

Supercharge! Chapter 3

Supercharging Your Volvo Chapter Three - Mother Of All Brackets by Greg Sievert

Chapter Three in my series of articles about supercharging our 1988 240 GL sedan will delve into the details of mounting the supercharger to the engine block. Chapter One dealt with some of the basics of supercharging and turbocharging, and told of my purchase of a used Toyota SC-14 supercharger. Chapter Two covered the search for a location under the bonnet for the supercharger, and touched on re-location of the power steering pump to the right side of the engine block. This chapter begins the tough job of fabricating a mounting bracket for the supercharger and A/C compressor.

When I started the project, I wasn't sure how I would go about making a mounting bracket for the supercharger. I ended up hastily returning to the Toyota wreckers to buy the mounting bracket from the Toyota engine. For some reason, I thought maybe I could use it, or a part of it, to mount the SC to the Volvo engine. Wrong! That decision cost me \$75. If you do ever purchase a used supercharger from the wreckers, see if you can get them to throw in all the hoses, valves, brackets, belts, etc. when you first purchase it. Once they have made a sale, they are unlikely to "throw in" anything for "free", but if you bargain up front, you might get them to give you the lot for the same price as you might pay for only the supercharger. In my case, it turned out the day I went back for the bracket, they were loading up the complete engine to sell to another customer. He only needed the engine block & head, but they were selling it to him complete for a price he was willing to pay. They could have given me the SC bracket, but they took the opportunity to pocket some more of my money. Lesson learned! I digress. So, what material would be suitable for the SC bracket? Steel, cast iron, aluminium? The Toyota bracket is cast iron. I started scavenging, mainly at Wayne's parents' house through the scrap metal pile, for suitable angle iron, tube iron, etc. When I got it all home, I thought that it was a little inelegant to be thinking about welding up some crude structure of iron bars and bolting the beautiful cast alloy supercharger to it. So I made the decision to fabricate an aluminium bracket. I figured I could get some 10 mm aluminium plate, cut it into shaped pieces, bolt it together, and make myself a bracket. In the future, I could even have it professionally tack-welded together if need be.

The first big concern was the fact that I don't have a machine shop. I do have the usual hand tools, and also the bonus of having brought a floor-standing drill press with me to Australia. I have a jigsaw, files, hacksaw, etc., but not a band saw. I really wanted to get a band saw to cut the aluminum pieces for the bracket, but I couldn't find a suitable one at the right price. So I decided to make the jigsaw do, knowing that I'd go through heaps of blades, and maybe even wear out the cheap hobbyist jigsaw. I decided to make an addition to my workshop (aka the garage!). I purchased an inexpensive bench sander, the one with a small disk sander and belt sander combined into one unit. (See Figure 1). This turned out to be a real Godsend when it came to smoothing edges, squaring up mating faces, etc.



Figure 1: Combination bench-top belt/disk sander

With the equipment problem solved (or so I thought), I went out and bought a half sheet of 10 mm MDF board to make a "prototype" bracket. The MDF was cheap, easy to cut, and would allow me to "design on the fly" without going through expensive metal-cutting jigsaw blades and aluminium alloy. It was solid enough, when held together with coarse screws, to support the supercharger and A/C compressor to test the fitment into the engine bay. One of the biggest challenges was measuring and aligning of the SC and A/C compressor to begin the task of making the bracket. I was necessary to take a few guesses as to how it would all fit together, knowing that with the real bracket, I could make some slight alterations if the prototype didn't fit quite right. The first piece of MDF that I cut served as the base plate - the main structure of the bracket that bolted to the side of the engine block in place of the standard Volvo A/C & PS pump bracket. I did a rough cut on the base plate, then tried to bolt it into position. A little trimming and "gentle persuasion" had it fitting up nicely, so I started on the remaining pieces of the bracket. I was a bit ashamed at the crudeness of the prototype, but I knew that any ugly square corners and "oops" items could be fixed later on. Figure 2 shows the MDF prototype bracket bolted into place with the supercharger mounted to it. What I ended up with was a pretty solid bracket that I was able to bolt into



Figure 2: MDF prototype bracket Mk. I bolted on engine

position with the SC and A/C compressor. It became immediately obvious that everything was going to be a tight fit. The SC couldn't be bolted into place without partially disassembling the bracket first. The A/C hoses got in the way of the SC inlet pipe, and the compressor mounting adjuster plate was hard up against the distributor housing. Things were looking a bit scary. Was this going to work?

About this time, a friend at work mentioned that he had a large sheet of 16 mm thick aluminium plate that he was willing to share with me. All I had to do was bring some stubbies and a bunch of angle grinder cut-off wheels. I measured out all the MDF bracket parts, threw in a safety factor, and came up with an estimate for how much of the aluminium I'd need to do the job. When we got done cutting the 1200 x 250 mm sheet, 16 mm thick, I sure hoped I had over-estimated the amount I needed, because it must have weighed in at about 40 kg! The good thing was it was free, but the bad thing was it was thicker than I had originally planned to use - 60% thicker, in fact. When you're building something with no structural analysis, you can't afford to optimise it for weight savings. I didn't want this thing to fail, so I figured I'd make sure it didn't! The other problem was that my MDF prototype bracket was only 10 mm thick, so that meant I needed to either scale it up on the fly, or opt to make another prototype. I decided to take the safe route, and I built Prototype Mk II.

Mk I had served its purpose well - it allowed me to correctly position the SC and A/C compressor, and also I could use it for overall dimensions. Mk II was my chance to make a more elegant design, while also fine-tuning the position of the SC to eliminate some tough clearance issues to the engine mount and the distributor. I wasn't able to find any 16 mm MDF, so I ended up using a white laminate shelf board that was nearly exact. The white laminate was also great for scribing measurement lines and produced nice, clean drill holes and edges. Things went pretty well, the cutting done with the jigsaw, and smoothing and radius work done on the bench sander. When complete, Mk II was quite a bit more solid than MK I, and it also looked a lot more presentable. The previous clearance issues were solved, except for a problem accessing one of the block mounting bolts. I wasn't convinced this would be a real problem, so I began preparing myself for what was to follow.

For some reason, I assumed cutting aluminium wouldn't be all that difficult. After all, it's a lot softer than steel, and with the proper blades it would cut like butter. Right. My decision to bulletproof the bracket and make it out of 16 mm thick plate suddenly seemed ridiculous when I started making that first cut with my feeble jigsaw. It was then that I began measuring cutting speed in millimeters per minute. It seemed



Figure 3: Mk. II Laminate base plate (Left) and Aluminium base plate (Right)

like millimeters per decade! I think it took me about an hour to cut out the base plate for the bracket, but it was a real triumph (Figure 3). Thank God for earplugs and tolerant neighbours! I methodically (over the next week or so) cut the remaining bracket pieces, and was surprised that my jigsaw didn't give up the ghost. It feels like it has a lot more free play

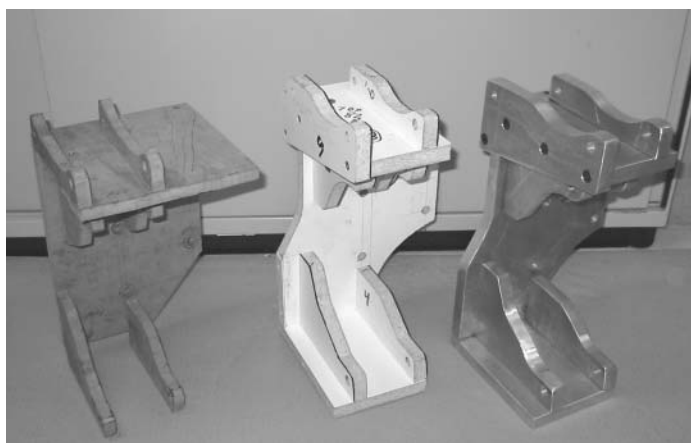


Figure 4: (Left to Right) Mk. I MDF bracket, Mk. II Laminate bracket & final Aluminium bracket

in it now than when I started!

The final step in making the bracket was drilling the holes and bolting it all together. I chose countersunk hex head bolts to do the job. I had to buy a couple metric drill bits, a tap to suit the bolt size, and also a special tapered counter-sink bit. Drilling and tapping the holes wasn't a real picnic. There's probably about 30 bolts holding the bracket together - so it took me another week or two of evenings drilling, tapping, fitting, adjusting, etc. before I finally had the finished product. Although there are a few flaws - the odd bolt that doesn't line up quite right and had to be forced - the overall result was pretty impressive. Not only did it look good, but it felt strong -

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very strong! If weight is anything to go by, this bracket will be the last thing standing if there's ever a nuclear war! Figure 4 shows the three brackets - Mk I, Mk II and the real McCoy. Figure 5 shows the supercharger bolted to the aluminium bracket.

With the Mother Of All Brackets complete, the next step of plumbing the inlet and outlet of the supercharger will be

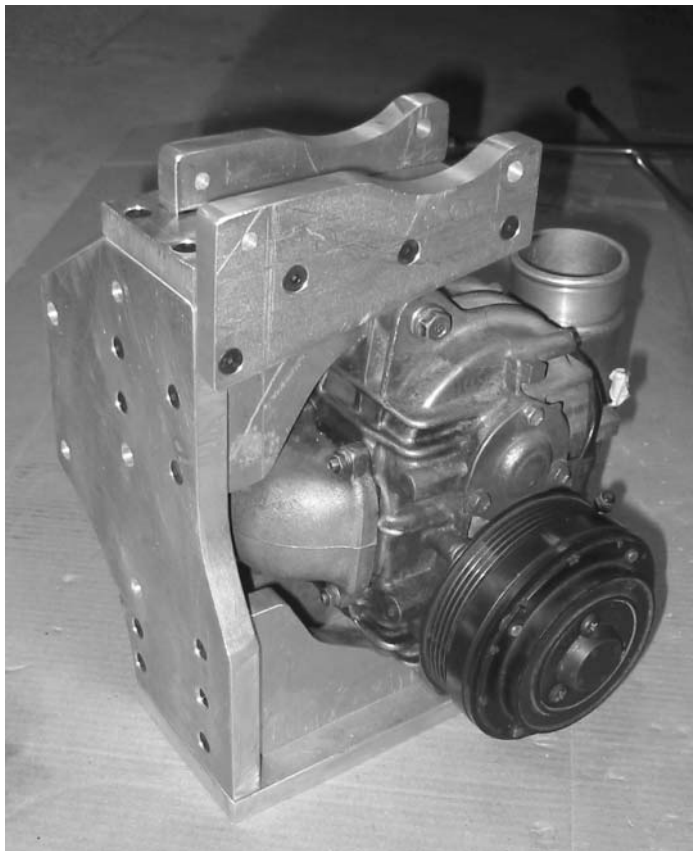


Figure 5: Completed Aluminium bracket bolted to supercharger, ready for installation on engine

addressed. Chapter 4: Plumbing 101 - will discuss this issue and the often-misunderstood bypass valve. Until next time, stay tuned! If anyone has any questions or comments, e-mail me at gsievert@tpg.com.au or call 9397-5976 after hours.

Regards,
Greg

242GT/262 Bertone Register Update:

Despite being given adequate notice by the new editor, I am doing this at last minute.

There has been some activity on the GT/Bertone front since my last article. This article is less technical and more aligned to owners.

I had a long chat with David from Brisbane recently who is very happy with his 1979 GT. David actually bought a 1980 GT new, but had to sell a year later due to family pressures but always had a soft spot for another one so bought this 79 model when the opportunity arose.

I have also received a Register form from Duncan in Brisbane who has purchased a gold 262 Coupe and is in process of bringing it up to scratch.

Athol from outside Ararat has purchased a 79 model and Glen from in Ararat has recently bought an 80 model. Both are very happy with their purchases and look forward to catching up in the New Year.

For Sale:

There are a couple of cars [that I am aware of] on the market at present. I am awaiting further details from Sue in Tasmania who has a one owner 1980 model, and there is a 79 model in a car yard in Ararat. This needs a tidy up in the paint but would make a good project. It is also a 3 speed automatic. There is also a damaged 79 auto for sale on Mornington Peninsula. It has front damage [grille/lights/ radiator] but still starts. The interior is not standard and is now a beige cloth colour on the seats. Prior to the accident it was always well maintained mechanically. Contact me if you are interested in this one.

Chop Top:

In the last issue of Rolling there was a photo of a 242 GT convertible. The console has been removed and switches relocated to the dash. I do not know who the owner is but it would be interested to have a chat about it. It is still a "bit rough" around the edges where the roof was removed.

High Mileage:

Gregor, up in NSW has a GT with close to 600,000 kms on the clock. As well as every day transport the car is used for hill climbs and historic supersprints with some success. It just shows Volvos including GTs just keep on keeping on. I will have to catch up with some of the modified cars [V8 262, 262 Turbo, GT Turbo] for another issue. Don't forget there is a fair amount of info on the 242GT and 262 on www.volvoadventures.com. Until next time,

Lance Phillips
242GT/262C Register

News from Mark Richardson VP Tuning

As this issue is arriving in our letterbox, the ECU re-programmer from TME should be up and running. We had some problems getting the software to work on my computer but sending a laptop down from Sweden has solved that. This makes it easier to do the upgrades on the spot. [if not too far of course] The system is only for turbo models from 850 onwards and fitted with Motronic or Bosch ME7. If not sure what your Volvo has you can always call me. Price for ECU upgrade Motronic -'98 \$1125 incl. GST and for the Bosch ME7 '99- \$1385 incl. GST. Pricing are rrp but for a limited time only anyone trade/club member or retail customer will receive a 15% discount on these prices!!

Anybody interested in S60 racing clothing? There will be some available as the Swedish racing season has ended and they are moving on to the next season preparations. It will be mainly polo's/ T-shirts /jackets - it all depends what is left. More on this in the next issue. Inquiries welcome (see below).

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