DIDYE–01

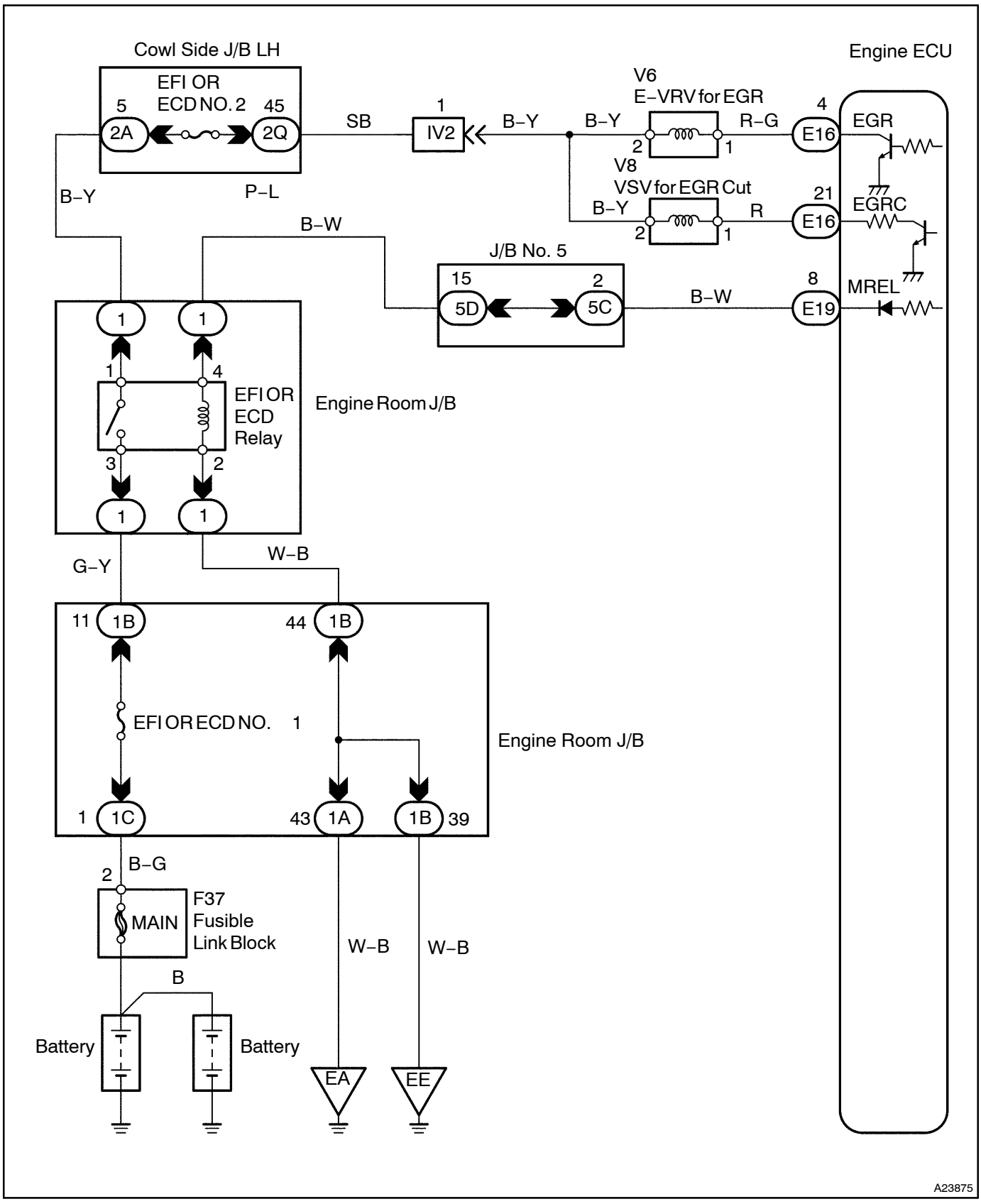
EGR Control Circuit

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 the EGR valve is controlled by the vacuum regulated by the VRV for EGR, which is 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, the 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

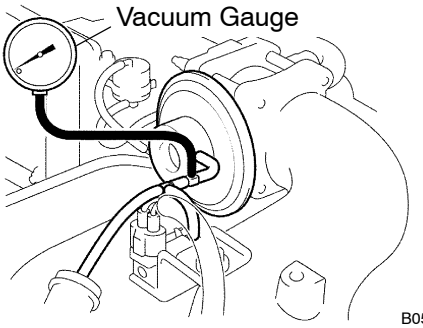
When using intelligent tester II:

1	**Check connection of vacuum hose.**

NG → **Repair or replace.**

OK

2	**Check the vacuum between EGR valve and VSV for EGR Cut 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:

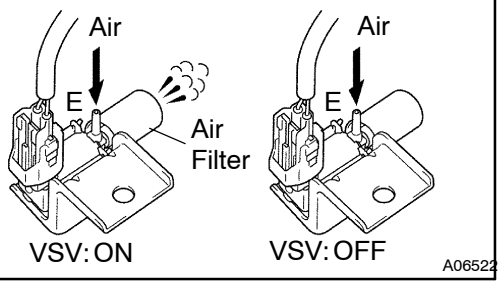
Type	Vacuum
I	0 kPa (0 mmHg, 0 in.Hg)
II	0 kPa (0 mmHg, 0 in.Hg) to 28 kPa (2 10 mmHg, 8.3 in.Hg)
III	Above 28 kPa (2 10 mmHg, 8.3 in.Hg)

Type I → **Go to step 7.**

Type III → **Go to step 10.**

Type II

3	Check the VSV for EGR Cut operation.



PREPARATION:

(a) Disconnect the vacuum hose from the VSV for EGR Cut.
(b) Connect the intelligent tester II to the DLC3.
(c) Turn the ignition switch ON and push the intelligent tester II main switch ON.
(d) Select the Active Test mode on the intelligent tester II.

CHECK:

Check operation of VSV for EGR Cut when it is operated by the intelligent tester II.

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 connection, damage and blockage of vacuum hose.

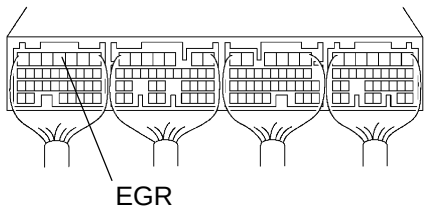
NG

4	Check VSV for EGR Cut (See Pub No. RM6 17E, page EC –9).

NG	Replace VSV for EGR Cut.

OK

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



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PREPARATION:

(a) Remove the glove compartment door.

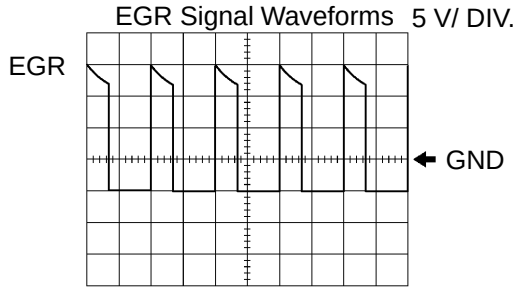
(b) Turn the ignition switch ON.

CHECK:

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

OK:

Voltage: 9 to 14 V



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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.

HINT:

The correct waveform is as shown.

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

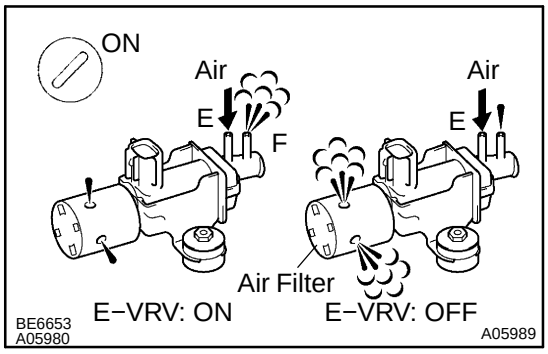
OK

6	Check for open and short in harness and connector between E−VRV 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 intelligent tester II to the DLC3.
(c) Turn the ignition switch ON and push the intelligent tester II main switch ON.
(d) Select the Active Test mode on the intelligent tester II.

CHECK:

Check operation of E−VRV when it is operated by the intelligent tester II.

OK:

E−VRV ON:
Air from pipe E flows out through pipe F.
E−VRV OFF:
Air from pipe E flows out through air filter.

OK	Go to step 10.

NG

8	Check E−VRV for EGR (See Pub No. RM617E, 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 EFI OR ECD relay (See page IN−19).

NG	Repair or replace harness or connector.

OK

10	**Check EGR valve (See Pub No. RM617E, page EC−9).**

NG → **Replace the EGR valve.**

OK

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

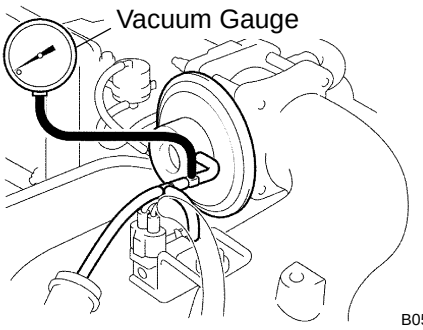
When not using intelligent tester II:

1	**Check connection of vacuum hose.**

NG → **Repair or replace.**

OK

2	**Check 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, 0 in.Hg) to 28 kPa (210 mmHg, 8.3 in.Hg)
III	Above 28 kPa (210 mmHg, 8.3 in.Hg)

Type I → **Go to step 6.**

Type III → **Go to step 9.**

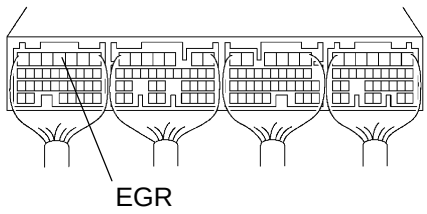
Type II

3	**Check VSV for EGR (See Pub No. RM617E, page EC−9).**

NG → **Replace VSV for EGR.**

OK

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



PREPARATION:

(a) Remove the glove compartment door.

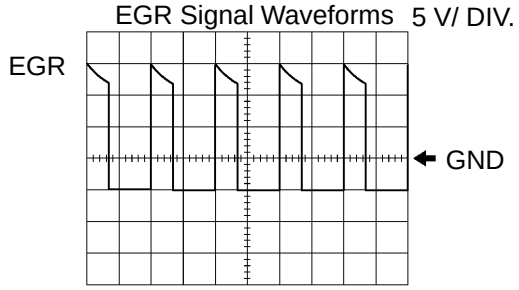
(b) Turn the ignition switch ON.

CHECK:

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

OK:

Voltage: 9 to 14 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.

HINT:

The correct waveform is as shown.

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

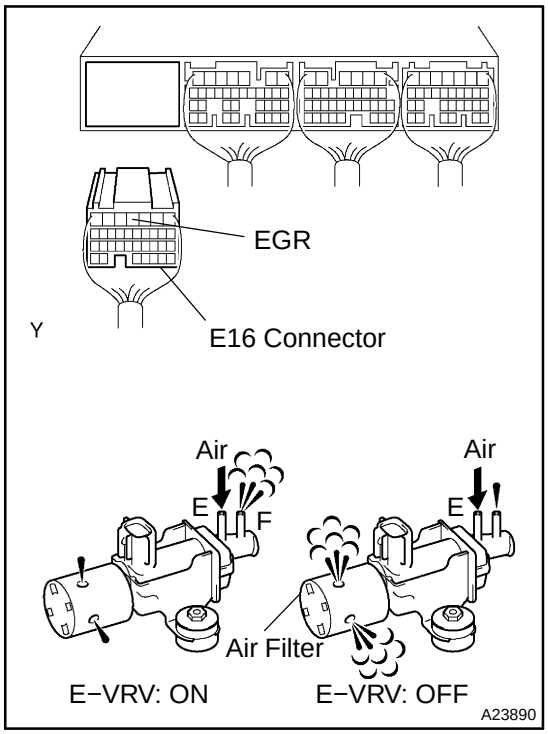
OK

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 E16 connector of the engine ECU.
(c) Turn the ignition switch ON.

CHECK:

Check 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 pipe E flows out through pipe F.
E−VRV OFF:
Air from pipe E flows out through air filter.

OK	Go to step 9.

NG

7	Check E−VRV for EGR (See Pub No. RM617E, 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 EFI OR ECD relay (See page IN−19).

NG	Repair or replace harness or connector.

OK

9	**Check EGR valve (See Pub No. RM617E, page EC−9).**

NG → **Replace EGR valve.**

OK

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