

VR Camaro V-6

installation instructions

Please read completely through before beginning your installation. If at any point you are uncomfortable performing any aspect of this installation yourself, please refer the installation to a qualified automotive technician.

Tools needed

1. Flat head and a Phillips head screwdrivers
2. 10mm socket/wrench
3. Dremel cutoff wheel , a hacksaw or sheers
4. Set aside, about 15-30 min of time for the installation.

Step one

REMOVING THE OEM AIR TUBE AND AIRBOX.

(Remove the OEM engine cover by Unscrewing the oil fill cap and simply lifting up on the cover. You have the option of re-installing this at the end of your installation. We leave them off to prevent excess heat soak.)

1. Using a flat head screwdriver remove the OEM intake tube.
2. Unplug the OEM air meter by pulling the yellow locking tab, Then simply squeeze the plastic connection on the harness and pull. The wiring harness should release.
3. Using the 10mm socket and extension, remove the two 10mm hold down nuts as shown from the OEM airbox mounting studs.
(Occasionally these will be cross-threaded from the factory and require some force to remove)
4. Lift out OEM air box by pulling straight up , you can wiggle it side to side and this may help it release, it will release with a POP! now simply lift it out of your way. Remove the PCV line from the box before lifting completely out.
5. Unscrew the electronic air meter from the OEM air box neck, using a 10mm socket /wrench.

Step Two

LEANING the RADIATOR

1. Using the 10mm socket/wrench remove the radiator bolts, (2 bolts) these are located at the top of the radiator on the back side of the core support as shown. You will be reusing the OEM plastic brackets.
2. Lean the radiator back about 1/2inch, it will fall there naturally so you probably won't need to push on it. Remove the rubber seal from the top of the A/C condenser, this simply peals out/off.
3. Using supplied Long bolts and Grommets 2 per side, simply place the grommets between the Brackets and the core-support as shown. Run the bolts in, these do not need to be tightened up yet. You will need to leave about 1 inch for clearance for the VR system to breath between the core support and the scoop/shovel of the VR system. You can check your measurements as shown when you get to this point coming up in the installation.

Step Three

Installing the VR system

Mounting The front wing;

Slide the wing down between the Core support and A/C condenser as shown. This uses the OEM bolt location. Using the supplied bolts from VR run the bolt through the OEM bracket then the wing and then the rubber grommet, in this order.



Install the supplied Red hose onto the throttle body housing of the as shown. Now” THIS IS A CRITICAL POINT. The VR system has a special rear air horn to increases airflow into the throttle body beyond what a ported throttle body will flow. In order for this to be effective, the rear of the air horn needs to butt up flush to the throttle body casting as shown. This eliminates any uneven transition that could cause an air dam affect and can cost 8-10hp. You will Push the VR system back against the throttle body , making sure they are flush and Tighten the hose clamps completely,

Re-install the air meter into the VR MAF housing using the supplied screws. “Do NOT bring the outer O-ring in on the screws” instead, simply tuck the O-ring in all the way around before tightening the screws. You can use the tip of your flat head screwdriver for this, some lube helps here. Wipe the O-ring with WD-40. Now tighten the screws just beyond finger tight, that is all that is needed.

Now place the VR system into the location as shown by rotating the system in place (this makes installation much quicker).



Cutting the OEM Brackets:

For this step you can use a dremel cutoff wheel, a hacksaw or even sheers but be careful. With the bracket off the car, you will be cutting the inside edge away for air box clearance. We have provided measurements for you inside the images using digital calipers as a reference.



Once completed simply reinstall the brackets as shown, the cut edge will be to the inside.



Now you can tighten up the bolts in the radiator brackets, again just tight enough, you do not need to run these all the way down. The grommets are 90 duramiter rubber they should stop most, but they are there to maintain spacing between the core support and the VR system, they also allow for flex and vibration deflection, which the OEM plastic radiators must have. (There needs to be a minimum of 1 inch of space between the scoop and core support. You can measure this as shown.)

Connect air meter wiring harness and push the yellow locking tab in to lock the harness.



PCV.

Using supplied Chrome VR breather simply push this into the OEM hose as shown. This breather has an internal baffle system.



A MUST READ SECTION

Driving/ Dynoing and Learn time.

You must allow the vehicle "learn time" to re-adjust to the new airflow before doing any performance driving or running on the dyno. In general, the long term fuel trims will take a set within 28-32 miles. It usually takes the E38 ECU/computer a full 100 miles of varied driving to completely learn the part. You will "FEEL" the ECU adjusting as you are driving. This will disappear in about 12 -20 miles. If you do not allow for this "learn time" the ECU will pull timing advance -4-10degrees here is a log file of what we are talking about

(with learn time)

(No learn time)

We have tried disconnecting the battery for 2 hrs/ overnight as well as just driving the car. We even reflashed the ECU it still takes time for the ECU to learn. Give it about 28-30 miles before starting any performance driving. At this mileage point the ECU usually has another 2-3% fuel trim left to go and +2-3 degrees of final timing advance for full power. Every airflow part is different and in general the more airflow you provide the longer the learn time for fine tuning but the initial 28-32 miles is usually the same.

Dynoing the VR system

The V-6 system is an active self intercooled system and as such is designed to be moving not sitting static. The system has been tuned to be moving. The mass airflow meter scaling and fuel curves require the vehicle to be in motion for full power. Sitting static the mass airflow meter is scaled back to allow for the added airflow from the ram affect 10%+ to finalize maf scaling. The ram affect is worth an additional 450-500HZ in maf scaling and an as measured through the vehicles air meter 10% air- flow increase. This self intercooling allows the cars ECU to run full timing advance on the road vs the dyno. Normally on the road under real world conditions the OEM combination will run - 7-8 degrees less timing than what was seen on the dyno. As an example: The VR in 3rd gear under sustained loads in 100+ deg heat has shown no timing retard and no detonation. We optimized the system for 3rd gear (man trans) as this would be the gear used to complete a 1/4 mile pass. Will any of this show up on a dyno? NO, None of this will ever show up on a dyno but it will show up on the road and track. Here is a data log for you to see the difference pictured below.

(Show picds)

Note the intake temps are the same yet the airflow rates are completely different as is the peak timing advance number.

Total power delivered by the VR system is over 30 rear wheel HP and 30+ftlbs of Torque.

Tuning the V-6 VR unit

We have the fuel trim and timing curve set on the VR system around OEM levels to keep the curve conservative for vehicle and fuel variation. The system "will benefit" from a custom tune but it is already "set up" just little stronger than OEM on both timing and fuel settings.