



### #82321 Scion tC Nitrous System

Thank you for choosing ZEX™ products; we are proud to be your manufacturer of choice.



## Kit Parts List

<u>Description</u>	<u>Qty.</u>	<u>Description</u>	<u>Qty.</u>
Nitrous Management Unit	1	.026 N20/ Fuel Jet	1
24" Hose, -3AN, purple	2	.032 N20/ Fuel Jet	1
3' Hose, -4AN, purple	1	.036 N20/ Fuel Jet	1
16' Hose, -4AN, purple	1	.040 N20/ Fuel Jet	1
Nitrous Nozzle	1	Wire Harness w/Arming Switch	1
1/8 NPT Bulkhead Fitting w/ Nut	1	TPS Resistor Wire	1
-4AN, 90 deg., Swivel Fitting	1	Aircraft Switch Cover	1
-4AN to 1/8npt, 90 deg. Fitting	1	Red 18 GA. Wire	10ft.
5/16 Tube to 3/8 Barb Adapter	1	5/16-18 X 1" Bolt for Bottle Brackets	4
10lb. Nitrous Bottle w/Valve	1	5/16 - 18 Nut for Bottle Brackets	4
Bottle Bracket (short)	1	5/16 Flat Washer	4
Bottle Bracket (long)	1	#8 x 1/2, Sheet Metal Screw	6
.019 N20/Fuel Jet	1	1/8-27 NPT Tap	1
.024 N20/ Fuel Jet	1	5/16 Fuel Line Quick Connect, 90 deg.	1
3/8 in. EFI Fuel Hose	1ft.	5/16 Fuel Line Quick Connect, 180 deg.	1
3/8 EFI Hose Clamps	2		

### Why Our Nitrous System Is Better:

- A complete nitrous system, designed specifically for the Scion tC. Everything is included in this kit for a safe, professional and easy installation.
- Adjustable from 55-75 horsepower. Safe enough for stock engines, powerful enough for track use.
- The ZEX nitrous system is activated at wide open throttle with advanced electronics that monitor your throttle position sensor (TPS). Easy and safe activation, especially with the tC's throttle-by-wire system.
- Unique nozzle design has "Active Fuel Control" built in. This feature monitors bottle pressure and when the nitrous system is engaged, it adds or subtracts enrichment fuel so the engine never runs too rich or too lean.

### Read this pre-installation guide before installing kit !!!!!!!

**How the ZEX™ nitrous system works:** The ZEX™ part #82321 nitrous oxide injection system begins with a connection to a supply cylinder containing pressurized liquid nitrous oxide and a connection to the engine's fuel system. These connections go the Nitrous Management Unit, which houses the nitrous and fuel solenoids. These solenoids are normally closed, but are opened when the TPS switch senses that the nitrous system is armed and the engine is at wide-open throttle. Once these solenoids open, the nitrous and fuel are delivered to the nitrous nozzle via flexible delivery lines. The amount of nitrous and fuel that is injected through the nozzle is adjustable by means of metering jets installed in the nozzle itself. These metering jets allow for easy changes 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:** Quite often, factory type, wide-gap, projected nose spark plugs will produce a detonation condition after a few seconds of nitrous use. The solution to the problem is to install spark plugs that have a 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, .030 to .035 in. spark plug gaps typically will 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™ Nitrous System, out of the box, is designed to work as a bolt-on kit 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 severe 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 all of the ignition coils by unplugging the leads going to them. Push the accelerator pedal to wide open throttle and hold it there. 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.

**Do not engage your nitrous system below 2500 rpm:** This ensures that you will not have excessive cylinder pressures that could cause engine damage. The ZEX™ Traction Control Window Switch (part #82085) is ideal for controlling the rpm range that your nitrous system operates in.

**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 manifold while the nitrous system is not being used.

**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 car working well on the smaller shot, you can then safely start to step up your nitrous kit horsepower.

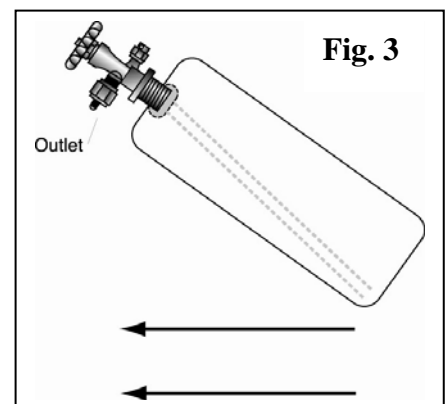
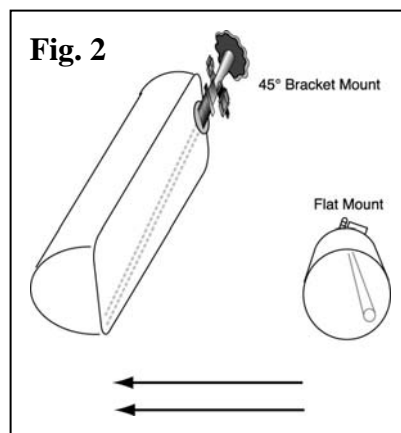
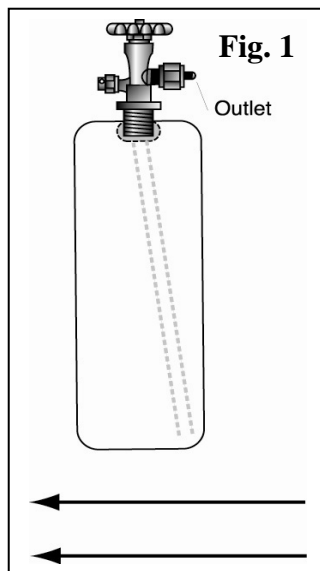
**Make sure your vehicle has an adequate fuel supply:** Nitrous systems put a large demand on your vehicle's fuel system. Make sure you have a large enough fuel pump to handle the demands of your engine, as well as the nitrous system.

**How to adjust power levels:** The ZEX™ Nitrous System is designed for multiple power levels. Metering jets installed in the nitrous nozzle control these power levels. To change the power output, all you need to do is install the appropriate set of jets. The correct combination of jets is listed on the tune-up sheet on the back of this instruction 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:

- 1. Decide where to put everything** - Before you start to install the various components of this kit, you'll have to locate the best locations of each component by trial fitment and careful measurement. First, decide where you want to mount the Nitrous Management Unit. Remember, the stainless steel braided lines that connect the NMU to the nitrous nozzle are 24 inches long. Observe and mark the location on the air inlet tube where you would like to put the nitrous nozzle. The arming switch should be installed in a position convenient to the driver, but not in an area where it could be accidentally armed. Next, decide where and how you'll mount the nitrous supply bottle, check Fig. 1, 2, and 3 for technical restrictions on bottle mounting locations and positions. Finally, have a reputable performance shop fill your nitrous bottle with automotive grade nitrous oxide before you begin. Do not overfill the nitrous bottle.



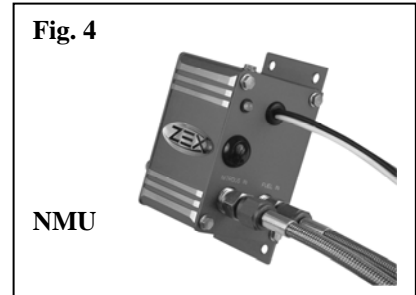
## **2. Mount Nitrous Supply Bottle**

- A.** Mount the nitrous supply bottle with the outlet facing down. You may want to consider installing a safety blow-down tube (ZEX™ Part #82099), as most racetracks require one. Route the tube from the safety pressure relief cap to the exterior of the vehicle, preferably underneath. Doing so will prevent the interior of the car from filling with a cloud of nitrous oxide should the safety pressure relief cap rupture.

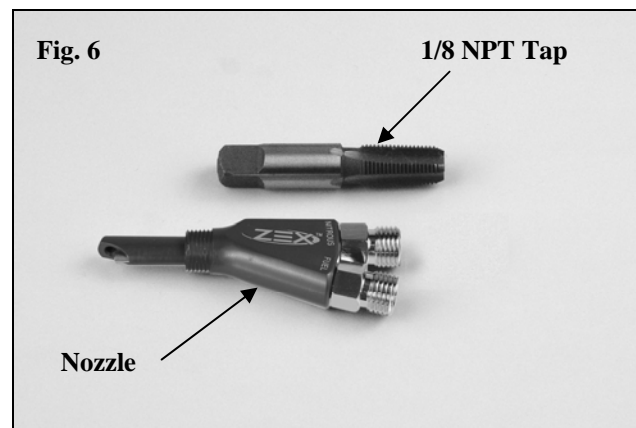
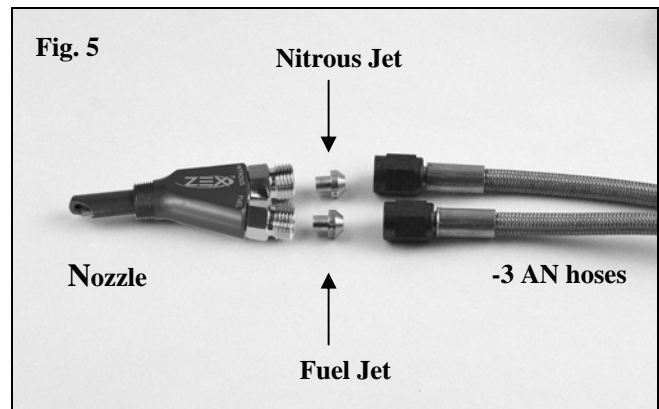
**B.** Index the pickup tube with bottle position. (Refer to fig. 1, 2, and 3). ZEX™ nitrous bottles are designed with the bottom of the siphon tube at the bottom of the bottle towards the outlet. Always mount the bottle so that as your vehicle accelerates, the liquid flows toward the pickup tube.

**3. Mount Nitrous Delivery Line Under the Vehicle** - When routing the nitrous delivery line under the vehicle, try to use the subframe as a conduit. This protects the line and eliminates the need to use clamps. The supplied cable ties work if you can run the line higher in the underbody so that it's safe from road level obstacles. For the pro-race look, you can use steel loom clamps with rubber sheathing to fasten the line to the body.

**4. Mount Nitrous Management Unit** - Keeping in mind the length restrictions of the nitrous nozzle feed lines, mount the Nitrous Management Unit (Fig.4) in a suitable location. It's a pretty rugged piece of equipment that is built to withstand underhood temperatures as well as exposure to weather. Connect the nitrous delivery line to the Nitrous Management Unit.



**5. Install Nitrous Nozzle** - Optimum nozzle placement is 6" to 18" from the throttle body; refer to Fig. 8 for the ideal nozzle location. This range of distance gives the nitrous, fuel and air, the proper time to mix before it enters the intake manifold plenum. Remember, nitrous nozzles must always be mounted after the mass airflow sensor, never before them. After you have determined where to mount the nitrous nozzle (Fig. 6) in the intake, make sure this location won't interfere with other components. After you've found the spot, mark it and remove the air inlet duct from your engine. Drill a 9/16 inch mounting hole and install the bulk head fitting. Be sure to remove any drill shavings since they can severely damage your engine if injected. Install the nitrous nozzle so that the spray is in the direction of airflow. We've also enclosed a tap (Fig. 6) should you desire to mount the nozzle directly into a metal air intake tube. Just drill an 11/32 inch hole where you want to thread-in 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 and the Nitrous Management Unit (Fig.5).



- 6. Wire It** - Once you have mounted the components, you are ready to wire the nitrous system. From the Nitrous Management Unit, find a suitable ground for the black wire and connect to it with the included crimp-on ground ring. Run the red wire through the firewall of the vehicle into the interior, behind the dashboard. Ensure that the red wire passes through a grommeted hole and not a bare metal hole. The wire's insulation may be rubbed off if put through a non-grommeted hole.

#### **IMPORTANT TECH NOTE!**

**Due to the sensitivity of the tC's throttle-by-wire system, the ZEX™ Nitrous Management Unit may cause intermittent check engine lights on some vehicles if the included TPS resistor wire is not used. It is recommended that you install the enclosed white TPS resistor wire between the engine's Throttle Position Sensor (TPS) output wire and the white TPS wire going to the ZEX™ Nitrous Management Unit. Use of this resistor will effectively isolate the Nitrous Management Unit and prevent check engine lights from occurring. This resistor in no way affects the activation or performance of your ZEX™ nitrous system.**

Connect one end of the TPS Resistor Wire to the vehicle's TPS voltage output wire. **On the tC, this is normally the solid BROWN wire on the TPS connector.** The correct TPS wire should have around .5 volts when the throttle blade is closed and around 4.5 volts when the throttle is opened fully. These are not exact voltage numbers, but simply give you an idea of the proper voltage you should be seeing. Connect the other end of the TPS resistor wire to the white wire from the Nitrous Management Unit. After these connections are completed, you need to install the arming switch/wire harness assembly. Find a suitable place in the interior of the vehicle for the arming switch and drill a 1/2 inch (.500) hole. Mount the switch and switch cover through this hole. Take the lead that the fuse assembly is attached to and find a suitable 12 volt accessory source of power under the dash. Use the T-tap electrical connector to splice into the 12 volt accessory wire and plug in the wire harness lead. Take the other lead from the arming switch and connect it to the red wire from the Nitrous Management Unit. As a reference for wire locations, use Fig. 8.

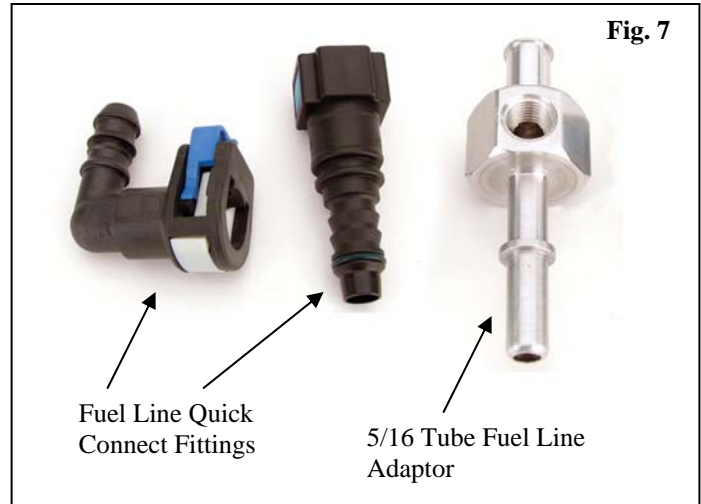
- 7. Program Activation Switch** - Now that you have completed the wiring of your nitrous system, the next step is to program the Activation Switch. To program the Activation Switch, turn the vehicle's ignition on, but do not start the engine. Turn the nitrous arming switch to the "ON" position. Go to the Nitrous Management Unit (NMU) and locate the push-button switch. Depress, then release, the push-button switch. Observe the NMU's Operation LED. At this point, it should be RED. This RED LED informs you that the NMU's Activation Switch is in learn mode. Depress the accelerator pedal to wide-open, hold it there for ten seconds, then release. Go back to the NMU and observe the Operation LED. At this point, the LED should be flashing continuously from RED to GREEN to OFF. This is the NMU'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 system's arming switch, then turn it back on. Go back to the NMU and observe the Operation LED. It should be solid GREEN at this point. This informs you that the system is armed and ready to activate at wide-open throttle. Open and release the throttle several times, you should hear the solenoids click each time you reach wide-open throttle. At this point, your Activation 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 NMU's Activation Switch.

## 8. Install Fuel Delivery Line

**WARNING!! The factory fuel system maintains fuel system pressure, even when the vehicle has been shut off.**

- A. The tC Nitrous System comes with easy to use fuel line quick connect adaptor fittings (Fig. 7).
- B. Disconnect the factory fuel line at the engine's fuel rail. Insert the 5/16 tube to 3/8 barb fuel line adapter into the fuel line. Select either the 90 deg. or straight fuel line quick connect fitting and snap that onto the fuel rail's inlet. We have included both 90 deg and straight fittings as a convenience for you, since some air intake kits may interfere with the straight fitting.



- Simply use what fits your particular installation best.
- C. Cut the included section of EFI fuel hose to length, and using the included fuel injection hose clamps, secure this piece of hose to each end of the fuel fittings. **Note: A light spray of WD-40 can make inserting the barbed ends into the fuel hose much easier**
- D. Install the 90 deg. -4 AN to 1/8npt fitting into the adaptor's threaded hole.
- E. Connect the 3 ft. long, -4AN fuel supply line to the -4 fitting you installed into the Fuel Line Adaptor. Connect the other end of this hose to the Nitrous Management Unit fuel inlet connection.

## 9. Check Fuel and Nitrous Pressure Lines

- A. Perform a final inspection of all plumbing and electrical connections to ensure that they are correct.
- B. Ensure that the nitrous bottle is turned off and the line pressure is relieved.
- C. Start the engine and observe all fuel connections for any leaks. Fix any fuel leaks before proceeding.
- D. Turn off the engine.
- E. 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.
- F. If everything checks out, close the nitrous bottle and relieve the line pressure.

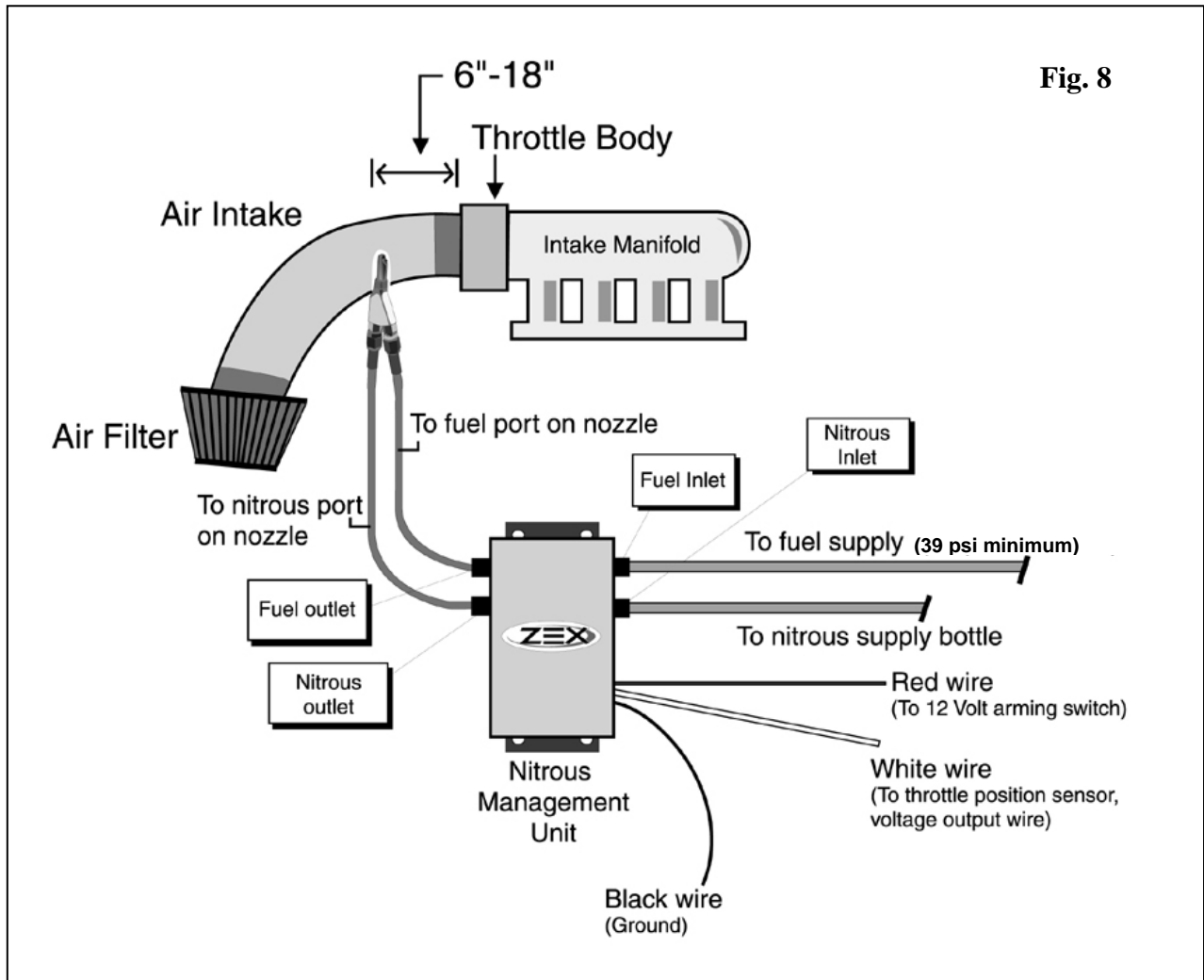
10. **Check Fuel Quality & Ignition Timing** - The last thing to do before enjoying your new nitrous system is to ensure that premium fuel (92 R/M Octane or better) is in the fuel tank, 1-2 step colder heat range spark plugs are installed and your ignition timing is programmed correctly. All recommended ignition timing retard amounts, in the Tune-Up Specs, are calculated off of the base, stock ignition table. It is not recommended to go above 55hp without



an ECU reprogram, designed for nitrous. If the correct ignition timing program is not used for the higher horsepower settings, severe engine damage may occur from detonation.

**ZEX™ #82321 Nitrous System Tune-Up Specs**

	55hp	65hp	75hp
<b>Nitrous Jet (950psi)</b>	32	36	40
<b>Fuel Jet (44psi)</b>	19	24	26
<b>Ignition Retard (deg.)</b>	0	2	4



**Fig. 8**