



## Kit Parts List

<u>DESCRIPTION</u>	<u>QTY.</u>		<u>DESCRIPTION</u>	<u>QTY.</u>
Fuel Solenoid	1		.032 Nitrous Jet	1
Solenoid Bracket	1		.030 Nitrous Jet	1
4AN to 1/4 NPT Filter Fitting	1		.034 Nitrous Jet	1
4AN male to 1/8 NPT male fitting, 90 deg.	1		.038 Nitrous Jet	1
3AN male to 1/8 NPT male fitting	1		.040 Nitrous Jet	1
4AN male to 1/8 NPT male fitting	1		.043 Nitrous Jet	1
1/8 NPT Bulkhead Fitting w/ Nut	1		.046 Nitrous Jet	1
In-Line Tee Fitting	1		.054 Nitrous Jet	1
Hose Clamps	2		.067 Nitrous Jet	1
Wet Nitrous Nozzle	1		.083 Nitrous Jet	1
3AN Braided Hose, 2 ft. long	2		Red 18 GA. Wire	15 ft.
4AN Braided Hose, 3 ft. long	1		Red 14 GA. Wire	15 ft.
Electronic Throttle Switch	1		Solenoid Screws	2
TPS Resistor Wire	1		#14 Bracket Screws	2
Relay	1		Schrader Valve Tool	1
.019 Nitrous Jet	1		1/8 NPT Tap	1
.026 Nitrous Jet	1			

## Read This Pre-installation Guide Before Installing Kit !!!!!!!

**How the ZEX™ Safe Shot Upgrade Kit works:** The ZEX™ 82358 upgrade kit adds a separate fuel supply system to your existing Safe Shot Nitrous System. The upgrade kit adds a fuel solenoid that is then tapped into the vehicle's fuel system. While this solenoid is normally closed, it opens along with the nitrous solenoid when the nitrous system is armed and the TPS switch senses that you are at wide-open throttle. Once these solenoids open, the fuel is delivered along with the nitrous to the wet style nitrous nozzle via a flexible delivery line. The amount of fuel and nitrous that is injected into the engine is adjustable by means of metering jets installed in the nozzle. These changeable metering jets allow for easy adjustments in horsepower settings.

**Work safely:** Always wear eye protection and gloves when working with lines or hoses that contain pressurized nitrous oxide or fuel. Never transport nitrous cylinders loose behind a seat or in the back of a pick-up truck. Always disconnect the GROUND side of the battery when working on any electrical components.

**Nitrous oxide won't fix problems you already have:** Before you install your nitrous system, be sure your engine is in good mechanical condition. Intermittent wiring problems, etc., can lead to erratic system performance and possible engine damage.

**Never defeat operation of the safety relief disc in the nitrous cylinder's valve:** It's required by law and is there for your safety. Never drill, machine, weld, deform, scratch, drop, or modify a nitrous oxide tank in ANY way whatsoever!

**Never overfill nitrous cylinders:** That little bit extra will put you and others at risk of injury. More often than not, when the cylinder warms up, the pressure goes above the limit of the safety relief disc and you lose all the nitrous you just paid for.

**All the power comes from the fuel, not the nitrous:** Nitrous oxide is simply a tool that allows you to adjust how much and how quickly the engine burns the fuel. If the fuel isn't there, the power won't be either.

**Avoid detonation at all times:** Nitrous enhanced detonation is much more damaging than detonation that occurs when naturally-aspirated due to the increased amount of fuel available for releasing energy and the fact that more oxygen is present.

**When system is activated, if something doesn't feel or sound right, BACK OFF:** If you hear any detonation or feel anything unusual, get off the throttle. It's a lot easier to check everything over than it is to just try to drive through it and damage expensive parts. Don't activate or have the system activated when you hit the stock rev limiter. The stock rev limiter is a fuel cutoff. If you cut fuel while you're injecting nitrous, you're instantly very lean. This momentary lean condition has the potential of causing engine damage.

**Spark plugs and nitrous performance:** Sometimes, factory type projected nose spark plugs will produce a detonation condition during nitrous use. The solution to the problem is to install spark plugs that have a 1-2 steps colder heat range and proper ground strap design for nitrous use. Consult your preferred spark plug manufacturer to ensure you install the correct plugs for the nitrous level you choose to run. Also, due to the cooler and denser inlet air charge that nitrous creates, it may be necessary to close-up your spark plug gaps to eliminate any misfiring. In our experience, tightening up your plug gap .003 to .005 in. will help to ensure proper ignition. You may be able to run a wider gap, or you may have to close them up, just be aware of this if you start to experience an ignition misfire when you are using your nitrous system.

**Engine modifications:** The ZEX™ Safe Shot Nitrous System and the Upgrade Kit are designed to work as a bolt-on for stock or mildly modified vehicles. Mildly modified vehicles would include header upgrades, exhaust upgrades, air filter kits, etc. If major engine modifications have been performed, a fuel pump upgrade will be required for safe nitrous system operation. Major engine modifications would include turbochargers, superchargers, aftermarket cylinder heads, head porting, camshafts, intake manifolds, etc. Failure to upgrade the fuel system when using nitrous in these highly modified applications may cause serious lean conditions that can result in engine damage.

**Do not use Teflon sealing tape on any fittings in a ZEX™ Nitrous System:** It is easy for Teflon tape to get pulled into the system, causing blockages that can ultimately lead to incorrect nitrous system performance and potentially, engine damage. Only use liquid thread sealer for all NPT type fittings. Do not use any thread sealing compound on AN style threads.

**Do not attempt to start your engine if nitrous has been accidentally injected into the engine while it was not running:** If this occurs, disable the ignition, open the throttle to wide-open, then with the throttle wide open, engage the starter and turn over the engine for several

seconds to clear the nitrous from the engine. Failure to do this before attempting to restart the engine can lead to a dangerous intake system backfire.

**When finished using your nitrous system, close the nitrous bottle valve and relieve the line pressure:** This eliminates the possibility that nitrous could inadvertently accumulate in the intake system while the nitrous system is not being used.

**Do not engage your nitrous system below 2500 rpm:** This ensures that you will not have excessive cylinder pressures that could cause engine damage.

**Do not run excessive bottle pressures:** Excessive bottle pressures, over 1100 psi, are dangerous to your engine. Your ZEX™ nitrous system is calibrated and optimized to operate from 900-1000 psi. Exceeding this will not improve performance. Over 1100 psi also runs the danger of locking the nitrous solenoid closed due to excessive pressure working against the valve's plunger. If this happens, you must cool the nitrous bottle down to lower the pressure. This will allow the valve to operate properly again.

**Start with the lowest horsepower setting and work your way up:** This ensures if you have any tuning issues to work out on your vehicle, they will get sorted out with a smaller shot of nitrous that will be less likely to damage your engine. Once you have the vehicle working well on the smaller shot, you can then safely start to step up your nitrous kit horsepower.

**How to adjust power levels:** The ZEX™ Safe Shot Upgrade Kit is designed for multiple power levels. Metering jets installed in the wet nitrous nozzle control these power levels. To change the power output, all you need to do is install the appropriate pair of jets. Remember to always retard the ignition timing per the tune-up chart at the end of this installation manual.

**Engine computer modifications:** Do not use any nitrous system if a non-nitrous custom tune has been programmed into your engine's computer. Custom computer tunes generally advance the ignition timing to optimize non-nitrous horsepower. If nitrous is injected while these non-nitrous tunes are loaded into your engine's computer, detonation will occur and this can lead to severe engine damage. It is important to only use computer tunes that have been specifically programmed for nitrous use. Specific tunes for nitrous should have the ignition timing reduced, per the tune-up chart at the end of this instruction manual. It is generally recommended that you retard the ignition timing around 2 degrees for every 50 hp worth of nitrous used, based on an optimized ignition curve for your engine.

## **Installation Instructions**

### **Step 1: Decide where to put everything**

Before you start to install the various components of this kit, you'll have to find the best locations of each component by trial fitment and careful measurement. First, decide where you want to mount the fuel solenoid; right next to the nitrous solenoid is often times ideal. Remember, the 3AN stainless steel braided lines that connect the fuel and nitrous solenoids to the nitrous nozzle are 2 ft. long. Locate a good spot for the nitrous nozzle. Normally, you can install the larger wet nitrous nozzle in the same location as the currently installed dry nozzle.

## Step 2: Mount Fuel Solenoid:

Install the -4AN filter fitting into the inlet side of the fuel solenoid, then install one of the 3AN fittings into the outlet side. Attach the mounting bracket to the solenoid and find a suitable location to mount it.

## Step 3: Install Fittings and Swap Hoses

Remove the 11 in. long nozzle feed line from the outlet side of the nitrous solenoid and install a 3AN fitting in its place. Attach one of the 2 ft. long, 3AN nozzle feed lines to both the fuel and nitrous solenoid outlet fittings. Connect the -4AN fuel feed line to the fuel solenoid inlet fitting.

## Step 4: Install Wet Nitrous Nozzle

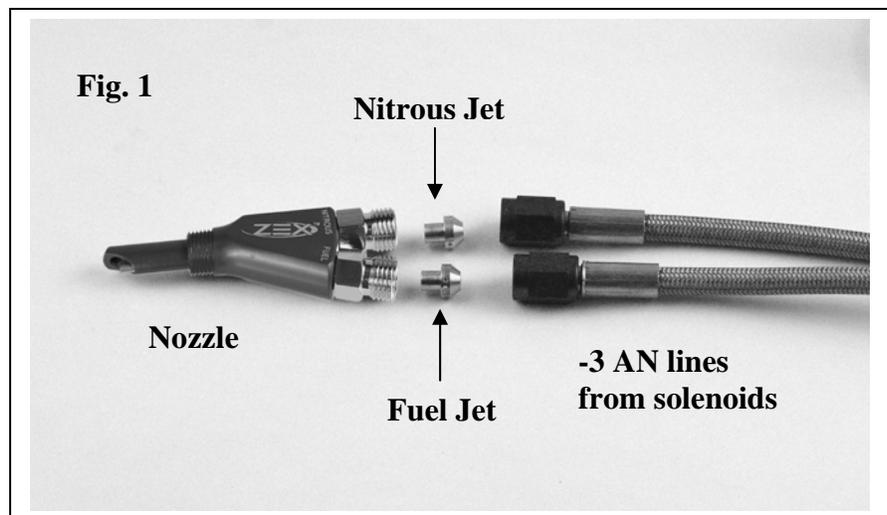
Optimum nozzle placement is 6" to 18" from the throttle body, between the mass air sensor and the throttle body. This range of distance gives the nitrous, fuel, and air, the proper time to mix before it enters the intake manifold plenum. Assuming that your existing dry nitrous nozzle has already been installed within that range, you can simply drill out the hole and install the wet nozzle in its place. First, remove the existing dry nitrous nozzle and 1/16 NPT bulkhead fitting from the air inlet tube, then drill out the existing hole to 9/16 inch diameter. Install the new 1/8 NPT bulk head fitting and screw in the nozzle. Be sure to remove any drill shavings that may have collected inside the air inlet tube, since they can damage your engine if ingested. Install the wet nitrous nozzle so that the spray is in the direction of airflow. We've enclosed a 1/8 NPT tap should you need to mount the nozzle in a metal duct. Just drill an 11/32 inch hole where you want to mount the nozzle, tap the hole and install the nozzle. Once installed, place the appropriate tuning jets in the nozzle and attach the 2-foot long, -3AN hoses to the nozzle jet fittings (Fig. 1).

## Step 5: Wire It

### IMPORTANT TECH NOTE FOR THROTTLE-BY-WIRE VEHICLES!

If your vehicle is a newer "throttle-by-wire" type vehicle, you must use the included "TPS resistor wire" (Fig. 2) to eliminate the potential for check engine lights once the ZEX TPS Switch is installed. It is required that you install the white TPS Resistor Wire

between the engine's Throttle Position Sensor (TPS) output wire and the white TPS wire going to the TPS Switch. Use of this resistor will effectively isolate the TPS Switch from the sensitive factory throttle controls and prevent check engine lights from occurring. This resistor in no way affects the activation or performance of your ZEX™ nitrous system.



### ADDITIONAL PROGRAMMING TECH NOTE!

Due to unique throttle-by-wire control programming from some vehicle manufacturers (Chrysler EFI Hemi's in particular), the throttle blades will not open with the accelerator pedal

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unless the engine is actually running. Since the ZEX Nitrous Management Unit's throttle activation switch must be programmed by opening the throttle blades with the engine off, an alternate actuation method must be used. When the programming instructions call for the throttle blade to be opened to wide-open, simply remove the air intake tube from the throttle body inlet and manually open the throttle blade with a screwdriver, wooden dowel, etc.

1. Locate your throttle position sensor's (TPS) voltage output wire. The TPS sensor is located on your engine's throttle body. Using a volt-meter, test the wires to find the TPS output signal wire. The correct wire will have a rising voltage that varies as you open and close the throttle. Most vehicles have around .5 volts at idle and 4.5 volts at wide-open throttle, but there are many other vehicles that will have some variation of this, such as 1.5 volts at idle and 3.5 volts at wide-open throttle. The important thing to remember is that the ZEX TPS switch will program itself to any rising voltage range.

2. Using the supplied electrical connectors and wire, refer to the wiring diagram for proper routing and electrical connections for the nitrous system (Fig. 3). Always use the existing 15 amp fuse that's already been installed from the original Safe Shot Nitrous System installation. The best positive (+) power source for the nitrous system's solenoids is a direct connection from relay post #5 to the battery's positive (+) post. Do not splice into the factory wire harness, it will not have the ability to supply the current required by the nitrous and fuel solenoids.

3. Finally, you will need to program the TPS Switch. To begin, turn the vehicle's ignition on, but do not start the engine. Turn the nitrous arming switch to the "ON" position. Go to the TPS Switch and locate the push-button. Depress, then release, the push-button. Observe the TPS Switch's operation light, at this point, it should be RED. This RED light informs you that the TPS Switch is in learn mode. Return to the driver's seat and depress the accelerator pedal to the floor, holding it there for ten seconds. Release the accelerator pedal and go back to the TPS Switch and observe the operation light. At this point, the light should be flashing continuously from RED to GREEN to OFF. This is the TPS Switch's way of telling you that it has successfully learned the voltage curve of your engine's throttle position sensor. Go back to the driver's compartment and turn off the arming switch, then turn it back on. Go back to the TPS Switch and observe the operation light, it should be solid GREEN at this point. This informs you that the system is armed and ready to activate at wide-open throttle. Return to the driver's seat and depress and release the accelerator pedal several times. You should hear the solenoids click each time you reach wide-open throttle. At this point, your TPS Switch is fully programmed and ready for use. If you ever transfer your nitrous system to another vehicle, perform this same procedure on the new vehicle to "relearn" the TPS Switch.

## Step 6: Install Fuel Delivery Line

**WARNING!!** EFI fuel systems maintain fuel pressure, even after the vehicle has been shut off.

Fig. 2



TPS Resistor Wire

Provide a source of fuel from the fuel rail or vehicle's fuel line and connect the 3 ft. long, -4 AN fuel feed line to it. For your convenience, an inline fuel tap and a 90 deg. 4AN fitting is supplied with the kit that will make it easy to tap into your vehicle's fuel system. Use whichever combination of these two fittings best suits your application.

### Step 7: Check Fuel and Nitrous Pressure Lines

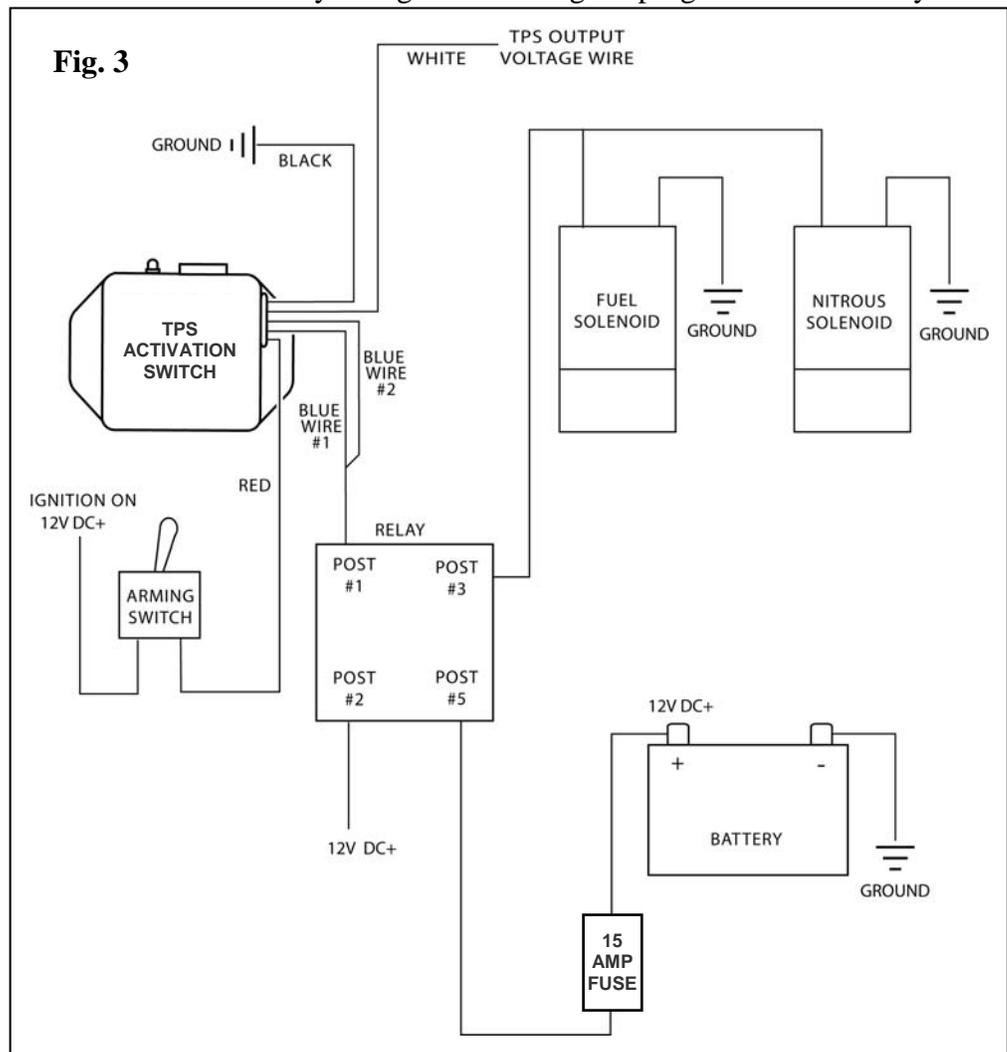
1. Perform a final inspection of all plumbing and electrical connections to ensure that they are correct.
2. Ensure that the nitrous bottle is turned off and the line pressure is relieved.
3. Start the engine and observe all fuel connections for any leaks, fix any leaks before proceeding.
4. Turn off the engine.
5. Open the nitrous bottle valve. Listen carefully for any leaks as your valve is opened. Leaks in the nitrous supply line will be obvious because they will be covered in frost.
6. If everything checks out, close the nitrous bottle and relieve the line pressure.

### Step 8: Check Fuel Quality & Ignition Timing

The last thing to do before enjoying your new Upgrade Kit is to ensure that premium fuel (92 R/M Octane or better) is in the fuel tank and that your ignition timing is programmed correctly. All recommended ignition timing retard amounts, in the Tune-Up Chart, are calculated off of the base, stock ignition table. For engines with optimized spark timing curves, a general rule of thumb is to retard the ignition timing by 2 degrees for every 50 HP worth of nitrous added. If the correct ignition timing program is not used for higher horsepower settings, severe engine damage may occur from detonation.

### Step 9: Enjoy!

After everything has been checked over and properly set-up, turn on the nitrous bottle and enjoy your ZEX™ Safe Shot Upgrade Kit.



## **ZEX™ #82358 Nitrous System Horsepower Selection Chart**

	<b>55 hp</b>	<b>75 hp</b>	<b>100 hp</b>	<b>125 hp</b>	<b>150 hp</b>	<b>175 hp</b>
<b>Nitrous Jet (950psi)</b>	32	40	46	54	67	83
<b>Fuel Jet (40psi)</b>	19	26	30	34	38	43
<b>Ignition Retard 4-6 cyl. (deg.)</b>	0	2	4	5	6	7
<b>Ignition Retard 8 cyl. (deg.)</b>	0	0	2	4	5	6

- **If your engine's computer has already been programmed with an optimized spark curve, add an additional 2 degrees of ignition retard to the above recommended timing retard amounts.**

### **Limited Warranty**

ZEX™ warrants that all of its products are free from defects in material and workmanship, and against excessive wear for a period of (1) one year from the date of purchase. This **limited warranty** shall cover the original purchaser.

**ZEX's obligation under this warranty is limited to the repair or replacement of its product.** To make a warranty claim, the part must be returned within (1) one year of purchase to the address listed below, freight prepaid. Items covered under warranty will be returned to you freight collect.

**It is the responsibility of the installer to ensure that all of the components are correct before installation. We assume no liability for any errors made in tolerances, component selection, or installation.**

**There is absolutely no warranty on the following:**

- Any parts used in racing applications;**
- Any product that has been physically altered, improperly installed or maintained;**
- Any product used in improper applications, abused, or not used in conjunction with the proper parts.**

**There are no implied warranties of merchantability or fitness for a particular purpose.** There are no warranties, which extend beyond the description of the face hereof. ZEX™ will not be responsible for incidental and consequential damages, property damage or personal injury damages to the extent permitted by law. Where required by law, implied warranties or merchantability and fitness are limited for a term of (1) one year from the date of original purchase.

This warranty gives you specific legal rights and you may also have other legal rights, which vary from state to state.

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