TURBOCHARGER

ON-VEHICLE INSPECTION OF TURBOCHARGER

1. INSPECT INTAKE AIR SYSTEM

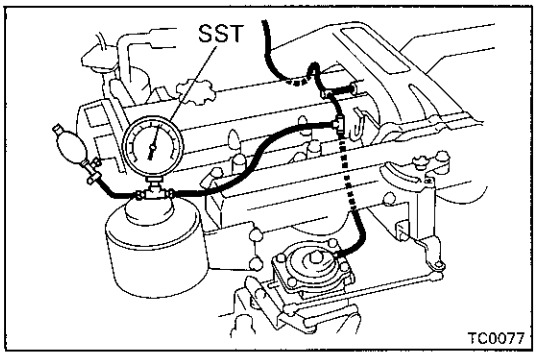
Check for leakage or clogging between the air cleaner and turbocharger inlet and between the turbocharger outlet and cylinder head.

- Clogged air cleaner .... Clean or replace the element
- Hoses collapsed or deformed .... Check each connection and repair
- Cracks in components .... Check and replace

2. INSPECT EXHAUST SYSTEM

Check for leakage or clogging between the cylinder head and turbocharger inlet and between the turbocharger outlet and exhaust pipe.

- Deformed components .... Repair or replace
- Foreign material in passages .... Remove
- Leakage from components .... Repair or replace
- Cracks in components .... Check and replace



3. CHECK TURBOCHARGING PRESSURE

(a) Warm up engine.

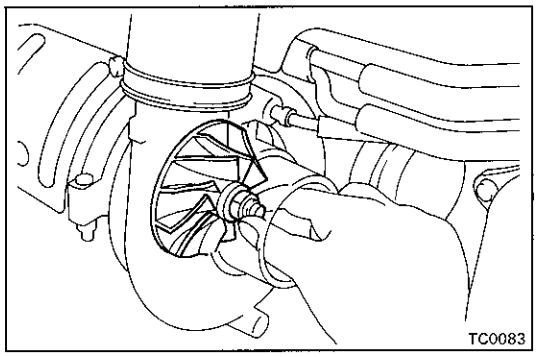
(b) Connect a 3-way union to the intake pipe pressure hose and install SST (turbocharger pressure gauge) to it.

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(b) Press in the clutch pedal, then press the accelerator pedal down as far as it will go. Measure the turbocharging pressure at maximum speed (4,400 rpm).

Standard pressure: 0.50 – 0.65 kg/cm^2 (7.1 – 9.2 psi, 49 – 64 kPa)

If the pressure is less than specification, check the intake air and exhaust systems for leakage. If there is no leakage, replace the turbocharger assembly.
If the pressure is above specification, check if the actuator hose is disconnected or cracked. If not, replace the turbocharger assembly.



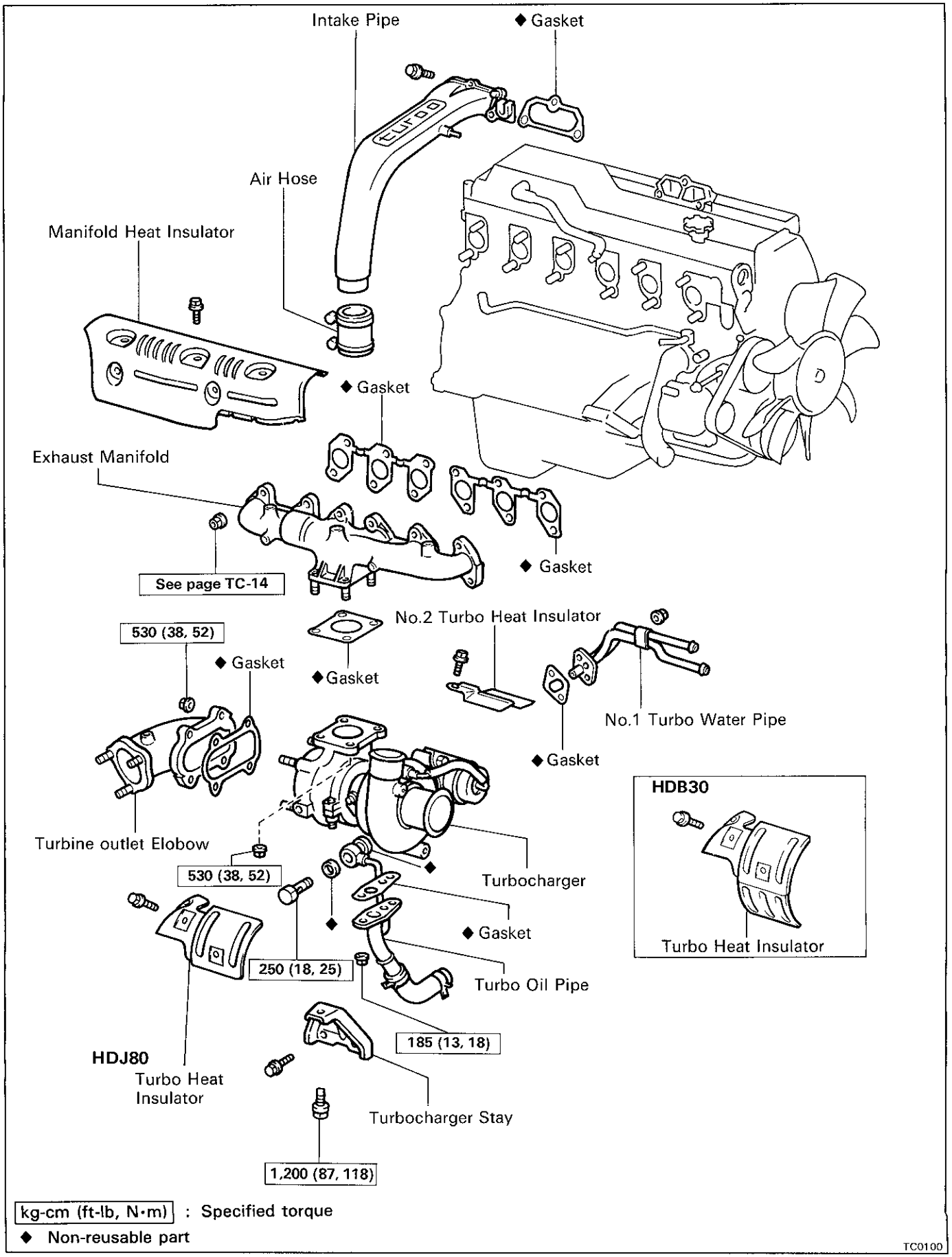
4. INSPECT IMPELLER WHEEL ROTATION

(a) Disconnect the air cleaner hose.

(b) Grasp the edge of the impeller wheel and turn it. Check that it turns smoothly.

If it does not turn or if it turns with drag, replace the turbocharger assembly.

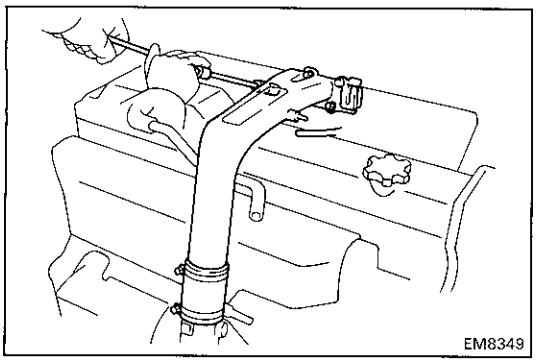
COMPONENTS



kg-cm (ft-lb, N·m) : Specified torque

◆ Non-reusable part

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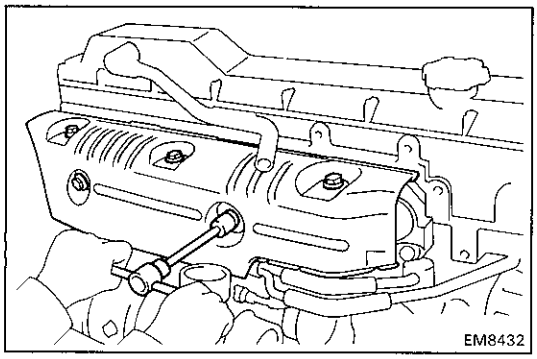


REMOVAL OF TURBOCHARGER

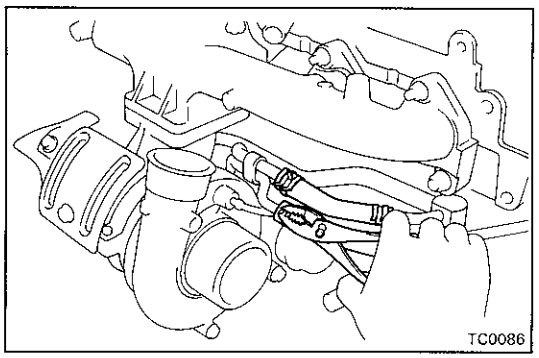
(See page TC-9)

1. DRAIN ENGINE COOLANT (See page CO-4)

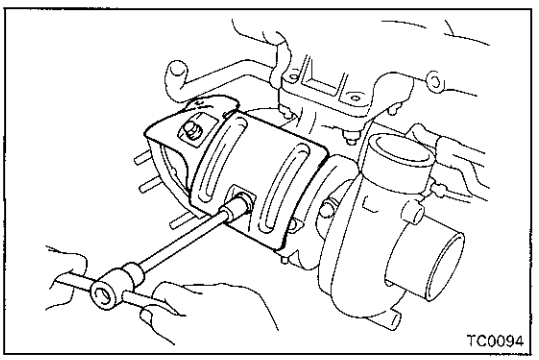
2. REMOVE INTAKE PIPE
   (a) Disconnect the vacuum hose for the boost compensator.
   (b) Disconnect the air hose clamp bolt.
   (c) Remove the three bolts and intake pipe.



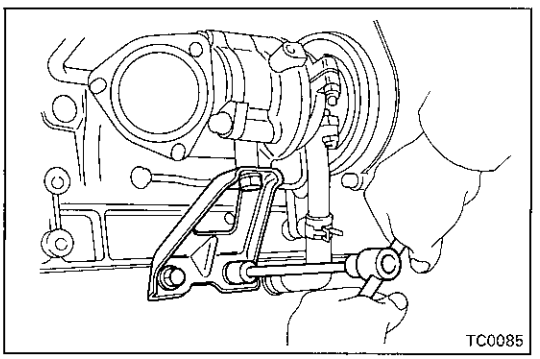
3. REMOVE EXHAUST MANIFOLD HEAT INSULATOR
   Remove the five bolts and heat insulator.



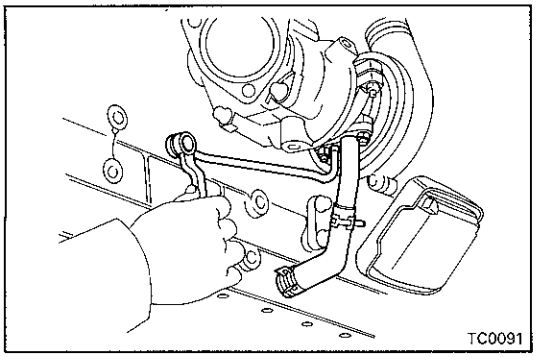
4. DISCONNECT WATER BY-PASS HOSES



5. REMOVE TURBO HEAT INSULATOR
   Remove the two bolt and heat insulator.



6. REMOVE TURBOCHARGER STAY
   Remove the three bolts and turbocharger stay.

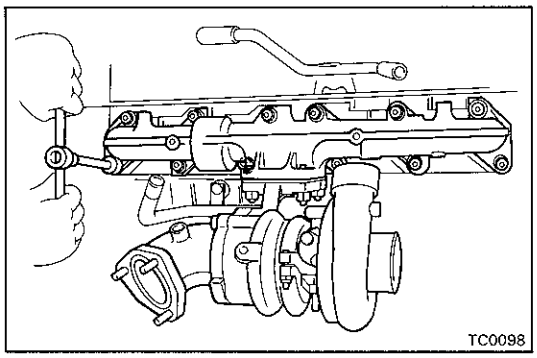


7. REMOVE TURBO OIL PIPE

(a) Remove the union bolt and two gaskets holding the turbo oil pipe to the cylinder block.

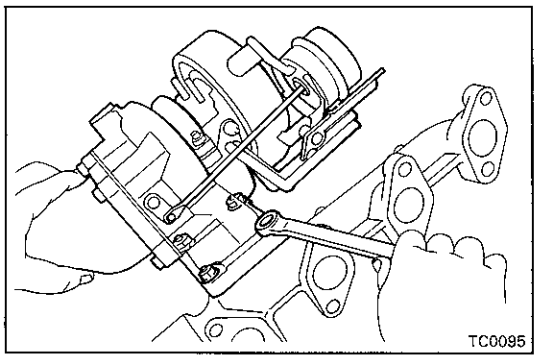
(b) Disconnect the turbo oil hose.

(c) Remove the two nuts, turbo oil pipe and gasket.



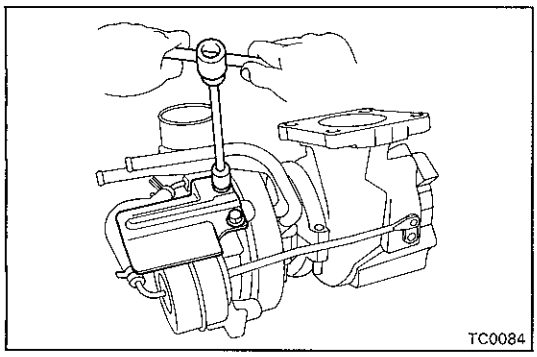
8. REMOVE TURBOCHARGER AND EXHAUST MANIFOLD ASSEMBLY

Remove the twelve nuts, the turbocharger and exhaust manifold assembly and gaskets.



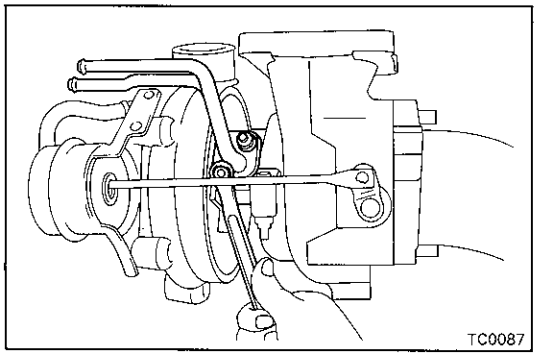
9. SEPARATE TURBOCHARGER AND EXHAUST MANIFOLD

Remove the four nuts, turbocharger and gasket.



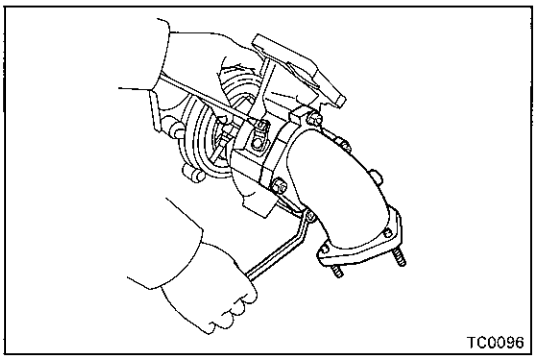
10. REMOVE NO.2 TURBO HEAT INSULATOR

Remove the two bolts and No.2 turbo heat insulator.



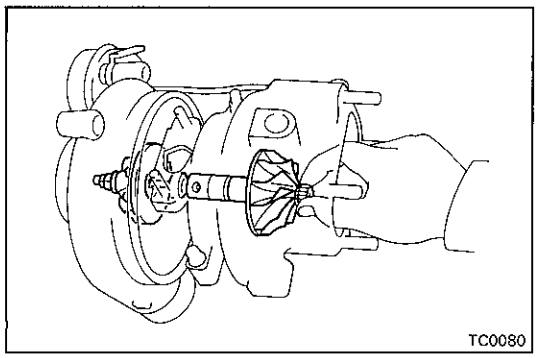
11. REMOVE NO.1 TURBO WATER PIPE

Remove the two nuts, No.1 turbo water pipe and gasket.



12. REMOVE TURBINE OUTLET ELBOW

Remove the four nuts, turbine outlet elbow and gasket.

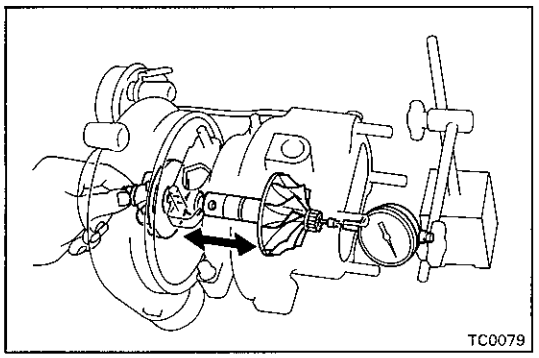


INSPECTION OF TURBOCHARGER

1. INSPECT IMPELLER WHEEL ROTATION

Grasp the edge of the turbine wheel and turn it. Check that the impeller wheel turns smoothly.

If the impeller wheel does not turn or if it turns with a drag, replace the turbocharger assembly.

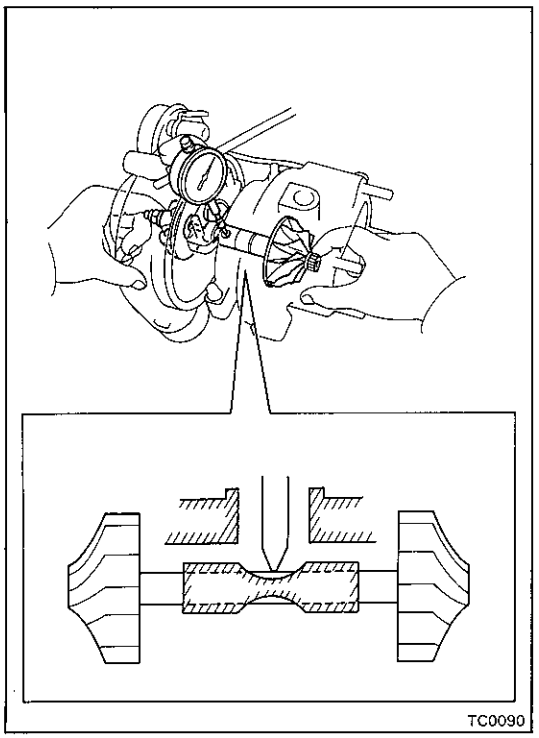


2. INSPECT AXIAL PLAY OF IMPELLER WHEEL

Insert a dial indicator into the exhaust side, hold the turbine wheel edge by hand and check the axial play.

Axial play: 0.13 mm (0.0051 in.) or less

If the axial play is not as specified, replace the turbocharger assembly.



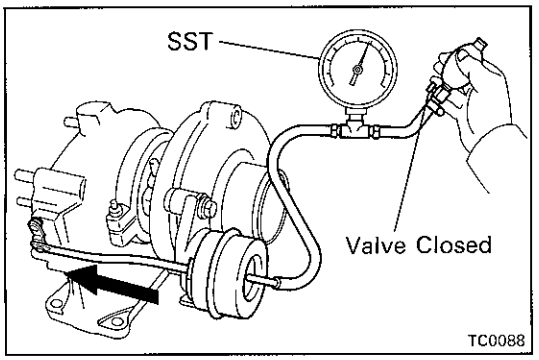
3. INSPECT RADIAL PLAY OF TURBINE SHAFT

(a) From the oil outlet hole, insert the dial indicator through the hole in the spacer bearing and set it in the center of the turbine shaft.

(b) Moving the turbine shaft in a radial direction, measure the radial play of the shaft.

Radial play: 0.18 mm (0.0071 in.) or less

If the radial play is not as specified, replace the turbocharger assembly.



4. INSPECT ACTUATOR OPERATION

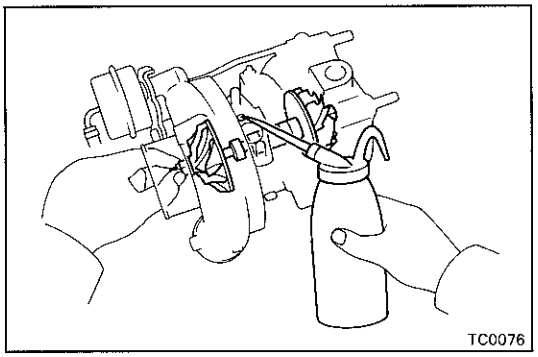
(a) Disconnect the actuator hose.

(b) Using SST (turbocharger pressure gauge), apply approx. 0.92 kg/cm^2 (13.1 psi, 90 kpa) of pressure to the actuator and check that the rod moves.

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If the rod does not move, replace the turbocharger assembly.

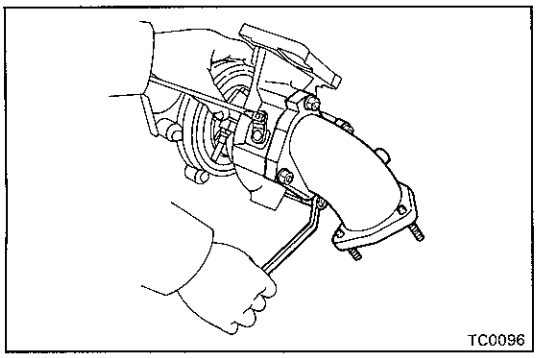
NOTICE: Never apply more than 1.05 kg/cm^2 (14.9 psi, 103 kPa) of pressure to the actuator.



INSTALLATION OF TURBOCHARGER

(See page TC-9)

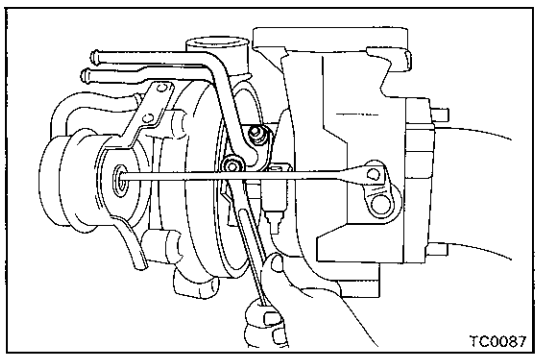
NOTICE: After replacing the turbocharger assembly, pour approx. 20 cc (1.2 cu in.) of new oil into the oil inlet and turn the impeller wheel by hand to splash oil on the bearing.



1. INSTALL TURBINE OUTLET ELBOW

Install a new gasket and the turbine outlet elbow with the four nuts.

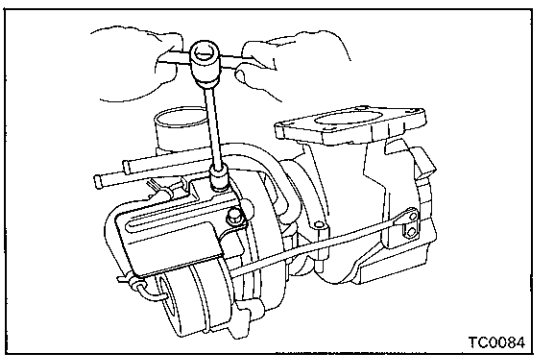
Torque: 530 kg-cm (38 ft-lb, 52 N·m)



2. INSTALL NO.1 TURBO WATER PIPE

Install a new gasket and the water pipe with the two nuts.

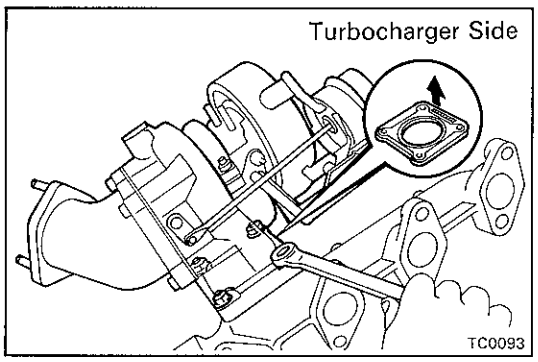
Torque: 80 kg-cm (69 in.-lb, 7.8 N·m)



3. INSTALL NO.2 TURBO HEAT INSULATOR

Install the No.2 turbo heat insulator with the two bolts.

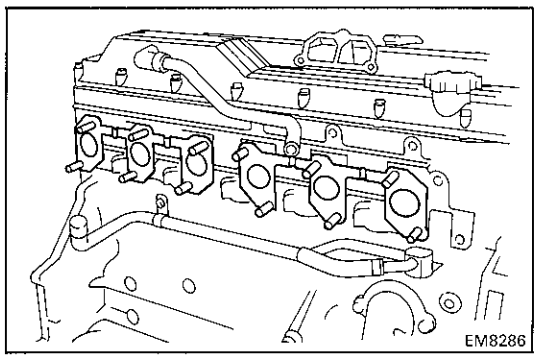
Torque: 80 kg-cm (69 in.-lb, 7.8 N·m)



4. ASSEMBLE TURBOCHARGER AND EXHAUST MANIFOLD

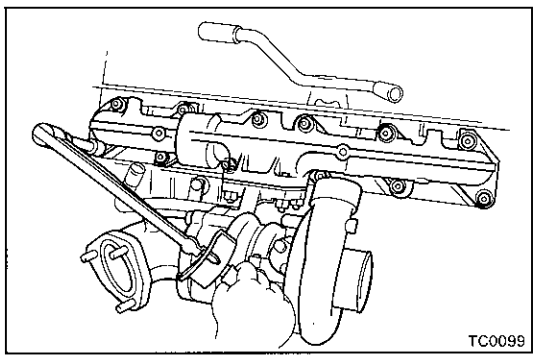
Install a new gasket and the turbocharger to the exhaust manifold with the four nuts.

Torque: 530 kg-cm (38 ft-lb, 52 N·m)



5. INSTALL TURBOCHARGER AND EXHAUST MANIFOLD ASSEMBLY

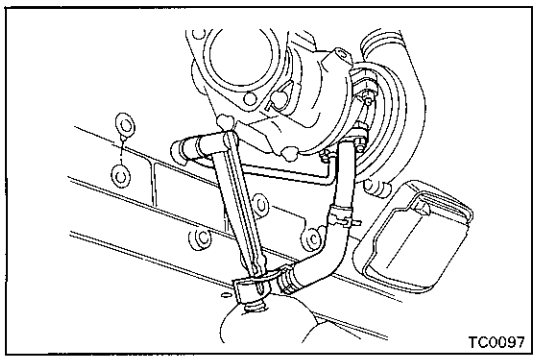
(a) Install two new gaskets to the cylinder head.



(b) Install the turbocharger and exhaust manifold assembly with the twelve nuts.

Torque: 400 kg-cm (29 ft-lb, 39 N·m)

HINT: Apply 330 kg-cm (24 ft-lb, 32 N·m) of torque when performing additional tightening of loosed nuts.



6. INSTALL TURBO OIL PIPE

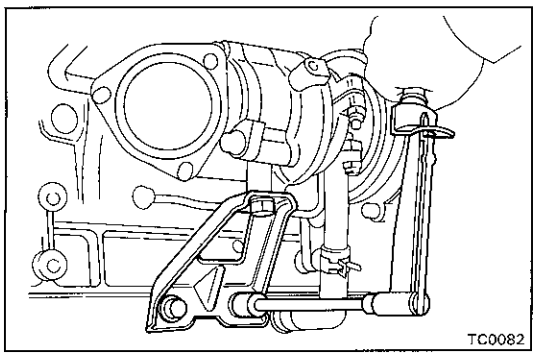
(a) Install a new gasket and the turbo oil pipe with the two nuts.

Torque: 185 kg-cm (13 ft-lb, 18 N·m)

(b) Connect the turbo oil hose.

(c) Install two new gaskets and the union bolt of the turbo oil pipe.

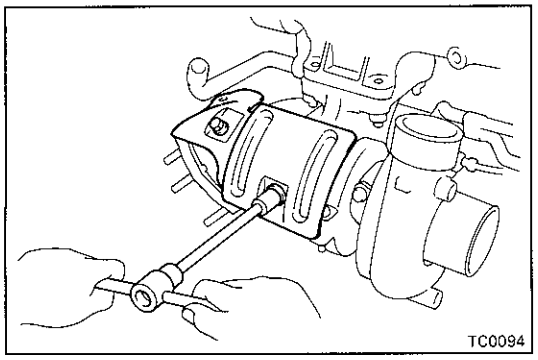
Torque: 250 kg-cm (18 ft-lb, 25 N·m)



7. INSTALL TURBOCHARGER STAY

Install the turbocharger stay with the three bolts.

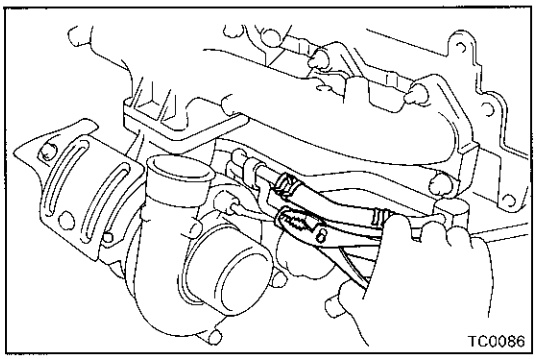
Torque: 1,200 kg-cm (87 ft-lb, 118 N·m)



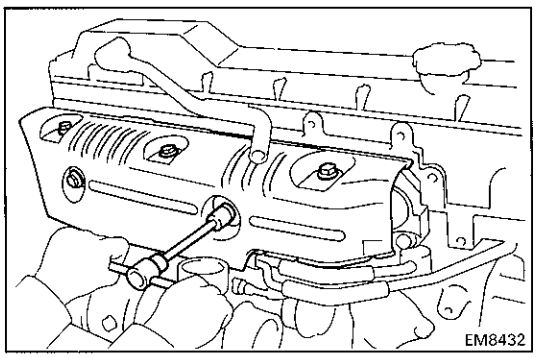
8. **INSTALL TURBOCHARGER HEAT INSULATOR**

Install the heat insulator with the two bolts.

Torque: 185 kg-cm (13 ft-lb, 18 N·m)



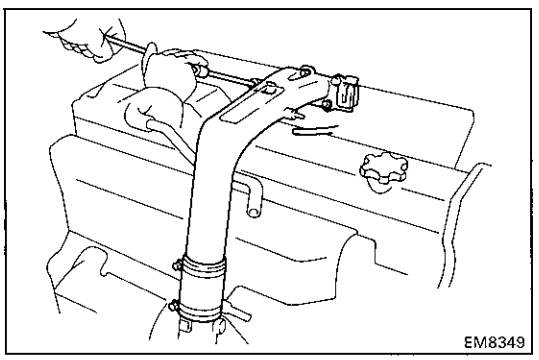
9. **CONNECT WATER BY-PASS HOSES**



10. **INSTALL EXHAUST MANIFOLD HEAT INSULATOR**

Install the heat insulator with the five bolts.

Torque: 185 kg-cm (13 ft-lb, 18 N·m)



11. **INSTALL INTAKE PIPE**

(a) Connect the air hose and install a new gasket and the intake pipe with the three bolts.

Torque: 200 kg-cm (14 ft-lb, 20 N·m)

(b) Connect boost compensator vacuum hose.

12. **FILL ENGINE WITH COOLANT (See page CO-5)**

13. **START ENGINE AND CHECK FOR LEAKS**

14. **CHECK ENGINE OIL LEVEL**