

BoonDocker Nitrous System Installation Instructions for Yamaha Raptor ATV

Before you begin, please read the instructions below and check kit contents

Nitrous Kit Contents:

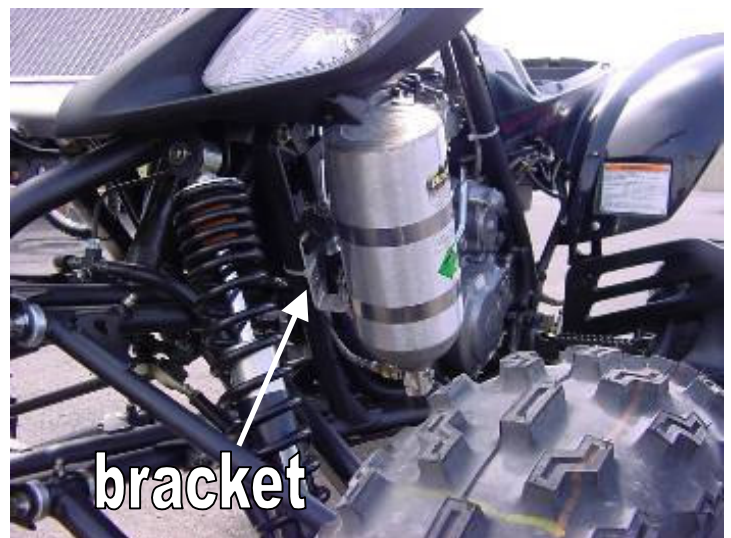
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|---|--|
| 1 – Nitrous Manifold with fittings installed | 1 – 1/8" NPT to 4AN adapter for solenoid |
| 1 – Nitrous Bottle with 4AN fitting | 1 – pushbutton switch |
| 2 – bottle clamps | 1 – mounting clamp for pushbutton switch |
| 1 – bottle bracket | 1 – rectifier |
| 1 – high pressure braided hose (4 feet) | 2 – 1/4" x 1" mounting bolts with washers for Nitrous Manifold |
| 1 – 12" length of 1/8" black nylon hose | 4 – misc. electrical connectors |
| 1 – solenoid | 3 – orifice cup plugs (1 for 1/4" tubing, 2 for 3/16" tubing) |
| 1 – solenoid holding bracket | 1 – 18" length of 1/4" tubing |
| 1 – 1/8" NPT compression fitting for solenoid | 1 – 1/4" x 1/4" x 1/4" barbed Tee |

Note: For the Yamaha Raptor, K&N filter part # **RU-4720** must first be installed. If K&N part # YA-6601 is used, it is likely that the back of the filter will need to be reduced in thickness (to 1/4") so the Nitrous Manifold can be installed.

Part I – Bottle Installation

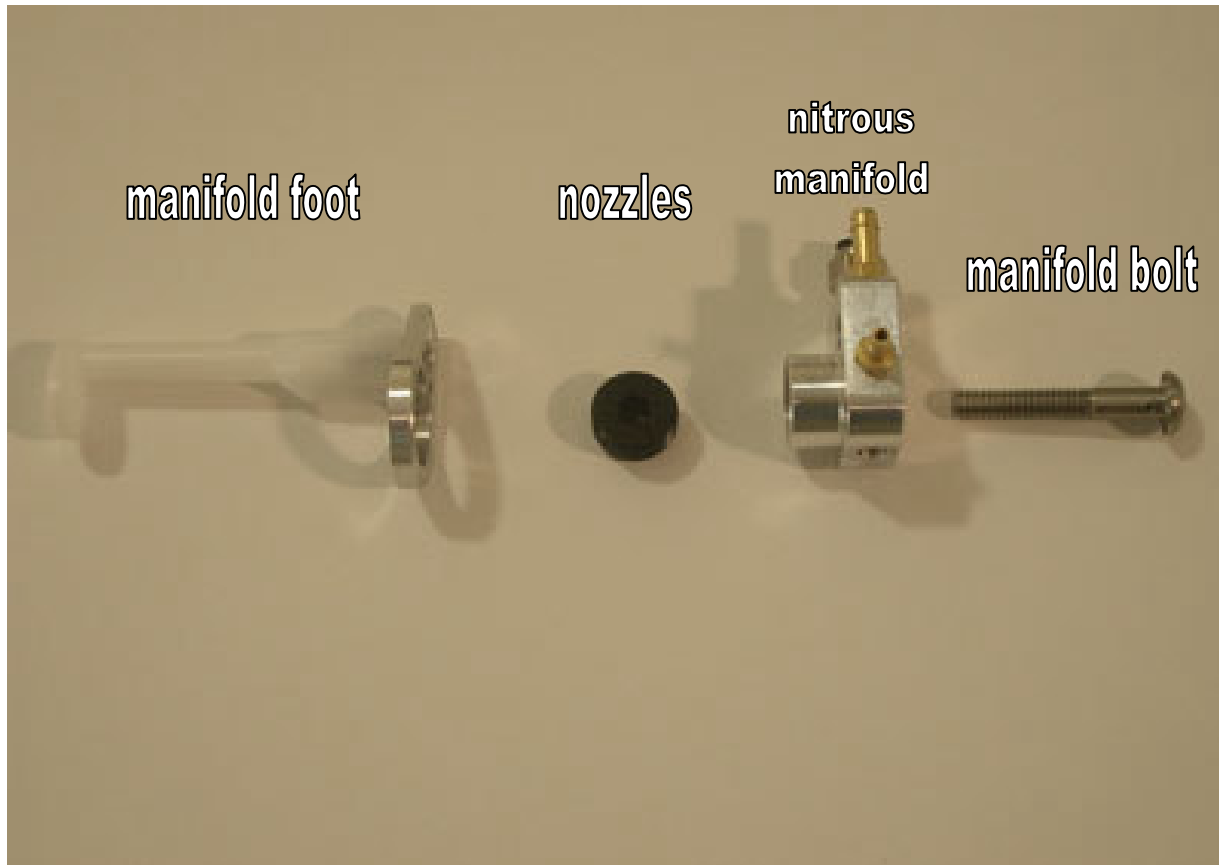
The bottle does not contain a siphon tube so the bottle must be mounted up-side down so the nitrous liquid can be picked up directly by the valve at the bottom of the bottle.

Two holes must be drilled in the frame in order to mount the bracket as shown.



Part II – Nitrous Manifold Installation

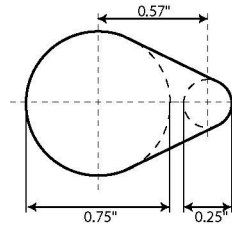
1. The Nitrous Manifold will be installed on the back of the air filter. Use the template below as a guide to drill the three holes using 1/2" and 5/16" drill bits.
2. Disassemble the nitrous manifold by first unscrewing the aluminum bolt. Carefully separate the plastic half from the aluminum body as show in the picture. Be careful not to allow debris inside the plastic piece or the aluminum body while the manifold is disassembled.



3. Install the manifold with the plastic half inside the filter and the aluminum half on the outside. Push the two halves together then thread the aluminum bolt in so the two halves are tight against the filter (be sure the o-rings are pushed on the aluminum body before tightening the bolt). Tighten to 80-90 in-lbs.

Note: It is possible to install the manifold pre-assembled. Insert the bolt through the manifold and start in manifold foot. Leave screw loose. You can insert foot and then rotate the manifold until it lines up with the foot and then tighten the screw.

4. Be sure the manifold body seals against the back of the filter and that there are no air leaks. Use silicon or thick grease if necessary.



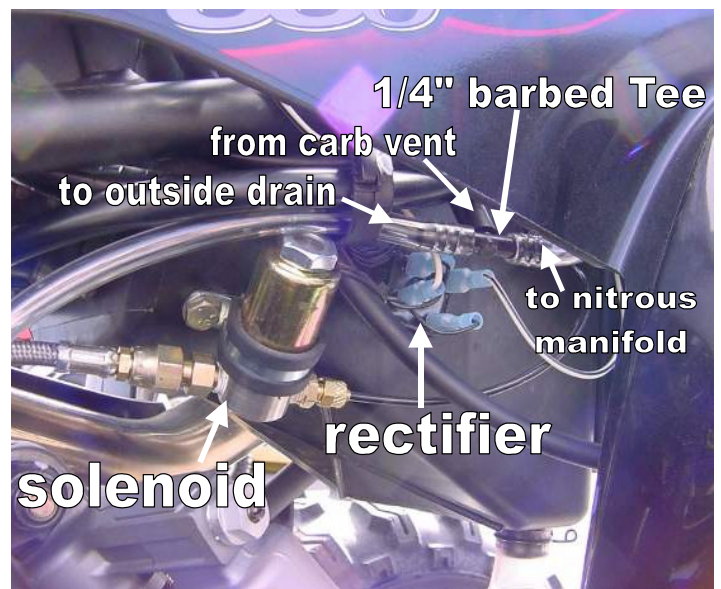
Manifold Cutout Template

Part III – Solenoid / Hose Installation

1. Before installing the following fittings, apply a thread sealant or Teflon tape to the threads – be careful not to contaminate the insides of these fittings.
 - a. Connect the 1/8 NPT - 4AN fitting to the side of the solenoid marked “IN”.
 - b. Connect the brass compression fitting to the side of the solenoid marked “OUT”.



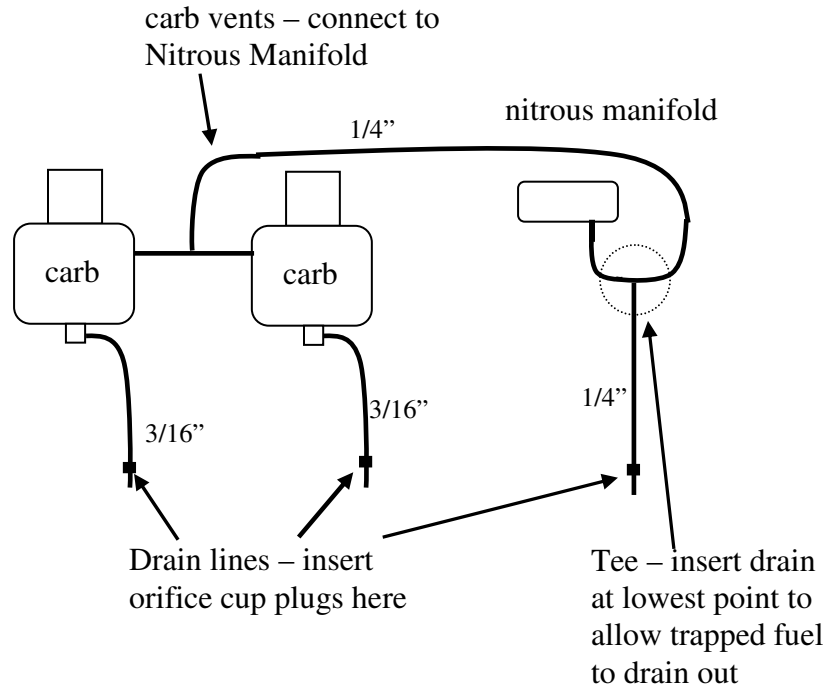
2. Locate the solenoid near the air box as shown in the picture. The 1/8” black nylon hose going to the manifold and the high-pressure hose from the bottle needs to easily reach the solenoid with no sharp bends.
3. Use the padded strap and a self-tapping screw to secure the solenoid on or near the air box.
4. Connect the 1/8” black nylon line from the solenoid brass fitting to the brass fitting on the nitrous manifold by routing it through the 1/8” hole in the air box. Keep this away from hot items. Note – do not over tighten the compression fittings!
5. Connect the high-pressure braided hose from the bottle to the solenoid. Route this hose along the frame and secure with zip-ties.



Part IV - Carb Vent to Nitrous Manifold Installation

The nitrous manifold must be able to pressurize the carb float bowl and the carb vent lines must be able to drain if fuel gets trapped in the lines.

Connect the carb vent lines to the nitrous manifold as shown below. Orifice cup plugs need to be installed in the bottom of all vent lines – the .030" orifice will allow fuel to drain, but retain pressure to the float bowl.



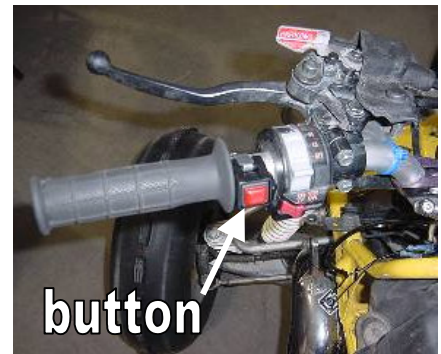
1. Use the 1/4" x 1/4" x 1/4" barbed tee to connect the carburetor vent line to the Nitrous Manifold (route a 1/4" line through the 1/4" hole in the air box). Add a length of 1/4" line to the other end of the tee to allow fuel to drain out the bottom. The tee must be located so the line from the carb and the manifold can all drain down.
2. Insert the orifice cup plugs into the ends of all three vent lines that exit out the bottom. These plugs help retain the pressure that goes to the carburetor float bowl when nitrous is used, and they all have small holes (.030") that allow fuel to drain out.
 - a. Remove the one-way check valve from each of the 3/16" carb drain lines and push a 3/16" orifice cup plug into each line. Reinsert the check-valves.
 - b. Push the 1/4" orifice cup plug into the 1/4" vent drain line.



Part V – Push-Button Installation

A. Button mounted on Handlebar

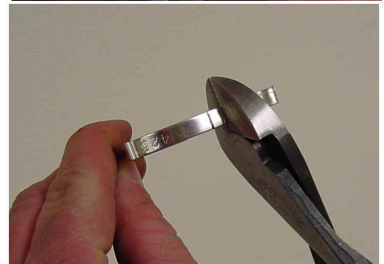
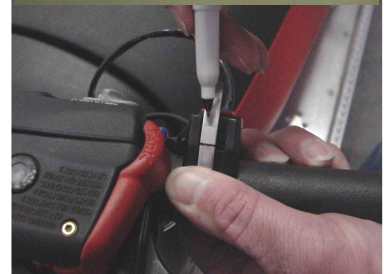
The pushbutton switch can be installed on the handlebar or directly on the left or right handgrip. The picture to the right shows the button mounted on the handlebar with the controls shifted over slightly to allow room.



B. Button mounted on Hand-grip

Shown below are directions for installing the button directly on the left hand-grip.

1. Using pliers, bend a hook into one end of the clamp.
2. Connect the clamp to the button as shown. Fit the hooked part of the clamp to the button so the straight part of the clamp is not connected.
3. Put the button on the left handlebar. With a pen, mark on the clamp where the mounting hole on the button and the clamp meet.
4. Remove the clamp and cut it approximately 1/4" to 3/8" away from the mark. Bend this end with pliers so it is similar to the other hooked end.
5. Put the button and clamp back on the handlebar. Tighten the clamp with side cutters so it is just snug. Do not over tighten.
6. The button should appear as shown in the picture.

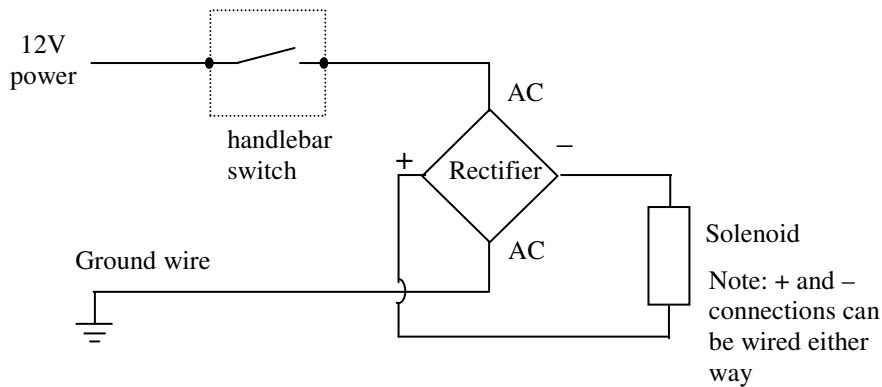


Part VI – Electrical Installation

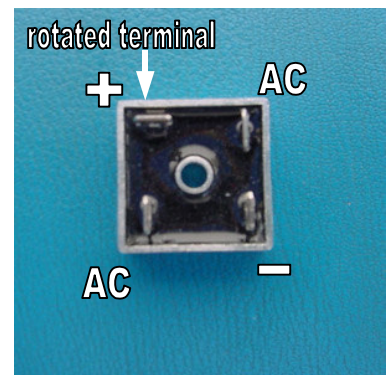
Wire the connections according to the diagram below. Use a 12V supply that is only on when the ignition key is turned on and the kill switch is in the “run” position. We still recommend using the rectifier even if the system has a battery – the diodes in the rectifier absorb the large current spike produced by the solenoid when the button breaks the connection (this prevents a spark). Even if a DC voltage is used, you must still connect the voltage supply to the two AC terminals.

Most rectifiers are labeled on the side “+”, “AC”, “-”, “AC” (see picture). If the rectifier is not labeled, see the picture below.

On the Raptor the brown wire that comes from the wires on the left-hand control is 12V when the key switch is on.



rectifier markings on the side



rectifier terminals

VII. Startup and Tuning Procedures

A. Carb Jetting:

Because the nitrous manifold changes the carb venting from atmosphere to inside the air box, the main jet size may need to be increased. When a large volume of air flows through the air box, a negative pressure may develop inside depending on how restrictive the air box is. This negative pressure can cause the engine to run too lean unless the main jet size is increased. An increase of 5 or 6 sizes richer (for example, go from a 144/146 to 157/160) may be necessary with a stock air box, a modified air box may or may not require jetting changes. Make sure the carb jetting is correct before proceeding with the tuning instructions.

Note: A quick check may be performed as follows:

1. With the nitrous manifold installed, run the ATV and note performance.
2. Temporarily disconnect one of the vent lines from the manifold so the carburetors are vented back to atmosphere.
3. Run the ATV again and note if performance improves.
4. If performance has improved, you will need to increase the main jet size. Replace the main jets with a larger size, reconnect the vent line to the nitrous manifold and retest. Continue increasing the main jet size until performance is the same as when the vent was disconnected from the nitrous manifold.

B. Important Notes before using Nitrous:

1. We strongly recommend using high octane fuel (at least 94 for most stock motors, more for modified motors). We have found that race fuel or Boondocker race fuel concentrate mixed with premium gas can provide the necessary octane.
2. We also recommend using one size colder spark plug (higher number = colder). In some cases decreasing the spark plug gap to around .020" achieves best results.
3. Be sure to use filtered nitrous – always use a filter when filling your bottle!

C. Startup & Leak Test Procedure

The rider must do the following steps every time the bottle is turned on and before doing the fuel adjustment procedure.

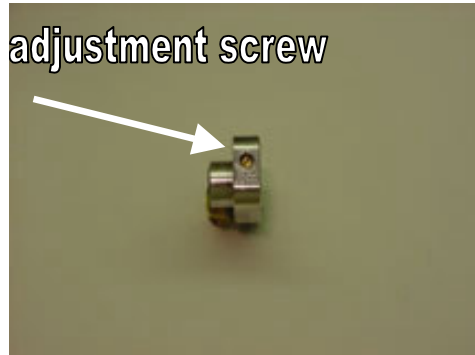
1. With the engine off, open the bottle valve and check for leaks. Shut the bottle valve off. With the valve shut, the hose will still have pressure in it.
2. With pressure in the hose and the bottle valve closed, start the engine. Check to make sure the solenoid does not discharge hose pressure.
3. With the engine running (be ready to shut down engine if necessary), open the bottle valve. Push the nitrous button for about one second or less. Engine rpm should increase if the nitrous system is functioning properly.

D. Nitrous Manifold Fuel Adjustment Procedure

The steps below should be done with a full nitrous bottle that is at the proper operating temperature (70-90deg F). Make sure the engine is at normal operating temperature. Do not exceed 2 seconds of nitrous use until the fuel adjustment is complete and correct.

This adjustment process should only be performed by an experienced tuner. If you are not an experienced tuner, find someone who is. Remember, safety first!

Warning: Only adjust the fuel mixture screws according to the steps below. The factory is fully closed. Begin tuning by turning the adjustment screw out two turns. The adjustment screw is a brass flat blade screw located on the side of the manifold.



1. Run the vehicle in an open area at full throttle and apply nitrous for 1 or 2 seconds. Note engine power and rpms when the button is pushed.
2. Richen the mixture by turning the nitrous manifold adjustment screw in (clockwise) 1/2 turn. Run nitrous for 1 or 2 seconds again and note power and rpm difference. If no power loss is noted, repeat step 2 until a loss is noted. A power loss indicates you are rich enough (be sure!) - go to step 3.
3. To find where the mixture starts to become too lean, turn the nitrous manifold adjustment screw out (counterclockwise) 1/2 turn and note power. A power increase should be noted. Turn nitrous manifold adjustment out 1/2 turn and compare to previous run. If no power increase is noted, go to step 4. If power increase is noted, repeat step 3 until no power increase is noted. Use extreme caution - you can go too lean!
4. For the final setting, turn the nitrous manifold adjustment screw back in (clockwise) 1/2 turn.
5. After this adjustment is made, if the engine does not run perfectly smooth when using nitrous, do not use it! If the exhaust note does not sound clean, the cause is likely detonation which can quickly destroy the engine. Either use higher octane fuel or reduce the engine's compression before using nitrous again.

Part VIII – Warranty, Terms & Conditions

Returned Goods – No merchandise will be accepted without prior approval. A RMA number (Return Merchandise Authorization) provided by Boondocker is required before a return will be accepted. A 20% handling and restocking charge will be applied to returned merchandise. No unauthorized returns will be accepted.

Limited Warranty – Boondocker warrants its product to the original purchaser against workmanship defects for a period of 90 days, commencing from the date of product delivery to the Consumer.

Maximum Liability – The maximum liability of Boondocker in connection with this warranty shall not under any circumstances exceed the price of the product claimed to be defective.