DTC	P0100/31	MASS OR VOLUME AIR FLOW CIRCUIT

DTC	P0102/31	MASS OR VOLUME AIR FLOW CIRCUIT LOW INPUT

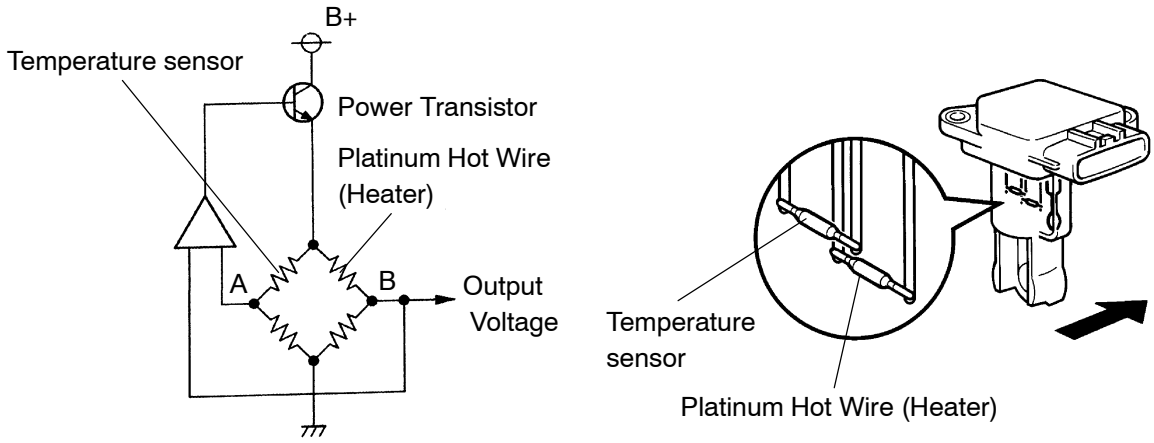
DTC	P0103/31	MASS OR VOLUME AIR FLOW CIRCUIT HIGH INPUT

CIRCUIT DESCRIPTION

The mass air flow meter uses a platinum hot wire. The hot wire mass air flow meter consists of a platinum hot wire, a temperature sensor and a control circuit installed in a plastic housing. The hot wire mass 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.



FI6929
A09074
A53295

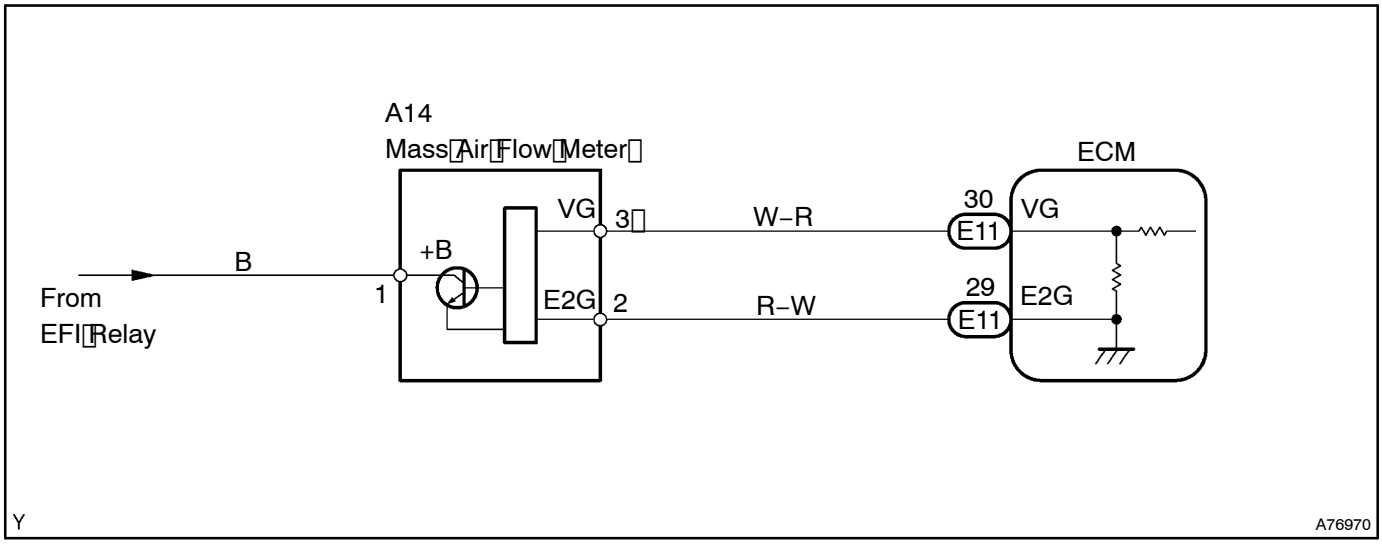
DTC No.	DTC Detection Condition	Trouble Area
P0100/31	When the mass air flow meter circuit has an open or a short more than 3 sec. under the 4,000 rpm engine speed.	• Open or short in mass air flow meter circuit • Mass air flow meter • ECM
P0102/31	When the mass air flow meter circuit has an open more than 3 sec. under the 4,000 rpm engine speed.	
P0103/31	When the mass air flow meter circuit has a short more than 3 sec. under the 4,000 rpm engine speed.	

HINT:

After confirming DTC ”P0100/31, P0102/31 or P0103/31”, use the hand–held tester to confirm the mass air flow ratio in the ”DIAGNOSIS / OBD/MOBD / DATA LIST / ALL”.

Air Flow Value (gm/s)	Malfunction
Approx. 0.0	• Mass air flow meter power source circuit open • VG circuit open or short
271.0 or more	• E2G circuit open

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:

Read freeze frame data using the 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 (MASS AIR FLOW RATE)

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

Result:

Mass air flow rate (gm/s)	Proceed to
0.0	A
271.0 or more	B
1 ≦ Mass Air Flow Rate ≦ 270.0 or more (*1)	C

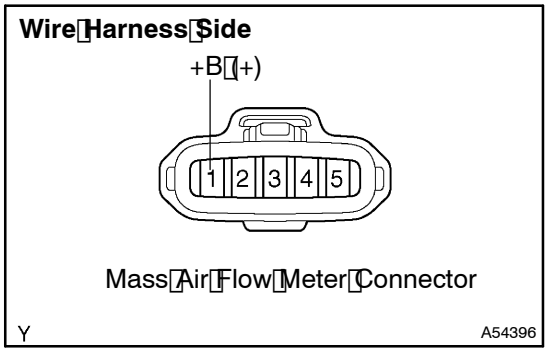
*1: The value must be changed when the throttle valve is opened or closed.

B	Go to step 6

C	CHECK FOR INTERMITTENT PROBLEMS (See page 05–7)

A

2 INSPECT MASS AIR FLOW METER (POWER SOURCE)



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

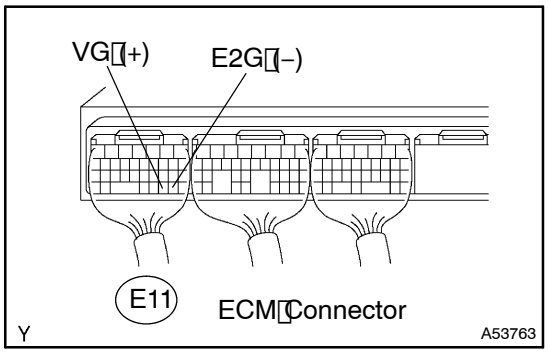
Standard:

Symbols (Terminal No.)	Specified condition
+B (1) – Body ground	9 to 14 V

NG → **Go to step 5**

OK

3 INSPECT ECM (VG VOLTAGE)



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

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

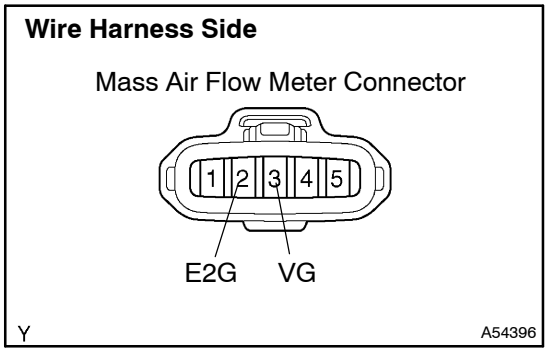
Standard:

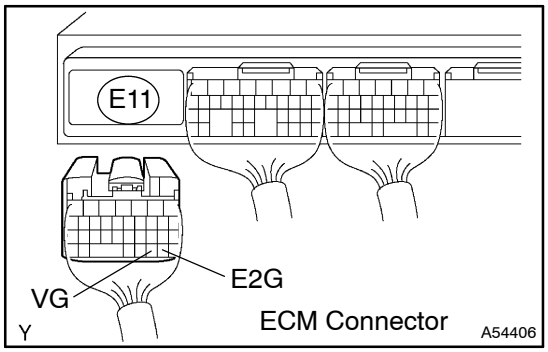
Symbols (Terminal No.)	Condition	Specified condition
VG (E11–30) – E2G (E11–29)	Engine is idling	0.5 to 3.0 V

OK → **CHECK AND REPLACE ECM (See page 01–35)**

NG

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





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

Standard (Check for open):

Symbols (Terminal No.)	Specified condition
VG (3) – VG (E11–30)	Continuity
E2G (2) – E2G (E11–29)	

Standard (Check for short):

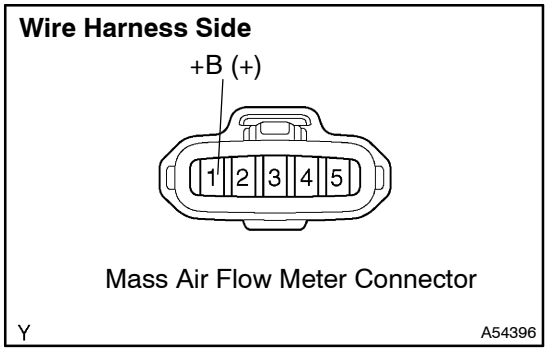
Symbols (Terminal No.)	Specified condition
VG (3) or VG (E11–30) – Body ground	No continuity

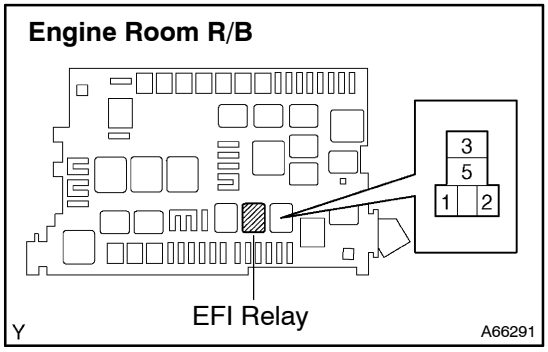
NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK

REPLACE MASS AIR FLOW METER

5 CHECK HARNESS AND CONNECTOR(MASS AIR FLOW METER – EFI RELAY)





(a) Disconnect the mass air flow meter connector.
(b) Remove the EFI relay from the engine room R/B.
(c) Check for continuity between the wire harness side connectors.

Standard (Check for open):

Symbols (Terminal No.)	Specified condition
+B (1) – EFI relay (3)	Continuity

Standard (Check for short):

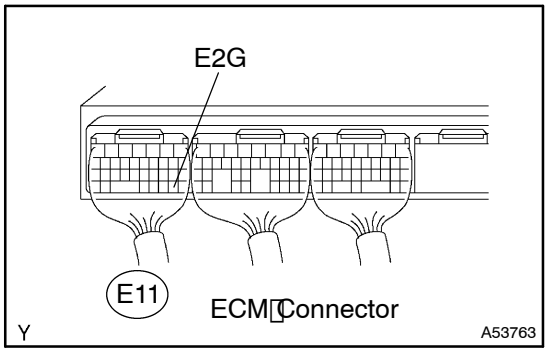
Symbols (Terminal No.)	Specified condition
+B (1) or EFI relay (3) – Body ground	No continuity

NG → REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

INSPECT ECM POWER SOURCE CIRCUIT (See page 05–7)

6 INSPECT ECM(SENSOR GROUND)



(a) Check for continuity between the terminal of the E11 ECM connector and the body ground.

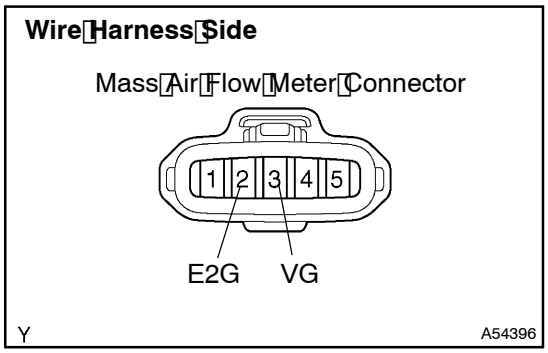
Standard:

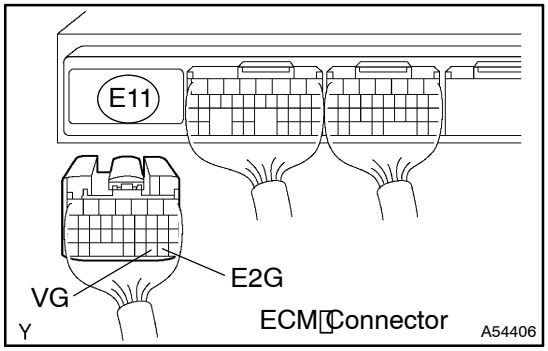
Symbols (Terminal No.)	Specified condition
E2G (E11–29) – Body ground	Continuity

NG → CHECK AND REPLACE ECM (See page 01–35)

OK

7 CHECK HARNESS AND CONNECTOR(MASS AIR FLOW METER – ECM)





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

Standard (Check for open):

Symbols (Terminal No.)	Specified condition
VG (3) – VG (E11–30)	Continuity
E2G (2) – E2G (E11–29)	

Standard (Check for short):

Symbols (Terminal No.)	Specified condition
VG (3) or VG (E11–30) – Body ground	No continuity

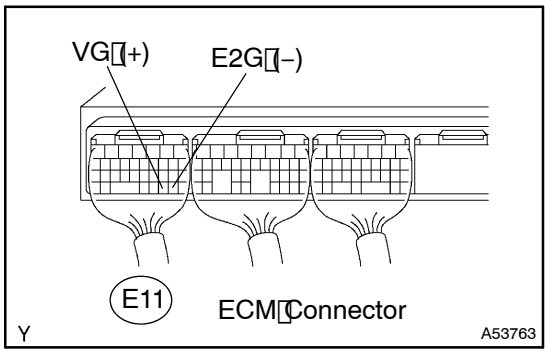
NG → REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

REPLACE MASS AIR FLOW METER

When not using hand-held tester:

1	INSPECT ECM (VG VOLTAGE)



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

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

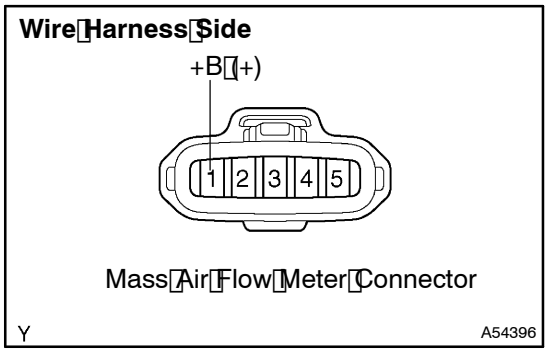
Standard:

Symbols (Terminal No.)	Condition	Specified condition
VG (E11–30) – E2G (E11–29)	Engine is idling	0.5 to 3.0 V

OK → **CHECK AND REPLACE ECM (See page 01–35)**

NG

2	INSPECT MASS AIR FLOW METER (POWER SOURCE)



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

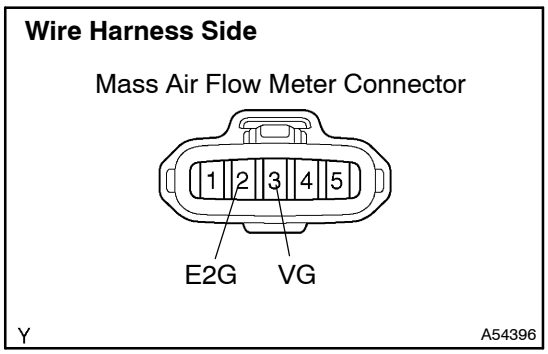
Standard:

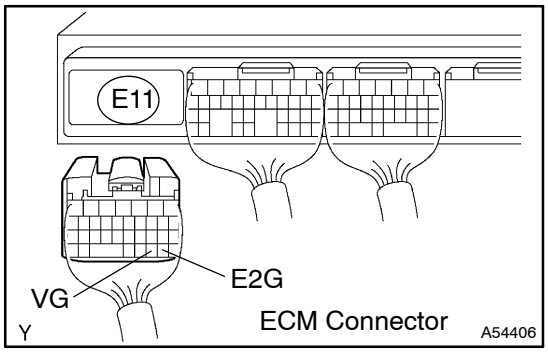
Symbols (Terminal No.)	Specified condition
+B (1) – Body ground	9 to 14 V

NG → **Go to step 4**

OK

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





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

Standard (Check for open):

Symbols (Terminal No.)	Specified condition
VG (3) – VG (E11–30)	Continuity
E2G (2) – E2G (E11–29)	

Standard (Check for short):

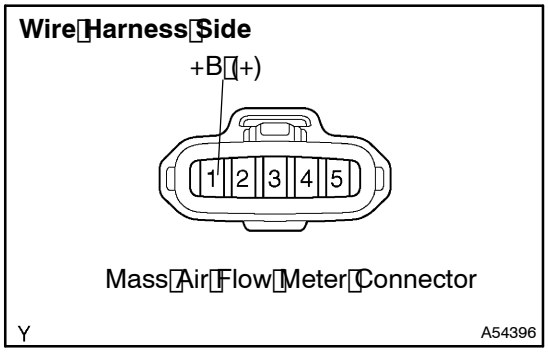
Symbols (Terminal No.)	Specified condition
VG (3) or VG (E11–30) – Body ground	No continuity

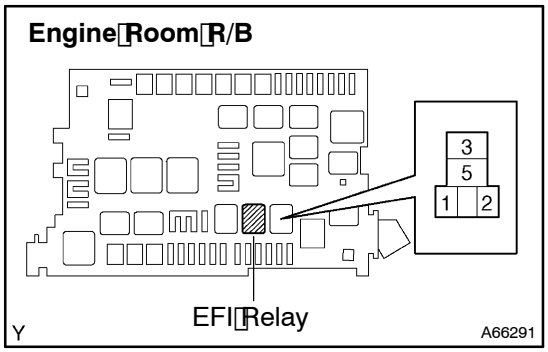
NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK

REPLACE MASS AIR FLOW METER

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





(a) Disconnect the mass air flow meter connector.
(b) Remove the EFI relay from the engine room R/B.
(c) Check for continuity between the wire harness side connectors.

Standard (Check for open):

Symbols (Terminal No.)	Specified condition
+B (1) – EFI relay (3)	Continuity

Standard (Check for short):

Symbols (Terminal No.)	Specified condition
+B (1) or EFI relay (3) – Body ground	No continuity

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

OK

INSPECT ECM POWER SOURCE CIRCUIT (See page 05–215)