

Kit Packing GN PAC kit

Modified Coolant Reservoir	_____
2 Long wire ties	_____
12 feet 7/16 loom	_____
12 Feet shielded cable	_____
1 foot 1/4 loom	_____
PAC wiring	_____
4 red butt connectors. 3 spade terminal. 2 o ring terminal.8 wire ties. 1 turn-one LED. Solder. heat shrink	
Green Wire Assy	_____
30 inch hose -6-6	_____
26 inch hose -4 -4	_____
18 inch hose -4 -4	_____
Methanol Filter	_____
90' 3/8 -6 fitting	_____
90' 3/8 -4 fitting	_____
Power Inj Bulb	_____
Mini OVF + cap	_____
Low Level LED w/grommet	_____
M15 Nozzle w/washers	_____
GN Install document	_____



1986/1987 Turbo Regal Installation Manual

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Tampa FL 33624
813-265-1400**

Introduction:

Thanks you for purchasing our injection system for your Turbo Regal. Please read through this manual to familiarize yourself with the installation procedure. If you should have any questions that this manual does not answer, do not hesitate and contact us for technical support at idoxlr8_70@yahoo.com email or 813-265-1400 phone.

First things first... Tools needed to perform installation

Drill with Uni-Bit(step drill bit), 13 MM wrench for bumper bolts, 10MM socket for coolant tank, 9/32 socket for MAP sensor and dash screws, 7/32 for dash bezel screws, good set of crimpers or soldering iron, good quality electrical tape, good set of wire cutters, and a digital voltmeter to confirm map sensor. A test light helps with troubleshooting.

Liquid.. for kit. The tank, lines, pump, fittings are designed around the use of water, methanol, or water/methanol alcohol mixtures. **Do Not use any lubricants, oil, gasoline, or any petroleum based products. The use of petroleum based products voids any and all warranties with the PUMP. This includes gasoline, oil, lubes.** A list of places that sell methanol can be found at www.turbobuick.com forum alcohol/nitrous/propane section. Typically places that sell race gas sell methanol. Typical methanol used is M1 from VP fuels. Another source is a product called "HEET" in the Yellow bottle. That can be found at most autoparts stores. Careful when purchasing methanol from open containers and cross contamination or fuel or oil additives to the alcohol. Some customers use Denatured alcohol. Which can be found at most hardware stores. It is typically more expensive and a little harsher on the pump. But when you cannot source methanol, it is what it is. If you should have any questions, please contact us for clarification.

Most chips made for the Buicks are designed with using straight methanol. If you want to use 50/50 or other mix, please consult your chip maker as its programming will need to be altered. Clarification. methanol adds fuel, water displaces it. If you add water to the alcohol, you are leaning out the mixture. The water creates more tuning issues as the weather cools down.

Nozzle.. single nozzle kit on straight methanol supports mid-upper 10's on pump gas with iron heads. Typical trap speed 124-126. Twin nozzle kits are needed typically past this performance level. Do not use a twin nozzle kit until performance at this level has been reached. A 12 second car with a twin nozzle kit will develop tuning issues.

86/87 Turbo Buick Install instructions 03/10

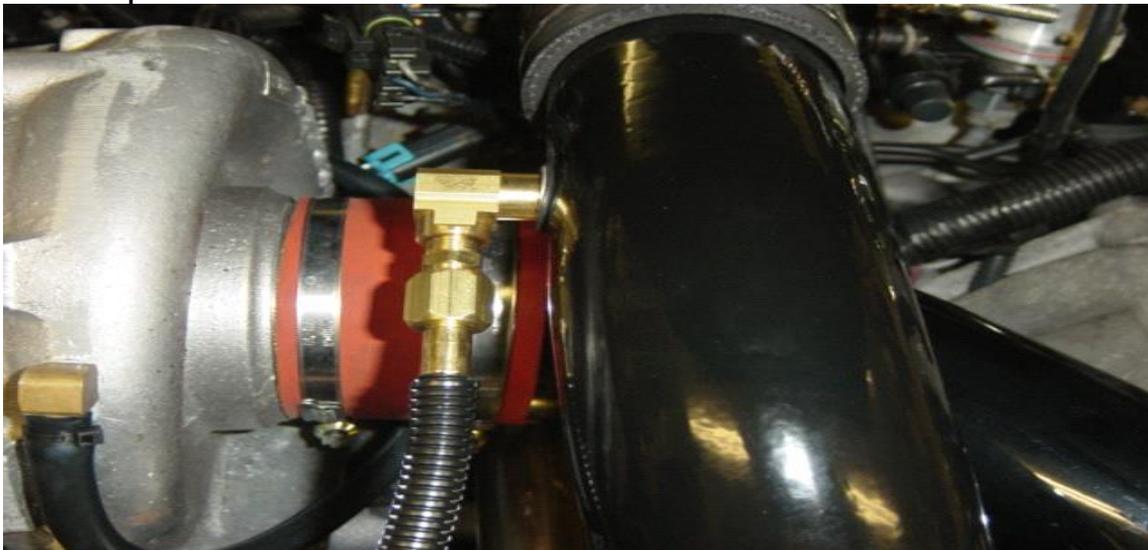
1. Pump mounting

Before mounting the pump, install the larger –6 brass 90 degree fitting on the inlet of the pump. It will be marked with an arrow indicating flow direction. Next install the smaller 90 degree -4 brass fitting on the outlet of the pump. Careful when tightening these fittings as the housing on the pump can break. Rule of thumb, tighten by hand then one full turn. The typical/easy place to install the pump is on the passenger side bumper bracket by removing two of the rubber bumpers on its bracket and removing the nuts on the bumper bracket, placing the pump with its motor pointing up over the two exposed bolts, and then putting the nuts back over the bolts. Next is ground the white wire with O-ring to either one of the bumper bolts, or bracket screw on the back of pump. PUMP CABLE IS TO BE RUN THROUGH THE INNER FENDER AND OUT BY THE BATTERY. Keep the pump cable away from the downpipe as it can burn. TIP.. remove tabs that hold rubber bumpers in place to make the plate flush.



2. Nozzle

Before removing the pipe for drilling, make sure there is ample room where the elbow for the nozzle will be located. At this time mark the pipe to where it will be drilled. Most Buick's the pipe is offset. The nozzle will require a 13/32 diameter hole to be drilled into the up-pipe. A 3/8 drill bit will work with a little drilling in/out. The location of the hole is not critical, although would be recommended it is placed so the nozzle is of higher level than the tank. My typical location is 9 o'clock on the straight section leading to the throttle body, by the turbo. Remember you will need a 7/16 wrench to hold the head of the nozzle. So give yourself ample room to reach the nozzle with a wrench. After drilling the hole, make sure there is no metal shavings left inside the pipe. Clean surface. Mount the nozzle from the inside out WITH THE RUBBER WASHER ON THE INSIDE INSTALLED and attach the 90 degree brass elbow onto it. Depending on the thickness of the pipe, will dictate whether an additional sealing washer will be needed or not on the outside of the pipe. To make the determination look through the hole on the elbow and make sure the tip of the nozzle does not contact the bottom of the fitting. In other words, does not bottom out. Tighten the nozzle so that it is held securely and point the elbow toward the radiator area for hose connection hook-up. Tip is to use red loc-tite on threads. And now install 1/8-4 adapter onto nozzle. So hose can latter be installed. No tape is needed. Sealant like Teflon paste is ok on the adapter. Red loc-tite on nozzle threads.



3. Hoses

The 3 supplied hoses are as follows. There is a 20 inch section of hose that leads from the outlet fitting of the pump to the filter assembly. Note the filter has an arrow engraved on it to note direction of flow. Attach the hose to the pump, and attach its other end to the filter. There is the pressure hose has a -4 fitting on both its end, at this time thread the hose onto the filter assembly, and once tightened, attach the other end to the nozzle. The feed hose goes attached to the pump inlet, it is a 30 inch larger diameter that goes from the tank to the pump inlet. New for Nov 06 Black Nomex hose.



4. Low Level wiring

The sender on the side of the tank will have two wires. One of the wires will go with a supplied o-ring terminal to ground. The other will be a tan colored wire that leads into the interior. The connections to this tan colored wire will come later in the In-car wiring.



5. MAP sensor

The MAP(manifold air pressure) sensor is needed by the system to read boost pressure. It is the sensor that tells the system when to start spraying and how much based on voltage from it. The electrical and mechanical installation to this sensor have to be **SOLID**. As a poor connection, either electrically or mechanically(hose) can lead to the system not functioning. The MAP sensor needed on the Turbo Regal is a 3 bar GM sensor part number 12223861. This sensor will have the capability to read boost pressures up to 29.4 PSI boost. The sensor has 3 wires(gray, green, black). The gray wire supplies power(+5 volts DC) to the sensor, the green wire supplies the signal to the PAC(Progressive Alcohol Controller), the black wire is ground to the sensor.

The map sensor is located on the passenger inner fender. It is held in place by two screws and has a vacuum line attached to it. The following are guidelines as they pertain to its installation. On cars with factory analog dashes and **functioning factory boost gauges**, typically all is done is unplug the 2 bar sensor, and plug the 3 bar sensor in its place. Splice into the center green wire on the plug. Suggestion is to use a small razor blade and strip back insulation, wrap wire and solder. Then re-tape over connection. Again, if the vehicle has a functioning boost/rpm gauge in the dash, you can skip the following wiring instructions.



On vehicles equipped with a GNX , digital dash, or aftermarket gauge cluster.. the gray wire on the plug that feeds the 5volt supply to the MAP sensor will need to be supplied to the sensor. As will the ground. A typical source for 5 volts will be the top wire of the TPS switch next to the throttle body. Basically run a wire from that top wire(gray) to the terminal labeled "C"(gray wire) on the MAP sensor. Terminal "A"(black wire) is ground. Terminal "B" is signal(green). To confirm the sensor has been wired correctly, turn the ignition on, and measure the green center wire(**with sensor plugged in**). It should read approx 1.6 volts dc with the engine off. If this checks ok, this portion is done. At this point I typically attach the included green wire to the center leg of the MAP sensor. The simple solution is one inch away from the sensor, using a single edge blade or knife, pull back the insulation, wrap the green wire on the green MAP sensor wire, and solder it together making a permanent connection. Tape over using quality electrical tape. This is used to send signal to the PAC controller. The green wire can also be accessed behind the passenger dash, although its location will have to be sought. I find it simple to access it under the hood.

On vehicles equipped with an aftermarket gauge cluster, the other way of supplying 5v to the gray wire is doing so behind the dash. There is a multipin connector by the ECM. The gray/green/black wires will be on it. Simply run a wire from the TPS gray wire on ECM to the gray wire on the multi pin. Terminal C14 is the 5v TPS 5v ref on the 32 pin(longer) connector. I recommend soldering these connections. **Do Not Use scotchlok type connector. If you lose 5v to the MAP sensor, the alcohol system will stop functioning.** Ground is just as important. I use the bolt that holds the dash up for ground.

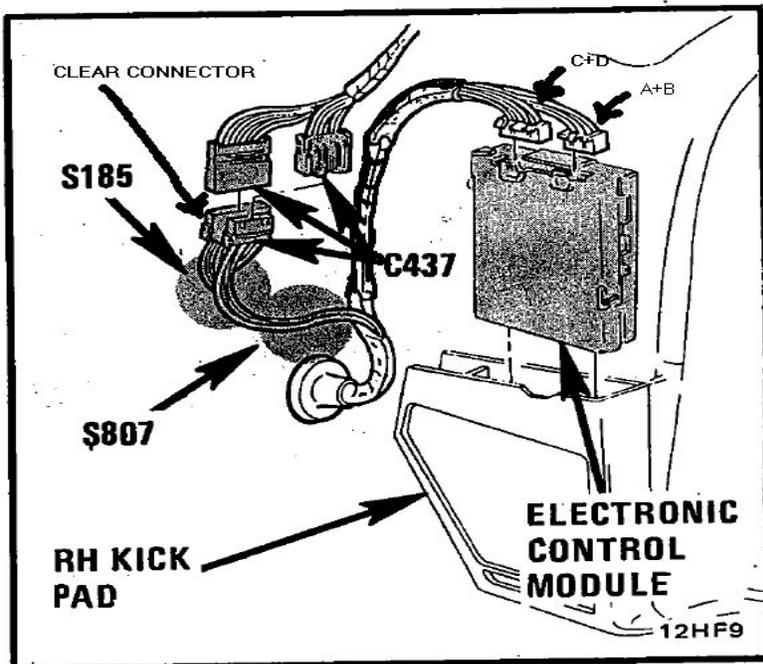


Figure C- Behind RH Side Of VIN 7 I/P

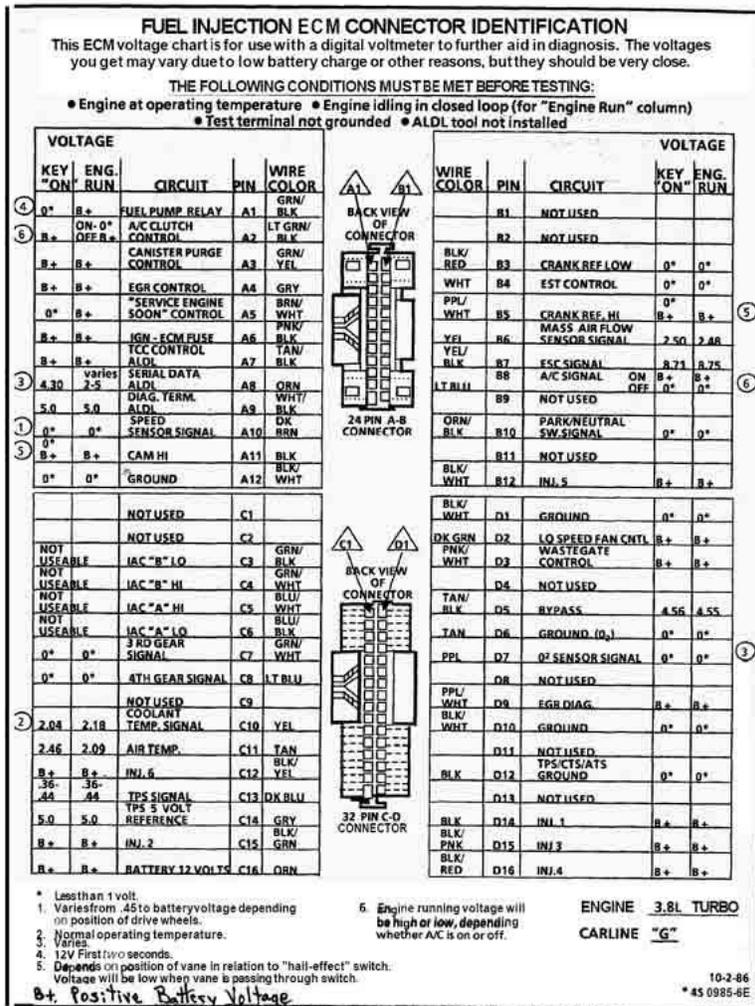


Figure A3-2d - ECM Connector Terminal End View - 3.8L Turbo "G" Series

NOTE>>> The 3 bar MAP is my #1 question. Again.. if your car has a functioning LED boost gauge.. the above extra wiring is not needed. If you don't have +5 volts on gray wire.. then the above diagrams should help you wire that. The sensor will work the same whether power comes from the TPS wire at the ECM or at the TPS sensor..

If you have an aftermarket ECU like a FAST, Accell Gen 7, BS3, etc.. all you do is splice into center pin and you are done. The ECU will already power the 3 bar.

Bottom line... Ignition ON.. green wire reads 1.6 volts dc.

TIP.. make sure hose from intake to 3 bar has no splices into it. And zip ties hose on 3 bar and on intake connection. Blowing hose off the MAP= no system. This goes as well for the hose to your fuel pressure regulator.

6. Under-hood wiring

My install tip on the under hood wiring that's been done, is get the green and tan wires and spiral them using a cordless drill. The reason to spiral them is it keeps them from fraying and makes them easier to install into the supplied wire loom. At this point use the supplied loom and slide it over the pump wire and insert the green/tan wire into the loom. Dress the wiring behind the coil pack area and feed into the car through the rubber grommet on the firewall/ I use a small section of metal coat hanger attached to the wire, and assist with feeding it through the grommet. At this point the installation as it pertains to under the hood is finalized. Dress the loom, make sure its routed neatly and away from windshield wiper arms, protruding bolts, etc. Cut the loom to the correct length, and get a quick visual as to the routing. **TIP>>> Run pump cable through passenger inner fender and behind overflow tank. Keep pump cable away from Downpipe as that will burn cable.**

Now maybe a good time to take a break, wash hands, the easy part begins.

7. Mini Overflow tank

Typical location is in front of battery. Supplied rubber hose can be used for this.





8. In-Car wiring

This is just guidelines from numerous installations I have done. The sky is the limit on creativity, and this should only be used as reference for what I have done, has been easy, and has worked.

The first thing I always do is visually place where the location of the "turn-on" LED will be located. Typically this will be near your boost gauge. The low level (alky tank) LED will typically go in the "low fuel" slot of the instrument cluster. The power injection bulb will go in the "power injection" slot of the instrument cluster. Once this visual has been determined, next I remove the bezel by unsnapping it carefully. Bringing down the tilt column to assists with this. And be careful, its plastic. Once the bezel is off, I then remove the small panel under the steering column with the AC duct on it. As well the panel with the Jute padding if the car is so equipped. Once these panels are removed, next I remove the little bezels to the left and right of the instrument cluster. These are held in by four 7/32 chrome headed screws. And there will be a small paper like gasket on them as well. The low level LED will have a rubber grommet and feature a red and tan colored wire that are spiraled. Insert the wire through the bottom left slot of the instrument cluster where the bezel reads "Low Fuel" and using a small screwdriver pop the rubber grommet into place. On the other side of

the bezel, there will be a slot under the check engine bulb labeled "Power Injection". Insert the glass bulb with the red/black wires through the holes securing it with the rubber grommet. Re-install the bezels back onto the cluster.

At this point, install the turn-on LED by the boost gauge by drilling a ¼ inch hole for the LED and running those wires to the bottom of the dash. Some disassembly may be required to do so.

To recap, at this point there should be a orange/brown wire from the turn-on led hanging under the dash. A red/tan wire from the low level LED, a red/black wire from the power injection bulb, a green wire from the MAP sensor, a tan wire from the low level sender, and the pump shielded wire.

Now come the connections of these wires.

I typically on the Buicks use the ground screw that's located above the hood release handle. It will have a 10mm head and be of course threads/long. The black wire with blue O-ring from the PAC will go attached to this point.

The red wire with spade terminal coming from the PAC will go to a switched ignition source. Typically I will use one of the free IGN terminals on the fuse box to supply it power. And also attach a black small wire tie to assure the red wire unto factory wiring so it doesn't come off.

Next is attach the **twisted orange/brown from the turn-on LED to the twisted orange/brown wire coming from the PAC 6 pin connector.**

Attach the green wire from the MAP to the green wire on the PAC 6 pin connector. The Violet/Gray wire leave alone until latter.

The **TAN wire from the low level LED to the TAN wire coming from under the hood.**

And finally come the pump connections. Cut the wire to length and strip approximately 3-4 inches of insulation from the wire. Remove foil, and

attach the thin bare silver wire to the white terminal using supplied male spade connector. Then strip about 1/2 inch of insulation on the red and black wires that lead to the pump. Do the same to the power injection bulb red/black wires. **Now wrap the two red wires together and insert them into the supplied spade connector. Use a quality set of crimpers. Attach to the Red female terminal. You can use the red wire on the 6 pin connector to supply power to the red wire from the low level LED.**

Then get the two black wires(pump black and power injection black) twist them together and install to the supplied spade terminal. Crimp them and attach to the black terminal. Refer to the next diagrams for crimping of terminals.

PAC terminal wiring instructions

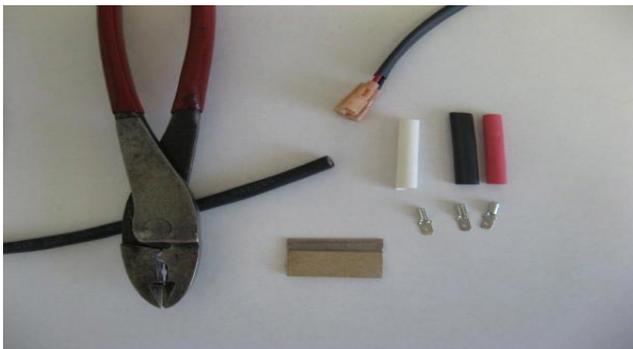
The following pictures show how to connect the pump cable wiring to the PAC controller.

Tools needed

1)Heavy duty set of crimpers(available through Home Depot, NAPA, Sears, Klein, Blue-Point, etc.) Do Not Use Cheap made in China crimpers....

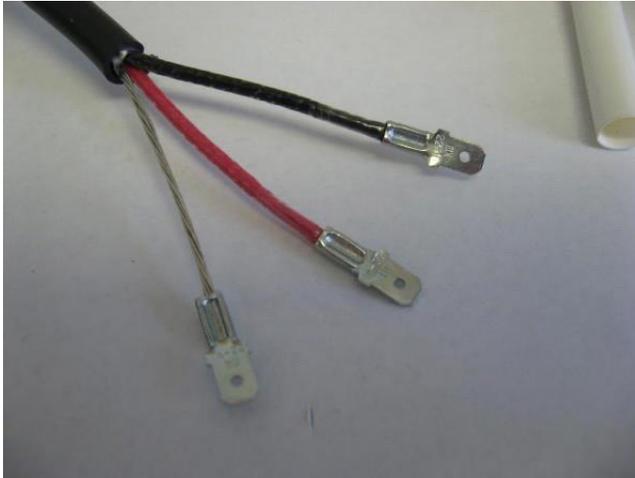
2)Razor blade

3)Heat gun or lighter



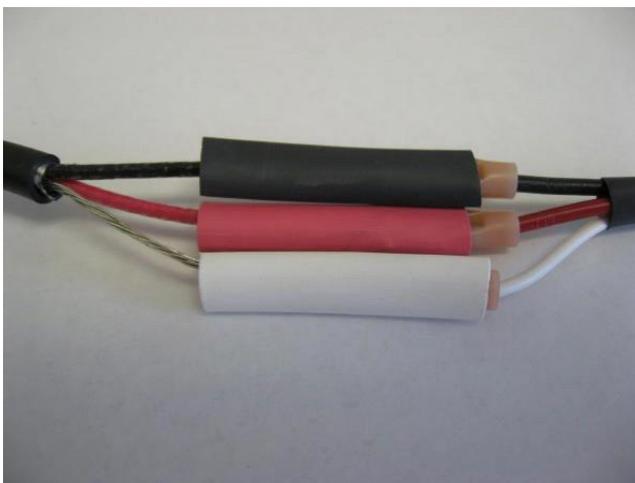
Step 1

Strip insulation from end of pump cable and separate wires. Note there are three wires. Red, Black, bare wire. Strip insulation Red and black wires. About ¼ inch is fine. And use the small supplied Male spade terminals. Crimp the terminals from the bottom as shown. Do not crimp on the slit as this opens the terminal.



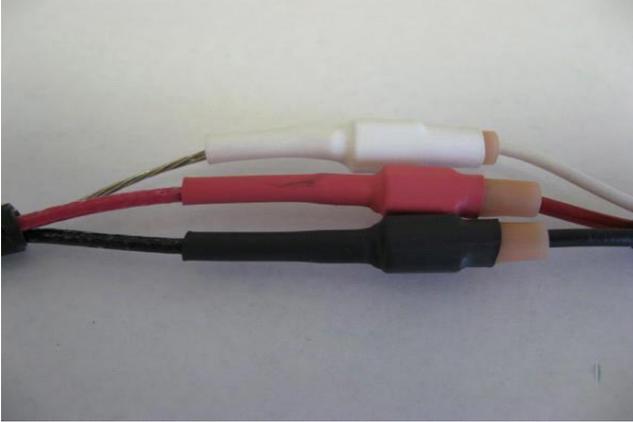
Step 2

Slide large black heat-shrink over terminals and cable. Next is slide white heat-shrink over Bare wire, slide Red heat-shrink over Red wire. Slide Black heat-shrink over Black wire. Then push male spades into their respective colored female connectors as shown. Next is slide heat-shrink over terminals.



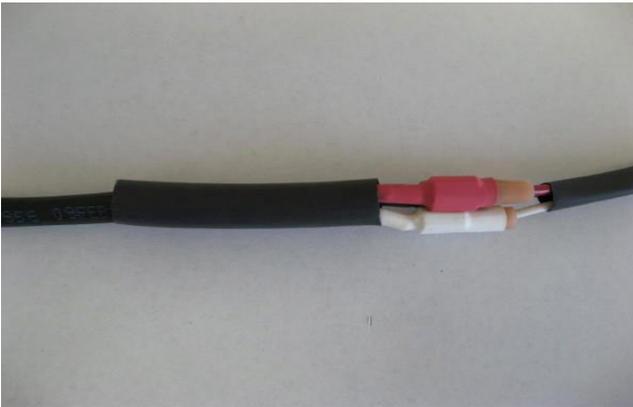
Step 3

Apply heat to the heat-shrink.



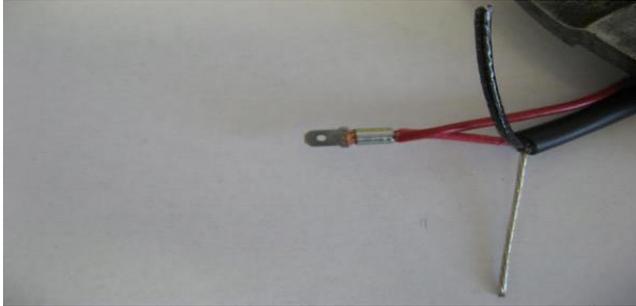
Step4

Slide large heat-shrink over entire connections



Step 5

In the event more than one wire will be attached to the Red wire. Example power injection bulb wires, Use the larger supplied Male spade that can accommodate larger wire and assemble as stated above.



I attach controller to the mounting point to the left of the steering column. This can be mounted in other locations, I chose this as a simple place.





9. The Violet and Gray wire

The Gray wire is to be used to activate a solenoid in applications where one is needed through the use of a switching module available separately. Typically it will not be used. Example an 1984/1985 Hot Air Buick install.

The Violet wire.. careful on how this wire is to be used, most applications will not benefit from it being connected. Here's the principle and connectivity. The violet wire while a ground is applied will limit the pressure output of the system. And its only use is to help assist with spool-up while brake torque is applied to spool the turbo in a racing application. So here are some ideas and methods to connect the wire for this feature to be present.

Simplest method is a momentary toggle switch in the ashtray whereby one leg of the switch goes to ground, the other to the violet wire. While staging the car, depress the switch and build boost.. As soon as the car launches release the switch and the system goes back to normal.

Next is to wire a relay to activate while the brake is being depressed. To do so, wire the Bosch 30 amp automotive relay as follows. Terminal 85 to the blue wire with stripe on the brake pedal switch. Terminal 86 on the relay and terminal 87 on the relay to chassis ground. Terminal 30 to violet. When the brakes are applied, the relay "clicks" thus applying a ground to the violet wire.

Another method for vehicles equipped with a transbrake, like a Stage rite, is to make a small bracket and use a leaf switch to activate ground while the car is in first gear. As soon as you pop the transmission into 2nd, the kit resumes normal operation.

10. Final

At this point you've concluded the installation, first thing to do is before putting alcohol into the tank, is turn the ignition "on" and set the blue gain knob to position 8. Next.. press the black test button and observe the turn-on LED next to the boost gauge light up Red. And the power injection bulb should light dimly as well. At this point observe the low fuel LED which should also be lit since the tank is empty. If everything checks ok, fill the tank with some water.. 8 ounces should be fine.. and check for leaks coming from fittings that may have not been tightened. The reason for water is that it is easier to deal with a leak when water is present versus a flammable liquid. Now.. Start the vehicle and press and hold the test button, observe the turn-on LED illuminates Red and so does the power injection bulb. The engine should stumble when liquid is sprayed into the motor. You will after a brief moment observe the LED change from red to green in color on a single nozzle system. If these tests are passed, then your ready for a road check.

Place Blue Gain knob at position 6 and use this as your starting point. Now go ahead and top of the tank with methanol alcohol. And on your maiden voyage bring the boost up slowly.. as the gauge goes past 6-7 PSI boost, the turn-on LED will illuminate Red. If it doesn't, do not continue the test and see why the MAP sensor isn't working. **This is very important. Go**

back to the step for the MAP sensor and confirm its wiring and the 1.6 volt output.

If it does work correctly, then proceed to increase the boost level observing how the engine feels and assure there is no surging when the alcohol is spraying. If this part is passed, watch your knock gauge, and roll into the throttle to your desired boost level. Stabbing the throttle on some cars can induce false knock. Just trying to make sure what you see is real or false.

From this point fine tuning of the system can be performed.

11. Fine tuning

On the Buick's I have installed, setting the blue knob to $\frac{3}{4}$ of maximum(5-6 On Blue gain Knob) and driving the car has worked. Although most cars will work with the system setup as is from factory default settings, this is just a guideline. With the gain knob(blue) turned to minimum, you should see some knock but not a whole lot. Typically less than 2 degrees at WOT. Increasing the gain knob should make the motor go to zero knock. If your setting is at minimum and you don't see any knock, you may have too much alcohol being sprayed. The adjustment that affects this is the knob inside the PAC controller labeled "INITIAL". Turning this screw counterclockwise reduces the ramp and puts less alcohol into the motor. Small adjustments make big changes. Repeat the procedure until the motor just has enough alcohol to curb the detonation, but not too much.

On certain applications, whereby chip/fueling is adjustable, it may be beneficial to increase the initial and lower the fueling whereby upping the flow of alcohol through the motor. The idea is to run sufficient injection as to permit running the desired boost and timing levels without detonation. Any more above and beyond that will only increase consumption.

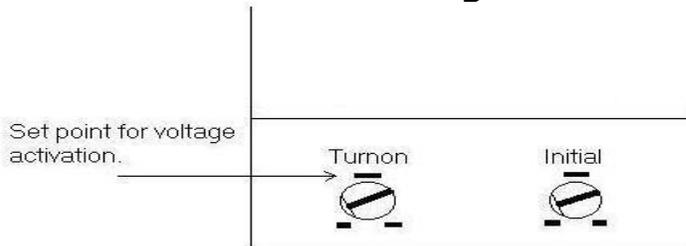
New for OCT '05... the system now incorporates a pressure sending unit to indicate system has developed pressure. The Turn-on LED will change color from red to green when the pressure threshold has been developed. It is important to note that the setting for this change can be adjusted by turning the allen head screw on the pressure switch located on the pump. My suggestion is have the pressure screw set so that reaching 10-12 PSI

boost activates the "pressure met" condition. Turning screw into the pump increases pressure threshold, turning it outward decreases it. You may find my factory setting to be correct. This is the reason the pump is mounted with the head downward.. so access to the screw can be attained and tweaked if needed.

So If the Turn-on LED doesn't change color to green when the boost starts coming up past 10-12 PSI... Do Not Go Wide Open Throttle.

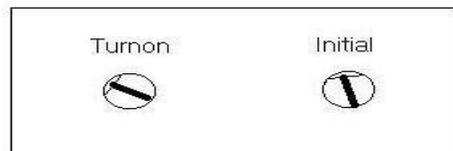
LAST tid bit.. the system features a test/prime button. Its purpose is to allow testing of the system. Before going WOT after the vehicle has been sitting for an extended time period, depress the button and confirm system is operational. Failure to do so can lead to an air pocket trapped in lines, and a delay in getting alcohol into the motor. This delay can cause damage to your motor. So the advice is.. always test the system first time out.. its assures peace of mind.

12. Troubleshooting



Turnon control will adjust from 1.7 volts DC to 4.9 volts DC. Full CCW is 1.7. Full CW is 4.9. Voltage can be adjusted by probing center terminal on Turnon control and adjusting to desired level.

3 bar GM sensor 5 PSI ~2.15 volts DC, 2 bar 4 PSI is 2.9 volts DC



This is typical factory preset for a GM 3 bar application. IE, Turbo Buick 2.2 volts DC



This is typical factory preset for a GM 2 bar application. IE Corvette 2.7 volts DC

The above is preset for the PAC controller. This should give you an indication where controls should be set in case of questionable operation.

Individual results may vary, enjoy the product responsibly.

Great care is taken in designing and testing of these systems prior to shipment, and due to the mechanical nature of the product:

Alkycontrol cannot be held liable for any damages sustained to your engine while racing it. The warranty of this product is the replacement of defective items ONLY for a period of One Year from Date Of Purchase. Only parts of the system that fail will be replaced, use care and discretion.

