ACIS CONTROL CIRCUIT

CIRCUIT DESCRIPTION

HINT:

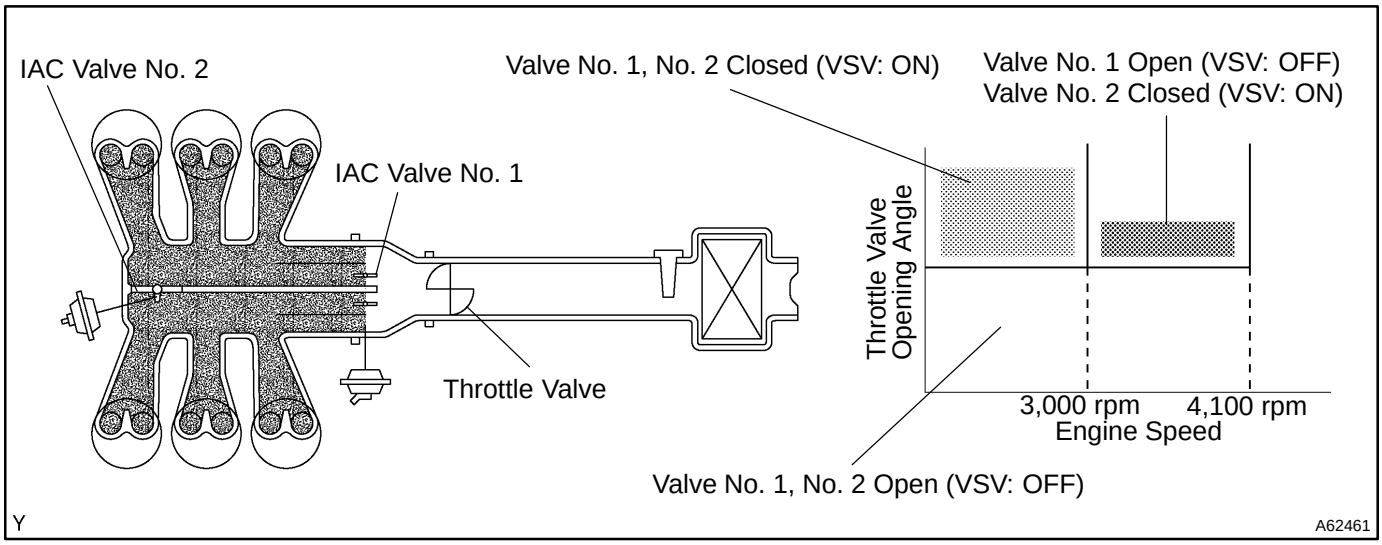
- The 1MZ−FE engine has 2 VSVs (No.1 and No.2)
- The 3MZ−FE engine has a VSV (No.1 only)

ACIS stands for ”Acoustic Control Induction System”.

1MZ−FE:

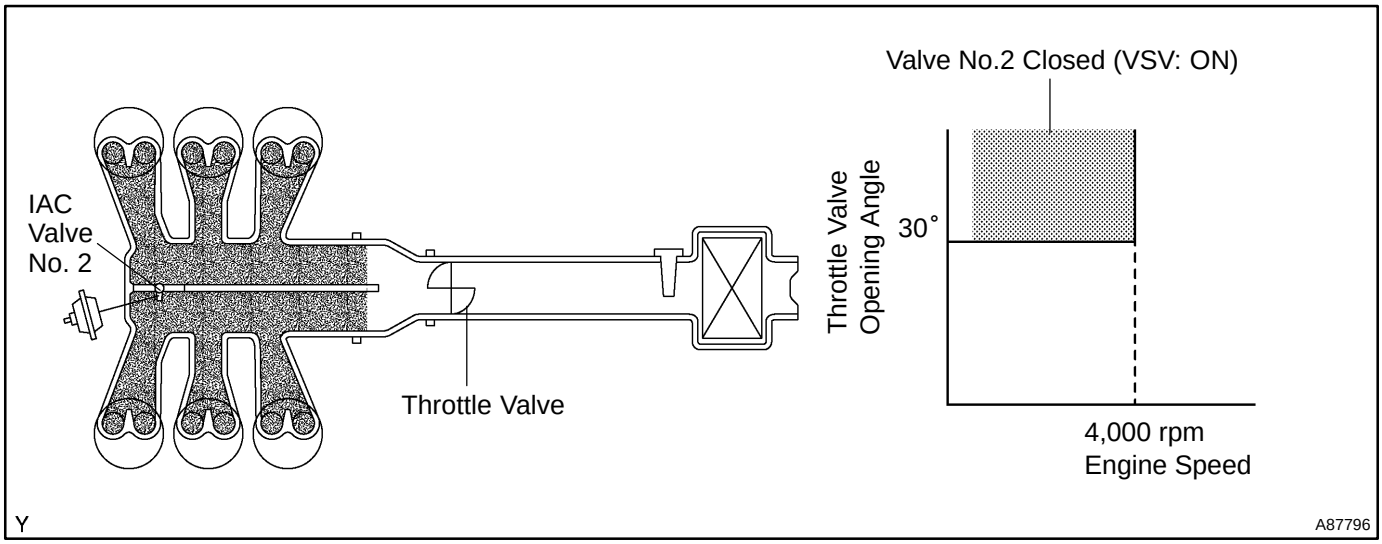
This circuit opens and closes the Intake Air Control (IAC) valve No. 1 and No. 2 in response to the engine load in order to increase the intake efficiency.

When the engine speed is 4,100 rpm or less and the throttle valve opening angle is 30° or more, the ECM turns the two VSVs On or Off and operates the IAC valve.

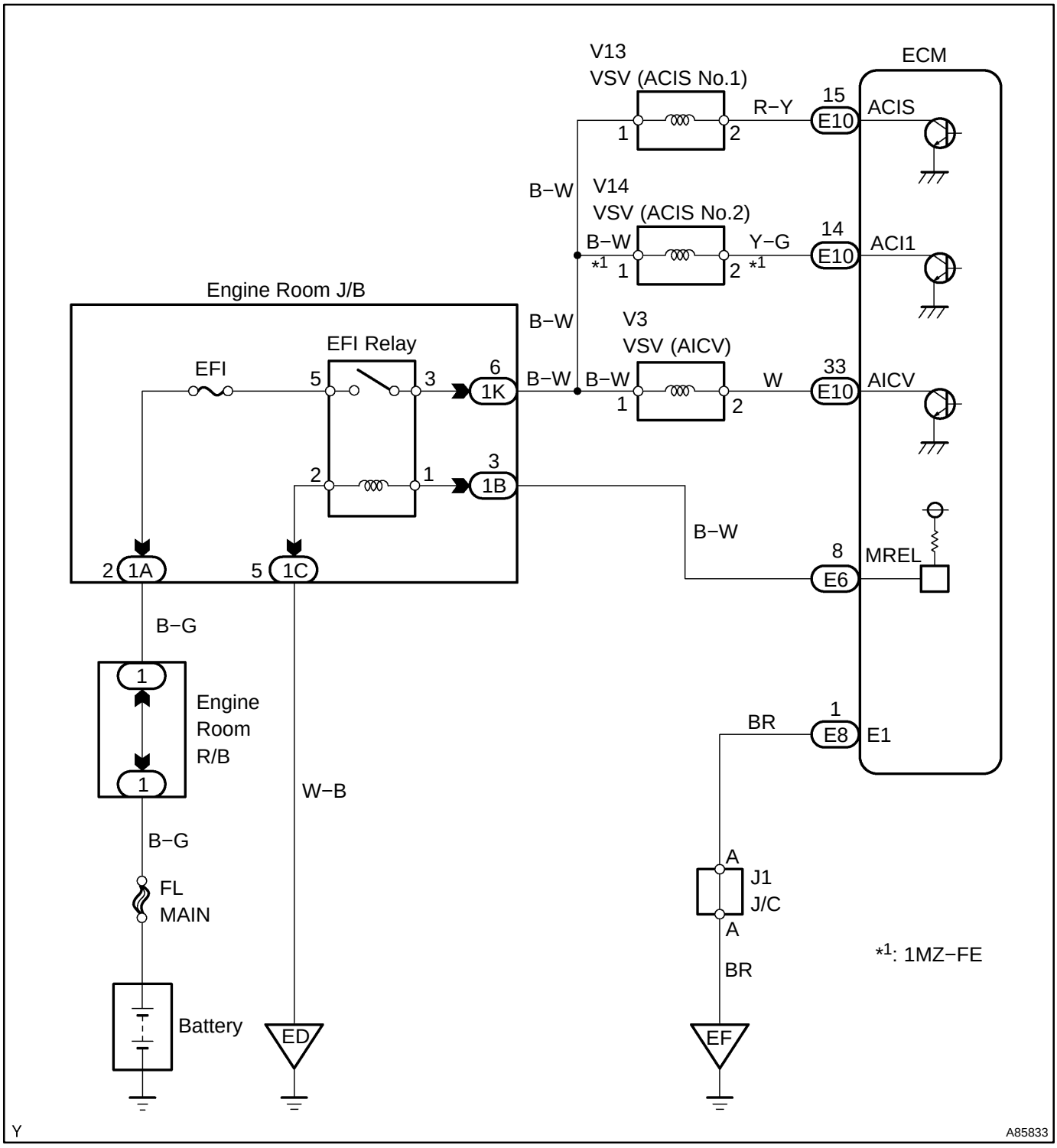


3MZ−FE:

The ECM opens and closes the Intake Air Control (IAC) valve No. 2 in response to engine speed (RPM/NE). This system improves intake manifold tuning for better efficiency at low and high engine rpm. When the engine speed is 4,000 rpm or less and the throttle valve opening angle is 30° or more, the ECM turns the VSV On or Off to operate the IAC valve.



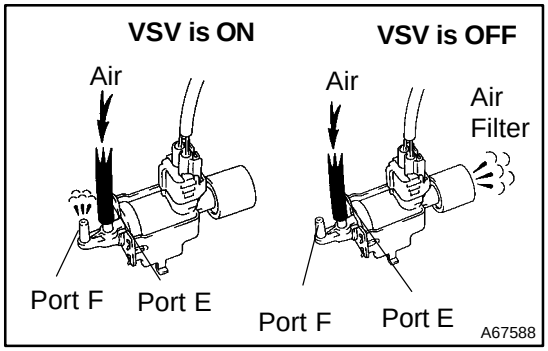
WIRING DIAGRAM



INSPECTION PROCEDURE

Hand−held tester:

1	**PERFORM ACTIVE TEST BY HAND−HELD TESTER (OPERATE VSV FOR IAC VALVE NO. 1 (1MZ−FE OLNY), NO. 2)**



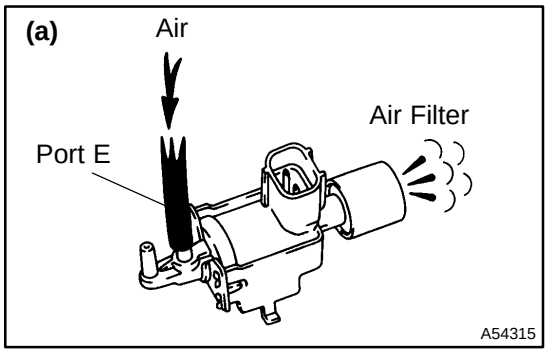
(a) Disconnect the vacuum hose.
(b) Connect the hand−held tester to the DLC3.
(c) Turn the ignition switch ON and push the hand−held tester main switch ON.
(d) 1MZ−FE:
Enter the following menus: DIAGNOSIS / ENHANCED OBD II / ACTIVE TEST / INTAKE CTL VSV1 or INTAKE CTL VSV2. Operate the VSV.
3MZ−FE:
Enter the following menus: DIAGNOSIS / ENHANCED OBD II / ACTIVE TEST / INTAKE CTL VSV1. Operate the VSV.
(e) Check the VSV operation.
Standard:

Tester Operation	Specified Condition
VSV is ON	Air from port E flows out through port F
VSV is OFF	Air from port E flows out through the air filter

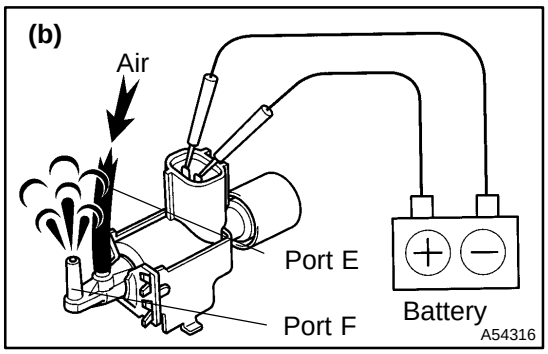
OK → **Go to step 4**

NG

2	CHECK VSV FOR IAC VALVE NO. 1 (1MZ−FE OLNY), NO. 2 (OPERATION)



(a) Check that air flows from port E to the air filter.

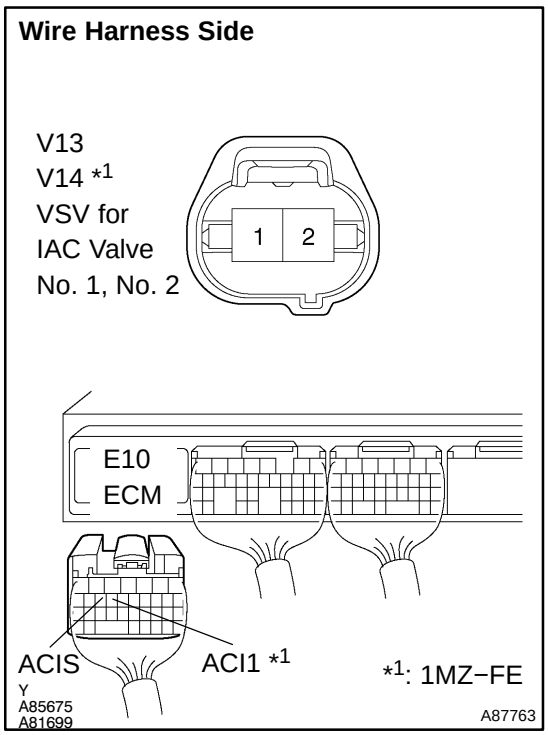


(b) Apply battery positive voltage across the terminals.
(c) Check that air flows from port E to port F.

NG → **REPLACE VSV**

OK

3	CHECK WIRE HARNESS (VSV FOR IAC VALVE NO. 1 (1MZ−FE ONLY), NO. 2 − ECM, VSF FOR IAC VALVE NO. 1 (1MZ−FE ONLY), NO. 2 − EFI RELAY)



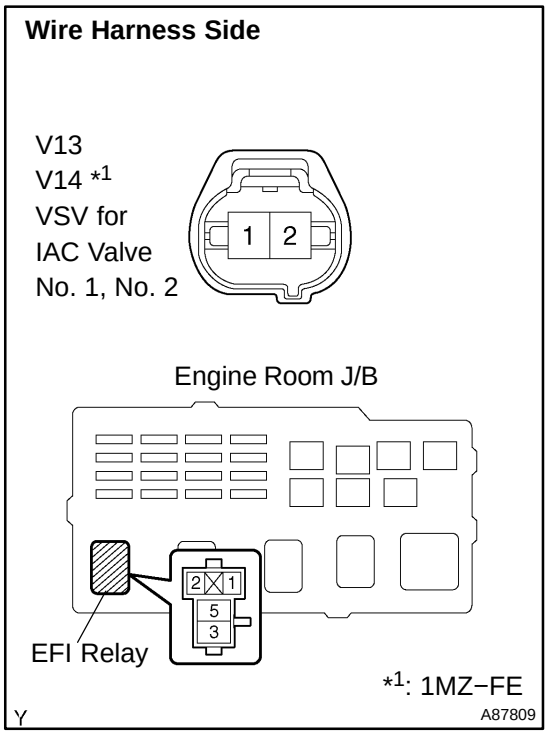
(a) Check the wire harness between the VSV and ECM.
(1) 1MZ−FE:
Disconnect the V13 and V14 VSV connectors.
3MZ−FE:
Disconnect the V13 VSV connector.
(2) Disconnect the E10 ECM connector.
(3) Measure the resistance of the wire harness side connectors.

Standard:
1MZ−FE

Tester Connection	Specified Condition
V13−2 − E10−15 (ACIS) V14−2 − E10−14 (ACI1)	Below 1 Ω
V13−2 or E10−15 (ACIS) − Body ground V14−2 or E10−14 (ACI1) − Body ground	10 kΩ or higher

3MZ−FE

Tester Connection	Specified Condition
V13−2 − E10−15 (ACIS)	Below 1 Ω
V13−2 or E10−15 (ACIS) − Body ground	10 kΩ or higher



(b) Check the wire harness between the VSV and EFI relay.
(1) 1MZ−FE:
Disconnect the V13 and V14 VSV for ACIS connectors.
3MZ−FE:
Disconnect the V13 VSV connector.
(2) Remove the EFI relay from the engine room J/B.
(3) Measure the resistance of the wire harness side connectors.

Standard:
1MZ−FE

Tester Connection	Specified Condition
V13−1 − J/B EFI relay terminal 3 V14−1 − J/B EFI relay terminal 3	Below 1 Ω

3MZ−FE

Tester Connection	Specified Condition
V13−1 − J/B EFI relay terminal 3	Below 1 Ω

NG → **REPAIR OR REPLACE HARNESS AND CONNECTOR**

OK

4	CHECK VACUUM HOSES (INTAKE MANIFOLD − INTAKE AIR CONTROL VALVE, INTAKE AIR CONTROL)

(a) Check that the vacuum hoses are connected correctly.
(b) Check that the vacuum hoses are not loose or disconnected.
(c) Check that the vacuum hoses do not have cracks, punctures or damage.

NG → **REPAIR OR REPLACE VACUUM HOSES**

OK

5	INSPECT INTAKE AIR CONTROL VALVE (See page 13−9)

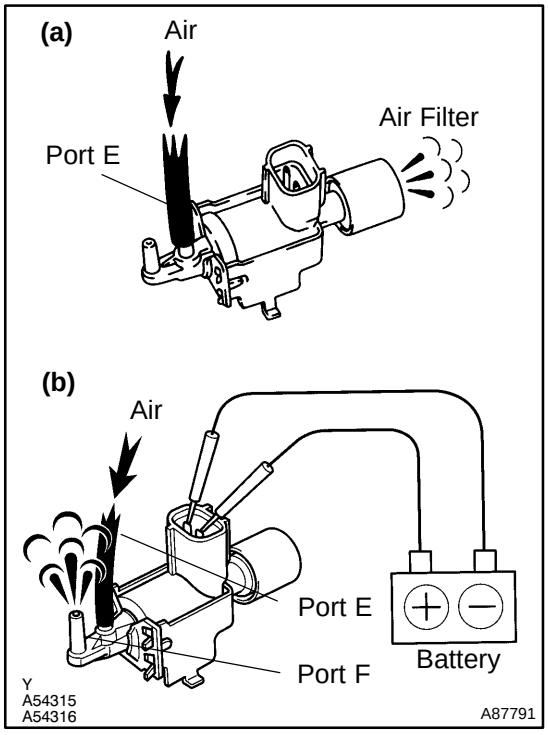
NG → **REPLACE INTAKE AIR CONTROL VALVE**

OK

REPLACE ECM (See page 10−25)

OBD II scan tool (excluding hand−held tester):

1	INSPECT VSV FOR IAC VALVE NO. 1 (1MZ−FE OLNY), NO. 2 (OPERATION)

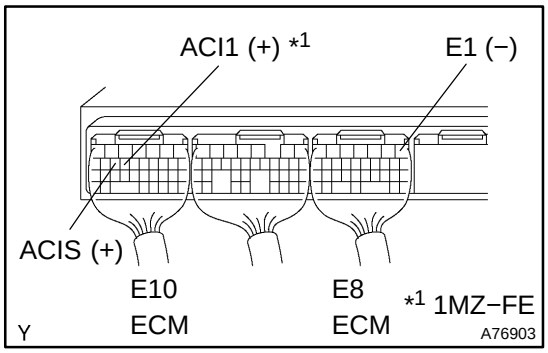


(a) Disconnect the VSV connector.
(b) Check the operation of the VSV when battery positive voltage is applied to the terminals of the VSV.
Standard:
Battery positive voltage is not applied:
Air from port E flows out through the air filter.
Battery positive voltage is applied:
Air from port E flows out through port F.

NG → **REPLACE VSV**

OK

2 CHECK ECM (ACIS VOLTAGE)



(a) Start the engine.
(b) Check the voltage of the ECM connectors.

Standard:

1MZ−FE

Tester Connection	Condition	Specified Condition
E10−15 (ACIS) − E8−1 (E1) E10−14 (ACI1) − E8−1 (E1)	• Engine speed is 2,700 rpm or less • Throttle valve opening angle is 30° or more	9 to 14 V
E10−15 (ACIS) − E8−1 (E1) E10−14 (ACI1) − E8−1 (E1)	• Idling	0 V

3MZ−FE

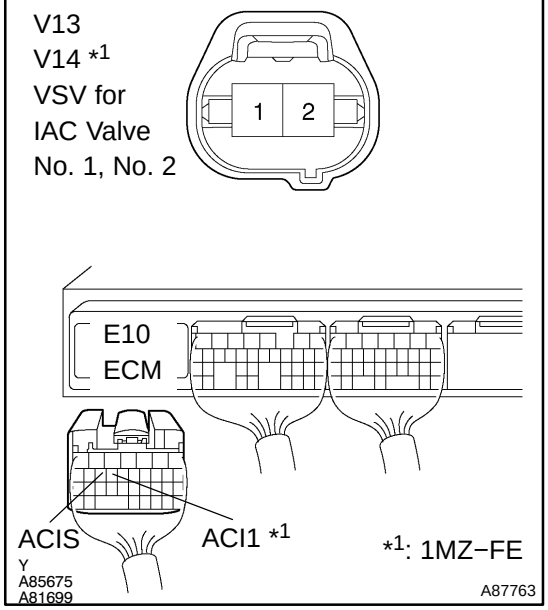
Tester Connection	Condition	Specified Condition
E10−15 (ACIS) − E8−1 (E1)	• Engine speed is 4,000 rpm or less • Throttle valve opening angle is 30° or more	9 to 14 V
E10−15 (ACIS) − E8−1 (E1)	• Idling	0 V

OK → **Go to step 4**

NG

3	CHECK WIRE HARNESS (VSV FOR IAC VALVE No. 1 (1MZ−FE ONLY), No. 2 − ECM, VSV FOR IAC VALVE No. 1 (1MZ−FE ONLY), No. 2 − EFI RELAY)

Wire Harness Side



(a) Check the wire harness between the VSV and ECM.
(1) 1MZ−FE:
Disconnect the V13 and V14 VSV connectors.
3MZ−FE:
Disconnect the V13 VSV connector.
(2) Disconnect the E10 ECM connector.
(3) Measure the resistance of the wire harness side connectors.

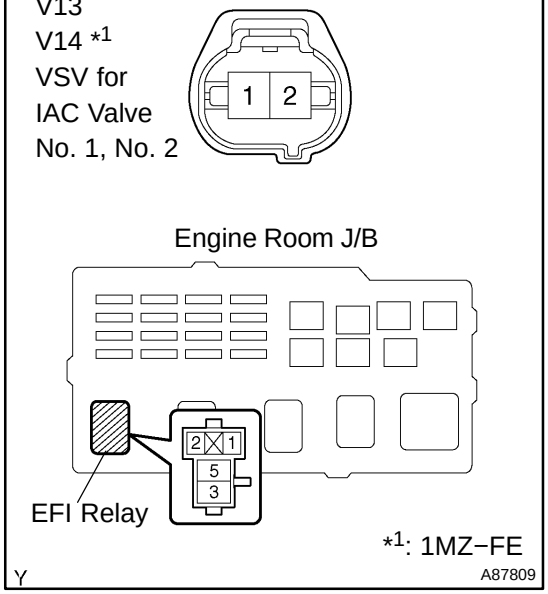
Standard:
1MZ−FE

Tester Connection	Specified Condition
V13−2 − E10−15 (ACIS) V14−2 − E10−14 (ACI1)	Below 1 Ω
V13−2 or E10−15 (ACIS) − Body ground V14−2 or E10−14 (ACI1) − Body ground	10 kΩ or higher

3MZ−FE

Tester Connection	Specified Condition
V13−2 − E10−15 (ACIS)	Below 1 Ω
V13−2 or E10−15 (ACIS) − Body ground	10 kΩ or higher

Wire Harness Side



(b) Check the wire harness between the VSV and EFI relay.
(1) 1MZ−FE:
Disconnect the V13 and V14 VSV connectors.
3MZ−FE:
Disconnect the V13 VSV connector.
(2) Remove the EFI relay from the engine room J/B.
(3) Measure the resistance of the wire harness side connectors.

Standard:
1MZ−FE

Tester Connection	Specified Condition
V13−1 − J/B EFI relay terminal 3 V14−1 − J/B EFI relay terminal 3	Below 1 Ω

3MZ−FE

Tester Connection	Specified Condition
V13−1 − J/B EFI relay terminal 3	Below 1 Ω

NG → **REPAIR OR REPLACE HARNESS AND CONNECTOR**

OK

4	CHECK VACUUM HOSES (INTAKE MANIFOLD − INTAKE AIR CONTROL VALVE, INTAKE AIR CONTROL)

(a) Check that the vacuum hoses are connected correctly.
(b) Check that the vacuum hoses are not loose or disconnected.
(c) Check that the vacuum hoses do not have cracks, punctures or damage.

NG → REPAIR OR REPLACE VACUUM HOSE

OK

5	INSPECT INTAKE AIR CONTROL VALVE (See page 13−9)

NG → REPLACE INTAKE AIR CONTROL VALVE

OK

REPLACE ECM (See page 10−25)