

|            |              |                                        |
|------------|--------------|----------------------------------------|
| <b>DTC</b> | <b>P0100</b> | <b>Mass or Volume Air Flow Circuit</b> |
|------------|--------------|----------------------------------------|

|            |              |                                                  |
|------------|--------------|--------------------------------------------------|
| <b>DTC</b> | <b>P0102</b> | <b>Mass or Volume Air Flow Circuit Low Input</b> |
|------------|--------------|--------------------------------------------------|

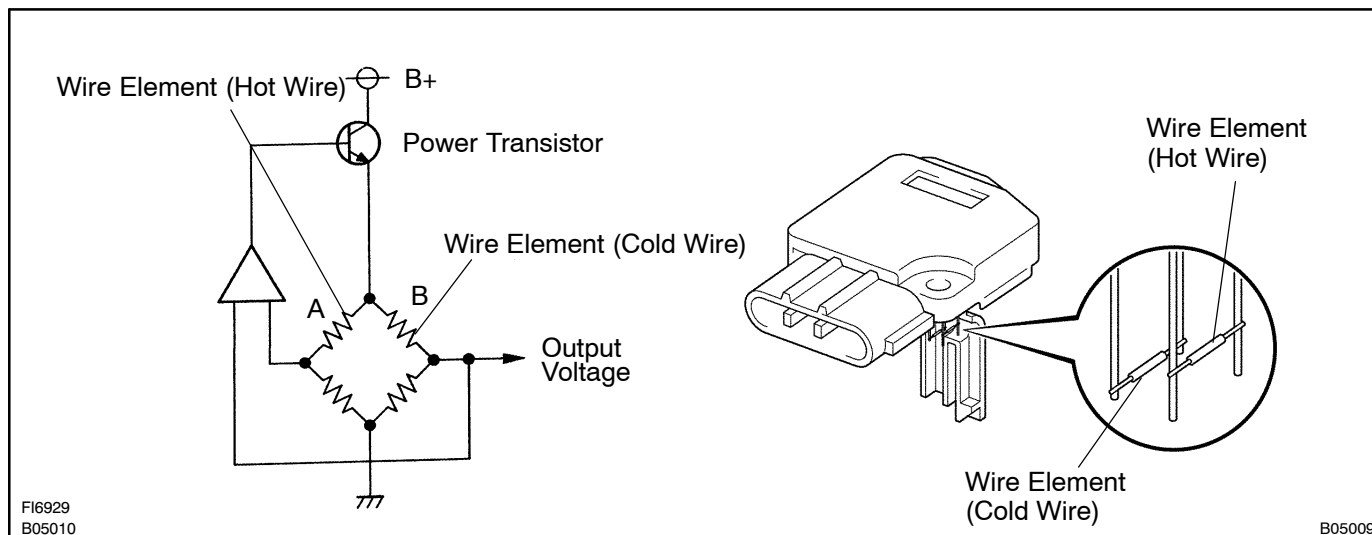
|            |              |                                                   |
|------------|--------------|---------------------------------------------------|
| <b>DTC</b> | <b>P0103</b> | <b>Mass or Volume Air Flow Circuit High Input</b> |
|------------|--------------|---------------------------------------------------|

## CIRCUIT DESCRIPTION

The mass air flow meter uses a platinum hot wire. The hot wire air flow meter consists of a wire element (cold wire), wire element (cold wire) and a control circuit installed in a plastic housing. The hot wire air flow meter works on the principle that the hot wire and wire element (cold wire) 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 wire element (cold wire) and wire element (cold wire) provide a bridge circuit with the power transistor controlled so that the potential of A and B remains equal to maintain the set temperature.



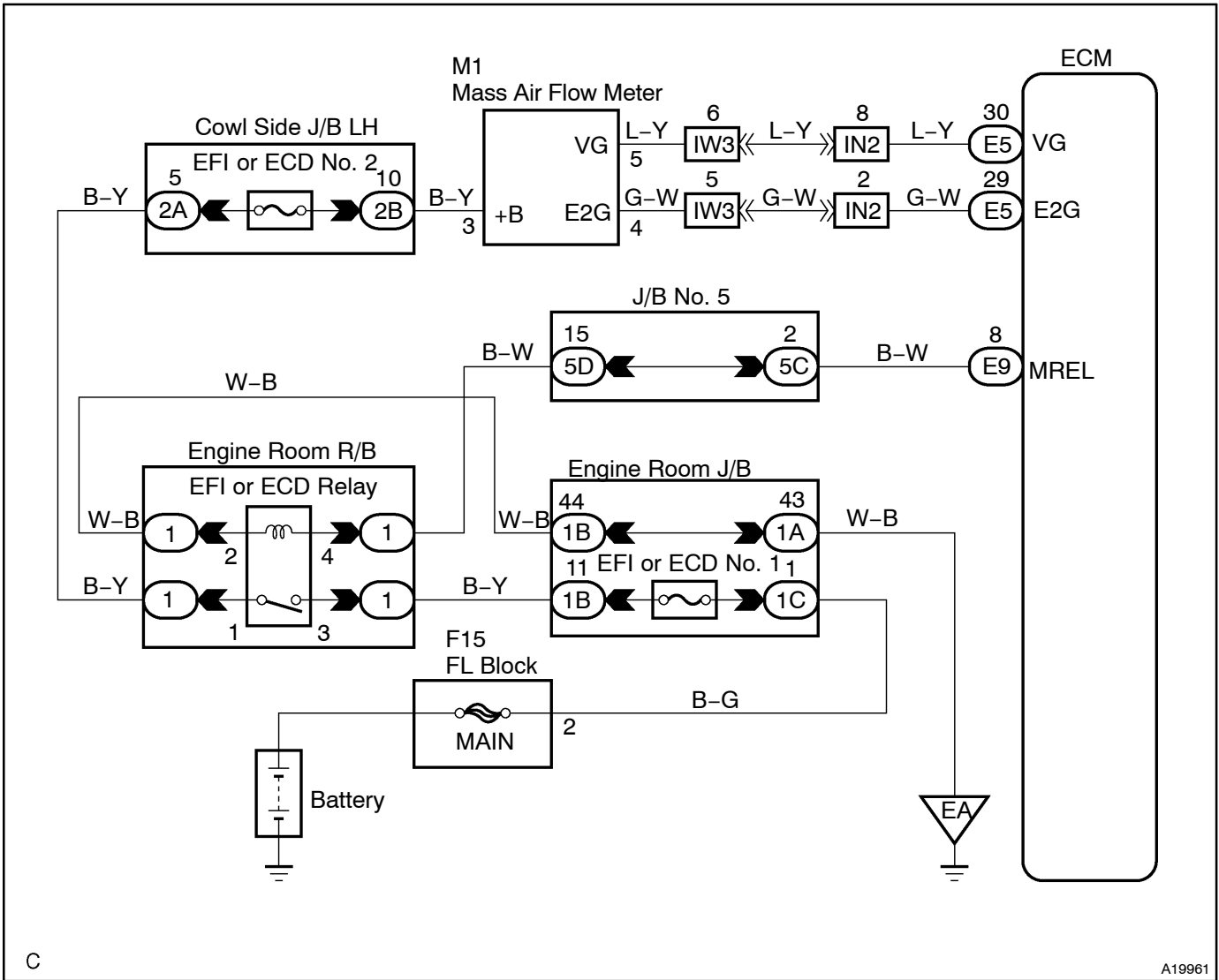
| DTC No. | DTC Detection Condition                                                                              | Trouble Area                                                                                                                  |
|---------|------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------|
| P0100   | Open or short in mass air flow meter circuit with more than 3 seconds engine speed 4,000 rpm or less | <ul style="list-style-type: none"> <li>• Mass air flow meter circuit</li> <li>• Mass air flow meter</li> <li>• ECM</li> </ul> |
| P0102   | Open in mass air flow meter circuit with more than 3 seconds engine speed 4,000 rpm or less          |                                                                                                                               |
| P0103   | Short in mass air flow meter circuit with more than 3 seconds engine speed 4,000 rpm or less         |                                                                                                                               |

**HINT:**

After confirming DTC P0100, P0102 and P0103, use the OBD II scan tool or hand-held tester to confirm the mass air flow ratio from the CURRENT DATA.

| Mass Air Flow Value (gm/sec.) | Malfunction                                                                                                                           |
|-------------------------------|---------------------------------------------------------------------------------------------------------------------------------------|
| Approx. 0.0                   | <ul style="list-style-type: none"> <li>• Mass air flow meter power source circuit open</li> <li>• VG circuit open or short</li> </ul> |
| 271.0 or more                 | <ul style="list-style-type: none"> <li>• EVG circuit open</li> </ul>                                                                  |

**WIRING DIAGRAM**



**INSPECTION PROCEDURE**

**HINT:**

Read freeze frame data using hand-held tester or the OBD II scan tool, as freeze frame data records the engine conditions when a malfunction is detected. When troubleshooting, this 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.

|          |                                                                                            |
|----------|--------------------------------------------------------------------------------------------|
| <b>1</b> | <b>Connect OBD II scan tool or hand-held tester, and read value of mass air flow rate.</b> |
|----------|--------------------------------------------------------------------------------------------|

**PREPARATION:**

- (a) Connect the OBD II scan tool or hand-held tester to the DLC3.
- (b) Turn the ignition switch ON and push the OBD II scan tool or hand-held tester main switch ON.
- (c) Start the engine.

**CHECK:**

Read the mass air flow rate on the OBD II scan tool or hand-held tester.

**RESULT:**

|                              | Type I | Type II       |
|------------------------------|--------|---------------|
| Mass Air Flow Rate (gm/sec.) | 0.0    | 271.0 or more |

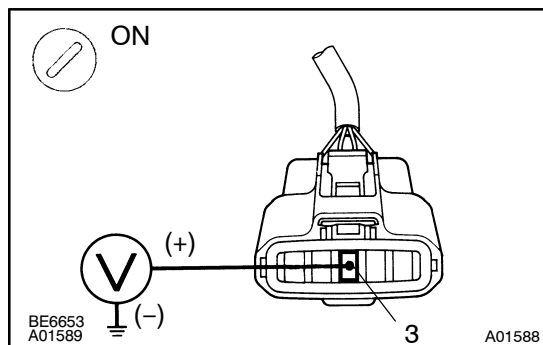
Type I

Go to step 2.

Type II

Go to step 5.

|          |                                                           |
|----------|-----------------------------------------------------------|
| <b>2</b> | <b>Check voltage of mass air flow meter power source.</b> |
|----------|-----------------------------------------------------------|

**PREPARATION:**

- (a) Disconnect the mass air flow meter connector.
- (b) Turn the ignition switch ON.

**CHECK:**

Measure the voltage between terminal 3 of the mass air flow meter connector and body ground.

**OK:**

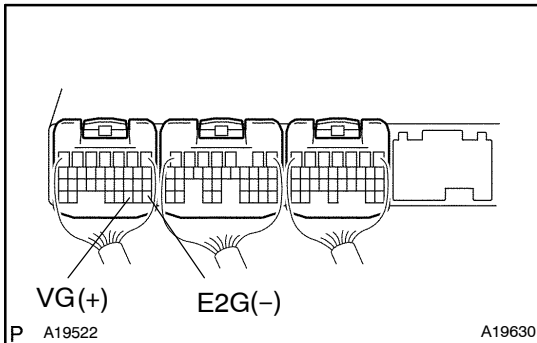
**Voltage: 9 – 14 V**

NG

**Check for open in harness and connector between EFI relay (Marking: EFI) and mass air flow meter (See page IN-36).**

OK

### 3 Check voltage between terminal VG and E2G of ECM connector.



#### **PREPARATION:**

- (a) Remove the glove compartment door (See page [SF-60](#)).
- (b) Start the engine.

#### **CHECK:**

Measure the voltage between terminal VG and E2G of the ECM connector while the engine is idling.

#### **OK:**

#### **Voltage:**

0.5 – 3.0 V (P or N range and A/C switch OFF)

OK

Check and replace ECM (See page [IN-36](#)).

NG

### 4 Check for open and short in harness and connector between mass air flow meter and ECM (See page [IN-36](#)).

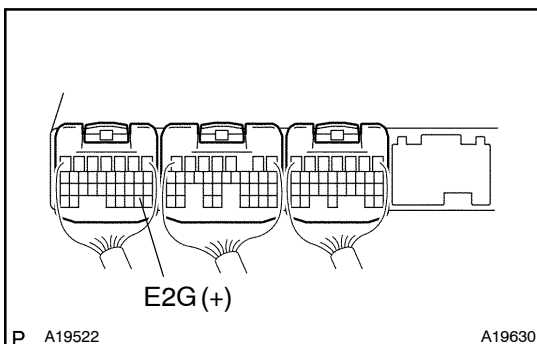
NG

Repair or replace harness or connector.

OK

Replace mass air flow meter.

### 5 Check continuity between terminal E2G of ECM connector and body ground.



#### **PREPARATION:**

Remove the glove compartment door (See page [SF-60](#)).

#### **CHECK:**

Check the continuity between terminal E2G of the ECM connector and body ground.

#### **OK:**

Continuity (1  $\Omega$  or less)

NG

Check and replace ECM (See page [IN-36](#)).

OK

|   |                                                                                                                   |
|---|-------------------------------------------------------------------------------------------------------------------|
| 6 | Check for open in harness and connector between mass air flow meter and ECM<br>(See page <a href="#">IN-36</a> ). |
|---|-------------------------------------------------------------------------------------------------------------------|

**NG****Repair or replace harness or connector.****OK****Replace mass air flow meter.**