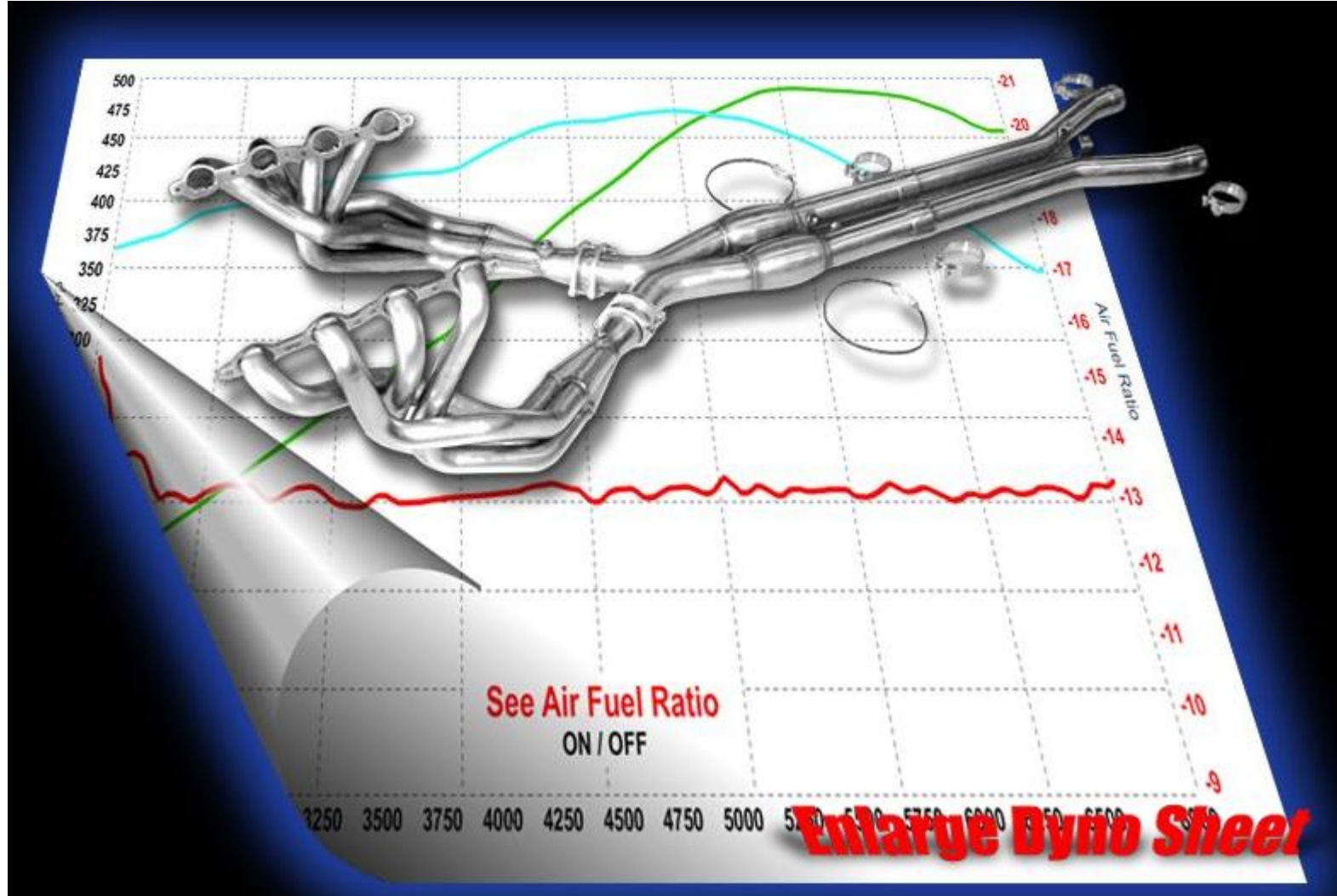


C6-2006 LS2 American Racing Header Installation / Instructions



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American Racing Headers prides itself on using only the finest material and construction methods for its kits, and the C6 Corvette system is no exception. Designed to replace everything from the exhaust ports to the overaxle pipes, this particular ARH system retails for \$1,695.00, and is complete with O2 sensor extension harnesses, grade 8 hardware, and all necessary clamps and gaskets. Nothing but shimmering 304 stainless steel comprises all systems, and unlike some other brands, the ARH header primaries are as close to equal in length as possible at 27 inches.

1



A peek underneath before we begin: The stock system forward of the Cat-Back consists of dual 2.5-inch cat pipes accepting exhaust from cast-iron manifolds. Like most factory exhausts of today, it exhibits none of the restrictive kinked bends or flaky, low-quality metal of earlier EFI vehicles. But we are here to improve, and improve we will!

2



The first item to disconnect is the existing Cat-Back exhaust, which in our case is an aftermarket system to complement the new ARH headers. Remove the nuts holding the stock h-pipe (or in our case, CORSA XO-pipe) to the factory cat pipes. This piece of the CORSA system will not be reused, since the dimensions differ due to the ARH X-pipe's high-flow cats and long-tubes positioning.

3

Remove X Pipe First



After unbolting the springy hangers securing the XO-pipe to the transmission assembly front, disconnect it from the overaxle pipes. Use of torches, air hammers, and other equipment may be necessary, but try not to injure the pipes too much. A trans jack should be used to steady the pipe--it is pretty heavy, and we cannot imagine any assistant wanting to stand in place as long as it took us to separate the system. We leave the CORSA overaxle pipes hanging, as our ARH system will later slip right onto them.

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Header

Two nuts hold each factory cat pipe to studs in the stock manifolds. But do not get overambitious here--there are rear O2 sensors in each, which need unplugging (though the sensors can be left in their respective pipes until they are out). For now, just loosen the nuts so that each pipe hangs a little lower, providing enough room to reach the sensor plugs near the engine. Be patient, as they can be a bit difficult.

5



Header I

With the rear O2s now unplugged, remove the aforementioned nuts and the cat pipes come out. We are done with system removal underneath and can shift our focus upward.

6



Under the hood, the plastic engine covers are popped from their rubberized mounts and removed, exposing the ignition coils. We will need to start disconnecting items on and about the cylinder heads, and the covers obstruct access to everything--and hide a substantial portion of the LS2's electromechanical majesty. (Dare to be different? Sell your engine covers on eBay.)

7



Header Install

Atop each valve cover, a front O2 is wired in via a plug assembly affixed to the coil bracket. Unplug it and unsnap the black plastic female connector; its wire leads to the sensor mounted in the manifold below. Repeat for the other side.

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The next step is to disconnect all of the ignition wires. This function-unknown piece of black plastic on the passenger side obstructs removal of the number 8 wire from its spark plug. An upward yank pops it out; we will see if it can be reinstalled after the long-tubes are put in place. (For those who cannot stand the suspense, the answer is yes). The next step is to disconnect all of the ignition wires. This function-unknown piece of black plastic on the passenger side obstructs removal of the number 8 wire from its spark plug. An upward yank pops it out; we will see if it can be reinstalled after the long-tubes are put in place. (For those who cannot stand the suspense, the answer is yes).

9



With all ignition wires removed, the spark plugs come out and are placed to the side for later use. These are the last ignition-related items to be extracted; fortunately, the coils can stay in place as the ARH headers will install from underneath.

10



On the passenger side, a 15mm bolt holds the dipstick tube to the head. Unlike some press-fit designs of past GM V-8s, an o-ring seals it to the block and so it easily pops out and up.

11



The final step in system-removal is stripping the stock manifolds from the engine. Six 13mm bolts on each side hold the manifolds in, and will have to be wrenched out because they are clogged with factory GM sealant. Note that there are multiple bolts on each manifold which do not need to come out; shinier bolts hold the manifold heat shield and can stay in place for now.

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Take care while removing the manifolds, as they can now easily drop straight to the floor. While still up top, orient them in order to get them temporarily stuck between the engine and fenderwell. This way, they will not fall as you venture underneath. Remember, there is still a delicate O2 sensor in each one.

13



The stock manifolds are decent-looking, with defined runners and an (at least somewhat) equal-length design. Like those used on C5 Corvettes, they are cast iron; LS7-equipped [cars](#) excepted, steel factory manifolds have not been used since model year 2000.

14



To get the O2s out of the manifolds, the manifold heat shields must come off via six 10mm bolts, and a 7/8 then removes each sensor. This got us thinking: with this tight of a fit just to get an open end in, changing a bad O2 with the manifold still on must be quite a challenge.

15



To avoid any chance of droppage, contamination, dog steal-age, or other unexpected mishap, it is best to transfer each O2 to its respective ARH header collector right away. Be sure to use anti-seize, but do not get any on the sensor--and do not over-tighten.

Head

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Before installing the headers, let's take a look at some of the detail work. Welded to the cylinder number 4 primary on the passenger-side header is the signature American Racing Headers emblem. As both the company name and logo suggest, ARH takes pride that its headers are 100 percent Made in America, using all-American components. ARH is "committed to maintaining a higher standard in performance and quality." And it shows.

17



Check out the fine finishing about the entrances to the header primaries. All welds have been carefully ground down for uninterrupted flow, and it is clear from this view that the header flange is precision-finished. Like every piece of an ARH header system, the entire header is 304 stainless.

Head

18



With no exhaust system in the way, it is time to install the rear O2 extensions (white wire sheath) into the existing factory wiring harness. The plugs sit just above the header collectors' position, and may be difficult or impossible to reach once the headers are installed. As you can see, the one on the passenger side is located just aft of the starter. The front O2 extensions can wait, as their plugs are easy to get to up top (those extensions have a black wire sheath, as we will see shortly).

19



To prepare the cylinder heads to accept the new headers, remove any dirt or grime from their surfaces with solvent. This helps to ensure an optimum seal, and we also suggest spraying the currently empty manifold bolt holes with penetrant, or even running a tap through them. Thanks to GM's aforementioned extensive use of sealant, the bolts came out hard. Note GM's widespread use of heat wrap on all factory wiring in the vicinity of the exhaust, which is a benefit for this project as the incidence of melted wires is greatly reduced.

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For whatever reason, ARH recommends reusing the factory exhaust manifold bolts. But one look at them reveals sealant buildup sufficient to strip a thread in the aluminum head. The buildup is so hard, it is impossible to get off even with strong solvents. So when you can't beat `em, burn `em! (A wire wheel is another option, but it is nowhere near as fun.) Had ARH provided new bolts, this extra step would have been avoided.

21



In order to get the passenger-side header into place, the ARH instructions called for the removal of grounds and wiring connections around the starter and block, and even recommended taking out the starter itself. We found that none of this was necessary, and our header popped right in! A couple of bolts up top will easily hold the header in place temporarily.

22



The driver-side ARH header is a bit more difficult to snake in. Obstructing the route is a clutch line bracket affixed to one of the bellhousing-to-engine bolts, so you will have to remove this bolt (or at least loosen it substantially), to gain header flange clearance. Note that our wiring for the driver-side rear O2 (with extension attached, bottom right) has already been routed behind the black bracket to help keep it away from the header.

23



With the clutch line bracket moved, the driver-side header should go in without further problems. Now is a good time to replace the bracket while the header is still loose, as it's much easier to get your hands up there. Then it's time to head up top, and at this point we should share a helpful tip: Bungee cords can be used to hold the headers in place while traversing up under the hood.

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After popping the gaskets behind the headers, we can start to install the bolts. Though many recommend using anti-seize to prevent corrosion between the ferrous bolt and aluminum head, in our experience, the heat expansion properties of 304 stainless steel sometimes result in the loosening of header bolts over time. Use thread locker to prevent this problem, and to help ward off oxidation. But we cannot use it quite yet: the ARH header system's design requires positioning the x-pipe before tightening the headers. Otherwise, the header collectors will be too close together for the x to fit.

25



Since thread locker would dry in the time it would take to get the x-pipe in place, the header bolts are installed dry and loosely. In the meantime, we can install the spark plugs. We were happy to find that the ARH primaries provide ample spark plug access--having to make special sockets for long-tube-equipped third-gen F-cars are personal nightmares not to be repeated. A dab of anti-seize on these threads is appropriate; tighten to GM's 11 lb-ft. torque spec.

26



It is almost time to install the x-pipe, but first route the rear O2 sensor wiring a bit more. ARH supplies handy clamps that can be sandwiched beneath the driveshaft tunnel crossbrace bolts. We found them very helpful in securing the rear O2 extensions already plugged in. This photo also provides a good look into ARH's so-called scavenger spike-equipped merge collectors, which exit at a full 3 inches, no matter which x-pipe design is chosen.

27



We have largely neglected the front O2 wiring up to this point, but it is now time to snap in the ARH-provided extensions (black wire sheath), which plug into the wiring harness atop our LS2. To keep the extensions away from heat on their way down to the header collectors, we found it best to run them along the back of the engine, ziptied to sturdy existing edifices. Take care to orient the extension plugs so that they will not interfere with reinstallation of the plastic engine covers (after trial and error, we found that strategic routing under the fuel rail helped get them low enough).

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With the headers still a bit loose, we now start to install the x-pipe and connection pipes. First, the connection pipes are slid onto the existing CORSA overaxle pipes. Note that ARH makes one slightly longer than the other so you do not mix them up (the shorter one installs on the passenger side). Also note that each has a bracket, which must face upward in order to connect to hangers at the front of the transmission. You can see one of these brackets near my right ring finger and the factory springy dangling hanger just above.

29



Before putting the x-pipe in place, the rear O2 sensors install into bungs welded in aft of the catalytic converters. The sensors are at severe angles to each other since vertical clearance will be tight between the pipes and the C6's driveshaft tunnel crossbrace. We should note that ARH refuses to use anything less than the highest-flowing metallic-substrate catalysts, and these units reportedly flow much higher with their larger-holed ceramic honeycomb than those used by other companies.

30



Next, slide the x-pipe onto the cat pipes. The orientation should be easy to figure out: the O2 sensors face up, and the passenger-side pipe juts backward slightly, to match up with its shorter connection pipe. The x-pipe is not exactly lightweight, so a trans jack will help avoid disaster.

31



Now that the x-pipe, connection pipes, and overaxle pipes are all loosely one piece, attach the x-pipe to the header collectors. Start the provided grade 8 collector bolts, but do not tighten them yet, and hang the connection pipes from the stock springy transmission hangers. At this point, make any corrections needed to center the x-pipe in the tunnel. This may include twisting connection pipes, as well as light prying here and there at various points on the exhaust.

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With everything loosely in place down below, we can final-tighten the headers. Put some thread locker on each bolt, and torque each header in a center-outward pattern to 11 lb-ft and then 18 lb-ft. With all bolts tight, you will need to proceed underneath to check that pipe spacing is still accurate; if it is off, you might have to improvise by loosening the headers and tightening one before the other. You may even have to do what we did, and insert a wooden board between the x-pipe and frame to keep it roughly centered while tightening. Be patient, but be sure not to let the thread locker dry.

33



With the headers now firmly bolted to the cylinder heads, take a look at the extraneous GM frame seam jutting out toward the lower passenger-side header, forward of the collector. If clearance here is too tight, you risk pesky rattles as the engine shakes while running. Just slice some of it with a sawzall. Though shown intact here, we eventually did cut it just to be safe.

34



It seems like we have done an awful lot of O2 wire routing, but we promise this will be the last of it. Plug the rear O2s into their extensions, and take note of all wire-to-pipe clearances. Clamp and zip-tie as needed, and do your best to minimize any slack. This will be easier with the x-pipe still loose on the collectors, as it creates greater clearance above the exhaust. Of particular concern to us was the area above the cats, which we knew would get more than a little warm under power. How well all of this wiring will hold up over time in this hot environment remains to be seen....

35



We did end up heat-wrapping some areas in particular risk of melting, and you can see some on the routed wiring above. You may recall that in the November 2006 issue, we installed an Innovate Motorsports wideband system on this car; in order to adapt it to the ARH headers, we had to weld a bung upstream of the cats. Just aft of the passenger collector proved the best spot, and here we tighten our Innovate wideband O2 sensor into place.

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The last undercar step in the installation is to make any final adjustments necessary to all exhaust pipes, and to tighten all connections. As you can see, we now have a dual 3-inch exhaust from front to back. On our application (and despite our best attempts otherwise), the assembly came slightly closer to the driver side of the driveshaft tunnel. Fortunately, we were able to make enough adjustments so it was rattle-free. Also, final-check the entire header system front-to-back for any stray wiring. Up near the engine, one or two areas of the factory wiring harness should be zip-tied for more room, though overall the clearance between the ARH headers and all factory wiring was excellent.

37



This view of our completed header installation showcases some of the thought that went into the design. Note how the header collectors drop down in size before exiting into the x-pipe at 3 inches; ARH's collector design purportedly assists in scavenging. Also note that their header systems feature catalytic converters located downstream of the crossover. ARH says that in testing, this configuration picked up several lb-ft of torque versus placing the cats forward of the X.

38



Up top, there are a few final odds and ends to take care of, and one of them involves the dipstick. ARH designed its header so that the dipstick tube will go back into the block without any bending or other modification.

39



The stock ignition wires pop back on. Adequate clearance is provided between the header primaries and all ignition wire boots, as well as the steering linkage. After we snapped this photo, the engine covers were popped back on, and we were all done.

40

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With our C6 strapped to this Dynojet 224x, its combination of headers and a dual 3-inch exhaust meant that sound echoing inside the concrete walls of TTP's Passaic Park, New Jersey shop was borderline deafening, and equally glorious. The factory tune was left in the Vette's PCM during the first pulls, for a pure bolt-on evaluation of the gains provided by our ARH headers.

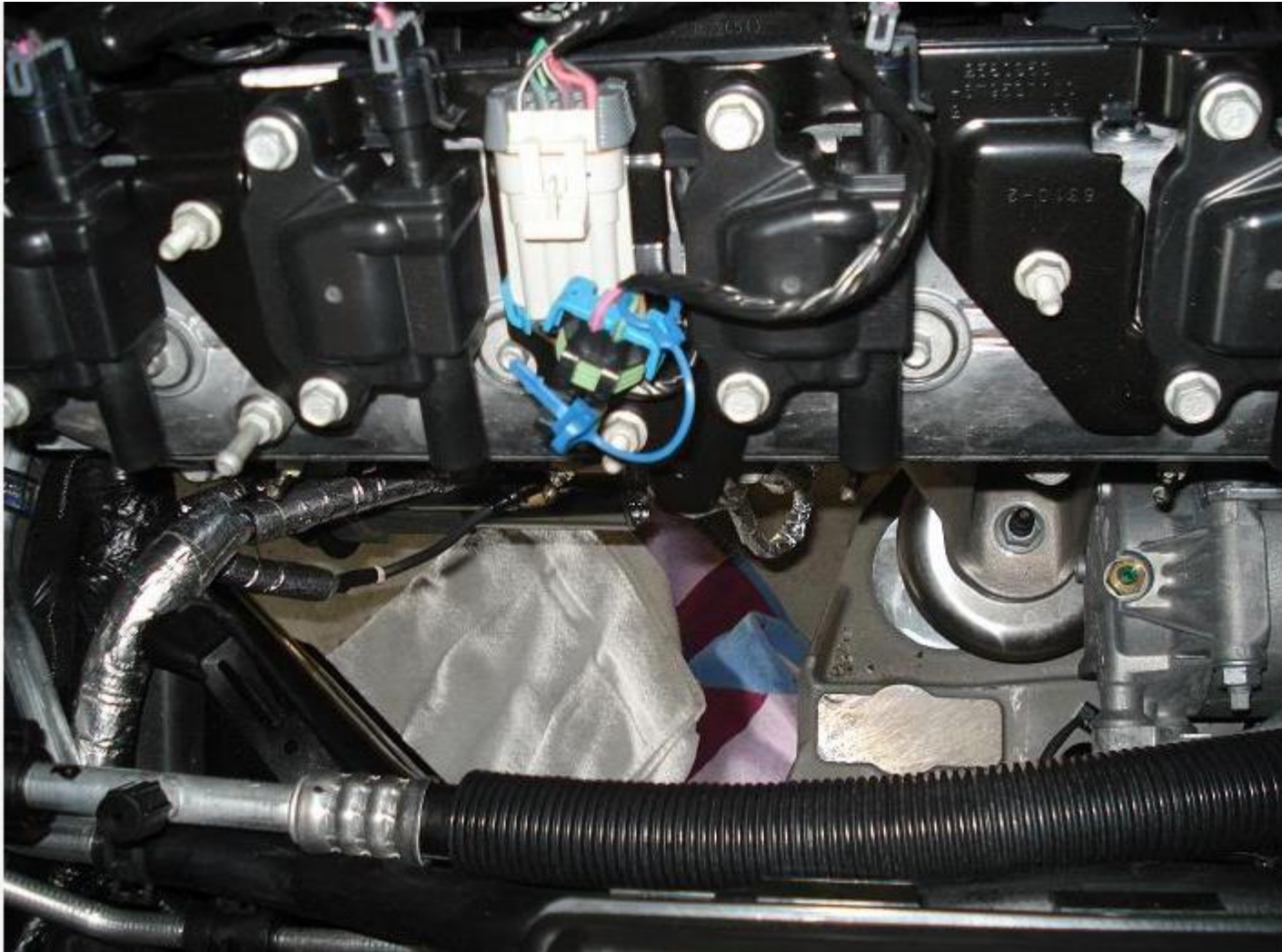
41



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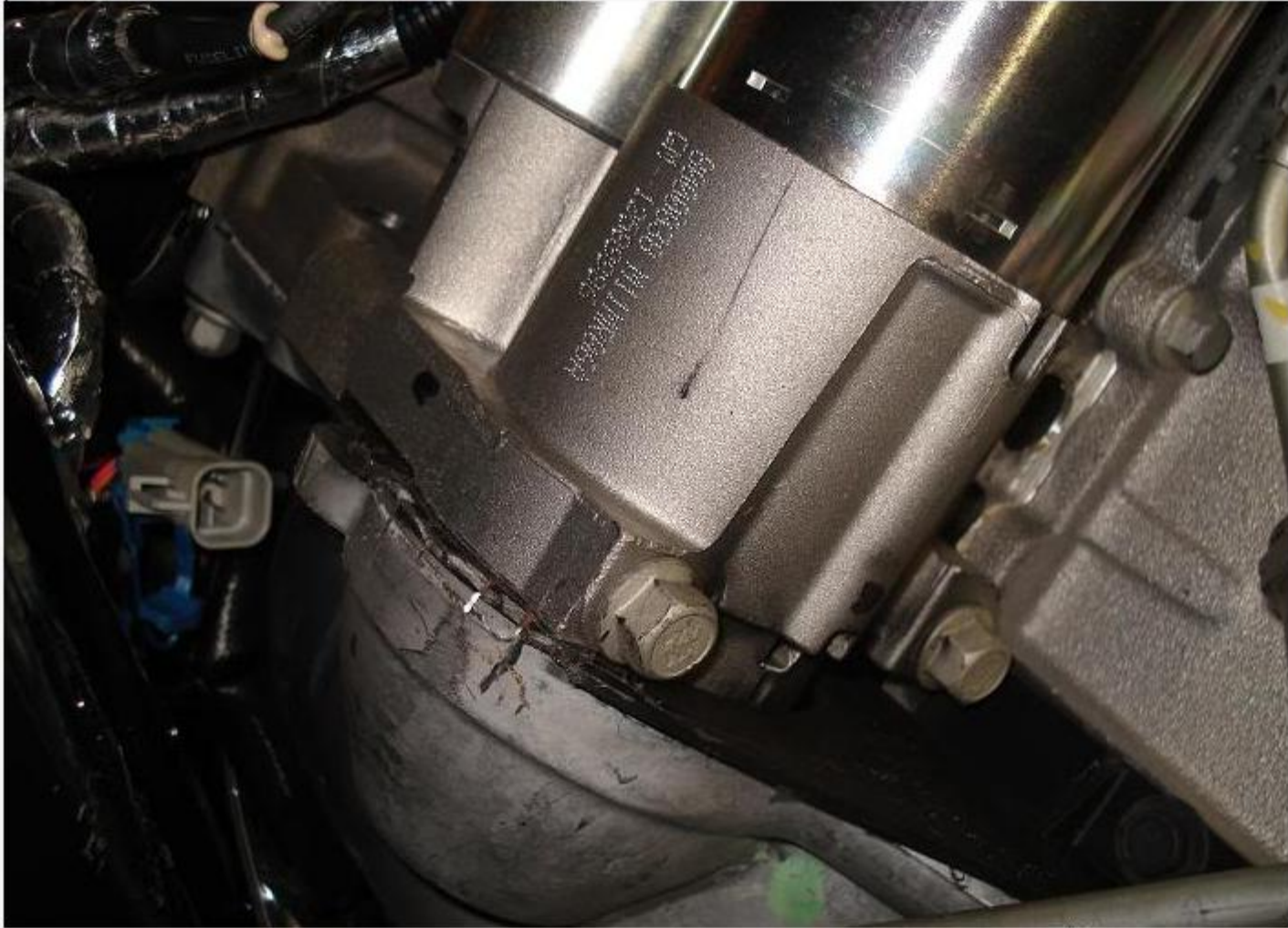




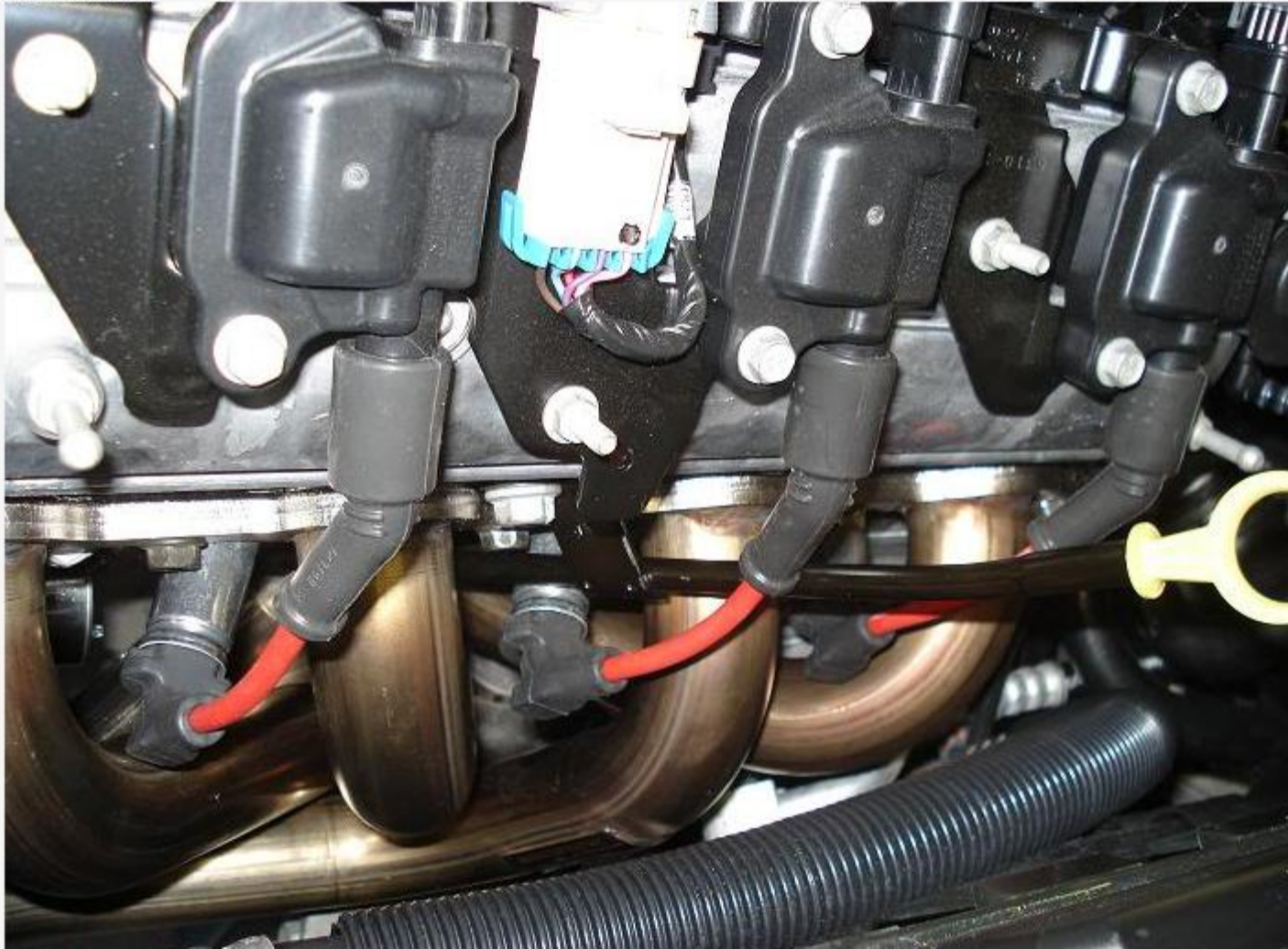
driver side of motor no exhaust



pic of the dremeled shim



passenger side header



driver side header installed:





