NON VVTI 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.

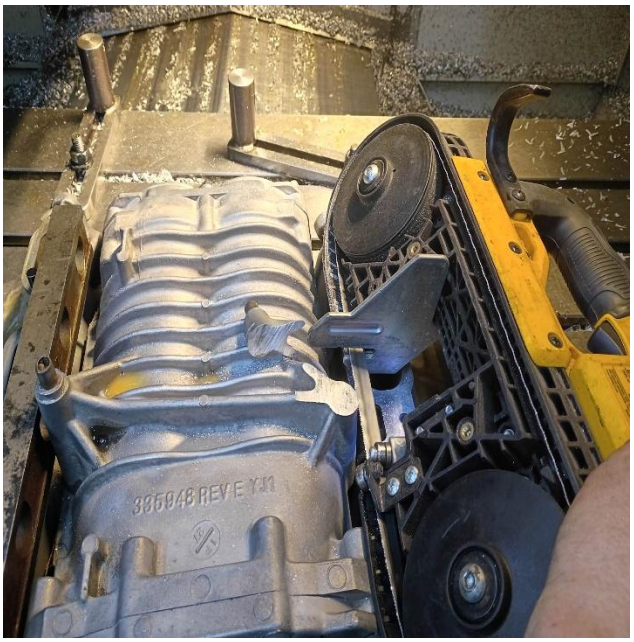
One drawback to this is that there needs to be some material removed from the supercharger housing that interferes with the fuel rails. The material that needs to be removed will not affect the overall strength and structure of the supercharger. We have been running this setup on our own engines and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

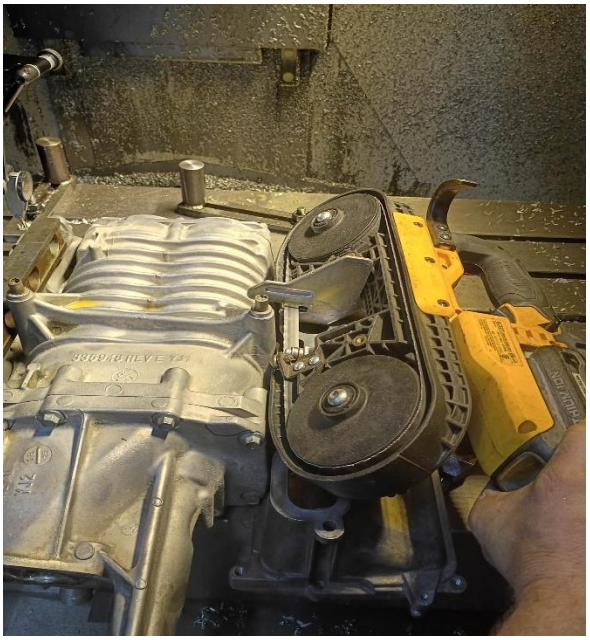
In this documentation, I will explain and show the best I can on what needs to be done to accomplish this.

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.





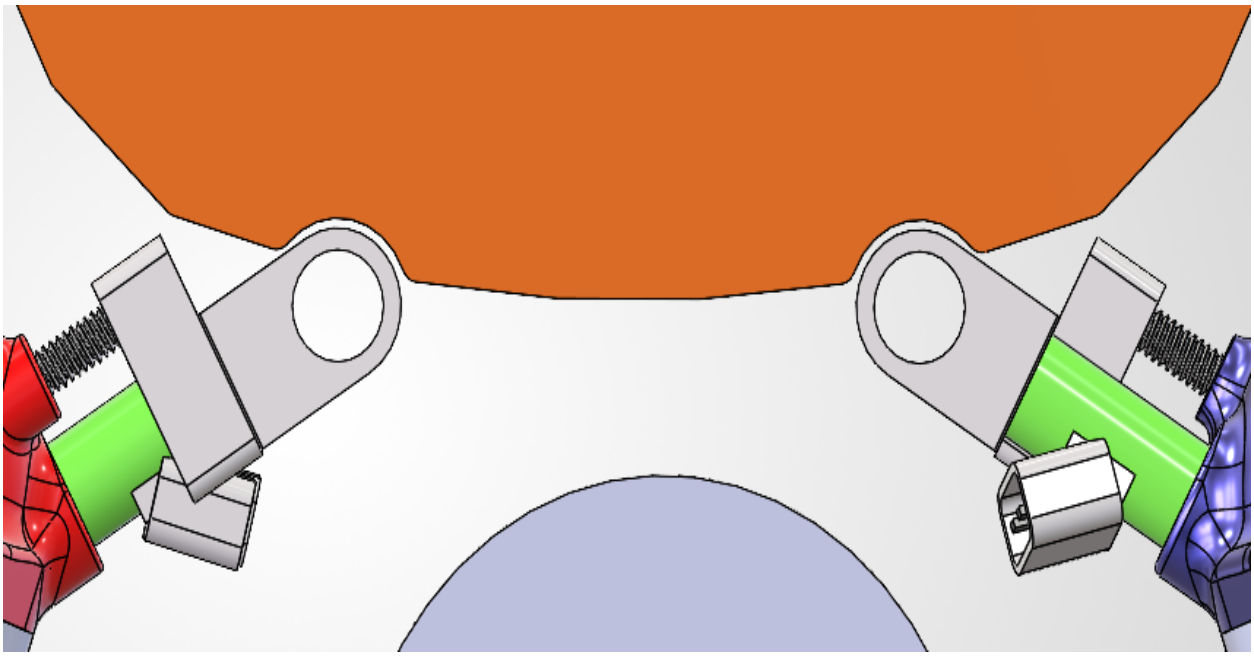
Step 2: Now that these two bosses are removed as close as possible to the supercharger housing, we can now address the machining or grinding of the other material that is in the way of the fuel rails fitting. You should use the fuel rails, bolted to the supercharger billet manifolds as a reference on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

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

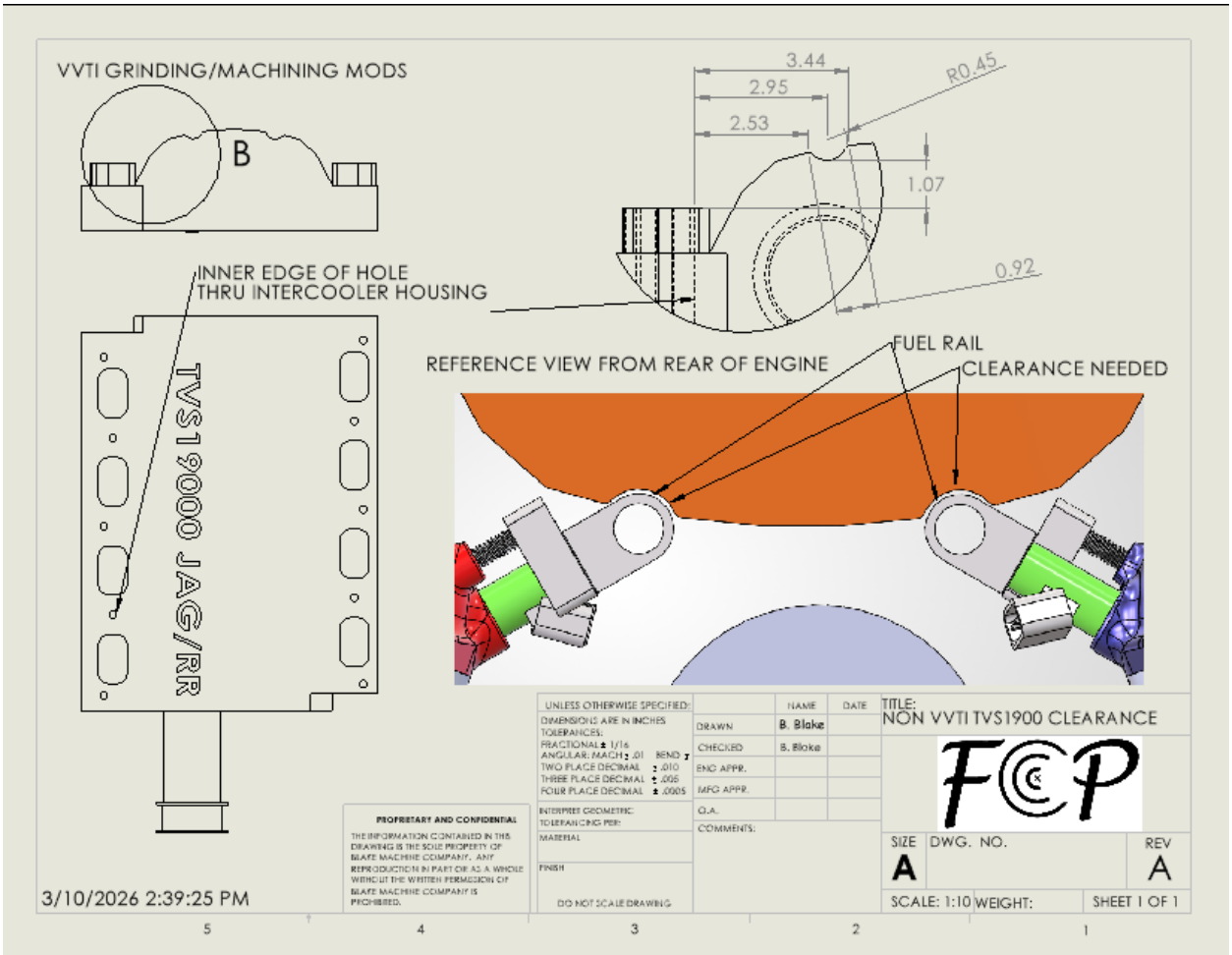
These bolts are not needed per say in the final modified assembly, as there is no oil sealing done in this area of the supercharger housing. This area is only vacuum as it is behind the throttle body, and before the supercharger rotors. Now, we have replaced this bolt just in the center, shown below. 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 this hole with a 21/64 (8.2mm) on the nose housing. Then we tap the hole 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

Here is an 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.

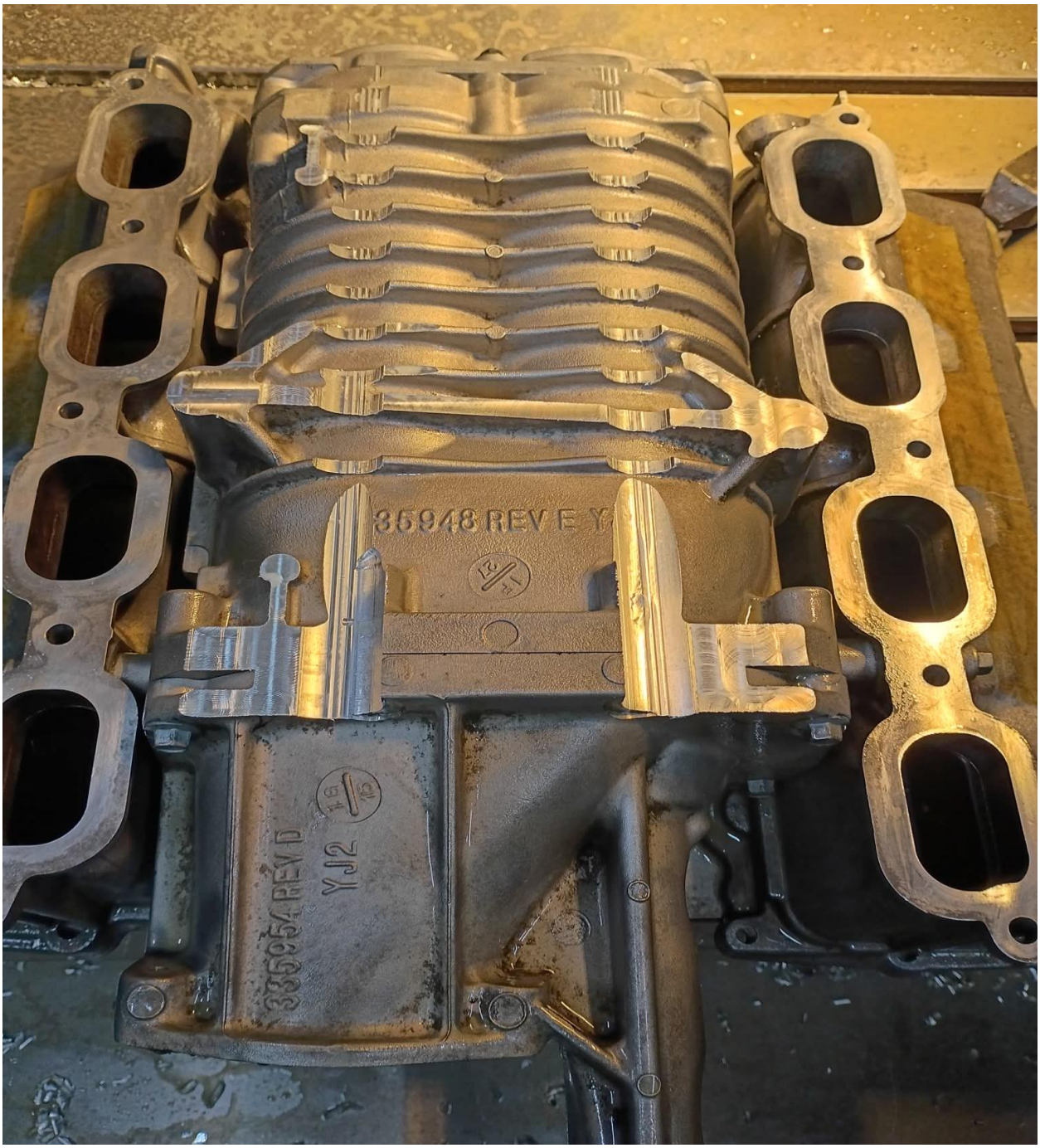


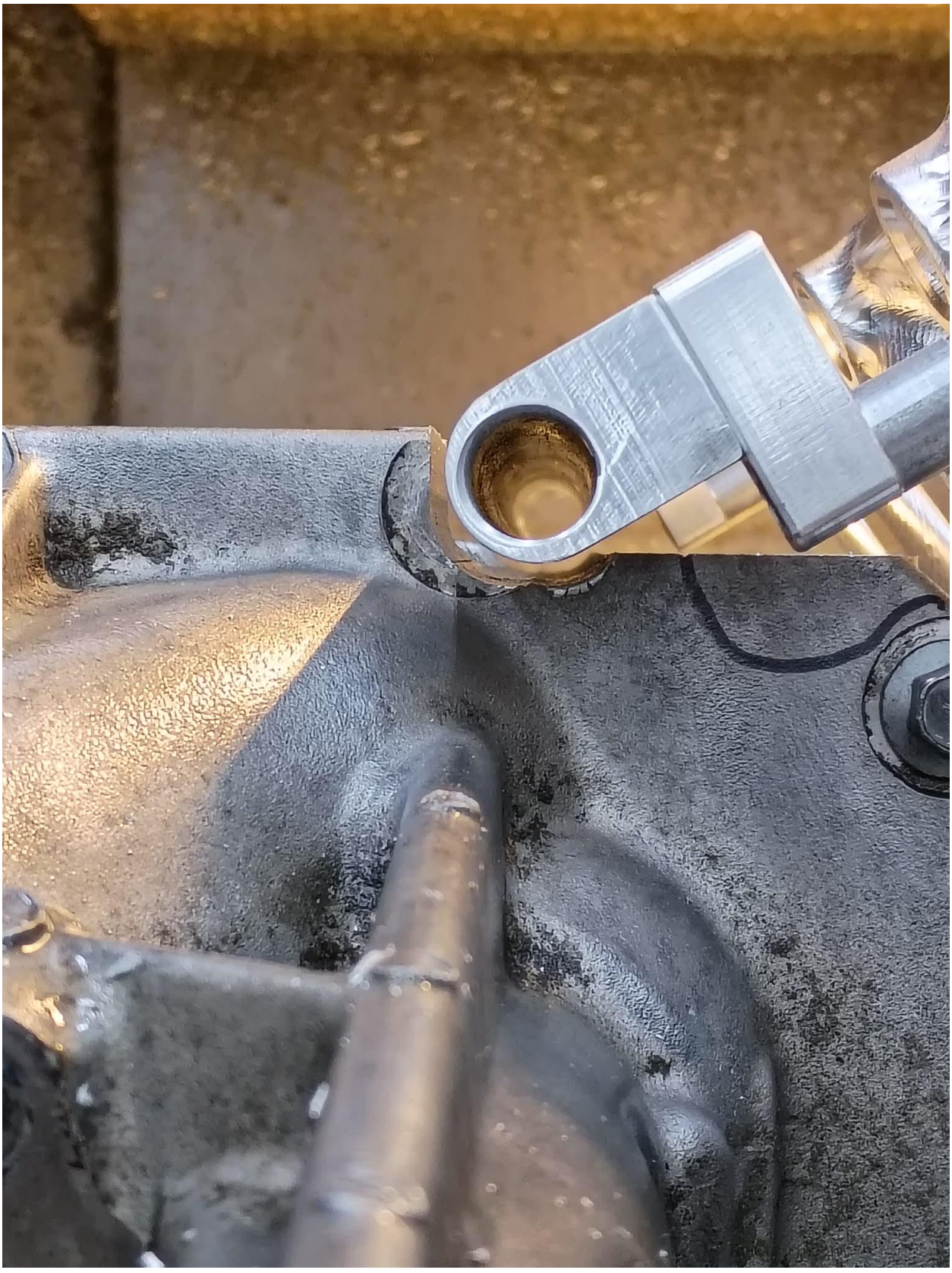
Use the flange mounting surface of the intercooler housing as a reference, as noted above you will be going to a height of about 1 1/16 of an inch above the mounting flange of the intercooler housing.

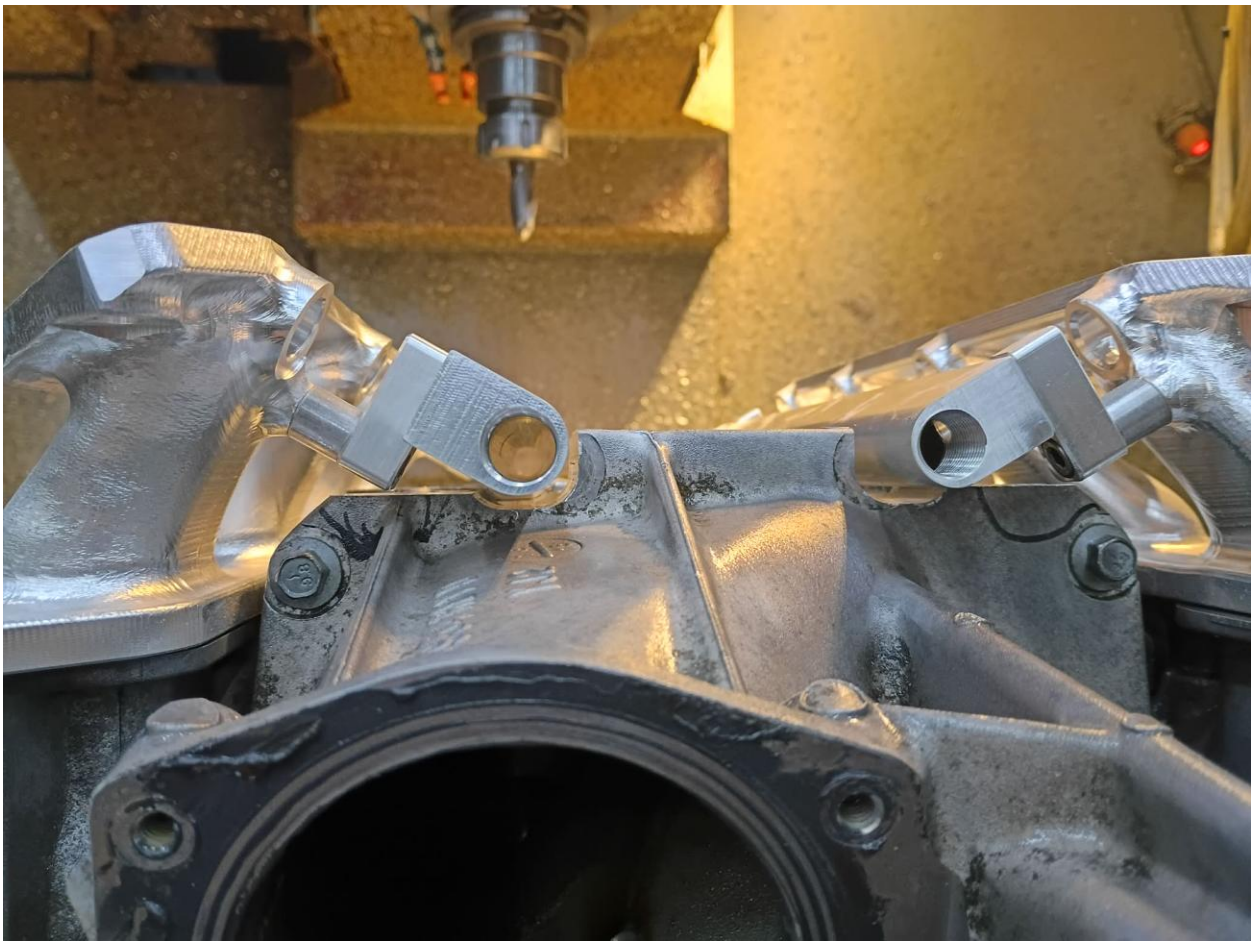
Then use the inner edge of the inner most mounting bolt hole as shown above.

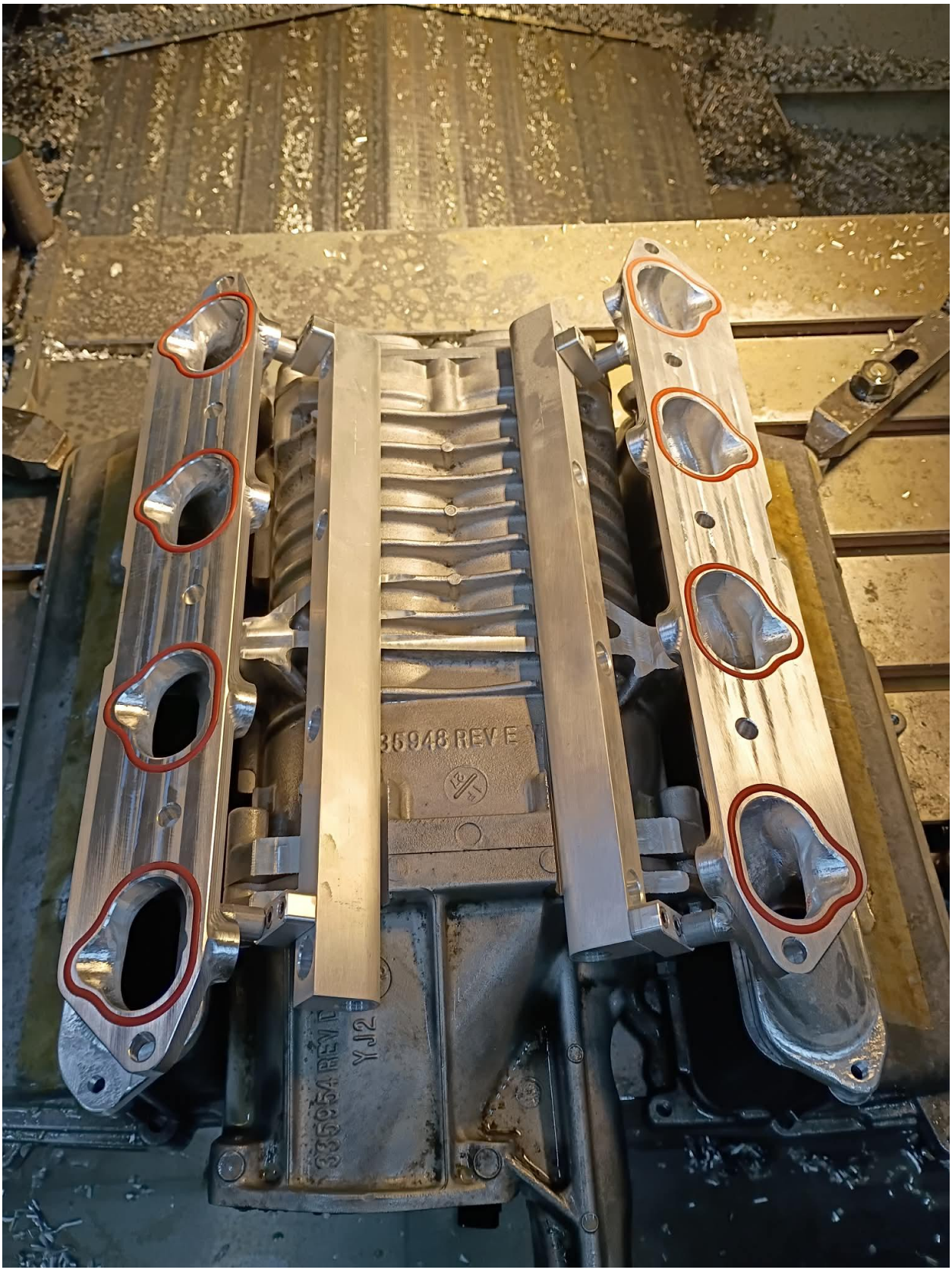
Now, all of this machining can be done by hand with a grinder, if you are careful and watch closely. We would recommend that you have this process done on a mill with a ¾” diameter ball mill. The end result will be much better than grinding by hand.

Here are some photos of what it should look like:





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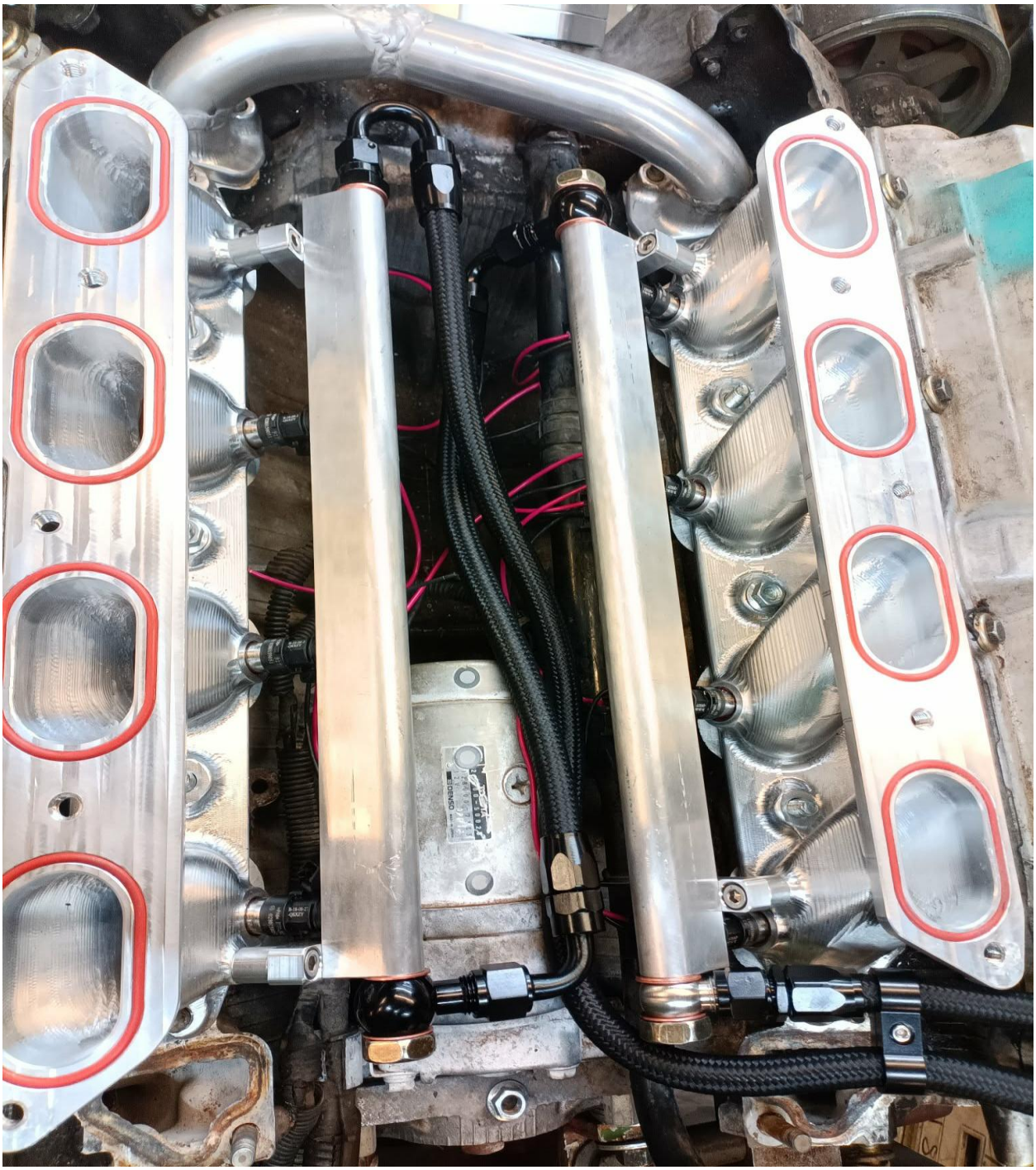
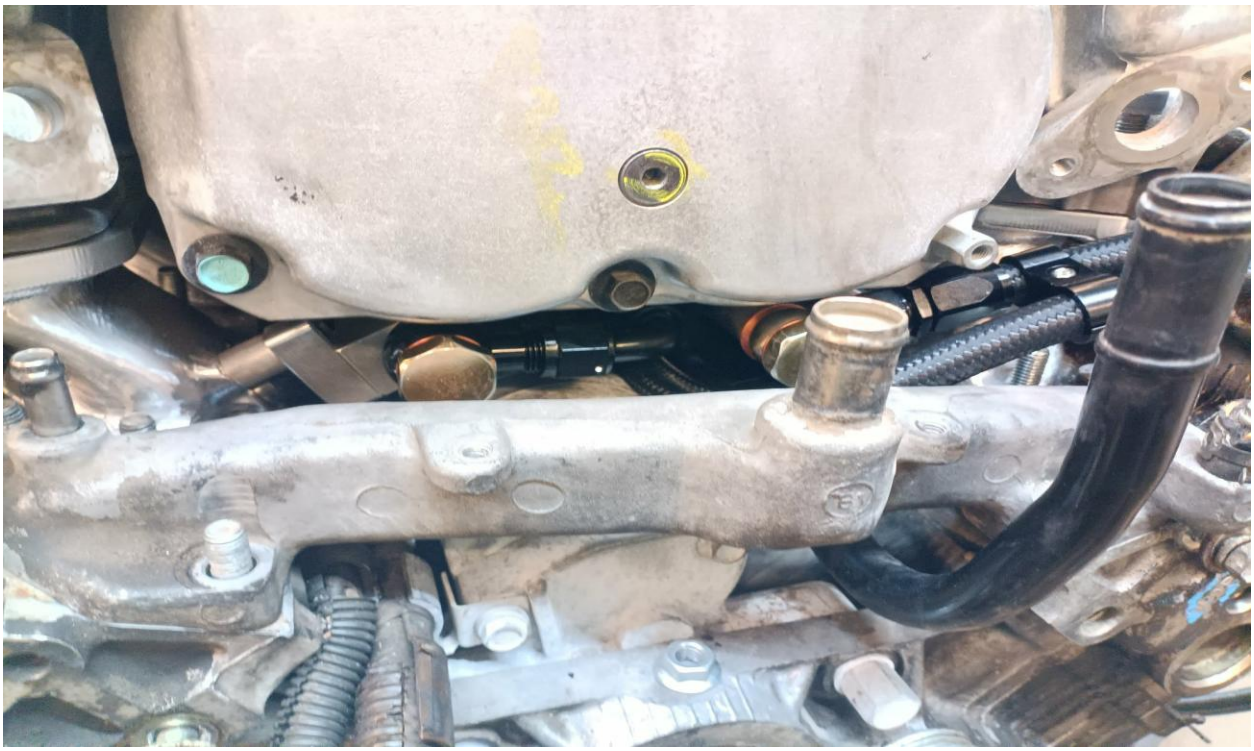
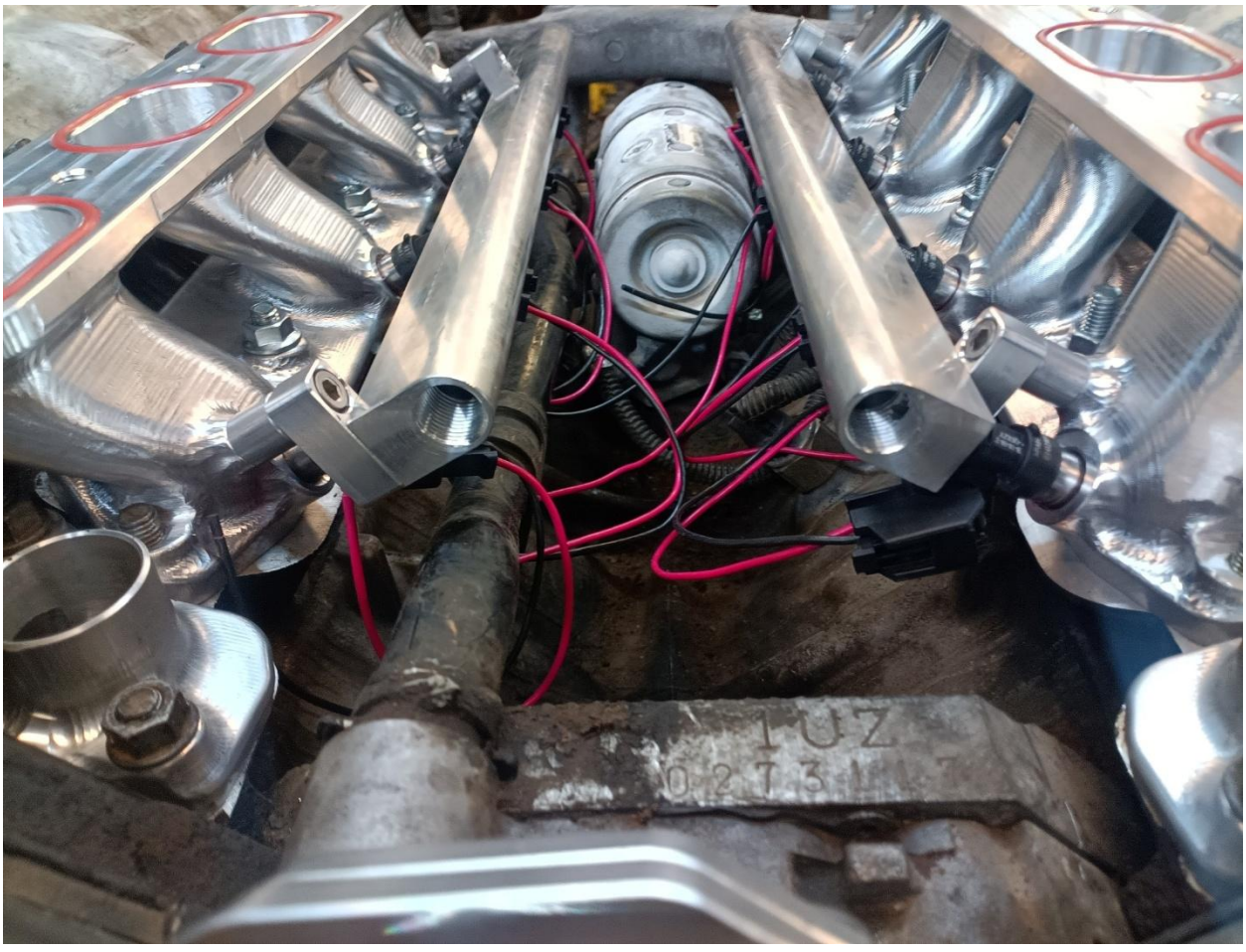
Step 4: Now that the manifolds and fuel rails fit, we need to address the fuel delivery. The fuel rails are made for 14mm injectors, LS3 type. The ends of the rails are tapped M16x1.5 for the corresponding banjo fittings. Now, you are also able to weld any type fittings you feel you might want for your specific application. Keep in mind that the rear crossover pipe is close to the rails, so a 90 degree type banjo fitting might work best. Or you can weld AN6 type fitting on the sides of the rails. Here are some photos of what we did on our build:



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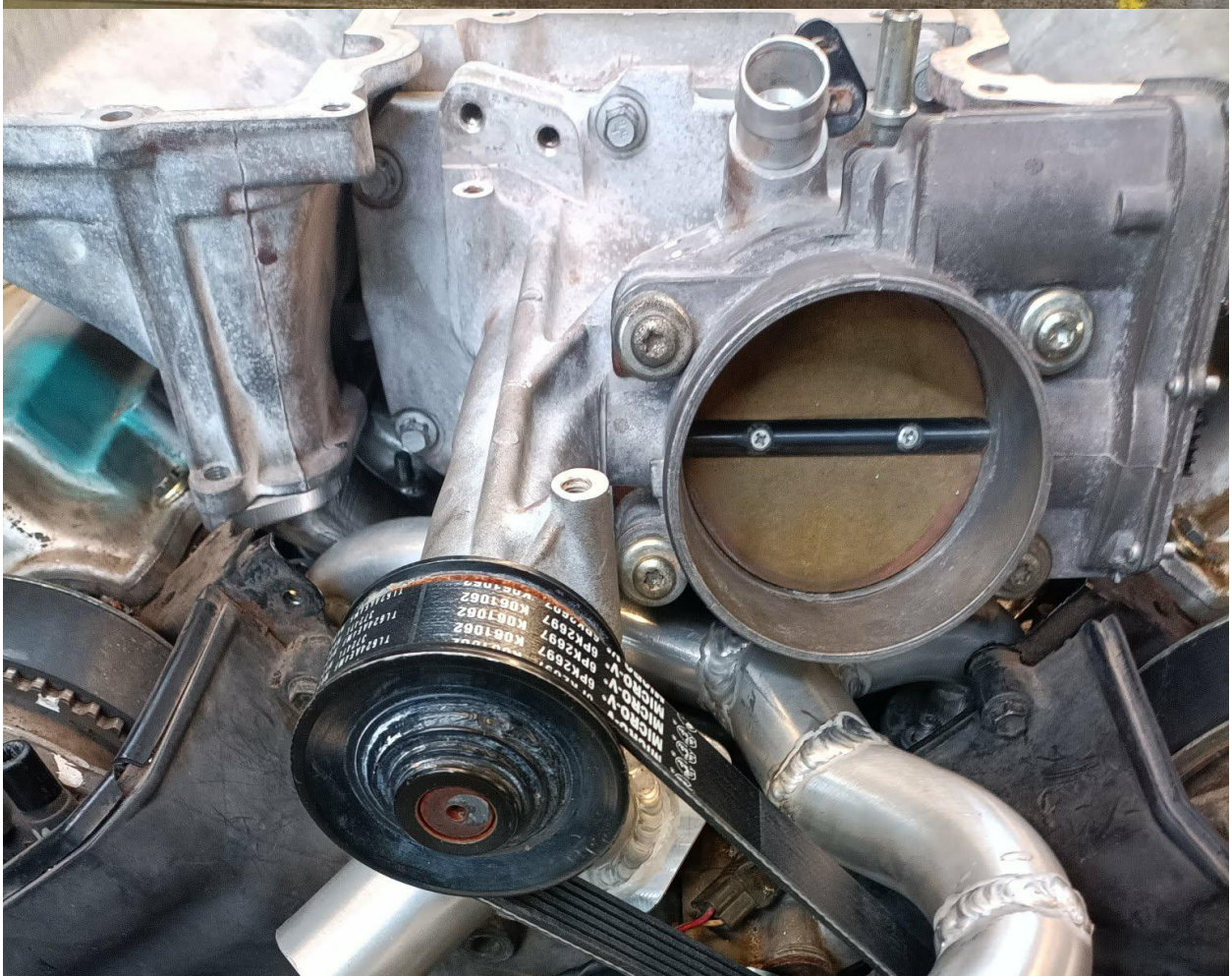
Step 5: Front water crossover. The original thermostat housing will have to be modified and or replaced. We make custom water manifold plates to where you can weld your own aluminum 1 ¼ dia. aluminum tubing onto them. You will want to run a remote thermostat with a bypass. Photos below show these mods:



Here is what the water inlet pipe and plate we offer looks like, this allows you to position the water pump inlet at any position you would desire, welding required:

We run a remote bypass type thermostat and housing, like the one shown here:

This concludes the main modifications needed to have the TVS1900 bolt onto your NON VVTI 1UZ 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