

TURBOCHARGER

ON-VEHICLE INSPECTION

E00X0-01

1. INSPECT INTAKE AIR SYSTEM

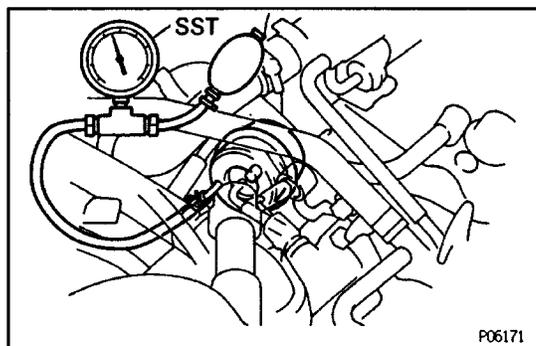
Check for leakage or clogging between the air cleaner housing and turbocharger inlet and between the turbocharger outlet and cylinder head.

- Clogged air cleaner Clean or replace element
- Hoses collapsed or deformed Repair or replace
- Leakage from connections 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. INSPECT ACTUATOR OPERATION

- Disconnect the actuator hose.
- Using SST, a turbocharger pressure gauge, apply approx. 65 kPa (0.66 kgf/cm², 9.4 psi) of pressure to the actuator and check that the rod moves. If the rod does not move, replace the turbocharger assembly.

SST 09992 - 00241

NOTICE: Never apply more than 81 kPa (0.83 kgf/cm², 11.8 psi) of pressure to the actuator.

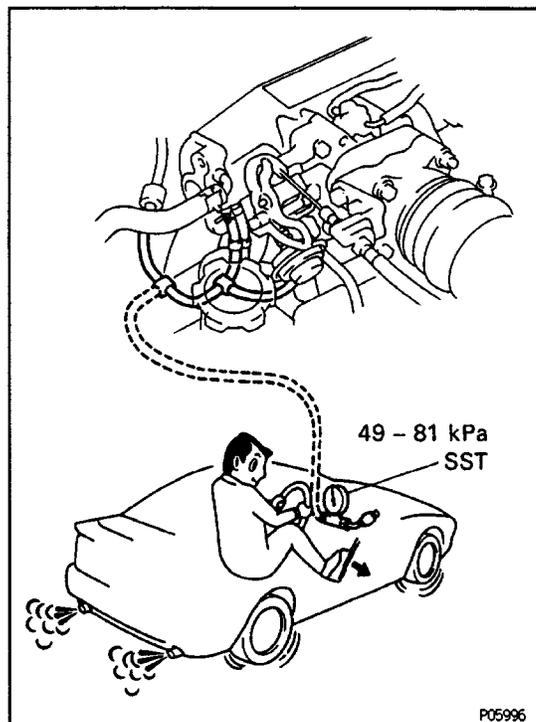
4. CHECK TURBOCHARGING PRESSURE

- Using a 3-way connector, connect SST, a turbocharger pressure gauge, to the hose between the intake manifold and manifold absolute pressure sensor. SST 09992 - 00241
- While driving with the engine running at 2,800 rpm or more with the throttle valve fully open in the 3rd gear, check the turbocharging pressure.

Standard pressure:

49 - 81 kPa (0.50 - 0.83 kgf/cm², 7.1 - 11.8 psi)

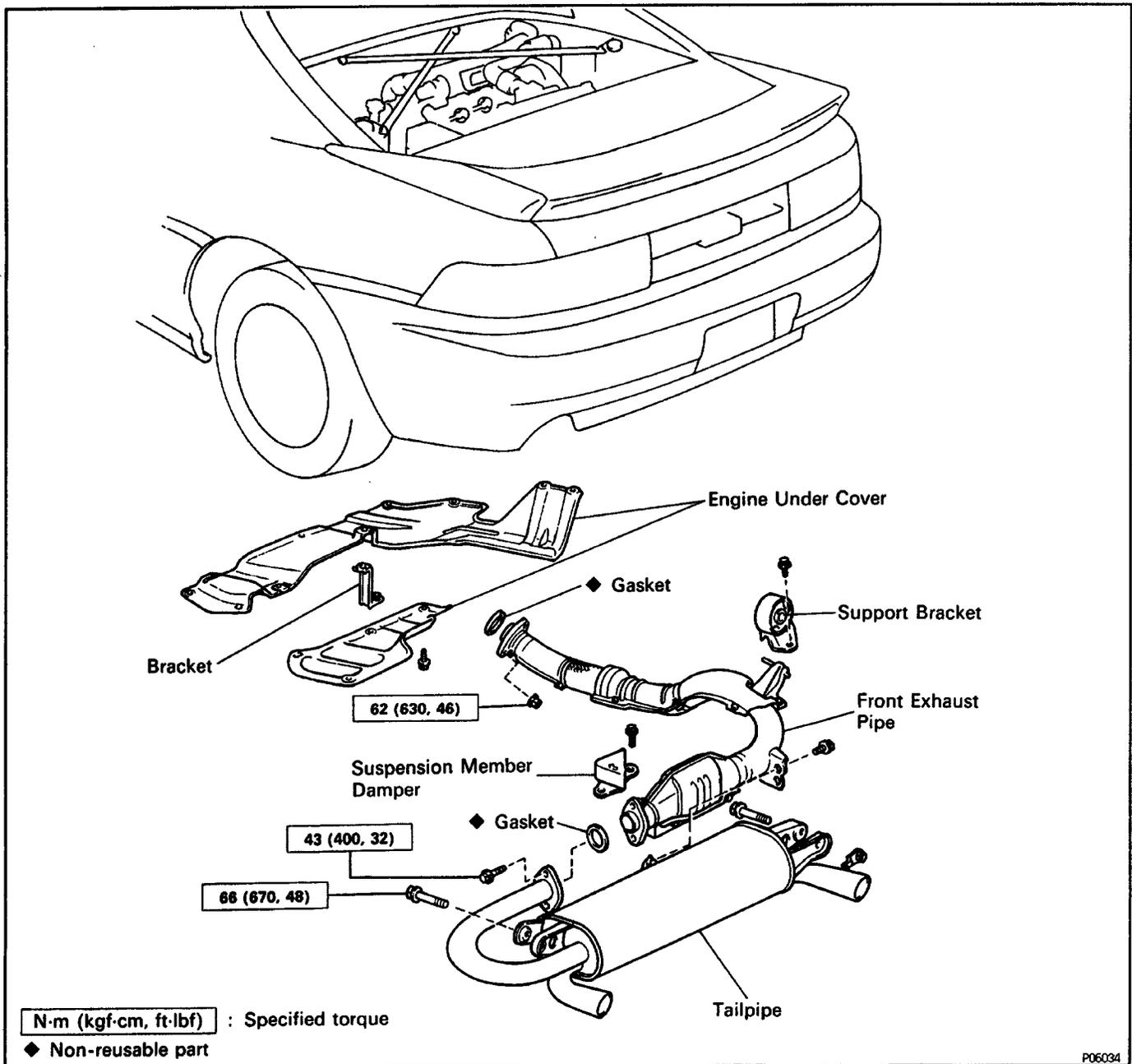
If the pressure is less than that specified, check the intake air and exhaust systems for leakage. If there is no leakage, replace the turbocharger assembly. If the pressure is above specification, check if the actuator hose is disconnected or cracked. If not, replace the turbocharger assembly.

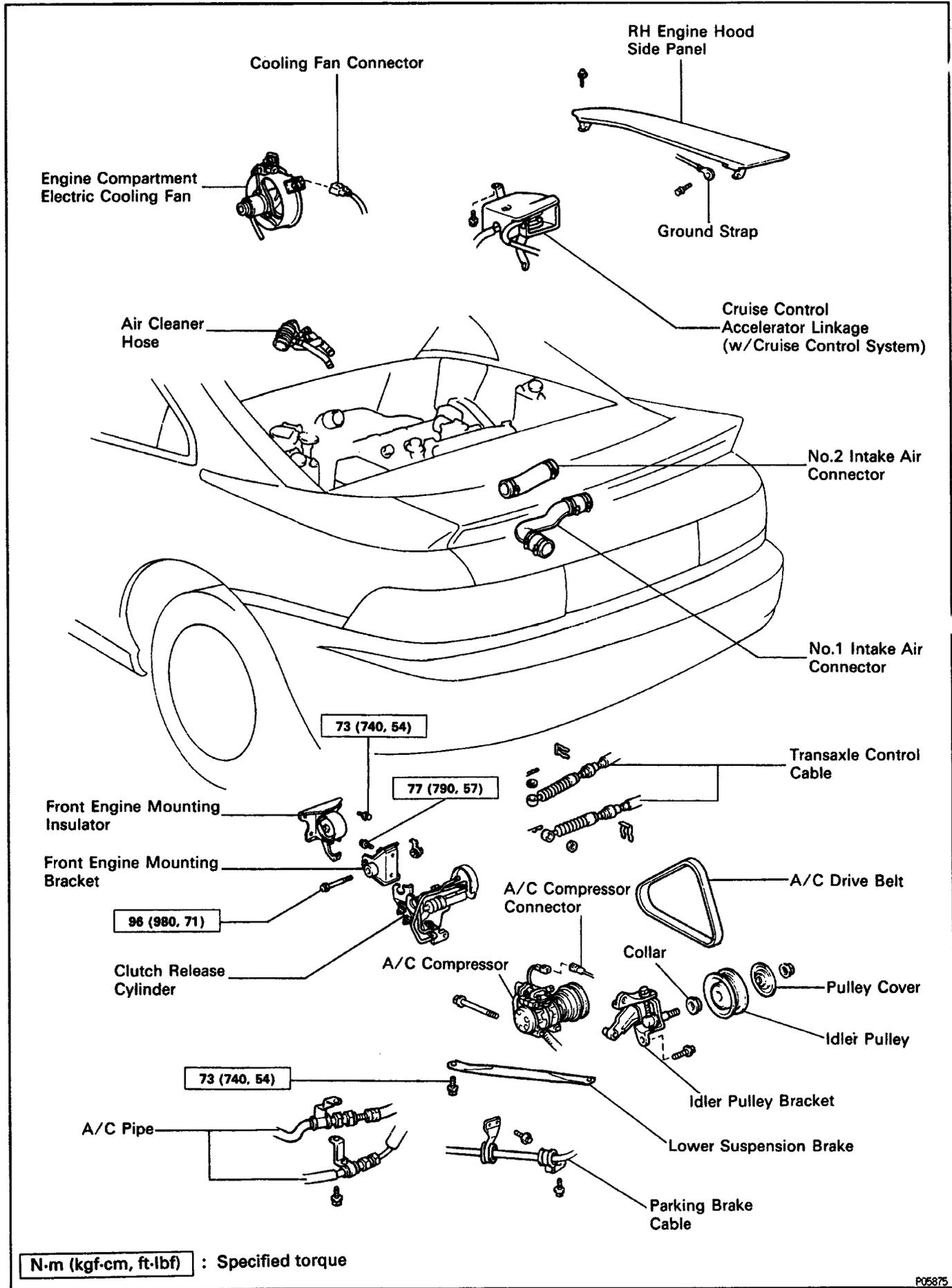


5. INSPECT IMPELLER WHEEL ROTATION
(See step 1 in Turbocharger Inspection)
6. INSPECT VSV FOR TURBOCHARGING PRESSURE
(See VSV Inspection under SMPI System)
7. INSPECT MAP
(See MAP Inspection under SMPI System)

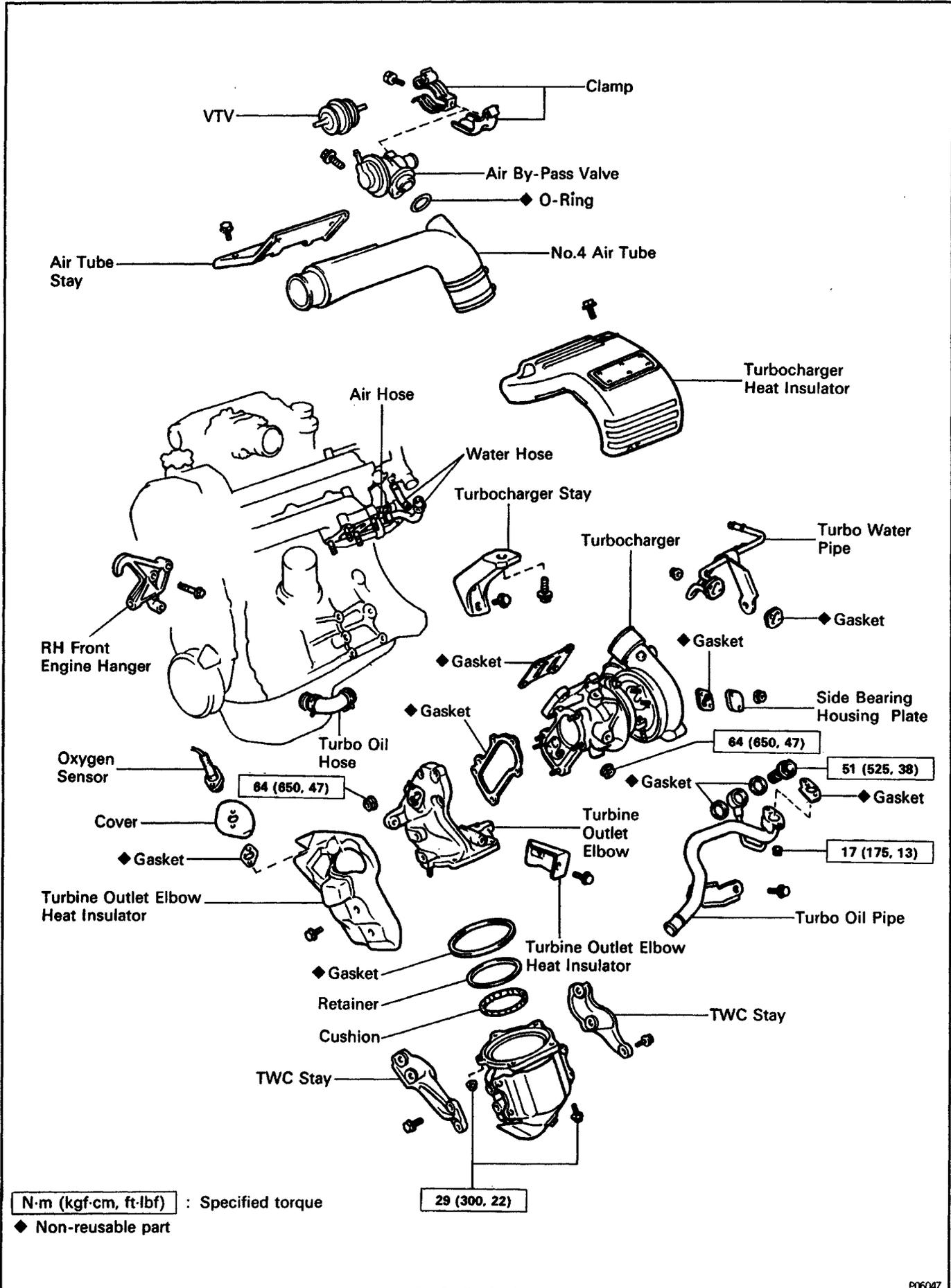
COMPONENTS FOR REMOVAL AND INSTALLATION

890X1-01

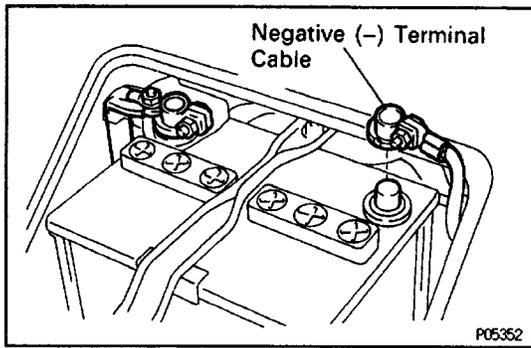




N·m (kgf·cm, ft·lbf) : Specified torque



N·m (kgf·cm, ft·lbf) : Specified torque
◆ Non-reusable part



TURBOCHARGER REMOVAL

(See Components for Removal and Installation)

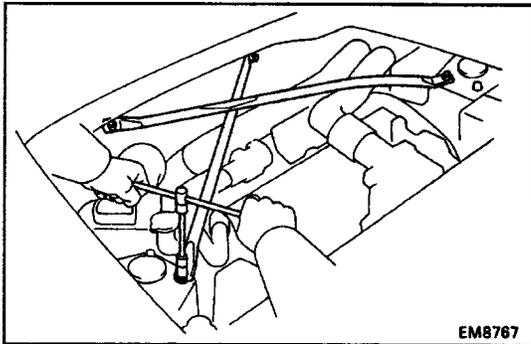
1. DISCONNECT CABLE FROM NEGATIVE TERMINAL OF BATTERY

CAUTION: Turn the ignition switch to "LOCK". Disconnect the negative terminal from the battery. Wait at least 20 seconds before proceeding with work.

2. DRAIN ENGINE OIL

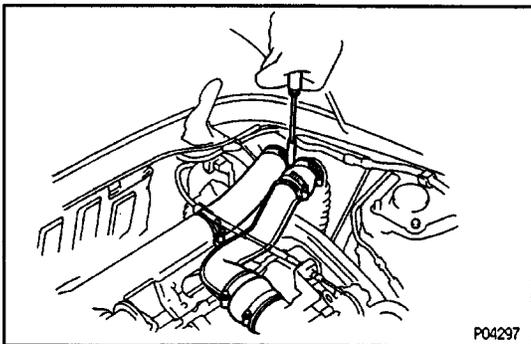
3. REMOVE ENGINE UNDER COVERS

4. REMOVE RH ENGINE HOOD SIDE PANEL

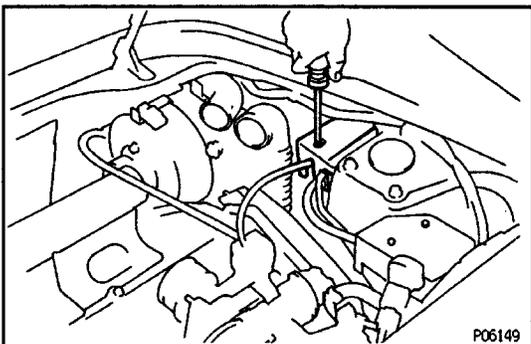


5. REMOVE UPPER SUSPENSION BRACE

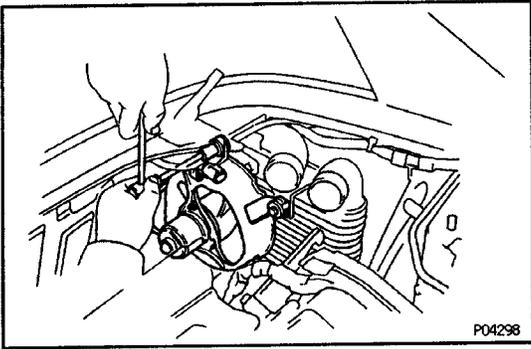
Remove the two bolts, two nuts and upper brace.



6. REMOVE NO.1 AND NO.2 INTAKE AIR CONNECTORS

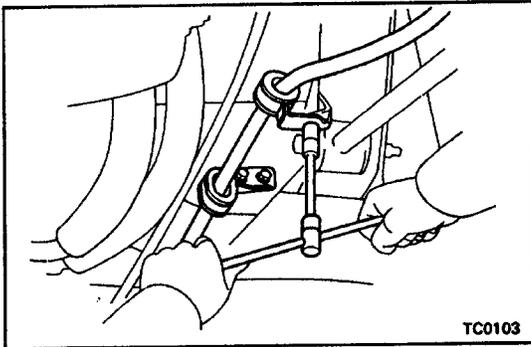


7. (w/ CRUISE CONTROL SYSTEM) REMOVE CRUISE CONTROL ACCELERATOR LINKAGE



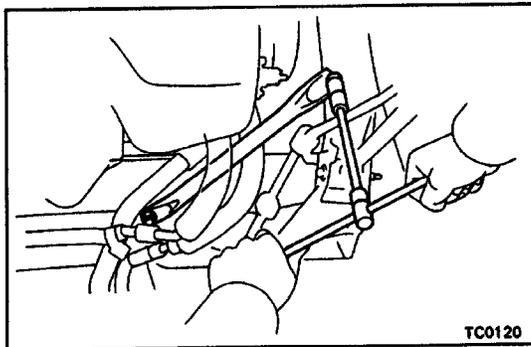
8. REMOVE ENGINE COMPARTMENT ELECTRIC COOLING FAN

- (a) Disconnect the cooling fan connector.
- (b) Loosen the three bolts, and remove the cooling fan.

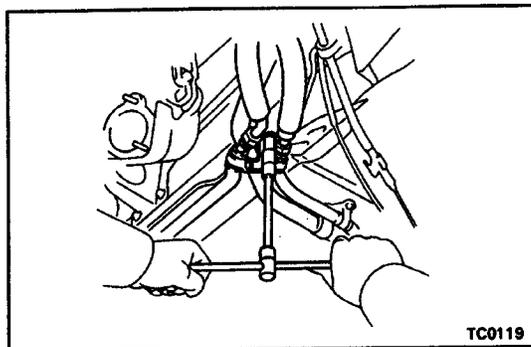


9. DISCONNECT A/C COMPRESSOR FROM ENGINE

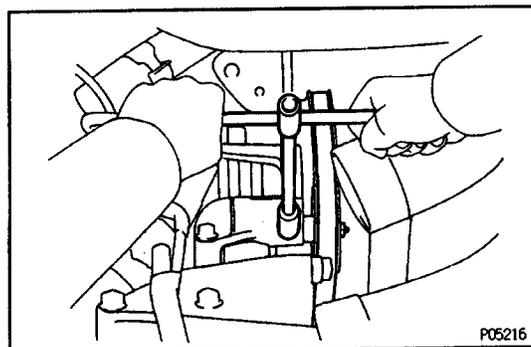
- (a) Remove the three clamp bolts, and disconnect the parking brake cable.



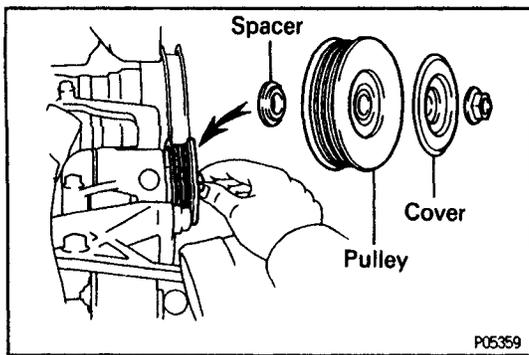
- (b) Remove the two bolts and lower suspension brace.



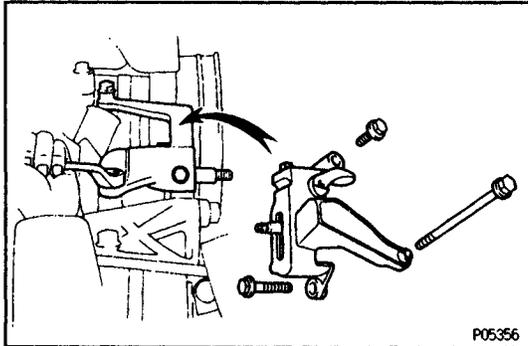
- (c) Remove the clamp nut, and disconnect the two A/C pipes.



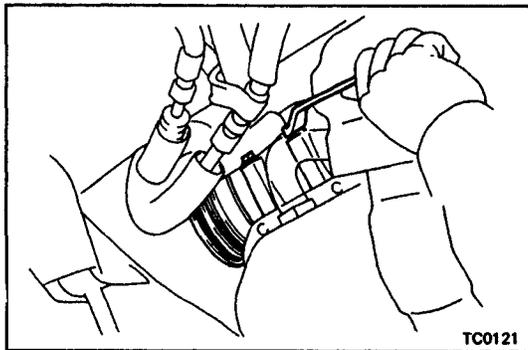
- (d) Loosen the idler pulley nut.
- (e) Loosen the adjusting bolt, and remove the drive belt.



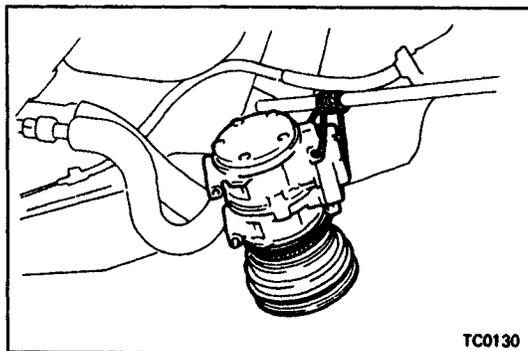
(f) Remove the nut, pulley cover, idler pulley and spacer.



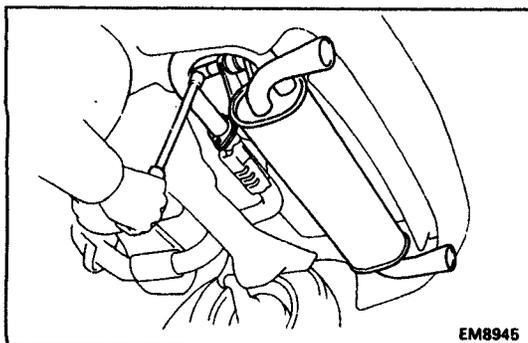
(g) Disconnect the A/C compressor connector.
(h) Remove the three bolts and idler pulley bracket.



(i) Remove the two bolts, and disconnect the A/C compressor from the engine.

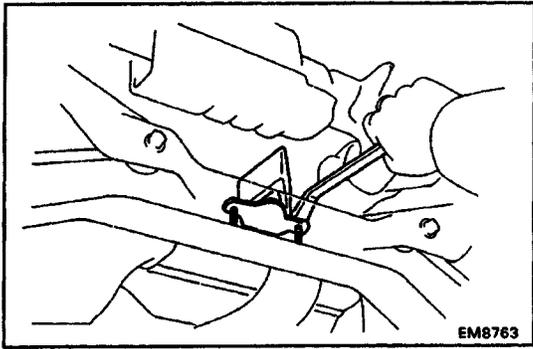


HINT: Suspend the A/C compressor to strut rod with a string.



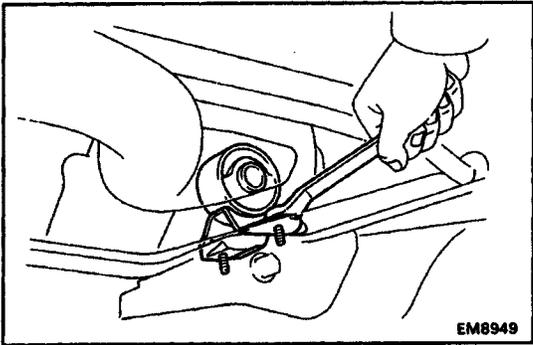
10. REMOVE TAILPIPE

- (a) Remove the two bolts holding the front exhaust pipe to the tailpipe bracket.
- (b) Remove the two bolts holding the front exhaust pipe to the tailpipe.
- (c) Remove the two bolts, tailpipe and gasket.

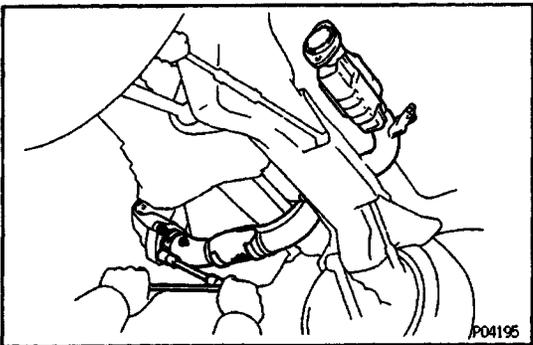


11. REMOVE FRONT EXHAUST PIPE

(a) Remove the two bolts and damper.

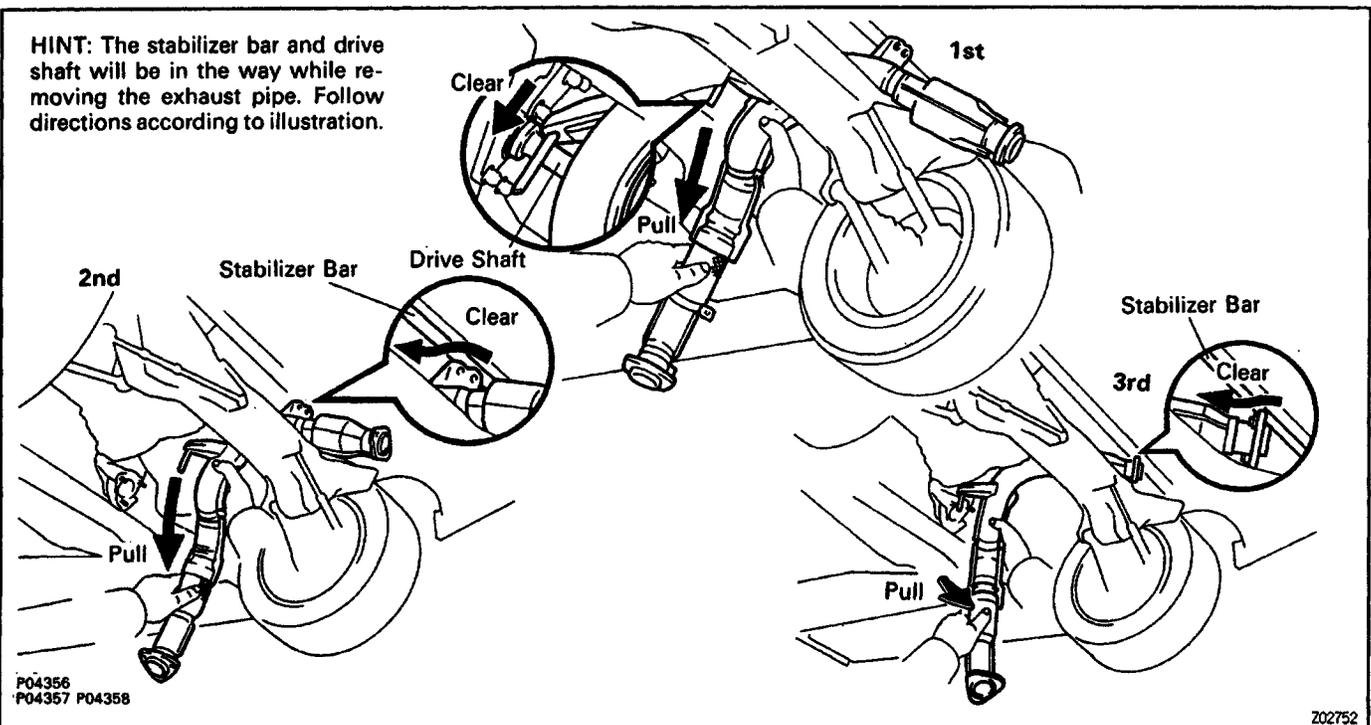


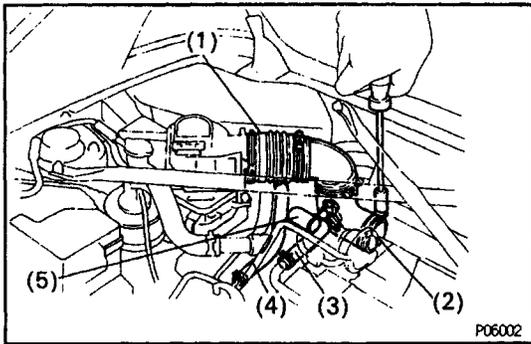
(b) Remove the two bolts and support bracket.



(c) Using a 14 mm deep socket wrench, remove the three nuts.

(d) Remove the front exhaust pipe and gasket.

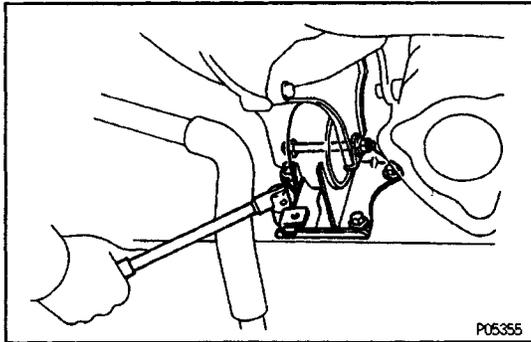




12. REMOVE AIR CLEANER HOSE

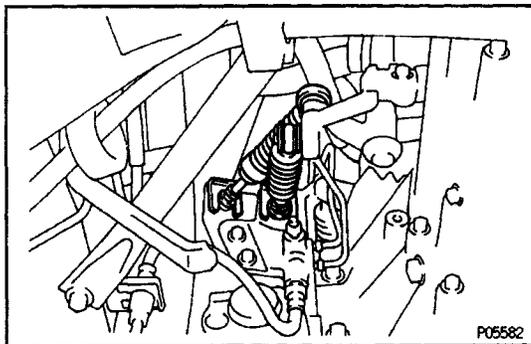
Disconnect the following hoses, and remove the air cleaner hose:

- (1) Air cleaner hose from air flow sensor
- (2) Air cleaner hose from turbocharger
- (3) PCV hose from cylinder head cover
- (4) Air hose from No.2 air hose
- (5) Air hose from air by-pass valve



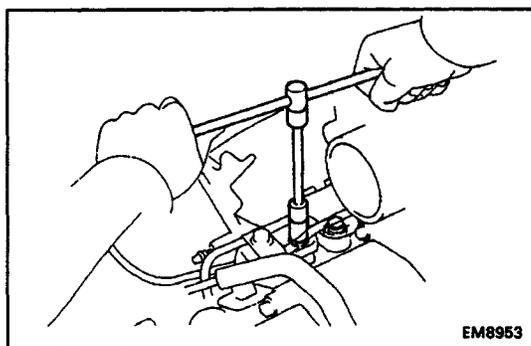
13. REMOVE FRONT ENGINE MOUNTING INSULATOR

- (a) Remove the through bolt and nut holding the mounting insulator to the mounting bracket.
- (b) Remove the four bolts and mounting insulator.

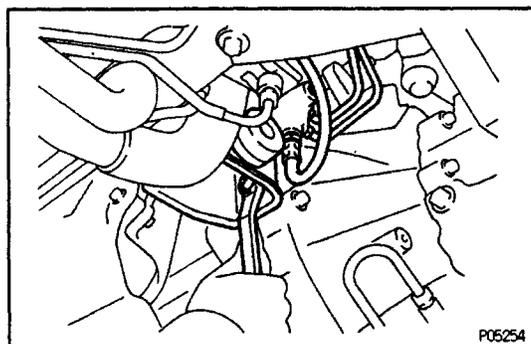


14. REMOVE FRONT ENGINE MOUNTING BRACKET AND CLUTCH RELEASE CYLINDER

- (a) Disconnect the two transaxle control cables from the transaxle.

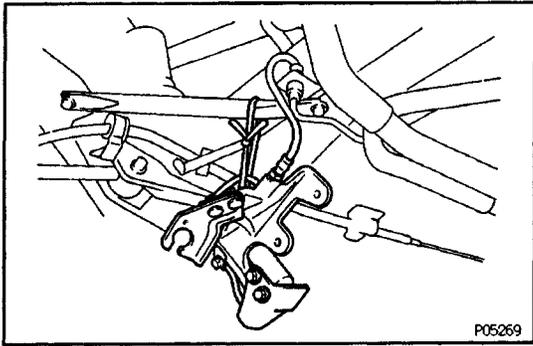


- (b) Remove the two bolts holding the clutch release cylinder to the transaxle.

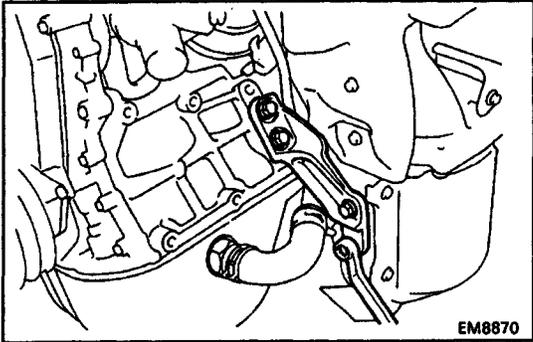


- (c) Remove the two bolts and mounting bracket.
- (d) Disconnect the clutch release cylinder from the transaxle.

Remove the three bolts and stiffener plate.

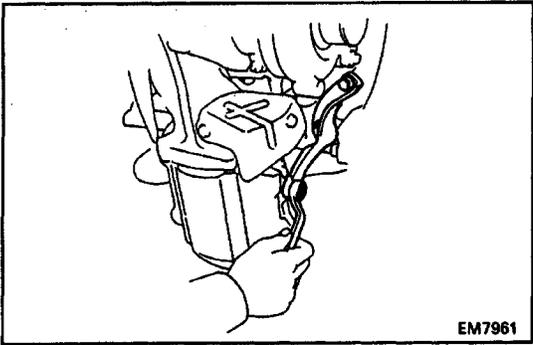


HINT: Suspend the clutch release cylinder to the suspension brace with a string.

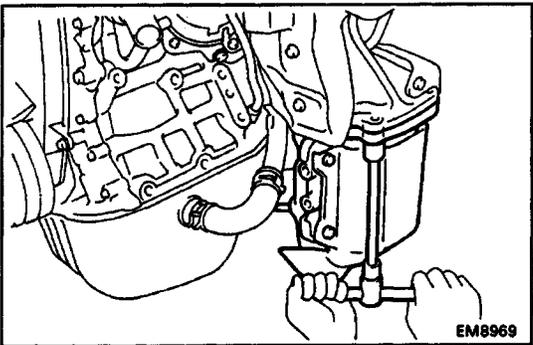


15. REMOVE MAIN TWC

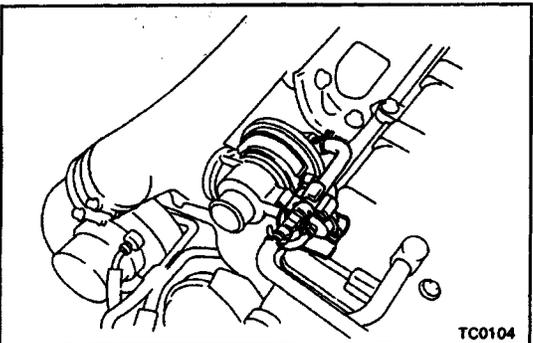
(a) Remove the four bolts and RH TWC stay.



(b) Remove the three bolts and LH TWC stay.



(c) Remove the three bolts, two nuts, TWC, gasket, retainer and cushion.



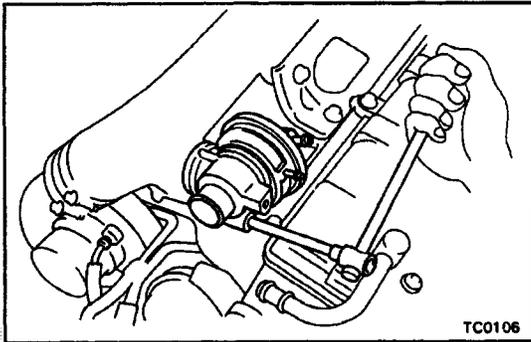
16. DISCONNECT AIR BY-PASS HOSES

(a) Disconnect the hose and VTV from the clamp.

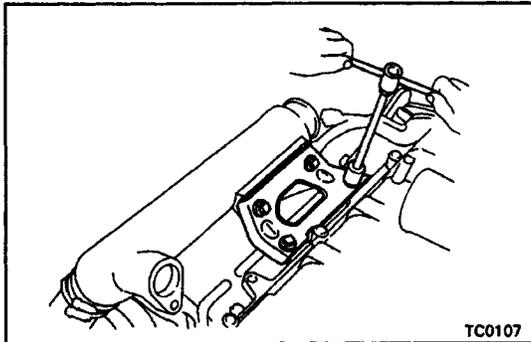
(b) Disconnect the two air by-pass hoses.

17. REMOVE CLAMPS OF AIR BY-PASS HOSE AND VTV

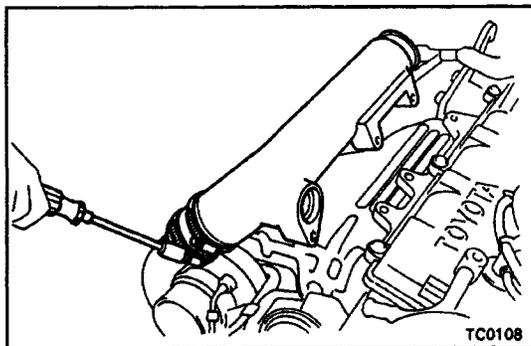
Remove the bolt and two clamps.

**18. REMOVE AIR BY-PASS VALVE**

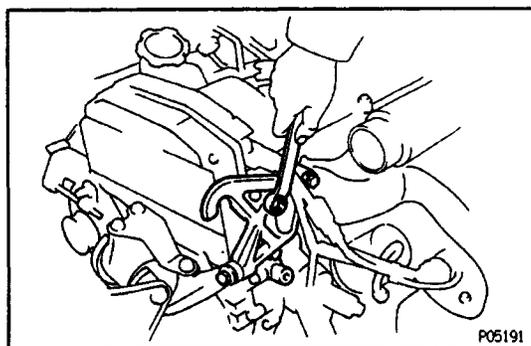
- (a) Remove the bolt and air by-pass valve.
- (b) Remove the O-ring from the air by-pass valve.

**19. REMOVE NO.4 AIR TUBE**

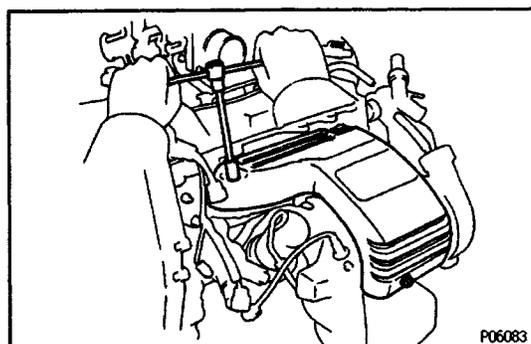
- (a) Remove the four bolts and air tube stay.



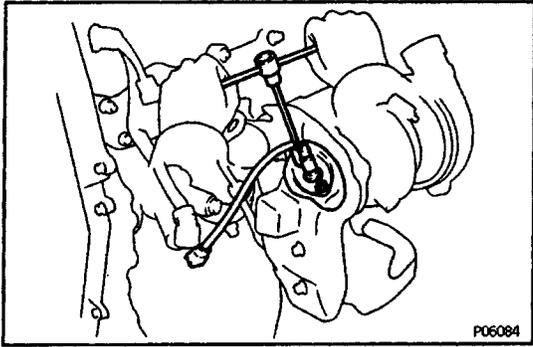
- (b) Loosen the hose clamp, and remove the air tube.

**20. REMOVE RH FRONT ENGINE HANGER**

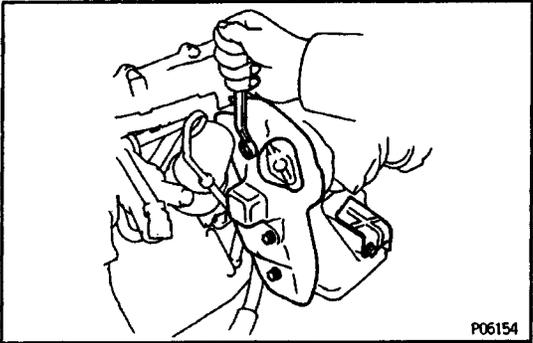
Remove the four bolts and engine hanger.

**21. REMOVE TURBOCHARGER 'HEAT INSULATOR**

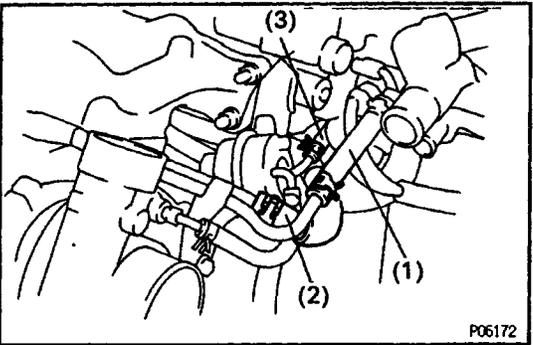
Remove the three bolts and heat insulator.

**22. REMOVE OXYGEN SENSOR**

- (a) Disconnect the oxygen sensor connector.
- (b) Remove the two nuts, cover, oxygen sensor and gasket.

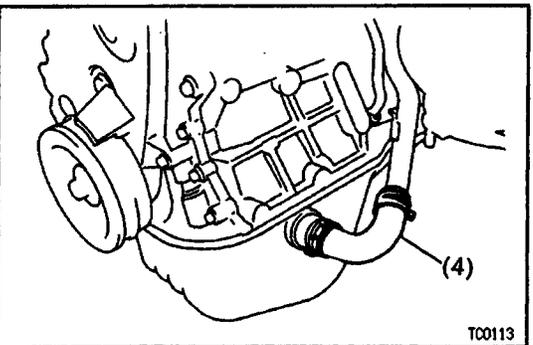
**23. REMOVE HEAT INSULATORS OF TURBINE OUTLET ELBOW**

- (a) Remove the oil dipstick.
- (b) Remove the three bolts and RH heat insulator.
- (c) Remove the two bolts and LH heat insulator.

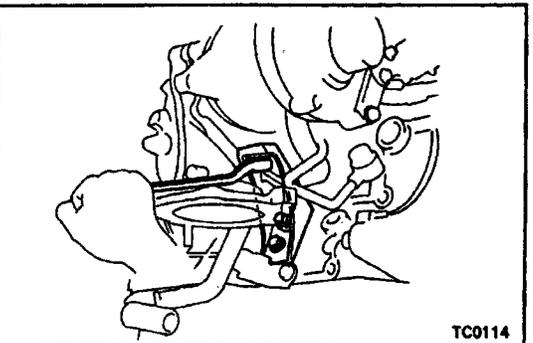
**24. DISCONNECT HOSES**

Disconnect the following hoses:

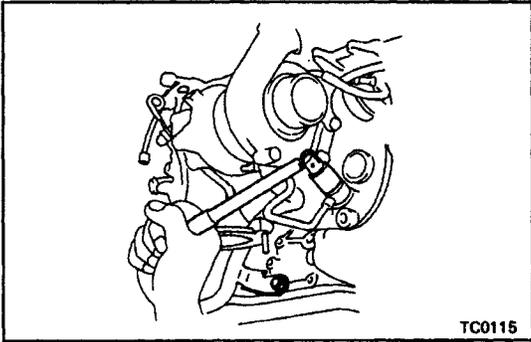
- (1) Water hose from water inlet housing
- (2) Water hose from water by-pass pipe
- (3) Air hose from actuator



- (4) Oil hose from turbo oil pipe

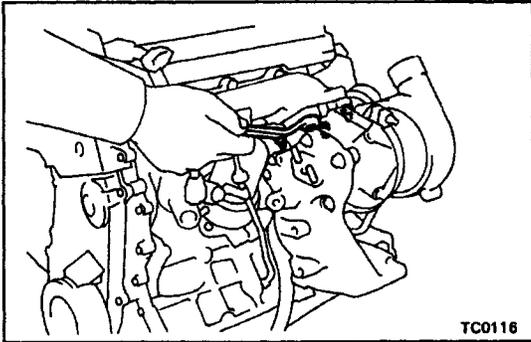
**25. REMOVE TURBOCHARGER STAY**

Remove the three bolts and turbocharger stay.

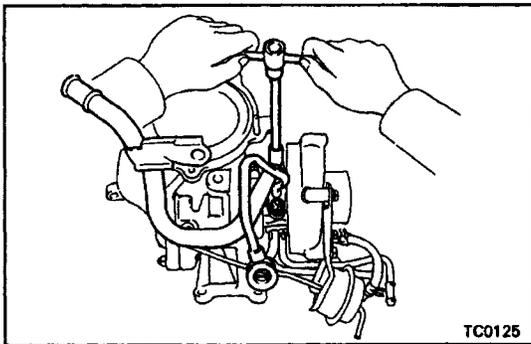


26. REMOVE TURBOCHARGER

- (a) Remove the bolt and union bolt holding the No. 1 turbo oil pipe to the cylinder block. Remove the two union bolt gaskets.

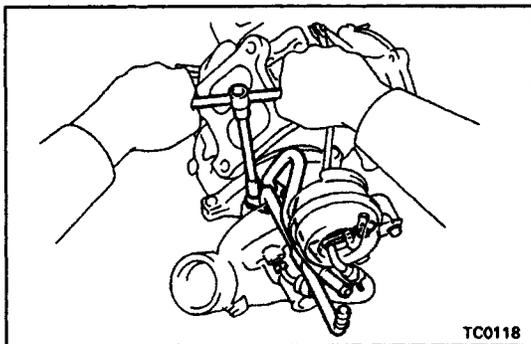


- (b) Remove the four nuts, turbocharger and gasket.



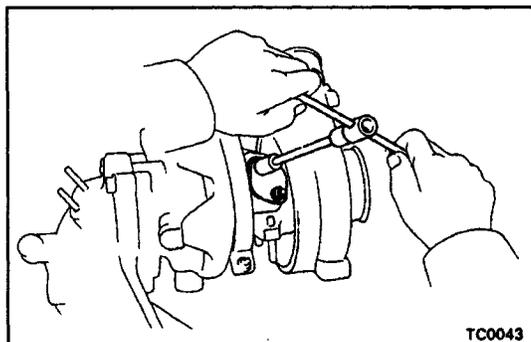
27. REMOVE TURBO OIL PIPE

Remove the two nuts, oil pipe and gasket.



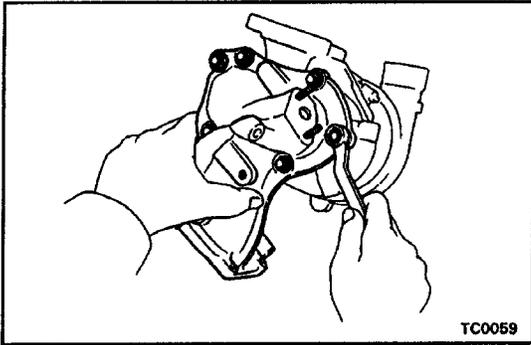
28. REMOVE TURBO WATER PIPE

Remove the two nuts, two bolts, water pipe and gasket.



29. REMOVE SIDE BEARING HOUSING PLATE

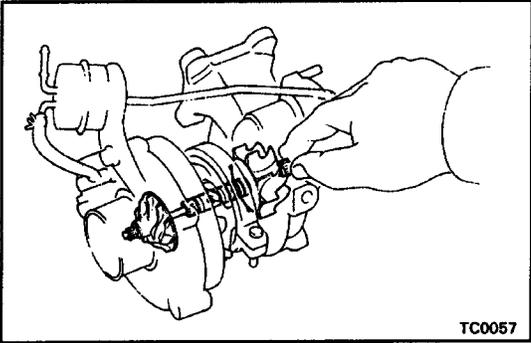
Remove the two nuts, housing plate and gasket.



TC0059

30. REMOVE TURBING OUTLET ELBOW

Remove the six nuts, outlet elbow and gasket.



TC0057

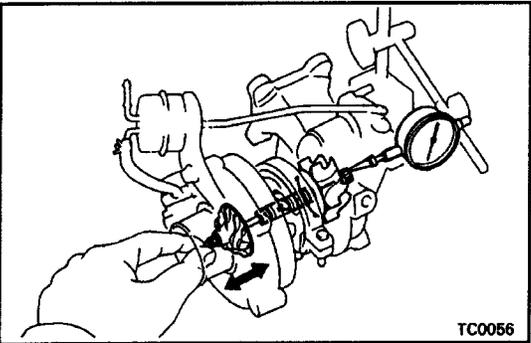
TURBOCHARGER INSPECTION

EG0X3-01

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.



TC0056

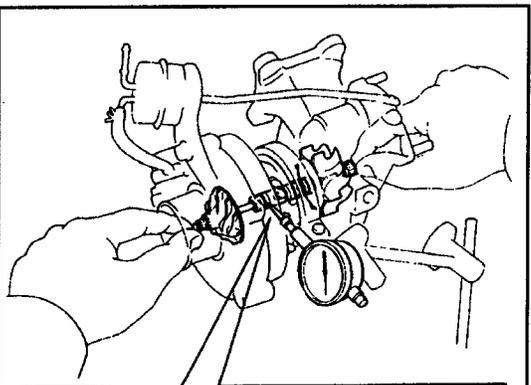
2. INSPECT AXIAL PLAY OF IMPELLER WHEEL

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

Standard clearance:

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 IMPELLER WHEEL

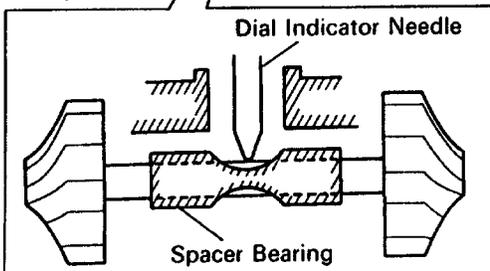
(a) From oil outlet hole, insert a dial indicator through the hole in the spacer bearing and set it in the center of the impeller shaft.

(b) Move the impeller shaft in a radial direction, measure the radial play of the impeller shaft.

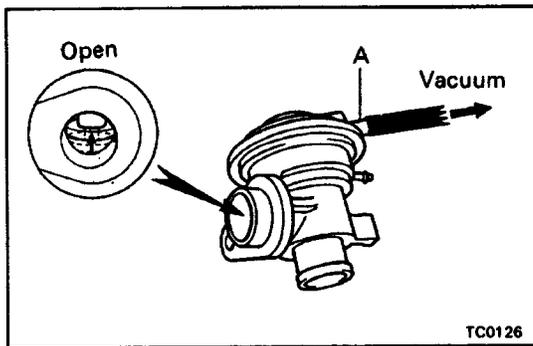
Standard clearance:

0.18 mm (0.0071 in.) or less

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

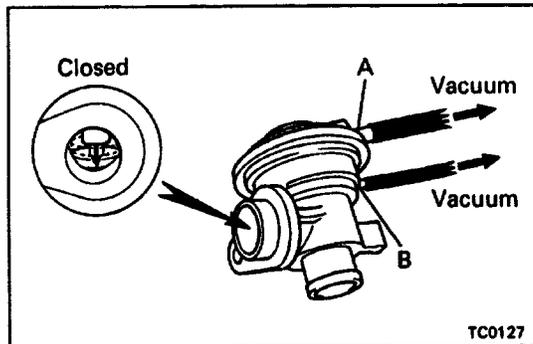
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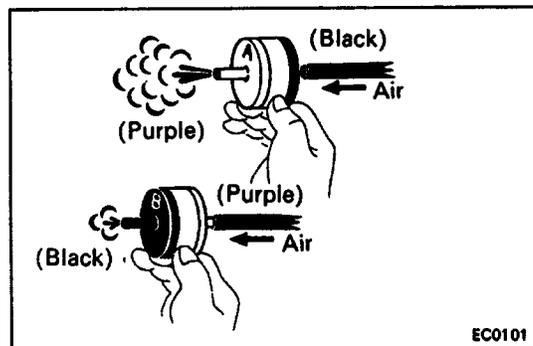


4. INSPECT AIR BY-PASS VALVE

(a) Apply vacuum to port A, and check that the valve is open.



(b) In the preceding condition, apply vacuum to port B, and check that the valve is closed.
If operation is not as specified, replace the valve.



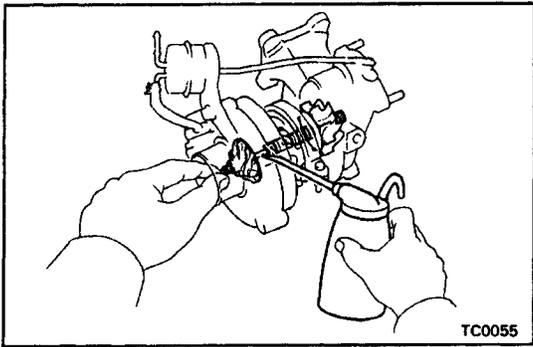
5. INSPECT VTV (FOR AIR BY-PASS VALVE)

(a) Check that air flows without resistance from ports "B" to "A".

(b) Check that air flows without difficulty from ports "A" to "B".

If operation is not as specified, replace the VTV.

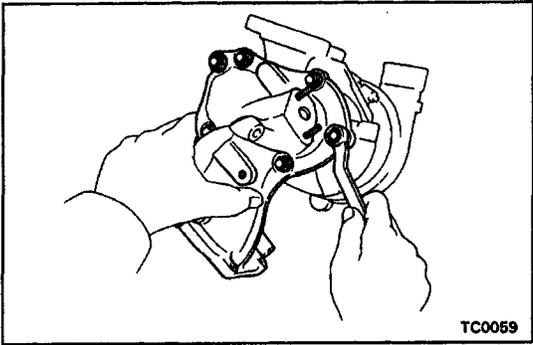
800X4-01



TURBOCHARGER INSTALLATION

(See Components for Removal and Installation)

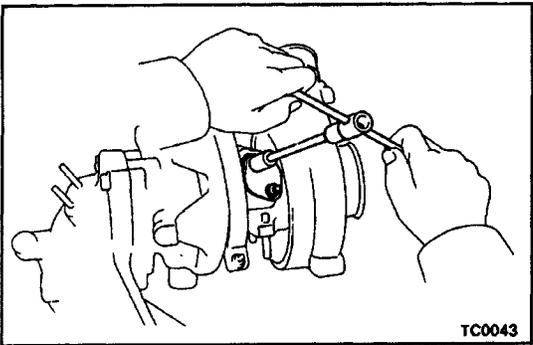
NOTICE: After replacing the turbocharger assembly, pour approx. 20 cm³ (1.2 cu in.) of fresh oil into the oil inlet and turn the impeller wheel by hand to splash oil on the bearing.



1. INSTALL TURBINE OUTLET ELBOW

Install a new gasket and the outlet elbow with the six nuts.

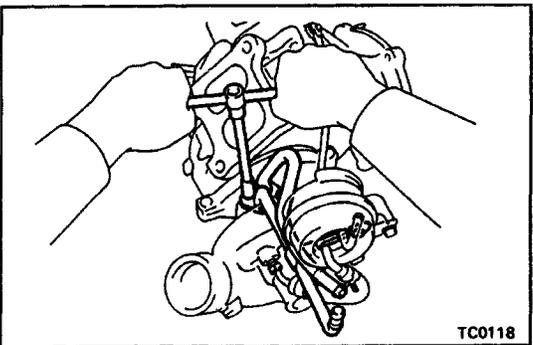
Torque: 64 N·m (650 kgf·cm, 47 ft·lbf)



2. INSTALL SIDE BEARING HOUSING PLATE

Install a new gasket and the housing plate with the two nuts.

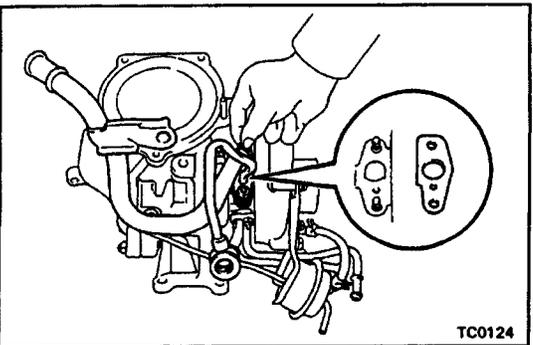
Torque: 11 N·m (120 kgf·cm, 9 ft·lbf)



3. INSTALL TURBO WATER PIPE

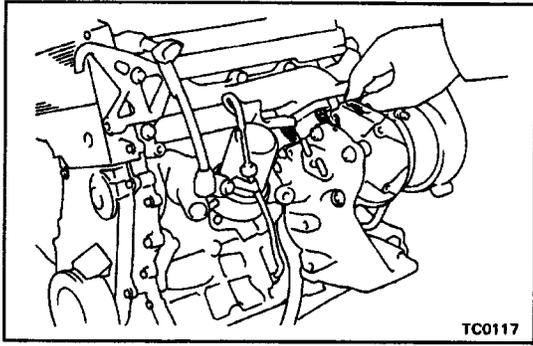
Install a new gasket and the water pipe with the two nuts and two bolts.

Torque: 11 N·m (120 kgf·cm, 9 ft·lbf)



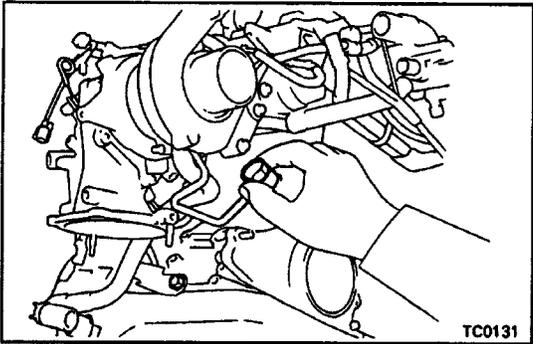
4. INSTALL TURBO OIL PIPE

- (a) Align the oil holes of the a new gasket and the turbocharger housing.
- (b) Install the gasket and oil pipe with the two nuts. Do not torque the nuts yet.

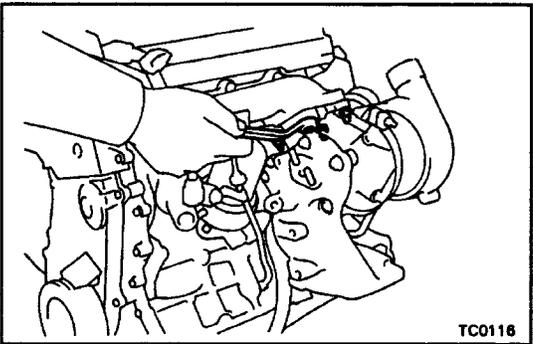


5. INSTALL TURBOCHARGER

- (a) Install a new gasket and the turbocharger with the four nuts. Do not torque the nuts.

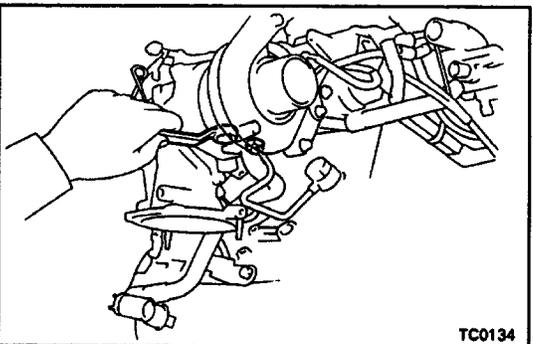


- (b) Install the oil pipe with the bolt, two new gaskets and union bolt. Do not torque the bolt and union bolt.



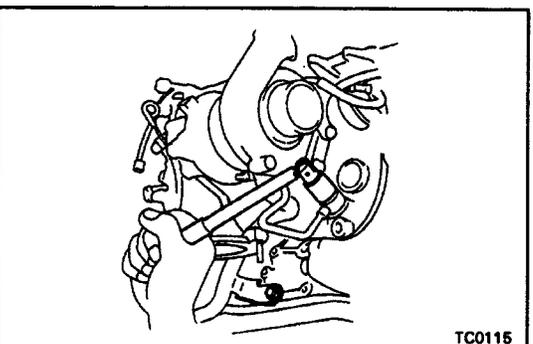
- (c) Tighten the four nuts holding the turbocharger to the exhaust manifold.

Torque: 64 N-m (650 kgf-cm, 47 ft-lbf)



- (d) Tighten the two nuts holding the oil pipe to the turbocharger.

Torque: 17 N-m (175 kgf-cm, 13 ft-lbf)

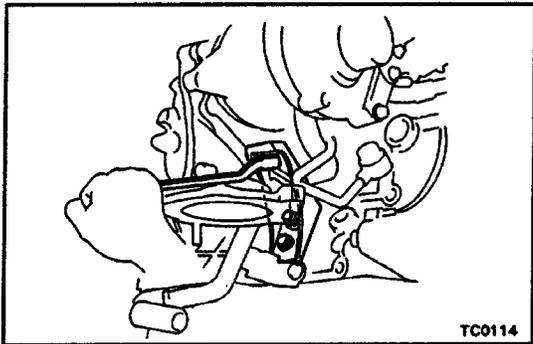


- (e) Tighten the union bolt holding the oil pipe to the cylinder block.

Torque: 51 N-m (525 kgf-cm, 38 ft-lbf)

- (f) Tighten the bolt holding the bracket of the oil pipe to the cylinder block.

Torque: 43 N-m (440 kgf-cm, 32 ft-lbf)

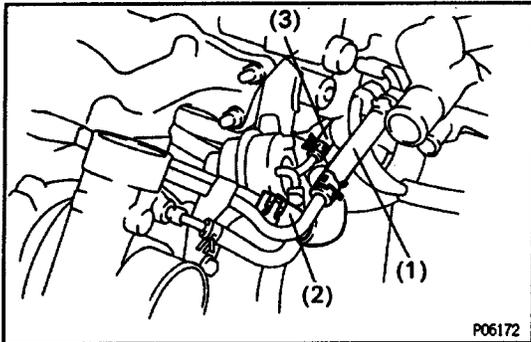


6. INSTALL TURBOCHARGER STAY

Install the turbocharger stay with the three bolts.

Torque:

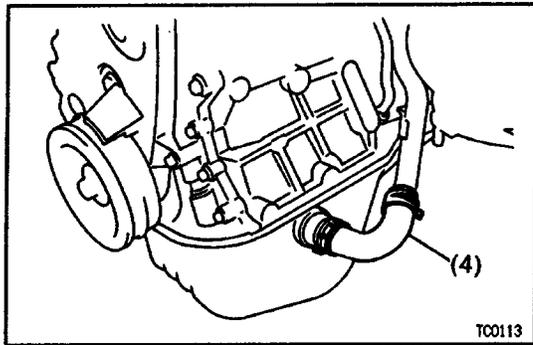
- 69 N-m (705 kgf-cm, 51 ft-lbf) for turbocharger side
- 59 N-m (600 kgf-cm, 43 ft-lbf) for cylinder block side



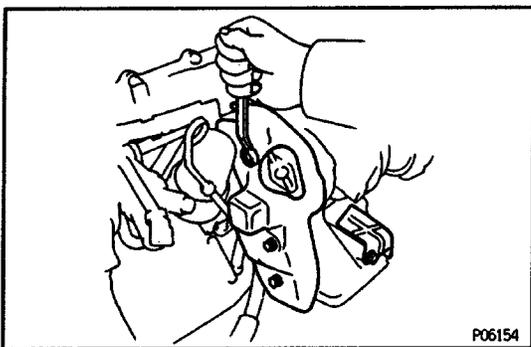
7. CONNECT HOSES

Disconnect the following hoses:

- (1) Water hose to water inlet housing
- (2) Water hose to water by-pass pipe
- (3) Air hose to actuator

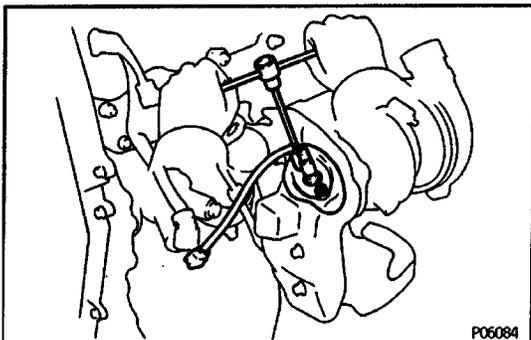


- (4) Oil hose to turbo oil pipe



8. INSTALL HEAT INSULATORS OF TURBINE OUTLET ELBOW

- (a) Install the RH heat insulator with the three bolts.
- (b) Install the LH heat insulator with the two bolts.
- (c) Install the oil dipstick.

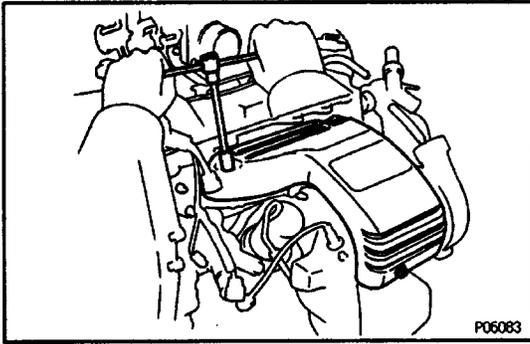


9. INSTALL OXYGEN SENSOR

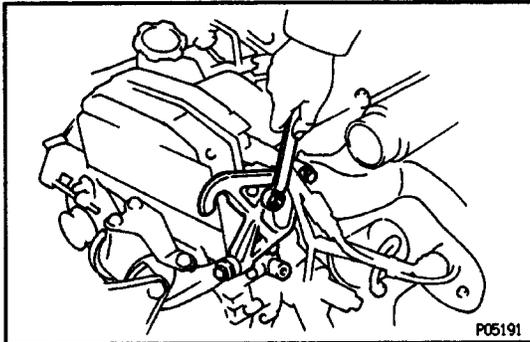
- (a) Install a new gaskets, the oxygen sensor and cover with the two nuts.

Torque: 44 N-m (450 kgf-cm, 33 ft-lbf)

- (b) Connect the oxygen sensor connector.

**10. INSTALL TURBOCHARGER HEAT INSULATOR**

Install the heat insulator with the three bolts.

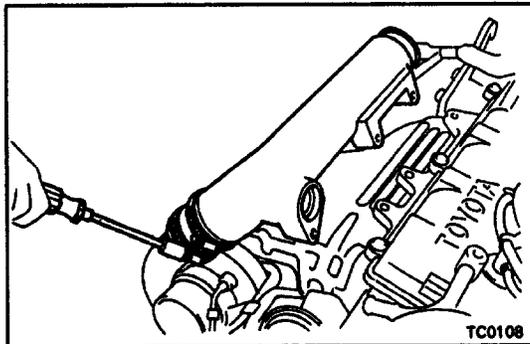
**11. INSTALL RH FRONT ENGINE HANGER**

Install the engine hanger with the four bolts.

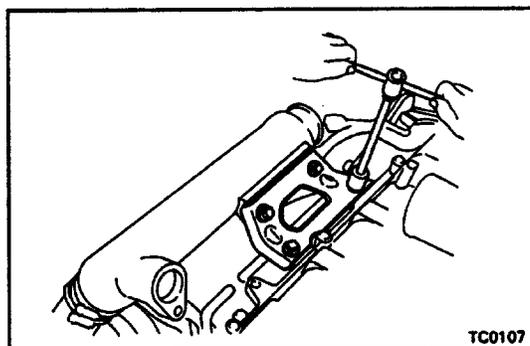
Torque:

39 N-m (400 kgf-cm 29 ft-lbf) for cylinder head

61 N-m (620 kgf-cm 45 ft-lbf) for mounting bracket

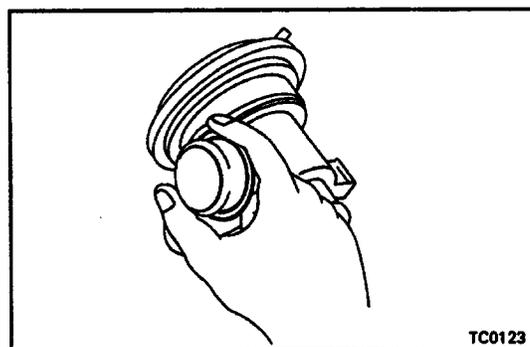
**12. INSTALL NO.4 AIR TUBE**

(a) Connect the air connector and air tube to the turbocharger.



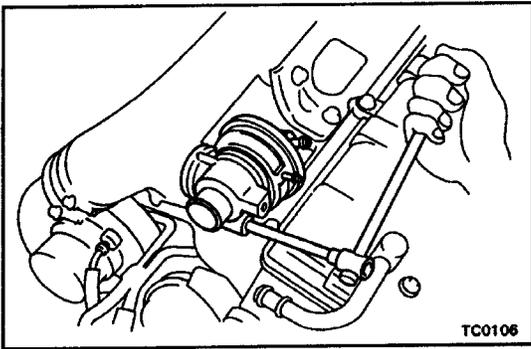
(b) Install the air tube stay with the four bolts.

Torque: 19 N-m (195 kgf-cm, 14 ft-lbf)

**13. INSTALL AIR BY-PASS VALVE**

(a) Install a new O-ring to the air by-pass valve.

(b) Apply soapy water on the O-ring.



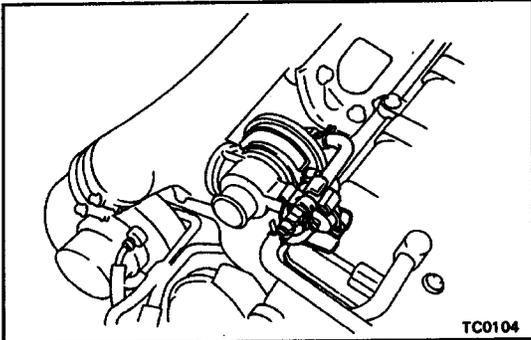
- (c) Install the air by-pass valve with the bolt.
Torque: 19 N-m (195 kgf-cm, 14 ft-lbf)

14. INSTALL CLAMPS OF AIR BY-PASS HOSE AND VTV

Install the two clamps with the bolt.

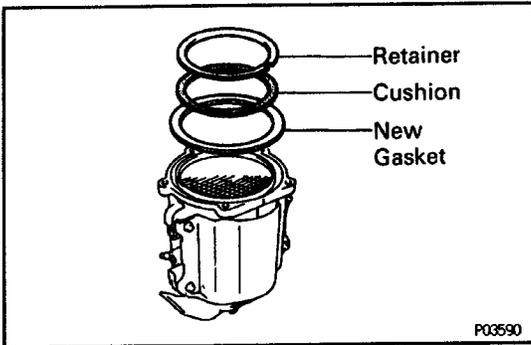
15. CONNECT AIR BY-PASS HOSES

- (a) Connect the two air by-pass hoses.
 (b) Install the air by-pass hose and VTV to the clamps.

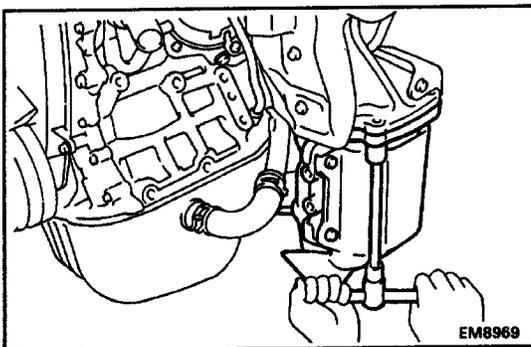


16. INSTALL MAIN TWC

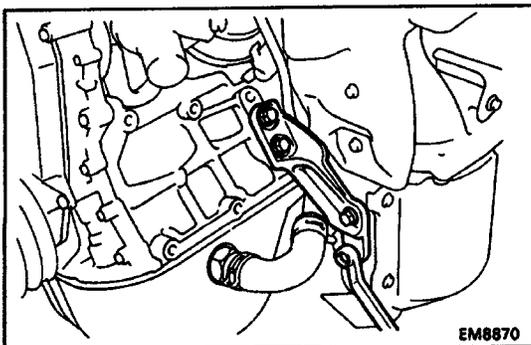
- (a) Place the cushion, retainer and a new gasket on the TWC.

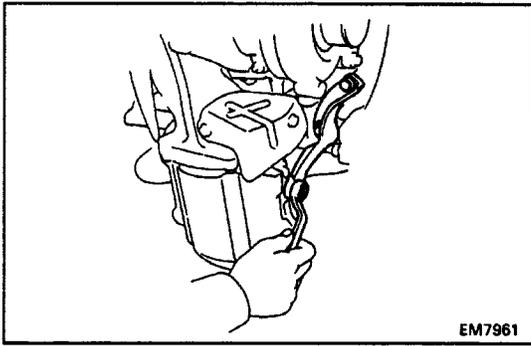


- (b) Install the TWC with the three bolts and two nuts.
Torque: 29 N-m (300 kgf-cm, 22 ft-lbf)

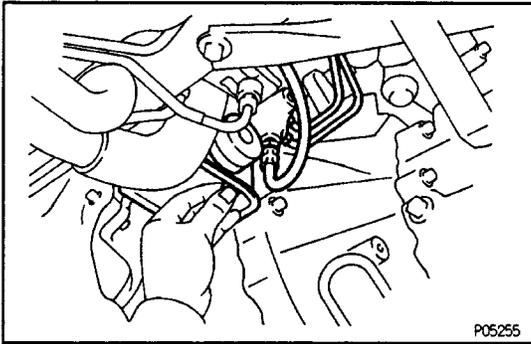


- (c) Install the RH TWC stay with the four bolts.
Torque: 59 N-m (600 kgf-cm, 43 ft-lbf)



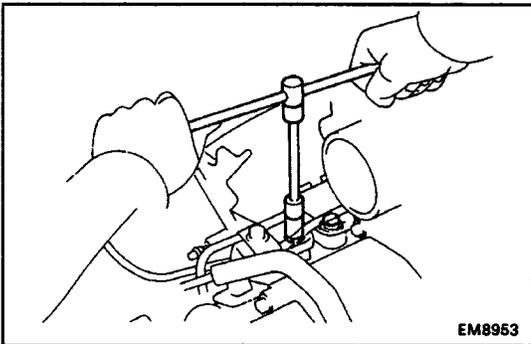


- (d) Install the LH TWC stay with the three bolts.
Torque: 59 N-m (600 kgf-cm, 43 ft-lbf)

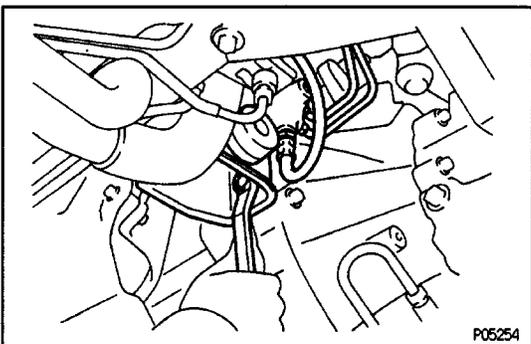


17. INSTALL CLUTCH RELEASE CYLINDER AND FRONT ENGINE MOUNTING BRACKET

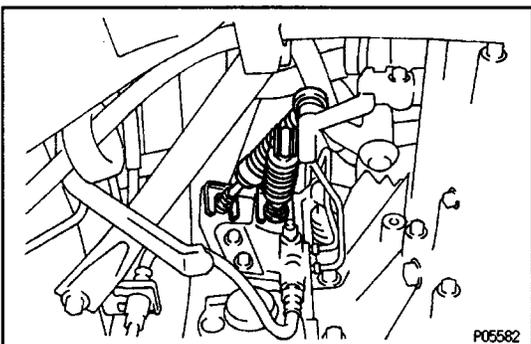
- (a) Temporarily install the release cylinder and mounting bracket with the two bolts.



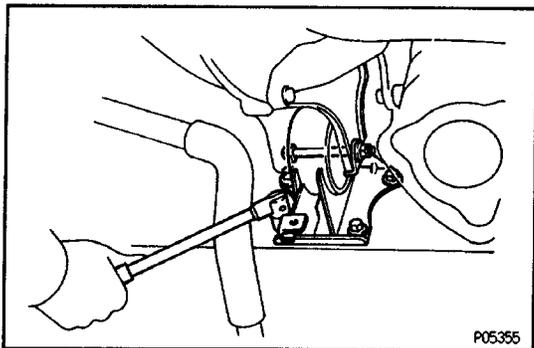
- (b) Install the clutch release cylinder with the two bolts.
Torque: 12 N-m (120 kgf-cm, 9 ft-lbf)



- (c) Tighten the two bolts holding the clutch release cylinder to the transaxle.
Torque: 77 N-m (790 kgf-cm, 57 ft-lbf)



- (d) Connect the two transaxle control cables to the transaxle.

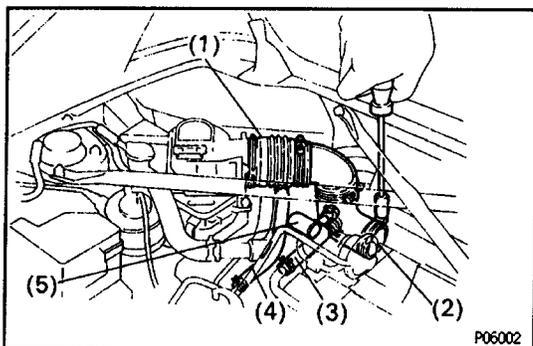
**18. INSTALL FRONT ENGINE MOUNTING INSULATOR**

- (a) Install the mounting insulator to the body with the four bolts.

Torque: 77 N-m (790 kgf-cm, 57 ft-lbf)

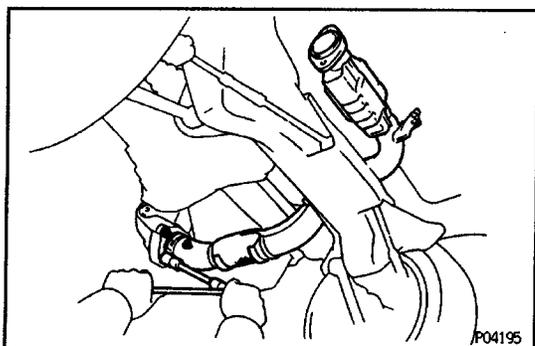
- (b) Install the mounting insulator to the mounting bracket with the through bolt and nut.

Torque: 96 N-m (980 kgf-cm, 71 ft-lbf)

**19. REMOVE AIR CLEANER HOSE**

Disconnect the following hoses, and remove the air cleaner hose:

- (1) Air cleaner hose from air flow sensor
- (2) Air cleaner hose from turbocharger
- (3) PCV hose from cylinder head cover
- (4) Air hose from No.2 air hose
- (5) Air hose from air by-pass valve

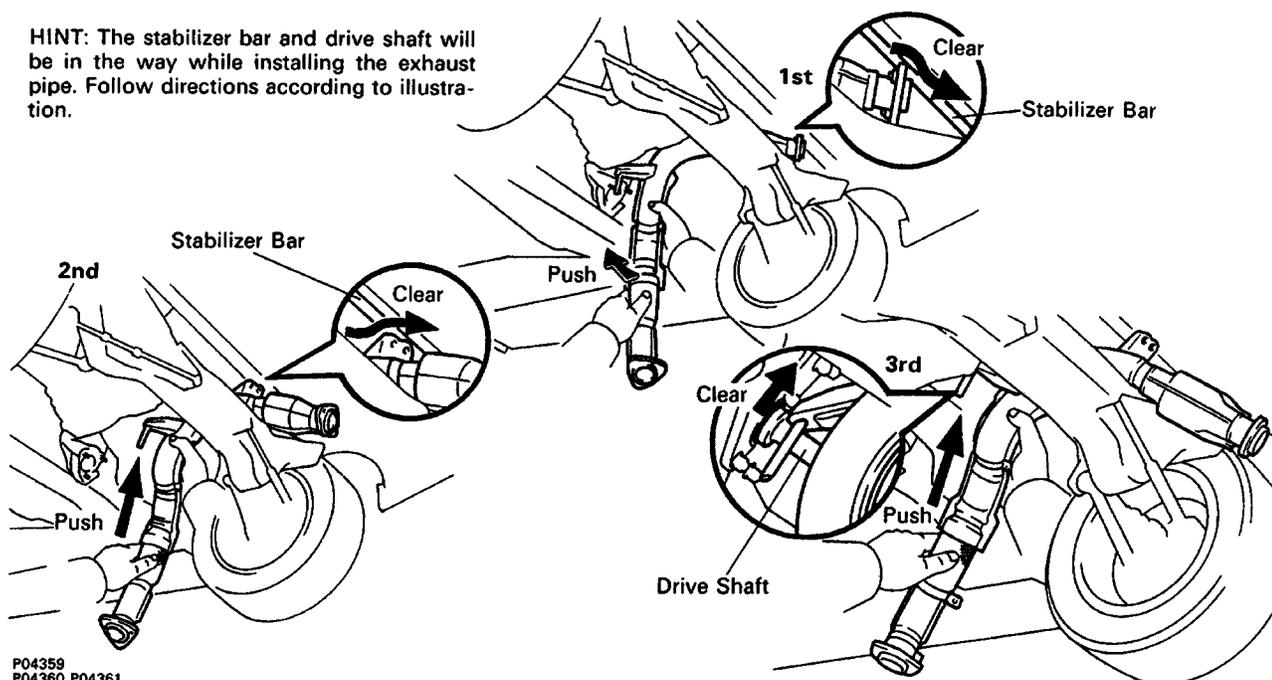
**20. INSTALL FRONT EXHAUST PIPE**

- (a) Place a new gasket to the front of the front exhaust pipe.

- (b) Using a 14 mm deep socket wrench, install the front exhaust pipe with three new nuts.

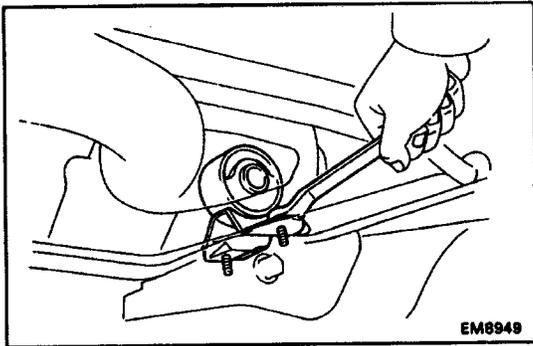
Torque: 62 N-m (630 kgf-cm, 46 ft-lbf)

HINT: The stabilizer bar and drive shaft will be in the way while installing the exhaust pipe. Follow directions according to illustration.

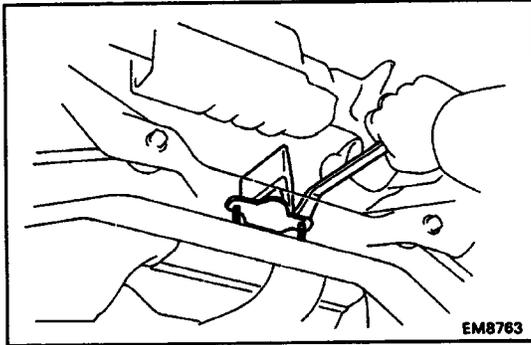


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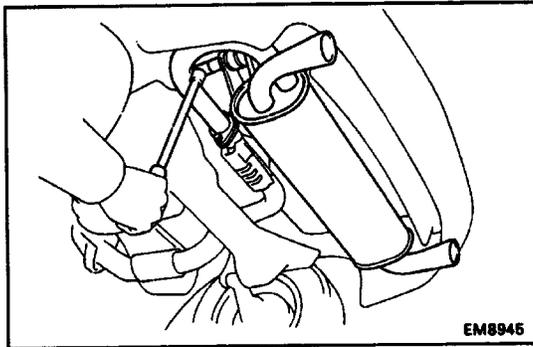
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- (c) Install the support bracket with the two bolts.
Torque: 21 N-m (210 kgf-cm, 15 ft-lbf)

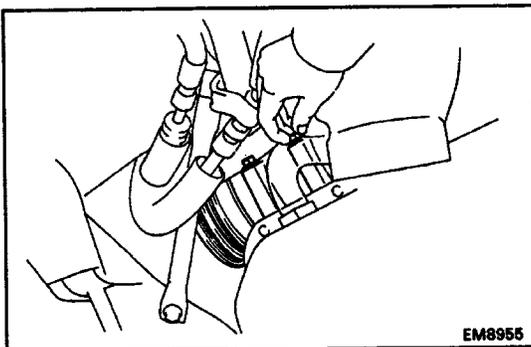


- (d) Install the damper with the two bolts.
Torque: 21 N-m (210 kgf-cm, 15 ft-lbf)



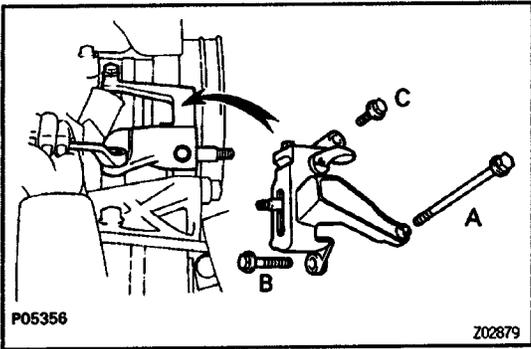
21. INSTALL TAILPIPE

- (a) Place a new gasket to the rear of the front exhaust pipe.
- (b) Install the tailpipe to the body bracket with the two bolts and nut.
Torque: 66 N-m (670 kgf-cm, 48 ft-lbf)
- (c) Install the two bolts holding the front exhaust pipe to the tailpipe.
Torque: 43 N-m (440 kgf-cm, 32 ft-lbf)
- (d) Install the two bolts holding the front exhaust pipe bracket to the tailpipe bracket.
Torque: 19 N-m (190 kgf-cm, 14 ft-lbf)



22. INSTALL A/C COMPRESSOR

- (a) Temporarily install the A/C compressor two bolts.



(b) Install the idler pulley bracket with the three bolts.

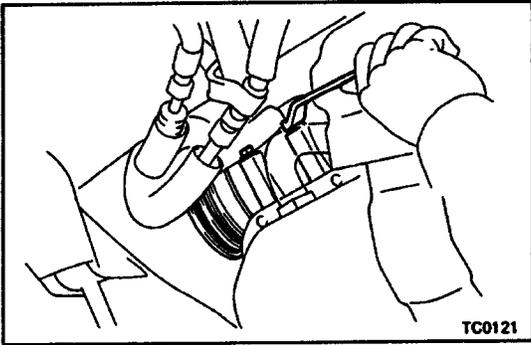
Torque:

25 N-m (250 kgf-cm, 18 ft-lbf) for A

27 N-m (275 kgf-cm, 20 ft-lbf) for B

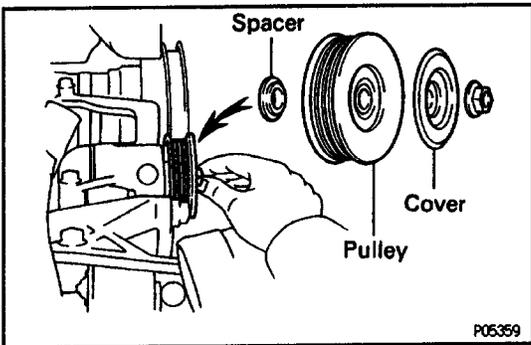
37 N-m (375 kgf-cm, 27 ft-lbf) for C

(c) Connect the A/C compressor connector.

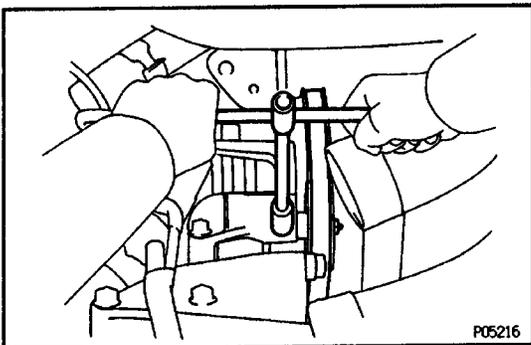


(d) Tighten the two bolts of the lower side of the A/C compressor.

Torque: 25 N-m (260 kgf-cm, 18 ft-lbf)

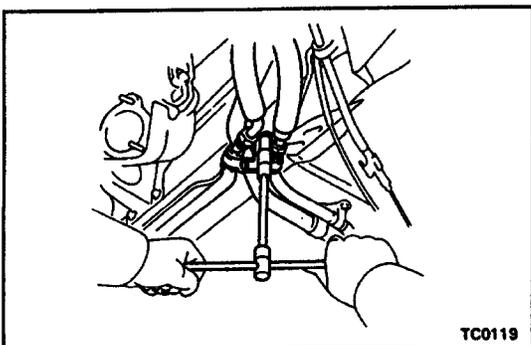


(e) Temporarily install the spacer, pulley and pulley cover with the nut.

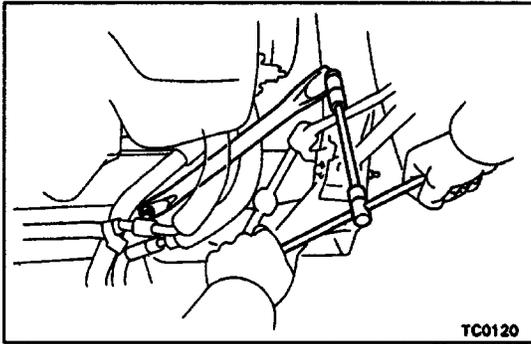


(f) Install the drive belt with the adjusting bolt.

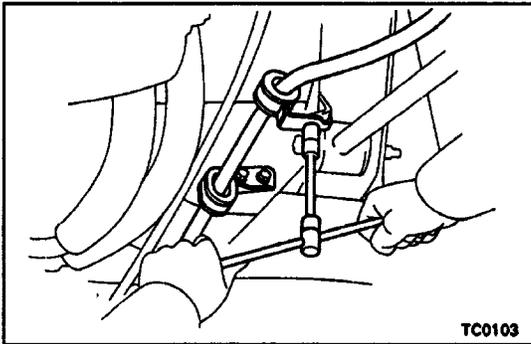
(g) Tighten the idler pulley nut.



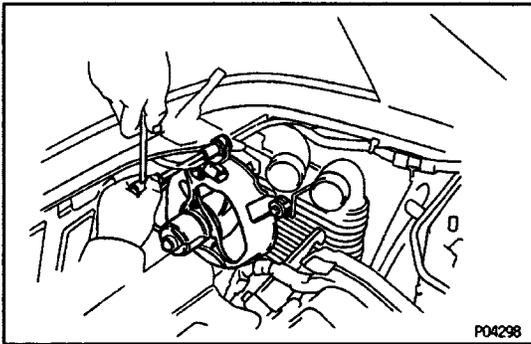
(h) Install the two A/C pipes with the two clamps and nut.



- (i) Install the lower suspension brace with the two bolts.
Torque: 73 N-m (740 kgf-cm, 54 ft-lbf)

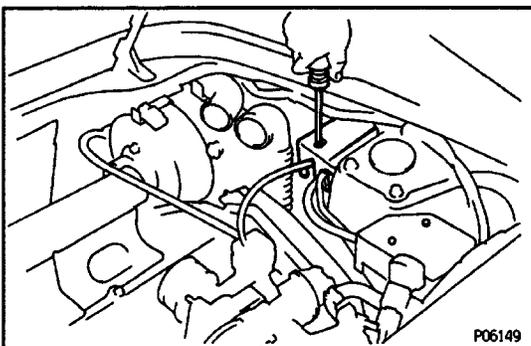


- (j) Install the parking brake cable with the two clamps and three bolts.

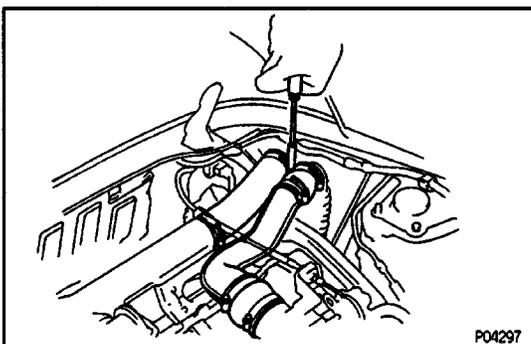


23. INSTALL ENGINE COMPARTMENT COOLING FAN

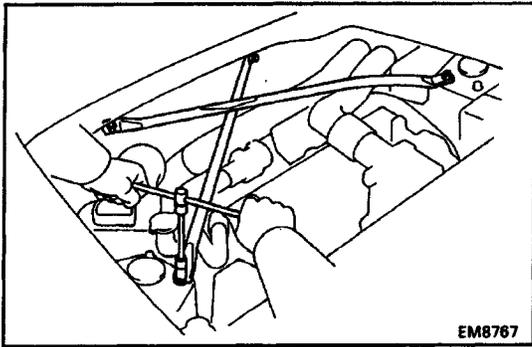
- (a) Install the cooling fan with the three bolts.
(b) Connect the cooling fan connector.



24. (w/ CRUISE CONTROL SYSTEM) INSTALL CRUISE CONTROL ACCELERATOR LINKAGE



25. INSTALL NO.1 AND NO.2 INTAKE AIR CONNECTORS

**26. INSTALL UPPER SUSPENSION BRACE**

Install the upper brace with the two bolts and two nuts.

Torque:

73 N-m (740 kgf-cm, 54 ft-lbf) for bolt

64 N-m (650 kgf-cm, 47 ft-lbf) for nut

27. INSTALL RH ENGINE HOOD SIDE PANEL**28. CONNECT CABLE TO NEGATIVE TERMINAL OF BATTERY****29. FILL WITH ENGINE COOLANT****30. START ENGINE AND CHECK FOR LEAKS****31. CHECK ENGINE OIL LEVEL****32. RECHECK ENGINE COOLANT LEVEL****33. INSTALL ENGINE UNDER COVERS**