

PERRIN

Air Oil Separator for 2015+ WRX

2021-03-01

PSP-ENG-609

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 protection 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@PERRINperformance.com

Instant Chat off the main page of www.PERRINperformance.com

Or simply call our tech team at 503-693-1702



WARNING: This product can expose you to chemicals including Lead which is known to the State of California to cause cancer birth defects or other reproductive harm. For more information, go to www.P65Warnings.ca.gov

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:

- Installation of this part should be performed by a qualified technician as this is a complicated and time-consuming installation with many different steps and optional hook ups along the way.
- Read through entire installation before starting this project. There is a decent amount of planning needed for hose routing, and it is important to understand the full installation before beginning installation of the AOS.
- **The included foam filter/diffuser is not recommended to be used in climates that drop below freezing temps. Normal water vapor that travels through the engine can collect on this and freeze, causing a restriction in flow through the AOS. The AOS will function perfectly fine with this piece removed. This diffuser is recommended for race cars that can see excessive oil sloshing into the heads during high "G" cornering, as this helps diffuse any massive amounts of oil that could reach the AOS.**
- We have provided a couple of methods on how to hook this up to your engine. Keep in mind there are many variations of how this can be installed. Consult your tuner or qualified technician before installing this part on your car to better determine how it should be setup on your vehicle.
- 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, you may still experience oil getting past our Air Oil Separator.

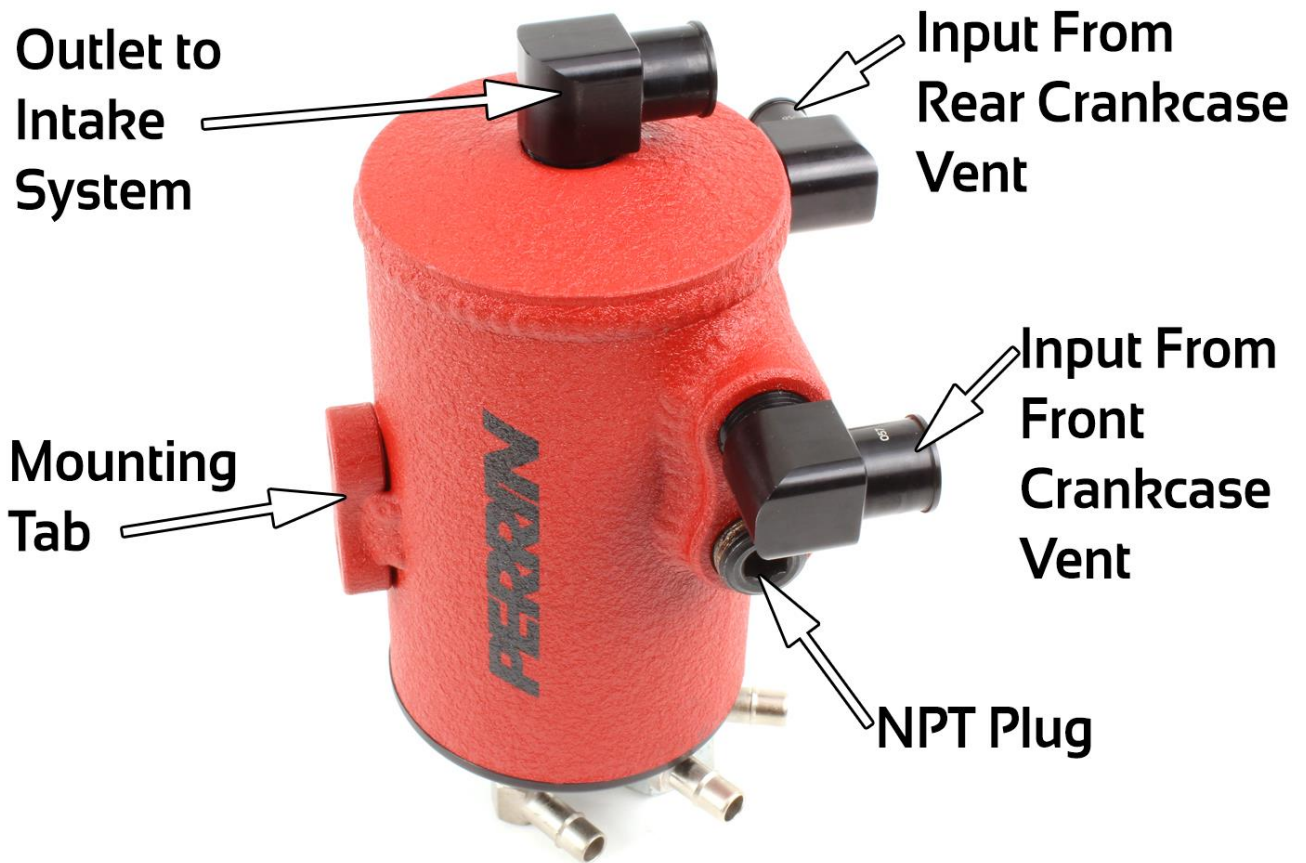
NPT Notes:

- There are many 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: Using a small amount of Teflon tape on threads is a good idea to ensure a proper seal. Teflon tape is rated to work up to 500F and is impervious to all chemicals that your AOS will see. This is highly recommended to use over any other sealant.**
- Angle of 90 degree fittings can be adjusted after tightening, as long as they are not backed off more than 1/4 of a turn.

Included Parts with PERRIN Air Oil Separator:

- (1) PERRIN Universal Air Oil Separator (AOS)
- (1) O-ring
- (1) 2015+ WRX AOS Bracket
- (1) Turbo Sump Restrictor/AOS Drain Adapter
- (4') 5/8" Crank Case Vent Hose
- (7') 1/2" Crank Case Vent Hose
- (4') 5/16" Fuel Hose
- (6') 5/16" Coolant Hose
- (10) #6 or 12-22mm Hose Clamps
- (8) #2 or 8-16 Hose Clamps
- (1) 3/8" Hose Plug
- (1) 3/8 NPT 1/2" Straight Fitting
- (2) 3/8 NPT 1/2" 90 Degree Fitting
- (2) 3/8 NPT 5/8" 90 Degree Fitting
- (1) 3/8 NPT- 5/8" Barb Female Fitting
- (1) 1/8 NPT 5/16" 90 Degree Barb Fitting
- (2) 1/8 NPT 5/16" Straight Barb Fitting
- (1) 5/8" Connector
- (1) 1/2" 90 Degree Connector

- (1) 5/16"-5/16" Connector
- (1) 5/8-1/2" Connector
- (1) 3/8 NPT Plug
- (1) 3/8" NPT Plug
- (2) M8x10mm Flat Head Cap Screw
- (1) M6x14mm Button Head Cap Screw
- (3) M6 Fender Washer Black
- (2) M6 SS Washer
- (2) M6 Nut
- (1) M4 Hex Wrench
- (1) M5 Hex Wrench
- (23) Zip Ties

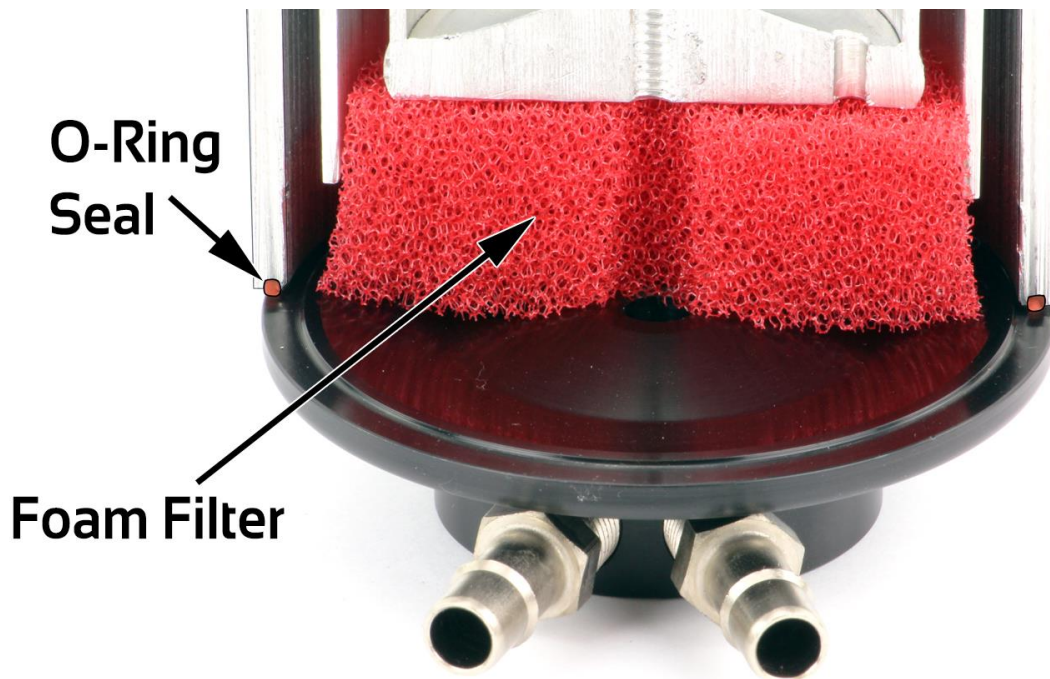


Installation Instructions

1. Using the above diagram as a guide, take note of all fittings, their orientation and our recommended connections.
2. Make sure vehicle has completely cooled off.
3. Remove plastic engine cover, then remove intercooler or any boost tubes connected charge pipe and throttle body. This is necessary to gain access to the rear crank case vent/PCV system and coolant tap for AOS.

4. Assembly of Air Oil Separator

- a. Each AOS is pre-assembled with M6 bolt, nylon seal, O-ring and foam filter inside for packaging purposes. To ensure your AOS has an oil tight seal, ensure that bolt is hand tightened before finishing installation. Failure to tighten M6 bolt will lead to vacuum leaks and oil leaking out bottom of can.
- b. **See above note regarding the use of the foam filter/diffuser in your AOS.**

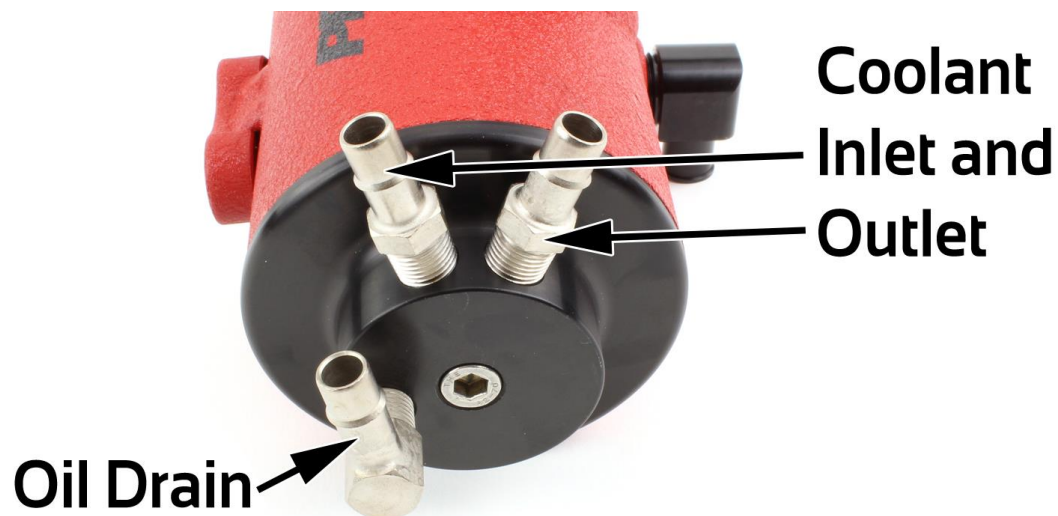


Cutaway Showing Internals of AOS

- Removal of bottom may be necessary to accurately tighten fittings. IF this is done, or bolt is loosened too far, the o-ring may become dislodged from the groove in the AOS body. Before tightening bottom, ensure that the o-ring is sitting equally around groove in bottom of AOS body. **NOTE: Some powder coating will be in the groove and this is ok as the o-ring will seal once tightened.**
- Orientate bottom to desired position (based on steps below) and hand tighten bolt. Double check that bottom fits evenly all the way around the bottom of the body. **NOTE: A slight mismatch can occur if bottom is pushed to one side or to the other. Make sure bottom is relatively centered over body while tightening, or an oil leak can occur.**
- These above steps may need to be done a couple times throughout the installation.

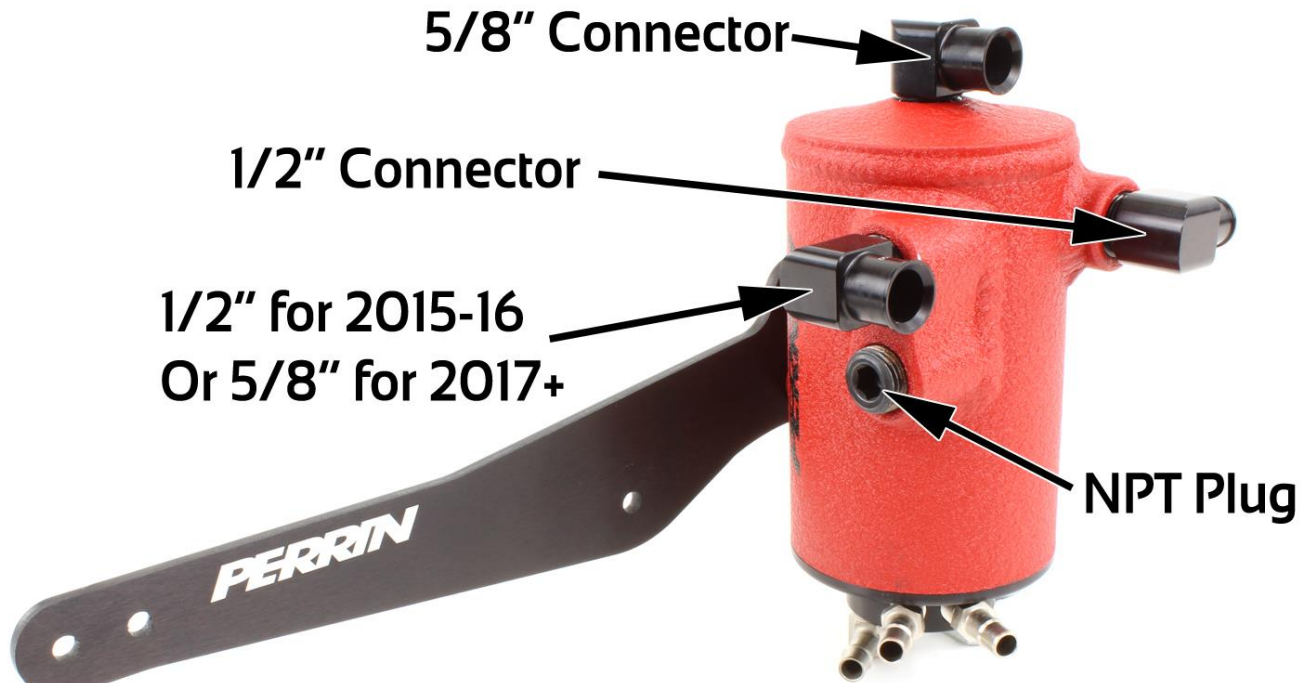
5. Orientation of Fittings on Bottom and Body

- Using diagram below and NPT fitting notes above, install (2) 5/16" Straight NPT fittings into side ports on bottom. **NOTE: Removal of bottom is recommended to tighten fittings properly in a vise.**
- Using diagram below and NPT fitting notes above, install 5/16" 90 degree fitting into bottom. It is important to make sure that the fitting is oriented similarly as shown when fitting is tight. If fitting is tight and doesn't line up properly, unscrew fitting half a turn and re-tighten until it lines up. This may take a couple of times until fitting lines up and is tight enough to seal. **NOTE: The orientation of fitting may need to be adjusted after AOS is mounted to chassis. The diagram provided should get you very close to the correct alignment.**



- Using diagram below and NPT notes above, install (1) 5/8" 90 degree fitting (marked 057) into port on top of AOS, making sure that when fitting is tight, that it aims 180 degrees away from mounting flange.
- Using diagram below and NPT notes above, install (1) 1/2" 90 degree fitting (marked 056) into single side port on AOS, making sure that when fitting is tight, that it aims away from body and is parallel to the bottom.

- e. Using diagram below and NPT notes above, install (1) 3/8NPT plug into the bottom port on the dual port side on AOS.
- f. Using diagram below and NPT notes above, install one of two fittings (see below) into upper port on dual port side of AOS, making sure it aims away from body and is parallel to the bottom.
 - i. 2015-2016 models must install 1/2" 90 degree fitting (marked 056) into upper port on AOS body.
 - ii. 2017-2019 models must install 5/8" 90 degree fitting (marked 057) into upper port on AOS body.



Take Note Of Orientation Of Fittings

6. Initial Air Oil Separator Mounting

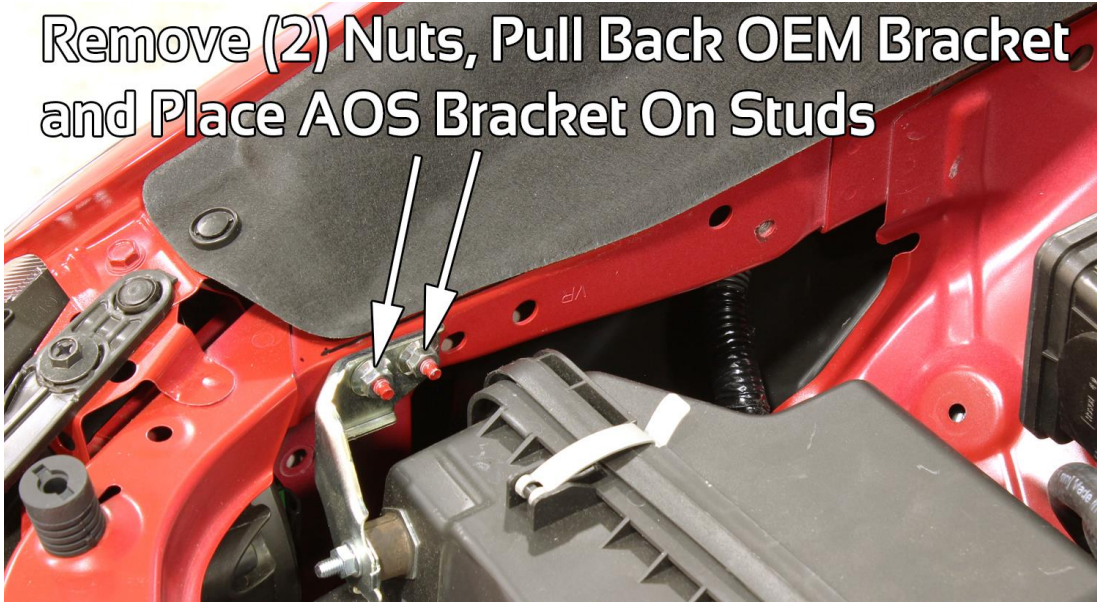
The supplied bracket mounts the AOS in a proper location for it to clear most all commonly installed components as well as mounting it high enough for the drain to work properly. If a custom mounting location is required, the AOS needs to meet two main criteria. First, the oil drain port needs to be higher than the engine port used for draining oil back into the engine. Secondly, AOS needs to be mounted vertically like in above picture. It will not function properly if mounted on its side or at an angle.



- a. Using supplied M8 flat head bolts, mount AOS to bracket as shown and tighten bolts.
- b. If removed in previous step to install fittings, install AOS bottom back to body making sure to follow the instructions in Step .3

- c. Connect supplied 1/4" Fuel hose to Oil drain fitting and secure with supplied clamp. This hose will be trimmed to length in future steps.
- d. Connect both ends of the supplied 5/16" coolant hose to coolant feed fittings (making a large loop), and secure with supplied clamps. This hose will be trimmed to length in future steps.

Remove (2) Nuts, Pull Back OEM Bracket and Place AOS Bracket On Studs



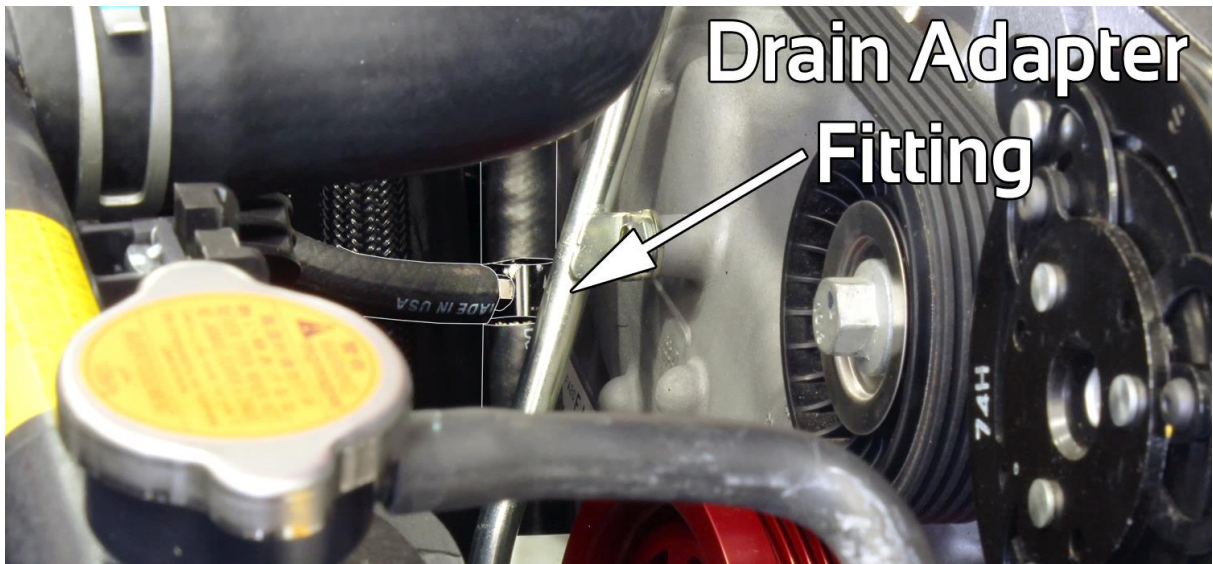
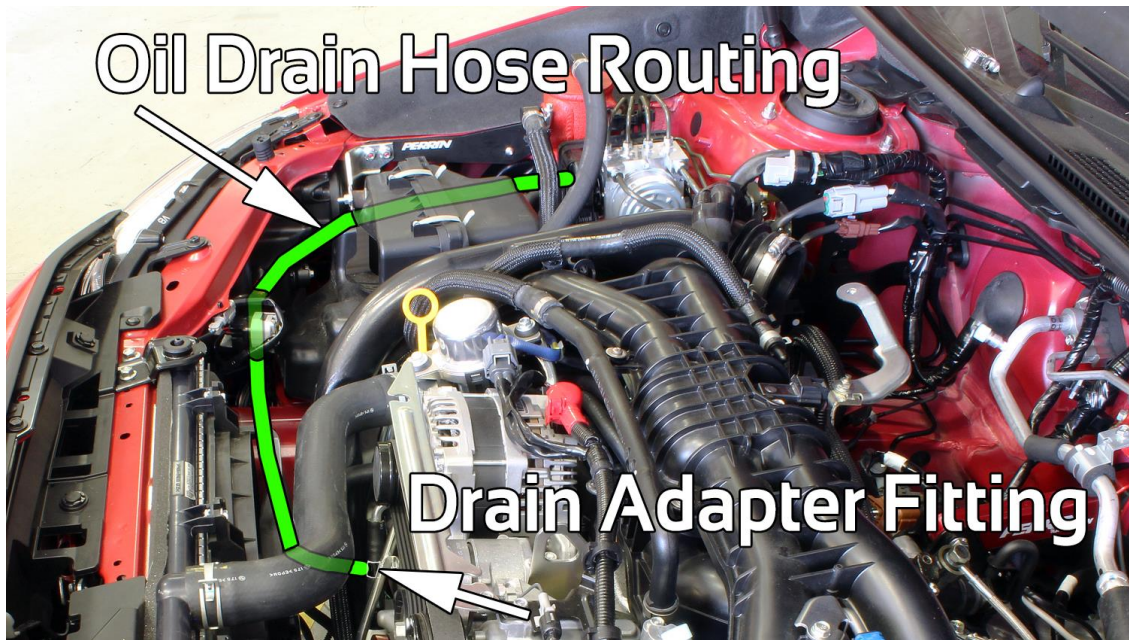
- e. Locate bracket securing intake chassis and remove (2) nuts. **NOTE: IF aftermarket intake is installed, this step may vary slightly.**
- f. Pull bracket back and slide supplied bracket behind it. Reinstall OEM bracket and install nuts but leave them loose for now.
- g. Thread supplied M6 bolt and washer, through bracket into chassis but leave bolt loose. Do not install M6 nuts removed in previous step at this time. AOS may need to be removed from chassis for further adjustments. **NOTE: If aftermarket intake was installed that did not utilize the OEM nuts shown below, use supplied M6 nuts and washers to secure.**



7. AOS Drain Adapter/Sump Restrictor Fitting Installation

The PERRIN AOS requires a drain to be installed for it to function properly. Our adapter that is included must be installed in the proper orientation as shown in the pictures below. Take note that there are three ways to install this depending on the year of car you have. In all applications, the important thing is that the adapter is installed along the turbo sumps vent hose. It can be above or below the diagnosis connectors, that is not critical to its functionality.

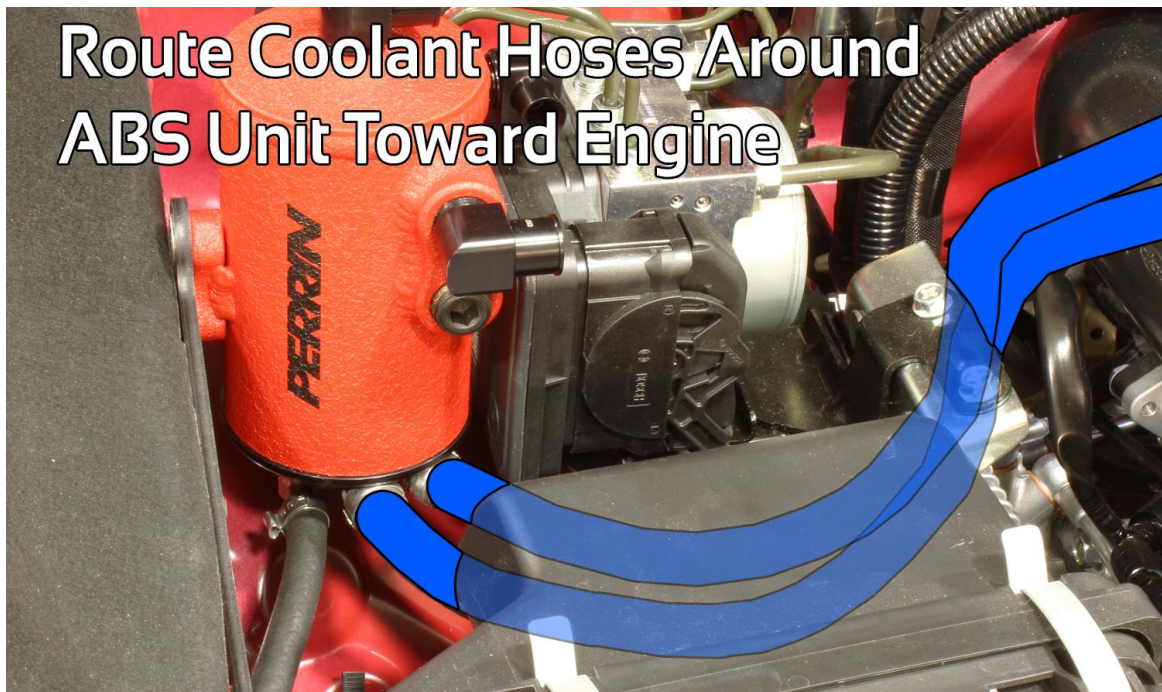
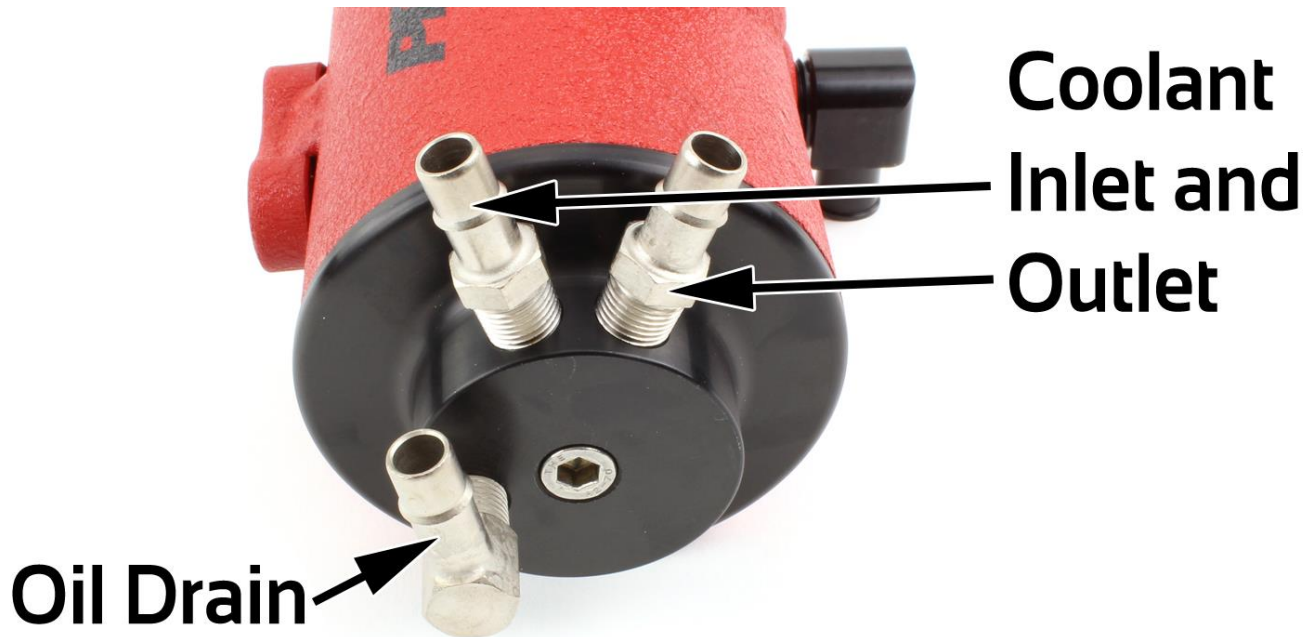
Included with this kit is the PSP-ENG-628 with a full set of instructions. Please follow the instructions included with that part (making sure to install the fitting into the side not the plug) then proceed with steps below.



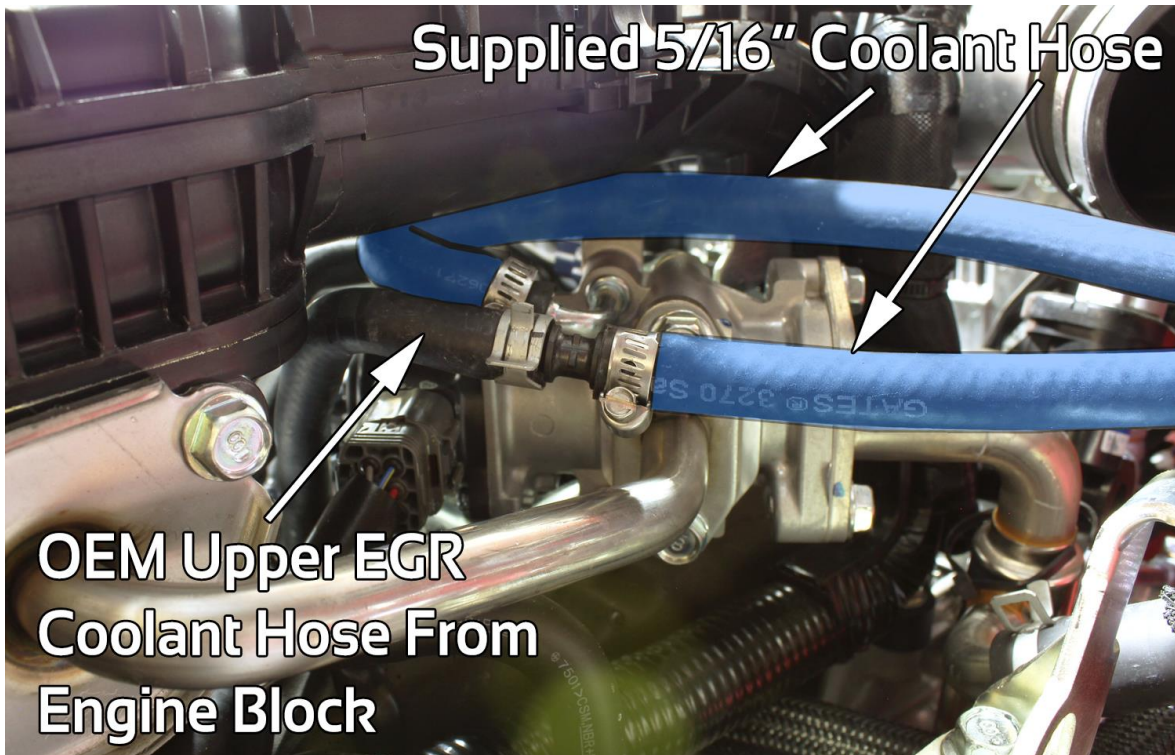
- Using above pictures as a guide, route 5/16" fuel hose from the AOS drain fitting (on bottom), around intake system, toward the front of the car, across radiator fans toward the oil drain adapter/restrictor fitting.
- Loop hose in a smooth way toward fitting and trim hose to fit. Secure hose to fitting using supplied hose clamp.
- Using supplied zip ties, secure fuel hose to radiator fan structure and other locations leading back to the AOS. **NOTE: During this final stage, make sure that hose is on a constant downward slope from the bottom of the AOS to the PERRIN Drain Adapter/Sump Restrictor.**

8. Coolant Feed Connections

The coolant connection is necessary as it helps reduce water vapor and sludge that can build up in AOS. The easiest connection to get coolant from is the EGR Valve, which is described below. If a custom install is required or this valve has been removed, an alternative location is the coolant connection on the throttle body. During these next few steps, you may choose to re-orient the AOS bottom and drain fitting. If this is done, make sure and follow the notes regarding NPT fittings and the assembly instructions of the AOS. **NOTE: Installing coolant connection will cause some coolant loss and coolant spill. Make sure to top off coolant after installation is complete.**



- Route both coolant hoses around ABS unit, toward engine, and then towards back side of intake manifold.
- Locate the EGR valve assembly and coolant hoses that feed it, on back side of intake manifold.
- Slide back pinch clamp on upper hose and disconnect from EGR Valve. Install supplied 5/16" connector into OEM hose and secure with pinch clamp. **NOTE: Some coolant will come out of the hose when removed, be prepared to catch and clean up any that spills out.**
- Route one of the coolant hoses from the AOS (doesn't matter which one) to the 5/16" connector, trim hose to fit and secure with supplied clamp. See picture below showing what this connection looks like.
- Route remaining coolant hose from AOS to upper coolant pipe on EGR valve, trim hose to fit and secure with supplied clamp. See picture below showing what this connection looks like.
- Using supplied zip ties, secure coolant hoses along engine, and then to chassis, making sure to leave some slack between chassis and engine.



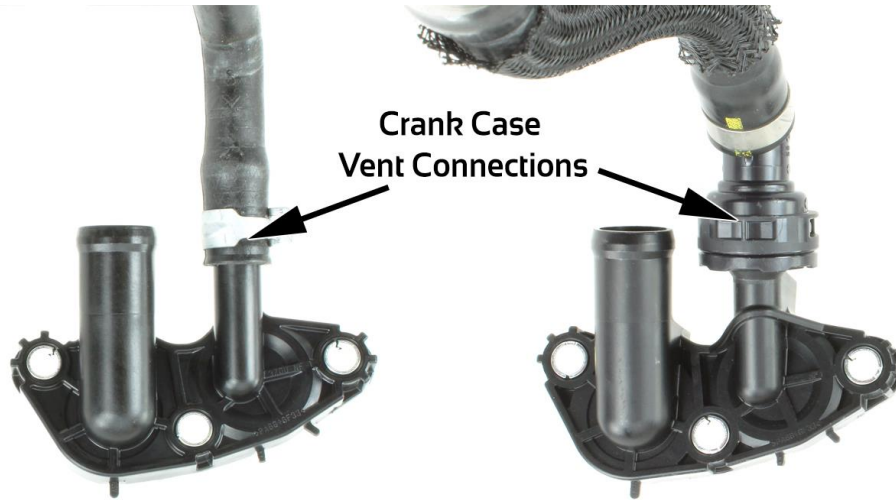
9. Final Air Oil Separator Mounting

- Double check AOS orientation and that bottom has been assembled correctly.
- While pushing down on AOS top, tighten M6 bolt in middle of bracket.
- Install intake support bracket over studs and over AOS bracket. Tighten M6 nuts removed in earlier steps. **NOTE: Included with the PERRIN AOS are extra M6 nuts and washers to be used in the cases where the OEM hardware was misplaced or not used with aftermarket intake.**

10. Front Crank Case Vent Connection

The front crank case port has two different styles found on 2015-16 WRX's and then the 2017+ models. Both versions route the crank case vent to a side port on the AOS. The difference is that the 2015-16 WRX requires replacing the entire OEM hose with a supplied 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.**



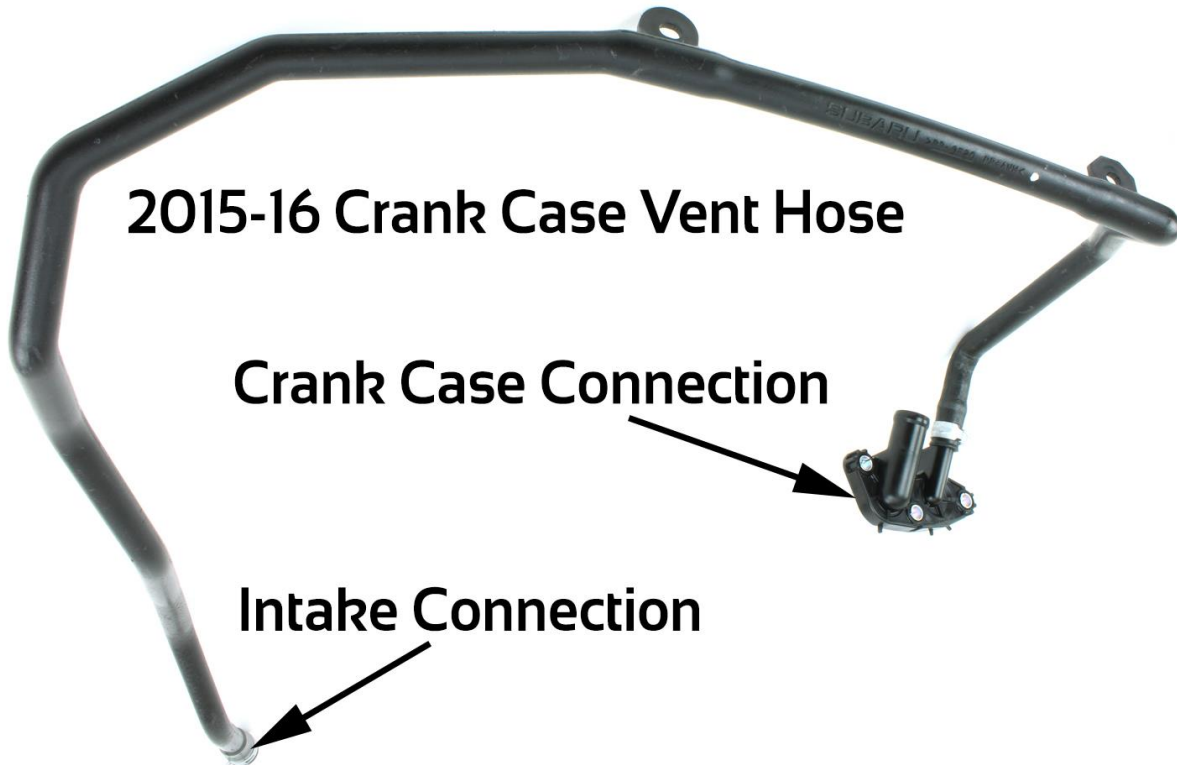


2015-2016 Models

2017+ Models

Front Crank Case Vent

- a. For 2015-16 WRX models:
- i. Remove (2) plastic connectors securing crank case vent hose/tube to front of intake manifold.
 - ii. Follow hose toward engine behind the AC pump 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, making sure to leave plastic crank case connection installed.
 - iv. Install supplied 5/8" hose over nipple on intake system and secure with hose clamp. Leave hose loosely routed toward AOS, this will be connected in future steps.
 - v. Install supplied 1/2" hose to crank case vent connection making sure to secure with supplied 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 do to the tight spaces around this fitting. Use a long handled flat head screw driver or a flexible head 7mm socket.**
 - vi. Route 1/2" crank case vent hose toward AOS and connect to 1/2" installed fitting on front of AOS (marked as input from front crank case). Make sure and trim hose to length, secure hose to engine with zip ties and secure with supplied hose clamp. See picture below of engine bay and hose routing.



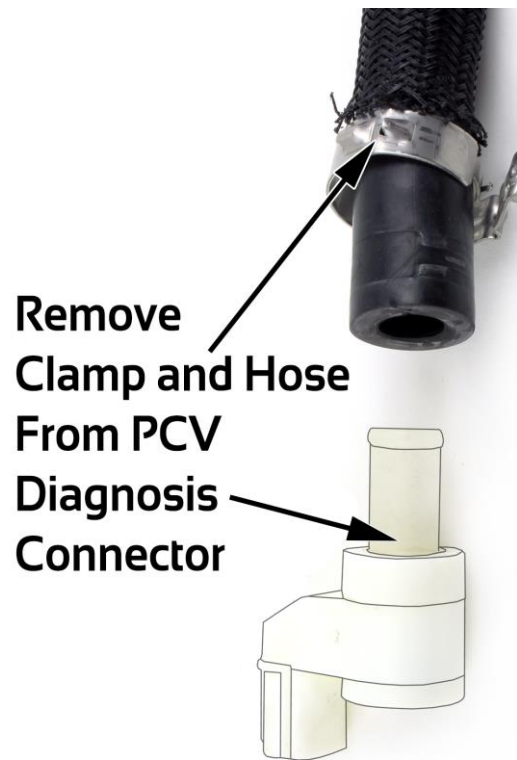
2015-16 Crank Case Vent Hose

Crank Case Connection

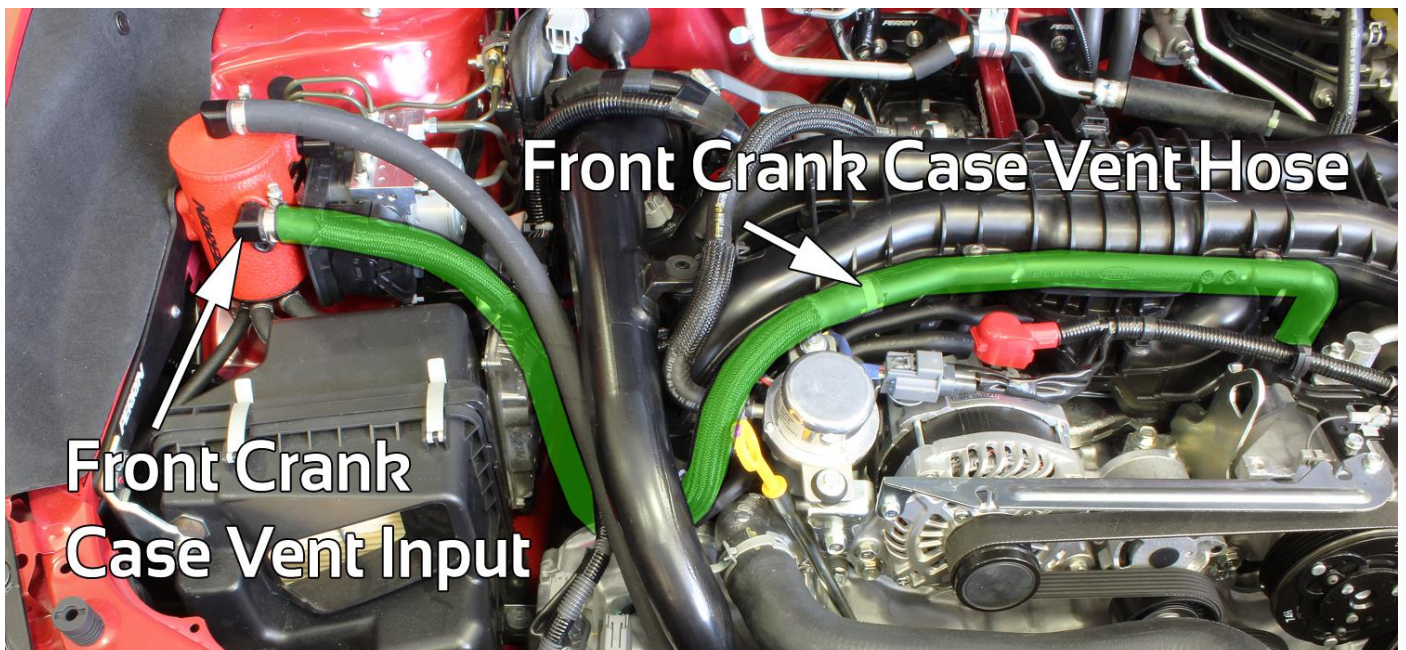
Intake Connection

b. For 2017+ 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. Remove clamp from hose by using a small screw driver under the tab and twisting to free clamp.
- iv. Remove OEM crank case vent hose from white connector and route toward AOS. **NOTE: This hose will eventually connect to top fitting (outlet) on AOS.**

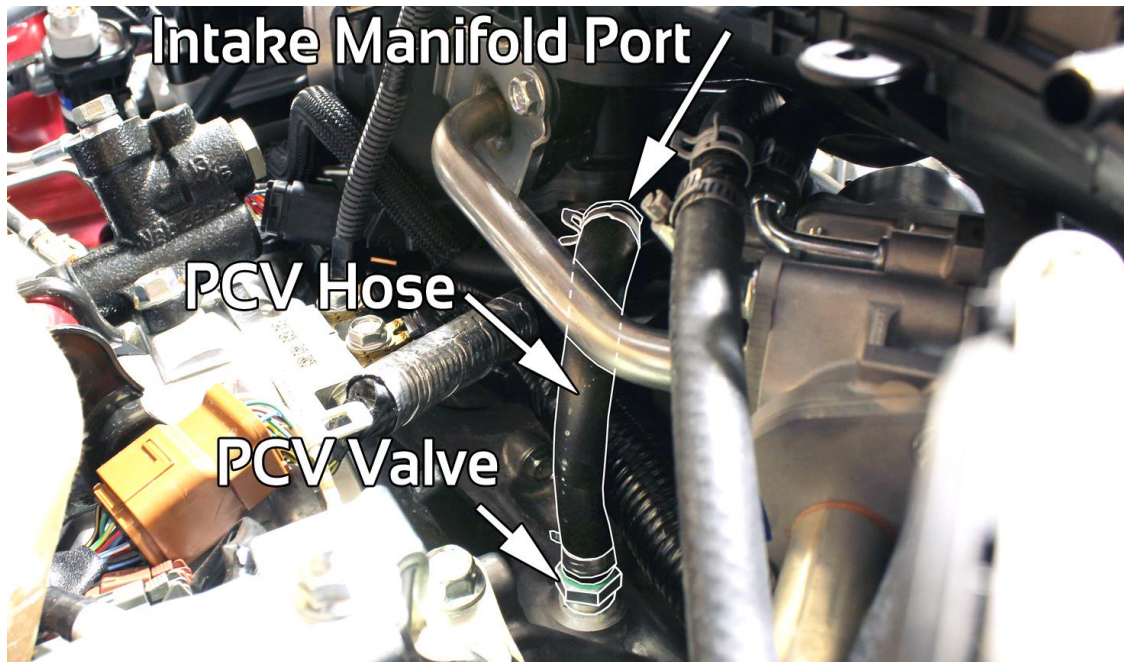


- v. Install supplied 5/8" hose over nipple of white connector, secure with hose clamp and reinstall back to intake system making sure electrical connection is made. Route hose loosely toward AOS, as this will be connected in future steps.
- vi. Route OEM crank case vent hose toward AOS and connect to 5/8" installed fitting on front of AOS (marked as input from front crank case). OEM hose does not need to be trimmed to length but can be if desired. Secure hose to engine with zip ties and secure with supplied hose clamp. See picture below of engine bay and hose routing.

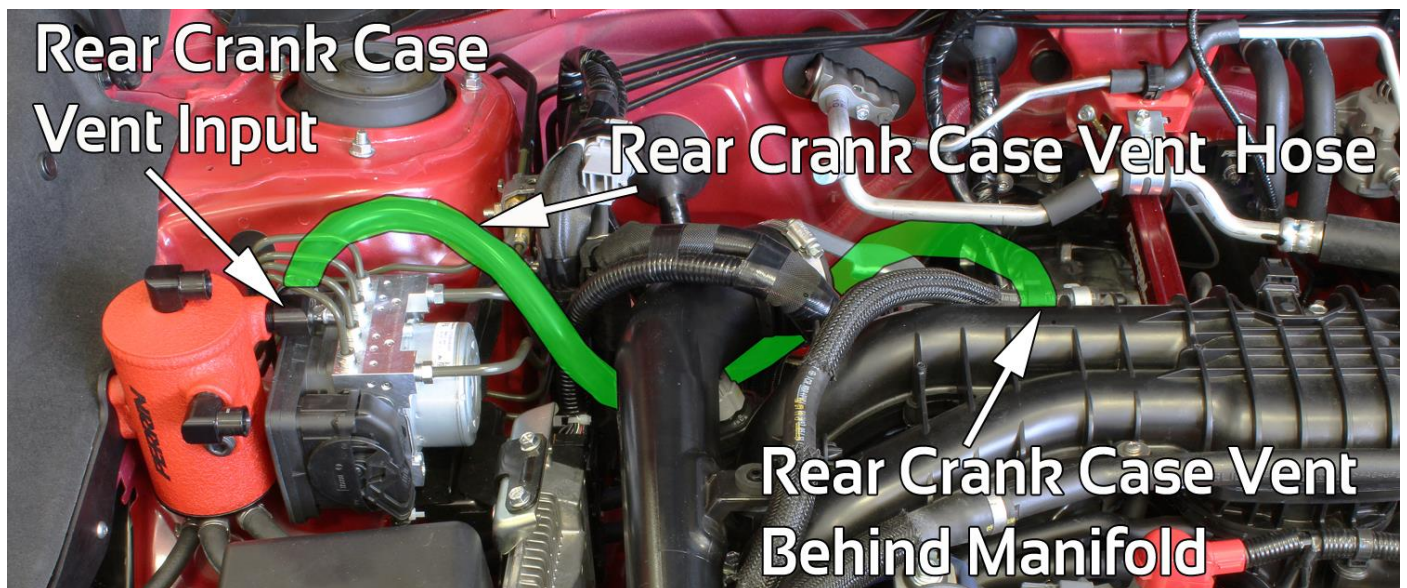


11. Rear Crank Case Vent Connection

The rear crank case vent is located behind the intake manifold toward the right side of the engine. This port has the OEM PCV screwed into and must be removed and supplied fitting installed.



- Locate PCV valve threaded into rear crank case vent. Use a 19mm socket and extension (a universal joint can make this a little easier) to reach around EGR pipe. **NOTE: The PCV valve will be reused in later steps.**
- Install supplied 1/2" straight 3/8NPT fitting (marked 058) following NPT notes above. Tighten using 3/4" wrench.
- Connect supplied 1/2" hose to fitting and secure with clamp.
- 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.**
- Connect hose to side crank case vent fitting as shown below. Trim hose to length and secure with supplied clamp.

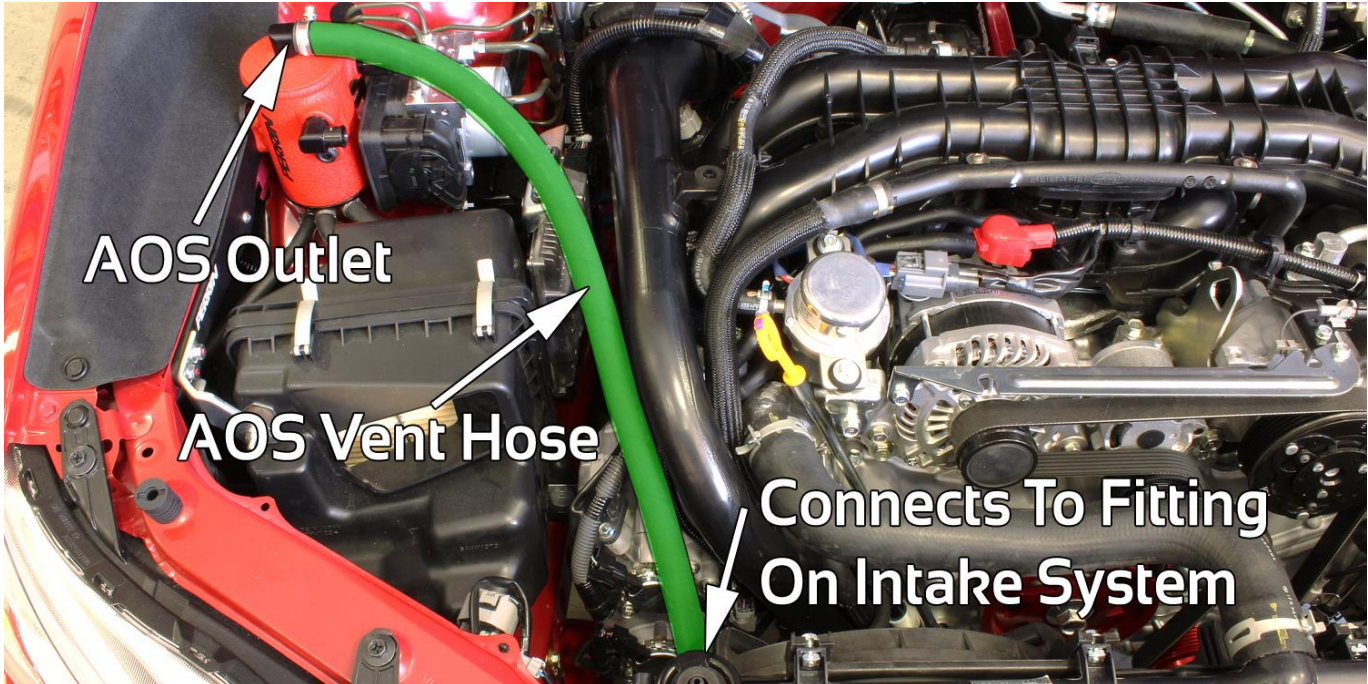


12. AOS Outlet and PCV Connection

The AOS outlet is the top threaded hole on body. This connection needs to be connected to the turbo intake system in front of the turbocharger, and behind the air filter. **NOTE: We do not recommend leaving this fitting open as oil and oil vapor can still come out under certain conditions, which can create a mess or combust if exposed to extreme heat.**

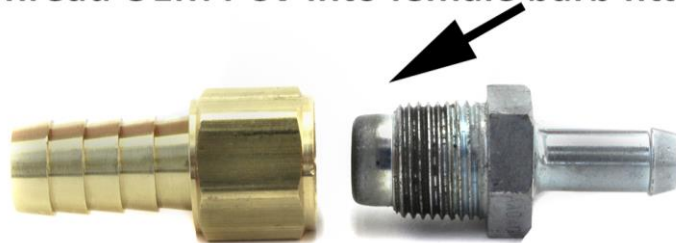
There are two options to connect the AOS to your intake system. One is installing it with the PCV system functioning, and the other is removing the PCV system. The PCV is a 1-way valve that provides crank case ventilation during idle and light load situations, but it can also be a partial source of oil vapors getting into sucked into the intake manifold. For most street driven vehicles, installing the PCV valve is a good idea, but for built motors and track cars, we recommend removing this. Read through all instructions below, then read PCV Delete Instructions, before deciding how to proceed.

- a. Route previously installed 5/8" hose (installed during step 10 to intake) to top fitting on AOS. Trim hose to length and secure with hose clamp. **NOTE: Make sure and route hose in a smooth path toward fitting and ensure no kinks in hose occur. Also make sure hose clamp is not on top of the hose as it can come in contact with hood liner.**

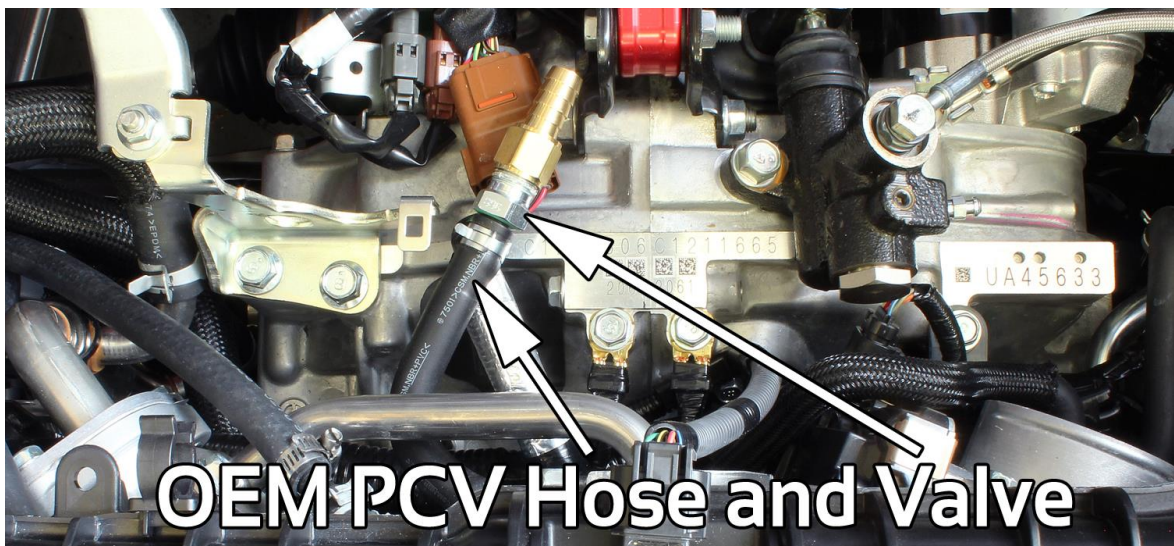


- b. Along the 5/8" hose, cut and install supplied "Y" connector as shown. **NOTE: The actual location of the cut does not matter, pictures shown are for illustration purposes only.**
- c. Locate PCV removed from engine block in earlier step and install into supplied female connector as shown below. See NPT Notes above regarding installation of these fittings. This valve is important to install as described or boost pressure will be lost and there will be no positive crankcase ventilation occurring. **NOTE: The PCV connection can be skipped for certain applications, see special note below regarding this.**

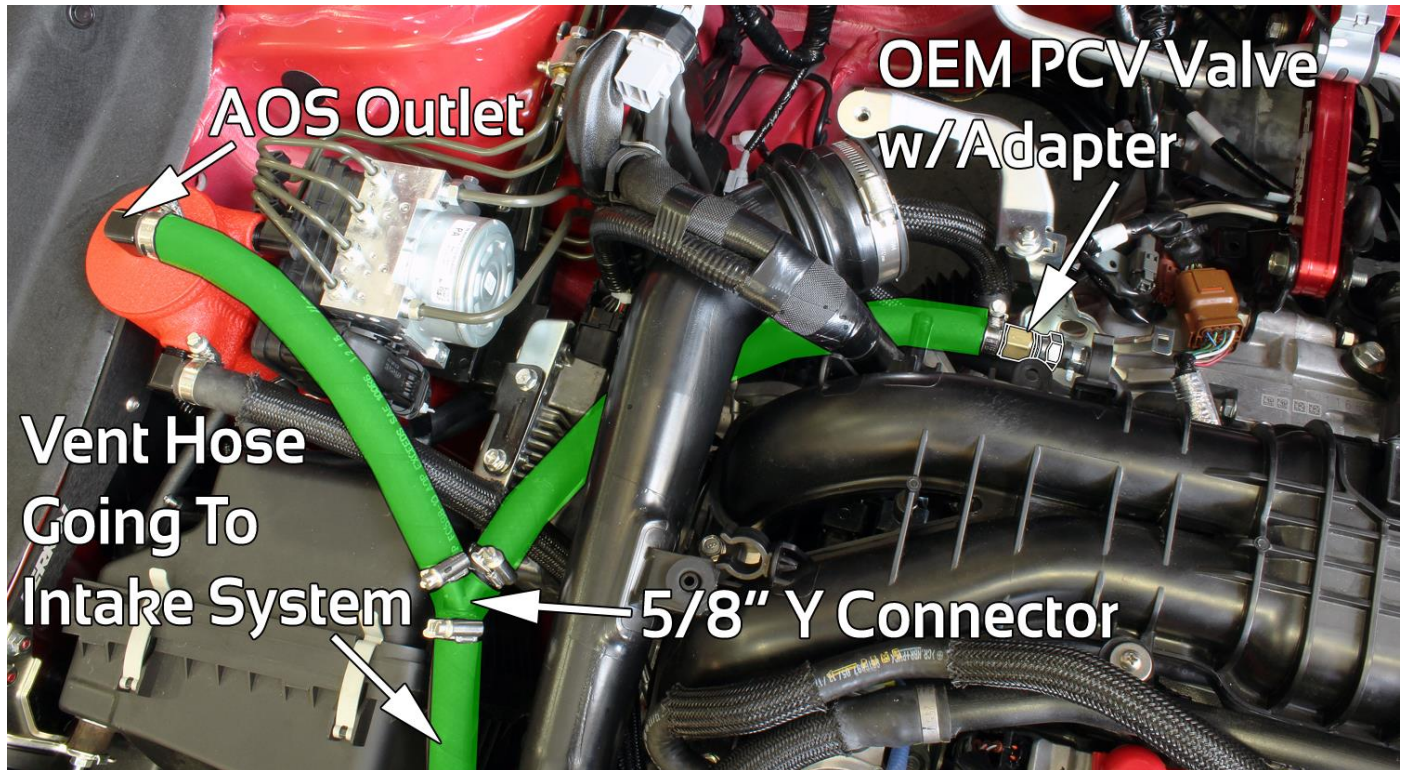
Thread OEM PCV into female barb fitting



- d. Locate vacuum hose on intake manifold (the PCV was connected to) and connect PCV assembly to it as shown, then secure with OEM pinch clamp. **NOTE: OEM PCV nipple connects to hose just as it was in stock form.**



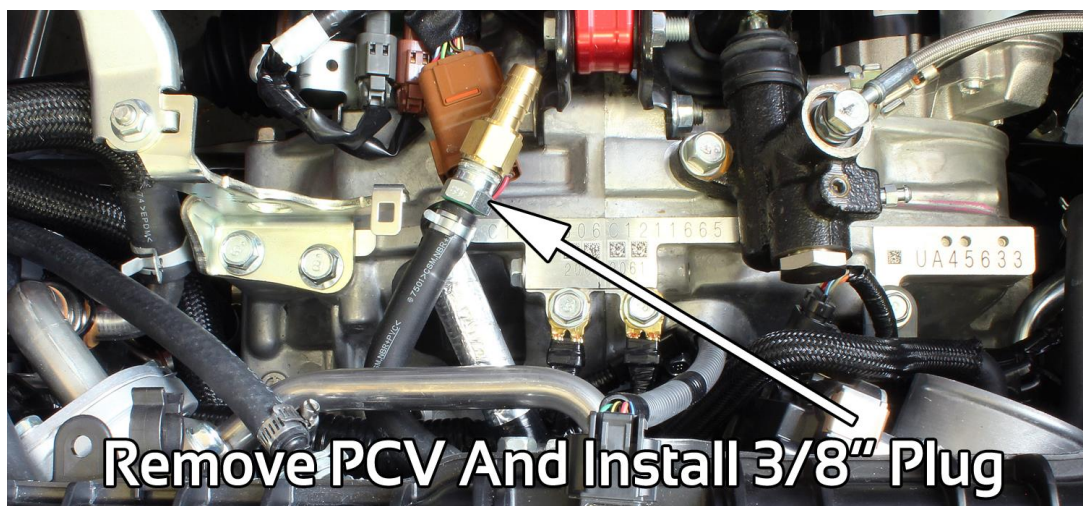
- e. Connect supplied 5/8" hose to fitting and secure with supplied clamp.
- f. Route hose toward "Y" fitting and trim hose to length, then sure with supplied clamp.
- g. Using supplied zip-ties secure all hoses away from extremely hot parts and moving parts of the engine.



PCV Delete for Cars with Built Engines

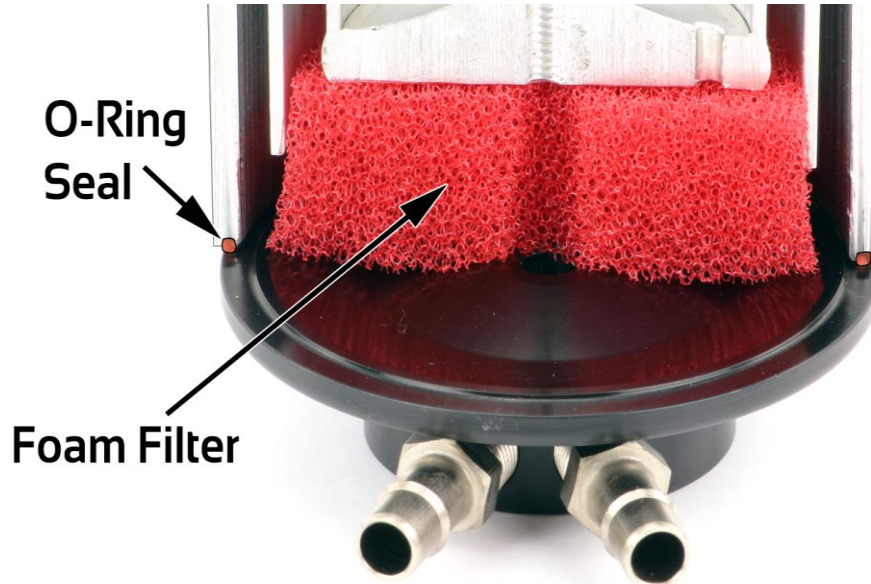
While we do not recommend this for street driven cars, some racecars may want to disconnect the PCV side of the system as this can lead to some oil vapors getting into the intake manifold. For those who understand these risks and understand the reason for removing the PCV connection, please follow the below alternate instructions.

- a. Route previously installed 5/8" hose (installed during step 10 to intake) to top fitting on AOS. Trim hose to length and secure with hose clamp. **NOTE: Make sure and route hose in a smooth path toward fitting and ensure no kinks in hose occur.**
- b. Locate hose on intake manifold that PCV was hooked to and install supplied 3/8" plug, then secure with OEM pinch clamp.



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 in case you find the o-ring is damaged.
- Leaving coolant hoses and oil drain hoses attached to bottom, remove bolt in bottom of AOS using an M5 wrench and remove AOS Body from car. Take note of nylon washer under head of bolt or located in AOS bottom. If this is damaged or missing, please call tech support and order another one.
- If foam filter/diffuser was installed, remove and use a biodegradable degreaser, liberally spray and let it sit for a few minutes. Wash out with warm water until it rinses clean water and is free of oil. Do NOT use brake cleaner on this part as it will destroy the foam.
- Using a biodegradable degreaser, liberally spray inside can and let it sit for a few minutes. Wash out with warm water until inside of AOS is clean and free of oil.



Cutaway Showing Internals of AOS

- Remove and inspect o-ring thoroughly and even 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.**
- Install O-ring into groove on into AOS body, making sure it is fully seated in groove and not sticking out.
- Reinstall foam filter/diffuser into AOS body. **NOTE: Remember this is not recommended in climates that drop below freezing.**
- Reinstalled AOS body to bottom, making sure to secure with bolt and nylon washer under head of bolt. Hand tighten bolt, making sure that bottom is lined up with body and o-ring is not sticking past it.

Questions, Comments and Suggestions Contact: Tech@PERRINperformance.com

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