DTC	P0100	MASS OR VOLUME AIR FLOW CIRCUIT

DTC	P0102	MASS OR VOLUME AIR FLOW CIRCUIT LOW INPUT

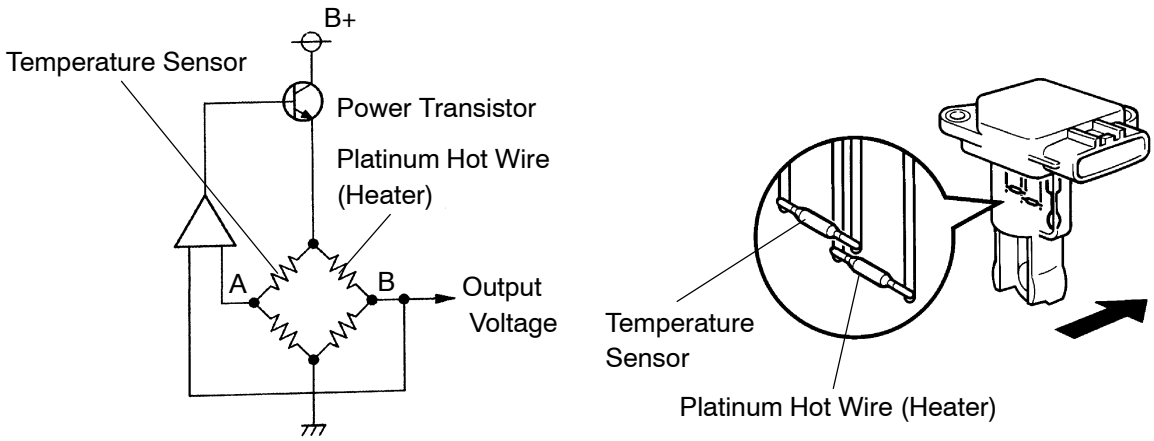
DTC	P0103	MASS OR VOLUME AIR FLOW CIRCUIT HIGH INPUT

CIRCUIT DESCRIPTION

The MAF (Mass Air Flow) meter 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 air flowing 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 set temperature.

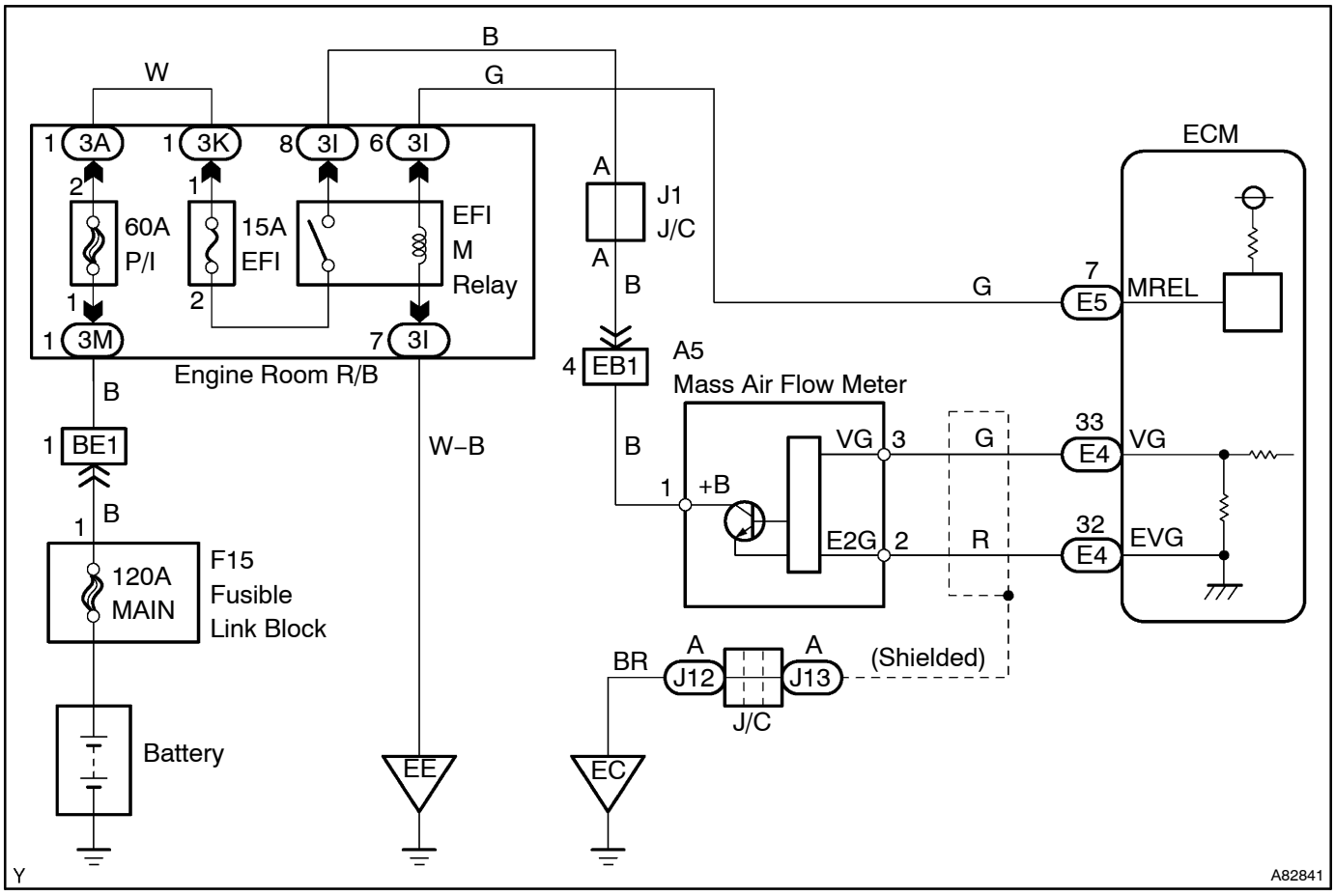


DTC No.	DTC Detection Condition	Trouble Area
P0100	When the mass air flow meter circuit has an open or a short for more than 3 seconds	• Open or short in mass air flow meter circuit • Mass air flow meter • ECM
P0102	When the mass air flow meter circuit has an open for more than 3 seconds	• Open in mass air flow meter circuit • Mass air flow meter • ECM
P0103	When the mass air flow meter circuit has a short for more than 3 seconds	• Short in mass air flow meter circuit • Mass air flow meter • ECM

HINT:
After confirming DTC P0100, P0102 or P0103, confirm the mass air flow ratio in Powertrain / Engine and ECT / Data List / MAF using the intelligent tester II.

Air Flow Rate (g/s)	Malfunction
Approximately 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 intelligent tester II. Freeze frame data records the engine condition when malfunction is detected. When troubleshooting, freeze frame data can help determine if the vehicle was running or stopped, 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) Put the engine in inspection mode (see page 05–1).
(c) Start the engine.
(d) Turn the Intelligent tester II ON.
(e) On the Intelligent tester II, select the item: Powertrain / Engine and ECT / Data List / MAF. Read its value.

Result:

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

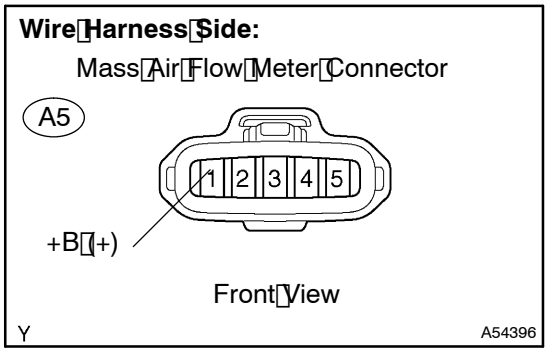
*1: The value must be changed when the throttle valve is opened or closed.

B → **Go to step 6**

C → **CHECK FOR INTERMITTENT PROBLEMS (See page 05-14)**

A

2	INSPECT MASS AIR FLOW METER (POWER SOURCE)



(a) Turn the power switch ON (IG).
(b) Disconnect the A5 mass air flow meter connector.
(c) Measure the voltage between the terminal of the wire harness side connector and body ground.

Standard:

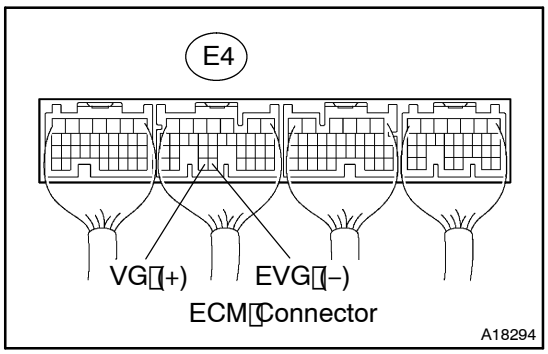
Tester Connection	Specified Condition
+B (A5–1) – Body ground	9 to 14 V

(d) Reconnect the mass air flow meter connector.

NG → **Go to step 5**

OK

3 INSPECT ECM (VG VOLTAGE)



(a) Put the engine in inspection mode (see page 05–1).
(b) Start the engine.
(c) Measure the voltage between the specified terminals of the E4 ECM connector.

HINT:
The A/C switch should be turned OFF.

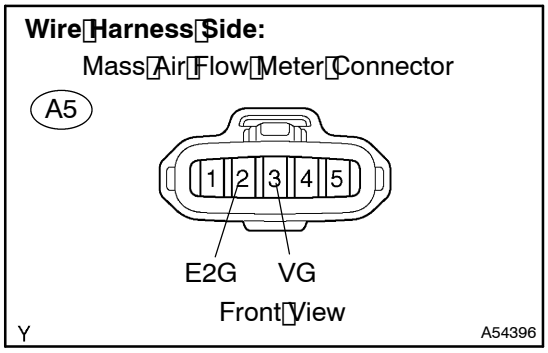
Standard:

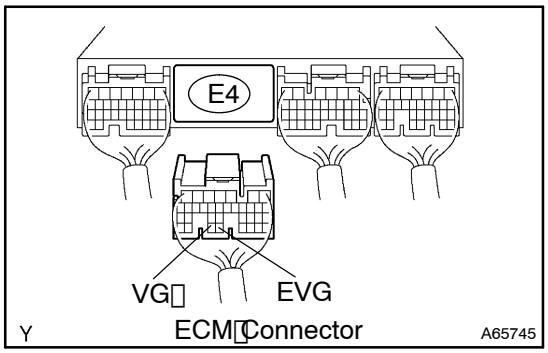
Tester Connection	Condition	Specified Condition
VG (E4–33) – EVG (E4–32)	Engine is idling	0.5 to 3.0 V

OK ⇒ **REPLACE ECM (See page 10–24)**

NG

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





(a) Disconnect the A5 mass air flow meter connector.
(b) Disconnect the E4 ECM connector.
(c) Check the resistance between the wire harness side connectors.

Standard (Check for open):

Tester Connection	Specified Condition
VG (A5–3) – VG (E4–33)	Below 1 Ω
E2G (A5–2) – EVG (E4–32)	Below 1 Ω

Standard (Check for short):

Tester Connection	Specified Condition
VG (A5–3) or VG (E4–33) – Body ground	10 kΩ or higher

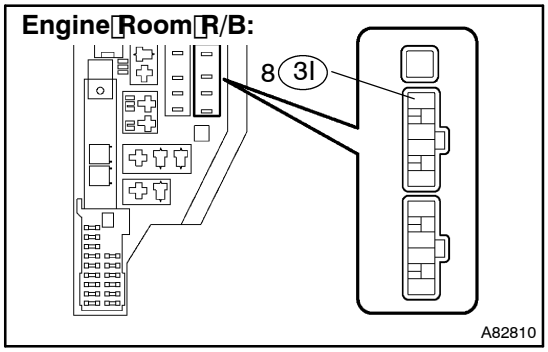
(d) Reconnect the mass air flow meter connector.
(e) Reconnect the ECM connector.

NG ⇒ **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK

REPLACE MASS AIR FLOW METER

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



(a) Remove the integration relay from the engine room R/B.
(b) Disconnect the A5 mass air flow meter connector.
(c) Check the resistance between the wire harness side connectors.

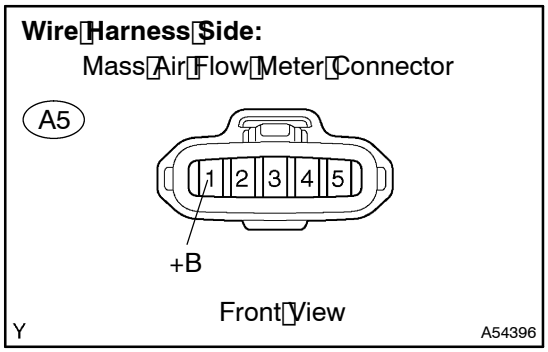
Standard (Check for open):

Tester Connection	Specified Condition
+B (A5–1) – EFI M relay (3I–8)	Below 1 Ω

Standard (Check for short):

Tester Connection	Specified Condition
+B (A5–1) or EFI M relay (3I–8) – Body ground	10 kΩ or higher

(d) Reconnect the mass air flow meter connector.
(e) Reinstall the integration relay.

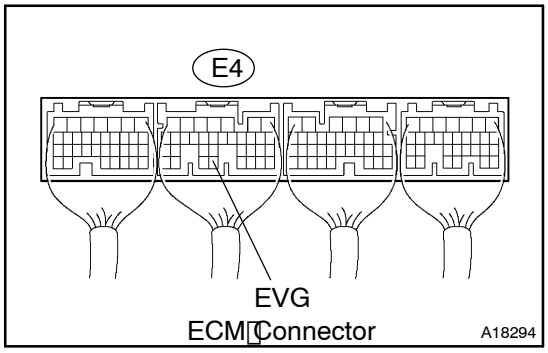


NG → REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

CHECK ECM POWER SOURCE CIRCUIT (See page 05–197)

6	INSPECT ECM(SENSOR GROUND)



(a) Check the resistance between the specified terminal of the E4 ECM connector and the body ground.

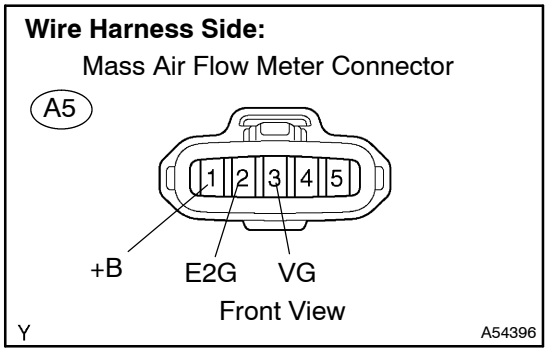
Standard:

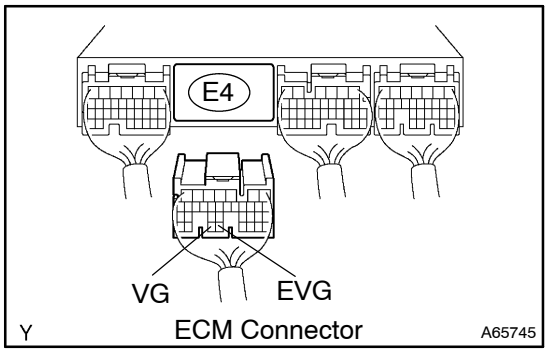
Tester Connection	Specified Condition
EVG (E4–32) – Body ground	Below 1 Ω

NG → REPLACE ECM (See page 10–24)

OK

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





(a) Disconnect the A5 mass air flow meter connector.
(b) Disconnect the E4 ECM connector.
(c) Check the resistance between the wire harness side connectors.

Standard (Check for open):

Tester Connection	Specified Condition
VG (A5–3) – VG (E4–33)	Below 1 Ω
E2G (A5–2) – EVG (E4–32)	Below 1 Ω

Standard (Check for short):

Tester Connection	Specified Condition
VG (A5–3) – +B (A5–1)	10 kΩ or higher

(d) Reconnect the mass air flow meter connector.
(e) Reconnect the ECM connector.

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

OK

REPLACE MASS AIR FLOW METER