# Nitrous Express EFI Nitrous Kit / Progressive Controller / Accessories **FULL REVIEW/DIY**

Original post link: http://www.e90post.com/forums/showthread.php?t=354785&highlight=nitrous+kit
( by Former_Boosted_IS - Feb 2010 )

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**Before I begin this review, I would ask for an open mind and nothing more. Quite a bit of data will be presented in this review, so I hope we can draw conclusions on the information presented and not urban legend.**

# INTRODUCTION

About a year ago, I heard of someone running a 50 shot of nitrous on an N54 and immediately something inside me said, "NAWS doesn't belong on a BMW". It is almost like we are programmed for this type of a response. Then I heard about OldBooster running a nitrous shot, then Brian355i, then AR Design running a 50 shot of nitrous. OldBooster had made tons of drag strip runs with nitrous and never had a single problem. I then consulted AR Design to find out a little more about what kind of shot he was running. AR Design said they ran a dry shot and Andrew was very fast to share that he thought the N54 responded superbly to nitrous. I spoke the STETT Performance to get their thoughts on nitrous and they believed the N54 would respond very well to a dry shot. I started to really question myself and this whole "Nitrous doesn't belong on a BMW" concept. Is this idea based on fact or was this idea based on old fashion urban legend? Ultimately, I found myself wondering if nitrous can be run safely on an N54?

The question of "Can nitrous can be run safely on an N54" led me to a search of our E46 M3 brothers. I found tons of posts about guys running NO2 (nitrous) on E46 M3s for years without trouble. I saw the response from the community was the same as I have seen here… "nitrous and BMWs don't mix". I read a transformation over the years among the community. Some started to believe it was viable, while there were always the stubborn group that hung tight to the urban legend. It was very clear that *safety cutoffs* are critical, but they are also critical in methanol, boost, etc. I was starting to realize that nitrous isn't taboo and I am sure people said the same thing about methanol years ago. I spoke with a number of friends that have run nitrous for years and they all said the same thing… if you do nitrous correctly, then it is just as safe as any other power mod. For me, I kept coming back to safety. I think the truth finally burned its way through the years of taboo that had clogged up my mind. Nitrous is as safe as the safety cutoffs you have in place.

# WET VS DRY SHOT NITROUS

If I was to try a nitrous shot, I had a decision to make… wet shot or dry shot?

> Quote: *A wet shot of nitrous is a precise amount of nitrous injected with a precise amount of fuel through one nozzle.*
>
> Quote: *A dry shot of nitrous is a precise amount of nitrous injected through a nozzle.*

Why would you need a wet or dry shot? Well NO2 breaks down into nitrogen and oxygen in your combustion chamber which essentially gives you more oxygen to create more power. Now, you must get more fuel into the combustion chamber with the nitrous or you will run lean. Now, I was debating a wet or dry shot? Traditionally for larger nitrous shots, like 100-200 shots, wet shots are exclusively used, but I had no desire for a large shot of nitrous. Turbod cars are notorious for huge gains on small shots of nitrous. Oldbooster, Brian335i, AR Design, and every other N54 I have spoke with ran a dry shot. The most informed people on the N54 will tell you that the N54 intake manifold and charge appears to be very susceptible to pooling (fuel puddling). Pooling can lead to nitrous backfires and they are not good. I knew AR Design had done some logging on his 50 dry shot and said the A/F ratios never went remotely lean on their testing. There was still one piece of the puzzle here that I needed to look at… I have a Snow Performance water/methanol kit. Basically, if I ran a dry shot with my methanol injection then I would always be adding 116 octane fuel to make for a very safe dry shot in my opinion. Testing would be needed to verify this and I could see where this was going. It was at this point that I decided I would try a dry shot, because I sincerely believed the HP addition would be large for a small shot. I knew I would need data to prove to myself if a dry shot could be safe on the N54 and this was one of the reasons I bought the FJO wideband which was used extensively during this testing.

# THE NITROUS EXPRESS KIT

With this my search began. I looked at a lot of the nitrous companies on the market, but kept coming back to Nitrous Express. Everyone I spoke with said they are simply the best bar none. This was not just from a few, but the overwhelming response. “I won’t use anyone but Nitrous Express” over and over. That made a strong impression on me, so I went to the website of Nitrous Express and began to look around.

Deciding on the dry shot is the beginning but how can I keep this safe? This is when the light went on! Nitrous Express has a progressive nitrous controller called the Octane Series Progressive Nitrous Controller. To say this piece is an extraordinary item would be an understatement.

**Here are some features of Octane Series Progressive Nitrous Controller:**

1. Allows you to set a nitrous window (the nitrous will only come on in these rpms if ALL conditions are met)
2. TPS activation (only activating when you floor the car)
3. Time delay (once all conditions are met, it will delay)
4. Time ramping (the nitrous comes on slowly over a user defined time)
5. Rpm ramping (the nitrous comes on slowly over a user defined RPM range)
6. A/F ratio lean fuel cutoff (if the car goes to lean, then nitrous immediately shuts off)
7. Rich cutoff (if the car goes to rich, then the nitrous immediately shuts off)
8. Low bottle pressure cutoff (shuts the nitrous down if the pressure in the nitrous bottle drops)

9. Controls the automatic bottle heater (it turns the bottle heater on and off to make sure it is at the correct pressure)
10. Displays rpm with a shift light
11. Displays A/F ratios by digital high speed databus
12. Displays TPS (whether the car is floored or not)
13. Displays percentage maximum of nitrous you are injecting
14. Displays whether the system is triggered or not displays bottle pressure

The list goes on and on. The Octane Series Progressive Nitrous Controller to me was the key to this entire project and was the final item that sold me on the Nitrous Express purchase. Some of the benefits on Nitrous Express kits are:

1. Nitrous Express Lightning Solenoids are widely accepted as the best on the market. They have few bends and incredible longevity.
2. The new Nitrous Express Lightning 45 bottles are the best flowing period.
3. They have fewer bends to interrupt flow. They even allow pressure reading on a closed bottle valve.
4. The Octane Series Progressive nitrous Controller offers the ultimate control and safety.

I felt like it is Nitrous Express, then everyone else, so I decided to purchase. Since this was going to be a test, I purchased a wet kit in case with the plan to run a dry shot first and if I felt it was unsafe, then I would move onto testing a wet kit.

My purchase included:

- A Custom EFI Nitrous System with 10 lb. Bottle
- The GenX-2 Accessory kit (bottle heater, purge, blow down tube, etc.)
- Octane Series Progressive Nitrous Controller
- Electric Gauge Transducer (so the controller can read the bottle pressure)

With this the review begins…

# EXPERIENCE WITH NITROUS EXPRESS


I called Nitrous Express to make my order with Mike Abney. The purchase process was very easy and I got a purchase order shortly after from Nitrous Express. Within a few days I had the kit in my hands. I have to say along the way Mike Abney in particular has been nothing less than an absolute wealth of information. When I had questions, he always had the answer. He spent a lot of time with me and even took multiple calls per day on many occasions. I cannot say enough positive things about him.

When the kit arrived at my door, I immediately knew Nitrous Express was the real deal. Their packaging was top tier, the organization was superior, and their protection of the items during the shipment process is as good as I have ever seen.

The ordering process was very easy with Nitrous Express. The second you get the items, you cannot question the quality of what you bought. Nitrous Express may be the best packaged/presented items I have ever ordered.

You can see how well organized the Nitrous Custom EFI system is.

Here are the mounting brackets and Lightning Series Solenoids.


Look at the carbon fiber Lightning Series Solenoids!!! Beautiful!

These are the nitrous fittings and NO2/Fuel lines.


The N02 fuel line is superb quality braided steel line.

Nitrous Express takes the liberty to include a very good hardware kit, wiring, and instructions.


Here you can see the bottle mounting hardware and the relay.

The new Nitrous Express Lightning 45 bottles are absolutely beautiful!


The Gex-X 2 accessory kit. Again, NX really focuses well on the presentation.


Here is a close-up of the automatic bottle heater.

Relays, bottle pressure gauge, fittings, etc.



Since I wanted to test a dry setup first, I ordered the dry nozzle.


This is the pressure transducer so the NX Octane Series Progressive Controller can automatically control your bottle warming functions.


Finally, the Nitrous Express Octane Series Progressive Nitrous Controller. In my opinion, this is the crown jewel of the entire project.


The Nitrous Express Octane Series Progressive Nitrous Controller has a superb manual that is very easy to follow.

The Nitrous Express Octane Series Progressive Nitrous Controller itself.

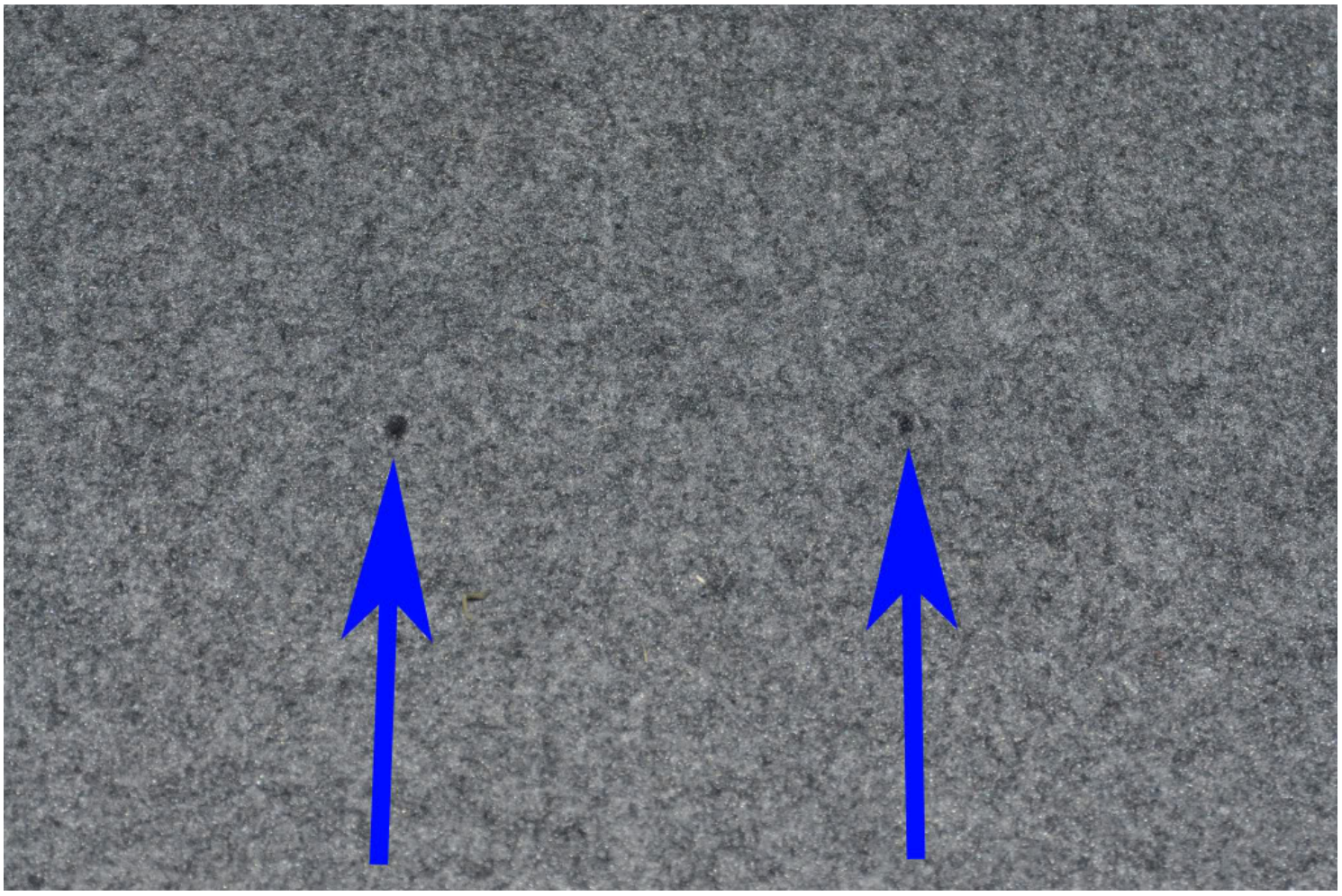
# INSTALLATION

I want to begin with a disclaimer here. THE INSTALLER TAKES ALL RISK WITH THIS INSTALLATION. THIS REVIEW IS MEANT TO BE NOTHING MORE THAN A GUIDE AND PLEASE USE AS SUCH.

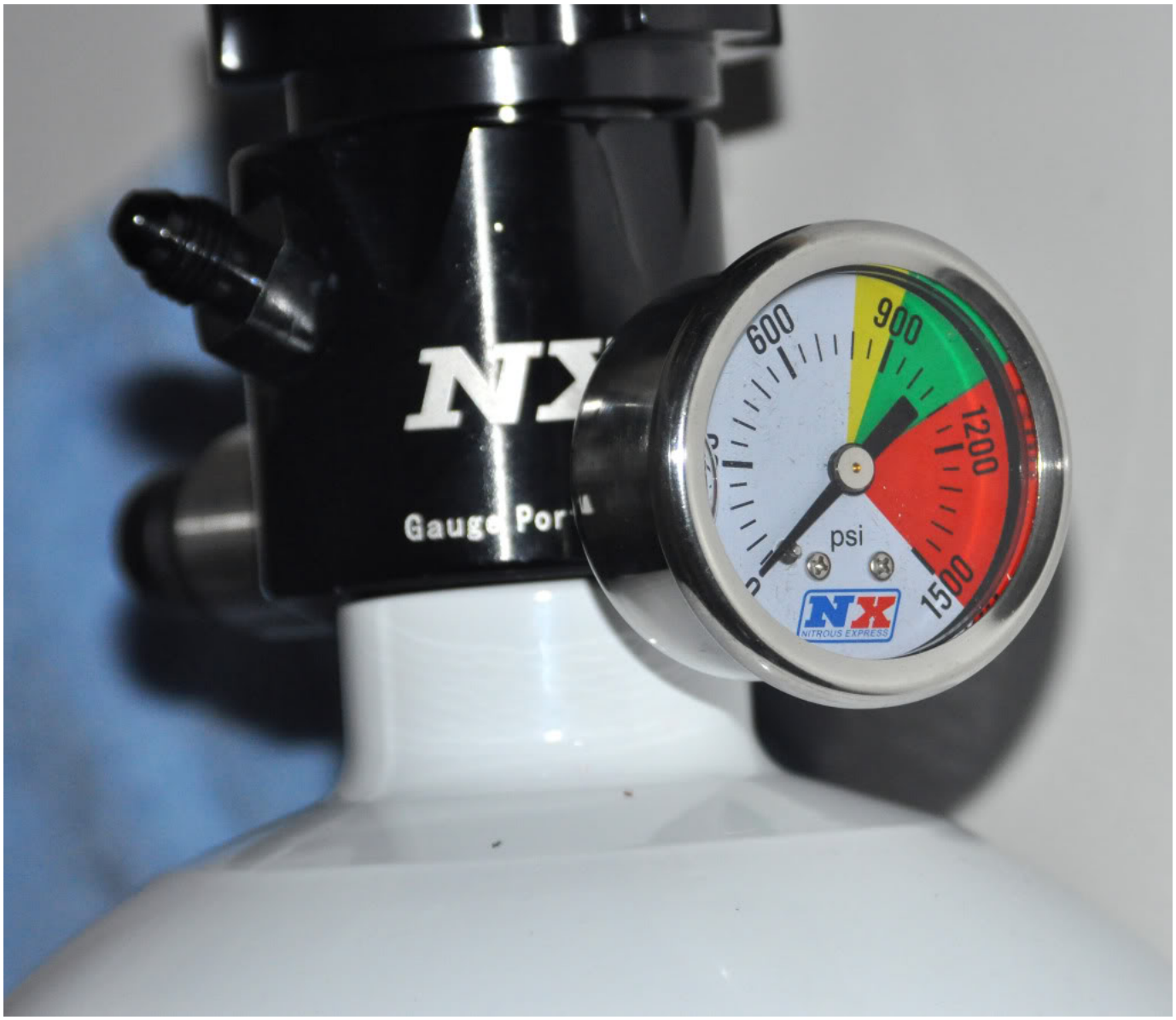
When you begin the install, it may be a little intimidating. I will tell you first off that this install is easier than methanol injection in my opinion. I think you can really knock this out in a day or weekend if you want to be really patient.

I always like to start at the back of the car and move forward. That means I started by mounting the bottle first. It is important to note that the NX Lightning Series 45 bottle neck *needs to face the front of the car and second the neck needs to be higher than the base of the bottle*. I chose a simple location near the rear that would allow easy access to the valve when I wanted to open it. First place the bottle mounts on, and place it where you want to mount it. You will then simply trace the holes and drill the rear trunk deck. Use the included hardware to mount the NX Lightning Series 45 bottle *temporarily*.

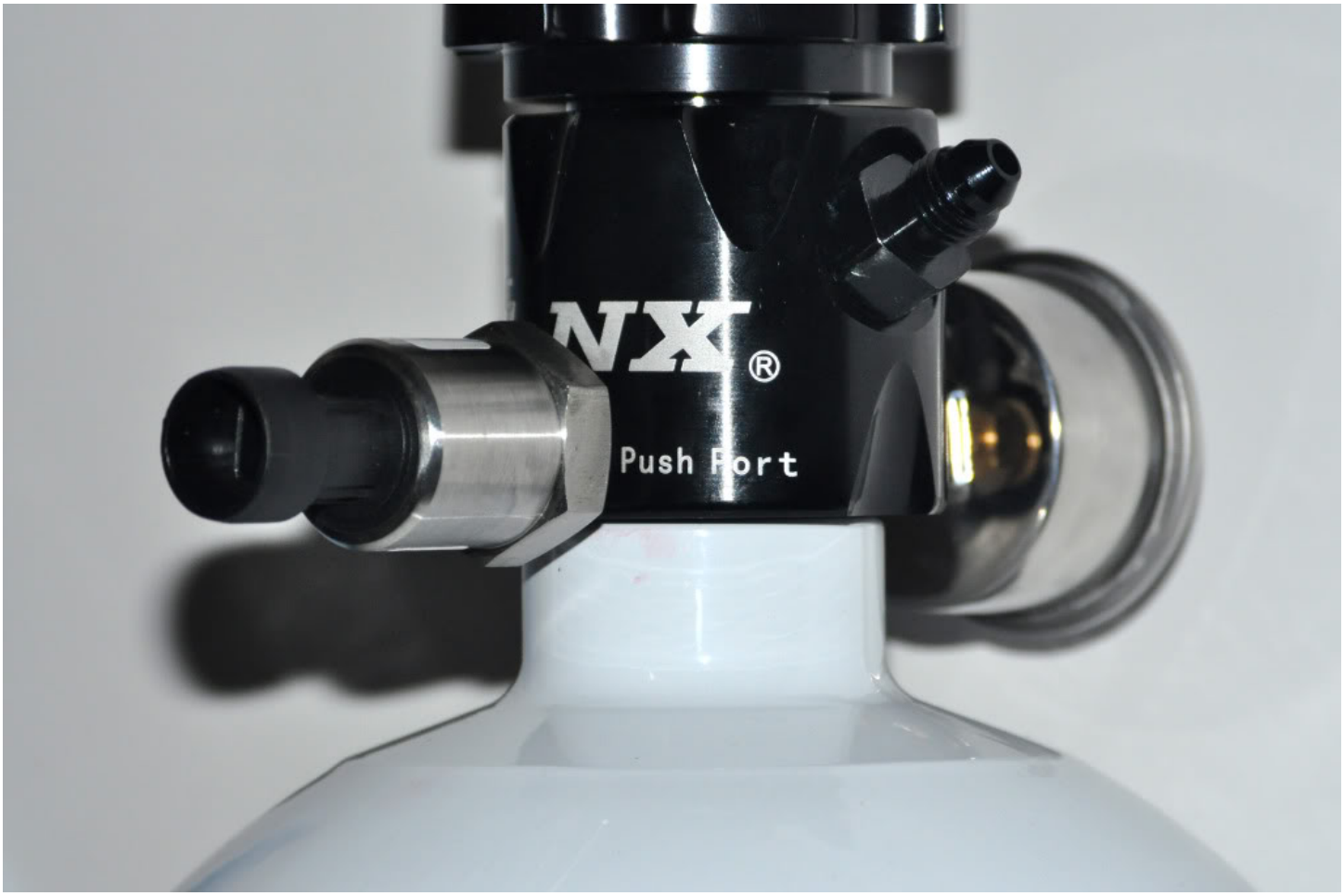
The blue arrows show the drill locations. You can see these are easily covered if you need to remove this quickly.



Now, it is time to take the bottle back out of the car and assemble it. The NX Lightning Series 45 valve has superb features that mean less hardware is needed. You can hook up the bottle pressure gauge and NX 1600 psi Pressure Transducer to the NX Lightning Series 45 valve and it will read even if the bottle valve is closed. This is a big difference from the old way of doing things and very convenient. Now you don't need to have the bottle valve open to read pressure! First you will screw in the pressure gauge on the gauge port side of the NX Lightning Series 45 valve. Always use the included thread lock (red tube) to secure threads from leaking.



Second, you install the NX pressure transducer to the push port and secure using included thread lock.



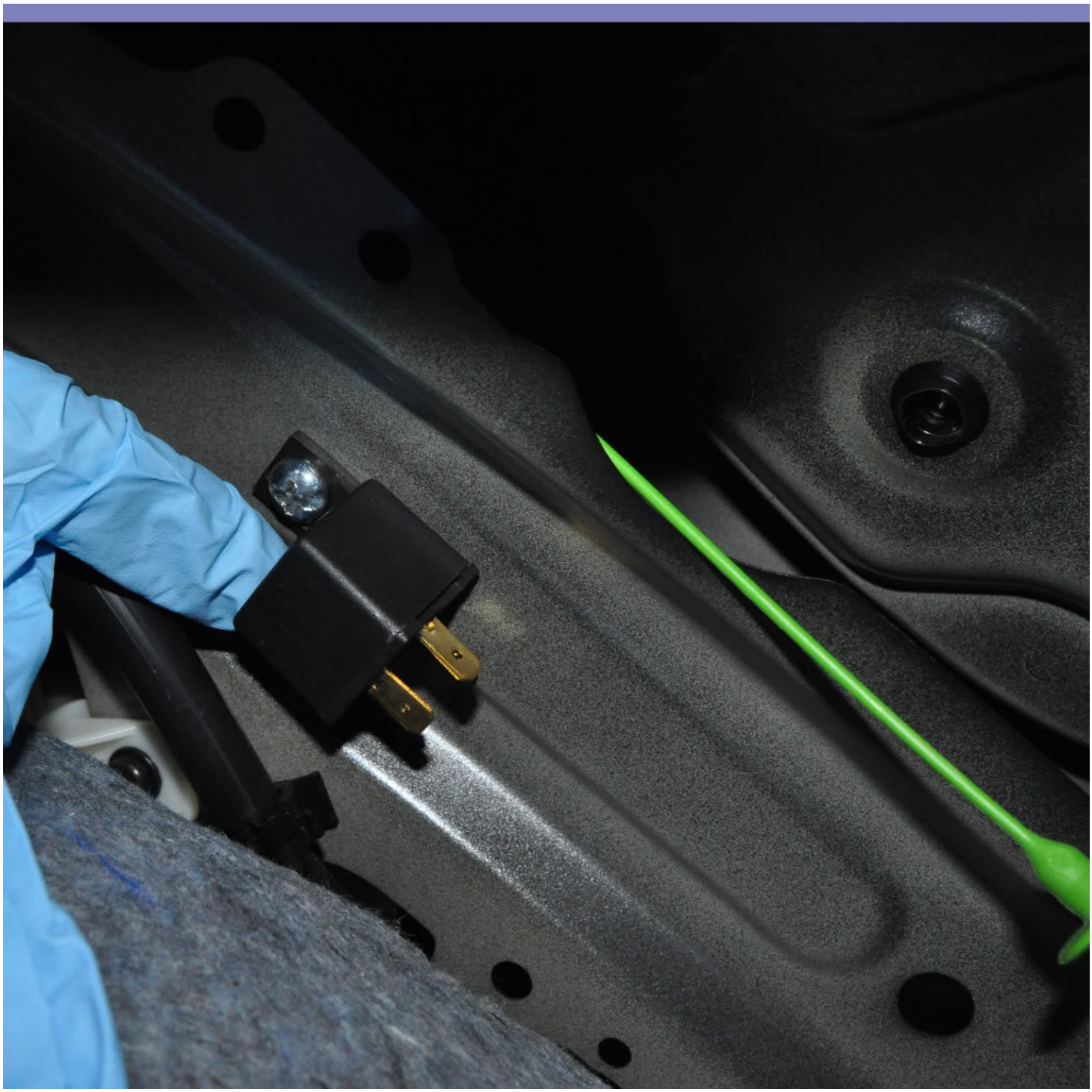

Finally, let's finish the bottle work by installing the NX bottle heater. Simply place it over the bottle and secure it using the velcro straps. You can mount it so that it will blend nicely with the label on the NX bottle.

*Note: You will notice, I didn't use a blow-down tube for now since the bottle is mounted in the trunk. Many NHRA tracks don't require them as long as the bottle is in an enclosed compartment like the trunk*


Great, the bottle is ready to install, but we should drill the holes for the wiring first to keep things clean. Test fit the bottle, and mark the locations to drill for the NX NO2 fuel line, NX pressure transducer, and NX bottle heater. *One note here, cover the openings of the NX NO2 fuel line with painters tape to assure that no debris will get in.* Notice the blue arrows showing where you will drill and pull the wire/NO2 fuel line/wiring harness for pressure transducer through the trunk floor.

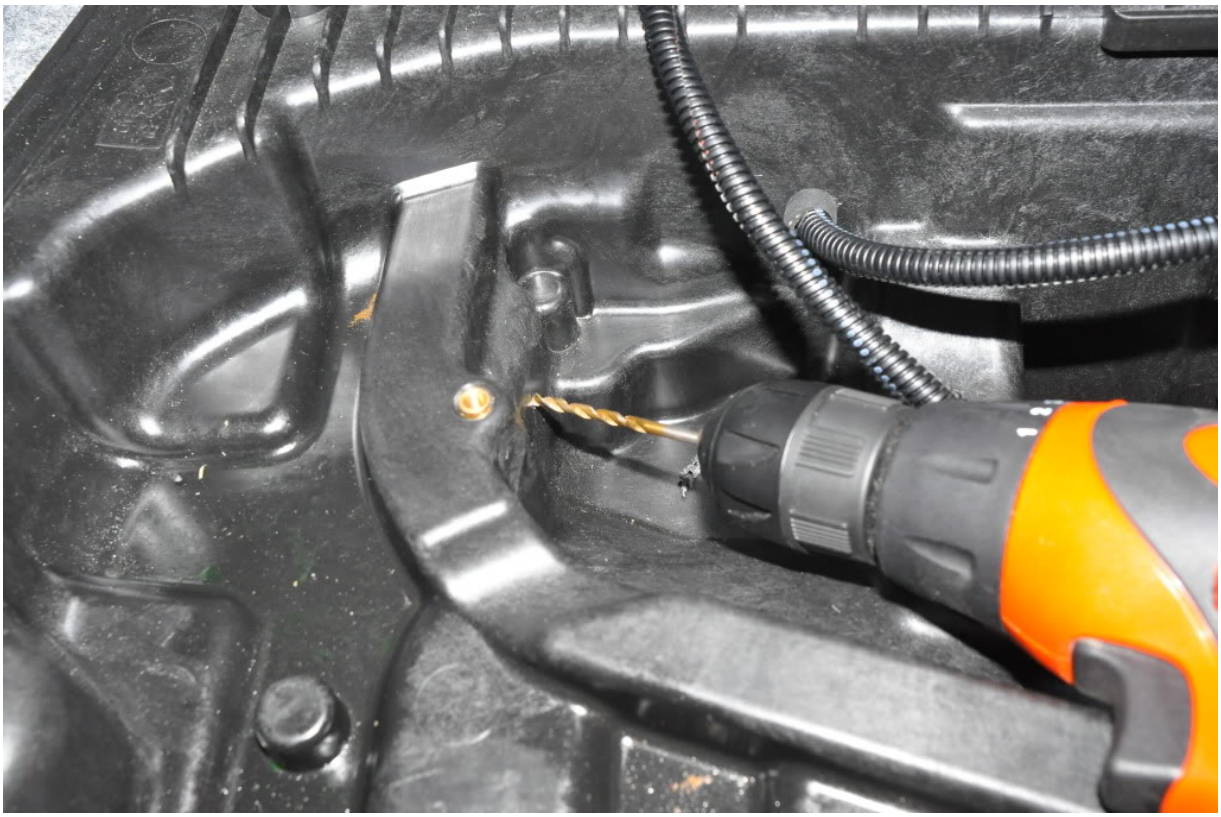

With all the wire run, it is time to wire up the bottle heater and run the wires to the front of the car. First, let's get the bottle heater and relay wired up. In case you do not know, the battery is on the passenger side of the car behind the trap to the far right of the trunk. Here is how to expose it.

I found a perfect spot to mount the NX bottle heater relay. Wire up the relay according to the instructions and you are a go! I used a 25 amp fuse to the relay to protect the system from a surge. *Note, follow the instructions closely because red on the relay is NOT power.*



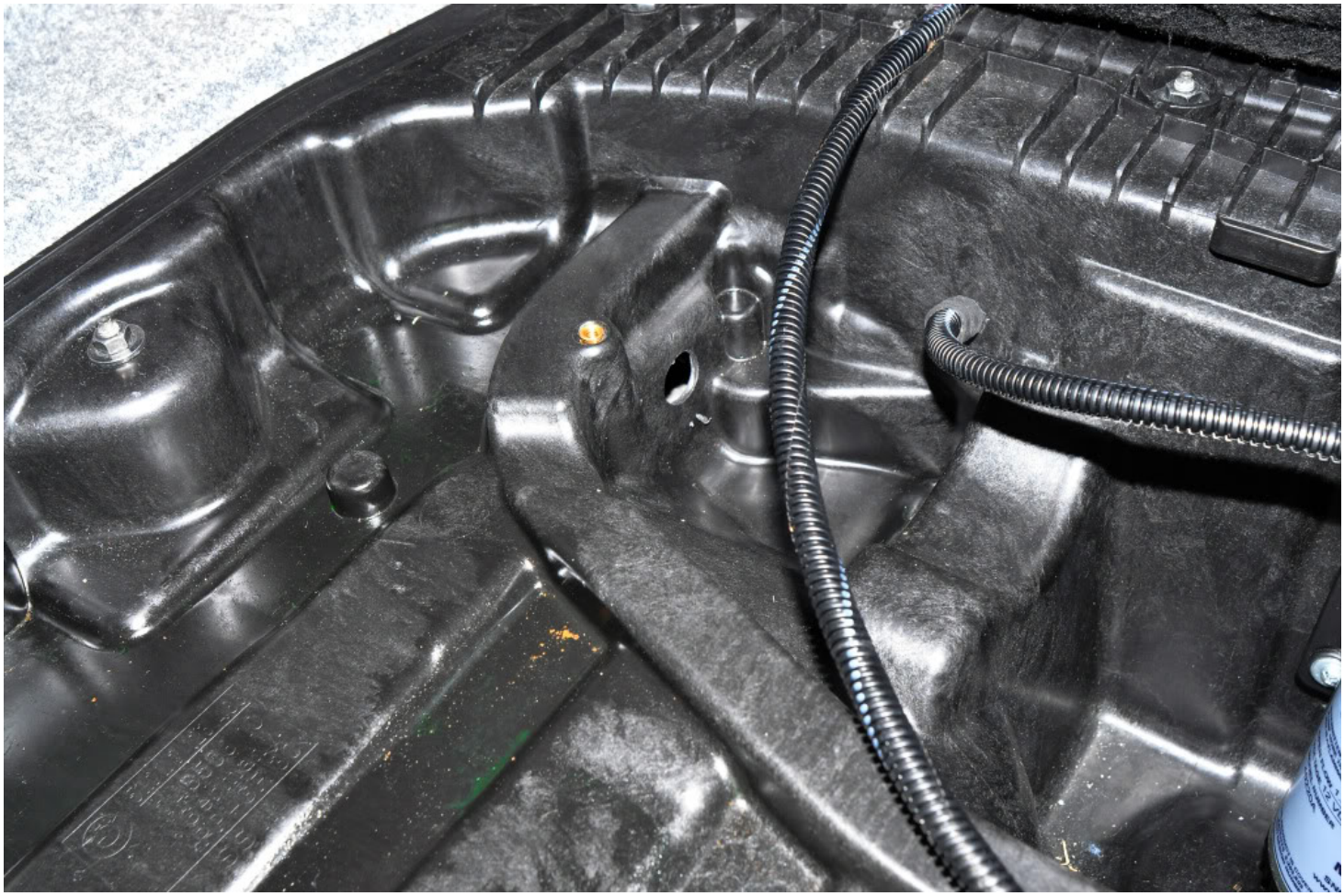
Now you are ready to run the wires under your interior to the driver's side footwell. Since the interior removal has been covered well, I will defer there. I would not install the bottle now because you will need to fill it later and you still have to run the NX NO2 fuel line, but this is a good time to secure the bottle mounting brackets to the trunk floor.

Speaking of the NX NO2 fuel line, let's get this run to the front of the car. If you chose to mount the NX bottle where I did, then you should follow the NO2 fuel line run path I suggest because the length is perfect. First you will drill a small hole on the exact location I am showing you in the plastic trunk bottom. Start with a small drill bit so it won't walk on you.



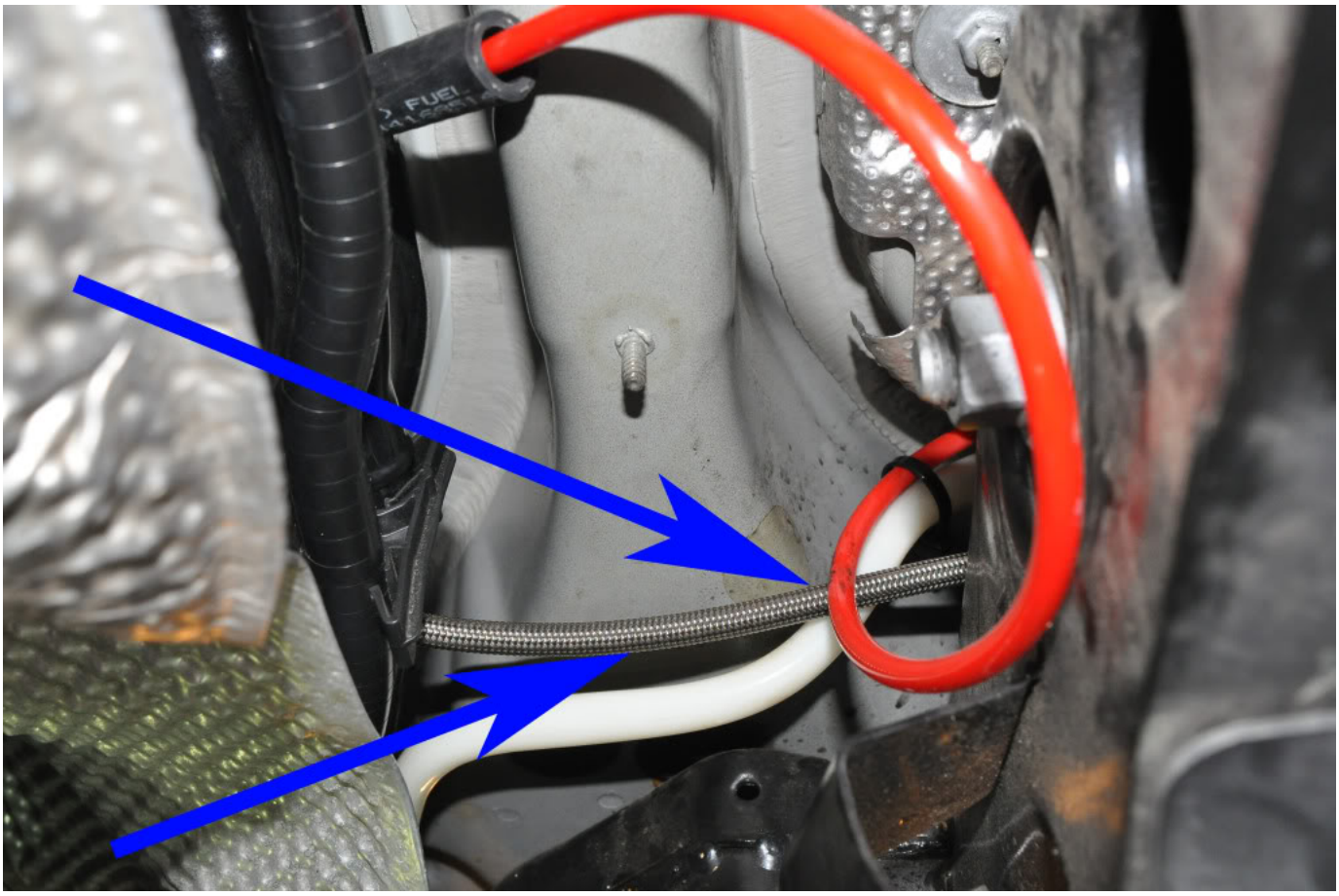
Now drill the hole up to ¾". If you don't have a step bit, get one! They are $10 at Harbor Freight and will save you so much time in future installations. You can "step" up the hole to any size necessary without changing the bit.

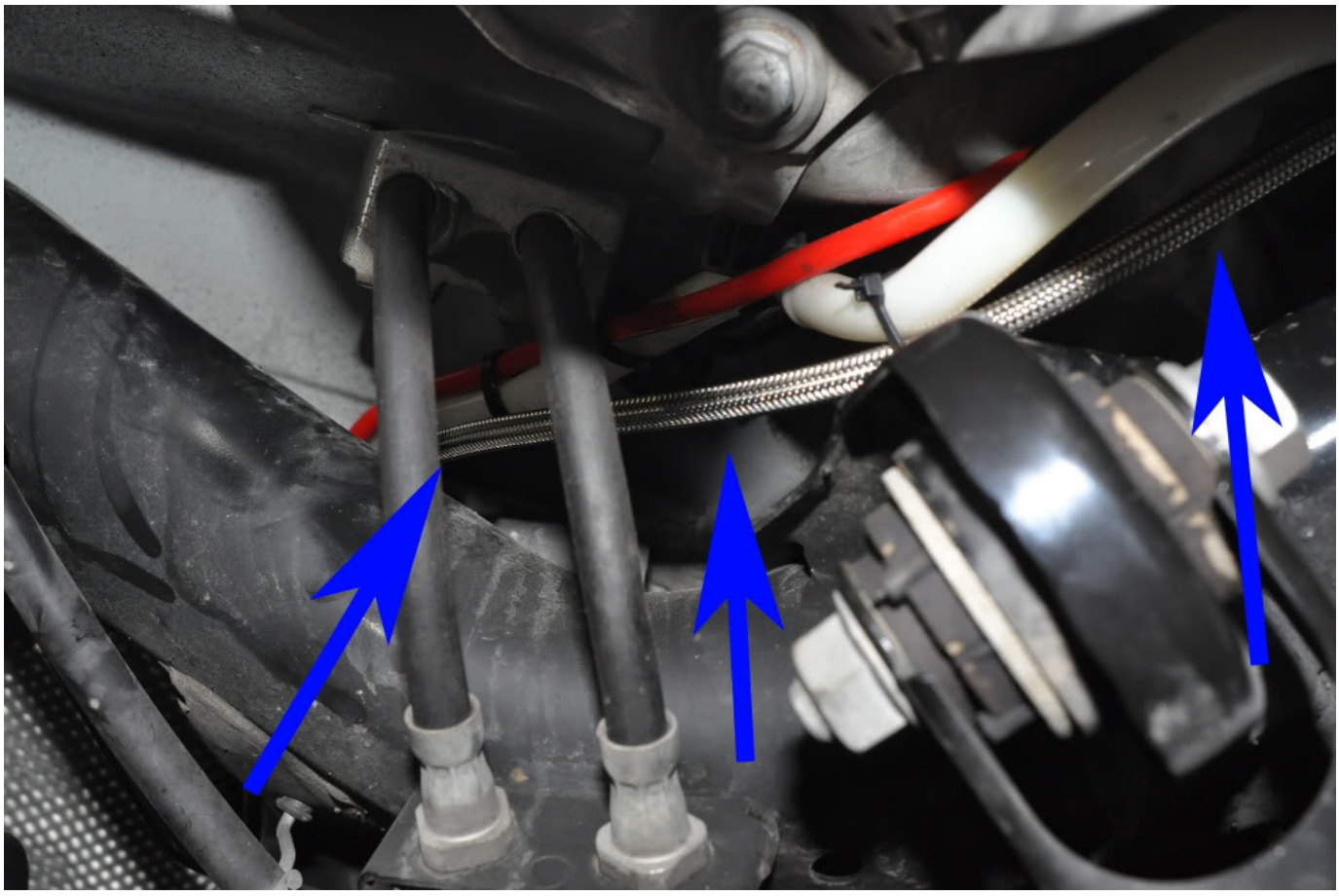
The final result should look like this.

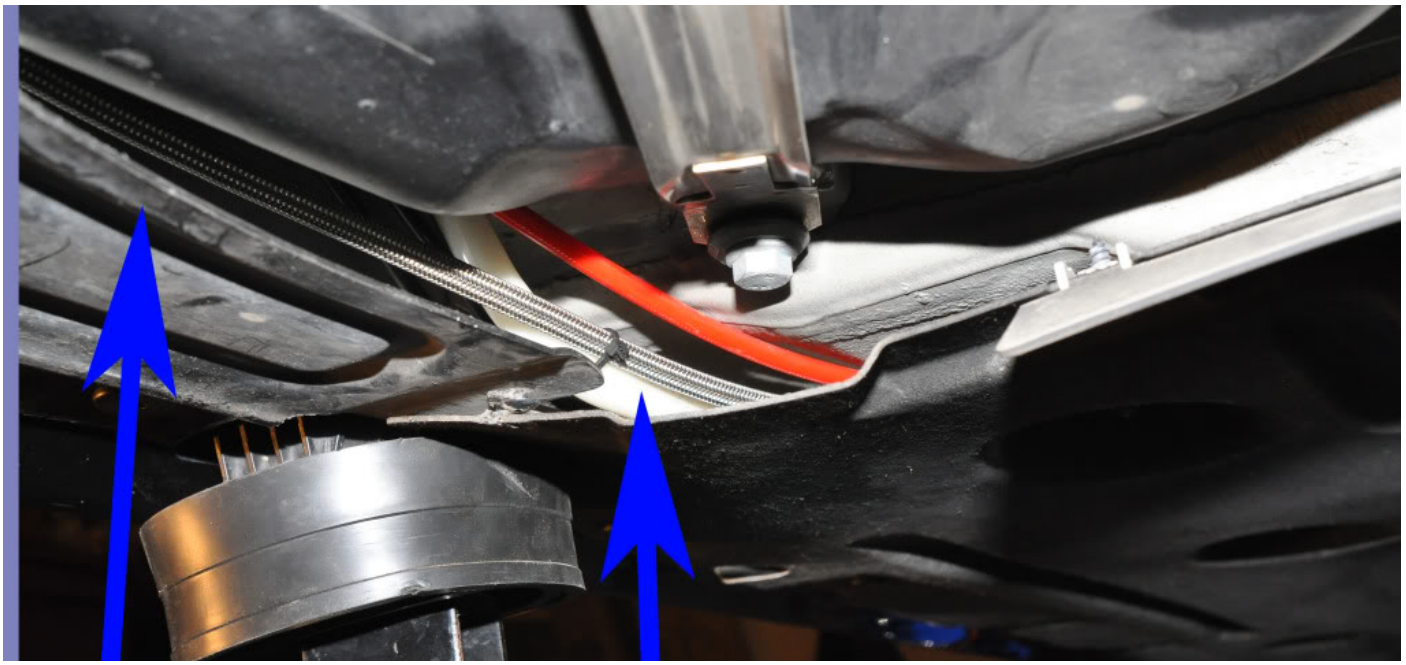


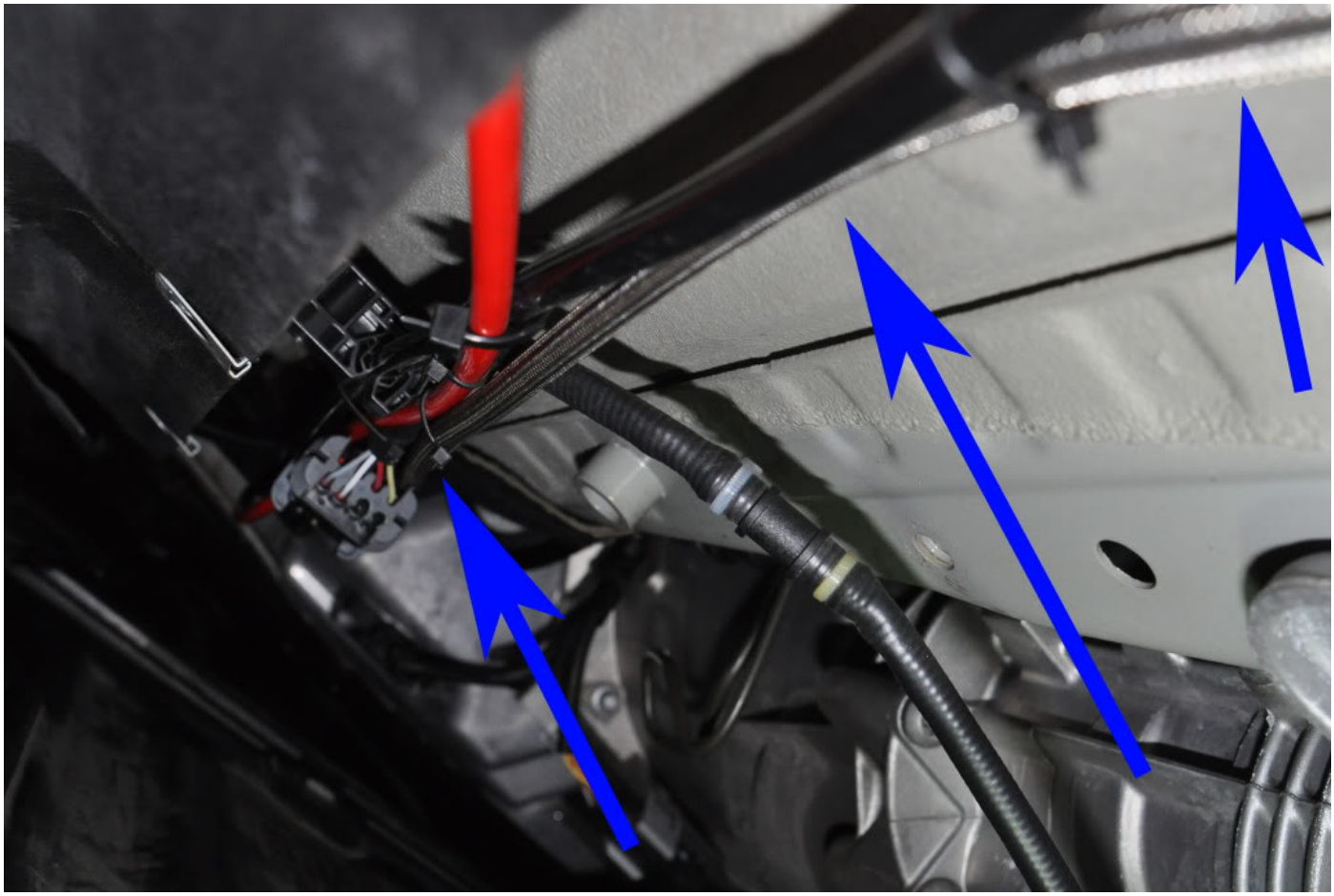
Run, the fuel hose through the hole and pull out all the slack. I always protect fuel line from impact or cutting surfaces, so I wrapped the NX NO2 fuel line in ½” hose that you can get at any auto store. This is what the final truck product will look like.

Now it is time to run the NX NO2 fuel line under the car to the engine compartment. I always chose the driver's side of the car because it keeps you away from the transmission and exhaust at all times. You will notice that I follow the white tubing all the way up to the engine compartment where the blue arrows highlight the run. You will need to pull a 2 under car belly panels, but this is very easy work. Remember to secure the NX NO2 fuel line with the included zip ties.


FUEL







Notice the NX NO2 fuel line in the engine compartment as noted by the blue arrow.

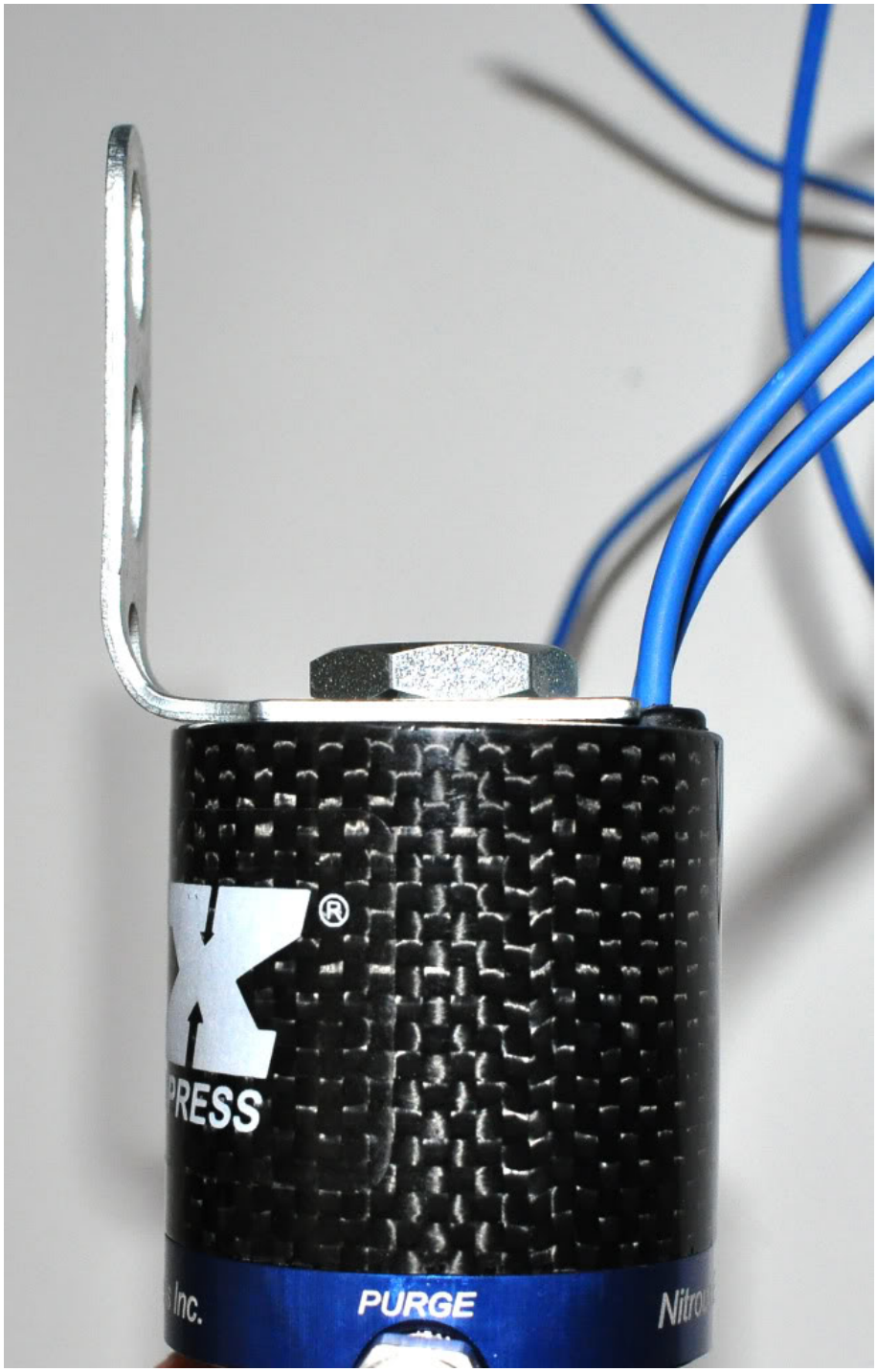
And here is close-up of the NX NO2 fuel line routed into the engine compartment.

At this point, we move toward the NX Lightning Series Solenoid install. The first thing to do here is assemble the fittings on the solenoid and purge solenoid. Always remember to use the included thread lock to secure the fittings.

One awesome features of the NX Lightning Series Solenoid is that it attaches directly to the purge solenoid. Attach the NX Lightning Series Solenoid to the purge solenoid and install the shorter NX NO2 fuel line to the bottom of the NX Lightning Series Solenoid. Remember to cover the open end of the NX NO2 fuel line with painter's tape to protect it from debris.

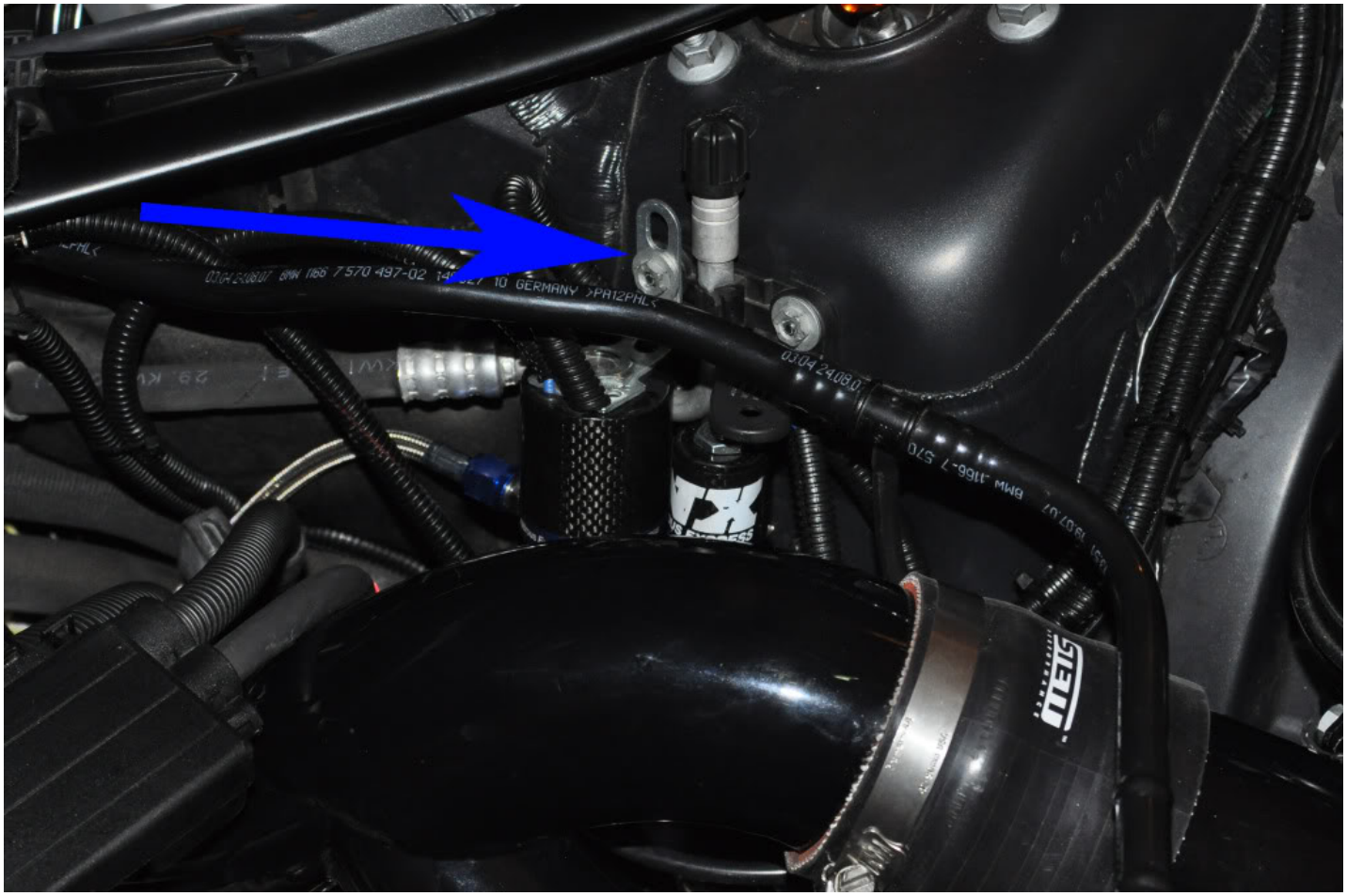

Then you will want to bend the mounting bracket as I am showing here and install it on the top screw of the NX solenoid.


PURGE
Nitrous Express Inc.
N2O
Outlet
15200L
Mode
In
U.S.A.




Let’s get this mounted in the engine bay. I found fantastic location to mount the NX Lightning Series Solenoid that works beautifully with the NO2 fuel line run. It is the location where the AC refill line/bracket is located!

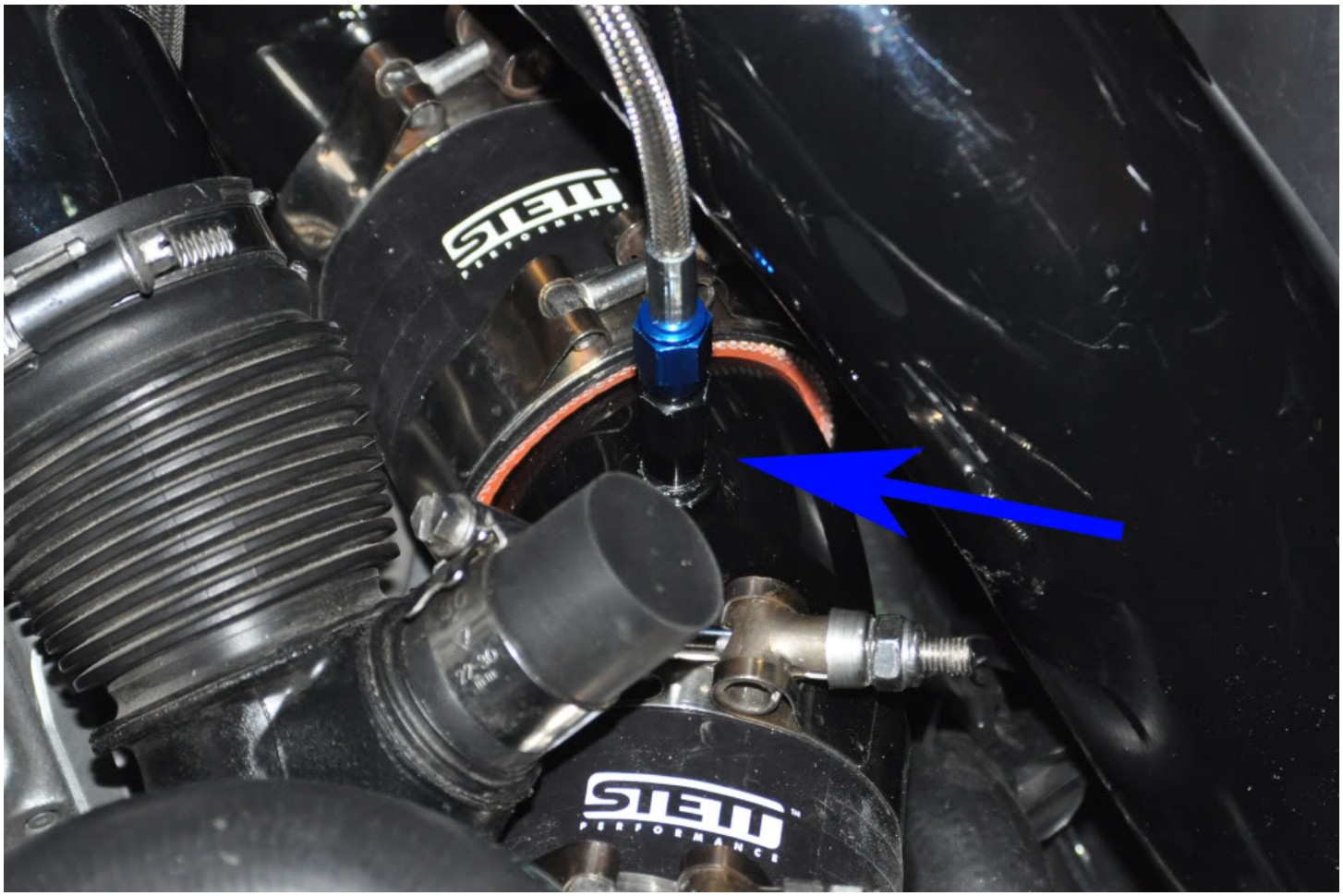
There are two ways to do this. You can attempt to mount it in front of the bracket or simple shave part of the AC refill bracket off using your dremmel. I personally cut off the back of the AC refill bracket that faces the firewall to make sure the mount was secure. Regardless, this location is absolutely ideal!



After you have mounted the solenoids, screw in the NX NO2 fuel line from the bottle and secure it using the included thread locks if you did not in the earlier step.

Finally, let's mount the nozzle and jet. I used the STETT Performance Nitrous/Methanol Elbow which includes a 1/8" NPT port for the nitrous nozzle. This is the perfect spot for the nitrous shot and very PNP. *I am using a .31 jet which is rated for 35 crank horsepower.* The jet will be inserted into the nozzle with the tapered end facing away from the nozzle.

Secure the fuel line to the nozzle using the supplied thread lock.

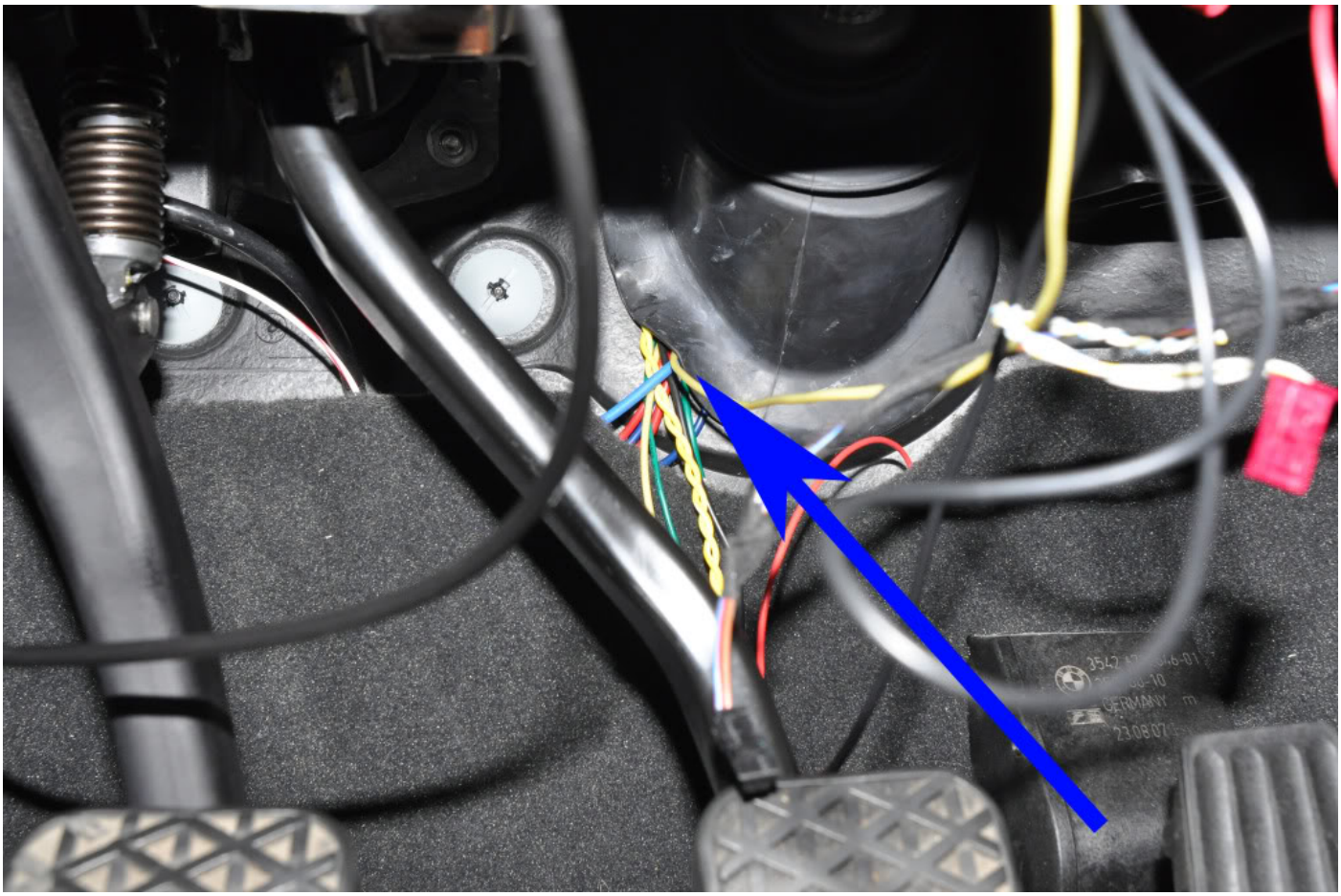


*For the time being, I didn't finish the purge install yet in the interest of getting this review done, but I will include instructions on this as soon as I finish it.*

This really finishes the hardware installation, so let's move onto the wiring under the hood and in the cabin. Let's stay under the hood because we are still there. The first item to address is mounting the relay for the solenoid. Again, I found a perfect spot for this relay that keeps it away from heat. Right behind the driver's side headlight there is a nice spot that you can see below.

For the constant power, you don’t want to run a wire all the way to the trunk obviously, so I used the battery post under the hood. You can see it in the picture below. Simply pull the plastic cover and secure the wire under the rear bolt. I used a 30 amp fuse to protect the system for a surge.

Wire up the solenoid and purge valve according to the instructions and route the needed wires into the cabin. I routed my wires through the steering wheel grommet shown below with a blue arrow. It is an easy, easy run.



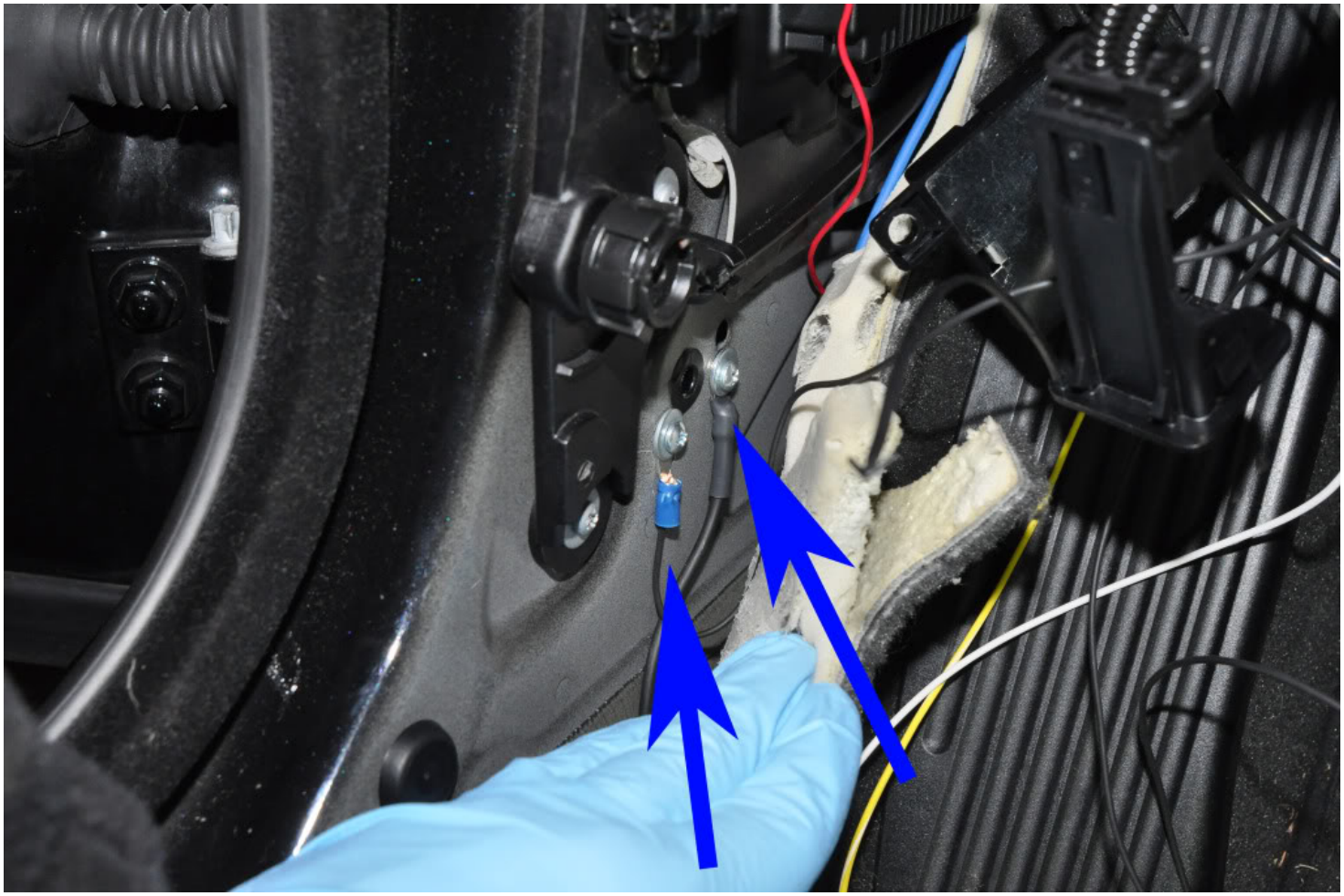
At this point you will wire up the NX Octane Series Progressive Nitrous Controller according to the instructions. The instructions are very thorough to say the least. If you want to view them prior to install, here is a link.

http://www.nitrousexpress.com/Instructions/octane_progressive.pdf

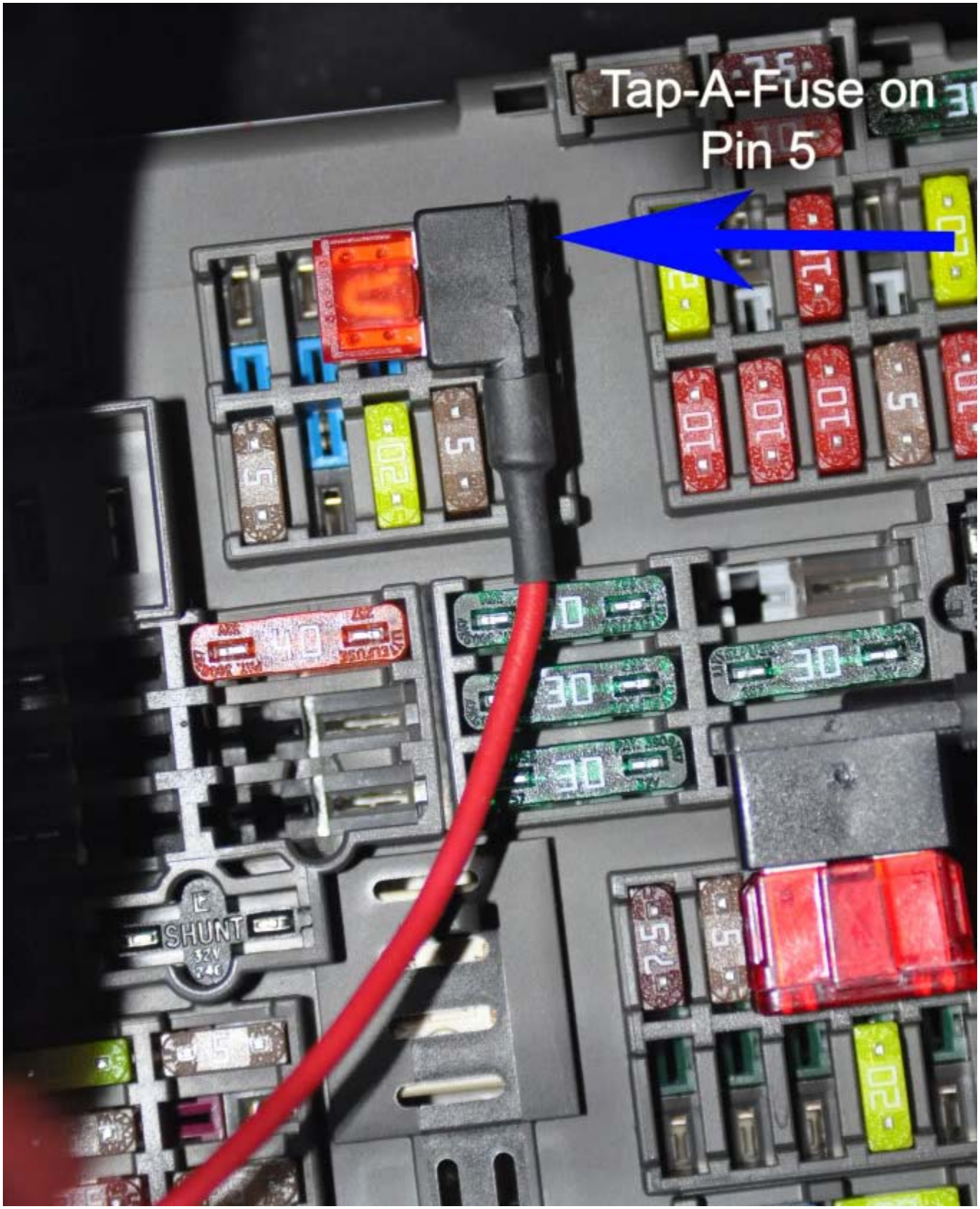
Other than the obvious, I do want to cover a few items:

1. Grounding the (2) controller grounds that require locations that are *not* shared grounds.
2. Key-on power.
3. RPM… where to get it?
4. TPS… where to get it?

The first thing I will cover is the ground locations. I searched for a while and ended up deciding just to drill 2 small pilot holes in the sheet metal below the trunk “pop” lever and mount the grounds there. This location is completely covered by carpet and takes 5 minutes total. You can see the mount points marked by blue arrows.



How do I get key-on power? Well since you ask. I used a Tap-A-Fuse which is such an easy solution. You can tap either fuse location 5 (blue arrow in picture below) if it is open or you can “jumper” fuse location 7 in the fuse box for key-on power.



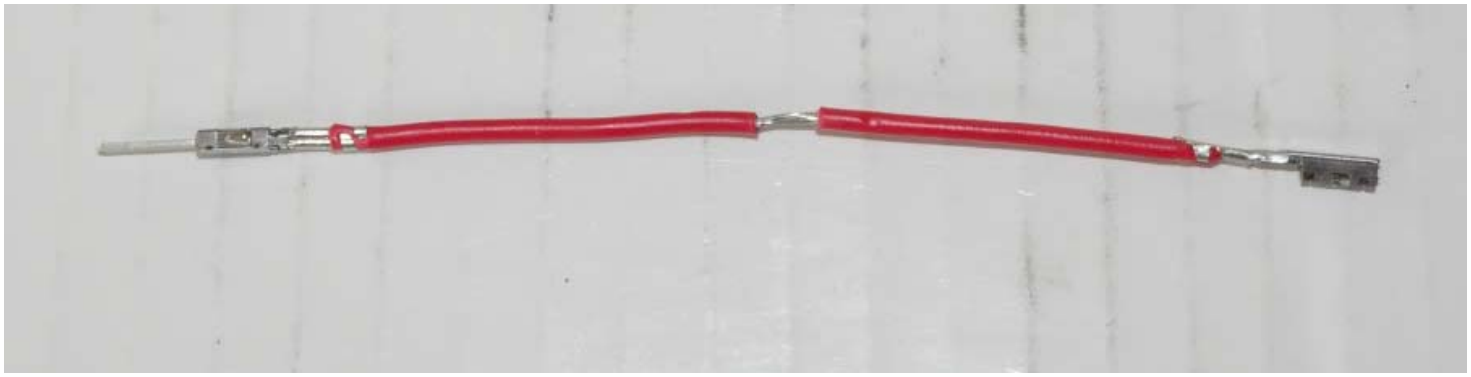
The NX Octane Series Progressive Nitrous Controller has a driver that will tell the solenoids to turn on. Just find any easy spot under the dash to mount it. I actually put it on under the dash above the hood “pop” lever.

So how do you get the RPM signal? The RPM output is pin 21 on the small grey slider in the ecu box. That is off the driver's side ecu plug. If you are not sure where to find the grey slider, just watch this video and look at 4:23 to see it:

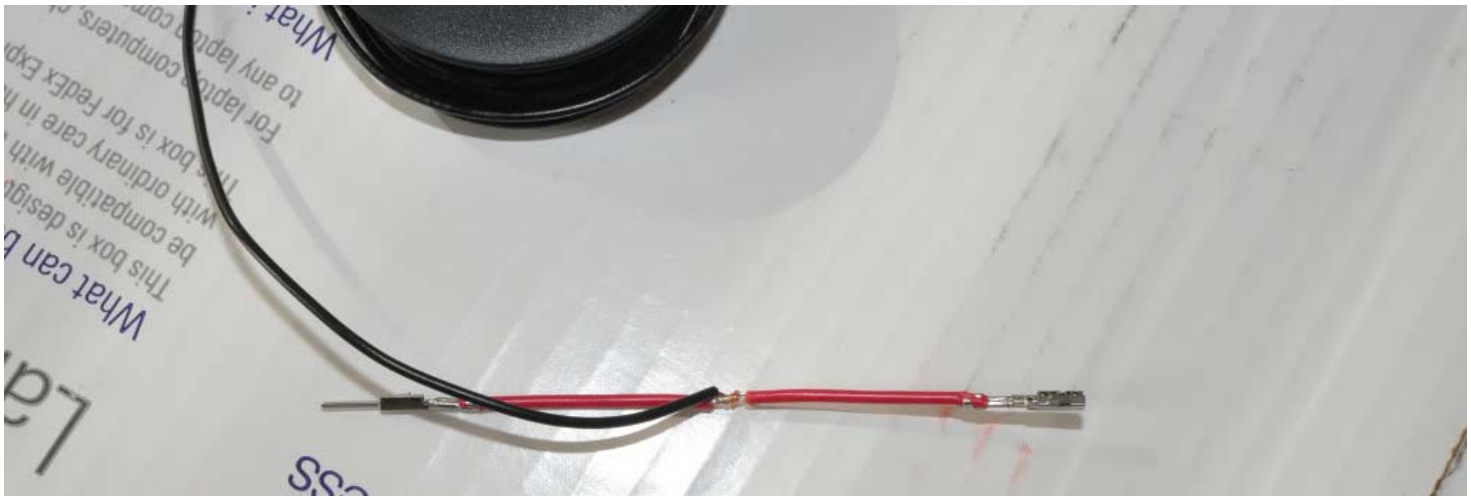
BMW Juice Box Installation video:
http://www.youtube.com/watch?feature=player_embedded&v=yMfqNzfMI-s

Now you will need to intercept the black wire in pin 21.

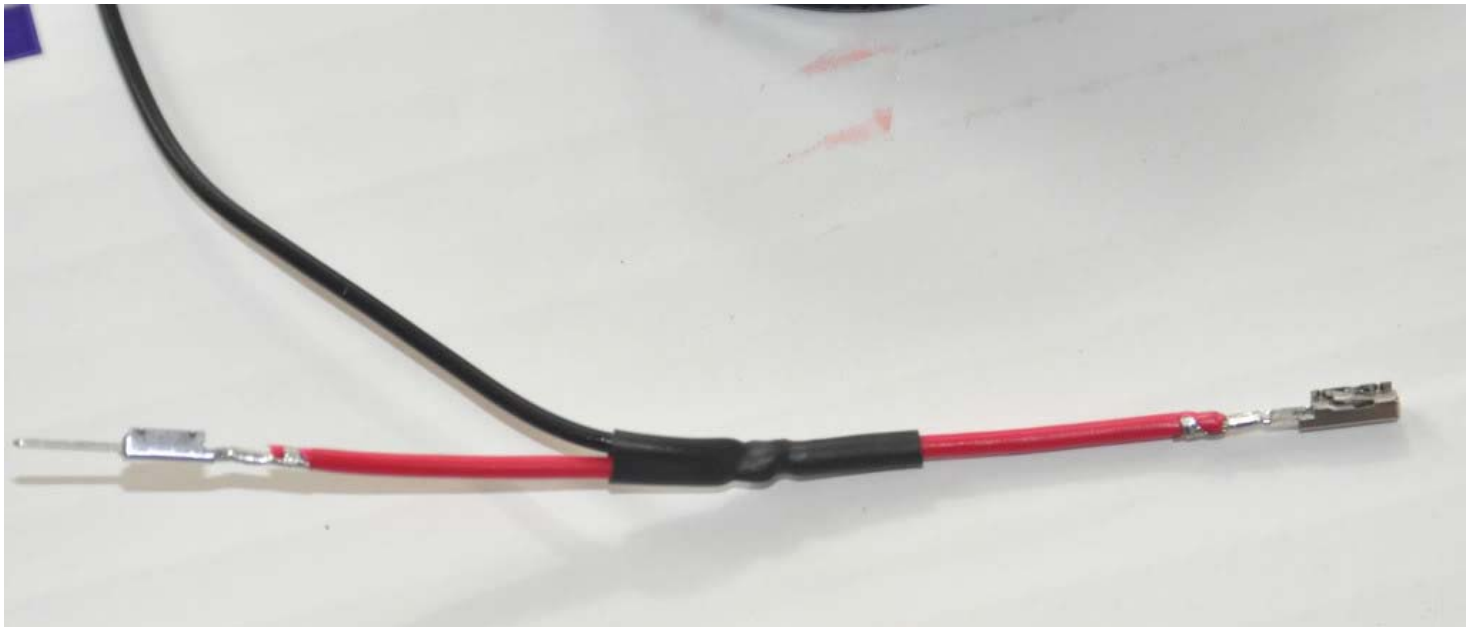
What is the easiest way to intercept it? I actually used a wire to create a simple and clean PNP style solution. I simply removed the PNP wire from my JB3 harness and stripped off a small section.



Then I added a black jumper wire.



Soldered it and used shrink wrap.

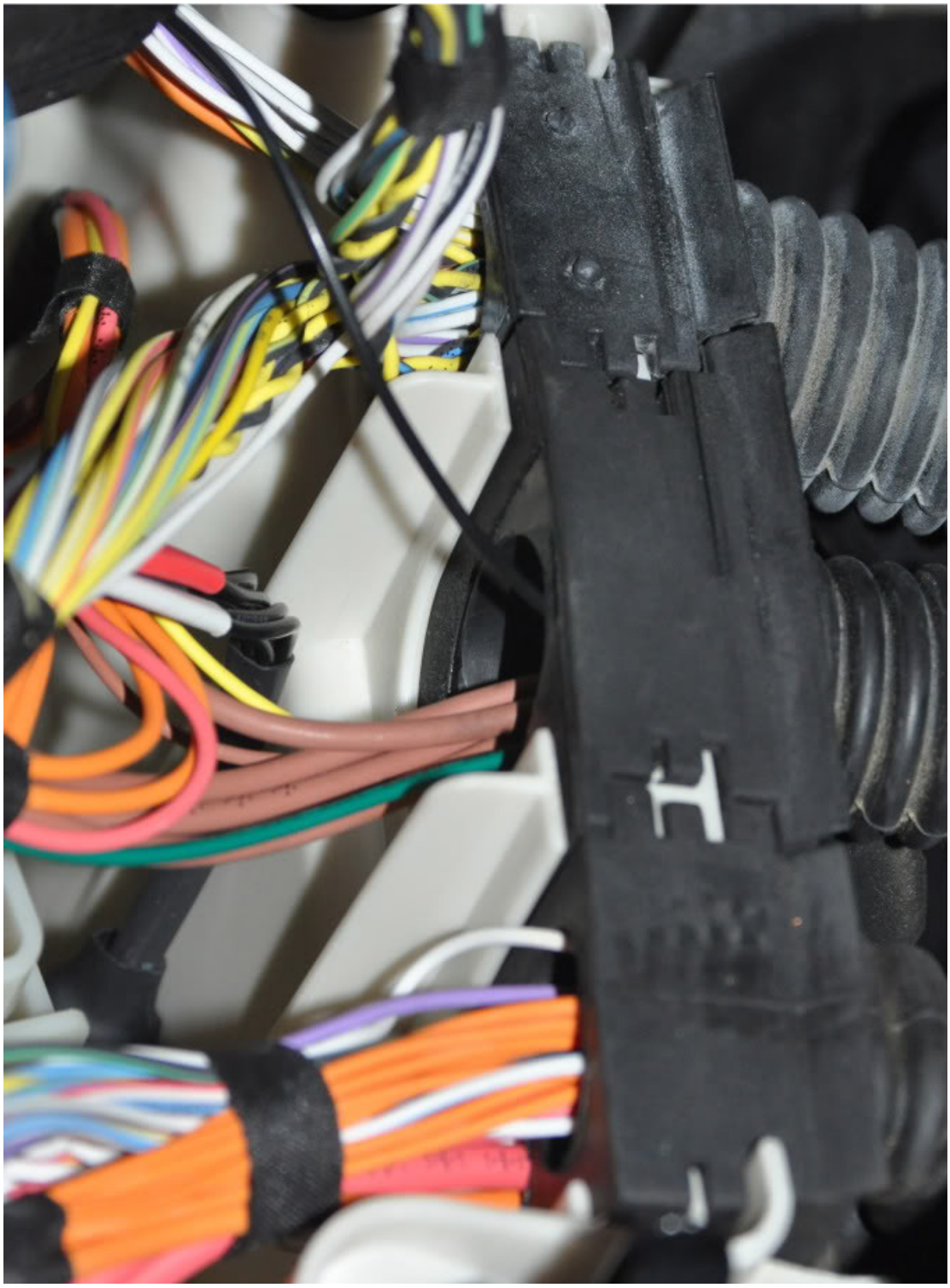


Then re-insert that back into pin 21 on your PNP harness and you have an RPM signal!!!

This is a standard 6 cylinder tach signal and you will use multiplier of /3 to get any controller to recognize this rpm signal.

Use the same technique to intercept the TPS wire. Where is the TPS wire? *It is also on the grey subconnector and pin 7 (yellow/white wire)*. I intercepted it in the PNP harness using the technique above.

Then run the wire out of the ecu through the middle rubber grommet. I ran the wire across the slider above the engine to the driver's side of the car to keep things clean.

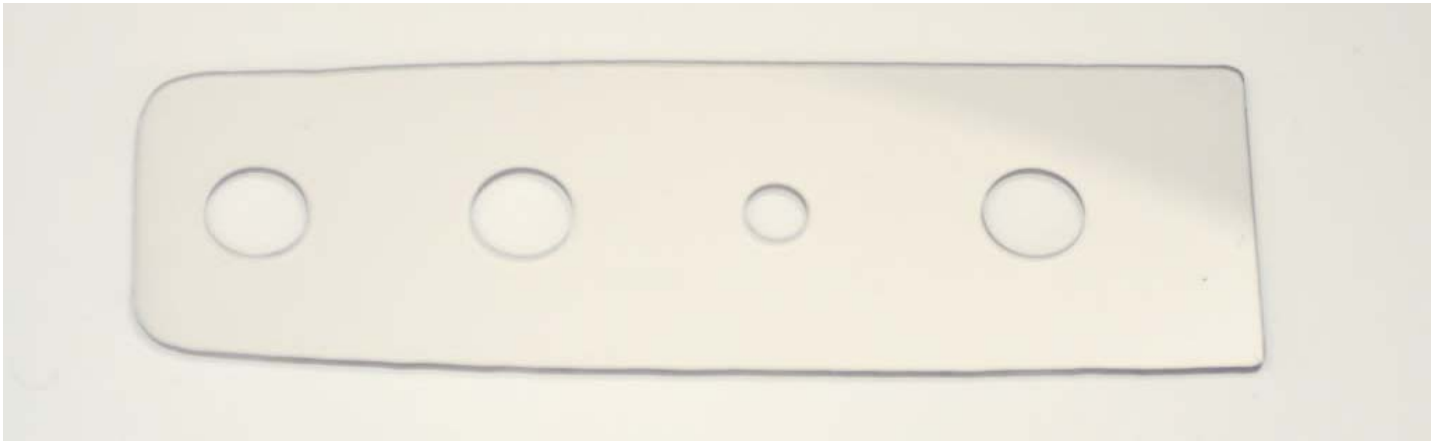


Route all the wires into the cabin through the rubber steering wheel grommet shown above.

Follow the rest of the instructions to finish the wiring and then tuck all the wires under the footwell carpet to keep things clean.

The final item to cover is the trigger switches for NX EFI kit, NX purge kit, and Purge fire button. I chose to go to Autozone and buy some blue led trigger switches so I could color coat my items. Red is methanol and blue is nitrous. Then, I had to decide where to put everything and I chose the armrest area. Just simply remove the rubber bottom to the armrest location that makes a perfect trigger switch panel. You can even use the rubber bottom to trace out the dimensions for the trigger panel. To remove the rubber insert, just lift it up using a little pressure to create friction. I decided again to use Lexan plastic to create the mounting plate because it is so easy to cut and form with dremmel. I placed the rubber insert on the Lexan to trace the pattern.

Then cut out and sand down the Lexan using your dremmel to create the mounting plate. After it is cut, trace the mounting locations for the trigger switches and purge fire button. Use a small drill to create a pilot hole, then use your step drill bit to open the hole to the correct mounting diameter.



I love carbon fiber fabric and used it to cover the mounting plate. Spray adhesive works beautifully here and follow normal wrapping procedures.

Time to mount the switches and purge button on the plate.

Wire things up and insert the panel into your armrest area.

At this point, your kit is ready to go *but* you still need to set up your Octane Series Progressive Nitrous Controller. Since the controller is such an advanced piece, I would like to cover that in the next section.

# OCTANE SERIES PROGRESSIVE NITROUS CONTROLLER

I wanted to look at the Octane Series Progressive Nitrous Controller separately because it is brings *so* much to the table. If you have a moment, please read through the instruction manual on the Octane Series Progressive Nitrous Controller:

http://www.nitrousexpress.com/Instructions/octane_progressive.pdf

Nitrous safety needs to be a strong consideration as it is with things like methanol or boost. Basically the Nitrous Express Octane Series Progressive Nitrous Controller does everything. I am not sure I could state it better than Nitrous Express, so have a look.
Quote:

> Basic Features:
>
> • RPM window switch
> • Wide-Open-Throttle detection when used with factory TPS or WOT switch. (Supports Fly-by-wire TPS)
> • Progressive controller (time or RPM based) with a 5 section programmable ramp
>
> BUT IT ALSO CAN BE A COLOR:
> • Progressive Controller Monitor Gauge which graphically displays all configured options
> • AIR/FUEL Gauge that supports all O2 widebands with a programmable analog output or the FJO Digital Data Bus.)
> • Nitrous Pressure Gauge with programmable safety set points.
> • Boost Gauge with programmable safety set points.
> • Fuel Pressure Gauge with programmable safety set points.
> • Oil Pressure Gauge with programmable safety set points.
> • Automatic Bottle Heater Control with safety shut-off
> • Shift Light
>
> Advanced Programming Features:
> • Lean and Rich Cut-Off
> • Remote ARMing
> • First Gear Lockout
> • Ramp delay
> • Default Power Up display mode
> • Automatic Armed display mode
> • User defined color ranges for each configured option
> • Expandable progressive driver that allows the main unit to drive an unlimited number of solenoids

To me, the Octane Series Progressive Nitrous Controller offers an unbelievable feature set. It is a boost gauge, fuel pressure gauge, nitrous pressure gauge, tach, shift light, bottle heater controller, visual data logger, nitrous window switch, nitrous WOT/TPS switch, progressive nitrous controller, etc. The Octane Series

Progressive Nitrous Controller is safety. Safety has been critically important to me through this whole process, so let me define a few things.

What is a window switch? A window switch defines an rpm range where the nitrous can spray if all other conditions are met. An example would be 3500 – 6300 rpms. This means you can never hit redline under nitrous and you can stop it from spraying too low in the rpm range.

What is a TPS (WOT) switch? The TPS switching means the nitrous cannot spray unless you are under wide open throttle (WOT). This assures you will get full fueling when the nitrous system sprays

What is an air fuel ratio cutoff. A lean/rich air fuel ratio cutout means *the controller will shutdown the nitrous system in the event that the air fuel ratio goes to rich or too lean*. It means it will stop the nitrous system before any damage could occur.

The Nitrous Express Octane Series Progressive Nitrous Controller also allows the FJO digital data bus input which is gigantic. This is a *very* high speed input for the wideband allowing multiple O2 sensors to be used. This is the fastest possible input ensuring the A/F data the controller uses for the A/F ratio shutdown is extraordinarily fast.

Finally, the Octane Series Progressive Nitrous Controller can obviously progressively control the nitrous. This will allow a time delay from the point all spray conditions are met and a time ramp for the nitrous to come on. It also allows rpm based progressive nitrous spraying. Everything is customizable and user defined.

Have a look at just some of the displays.


13.2


1743


1762


541
14.5
873
0%


And of course, HD videos.

http://www.youtube.com/watch?feature=player_embedded&v=8Te-e9NovCE

http://www.youtube.com/watch?feature=player_embedded&v=g5Rqq-JJW80

http://www.youtube.com/watch?feature=player_embedded&v=sM27tYAmaWo

The bottom line is the Octane Series Progressive Nitrous Controller does everything I wanted in a compact color display!

# CONFIGURATION SETTINGS

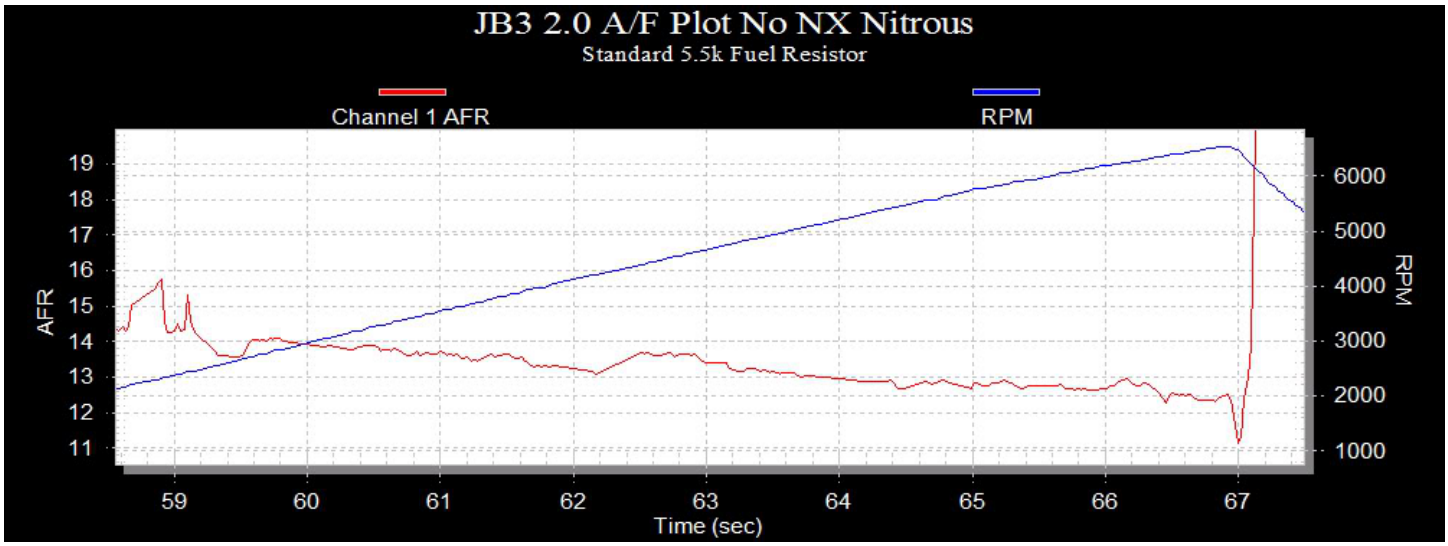
Without going through every configuration setting, I wanted to post some of the more important.

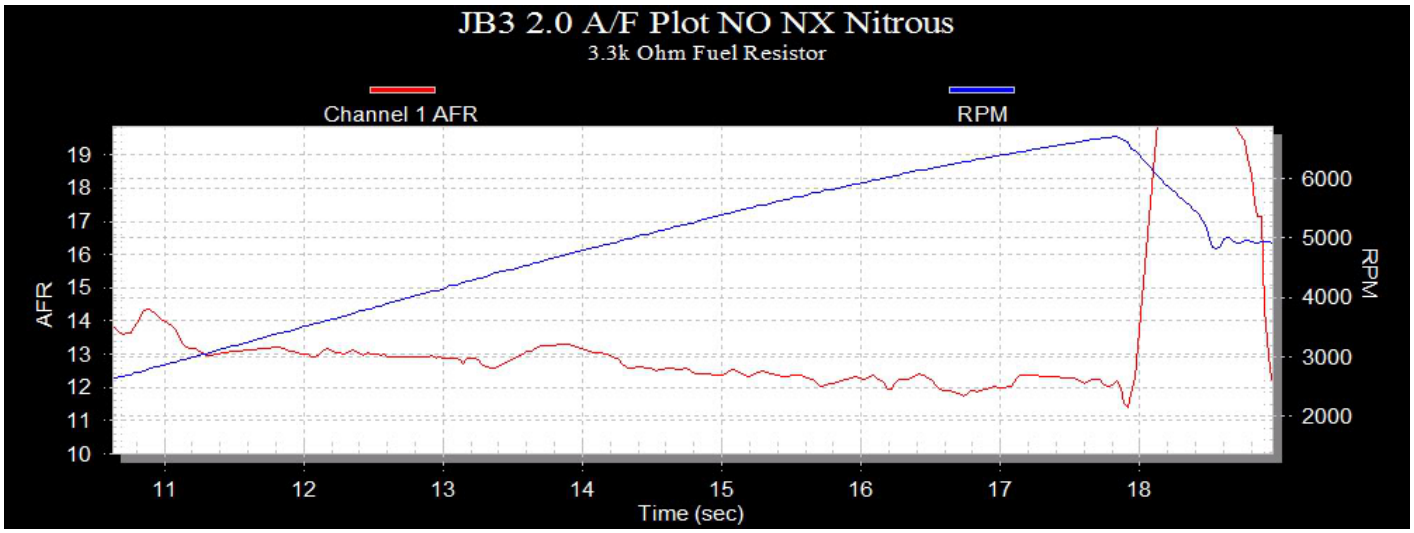
TPS maximum voltage or WOT for our car can differ from vehicle to vehicle. For my vehicle 2.03 is highest TPS will go, but sometimes at WOT the TPS can be as low as 1.95v. I set it to 1.80v to ensure the varying TPS at WOT will not kick me out of nitrous spraying.

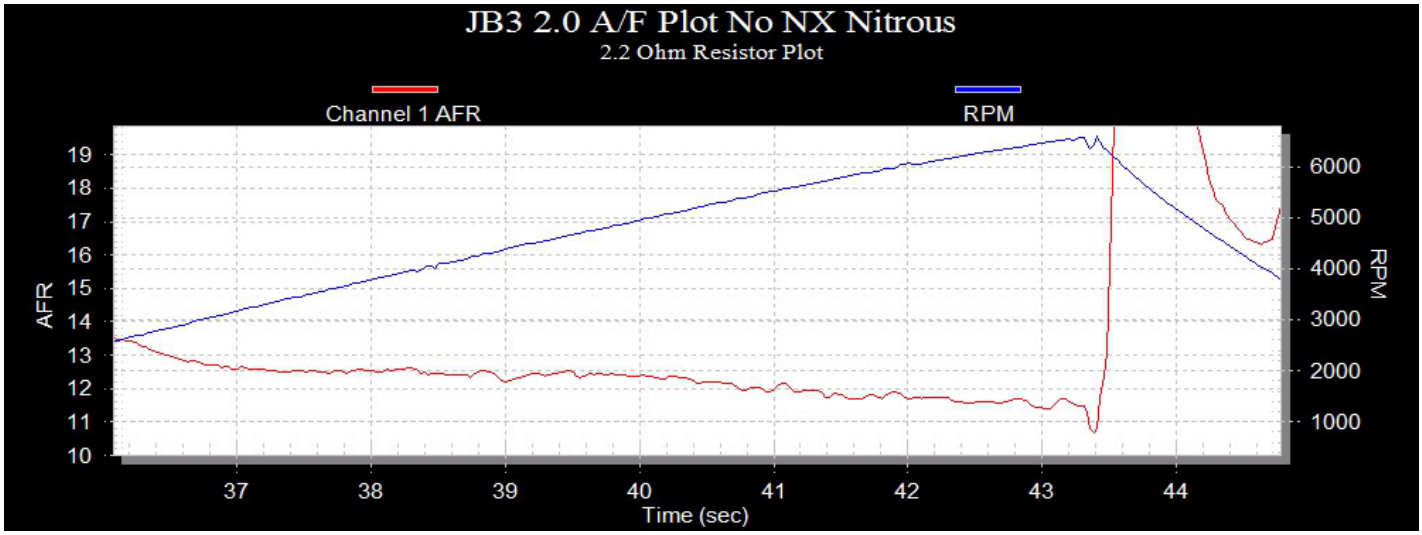
I set the RPM window to 3000 rpms to 6300 rpms. This means if all the other conditions are met, that nitrous can only spray between these rpms.

I chose to use a time delay of 1 second. This means once I hit TPS voltage of 1.8v or higher (WOT) and I am within the RPM window, then the controller will delay once second before spraying the nitrous. This was to ensure I will be spraying methanol before the nitrous ever hits the engine. I then chose a time ramp of 3 seconds, meaning the nitrous will ramp the nitrous from 0% to 100% linearly over 3 seconds. This ramp gives the car ample time to react to the nitrous through the post turbo wideband O2 sensors. The data shows this worked beautifully.

Next, A/F ratio cutoff is critically important. In my testing, I have found the N54 direct injection to be remarkably flexible. In fact, what you would consider lean on a traditional port fuel injection car is VASTLY different on the N54 DI motor. 13.5:1 air/fuel ratios are not uncommon at all under full boost on the N54. With that said, I wanted it to be richer than what the stock JB3 provides to give me more head room for safety purposes. *Terry Burger from BMS was remarkably helpful through the process*. Through Terry's help, I was able to modify my JB3 board from the stock 5.5k ohm fuel resistor ultimately to a 2.2k ohm fuel resistor. Below you can see the difference from 5.5k ohm, to 3.3k ohm, to 2.2k ohm resistor.






The 2.2k ohm fuel resistor gave me a lot of headroom of 12.5:1 at WOT to 11.5:1 at redline.

This allowed me to go with an A/F ratio cutoff on the NX Octane Series Progressive Nitrous Controller of 12.8:1 with a delay of 2/10 seconds. This means if the A/F ratio goes leaner than 12.8:1 for more than 0.2 seconds the system will automatically shutoff.

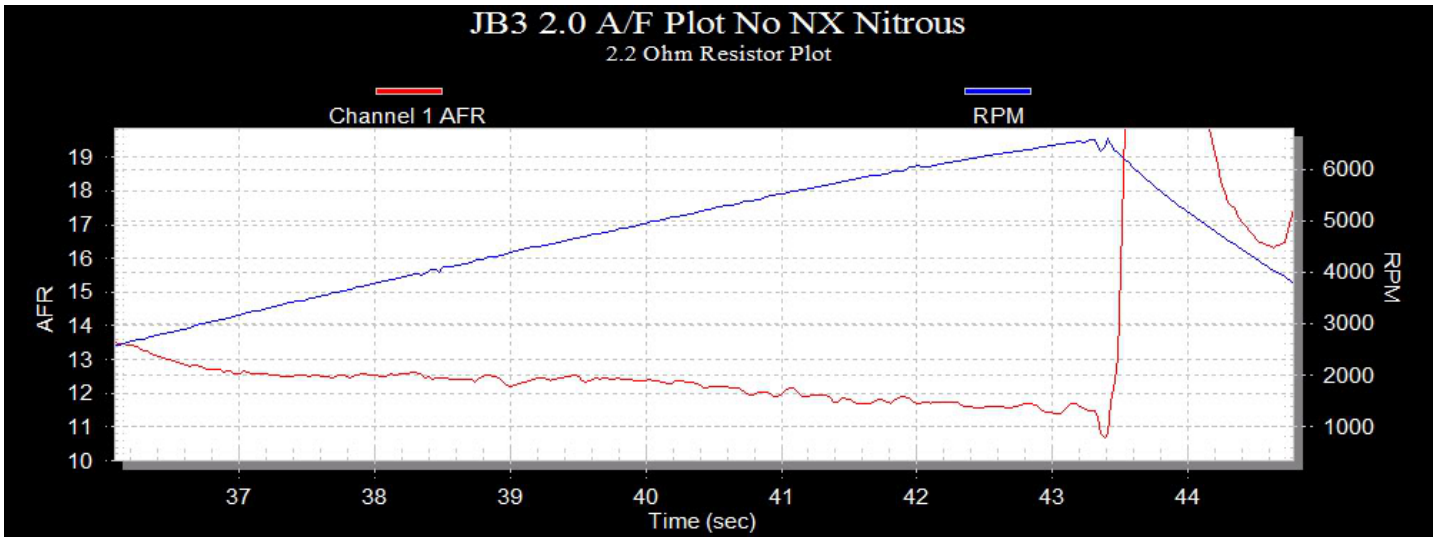
I set the bottle safety cutoff to 950 to 1075 psi guaranteeing the nitrous system cannot spray without having an acceptable bottle pressure. This prevents the setup from going rich or lean due to high or low bottle pressure.

# RESULTS

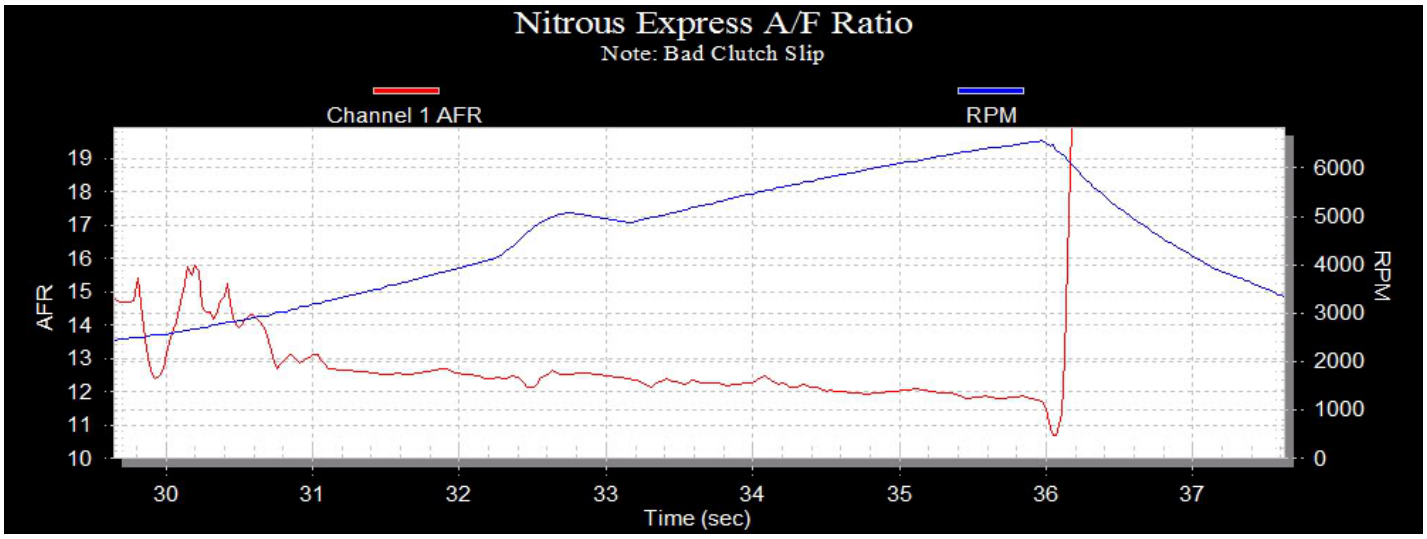
Once I felt I had effectively addressed safety, it was time to hit the dyno. I knew going in that there was a strong possibility that I would smoke the clutch and unfortunately I did. With that said, I still feel it was worth it because the data is superb.

*It should be emphasized that despite the fact that many N54 guys run MS109 during their dyno runs, I wanted to establish real world gains on pump gas.*

This data was all obtained on a Mustang Dyno using JB3 2.0 Gen. 3 board with 2.2k ohm fuel resistors. It is also easy to note the massive clutch slip from 4200 to 4800 rpms on the nitrous run. Keep in mind the Mustang Dyno is a load bearing dyno, so it simulates road conditions incredibly well and it is the standard for dyno tuning cars. Let's begin by examining the A/F ratio data. First, let's look at the A/F ratios off nitrous.



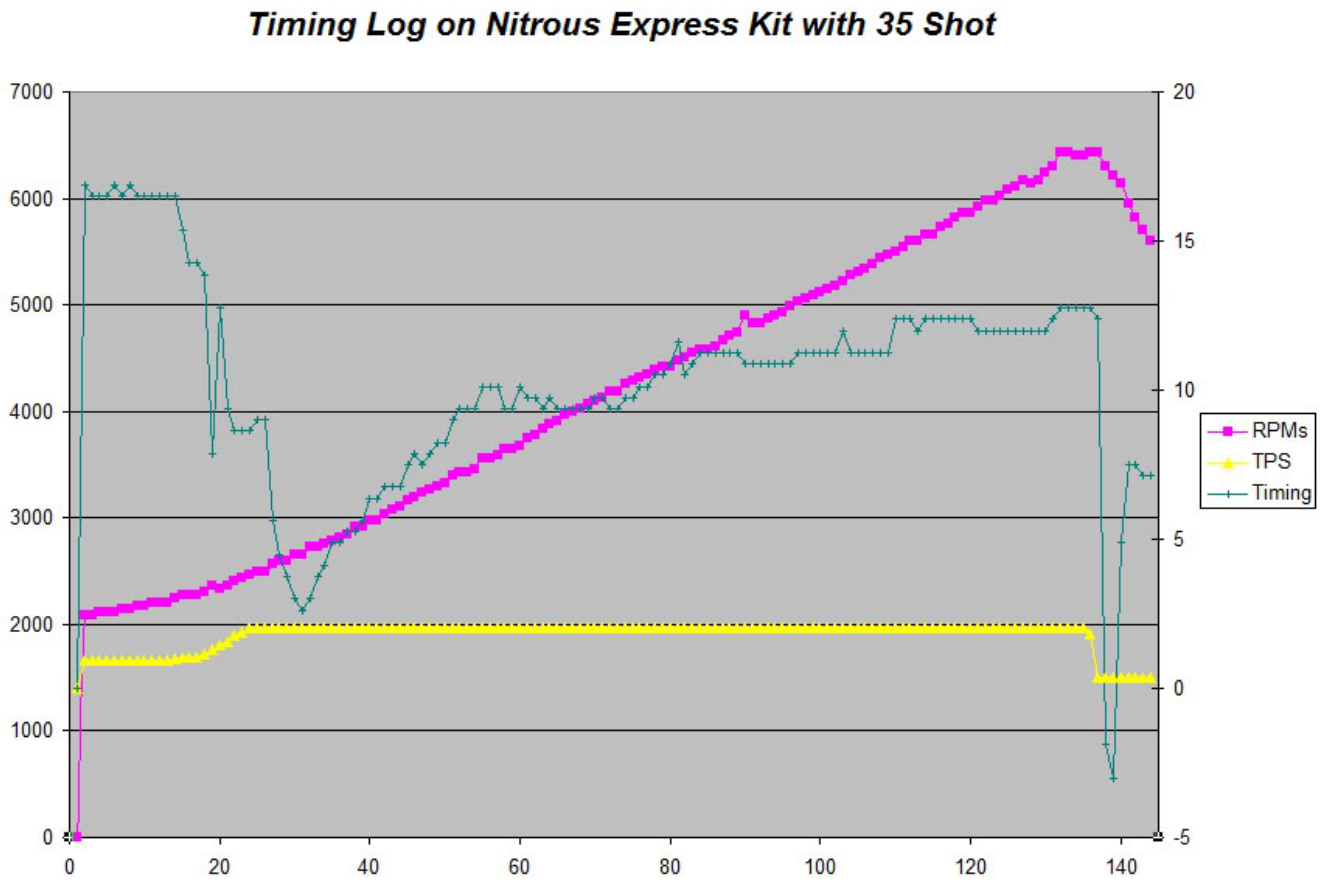

Now, the A/F ratios on the NX EFI nitrous kit.




On both plots, you can see an A/F ratio of around 12.5:1 at WOT and near 11.5:1 at redline. Notice on the nitrous run, the A/F ratios actually dips slightly richer in the middle rpms and nearly identical at redline. Clearly the car is reacting extremely well and quickly detecting the nitrous then adding the appropriate fuel

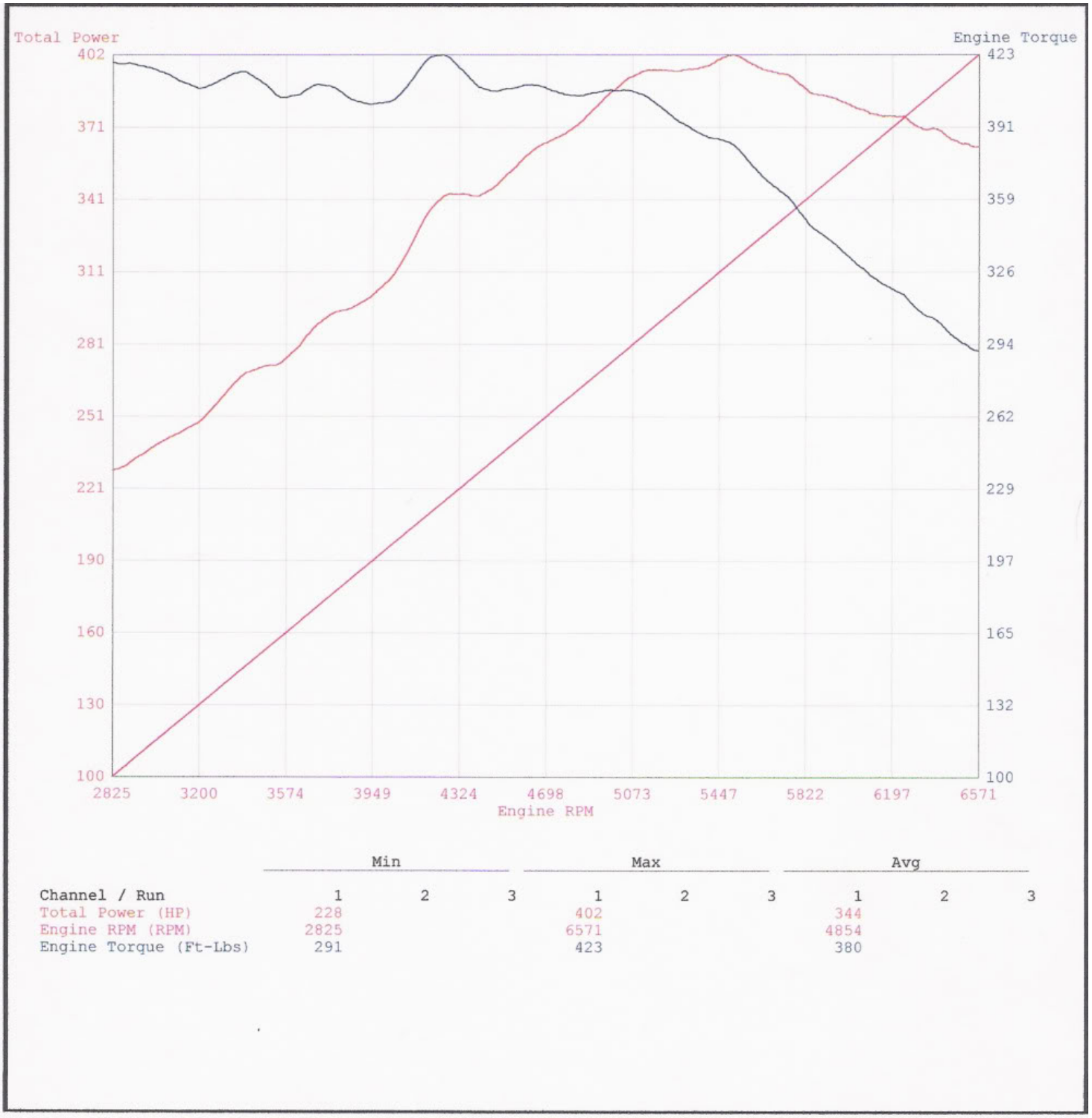
instaneously. I think these plots speak more than anything I could say.

Next, let's examine the timing during a street pull I did prior to the dyno session. I wasn't sure if we would lose the clutch on the dyno and didn't want to miss a logging opportunity. You can see a clear timing rise through the entire run without any KR (knock retard) events whatsoever.




Again, this data strongly speaks for itself.

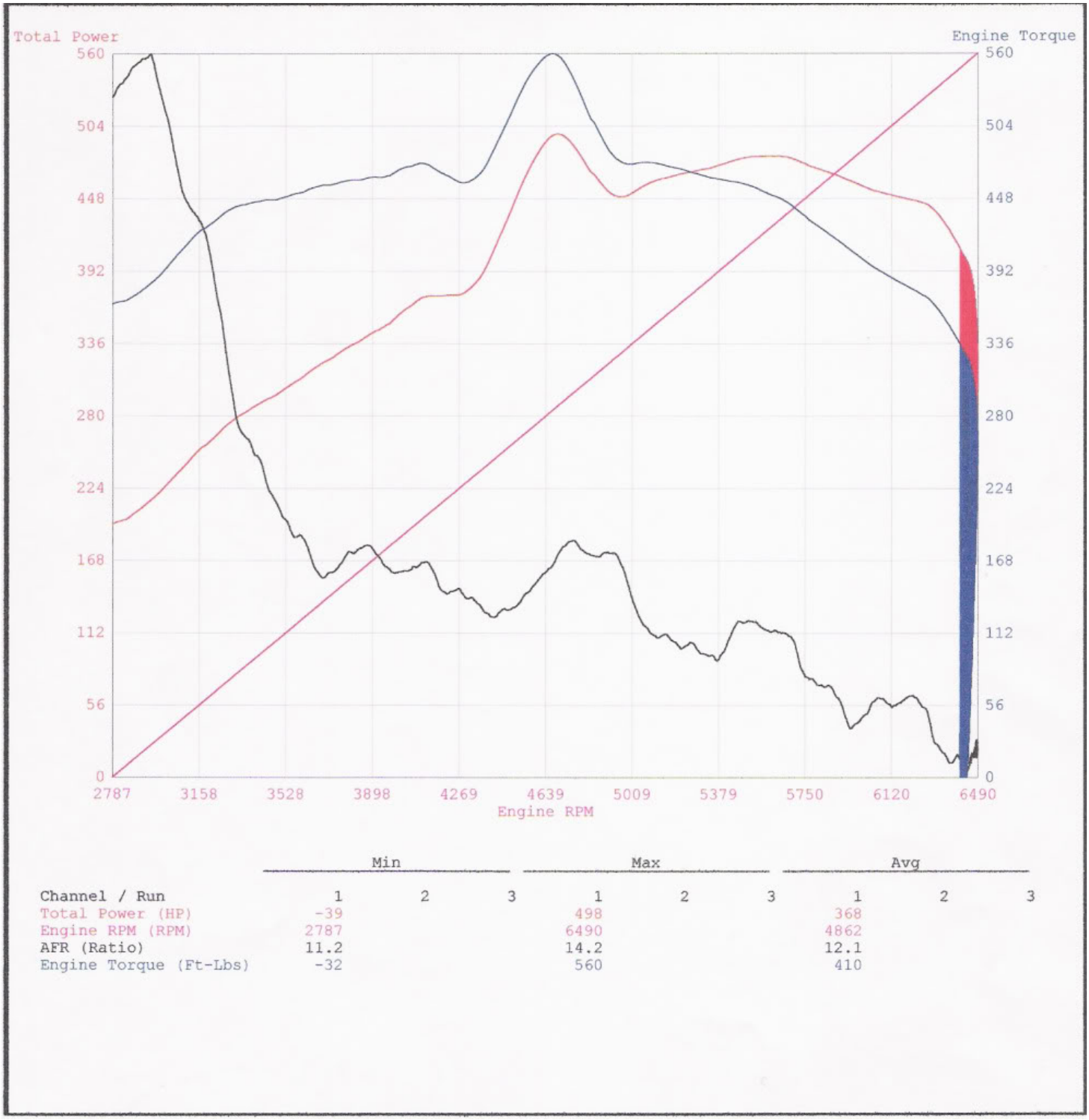
Finally, let's look at the power and torque the N54 made on the Nitrous Express EFI kit with a 35 hp jet. This was the most surprising part of the testing. First, I want to post the run <u>without</u> nitrous running about 16-16.5 psi with approximately 700 ml/min of methanol (66/33) using *pump gas.*




| | Min | | | Max | | | Avg | | |
|---|---|---|---|---|---|---|---|---|---|
| Channel / Run | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 |
| Total Power (HP) | 228 | | | 402 | | | 344 | | |
| Engine RPM (RPM) | 2825 | | | 6571 | | | 4854 | | |
| Engine Torque (Ft-Lbs) | 291 | | | 423 | | | 380 | | |

You can see I made 402 rwhp and 423 rwtq.

Now, the dyno on the Nitrous Express EFI kit with a 35 hp jet. This run averaged about 15 psi with approximately 700 ml/min of methanol (85/15) running *pump gas*. It should be noted, I ran lower boost on this run than the basline run.




| | Min | | | Max | | | Avg | | |
|---|---|---|---|---|---|---|---|---|---|
| Channel / Run | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 |
| Total Power (HP) | -39 | | | 498 | | | 368 | | |
| Engine RPM (RPM) | 2787 | | | 6490 | | | 4862 | | |
| AFR (Ratio) | 11.2 | | | 14.2 | | | 12.1 | | |
| Engine Torque (Ft-Lbs) | -32 | | | 560 | | | 410 | | |

This run produced 487 rwhp and 478 rwtq outside of the clutch slip. It should be noted that the torque was still rising when the slip occurred, so we do not know the full torque the car would have produced. The difference is a gain of 85 rwhp and 55 rwtq! It should also be noted that the increase in horsepower was made at 1 – 1.5 psi less than the baseline run. These are not spot gains, but gains over almost the entire dyno adding enormous area under the curve. We also can see the dyno on the Nitrous Express EFI run was considerably smoother, but I think most of that should be attributed to the JB3 2.0 boost control.

****It should also be noted again, that these runs were done on a Mustang Dyno which traditionally read 8-12% lower than Dynojets. I made 252 rwhp stock and many of the dynojet numbers average around 272 rwhp stock. To compare these Mustang Dyno numbers to a dynojet, we should apply an 8% correction factor. This is an accepted technique by most if not all. The 8% correction factor results in the following results:**

**526 rwhp on Nitrous Express EFI kit.**
**516 rwtq on Nitrous Express EFI kit.**
**Increase of 92 rwhp over baseline dyno.**
**Increase of 59 rwtq over baseline dyno.**

# CONCLUSION

Nitrous Express is clearly in the upper echelon of nitrous systems. Their packaging was superior, their customer service superior, their technical expertise was superior, and the NX EFI nitrous kit is absolutely top quality. The Nitrous Express Octane Series Progressive Nitrous Controller is the crown jewel in this setup. It provides an unmatched feature set allowing a very high level of safety, control, and all in a 52 mm gauge foot print. There is a reason that people say Nitrous Express is the best in the business and now I know.

If I was to order now knowing all the information I have now, I would order:

- Nitrous Express EFI Dry Kit with 10 lb bottle
- Bottle Heater
- Purge Valve Setup (optional)
- Pressure Transducer (1600 psi) & Harness
- Nitrous Express Octane Series Progressive Nitrous Controller

The reality is I ordered a bit too much.

I personally feel comfortable concluding the A/F ratios appear very safe under nitrous. The timing appears to be superb on all the nitrous runs with a stock like rise across the rpm range and similar to everything I have logged. The NX 35 hp shot was worth a dynojet corrected 92 rwhp and at least 59 rwtq on pump gas.

To tell the truth, this began as a curiosity for me. I wanted to *know*, based on data, whether nitrous would work well on the N54. This exploration lead into a long project that began with the FJO Wideband O2 kit with Data Logging, moved onto the STETT Nitrous/Methanol Elbow, and culminated with the Nitrous Express EFI kit with Octane Series Progressive Controller. I always knew I was going to run a smaller shot, but I never expected such remarkable gains. The N54 seems to respond incredibly well to nitrous. I really feel the safety mechanisms in place on the Nitrous Express Octane Series Progressive Nitrous Controller along with the Snow Performance water/methanol injection make for a very comfortable setup. We are using a small 35 hp dry shot with the addition of 116 octane fuel to create a pseudo-wet shot producing superb gains. I know some people will react like I once did and say “NAWS doesn’t belong on a BMW”, but I hope after objectively looking at the data that many will respond by questioning the real roots of that urban legend.

# EDIT APRIL 6TH.

About 1 month ago, I added a Nitrous Express kit to my N54 and gained 92 rwhp on a 35 shot (0.031 jet). I was floored with the quality of the NX kit in every aspect. To be honest, they rank up at the top of any product I have ever reviewed in almost every aspect. Their solenoids are so far superior to the competition and their build quality is unsurpassed. They claim to be the next generation of nitrous and they live up to every letter of their word. Well, I wanted to finish off my nitrous system with a couple of accessories and there was no question who I was going to order from. I wanted a remote bottle opener to make things easier and a bottle jacket to aid in the warming of the bottle and to help keep it at ideal pressure.

With that, I ordered the following

- Nitrous Express Remote Bottle Opener
- Nitrous Express Bottle Jacket

In addition, I finally got the time to finish off the purge kit I originally ordered from Nitrous Express, so I will cover that in this review/DIY as well.

**Experience with Nitrous Express**

I think there is a reason that both Shiv from Vishnu and Terry from BMS all endorse NX products. Simply put they are the best. When I order from Nitrous Express, I like to speak with Mike Abney because his expertise is off the chart. He is an enthusiast and he knows his products. He has always been tremendously friendly and I have enjoyed every conversation I have had with him. When I ordered, I was informed when the items would ship and I had them in just a few days.

Nitrous Express clearly believes in the entire buying process. When you get home the day the NX products arrive, you can see the Nitrous Express boxes staring you down as you drive up. It really is awesome.

The products came individually packaged and protected with peanuts.


The Nitrous Express Remote Bottle Opener comes individually boxed.


The Nitrous Express Remote Bottle Opener box contains the motor, gears, hardware, the switch, and all necessary connectors.



You can see the well built clutch style Nitrous Express Remote Bottle Opener and gearing.


I also ordered the Nitrous Express Bottle Jacket. It is another beautiful product with a very sharp logo.


NX
www.nitrousexpress.com

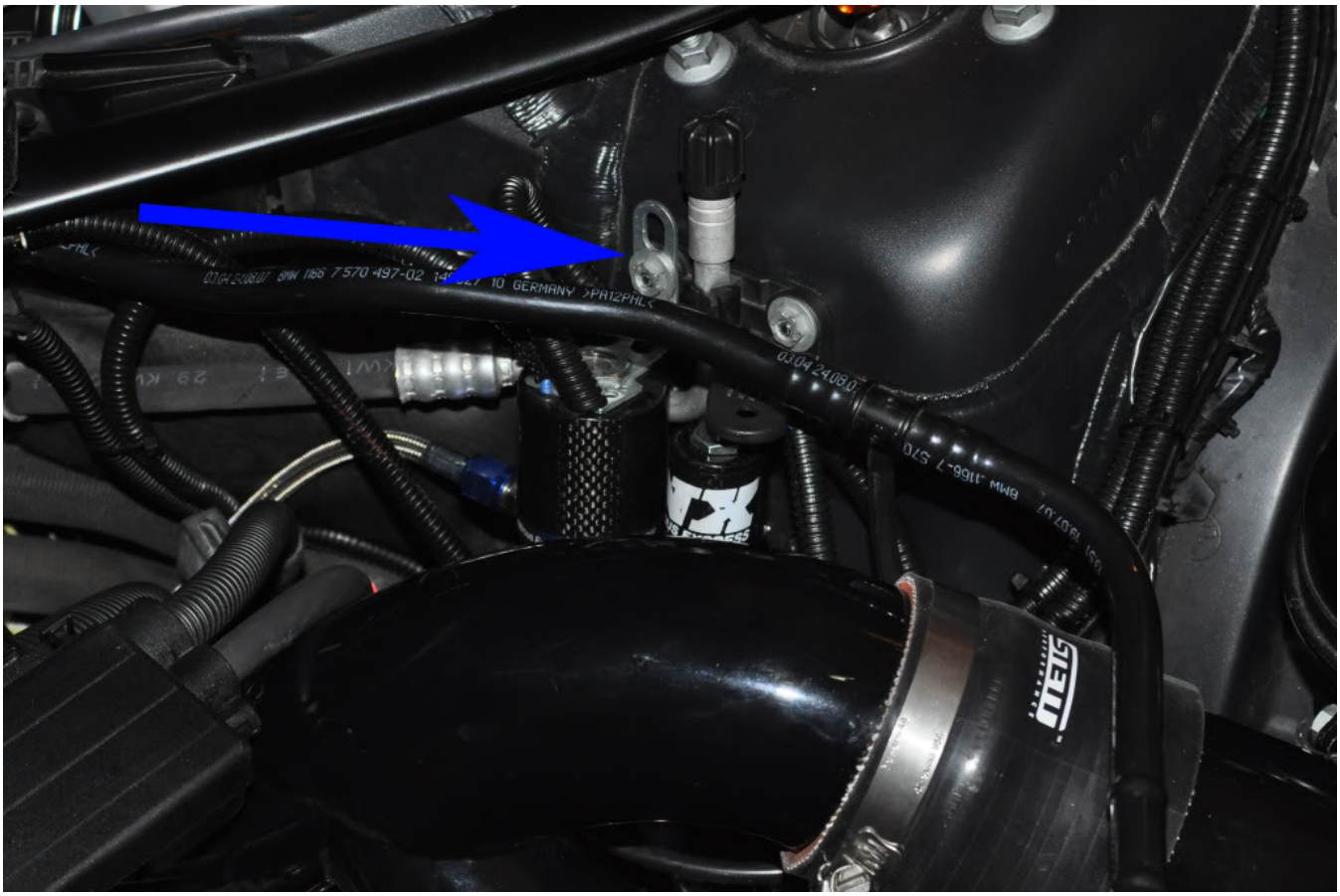
Finally, I already had the NX purge kit on my car, but never ran the tube or hard line to use it... until now. Since I wanted a dual purge setup, I ordered a "T" from Nitrous Express to use.

Nitrous Express really understands how to make the buying experience awesome.

# INSTALLATION

You take all responsibility on your own installations. This is simply a documentation of how I installed these products.

*Nitrous Express Purge Setup*
Since I began the purge install process, I want to begin here. Last time I wrote about my Nitrous Express Purge, I left you here.



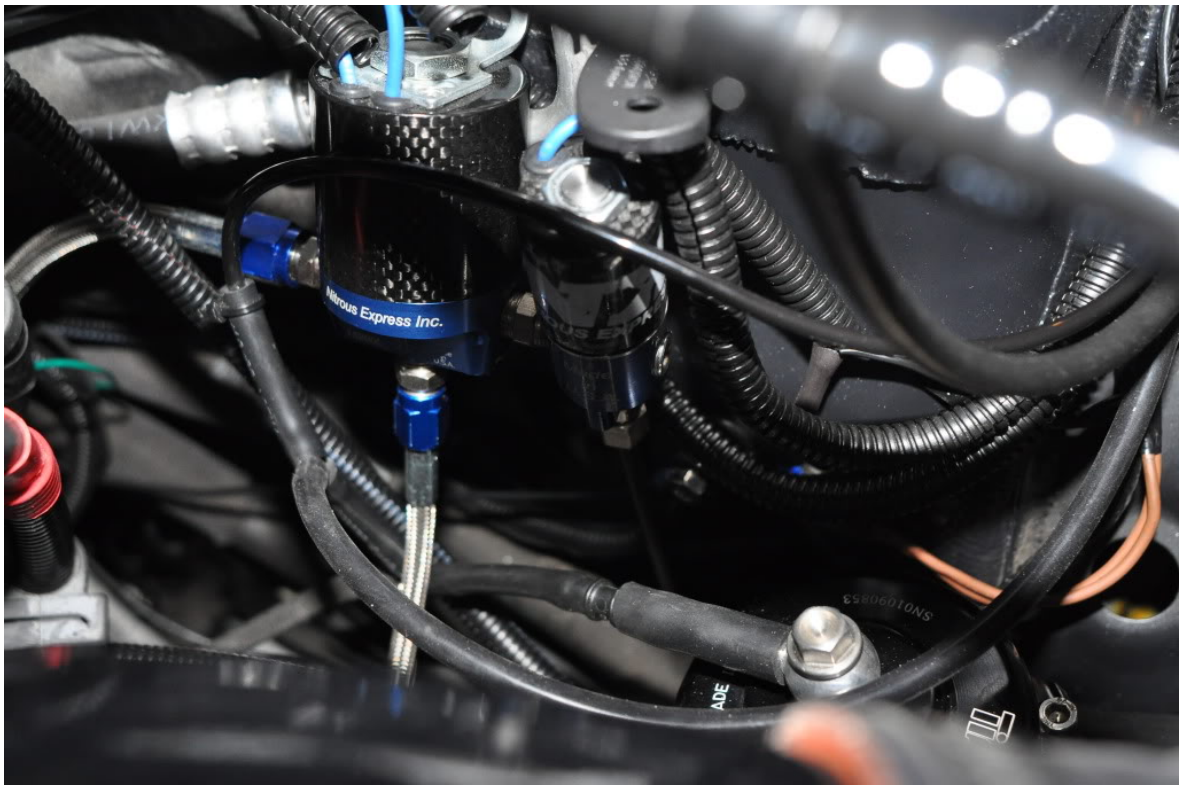
All that was left to do is run the purge line. I had to decide whether I wanted to use vacuum line or hard line to purge through. The soft vacuum line leaks on a lot of applications, so I wanted nothing to do with it. Nitrous Express sells stainless steel line to use for purging, but I wanted a more stealthy black look. So how did I accomplish this? Brake line! 3/16" brake line is sold in any auto store on every street corner and can be bought at $5 for a 3 foot section. It is cheap and black. Basically I was able to do the entire purge line and "T" for a dual purge for next to nothing.

Before you begin, you should know how the "T" connector for the dual purge works. It accepts a flared end from the brake line. This is important because it means you will just need to make sure to thread the flared fitting and blue nut onto the line *before* you run it! Here is what that would look like.

Tape these to the end of the tube you will be bending so it is there when you need it later.

The purge solenoid that you buy from NX comes with a compression fitting for the hard line on it. What this means is you need to insert the brake line into the compression fitting, but you need to cut the flare end off the brake line. A dremel does this in 10 seconds.

You will simply slide this into the compression fitting on the end of the purge solenoid and tighten it down. *Make sure the purge solenoid is facing straight down so you can make the brake line run easy.*

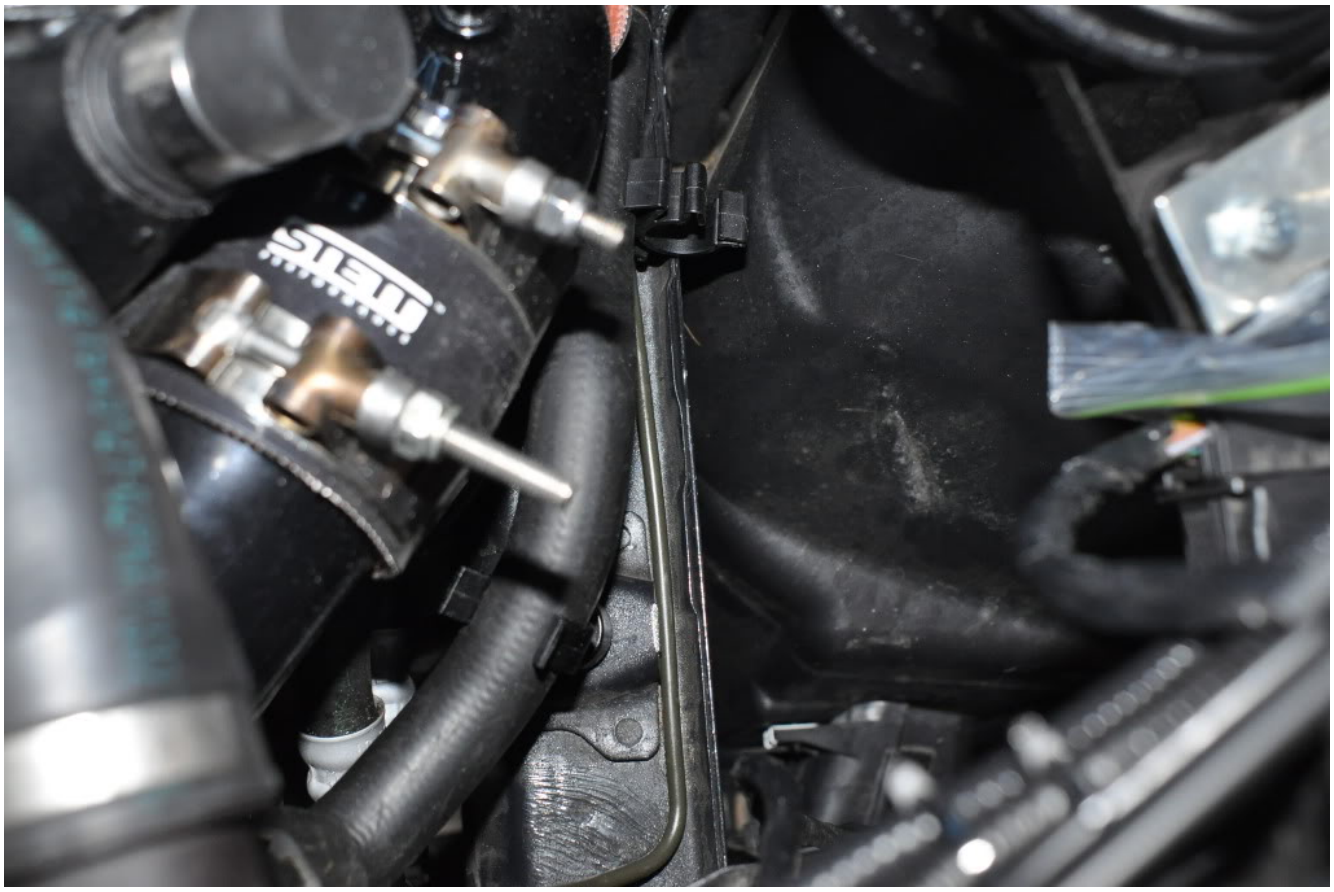



What will seem like the more difficult part is the bending of the brake line. To solve this problem, you need to go to Harbor Freight and get a brake line bender. This one is perfect and only cost $5.


The above bender has a specific location for 3/16" brake line and does a very good job on tight bends.

I found it a lot easier to do this with the front bumper off and it only takes 20 minutes to remove, so I pulled it off. When running the brake or purge line, you will need to measure and bend it to run it to your purge location. I chose the kidney grills and that is the path I will follow here. I ran the purge line toward the subframe from the solenoid as you can see in the picture above.

From there I ran the line along the subframe and toward the back of the driver's side headlight.

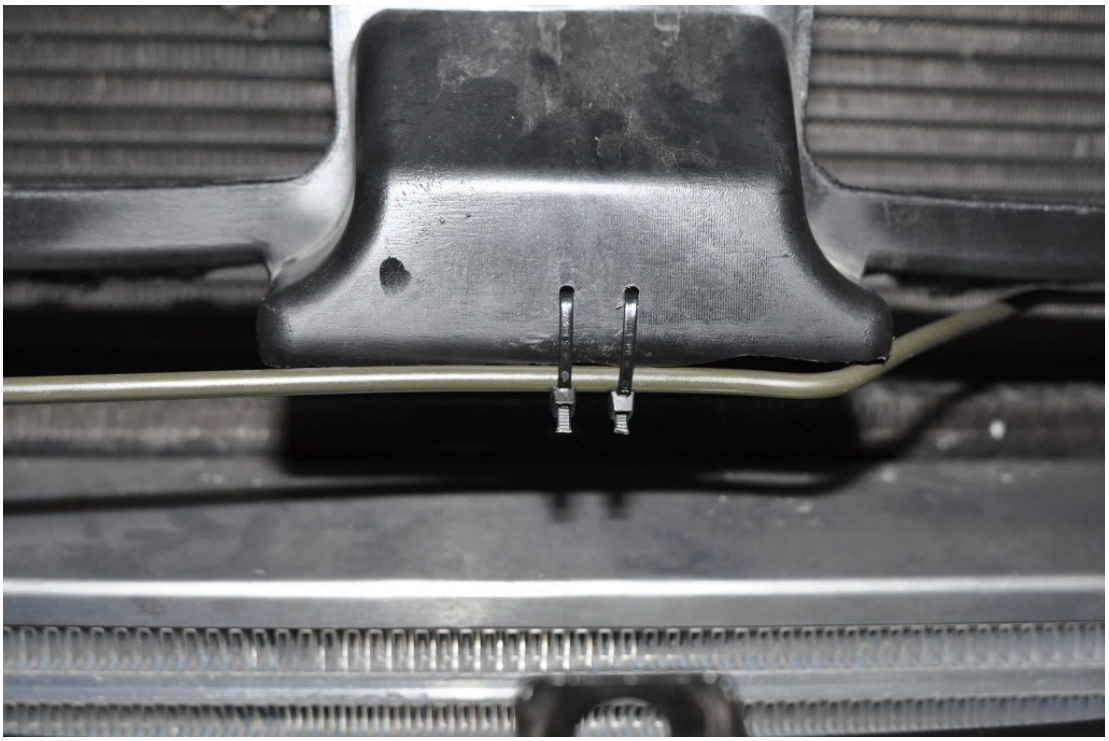


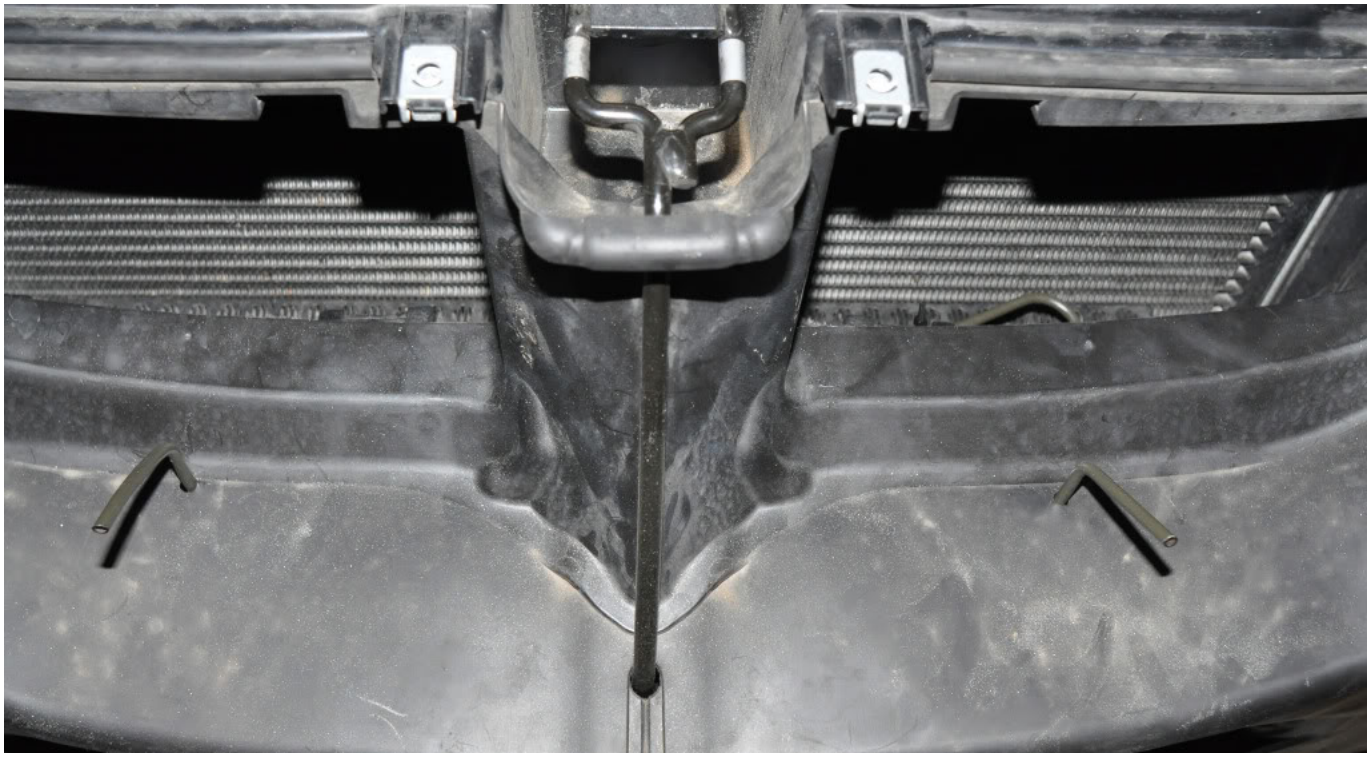
Then I covered it in loom to eliminate vibration and conceal it nicely in the engine compartment.

Then I bent it around the corner and routed the brake line out the nose of the car between the driver's side headlight and radiator. From here I bent the 36" brake line I used to the "T" fitting. Remember the blue nut

and flared fitting you put on the line earler? Well now it is time to use this to attach the flared end of the brake line to the "T".

The rest of this install is pretty simple. I did the same thing for the two purge outlets. I cut off one flared end of the brake line and fed the flared fitting and blue nut down to the flared end of the brake line. Taped the blue nut and flare fitting to secure it. I bent the line to exit from the 8th slat in the kidney grill. I tightened everything and added blue thread locker to secure the brake line to the "T" fitting. Finally I zip tied everything so the purge pressure would not move the lines. The final results...





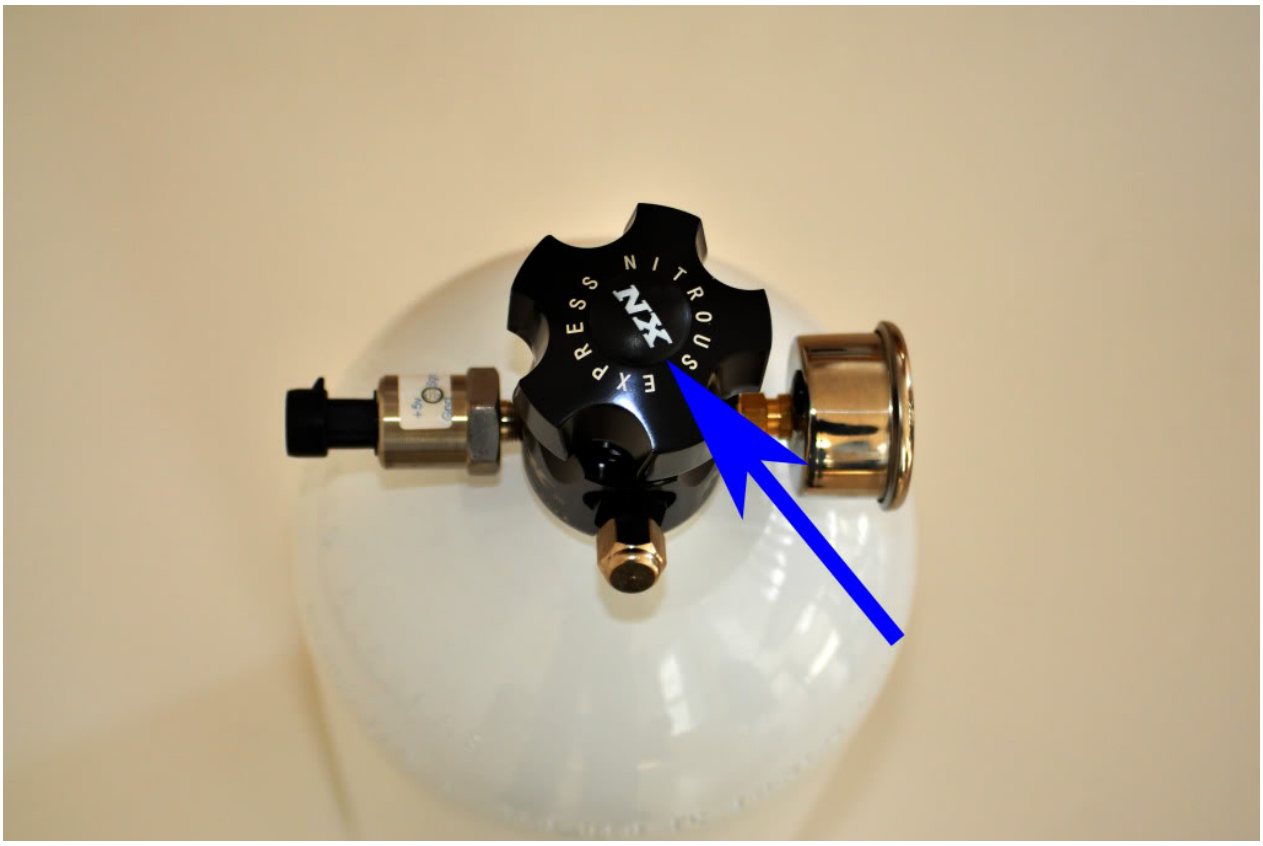
I know, I know... let me guess? You want to see it?

http://www.youtube.com/watch?feature=player_embedded&v=8qL9QAj8Wwc

# NX REMOTE BOTTLE OPENER.

The instructions are good on the NX remote bottle opener, but I still feel it is helpful to walk through the install. First you must remove the bottle from the car to do the work. Always make sure the bottle valve is closed when removing it! When you get the bottle to the place you will work on it, you will need to place the D-4 cap that came with the NX remote opener kit on the valve exit nipple.


Now you will need to remove the handwheel from the NX bottle. Lift the cap shown below with a thin flat head screw driver carefully to make sure you don't damage anything.

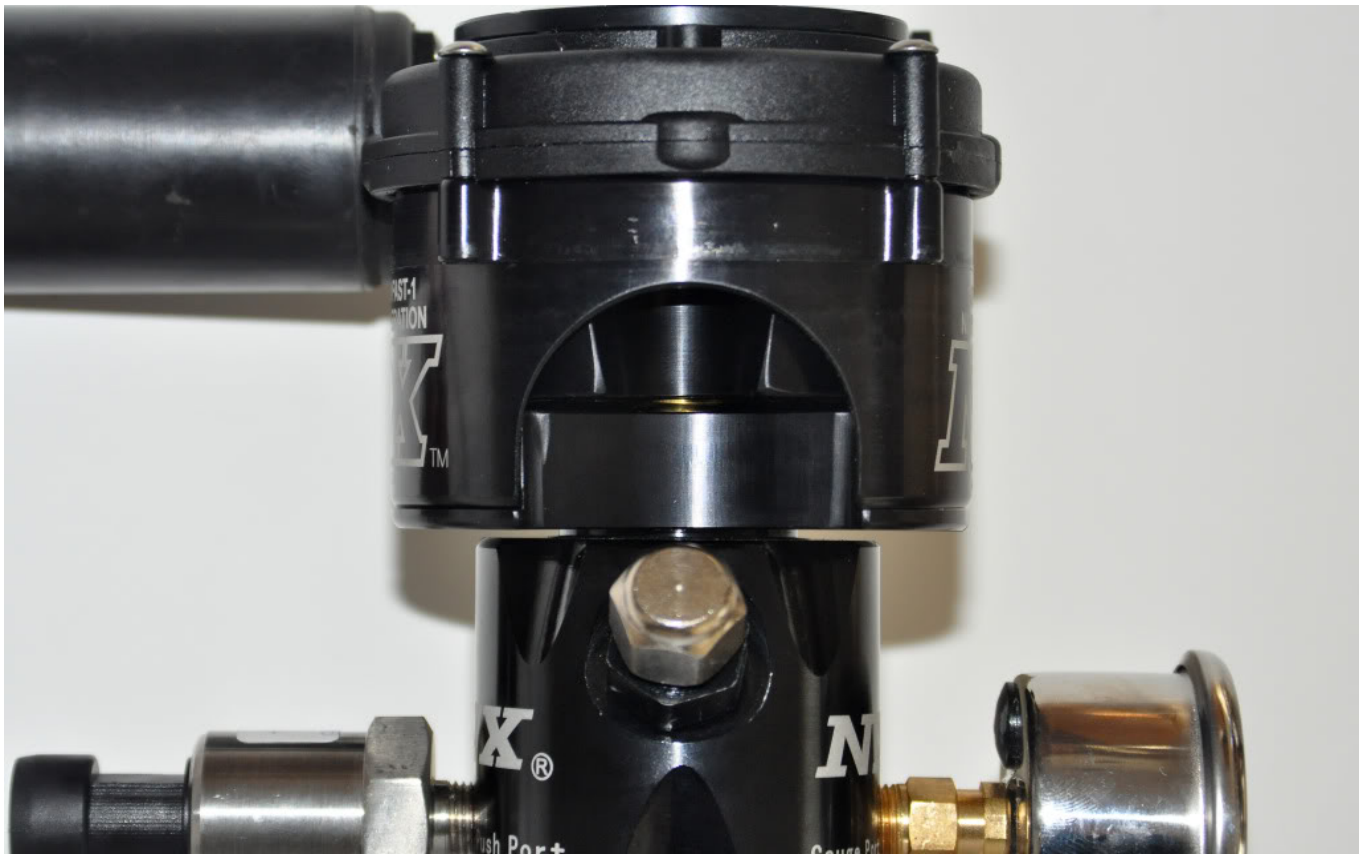



This will expose the bolt that holds the handwheel on. Remove this nut, but keep it handy because you will reuse it.

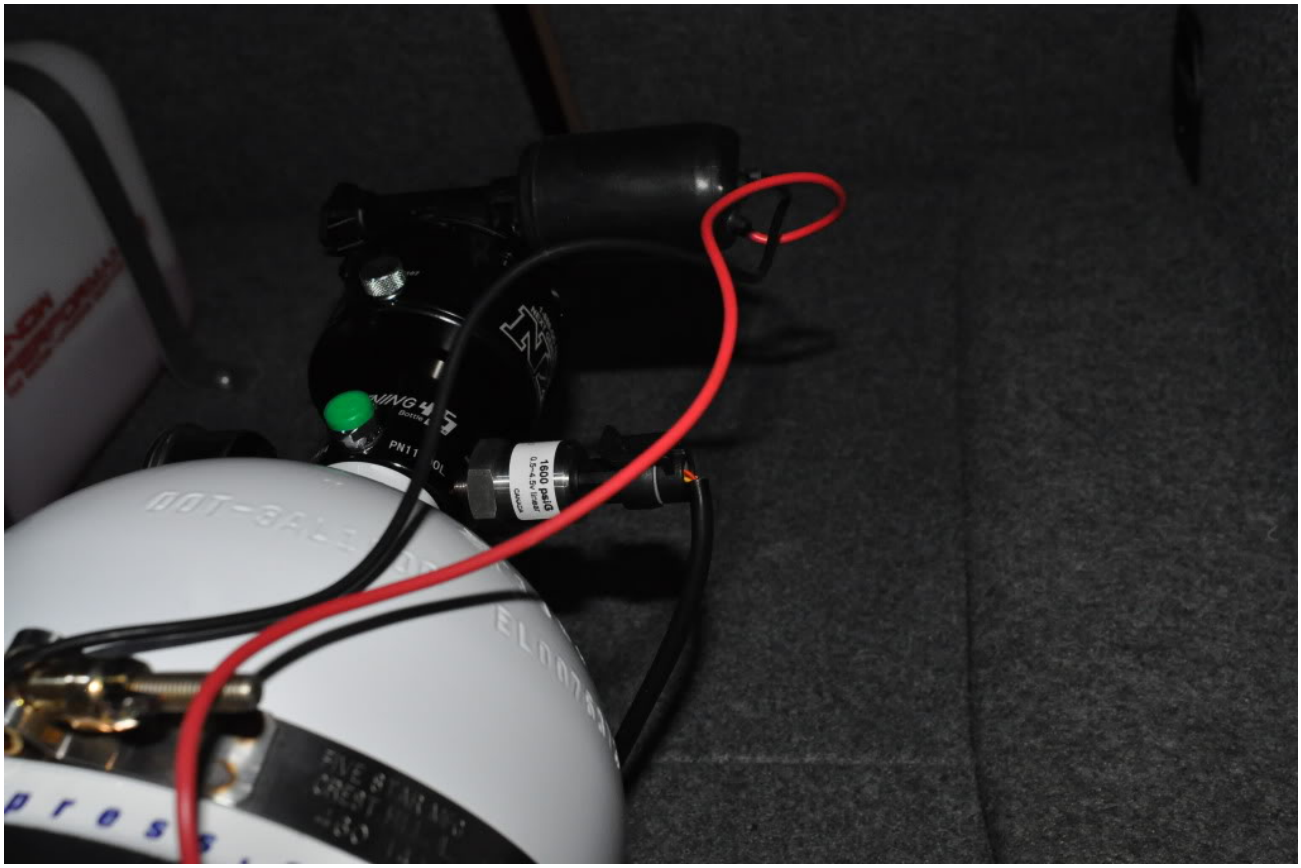

With the nut removed, you can take the handwheel off.


With the handwheel removed, you can start the installation of the NX remote bottle opener. First you will put the adapter collar on the bottle. This will determine where the remote bottle opener sits, so it is important. Just open and close the valve using the handwheel to insure you have no binding, then secure the allen bolt on the adapter collar.

Install the new handwheel that came with the NX Remote Bottle Opener kit and tighten it with the bolt you took off earlier. Now place the main body of the remote opener over the gears on the hand wheel making sure they line up properly!

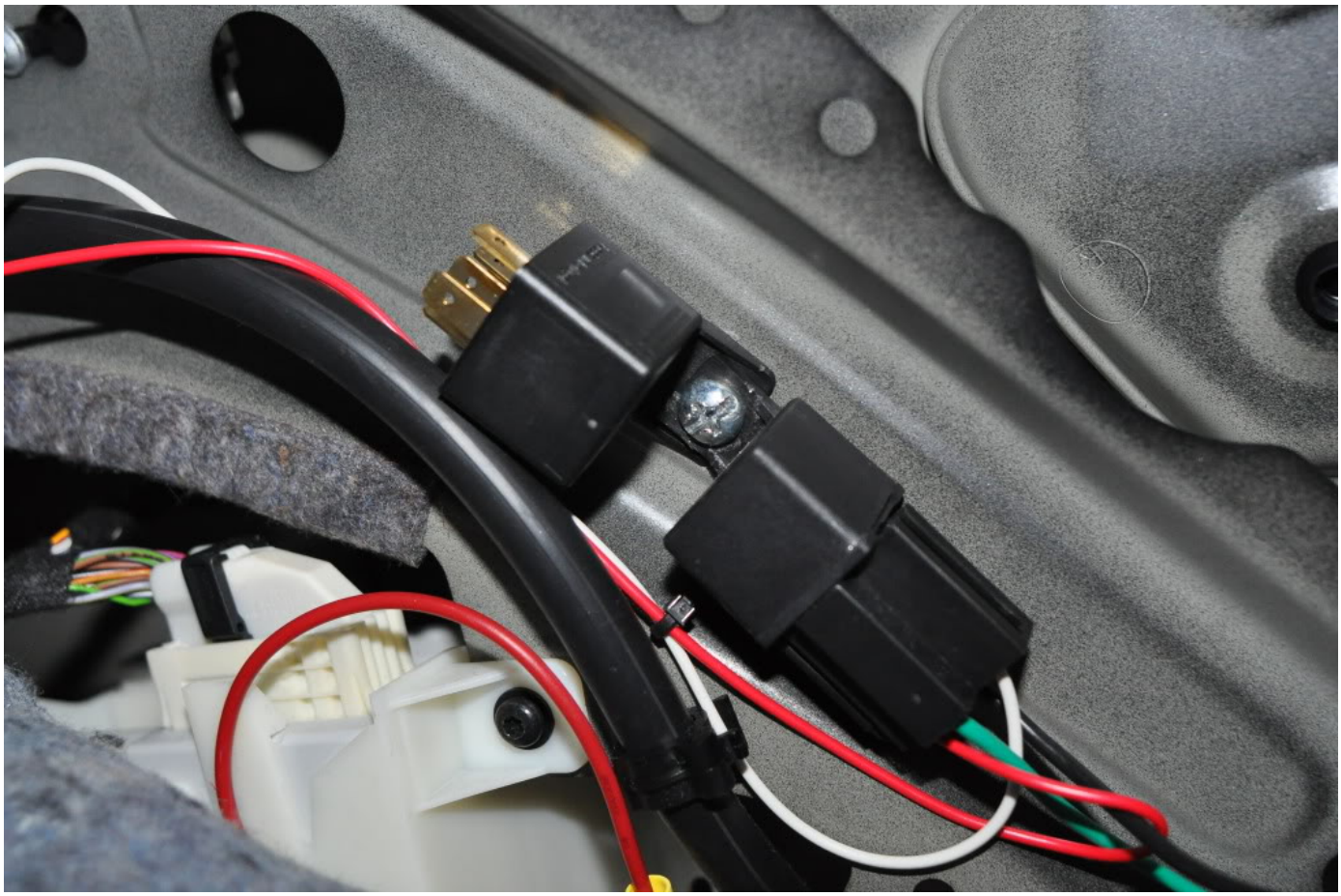
When you are pleased with the setup, you can secure the main body to the collar with the thumb screw that came with the kit. Now it is off to install this in the car. Place your bottle back in the mounting brackets so you can mark where you need to drill to conceal the wires.



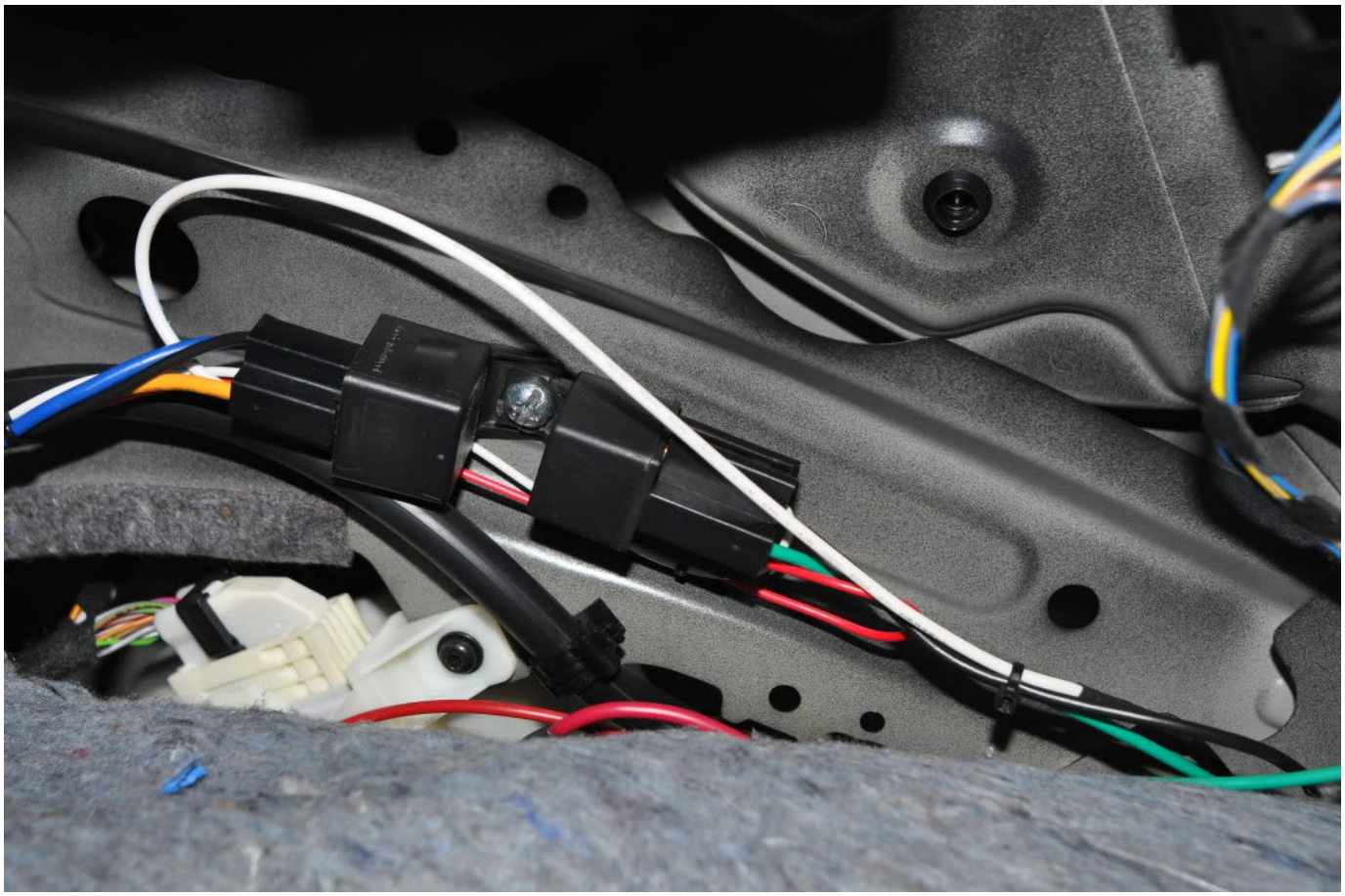
Drill the hole.

Route the wire through the hole and loom it to keep things looking clean.


Now you have some decisions to make on wiring. The bottle opener can pull up to 20 amps as the remote opener completely closes or opens the valve. The problem is that a tap-a-fuse cannot be used on a draw of more than 10 amps. You can try it, but I didn't want run wires twice, so I bought a Bosch (now named Tyco) relay and wired it up that way. It was just the easy route to go because the relay draws power from the battery and it turns with little current draw from a key-on power source. For the key-on power, you can just tap into your methanol or nitrous tap-a-fuse. The first thing to figure out was where to mount the relay. There is a very nice location above the battery and behind the carpet in the rear of the car.

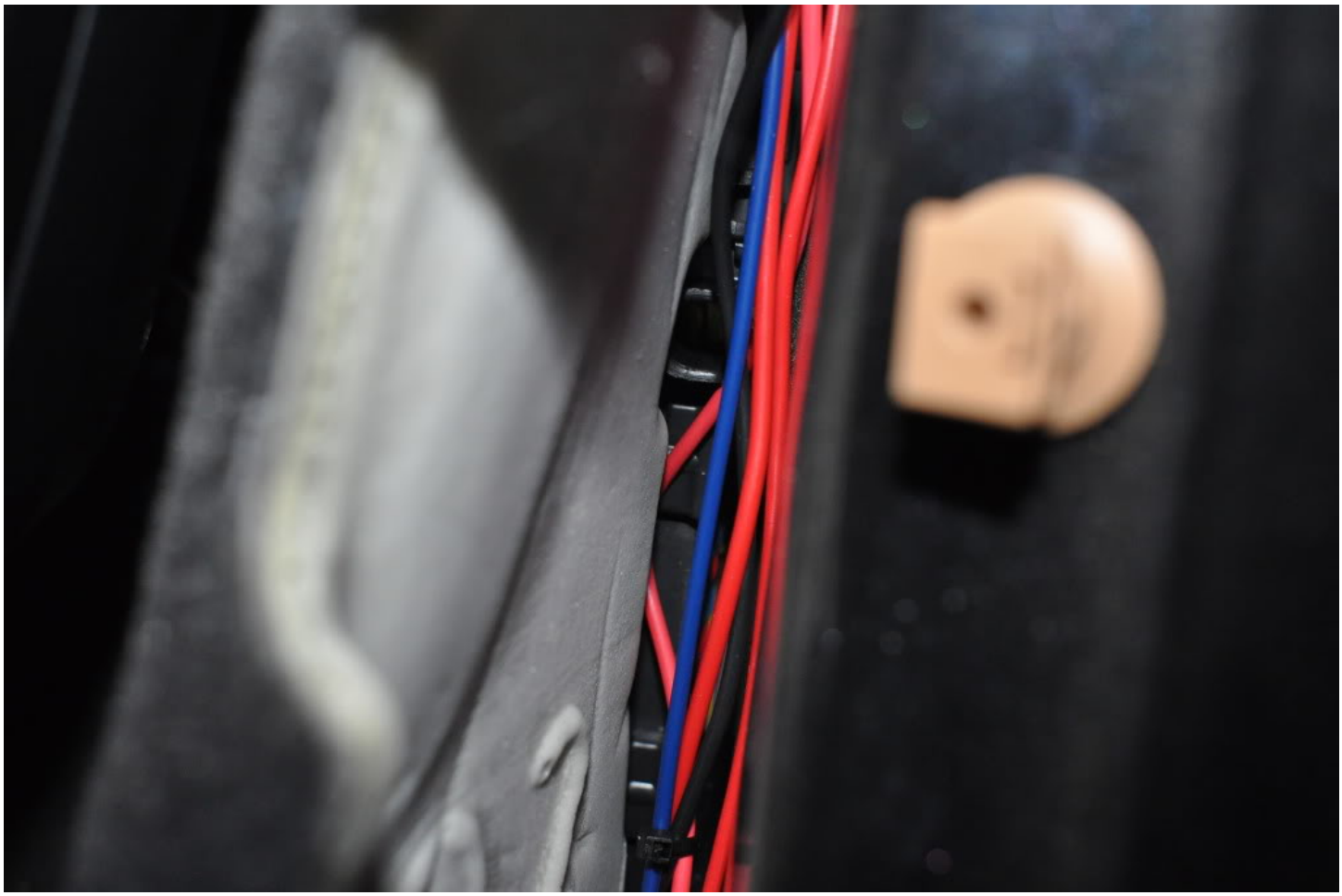


Wire up the relay and *label all wires* so you know where to hook all the wires up on the switch.

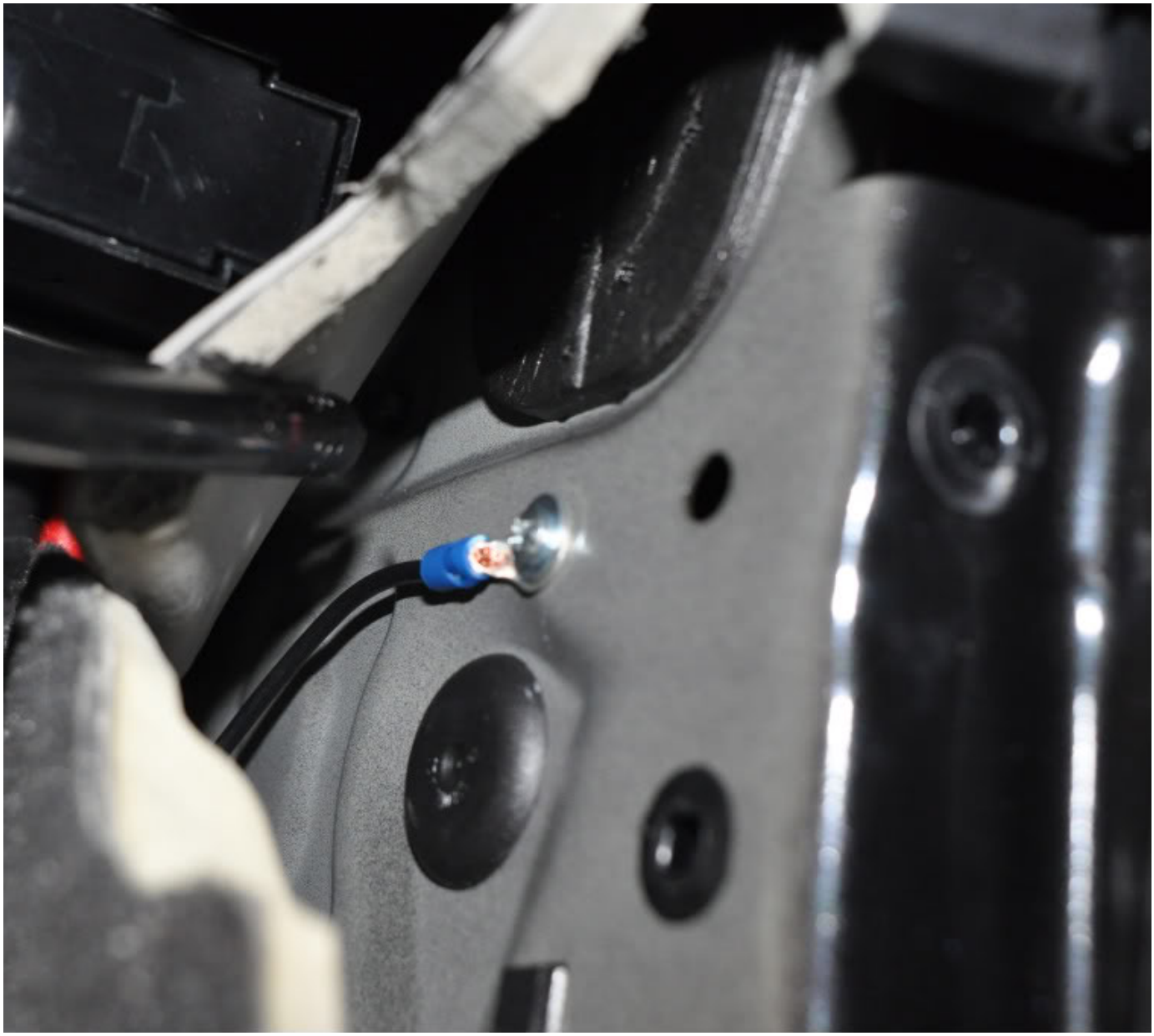


I added a 20 amp fuse inline between the power wire on the relay and the battery. I grounded the relay right to the battery.

Route the wires now to the location where you will put the switch. My switch is in my armrest area, so that was my destination.



Now the last thing you will need is a ground source for the switch. I get tired of searching for grounds, so I just drilled and secured a ground near the passenger kick panel.



The last of the work is to wire up the switch and that should be obvious from the instructions. Connect your ground and battery power to the relay now that everything is wired up.

I cut a new trigger plate out of Lexan and covered it in carbon fiber cloth. Here is the new trigger plate wired up.

Now, I can open the bottle from the driver's seat.

*Nitrous Express Bottle Jacket*

Easiest install ever! Place the NX bottle jacket over the bottle and secure the velcro straps! DONE!


# CONCLUSIONS

Nitrous Express is a pleasure to purchase from. Their packaging may be the best I have ever seen. Their customer service has been a 10 out of 10 in particular with Mike Abney. Their shipping process is painless and the items always arrive in pristine condition.

The Nitrous Express Remote Bottle Opener is the best in the industry. It is a clutch setup with replacement parts in the event they are ever needed. The NX Remote Bottle opener is a well built unit, complete with all the necessary hardware to install, and easy to use. If you choose to wire it as I did, you will need to order a Bosch (Tyco) relay. The NX Remote Bottle Opener simply adds convenience if that is what you are looking for and NX does it well.

The NX purge kit is easy to use and can be easily installed in a stealty way using brake line (also saves a few $$$). The switch and fire button are easy and intuitive. The solenoid is even very attractive with a carbon fiber wrap. Purging can help get rid of any bubbles that form in the nitrous fluid increasing traps but up to 2 MPH. On a small shot like mine, I will admit it is all show, but looks good.

Finally, the NX Bottle Jacket is an easy to use product. It is well constructed and should stand the test of time. It helps keep the bottle warm and helps it heat faster. Nitrous Express claims to be the Next Generation Nitrous System and they continue to live up to the high standards they set for themselves.

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*Last edited by Former_Boosted_IS; 04-06-2010 at 08:22 AM.*