



INSTALLATION INSTRUCTIONS
FOR
WATER / METHANOL INJECTION
SYSTEM
FOR UNIVERSAL
TURBO DIESEL APPLICATIONS

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Have a question?

FAQ: www.nitrousexpress.com



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.

Kit Contents

Parts

- UHO Pump (Ultra High Output)
- 3 Qt Reservoir
- 10 ft High Pressure Tubing
- 3 ft Black Wire Loom
- Level Switch Upgrade Pack
- 2 ft 1/8" Silicone Hose

Electrical Pack

- 2 Blue Butt Connectors
- 3 Small Eyehooks
- 1 Male Connector
- 4 Female Connectors
- 10 Tie Wraps
- 1 Arm Switch
- 1 Brass Hose Barb
- 5" Double Sided Tape
- Stage 3 Diesel Controller
- Temperature Probe
- Yellow K-Type Temp Probe Connector

Upgrades/Options

- 2.5 Gallon Reservoir
- 7 Gallon Reservoir
- Solenoid Upgrade
- Hose Adaptor or Bung
- Boost Juice

Mechanical Packets

- 1 Nozzle Holder
- 1 3/8" Reducer Bushing
- 1 1/8" NPT to 1/4" OD Elbow
- 8 #8x1&1/2" Screws
- 8 #8 Washers
- 4 #6x1/2" Screws
- 1 Dual Nozzle Upgrade
- 1 Bulkhead
- 1 Temp Probe Compression Fitting – 3/16"
- 1 Sealant
- 1 375ml/min Nozzle
- 2 625ml/min Nozzles

Required Tools

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

Introduction

The Stage 3 Diesel systems are the most comprehensive water-methanol injection kits Nitrous Express makes. This controller senses not only manifold boost pressure but also exhaust gas temperatures to control injection. Using two inputs allows for the smoothest injection control in the widest range of conditions.

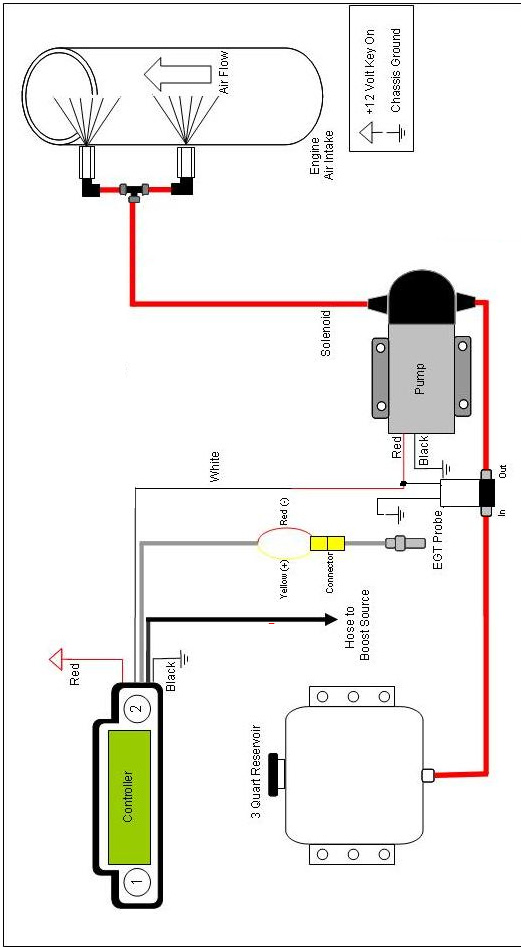
More importantly, it also keeps the EGTs as low as possible – if they begin to climb, even if the boost stays constant, the Stage 3 controller will read this and inject more water-methanol to compensate.

The adjustments to the delivery on the fly are accomplished with two easy-to-use push buttons, allowing for more or less injection, or switching from both boost & EGT referenced injection (smoothest, best for towing and EGT control) to just boost referenced injection (most responsive, best for performance and racing).

Please refer to the following system diagram during install. It is highly recommended for bed-mount tanks of any kind. Completely read through this instruction manual before attempting installation. Contact Nitrous Express 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



Note: The provided rocker switch is used on the controller power supply. The bronze colored prong on the switch goes to ground, the middle silver prong goes to the controller red wire, and the remaining silver prong goes to a 12V key-on power source fused for 10-15 amps.

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 straight fitting with included sealant and mount reservoir as high in engine compartment as possible using #8x1½" sheet metal screws and washers provided. Note that the nozzles should be the highest point in the system, not the reservoir.

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



Bulkhead Fitting Installed in Washer Tank.

- Drill 9/16" hole in desired bulkhead location.
- Remove one nut from bulkhead and turn the remaining nut to the 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.

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

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 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.



Mount pump away from direct road spray and debris.

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. The pump can be mounted on the floor next to the reservoir.

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 - 300 WHP	625 ml/min nozzle
325 - 400 WHP	375 & 625 ml/min nozzle
450 - 650 WHP	2 X 625 ml/min nozzles

Seal the nozzle into the nozzle holder using included 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 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 Performance fittings.



Correct



Incorrect

NOTE: If nozzle is mounted lower than the reservoir, a Solenoid Upgrade 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. Choose and mark mounting location for nozzle placement. Nozzles can be placed in a variety of places on the charge pipe between the intercooler outlet and the intake inlet, so long as they have a clear spray pattern into the airflow, and the nozzle tip is flush with the inside wall of the tube or protruding slightly into the airflow.

Drill and tap (11/32" pre-drill, 1/8"-27 NPT tap) for nozzle(s).



Optional Weld-In Bung Shown

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 sealant.

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.

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 shavings from entering the exhaust and turbo. During tapping, coat tap with heavy grease so it will collect metal shavings.



Mount the Temp Probe using the compression fitting (provided).

Installation - Electrical

Variable Controller Installation



Attach controller to secure location with easy access in driver's compartment using supplied tape. Connect black silicone tubing from intake plenum boost line (using the included 'T' fitting) to clear tubing coming from the controller and secure with tie wraps.

⚠ 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 WHITE wire to Pump RED power wire.
- Connect RED wire to +12 volt key on source with inline switch. (Bronze prong is ground on switch.)
- 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.

Always have a good ground. Poor grounding will result in erratic operation of controller.

Controller Operation

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

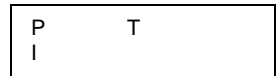
To control the screen selection, the unit has two operator buttons; one to the left of the screen (Button 1) and one to the right of the screen (Button 2). Pressing and releasing Button 1 will cause the display to sequence to the next mode. Button 2 is only active in the control/setup screens, and is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

Screen 1



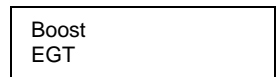
This mode displays Boost Pressure (P), Temperature (T) and Injection percentage (I) as three independent bar graphs. The pressure scale is scaled proportional to the Lo/Hi boost selection.

Screen 2



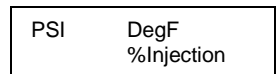
This mode displays the boost pressure and EGT temperature in PSI and °F.

Screen 3



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

Screen 4



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

Screen 5

BAR DegC
%Injection

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 English units.

Screen 7

BAR
DegC

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

Screen 8

EGT Control
Change

This is the setup screen for the “Boost Only” control mode. Pressing the right Button (button 2) will toggle the setting between EGT Control ON and OFF. If the “EGT Control” is ON, the matrix value for the injection is used. If the “EGT Control” is OFF, the “Boost Only” injection setting will be used. The selection of this function is also stored in system memory and recalled on power on. EGT Control is useful during towing or on long grades.

Screen 9

Boost Range
Change

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

Screen 10

Injection Gain
Increase

This screen is used to increase the injection gain setting. Pressing and releasing Button 2 will increase the gain setting. This setting is also remembered on power up.

Screen 11

Injection Gain
Decrease

This screen is used to decrease the injection gain setting. Pressing and releasing Button 2 will decrease the gain setting. This setting is also remembered on power up. **5%-10% changes in Gain have a significant impact on injection.**

Variable Controller Tuning

EGT Control Mode

When EGT Control mode is enabled, the controller will measure EGTs and boost pressure to calculate the injection rate. This is ideal for towing or heavily loaded situations. In this mode, a high gain setting will result in a larger injection rate.

- Toggle to Screen 8. Set EGT Control to ON.
- Toggle to Screen 10. Adjust the gain up to 100.
- If combustion quench occurs as evidenced by engine “bucking”, reduce the injection quantity or lower the gain setting on the module. This can be done by:
 - Using a smaller nozzle(s).
 - Adjusting the gain.
- To adjust gain down, toggle to screen 11. Adjust the gain down until engine runs smooth with no bucking.

Boost Only Mode

The controller has a “boost only” mode. When EGT Control mode is disabled, injection is a function of boost pressure only which is desirable in racing and day to day applications where more immediate injection is desired.

- Toggle to Screen 8. Set EGT Control to OFF.
- If combustion quench occurs as evidenced by engine “bucking”, reduce the injection quantity or lower the gain setting on the module. This can be done by:
 - Using a smaller nozzle(s).
 - Adjusting the gain.
- To adjust gain down, toggle to screen 11. Adjust the gain down until engine runs smooth with no bucking.

Example:

For a truck making 30-35 PSI maximum boost and about 400HP, use a 625 and a 375 nozzle. Set the boost range to High and leave gain at 100%.

Testing the System

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

Step 2 Test Pump and Mechanical System

Disconnect pump from 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 (1 - 5 sec.) will purge air bubbles from the system after installation. This can be accomplished during initial use.

Step 3 Test Controller

- With the nozzles removed from the intake, place the controller in “boost only” mode by disabling the EGT Control mode. Set gain to 100.
- Disconnect the silicone boost line from the ‘T’ fitting at the intake boost line.
- Using a hand pump, apply 10-20 psig of pressure to the boost line.
- 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 10 and Screen 11 to adjust the gain.

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.

Caution: To avoid “pooling” in the intake and possible engine damage upon start-up, it is recommended that:

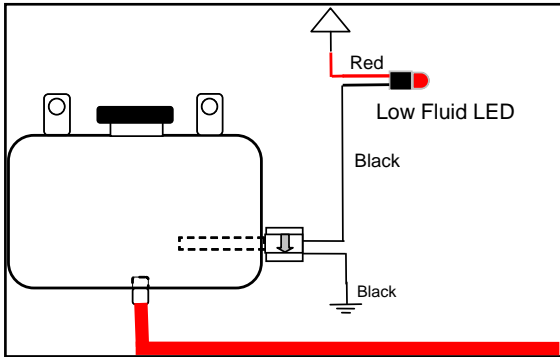
1. The engine be run without water/methanol for at least 5 minutes after injection before turning the engine off.
2. The “armed switch” is turned to the off position when the engine is off.

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.

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

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

Fluid Level Switch



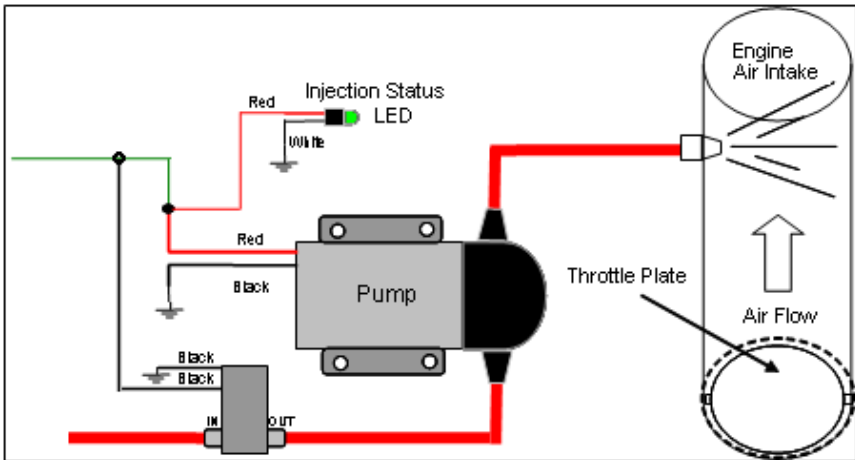
Instructions

- 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. Sealant 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 Sealant 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 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.

Install Notes

Pump Setting _____(psig)

Nozzle Size _____(ml/min)

Controller 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. Nitrous Express 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.

Warranty

Nitrous Express commitment to providing the best water/methanol systems is reflected in the components and construction of all Nitrous Express water-methanol kits.

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. NX'S SOLE LIABILITY IS LIMITED TO THE REMEDY SET FORTH ABOVE. IN NO EVENT WILL NX 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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