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Notes

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The names, addresses and telephone numbers mentioned are current as of September 9, 2011. Note that this information is subject to change. Please refer to www.snowperformance.net for current information.

BOOST COOLER™

**INSTALLATION INSTRUCTIONS
FOR PART #48005
DIESEL STAGE 3 MPG-MAX™
WATER / METHANOL INJECTION
SYSTEM
CHEVY/GM DURAMAX
6.6L DIESEL**



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Have a question?

FAQ: www.snowperformance.net/faqs.php



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.

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.

Non-Warranty Repair/Retest

Products returned due to damage or misuse and Products retested with no problem found will be returned to customer at customer's expense.

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'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. Product will be returned to customer at customer's expense. A credit card number must be provided in order to obtain an RMA (Return Merchandise Authorization) number prior to returning Product.

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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.

Warranty

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 for 90-days providing:

1. You are the original purchaser and provide proof of purchase.
2. For 1-year warranty, the Warranty Card that came with system (not applicable to separate parts purchases) is returned to Snow within 45-days of purchase. If valid warranty card not on file with Snow, the standard 90 day warranty applies from date of purchase.
3. For Lifetime warranty, the Warranty Card that came with system (not applicable to separate parts purchases) is returned to Snow within 45-days of purchase and Boost Juice® injection fluid is used exclusively.*
3. An RMA # has been attained and is displayed on package containing returned part.
4. Parts Warranty ~ 90 day warranty on parts purchased separately if used in conjunction with a Snow System. No warranty implied if used with a non-Snow part/system.

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.

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.

* Boost Juice® usage evidenced by invoices/ receipts.

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 719-633-3811, getting an RMA (Return

Kit Contents

Parts

- 7 Gallon Reservoir
- UHO Pump (Ultra High Output)
- 25 ft High Pressure Tubing
- 3 ft Black Wire Loom
- 18" 1/8" Silicone Tubing

Electrical Packet

- 2 Blue Butt Connectors
- 3 Small Eyehooks
- 1 Male Connector
- 3 Female Connectors
- 10 Tie Wraps
- 1 Arm Switch
- 1 Brass Hose Barb
- 5" Double Sided Tape
- 1 Yellow Temp Probe Connector
- Diesel Stage 3 MPG Max Controller
- Temperature Probe
- Fuse holder
- 20 amp fuse

Required Tools

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

Mechanical Packets

- 1 Nozzle Holder
- 4 #8x1&1/2" Screws
- 4 #8 Washers
- 2 Dual Nozzle Upgrades
- 2 Solenoid Upgrade
- 7 Gallon Fitting Set:
 - 90° Elbow
 - 3/8" – 1/8" Reducer
- 1 Temp Probe Compression Fitting – 3/16"
- 1 E-6000 (GOOP)
- 1 175ml/min Nozzle
- 1 375ml/min Nozzle
- 1 625ml/min Nozzle

Upgrades/Options

- 2.5 Gallon Reservoir
- Hose Adaptor or Bung
- Boost Juice
- Level Switch

Introduction

The Snow Performance Boost Cooler® Diesel Stage 3 MPG-MAX™ water/methanol injection system provides more power, cooler EGTs, and excellent fuel economy increases. The MPG-MAX™ system does not require a sustained high load state in order to provide maximum fuel economy gains. The MPG-MAX™ system uses a new injection management controller that allows for a small spray of water/methanol to be injected across the power curve. This provides an increase in combustion efficiency which provides more power without injecting more diesel fuel. This increase in efficiency translates into an increase in fuel economy. Typical fuel economy increases are 10%-15% or 1-3 MPG.

The MPG-MAX™ system has a secondary output that is used to activate a Power Mode. This introduces a second phase of injection. A larger nozzle(s) is used to inject more fluid to make more power. The Power Mode activation point is adjustable for best performance.

Because the MPG-MAX™ system injects more frequently, the fluid consumption rate will be higher than other Boost Cooler systems. The MPG-MAX™ system has been coupled with the Snow Performance 7 Gallon Reservoir to provide a large fluid tank that fits well into the bed of a truck. This will provide the longest range possible and includes the necessary installation hardware.

Refer to the following installation diagram. Completely read through this instruction manual before attempting installation. Contact Snow Performance for any questions or concerns.

Nozzle Identification Chart:

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

-
-
- 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.

Install Notes

Pump Setting _____

Nozzle Size _____

Controller Setting _____

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

Note: The diagram shows all three nozzles. Often only two are appropriate. Please see page 8 for details

Note: The system can use two nozzles simultaneously, but this is not always needed. Refer to the nozzle guide on page 8 for nozzle selection.

Installation - Mechanical

Step 1 Reservoir Install

Install 90 degree elbow into reducer bushing using E6000 sealant. Turn ½ turn past finger tight. Do not use Teflon sealants on Snow Performance fittings. Install reducer bushing into reservoir outlet using E6000 sealant. Turn ½ turn past finger tight.



- Test fit reservoir in desired mounting location. Typical placement is tucked up along the side of a pickup bed or in a bed mounted tool box.
- Check the area under the bed near the desired mounting location. Note the location of fuel tanks, fuel lines, and wiring.
- Mark the location of the four aluminum mounting strap tab bolt holes.
- Drill through bed with appropriately sized drill bit. USE CAUTION WHILE DRILLING.
- Mount reservoir with aluminum mounting straps using appropriate hardware.

- Pump should activate, fluid should flow, and tank level should go down.

Tuning Quick Reference

If combustion quench occurs as evidenced by engine “bucking”, reduce the injection quantity. This can be done by:

1. Using a smaller nozzle(s).
2. Using Screen 9 and Screen 10 to adjust the gain.

Caution*****

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

Also, fresh methanol – less than 1 month old when exposed to atmosphere – and using a greater methanol concentration – up to 50% - will reduce combustion quench.

100% water will cool combustion and EGTs and will increase power approx 20-30 HP.

75/25 water/methanol will reduce EGTs and power will increase approximately 40 HP.

50/50 water/methanol will reduce EGTs and increase power approximately 70+ HP.

1. The “armed switch” is turned to the off position when the engine is off.

Caution: Do not attempt to inject water/methanol until the engine has reach operating temperature. A cold engine is more susceptible to quench and poor performance.

Step 1 Test Pump and Mechanical System

Disconnect pump from controller.

Caution: Failure to do this will result in damage to the controller.

Using a 12 volt source, apply power to red wire of pump. Pump should activate 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 purge air bubbles after installation. This can be accomplished during initial use.

Step 2 Test Controller

- With tube removed from the nozzle, place the controller in "boost only" mode by selecting MPG mode. Set start at 5psig and full at 6psig.
- Disconnect the silicone boost line from the 'T' fitting on the intake boost line.
- Turn key on and ensure arming switch on.
- Using a hand pump, apply 10-20 psig of pressure to the boost line going to the controller.

Caution*****

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

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, and then pull on the hose gently.



Measure the distance from the reservoir outlet to the pump inlet. Cut the 1/4" 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. The pump can be mounted under the truck bed in a place protected from road spray.

Caution*****

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

activate 6-10 psig before your maximum boost pressure. If the max boost pressure is 30 set the POWER MODE start point to 20-24 psig. If the max boost pressure is 40 set the POWER MODE start point to 30 psig.

ADJUSTING THE CONTROLLER

The MPG MAX phase of injection is meant to inject a small amount of fluid during low load cruising. Starting the MPG MAX phase as early as possible offers the largest range of benefit. If combustion quench occurs as evidenced by engine bucking or bogging, too much fluid is being injected too soon. To prevent quench try each of the following:

- Toggle to Screen 8A. Adjust the MPG MODE START point to come on at a higher boost level. Adjusting the 100% point higher will also help reduce quench.
- Change out MPG MAX nozzle to the next size smaller.

If quench occurs when the POWER MODE activates try each of the following:

- Toggle to Screen 12. Adjust the POWER MODE START point to come on at a higher boost level.
- Toggle to Screen 11. Adjust the GAIN down to reduce overall injection amount if in Tow Mode.
- Change out POWER MODE nozzle(s) to the next size smaller.

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 1/4 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.
- Pump is now primed. Reconnect tubing from pump outlet to nozzle (or solenoid).

If using a solenoid in between the pump and the reservoir: Remove the solenoid and place a solid piece of tube between the pump and the reservoir and prime the system. Then replace the solenoid in between the pump and reservoir.

- Toggle to Screen 8. Select MPG mode.
- Toggle to Screen 8A/B. Adjust the start point up or down. Typical start points are 7-8 psig.
- Toggle to Screen 8C/D. Adjust the full 100% point up or down. Typical 100% points are 16-20 psig
- Toggle to Screen 9. Select boost level. See “Controller Operation: Screen 9”.
- Toggle to Screen 12/13. Adjust the POWER MODE activation point up or down. Initially set the POWER MODE start point to activate 6-10 psig of your maximum boost pressure. If the max boost pressure is 30 set the POWER MODE start point to 20-24 psig. If the max boost pressure is 40 set the POWER MODE start point to 30 psig.

A typical application making about 30 psig should set the MPG Start at 7 psig, the MPG 100% at 15 psig, and the Power Mode Start at 25 psig. This will yield small amounts of injection in normal operational conditions and maximum cooling in heavy load and high performance situations.

TOW MODE

In Tow mode, the controller will measure EGTs and boost pressure to calculate the injection rate. Based on these two inputs, the controller uses pre-mapped 2-D matrix to determine how much fluid to inject. Because the controller is pre-programmed, there are no start and full points to adjust.

- Toggle to Screen 8. Select Tow mode.
- Toggle to Screen 9. Select boost level. See “Controller Operation: Screen 9”.
- Toggle to Screen 12/13. Adjust the POWER MODE activation point up or down. Initially set the POWER MODE start point to

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:

HP	MPG MAX	POWER MODE
350 > WHP	175 ml/min	375 ml/min
400 - 500 WHP	175 ml/min	625 m/min
500 < WHP	175 ml/min	375 + 625 ml/min

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 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

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. Choose and mark mounting location for nozzle placement. Nozzles can be mounted in a variety of places on the charge pipe between the intercooler outlet and the intake inlet, as long as they have a clear spray pattern into the airflow.

Remove the piece just before the intake and drill and tap (11/32" pre-drill, 1/8"-27 NPT tap) for two or three nozzles.



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® sealant to seal the threads.

Step 5 Nozzle and Solenoid Connection

Solenoid is flow directional. Be sure to note which port is the INLET/PRESSURE port (2 or IN) and which is the OUTLET port (1 or OUT).

The main outlet line coming from the Reservoir connects to the first solenoids inlet. The outlet of this solenoid connects to the inlet of

Screen 8D

MPG Mode 100%
PSI Down

MPG MODE 100% - DOWN. Pressing and releasing button 2 will decrease the maximum injection point.

Screen 9-(TOW MODE ONLY)

Boost Range
Change

This screen is used to select between LOW, MED, and HI boost mode. **For vehicles making 8-18 psig of boost, use LOW mode. For vehicles making 18-25 psig of boost, use MED mode. For vehicles making 25+ psig of boost, use HI mode.**

Screen 10-(TOW MODE ONLY)

Inj Gain
Increase

This screen is used to increase the injection gain setting. Pressing and releasing button 2 will increase the gain setting. **Changes in gain affect injection in Tow Mode only. 5%-10% changes make a big impact.**

Screen 11-(TOW MODE ONLY)

Inj Gain
Decrease

This screen is used to decrease the injection gain setting. Pressing and releasing button 2 will decrease the gain setting.

Screen 12-(MPG MODE ONLY)

Power Mode Start
Up

POWER MODE START - UP. Pressing and releasing button 2 will increase the Power Mode injection activation point. **Set this to 6-10 psig before maximum boost.**

Screen 13-(MPG MODE ONLY)

Power Mode Start
Down

POWER MODE START - DOWN. Pressing and releasing button 2 will decrease the Power Mode injection activation point.

Variable Controller Tuning

MPG MODE

In MPG mode, injection is a function of boost pressure only which is desirable when a more immediate injection is desired. In MPG mode, an injection start and full point must be selected.

Screen 5

BAR DegC
 %Inj

This mode displays the Boost, EGT and Injection in Metric units

Screen 6

PSI
DegF

This display shows both digital and bar graph readings for boost and EGT in Standard units.

Screen 7

Bar
DegC

This display shows both digital and bar graph readings for boost and EGT in Metric units.

Screen 8

Injection Mode
Change

This is the setup screen for the control mode. Pressing the right button (# 2) will toggle the setting between MPG and Tow. If Tow is selected, the 2-D matrix value for the injection is used. If MPG is selected, boost alone will determine injection. Tow mode is used in loaded or towing situations. MPG injection is used in day to day driving and high-performance situations.

Screen 8A

MPG Mode Start
PSI Up

MPG MODE START - UP. Pressing and releasing button 2 will increase the injection activation point. **Typical activation points are in the 7-8 psig range.**

Screen 8B

MPG Mode Start
PSI Down

MPG MODE START - DOWN. Pressing and releasing button 2 will decrease the injection activation point.

Screen 8C

MPG Mode 100%
PSI Up

MPG MODE 100% - UP. Pressing and releasing button 2 will increase the maximum injection point. **Typical 100% points are in the 16-20 psig range.**

the pump. The outlet of the pump connects to the Union "T". One outlet of the tee goes to the small MPG-MAX™ nozzle and the other outlet of the tee connects to the second solenoid. The outlet from the second solenoid will connect to the POWER MODE nozzle(s).

Measure the distance from the pump outlet to the injection location. 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

Step 6 Install EGT Probe

Drill and tap exhaust manifold pre-turbo. If this is performed with the exhaust manifold still on the engine, start the engine and let it idle while drilling and tapping. This will prevent shaving from entering the exhaust and turbo. During tapping, coat tap with heavy grease so it will collect any metal shavings.



Mount the Temp Probe using the 3/16" compression fitting (provided).

Installation - Electrical

Variable Controller Installation



Attach controller to secure location with easy access in driver's compartment using supplied tape. Install brass hose barb into intake tubing 3" prior to nozzles. Connect black silicone tubing from brass hose barb to clear tubing coming from the controller and secure with a tie wrap.

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

- Connect BLACK to a good ground location.
- Connect WHITE wire to Pump RED power wire.
- Connect GREEN wire to one BLACK wire from solenoid. Connect other BLACK wire to ground.
- Connect RED wire to inline switch and then connect to +12V key on source.
- Wire the Yellow "K" type temp probe connector to temp probe installed in Step 6 above. The YELLOW wire connects to the POSITIVE terminal, the RED wire connects to the NEGATIVE terminal of the connector. Connect to the lead from control module.

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

Controller Operation

The controller has an LCD display screen. The display software allows for seven different display modes and three control/setup screens.

To control the screen selection, the unit has two operator buttons; one to the left of the screen (button 1) and one to the right of the screen (button 2). Pressing and releasing button 1 will cause the display to sequence to the next screen. Button 2 is only active in the control/setup screens, and is used to change the current control setting of the setup screen displayed.

The system memory will remember the current display setting even if the unit is turned off. The controller will turn on at the last used display setting.

Additionally, button 2 is used for the "Injection ON/OFF" function.

Pressing and holding button 2, then pressing button 1, then releasing both buttons will change the system to read only without changing the display screen. The pump will not activate in read only. All screen display functions will remain active even when the injection is turned off. To get the controller out of read only mode, just repeat the procedure.

Screen 1

P	T
Inj	

This mode displays pressure (P), temperature (T) and injection percentage (Inj) as three independent bar graphs.

Screen 2

Boost
EGT

This mode displays the boost pressure and EGT temperature in PSI and degrees F.

Screen 3

Boost
EGT

This mode displays the boost pressure and EGT temperature in BAR and degrees C.

Screen 4

PSI	DegF	T
	%Inj	

This mode displays the boost, EGT and injection in Standard units.