



PowerFogger™
Universal Wet Drive-By-Wire 8 Cylinder
Nitrous Oxide System

Kit Number 05135NOS



OWNER'S MANUAL
P/N 199R10408-2

CONGRATULATIONS on purchasing your NOS Nitrous Oxide Injection System! Your system is composed of the highest quality components available. It should provide many miles of trouble-free performance when used correctly. If you have any questions regarding the performance of your system, call NOS Technical Service at 1-866-464-6553.

NOTICE: Installation of Nitrous Oxide Systems Inc. products signifies that you have read this document and have agreed to the terms stated within.

It is the purchaser's responsibility to follow all installation instruction guidelines and safety procedures supplied with the product as it is received by the purchaser to determine the compatibility of the product with the vehicle or the device the purchaser intends to install the product on.

Nitrous Oxide Systems Inc. assumes no responsibility for damages occurring from accident, misuse, abuse, improper installation, improper operation, lack of reasonable care, or all previously stated reasons resulting from incompatibility with other manufacturers' products.

Nitrous Oxide Systems Inc. assumes no responsibility or liability for damages incurred by the use of products manufactured or sold by Nitrous Oxide Systems Inc. on vehicles used for competition or racing.

Nitrous Oxide Systems Inc. neither recommends nor condones the use of products manufactured or sold by Nitrous Oxide Systems Inc. on vehicles, which may be driven on public roads or highways, and assumes no responsibility for damages incurred by such use.

NOS nitrous oxide is legal for use in most states when used in accordance with state and local traffic laws. NOS does not recommend or condone the use of its products in illegal racing activities.

NOS has not pursued California Air Research Board (CARB) exemptions for these kits, hence, they are not legal for use on pollution-controlled vehicles in California. A correctly installed NOS nitrous system should not alter the emission control performance of your vehicle under standard EPA test cycle conditions.

NOTICE: The NOS Universal 8 Cylinder NOS System Kits are not intended for use on hatchback type vehicles without the use of NOS part numbers 16160NOS (External Aluminum Blow-Down Tube) and 16169NOS (Racer Safety Pressure Relief Cap).

HAZARDS DEFINED

This manual presents step-by-step instructions that describe the process of installing your NOS Nitrous Oxide Injection System. These procedures provide a framework for installation and operation of this kit. Parts are referenced by name and number to avoid confusion. Within the instructions, you are advised of potential hazards, pitfalls, and problems to avoid. The following examples explain the various hazard levels:

WARNING! Failure to comply with instructions may result in injury or death.

CAUTION! Failure to comply with instructions may result in damage to equipment.

NOTE: This information is important, needs to be emphasized, and is set apart from the rest of the text.

HINT: These special instructions provide a handy work tip.

NITROUS OXIDE INJECTION SYSTEM SAFETY TIPS

WARNINGS

IT IS NOT LEGAL TO ENGAGE NITROUS OXIDE INJECTION SYSTEMS ON PUBLIC ROADS OR HIGHWAYS. NITROUS OXIDE INJECTION SYSTEMS ARE ONLY TO BE ENGAGED DURING SANCTIONED COMPETITION OR RACING EVENTS.

Do not attempt to start the engine if the nitrous has been injected while the engine was not running. Disable the ignition system (consult owner's manual) and turn the engine over with the throttle wide open for several revolutions before attempting to start. Failure to do so can result in extreme engine damage.

Never permit oil, grease, or any other readily combustible substances to come in contact with cylinders, valves, solenoids, hoses, and fittings. Oil and certain gases (such as oxygen and nitrous oxide) may combine to produce a highly flammable condition.

Never interchange nitrous and fuel solenoids. Failure to follow these simple instructions can result in extreme engine damage and/or personal injury.

Never drop or violently strike the bottle. Doing so may result in an explosive bottle failure.

Never change pressure settings of safety relief valve on the nitrous bottle valve. Increasing the safety relief valve pressure settings may create an explosive bottle hazard.

Please note that the NOS bottle label has changed to a two-part assembly. The first label is already located on the bottle. Upon filling your bottle with nitrous oxide, apply the (second) material information label in the area indicated in the picture to the right.

NOTE: The material information decal is located in the same plastic bag as the bottle.

WARNING! Once the nitrous bottle has been filled, it must be shipped according to the applicable transportation and shipping regulations!

Do not deface or remove any markings, which are used for content identification.

Nitrous bottle valves should always be closed when the system is not being used.

Notify the supplier of any condition that may have permitted any foreign matter to enter the valve or bottle.

Keep the valves closed on all empty bottles to prevent accidental contamination.

After storage, open the nitrous bottle valve for an instant to clear the opening of any possible dust or dirt.

It is important that all threads on the valves and solenoids are properly mated. Never force connections that do not fit properly.



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WHAT IS NITROUS OXIDE?

NITROUS OXIDE...

...Is a cryogenic gas composed of nitrogen and oxygen molecules

...Is 36% oxygen by weight

...Is non-flammable by itself

...Is stored as a compressed liquid

...Exists in two grades—U.S.P. and Nitrous Plus:

- U.S.P. is medical grade nitrous oxide; its common use is dental and veterinary anesthesia. It is also commonly used as a propellant in canned whipped cream. U.S.P. is not available to the public.
- Nitrous Plus differs from U.S.P. in that it contains trace amounts of sulphur dioxide added to prevent substance abuse. Nitrous Plus is intended for automotive applications and is available for sale to the public.

In automotive applications, Nitrous Plus and fuel are injected into the engine's intake manifold, which produces the following results:

- Lowers engine intake air temperature, producing a dense inlet charge.
- Increases the oxygen content of the inlet charge (air is only 22 percent oxygen by weight).
- Increases the rate at which combustion occurs in the engine's cylinders.

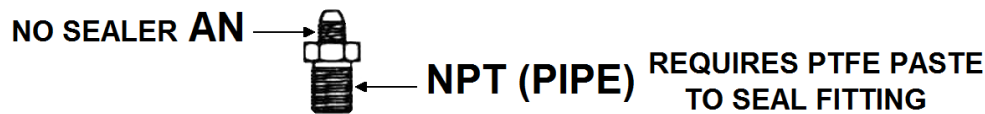
Do's and Don'ts of Nitrous Oxide

Do's

- Read all instructions before attempting to install your NOS nitrous system.
- Make sure your fuel delivery system is adequate for the nitrous jetting you have chosen. Inadequate fuel pressure or flow will result in engine damage.
- Use 14 gauge (minimum) wire when installing electrical system components.
- Use high-quality connections at all electrical joints.
- Use PTFE-based paste on pipe-style fittings.
- Make sure your engine and related components (ignition, carburetor, and driveline) are in proper working condition.
- If nitrous is accidentally injected into the engine when it is not running, remove the engine coil wire, open the throttle, and crank the engine 10 to 15 seconds before starting. Failure to do so can result in an explosive engine failure.**
- Use your NOS nitrous system only at wide-open throttle and at engine speeds above 3000 RPM.**
- Install a proper engine-to-chassis ground. Failure to do so may result in an explosive failure of the main nitrous supply line.**
- Use a high-quality fuel, as suggested in Chapter 3, Baseline Tuning Suggestions.

Don'ts

- Engage your nitrous system with the engine off. Severe engine damage can occur.
- Modify NOS nitrous systems (if you need a non-stock item, call NOS Technical Service for assistance).
- Overtighten AN type fittings.
- Use PTFE Tape on any pipe threads. Pieces of PTFE tape can break loose and become lodged in nitrous or fuel solenoids or solenoid filters. Debris lodged in a nitrous or fuel solenoid can cause catastrophic engine failure.



- Use sealant of any kind on AN type fittings.
- Allow nitrous pressure to exceed 1100 psi. Excessive pressure can cause swelling or in extreme cases failure of the nitrous solenoid plunger. Solenoid plungers are designed so that pressure-induced failures will prevent the valve from operating. No leakage should occur with this type of failure.
- Inhale nitrous oxide. Death due to suffocation can occur.**
- Allow nitrous oxide to come in contact with skin. Severe frostbite can occur.**
- Use octane boosters that contain methanol. Fuel solenoid failure may occur, producing severe engine damage.

Chapter 1 Introduction to your NOS Nitrous Oxide Kit

1.1 General Information

Kit Number 05135NOS is intended for 8 cylinder applications. This kit was designed to be used on fuel injected engines with or without drive-by-wire throttle control. The kit includes jet sizes for higher or lower fuel pressures. To select the jets for applications with higher or lower fuel pressures, refer to **Table 3 on Page 18**.

NOTE: This nitrous oxide injection system injects a mixture of nitrous oxide and fuel into the air intake duct. If the instructions are not carefully followed, poor mixture distribution can occur, resulting in variations of air to fuel ratio from cylinder to cylinder. In extreme cases, intake manifold backfires can occur, if the instructions are not followed exactly.

These kits have been designed for safety and smoothness of operation. Nitrous oxide is injected into the engine only when the following conditions are met:

- Bottle valve is opened.
- System is armed.
- Engine is at wide-open throttle.

Horsepower and torque increases due to these kits will vary with engine displacement and modifications. Approximate power increase estimates can be made based upon the massflow of nitrous oxide into the engine. The following table is provided to allow you to estimate the power increase you can expect for your application. NOS **strongly** suggests that an upper limit of about 40% to 50% increase in power output from your stock engine. Exceeding this can result in premature engine failure.

Table 1 Jetting Combinations @ 43 PSI Fuel Pressure

Kits	Nitrous/Fuel Jetting	Approximate Power Increase (BHP)
Kit 05135NOS	40/28	75 HP
	51/34	100HP
	65/38	125 HP

NOTE: If jets other than the ones recommended in the table are used, please refer to Chapter 3, “Baseline Tuning Suggestions” and Chapter 4, “Preparing for Operation”, for additional information on jet selection.

Driveability, fuel economy, and exhaust emissions should not be affected under normal (part throttle) conditions.

1.2 System Requirements

When used correctly, these kits will work with stock internal engine components. **To ensure proper performance and engine life, the following is an absolute must:**

□ Manual Transmissions

If the vehicle is to be exposed to severe operating conditions, such as drag strip usage, the standard clutch should be replaced with a high performance unit.

□ Automatic Transmissions

If the vehicle is to be exposed to severe operating conditions, such as drag strip usage, a reputable high-performance transmission shop should service the automatic transmission.

1.3 Kit Components

Before beginning the installation of your NOS kit, compare the components in your kit with those shown in Figure 1 and listed in Table 2. If any components are missing, please contact NOS Technical Support at 1-866-GOHOLLEY.

Table 2 NOS Universal Wet Kit 05135NOS Parts List

Item	Description	Quantity	NOS P/N
(1)	4AN Bottle Nut Adapter	1	16220NOS
(2)	Bottle Nut PTFE Washer	1	16210NOS
(3)	#10 N ₂ O Bottle	1	14745NOS
(4)	#10 Bottle Bracket Set	1	14125NOS
(5)	Soft Plume Nozzle	1	13716NOS
(6)	Soft Plume Nozzle Adapter	1	13715-SNOS
(7)	Soft Plume Nozzle Adapter Nut	1	13713-SNOS
(8)	Nitrous Solenoid	1	18045NOS
(9)	1/4" NPT x 4AN N ₂ O Filter	1	15560NOS
(10)	2 ft. 3AN Hose (Blue)	1	15060-1NOS
(11)	Fuel Solenoid	1	18050NOS
(12)	1/8" NPT x 4AN Fuel Filter	1	15571NOS
(13)	2 ft. 3AN Hose (Red)	1	15060-2NOS
(14)	Solenoid Mounting Bracket w/ screws	2	16500NOS
(15)	Stainless Steel Flare Jets	12	13760-24,-28,-33,-34,-36,-38,-40,-46,-51,-55,-60,&-65NOS
(16)	16 ft. 4AN Hose (Blue)	1	15300NOS
(17)	WOT / Window Switch	1	200R552A
(18)	Arming Switch	1	15604NOS
(19)	Wiring Relay—30 AMP	1	15618NOS
(20)	Harness for Wiring Relay with 15 AMP Fuse	1	15604-SNOS
(21)	1 ft. 4AN Hose (Red)	1	15215-SNOS
(22)	1/16" NPT x 4AN Fitting	1	17945NOS
(23)	5/16", 5/16" Hose Barb Fitting	1	19R904
(24)	5/16" Hose Clamp Fittings	2	36R646A
(25)	1/16" NPT Pipe Tap	1	15990NOS
(26)	T-tap Crimp Connectors	2	204R247
(27)	Male Disconnects	2	204R307

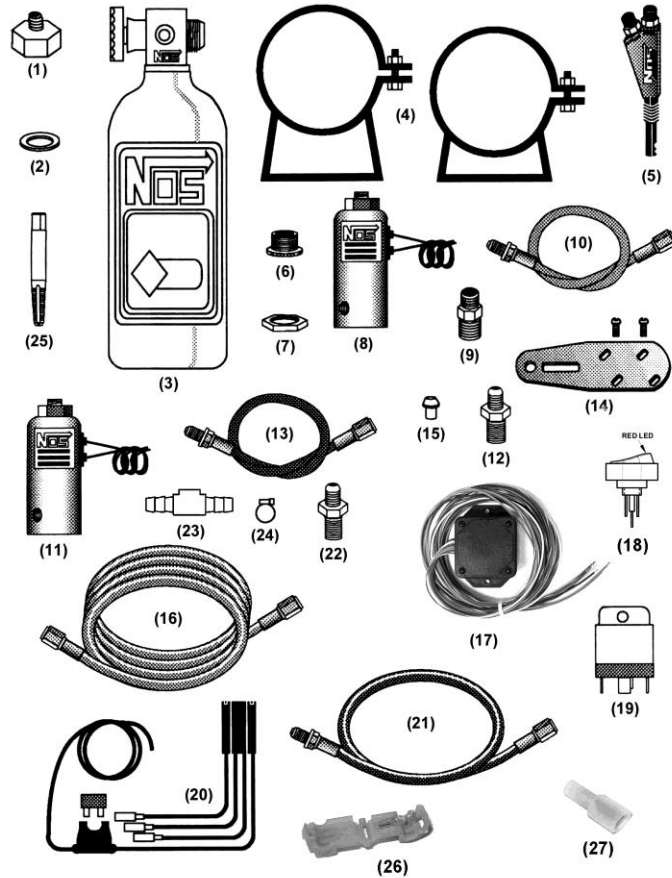


Figure 1 Universal Wet Kit Components

Chapter 2 Kit Installation

2.1 Bottle Mounting Instructions

NOTE: Disconnect the battery ground before beginning installation.

2.1.1 Street Vehicles

Accurate calibration of your NOS nitrous system depends on the bottle remaining at a stable temperature. Mount the bottle away from heat sources, such as the engine compartment or exhaust system, and away from windows, where the bottle is exposed to direct sunlight.

NOS recommends that the bottle be environmentally separated from the driver's compartment. Because hatchback-type vehicles generally do not have a firewall between the trunk area and the driver's compartment, the safety pressure relief cap should be replaced with P/N 16169NOS and P/N 16160NOS should be added. P/N 16160NOS is an aluminum blow-down tube (a -8 neoprene-line braided hose can be substituted). The blow-down tube should be routed to the exterior of the vehicle (preferably under the vehicle). This procedure will prevent filling the driver's compartment with a cloud of nitrous oxide, if the safety pressure relief cap should happen to rupture for any reason.

2.1.2 Racing Vehicles

Before mounting a nitrous bottle in a racing vehicle intended for use in sanctioned events, check with the sanctioning association for any rules regarding this subject. Most associations require that the bottle be mounted within the confines of the safety roll cage with the safety pressure relief cap vented away from the driver's compartment.

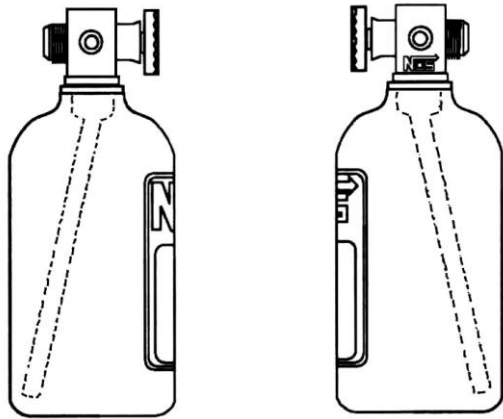


Figure 2 Nitrous Bottle Siphon Tube Orientation

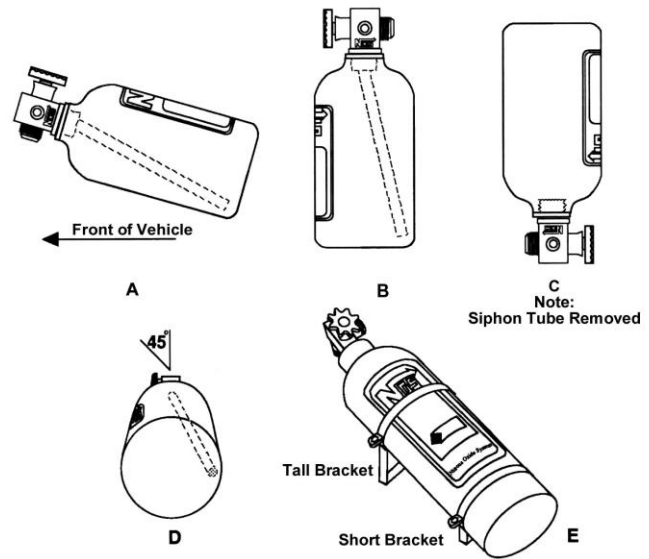


Figure 3 Nitrous Bottle Mounting Orientations

2.2 Bottle Orientation

Bottle placement is critical to the performance of your NOS nitrous system. It is important to understand how the bottle valve and siphon tube are assembled to properly orient the bottle in your vehicle and ensure that it picks up liquid nitrous while undergoing acceleration. All NOS nitrous bottles are assembled so that the bottom of the siphon tube is at the bottom of the bottle and opposite the bottle label (Figure 2).

Whenever the bottle is mounted in a lay-down position, the valve handle must be towards the front of the vehicle with the label facing up (Figure 3A).

If the bottle is mounted vertically, the valve handle and label must face toward the front of the vehicle (Figure 3B). This orientation will position the siphon tube at the back of the bottle where the liquid N_2O will be during acceleration.

WARNING! DO NOT attempt to remove the siphon tube without completely emptying the bottle of all nitrous and pressure. Failure to completely empty the bottle will result in an explosive condition causing injury or death.

A bottle mounted upside-down must have the siphon tube removed before use (Figure 3C). Non-siphon bottles can be specially ordered from NOS.

If the bottle must be mounted parallel to the axles of the vehicle (sideways), the valve handle and label must be angled at approximately 45° toward the front of the vehicle (Figure 3D). This orientation will position the siphon tube toward the rear of the bottle.

NOTE: When using a bottle with a siphon tube, the tall bracket should be at the valve end of the bottle and the short bracket at the bottom (Figure 3E).

The most efficient mounting is the lay-down position (Figure 3A) with the valve handle toward the front of the vehicle. This position allows the greatest amount of liquid to be used before the siphon tube begins to pick up gaseous nitrous oxide.

2.3 Bottle Installation

After you have determined the location and orientation of the nitrous bottle, use the following procedure to install the bottle:

NOTE: Numbers in parentheses () refer to the parts list / assembly drawing number for the component. Figure 4 shows the installation assembly for the Universal Wet NOS system.

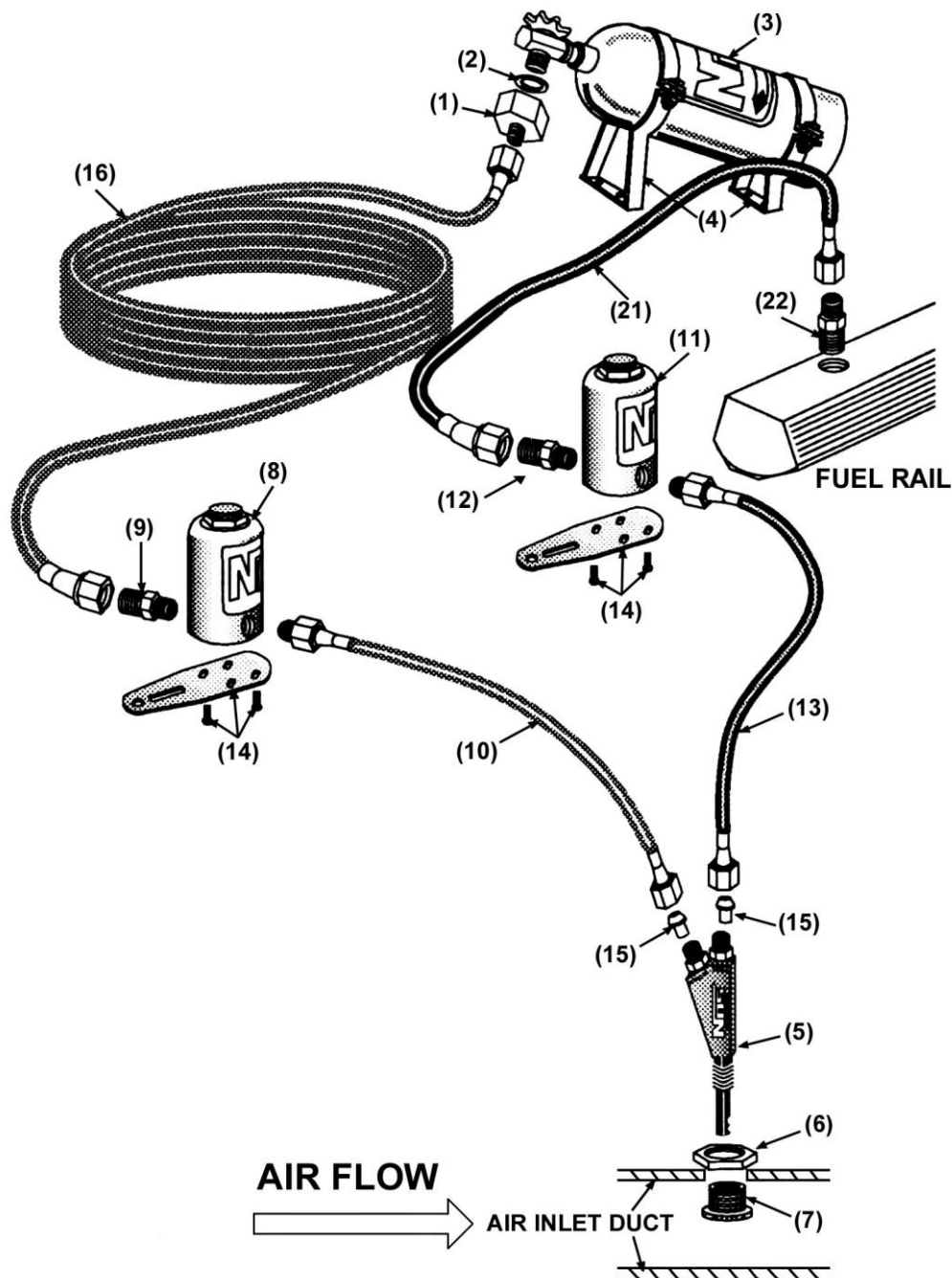


Figure 4 Exploded View of Universal Wet NOS System

1. Install the bottle nut adapter (1) and PTFE washer (2) on the nitrous bottle (3). Tighten securely.
2. Loosely install the bottle mounting brackets (4) on the nitrous bottle, as shown in Figure 3E.
3. Locate the bottle/bracket assembly in the desired mounting location, ensuring that the location will provide easy access to the bottle valve, hose connection, and bracket clamp bolts to facilitate bottle changing.
4. Use the assembled bottle/bracket unit as a pattern to mark and drill four 5/16" holes in the mounting surface.

CAUTION! When drilling or punching holes for these brackets, be aware what components, wires, or hoses are located or routed behind the general area to avoid vehicle or equipment malfunction.

5. Mount the brackets securely to the surface (recommended minimum of 5/16" bolts or No. 12 sheet metal screws).
6. Secure the nitrous bottle in the mounting brackets and tighten the bracket clamps.

2.4 Soft Plume Nozzle Installation

NOTE: The recommended mounting location for the Soft Plume nozzle is in the air inlet duct, between the throttle body and the mass airflow sensor (in applications where a mass airflow sensor is used). In certain applications where the throttle body is an integrate part of the air cleaner housing, install the nozzle between the throttle body and the intake manifold. If possible, install the nozzle between 6 and 12 inches before the throttle body or any major turn in the air inlet duct. See Figure 5. If your vehicle does not facilitate the above installation requirements, call the NOS technical department to determine compatibility before continuing installation.

1. Before making any permanent modifications to the vehicle, layout the location of all the major components (solenoid, nozzle, fuel/nitrous supply lines, etc.).
2. Select the desired mounting location for the Soft Plume Nozzle (5), taking into account the length of the nitrous and fuel supply hoses and the intended location of the solenoids. Take into account that the nozzle adapter (6) needs to be restrained during final installation, and accessibility of a tool is important. Make sure the nozzle and feed lines will not interfere with engine components or accessories and will not interfere with the hood when closed. The nozzle should not move from the perpendicular position in the air inlet duct due to strain induced by the nitrous and/or fuel supply hose.
3. Remove the air inlet duct.
4. A. **Metal Mounting Surface:** Drill a 1/4" hole perpendicular to the centerline of the inlet duct. Tap the hole using a 1/16" NPT tap. Tap depth should be deep enough, so that the discharge orifice of the nozzle is completely submerged into the duct, but not so deep that the Soft Plume nozzle bottoms out.

CAUTION! All debris **must** be removed from the air inlet duct. Use compressed air, if available. Failure to do so can result in severe engine damage.

- B. **Rubber/Hard Plastic Mounting Surface:** Drill a 7/16" hole perpendicular to the inlet duct centerline through the inlet duct. Insert the Soft Plume nozzle adapter (6) into the 7/16" hole with the head inside the duct. Use Loctite or a similar compound on the nozzle adapter threads and securely tighten the nozzle adapter nut (7) to the nozzle adapter (6).

CAUTION! Severe engine damage can occur if the nozzle adapter / nozzle assembly works loose from the air inlet duct. Ensure that the Soft Plume nozzle is securely tightened in the air duct.

5. Note the discharge side of the Soft Plume nozzle. Install the Soft Plume nozzle in the inlet duct with the discharge side pointed toward the engine (downstream or in the direction of the induced air stream). Use PTFE paste to ensure adequate sealing.
6. Install the air inlet duct.

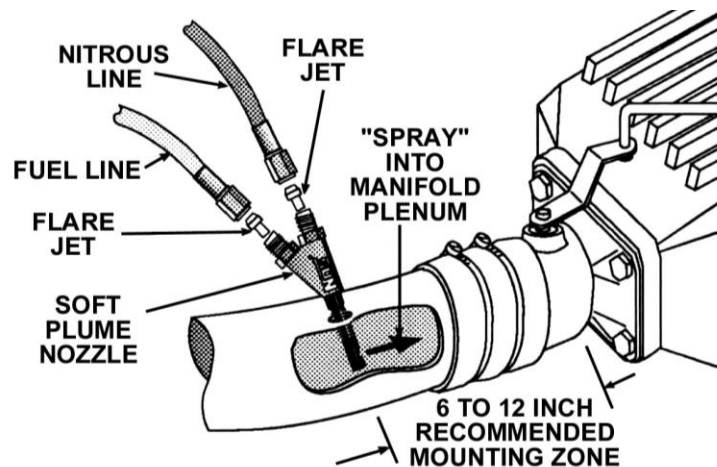


Figure 5 Soft Plume Nozzle Installation Cut-Away

2.5 Solenoid Mounting

CAUTION: Do not overtighten the vise in the following procedure, or the solenoid will be damaged.

1. Clamp the nitrous solenoid (8) in a bench vise.
2. Thread the 1/4" NPT x 4AN nitrous filter fitting (9) into the inlet port of the nitrous solenoid. Use PTFE paste to avoid leaks.
3. Thread the 1/8 NPT male end of the blue 2 ft. 3AN hose (10) into the outlet port of the nitrous solenoid. Remove from the vise.
4. Clamp the fuel solenoid (11) in a bench vise.
5. Thread the 1/8" NPT x 4AN fuel filter fitting (12) into the inlet port of the fuel solenoid. Remove from the vise.
6. Thread the 1/8 NPT male end of the red 2 ft. 3AN hose (13) into the outlet port of the fuel solenoid. Use PTFE paste to avoid leaks.
7. Attach the nitrous solenoid to the solenoid mounting bracket (14).
8. Attach the fuel solenoid to the solenoid mounting bracket (14).
9. Select the mounting location for the solenoid assembly. Ensure that the assembly and lines do not interfere with engine accessories or body parts, and that hoses reach the Soft Plume nozzle inlet ports without being stretched or kinked.
10. Securely mount the solenoid assembly.

2.6 Solenoid / Soft Plume Nozzle Hose Connection

1. Select the proper nitrous and fuel jets (15). Place the desired jets in the Soft Plume nozzle, making sure that the jets are inserted into the correct locations, as marked on the nozzle.

NOTE: Please refer to Chapter 4, "Preparing for Operation", and Chapter 3, "Baseline Tuning Suggestions", for additional information on jet selection.

2. Connect and tighten the open end of the blue 2 ft. 3AN hose (10) to the Soft Plume nozzle inlet port marked "nitrous". Hold the Soft Plume nozzle in position with a wrench to ensure the nozzle doesn't rotate out of position when the line is tightened.
3. Connect and tighten the open end of the red 2 ft. 3AN hose (13) to the Soft Plume nozzle inlet port marked "fuel". Hold the Soft Plume nozzle in position with a wrench to ensure the nozzle doesn't rotate out of position when the line is tightened.

2.7 Nitrous Feed Line Mounting

HINT: Most late model vehicles have access plugs in the trunk floor, which are convenient for nitrous line routing. Following the fuel lines along the underbody, and entering the engine bay through the front fender well between the plastic inner fender panel and the body usually works well.

1. Determine the route for your nitrous feed line to follow. Ensure the path is clear of exhaust system, suspension, steering, wheels, electrical lines and components, and tires.
2. Feed the nitrous supply line (16) along the proposed route.
3. If it is necessary to support the nitrous supply line under the vehicle, use 1/2" Tinnerman clamps or nylon tie-wraps to support the line securely.
4. Attach the nitrous supply line to the 4AN bottle nut adapter (1) on the nitrous bottle.

WARNING! Nitrous oxide can cause death if inhaled. Severe frostbite can occur, if allowed to contact the skin. Always point the nitrous line opening away from people when purging the line.

5. Purge the nitrous supply line.
 - A. Wrap the end of the nitrous line with a rag and hold securely.
 - B. Point the opening **away** from people.
 - C. Briefly open the bottle valve.
6. Attach the nitrous supply line to the filter installed in the nitrous solenoid inlet port.

2.8 Fuel Supply Connection

The fuel supply can be achieved by connecting into any component of the original equipment high-pressure fuel supply system. Some examples are as follows:

- Connecting to the fuel pressure test port installed in the fuel rail (if available)
- Connecting to the fuel rail by tapping into the end caps of the rail
- Connecting to the banjo fitting on the fuel filter (most of the European applications)
- Connecting to the fuel supply hose of the original fuel system

2.8.1 Fuel Supply Connection by using Fuel Rail Test Port

Supplemental fuel for the NOS nitrous oxide injection system is taken directly from the fuel rail, which feeds the engine's fuel injectors. Figure 6 shows the typical fuel rail configurations. If you cannot locate the fuel rail on your engine, consult a repair manual for your vehicle.

1. Identify the location of the fuel rail "test port" on the fuel rail.
2. Remove the protective cap from the test port. Remove the Schrader valve from the test port using a tire valve core tool.

CAUTION! When removing the Schrader valve from the fuel rail test port, use caution. Fuel in the rail is under high pressure. Never remove the Schrader valve when the engine is hot.

3. Connect the 1 ft. red 4AN hose (21) to the fuel rail test port.

NOTE: Some vehicles equipped with a fuel rail test port do not have threads on the test port compatible with the red 4AN supply line. If your vehicle is so equipped, you must either replace the test port fitting with the 1/16" NPT x 4AN fitting (22), or install the 1/16" x 4AN fitting (22) using steps A through F on the following page.

2.8.2 Fuel Supply Connection by Tapping Fuel Rail

NOTE: If your vehicle's fuel rail is not equipped with a test port, the fuel rail will need to be removed and tapped for the 1/16"NPT x 4AN fitting (22) using steps A through F on the following page.

CAUTION! Before attempting any modifications to the fuel rail, make sure that enough wall thickness is available to achieve 3 to 4 threads of engagement during the tapping operation. This would be equivalent to 0.120" (3.00mm) to 0.150" (4.00mm) wall thickness.

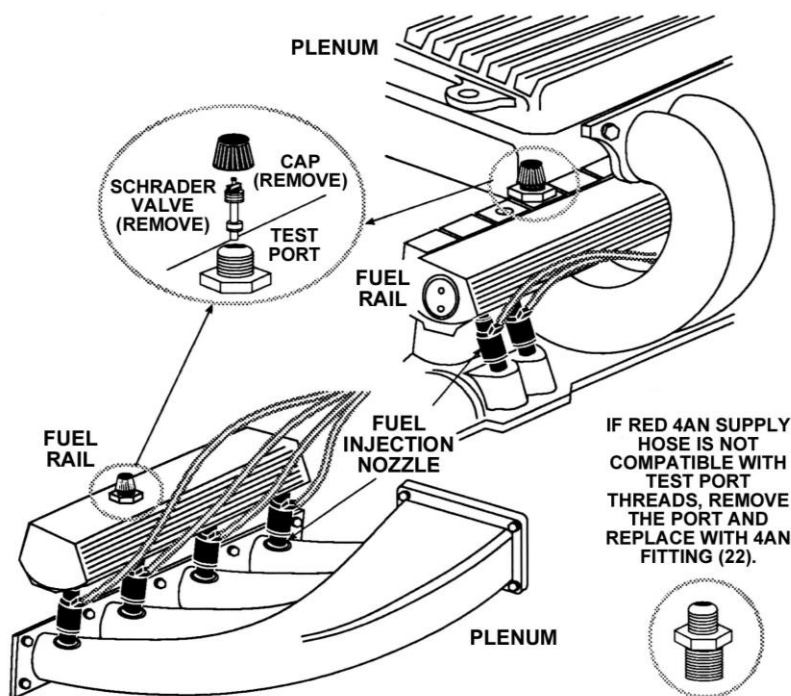


Figure 6 Typical Fuel Rail

- A. Select a location for the 1/16" NPT x 4AN fitting (22) on the fuel rail. Make sure that the fitting and line are clear of all engine components.
- B. Remove the fuel rail from the engine. Remove the fuel injectors and regulator (if applicable) from the fuel rail. Drill a 1/4" hole in the fuel rail, making sure that the hole is perpendicular to the mounting surface, and that the hole penetrates into the fuel rail reservoir.
- C. Tap the 1/4" hole with the 1/16" NPT tap (25). De-burr entry and exit hole edges.

CAUTION! All debris must be removed from the fuel rail. Failure to do so will result in an engine failure.

- D. Remove all debris from the fuel rail.
- E. Install the 1/16" NPT x 4AN fitting (22) in the tapped hole. Use PTFE paste to avoid fuel leaks.
- F. Re-install the fuel injectors and regulator. Use clean engine oil to lubricate the o-rings.
- G. Install the fuel rail on the engine.

4. Connect the 1 ft. red 4AN hose (21) to the test port / 4AN fitting.

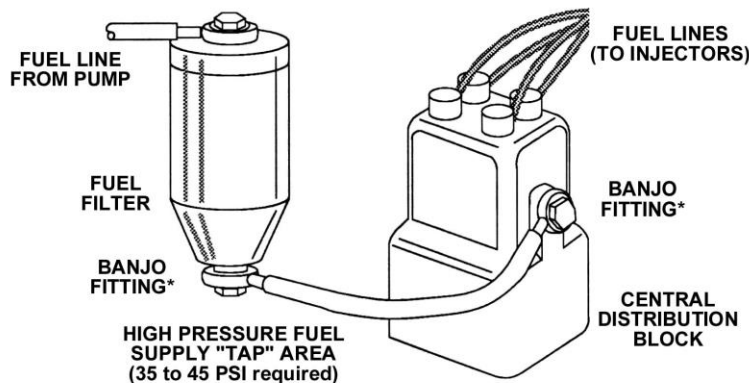
2.8.3 Fuel Supply Connection by Tapping into Main Fuel Supply Fitting

Some engines utilize a fuel rail or distribution block system that does not have test ports and does not allow drilling and tapping to install the 4AN fitting. Supplemental fuel for the NOS nitrous oxide injection kit must be acquired from the fuel injectors high-pressure supply line.

1. Locate the main fuel supply line. The main fuel supply line feeds pressurized fuel from the fuel pump (in-line or in-tank fuel pump) to the fuel filter and from the fuel filter to the fuel rail or distribution block. The most desired location to "tap" into the fuel line is after the fuel filter.
2. Examine the outlet port of the fuel filter or the inlet to the central distribution block for a "banjo" bolt fitting. See Figure 7. Remove the fitting and examine the diameter of the shank of the fitting. To use this fitting for the supplemental fuel supply, the diameter must be sufficient for a 1/4" hole to be drilled through the centerline of the fitting. See Figure 8.
3. Drill a 1/4" hole through the centerline of the banjo fitting.
4. Tap the 1/4" hole with the 1/16" NPT tap (25).

CAUTION! All debris MUST be removed from the inlet fitting. Failure to do so can result in severe engine damage.

5. Thread the brass 1/16" NPT to 4AN fitting (22) into the modified banjo fitting. Use PTFE paste to avoid fuel leaks.
6. Install the modified banjo fitting into the fuel filter.
7. Connect the 1 ft. red 4AN hose (21) on to the 4AN fitting.



* BANJO FITTING IN EITHER LOCATION MAY BE DRILLED & TAPPED, AS PER FIGURE 8

Figure 7 Fuel Filter/Banjo Fitting



DRILL BANJO FITTING BOLT WITH A 1/4" DRILL BIT & TAP WITH THE 1/16 NPT TAP (25).



1/16 NPT X 4 AN FITTING (22) INSTALLED

Figure 8 Schematic of "Drilled Out" Banjo Fitting

2.8.4 Fuel Supply Connection by Tapping into Main Fuel Supply Hose (Rubber Hose Only)

1. Locate the main fuel supply line. The main fuel supply line feeds pressurized fuel from the fuel pump (in-line or in-tank fuel pump) to the fuel filter and from the fuel filter to the fuel rail or distribution block. The most desired location to "tap" into the fuel line is after the fuel filter.

WARNING! Certain vehicles are equipped with main fuel lines that hard plastic with a rubber-like shell. DO NOT cut or splice into this type of line, since leak-proof connections cannot be achieved with the supplied hardware. Leaking fuel lines may cause engine damage, injury, or death. Call the NOS technical department for potential suggestions or options.

2. Locate a section of the rubber main fuel supply line where the 5/16" hose barb fitting can be easily installed and the fuel enrichment supply line can be easily connected without interfering with engine and ancillaries.
3. Assemble the 1/16" NPT x 4AN fitting (22) to the 5/16" hose barb fitting (23). Do not over-tighten the 1/16" NPT x 4AN fitting as the fuel passage in the fitting could be blocked. Use PTFE paste to avoid fuel leaks.
4. Slide hose clamps (24) on both ends of the main fuel supply line.
5. Install both ends of the main fuel supply line to the ends of the 5/16" hose barb fitting.
6. Tighten the hose clamps (24).
7. Connect 1 ft. red 4AN hose (21) to the 4AN fitting (22).

2.9 NOS WOT/Window Switch

The NOS WOT/RPM activated 2 stage Window Switch with Shift light control is a universal activation switch. It is designed to work with 4-cycle engines ranging from 1 to 18 cylinders. Activation of output wires is determined by engine RPM speed input and/or Throttle Position Sensor (TPS) input. Use of an RPM and TPS input ensures safe operation of a nitrous system by only allowing for activation at wide-open throttle and above a safe engine speed and is highly recommended.

The TPS portion of the switch works by recognizing what voltage the TPS sensor is outputting to the vehicle's ECU. This is particularly useful on late model electronic/"drive-by-wire" throttle body equipped vehicles. Typically, wide open throttle is achieved at around 4 volts or above on most TPS equipped vehicles. The NOS WOT/Window switch can be set to various voltages for the TPS activation. This switch is compatible with both rising and falling throttle position sensors. NOS recommends that this be set to a voltage at or just below TPS "W.O.T." voltage.

Some drive-by-wire vehicles such as GM LS2 engines use a "falling" TPS voltage, meaning that as the throttle is opened voltage decreases compared to typical applications which use a "rising" TPS voltage meaning that as the throttle is opened the voltage increases. This unit can work with either a rising or falling TPS voltage. The RPM input can be connected to an individual ignition coil "driver" wire or to a tachometer output circuit. (Information on this connection is contained further in the manual.)

This unit is aesthetically designed so that it can be mounted in the passenger compartment. The user can then view engine speed, TPS position, and nitrous arming and activation information, as well as make easy changes to the unit. It can be used to troubleshoot any issues with system activation as well.

If you have any questions, please contact **NOS tech service at 1-866-464-6553.**

WARNING: Improper wiring of this unit may cause damage

2.10 Electrical Installation

Refer to **Figure 9** and the procedures in this section for NOS electrical system installation.

WARNING! Death or injury may occur from working on a charged electrical system.

1. Disconnect the car battery at the ground cable (if not already done).
2. Install the WOT/Window Switch as follows:
 - A. Find a suitable mounting location away from heat and vibration (ex. Firewall or vehicle interior). Position so that the wires are pointing down if mounted in engine compartment. Although the unit is potted, it should not be placed in such a way that it will receive a heavy spray of water.
 - B. Loosely route the WOT/Window Switch wires to the locations found on the drawing.
 - C. Route the Red / White wire from the WOT/Window Switch to the nitrous arming switch.
3. When installing the WOT/Window Switch, place the NOS relay (Part # 15618NOS, Sold separately) in the engine compartment near the battery. The orange wire on the relay harness should reach the positive terminal of the vehicle battery.
4. Connect the orange relay wire to the battery (+) terminal. Install a 15 AMP fuse into the fuse socket.
5. Connect one wire from each solenoid together and attach to the blue relay wire (trigger).

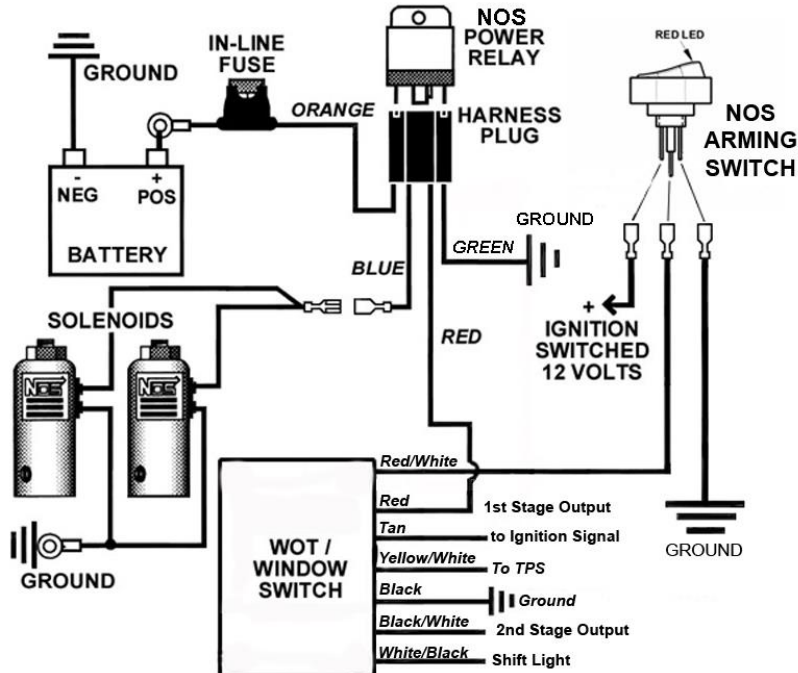


Figure 9 Electric Wiring Schematic for NOS Relay and NOS WOT/RPM Switch ONLY

6. Connect the remaining solenoid wires to good chassis ground.
7. Ground the green relay wire to a good chassis ground.
8. Connect red relay wire to the solid red wire (power +12V side of relay) on the WOT/Window Switch.
9. Connect the tan wire of the WOT/Window Switch to the ignition coil signal wire or tach output wire using the T-tap provided, as shown in **Figure 10**. See **Section 2.11**.

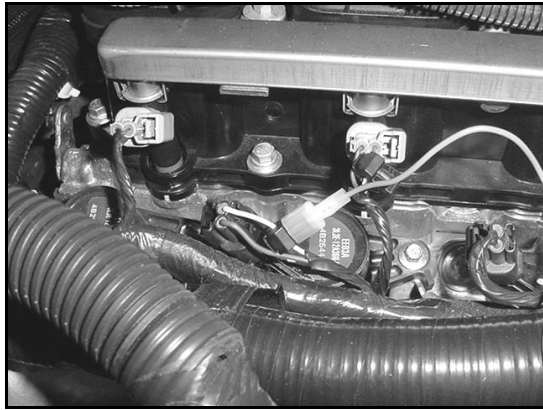


Figure 10

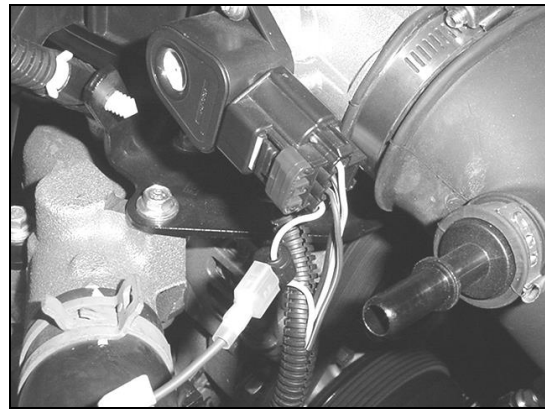


Figure 11

10. Connect the black wire of the WOT/Window Switch to a good ground.
11. Connect the yellow / white striped wire on the WOT/Window Switch using a T-tap (provided) to the vehicle's TPS reference signal wire (typically "TP sensor signal" in the factory service manual). **See Figure 11.** For help identifying proper wire, **see Section 2.12.**
12. Connect the red / white striped wire on the WOT/Window Switch to the middle or #2 terminal of the NOS arming switch (not supplied with this kit).
13. Connect the #1 terminal (away from the LED) of the NOS arming switch to a 12 volt switched power source in the car. Connect the #3 terminal (side of the LED) to a ground.
14. The black/white striped wire is for a second stage of control. An example of its use can be a 2nd stage of nitrous control. This stage is a ground output and must be connected to the **GREEN** ground wire of a second relay (Part # 15618NOS, Sold separately). The solid red wire from the relay should be wired to the center terminal of the NOS arming switch. Wire the remainder of the relay wires according to the illustration and steps 3 thru 7 above. If this wire will not be used, heat shrink the end and secure it tightly out of the way.
15. The white/black striped wire is the shift output. This wire is only capable of supplying a low current ground output. If using the black/white wire to trigger a high current device (over 1Amp), a relay **must** be installed and the white/black wire used to activate the low current side of the relay. If you need a +12v output trigger, use the white/black wire to activate a relay that will supply +12v. If this wire will not be used, heat shrink the end and secure it tightly out of the way.
16. Once these steps are verified, proceed to the next section.

2.11 RPM Input Connection:

The RPM input wire (Tan) can be connected to a square wave signal wire, found on most capacitive discharge ignition systems, or to a coil trigger wire on inductive ignition systems. The unit can be adjusted according to how many times per revolution the circuit is triggered. The wire needs to be connected to what is usually referred to as the "coil signal", "coil trigger", or "tach output" wire.

NOTE: If using a capacitive discharge ignition system, such as a MSD unit, NEVER connect to any of the coil wires or the unit will be damaged. You must connect to the "tach out" wire on the MSD unit.

NOTE: Always refer to the factory service manual to ensure you connect to the proper wire or damage will result.

2.12 Testing The Throttle Position Sensor:

A properly adjusted and functioning throttle position sensor is essential to the proper operation of the NOS WOT/Window Switch. The TPS is a precision electrical component that acts as a variable resistor. The ECU provides a reference voltage to the TPS. As the resistance varies with the throttle angle, the TPS provides a return signal to the ECU.

1. Locate the vehicle's TPS, and the associated wires that attach to it (refer to factory service manual).
2. Turn the ignition key to the "on" position.
3. Using the positive lead of the voltmeter, probe the wires that connect to the TPS sensor. On a drive-by-wire vehicle, the signal wire is usually termed "TP sensor signal". One wire will have a constant 5 volt signal to it (reference), the other wire will be a ground wire, and the remaining wire will be the signal wire (drive-by-wire throttle bodies usually have 2 signal wires).

- When the “signal” wire is located, note the voltage that is output with the throttle closed. (**See Note**) This value will typically be 1 volt or less, depending on the application for rising TPS signals. If it is a falling TPS signal, this voltage is typically 4-5 volts at idle.

NOTE: Output voltage with the key on engine off of a drive by wire vehicle may be lower as these systems use the throttle plate to control idle air instead of an IAC.

- Slowly open the throttle and observe the voltmeter’s readout. On a drive-by-wire vehicle, have an assistant apply the throttle pedal. The voltage should increase smoothly from the closed throttle voltage to 4.0 to 5.0 volts at wide-open throttle or decrease to 1.0 to 2.0 volts at wide open throttle.
- Connect the provided T-tap connector onto the signal wire.
- Refer to **Section 2.13** for setting and verifying proper TPS setting for the unit. The setting used should be what the voltage is at WOT or 0.1-0.2 volts less on a rising TPS signals and 0.1-0.2 volts more on falling TPS signals.

NOTE: The throttle position sensor input does NOT have to be used. If this input is not used and is to be disabled, connect the TPS input wire (from the NOS WOT/Window Switch) to a good chassis ground. Select “falling” TPS in the configuration and set value to 4.0.

2.13 Configuring Settings of the NOS WOT / Window Switch

NOTE: Recommended initial settings for the NOS WOT/Window Switch are as follows; RPM - 3000 rpm (On) and 6000 rpm (Off). The TPS should be configured for the appropriate type of system (rising or falling voltage) with voltage set .2 volts lower than WOT voltage for rising voltage and .2 volts higher than WOT voltage for falling voltage systems. **Altering RPM On and Off settings can be beneficial to tailor nitrous delivery to your particular application.**

- To enter configuration mode, turn power on to the NOS WOT/ Window Switch, press and hold both the #1 and #2 buttons for 1-2 seconds. The upper display will read “Set Up” and then “Prog” momentarily **See Figure 12** and then the lower display will display “1 On” . The upper display will show the activation On RPM for the first stage. **See Figure 13**



Figure 12



Figure 13

Note: On RPM is indicated by the corresponding blue LED being illuminated. Off RPM will be indicated by the LED being illuminated red.

- Depress the #2 BUTTON to scroll through the “ON” RPM thousandths position numbers. Once you have selected the desired thousandths RPM, press the #1 BUTTON to move over to the hundredths position. Repeat the steps above to complete the “ON” RPM desired.
- Once the “ON” RPM has been selected the blue LED will turn red. This indicates that you are now ready to set the “OFF” RPM setting. The procedure for selecting the desired “OFF” RPM will be identical to the “ON” RPM setting procedure.
- Once the last digit of the “OFF” RPM has been set, press the #1 BUTTON to enter the 2nd stage set up mode and the lower screen will display “2 On”. Repeat steps # 2 and # 3 to program the “ON” and “OFF” RPM for stage 2.
- Once the last digit of the “OFF” RPM has been set for the 2nd stage, press the #1 BUTTON to enter the Shift Light set up mode. You can use this to light a shift light at a given programmable RPM. The lower screen will display “Shft”. Depress the #2 BUTTON to scroll through the RPM thousandths position numbers. Once you have selected the desired thousandths RPM, press the #1 BUTTON to move over to the hundredths position. Repeat the steps above to complete the Shift RPM desired. Once the last digit has been set, Press the # 1 button to enter the TPS mode.
- The TPS mode will require the user to select either “rising” throttle position voltage or “falling” throttle position voltage. “Rising” throttle position voltage mode can be identified by the green flashing center LED. Press the #2 BUTTON once to select “falling” throttle position voltage. “Falling” throttle position voltage mode can be identified by the red flashing center

LED. Pressing the #2 BUTTON will alternate between “rising” (**flashing green LED**) and “falling” (**flashing red LED**) throttle position sensor voltage.

7. **For “rising” throttle position voltage:** Press the #1 BUTTON while the GREEN LED is flashing. The GREEN LED will stop flashing and remain illuminated. The first digit of the lower display will now be flashing indicating that the desired throttle position sensor voltage can now be set. Pressing the #2 BUTTON will change the whole voltage reading from 0-4 volts. Once the whole voltage reading is obtained press the #1 BUTTON to select the desired tenths voltage. **See Figure 14**
8. **For “falling” throttle position voltage:** Press the #1 BUTTON while the RED LED is flashing. The RED LED will stop flashing and remain illuminated. The first digit of the lower display will now be flashing indicating that the desired throttle position sensor voltage can now be set. Pressing the #2 BUTTON will change the whole voltage reading from 0-4 volts. Once the whole voltage reading is obtained press the #1 BUTTON to select the desired tenths voltage. Press the #1 BUTTON to store TP voltage selection.



Figure 14

NOTE: The selected voltage should always be within .2 volts of WOT. i.e. – If rising TP voltage at WOT is 4.5vdc, the NOS WOT/Window Switch should be set between 4.3 – 4.5vdc. If falling TP voltage at WOT is 1.0vdc, the NOS/Window Switch should be set to 1.2-1.1vdc. This will prevent part throttle activation which can cause irreversible damage to the engine!

9. Once the TP voltage has been selected and stored, the 3rd & 4th digits should be illuminated with the 3rd digit flashing. This indicates that the ignition signal input is ready to be configured. Press the #2 BUTTON until the correct first digit, which corresponds with your specific ignition system in the chart below, appears. Once the correct number appears, press the #1 BUTTON. The 4th digit will now be flashing indicating you are ready to select the last number of the ignition input configuration. Press the #2 BUTTON until the second number needed to correspond with your ignition system appears. Press the #1 BUTTON to complete and exit the configuration mode. The NOS WOT/Window Switch can be configured to operate on any 4-cycle engine “tach output” signal from 1-18 cylinders.

Use the appropriate numbers to correspond with the vehicle ignition system;

- 00 – Use for non-waste spark DIS ignition systems i.e. - coil per plug
- 02 – Use for waste spark DIS ignition systems
- 04 – 4 cylinder engines connected to the “tach output” wire
- 06 – 6 cylinder engines connected to the “tach output” wire
- 08 – 8 cylinder engines connected to the “tach output” wire
- 10 – 10 cylinder engines connected to the “tach output” wire
- 12 – 12 cylinder engines connected to the “tach output” wire

NOTE: For applications that will rev above 10,000 RPM, add 20 to the configuration of the ignition signal input. The RPM on the display will read 10% of the actual engine RPM in this mode. For example: – High revving 4 cylinder applications will use “24” instead of “04”. If actual engine is 1000 rpm’s the display will read 100 rpm’s - the maximum RPM for the NOS WOT/Window Switch is 20,000 RPM.

2.14 Verifying Settings and Operation of the NOS WOT / Window Switch

IMPORTANT! Disconnect the solenoid control wires! Make sure the nitrous bottle valve is closed!

CAUTION! EXERCISE EXTREME CAUTION WHILE SETTING THE WOT/WINDOW SWITCH, AS WORKING AROUND A RUNNING ENGINE IS EXTREMELY DANGEROUS! SECURE ALL LOOSE CLOTHING AND ITEMS TO SAFEGUARD AGAINST CONTACT WITH THE ENGINE! ACTIVE NITROUS AND FUEL SYSTEMS ARE EXTREMELY DANGEROUS!

1. Start engine and verify the RPM displayed on the NOS WOT / Window Switch matches actual engine RPM. If RPM differs, go back and configure the correct ignition signal input.

2. Verify that the TPS input is functioning correctly. The left two digits on the lower display will show actual “real time” TPS voltage. This value should increase as the throttle is opened and decrease as it closes on rising voltage equipped vehicles. If “0.0” is displayed, the TPS input is not connected properly. The two digits on the right side of the lower display will read maximum TPS voltage achieved. This is helpful in accurately setting WOT voltage. The maximum voltage reading can be cleared by depressing the #2 BUTTON.
3. To verify operation of the NOS WOT / Window Switch, lower RPM of the #1, #2 window switch and the TPS setting to a reasonable engine operating range. Set the shift light RPM to the same RPM as the #1 window switch.
4. Start the engine and bring engine speed up to “On RPM” setting and verify proper operation based on the chart in figure 15. Continue bringing the engine speed up to the “Off RPM” setting and verify proper operation based on the chart in figure 15.

	First Stage	Second Stage	Shift Light
Indicator Position	<i>Top LED</i>	<i>Lower Screen 3rd Digit</i>	<i>Lower Screen 4th Digit</i>
On RPM	Blue	2	S
Off RPM	Red	Overscore	N/A
Below On RPM	Off	Underscore	N/A
Below RPM Shift Point	N/A	N/A	Underscore

Figure 15

5. The center LED will illuminate red until the “TPS voltage” reaches the set voltage. Once the set voltage has been reached the center LED will illuminate green.
6. Once the “On RPM” of switch #1 and “TPS voltage” are met the bottom LED will illuminate blue. This indicates that the 12 volt and ground outputs are active.
7. Once you have verified proper operation of the NOS WOT / Window Switch, reset all of the values to the desired settings.

NOTE: If you do not want to have a window switch function, select 0 RPM for the lower limit and 9999 RPM for the higher limit. The input wire needs to be connected. NOS recommends the use of the high and low side of the window switch.

Chapter 3 Baseline Tuning Suggestions

NOTE: If you are unsure of your EFI system fuel pressure, you need to refer to Chapter 4, steps 2A through 2C before selecting a baseline tuning combination.

Your NOS System comes preset with nitrous and fuel jetting based upon engine displacement. The jetting combinations are conservative and are intended to work with stock ignition and +92 octane unleaded pump gasoline. Nitrous and fuel jetting combinations are derived based upon 950 psi (85° F) nitrous bottle pressure and fuel pressures as depicted in Table 3. Using the listed jetting and suggested fuel and nitrous pressure levels should yield safe and reliable power increase.

Table 3 EFI System Jetting Map

N ₂ O Jet Size	Fuel Jet Size at Fuel Pressure [PSI]				
	20 psi	30 psi	40 psi	50 psi	60 psi
38	30-31	28-29	26-28	25-26	25-26
40	31-32	29-30	28-29	26-28	26-28
42	32-33	30-31	29-30	28-29	28-29
44	33-34	31-32	30-31	29-30	28-29
46	34-35	32-33	31-32	30-31	29-30
48	35-36	33-34	32-33	31-32	30-31
50	37-38	34-35	33-34	32-33	31-32
52	38-39	35-36	34-35	33-34	32-33
54	39-40	36-37	35-36	34-35	33-34
56	40-41	37-38	36-37	35-36	34-35
58	41-42	38-39	37-38	36-37	35-36
60	42-43	39-40	38-39	37-38	36-37
62	42-43	39-40	38-39	37-38	36-37
64	43-44	40-41	39-40	38-39	37-38
66	43-44	40-41	39-40	38-39	37-38

Using these jetting combinations with lower bottle pressure and / or higher fuel pressure may produce an excessively rich condition. This can result in a loss of power, excessive exhaust smoke (black) or misfiring (backfiring through the exhaust).

If you experience any of these conditions, or you desire to maximize the power output from your system, you should refer to Chapter 5, “Advanced Tuning for Maximum Power”.

CAUTION! Use of excessive bottle pressure and/or inadequate fuel pressure can result in an excessively lean condition. In extreme cases, this will produce catastrophic engine failure.

Chapter 4 Preparing for Operation

NOTE: If jets for higher HP gains are being considered, you need to perform steps 2A through 2C before selecting a baseline tuning combination.

1. Turn on the ignition switch. Check for fuel leaks. Shut the vehicle off.
2.
 - A. Connect a fuel pressure gauge to the fuel pressure test port or the 4AN fitting that you installed in the fuel rail / banjo fitting in Section 2.8.
 - B. Turn on the ignition switch. Check for fuel leaks. Record the fuel pressure. Shut the vehicle off.
 - C. Examine the jetting chart in Table 3. Locate the nitrous jet you are intending to use in column #1. Go across the top row to the fuel pressure your vehicle operates at. Find the box that corresponds to your fuel pressure and nitrous jet. If the recommended fuel jet was not included in your kit, phone the NOS technical department for assistance.
3. Install the correct fuel jet in the Soft Plume nozzle. Close the nitrous bottle. Turn the arming switch on. Set the engine speed at 2000 RPM. Briefly activate the WOT/Window Switch. Engine speed should decrease, if the fuel delivery system is performing properly. If not, refer to Appendix A, Troubleshooting Guide.

NOTE: If jets for higher HP gains are being considered, care must be taken to ensure that the fuel delivery system of your vehicle is adequate. Before opening the nitrous bottle valve, repeat step 2B with the vehicle under wide-open throttle acceleration. Fuel pressure should not deviate more than 4-5 psi when the fuel side of the nitrous system is activated. If the fuel pressure drop is greater than this, a supplemental fuel pump will be required. Contact the NOS technical department for recommendations. Fuel pressure safety switch P/N 15686NOS is recommended to reduce the risk of engine damage should fuel pressure drop to dangerous levels.

4. Open the nitrous bottle valve.
5. Inspect the nitrous lines and fittings for leaks.
6. ENJOY!

CAUTION! Never activate your nitrous system below 3000 engine RPM.

Chapter 5 Advanced Tuning for Maximum Power

After performing the Baseline Tuning Suggestion—Chapter 3, if you desire to maximize the performance of your system, perform the following:

NOTE: Always perform the nitrous/fuel ratio modifications listed in Section 5.1 before attempting to optimize the ignition timing (Section 5.2). Improper nitrous/fuel ratio combinations can mislead you when attempting to optimize the ignition timing.

5.1 Determining Optimum Nitrous/Fuel Jetting

The factory calibrated nitrous / fuel ratio included to provide you with a safe starting point. It is intended to be used with 950 psi nitrous bottle pressure and fuel pressures as stated in Table 3. In some instances, slight changes in fuel pressure may produce performance gains.

1. Stabilize the nitrous bottle pressure at 950 psi.
2. Perform a dynamometer pull or a full throttle pass down the racetrack. Note the power reading or vehicle mph (not e.t.). Examine spark plugs for the indication of lean or rich nitrous/fuel conditions (refer to Figure 14 for tips on reading the spark plugs).
 - 2A. If spark plugs appear to be excessively rich, decrease the fuel jet size 2 steps (ex. 36 to 34, 34 to 32, etc;).
 - 2B. If spark plugs appear to be excessively lean, increase the fuel jet size 2 steps (ex. 34 to 36, 32 to 34, etc;).
 - 2C. If spark plugs have a “like new” appearance on the porcelain and electrode, do not make a fuel jetting change.
3. Repeat steps 1 and 2 until the desired mixture is obtained.

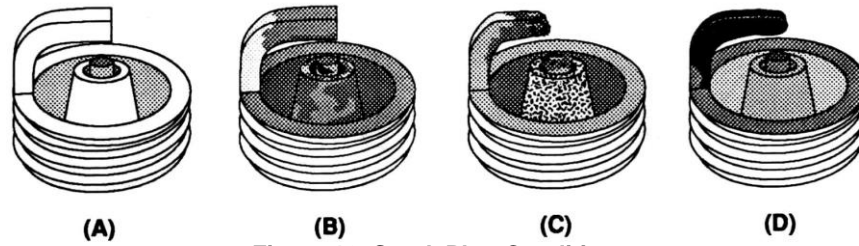


Figure 16 Spark Plug Condition

How to Read Spark Plugs from a Nitrous Oxide Injected Engine

A. Correct Timing, Mixture, and Spark Plug Heat Range

Ground strap retains a “like new” appearance. Edges are crisp, with no signs of discoloration. Porcelain retains clear white appearance with no “peppering” or spotting.

B. Excessively Rich Mixture

Porcelain may be fuel stained, appearing brown or black. In extreme cases, ground strap, electrode, and porcelain may be damp with gasoline, or smell of fuel.

C. Detonation

Edges of the ground strap may become rounded. Porcelain has the appearance of being sprinkled with pepper, or may have aluminum speckles. During heavy detonation, the ground strap tip may burn off. This phenomena can result from excessive ignition timing, too high a heat range spark plug, or inadequate fuel octane.

D. Excessively Lean Mixture

Edges of the ground strap may become rounded. Under moderate overheating, the tip of the ground strap can discolor, usually turning purple, or the entire ground strap can become discolored.

5.2 Determining Optimum Ignition Timing

IMPORTANT! Ignition timing should be retarded approximately 2 degrees per 50 HP increase due to nitrous oxide injection. Start with the engine’s best total timing and reduce from there. Use the initial settings, which are 2-3 degrees more retarded than you expect to be optimum.

Example:	Total Ignition Timing with Nitrous-----	38°
	100 HP Increase from Nitrous-----2°/50HP-----	4° Retard
	Initial Safety Margin-----	<u>2° Retard</u>
	Initial Timing with Nitrous-----	32°

The following scheme for determining ignition timing should allow you to determine the optimum setting for your vehicle, without incurring engine damage during the tuning phase.

1. Estimate the reduced ignition timing that you think will produce the best power, based upon the 2-degree retard per 50 horsepower increase rule.
2. Set the ignition timing 2 to 3 degrees retarded from your best power estimate setting.
3. Stabilize the nitrous bottle pressure at 950 psi.
4. Perform a dynamometer pull or a full throttle pass down the racetrack. Note the power reading or vehicle mph.
5. Increase the ignition timing 2 degrees.
6. Perform a dynamometer pull or a full throttle pass down the racetrack. Note the power reading or vehicle mph. Examine the spark plugs for signs of detonation (refer to Figure 16 for tips on reading spark plugs).
 - 6A. If power increase or vehicle mph increase **and** spark plugs show no sign of overheating or detonation, increase the ignition timing 2 degrees.
 - 6B. If power increase or vehicle mph increase **and** spark plugs begin to show slight signs of detonation—STOP. Do not advance the timing further. You may choose to reduce the timing 2 degrees at this point for an extra margin of safety.
 - 6C. If power decreases or vehicle mph decreases, reduce the ignition timing 2 degrees.
7. Repeat step 6 until optimum ignition timing is obtained.

Chapter 6 Routine Maintenance

6.1 Nitrous Solenoid Filter

When nitrous bottles are refilled they can become contaminated with debris, if the refiller does not have an adequate filter in their transfer pump mechanism. Contaminants in the bottle will eventually become lodged in the nitrous solenoid filter fitting.

You should periodically (after every 20-30 pounds of nitrous usage) examine the mesh in the nitrous filter for debris.

To clean the filter, follow the following steps:

1. Close the valve on the nitrous bottle. Empty the main nitrous feed line.
2. Disconnect the main nitrous feed line from the nitrous solenoid. Remove the nitrous filter fitting from the nitrous solenoid.
3. Remove **all** PTFE paste debris from the solenoid inlet port threads and from the nitrous solenoid filter pipe threads.
4. Examine the mesh in the nitrous filter fitting for contaminants. Blow out debris with compressed air, if necessary.
5. Apply fresh PTFE paste to the nitrous filter pipe threads. Reinstall the filter in the nitrous solenoid.
6. Reconnect the main nitrous supply line to the nitrous solenoid.

6.2 Nitrous Solenoid Plunger

6.2.1 General Information

The seals used in NOS nitrous solenoid plungers are constructed from materials that are designed to be used with nitrous oxide. When kept free from fuel contaminants or from overpressurization, they should provide trouble free performance.

You should periodically (after every 20-30 pounds of nitrous usage) examine the seal in the nitrous solenoid plunger.

The seals used in NOS nitrous solenoid plungers are designed to work at pressures up to 1100 psi. Exposing the plunger to excessive pressure (whether the vehicle is sitting or in-use) can result in the seal in the plunger seal swelling or in extreme cases, plunger seal disintegration.

NOTE: The seals are designed so that if they fail due to overpressurization, they will not leak, the valve will just fail to flow nitrous oxide.

Swelling of the nitrous solenoid plunger seal will reduce nitrous flow (causing an excessively rich nitrous/fuel condition and a loss of power).

6.2.2 Nitrous Solenoid Plunger Disassembly and Inspection

1. Close the valve on the nitrous bottle. Empty the main nitrous supply line.
2. Remove the retaining nut from the nitrous solenoid. Remove the coil and housing from the nitrous solenoid base.
3. Unscrew the stem from the nitrous solenoid base. Do this by double nutting the stem, or by using a solenoid stem removal tool. **Do not use pliers on the solenoid stem. Damage to the stem will result.**
4. Remove the stem, spring, and plunger from the solenoid base.
5. Examine the plunger seal for swelling. The seal surface should be flat, except for a small circular indentation in the center of the seal;

A fuel-contaminated seal will protrude from the plunger and be dome-shaped. A fuel-contaminated seal may return to its original shape if left out in the fresh air for several days. It may then be returned to service.

A seal, which has been overpressurized, may be dome-shaped, or the sealing surface may be flat with the seal protruding out of the plunger. A dome-shaped seal may return to its original shape if left out in the fresh air for several days. It may then be returned to service. A seal, which is flat, but protrudes from the plunger body has probably failed internally and should be replaced.

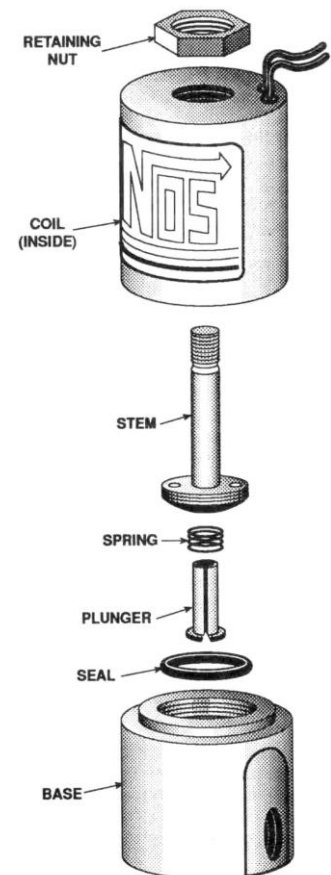


Figure 17

Appendix A Troubleshooting Guide

The troubleshooting chart on the following pages should help determine and rectify most problems with your installed NOS system. If you still need assistance determining or fixing problems, call the NOS Technical Support at 1-866-464-6553.

PROBLEM	POSSIBLE CAUSES	DIAGNOSTIC PROCEDURE	CORRECTIVE ACTION
No change in engine speed when the fuel solenoid is activated (Preparing for Operation—Chapter 4).	System wired incorrectly.	Compare wiring to schematic in Fig. 9.	Wire per instructions.
	Restricted fuel line.	Inspect fuel line for restrictions (crimped or plugged).	Remove restrictions.
	Malfunctioning fuel solenoid.	Turn arming switch ON. Cycle the microswitch. Solenoid should make "clicking" noise.	Repair/replace solenoid.
Change in engine speed when nitrous bottle valve is opened (Preparing for Operation—Chapter 4).	Malfunctioning nitrous solenoid.	Remove and inspect solenoid.	Repair/replace solenoid.
Engine runs rich when system is activated.	Bottle valve not fully opened.	Check bottle valve.	Open valve fully.
	Bottle mounted improperly.	Check bottle orientation.	Mount bottle properly.
	Plugged nitrous filter.	Inspect filter.	Clean/replace filter.
	Low bottle pressure.	Check bottle temperature.	Set bottle temperature to 75° to 85°F.
	Inadequate nitrous supply.	Weigh bottle.	Fill bottle. (1-800-99-REFILL)
	Mismatched N ₂ O/fuel jetting.	Compare jetting to recommended values.	Install correct jets.
	Excessive fuel pressure.	Install fuel pressure gauge, such as NOS P/N 15906NOS, in the fuel line. Measure the pressure during acceleration with the system activated.	Regulate pressure down, or install smaller fuel jetting.
	Loose nitrous solenoid wiring.	Inspect the solenoid wiring.	Repair wiring.
	Malfunctioning nitrous solenoid.	WARNING: Solenoid discharges nitrous at a high rate. Don't inhale nitrous; death may occur. Skin contact may cause frostbite. Close bottle valve. Disconnect the nitrous solenoid outlet port. Disconnect the solenoid (+) lead. Open the nitrous bottle valve. Connect the +12V to the solenoid. Solenoid should discharge N ₂ O at a high rate.	Rebuild solenoid.
No change in performance when system is activated.	System wired incorrectly.	Compare nitrous wiring to schematic (Fig. 9).	Wire system per instructions.
	Loose ground wire(s).	Connect 12V test light to battery (+) terminal. Check for continuity at grounds noted in Fig. 9.	Tighten/repair loose grounds.
	Malfunctioning arming switch.	Turn arming switch on. Connect 12V test light to battery (-) terminal. Check for power at pole #2.	Replace pushbutton
	No power to arming switch.	Connect 12V test light to battery (-) terminal. Check for power at pole #1 on arming switch.	Repair wiring.
	Malfunctioning WOT / Window Switch.	See "Test the WOT / Window Switch" section.	Replace WOT / Window Switch.
	Overly rich fuel condition.	Check for black smoke or backfiring through exhaust with system activated.	Install smaller fuel jet or decrease fuel pressure.
Engine detonates mildly when system is activated.	Excessive ignition timing.	Check ignition timing.	Reduce timing in 2° increments.
	Inadequate octane fuel.		Use higher octane fuel.
	Spark plug heat range too high.		Reduce spark plug heat range (maximum 2 steps).
	Too much nitrous flow.		Reduce nitrous jetting.

Engine detonates heavily when system is activated.	Inadequate fuel delivery due to: Plugged fuel filter.	Inspect fuel filter.	Clean or replace filter.
	Crimped fuel line.	Inspect fuel line.	Replace crimped line.
	Weak fuel pump.	Install fuel pressure gauge, such as NOS P/N 15906NOS, in the fuel line. Run engine under load at wide-open throttle, with system activated. Fuel pressure should be within 5 PSI of fuel pressure at idle.	Repair/replace fuel pump.
High-rpm misfire when system is activated.	Excessive spark plug gap.	Inspect spark plugs.	Set spark plug gap at 0.030" to 0.035".
	Weak ignition/ignition component failure.	Inspect components (plug wires, distributor cap, etc.)	Replace worn components.
Surges under acceleration when system is activated.	Inadequate supply of nitrous.	Check bottle weight.	Replace with full bottle.
	Bottle mounted incorrectly.	Compare bottle position and orientation to instructions (Figures 2 & 3).	Mount or orient bottle correctly.

Nitrous Oxide Accessories

NOS systems are calibrated for optimum performance with a bottle pressure of 900-950 psi. The pressure will change with temperature. Heater kits are thermostatically controlled to keep the bottle near 85° F to provide correct pressure. **Bottle Heater (P/N 14164NOS)** is available for 10 & 15 lb. bottles.

Insulating the bottle helps maintain pressure by keeping heat in the bottle when it's cold, or heat out when it's hot outside. The blankets are made of a rugged, easily cleaned Nylon outer shell with insulation. It's also an excellent "dress up" accessory and perfect for "covering" battle-scarred bottles. **Bottle Blanket (P/N 14165NOS)** is a 7" diameter blanket for the 10 lb. bottle.



P/N 14164NOS



P/N 14165NOS

With the 35 PSI **Adjustable Pressure Switch (P/N 15686NOS)**, you won't be blasting nitrous into the engine if the fuel pressure is below what is required to supply the required extra fuel. This fuel pressure safety switch can be adjusted to any desired setting, but is preset to 35 PSI at the factory.



P/N 15686NOS



P/N 16030NOS

The primary purpose of a **Purge Valve, P/N 16030NOS**, is to release trapped air or gaseous nitrous from the feed line(s). This helps to ensure consistent performances. And, purging looks cool too!

Nitrous Pressure Gauges (P/N 15910NOS) measure from 0-1500 psi (although recommended level is 900-950 psi) and are essential in monitoring the bottle.

The **Quick Release Hinged Aluminum Bracket, P/N 14140NOS**, is available for 10 lb. and 15 lb. bottles. **P/N 14147NOS** is available for the carbon fiber bottle.



P/N 15910NOS



P/N 14140NOS

For those who want the ultimate in appearance, NOS offers many popular bottles that are fully polished. **P/N 14745-PNOS** is our 10 lb. fully polished bottle.

For optimum weight reduction and distinctive high-tech looks, these DOT-approved NOS carbon fiber-wrapped bottles are it! Weighs about half of the standard bottle (empty). **P/N 14748NOS** has 12.8 lb. capacity.



P/N 14745-PNOS



P/N 14748NOS

To order, contact your local NOS dealer.

NOS Technical Support

Phone: 1-866-464-6553

For online help, please refer to the Tech Service section of our website: www.holley.com

For bottle refill information: 1-800-99-REFILL

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