DTC	P0100/31	MASS OR VOLUME AIR FLOW CIRCUIT

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

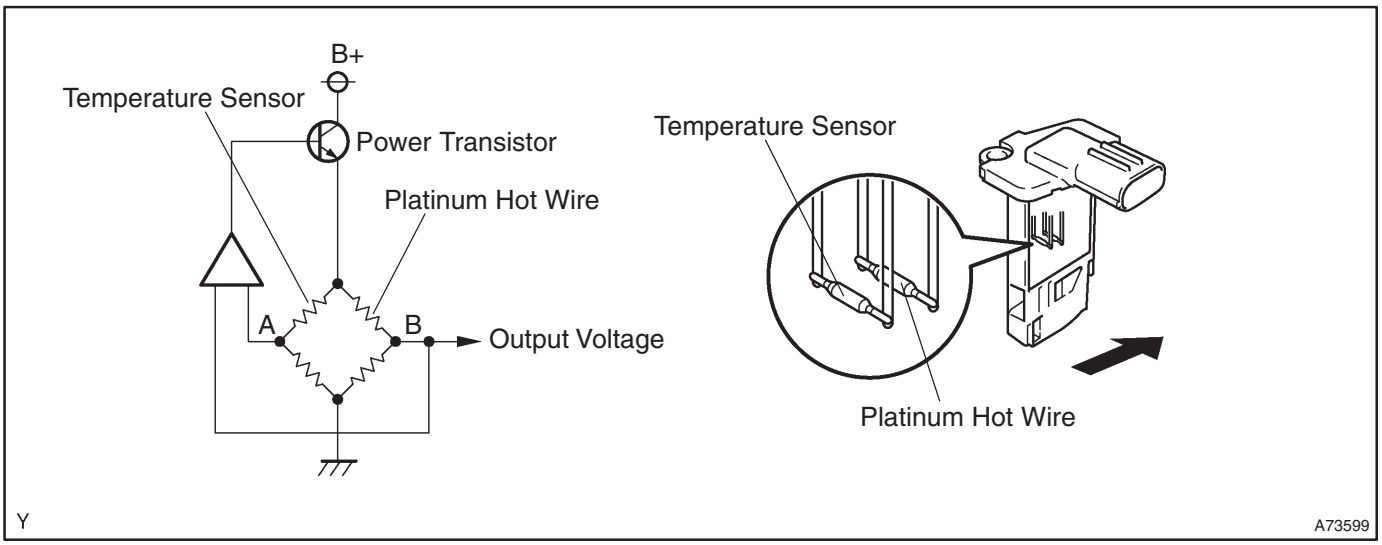
DTC	P0103/31	MASS OR VOLUME AIR FLOW CIRCUIT HIGH INPUT

CIRCUIT DESCRIPTION

The Mass Air Flow (MAF) meter is a sensor that measures the amount of air flowing through the throttle valve. The ECM uses this information to determine the fuel injection time and provides a proper air–fuel ratio. Inside the MAF meter, there is a heated platinum wire exposed to the flow of intake air.

By applying a specific current to the wire, the ECM heats this wire to a given temperature. The flow of incoming air cools the wire and an internal thermistor, affecting their resistance. To maintain a constant current value, the ECM varies the voltage applied to these components in the MAF meter. The voltage level is proportional to the flow of the air passing through the sensor. The ECM interprets this voltage as the intake air amount.

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

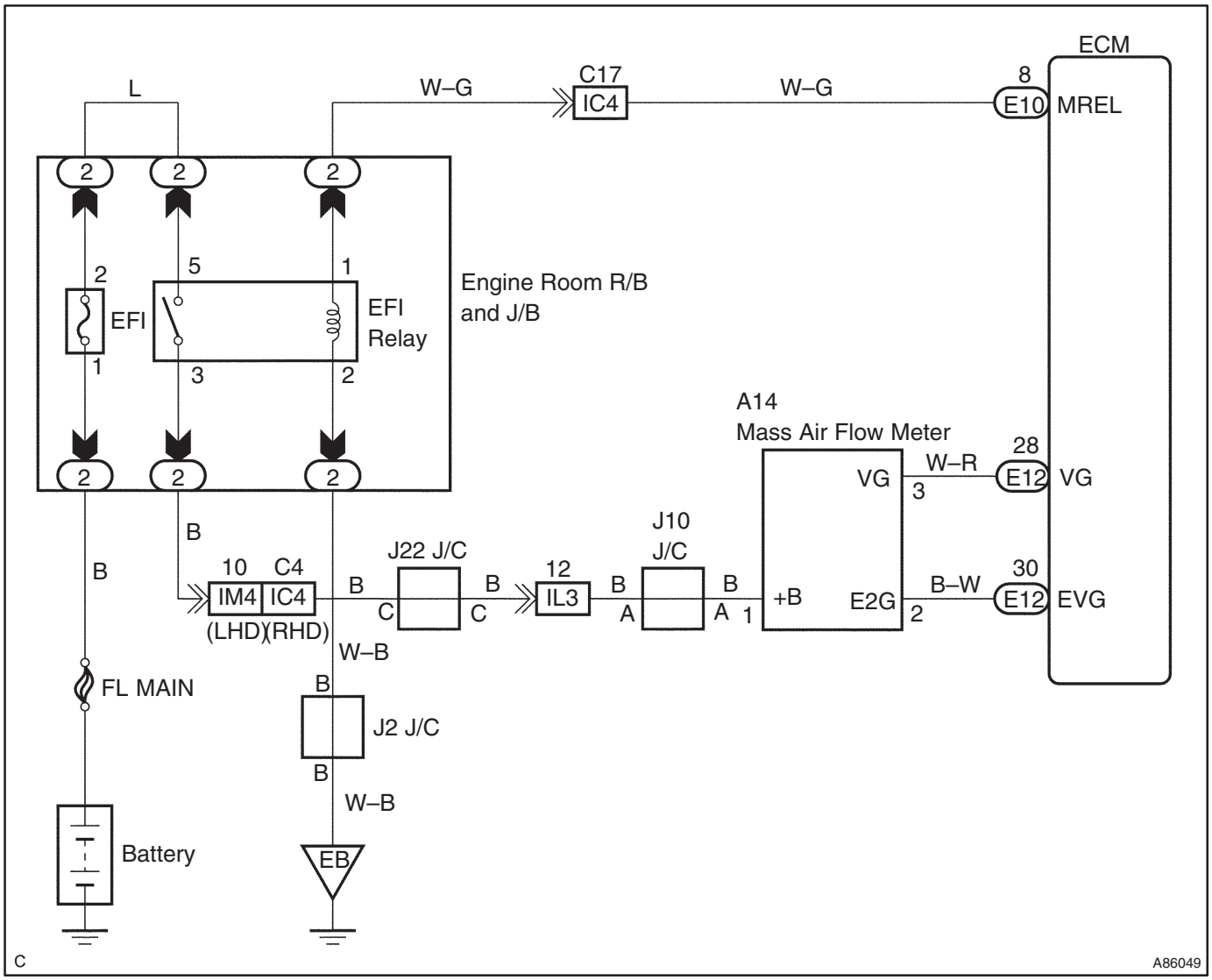


DTC No.	DTC Detection Condition	Trouble Area
P0100/31	When MAF meter circuit has an open or a short for more than 3 seconds	• Open or short in MAF meter circuit • MAF meter • ECM
P0102/31	When MAF meter circuit has an open for more than 3 seconds	• Open in MAF meter circuit • MAF meter • ECM
P0103/31	When MAF meter circuit has a short for more than 3 seconds	• Short in MAF meter circuit • MAF meter • ECM

HINT:
When DTC P0100, P0102 or P0103 is detected, check the air flow ratio by selecting Powertrain / Engine and ECT / Data List / AFM on the intelligent tester II.

Air Flow Value (g/second)	Malfunction
Approximately 0.0	• Open in MAF meter power source circuit • Open or short in VG circuit
271.0 or more	• Open in EVG circuit

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:
Read freeze frame data using the intelligent tester II. Freeze frame data record the engine condition when malfunctions are detected. When troubleshooting, freeze frame data can help determine if the vehicle was moving or stationary, if the engine was warmed up or not, if the air–fuel ratio was lean or rich, and other data from the time the malfunction occurred.

1 READ VALUE OF INTELLIGENT TESTER II(MASS AIR FLOW RATE)

(a) Connect the intelligent tester II to the DLC3.
(b) Start the engine.
(c) Turn the intelligent tester II ON.
(d) Select the following menu items: Powertrain / Engine and ECT / Data List / MAF.
(e) Read the value.

Result:

Mass Air Flow Rate (g/second)	Proceed To
0.0	A
271.0 or more	B
Between 1.0 and 270.0 (*1)	C

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

B → **Go to step 6**

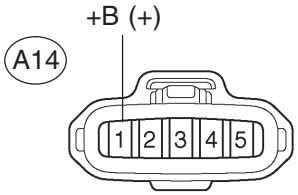
C → **CHECK FOR INTERMITTENT PROBLEMS (See page 05–8)**

A

2 INSPECT MASS AIR FLOW METER(POWER SOURCE)

Wire Harness Side:

Mass Air Flow Meter Connector



Front View

A84809

(a) Disconnect the A14 MAF meter connector.
(b) Turn the ignition switch to ON.
(c) Measure the voltage according to the value(s) in the table below.

Standard:

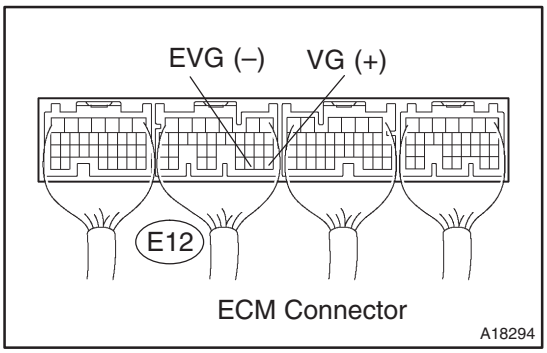
Tester Connection	Specified Condition
+B (A14–1) – Body ground	9 to 14 V

(d) Reconnect the MAF meter connector.

NG → **Go to step 5**

OK

3 INSPECT ECM(VG VOLTAGE)



(a) Start the engine.
(b) Measure the voltage according to the value(s) in the table below.

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

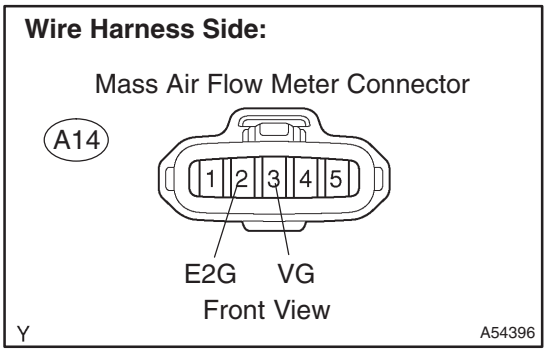
Standard:

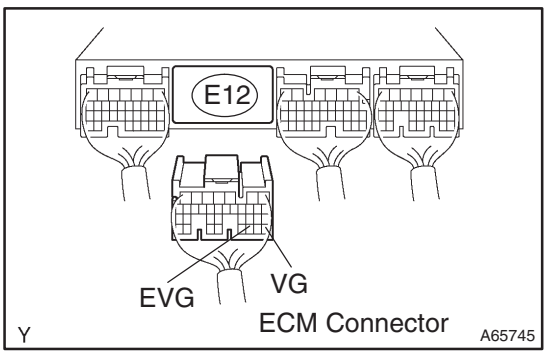
Tester Connection	Condition	Specified Condition
VG (E12–28) – EVG (E12–30)	Engine is idling	0.5 to 3.0 V

OK → **REPLACE ECM (See page 10–12)**

NG

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





(a) Disconnect the A14 MAF meter connector.
(b) Disconnect the E12 ECM connector.
(c) Measure the resistance according to the value(s) in the table below.

Standard (Check for open):

Tester Connection	Specified Condition
VG (A14–3) – VG (E12–28)	Below 1 Ω
E2G (A14–2) – EVG (E12–30)	Below 1 Ω

Standard (Check for short):

Tester Connection	Specified Condition
VG (A14–3) or VG (E12–28) – Body ground	10 kΩ or higher

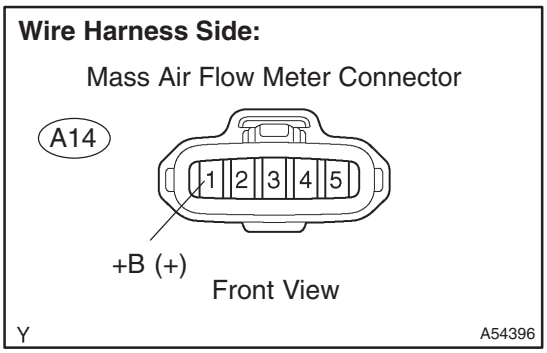
(d) Reconnect the MAF meter connector.
(e) Reconnect the ECM connector.

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 A14 MAF meter connector.
(b) Remove the EFI relay from the engine room R/B and J/B.
(c) Measure the resistance according to the value(s) in the table below.

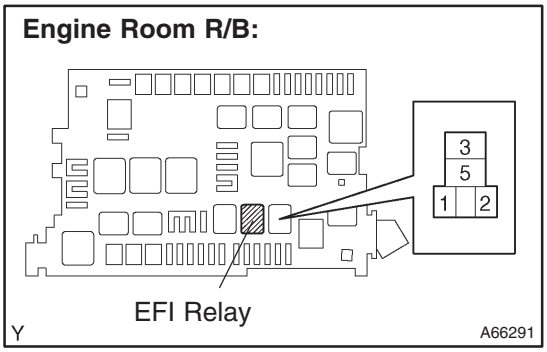
Standard (Check for open):

Tester Connection	Specified Condition
+B (A14–1) – EFI relay (3)	Below 1 Ω

Standard (Check for short):

Tester Connection	Specified Condition
+B (A14–1) or EFI relay (3) – Body ground	10 kΩ or higher

(d) Reconnect the MAF meter connector.
(e) Reinstall the EFI relay.

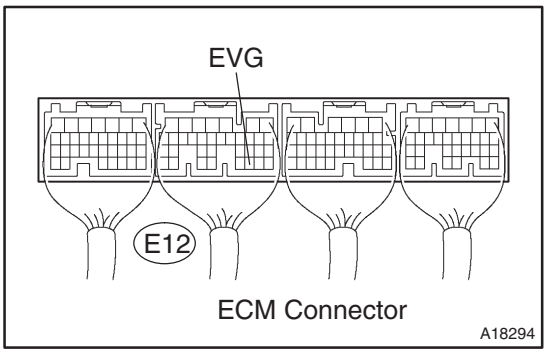


NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK

INSPECT ECM POWER SOURCE CIRCUIT (See page 05–168)

6 INSPECT ECM(SENSOR GROUND)



(a) Measure the resistance according to the value(s) in the table below.

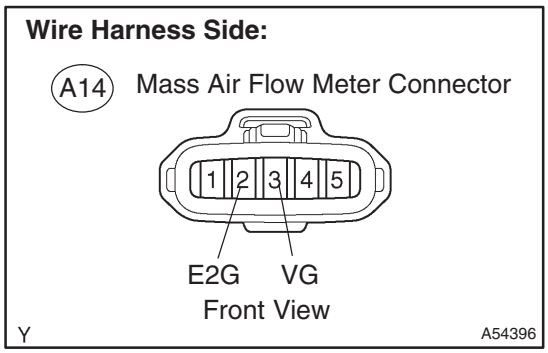
Standard:

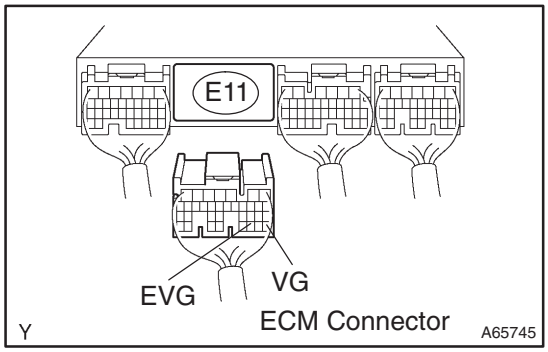
Tester Connection	Specified Condition
EVG (E12–30) – Body ground	Below 1 Ω

NG → **REPLACE ECM (See page 10–12)**

OK

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





(a) Disconnect the A14 MAF meter connector.
(b) Disconnect the E11 ECM connector.
(c) Measure the resistance according to the value(s) in the table below.

Standard (Check for open):

Tester Connection	Specified Condition
VG (A14–3) – VG (E12–28)	Below 1 Ω
E2G (A14–2) – EVG (E12–30)	Below 1 Ω

Standard (Check for short):

Tester Connection	Specified Condition
VG (A14–3) or VG (E12–28) – Body ground	10 kΩ or higher

(d) Reconnect the MAF meter connector.
(e) Reconnect the ECM connector.

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

OK

REPLACE MASS AIR FLOW METER