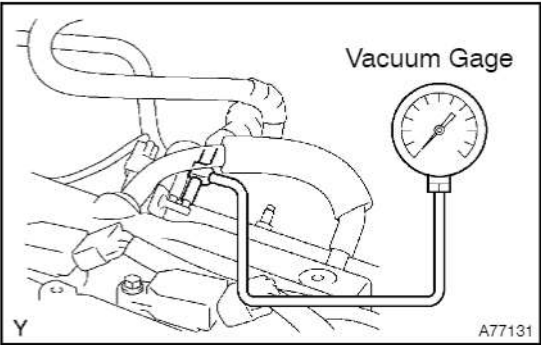


INTAKE AIR CONTROL SYSTEM (2AZ-FSE)
ON-VEHICLE INSPECTION

1308J-01

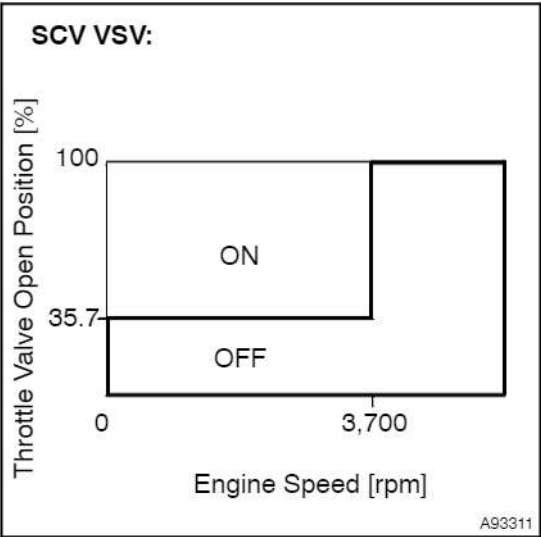


1. INSPECT INTAKE AIR CONTROL SYSTEM

- (a) Using a 3-way connector, connect the vacuum gauge to the actuator hose as shown in the illustration.
- (b) Connect the hand-held tester to the DLC 3.
- (c) Start the engine.
- (d) Turn the hand-held tester ON.
- (e) Select the item "DIAGNOSIS/ENHANCED OBD II/ACTIVE TEST/INTAKE CTL VSV 1", then operate the VSV for AICS.

Vacuum:

Tester Operation	Specified Condition
VSV is ON	approximately 27.6 kpa (207 mmHg, 8.1 in.Hg)
VSV is OFF	0 kPa (0 mm Hg, 0 in. Hg.)

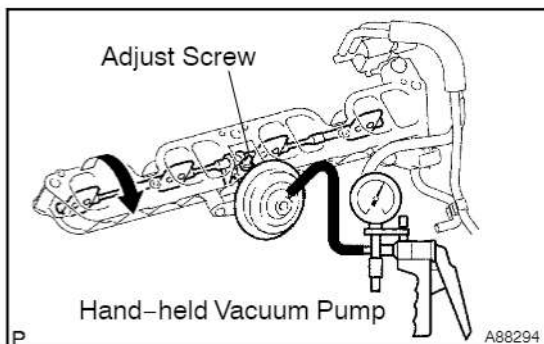


- (f) Shift the transmission into the P range, then control the accelerator pedal.

- (g) Using the hand-held tester, check the VSV operation.
- HINT:

The value in the illustration is only for reference; the throttle valve may operate diversely depending on the engine running condition.

INSPECTION



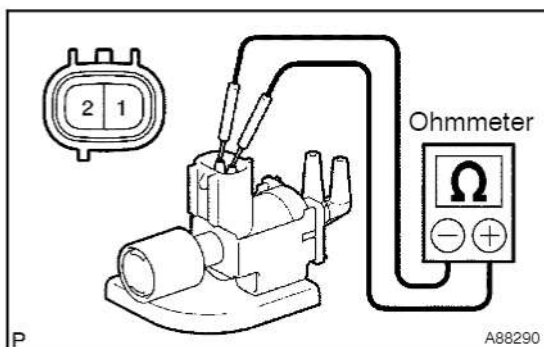
1. INSPECT INTAKE AIR CONTROL VALVE ASSY

- (a) Check the operation.
 - (1) With 34.7 kPa (260 mmHg, 10.2 in.Hg) of vacuum applied to the actuator, check that the actuator rod moves.
 - (2) 1 minute after applying the vacuum, check that the actuator rod does not return.

NOTICE:

Do not adjust the adjust screw.

If the operation is not as specified, replace the intake air control valve.



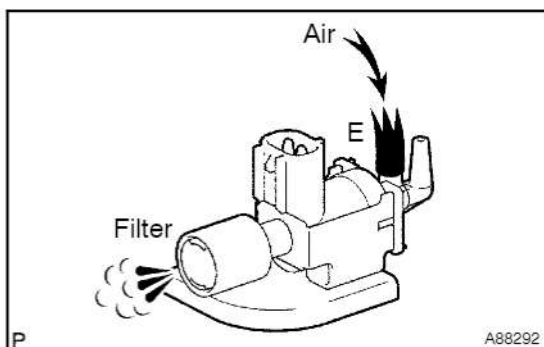
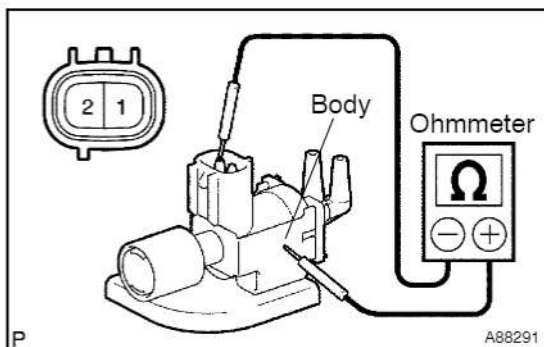
2. INSPECT VACUUM SWITCHING VALVE ASSY NO.1

- (a) Inspect the resistance.
 - (1) Using an ohmmeter, measure the resistance between the terminals.

Standard:

Tester Connection	Specified Condition
1 - 2	33 to 39 Ω at 20°C (68°F)
1 - Body	10 k Ω or higher
2 - Body	10 k Ω or higher

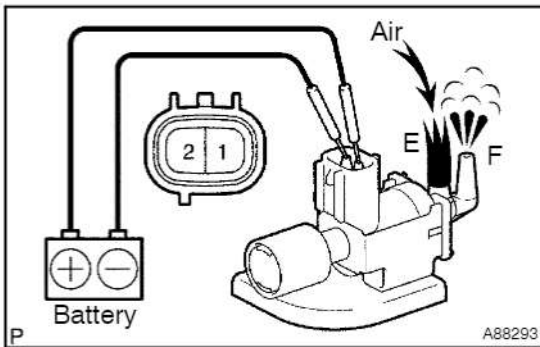
If the result is not as specified, replace the vacuum switching valve No. 1.



- (b) Check the ventilation.

- (1) Check that air flows from port E to filter.

If the operation is not as specified, replace the vacuum switching valve No. 1.



(2) Apply battery voltage across the terminals.

(3) Check that air flows from ports E to F.

If the operation is not as specified, replace the vacuum switching valve No. 1.

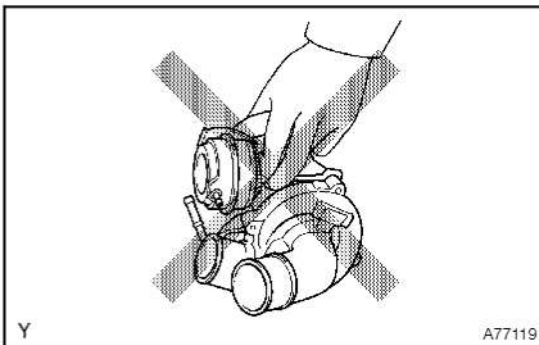
TURBO CHARGER SYSTEM (1CD-FTV)(From September, 2003)

PRECAUTION

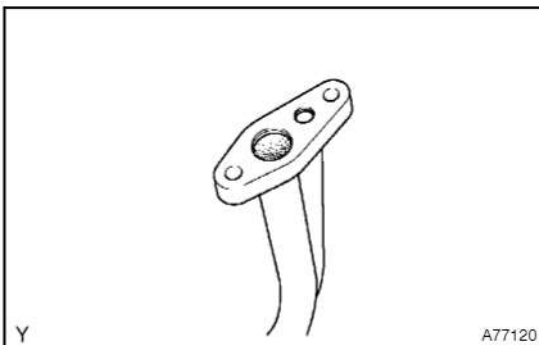
1302Y-04

1. MAINTENANCE PRECAUTION

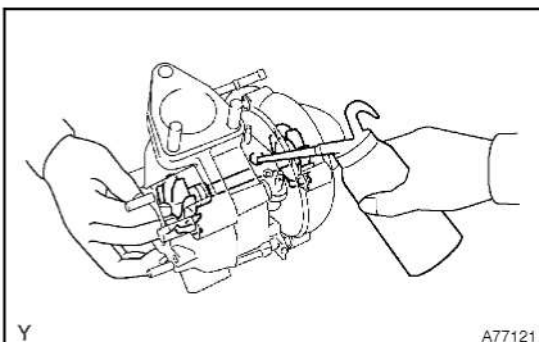
- (a) Do not stop the engine immediately after pulling a trailer, or after high speed or uphill driving. Let the engine idle for 20 to 120 seconds before turning the ignition switch to OFF (according as the driving condition, the idling time varies).
- (b) Avoid quickly accelerating the pedal or increasing the engine speed immediately after starting a cold engine.
- (c) If the turbocharger is found defective, it must be replaced. Also, inspect the source of the trouble including conditions of the turbocharger that having been used. Repair or replace the followings if necessary:
 - (1) Engine oil (level and quality)
 - (2) Oil lines leading to the turbocharger



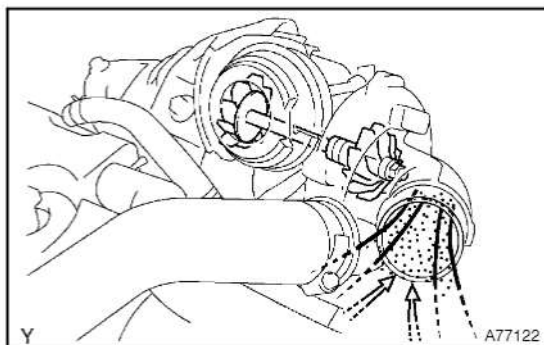
- (d) Pay due attention when removing and reinstalling the turbocharger assembly. Do not drop, grasp, or give shock to the easily-deformed assembly parts such as the actuator or push rod when removing or reinstalling.
- (e) Before removing, cover both the intake and exhaust ports and the oil inlet to prevent dirt or foreign objects from being introduced.



- (f) If replacing the turbocharger, check the oil pipe for deposits. If necessary, replace the oil pipe, too.
- (g) Thoroughly remove old gasket sticking to the lubrication oil pipe flange and turbocharger oil flange.
- (h) If replacing the bolt(s) or nut(s), Toyota genuine parts must be used to prevent breakage or deformation.



- (i) If replacing the turbocharger, put 20 cm³ (1.2 cu in.) of fresh oil into the turbocharger oil inlet hole, then turn the turbine wheel by hand to spread oil to the bearing.
- (j) If overhauling or replacing the engine, cut the fuel supply after reassembling and crank the engine for 30 seconds to feed oil throughout the engine. Run the engine at idle for 60 seconds.



- (k) Since the turbine wheels run at extremely high speed, if the engine is running without the air cleaner, case cover and hose, the turbine wheel will be damaged by introduced foreign particles.

ON-VEHICLE INSPECTION

1. INSPECT INTAKE AIR SYSTEM

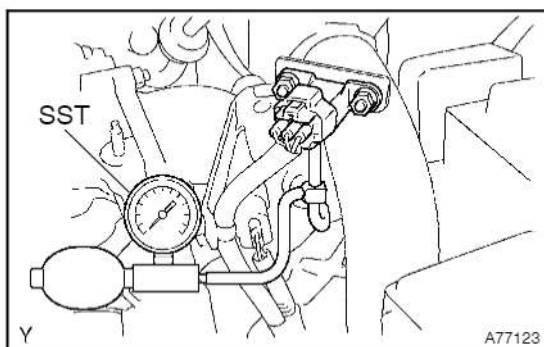
- (a) Check for leakage or clogging between the air cleaner housing and turbocharger inlet and between the turbocharger outlet and cylinder head.

Condition	Operation
Clogged air cleaner	Clean or replace the element
Collapsed or deformed hoses	Repair or replace
Leakage from connections	Check each connection and repair
Cracks in components	Check and replace

2. INSPECT EXHAUST SYSTEM

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

Condition	Operation
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 the engine.
 (b) Using a 3-way connector, connect SST (turbocharger pressure gauge) to the hose leading to the intake air connector.
 SST 09992 - 00242
 (c) While depressing the clutch pedal, press the accelerator pedal down fully. Measure the turbocharging pressure at the maximum speed (5,100 to 5,250 rpm).

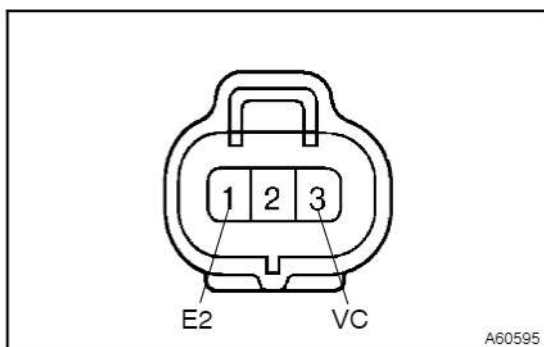
Standard pressure:

15 to 45 kPa (0.15 to 0.46 kgf/cm², 2.2 to 6.5 psi)

If the pressure is less than specification, check both the intake air and exhaust systems for leakage.

If there is no leakage, check if the actuator hose has disconnected. If not, check the turbocharger.

If the pressure is greater than the specification, check if the actuator hose has disconnected or cracked. If not, check the turbocharger.



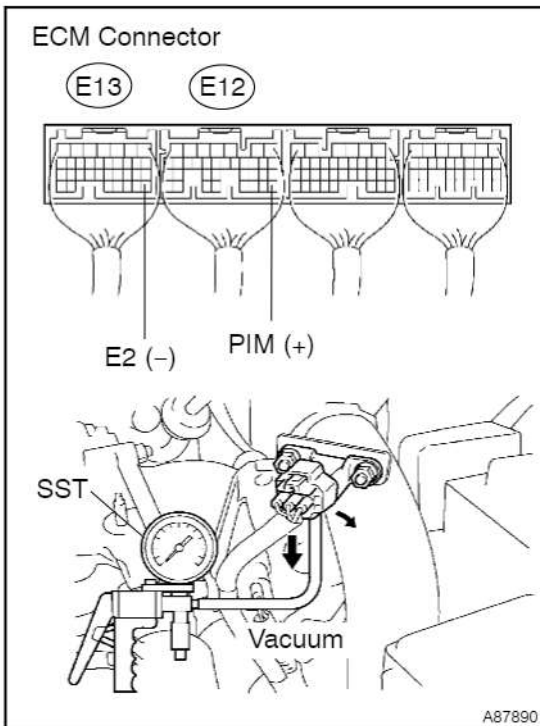
4. INSPECT TURBO PRESSURE SENSOR

- (a) Inspect the power source voltage.
 (1) Disconnect the turbo pressure sensor connector.
 (2) Turn the ignition switch to ON.
 (3) Using a voltmeter, measure the voltage between connector terminals 3 (VC) and 1 (E2) of the wire harness side.

Voltage: 4.5 to 5.5 V

If the result is not as specified, check the wiring and ECM.

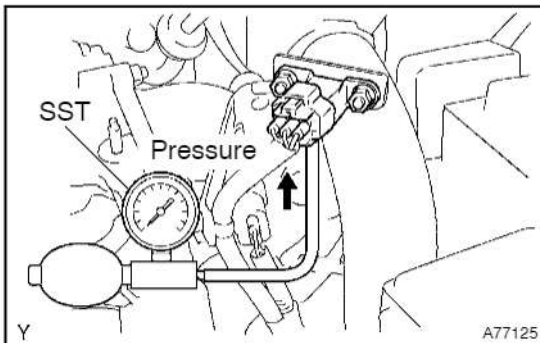
- (4) Turn the ignition switch to OFF.
- (5) Reconnect the turbo pressure sensor connector.



- (b) Inspect the supply power.
 - (1) Turn the ignition switch to ON.
 - (2) Disconnect the vacuum hose from the turbo pressure sensor.
 - (3) Connect a voltmeter to terminals E12-28 (PIM) and E13-28 (E2) of the ECM, then measure the output voltage under atmospheric pressure.
 - (4) Apply vacuum to the turbo pressure sensor in 13.3 kPa (100 mmHg, 3.94 in.Hg) to 66.7 kPa (500 mmHg, 19.69 in.Hg).
 - (5) Measure the voltage decrease from step (3).

Voltage drop:

Apply Vacuum [kPa (mmHg, in.Hg)]	Voltage Decrease [V]
13.3 (100, 3.94)	0.1 to 0.3
26.7 (200, 7.87)	0.3 to 0.5
40.0 (300, 11.81)	0.5 to 0.7
57.3 (400, 15.75)	0.7 to 0.9
66.7 (500, 19.69)	0.9 to 1.0



- (6) Using SST (a turbocharger pressure gauge), apply pressure to the turbo pressure sensor in 19.6 kPa (0.20 kgf/cm², 2.84 psi) to 98.0 kPa (1.00 kgf/cm², 14.2 psi).

SST 09992-00242

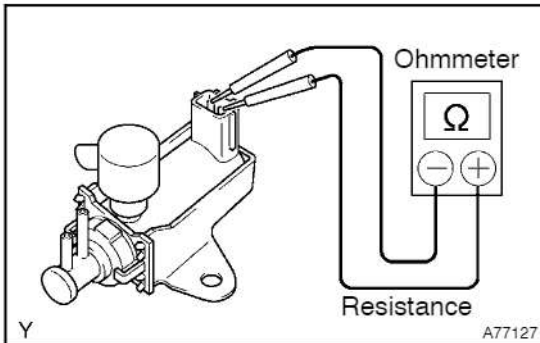
- (7) Measure the voltage increase from step (3).

Voltage up:

Applied Pressure [kPa (kgf/cm ² , psi)]	Voltage Increase [V]
19.6 (0.20, 2.84)	0.1 to 0.4
39.2 (0.40, 5.69)	0.4 to 0.7
58.8 (0.60, 8.53)	0.7 to 1.0
78.5 (0.80, 11.4)	1.0 to 1.3
98.0 (1.00, 14.2)	1.3 to 1.6

If the result is not as specified, check the wiring and ECM.

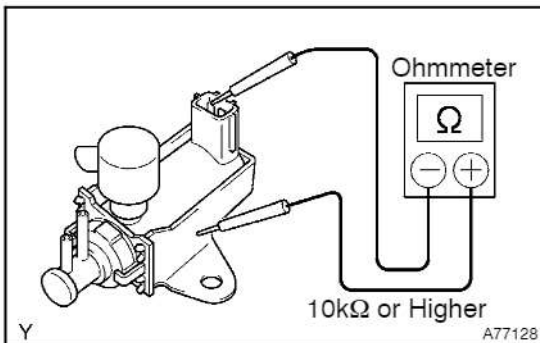
INSPECTION



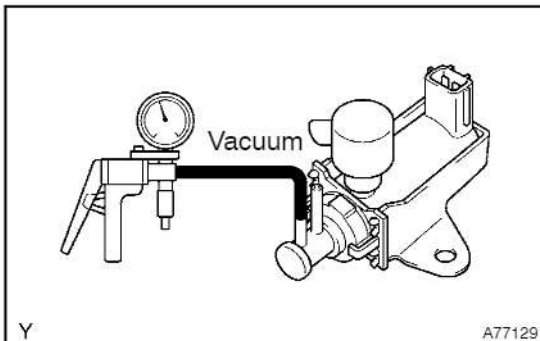
1. INSPECT VACUUM REGULATING VALVE ASSY

(a) Inspect the resistance.

- (1) Using an ohmmeter, measure the resistance between the terminals.

Resistance:**10 to 14 Ω at 20°C (68°F)**

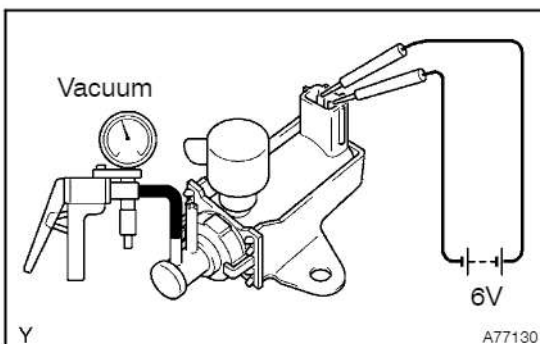
- (2) Using an ohmmeter, measure the resistance between each terminal and the body.

Standard: 10 k Ω or higher

(b) Check the air tightness.

- (1) Apply vacuum to the vacuum output port. Check that the needle of the vacuum pump indicates increase of 66.7 kPa (500 mmHg, 19.7 in.Hg) or more.

If the air tightness is not as specified, replace the vacuum regulating valve.



(c) Check the operation.

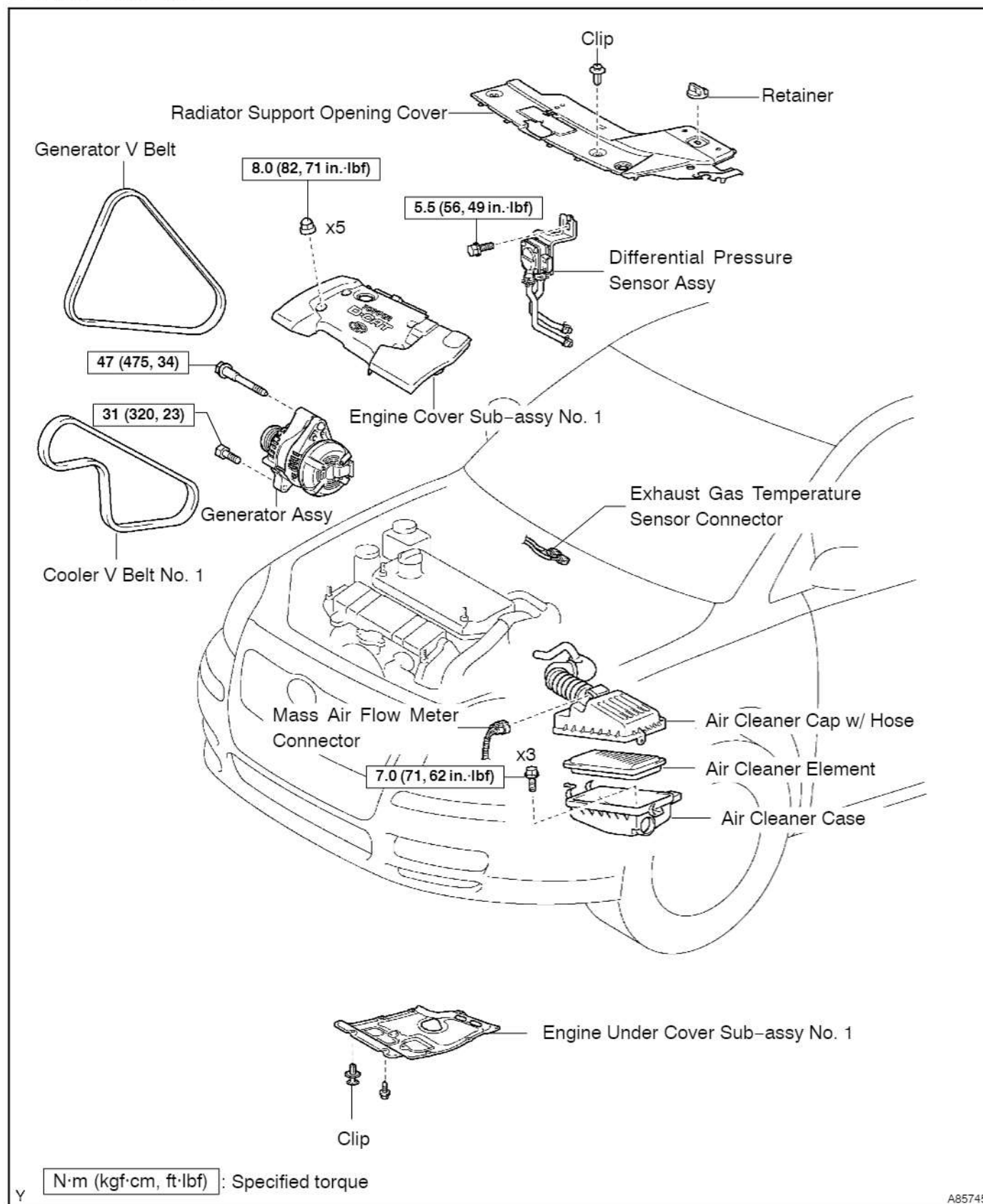
- (1) Apply about 4 dry batteries of 1.5V in series.
(2) Check that the needle does not move when vacuum is applied to the vacuum outlet port.

If the operation is not as specified, replace the vacuum regulating valve.

TURBOCHARGER SUB-ASSY (1CD-FTV)(From September, 2003)

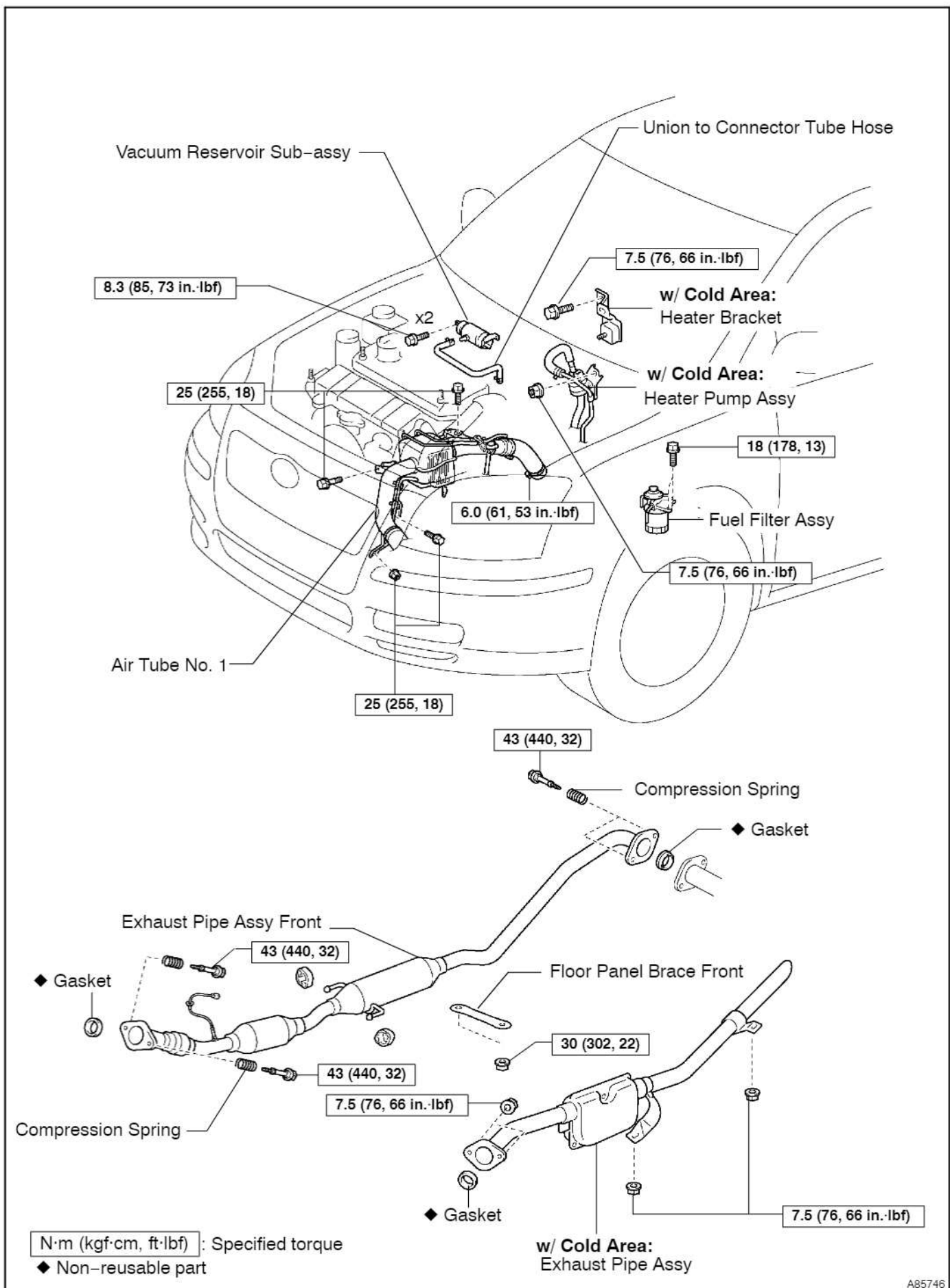
COMPONENTS

1306Y-02

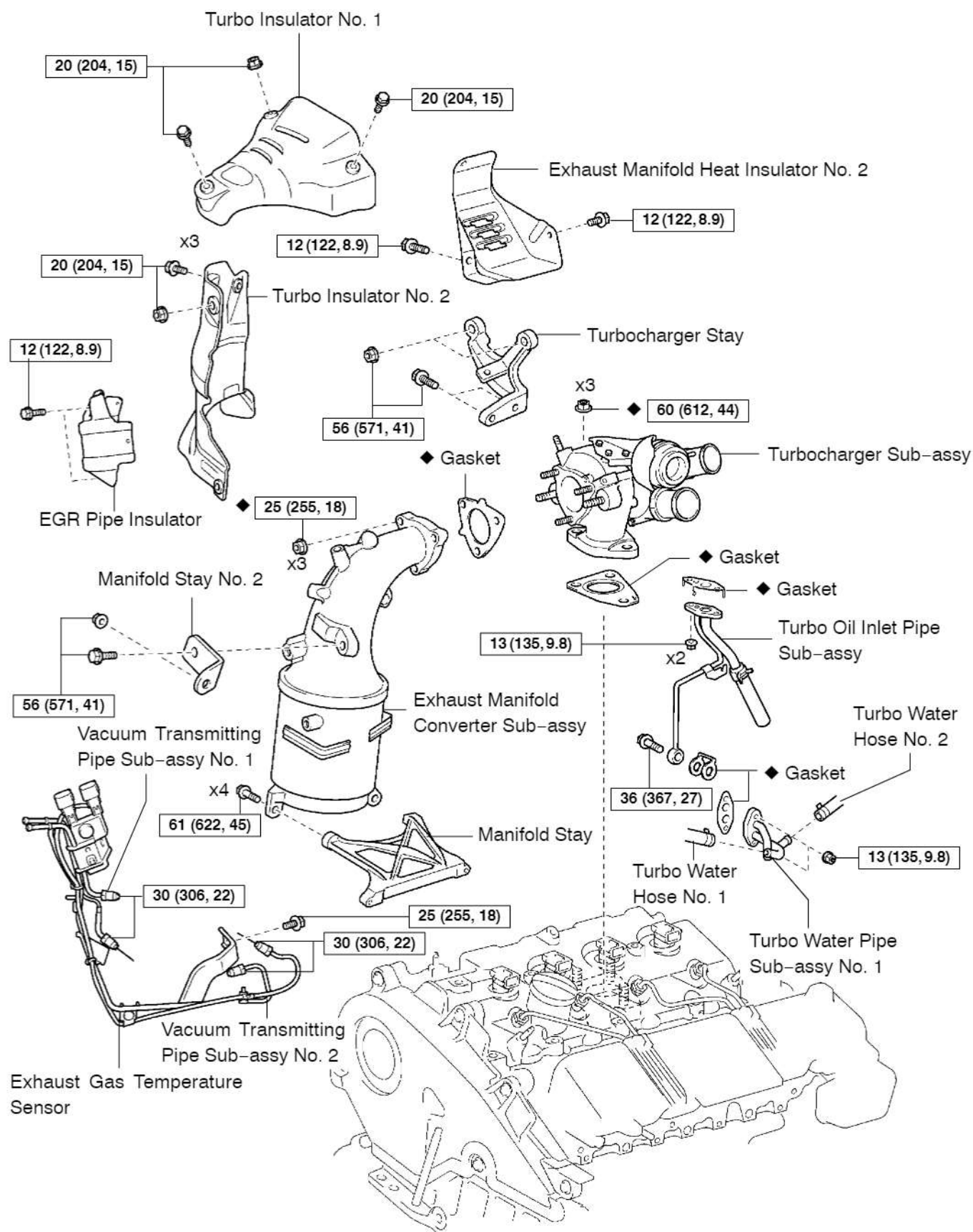


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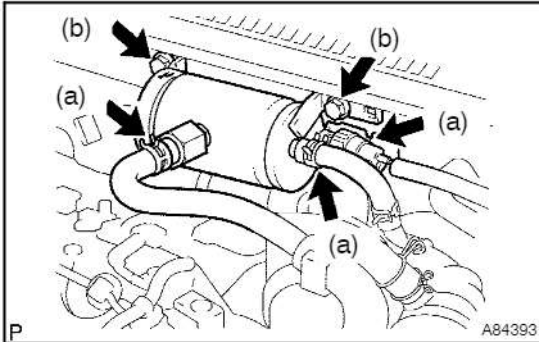
N·m (kgf·cm, ft·lbf) : Specified torque

◆ Non-reusable part

A85747

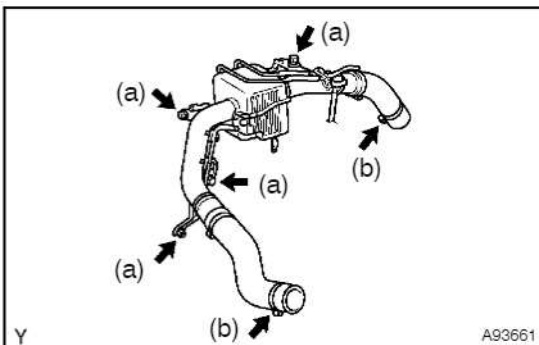
REPLACEMENT

1. REMOVE ENGINE UNDER COVER SUB-ASSY NO.1
2. DRAIN ENGINE COOLANT (See page 16-19)
3. REMOVE RADIATOR SUPPORT OPENING COVER
4. REMOVE ENGINE COVER SUB-ASSY NO.1
- (a) Remove the 5 nuts and engine cover.



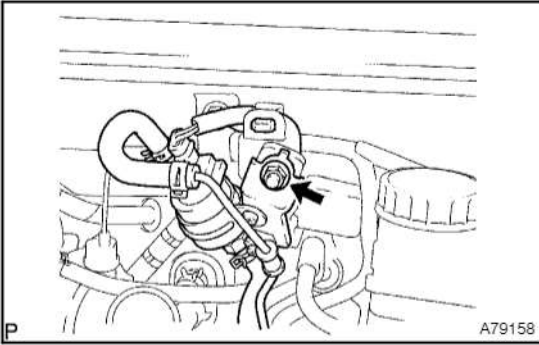
5. REMOVE VACUUM RESERVOIR SUB-ASSY
- (a) Disconnect the 2 vacuum hoses and connector.
- (b) Remove the 2 bolts and vacuum reservoir.

6. REMOVE DIFFERENTIAL PRESSURE SENSOR ASSY (See page 14-108)
7. DISCONNECT ENGINE WIRE (See page 14-138)
8. REMOVE AIR CLEANER ASSY
- (a) Disconnect the PCV hose and connector.
- (b) Remove the air cleaner cap with the air cleaner hose.
- (c) Remove the air cleaner filter element.
- (d) Remove the 3 bolts and air cleaner case.



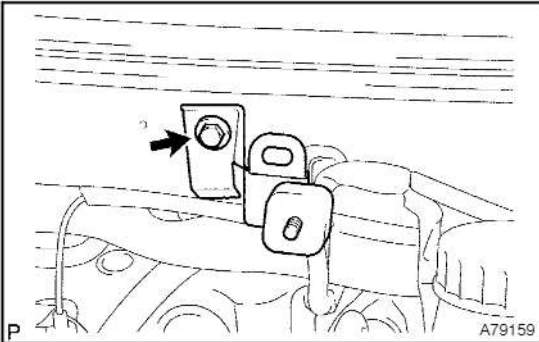
9. REMOVE AIR TUBE NO.1
- (a) Remove the 3 bolts and nut, then separate the air tube No. 1.
- (b) Loosen the hose clamp bolts.

10. REMOVE FUEL FILTER ASSY (See Pub. No. RM1018E on page 11-82)



11. SEPARATE HEATER PUMP ASSY (W/ COLD AREA)

- (a) Remove the nut, then disconnect the connector.
- (b) Separate the heater pump.

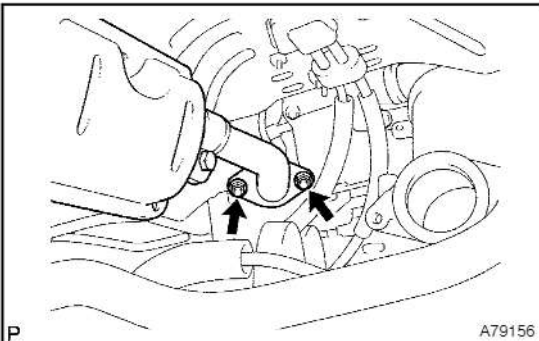


12. REMOVE HEATER BRACKET (W/ COLD AREA)

- (a) Remove the bolt and heater bracket.

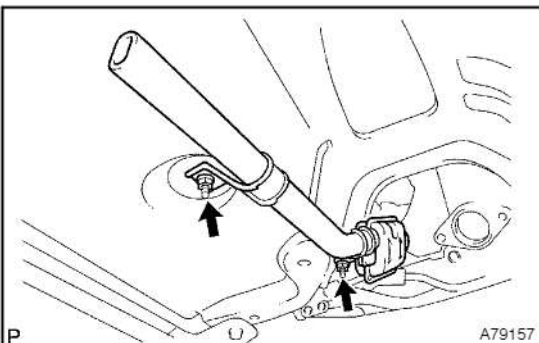
13. REMOVE FLOOR PANEL BRACE FRONT (See page 15-6)

14. REMOVE EXHAUST PIPE ASSY FRONT (See page 15-6)

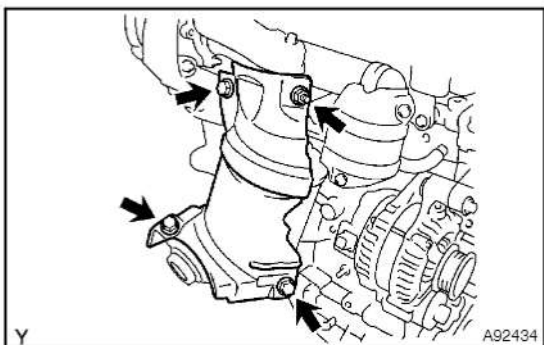


15. REMOVE EXHAUST PIPE ASSY (W/ COLD AREA)

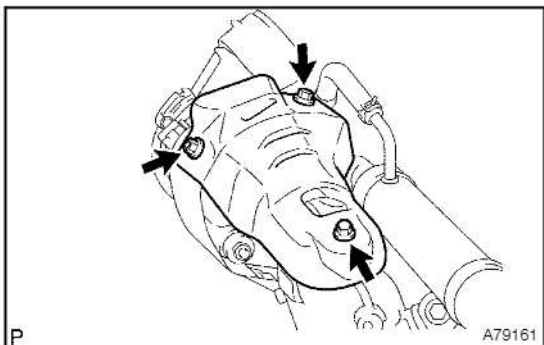
- (a) Remove the 2 nuts.



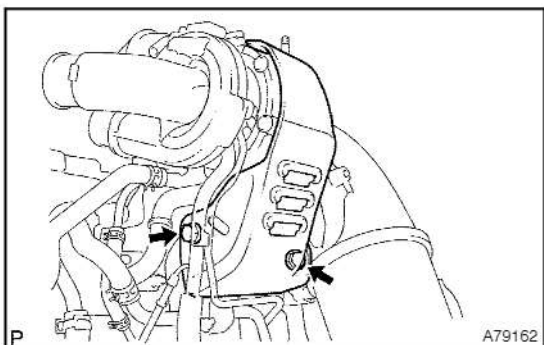
- (b) Remove the 2 nuts and exhaust pipe sub-assembly.

**16. REMOVE TURBO INSULATOR NO.2**

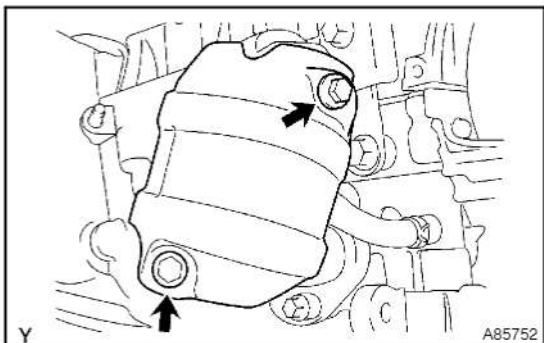
- (a) Remove the 3 bolts and nut, then remove the turbo insulator.

**17. REMOVE TURBO INSULATOR NO.1**

- (a) Remove the 2 bolts and nut, then remove the turbo insulator.

**18. REMOVE EXHAUST MANIFOLD HEAT INSULATOR NO.2**

- (a) Remove the 2 bolts and exhaust manifold heat insulator.

19. REMOVE GENERATOR ASSY (See Pub. No. RM1018E on page 19-29)**20. REMOVE EGR PIPE INSULATOR**

- (a) Remove the 2 bolts and EGR pipe insulator.

21. REMOVE EXHAUST GAS TEMPERATURE SENSOR (See page 14-108)

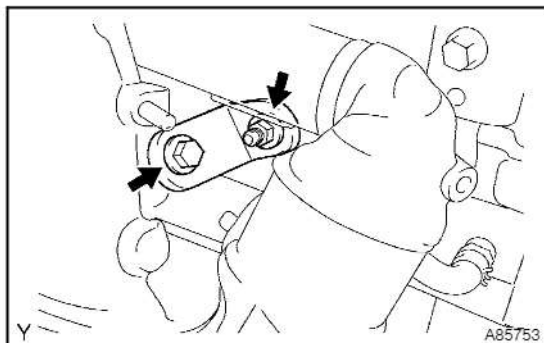
SST 09023-38400

22. REMOVE VACUUM TRANSMITTING PIPE SUB-ASSY NO.1 (See page 14-108)

SST 09023-38200

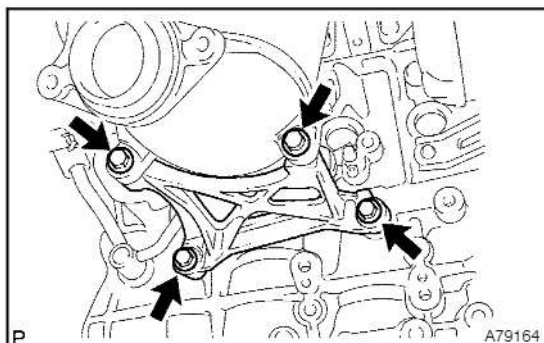
23. REMOVE VACUUM TRANSMITTING PIPE SUB-ASSY NO.2 (See page 14-108)

SST 09023-38200



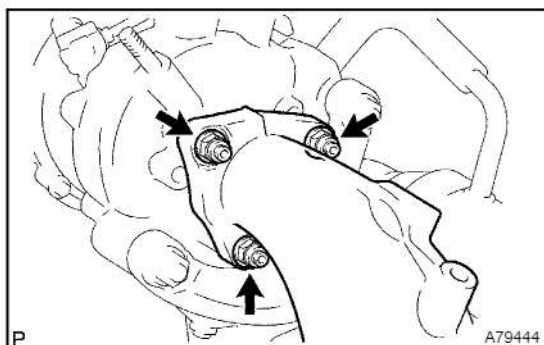
24. REMOVE MANIFOLD STAY NO.2

- (a) Remove the bolt and nut, then remove the manifold stay No. 2.



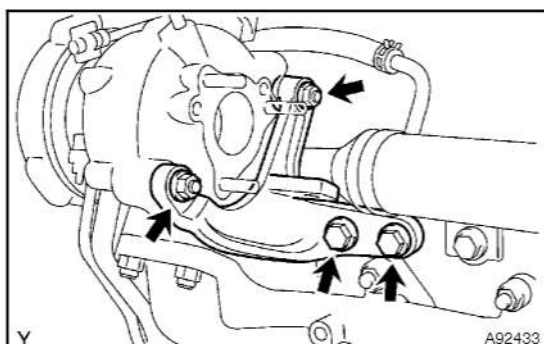
25. REMOVE MANIFOLD STAY

- (a) Remove the 4 bolts and manifold stay.



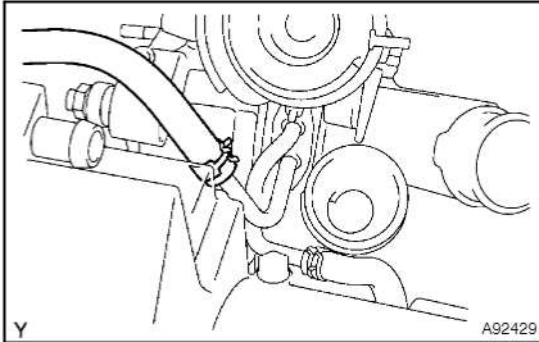
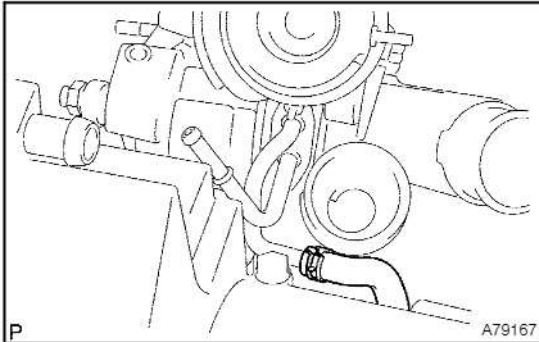
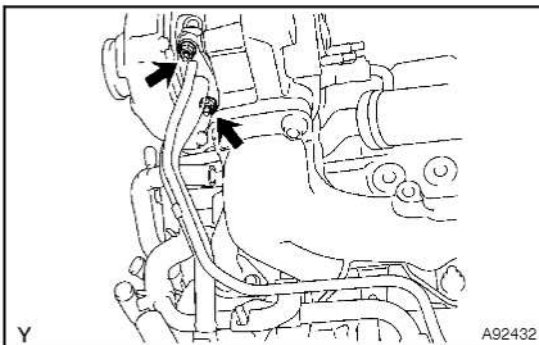
26. REMOVE EXHAUST MANIFOLD CONVERTER SUB-ASSY

- (a) Remove the 3 nuts, manifold converter and gasket.

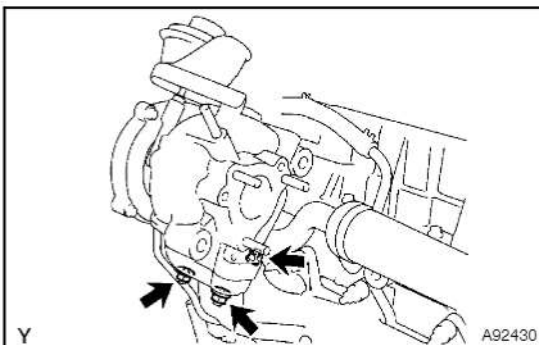


27. REMOVE TURBOCHARGER STAY

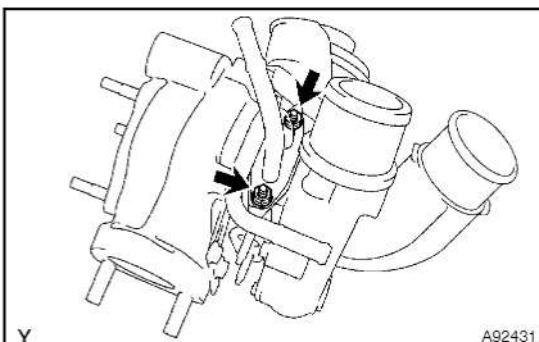
- (a) Remove the 2 bolts and 2 nuts, then remove the turbo-charger stay.

**28. DISCONNECT TURBO WATER HOSE NO.1****29. DISCONNECT TURBO WATER HOSE NO.2****30. SEPARATE TURBO OIL INLET PIPE SUB-ASSY**

- (a) Remove the 2 nuts, turbo oil pipe and gasket.

**31. REMOVE TURBOCHARGER SUB-ASSY**

- (a) Remove the 3 nuts, turbocharger and gasket.

**32. REMOVE TURBO WATER PIPE SUB-ASSY NO.1**

- (a) Remove the 2 nuts, turbo water pipe and gasket.

33. INSTALL TURBO WATER PIPE SUB-ASSY NO.1

- (a) Install a new gasket and the turbo water pipe with the 2 nuts.

Torque: 13 N·m (135 kgf·cm, 9.8 ft·lbf)

34. INSTALL TURBOCHARGER SUB-ASSY

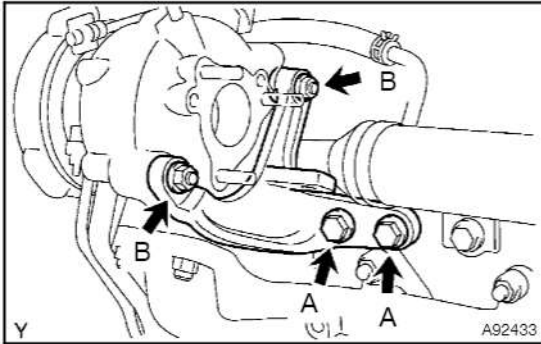
- (a) Install a new gasket and the turbocharger with the 3 nuts.

Torque: 60 N·m (612 kgf·cm, 44 ft·lbf)

35. INSTALL TURBO OIL INLET PIPE SUB-ASSY

- (a) Install a new gasket and the oil pipe with the 2 nuts.

Torque: 13 N·m (135 kgf·cm, 9.8 ft·lbf)



36. INSTALL TURBOCHARGER STAY

- (a) Install the turbocharger stay, then temporarily tighten bolts A.

- (b) Temporarily tighten nuts B while pushing the cylinder head toward the turbocharger stay.

Torque: 8.0 N·m (82 kgf·cm, 71 in·lbf)

- (c) Tighten bolts A.

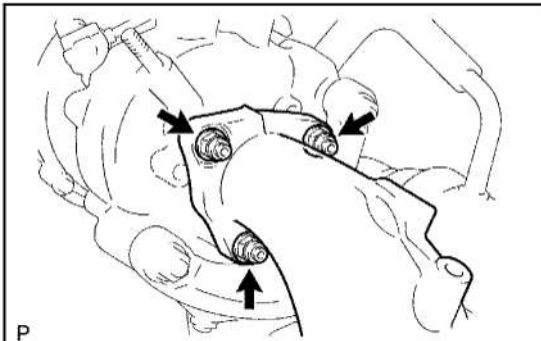
Torque: 56 N·m (571 kgf·cm, 41 ft·lbf)

- (d) Tighten nuts B.

Torque: 56 N·m (571 kgf·cm, 41 ft·lbf)

37. INSTALL EXHAUST MANIFOLD CONVERTER SUB-ASSY

- (a) Install the manifold stay, then temporarily tighten the cylinder block side of the manifold stay.



- (b) Install a new gasket and the manifold converter, then temporarily tighten bolts A and bolts B while pushing the upper portion of the converter toward the turbocharger.

Torque: 8.0 N·m (82 kgf·cm, 71 in·lbf)

- (c) Tighten the 3 nuts.

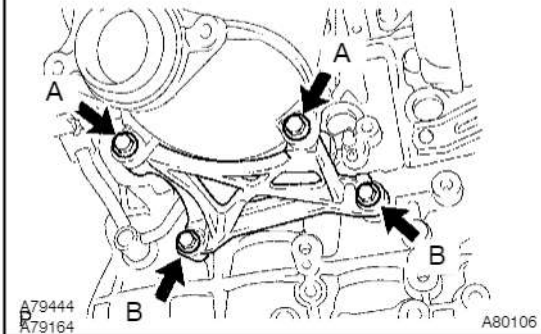
Torque: 25 N·m (255 kgf·cm, 18 ft·lbf)

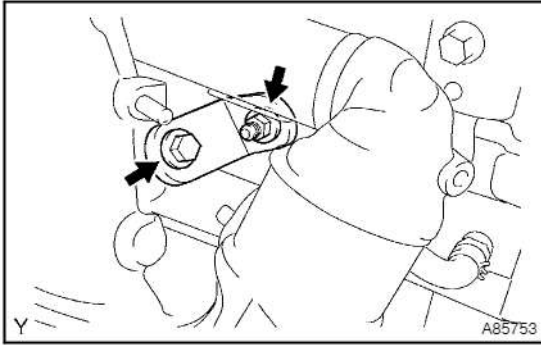
- (d) Tighten bolts A.

Torque: 61 N·m (622 kgf·cm, 45 ft·lbf)

- (e) Tighten bolts B.

Torque: 61 N·m (622 kgf·cm, 45 ft·lbf)



**38. INSTALL MANIFOLD STAY NO.2**

- (a) Install the manifold stay No. 2, then temporarily tighten the bolt.
- (b) Temporarily tighten the nut while pushing the manifold stay No. 2 toward the cylinder head.

Torque: 8.0 N·m (82 kgf·cm, 71 in·lbf)

HINT:

No clearance between the stay and cylinder head should be confirmed.

- (c) Tighten the bolt.
Torque: 56 N·m (571 kgf·cm, 41 ft·lbf)
- (d) Tighten the nut.
Torque: 56 N·m (571 kgf·cm, 41 ft·lbf)

39. INSTALL VACUUM TRANSMITTING PIPE SUB-ASSY NO.2 (See page 14-108)

SST 09023-38200

40. INSTALL VACUUM TRANSMITTING PIPE SUB-ASSY NO.1 (See page 14-108)

SST 09023-38200

41. INSTALL EXHAUST GAS TEMPERATURE SENSOR (See page 14-108)

SST 09023-38400

42. INSTALL EGR PIPE INSULATOR

Torque: 12 N·m (122 kgf·cm, 8.9 ft·lbf)

43. INSTALL GENERATOR ASSY (See Pub. No. RM1018E on page 19-29)**44. INSTALL EXHAUST MANIFOLD HEAT INSULATOR NO.2**

Torque: 12 N·m (122 kgf·cm, 8.9 ft·lbf)

45. INSTALL TURBO INSULATOR NO.1

Torque: 20 N·m (204 kgf·cm, 15 ft·lbf)

46. INSTALL TURBO INSULATOR NO.2

Torque: 20 N·m (204 kgf·cm, 15 ft·lbf)

47. INSTALL EXHAUST PIPE ASSY (W/ COLD AREA)

Torque: 7.5 N·m (76 kgf·cm, 66 in·lbf)

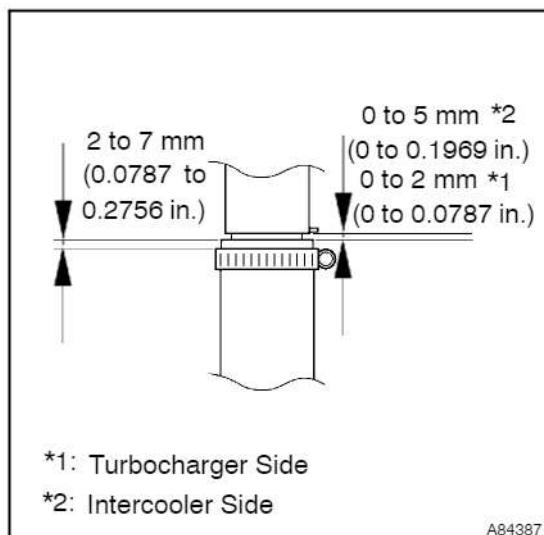
48. INSTALL EXHAUST PIPE ASSY FRONT (See page 15-6)**49. INSTALL FLOOR PANEL BRACE FRONT (See page 15-6)****50. INSTALL HEATER BRACKET (W/ COLD AREA)**

Torque: 7.5 N·m (76 kgf·cm, 66 in·lbf)

51. INSTALL HEATER PUMP ASSY (W/ COLD AREA)

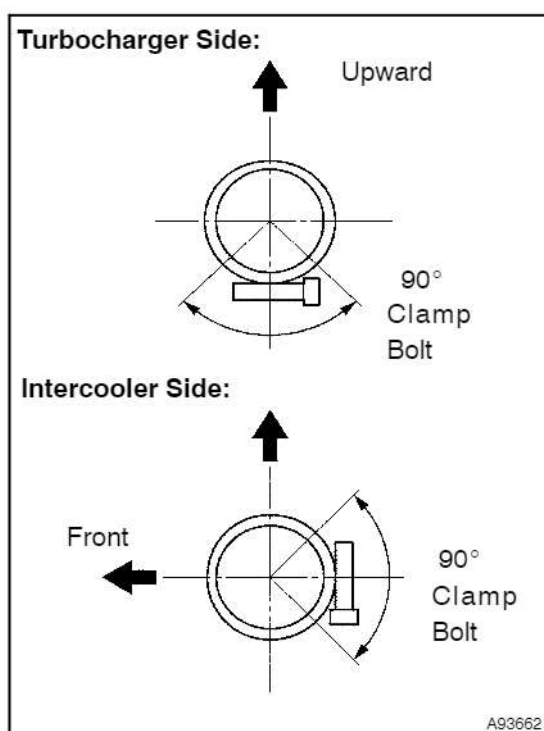
Torque: 7.5 N·m (76 kgf·cm, 66 in·lbf)

52. INSTALL FUEL FILTER ASSY (See Pub. No. RM1018E on page 11-82)



53. INSTALL AIR TUBE NO.1

- (a) Install the air hose and hose clamps as shown in the illustration.



- (b) Tighten the hose clamps as shown in the illustration.

Torque: 6.0 N·m (61 kgf·cm, 53 in.·lbf)

- (c) Install the air tube No. 1 with the 3 bolts and nut.

Torque: 25 N·m (255 kgf·cm, 18 ft·lbf)

54. INSTALL DIFFERENTIAL PRESSURE SENSOR ASSY (See page 14-108)

55. INSTALL AIR CLEANER ASSY

Torque: 7.0 N·m (71 kgf·cm, 62 in.·lbf)

56. INSTALL VACUUM RESERVOIR SUB-ASSY

Torque: 8.3 N·m (85 kgf·cm, 73 in.·lbf)

57. INSTALL ENGINE COVER SUB-ASSY NO.1

Torque: 8.0 N·m (82 kgf·cm, 71 in.·lbf)

58. ADD ENGINE COOLANT (See page 16-19)

59. CHECK ENGINE OIL LEVEL

60. CHECK FOR ENGINE COOLANT LEAKS (See page 16-15)

61. CHECK FOR ENGINE OIL LEAKS

62. CHECK FOR FUEL LEAKS (See page 11-46)

63. CHECK FOR EXHAUST GAS LEAKS