



SK688R38JP1 Adventure Kit

2007-2011 Jeep Wrangler JK 3.8L
Engine Application



INSTALLATION GUIDE



SK688R38JP1 Adventure Kit

GENERAL INSTALLATION INFORMATION

This kit can be installed in a home garage, but if you have doubts, let a professional installer do the job. If you are installing our Big Bore XD Steering Gear also, we highly recommend a second person to help with the steering gear installation. It weighs about 50lbs and is difficult to locate and thread in the mount bolts by yourself.

You will need a 46mm socket and a torque wrench that will allow you to torque the pitman arm nut to 220-240 foot-pounds. Other than that, regular hand tools are all that's needed. For information on the torque specs, please see the factory user manual or other aftermarket guide book.

For the kit to be eligible for warranty, it must be installed as a complete kit with the provided cooler, pump, gear, reservoir, SRVT and hoses provided.

****TO NOTE**** this is just a guide for the installation. Each Jeep is slightly different from the next, so no two installations will be exactly the same.

If you have any installation questions, contact us at support@pscmotorsports.com. PSC's hours of operation are Monday-Friday, 9 am - 5 pm CST.

SK688R38JP1 PARTS LIST

SG688R Big Bore XD Steering Gear, Pitman Arm and Hardware

- (2) M12-1.5x100mm—12mm-1.5x100mm bolt
- (2) M12mm Deep Washer
- (2) M12mm Lock Washer

Power Steering Pump and Reservoir Kit

- (1) Power Steering Pump
- (3) M8-1.25 x 30mm Socket Head bolts to mount the Power Steering Pump
- (3) M8 Washers for the Socket Head Pump Mount bolts
- (1) Remote Reservoir Kit
- (1) HE80475 Stock Replacement High-Pressure Gear-to-Pump Hose
- (1) Low pressure Pump-to-Reservoir OUT Port Hose & -12 OUT Port AN Fitting
- (1) Reservoir Bracket Kit
 - (1) Reservoir Bracket
 - (2) 5/16-18 x 1" Bracket-Reservoir Bolts
 - (4) 5/16" Washers
 - (2) 5/16-18 Lock Nut
- (1) Power Steering Belt, 90"
- (1) Hose, Hardware and Cooler Kit
 - (1) 16" Heat Sink Fluid Cooler
 - (1) Low-Pressure Hose—Gearbox to Cooler
 - (1) Low-Pressure Hose—Cooler to Reservoir IN Port
 - (2) AN -8-6 Adapter Fittings for Cooler ends
 - (1) AN -8-8 Adapter Fitting for Reservoir IN Port
 - (1) SF11 Steering Gear Return Port Adapter Fitting
 - (2) 1/4"-20x2" Bolt to mount Cooler to the Radiator Frame Rail
 - (4) 1/4" SAE Washer
 - (2) 1/4"-20 Lock Nut
- (1) Permabond LM113 Thread Sealant 10mL
- (1) SRVT Anti-Splash Valve

SWE715—Power Steering Fluid, 1-Quart Four-pack

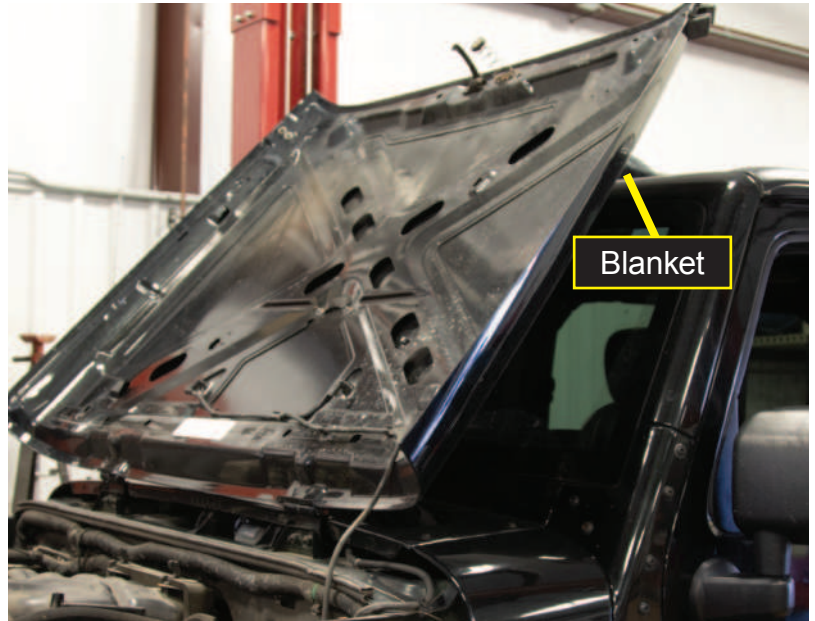
NOTE: Use Permabond thread locker compound on all bolts without lock washer or lock nut. Use hydraulic thread sealant on all hydraulic fittings and hose couplings.



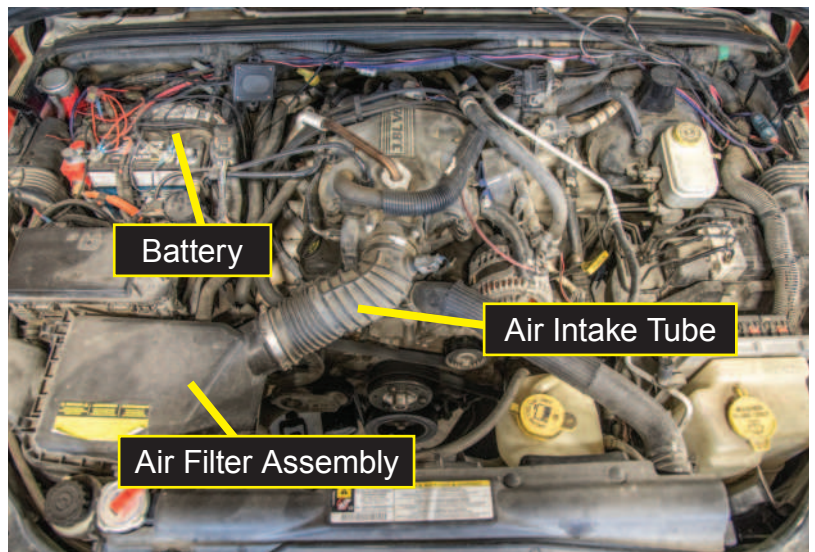
INSTALLATION GUIDE

SK688R38JP1

- 1) Lift hood all the way back against windshield. Be sure to place something between them to prevent damage.



- 2) Disconnect battery. Remove engine cover, air filter assembly, and intake tubing.



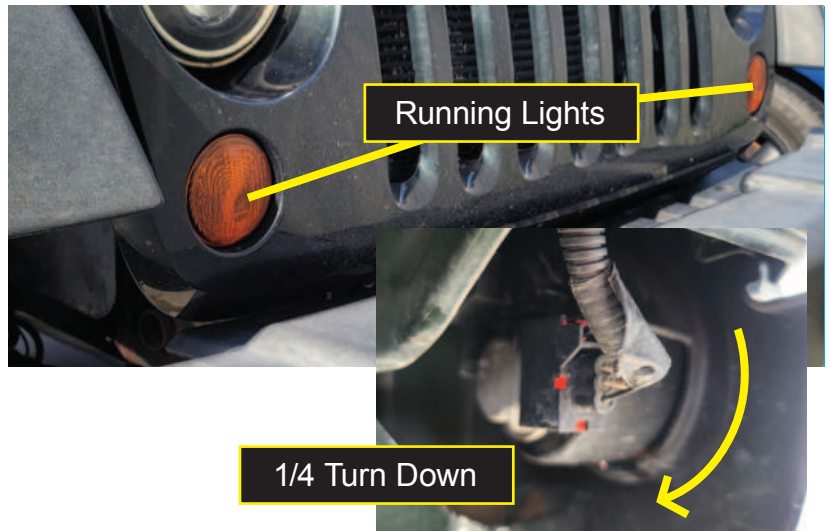


INSTALLATION GUIDE

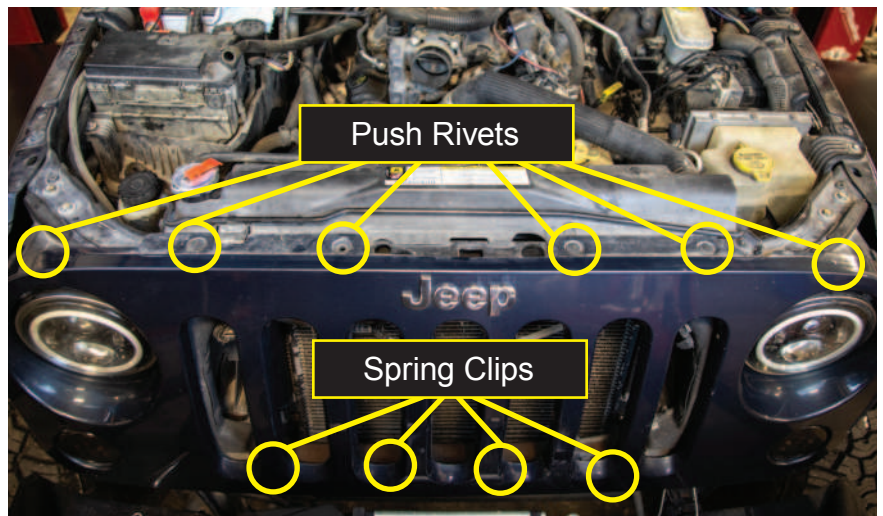
SK688R38JP1

- 3) Remove the grill by turning the signal/running lights in the grill each a quarter turn down then pull them out of the socket.

NOTE: Depending upon which bumper and/or winch setup you have, you may need to remove it for access to install this kit. You may only need to loosen the winch and lean it forward to remove the grill.



- 4) Finish removing the grill by releasing and removing the push rivets along top of the grill (6 total). Then push the 4 spring clips at the bottom of the grill to release it from the frame crossmember.





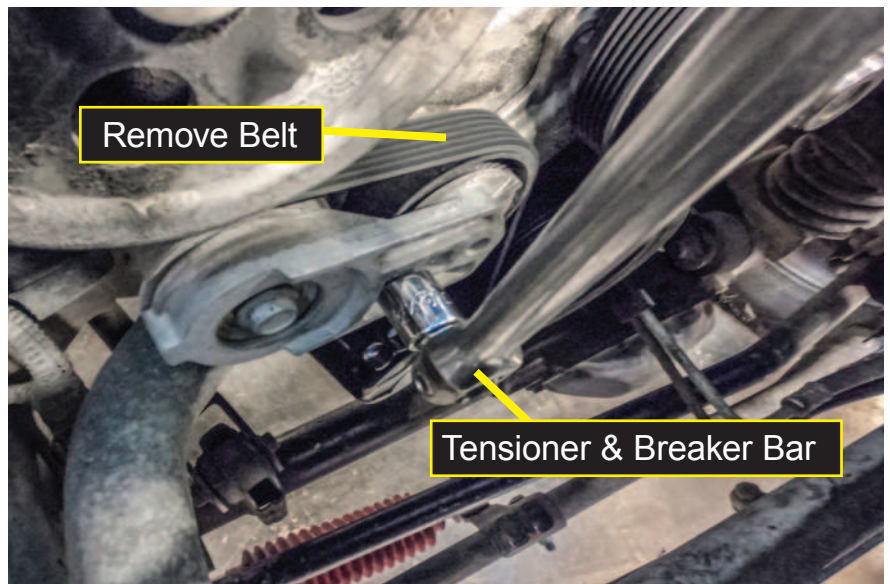
INSTALLATION GUIDE

SK688R38JP1

- 5) Secure the steering wheel so it cannot turn. We used a ratchet strap.



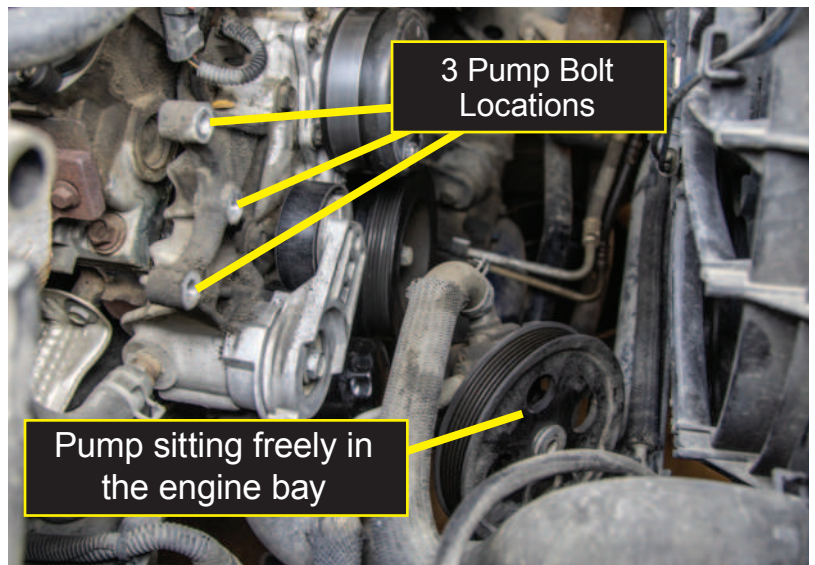
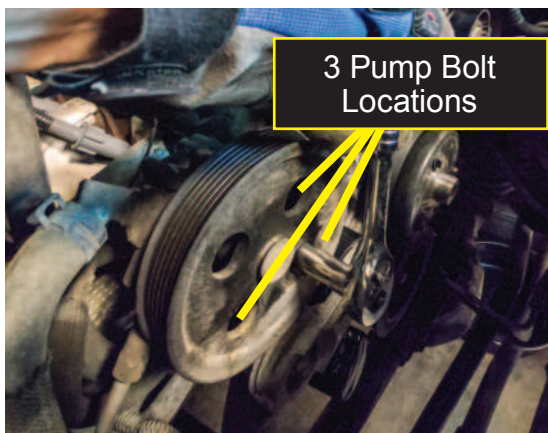
- 6) Take a 3/8" breaker bar and extension and insert it into the square hole in the belt tensioner. Push the breaker bar clockwise to release tension on the belt to loosen and remove it from the pulleys—throw it away, it will not be used again.



- 7) Take out the coolant tank and move it to the front of the grill area. You do not need to disconnect the tubing.



- 8) Unbolt the stock pump from the frame and let it sit freely in the engine bay with all hoses still attached.





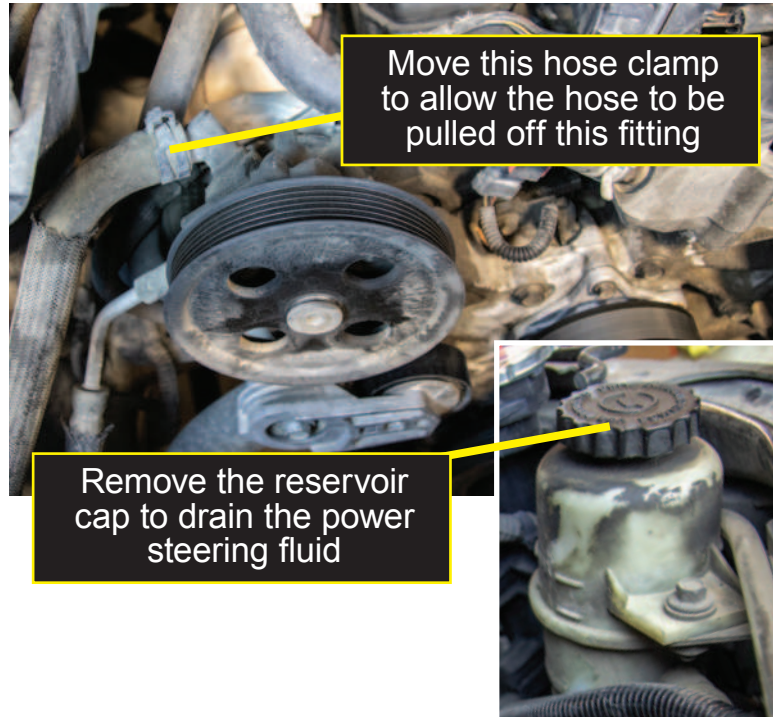
INSTALLATION GUIDE

SK688R38JP1

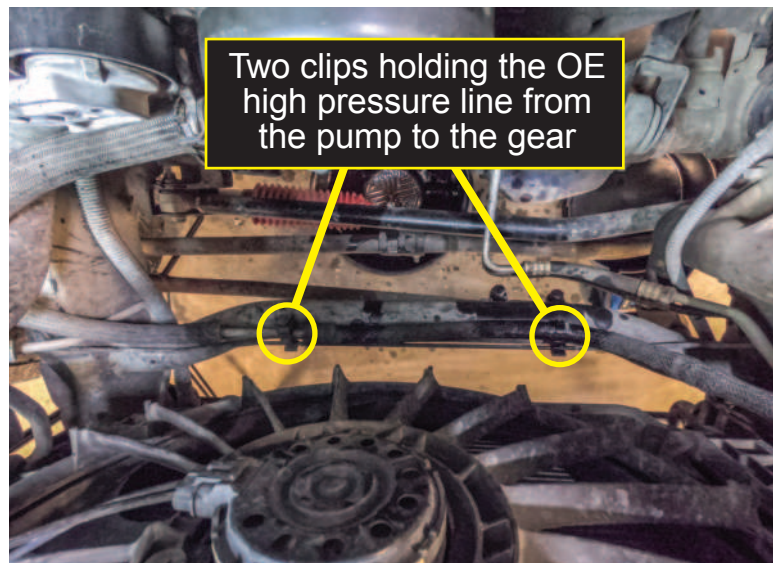
- 9) On the hose that connects the reservoir to the pump, move the hose clamp off of the hose/fitting area of the pump so you can pull that hose off of that fitting.

Open up the reservoir cap so that the power steering fluid can drain out of the hose easily.

NOTE: Have a pan underneath the pump/hose area so that it can drain into the pan and not make a mess on the ground.



- 10) Looking down through the engine bay space, you will see the OE high-pressure line that connects the steering gear and power steering pump. It is clipped to the frame crossmember (under and behind the radiator) by 2 clamps. Remove the line from these clips to free this line from the frame.





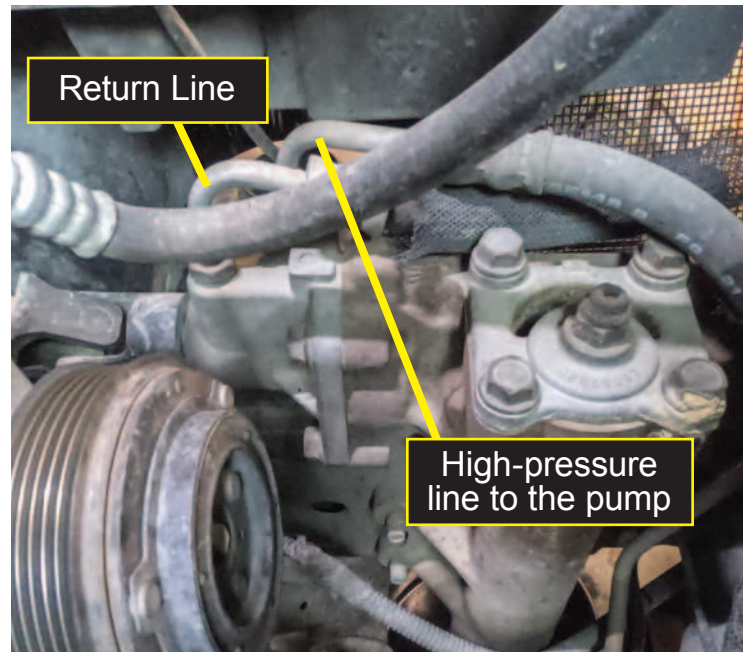
INSTALLATION GUIDE

SK688R38JP1

- 11) Unbolt both the high-pressure and return hoses from the steering gear.

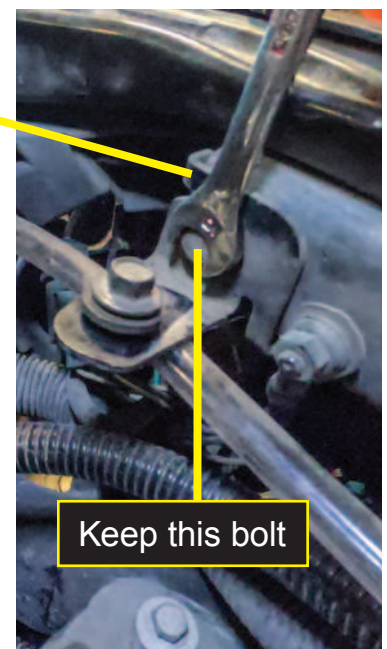
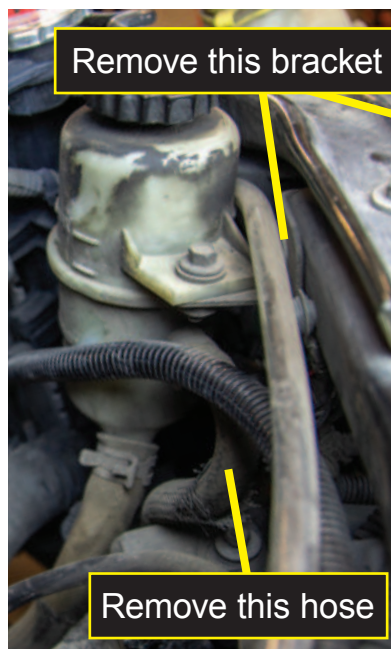
Then, with the high-pressure line still attached, remove the pump by bringing it up through the engine bay.

NOTE: The steering gear is located on the inside of the frame next to the driver-side tire. Have a drip pan underneath there to catch any fluid.



- 12) Remove the hose from the side of the reservoir and unbolt the bracket that holds the reservoir to the frame. Keep the bolt, discard the reservoir and bracket. You will use the bolt in Step 37

NOTE: Have a drip pan underneath the reservoir in case any fluid drips out.

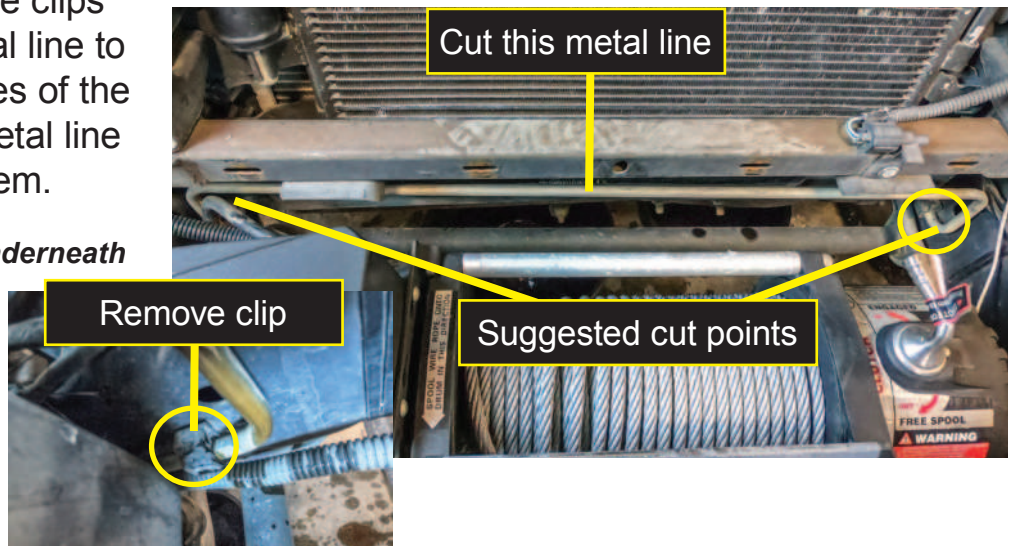


INSTALLATION GUIDE

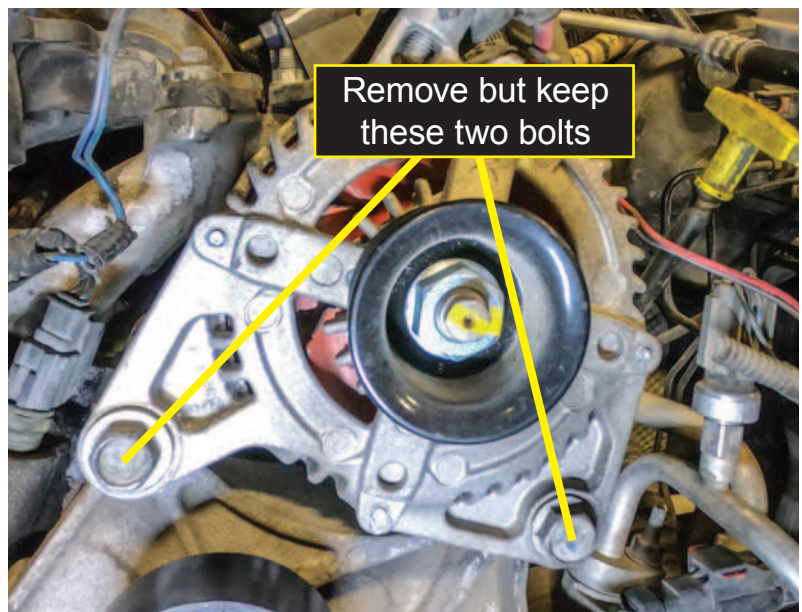
SK688R38JP1

- 13) Cut the metal line that attaches the gear to the reservoir in the suggested places under the frame crossmember, to make it easier to remove the line. Then unclip, or completely remove, the clips that attached the metal line to the frame on both sides of the frame. Remove the metal line pieces and discard them.

NOTE: Have a drip pan underneath where you cut the line in case any fluid drips out.



- 14) Remove the two alternator bolts, but leave the alternator in place. Keep the bolts, you will use them in a later step.

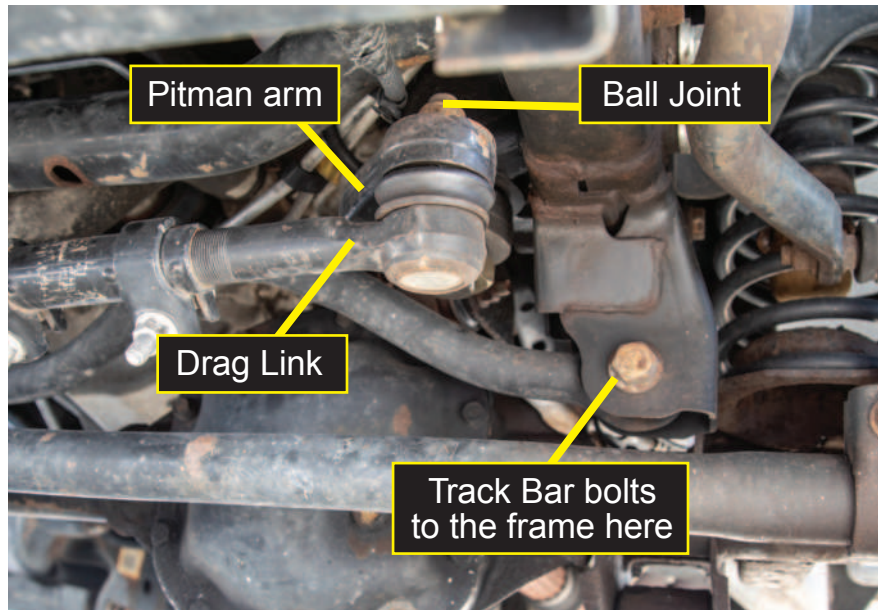




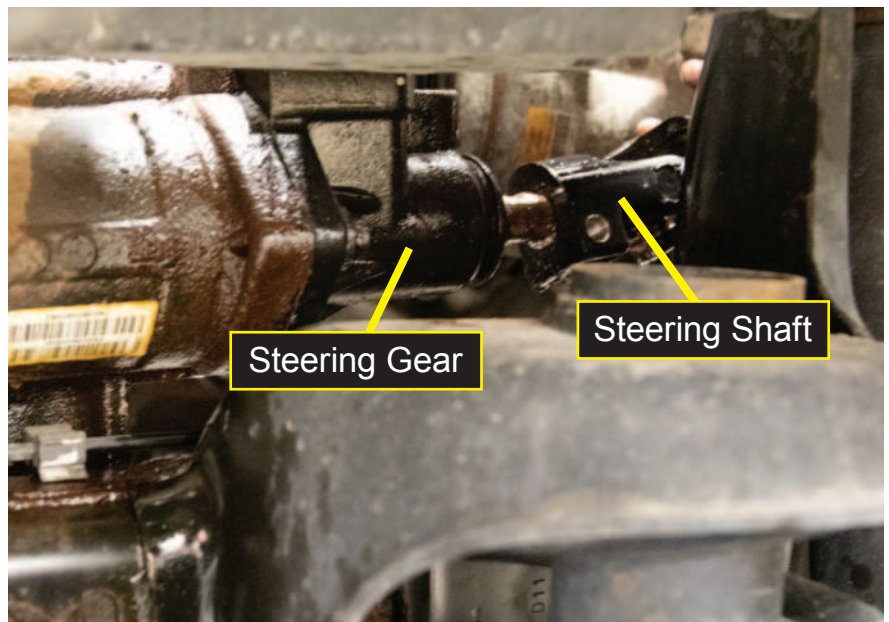
INSTALLATION GUIDE

SK688R38JP1

- 15) Remove the drag link and ball joint from the pitman arm and the track bar from the frame and swing down out of the way.



- 16) Unbolt, then disconnect the steering shaft from the steering gear by using a pry bar to gently push the shaft toward the firewall.



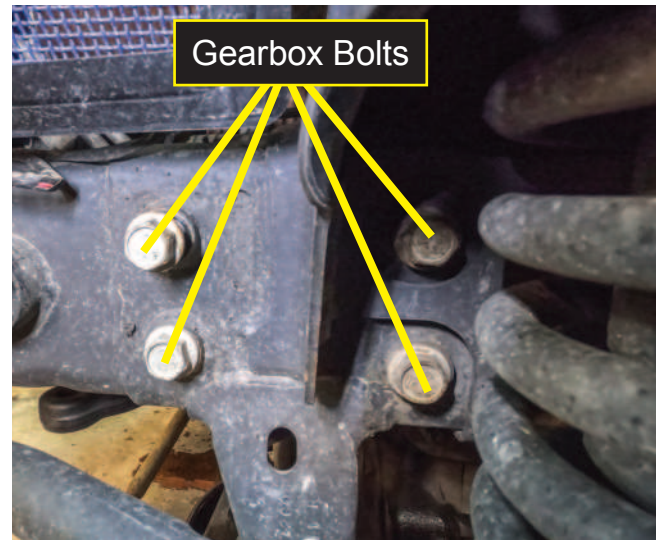


INSTALLATION GUIDE

SK688R38JP1

- 17) ****This takes 2 people**** One person will go through the fender well to remove (4) bolts (save TWO for re-use). The other person should hold the gearbox in place (we recommend holding it from the top by going down through the top of the engine bay) while it is being unbolted. Once unbolted, it can be pulled up and out of the top of the vehicle.

NOTE: The steering gearbox is **HEAVY**; we recommend you get someone to help you remove the original and install the PSC Big Bore gearbox.



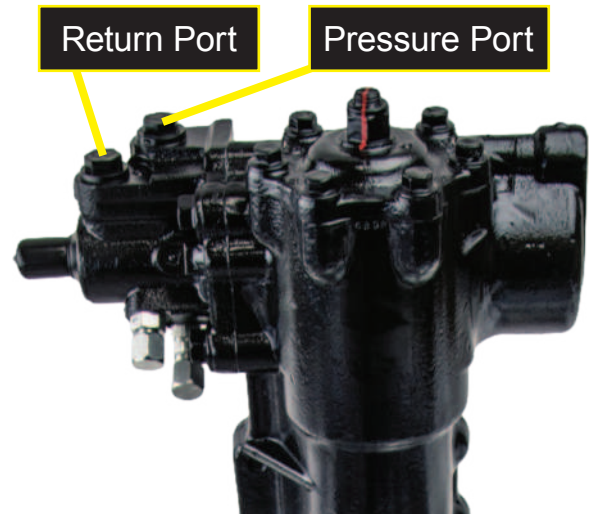
Now that all the stock parts have been uninstalled, it is time to start installing the new PSC kit parts.



INSTALLATION GUIDE

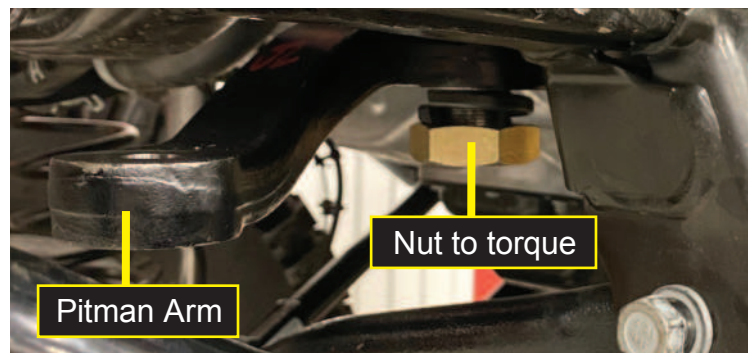
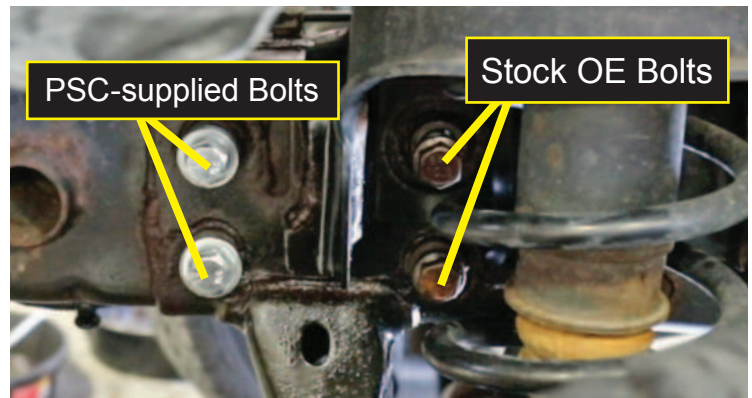
SK688R38JP1

- 18) Install supplied SF11 AN fitting into the return port of the new PSC Big Bore XD steering gearbox (use hydraulic thread sealant when installing this fitting to prevent leaks). Then raise the gearbox through the bottom of the vehicle and maneuver it into place. Use the two (2) PSC-supplied bolts as noted in the middle picture.



- 19) Once the Big Bore XD gearbox is bolted to the frame, install the pitman arm to the gearbox and torque it to 220-240 ft/lbs (or to what your user manual states) using a 46mm socket and a torque wrench.

NOTE: If you don't have a torque wrench and 46mm socket, you can take it to your local auto parts store and have them put it on. You can then install the complete assembly to the frame.

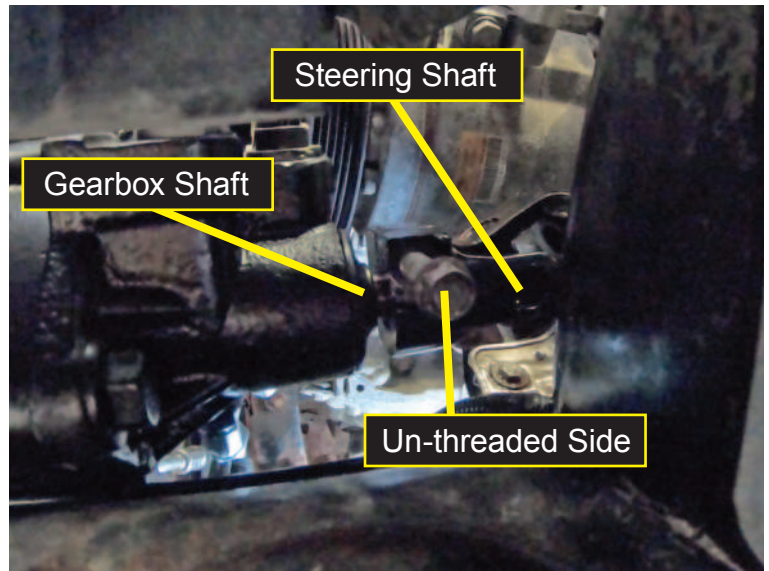




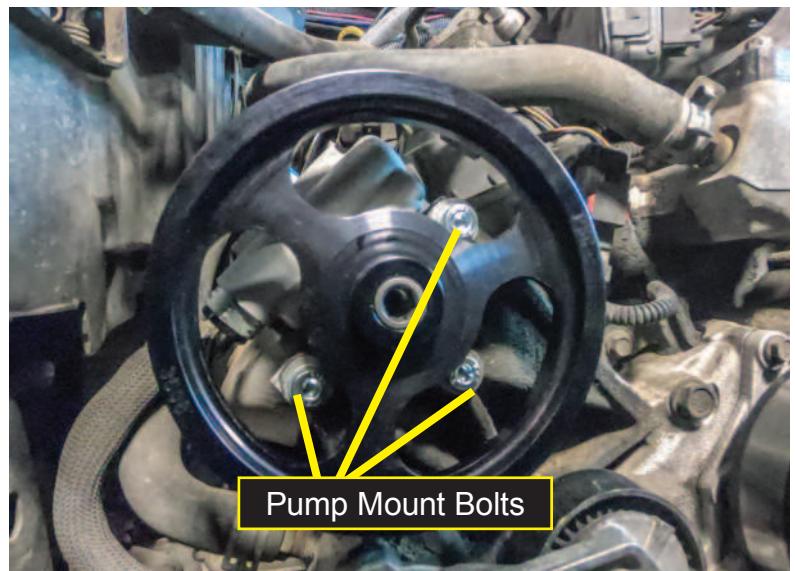
INSTALLATION GUIDE

SK688R38JP1

- 20) Slide steering shaft onto gearbox shaft. Be sure to install steering shaft bolt correctly. Bolt goes through un-threaded side of coupler first, then threads into other side.



- 21) Using the PSC-supplied socket-head bolts and washers, mount the power steering pump to the engine block where the stock pump was mounted. Use the PSC-provided Permabond thread sealant on these bolts.

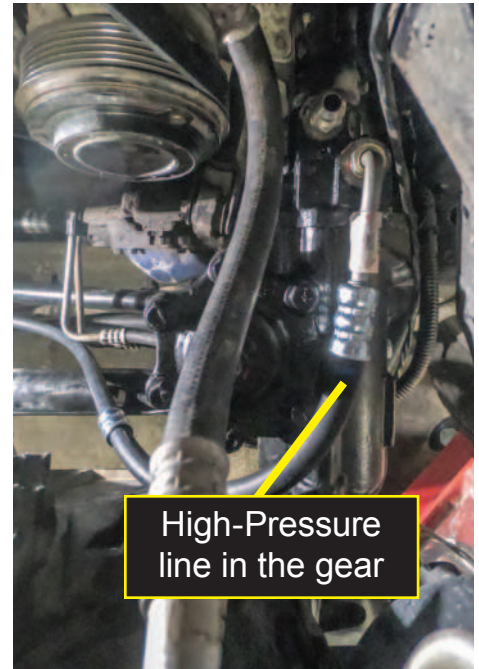


INSTALLATION GUIDE

SK688R38JP1

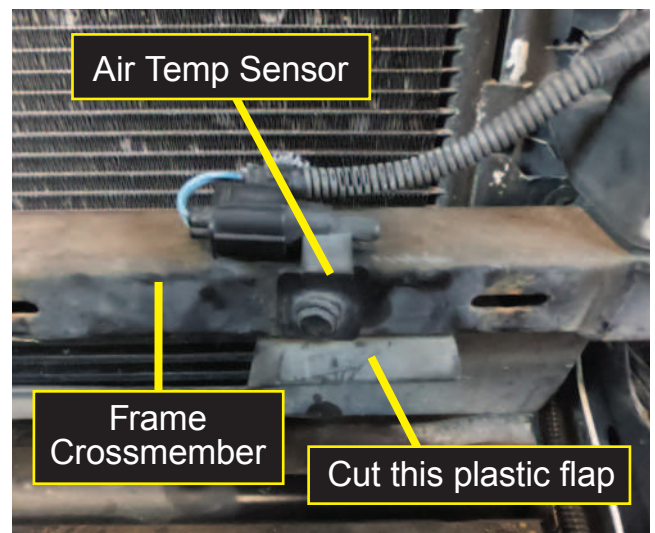
- 22) Install the high pressure line that goes between the pump and the steering gear. Use the same frame clamps that you removed the stock line from to hold it in place.

NOTE: Use hydraulic thread sealant on these fittings



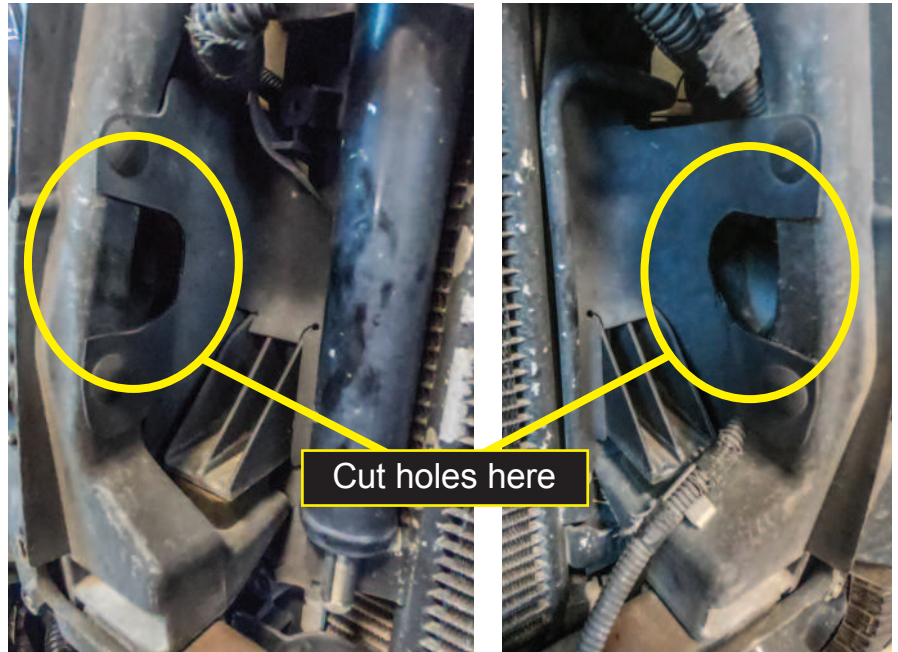
- 23) To mount the cooler, the Outside Air Temperature Sensor needs to be relocated to under the frame crossmember. First, cut the plastic flap that is under the sensor so it is flush with the front of the frame crossmember. Then use a flathead screwdriver to pop the sensor out of the frame hole.

You will flip this sensor up-side-down and reinstall it in the same hole in a later step. For now, tuck it to the side out of the way.

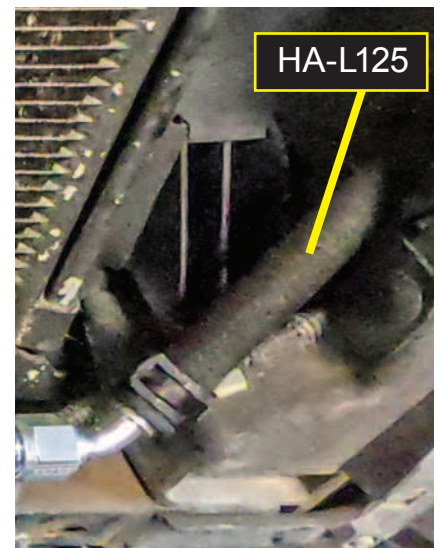


INSTALLATION GUIDE SK688R38JP1

- 24) Cut holes in the plastic pieces on both sides of the frame uprights next to the radiator. See the picture to the right.



- 25) Next feed the hose that goes from the cooler to the reservoir (38" hose) through the hole cut on the passenger-side of the radiator and the hose that goes from the cooler to the gear (20.5" hose) through the hole on the driver-side of the radiator. The 45° hose fittings will attach to the cooler.



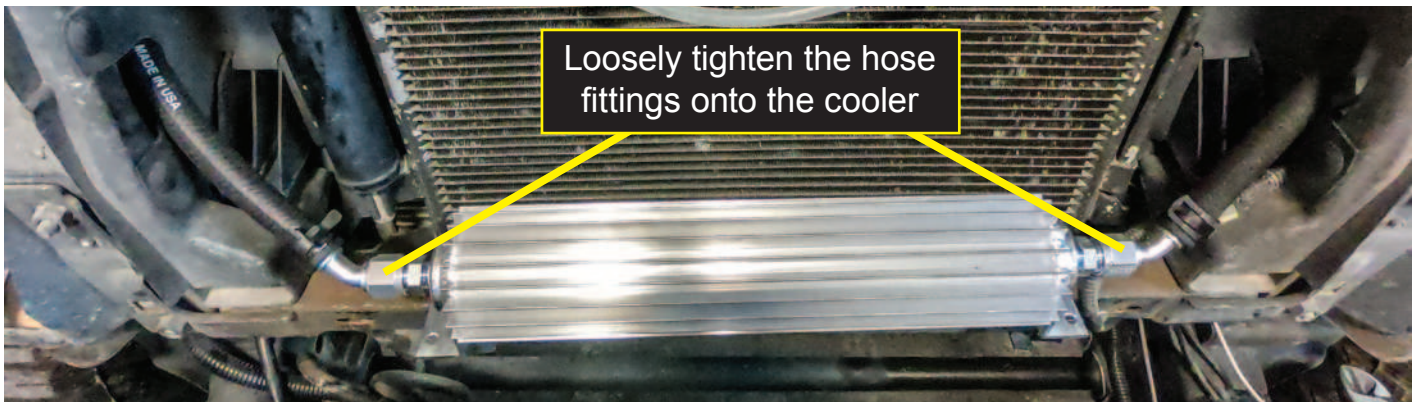
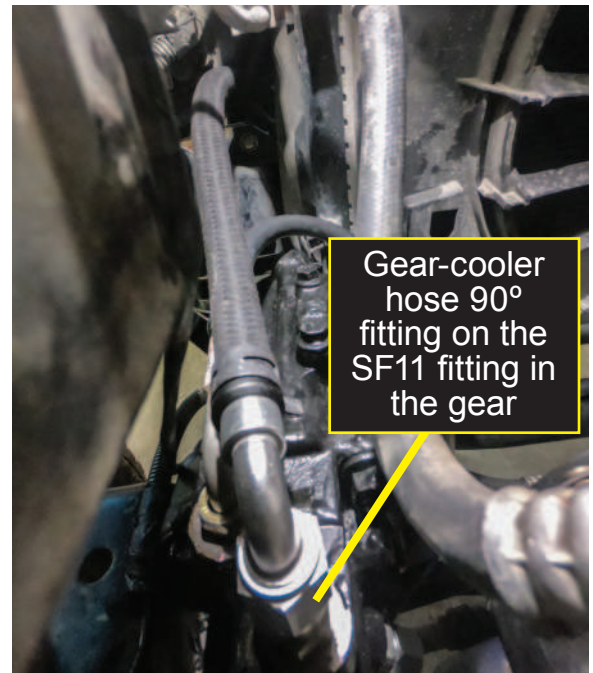


INSTALLATION GUIDE

SK688R38JP1

- 26) Put hydraulic thread sealant on the SF11 fitting that was already bolted into the gear, screw on the 90° fitting from the cooler hose and fully tighten it onto the fitting.

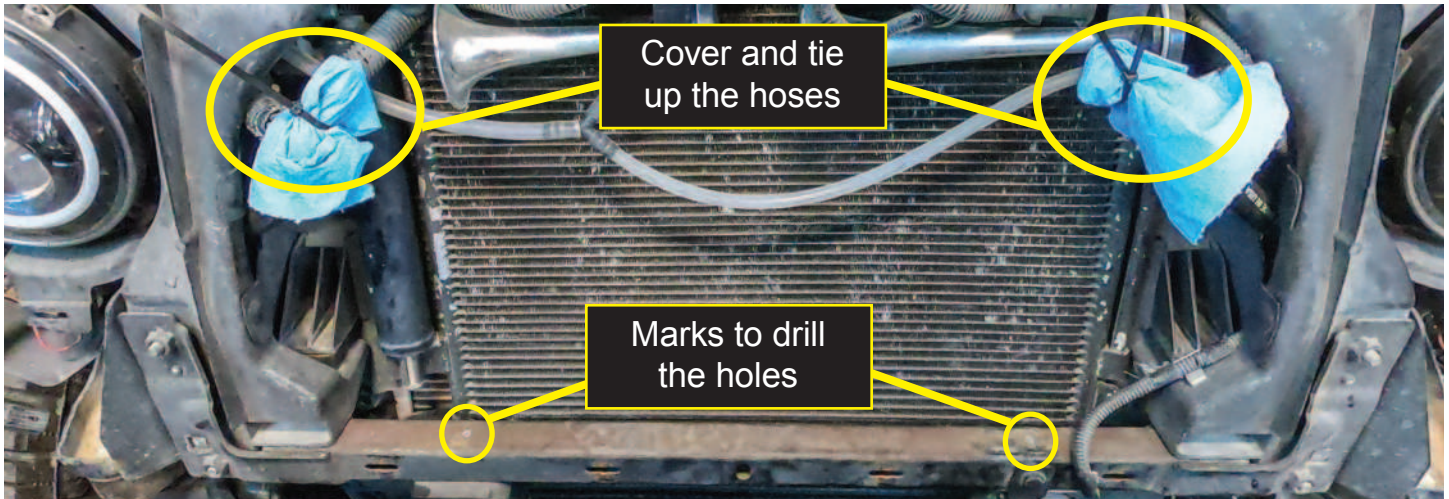
NOTE: Use hydraulic thread sealant on all AN fittings between hose, reservoir and pump.



- 27) Put hydraulic thread sealant on the -8-6 AN fittings that go into the cooler ends and fully tighten them into the cooler.

Place the cooler on the frame crossmember, and barely screw on the hose fittings onto the cooler fittings. Your cooler should be mostly centered in front of the radiator. Now you can see where the cooler should be mounted on the frame.

NOTE: If the hoses are slightly rubbing on the plastic radiator upright supports, cut a little more of the plastic to give the hoses clearance. DO NOT over torque the hose fittings onto the cooler ends...they can crack and leak.



- 28) Hold the cooler in place so the front holes of the cooler's mounting tabs are in the center of the frame crossmember. Then, with a silver pencil/sharpie, mark where the cooler bracket holes should be drilled out on the frame. Back the hoses off of the cooler to remove it, and cover and tie up the hoses so they are out of the way.

It is important that you have the hoses covered for the next step to prevent metal from entering into the system.

- 29) Take a center punch and hammer and tap a dimple into the frame where the center of the bracket hole mark is. This will allow your drill bit to find where it needs to be placed.

Then using a 1/4" drill bit and pressure, drill holes through BOTH sides of the frame tube.



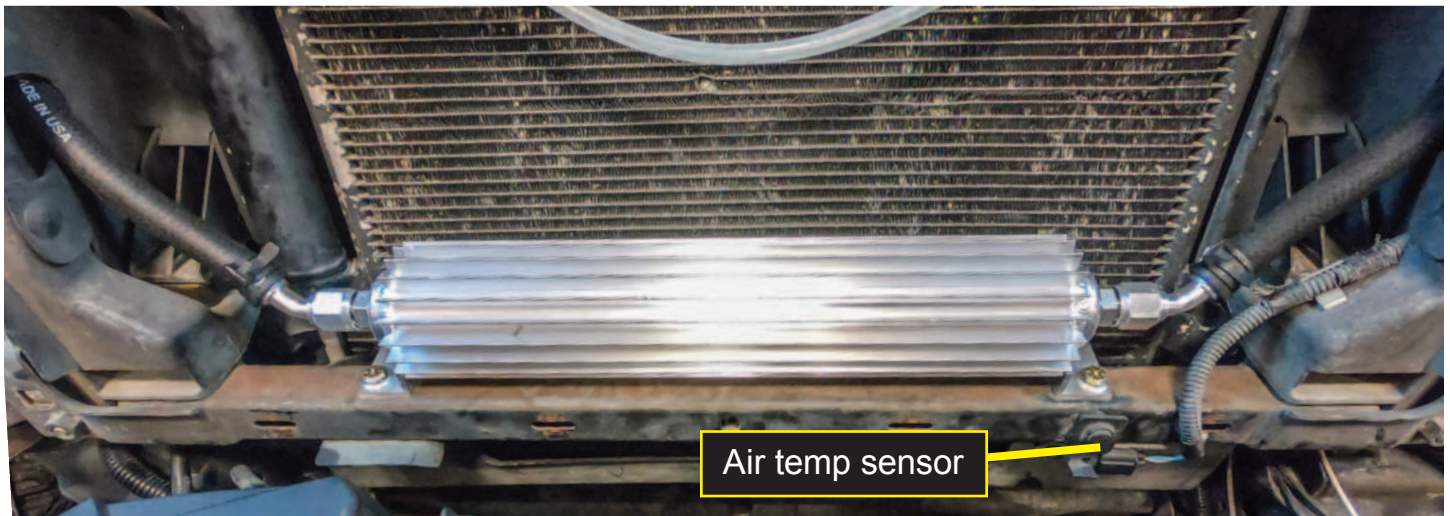
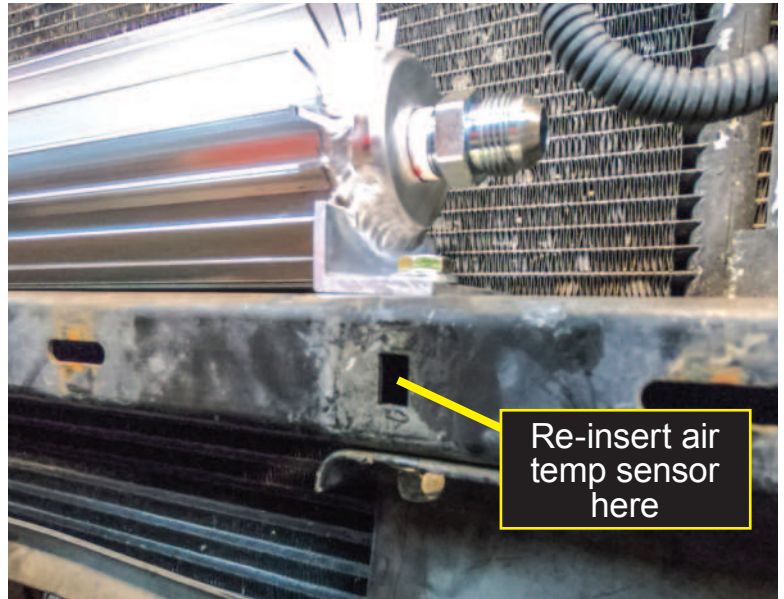


INSTALLATION GUIDE

SK688R38JP1

- 30) Using the 1/4"-20x2" bolts, washers and lock nuts mount the cooler as shown to the right.

Re-insert the outside air temperature sensor back into the hole on the front of the frame crossmember.



- 31) Re-attach the hoses using hydraulic thread sealant on both ends of the cooler.

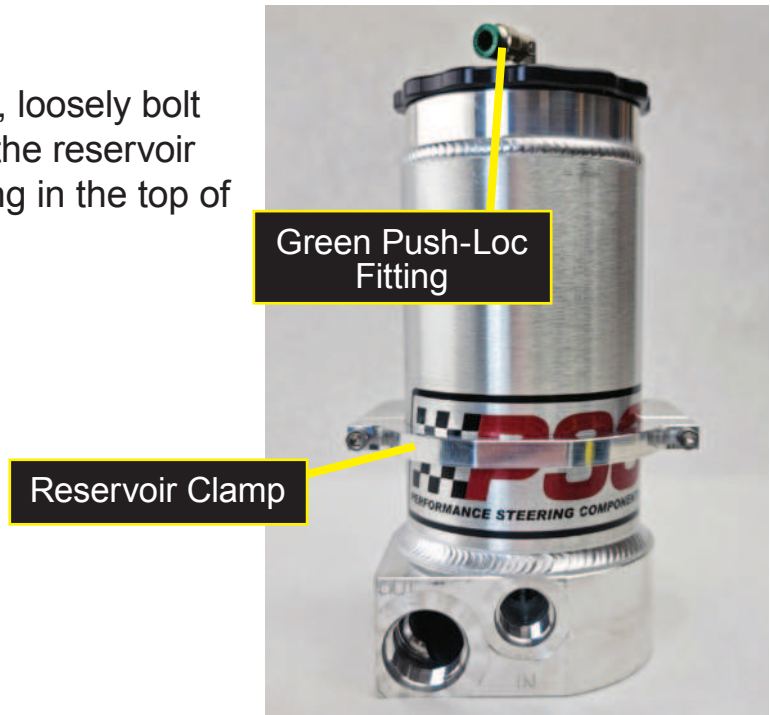
Fully tighten these hose fittings, but apply opposite pressure so the lines do not turn when you fully tighten them.



INSTALLATION GUIDE

SK688R38JP1

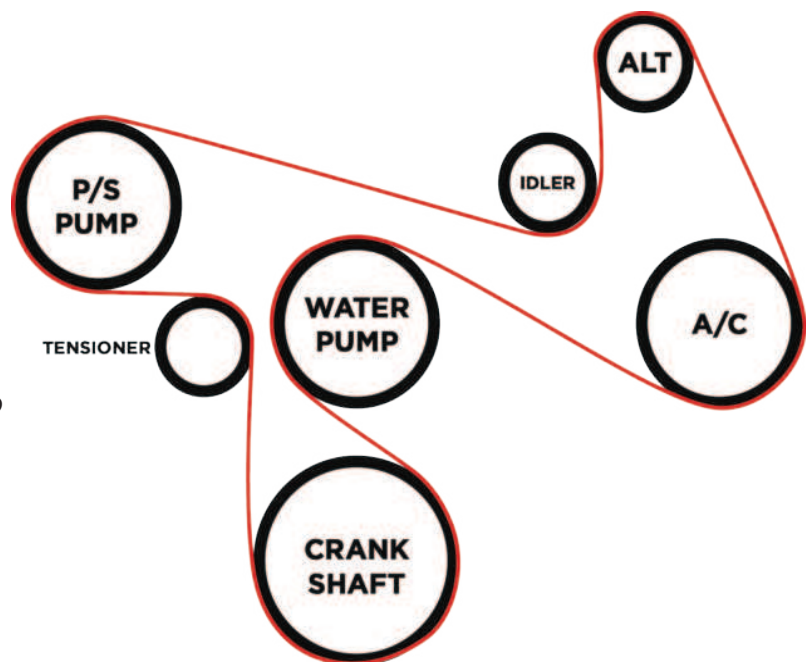
- 32) In preparation to mount the reservoir, loosely bolt together the reservoir clamp around the reservoir and screw in the green push-loc fitting in the top of the reservoir.



- 33) Re-install the serpentine belt by pushing the breaker bar inserted into the tensioner hole clockwise (like in step 6).

Refer to picture to the right for correct belt route.

NOTE: The ribbed side of the belt will go onto the ribbed pulleys, the smooth belt side will go on the smooth pulleys.



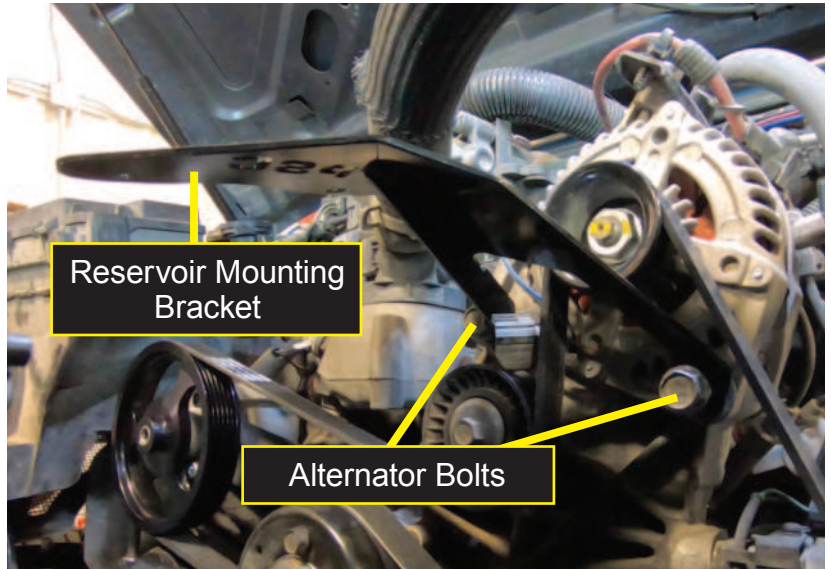


INSTALLATION GUIDE

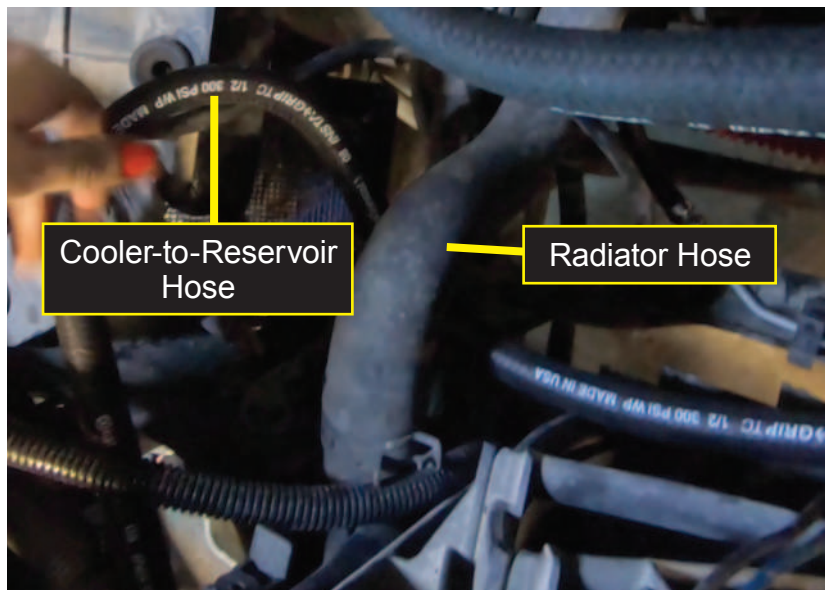
SK688R38JP1

- 34) Using the two alternator bolts you removed in Step 14, bolt on the reservoir mounting bracket. See the picture to the right.

NOTE: If the alternator bolts are not going back in, you might need to release the tensioner again in case the alternator shifted after putting on the serpentine belt.



- 35) Route the hose that runs between the cooler and the reservoir underneath the large rubber radiator hose. See the picture to the right.





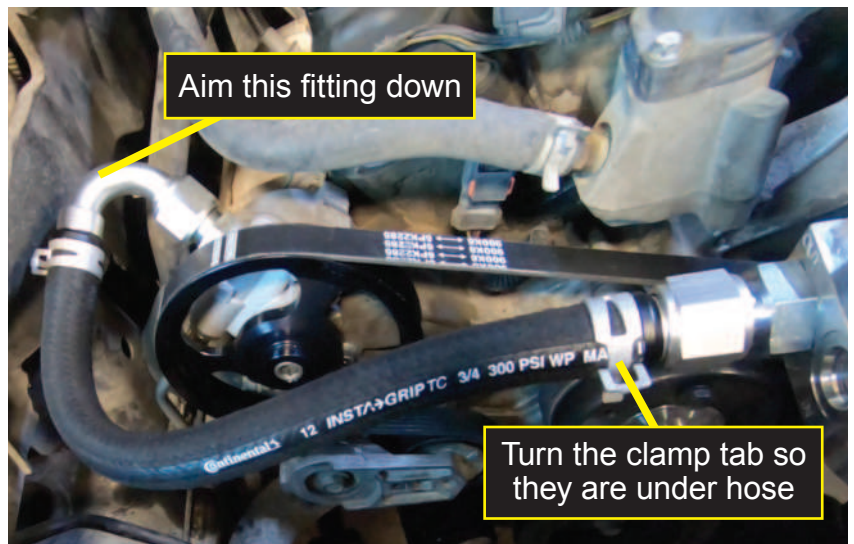
INSTALLATION GUIDE

SK688R38JP1

- 36) Loosely bolt the reservoir/clamp mount assembly onto the alternator bracket using the PSC-provided bolts, washers and nuts. Move the reservoir as far away from the engine block as possible and fully tighten the bolts/nuts. Lastly, adjust where the clamp mount is fixed around the reservoir so that the reservoir is as raised as it can be, without hitting the underside of the hood (approximately 1-1.5 inches from the reservoir base).



- 37) Using hydraulic thread sealant, screw in the large -12AN fitting into the OUT port of the reservoir. Then attach the large diameter hose between the pump and reservoir. Again, use hydraulic thread sealant when attaching the hoses to the AN fittings. Aim the fitting going into the pump down as much as possible so the hose will avoid the air box.



NOTE: Be sure that the hose clamps are aimed down or away from where hoses, belts or other lines are to prevent damage.



INSTALLATION GUIDE

SK688R38JP1

- 38) Now screw in the fitting into the IN port of the reservoir using hydraulic thread sealant. Then attach the cooler-to-reservoir hose to that fitting, again using hydraulic thread sealant.

NOTE: Be sure that the hose clamp tabs are aimed directly down or away from where hoses, belts or other lines are to prevent damage.



- 39) Last component to install is the SRVT valve. It goes at the front of the engine bay on the passenger-side of the radiator where you removed the stock power steering reservoir in Step 12. Use that stock bolt you retained and bolt the SRVT directly onto the frame.

NOTE: Be sure that the hose clamps are aimed down or away from where hoses, belts or other lines are to prevent damage.





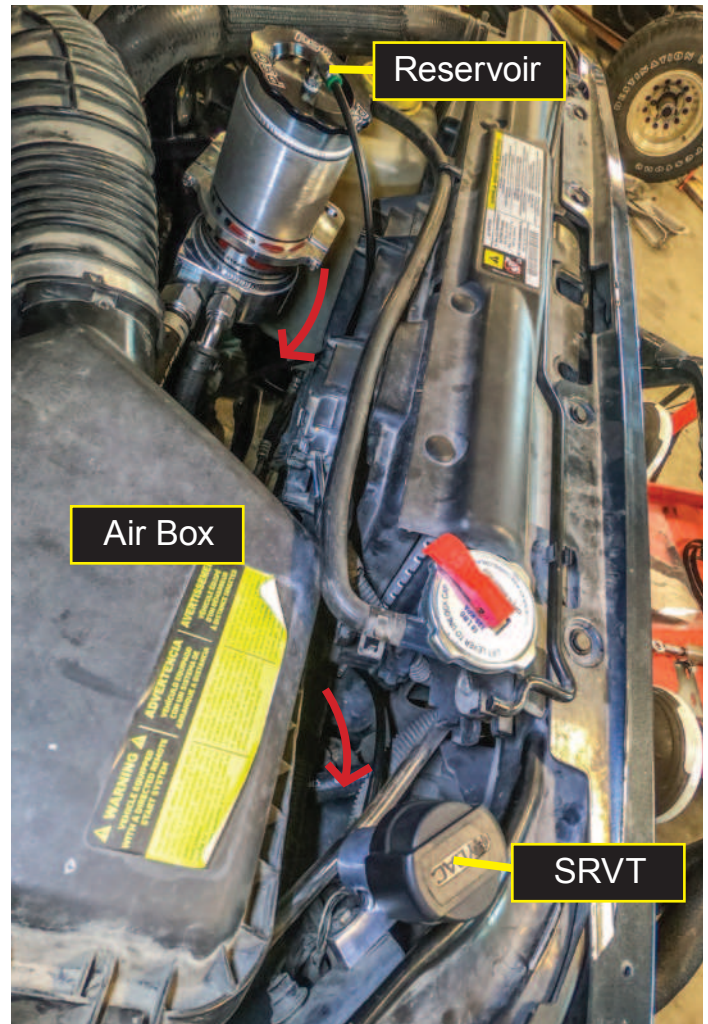
INSTALLATION GUIDE

SK688R38JP1

- 40) Re-install the air box, air intake tube and reconnect the sensor. Then push one end of the parfex tubing into the reservoir's green push-loc fitting and route it under the airbox and push the other end into the SRVT green push-loc fitting. See the picture to the right.

If you are installing a PSC Cylinder Assist™ kit, please refer to the proper CAK Installation guide, install the CAK parts, then come back to this point to finish the installl.

- 41) Re-install track bar to the frame, drag link to the pitman arm, grill, running lights in the grill and engine coolant reservoir in reverse order from disassembly. Then re-connect the battery.



- 42) Power steering fluid fill and bleeding instructions are on next page.
Take your time and be patient with this step—it is critical that this is done right.



BLEEDING PROCEDURES

With the kit installed, the last and most important step is adding the Swepeco Power Steering fluid and bleeding the system of all air. Swepeco is the Official Fluid manufacturer for PSC. The kit includes four (4) quarts of Swepeco 715 for use in the system. This part takes patience and diligence to do it properly—but it is critical to purge all the air out of the system to prevent damage to the pump.

Start by jacking up the front of the vehicle and put jack stands under the front axle. This allows it to be much easier to turn the steering wheel full right and left when there is no load resistance on the steering.

Next, start by adding the Swepeco power steering fluid in the reservoir. **Fill it to just over the filter top or about 1" to 1-1/2" of fluid from the top of the fill reservoir (see the picture).**

Once it looks as though no more fluid is going into the system, turn the steering wheel from lock to lock (all the way right and all the way left) to pull more fluid through the system. Add fluid as necessary and repeat until the fluid level remains consistent. Then, put on the reservoir cap and start the engine for about 30 seconds—do not turn the steering wheel yet. The fluid will have disappeared in the fill tank and you can now add more fluid. Repeat this a couple of times, letting a few minutes pass between startups. The fluid gets very aerated during this procedure and sometimes you need to let it sit—giving it time to let the air bubbles work their way up and out of the system.

Now, start the engine and turn the steering wheel completely to the right and then left 10-15 times, shut the engine off for about 10 minutes and add fluid as necessary. Repeat this 3-4 times. This will really start pushing the air out, but again it takes time for the air bubbles to work their way out, so be patient and let the vehicle sit between each start for 10 minutes. Once you have done this a few times, the fluid level should stop dropping and no bubbles should be visible in the reservoir.

Remove the jack stands and lower the vehicle to put a full load on it. Make sure you have installed the vent hose to the SRVT before driving. Drive the vehicle to build a little heat in the fluid (this helps bleed the remaining air out). Remember, when you hear the pump whine, it is aerating the fluid. Shut off the engine, let the fluid clear up and top off to the above-mentioned fluid level. Then, once the vehicle has been shut off and the engine is cold, take the cap off of the reservoir and have someone start the car while you watch the reservoir fluid level. If the level drops when the car starts, you still have air in the system. If it does not, you should be good.

Again, note that getting all the air out of the system takes awhile. If the pump is whining, you are aerating the fluid which is not good for the pump. So, if you are running your vehicle for an extended time and your pump has not stopped whining, it needs to be addressed as soon as possible. Sometimes this can be as simple as letting the vehicle sit to get the last of the air out. Always make sure the fluid level is good and there are no leaks.

If you have any questions contact us Monday-Friday from 9-5 CST at support@pscmotorsports.com.

Thank you for your purchase!

