

# **MILLER** **PERFORMANCE**



## **E24-E28 M88 & S38 Mass Air Flow Conversion System**

### **Instruction Manual**

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# Limited Lifetime Warranty

**Miller Performance Ltd. warrants that products manufactured by Miller Performance Ltd will be free from defects in materials and workmanship for the life that you own your vehicle.** If any such product proves defective during the applicable warranty period, Miller Performance Ltd., at its option, either will repair the defective product with charge for parts and labor or will provide a replacement in exchange for the defective product. **Items not manufactured by Miller Performance Ltd. Have a limited warranty of one year past the date of purchase.**

In order to obtain service under this warranty, the customer must notify Miller Performance Ltd. of the defect before the expiration of the warranty period and make suitable arrangements for the performance of service. In all cases the customer will be responsible for packaging and shipping the defective product back to the service center specified by Miller Performance Ltd., with shipping charges prepaid. Miller Performance Ltd. shall pay for the return of the product to the customer if the shipment is within North America, otherwise the customer shall be responsible for all shipping charges, insurance, duties and taxes, if the product is returned to any other location.

This warranty shall not apply to any defect, failure or damage caused by improper use or failure to observe proper operating procedures per the product specification or operators manual or improper or inadequate maintenance and care. Miller Performance Ltd. shall not be obligated to furnish service under this warranty 1) to repair damage resulting from attempts by personnel other than Miller Performance Ltd's. representatives to repair or service the product; 2) to repair damage resulting from improper use or connection to incompatible equipment; 3) to repair damage resulting from operation outside of the operating or environmental specifications of the product.

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# 1. General Information

## **1.1 Introduction**

The Miller Performance MAF System™ has been carefully developed to provide optimum performance without compromising dependability. We have always used a factory correct formula in the development of Miller Performance products and custom built ground up super cars.

This MAF System is engineered to upgrade a stock M88 or S38 engine to a more modern style of air flow sensor. The performance of this application may be altered if you have done or will do other modifications to your car. You can contact our technical department if you have any questions regarding other modifications before installing this kit.

## **1.2 MAF System Description**

The Miller Performance MAF system™ features the following:





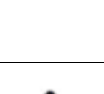
- 4" MAF Housing With Sensor
- Stock Mountable Design
- Excellent flow rating
- Fast install time

### 1.3 Tools Required

The Following tools and supplies (not included) or similar tools and supplies are required for fast and proper installation of this Miller Performance MAF System™:

- Flathead Screwdriver
- Philips Screwdriver
- 10mm socket wrench
- Wire strippers
- Solder
- Soldering iron
- Shrink tube
- Electrical tape
- Heat gun (to shrink 'shrink tube')
- Silicone

### 1.4 Safety and Precautions

	<b>Warning:</b> Ensure vehicle cannot roll when working on the vehicle
	<b>Warning:</b> Disconnect the ground strap (negative) whenever doing work on electrical or fuel systems.
	<b>Warning:</b> Never run the engine unless the work area is well ventilated. Carbon monoxide kills!
	<b>Caution:</b> Before starting each procedure, ensure that you have all the necessary tools and parts on hand. Read all instructions thoroughly; do not attempt shortcuts use only parts and materials that are included in this kit or approved by Miller Performance.
	<b>Caution:</b> Be careful when using soldering iron. Temperatures can be in excess of 400 degrees and burns can be serious.

## 2. System Installation

### 2.1 Introduction

The following section provides information that **MUST** be read and understood before proceeding with the installation of your Miller Performance MAF System™. The information included in this section is considered basic essential information and may not include any or all possible complications you may experience during the installation of this system.

Limit the number of distractions while installing this kit. Pay close and careful attention to the instructions and information provided in this manual during the installation. Damage to your vehicle and/or personal injury may result due to lack of attention.

### 2.2 Battery Disconnect



**Figure 1**  
**Disconnect the Negative terminal on the battery.**

## 2.3 ECU and Chip Modifications

This section will guide you through the process of accessing your ECU to change the Chip and modify some ECU wires.

1. Open the glove box and undo the plastic cover above the compartment. This will expose the ECU
2. Now the ECU will be exposed. Using a 10mm socket wrench, undo the two 10mm nuts.
3. Unplug the ECU from its connector harness.

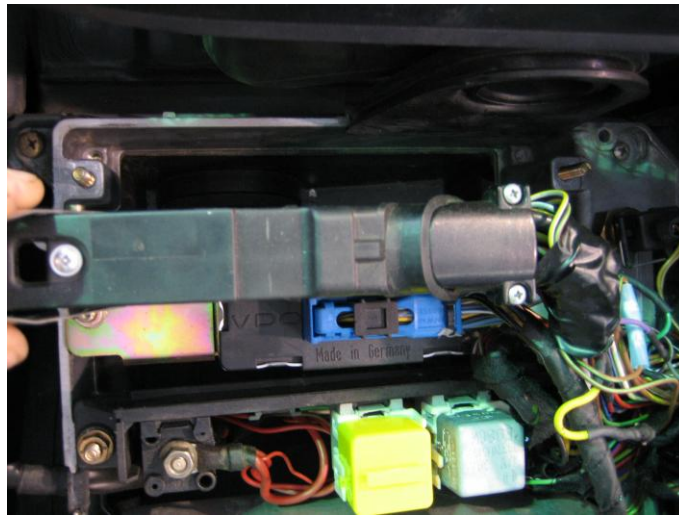


Figure 2

4. Use a small Philips to remove the three small screws on the back to the ECU plug connector.
5. After the removal of the three screws, carefully pry, with a flat screw driver, the black backing, back and off the ECU plug. Don't lose the rubber ring around the ECU plug.

6. Once you have successfully removed the harness from its black casing you should end up with something like this



Figure 3

7. Once you have the cover pulled back you are now ready to re-route a few wires.

## **2.4 ECU Retrofit (Acquiring 12v Signal)**

Don't be intimidated by this procedure. It involves two wires and a small bit of soldering. Be sure to read and completely understand this section. It is very important to find the correct wires and pin locations. Otherwise your vehicle could run poorly or not at all.

### **READ THIS SECTION SLOWLY AND CAREFULLY!**

1. Locate the pin 9 wire usually grey/white but not always.
2. Cut this wire near the plug as it is no longer used. Leave a bit of wire coming out of the plug and cover it with shrink tube, ensuring that it will not ground out on anything.
3. Grab the other side of the wire (pin 9) that is going out to the engine bay, take this wire and strip the end off a little bit.
4. Locate pin 35 usually red/blue, but not always.
5. Carefully strip the wire's coating back on the pin 35 wire without cutting through the wire. Make sure you do this in a place where the wire that used to go to pin 9 can reach it.

6. Take the two wires and create a 'T' soldering the pin 9 wire into the pin 35 wire.
8. After the solder is cool lightly pull on the connection to ensure it is going to hold up. Using some electrical tape, cover the new connection tightly. See figure 4.



Figure 4

9. You can now put the ECU plug back together. Remember to screw the three small Philips screws back in.

## **2.5 Chip Removal/installation**

The Chip contains the software required for your vehicle to operate. Avoid high static areas. Also avoid dropping the chip and spilling liquids on it.

You need to take the metal case off of the ECU. There are tabs all the way around the bottom side. Using a small flat screwdriver gently lift up the tabs to release the ECU. Be careful not to bend the tabs too far as they may break.

Once you have the ECU open and the chip side exposed you are ready to replace your current chip.

Carefully pry evenly on each side of the chip back and forth until it is free from its holder.

Take the chip that came with your MAF System and install it in place of the original one. Make sure that you align the small notch (half circle) on the chip, to the small notch on the ECU, this will insure your chip is installed properly. Make sure the chip provided is matched to the last three numbers of your ECU, ending in 055 or 079



Figure 5

You have successfully completed all steps required for the ECU. You can now reassemble the ECU and glove box.

## ***2.6 AFM to MAF Replacement***

In this section you will be working in the engine bay. You will undo the Air Box clamps. Also undo the hose clamp on the engine side of the Air Flow Meter.

1. On the fender side of the air box there is one nut. Undo it and set it aside.
2. Loosen the hose clamp on the back side of the Air Flow Meter (AFM). Unplug the plug going to the AFM.
3. Pull the Air Box with the AFM out. Open the Air Box and remove the four bolts to take off the AFM
4. Take the Miller Performance MAF housing and fit it to the air box. You may need to trim the opening to get the full 4" benefits. Drill the holes for the four bolts and seal the MAF to the air box with some RTV silicone.

## 2.7 Reassembly

Reinstall the air box and MAF assembly.



Figure 6

Check to make sure air boots are tightly pressed on to the MAF.

There is a “positioner” in the middle of the MAF plug. Make sure that lines up with the key way on the BMW plug. Plugging in upside down will void warranty.

## **3. Drive your Vehicle**

### **3.1 Initial Start up**

Remember to connect you battery before you start your vehicle. Once you have connected the battery you will be ready to test your newly installed MAF.

**\*\*Note: When you unplug your ECU it loses its “memory” and the car may drive rough for the first few minutes. Drive the car around for ten minutes and the car should be running smoothly again.**

Your car should feel more responsive now! You should also be experiencing more power and smoother acceleration. We hope you are satisfied with our product. Thank you for choosing Miller Performance for you BMW performance needs.

### **3.2 Troubleshooting**

If your car hasn't smoothed out after a half hour of driving you may need to check some things.

1. Ensure all your wiring was done correctly.
2. Ensure MAF is plugged in properly
3. Ensure Air Filter is Clean.
4. Check your Throttle Position Switch, this is a very common problem and you will not be able to access your “Full Throttle Maps” causing a loss in performance and drivability.
5. Ensure the Chip that was sent was for your ECU number.

If you cannot resolve the problem please phone us and we will help walk you through a solution. You can reach us at our normal number, (604) 755 7692. We will not let you go unsatisfied.