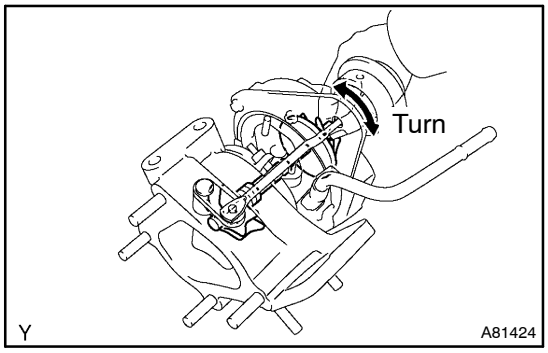
TURBOCHARGER SUB–ASSY (15B–FTE)

13068–01

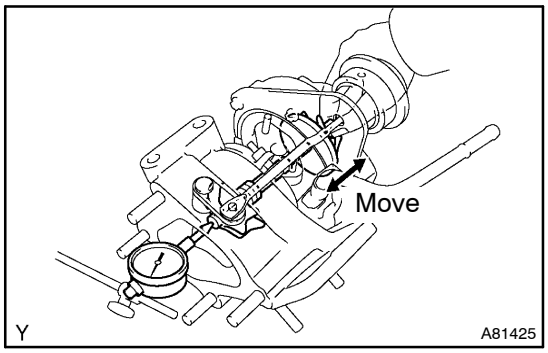
OVERHAUL



1. INSPECT BEARING HOUSING SUB–ASSY

(a) Check that the turbine shaft smoothly turns.

If the turbine shaft turns remarkably heavily or is stuck, replace the bearing housing. At that time, also check that the turbine housing interferes with the compressor housing.



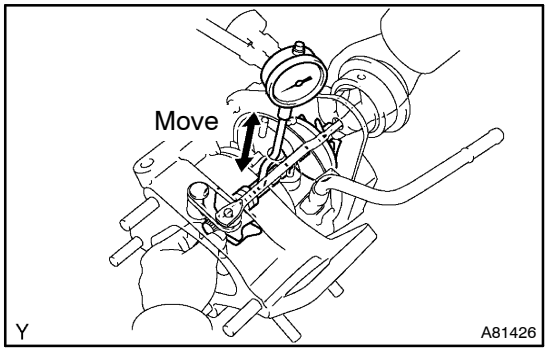
(b) Inspect the axial play of the turbine shaft.

(1) Using a dial indicator, insert the needle of the dial indicator into the exhaust side.

(2) Moving the turbine shaft in the axial direction, measure the axial play of the turbine shaft.

Maximum play: 0.08 mm (0.0031 in.) or less

If the axial play is greater than the maximum, replace the bearing housing. At that time, check also that the turbine housing interferes with the compressor housing.



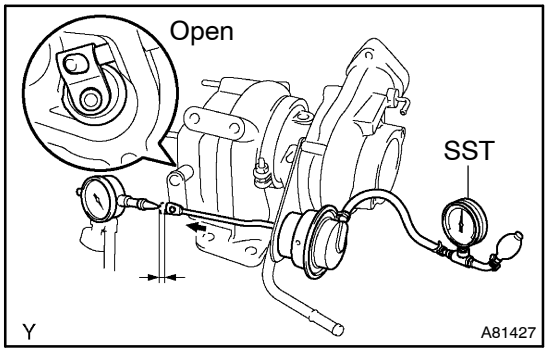
(c) Inspect the radial play of the turbine shaft.

(1) Set a dial indicator in the center of the turbine shaft by inserting the dial indicator needle into the oil outlet hole

(2) Move the turbine shaft in a radial direction and measure the radial play of the turbine shaft.

Maximum play: 0.11 mm (0.0043 in.) or less

If the radial play is greater than the maximum, replace the bearing housing. At that time, check also that the turbine housing interferes with the compressor housing.



2. INSPECT W/BRACKET ACTUATOR ASSY

(a) Disconnect the actuator hose from the compressor housing.

(b) Using SST and a dial indicator, read the graduation of SST when the actuator push rod is 2 mm (0.079 in.).

SST 09992–00242

Standard pressure:

152 – 165 kPa (1.55 – 1.68 kgf/cm^2, 22 – 23.9 psi)

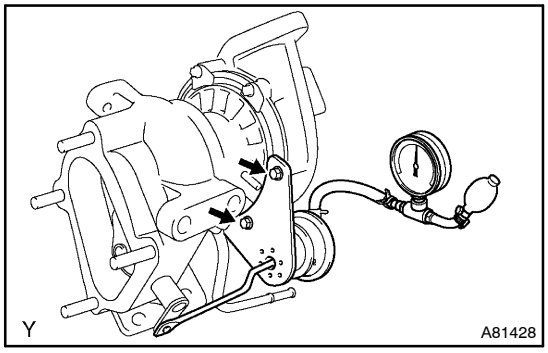
(c) Check that the actuator push rod is moved and the waste gate valve is opened.

NOTICE:

Do not apply more than 147 kPa (1.50 kgf/cm^2, 21.2 psi) of pressure to the actuator.

If operation is not as specified, replace the turbocharger.

(d) Reconnect the actuator hose to the compressor housing.



3. REMOVE W/BRACKET ACTUATOR ASSY

(a) Remove the actuator hose from the compressor housing.

(b) Using SST, move the actuator push rod.

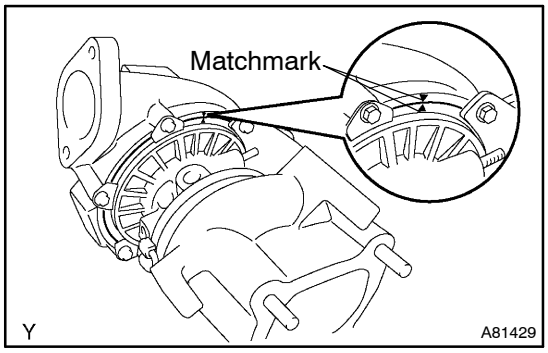
SST 09992–00242

NOTICE:

Do not apply more than 185 kPa (1.89 kgf/cm^2, 26.9 psi) of pressure to the actuator.

(c) Remove the 2 bolts, E–ring and actuator.

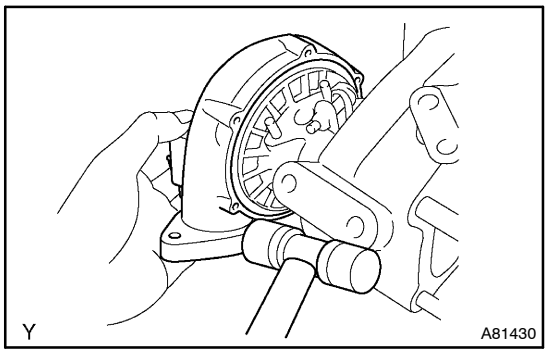
(d) Remove the actuator hose.



4. REMOVE COMPRESSOR HOUSING SUB–ASSY

(a) Place the matchmarks on the compressor housing and bearing housing.

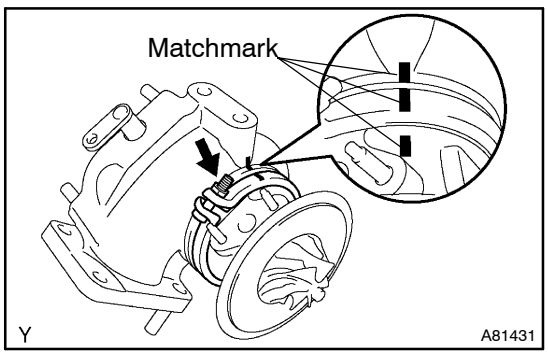
(b) Remove the 3 bolts.



(c) Using a plastic–faced hammer, tap out the compressor housing.

NOTICE:

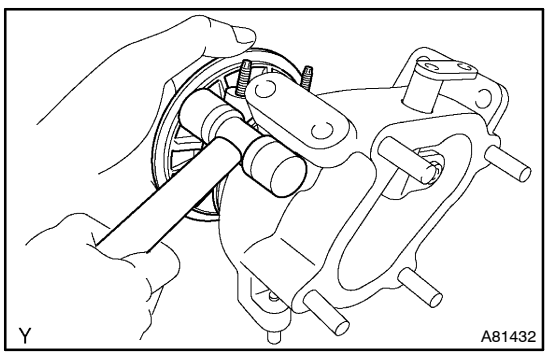
- **Remove the housing as straight as possible and do not allow the turbine wheel to interfere with the turbine housing.**
- **Do not tap the bearing housing.**



5. REMOVE TURBINE HOUSING

(a) Place the matchmarks on the V–band, turbine housing and bearing housing.

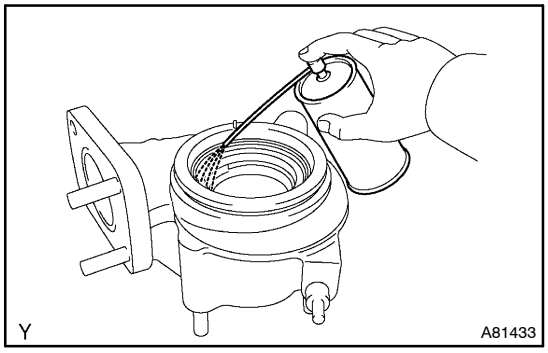
(b) Remove the bolt, nut and V–band.



(c) Using a plastic–faced hammer, tap out the bearing housing.

NOTICE:

- **Remove the housing as straight as possible and do not allow the turbine wheel to interfere with the turbine housing.**
- **Do not tap the bearing housing.**

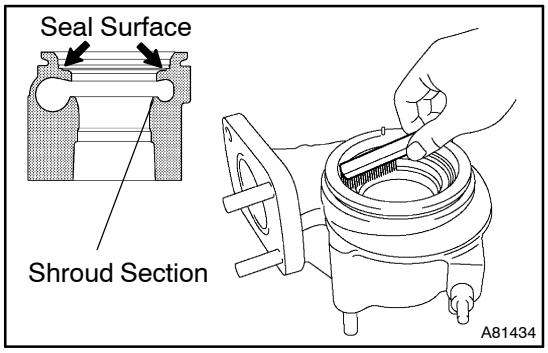


6. CLEAN TURBINE HOUSING

(a) Spray the engine conditioner to the section where the carbon dirt is adhered.

NOTICE:

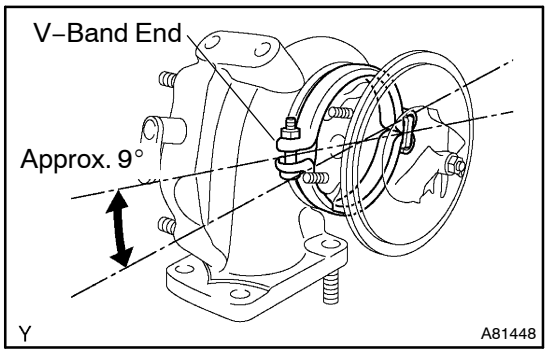
Be careful not to erase the matchmark of the turbine housing.



(b) Using a wire brush, remove all the carbon dirt inside the turbine housing.

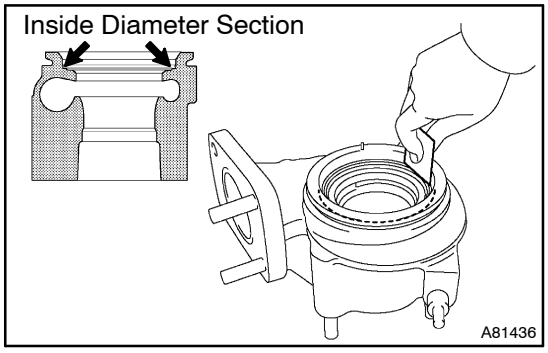
NOTICE:

Clean the seal surface and shroud section thoroughly, as shown in the illustration. Also clean the waste gate valve seat thoroughly.



HINT:

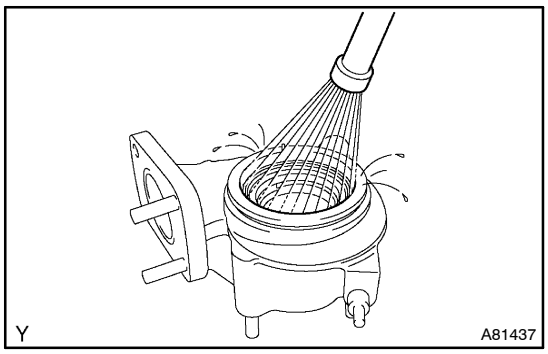
When the carbon dirt is heavily adhered, remove it using a scraper.



(c) Clean the inside diameter section with a sandpaper (No.100) until the metal surface appears.

NOTICE:

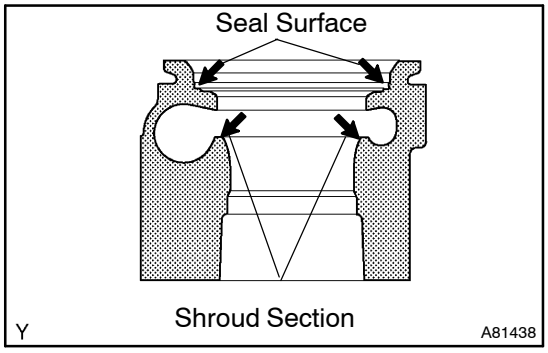
If the cleaning is not enough, the installation of the bearing housing will becomes harder, so clean it well.



(d) Wash the turbine housing with compressed air or a steam cleaner.

NOTICE:

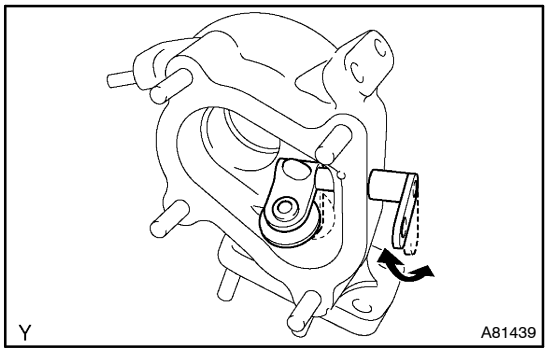
Wash the turbine housing well without leaving any irregular objects.



(e) Check that there is no severe damage on the seal surface.

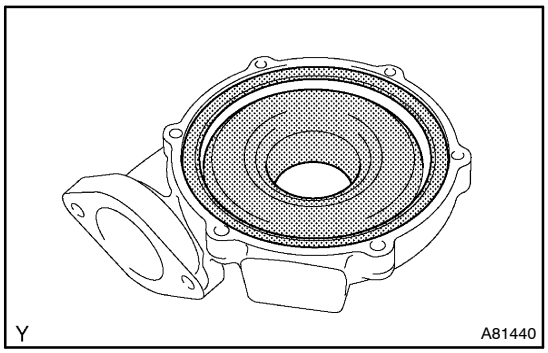
(f) Check that there is no bore made by the interference with the turbine wheel in the shroud section.

If the turbine housing has remarkable damage or bore, replace the turbocharger.



(g) Move the waste gate valve link and check that it turns smoothly without stick.

If the link is badly turning, clean it again. If it is badly turning even after cleaning, replace the turbocharger.



(h) Clean the compressor housing.

NOTICE:

Be careful not to drop any oil on the contact surfaces.

(1) Using a razor blade and gasket scraper, remove all the old packing (FIPG).

(2) Thoroughly clean all the components to remove all the loose materials.

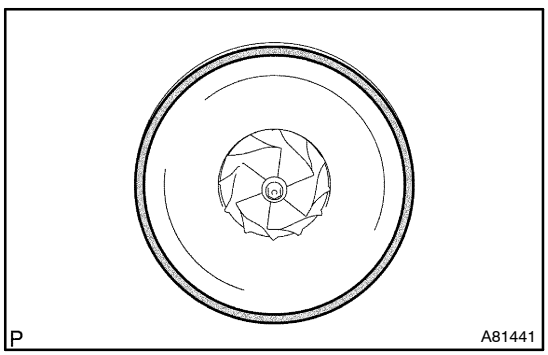
(3) Using a non–residue solvent, clean both sealing surfaces.

(4) Wipe off the dirt from the inside of the housing with a shop rag.

(5) Check that there is no severe interference with the impeller wheel.

If there is burr made by a slight interference damage, remove it with a sandpaper (No.400) and blow the dust with compressed air.

If the housing has heavy damage, replace the turbocharger.

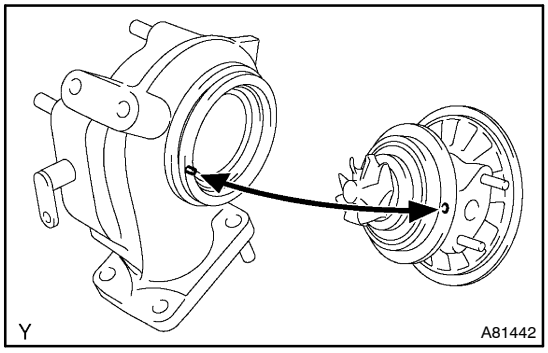


(i) Clean the bearing housing.

NOTICE:

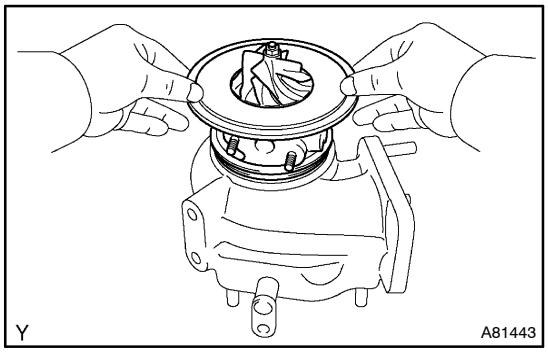
Be careful not to drop any oil on the contact surfaces.

(1) Using a razor blade and gasket scraper, remove all the old packing (FIPG).



7. INSTALL TURBINE HOUSING

(a) Align the pin of the turbine housing with the pin hole of the bearing housing.

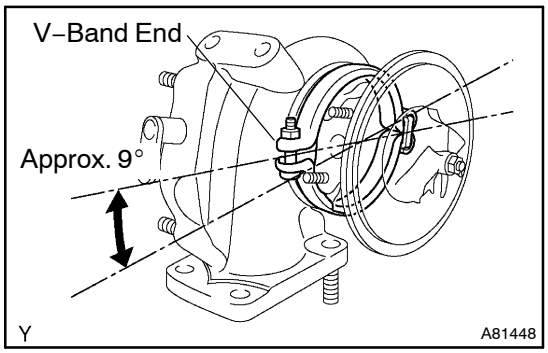


(b) Install the bearing housing to the turbine housing.

NOTICE:

Install the bearing housing straight, and be careful not to damage the turbine wheel.

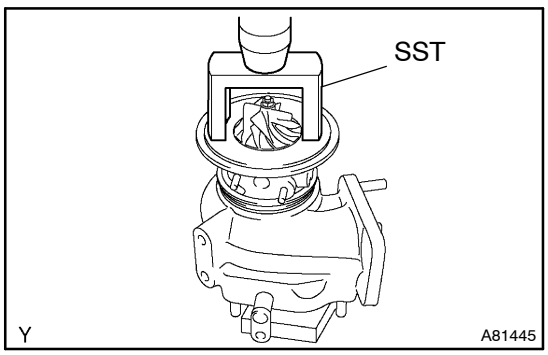
If pressing in the bearing housing by hand is difficult due to hard engagement, perfrom step (C) below.



HINT:

Apply a little penetrate rust prevention lubricant onto the engagement section to make the installation easier.

If pressing in the bearing housing by hand is difficult due to hard engagement, perfrom step (C) below.

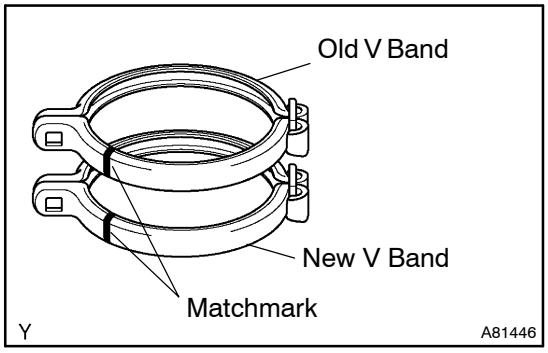


(c) If that the engagement of the bearing housing is hard, use SST and a press to install the bearing housing while checking the smooth rotation of the impeller wheel.

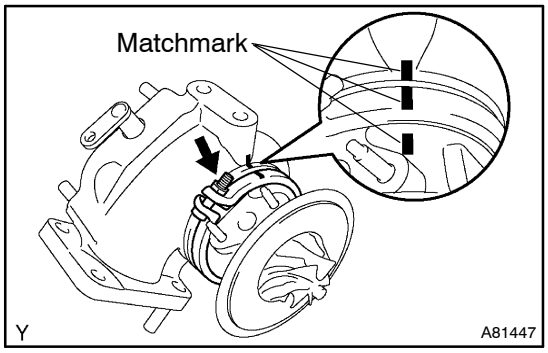
SST 09350–32014 (09351–32070)

NOTICE:

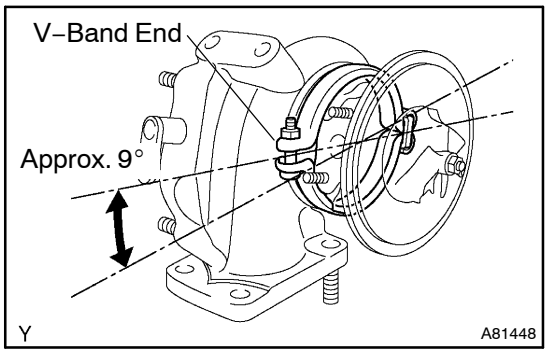
- **Do not hold the turbine housing with the stud bolts.**
- **Be sure to install the bearing housing straight without tilting, because the shaft may be bent and it cause the irregular noise.**
- **Press in the bearing housing slowly. When the rotation of the immediately and perform the operation again.**
- **After the installation, check that the turbine shaft turns smoothly.**



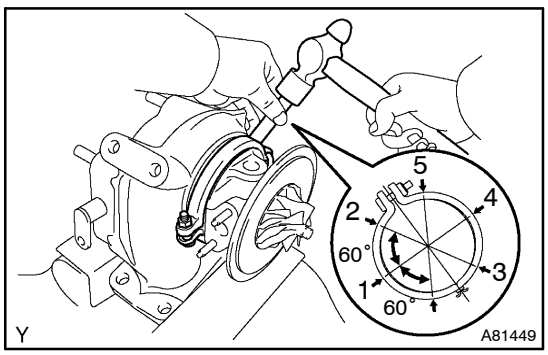
(d) Place a new and old (used) V–bands in line, then reprint the matchmark position on the old V–band onto a new one.



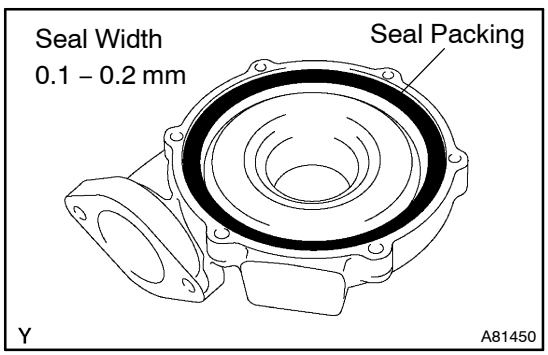
(e) Align the matchmarks on the new V–band, turbine housing and bearing housing, and temporarily install a new bolt and nut.
Torque: 8.3 N·m (85 kgf·cm, 74 in.·lbf)



HINT:
When the matchmarks are erased, make the matching openings meet at the position, as shown in the illustration.



(f) Using a brass bar and hammer, lightly hit the V–band 2 or 3 times at each place in the order of 1 through 5, as shown in the illustration.
(g) Tighten the nut with the specified torque.
Torque: 8.3 N·m (85 kgf·cm, 74 in.·lbf)
(h) Using a brass bar and hammer, hit the V–band 2 or 3 times lightly at each place in the order of 1 through 4 as shown in the illustration.
(i) Tighten the nut completely.
Torque: 8.3 N·m (85 kgf·cm, 74 in.·lbf)

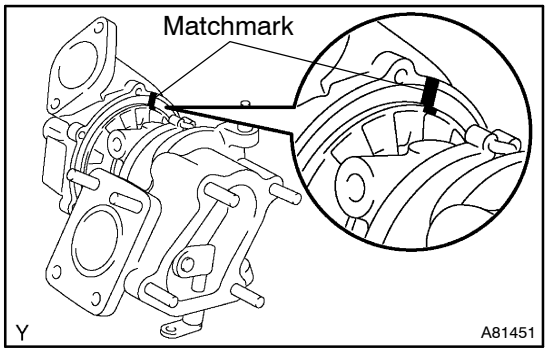


8. INSTALL COMPRESSOR HOUSING SUB–ASSY

(a) If of reusing the compressor housing and bearing housing:
(1) Apply seal packing to the bearing housing, as shown in the illustration.
Seal packing: Part No. 08826–00080, or equivalent

NOTICE:
Do not apply an excessive amount of seal packing to the surface.

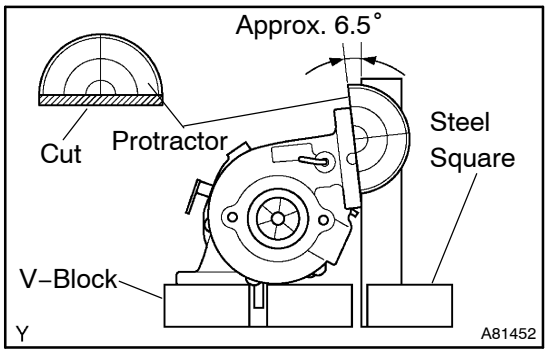
- Install a nozzle that has an opening of 0.1 – 0.2 mm (0.004 – 0.008 in.).
- Parts must be assembled within 5 minutes after the application. Otherwise, the material must be removed and seal packing must be reapplied.
- Immediately remove the nozzle from the tube and reinstall the cap.



(2) Align the matchmarks on the compressor housing and bearing housing, and install them.

NOTICE:

- **Do not allow the impeller wheel to interfere with the compressor housing.**
- **Check that the turbine shaft smoothly turns.**



(3) Using a steel square and protractor, check the installation angle of the outlet port of the compressor housing, as shown in the illustration.

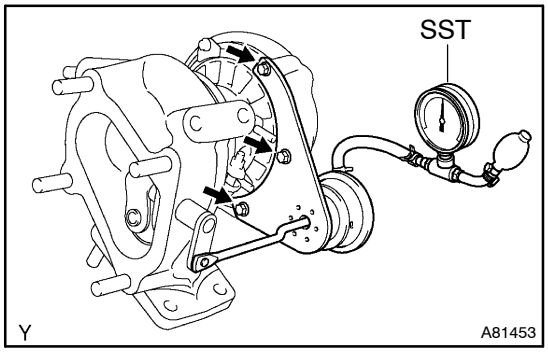
(4) Temporarily install the 3 clamp plates and 3 bolts.

(b) If using a new compressor housing and/or bearing housing:

(1) Temporarily install the compressor housing on the bearing housing, make the installation angle of the outlet port of the compressor housing meet at the position shown in the illustration and place the matchmarks.

(2) Remove the compressor housing.

(3) The following procedures are the same as that of reusing the compressor housing and/or bearing housing.



9. INSTALL W/BRACKET ACTUATOR ASSY

(a) Using SST, move the actuator push rod.

NOTICE:

Do not apply more than 185 kPa (1.89 kgf/cm^2, 26.9 psi) of pressure to the actuator.

(b) Connect the actuator push rod to the waste gate valve link with a new E–ring.

(c) Install the actuator to the compressor housing with the 3 bolts. Uniformly tighten the 6 bolts in several passes.

Torque: 4.7 N·m (48 kgf·cm, 42 in.·lbf)

(d) Remove the SST.

(e) Connect the actuator hose.

10. INSTALL TURBO OIL INLET PIPE SUB–ASSY

(a) Install a new gasket and the water pipe with the union bolt.
Torque: 26 N·m (265 kgf·cm, 19 ft·lbf)