

DTC	31	Volume Air Flow Meter Circuit
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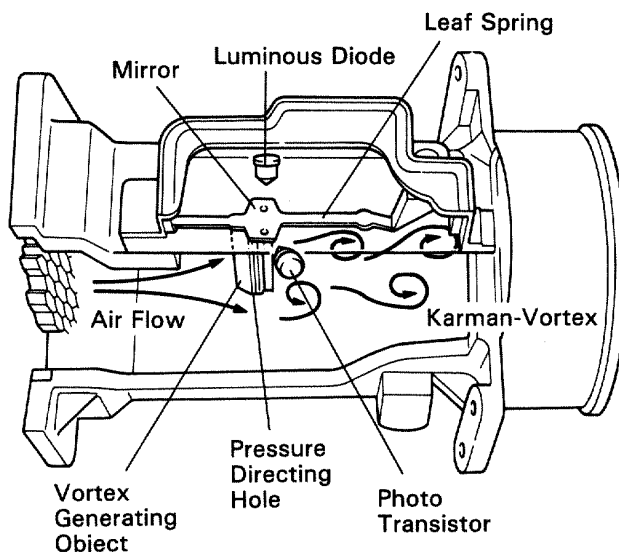
— CIRCUIT DESCRIPTION —

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

FI4504

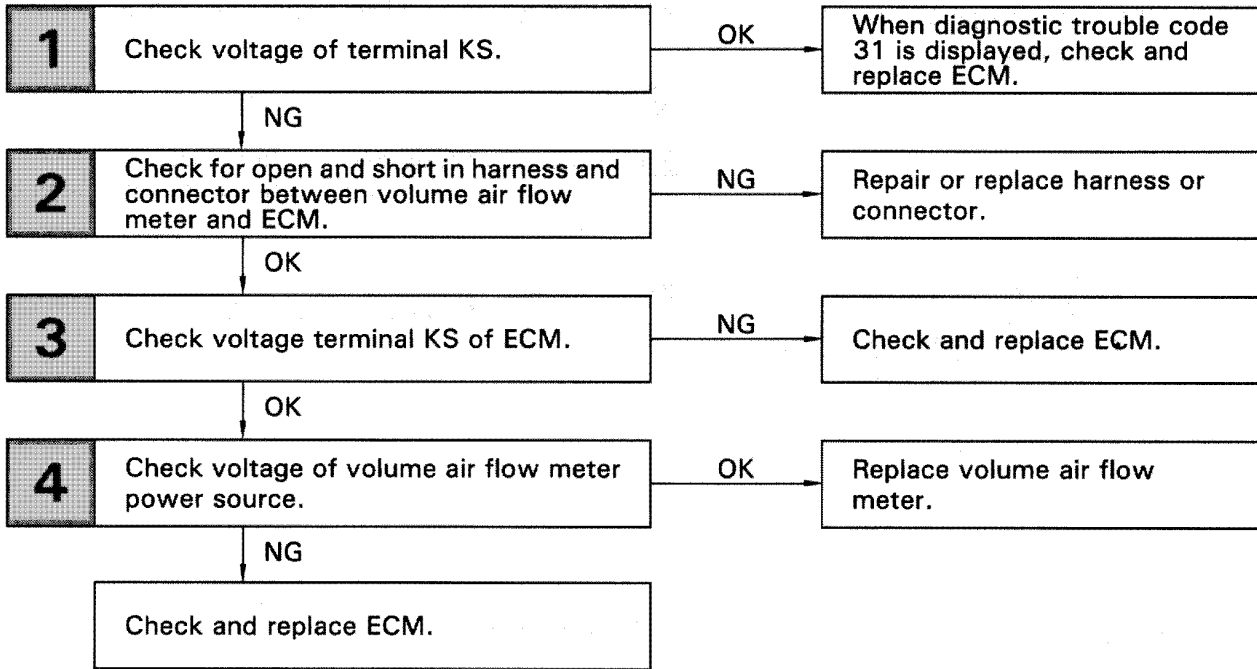


FI3046

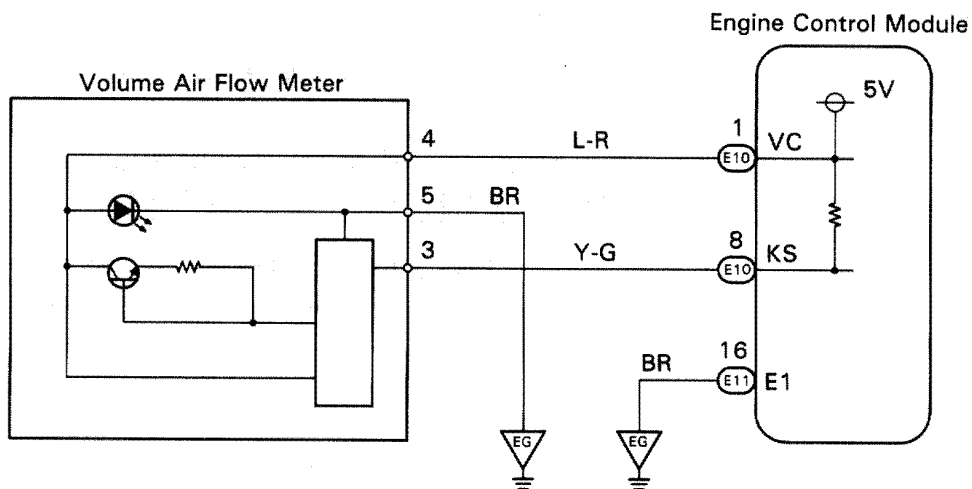
DTC No.	DTC Detecting Condition	Trouble Area
31	(1) All conditions below are detected. (a) No volume air flow signal to ECM for 2 sec. when engine speed is above 300 rpm. (b) Engine stall. (2) No volume air flow signal to ECM for 5 sec. when engine speed is above 300 rpm.	<ul style="list-style-type: none"> •Open or short in volume air meter circuit. •Volume air flow meter. •ECM

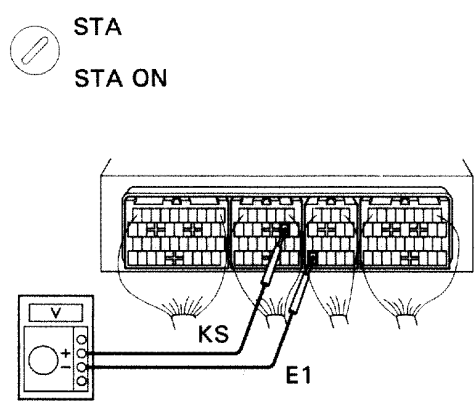
If the ECM detects diagnostic trouble code “31”, it enters fail safe mode (See page [EG-516](#)).

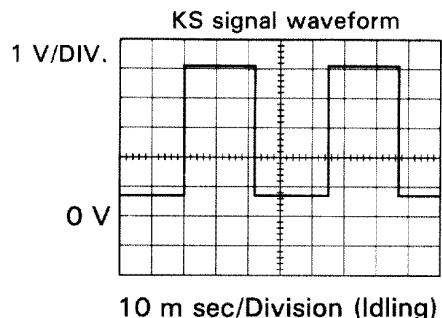
DIAGNOSTIC CHART



WIRING DIAGRAM



1	Check voltage between terminals KS and E1 of engine control module connector.
 <p style="margin-top: 10px;">BE6653 FI6799</p>	<p>P Remove the instrument panel under cover.</p> <p>C Measure voltage between terminals KS and E1 of engine control module connector while engine is cranked.</p> <p>OK Voltage: 2.0 – 4.0 V (Neither 0 V nor 5 V)</p>

Reference	INSPECTION USING OSCILLOSCOPE
 <p style="margin-top: 10px;">8512</p>	<ul style="list-style-type: none"> • During cranking or idling, check waveform between terminals KS and E1 of engine control module. <p>HINT: The correct waveform appears as shown in the illustration on the left, with rectangle waves.</p>

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-34).
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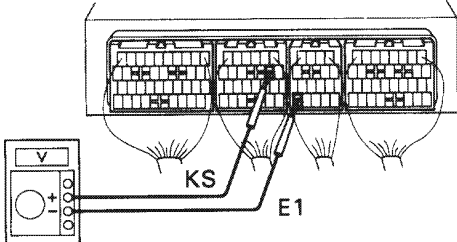
OK

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.

ON
IG ON



BE6653
F16799

P 1. Disconnect the volume air flow meter connector.
2. Remove the instrument panel under cover.
3. Turn ignition switch ON.

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

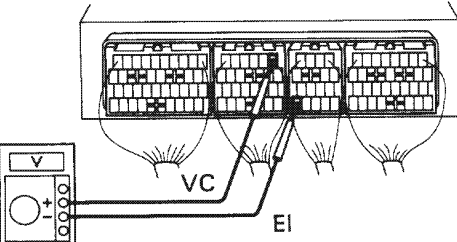
OK Voltage: 4.5 – 5.5 V

OK

NG Check and replace ECM.

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

ON
IG ON



BE6653
F16800

P 1. Disconnect the air flow meter connector.
2. Remove the instrument panel under cover.
3. 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.