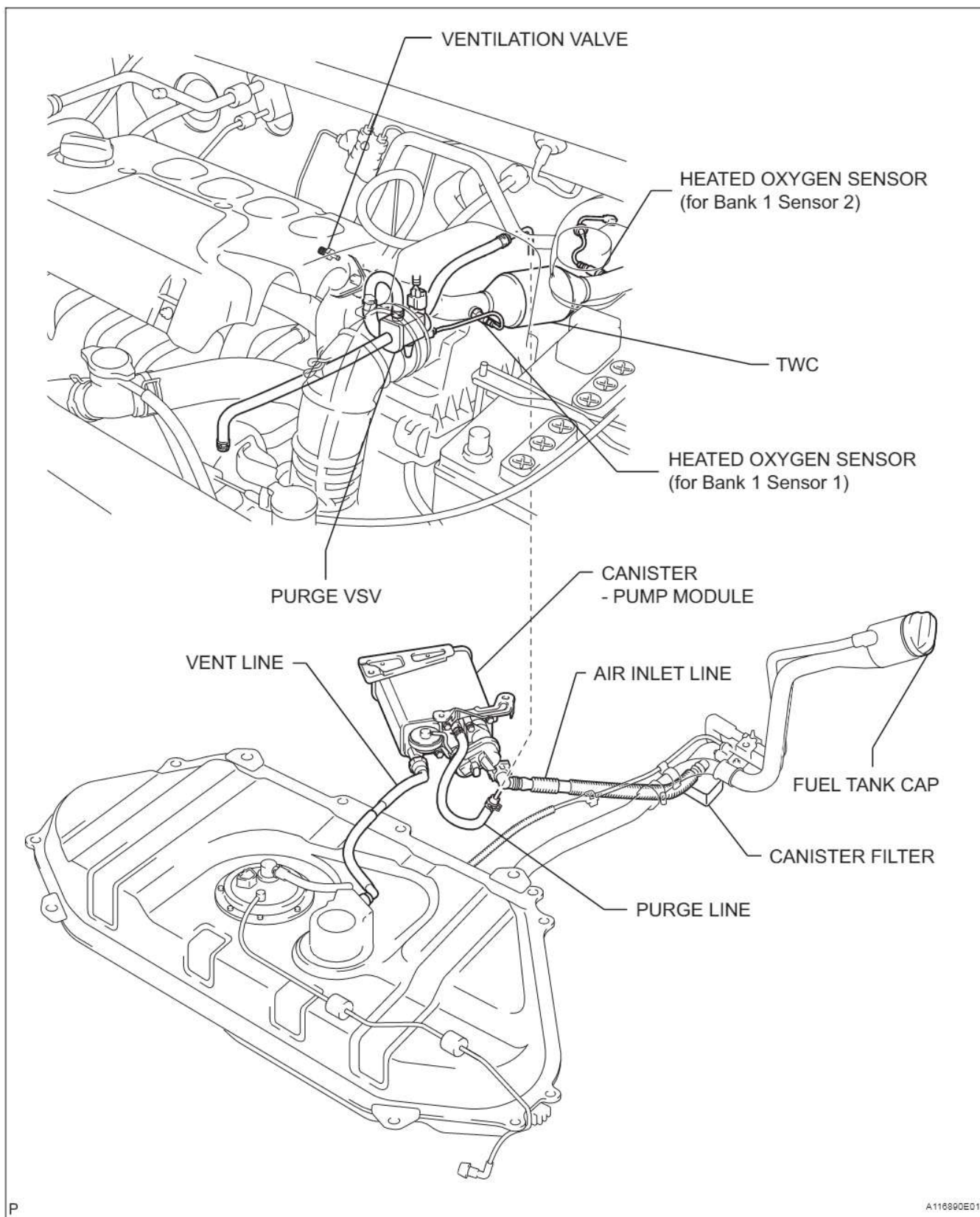
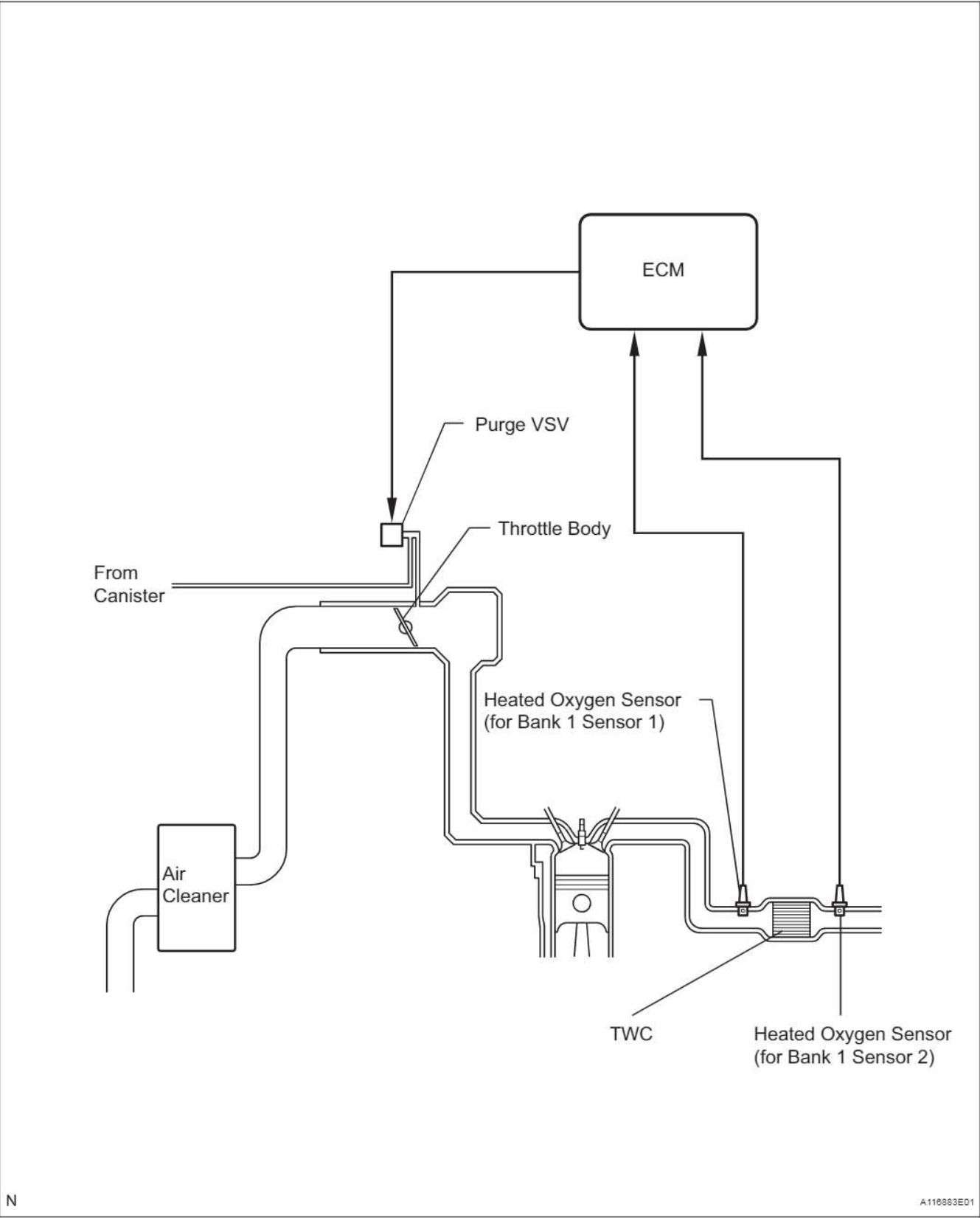


EMISSION CONTROL SYSTEM

PARTS LOCATION

**EC**

SYSTEM DIAGRAM

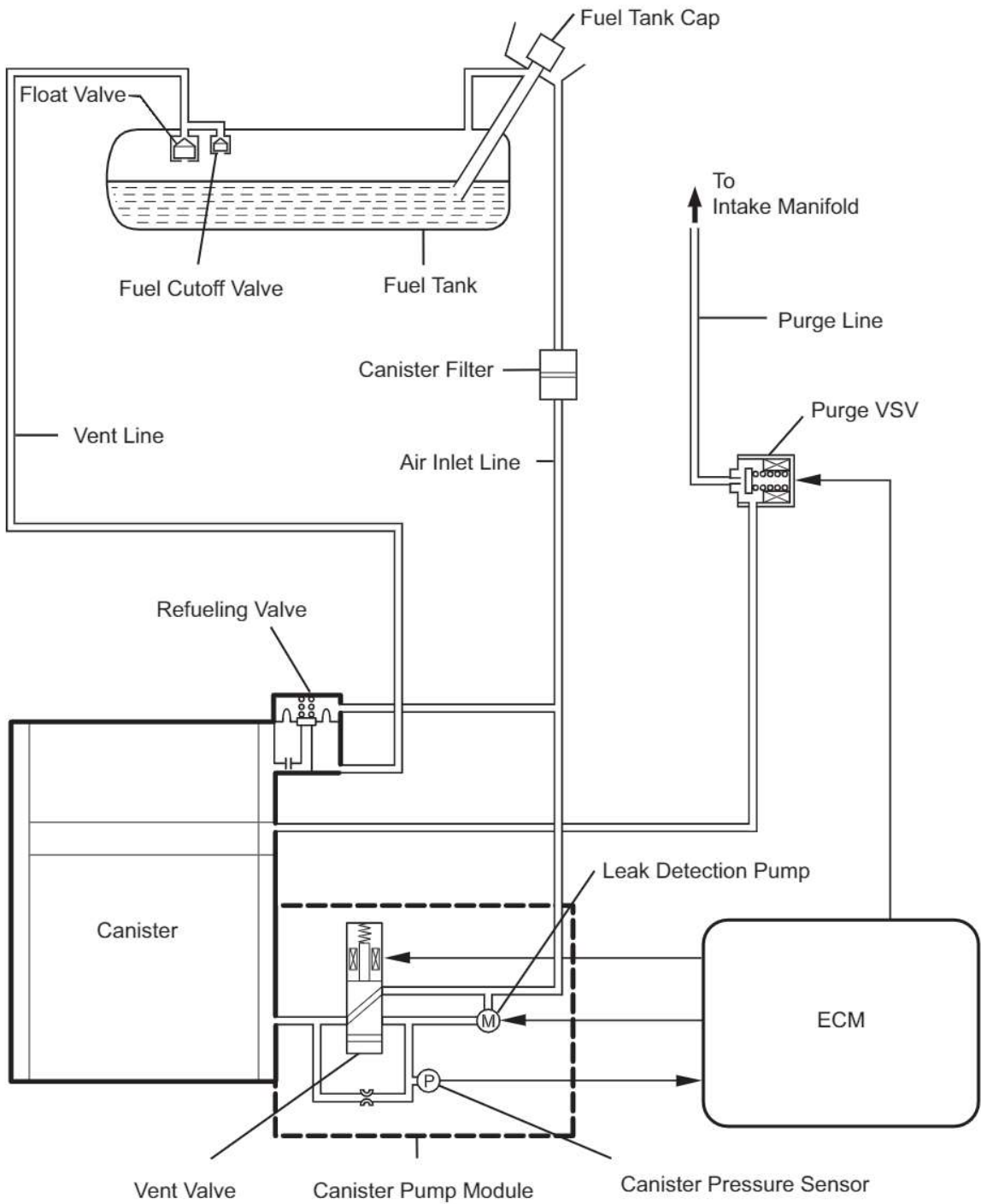


EC

1NZ-FE EMISSION CONTROL – EMISSION CONTROL SYSTEM

EC-3

EC

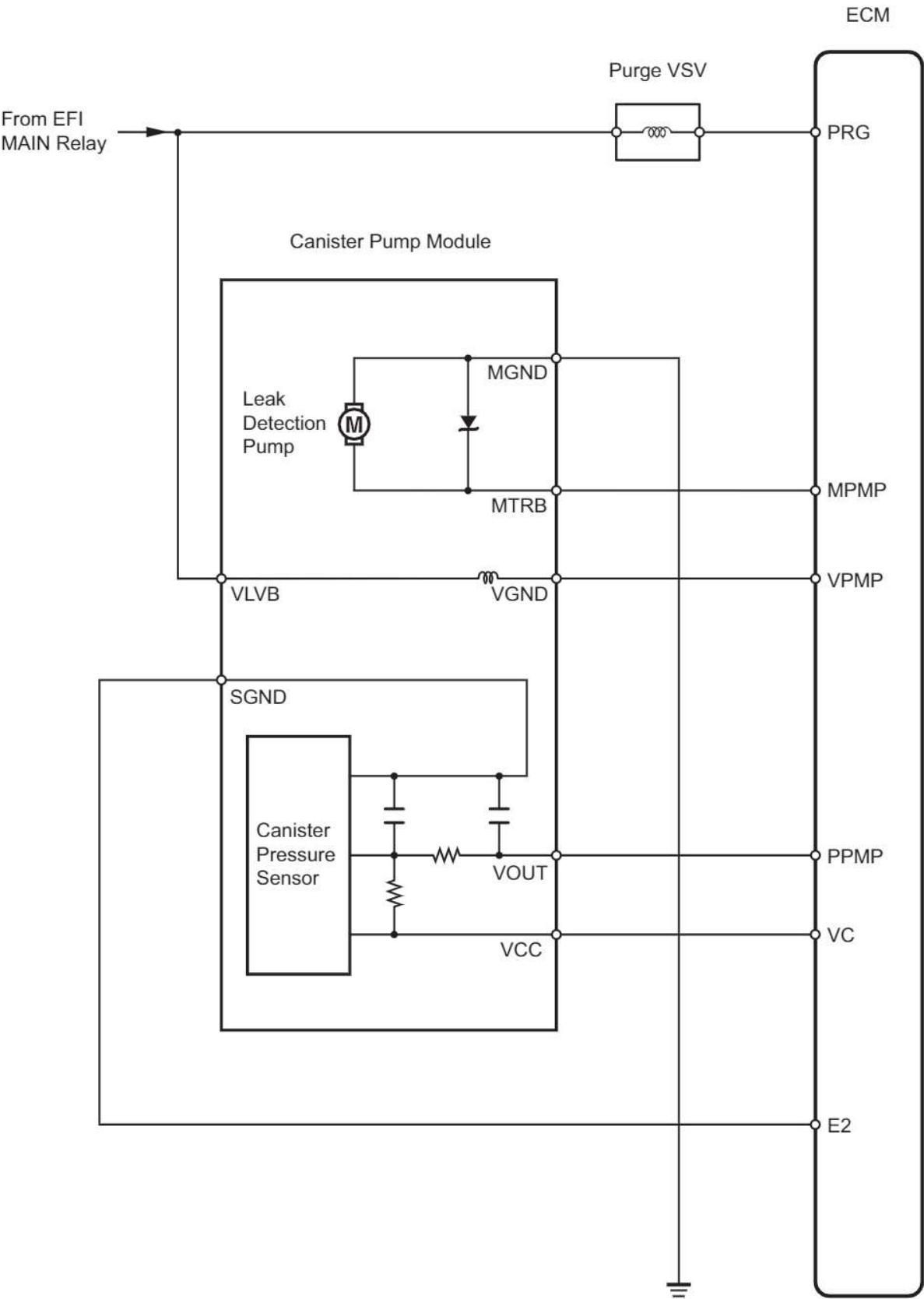


N

A120008E01

EC-4

1NZ-FE EMISSION CONTROL – EMISSION CONTROL SYSTEM

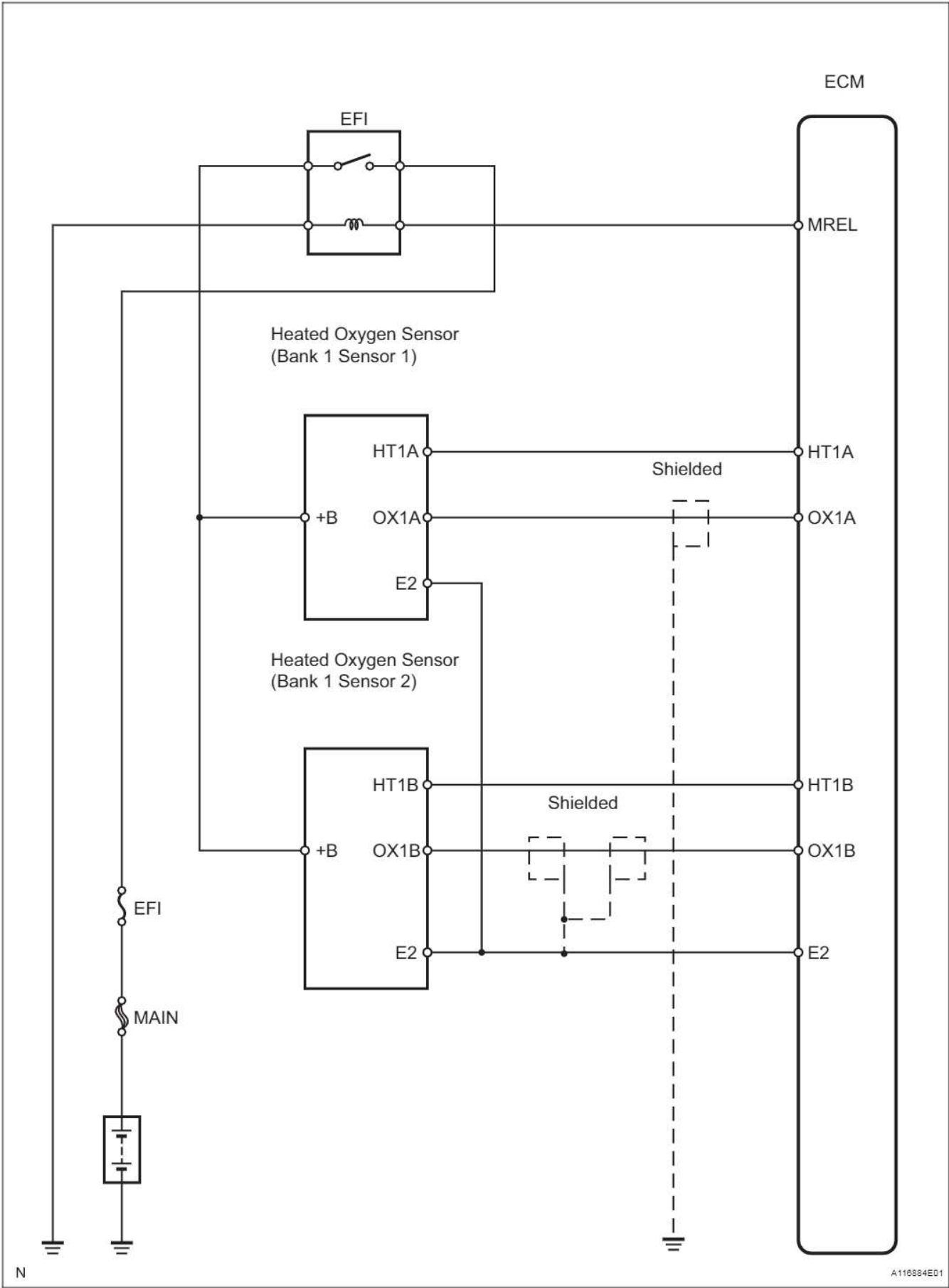


A110885E01

1NZ-FE EMISSION CONTROL – EMISSION CONTROL SYSTEM

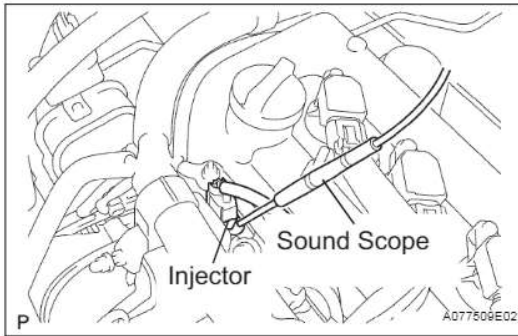
EC-5

EC



EC-6

1NZ-FE EMISSION CONTROL – EMISSION CONTROL SYSTEM



ON-VEHICLE INSPECTION

1. CHECK FUEL CUT RPM

- Increase the engine speed to at least 3,500 rpm.
- Use a sound scope to check for injector operating noise.
- Check that the operating sounds stop momentarily and then resume when the throttle lever is released.

HINT:

Measure with the A/C OFF.

Fuel return rpm:**1,400 rpm**

2. VISUALLY CHECK HOSES, CONNECTORS, AND GASKETS

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

NOTICE:

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

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

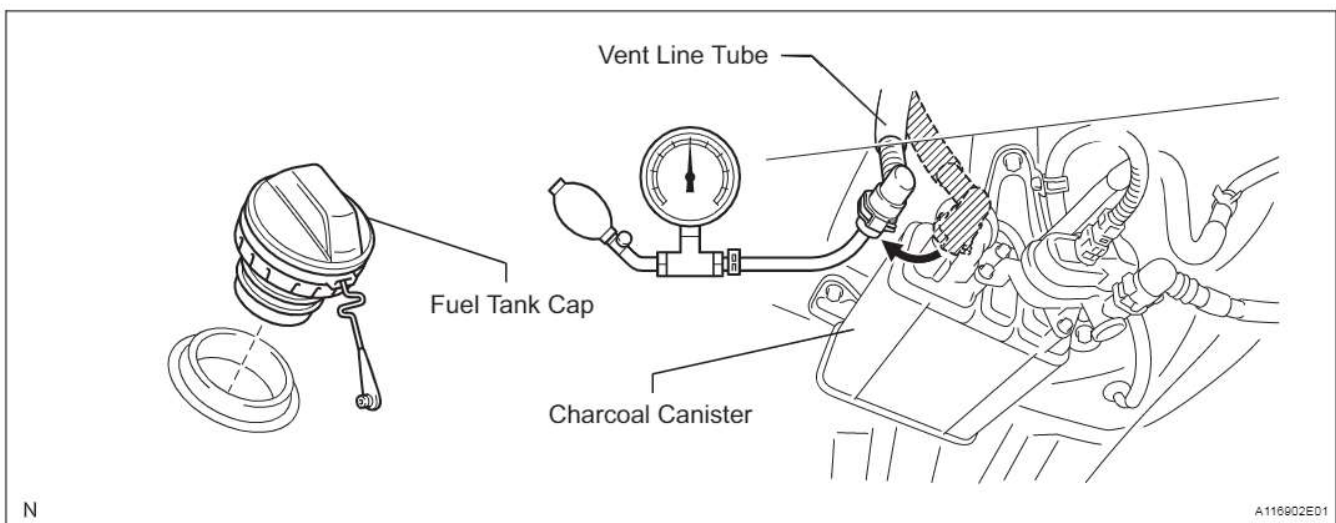
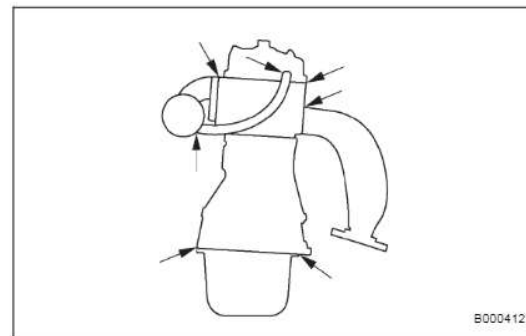
3. CHECK LINE AND CONNECTORS

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

4. CHECK FUEL TANK ASSEMBLY

- Visually check for deformation, cracks or fuel leakage.

5. CHECK FUEL TANK AND VENT LINE



- Disconnect the vent line hose from the canister.
- Connect the pressure gauge to the vent line tube.

- (c) Apply 4 kPa (41 kgf/cm², 30 mmHg) of pressure to the vent line of the fuel tank.

HINT:

Perform this inspection with the fuel tank less than 90% full. When the fuel tank is full, the fuel cutoff valve closes and pressure is released through the 1.5 mm orifice. As a result, when the fuel tank cap is removed, pressure does not decrease smoothly.

- (d) Check that the fuel tank pressure is maintained for some time, and does not decrease immediately.

HINT:

If pressure decreases immediately, one of the following may be the cause:

- The fuel tank cap is not completely tightened.
- The fuel tank cap is damaged.
- Air is leaking from the vent line.
- The fuel tank is damaged.

- (e) When the fuel tank cap is removed, check that pressure is released smoothly.

HINT:

If the pressure does not drop, replace the fuel tank assembly.

- (f) Reconnect the vent line tube to the canister.

6. CHECK AIR INLET LINE

- (a) Disconnect the air inlet line hose from the charcoal canister.

- (b) Check that air flows freely into the air inlet line.

HINT:

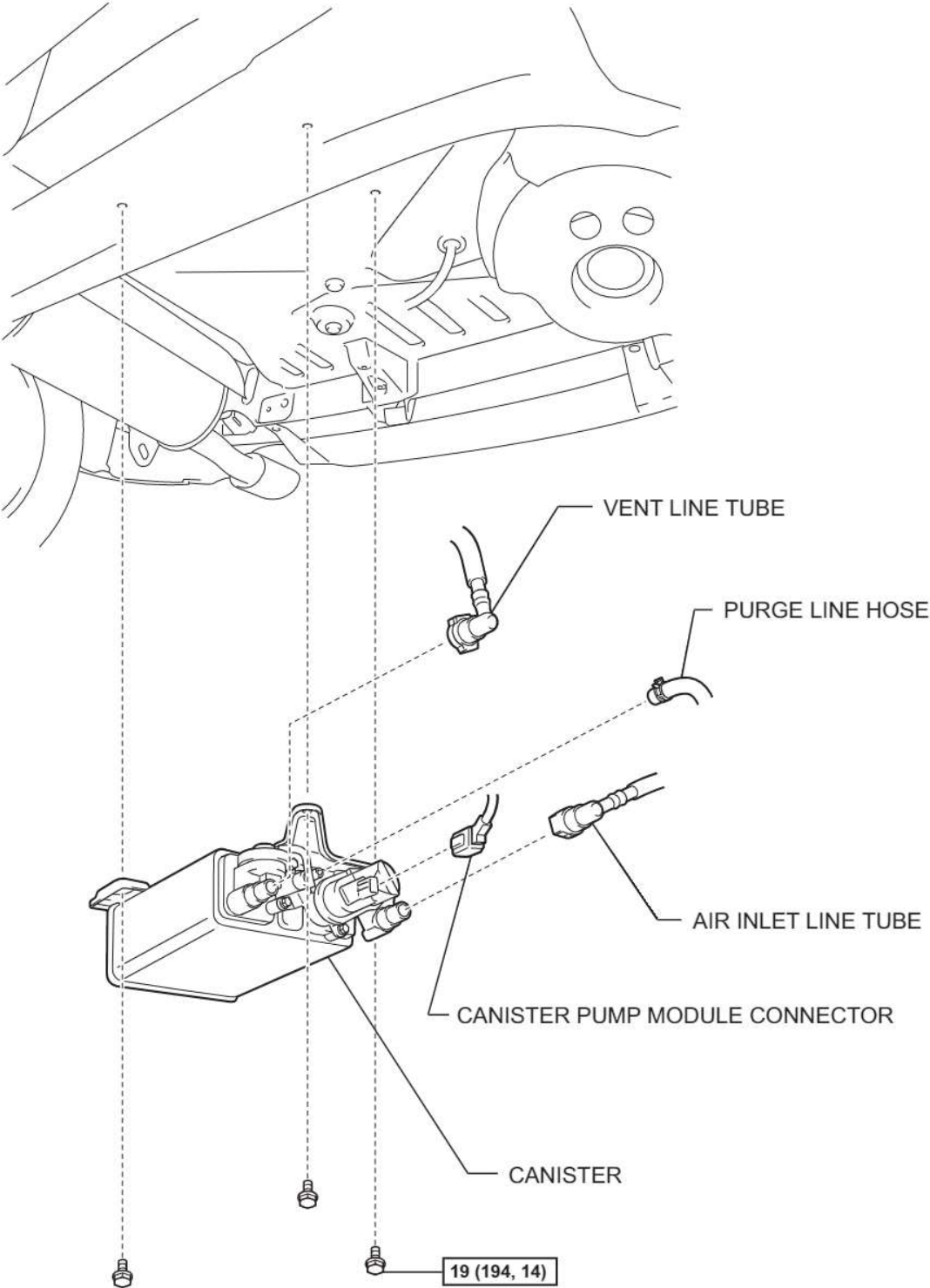
If air does not flow freely into the air inlet line, repair or replace it.

- (c) Reconnect the air inlet line hose to the charcoal canister.

EC

CANISTER
COMPONENTS

EC



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

P

A116893E01

1NZ-FE EMISSION CONTROL – CANISTER

EC-9

REMOVAL

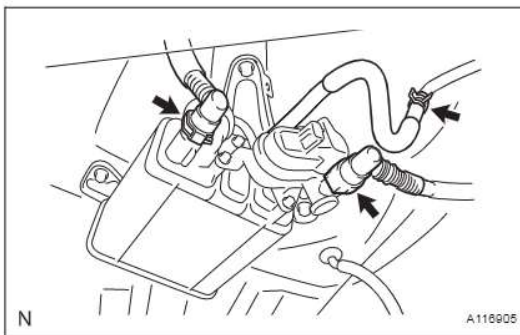
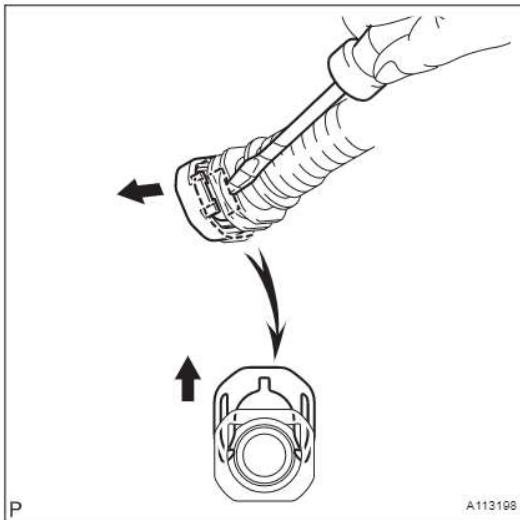
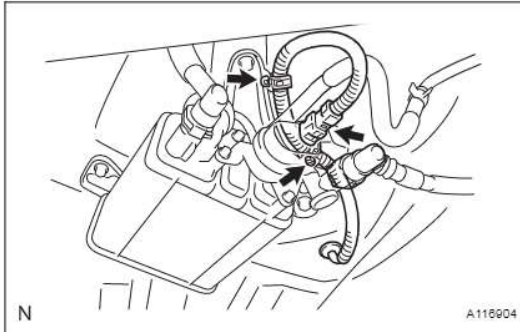
1. **DISCONNECT CABLE FROM NEGATIVE BATTERY TERMINAL**

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 CANISTER**

(a) Disconnect the connector and detach the 2 clamps.



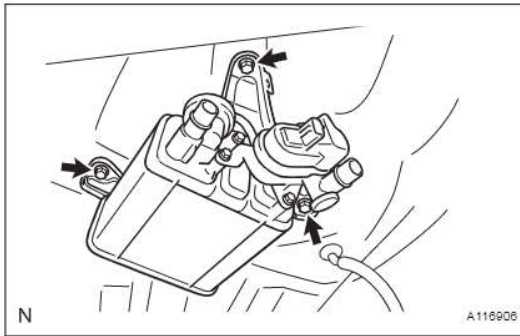
(b) Disconnect the 2 tubes and hose.
(1) Using a screwdriver, pry up the retainer.
HINT:
Do not remove the retainer.

- (2) Disconnect the purge line hose.
- (3) Disconnect the air inlet line tube from the canister.
- (4) Disconnect the vent line tube from the canister (leak detection pump).

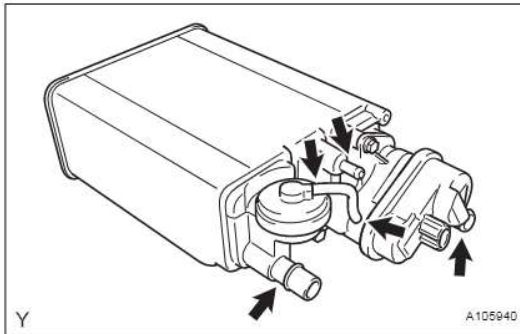
EC

EC-10

1NZ-FE EMISSION CONTROL – CANISTER



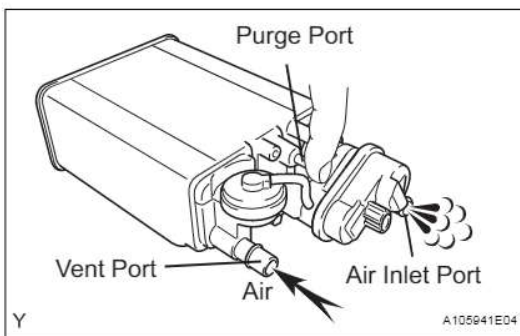
(c) Remove the 3 bolts and canister.



INSPECTION

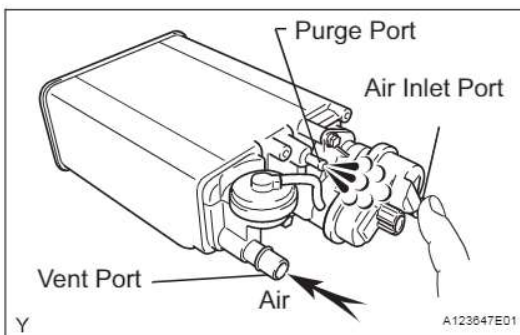
1. INSPECT CANISTER

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

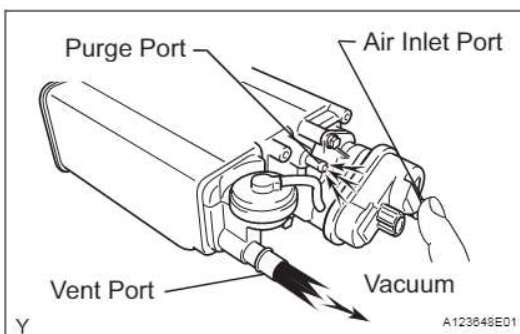


(b) Check the canister operation.

(1) While holding the purge port closed, blow air 0.39 kPa (4.0 kgf/cm², 3 mmHg) into the vent port, and check that air flows from the air inlet port. If the result is not as specified, replace the canister.



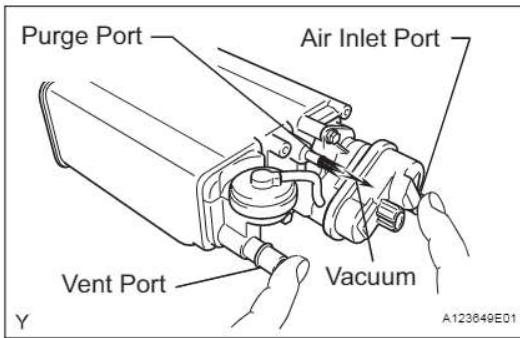
(2) While holding the air inlet port closed, blow air 0.39 kPa (4.0 kgf/cm², 3 mmHg) into the vent port, and check that air flows from the purge port. If the result is not as specified, replace the canister.



(3) While holding the air inlet port closed, apply vacuum 3.43 kPa (35.0 kgf/cm², 25.7 mmHg) to the vent port, and check that air is sucked into the purge port. If the result is not as specified, replace the canister.

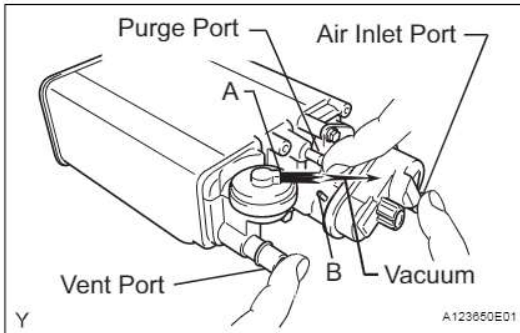
1NZ-FE EMISSION CONTROL – CANISTER

EC-11



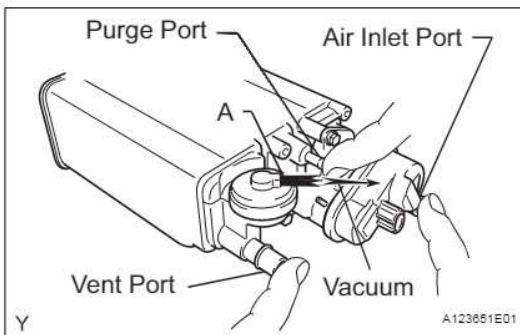
(c) Check the air tightness.

- (1) While holding the vent and air inlet ports closed, apply vacuum 3.43 kPa (35.0 kgf/cm², 25.7 mmHg) to the purge port, and check that the vacuum is maintained for 1 minute. If the result is not as specified, replace the canister.



(d) Check the diaphragm.

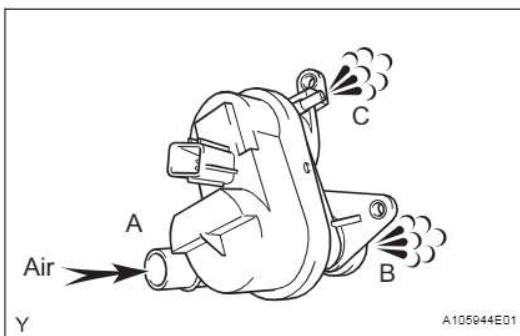
- (1) Remove the air hose between ports A and B.
- (2) While holding the vent, purge and air inlet ports closed, apply vacuum 1.42 kPa (14.5 kgf/cm², 10.6 mmHg) port A, and check that air is not sucked into port B.



- (3) While holding the vent, purge and air inlet ports closed, apply vacuum 1.42 kPa (14.5 kgf/cm², 10.6 mmHg) into port A, and measure how long it takes for the vacuum to drop.

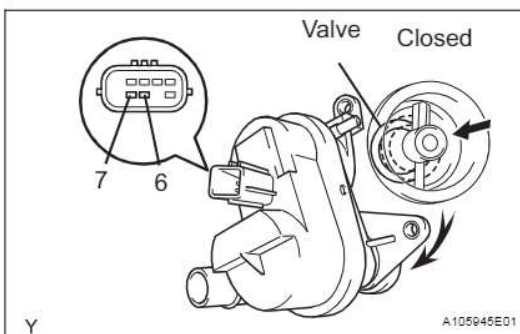
Vacuum drop time:**10 seconds or more**

If the result is not as specified, replace the canister.



(e) Check leak detection pump.

- (1) Check that air flows from port A to port B and C. If the result is not as specified, replace the canister.



- (2) Connect the positive (+) lead of the battery to terminal 7 and the negative (-) lead to terminal 6.
- (3) Check that the valve is closed. If the result is not as specified, replace the canister.
- (4) Install the canister pump module.

EC

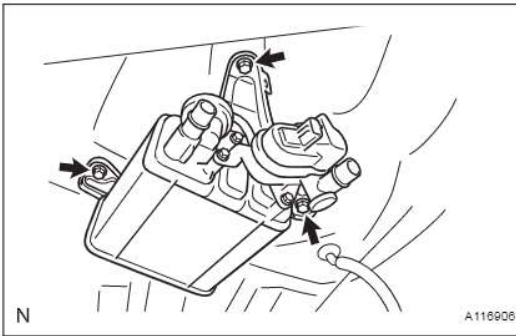
EC-12

1NZ-FE EMISSION CONTROL – CANISTER

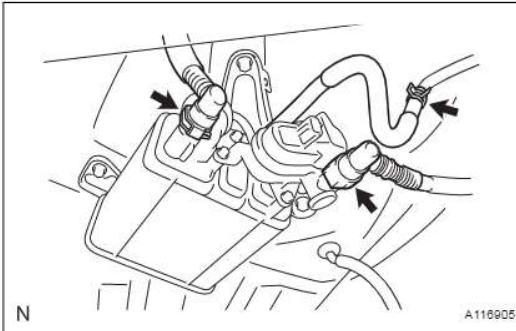
INSTALLATION

1. INSTALL CANISTER

- (a) Install the canister with the 3 bolts.
Torque: 19 N*m (194 kgf*cm, 14 ft.*lbf)



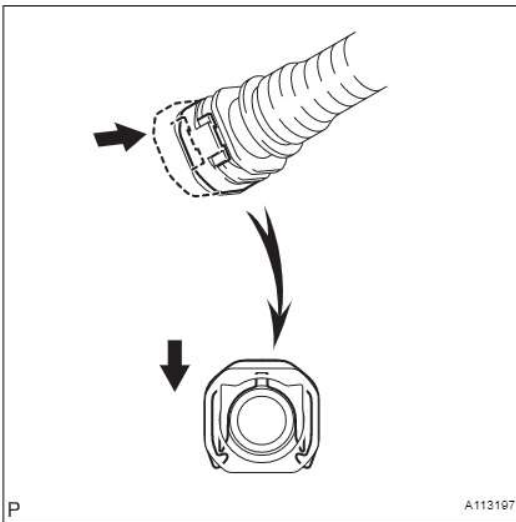
- (b) Connect the 2 tubes and hose.



- (1) Connect the air inlet line tube to the canister (leak detection pump).
- (2) Connect the vent line tube to the canister.
- (3) Connect the purge line hose.

HINT:

Install the hose to the canister, and then attach the retainer.



- (c) Connect the connector and attach the 2 clamps.

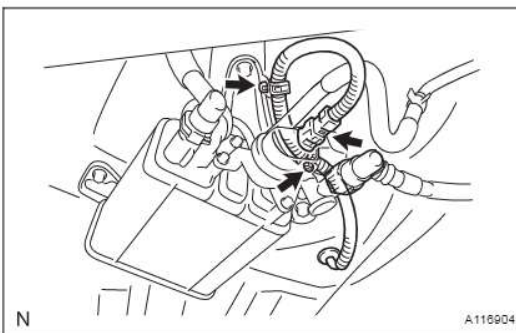
2. CONNECT CABLE TO NEGATIVE BATTERY TERMINAL

3. PERFORM INITIALIZATION

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

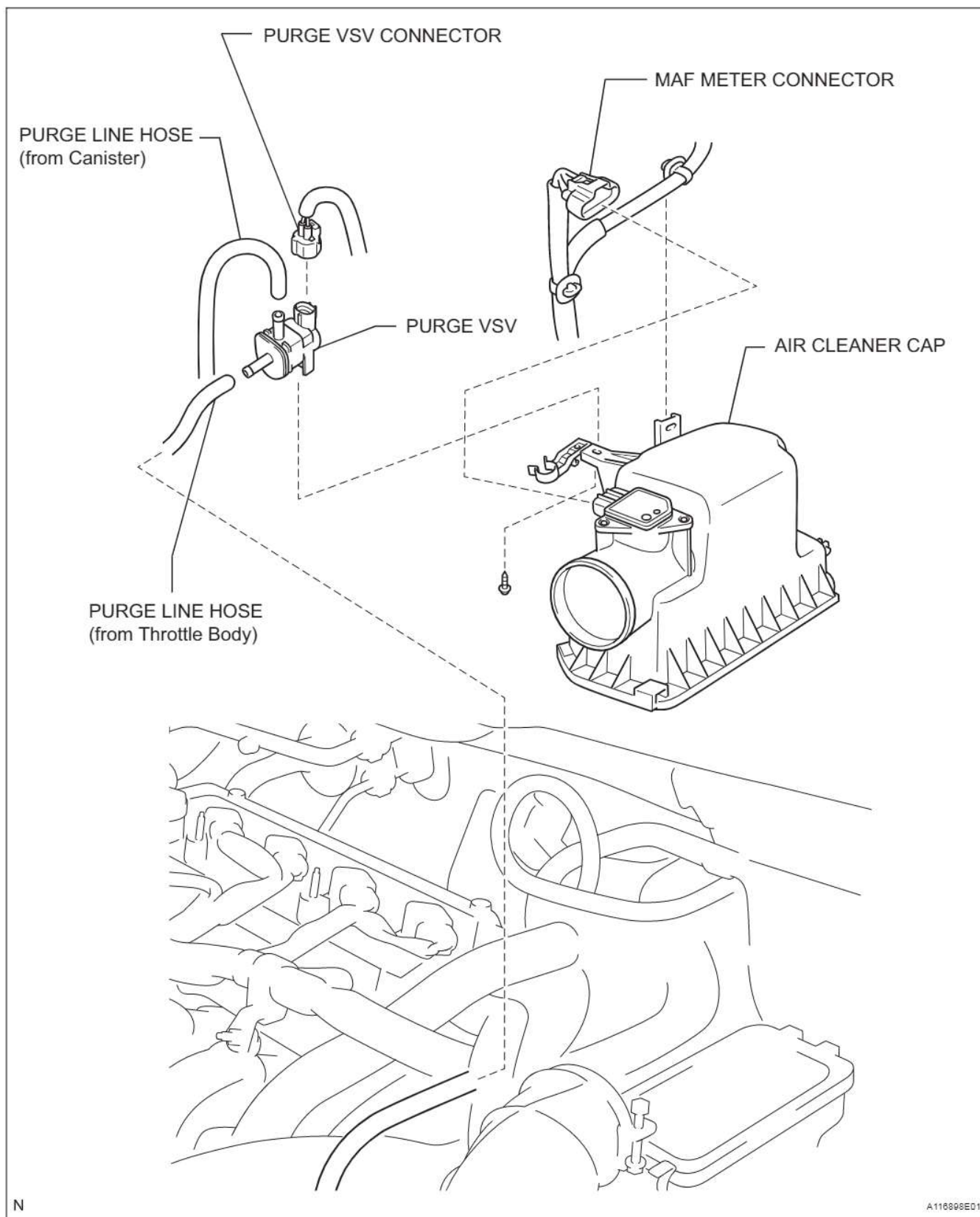
NOTICE:

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



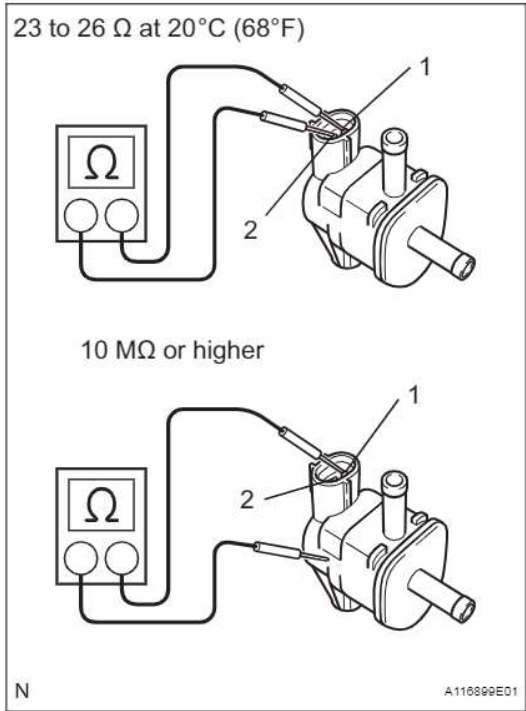
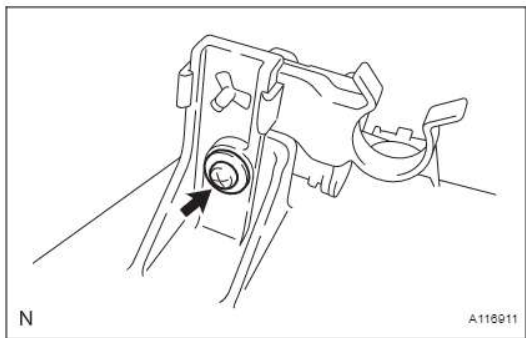
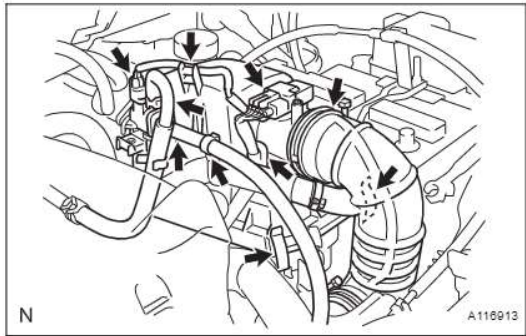
VACUUM SWITCHING VALVE

COMPONENTS

**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 CLEANER CAP
(a) Disconnect the MAF meter connector.
(b) Disconnect the purge VSV connector.
(c) Disconnect the 2 wire harness clamps from the air
cleaner cap.
(d) Disconnect the 2 purge line hoses.
(e) Disconnect the purge line hose from the hose
clamp.
(f) Unlock the 2 clamps holding the air cleaner cap to
the air cleaner case.
(g) Loosen the hose clamp and remove the air cleaner
cap.
3. REMOVE PURGE VSV
(a) Remove the screw and purge VSV.



INSPECTION

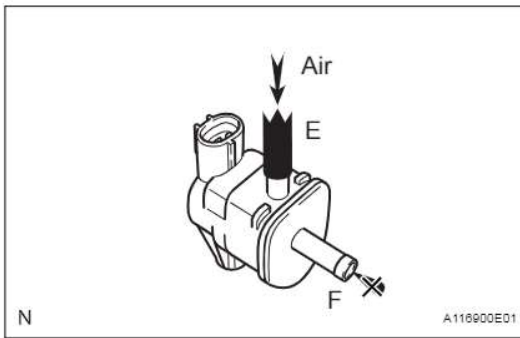
1. INSPECT PURGE VSV
(a) Measure the resistance of the purge VSV.
Standard resistance

Tester Connection	Specified Condition
1 - 2	23 to 26 Ω at 20°C (68°F)
1 - Body ground 2 - Body ground	10 MΩ or higher

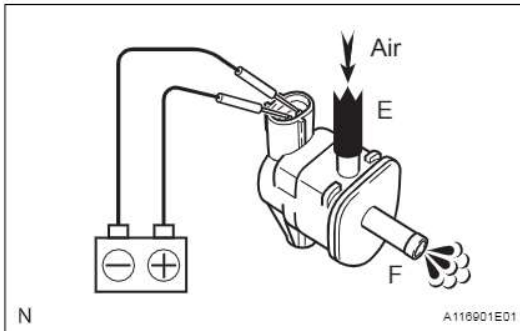
If the result is not as specified, replace the purge VSV.

1NZ-FE EMISSION CONTROL – VACUUM SWITCHING VALVE

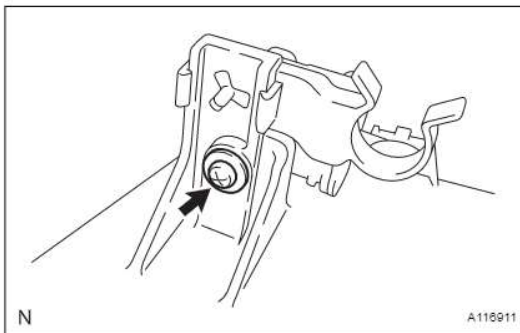
EC-15



- (b) Check operation of the purge VSV.
 (1) Check that air does not flow from port E to port F.



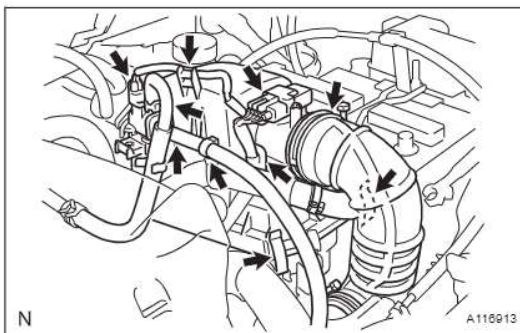
- (2) Apply battery voltage across terminals 1 and 2.
 (3) Check that air flows from port E to port F.
 If the result is not as specified, replace the purge VSV.



INSTALLATION

1. INSTALL PURGE VSV

- (a) Install the purge VSV with the screw.



2. INSTALL AIR CLEANER CAP

- (a) Install the air cleaner cap and tighten the hose clamp.
 (b) Lock the 2 clamps holding the air cleaner cap to the air cleaner case.
 (c) Connect the purge line hose to the hose clamp.
 (d) Connect the 2 purge line hoses.
 (e) Connect the 2 wire harness clamps to the air cleaner cap.
 (f) Connect the purge VSV connector.
 (g) Connect the MAF meter connector.

3. CONNECT CABLE TO NEGATIVE BATTERY TERMINAL

4. PERFORM INITIALIZATION

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

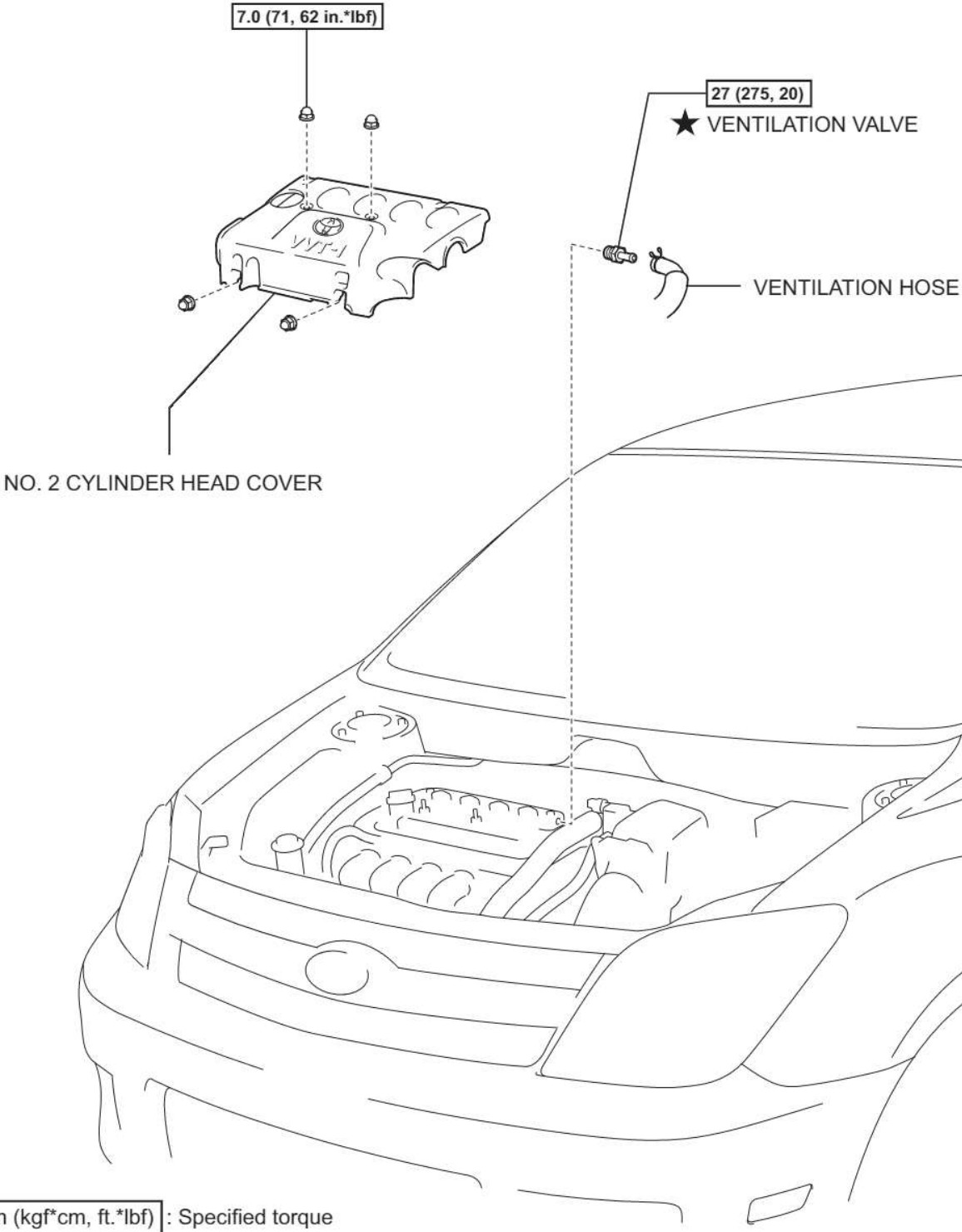
NOTICE:

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

EC

VENTILATION VALVE
COMPONENTS

EC



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

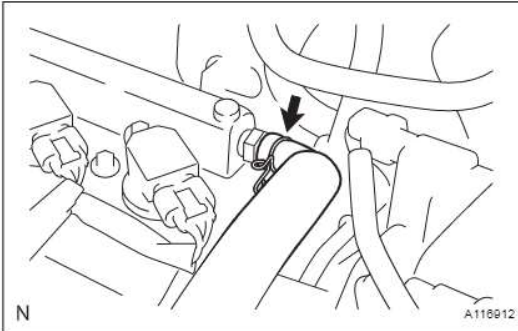
★ Precoated part

P

A116992E01

REMOVAL

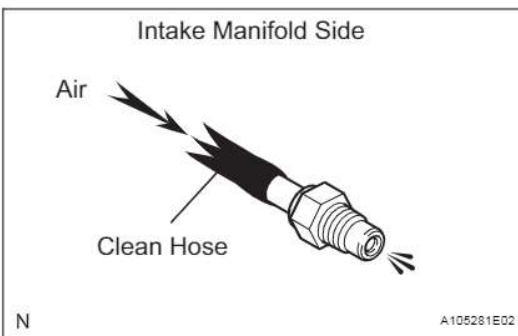
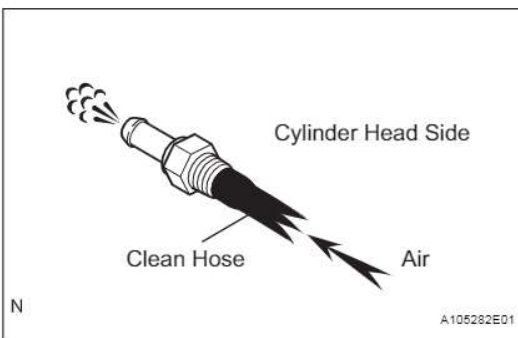
1. **REMOVE NO. 2 CYLINDER HEAD COVER** (See page **FU-11**)
2. **DISCONNECT VENTILATION HOSE**
 - (a) Disconnect the ventilation hose from the ventilation valve.
3. **REMOVE VENTILATION VALVE**
 - (a) Remove the ventilation valve.



INSPECTION

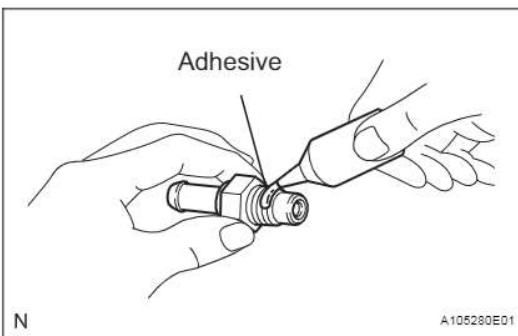
1. **INSPECT VENTILATION VALVE**
 - (a) Install a clean hose to the ventilation valve.
 - (b) Check the ventilation valve operation.
 - (1) Blow air into the cylinder head side, and check that air passes through easily.

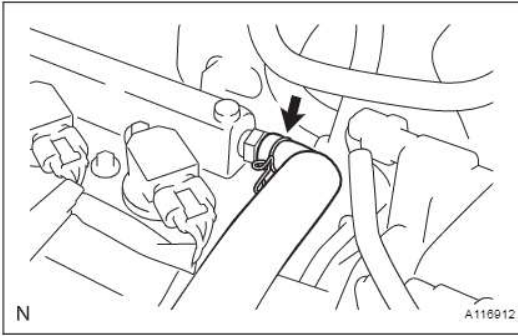
CAUTION:
Do not suck air through the valve.
Petroleum substances inside the valve are hazardous to your health.
 - (2) Blow air into the intake manifold side, and check that air passes through with difficulty. If the result is not as specified, replace the ventilation valve.
 - (c) Remove the clean hose from the ventilation valve.



INSTALLATION

1. **INSTALL VENTILATION VALVE**
 - (a) Apply adhesive to 2 or 3 threads of the valve.
Adhesive:
Part No. 08833-00070, THREE BOND 1324 or equivalent.
 - (b) Install the ventilation valve.
Torque: 27 N*m (275 kgf*cm, 20 ft.*lbf)



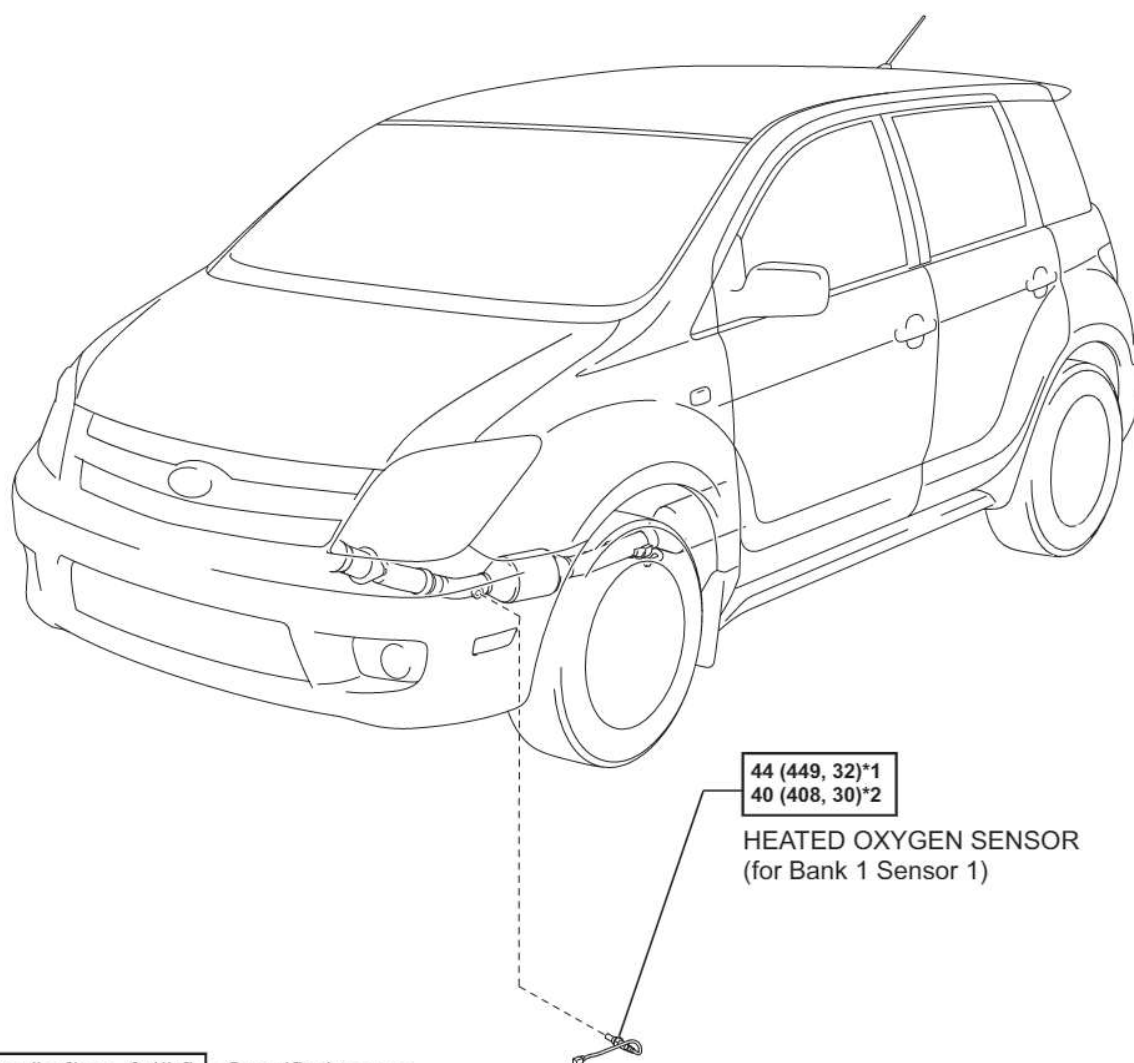
EC-18**1NZ-FE EMISSION CONTROL – VENTILATION VALVE**

- 2. CONNECT VENTILATION HOSE**
(a) Connect the ventilation hose to the ventilation valve.
- 3. INSTALL NO. 2 CYLINDER HEAD COVER (See page [FU-15](#))**

EC

HEATED OXYGEN SENSOR (for Bank 1 Sensor 1)

COMPONENTS



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

*1: For use with SST

*2: For use without SST

EC

EC-20

1NZ-FE EMISSION CONTROL – HEATED OXYGEN SENSOR (for Bank 1 Sensor 1)

ON-VEHICLE INSPECTION

1. CHECK AIR-FUEL RATIO COMPENSATION SYSTEM

HINT:
The system can also be checked by choosing "DATA MONITOR/O₂SENSOR OUTPUT VOLTAGE" on the intelligent tester monitor.

- (a) Connect the intelligent tester to terminals E3-21 (OX1A) and E3-28 (E2) of the ECM.

NOTICE:
Connect test leads from the backside of the connector with the ECU connected.

- (b) Warm up the heated oxygen sensor at an engine speed of 2,500 rpm for approximately 2 minutes.
(c) Check that the voltage varies between approximately 0 V and 1 V at an engine speed of 2,500 rpm.

OK:
The voltage varies more than 8 times in 10 seconds.

- NOTICE:**
- Perform the check immediately after warming up the heated oxygen sensor.
 - If the voltage variation could not be verified, warm up the heated oxygen sensor again.

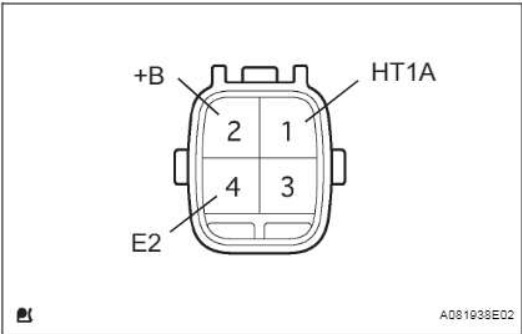
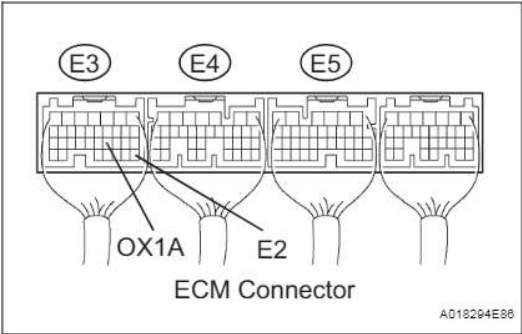
2. INSPECT HEATED OXYGEN SENSOR

- (a) Disconnect the sensor connector.
(b) Measure the resistance of the sensor.

Standard resistance

Tester Connection	Specified Condition
1 (HT1A) - 2 (+B)	11 to 16 Ω at 20°C (68°F)
1 (HT1A) - 4 (E2)	10 kΩ or higher

- If the result is not as specified, replace the sensor.
(c) Connect the sensor connector.



REMOVAL

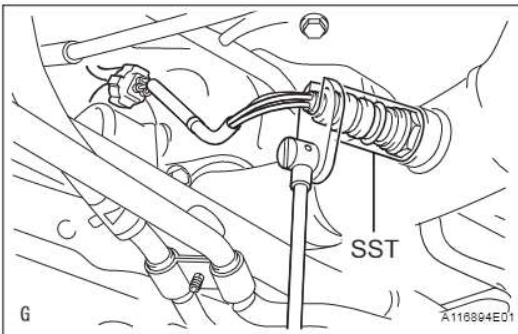
1. DISCONNECT CABLE FROM NEGATIVE BATTERY TERMINAL

CAUTION:

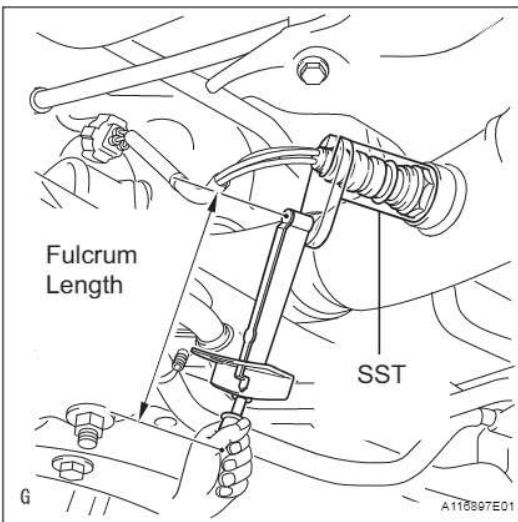
Wait at least 90 seconds after disconnecting the cable from the negative (-) battery terminal to prevent airbag and seat belt pretensioner activation.

2. REMOVE HEATED OXYGEN SENSOR

(a) Disconnect the sensor connector.



(b) Using SST, remove the sensor.
SST 09224-00010



INSTALLATION

1. INSTALL HEATED OXYGEN SENSOR

(a) Using SST, install the sensor.

SST 09224-00010

Torque: 44 N*m (449 kgf*cm, 32 ft.*lbf) for use with SST

40 N*m (408 kgf*cm, 30 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 initialization (see page [IN-23](#)).

NOTICE:

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

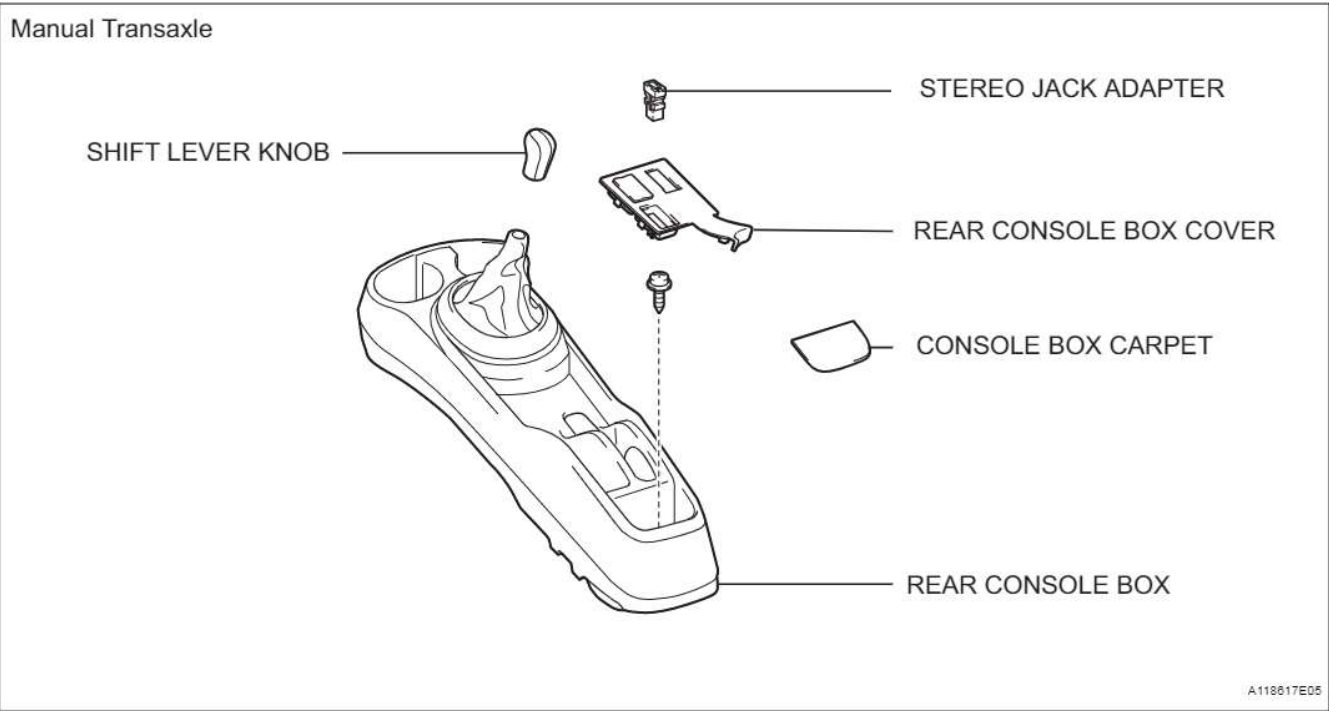
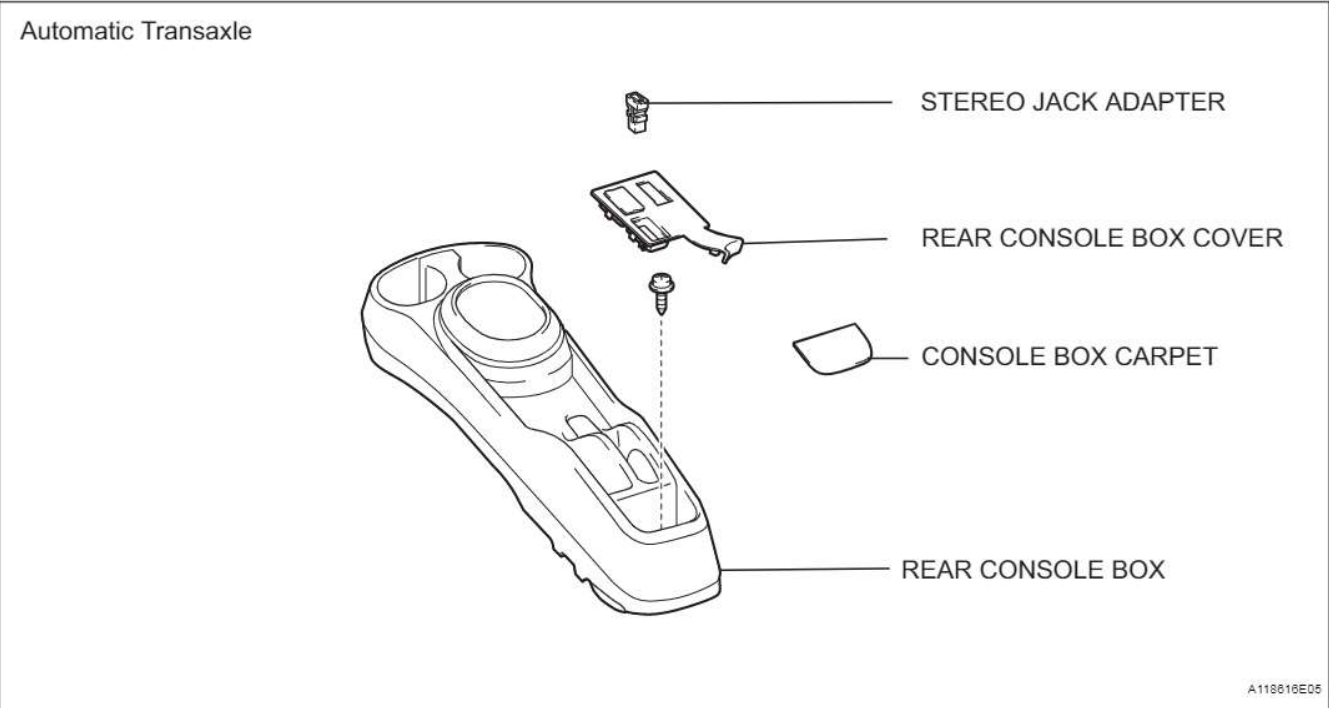
4. CHECK FOR EXHAUST GAS LEAKS

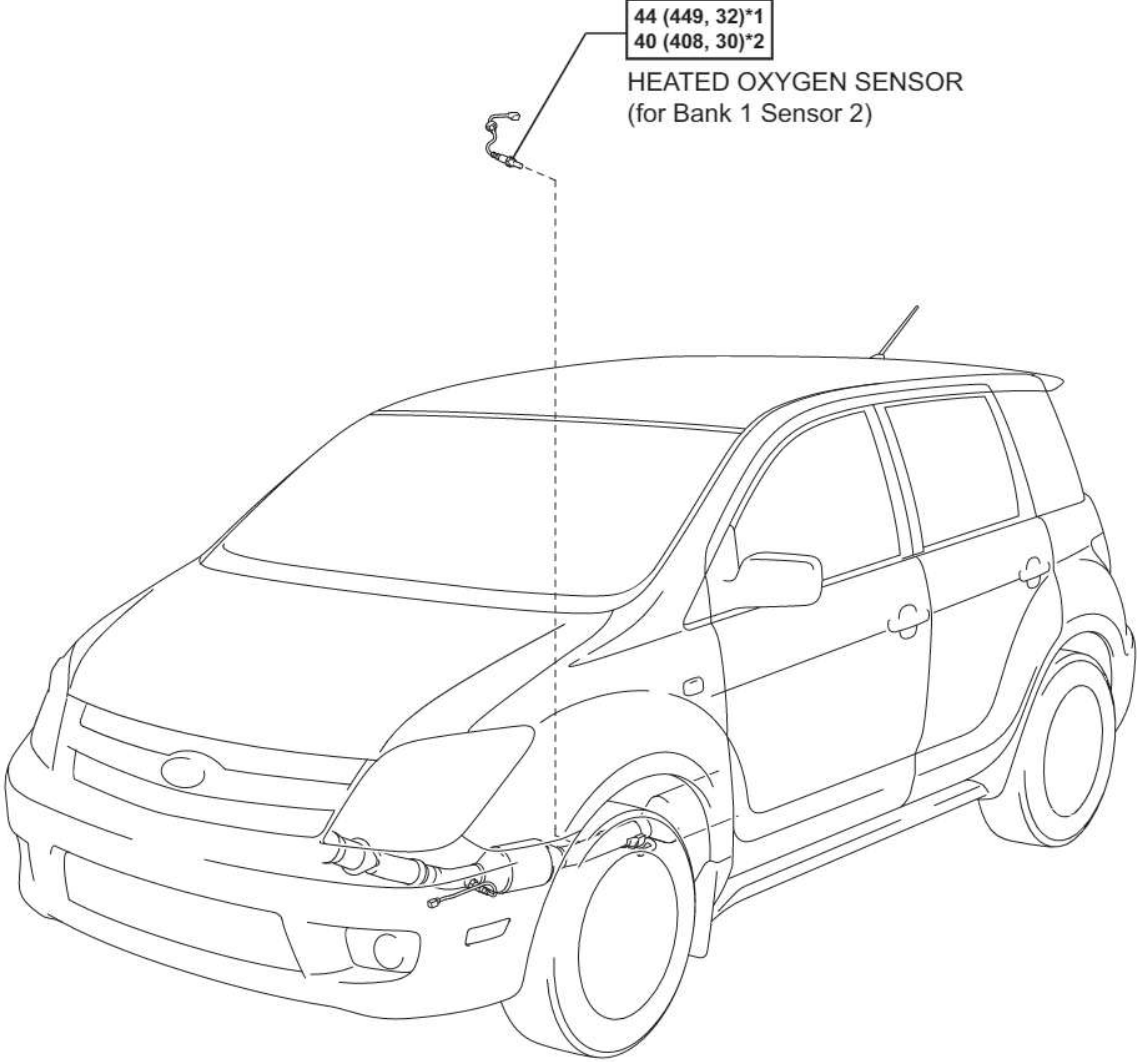
If gas is leaking, tighten the problem areas to stop the leak. Replace damaged parts as necessary.

EC

HEATED OXYGEN SENSOR (for Bank 1 Sensor 2)

COMPONENTS





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

*1: For use with SST

*2: For use without SST

P

EC

EC-24 1NZ-FE EMISSION CONTROL – HEATED OXYGEN SENSOR (for Bank 1 Sensor 2)

ON-VEHICLE INSPECTION

1. CHECK AIR-FUEL RATIO COMPENSATION SYSTEM

HINT:
The system can also be checked by choosing "DATA MONITOR/O₂SENSOR OUTPUT VOLTAGE" on the intelligent tester monitor.

- (a) Connect the intelligent tester to terminals E3-25 (OX1B) and E3-28 (E2) of the ECM.

NOTICE:
Connect test leads from the backside of the connector with the ECU connected.

- (b) Warm up the heated oxygen sensor at an engine speed of 2,500 rpm for approximately 2 minutes.
(c) Check that the voltage varies between approximately 0 V and 1 V at an engine speed of 2,500 rpm.

OK:
The voltage varies more than 8 times in 10 seconds.

- NOTICE:**
- Perform the check immediately after warming up the heated oxygen sensor.
 - If the voltage variation could not be verified, warm up the heated oxygen sensor again.

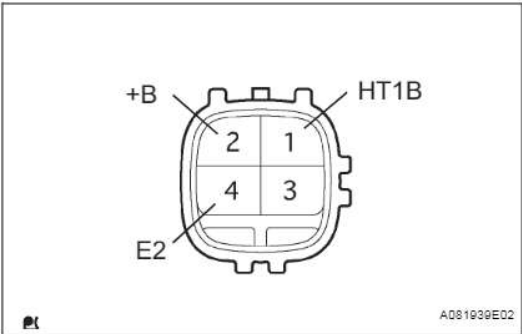
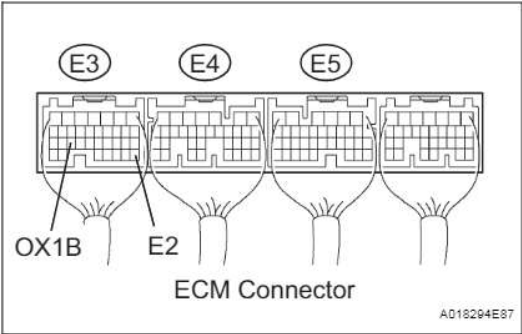
2. INSPECT HEATED OXYGEN SENSOR

- (a) Disconnect the sensor connector.
(b) Measure the resistance of the sensor.

Standard resistance

Tester Connection	Specified Condition
1 (HT1B) - 2 (+B)	11 to 16 Ω at 20°C (68°F)
1 (HT1B) - 4 (E2)	10 kΩ or higher

- If the result is not as specified, replace the sensor.
(c) Connect the sensor connector.



REMOVAL

1. DISCONNECT CABLE FROM NEGATIVE BATTERY TERMINAL

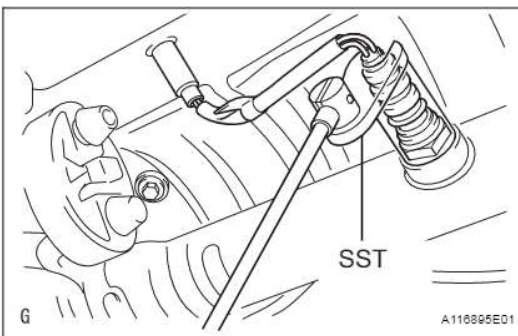
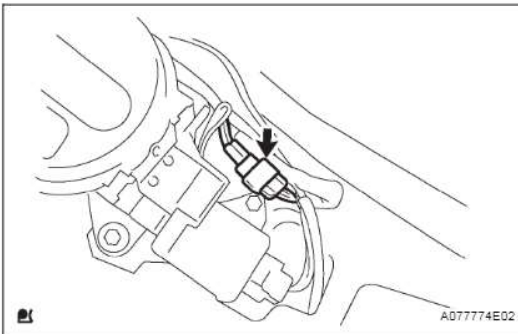
CAUTION:

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

2. REMOVE SHIFT LEVER KNOB (for Manual Transaxle)
3. REMOVE REAR CONSOLE BOX (See page [IP-26](#))

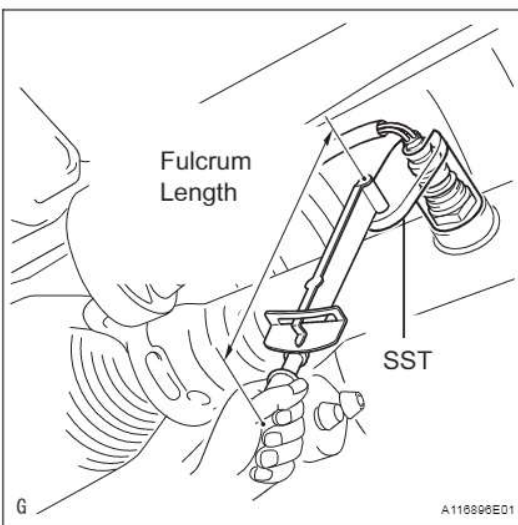
4. REMOVE HEATED OXYGEN SENSOR

(a) Disconnect the sensor connector.



(b) Using SST, remove the sensor.

SST 09224-00010



INSTALLATION

1. INSTALL HEATED OXYGEN SENSOR

(a) Using SST, install the sensor.

SST 09224-00010

Torque: 44 N*m (449 kgf*cm, 32 ft.*lbf) for use with SST

40 N*m (408 kgf*cm, 30 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. INSTALL REAR CONSOLE BOX (See page [IP-27](#))
3. INSTALL SHIFT LEVER KNOB (for Manual Transaxle)
4. CONNECT CABLE TO NEGATIVE BATTERY TERMINAL

EC

EC-26**1NZ-FE EMISSION CONTROL – HEATED OXYGEN SENSOR (for Bank 1 Sensor 2)**

5. PERFORM INITIALIZATION

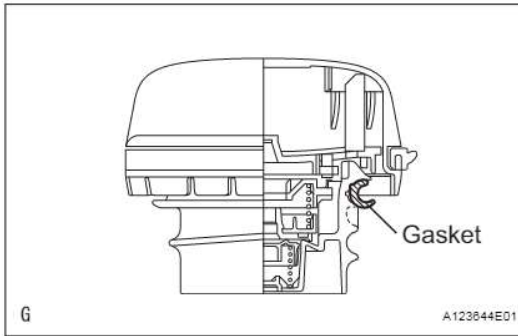
- (a) Perform initialization (see page [IN-23](#)).

NOTICE:

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

6. CHECK FOR EXHAUST GAS LEAKS

If gas is leaking, tighten the problem areas to stop the leak. Replace damaged parts as necessary.

EC-26**1NZ-FE EMISSION CONTROL – FUEL TANK CAP****FUEL TANK CAP****ON-VEHICLE INSPECTION****1. CHECK FUEL TANK CAP ASSEMBLY**

- (a) Visually check if the cap or gasket is deformed or damaged.

EC