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INSTALLATION INSTRUCTIONS

WATER INJECTION SYSTEM

$449 + Shipping
Order

P/N 30993

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READ THIS FIRST: Study these instructions completely before proceeding. Engine damage may occur if any component within these instructions is improperly installed. Turbonetics, Inc or any of its distributors cannot be held responsible for damages as a result of negligent or improper installation. This complete water injection system can be installed using common tools and automotive procedures, but installer must have a thorough knowledge of automotive engine operation and feel comfortable working on the vehicle. If in doubt, contact Turbonetics' technical support staff at 805-581-0333, between the hours of 8:00AM and 5:00PM PST, Monday through Friday.

Remove the water injection system from its carton and inspect for any obvious physical damage. All kit components are thoroughly inspected and carefully packaged prior to shipment from the factory. If any shipping damage is evident, contact your supplier and request that they process a claim with the shipper involved. Be sure to review the parts list on page 3 to verify that you have all necessary system components to proceed. If any components in the parts list are missing, contact Turbonetics' customer service staff.

The information contained in this publication was accurate and in effect at the time the publication was approved for printing and is subject to change without notice or liability. Turbonetics reserves the right to revise the information presented herein or to discontinue the production of parts described at any time.

SAFETY REQUIREMENTS: It is recommended to follow these precautions.

- Always wear safety glasses & gloves.
- Turn the ignition switch to the OFF position & disconnect the battery.
- Always use properly rated jack stands when working under the vehicle.
- Prevent unexpected vehicle movement by using wheel chocks and/or parking brake.
- Operate the vehicle only in well ventilated areas.
- Do not smoke or use flammable items near or around the vehicle's fuel system.
- Keep hands, clothing and other objects away from moving parts when engine is running.

SUPPLIES: It is recommended to have the following items before beginning installation.

- Factory service manual, for your model year vehicle
- A large table or bench, and plenty of adjacent available workspace
- Standard selection of automotive tools, primarily metric sizes
- An assortment of "zip ties" and/or thin-gauge steel wire
- The ability to securely lift the vehicle at least a few feet off the ground
- High temp. automotive RTV sealant
- NPT thread sealant

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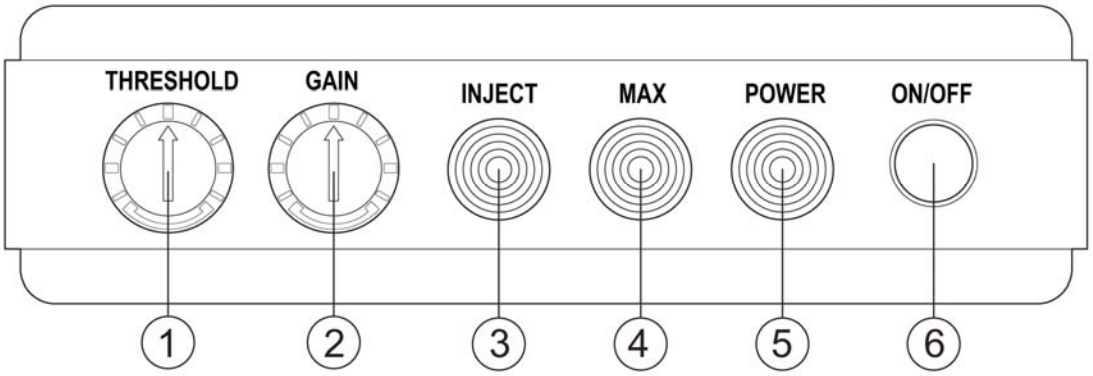
INSTALLING THE WIS SYSTEM

1.) Select a area that is well ventilated to keep the pump cool and securely mount the pump.
2.) Connect the red wire to a switched positive (+) power supply
3.) Connect the black wire to ground (-)
4.) Connect the blue wire to any positive (+) 5V signal source (map sensor, TPS, etc.)
5.) Locate where you would like to install the nozzle and drill a XX" hole. Using the supplied 1/8" NPT, coat the tap with grease and tap the hole. Make sure to clean out any chips prior to re-intalling the part or starting the engine
6.) Connect one end of the supplied nylon water line from the water pump to the reservoir (windshield washer reservoir, etc.)
7.) Connect one end of the supplied nylon water line from the water pump to the supplied nozzle



1. THRESHOLD ADJUSTMENT DIAL:
This dial determines the starting point of the water injection system, it has eight indexed positions. The actual point of injection is relative to the sensor used. Most sensors such as MAP (Manifold Absolute Pressure) sensor, MAF (Mass Air Flow) sensor etc has an output voltage of 0-5VDC. The WIS require such a voltage input to start the Water spray. More details on this later.

2. **GAIN ADJUSTMENT DIAL:**
Once the injection point is determined, we need to set the amount of quantity of liquid relative to the input voltage from the sensors. The "GAIN" dial does such that. In order to make the setting relative simple, the WIS provides two leds to indicate the "START" point and "END" point of the progressive spray range. The "GAIN" dial has a wide gain range so only adjust it with very small increments.

3. **INJECT LED (blue):**
This LED shows the starting point of the water spray. The brightness of the led will increase as the duty cycle of the water injection pump increases. The WIS sends a PWM (Pulse Width Modulated) signal to control the speed of the water pump. Higher pump speed creates more pressure so mass flow will increase relatively.

4. **MAX LED (red):**
When the pump speed is approaching 85% of the maximum power, this led will come on and alert the user that the setting of the "GAIN" dial is near this ideal setting. This feature makes the setting up of the WIS system very simple.

4. **POWER LED (green):**
This led indicates the WIS is switched on.

5. **ON/OFF BUTTON:**
Toggle press-button switch for tuning the WIS off or on.

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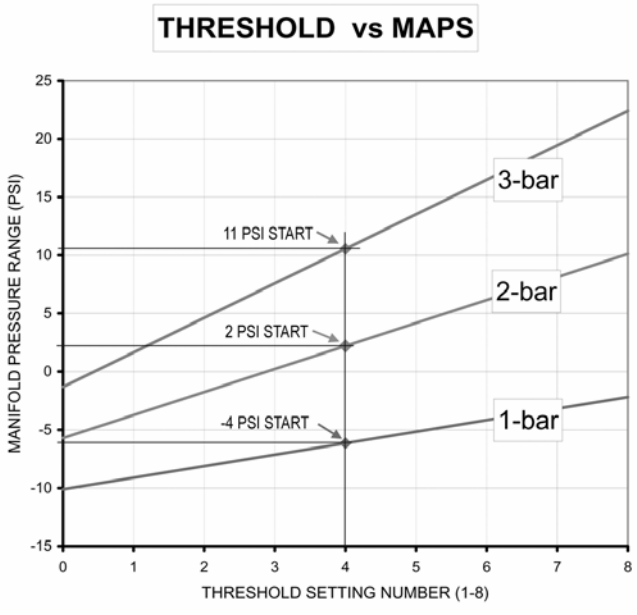
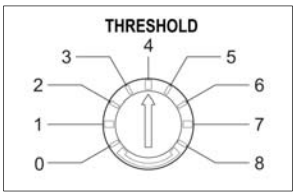
The "THRESHOLD" DIAL EXPLAINED:

We have created a chart of the right to show the details of how the dial works with different types of sensors. We have chosen to use a MAP sensor since it has many variations. Since the WIS is designed to read any sensor with an output voltage of 0-5Volts.

There are basically three common variations to a MAP sensor: 1-bar, 2-bar and 3-bar. The 1-bar sensor is normally found on Naturally Aspirated Engines and the 2/3-bar type on Force Induction Engines. The WIS is designed to work on all those.

A vertical line in the middle on the chart crosses three sensor response lines. At the point of intersection, it translates into three values. For the 1-bar MAP sensor, the WI turn-on point is –4psi below the atmospheric and 2/3-bar sensors trigger at 2 and 11 psi respectively.

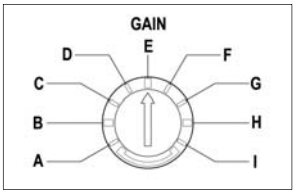




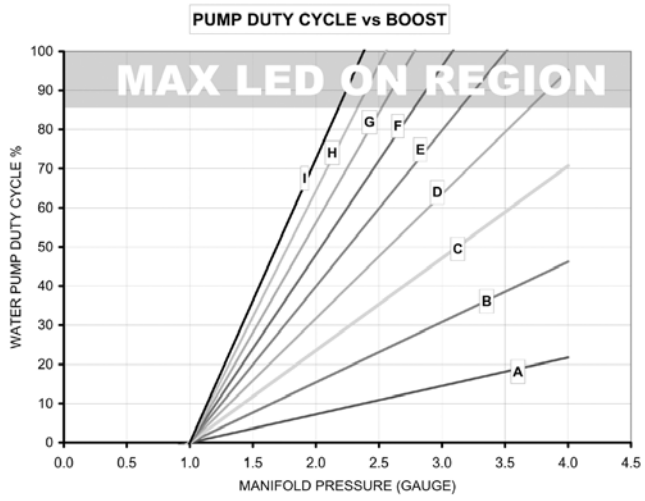
The numbers along the bottom of the chart is same as the numbers indexed on the "THRESHOLD" dial. User can shift the vertical line from the left to the right to arrive at the desired "water spray" onset point by turning the "THRESHOLD" dial.

The "GAIN" DIAL EXPLAINED:

In an attempt to accommodate the vast operating range of input signals, the WIS has a huge "electronic input gain adjustment" stage. It is basically shared between eight amplification settings "A" to "I".



The "A" line on the chart (right) is the least amplified. It starts to increase the pump speed at 1psi ("ON" threshold) ramps the pump speed to 20% at 4psi. If the dial in set to "D", the pump will reach 95% in the same "4psi" signal. Please note when the "D" line crosses the 85% duty cycle region, the "MAX" led will be lit.



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Specifications:

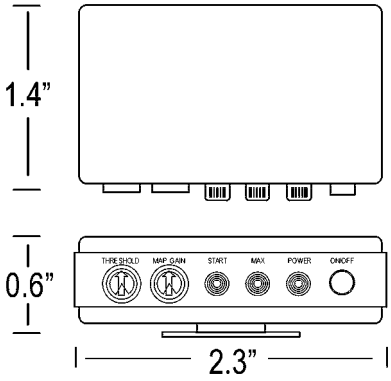
Input voltage: 10-15V
Input current::
- Standby: 50ma
- 100% duty cycle 5A

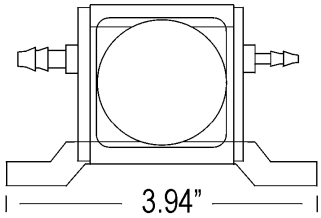
MAP sensor input range: 0-5V
Dash Controller PWM output:
- Duty Cycle 0-100%
- PWM frequency 100Hz

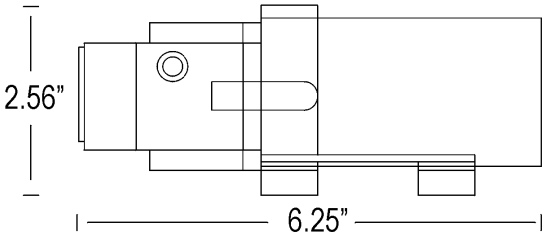
PWM Pump:
- PWM input range 0-100%
- Max. Pressure ..... 6 bar
- Max. Flow ..... 310cc/ min @ 6 bar
- Max. Flow ..... 1litre / min @ 3bar
- Input port ..... .6mm OD hose barb
- Output port ....4mm OD hose barb

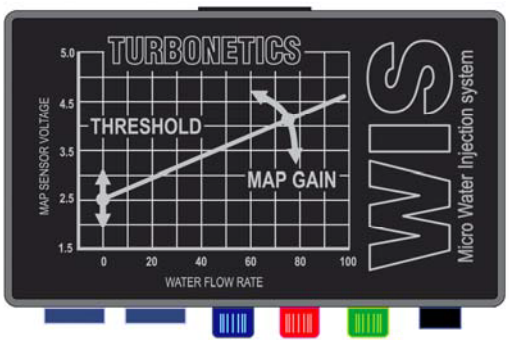
Atomizing Water jet:
- Orifice: 1mm
- Material: ..... Nickel over Brass
- Thread: ..... M8 x 0.75mm

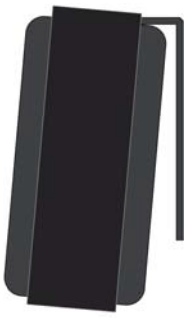
Filter (Disc type) ..... 100 micron Stainless











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WIS – Water / Alcohol Injection System

Full user control over the entire operating range of a 1, 2, 3 –bar MAP Sensor

Descriptions:

The system is comprised of a dash-mounted controller and a high-pressure diaphragm pump designed to receive a Pulse Width Modulation (PWM) signal from the controller.

The pump can be used with a high concentration of alcohol (75%) as well as just water alone; this is particularly useful for applications where alcohol can enhance the fuel octane or just as additional fuel at high boost levels. It is recommended that alcohol be added for cold operating conditions.

The Dash controller only measures 2.3" x 1.4" x 0.6" tall, perfectly suited to fit into any small cockpit space. Although small in size, it contains all the necessary controls to enable the user to cover the 'mid' to 'high' load range of any 0-5V output MAP sensor.

Injection triggering point is set by the 'THRESHOLD' potentiometer and is indicated by a blue LED on the controller. It is user adjustable between 1.5-4.5V. Adjustment to this potentiometer will determine the starting point of the water injection system. As shown in the chart below, 1.5V of a 2 bar MAP sensor represents approximately 0.4 bar below atmosphere (vacuum), while a 3 bar sensor represents almost atmospheric pressure.

The injection % range is set by the 'GAIN' potentiometer on the controller. As the red LED lights up, it indicates about 80% of full injection and will continue to get brighter until it approaches 100%. The gain potentiometer can be set to arrive at any level at any boost.

The water injection system can be switched off via an 'ON/OFF' push button, indicated by a green LED on the controller.

This latest 'Plug and Play' water injection from Turbonetics sets a new standard for the growing water injection market currently shared by many new water injection manufacturers.

Applications and Features:

- **Charge-air cooling for force induction engines**
- **Minimizing the onset of detonation**
- **Suitable to run water and alcohol mixtures**
- **"Plug and Play" controller for ease of installation**
- **All components are properly engineered for reliable operation**
- **Intermittent diaphragm pump – more reliable than the normal windshield washer pump**
- **Built in Thermal-Cut in water pump**
- **Enable "Meaner & Leaner" air / fuel ratio**
- **Increase octane rating on low grade pump fuel**
- **Dash controller allows real-time user flow control with status LEDs**
- **Only three wires needed to be connected for total control**
- **Can be used with any 0-5V load sensors (built-in over voltage protection circuitry)**
- **Inline 100 micron stainless steel filter**
- **Water tank - optional**

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