



P/N A5153-SNOS

# GM TBI WET MANIFOLD SYSTEM

Kit Numbers: 05153NOS - ALL

## OWNER'S MANUAL

**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 1-714-546-0592.

**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 Competition Cheater System Kit is not intended for use on hatchback type vehicles without the use of NOS part numbers 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.**

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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

Wet manifold nitrous oxide injection kits are designed for late model vehicles equipped with throttle body fuel injection. In most applications, these vehicles use a central fuel injection unit as opposed to a multi-port 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 typical engines, the following power increases approximate what you can expect to see.

**Table 1 Jetting and Power Levels**

Nitrous/Fuel Jetting	Approximate Power Gain	Recommended Application (Kit #)	Approximate N <sub>2</sub> O Consumption Rate
36-26	50 BHP	05153 – V6NOS	.5 lbs./10 sec.
47-36	100 BHP	05153-V6NOS & 05153NOS	1.0 lbs./10 sec.
52-39	120 BHP	05153NOS & 05153-454NOS	1.2 lbs./10 sec.
65-42	135 BHP	05153-454NOS	1.4 lbs./10 sec.

**1.2 TBI Wet Manifold 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 TBI Wet Manifold kits, the following are absolute musts:**

**□ Adequate Fuel Pressure and Delivery**

Most central fuel injection-style systems (Throttle Body Injection) are designed to operate at 15-20 psi fuel pressure. If modifications other than the installation of a nitrous oxide injection kit have been performed to your vehicle, make sure that your fuel system is capable of maintaining effective fuel pressure. If you have any doubts as to the integrity of your fuel system, NOS strongly suggests the addition of an auxiliary in-line fuel pump, similar to our P/N 15763NOS unit.

**□ Intake Manifold**

Do not attempt to use this kit in conjunction with aftermarket “EPROMS” that use more aggressive ignition timing curves than stock.

**1.3 Kit Components**

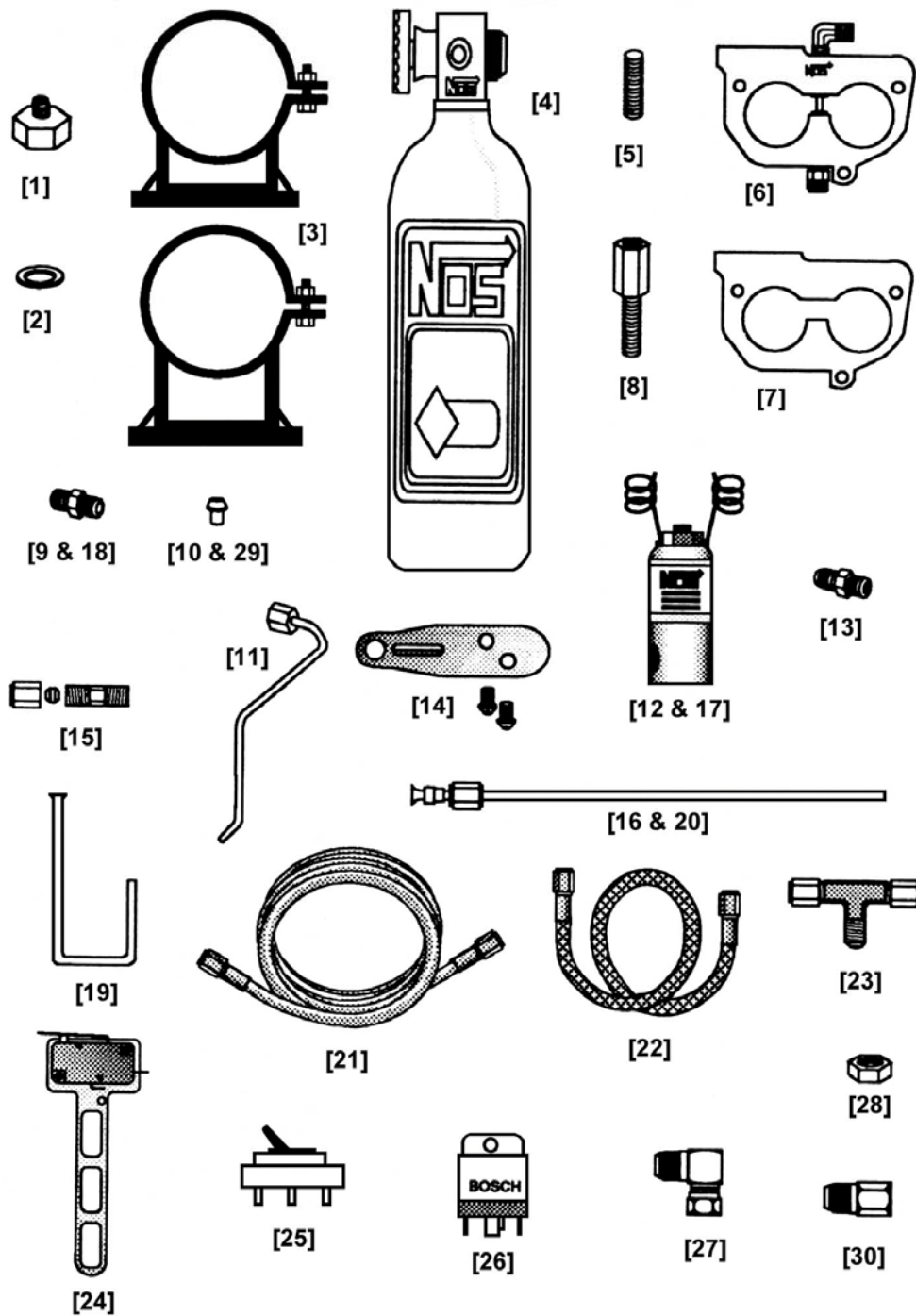
Before beginning the installation of your NOS kit, compare the components in your kit with those shown in Figure 1 and listed in Table 2. If any components are missing, please contact NOS Technical Support at 1-714-546-0592.

**Table 2 Kit Number 05153NOS – All – Parts List**

Item	Description	Quantity	NOS P/N
(1)	Bottle Valve Adapter	1	16220NOS
(2)	Bottle Valve Washer	1	16210NOS
(3)	Bottle Bracket Set	1	14135NOS
(4)	Bottle 10 lb.	1	14745NOS
(5)	TBI Hold Down Stud	1	13498NOS
(6)	Injector Plate Assembly	1	**
(7)	Throttle Body Gaskets	2	**
(8)	TBI Hold Down Bolts	2	13495NOS
(9)	Flare Jet Adapter	1	17954NOS
(10)	Flare Jet Assortment	2	**
(11)	Fuel Source Tube	1	16896NOS
(12)	Power Shot N <sub>2</sub> O Solenoid	1	16020NOS
(13)	N <sub>2</sub> O Filter	1	15570NOS
(14)	Solenoid Mounting Bracket & Screws	2	16505NOS
(15)	Compression Fitting	3	16433NOS
(16)	1 ft. Extension Tube, Blue B-Nut, & Sleeve	1	
(17)	Power Shot Fuel Solenoid	1	16080NOS
(18)	1/8" NPT x 4AN Adapter (Red)	1	17961NOS
(19)	“Formed” Fuel Solenoid Extension Tube	1	16897NOS
(20)	1 ft. Extension Tube, Red B-Nut, & Sleeve	1	
(21)	4AN x 14 ft. N <sub>2</sub> O Hose (Blue)	1	15295NOS
(22)	2 ft. 4AN x 4AN Hose (Red)	1	15231NOS
(23)	3/8" Compression TEE	1	16470NOS
(24)	Microswitch & Bracket	1	15640NOS
(25)	Arming Toggle Switch	1	15600NOS
(26)	Wiring Relay – 30 AMP*	1	15618NOS
(27)	90° 4AN x 4AN Swivel Adapter	1	17535NOS
(28)	5/16 – 24 Nut	1	17997NOS
(29)	Fuel Source Flare Jet (#120)	1	13750-120NOS
(30)	1/8" NPT (Female) x 4AN (Male) Fitting	1	16781NOS

\*Wiring, connectors, and fuse also supplied. \*\*Varies with application.

Figure 1 Kit Number 05153NOS Components Identification



## Chapter 2 Kit Installation

### 2.1 Bottle Mounting Instructions

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

#### 2.1.1 Street Vehicles

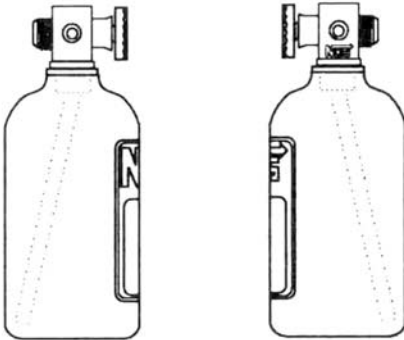
Accurate calibration of your NOS nitrous system depends on the bottle remaining at a stable temperature. Mount the bottle away from heat sources, such as the engine compartment, exhaust system, and away from windows where the bottle is exposed to direct sunlight.

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 16166NOS and P/N 16160NOS should be added. P/N 16160NOS is an aluminum blow-down tube (a -8 neoprene-lined 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 cap should rupture for any reason.

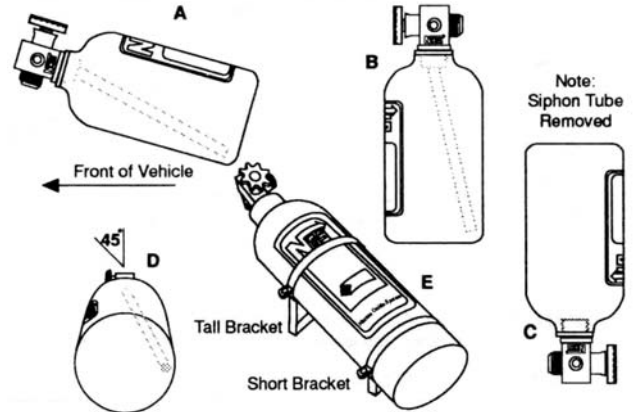
### 2.1.2 Racing Vehicles

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 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.

**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<sub>2</sub>O 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 1). Figure 4A shows the installation assembly for kit number 05153NOS (vehicles with stainless steel fuel lines – not the braided-type fuel line). Figure 4B shows the installation assembly for kit number 05153NOS (vehicles with braided-type steel fuel line).

1. Install the bottle valve adapter (1) and washer (2) on the nitrous bottle (4), and tighten securely.

2. Slip the bottle mounting brackets (3) onto the nitrous bottle (4).
3. Locate the bottle assembly in the desired mounting area, 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. Tighten the bracket clamps on the bottle.

**Figure 4A System Assembly Drawing – Vehicles with Stainless Steel Fuel Lines – not the braided-type fuel line**

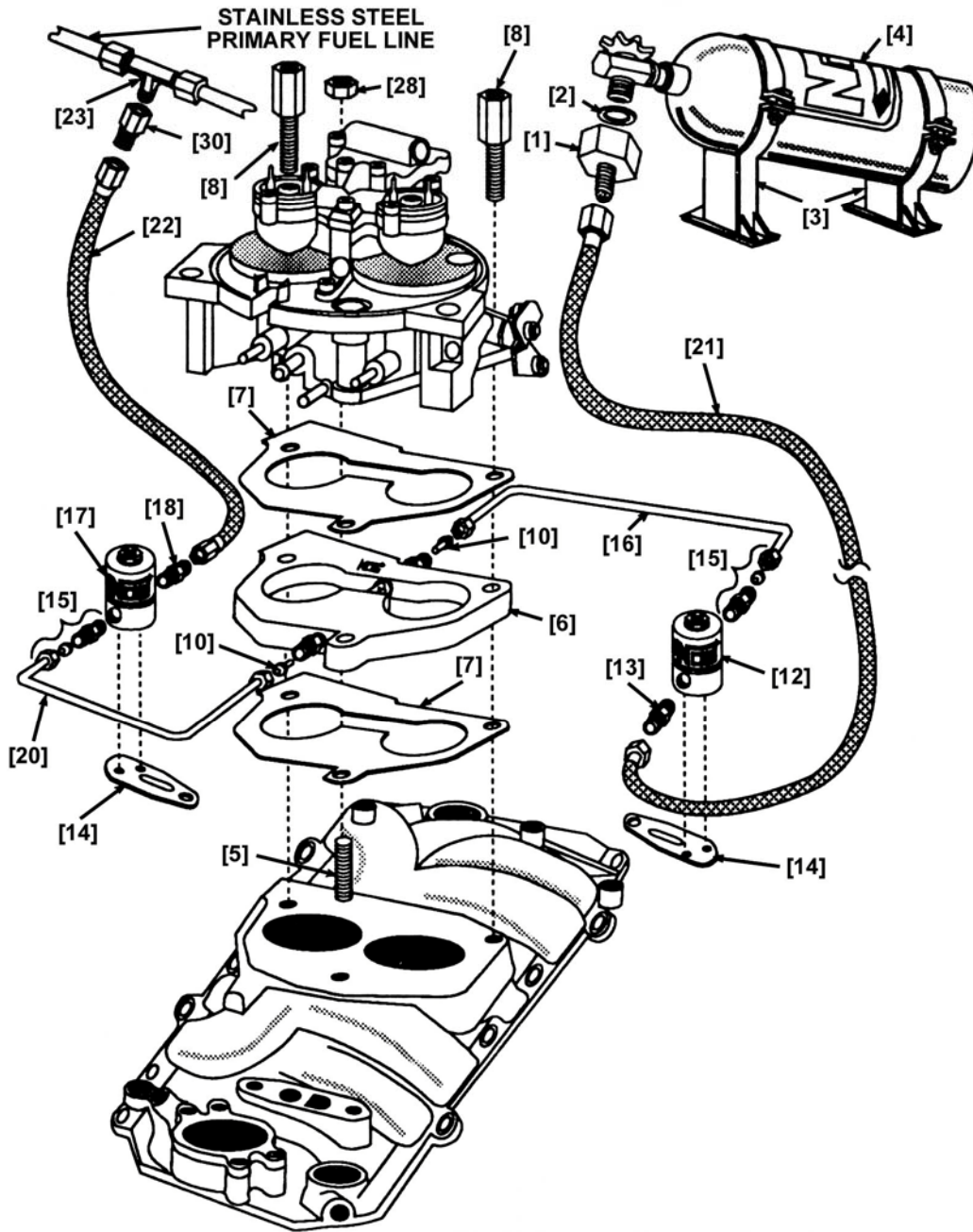
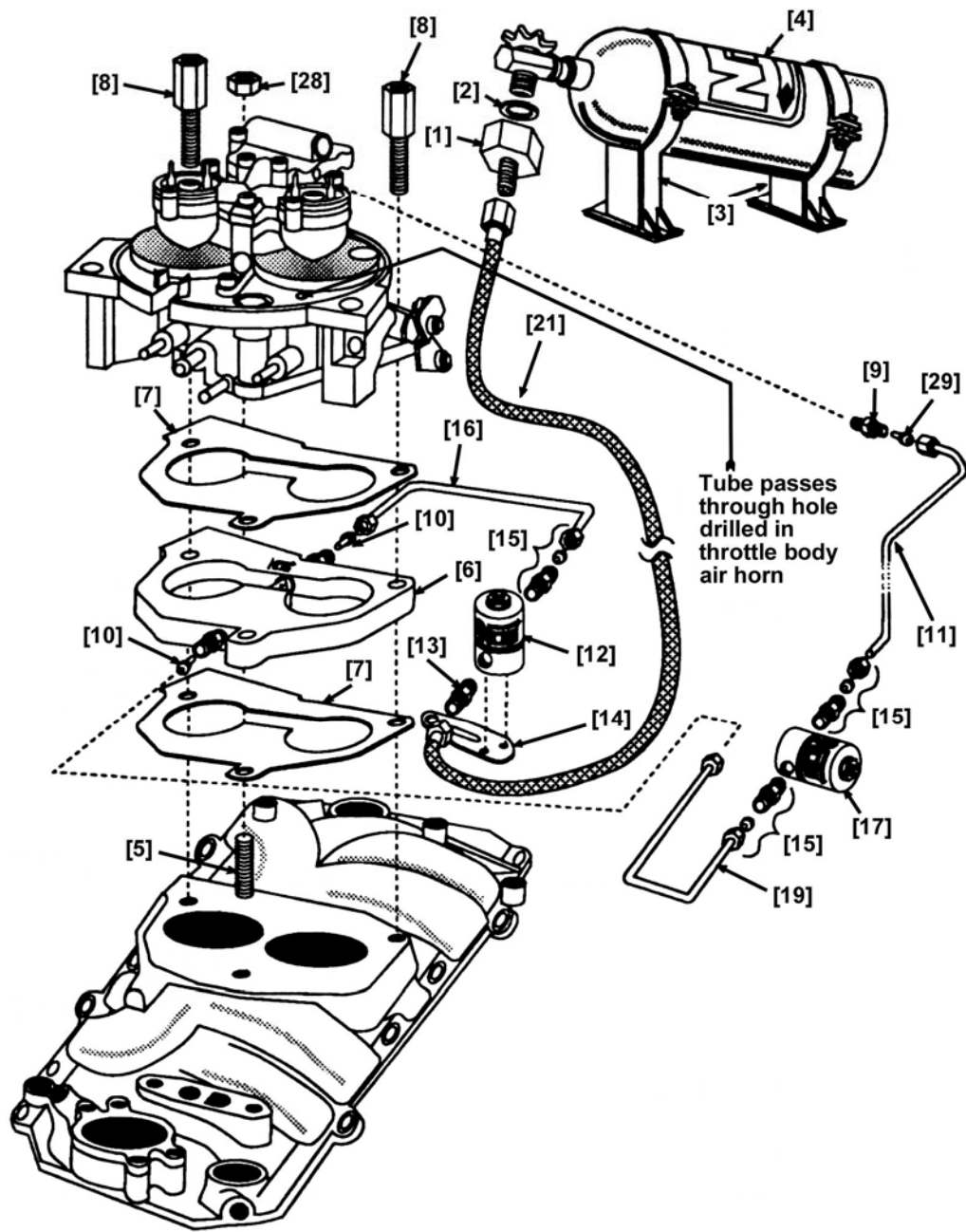




Figure 4B System Assembly Drawing – Vehicles with Braided Steel Fuel Lines



## 2.4 Injector Plate Mounting

Use the following procedure to install the injector plate (6):

1. Remove the throttle body inlet ducting and air cleaner.
2. Disconnect the throttle linkage from the throttle body.
3. Disconnect the fuel and vacuum lines from the throttle body.
4. Remove the throttle body.
5. Install the TBI Hold-Down Stud (5) in the front center bolt hole in the intake manifold.
6. Install the injector plate (6) and gaskets (7) on the intake manifold with the nitrous tube (Blue) discharge orifices pointed into the engine (holes in spray bar facing down).

**NOTE:** When installing kit number 05153NOS, examine the type of fuel line used to feed the throttle body before reinstalling the throttle body. If your vehicle uses a braided steel fuel line, you will need to perform the modifications listed in section 2.4.1 before reinstalling the throttle body.

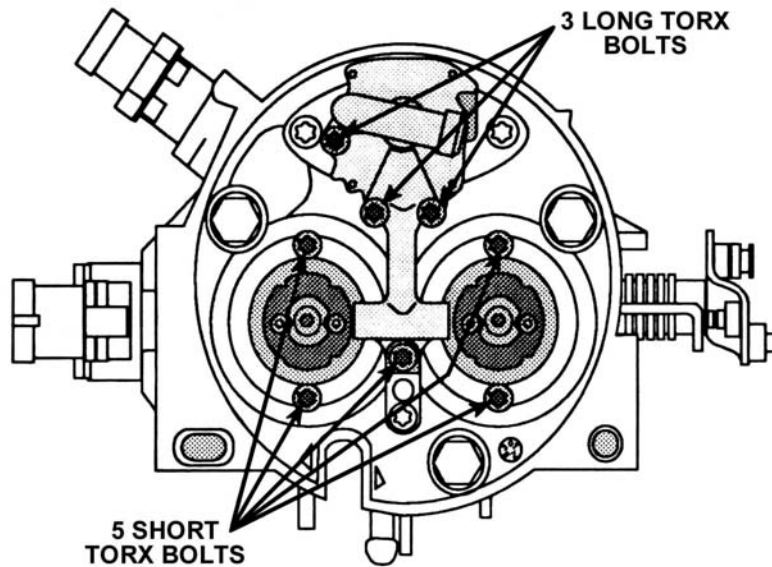
7. Reinstall the throttle body.
8. Install the TBI Hold-Down Bolts (8) in the two rear hold-down bolt holes and the 5/16-24 Nut (28) onto the TBI Hold-Down Stud (5).
9. Reconnect the throttle linkage and vacuum lines.

### 2.4.1 Supplemental Fuel Source – For Vehicles with Braided Steel Fuel Lines

1. Remove the 8 retaining torx screws from the fuel cavity cover on the throttle body. See Figure 5.

**NOTE:** Be careful when handling the fuel cavity cover. It is not available as a separate component from GM. If you break it, you will have to purchase an entire throttle body.

**Figure 5 TBI Fuel Cavity Cover Bolt Locations**



**Figure 6 TBI Fuel Pressure Regulator Bolt Locations**

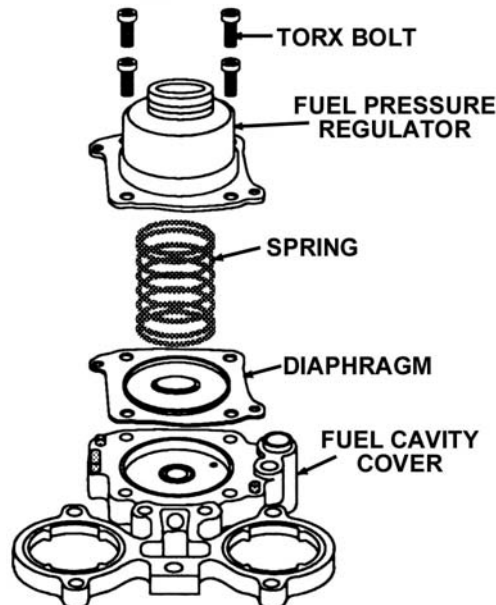


Figure 7 TBI Fuel Source Access Hole Location – Side and Underside Views

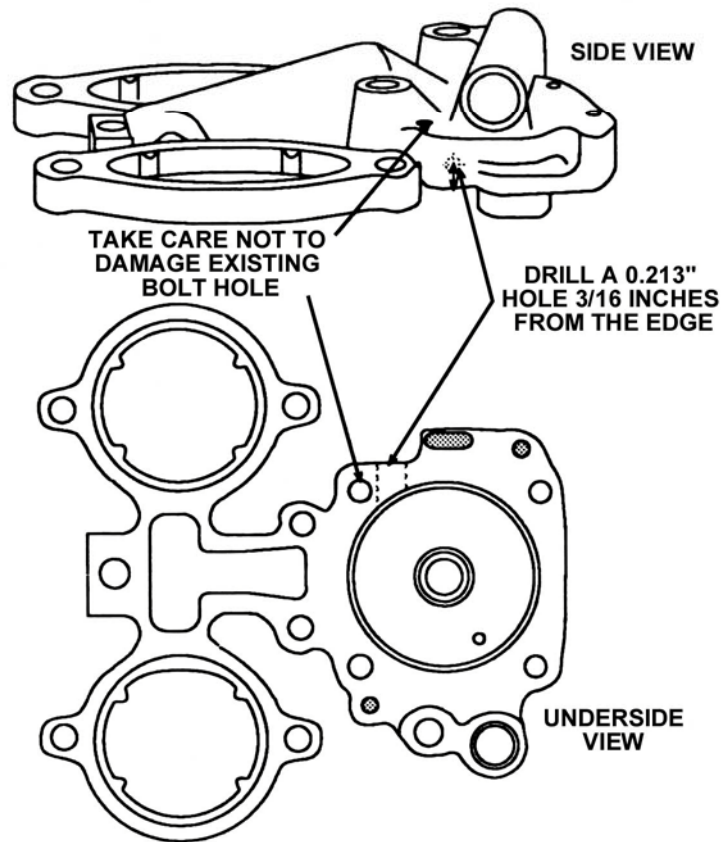
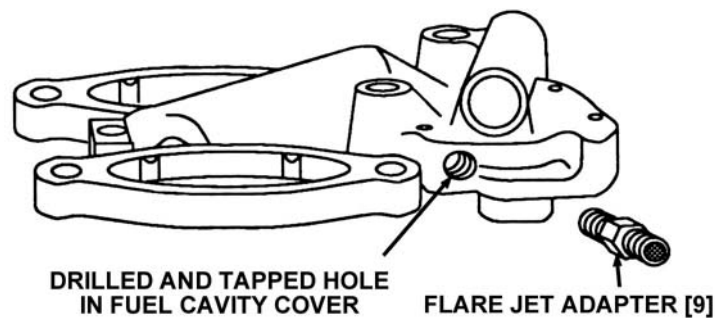


Figure 8 Installation of Fuel Source Fitting



2. Remove the fuel cavity cover. Leave the gasket attached to the throttle body and **DO NOT** remove the electric fuel solenoids from the throttle body.
3. Remove the 4 torx screws that hold the fuel pressure regulator assembly to the fuel cavity cover. See Figure 6.
4. Remove the fuel pressure regulator, spring, and diaphragm from the fuel cavity cover. You should now have a completely bare fuel cavity cover.
5. At the location shown in Figure 7 – approximately 3/16" (5mm) from the edge, drill a hole using a #3 (.213" diameter) drill into the fuel cavity. Be careful not to drill into the nearby bolt hole.
6. Tap the #3 hole with a 1/4" x 28 tap.
7. Install the 1/4" x 28 brass Flare Jet Adapter (9) into the tapped hole. Use a sealer (such as Teflon paste) on the threads that is impermeable to gasoline. See Figure 8.

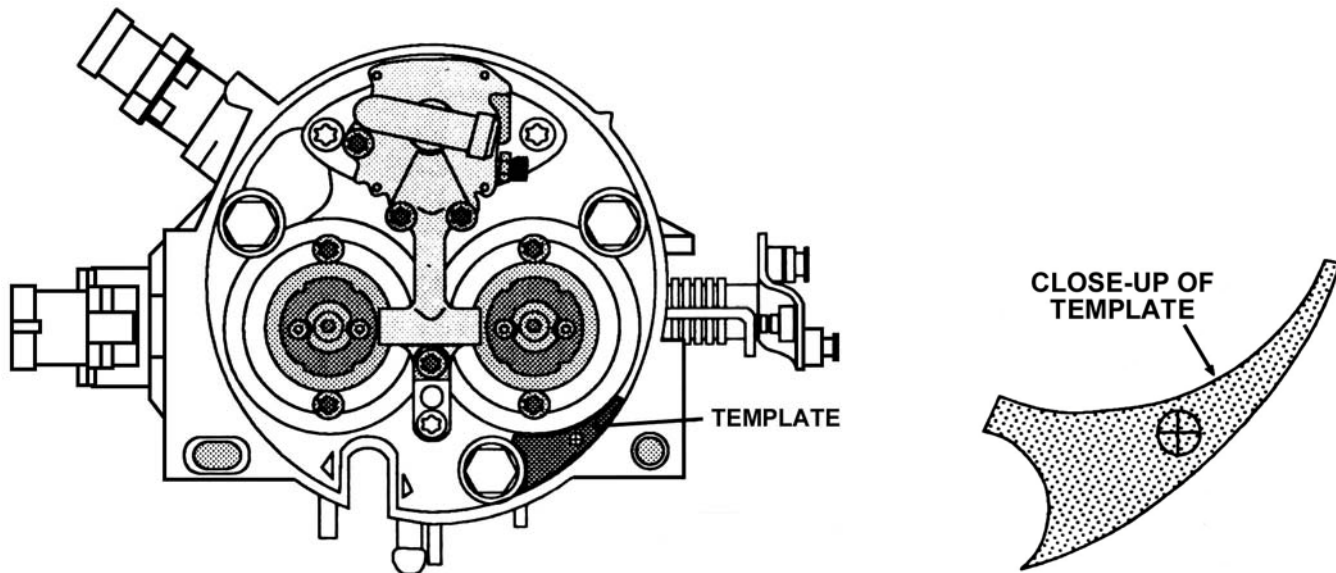
**NOTE:** When reinstalling the screws in the following steps, be careful not to overtighten them.

8. Reinstall the diaphragm, spring, and fuel pressure regulator onto the fuel cavity cover.

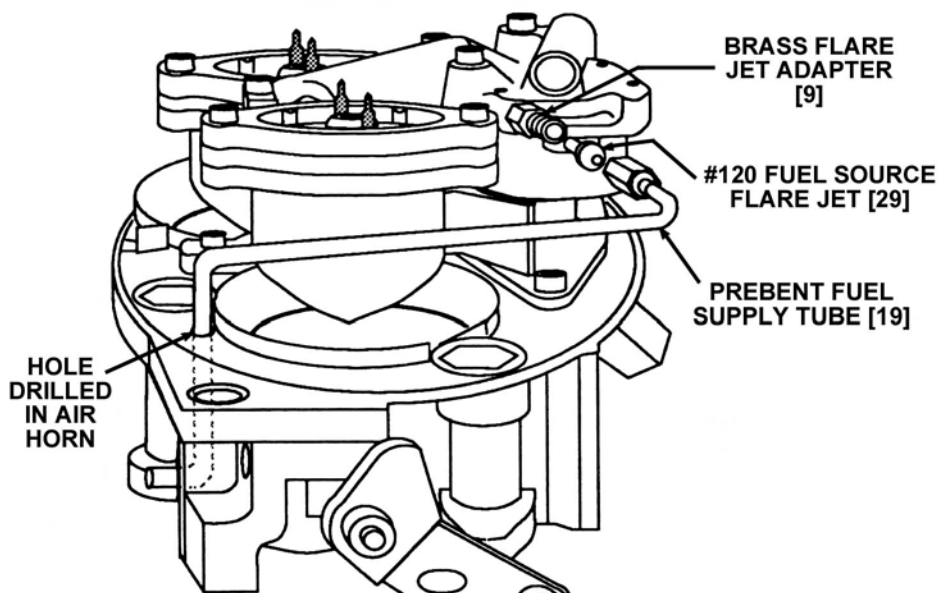
9. Reinstall the fuel cavity cover onto the throttle body.
10. Cut out the template shown in Figure 10. Lay it on the throttle body, as shown in Figure 9.
11. Drill a #3 hole through the throttle body air horn at the location marked on the template. See Figure 9.
12. Insert the prebent fuel supply tube (11) through the hole you drilled in the throttle body air horn. See Figure 11.
13. Insert the #120 Fuel Source Flare Jet (29) in the brass fitting located in the fuel cavity cover.
14. Attach the prebent fuel supply tube to the brass flare jet fitting in the fuel cavity cover. Secure the tube in place. Hold the brass fitting when tightening the red B-Nut on the prebent fuel supply tube.

**Figure 9 Installed Air Horn Clearance Template**

**Figure 10 Air Horn Clearance Template**



**Figure 11 Installation of Fuel Source Flare Jet & Fuel Supply Tube**



## 2.5 Nitrous Solenoid Installation & Injector Plate Hook-Up

**NOTE:** Remember to use Teflon paste **only** on pipe threads.

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

1. Clamp the nitrous solenoid (12) in a bench vise.
2. Install the nitrous filter fitting (13) in the inlet port of the nitrous solenoid.
3. Install the solenoid mounting bracket (14) and screws on the nitrous solenoid.
4. Install the brass compression fitting (15) in the outlet port of the nitrous solenoid.
5. Select a mounting location for the solenoid. Make sure that the blue 1 ft. extension tube (16) will reach from the solenoid to the nitrous fitting in the injector plate.
6. Bend the blue extension tube to the desired contour. Cut to length and deburr the cut end.
7. Secure the solenoid in place.
8. Select the proper nitrous jet (10) from the application chart. Install the jet into the nitrous fitting in the injector plate (6).
9. Disassemble the compression fitting adapter that is installed in the outlet port of the nitrous solenoid.
10. Slip the nut and ferrule onto the extension tube.
11. Slip the inlet of the solenoid extension tube into the compression fitting and tighten.
12. Connect the solenoid extension tube to the injector plate.

## **2.6 Fuel Solenoid Installation & Injector Plate Hook-Up**

### **2.6.1 Fuel Solenoid Installation & Injector Plate Hook-Up (Vehicles with Stainless Steel Fuel Lines – not the braided-type fuel line)**

**NOTE:** Remember to use Teflon paste **only** on pipe threads.

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

1. Clamp the fuel solenoid (17) in a bench vise. See Figure 4A.
2. Install the red 1/8" NPT x 4AN fitting (18) in the inlet port of the fuel solenoid.
3. Install the solenoid mounting bracket (14) and screws on the fuel solenoid.
4. Install the brass compression fitting (15) in the outlet port of the fuel solenoid.
5. Select the mounting location for the solenoid. Make sure that the red 1 ft. extension tube (20) will reach from the solenoid to the fuel fitting in the injector plate. Also, make sure that the solenoid is located so that the 2 ft. 4AN Hose (22) will reach the primary fuel line TEE fitting (23).
6. Bend the red extension tube to the desired contour. Cut to length and deburr the cut end.
7. Secure the solenoid in place.
8. Select the proper fuel jet from the application chart. Install the jet into the fuel fitting in the injector plate.
9. Disassemble the compression fitting adapter that is installed in the outlet port of the fuel solenoid.
10. Slip the nut and ferrule onto the solenoid extension tube.
11. Slip the inlet of the solenoid extension tube into the compression fitting and tighten.
12. Connect the solenoid extension tube to the injector plate.

### **2.6.2 Fuel Solenoid Installation & Injector Plate Hook-Up (Vehicles with braided-type fuel lines)**

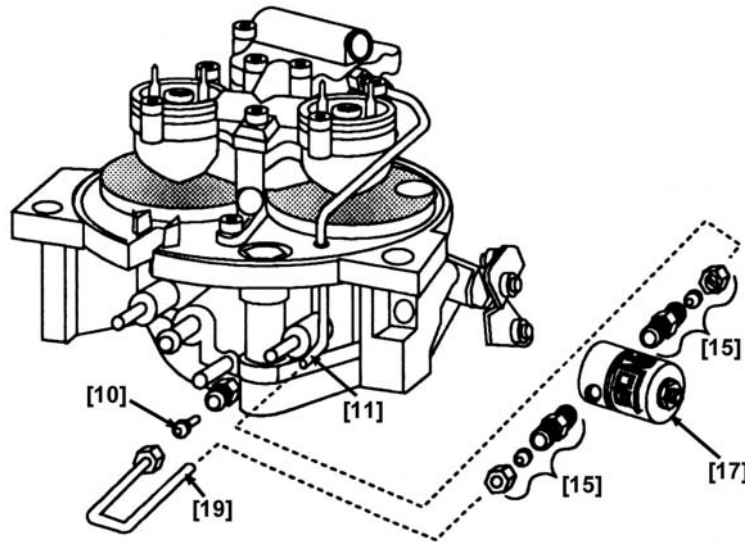
**NOTE:** Remember to use Teflon paste **only** on pipe threads.

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

1. Clamp the fuel solenoid (17) in a bench vise. See Figure 4A.

2. Install the brass compression fitting adapter (15) in the inlet port of the fuel solenoid.
3. Install the brass compression fitting adapter (15) in the outlet port of the fuel solenoid.
4. Remove the solenoid from the vise. Disassemble the compression fitting adapters.
5. Slip a nut and ferrule onto the fuel feed tube (11) that you installed in the throttle body.
6. Slip the inlet of the fuel solenoid onto the fuel feed tube. Assemble the compression fitting. Rotate the solenoid to the desired orientation and tighten the compression fitting. See Figure 12.
7. Select the proper fuel jet (10) from the application chart. Install the jet into the fuel fitting in the injector plate (6).
8. Install the formed fuel (red) extension tube (19) using a red B-Nut.
9. Tighten the solenoid mount.

**Figure 12 Fuel Solenoid Location – For Vehicles with Braided Steel Fuel Lines**



## 2.7 Nitrous Feed Line Mounting

**HINT:** Routing the main nitrous feed line from the bottle under the vehicle and following the vehicle's fuel lines along the underbody usually works well. If there is not room for the hose to enter the vehicle engine bay between the engine and the frame rails, vehicles with plastic inner fenders can have the hose enter the engine bay between the plastic inner fender and the body.

1. Determine the route for your nitrous feed line to follow. Ensure that the path is clear of exhaust system, suspension, steering, wheels, electrical lines and components, and tires.
2. Feed the main nitrous supply line (21) 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 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 nitrous solenoid inlet port.

## 2.8 Fuel Line Connection for Vehicles with Stainless Steel Fuel Lines – not braided type fuel lines

1. Choose the location where the primary steel fuel line is to be tapped. The splice should be located so that the 2 ft. 4AN hose (22) will reach the inlet port of the fuel solenoid.
2. Cut and deburr the primary fuel line.
3. Install the brass fuel line compression TEE fitting (23) in the primary fuel line.
4. Install the 1/8" (Female) x 4AN (Male) fitting (30) on the center leg of the brass fuel line compression TEE.
5. Connect the open brass fuel line compression TEE to the inlet port of the fuel solenoid using the 2 ft. 4AN hose (22).

## 2.9 Electrical System Installation

Refer to the wiring schematic (Figure 13) and the procedures in this section for the 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 (24) 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 14A).
- C. Ensure that the throttle and switch can reach the activation position shown in Figure 14B, by using the accelerator pedal. Have an assistant slowly press the pedal to the floor while you listen for the "click" of the microswitch.

Figure 13 Wiring Schematic

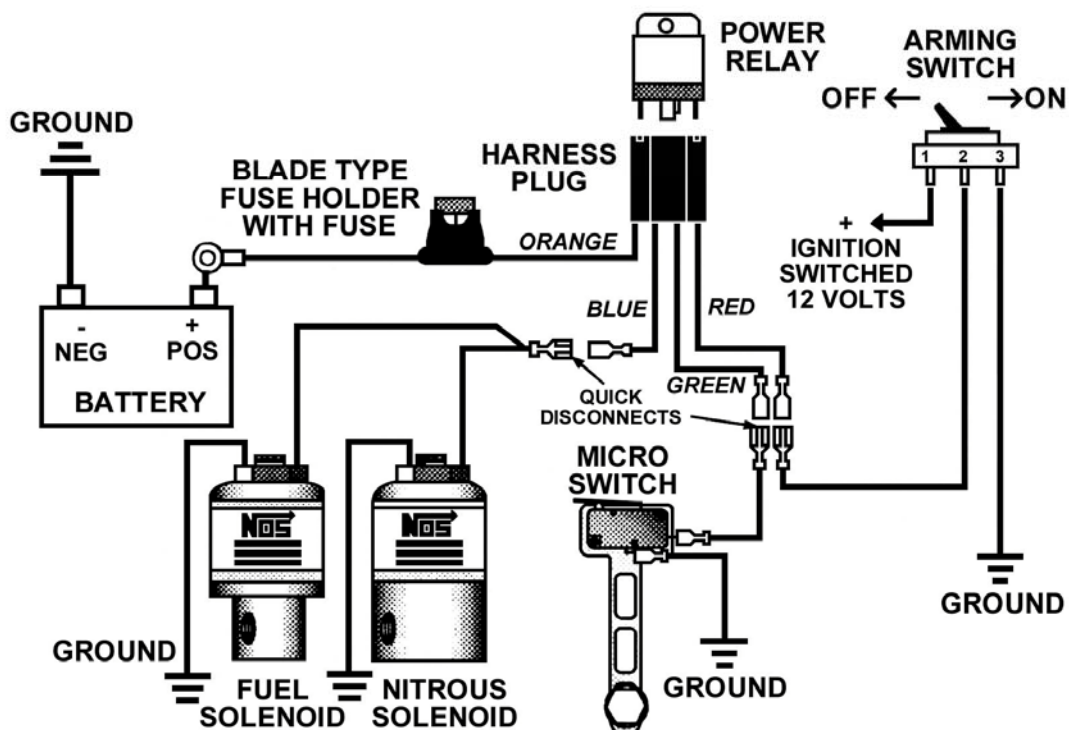
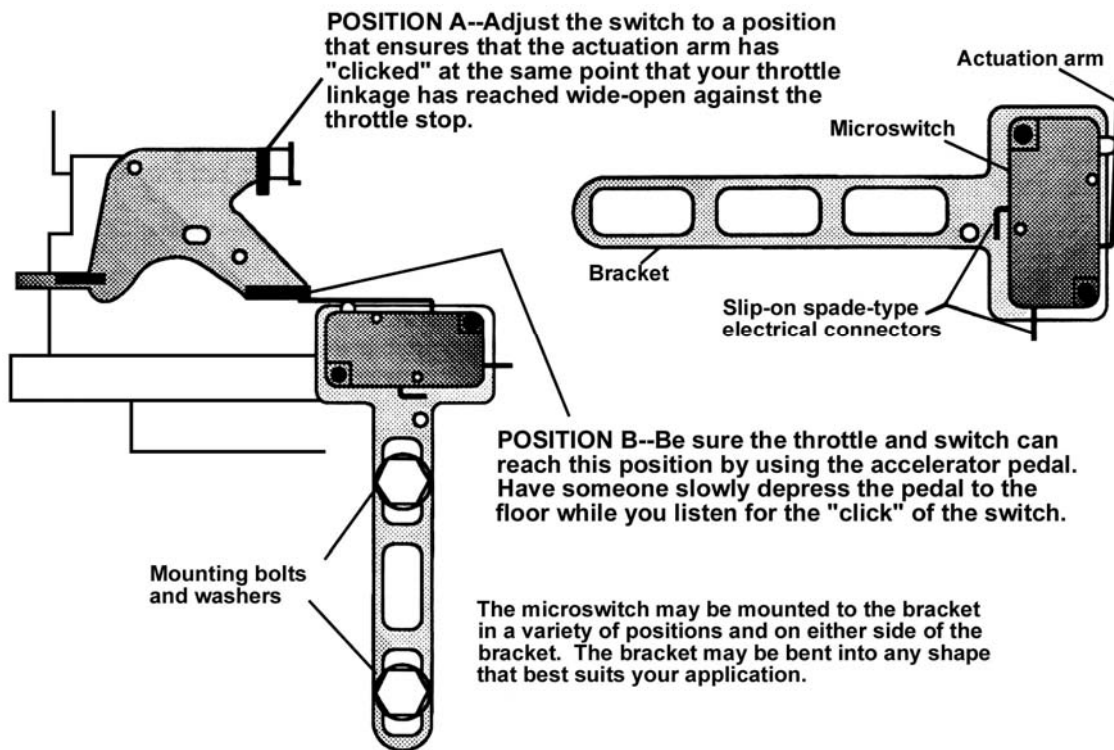


Figure 14 Throttle Microswitch Installation



3. Install the NOS arming toggle switch (25) in the vehicle's interior, within easy reach of the driver.
4. Install the wiring relay (26) and the relay harness in the engine compartment near the battery. The relay's orange wire should reach the battery (+) terminal.
5. Connect one wire from each solenoid together. Join the solenoid wires to the blue relay wire.
6. Connect the remaining solenoid wires to a ground.
7. Connect the green relay wire to either terminal on the microswitch.
8. Connect the open terminal on the microswitch to a ground.
9. Connect the red relay wire to the middle (#2) terminal on the arming toggle switch.
10. Connect terminal #1 on the arming switch to a switched +12V power source.

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

11. Connect terminal #3 of the arming switch to the ground.
12. Reconnect the battery.

## Chapter 3 Baseline Tuning Suggestions

Your NOS TBI Wet Manifold Kit comes with two sets of nitrous and fuel jets. These are conservative jetting combinations, based upon 900 psi nitrous oxide bottle pressure and 15 to 20 psi 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 if your carburetor is jetted excessively rich.

If you experience any of these conditions, or you desire to maximize the power output from your system, 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.**

Your NOS Kit Number 05153-V6NOS, 05153-V8NOS, or 05153-454NOS is factory set to work with stock General Motors engine settings. For maximum performance, follow the settings listed in Table 3.

**Table 3 Suggested Baseline Tuning Combinations for NOS TBI Wet Manifold Kits**

Configuration	N <sub>2</sub> O Jetting (Nitrous – Fuel)	Fuel Quality	Ignition Timing	Plugs
05153-V6NOS	36/26	92+ octane pump gas	Standard	Standard
05153-V8NOS	47/36	92+ octane pump gas	Standard	Standard
05153-454NOS	65/42	92+ octane pump gas	Standard	Standard

## Chapter 4 Preparing for Operation

After you have completed the installation of your NOS TBI Wet Manifold 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 toggle switch on. Set the engine speed at 2000 RPM. Briefly depress the activation arm on the microswitch. The 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 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 combinations can mislead you when attempting to optimize the ignition timing.

#### 5.1.1 Determining Optimum Nitrous/Fuel Jetting

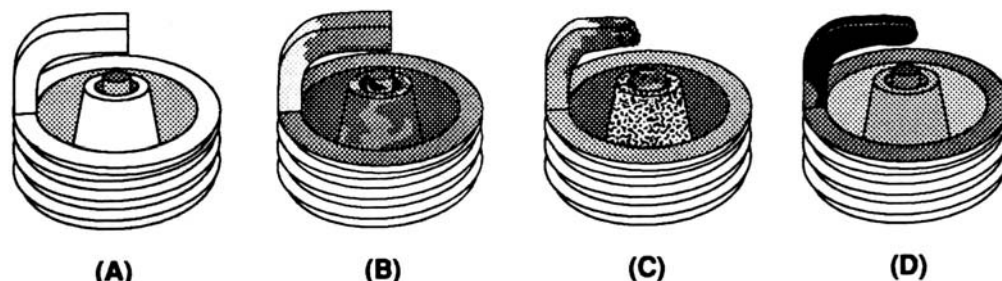
The jetting combinations included in your kit are compromises, intended to provide you with a safe starting point. They are intended to be used with 900 psi nitrous bottle pressure and 15-20 psi flowing fuel pressure. In many instances, installing slightly smaller fuel jets than the units provided in 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 the spark plugs for the indication of lean or rich nitrous/fuel conditions (refer to Figure 15 for tips on reading the spark plugs).

- 2A. If spark plugs appear to be excessively rich, decrease the fuel jet size 2 steps (ex. 42 to 40, 36 to 34, 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 15 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!** For maximum performance, 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-----	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 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 15 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.

In 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 injector plate spray bars (fuel and nitrous), 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

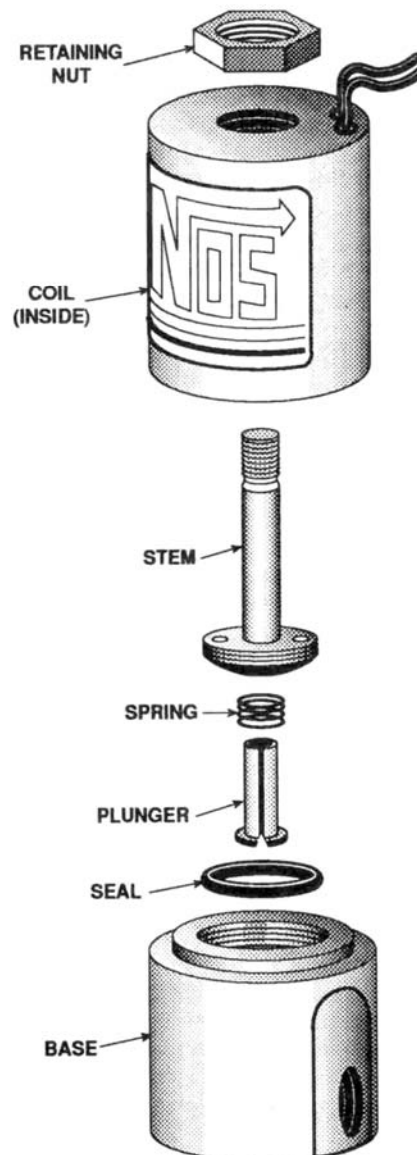
1. Close the valve on the nitrous bottle.
2. Empty the main nitrous supply line.

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), which is included in all solenoid overhaul kits. **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 16 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 1-714-546-0592.

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 (Figure 13).	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 temperature to 75° to 85°F.
	Inadequate nitrous supply.	Weigh bottle.	Fill bottle. 1-800-99-REFILL
	Mismatched N <sub>2</sub> O/fuel jetting.	Compare jetting to recommended values.	Install correct jets.
	Loose nitrous solenoid wiring.	Inspect the solenoid wiring.	Repair wiring.
No change in performance when system is activated.	Malfunctioning nitrous solenoid.	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 make clicking noise.	Replace solenoid.
	System wired incorrectly.	Compare nitrous wiring to schematic (Figure 13).	Wire system per instructions.
	In-line fuse blown	Check fuse.	Replace fuse.
	Loose ground wire(s).	Connect 12V test light to battery (+) terminal. Check for continuity at grounds noted in schematic.	Tighten/repair loose grounds.
	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.
	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.	Malfunctioning throttle microswitch.	Temporarily disconnect power relay green wire from microswitch. Connect 12V test light to the battery (-) terminal. Manually set the microswitch ON. Check for continuity at microswitch positive terminal.	Replace throttle microswitch.
	Excessive ignition timing.	Check ignition timing.	Reduce timing in 2° increments, up to 4° from non-nitrous conditions.
	Inadequate octane fuel.		Use higher octane fuel; up to 100 octane – unleaded
	Spark plug heat range too high.		Reduce spark plug heat range (max. 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 fuel filter.
	Crimped fuel line.	Inspect fuel line.	Replace crimped line.
	Weak fuel pump.	Install fuel pressure gauge, such as NOS P/N 15906NOS. Run engine under load at wide-open throttle, with system activated. Fuel pressure should be at least 25 psi.	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 bottle.
	Bottle mounted incorrectly.	Compare bottle position and orientation to instructions.	Mount or orient bottle correctly.

## Nitrous Oxide Accessories

To maintain optimum system performance on cold days, a **Bottle Heater (P/N 14164NOS)** is a must.

To maximize the efficiency of the system, a **Bottle Blanket (P/N 14165NOS)** is also suggested.

**#10 Bottle Heater P/N 14164NOS**



**#10 Bottle Blanket P/N 14165NOS**



**Throttle/RPM-Activated Switch P/N 15879NOS**



**Remote Bottle Valve P/N 16058NOS**



The **Throttle/RPM-Activated Switch, P/N 15879NOS**, allows hands-free nitrous operation and prevents nitrous from being injected at speeds above or below operator-set levels. Greatly reduces chance of accidental engine damage. ON/OFF levels adjust from 2000 to 9000 RPM.

The **Remote Bottle Valve, P/N 16058NOS** is the perfect convenience accessory—electronically turns 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.

**TO ORDER, CONTACT YOUR LOCAL DEALER!**

**NOS Technical Support  
1357 E. Grand Ave.  
Pomona, CA 91766**

**Phone: (714) 546-0592 Fax: (714) 545-8319 Email: nos@support.holley.com**