

HARD RIDER



Congratulations on purchasing your HardRider Motorcycle Nitrous Oxide Injection System! The best and most affordable way to power. This instruction guide is just a general guide and we take no responsibility for content. Research this and other information will help you get the right install and be protected.

HardRider Motorcycle can provide email support on questions that are not covered in this guide. Phone calls are more difficult because we could be in the middle of an install and we would need more people to deal with thousands of nitrous users at additional cost. Most information is right here in this guide.

Your system is composed of the highest quality components available and will provide trouble-free performance when used correctly. Keep in mind installations vary a lot, with needs, preferences and usage. This information is made to be generic and may discuss things not exactly the way you are using the product. We recommend highly you do your research thoroughly and use these instructions as a general guide.

It is the purchaser's responsibility to follow all installation instruction guidelines and safety procedures supplied with the product(s), and to determine the compatibility of the product with the bike or the equipment the purchaser intends to install the product on. The purchaser must take their own responsibility in using any of our products because they are specialized performance products. If you do not feel comfortable, then hire a professional that has experience working with these kinds of products.

HardRider Motorcycle 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 misunderstanding, inexperience or incompatibility with other manufacturers' products.

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

HardRider Motorcycle nitrous oxide products are produced for tracks that allow nitrous oxide or roadways that allow the same and does not encourage any use of these products that are contrary to the law.

HAZARDS DEFINED

This guide presents instructions that describe the process of installing your HardRider Motorcycle Nitrous Oxide Injection System. These procedures provide a framework for installation and operation of this kit. Within the instructions, you are advised of potential hazards, pitfalls, and problems to avoid.

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 or unarm the system 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 or modify system components. 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.
- 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.

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WHAT IS NITROUS OXIDE?

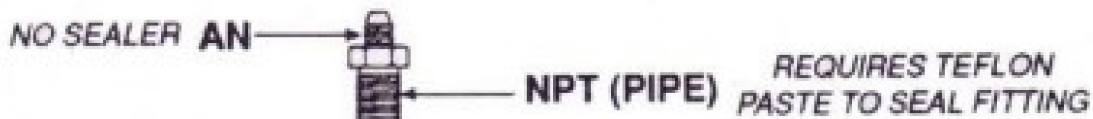
- a cryogenic gas composed of nitrogen and oxygen molecules.
- 36% oxygen by weight.
- non-flammable by itself
- stored as a compressed liquid
- exists in two grades | U.S.P. and Nitrous Plus:

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 Bike applications, Nitrous is 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.
- Tricks electronics into adding additional fuel to make more power.



Do's

- Read all instructions before attempting to install your HardRider Motorcycle 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 specific fittings only.**
- 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, or disarm, 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 nitrous system only at wide-open throttle and at engine speeds above 4000 RPM.
- Use a high-quality fuel ie 93 Octane, Baseline Tuning Suggestions.

Don'ts

- Engage your nitrous system with the engine off. Severe engine damage can occur.
- Modify nitrous system (if you need a non-stock item, email HardRider Motorcycle).
- Over tighten AN type fittings.
- Use Teflon Tape on compression fittings.
- 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.**

General Information

This kit is intended for EFI motorcycle applications. The HardRider Motorcycle kit was designed to work with EFI bikes that need a little extra power. 20 to 40 hp gains are typical for basic kit. The factory sensor in the intake track measures air temperature to make fuel adjustments. It is important that your bike has an AIR TEMP SENSOR if you are not using a Power Commander or getting a dyno ECU tune. The cold nitrous air tricks the computer into thinking that your engine needs more fuel. This extra fuel is then matched up with the extra nitrous in the engine creating the extra power via more air and fuel like liquid supercharging.

Horsepower and torque increases due to these kits will vary with engine displacement, modifications and jet sizes.

Approximate power increase estimates can be made based upon the mass flow 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. Hardrider Motorcycle strongly suggests that an upper limit of about a 40hp increase in power output from your stock engine with 93 Octane pump gas. Exceeding this without knowledge and understanding of AFR and engine limits can result in premature engine failure due to lack of fuel.

There are ways and options around this. 1) as explained is to spray the sensors and trick the system into adding more fuel. 2) using a power commander to add more fuel and 3) a dyno tune which will provide optimum AFR (air fuel ratio).

AFR is the most important aspect in gaining horsepower safely.

Jetting

Kits Nitrous Jet Approximate Power Increase (BHP)

The following are standard gains in horsepower with jets, but this will change if you use twin jets, or 4 jets etc on your motorcycle. See Illustrations in the next two pages for more detailed information on jets. Guides are approximate and vary on bike and install.

Hardrider Motorcycle EFI Bike Kit

Single Jet 28 - 15 HP

Single Jet 34 - 30 HP

Single Jet 36 - 40 HP

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

System Requirements

Clutch

When used correctly, these kits should work with stock internal engine components. It depends on the horsepower output you are using and the way you use the bike. Even riders that are not adding nitrous and push their bike to the extremes regularly will most likely need a performance clutch, of which there are many kinds at many different price options.

To ensure proper performance and engine life, we recommend:

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

Nitrous Horsepower & Jet Size Info

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MPS Racing Dry Nitrous Jetting & Recommendation Chart

For Fuel Injected 4 Cylinder Motorcycles

HP Gain	Nitrous Jet Single Nozzle	Nitrous Jet 4 Nozzles	600cc	750cc	1000cc	1300+cc	Fuel % Increase
4	9		Stock	Stock	Stock	Stock	3%
4.5	10		Stock	Stock	Stock	Stock	3%
6	12		Stock	Stock	Stock	Stock	3%
7	13		Stock	Stock	Stock	Stock	3%
8	14		Stock	Stock	Stock	Stock	3%
8.5	15		Stock	Stock	Stock	Stock	3%
10	16		Stock	Stock	Stock	Stock	3%
11	17		Stock	Stock	Stock	Stock	5%
13	18		Stock	Stock	Stock	Stock	5%
14	19		Stock	Stock	Stock	Stock	5%
15	20		Stock	Stock	Stock	Stock	5%
16		9	Stock	Stock	Stock	Stock	5%
17	21	10	Stock	Stock	Stock	Stock	8%
19	22		Stock	Stock	Stock	Stock	8%
20	23		Stock	Stock	Stock	Stock	8%
22	24		Stock	Stock	Stock	Stock	9%
24	25	12	Stock	Stock	Stock	Stock	9%
26	26		Stock	Stock	Stock	Stock	10%
27		13	Stock	Stock	Stock	Stock	10%
28	27		Stock	Stock	Stock	Stock	10%
30	28		Stock	Stock	Stock	Stock	10%
31		14	Stock	Stock	Stock	Stock	10%
32	29		Stock	Stock	Stock	Stock	10%
34		15	Mod	Mod	Stock	Stock	12%
35	30		Mod	Mod	Stock	Stock	12%
36	31		Mod	Mod	Stock	Stock	12%
39	32		Mod	Mod	Mod	Stock	12%
40		16	Mod	Mod	Mod	Stock	15%
42	33		Mod	Mod	Mod	Stock	15%
44	34	17	Mod	Mod	Mod	Stock	15%
47	35		Mod	Mod	Mod	Stock	15%
50	36		Mod	Mod	Mod	Stock	17%
53		18	Mod	Mod	Mod	Mod	20%
53	37		Mod	Mod	Mod	Mod	20%
54		19	Mod	Mod	Mod	Mod	20%
55	38		Mod	Mod	Mod	Mod	20%
59	39		Mod	Mod	Mod	Mod	21%
61	40	20	Mod	Mod	Mod	Mod	21%
65	41		Mod	Mod	Mod	Mod	22%
68	42	21	Mod	Mod	Mod	Mod	*
71	43		Mod	Mod	Mod	Mod	*
74	44		Mod	Mod	Mod	Mod	*
75		22	Mod	Mod	Mod	Mod	*
77	45		Mod	Mod	Mod	Mod	*
82	46	23	Mod	Mod	Mod	Mod	*
85	47		Mod	Mod	Mod	Mod	*
88	48	24	Mod	Mod	Mod	Mod	*
90			Mod	Mod	Mod	Mod	*
92	49		Mod	Mod	Mod	Mod	*

Nitrous Horsepower & Jet Size Info

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95		25	Mod	Mod	Mod	Mod	*
96	50		Mod	Mod	Mod	Mod	*
105		26	Mod	Mod	Mod	Mod	*
112		27	Mod	Mod	Mod	Mod	*
119		28	Mod	Mod	Mod	Mod	*
129		29	Mod	Mod	Mod	Mod	*
139		30	Mod	Mod	Mod	Mod	*
146		31	Mod	Mod	Mod	Mod	*
156		32	Mod	Mod	Mod	Mod	*
167		33	Mod	Mod	Mod	Mod	*
177		34	Mod	Mod	Mod	Mod	*
187		35	Mod	Mod	Mod	Mod	*
200		36	Mod	Mod	Mod	Mod	*
211		37	Mod	Mod	Mod	Mod	*
221		38	Mod	Mod	Mod	Mod	*
235		39	Mod	Mod	Mod	Mod	*
245		40	Mod	Mod	Mod	Mod	*
258		41	Mod	Mod	Mod	Mod	*
272		42	Mod	Mod	Mod	Mod	*
286		43	Mod	Mod	Mod	Mod	*
296		44	Mod	Mod	Mod	Mod	*
309		45	Mod	Mod	Mod	Mod	*
326		46	Mod	Mod	Mod	Mod	*
340		47	Mod	Mod	Mod	Mod	*
354		48	Mod	Mod	Mod	Mod	*
367		49	Mod	Mod	Mod	Mod	*
384		50	Mod	Mod	Mod	Mod	*

Stock – 93 Pump Gas, Stock Engine, Stock Timing

Mod – Engine Modifications Required (i.e., Pistons, Rods, Valves, Valve Springs)

Horsepower increases as measured at rear wheel

Kit Components

Before beginning the installation of your Hardrider Motorcycle nitrous kit, check the components in your purchase against the following basic kit. However, most purchasers have custom needs and purchase accordingly.

HardRider Motorcycle Harley|Victory Twin Bottle EFI Bike N2O Basic Components

Standard Item Description Quantity

- 1 - Main tubing 10 feet 1 (most of our kits we recommend braided lines)
- 2 - 1/16 NPT Compression tubing Fitting 2
- 3 - 1/8 NPT compression tube Fitting 1
- 4 - T Compression fitting for tubing 1
- 5 - Tubing Fitting Mount (into intake) 2
- 6 - Tie straps 10
- 7 - 1/8 NPT T 1
- 8 - 3AN Nitrous Line with 4AN fitting 2
- 9 - N2O Bottle with high flow valve 1
- 10 - Bottle syphon tube kit 2
- 11 - Nitrous Solenoid 1
- 12 - Flare Jets 3
- 13 - Wire and electrical connectors 1
- 14 - Arming Switch 1
- 15 - Solenoid bracket 1
- 16 - Billet Bottle mounting Bracket 2
- 17 - 1/8 NPT X 4AN blue fitting (on bottle) 2
- 18 - 1/8 NPT NIPPLE 1

NITROUS KITS

Item	Description	Quantity	P/N
1	Main tubing 10 feet	1	
2	1/16" NPT Compression tubing Fitting	2	
3	1/8" NPT compression tube Fitting	1	
4	"T" Compression fitting for tubing	1	
5	Tubing Fitting Mount (into intake)	2	
6	Tie straps	10	
7	1/8" NPT "T"	1	
8	3AN Nitrous Line with 4AN fitting	2	
9	N2O Bottle with high flow valve	1	
10	Bottle syphon tube kit	2	
11	Nitrous Solenoid	1	
12	Flare Jets	3	
13	Wire and electrical connectors	1	
14	Arming Switch	1	
15	Solenoid bracket	1	
16	Billet Bottle mounting Bracket	2	
17	1/8" NPT X 4AN blue fitting (on bottle)	2	
18	1/8" NPT NIPPLE	1	

Kit Installation

Bottle Mounting Instructions

Note: Disconnect the battery ground before beginning installation.

Bikes

Accurate calibration of your Hardrider Motorcycle 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. If you mount it near the engine and the bottle pressure gets to high the solenoid may not open or you could run lean due to, too much nitrous being injected into the engine.

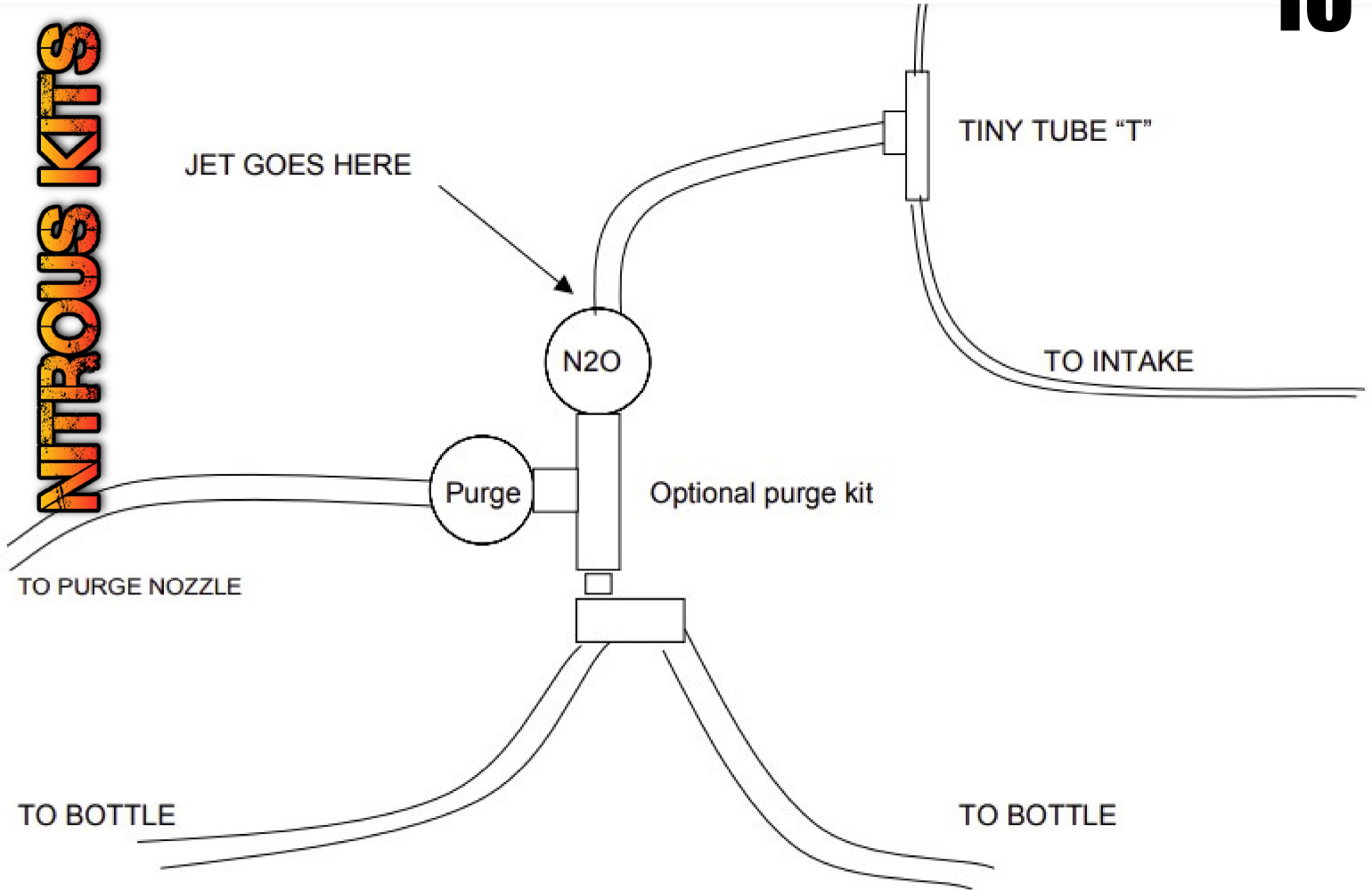
For Bottles without a siphon tube

Mount the bottle with the valve lower than the body of the bottle. The bottle does not contain a siphon tube so in order to get the liquid nitrous out of the bottle you need to keep the valve at the lowest point. Make sure the valve is also pointing to the back of the bike, as the liquid nitrous will be forced to the valve during hard acceleration! This will maximize the performance and use all the nitrous in the bottle. If you mount the bottles as shown below, make sure the bottle is empty, remove the valve and install the copper syphin tube. Have your nitrous source tech, fill, seal and setup your nitrous bottle with or without syphon tube per your install setup.

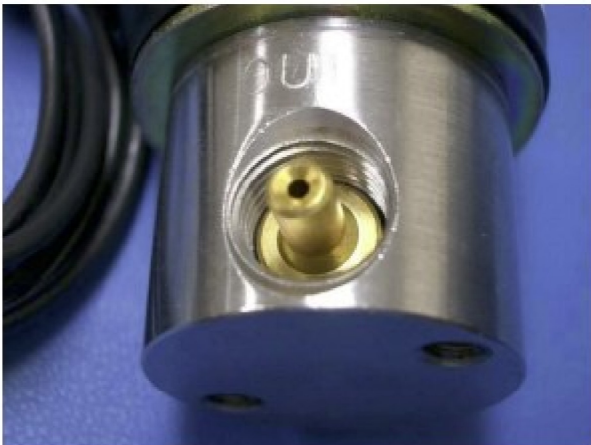
Bottle Installation

After you have determined the location and orientation of the nitrous bottle, use the following procedure to install the bottle: Use the bracket provided to help secure the bottle. If the bracket does not fit or is causing mounting issues then you need to customize the installation. Just make sure the bottle is securely mounted and cannot cause a dangerous condition. Mount the Bracket to the tube Frame. Make sure they clear the tires and moving parts. Make sure the bottles are on the brackets to check fitment location. Do not over tighten the brackets!





- 1) Attach the braided lines to the T fitting to the solenoid.
- 2) If you have the optional purge, screw that assembly into the solenoid first as shown above. See pictures below for reference.



Solenoid mounting with jet installation

First select the jet size you want to use from the chart. Insert the jet into the solenoid out port as shown.

Screw the compression fitting into the solenoid until it hits the jet. Do not over tighten the fitting as it can damage the jet. Just make it snug so a good seal is obtained. Mount the solenoid to the bracket and secure in a cool location.

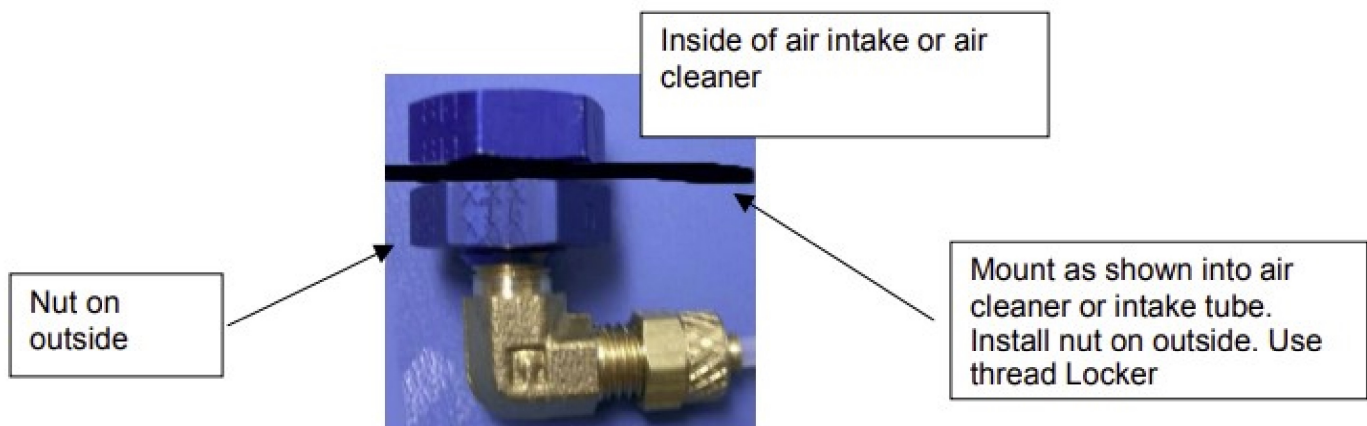
Injection fitting installation into intake

Drill a hole(s) in the air cleaner to secure the tube fitting mounts. Install the tube fitting mounts as shown. The goal is to get the Nitrous Cloud to spray at the air temp sensor and fool the computer. You do not want the Nitrous to miss the air temp sensor as this will cause a lean condition and make less power! The goal is to point one of the nozzles directly at the air temp sensor. Make sure and do not mount the nozzles in a manner so that any nozzle points directly at any of the throttle body inlets thus bypassing the air temp sensor. Screw in the tube fittings as shown into the mounts. On many Harley engines the air temp sensor is mounted in the middle of the intake tube where the intake splits to each cylinder. Spraying the nitrous into the air cleaner or after the throttle body works fine. Warning! Make sure you orientate the fittings so that they point in a common direction and are away from moving parts or exhaust as the tubing will run to these fittings!

Tubing installation

Locate a good place for the lines. Try and make the line as short as possible from the T to the fittings. Install the lines into the compression fittings. Run both lines to the T and install. Do not over tighten the compression fittings. Now run the line from the T to the solenoid and secure to the solenoid.

Warning! Make sure you orientate the fittings so that they point in a common direction away from moving parts or exhaust, as the line will run to these fittings! Keep away from all moving parts.



Electrical System installation

WARNING! Injury may occur from working on a charged electrical system.

Disconnect the battery at the ground cable (if not already done.)

Your factory horn or starter switch can be used to trigger the nitrous system. The Switch is for arming the system. Use the diagrams below to help assist you with the installation.

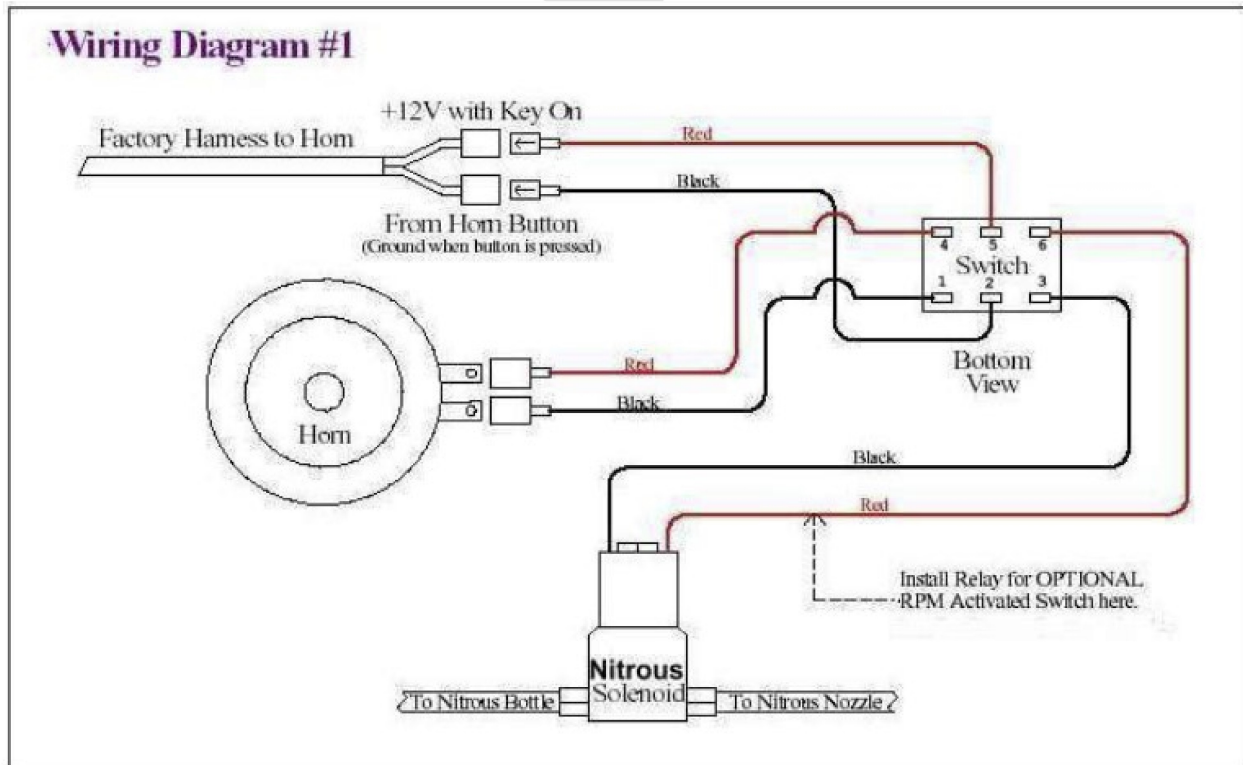
Note: Consult the motorcycle factory manual for proper wiring if it is not covered in the following diagrams.

Some models provide +12v when the horn is activated. When using wiring diagram #2 the solenoid wire polarity will need to be reversed if the horn button provides +12v.

NOTE: SOLENOIDS HAVE TWO BLACK WIRES, IT DOES NOT HAVE POLARITY SO USE ANY WIRE.

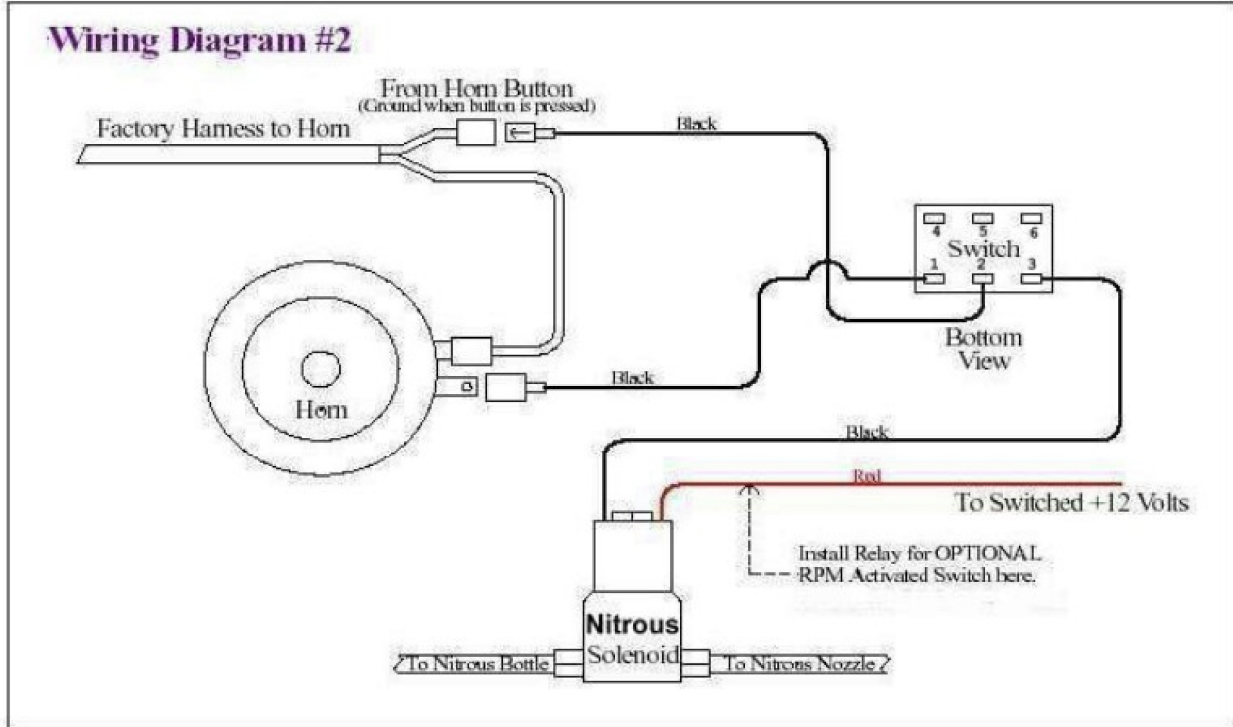
NOTE: Nitrous flowing through the solenoid is needed to keep the coil from melting. Short, one or two second power cycles will not hurt them but more than 5 seconds with no nitrous flowing though it will melt the coil.

NITROUS KITS



NOTE: SOLENOIDS HAVE TWO BLACK WIRES, IT DOES NOT HAVE POLARITY SO USE ANY WIRE!

NOTE: Nitrous flowing through the solenoid is needed to keep the coil from melting. Short, one or two second power cycles will not hurt them but more than 5 seconds with no nitrous flowing though it will melt the coil and void your warranty.



NOTE: SOLENOIDS HAVE TWO BLACK WIRES, IT DOES NOT HAVE POLARITY SO USE ANY WIRE!

NITROUS KITS

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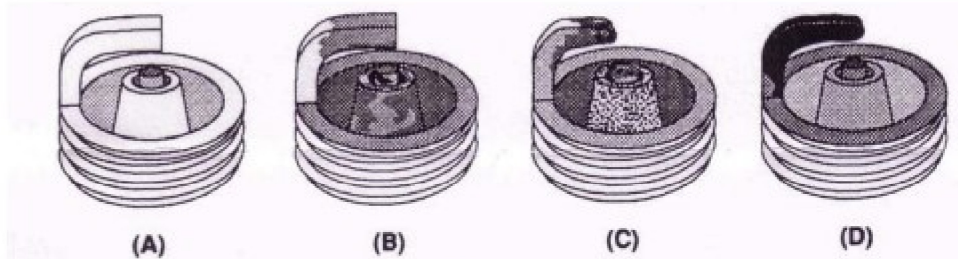
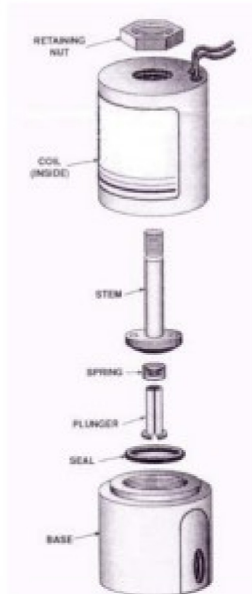


FIG. 11



For optional Purge installation wiring, see instructions with the Purge kit.

Baseline tuning suggestions

Start with the smallest jet. Try it in a controlled situation like on a dyno first then on the track. Use stock timing while using the nitrous. Advancing the timing while using nitrous can lead to detonation and serious engine damage. Use the highest octane you can find, minimum 91 octane. Do not use a higher than 40hp jet without a professional tune. If your bike is equipped with a power commander its recommended that you increase the high rpm fuel curve to add some safety margin. Do not allow the engine to hit the rev limited while on nitrous. An rpm activated switch is great for this. It is not required to use a power commander if you run 30HP of less jetting.

Preparing for operation

Warning: Always wear proper safety gear while racing your bike.

- 1) Hook your battery back up.
- 2) Open the nitrous bottle valve.
- 3) Inspect all the lines and fittings for leaks and adjust as needed.
- 4) **Never use the nitrous in first gear as wheel spin or a wheelie may result.**
- 5) Surging while using the nitrous is due to:
 - A) Nitrous in bottle is low or almost gone.
 - B) The nitrous is not consistently coming out of the bottle due to a poor mounting method.
- 6) Low power: Low on nitrous or the tube compression fittings are over tightened, reducing flow.

Advanced Tuning for Maximum power

Go to a professional shop for tuning if power levels over 30 Horsepower are required.

Reading Spark plugs from a nitrous oxide injected engine (see previous page)

- 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.

Routine Maintenance

Nitrous filters and lines

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

Nitrous Solenoid Plunger

The seals used in our 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 and a loss of power).

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.
- 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.

About Bottle Filling

One of the most overlooked aspect of the nitrous system are a few very important details in working with nitrous gas and filling bottles.

Nitrous users tend to be divided into two classifications: 1) serious drag racers and 2) occasional strip or offroad users. For our purpose here, we will talk about occasional users. The best way to work with nitrous is to purchase one or two new or used bottles in excellent condition and have them filled. Then have smaller bottles for your motorcycle. It will be important on any bottle you purchase to know whether or not the bottle has a syphon tube inside for mother and user bottles.

Using a syphon tube is mostly dependant on where you are placing the bottle on the bike. If the nozzle is up facing the front of the bike you need a syphon tube to pull nitrous from the bottom. If the nozzle is facing down towards the back of the bike, you would remove the syphon tube. You will see on drag bike swingarms sometimes the nozzle is up and sometimes down, so its the same thing, down mean no syphone tube.

The same for mother bottles. If you are filling and the mother bottle has a syphon it the nozzle has to be up and without syphon the nozzle is down. We prefer no-syphon for mother bottles as it is a gravity issue. With no syphon and the nozzle down, the gas has less work to do in getting into the user bottles.

We are of course talking about gravity fills and not pump fills. the majority of occasional users use gravity fills because the pumps are \$1k+. Easier with pump but more expensive.

On all filling you will need a quality weighing scale for your bottles. Each bottle comes with what weight indicators but the best thing to do is weigh your bottle empty, have it zeroed out and then at the 20oz or 2.5lb to the bottle weight.

IMPORTANT: Do NOT overfill your bottles for any reason ever. Better to slightly underfill and the reason for this is over filled bottles in warm weather will over pressurize and when this happens you have to release some of that pressure or get ice on it or get into some shade. A properly filled or slightly filled bottle will not have this problem. So make sure you keep an eye on your gauges, but do not overfill thinking what many might, that you are getting more gas, you are getting a problem.

For gravity feed filling you will see that there are many people that recommend putting the bottle in the freezer, don't. Put it in a fridge or in ice for a while but a freezer dries out the seals and it is not good to fill a frozen bottle. These bottles normally get overfilled. For filling: a mother bottle to user bottle just a single short line from one bottle to the other, use valves on bottles to open and close.

CAUTION: Always wear protective clothing, gloves and eye shield. sometimes even for experienced users, when opening a bottle a small burst of gas can come the wrong way and because of the cold temperature, will severely burn your skin.

General Usage

The second hardest thing in your nitrous install is the positioning and securing of the nitrous bottle(s). For sport bikes with extended swingarms, the obvious place is in the swingarm and that will need a little thought getting it securely located nozzle up or down. For some bikes riders put the bottle in the trunk or saddlebag, by far the easiest place and most out of sight option. Part of this is space and where to put things ie the bottle, solenoids, wiring etc.

Likely the most complex thing is the electrical wiring. Ok for some people it is considerably easier, but for people that have no clue about wiring, it will be a challenge and perhaps having a buddy that understands wiring basics will be a big help. It is really straight forward.

User Setups

You can take your nitrous kit and put on controllers and use with your horn or TPS WOT wide open throttle, and all are good. For moderate hp demands say up to 40-60hp max our favourite install is the simplest, which is using the horn button to spray nitrous into the air box aimed at the air sensor. For AFR have the power commander or dyno tune look after this and the benefit of the dynotune is, it's as exact as you can get.

Keep in mind the TPS WOT wide open throttle is a great product but it is not a precise tool and however your install, you want to make sure that you understand it, it works the way you want and is consistent.

One of the reasons why people like to use the Power Commander is, because its easy to use once you get to understand it and the big benefit is you are in control and can change as needed. With a dyno tune and ECU setup you are locked in. But having said that...for people that do not want to tinker with the power commander, its the way to go.

We have not talked about spyder kits spraying directly into the throttle bodies and yes this is an optimum level II approach. You will not be spraying the sensors to get that benefit (occasional riders with small demands) but you do get more accurate spray into the throttle bodies.

However in spraying the air box we feel that the nitrous hit is less blunt or explosive and we always suggest 2 nozzles, one aimed at the sensor on one side and the other for the other side providing a more balanced nitrous in your air box.

Of course we are talking about Dry Kits here for all EFI (fuel injected engines) with air boxes. Carbureted motorcycles require Wet Kits and have to be tuned manually. Wet kits have an extra solenoid to spray gas as well as nitrous directly into the throttle bodies.

Purge

The purpose of the Purge is to remove all the gaseous nitrous and air from the main feed line near the solenoids. This will eliminate any bogs or hesitations when the Nitrous is activated, as it will hit much harder meaning more power, quicker.

Note: Always wear safety glasses. Before you begin make sure that the bottle valve is closed and the main nitrous line is empty. Liquid nitrous can cause serious burns or frostbite if it sprays on your skin! If your not sure the line is empty, wear a glove and crack the line at the bottle and slowly let the Nitrous leak out of the lines.

1) Disconnect your feed line to your existing nitrous systems solenoid (At the solenoid, make sure bottle is off and no pressure is in the line).

Note: Use Teflon paste on all NPT threads as tape will cause problems if it breaks off and get caught inside solenoids or jets. Do not use paste on AN compression fittings. The HardRider Motorcycle purge system comes partly assembled to show typical installation configuration but it will vary from system to system.

2) The goal is to tap into the nitrous feed line just before your existing systems solenoid. Assemble the 1/8 NPT union into the Nitrous Purge solenoids IN port. Assemble the other end of the 1/8 NPT union to the long flow-through adaptors side hole.

3) Install the plastic purge tube compression fitting into the nitrous purge solenoids OUT port, or braided lines.

4) Attach the female end of the purge assembly onto the blue male fitting located on the inlet port of your nitrous systems solenoid. Make sure you have the Nitrous purge assembly facing the direction you want! Leave room to attach the line.

5) Blow the dust out of the main feed line by cracking the bottle open a tiny bit. Have a friend hold the line with a glove being careful as nitrous can burn.

6) Attach the main feed line to the purge assembly.

7) Install the purge tube as follows: remove the nut on the compression fitting being careful as there may be a brass compression component inside that will be loose!

a. Install the nut over the plastic purge tube.

b. Slide the brass ferrule all the way into the plastic purge tube.

c. Tighten the nut firmly. If the nut is not tight the plastic purge tube may blow off during the purge, as there is a lot of pressure and flow out the plastic purge tube.

8) After everything is checked and tight, slowly open the bottle and allow nitrous to enter the system. Check for leaks at all joints and repair if leaks are found.

9) Route the plastic purge tube to the location of your choice. Make sure it is securely fastened down, as the high pressure during purge will make the plastic purge tube act like a loose fire hose!

Standard Purge

Nitrous Lines TO INTAKE

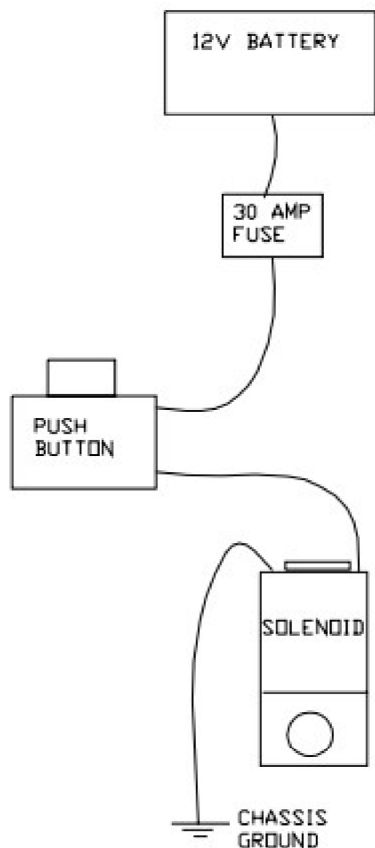
10) Your ready to test your new Purge system, press the purge button and verify that you can see the Nitrous come out in liquid form. Once liquid nitrous comes out the plastic purge tube your ready to rock! Make any adjustment to the plastic purge tube at this time, verify that it is secure and remember, Nitrous burns so watch your skin and eyes.

Note: Most Nitrous systems are designed to operate at 900-950PSI bottle pressure, excessive pressure can damage solenoids or cause dangerous conditions so please keep that pressure in check!!

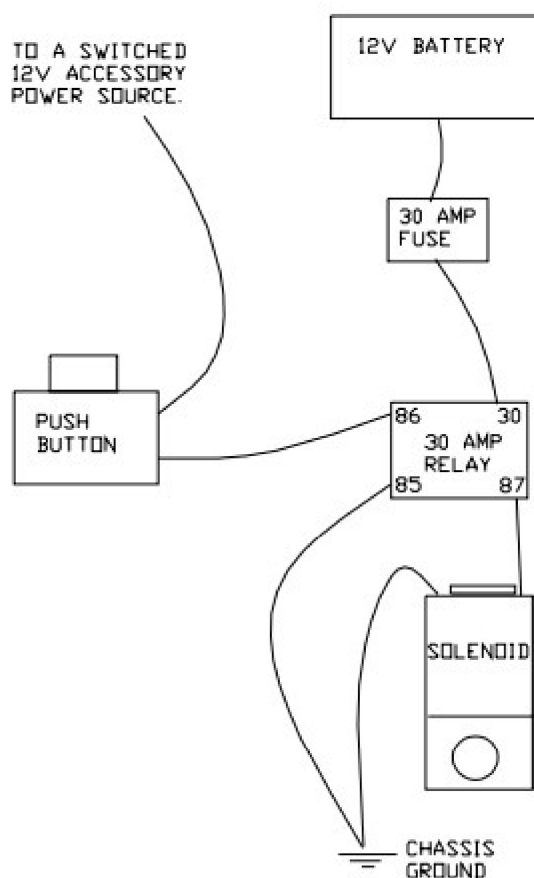
Installation Guidelines for Solenoids Nitrous solenoids need to have Nitrous flowing through them to keep them from burning out. They can draw up to 20amps and will create lots of heat. Do not let them turn on without nitrous flowing through them. And as mentioned previously, do not overfill bottles as this creates increased pressure that is more easily over pressurized in hot summer temperatures.

NITROUS KITS

TYPICAL INSTALLATION



ADVANCED INSTALLATION



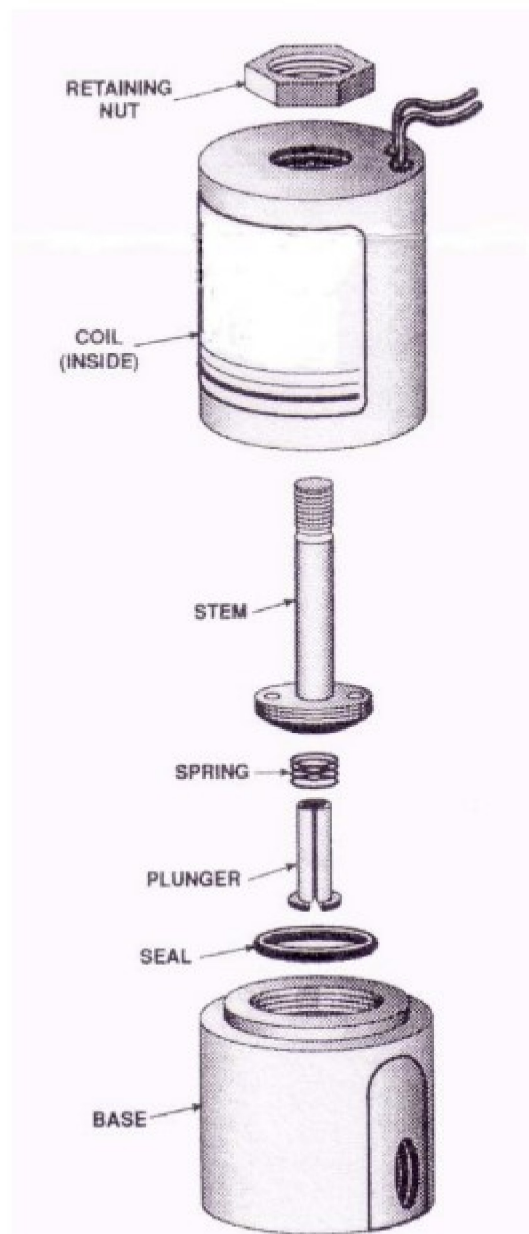
Installation Guidelines for Solenoids

Nitrous solenoids need to have Nitrous flowing through them to keep them from burning out. They can draw up to 20amps and will create lots of heat. Do not let them turn on without nitrous flowing through them for more than 10 seconds or the coils will melt and the fuse will blow. Do not turn them on for more than 30 seconds even if nitrous is flowing to keep them cool. If you cannot follow these guidelines email us and we can tell you how to avoid these issues. Do not mount the solenoids directly to the intake manifold or engine; it must be isolated from the heat. It is recommended you use at least 16 AWG wire! If the wires run a long ways use 14AWG wire! Do not use any toggle switch in line with the solenoid as they can melt due to the high current going through them. Nitrous Burns and Gasoline is flammable so be careful! And yes to your question, All Nitrous solenoids are designed this way because of the extreme nature of the application.

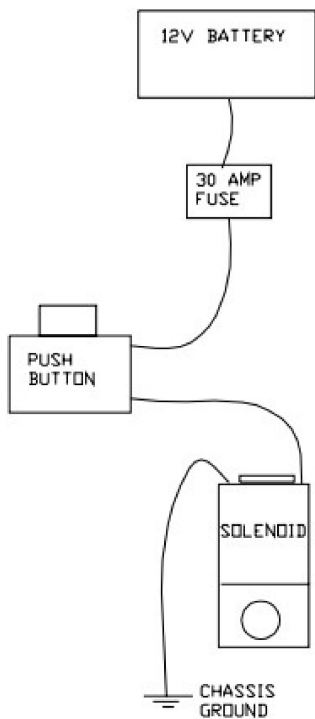
Mount your solenoid in a cool temperature location! Extreme pressure will kill your solenoid seal so do not even open your bottle if it has been sitting in the sun!

Nitrous Solenoid plunger Disassembly and inspection

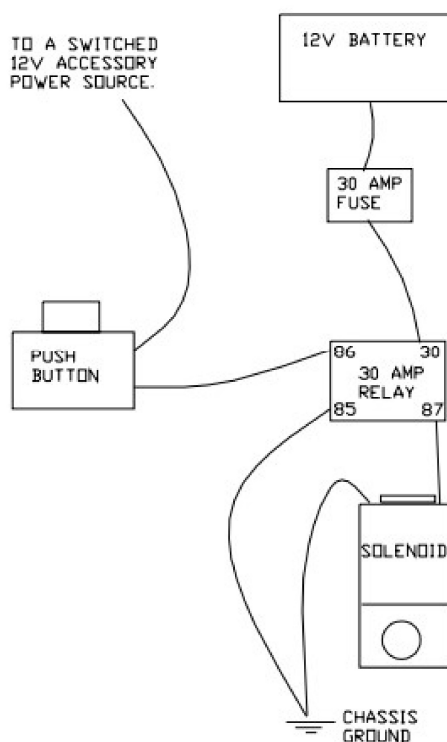
- 1) Close the valve on the nitrous bottle.
- 2) Empty the main nitrous supply line.
- 3) Remove the main nitrous supply line.
- 4) Remove the retaining nut form the nitrous solenoid and remove the coil and housing. Note any shims.
- 5) Unscrew the stem from the nitrous solenoid base. Do this by double 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.



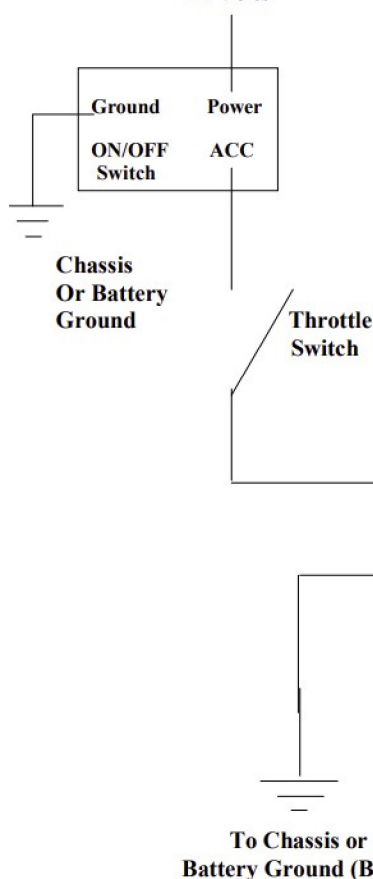
TYPICAL INSTALLATION



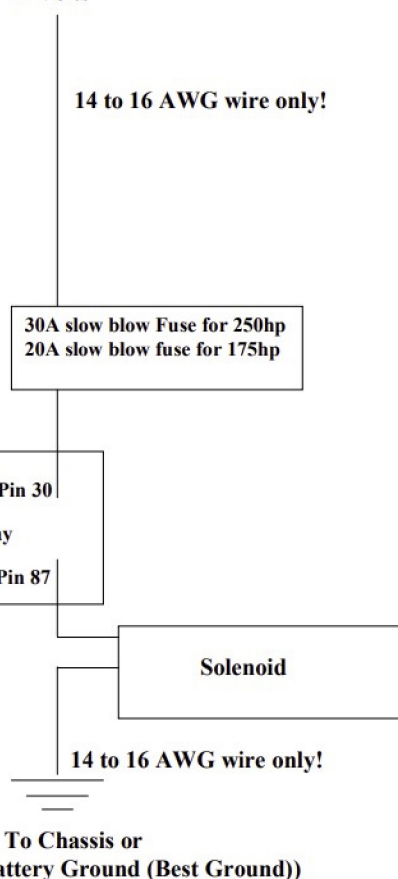
ADVANCED INSTALLATION



Key/Accessory Switched 12 Volts



Battery 12 Volts



TPS WOT INSTALLATION

- 1) Mount the TPS switch in a location so adjustments are simple but away from moving or hot parts! Keep all wires away from ignition wire.
- 2) Make sure the battery is disconnected before you start.
- 3) Attach the Black wire to a solid ground.
- 4) Attach the Red wire to your Arming Switch. 12V power will be applied to this red wire when nitrous is armed.

Note: Its recommended to hook this to a fuse inline or a fused location of 5 amps.

- 5) Attach the Blue wire to your TPS wire signal that has the 0-5V output. Typical output will be about 4.5V at wide-open throttle. Check with your motorcycle manual to find the correct color wire on your TPS switch mounted to your throttle body.
- 6) Red/White wire This wire provides 12 volt power when the TPS is activated, Use it to control a relay is power to turn it on. The other side of the relay should be grounded. Attach this wire to your Nitrous Relay (Do not connect directly to your solenoids as you will damage the TPS switch).
- 7) Black/White wire This wire provides a connection to ground when the TPS is activated, use it to control a relay is ground to turn the relay on. The other side of the relay should go to 12V. Attach this wire to your Nitrous Relay (Do not connect directly to your solenoids as you will damage the TPS switch).

ADJUSTMENTING / PROGRAMMING THE TPS:

- 1) Make sure your solenoids are not hooked up or fuse removed so the solenoids will not open during the adjustment process.
- 2) Start the vehicle and power on the TPS. The led will flash RED to indicate that the TPS switch point is not programmed.
- 3) Press and hold the program button for 3 seconds. The led will go solid red for a few seconds while monitoring your TPS sensor voltage, DO NOT TOUCH THE GAS AT THIS POINT.
- 4) The led will now flash GREEN and RED. DO NOT SHUT OFF THE ENGINE UNTIL DONE WITH PROGRAMMING!
- 5) Drive the vehicle and do a few quick wide open throttle cycles. Caution. This should be performed on a dynamometer or at the race track to avoid any dangerous situations. Stop but DO NOT SHUT THE ENGINE OFF!
- 6) The led should be flashing GREEN letting you know it acquired a good wide open throttle voltage. If the led is flashing RED then it did not program correctly. At any point if the unit gets stuck in a weird mode, simply press and hold the program button down until the led flashes RED. Once the unit is reset try again from the beginning.
- 7) Press and hold the program button until the GREEN led stays on, then release the program button quickly!
- 8) Turn the TPS power off and shut the engine down.
- 9) Connect your solenoids.

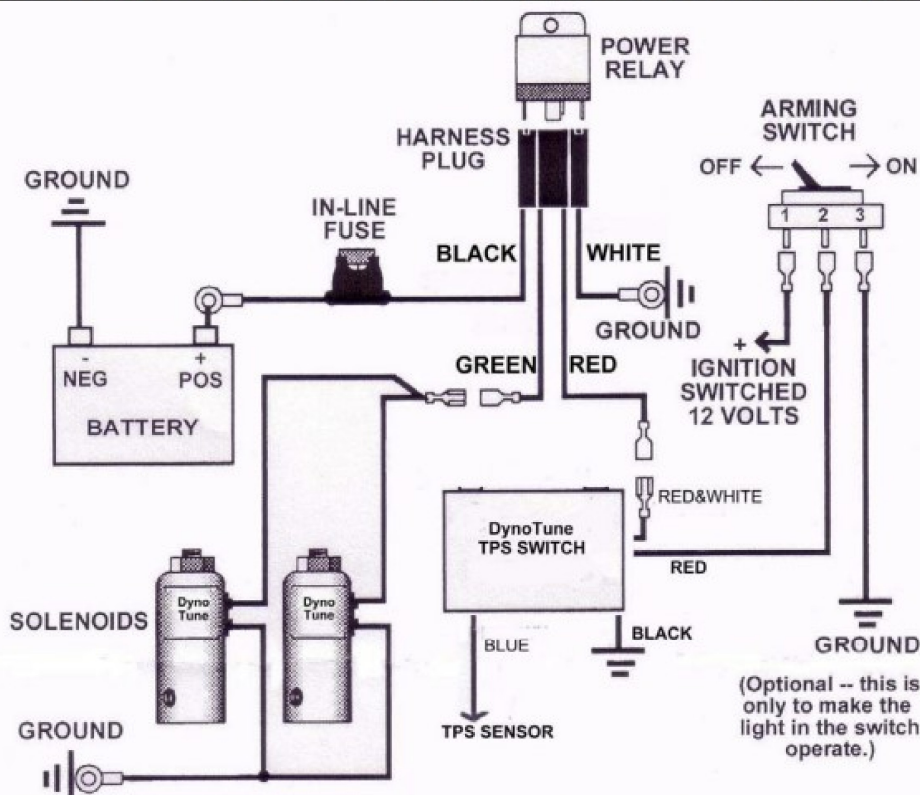
Normal operation after the unit is programmed:

The led should be GREEN when power to TPS switch is on.

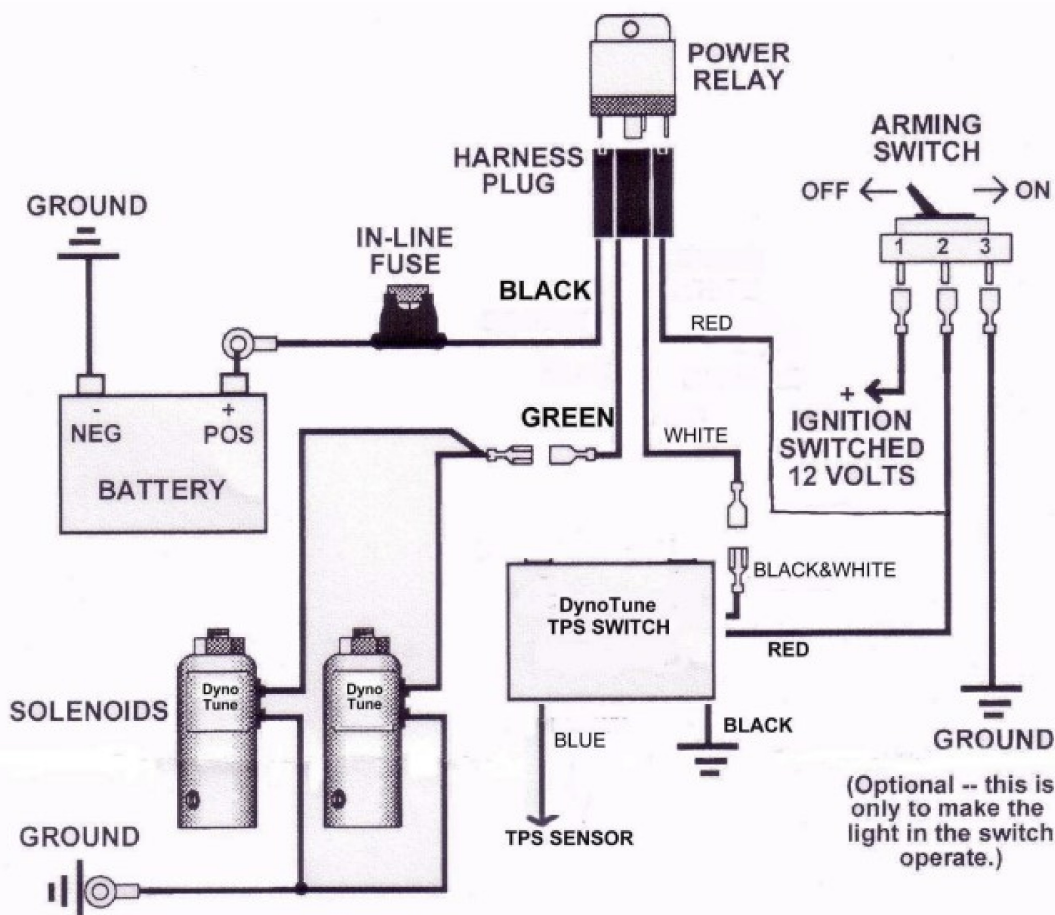
The led should be BLUE when the TPS switch senses 95% throttle opening.

Wiring diagram shows the TPS configured to send 12V to the power relay at WOT

Wiring below shows the TPS configured to send 12V to the power relay at WOT.

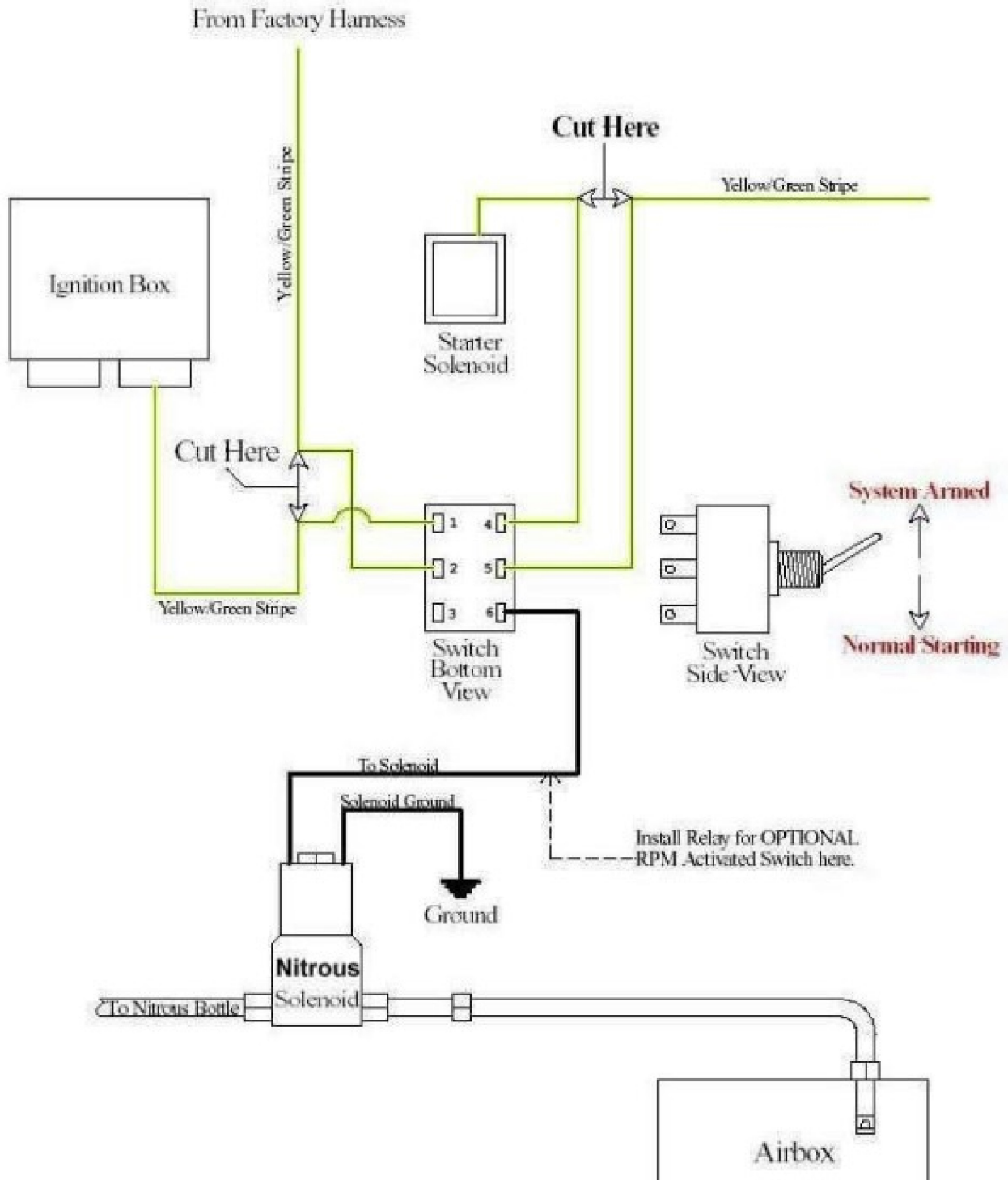


Wiring below shows the TPS configured to ground the white relay wire at WOT.



NITROUS KITS

Wiring Diagram #3, Starter Button Activation for Suzuki Hayabusa



Black Widow Spider Kit

Direct Nitrous to Throttle Bodies - Bypassing Air Box Oxygen Sensor
Requires at Minimum - Power Commander and/or Dyno tune

