

**INSTALLATION INSTRUCTIONS
FOR PART #20011WRX
WATER / METHANOL INJECTION
SYSTEM FOR ALL
SUBARU WRX/STI**



Kit Contents

Parts

- UHO Pump (Ultra High Output)
- 20 ft High Pressure Tubing
- 3 ft Black Wire Loom
- 3Qt Reservoir

Electrical Packet

- 1 Green LED
- 2 Blue Butt Connectors
- 2 Small Eyehooks
- 1 Male Connector
- 1 Female Connector
- 1 Wire Splice
- VC-25/MAF Controller
- 10 Tie Wraps
- Level Switch Upgrade

Required Tools

Electric Drill w/ Drill Bits
Utility Knife
Screwdriver – Phillips
Assorted Wrenches
1/8" NPT Tap

Mechanical Packet

- 1 Nozzle Holder
- 8 #8x1&1/2" Screws
- 8 #8 Washers
- 4 #6x1/2" Screws
- 1 Bulkhead Fitting
- 1 Reservoir Fitting 3/8" NPT to 1/4" tube
- 1 E-6000® (GOOP)

Nozzles

- 60ML/MN (1)
- 100ML/MN (2)
- 175ML/MN (3)
- 225ML/MN (4)
- 375ML/MN (5)
- 625ML/MN (6)

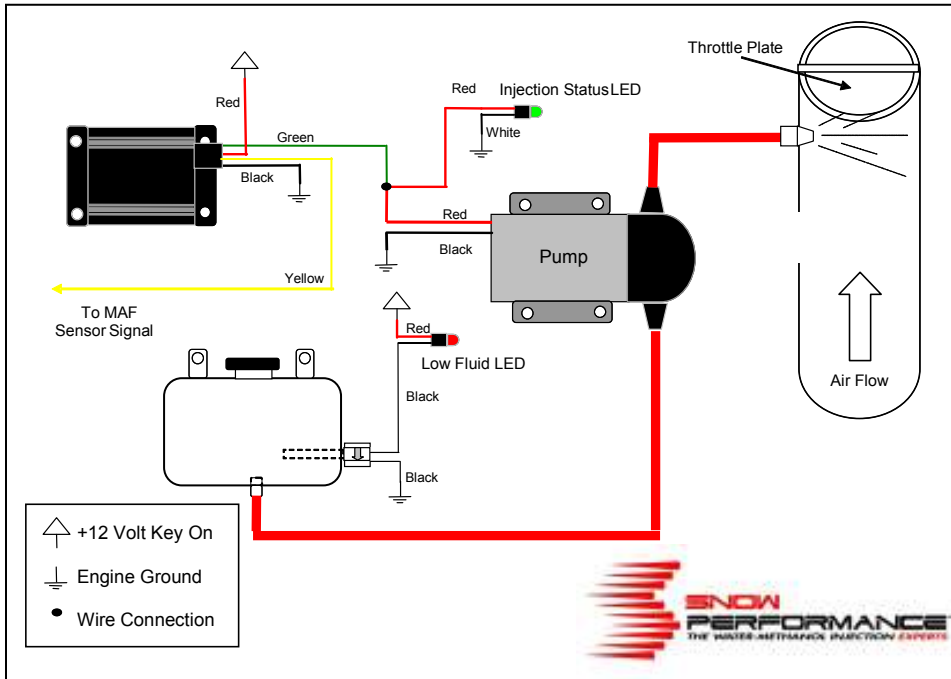
Upgrades

- Bulkhead
 - 2.5 Gallon Reservoir
 - Solenoid
 - Hose Adaptor or Bung
 - SafeInjection®
 - Nitrobooster®
 - Dual Nozzle
 - Boost Juice
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Introduction

This kit has been specifically assembled to work with all Subaru WRX cars including the STI. The standard 3 quart reservoir has been omitted and replaced by a bulkhead fitting. This fitting is used to tap into your factory windshield washer fluid reservoir or the factory intercooler sprayer reservoir (STI). Both allow for greater fluid capacity and cleaner installations. Using either reservoir does not defeat their originally intended use.

Please refer to the follow System Diagram during installation.



Nozzle Identification Chart:

Nozzle Number	Nozzle Size	Nozzle Number	Nozzle Size
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1	60 ml/min	4	225 ml/min
2	100 ml/min	5	375 ml/min
3	175 ml/min	6	625 ml/min

Installation – Mechanical

Step 1 Reservoir Install

Remove desired reservoir. Using the following procedure, install bulkhead fitting as low as possible in reservoir. Be sure to leave enough room to route tubing under or around reservoir once reinstalled. The bulkhead can be installed horizontally if desired for ease of tube routing.

- Drill 9/16" hole in desired bulkhead location.
- Remove one nut from bulkhead and turn the remaining nut until it is at the very end.
- Feed red tubing through the drilled hole and up and out of the top of the reservoir.
- Attach tubing to the bulkhead on the side opposite the nut.
- Pull the tubing through the bulkhead hole until the bulkhead seats against the inside of the reservoir.
- Apply a liberal amount of E6000® sealant (included) around bulkhead.
- Slide the nut you had previously removed up onto the tube and thread onto bulkhead.
- While pulling firmly on the red tubing, tighten the outer nut using a 17mm socket (only needs to be hand tight). A ratchet is not needed.
- Once sealant has set, fill reservoir with water and check for leaks.



Factory STI I/C Sprayer Tank

Caution*****

To avoid gravity feeding of fluid with rear mount reservoirs, it is essential to use a check valve in-line between the reservoir and pump. **Do not operate** your rear mount equipped vehicle without a check valve installed.

Caution*****

Whenever the nozzle is mounted post-throttle plate, to avoid siphoning fluid at idle, it is essential to use a solenoid upgrade inline between the reservoir and pump.

Step 2 Pump Install

Mount the pump so the inlet is positioned at the lowest point of the reservoir or lower. Pump can be mounted horizontally or vertically using the supplied screws and washers. Ensure that no sharp bends in the high pressure tube occur near the pump. Sharp bends can cause stress on the inlet and outlet ports of the pump, causing leaks. Trim tube with a utility knife or razor blade, making sure to eliminate any burrs or kinks on the end. Insert firmly into the pump about ½ inch through the light grey locking collar. Note the arrows indicating flow direction on the top of the pump. To remove the hose, gently and evenly push the light grey locking collar into the head unit of the pump, then pull on the hose gently.



Measure the distance from the reservoir outlet to the pump inlet. Cut the ¼" red tubing using utility knife. Make cuts are as square as possible.

Ensure there are no kinks in the tubing and insert tubing into quick disconnects at pump and reservoir until fully seated. Keep the pump within 2 feet of the reservoir.

Caution*****

Pump must be shielded from road debris and tire wash. Failure to do so will result in pump failure

Step 3 Nozzle Selection

Nozzle sizing is a function of horsepower, which approximates the engine airflow, and boost, which approximates intake charge heat.

Recommended starting points:

Stock - 250 WHP:	175ml/min nozzle.
250 - 400 WHP:	375ml/min nozzle
400 - 600 WHP:	625ml/min nozzle

TECH TIP Seal the nozzle into the nozzle holder using included GOOP® sealant. Using a sealant that is not permanent will allow for nozzle changes during tuning. Simply remove the nozzle, clean the threads, and reinstall using sealant.

Assemble desired nozzle into nozzle holder using E6000® sealant. **The end of the nozzle with the fine mesh screen is to be inserted into the nozzle holder.** Torque 1/2 turn past finger tight. Do not use Teflon sealants on Snow Performance fittings.



Correct



Incorrect

NOTE: If nozzle is mounted lower than the reservoir, a Solenoid Upgrade (#40060) must be used to prevent draining.

Step 4 Nozzle Mounting

The nozzle assembly should be installed 90° to the direction of airflow. On round intake tubes, this is 360° around the tube meaning the nozzle can be mounted in any direction. This will ensure maximum cooling as the nozzle sprays in a cone pattern. The nozzle should be the highest point in the system, and its tip should be flush with the inside wall of the tube or projecting slightly into the airflow to ensure good spray pattern.

Photo Courtesy of Street Sports



Nozzle mounted at the outlet of the factory intercooler. Note the slight projection of the nozzle tip into the airflow.

The nozzle is mounted using its external 1/8 NPT threads. Tighten the nozzle and nozzle holder assembly one half turn past finger tight using E6000® to seal the threads.

You can mount the nozzle in a plastic or rubber air inlet tube using a Nozzle Mounting Adapter (#40110). Weld-in aluminum (#40120) and steel (#40130) are available.

TECH TIP The typical nozzle mounting point is before the throttle body/plate. If you mount the nozzle after the throttle body/plate, a Solenoid Upgrade (PN 40060) must be used to prevent siphoning at idle.

Step 5 Nozzle Connection

Measure the distance from the pump outlet to the nozzle holder. Cut the ¼" tubing using utility knife. Make cuts are as square as possible.

Ensure there are no kinks in the tubing and insert tubing into quick disconnects until fully seated. Gently pull on tubing to ensure a good connection.

Photo courtesy of Street Sports



Use tie wraps to help route tubing and to ensure it doesn't contact moving or hot parts in the engine compartment. Have tubing connect to quick connect fittings at shallow angles. Having an immediate sharp bend may unseat the tubing from the internal o-ring and create a leak.

Continual insertion and removal from quick connect fittings will mar the end of the tubing. Over time the internal gripping teeth may lose their hold of the tubing which may create a leak. If this occurs simply remove the tubing and make a fresh cut using a razor blade.


Installation - Electrical

Variable Controller Installation

Attach the controller to secure location with easy access in engine bay or passenger compartment. The VC series controllers are designed to withstand engine bay conditions, but should not be mounted directly to the engine block. Often a location inside the passenger cabin is ideal as long as wires can be routed safely through the firewall. Be sure to mount the controller with easy access to the adjustment dials.

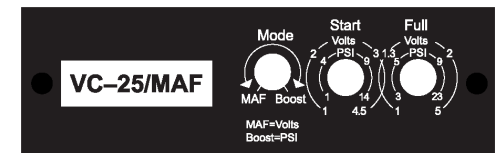
 **CAUTION: Disconnect the negative battery terminal while connecting wires to prevent electrical fire or damage to controller.**

- Connect BLACK wire to a good ground location.
- Connect GREEN wire to Pump RED power wire.
- Connect RED wire to 12 volt key on source. When selecting a 12 volt key-on source, try to find a dedicated circuit fused for 10-15 amps.
- Connect YELLOW wire to the MAF sensor signal output wire. This wire will have .8V-1.2V at idle.

 **TECH TIP** Always have a good electrical ground connection. Poor ground will result in erratic operation of controller.

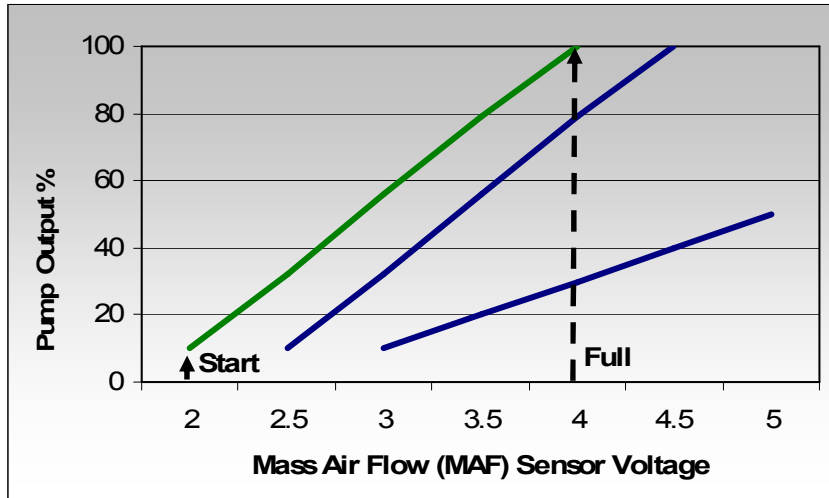
Variable Controller Tuning

- Rotate the MODE switch counter clockwise to select MAF mode.
- Adjust the START MAF level first by turning dial to 2.5 volts. This sets the MAF voltage required to activate the injection system. If earlier injection is desired, turn this setting down but do not set lower than idle voltage.



- Adjust FULL dial to the maximum MAF voltage the vehicle can make. On applications with stock MAF calibrations, this is usually 4-4.5 VDC.
- If bucking or bogging is experienced at the onset of injection, increase the start point. If it is felt in the higher RPMs, increase the full point.

Controller Operation Example



For setting 1, left, the chart shows the Start dial at 2 volts and the Full dial at 4 volts. At 2 volts from the MAF, the pump will operate at 10%. At 4 volts from the MAF, the pump will deliver 100% of injection pressure. For MAF voltage readings between the Start and Full settings, the controller will linearly adjust the pump output as shown on the graph.

Tuning

Start tuning by carefully trying lower start point settings. If bogging is experienced at the onset of injection, move the start dial back up (clockwise) a small amount. Injection should occur under moderate to high acceleration, but not in normal driving.

With the start point set, try lower points for the full setting. If bogging is experienced as injection ramps up, turn the full point back up (clockwise) to a safe level. The engine should run with no bogging or miss-fires. Be sure to make small changes and then test them each time to avoid any drastic differences in injection. If the Full dial can be set at the same point as the Start dial, a larger nozzle may be used to more cooling and octane.

A stock turbo WRX or STI will typically be set with a start setting at approximately 2vdc and a full setting at the 4.5vdc.

Testing the System

Note: for best results, prime pump before use

To clear air from the pump and insure that the system is primed:

- Fill reservoir with water approx ¼ full.
- Remove tubing from nozzle (or solenoid if solenoid used in-line between pump and nozzle) and run tube into separate container.
- Apply 12 VDC to red pump wire for approximately 5 seconds or until fluid flow is consistent. **Please ensure controller green wire is disconnected or controller damage could result.**
- Pump is now primed. Reconnect tubing from pump outlet to nozzle (or solenoid).

If using check Valve in between the pump and the reservoir:

Remove the check valve and place a solid piece of tube between the pump and the reservoir and prime the system. Then replace Check valve in between the pump and reservoir.

Step 1 Test Pump and Mechanical System

Disconnect all control and SafeInjection® modules. Disconnect tube from the outlet port of the pump. Using a 12 volt source, apply power to red wire of pump. Pump should activate, green LED should go on, and fluid level in tank should go down. It is recommended to also check the nozzle spray pattern while following this procedure. Also check for leaks. Never flow liquid through a SafeInjection® module without all nozzles connected.



If pump goes on and fluid level doesn't go down, there is an obstruction in the tube or nozzle. Activation of the pump for short intervals will purge air from the system after installation. This can be accomplished during initial use.

Step 2 Test Controller

- Turn ignition key on so that the system has 12volt power. If the pump runs, turn key off immediately and inspect ground wires for secure connection and repair as needed.

Tuning Quick Reference

The power potential of the system is realized through increased boost and/or timing. The large gains on octane and cooling provided by the system make this possible, even on standard pump fuel.

The Boost Cooler® adds an alternate fuel source as well as significantly cools combustion. With the Boost Cooler®, one does not need to cool combustion with overly rich air/fuel ratios. To minimize combustion quench, you should start with an air to fuel ratio of 12.0-12.5:1.

Injecting water/methanol lower than 3300-3500 RPM could result in combustion quench. All vehicles are different. If the engine bogs or loses power, then it is coming on too early, the quantity is too much, or there is not enough methanol in the mixture (50/50 water/methanol recommended).

Caution*****

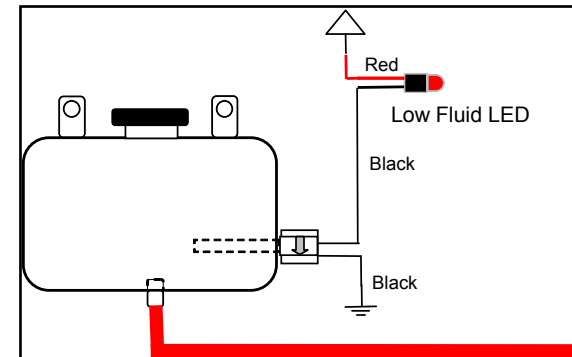
Prolonged quench may cause lower engine damage over a period of time.

Maintenance – Remove nozzle(s) and clean screen filters at least once per year using shower cleaner/descaler.

The Boost Cooler® has been designed to operate with high concentrations of methanol. Oil or other additives are not required for system lubrication.

For best performance, cooling and system life it is recommend that Snow Performance Boost Juice™, part #40008, be the exclusive fluid used in the system.

Fluid Level Switch



Instructions

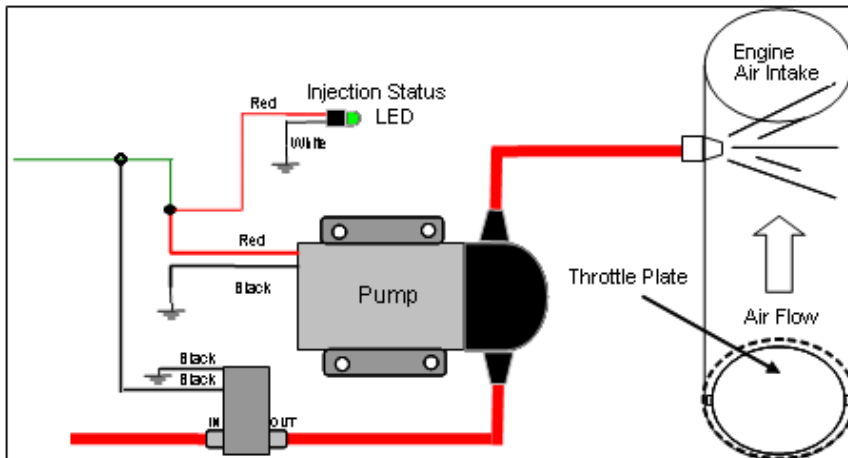
- Locate desired level switch mounting position. Suggested placement is 1/5 of max reservoir height.
- Carefully drill side of reservoir using 13/16" bit. A step bit is recommended for best drilling results. Hole must be free of nicks or shavings for proper sealing.
- Remove rubber seal from level switch. Insert seal into reservoir until fully seated. Goop can be used around the edges of the hole.
- Lubricate exterior of level switch with water and insert into seal until fully seated. Position level switch so **GT** symbol is at six o'clock position.
- Wait 30 minutes for Goop to cure, then test for leaks. With fluid level above level switch, float should be angled up. With fluid level below level switch, float should be in horizontal position.
- Connect one black wire from level switch to ground.



- Connect other black wire from level switch to white wire from LED.
- Connect red wire from LED to +12 volt key on power source.

Solenoid Upgrade (optional)

The optional Solenoid Upgrade (#40060) is required if the nozzle is to be installed after the intake throttle plate (as shown), or the fluid reservoir is mounted higher than the nozzle. It is highly recommended for trunk-mount reservoirs.



Finger thread the two 1/8" NPT quick connect fittings into ports labeled (2 or IN) and (1 or OUT) on the solenoid. Tighten an additional half turn past finger tight.

Note: Solenoid must be installed Pre-pump to ensure correct operation.

Cut high pressure line at location solenoid is to be installed. Insert ends of cut line into quick connect fittings of solenoid. The port labeled (2 or IN) is the inlet and the port labeled (1 or OUT) is the outlet. Gently pull on line to check secure connection. If line pulls out, re-insert farther into fitting to engage locking clips. If high pressure line removal is required, firmly press in metal fitting ring to disengage locking clips while pulling hose from fitting.

Connect one of the BLACK wires from solenoid to the RED positive pump wire or the WHITE wire from the controller. Note that connecting

the wire to any other power source other than the pump/controller wire will result in improper operation of solenoid. Connect the second BLACK wire to a secure chassis ground location.