



P/N A5072-SNOS

# INLINE SPORTSMAN FOGGER SYSTEM

Kit Numbers: 05030NOS, 05030-FINOS, 05040NOS, and 05040-FINOS



## OWNER'S MANUAL

**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 Sportsman Fogger Kit is not intended for use on hatchback type vehicles without the use of NOS P/N 16160NOS (External Aluminum Blow-Down Tube) and 16166NOS (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

**Do not attempt to start the engine if the nitrous has been injected while the engine was not running. Disconnect the coil wire 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.**

**Identify the gas content by the NOS label on the bottle before using. If the bottle is not identified to show the gas contained, return the bottle to the supplier.**

**Do not deface or remove any markings, which are on the nitrous bottle.**

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

**Notify the supplier of any condition, which might 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.**

**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-GOHOLLEY.

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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 Teflon-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 Teflon Tape on any pipe threads. Pieces of Teflon 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

Direct port injection style kits are intended to provide maximum performance and tunability in a nitrous oxide injection system. Horsepower increases from these kits will vary with engine displacement and configuration. However, approximate power increases can be estimated based upon the massflow of nitrous oxide into the engine. On a typical engine, the following power increases approximate what you can expect to see.

**Table 1 Jetting and Power Levels**

<b>Configuration</b>	<b>Nitrous/Fuel Jetting</b>	<b>Approximate Power Increase (BHP)</b>	<b>Approximate N<sub>2</sub>O Consumption Rate</b>
05030NOS	18-18	45	.55lbs./10 sec.
	20-20	70	.70lbs./10 sec.
05030-FINOS	20-14	70	.70lbs./10 sec.
	22-16	85	.85lbs./10 sec.
05040NOS	18-18	65	.85lbs./10 sec.
	20-20	110	1.10lbs./10 sec.
05040-FINOS	20-14	110	1.10lbs./10 sec.
	22-16	125	1.35lbs./10 sec.

**NOTE:** A full #10 bottle will weigh 25 lbs. For best performance, the bottle should be refilled when it weighs 17 to 18 lbs.

## 1.2 Sportsman Fogger System Requirements

When used correctly, NOS nitrous oxide injection elevates cylinder pressures and temperatures while increasing the combustion rate. These characteristics make the engine more sensitive to detonation. **To ensure proper performance and engine life with all Sportsman Fogger kits, the following is an absolute must:**

### Adequate Fuel Pressure and Delivery

When designing your fuel system, plan on your fuel pump(s) and lines flow at least 0.10 gallons of gasoline per hour per horsepower at the fuel pressure your engine is designed to operate at. For Kit Numbers 05030NOS and 05040NOS, typical fuel pressures are between 5 and 7 psig. Kit Numbers 05030-FINOS and 05040-FINOS are applicable to vehicles that operate at 35-45 psig at wide-open throttle.

**NOTE: If you intend to increase engine output by more than 40-50%, the following modifications in engine configuration are suggested.**

### Forged Pistons

Cast pistons are very prone to failure at elevated cylinder temperatures and pressures.

### Connecting Rods

Cast connecting rods tend to break under the high compressive loads generated with large doses of nitrous oxide. For most applications, factory forged connecting rods are acceptable. For very high output applications, a steel billet or aluminum rod is suggested.

### Cylinder Block

Four-bolt main cap blocks reduce the tendency for the main caps to “walk” under high-output loading. Cylinder head studs decrease the chance of cylinder heads lifting or moving relative to the cylinder block deck surface.

### Crankshaft

Stock-type cast crankshafts may break. For most applications, a factory forging is acceptable. Aftermarket units are recommended for very high output applications.

### High Output Ignition System

Stock ignition systems are prone to producing misfires at high-RPM, when subjected to high cylinder pressures. A quality aftermarket-racing ignition is suggested.

### 1.3 Kit Components

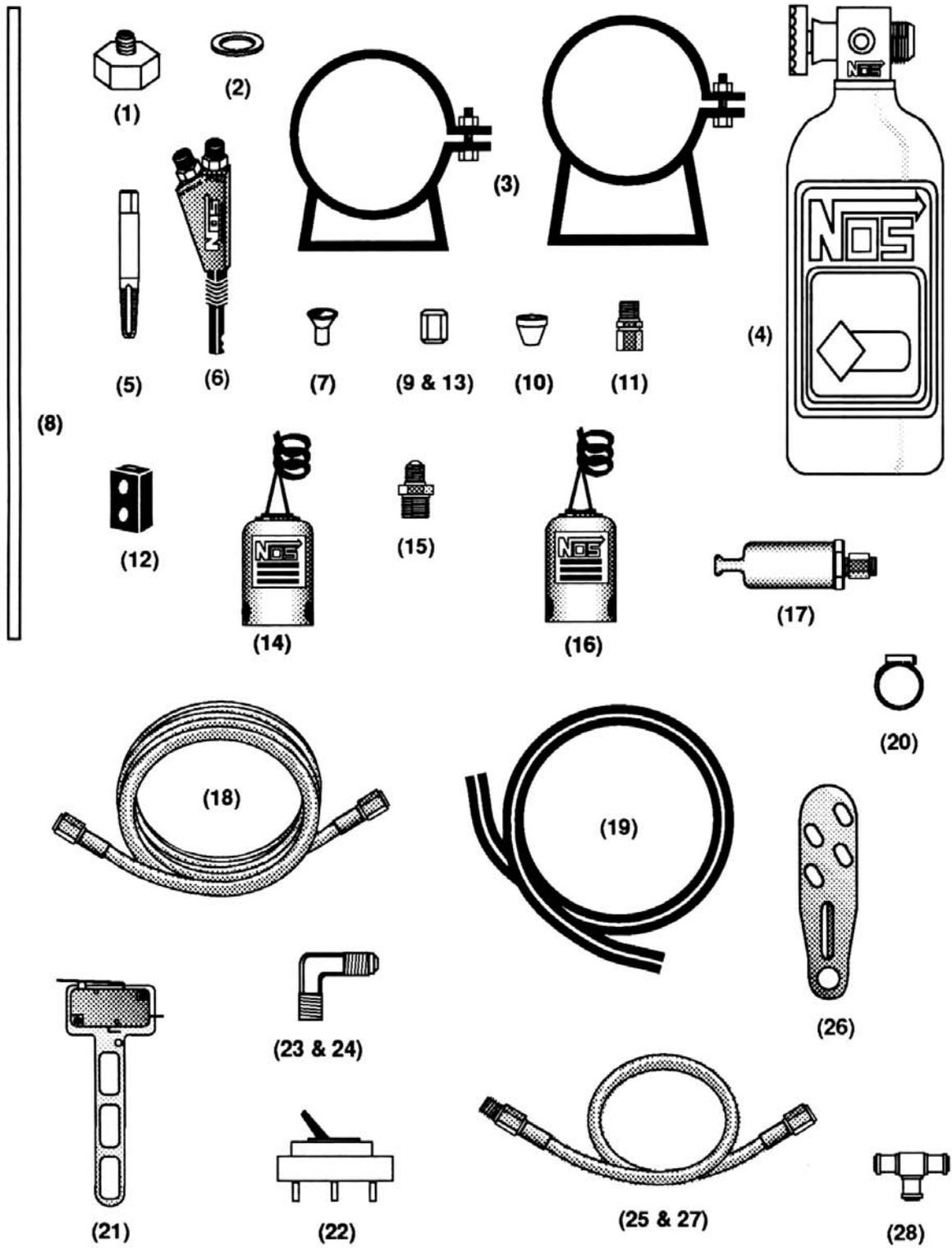
Before beginning the installation of your NOS kit, compare the components in your kit with those shown in Figure 1 or 2, and listed in Table 2 or 3. If any components are missing, please contact NOS Technical Support at 1-866-GOHOLLEY.

**Table 2 Kit Numbers 05030NOS and 05040NOS Parts List**

Item	Description	Quantity	NOS P/N
(1)	Bottle Valve Adapter	1	16220NOS
(2)	Bottle Washer	1	16210NOS
(3)	Bottle Bracket Set	1	14125NOS
(4)	Bottle 10 lb.	1	14745NOS
(5)	1/16" NPT Tap	1	15990NOS
(6)	Fogger Nozzle	*	13700BNOS
(7)	Funnel Jet	*	*
(8)	Solenoid Extension Tube	*	16300-SNOS
(9)	3AN x 1/8" B-Nut (Blue)	*	17540NOS
(10)	1/8" Ferrule	*	16404NOS
(11)	1/16" NPT Compression Fitting	*	16430NOS
(12)	1/8" NPT x 1/16" NPT Distribution Block	2	*
(13)	3AN x 1/8" B-Nut (Red)	*	17541NOS
Not shown	12" 4 AN x 3 AN Hose (Blue)	1	15340NOS
(14)	Power Shot N <sub>2</sub> O Solenoid	1	16020NOS
(15)	N <sub>2</sub> O Filter	1	15570NOS
(16)	Power Shot Fuel Solenoid	1	16080NOS
(17)	Fuel Filter	1	15540NOS
(18)	4AN x 14 ft. N <sub>2</sub> O Hose (Blue)	1	15295NOS
(19)	Rubber Fuel Hose (2 ft.)	1	15000-SNOS
(20)	Hose Clamp	4	-----
(21)	Microswitch and Bracket	1	15640NOS
(22)	Arming Switch	1	15602NOS
(23)	1/8" NPT x 3AN 90° Fitting (Blue)	1	17650NOS
(24)	1/8" NPT x 3AN 90° Fitting (Red)	1	17651NOS
(25)	3AN Hose (2 ft. Blue)	1	15060-1NOS
(26)	Solenoid Mounting Bracket with screws	1	16505-SNOS
(27)	3AN Hose (2 ft. Red)	1	15060-2NOS
(28)	Fuel TEE 5/16"	1	15534NOS

\*Varies with application.

Figure 1 Kits 05030NOS & 05040NOS Components

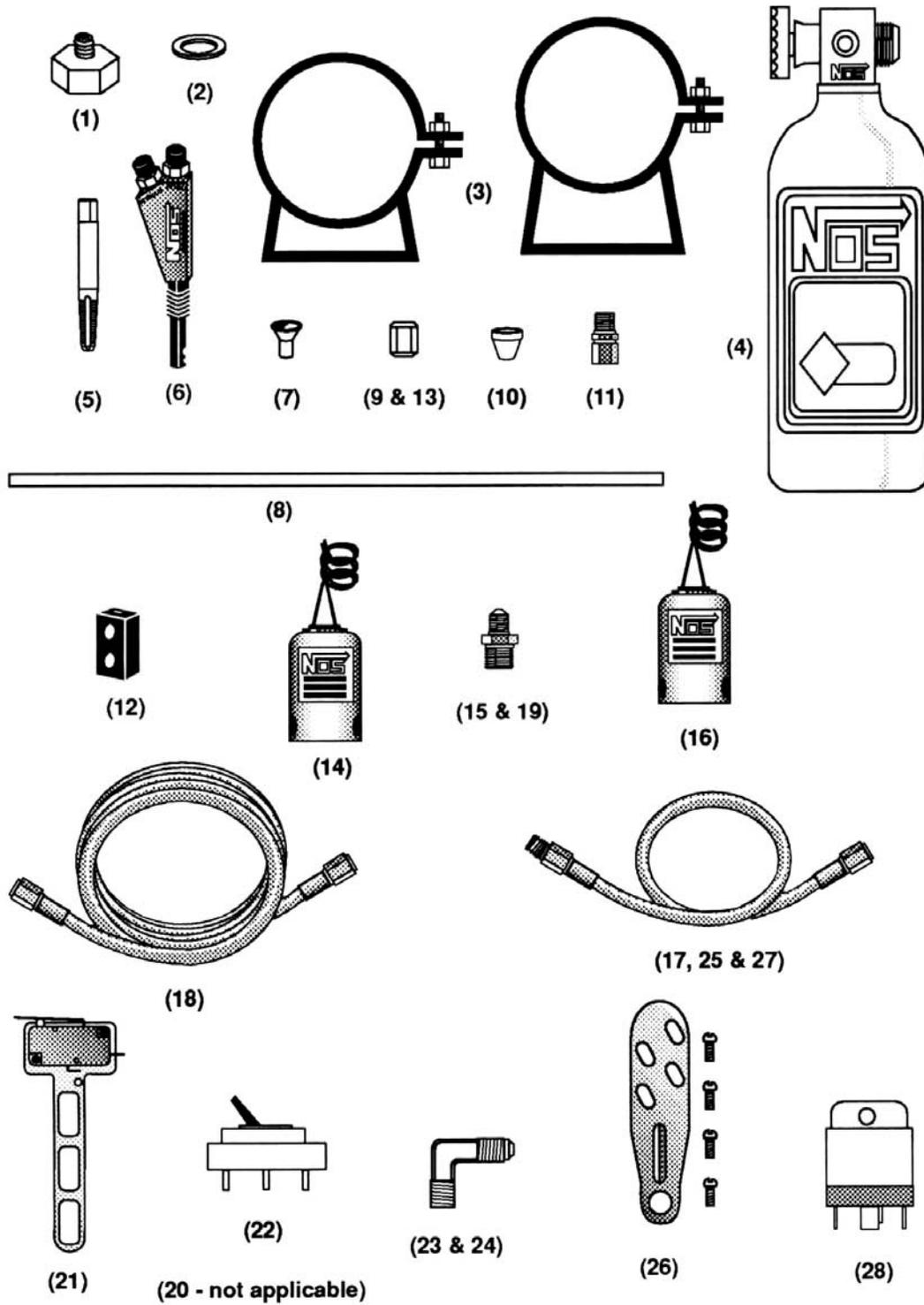


**Table 3 Kit Numbers 05030-FINOS and 05040-FINOS Parts List**

<b>Item</b>	<b>Description</b>	<b>Quantity</b>	<b>NOS P/N</b>
(1)	Bottle Valve Adapter	1	16220NOS
(2)	Bottle Washer	1	16210NOS
(3)	Bottle Bracket Set	1	14125NOS
(4)	Bottle 10 lb.	1	14745NOS
(5)	1/16" NPT Tap	1	15990NOS
(6)	Fogger Nozzle	*	13700BNOS
(7)	Funnel Jet	*	*
(8)	Solenoid Extension Tube	*	16300-SNOS
(9)	3AN x 1/8" B-Nut (Blue)	*	17540NOS
(10)	1/8" Ferrule	*	16404NOS
(11)	1/16" NPT Compression Fitting	*	16430NOS
(12)	1/8" NPT x 1/16" NPT Distribution Block	2	*
(13)	3AN x 1/8" B-Nut (Red)	*	17541NOS
(14)	Power Shot N <sub>2</sub> O Solenoid	1	16020NOS
(15)	N <sub>2</sub> O Filter	1	15570NOS
(16)	Power Shot Fuel Solenoid	1	16080NOS
(17)	2 ft. 4AN x 1/8 NPT Hose (Red)	1	15230-2NOS
(18)	4AN x 14 ft. N <sub>2</sub> O Hose (Blue)	1	15295NOS
(19)	4AN x 1/16" Adapter Fitting	1	17945NOS
(20)	---Not applicable---	-	-----
(21)	Microswitch and Bracket	1	15640NOS
(22)	Arming Switch	1	15602NOS
(23)	1/8" NPT x 3AN 90° Fitting (Blue)	1	17650NOS
(24)	1/8" NPT x 3AN 90° Fitting (Red)	1	17651NOS
(25)	3AN Hose (2 ft. Blue)	1	15060-1NOS
(26)	Solenoid Mounting Bracket with screws	1	16505NOS
(27)	3AN Hose (2 ft. Red)	1	15060-2NOS
(28)	30 AMP Relay & Wiring Harness	1	15618NOS

\*Varies with application.

Figure 2 Kit Numbers 05030-FINOS & 05040-FINOS System Components



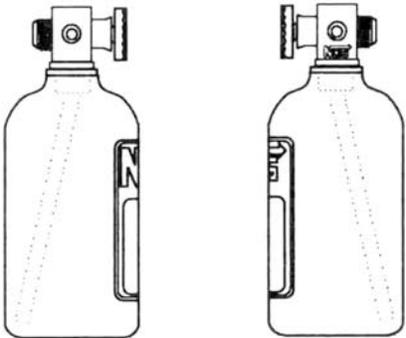
## Chapter 2 Kit Installation

### 2.1 Bottle Mounting Instructions

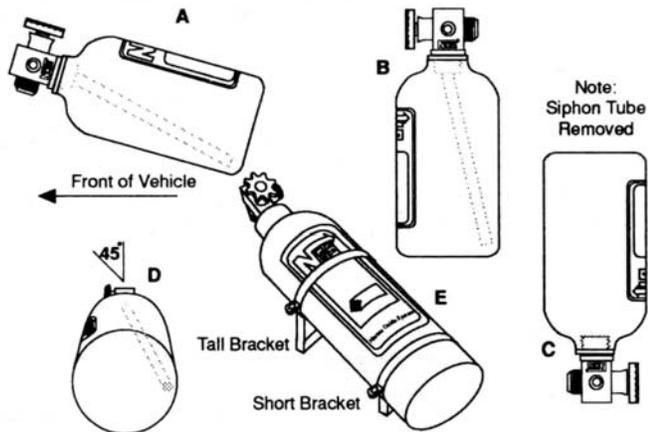
**NOTE:** Disconnect the battery ground before beginning installation.

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 the bottle to be mounted within the confines of the safety roll cage with the safety pressure relief cap vented away from the driver's compartment. NOS offers a special safety pressure relief cap (P/N 16166NOS) and an aluminum blow-down tube (P/N 16160NOS) for this purpose.

**Figure 3 Nitrous Bottle Siphon Tube Orientation**



**Figure 4 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 3).

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 4A).

If the bottle is mounted vertically, the valve handle and label must face toward the front of the vehicle (Figure 4B). 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 4C). 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  $45^\circ$  toward the front of the vehicle (Figure 4D). 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 4E).

The most efficient mounting is the lay-down position (Figure 4A) 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

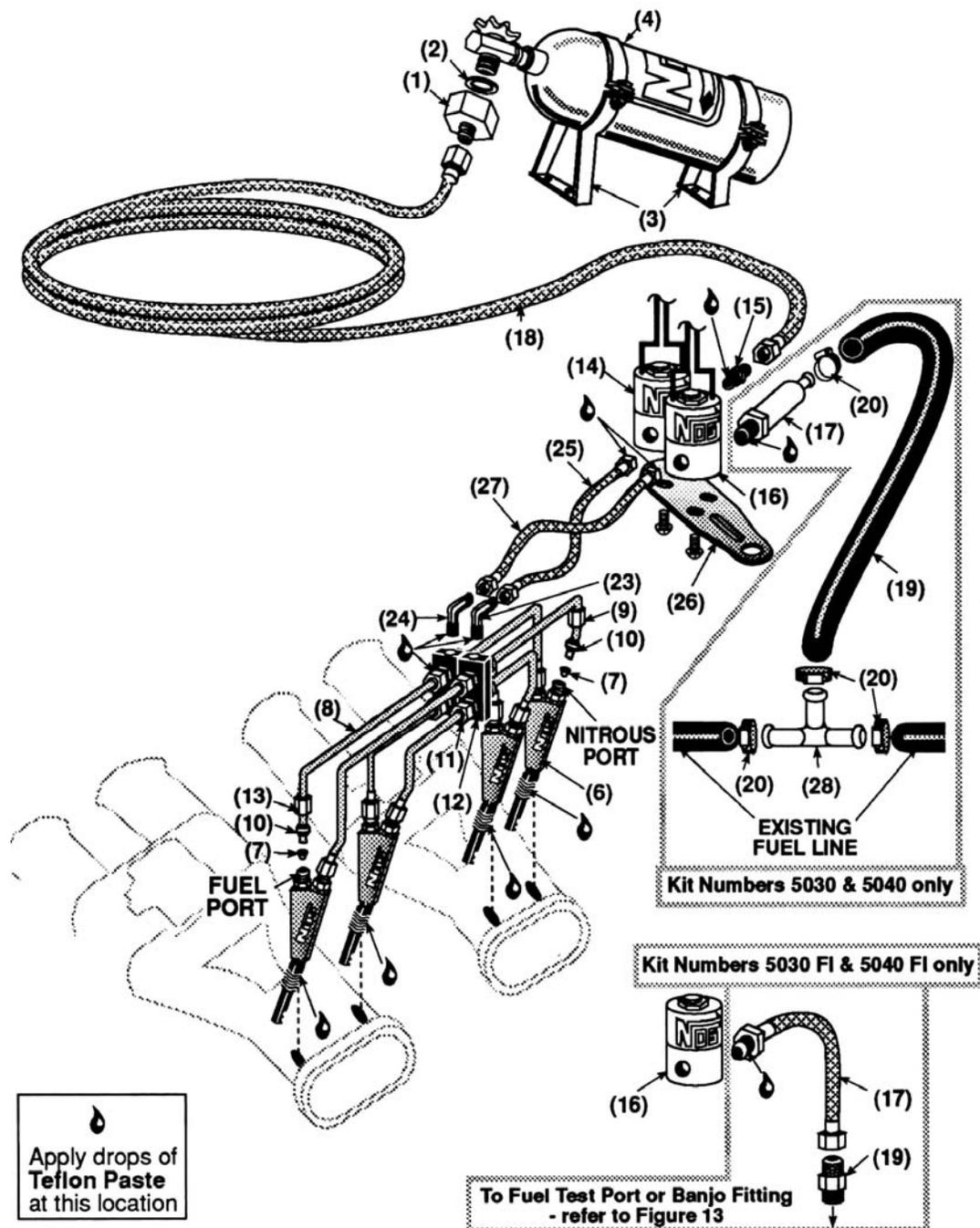
After you have determined the location and orientation of the nitrous bottle, use the following procedure to install the bottle:

**NOTE:** Numbers in parentheses ( ) refer to the parts list (Table 2 or 3) and the component identification drawing (Figure 1 or 2). Refer to Figure 5, the exploded view of all parts to be installed, while performing the following instructions.

1. Install the bottle nut adapter (1) and washer (2) on the nitrous bottle (4), and tighten securely.
2. Loosely install the bottle mounting brackets (3) on the nitrous bottle, as shown in Figure 4E.
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.
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.

**NOTE:** NOS provides custom plumbing services for Fogger nozzle installation if you would rather not perform these operations yourself.

**Figure 5 System Exploded View**



## 2.4 Fogger Nozzle Installation

Figure 6 displays a typical Fogger nozzle installation location. Use this figure as a guide for locating your nozzles.

**NOTE:** When mounting Fogger nozzles, ensure that the nozzles and feed lines do not interfere with engine components. The intake manifold must be removed from the engine during drilling and tapping operations.

1. Mark the desired Fogger nozzle mounting locations on the intake manifold.
2. Remove the intake manifold from the engine.
3. Drill a 1/4" diameter hole into the intake manifold at each Fogger nozzle mounting location. For aesthetic purposes, all holes on each cylinder bank should be drilled to line up straight.

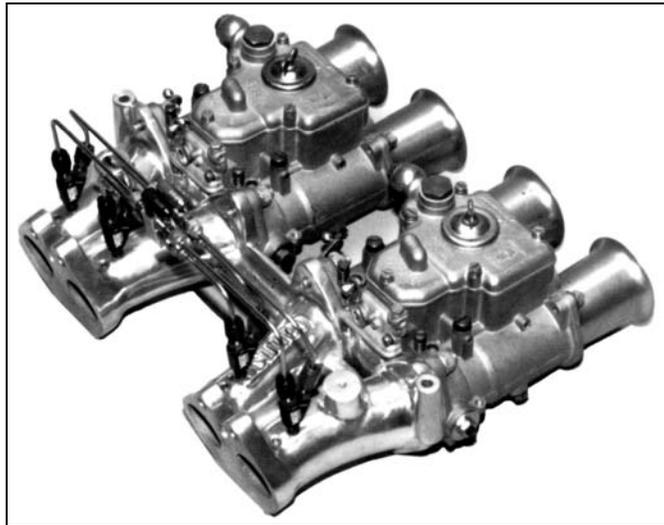
**NOTE:** Holes should be tapped just deep enough for the discharge orifice of the Fogger nozzle head to protrude through. Be careful not to tap holes too deep, as the Fogger nozzle may not adequately seal.

4. Tap each 1/4" hole with the 1/16" NPT tap (5).
5. Remove all debris from the intake manifold.

**HINT:** Apply Teflon past to the threads of each Fogger nozzle before installing them in the manifold. This will help prevent vacuum leaks into the intake manifold.

6. Install a Fogger nozzle (6) into each 1/4" hole, orienting the nozzles so the discharge orifices are pointed down the intake manifold port toward the intake valve.
7. Examine Chapter 3—Baseline Tuning Suggestions—for proper nitrous and fuel jet selection for your application. Install the desired funnel jets (7) in the Fogger nozzles.

**Figure 6 Fogger Nozzle Mounting Position**



## 2.5 Fogger Nozzle Feed Tube Mounting

### 2.5.1 Nitrous Feed Tube Installation

**NOTE:** For professional looking results, the following steps need to be performed with a quality tube-bending tool. NOS sells a tool for this purpose under P/N 15991NOS.

**NOTE:** If you are not experienced in tube bending, it is advisable that before you bend each solenoid extension tube, you make a sample tube using either a piece of brake line or a coat hanger. This "practice" will help you minimize errors and help you to produce an aesthetically pleasing plumbing job.

1. Remove the compression fittings from one distribution block (12). Remove the compression nuts from the compression fitting bodies. Apply Teflon past to the pipe threads on the distribution block fittings. Install and tighten all fittings into the distribution block.
2. Select two of the 12" solenoid extension tubes (8), and measure 1" in from the end and mark.

3. Make a 90° bend in the two solenoid extension tubes at the 1" mark. The bend should start at the 1" mark and proceed away from the end of the tube.
4. Install the two bent solenoid extension tubes, ferrules, and B-Nut assemblies on the nitrous inlet ports of the center two Fogger nozzles, with the lone legs of the tube crossing. Measure between the insides of the tubes and place a center mark across both tubes.
5. Measure and mark a centerline on the side of the distribution block.
6. Holding the **marked** block alongside the installed "crossed" nitrous feed tubes, so that their center marks are aligned, place another mark on each solenoid tube extension at the **inside end** of the two exposed compression fitting body thread sections.
7. Remove the two solenoid extension tubes. Cut off the tubes at the inside end marks. Deburr and ream the cut ends.

**NOTE:** Be sure to remove any debris, left from cutting and deburring, from the inside of the tube before assembly.

8. Install the compression fitting nuts on the "smoothed" ends of the solenoid extension tubes.
9. Insert the solenoid extension tubes into the compression fitting bodies that are located in the lower ports of the distribution block. Rotate the distribution block, so that it is positioned vertically (relative to the intake manifold runners). Lightly tighten the compression fittings. Lightly tighten the Blue B-Nuts onto the Fogger nozzle nitrous port inlet fittings.

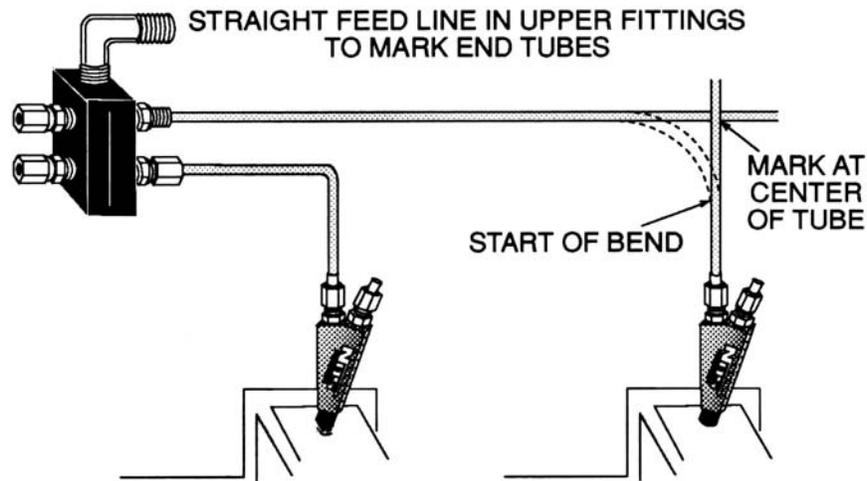
**IMPORTANT: Steps 10. A. to 10. I. apply to Kits 05040NOS and 05040-FINOS only.**

10. A. Attach and lightly tighten an unbent 12" solenoid extension tube, B-Nut, and ferrule on the nitrous ports of the two "middle" Fogger nozzles (Nozzle 2 and 5 when counting from either end).
- B. Insert and hold in place the two unbent 12" solenoid extension tubes in the two middle or "center" ports of the distribution block, so that they intersect each of the two solenoid extension tubes that are attached to the middle Fogger nozzles at 90° angles.
- C. Place a mark on the middle solenoid extension tubes at the center of the intersection with the horizontal tubes. Refer to Figure 7.
- D. Remove the two middle nitrous feed tubes. Bend the tubes 90°. The tube should be placed in the tubing bender, such that the marks align with the "finished" bend mark on the tubing bender. The bend should proceed away from the nozzle.
- E. Place a mark on the two installed nitrous solenoid extension tubes at the inside edge of the two exposed compression fitting body thread sections.
- F. Remove the two nitrous solenoid extension tubes. Cut off the tubes at the inside of the end marks. Deburr and ream the cut ends.

**NOTE:** Be sure to remove any debris, left from cutting and deburring, from the inside of the tube before assembly.

- G. Install the compression fitting nuts on the "smoothed" ends of the solenoid extension tubes.
- H. Insert the solenoid extension tubes into the compression fitting bodies. Lightly tighten the compression nuts.
- I. Connect and tighten the solenoid extension tubes to the Fogger nozzles.
11. Attach and lightly tighten an unbent 12" solenoid extension tube, B-Nut, and ferrule on the nitrous ports of the two outboard Fogger nozzles.
12. Insert and hold in place the two unbent 12" solenoid extension tubes in the two upper ports of the distribution block, so that they intersect each of the two solenoid extension tubes that are attached to the outboard Fogger nozzles at 90° angles.
13. Place a mark on the outboard solenoid extension tubes at the **center** of the intersection with the horizontal tubes. Refer to Figure 7.
14. Remove the two end nitrous feed tubes. Bend the tubes 90°. The tube should be placed in the tubing bender, such that the marks align with the "finished" bend mark on the tube bender. The bend should proceed away from the nozzle end.
15. Place a mark on the two installed nitrous solenoid extension tubes at the inside edge of the two exposed compression fitting body thread sections.

**Figure 7 End Fogger Nozzle Feed Tube**



16. Remove the two nitrous solenoid extension tubes. Cut off the tubes at the inside end of the marks. Deburr and ream the cut ends.

**NOTE:** Be sure to remove any debris, left from cutting and deburring, from the inside of the tube before assembly.

17. Install the compression fitting nuts on the “smoothed” ends of the solenoid extension tubes.

18. Insert the solenoid extension tubes into the compression fitting bodies. Lightly tighten the compression nuts.

19. Connect and tighten the solenoid extension tubes to the Fogger nozzles.

20. Tighten all the nitrous feed tube fittings.

21. Install the 90° Blue 1/8” NPT x 3AN fitting (23) in the distribution block inlet port. Be sure that the fitting is oriented, so that when the nitrous feed hose is connected, neither the hose nor the fitting interferes with any other engine or nitrous system components.

### 2.5.2 Fuel Feed Tube Installation

1. Remove the compression fittings from one distribution block (13). Remove the compression nuts from the compression fitting bodies. Apply Teflon past to the pipe threads on the distribution block fittings. Install and tighten all the fittings into the distribution block.

2. Clamp the distribution block to the side of the nitrous distribution block.

3. Install a Red B-Nut and ferrule on each of the two 12” solenoid extension tubes.

4. Install the two solenoid extension tubes on the center two nozzles.

5. With your thumb and forefinger, bend the two tubes inwards, so that they are aligned with the compression fittings in the distribution block. Refer to Figure 8.

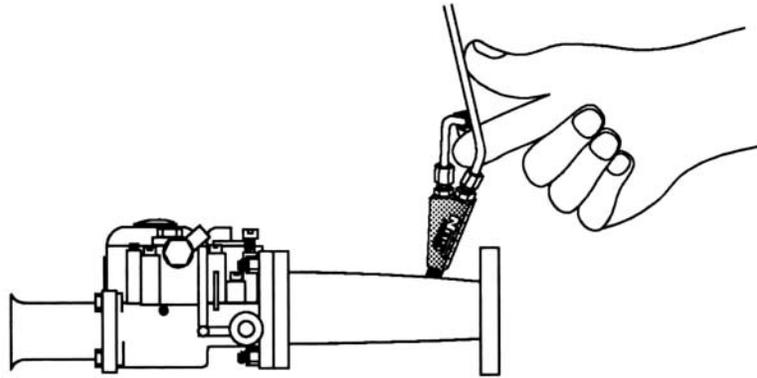
6. Insert and hold in place an unbent 12” solenoid extension tube in the two lower ports of the distribution block. The extension tubes should be positioned so that they intersect each of the previously bent fuel solenoid extension tubes at 90° angles. Place a mark on both previously bent fuel solenoid extension tubes at the center of the horizontal tubes. Refer to Figure 9.

7. Remove the unbent 12” solenoid extension tubes from the compression fittings.

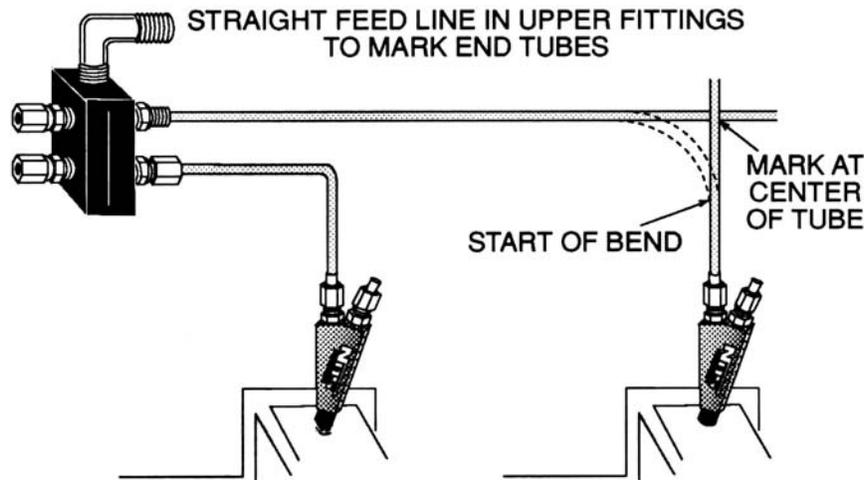
8. Remove the two center fuel feed tubes. Bend the tubes 90°. The tube should be placed in the tubing bender, such that the marks on the tubes align with the “finished” bend mark on the tube bender. The bend should proceed away from the flared end.

9. Install and loosely tighten the two bent fuel solenoid extension tubes.

**Figure 8 Solenoid Extension Tube Installation**



**Figure 9 End Fogger Nozzle Feed Tubes**



10. Place a mark on the two installed fuel solenoid extension tubes at the inside edge of the two exposed compression fitting body thread sections.

11. Remove the two solenoid extension tubes. Cut off the tubes at the inside end marks. Deburr and ream the cut ends.

**NOTE:** Be sure to remove any debris left from cutting and deburring from the inside of the tube before assembly.

12. Install the compression fitting nuts on the “smoothed” ends of the solenoid extension tubes.

13. Insert the solenoid extension tubes into the compression fitting bodies. Lightly tighten the compression fittings. Lightly tighten the Red B-Nuts onto the Fogger nozzle fuel port inlet fittings.

**Steps 14 A to 14 J apply to Kits 5040 and 5040-FI only.**

14. A. Attach and lightly tighten an unbent 12” solenoid extension tube, B-Nut, and ferrule on the fuel ports of the two “middle” Fogger nozzles (Nozzles 2 and 5 when counting from either end).
- B. Insert and hold in place the two unbent 12” solenoid extension tubes in the two middle or “center” ports of the distribution block so that they intersect each of the two solenoid extension tubes that are attached to the middle Fogger nozzles at 90° angles.
- C. With your thumb and forefinger, bend the two tubes that are attached to the Fogger nozzles upwards so that they intersect the horizontal tubes currently installed in the distribution block. Refer to Figure 8.
- D. Place a mark on the middle solenoid extension tubes at the center of the intersection with the horizontal tubes. Refer to Figure 9.
- E. Remove the two middle fuel feed tubes. Bend the tubes 90°. The tube should be placed in the tubing bender, such that the marks align with the “finished” bend mark on the tubing bender. The bend should proceed away from the nozzle.

- F. Place a mark on the two installed fuel solenoid extension tubes at the edge of the two exposed compression fitting body thread sections.
  - G. Remove the two fuel solenoid extension tubes. Cut off the tubes at the inside of the end marks. Deburr and ream the cut ends.
  - H. Install the compression fitting nuts on “smoothed” ends of the solenoid extension tubes.
  - I. Insert the solenoid extension tubes into the compression fitting bodies. Lightly tighten the compression nuts.
  - J. Connect and tighten the solenoid extension tubes to the Fogger nozzles.
15. Attach and lightly tighten an unbent 12” solenoid extension tube, B-Nut, and ferrule on the fuel ports of the two outboard Fogger nozzles.
  16. Insert and hold in place, the two unbent 12” solenoid extension tubes in the two upper ports of the distribution block so that they intersect each of the two solenoid extension tubes that are attached to the outboard Fogger nozzles at 90° angles.
  17. With your thumb and forefinger, bend the two tubes that are attached to the Fogger nozzles upwards so that they intersect the horizontal tubes currently installed in the distribution block. Refer to Figure 8.
  18. Place a mark on the middle solenoid extension tubes at the center of the intersection with the horizontal tubes. Refer to Figure 9.
  19. Remove the two end fuel feed tubes. Bend the tubes 90°. The tube should be placed in the tubing bender, such that the marks align with the “finished” bend mark on the tubing bender. The bend should proceed away from the nozzle.
  20. Place a mark on the two installed fuel solenoid extension tubes at the inside edge of the two exposed compression fitting body thread sections.
  21. Remove the two fuel solenoid extension tubes. Cut off the tubes at the inside of the end marks. Deburr and ream the cut ends.

**NOTE:** Be sure to remove any debris left from cutting and deburring from the inside of the tube before assembly.

22. Install the compression fitting nuts on “smoothed” ends of the solenoid extension tubes.
23. Insert the solenoid extension tubes into the compression fitting bodies. Lightly tighten the compression nuts.
24. Connect and tighten the solenoid extension tubes to the Fogger nozzles.
25. Tighten all fuel feed tube fittings.
26. Install the 90° Red 1/8” NPT x 3AN fitting (24) in the distribution block inlet port. Be sure that the fitting is oriented so that when the fuel feed hose is connected, neither the hose nor the fitting interferes with any other engine or nitrous system components.
27. Reinstall the intake manifold on the engine.

## **2.6 Nitrous and Fuel Solenoid Installation**

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

**NOTE:** Apply Teflon-based paste to all pipe fittings before assembling solenoids.

### **2.6.1 Nitrous Solenoid Installation**

1. Clamp the nitrous solenoid (14) in a bench vise.
2. Install the brass 1/8” NPT end of the “Blue” 2 ft. 3AN hose (25) into the outlet port of the nitrous solenoid.
3. Install the nitrous filter fitting (15) into the inlet port of the nitrous solenoid.
4. Attach the nitrous solenoid to the solenoid mounting bracket (26). Remove from the vise.

### **2.6.2 Fuel Solenoid Installation**

1. Clamp the fuel solenoid (16) in a bench vise.

2. Install the brass 1/8" NPT end of the "Red" 2 ft. 3 AN hose (27) into the outlet port of the fuel solenoid.
3. Install the fuel filter fitting (17) [Kits 5030 and 5040 only] into the inlet port of the fuel solenoid.
4. Attach the fuel to the fuel solenoid mounting bracket (26). Remove from the vise.
5. Select the mounting location for the fuel and nitrous solenoid assembly. Solenoids must be mounted in a location that easily allows the Red and Blue 3AN lines to reach the nitrous and fuel distribution blocks. Secure into place.
6. Connect the Red and Blue 3AN hoses to the appropriate fittings on the distribution blocks. Secure into place.

## 2.7 Main Nitrous Feed Line Mounting

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 4AN x 14 ft. nitrous supply line (18) 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 nitrous bottle valve adapter (1).

**WARNING: Nitrous oxide is dangerous to humans if inhaled or if it comes in contact with 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 nitrous solenoid inlet port.

## 2.8 Fuel Supply Connection

### 2.8.1 Fuel Solenoid Feed Line Installation (Kits 05030NOS & 05040NOS only)

Under most operating conditions, it is suggested that a separate 3/8" fuel line and pump be dedicated to the nitrous system. If you choose to use a single-line fuel system to feed both the engine and the nitrous system, follow these instructions, but remember—at higher power levels, this fuel system may be inadequate. Install the supplied auxiliary fuel hose (19):

1. Choose the location where the primary fuel line is to be tapped.
2. Cut and deburr the primary fuel line.
3. Install the brass fuel line TEE fitting (28) in the primary fuel line.
4. Connect the brass TEE fitting to the inlet port of the fuel solenoid using the auxiliary fuel line hose (19) and the fuel hose clamps (20).

### 2.8.2 Fuel Solenoid Feed Line Installation (Kits 05030-FINOS & 05040-FINOS only)

1. Connect the 2 ft. 4AN x 1/8 NPT hose (17) to the inlet port of the fuel solenoid.

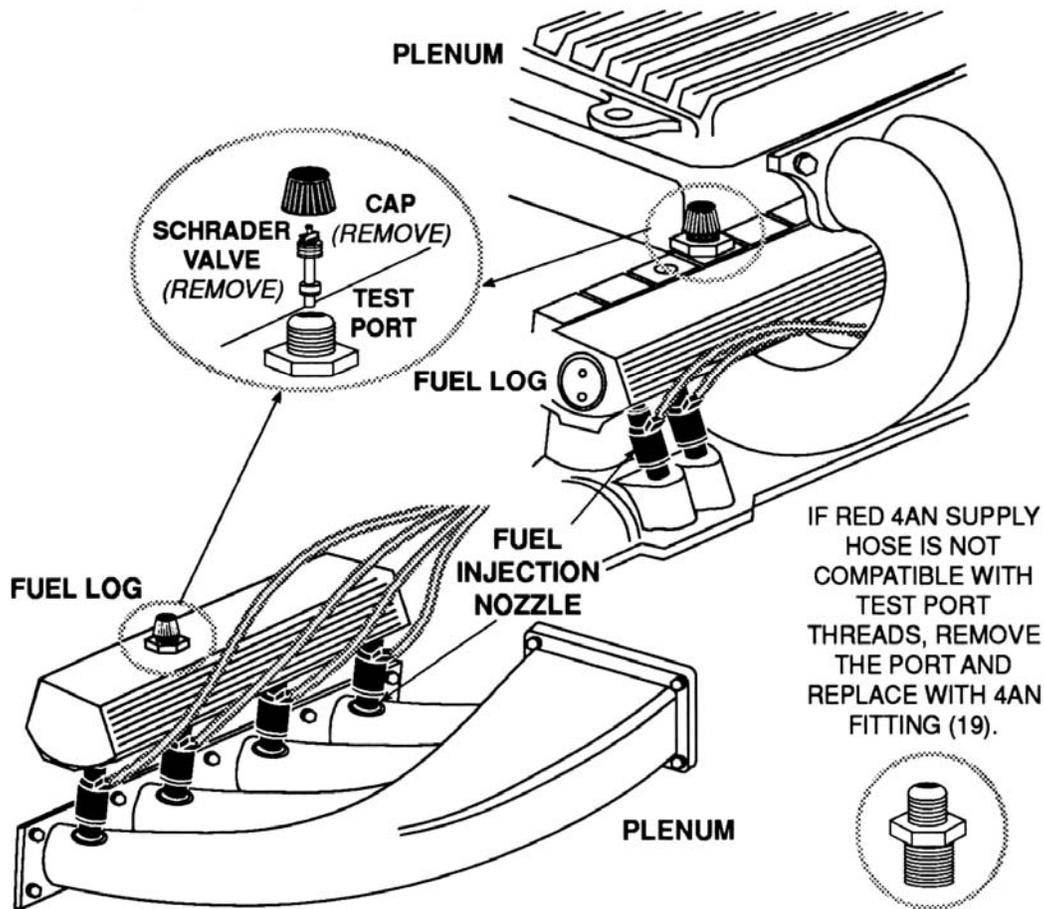
### 2.8.3 Fuel Supply Connection (Fuel Systems with Fuel Logs)

Supplemental fuel for the NOS nitrous oxide injection system is taken directly from the high pressure log that feeds the engine's fuel injectors. Figures 10 and 11 show the typical fuel log configurations. If you cannot locate the fuel log on your engine, consult a repair manual for your vehicle.

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

**CAUTION: When removing the Schrader valve from the fuel log test port, use caution. Fuel in the log is under high pressure. NEVER remove the Schrader valve when the engine is hot.**

Figure 10 & 11 Typical Fuel Logs



**NOTE:** If your vehicle's fuel log is not equipped with a test port, the fuel log will need to be removed and tapped for an "AN" fitting using steps 2A through 2F.

**NOTE:** Some vehicles equipped with a fuel log 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 4AN fitting, or install the brass 4AN fitting using steps 2A through 2F.

2A. Select a location on the fuel log for the brass 4AN fitting (19) to be located. Make sure the fitting and line are clear of all engine components.

2B. Remove the fuel log from the engine. Drill a 1/4" hole in the fuel log, making sure that the hole is perpendicular to the mounting surface, and that the hole penetrates into the fuel log reservoir.

2C. Tap the 1/4" hole with the 1/16" NPT tap.

2D. Remove all debris from the fuel log.

**CAUTION: All debris MUST be removed from the fuel log. Failure to do so will result in an engine failure.**

2E. Install the brass fitting in the tapped hole.

2F. Install the fuel log on the engine.

3. Thread the remaining end of the 2 ft. red 4AN hose (17) to the test port/4AN fitting.

### 2.8.4 Fuel Supply Connect (Fuel Systems without Fuel Logs)

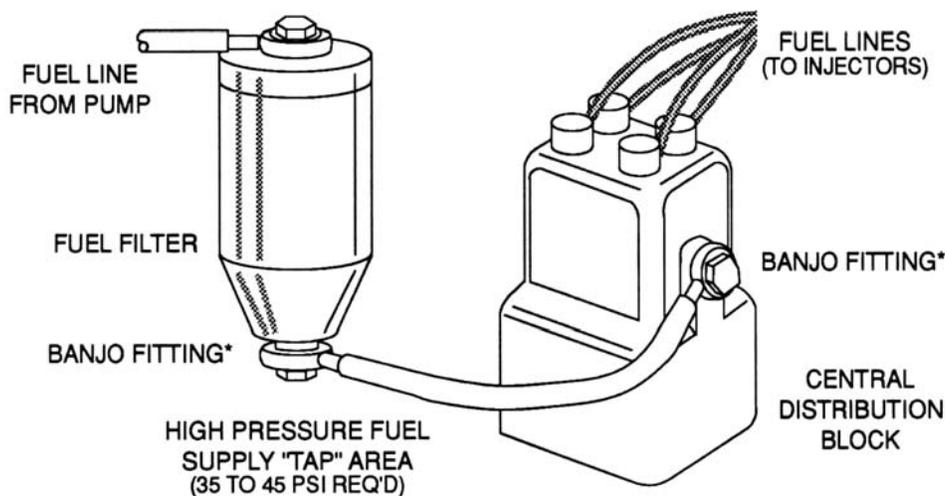
Some engines utilize a fuel distribution system that has a central distribution block. This type system does not incorporate a fuel pressure "test port". Supplemental fuel for the NOS nitrous oxide injection kit must be acquired from the fuel injectors high-pressure supply line.

1. Locate the central distribution block. It is easily identifiable by the fuel lines that run from the distribution block to each fuel injector. Connected to the central distribution block is the main fuel supply line. This line runs from the distribution block. Located between the fuel pump and the distribution block is the fuel filter. The desired location to “tap” into the fuel line is between the fuel filter and the distribution block.
2. Examine the outlet port of the fuel filter or the inlet to the central distribution block for a “banjo” bolt fitting. See Figure 12. 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 13.
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.

**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 (19) into the tapped hole.
6. Install the modified banjo fitting into the fuel filter.
7. Thread the open end of the 2 ft. red 4AN hose (17) into the test port/4AN fitting.

**Figure 12 Fuel Filter/Banjo Fitting**



\* BANJO FITTING IN EITHER LOCATION MAY BE DRILLED AND TAPPED AS PER FIGURE 13

**Figure 13 Schematic of “Drilled Out” Banjo Fitting**



## 2.9 Electrical System

### 2.9.1 Electrical System Installation—Kits 05030NOS & 05040NOS

Refer to Figures 14 & 15 for 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).

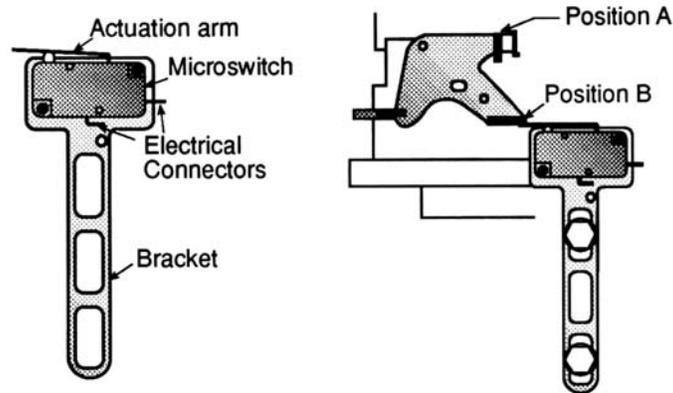
**WARNING! Binding or dragging of the throttle linkage will create a potentially dangerous stuck-throttle condition. Ensure that the microswitch does not interfere with normal throttle linkage operation.**

2. Install the throttle microswitch (21) as follows:

**HINT:** The microswitch may be mounted to the bracket in a variety of positions and on either side of the bracket. The bracket may be bent to suit the application.

- A. Mount the throttle microswitch on the carburetor so that the throttle linkage movement triggers the microswitch.
- B. Adjust the microswitch to trigger at wide-open throttle by adjusting the microswitch's position to ensure the actuation arm of the microswitch "clicks" at the same point your throttle linkage reaches wide-open throttle against the throttle stop (Position 14A).
- C. Ensure that the microswitch is activated by the accelerator pedal: Slowly press the throttle to the floor while you listen for the "click" of the microswitch (Position 14B).

**Figure 14 Throttle Microswitch Installation**

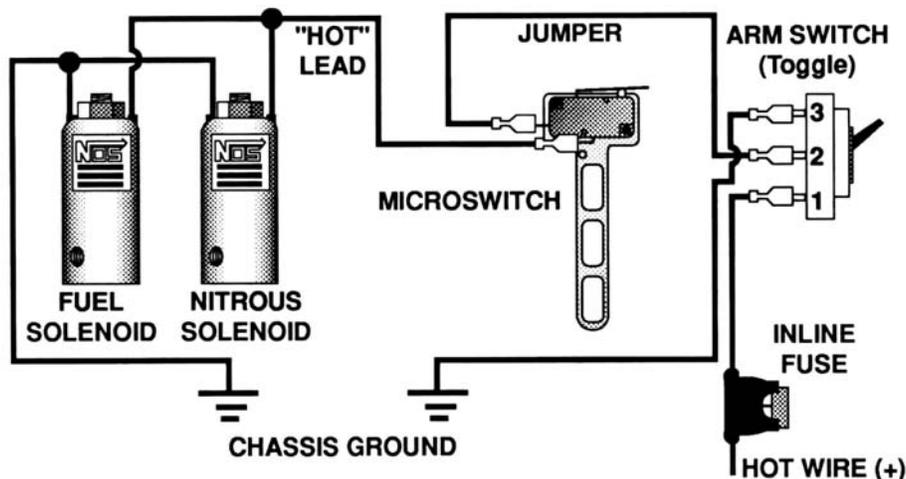


3. Install the NOS arming switch in the vehicle interior, within easy reach of the driver.
4. Connect terminal #1 on Arming Switch (22) to an ignition switched +12V source, using the fused red wire provided.

**NOTE:** When selecting an ignition switched +12V source, ensure that your source is capable of handling the amperage of the fuse provided by NOS.

5. Connect terminal #2 of the arming switch to one post of the throttle microswitch (either post will do), with the blue wire provided.
6. Connect terminal #3 of the arming switch to the ground. (You may elect to skip this step. If you do so, the light in the arming switch will not illuminate when the system is armed).
7. Connect the open post of the microswitch to one wire from each solenoid (either wire will do, the solenoids are not polarized), using the blue wire provided.
8. Connect the open wire from each solenoid to the ground.

**Figure 15 Wiring Diagram—Vehicles without Fuel Injection**



## 2.9.2 Electrical System Installation—Kits 05030-FINOS & 05040-FINOS

Refer to Figures 16 & 17 for 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).

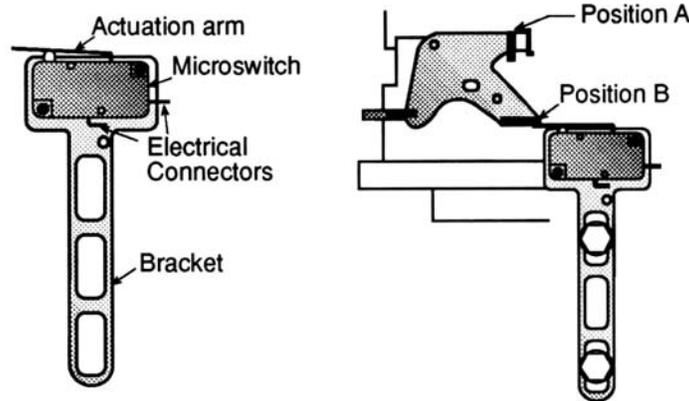
**WARNING! Binding or dragging of the throttle linkage will create a potentially dangerous stuck-throttle condition. Ensure that the microswitch does not interfere with normal throttle linkage operation.**

2. Install the throttle microswitch (21) as follows:

**HINT:** The microswitch may be mounted to the bracket in a variety of positions and on either side of the bracket. The bracket may be bent to suit the application.

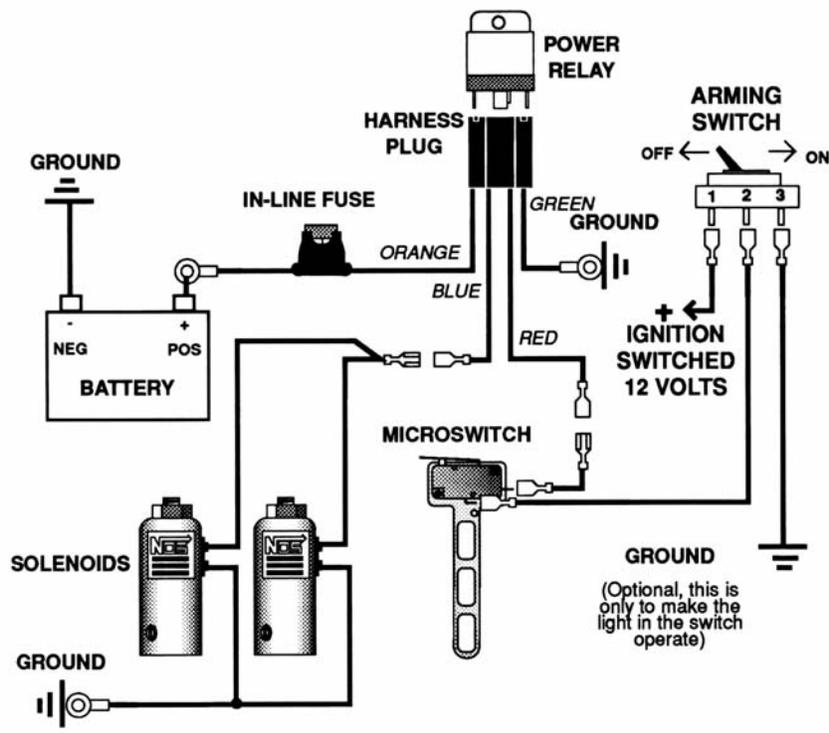
- A. Mount the throttle microswitch on the throttle body so that the throttle linkage movement triggers the microswitch.
- B. Adjust the microswitch to trigger at wide-open throttle by adjusting the microswitch's position to ensure the actuation arm of the microswitch "clicks" at the same point your throttle linkage reaches wide-open throttle against the throttle stop (Position 16A).
- C. Ensure that the microswitch is activated by the accelerator pedal: Slowly press the throttle to the floor while you listen for the "click" of the microswitch (Position 16B).

**Figure 16 Throttle Microswitch Installation**



3. Install the NOS arming switch (22) in the vehicle interior, within easy reach of the driver.
4. Install the wiring relay and relay harness (28) in the engine compartment, near the battery. The relay's orange wire should reach the battery (+) terminal.
5. Connect the orange relay wire to the battery (+) terminal. Install the 15 AMP fuse into the fuse socket.
6. Connect one wire from each solenoid together. Join the solenoid wires to the blue relay wire.
7. Join the remaining solenoid wires together. Connect to a good chassis ground.
8. Connect the green relay wire to a good chassis ground.
9. Connect the red relay wire to either terminal on the microswitch.
10. Connect the open terminal on the microswitch to the middle (#2) terminal on the arming switch.
11. Connect #1 terminal on the arming switch to the switched 12 volt power source.
12. Connect #3 terminal of the arming switch to the ground.
13. Reconnect the battery.
14. Turn the arming switch on.
15. Push the throttle wide open, while the engine is off. Each solenoid should make a clicking noise if it is cycling correctly. If no noise is heard, check all the wiring connections and the wiring schematic in Figure 17.

Figure 17 Wiring Diagram—Vehicles with Fuel Injection



### Chapter 3 Baseline Tuning Suggestions

Your NOS Inline Sportsman Fogger Injection Kit comes with two sets of nitrous and fuel jets. These are conservative jetting combinations, based upon 900 psi nitrous oxide bottle pressure and 5 to 6 psi (Kits 05030NOS & 05040NOS) or 40-45 psi (Kits 05030-FINOS & 05040-FINOS) flowing fuel pressure. Operating with these pressure levels should yield safe and reliable power increases.

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). This condition may also arise in carbureted applications that are jetted excessively rich.

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.**

Table 4 Suggested Baseline Tuning Combinations

Stage #	Jetting N <sub>2</sub> O/Fuel	Fuel Quality	Ignition Timing	Spark Plug Heat Range
I	18/18	92+ octane	Stock	Stock
	20/14**	100+ octane	-2°	Decrease 1-2 steps
II	20/20	100+ octane	-2°	Decrease 1-2 steps
	22/16**	100+ octane	-4°	Decrease 2-3 steps

\*\*Jetting combinations are for 5030-FINOS & 5040-FINOS Kits

### Chapter 4 Preparing for Operation

After you have completed the installation of your NOS Sportsman Fogger system kit, perform the following checkout procedure before operating your vehicle.

**NOTE:** Before performing steps 1-4, make sure that the nitrous bottle valve is closed and the main nitrous supply line is empty.

1. Turn on the fuel pump.
2. Check all the fuel lines and fittings for leaks.

3. Start the engine.
4. Turn the arming switch on. Set the engine speed at 2000 RPM. Briefly depress the activation arm on the microswitch. Engine speed should decrease if the fuel delivery system is performing properly; if not, refer to Appendix A, Troubleshooting Guide.
5. Open the nitrous bottle valve.

**NOTE:** There should be no change in the engine idle speed. If the idle speed changes, refer to Appendix A, Troubleshooting Guide.

6. Inspect the nitrous lines and fittings for leaks.
7. ENJOY!

## Chapter 5 Advanced Tuning for Maximum Power

### 5.1 Optimum Nitrous/Fuel Jetting

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 jetting modifications listed in Section 5.1.1 before attempting to optimize the ignition timing (Section 5.1.2). Improper nitrous/fuel jetting can mislead you when attempting to optimize the ignition timing.

#### 5.1.1 Determining Optimum Nitrous/Fuel Jetting

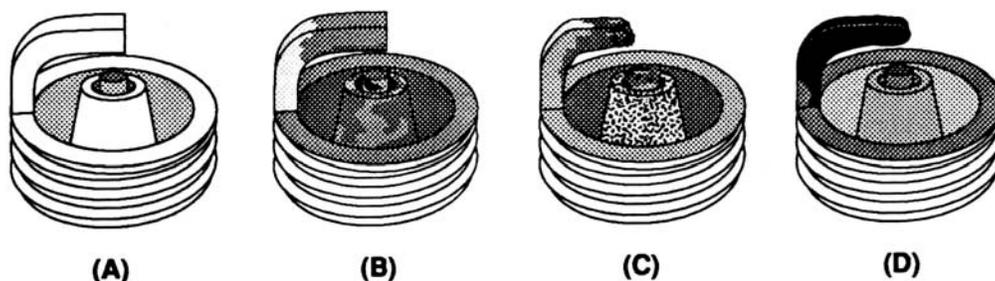
**NOTE:** The procedure outlined in this section is not recommended for Kits 05030-FINOS & 05040-FINOS, unless you are operating at fuel pressures outside the design envelope (35-45 psi) of the system.

The jetting combinations included in Kits 05030NOS & 05040NOS are intended to provide you with a safe, reliable power increase. They are intended to be used with 900 psi nitrous bottle pressure and 5-6 psi flowing fuel pressure. In some instances, installing slightly smaller fuel jets than the units provided in your kit, will provide a more optimum nitrous/fuel ratio and increase power.

Always run the baseline jetting included in your kit before attempting to decrease fuel jet size. Optimum jetting can be determined using the following scheme.

1. Stabilize the nitrous bottle pressure at 900 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 18 for tips on reading the spark plugs).
  - 2A. If spark plugs appear to be excessively rich, decrease the fuel jet size 2 steps (ex. 22 to 20, 20 to 18, etc;).
  - 2B. If spark plugs appear to be excessively lean, increase the fuel jet size 2 steps.
  - 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 18 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.

## 5.1.2 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.

<b>Example:</b>	Ignition Timing with Nitrous-----	38°
	100 HP Increase from Nitrous-----2°/50HP-----	3° Retard
	Initial Safety Margin-----	<u>2° Retard</u>
	Initial Timing with Nitrous-----	33°

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 900 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 18 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 his 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.

2. Empty the main nitrous feed line.
3. Disconnect the main nitrous feed line from the nitrous solenoid.
4. Remove the nitrous filter fitting from the nitrous solenoid.
5. Remove **all** Teflon paste debris from the solenoid inlet port threads and from the nitrous solenoid filter pipe threads.
6. Examine the mesh in the nitrous filter fitting for contaminants. Blow out debris with compressed air, if necessary.
7. Apply fresh Teflon paste to the nitrous filter pipe threads. Reinstall the filter in the nitrous solenoid.
8. 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, which 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.

Due to the Sportsman Fogger System being a wet manifold style nitrous kit, the nitrous solenoid plunger will get exposed to fuel vapors. This is unavoidable. Fluctuations in the intake manifold pressure due to opening and closing of the throttle induce flow into the out of the NOS Fogger nozzles, when the NOS system is not in use. Long term exposure of the nitrous solenoid plunger seal to the fuel vapors will result in swelling of the plunger seal. This will reduce the nitrous flow (causing an excessively rich nitrous/fuel condition and a loss of power).

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 swelling or in extreme cases disintegrating.

**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).

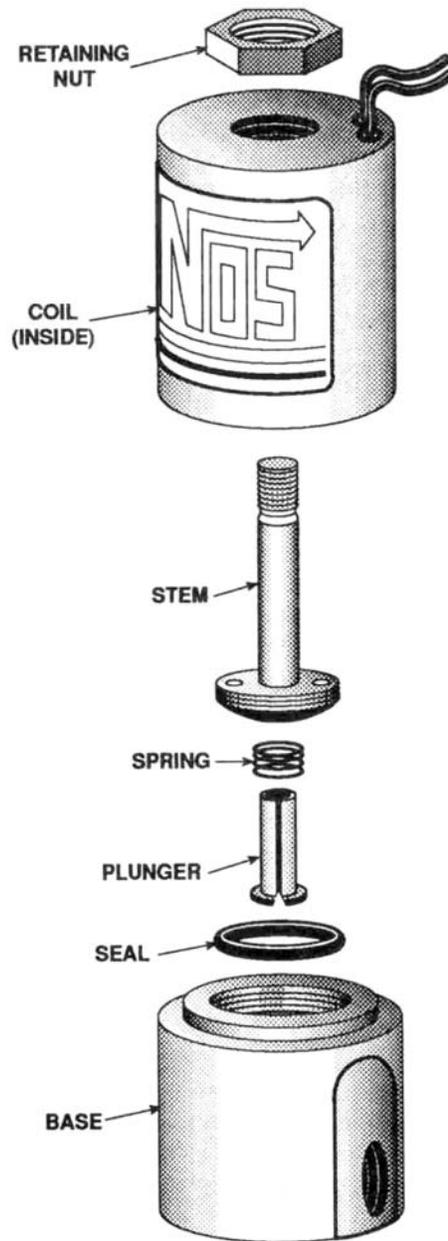
### 6.2.2 Nitrous Solenoid Plunger Disassembly and Inspection

1. Close the valve on the nitrous bottle.
2. Empty the main nitrous supply line.
3. Remove the retaining nut from the nitrous solenoid.
4. Remove the coil and housing from the nitrous solenoid base.
5. Unscrew the stem from the nitrous solenoid base. Do this by double nutting the stem, or by using a solenoid stem removal tool (NOS P/N 16665-SNOS). **Do not use pliers on the solenoid stem. Damage to the stem will result.**
6. Remove the stem, spring, and plunger from the solenoid base.
7. 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 19 Exploded View of a Typical Solenoid



### 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-GOHOLLEY.

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.	Wire per instructions.
	Restricted fuel line.	Inspect fuel line for restrictions (crimped or plugged).	Remove restrictions.
	Malfunctioning fuel solenoid.	Turn arming switch ON. Activate 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 temp. 80°-85°F.
	Inadequate N <sub>2</sub> O supply.	Weigh bottle.	Fill bottle. 1-800-997-3345
	Mismatched N <sub>2</sub> O/fuel jetting.	Compare jetting to recommended values.	Install correct jets.
	Excessive fuel pressure.	Install fuel pressure gauge, such as NOS P/N 15931NOS, in the fuel line. Measure the pressure during acceleration with the system activated.	Regulate pressure down, or install smaller fuel jetting.
	Loose N <sub>2</sub> O solenoid wiring.	Inspect the solenoid wiring.	Repair wiring.
No change in performance when system is activated.	Malfunctioning nitrous solenoid.	<b>WARNING:</b> <i>Solenoid discharges nitrous at high rate. Don't inhale nitrous; death may occur. Skin contact may cause frostbite.</i> Close bottle valve. Disconnect N <sub>2</sub> O solenoid outlet port. Disconnect solenoid (+) lead. Open N <sub>2</sub> O bottle valve. Briefly connect +12V to solenoid. It should discharge N <sub>2</sub> O at a high rate.	Rebuild solenoid.
	System wired incorrectly.	Compare nitrous wiring to schematic.	Wire system per instructions.
	Loose ground wire(s).	Connect 12V test light to battery (+) terminal. Check for continuity at grounds noted in schematic.	Tighten/repair loose grounds.
	Malfunctioning pushbutton.	Turn bottle valve off. Turn arming switch on. Connect 12V test light to battery (-). Turn pushbutton switch on. Check for continuity at pushbutton output pole.	Replace pushbutton
	No power to arming switch.	With vehicle ignition on, connect 12V test light to battery (-) terminal. Check for power at pole #1 on arming switch.	Repair wiring.
	Malfunctioning arming switch.	With vehicle ignition on, turn arming switch on. Connect 12V test light to battery (-) terminal. Check for power at red wire on arming switch.	Replace arming switch.
	Malfunctioning throttle microswitch.	Temporarily disconnect power relay green wire from microswitch. Connect 12V test light to battery (+) terminal. Check for power at red wire on arming switch.	Replace throttle microswitch.
	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, up to 8° from non-nitrous conditions.
	Inadequate octane fuel.		Use higher octane fuel; up to 116VPC-16.
	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 15931NOS. Run engine under load at WOT, with system activated.	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 N <sub>2</sub> O.	Check bottle weight.	Replace with full bottle.
	Bottle mounted incorrectly.	Compare bottle position and orientation to instructions.	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



P/N 16058NOS

The **Remote Bottle Valve (P/N 16058NOS)** is the perfect convenience accessory—it electronically turns the nitrous bottle on and off with the flick of a switch—no more trips to the trunk. It is also great as a safety shut-off valve. It operates on 12V DC. The complete kit includes hardware and installation instructions.

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 16030NOS



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 14747NOS** has 12.5 lb. capacity.



P/N 14745-PNOS



P/N 14747NOSNOS

NOS Technical Support  
Phone: 1-866-GOHOLLEY  
Fax: 1-270-781-9772

For online help, please refer to the Tech Service section of our website: [www.holley.com](http://www.holley.com)

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Date: 10-13-00