Toyota GR86 / Subaru BRZ Brake Cooling Kit

Installation Manual

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Document Revisions

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1.1. Overview: Detailed instructions on installing the brake cooling kits for the Toyota GR86, and 2022+ Subaru BRZ.

1.2. Difficulty: Moderate

1.3. Time Required: 2 - 3 Hours

1.4. Tools Needed:

- Drill
- 3/8” drill bit
- 8mm socket
- 10mm socket
- Ratchet
- Phillips Screw driver
- Flat Head Screwdriver or Panel Popper Tool
- 9/16 wrench
- 12mm socket
- 14mm socket
- 17mm socket
- 2.5mm allen wrench
- 4mm hex socket
- 5mm hex socket
- Side cuts
- Jack and Jack stands

1.5. Assembly Components

1.5.1. Backing Plate Kit:

- (2) Backing Plates with riveted carbon ducts
- Hardware Bag
  - (6) M8x1.25 Flanged Button Head Cap Screw (BHCS), Stainless
  - (6) Hard anodized aluminum spacers
  - (2) Foam tape

1.5.2. Duct Kit:

- (2) Inside Fender Pancake Duct
- (2) Pancake Duct Bracket
- (2) 3D-Printed Carbon x Nylon Inlet Duct
- (2) 2.5” High Temp Silicone Hose cut to length
- (2) 3.0” Neoprene Hose cut to length
- (1) Hardware Bag
  - (4) 3.0” Hose Clamps
  - (4) 2.5” Hose Clamps
  - (6) 21.5” Cable Ties
  - (1) Steering rack limiter kit
    - (6) Nylon limiting spacers
    - (2) Hose Clamps
  - (1) Bolt/Washer/Nut Hardware Bag
    - (1) M6x1.0 rivet nut installer tool
    - (2) M6x1.0 Swage Style rivet nuts for sheet metal
    - (3) M5x0.8 Serrated Flange Nut, Stainless
    - (3) M5 Washer, Stainless
    - (2) M6x1.0x16mm Long BHCS, Stainless
    - (2) M6x18mm O.D. Washer, Stainless

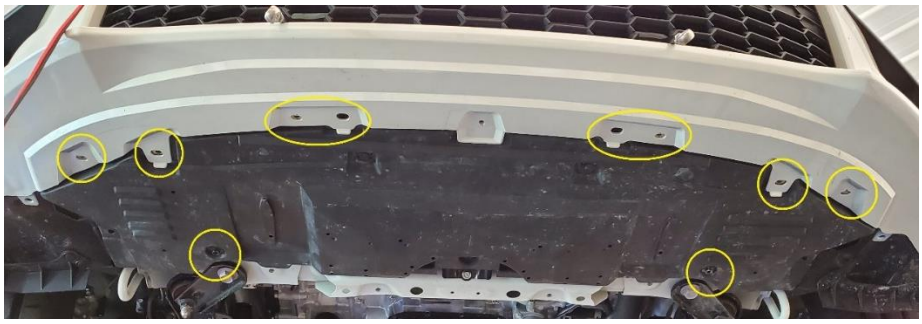
2. Toyota GR86 / 2022 Subaru BRZ Brake Cooling Kit Installation

2.1. We are not responsible for damage to you or your vehicle by following this manual and installing Verus Engineering products.

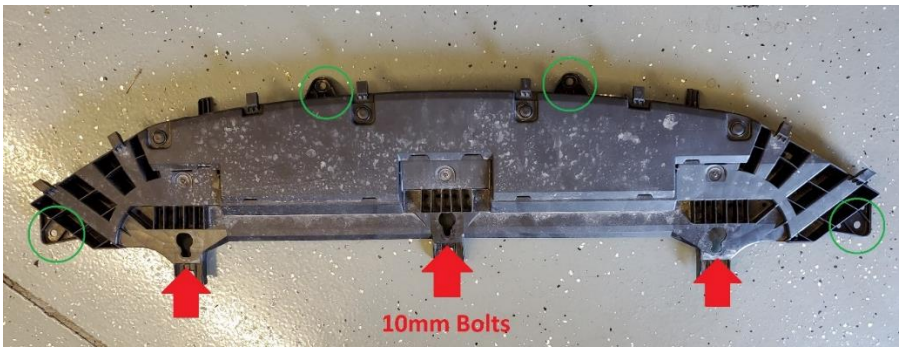
2.2. Begin with disconnecting the battery, negative first, if this makes you feel more comfortable working on the car. It is always a good idea to disconnect the battery anytime when working on the car.

2.3. Jack the car up, and support it safely.

2.4. Remove the front bumper splash guard.

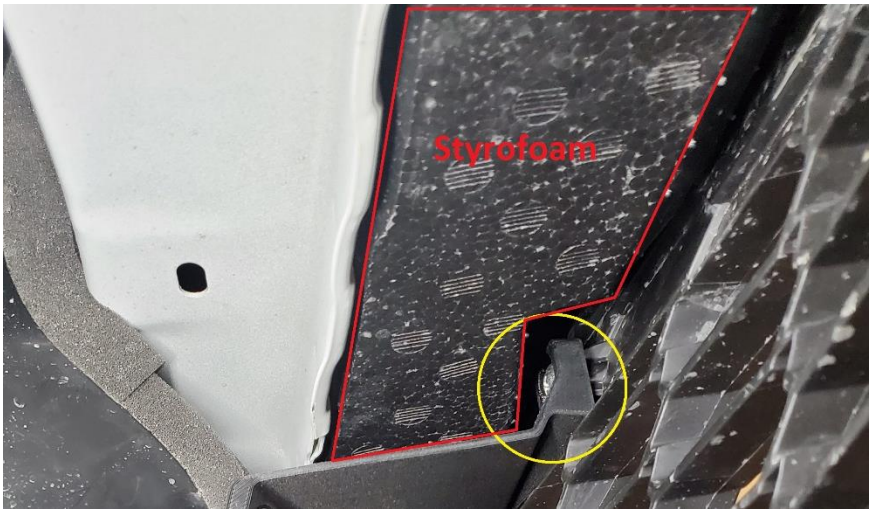


2.5. Remove the lower radiator tray that sits directly above it.



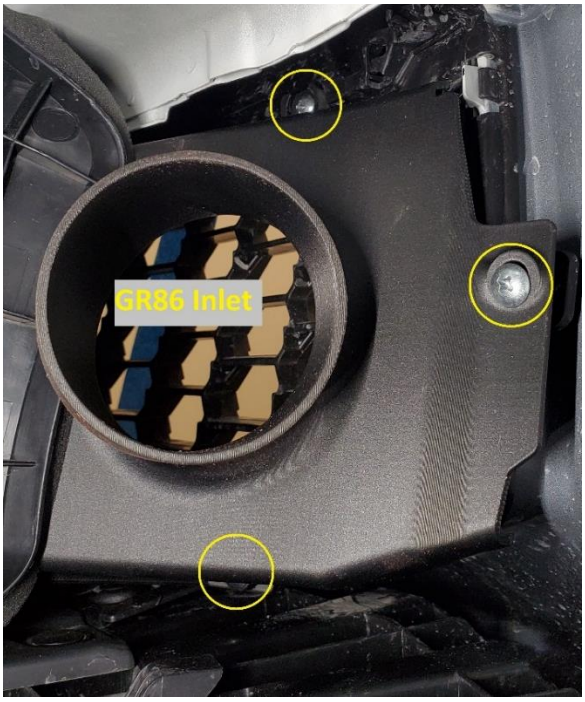
2.6. At this point you should be looking at the back side of the bumper grill. Replace the OEM air guides with the supplied inlet ducts. The BRZ and GR86 OEM air guides are slightly different in the way they look, but are fastened in the same manner. Note: The upper screw may be partially blocked by the Styrofoam, and should simply be pushed up and out of the way.

BRZ Air Guide Pictured Above



GR86 Air Guide Styrofoam Pictured Above

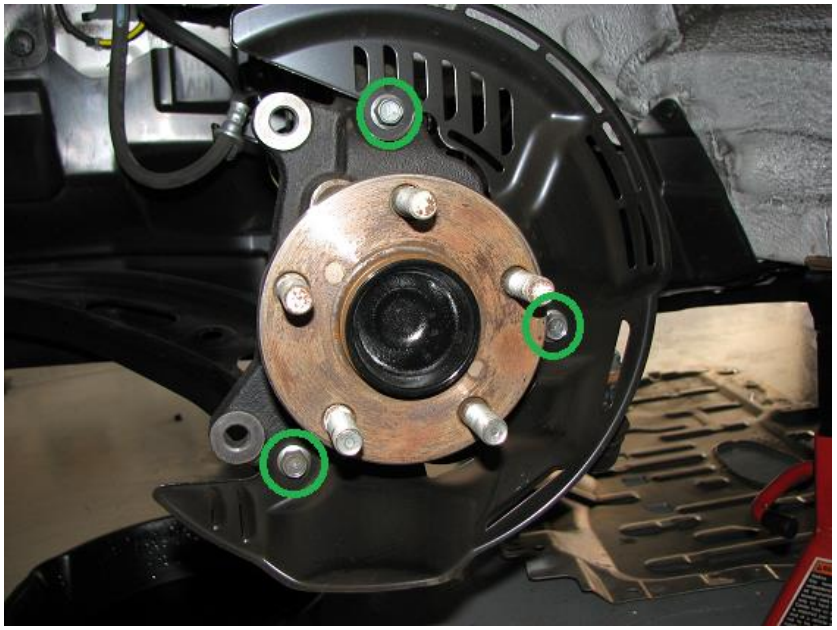
2.6.1. GR86 owners will utilize all of the screws from the OEM air guides, and ***BRZ*** owners will only reinstall screws into the ***TOP, and BOTTOM*** locations. The middle hole will be used only as a locating dowel. Follow the photos below for reference.



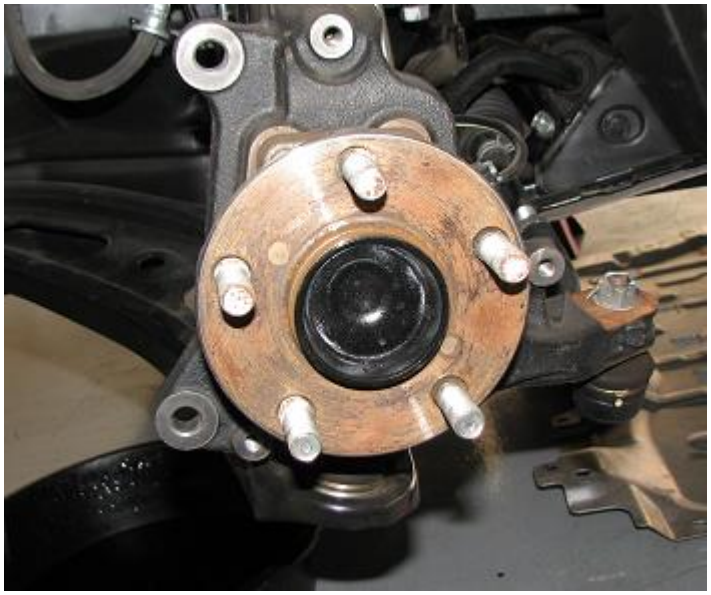
2.7. Remove the front wheels.

2.8. Then remove the brake caliper and bracket by unbolting the 17mm bolts. Below is what it will look like with both bracket and caliper removed.

2.9. Remove the rotor. Below is a photo of the rotor removed.

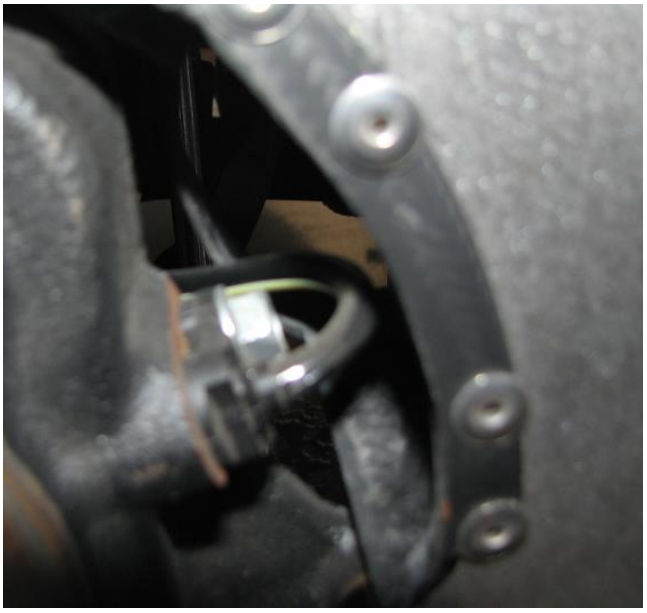


2.10. Remove the OEM backing plate by unbolting the (3) 12mm bolts circled in green above. Below is a photo with the backing plate removed.

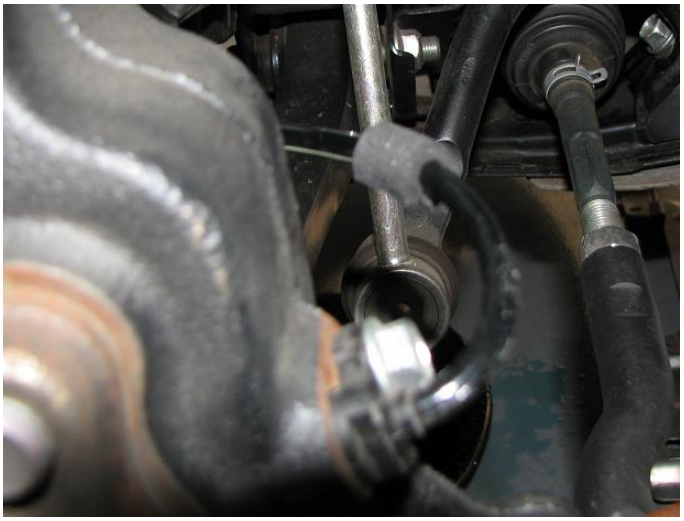


2.11. Loosely install the new Verus Engineering backing plate on the knuckle. Place the hard anodized spacers behind the backing plate. The wheel speed sensor should remain installed and will be placed between the knuckle and the carbon duct. Use the supplied 20mm long flanged M8 BHCS.

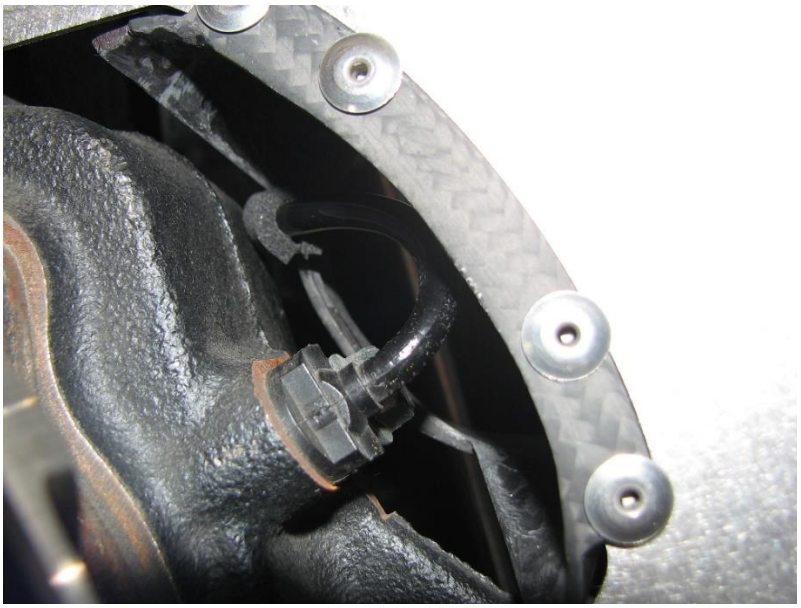
2.12. As you can see below, the wheel speed sensor wire is slightly rubbing on the carbon duct and the knuckle. Mark this location and remove the backing plate.



2.13. Using your mark as a guideline and one of the two strips of foam, wrap the wire to protect it against damage.



2.14. Re-install the backing plate with the supplied hardware and position the wire so that it is safely and nicely squeezed between the knuckle and the duct. The goal here is to have no movement and a snug fit to ensure the wire does not get abraded over time.



2.15. Fully tighten the (3) M8 flanged BHCS.

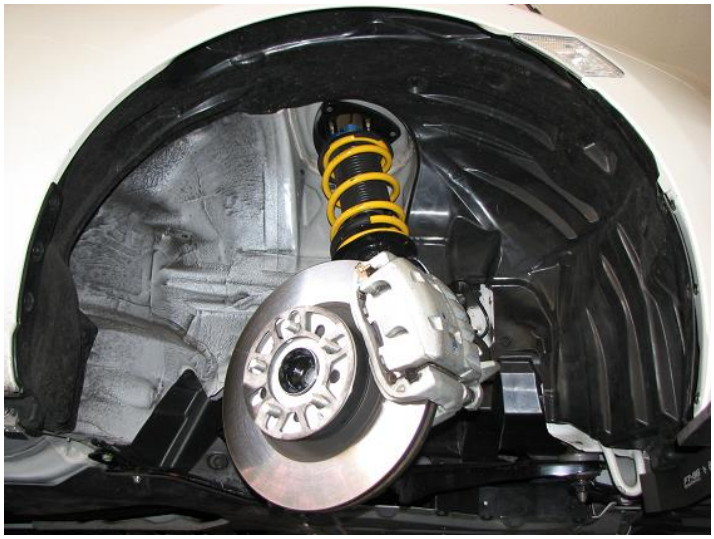
2.16. Re-install your rotor and tighten it down fully with (2) of the lug nuts. Spin the rotor and ensure no contact between the rotor and the backing plate takes place.

2.17. Repeat this test at full lock both ways. If by chance the backing plate does hit the rotor, make note of where on the backing plate and gently bend the backing plate away from the rotor. The backing plate is stainless steel so bending it will not be detrimental to its life. In some severe cases it may be necessary to cut the backing plate, (IE: AP Sprint with Whiteline Roll Center Adjusters) but most installs require slight tweaking and nothing else.

2.18. Reinstall the brake caliper.

2.19. ****At this point, the backing plate install is concluded. Reinstall wheels, torque to factory spec, and enjoy your freshly installed backing plates which except 2.5" brake duct hose. Full kit installation continues below!***

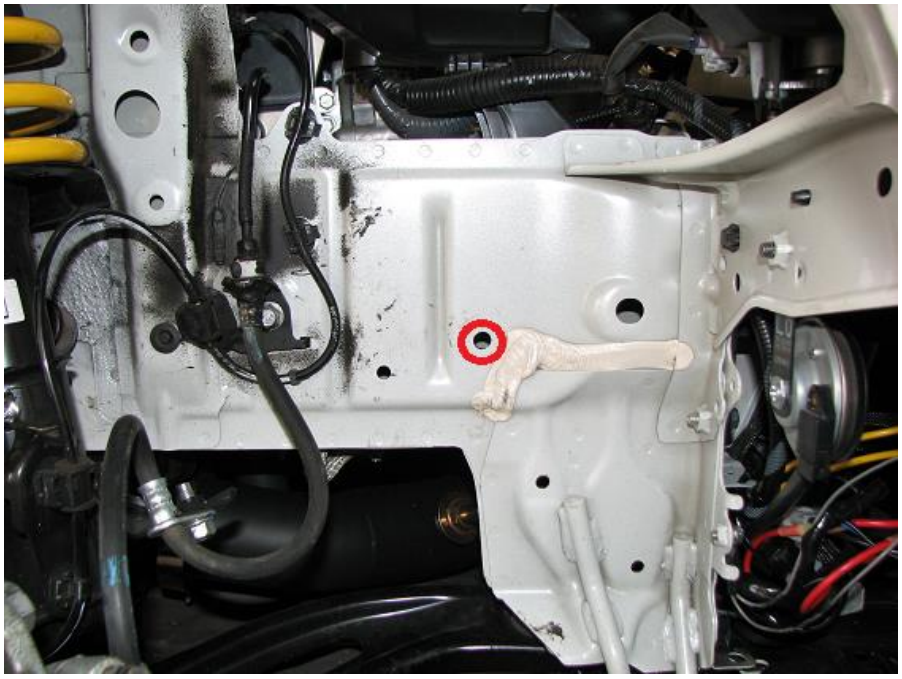
2.20. Starting from where we left off, we have the view below. We need to remove the fender liner from the shock area to under the bumper.



2.21. Due to the splitter and front wheel deflectors, we opted to remove it from the rear and fold it forward. The fender liner is removed with various styles of plastic rivets and push pins, using your best judgement and the plastic removal tool, remove these.

2.22. Remove the engine bay plastic piece by removing a few more plastic rivets from the inner fender and from the bottom of the car. This plastic shroud piece is circled below.

2.23. Looking at the inner fender, you should see a view similar to the below picture. Drill the highlighted hole to 3/8".



2.24. We recommend using a shop vac and trying to suck out all metal fillings before they drop into the frame. We also recommend painting this hole or using sealant when installing the rivet nut to reduce the chances of rust.

2.25. Using the 9/16 wrench and 10mm on a ratchet, install a rivet nut into the drilled, cleaned, and painted hole. Right to tighten, left to loosen. Use the wrench to steady the nut while you put forward pressure on the 10mm from the ratchet as you tighten the rivet nut.

2.26. You will feel it get significantly harder to tighten, this is a sign the rivet nut is fully installed. Below is an example of a fully installed rivet nut.

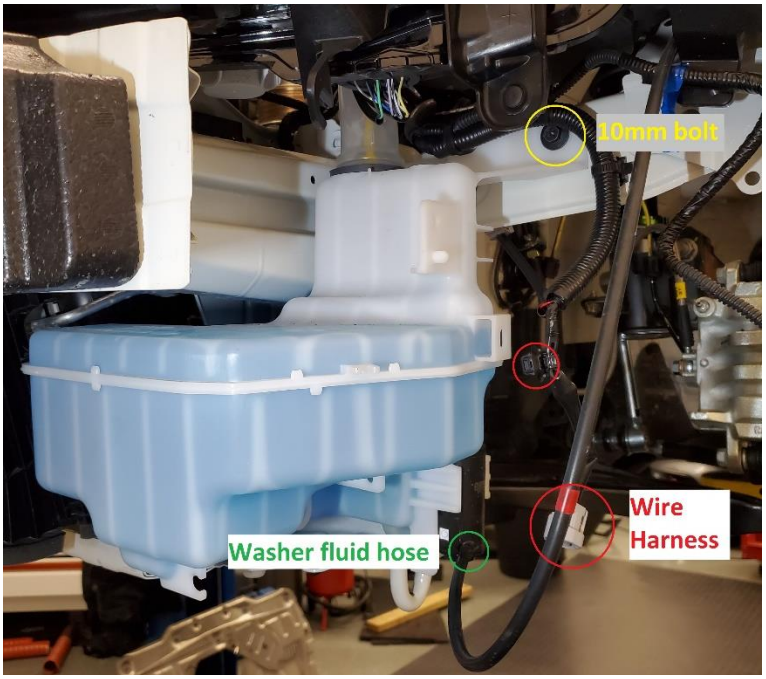
2.27. Moving back to the engine bay plastic shroud piece that we removed, we need to cut a slight relief hole in it to allow the fender liner duct to sit as flush with the fender as possible. Below is where we started with the cut, we used a razor blade and steady hands to cut this out. It's better to start small and then work your way larger, the below picture is a good starting point. *Note: This is the passenger side!!! Driver's side is mirrored to this.*

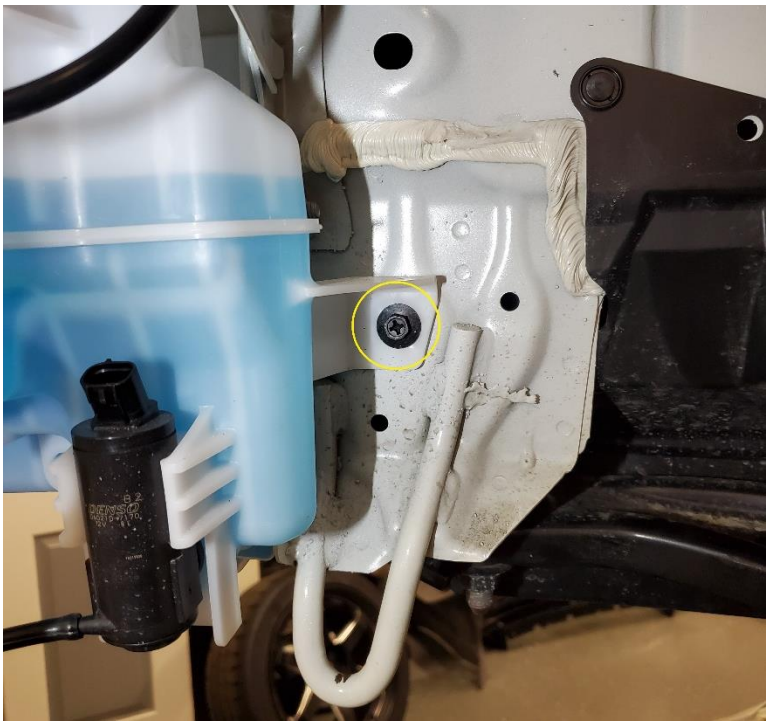
2.28. Install the fender duct bracket and the fender duct as shown below by using a 16mm BHCS, 18mm OD M6 washer, and M5x.8 serrated flange nut. Torque to 6 ft-lbs. Note: The inlet (right side of below picture) should nearly be touching the front pinch weld and installed as

low, and forward as it can fit. This is an example of a typical fitment however; you may find that your wheel and tire setup might necessitate a slightly different angle.

2.28.1. For the **Passenger side** you will also need to either bend the tab shown below or cut it off. We chose to simply bend it forward. If you cut it off be sure to secure the wire harness that is secured to that area.

2.28.2. For the **Driver side**, you will need to remove the washer fluid reservoir. Remove the 10mm head bolts, disconnect the electrical connector and hose, then remove the washer fluid reservoir.





2.29. With the duct installed, we can better judge how the relief cut needs to change. Below is where we finalized the cutting of the duct at.

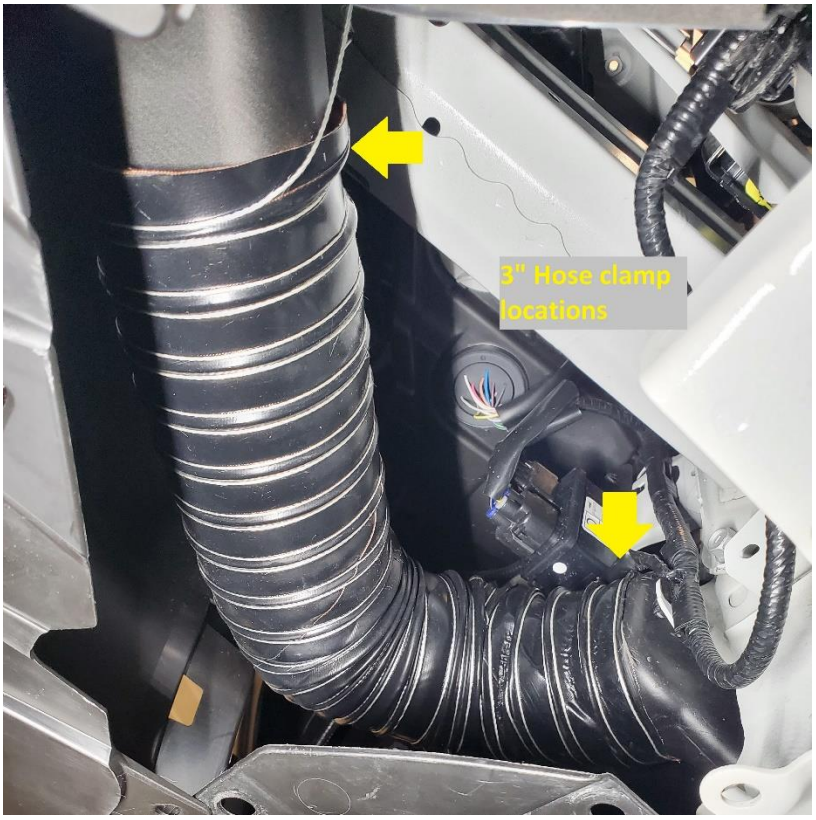
2.30. Before installing the hoses, it is not a bad idea to tape the edges of the hoses to ensure they live a longer life. This ensure the hose does not come unraveled or that the wire inside pokes anything. This is not a necessity, more a nice way to finish off the cuts we made to make the kits. We use gaff tape but other tape can be used as well. *** This is not necessary! ***

2.30.1. Cut slits vertically to make 5-6 segments.

2.30.2. Fold over each slit pressing firmly against the hose.

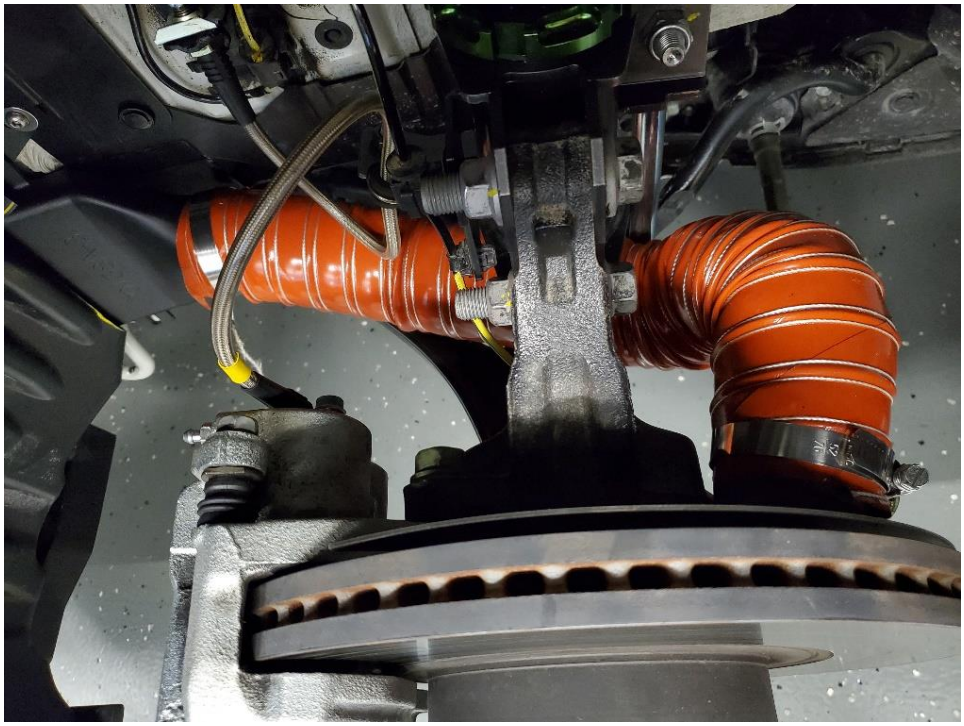
2.30.3. A fully finished duct is pictured below. The tape may not stick well to the hose due to the silicone/neoprene; however, once clamped it will hold well.

2.31. Grab two of the four larger hose clamps and one of the 3” neoprene (Black) brake duct hoses, and use them to attach the hose to both the inlet, and fender duct. Ensure the neoprene is well worked as we have found these to be quite stiff until you bend and compress them. So compress them, bend them, and expand them till it has a bit more play. Place this hose between the fender duct and the inlet duct as shown below.



2.32. *If you are going to run mesh to keep debris out of the kit, we recommend running it here. Either between the inlet duct and the hose or the hose and the fender duct. You'll want to put the mesh over top of the plastic duct, then tighten the hose on top of the mesh with the hose clamp.

2.33. Moving rearward, grab two of the four smaller hose clamps and the 2.5" (Orange) silicone high temp brake duct. One end goes on the fender duct, the other on the carbon backing plate.



2.34. Reinstall the fender liner with all the OEM plastic rivets, push pins, etc. The 3" neoprene hose will slightly push the liner rearward, this is okay and the wheel should not have issues clearing this.

2.35. When reinstalling, you will notice that the fender duct and the liner don't mesh the best. With a razor blade, cut out reliefs for the bracket and the vent to slide through. Keep the cut as small as possible.

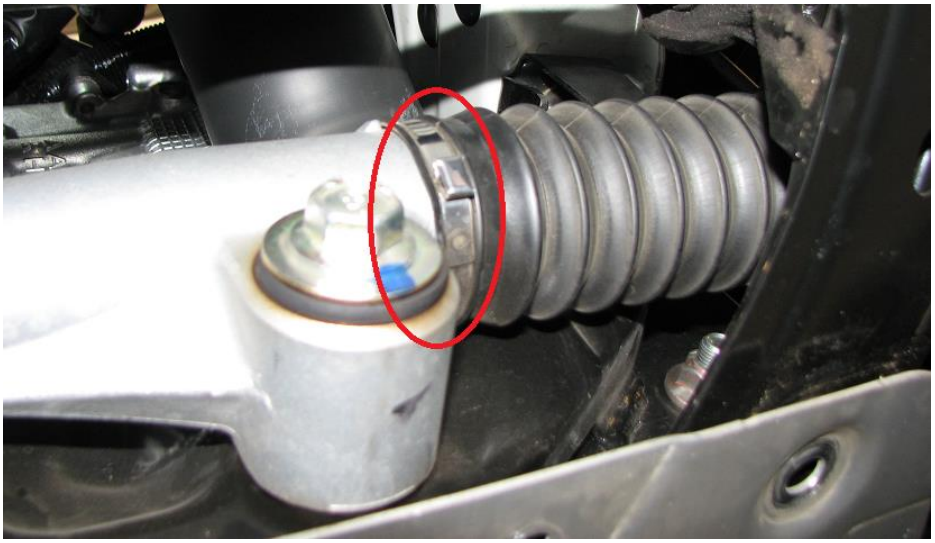
2.36. With the wheel still off, turn the wheels full left and full right to ensure the ducts avoid moving components and that the hose is properly routed.

2.37. Place the wheels back on the hub and tighten the wheels down. We do not recommend testing fender duct to wheel clearance until the car is ***on the ground*** as suspension geometry changes when the wheels are on the ground and increases clearance.

2.38. When on the ground, rotate wheels to full lock and check tire to duct clearance with a flash light, mirror, and crawling around underneath your car. If clearance is an issue, we have two solutions for this. One would be to remove the fender duct between events. Basically, you would use the brake cooling kit when it is needed and remove them for daily use. The other is our steering rack limiter kit, which is included in the kit. Below are install directions on how to install steering rack limiter kit.

2.39. Lift the front of the car up and place it on jack stands. We need to get access to the transmission cover, which is the fiberglass felt piece that covers the transmission. Remove this by removing the 12mm and 10mm bolts shown below as well as a few other 10mm further rearward.

2.40. When you get the black cover off you will see the steering rack. On each side, there is a boot and clamps that hold the boot on. We will be removing the inboard clamp to gain access to the rack. Using side cuts, remove the OEM clamp (circled in red). We will not be re-using this for install, it is not easy to remove.

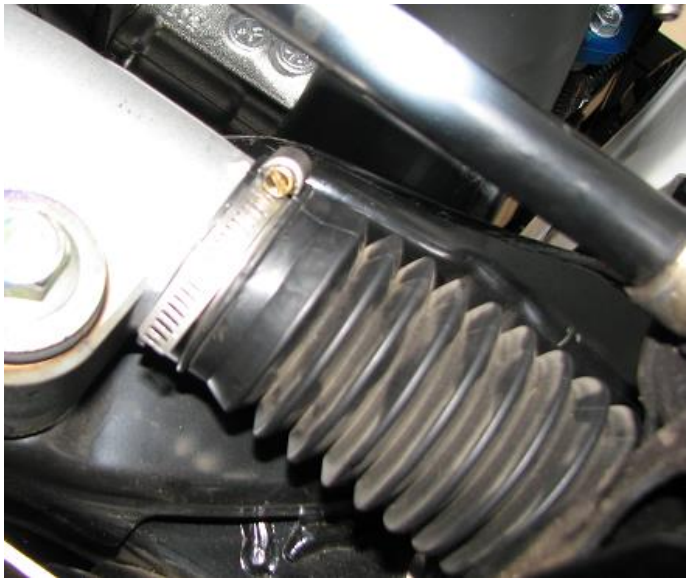


2.41. Once the strap is removed, pull the boot off towards the outside of the car, and slip one or more of the steering rack limits onto the rack. The open end should face forward as shown below.

2.42. Our R&D vehicle had wheels (Titan7 T-S5 17x9 +47) and tires on the car that contact the fender duct at full lock when lowered about 1.5". We found we needed (3) spacers to clear the brake duct. Each wheel/tire combo, suspension droop, setup will require a different number of limiters.

2.43. **Each limiter reduces turning diameter by approximately 1-1.5 fee**t**.**

2.44. Slip the boot back onto the steering rack and clamp it down with the supplied worm drive clamp.



2.45. Reinstall the transmission cover and lower the car back down. Double check duct clearance at full lock, hose clearance, and that the wheels are fully torqued down.

2.46. Enjoy your brake cooling kit! Please email us at sales@verus-engineering.com with any concerns, comments, or feedback.