DI3SC–01

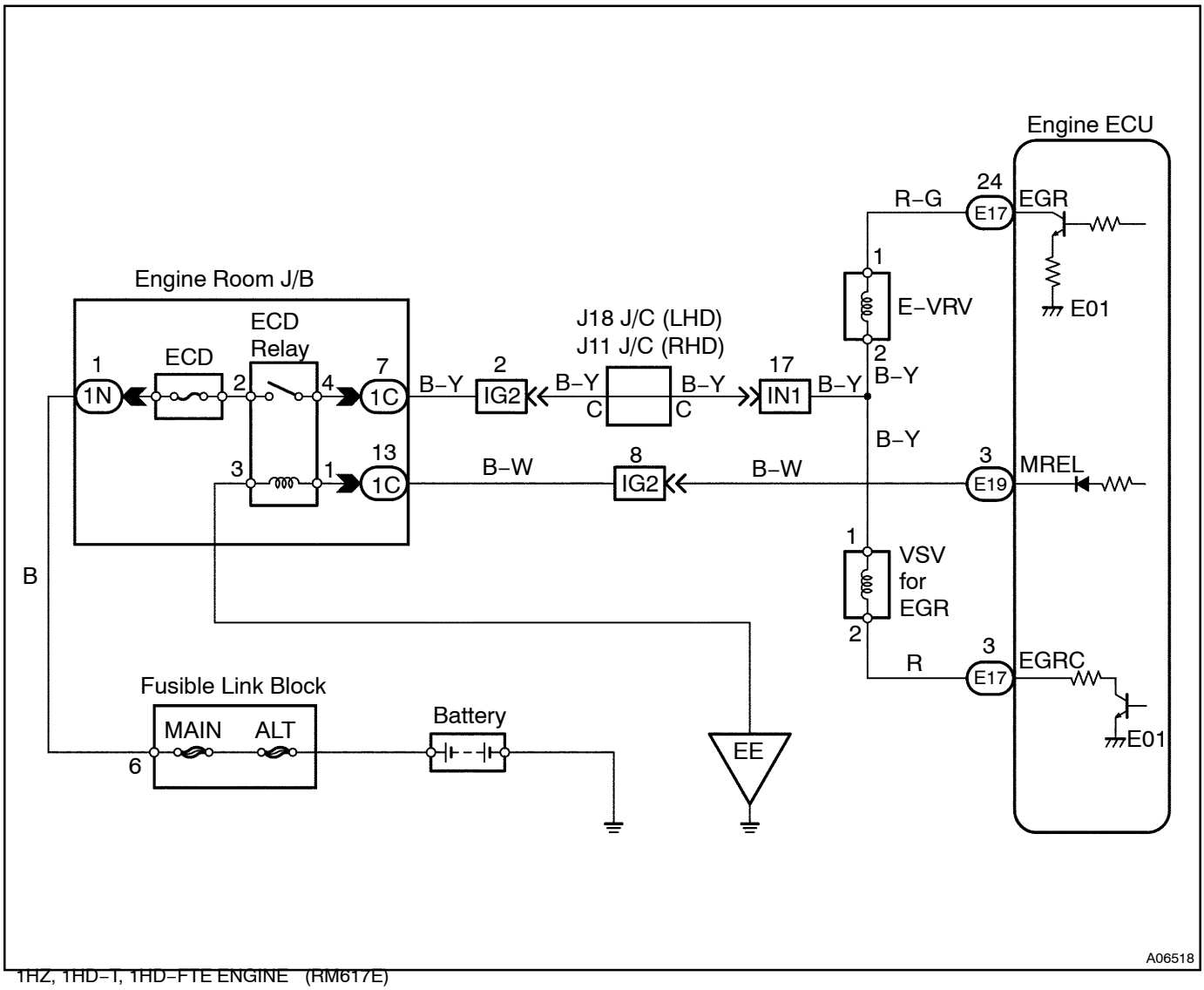
EGR Control Circuit

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 temperature and reduce NOx emissions,
The lift amount of EGR valve is controlled by the vacuum which is regulated by the E–VRV operated by the engine ECU.
If even one of the following conditions is fulfilled, the VSV is turned ON by a signal from the ECU. 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 (Diesel throttle valve closed)
- Light engine load (amount of intake air very small)
- Engine speed over 3,000 rpm

WIRING DIAGRAM



INSPECTION PROCEDURE

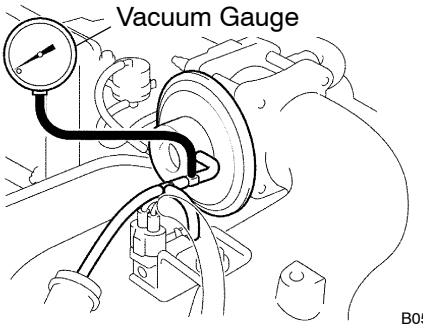
When using hand–held tester

1	**Check the connection of vacuum hose.**

NG → **Repair or replace.**

OK

2	**Check the vacuum between EGR valve and VSV for EGR at 1,500 rpm.**



PREPARATION:

(a) Using a 3–way connector, connect 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 1,500 rpm.

RESULT:

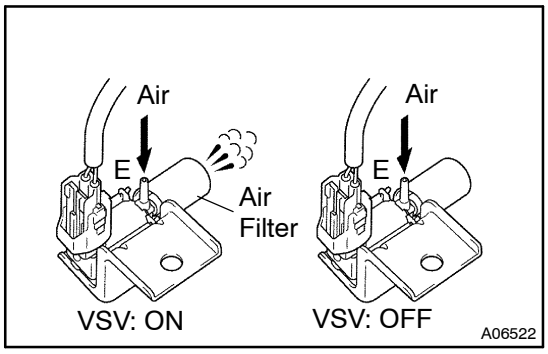
Type	Vacuum
I	0 kPa (0 mmHg, 0 in. Hg)
II	0 kPa (0 mmHg, in. Hg) ~ 28 kPa (210 mmHg, 8.3 in. Hg)
III	Above 28 kPa (210 mmHg, 8.3 in. Hg)

Type I → **Go to step 7.**

Type III → **Go to step 10**

Type II

3	Check the VSV circuit for EGR.



PREPARATION:

(a) Disconnect the vacuum hose from the VSV for EGR.
(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 operation of VSV for EGR, when it is operated by the hand–held tester.

OK:

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

OK	Check the connection, damage and blockage of vacuum hose.

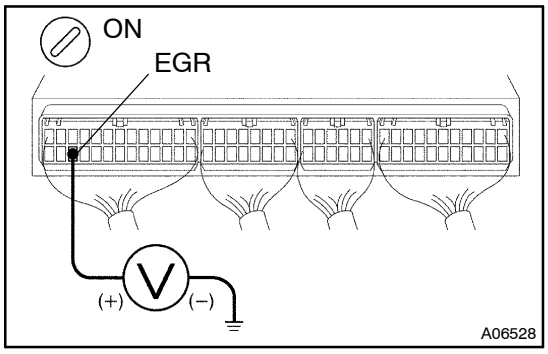
NG

4	Check VSV for EGR (See page EC–9).

NG	Replace VSV for EGR.

OK

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



PREPARATION:

(a) Remove the glove compartment door.

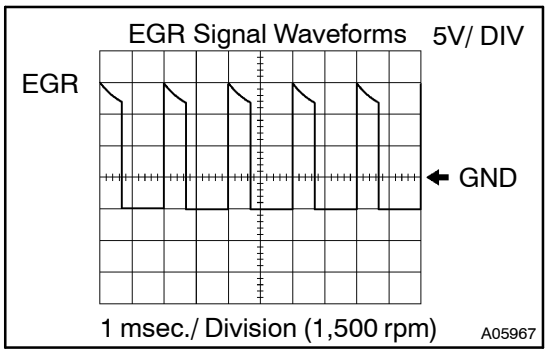
(b) Turn the ignition switch ON.

CHECK:

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

OK:

Voltage: 9 – 14 V



Reference: INSPECTION USING OSCILLOSCOPE

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

HINT:

The correct waveform is as shown.

NG → **Check and replace engine ECU (See page IN–19).**

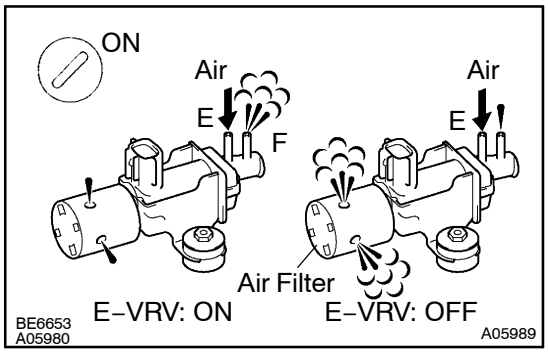
OK

6	Check for open and short in harness and connector between VSV for EGR and engine ECU (See page IN–19).

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

OK

7	Check operation of E–VRV.



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 the push hand–held tester main switch ON.
(d) Select the ACTIVE TEST mode on the hand–held tester.

CHECK:

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

OK:

E–VRV ON:
Air from pipe E is flowing out through pipe F.
E–VRV OFF:
Air from pipe E is flowing out through air filter.

OK	Go to step 10.

NG

8	Check E–VRV for EGR (See page EC–9).

NG	Replace E–VRV.

OK

9	Check for open and short in harness and connector between E–VRV and engine ECU, E–VRV and ECD main relay (Marking : ECD) (See page IN–19).

NG	Repair or replace harness or connector.

OK

10	Check EGR valve (See page EC–9).

NG → Replace the EGR valve.

OK →

Check and replace engine ECU (See page IN–19).

When not using hand–held tester

1	Check the connection of vacuum hose.

NG → Repair or replace.

OK →

2	Check the vacuum between EGR valve and VSV for EGR at 1,500 rpm (See page DI–85, Step 2).

Type I → Go to step 6.

Type III → Go to step 9.

Type II →

3	Check VSV for EGR (See page EC–9).

NG → Replace VSV for EGR.

OK →

4	**Check voltage between terminal EGR of engine ECU and body ground (See page DI–85, Step 5).**

NG → **Check and replace engine ECU (See page IN–19).**

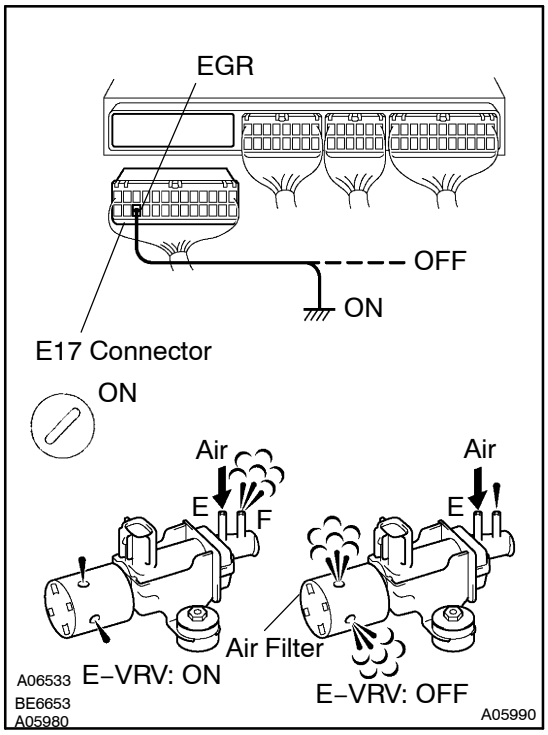
OK

5	**Check for open and short in harness and connector between VSV for EGR and engine ECU (See page IN–19).**

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

OK

6	**Check operation of E–VRV.**



PREPARATION:

(a) Remove the glove compartment door.
(b) Disconnect the ”E17” connector of engine ECU.
(c) Turn the ignition switch ON.

CHECK:

Check E–VRV operation.

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

OK:

E–VRV ON:
Air from pipe E is flowing out through pipe F.
E–VRV OFF:
Air from pipe E is flowing out through air filter.

OK → **Go to step 9.**

NG

7	Check E–VRV (See page EC–9).

NG → Replace E–VRV.

OK ↓

8	Check for open and short in harness and connector between E–VRV and engine ECU, E–VRV and ECD main relay (Marking : ECD) (See page IN–19).

NG → Repair or replace harness or connector.

OK ↓

9	Check EGR valve (See page EC–9).

NG → Replace EGR valve.

OK ↓

Check and replace engine ECU (See page IN–19).