

GM LT-1 Nitrous Oxide System # 13070



INSTALLATION AND TUNING INSTRUCTIONS

INTRODUCTION

Congratulations. You have just purchased an extremely high quality, high performance kit that introduces you into the world of nitrous oxide. It is imperative that you read and completely understand all aspects of these instructions prior to the installation of your new system. Now, let's start out with a brief look into the basics of nitrous.

Nitrous is the most cost effective way to increase the performance of an internal combustion engine. The way it works is to increase the amount of oxygen that can be introduced into the cylinder during the intake stroke. With more oxygen, more fuel can be burned, and thus, the engine produces more power. This equation works without exception as long as the proper amount of fuel is added to the cylinder to match the nitrous charge. If the fuel is not added, the engine is forced into a lean condition which causes combustion temperatures to increase, along with the potential for massive engine failures.

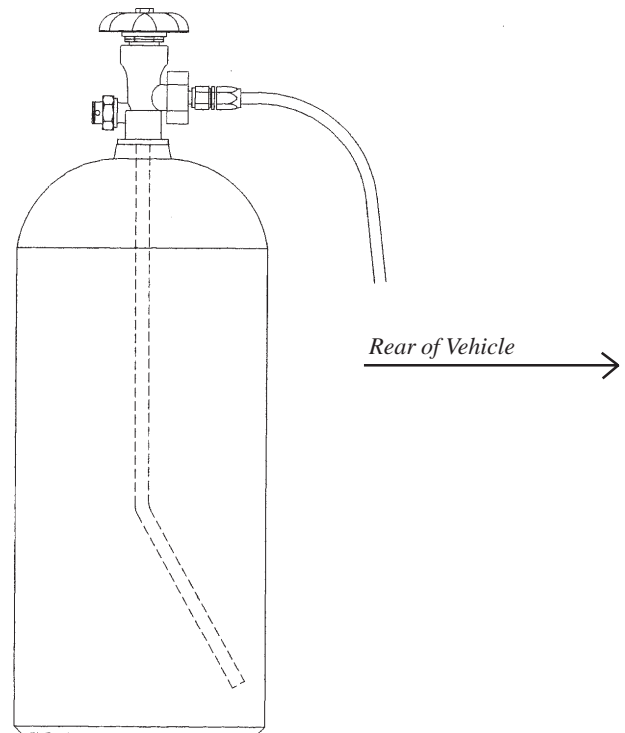
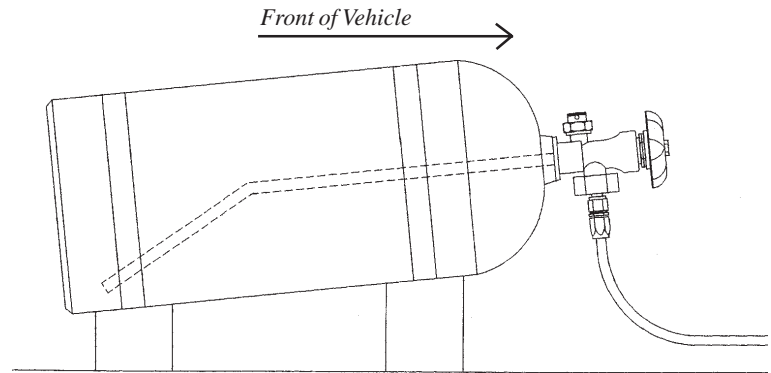
The nitrous system consists of four main components: nitrous delivery system, fuel delivery system, system plate, and electrical system. We will look at each of these in terms of installation and tuning. Testing the system will then be discussed along with some general tips.

NOTE: BEFORE ANY WORK BEGINS, DISCONNECT THE POSITIVE BATTERY TERMINAL.

NITROUS DELIVERY SYSTEM

The nitrous oxide cylinder should be mounted in the trunk area or somewhere out of the driver's compartment. The positioning of the cylinder must be done as the diagrams at right show to insure that the siphon tube remains covered with liquid nitrous. Either installation is acceptable, which ever fits your vehicle better.

If mounting the cylinder in the horizontal position, the cylinder brackets should be assembled on the cylinder and used as a template for marking the eight 5/16" clearance holes to be drilled for mounting the cylinder.



NOTE: BE SURE NOT TO PUNCTURE ANY FUEL LINES, THE TANK, ETC., WHEN DRILLING.

For further questions, please contact our technical department at (706) 864-8544.

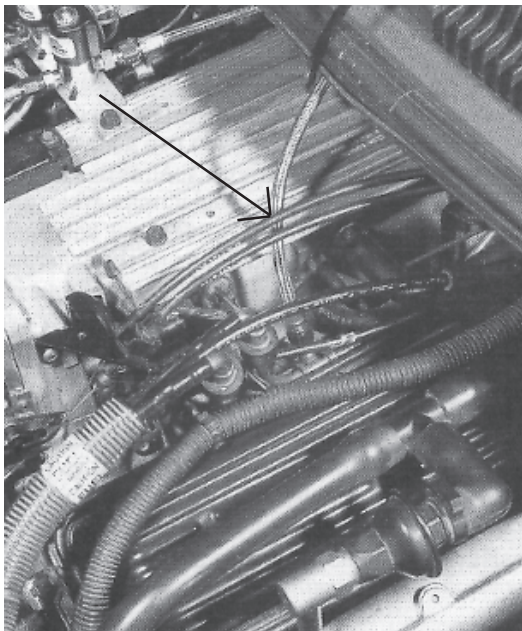
The cylinder must be mounted with the valve outlet facing down, the valve towards the front of the car, and the valve end higher than bottom of the cylinder.

The fitting that is on the valve in the upright position is the pressure relief. Should the cylinder exceed 3000 psi, this relief fitting is where the cylinder will empty. If the car is to be used in IHRA competition, the rules dictate this relief fitting be vented to the outside of the car. Part number 16021 is a relief valve with a threaded outside that accepts a -8 AN hose end. The other end of the hose can be fixed to a -8 AN bulkhead (part number 150887) to exit the car.

There are several ways that the nitrous supply line can be run to the engine compartment. Some suggestions are under the carpet, under the kick panel moldings, or under the floor panel. Any method is fine, just be certain the line is secure, cannot be tugged out of position, and is protected from blows that could cause the line to rupture. Route the line into the engine compartment to the area where the throttle body is located, and, where the plate will be installed. Make sure the line will still have a small amount of slack, to absorb any engine to chassis movement.

FUEL DELIVERY SYSTEM

The first step in the installation of the fuel delivery system is to locate the Schrader valve. It can be found on the fuel rail, on the drivers side, at about the middle of the engine. (See arrow).



Once the valve has been found, remove the cap and the internals from the valve body. (See figure 2). It's a good idea to have some rags handy at this point to soak up the leaking fuel.

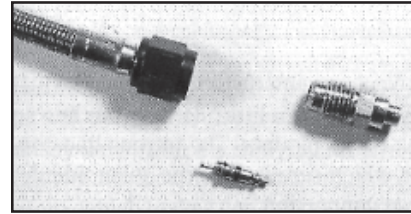


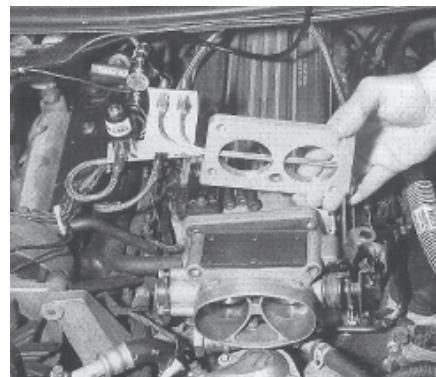
Figure 2

Now, attach the 24" #4 line with the red nuts to the fitting. Tighten securely, but don't over tighten and rip the fitting off the rail. Route the line across the manifold to the passenger side of the intake.

SYSTEM PLATE

To install the plate, remove the air duct tract that runs from the air box (located in the front along the core support on the drivers side) to the throttle body. It will probably be easier to remove the air box along with the induction tract. Now, unhook the cables that attach to the throttle body linkage on the driver's side. With these removed, the four (4) bolts (10 mm) used to retain the throttle body can be seen. Remove these bolts and the throttle body will be free from the intake manifold. With

Figure 3



the throttle body loose, slip the plate in (as shown in figure 3) between the throttle body and the intake manifold. Now, using the four (4) Allen head screws, reinstall the throttle body. (See figure 4).



Figure 4

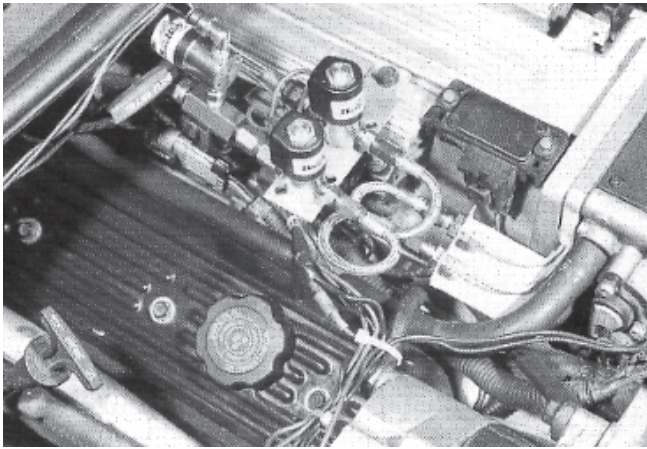


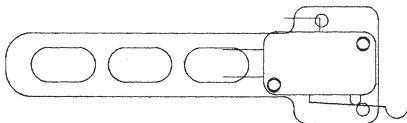
Figure 5

The solenoids are to be mounted using the front fuel rail bolt on the passenger side of the intake manifold. Simply loosen the bolt and insert the solenoids and bracket and re-tighten. (**Figure 5**). It should be noted that an optional purge system (PN 19006) which is not included in this kit is also shown in figure 5.

Remove the three screws that hold the throttle cable bracket to the front driver's side of the manifold. Using the three flat-head screws, install the two "L" shaped throttle relocation brackets (with leg down) and the rectangular bracket to the manifold. The two "L" shaped brackets should be placed on the top two manifold bosses while the rectangular bracket is used on the bottom boss. Reinstall the throttle cable bracket to the relocation brackets using the 1/4-20 button-head screws, and reconnect the cables to the linkage.

Mount the Full Throttle Switch Bracket (shown in diagram below) so that the switch is engaged, with the lever depressed, when the car is at full throttle. One suggested mounting location is to bend the bracket into an "L" shape and mount it using the top driver's side throttle body bolt so that the switch is tripped by the back side of the linkage. The switch is to be mounted to the bracket as shown.

Now, reinstall the induction tract removed during installation, and attach the nitrous feed line and fuel supply lines to the proper solenoids (marked accordingly).



ELECTRICAL SYSTEM

The proper and safe wiring of the nitrous system is also critical for consistent performance. Safety should always be the primary consideration when wiring. NitrousWorks strongly recommends the use of electrical relays, which prevent the amperage draw of the solenoids from damaging the activation switches. Relays also contribute to the proper functioning of the solenoids.

Diagrams Three and Four show two proposed wiring diagrams. It should be noted that any wire used to deliver power to the solenoids should be a minimum of 16-14 gauge wire. The trigger wiring for the relay can be a 22-18 gauge wire. (**See insert - diagrams 3 and 4**)

Diagram Three exemplifies the minimum requirement. Though this diagram may look simpler in design than Diagram Four, you may find it more cumbersome to install. It is mandatory for the 12V switched power supply to be able to handle 25-30 amps to assure proper solenoid operation. From the power supply, run to the toggle "arming" switch. From the toggle switch, either run to the solenoids or to an optional momentary switch (PN 16010) and then to the solenoids.

It should be noted at this point that each solenoid has two wires coming out of it. Either wire can be positive or ground. You choose!

From the other two wires, run to the optional Hobbs switch or directly to the full throttle switch. The switch is to be wired using the "NO" (normally open) terminal and the "COM" (common) terminal as shown in the diagram. The Hobbs switch is a pressure sensing switch that will close the circuit as long as it is exposed to its minimum rated pressure. They come in two settings, 5 psi and 30 psi. It is recommended to include one of these switches (5 psi, PN 16006) to monitor the pre regulator fuel pressure and shut the system down if your fuel system fails. This can really save your engine.

From the full throttle switch, run to a good ground.

Diagram Four is the preferred wiring diagram. This design has four main legs. The switched power supply in this system does not need to supply high amps to the toggle switch. A switched auxiliary port on your fuse panel is an excellent choice. Run from the toggle through the optional

momentary switch to the #86 connection on the relay. Coming out of the relay (connection #85), you can wire through an optional Hobbs switch or directly to the full throttle switch and then to ground. The switch is to be wired using the "NO" (normally open) terminal and the "COM" (common) terminal as shown in the diagram.

To supply power to the solenoids, it is recommended to run from the positive terminal on the battery to the #30 connection. From connection #87 on the relay, run to the solenoids and then from the solenoids to a good ground.

TESTING THE SYSTEM

NOTE: AT THIS POINT, RE-CONNECT THE POSITIVE BATTERY TERMINAL!

The first thing to check is the wiring. If a Hobbs switch is in the system, it will be necessary to build a small jumper or remove it from the system. It will not close the circuit unless it is exposed to pressure. These tests will be done with the engine off.

With the key in the on position, without the engine running, and the toggle switch in the off position, depress the full throttle switch and any optional momentary switches. Nothing should happen. Now perform the same test with the toggle in the on position. This time the solenoids should click. If they do, the wiring is correct.. This test works for either wiring design.

To check for fuel leaks, start the car and look to the fuel rail fitting and the solenoid inlet fitting. If no leaks are present, turn the engine off.

CAUTION: NITROUS IS EXTREMELY COLD AND CAN CAUSE BURNS SIMILAR TO FROSTBITE. USE CAUTION TO PREVENT EXPOSURE TO NITROUS.

To check for nitrous leaks, open the bottle valve and examine both the connection at the bottle valve and the connection at the solenoid inlet fitting. If no leaks are found, open the throttle blade and look into the intake for any leaks coming out of the spray bars. This would indicate a leaking solenoid. If no leaks are found, close the bottle valve and bleed the lines. This can be done by loosening the line nut at the bottle valve. If any leaks are found at the fittings, tighten the line nut. If leaking persists, close the bottle valve and remove the line for inspection.

Contact The Nitrous Works with any questions. If a leak is detected at the spray bars, close the bottle valve immediately. Remove the coil wire and crank the engine with the throttle blade in the wide open position for about 5 seconds. At this point, contact The Nitrous Works Tech Support at (706) 864-7009.

TUNING TIPS

Note: To overcome the increased cylinder pressures experienced with nitrous use, it is mandatory to decrease plug gaps to .030 or install an MSD-6 AL or like ignition performance enhancer to reduce the chances of backfire or other detrimental occurrences.

All Nitrous Works systems are calibrated to operate with a bottle pressure of 1000 psi. Pressure lower than this will cause the system to run rich, which will make the vehicle seem "sluggish" and produce power "in waves". If the bottle pressure exceeds the 1000 psi mark, the kit may go lean. A lean kit produces extremely high combustion temperatures and can lead to severe engine damage. The best way to keep an eye on bottle pressure is to install a gauge adapter and gauge (PN 16005 (-4) or PN 16013 (-6)).

Along with bottle pressure, specified jetting changes can be made to affect the richness or leanness of the kit. The larger the fuel jet, the richer the system will be. Smaller jets will lean the system out. The kits are set up to run with a fuel system operating at 40 psi. You may need to adjust your jetting based on your actual fuel pressure (go up or down a size or two). A tell-tale sign of a rich system is black exhaust. One can also look to the spark plugs. If the plug is black and wet, the system is rich. If the plug is white or has a semi-burned tip, the system is lean. Remember, to get a good spark plug reading one must check the plugs immediately after a run, not after a drive back to the pits.

NOTE: WHEN TUNING A NITROUS KIT FOR PEAK PERFORMANCE, IT IS ALWAYS BETTER TO ERROR TO THE RICH SIDE THAN THE LEAN SIDE. A RICH SYSTEM MAY LACK IN PERFORMANCE BUT IS NOT LIKELY TO HURT PARTS LIKE A LEAN SYSTEM WILL!

Timing can also play a key role in nitrous tuning. Retarding the timing 2-4 degrees is a good rule of thumb. Further retardation may be necessary on larger or dual stage kits to prevent detonation.

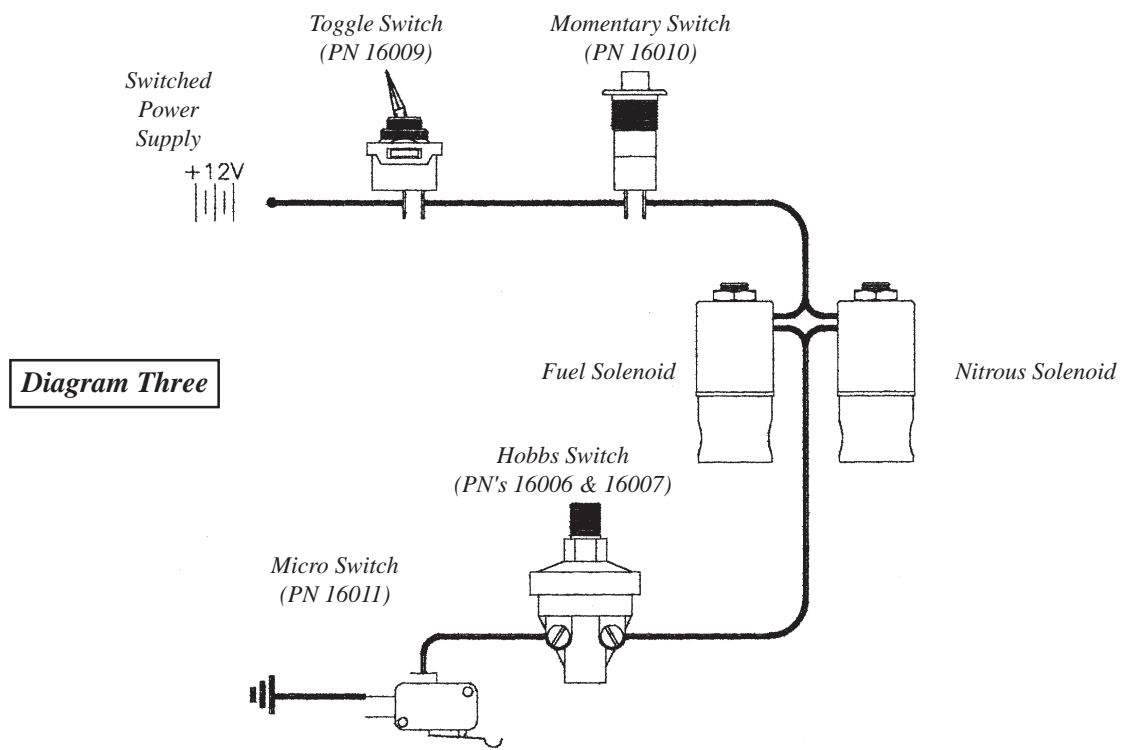


Diagram Three – Suggested Wiring

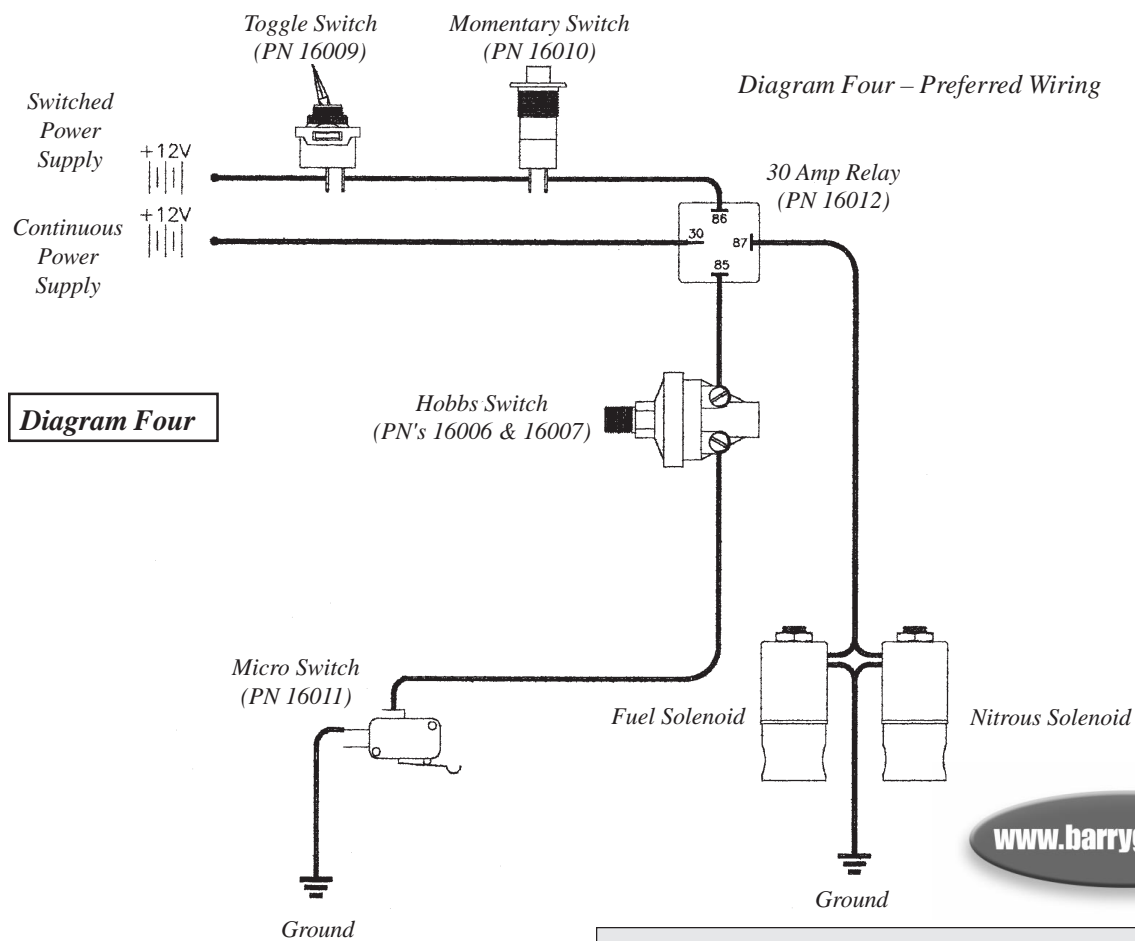


Diagram Four – Preferred Wiring



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For further questions, please contact our technical department at (706) 864-8544.