Owner's Manual

Dual-stage EFI Systems
Part Number #13100

Part # 13100 Dual-stage system
Part # 13100A Conversion Kit (without bottle, brackets, feed line, and bottle nut)

- Safety
- Contents
- Installation
- Operation
- Maintenance

VITAL INFORMATION BELOW—PLEASE READ SAFETY AND OPERATING INSTRUCTIONS BEFORE FIRST USE OF THIS PRODUCT

For answers to your questions concerning this product, please contact the **NITROUSWORKS Technical Department** at **(706) 864-8544** from 8:00 AM until 6:00 PM, Monday till Friday (Eastern Standard Time) or visit the Barry Grant, Inc. website at **www.barrygrant.com**

SAFETY INSTRUCTIONS

Warning: NitrousWorks kits are designed for racing use only. They are not to be used on public highways. Basic safety precautions must always be followed to reduce the risk of fire and serious injury. The installer and operator are responsible for following the warnings and instructions in this manual. Please read the entire instruction manual before using this product. Restrict the use of this product to only those who are familiar with the installation and operating instructions.

- Fuel is combustible; therefore, be careful not to drip any fuel on a hot engine or hot components.

- Inspect all fittings and connections prior to use and make sure they are tight and leak-free. Your safety depends upon it.

Disconnect the battery before wiring.

CONTENTS OF THIS BOX

- 2- Nitrous nozzles with jet adapter fittings
- 2- Nozzle bushings (to secure nozzles in nozzle plate)
- Nozzle plate (to secure bushings and nozzles in air inlet hose)
- Assorted jets to provide different levels of power output (see accompanying data)
- 4- Solenoids (2 nitrous and 2 fuel—all mounted on brackets)
- Hoses 18” long (-4AN x -3AN) (one hose with red fittings and one hose with blue fittings)
- Hoses 12” long (three with red fittings and two with blue)
- Tee -4AN (for fuel)
- Tee -4AN with filter (for nitrous)
- Compression Tee (for fuel connection)
- Fitting, 1/16 NPT x -4AN (for Ford rails)
- Switch, Wide-open-throttle (WOT)
- Arming Switch
- Coil Cord Switch
- Relays
- Instruction Manual
- Assorted wire and terminal ends

The complete nitrous system includes the following:

- 10lb. nitrous bottle
- Bottle brackets
- Feed line: -4AN x 16-feet long
- 1- Bottle nut -4AN (to attach bottle to feed line)

INSTALLATION and OPERATION

This kit is designed for use on most fuel-injected vehicles. Before using nitrous oxide, make sure the engine is in proper working order and that the fuel delivery system is capable of providing the additional fuel to sustain the nitrous oxide system.

Installing the Nozzles

The nozzles should be mounted in the air inlet hose 3- to 4-inches before the throttle body. To accomplish this, remove the air inlet hose from the throttle body and the air box. Select a location on the hose to mount the nozzles that will not interfere with other components once they are installed, yet still

provide a direct path for the nitrous and fuel to spray into the intake manifold. Drill two 1/2-inch holes through the hose to install the nozzle mounting bushings (flanged style). The simplest way to identify the position of the holes is to place the two-hole bracket on the hose and spot through with an ink or paint marker. Once the holes are cut in the air inlet hose, place the flanged bushings through the two-hole bracket and push the assembly through the holes from the inside of the inlet hose. When the bushings appear through the tube, install the nuts on the topside of the bushings and tighten. Once the bushings are secure, install the nozzles. Both nozzles are the same. They must be installed with their discharge openings toward the intake manifold. Once the nozzles are tight in the adapters, the air inlet hose can be reinstalled.

Mounting the Solenoids

Both sets of solenoids are the same: a fuel and a nitrous solenoid mounted together on each bracket. Mount the solenoids such that they do not interfere with moving parts, but are still close enough to connect to the lines.

Connecting the Hoses

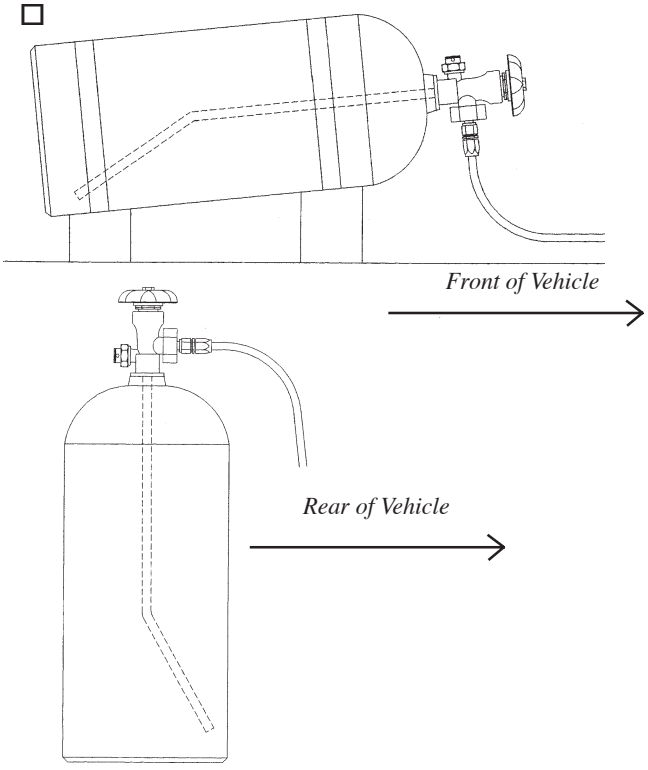
Before connecting the nozzles to the solenoids with the hoses provided, install both fuel and nitrous jets in the nozzles. Using the jetting chart provided, choose the desired HP level for each stage. The fuel jets are installed in the upper nozzle openings that are closer to the intake manifold; accordingly the nitrous jets are installed in the upper nozzle openings that are further away from the intake manifold in each nozzle. With the jets installed, attach the 18" hoses to the nozzles (–3AN swivel ends). Use the hoses with the red end fittings for fuel and the hoses with blue end fittings for nitrous. The red hose ends, when attached to the nozzles, will be closer to the intake manifold or throttle body, while the blue hose ends will be further away. Attach the remaining hose ends to the solenoids. Again, connect the red ends to the fuel solenoids and the blue ends to the nitrous solenoids. The solenoids are marked fuel and nitrous. Make sure to connect the lines from each nozzle (both fuel and nitrous) to the appropriate solenoids as they are paired; the first-stage nozzle is attached to the first stage solenoids and the second-stage nozzle attached to the second-stage solenoids.

With the four hoses connected from the two nozzles to the four solenoids, use the 12" –4AN hoses to connect the solenoids to each other. Again, red for fuel and blue for nitrous. The two fuel solenoids will connect to the standard –4AN tee using the red-end hoses. The nitrous solenoids will connect to the –4AN tee, which includes a filter adapter, using the blue hoses.
☐

Mounting the Nitrous Bottle

The nitrous bottle should be mounted outside the driver's compartment; the trunk of the vehicle is generally the preferred location. The bottle is provided with mounting brackets to ensure the end with the valve is always higher. The valve should be facing forward (toward the front of the vehicle) with the bottle nut facing downward toward the floor pan of the vehicle.

With the bottle mounted, install the bottle nut, making sure to insert the washer into the bottle nut before installing it. Route the 16' –4AN nitrous line from the bottle toward the nitrous tee in the engine compartment; that is, the filtered tee that connects the two nitrous solenoids. Do not route this line through the driver's compartment. Further, ensure it is kept away from moving components and protected from high temperatures. With the feed line routed, it can now be connected to the bottle and the filtered tee.
☐



Feeding Fuel to the Solenoids

This system can be easily adapted to suit most fuel-injected vehicles. Ensure the engine is cold and that eye protection is in place. Locate the fuel pressure test port on the fuel rail and remove the threaded cap. Cover the port with a rag and depress the Schrader valve to relieve the residual fuel pressure. On GM vehicles equipped with a fuel rail, remove the Schrader valve and connect the remaining 12" red –4AN fuel line from the rail fitting to the tee that connects to the two fuel solenoids.

On most Ford vehicles, it is possible to remove the Schrader valve and install the 1/16" NPT x –4AN adapter provided. With the adapter installed, connect the 12" red –4AN fuel line to the tee that connects to the two fuel solenoids.

On most other vehicles, the best approach is to cut the stock steel fuel line and install the compression tee that is supplied with the kit. Tighten the tee and connect the 1/8" NPT x –4AN adapter. To the adapter, connect the 12" red –4AN fuel line to the tee that connects to the two fuel solenoids
☐

Wiring: Full-Throttle Switch

Before wiring disconnect the battery. This kit is provided with a Full-throttle switch and mounting bracket. Position the bracket and bend it as necessary such that the switch is closed when the throttle is fully open. This stops the flow of nitrous when the throttle is not in the fully open position. With the switch mounted, confirm that it opens and closes with throttle movement. Then, connect a wire from the bottom terminal of the common post (marked COM) to a reliable chassis ground. Take one wire from each of the four solenoids and connect them together. These wires will connect to the middle terminal of the Full-throttle switch. This terminal will be marked NO (Normally Open). Now connect the remaining wires of the nitrous and fuel solenoids to each other in pairs: one nitrous with one fuel. This will allow the activation of each nitrous stage individually.
☐

Master Arming Switch:

The toggle switch in the kit acts as the Master Arming switch, and needs to be wired as a switched power supply, a "keyed-on" 12-volt source. This means that it will only receive power when the ignition is on. On the remaining terminal of the switch, two wires are employed: one is connected to the #86 terminal of the first-stage relay; the other wire is connected to the coil cord for the second stage of nitrous.
☐

1st Stage Relay:

With a wired connection already in place between the Master Arming switch and the #86 terminal of the first-stage relay, run a 10-gauge wire directly from the battery to the #30 terminal of the relay. Incorporating a 25-amp fuse in this wire is advised. Run a wire from the #85 terminal of the relay to a reliable chassis ground. Any optional Hobbs switches, which prevent the nitrous system from operating due to low fuel or oil pressure, should be incorporated in this wire as well. Later, when testing the system, these will be bypassed by connecting the two terminals on the switch using a jumper wire. The next step is to connect the two wires from one set of solenoids (mentioned above—one nitrous and one fuel) to the #87 terminal of the first-stage relay. The first stage is now wired and ready to operate. Turn on the Master Arming switch, open the throttle fully, and the first stage of nitrous will activate.
☐

2nd Stage Relay:

Run a wire from the coil cord to the #86 terminal of the second-stage relay. Use a 10-gauge wire directly from the battery to the #30 terminal of the relay. Incorporating a 25-amp fuse is advised. Run a wire from the #85 terminal of the relay to a reliable chassis ground. Connect the remaining two wires from one set of solenoids (one nitrous and one fuel) to the #87 terminal of the second-stage relay. The second stage is now wired and ready for use. As indicated in the previous paragraph, by turning on the Master Arming switch and opening the throttle fully, the first stage of nitrous will activate. When the coil cord button is pushed, the second stage will activate.
☐

Checking the System:

Wiring:

Reconnect the battery and check the wiring. First, ensure the nitrous bottle is turned off and disconnect power to the fuel pump. Turn on the ignition system and the Master Arming switch. Depress the throttle to its fully open position and the first-stage solenoids should click open. Now depress the coil cord button and the second-stage sole-

noids should click open. If there's uncertainty as to whether the solenoids are opening, touch the top of the coil with a screwdriver: the coil becomes magnetic when open. As soon as the throttle moves from its fully open position, the solenoids should close. Note: always use this procedure as your first trouble-shooting check.

☐

Fuel Lines:

Reconnect the fuel pump and apply soapy water around the fuel connections to confirm that the system is sealed. This procedure is important as your safety depends upon it.

☐

Nitrous Lines:

Connect a full bottle of nitrous to the system. Open the bottle valve to check for leaks around the nitrous fittings. As mentioned above, use soapy water to confirm that the system is leak-free. Close the bottle valve once the checks are completed. The bottle valve should only be open during use.

Caution: Never allow nitrous, in either liquid or gaseous form, to make contact with your skin. Liquid nitrous has a temperature of -125°F (-87.2°C). Direct exposure to nitrous will cause severe and permanent frostbite.

☐

The system is now ready for use.

☐

Tuning Tips for Nitrous:

1. An upgraded ignition system will produce a stronger spark and overcome the increased cylinder pressures induced by the use of nitrous oxide. Reducing plug gaps can also help the ignition perform at elevated cylinder pressures.

2. Use spark plugs from a colder heat range with nitrous oxide.

3. Though engines differ, retarding the ignition timing when power increases approach 75 HP should be considered. Retarding the ignition timing by one degree every 25HP over 75HP is generally advised.

4. The jetting provided with this kit is an approximation. Depending upon the performance of your vehicle, it may be necessary to enrich the mixture by using larger fuel jets or, alternatively, to make the mixture leaner (use smaller fuel jets).

5. This system has been calibrated to operate at 1000 PSI of bottle pressure. To monitor the pressure, use a bottle pressure gauge (P/N 16005). The better solution to control bottle pressure, however, is to use a Max-Pak bottle heater kit (P/N 16032), which maintains optimum bottle pressure.

6. Initially, apply nitrous oxide by using lower horsepower levels. Increase the power level if it's safe to do so.

☐

Nitrous oxide should be used for closed-course racing only—never on public highways.

☐

For further questions, please contact our technical department at (706) 864-8544 or email tech support: www.barrygrant.com

POWER WING NOZZLE INSTALLATION