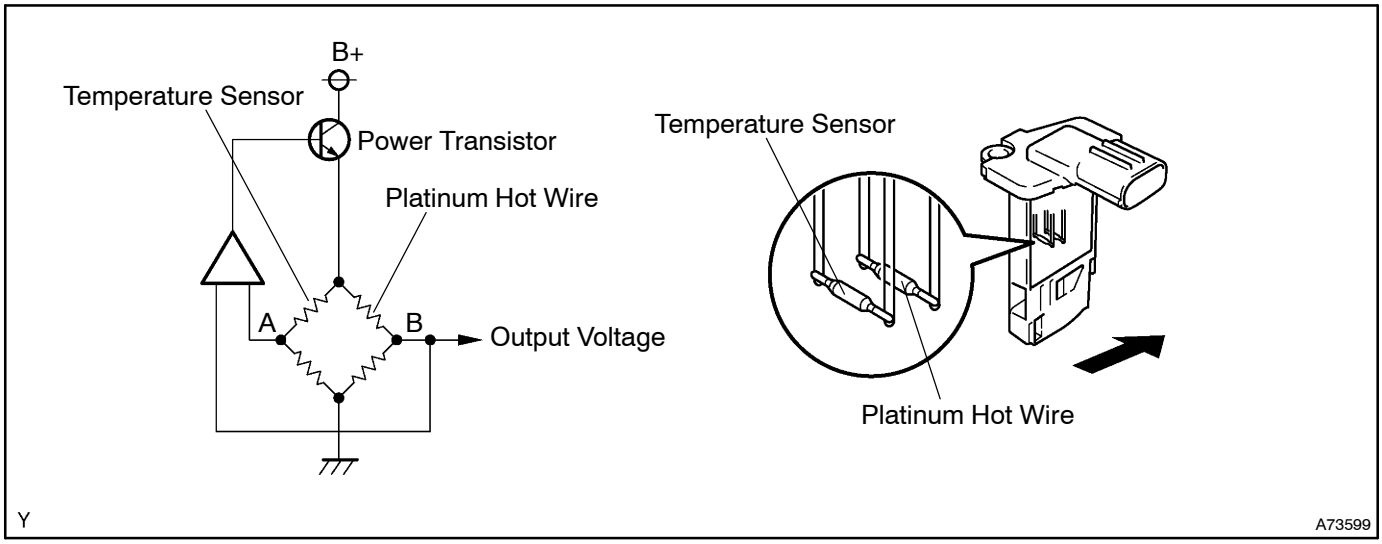
DTC P0100/31 MASS OR VOLUME AIR FLOW CIRCUIT

CIRCUIT DESCRIPTION

The mass air flow meter uses a platinum hot wire. The hot wire air flow meter consists of a platinum hot wire, temperature sensor and a control circuit installed in a plastic housing. The hot wire air flow meter works on the principle that the hot wire and temperature sensor located in the intake air bypass of the housing detect any changes in the intake air temperature.

The hot wire is maintained at the set temperature by controlling the current flow through the hot wire. This current flow is then measured as the output voltage of the mass air flow meter.

The circuit is constructed so that the platinum hot wire and temperature sensor provide a bridge circuit, with the power transistor controlled so that the potential of A and B remains equal to maintain the set temperature.



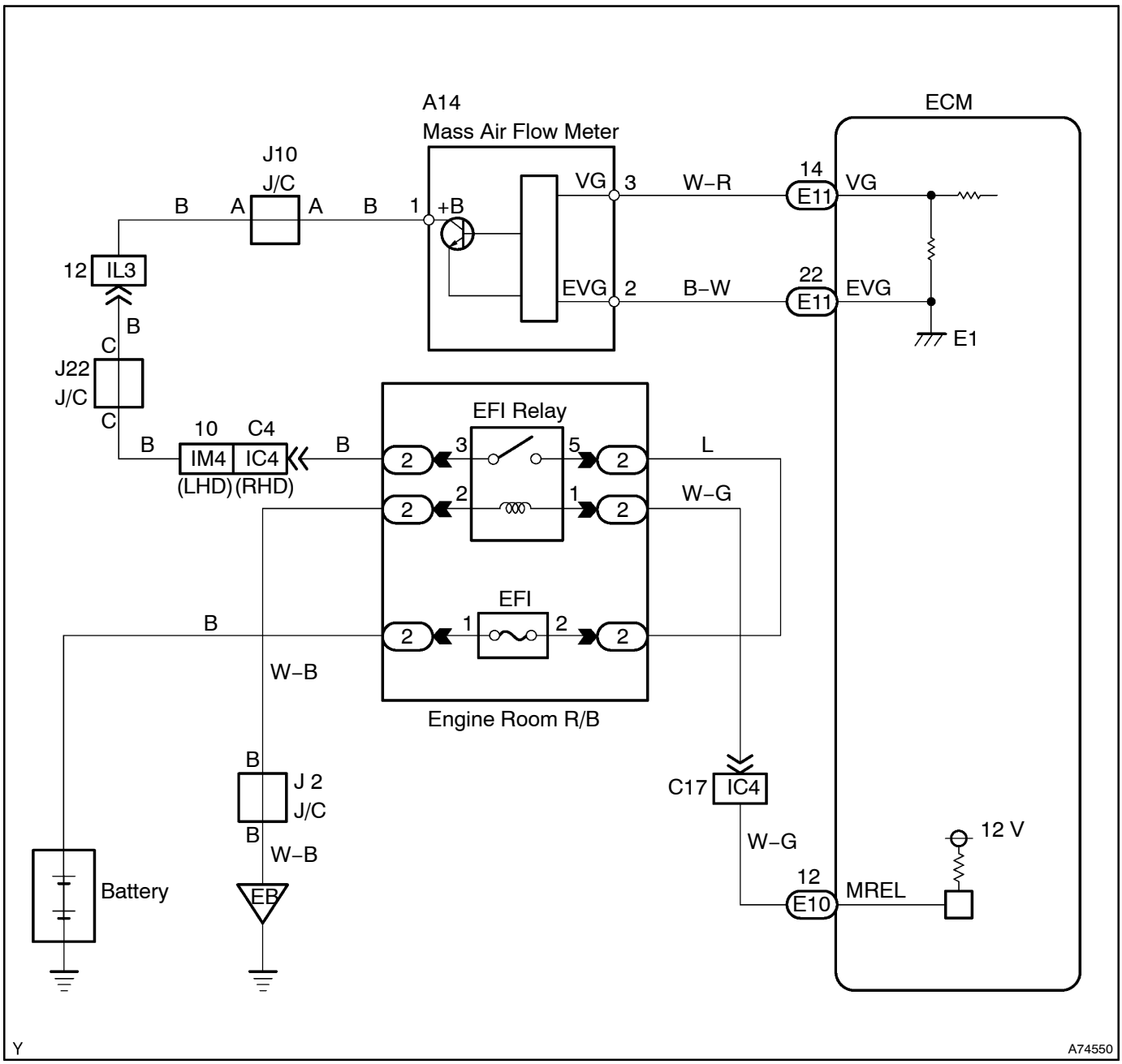
DTC No.	DTC Detecting Condition	Trouble Area
P0100/31	Open or short in mass air flow meter circuit with more than 3 sec.	• Open or short in mass air flow meter circuit • Mass air flow meter • ECM

HINT:

After confirming DTC P0100/31 use the hand–held tester to confirm the mass air flow ratio from the ”DIAGNOSIS/ENHANCED OBD II/DATA LIST/ALL DATA”.

Air Flow Value (gm/sec.)	Malfunction
Approx. 0.0	• Mass air flow meter power source circuit open • VG circuit open or short
170.1 or more	• EVG circuit open

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:

Read freeze frame data using hand–held tester, as freeze frame data records the engine conditions when a malfunction is detected. When troubleshooting, it is useful for determining whether the vehicle was running or stopped, the engine was warmed up or not, the air–fuel ratio was lean or rich, etc. at the time of the malfunction.

When using hand–held tester:

1	READ VALUE OF HAND–HELD TESTER (MAF)

(a) Connect the hand–held tester to the DLC3.
(b) Turn the ignition switch ON and push the hand–held tester main switch ON.
(c) Start the engine.
(d) Select the item "DIAGNOSIS/ENHANCED OBD II/DATA LIST/ALL DATA/MAF" and read its value displayed the hand–held tester.

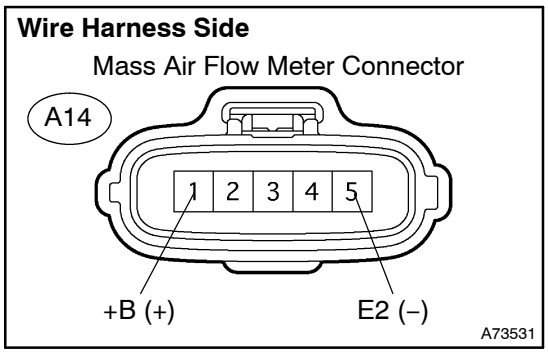
Result:

Intake air flow rate	Proceed to
0.0 gm/sec.	A
170.1 gm/sec. or more	B

B → **Go to step 5**

A

2	CHECK HARNESS AND CONNECTOR (MASS AIR FLOW METER POWER SOURCE)



(a) Disconnect the A14 mass air flow meter connector.
(b) Turn the ignition switch ON.
(c) Measure the voltage between the terminal of the wire harness side connector.

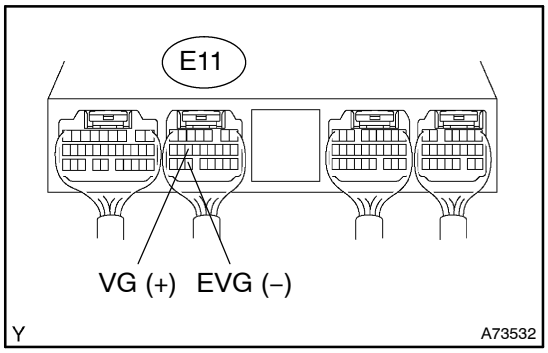
Voltage:

Symbols (Terminal No.)	Specified condition
+B (A14–1) ⇔ E2 (A14–5)	9 – 14 V

NG → **Go to step 7**

OK

3	CHECK ECM (VG VOLTAGE)



(a) Start the engine.
(b) Measure the voltage between the terminals of the E11 ECM connector while the engine is idling.

Voltage:

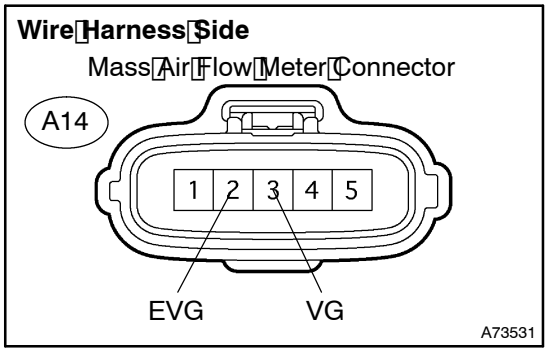
Symbols (Terminal No.)	Specified condition
VG (E11–14) ⇔ EVG (E11–22)	1.1 – 1.5 V

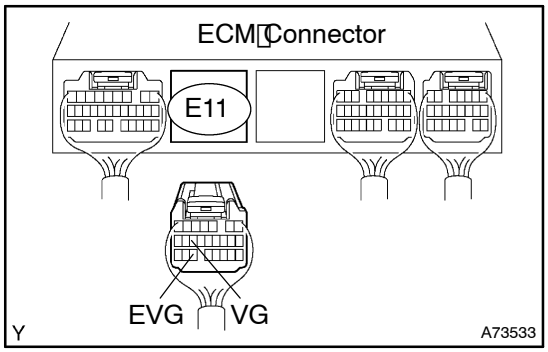
HINT:
The shift position should be P or N and A/C switch should be turned OFF.

NG → **CHECK AND REPLACE ECM (See page 01–36)**

OK

4 CHECK HARNESS AND CONNECTOR (MASS AIR FLOW METER ⇔ ECM)





(a) Disconnect the A14 mass air flow meter connector.
(b) DIsconnect the E11 ECM connector.
(c) Check the continuity between the wire harness side connectors.

Standard (Check for open):

Symbols (Terminal No.)	Specified condition
EVG (A14–2) ⇔ EVG (E11–22)	Continuity
VG (A14–3) ⇔ VG (E11–14)	

Standard (Check for short):

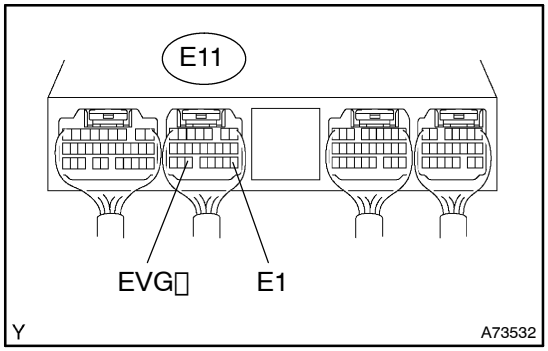
Symbols (Terminal No.)	Specified condition
EVG (A14–2) or EVG (E11–22) ⇔ Other terminals and body ground	No continuity
VG (A14–3) or VG (E11–14) ⇔ Other terminals and body ground	

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

OK

REPLACE MASS AIR FLOW METER

5 CHECK ECM (ECM GROUND)



(a) Check the continuity between the terminals of the E11 ECM connector.

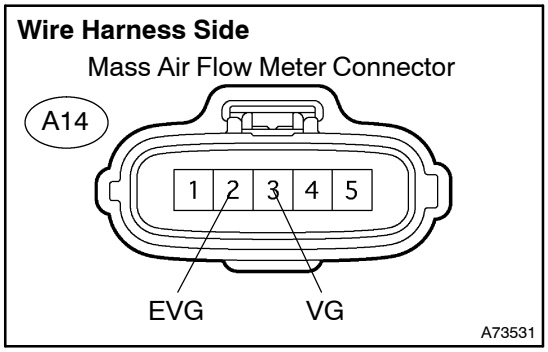
Standard:

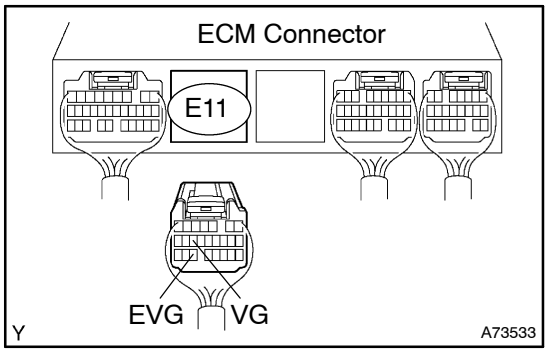
Symbols (Terminal No.)	Specified condition
EVG (E11–22) ⇔ E1 (E11–17)	Continuity

NG → **CHECK AND REPLACE ECM (See page 01–36)**

OK

6 CHECK HARNESS AND CONNECTOR (MASS AIR FLOW METER ⇔ ECM)





(a) Disconnect the A14 mass air flow meter connector.
(b) Disconnect the E11 ECM connector.
(c) Check the continuity between the wire harness side connectors.

Standard (Check for open):

Symbols (Terminal No.)	Specified condition
EVG (A14–2) ⇔ EVG (E11–22)	Continuity
VG (A14–3) ⇔ VG (E11–14)	

Standard (Check for short):

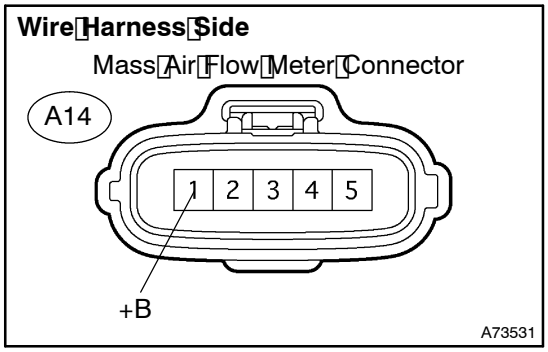
Symbols (Terminal No.)	Specified condition
EVG (A14–2) or EVG (E11–22) ⇔ Other terminals and body ground	No continuity
VG (A14–3) or VG (E11–14) ⇔ Other terminals and body ground	

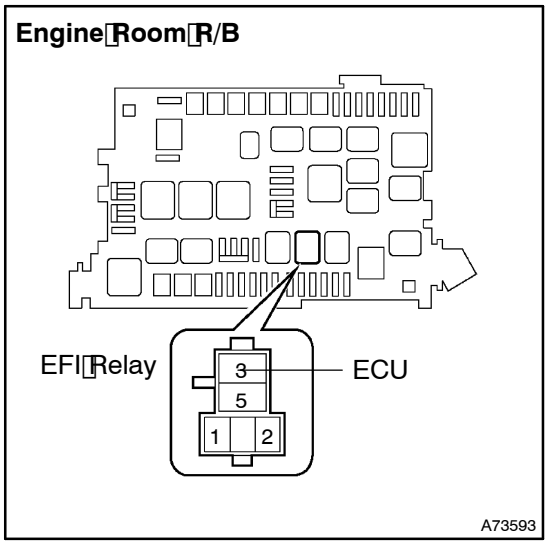
NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK

REPLACE MASS AIR FLOW METER

7	CHECK HARNESS AND CONNECTOR (MASS AIR FLOW METER ⇔ EFI RELAY





(a) Disconnect the A14 mass air flow meter connector.
(b) Remove the EFI relay.
(c) Check the continuity between the wire harness side connectors.

Standard (check for open):

Symbols (Terminal No.)	Specified condition
+B (A14–1) ⇔ ECU (EFI relay terminal 3 of R/B)	Continuity

Standard (check for short):

Symbols (Terminal No.)	Specified condition
+B (A14–1) or ECU (EFI relay terminal 3 of R/B) ⇔ Other terminals and body ground	No continuity

NOTICE:
Do not insert the tester hard in the procedure (c), or the holder may be damaged.

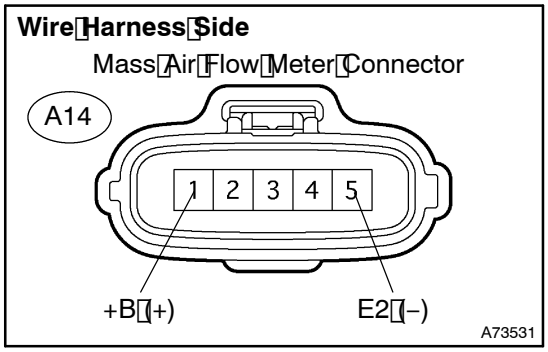
NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK

CHECK FOR ECM POWER SOURCE CIRCUIT (See page 05–158)

When not using hand–held tester:

1	CHECK HARNESS AND CONNECTOR (MASS AIR FLOW METER POWER SOURCE)



(a) Disconnect the A14 mass air flow meter connector.
(b) Turn the ignition switch ON.
(c) Measure the voltage between the terminal of the wire harness side connector.

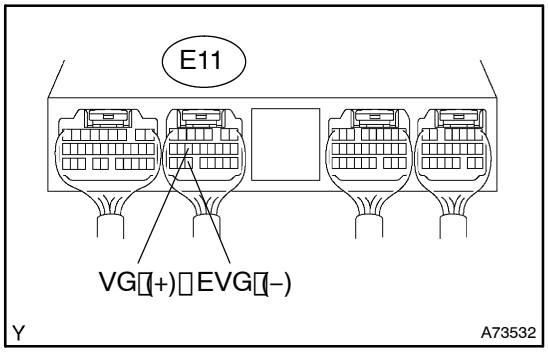
Voltage:

Symbols (Terminal No.)	Specified condition
+B (A14–1) ⇔ E2 (A14–5)	9 – 14 V

NG → **Go to step 4**

OK

2 CHECK ECM (VG VOLTAGE)



(a) Start the engine.
(b) Measure the voltage between the terminals of the E11 ECM connector while the engine is idling.

Voltage:

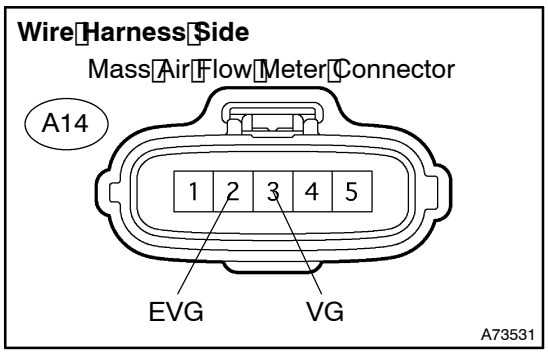
Symbols (Terminal No.)	Specified condition
VG (E11–14) ⇔ EVG (E11–22)	1.1 – 1.5 V

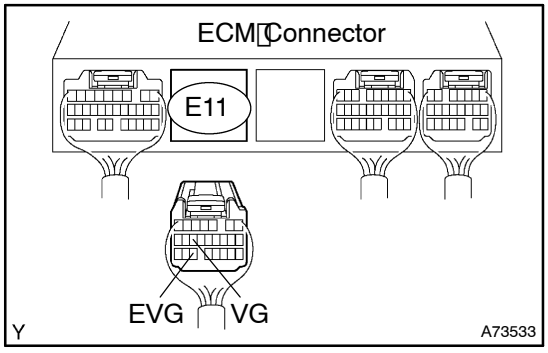
HINT:
The shift position should be P or N and A/C switch should be turned OFF.

NG → **CHECK AND REPLACE ECM (See page 01–36)**

OK

3 CHECK HARNESS AND CONNECTOR (MASS AIR FLOW METER ⇔ ECM)





(a) Disconnect the A14 mass air flow meter connector.
(b) Disconnect the E11 ECM connector.
(c) Check the continuity between the wire harness side connectors.

Standard (Check for open):

Symbols (Terminal No.)	Specified condition
EVG (A14–2) ⇔ EVG (E11–22)	Continuity
VG (A14–3) ⇔ VG (E11–14)	

Standard (Check for short):

Symbols (Terminal No.)	Specified condition
EVG (A14–2) or EVG (E11–22) ⇔ Other terminals and body ground	No continuity
VG (A14–3) or VG (E11–14) ⇔ Other terminals and body ground	

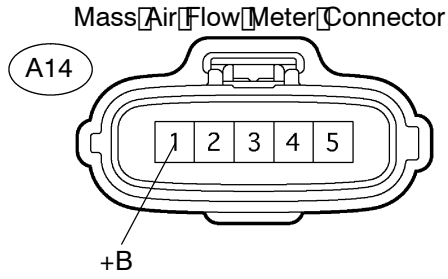
NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK

REPLACE MASS AIR FLOW METER

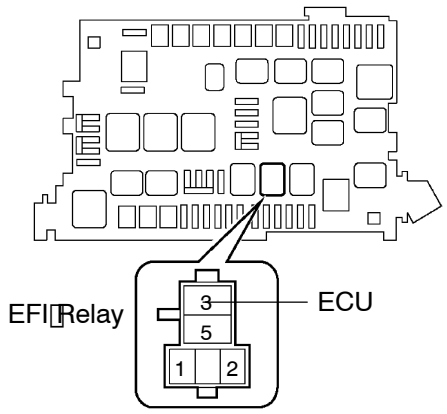
4	CHECK HARNESS AND CONNECTOR (MASS AIR FLOW METER ⇔ EFI RELAY)

Wire Harness Side



A73531

Engine Room R/B



A73593

(a) Disconnect the A14 mass air flow meter connector.
(b) Remove the EFI relay.
(c) Check the continuity between the wire harness side connectors.

Standard (check for open):

Symbols (Terminal No.)	Specified condition
+B (A14–1) ⇔ ECU (EFI relay terminal 3 of R/B)	Continuity

Standard (check for short):

Symbols (Terminal No.)	Specified condition
+B (A14–1) or ECU (EFI relay terminal 3 of R/B) ⇔ Other terminals and body ground	Continuity

NOTICE:
Do not insert the tester hard in the procedure (c), or the holder may be damaged.

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

OK

CHECK FOR ECM POWER SOURCE CIRCUIT (See page 05–158)