DI9GH–02

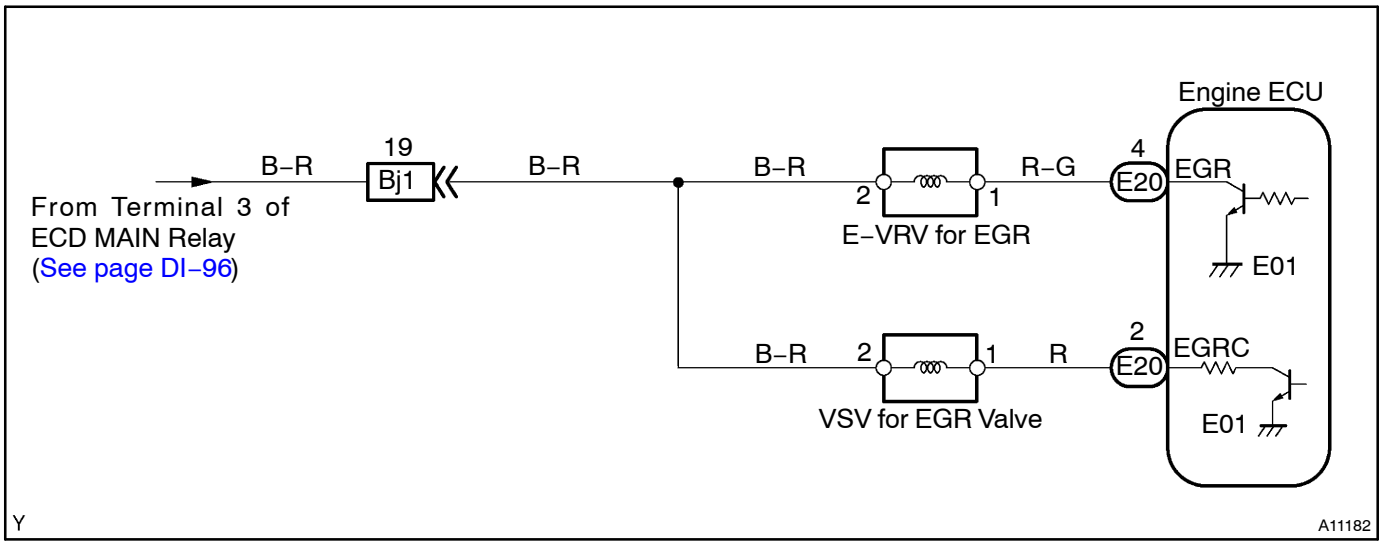
EGR Control Circuit

CIRCUIT DESCRIPTION

The EGR system recirculates exhaust gas, which is controlled to proper quantity for variable driving conditions, into the intake air to moderate combustion, reduce the combustion temperature and reduce NOx emissions,
Valve lift amount of the EGR valve is controlled by vacuum regulated by the E–VRV operated by the engine ECU.
If any one of the following conditions come to existence, the VSV is turned ON by the ECU, and atmospheric air is supplied into the EGR valve. This results 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
- Engine speed over 3,000 rpm

WIRING DIAGRAM



INSPECTION PROCEDURE

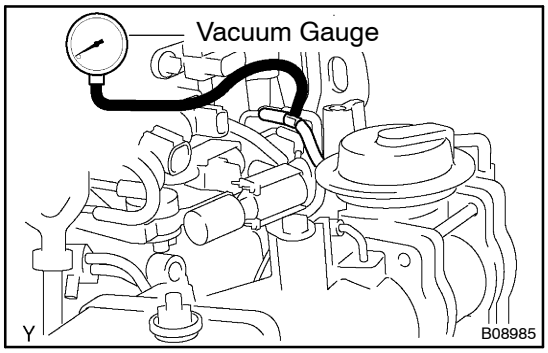
When using hand–held tester:

1	**Check connection of vacuum hose.**

NG → **Repair or replace.**

OK

2	Check vacuum between EGR valve and VSV for EGR valve at 1,600 rpm.



PREPARATION:

(a) Using a 3–way connector, apply a vacuum gauge to the hose between the VSV and EGR valve.
(b) Warm up the engine to above 80˚C (176˚F).

CHECK:

Check the vacuum at 1,600 rpm.

RESULT:

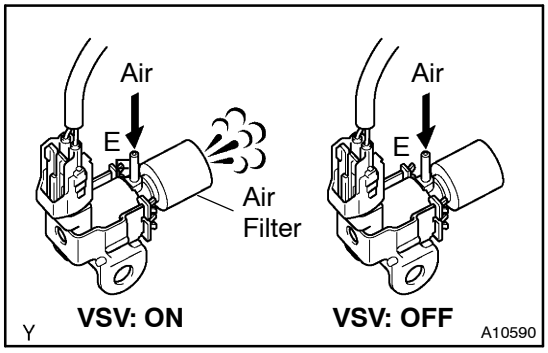
Type	Vacuum
I	0 kPa (0 mmHg, 0in. Hg)
II	0 kPa (0 mmHg, in. Hg) – 18.7 kPa (210 mmHg, 8.3 in. Hg)
III	Above 18.7 kPa (210 mmHg, 8.3 in. Hg)

Type I → **Go to step 7.**

Type III → **Go to step 10.**

Type II

3	Check VSV circuit for EGR valve.



PREPARATION:

(a) Disconnect the vacuum hose from the VSV.
(b) Connect the hand–held tester to the DLC3.
(c) Turn the ignition switch ON and push the hand–held tester main switch ON.
(d) Select the ACTIVE TEST mode on the hand–held tester.

CHECK:

Check the operation of the VSV when it is operated by the hand–held tester.

OK:

VSV is ON:
Air from port E flows out through air filter.
VSV is OFF:
Air does not flow from port E to air filter.

OK → **Check connection, damage and blockage of vacuum hose.**

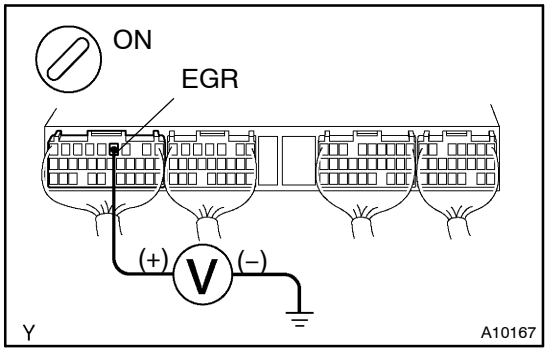
NG

4	**Check VSV for EGR valve (See page ED–12).**

NG → **Replace VSV for EGR valve.**

OK

5	**Check voltage between terminal EGR of engine ECU connector and body ground.**



PREPARATION:

(a) Disconnect the engine ECU from the body bracket (See page ED–30).

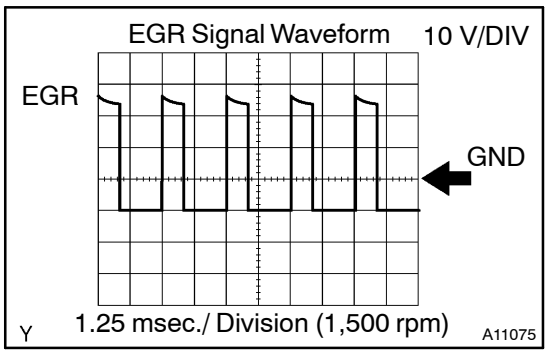
(b) Turn the ignition switch ON.

CHECK:

Measure the voltage between terminal EGR of the engine ECU connector and body ground.

OK:

Voltage: 18 – 27 V



Reference: INSPECTION USING OSCILLOSCOPE

During EGR system is ON (engine speed 1,500 rpm), check the waveform between terminals EGR and E1 of the engine ECU connector.

HINT:

The correct waveform is as shown.

NG → **Check and replace engine ECU (See page IN–20).**

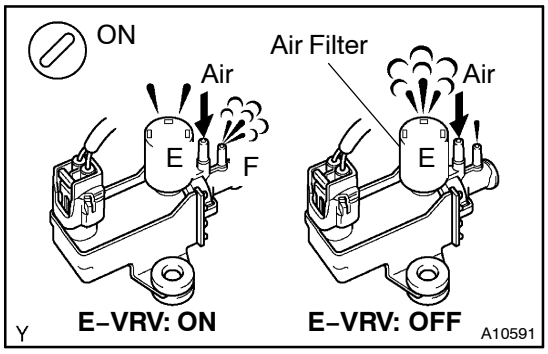
OK

6	**Check for open and short in harness and connector between VSV for EGR valve and engine ECU (See page IN–20).**

NG → **Repair or replace harness or connector.**

OK

7	**Check operation of E–VRV for EGR.**



PREPARATION:

(a) Disconnect the vacuum hoses from the E–VRV.
(b) Connect the hand–held tester to the DLC3.
(c) Turn the ignition switch ON and push the hand–held tester main switch ON.
(d) Select the ACTIVE TEST mode on the hand–held tester.

CHECK:

Check the operation of the E–VRV when it is operated by the hand–held tester.

OK:

E–VRV ON:
Air from port E flows out from port F.
E–VRV OFF:
Air from port E flows out from air filter.

OK	**Go to step 10.**

NG

8	**Check E–VRV for EGR (See page ED–10).**

NG	**Replace E–VRV for EGR.**

OK

9	**Check for open and short in harness and connector between E–VRV for EGR and engine ECU, E–VRV and ECD main relay (Marking: ECD MAIN) (See page IN–20).**

NG	**Repair or replace harness or connector.**

OK

10	**Check EGR valve (See page EC–7).**

NG → Replace EGR valve.

OK

Check and replace engine ECU (See page IN–20).

When not using hand–held tester:

1	Check connection of vacuum hose.

NG → Repair or replace.

OK

2	Check vacuum between EGR valve and VSV for EGR at 1,600 rpm (See page DI–77, step 2).

Type I → Go to step 6.

Type III → Go to step 9.

Type II

3	Check VSV for EGR valve (See page ED–12).

NG → Replace VSV for EGR valve.

OK

4	Check voltage between terminal EGR of engine ECU connector and body ground (See page DI–77, step 5).

NG	Check and replace engine ECU (See page IN–20).

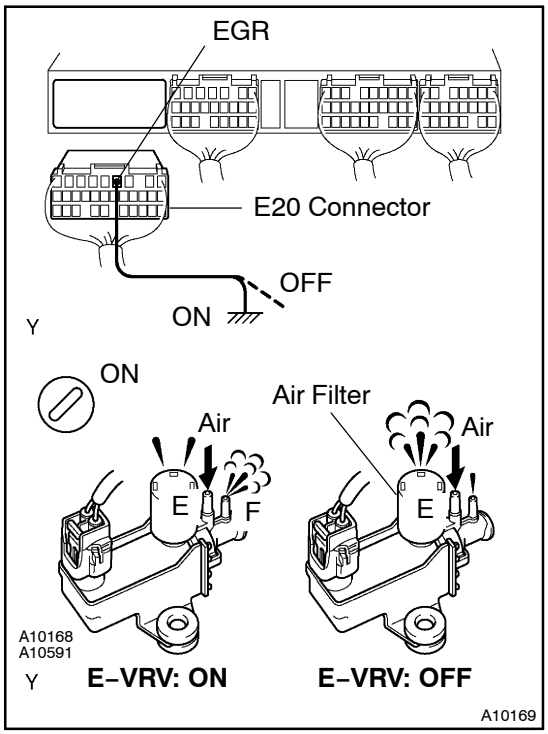
OK

5	Check for open and short in harness and connector between VSV for EGR valve and engine ECU (See page IN–20).

NG	Repair or replace harness or connector.

OK

6	Check operation of E–VRV for EGR.



PREPARATION:

(a) Disconnect the engine ECU from the body bracket (See page ED–30).

(b) Disconnect the E20 connector from the engine ECU.

(c) Turn the ignition switch ON.

CHECK:

Check the E–VRV operation.

(1) Connect between terminal EGR of the engine ECU connector and body ground (ON).

(2) Disconnect between terminal EGR of the engine ECU connector and body ground (OFF).

OK:

E–VRV ON:
Air from port E flows out through port F.
E–VRV OFF:
Air from port E flows out through air filter.

OK	Go to step 9.

NG

7	Check E–VRV for EGR (See page ED–10).

NG → Replace E–VRV for EGR.

OK

8	Check for open and short in harness and connector between E–VRV for EGR and engine ECU, E–VRV and ECD main relay (Marking: ECD MAIN) (See page IN–20).

NG → Repair or replace harness or connector.

OK

9	Check EGR valve (See page EC–7).

NG → Replace EGR valve.

OK

Check and replace engine ECU (See page IN–20).