ZZPERFORMANCE

Installation Instructions
ZZP Fifth Injector Controller
ZZ-LNF5m

Estimated Installation Time:

Installation Difficulty:

Some procedures will not be described in full detail. If you run into any installation issues or have trouble comprehending any of the procedures, please contact customerservice@zzperformance.com

Kit Contents:

1 – AEM Controller Box

1 – AEM Controller Wiring Harness

1 – Bosch Intercooler Pump Plug

1 – 5th Injector Line

1 – Single Injector Rail

8” – ¼ Silicone Vacuum Hose

1 – M6 x 90MM Zinc Hex Head Screw

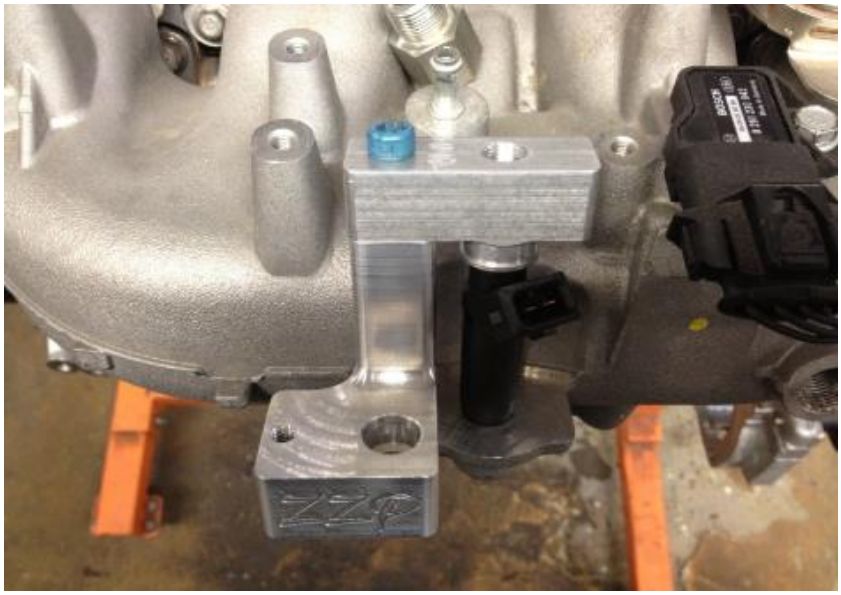
1 – Single Injector Stand

1 – 107961 60# Injector - EV1

4 – 5” Zip Tie

1 – ¼” X 1/8” Male Fitting

1 – ¼ Hose x 1/8 NPT 90°



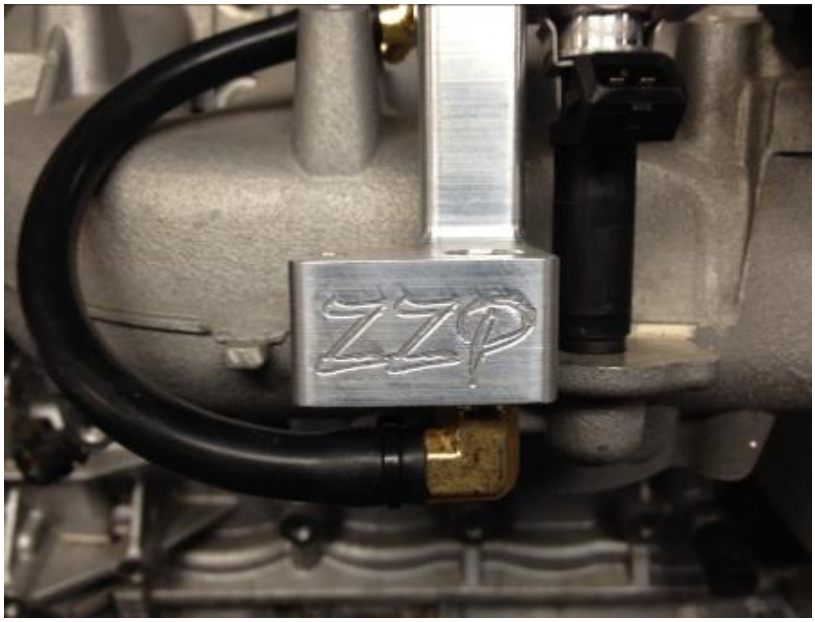
1. Remove the evap line from the top of the evap solenoid and rotate it out of the way.

2. Now, unbolt the evap solenoid. You will be re-using the bolt.

3. Using the supplied bolt, bolt down the fuel rail, injector and evap relocate stand. Be sure to use some grease on both injector O-rings.

4. Mount the evap solenoid on the new stand and connect the evap line to the top of the solenoid.

5. Connect the supplied vacuum line to the barbed fitting that is installed at the bottom of the evap stand.



6. Using the supplied vacuum T, connect the intake vacuum port closest to the evap solenoid. This is the same port used for the BOV on the ZZP turbo upgrade kit.

7. Next, remove the core from the Schrader valve on the low pressure side fuel feed. It is the fitting just a few inches away from where you fuel feed line connects. You do not need the valve core with the 5th injector kit, but it should be saved for use if you remove your 5th injector kit at a later date.

8. Install the supplied braided fuel line on the fuel feed fitting and then the new ZZP fuel rail; zip-tie all connections.

The mechanical section of your ZZP 5th injector kit is now complete. Time to move on to the wiring!

WIRING YOUR INJECTOR CONTROLLER

- **We highly recommend soldering all wiring connections.**
- **We also highly recommend installing the AEM controller inside your vehicle for easy access and to keep it out of extreme heat, cold, and water.**

INSTALLATION

Controller Install

The progressive controller is **NOT** waterproof and should **NOT** be mounted in the engine bay! Find a convenient location for the controller inside the driver's compartment. The adjustment knobs should remain in an accessible location but still remain protected from possible water incursion. If you need to extend the wires to mount the controller use at least 16 AWG wire for the pump and controller ground circuits and 18 AWG for the remainder. The controller contains an externally accessible fuse; no additional fuses are required. Use the supplied zip-ties to mount the controller.

Progressive Controller Installation

Pin#	Description	Wire	Color	Connection
1	Injector Plug	16 AWG	Orange	Connect to injector harness
2	LED -	20 AWG	Gray	NOT USED
3	LED +	20 AWG	Violet	NOT USED
4	Solenoid	20 AWG	Brown/White	NOT USED
5	Boost Safe LS Out	18 AWG	Green	NOT USED
6	Injector Plug	16 AWG	Pink	Connect to injector harness
7	Ground	16 AWG	Black	Connect directly to negative battery terminal
8	Level Switch +	20 AWG	White	Connect to wire 9
9	Level Switch -	20 AWG	Brown	Connect to wire 8
10	Arm Switch +	20 AWG	Yellow	Connect to 12v ignition power
11	External Signal	18 AWG	Blue	Connect to external signal for MAF frequency
12	Power 12v	16 AWG	Red	Main power connection. Connect directly to positive battery terminal

Frequency MAF Installation

Operation:
The Frequency MAF mode is designed for vehicles where MAF is used and the output of their MAF sensor is digital and a frequency.

Dip Switch Settings:

Mode	DIP Switches	Common Applications
Frequency MAF (40Hz–220Hz)	OFF – ON – OFF	1993 and older GM
Frequency MAF (400Hz–2200Hz)	OFF – ON – ON	1990–1999 Mitsu 1G/2G DSM
Frequency MAF (2kHz–14kHz)	ON – OFF – OFF	1994+ GM VW 2.0T, etc.

Setup, Connection:
To set up your system for MAF you must first find the correct source to connect to. In order to locate the correct signal, the use of a voltmeter is required. Once you have located your MAF sensor, you can begin to check the wires for the "signal" wire. The signal wire should remain at or near 0 Volts when the car is turned off or is not running. Once the vehicle is started, it should remain at or near 2.5 Volts. This is because the signal has a duty cycle of 50% and a voltage range of 0–5V, so the average voltage will be near the middle of this range. To determine if you do in fact have the correct wire, rev the engine while monitoring the voltage. It should remain the same regardless of the engine speed. If you are experiencing difficulty locating the signal wire, refer to the vehicle's service manual to locate the MAF signal wire, and then try to verify again with a voltmeter. Once you have found the correct signal wire, you may tap onto it and connect it to pin #11 (blue) of the Water/Methanol Controller.

Testing:
To test your setup it is recommended you finish the installation, but before installing the nozzle run the engine and ensure the system is operating as expected. That is, when the engine is running and the MAF sensor is outputting in a range set by the controller you will get flow. You want to ensure you are not getting flow when the engine is turned off or when it is not expected. This could be due to improper wiring or having the incorrect mode selected.

CONTROLLER

Settings

The AEM Water/Methanol Injection Controller is a progressive type controller. This means that fluid will be injected in proportion to the amount of boost that is detected by the external MAP input. In other words, higher signal input equals more fluid. It is therefore imperative that the external signal connection be made properly and securely or vehicle/engine damage could occur. In addition, the controller will automatically compensate for any fluctuations in battery voltage variations to ensure consistent flow under all conditions.

The two knobs on the face of the controller dictate at what signal input minimum fluid injection starts and at what signal input maximum/full fluid injection occurs. Fluid injection will 'progressively' increase between these two points as set by the adjustment knobs.

The "Start" dial has a range from 0% (full counterclockwise rotation) to 100% (full clockwise rotation). The "Full" dial has a range of 0% (full counterclockwise rotation) to 100% (full clockwise rotation). It is suggested to adjust the "Start" value by setting the dial to approximately 25% of the vehicle's maximum signal input. Adjust the full-in value to your maximum possible percent for signal input. These are only suggestions; improper use or setting could result in engine or vehicle damage – please consult your tuner.

Mode Selection

The mode can only be selected or changed while the unit is turned off. To change the mode remove the back cover exposing the three DIP switch selectors. Follow the guide on the controller to select the appropriate mode for your application.

Status LED

The controller has an on-board Status LED. This will mimic the operation of the external LED. Upon startup the current mode is flashed in green on the status LED. It will flash error codes in red as well as illuminate with varying intensity as a function of flow in green.

Fuse

The controller has an externally accessible fuse. The controller itself will turn on and function, but the pump will not run without the fuse. If the controller is reporting an open circuit it may be that the fuse has blown or is not installed correctly. Use a 15 amp fast blow fuse for replacement purposes.

TEST Button

The TEST button feature is available to test the system's functionality. This feature should be used **ONLY** with the nozzle disconnected from the engine. This is to prevent unintentional pumping of fluid into the engine. To operate the TEST button, press and hold. The pump speed will gradually increase from zero to full speed within 3 seconds and then remain at full speed for another 3 seconds before stopping. Flow should begin gradually and then hold at full pressure for a total test time of 6 seconds.

Short Circuit Self-Diagnostics

SELF-DIAGNOSTICS MUST BE TURNED OFF FOR PROPER FUNCTION WITH THIS KIT

There are two modes of pump-driver short circuit protection available. One can detect a short at any time but produces a slight buzzing in the pump. This should not be noticeable under most conditions but can be turned off if it is objectionable. If turned off, a short circuit can only be detected when the pump is running.

To enable or disable this diagnostic (and the buzzing): Press and hold the TEST button while applying power to the controller. The change is acknowledged by a single long flash of the status LED output and the external LED. Once the button is released the controller will continue to function normally. You can also tell what mode has been selected by listening for the buzzing sound in the pump. Repeating this operation will toggle between the two modes.

Here is an example of MAF chart adjustments made in order to compensate for the additional fuel flow from the 5th injector.

MAF chart without 5th injector

	19,531	17,361	15,625	14,205	13,021	12,019	11,161	10,417	9,766	9,191	8,681	8,224	7,813
MAF Airflow	88.13	85.58	79.53	73.45	66.73	58.98	48.87	39.56	31.98	27.62	23.17	19.79	17.45

MAF chart with 5th injector

	19,531	17,361	15,625	14,205	13,021	12,019	11,161	10,417	9,766	9,191	8,681	8,224	7,813
MAF Airflow	75.33	72.78	66.73	60.65	60.33	55.78	47.27	38.76	31.58	27.42	23.17	19.79	17.45

Notice how the chart has been adjust very little at 9,191 Hz compared to the adjustment made at 14,205. While every setup can vary and it is best to tune your setup for best results, this will give you a basic idea of what changes to make.

0: 2000hz
1 3200hz
2 4400hz
3 5600hz
4 6800hz
5 8000hz
6 9200hz
7 10400hz
8 11600hz
9 12800hz
10 14000hz