The 7 SHOOTER

---ANOTHER ROUND FOR THE BUICKS---

1986 thru 1989 GN/T/TTA turbocharged engines

TOOLS REQUIRED:

7/16", 1/2", 9/16" and 1" open end wrenches
Adjustable Crescent wrench
4mm Hex Key wrench
Standard and Phillips screwdrivers
Small pocket screwdriver (for trimpot adjustment)

Remove the two screws securing the original vacuum pod using an 8mm socket. Lift pod off throttle body to remove gasket. Next, carefully pry off vacuum hoses using a flat blade screwdriver (View 1). Extra hoses are included in kit.

Carefully install each hose onto the new vacuum pod, one at a time. Use the new gasket provided in the kit under the pod, being sure to place the gasket correctly, as shown in View 2. Install the two socket head screws into the locations using a 4mm hex key wrench. The gasket should be pushed all the way in the direction shown in View 3, so that the gasket is held against the mounting screws, then snug the screws. Do not overtighten; you are threading into aluminum excessive force can strip the threads. You may wish to use Loctite to secure the screws (not included). Tighten firmly, enough to fully seat the gasket. Double check your work to be sure gasket is positioned properly, to avoid vacuum leaks. NOTE: THIS UNIT IS DESIGNED TO ACCOMMODATE STOCK TO 1/2 INCH PLENUM SPACERS ONLY. HIGHER SPACERS WILL REQUIRE LONGER FUEL INLET HOSE AND WILL CAUSE HOOD CLEARANCE PROBLEMS. BE SURE YOU CHECK FOR PROPER HOOD CLEARANCE BEFORE CLOSING HOOD.

Disconnect negative battery cable. Remove cap from schrader valve adjacent to the fuel pressure regulator. Since you are going to remove the valve stem, place a rag underneath the schrader valve to absorb excess fuel. Carefully unscrew the valve stem in the fitting, using the tool provided as shown in View 4. Any fuel pressure in the rail will push excess fuel out at this point, so have the rag ready.

Thread the 90 degree fitting into the fuel solenoid. Hand tighten the fitting so that it is positioned as shown in View 5. This view shows a general location, but be sure it does not interfere with any other object in this location, particularly the throttle linkage. Install the tee as shown in this view, again hand tighten only. Hand tightening allows for minor adjustment during installation. The access port should be positioned so that an external fuel pressure gage or hose can be readily attached. The port is supplied with a cap to block off this port when not being used. Once the solenoid is positioned, remove the entire assembly from the fuel rail schrader valve and tighten all fittings well, being careful not to overtighten. Use a bench vise to hold the assembly during final tightening. Once all fittings are tight, the male fitting on the solenoid should be pointed straight up towards the top of the engine.

Position the hose assembly onto the male fitting at the solenoid as shown in View 6. Hand tighten only. Now, select a fuel jet and slip into the vacuum pod fitting. Thread the upper (90 degree) hose over the fuel jet and onto the threaded inlet fitting as shown in View 7. Carefully tighten the upper hose fitting as seen in View 7. After the upper hose is located properly and the hose is tight, tighten the lower fitting being careful not to twist the hose during the tightening process. Once the hose is tight on the bottom, the fuel jet is easily removeable and can be changed using only a 1/2 inch wrench.

Install the module as shown in View 8. It is designed to be installed on the heater using a single mounting screw. Locate the factory 2-bar MAP sensor found on the inner passenger side fender

well. Unplug the connector in the MAP sensor, and replace it with the connector from the module. Remember, unpluging the connector disables the factory bar graph boost gage, so you will notice it does not work. Since most cars have had external boost gages added and the factory bar graph gage is limited to 15 PSI, we chose to leave it disabled during the operation of the 7 Shooter.

Position the long harness running from the module behind the engine and along the drivers side below the EGR solenoid. The 7 Shooter control module gets its power from the EGR solenoid connection. Unplug the EGR solenoid connector and insert the plug into the gray connector. Then, plug the black connector into the EGR solenoid. Run the remaining length of harness up to the solenoid valve connector, being careful not to place it in contact with the EGR valve.

If you require the bar graph boost gage to be functional, a second MAP sensor, not included in kit, will be required. The 7 Shooter kit includes a separate vacuum hose and vacuum tee for this purpose. Boost turn-on of the 7 Shooter above 14 PSI requires a 3 bar sensor, as shown in the illustration. Digital dash equipped cars require a MAP sensor since these cars were not equipped with a bar graph gage from the factory.

The small 3 cavity connector is a feature connector designed to plug into the supplied LED harness. Other optional modules can be plugged into this connector; Voltage Enhancer Module, or Secondary Fuel Pump Relay Module. As a general rule, you set the turn-on boost at 10 to 13 PSI and position the LED near your boost gage to see exactly when it is triggered.

IMPORTANT! Before starting engine, remove the upper hose fitting at the vacuum pod and place the fitting in a small can or bottle to drain some fuel from the system. This allows the flushing of contaminants and prevents clogging of fuel jet. To do this, you must build fuel rail pressure by cycling the ignition key or jumpering the fuel pump. NOW is when you can check for fuel leaks between the fuel rail and the solenoid. It is VERY IMPORTANT that there are no leaks and all fittings are tightened correctly. Remember to replace the negative battery cable at this point. To test operation of the unit and to purge the system: With key on but engine not running; remove the MAP connector and jumper the red and green wires; this will activate the solenoid regardless of trimpot setting. You will hear the solenoid click and allow fuel to flow into the container. BE SURE that gasoline flows from this fitting. Caution should be used as fuel is under pressure and quite a bit can flow from the open line. At this point, you can install the desired fuel jet and tighten the fuel line onto the jet. Once all fittings are tightened, module is installed and system has been purged and tested, remove any gasoline-soaked rags and start engine. **ALWAYS CHECK YOUR WORK AFTER INITIAL RUN TO CHECK FOR POSSIBLE FUEL LEAKS.**

TUNING FOR PERFORMANCE

You will need the following:

Accurate boost gage
Fuel pressure gage
Adjustable fuel pressure regulator
Means by which you can control your boost
Means to monitor your oxygen sensor voltage such as a scantool or similar tuning device

You must be sure the car has adequate fuel pump volume and
pressure to prevent the fuel pressure from dropping at upper RPM and/or top of third gear at wide open throttle. Fuel system must be capable of supporting the additional fuel requirements by the installation of the 7 Shooter (have you changed your fuel filter lately?)

Proper 02 voltage will be somewhere between 740mV to 900mV at wide open throttle. High octane

(100+) fuel can run closer to the 740mV range as compared to low (92) octane fuel.

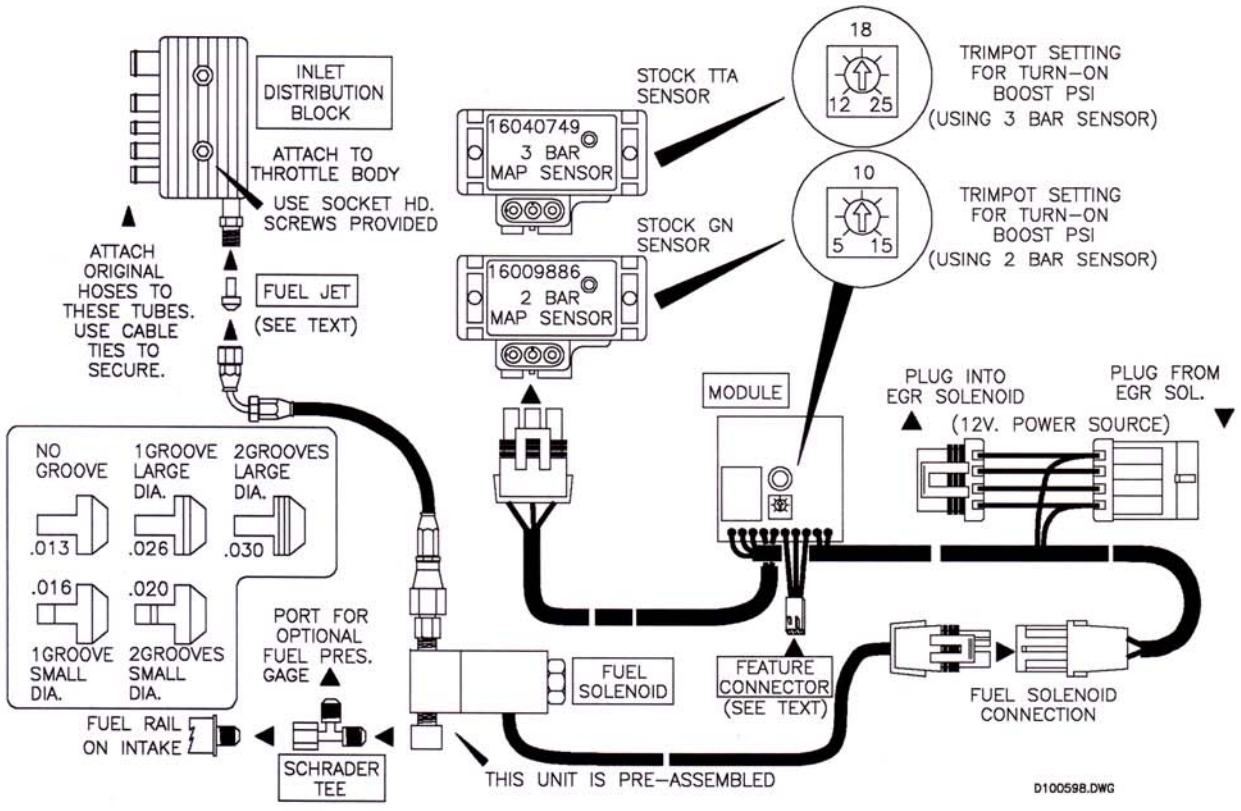
Set your base fuel pressure to 43 PSI (3 bar) with the vacuum line off of the regulator. Install the .020" fuel jet (2 grooves on the small diameter) to start with. Refer to illustration to determine how the jets are marked for size/flow. Larger jets increase fuel flow to richen fueling under boost. The .020 jet is roughly equivalent to a 40lbs/hr of fuel. This should be used as a basis for selection.

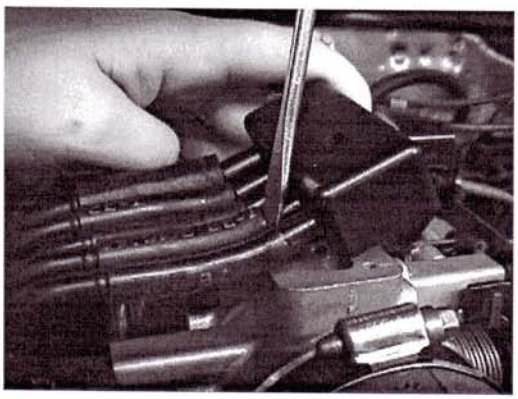
RACE TUNING:

The 7 Shooter should turn on at 2 to 3 lbs. below the maximum desired boost. This will prevent an overly rich condition at the lower end of boost and assure fuel delivery when needed. Launch fuel conditions can be modified by the adjustment of base fuel pressure, i.e. overly rich launch can be compensated for by reducing fuel pressure. The 7 Shooter is intended to enhance fuel at the top of the power curve. Be sure to monitor your ESC counts and knock retard. Running richer is generally safer than running too lean. Also, there is no substitute for octane if maximum horsepower is needed.

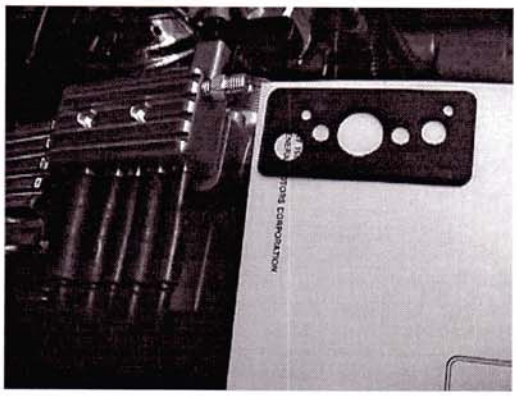
STREET TUNING:

Typically, 92 octane fuel is adequate for 17 lbs. of boost or lower. You will need to see 900mV or so, which will run necessarily rich to prevent detonation and add to the cooling of the combustion chamber. Remember, 92 octane fuel is formulated for emission purposes and fuel economy. Attempting to run leaner will lead to detonation on the turbocharged engine and can cause early head gasket failure (or worse!). The 7 Shooter should be set to turn on between 5 and 15 pounds to compensate for part-throttle lean condition associated with the turbo engine. Boost and ignition timing are key factors in controlling detonation. Persistent detonation may indicate other problems.





VIEW 1



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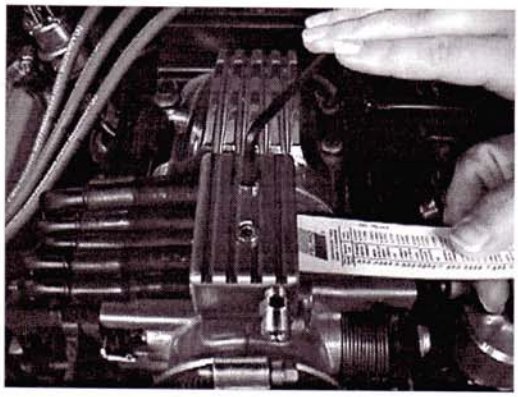
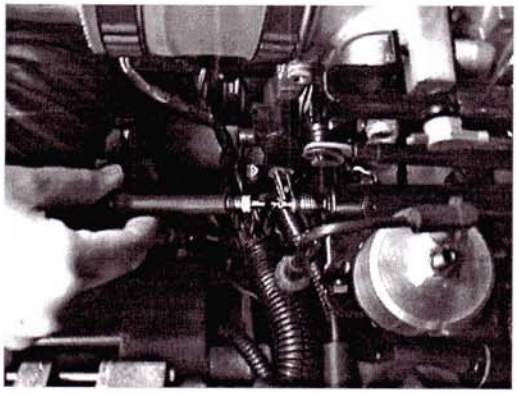
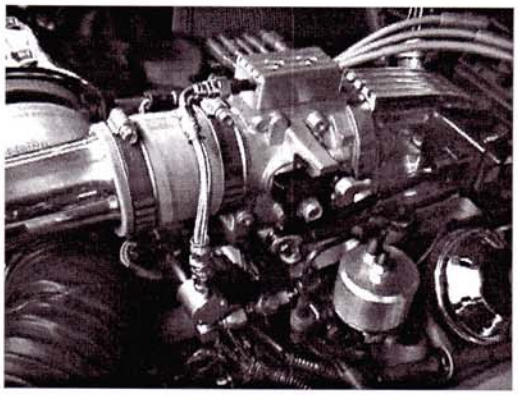


VIEW 3

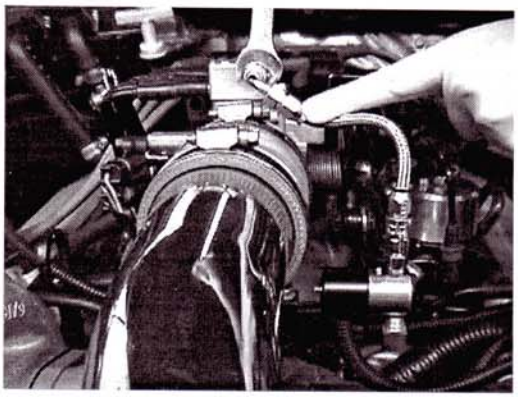


VIEW 4

VIEW 5



VIEW 6



VIEW 7

VIEW 8