

# VERUS ENGINEERING

## AOS Kit and Accessories – Subaru VB WRX Install Manual



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### Document Revisions

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## AOS Kit and Accessories for Subaru VB WRX – Install Manual

**1. Introduction**

**1.1. Overview:** Detailed instructions on installing the Verus Engineering AOS kit, as well as the accessories associated with the AOS kit, for the VB Subaru WRX.

**1.2. Difficulty:** Moderate

**1.3. Time Required:** 2-4 hours

**1.4. Tools Needed:**

- 1.4.1.** Ratchet
- 1.4.2.** 10mm Socket
- 1.4.3.** 12mm Socket
- 1.4.4.** 19mm Deep Socket
- 1.4.5.** 27mm Deep Socket
- 1.4.6.** Extension
- 1.4.7.** 4mm Allen Wrench
- 1.4.8.** Flathead Screwdriver
- 1.4.9.** Utility Knife
- 1.4.10.** Phillips Head Screwdriver
- 1.4.11.** Side Cuts / Hose cutter
- 1.4.12.** Needle Nose Pliers
- 1.4.13.** Teflon Sealant
- 1.4.14.** Tape Measure

**1.5. AOS Kit Components**

- 1.5.1.** (1) AOS, Assembled with (4) Desiccant filters and stainless mesh

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- 1.5.2. (1) AOS Bracket
- 1.5.3. (100) Inches 1/2" Rubber Hose
- 1.5.4. (20) Inches 7/8" Rubber Hose
- 1.5.5. Hardware Bag
  - 1.5.5.1. (3) M6x1.0 BHCS x 16mm Long, Stainless
  - 1.5.5.2. (3) M6 x 12mm OD Washer, Stainless
  - 1.5.5.3. (2) M6 Serrated Flange Nut, Stainless
  - 1.5.5.4. (6) Zip Tie
  - 1.5.5.5. (1) 7/8" O.D. Hose Clamp
  - 1.5.5.6. (1) 3/8 NPT to 1/2" Hose Barb

**1.6. Coolant Add On Kit**

- 1.6.1. (1) Coolant Plate
- 1.6.2. (2) Banjo Bolt
- 1.6.3. (4) Banjo Washer
- 1.6.4. (2) 5/16" Banjo
- 1.6.5. (70) Inches of coolant hose
- 1.6.6. (4) M6x1.0 BHCS x 16mm Long, Stainless
- 1.6.7. (2) M6 x 12mm OD Washer, Stainless
- 1.6.8. (4) Hose Clamp, 9-16mm
- 1.6.9. (4) Zip Tie

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**1.7. Drain Back Kit Components**

- 1.7.1. (1) 1/2" Wye Fitting
- 1.7.2. (1) AOS Bottom Replacement Plug
- 1.7.3. (1) -6AN to 1/2" Hose Adapter
- 1.7.4. (14) Inches 1/2" Rubber Hose
- 1.7.5. (4) 7.5" Zip Tie
- 1.7.6. (1) #014 Buna O-Ring



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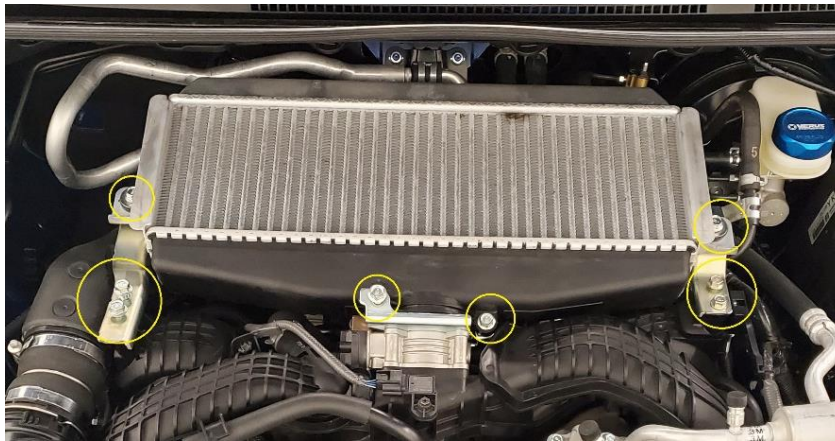
**2. Subaru VB WRX AOS install**

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

**\*\*MAKE SURE THE ENGINE IS COLD BEFORE ATTEMPTING THIS INSTALLATION\*\***

**2.2.** Start by popping the hood.

**2.3.** For this install, we have to remove the intercooler. Start by removing the 12mm bolts circled below.

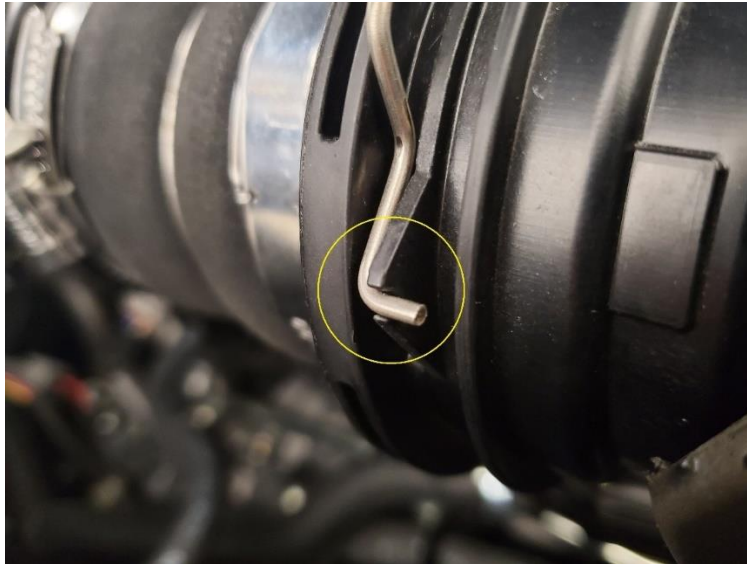


**2.3.1.** Disengage the retaining ring on the charge pipe. Do this by pulling up on the retaining ring. It is seated in the disengaged position in the below images.



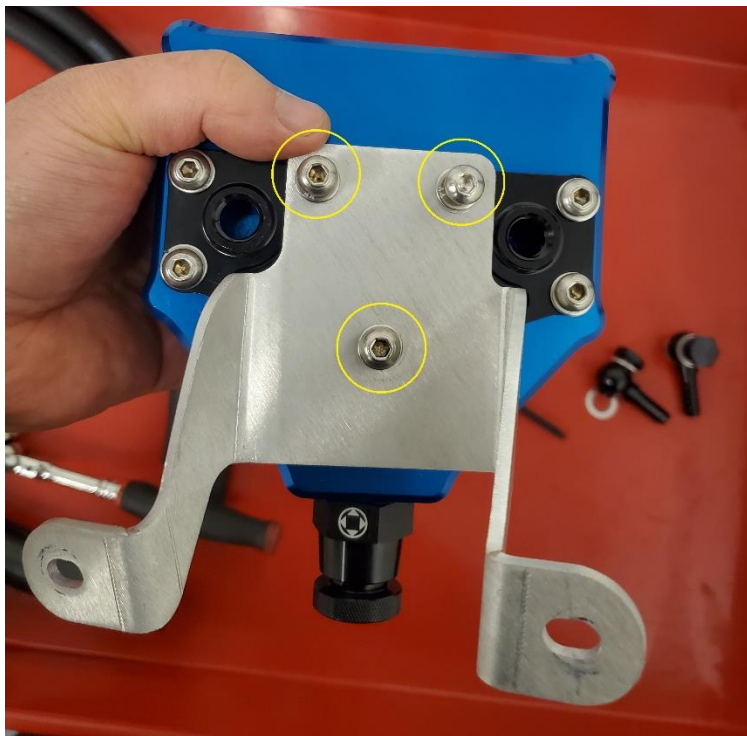
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2.3.2. Remove the intercooler, and charge-pipe assembly.

2.4. We will now begin the installation of the AOS to the bracket. Use three 16mm long BHCS, and 12mm washers as shown below. Torque the bolts to 6 ft-lbs. **NOTE: The coolant add-on plate is also installed in the picture below.**



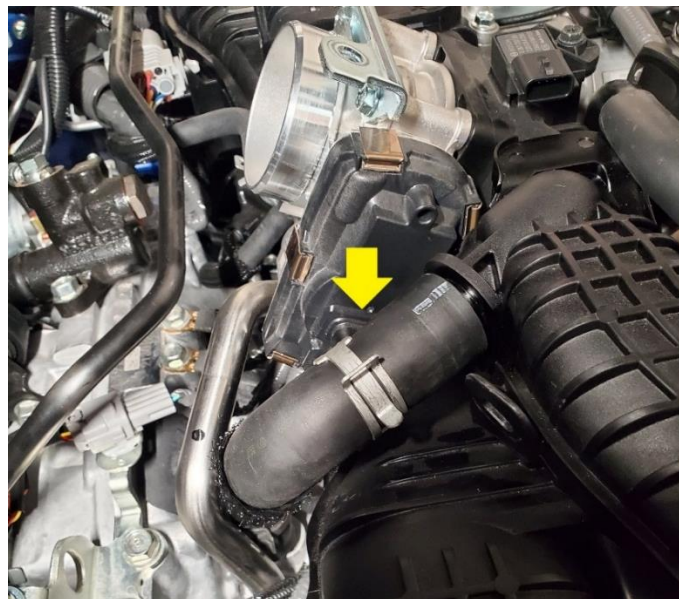
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- 2.5.** Locate the two studs on the firewall (located on the passenger side), and install the AOS and bracket to the car using two M6 serrated flange nuts. Torque to 6 ft-lbs. If you're installing the Coolant Add-on kit, skip to **3.0**.

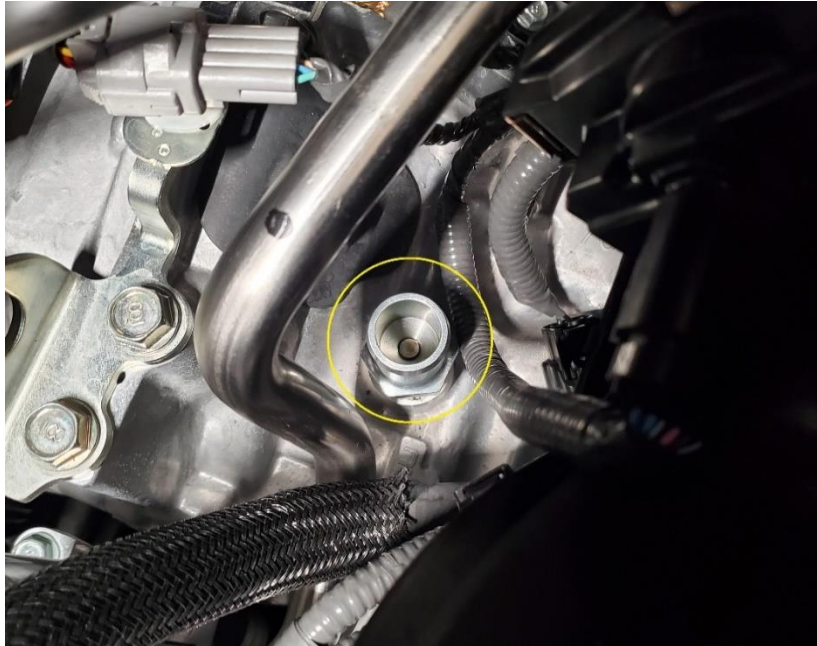


- 2.6.** Remove the OEM PCV valve by first removing the large 7/8" hose, and clamps from the manifold and PCV valve itself.





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**2.7.** Remove the PCV valve.

- 2.8.** Replace the PCV valve in the engine block with the provided NPT to 1/2" barb fitting. Clean and degrease the threads on both the fitting and the engine block (make sure no debris falls into the engine), and apply thread sealant to the threads on the provided fitting. Tighten the fitting about a 1/4 turn past snug. These are tapered threads, and should **NOT** be bottomed out.



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- 2.9.** Next, install the the PCV valve into the second port from the left on AOS using the same method described above. Clean and degrease threads, apply sealant, and torque a 1/4 turn past snug.



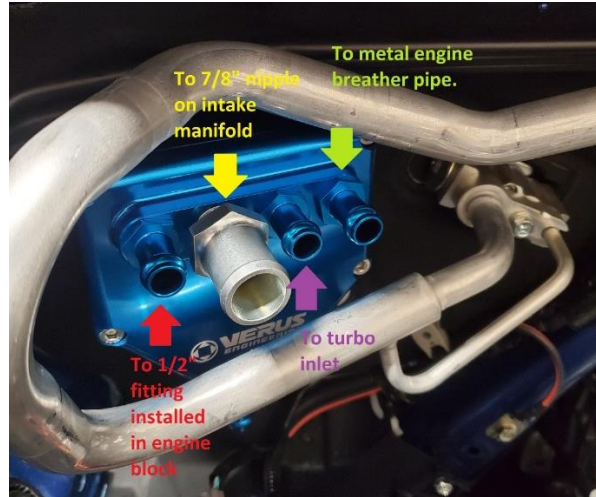
- 2.10.** With the PCV valve installed, we now need to install the rest of the 1/2" barb fittings to the AOS. Thread them hand tight, making sure they are bottomed out and the o-ring is fully engaged.



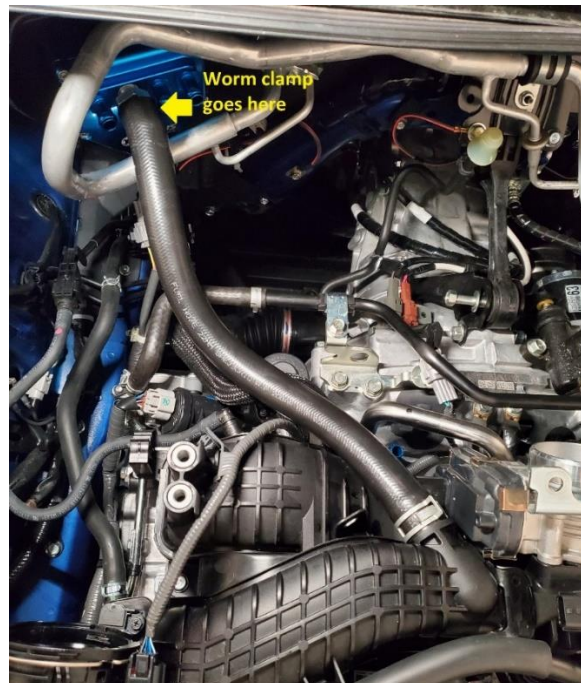
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- 2.11. Before we begin routing the hoses, familiarize yourself with the diagram below. It will help to have an idea where each hose is going prior to routing them.



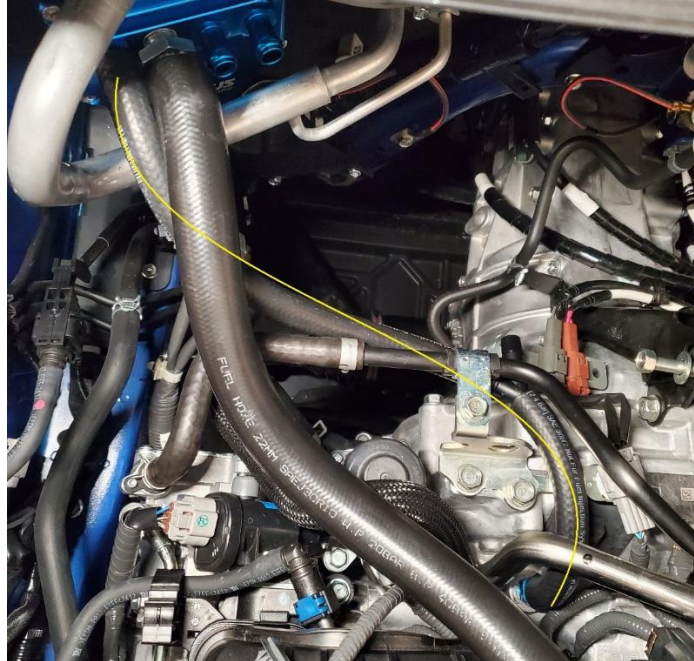
- 2.12. With the diagram above in mind, let us begin routing the hoses. As always confirm any measurements before cutting the hoses to length.
- 2.13. Cut 18" of 7/8" hose and route it from the PCV valve on the AOS to the intake manifold nipple. On the manifold side, reuse the OEM spring clamp. Use the supplied worm drive clamp for the AOS side connection.



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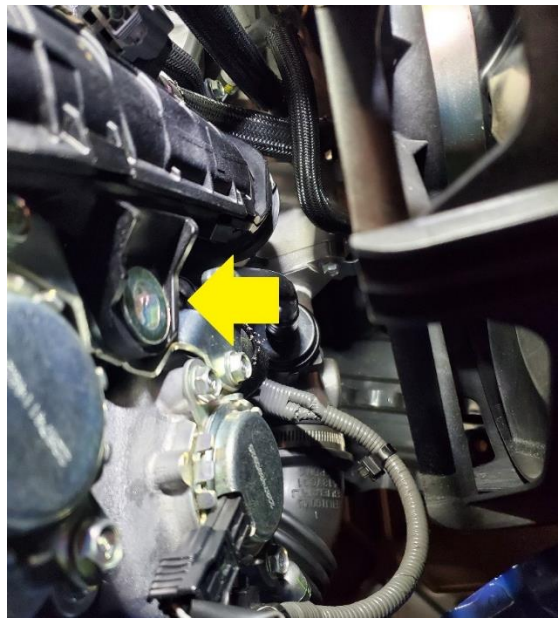
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- 2.14.** Cut 20" of 1/2" hose, and route it from the far left AOS fitting to the 1/2" fitting installed in the engine block. If you are installing the AOS Drain back Kit, skip to **3.0**.



- 2.15.** Next, we need to remove the remaining charge-pipe.

- 2.15.1.** Remove the 12mm head bolt located between the passenger side cam actuators as shown below. The radiator is on the right side of the below image as well.



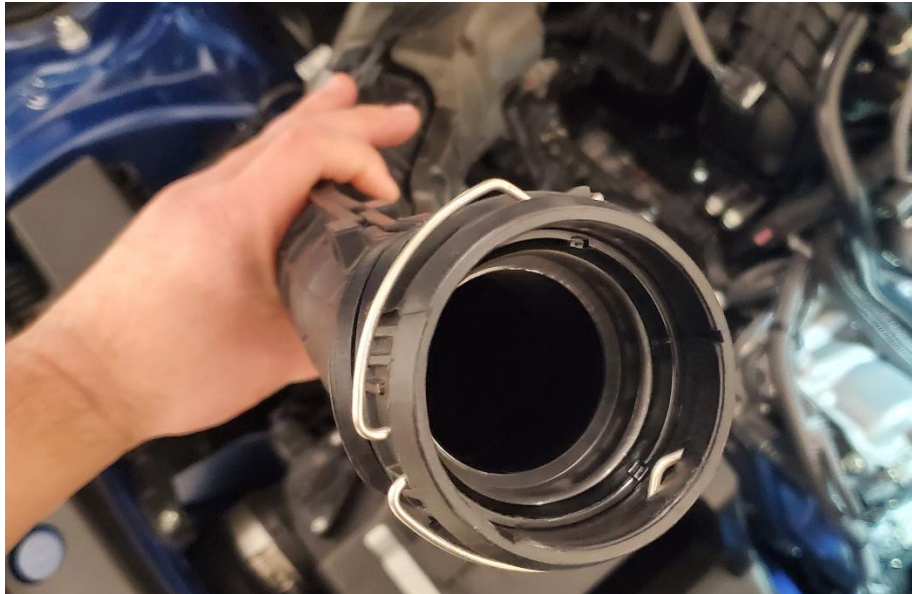
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- 2.15.2.** To remove the charge-pipe, we need to pull up, and release a metal clip just like in **2.3.1.**

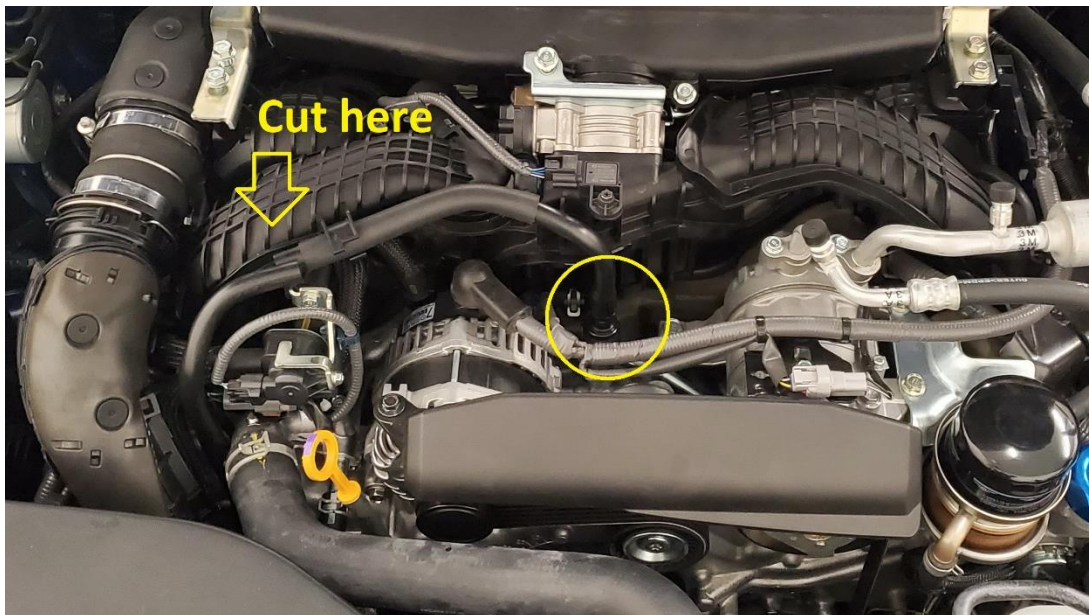


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**2.16.** Remove the charge-pipe.

**2.17.** Now locate the fitting for the engine block breather tube between the A/C compressor, and alternator. Cut the engine breather tube in half.



**2.18.** Where the tube meets the fitting for the engine breather tube slice the tube lightly where it is pressed onto the fitting. We recommend doing multiple light slices to prevent damaging the fitting. Once you slice through the tube, remove it.

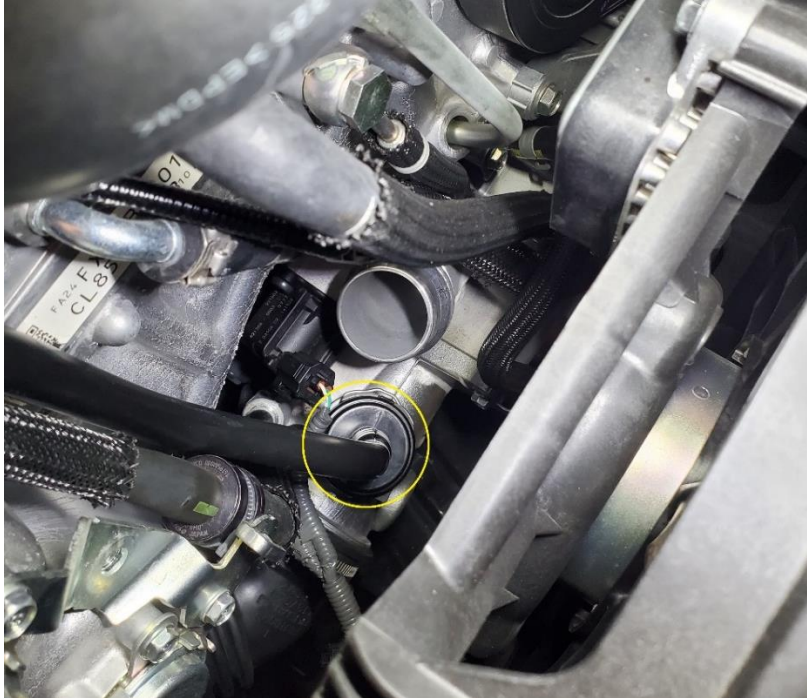
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- 2.18.1.** Following the other half of the tube down to the turbo inlet, you will notice there is another metal clip to release in order to remove the fitting. Take note of where the tube is routed. This is where the AOS hose will also be routed.



- 2.18.2.** With the metal clip released, pull the tube out and perform the same steps to remove the tube from the fitting.

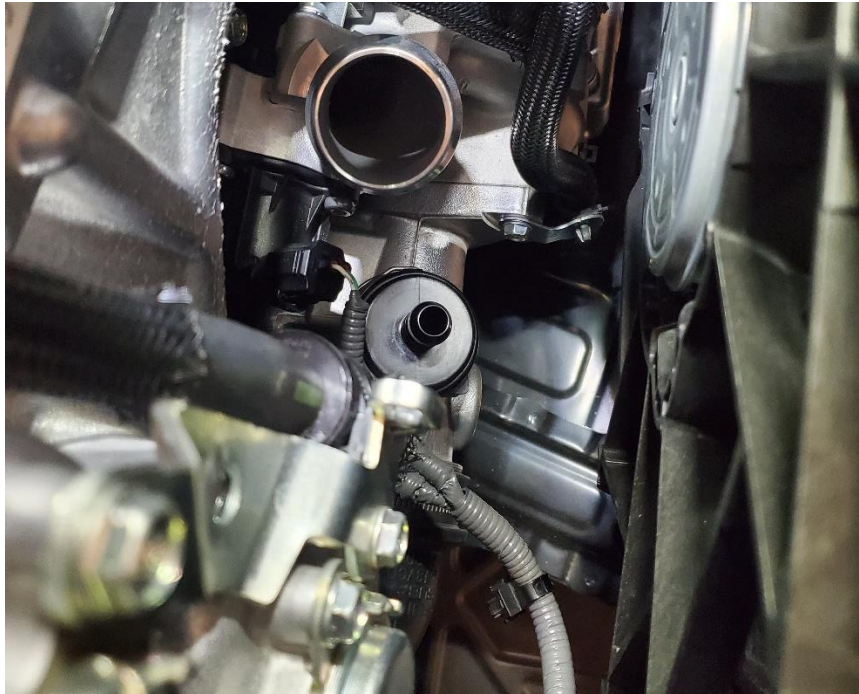


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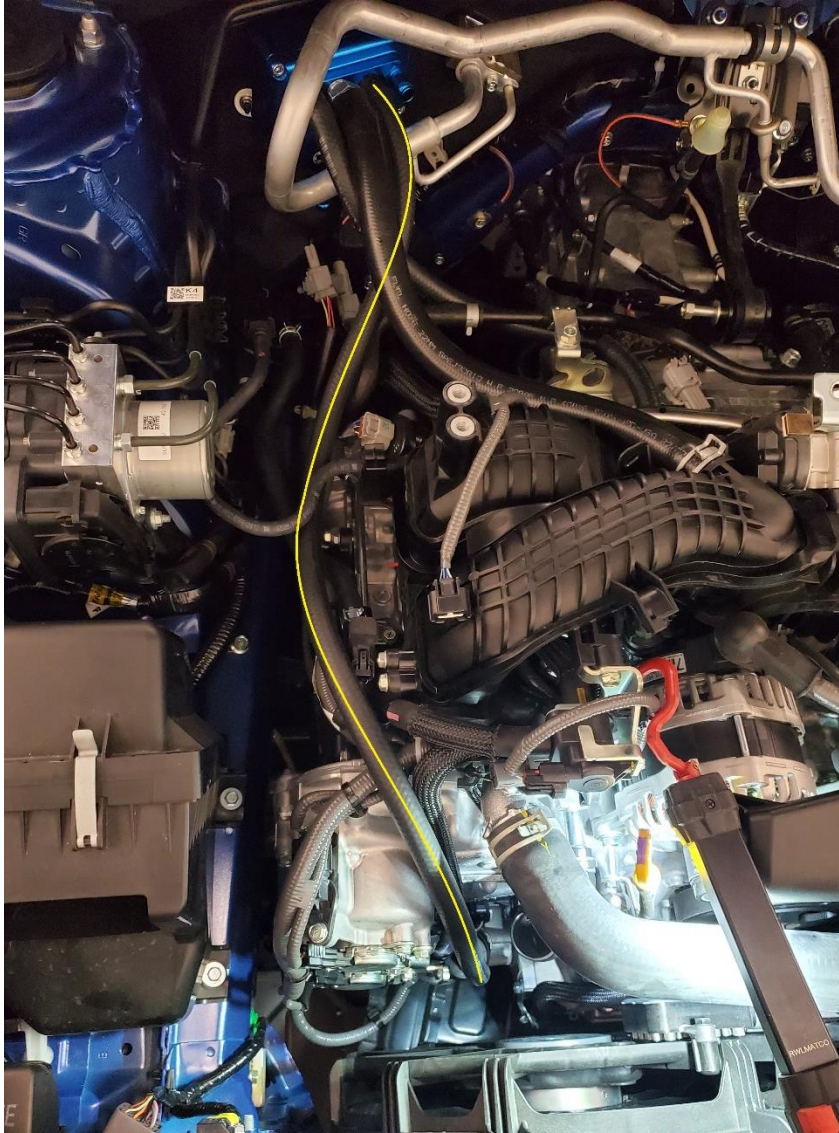
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- 2.18.3.** Install the fitting back on to the turbo inlet.



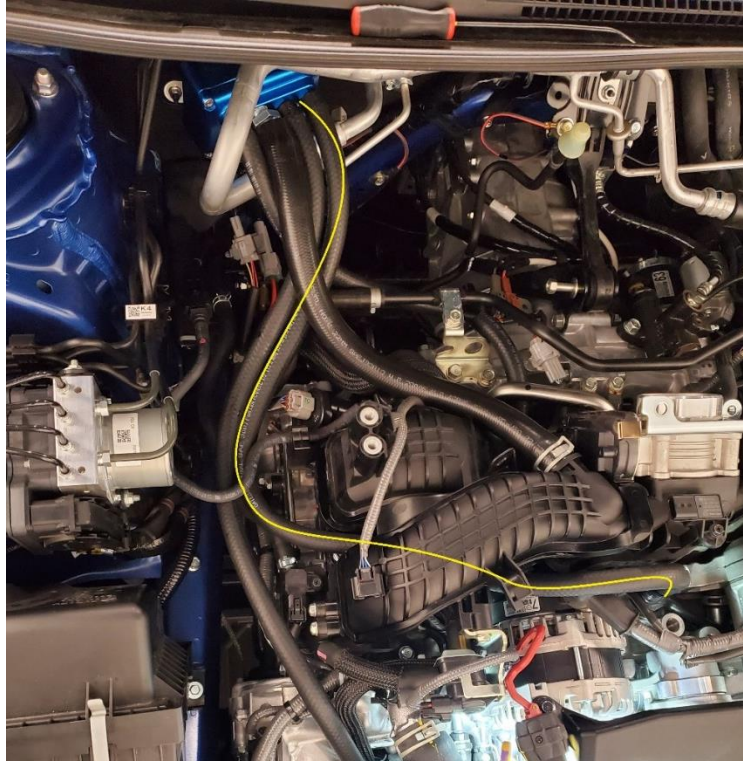
- 2.19.** We are now ready to route the hoses for the engine breather side.
- 2.20.** Cut 39.5" of 1/2" hose and route it from the AOS fitting next to the PCV valve to the turbo inlet. The hose should be routed against the timing chain cover where the OEM breather tube used to be.

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- 2.21.** Next, cut 35" of 1/2" hose, and route it from the last AOS fitting available to the metal engine breather tube. Route this next to the hose going to the turbo inlet, and then cross under the intake manifold.

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**2.22.** At this point, all of the connections for the base AOS kit are made. If no accessories are being installed, the installation is complete. Simply reinstall the charge-pipes and intercooler in reverse order.

**2.23.** Congratulations on installing the VB WRX AOS with optional drain back, and coolant add-on kit!

**2.24.** For any questions or comments, please send us and e-mail at [sales@verus-engineering.com](mailto:sales@verus-engineering.com).

**\*\*Optional Coolant Add-on Kit install\*\*****3. Coolant Add-On Kit Install**

**3.1.** Locate the Coolant Plate. Notice the o-ring that is pre-installed.



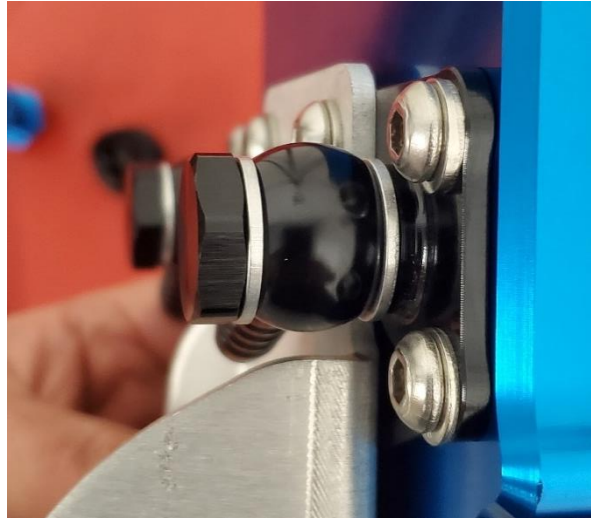
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- 3.2. Install the coolant plate between the AOS, and the mounting bracket. Use seven 16mm long M6 BHCS, and torque to 6 ft-lbs. Make sure the o-ring does not become unseated and get pinched.



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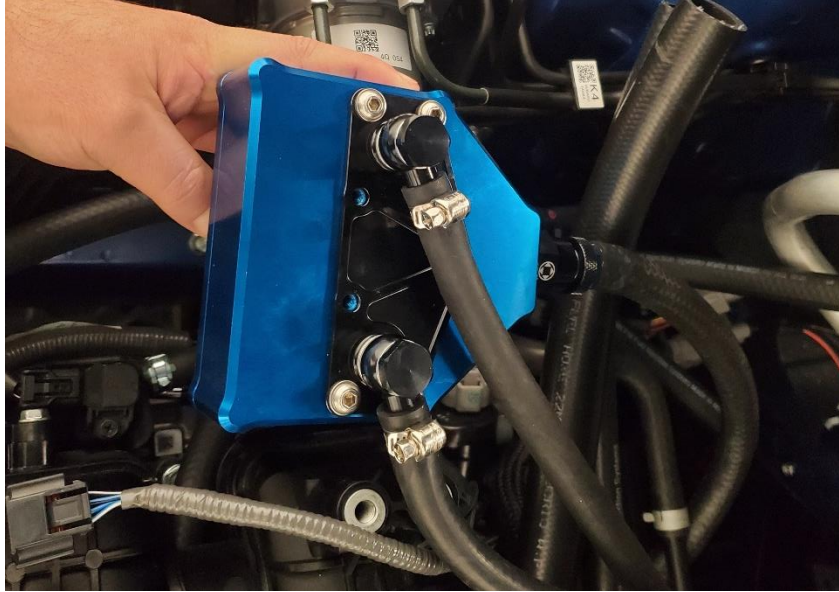
- 3.3.** Install the banjo bolt, and fittings. The barbed banjo fitting should be between the two crush washers. Clock the banjo fittings as shown (towards the driver side), and tighten the banjo bolts.



- 3.4.** Cut two lengths of 5/16" coolant hose. Cut one to 32" long, and the other to 30.5".

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- 3.5. Using the supplied hose clamps, attach the shorter hose to the banjo fitting closest to the driver side, and the other to the passenger side.



- 3.6. Bolt the AOS to the fire wall with the two M6 serrated flange nuts just as you would have in 2.5. Torque the nuts to 6 ft-lbs.



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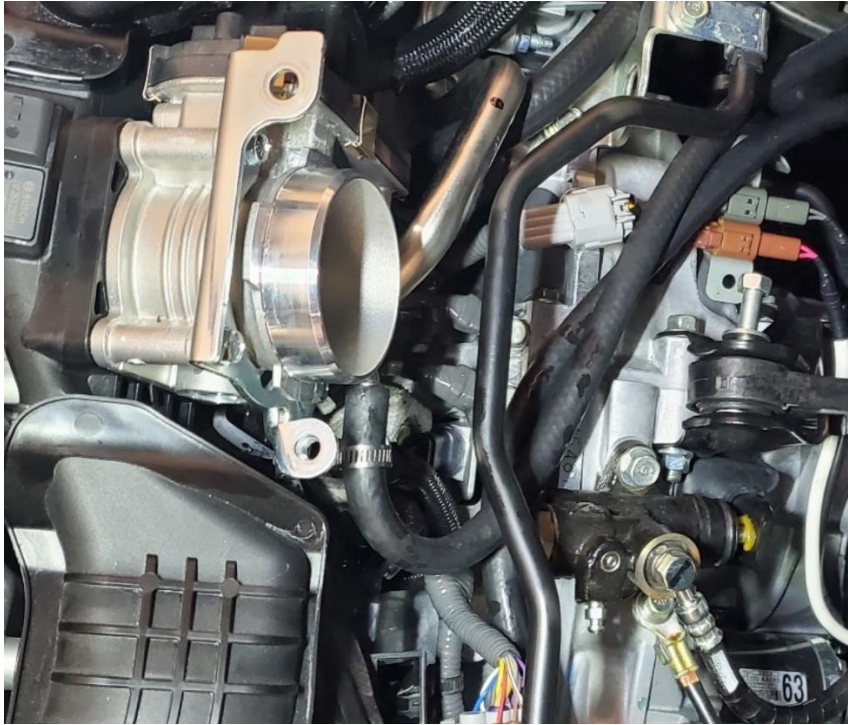
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- 3.7. Next locate the throttle body coolant hose that we will need to remove. It is directly under the throttle body opening.

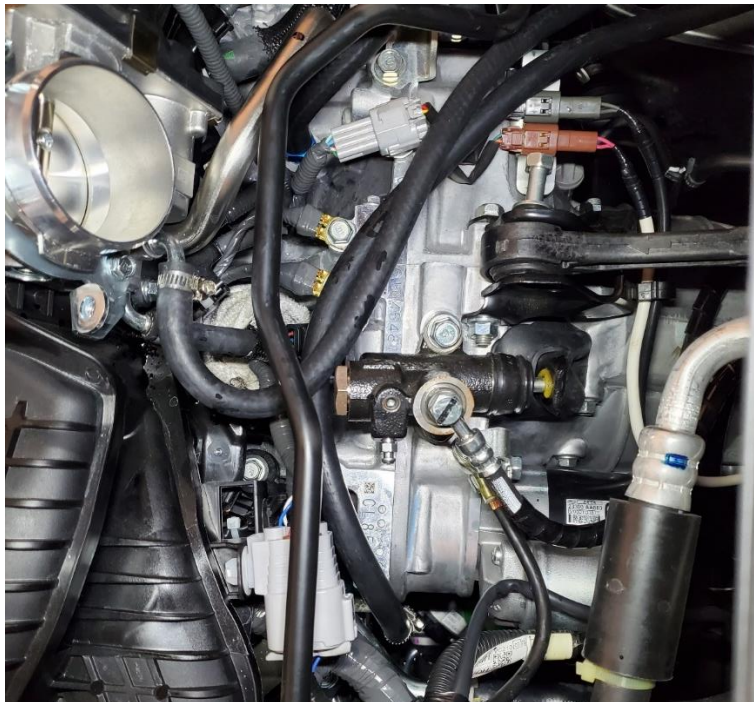


- 3.8. As shown above, pinch the coolant line off using some needle nose Visegrips or hose pinchers.
- 3.9. Remove the coolant hose from the throttle body, and replace it with the coolant hose coming from the driver side banjo fitting. Tighten the clamp on the AOS coolant hose. **NOTE:** A small amount of coolant will drip out of the throttle body when the hose is removed.

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- 3.10.** Follow the OEM coolant hose to its' next attachment point behind the driver side cylinder head. Remove the clamp, and the OEM coolant hose all together. Replace that connection with the other AOS coolant hose. Tighten the clamp for the AOS coolant hose.



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- 3.11. Secure the hoses away from any sharp edges or abrasive surfaces with the supplied zip ties.
- 3.12. Continue back with the install manual at 2.6.

**\*\*Optional Drain Back Kit Install\*\*****4. AOS Drain Back Kit install**

- 4.1. Start by unscrewing the plug at the bottom of the AOS
- 4.2. Swap the o-ring over from the knurled plug fitting to the new threaded adapter with the through hole shown below.



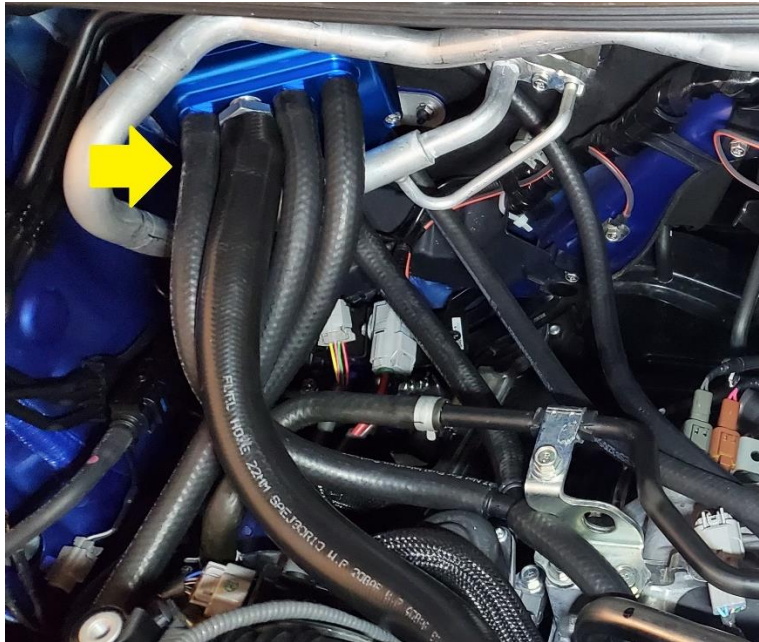
- 3.1. Then, install the black 6AN to 1/2" barb into this and torque to 8 ft-lbs. A photo of this is shown below. **When installing the black 6AN to 1/2" nipple, do so with the knurled fitting already installed on the AOS.**

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**4.3.** Attach the supplied 12" long hose to the drain back fitting on the AOS.

**4.4.** Locate the hose going from the AOS to the 1/2" adapter fitting installed in the engine block.

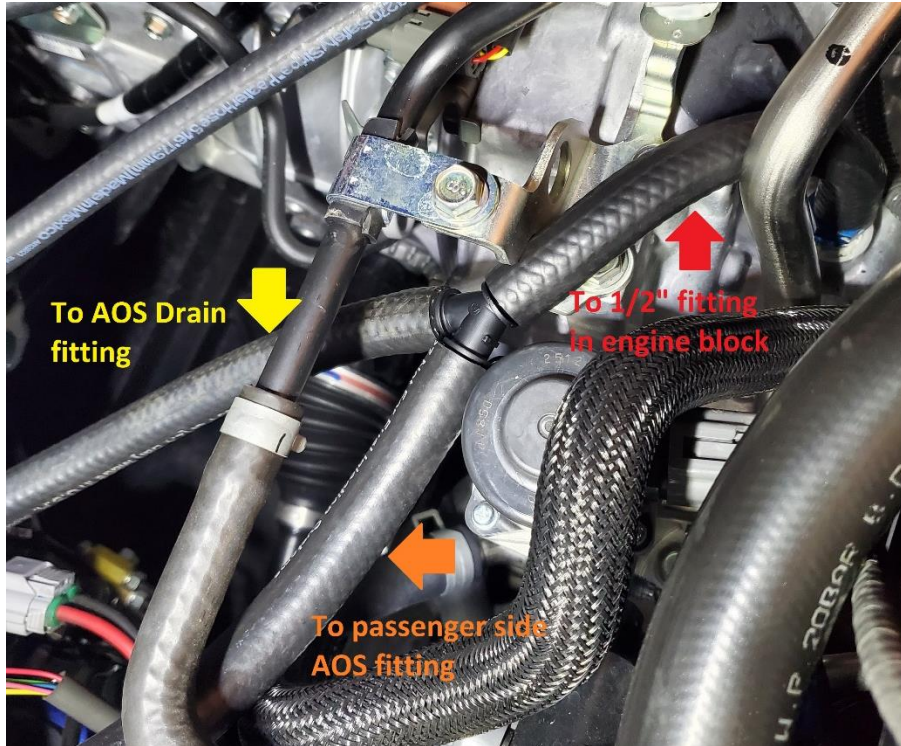


**4.5.** Remove the hose from the AOS and cut it into two pieces. One should be approximately 13", and the other should be approximately 7".

**4.6.** Install the 7" section to the 1/2" adapter installed in the engine block.

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- 4.7. Install the 13" section back onto the AOS.
- 4.8. Using the supplied "Y" fitting, combine all three hoses as shown below



- 4.9. Continue on with the installation at 2.15.