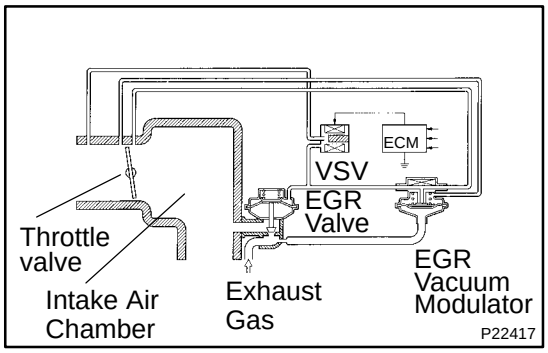
DI5PK-02

DTC	P0401	Exhaust Gas Recirculation Flow Insufficient Detected

CIRCUIT DESCRIPTION

The EGR system recirculates exhaust gas, which is controlled to the proper quantity to suit the driving conditions, into the intake air mixture to slow down combustion, reduce the combustion temp. and reduce NOx emissions. The amount of EGR is regulated by the EGR vacuum modulator according to the engine load.

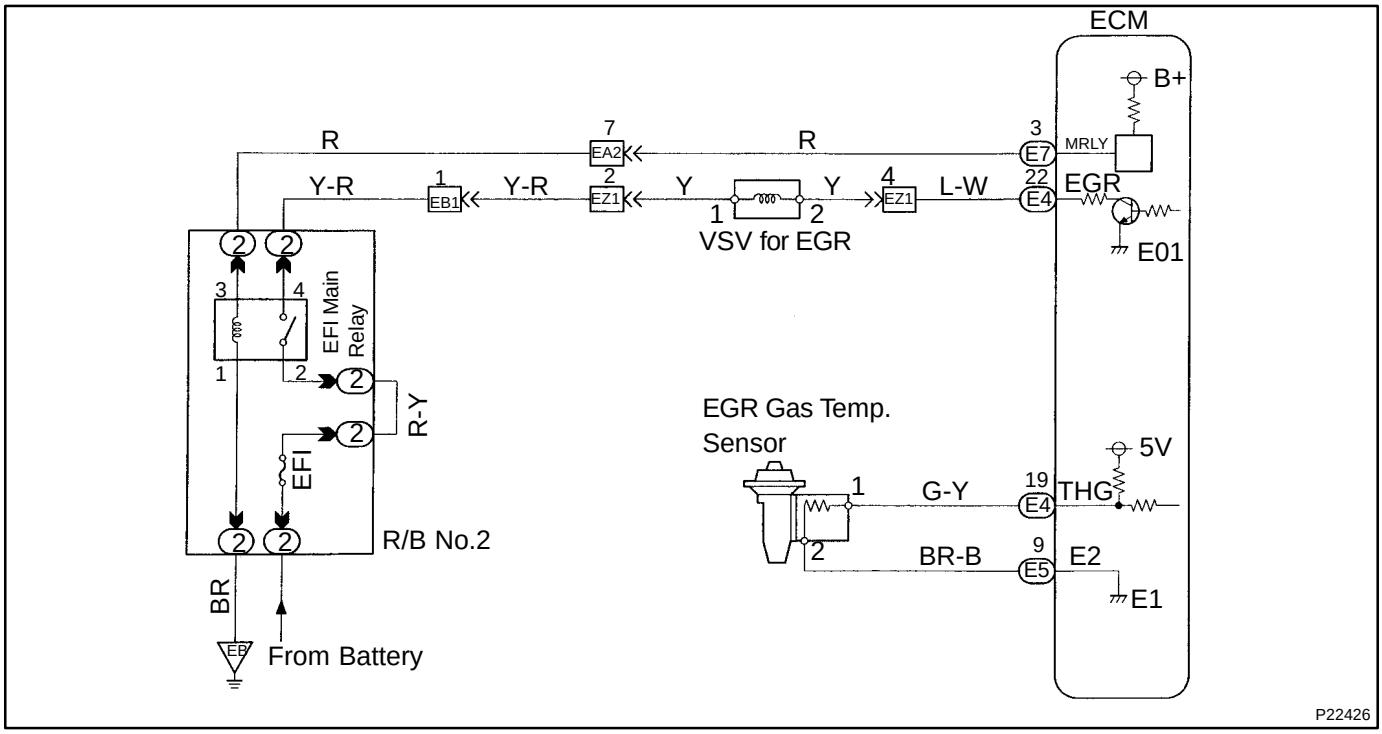


If even one of the following conditions is fulfilled, the VSV is turned ON by a signal from the ECM.
This results in atmospheric air acting on the EGR valve, closing the EGR valve and shutting off the exhaust gas (EGR cut-off). Under the following conditions, EGR is cut to maintain driveability.

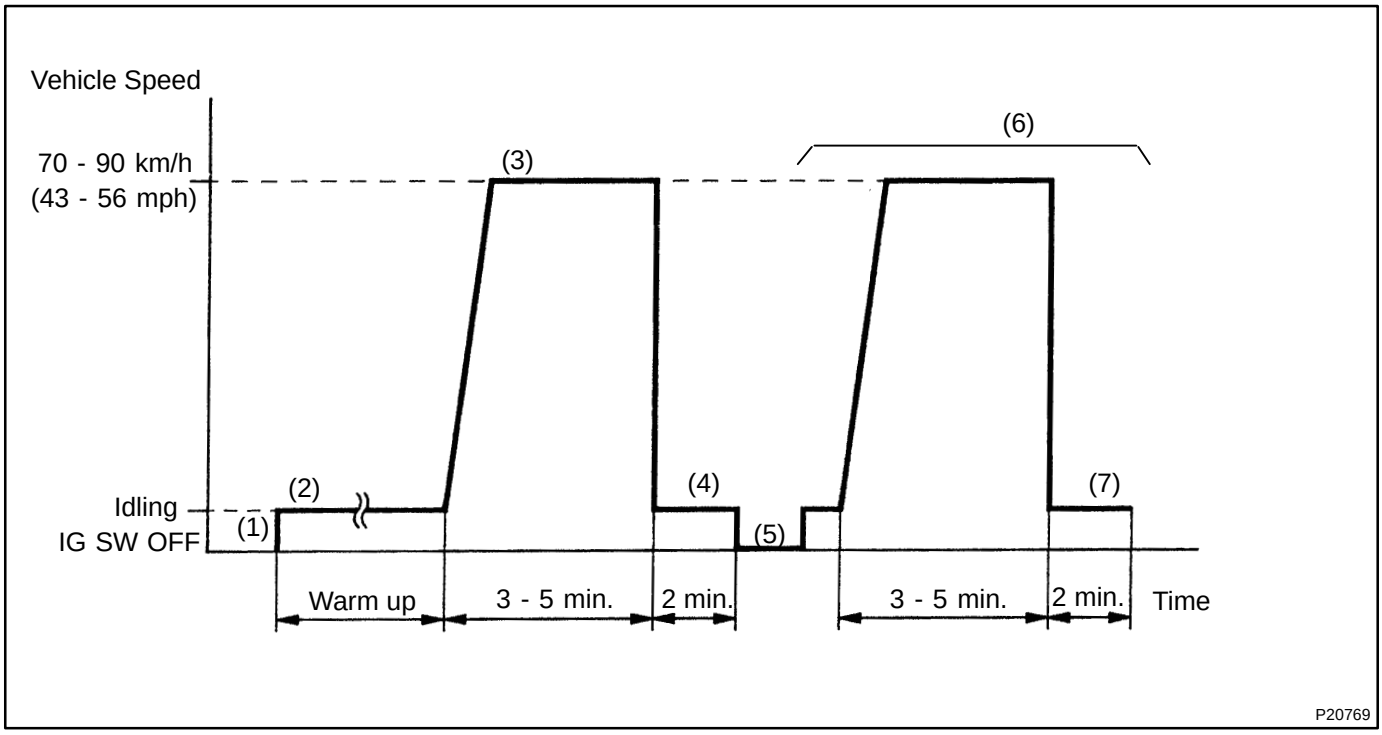
- Before the engine is warmed up.
- During deceleration (throttle valve closed).
- Light engine load (amount of intake air very small).
- Engine racing.

DTC No.	DTC Detecting Condition	Trouble Area
P0401	After the engine is warmed up and run at 80 km/h (50 mph) for 3 to 5 minutes, the EGR gas temperature sensor value does not exceed 38˚C (100.4˚F) above the ambient air temperature. (2 trip detection logic)	• EGR valve stuck closed • Short in VSV circuit for EGR • Open in EGR gas temp. sensor circuit • EGR hose disconnected • ECM

WIRING DIAGRAM



SYSTEM CHECK DRIVING PATTERN



(1) Connect the OBD II scan tool or TOYOTA hand-held tester to the DLC3.
(2) Start and warm up the engine with all accessories switched OFF.
(3) Run the vehicle at 70 - 90 km/h (43 - 56 mph) for 3 min. or more.
(4) Idle the engine for about 2 min.
(5) Stop at safe place and turn the ignition switch OFF.
(6) Start the engine and do steps (3) and (4) again.
(7) Check the "READINESS TESTS" mode on the OBD II scan tool or TOYOTA hand-held tester.

If "COMPL" is displayed and the MIL does not light up, the system is normal.
If "INCMPL" is displayed and the MIL does not light up, run the vehicle again and check it.
HINT:
"INCMPL" is displayed when either condition (a) or (b) exists.
(a) The system check is incomplete.
(b) There is a malfunction in the system.
If there is a malfunction in the system, the MIL will light up after steps (2) to (6) above are done.

INSPECTION PROCEDURE
TOYOTA hand-held tester

1	**Connect the TOYOTA hand-held tester and read value of EGR gas temp. value.**

PREPARATION:

(a) Remove the fuse cover on the instrument panel.
(b) Connect the TOYOTA hand-held tester to the DLC3.
(c) Turn ignition switch ON and push the TOYOTA hand-held tester main switch ON.

CHECK:

Read EGR gas temp. on the TOYOTA hand-held tester.

OK:

EGR gas temp.: 10˚C (50˚F) or more

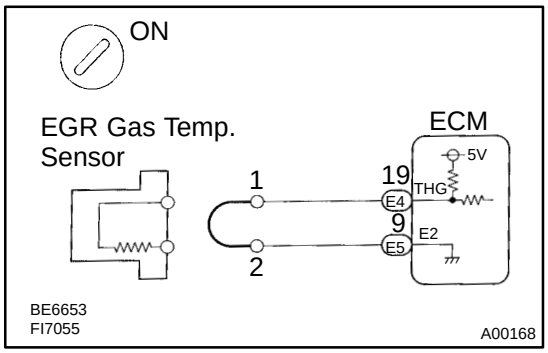
HINT:

If there is and open circuit, the TOYOTA hand-held tester indicates 3.1˚C (37.6˚F).

OK → **Go to step 4.**

NG

2	**Check for open in harness or ECM.**



PREPARATION:

(a) Disconnect the EGR gas temp. sensor connector.
(b) Connect sensor wire harness terminals together.
(c) Turn ignition switch ON.

CHECK:

Read EGR gas temp. on the TOYOTA hand-held tester.

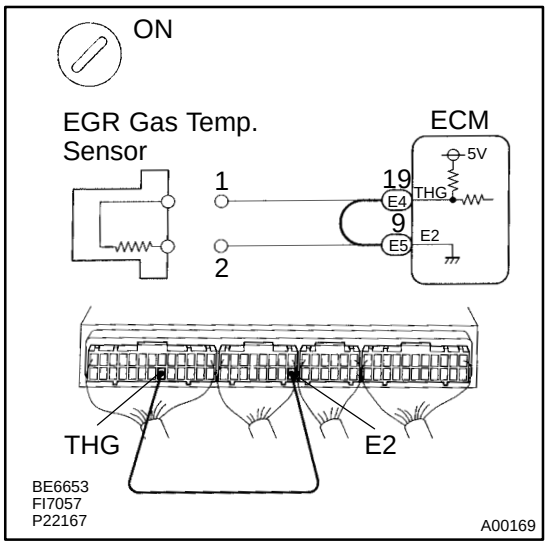
OK:

EGR gas temp.: Approx. 157.5˚C (315.5˚F)

OK → **Confirm good connection at sensor.**
If OK, replace EGR gas temp. sensor.

NG

3	Check for open in harness or ECM.



PREPARATION:

(a) Remove the instrument panel speaker No.1 panel (See page SF-65).

(b) Connect between terminals THG and E2 of ECM connector.

HINT:

EGR gas temp. sensor connector is disconnected.

Before checking, do a visual check and contact pressure check for the ECM connector (See page IN-28).

CHECK:

Read EGR gas temp. on the TOYOTA hand-held tester.

OK:

EGR gas temp.: Approx. 157.5°C (315.5°F)

OK	Open in harness between terminals E2 or THG. Repair or replace harness.

NG

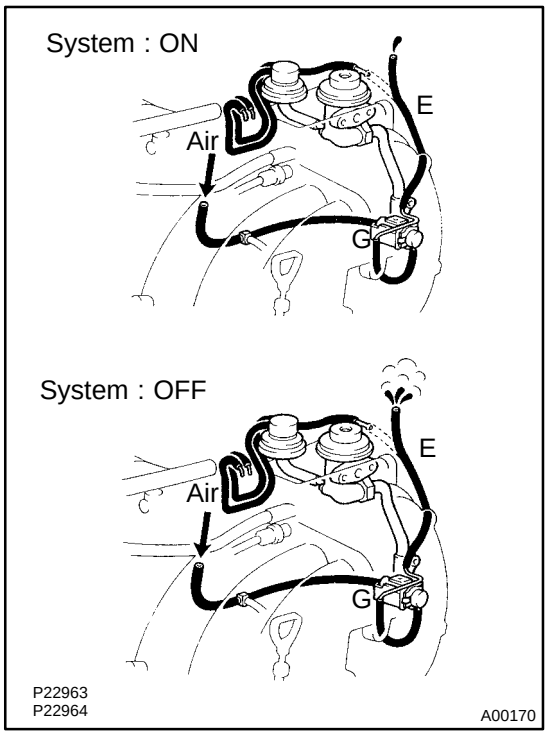
Confirm connection at ECM.
If OK, replace ECM (See page IN-28).

4	Check the connection of the vacuum hose, EGR hose (See page EC-11).

NG	Repair or replace.

OK

5	Check the VSV for EGR.



PREPARATION:

(a) Remove the fuse cover on the instrument panel.
(b) Connect the TOYOTA hand-held tester to the DLC3.
(c) Turn ignition switch ON and TOYOTA hand-held tester main switch ON.
(d) Select the ACTIVE TEST mode on the TOYOTA hand-held tester.

CHECK:

Check operation of VSV, when it is operated by the TOYOTA hand-held tester.

OK:

EGR system is ON:
Air does not flow from pipe G to pipe E.
EGR system is OFF:
Air from pipe G is flowing out through pipe E.

OK → **Go to step 7.**

NG

6	Check operation of the VSV for EGR (See page SF-60).

NG → **Replace VSV for EGR.**

OK

Check for open in harness and connector between VSV and ECM (See page IN-28).

7	Check EGR vacuum modulator (See page EC-11).

NG → **Repair or replace.**

OK

8	**Check EGR valve (See page EC-11).**

NG → **Repair or replace.**

OK

9	**Check value of EGR gas temp. sensor.**

PREPARATION:

(a) Remove the fuse cover on the instrument panel.
(b) Connect the TOYOTA hand-held tester to the DLC3.
(c) Turn ignition switch ON and TOYOTA hand-held tester main switch ON.
(d) Select the ACTIVE TEST mode on the TOYOTA hand-held tester. (EGR system ON)
(e) Race the engine at 4,000 rpm for 3 mins.

CHECK:

Measure the EGR gas temp. while racing engine at 4,000 rpm.

OK:

EGR gas temp. after 3 mins.: 140˚C (284˚F) or more

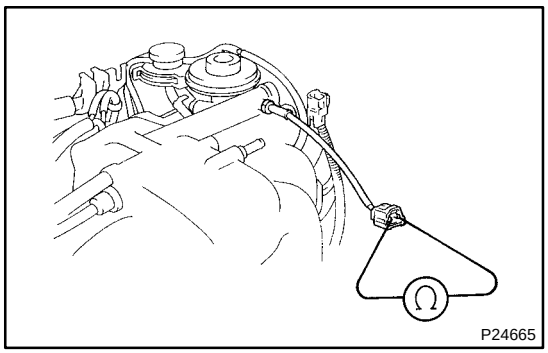
NG → **Replace EGR gas temp. sensor.**

OK

Check and replace ECM (See page IN-28).

OBD II scan tool (excluding TOYOTA hand-held tester)

1	**Check resistance of EGR gas temp. sensor.**



PREPARATION:
Disconnect EGR gas temp. sensor connector.
CHECK:
Measure resistance between terminals of EGR gas temp. sensor connector.
OK:

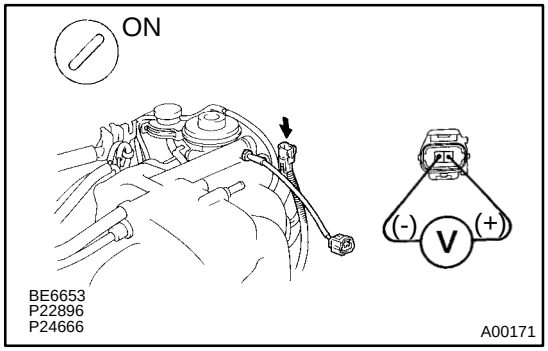
Resistance: 600 kΩ or less

HINT:
If there is open circuit, ohmmeter indicates 720 kΩ or more.

NG	**Check and replace EGR gas temp. sensor (See page SF-63).**

OK

2	**Check for open in harness or ECM.**



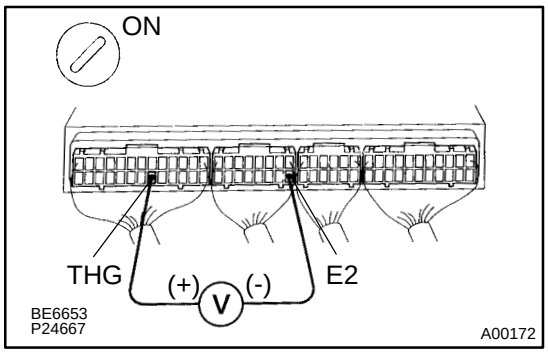
PREPARATION:
(a) Disconnect EGR gas temp. sensor connector.
(b) Turn ignition switch ON.
CHECK:
Measure voltage between terminals of EGR gas temp. sensor wire harness side connector.
OK:

Voltage: 4.5 - 5.5 V

OK	**Go to step 4.**

NG

3	Check for open in harness or ECM.



PREPARATION:

(a) Remove instrument panel speaker No.1 panel (See page SF-65).

(b) Turn ignition switch ON.

CHECK:

Measure voltage between terminals of THG and E2 of ECM connector.

HINT:

EGR gas temp. sensor connector is disconnected.

OK:

Voltage: 4.5 - 5.5 V

OK	Open in harness between terminals E2 or THG. Repair or replace harness.

NG

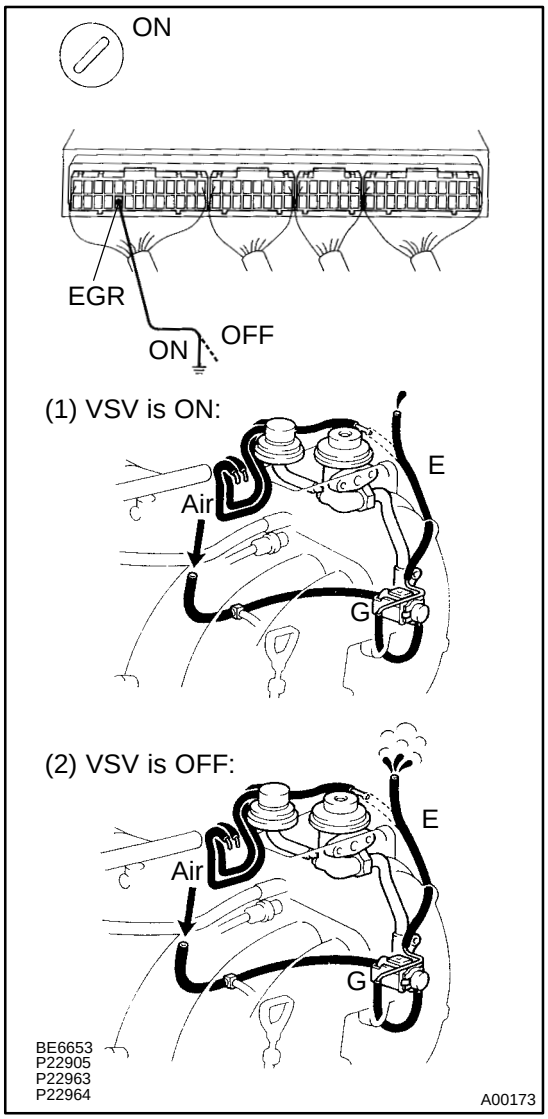
Confirm connection at ECM.
If OK, replace ECM (See page IN-28).

4	Check connection of vacuum hose, EGR hose (See page EC-11).

NG	Repair or replace.

OK

5	Check the VSV for EGR.



PREPARATION:

(a) Remove instrument panel speaker No.1 panel (See page SF-65).

(b) Turn ignition switch ON.

CHECK:

Check VSV function.

(1) Connect between terminal EGR of ECM and body ground (ON).

(2) Disconnect between terminal EGR of ECM and body ground (OFF).

OK:

(1) VSV is ON:
Air does not flow from pipe G to pipe E.
(2) VSV is OFF:
Air from pipe G is flows out through pipe E.

OK	**Go to step 7.**

NG

6	Check operation for the VSV for EGR (See page SF-60).

NG → Replace VSV for EGR.

OK

Check for open in harness and connector between R/B No.2 and ECM (See page IN-28).

7	Check EGR vacuum modulator (See page EC-11).

NG → Repair or replace.

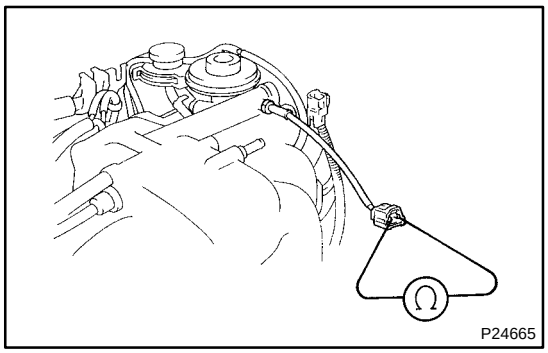
OK

8	Check EGR valve (See page EC-11).

NG → Repair or replace.

OK

9	**Check resistance of EGR gas temp. sensor (See page SF-63).**



PREPARATION:

(a) Disconnect EGR gas temp. sensor connector.
(b) Start the engine and warm it up.
(c) Disconnect VSV connector for EGR.
(d) Race the engine at 4,000 rpm or 3 mins.

CHECK:

Measure the resistance of the EGR gas temp. sensor while racing the engine at 4,000 rpm.

OK:

Resistance of EGR gas temp. sensor after 3 mins.: 4.3 kΩ or less

HINT:
At 20˚C (68˚F): 188.6 - 439.0 kΩ for resistance.

NG → **Replace EGR gas temp. sensor.**

OK

Check and replace ECM (See page IN-28).