6.0L VG Turbo Rebuild

IMPORTANT: Before starting installation, please be sure that all items which were supplied with the kit are accounted for.

Recommended Parts:

-Garrett 6.0L VGT Turbo Rebuild Kit 740659-0010

Recommended Tools & Supplies:

-Metric and SAE 12 Point Sockets and Wrenches
-T-20 Torx® Driver
-In-Lb Torque Wrench
-Scotch-Brite® Disks and Arbor (61-5000-7982-9)
-Anti-Seize Compund

Instructions:

1. Using paint or a scribe, mark the turbine clamp and turbine housing to ensure they get installed in the same place at assembly. (Fig 1)
2. Using a 14mm Deep socket, loosen the turbine side V-band clamp. It may be required to remove the nut fully from the clamp to get it to disengage from the turbine housing flange. The V-band can be slid off the housing and left loose until the turbine housing is removed.
3. Separate the turbine housing by inserting a putty knife into the groove. You may need to work it around tapping it with a hammer to break the housing free. Applying PB Blaster® is also helpful in freeing up the housing. (Fig 2)
4. Once the housing is loose, make sure the turbo is placed on the bench with the turbine housing down. This will help keep the Unison Ring and Vanes together in the housing.
5. Remove the turbo charger assy. off of the turbine housing being careful of the turbine wheel fins.
6. Mark the turbine housing with a scribe or paint mark where the unison ring crank pin sits (oval slot in Unison Ring). This will allow you to index the Unison Ring during reassembly. (Fig 3)
7. Remove the Unison Ring from the turbine housing and place to the side.
8. Remove the vanes from the turbine housing and place to the side.

Fig 1


Fig 2

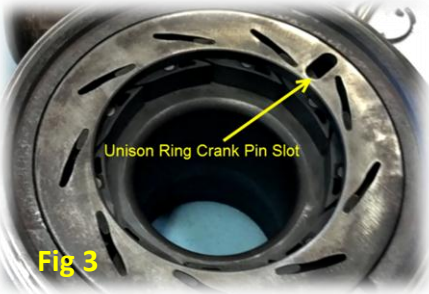

Fig 3

9) You can now clean the Unison Ring and turbine housing where the vanes sit and at the clamping surface. (Fig 4) Use a Scotch-Brite® disc to remove any rust, carbon and coking from the parts. You will need to cut down the disks or buy 1" disks and an arbor to fit in between the pins on the turbine housing side. If you have heavy deposits on the parts, scrape them first with a sharp flat tool like a razor blade to remove the stubborn deposits. If the Unison Ring is damaged, replace it with P/N 3C3Z6C885A**.** Clean the pins using a wire brush to remove any soot/debris.
10) Clean the guide vanes with Scotch-Brite® by hand. If they have heavy deposits you can soak them in parts cleaner and scrape them with a non-marring scraper. Make sure the pin hole is clear of any debris. Once cleaned, inspect the guide vanes for any damage. (Fig 5)
11) Apply a light coatof anti-seize to the pins on the turbine housing and into the pin hole on the guide vane. Also apply anti-seize to the drive pin on the guide vane and to the drive slot on the unison ring. A small amount of anti-seize applied to the surface of the Unison Ring where it sits on the guide vanes and Unison Ring crank pin slot will protect them from galling.
12) Install the guide vanes onto the turbine housing followed by the Unison Ring (locate the crank pin slot where you marked the housing in step 6). Align the guide vane drive pins into the slots on the unison ring until all the vanes are engaged into the Unison Ring. Place the turbine housing to the side for now.
13) Remove the bolts (6) from the compressor housing using an 8mm 12 point socket. Remove the compressor housing by lightly tapping with a soft face hammer and being careful not to damage the compressor wheel. (Fig 6)
14) To remove the compressor wheel you will need to hold the turbine shaft while loosening the compressor wheel. It is best to use a bench vice to clamp on the turbine shaft as the hex is usually machined to balance the turbine shaft. (Fig 8)(A 7/8" or 22mm wrench can be used to hold the turbine shaft if a bench vice is not available) While holding the turbine shaft, loosen the compressor wheel with a 14mm wrench turning it ***CLOCKWISE*** as the shaft is threaded with R/H threads. (Fig 7) Once it is loose, thread the compressor wheel off and place to the side.


Fig 4


Fig 5

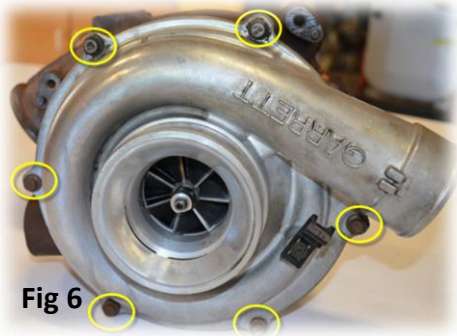
Fig 6

Fig 7


Fig 8

15) Mark a reference line on the back plate to the center spool using a marker. This will help on reassembly.
16) Using a 8mm 12 point socket, remove the (4) bolts holding the compressor back plate onto the turbo spool. Once the bolts are out, you will be able to lift the back plate off of the spool. (The Thrust Collar and thrust bearing may come out with the back plate. As the bearing seal ring will be engaged in the back plate as shown in (Fig 9)
17) If the Thrust Collar and thrust bearing stayed on the shaft, remove from the shaft by sliding the assembly up the shaft being careful not to drag the assembly on the shaft. (Fig 10)
18) Using a scribe or hook tool, remove and discard the back plate sealing ring from the spool. (Fig 10)
19) Locate the (2) bushings, Thrust Collar and thrust bearing from the rebuild kit and place them in a cup of new motor oil to soak.
20) Place the turbo spool on it's side and support the turbine wheel. Lightly tap the compressor shaft with a soft faced mallet to disengage the turbine side seal ring. It does not take much force to do this. Once the seal ring is disengaged from the spool, the turbine wheel and shaft will be able to be removed from the center spool. Be careful when removing the assembly as the bushings and spacer will most likely come out with the shaft. (Fig 11)
21) Remove the bushings and spacer from the shaft. These are not re-used and can be discarded.
22) Clean the turbine shaft assembly to remove all oil debris and build-up. Once the base of the shaft is cleaned, you will need to remove the oil seal ring from the shaft. Use a scribe or small hook, remove the ring by prying it out of the groove and sliding off of the shaft. (Fig 12)
23) Continue to clean the shaft assembly using a soft wire brush and lightly cleaning with a Scotch-Brite® pad. This will remove the remaining build-up and prepare the shaft for installation.
24) Using the new oil seal ring provided in the kit, carefully install it onto the turbine shaft and into the groove. Place the turbine shaft to the side for now. (Fig 13)
25) Using a Torx® T-20 bit, remove the (3) screws from the center spool cover plate. Clean the debris and build-up from the spool and plate. Ensure you get the groove in the spool cleaned out properly. A scribe is useful in removing the debris in the groove. Re-install the plate with new screws provided in the kit. (Fig 14)


Fig 9


Fig 10


Fig 11


Fig 12

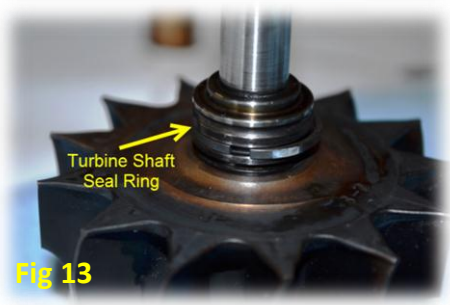

Fig 13


Fig 14

26) There are two O-rings included in the kit that are for the VGT Actuator. Remove the covers by removing the snap rings and replace the O-rings if needed. (Fig 15)
27) Remove the shaft bushings from the cup of oil and place one onto the turbine shaft, slide on the spacer, then slide on the other bushing. Apply clean oil to the shaft and bushings. (Fig 16)
28) Insert the turbine shaft assembly into the spool being careful to keep the bushings and shaft centered in the spool bore. The shaft will slide in freely until the oil seal ring aligns into the spool housing. You will need to push firmly or tap the turbine wheel with a soft faced mallet to seat the oil seal ring in the housing. You may hear an audible snap when it engages. The wheel will move into the housing approximately 1/8".
29) Remove the thrust bearing and thrust washer out of the cup of oil.
30) Install the oil seal ring onto the thrust bearing into the groove. (Fig 17)
31) The trust washer must be installed with the grooves facing the spool for lubrication. Insert the bearing into the washer as shown in (Fig 18).
32) Slide the thrust washer/bearing assembly onto the turbo shaft with the washer facing the spool assembly.
33) Engage the thrust washer into the grooves in the spool assembly. It will only go in one way so rotate the thrust washer until the washer tabs engage with the spool slots. (Fig 19)
34) Install the new spool to back plate seal from the kit into the groove on the spool. It may want to use a little oil to keep the seal in the groove during assembly.
35) Make sure the back plate is cleaned before installing.
36) Slide the back plate onto the turbo shaft and engage the thrust bearing into the back plate (use the mark applied in step 15 to aid in aligning the back plate to the spool). The oil seal ring will need to be engaged into the back plate. This can be done by pressing the back plate firmly onto the spool.
37) Once the back plate is seated fully, install (4) new bolts and tighten using a 8mm 12 point socket. Torque the bolts to 12 FT-LBS in a cross pattern.
38) Thread the compressor wheel onto the shaft by turning it counter clockwise. You may choose to use Loctite® in the threads. Tighten the compressor wheel by holding the turbine shaft in a vice as it was done during removal. Tighten to 10 FT-LBS.


Fig 15


Fig 16

Fig 17


Fig 18


Fig 19

39) Inspect the compressor housing seal around the parameter of the back plate. (Fig 20) Replace if torn. Install the compressor housing onto the back plate. Make sure the housing is seated evenly and the compressor wheel turns freely. Install the (6) bolts and snug down. Torque the bolts in a crisscross pattern to 12 FT-LBS. Verify the compressor wheel rotates freely after torque has been applied to the bolts.
40) Place the turbine housing with the alignment notch facing you.
41) Install the turbine housing v-band clamp onto the turbine housing below the flange.
42) Apply a light coat of anti-seize compound to the turbine housing clamp flange contact area.
43) Line up the turbo assembly onto the turbine housing making sure the alignment pin engages into the notch on the turbine housing. Also make sure the Unison Ring crank pin and pin slot are aligned before pushing the turbo onto the turbine housing. (Fig 21 & 22)
44) After everything is lined up, press the turbo onto the turbine housing fully and work the v-band clamp around the flange fully. Snug up the clamp until it will just slid around the flange. Set the clamp to the position marked earlier and tighten the clamp to 160 in-lb. Loosen the nut and torque to 50 in-lb. Tap the turbine housing with a soft faced mallet and re-torque the v-band clamp to 150 in-lb.
45) Install the VGT Control solenoid if it was removed during the install.


Fig 20

Fig 21


Fig 22

Thanks to Ken (Woodnthings on FTE) for Pictures and Instructions.

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