

## **R53 Supercharger Oil Maintenance (and other stuff)**

My wife decided to go and spend a week visiting family. I just rolled over 70,000 miles on Jango, my 2006 R53 (MCS Hardtop), so I thought that I'd take advantage of having 2 cars to myself and lots of free time by doing a deep service.

The primary purpose was a supercharger oil check/refill... It's an MCS only job that should be done every 80,000 miles or so for those of us with supercharged engines. I'm a bit early, but I had the time to do it now, so why not? I'm also very protective of my scheduled play time... I would hate to lose track time or fun time at an event like MINIs on the Dragon because of a break-down, so I tend to do more preventative maintenance than most... you have to figure out the cost/benefit for yourself.

The Disclaimer: I'm neither a mechanic nor do I play one on TV. I'm just a guy who is handy, has accumulated a decent set of tools and gets some perverse sort of satisfaction from documenting work like this for his friends and the MINI community. I've done a lot of on-line research on the topic and found a few decent threads around the interwebs, but nothing that spelled it all out with parts lists, pics. and such. This is my attempt to fill the gap by consolidating all of the info I've found from various sources. I've got the Haynes guide plus lots of info from the internet consolidated here. This service is not a simple or clean task. Consider yourself warned. As with all information on the internet, please confirm the information until you are satisfied that it is correct. I have done my best to accurately include part numbers / prices / etc., but prices vary and, as my wife will tell you, I frequently make mistakes.

To get to the supercharger oil ports, you have to remove the supercharger from the car... that means that lots of other stuff is coming out as well. I'm big on preventative maintenance and I drive my car fairly hard (the occasional track weekend and I tow a small camping trailer), so I decided to take care of some other things while I was in there. I probably spent 12 hours of dedicated work on the whole thing (not counting parts runs, etc.).

### **Here is my parts list.**

- Gaskets and seals - there are several gaskets and seals that are 1-time use only, so you will have to replace 'em. 3 of the gaskets were not in stock at my local dealership (Thanks MINI of Dallas for the Metroplex MINI club member discount), so be sure to make your parts run early. It took them 2 days to get the parts in stock (very reasonable, IMHO). If you are not going to replace the water pump, get 2 of the water pump O-rings.

Small Horn Gasket: (Figure 3 - #6)	17-51-1-524-319	\$1.86	Qty 1
Lg Horn Gasket: (Figure 3 - #9)	17-51-1-520-044	\$5.33	Qty 1
Green Profile Gasket: (Figure 2 - #2)	11-61-0-020-836	\$24.14	Qty 1
Throttle Body Gasket: (Figure 4 - #2)	13-54-7-509-045	\$12.27	Qty 1
Water pump O-ring: (Figure 1 - #2)	11-51-7-509-186	\$3.56	Qty 1
Dipstick O-ring:	11-43-7-513-891	\$1.16	Qty 1
Crank sensor O-ring	12-14-7-514-983	\$1.76	Qty 1
MINI Brand Coolant	82-14-0-131-133	\$18.85	Qty 1

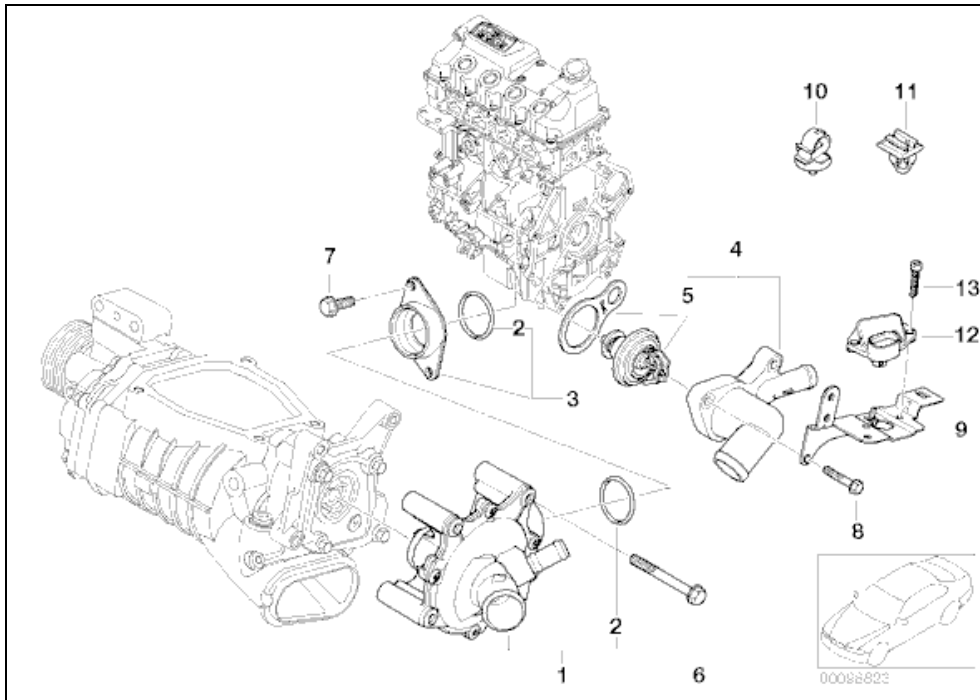


Figure 1

Picture from [www.RealOEM.com](http://www.RealOEM.com)

The 2 water pump o-rings are (#2) in figure 1, above.  
 You can also see the water pump (#1), the thermostat (comes fitted with a new gasket, both labeled #5) and thermostat housing (#4).

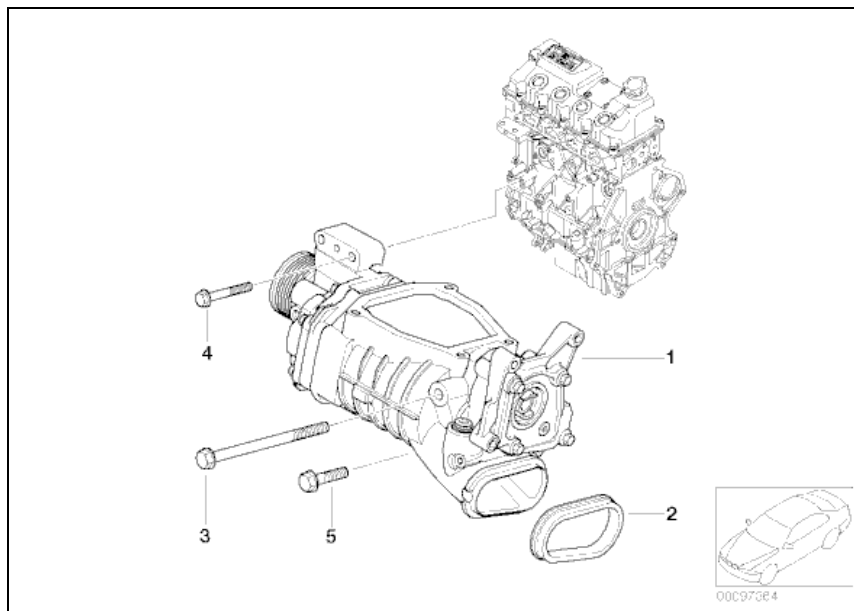


Figure 2

Picture from [www.RealOEM.com](http://www.RealOEM.com)

You can see the green gasket (#2) in figure 2.

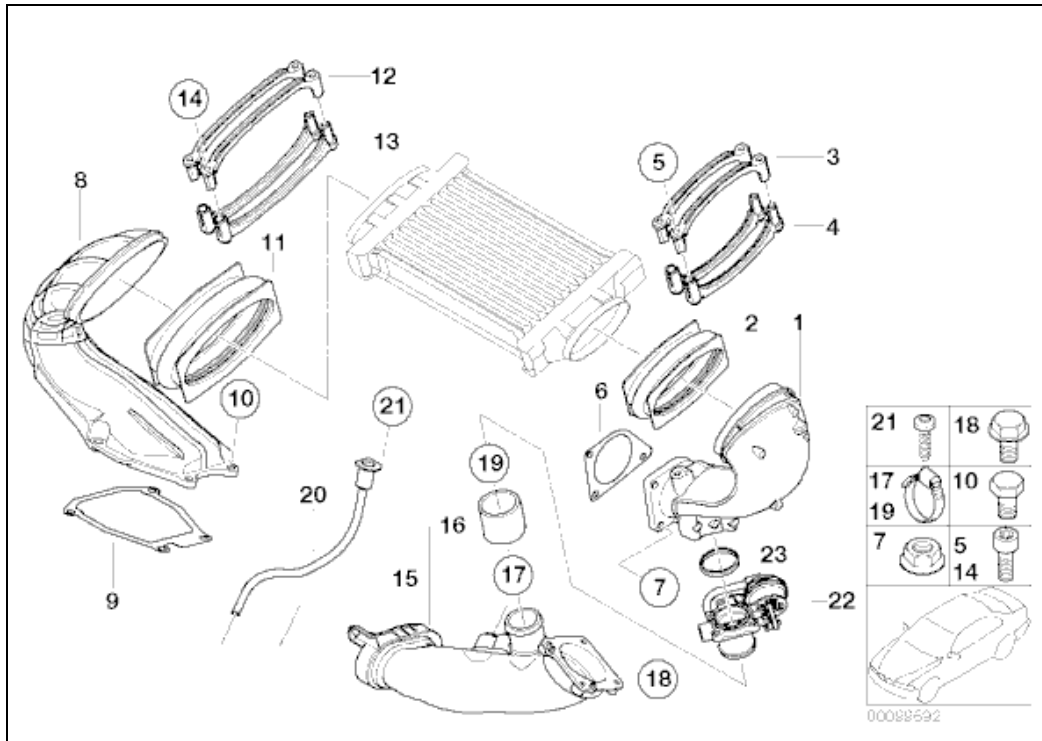


Figure 3

Picture from [www.RealOEM.com](http://www.RealOEM.com)

In figure 3, #9 is the black profile gasket that goes between the supercharger top and the intercooler horn.

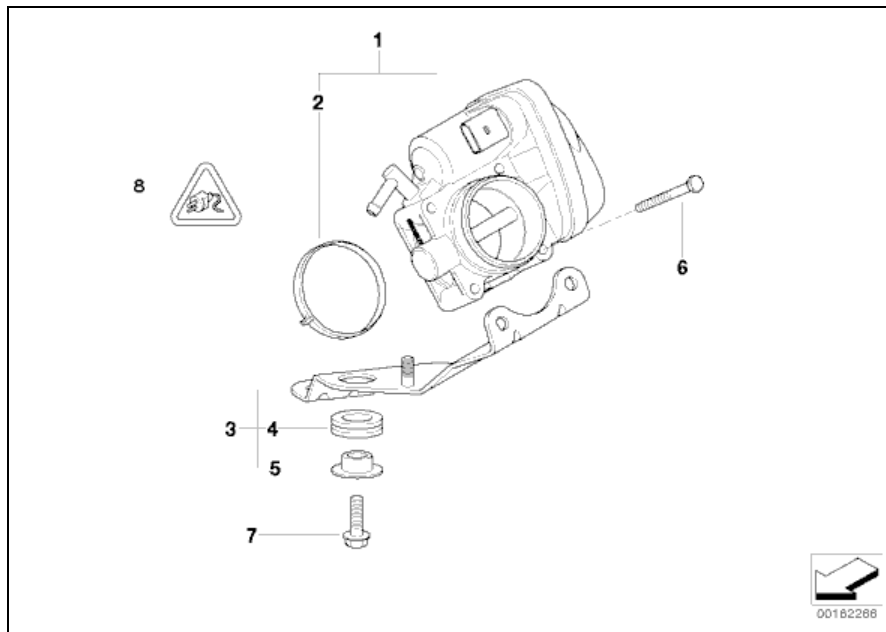


Figure 4

Picture from [www.RealOEM.com](http://www.RealOEM.com)

In Figure 4, you can see the last gasket to be replaced around the throttle body valve, #2.

- Coolant - I did a flush 7k ago, but the coolant has to come out so fresh will go back in. I got a bottle at the parts desk to minimize any complexity of getting the wrong stuff. I mix it with an equal volume of distilled water and then put a tag on the bottle to mark it as 'Ready to Use'.

MINI Brand Coolant	82-14-0-131-133	\$18.85	Qty 1
Distilled Water from the grocery store		\$0.99/gal	2 Gal

- Supercharger oil - The supercharger is supposed to get 6oz of oil on the drive side and 2oz on the water pump side, but there seems to be some variability. You fill it until it starts running out of the fill hole. It comes in 4oz bottles, so 2 bottles should do, but get a third to help with rinsing out the old, dirty oil. It's funny, but MINI doesn't sell the oil... they just wait for the part to fail and then sell remanufactured superchargers at over \$2000 each! Some GM vehicles use the same Eaton supercharger oil, so it can be found on-line or at Chevy/Buick/Cadillac/GMC dealerships. I had 3 bottles ordered for me at my local Cadillac dealership for \$10.39 each... it took 5 days for delivery, so order early (they usually only keep 1 on the shelf at the dealership I went to).  
NOTE: This stuff is nasty, stinks to high heaven and is supposedly toxic. Wear gloves and eye protection when handling. Don't touch your face, eat or drink while doing the parts of this process involving the oil, either old or new.

GM Supercharger Oil	GM Part 12345982	\$8.96	Qty 3
<a href="http://www.summitracing.com/parts/NAL-12345982/?rtype=10">http://www.summitracing.com/parts/NAL-12345982/?rtype=10</a>			

- Water pump – This one is an easy choice to me. If it's going to take you 6 hours to replace the supercharger oil and it will only add another 15 minutes to replace the water pump, why would you not do it? K-huevo, who is a real mechanic, says no need... he has customers with 180k+ on the stock water pump, so the decision isn't as cut and dry to everyone as it is to me (he says "If there is no weeping from either hole, and it's not squealing, there's no need to change the waterpump"). My thought is that you could try and save \$112 on parts by not buying a new water pump, but if you are paying a mechanic to do the work (at \$100 an hour), you don't want to pay \$600 in labor just to have your stock water pump die on you one week later and you have to do the same \$600 in labor all over again... that's not much of a savings! Of course, you might make it another 100k miles without the replacement and you just saved \$112. I'll have to leave that decision to you... I'll be doing the replacement and will consider the \$112 an investment in my peace of mind.

The new (remanufactured) water pump comes with one of the o-rings you will need pre-installed. Pick up another (part # is above under 'gaskets and seals') at the dealership. If you aren't replacing the water pump, be sure you order 2 o-rings.

Remanufactured Water Pump	11-51-7-520-123	\$112.94	Qty 1
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- Thermostat and housing: I usually replace the thermostat every time I flush the coolant and I replace the housing every other time (it's a known place for cracks/leaking coolant). I just replaced both of these 7k miles ago... they will be staying in the car this time. The prices and part numbers are from [www.RealOEM.com](http://www.RealOEM.com), but they should be pretty close. I seem to remember paying \$30-ish for the thermostat and \$45-ish for the housing. I won't be writing about the install of these components, but there is already a nice write-up on how to do this replacement:  
<http://www.motoringalliance.com/library/1st-generation-mini-cooper-how-to-3/r53-thermostat--housing-installation-91/>

Thermostat	1-11-53-759-6787	\$33.64	Qty 1
Thermostat Housing	1-11-53-751-2733	\$38.18	Qty 1

- Coolant Hoses: I'd usually wait until 100,000 to replace hoses, but I'm going to have the car in pieces and the coolant out of the car, so will be an easy change... New clamps will go in as well (Way called

me and offered the Samco clamp kit... the clamps are simple and can be found anywhere, but for the \$10 I'd save by digging through the bins at my local stores, it's worth it to me to pay the \$10 and avoid the hassle of digging for the right size clamp and running around town). I think you can purchase the factory hoses for around \$100, but for \$180-200, you can get silicone hoses that come in cool colors!

K-Huevo, a real mechanic that I respect on the national MINI boards, isn't thrilled with the fitment of the Samco hoses he has seen before. He also says that they are a bit less oil/solvent resistant than the factory hoses, so keep 'em clean if you get 'em, and be careful with the clamps to ensure that they don't cause rub points. I had a hard time getting a good seal on the Samco hose bleed screw on the top radiator hose and wound up cutting it and splicing in the factory bleed pipe.

If you aren't going to replace your coolant hoses with the nice silicone ones that come with a new stainless bleeder screw, I would suggest that you at least replace the factory plastic coolant bleeder screw with a nice brass one. The plastic OEM piece gets brittle and the head of the likes to break off.

Way Motor Works – Samco Hoses	\$211.00	1 set
<a href="http://www.waymotorworks.com/samco-c...s-r52-r53.html">http://www.waymotorworks.com/samco-c...s-r52-r53.html</a>		
Way Motor Works – Hose Clamp Kit	\$34.00	1 set
Way Motor Works – Brass Bleeder Screw	\$4.95	Qty 1
<a href="http://www.waymotorworks.com/brass-c...der-screw.html">http://www.waymotorworks.com/brass-c...der-screw.html</a>		

- I'm having my supercharger horns powder coated. I have 'em off of the car already, so it's only increasing my work a handful of bolts. I've found a place with a 2 day turn-around time on the work. It will cost just over \$100 to have them powder coated and top-coated with clear (\$24 less if you want just base coat). This is a non-functional mod... It just adds a nice bit of bling to the engine bay. (E Powder Coating in Mesquite, TX). I was planning to have the Grillcraft lower front grill blasted and re-coated in gloss black while I had the front bumper off, so doing the horns is a convenient bonus. After 6 years and 70k miles, it is chipped up a bit. See pics on the last page.
- The belt tensioner is also a place for concern in an older MINI. Usually the tensioner damper bushings will wear away with time and exposure to the high temps in the engine bay. Until recently, your only recourse was to replace the entire tensioner assembly (around \$150 at the MINI parts desk, I think). I'll be trying something different and will be replacing just the damper bushings with pieces from Powerflex. K-Huevo isn't a big fan of the polyurethane bushings in this application. I'm going to give 'em a shot and keep an eye on them. By the time they wear out, I'll probably be ready for a whole new tensioner assembly anyway.

If you haven't replaced your belt in the last 25k miles, it's time for a new one as well... you might as well...you will already have it off of the car and it's fairly cheap. I use the Gates belt # K060535 with my 16% supercharger reduction pulley. The stock pulley will require a different size belt.

I'll also be replacing the Detroit Tuned tensioner stop (a braided wire cable that prevents supercharger damage if the belt should snap) as I noticed a few fraying spots on mine that has seen 4+ years of service:

Stock MINI Belt	1287520199	\$37.60	Qty 1
JCW MINI Belt	11287545120	\$37.60	Qty 1
New Tensioner	11287509476	\$152.93	Qty 1

Way Motor Works – Powerflex Supercharger Bushings + DT stop \$62.95  
<http://www.waymotorworks.com/powerflex-supercharger-belt-damper-polyurethane-bushing.html>

- **Spark plugs:** Is it time to replace your spark plugs? If so, get a set on order. You will have the intercooler off of the top of the engine and that's half way there. At that point you just pull the plug covers off and unscrew the old ones. On a completely cold engine, finger-tighten the plugs and then tighten to 28 Nm (21 Lb-Ft / 252 Lb-In). It is easy to cross-thread these plugs on the aluminum threads, so I slip them inside the end of a piece of hose and use the hose to get the threads started. I put a tiny amount of anti-sieze on the threads and some dielectric grease in the plug wire boots. If you can bring yourself to take the intercooler off again, you should really come back 2-3 weeks later and re-torque the plugs.

I use NGK plugs that are one degree colder than stock (given my fairly tame mods of a 16% pulley, CAI, coil pack, Cat-back exhaust, JCW injectors and tune).

- **Oil Pan Gasket:** Have you made it 80k miles and you haven't found your oil pan gasket to be leaking yet? Many of my local club members have had their R53 oil pan gaskets start to leak at the 5-6 year mark. Once I got everything apart, I discovered that mine was leaking as well (when I started the job, I knew that something was leaking oil). Because everything else was off of the car, replacing this gasket was really only a 1 hour addition to the work, so I think that, in another 80k miles, I will probably replace this gasket proactively.

I occasionally track my MINI, so if I had known that I was going to be doing this, I probably would have dropped the \$180 for a baffled oil pan (Way: <http://www.waymotorworks.com/wmw-baffled-oil-pan-r50-r53.html>). Since it was a bit of a surprise, I just got a stock gasket from the parts desk and did the simple replacement. You will have to drain the oil, so you will need all of the fixin's for an oil change.

Oil pan Gasket	11-13-1-487-221	\$34.44	Qty 1
Oil filter and o-ring for R53	11-42-7-512-446	\$10.05	Qty 1
Oil (I use Royal Purple but MINI Brand or any full synthetic is OK)			5 Qts

### **Thanks:**

Whenever you pull together info like this, you wind up doing lots of copying and pasting from the interwebs, talking to folks on the phone and chatting over parts desk counters. This is a non-comprehensive list of folks who helped out, whether they know it or not!

- Here is a very helpful thread over on NAM... my thanks to KHuevo (Keith) and AZBlackOut in particular for various facts, tips and diagrams. Keith was very generous, sharing his thoughts on possible additions to my process via PM and adding a few things to check along the way: <http://www.northamericanmotoring.com/forums/stock-problems-issues/74674-rattle-supercharger-water-pump-9.html>
- Thank you [www.RealOEM.com](http://www.RealOEM.com). They have great exploded parts diagrams and access to part numbers. I love this site... I'm hoping that this note (and my credit in the text of the diagrams) compensates them for their amazing service.
- Thank you Way at Way Motorworks. I got several of the parts from him. Great service, as usual, from Way.
- William: Thank you for the good company and the help turning wrenches. I appreciate it. I also appreciate the eyes of BThayer23, AliceCooper, Cadenza and jahusamini for their review of this document before it went live to the world.

### Getting down to it:

Now that I have all of the parts together, let's get to work! You will accumulate a large number of loose nuts and bolts, so I suggest that you get some sort of system together to keep it all organized. I got a box of ziplock sandwich bags and when I finished a step, I'd drop all of the nuts into a bag and use a sharpie to mark the step number on the bag. It made the reassembly process much easier.

Step 1: Disconnect the positive battery terminal. 10mm bolt

Step 2: Put the front end of the car up on jack stands and make sure that it is secure. Then remove both of the front wheels.

Step 3: Start the disassembly. The front bumper fascia has to come off. I've got the M7 air splitter up there, but the bolts are the same for everyone. There are 2 bolts on each side of the radiator on top of the bumper. One is a standard 14mm nut. The other is a Torx-30. Remove all 4. See Figure 5 where I'm pointing at the 14mm nut. The Torx bolt is just to the right of it.



Figure 5

Step 4: I've got an aluminum skidplate on the underside of my car, but I removed a plastic windscreen thing from under there when I installed the skidplate years ago. I removed four 6mm allen head screws to get the skidplate off, but your process will be slightly different. I'll have to leave you to your own skills to remove that plastic tray. There was one 10mm bolt right up front center, just under the bumper.

Step 5: Keep on with the removal of the bumper. Remove the bolts on either side from within the fender well (my white gloved finger is hard to see in Figure 6, but it is coming up from the bottom of the frame). Remove the 2 screws from just under the bumper as well (see Figure 7).



Figure 6



Figure 7

Step 6: Detach the turn signal lights and driving lights from the light housings. Just grab the fittings on the back and give 'em a ¼ twist counter clockwise and they will pop loose.

Now you can remove the bumper fascia and set it off to the side.



Step 7: Remove the 5 nuts and 2 bolts on either side that hold the aluminum bumper on to the front of the car. See Figure 8.



Figure 8

Once you get the bumper off the car, set it aside and get a bucket. It's time to drain the coolant. The radiator connection you use is the lower one. It's on the back side of the radiator, on the driver's side. There is a rubber hose that connects in to the plastic tube. There is a clamp on it that you loosen by pinching two tabs together. I have a pair of needle-nose vice grips that are perfect for this purpose. Slide the clamp up the hose an inch or so then pull the hose off. Be ready to catch the coolant. Leave the bucket under there... it's going to dribble out for a long while. It seems to go a bit more quickly if you loosen the coolant reservoir cap. (Figure 9)



Figure 9



Figure 10

Step 8: Remove the 2 black curved crush tubes that the lower aluminum bumper bolts attached to. On each, there are two 17mm bolts under the car (see Figure 10) that hold them in place and a smaller 10mm bolt on the front.

Step 9: There are 3 plastic connectors in each fender liner. They are a lot like molly bolts... as the plastic Phillips head screws go in, they cause the back side to expand. These little suckers are frequently frozen from dirt and debris from the road. They like to strip out and you frequently have to just force them out with needle nose pliers.

Step 10: Make sure that your coolant catch bucket is in place and then disconnect the top radiator hose from the radiator. This hose runs along the front of the car, just underneath the intercooler, and connects to the back side of the radiator on the passenger side. It has a similar spring clamp holding it in place. Squeeze the clamp, slide it back a few inches and then pull the hose off of the radiator. When you do, more coolant will suddenly drain from the radiator... aren't you glad I reminded you to check that the catch bucket was in place?

Step 11: On the passenger side of the car, disconnect the horn electrical connector and feed the turn signal light and driving light connectors through the plastic frame. You only need to do this on the passenger side, preparing for step 12. On the driver's side, remove the 10mm bolt that holds the AC refrigerant connection in place (where I'm pointing in Figure 11) and disconnect the electrical fitting that attaches to that bracket.



Figure 11

Step 12: Fold the radiator and the AC condenser forward. Let it pivot on the driver's side and tip forward. I had a folding chair that worked perfectly as a support and I secured it to the chair with a few bungee cords. Ben (Bthayer23) completely removed the radiator and swung the AC compressor out of the way. If you do this, you can completely flush the radiator w/ a garden hose.



Figure 12

Step 13: We've been focusing on the front of the motor... now it's time to work on the top. Remove the two 8mm bolts on the front of the intercooler and the eight Torx-30 bolts that hold the rubber boots on either side of the intercooler. I've had an aftermarket intercooler for over 4 years, so I can't remember how the stock intercooler attaches. Just start removing screws until the intercooler separates from the car.

From Ben: The stock intercooler has four T30 bolts, two long and two short, holding the cover and intercooler down; remove all four. There's four 8mm hex bolts holding a pair of black brackets on the front side of the intercooler; remove all four. Then there's 8 T30 bolts on the flexible boots; on each side, loosen the outer pair. Pull the intercooler to one side and lift one of the boots off the horn. Remove the boots and wipe down the inside, and rinse the intercooler with acetone.

**Step 14:** Remove the tube that leads air from the filter box to the by-pass valve. Again, I've got an aftermarket part, but I had to loosen 2 large clamps and one small one from this pipe.

**Step 15:** Remove the 10mm bolt on the driver's side of the supercharger. It holds on the black plastic pipe that takes air to the supercharger. You will find the green gasket (you did buy a new one, right?) inside. See Figure 14 where I'm pointing to the hole where the bolt was.

**Step 16:** Remove the three 11mm bolts on the supercharger horn on the driver's side of the engine.



Figure 13



Figure 14

**Step 17:** Remove the hose that goes from the water pump to the top of the radiator.

**Step 18:** Remove the two 10mm bolts that connect the Bypass valve to the bracket. See Figure 14 where I'm pointing at the hole closest to the front of the car. You also need to remove the one directly above my finger.

**Step 19:** Disconnect the vacuum line by pressing down on the red ring while gently lifting the grey hose. It should disengage with just a little bit of pressure. See Figure 15.

**Step 20:** Remove the driver's side supercharger horn. You will have to loosen a hose clamp on the underside of it to get it free and out of the way. See Figure 16.

**Step 21:** Remove the oil dipstick and then the 13mm bolt that secures the top of the dipstick guide tube.

**Step 22:** Let's get that pesky drive belt out of the way. Use the belt tensioner tool to remove the tension on the belt and slip an allen wrench into the second hole to lock the belt tensioner out of the way so that the belt can be removed. I've done a full write-up on the belt removal and replacement that is available here: <http://www.motoringalliance.com/library/1st-generation-mini-cooper-how-to-3/replacing-the-serpentine-belt-on-an-r53-mcs-3/>

Note: Someone over on NAM mentions this way of removing the tension without the tool. I've got the tool, so I use it, but other folks are finding a way around it. He was nice enough to shoot a video!

*Everyone talks about this "special" tool needed to remove this thing. Very wrong, it is more simple than you think. I used a bolt that i had laying around and was just big enough around to fit in one of the 3 holes that are located on the tensioner. It should stick out maybe 1/2" to use as a pivot. Then using just a flat piece of metal about 2 feet long and 1" wide and 1/4" thick. I placed one end on the crack pulley and pulled upward using the bolt as the pivot and it released all the pressure very VERY easily so that my buddy could put an allen wrench in the second hole that gets exposed from the tab in the spring (on top of the tensioner). I made a video of us releasing the tension the same way as I did before after it was all done. Again, this took maybe 40 seconds.  
<http://www.youtube.com/watch?v=fuXCLGj2E2o>*



Figure 15



Figure 16

**Step 23:** Remove the two 13mm bolts on the driver's side of the supercharger, and the two on the passenger side as well. These reinstall with 45Nm / 33.2 Lb-Ft of torque.

**Step 24:** Remove the 16mm bolt on the end of the supercharger. This is the one that is used as a pivot for the belt tensioner tool. You will need a box-end wrench or an adjustable crescent wrench will work as well. See Figure 17 where I'm pointing at the bolt.

Keith (khuevo on the boards) recommended removing the tensioner for an evaluation. A new tensioner assembly is \$150 or so, I believe. Here is his recommendation:

*Remove the idler, screw the captured bushing tight, and spin while holding close to your favored ear. If you hear or feel grittiness, or hear loose bearing balls fall (tink-tink) on the last rotation, replace the idler.*

**Step 25:** Remove the 3 bolts on the alternator and use a bungie to support the alternator up and out of the way. If you wish, you can just disconnect the electrical connection and maybe one more bolt and remove it completely from the car.

**Step 26:** Remove the lower dipstick guide tube 13mm bolt. Pull upwards on the dipstick guide tube while twisting a bit and the whole thing will pop upwards and out of the block. Use a tightly rolled bit of paper towel or shop towel to block this hole... we will be removing the supercharger soon and coolant will run down the front face of the engine block towards this hole and you don't want coolant going in there, especially if you aren't going to replace the oil / oil pan gasket. One of the parts in the first few pages I told you to get was a new o-ring for the bottom of the dipstick guide tube. Just slide the old one off and put the new one on. I like to apply a bit of engine oil to the new o-ring to keep it safe from pinching/twisting during the reinstall.



Figure 17



Figure 18

**Step 27:** Remove the 2 connections with the red quick connects on the intake pipe to the supercharger. You can see two of 'em in Figure 18. There is another one to disconnect on the front of the supercharger. Note: I had a hard time getting the factory hose clamp in Figure 18 to work again (it's hanging loose, just to the left of the red connectors), so I replaced it with a standard worm-drive stainless hose clamp from my local auto-parts store. Just be sure that it doesn't rub on other components when you reinstall.

**Step 28:** Get your bucket ready to catch more coolant (under the lead edge of the oil pan) and make sure that your dipstick guide tube hole is plugged securely. Remove the supercharger by pulling it forward. It might take a bit of twisting. The water pump connects directly to the engine block and when you pull the supercharger, more coolant will come out, running down the front of the block.

**Step 29:** Remove the large supercharger horn by pulling the four 10mm bolts that attach it to the supercharger. These reattach later with 25nm or 18ft-lbs of torque.

Step 30: Remove the three 13mm bolts that attach the water pump to the supercharger. They reinstall with 25 Nm / 18.4 lb-ft of torque.

Step 31: This is the step art you have been waiting for... the supercharger oil swap (and it only took 30 steps to get here). There are 2 oil reservoirs on the supercharger, one on the pulley side (Figure 19) and one on the water pump side (Figure 20). The plugs are removed with a 3/16 allen wrench. Work one side at a time, removing the plug and draining the oil. I then added an ounce or so of fresh oil, replaced the plug, spun the supercharger by hand (while rotating) and drained again to help flush things out well. The pulley side oil was very dirty and got 3 rinse cycles like this until I was happy with the color of the oil coming out. Fill the pulley side with 6oz of oil and, when you level the supercharger, a bit should start to dribble out the fill hole. Cap it and do the water pump side which gets 2oz of oil on the final fill.

This oil is nasty stuff. It stinks to high heaven and is supposedly toxic. Wear gloves and eye protection when handling. Don't touch your face, eat or drink while doing the parts of this process involving the oil, either old or new.

I was able to look inside the plug hole and saw that my gears appeared to be in good shape. You can also tell a bit about the condition of your supercharger bearings by looking at the lobes (the 'fan blades' inside). I wanted to crack open the oil reservoirs on the supercharger for a good inspection, but I got this note from Keith (k-huevo):

*Avoid removing the SC reservoir flanges just for the sake of curiosity. If you see major loss of coating on the lobes, that's an indicator of excessive bearing play, but it will also be accompanied by an unhealthy noise, so you would have suspicion going in. Unfortunately the aftermarket rebuilds are not lasting long. If yours has failed, purchase a used original unit from the marketplace.*



Figure 19



Figure 20

**Step 32:** The water pump connects to the block through a flange with two 8mm bolts. If you didn't get a new water pump, you should replace the o-ring that fits on the water pump and connects to this flange. Remove the two bolts and you will find another of the same o-rings behind it. Clean up all surfaces and reinstall the flange with a new o-ring. See figure 21.



Figure 21



Figure 22

**Step 33:** The crank sensor on almost every R53 I've seen is at least weeping a little bit of oil. Some are leaking quite a bit. Mine wasn't bad, but the front of the engine block showed the dirty oil / dust, cauliflower-like growth of a long-term oil leak. I cleaned up the block with engine cleaner, removed the 10mm bolt, and replaced the o-ring. For good measure, I applied a bead of red high-temp RTV sealant on the outside edge of the o-ring and reinstalled. Figure 22 is the 'after' photo and you can see the red RTV extruded from edges when I tightened the bolt. Hopefully this one will stay sealed!

**Step 34:** I decided to have my supercharger horns powder coated, so I removed the valve from the small horn by removing the 10mm bolts. This step is only necessary if you want to have the horns powder coated.

**Step 35:** Once I got in this deep, I found the source of a small oil leak that I've had for a month or so... a bad oil pan gasket. If you are in this far, it is only a few more bolts to do this job, so I'm going to do the pan gasket replacement with every supercharger oil service. If you don't want to do this, skip step 35.



Step 35A: Drain the oil from the engine and remove the oil filter.

Step 35B: Remove the three 13mm bolts that attach the AC compressor to the oil pan. They are reinstalled with 25nm / 18 ft-lbs torque.

Step 35C: Remove the two 13mm nuts that attach the power steering pump fan to the oil pan.

Step 35D: Remove the 16mm bolt that holds the engine mount to the oil pan. It is reinstalled with 100nm / 74 ft-lbs torque.

Step 35E: Remove the three 15mm bolts that half the pan to the transmission. They are reinstalled with 85nm / 63 ft-lbs torque.

Step 35F: Remove the thirteen 10mm bolts that hold the sump to the block.

Step 35G: Remove the pan and clean it out, paying attention to all gasket-touching surfaces.

Step 35H: Replace the oil pan gasket. Reattach the bolts from step 35F and 35E until they are just finger tight. Snug up the 3 transmission mounting bolts first, then the 13 pan bolts in Fig 23. Now torque the 13 pan bolts to 31nm / 23 ft-lbs torque spec in the sequence specified in figure 23 and then torque the 3 transmission mount bolts to 85nm / 63ft-lbs.

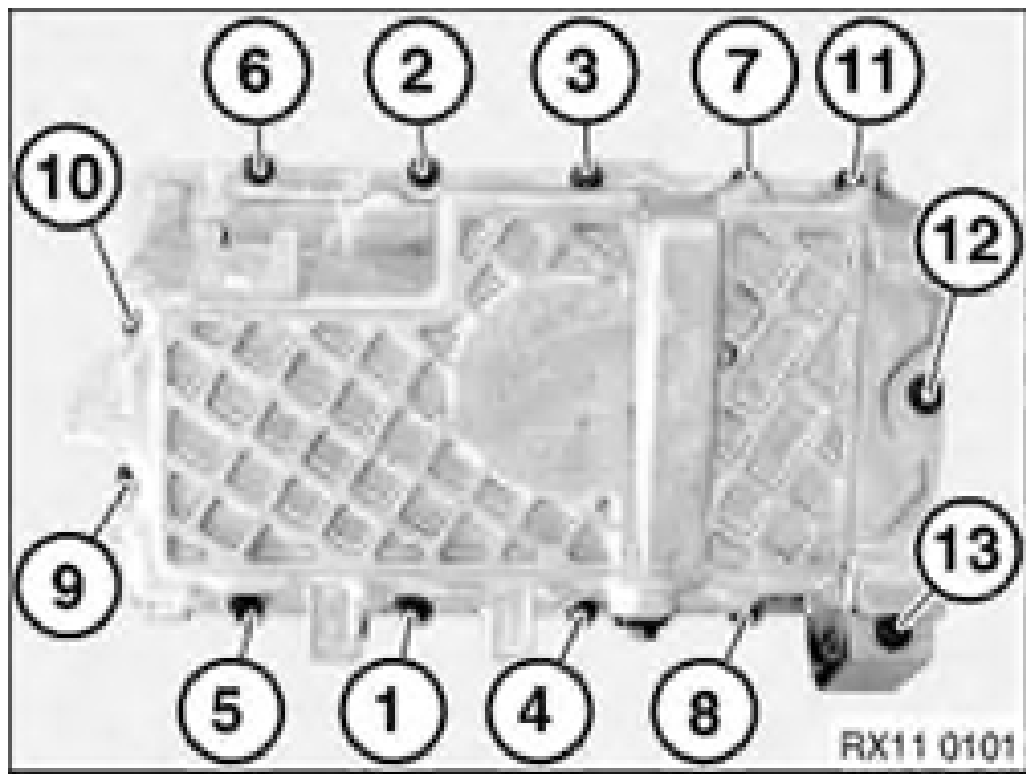


Figure 23 – I'd like to give attribution for the image, but I don't know where it came from.

Step 35H: Tighten the 3 bolts from 35E. They are reinstalled with 85nm / 63 ft-lbs torque.

Step 35I: Reinstall the bolts from steps 35B, C and D.

Step 35J: Put on a new o-ring on the filter canister and install a new filter.

Step 35K: Don't forget to add oil, but you will need the dipstick guide tube to be reinstalled so you can check the oil level, so do this later, once you have everything back together.

**Step 36:** What now? Now you start working backwards, reinstalling everything that you just took off.

**Tip #1:** Ben has this advice: When reinstalling the water pump, install the supercharger first. Then rub some Sil-Glyde generously on the water pump o-rings (I found some at NAPA). Fit is critical here, so slide it back into the block carefully and bolt it up to the supercharger first. Then go back and screw in the bolts holding it against the block. This way you're using the supercharger to line up the water pump; otherwise if you tighten the bolts on the block first, then bolt it against the supercharger, it'll tug against the o-rings and cause a leak.

The orange throttle body o-ring can just be flipped around, unless it's cracked or torn.

Spray a rag with silicone spray and wipe the green supercharger gasket on all sides. This gasket isn't on the pressurized side of the supercharger, so fit isn't critical, but it works better if it's allowed to slide around a little bit.

**Tip #2:** I always forget the belt path. I made this diagram a few years ago and need it almost every time I mount a belt:

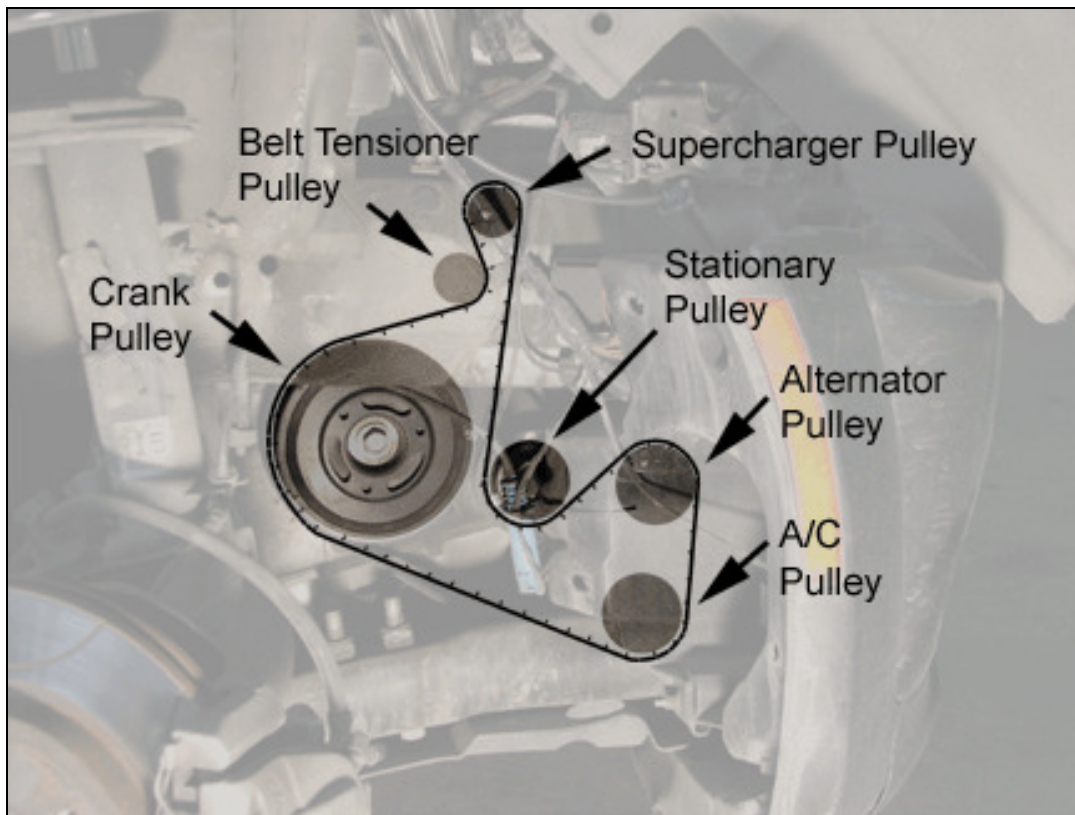


Figure 24

**Tip #3:** When you replace the coolant, you will need to bleed the coolant system to get rid of air. Once you have the car back together (don't forget the oil), start the car and let it come up to temperature. Turn the heat on high with the windows down and crack the bleed screw that is on the upper radiator hose until only fluid runs out. Keep adding coolant to the reservoir until it stays near full. After your next few long drives (over 15 min), do this same process of bleeding the system. I kept a funnel, coolant, paper towel and a screwdriver in the boot for a week until I was satisfied that when I bled, I got no air out of the bleed screw.

Tip #4: Keith (k-huevo) recommends that you remove a corner of the fan shroud on the radiator support to prevent or stop contact with the coolant hose that passes in front of the intake manifold. He gave me these before and after pics:



BEFORE

Figure 25



AFTER

Figure 26

I've gotta say, I love the extra red bits in the engine bay. Anything red adds extra HP! :D

