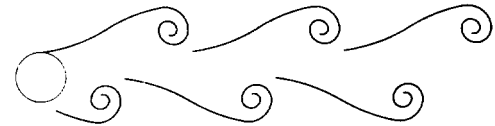


<b>DTC</b>	<b>31</b>	<b>Volume Air Flow Meter Circuit</b>
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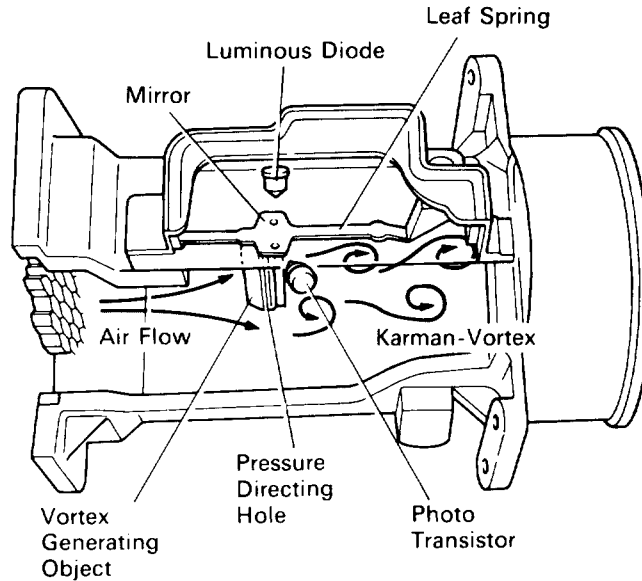
**— CIRCUIT DESCRIPTION —**

As shown in the figure at right, when a pillar (Vortex generating body) is placed in the path of a uniform flow, vortices called Karman-Vortex are generated downstream of the object. Using this principle, a vortex generator is placed inside the Volume air flow meter. By measuring the frequency of the vortices generated, the ECM can determine the volume of air flowing through the volume air flow meter. The vortices are detected by their exerting pressure on thin metal foil (mirror) surfaces and a light emitting element and light receptor (LED and photo transistor) positioned opposite the mirror which senses the vibrations in the mirror optically. The ECM uses these signals mainly for calculation of the basic injection volume and the basic ignition advance angle.



Karman-Vortex

F14504

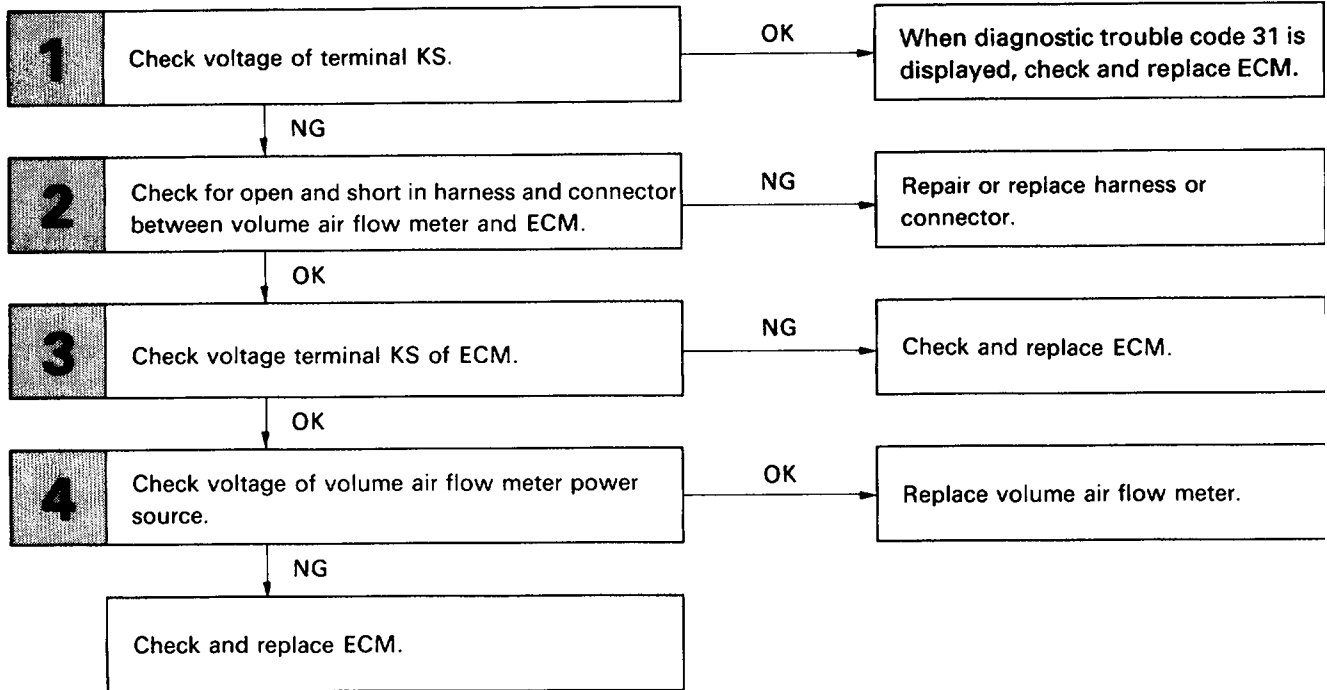


F13045

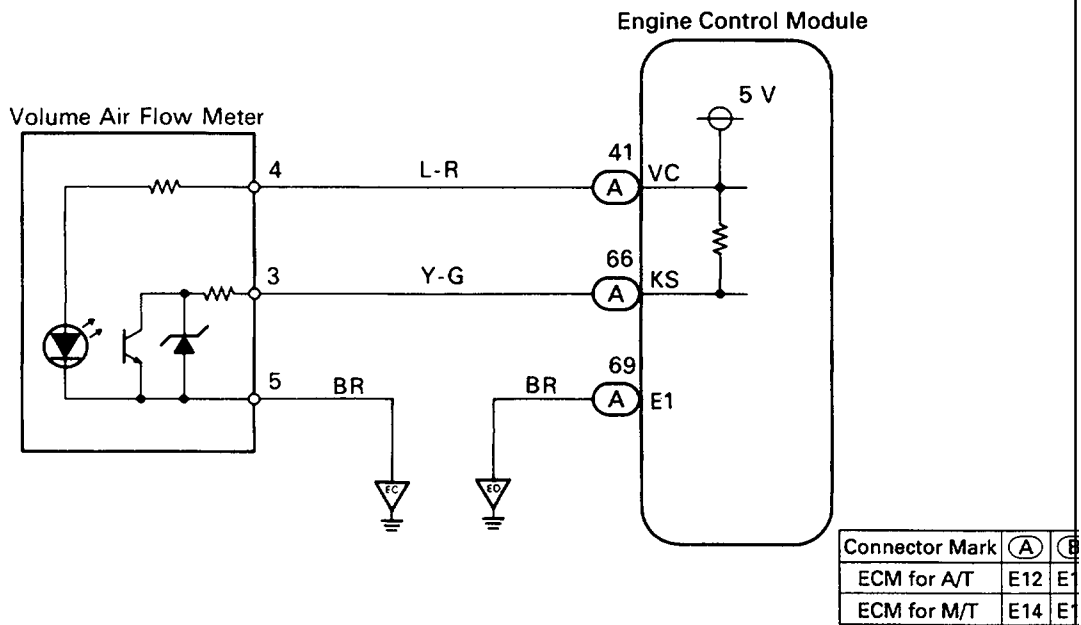
DTC No.	Diagnostic Trouble Code Detecting Condition	Trouble Area
<b>31</b>	All conditions below are detected. (a) No volume air-flow meter signal to ECM for 2 sec. when engine speed is above 300 rpm. (b) Engine stall.	<ul style="list-style-type: none"> <li>• Open or short in volume air flow meter circuit.</li> <li>• Volume air flow meter</li> <li>• ECM</li> </ul>

If the ECM detects diagnostic trouble code “31”, it operates the fail safe function, keeping the ignition timing and fuel injection volume constant and making it possible to drive the vehicle.

### DIAGNOSTIC CHART

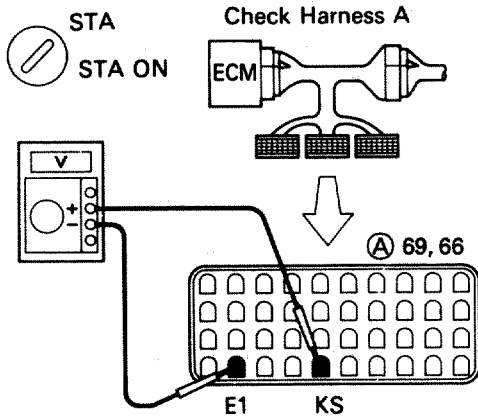


### WIRING DIAGRAM



# INSPECTION PROCEDURE

## 1 Check voltage between terminals KS and E1 of engine control module connector.



BE6653  
FI6502

**P** Connect the Check Harness A.  
(See page [EG-328](#))

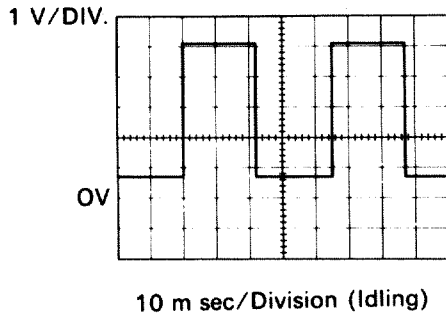
**C** Measure voltage between terminals KS and E1 of engine control module connector while engine is cranked.

**OK** Voltage: 2.0 – 4.0 V  
(Neither 0 V nor 5 V)

### Reference

### INSPECTION USING OSCILLOSCOPE

KS signal waveform



FI6512

- During cranking or idling, measure between terminals KS and E1 of engine control module.

**HINT:** The correct waveform appears as shown in the illustration on the left, with rectangle waves.

NG

OK

When diagnostic trouble code 31 is displayed, check and replace engine control module.

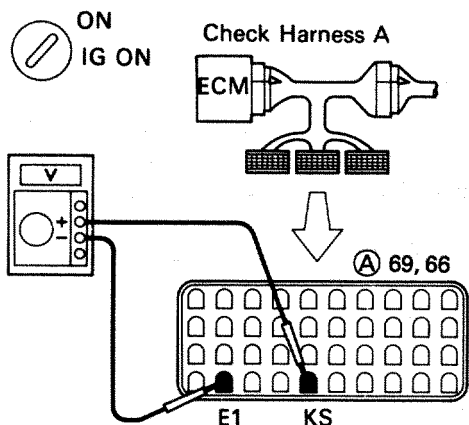
## 2 Check for open and short in harness and connector between engine control module and volume air flow meter (See page [IN-33](#)).

OK

NG

Repair or replace harness or connector.

### 3 Disconnect volume air flow meter connector and check voltage between terminals KS and E1 of engine control module connector.

BE6653  
FI6502

- P** 1. Disconnect the volume air flow meter connector.  
2. Turn ignition switch on.

**C** Measure voltage between terminals KS and E1 of engine control module connector.

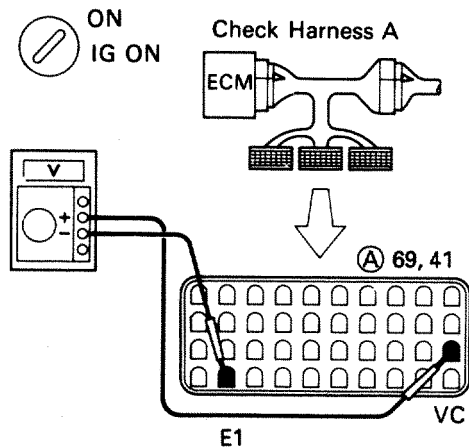
**OK** Voltage: 4.5 - 5.5 V

OK

NG

Check and replace engine control module.

### 4 Disconnect volume air flow meter connector and check voltage between terminals VC and E1 of engine control module connector.

BE6653  
FI6508

- P** 1. Disconnect the volume air flow meter connector.  
2. Turn ignition switch on.

**C** Measure voltage between terminals VC and E1 of engine control module connector.

**OK** Voltage: 4.5 - 5.5 V

NG

OK

Replace volume air flow meter.

Check and replace engine control module.