Mods needed to run the Blake Machine supercharger manifolds

The TVS1900 intercooled supercharger from the 2010-2019 Range Rover 5.0L and Jaguar engines is a very efficient and low profile supercharger assembly. It works extremely well with making lots of power with cool intake temperatures. The problem with most intercooled superchargers on the Lexus engines, is that the intercooler goes in between the supercharger and the cylinder heads. This not only makes it an issue when wanting to keep a low profile overall engine height to keep everything under a stock hood, but it also makes it to where the thermal efficiency of one intercooler cannot exchange the heat that a dual intercooler can. The Jaguar and Range Rover 5.0l came with dual intercoolers.

When we at Blake Machine set out to manufacture the billet intake manifolds to adapt this supercharger assembly to the Lexus UZ family of engines, the first priority was to keep the overall height of the entire assembly low as possible. To do this we had to move the fuel injectors and fuel rails to the inside of the "V" of the engine. This allowed us to keep a super low profile for the final assembly.

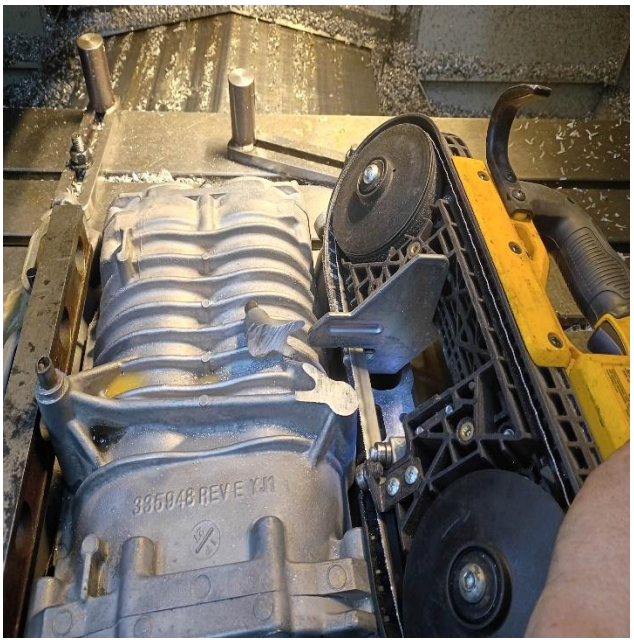
One drawback to this is that there needs to be some material removed from the supercharger housing that interferes with the fuel rails. The material that needs to be removed will not affect the overall strength and structure of the supercharger. We have been running this setup on our own engines and have had zero issues. The material is still plenty thick enough in the casting to not cause any issues.

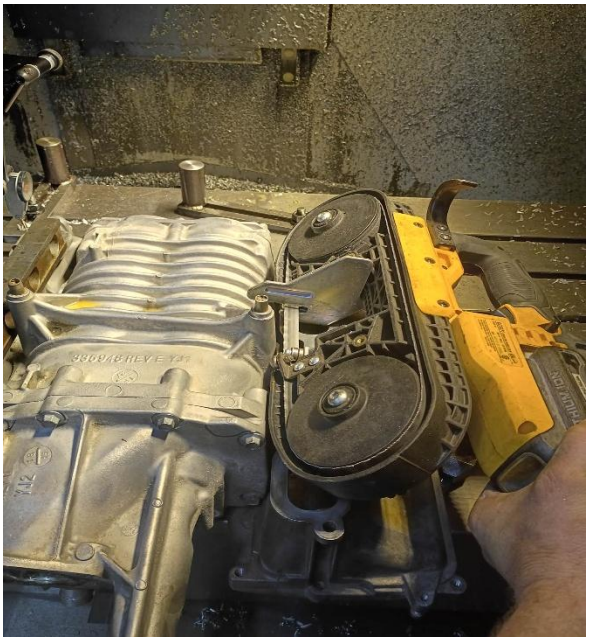
In this documentation, I will explain and show the best I can on what needs to be done to accomplish this.

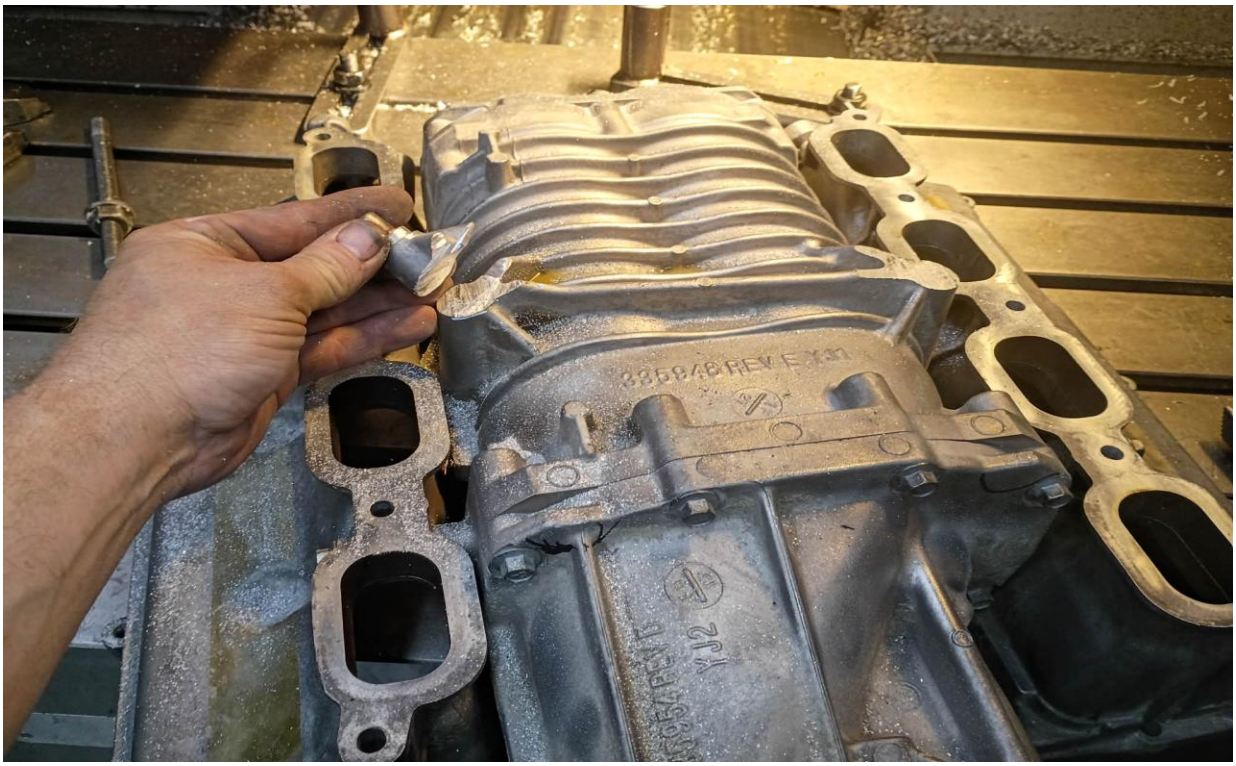
Please wear protective clothing and safety glasses when performing cutting modifications.

These modifications shall only be done by a competent fabricator and or machinist. If you are not comfortable with doing the following modifications, we are offering a service to have us do these modifications for your at our machine shop in Phoenix, AZ, USA. You would mail us your supercharger and we can machine it, and then return to you. Prices for these services are at the end of this article.

Step 1: Remove the two large bosses that originally held a insulation pad on the Range Rover/Jaguar engine. This is easiest done with a portable band saw or Sawzall. You can also use a cut off wheel on a grinder as well.





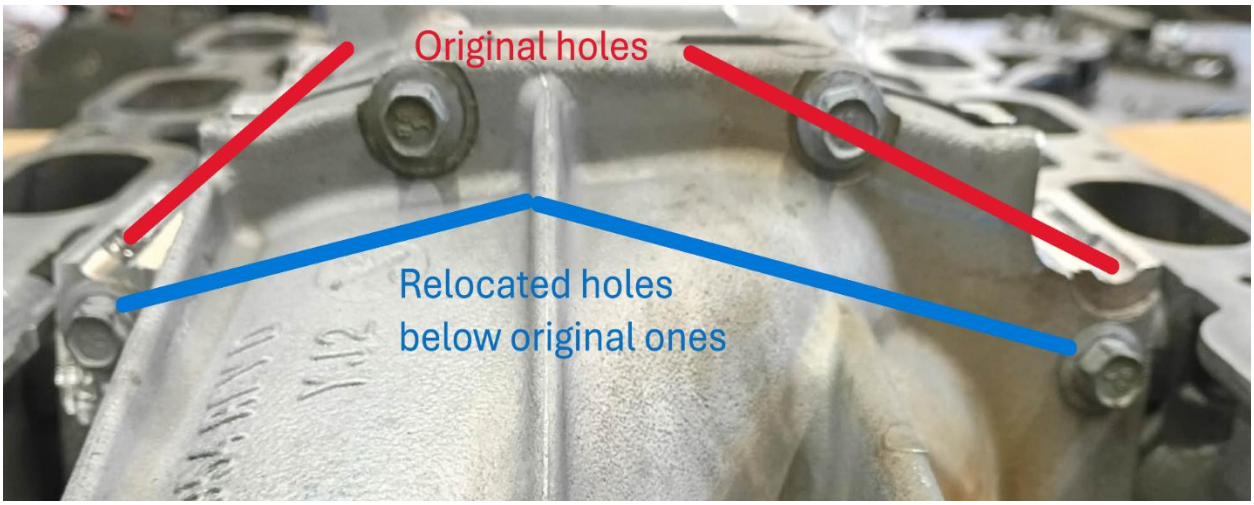


Step 2: Now that these two bosses are removed as close as possible to the supercharger housing, we can now address the machining or grinding of the other material that is in the way of the fuel rails fitting. You should use the fuel rails, bolted to the supercharger billet manifolds as a reference on where, and how much to clearance, but we will give dimensions and photos to help with the process.

Here is a dimensional drawing to help show where and how much clearance is needed.

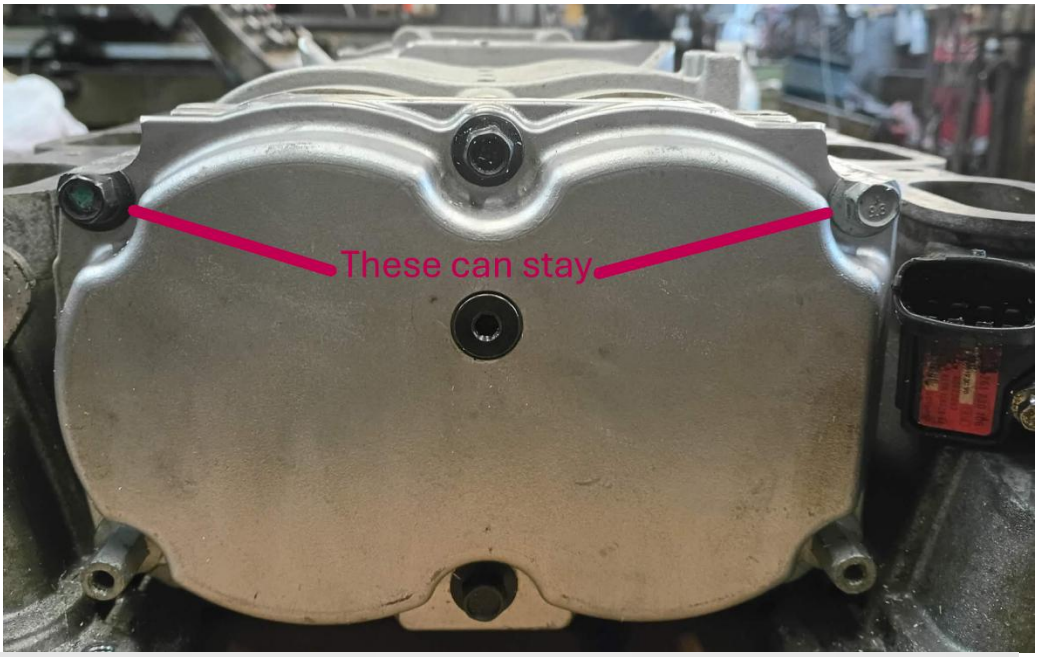
We need to remove the two front bolts shown here before we start this process.

These bolts are not needed per say in the final modified assembly, as there is no oil sealing done in this area of the supercharger housing. This area is only vacuum as it is behind the throttle body, and before the supercharger rotors. Now, we have relocated these bolts just below where they are originally to show that option as well. This was done with a hand drill, and using a 17/64 (6.7mm) drill bit to drill through the front housing and into the main housing by about 1.5 inches. Then we remove the nose housing and then open up the diameter of these holes with a 21/64 (8.2mm) on the nose housing. Then we tap the holes

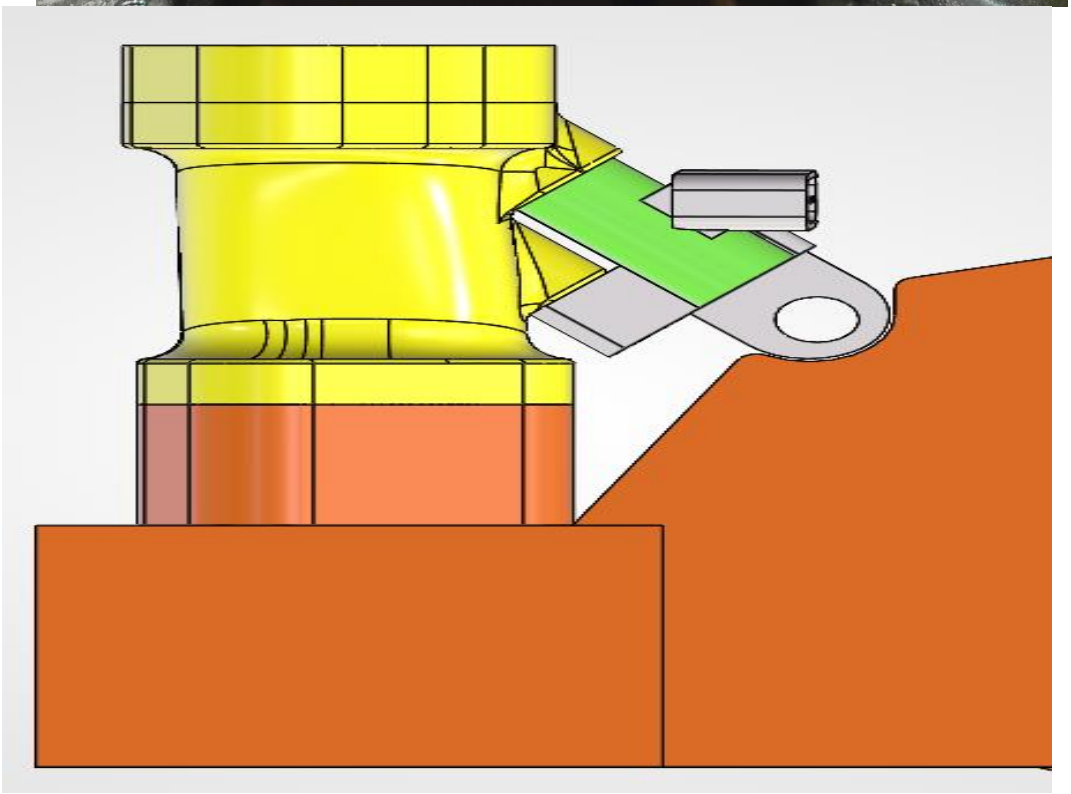


that we drilled into the main housing with a 8x1.25 tap. This process can be done after the grinding/machining. This is shown below:

Step 3: Now we need to get the main clearance done. The rear bolts shown below, can stay in as the holes will not get relocated, but the flange of the bolt will get ground/machined down.

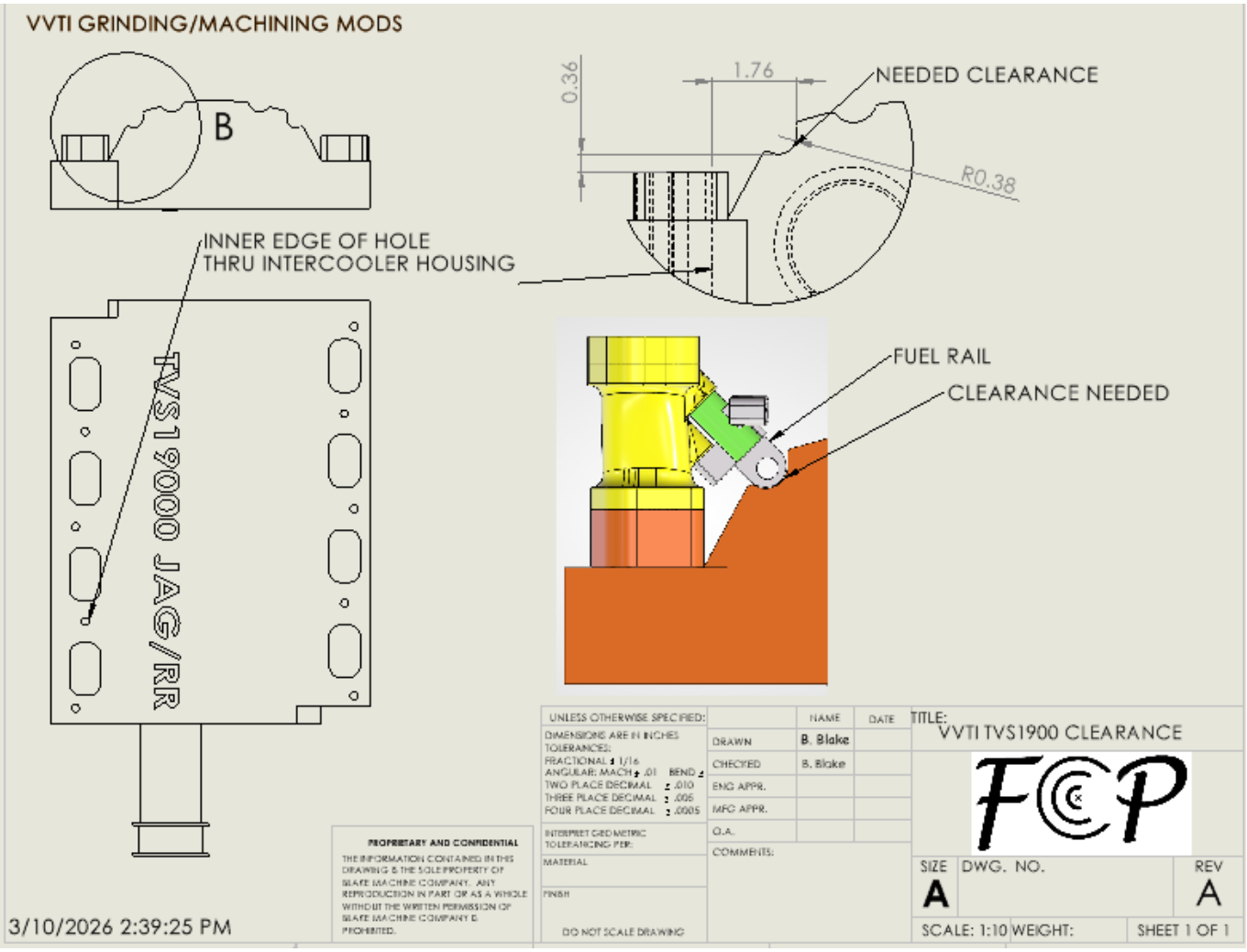


As you can see, the tops of those bolts got ground down to the hex diameter.



Here is a end view of how the clearance will look

Here is a dimensional drawing showing the clearance needed. These dimensions apply to both sides, just in a mirrored pattern so only one dimensioned side is needed.

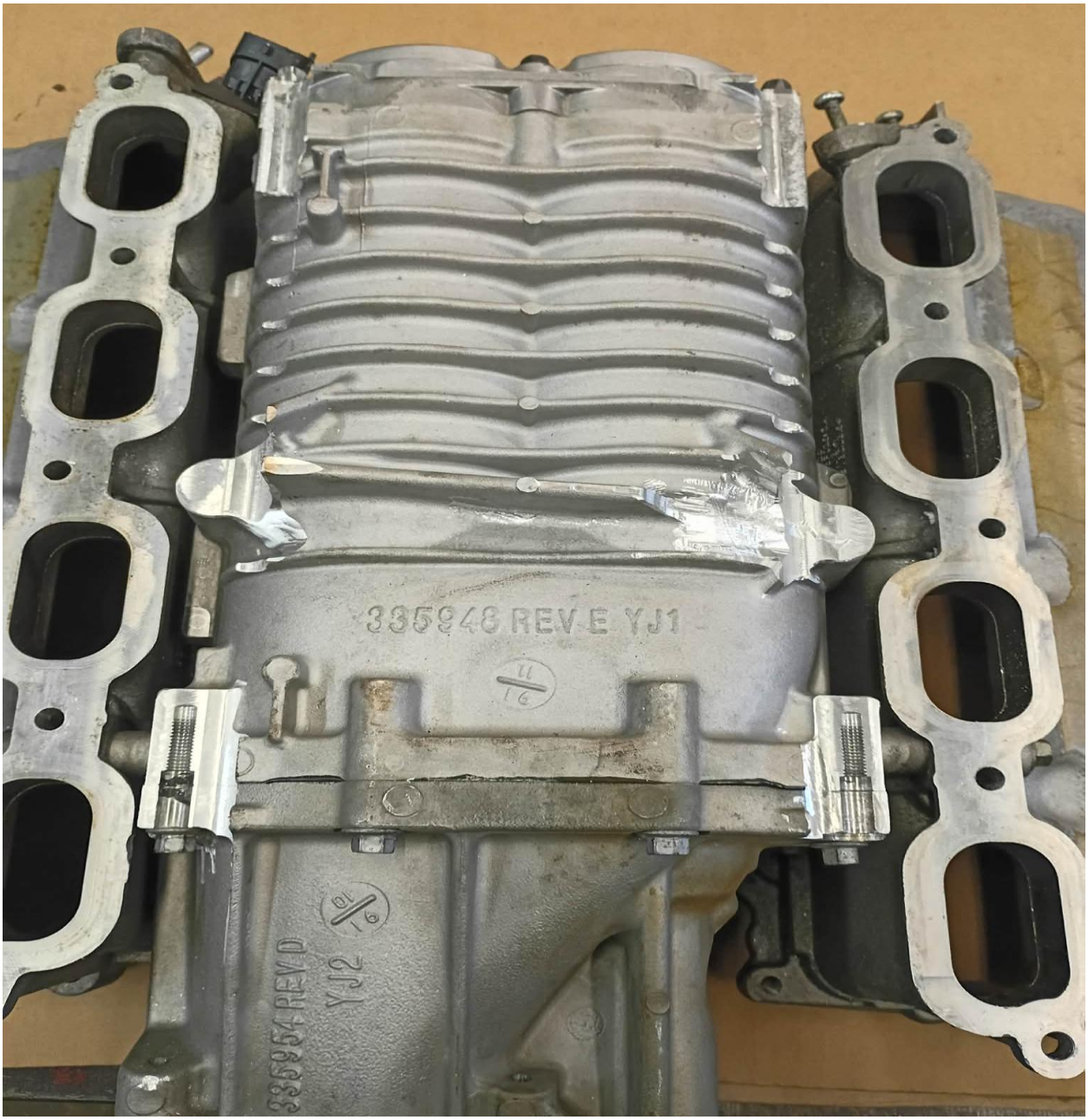


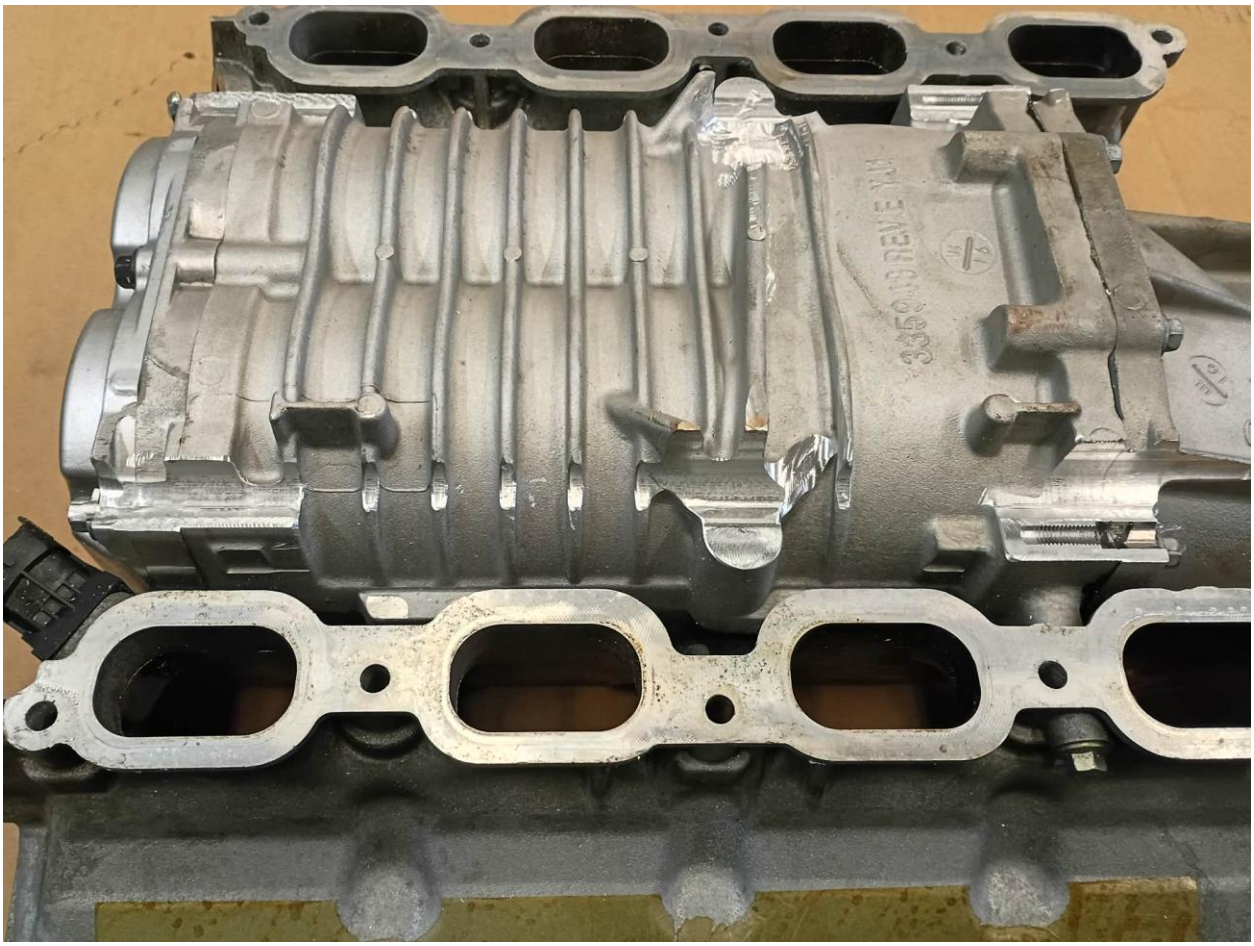
Use the flange mounting surface of the intercooler housing as a reference, as noted above you will be going to a height of about 3/8 of an inch above the mounting flange of the intercooler housing.

Then use the inner edge of the inner most mounting bolt hole as shown above, and move over 1.75” approx.

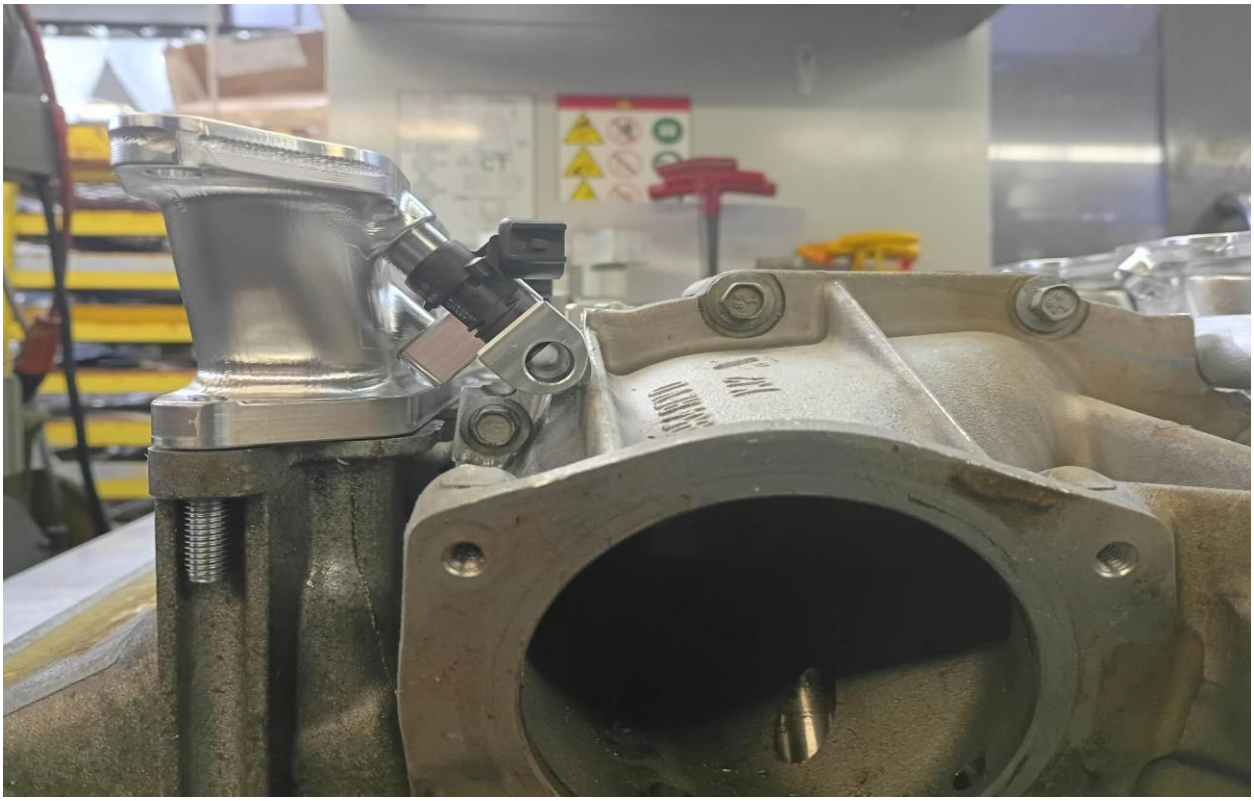
Now, all of this machining can be done by hand with a grinder, if you are careful and watch closely. We would recommend that you have this process done on a mill with a ¾” diameter ball mill. The end result will be much better than grinding by hand.

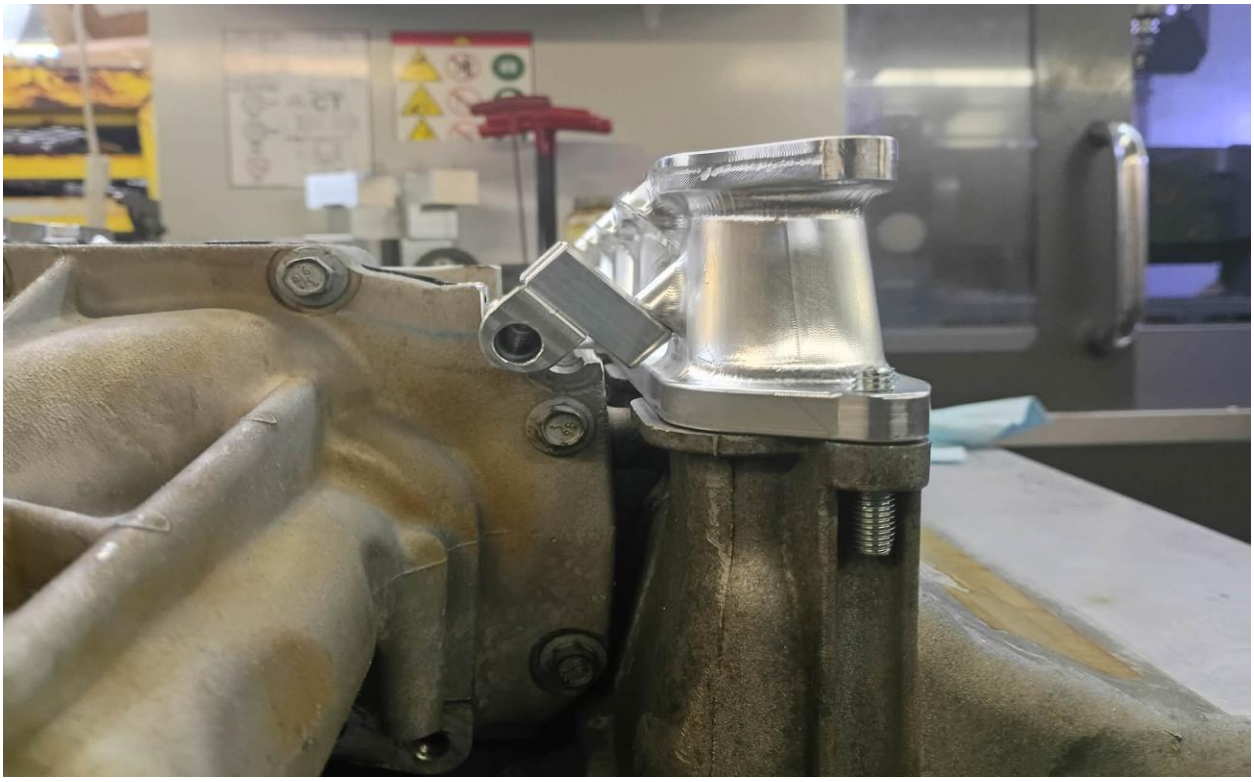
Here are some photos of the finished product and what it should look like:

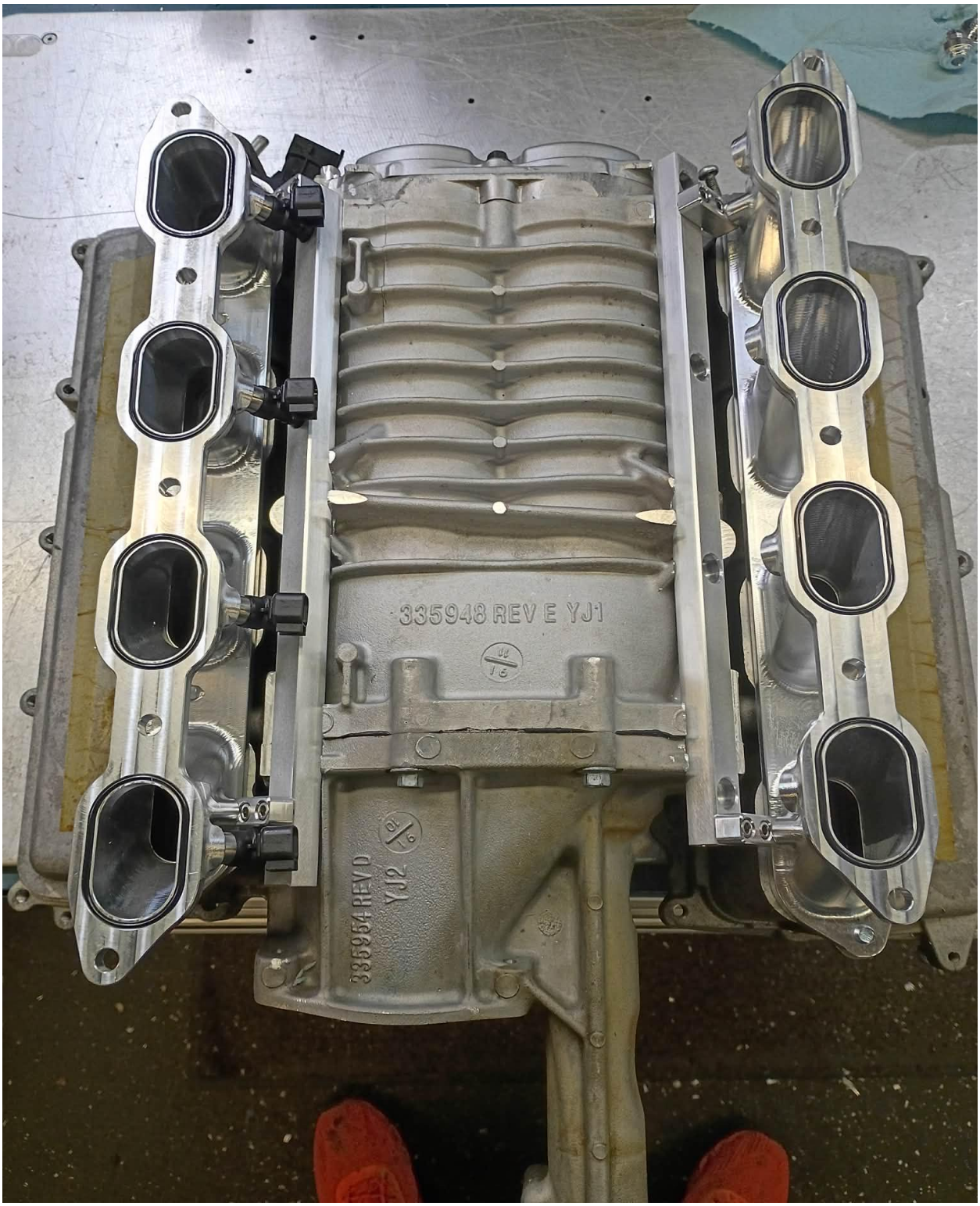


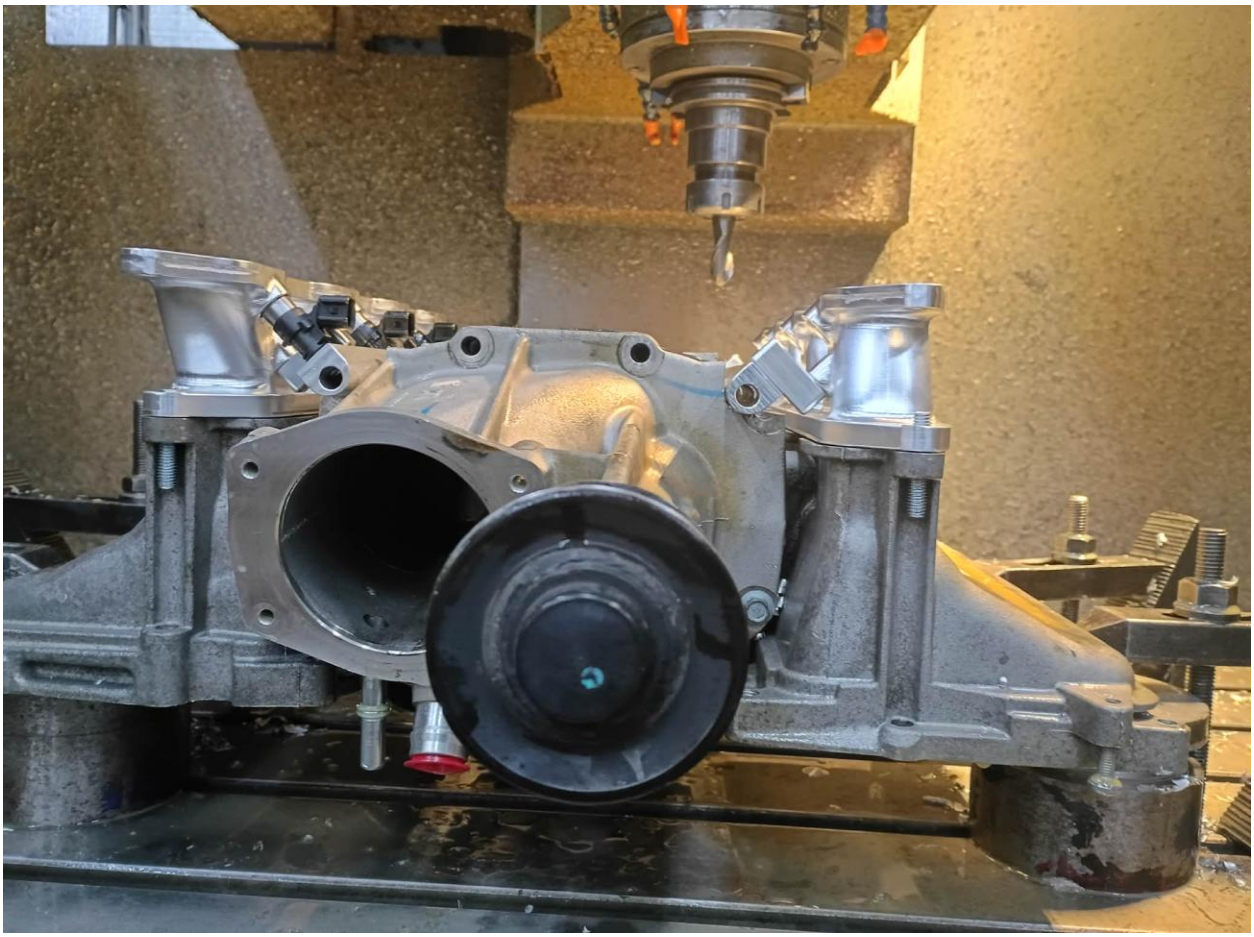


Now you can test fit the supercharger manifolds on the supercharger/intercooler and this is what it should look like:

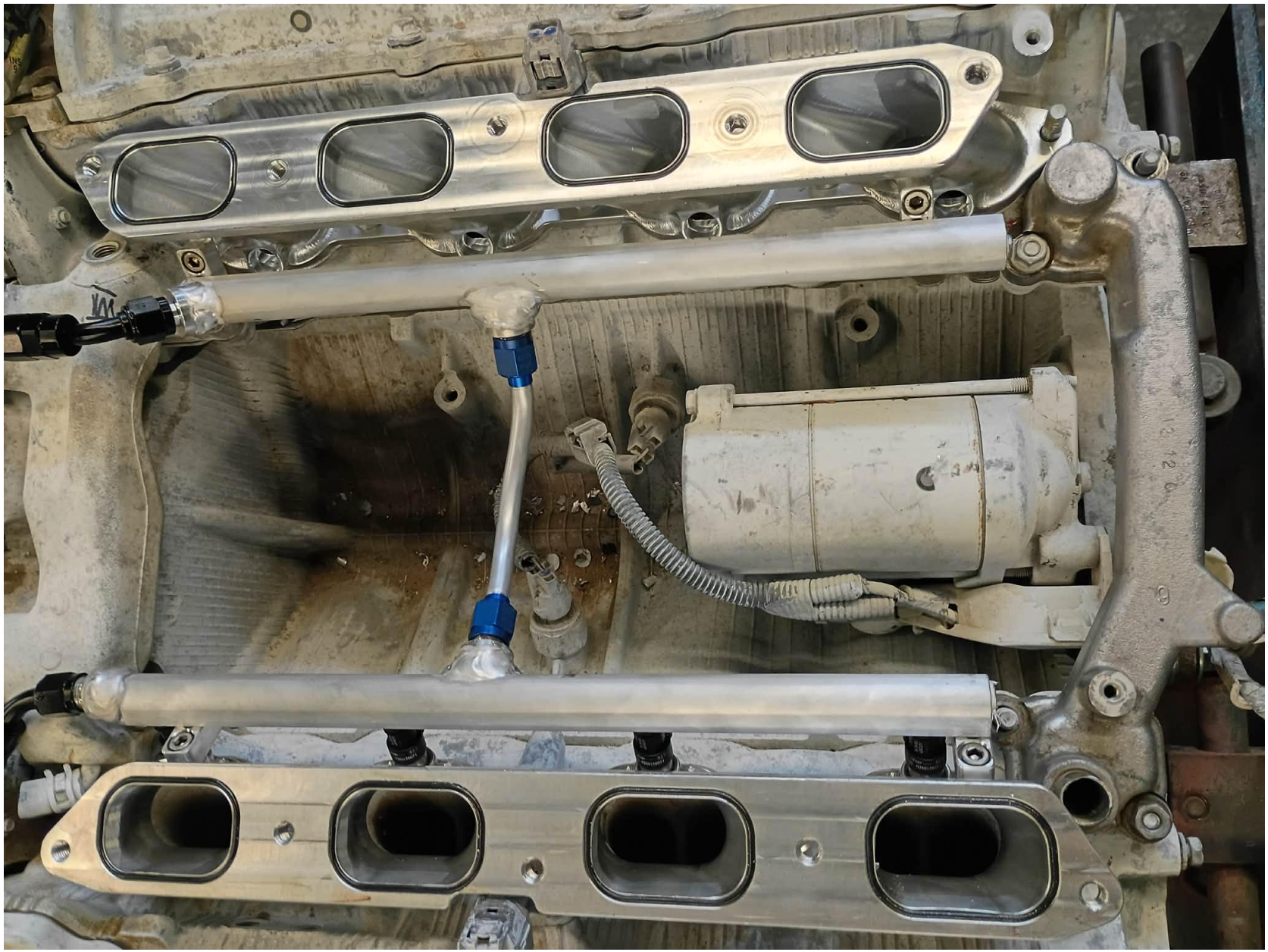


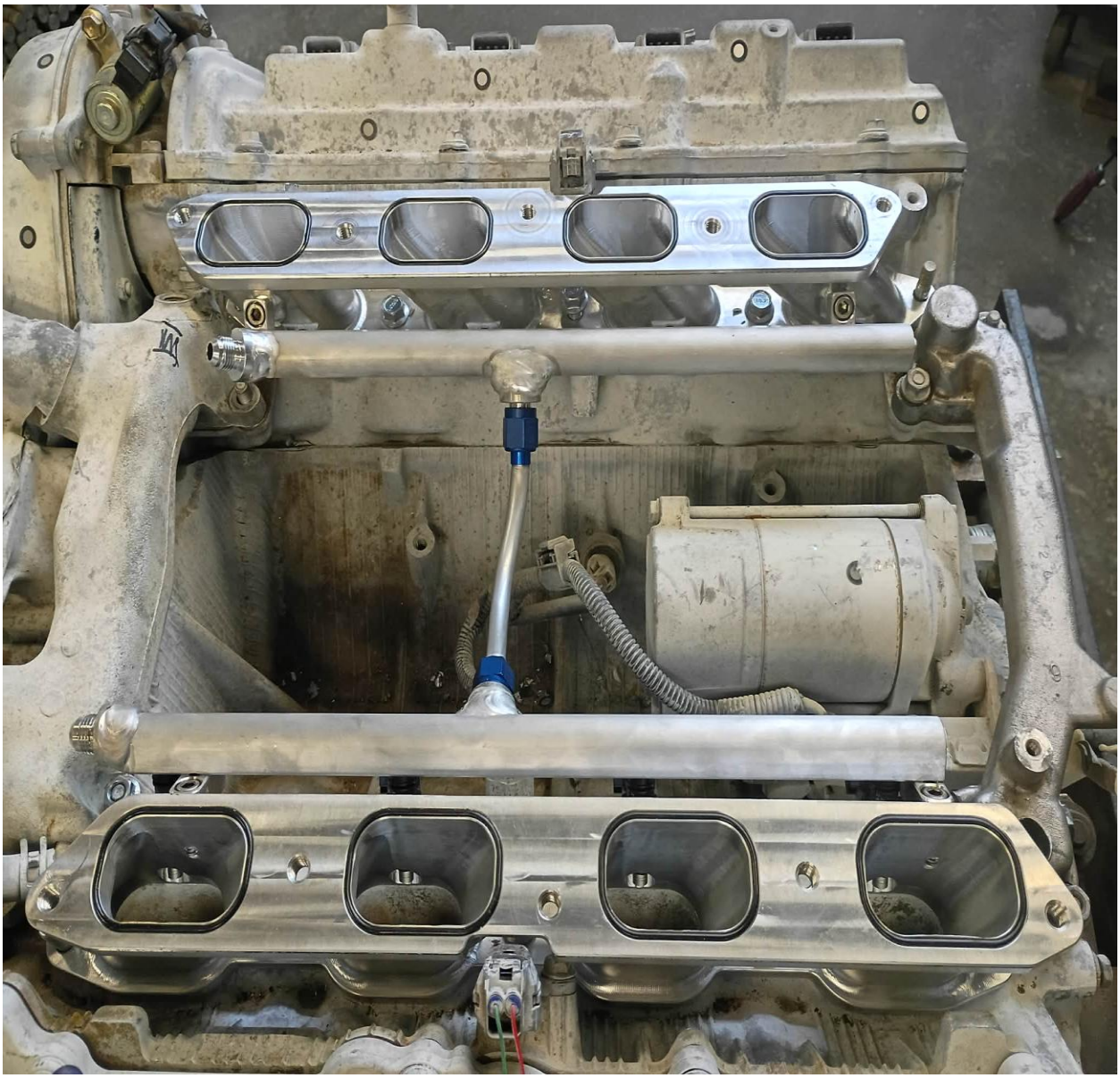



335948 REV E YJ1
335954 REV D
YJ2



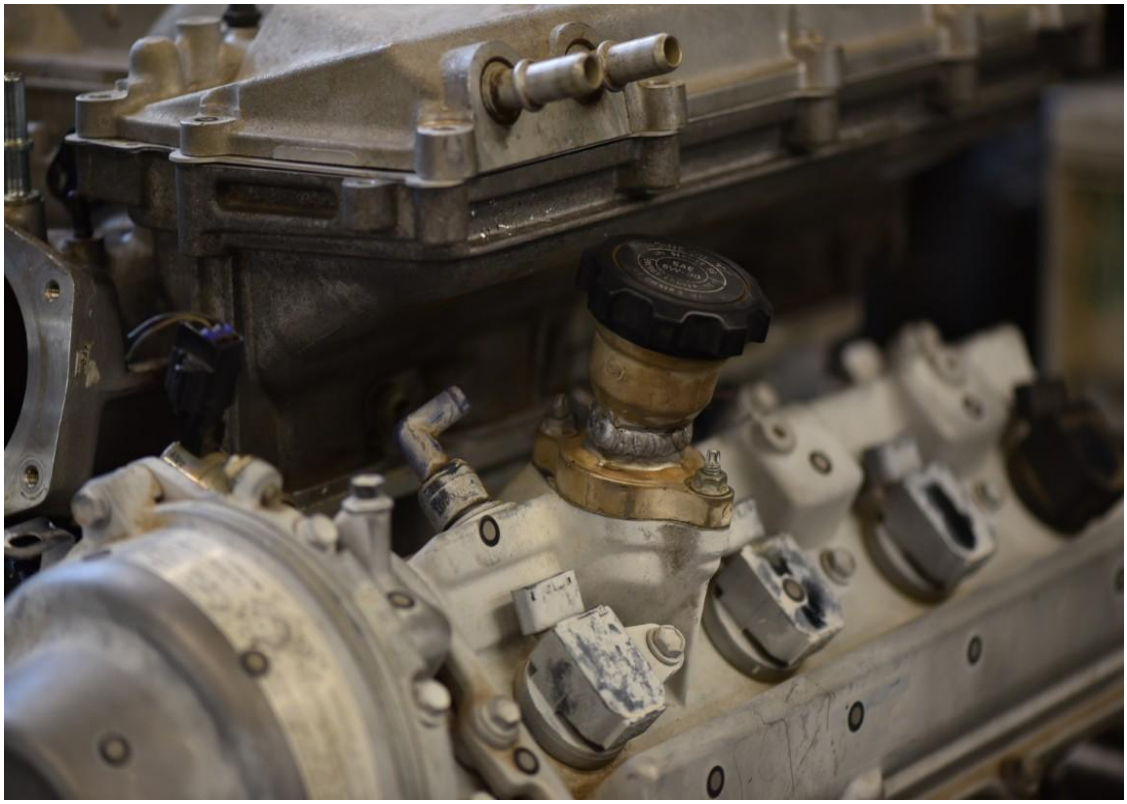
Step 4: Now that the manifolds and fuel rails fit, we need to address the fuel delivery. We recommend welding an6 male fittings on the rails. We weld the middle fittings as shown below to have a balance and flow tube between the rails. This is made with 3/8 aluminum flared and Ferrell fittings that are an6. The left rail if viewing from the drivers seat is welded on straight on the front end for fuel inlet/outlet. The right rail needs to be welded at an angle as shown to clear the front water crossover housing.

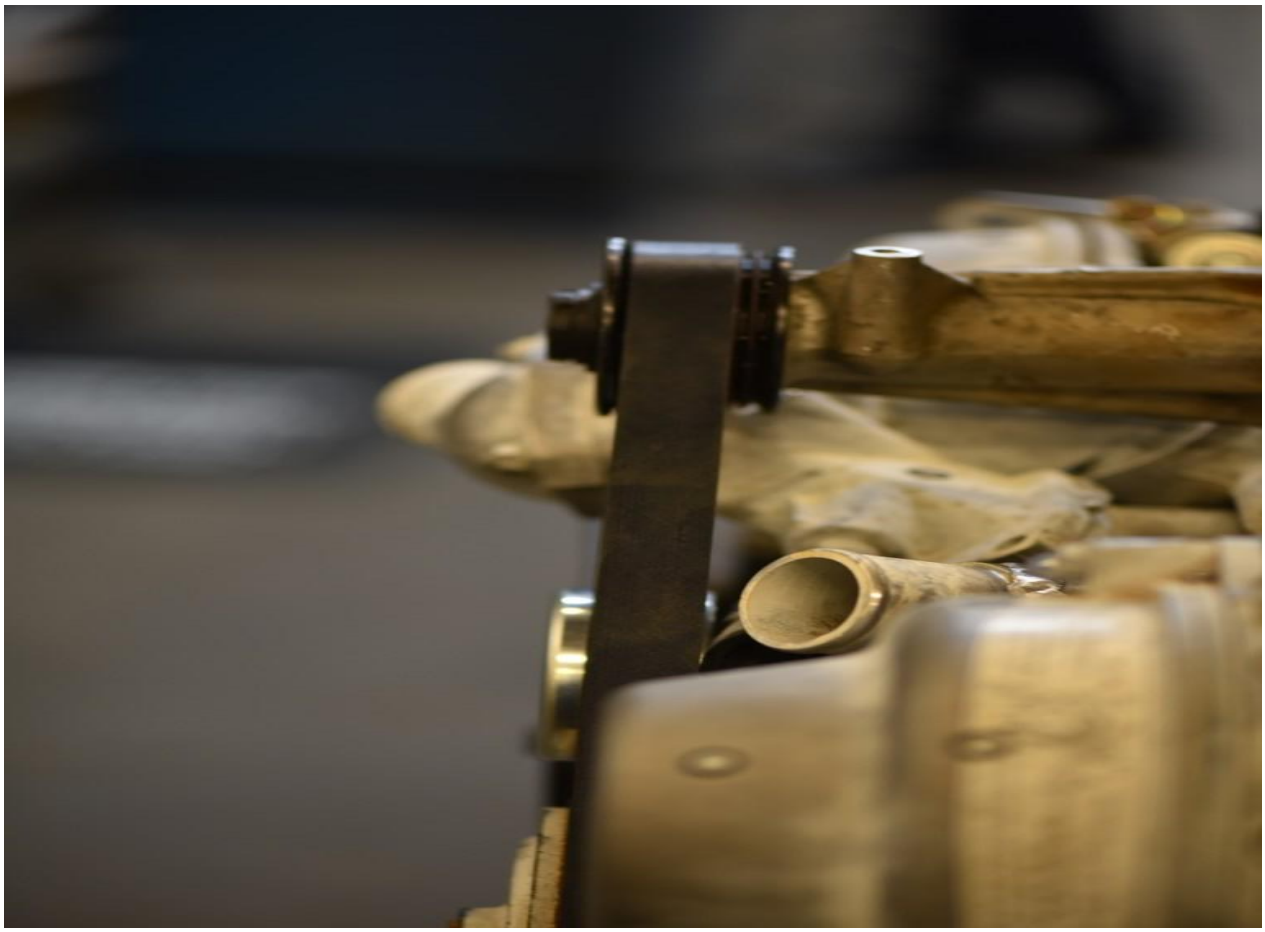




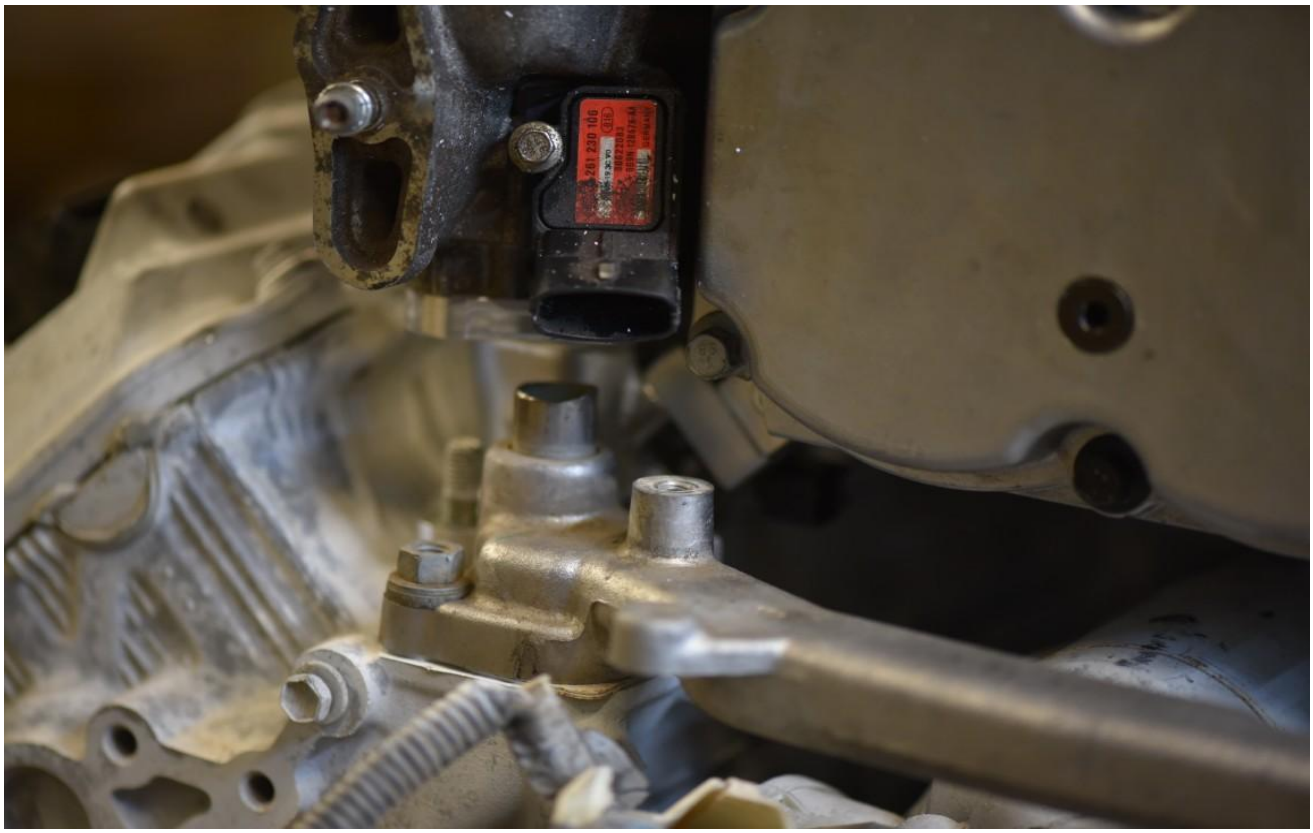
The rear of the fuel rails can be welded shut, or use a threaded plug.

Step 5: There are variations of the 1UZ VVTI, 2UZ and 3UZ front thermostat housings. Some are long, some are short. Regardless you may need to cut and reweld the water outlet to clear the supercharger belt. You also will need to cut about 2 inches out of the oil filler tube to clear the intercooler housing. Photos below show these mods:





Step 6: On some models, the rear crossover pipe that has the heater line on it will need to be shortened and either capped, or shortened and have a angled hose installed to have your heater work.



This concludes the main modifications needed to have the TVS1900 bolt onto your VVTI UZ series engine. If you have any questions or concerns, please do not hesitate to contact us at bryan@1uzfe.com

1uzfe.com located at 1444 south 8th street, Phoenix, AZ, 85034 USA

Prices for us at 1UZFE.COM to do these mods to your parts. You will have to ship us your parts and we will perform the modifications and then send back to you. You would cover the cost of shipping both ways and the labor of the service:

CNC machine supercharger housing to fit manifolds with fuel rails= 275.00

Cut and weld your oil filler tube= 50.00

Cut and weld your water outlet on your thermostat housing= 50.00

Weld an6 fittings and make the custom crossover fuel rail balance tube= 190.00