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## ***Turbo Installation Instructions***

### **Parts included:**

- 1 Instruction set
- 1 Custom T-3/T-4 ceramic ball bearing turbo
- 1 A910E6375 gasket (turbo oil drain)
- 1 A910E6374F gasket (turbo oil feed)
- 1 A910E6376F gasket (exhaust manifold to turbo)
- 1 Shipping case/packing

### **Tools required:**

- 10 mm combination wrench
- 12 mm combination wrench (must be a high quality wrench, NOT A CRAFTSMAN)
- 12 mm stubby wrench (must be a high quality wrench, NOT A CRAFTSMAN)
- 13 mm combination wrench
- 17 mm combination wrench
- 3/8" drive 10 mm socket
- 3/8" drive 13 mm socket
- 3/8" drive extensions
- 3/8" drive ratchet
- 1/2" drive 17 mm socket
- 1/2" drive extensions
- 1/2" drive ratchet
- Long shaft 3/16" flat tip screwdriver
- Hammer
- Pliers
- Long brass drift
- Fender cover
- Penetrating oil
- Anti-seize paste
- Oil
- Coolant/water

### **Step 1.**

Unpack contents and check against the parts list. Report any errors immediately to WC Engineering.

### **Step 2.**

Read these instructions completely before starting work. Several steps may require the use of penetrating oil, which may need to be applied in advance.

### **Step 3.**

Gather the needed tools and have a clean area with enough room to work. This entire procedure can be performed with the car on the ground. No lifting is required, but lifting may make some operations simpler. Access is required to the engine bay, the exhaust system, and the left rear wheel well. Removal of the left rear wheel will make some procedures easier.

### **Step 4. *Precautions***

Disconnect the battery, cover the left rear quarter panel with an appropriate fender cover, and remove the engine cover. If lifting the vehicle, jack it from the rear convergence of the frame under the transmission fixings. Properly place jack stands under the rear hubs to support the weight of the vehicle.

### **Step 5. *Downpipe Heat Shield***

Remove the heat shield in the left rear wheel well. Three 10 mm bolts hold it in place and the mounting brackets are attached to the body. Penetrating oil may be necessary if the heat shield hasn't been previously removed.

### **Step 6. *Exhaust System***

Unbolt the exhaust system/exhaust backpressure valve from the downpipe/catalytic converter. Three long bolts (13 mm head) hold the flange in place. Disconnect the vacuum hose from the exhaust backpressure valve (EBV). Remove the EBV and set it aside. Penetrating oil should be applied in advance and during the disassembly, anti-seize paste should be put on the threads of the bolts to prevent galling.

### **Step 7. *Downpipe***

Working from the left rear wheel well and the engine compartment, loosen the three 17 mm nuts holding the downpipe to the turbo housing. This is another area that penetrating oil should be applied in advance and anti-seize paste applied during the removal of the nuts. (Please see Step 30 about the studs.) Once all three nuts are removed, the triangular flange can be pulled back off the studs. Withdraw the downpipe from the turbo, but do not allow the downpipe to hang from the wires to the oxygen sensor.



### Step 8. Chargecooler

- A. Working from the engine compartment, disconnect the mass air temperature (MAT) sensor. Unplug the harness from the sensor. The sensor is located on the chargecooler near the oil filler cap.
- B. Disconnect the chargecooler static ground strap. On the rear of the chargecooler there is a small bolt (10 mm head) that has a short braided wire attached to it. Unscrew the bolt and set aside.
- C. Loosen the hose clamps that attach the intake hose from the chargecooler to the intake plenum. It will be necessary to work the hose towards the intake plenum.
- D. Loosen the hose clamps on the intake hose that feeds from the turbo outlet to the chargecooler.
- E. Using a 13 mm wrench, unbolt the front chargecooler mount. The mount is a rubber load mount that is susceptible to twisting, so use a backup wrench on the mount to prevent shearing the rubber.
- F. Unbolt the rear chargecooler mount. This is also a 13 mm nut that should be removed carefully to avoid damage to the rubber load mount.
- G. Leave the chargecooler plumbing hoses intact. (It won't be necessary to drain or fill the chargecooler coolant.) Pull the chargecooler up, and to the left until the chargecooler comes loose from the air intake hoses. "Fold" the chargecooler assembly over towards the intake plenum to place it out of the way.



### Step 9. Intake Air Hose

Using a long flat screwdriver, loosen the hose clamp on the intake hose at the turbo. Grasp the hose, and with a twisting motion, slide the hose off the turbo intake. Loosen the hose clamp at the air cleaner end and withdraw the intake hose from the engine compartment. *NOTE: Take time to observe the routing of the intake air hose and the other hoses, wires, and tubing in the area. When reassembling, you may wonder how the hose actually fit there before.*



### Step 10. Wastegate Hoses

The wastegate actuator hose is actually two pieces. There is one hose that feeds from a fitting near the turbo compressor outlet to the trunk wall, and another hose that feeds from the trunk wall to the wastegate actuator itself. Using a pair of pliers, loosen the small hose clamps on the hose at the turbo outlet fitting. Slide the clamp back on the hose and pull the hose from the barbed fitting. Repeat the procedure and disconnect the hose from the wastegate actuator.



### Step 11. Coolant Hose

Use a flat bladed screwdriver to loosen the hose clamps securing the two coolant hoses to the turbo. One hose is on the front of the turbo and one is on the rear. Disconnect the hoses from the turbo and move the ends aside. Coolant spillage should be minimal.

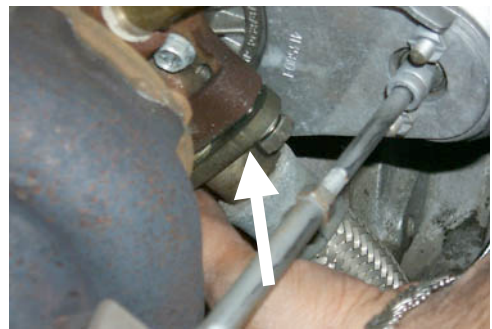
### Step 12. Oil Feed Hose

The turbo oil feed is supplied by a stainless steel line to the top center of the turbo. An "AN" fitting on the hose is attached to an adapter plate that is bolted to the turbo. Remove the two 10 mm bolts that hold the adapter plate to the turbo center section. Move the hose out of the way. Oil loss should be minimal. Clean the adapter's surface to accept a new gasket upon re-assembly.



### Step 13. Oil Drain Hose

The turbo drain hose is a large (about 1" diameter) stainless steel hose that runs from the center section of the turbo down to the left side of the oil pan. Working from the left wheel well (or under the car), remove the two 10 mm bolts that hold the turbo drain hose to the turbo center section. Oil loss should be minimal.



### Step 14. Heat Shield

Using a long 10 mm wrench, loosen the four nuts securing the heat shield to the rear of the cylinder head. The four nuts hold the stainless steel shield, a composite insulation shield, and the rear chargecooler mount. There are several large flat washers and two spacers involved. Make note of their locations and set the nuts, washers, spacers, and heat shields aside.



### Step 15. Turbo/Exhaust Manifold Nuts

Four 12 mm nuts hold the turbo to the exhaust manifold. Each of the nuts has a locking tab that must be bent away from the nut in order to remove the nut. Access to the locking tabs is narrow and difficult to get to.

- A. Using the brass drift and a hammer, bend the locking tabs down and out of the way. Some nuts may have more than one tab to release. You may also need to use a long screwdriver to start bending the tabs away from the nuts.



- B.** Once the locking tabs are clear, remove the four 12 mm nuts from the studs. These will require soaking in penetrating oil before removal, and is advisable to put anti-seize paste on the threads of the studs before disassembly. You will need a long and stubby wrench to gain access to the nuts. Also, these are locking nuts, so they will require wrenching all the way off (they will not “spin free”).



**NOTE: A QUALITY wrench must be used on the nuts. DO NOT use a Craftsman wrench on the nuts, or any other “inexpensive” open-ended wrench. I have seen the wrench head flex during attempted removal.**

- C.** Once the nuts are removed, the stainless steel locking flanges can be lifted off the studs, and the turbo can be lifted from the exhaust manifold. You will need to maneuver the unit around to get it to clear the cylinder head and trunk wall. Do not lift the unit by the wastegate actuator rod. Place the unit on a suitable workbench.

### **Step 16. Turbo Disassembly, Prep, and Clocking**

It will be necessary to remove the brass water fittings from the turbo and move them over to the new turbo. The fittings must be moved over because different cars over various model years have slightly different fittings. Note the orientation and clocking of the water fittings. We will remove the water pipes one at a time and reinstall them on the new turbo. First, remove the “pipe” portion from the “elbow” portion of the fittings. Next, unscrew the elbow section from the turbo center. Note the clocking of the compressor section and turbine section to the center section of the original turbo. On the new turbo, loosen (but do not remove) the 13 mm headed bolts that secure the compressor section to the center section, and rotate it to match your original turbo. Retighten the bolts, and repeat the procedure for the turbine section.

Clean the threads of any remaining sealant. Apply fresh pipe sealant and reinstall the elbow and pipe to the new turbo, in the same orientation and clocking as the original turbo. Repeat the steps for the second water fitting.



### **Step 17. Wastegate Removal**

Carefully remove the black “circlip” that holds the wastegate rod to the wastegate control valve. Unbolt the wastegate actuator from the compressor section. Transfer it to the new turbo and reattach the actuator rod. You should have a compressor section “clamp” leftover after this. Please return the clamp.

### **Step 18. Turbo Installation**

The installation of the turbo is the reverse of the removal.

- A.** Start by cleaning the mating surface of the exhaust manifold and installing the turbo/exhaust manifold gasket. The gasket has a ridge around the opening and should be installed with the ridge side up.
- B.** Negotiate the turbo into position on the exhaust manifold and put the stainless steel locking plates in place.
- C.** Install the four nuts onto the studs and tighten them down in an even pattern. The torque spec is 29–31 ft-lbs. However, it is highly unlikely that you will be able to access the nuts with a torque wrench. This is going to require you to determine the amount of “grunt” necessary to achieve the proper torque.
- D.** Once the nuts are on, bend the locking tabs back into place. At least one tab **MUST** be seated against each nut. If this step is skipped, the nut **WILL** back off the stud, and an exhaust leak **WILL** occur.

### **Step 19. Oil Drain Hose**

Clean the mating surface flange of the oil drain hose. Using the new gasket supplied, bolt the hose up to the turbo.

### **Step 20. Oil Feed Hose**

Put a few drops of fresh oil down the oil feed hole on the top of the turbo to prime it. Clean the mating surface flange of the oil feed hose. Using the new gasket supplied, bolt the hose up to the turbo.

### **Step 21. Coolant Hoses**

Put the coolant hoses onto the feed pipes and tighten the hose clamps.

### **Step 22. Heat Shields**

Reinstall the spacers, washers, composite shield, chargecooler mounting bracket, stainless heat shield, and nuts, in the same order as removed.

### **Step 23. Wastegate Hoses**

Put the two wastegate hoses onto the wastegate actuator and the barbed fitting, and replace the small hose clamps with a pair of pliers.

### **Step 24. Intake Air Hose**

Jockey the intake air hose back through the nest of wires and hoses that it was routed through before. (Like I mentioned, it’s a tight fit.) Tighten the hose clamps at either end.

### **Step 25. Chargecooler**

Put the intake hose onto the intake plenum pipe and push it on as far as possible. Put the hose on the turbo outlet and position the chargecooler back into position. This part may require “a little special lovin’” to get it all the intake hoses and chargecooler into their proper positions. When the positions are set, install the two 13 mm nuts to the rubber lord mounts and tighten the hose clamps. Re-attach the static ground strap, and plug in the MAT sensor.

### **Step 26. Downpipe**

Offer up the downpipe to the turbo, and clock the flange to slide onto the studs. Put some anti-seize paste on the studs, and install the nuts, but do not fully tighten them yet. The flange should be “snug.”

### **Step 27. Exhaust**

Put the EBV in place on the downpipe/catalytic converter and locate the exhaust pipe to the EBV. Put some anti-seize paste on the bolt threads and install the three bolts and nuts. It may be necessary to “jockey” the downpipe around to get the whole assembly to line up and seal. Double-check the flange at the turbo for alignment and the EBV. Snug the bolts up and when satisfied with the EBV and turbo flange alignment, tighten the turbo flange nuts and the EBV bolts.

### **Step 28. Downpipe Heat Shield**

Reinstall the wheel well heat shield with the three bolts.

### **Step 29. Startup**

Check over the work again, assure that everything is tight, and in it’s proper place. Check the coolant level and top up if necessary. Check the oil level, and top up if necessary. Reconnect the battery.

Start the car and immediately check for any fluid/exhaust leaks. Stop the engine if any are found and repair as necessary.

### **Step 30. Packaging**

Package up the core unit and return it to WC Engineering. *NOTE: If any of the exhaust studs are bent, missing, stripped, broken, or otherwise damaged, there will be a charge of \$100 US for EACH STUD that needs to be replaced.*