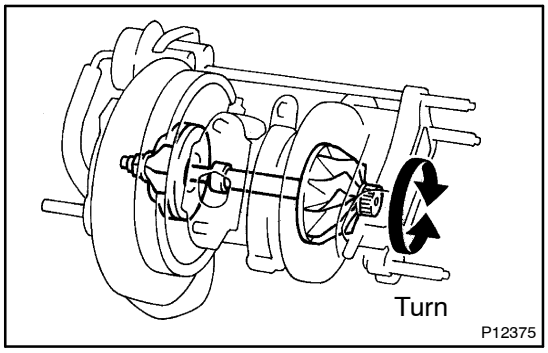
1304S–01

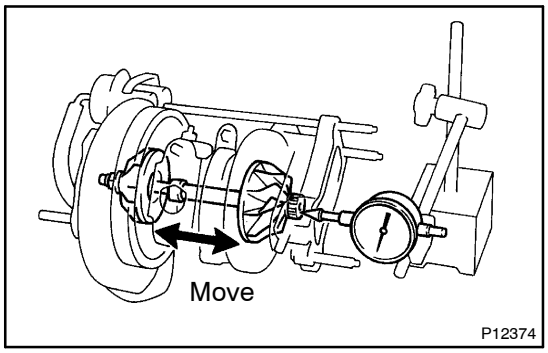
OVERHAUL



1. INSPECT BEARING HOUSING SUB–ASSY

(a) Check that the turbine shaft turns smoothly.

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



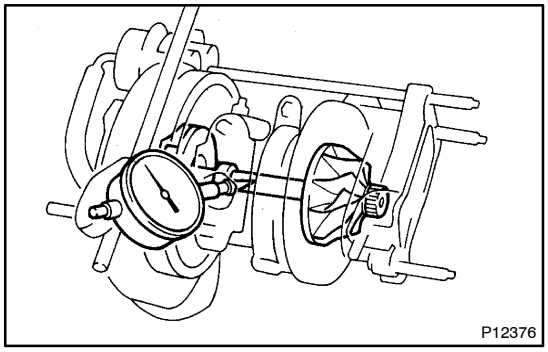
(b) Inspect the axial play of the turbine shaft.

(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: 0.15 mm (0.0063 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.



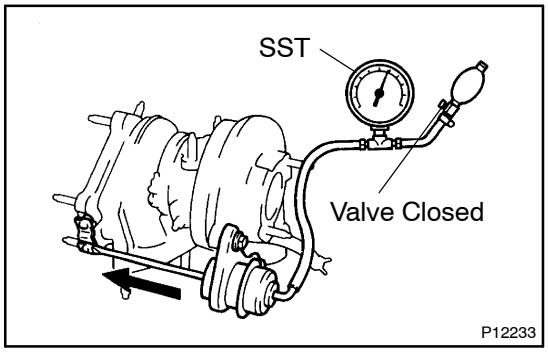
(c) Inspect the radial play of turbine shaft.

(1) Set a dial indicator to 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, 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 maximum, replace the bearing housing. At that time, check also that the turbine housing interferes with the compressor housing.



2. INSPECT W/BRACKET REPAIR ACTUAOR ASSY

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

(b) Using SST, apply 111 kPa (1.13 kg/f cm^2, 16.1 psi) of the pressure to the actuator.

SST 09992–00242

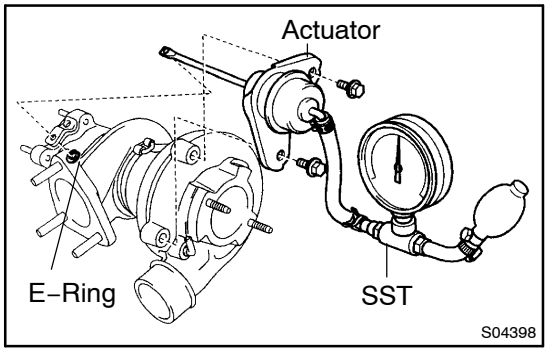
(c) Check that the actuator push rod is moved and the waste gate valve is opened.

NOTICE:

Never apply more than 140 kPa (1.43 kgf/cm^2, 20.3 psi) of pressure to the actuator.

If the operation is not as specified, replace the turbocharger.

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



3. REMOVE W/BRACKET REPAIR ACTUAOR ASSY

(a) Remove the actuator hose.

(b) Using SST, apply pressure to the actuator.
SST 09992–00242

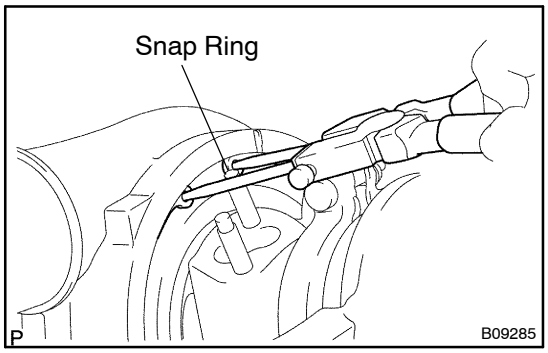
NOTICE:

Never apply more than 140 kPa (1.43 kgf/cm^2, 20.3 psi) to pressure to the actuator.

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

4. REMOVE COMPRESSOR HOUSING

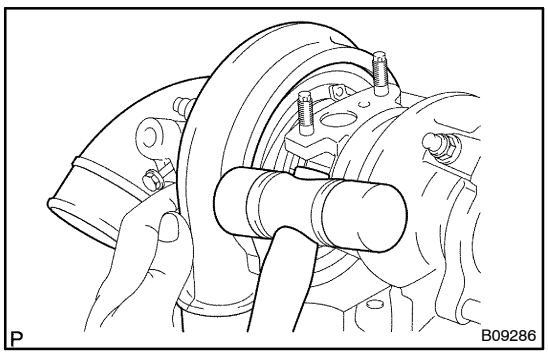
(a) Place the matchmarks on the compressor housing and bearing housing.



(b) Using snap ring pliers, remove the snap ring from the compressor housing.

HINT:

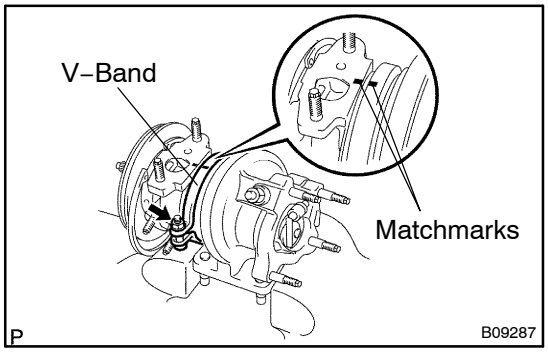
Do not remove the snap ring with force from the turbocharger.



(c) Tap the turbine housing by a plastic–faced hammer, remove the compressor housing.

NOTICE:

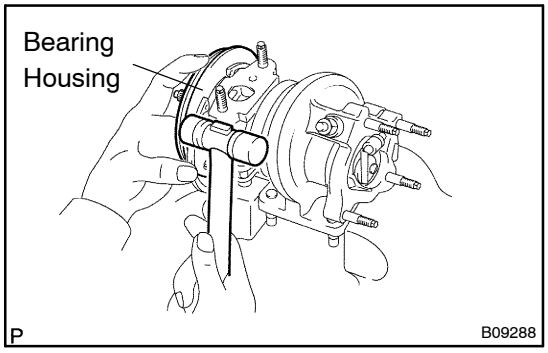
- **Remove the bearing housing as straight as possible and do not interfere the turbine wheel with the turbine housing.**
- **Do not tap the bearing housing.**



5. REMOVE BEARING HOUSING SUB–ASSY

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

(b) Remove the bolt, nut and V band.



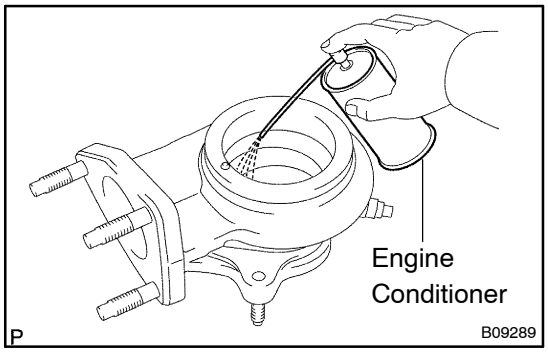
(c) Tap the turbine housing by a plastic–faced hammer, remove the bearing housing.

NOTICE:

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

(d) Remove the snap ring from the turbocharger.

(e) Remove the O–ring from the bearing housing.



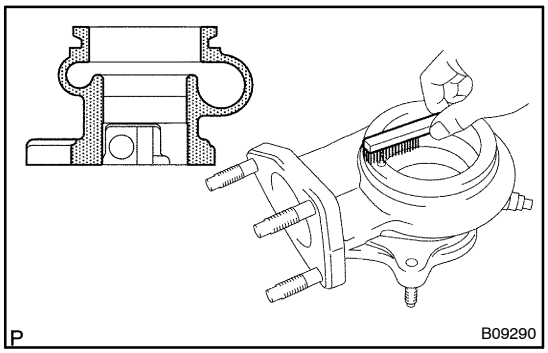
6. CLEAN PARTS

(a) Clean the turbine housing.

(1) 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.



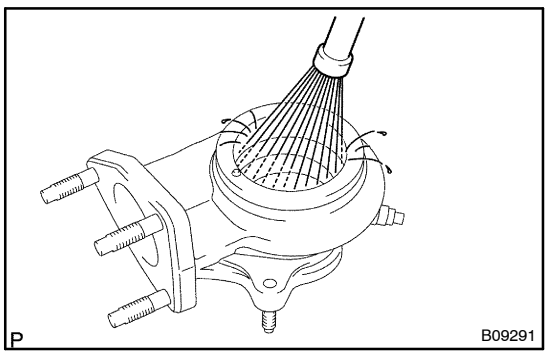
(2) Using a wire brush, remove all the carbon dirt inside the turbine housing.

NOTICE:

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

HINT:

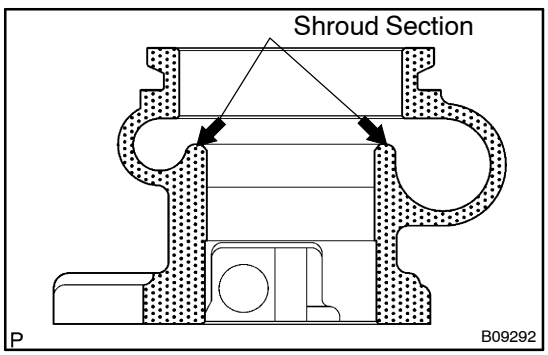
When the carbon dirt is heavily adhered, remove it using a scraper.



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

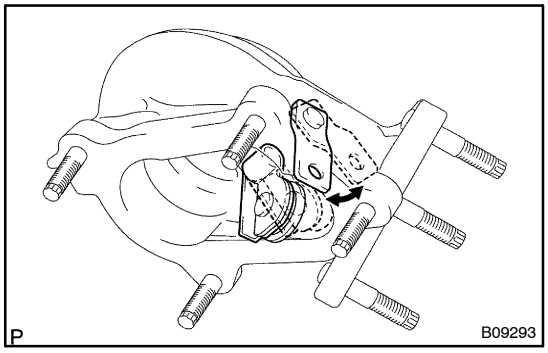
NOTICE:

Wash the turbine housing well without leaving any irregular objects.



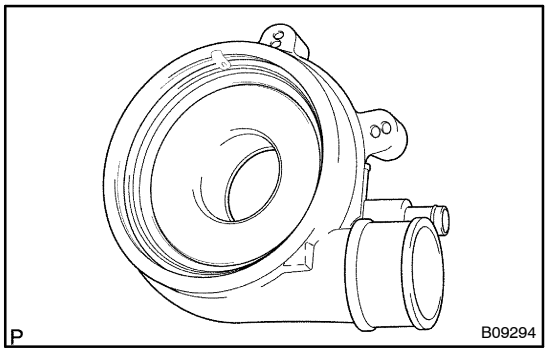
(4) Check that there is no bore made by the interference with the turbine wheel in the shroud section.

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



(b) Inspect the waste gate valve.
   (1) Move the waste gate valve link and check that it runs smoothly without sticking.

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



(c) Clean the compressor housing.

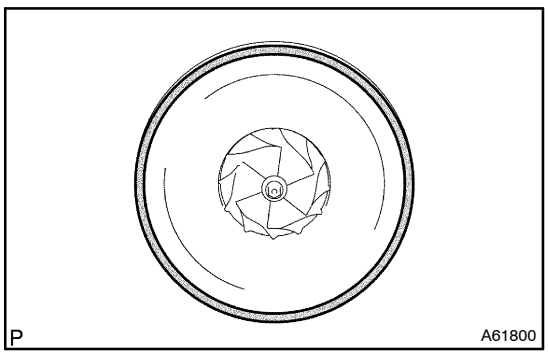
NOTICE:

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 material.
   (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 bur 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.

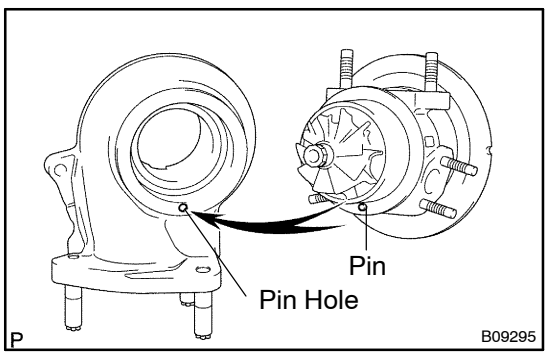


(d) Clean the bearing housing.

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 BEARING HOUSING SUB–ASSY

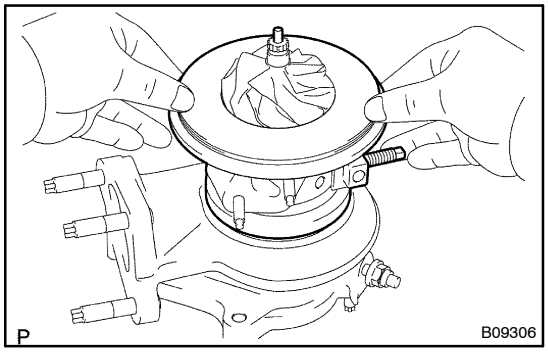
(a) Install the snap ring to the turbocharger.

HINT:

In advance, put the snap ring through the bearing housing.

(b) Install a new O–ring to the bearing housing.

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



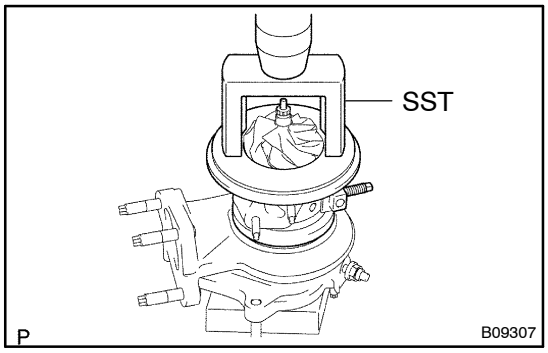
(d) Install the bearing housing to the turbine housing.

NOTICE:

- **Install the bearing housing straight, and be careful not to damage the turbine wheel.**
- **In case of having difficulty of pressing in the bearing housing to install with a hand due to hard engagement, apply the procedure (c).**

HINT:

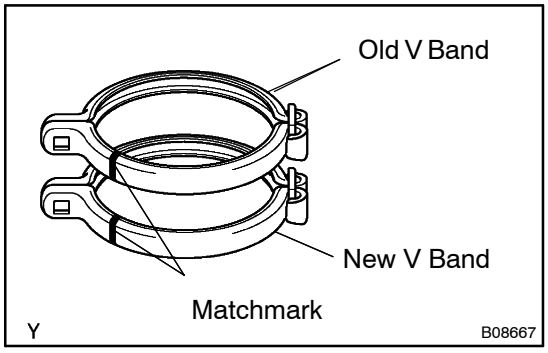
Apply a little penetrate rust prevention lubricant onto the engagement section to make installation easier.



(e) In case that the engagement of the bearing hosing is hard, using SST and a press. install the bearing hosing while checking the smooth rotation of the impeller wheel.
SST 09350–32014 (09351–32070)

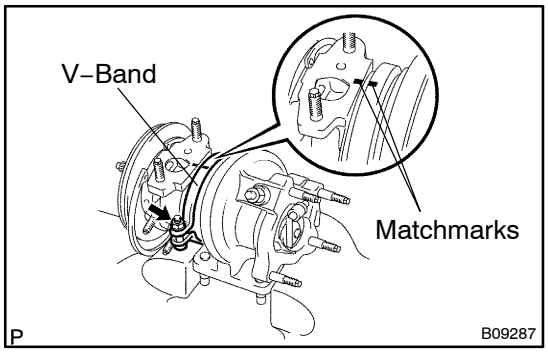
NOTICE:

- **Do not hold the turbine hosing with the stud bolts.**
- **Be sure to install the baring housing straight without tilting as the shaft may bent and cause the irregular noise.**
- **Press in the bearing housing slowly. When the rotation of the impeller wheel becomes heavy, return the press immediately and do the operation again.**
- **After installed, check that the turbine shaft turns smoothly.**



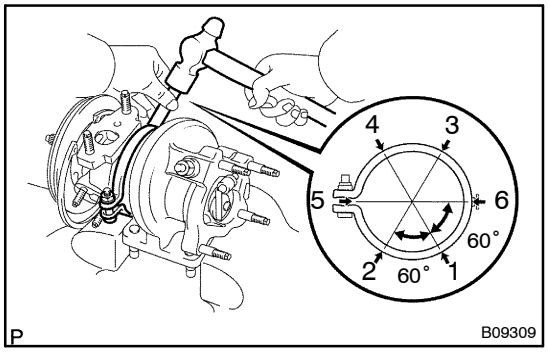
8. INSTALL V BAND

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



(b) Align the matchmarks on the new V band, turbine housing and bearing housing, and temporarily install a new bolt and nut.

Torque: 4.8 N·m (49 kgf·cm, 42 in.·lbf)



(c) Using a brass bar and hammer, hit the V band for 2 or 3 times lightly at each place in the order of 1 through 5 as shown in the illustration.

(d) Tighten the nut and bolt with the specified torque.
Torque: 4.8 N·m (49 kgf·cm, 42 in.·lbf)

(e) Using a brass bar and hammer, hit the V band for 2 or 3 times lightly at each place in the order of 1 through 4 as shown in the illustration.

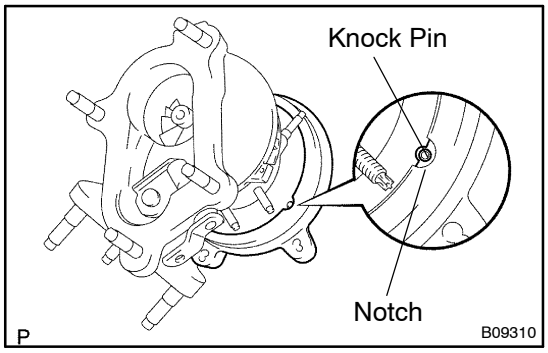
(f) Tighten the nut completely.
Torque: 4.8 N·m (49 kgf·cm, 42 in.·lbf)

9. INSTALL COMPRESSOR HOUSING

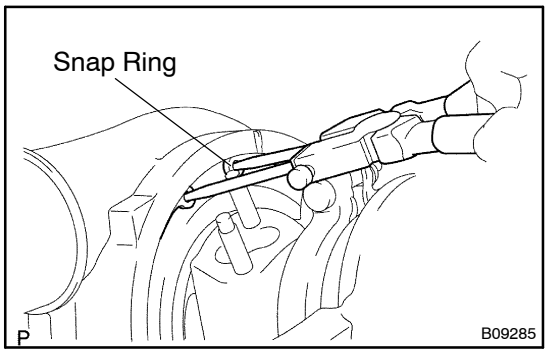
(a) Align the knock pin of the bearing housing with the notch of the compressor housing, and install them.

NOTICE:

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



(b) Using snap ring pliers, install the snap ring to the compressor housing.



10. INSTALL W/BRACKET REPAIR ACTUAOR ASSY

(a) Using SST, apply pressure to the actuator.
SST 09992–00242

NOTICE:

Never apply more than 140 kPa (1.43 kgf/cm^2, 20.3 psi) of pressure to the actuator.

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

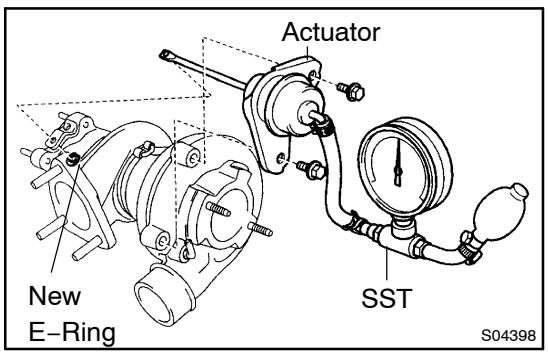
(c) Install the actuator with the 2 bolts.
Torque: 19.1 N·m (195 kgf·cm, 14 ft·lbf)

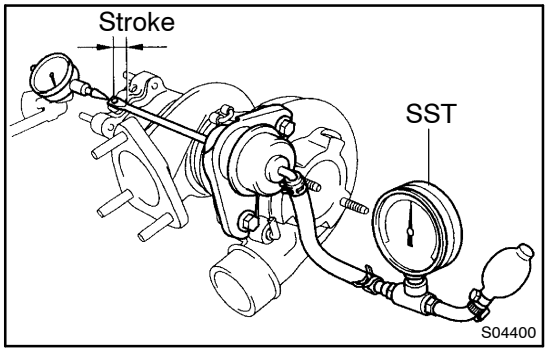
(d) Remove SST.

11. ADJUST TURBOCHARGER ACTUATOR ROD STROKE

NOTICE:

Never apply more than 140 kPa (1.43 kgf/cm^2, 20.3 psi) of pressure to the actuator.



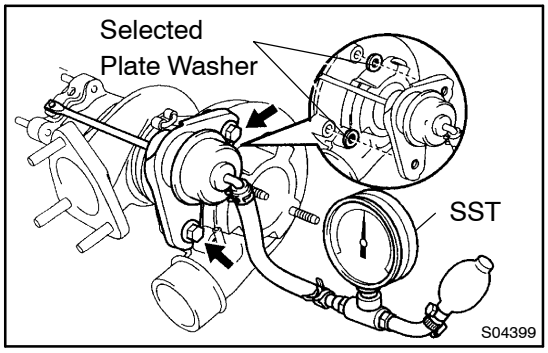


(a) Set the dial indicator as shown in the illustration.
(b) Using SST, apply 111 kPa (1.13 kgf/cm^2, 16.1 psi) of pressure to the actuator, and measure the push rod stroke.
SST 09992–00242
(c) Select the plate washer according to the table below.

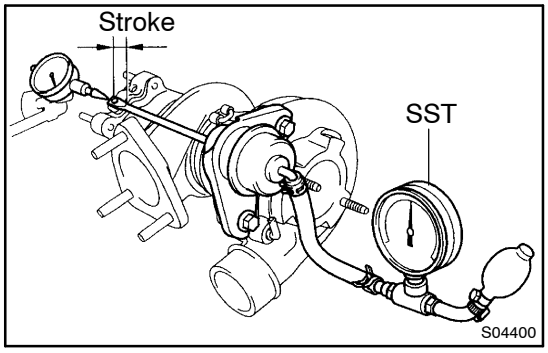
Stroke measurement mm (in.)	Required plate washer thickness mm (in.)
1.20 – 1.70 (0.0472 – 0.0669)	–
1.71 – 2.20 (0.0673 – 0.0866)	0.5 (0.020)
2.21 – 2.70 (0.0870 – 0.1063)	1.0 (0.039)
2.71 – 3.20 (0.1067 – 0.1260)	1.5 (0.059)
3.21 – 3.70 (0.1264 – 0.1457)	2.0 (0.079)
3.71 – 4.20 (0.1461 – 0.1850)	2.5 (0.098)
4.21 – 4.70 (0.1657 – 0.1850)	3.0 (0.118)
4.71 – 5.20 (0.1854 – 0.2047)	3.5 (0.138)
5.21 – 5.70 (0.2051 – 0.2244)	4.0 (0.157)
5.71 – 6.20 (0.2248 – 0.2441)	4.5 (0.177)
6.21 – 6.70 (0.2445 – 0.2638)	5.0 (0.197)
6.71 – 7.20 (0.2642 – 0.2827)	5.5 (0.217)
7.21 – 7.70 (0.2839 – 0.3031)	6.0 (0.236)
7.71 – 8.20 (0.3035 – 0.3228)	6.5 (0.256)

NOTICE:

- **Use a combination of plate washers of 0.5 mm (0.020 in.), 1.0 mm (0.039 in.) and 3.0 mm (0.118 in.) thickness to achieve the required thickness.**
- **Use the same thickness of the plate washer for the 2 locations between the actuator and compressor housing.**
- **If the plate washer thickness exceeds 3.5 mm (0.138 in.), replace the actuator installation bolts with the bolts from the kit part.**



(d) Using SST, apply 111 kPa (1.13 kgf/cm^2, 16.1 psi) of pressure to the actuator, and install the selected plate washers between the actuator and compressor housing with the 2 bolts.
SST 09992–00242
Torque: 19.1 N·m (195 kgf·cm, 14 in.·lbf)



(e) Using SST, apply 111 kPa (1.13 kgf/cm^2, 16.1 psi) of pressure to the actuator, and measure the actuator push rod stroke.

SST 09992–00242

Standard stroke: 1.20 – 1.70 mm (0.0472 – 0.0669 in.)

If the stroke is outside specifications, select the plate washers again.

(f) Connect the actuator hose.

(g) Remove SST.

(h) Apply yellow paint from the actuator bolts to the actuator bracket (Means that the actuator has been installed correctly).