DTC	P0100/31	MASS OR VOLUME AIR FLOW CIRCUIT

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

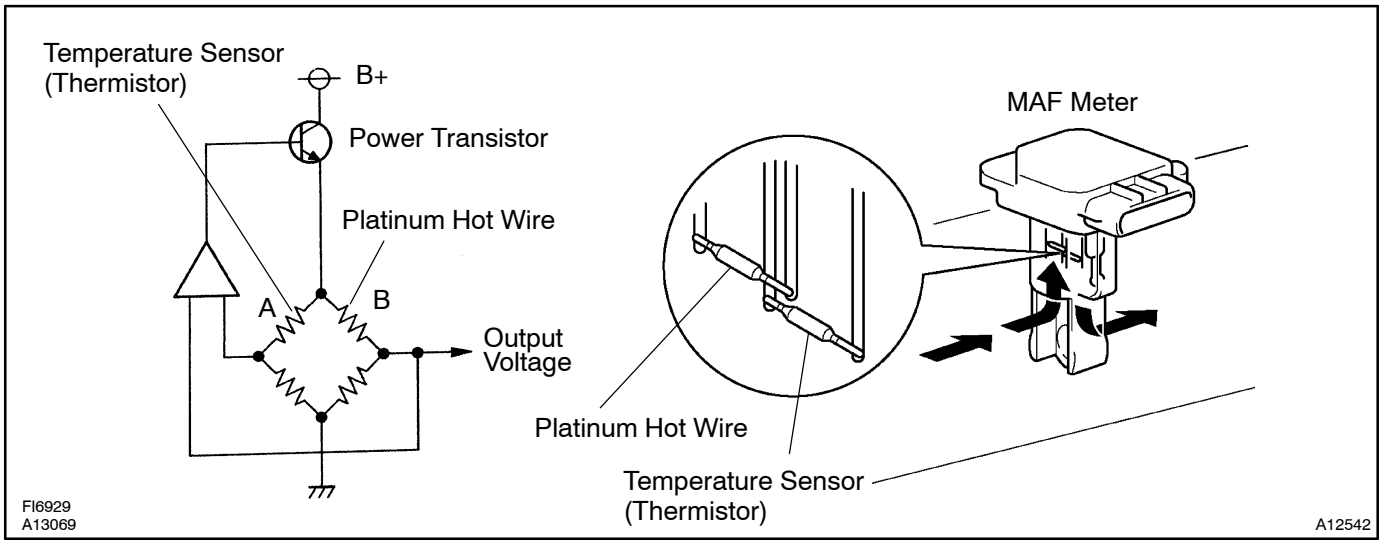
DTC	P0103/31	MASS OR VOLUME AIR FLOW CIRCUIT HIGH INPUT

CIRCUIT DESCRIPTION

The Mass Air Flow (MAF) meter uses a platinum hot wire. The hot wire MAF meter consists of a platinum hot wire, thermistor and a control circuit installed in a plastic housing. The hot wire MAF meter works on the principle that the hot wire and thermistor located in the intake air bypass of the housing detect any changes in the IAT.

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 MAF meter.

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

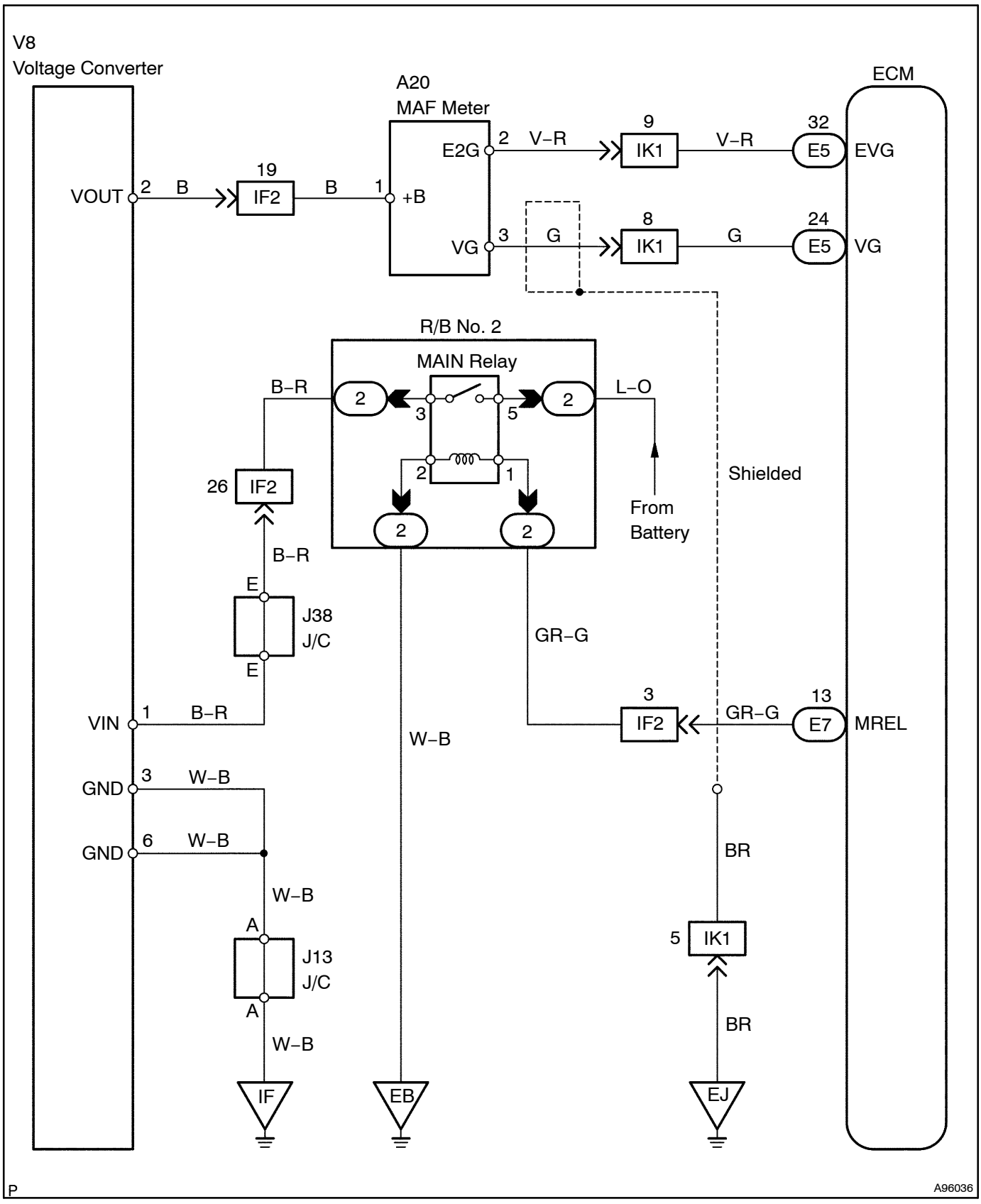


DTC No.	DTC Detection Condition	Trouble Area
P0100/31	Open or short in MAF meter circuit for more than 3 seconds with engine speed at 4,000 rpm or less	• Open or short in MAF meter circuit • MAF meter • Voltage converter • ECM
P0102/31	Open in MAF meter circuit for more than 3 seconds with engine speed at 4,000 rpm or less	Same as DTC No. P0100/31
P0103/31	Short in MAF meter circuit for more than 3 seconds with engine speed at 4,000 rpm or less	Same as DTC No. P0100/31

HINT:
After confirming DTC P0100/31, P0102/31 or P0103/31, use the hand–held tester to confirm the MAF ratio from the MAF menu (to reach the MAF menu: DIAGNOSIS / OBD/MOBD / DATA LIST / ALL / MAF).

Air Flow Value (gm/sec.)	Malfunction
Approx. 0.0	• MAF 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 the hand–held tester. Freeze frame data records the engine conditions when a 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.

When using hand–held tester:

1	READ VALUE OF DATA LIST (MAF RATE)

(a) Connect the hand–held tester (with 24 V VIM) to the DLC3.
(b) Start the engine.
(c) Turn the hand–held tester ON.
(d) On the hand–held tester, enter the following menus: DIAGNOSIS / OBD/MOBD / DATA LIST / ALL / MAF. Read the values.
Result:

Air Flow Rate (gm/s)	Proceed to
0.0	A
170.1 or more	B
Between 1.6 and 170.0 *	C

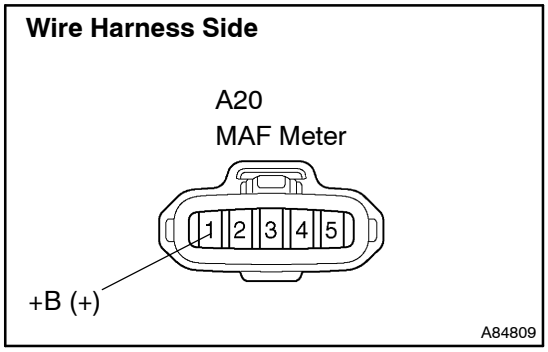
HINT:
*: The value must change when the throttle valve is opened or closed.

B → **Go to step 4**

C → **CHECK FOR INTERMITTENT PROBLEMS** (See page 05–10)

A

2	CHECK MASS AIR FLOW METER (POWER SOURCE)



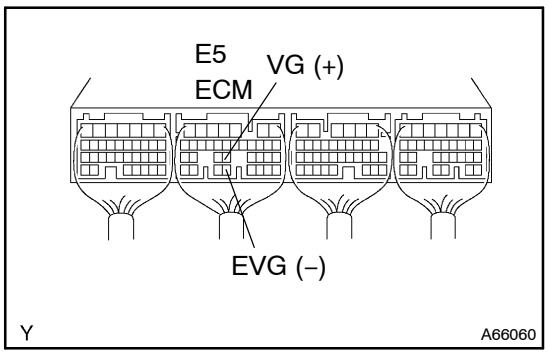
(a) Turn the ignition switch ON.
(b) Disconnect the A20 MAF meter connector.
(c) Measure the voltage of the wire harness side connector.
Standard:

Tester Connection	Specified Condition
A20–1 (+B) – Body ground	13 to 17 V

NG → **Go to step 5**

OK

3 CHECK ECM (VG VOLTAGE)



(a) Start the engine.
(b) Measure the voltage of the ECM connector.
Standard:

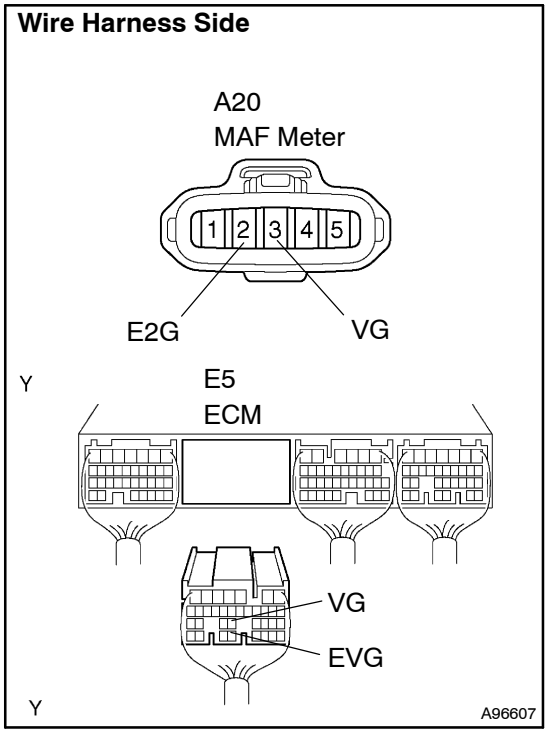
Tester Connection	Condition	Specified Condition
E5–24 (VG) – E5–32 (EVG)	Engine is idling	1.8 to 2.6 V
E5–24 (VG) – E5–32 (EVG)	Engine speed at 3,000 rpm	3.0 to 4.0 V

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

OK → **REPLACE ECM (See page 10–10)**

NG

4 CHECK WIRE HARNESS (MAF METER – ECM)



(a) Disconnect the A20 MAF meter connector.
(b) Disconnect the E5 ECM connector.
(c) Measure the resistance of the wire harness side connectors.
Standard:

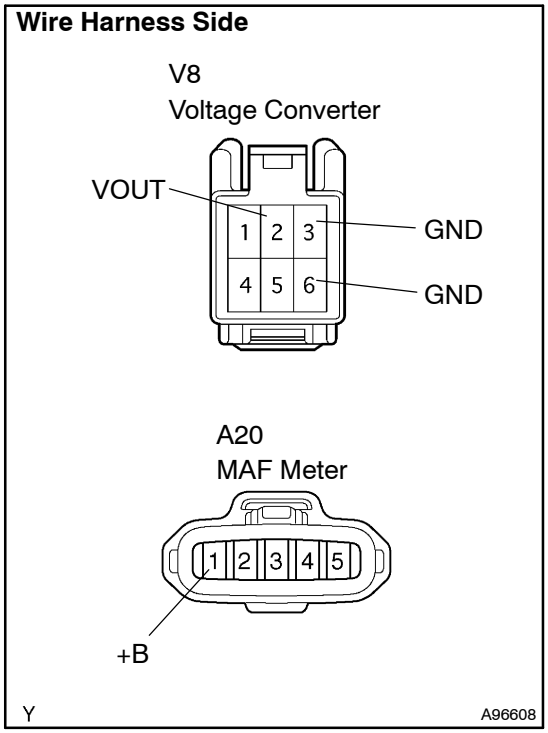
Tester Connection	Specified Condition
A20–3 (VG) – E5–24 (VG) A20–2 (E2G) – E5–32 (EVG)	Below 1 Ω
A20–3 (VG) or E5–24 (VG) – Body ground	10 kΩ or higher

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

OK

REPLACE MASS AIR FLOW METER

5 CHECK WIRE HARNESS (VOLTAGE CONVERTER – MAF METER)



(a) Disconnect the V8 voltage converter connector.
(b) Disconnect the A20 MAF meter connector.
(c) Measure the resistance of the wire harness side connectors.

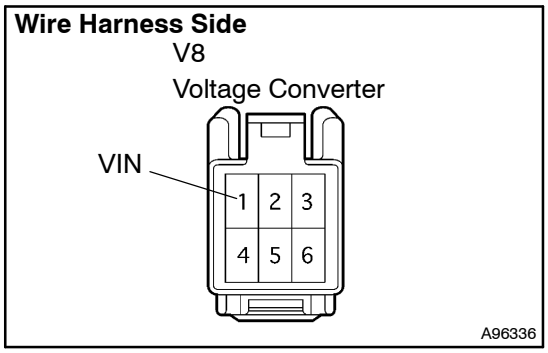
Standard:

Tester Connection	Specified Condition
V8–2 (VOUT) – A20–1 (+B) V8–3 (GND) – Body ground V8–6 (GND) – Body ground	Below 1 Ω
V8–2 (VOUT) or A20–1 (+B) – Body ground	10 kΩ or higher

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

OK

6 CHECK VOLTAGE CONVERTER (VIM VOLTAGE)



(a) Turn the ignition switch ON.
(b) Disconnect the V8 voltage converter connector.
(c) Measure the voltage of the converter connector.

Standard:

Tester Connection	Specified Condition
V8–1 (VIN) – V8 –3 (GND)	18 to 27 V

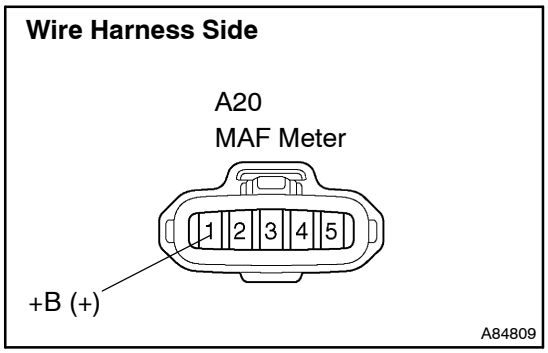
NG → **REPLACE VOLTAGE CONVERTER CHECK**

OK

CHECK AND REPLACE ECM POWER SOURCE CIRCUIT (See page 05–152)

When not using hand–held tester:

1	CHECK MASS AIR FLOW METER (POWER SOURCE)



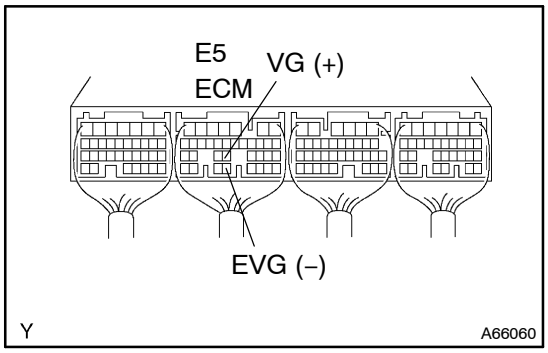
(a) Turn the ignition switch ON.
(b) Disconnect the A20 MAF meter connector.
(c) Measure the voltage of the wire harness side connector.
Standard:

Tester Connection	Specified Condition
A20–1 (+B) – Body ground	13 to 17 V

NG → **Go to step 4**

OK

2	CHECK ECM (VG VOLTAGE)



(a) Start the engine.
(b) Measure the voltage of the ECM connector.
Standard:

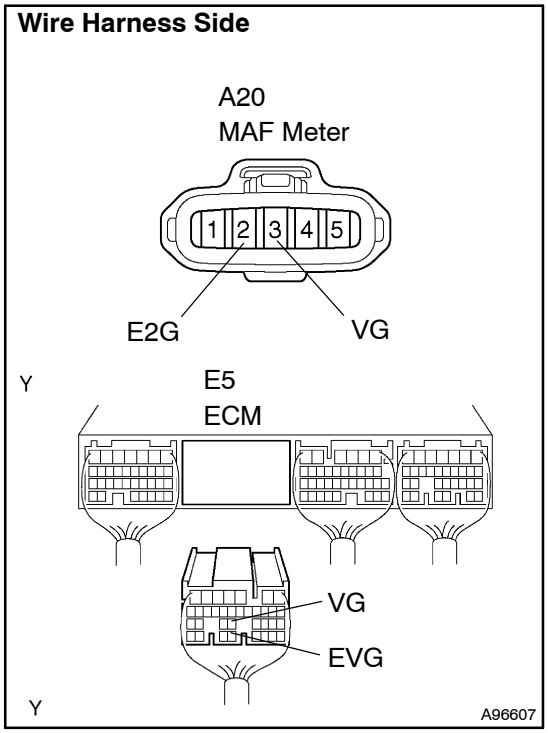
Tester Connection	Condition	Specified Condition
E5–24 (VG) – E5–32 (EVG)	Engine is idling	1.8 to 2.6 V
E5–24 (VG) – E5–32 (EVG)	Engine speed at 3,000 rpm	3.0 to 4.0 V

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

OK → **REPLACE ECM (See page 10–10)**

NG

3 CHECK WIRE HARNESS (MAF METER – ECM)



(a) Disconnect the A20 MAF meter connector.
(b) Disconnect the E5 ECM connector.
(c) Measure the resistance of the wire harness side connectors.

Standard:

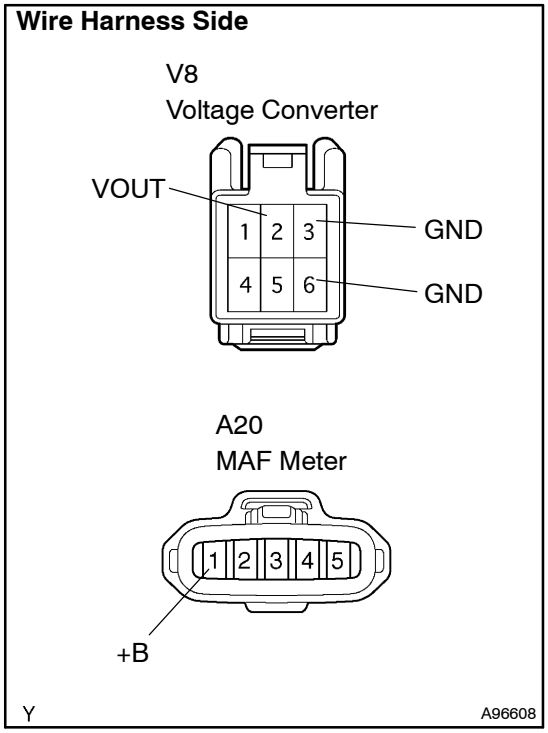
Tester Connection	Specified Condition
A20–3 (VG) – E5–24 (VG) A20–2 (E2G) – E5–32 (EVG)	Below 1 Ω
A20–3 (VG) or E5–24 (VG) – Body ground	10 kΩ or higher

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

OK

REPLACE MASS AIR FLOW METER

4 CHECK WIRE HARNESS (VOLTAGE CONVERTER – MAF METER)



(a) Disconnect the V8 voltage converter connector.
(b) Disconnect the A20 MAF meter connector.
(c) Measure the resistance of the wire harness side connectors.

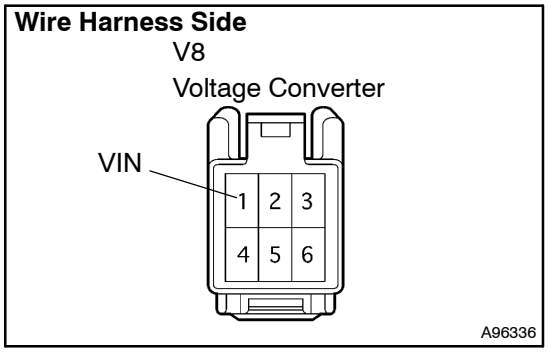
Standard:

Tester Connection	Specified Condition
V8–2 (VOUT) – A20–1 (+B) V8–3 (GND) – Body ground V8–6 (GND) – Body ground	Below 1 Ω
V8–2 (VOUT) or A20–1 (+B) – Body ground	10 kΩ or higher

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

OK

5	CHECK VOLTAGE CONVERTER (VIM VOLTAGE)



(a) Turn the ignition switch ON.
(b) Disconnect the V8 voltage converter connector.
(c) Measure the voltage of the converter connector.

Standard:

Tester Connection	Specified Condition
V8–1 (VIN) – V8 –3 (GND)	18 to 27 V

NG → **REPLACE VOLTAGE CONVERTER**

OK

CHECK AND REPLACE ECM POWER SOURCE CIRCUIT (See page 05–152)