

M7 Tuning

Air Gain System v3 Installation



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Introduction

The M7 Tuning Air Gain System is unique in the Mini aftermarket. It is the only intake system on the market that improves upon the restrictive stock intake duct that goes between the throttle body and the supercharger. Our design allows for higher levels of flow than any other system. When combined with the larger throttle body (included in the AGS Pro package) and heat shield, the AGS intake system will allow your Mini to breathe much better than stock. Because of the higher flow capacity of the AGS system, it will really start to shine when combined with other breathing improvements, like under-drive supercharger pulleys as well as ported and polished superchargers, intake runners, and cylinder heads.

This installation guide will explain how to install your Air Gain System, including the larger throttle body and the heat shield.

Package Contents

Check your package for external damage. If any is present, contact the shipper. If the package looks good, open it and make sure all items are present.

Item	AGS Kit
* 12 inch Hose 1/2 inch	All
* AGS tube	All
* AGS insert	All
* AGS Filter	All
* T-bolt Clamp (1pc)	All
* Small clamps (5pcs)	All
* Medium wire clamps (2pcs)	All
* Hose connector (1pc)	All
* 3' Hose 3/16"	All
* Elbows 90° for AGS (2pcs)	All
* Throttle body elbow CNC aluminum (1pc)	All
* M7 Aluminum label (1pc)	All
* Wiring harness 7" extension wires (6pc)	All
* Small Shrink Tubing 2" (12pc)	All
* Large Shrink Tubing 4" (2pc)	All
* Insulation Sheath 8" (1pc)	All
* Vacuum adapters for MAP sensor and VAC booster and 24 inches of vacuum hose	All
* AGS filter to crank case vent adapter elbow (1pc)	All
* Radiator hose heat shield blanket w/3 cable ties	All
* Radiator hose extension with adapter and (3) hose clamps	All
* Red bolt Cap to prevent chafing of TB	All
* M7 62mm Throttle Body	Pro Only
* Carbon Fiber Heat Shield	Option

Tools Required

Phillips Head Screwdriver
8mm Socket
10mm Socket
11mm Socket
13mm Socket
Extensions
Socket Driver
#30 Torx Driver
Flat Head Screwdriver
Needle Nose Pliers
3mm Allen Wrench
Dremel Tool or Reciprocating Saw
Soldering Iron
Heat Gun
Solder
Wirecutters/strippers
Cordless Drill
#21 Drill
#2 Drill
WD-40
Shop Rags
Coolant
Something Cold to Drink (optional)

Putting the car in service mode.

The front end of the Mini is tightly packed, with little access to the front of the motor. In order to get the space needed to do the installation, the modular front end must be moved forward. This is called “service mode” and while it may seem like quite a project, it is fairly simple and quick to do. As we’ll be digging fairly deeply into the front end, it’s a good idea to start by disconnecting the battery.

Raise the Front End

You can either do this with ramps, jack stands or a hoist. Note that if you use a hoist, you will need to replace more coolant, as the Mini tends to lean a little forward because of the forward weight bias. Ramps and jack stands do not share this issue, and very little coolant will need to be replaced.

Remove the front bumper cover

Start by removing the 3 10 mm bolts and the 2 (or 4?) Phillips head screws from the air dam under the front of the car.

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Next, remove the two (one each side) 8 mm bolts from within each wheel well. Long extensions can help here.



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The last two fasteners are the T-30 Torx screws. The side marker lights, the driving lights, and the optional external temp sensor (This is installed on your car if you have either of the optional GPS navigation system or on-board computer.) are all attached to the bumper cover. The temp sensor just snaps into place. The electrical connectors have locks, released by squeezing the back of the connector. Remove the cover, and store it where it won't get scratched. Here is a photo of the wire routing of the side with the temperature sensor.



Remove the aluminum bumper brace



Remove the wires from the brace so they won't get snagged when the brace is removed from the car. Each side is attached with 4 13 mm nuts, and one 13 mm bolt. Remove all 10 of these connectors, and the brace will pull away and off of the car.



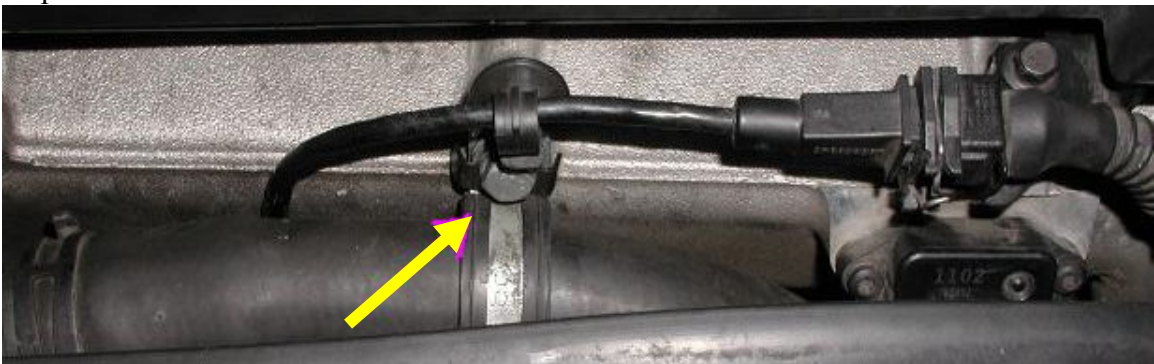
Lean the Modular Front End forward

There are 2 10 mm bolts (one on each side) that need to be removed (shown in the photo above) and there are 8 (four on each side) plastic connectors in each wheel well that need to be removed.

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If you crank the wheel all the way to one side, you can gain access to all four connectors, one wheel well at a time. Use a stubby Phillips head screwdriver to back out the screw part of the connector. If they rotate, you can hold the backside of the connector with your hand. All four of these are exposed on the front of the car. Crank the wheel the other way and repeat in the other wheel well. You'll have to remove the front hose clamp that holds the hard plastic intake tube to the MFE so it can move. A small flat-bladed screw driver helps here.



The 10 mm bolt that hold the knock sensor wire and holds the upper radiator hose to the intake manifold must be removed. Now you can lift some of the weight of the MFE, and lean it forward 4-6 inches.



Now there's enough room to work. This is the Hot Air Intake that will be removed to make way for the AGS.

Parts Removal

Removing the existing air cleaner.

Start by removing the stock hose clamp near the air box from the rubber hose that goes to the throttle body. Wiggle the hard plastic tube around to remove it. Remove the plastic funnel attached to the MFE, and now you can get to the hose clamp on the throttle body. Remove the clamp, and then the rubber tube. The upper part of the air box does not need to be removed, but I like the added space, and the bottom half makes a nice under-hood tool tray, so I left mine off.

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Disconnect the wiring harness (remember these are locking connectors, so make sure you press on the lock enough so that the connector slides off without fighting), the 4 10mm bolts, and the vacuum hose (this last item may be easier to remove after the throttle body is no longer mounted to the car). The clip on the vacuum hose can be moved with pliers. The throttle body is captured between the support bracket and the stock tube. It will come out, but it takes a little coercion!



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If you have an AGS Pro System with a larger throttle body, just set the stock unit aside, and return it to M7 to get your core charge refunded. If you are going to reuse your stock TB, you must remove the right angle vacuum hose barb and replace it with the low profile connector supplied with your kit. Also, the barb should point to the back side of the throttle body, the side with the rubber gasket.



This shows the stock tube that will be replaced. You can also see the bypass valve and the cooling hoses.

Optional: Removing the Intercooler and Bypass Valve Assembly

While the work can be completed without removing the intercooler, bypass valve, and post IC intake horn, I found the extra room to work to be well worth the effort. Start by removing the 4 T-30 Torx screws that hold the intercooler cover. Remove and set this aside. Next, undo and remove the top half of the intercooler boot cover clamps, both on the exit (smaller) boot and the one closer to the IC on the larger boot. Remove one 8 mm bolt from each of the IC support brackets at the front of the IC, and swing the brackets out of the way. Now pull up on the end of the IC that has the small boot, and it will pop up. Lift the intercooler up and away and set aside. (Note: My IC is black because it's coated with a thermal dispersant. Yours will be bare metal.)

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Remove the smaller boot, and the lower half of the three clamps that had been loosened.

Loosen the top hose clamp below the bypass valve. Remove the 3 11 mm nuts that hold the intake horn onto the intake manifold. The bypass valve hose will fight you a bit, but the horn can be pulled off the intake manifold now.



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If you've never checked your bypass valve, now is a good time to do so. Make sure that the set screw that limits travel allows the valve to fully close. Also, some valves have needed the butterfly adjusted. Thread lock was used on later model years, so if you're going to make adjustments to your valve, you may have to use some heat to loosen things up.



This is the engine bay with the intake, intercooler, throttle body and intake horn all removed from the car.

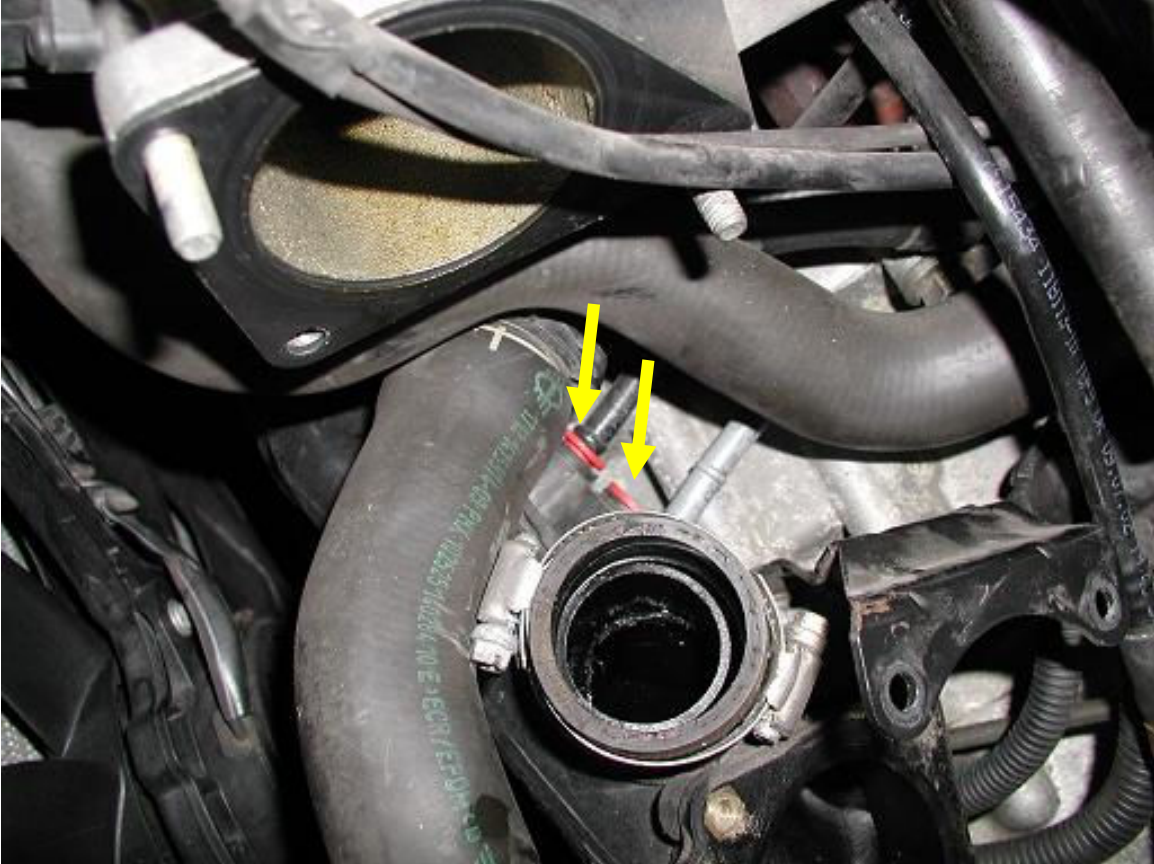
Removing the rest of the bits....

First off, the rubber vacuum hose that was attached to the throttle body can be removed.



It will just pull off of the hard plastic hose.

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Next, remove the two vacuum lines. If you push down on the red collar, the tube can pull out. The above photo shows the grey tube removed, and the black still in place. Now you can remove the 10 mm nut that attaches the intake duct to the supercharger, and remove the duct from the car. If you chose to not remove the bypass valve assembly, you will have to use long needle nosed pliers to get to the red release collars.



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The grey tube you removed in the last step goes to the MAP sensor. It's mounted above the thermostat housing at the end of the head near the air box. The MAP sensor must be removed to fully remove and replace the tube. It's held in place with two 3mm Allen socket head cap screws.



Remove the MAP sensor, and pull out the stock MAP sensor vacuum tube.

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The other vacuum line needs to be removed as well. It ends at a quick connect near the battery terminal. Make sure to press on the white part of the connector to unlock it! When it's disconnected, just pull it out!

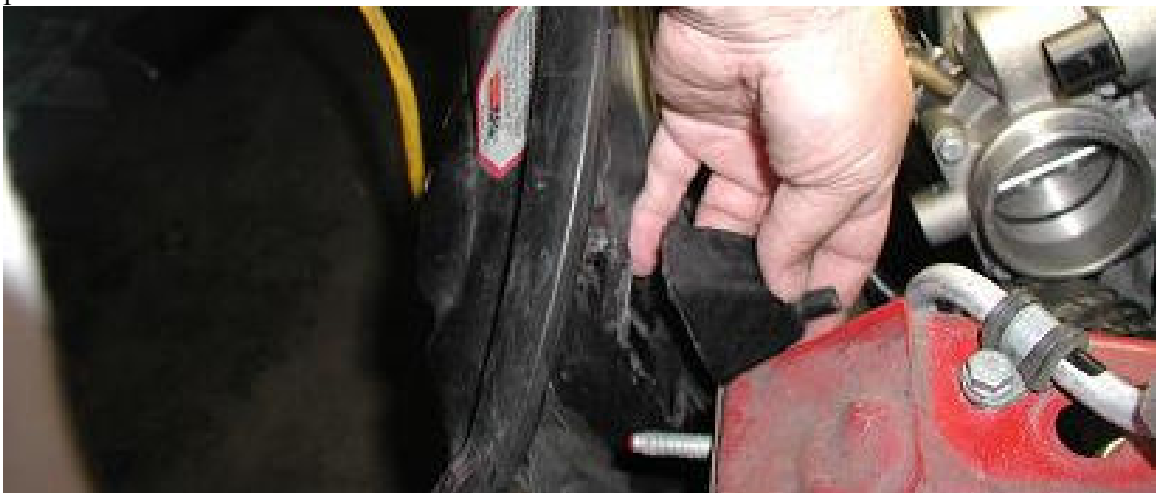


Next, remove the throttle body support bracket. This won't be used in with the AGS system. It's held in place with two 13 mm bolts, and the wiring harness is attached with a 10 mm nut. Disconnect the radiator hose at the water pump. Some coolant will spill, so be prepared.

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Remove this plastic bracket (held in place with a single 10 mm bolt). Also, slide the round rubber tube protector down. The filter will need the space! Remove the bracket that holds the electrical connectors in place. The electrical connectors will be wire tied in place later.



Cut this tab off the radiator shroud. That's the last bit of removal.

Extending the Throttle Body Wiring Harness

The AGS System rotates and relocates the throttle body. Because of this, the wiring harness needs additional length. While this step may seem intimidating, it's actually very easy. The idea here is to splice in about 6"-8" of additional length.



First, remove the cover at the back end of the throttle body connector. It's a snap close held at two points. When open, it can be removed from the harness.



Stretch the wiring sheath back so that you expose enough wire to work with, on both ends! Now comes the hard part. Cut the wires, one at a time. (Cut one at a time in case there is still residual charge built up in the car's electronics.)

Tinning the wires

Tinning, or pre-soldering, the wires will make the act of actually soldering the wires much easier. Strip 3/8"-1/2" of insulation from each wire, both the connector and the wiring harness in the car.

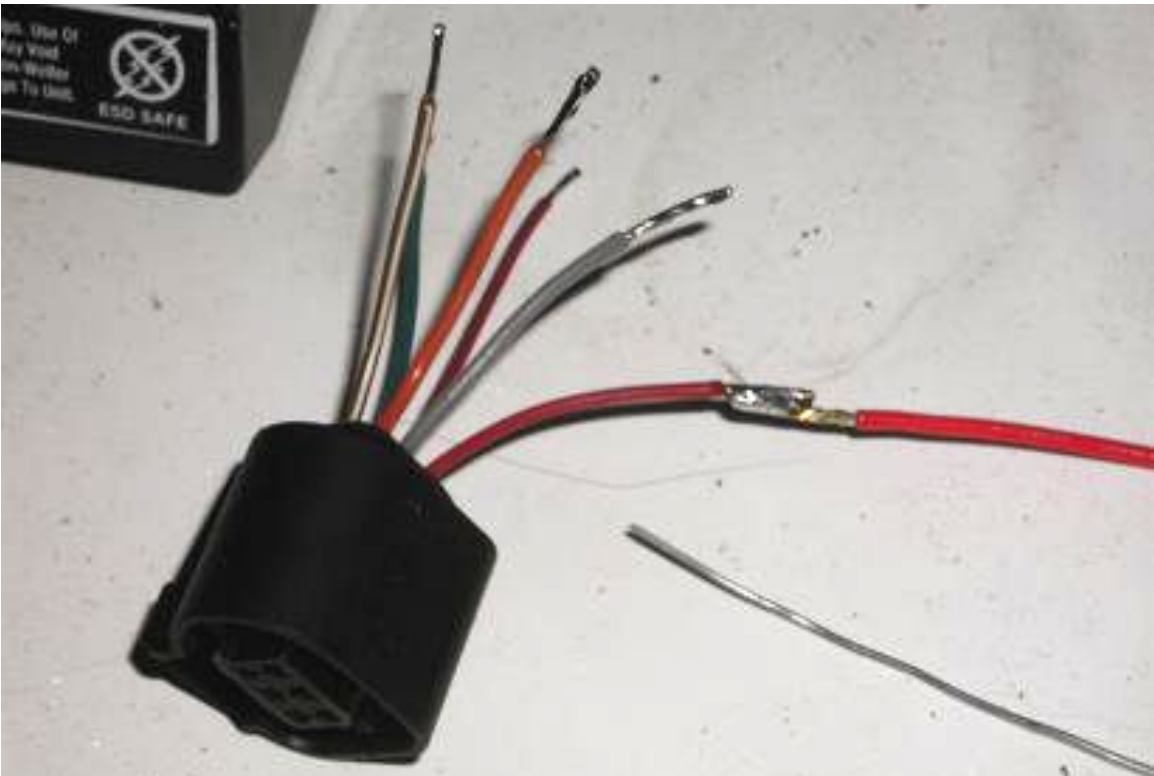
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Apply heat and solder to each wire until some solder wicks into the wire. That's it! Now, when you solder the two wires together, all you need to do is heat the solder to re-flow. This takes less time than waiting for the solder to wick as well.

Extending the harness

Add the wires to the connector end first. You can do this on the bench where it's easier to work.



Add shrink tubing for insulation.

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And repeat until you finished the whole connector.



Slide some ½” shrink wrap over the wire bundles (two pieces, one for each end of the splice) so that you can bundle the work after soldering. And remember to put on the small piece of shrink wrap before you solder each wire onto the wiring harness! After all the soldering is done, and the shrink tubing has been hit with a heat gun, add the supplied insulation sheath over the wires. Re-attach the connector cover, and you are done with the wiring!



Assembly

Assembly is slightly different than removal, and there are some items that you can do to improve your car in other ways as well.

Lightly lube the SC intake gasket with some WD40 or some engine oil and place onto the supercharger intake.



This shows the gasket mounted on the supercharger intake. Note that it's asymmetrical, with one end smaller than the other. There is a rubber alignment tab as well.

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Install the AGS tube, and use the 10 mm shoulder bolt to attach it to the supercharger.



Use the supplied clamps to attach the new vacuum lines to the AGS tube. Take care to make sure that the hoses are well routed, and aren't pinched or twisted.



Re-attach the intake horn and bypass valve assembly. Note: The radiator hoses will tuck in tightly. Make sure that the hose clamps for the bypass valve don't restrict the bypass

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valve operation or rub on the coolant hoses. Use the 4 long 10 mm bolts to attach the throttle body to the AGS tube. You can route and attach the TB vacuum line now as well. After attaching the radiator hose (below) I found that the TB vacuum line routed better by going above the AGS tube. See the next photo for details.



Attach the radiator hose extension included with the AGS kit to the water pump. Mark the stock hose where you will cut it. Cut the hose, and install the coupler with the hose clamps provided. Make sure nothing can rub the TB wiring harness. Note the TB vacuum line now runs above the AGS tube. Route the TB wiring harness under the TB, but don't connect it yet, you'll need the space for putting the filter on.

The filter is a bit of a fight to install. I found that I had to push it past where it would finally be to get the gasket lip over the throttle body. Then I pulled the filter back into place. You have to route the band clamp in after the filter is installed. Now you can attach the throttle body electrical connector. It's a tight fit, so make sure that nothing is bent too much or pinched. Put the orange bolt cover onto the tightened band clamp to prevent any chafing.



Now's the time to wrap the radiator hose with the insulation, and wire tie it into place.

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The last crankcase vent needs to be installed now. I removed the stock hose from the valve cover, routed the supplied ½" ID hose to the connector on the base of the air filter, and used the stock clamp to hold it in place.



This photo shows the routing on the head. Now you can replace the intercooler. I have found the technique used for removal works pretty good backwards! It takes a bit the first time, but I've found this to be a fast and easy way to get the IC back on. Make sure the IC boot clamps are tight, and don't forget the 8mm bolts that hold the IC supports to the intake manifold. Re-install the cover.

I found the radiator shroud didn't want to seat well the first time I went to put it all back together. This is because the AGS system is packed in there tight! So place the radiator shroud as best you can, and then place the AI bumper extrusions in place. Use the large bolts to help "pull it in". Use care to check that every think is just getting a bit squeezed, and that nothing is pinching (look especially closely at any hose clamps and the like).

Top up the coolant using the vent in the upper radiator hose and adding some to the overflow tank before putting every last bit back on the car. Re-connect the battery. Test the car. Make sure it doesn't throw any codes and idles smoothly. Shut off the car. Open the radiator hose vent and wait until water comes out. Close the vent.

If everything is good, re-attach the radiator hose support (at the front of the intake manifold). Make sure that the AI bumper extrusion is tight. Re-attach the lower radiator shroud using the two 10 mm bolts. Re-attach the wheel well liners to the shroud by inserting the plastic fasteners. The screw can just be pressed in, no need to use a screw driver.

Now is also the time to look at your front bumper cover. The lower edge can be pretty beat up, and some of the gaps between the plastic parts may not be as good as you want. Take the opportunity to work the gaps (all it takes is a Phillips screwdriver). Also, the gaps at the end of the bumper cover are adjusted via the 8 mm bolts, but also by the support that the 8 mm bolts go through. There is another bolt that holds this support in place. If you want to adjust the gaps at the end of your bumper, these two bolts are what do it. While you're at it, take a moment to make sure your car is perfect.

Installation of the Heat Shield

The heat shield is held on by two self tapping screws. I positioned the shield where I wanted it to be, and then drilled through the Al bracket and the frame rail with a #21 drill (to give the threads some meat to bite). I then re-drilled the Al bracket with a #2 drill and attached the heat shield with #10 self tapping screws.



Now is the time to wire-tie the electrical connectors down to the A/C test tube.

Congratulations! You have finished the installation of the M7 Air Gain System!

Optional: Getting more air

Because the AGS isn't a true cold air system, anything that will get more cold air to the filter is beneficial. Some have opened up the hole in the radiator shroud to get access to more air from the front of the car.



First, mark where you're going to cut. I used a black Sharpie, and stopped my enlargement where there is a bracing rib on the back of the shroud.



This is the piece I cut out.

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Here I used some Al duct tape to seal the gap between the radiator shroud and the heat shield. Now the AGS will get even more air than stock!