Air Oil Separator for 2015-2021 WRX

2026-02-25 PSP-ENG-620

Thank you for purchasing this PERRIN product for your car! Installation of this product should only be performed by persons experienced with installation of aftermarket performance parts and proper operation of high performance vehicles. If vehicle needs to be raised off the ground for installation, the installer must use proper jacks, jack-stands and/or a professional vehicle hoist for safety of the installer and to protect property. If the vehicle is lifted improperly, serious injury or death may occur! Please read through all instructions before performing any portion of installation. Always use appropriate personal proection equipment such as gloves, eye and hearing protection for installation of this product. If you have any questions, please contact our tech department prior to starting installation. We can be reached in any of the following methods:

Email Tech@PERRIN.com
Instant Chat off the main page of www.PERRIN.com
Or simply call our tech team at 503-693-1702



WARNING: Handling passenger or off-highway motor vehicle parts can expose you to chemicals such as phthalates and lead, which can cause cancer and reproductive harm. To minimize exposure, service the vehicle in a well-ventilated area, wear gloves, and wash your hands. WARNING: Handling passenger or off-highway motor vehicle parts can expose you to chemicals such as phthalates and lead, which can cause cancer and reproductive harm. To minimize exposure, service the vehicle in a well-ventilated area, wear gloves, and wash your hands.

GENERAL MODIFICATION NOTE

Modifications to any vehicle can change the handling and performance. As with any vehicle extreme care must be used to prevent loss of control or roll-over during sharp turns or abrupt maneuvers. Always wear seat belts, and drive safely, recognizing that reduced speeds and specialized driving techniques may be required. Failure to drive a vehicle safely may result in serious injury or death. Do not drive a vehicle unless you are familiar with its unique handling characteristics and are confident of your ability to maintain control under all driving conditions. Some modifications (and combinations of modifications) are not recommended and may not be permitted in your state or country. Consult the owner's manual, service manual, instructions accompanying these products, and local laws before purchasing and installing these modifications. You are responsible for the legality and safety of the vehicle you modify using these components.

SPECIAL NOTES:

- The PERRIN Air Oil Separator (AOS) was designed to remove a significant amount of the oil and water vapor that normally gets sent to your intake system to be ingested by your engine. There are many variables as to how much oil will make it past our AOS but expect it to remove a significant amount of the crank case blow by. For cars with built engines with excessive blow-by, or have an aftermarket turbo, you may still experience oil getting past our Air Oil Separator.
- When installing hoses to barb fittings, a small amount of oil on each fitting will allow hoses to slide on easier.
- There are extra parts included in this kit that will not be used.
- There is not a flow direction to the coolant fittings! It does not matter which one goes where as long as they are connected to the engines coolant fittings and there is loop from the top to the bottom of the AOS.

NPT NOTES:

- There are NPT (National Pipe Thread) fittings included with your Air Oil Separator. Throughout the instructions, these notes below will be referred to often. It's important to understand these types of fittings and how they work.
- NPT fittings are a tapered thread that seals when tightened, not bottomed out. Thread fittings in by hand and tighten roughly 1/2 to 1 full turn more until fitting is tight. **NOTE: Use a small amount of Teflon tape or proper thread sealant on threads of each NPT fitting before installing into each part.**
- Angle of the 90 degree fitting can be adjusted after tightening, as long as it is not backed off more than 1/4 of a turn. When in doubt, tighten the fitting versus loosen it.

Included Parts with PERRIN Air Oil Separator:

QTY	Part Number	Description
1	X-PSP-ENG-620	Air Oil Separator Universal Assembled
1	X-PSP-ENG-623	Bracket for AOS, 2002-07 WRX/STI
1	X-PSP-ENG-624	Bracket for AOS, 2008-21 WRX/STI
1	S-PSP-ENG-620	Subpacket for 2002-21 WRX/STI Air Oil Separator
3	X-HOS-107	3/8" ID Fuel Injection Hose (27346)
3	X-HOS-111	5/16" ID Crank Case Emissions Hose (27069)
85	X-HOS-115	5/16" Heater/Coolant Hose (28408) 50 foot spool
9	X-HOS-120	1/2" Emissions/Crank Case Vent Hose (27019) 250' roll
4	X-HOS-127	5/8"ID Emissions Crank Case Vent Hose (27008) (25' per box)
1	X-PSP-ENG-626BK	Crank Case Vent Bung NPT threads Black Anodized
1	X-CON-056BK	Aluminum 3/8NPT -1/2" Hose Barb 90 Degree Black
3	X-CON-058BK	Aluminum 3/8NPT -1/2" Hose Barb Straight Black
2	X-CON-059BK	Aluminum 3/8NPT -5/8" Hose Barb Straight Black
1	X-CON-067BK	Aluminum 3/8NPT Flange Plug Black
2	X-CON-009	Plastic 1/2"-1/2" Straight
1	X-CON-019	Plastic 1/2"-5/8" Reducer
2	X-CON-020	Plastic 1/2" 90 Degree
1	X-CON-031	Plastic 5/8" Y Connector
1	X-CON-038	Plastic 1/2" Y Connector
1	X-CON-039	Plastic 5/16"- 5/16" Straight
1	X-CON-069	Plastic 1/2" to 5/16" Reduction Tee

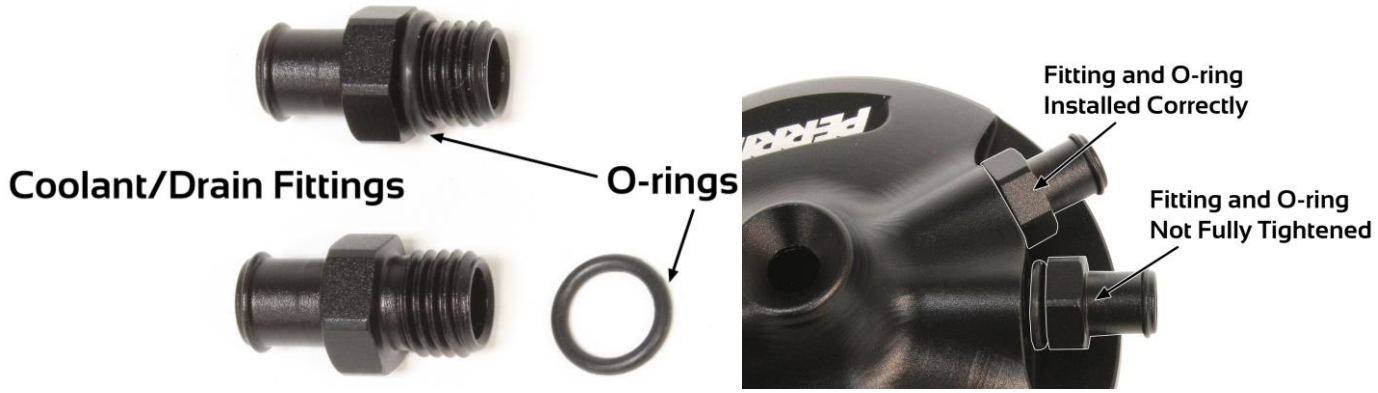
1	X-CON-073	Cap Vinyl for 1/2"-9/16" OD, 3/4" Long Black
1	X-CON-026	Brass 1/4NPT 3/8" Barb Straight
1	X-CON-044	Nickel 1/8NPT 5/16" Barb 90 Degree
2	X-CON-048	Nickel 1/4NPT 1/2" Barb Straight
1	X-CON-053	Aluminum 3/8NPT Female to 1/2" Barb (EDP 240)
1	X-CON-060	Aluminum 3/8NPT Female to 5/8" Barb (EDP 80)
2	X-CON-080	Plastic 1/2" OD Plug
2	X-BLT-00250PPS	1/4NPT Socket Plug Steel
2	X-BLT-M618WF-SS	M6 x 18 Fender Washer SS
2	X-BLT-M6X14CSB-SS	M6 x 14mm Button Head Socket cap screw SS
3	X-BLT-M8WF-SS	M8 Flat Washer Stainless Steel
3	X-BLT-M8X10CSB-SS	M8 X 10 Button Head SS Screw
10	X-CLAMP-002	Clamp Size 2 or 8-16mm
11	X-CLAMP-006	Clamp Size 6 or 12-22mm
2	X-CLAMP-008	Clamp Size 8 or 16-27mm
5	X-CLAMP-17.0	Clamp Oetiker 17.0
15	X-CLAMP-22.6	Oetiker Clamp 22.6
1.625	X-HOS-125	3/4" ID Emissions/Crank Case Vent Hose (27010)
20	X-BLT-CT080B-18	Zip Tie 8" Long
1	X-BLT-GRS-209	Grease for Polyurethane Bushings Packet

WHICH WAY IS THE RIGHT WAY?

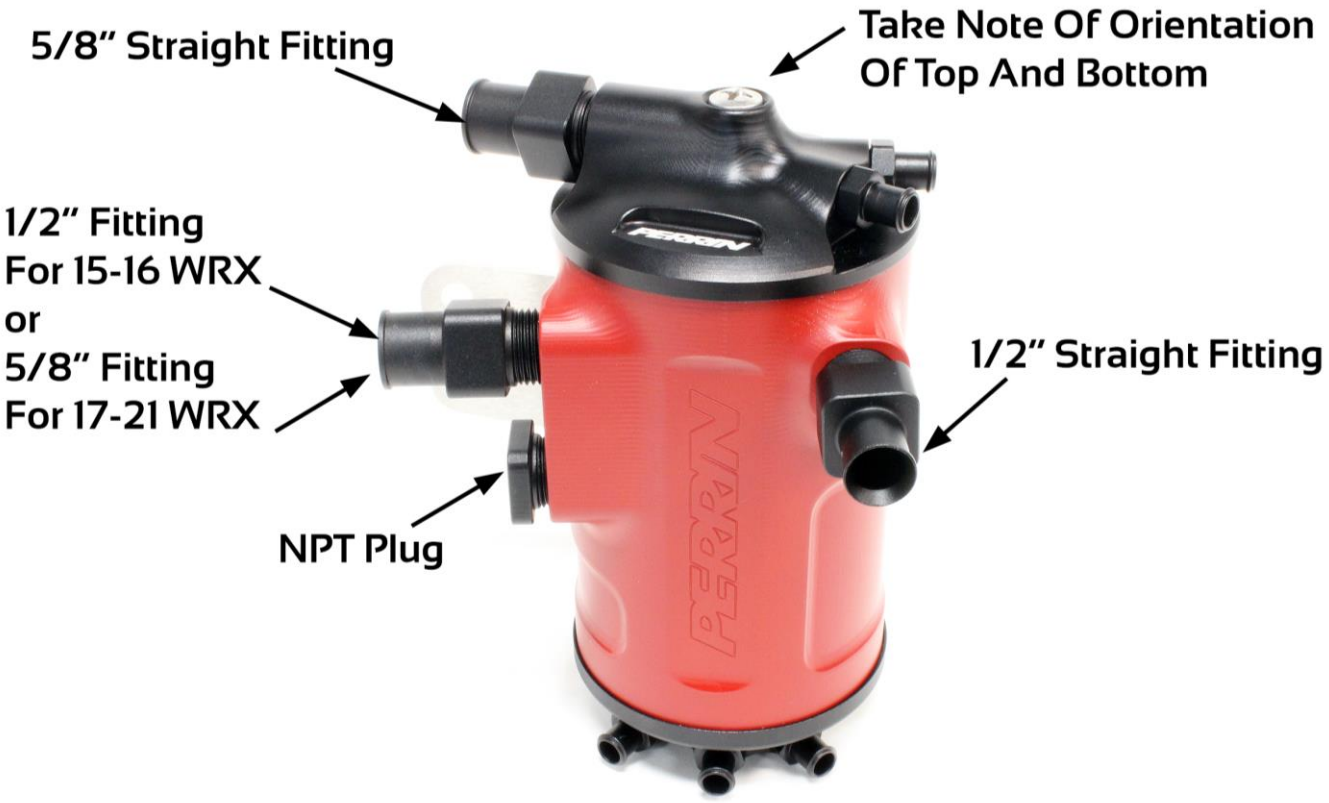
In ALL situations, when describing left and right sides of the vehicle it is always as though you are sitting in the driver's seat looking forward.
Example of a US Market Vehicle: If standing in front of the car, looking at the engine bay, the Drivers side is described as the LEFT side the vehicle.

1. Installation Prep Of AOS

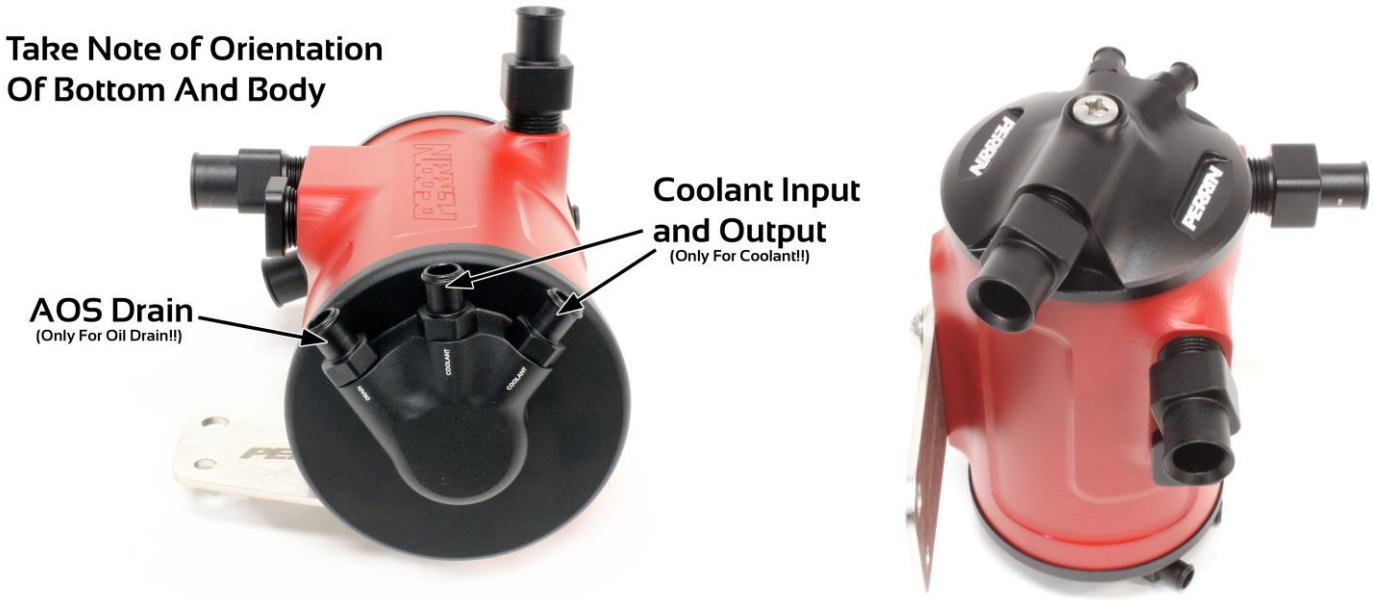
Each AOS is pre-assembled and does not require it to be taken apart during the install. During the installation process, you may need to loosen and reorient the parts or you may want to take it apart completely to install the fittings. If you do take it apart follow the instructions at the end that goes over how to maintain your AOS.



a. Install supplied O-rings to each of the 5/16" barb fittings as shown and apply a small amount of the supplied grease to the O-rings. Thread (3) of the fittings into the ports on the AOS bottom, and (2) fittings into the ports on the AOS top.
b. As you tighten the fittings into each port make sure that the O-ring is fully seated and isn't sticking out as it's tightened. Tighten fittings to 5-8ft-lbs or just past hand tight. These fittings seal using O-rings and do not need to be overly tight to seal, like the NPT fittings.
c. Using diagram below and the NPT fitting notes above, install (1) 5/8" barb straight NPT fitting (marked 059) into the port of the AOS top.
d. Using diagram below and the NPT fitting notes above, install (1) 1/2" barb straight NPT fitting (marked 058) into the single side port on the AOS body. **NOTE: There are 90-degree fittings included that can be installed instead. If you choose to install these fittings due to other aftermarket parts, they will not affect how the AOS functions.**
e. Using diagram below and the NPT fitting notes above, install fitting into the upper fitting on the double side port on the AOS.
    i. For 2015-16 models, install the supplied 1/2" barb straight fitting (marked 058).
    ii. For 2017-21 modes, install the supplied 5/8" barb straight fitting (marked 059).
f. Using diagram below and the NPT fitting notes above, install (1) NPT plug fitting into the remaining open port on the AOS.



g. Loosen the center screw about half of a turn and rotate the top until the top fitting is aimed similar to the picture below.
h. Rotate the AOS bottom until it is oriented like the picture below.



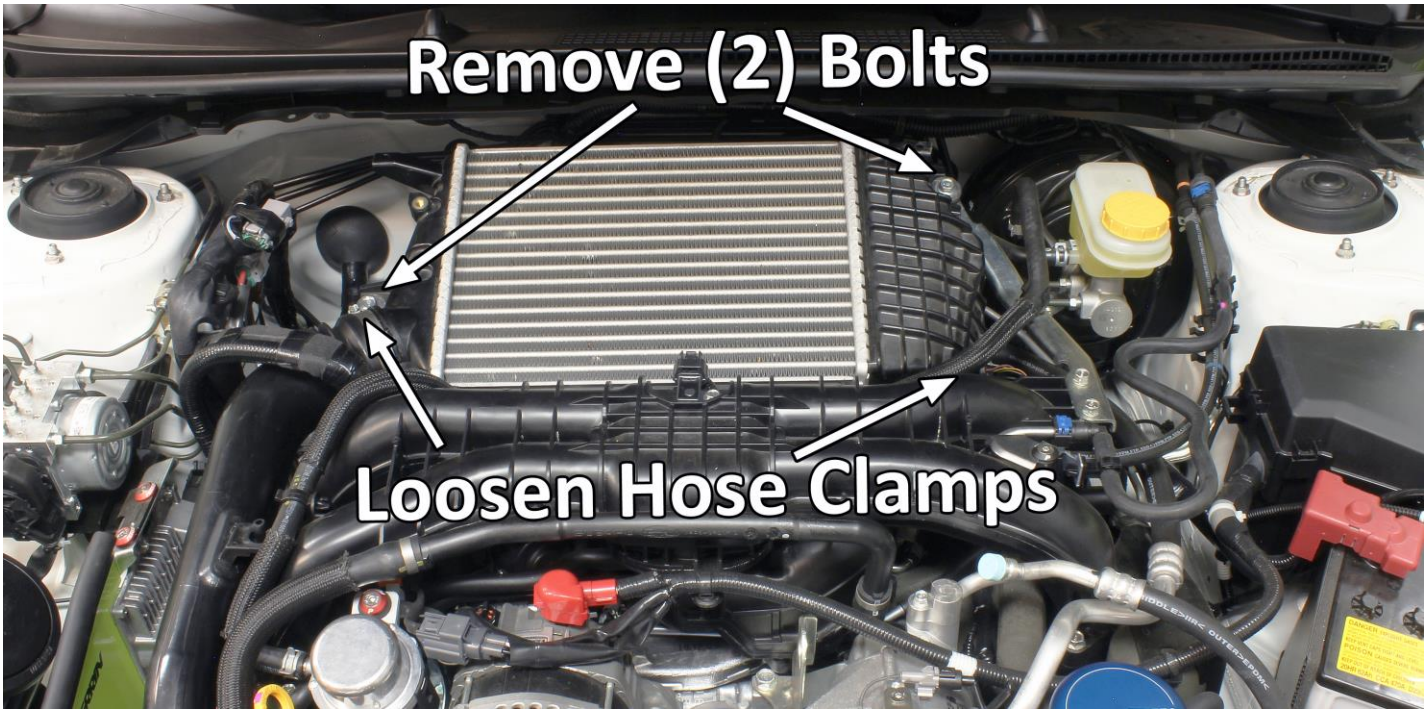
i. Tighten center screw to secure all AOS parts together. **NOTE: Further adjustments can be made in later steps, so there is no need to make it perfect at this time. If the center screw was loosened too far, check that the O-ring is in the small groove in the bottom of the AOS. See the last section on how to maintain your AOS to make sure this is done correctly.**

j. Install supplied bracket (marked 624) to one of the sets of holes on the AOS body using supplied M8 button head bolt and washers. Tighten screws to 10 to 15ft-lbs. **NOTE: There are many sets of holes to mount the bracket to, but we suggest mounting it to the set that allows you to see the upper 2 holes as shown. Depending on other parts installed, you may choose to move this up or down. As long as the oil drain is higher than the engine block fitting, you can mount lower than the suggested amount.**

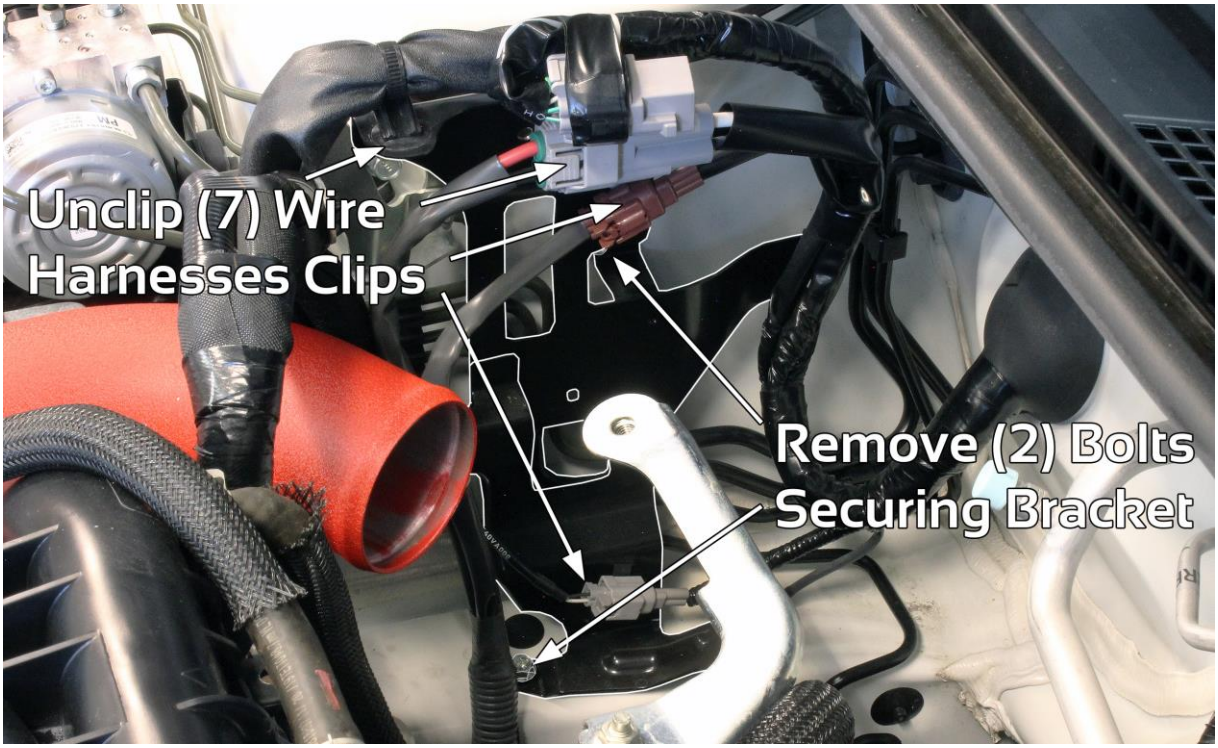


2. Remove OEM Parts

a. Make sure vehicle has completely cooled off. **NOTE: If there is strut bar installed, remove it at this time.**
b. Locate and remove (2) plastic fasteners on the upper section of the plastic engine cover then carefully lift the front section to unsnap engine cover from mounting bracket. Set engine cover aside for now.
c. Loosen hose clamp holding throttle body coupler to intercooler (left side) and charge pipe to intercooler (right side), then remove (2) bolts securing intercooler to mounting brackets.



d. Lift up on sides and back of intercooler to free from both the throttle body and charge pipe, then remove intercooler from engine bay. **NOTE: This step can be difficult, make sure that the hose clamps are very loose to ensure they are not holding anything up. Using spray lubricants around connections can aid in removal of intercooler.**



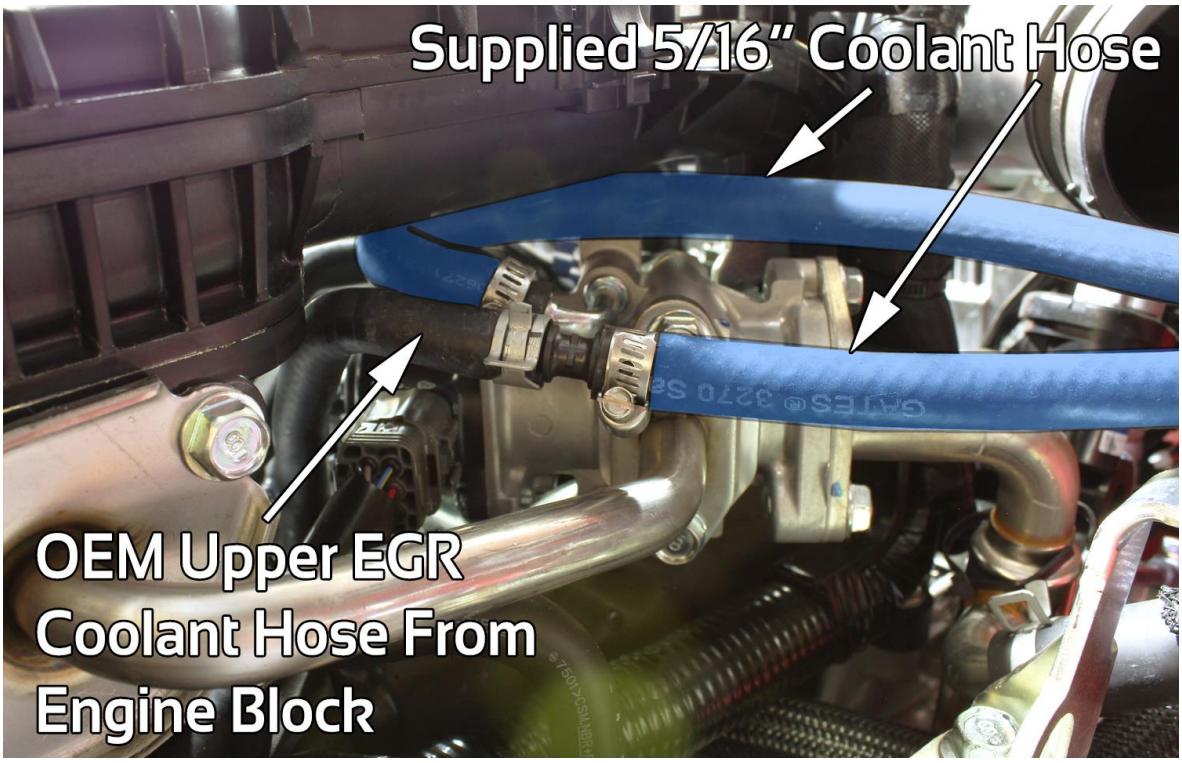
e. Locate large black wire harness bracket on right side of engine bay. Remove (2) M6 bolts to free bracket from shock tower and using pliers, unclip all (7) connection points for the wire harness and plugs. Remove bracket from engine bay as this will not be reused.



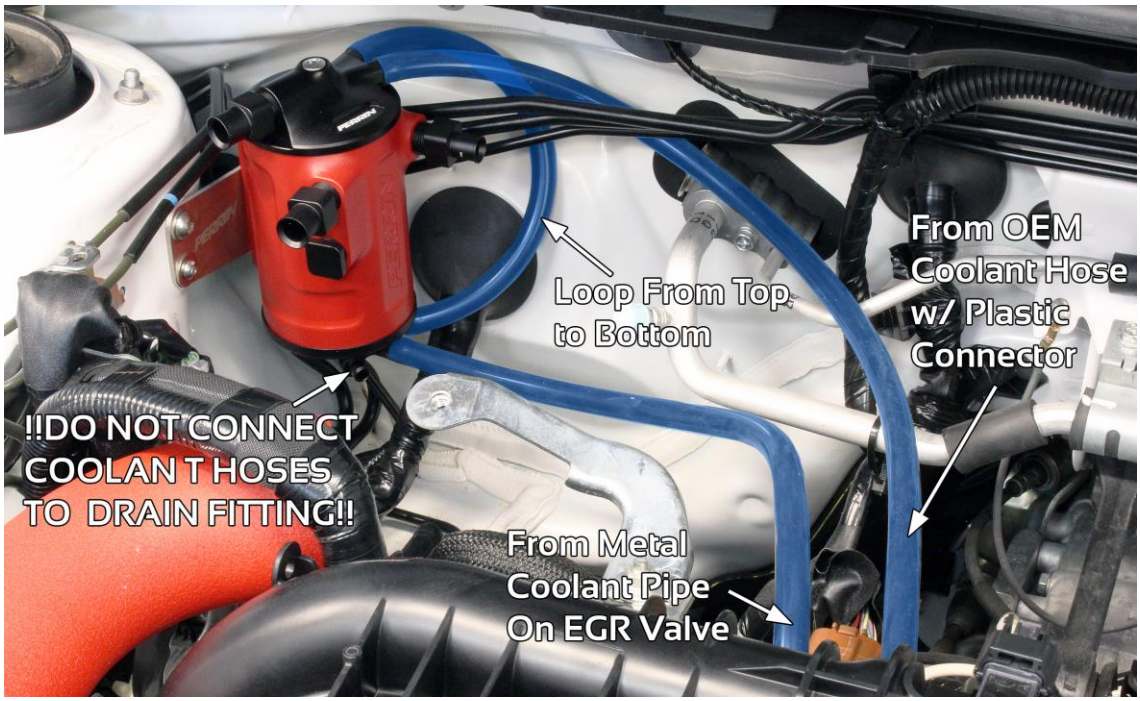
f. Bend wire harness down toward frame rail and secure to brake lines using supplied zip ties.
g. Locate (2) holes on the shock tower, one of which is an M6 threaded hole and one is an M8 threaded hole.
h. Using supplied M6 and M8 button head screws, and washers, mount AOS with bracket to shock tower as shown but leave bolts loose as you will need to remove to install some of the hoses in later steps.

3. Coolant Feed Connections

a. Install supplied 5/16" straight connector to one end of the supplied 5/16” coolant hose and (1) size 2 hose clamp to the other end. You will leave this hose as a loop for the next few steps.
b. Using picture below as a guide, locate the EGR valve behind the intake manifold on right side of engine. Locate the upper coolant hose feeding the EGR valve and slide pinch clamp back to free hose from steel coolant pipe on EGR valve.

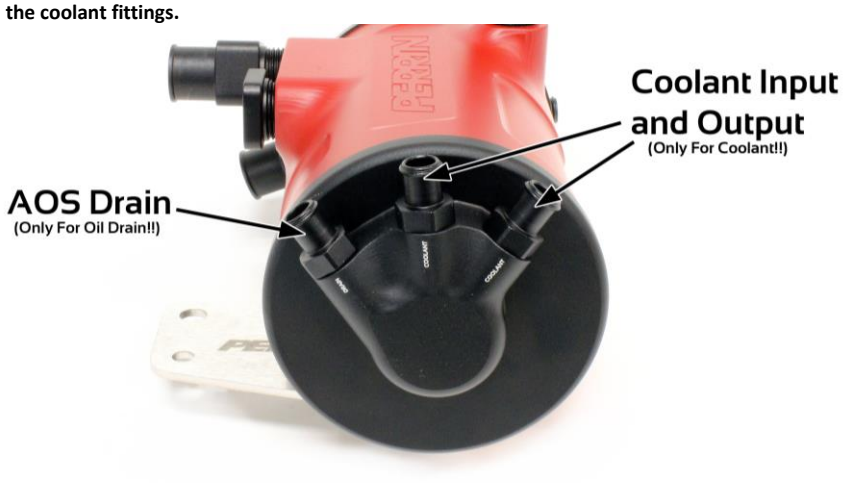


c. As fast as possible (to reduce coolant loss), remove rubber hose from steel coolant pipe and install it onto the plastic 5/16" straight connector (installed in step above), then connect remaining side of supplied 5/16” coolant hose (still in a loop) to left open steel coolant pipe on EGR valve. Secure hose to steel coolant pipe using previously installed hose clamp.
d. Route hoses (leave it in a loop to control coolant loss) toward the firewall and AOS, making sure they are routed in a smooth way and away from moving parts. See picture below for a rough diagram of how this should look.



Make sure that NONE of the coolant hoses connect to the drain fitting on the bottom of the AOS. Check orientation picture to check this is done correct

e. Using the picture above as a guide, start with cutting the hose (connected to the steel pipe on the EGR valve) to connect to the middle fitting on the AOS bottom.
   i. Do NOT connect this hose to the drain fitting or engine damage will occur! See picture below to make sure this is done correct.
   ii. **NOTE: It does not matter which side of the loop of hose connects to this fitting as there is no flow direction to this. If you choose to connect them opposite how we describe them, that will not affect how the part works as long as it is connected to the coolant fittings.**



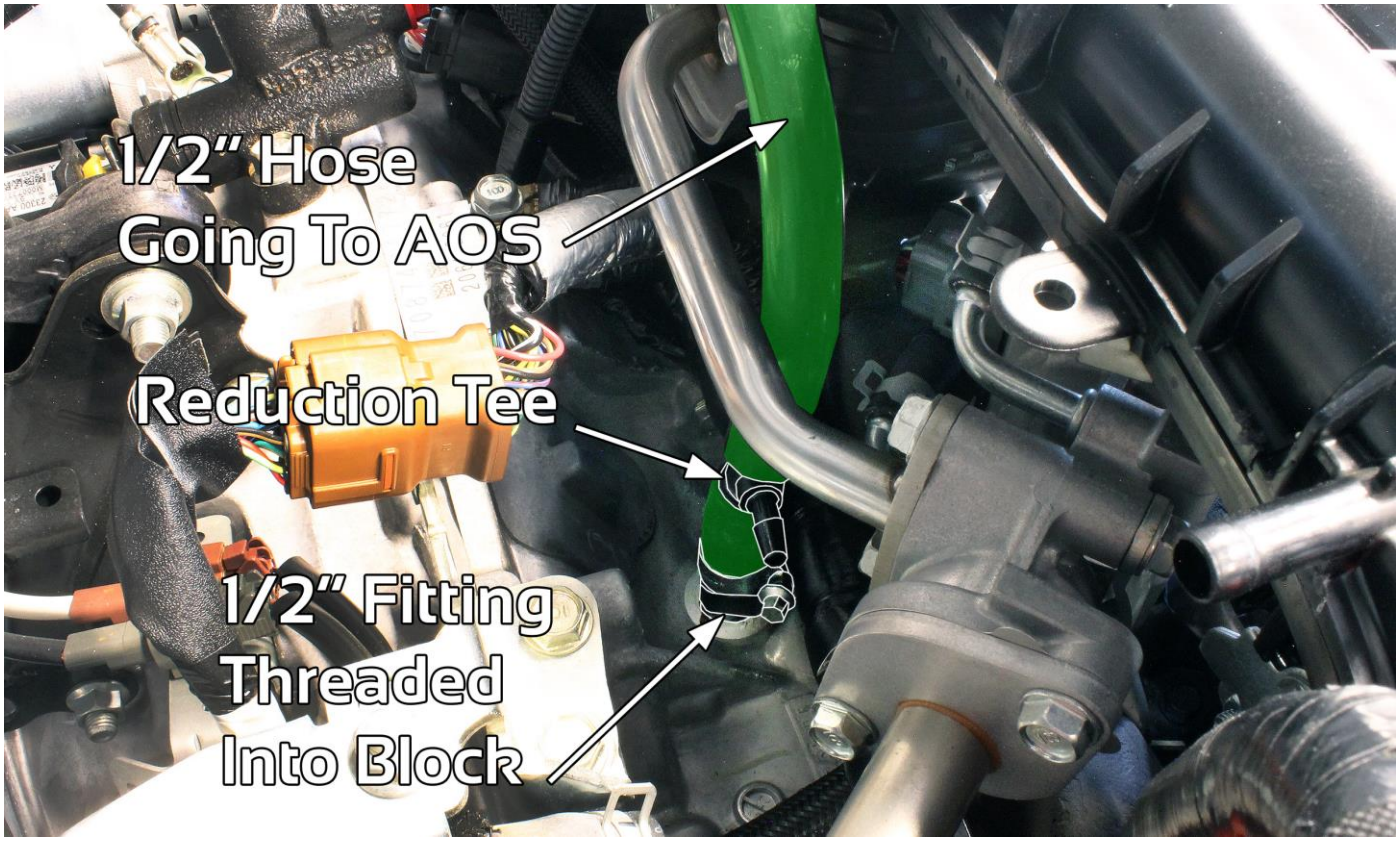
f. Install supplied size 2 hose clamp (or lower profile pinch clamp) over hose but do not tighten currently. **NOTE: Included with each kit are two different types of clamps, a worm drive type and a lower profile crimp type. The crimp type clamp requires the use of a nipper/single ear crimping tool to secure. If you are not familiar with this type of clamp, install the supplied worm drive clamp.**
g. Trim and connect remaining length of hose (connected to plastic fitting and OEM coolant hose) to one of the upper coolant fittings on the AOS. Install supplied size 2 hose clamp (or lower profile pinch clamp) over hose but do not tighten currently. **NOTE: Included with each kit are two different types of clamps, a worm drive type and a lower profile crimp type. The crimp type clamp requires the use of a nipper/single ear crimping tool to secure. If you are not familiar with this type of clamp, install the supplied worm drive clamp.**
h. Use remaining length of hose to create a loop from the remaining coolant fittings on the top and bottom. **NOTE: Make sure you do NOT connect one of these to the drain fitting on the bottom. Engine damage will occur if this is done incorrectly!**
i. Install supplied size 2 clamps (or lower profile pinch clamp) over hoses, then install hoses to fitting and secure with clamps. **NOTE: Included with each kit are two different types of clamps, a worm drive type and a lower profile crimp type. The crimp type clamp requires the use of a nipper/single ear crimping tool to secure. If you are not familiar with this type of clamp, install the supplied worm drive clamp.**
j. Tighten all hose clamps and secure coolant hoses along firewall and engine using supplied zip ties.

4. Rear Crank Case Vent and Drain Connection

a. Locate and remove PCV hose from PCV valve and intake manifold, then set aside, as this will be reused in later steps.
b. Using a 19mm socket and extension remove the PCV valve from the crank case, then set aside, as this will be reused in later steps.

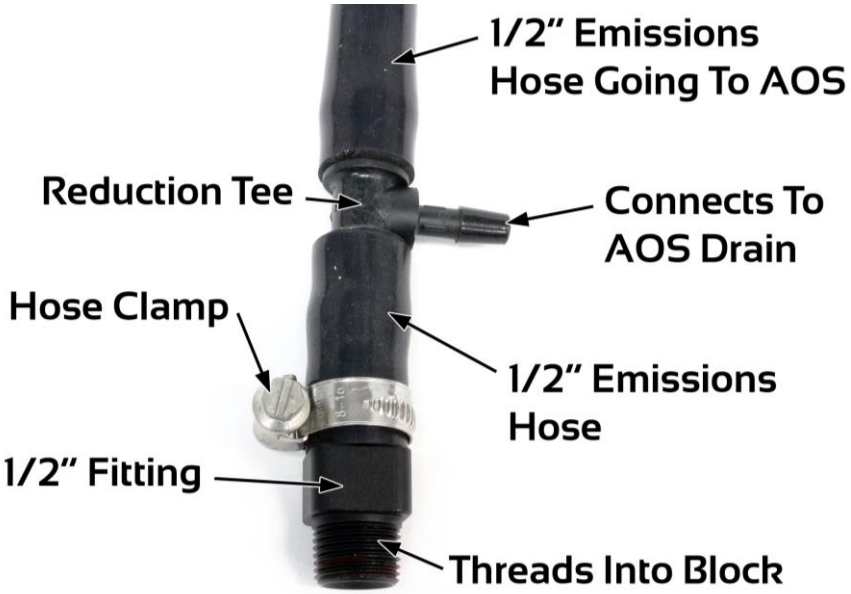


c. Install supplied 1/2” straight 3/8NPT fitting (marked 058) into the hole the PCV valve was removed. **NOTE: Make sure to follow NPT notes above and tighten with 3/4” wrench.**



d. Locate the supplied 1/2" emissions hose and cut a piece that is as close to 1-5/8" as possible. Connect hose to supplied 1/2" reduction tee, then place (1) size 6 hose clamp over the end of, then install hose to fitting on block as shown above.

e. Rotate small leg of tee toward the shock tower or right side of vehicle and tighten clamp securing hose w/tee to engine block. **NOTE: the plastic tee is designed to not need a hose clamp.**



Above picture shows how the assembly with T and fittings looks after its installed.

f. Connect remaining 1/2" hose to top of tee fitting, and route hose toward firewall then across to where the AOS sits.

g. Route hose toward shock tower, then toward AOS as shown below. **NOTE: Make sure to route hose in a way that hose will not kink. Alternatively, you can use supplied 90-degree 1/2" connector to make a sharp turn to clear certain aftermarket intercoolers.**

h. Connect hose to side crank case vent fitting as shown below. Trim hose to length and secure with supplied clamp(or lower profile pinch clamp). **NOTE: Included are two different types of clamps, a worm drive type and a lower profile crimp type. The crimp type clamp requires the use of a nipper/single ear crimping tool to secure. If you are not familiar with this type of clamp, install the supplied worm drive clamp.**.



i. Using picture below as a guide, connect 5/16" emissions hose from the AOS drain fitting (on bottom of AOS), toward the engine as shown.



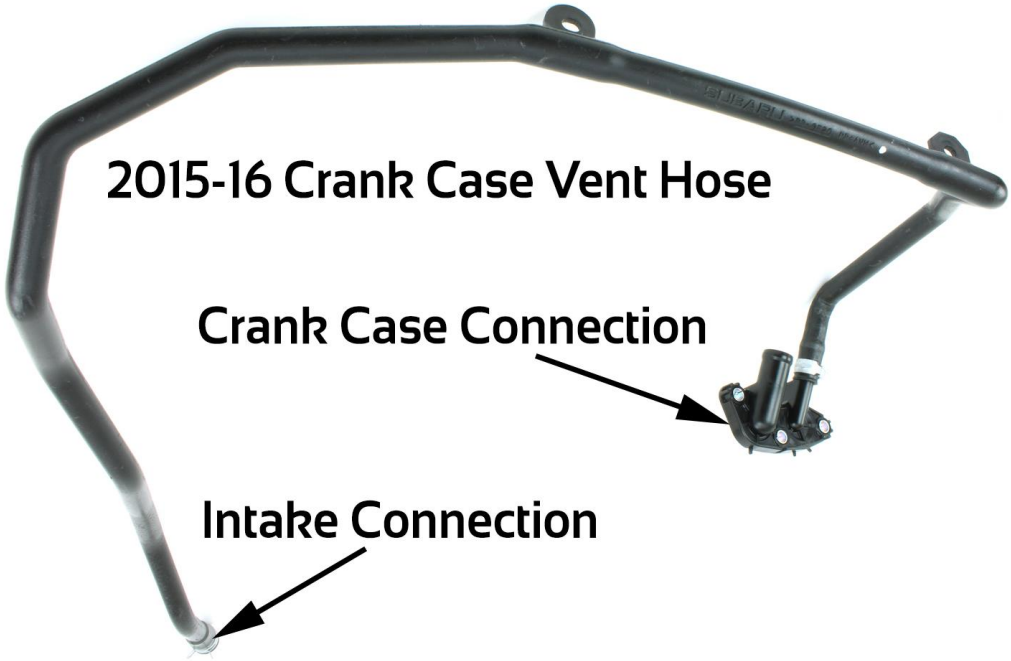
j. Connect other end of hose to the remaining leg of the reduction T at the engine. Secure both ends of hose using supplied size 2 hose clamps. We do not recommend using pinch clamps on this connection for maintenance reasons. Extra clamps are included if you choose to use them.

k. Using supplied zip ties, secure hose to make sure it cannot droop down over time. **NOTE: During this final stage, make sure that hose is on a constant downward slope from the bottom of the AOS to the reduction T installed on the engine.**



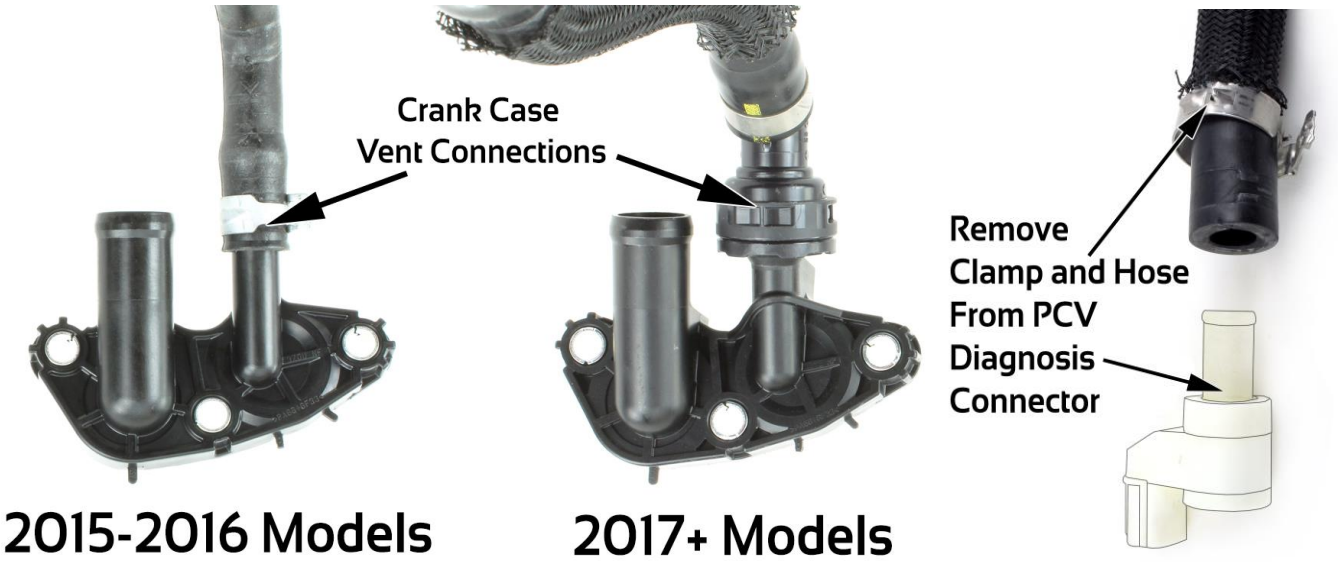
5. Front Crank Case Vent Connection

The front crank case port has two different styles found on 2015-16 WRX's and then the 2017-21 models. Both versions route the front crank case vent to the front port on the AOS. The difference is that the 2015-16 WRX requires replacing the entire OEM hose with the supplied 1/2" hose, and the 2017+ uses the OEM hose to connect to this port. **NOTE: Removal of radiator fan can make this step easier to do. To remove fan, simply remove (2) 10mm bolts on the top of the fan, and one electrical connector at the bottom, then pull fan out of car.**



Above picture shows the front crank case vent hose going from the engine block (right side of picture) down to the intake system (left side of picture)

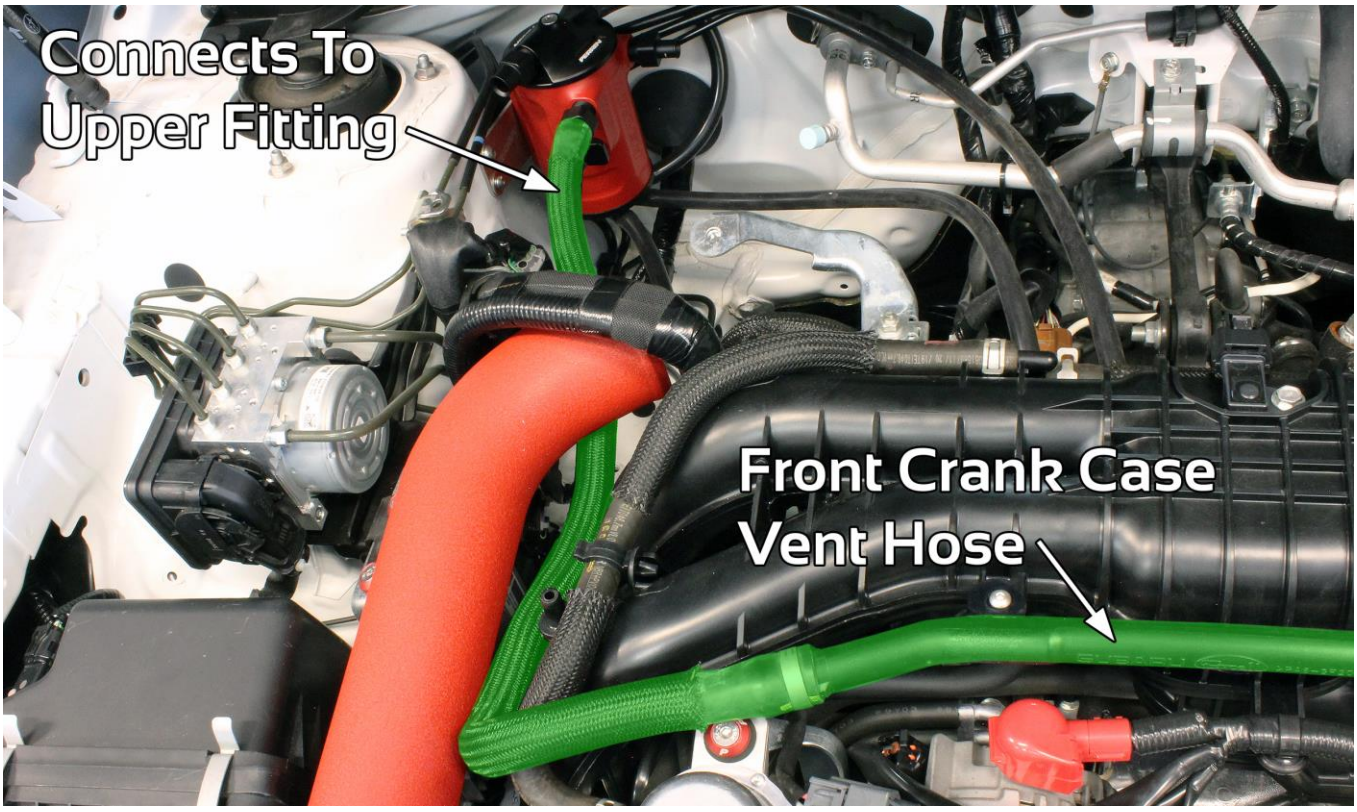
a. For 2015-16 WRX models:
   i. Remove (2) plastic connectors securing front crank case vent hose/tube to front of intake manifold.
   ii. Follow hose toward engine behind the AC compressor and locate clamp. Slide clamp off hose and remove hose from crank case vent connection (plastic part shown in above picture).
   iii. Follow remaining side of hose toward front of engine down to the intake system. Slide clamp off hose and remove entire crank case vent hose from vehicle. **NOTE: Make sure to leave plastic crank case connection installed on engine block.**
   iv. Install supplied 5/8" emissions hose over nipple on intake system and secure with supplied size 6 hose clamp. Leave hose loosely routed toward AOS, this will be connected in future steps.
   v. Install supplied 1/2" emissions hose to crank case vent connection on engine block making sure to secure with supplied size 6 hose clamp. Depending on exact routing, use of the supplied 90-degree connector may be required to ensure there are no kinks in the hose. **NOTE: Tightening clamp may be difficult due to the tight spaces around this fitting. Use a long handled flat head screwdriver or a flexible head 7mm socket.**
   vi. Route 1/2" emissions hose toward AOS and connect it to the fitting on front of AOS above the NPT plug. Make sure and trim hose to length, secure hose to engine with zip ties and secure with supplied size 6 hose clamp. See picture below of engine bay and hose routing.



Above picture shows the front crank case vent hose connection at the engine block, located behind the AC compressor.

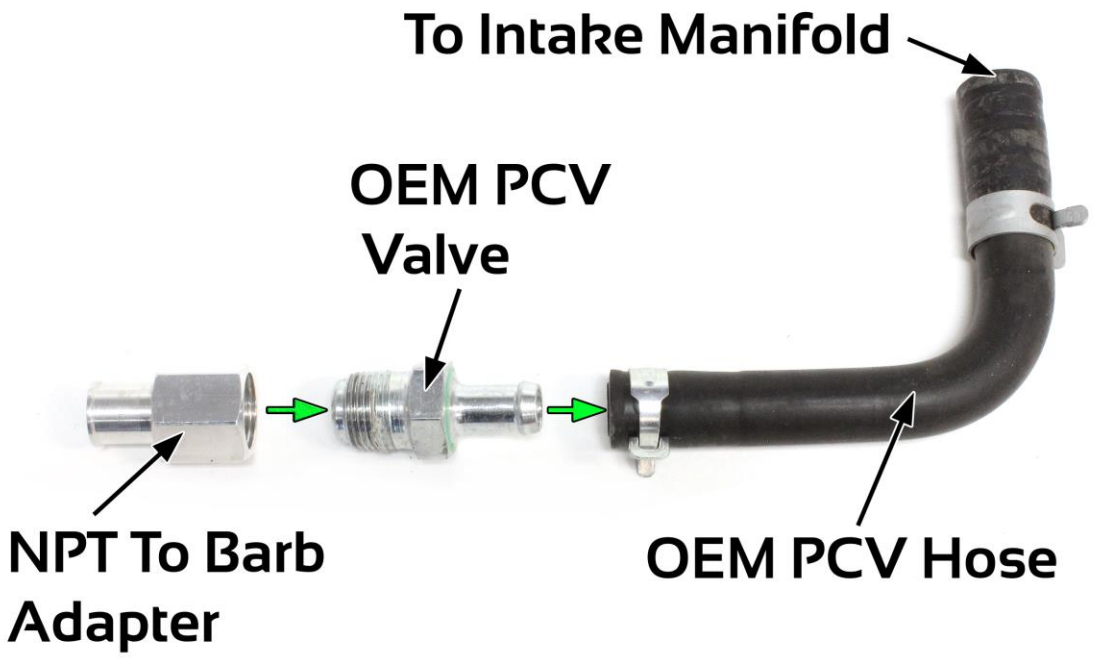
Above picture shows white connector used on the 2017-21 WRX models.

b. For 2017-21 WRX Models:
   i. Locate crank case vent hose connected to front of intake manifold and follow it toward the front of the engine down toward the intake system.
   ii. Remove hose and white connector from intake by pinching button on electrical connector and pulling hose straight up.
   iii. Pull hose up into the engine bay, then remove clamp from hose by using a small screwdriver under the tab and twisting it to free clamp.
   iv. Using picture above as a guide, remove hose from white connector, pull hose up into the engine bay around and route toward AOS.
   v. Install supplied 5/8" hose over nipple of white connector and secure with supplied size 6 hose clamp.
   vi. Reinstall white connector and hose back onto the intake system making sure electrical connection is made. Route hose loosely toward AOS, as this will be connected in future steps.
   vii. Using picture below as a guide, route OEM crank case vent hose toward AOS and connect it to the fitting on front of AOS above the NPT plug. Secure hose with supplied size 6 hose clamp (or lower profile pinch clamp). **NOTE#1: Included are two different types of clamps, a worm drive type and a lower profile crimp type. The crimp type clamp requires the use of a nipper/single ear crimping tool to secure. If you are not familiar with this type of clamp, install the supplied worm drive clamp**. **NOTE#2: Hose will not need to be trimmed to length if routed as shown below.**

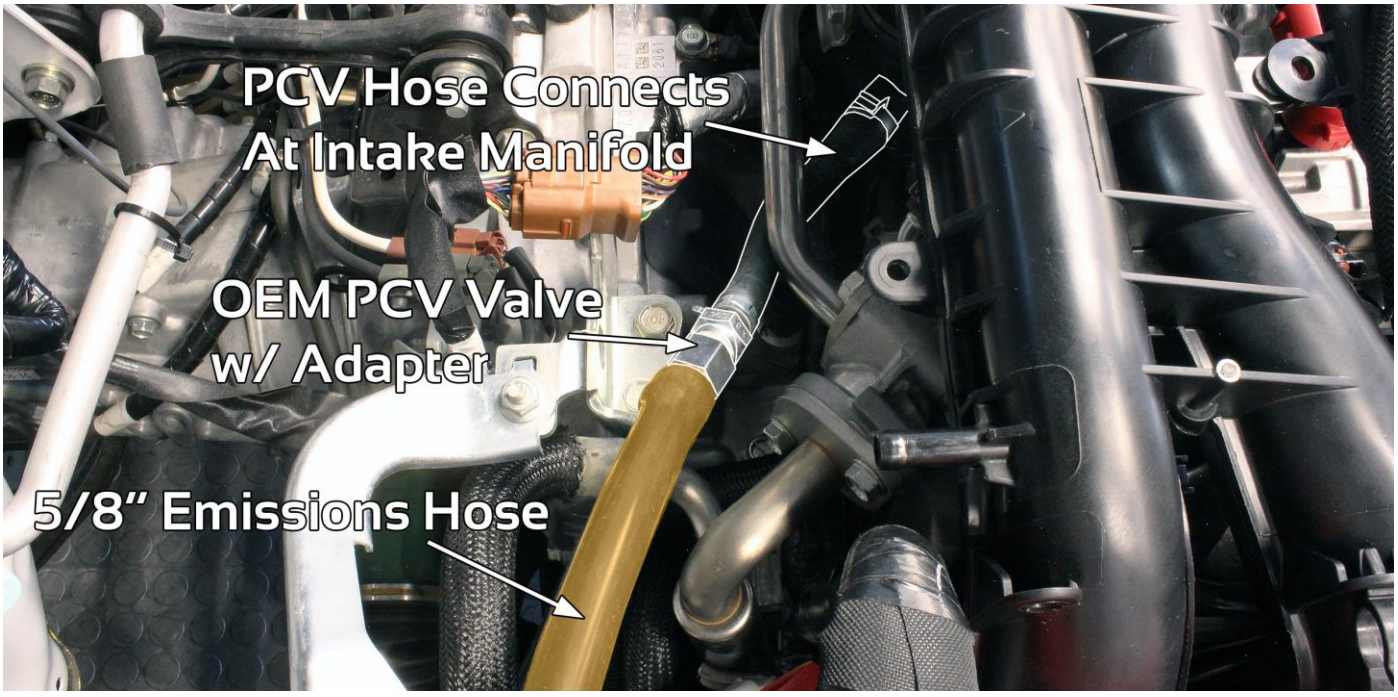


6. AOS Outlet and PCV Connection

a. Install supplied 5/8” barb to female 3/8NPT onto PCV valve (removed from engine in previous steps). **See NPT Notes above regarding installation of these fittings.** This valve is important to install in the correct orientation or boost pressure will be lost and there will be no positive crankcase ventilation occurring.



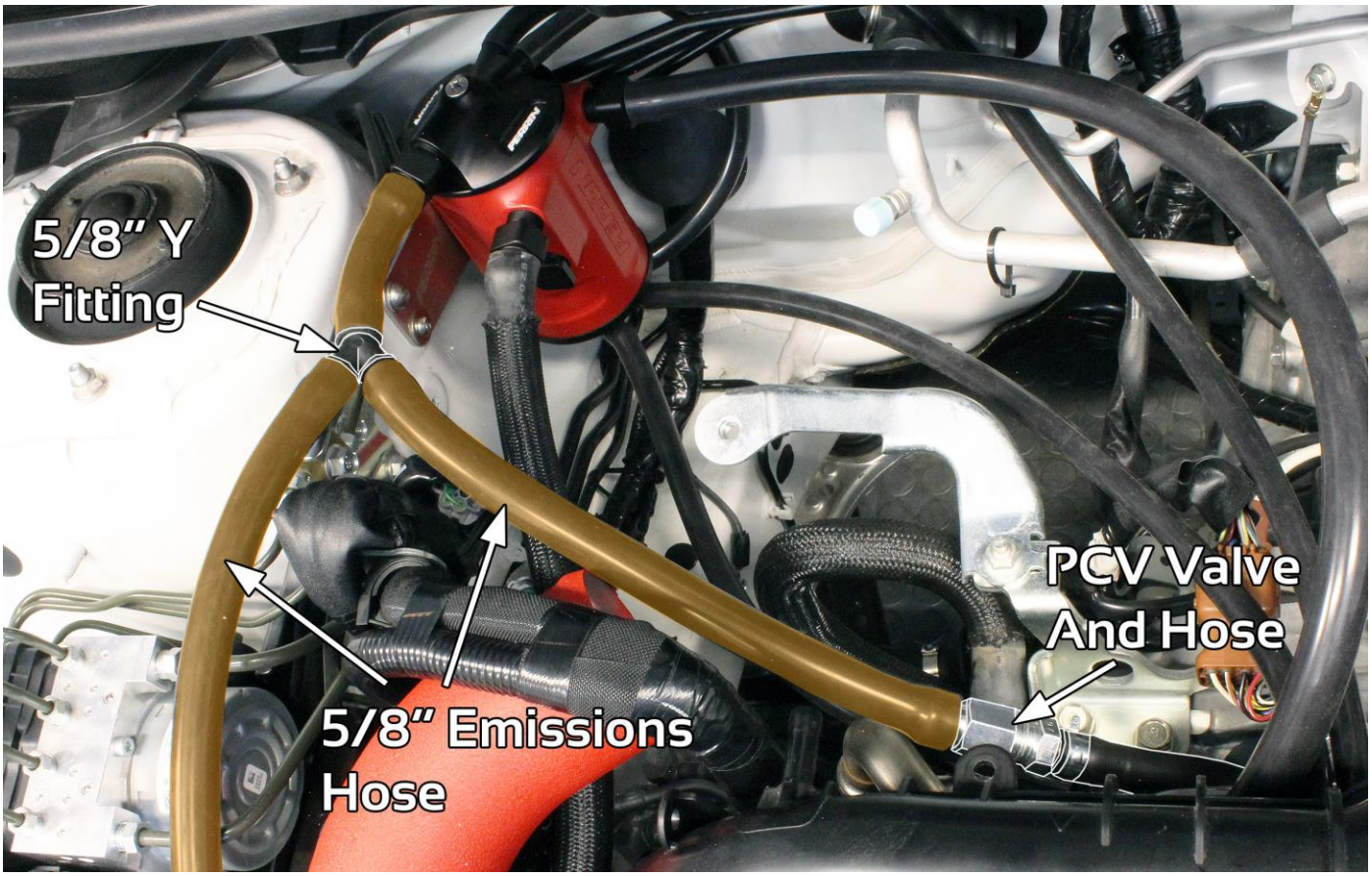
b. Install PCV valve into OEM PCV hose and reconnect hose to the port on the intake manifold that it was attached to. Use both the above and below pictures as a guide as to how this should look when completed.



c. Cut a 12” piece of the supplied 5/8” emissions hose (take from section connected to the intake system) and connect it to the barb fitting on the PCV valve adapter, route hose toward AOS making sure to go under the charge pipe, then secure with supplied size 6 hose clamp (or lower profile pinch clamp). **NOTE: Included are two different types of clamps, a worm drive type and a lower profile crimp type. The crimp type clamp requires the use of a nipper/single ear crimping tool to secure. If you are not familiar with this type of clamp, install the supplied worm drive clamp.**

d. Run previously installed 5/8” hose (connected to intake system) to top fitting on AOS. Trim hose to length and secure with hose clamp (or lower profile pinch clamp). **NOTE#1: Included are two different types of clamps, a worm drive type and a lower profile crimp type. The crimp type clamp requires the use of a nipper/single ear crimping tool to secure. If you are not familiar with this type of clamp, install the supplied worm drive clamp.**. **NOTE#2: Make sure and route hose in a smooth path toward fitting and ensure no kinks in hose occur.**

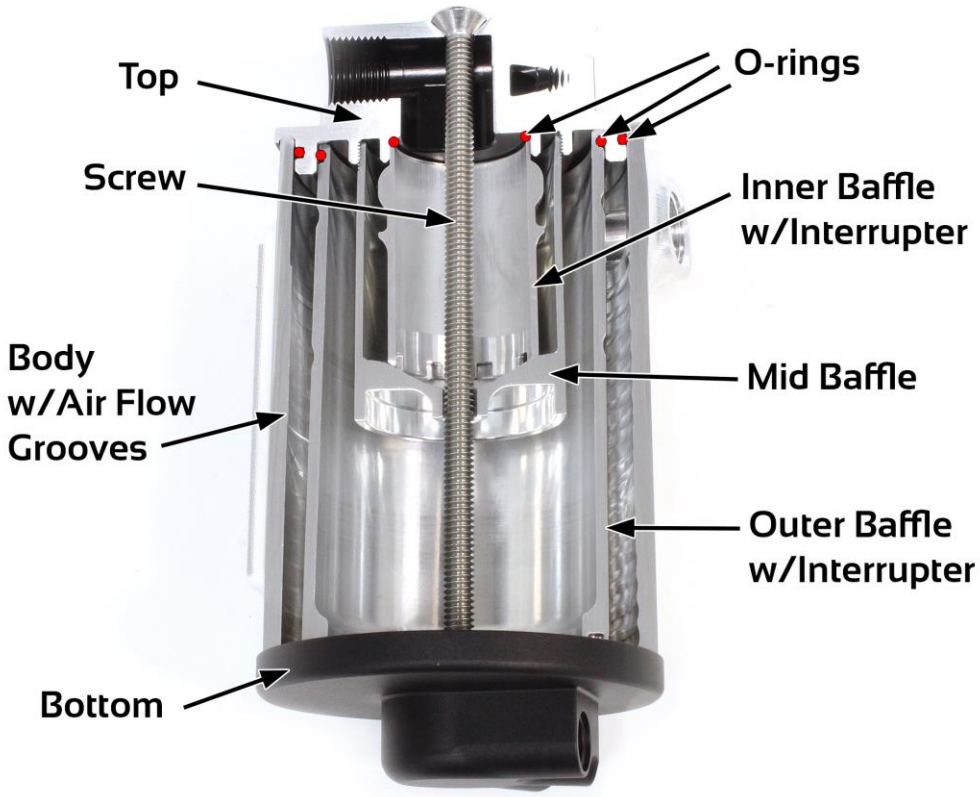
e. Somewhere along the 5/8” hose, cut and install supplied “Y” connector as shown in picture below. **NOTE: The actual location of the cut does not matter, pictures shown are for illustration purposes only.**



f. Connect 5/8” hose from PCV adapter to open leg of “Y” as shown in picture above. The plastic “Y” fitting is designed to not need hose clamps.

7. Final Checks and Testing

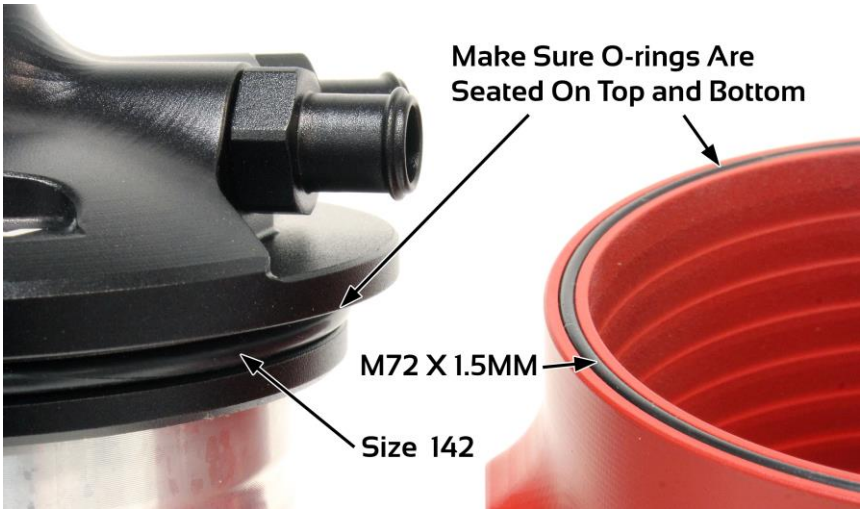
a. Using supplied zip-ties secure all hoses away from extremely hot parts and moving parts of the engine.
b. Check that the AOS drain hose is still in a downhill orientation before proceeding.
c. Reinstall the intercooler and check that all the hoses are clear and not being pinched off still.
d. Start car and listen for any vacuum leaks and look for any check engine lights. If no check engine light appears, let car warm up completely and check for any leaking coolant from hoses and fittings. If no leaks are found, install the intercooler shroud and take car for test drive.
e. After roughly 30 min of driving stop and recheck that there are no leaks found. Fix any leaks before continuing to drive car.
f. After 2-3 weeks of driving check all fittings for leaks (mainly for oil leaks) and fix any leaks before continuing to drive car.



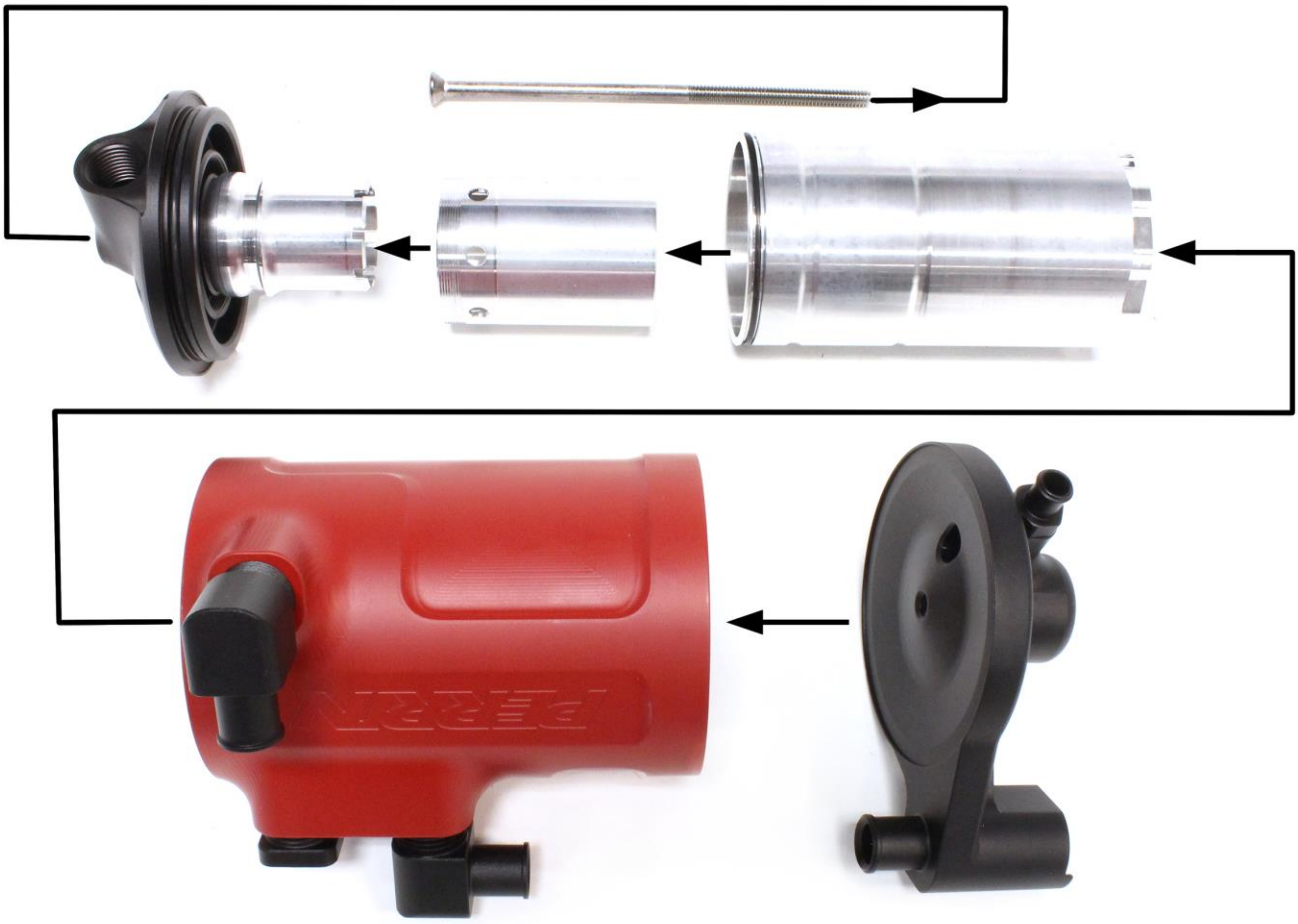
Maintaining your Air Oil Separator

There is very little maintenance required with the PERRIN AOS. From time to time, you may want to remove it and clean out some of the oil residue from the inside. Before taking apart, double check you have the spare O-ring for the body in case you find the O-ring is damaged.

- Disconnect crank case hoses from AOS. Leaving coolant hoses and oil drain hoses attached to the top and bottom, remove bolt from top of AOS, then pull AOS top away from the body and bottom.
- Remove outer baffle w/ interrupter from top (held in with an O-ring), unscrew the mid baffle and then the inner baffle can be removed. NOTE: The inner baffle may fall out with the mid baffle or may require a slight amount of force to pull it out.
- Using paper towels and/or a biodegradable degreaser, clean out as needed until AOS is free of sludge.



- Locate and remove O-rings from the AOS top and AOS body. Inspect them thoroughly and then remove from bottom to ensure it is not cut or cracked. **NOTE: Do NOT use brake cleaner to clean O-ring as damage may occur.**
- Reinstall O-rings into their respective grooves, making sure they are fully seated and not sticking out. Applying a small amount of oil or grease to these will make the next few steps easier to install and align.
- Using the diagram below, start with installing the smallest diffuser into the top, then screw in the next largest one to lock them both in place. Tighten this diffuser firmly by hand and do not use a wrench to tighten. Install the largest diffuser into the top making sure that the O-ring is installed.



- Install the AOS body to the top, then install the entire assembly to the bottom. Make sure that the small O-ring on the bottom of the AOS body is in the groove and not sticking out, or the O-ring can become damaged and create a leak.
- Reinstall the long screw through the AOS, make any alignment changes to the top and body, then tighten screw to hand tight.
- Reattached the crank case hoses as they were before.
- If you find any leaking afterward, check that the O-rings are lined up and check that the AOS body is lined up with groove in bottom.

Questions, Comments and Suggestions Contact: Tech@PERRIN.com
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Call Our Tech Team at 503-693-1702