Multi-Input Water/Methanol Injection Controller P/N 30-3305

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 vehicles 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, and 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 systems 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 over 3 seconds, and then remain full 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

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.

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	Pump Ground	16 AWG	Orange	Connect to ground (black) wire of pump.
2	LED -	20 AWG	Gray	Connect to ground (black) wire of external LED.
3	LED +	20 AWG	Violet	Connect to positive (red) wire of external LED.
4	Solenoid -	20 AWG	Brown/White	1.5A Low Side output. Connect to optional flow control solenoid.
5	Boost Safe LS Out	18 AWG	Green	1.7A Low Side output. Grounded when error condition exists.
6	Pump Power	16 AWG	Pink	Connect to the positive (red) wire of pump.
7	Ground	16 AWG	Black	Main ground connection, connect directly to battery ground.
8	Level Switch+	20 AWG	White	Connect to the white wire of the fluid tank level sensor*
9	Level Switch-	20 AWG	Brown	Connect to the black wire of the fluid tank level sensor*
10	Arm Switch +	20 AWG	Yellow	Arms injection system. Connect to a switched 12V source.
11	External Signal	18 AWG	Blue	Connect to External Signal. (0-5V, injector duty, MAF frequency)
12	Power 12V	16 AWG	Red	Main Power Connection, connect directly to positive battery terminal.

*Note: If fluid tank is equipped with previous generation level sensor, identified by having two black wires, then pins 8 (white) and 9 (brown) may be connected to either of the two black sensor wires. The polarity is unimportant.

Note: 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.

External LED Install

Find a suitable location in the driver's line of sight to mount the external LED. Mount the LED and run the wires to the controller. The LED indicates the operation of the controller. If the pump is off and there are no errors the LED will be off. If there are no errors and the pump is on the LED intensity will vary with the pump speed. If there are any errors they will be indicated by flashing the LED.

External MAP, Injector Duty, MAF overview

The connection of the External MAP/MAF pin will depend on the desired mode of operation. Please follow the table in determining where to connect this wire.

Mode of operation	Dip Switch Settings	Pin Installation location
MAF / MAP (0V-5V)	ON – ON – ON	*Connect to signal output from MAF/MAP where signal range is 0V-5V.
Injector Duty (0%-100%)	OFF – OFF – ON	*Connect to the injector duty signal that is active low. Multi-Pulse Injection, as is found on some diesel applications, is **NOT** supported. Please verify a single pulse for each injection event with an oscilloscope prior to operation.
Frequency MAF (40Hz - 220Hz)	OFF – ON – OFF	*Connect to the frequency MAF signal.
Frequency MAF (400Hz – 2200Hz)	OFF – ON – ON	*Connect to the frequency MAF signal.
Frequency MAF (2kHz – 14kHz)	ON – OFF – OFF	*Connect to the frequency MAF signal.

*Please consult the factory service manual to find the appropriate wire to tap for the above connections. It is acceptable to make this tap close to the sensor/injector or nearer to the ECU itself; whichever is more convenient.

External MAP 0-5V Installation

Operation:
The 0 – 5 Volt external MAP mode is designed for vehicles running high boost, beyond that of the Internal and HD models, or for users who already have a sensor or output of their MAP with a range of 0 – 5 Volts. See Table 1 for compatible AEM MAP sensors.

Dip Switch Settings:
ON – ON – ON

Setup, Connection:
To setup your system for external MAP you must first find the correct source to connect to. In order to locate the correct signal the use of a volt meter will be required. Once you have located your MAP 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 continue to remain at or near 0, however it may begin oscillate up and down slightly. To determine if you do in fact have the correct wire you can try and rev the engine while monitoring the voltage. You should observe the signal rising and falling with engine speed. Please note that you may need to rev the engine high enough to put it into boost. Once you have found the correct signal wire you may tap onto it (if it is used by other devices), or connect it directly to the Water Methanol controller (Pin #11 – Blue).

Testing:
To test your setup it is recommended you finish the installation, but before installing the nozzle you run the engine and ensure the system is operating as expected. That is when the engine is running and the MAP 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 is not expected. This could be due to improper wiring or the incorrect mode selected.

Pressure Range	AEM Brass Sensor Kit P/N	AEM Stainless Steel Sensor Kit P/N
1 Bar / 15PSIa	30-2131-15G	30-2130-15
2 Bar / 30 PSIa	30-2131-30	30-2130-30
3.5 Bar / 50 PSIa	30-2131-50	30-2130-50
5 Bar / 75 PSIa	30-2131-75	30-2130-75
100 PSIg	30-2131-100	30-2130-100

Table 1 – Compatible AEM Pressure Sensor Kits

Injector Duty Installation

Operation:
The Injector Duty mode is designed for vehicles where water methanol injection rate is desired to be highly coupled to the injector duty, meaning the more fuel the more water methanol. This mode can be used when MAF is not available, or in NA vehicles. Injector duty is **NOT** intended to work with diesel or other multi-pulse injection systems.

Dip Switch Settings:
OFF – OFF – ON

Setup, Connection:
To setup your system for injector duty you must first find the correct signal wire to connect too. You must locate and tap onto one of the two wires going to the fuel injector. One of the wires will be switched +12V (typically red) and the other will be the desired signal wire from the ECU. Using a voltmeter you can determine if you have the correct signal by watching the voltage as the engine is running. As duty cycle increases and more fuel injected, the measured DC voltage will appear *lower* as viewed on a voltmeter. If you have an oscilloscope or a way to measure duty cycle this is even better. Once you are sure you have the correct signal you can tap on to the signal and connect that to pin #11 (blue wire) on the controller.

Testing:
To test your setup it is recommended you finish the installation, but before installing the nozzle you run the engine and ensure the system is operating as expected. That is when the engine is running you want to ensure you are not getting flow when the engine is turned off or is not expected. This could be due to improper wiring or the incorrect mode selected.

0-5V MAF Installation

Operation:
The 0 – 5 Volt MAF mode is designed for vehicles where MAF is used and the output of their MAF sensor is 0-5V and not a frequency.

Dip Switch Settings:

Mode	DIP Switches	Common Applications
0 - 5 Volt	ON – ON – ON	VW/Audi 1.8T Subaru WRX/STi Nissan S13/S14/S15/300ZX

Setup, Connection:
To setup your system for MAF you must first find the correct source to connect too. In order to locate the correct signal the use of a voltmeter will be 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 continue to remain at or near 0, however it may begin oscillate up and down slightly. To determine if you do in fact have the correct wire you can try and rev the engine while monitoring the voltage. If the signal rises and falls with the engine speed then you have likely identified the correct wire. 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 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 you 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.

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 setup your system for MAF you must first find the correct source to connect too. In order to locate the correct signal the use of a voltmeter will be 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 about ½. To determine if you do in fact have the correct wire you can try and 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 vehicles 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 you 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.

Optional System Upgrades

Water/Methanol Injection FAILSAFE Device AEM P/N 30-3020/30-3020M

Actively monitors the entire flow curve independent of pressure, continuously collecting flow vs. injection rate data so that any deviation from your established flow curve will trigger an alarm output that can be used to reduce boost or timing, change maps, add fuel, trigger a two-step or perform practically any action you choose to save your engine. It is PC programmable (with USB connectivity) which eliminates the guesswork when setting min/max threshold parameters. **HIGHLY RECOMMENDED** for all water/methanol injection systems

Water/Methanol Injection Flow Gauge – AEM P/N 30-5141/30-5142

Displays flow rate data on a smooth moving needle-type gauge that allows you to accurately monitor the status of your injection system in real time. Available in max flow rates of 500 cc/min or 1000 cc/min with a black or white face. The AEM water/methanol injection filter is **HIGHLY RECOMMENDED** when using this flow gauge.

Water/Methanol Injection Filter – AEM P/N 30-3003

Inline filter that uses a micronic mesh screen to filter out particles as small as 40 microns. Allows a cleaner flow of water/methanol into the injection pump, lines, and nozzles increasing overall system longevity. Injection filter is **HIGHLY RECOMMENDED** when using the AEM water/methanol injection flow gauge.

Additional Nozzle Kit – AEM P/N 30-3012

Includes one nozzle body, two jet sizes, and the necessary hardware to run a second nozzle in your injection system.

5 Gallon Tank – AEM P/N 30-3010

Upgrade to a 5 gallon tank to maximize your fluid holding capacity. Includes level sensor and mounting hardware.

Performance Air Intake Systems