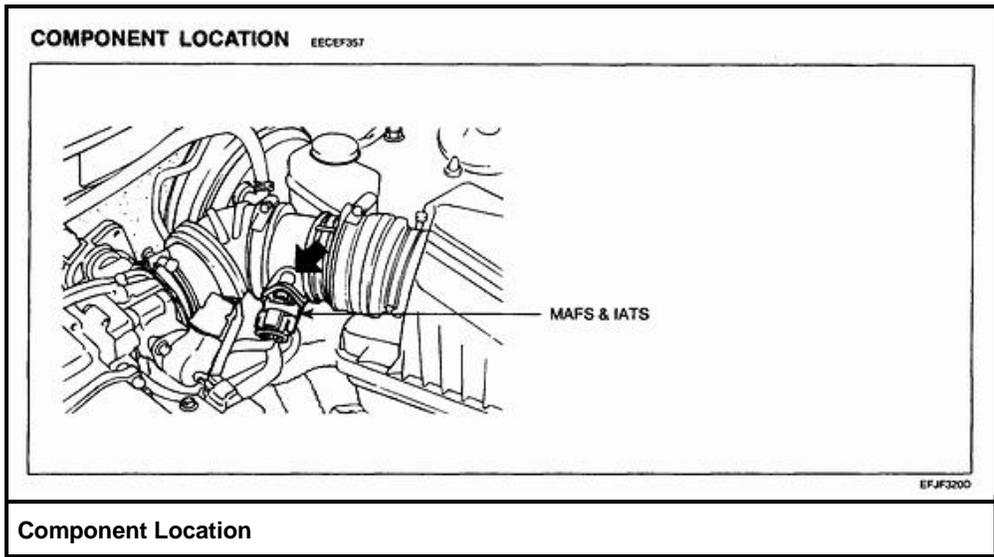


**DTC P0102 MASS OR VOLUME AIR FLOW CIRCUIT LOW INPUT**



**GENERAL DESCRIPTION**

The mass air flow sensor (MAF) is located between the air cleaner assembly and throttle body. The MAF uses a hot film type sensing element to measure the mass of intake air entering the engine. This hot film type air flow sensor consists of a hot film sensor, housing and metering ducts. Mass air flow rate is measured by detection of heat transfer from a hot film probe. The change in air flow rate causes change in the amount of heat being transferred from the hot film probe surface to the air. A large amount of intake air represents acceleration or high load condition while a small amount of intake air represent deceleration or idle. The mass of intake air should increase at acceleration and be stable during constant engine speed. The PCM uses this information to determine the injection duration and ignition timing for the desired air/fuel ratio.

**DTC DESCRIPTION**

If MAF output voltage is lower than threshold value, the PCM determines that a fault exists and a DTC is stored.

**DTC DETECTING CONDITION** E0BANE07

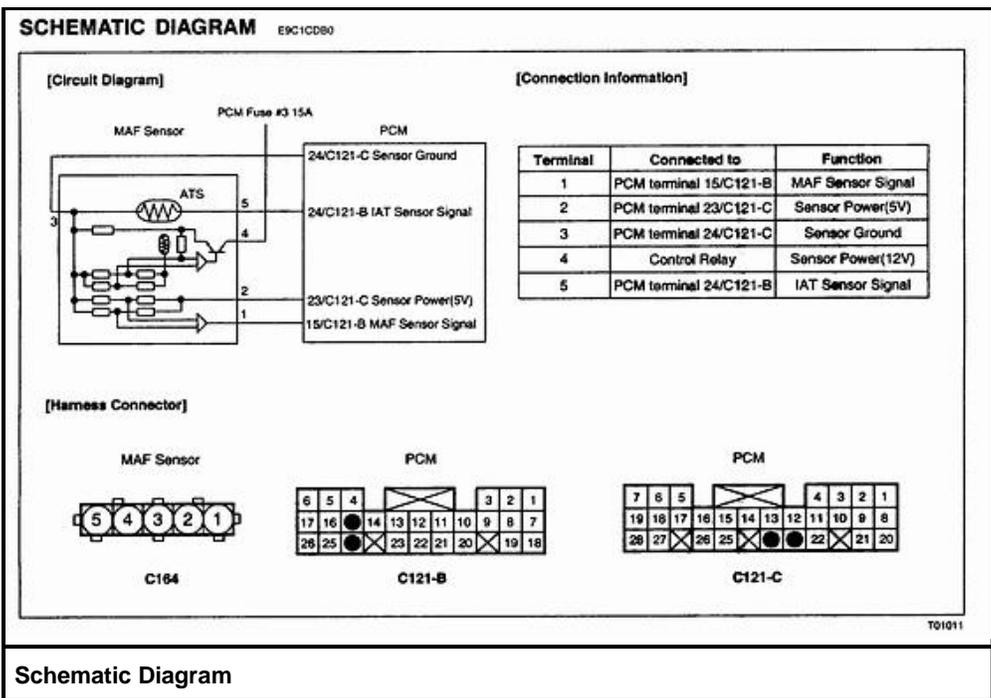
Item	Detecting Condition	Possible cause
DTC Strategy	• Low Voltage	<ul style="list-style-type: none"> <li>• Poor connection</li> <li>• Open or short to ground in MAF sensor circuit</li> <li>• Dirty air cleaner</li> <li>• Faulty MAF</li> <li>• Faulty PCM</li> </ul>
Enable Conditions	• Engine speed > 400rpm	
Threshold value	• Output voltage < 1.06V	
Diagnosis Time	• Continuous	
MIL On Condition	• 2 driving cycles	

**DTC Detecting Condition**

**SPECIFICATION** E54A2C78

	Normal Parameter		
	Approx.700RPM (Idle)	Approx. 2000RPM	Approx.3000RPM
Signal Voltage	0.6 ~ 1.0V	1.3 ~ 1.5V	1.7 ~ 1.9V
Mass Air Flow	11.66kg/h	28.41 ~ 35.58kg/h	43.84 ~ 53.38kg/h

**Specification**



Schematic Diagram

### MONITOR SCANTOOL DATA

1. Connect Scantool to Data Link Connector (DLC).
2. Engine "ON" & Warm up the engine to normal operating temperature.

	Normal Parameter		
	Approx.700RPM (Idle)	Approx. 2000RPM	Approx.3000RPM
Signal Voltage	0.6 ~ 1.0V	1.3 ~ 1.5V	1.7 ~ 1.9V
Mass Air Flow	11.66kg/h	28.41 ~ 35.58kg/h	43.84 ~ 53.38kg/h

**1.2 CURRENT DATA**

MASS . AIR FLOW SNSR	1250 mV
TP SENSOR(ECM)	4296 mV
ENGINE SPEED-COARSE	687 rpm
CLOSED TP SWITCH	ON
ENGINE SPEED-FINE	695 rpm
ACCEL P. SNSR(EMS)	664 mV
ACCEL P. SNSR(ETS)	703 mV
MAP SENSOR	1269 mV

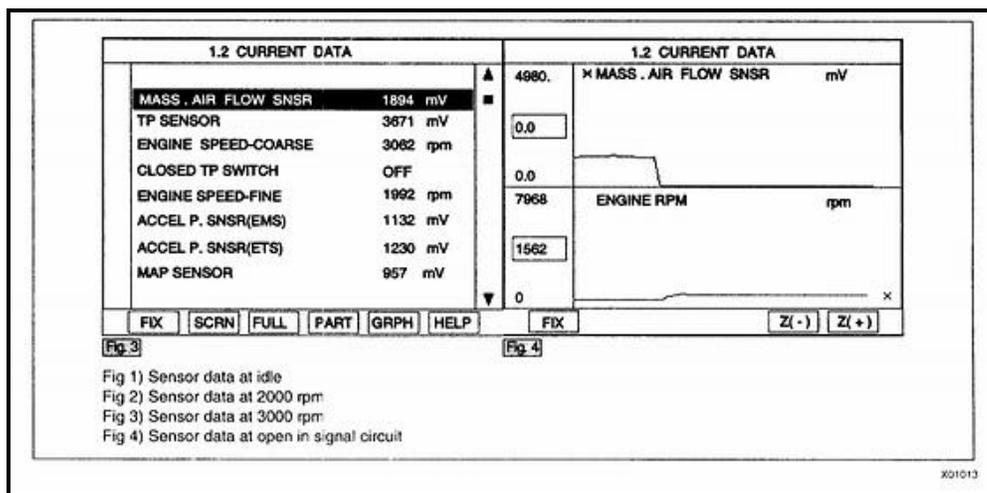
FIX SCRN FULL PART GRPH HELP

**1.2 CURRENT DATA**

MASS . AIR FLOW SNSR	1679 mV
TP SENSOR(ECM)	3847 mV
ENGINE SPEED-COARSE	2156 rpm
CLOSED TP SWITCH	OFF
ENGINE SPEED-FINE	1992 rpm
ACCEL P. SNSR(EMS)	1015 mV
ACCEL P. SNSR(ETS)	1113 mV
MAP SENSOR	996 mV

FIX SCRN FULL PART GRPH HELP

X01012



3. Monitor the "MAFS VOLTAGE" parameter on Scantool.

Specification: Voltage increases in response to racing

4. Is the MAF sensor parameter displayed within specifications?

**YES:** Fault is intermittent caused by poor contact in the sensor's and/or PCM's connector or was repaired and PCM memory was not cleared. Thoroughly check connectors for looseness, poor connection, bending, corrosion, contamination, deterioration, or damage. Repair or replace as necessary and go to "Verification of Vehicle Repair" procedure.

**NO:** Go to "W/Harness Inspection" procedure.

#### TERMINAL INSPECTION

1. Many malfunctions in the electrical system are caused by poor harness and terminals.

Faults can also be caused by interference from other electrical systems, and mechanical or chemical damage.

2. Thoroughly check connectors for looseness, poor connection, bending, corrosion, contamination, deterioration, or damage.

3. Has a problem been found?

**YES:** Repair as necessary and go to "Verification of Vehicle Repair" procedure.

**NO:** Go to "Power Circuit Inspection Procedure."

#### POWER CIRCUIT INSPECTION

1. Check Power Supply

1. Ignition "OFF"

2. Disconnect MAF sensor connector.

3. Ignition "ON" & Engine "OFF"

4. Measure voltage between terminal 4 of MAF sensor harness connector and chassis ground.

Specification: Approx. B+

5. Is the measured voltage within specifications?

**YES:** Go to "Check MAFS Power" as below.

**NO:** Check that Fuse is installed or blown off between control relay and MA sensor.

Check open in harness between control relay and MAF sensor.

Repair or replace as necessary and then, go to "Verification of Vehicle Repair" procedure.

2. Check MAFS Power

1. Ignition "OFF"

2. Disconnect MAF sensor connector.

3. Ignition "ON" & Engine "OFF"

4. Measure voltage between terminal 2 of MAF sensor harness connector and chassis ground.

Specification: Approx. 5 V

5. Is the measured voltage within specifications?

**YES:** Go to "Signal Circuit Inspection" procedure.

**NO:** Check open in harness between control relay and MAF sensor.  
Repair or replace as necessary and then, go to " Verification of Vehicle Repair" procedure.

**SIGNAL CIRCUIT INSPECTION**

1. Check for short to ground in harness.
  1. Ignition "OFF"
  2. Disconnect MAFS sensor connector.
  3. Measure resistance between terminal 1 of MAFS sensor harness connector and chassis ground.

Specification: Infinite

4. Is the measured resistance within specifications?

**YES:** Go to "Check for open in harness" as below.

**NO:** Check short to ground in signal harness.  
Repair or replace as necessary and then, go to "Verification of Vehicle Repair" procedure.

2. Check for open in harness
  1. Ignition "OFF"
  2. Disconnect MAFS sensor and PCM connector.
  3. Measure resistance between terminal 1 of MAFS sensor harness connector and terminal 15/ C121-B of PCM harness connector.

Specification: Approx. below **1 ohms**

4. Is the measured resistance within specifications?

**YES:** Go to " Component Inspection "procedure.

**NO:** Check open in harness between MAFS connector and PCM connector.  
Repair or replace as necessary and then, go to" Verification of Vehicle Repair" procedure.

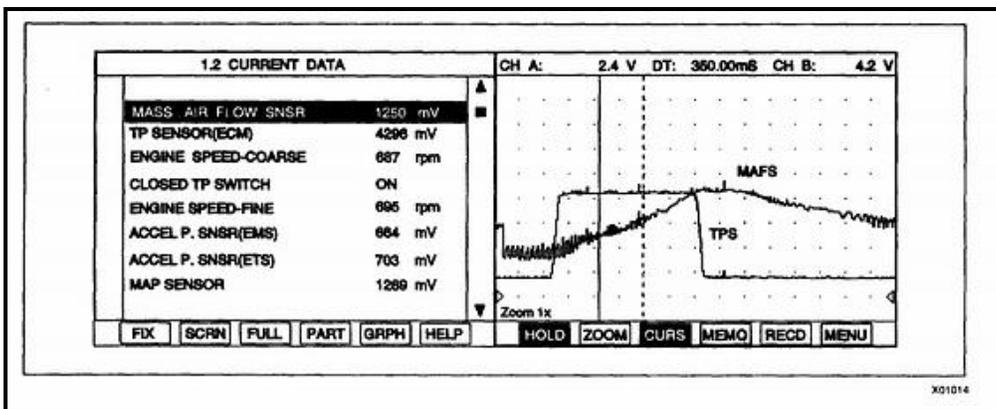
**COMPONENT INSPECTION**

1. Visual Inspection
  1. Check the MAFS for contamination, deterioration, or damage.
  2. Is the MAFS contaminated, deteriorated or damaged?

**YES:** Repair or replace as necessary and Go to "Verification of Vehicle Repair" procedure.

**NO:** Go to " Check MAFS" as below.

2. Check MAFS
  1. Engine "ON"
  2. Connect Scantool and select the "MAF SENSOR" parameter on the CURRENT DATA.



3. Monitor signal waveform of the "MAF SENSOR" on the Scantool.

Specification: MAF value is increased correspondently with TPS when pressing accelerator pedal.

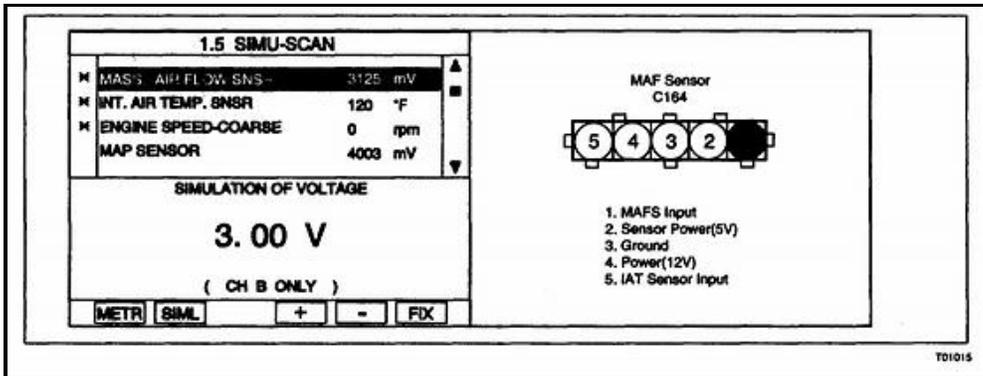
4. Is the measured signal waveform of MAF sensor displaying correctly?

**YES:** Go to "Check PCM" as below.

**NO:** Substitute with a known - good MAF and check for proper operation.  
If the problem is corrected, replace MAF and go to "Verification of Vehicle Repair" procedure.

3. Check PCM

1. Ignition "OFF"
2. Connect Scantool and Ignition "ON"
3. Select simulation function on Scantool.



4. Simulate voltage at terminal 1 of MAF sensor signal connector.
5. Does the signal value of MAF sensor changes according to simulation voltage?

**YES:** Thoroughly check connectors for looseness, poor connection, bending, corrosion, contamination, deterioration, or damage. Repair or replace as necessary and go to "Verification of Vehicle Repair" procedure.

**NO:** Substitute with a known - good PCM and check for proper operation.  
If the problem is corrected, replace PCM and go to "Verification of Vehicle Repair" procedure.

**VERIFICATION OF VEHICLE REPAIR**

After a repair, it is essential to verify that the fault has been corrected.

1. Monitor and record the Freeze Frame Data for the Diagnostic Trouble Code (DTC) which has been diagnosed.
2. Using a Scantool, Clear the DTCs.
3. Operate the vehicle within conditions noted in the freeze frame data or enable conditions.
4. Monitor that all readiness test have been verified as "Complete"
5. Are any DTCs present?

**YES:** Go to the applicable trouble shooting procedure.

**NO:** System is performing to specification at this time.