

## Kit Packing C5 Vette

PAC controller

Pump w/4 Feet shielded cable

4 Feet 7/16 split loom

2 long wire ties

PAC wiring + DS tape

18 inch hose -6 -6

22 inch hose -4 -4

32 inch hose -4 -4

Methanol Filter

90' 3/8 -6 fitting

90' 3/8 -4 fitting

MAP Sensor w/regulator

Brass T for MAP

4 self tapping w/washers

Cap w/vent

Tank Plug

Bulkhead w/seal

90' 1/4-6 fitting

Nozzle w/washers + adapter

Low level grommet

Check valve

Nozzle document

PAC document

MAP document

C5 install document

Custom Dual nozzle

M10 nozzle

1/8 T fitting

4 inch -4-4 hose 6 inch -4-4 hose

Large check valve



### **Alky Pump install**

**Important notes... Do Not Mount pump with head facing upwards as this will allow water to collect inside sleeve and ruin motor. Please install as pictured, It can also be installed horizontally as long as the pitch does not allow water to collect in sleeve.**

**Any question.. please call 813-265-1400 Julio**



## C5 Corvette installation instructions

### 1) The tank modification

The windshield washer tank will need to be modified to deliver the fluid to the pump assembly. The modification entails drilling a  $\frac{3}{4}$  diameter hole in the bottom of the tank, its lowest rear point, then installing the supplied bulkhead fitting. The fitting will be installed as follows, the main body of the bulkhead and Teflon washer will be inserted from the inside of the tank out, then once through, install stat-o-seal washer, then stainless washer, then nut. Once nut is threaded.. tighten assembly. Some tips for doing this are, if a small length of wire is fed from inlet to outlet, the fitting can be slipped on to the wire and guided into place. Once the nut has been started, grabbing inside of fitting with needle nose pliers to hold the thread, then use a wrench for tightening the nut down. Lastly an inexpensive  $\frac{3}{4}$  drill bit for making the hole is a simple spade wood bit available at most hardware stores. Its only plastic. At this point install 90 degree fitting pointing toward tank. The short length of -6 hose which is 18 inches will be attached at this point. It may be advisable to test the tank for leaks at this point using water. Next is to drill hole into cap and install supplied vent. Drill a smaller diameter hole, and press vent in.  $\frac{3}{8}$  should do it. Next is pull motor from tank and install the supplied brass tank plug into rubber grommet. Motor can be used with an external tank available separately. Also replace low level sender grommet with supplied new one.







## 2) Pump mounting

Before mounting the pump, install the brass 90 degree fitting on the inlet of the pump, use the larger of the two fittings provided. The top of the pump will be marked with an arrow indicating flow direction. Next install the smaller 90 degree 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 mounting location for the pump will be in the wheel well behind the drivers side front tire. Use the supplied 4 self tapping screws to attach pump, if drilling into chassis metal, attach o-ring to one of the bolts before its drilled into place. This will ground it. Now install the short 18 inch feed hose. Next, on the outlet attach 32 inch section of hose. Pump is to be mounted with its head pointing down to the ground so access to adjustment screw can latter be made if needed.



### 3) Nozzle

The nozzle will be placed before throttle body. Install head of nozzle in the upper portion of the air bridge 2 o'clock position on Mag cars or in the upper portion of the pipe on supercharged applications. **The installed height of the nozzle must be higher than the tank. Else siphoning can occur.** Simply drill 3/8 diameter hole into location, feed nozzle in leaving one sealing washer on the inside.. tighten fitting on the outside , then depending on thickness of material, install other washer on the outside. Some applications require no washers with thick aluminum or silicone hose installs.. others require just one.. others both.. in the case of thin aluminum. Trick is to not bottom nozzle out in the 90 degree elbow supplied. After nozzle is installed attach supplied 1/8 pipe to -4 adapter. Clean area for debris, reinstall pipe. There is a supplied check valve "IN CASE" siphoning occurs, whereby liquid flows when system is shut off.

### 4) MAP sensor

The MAP(manifold air pressure) sensor can be installed under the dash if an aftermarket mechanical gauge is used. Enclosed is a brass "t" and compression fittings so the plastic line going to the aftermarket gauge can be used. Simply cut tubing, and place brass block in-line. Then attach small section of hose from brass barb to nipple on MAP sensor. Enclosed for 5 volt power is a 5 volt regulator. Wire the regulator RED to Red on 6 pin connector, Black to ground, green to green on 6 pin connector.

### 5) Under-hood wiring

The only wiring needed to be done under the hood is the pump, and then run shielded double wire into vehicle through firewall. Two options, one is through the grommet or drilling a small hole through the fiberglass and using RTV sealant underneath the hood latch grommet.

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

### 6) 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 purpose of this LED is to indicate when the system has reached its turn-on threshold based on the signal from

the MAP sensor.

At this point remove the lower panel under the dash, and the panel that goes under the steering column. Drill holes and run LED wiring from the pillar to underneath the dash.

The turn-on LED has a orange/brown wire. Next is locate a solid ground point under the dash. The black wire from the PAC power distribution box will be attached to this, and the black wire from the 5 volt MAP regulator(if supplied with system). The red wire with male spade 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, or one of the heavy duty switched +12 wires coming from the ignition switch assembly. Tip is to solder off of the thick Orange wire on the ignition switch assembly. And also attach a black small wire tie to assure the red wire onto factory wiring so it doesn't come off. Next is attach the **orange wire from the turn-on led to the orange wire coming from the controller, brown wire to brown wire**. Attach the green wire from the MAP to the green wire on the PAC controller. The violet/gray wire leave alone until latter.

And finally the pump connections. Cut the wire to length and strip approx 3-4 inches of insulation from the wire. Remove foil. Then strip about 1/2 inch of insulation on the red and black wires that lead to the pump.

**On the PAC controller there is a set of wires with pink terminals. Those wires will be a red, black, and white. Those are the pump drive terminals. Using a quality set of crimpers, attach male spade terminals to the red, black, and bare pump cable. Crimp from the bottom opposite the slit in the terminal. Now connect red wire from pump cable to red wire on PAC with a female terminal. . Then connect the black wire from pump cable to black wire on PAC with a female terminal. Then attach bare wire to supplied spade terminal and install to the White female terminal. Follow the included sheet for tips on assembling these connections using the supplied heatshrink. That's it.**

## **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....**

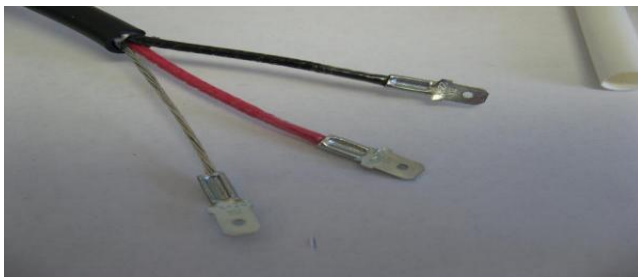
**2)Razor blade**

**3)Heat gun or lighter**



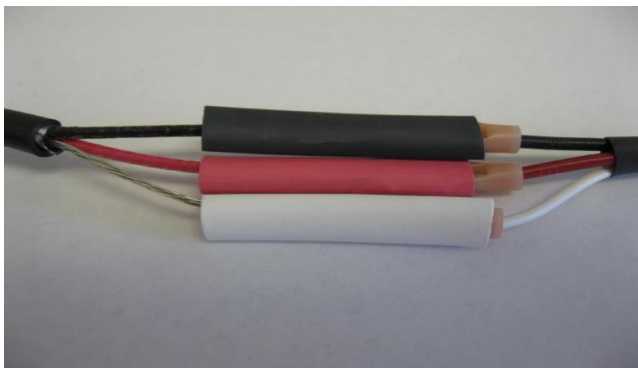
**Step 1**

**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 1/4 inch is fine. And use the small supplied Male spade terminals. Crimp the terminals from the bottom as shown.**



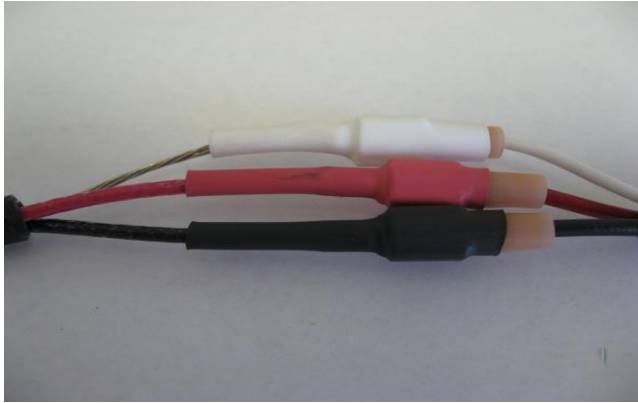
**Step 2**

**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.**



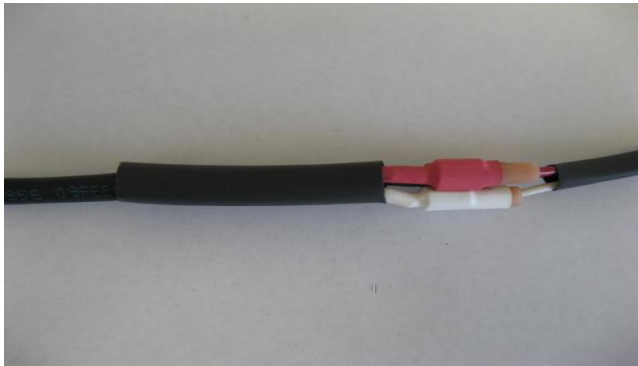
### **Step 3**

**Apply heat to the heat-shrink.**



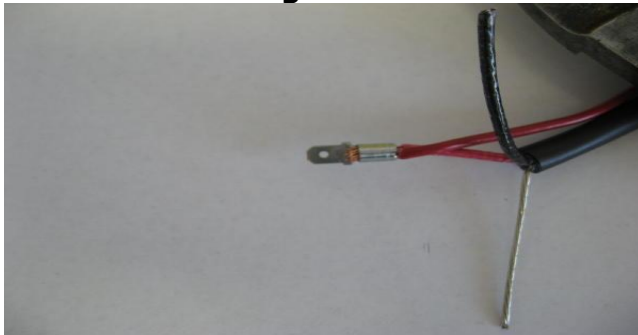
### **Step4**

**Slide large heat-shrink over entire connections**



### **Step 5**

**In the event more than one wire will be attached to the Red wire. Example Map sensor regulator, use the larger supplied Male spade that can accommodate larger wire and assemble as stated above.**







Mount PAC controller in aluminum frame, it will need to be loosened to fit in place. Reinstall frame. Then ZIP tie the controller in place through the 2 lower holes in frame. Try to install PAC controller as far up in the frame as possible so that adjustments can be made by removing the trunk button assembly quickly. Once adjusted on a dyno, they should need to be changed.

## 7) The gray/violet wire

**Be 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.

The gray wire can be used to trigger an auxiliary system. In case a solenoid or other device requires a signal once the system activates. Typically these wires are not used.

## 8) Final

At this point you've concluded the installation, first thing to do is before putting alcohol/water into the tank, is turn the ignition "on" and set the blue gain knob to the middle position. Next depress the black test button and observe the turn-on LED next to the boost gauge light up. At this point observe the low washer fluid lamp, which should also be lit since the tank is empty. If everything checks ok, fill the tank with alcohol/water, and check for leaks coming from fittings that may have not been tightened. Start the vehicle and hit the test button, observe the turn-on LED illuminates.

If these tests are passed, then you're ready for a road check. And on your maiden voyage bring the boost up slowly and as the gauge goes past 4 PSI boost, the turn-on LED will illuminate. If it doesn't, do not continue the test and see why the MAP sensor isn't working. **This is very important.**

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 system is spraying. If this part is passed, watch your knock readings, 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. Also observe the turn-on LED and it will change color from red to green when initial pressure is developed. This can be changed via the adjusting screw on top of the pump. Outward decreases activation pressure, inward.. increases it. Typically I will set so it comes on early on. You may find our setting to be acceptable. Adjusting this screw has no effect on the system or its delivery. Its for changing when the LED indicator flips color.

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

## 9) Fine tuning

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/water 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.

Individual results may vary, enjoy the product.

## **10) Interference**

On some types of scan-tools it may be possible the PWM signal to drive the pump can give erroneous readings. The simple fix is to run the power to the PAC red wire from a relay switched battery source. The following is an overview how this is accomplished only if needed. A wire of suitable gauge 10-12, is run from battery "+" terminal to the inside of the vehicle. A 20 amp fuse is recommended at the battery connection. Then a 30 amp bosch style relay is used. Terminals on relay will be connected as follows,

30 Battery input

87 PAC red

85 Ground

86 Ignition switched

When the ignition is applied to the relay, its contacts close applying power from battery straight to the controller. Thus isolating completely its power from all vehicle electrical. Again this step may not be needed, this information is provided as a just in case.

## **11) Contact**

**If any part of this procedure is unclear, or issue arises, please contact me or the vendor for assistance. Also note there are installation pictures available on my web site [www.alkycontrol.com](http://www.alkycontrol.com) . It would be my pleasure in helping you make the car go fast and stay together.**

**Julio Don 1-813-265-1400**

**email: idoxlr8\_70@yahoo.com**

# **PAC- Progressive Alcohol Controller**

## **Introduction**

The PAC is a versatile electronic motor controller using pulse width modulation technology. It allows the user to custom tailor voltage output to the injection pump being used so that it increases pressure with the increase in voltage output coming from the vehicle MAP sensor. Recommended that vehicle have a 3 bar map sensor for better voltage control. Will support any injection pump rated up to 15 amps.

## **Features**

Added flexibility to the control of an injection pump to overcome boost pressure in intake tract, ability to run higher pressures from an injection pump without inducing flooding or transitional knock, input terminal for pressure reduction(brake input), ability to custom tailor installation, ease of use, and flexibility. Built in fuse.

## **Unpacking**

Included in the kit should be enough wiring and connectors to do a full install. This is a list of what is included. Controller, 12 feet 16 gauge shielded cable, 12 feet ¼ inch loom, 4 red splices, 8 wire ties, 3 spade terminals, one LED, solder, and some heat shrink tubing.

## **Tools Required/Recommended**

Connector crimper.. Klein, Blue point, etc. , soldering iron or gun with 60/40 solder, drill with unibit drill bit, 12V test lite, heat gun, basic hand tools, and a digital voltmeter.

## **Installation**

These are general guidelines for component installation. The kit comprises of two individual modules. They are the main controller, and the remote controller. A RED and a Black weather pack connector is used to supply power to the main controller. The Red goes to a switched ignition source capable of handling 15 amps. I use the IGN terminal on a GM fuse block. Or this

can be routed from a relay activated by the ignition switch. Black goes to chassis ground. The connections to the injection pump are the Red/Black/White wires coming from the main controller. Connections to these using the supplied spade connectors. Red wire to from the pump to Red wire from main controller. Black wire from pump to Black wire from main controller. There is a “drain/silver/bare” wire for the pressure sensing, this will be connected to the White terminal. It is highly recommended that these connections be soldered to assure reliable connections.

IMPORTANT NOTE: The “Black Pump Wire” on the main controller is not a ground.

Main controller wiring, green-violet-gray-orange-brown.

Green is connected to the MAP sensor signal wire. On in the case of Ford vehicles.. MAF

Gray is an auxillary output that will switch + voltage when system activates. Examples to run a solenoid driver relay module, input to external boost controller, etc.. typically not used

Orange/Brown twisted go to the Turn-on LED. These wires will flip polarity when pressure is developed. Suggestion is to place turn-on LED near boost gauge to indicate system has activated.

Violet wire is the negative trigger input terminal for pump speed reduction. Grounding this wire reduces injection pump speed to initial pump pressure for staging applications while drag racing. Intended application are E-brake switches.

The remote controller affords the user the flexibility of custom installing controls with dash panels of vehicles or attaching control box as is. For custom installation, simply remove screws from box and relocate controls and LED. A small jewelers screwdriver will be required to remove knob assembly. Unibit drill bit makes graduated drilling holes a snap.

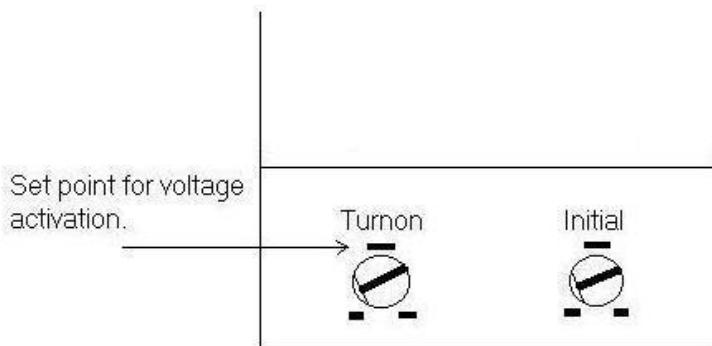
## **Setup and Use**

The remote controller features a knob that controls ON/OFF and GAIN. The LED next to it indicates system is armed and the push button applies “initial” pump speed to the pump for testing operation.

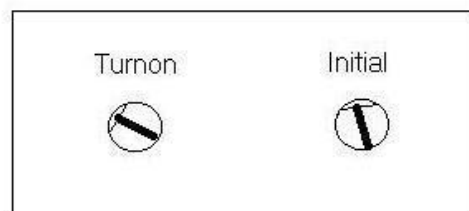
On the main controller is an access door. Opening the access door reveals two controls internally labeled “TURN-ON” and “INITIAL”. The turn-on control allows the user to set a turn-on voltage from 1.7volts to 5volts. Clockwise rotation increases the voltage needed to trigger system. The “INITIAL” control determines how much voltage is sent to the pump when the system is triggered. Typical settings are factory preset for 4 PSI turn-on with a 2 volt output to the pump. These can be recalibrated by the user by simply turning the controls clockwise to increase, counter clockwise to reduce. A LITTLE AT A TIME. Use fingers or small flat screwdriver. An electronic voltmeter can be used for initial pump setup as well. Procedure involves placing voltmeter across terminals on power distribution block and pressing the push button on remote controller. Typical setting is 1-3 volts. Next is the “Pump Gain Control” on the remote controller. This control interacts with the initial pump speed control. Usual and typical settings place this knob in the 12-2 o’clock position. It is used to ramp the voltage gain to the



pump as the signal from the MAP sensor increases. Turning this knob clockwise will increase output voltage multiplication and slightly increase the initial pump speed. Only way to know what is best suited for your particular application is trial and error.



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

## Tuning suggestions

First, best place to tune an alcohol system is the race track under closed track conditions. I do not recommend hi-speed testing of products on public roadways where you or others may be in-danger. Also no expressed liability is expressed with the use of this product. USE AT YOUR OWN RISK.

Ok, we're ready. Set pump gain knob to 6 and bring turbo up to your initial PSI setting(recommend ½ half of factory boost setting) see if LED illuminates, if not re-calibrate

setting in main controller. Once this is done, monitoring engine knock, race car.... If knock retard is encountered, ascertain if the knock is occurring as the boost increases(transitional) or is occurring at due to high boost levels.

Adding gain to the knob(clockwise) increases pump pressure output. If the knock is occurring due to transitional, increasing initial pump speed or decreasing turn-on point will aid these conditions. Again every vehicle is different, the initial and turn-on will more than likely never be recalibrated once system is setup. They will not correct a tuning problem and/or engine fault.

Timing suggestions, Low timing and high boost. Setting up the fueling, timing, coupled with the alcohol output requires time and patience. Do small steps at a time and enjoy the product and its technology.

The pump features an allen screw to adjust pressure activation. Every vehicle is different, as will be the setting of this screw. Suggestion is to have it sense pressure early on. If there ever is an issue with the system(empty tank, tank leak, clogged feed line, etc) this will advise of a problem. Although it can be set to activate under higher pressures. This is a personal preference. And the brown wire can be used for triggering boost controllers as well. No pressure=no Hi Boost

