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Installation: Turbocharger Actuator

UNDERHOOD

Please read the instructions completely.
Improper installation can and will damage the turbocharger.

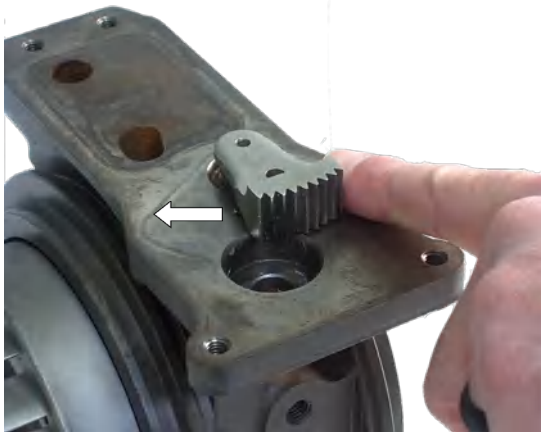
1. Drain the radiator. On '07.5-'12 trucks, remove the radiator cap and the vent plug. (The coolant vent plug is sticking straight up near the passenger side of the valve cover.) The '13-'18 engines do not have a radiator cap or vent plug. Instead remove the cap from the coolant reservoir located onthe passenger side close to the firewall. There is a drain valve on the bottom driver's side of the radiator. You will need a 4.5 gallon or larger container to drain the coolant. Spray a lubricant like WD-40 in the radiator drain hole to lubricate the sealing O-ring. Use pliers to turn the drain tab counter clockwise while pulling towards the rear of the truck.

2. Properly support vehicle and remove passenger side wheel. Next remove the passenger side inner fender cover. Disengage any component retaining clips, remove the screws and plastic clips holding the inner fender cover on.

3. Make sure the coolant is completely finished draining before proceeding.

4. Unplug the actuator harness from the engine harness. Remove (4) 5mm Allen head screws holding the actuator onto the turbocharger and pull actuator straight back from turbo. 5mm bit included. You can use a 1/4" wrench to turn the difficult to access lower bolts on 2013-2018 trucks.

5. With the actuator removed check the gear lever for movement. It should easily be able to move full travel with one finger. You will want to use the side of the tip of your index finger, rather than the palm (front) of your index finger. We have found that the side of your index finger will have less available force to move the gear and falls more in line with diagnosing a turbo gear that requires too much force to be moved. (Full travel is approximately 1 inch).



If you need more assistance, we are only a phone call away.
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Monday–Friday
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Picture the turbo gear as a door. If a door is not opening or closing easily, you don't slam the door open and closed to find the restriction, you move it back and forth slowly feeling for any restriction. Any small amount of gear movement resistance at or near room temperature will be greatly amplified when the turbo is over 1000 degrees. Temperatures this high will cause all the moving parts and the turbo housing to thermally expand. You will also want to load the vane gear by pushing and pulling on it while moving it back and forth. The slightest amount of resistance at room temperature is enough to cause issues during operation.

We then suggest swiping the vane gear against each stop with moderate force. This is done to make sure that when the vanes are moved to the extreme ends of its travel, they do not stick. If the actuator lever cannot be moved easily from the full travel stop in either direction, or if any resistance is found when pushing away from either end of its fullest travel, the turbo must be replaced.

6 Now check the turbo vane actuator vane gear for proper timing.

2007.5-2012 Turbos: move the turbo vane gear all the way to the compressor side (front of turbo) travel stop. Look straight down the alignment hole in the gear comparing it to the alignment hole in the turbo housing. There should be no overlap on either side of the opening.

2013-2018 Turbos: the alignment hole that will be used is with the turbo vane gear moved all the way against the stop that is closer to the turbine (rear of turbo). Look straight down the alignment hole in the gear comparing it to the alignment hole in the turbo housing. There should be no overlap on either side of the opening.

If you would like to accurately and precisely check the gear to turbo housing timing and alignment, a "no-go gauge" that is .0186 outside diameter is the appropriate size tool to use. This will be inserted into the vane gear hole and into the turbo housing. If the no-go gauge does not slide into the turbo housing at full travel of the gear using the year range information above, then the turbo is not usable. This misalignment has been seen on many used and remanufactured turbos.

If you find that the hole in the turbo vane gear lines up with both holes in the turbo housing at the furthest travel in each direction, then the timing is not correct and the turbo should not be used. Some turbo remanufacturing facilities may use a bearing housing that is different from the original year range application. The only way we know to determine the difference in bearing housings is listed below.

2007.5-2012: smooth surface below the vane sector gear.

2013-2018: small straight lines machined into the bearing housing that are visible when moving the vane sector gear back and forth.

7 2007.5-2012: Remove the (4) T20 tamper resistant six-sided Torx screws** holding the 2 actuator halves together and separate the two halves. We supply a T20 tamper resistant bit. Clean as much factory installed grease as possible.

2013-2018: will skip this step due to not reusing any parts.

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8 Mount the new actuator halve to the gear housing and use either the (4) removed T20 tamper resistant Torx screws to secure or use the included (4) T15 Torx screws. Torque the screws to 25 in-lbs. Do not over torque. The gearbox gear will not move once assembled to the actuator motor.

2013-2018 trucks will use the supplied green gasket to seal between the actuator and the new gear housing.

9 Be sure to dry off all components and make sure both pieces are completely moisture-free before bolting to the turbo. Verify that the mounting surface of the actuator housing does not have any recessed grooves that would not allow the gaskets to seal off the coolant.

We suggest blowing compressed air into the gear housing side of the turbo and the actuator gear box if reusing on a 2007.5-2012 application. This is done to verify that there is no residual coolant/moisture present before bolting the actuator to the turbo. The only way for coolant to enter the actuator is if the coolant was not drained properly prior to removing the original actuator, the pocket behind the gear or mounting surface was not dried properly, or the new actuator is not mounted properly prior to adding coolant back.

If you look at the back of the gear housing you will see 2 pockets. Each of these pockets has an O-ring around it. The top pocket, as installed on the truck, is designed to have coolant in it. The bottom pocket where the actuator shaft sits is designed to stay dry at all times. If you don't fully drain the coolant before removing the old actuator, the water drains from where the top pocket is to where the bottom pocket sits. When you then install the new actuator, you now have coolant where the bottom dry pocket is supposed to be.

It is critical the above steps are taken to ensure the gear housing is DRY before installing the new actuator. There is no other reasonable way moisture can enter the housing after installation. If moisture is later present then it almost certainly points to not correctly drying the housing prior to install. Further, if the wet pocket O-ring failed, the coolant would not go into the dry pocket, but would, instead, only leak to atmosphere. If the dry pocket O-ring failed, then the wet pocket would still have the coolant trapped in it and you still would not see this. If both O-rings failed, it still would leak from the wet side to atmosphere, not the dry side.

IMPORTANT: Do not grease the actuator gears! 2007.5-2012- Remove as much of the factory grease as possible. It does not matter what position the turbo vane gear is in because the actuator self-calibrates during each start cycle.

10 Mount the actuator to the turbocharger using the supplied gaskets. (Do not use any type of gasket sealer.) Make sure the actuator is sitting flush against the turbo before tightening bolts. Using the (4) new Allen head bolts that are included, tighten the actuator to the turbocharger.

IMPORTANT: Do not use the screws to force them together. Make sure they are flush before tightening! This can cause binding of the vanes and slow response codes. Torque the (4) 5mm Allen bolts to 80 inch pounds. 5mm bit included for the lower bolts on 2013-2018 trucks and we suggest using a 1/4" wrench to tighten it. Because a torque wrench is not able to be used on the lower 2 bolts on a 2013-2018 truck, you will want to tighten the 2 lower mounting bolts by hand, and turn your wrench an additional 90 degrees.

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11 Plug the actuator connector back into the engine harness. Be careful to avoid routing it against the hot side of the turbo or exhaust. Do not use any kind of dielectric grease!

12 Close the radiator drain and refill the coolant system.

2007.5-2012: Leave the coolant vent plug out until you get most of the coolant back in and it starts coming out of the vent.

2013-2018: Top off the coolant resevoir and start the truck. Hold 2000 RPM for around 10 minutes. This should be enough time for the thermostat to open. Turn engine off and top off coolant resevoir.

All year models: Check coolant level for the next few days while engine is cold and top off until correct level is maintained.

13 Re-install the fender cover and radiator cap.

* 5mm bit included, In tight areas you can use a 1/4" wrench to turn it.

** T20 Torx tamper-resistant bit included. You can use a 1/4" wrench to turn it.

For a very helpful installation video, go to: https://www.genosgarage.com/install_instructions
INSTALLATION & TECH VIDEOS ► Electronic Turbo Actuator