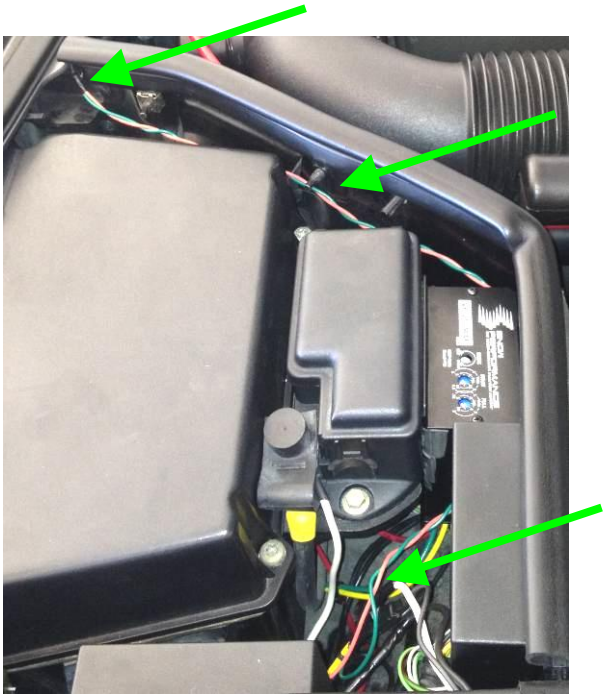
I removed the rubber bumper and routed the wires into the ECU bay through a notch in the sheet metal. It's a good idea to add a layer of shrink tubing or electrical tape to the outside to help protect the wires Once the wires were protected and situated in the notch I put the rubber bumper back in.

It can be a tight fit with the wires and the bumper but an alternative is to tuck the wires under the fender flange and slide the bumper in after them, essentially routing the wires around the bumper rather than under it.

Trim the wires and put connectors on the ends of the MAF signal and pump wires. I added a pigtail to the pump power to later attach to the "system active" light I wanted to have inside the car. Connect the MAF signal to the yellow wire on the controller, the pump power and pigtail to the green wire and the ground.

The last step for the controller was to make up two wires with connectors on one end for the switch and indicator light. These are going to run across the engine bay, through the firewall, up behind the dash and into the A pillar. I strung the wire across the front and along the length of the car to sort of eyeball how much wire was needed. Be generous, wire is cheap and the fewer the splices the better. I twisted them together for convenience and taped up the section where they cross through the sheet metal next to the firewall (green arrows).



Once I put the covers back on everything it was starting to look pretty good.

Boost Gauge (engine bay part)

The Podi boost gauge is an electronic type with a sending unit that gets mounted in the engine bay and only a small wiring harness is run to the gauge inside. Since the sensor is so close to the manifold it is provided with an in line air filter to prevent oil mist or other crud from getting into the sensor itself.

I tied into the manifold pressure measurement that the fuel pressure regulator uses and opted to put the filter upstream of both the boost gauge and the fuel pressure regulator. The provided tubing is more than enough to connect everything up. I cut a short length to run from the manifold to the filter, another length to go from the filter to the T fitting and then a longer piece to go from the T to the sensor. I trimmed a little off of the fuel pressure regulator hose and connected it to the other port on the T fitting. The filter and T fitting will tuck down in between the S/C outlet and the charge cooler without any problems.

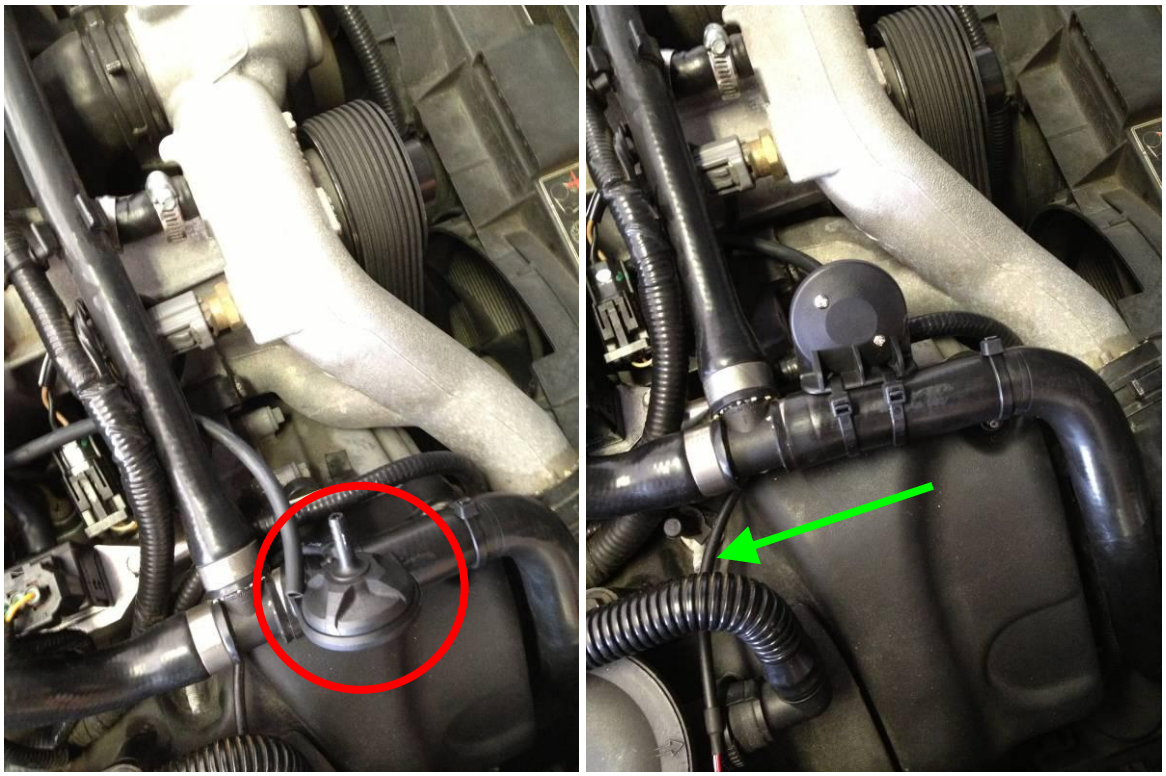
I wasn't expecting to see much from the filter, but after a few hundred miles of use the short run of tube between the manifold and filter was starting to show some residue, so it seems to be doing some good. Makes me wonder what has been spewing into the fuel pressure regulator for all these years.

Don't mind the red tube in the picture, it is just the water/methanol tubing from the pump. The picture was taken before I had connected it to the fitting in the intake tube.

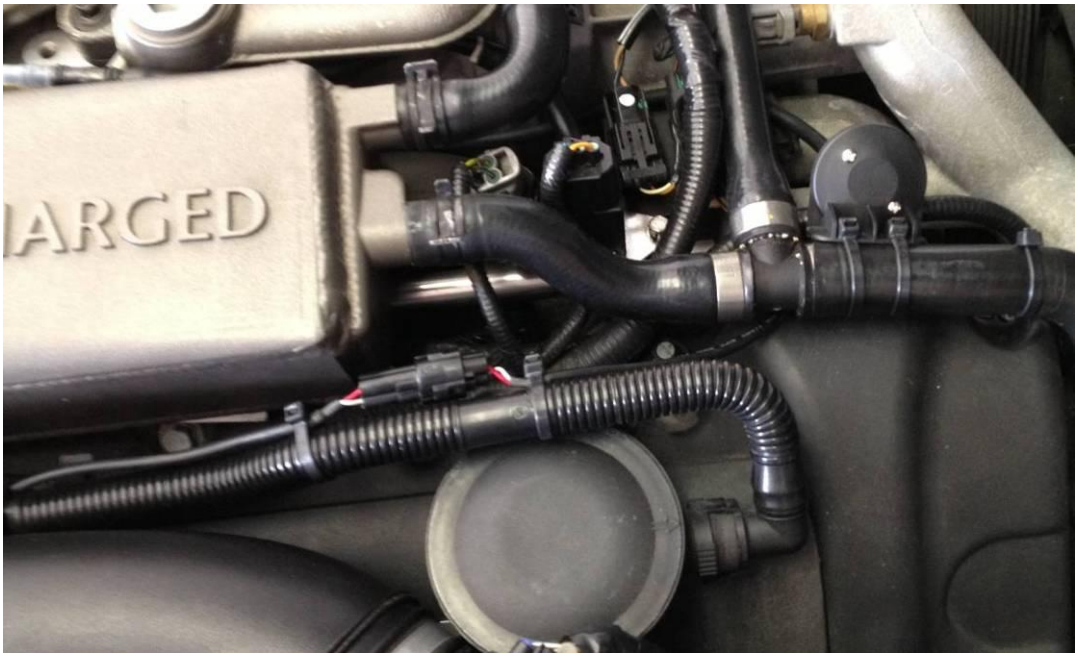
The pressure sensor is fairly small and for lack of a better place, I just strapped it to one of the intercooler coolant hoses. I connected the tubing and turned it downward so that it wouldn't interfere with the hood liner.

The wiring harness (green arrow) I routed under the coolant hose and cable tied it to the breather tubing.

The provided extension harness isn't quite long enough to get to the A pillar from where I mounted the sensor but it will get into the car and let the splicing be done under the dash and out of the weather.



I routed the boost gauge harness along the breather tube to the back of the intercooler and then tied it to the small wire harness the runs across the top of the engine.

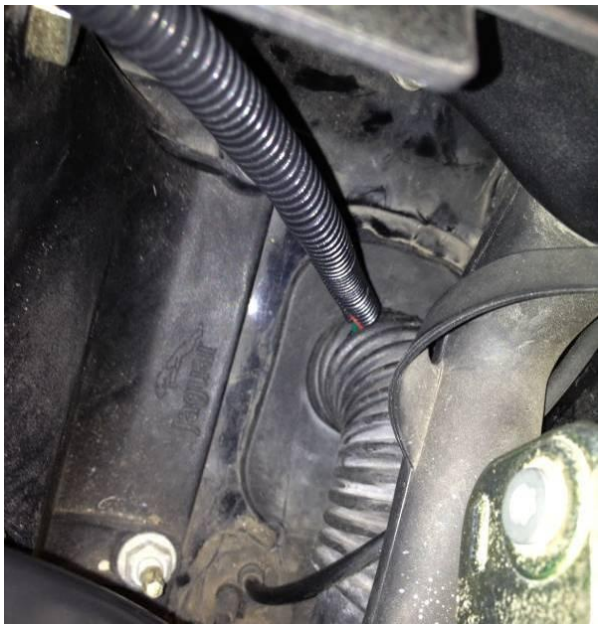


Once to the middle of the car I jumped it across and joined with the switch and light wire for the injection system (red circle).

Credit where credit is due, I followed the instructions that the Jag Wrangler wrote for the Real Gauge oil pressure option for routing wires into the car from the engine compartment.

http://www.thejagwrangler.com/realgauge-installation.html on pages 15-19

I got the switch, the light and the 3 wire gauge harness pulled through the hole in the boot (finally) and fished them into the driver's side footwell. All said and done, it looked like the picture below, with the wires running though a small hole in the accordion boot.



Gauge Pod and A-Pillar

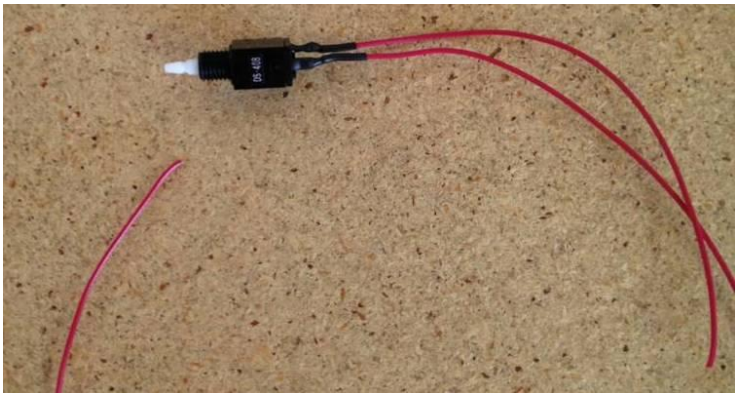
I wanted to have a "system active" light, a switch and boost gauge in the same pod on the A pillar. The light provided with the Snow kit is an LED, so not much current required for that one and the switching signal to the relay is at most 160mA, according to the data sheet.

The LED gets its power from the wire connected to the pump drive signal at the controller, so it just needed a ground and the switch only needs a +12V connection, both of which are available in the boost gauge pigtail harness.

The boost gauge harness actually has 6 wires, but only 4 of them are used in this application (brown and green are unused). Yellow is the battery constant, black is ground, orange is the boost signal and red is the ignition voltage. I used two mini Posi-Taps on the black wire for the LED ground and the red wire for the on/off switch.

The switch I chose is a push on / push off type, that mounts through a ¼" hole. Just about any kind of switch will work since the current is so low, but this one took up the least amount of space and was not too intrusive to the interior.

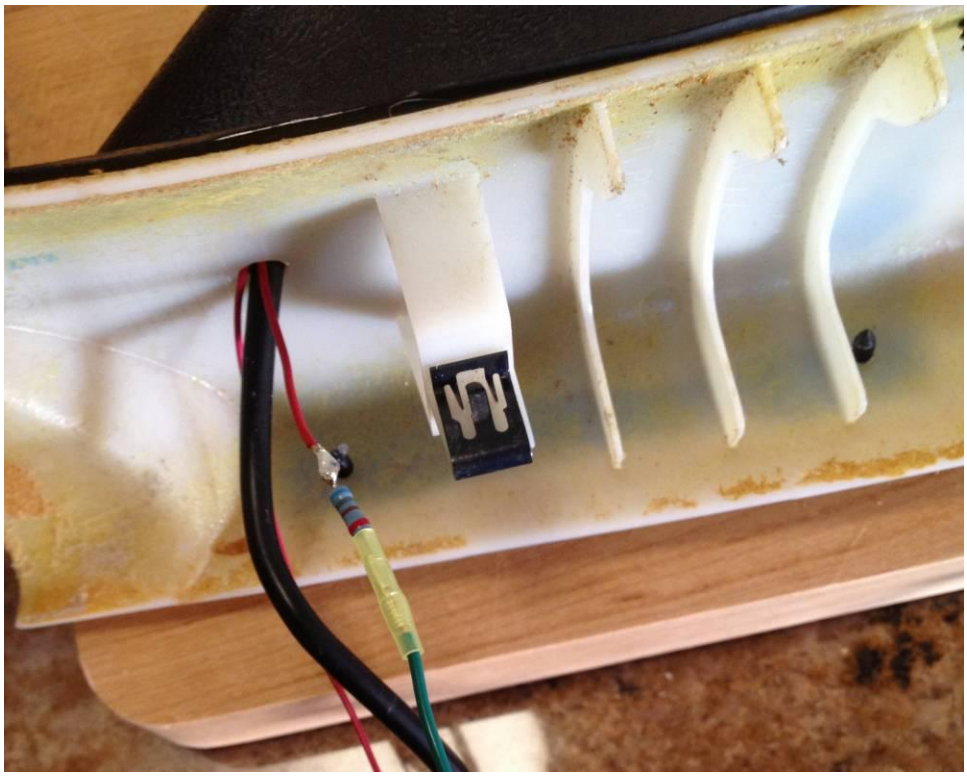
I soldered two wires to the switch, one short for connecting to the tap on the gauge harness inside the pod and one long, to extend out of the pod and behind the A-pillar. After soldering I put some shrink tube over the connections to protect them.



For the LED, the white wire (ground) can be directly connected to the Posi-Tap and the red wire will need an extension to make it long enough to route out of the pod and easily connect behind the A-pillar trim.

The first LED failed pretty quickly after I started testing the system but I was able to find a replacement at the local Fry's electronics. The replacement was a dead ringer for the original, even down to the text printed on the pigtail wires. What's interesting is that the package called for putting a 680ohm resistor in series with the LED for a 12V application, but there was no mention of this requirement in the Snow instructions. The second time around, I added the resistor per the LED packaging and that's what you see in the picture.

I had to make this repair after the pod was assembled and glued to the A-pillar so it's a little less tidy than I would have liked, but I covered it all up with some shrink tube to hide it.



I removed the A-pillar according to the Rev's video: HOW TO: Recover the A-Pillars

I had intended to get the pillar re-covered when the pod was installed, so just peeled the old covering material off. There was some left over residue so, I took a 100 grit sanding block to it to remove the glue crud and remnants of stuck on foam. It probably wasn't completely necessary to do the sanding, bit I think it made forming the gauge pod to the shape of the pillar cover a little easier since the surface was smooth.

As it was going to be covered up, I wasn't too picky about the gauge pod I used and just picked one up from Autozone for about $20. It wasn't even close to the right shape, but fortunately they can be conformed to the pillar by heating and bending.

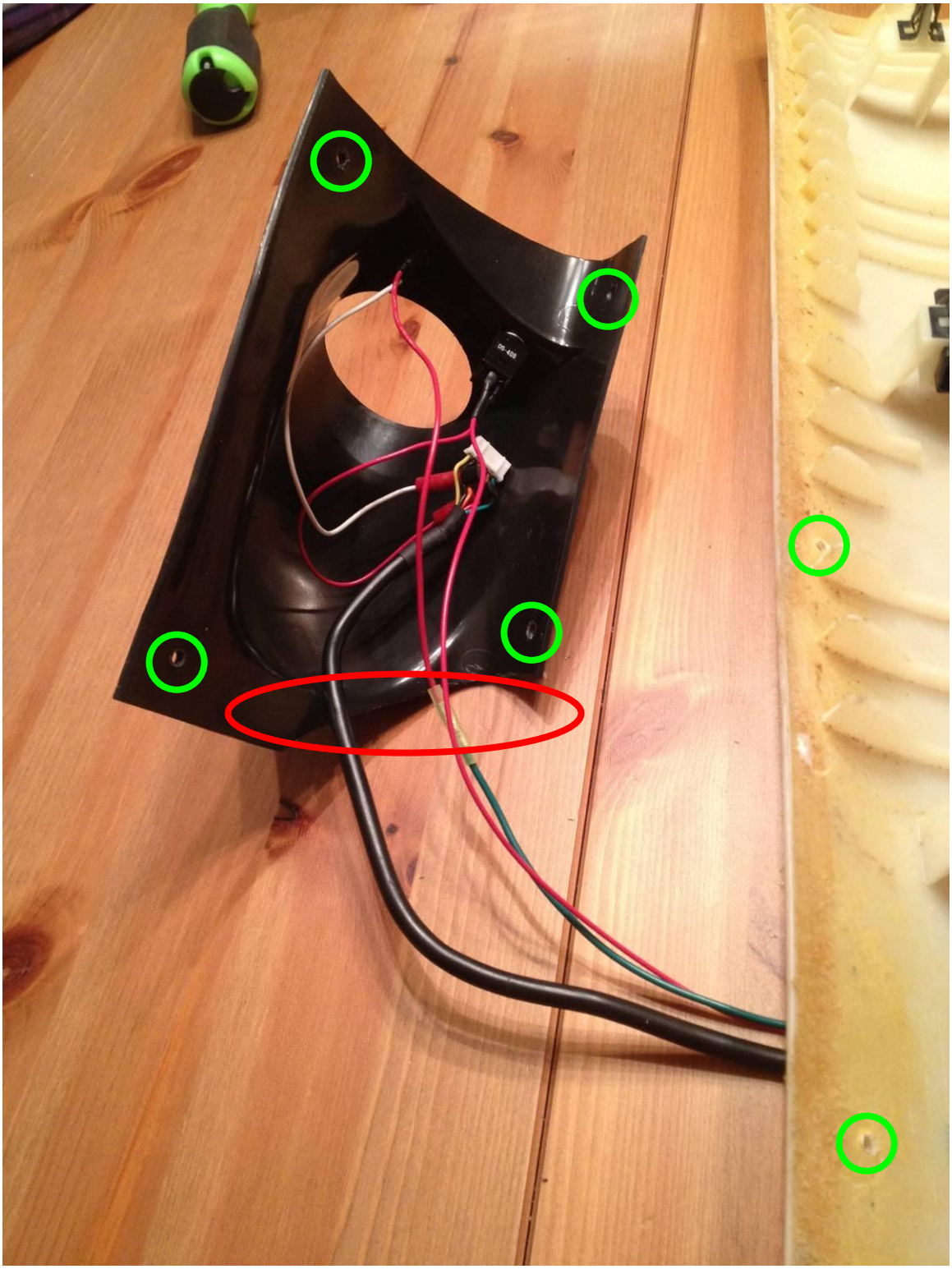
I highly recommend a heat gun (and gloves) for this part, as it makes things go much, much faster. You could probably use a hair dryer, but the higher temp of the heat gun is easier to work with.

Once the plastic is warmed up, it's pretty easy to work it around the shape of the pillar. To keep the pod as far down on the pillar as possible I trimmed the bottom to match the curvature of the pillar where it meets the dash (red circle).

Once it was in more or less the right shape, I pre drilled holes in the corners (green circles) and mounted the pod with the provided screws. With the screws to help hold things together it was easier to heat and work the plastic to get a very nice, conformal shape.

Once the shape was right and everything was cooled off and hardened again, I marked the locations for the switch (1/4" hole) and the LED (1/8" hole). I test fit the gauge for the purpose of marking these to be sure everything was lined up like it should be.

After taking everything apart and drilling the holes, I mounted the switch and LED in the pod. I also drilled a ½" hole in the A pillar, down toward the bottom, under the pod, to pull the wires through. After putting the wires through the pillar I added a cable tie so that I couldn't accidentally pull them back though. It's really not much to worry about though, the gauge is just a friction mount so it's easy enough to pull out and feed the wires through the hole again if needed.



Now I attached the gauge pod with the screws, connected the gauge to the harness and fit it together for the first time. I didn't glue the gauge pod down just yet, because I wanted to install it in the car and make sure everything worked properly.

Wiring the Gauge Pod in the Car

Remove the lower fascia of the dash under the steering column, disconnecting the buttons and the climate control temperature sensor so it can be removed from the car. Then remove the dash wood trim panels from the instrument section and the vent nearest the driver's door.

The harness from the boost sensor isn't quite long enough and I had to clip the small connector off and splice in an extension for the three wires. It's not clear what the little connector is for anyway, as it doesn't have a mate included in the gauge kit. All I can imagine is that it's a stock harness of some kind.

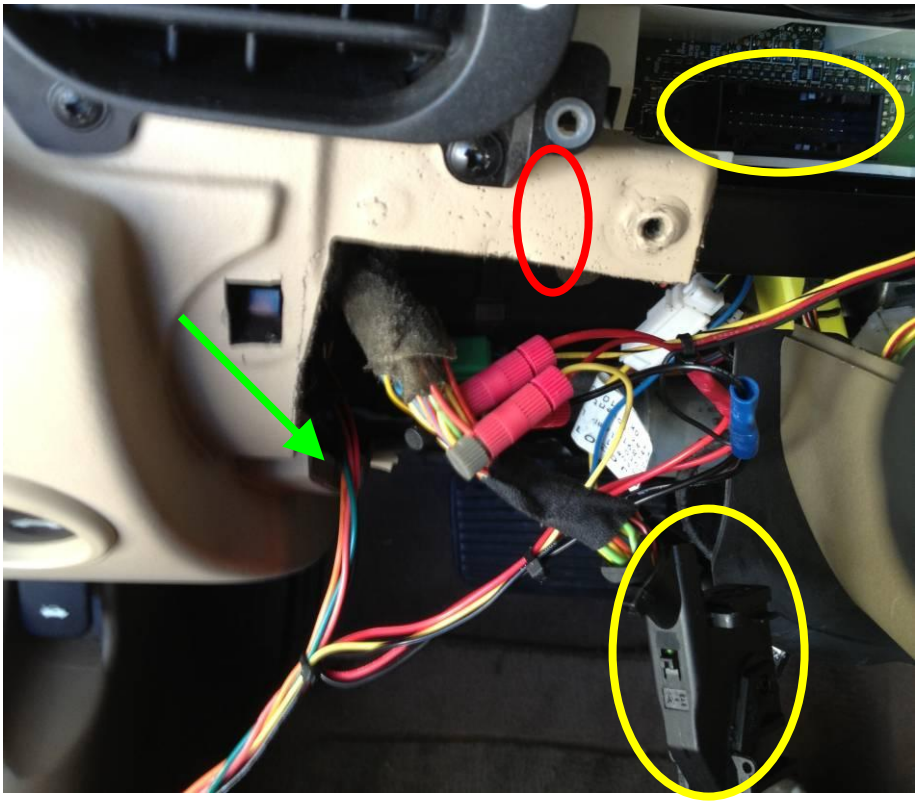
Two of the wires will get connected under the dash for power and ground; the third will need to route up to the A-pillar for the sensor measurement to the gauge.

The light and switch wires were long enough already and I bundled them together, putting a small cable tie on either side of the splice to act as a bit of a strain relief.

I fished the 5 wires up over the dash supports, making sure that they would not be hanging down in the footwell, and pulled them out just below the vent (green arrow).

I had previously installed the Real Gauge and used the same taps for voltage and ground, so some of the connectors in the picture were already there. I always recommend disconnecting the battery before unplugging the instrument cluster as there are a lot of sensitive electronics in there.

There is a cable tie holding the left instrument cluster harness to the dash (red circle) that needs to be cut. After that, I unplugged the left side harness from the instrument cluster (yellow circles) and pulled the wiring down for better access. If this harness hasn't been touched before then there will be some foam padding tape wrapped around that will need to be pealed back. It is a crumbly mess and the real gauge kit comes with some alcohol wipes to de-goo the wires. If this harness hasn't been touched before then it's not a bad idea to swap the wires with some alcohol to remove the tape residue before tapping them.



Of the five wires coming up from the lower part of the dash, three continue on to the A-pillar: switch, light, and pressure signal. The other two, power and ground for the pressure sensor, need to be connected here under the dash.

There are three more wires in the gauge harness coming out of the A-pillar pod that aren't long enough to reach down here, a battery, ignition and ground.

Starting with the five wires from below, I pulled two off (green arrow) and added three more (blue arrow) for a total of six now bound for the A-pillar (yellow circle). A couple of cable ties to keep everything sorted and I could start connecting it up.

There are three wires that I had to tie into:

1) Battery (red)
2) Ignition (white with green stripe)
3) Ground (black)

This is the same as required by the Real Gauge so I shared the existing connections. Two of the Posi-taps are visible in the picture and the third is hidden behind the others.

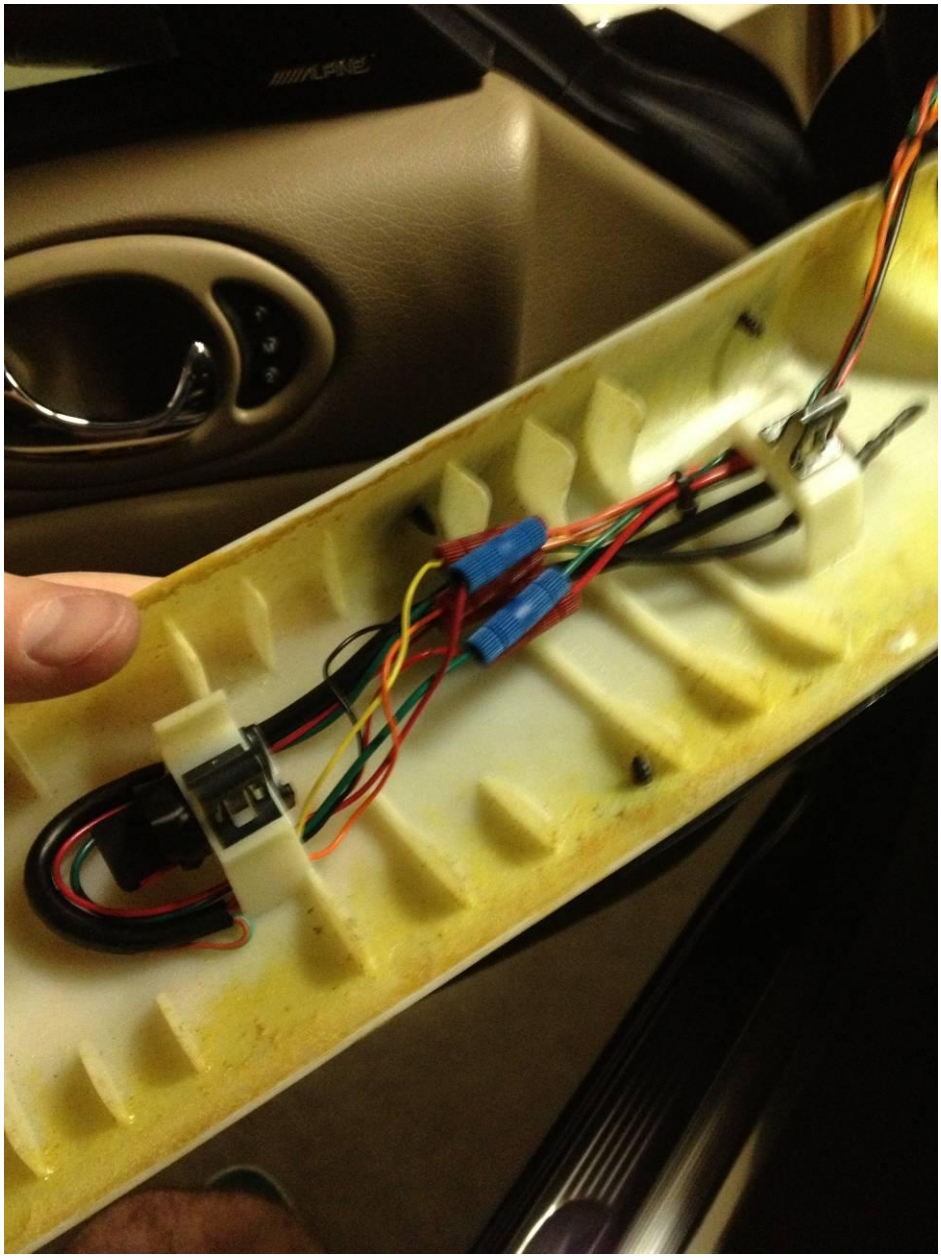
The Posi-taps aren't large enough to accommodate multiple wires easily, so I added a crimp union (green arrow) to collect the ground and ignition wires, including those for the Real Gauge. I crimped them all together on one side of the union, and have a single wire on the other side for attaching to the tap.

With that done, I reconnected the instrument cluster and replaced the cable tie that was cut earlier to hold the harness in place.

I added cable ties every four inches or so on the harness running up through the dash to keep everything together and make it easier to snake through there.

Looking up from below (red arrow) I could see a path through the dash to the base of the A-pillar. Using the same techniques as before, I fished the wires up through the dash and out the top.

I left enough length to run about half to 2/3 of the way up the A-pillar with the six wires, trimmed them to the same length and stripped the ends. I then used Posi-connectors to attach the harness from below to the gauge, switch and light connections. The bundle of wires will tuck under the A-pillar supports and stay out of the way.

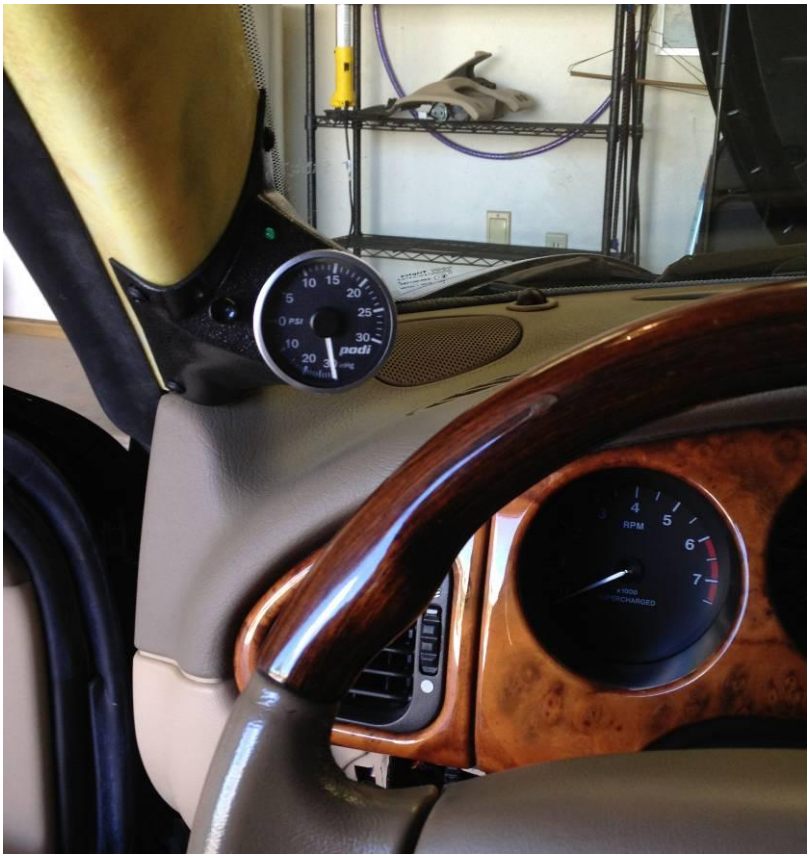

ALPINE

All wired up, I snapped the pillar in place, reconnected the battery and turned the key to see if it would explode.

No fire. No smoke. So far so good. Just the gauge initialization and a quick flash of the LED and the gauge settled in at zero just like it should. I fired the car up and the gauge showed about 20in of vacuum. Success!

To test the injection system, I shut the car off and set the injection start adjustment all the way to its minimum. Then when switching the key to position two, the pump started running and I was able to toggle the on/off switch. Everything worked like a charm.

It's not pretty in this picture, but I drive the car this way for about a week to make sure there were no problems before getting it covered. Good thing too, because that LED died on about day 2 and I had to fix it take everything apart again to fix it.



The only way to really set a system like this up is to tune it on a dyno like any other performance modification, but I ventured a guess based on some baseline data I had collected before.

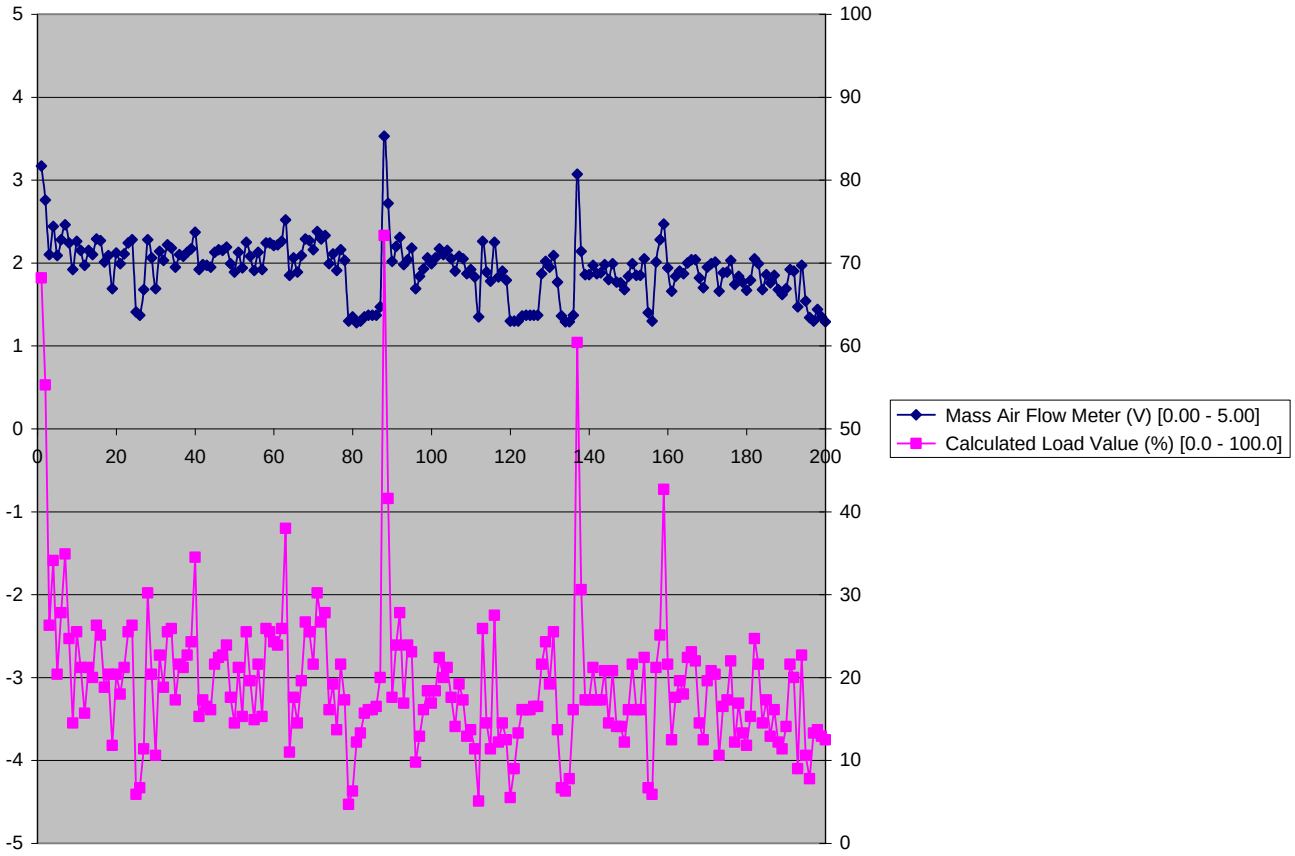
Below is a plot of the MAF sensor output (0-5V) vs the calculated load value, essentially how hard the engine is working. This was collected on a fairly long highway cruise after the car was warmed up and into closed loop control mode.

I was collecting a lot of data at the same time so the rate is pretty slow, about 4sec between points, or there abouts, but most of the load values are cruise (70-80mph) are in the 15-25% range and MAF

output is 2-2.5V. There are a couple of passing maneuvers in there that show 70% load and a 3.5V MAF output. From this, I set the starting point for the injection system at about 2.75V and the maximum at about 3.5V.

I wanted the system to be off for most "normal" driving; things like cruising on the highway and typical acceleration away from traffic lights in town. It took a little tinkering to get there but the MAF data was helpful as a starting point and actually pretty close to what I wanted it to be.

At 70mph, the system will come on shortly before the throttle position where a downshift occurs and, if watching the boost gauge, that is around 6psi. At in town speeds the boost value where the system activates varies depending on the load condition, RPM, etc, since it's running off of the total air consumption.



After running for a little while to ensure no problems, I glued the gauge pod in place with contact cement and had it professionally covered. I'm glad I got a professional trimmer to do this as he ended up making 3 attempts because the complex shape. To get the right shape and have something that wouldn't come apart when we made the holes for the switch and light, he made the covering in 3 pieces and stitched it together.

There is still a little bit of a bump at the transition to the gauge pod but all around, I think it looks pretty good.

The perspective picture:

And up close:

There are two different trim rings for the gauge included, a silver and a black. Earlier pictures had the silver but I changed to the black, since my main instruments don't have trim rings.

The gauge looks a little off in the picture but that is because of the camera, from where the driver sits, it's nice and square with zero psi being horizontal. It is just a friction fit, so can easily be rotated to suit any perspective.

Water Methanol Mix

You can buy pre-mixed solution and some even use the ultra low temp windshield washer fluid but I opted to mix my own. There are some race shops in town that sell methanol and believe it or not, it's cheaper than gasoline!

I bought a 5 gal container and a 2 gal gas can to mix in. The 5 gal, I get filled up with methanol from the race shop and the 2 gal can I marked on the sides in 1 gal increments. I put 1 gal of methanol in the can and then 1 gal of distilled water. The mix really isn't that critical, but I shoot for 50/50.

As for filling, I found that a funnel with a flexible tube works well. I put the flexible tube past the 90 deg turn and down the neck a ways so that I don't have to try and pour into that awkward plastic fill cap.

Conclusion

So that's it, water injection and a boost gauge. There were a few minor hiccups in the installation but all around I'm very happy with the Snow Performance kit. It does require some DIY effort to hook all of the pieces together but the pump and controller are solid pieces that give a good degree of flexibility in how they are used. I am also very happy with the Podi gauge, its look and the ease of installation.