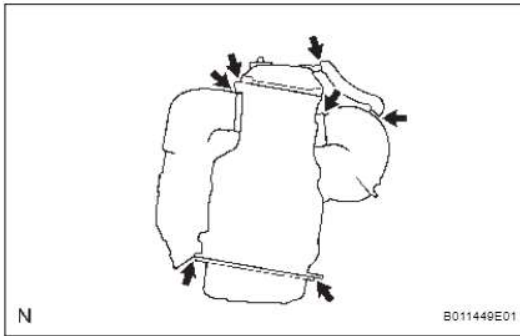




EMISSION CONTROL SYSTEM

ON-VEHICLE INSPECTION

1. VISUALLY CHECK HOSES, CONNECTORS AND GASKETS

- (a) Check that there are no cracks, leaks or damage.

NOTICE:

- Detachment or other problems with the engine oil dipstick, filler cap, ventilation hose and other components may cause the engine to run improperly.
- Air suction caused by disconnections, looseness or cracks in the parts of the air induction system between the throttle body and cylinder head will cause engine failure or engine malfunctions.

If the result is not as specified, replace parts as necessary.

EC

2. CHECK HOSES AND CONNECTORS

- (a) Visually check for loose connections, sharp bends or damage.

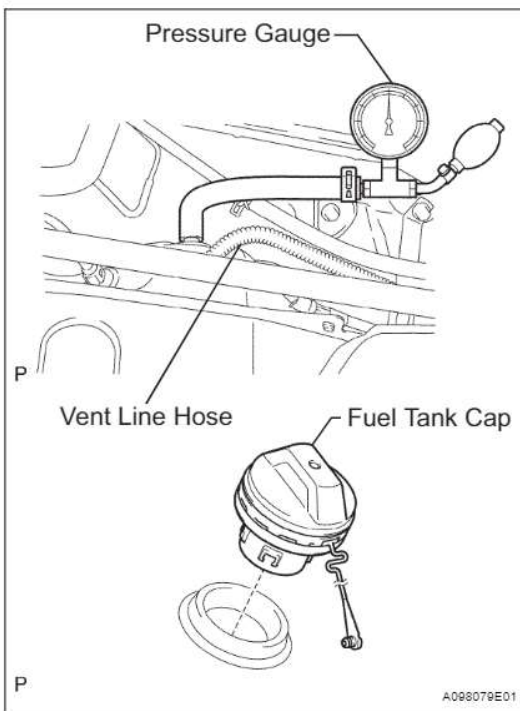
3. INSPECT FUEL CUT OFF VALVE AND FILL CHECK VALVE

- (a) Disconnect the vent line hose from the fuel tank (see page [FU-29](#)).
- (b) Connect the pressure gauge to the fuel tank.
- (c) Fill the fuel tank with fuel.
- (d) Apply pressure of 4 kPa (41kgf/cm², 0.58 psi) to the vent port of the fuel tank.

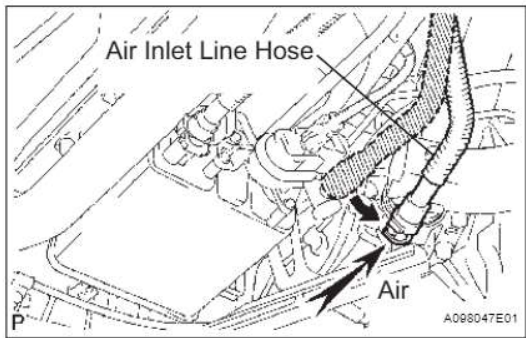
HINT:

It is necessary to check the amount of fuel tank. When the fuel tank is full, the float valve of the fill check valve is closed and no air can pass through.

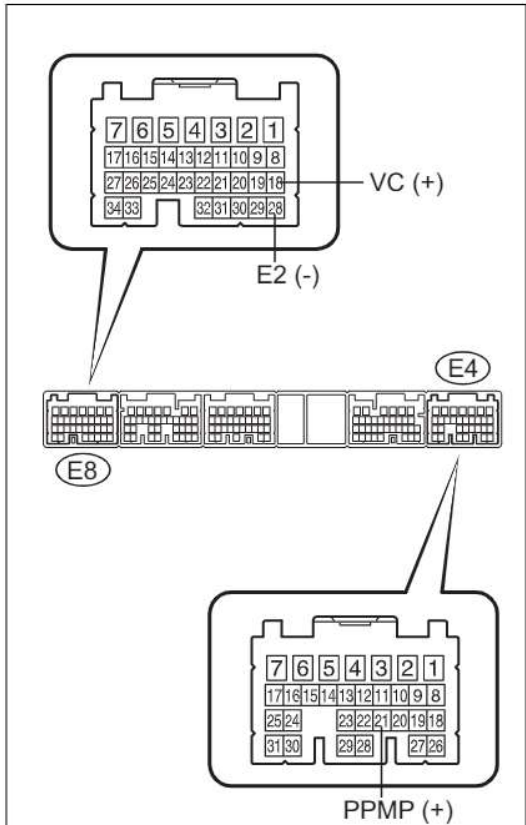
- (e) Remove the fuel tank cap, and check that pressure drops.
If the pressure does not drop, replace the fuel tank assembly.
- (f) Reconnect the vent line hose to the fuel tank (see page [FU-35](#)).



EC-2 2AZ-FE EMISSION CONTROL – EMISSION CONTROL SYSTEM



4. CHECK AIR INLET LINE
- (a) Disconnect the air inlet line hose from the charcoal canister.
 - (b) Check that air can flow freely into the air inlet line. If air cannot flow freely into the air inlet line, repair or replace it.
 - (c) Reconnect the air inlet line hose to the charcoal canister.



5. INSPECT LEAK DETECTION PUMP (PRESSURE SENSOR)

- (a) Measure the power source voltage of the ECM connectors.

Standard voltage

Tester Connection	Condition	Specified Condition
E8-18 (VC) -E8-28 (E2)	Ignition switch ON	4.5 to 5.5 V

If the voltage is not as specified, check the ECM, leak detection pump and wire harness.

- (b) Measure the power output of the ECM connectors.
- (1) Remove the fuel tank cap.

Standard voltage

Tester Connection	Condition	Specified Condition
E4-21 (PPMP) - E8-28 (E2)	Ignition switch ON	1.425 to 4.150 V

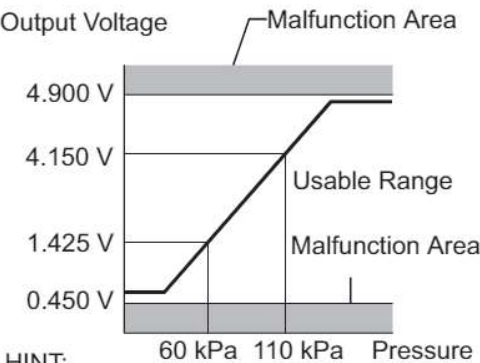
If the voltage is not as specified, check the ECM, leak detection pump and wire harness.

- (2) Install the fuel tank cap.

6. CHECK FUEL TANK ASSEMBLY

- (a) Visually check for deformation, cracks or fuel leakage.

Pressure Sensor Specification

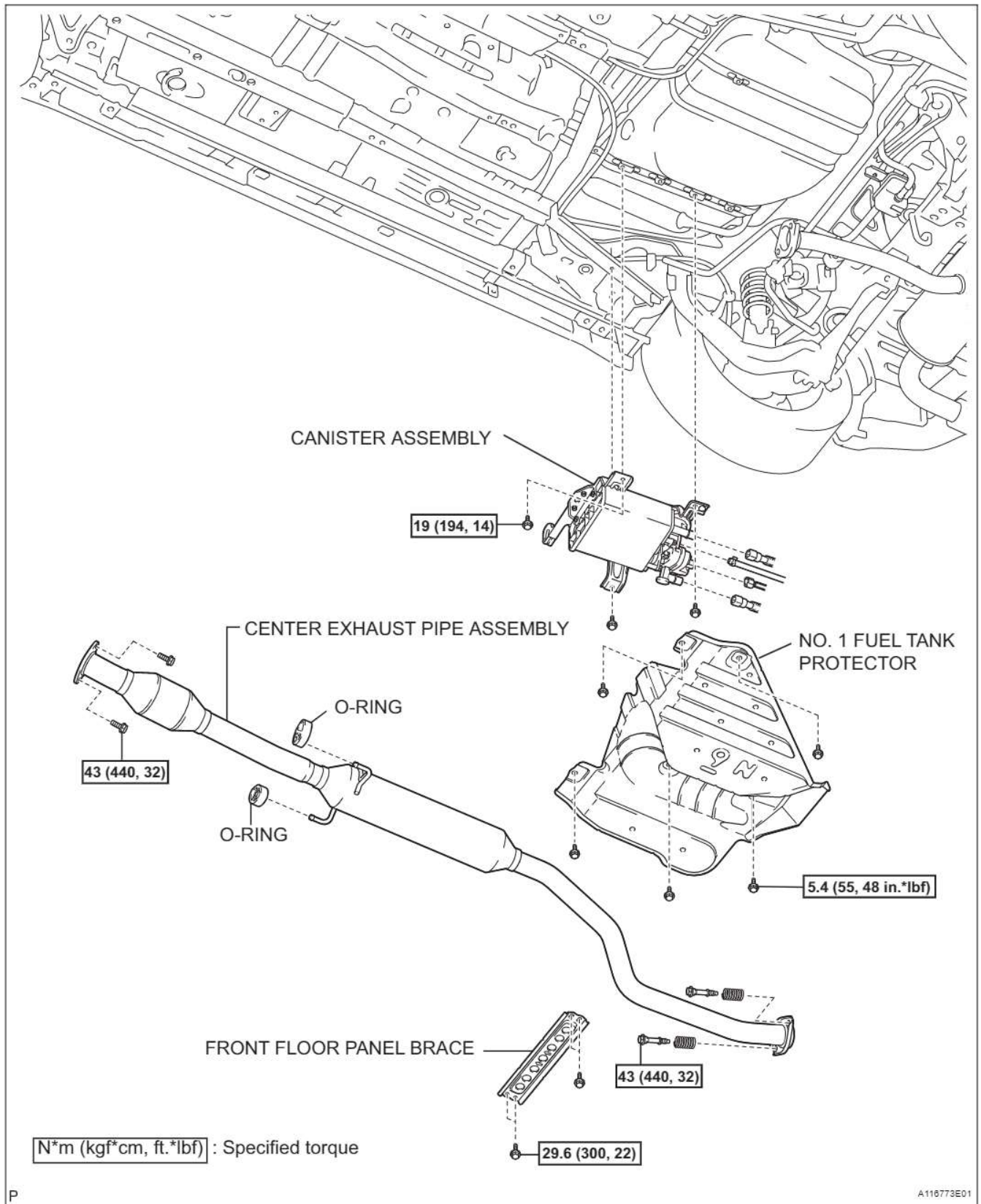


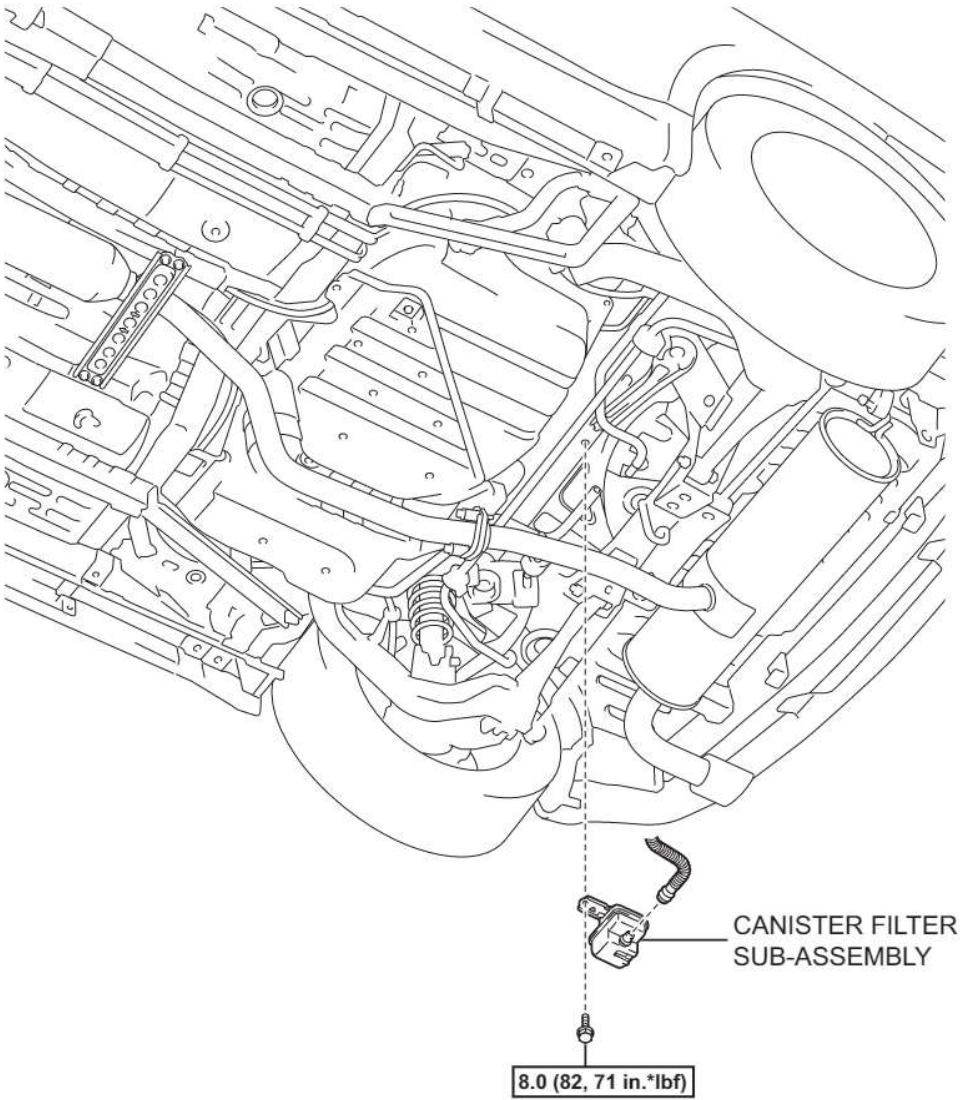
HINT:
Atmospheric Pressure when
altitude is 0 is 101.3 kPa

2AZ-FE EMISSION CONTROL – CANISTER

EC-3

CANISTER COMPONENTS





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

REMOVAL

1. DISCONNECT CABLE FROM NEGATIVE BATTERY TERMINAL

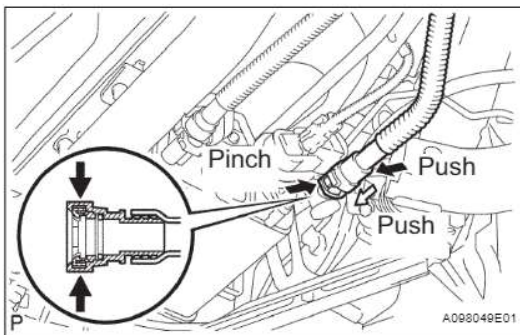
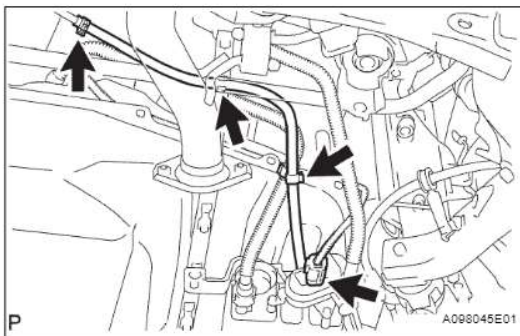
CAUTION:

Wait at least 90 seconds after disconnecting the cable from the negative (-) battery terminal to prevent airbag and seat belt pretensioner activation.

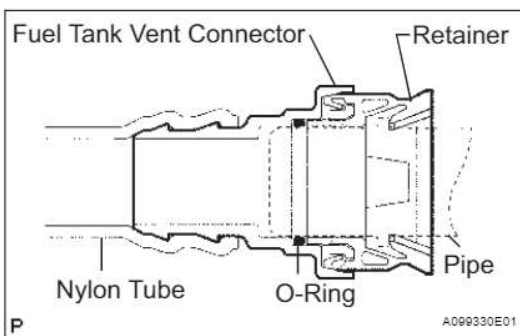
2. REMOVE FRONT FLOOR PANEL BRACE (See page EX-2)
3. REMOVE CENTER EXHAUST PIPE ASSEMBLY (See page EX-2)
4. REMOVE NO. 1 FUEL TANK PROTECTOR (See page FU-29)
5. REMOVE REAR SUSPENSION BRACE LOWER RH (See page FU-29)
6. REMOVE CANISTER ASSEMBLY

- (a) Disconnect the leak detection pump connector.
- (b) Disconnect the fuel emission hose and 2 clamps.

EC



- (c) Disconnect the fuel tank vent hose.



- (1) Pinch the retainer and pull out the fuel tank vent connector with the fuel tank vent connector pushed to the pipe side to disconnect the fuel tank vent hose from the charcoal canister.

NOTICE:

- Remove dirt or foreign objects on the fuel tank vent connector before this work.
- Do not allow any scratches or foreign objects on the parts when disconnecting as the fuel tank vent connector has the O-ring that seals the pipe.
- Perform this work by hand. Do not use any tools.

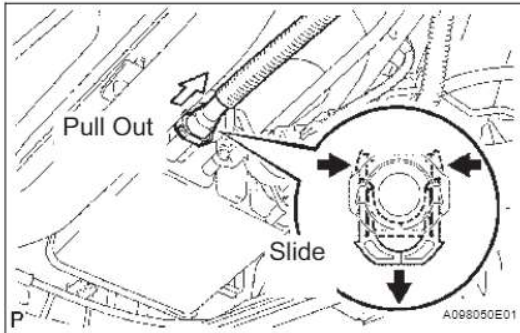
EC-6

2AZ-FE EMISSION CONTROL – CANISTER

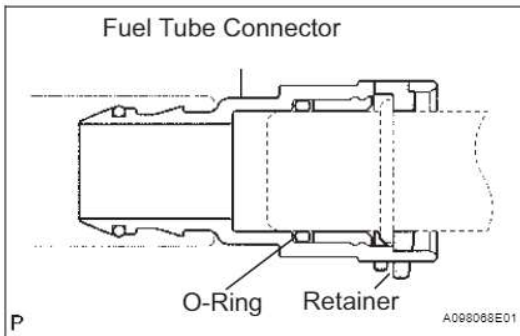
- Do not forcibly bend, twist or turn the nylon tube.
- Protect the connected part by covering it with a plastic bag after disconnecting the fuel tank vent hose.
- If the fuel tank vent connector and pipe are stuck, push and pull them to release.

(d) Disconnect the fuel tank vent hose.

- (1) Pinch the tab of the retainer of the fuel tube connector to remove the lock claws and slide it as shown in the illustration.



EC



- (2) Pull the fuel tank vent hose out of the charcoal canister.

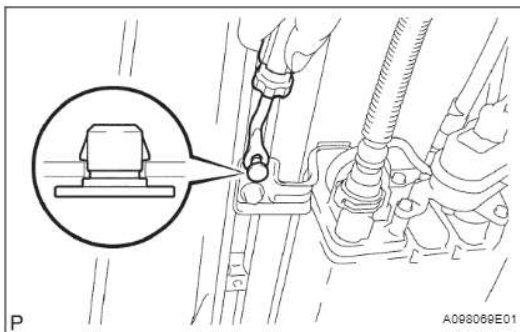
NOTICE:

- Remove any dirt or foreign objects on the fuel tube connector before performing this work.
- Do not allow any scratches or foreign objects on the parts when disconnecting as the fuel tube connector has the O-ring that seals the pipe.
- Perform this work by hand. Do not use any tools.
- Do not forcibly bend, twist or turn the nylon tube.
- Protect the disconnected part by covering it with a plastic bag after disconnecting the fuel tank vent hose.
- If the fuel tube connector and pipe are stuck, push and pull to release them.

- (e) Using a clip remover, remove the clip.

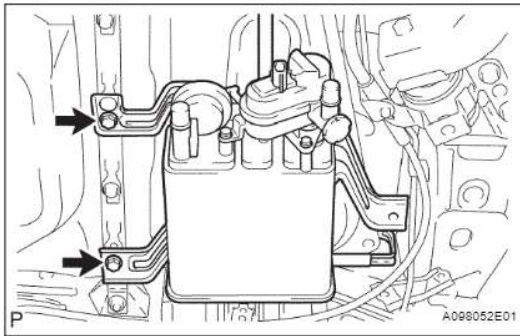
HINT:

The clip is for placing the part temporarily when working at a workshop. There is no need to install the clip when reassembling.



2AZ-FE EMISSION CONTROL – CANISTER

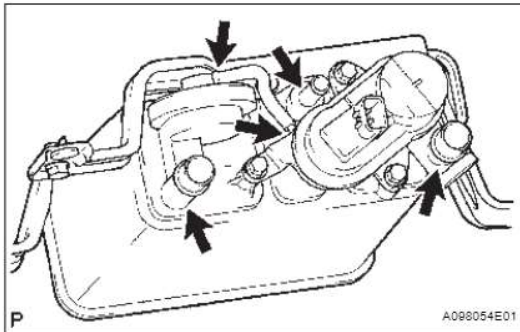
EC-7



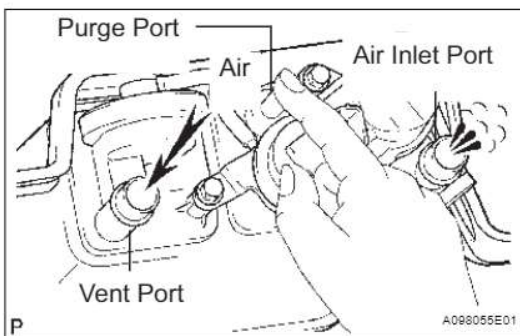
(f) Remove the 2 bolts and charcoal canister.

7. REMOVE CANISTER FILTER SUB-ASSEMBLY

- (a) Disconnect the 2 hoses.
- (b) Remove the bolt and filter.

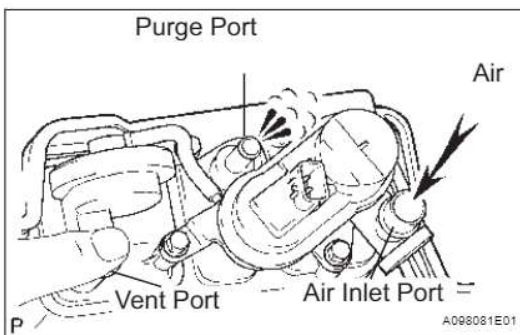
**INSPECTION****1. INSPECT CANISTER ASSEMBLY**

- (a) Visually check the canister for cracks or damage. If cracks or damage are found, replace the canister assembly.



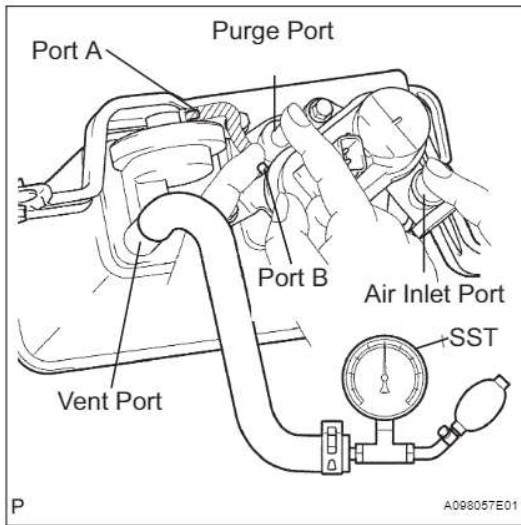
(b) Check canister operation.

- (1) While holding the purge port closed, blow 1.67 kPa (17.0 gf/cm², 0.24 psi) to the vent port, and check that the air flows from the air inlet port. If the result is not as specified, replace the canister assembly.



- (2) While holding the vent port closed, blow 1.10 kPa (11.2 gf/cm², 0.16 psi) to the air inlet port, and check that the air flows from the purge port. If the result is not as specified, replace the canister assembly.

EC

EC-8**2AZ-FE EMISSION CONTROL – CANISTER**

(c) Check the air leakage.

- (1) Remove the air hose between ports A and B.
- (2) Connect SST (pressure gauge) to the vent port of the canister.

SST 09992-00242

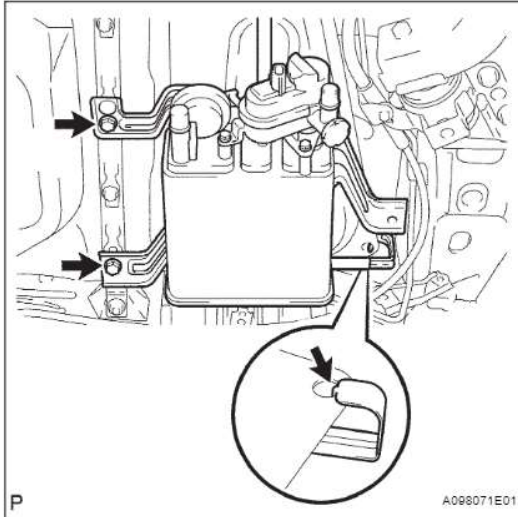
- (3) While holding port B, the purge port and the air inlet port closed, apply 19.6 kPa (0.2 kgf/cm², 2.81 psi) to the vent port, and then confirm that the pressure is retained.
If the result is not as specified, replace the canister assembly.

EC

INSTALLATION

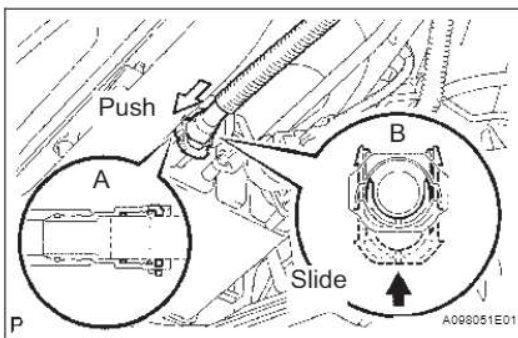
1. INSTALL CANISTER FILTER SUB-ASSEMBLY

- Install the filter with the bolt.
Torque: 8.0 N*m (82 kgf*cm, 71 in.*lbf)
- Connect the 2 hoses.



2. INSTALL CANISTER ASSEMBLY

- Temporarily hook the claw of the canister bracket around the fuel tank hoses, and install the canister with the 2 bolts.
Torque: 19 N*m (194 kgf*cm, 14 ft.*lbf)



- Install the fuel vent hose.
 - Connect the pipe to the fuel tube connector, as shown in A in the illustration. Then push up the retainer to lock the claws, as shown in B in the illustration.

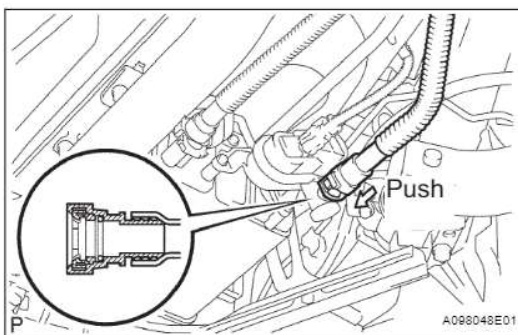
NOTICE:

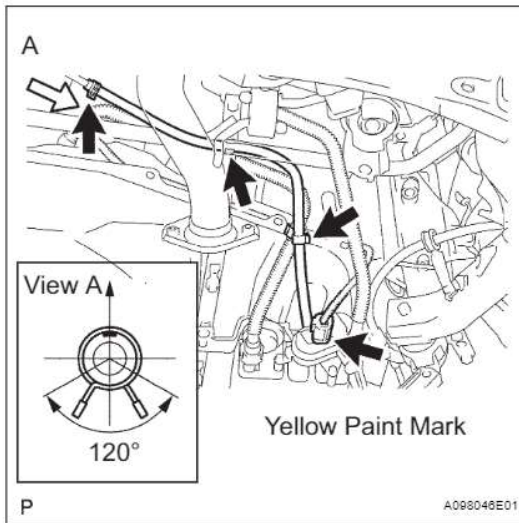
- Check that there are no scratches or foreign objects around the connected part of the fuel tube connector and pipe before performing this work.
- After connecting the fuel tank vent hose, check that the fuel tank vent hose is securely connected by pulling the fuel tube connector and pipe.

- Connect the fuel tank vent hose.
 - Align the fuel tank vent connector with the pipe, and then push in the fuel tank vent connector until the retainer makes a "click" sound to connect the fuel tank vent hose to the canister.

NOTICE:

- Check that there are no scratches or foreign objects around the connected part of the fuel tank vent connector and pipe before this work.
- After connecting the fuel tank vent hose, check that the fuel tank vent hose is securely connected by pulling the quick connector.



EC-10**2AZ-FE EMISSION CONTROL – CANISTER**

(d) Install the fuel emission hose and 2 clamps.

(e) Install the leak detection pump connector.

3. **INSTALL REAR SUSPENSION BRACE LOWER RH** (See page [FU-36](#))
4. **INSTALL NO. 1 FUEL TANK PROTECTOR** (See page [FU-37](#))
5. **INSTALL CENTER EXHAUST PIPE ASSEMBLY** (See page [EX-4](#))
6. **INSTALL FRONT FLOOR PANEL BRACE** (See page [EX-5](#))
7. **CONNECT CABLE TO NEGATIVE BATTERY TERMINAL**
8. **PERFORM INITIALIZATION**
 - (a) Perform the initialization (see page [IN-23](#)).

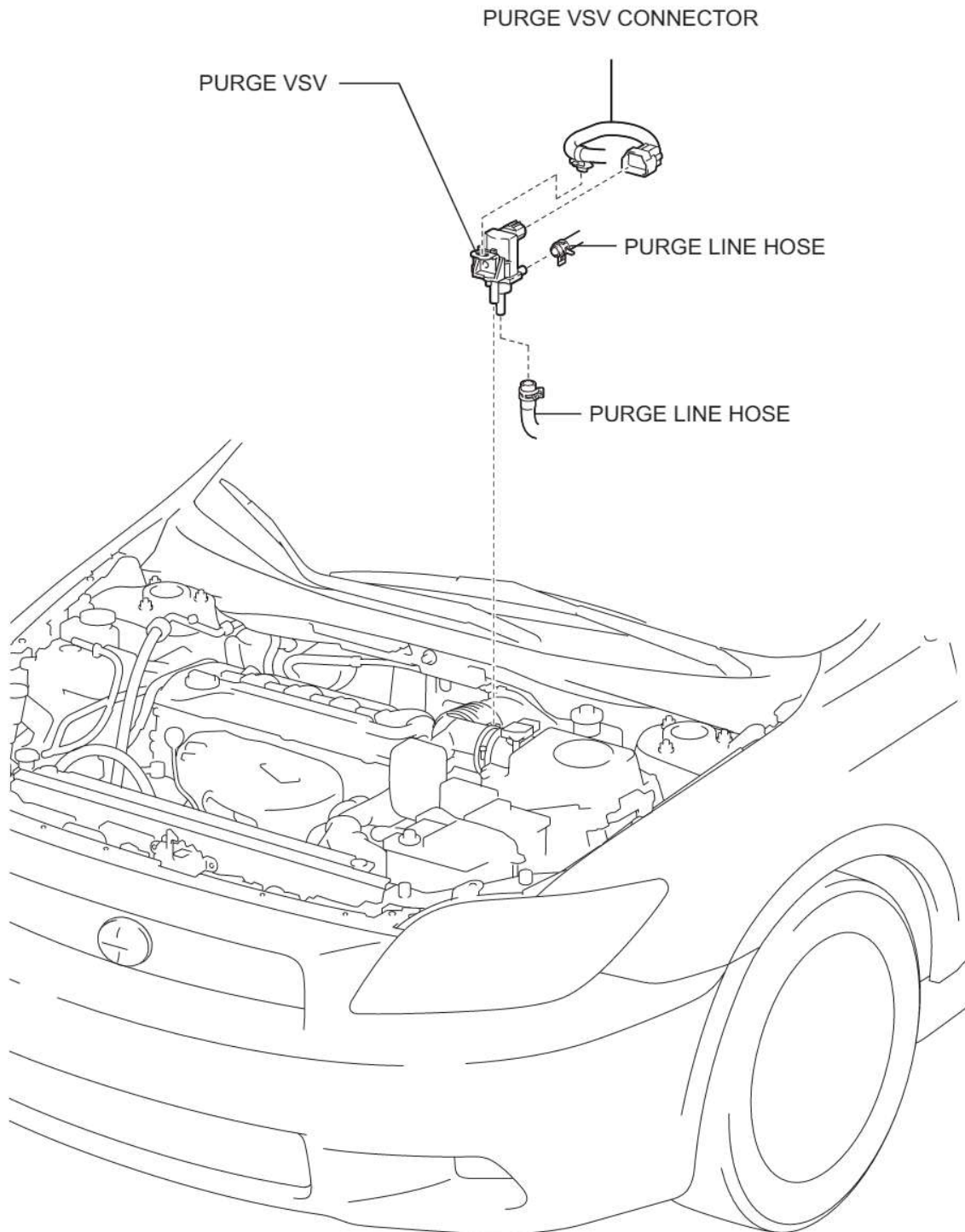
NOTICE:
Certain systems need to be initialized after disconnecting and reconnecting the cable from the negative (-) battery terminal.
9. **CHECK FOR EXHAUST GAS LEAKS**

EC

EC-10

2AZ-FE EMISSION CONTROL – VACUUM SWITCHING VALVE

VACUUM SWITCHING VALVE COMPONENTS

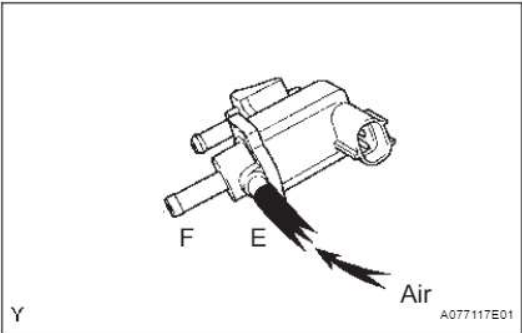
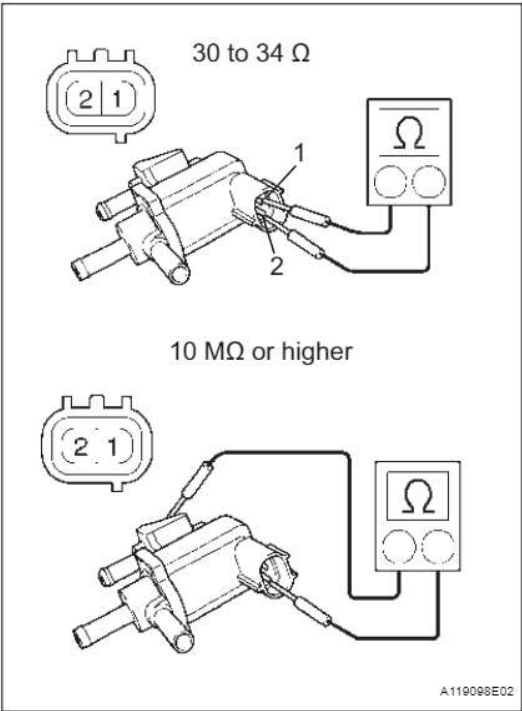
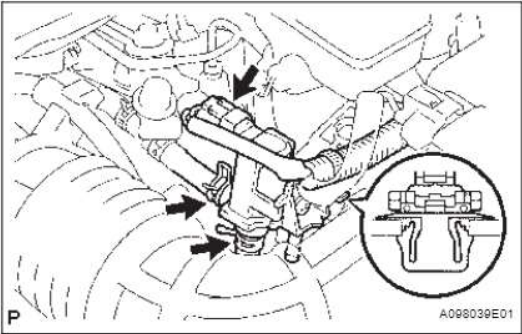


P

A116769E01

REMOVAL

1. DISCONNECT CABLE FROM NEGATIVE BATTERY
TERMINAL
CAUTION:
Wait at least 90 seconds after disconnecting the
cable from the negative (-) battery terminal to
prevent airbag and seat belt pretensioner activation.
2. REMOVE PURGE VSV
(a) Disconnect the purge VSV connector.
(b) Remove the wire harness clamp.
(c) Disconnect the 2 purge line hoses from the vacuum
switching valve.
(d) Remove the purge VSV from the air cleaner hose.



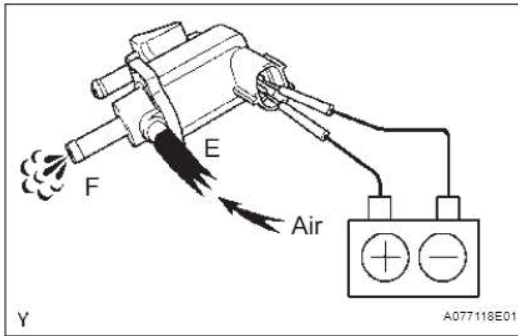
INSPECTION

1. INSPECT VACUUM SWITCHING VALVE ASSEMBLY
(for EVAP)
(a) Measure the resistance of the purge VSV.
Standard resistance
- | Tester Connection | Specified Condition |
|------------------------------------|---------------------------|
| 1 - 2 | 30 to 34 Ω at 20°C (68°F) |
| 1 - Body ground
2 - Body ground | 10 MΩ or higher |
- If the result is not as specified, replace the purge
VSV.
- (b) Check the operation of the purge VSV.
(1) Check that air does not flow from port E to port
F.

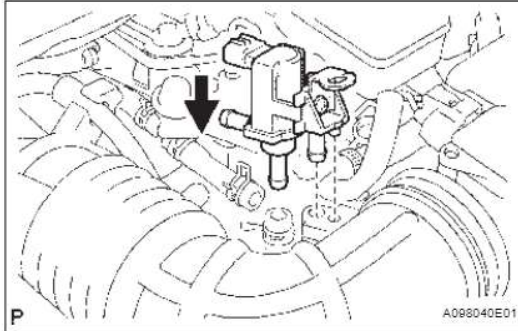
EC

EC-12

2AZ-FE EMISSION CONTROL – VACUUM SWITCHING VALVE



- (2) Apply battery voltage across terminals.
- (3) Check that air flows from port E to port F. If the result is not as specified, replace the purge VSV.



INSTALLATION

1. INSTALL PURGE VSV

- (a) Install the purge VSV onto the air cleaner hose.

- (b) Connect the 2 purge line hoses to the purge VSV.

NOTICE:

Make sure that the hose clip and mark are at the correct angle when installing.

- (c) Install the wire harness clamp.
- (d) Connect the purge VSV connector.

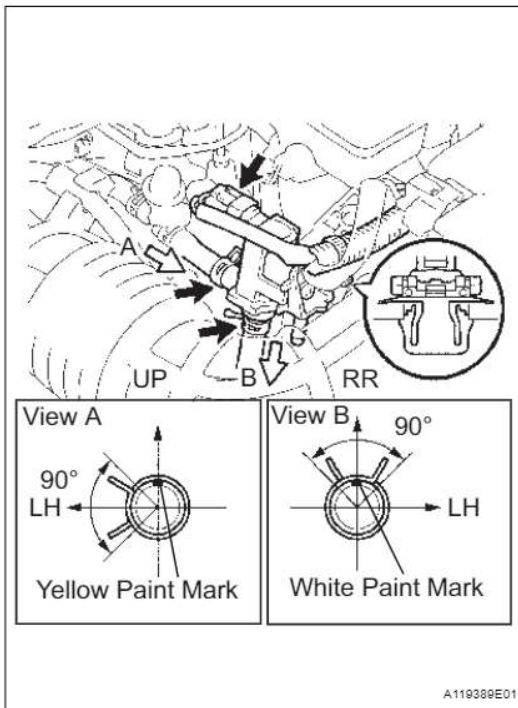
2. CONNECT CABLE TO NEGATIVE BATTERY TERMINAL

3. PERFORM INITIALIZATION

- (a) Perform the initialization (see page [IN-23](#)).

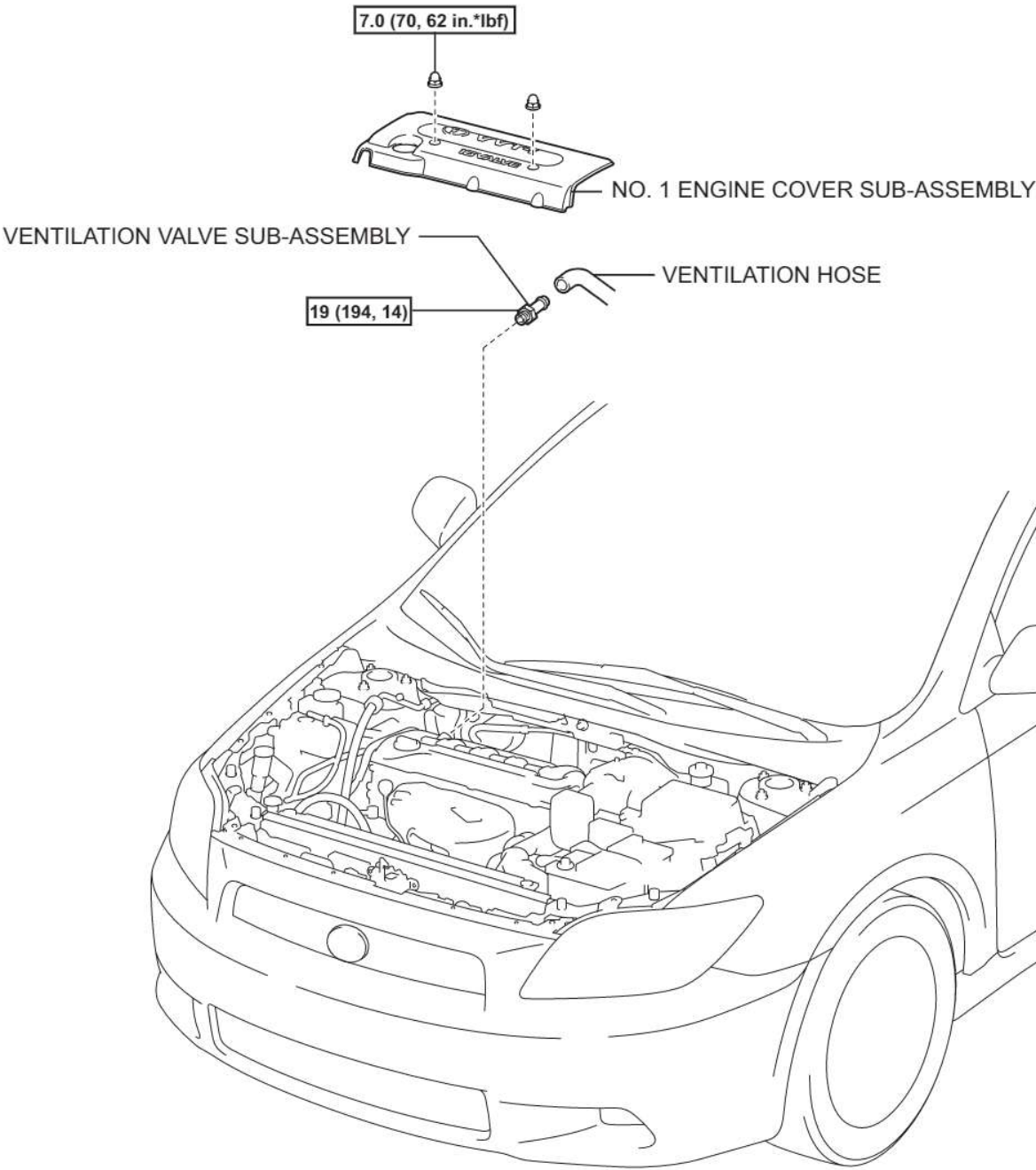
NOTICE:

Certain systems need to be initialized after disconnecting and reconnecting the cable from the negative (-) battery terminal.



VENTILATION VALVE

COMPONENTS



EC

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

P

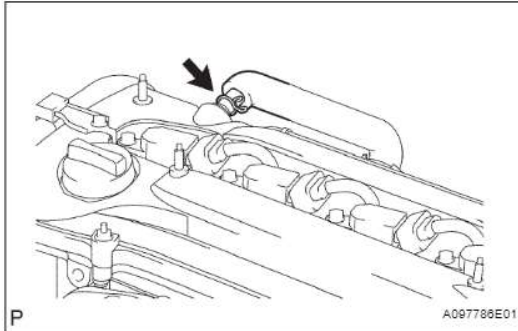
A118771E01

EC-14

2AZ-FE EMISSION CONTROL – VENTILATION VALVE

REMOVAL

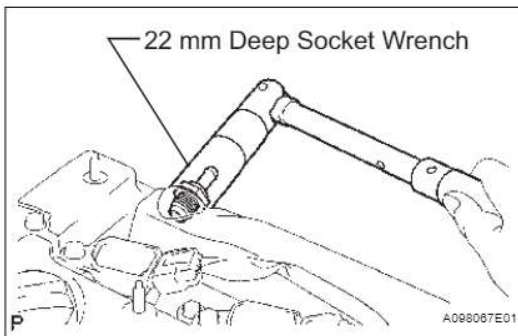
1. REMOVE NO. 1 ENGINE COVER SUB-ASSEMBLY
(See page EM-22)



2. REMOVE VENTILATION VALVE SUB-ASSEMBLY

- (a) Disconnect the No. 2 ventilation hose from the ventilation valve.

- (b) Using a 22 mm deep socket wrench, remove the ventilation valve.



EC

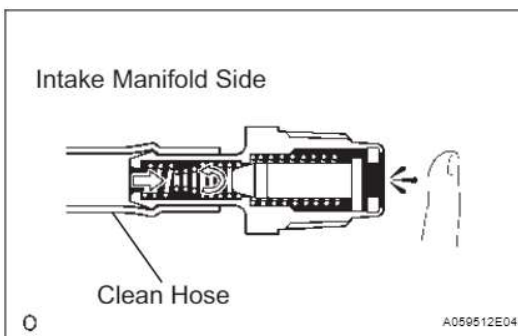
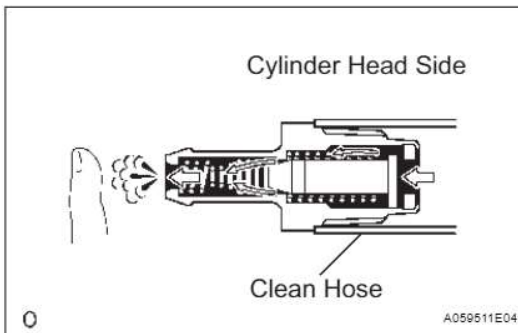
INSPECTION

1. INSPECT VENTILATION VALVE SUB-ASSEMBLY

- (a) Install a clean hose to the ventilation valve.
- (b) Check the ventilation valve operation.
 - (1) Blow air into the cylinder head side, and check that air passes through easily.

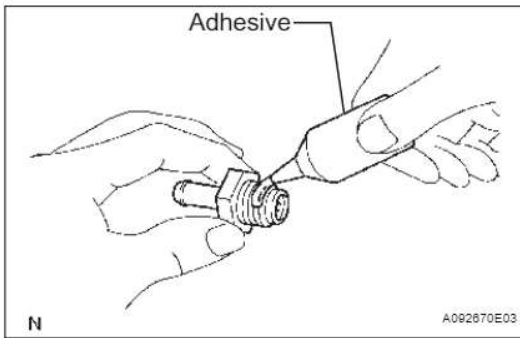
CAUTION:**Do not suck air through the valve.****Petroleum substances inside the valve are hazardous to your health.**

- (2) Blow air into the intake manifold side, and check that air passes through with difficulty. If the result is not as specified, replace the ventilation valve sub-assembly.
- (c) Remove the clean hose from the ventilation valve.



2AZ-FE EMISSION CONTROL – VENTILATION VALVE

EC-15

**INSTALLATION****1. INSTALL VENTILATION VALVE SUB-ASSEMBLY**

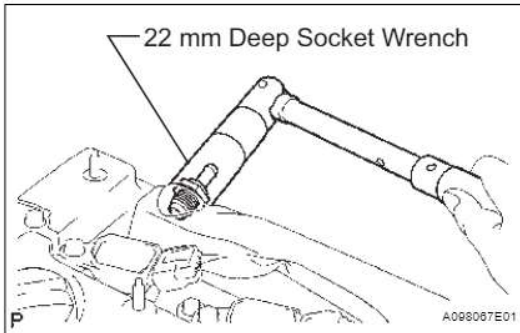
- (a) Apply adhesive to 2 or 3 threads of the ventilation valve.

Adhesive:

Part No. 08833-00070, THREE BOND 1342 or equivalent

- (b) Using a 22 mm deep socket wrench, install the ventilation valve.

Torque: 19 N*m (194 kgf*cm, 14 ft.*lbf)

2. INSTALL NO. 1 ENGINE COVER SUB-ASSEMBLY
(See page [EM-42](#))**3. CHECK FOR ENGINE OIL LEAKS****EC**

EC-16

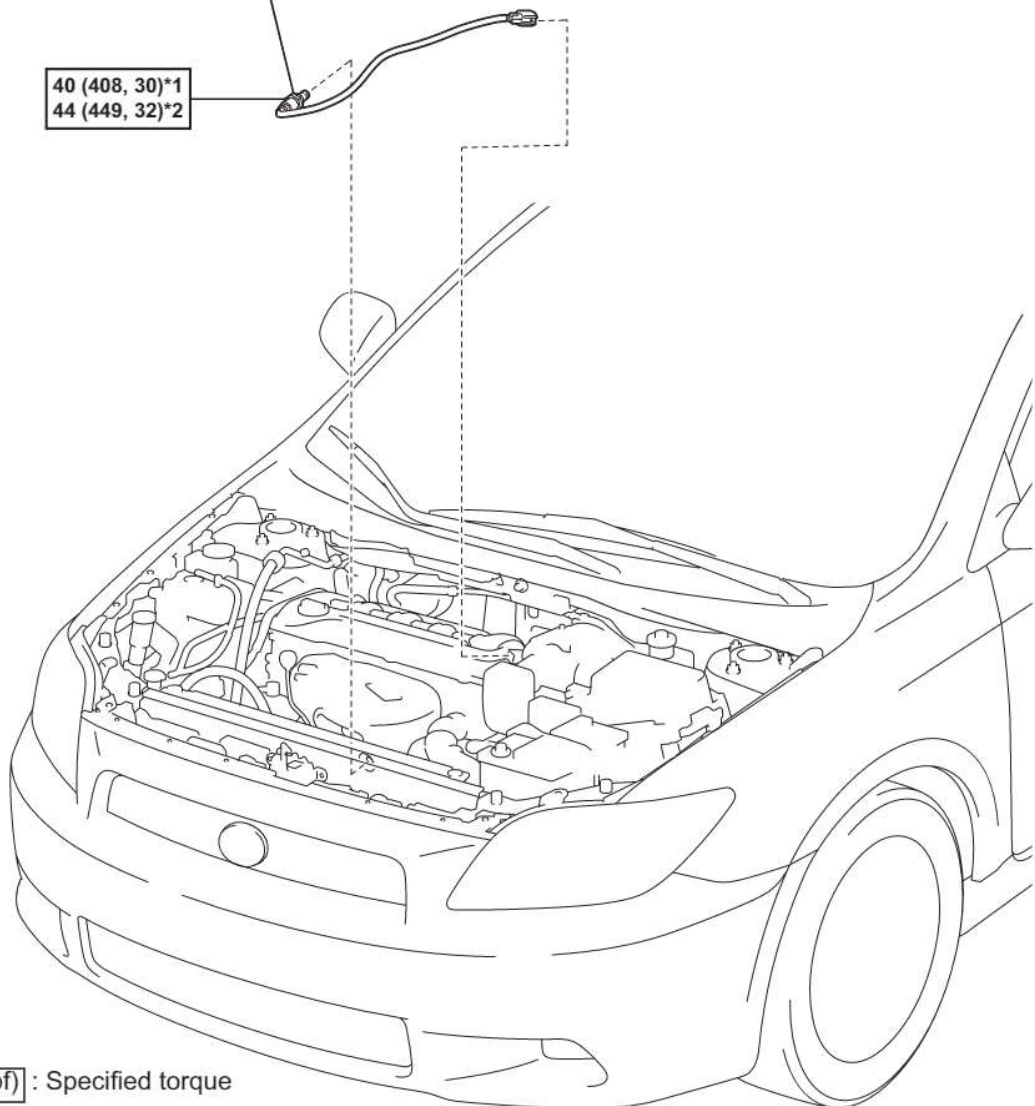
2AZ-FE EMISSION CONTROL – AIR FUEL RATIO SENSOR

AIR FUEL RATIO SENSOR

COMPONENTS

AIR FUEL RATIO SENSOR
(for Bank 1 Sensor 1)

40 (408, 30)*1
44 (449, 32)*2



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

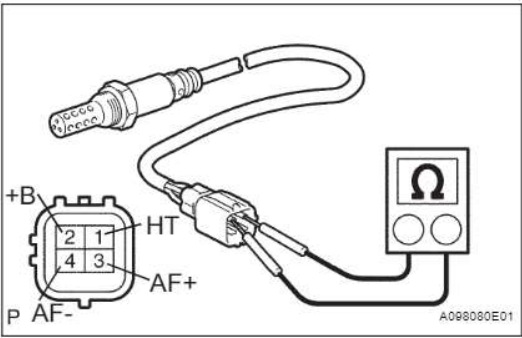
*1: For use with SST

*2: For use without SST

P

A116770E01

2AZ-FE EMISSION CONTROL – AIR FUEL RATIO SENSOR



ON-VEHICLE INSPECTION

1. INSPECT AIR FUEL RATIO SENSOR (for Bank 1 Sensor 1)

- (a) Measure the resistance of the sensor.
Standard resistance

Tester Connection	Specified Condition
1 (HT) - 2 (+B)	1.8 to 3.4 Ω at 20°C (68°F)
1 (HT) - 4 (AF-)	10 k Ω or higher

If the resistance is not as specified, replace the sensor.

2. INSPECT AIR FUEL RATIO COMPENSATION SYSTEM

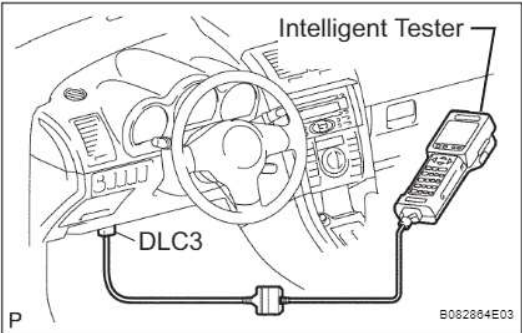
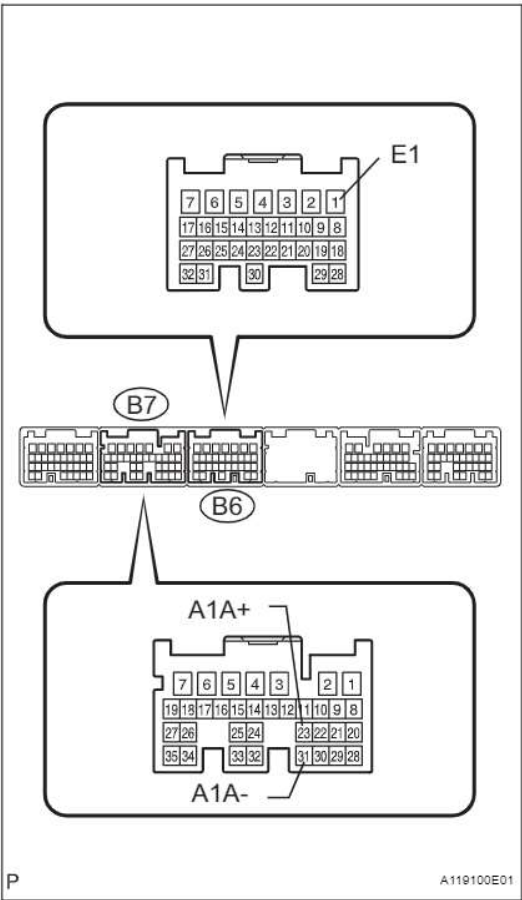
- (a) Measure the voltage of the ECM connectors.
Standard voltage

Tester Connection	Condition	Specified Condition
B7-23 (A1A+) - B6-1 (E1)	Ignition switch ON	3.3 V
B7-31 (A1A-) - B6-1 (E1)	Ignition switch ON	2.9 V

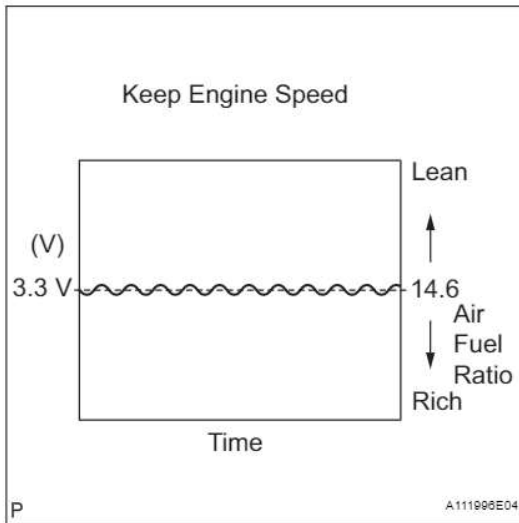
NOTICE:
Connect test leads from the back side of the connector. The connectors should not be disconnected from the ECM.

HINT:
The voltage between the terminals of the ECM is kept constant regardless of the voltage of the A/F sensor.

EC



- (b) Connect the intelligent tester to the DLC3.
(c) Turn the ignition switch to ON.
(d) Select the following menu items: Data List / A/FS B1 S1 and O2S B1 S2.
(e) Warm up the A/F sensor with the engine speed at 2,500 rpm for approximately 2 minutes.

EC-18**2AZ-FE EMISSION CONTROL – AIR FUEL RATIO SENSOR**

- (f) Keep the engine speed at 2,500 rpm and confirm that the display of "A/FS B1 S1" is as shown in the illustration.

HINT:

- The illustration may slightly differ from the display on the intelligent tester.
 - Only the intelligent tester displays the waveform of the A/F sensor.
- (g) Confirm that the display of "O2S B1 S2" changes between 0 to 1 V with the engine speed at 2,500 rpm.

OK:

The voltage output oscillates more than 8 times in 10 seconds.

CAUTION:

- Perform the check immediately after warming the engine up.
- If the voltage variation could not be verified, warm up the heated oxygen sensor again. If it could not be verified even after warming up the sensor again, check for DTCs (see page [ES-47](#)).

EC

REMOVAL

1. DISCONNECT CABLE FROM NEGATIVE BATTERY TERMINAL

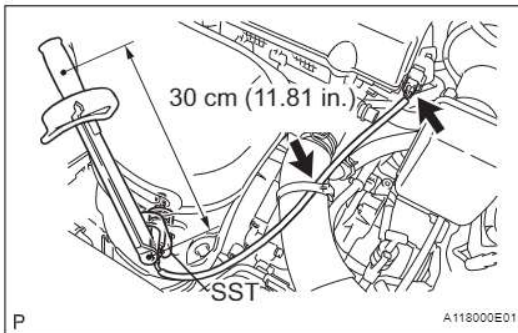
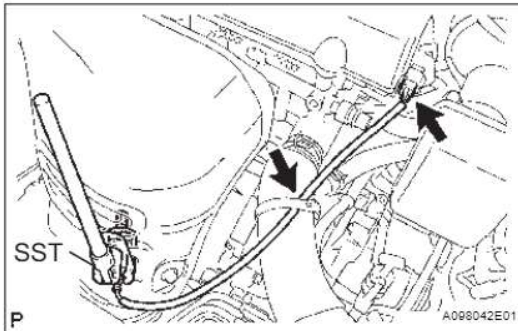
CAUTION:

Wait at least 90 seconds after disconnecting the cable from the negative (-) battery terminal to prevent airbag and seat belt pretensioner activation.

2. REMOVE AIR FUEL RATIO SENSOR (for Bank 1 Sensor 1)

- (a) Disconnect the sensor connector.
- (b) Using SST, remove the sensor from the exhaust manifold.

SST 09224-00010



INSTALLATION

1. INSTALL AIR FUEL RATIO SENSOR (for Bank 1 Sensor 1)

- (a) Using SST, install the sensor to the exhaust manifold.

SST 09224-00010

Torque: 40 N*m (408 kgf*cm, 30 ft.*lbf) for use with SST

44 N*m (449 kgf*cm, 32 ft.*lbf) for use without SST

HINT:

Use a torque wrench with a fulcrum length of 30 cm (11.81 in.).

- (b) Connect the sensor connector.

2. CONNECT CABLE TO NEGATIVE BATTERY TERMINAL

3. PERFORM INITIALIZATION

- (a) Perform the initialization (see page [IN-23](#)).

NOTICE:

Certain systems need to be initialized after disconnecting and reconnecting the cable from the negative (-) battery terminal.

4. CHECK FOR EXHAUST GAS LEAKS

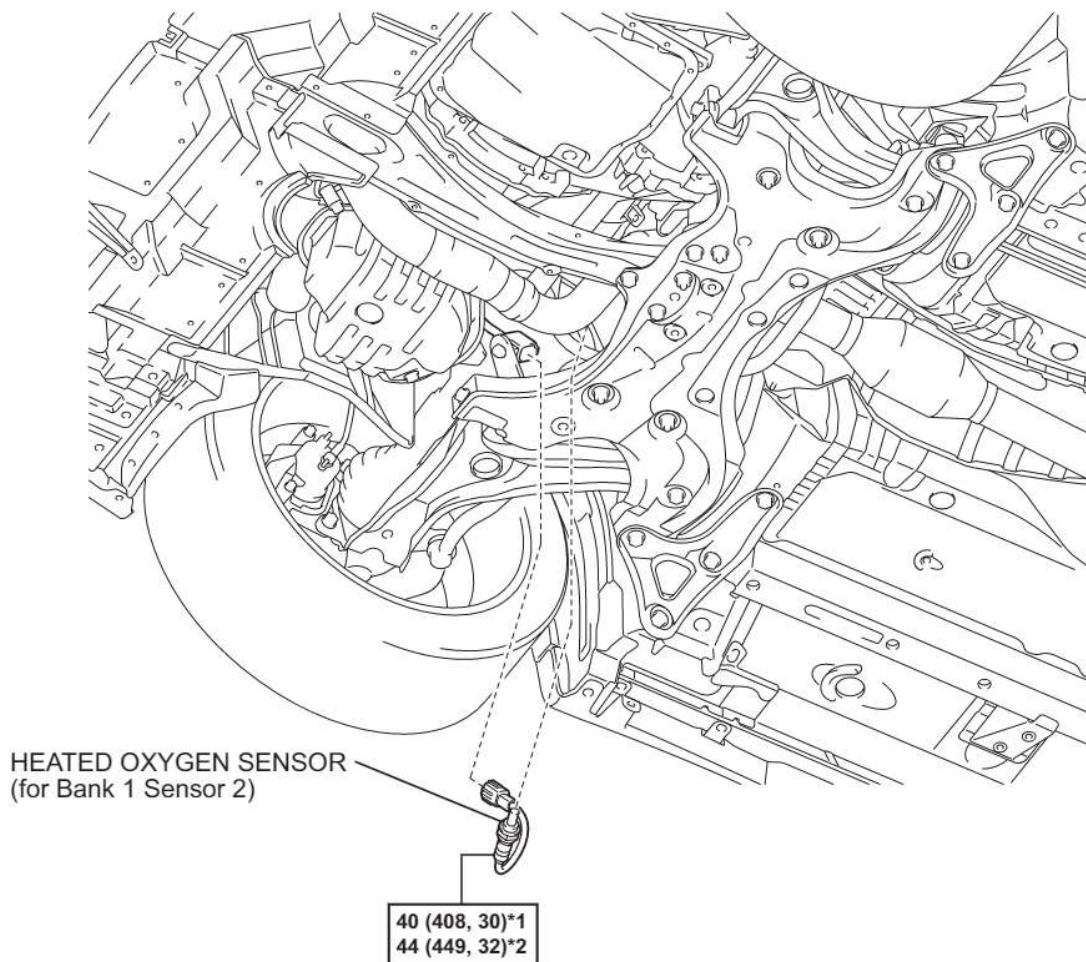
EC

EC-20

2AZ-FE EMISSION CONTROL – HEATED OXYGEN SENSOR

HEATED OXYGEN SENSOR

COMPONENTS



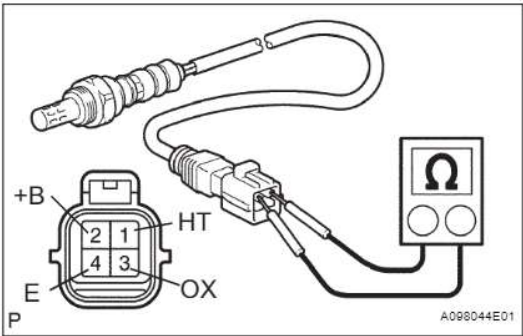
N*m (kgf*cm, ft.*lbf) : Specified torque

*1: For use with SST

*2: For use without SST

P

A116772E01



ON-VEHICLE INSPECTION

1. INSPECT HEATED OXYGEN SENSOR (for Bank 1 Sensor 2)
- (a) Measure the resistance of the sensor.
- Standard resistance**

Tester Connection	Specified Condition
1 (HT) - 2 (+B)	11 to 16 Ω at 20°C (68°F)
1 (HT) - 4 (E)	10 k Ω or higher

If the resistance is not as specified, replace the sensor.

EC-22

2AZ-FE EMISSION CONTROL – HEATED OXYGEN SENSOR

REMOVAL

1. DISCONNECT CABLE FROM NEGATIVE BATTERY TERMINAL

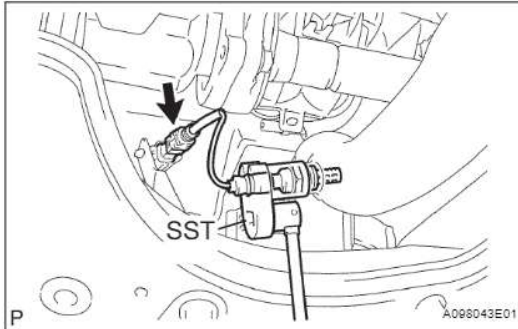
CAUTION:

Wait at least 90 seconds after disconnecting the cable from the negative (-) battery terminal to prevent airbag and seat belt pretensioner activation.

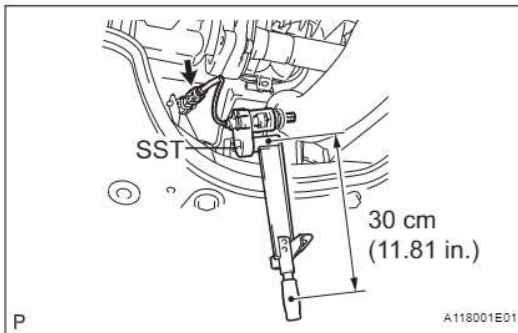
2. REMOVE HEATED OXYGEN SENSOR (for Bank 1 Sensor 2)

- (a) Disconnect the sensor connector.
- (b) Using SST, remove the sensor from the front exhaust pipe.

SST 09224-00010



EC



INSTALLATION

1. INSTALL HEATED OXYGEN SENSOR (for Bank 1 Sensor 2)

- (a) Using SST, install the sensor to the front exhaust pipe.

SST 09224-00010

Torque: 40 N*m (408 kgf*cm, 30 ft.*lbf) for use with SST

44 N*m (449 kgf*cm, 32 ft.*lbf) for use without SST

HINT:

Use a torque wrench with a fulcrum length of 30 cm (11.81 in.).

- (b) Connect the sensor connector.

2. CONNECT CABLE TO NEGATIVE BATTERY TERMINAL

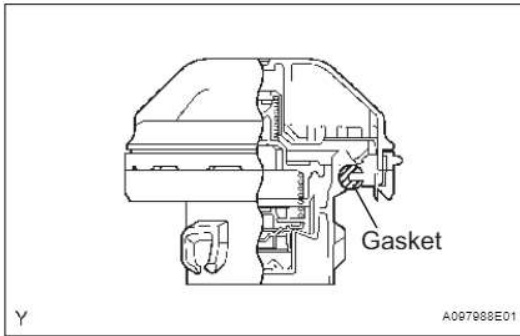
3. PERFORM INITIALIZATION

- (a) Perform the initialization (see page [IN-23](#)).

NOTICE:

Certain systems need to be initialized after disconnecting and reconnecting the cable from the negative (-) battery terminal.

4. CHECK FOR EXHAUST GAS LEAKS



FUEL TANK CAP

INSPECTION

1. INSPECT FUEL TANK CAP ASSEMBLY

- (a) Visually check that the cap and gasket are not deformed or damaged.
If the result is not as specified, replace the cap assembly or gasket.