



# INSTALLATION INSTRUCTIONS

AOS-R (Air Oil Separator-Return)

02-14 Impreza (Turbo Models)

15-21 Subaru STi

Support: [info@radiumauto.com](mailto:info@radiumauto.com)

Document# 19-0102

## NOTES:

A. If a front-mount intercooler or rotated turbo are used, some steps may not apply and the installation may have to be modified according to the vehicle setup.

B. If operated in freezing environments, Radium recommends installing insulation sleeving (not included) over any hose exposed to cold air flow. This will help prevent the natural phenomenon of water condensation freezing and clogging the hose.

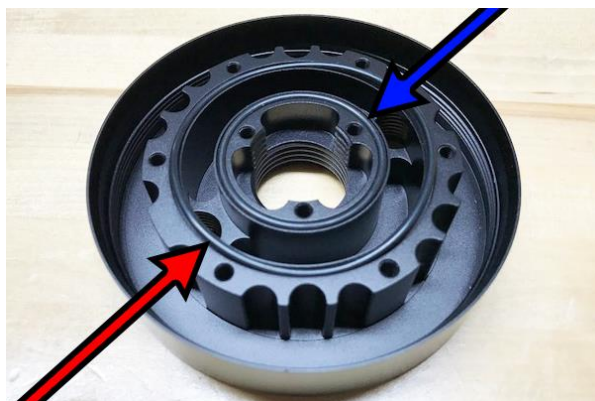
C. Please know the Subaru engine code as this document is split into 2 sections based on engine type: **EJ205 / EJ257 / 04-07 EJ255** and **08-14 EJ255**.

1. ENGINE FAILURE MAY OCCUR IF THE AOS-R IS NOT PROPERLY ASSEMBLED. First, place the two provided O-rings into the two O-ring grooves shown.

2. Place the green coolant seal plate on top of the O-rings. This CANNOT go on upside down but it goes on in a VERY specific orientation. The outer fins and all 9 bolt holes should align perfectly, as shown.

3. Apply a high strength thread locker and secure all 9 included button head bolts using a 5/64" Allen hex wrench.

4. Using multi-purpose oil, lubricate the AOS-R lower O-ring.



5. Spin the bottom heating section to the AOS-R.



#### 6. EJ205 / EJ257 / 04-07 EJ255 ENGINES

Using a 10mm socket, remove the battery's negative terminal.

Loosen the throttle body hose clamp and the turbocharger outlet clamp using a flat head screwdriver. Using a 12mm socket, remove the M8 intercooler mount bolts and the recirculation blow off valve bolts from the intercooler (leave it connected to the hose). Unbolt the black metal crank breather piping from the bottom of the intercooler using a 10mm socket. Carefully lift out the intercooler and set aside.

**NOTE:** The 2015-2016 STi vehicles have a "sound generator tube". See Subaru intake hose P/N: 46013AG020 if removing the sound generator tube but still using the OEM intake.



#### 6a. EJ205 / EJ257 / 04-07 EJ255 ENGINES

Steps 6a-6e are required only for certain mid to late model Subaru vehicles.

Find the large engine harness on the RH strut tower. The large connector will first need to be separated from the mounting bracket. Using a flat blade, simultaneously push the internal locking tab and pull apart to separate.

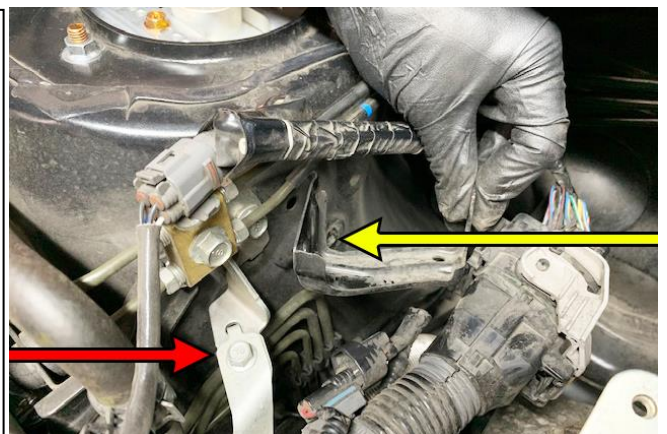


#### 6b. EJ205 / EJ257 / 04-07 EJ255 ENGINES

##### **Mid to Late Model Subarus**

Using a 10mm socket, remove the engine harness mount (yellow arrow). This bracket and bolt will not be reused. Some vehicles will use 2 bolts in this location.

Using a 10mm socket, temporarily unscrew the mounting bracket bolt (red arrow) from the power steering mount.





#### 6c. EJ205 / EJ257 / 04-07 EJ255 ENGINES

##### **Mid to Late Model Subarus**

Using needle nose pliers, dislodge the O2 sensor connector plastic stay from the brake hard line mount shown.

Unplug the O2 sensor connector.



#### 6d. EJ205 / EJ257 / 04-07 EJ255 ENGINES

##### **Mid to Late Model Subarus**

Using a 10mm socket, temporarily remove the two M6 bolts that secure the power steering reservoir.



#### 6e. EJ205 / EJ257 / 04-07 EJ255 ENGINES

##### **Mid to Late Model Subarus**

Using a flat blade, carefully push the engine harness connector tab inwards while simultaneously rotating the large swinging lock to separate the connectors.

Pull the front portion of the engine harness forward and around the brake and power steering bracket and brake hard line mount. Reconnect the large engine harness connectors. Make sure the connectors are fully engaged and the lever is closed.

To gain the required clearance for the AOS-R system, position the large engine connectors lower than the power steering hose on the RH strut tower.



#### 7. EJ205 / EJ257 / 04-07 EJ255 ENGINES

Locate the small piece of rubber trim and the formed AOS-R sheet metal bracket in the kit. The bracket from 20-0207-08 is shown but the bracket found in 20-0207-02 is very similar.

Mount the rubber trim to the support flange on the bracket and cut to length with scissors.



#### 7a. EJ205 / EJ257 / 04-07 EJ255 ENGINES

##### **20-0207-02 and 20-0207-08 Only:**

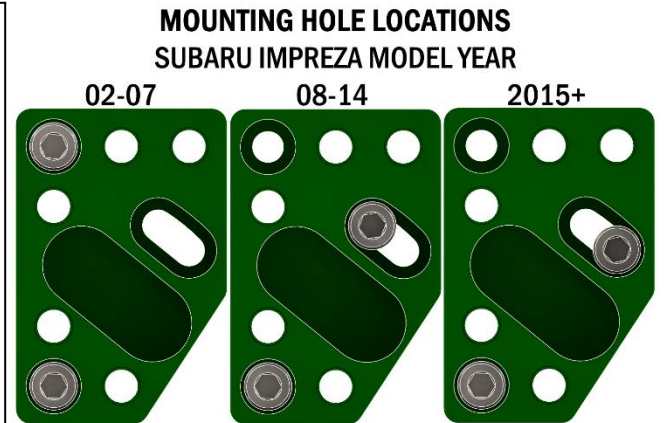
Using the supplied M6x1mm Allen head bolts and a 4mm Allen Wrench, mount the AOS-R bracket directly to the RH strut tower, as shown.



#### 7b. EJ205 / EJ257 / 04-07 EJ255 ENGINES

##### **20-0607 Only:**

Using the two supplied M6x1mm socket head bolts and a 5mm Allen Wrench, mount the billet mount directly to the RH strut tower, as shown.



#### 7c. EJ205 / EJ257 / 04-07 EJ255 ENGINES

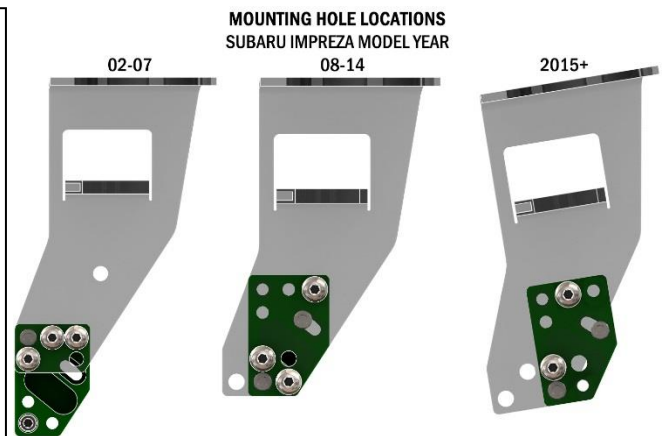
##### **20-0607 Only:**

Using the three supplied M8x1.25mm socket head bolts and a 5mm Allen Wrench, mount the AOS-R bracket directly to the billet AOS-R mount, as shown.

02-07: use 3 bolts

08-14: use 3 bolts

2015+: use 2 bolts



#### 8. EJ205 / EJ257 / 04-07 EJ255 ENGINES

Remove the 4 throttle body bolts using a 10mm socket.

Prior to removing the coolant lines, pinch the lower coolant hose that connects the turbo to the cylinder head using locking pliers. This will minimize coolant loss.

Disconnect the electrical plugs and set the throttle body aside. Do not lose or damage the throttle body gasket as it will be reused.

If extra clearance is required, disconnect the recirculation blow-off valve hose from the intake pipe and set aside.





#### 9. EJ205 / EJ257 / 04-07 EJ255 ENGINES

Locate the 3-way TEE underneath the turbo compressor. These will slightly vary depending on the year of the engine.

While keeping all 3 hoses still attached, the 3-way TEE will be removed from the vehicle.

The short large hose that attaches to the engine's large crankcase port may have a non-serviceable clamp. If this is the case, use a flat blade to unlatch and remove.



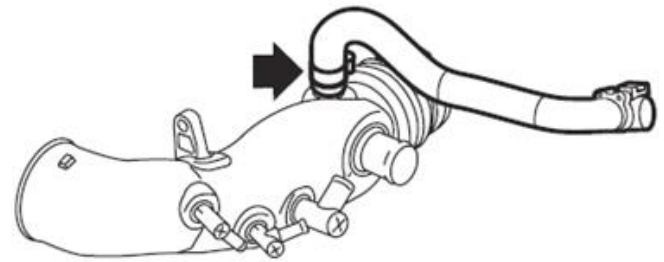
#### 10. EJ205 / EJ257 / 04-07 EJ255 ENGINES

The next few steps are regarding the hose that connects from the 3-way TEE to the turbo inlet.

##### EJ205 Engines

Remove the clamp (shown). Install the provided ½" rubber cap onto the now vacant barb nipple on the turbo inlet pipe.

See the following step for other engines.



#### 10a. EJ205 / EJ257 / 04-07 EJ255 ENGINES

##### **EJ257 and 04-07 EJ255 Engines**

These engines will have an electrical connector tube on the OEM hose that attaches to the turbo inlet pipe (STi model shown). This PCV leak detection plug is used to communicate to the computer for diagnostic purposes. In particular, for cases when the PCV system is mistakenly disconnected.

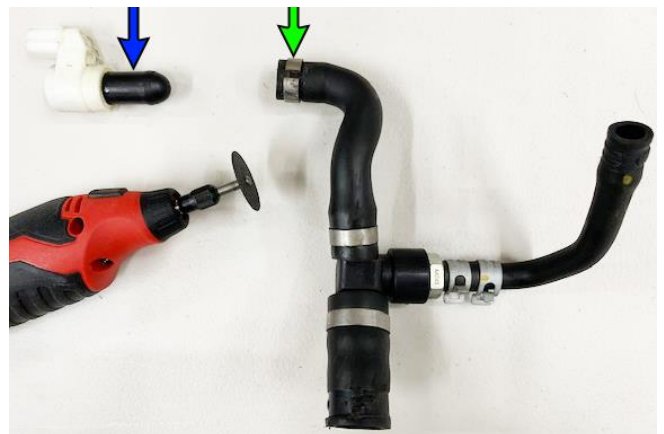


#### 10b. EJ205 / EJ257 / 04-07 EJ255 ENGINES

##### **Mid to Late Model Subarus**

Using a cut-off wheel, remove the non-serviceable clamp (shown green) that secures the hose to the diagnostic connector.

For OEM and aftermarket turbo inlets that support this diagnostic connector, install the provided ½" rubber cap onto the now vacant nipple of the diagnostic connector (shown blue). Reconnect it to the turbo inlet pipe.

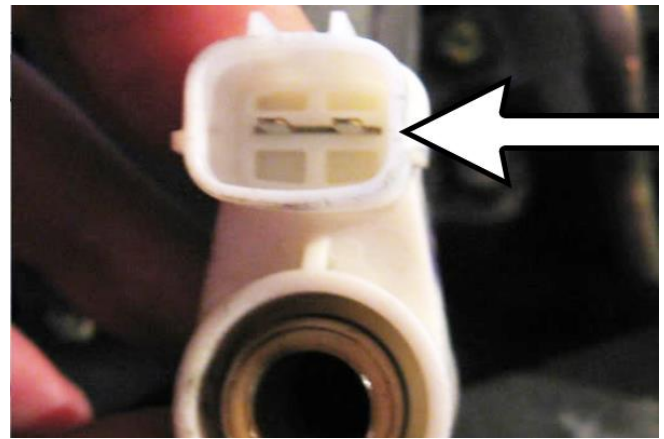


#### 10c. EJ205 / EJ257 / 04-07 EJ255 ENGINES

##### **Mid to Late Model Subarus**

For aftermarket turbo inlets that do NOT support the OEM diagnostic connector, follow the next few steps.

Extra parts may be needed. All that matters is that the port on the turbo inlet must be blocked off or plugged in some manner. To eliminate the diagnostic connector, simply separate it from its post using a flat blade. It will pop off as it has an internal O-ring seal. Using needle nose pliers, carefully pull to dislodge the small metal jumper shunt (shown) inside the PCV leak detection diagnosis connector. It is not a resistor.



#### 10d. EJ205 / EJ257 / 04-07 EJ255 ENGINES

##### **Mid to Late Model Subarus**

As shown, insert the small metal jumper to the wiring harness female terminals.



#### 10e. EJ205 / EJ257 / 04-07 EJ255 ENGINES

##### **Mid to Late Model Subarus**

Insulate this wiring junction with electrical tape to prevent accidental shorting.

This connector should be tucked out of the way.



#### 11. EJ205 / EJ257 / 04-07 EJ255 ENGINES

Remove the hose barb fitting (shown) from the intake manifold using a 19mm wrench.

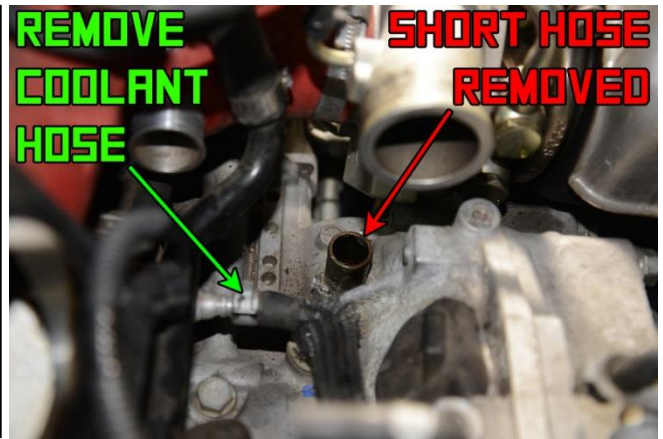
Apply a small amount of PTFE (Teflon) to the tapered threads of the included plug. Using a 6mm Allen wrench, install the plug to block off the OEM intake manifold port.



#### 12. EJ205 / EJ257 / 04-07 EJ255 ENGINES

If not already, be sure to remove the small section of rubber hose from the large port on the engine block, as shown in RED.

Also disconnect and remove the coolant hose (shown in GREEN) that attaches to the coolant manifold. The OEM hose clamps will be reused.



#### 13. EJ205 / EJ257 / 04-07 EJ255 ENGINES

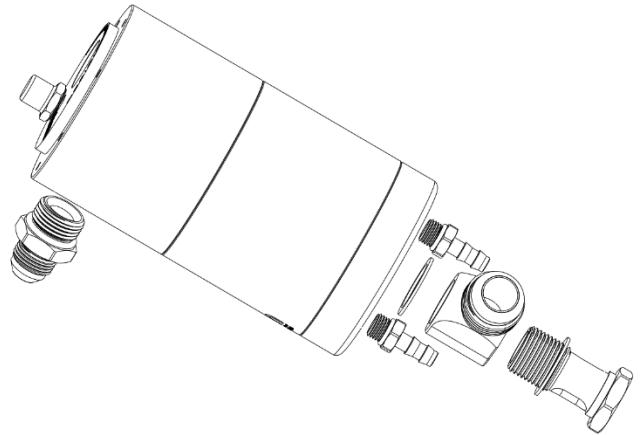
Lubricate the 8AN male O-ring with light oil and tighten into the side port. Lubricate the O-rings on the 2 small hose barb adapters with light oil and tighten into the bottom ports.

##### AOS-R BOTTOM PORT BANJO FITTING NOTES:

- For kits manufactured prior to Nov 2020, a green crush washer banjo (shown) is included.
- For kits manufactured after Nov 2020, a stainless steel O-ring banjo fitting is included.

Before installing the lower banjo, make sure the 8AN fitting in the side port will point towards the front of the vehicle. Install the large 12AN banjo bolt fitting into the AOS-R bottom port so that the lower banjo will point to the rear and towards the center of the firewall.

- For crush washer style fittings, make sure the banjo is not upside down. Do not tighten yet.
- For O-ring style banjo fittings, tighten now using a 6mm Allen Wrench.



#### 14. EJ205 / EJ257 / 04-07 EJ255 ENGINES

Temporarily mount the AOS-R to the bracket using the supplied M5x.8mm bolts and a 3mm Allen wrench.



#### 15a. EJ205 / EJ257 / 04-07 EJ255 ENGINES

Next, the provided 3/4" PCV hose will route between the large port on the engine block and the lower AOS-R bottom port. However, the exact procedure will depend on a couple variables. Example: size of turbo, where turbo is located, and intercooler location.

This step can ONLY be used if the top mount intercooler bracket has been removed or has been drastically modified. If this is not the case, follow next step. If there is ample room, install the 3/4" ID PCV hose directly onto the large crankcase port but do NOT install the included spring clamp yet.

As depicted, route the 3/4" PCV hose under the turbo compressor outlet and toward the firewall.





#### 15b. EJ205 / EJ257 / 04-07 EJ255 ENGINES

Assuming the area discussed is too tight, use the provided 90 degree adapter (shown) to avoid hose kinking.

Cut a 2.75" (70mm) long section of  $\frac{3}{4}$ " PCV hose and attach to the 90 degree elbow. Attach the rest of the  $\frac{3}{4}$ " hose to the opposite end of the elbow. These connections do NOT require hose clamps.

Temporarily install the short end of the  $\frac{3}{4}$ " hose assembly to the large crankcase port on the engine block but do NOT install the included spring clamp yet.

NOTE: the  $\frac{3}{4}$ " hose will land just under the OEM blow-off valve recirculation hose (if still equipped).



#### 15c. EJ205 / EJ257 / 04-07 EJ255 ENGINES

Route the  $\frac{3}{4}$ " hose toward the center of the engine. Next, bend the hose 180 deg positioning it on top of the dog bone pitch stop. Arc the hose so that it keeps a safe distance from the turbo and downpipe. NOTE: If there is not a clear path for the  $\frac{3}{4}$ " hose or there is a miscellaneous obstruction, the complete AOS-R unit can also be adjusted in the mounting bracket's slotted holes for proper clocking. Find the included 45 deg 12AN hose end and mock it up next to the lower banjo fitting and hose. Adjust the rotation of the lower banjo, if needed. Cut the  $\frac{3}{4}$ " hose to an appropriate length for best fit and remove from the vehicle.

For kits manufactured prior to Nov 2020, remove the AOS-R and tighten the lower banjo bolt to 25 ft-lb using a 28mm (1-1/8") socket. Reinstall the AOS-R.



#### 16. EJ205 / EJ257 / 04-07 EJ255 ENGINES

Secure the 45 deg 12AN hose end into a vice. Lubricate the barbs with oil and fully install the  $\frac{3}{4}$ " hose over the PushLok barbs.

NOTE: PushLok barbs do NOT require clamps.



#### 17. EJ205 / EJ257 / 04-07 EJ255 ENGINES

Reinstall the  $\frac{3}{4}$ " hose to the large crankcase port on the engine block and secure with the included spring clamp.

Route the hose as before but this time use one of the provided cable zip ties and secure the hose to the dog bone pitch stop.

Do NOT secure the  $\frac{3}{4}$ " hose to the AOS-R at this time.





#### 18. EJ205 / EJ257 / 04-07 EJ255 ENGINES

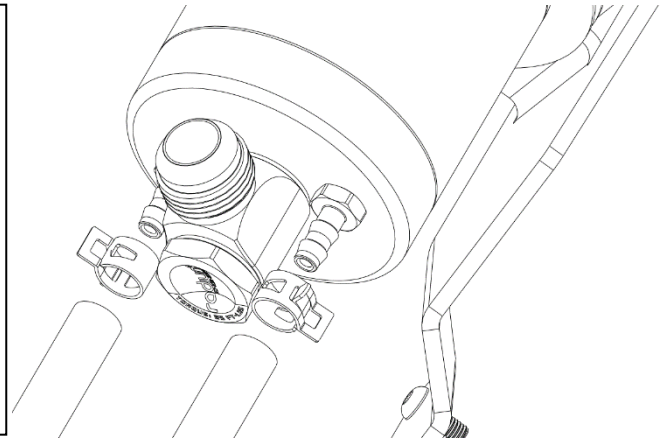
Locate the included 5/16" heater hose in the kit.

Cut one section to ~37" and install it to one of the hose barb nipples on the bottom of the AOS-R. It does not matter which port as they are interchangeable.

Attach the remaining piece of 5/16" heater hose to the other hose barb nipple.

Secure both heater hoses to the AOS-R using the included spring hose clamps.

Connect the 12AN hose end to the lower banjo fitting and tighten with a non-marring wrench.



#### 19a. EJ205 / EJ257 / 04-07 EJ255 ENGINES

Route the coolant hoses from the AOS-R forward along the strut tower. Pass them underneath the power steering lines and towards the engine, just in front of the wastegate actuator. Next, run them over the top of the turbo intake pipe to the area of the throttle body.

Make sure the hoses are not kinked, twisted, or routed near any sharp edges that could chafe the hose.

If using the direct route for 3/4" hose that routes under the turbo outlet, connect the 37" long hose to the coolant manifold, as shown. Cut to length, if necessary. Reuse the OEM spring hose clamp. Secure the heater hoses with a cable zip-tie.



#### 19b EJ205 / EJ257 / 04-07 EJ255 ENGINES

If the 3/4" hose was routed the long way, the 37" heater hose should wrap around the turbo outlet and under the 3/4" hose to the coolant manifold, as shown.

Cut to length, if necessary. Reuse the OEM spring hose clamp.

Secure the heater hoses with a cable zip-tie.



#### 20. EJ205 / EJ257 / 04-07 EJ255 ENGINES

Reinstall the throttle body. Torque the four M6 bolts to 6ftlbs.

Connect the other 5/16" heater hose from the AOS-R to the nipple underneath the throttle body opening. Reuse the OEM spring hose clamp, as shown. Secure the heater hoses in place using the included zip ties.

Reconnect the factory coolant hose to the nipple on the side of the throttle body.

Plug in the electrical connectors for the throttle body.



20a. EJ205 / EJ257 / 04-07 EJ255 ENGINES

**Mid to Late Model Subarus**

For late model engines, disconnect the daisy chain connectors on the LH side of the engine.



21. EJ205 / EJ257 / 04-07 EJ255 ENGINES

Remove the OEM crossover vent tube that secured to the intercooler as this will NOT be reused.

**Mid to Late Model Subarus**

Remove the electrical connector from the tube using a flat blade.



21a. EJ205 / EJ257 / 04-07 EJ255 ENGINES

**Mid to Late Model Subarus**

Pull the metal shunt out of the diagnostic connector using needle nose pliers.

As shown, insert the small metal jumper to the wiring harness female terminals.



21b. EJ205 / EJ257 / 04-07 EJ255 ENGINES

**Mid to Late Model Subarus**

Insulate this wiring junction with electrical tape to prevent accidental shorting.

This connector should be tucked out of the way.



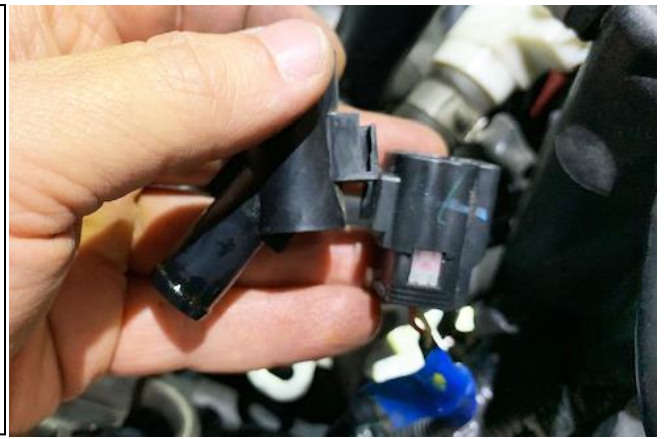


21c. EJ205 / EJ257 / 04-07 EJ255 ENGINES

**Mid to Late Model Subarus**

Unplug the diagnostic connector on the RH side of the engine. Pull the metal shunt out of the diagnostic connector using needle nose pliers.

Remove the electrical connector from the tube (as shown) using a flat blade.



21d. EJ205 / EJ257 / 04-07 EJ255 ENGINES

**Mid to Late Model Subarus**

As shown, insert the small metal jumper to the wiring harness female terminals.



21e. EJ205 / EJ257 / 04-07 EJ255 ENGINES

**Mid to Late Model Subarus**

Insulate this wiring junction with electrical tape to prevent accidental shorting.

This connector should be tucked out of the way.



22. EJ205 / EJ257 / 04-07 EJ255 ENGINES

To free up space and gain access, remove the air intake filter.



### 23. EJ205 / EJ257 / 04-07 EJ255 ENGINES

Remove the 2 vent hoses from each valve cover vent port (right side and left side). For EJ25 engines, there are 2 vent ports on each valve over. Do not remove the rear port hoses. Only the frontmost vent ports on the valve covers will be modified.

For engines that have OEM spring clamps, they will be reused.

For late model engines that have non-serviceable clamps, use a flat head screwdriver to unlatch as shown. These OEM clamps will be discarded.



### 24. EJ205 / EJ257 / 04-07 EJ255 ENGINES

Remove the OEM valve cover vent hose from the air intake pipe. This port will be found just in front of the intake manifold on the turbo inlet pipe. For some engines, an OEM solenoid will need to be removed for access.

This connection will be vastly different depending on model year and aftermarket modifications. The most common connection including aftermarket variations (shown) will use a ½" OD barb.



### 24a. EJ205 / EJ257 / 04-07 EJ255 ENGINES

#### **Mid to Late Model Subarus**

These engines will have an electrical connector tube on the OEM hose that attaches to the turbo inlet pipe (STi model shown).

Unplug the connector, as shown.

Next, instead of cutting the non-serviceable clamp, simply pull the hose directly upwards and it will release from the turbo inlet port.



### 24b. EJ205 / EJ257 / 04-07 EJ255 ENGINES

#### **Mid to Late Model Subarus**

Pull the metal shunt out of the diagnostic connector using needle nose pliers.

Remove the electrical connector from the tube (as shown) using a flat blade.





**24c. EJ205 / EJ257 / 04-07 EJ255 ENGINES**

**Mid to Late Model Subarus**

As shown, insert the small metal jumper to the wiring harness female terminals.



**24d. EJ205 / EJ257 / 04-07 EJ255 ENGINES**

**Mid to Late Model Subarus**

Insulate this wiring junction with electrical tape to prevent accidental shorting.

This connector should be tucked out of the way.



**25a. EJ205 / EJ257 / 04-07 EJ255 ENGINES**

**Early Model Subarus or Subarus with Aftermarket Turbo Inlet Pipe**

Install the provided 1/2" hose to the turbo inlet port and secure with the original hose clamp.

Next, route the hose to the AOS-R side "vent" port. Cut to length. Using oil, lubricate the barbs on the included 8AN hose end and fully seat the hose. NOTE: PushLok hose ends do NOT require clamps. Install the hose end to the 8AN male port on the AOS-R. Tighten using a 7/8" non-marring wrench.

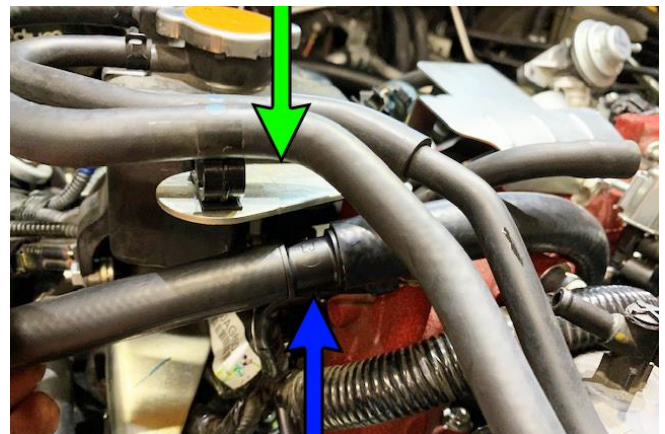


**25b. EJ205 / EJ257 / 04-07 EJ255 ENGINES**

**Mid to Late Model Subarus with OEM Turbo Inlet Pipe**

Install the provided 5/8" hose to the turbo inlet port. Secure with the provided spring clamp. Find the 5/8" to 1/2" barb adapter in the kit (blue arrow). Route the 5/8" hose towards the OEM mount (green arrow). Cut the 5/8" hose to length at the mount. Using oil lubrication install the 5/8" hose on the one side and the provided 1/2" hose on the opposite side. These connections do NOT require clamps. Secure the barb adapter to the OEM mount using a zip-tie.

Next, route the hose to the AOS-R side "vent" port. Cut to length. Using oil, lubricate the barbs on the included 8AN hose end and fully seat the hose. NOTE: PushLok hose ends do NOT require clamps. Install the hose end to the 8AN male port on the AOS-R. Tighten using a 7/8" non-marring wrench.



#### 26. EJ205 / EJ257 / 04-07 EJ255 ENGINES

##### AOS-R TOP PORT BANJO FITTING NOTES:

1. For kits manufactured prior to August 2020, a green banjo fitting is included. Orient the banjo towards the front and tighten using a 1-1/8" wrench.
2. For kits manufactured after August 2020, a stainless steel banjo fitting is included. Tighten using a 6mm Allen wrench and orient towards the front.

Install a section of the 5/8" hose to the included 10AN straight hose end. Cut the hose 6" long and insert it over the 5/8" side of the provided "Y" fitting. Clamps are NOT required. Screw the 10AN hose end (with hose) onto the catch can top port banjo fitting and tighten using a 1" non-marring wrench.



#### 27. EJ205 / EJ257 / 04-07 EJ255 ENGINES

Use a section of the included 1/2" hose to go from one branch of the Y-fitting down to the RH valve cover vent port. Cut the hose to length and secure to the vent port using a spring hose clamp.

NOTE: Use oil lubrication on the Y-fitting. Clamps are NOT required.



#### 28. EJ205 / EJ257 / 04-07 EJ255 ENGINES

Use the remaining 1/2" hose, make a connection between the LH valve cover vent port and the other branch of the Y-fitting. The intercooler will likely have to put on and off a couple times to find optimal routing. Cut the hose to length. Secure the 1/2" hose to the left side vent port using a spring hose clamp. NOTE: Use oil lubrication on the Y-fitting. Clamps are NOT required.

Reinstall all components in reverse order. Use the provided cable zip-ties to secure all loose hoses keeping them away from hot areas and sharp edges.

**NOTE: Because of engine variances, it is normal to have left over parts that will not be used.**



#### 29. EJ205 / EJ257 / 04-07 EJ255 ENGINES

Reconnect the battery terminal. Start the vehicle and check for leaks. Top off cooling system, if necessary. **Installation complete for EJ205, EJ257, and 04-07 EJ255 Engines.**





#### 26. 08-14 SUBARU EJ255 ENGINE

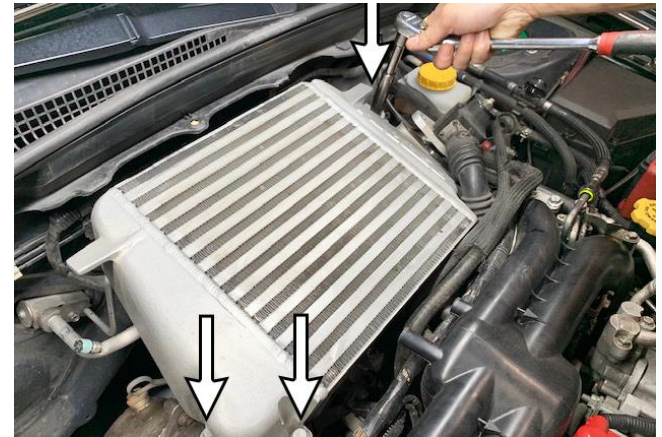
**NOTE: IF THE VEHICLE HAS THE EARLY MODEL EJ255 ENGINE WITH AN ALUMINUM INTAKE MANIFOLD, USE THE EJ257 INSTRUCTIONS LISTED ABOVE.**

Using a 10mm socket, remove the battery's negative terminal. Next, remove the two M6 bolts from the bypass valve (shown).



#### 27. 08-14 SUBARU EJ255 ENGINE

Using a 12mm socket remove the three M8 bolts that secure the intercooler.



#### 28. 08-14 SUBARU EJ255 ENGINE

Using a flat head screwdriver, loosen the intercooler outlet hose clamp.



#### 29. 08-14 SUBARU EJ255 ENGINE

Move the intercooler back and forth to dislodge. Do not lose the turbo outlet gasket on the intercooler inlet. Carefully pull the intercooler upwards and remove from the vehicle.



### 30. 08-14 SUBARU EJ255 ENGINE

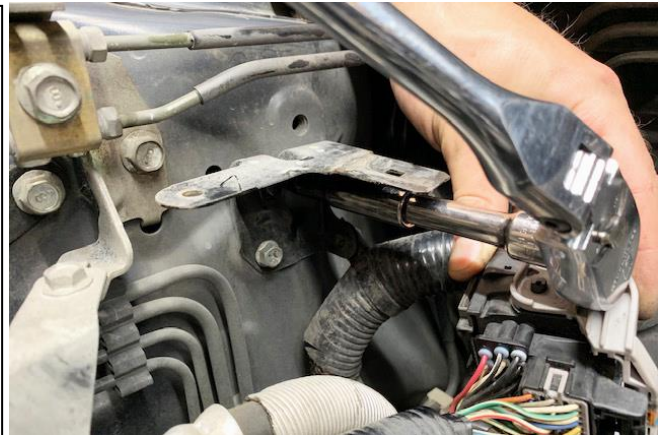
Find the large engine harness on the RH strut tower. The large connector will first need to be separated from the mounting bracket. Using a flat blade, simultaneously push the internal locking tab and pull apart to separate.



### 31. 08-14 SUBARU EJ255 ENGINE

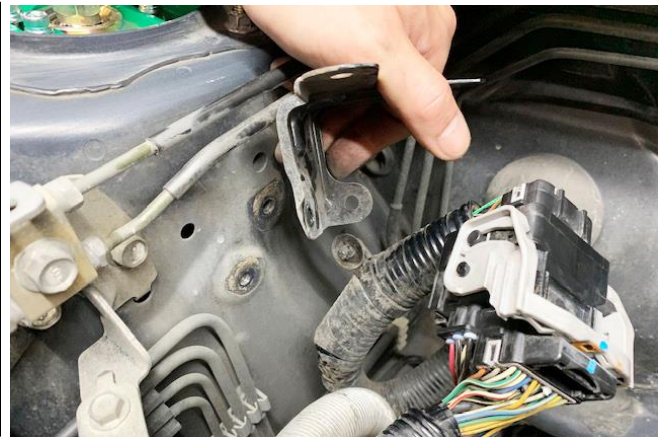
Using a 10mm socket, remove the engine harness mount. These bolts and bracket will not be reused.

These are the threaded bosses that the catch can kit will use for mounting.



### 32. 08-14 SUBARU EJ255 ENGINE

Using needle nose pliers, dislodge the wiring loom's plastic stay, as shown.



### 33. 08-14 SUBARU EJ255 ENGINE

Unlatch the grey lock on the engine harness connector.





#### 34. 08-14 SUBARU EJ255 ENGINE

Pully pivot the grey latch. This will disconnect the electrical plug.



#### 35. 08-14 SUBARU EJ255 ENGINE

Using a 10mm socket, temporarily unscrew the mounting bracket bolt from the power steering mount.

Pull the front portion of the engine harness forward and around the brake and power steering bracket and brake hard line mount. Reconnect the large engine harness connectors. Make sure the connectors are fully engaged and the lever is closed.

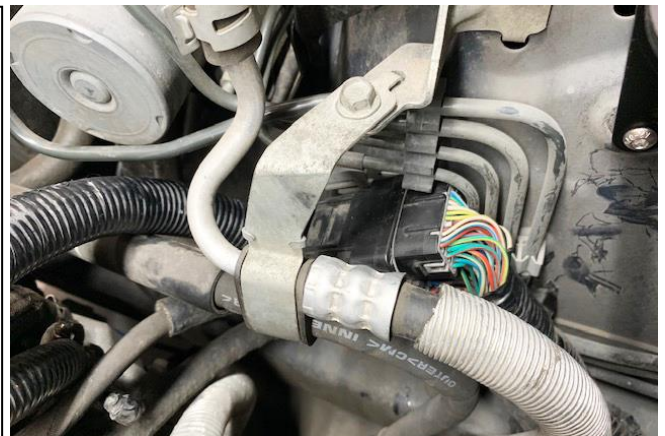
To gain the required clearance for the AOS-R, position the large engine connectors lower than the power steering hose on the RH strut tower.



#### 36. 08-14 SUBARU EJ255 ENGINE

Pull the front portion of the engine harness forward and around the brake and power steering bracket and brake hard line mount. Reconnect the large engine harness connectors. Make sure the connectors are fully engaged and the lever is closed.

To gain the required clearance for the catch cans, position the large engine connectors lower than the power steering hose on the RH strut tower.



#### 37. 08-14 SUBARU EJ255 ENGINE

Locate the small piece of rubber trim and the formed AOS-R sheet metal bracket in the kit. The bracket from 20-0207-08 is shown.

Mount the rubber trim to the support flange on the bracket and cut to length with scissors.



### 38. 08-14 SUBARU EJ255 ENGINE

#### **20-0207-08 Only:**

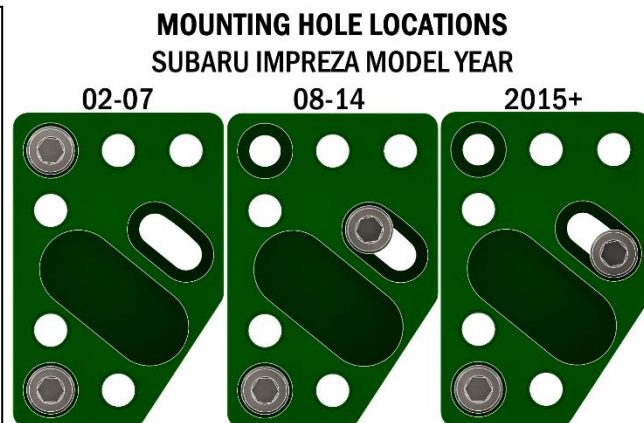
Using the supplied M6x1mm Allen head bolts and a 4mm Allen Wrench, mount the AOS-R bracket directly to the RH strut tower, as shown.



### 39. 08-14 SUBARU EJ255 ENGINE

#### **20-0607 Only:**

Using the two supplied M6x1mm socket head bolts and a 5mm Allen Wrench, mount the billet mount directly to the RH strut tower, as shown.



### 40. 08-14 SUBARU EJ255 ENGINE

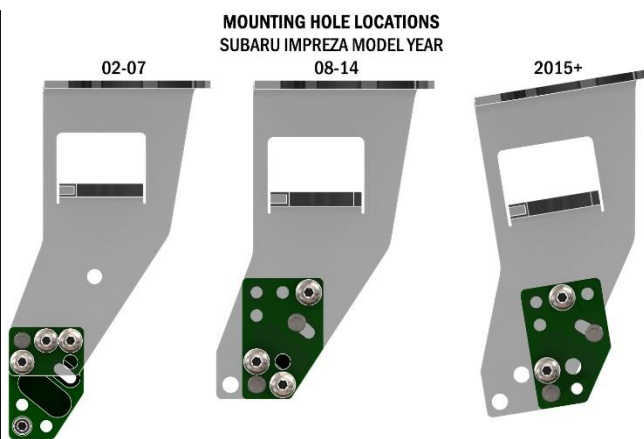
#### **20-0607 Only:**

Using the supplied M8x1.25mm socket head bolts and a 5mm Allen Wrench, mount the AOS-R bracket directly to the billet AOS-R mount, as shown.

02-07: use 3 bolts

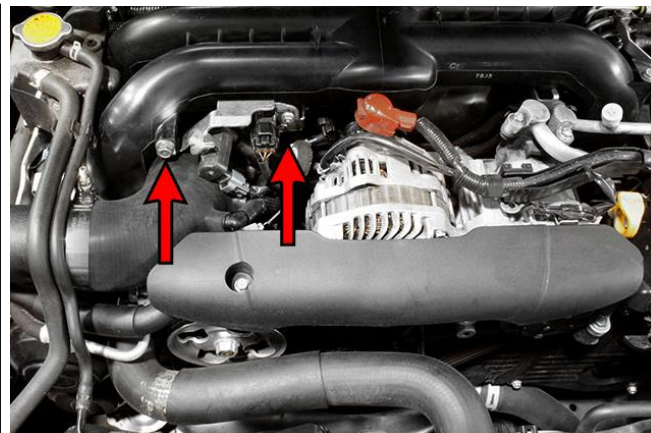
08-14: use 3 bolts

2015+: use 2 bolts



### 41. 08-14 SUBARU EJ255 ENGINE

For accessibility, remove the bolts (shown) that hold the wastegate solenoid bracket. Temporarily move the wastegate solenoid assembly to the side.





#### 42. 08-14 SUBARU EJ255 ENGINE

Using pliers, disconnect the hose that runs from the black plastic molded crossover tube underneath the intake manifold to the turbo air inlet pipe.



#### 43. 08-14 SUBARU EJ255 ENGINE

On each side of the engine there are 2 vertical crankcase vent ports on the valve covers (4 total). The rearward port crankcase hoses will not be modified.

For the front-most ports, remove the hoses from the valve covers.

For engines that have OEM spring clamps, they will be reused.

For late model engines that have non-serviceable clamps, use a flat head screwdriver to unlatch as shown. These OEM clamps will be discarded.



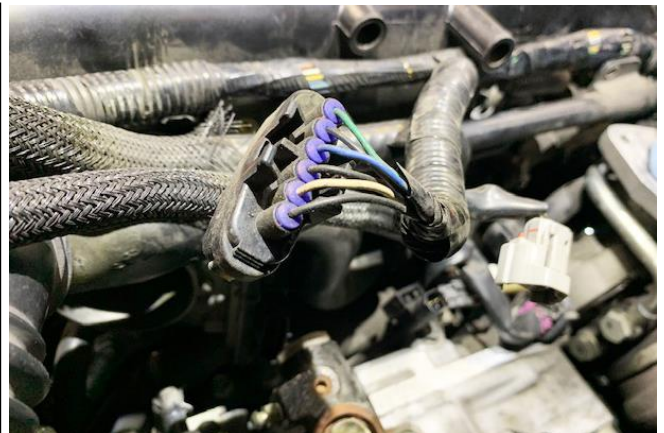
#### 44. 08-14 SUBARU EJ255 ENGINE

Disconnect and remove the OEM spring clamps on each side of the black plastic molded crossover tube that runs along the intercooler.



#### 45. 08-14 SUBARU EJ255 ENGINE

Prior to removing the black plastic molded crossover tube, the throttle body connector and the knock sensor will need to be disconnected.



#### 46. 08-14 SUBARU EJ255 ENGINE

Remove the M6 bolts that secure the black plastic molded crossover tube using a 10mm socket wrench. This will NOT be reused.

Reinstall the single bolt for the blow-off recirculation valve and reconnect the knock sensor and throttle body connectors.

Install the included vacuum cap to the now vacant turbo inlet port.



#### 47. 08-14 SUBARU EJ255 ENGINE

Find the 3-way junction underneath the turbo compressor. The hose shown may be held on with a crimp-style clamp. Peel back the banding to undo the crimp.



#### 48. 08-14 SUBARU EJ255 ENGINE

Separate the white connector from the 3-way junction, as shown.



#### 49. 08-14 SUBARU EJ255 ENGINE

Press the grey connector thumb tab to unlock and release the white connector, as shown.

NOTE: This white electrical connector tube is a PCV leak detection plug. It is used to communicate to the computer for diagnostic purposes. In particular, for cases when the PCV system is mistakenly disconnected.





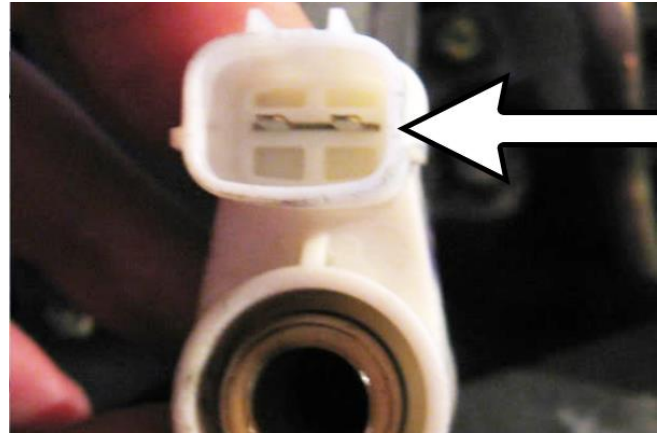
#### 50. 08-14 SUBARU EJ255 ENGINE

Using a flat head screwdriver, remove the grey wiring connector from the black tube, as shown.



#### 51. 08-14 SUBARU EJ255 ENGINE

Using needle nose pliers, carefully pull to dislodge the small metal jumper shunt (shown) inside the PCV leak detection diagnosis connector. It is not a resistor.



#### 52. 08-14 SUBARU EJ255 ENGINE

Attach this piece to the wiring harness female terminals, as shown.



#### 53. 08-14 SUBARU EJ255 ENGINE

Insulate this wiring junction with electrical tape to prevent accidental shorting. The mating connector should be tucked out of the way.



#### 54. 08-14 SUBARU EJ255 ENGINE

Next, remove this same hose connection from the turbo inlet pipe. This hose will NOT be reused.



#### 55. 08-14 SUBARU EJ255 ENGINE

Remove all parts shown from the vehicle.

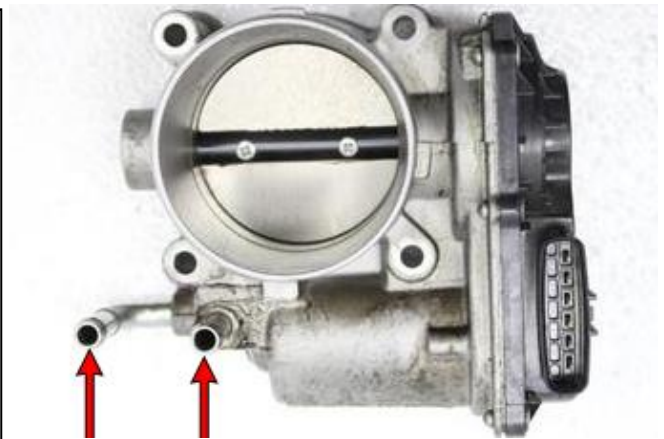
The large section of the 3-way junction that attaches to the engine's large crankcase port may have a non-serviceable clamp. If this is the case, use a flat blade to unlatch and remove.



#### 56. 08-14 SUBARU EJ255 ENGINE

Prior to removing the coolant lines, pinch the lower coolant hose that connects the turbo to the cylinder head using locking pliers. This will minimize coolant loss.

Next, remove the 2 coolant hoses from the throttle body (ports shown). The OEM hose clamps will be reused.



#### 57. 08-14 SUBARU EJ255 ENGINE

Remove the hose barb fitting (shown) from the intake manifold.

Apply a small amount of PTFE (Teflon) to the tapered threads of the included plug. Using a 6mm Allen wrench, install the plug to block off the OEM intake manifold port.





#### 58. 08-14 SUBARU EJ255 ENGINE

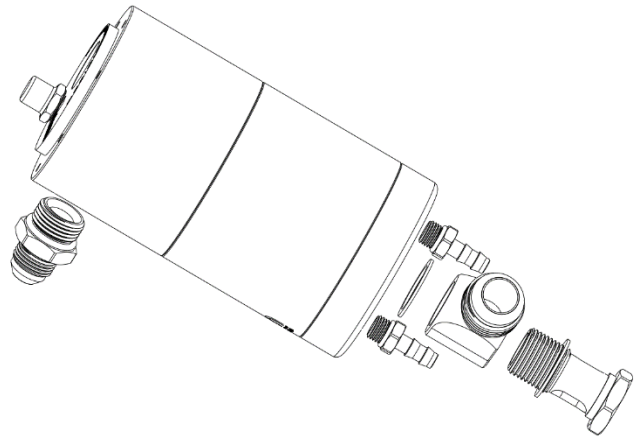
Lubricate the 8AN male O-ring with light oil and tighten into the side port. Lubricate the O-rings on the 2 small hose barb adapters with light oil and tighten into the bottom ports.

##### AOS-R BOTTOM PORT BANJO FITTING NOTES:

- For kits manufactured prior to Nov 2020, a green crush washer banjo (shown) is included.
- For kits manufactured after Nov 2020, a stainless steel O-ring banjo fitting is included.

Before installing the lower banjo, make sure the 8AN fitting in the side port will point towards the front of the vehicle. Install the large 12AN banjo bolt fitting into the AOS-R bottom port so that the lower banjo will point to the rear and towards the center of the firewall.

- For crush washer style fittings, make sure the banjo is not upside down. Do not tighten yet.
- For O-ring style banjo fittings, tighten now using a 6mm Allen Wrench.



#### 59. 08-14 SUBARU EJ255 ENGINE

Temporarily mount the AOS-R to the bracket using the supplied M5x.8mm bolts and a 3mm Allen wrench.



#### 60a. 08-14 SUBARU EJ255 ENGINE

Next, the provided  $\frac{3}{4}$ " hose will route between the large port on the engine block and the lower AOS-R bottom port. However, the exact procedure will depend on a couple variables: size of turbo, where turbo is located, and intercooler location.

This step can ONLY be used if the top mount intercooler bracket has been removed or has been drastically modified. If this is not the case, follow next step. If there is ample room, install the  $\frac{3}{4}$ " ID hose directly onto the large crankcase port but do NOT install the included spring clamp yet.

As depicted, route the  $\frac{3}{4}$ " hose under the turbo compressor outlet and toward the firewall.



#### 60b. 08-14 SUBARU EJ255 ENGINE

Assuming the area discussed is too tight, use the provided 90 degree adapter (shown) to avoid hose kinking.

Cut a 2.75" (70mm) long section of  $\frac{3}{4}$ " PCV hose and attach to the 90 degree elbow. Attach the rest of the  $\frac{3}{4}$ " hose to the opposite end of the elbow. These connections do NOT require hose clamps.

Temporarily install the short end of the  $\frac{3}{4}$ " hose assembly to the large crankcase port on the engine block but do NOT install the included spring clamp yet.



#### 60c. 08-14 SUBARU EJ255 ENGINE

Route the  $\frac{3}{4}$ " hose toward the center of the engine. Next, bend the hose 180 deg positioning it on top of the dog bone pitch stop. Arc the hose so that it keeps a safe distance from the turbo and downpipe. NOTE: If there is not a clear path for the  $\frac{3}{4}$ " hose or there is a miscellaneous obstruction, the complete AOS-R unit can also be adjusted in the mounting bracket's slotted holes for proper clocking. Find the included 45 deg 12AN hose end and mock it up next to the lower banjo fitting and hose. Adjust the rotation of the lower banjo, if needed. Cut the  $\frac{3}{4}$ " hose to an appropriate length for best fit and remove from the vehicle.

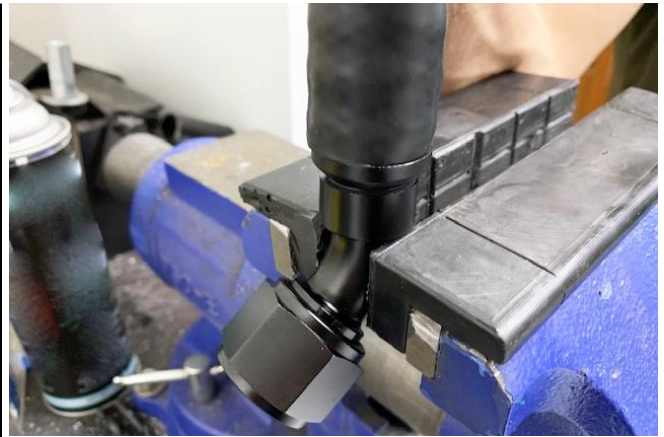
For kits manufactured prior to Nov 2020, remove the AOS-R and tighten the lower banjo bolt to 25 ft-lb using a 28mm (1-1/8") socket. Reinstall the AOS-R.



#### 61. 08-14 SUBARU EJ255 ENGINE

Secure the 45 degree 12AN hose end into a vice. Lubricate the barbs with oil and fully install the  $\frac{3}{4}$ " hose over the PushLok barbs.

NOTE: PushLok barbs do NOT require clamps.



#### 62. 08-14 SUBARU EJ255 ENGINE

Reinstall the  $\frac{3}{4}$ " hose to the large crankcase port on the engine block and secure with the included spring clamp.

Route the hose as before but this time use one of the provided cable zip ties and secure the hose to the dog bone pitch stop.

Do NOT secure the  $\frac{3}{4}$ " hose to the AOS-R at this time.

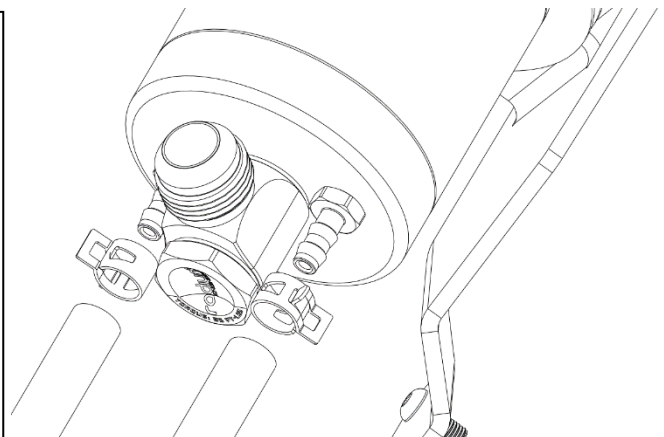


#### 63. 08-14 SUBARU EJ255 ENGINE

Locate the included 5/16" heater hose. Run two hoses from the AOS-R to the throttle body coolant ports. It does not matter which ports are used as they are all interchangeable. Make sure the hoses are not kinked, twisted, or routed near any sharp edges that could chafe the hose.

Secure both hoses to the AOS-R using the included spring hose clamps. Reuse the OEM spring hose clamps for the throttle body ports. Secure the hoses with a cable zip-tie.

Next, connect the 12AN hose end to the lower banjo fitting and tighten with a non-marring wrench.





#### 64. 08-14 SUBARU EJ255 ENGINE

Disconnect the LH side diagnostic connector. Pull the metal shunt out of the diagnostic connector using needle nose pliers.

As shown, insert the small metal jumper to the wiring harness female terminals.



#### 65. 08-14 SUBARU EJ255 ENGINE

Insulate this wiring junction with electrical tape to prevent accidental shorting.

This connector should be tucked out of the way.



#### 66. 08-14 SUBARU EJ255 ENGINE

Unplug the diagnostic connector on the RH side of the engine. Pull the metal shunt out of the diagnostic connector using needle nose pliers.

Remove the electrical connector from the tube (as shown) using a flat head screwdriver.



#### 67. 08-14 SUBARU EJ255 ENGINE

As shown, insert the small metal jumper to the wiring harness female terminals.



#### 68. 08-14 SUBARU EJ255 ENGINE

Insulate this wiring junction with electrical tape to prevent accidental shorting.

This connector should be tucked out of the way.



#### 69. 08-14 SUBARU EJ255 ENGINE

To free up space and gain access, remove the air intake filter (if equipped).



#### 70. 08-14 SUBARU EJ255 ENGINE

Next, install a section of 1/2" hose on the turbo inlet tube and secure with a spring clamp.

NOTE: of the 2 ports that have been modified on the turbo inlet pipe, this port is closest to the turbocharger. The front turbo inlet pipe port should be capped with a vacuum plug.



#### 71. 08-14 SUBARU EJ255 ENGINE

Next, route the hose behind the intake manifold and underneath the coolant hose (shown) towards the AOS-R side "vent" port. Cut to length.

Using oil, lubricate the barbs on the included 8AN hose end and fully seat the hose. NOTE: PushLok hose ends do NOT require clamps. Install the hose end to the 8AN male port on the AOS-R. Tighten using a 7/8" non-marring wrench.





#### 72. 08-14 SUBARU EJ255 ENGINE

##### AOS-R TOP PORT BANJO FITTING NOTES:

1. For kits manufactured prior to August 2020, a green banjo fitting is included. Orient the banjo towards the front and tighten using a 1-1/8" wrench.
2. For kits manufactured after August 2020, a stainless steel banjo fitting is included. Tighten using a 6mm Allen wrench and orient towards the front.

Install a section of the 5/8" hose to the included 10AN straight hose end. Cut the hose 6" long and insert it over the 5/8" side of the provided "Y" fitting. Clamps are NOT required. Screw the 10AN hose end (with hose) onto the catch can top port banjo fitting and tighten using a 1" non-marring wrench.



#### 73. 08-14 SUBARU EJ255 ENGINE

Use a section of the included 1/2" hose to go from one branch of the Y-fitting down to the RH valve cover vent port. Cut the hose to length and secure to the vent port using a spring hose clamp.

NOTE: Use oil lubrication on the Y-fitting. Clamps are NOT required.

Use the remaining 1/2" hose, make a connection between the LH valve cover vent port and the other branch of the Y-fitting. The intercooler will likely have to put on and off a couple times to find optimal routing. Cut the hose to length. Secure the 1/2" hose to the left side vent port using a spring hose clamp. NOTE: Use oil lubrication on the Y-fitting. Clamps are NOT required.



#### 74. 08-14 SUBARU EJ255 ENGINE

Be sure to put a vacuum cap in the large front-most turbo inlet port (shown).

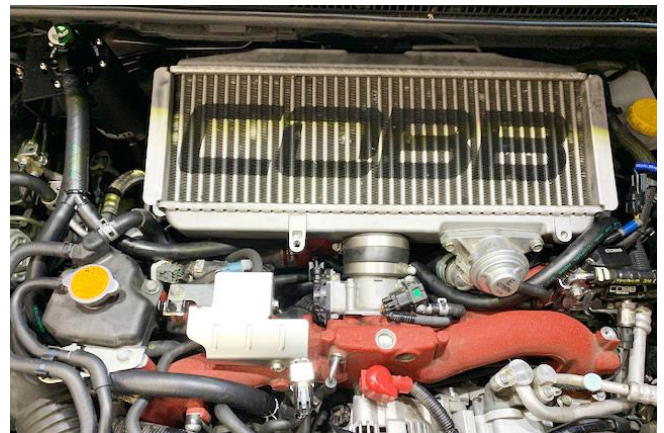


#### 75. 08-14 SUBARU EJ255 ENGINE

Reinstall all components in reverse order.

Use the provided cable zip-ties to secure all loose hoses keeping them away from hot areas and sharp edges.

**NOTE: Because of engine variances, it is normal to have left over parts that will not be used.**



#### 76. 08-14 SUBARU EJ255 ENGINE

Reconnect the battery terminal. Start the vehicle and check for leaks. Top off cooling system, if necessary.

Installation complete for 08-14 Subaru EJ255



The diagram below illustrates how the AOS-R hose routing works dynamically.

