



## **OWNER'S MANUAL for LS-1 Firebird & Camaro Plate Kit Applications**

CONGRATULATIONS on purchasing your DynoTune 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 our system, call DynoTune Technical Service at 1-978-562-6040.

**NOTICE:** Installation of this DynoTune INC. Nitrous oxide system product 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.

DynoTune 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.

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

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

DynoTune 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 DynoTune nitrous system should not alter the emission control performance of your vehicle under standard EPA test cycle conditions.

**NOTICE:** The DynoTune Nitrous Systems are not intended for use on hatchback type vehicles without the use of a DynoTune bottle blow-down tube kit.

### **HAZARDS DEFINED**

This manual presents step-by-step instructions that describe the process of installing your DynoTune 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 Dynotune 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.

# TABLE OF CONTENTS

## **WHAT IS NITROUX OXIDE?**

### **Do's and Don'ts of Nitrous Oxide**

#### Chapter 1. Introduction to your DynoTune Nitrous Oxide Kit

- 1.1 General Information
- 1.2 System Requirements
- 1.3 Kit Components

### **Chapter 2. Kit Installation**

- 2.1 Bottle Mounting Instructions
  - 2.1.1 Street Vehicles
  - 2.1.2 Racing Vehicles
- 2.2 Bottle Orientation
- 2.3 Bottle Installation
- 2.4 Wet Plate Installation (stock size throttle body)
- 2.5 Solenoid Mounting
- 2.6 Solenoid/Wet Nozzle Hose Connection
- 2.7 Nitrous Feed Line Mounting
- 2.8 Fuel Supply Connection
  - 2.8.1 Fuel Supply Connection by using Fuel Rail Test Port
  - 2.8.2 Fuel Supply Connection by Tapping Fuel Rail
  - 2.8.3 Fuel Supply Connection by Tapping into Main Fuel Supply Fitting
  - 2.8.4 Fuel Supply Connection by Tapping into Main Fuel Supply Hose (Rubber Hose Only)
- 2.9 Electrical System Installation

### **Chapter 3. Baseline Tuning Suggestions**

### **Chapter 4. Preparing for Operation**

### **Chapter 5. Advanced Tuning for Maximum Power**

- 5.1 Determining Optimum Nitrous/Fuel Jetting
- 5.2 Determining Optimum Ignition Timing

### **Chapter 6. Routine Maintenance**

- 6.1 Nitrous Solenoid
- 6.2 Nitrous Solenoid Plunger
  - 6.2.1 General Information
  - 6.2.2 6.2.2 Nitrous Solenoid Plunger Disassembly and Inspection

### **Appendix A. Troubleshooting Guide**

## 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 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).
- ❑ Increase 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 DynoTune 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. *Do not use any performance chip or modified computer that advances timing more than stock.*
- ❑ 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 DynoTune 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 DynoTune nitrous systems (if you need a non-stock item, call DynoTune Technical Service for assistance).
- ❑ Over tighten 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.
- ❑ 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 DynoTune Nitrous Oxide Kit

### 1.1 General Information

This kit is intended for 8 cylinder LS1 applications. This kit was designed to be used on late model multi-point fuel injection type engines with 45 psi  $\pm$  5 psi fuel pressure(near stock).

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

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

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

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

**Table 1. Jetting Combinations @ 45 PSI Fuel Pressure**

Kits	Nitrous / Fuel Jetting	Approximate Power Increase (BHP)
DynoTune Wet EFI plate system  (LS1 LS6 engines)	42 / 26	75 HP
	50 / 30	100 HP
	64 / 38	150 HP

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

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

## 1.2 System Requirements

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

### ❑ Manual Transmissions

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

### ❑ Automatic Transmissions

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

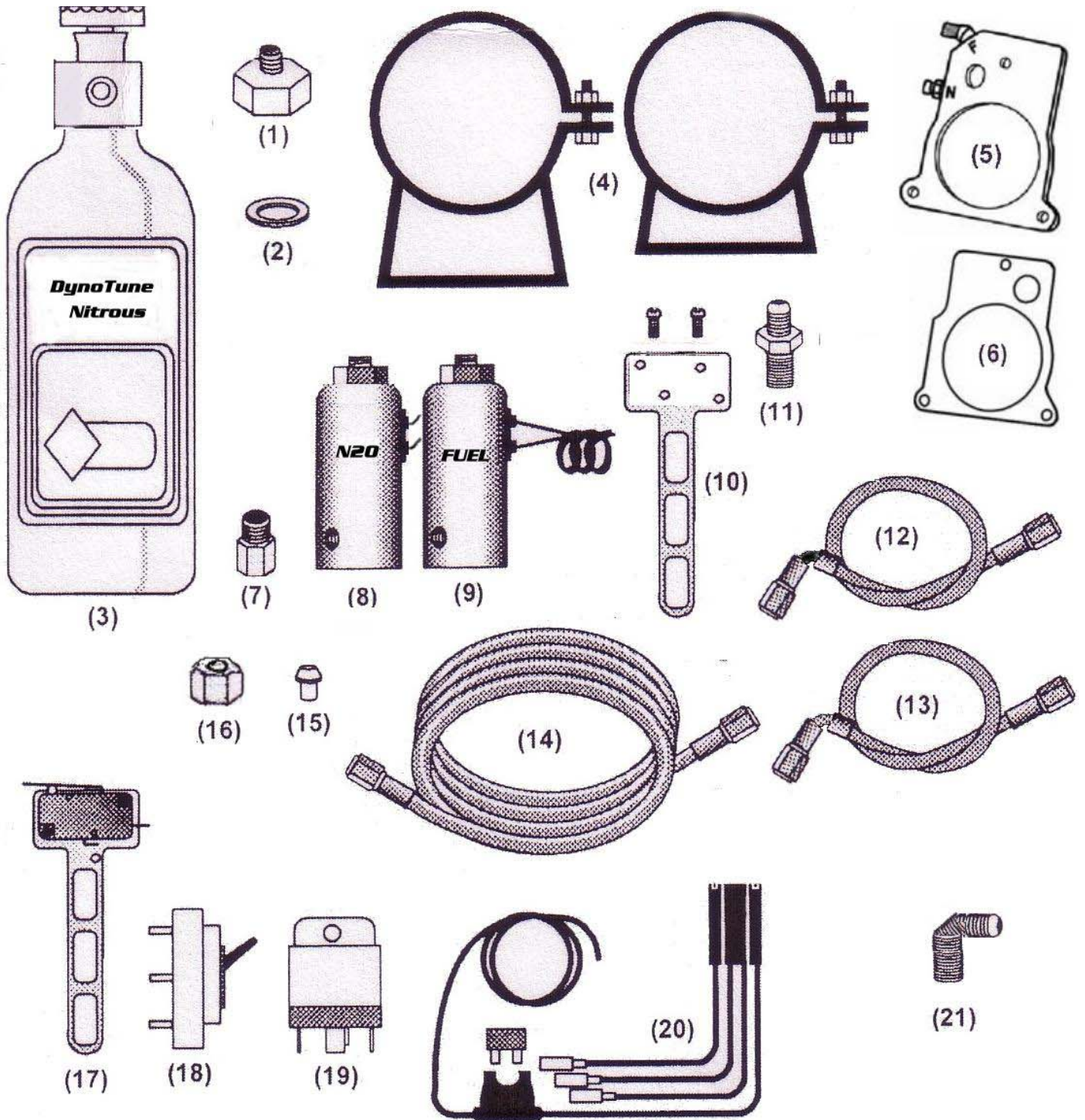
## 1.3 Kit Components

Before beginning the installation of your DynoTune nitrous 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 DynoTune Technical Support at (978) 562-6040

**Table 2. DynoTune LS1 Firebird & Camaro Wet Plate Kit Parts List**

Item	Description	Quantity	P/N
1	4AN Bottle Nut Adapter	1	
2	Bottle Nut Teflon Washer	1	
3	#10 N20 Bottle	1	
4	#10 Bottle Bracket Set	1	
5	Wet LS1 Plate	1	
6	Wet LS1 Plate gasket	1	
7	4AN Blue Swivel Fuel Rail Fitting	1	
8	Nitrous Solenoid Large Size	1	
9	Fuel Solenoid Small Size	1	
10	Solenoid Mounting Bracket w/screws	2	
11	1/8" NPT x 4AN Fitting	2	
12	22" 3AN Hose to 4AN 90 Degree (Blue)	1	
13	16" 3AN Hose to 4AN 90 Degree (Red)	1	
14	16 ft. 4AN Hose (blue)	1	
15	Flare Jets	6	
16	Power Steering Tank Spacer Bolts 10mm	2	
17	Micro switch assembly	1	
18	Arming Switch	1	
19	Wiring Relay – 30 AMP	1	
20	Harness for Wiring Relay w/ Fuse	1	
21	1/8" NPT x 4AN 90 Degree Fitting	1	
22	M6 x 45 throttle body bolts	3	
23	M10 x 90 power steering tank bolts	2	
24	Throttle spacer adaptor with bolts	1	

Figure 1. LS1 Plate Kit Components



## Chapter 2. Kit Installation

### 2.1 Bottle Mounting Instructions

NOTE: Disconnect the battery ground before beginning installation.

#### 2.1.1 Street Vehicles

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

Dynotune 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 a Blow-Down kit that will vent the Nitrous outside the passenger compartment during an over pressure condition. The blow-down tube should be routed to the exterior of the vehicle (preferably under the vehicle). This procedure will prevent filling the driver's compartment with a cloud of nitrous oxide, If the safety pressure relief cap should happen to rupture for any reason.

#### 2.1.2 Racing Vehicles

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

Figure 2 Nitrous Bottle Siphon Tube Orientation

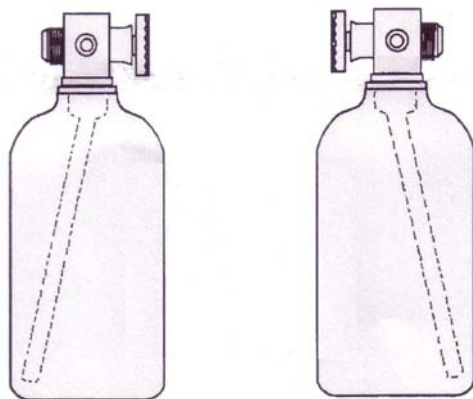
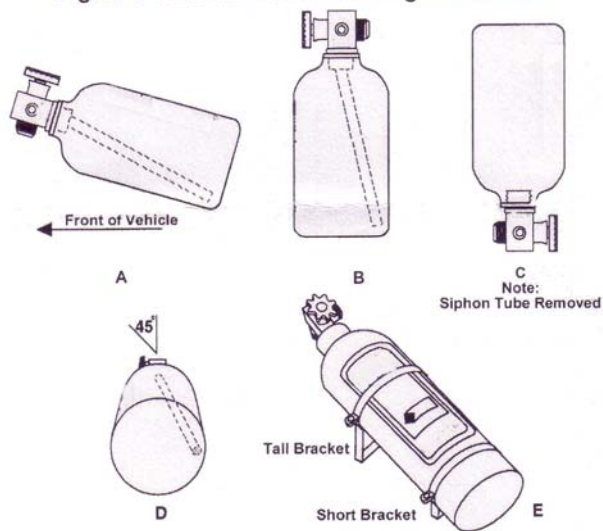


Figure 3 Nitrous Bottle Mounting Orientations



### 2.2 Bottle Orientation

Bottle placement is critical to the performance of your DynoTune 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 Dynotune 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 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 DynoTune.

If the bottle must be mounted parallel to the axles of the vehicle (sideways), the 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) 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 components. Figure 4 shows installation assembly for the DynoTune nitrous system.

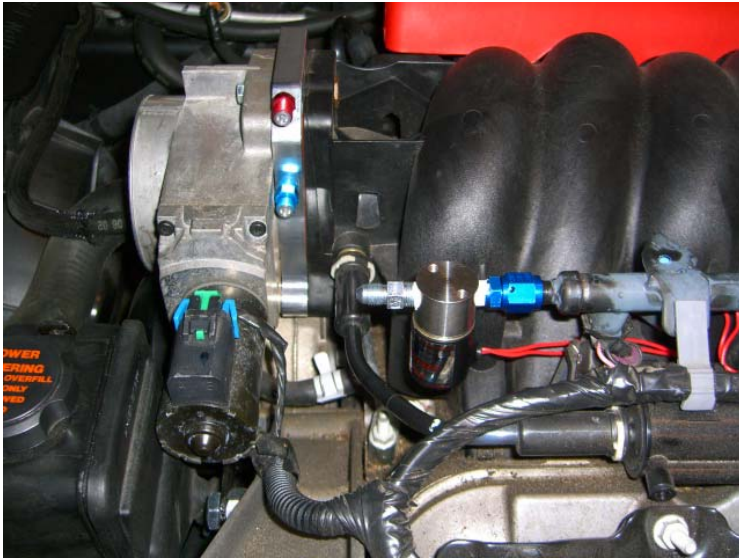


**FIG. 4**

- 1) Install the bottle nut adapter (1) and Teflon washer (2) on the nitrous bottle (3). Tighten securely.
- 2) Loosely install the bottle mounting brackets (4) on the nitrous bottle, as shown in fig 3E.
- 3) Locate the bottle/bracket assembly in the desired mounting location, ensuring that the location will provide easy access to the bottle valve, hose connection, and the bracket clamp bolts to facilitate bottle changing.
- 4) Use the assembled bottle/bracket unit as a pattern to mark and drill the four 5/16" holes in the mounting surface. **Caution: When Drilling or punching holes for the brackets, be aware of wires, hoses, fuel tanks etc that may be under or near the brackets!**
- 5) Mount the brackets securely to the surface.
- 6) Secure the bottle into the mounting brackets and tighten the bracket clamps.

## 2.4 Wet Plate installation

- 1) Before making any permanent modifications to the vehicle, layout the location of all major components (solenoids, Plate, fuel/nitrous supply lines etc.)
- 2) Remove rubber intake bellows and the three bolts holding the throttle body. Leave the connectors connected to the throttle body except the rubber vacuum hose. Remove throttle bracket bolts
- 3) Install the Nitrous plate to the intake between the throttle body and intake, make sure "Intake side" marked on plate faces the engine. Slide the gasket in front of the plate, press throttle body against the new gasket and install the three new longer bolts. Torque to 8.8 ft/lb. Install throttle bracket spacer and new bolts. CHECK THROTTLE OPERATION BEFORE DRIVING OR STARTING THE CAR. CHECK FOR STICKING OR BINDING!



## 2.5 Solenoid Mounting

Throttle Spacer Bracket

- 4) Make sure the battery is disconnected, remove the fuel rail test port cap at the end of the fuel rail. Bleed the pressure from the fuel rail, loosen your gas tank cap so pressure does not build up in your gas tank. Remove the small Schrader valve fitting in the end of the fuel rail (looks like a bike tire valve core). Use a bike valve core remover or real small needle nose pliers.
- 5) Attach blue swivel fuel rail fitting to fuel solenoid "In" Port. Attach the 4AN X 1/8" NPT fitting to the "Out" Port on the fuel solenoid. Use a vice to hold the solenoids while putting fittings on, never hold the solenoid by the black top hat as the tube inside could get damaged if you bend it and cause a dangerous condition or leak. Attach solenoid assembly to fuel rail as shown. Don't over tighten!
- 6) Mount the Nitrous solenoid to the bracket. You can bend the bracket as needed. You can bend it like a "Z" so the solenoid can be mounted like below. You can bend it any way you like. It's best to attach the bracket to the solenoid first so you can picture the bend. We give you an extra bracket just in case. Before you bolt it down, install the fittings to the solenoid.



- 6) Install the 4AN to 1/8" NPT straight fitting into the "IN" Port on the nitrous solenoid. Install the 90 degree 4AN X 1/8" NPT fitting into the "Out" port as shown above. Make sure and have it pointing in the direction shown.
- 7) Bolt the solenoid assembly down making sure it clears the engine belts etc.

## 2.6 Solenoid / Plate hose connections

- 1) Install the jet for the nitrous, into the nitrous plate jet holders "Blue fitting"
- 2) Attach the 22" blue nitrous line to the plate so the jet is trapped in between. Tighten the line but do not go crazy.
- 3) Install the jet for the fuel. Into the nitrous plate jet holders "Red fitting"
- 4) Attach the 16" red nitrous line to the plate so the jet is trapped in between. Tighten the line but do not go crazy.
- 5) Attach the other end of the 16" red fuel line to the fuel solenoid "Out" port fitting. Tighten line. Note" Loop the line 360 degrees and then attach the line like the photo. Make sure there is not to much stress on the end of the fuel rail!



- 6) Attach the other end of the 22" blue nitrous line to the nitrous solenoid "Out" port fitting. Tighten Line. Note" Route the line like the photo.

## 2.7 Nitrous Feed Line Mounting

Some folks run the lines under the car or inside the car, under the carpeting. If you run the line under the carpet, its best to run it under the drivers side kick panels and drill a small hole above the hole that is coming into the drivers compartment just above the drivers left foot rest, you will see the rubber factory plug there. Check NHRA rules for racing applications as routing the line inside the car may be dangerous. Its always recommended to run the lines outside the car.

- 1) Determine the route for your nitrous feed line. Ensure the path is clear of the exhaust and moving parts like wheels, brakes, steering linkage etc. (Run it to the drives side location as shown in the pictures. We like to run the line in the car, under the carpet to the firewall. There is a rubber boot near the steering wheel near the Brake vacuum booster on the firewall. You can slice the rubber seal and feed the line through under the vacuum booster where it attaches to the fire wall. Seal it up with silicone after its all installed.
- 2) Feed the nitrous supply line (16) along the route you have decided on.
- 3) Use nylon quick zips to secure the Line as needed.
- 4) Attach the Nitrous Feed line to the 4AN bottle nut (1) on the nitrous bottle. **Warning: Nitrous oxide can cause death if inhaled or cause sever frost bite if it contacts your skin, always point the line away for people or objects when purging the air from the line.**
- 5) Purge the nitrous supply line at the solenoid end.
  - a. Wrap the nitrous line open end with a rag and secure down.
  - b. Crack the bottle valve slightly to purge the line, it only takes a second to purge the line.
- 6) Attach the nitrous supply line to the Nitrous solenoid fitting on the "IN" port fitting.

## 2.8 Fuel Supply Connection

- See section for fuel solenoid.

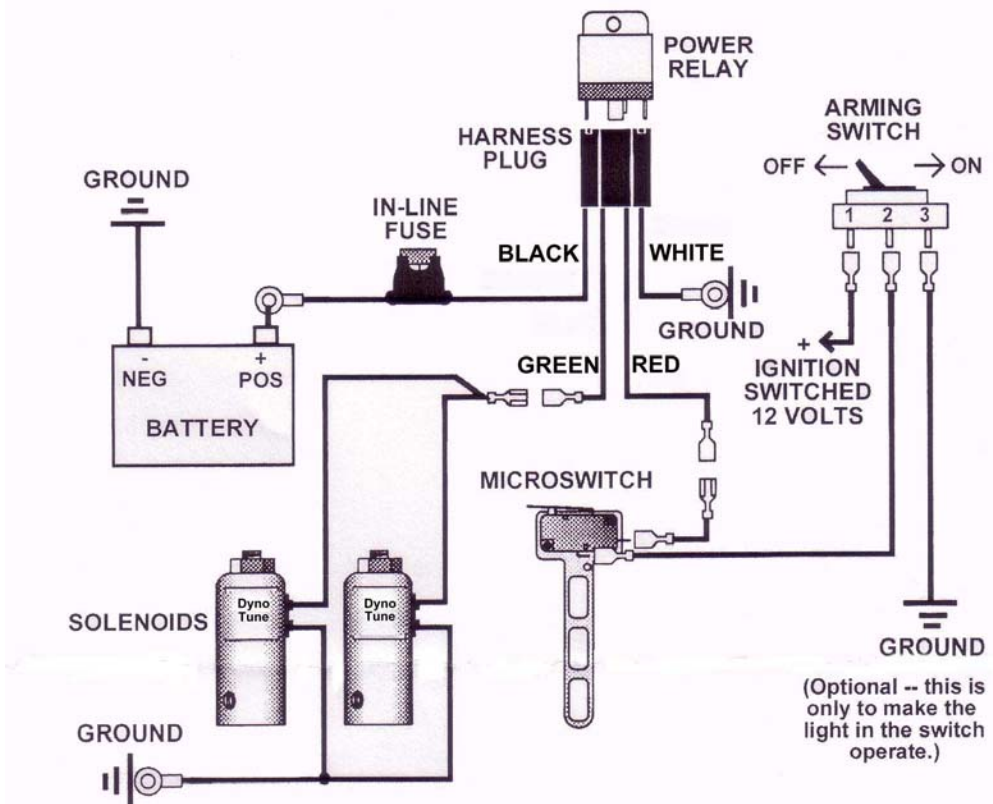


FIG. 9

## 2.9 Electrical System installation

Refer to figure 9 and the procedures in this section for electrical system installation. **WARNING! Death or injury may occur from working on a charged electrical system.**

- 1) Disconnect the battery at the ground cable (if not already done.)
- 2) Install the throttle micro switch (17) as follows: Hint, the micro-switch 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. **WARNING! Binding or dragging of the throttle linkage will create a potentially dangerous stuck-throttle condition. Ensure that the micro-switch does not interfere with the normal operation of the throttle linkage operation.**
  - a. Mount the throttle micro-switch on the throttle pedal bracket so that the throttle pedal arm movement triggers the micro-switch. See picture below:



- b. Adjust the micro-switch to trigger at wide-open throttle by adjusting the micro-switches position to ensure the actuation of the micro-switch “clicks” at the same point the throttle pedal reaches wide-open throttle.
  - c. Slowly press the pedal to the floor while you listen for the “Click” of the micro-switch.
  - d. Warning: Make sure carpeting and floor mats cannot interfere with the operation of the micro-switch or accidentally operate the switch.
- 3) Install the arming switch in the vehicle interior, within easy reach from the driver's seat. This switch will put power to the entire system. CAUTION! Never activate your nitrous system below 3000 RPMs as doing so could damage your engine.
  - 4) Install the relay and the relay harness in the engine compartment near the battery.
  - 5) Connect one of the orange fuse wires to the battery (+) terminal. Connect the other fuse wire to the Black wire going to the relay. Install the fuse into the fuse holder
  - 6) Connect one wire from each of the solenoids together. Join the solenoid wires to the Green relay wire. **(NOTE: Blue wire on relay not used)**
  - 7) Join the remaining solenoid wires together. Connect to a good chassis ground.

### Micro-Switch Wiring

- 1) Connect the White relay wire to a good solid ground.
- 2) Connect the red relay wire to either terminal on the throttle micro-switch.
- 3) Connect the open terminal on the micro-switch to the (#2) terminal (acc) on the arming switch.
- 4) Connect the #1 terminal (power) on the arming switch to a 12volt power source.
- 5) Connect the #3 terminal (ground) of the arming switch to ground.
- 6) Reconnect the battery.
- 7) Turn the arming switch on.
- 8) Push the throttle wide open while the engine is not running, bottle closed. Each solenoid should make a clicking noise if it is working properly. If no Noise is heard, check all wiring connections and each wire in schematic per figure 9. **NOTE: Nitrous and Fuel flowing through the solenoids is needed to keep the coils from melting. Short, one second power cycles will not hurt them but more than 5 seconds with no nitrous or fuel flowing through them will melt the coils and void your warranty.**

## Chapter 3 Baseline tuning suggestions

Your DynoTune system comes preset with nitrous and fuel jetting based upon engine displacement. The jetting combinations are conservative and are intended to work with stock ignition systems and +92 octane unleaded gasoline. Nitrous and fuel jetting combinations are derived based upon 950 PSI (85 degrees F) nitrous bottle pressure and fuel pressure as depicted in table 3. Using the listed jetting and suggested fuel and nitrous pressure levels should yield safe reliable power increases. Note: Power levels higher than 100hp should use one heat range cooler plugs NGK TR6. Using an octane booster may eliminate the need for timing retard at 150hp levels and higher. 125HP will not require and timing retard, just try and use 92-93 octane. LS engines use knock sensors so if it senses any pinging/detonation, the computer will retard the timing for you!

Using different jetting combinations with lower bottle pressure and or higher fuel pressure may produce an excessively rich condition while using the system. This can result in a loss of power, excessive exhaust smoke (black) or misfiring (backfiring through the exhaust). If you experience any of these conditions, or you desire to maximize the power output from your system, you should refer to chapter 5, "Advanced tuning for maximum power".

Caution! Use of excessive bottle pressure and or inadequate fuel pressure can result in an excessively lean condition. In extreme cases, this will produce major engine damage!

## Chapter 4 Preparing for operation

- 1) Turn on the ignition switch and check for fuel leaks. Shut off the vehicle.
- 2) Open the nitrous bottle valve.
- 3) Inspect all the lines and fittings for leaks and adjust as needed.
- 4) Enjoy the power only a DynoTune Nitrous system can offer!

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

## Chapter 5 Advanced Tuning for Maximum power

After performing the Baseline Tuning Suggestion-Chapter 3, if you desire to maximize the performance of your system (150hp), perform the following:

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

### 5.1 Determining optimum Nitrous/Fuel jetting

The factory calibrated nitrous/fuel ratio included is provided to you with a safe starting point. Baseline Jetting is calibrated using a 950psi nitrous bottle pressure and fuel pressure as stated in table 3. In some instances, slight changes in fuel pressure may produce performance gains.

- 1) Stabilize the nitrous bottle pressure at 950 psi.
- 2) Perform a dynamometer pull or a full throttle pass down the racetrack. Note the power reading or vehicle MPH (not ET). Examine the spark plugs for the indication of lean or rich nitrous/fuel conditions (refer to Figure 11 for tips on reading the spark plugs).
  - A. If the spark plugs appear to be excessively rich, decrease the fuel jet size 2 steps
  - B. A. If the spark plugs appear to be excessively lean, increase the fuel jet size 2 steps
  - C. If the 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

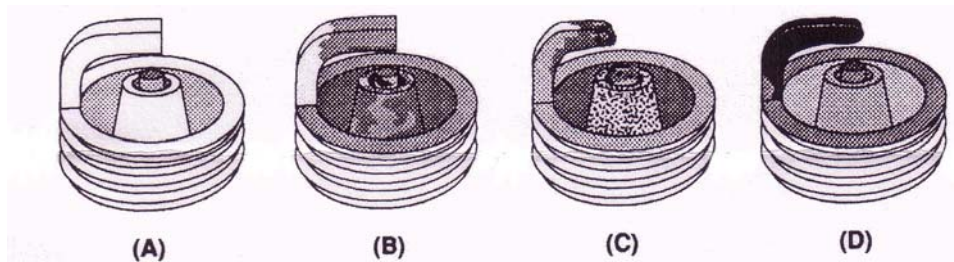


FIG. 11

## 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, the 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 be burnt 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 in color, or the entire ground start can become discolored.

## 5.2 Determining Optimum Ignition Timing

**IMPORTANT!** Ignition timing should be retarded approximately 2 degrees per 50 hp above a 100hp increase. So at 150hp total increase use 2 degrees additional retard.

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

1. Estimate the reduced ignition timing that you think will produce the best power.
2. Set the ignition timing 2 to 3 degrees retarded from your best power estimate setting.
3. Stabilize the nitrous bottle pressure at 950PSI.
4. Perform a dynamometer pull or a full throttle pass down the racetrack. Note the power reading or vehicle MPH at the track.
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 at the track. Examine the spark plugs for signs of detonation (refer to figure 11 for tips on reading spark plugs).
  - A. If power increase or vehicle MPH increase **AND** spark plugs show no signs of overheating or detonation, increase the ignition 2 degrees.
  - B. If power increase or vehicle MPH increase **AND** spark plugs begin to show slight signs or 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.
  - C. 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 filters and lines

- 1) Clean the Filter in the nitrous solenoid inlet port if so equipped.
- 2) Inspect all fuel lines and nitrous lines for leaks and repair as needed.

#### 6.2.1 General information

The seals used in DynoTune nitrous oxide solenoids are designed to be used with nitrous oxide only. When kept from fuel contamination or over pressurization, they should provide trouble free performance. You should periodically (after every 20-30 pounds of nitrous usage) examine the seal in the Nitrous solenoid plunger. The seals used in the plungers are designed to work at pressures up to 1100psi. Exposing the plunger to excessive pressure can result in the seal in the plunger swelling or in extreme cases, the plunger seal disintegration resulting in a leaky solenoid.

NOTE: The swelling of the nitrous solenoid plunger seal will reduce nitrous flow (causing an excessively rich nitrous/Fuel condition and a loss of power).

#### 6.2.3 Nitrous Solenoid plunger Disassembly and inspection

- 1) Close the valve on the nitrous bottle.
- 2) Empty the main nitrous supply line.
- 3) Remove the main nitrous supply line.
- 4) Remove the retaining nut from the nitrous solenoid and remove the coil and housing. Note any shims.
- 5) Unscrew the stem from the nitrous solenoid base. Do this by double nutting the stem; do not use pliers as this will damage the stem!
- 6) Remove the stem, spring and plunger from the solenoid base.
- 7) Examine the plunger seat 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 in the fresh air over several days. A seal, which is flat, but protrudes from the plunger body has probably failed internally and should be replaced.

- 8) Re-assemble in reverse order.

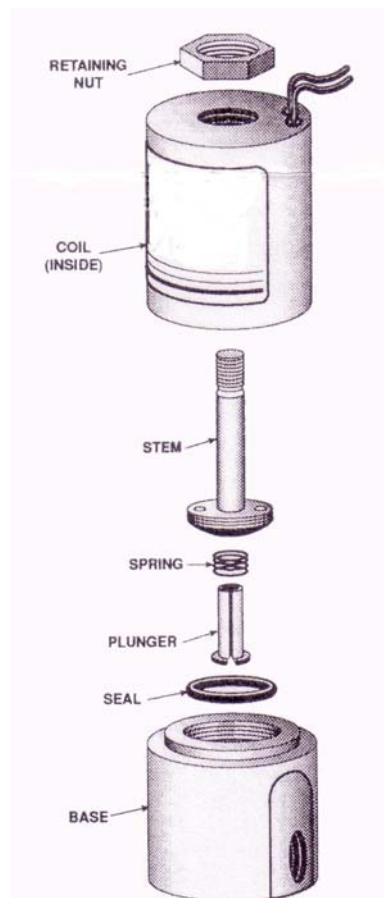


FIG. 12

# Troubleshooting Chart

PROBLEM	POSSIBLE CAUSES	DIAGNOSTIC PROCEDURE	CORECTIVE ACTION
No change in engine speed when the fuel solenoid is activated (preparing for operation—chapter 4)	System wired incorrectly	Compare wiring to Wiring fig 9.	Wire per instructions.
	Restricted fuel line.	Inspect fuel line for restrictions (crimped or plugged).	Remove restriction
	malfunctioning fuel solenoid.	Turn arming switch on. Cycle the microswitch. Solenoid should make a "clicking" noise.	repair/replace solenoid
Change in engine speed when nitrous bottle valve is opened-preparing for operation chapter 4	Malfuntioning 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 nitrosu filter	Inspect filter	Clean/Replace filter
	Low bottle pressure	Check bottle temp/pressure	Set bottle temp to 75-85 F or 950 PS pressure
	Inadequate nitrous supply	Weigh bottle	Fill bottle
	Mismatched nitrous.fuel jetting	compare jets to recommened jets	install correct jets
	Excessive fuel pressure	Install a fuel pressure gauge, measure pressure during acelleration with system activated	Regulate pressure down or install a smaller fuel jet
	Loose nitrous solenoid wiring	Inspect nitrous solenoid wiring	Repair wiring.
	Malfuntioning nitrous solenoid	Close the bottle valve. Disconnect the nitrous solenoid (+) lead. Open the nitrous bottle valve. Connect +12v to the solenoid lead. Nitrous should discharge at high rate.	Rebuild solenoid
No change in performance when system is activated.	System wired incorrectly	Compare wiring to schematic in figure 9	Wire system per instructions
	Loose ground wire(s)	Connect 12v test light to the battery (+) terminal. Check for continuity at grounds noted in figure 9	Tightem/Repair loose grounds
	Malfuntioning arming siwtch	Turn arming siwtch on. Connect 12V test light to battery (-) terminal. Check for power at pole #2	Replace pushbutton
	No power to arming switch	Connect 12v test light to battery (-) terminal. Check for power at pole #1 on arming switch.	Repair wiring.
	Malfuntioning throttle mircoswitch	Temporarily disconnect power relay red wire from microswitch. Connect 12V test light from battery (-) terminal. Manually set microswitch ON. Check for continuity at microswitch positive termial (fig 9)	Replace throttle microswitch
	Overly rich fuel conditon	Check for black smoke or backfiring thurgh the exhaust with system activated.	Install smaller fuel jet or decrease fuel pressure
Engine detonates mildly when system is activated	Excessive igtion timing	Check ignition timing	Reduce timing in 2 degree increamnets.
	Inadequate octane fuel		Use higher octane fuel
	Spark plug heat range to high.		Reduce spark plug heat range (maximun 2 steps)
	Too much nitrous flow	Check bottle pressure as it may be to high	Reduce nitrous jetting

## Troubleshooting Chart Continued

PROBLEM	POSSIBLE CAUSES	DIAGNOSTIC PROCEDURE	CORRECTIVE ACTION
Engine detonates heavily when system is activated	Inadequate fuel delivery due to: Plugged fuel filter	Inspect filter	Clean or replace filter
	Crimped fuel line	Inspect fuel line	Replace crimped line
	Weak fuel pump	Replace fuel pump with high performance version	Repair/Replace fuel pump
High-RPM misfire when system is activated.	Excessive spark plug gap	Inspect spark plugs	Set spark plug gap at .030" to .035"
	Weak Ignition/Ignition component failure	Inspect components (Plug wires, distributor cap, etc.)	Replace worn parts.
Surges under acceleration when system is activated.	Inadequate supply of nitrous	Check bottle weight	Fill bottle
	Bottle mounted incorrectly	orientation to instructions (figures 2&3)	Mount Bottle in correct orientation