

BOOST COOLER™

**INSTALLATION INSTRUCTIONS
FOR PART #20020
WATER / METHANOL INJECTION
SYSTEMS**



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 **CAUTION**

You must completely read through these instructions before installing and operating this product. Failure to do so can result in damage to this product and the vehicle.

REGISTRATION CARD

NAME _____
 ADDRESS _____ APT. _____
 CITY _____ STATE _____ ZIP _____
 EMAIL _____

Return with proof of purchase (copy of sales receipt) within 90 days of purchase date to:

Snow Performance
 213 Aspen Garden Way - Bldg. #1
 Woodland Park, CO 80863

This registration card **MUST** be returned to activate your **LIFETIME WARRANTY**.

How did you learn about the Boost Cooler® product?

Internet	Television Advertising	Magazine Article/Advertising
Racing Event	Friend or Relative	Purchase Location

Why did you buy a Boost Cooler® system?

Increased Horsepower	Reliability	Warranty
Other: _____	Cooling Efficiency	Detonation Control

Which of the following publications do you read regularly?

5.0 Mustang	Euro Car	Muscle Mustang & Fast Fords	
Stock Car Racing	Automobile	Four Wheeler	National Dragster
Super Chevy	Auto Week	GRM	Off-Road
Super Ford	Car and Driver	Hot Rod	Trailer Life
Popular Hot Rodding	Car Craft	Mopar Muscle	Road & Track
Truckin	Chevy High Performance		Motorhome
Sport Compact Car	Truck Trends	Cycle world	Motor Trend
Sport Truck		Other: _____	

Which Internet forums do you visit regularly?

3si.org	superhonda.com	pirate4x4.com	Other
vwvortex.com	ls1tech.com	honda-acura.net	
mustangworld.com	ford-trucks.com	corvetteforum.com	
honda-tech.com	corral.net	fordtruckworld	
srtforums.com	clubsi.com	rx7club.com	
waterinjection.info	s2ki.com	clubrsx.com	
clubwrx.net	other: _____	dsmtalk.com	
nasioc.com	wrxlinks.com	none	
dsmtuners.com	lancerregister.com	maxima.org	

WHERE/DATE PURCHASED _____

ADDRESS _____

MAKE/MODEL/YEAR OF VEHICLE _____

SNOW PERFORMANCE PART NO. _____

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Notes

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The names, addresses and telephone numbers mentioned are current as of November 21, 2008. Note that this information is subject to change. Please refer to www.snowperformance.net for current information.

Kit Contents

Parts

- 1 150+ psig Pump
- 3 Qt Reservoir
- 10 ft Red High Pressure Tubing
- 4 ft Black Wire Loom
- Installation Instructions

Electrical Packet

- 1 Green LED
- 2 Blue Butt Connectors
- 1 Wire splice
- 1 Large Eyehook
- 1 Small Eyehook
- 1 Male Connector
- 3 Female Connectors
- 1 Vacuum "T"
- VC-A10 Controller With Harness
- 10 Tie Wraps

Required Tools

Electric Drill w/ Drill Bits
Adjustable Wrench
Utility Knife
Screwdriver – Phillips
5/16" Open End Wrench
1/8" NPT Tap

Mechanical Packet

- 1 Nozzle Holder
- 2 3/8" NPT – 1/8" NPT Reducer Bushings
- 2 1/8" NPT – 1/4" Tube Elbow Fittings
- 1 3/8" NPT – 1/4" Tube Straight Fitting
- 7 #8x1&1/2" Screws
- 7 #8 Washers
- 1 #6x1/2" Screw
- 1 Sticker
- 18 in 1/8" Silicone tubing
- 1 E-6000 (GOOP)

Nozzles

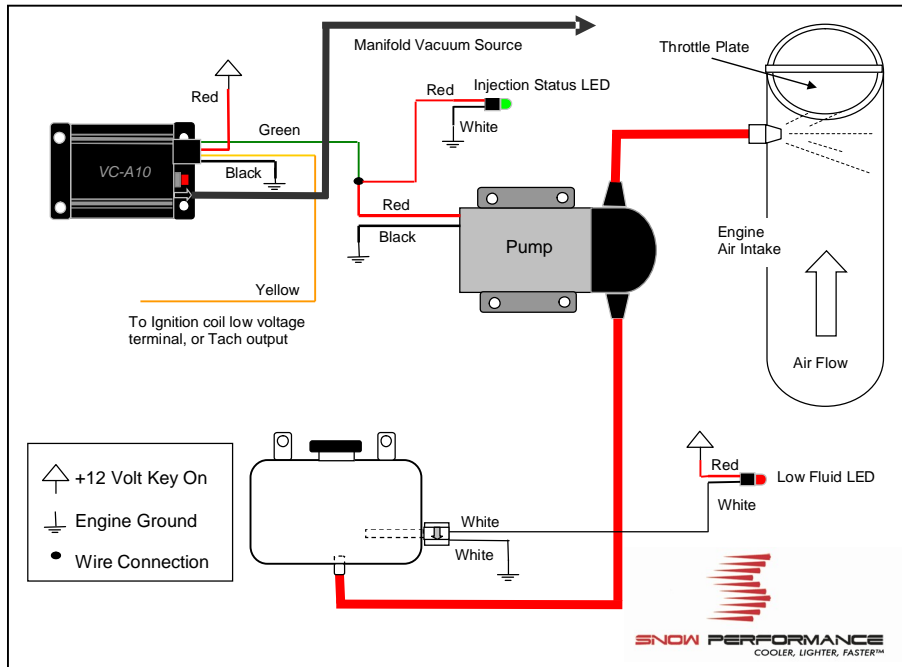
- 60ML/MN (Yellow)
- 100ML/MN (Black)
- 175ML/MN (Green)
- 225ML/MN (Purple)
- 375ML/MN (Red)
- 625ML/MN (Blue)

Upgrades

- Bulkhead
- 2.5 Gallon Reservoir
- Solenoid
- Hose Adaptor or Bung
- Level Switch
- SafeInjection®
- Nitrobooster®
- Dual Nozzle
- Carb Plate

Introduction

- Please refer to system diagram during install. The optional Level Switch Upgrade (#40030) is shown.



Nozzle Identification Chart:

Nozzle Color	Nozzle Size	Nozzle Color	Nozzle Size
Yellow	60 ml/min	Purple	225 ml/min
Black	100 ml/min	Red	375 ml/min
Green	175 ml/min	Blue	625 ml/min

LIMITATION OF LIABILITY

REPAIR OR REPLACEMENT OF A DEFECTIVE PRODUCT IS THE ORIGINAL RETAIL PURCHASER'S EXCLUSIVE REMEDY UNDER THIS WARRANTY.

DAMAGE OR INJURY TO THE ORIGINAL RETAIL PURCHASER, TO HIS OR HER VEHICLE, CARGO, OR PROPERTY, AND/OR TO ANY OTHER PERSON OR PROPERTY IS NOT COVERED BY THIS WARRANTY. THIS WARRANTY IS EXPRESSLY MADE IN LIEU OF ANY AND ALL OTHER EXPRESS WARRANTIES, WHETHER ORAL OR WRITTEN.

SNOW PERFORMANCE'S SOLE LIABILITY IS LIMITED TO THE REMEDY SET FORTH ABOVE. IN NO EVENT WILL SNOW BE LIABLE FOR ANY DIRECT, INDIRECT, CONSEQUENTIAL, INCIDENTAL, SPECIAL, EXEMPLARY, OR PUNITIVE DAMAGES OR FOR ANY OTHER DAMAGES OF ANY KIND OR NATURE (INCLUDING, BUT NOT LIMITED TO, LOST PROFITS OR LOST SALES).

SOME STATES DO NOT ALLOW THE EXCLUSION OR LIMITATION OF INCIDENTAL OR CONSEQUENTIAL DAMAGES, SO THE ABOVE LIMITATIONS MAY NOT APPLY TO YOU.

Non-Warranty Repair/Retest

Products returned due to damage or misuse and Products retested with no problem found are subject to repair/retest charges and product will be returned to customer at customer's expense. A purchase order or credit card number must be provided in order to obtain an RMA (Return Merchandise Authorization) number prior to returning Product.

This warranty does not cover problems caused by normal wear and tear including aesthetic oxidation of surfaces, accidents, unlawful vehicle operation, or modifications or repairs to product not performed or authorized by Snow. This includes any product that is disassembled or taken apart for any reason.

In addition, this warranty does not cover problems resulting from conditions beyond Snow's control including, but not limited to, theft, misuse, overloading, or failure to assemble, mount or use the product in accordance with Snow's written instructions or guidelines included with the product or made available to the original retail purchaser.

In the event of failure, Snow will repair or replace the part at Snow's sole discretion. Failures resulting from misapplication or misuse of the Product, failure to adhere to any specifications or instructions, or failure resulting from neglect, abuse, accidents, or act of nature are not covered under this warranty.

Warranty service may be obtained by calling 866-365-2762, getting an RMA (Return Merchandise Authorization), delivering the part to Snow along with proof of purchase. Customer agrees to insure the Product or assume the risk of loss or damage in transit, to prepay shipping charges to Snow, and to use the original shipping container or equivalent. Shipping for Warranty replacement parts shipped outside the continental US will be charged to customer.

Installation – Mechanical

Step 1 Reservoir Install

Install straight fitting with a small amount of E6000 sealant and mount reservoir as high in engine compartment as possible using #8x1½" sheet metal screws and washers provided.



Optional: The factory windshield washer reservoir can be used as the reservoir for your system.

- 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 GOOP 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.

TECH TIP You can mount the tank in the rear of the vehicle. The pump is a pusher type by design so it needs to be mounted as close to the reservoir as possible. Because the pump is oversized, injection pressure will not be affected. A Solenoid Upgrade is recommended for rear mounted reservoirs.

Step 2 Pump Install

Install 3/8" NPT to 1/8" NPT plastic reducer bushing using GOOP sealant on threads. Tighten 2-3 turns past finger tight. Install 1/8" NPT elbow fitting into bushing using GOOP sealant on threads. Tighten 2-3 turns past finger tight. Mount pump so the pump inlet is positioned at the lowest point of the reservoir or lower. Pump can be mounted horizontally or vertically using (4) supplied #8x1½" screws and washers.



Optional 2.5 Gal. Reservoir (#40020) Shown

Measure the distance from the reservoir outlet to the pump inlet.

Cut the ¼" red tubing using utility knife. Make cuts 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.

NOTE: The new style pump is factory set at 150 psig. It can be turned up 1-2 full clockwise turns to increase pressure (180+ psig depending on nozzle size).

Warranty

Snow Performance's commitment to providing the best water/methanol system is reflected in the components and construction of all Snow Performance Boost Cooler® kits.

A lifetime warranty for injection systems is available with exclusive use of Boost Juice injection fluid. The standard warranty is 90 days from purchase and covers all Snow Performance products and accessories purchased on or after October 30, 2008 manufactured by Snow Performance, Inc. (Snow). This warranty terminates when the original retail purchaser sells or otherwise transfers the product to any other person.

Warranty Policy

Snow Performance, Inc. warrants that the Product shall conform to and perform in accordance with published technical specifications and shall be free of defects in materials and workmanship providing:

1. You are the original purchaser and provide proof of purchase.
2. For lifetime warranty, the Warranty Card that came with system (not applicable to separate parts purchases) is returned to Snow within 90-days of purchase. If valid warranty card not on file with Snow, the standard 90 day warranty applies from date of purchase.
3. An RMA # has been attained and is displayed on package containing returned part.

Subject to Snow's inspection of the product, Snow will remedy defects in materials and/or workmanship by repairing or replacing, at Snow's option, the defective product without charge for parts or labor, subject to the limitations and exclusions described in this warranty.

Install Notes

Pump Setting _____(psig)

Nozzle Size _____(ml/min)

Boost / Vacuum setting _____

Misc:

Disclaimer

Do not use this product until you have carefully read the following agreement. This sets forth the terms and conditions for the use of this product. The installation of this product indicates that the BUYER has read and understands this agreement and accepts its terms and conditions. Performance products by their nature are designed to increase horsepower and performance not engineered in the original vehicle and the increased stress could result in damage to related systems. This is a high performance product – use at your own risk. Snow Performance Inc., its agents, employees or owners shall not be under any liability whether in contract or otherwise whether or not resulting from our negligence or contents of information supplied for any damage or loss resulting from such information. The BUYER is responsible to fully understand the capability and limitations of his/her vehicle according to manufacturer specifications and agrees to hold the SELLER harmless from any damage resulting from failure to adhere to such specifications. The SELLER disclaims any warranty and expressly disclaims any liability for personal injury or damages. The BUYER acknowledges and agrees that the disclaimer of any liability for personal injury is a material term for this agreement and the BUYER agrees to indemnify the SELLER and to hold the SELLER harmless from any claim related to the item of the equipment purchased. Under no circumstances will the SELLER be liable for any damages or expenses by reason of use or sale of any such equipment. The BUYER is responsible to obey all applicable federal, state, and local laws, statutes, and ordinances when operating his/her vehicle, and the BUYER agrees to hold SELLER harmless from any violation thereof. The SELLER assumes no liability regarding the improper installation or misapplication of its products. It is the installer's responsibility to check for proper installation and if in doubt, contact the manufacturer.

Step 3 Nozzle Selection

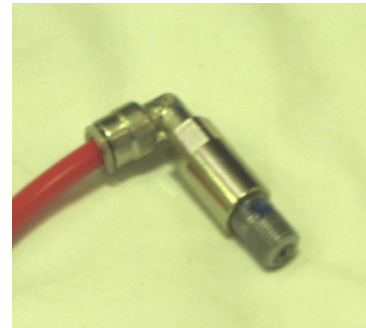
Nozzle sizing is a function of horsepower, which approximates the engine airflow, and boost, which approximates intake charge heat.

Recommended starting points:

250 - 350 RWHP:	175ml/min nozzle.
350 - 475 RWHP:	375ml/min nozzle
475 - 600 RWHP	625ml/min nozzle

TECH TIP Seal the nozzle into the nozzle holder using 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 methanol resistant 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.



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. Be sure that the nozzle is the highest point in the system.

Drill and tap (11/32" pre-drill, 1/8"-27 NPT tap) air inlet tube as close as possible to throttle body/throttle plate.



The nozzle is mounted into the intake using its external 1/8 NPT threads. Tighten the nozzle and nozzle holder assembly one half turn past hand tight using methanol resistant sealant to seal the threads.

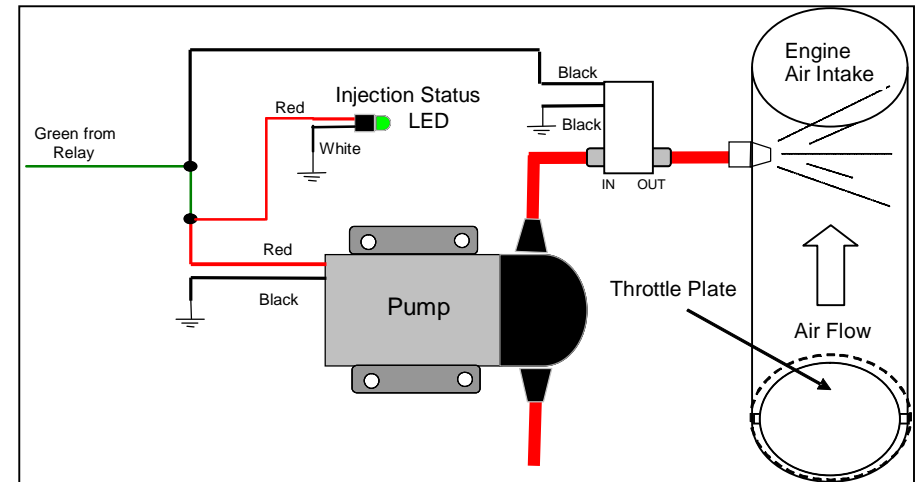
On carbureted applications the nozzle can be mounted before or after the throttle plate. A Carb Plate is available (#40050) for 4150 style square bore carburetors.

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) bungs are available.

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

Solenoid Upgrade (optional)

The optional Solenoid Upgrade (#40060) is required if the nozzle is to be installed after the intake throttle plate, or the fluid reservoir is mounted higher than the nozzle.

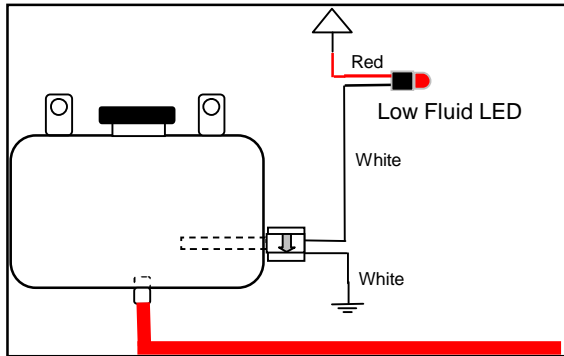


Hand thread the two 1/8" NPT quick connect fittings into ports labeled IN and OUT on the solenoid. Tighten an additional half turn.

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 IN is the inlet and the port labeled OUT is the outlet. Firmly 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 plastic 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. Note that connecting the wire to any other power source other than the pump wire will result in improper operation of solenoid. Connect the second BLACK wire to a secure chassis ground location.

Fluid Level Switch (optional)



Instructions

- After mounting reservoir, mount red LED in dash next to the green “injection” LED is usually easiest.
- Wire LED per diagram with Red wire to a 12v key-on source, and the White wire to one of the White wires of the level switch.
- Connect other White wire of the level switch to vehicle ground.
- With key-on source enabled, the red LED should be “on” with no fluid in the reservoir. Upon filling the reservoir, the red LED should be “off”.



TECH TIP The level switch is designed to indicate when there is less than 1” of fluid in the reservoir.

Step 5 Nozzle Connection

Measure the distance from the pump outlet to the nozzle holder. 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 until fully seated. Gently pull on tubing to ensure a good connection.

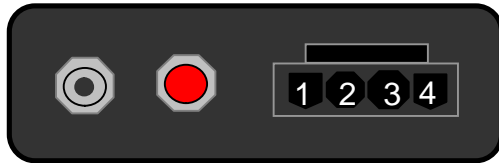


Use tie wraps to help route tubing and to ensure it doesn't contact moving or hot parts in the engine compartment. Have tubing connect to quick connect fittings at shallow angles. Having an immediate sharp bend may unseat the tubing from the internal o-ring and create a leak.

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



The figure above shows the back view of the VC-A10 controller. Attach 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. Connect vacuum hose from intake manifold to hose barb on back of controller. Plug wire harness into back of controller. Note the terminal positions are numbered on the bottom side of wire harness connector. Your controller has an internal self resetting fuse such that an external automotive type fuse is not required. In the case of a fault, the internal fuse will attempt to reset after about 1 minute.

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

- Connect GREEN wire at position 4 to Pump Red power wire.
- Connect RED wire at position 3 to +12V key on source. When selecting a 12V key-on source, try to find a dedicated circuit with at least a 15 AMP capability (25 AMP with 220psi pump).
- Connect YELLOW wire at position 2 to low voltage side (-) of primary ignition coil or engine tachometer signal wire.
- Connect BLACK wire at position 1 to a good ground location.

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

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

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™ (#40008) be the exclusive fluid used in the system.

Tuning Quick Reference

Increase base timing in 2 degree increments until the first hint of detonation then back off 2 degrees (use 3rd gear pulls from 2000 RPM).

The kit enables the use of increased timing which provides for over 50% of the potential power increase (denser intake charge the remainder). All other factors being the same, if base timing is not increased over the non-water/methanol injection settings, power increase will be less.

After tuning, ensure that reservoir has adequate fluid at all times. It is recommended that reservoir always be at least 1/4 full.

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 with a conservative timing setting.

Injecting water/methanol lower than 3300 - 3500 RPM could result in combustion quench. 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).

If you have to increase the onset too high in the rpm range (detonation control is needed sooner), decrease pump pressure and/or go to a smaller nozzle.

In the black head of the pump, there is a 2mm Allen head screw that will regulate the pressure. On the 150 psig pump, for every full turn counter clockwise you will decrease the pump pressure by 18-20 psig. On the 220 psig pump it will decrease the pump pressure 20-22psig for every turn counter clockwise.

When increasing the pump pressure, the allen screw will become tight. This is full pressure. **BE CAREFUL NOT TO OVERTIGHTEN.** If you go too far on the screw clockwise, then you can strip out the plastic threads.

Calibrating RPM Switch

The VC-A10 has an intern RPM switch that is programmable. This feature sets the minimum RPM required to enable injection. The RPM switch can be programmed at any time with the following steps:

- Start engine and wait 5 seconds for controller power up delay.
- Rev engine to desired injection RPM point and hold throttle position constant.
- Press and hold RED button on back of controller for 3-4 seconds. During this time controller will sample RPM signal and save reading to internal memory.

The factory programmed RPM point of the VC-A10 is beyond normal vehicle range and **MUST** be set during install per above procedure before injection will occur.

Variable Controller Tuning

The VC-A10 has a built in 5 second power up delay. This feature helps prevents injection during engine starting.

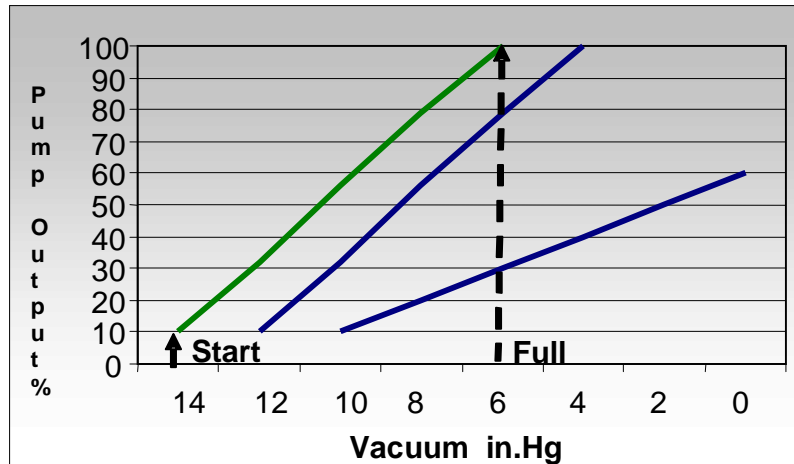


The VC-A10 is designed to control injection based on engine load. Once the RPM switch is calibrated, the controller will activate injection based on engine load whenever the engine RPM is greater then the calibrated RPM.

The following steps provide a guideline for initial dial settings. Additional fine tuning of the dial positions might be required based on engine performance and modification.

- Adjust the "Start" point first by turning dial clockwise to about one third of the engines max vacuum. This sets the vacuum pressure required to activate the injection system.
- Next, adjust "Full" to the engines minimum vacuum.
- Note - over lapping the settings, where the Full dial is at higher vacuum then Start, will result in max injection at the onset point.
- Adjust Full dial until a smooth power curve is felt with no misfiring.

Controller Operation Example



The above chart plots three different settings for the VC-A10 water/methanol injection controller

For setting 1, GREEN, the chart shows the Start dial at 14 in. Hg and the Full dial at 6 inHg. At 14 inHg of manifold vacuum, the pump will operate at 10%. At 6 inHg of manifold vacuum, the pump will deliver 100% of injection pressure.

For manifold vacuum readings between the Start and Full settings, the controller will linearly adjust the pump pressure as shown on the graph.

Testing the System

Step 1 Test Pump and Mechanical System

Disconnect pump from controller. 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.



If pump goes on and fluid level doesn't go down, there is an obstruction in the tube or nozzle.

Activation of pump for short periods (2 - 5 sec.) will not cause engine damage.

Step 2 Test Controller

With the nozzle removed from intake, start vehicle and let it idle for 10 seconds. Set the rpm switch with the motor at 1500. Increase engine RPM above 1500 rpm and remove the vacuum line from the controller. The controller is now detecting atmospheric pressure which is the same condition as wide open throttle. The pump should activate, green LED should go on, and the fluid level in tank should go down. If system does not activate, check all wiring connections.