

Things you will need:

- Full set of sockets, rachets, and wrenches. The primary sizes you will need are 10mm, 12mm, 14mm, 17mm, 19mm, 22mm, 29mm (12 point specifically)
- [Breaker bar](#)
- Pry bar
- Transmission jack
- Floor jack
- Jack stands
- Engine hoist (optional)
- BFH (Big f*cking hammer)
- Lineman gloves
- Body panel pry tool (optional but very helpful)
- 4 qts of ATF WS from Toyota (NO SUBSTITUTES)
- 1 gallon of pink inverter coolant from Toyota (NO SUBSTITUTES)
- Screwdrivers (phillips and flathead)
- Multimeter capable of reading >450VDC
- Fluid catcher
- Helper - The transmission is probably around 300 lbs (guesstimate)
- Patience
- Band-aids
- Case of beer of your choice

Project Costs

- Transmission: \$250-\$600 depending on where you buy it from (Mine was \$500)
- ATF WS x 4 @ \$10/qt
- Toyota Inverter coolant @ \$22/gal
- Axles seals x 2 @ \$15 ea (Optional, strongly recommend)
- Rear main seal (Optional, strongly recommend) @ \$30
- Assorted plastic rivets \$5
- **Procedure**

1) Remove rear panel, [spare tire](#) cover, passenger side battery cover.

2) Pull negative battery cable from 12V acc battery using 10mm wrench



3) Wearing HV lineman gloves, remove safety plug from HV battery pack by pulling up on the handle of the plug until it snaps up, then swing counter-clockwise to pull plug out. Put in safe place.



4) Break wheel lugs loose using 21mm socket and a [breaker bar](#). Or an impact wrench if you have one. By the way, Target(r) flip flops are the footwear of choice for working on vehicles.

5) Raise vehicle and place on jackstands.

6) Remove lugs from wheels, put wheels under car behind jackstands. THIS MAY SAVE YOUR LIFE.

7) Remove screws and bolts from front engine covers. Note the threads, the rough threaded ones are in the front and the machine threaded ones are toward the back. 11 bolts total, 10mm.



8) Remove front air dam, 8 bolts, 10mm.

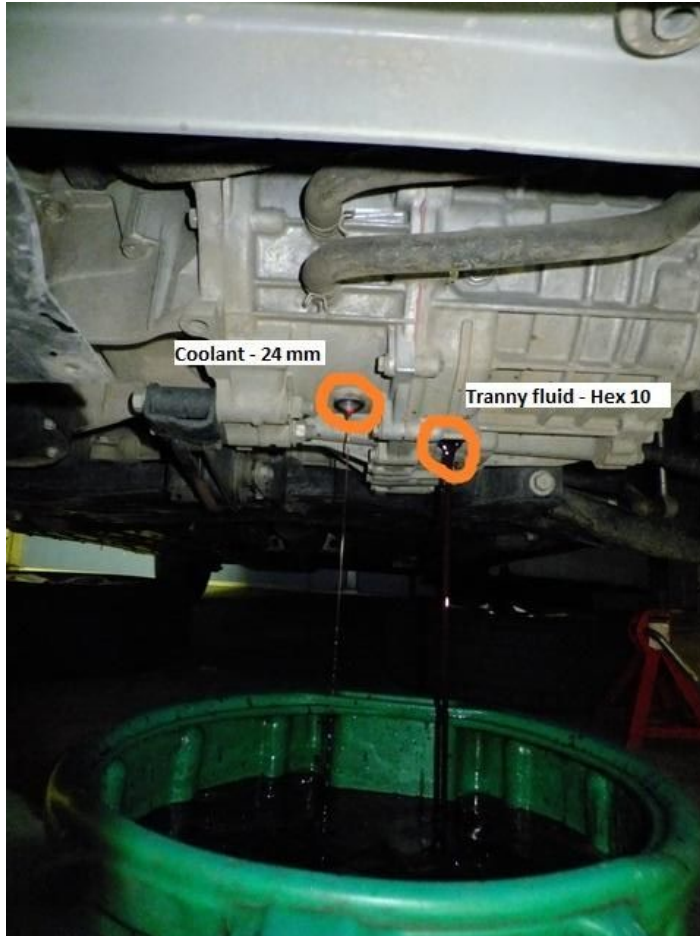
9) Remove two quarter inch plastic rivets and plastic screw (10mm) from engine cover inside the driver side wheelwell.



10) Remove the 1 plastic rivet connecting the driver's side engine cover to the passenger side engine cover. At this point the engine cover can be removed and set to the side.

11) Drain coolant from transmission by removing the 24 mm plug from the bottom of the transmission. Remove the cap from the [coolant reservoir](#) to speed up draining.

12) Drain the transmission fluid by removing the Size 10 hex plug



13) While the transmission drains, lift the hood and remove the two leftmost plastic rivets. They will probably break off. Don't worry [Autozone](#) stocks these in the HELP! section



14) Disconnect washer hose from the y-splitter under the hood lining.

15) Find a helper and remove the (4) 12mm bolts holding the hood on. Remove hood and set aside.

16) On to getting access to the inverter... Pop the cover off the driver's side [windshield wiper](#) with a small flatblade screwdriver, and unbolt the 14mm nut holding it down. Grab the arm and yank up and down to break it loose and remove the wiper. Put the nut back on the motor for safekeeping.



17) Remove the (2) 14mm nuts off the pass side wiper. Remove wiper, set aside, put nuts back on motor for safekeeping.

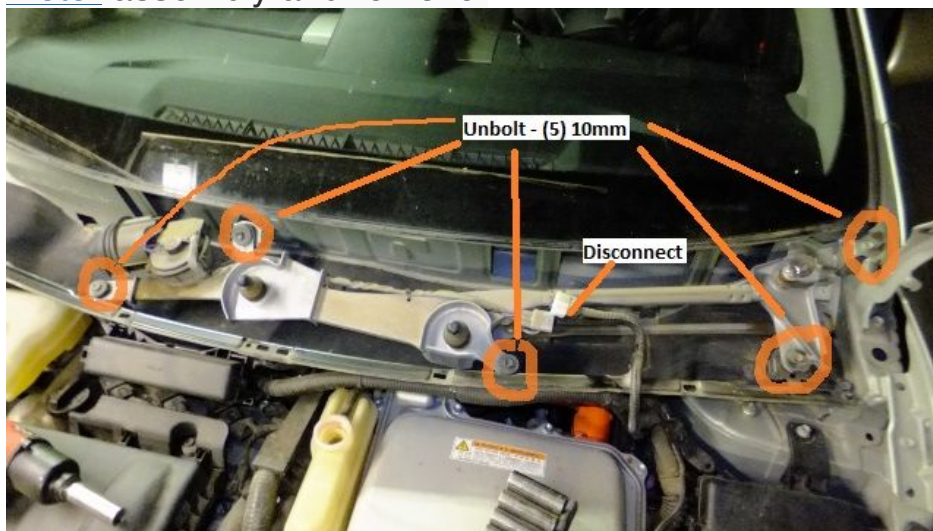


18) Pop a plastic rivet on the driver's side and the passenger's side of the upper cowl. More than likely these will also break and will need to be replaced. It should pull out with a few snaps there and there.

Pulling out the cowl



19) Unbolt the 5 10mm bolts holding down the [wiper motor](#) assembly and remove.



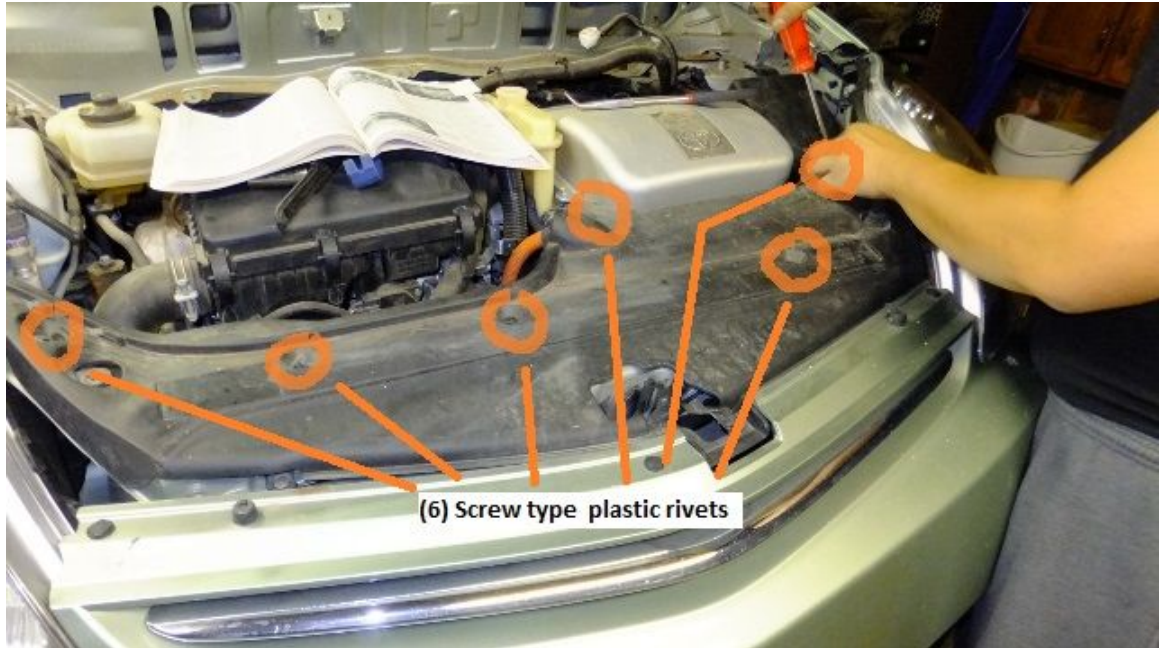
20) Remove the (2) 10mm bolts holding the relay box to the lower cowl, unfasten the clips holding the cable ties down to the relay box from the back using [needle nose pliers](#). Then, unbolt the (7) 10mm bolts holding down the lower cowl and remove.

Removing the cable ties from the backside

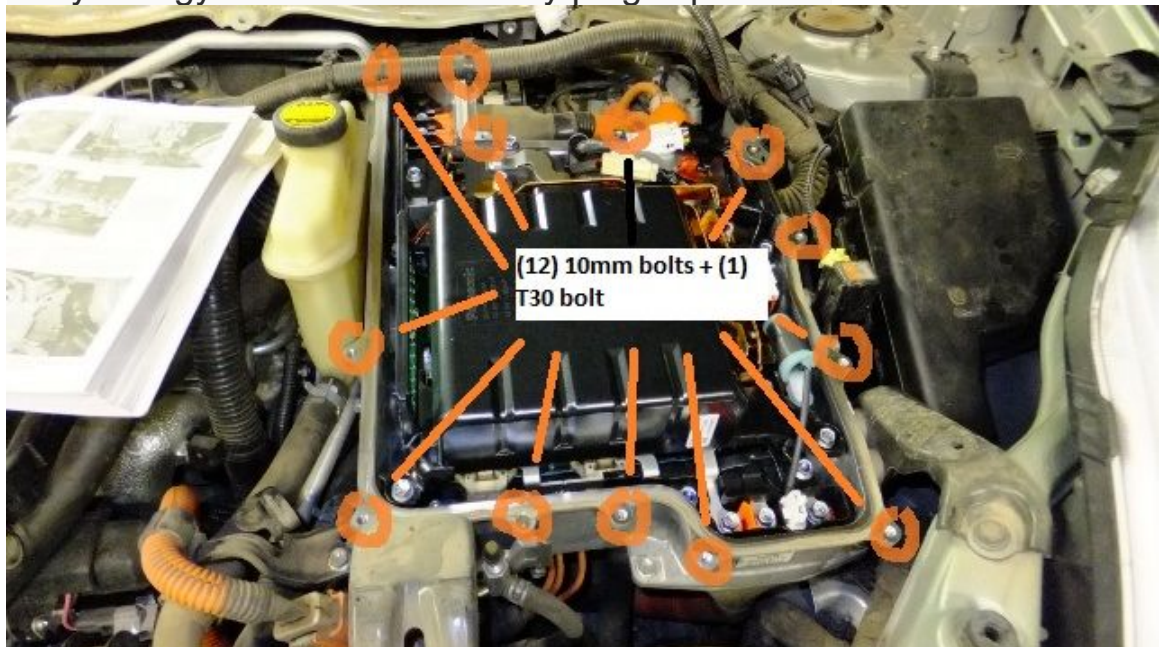


Lower cowl out... we now have access to the backside of the inverter.

21) Let's now get access to the front of the inverter by removing the radiator cover. The thing is cheaply held in with (6) screw type plastic rivets. If you are careful you can get these out without breaking them. To do this, pull up slightly on the cover itself while you unscrew and it should pop out. Remove radiator cover and set aside with the other pile of crap you have going on.



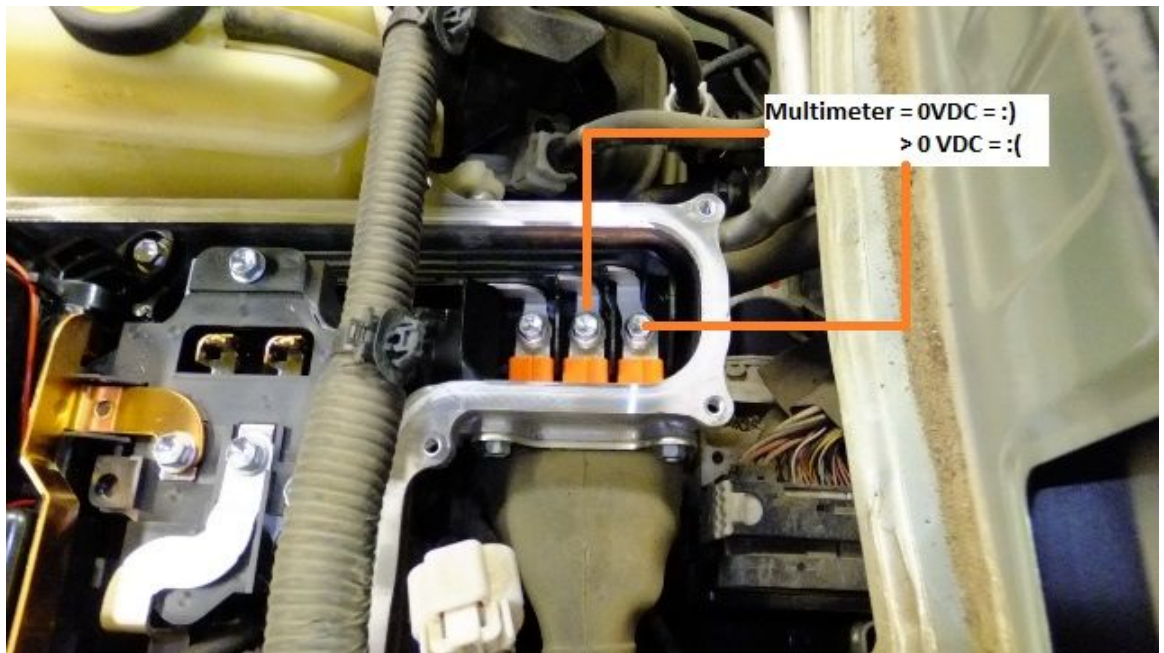
22) Next, remove the inverter cover. There are (12) 10mm bolts around the edges and (1) Torx T-30 bolt. An air ratchet really helps get this done quickly. Pop the cover off and set to the side. After you pop the cover off... **DON'T TOUCH ANYTHING INSIDE THE INVERTER WITHOUT TESTING FOR VOLTAGE FIRST.** The inverter may still carry energy even after the safety plug is pulled!!!!



23) Now, let's test to see if the inverter still has potential to stop your heart. First, pull off the [circuit breaker](#) connector on the right side of the inverter by using a hook or small screwdriver to slide the sleeve of the connector up, then pop it off.



24) Then put a volt meter (in DC) across the 2 points shown in each of the pictures and you should see 0 VDC across each.



25) Disconnect the three coolant hoses from the inverter



26) Remove the two electrical connectors and detach frame cables



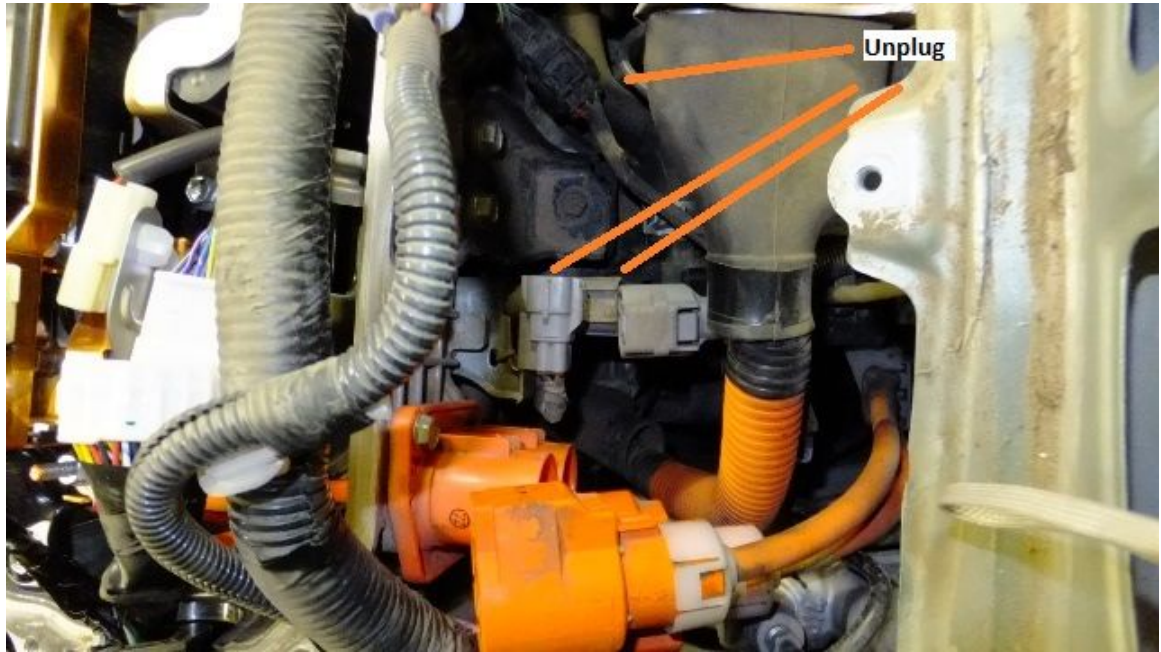
27) Disconnect the AC wiring connector by first pulling up the green tab. Then press down on the button in the green tab and pull off. Unbolt the bracket holding the [wiring harness](#) while you are there.



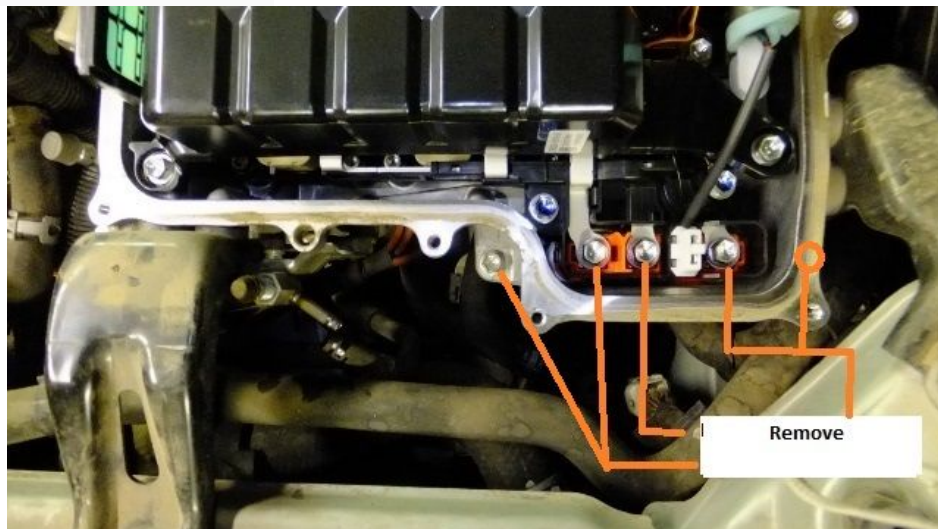
28) Disconnect the three wiring harnesses inside the inverter.



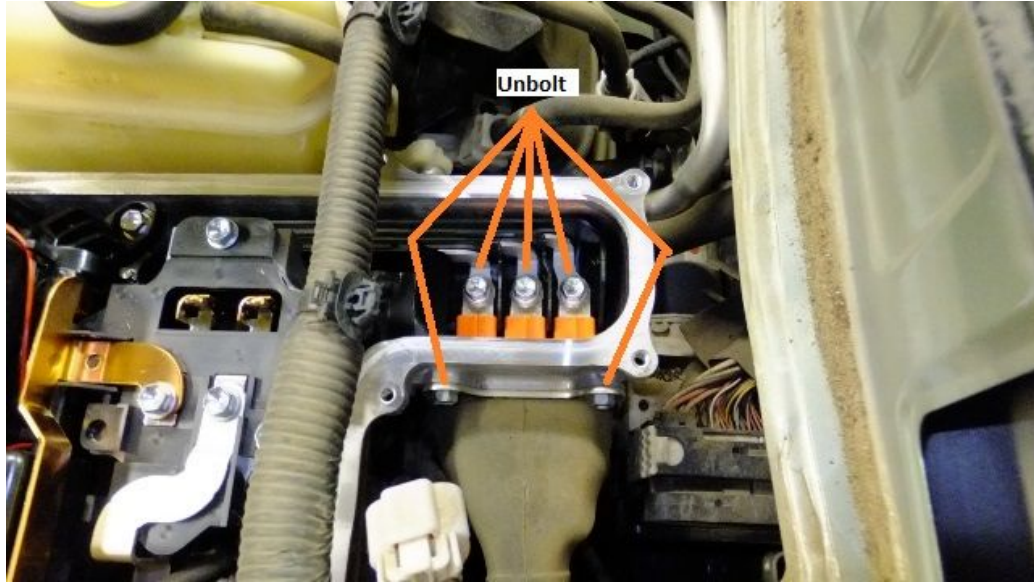
29) Disconnect the three wiring harnesses on the backside of the inverter



30) Unbolt the front cables going out of the inverter to MG2. (3) 10mm inside the inverter, (2) 10mm outside. Pull down the cable to unsocket it.



31) Unbolt the rear cables going out of the inverter to MG1. As like the front one, (3) 10mm inside, (2) 10mm outside. Pull on cable to unsocket it.



32) Unbolt the (3) 12mm bolts holding down the inverter. Remove inverter and set aside **CAREFULLY**. I don't even want to know how much this thing is to replace. Also, it's seemingly heavy. You may be ok trying to solo it, you may not... i'd stay on the safe side and get help.



Inverter out of the car



33) So the manual calls for removing the airbox at this stage. This only applies if you plan on using a crane or engine hoist to suspend the engine while you remove the transmission. If you are ghetto and use a floor jack (like me) you can skip this step. However, if you do, it is very easy. Unscrew the breather clamp and [throttle body](#) clamp. Remove the two 10mm bolts in the upper right hand corner of the airbox. Unclip the TPS wire from the box and you can lift it out.

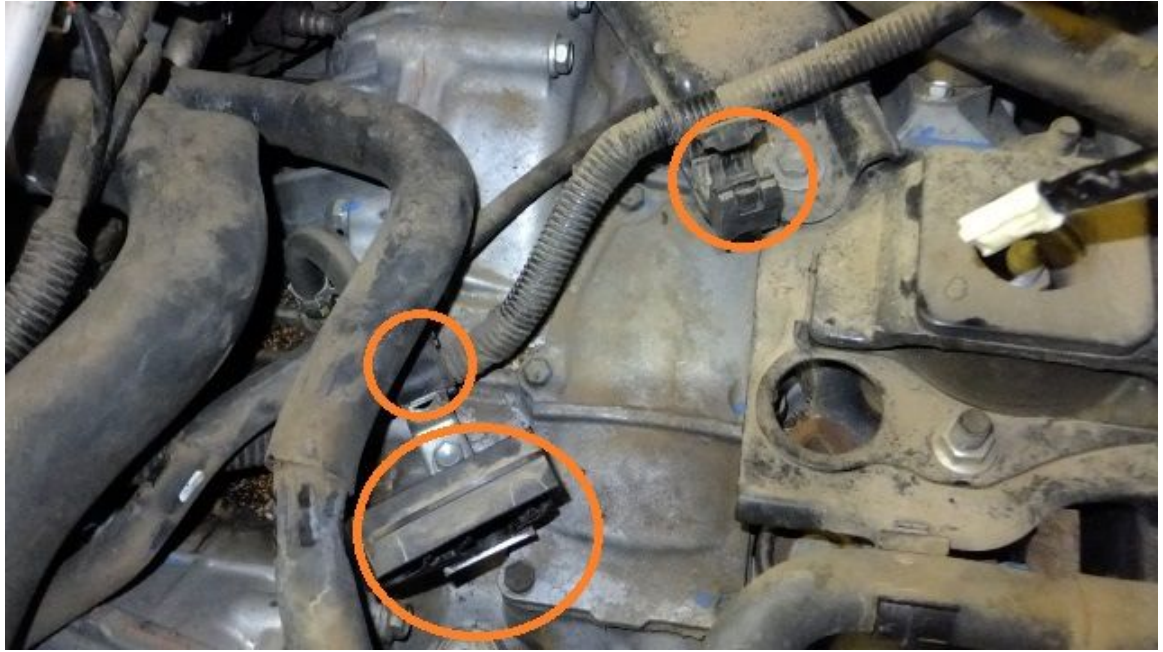
34) Next, unhooking the bajillion assorted wiring connectors and hoses. There is literally so much that I was not able to document it all without getting a little angry, so i'll put in what I did document, but there is more. Unhook, disconnect everything circled in orange. Note that the wiring is attached to brackets, you can simply just disconnect the clip off the bracket instead of unbolting the bracket itself. These clips you pull the tab outward and then pull off unlike connectors where you press in on the

tab then pull off. The one that is the hardest to get to (no picture) is the connector on the very back of the transmission, its also easy to miss because it isn't in plain site.

Front driver's side



Toward the driver's side mount



Looking up under the car toward the engine



Above next to the engine



Under the [transmission mount](#)



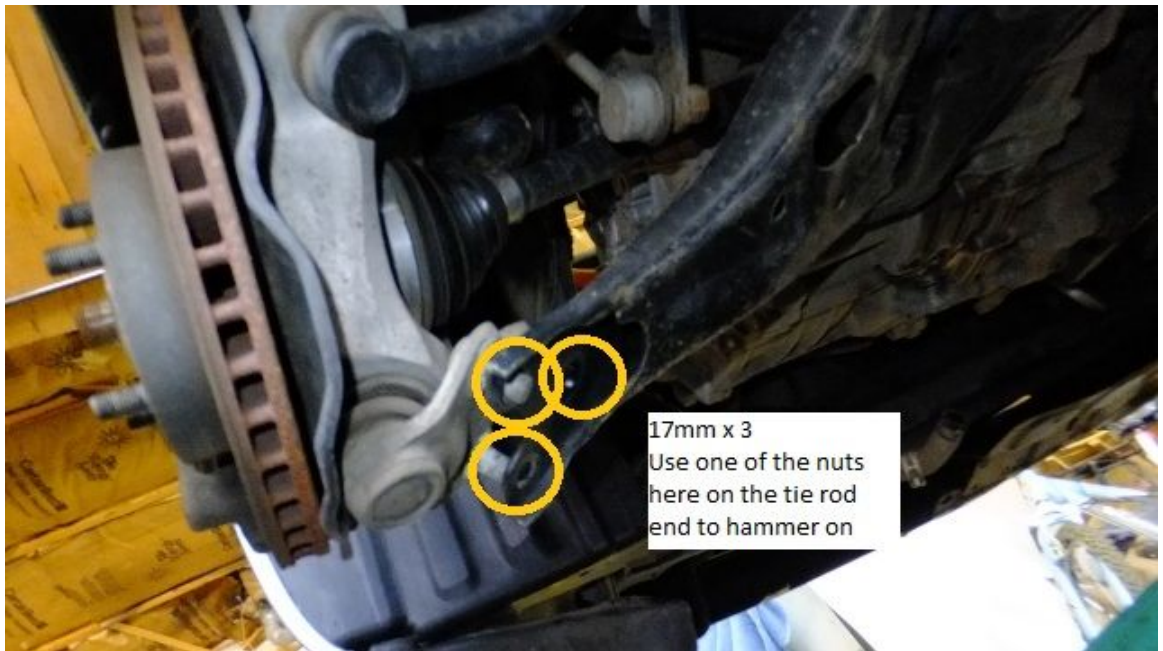
35) Now, let's remove the axles. Starting with the driver's side, use a centerpunch to unstage the large 12pt [axle nut](#) (29 mm). Use an impact (if available) to knock the axle nut off. If an impact wrench is not available, you can use a pry bar to hold the lugs while you strong arm the axle nut. Leave the nut slightly on so you can hammer on it in after the next step.



36) remove the cotter pin out of the [tie rod end](#) and unbolt the 17mm castle nut. You probably won't be able to break it free from the knuckle just yet. Don't worry, we'll get to that in a second. Look underneath the ball joint and you will see two 17mm nuts and one 17mm bolt, unbolt those. You can use one of these regular nuts to hammer on the tie rod end to break it free safely. Take one of the 17mm nuts, and thread it down on the tie rod end a bit and smack it with a hammer, it should break free pretty easily. Pull the hub assembly off the lower control arm. Use a hammer to gently pound on the [axle nut](#) to pop the axle out of the hub.



Disconnect the [lower control arm](#)



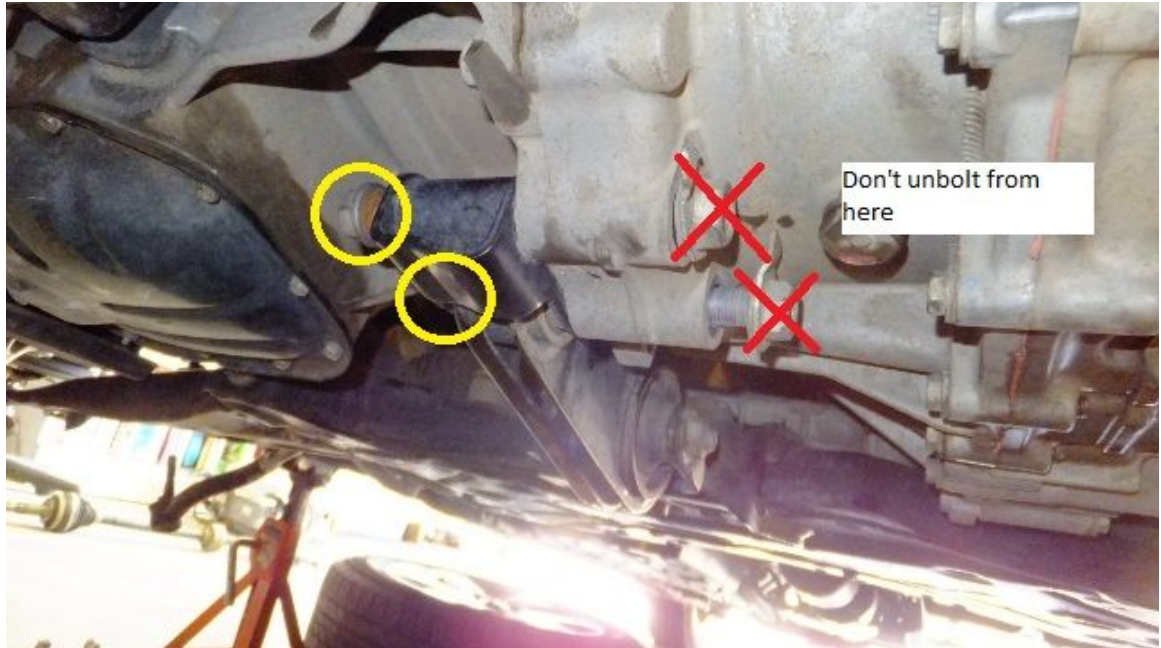
Break the [tie rod](#) free from the hub assembly



37) Pry the axle out from the transmission. You can use a prybar to push right behind the [CV boot](#) on a little cutout of the axle, but NOT on the dustcover of the [CV joint](#), it is relatively thin and you WILL bend it if you put any substantial force on it. These were relatively stubborn to get out and I needed to basically smack the pry bar about 10 times (hard) to pop the axle off.

38) Repeat process for passenger side.

39) Let's pull off the engine torsion mount under the engine. So crawl underneath the car and between the engine and transmission you will see a large bracket coming from the crossmember to where the engine bolts up to the transmission, we need to pull these bolts. Using a 19mm socket, unbolt the BOLT ends. You can't unbolt the nut ends because they have fixtures. Once both bolts are unbolted you slide them out.



40) Now lets go ahead and remove the crossmember. You can get a transmission out leaving this in, but good luck getting a transmission in. It takes about 20 minutes and is well worth the effort. Unbolt the (4) 17mm bolts holding the [rack and pinion](#) to the [crossmember](#).

41) Unbolt the sway bar endlinks. I chose to unbolt them where it connects to the strut.

42) Unbolt the (4) 19mm bolts holding the crossmember onto the body. Two are toward the back on each side (circled), two are right above the control arm (not shown). This thing is heavy, so I would put a tranny jack underneath to support it while you are unbolting this thing. Get the thing out of the way, and let the rack and pinion dangle there.



[Crossmember](#) out

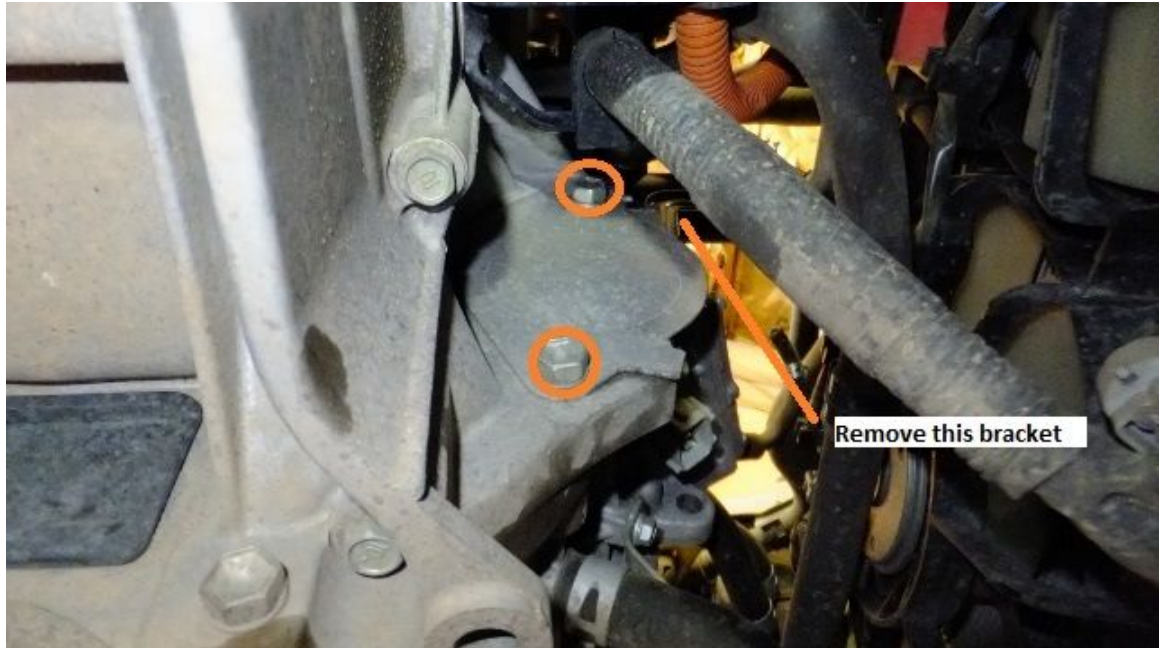


43) Continuing onto unfastening the transmission, unbolt the (4) 14mm bolts holding the transmission to the engine. Ignore the fact that the [crossmember](#) torsion support is still shown. I

took the transmission out with the cross-member in. However, i **strongly** recommend taking the cross-member out first as it **REALLY** sucks to take out and is virtually impossible to put in without a mini-miracle.

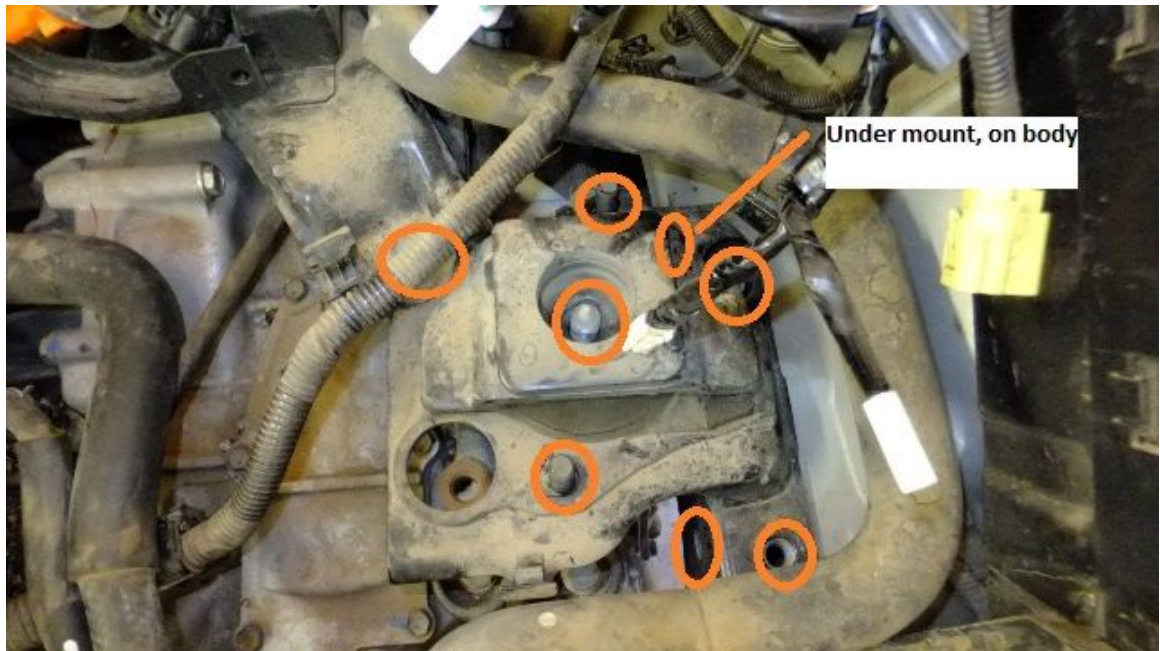


44) Unbolt the starter cover bolts... for a starter that isn't there. (2) 14mm. Also, there is a bracket on the front of the engine that holds up some wiring that is attached with a 10mm bolt, remove this as it has a plastic piece that overlaps the transmission.



45) Support the engine with either an engine hoist or a floor jack. If supporting below with a floor jack, make sure you support it on the edge of the oil pan and not the middle. You only want to put on as much pressure as required to barely move the engine. Also put a transmission jack under the transmission and take the weight off. If you do not have a transmission jack, this job will be **very** hard to do without one. You can use a floor jack, but you will not be able to solo this job.

43) Go back topside and remove the [transmission mount](#) damper on the top side of the transmission near the driver's side. Two bolts diagonal from the spike at 2 o'clock and 7 o'clock (looking toward the rear), one bolt in the back left corner, 2 bolts topside on the right hand side into the body, and 2 bolts horizontally into the body between the transmission and the body.



Also remove the nut off the transmission "spike". (2) 12mm + (1) 17 mm. Once you pull off the damper, go ahead and then remove the [transmission mount](#) "spike" itself. (3) 14mm.

44) Unbolt the two top 14mm bolts holding the transmission onto the engine. Using pry bars, pry the transmission from the engine. Best way to do this is get a few millimeters on the top pushed off, then go under and get a few millimeters pushed off. Alternate until the transmission clears the damper. You may need to lower the engine and transmission simultaneously to clear the transmission from the body. Don't go too far though, there is a lot of crap that is attached to the engine still. I only needed to lower it about 2 inches.

45) Lower the transmission, and its out!

Transmission out!

Installation is reverse of removal. The only procedure you would

need is how to fill the transmission and inverter coolant. The transmission fill hole is on the front of (car front) the transmission and can be removed with a 24 mm socket. Mine took a little over 4 qts of ATF WS. To fill the inverter, you fill it up through the reservoir, massage the coolant hose coming from it to get some bubbles out. Top off, then take a [vacuum hose](#) and attach it to the bleeder nipple, and route the vacuum hose back to the top of the reservoir. Take a 10mm and crack the bleeder open. Keep topping off and massaging hoses above and below to get the air bubbles out. Once the car is operational, drive it around and top off, that should be the last of the bubbles.

Additional notes: I would throw in some new axle seals and a rear main seal while this thing is off. If you do choose to replace the rear main seal the torque specs for the flywheel are 36 ft-lbs+90 degrees (though good luck getting the last 90 degrees in), and the outer plate (sort of like a pressure plate) is 15 ft-lbs. Beware though, there is no alignment tool for that clutch that I was able to find (at least in my stash of ~15 assorted clutch alignment tools), I used a deep socket (size forgotten) to line it up the best I could while I tightened the bolts. Luckily, the transmission mounted with no problems. Also, I would throw in a new inverter coolant pump for peace of mind.