Injector size of ECU} / \text{Injector size installed})) * 100$$

eg. Stock DSM = 450, 550's installed  $1 - (450/550) * 100 = 19\%$

(the Translator must be set to 20% lean for 550's. The **BASE 4** setting is for 550's)

The BASE dial (ONLY) is configured so that turning it clockwise makes the car run leaner thru setting D.



BASE Dial: set to match injectors and fuel system.

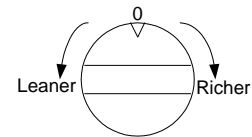
Dial Setting	% flow change	Injector DSM	Injector 3/S	Dial Setting	% flow change	Injector DSM	Injector 3/S
0	0	Stock (450)	Stock (360)	8	-40%	750	600
1	-5%	475	380	9	-45%	820	650
2	-10%	500	400	A	-50%	900	720
3	-15%	525	425	B	-55%	1000	800
4	-20%	550	450	C	-60%	1100	900
5	-25%	600	480	D	-65%	1250	1025
6	-30%	650	525	E	+10%	400	325
7	-35%	700	550	F	+5%	425	340

**Idle, Mid, WOT, and AUX all follow the following table.**

Dial Setting	% flow change
0	<b>0</b>
1	<b>5%</b>
2	<b>10%</b>
3	<b>15%</b>
4	<b>20%</b>
5	<b>25%</b>
6	<b>30%</b>
7	<b>35%</b>

Dial Setting	% flow change
<b>8</b>	<b>35%</b>
<b>9</b>	<b>-35%</b>
<b>A</b>	<b>-30%</b>
<b>B</b>	<b>-25%</b>
<b>C</b>	<b>-20%</b>
<b>D</b>	<b>-15%</b>
<b>E</b>	<b>-10%</b>
<b>F</b>	<b>-5%</b>

These dials are configured so that turning them clockwise makes the car run richer and counter-clockwise to run leaner.



### **Tuning and Adjustment**

The user must have access to some feedback tools. Although rough tuning can be accomplished by the seat-of-the-pants method, a Scantool is extremely valuable in determining the best settings of the Translator. The ECU does not update its learned fuel trim values all the time and a perceived change could be learned out once the fuel trim updates activate. Some amount of drive-time must be allowed so the ECU can adjust to the changes.

Begin with the BASE setting selected for the vehicle configuration. The BASE setting must be accomplished first since the BASE correction factor is always active. Check the fuel trim at steady road-load cruise (35-45 mph) once the ECU has had some time to adjust. The trim should be between 90% and 110%. Use the "Fuel Trim" for tuning, the "O2 trim" is misleading since it is scaled differently and does not track the required fuel tuning very well. Once the BASE setting is correct, leave it alone and adjust the other dials to accomplish your desired tuning.

Most cars will run very well with the BASE tuned correctly and no other changes. If there are vacuum leaks, the IDLE dial may need adjustment to bring the idle fuel trim into the center of its range. Conversely, a rich idle caused by injectors can be tuned out with the IDLE dial. If the fuel trim is 'low' (less than 90%) turn the IDLE dial counter-clockwise to correct it. The dial adjusts about 5% per 'click'.

The MID dial is adjusted to tune the fuel delivery during mid-throttle operation, 1-8 psi boost. By turning the dial counter clockwise the fuel mixture can be leaned out to enhance turbo spool-up. Leaning the fuel mixture can lead to detonation if octane is insufficient. Turning the dial so lean that the O2 sensor shows less than .500 volts will result in reduced performance. The optimum, setting is somewhat car/configuration/octane dependent. Running the highest octane available is the best way to ensure optimum performance.

The WOT dial is used to adjust the fuel delivery at full throttle. . By turning the dial counter-clockwise the fuel mixture can be leaned out to increase horsepower. Leaning the fuel mixture can lead to detonation if octane is insufficient. Turning the dial so lean that the O2 sensor shows less than .800 volts can cause excessive detonation. The optimum, setting is somewhat car/configuration/octane dependent. Running the highest octane available is the best way to ensure optimum performance.

The AUX dial is used to tune fuel delivery when the AUX Trigger wire is energized. The AUX setting is ADDED TO the WOT setting. If WOT is -5% and AUX is -5%, then when the Trigger wire is energized, the total adjustment is -10%. When the MODE 4 switch is ON (Contoured AUX mode) the fuel adjustment is corrected with the RPM signal to more closely match a "fixed-delivery fuel modifier". Examples include Alcohol injection, Propane injection, N2O injection. For Alcohol and Propane, the AUX dial should be set in the lean range to compensate for the 'fuel' being added. Connect the purple wire so it will be energized when the Alcohol/Propane system is activating. For Nitrous Oxide, the AUX dial should be set in the rich range begin, and leaned out only as the tuning progresses to ensure no detonation occurs. Connect the purple wire so it will be energized when the Nitrous system is activating.

**A note about tuning WOT fuel delivery:** Detonation (ping, or spark knock) is the enemy of every engine. This is ESPECIALLY true of turbocharged and supercharged engines. Occasional detonation of pump gas is not unusual. Heavy detonation on pump gas, or any detonation on race gas indicates a problem. Continued operation under these conditions will result in broken parts. Head gaskets, pistons, and bearings all take a tremendous beating when a boosted engine detonates. Avoid detonation under all circumstances.

The Translator is a tool to adjust fuel delivery and increase the performance of your vehicle. Like any tool it can be misused and can cause damage. Proper use of the Translator (using a scantool for tuning) will enhance the vehicle performance and owner enjoyment. Ramchargers is not liable for misuse of the Translator and any engine damage caused by its use or misuse.

### **Troubleshooting:**

If the installation and tuning does not progress as the steps indicate, the translator signals can be checked according to the following table.

Wires to MAF sensor:

Pink - +12 volts

Yellow - MAF frequency signal

Black - ground (0 volts)

Wires to Vehicle:

Pink - +12

Green - Translator frequency signal

Black - Ground (0 volts)

Brown - ATS (Air temperature signal, fixed at 80 degrees)

Gray - BARO (Barometric pressure signal, fixed at 3.9 volts)

White - RPM signal, connected to CAS sensor.

No LED blink at key on: check power feed to Translator, check connections, check fuse.

Green LED is blinking: If no RPM signal is present and the MAF signal is 50 grams/sec or higher (for .5 sec) then the Translator switches to 'backup mode'. In Backup Mode, the dial selection is according to the following table:

IDLE < 10 grams/sec airflow		IDLE < 10 grams/sec airflow
DSM: MID > 65 grams/sec airflow	3/S	MID > 85 grams/sec airflow
WOT > 120 grams/sec airflow		WOT > 150 grams/sec airflow

The engine will run perfectly well in backup mode, Contoured AUX mode will not work though.