



# INSTALLATION INSTRUCTIONS

## AOS-R (AIR OIL SEPARATOR-RETURN)

TOYOTA GT86, SUBARU BRZ, SCION FR-S  
LEFT HAND DRIVE ONLY


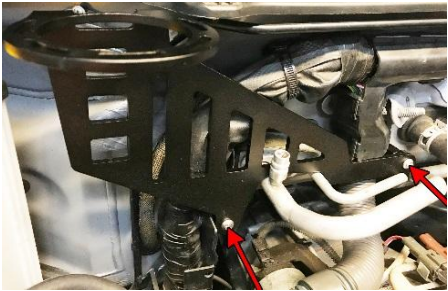


**Document:** 19-0163





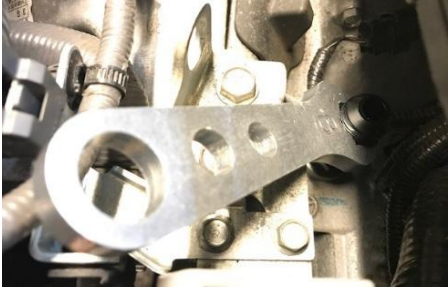

**Support:** info@radiumauto.com




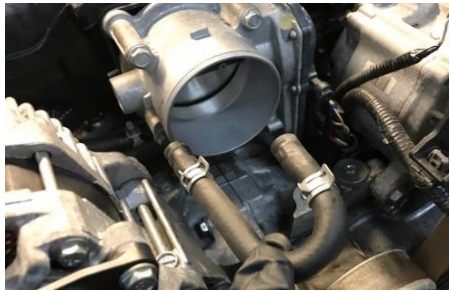

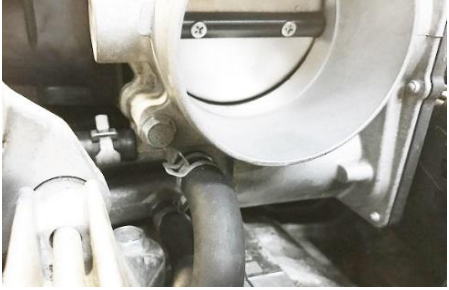
This document covers the installation of the Radium Engineering AOS-R in a LHD FR-S/BRZ/86 vehicle.

If operated in freezing environments, Radium Engineering 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 potentially clogging the hose.





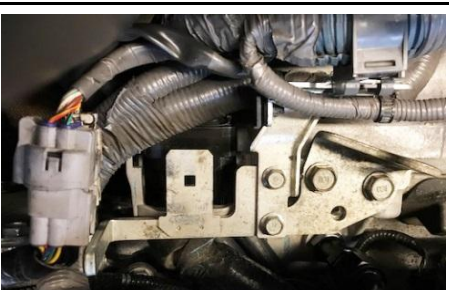

Disconnect the negative battery terminal before beginning.






STEP	TOOLS NEEDED	INSTRUCTIONS	PHOTO
1	10mm Socket	In the engine bay, locate the AC line pass through on the passenger side of the firewall. Temporarily unscrew the plastic cap from the A/C line. Remove the two M6 nuts on the firewall on either side of the A/C bulkhead. Using a 1/2" (or 13mm) wrench, install the included hex coupling nuts included in the kit.	
	1/2" Wrench		
2	4mm Allen Wrench	Install the included aluminum bracket as shown and line up the two mounting points with the hex couplers installed in the previous step.  The A/C lines will need to be simultaneously pulled forward to get the bracket in place.  To secure, use the supplied M6 button head screws (red arrows) and a 4mm Allen hex wrench.	
3		Remove the cover from the center of the intake manifold by first pressing the plastic tab inwards from the lower front center of the cover. Next, carefully lift the front upwards then pull the rear of the cover forward to release.  Pull rearwards to disconnect the PCV hose (shown) from the intake manifold.	
4		To remove the PCV hose, grab the side attached to the PCV valve and simply pull upwards. This hose will NOT be reused.	






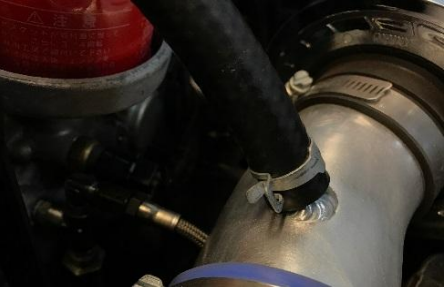
5		Find the included rubber cap in the kit and install on the intake manifold barb, as shown. This will be a tight fit. Soaking the cap in warm water will help with installation.	
6	19mm Socket Wrench	Using a socket with extension, unscrew the PCV valve from the engine block.	
	Socket Swivel Adapter		
	Socket Extension		
7		The OEM PCV valve (shown) will not be reused.	
8	PTFE (Teflon) Paste	Find the -10AN PCV Delete Fitting (shown) in the kit. Apply a small amount of PTFE sealant or tape to the tapered threads. Do not apply any to the -AN side of the fitting.	
9	7/8" Wrench	Install the fitting into the location where the PCV was removed. Hand tighten then add another 1.5 to 3 turns with a wrench. The use of a non marring aluminum wrench is ideal for tightening the PCV delete fitting.	
10		Find the included -10AN push lok 90 degree hose end. Screw it on the PCV delete fitting and point it towards the firewall.  DO NOT FULLY TIGHTEN YET.	

11	Pliers	Disconnect the crankcase breather hose from the air intake pipe.	
12	Pliers	For a clean install, run the OEM crankcase breather hose underneath the intake manifold towards the rear of the engine bay. This is a very tight fit but can be done with the intake manifold still on. Alternatively, the hose can be run over the top of the intake manifold.	
		Install the included 1/2" barb to barb connector into the OEM crankcase breather hose and secure using the OEM spring clamp, as shown.	
13		Unplug the MAF sensor.	
		Remove the intake pipe that connects to the throttle body. NOTE: This procedure will vary depending on the engine configuration and modifications.	
14	Pliers	The short coolant hose that routes from the throttle body to the coolant manifold will be replaced.	
	Rag		
		Using pliers, loosen the OEM spring clamps and slide down the rubber coolant hose. Place a rag down underneath these connection points.	
		Pull the hose off as shown and catch all spilled coolant. Remove the OEM spring clamp as they will be reused. The OEM coolant hose will not be reused.	
15	Hose Cutters	Find the included 5/16" heater hose in the kit and cut it in half.	
		To permit a large bend radius, the heater hoses should be strategically routed. Run both hoses under the alternator bracket, as shown. Make sure they come out underneath the wiring harness connectors near the firewall.	
16	Pliers	Transfer the OEM spring clamps from the small coolant hose onto the ends of the 5/16" hoses and connect them to the coolant fittings on the throttle body. A light amount of oil may be necessary to help the hoses slip on to OEM barbs.	
		NOTE: either hose can be plumbed to either coolant port.	



17		The oil that is collected by the AOS will drain back into the engine through the -10AN PCV delete fitting. Moving of some components is required in order to make a clear path from the lower AOS -10AN fitting to the -10AN PCV delete fitting.	
18	Flat Head Screwdriver	Shown is the large black electrical connector that will be repositioned from the topside of the OEM steel bracket to the underside of the OEM steel bracket. All other plugs will be reconnected as before.	
	Pliers		
		Start this procedure by disconnecting all of the electrical plugs and strain reliefs associated with the OEM steel bracket.	
		A small flat head screwdriver will be necessary to dislodge the connectors from the bracket. Pliers can be used to removed the strain reliefs.	
19	14mm Socket Wrench	To remove the OEM steel bracket from the engine block unscrew the two M10 bolts using a 14mm socket wrench.	
20		When reconnecting the large black electrical connector, reposition and route it underneath the large battery cables, as shown.	
21	14mm Socket Wrench	Place the OEM steel bracket on top of the large black electrical connector and reinstall the two OEM M10 bolts.	
		Reconnect all other electrical plugs and strain reliefs to the OEM steel bracket. Some connections may need to be rerouted around the large wiring bundles for optimal strain relief.	
		The bracket assembly will look as pictured.	
22		<b>ENGINE FAILURE MAY OCCUR IF THE AOS-R IS NOT PROPERLY ASSEMBLED</b>	
		First, place the two provided O-rings into the two O-ring grooves shown.	

23		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.	
24	5/64" Allen Wrench	Find the 9 button head screws included in the kit. These may already have an impregnated thread locking compound on the threads. If not, a high strength thread locker will need to be applied.  As shown, secure all screws using a 5/64" Allen hex wrench.	
	Thread Locker		
25	Oil	Using multi-purpose oil, lubricate the AOS-R lower O-ring.	
26		Spin the bottom heating section to the AOS-R.	
27	1" Wrench	Install the -8AN male fitting on the side port. Install the 2 small barb fittings on the bottom ports. Lubricate the O-rings. Hand tighten the -8AN banjo fitting on the top port.  AOS-R BOTTOM PORT BANJO FITTING NOTES: 1. For kits manufactured prior to Aug 2020, a green banjo fitting is included. Orient the banjo as shown and hand tighten the bolt. 2. For kits manufactured after Aug 2020, a stainless steel banjo fitting is included. Tighten using a 6mm Allen wrench.	
	14mm Wrench		
28	Scissors	Find the short piece of rubber edge trim in the kit. Cut three pieces that are 3/4" (19mm) long. Install the edge trim on the AOS bracket, as highlighted in blue. This will keep the AOS from rattling against the bracket.  Apply a medium strength threadlocker to the five included M5 screws. Using a 3mm Allen hex wrench, install the AOS to the bracket pointing the side port fitting to the LH side of the vehicle, as shown.	
	Threadlocker		
	3mm Allen Wrench		

29	Hose Cutter	<p>NOTE: For the next steps, it might be easier to remove the OEM ECU bracket for easier access to this area.</p> <p>Run the 2 heater hoses from Step 16 to the lower AOS barb fittings. Either hose can be connected to either barb fitting. Measure and cut to length. Leave some slack to permit the engine to move under load.</p> <p>Use the included spring clamps to secure.</p>	
	Pliers		
30	Hose Cutter	<p>Hand tighten the -10AN straight hose end to the bottom banjo fitting. Fit a piece of 5/8" hose between the two fittings and cut to length with slack for engine movement.</p> <p>Remove the -10AN hose ends. Fully insert the 5/8" hose onto the hose ends. Install this assembled hose back in place and tighten the hose ends to the PCV delete fitting and the bottom banjo fitting.</p> <p>NOTE: For kits manufactured prior to Aug 2020, torque the lower AOS banjo bolt using a 1-1/8" wrench (shown).</p>	
	1" Wrench		
	Light Oil		
31	Light Oil	<p>Using a drop of oil for lubrication, install one of the -8AN 90 degree hose ends to the 1/2" PCV hose. Hose clamps are NOT necessary for PushLok hose ends.</p> <p>Screw the hose end to the top banjo fitting. Position the hose vertically (as shown) and tighten with a 7/8" (-8AN) wrench.</p>	
	7/8" Wrench		
32	Light Oil	<p>Run the hose to the LH side along the rear of the engine and over the transmission. Make sure it is not kinked or in danger of becoming damaged and cut to length.</p> <p>Use a drop of lubrication and install to the barbed fitting from Step 12, as shown. A hose clamp is NOT necessary.</p>	
33	Light Oil	<p>Using a drop of oil for lubrication, install the other -8AN 90 degree hose end to the 1/2" PCV hose. Hose clamps are NOT necessary for PushLok hose ends.</p> <p>Screw the hose end to the side -8AN fitting. Position the hose vertically and tighten with a 7/8" (-8AN) wrench.</p> <p>Run the hose to the LH side along the previously installed -8AN hose, as shown.</p>	
	7/8" Wrench		
34	Pliers	<p>Install the air intake system. Route the hose underneath the intake manifold towards the inlet pipe. NOTE: For boosted engines, this PCV hose must route to the suction side (pipe with air filter) as shown and not the compressor boost pipe.</p> <p>Make sure the hose is not kinked or in danger of becoming damaged and cut to length. To secure, reuse the OEM hose clamp.</p>	



35		Make sure all parts are reinstalled correctly and all fittings and hose clamps are secure.  Start the vehicle and check for any leaks. <b>Installation complete.</b>	