ENGINE FUEL & EMISSION CONTROL SYSTEM

SECTION EF & EC

CONTENTS

CONTENTS (Cont'd.)

GA

Note: Refer to Foldout page for "ECCS WIRING DIAGRAM".

GA

SR

When you read wiring diagrams:
- **Read GI section, "HOW TO READ WIRING DIAGRAMS".**
- **See EL section, "POWER SUPPLY ROUTING" for power distribution circuit.**

When you perform trouble diagnoses, read GI section, "HOW TO FOLLOW FLOW CHART IN TROUBLE DIAGNOSES".

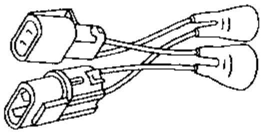
Supplemental Restraint System "AIR BAG"

The Supplemental Restraint System "Air Bag" helps to reduce the risk or severity of injury to the driver in a frontal collision. The Supplemental Restraint System consists of an air bag (located in the center of the steering wheel), sensors, a diagnostic unit, warning lamp, wiring harness and spiral cable. Information necessary to service the system safely is included in the **BF section** of this Service Manual.

WARNING:

- **To avoid rendering the SRS inoperative, which could lead to personal injury or death in the event of a severe frontal collision, all maintenance must be performed by an authorized NISSAN dealer.**
- **Improper maintenance, including incorrect removal and installation of the SRS, can lead to personal injury caused by unintentional activation of the system.**
- **All SRS electrical wiring harnesses and connectors are covered with yellow outer insulation. Do not use electrical test equipment on any circuit related to the SRS "Air Bag".**

Special Service Tool

Tool number (Kent-Moore number) Tool name	Description	Engine application	
		SR	GA
EG11160000 (—) Adapter harness	Measuring engine speed  NT056	X	X

Engine Fuel & Emission Control System

ECM

- Do not disassembly ECM (ECCS control module).
- Do not turn diagnosis mode selector forcibly.
- If a battery terminal is disconnected, the memory will return to the ECM value.
  The ECM will now start to self-control at its initial value. Engine operation can vary slightly when the terminal is disconnected. However, this is not an indication of a problem. Do not replace parts because of a slight variation.

WIRELESS EQUIPMENT

- When installing C.B. ham radio or a mobile phone, be sure to observe the following as it may adversely affect electronic control systems depending on its installation location.

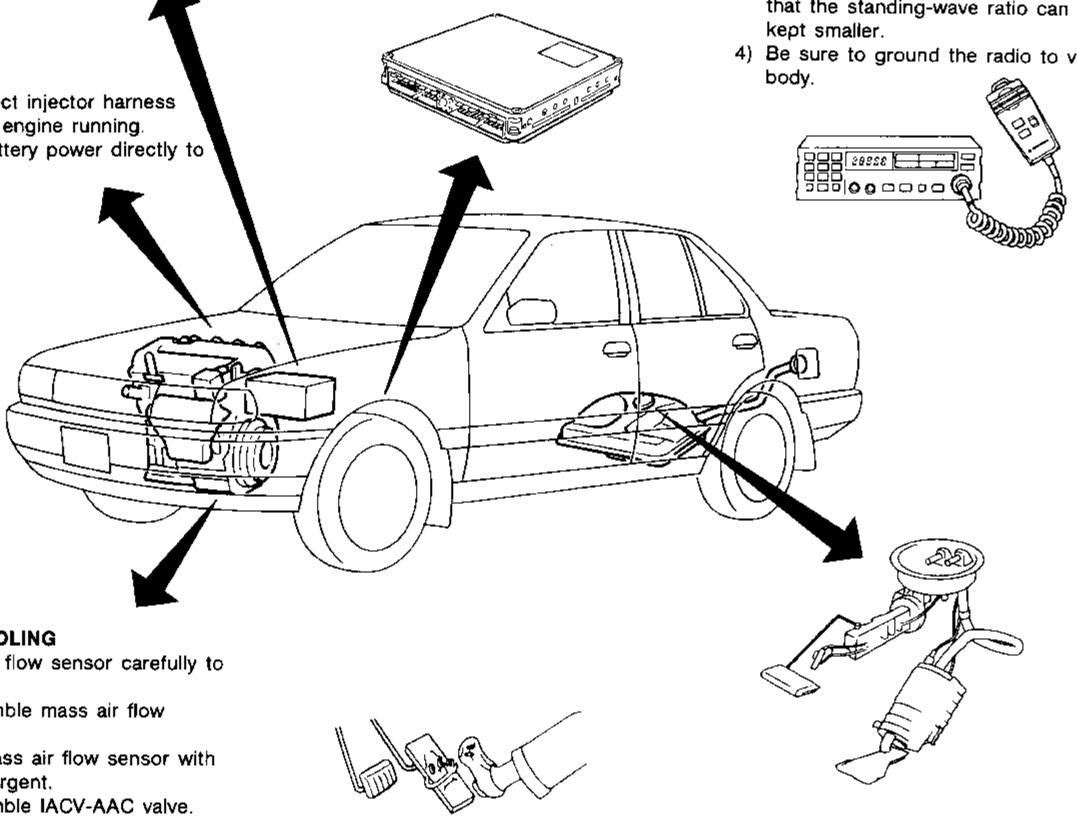
1) Keep the antenna as far as possible away from the ECM.
2) Keep the antenna feeder line more than 20 cm (7.9 in) away from the harness of electronic controls.
   Do not let them run parallel for a long distance.
3) Adjust the antenna and feeder line so that the standing-wave ratio can be kept smaller.
4) Be sure to ground the radio to vehicle body.

BATTERY

- Always use a 12 volt battery as power source.
- Do not attempt to disconnect battery cables while engine is running.

INJECTOR

- Do not disconnect injector harness connectors with engine running.
- Do not apply battery power directly to injectors.



ECCS PARTS HANDLING

- Handle mass air flow sensor carefully to avoid damage.
- Do not disassemble mass air flow sensor.
- Do not clean mass air flow sensor with any type of detergent.
- Do not disassemble IACV-AAC valve.
- Even a slight leak in the air intake system can cause serious problems.
- Do not shock or jar the camshaft position sensor.

WHEN STARTING

- Do not depress accelerator pedal when starting.
- Immediately after starting, do not rev up engine unnecessarily.
- Do not rev up engine just prior to shutdown.

FUEL PUMP

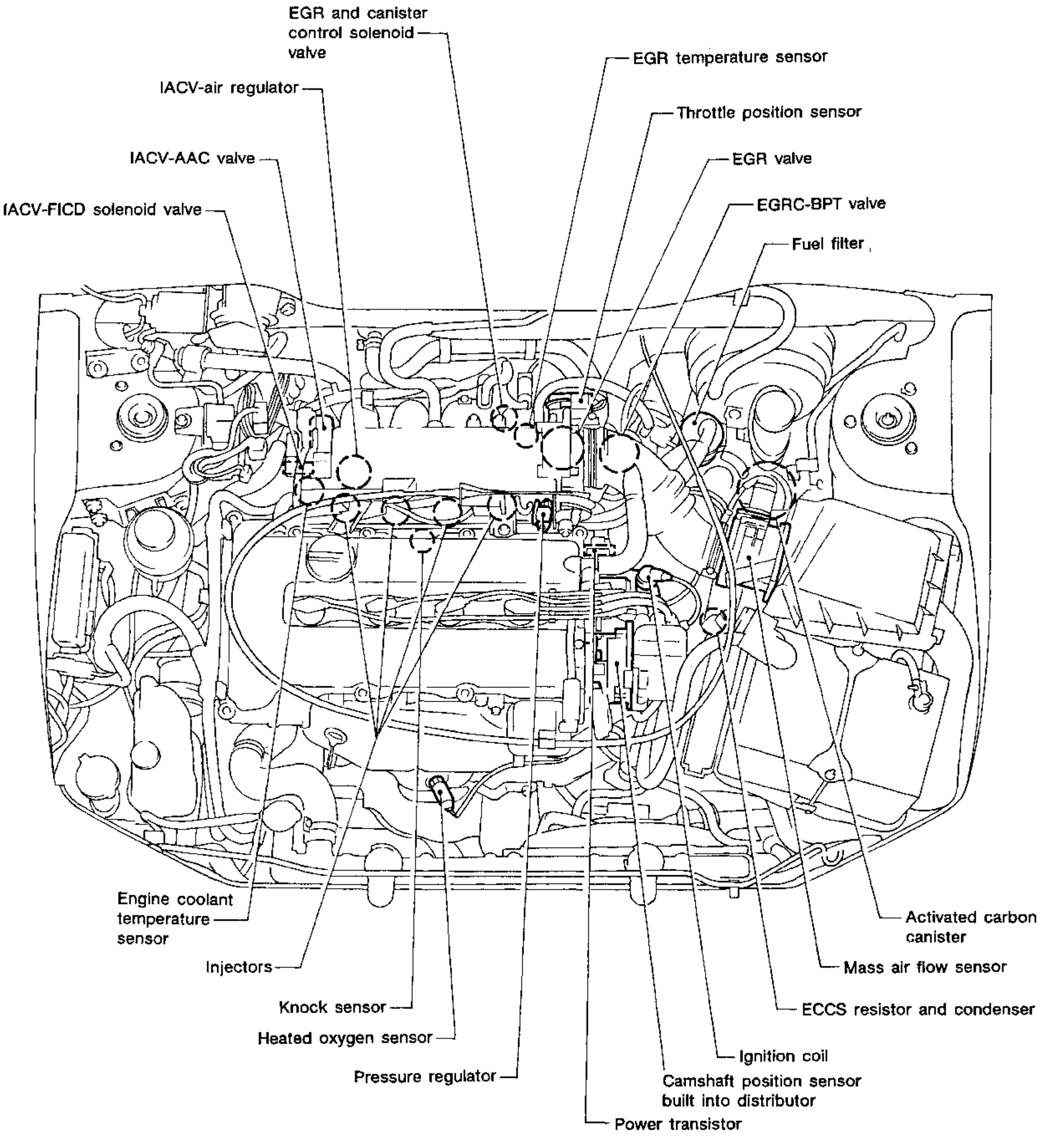
- Do not operate fuel pump when there is no fuel in lines.
- Tighten fuel hose clamps to the specified torque.

ECCS HARNESS HANDLING

- Securely connect ECCS harness connectors.
  A poor connection can cause an extremely high (surge) voltage to develop in coil and condenser, thus resulting in damage to ICs.
- Keep ECCS harness at least 10 cm (3.9 in) away from adjacent harnesses, to prevent ECCS system malfunction due to receiving external noise, degraded operation of ICs, etc.
- Keep ECCS parts and harnesses dry.
- Before removing parts, turn off ignition switch and then disconnect battery ground cable.

MEF510DA

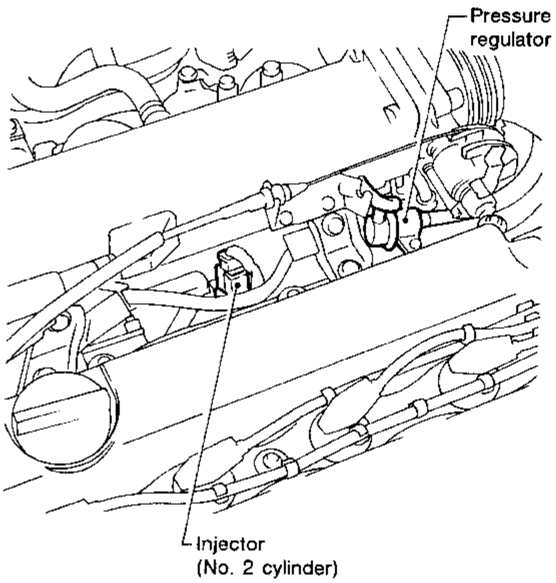
ECCS Component Parts Location

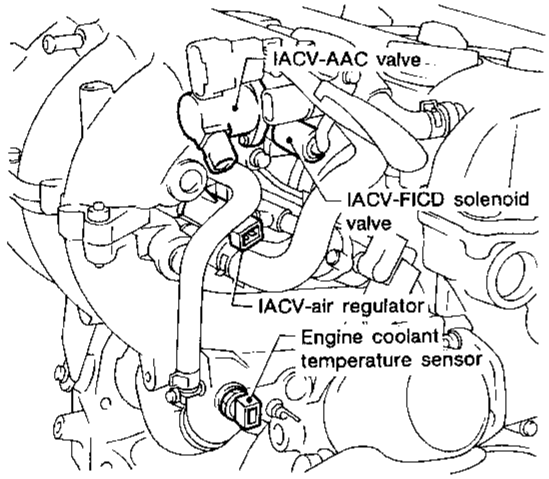


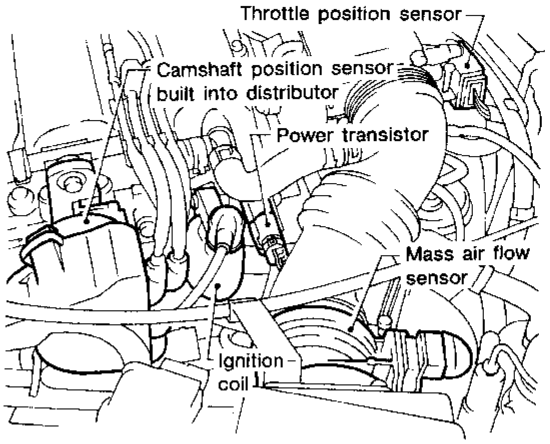
SEF538N

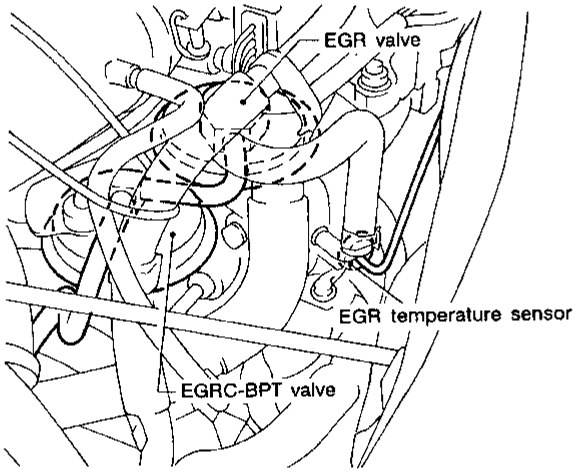
GI
MA
EM
LC
EF & EC
FE
CL
MT
AT
FA
RA
BR
ST
BF
HA
EL
IDX

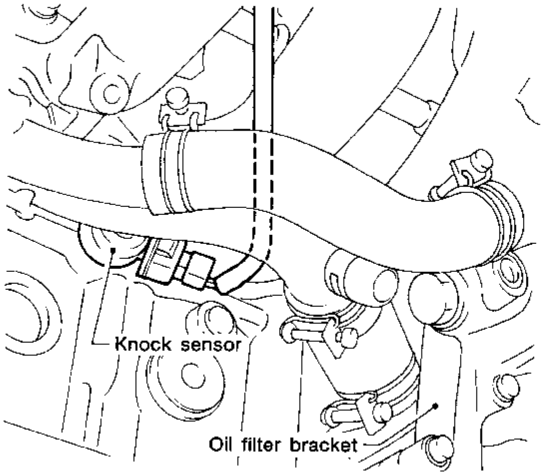
ECCS Component Parts Location (Cont'd)

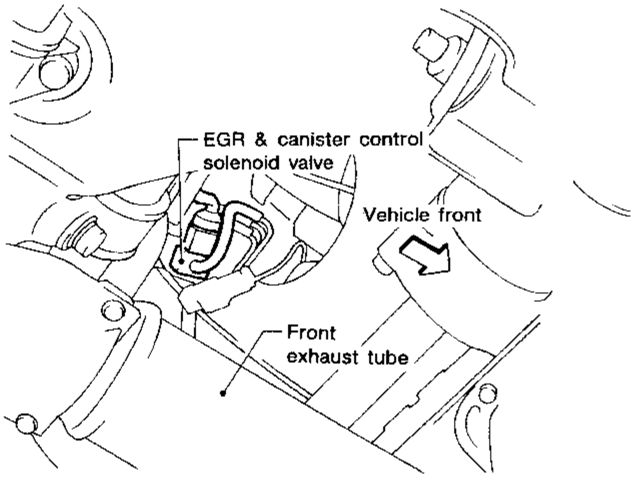






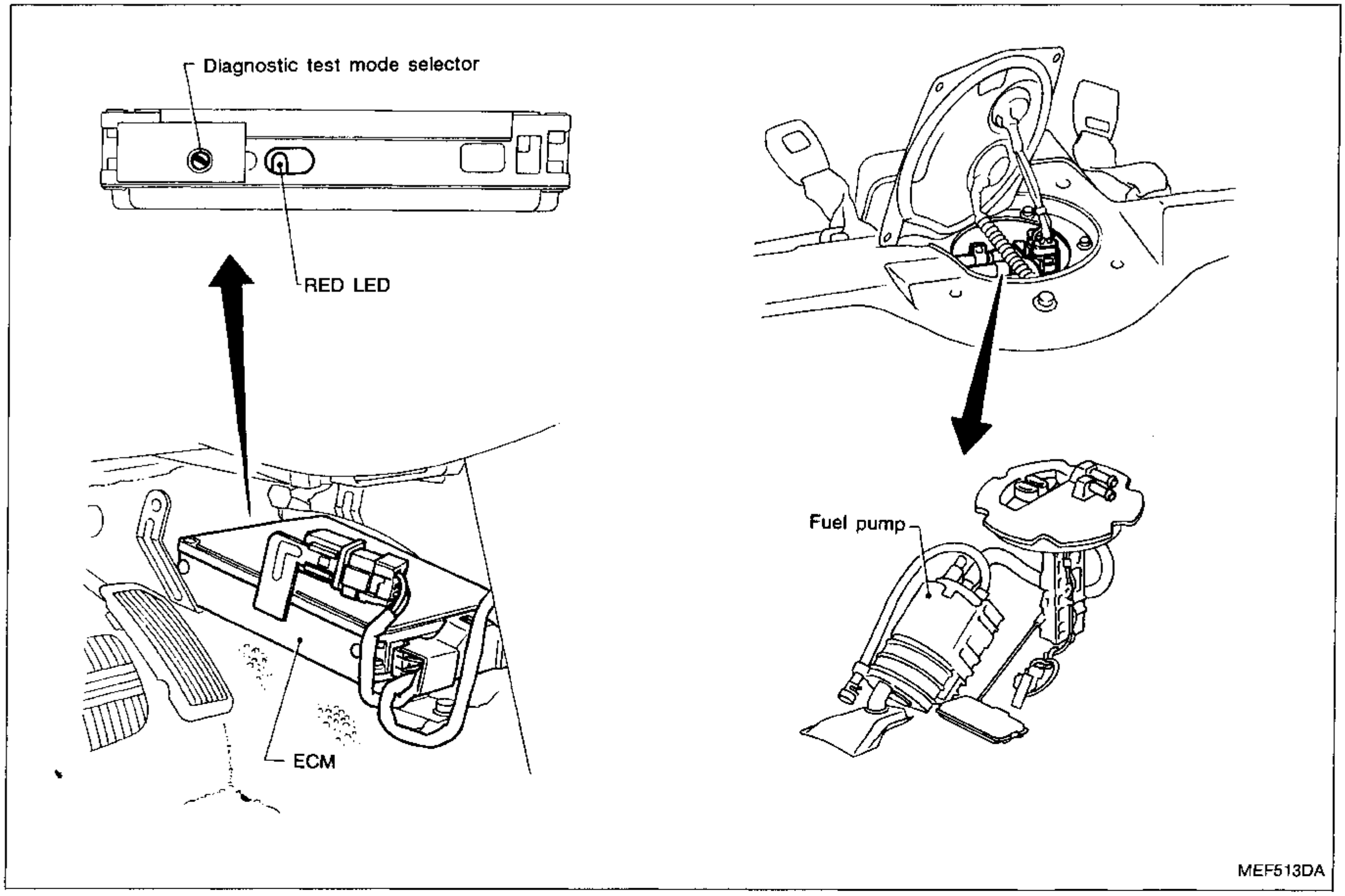






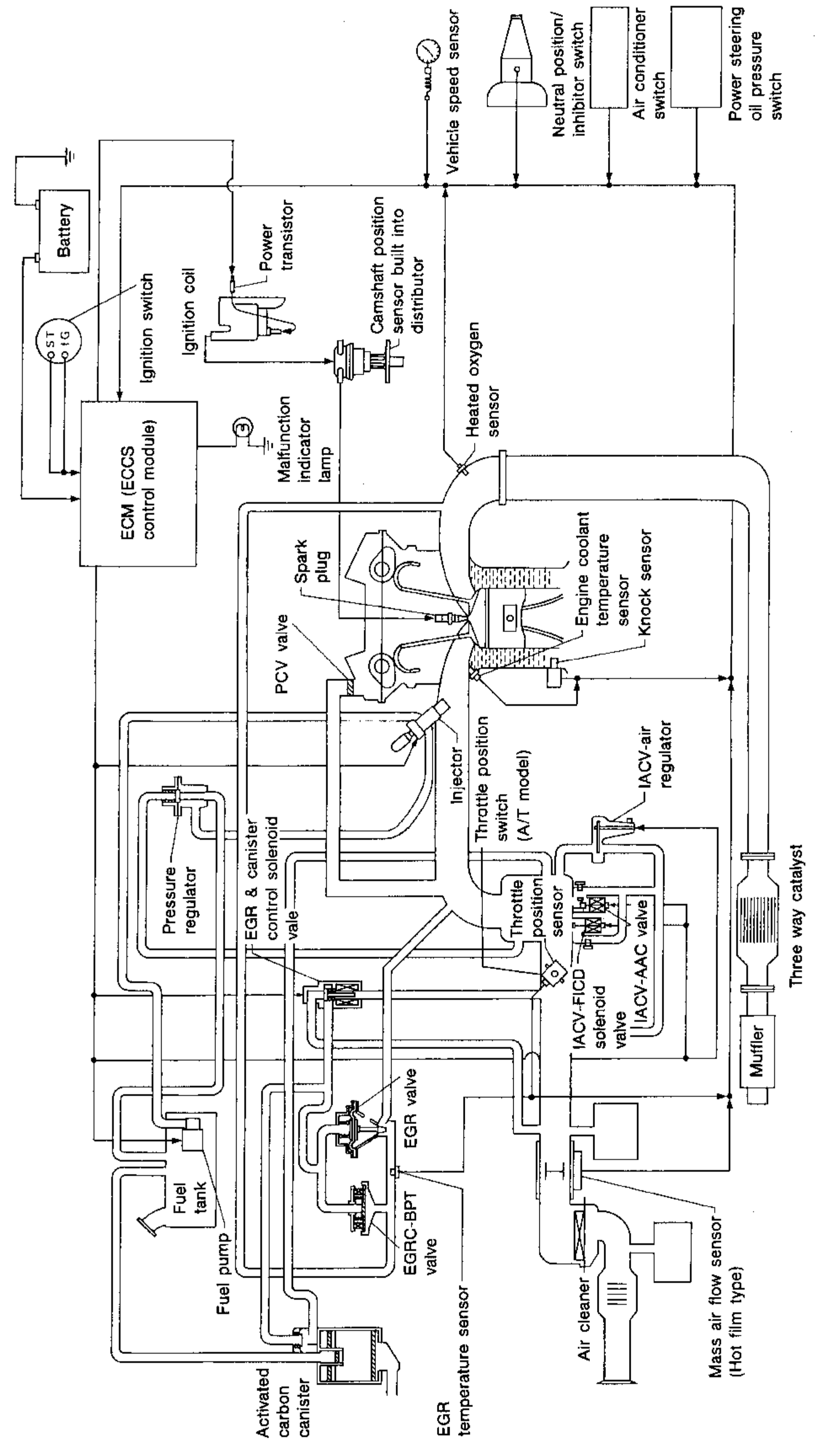
SEF539N

ECCS Component Parts Location (Cont'd)



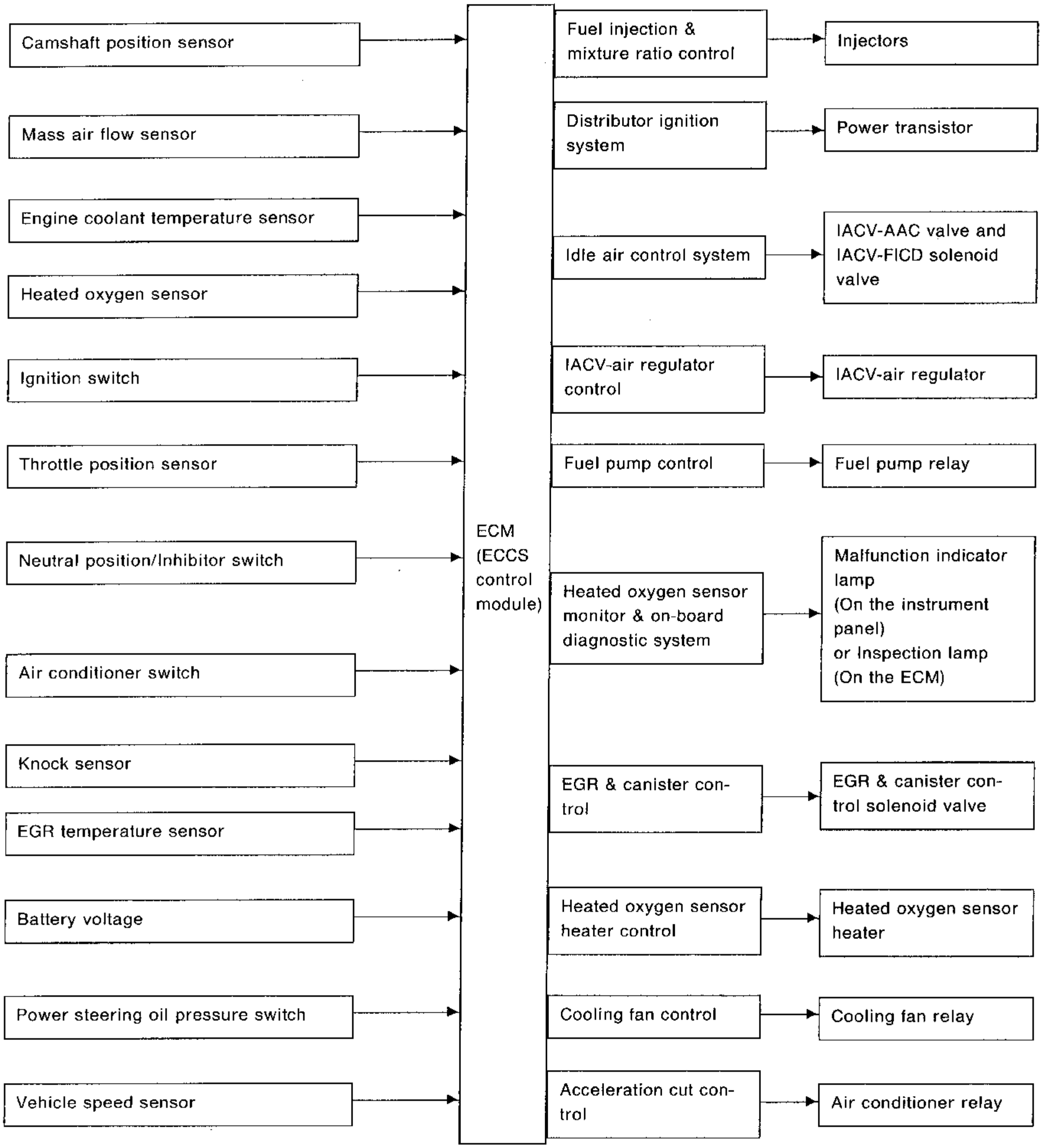
MEF513DA

System Diagram



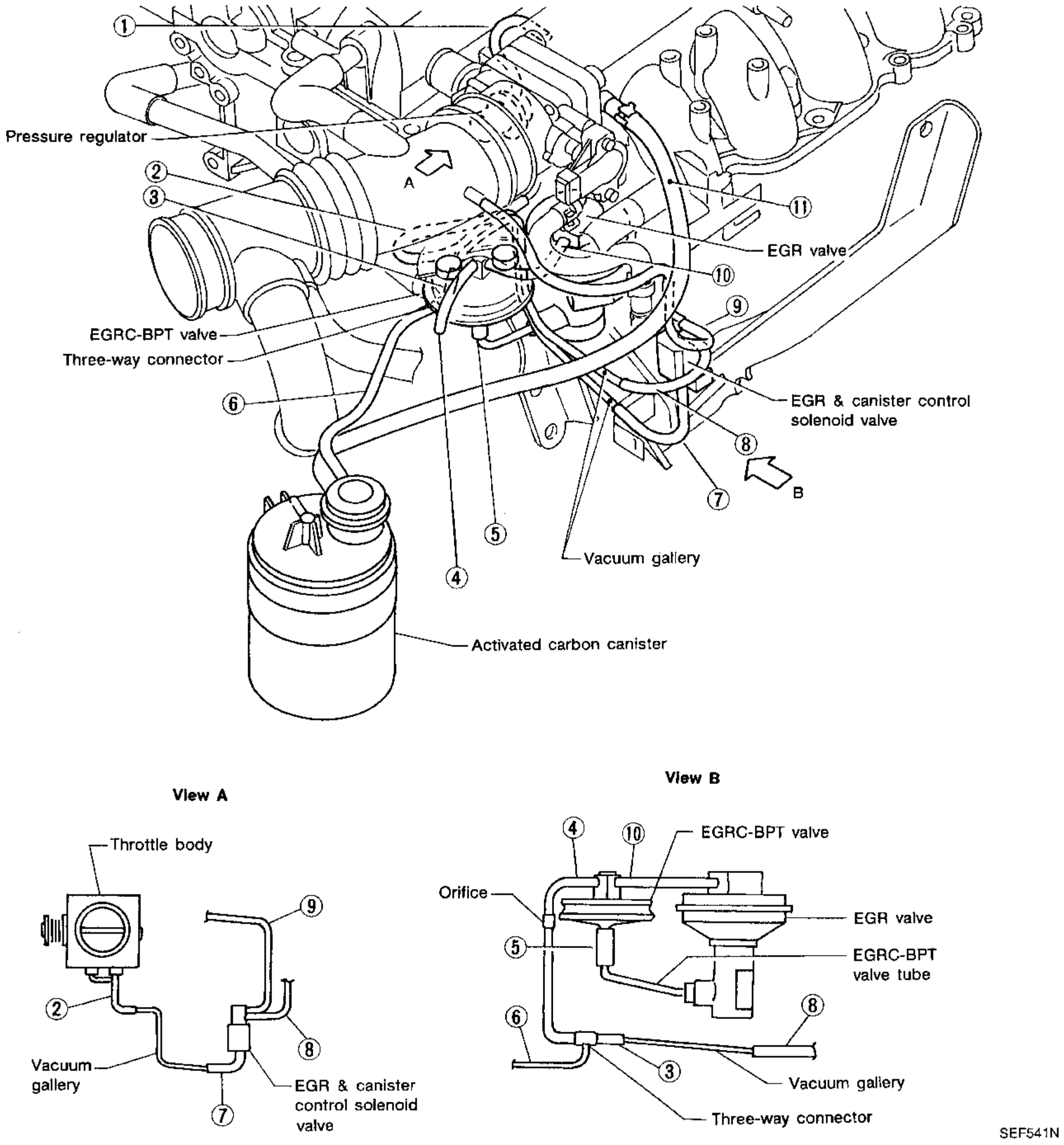
SEF540N

System Chart



GI
MA
EM
LC
EF & EC
FE
CL
MT
AT
FA
RA
BR
ST
BF
HA
EL
IDX

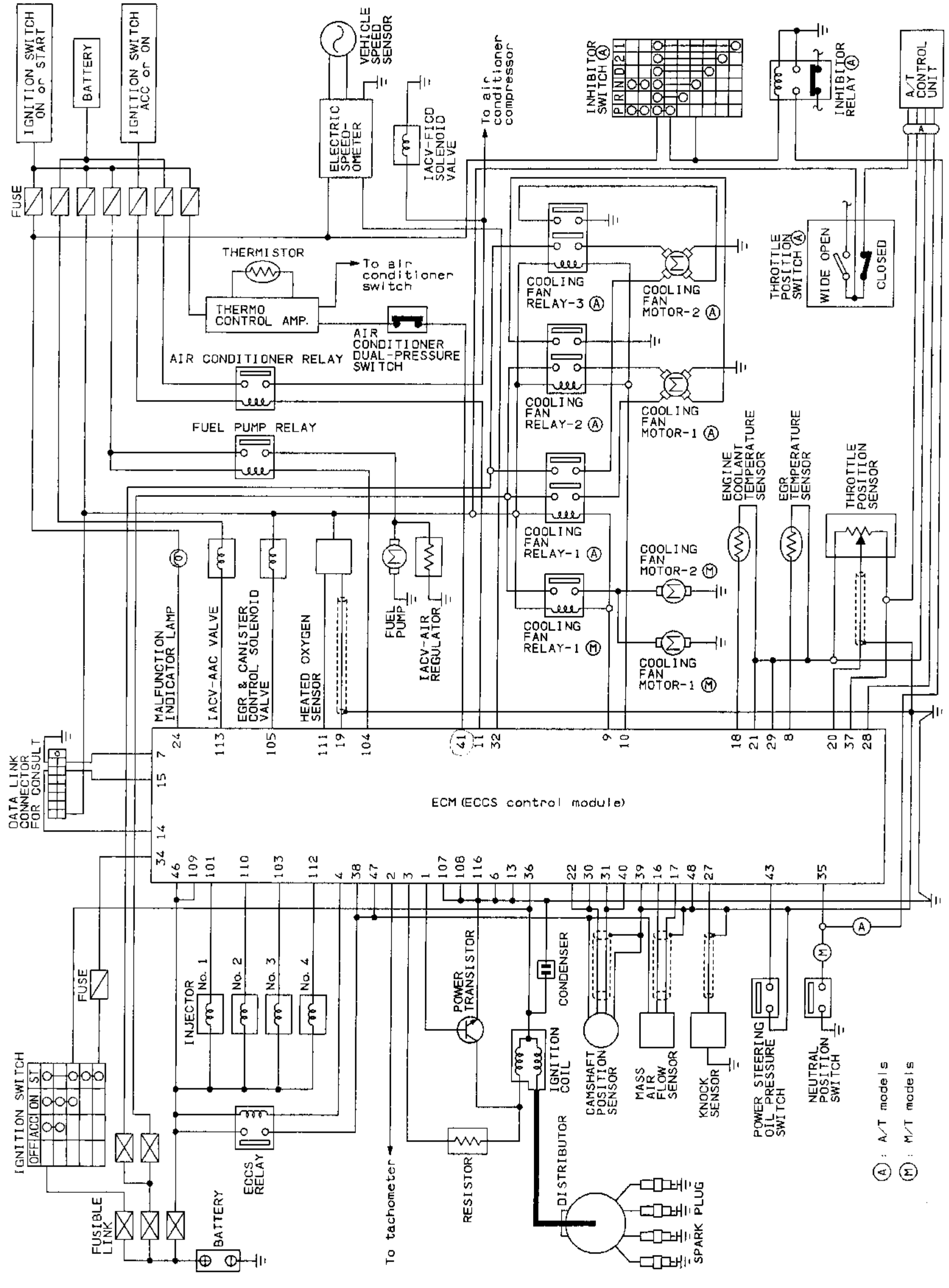
Vacuum Hose Drawing



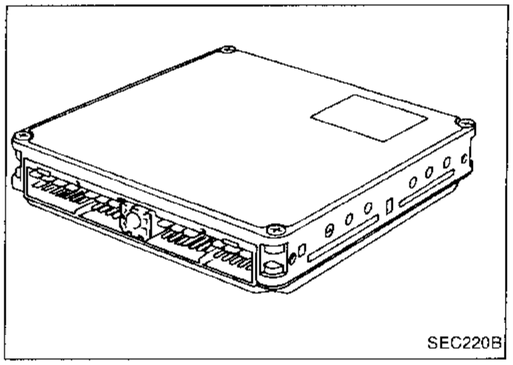
SEF541N

① Pressure regulator to intake manifold collector
② Throttle body to vacuum gallery
③ Three-way connector to vacuum gallery
④ EGRC-BPT valve to three-way connector
⑤ EGRC-BPT valve to EGRC-BPT valve tube
⑥ Three-way connector to activated carbon canister (vacuum line)
⑦ EGR & canister control solenoid valve to vacuum gallery (for throttle body)
⑧ EGR & canister control solenoid valve to vacuum gallery (for three-way connector)
⑨ EGR & canister control solenoid valve to air duct
⑩ EGRC-BPT valve to EGR valve
⑪ Activated carbon canister (purge line) to intake manifold collector

Circuit Diagram

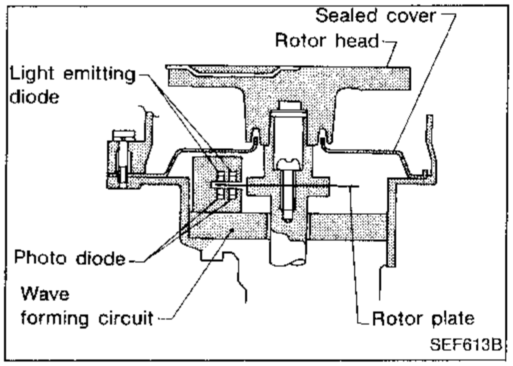


MEF320F


SEC220B

Engine Control Module (ECM)-ECCS Control Module

The ECM consists of a microcomputer, inspection lamp, a diagnostic test mode selector, and connectors for signal input and output and for power supply. The unit controls the engine.

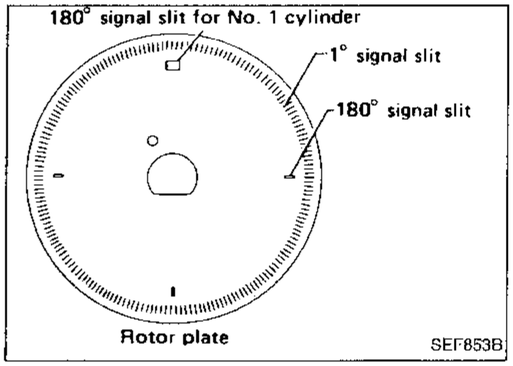


SEF613B

Camshaft Position Sensor (CMPS)

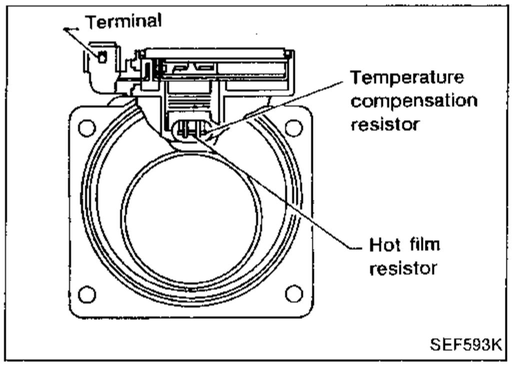
The camshaft position sensor is a basic component of the entire ECCS. It monitors engine speed and piston position, and sends signals to the ECM to control fuel injection, ignition timing and other functions.

The camshaft position sensor has a rotor plate and a wave-forming circuit. The rotor plate has 360 slits for 1° signal and 4 slits for 180° signal. Light Emitting Diodes (LED) and photo diodes are built in the wave-forming circuit.



SEF853B

When the rotor plate passes between the LED and the photo diode, the slits in the rotor plate continually cut the light being transmitted to the photo diode from the LED. This generates rough-shaped pulses which are converted into on-off pulses by the wave-forming circuit, which are sent to the ECM.



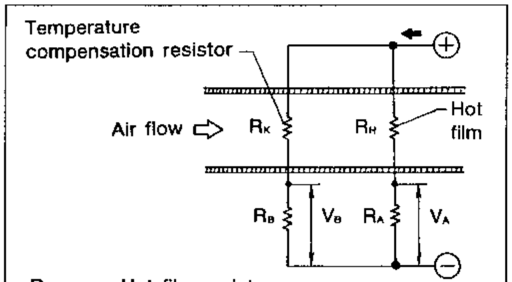
SEF593K

Mass Air Flow Sensor (MAFS)

The mass air flow sensor measures the intake air flow rate by taking a part of the entire flow. Measurements are made in such a manner that the ECM receives electrical output signals varied by the amount of heat emitting from the hot film placed in the stream of the intake air.

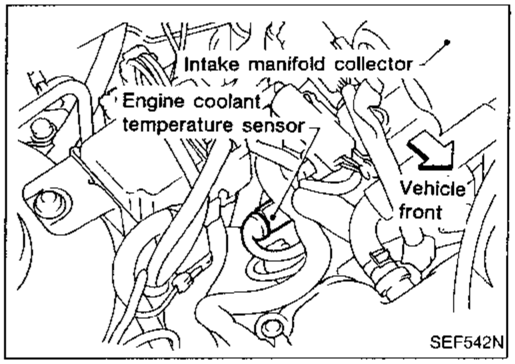
When intake air flows into the intake manifold through a route around the hot film, the heat generated from the hot film is taken away by the air. The amount of heat depends on the air flow. On the other hand, the temperature of the hot film is automatically controlled to a certain number of degrees.

Therefore, it is necessary to supply the hot film with more electric current in order to maintain the temperature of the hot film. The ECM knows the air flow by means of the electric change.



R_H : Hot film resistance
R_K : Temperature compensation resistor
R_A, R_B : Constant resistance

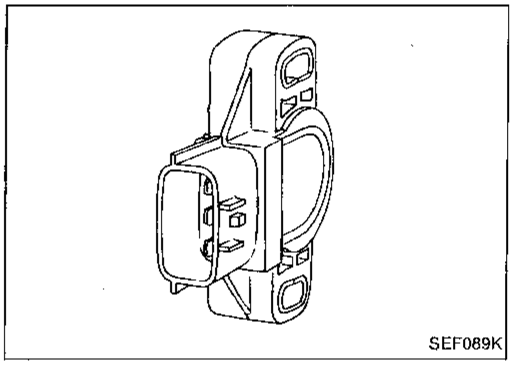
SEF967K



Engine Coolant Temperature Sensor (ECTS)

The engine coolant temperature sensor, located behind the oil filter, detects engine coolant temperature and transmits a signal to the ECM.

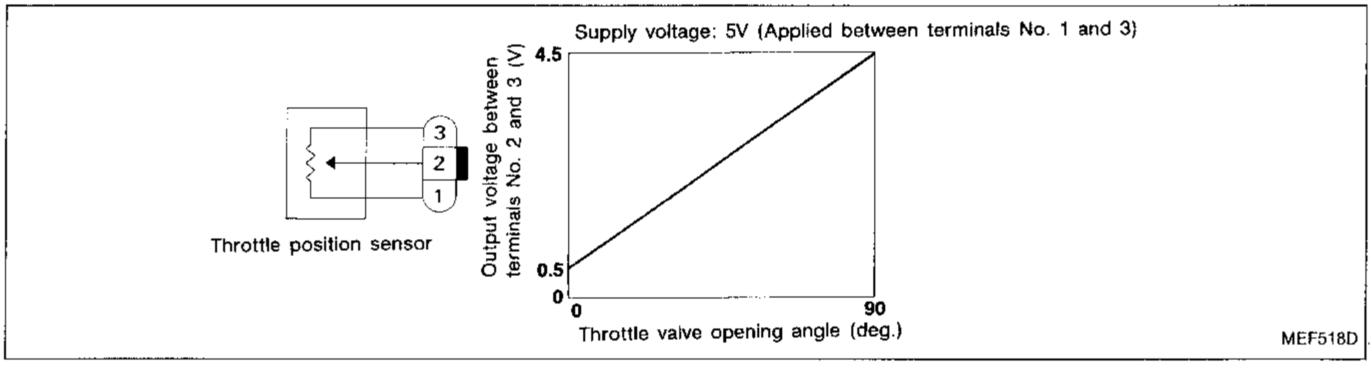
The temperature sensing unit employs a thermistor which is sensitive to the change in temperature. Electrical resistance of the thermistor decreases in response to the temperature rise.



Throttle Position Sensor (TPS) & Soft Closed Throttle Position (CTP) Switch (M/T models)

The throttle position sensor responds to the accelerator pedal movement. This sensor is a kind of potentiometer which transforms the throttle position into output voltage, and emits the voltage signal to the ECM. In addition, the sensor detects the opening and closing speed of the throttle valve and feeds the voltage signal to the ECM.

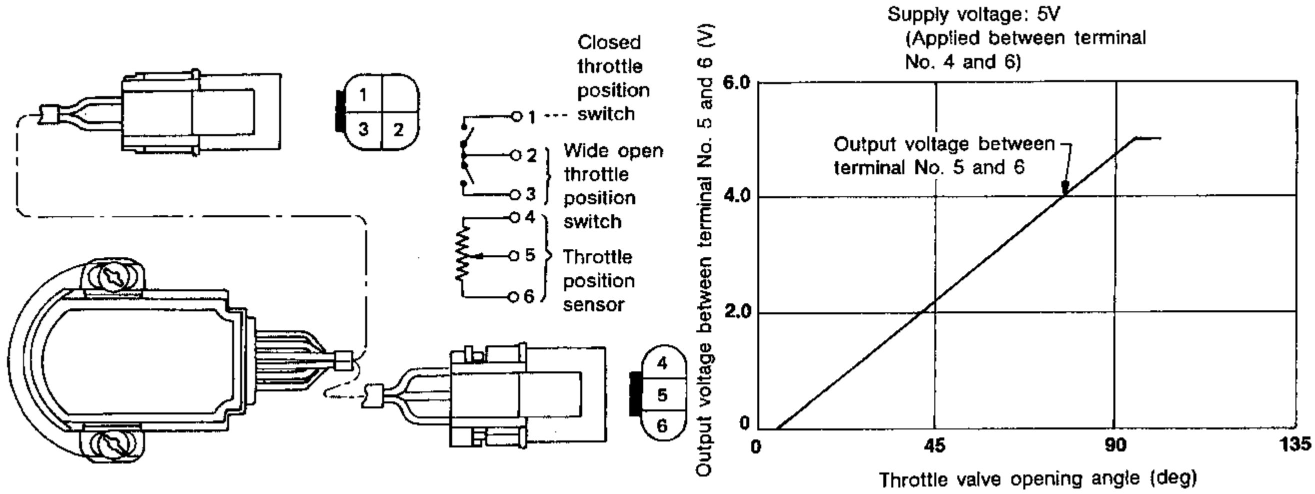
Idle position of the throttle valve is determined by the ECM receiving the signal from the throttle position sensor. This system is called "soft closed throttle position switch". This one controls engine operation such as fuel cut.



Throttle Position Sensor (TPS) & Soft/Hard Closed Throttle Position (CTP) Switch (A/T models)

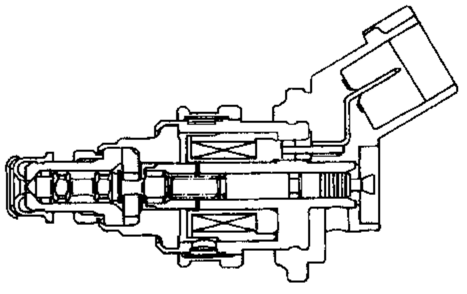
The throttle position sensor responds to the accelerator pedal movement. This sensor is a kind of potentiometer which transforms the throttle position into output voltage, and emits the voltage signal to the ECM. In addition, the sensor detects the opening and closing speed of the throttle valve and feeds the voltage signal to the ECM.

Idle position of the throttle valve is determined by the ECM receiving the signal from the throttle position sensor. This system is called "soft closed throttle position switch". This one controls engine operation such as fuel cut. On the other hand, "hard closed throttle position switch", which is built in the throttle position sensor unit, is not used for engine control.



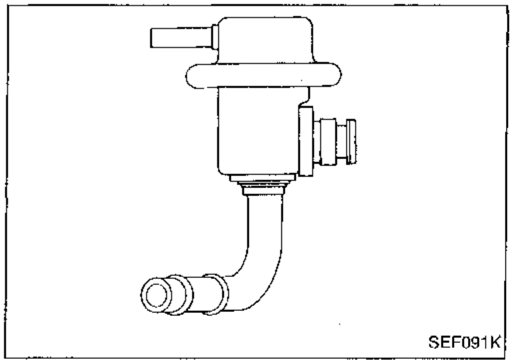
SEF543N

Fuel Injector



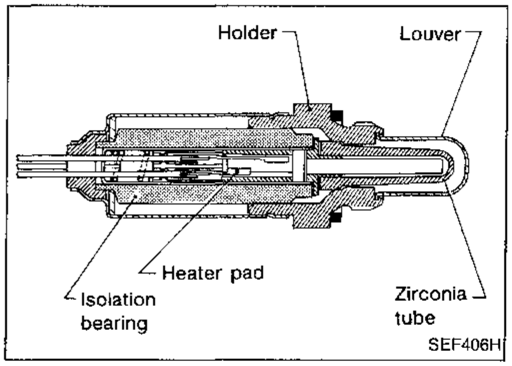
SEF782K

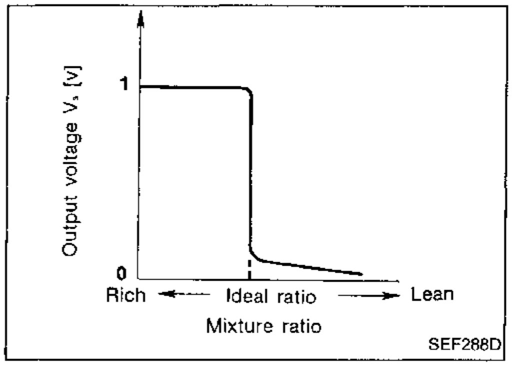
The fuel injector is a small, elaborate solenoid valve. As the ECM sends injection signals to the injector, the coil in the injector pulls the needle valve back and fuel is released into the intake manifold through the nozzle. The injected fuel is controlled by the ECM in terms of injection pulse duration.



Pressure Regulator

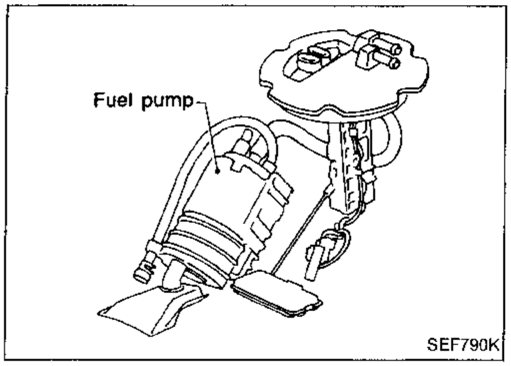
The pressure regulator maintains the fuel pressure at 299.1 kPa (3.05 kg/cm^2, 43.4 psi). Since the injected fuel amount depends on injection pulse duration, it is necessary to maintain the pressure at the above value.





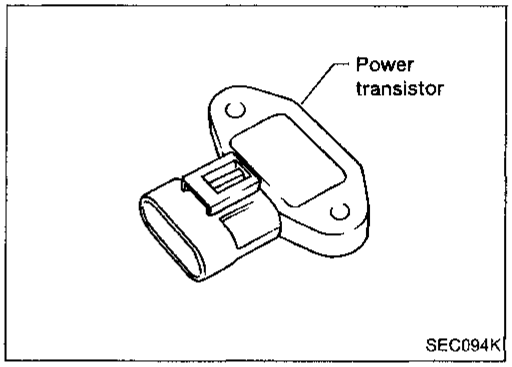
Heated Oxygen Sensor (HO2S)

The heated oxygen sensor, which is placed into the exhaust manifold, monitors the amount of oxygen in the exhaust gas. The sensor has a closed-end tube made of ceramic zirconia. The outer surface of the tube is exposed to exhaust gas, and the inner surface to atmosphere. The zirconia of the tube compares the oxygen density of exhaust gas with that of atmosphere, and generates electricity. In order to improve generating power of the zirconia, its tube is coated with platinum. The voltage is approximately 1V in a richer condition of the mixture ratio than the ideal air-fuel ratio, while approximately 0V in leaner conditions. The radical change from 1V to 0V occurs at around the ideal mixture ratio. In this way, the heated oxygen sensor detects the amount of oxygen in the exhaust gas and sends the signal of approximately 1V or 0V to the ECM. A heater is used to activate the sensor.



Fuel Pump

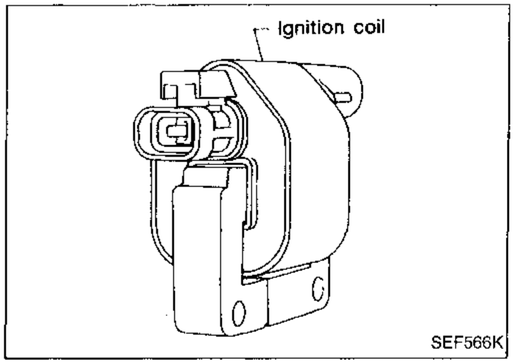
A turbine type design fuel pump is used and is situated in the fuel tank.

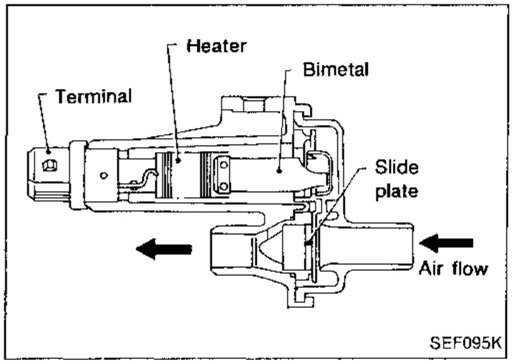


Power Transistor & Ignition Coil

The ignition signal from the ECM is amplified by the power transistor, which turns the ignition coil primary circuit on and off, inducing the proper high voltage in the secondary circuit. The ignition coil is a small, molded type.

Power Transistor & Ignition Coil (Cont'd)

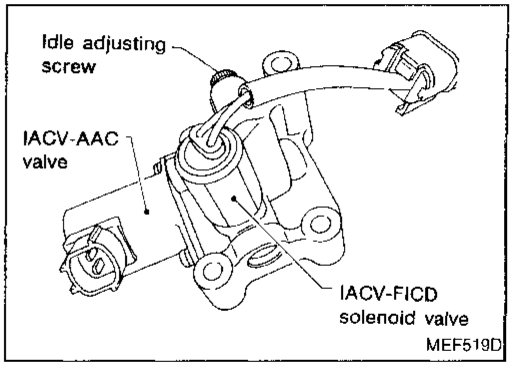




Idle Air Control Valve (IACV)-Air Regulator

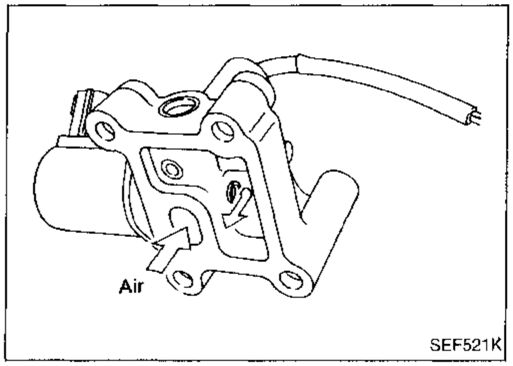
The IACV-air regulator provides an air by-pass when the engine is cold for a fast idle during warm-up.

A bimetal, heater and rotary shutter are built into the IACV-air regulator. When the bimetal temperature is low, the air by-pass port opens. As the engine starts and electric current flows through a heater, the bimetal begins to turn the shutter to close the by-pass port. The air passage remains closed until the engine stops and the bimetal temperature drops.



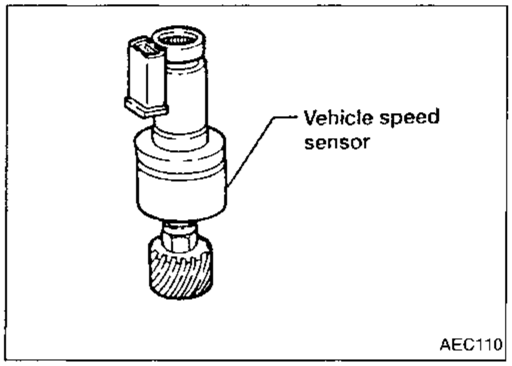
Idle Air Adjusting (IAA) Unit

The IAA unit is made up of the IACV-AAC valve, IACV-FICD solenoid valve and idle adjusting screw. It receives the signal from the ECM and controls the idle speed at the preset value.



Idle Air Control Valve (IACV)-Auxiliary Air Control (AAC) Valve

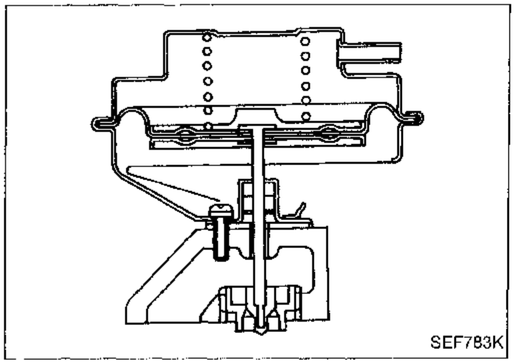
The ECM actuates the IACV-AAC valve by an ON/OFF pulse. The longer that ON duty is left on, the larger the amount of air that will flow through the IACV-AAC valve.



Vehicle Speed Sensor (VSS)

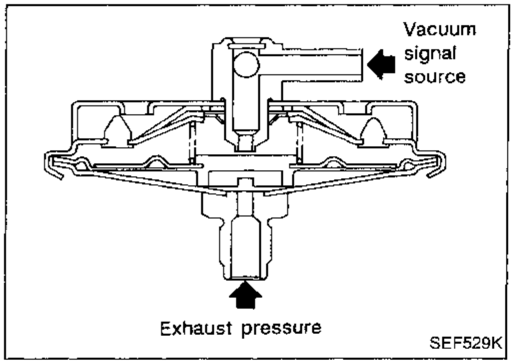
The vehicle speed sensor provides a vehicle speed signal to the ECM.

The speed sensor consists of a reed switch, which is installed in the speedometer unit and transforms vehicle speed into a pulse signal.



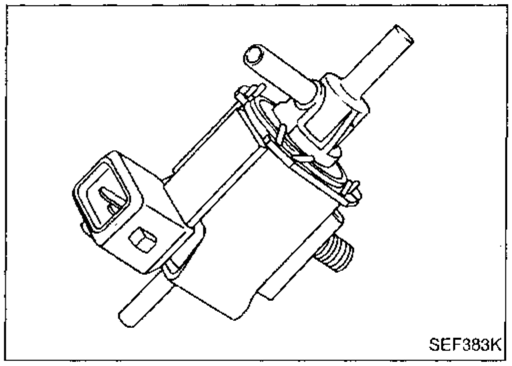
Exhaust Gas Recirculation (EGR) Valve

The EGR valve controls the quantity of exhaust gas to be led to the intake manifold through vertical movement of the taper valve connected to the diaphragm, to which vacuum is applied in response to the opening of the throttle valve.



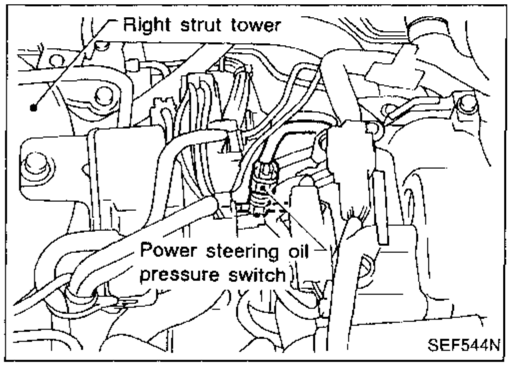
EGR Control (EGRC)-BPT Valve

The EGRC-BPT valve monitors exhaust pressure to activate the diaphragm, controlling throttle body vacuum applied to the EGR valve. In other words, recirculated exhaust gas is controlled in response to positioning of the EGR valve or to engine operation.



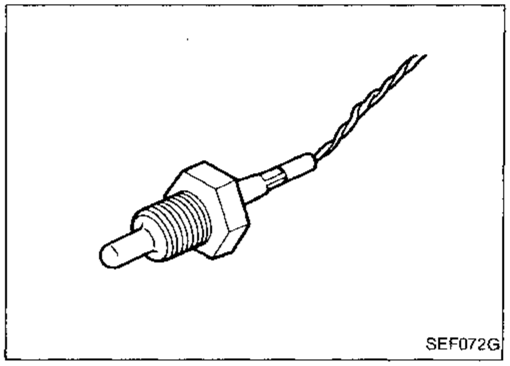
EGR & Canister Control Solenoid Valve

The EGR and canister systems are controlled only by the ECM. At both low- and high-speed revolutions of engine, the solenoid valve turns on and accordingly the EGR valve and canister cut the exhaust gas and fuel vapor leading to the intake manifold.



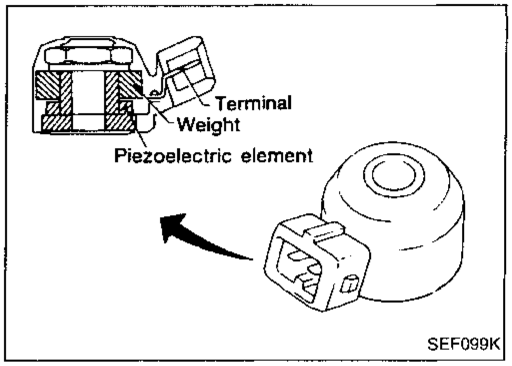
Power Steering Oil Pressure Switch

The power steering oil pressure switch is attached to the power steering high-pressure tube and detects the power steering load, sending the load signal to the ECM. The ECM then sends the idle-up signal to the IACV-AAC valve.



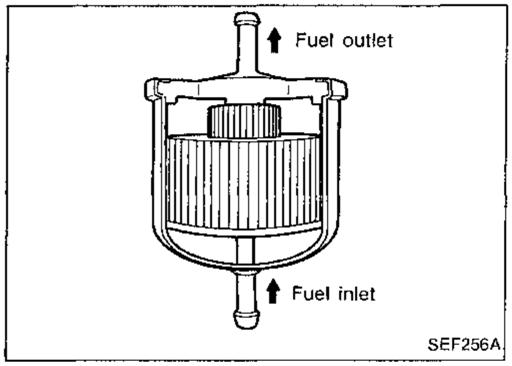
EGR Temperature Sensor

The EGR temperature sensor monitors exhaust gas temperature and transmits a signal to the ECM. The temperature sensing unit employs a thermistor which is sensitive to the change in temperature. Electric resistance of the thermistor decreases in response to the temperature rise.



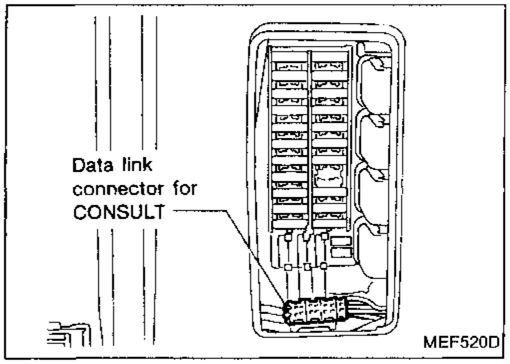
Knock Sensor (KS)

The knock sensor is attached to the cylinder block and senses engine knocking conditions.
A knocking vibration from the cylinder block is applied as pressure to the piezoelectric element. This vibrational pressure is then converted into a voltage signal which is delivered as output.



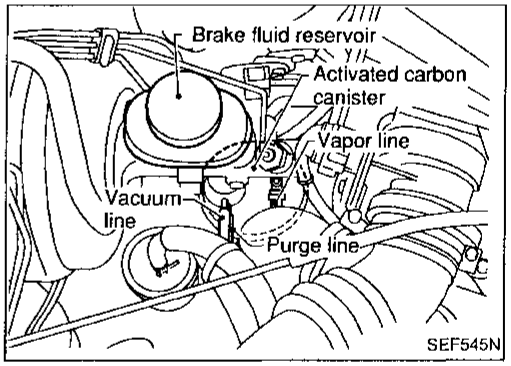
Fuel Filter

The specially designed fuel filter has a metal case in order to withstand high fuel pressure.



Data Link Connector for CONSULT

The data link connector for CONSULT is located behind the fuse box cover.

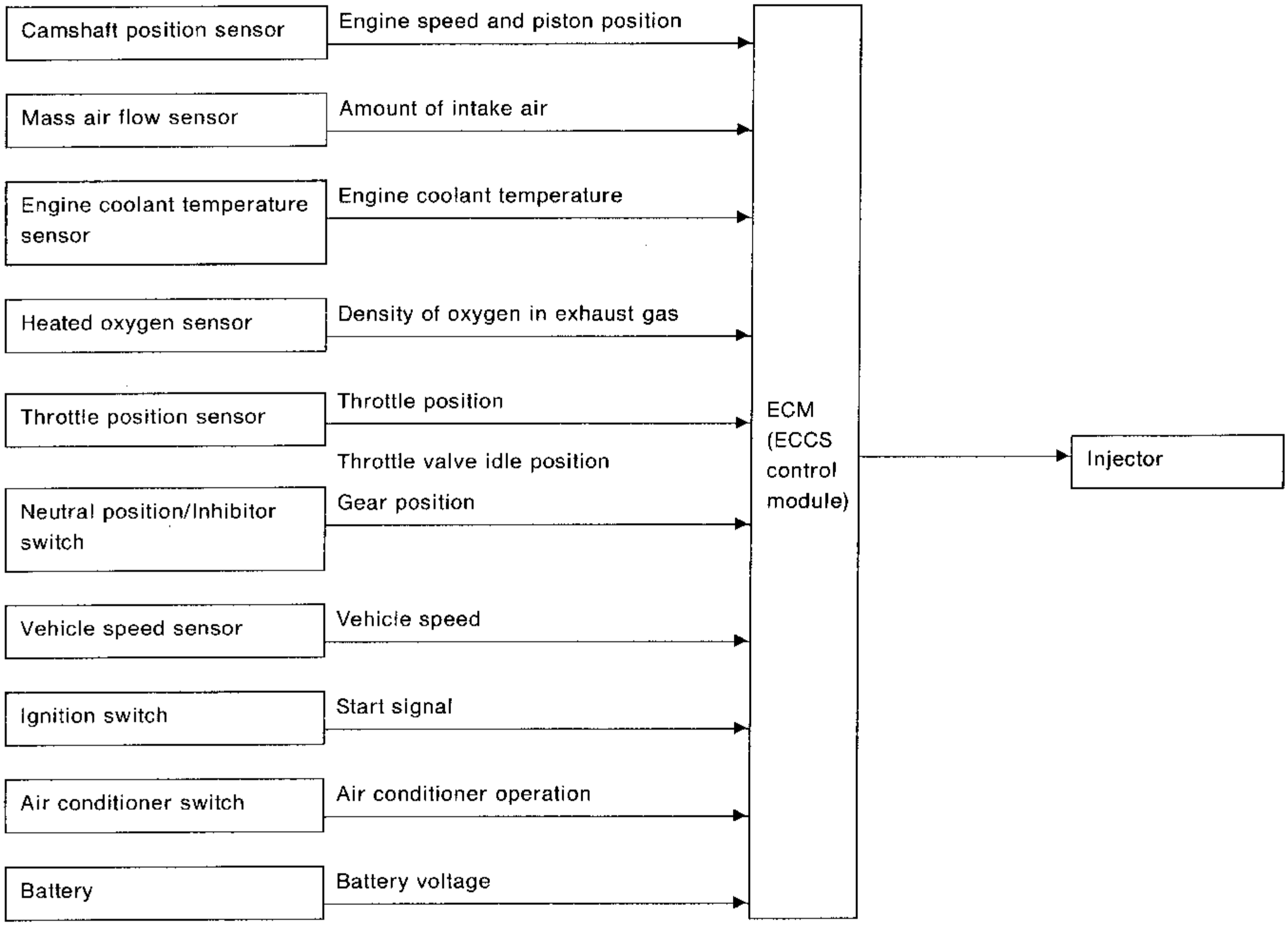


Activated Carbon Canister

The carbon canister is filled with active charcoal to absorb evaporative gases produced in the fuel tank. These absorbed gases are then delivered to the intake manifold by manifold vacuum for combustion purposes.

Multiport Fuel Injection (MFI) System

INPUT/OUTPUT SIGNAL LINE



BASIC MULTIPORT FUEL INJECTION SYSTEM

The amount of fuel injected from the fuel injector, or the length of time the valve remains open, is determined by the ECM. The basic amount of fuel injected is a program value mapped in the ECM memory. In other words, the program value is preset by engine operating conditions determined by input signals (for engine speed and air intake) from both the camshaft position sensor and the mass air flow sensor.

VARIOUS FUEL INJECTION INCREASE/DECREASE COMPENSATION

In addition, the amount of fuel injection is compensated for to improve engine performance under various operating conditions as listed below.

<Fuel increase>

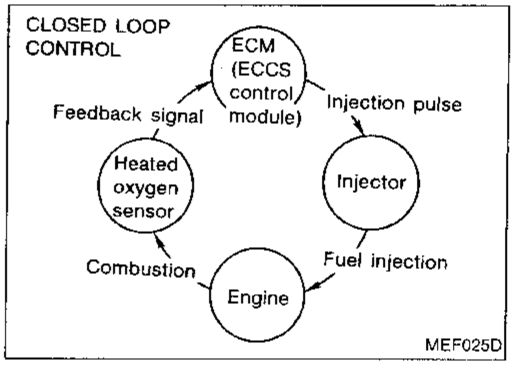
1) During warm-up
2) When starting the engine
3) During acceleration
4) Hot-engine operation
5) When selector lever is changed from "N" to "D" (A/T models only)

<Fuel decrease>

1) During deceleration

GI
MA
EM
LC
EF & EC
FE
CL
MT
AT
FA
RA
BR
ST
BF
HA
EL
IDX

Multiport Fuel Injection (MFI) System (Cont'd)



MIXTURE RATIO FEEDBACK CONTROL

Mixture ratio feedback system is designed to precisely control the mixture ratio to the stoichiometric point so that the three way catalyst can reduce CO, HC and NOx emissions. This system uses an heated oxygen sensor in the exhaust manifold to check the air-fuel ratio. The ECM adjusts the injection pulse width according to the sensor voltage so the mixture ratio will be within the range of the stoichiometric air-fuel ratio.

This stage refers to the closed loop control condition. The open loop control condition refers to that under which the ECM detects any of the following conditions and feedback control stops in order to maintain stabilized fuel combustion.

1) Deceleration
2) High-load operation
3) Engine idling
4) Malfunction of heated oxygen sensor or its circuit
5) Insufficient activation of heated oxygen sensor at low engine coolant temperature
6) Engine starting
7) Hot-engine operation
8) When all of the following conditions are met:

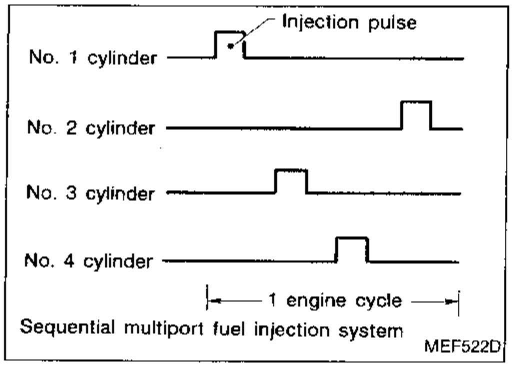
- Ignition switch "ON"
- Soft closed throttle position switch "ON"
- Neutral position switch "OFF"
- Engine running at idle speed
- Vehicle running at slow speed

MIXTURE RATIO SELF-LEARNING CONTROL

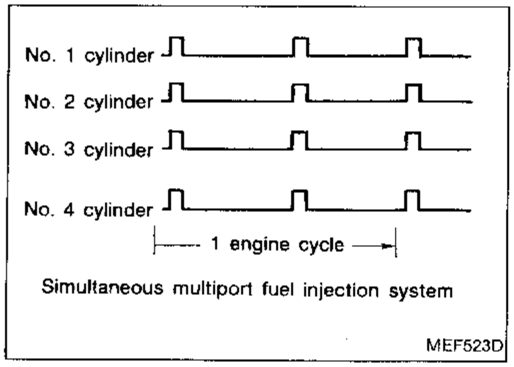
The mixture ratio feedback control system monitors the mixture ratio signal transmitted from the heated oxygen sensor. This feedback signal is then sent to the ECM to control the amount of fuel injection to provide a basic mixture ratio as close to the theoretical mixture ratio as possible. However, the basic mixture ratio is not necessarily controlled as originally designed. This is due to manufacturing errors (e.g., mass air flow sensor hot wire) and changes during operation (injector clogging, etc.) of ECCS parts which directly affect the mixture ratio.

Accordingly, a difference between the basic and theoretical mixture ratios is quantitatively monitored in this system. It is then computed in terms of "fuel injection duration" to automatically compensate for the difference between the two ratios.

FUEL INJECTION TIMING



Sequential multiport fuel injection system



Simultaneous multiport fuel injection system

Two types of fuel injection systems are used — simultaneous multiport fuel injection system and sequential multiport fuel injection system. In the former, fuel is injected into all four cylinders simultaneously twice each engine cycle.

In other words, pulse signals of the same width are simultaneously transmitted from the ECM to the four injectors two times for each engine cycle.

In the sequential multiport fuel injection system system, fuel is injected into each cylinder during each engine cycle according to the firing order.

When the engine is being started and/or if the fail-safe system (CPU of ECM) is operating, simultaneous multiport fuel injection system is used.

When the engine is running sequential multiport fuel injection system is used.

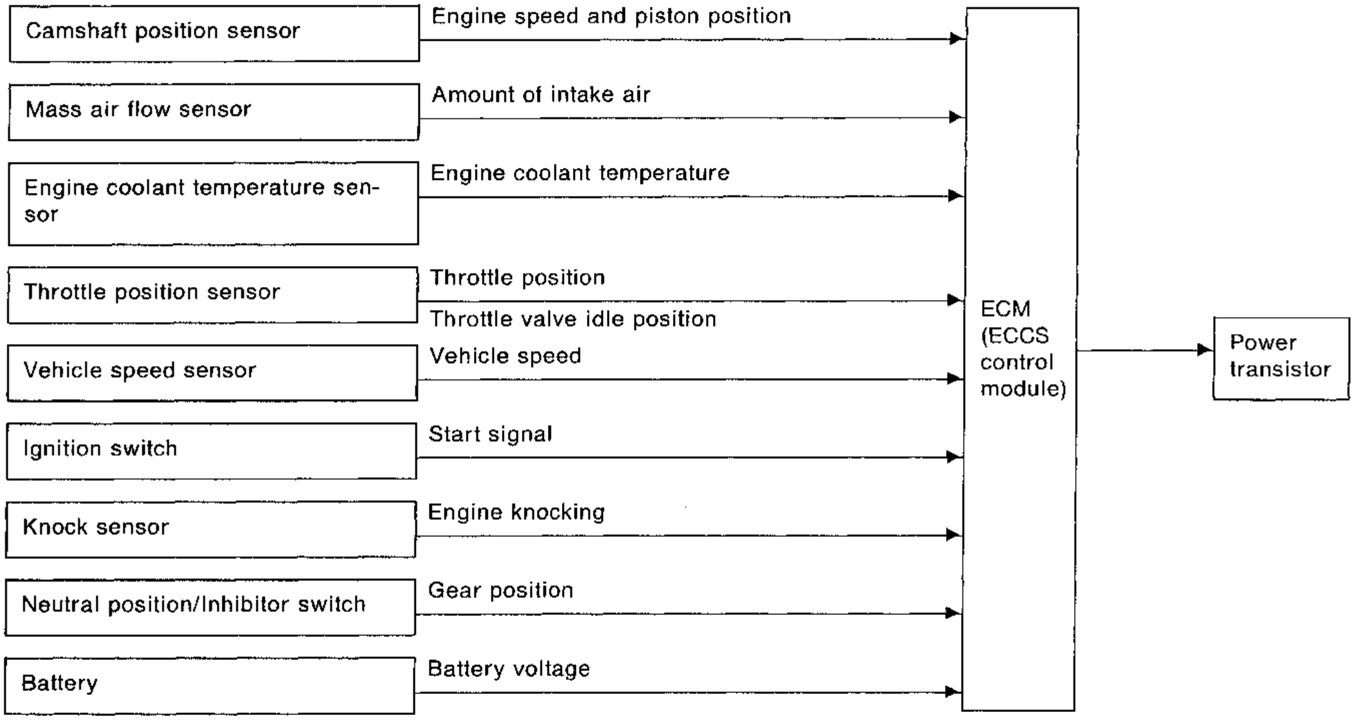
Multiport Fuel Injection (MFI) System (Cont'd)

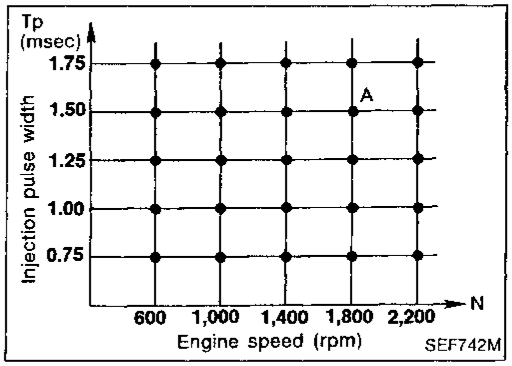
FUEL SHUT-OFF

Fuel to each cylinder is cut off during deceleration or operation of the engine at excessively high speeds.

Distributor Ignition (DI) System

INPUT/OUTPUT SIGNAL LINE





SYSTEM DESCRIPTION

The ignition timing is controlled by the ECM in order to maintain the best air-fuel ratio in response to every running condition of the engine.
The ignition timing data is stored in the ECM, in the form of the map shown at left.
The ECM detects information such as the injection pulse width and camshaft position sensor signal which varies every moment. Then responding to this information, ignition signals are transmitted to the power transistor.

e.g. N: 1,800 rpm, Tp: 1.50 msec
A °BTDC

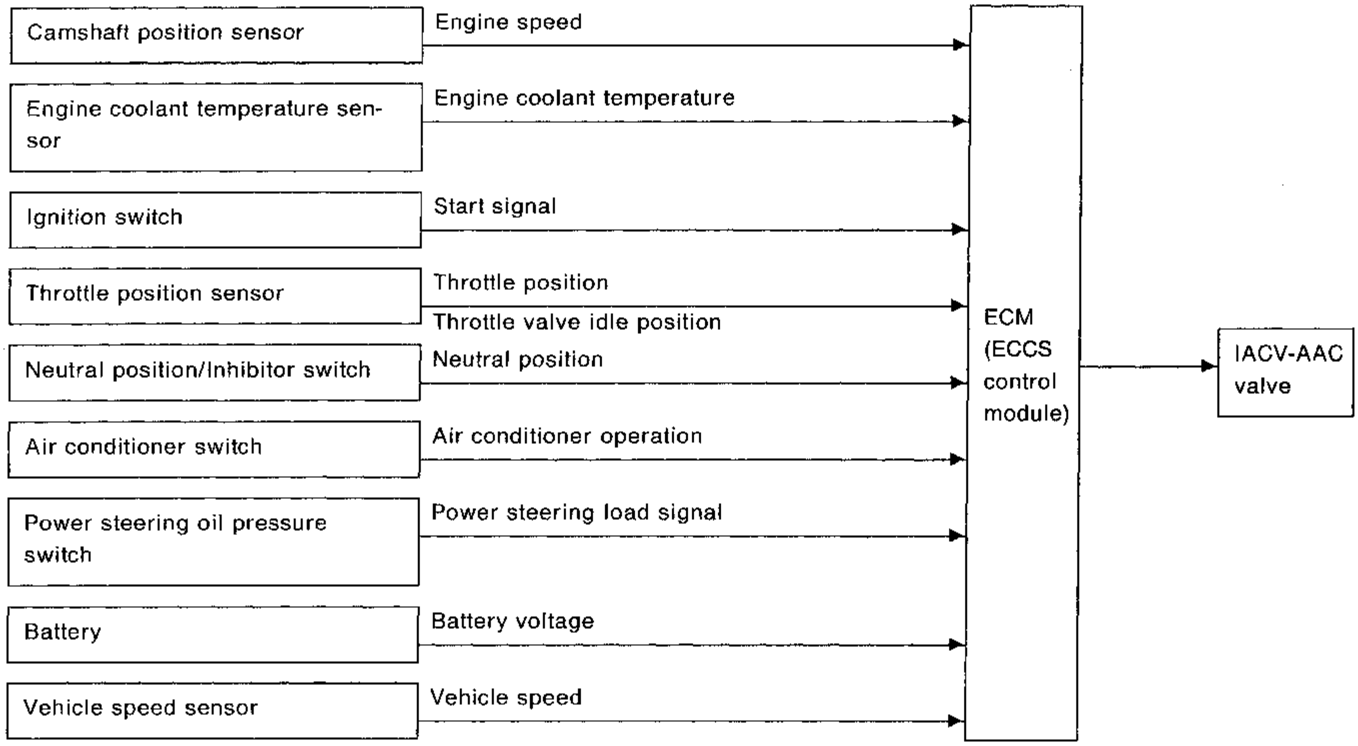
In addition to this,

1) At starting
2) During warm-up
3) At idle
4) At acceleration
5) Hot-engine operation

the ignition timing is revised by the ECM according to the other data stored in the ECM.
The retard system by knock sensor is designed only for emergencies. The basic ignition timing is pre-programmed within the anti-knocking zone, even if recommended fuel is used under dry conditions. Consequently, the retard system does not operate under normal driving conditions.
However, if engine knocking occurs, the knock sensor monitors the condition and the signal is transmitted to the ECM (ECCS control module). After receiving it, the ECM retards the ignition timing to avoid the knocking condition.

Idle Air Control (IAC) System

INPUT/OUTPUT SIGNAL LINE

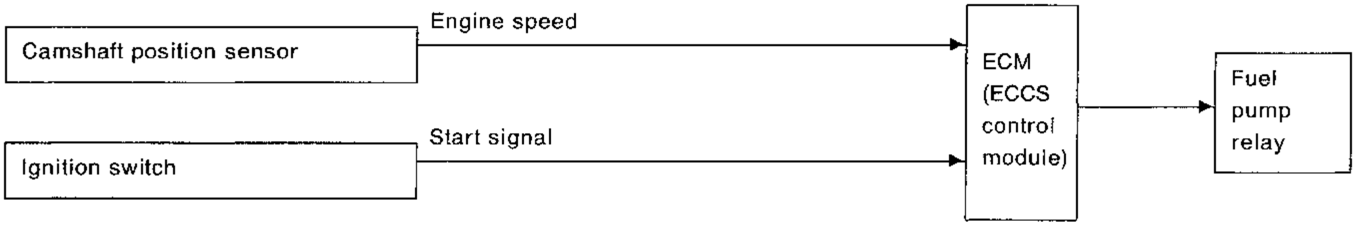


SYSTEM DESCRIPTION

This system automatically controls engine idle speed to a specified level. Idle speed is controlled through fine adjustment of the amount of air which by-passes the throttle valve via IACV-AAC valve. The IACV-AAC valve repeats ON/OFF operation according to the signal sent from the ECM. The camshaft position sensor detects the actual engine speed and sends a signal to the ECM. The ECM then controls the ON/OFF time of the IACV-AAC valve so that engine speed coincides with the target value memorized in ECM. The target engine speed is the lowest speed at which the engine can operate steadily. The optimum value stored in the ECM is determined by taking into consideration various engine conditions, such as warming up and during deceleration, fuel consumption, and engine load (air conditioner, electrical load).

Fuel Pump Control

INPUT/OUTPUT SIGNAL LINE



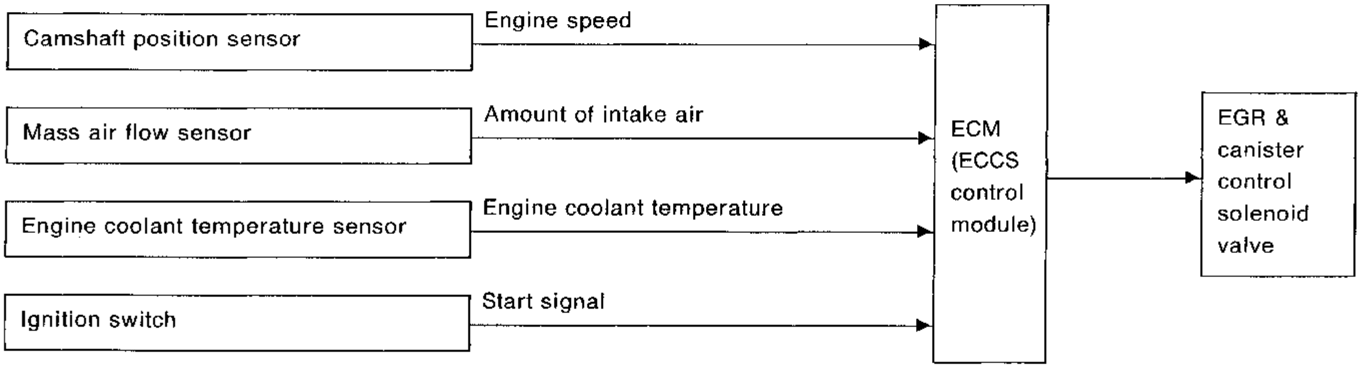
SYSTEM DESCRIPTION

The ECM activates the fuel pump for several seconds after the ignition switch is turned on to improve engine startability. If the ECM receives a 180° signal from the camshaft position sensor, it knows that the engine is rotating, and causes the pump to perform. If the 180° signal is not received when the ignition switch is on, the engine stalls. The ECM stops pump operation and prevents battery discharging, thereby improving safety. The ECM does not directly drive the fuel pump. It controls the ON/OFF fuel pump relay, which in turn controls the fuel pump.

Condition	Fuel pump operation
Ignition switch is turned to ON.	Operates for 5 seconds
Engine running and cranking	Operates
When engine is stopped	Stops in 1 second
Except as shown above	Stops

EGR (Exhaust Gas Recirculation) & Canister Control

INPUT/OUTPUT SIGNAL LINE



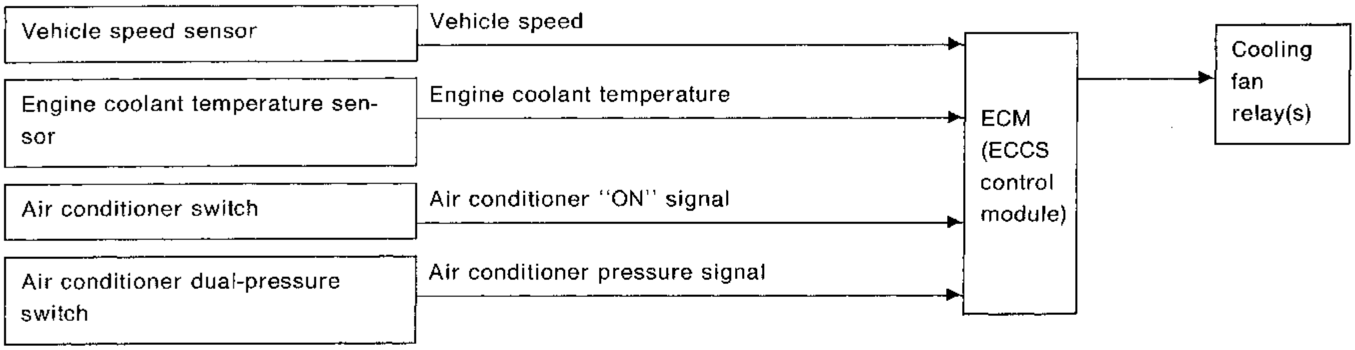
SYSTEM DESCRIPTION

In addition, a system is provided which precisely cuts and controls port vacuum applied to the EGR valve and canister to suit engine operating conditions. This cut-and-control operation is accomplished through the ECM. When the ECM detects any of the following conditions, current flows through the solenoid valve in the EGR and canister control vacuum line. This causes the port vacuum to be discharged into the atmosphere so that the EGR valve and canister remain closed.

1) Low engine coolant temperature
2) Engine starting
3) High-speed engine operation
4) Engine idling
5) Excessively high engine coolant temperature
6) Mass air flow sensor malfunction

Cooling Fan Control

INPUT/OUTPUT SIGNAL LINE



FOR M/T MODELS

The ECM controls the cooling fan corresponding to the vehicle speed, engine coolant temperature, and air conditioner ON signal. The control system has 2-step control [ON/OFF].

Operation

Air conditioner switch is "OFF"

Engine coolant temperature °C (°F)	Cooling fans	Remarks
94 (201) or less	OFF	
Between 95 (203) and 99 (210)	OFF	Vehicle speed is 19 km/h (12 MPH) or less
	ON	Vehicle speed is 20 km/h (12 MPH) or more
100 (212) or more	ON	

Air conditioner switch is "ON"

Engine coolant temperature °C (°F)	Cooling fans	Remarks
94 (201) or less	OFF	Vehicle speed is 80 km/h (50 MPH) or more
	ON	Vehicle speed is 79 km/h (49 MPH) or less
95 (203) or more	ON	

FOR A/T MODELS

The ECM performs ON/OFF control and LOW/HIGH speed control of the cooling fan corresponding to the vehicle speed, engine coolant temperature, and air conditioner ON signal.

Operation

Air conditioner switch is "OFF"

Engine coolant temperature °C (°F)	Cooling fans	Remarks
94 (201) or less	OFF	
Between 95 (203) and 99 (210)	LOW	
Between 100 (212) and 104 (219)	LOW	Vehicle speed is 19 km/h (12 MPH) or less
	HIGH	Vehicle speed is 20 km/h (12 MPH) or more
105 (221) or more	HIGH	

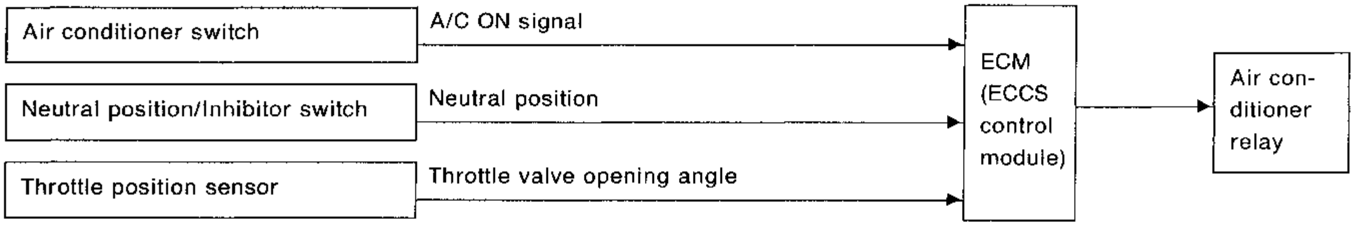
Air conditioner switch is "ON"

Engine coolant temperature °C (°F)	Cooling fans	Remarks
94 (201) or less	OFF	Vehicle speed is 80 km/h (50 MPH) or more
	LOW	Vehicle speed is 79 km/h (49 MPH) or less
Between 95 (203) and 99 (210)	LOW	
Between 100 (212) and 104 (219)	LOW	Vehicle speed is 19 km/h (12 MPH) or less
	HIGH	Vehicle speed is 20 km/h (12 MPH) or more
105 (221) or more	HIGH	

The cooling fan operates at HIGH if the self-diagnosing engine coolant temperature sensor system results in "NG".

Acceleration Cut Control

INPUT/OUTPUT SIGNAL LINE

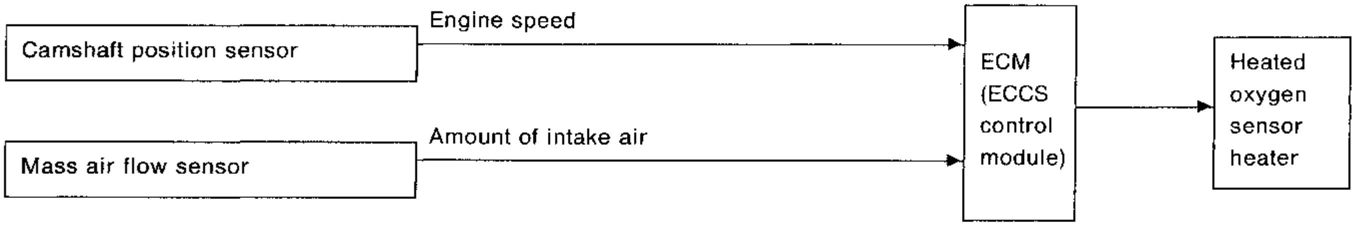


SYSTEM DESCRIPTION

When the accelerator pedal is fully depressed, the air conditioner is turned off for a few seconds. This system improves acceleration when the air conditioner is used.

Heated Oxygen Sensor (HO2S) Heater Control

INPUT/OUTPUT SIGNAL LINE



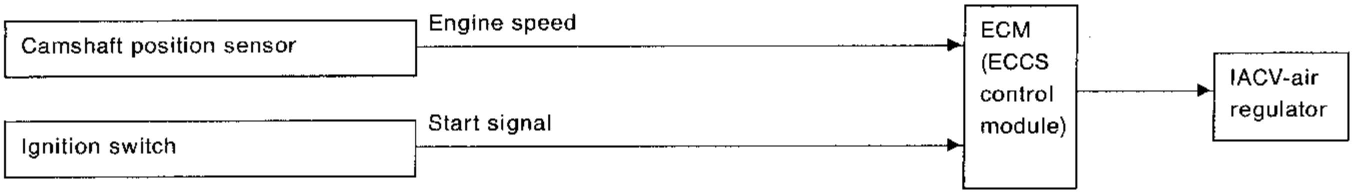
The ECM performs ON/OFF control of the heated oxygen sensor heater corresponding to the engine speed and engine load.

OPERATION

Engine speed rpm	Engine load	Heated oxygen sensor heater
Above 3,200	—	OFF
Below 3,200	Heavy load	OFF
	Middle or light load	ON

Idle Air Control Valve (IACV)-Air Regulator Control

INPUT/OUTPUT SIGNAL LINE



SYSTEM DESCRIPTION

The IACV-air regulator is controlled by the ECM at the same time as fuel pump ON-OFF control.

Condition	IACV-air regulator operation
Ignition switch is turned to ON	Operates for 5 seconds
While engine is running and cranking	Operates
When engine is stopped	OFF in 1 second
Except as shown above	OFF

Fail-safe System

CPU MALFUNCTION OF ECM

Outline

The fail-safe system makes engine starting possible if there is something malfunctioning in the ECM's CPU circuit. In former models, engine starting was difficult under the conditions mentioned above. But with the provisions provided in this fail-safe system, it is possible to start the engine.

Fail-safe system activating condition when ECM is malfunctioning

The computing function of the ECM was judged to be malfunctioning.

When the fail-safe system activates, i.e. if the ECM detects a malfunction condition in the CPU of ECM, the MALFUNCTION INDICATOR LAMP on the instrument panel lights to warn the driver.

Engine control, with fail-safe system, operates when ECM is malfunctioning

When the fail-safe system is operating, fuel injection, ignition timing, fuel pump operation, IACV-AAC valve operation and cooling fan operation are controlled under certain limitations.

Operation

	Operation
Fuel injection	Simultaneous multiport fuel injection system
Ignition timing	Ignition timing is fixed at the preset valve.
Fuel pump	Fuel pump relay is "ON" when engine is running and "OFF" when engine stalls.
IACV-AAC valve	Full open
Cooling fans	Cooling fan relay "ON"

Cancellation of fail-safe system when ECM is malfunctioning

Activation of the fail-safe system is canceled each time the ignition switch is turned OFF. The system is reactivated if all of the above-mentioned activating conditions are satisfied after turning the ignition switch from OFF to ON.

MASS AIR FLOW SENSOR MALFUNCTION

If the mass air flow sensor output voltage is above or below the specified value, the ECM senses a mass air flow sensor malfunction. In case of a malfunction, the throttle position sensor substitutes for the mass air flow sensor.

Though mass air flow sensor is malfunctioning, it is possible to drive the vehicle and start the engine. But engine speed will not rise more than 2,400 rpm in order to inform the driver of fail-safe system operation while driving.

Operation

Engine condition	Starter switch	Fail-safe system	Fail-safe functioning
Stopped	ANY	Does not operate	—
Cranking	ON	Operates	Engine will be started by a pre-determined injection pulse on ECM.
Running	OFF		Engine speed will not rise above 2,400 rpm

Fail-safe System (Cont'd)

ENGINE COOLANT TEMPERATURE SENSOR MALFUNCTION

When engine coolant temperature sensor output voltage is below or above the specified value, water temperature is fixed at the preset value as follows:

Operation

Condition	Engine coolant temperature decided
Just as ignition switch is turned ON or Start	30°C (86°F)
More than 6 minutes after ignition ON or Start	80°C (176°F)
Except as shown above	30 - 80°C (86 - 176°F) (Depends on the time)

KNOCK SENSOR MALFUNCTION

When the output signal of the knock sensor is abnormal, the ECM judges it to be malfunctioning. When knock sensor is malfunctioning, ignition timing will retard according to operating conditions.

THROTTLE POSITION SENSOR MALFUNCTION

Description

When the output signal of throttle position sensor is abnormal the ECM judges it as a malfunctioning of throttle position sensor.
The ECM does not use the throttle position sensor signal, but judges the idle position by the amount of fuel injected and the engine speed.

Operation

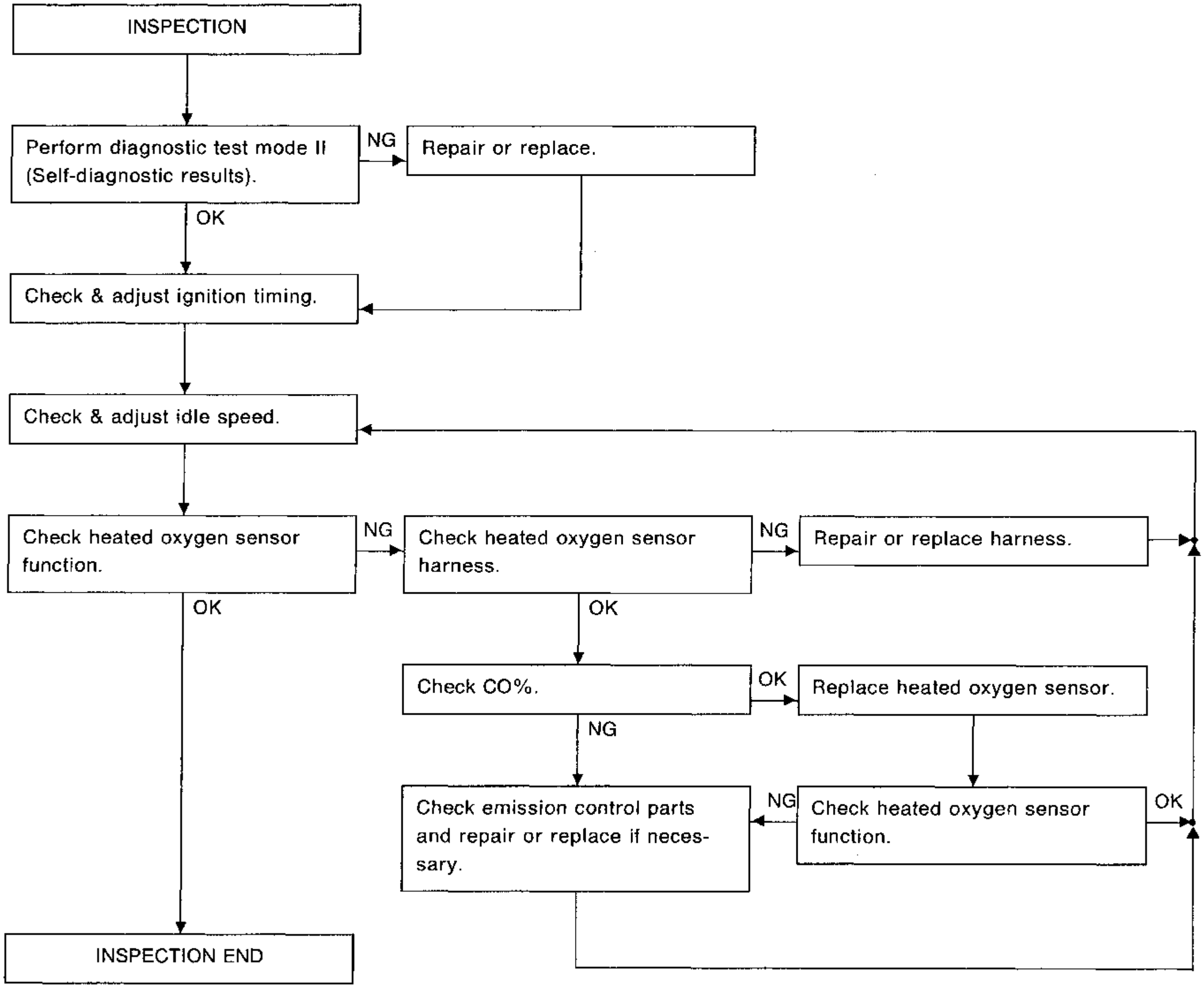
	Driving condition
When engine is idling	Normal
When accelerating	Poor acceleration

PREPARATION

1. Make sure that the following parts are in good order.
- Battery
- Ignition system
- Engine oil and coolant levels
- Fuses
- ECM harness connector
- Vacuum hoses
- Air intake system
  (Oil filler cap, oil level gauge, etc.)
- Fuel pressure
- Engine compression
- Throttle valve

2. On air conditioner equipped models, checks should be carried out while the air conditioner is "OFF".
3. On automatic transaxle equipped models, when checking idle speed, ignition timing and mixture ratio, checks should be carried out while shift lever is in "N" position.
4. When measuring "CO" percentage, insert probe more than 40 cm (15.7 in) into tail pipe.
5. Turn off headlamps, heater blower, rear defogger.
6. Keep front wheels pointed straight ahead.
7. Make the check after the cooling fan has stopped.

Overall inspection sequence

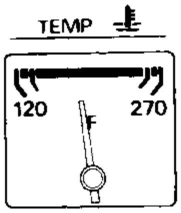


START

↓

Visually check the following:
- Air cleaner clogging
- Hoses and ducts for leaks
- EGR valve operation
- Electrical connectors
- Gasket
- Throttle valve and throttle position sensor operation

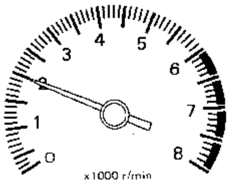
↓



SEF246F

Start engine and warm it up until water temperature indicator points to the middle of gauge.
Ensure engine stays below 1,000 rpm.

↓

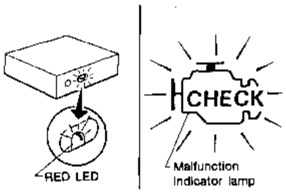


SEF247F

Open engine hood and run engine at about 2,000 rpm for about 2 minutes under no-load.

↓

Perform diagnostic test mode II (Self-diagnostic results) (Diagnostic Test Mode II).

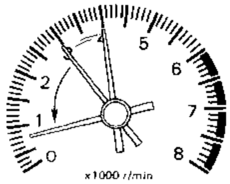


MEF377DA

OK ↓ — NG ↓

NG: Repair or replace components as necessary.

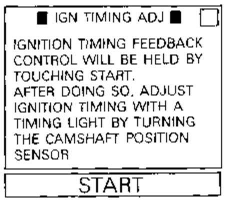
↓



SEF248F

Run engine at about 2,000 rpm for about 2 minutes under no-load.
Race engine two or three times under no-load, then run engine for about 1 minute at idle speed.

↓


■ IGN TIMING ADJ ■ ☐

IGNITION TIMING FEEDBACK CONTROL WILL BE HELD BY TOUCHING START. AFTER DOING SO, ADJUST IGNITION TIMING WITH A TIMING LIGHT BY TURNING THE CAMSHAFT POSITION SENSOR

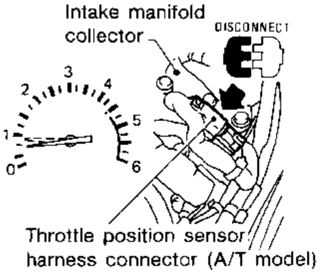
START

SEF546N

1) Select "IGN TIMING ADJ" in "WORK SUPPORT" mode.
2) Touch "START".

OR

1) Turn off engine and disconnect throttle position sensor harness connector.
2) Start engine.



SEF547N

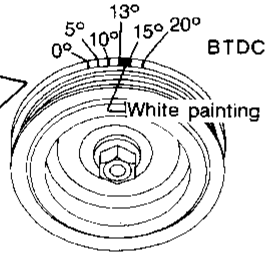
↓

Race engine (2,000 - 3,000 rpm) 2 or 3 times under no-load and then run engine at idle speed.

↓

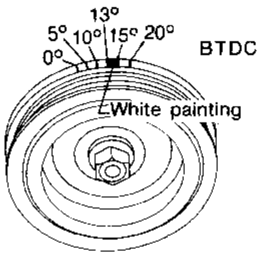
Check ignition timing with a timing light.

M/T: 15° ± 2° BTDC
A/T: 15° ± 2° BTDC (in "N" position)



↓ OK — ↓ NG

Ⓐ — Ⓘ



Ⓐ

Ⓘ

Adjust ignition timing to the specified value by turning distributor after loosing bolts which secure distributor.

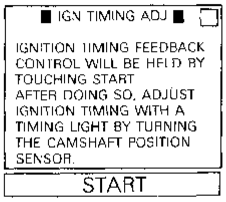
M/T: 15°±2° BTDC
A/T: 15°±2° BTDC (in "N" position)

Ⓔ

1) Select "IGN TIMING ADJ" in "WORK SUPPORT" mode.
2) Touch "START".

OR

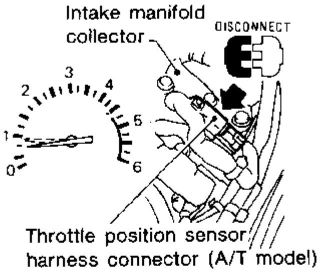
1) Turn off engine and disconnect throttle position sensor harness connector.
2) Start engine.


■ IGN TIMING ADJ ■ ☐

IGNITION TIMING FEEDBACK CONTROL WILL BE HELD BY TOUCHING START
AFTER DOING SO, ADJUST IGNITION TIMING WITH A TIMING LIGHT BY TURNING THE CAMSHAFT POSITION SENSOR.

START

SEF546N



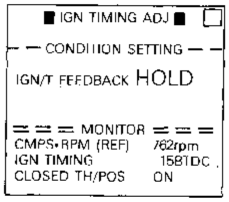
SEF547N

Check idle speed.
- Read idle speed in "IGN TIMING ADJ" in "WORK SUPPORT" mode.

OR

- Check idle speed.

M/T: 750±50 rpm
A/T: 750±50 rpm (in "N" position)


■ IGN TIMING ADJ ■ ☐

— CONDITION SETTING —

IGN/T FEEDBACK HOLD

=== MONITOR ===
CMPS•RPM (REF) 762rpm
IGN TIMING 15BTDC
CLOSED TH/POS ON

SEF548N

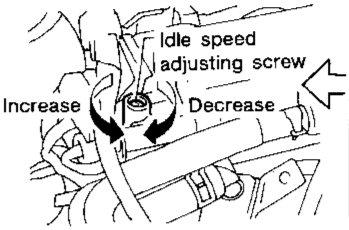
OK

NG

Race engine (2,000 - 3,000 rpm) 2 or 3 times under no-load and run engine at idle speed.

Adjust idle speed by turning idle speed adjusting screw.

M/T: 750±50 rpm
A/T: 750±50 rpm (in "N" position)

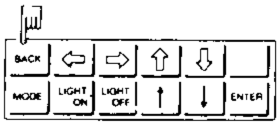


SEF549N

1) Touch "BACK".

OR

1) Turn off engine and connect throttle position sensor harness connector.
2) Start engine.

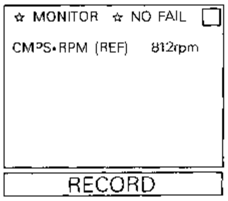


SEF913J

Race engine (2,000 - 3,000 rpm) 2 or 3 times under no-load and run engine at idle speed.

Ⓙ

Ⓙ


☆ MONITOR ☆ NO FAIL ☐

CMPS·RPM (REF) 812rpm

RECORD

SEF550N

Check idle speed.

- Read idle speed in "DATA MONITOR" mode with CONSULT.

OR

- Check idle speed.

M/T: 800±50 rpm
A/T: 800±50 rpm (in "N" position)

OK

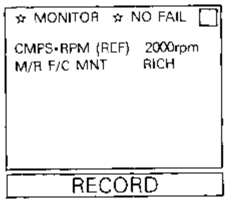
NG

Check IACV-AAC valve and replace if necessary.

Check IACV-AAC valve harness and repair if necessary.

Check ECM function* by substituting another known good ECM.

* ECM may be the cause of a problem, but this is rarely the case.


☆ MONITOR ☆ NO FAIL ☐

CMPS·RPM (REF) 2000rpm
M/R F/C MNT RICH

RECORD

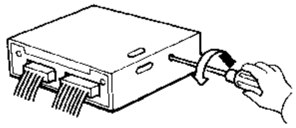
SEF551N

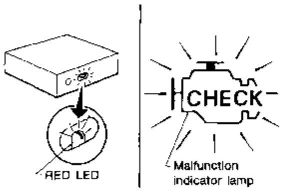
1. See "M/R F/C MNT" in "Data monitor" mode.
2. Run engine at about 2,000 rpm for about 2 minutes under no-load.
3. Maintaining engine at 2,000 rpm under no-load (engine is warmed up sufficiently.), check that the monitor fluctuates between "LEAN" and "RICH" more than 5 times during 10 seconds.

RICH → LEAN → RICH →
1 time 2 times
LEAN → RICH .....

OR

NG → Ⓒ


SEF957D



MEF377DA

1. Set "Heated oxygen sensor monitor" in the diagnostic test mode II. (See page EF & EC-50.)
2. Run engine at about 2,000 rpm for about 2 minutes under no-load.
3. Maintaining engine at 2,000 rpm under no-load, check to make sure that the RED LED on the ECM or the malfunction indicator lamp on the instrument panel goes ON and OFF more than 5 times during 10 seconds.

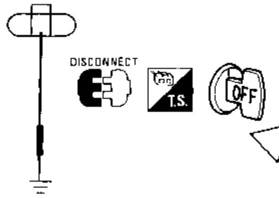
OK

END

GI
MA
EM
LC
EF & EC
FE
CL
MT
AT
FA
RA
BR
ST
BF
HA
EL
IDX

Ⓒ

Heated oxygen sensor harness connector



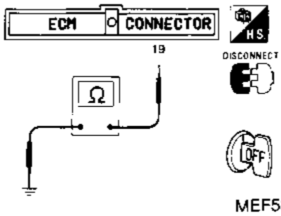
As for the location of heated oxygen sensor harness connector, refer to Diagnostic Procedure 16.

MEF533D

Check heated oxygen sensor harness:

1) Turn off engine and disconnect battery ground cable.
2) Disconnect ECM SMJ harness connector from ECM.
3) Disconnect heated oxygen sensor harness connector and connect main harness side terminal for heated oxygen sensor to ground with a jumper wire.
4) Check for continuity between terminal No. 19 of ECM SMJ harness connector and body ground.

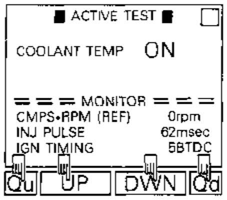
Continuity exists..**OK**
Continuity does not exist...**NG**



MEF534D

NG: Repair or replace harness. → Ⓔ

OK: Connect ECM SMJ harness connector to ECM.



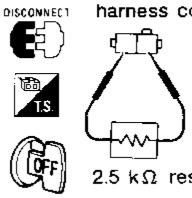
SEF552N

1) Connect battery ground cable.
2) Select "ENG COOLANT TEMP" in "ACTIVE TEST" mode.
3) Set "COOLANT" to 20°C (68°F) by touching "Qu" and "Qd" and "UP", "DOWN".

OR

1) Disconnect engine coolant temperature sensor harness connector.
2) Connect a resistor (2.5 kΩ) between terminals of engine coolant temperature sensor harness connector.
3) Connect battery ground cable.

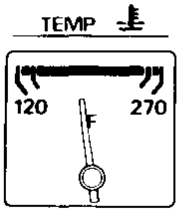
Engine coolant temperature sensor harness connector



2.5 kΩ resistor

MEF537D

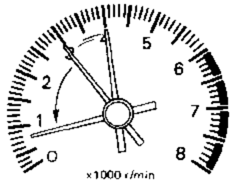
Start engine and warm it up until water temperature indicator points to middle of gauge.



SEF246F

Ⓓ

Ⓓ



SEF248F

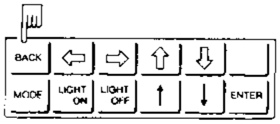
Race engine two or three times under no-load, then run engine at idle speed.

Check "CO"%.

Idle CO: Less than 5%

After checking CO%,

1) Touch "BACK".



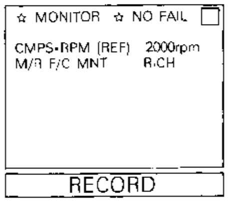
SEF913J

1) Disconnect the resistor from terminals of engine coolant temperature sensor harness connector.
2) Connect engine coolant temperature sensor harness connector to engine coolant temperature sensor.

NG

OK

Replace heated oxygen sensor.


☆ MONITOR ☆ NO FAIL ☐

CMPS·RPM (REF) 2000rpm
M/R F/C MNT RICH

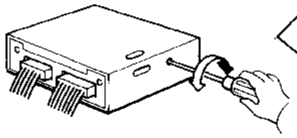
RECORD

SEF553N

1. See "M/R F/C MNT" in "Data monitor" mode.
2. Maintaining engine at 2,000 rpm under no-load (engine is warmed up sufficiently.), check that the monitor fluctuates between "LEAN" and "RICH" more than 5 times during 10 seconds.

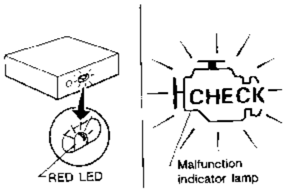
RICH → LEAN → RICH →
1 time 2 times
LEAN → RICH .....

OR



SEF957D

1. Set "Heated oxygen sensor monitor" in the diagnostic test mode II. (See page EF & EC-50.)
2. Maintaining engine at 2,000 rpm under no-load, check to make sure that the RED LED on the ECM or the malfunction indicator lamp on the instrument panel goes ON and OFF more than 5 times during 10 seconds.



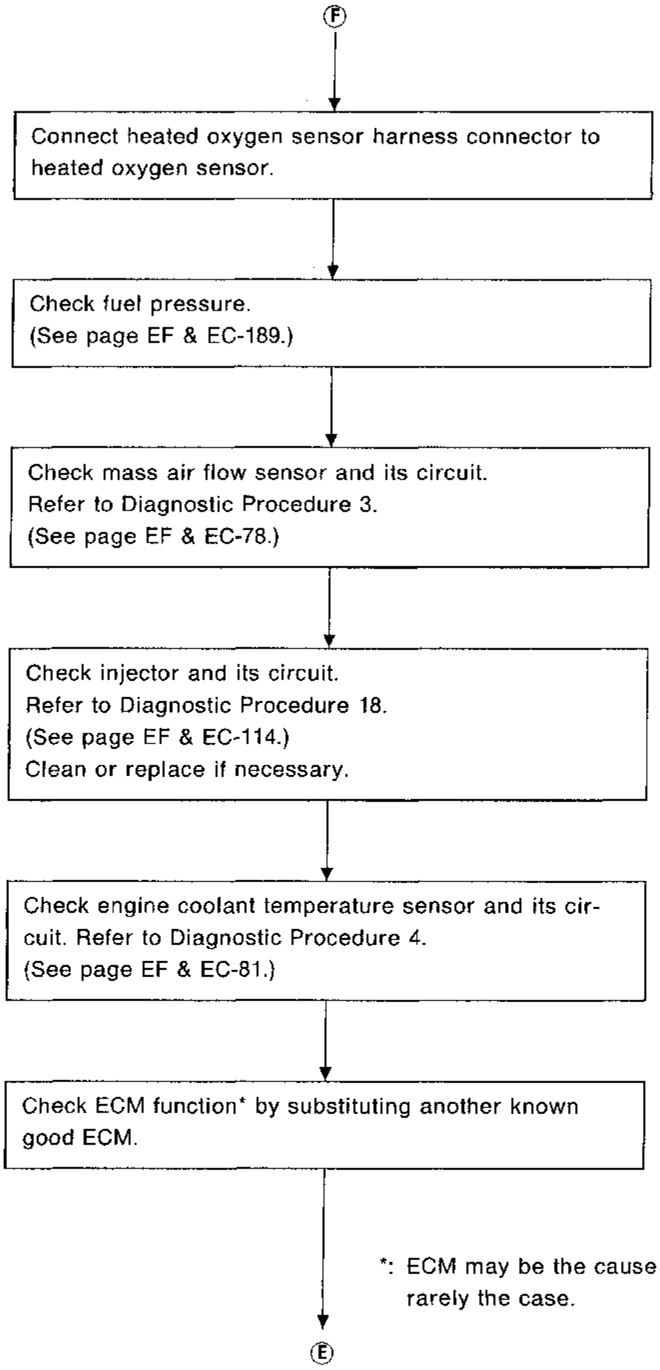
MEF377DA

NG

OK

Ⓕ

Ⓔ



Connect heated oxygen sensor harness connector to heated oxygen sensor.

Check fuel pressure.
(See page EF & EC-189.)

Check mass air flow sensor and its circuit.
Refer to Diagnostic Procedure 3.
(See page EF & EC-78.)

Check injector and its circuit.
Refer to Diagnostic Procedure 18.
(See page EF & EC-114.)
Clean or replace if necessary.

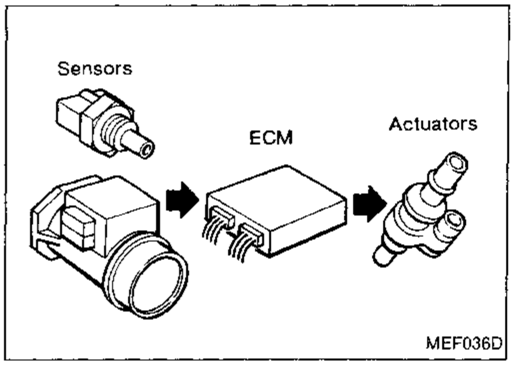
Check engine coolant temperature sensor and its circuit. Refer to Diagnostic Procedure 4.
(See page EF & EC-81.)

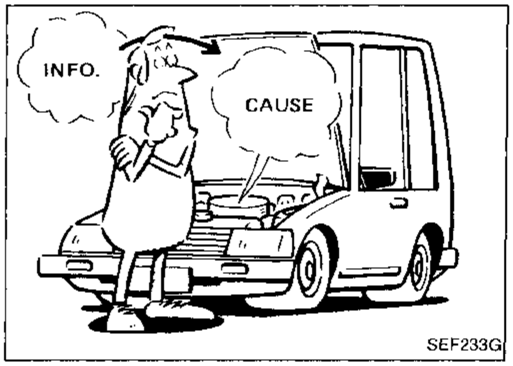
Check ECM function* by substituting another known good ECM.

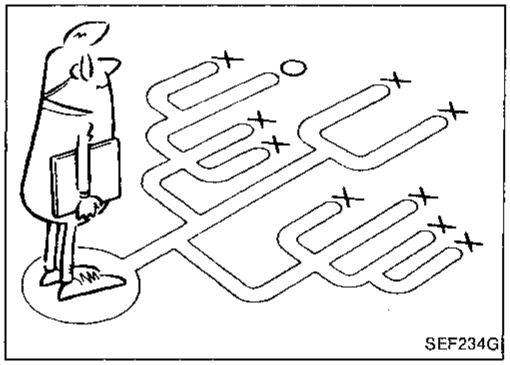
*: ECM may be the cause of a problem, but this is rarely the case.

Contents

Contents (Cont'd)







How to Perform Trouble Diagnoses for Quick and Accurate Repair

INTRODUCTION

The engine has an ECM to control major systems such as fuel control, ignition control, idle air control system, etc. The ECM accepts input signals from sensors and instantly drives actuators. It is essential that both kinds of signals are proper and stable. At the same time, it is important that there are no conventional problems such as vacuum leaks, fouled spark plugs, or other problems with the engine.

It is much more difficult to diagnose a problem that occurs intermittently rather than continuously. Most intermittent problems are caused by poor electric connections or improper wiring. In this case, careful checking of suspected circuits may help prevent the replacement of good parts.

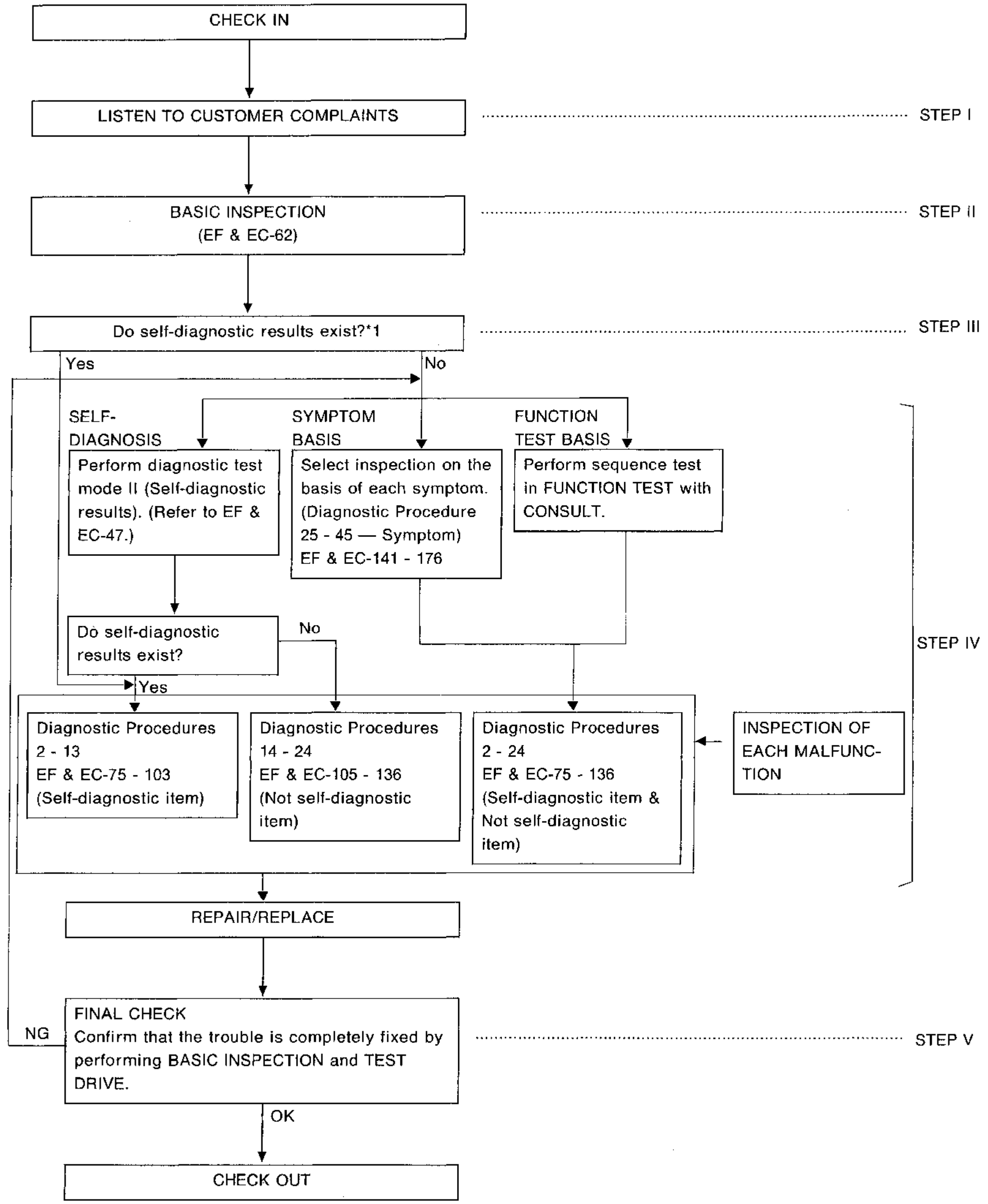
A visual check only may not find the cause of the problems, so a road test with a circuit tester connected to a suspected circuit should be performed.

Before undertaking actual checks, take just a few minutes to talk with a customer who approaches with a driveability complaint. The customer is a very good supplier of information on such problems, especially intermittent ones. Through interaction with the customer, find out what symptoms are present and under what conditions they occur.

Start your diagnosis by looking for "conventional" problems first. This is one of the best ways to troubleshoot driveability problems on an electronically controlled engine vehicle.

How to Perform Trouble Diagnoses for Quick and Accurate Repair (Cont'd)

WORK FLOW



---

*1: If the on-board diagnostic system cannot be performed, check main power supply and ground circuit. (See Diagnostic Procedure 1)

*2: If the trouble is not duplicated, see INTERMITTENT PROBLEM SIMULATION (EF & EC-43).

How to Perform Trouble Diagnoses for Quick and Accurate Repair (Cont'd)

DESCRIPTION FOR WORK FLOW

STEP	DESCRIPTION
STEP I	Identify the trouble using the "DIAGNOSTIC WORKSHEET" as shown on the next page.
STEP II	Be sure to carry out the Basic Inspection, or the results of inspections thereafter may be misinterpreted.
STEP III	Check the self-diagnostic results stored in the ECM of the failed vehicle.
STEP IV	Perform inspection often selecting from the following three tests according to the trouble observed. 1. DIAGNOSTIC TEST MODE II (Self-diagnostic results) Follow the DIAGNOSTIC TEST MODE II (Self-diagnostic results) procedure for each item described in "How to Execute DIAGNOSTIC TEST MODE II (Self-diagnostic results)". Non-self-diagnostic procedures described for some items will also provide results which are equal to the self-diagnostic results. 2. SYMPTOM BASIS This inspection is of a simplified method. When performing inspection of a part, the corresponding system must be checked thoroughly by selecting the appropriate check item from Diagnostic Procedures 2 - 24. 3. FUNCTION TEST BASIS (Sequence test) In this inspection, the CONSULT judges "OK" or "NG" on each system in place of a technician. When performing inspection of a part, the corresponding system must be checked thoroughly by selecting the appropriate check item from Diagnostic Procedures 2 - 24. 4. Diagnostic Procedure ● This inspection program is prepared using the data obtained when disconnection of harness or connectors has occurred in the respective circuit. ● Inspection of the "Not self-diagnostic item" does not actually start with the execution of diagnostic test mode II. However, inspection is started by assuming that the diagnostic test mode II has already been performed. ● When a system having the diagnostic test mode II function contains any circuit placed outside the range of this diagnostic test mode II function, it is arranged that the "Not self-diagnostic item" of such a system will be performed when the self-diagnostic result is OK. Example: CAMSHAFT POSITION SENSOR
STEP V	1. FINAL CHECK item is not described in the "Not self-diagnostic item". However, this FINAL CHECK must be performed without fail in order to ensure that the trouble has been repaired, and also that the unit disassembled in the course of the repair work has been reassembled correctly. 2. If the same trouble phenomenon is observed again in the final check: Go back to STEP IV, and perform the inspection using a method which is different from the previous method. 3. If the cause of the trouble is still unknown even after conducting step II above, check the circuit of each system for a short by using the voltage available at the "ECM INPUT/OUTPUT SIGNAL INSPECTION" terminal.

GI
MA
EM
LC
EF & EC
FE
CL
MT
AT
FA
RA
BR
ST
BF
HA
EL
IDX

How to Perform Trouble Diagnoses for Quick and Accurate Repair (Cont'd)

KEY POINTS

WHAT	Vehicle & engine model
WHEN	Date, Frequencies
WHERE.....	Road conditions
HOW	Operating conditions, Weather conditions, Symptoms

SEF907L

DIAGNOSTIC WORKSHEET

There are many kinds of operating conditions that lead to malfunctions on engine components.

A good grasp of such conditions can make trouble-shooting faster and more accurate.

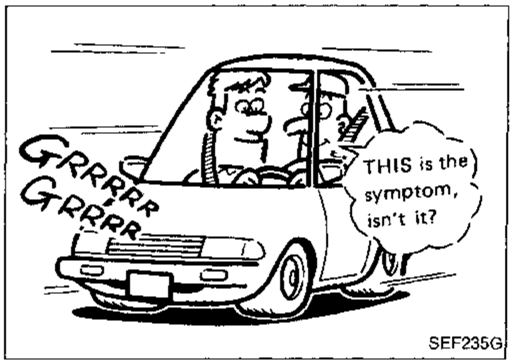
In general, feelings for a problem depend on each customer. It is important to fully understand the symptoms or under what conditions a customer complains.

Make good use of a diagnostic worksheet such as the one shown below in order to utilize all the complaints for trouble-shooting.

Worksheet sample

Customer name MR/MS		Model & Year	VIN
Engine #		Trans.	Mileage
Incident Date		Manuf. Date	In Service Date
Symptoms	☐ Startability	☐ Impossible to start ☐ No combustion ☐ Partial combustion ☐ Partial combustion affected by throttle position ☐ Partial combustion NOT affected by throttle position ☐ Possible but hard to start ☐ Others [ ]	
	☐ Idling	☐ No fast idle ☐ Unstable ☐ High idle ☐ Low idle ☐ Others [ ]	
	☐ Driveability	☐ Stumble ☐ Surge ☐ Knock ☐ Lack of power ☐ Intake backfire ☐ Exhaust backfire ☐ Others [ ]	
	☐ Engine stall	☐ At the time of start ☐ While idling ☐ While accelerating ☐ While decelerating ☐ Just after stopping ☐ While loading	
Incident occurrence		☐ Just after delivery ☐ Recently ☐ In the morning ☐ At night ☐ In the daytime	
Frequency		☐ All the time ☐ Under certain conditions ☐ Sometimes	
Weather conditions		☐ Not affected	
	Weather	☐ Fine ☐ Raining ☐ Snowing ☐ Others [ ]	
	Temperature	☐ Hot ☐ Warm ☐ Cool ☐ Cold ☐ Humid °F	
Engine conditions		☐ Cold ☐ During warm-up ☐ After warm-up Engine speed 0 2,000 4,000 6,000 8,000 rpm	
Road conditions		☐ In town ☐ In suburbs ☐ Highway ☐ Off road (up/down)	
Driving conditions		☐ Not affected ☐ At starting ☐ While idling ☐ At racing ☐ While accelerating ☐ While cruising ☐ While decelerating ☐ While turning (RH/LH) Vehicle speed 0 10 20 30 40 50 60 MPH	
Malfunction indicator lamp		☐ Turned on ☐ Not turned on	

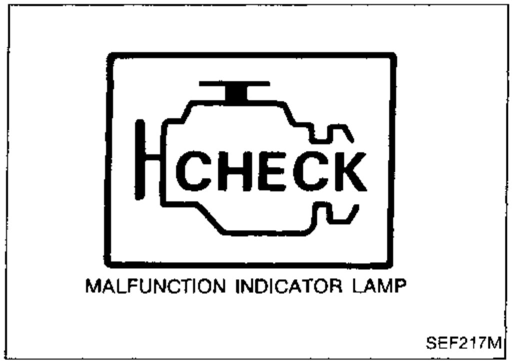
How to Perform Trouble Diagnoses for Quick and Accurate Repair (Cont'd)



INTERMITTENT PROBLEM SIMULATION

In order to duplicate an intermittent problem, it is effective to create similar conditions for component parts, under which the problem might occur.
Perform the activity listed under Service procedure and note the result.

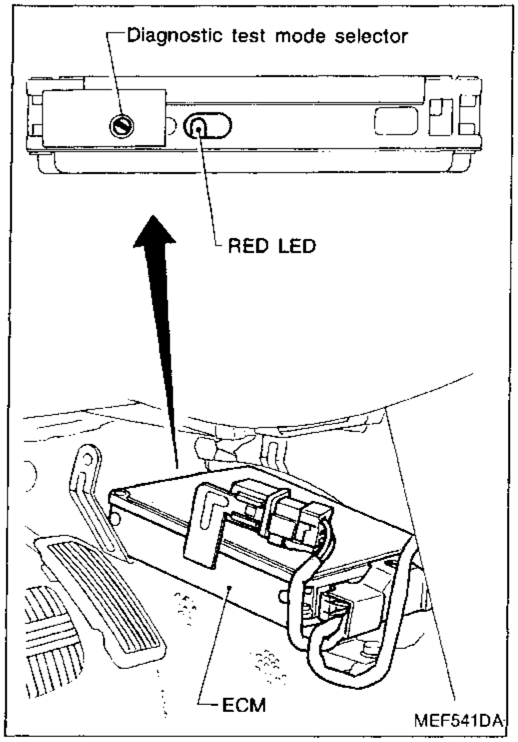
	Variable factor	Influential part	Target condition	Service procedure
1	Mixture ratio	Pressure regulator	Made lean	Remove vacuum hose and apply vacuum.
			Made rich	Remove vacuum hose and apply pressure.
2	Ignition timing	Camshaft position sensor	Advanced	Rotate distributor clockwise.
			Retarded	Rotate distributor counterclockwise.
3	Mixture ratio feedback control	Heated oxygen sensor	Suspended	Disconnect heated oxygen sensor harness connector.
		ECM	Operation check	Perform diagnostic test mode II (Self-diagnostic results) at 2,000 rpm.
4	Idle speed	IACV-AAC valve	Raised	Turn idle adjusting screw counterclockwise.
			Lowered	Turn idle adjusting screw clockwise.
5	Electrical connection (Electric continuity)	Harness connectors and wires	Poor electrical connection or improper wiring	Tap or wiggle.
				Race engine rapidly. See if the torque reaction of the engine unit causes electric breaks.
6	Temperature	ECM	Cooled	Cool with an icing spray or similar device.
			Warmed	Heat with a hair drier. **[WARNING: Do not overheat the unit.]**
7	Moisture	Electric parts	Damp	Wet. **[WARNING: Do not directly pour water on components. Use a mist sprayer.]**
8	Electric loads	Load switches	Loaded	Turn on headlamps, air conditioner, rear defogger, etc.
9	Closed throttle position switch condition	ECM	ON-OFF switching	Rotate throttle position sensor body.
10	Ignition spark	Timing light	Spark power check	Try to flash timing light for each cylinder using ignition coil adapter (SST).



On-board Diagnostic System

MALFUNCTION INDICATOR LAMP

A malfunction indicator lamp has been adopted on all models. This light blinks simultaneously with the RED LED on the ECM.



ECM LED

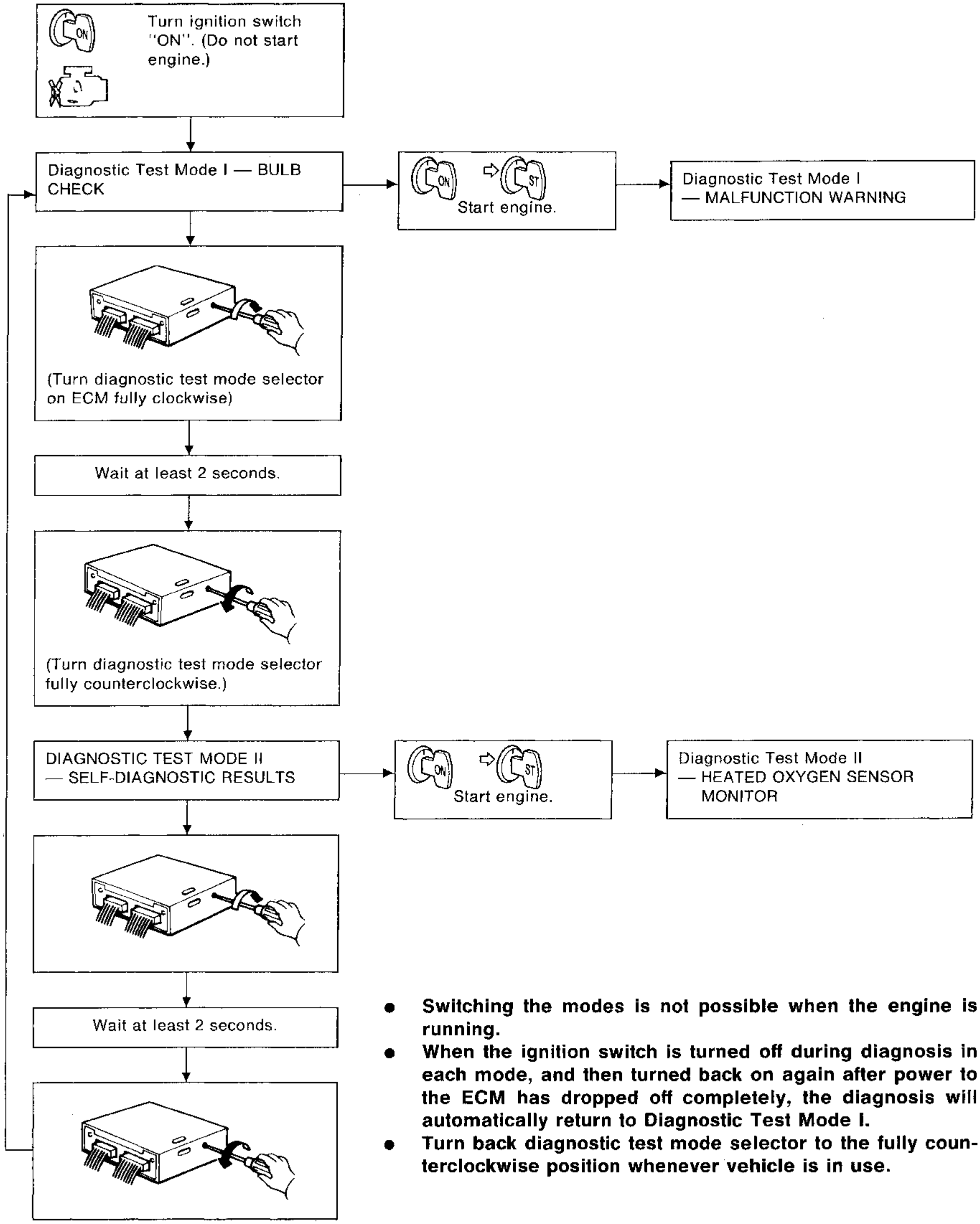
The ECM has only one RED LED.

ON-BOARD DIAGNOSTIC SYSTEM FUNCTION

Condition		Diagnostic Test Mode I	Diagnostic Test Mode II
Ignition switch in "ON" position	Engine stopped	BULB CHECK	SELF-DIAGNOSTIC RESULTS
	Engine running	MALFUNCTION WARNING	HEATED OXYGEN SENSOR MONITOR

On-board Diagnostic System (Cont'd)

HOW TO SWITCH DIAGNOSTIC TEST MODES



- **Switching the modes is not possible when the engine is running.**
- **When the ignition switch is turned off during diagnosis in each mode, and then turned back on again after power to the ECM has dropped off completely, the diagnosis will automatically return to Diagnostic Test Mode I.**
- **Turn back diagnostic test mode selector to the fully counterclockwise position whenever vehicle is in use.**

On-board Diagnostic System — Diagnostic Test Mode I

DIAGNOSTIC TEST MODE I — BULB CHECK

In this mode, the RED LED in the ECM and the MALFUNCTION INDICATOR LAMP in the instrument panel stay "ON".
If either remain "OFF", check the bulb in the MALFUNCTION INDICATOR LAMP or the RED LED.

DIAGNOSTIC TEST MODE I — MALFUNCTION WARNING

MALFUNCTION INDICATOR LAMP and RED LED	Condition
ON	When the following malfunctions (malfunction indicator lamp item) are detected or the ECM's CPU is malfunctioning.
OFF	OK

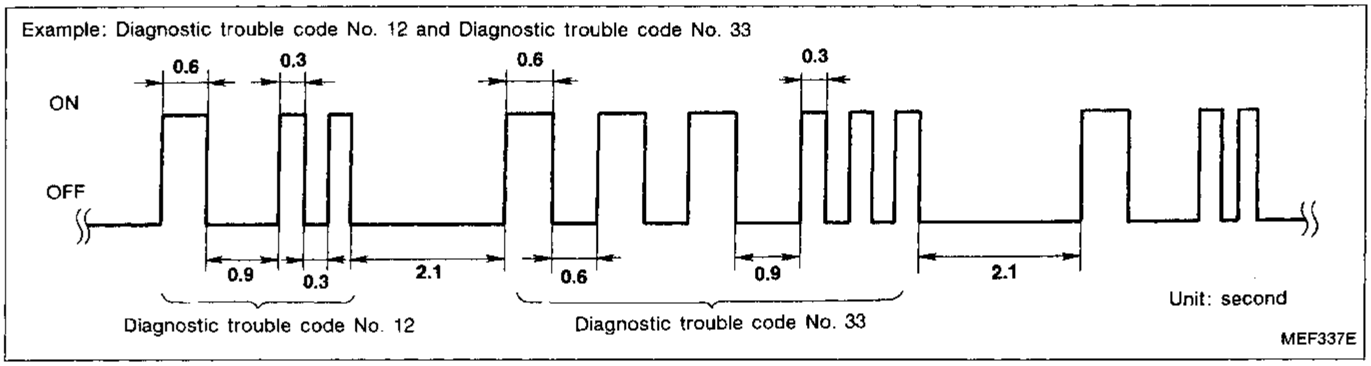
Diagnostic trouble code No.	Malfunction
12	Mass air flow sensor circuit
13	Engine coolant temperature sensor circuit
14	Vehicle speed sensor circuit
31	ECM (ECCS control module)
32	EGR function
33	Heated oxygen sensor circuit
35	EGR temperature sensor circuit
43	Throttle position sensor circuit
45	Injector leak

- **These Diagnostic Trouble Code Numbers are clarified in Diagnostic Test Mode II — SELF-DIAGNOSTIC RESULTS.**
- **The RED LED and the MALFUNCTION INDICATOR LAMP will turn off when normal condition is detected. At this time, the Diagnostic Test Mode II — SELF-DIAGNOSTIC RESULTS memory must be cleared as the contents remain stored.**

On-board Diagnostic System — Diagnostic Test Mode II (Self-diagnostic results)

DESCRIPTION

In this mode, a diagnostic trouble code is indicated by the number of flashes from the RED LED or the MALFUNCTION INDICATOR LAMP as shown below:



Example: Diagnostic trouble code No. 12 and Diagnostic trouble code No. 33

Long (0.6 second) blinking indicates the number of ten digits and short (0.3 second) blinking indicates the number of single digits.

For example, the red LED flashes once for 0.6 seconds and then it flashes twice for 0.3 seconds. This indicates the number "12" and refers to a malfunction in the mass air flow sensor. In this way, all the problems are classified by their diagnostic trouble code numbers.

The diagnostic results will remain in ECM memory.

Display diagnostic trouble code table

Diagnostic trouble code No.	Detected items	Availability
11*	Camshaft position sensor circuit	X
12 CHECK	Mass air flow sensor circuit	X
13 CHECK	Engine coolant temperature sensor circuit	X
14 CHECK	Vehicle speed sensor circuit	X
21*	Ignition signal circuit	X
31 CHECK	ECM	X
32 CHECK	EGR function	X
33 CHECK	Heated oxygen sensor circuit	X
34	Knock sensor circuit	X
35 CHECK	EGR temperature sensor circuit	X
43 CHECK	Throttle position sensor circuit	X
45 CHECK	Injector leak	X
55	No malfunction in the above circuits	X

X: Available

CHECK: Malfunction indicator lamp item

*: Check items causing a malfunction of camshaft position sensor circuit first, if both diagnostic trouble code No. 11 and 21 are displayed at the same time.

GI
MA
EM
LC
EF & EC
FE
CL
MT
AT
FA
RA
BR
ST
BF
HA
EL
IDX

On-board Diagnostic System — Diagnostic Test Mode II (Self-diagnostic results) (Cont'd)

Diagnostic trouble code No.	Detected items	Malfunction is detected when ...	Check item (remedy)
*11	Camshaft position sensor circuit	• Either 1° or 180° signal is not entered for the first few seconds during engine cranking. • Either 1° or 180° signal is not input often enough while the engine speed is higher than the specified rpm.	• Harness and connector (If harness and connector are normal, replace camshaft position sensor.)
12	Mass air flow sensor circuit	• The mass air flow sensor circuit is open or shorted. (An abnormally high or low voltage is entered.)	• Harness and connector (If harness and connector are normal, replace mass air flow sensor.)
13	Engine coolant temperature sensor circuit	• The engine coolant temperature sensor circuit is open or shorted. (An abnormally high or low output voltage is entered.)	• Harness and connector • Engine coolant temperature sensor
14	Vehicle speed sensor circuit	• The vehicle speed sensor circuit is open or shorted.	• Harness and connector • Vehicle speed sensor (reed switch)
*21	Ignition signal circuit	• The ignition signal in the primary circuit is not entered during engine cranking or running.	• Harness and connector • Power transistor unit
31	ECM	• ECM calculation function is malfunctioning.	[Replace ECM (ECCS control module).]
32	EGR function	• EGR valve does not operate. (EGR valve spring does not lift.)	• EGR valve • EGR & canister control solenoid valve
33	Heated oxygen sensor circuit	• The heated oxygen sensor circuit is open or shorted. (An abnormally high or low output voltage is entered.)	• Harness and connector • Heated oxygen sensor • Fuel pressure • Injectors • Intake air leaks
34	Knock sensor circuit	• The knock sensor circuit is open or shorted. (An abnormally high or low voltage is entered.)	• Harness and connector • Knock sensor
35	EGR temperature sensor circuit	• The EGR temperature sensor circuit is open or shorted. (An abnormally high or low voltage is entered.)	• Harness and connector • EGR temperature sensor
43	Throttle position sensor circuit	• The throttle position sensor circuit is open or shorted. (An abnormally high or low voltage is entered.)	• Harness and connector • Throttle position sensor
45	Injector leak	• Fuel leaks from injector.	• Injector

*: Check items causing a malfunction of camshaft position sensor circuit first, if both diagnostic trouble code No. 11 and 21 come out at the same time.

HOW TO ERASE DIAGNOSTIC TEST MODE II (SELF-DIAGNOSTIC RESULTS)

The diagnostic trouble code is erased from the backup memory on the ECM when the diagnostic test mode is changed from Diagnostic Test Mode II to Diagnostic Test Mode I. (Refer to "HOW TO SWITCH DIAGNOSTIC TEST MODES".)

- **When the battery terminal is disconnected, the diagnostic trouble code will be lost from the backup memory within 24 hours.**
- **Before starting on-board diagnostic system, do not erase the stored memory before beginning on-board diagnostic system.**

On-board Diagnostic System — Diagnostic Test Mode II (Heated oxygen sensor monitor)

DESCRIPTION

In this mode, the MALFUNCTION INDICATOR LAMP and RED LED display the condition of the fuel mixture (lean or rich) which is monitored by the heated oxygen sensor.

MALFUNCTION INDICATOR LAMP and RED LED	Fuel mixture condition in the exhaust gas	Air fuel ratio feedback control condition
ON	Lean	Closed loop system
OFF	Rich	
*Remains ON or OFF	Any condition	Open loop system

*: Maintains conditions just before switching to open loop.

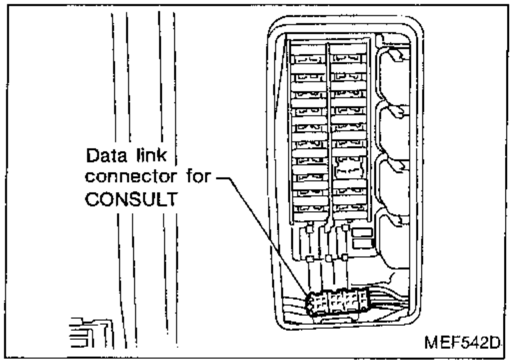
HOW TO CHECK HEATED OXYGEN SENSOR

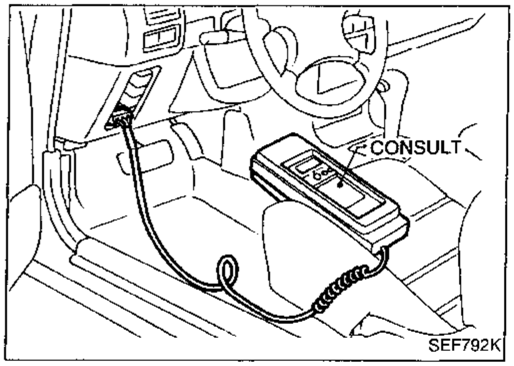
1. Set Diagnostic Test Mode II. (Refer to "HOW TO SWITCH DIAGNOSTIC TEST MODES".)
2. Start engine and warm it up until engine coolant temperature indicator points to the middle of the gauge.
3. Run engine at about 2,000 rpm for about 2 minutes under no-load conditions.
4. Make sure RED LED or MALFUNCTION INDICATOR LAMP goes ON and OFF more than 5 times every 10 seconds; measured at 2,000 rpm under no-load.

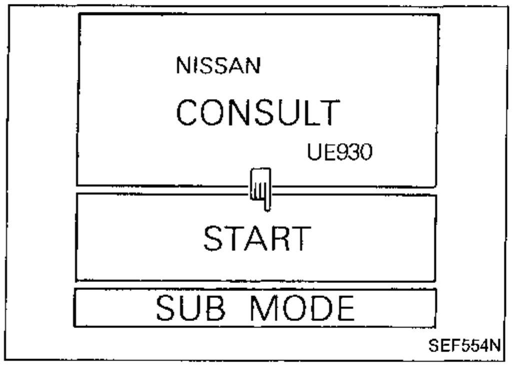
Consult

CONSULT INSPECTION PROCEDURE

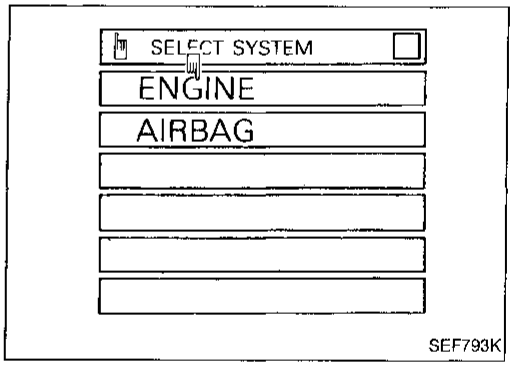
1. Turn off ignition switch.
2. Connect "CONSULT" to data link connector for CONSULT. (Data link connector for CONSULT is located behind the fuse box cover.)



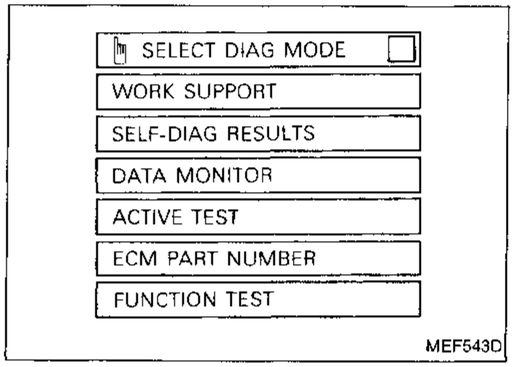




3. Turn on ignition switch.
4. Touch "START".



5. Touch "ENGINE".



6. Perform each diagnostic test mode according to the inspection sheet as follows:

For further information, see the CONSULT Operation Manual.

Consult (Cont'd)

ECCS COMPONENT PARTS APPLICATION

ECCS COMPONENT PARTS		DIAGNOSTIC TEST MODE				
		WORK SUPPORT	SELF-DIAGNOSTIC RESULTS	DATA MONITOR	ACTIVE TEST	FUNCTION TEST
INPUT	Camshaft position sensor		X	X		
	Mass air flow sensor		X	X		
	Engine coolant temperature sensor		X	X	X	
	Heated oxygen sensor		X	X		X
	Vehicle speed sensor		X	X		X
	Throttle position sensor	X	X	X		X
	EGR temperature sensor		X	X		
	Knock sensor		X			
	Ignition switch (start signal)			X		X
	Air conditioner switch			X		
	Neutral position switch			X		X
	Power steering oil pressure switch			X		X
	Battery			X		
OUTPUT	Injectors		X	X	X	X
	Power transistor (ignition timing)	X	X (Ignition signal)	X	X	X
	IACV-AAC valve	X		X	X	X
	EGR & canister control solenoid valve			X	X	X
	Air conditioner relay			X		
	Fuel pump relay	X		X	X	X
	Cooling fan			X	X	X

X: Applicable

Consult (Cont'd)

FUNCTION

Diagnostic test mode	Function
Work support	This mode enables a technician to adjust some devices faster and more accurately by following the indications on the CONSULT unit.
Self-diagnostic results	Self-diagnostic results can be read and erased quickly.
Data monitor	Input/Output data in the ECM can be read.
Active test	Diagnostic Test Mode in which CONSULT drives some actuators apart from the ECMs and also shifts some parameters in a specified range.
ECM part numbers	ECM part numbers can be read.
Function test	Conducted by CONSULT instead of a technician to determine whether each system is "OK" or "NG".

WORK SUPPORT MODE

WORK ITEM	CONDITION	USAGE
THRL POS SEN ADJ	CHECK THE THROTTLE POSITION SENSOR SIGNAL. ADJUST IT TO THE SPECIFIED VALUE BY ROTATING THE SENSOR BODY UNDER THE FOLLOWING CONDITIONS. ● IGN SW "ON" ● ENG NOT RUNNING ● ACC PEDAL NOT PRESSED	When adjusting throttle position sensor initial position.
IGNITION TIMING ADJ	● IGNITION TIMING FEEDBACK CONTROL WILL BE HELD BY TOUCHING "START". AFTER DOING SO, ADJUST IGNITION TIMING WITH A TIMING LIGHT BY TURNING THE CAMSHAFT POSITION SENSOR.	When adjusting initial ignition timing.
IACV-AAC/V ADJ	SET ENGINE SPEED AT THE SPECIFIED VALUE UNDER THE FOLLOWING CONDITIONS. ● ENGINE WARMED UP ● NO-LOAD	When adjusting idle speed.
FUEL PRESSURE RELEASE	● FUEL PUMP WILL STOP BY TOUCHING "START" DURING IDLING. CRANK A FEW TIMES AFTER ENGINE STALLS.	When releasing fuel pressure from fuel line.

Consult (Cont'd)

SELF-DIAGNOSTIC RESULTS MODE

DIAGNOSTIC ITEM	DIAGNOSTIC ITEM IS DETECTED WHEN ...	CHECK ITEM (REMEDY)
CAMSHAFT POSI SEN*	● Either 1° or 180° signal is not entered for the first few seconds during engine cranking. ● Either 1° or 180° signal is not input often enough while the engine speed is higher than the specified rpm.	● Harness and connector (If harness and connector are normal, replace camshaft position sensor.)
MASS AIR FLOW SEN	● The mass air flow sensor circuit is open or shorted. (An abnormally high or low voltage is entered.)	● Harness and connector (If harness and connector are normal, replace mass air flow sensor.)
COOLANT TEMP SEN	● The engine coolant temperature sensor circuit is open or shorted. (An abnormally high or low output voltage is entered.)	● Harness and connector ● Engine coolant temperature sensor
VEHICLE SPEED SEN	● The vehicle speed sensor circuit is open or shorted.	● Harness and connector ● Vehicle speed sensor (reed switch)
IGN SIGNAL-PRIMARY*	● The ignition signal in primary circuit is not entered during engine cranking or running.	● Harness and connector ● Power transistor unit
ECM	● ECM calculation function is malfunctioning.	[Replace ECM (ECCS control module).]
EGR SYSTEM EGRC SOLENOID/V	● EGR valve does not operate. (EGR valve spring does not lift.)	● EGR valve ● EGR & canister control solenoid valve
OXYGEN SEN	● The heated oxygen sensor circuit is open or shorted. (An abnormally high or low output voltage is entered.)	● Harness and connector ● Heated oxygen sensor ● Fuel pressure ● Injectors ● Intake air leaks
KNOCK SENSOR	● The knock sensor circuit is open or shorted. (An abnormally high or low voltage is entered.)	● Harness and connector ● Knock sensor
EGR TEMP SENSOR	● The EGR temperature sensor circuit is open or shorted. (An abnormally high or low voltage is entered.)	● Harness and connector ● EGR temperature sensor
THROTTLE POSI SEN	● The throttle position sensor circuit is open or shorted. (An abnormally high or low voltage is entered.)	● Harness and connector ● Throttle position sensor
INJECTOR-LEAK	● Fuel leaks from injector.	● Injector

*: Check items causing a malfunction of camshaft position sensor circuit first, if both "CAMSHAFT POSI SEN" and "IGN SIGNAL-PRIMARY" come out at the same time.

Consult (Cont'd)

DATA MONITOR MODE

Remarks:

- Specification data are reference values.
- Specification data are output/input values which are detected or supplied by the ECM at the connector.

* Specification data may not be directly related to their components signals/values/operations.

i.e. Adjust ignition timing with a timing light before monitoring IGN TIMING, because the monitor may show the specification data in spite of the ignition timing not being adjusted to the specification data. This IGN TIMING monitors the data calculated by the ECM according to the signals input from the camshaft position sensor and other ignition timing related sensors.

MONITOR ITEM	CONDITION		SPECIFICATION	CHECK ITEM WHEN OUTSIDE SPEC.
CMPS·RPM (REF)	• Tachometer: Connect • Run engine and compare tachometer indication with the CONSULT value.		Almost the same speed as the CONSULT value.	• Harness and connector • Camshaft position sensor
MAS AIR/FL SE	• Engine: After warming up, idle the engine • A/C switch "OFF" • Shift lever "N"	Idle	1.3 - 1.7V	• Harness and connector • Mass air flow sensor
		2,000 rpm	1.7 - 2.1V	
COOLAN TEMP/S	• Engine: After warming up		More than 70°C (158°F)	• Harness and connector • Engine coolant temperature sensor
O2 SEN	• Engine: After warming up	Maintaining engine speed at 2,000 rpm	0 - 0.3V ↔ Approx. 0.6 - 1.0V	• Harness and connector • Heated oxygen sensor • Intake air leaks • Injectors
M/R F/C MNT			LEAN ↔ RICH Changes more than 5 times during 10 seconds.	
VHCL SPEED SE	• Turn drive wheels and compare speedometer indication with the CONSULT value		Almost the same speed as the CONSULT value	• Harness and connector • Vehicle speed sensor
BATTERY VOLT	• Ignition switch: ON (Engine stopped)		11 - 14V	• Battery • ECM power supply circuit
THRTL POS SEN	• Ignition switch: ON (Engine stopped)	Throttle valve fully closed	0.45 - 0.55V	• Harness and connector • Throttle position sensor • Throttle position sensor adjustment
		Throttle valve fully opened	Approx. 4.0V	
EGR TEMP SEN	• Engine: After warming up		Less than 4.5V	• Harness and connector • EGR temperature sensor
START SIGNAL	• Ignition switch: ON → START		OFF → ON	• Harness and connector • Starter switch
CLOSED TH/POS	• Ignition switch: ON (Engine stopped)	Throttle valve: Idle position	ON	• Harness and connector • Throttle position sensor • Throttle position sensor adjustment
		Throttle valve: Slightly open	OFF	
AIR COND SIG	• Engine: After warming up, idle the engine	A/C switch "OFF"	OFF	• Harness and connector • Air conditioner switch
		A/C switch "ON"	ON	
NEUT POSI SW	• Ignition switch: ON	Shift lever "P" or "N"	ON	• Harness and connector • Neutral position switch
		Except above	OFF	
PW/ST SIGNAL	• Engine: After warming up, idle the engine	Steering wheel in neutral position (forward direction)	OFF	• Harness and connector • Power steering oil pressure switch
		The steering wheel is turned	ON	

Consult (Cont'd)

MONITOR ITEM	CONDITION			SPECIFICATION	CHECK ITEM WHEN OUTSIDE SPEC.
FUEL PUMP RLY	• Ignition switch is turned to ON (Operates for 5 seconds) • Engine running and cranking • When engine is stopped (stops in 1.0 seconds)			ON	• Harness and connector • Fuel pump relay
	Except as shown above			OFF	
COOLING FAN	• After warming up engine, idle the engine. • A/C switch "OFF"	M/T	Engine coolant temperature is 99°C (210°F) or less	OFF	• Harness and connector • Cooling fan relay • Cooling fan
			Engine coolant temperature is 100°C (212°F) or more	ON	
		A/T	Engine coolant temperature is 94°C (201°F) or less	OFF	
			Engine coolant temperature is between 95°C (203°F) and 104°C (219°F)	LOW	
			Engine coolant temperature is 105°C (221°F) or more	HIGH	
INJ PULSE	• Engine: After warming up • A/C switch "OFF" • Shift lever "N" • No-load		Idle	2.4 - 3.2 msec.	• Harness and connector • Injector • Mass air flow sensor • Intake air system
			2,000 rpm	1.9 - 2.8 msec.	
IGN TIMING	ditto		Idle	15° BTDC	• Harness and connector • Camshaft position sensor
			2,000 rpm	More than 25° BTDC	
IACV-AAC/V	ditto		Idle	20 - 40%	• Harness and connector • IACV-AAC valve
			2,000 rpm	—	
A/F ALPHA	• Engine: After warming up		Maintaining engine speed at 2,000 rpm	75 - 125%	• Harness and connector • Injectors • Mass air flow sensor • Heated oxygen sensor • Canister purge line • Intake air system
AIR COND RLY	• Air conditioner switch OFF → ON			OFF → ON	• Harness and connector • Air conditioner switch • Air conditioner relay
EGRC SOL/V	• Engine: After warming up • A/C switch "OFF" • Shift lever "N" • No-load		2,000 rpm	OFF	• Harness and connector • EGR & canister control solenoid valve
			4,000 rpm	ON	

Consult (Cont'd)

ACTIVE TEST MODE

TEST ITEM	CONDITION	JUDGMENT	CHECK ITEM (REMEDY)
FUEL INJECTION	• Engine: Return to the original trouble condition • Change the amount of fuel injection using CONSULT.	If trouble symptom disappears, see CHECK ITEM.	• Harness and connector • Fuel injectors • Heated oxygen sensor
IACV-AAC/V OPENING	• Engine: After warming up, idle the engine. • Change the IACV-AAC valve opening percent using CONSULT.	Engine speed changes according to the opening percent.	• Harness and connector • IACV-AAC valve
ENG COOLANT TEMP	• Engine: Return to the original trouble condition • Change the engine coolant temperature using CONSULT.	If trouble symptom disappears, see CHECK ITEM.	• Harness and connector • Engine coolant temperature sensor • Fuel injectors
IGNITION TIMING	• Engine: Return to the original trouble condition • Timing light: Set • Retard the ignition timing using CONSULT.	If trouble symptom disappears, see CHECK ITEM.	• Adjust initial ignition timing
POWER BALANCE	• Engine: After warming up, idle the engine. • A/C switch "OFF" • Shift lever "N" • Cut off each injector signal one at a time using CONSULT.	Engine runs rough or dies.	• Harness and connector • Compression • Injectors • Power transistor • Spark plugs • Ignition coils
COOLING FAN	• Ignition switch: ON • Turn the cooling fan "ON" and "OFF" using CONSULT.	Cooling fan moves and stops.	• Harness and connector • Cooling fan motor
FUEL PUMP RLY	• Ignition switch: ON (Engine stopped) • Turn the fuel pump relay "ON" and "OFF" using CONSULT and listen to operating sound.	Fuel pump relay makes the operating sound.	• Harness and connector • Fuel pump relay
EGRC SOLENOID VALVE	• Ignition switch: ON • Turn solenoid valve "ON" and "OFF" with the CONSULT and listen to operating sound.	Solenoid valve makes an operating sound.	• Harness and connector • Solenoid valve
SELF-LEARNING CONT	• In this test, the coefficient of self-learning control mixture ratio returns to the original coefficient by touching "CLEAR" on the screen.		

Consult (Cont'd)

FUNCTION TEST MODE

FUNCTION TEST ITEM	CONDITION	JUDGEMENT		CHECK ITEM (REMEDY)
SELF-DIAG RESULTS	• Ignition switch: ON (Engine stopped) • Displays the results of on-board diagnostic system.	—		Objective system
CLOSED THROTTLE POSI (CLOSED THROTTLE POSITION SWITCH CIRCUIT)	• Ignition switch: ON (Engine stopped) • Closed throttle position switch circuit is tested when throttle is opened and closed fully. ("IDLE POSITION" is the test item name for the vehicles in which idle is selected by throttle position sensor.)	Throttle valve: opened	OFF	• Harness and connector • Throttle position sensor (Closed throttle position switch) • Throttle position sensor (Closed throttle position switch) adjustment • Throttle linkage • Verify operation in DATA MONITOR mode.
		Throttle valve: closed	ON	
THROTTLE POSI SEN CKT	• Ignition switch: ON (Engine stopped) • Throttle position sensor circuit is tested when throttle is opened and closed fully.	Range (Throttle valve fully opened — Throttle valve fully closed)	More than 3.0V	• Harness and connector • Throttle position sensor • Throttle position sensor adjustment • Throttle linkage • Verify operation in DATA MONITOR mode.
NEUTRAL POSI SW CKT	• Ignition switch: ON (Engine stopped) • Neutral position switch circuit is tested when shift lever is manipulated.	OUT OF N/P-RANGE	OFF	• Harness and connector • Neutral position switch/ Inhibitor switch • Linkage + Inhibitor switch adjustment
		IN N-RANGE	ON	
FUEL PUMP CIRCUIT	• Ignition switch: ON (Engine stopped) • Fuel pump circuit is tested by checking the pulsation in fuel pressure when fuel tube is pinched.	There is pressure pulsation on the fuel feed hose.		• Harness and connector • Fuel pump • Fuel pump relay • Fuel filter clogging • Fuel level
EGRC SOL/V CIRCUIT	• Ignition switch: ON (Engine stopped) • EGR & canister control S/V circuit is tested by checking solenoid valve operating noise.	The solenoid valve makes an operating sound every 3 seconds.		• Harness and connector • EGR & canister control solenoid valve
COOLING FAN CIRCUIT	• Ignition switch: ON (Engine stopped) • Cooling fan circuit is tested when cooling fan is rotated.	• The cooling fan rotates and stops every 3 seconds.		• Harness and connector • Cooling fan motor • Cooling fan relay

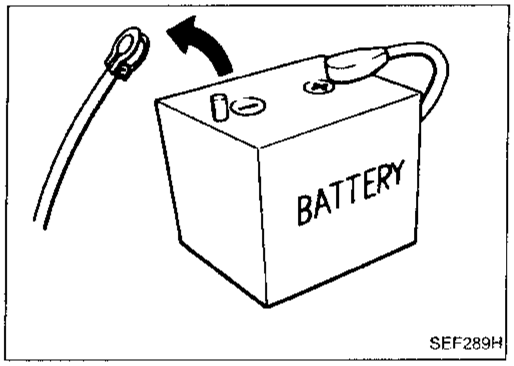
Consult (Cont'd)

FUNCTION TEST ITEM	CONDITION	JUDGEMENT		CHECK ITEM (REMEDY)
START SIGNAL CIRCUIT	● Ignition switch: ON → START ● Start signal circuit is tested when engine is started by operating the starter. Battery voltage and water temperature before cranking, and average battery voltage, mass air flow sensor output voltage and cranking speed during cranking are displayed.	Start signal: OFF → ON		● Harness and connector ● Ignition switch
PW/ST SIGNAL CIRCUIT	● Ignition switch: ON (Engine running) ● Power steering circuit is tested when steering wheel is rotated fully and then set to a straight line running position.	Locked position	ON	● Harness and connector ● Power steering oil pressure switch ● Power steering oil pump
		Neutral position	OFF	
VEHICLE SPEED SEN CKT	●Vehicle speed sensor circuit is tested when vehicle is running at a speed of 10 km/h (6 MPH) or higher.	Vehicle speed sensor input signal is greater than 4 km/h (2 MPH)		● Harness and connector ● Vehicle speed sensor ● Electric speedometer
IGN TIMING ADJ	● After warming up, idle the engine. ● Ignition timing adjustment is checked by reading ignition timing with a timing light and checking whether it agrees with specifications.	The timing light indicates the same value on the screen.		● Adjust ignition timing (by moving camshaft position sensor or distributor) ● Camshaft position sensor drive mechanism
MIXTURE RATIO TEST	● Air-fuel ratio feedback circuit (injection system, ignition system, vacuum system, etc.) is tested by examining the O_2 sensor output at 2,000 rpm under non-loaded state.	● O_2 SEN COUNT: More than 5 times during 10 seconds		● INJECTION SYS (Injector, fuel pressure regulator, harness or connector) ● IGNITION SYS (Spark plug, power transistor, ignition coil, harness or connector) ● VACUUM SYS (Intake air leaks) ● O_2 sensor circuit ● O_2 sensor operation ● Fuel pressure high or low ● Mass air flow sensor

Consult (Cont'd)

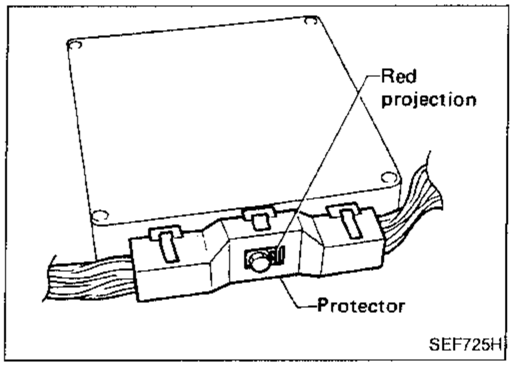
FUNCTION TEST ITEM	CONDITION	JUDGEMENT	CHECK ITEM (REMEDY)
POWER BALANCE	● After warming up, idle the engine. ● Injector operation of each cylinder is stopped one after another, and resultant change in engine rotation is examined to evaluate combustion of each cylinder. (This is only displayed for models where a sequential multiport fuel injection system system is used.)	Difference in engine speed is greater than 25 rpm before and after cutting off the injector of each cylinder.	● Injector circuit (Injector, harness or connector) ● Ignition circuit (Spark plug, power transistor, ignition coil, harness or connector) ● Compression ● Valve timing
IACV-AAC/V SYSTEM	● After warming up, idle the engine. ● IACV-AAC valve system is tested by detecting change in engine speed when IACV-AAC valve opening is changed to 0%, 20% and 80%.	Difference in engine speed is greater than 150 rpm between when valve opening is at 80% (102 steps) and at 20% (25 steps).	● Harness and connector ● IACV-AAC valve ● Air passage restriction between air inlet and IACV-AAC valve ● IAS (Idle adjusting screw) adjustment

Diagnostic Procedure

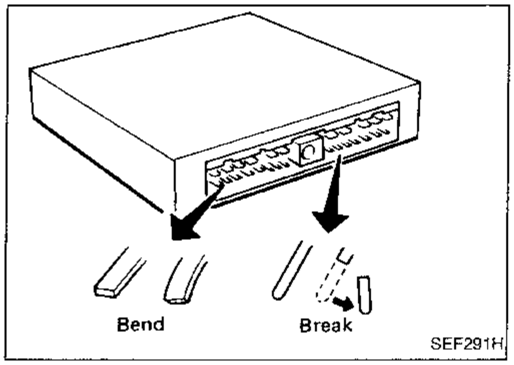


CAUTION:

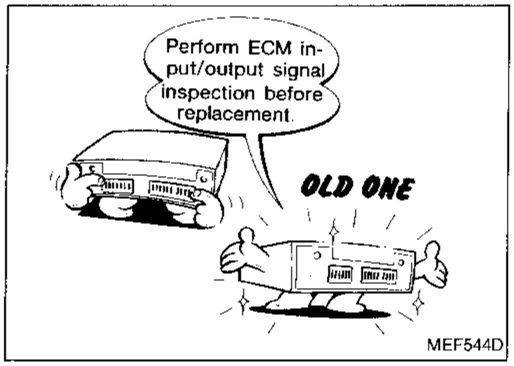
1. **Before connecting or disconnecting the ECM harness connector to or from any ECM, be sure to turn the ignition switch to the "OFF" position and disconnect the negative battery terminal in order not to damage ECM as battery voltage is applied to ECM even if ignition switch is turned off. Failure to do so may damage the ECM.**



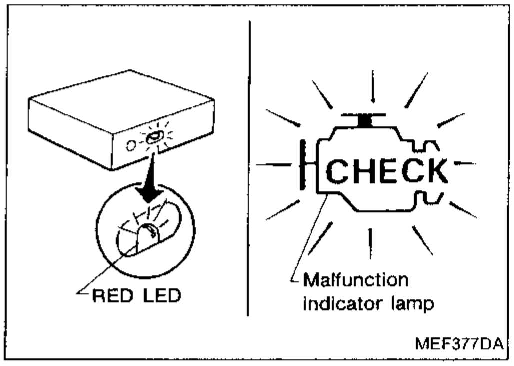
2. **When connecting ECM harness connector, tighten securing bolt until red projection is in line with connector face.**



3. **When connecting or disconnecting pin connectors into or from ECM, take care not to damage pin terminals (bend or break).**
4. **Make sure that there are not any bends or breaks on ECM pin terminal, when connecting pin connectors.**

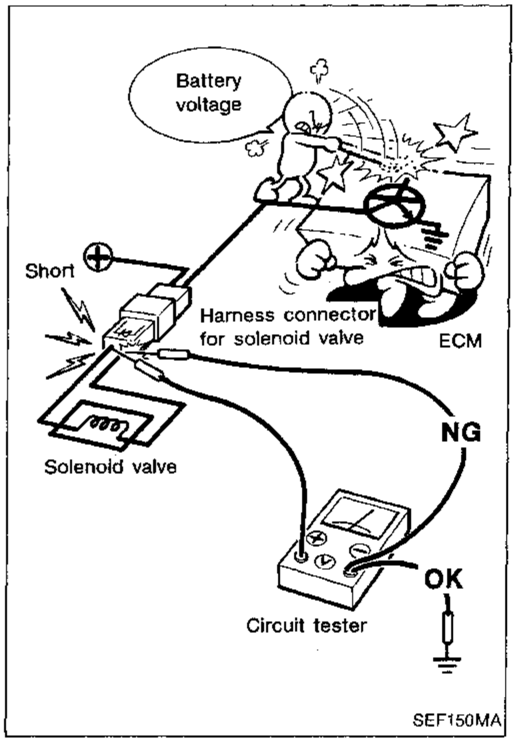


5. **Before replacing ECM, perform ECM input/output signal inspection and make sure whether ECM functions properly or not. (See page EF & EC-177.)**



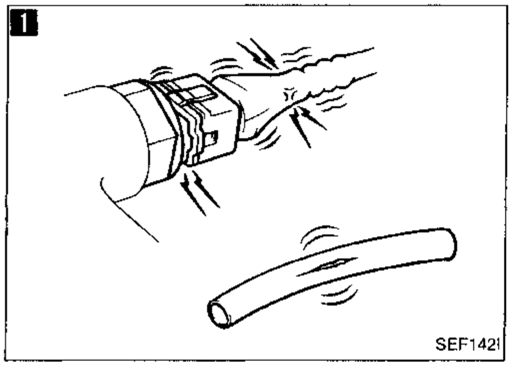
6. **After performing this "Diagnostic Procedure", perform diagnostic test mode II (Self-diagnostic results) and driving test.**

Diagnostic Procedure (Cont'd)



7. **When measuring ECM controlled components supply voltage with a circuit tester, separate one tester probe from the other.**
   If the two tester probes accidentally make contact with each other during measurement, the circuit will be shorted, resulting in damage to the ECM power transistor.

Basic Inspection

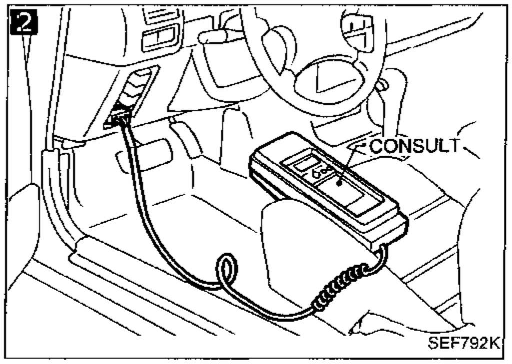


1

BEFORE STARTING

1. Check service records for any recent repairs that may indicate a related problem, or the current need for scheduled maintenance.
2. Open engine hood and check the following:

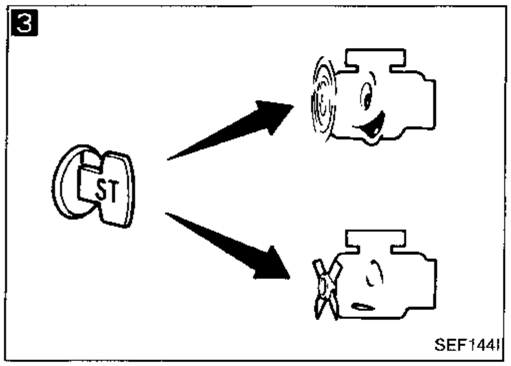
- Harness connectors for proper connections
- Vacuum hoses for splits, kinks, and proper connections
- Wiring for proper connections, pinches, and cuts



2

CONNECT CONSULT TO THE VEHICLE

Connect "CONSULT" to the data link connector for CONSULT and select "ENGINE" from the menu. (Refer to page EF & EC-50.)

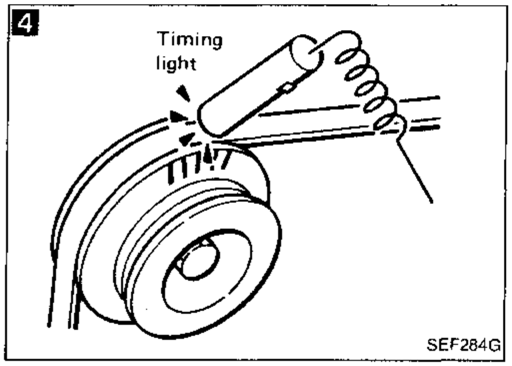


3

DOES ENGINE START?

No → Go to **6**.

Yes ↓



4

CHECK IGNITION TIMING.

Warm up engine sufficiently and check ignition timing at idle using timing light. (Refer to page EF & EC-30.)

Ignition timing:
15° ± 2° BTDC

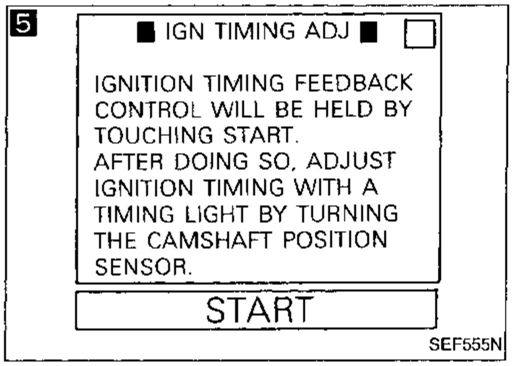
NG → Adjust ignition timing by turning camshaft position sensor.

OK ↓

(Go to Ⓐ on next page.)

Basic Inspection (Cont'd)

5



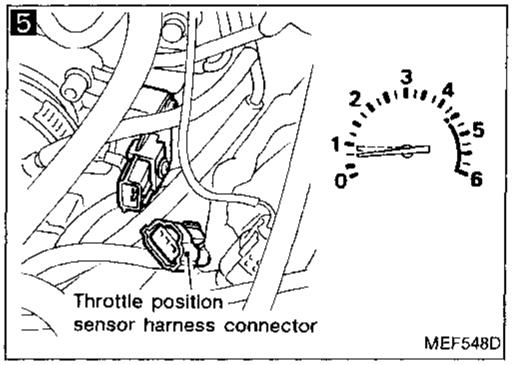
■ IGN TIMING ADJ ■ ☐

IGNITION TIMING FEEDBACK CONTROL WILL BE HELD BY TOUCHING START.
AFTER DOING SO, ADJUST IGNITION TIMING WITH A TIMING LIGHT BY TURNING THE CAMSHAFT POSITION SENSOR.

START

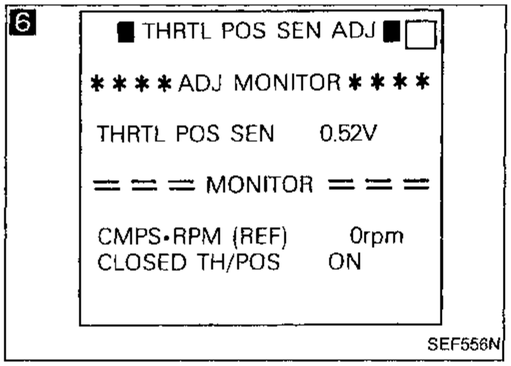
SEF555N

5



MEF548D

6



■ THRTL POS SEN ADJ ■ ☐

**** ADJ MONITOR ****

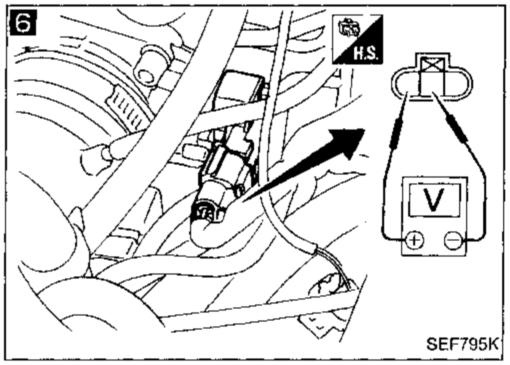
THRTL POS SEN 0.52V

=== MONITOR ===

CMPS•RPM (REF) 0rpm
CLOSED TH/POS ON

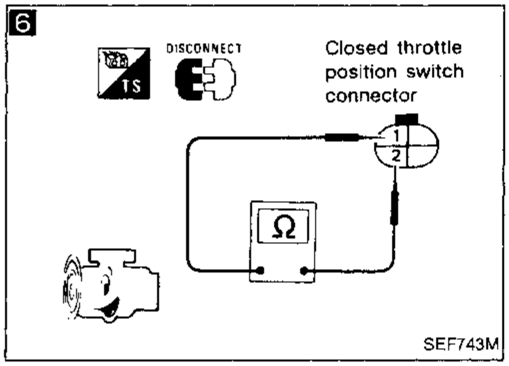
SEF556N

6



SEF795K

6



SEF743M

Ⓐ

5

CHECK IDLE ADJ. SCREW INITIAL SET RPM.

1. Select "IGN TIMING ADJ" in "WORK SUPPORT" mode.
2. When touching "START", does engine speed fall to 750 ± 50 rpm (in "N" position)?

OR

When disconnecting throttle position sensor harness connector, does engine speed fall to 750 ± 50 rpm (in "N" position)?

No → Adjust engine speed by turning idle adjusting screw.

Yes ↓

6

CHECK THROTTLE POSITION SENSOR IDLE POSITION (M/T model only).

1. Perform "THRTL POS SEN ADJ" in "WORK SUPPORT" mode.
2. Check that output voltage of throttle position sensor is 0.45 to 0.55V. (Throttle valve fully closes.) and "IDLE POSITION" stays "ON".

OR

Measure output voltage of throttle position sensor using voltmeter, and check that it is 0.45 to 0.55V. (Throttle valve fully closed.)

NG →

1. Adjust output voltage by rotating throttle position sensor body.
2. Disconnect throttle position sensor harness connector for a few seconds and then reconnect it.
3. Confirm that "IDLE POSITION" stays "ON".

OK ↓

6

CHECK CLOSED THROTTLE POSITION SWITCH IDLE POSITION (AT model only).

Check closed throttle position switch OFF → ON engine speed with circuit tester, closing throttle valve manually.

Closed throttle position switch OFF → ON engine speed
1,050 ± 150 rpm ("N" position)

NG →

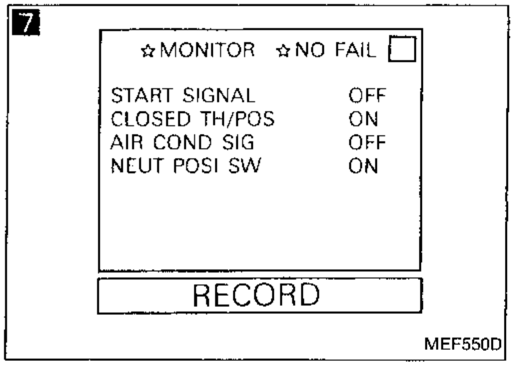
1. Adjust continuity signal by rotating throttle position sensor body.
2. Disconnect throttle position sensor harness connector for a few seconds and then reconnect it.
3. Confirm that "IDLE POSITION" stays "ON" using CONSULT.

OK ↓

(Go to Ⓑ on next page.)

Basic Inspection (Cont'd)

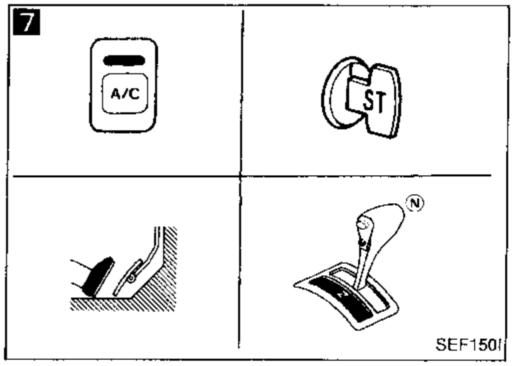
Ⓑ



☆MONITOR ☆NO FAIL ☐

START SIGNAL OFF
CLOSED TH/POS ON
AIR COND SIG OFF
NEUT POSI SW ON

MEF550D



SEF150I

7

CHECK SWITCH INPUT SIGNAL.

Select the following switches in "DATA MONITOR" mode,

a) Start signal,
b) Idle position,
c) Air conditioner signal,
d) Neutral position (Parking) switch, and check the switches' ON-OFF operation.

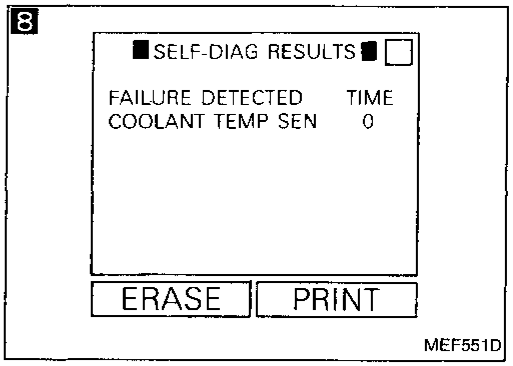
OR

Remove ECM from behind audio system panel and check the above switches' ON-OFF operation using voltmeter at each ECM terminal.

Switch	Condition	Voltage (V)
Start signal	IGN ON → IGN START	0 → Battery voltage
Idle position	Accelerator pedal released → Accelerator pedal fully depressed	0.45 - 0.55 → Approx. 4.0
A/C signal	A/C OFF → A/C ON (Engine running)	Battery voltage → 0
Neutral position (Parking) switch	Shift lever is Neutral position → Except Neutral position	0 → Battery voltage

NG → Repair or replace the malfunctioning switch or its circuit.

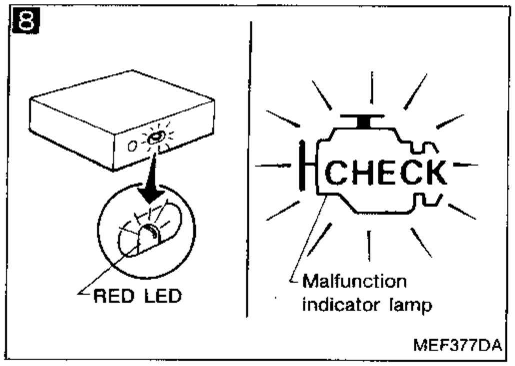
OK



■SELF-DIAG RESULTS■ ☐

FAILURE DETECTED TIME
COOLANT TEMP SEN 0

MEF551D



MEF377DA

8

READ SELF-DIAGNOSTIC RESULTS.

1. Perform "SELF-DIAG RESULTS" mode.
2. Read out self-diagnostic results.
3. Is a failure detected?

OR

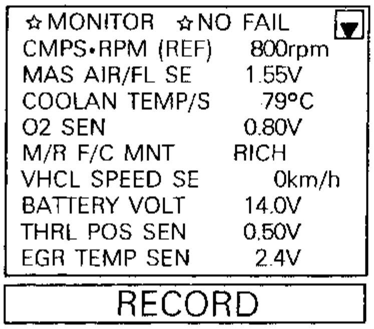
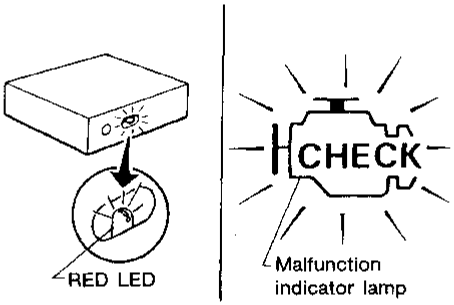
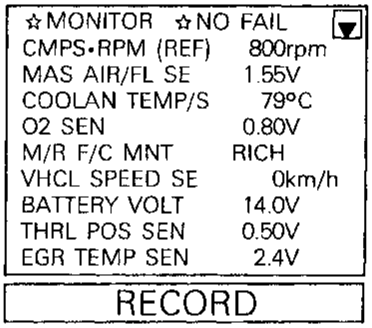
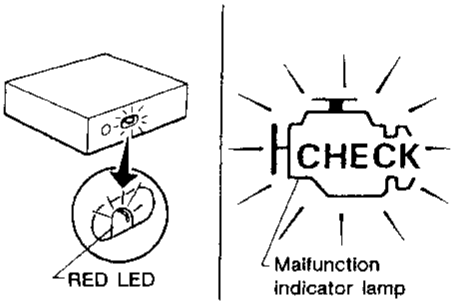
1. Set "Self-diagnostic results mode" in Diagnostic Test Mode II. (Refer to page EF & EC-47.)
2. Count the number of RED LED or malfunction indicator lamp flashes and read out the diagnostic trouble codes.
3. Are the diagnostic trouble codes shown?

Yes → Go to the relevant inspection procedure.

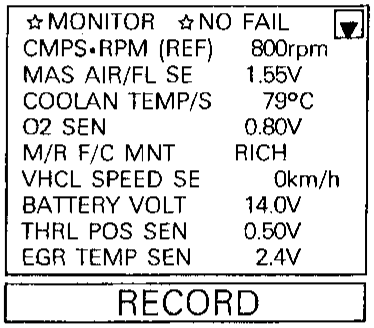
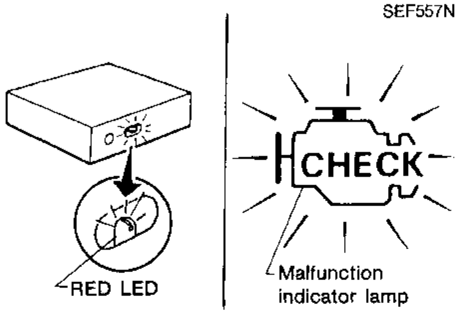
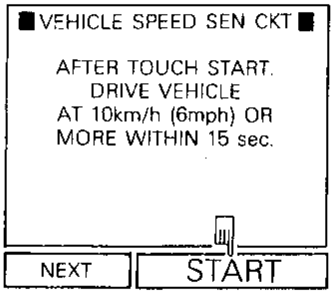
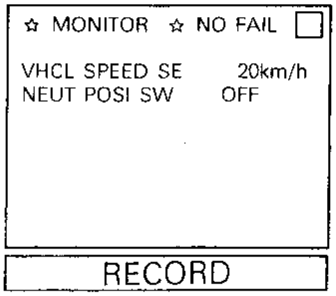
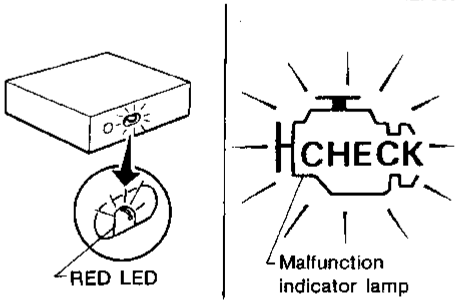
No

INSPECTION END

How to Execute On-board Diagnostic System in Diagnostic Test Mode II

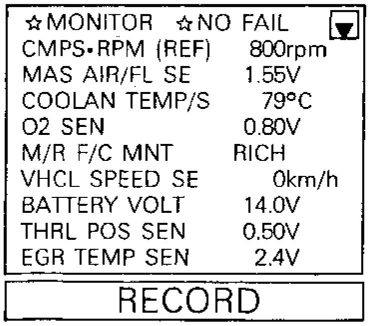
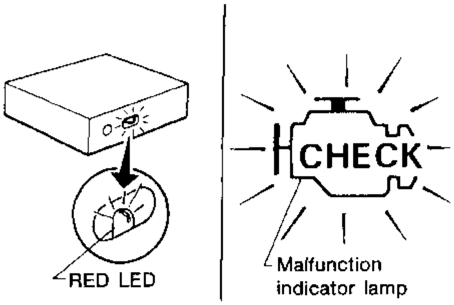
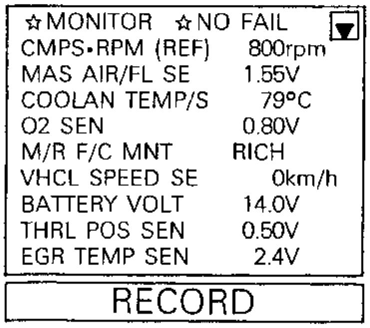
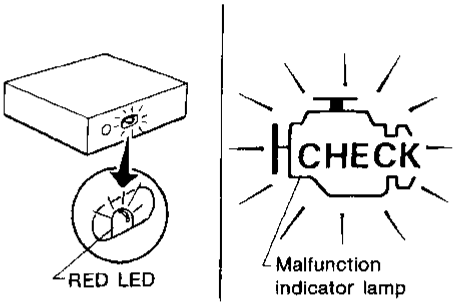
Detected items	Display Diagnostic trouble code No.	How to perform diagnostic test mode II (Self-diagnostic results) judgement	
		Illustration	Method
Camshaft position sensor circuit	11	 ☆MONITOR ☆NO FAIL CMPS•RPM (REF) 800rpm MAS AIR/FL SE 1.55V COOLAN TEMP/S 79°C O2 SEN 0.80V M/R F/C MNT RICH VHCL SPEED SE 0km/h BATTERY VOLT 14.0V THRL POS SEN 0.50V EGR TEMP SEN 2.4V RECORD SEF557N  MEF377DA	**PERFORM DIAGNOSTIC TEST MODE II (SELF-DIAGNOSTIC RESULTS).** 1) Start engine. 2) Select "DATA MONITOR" mode with CONSULT. ☆ **NO FAIL** OR 2) Turn ignition switch "OFF" and then "ON". 3) Perform diagnostic test mode II (Self-diagnostic results) with ECM. **Malfunction indicator lamp and red LED display diagnostic trouble code No. 55.**
Mass air flow sensor circuit	12	 ☆MONITOR ☆NO FAIL CMPS•RPM (REF) 800rpm MAS AIR/FL SE 1.55V COOLAN TEMP/S 79°C O2 SEN 0.80V M/R F/C MNT RICH VHCL SPEED SE 0km/h BATTERY VOLT 14.0V THRL POS SEN 0.50V EGR TEMP SEN 2.4V RECORD SEF557N  MEF377DA	**PERFORM DIAGNOSTIC TEST MODE II (SELF-DIAGNOSTIC RESULTS).** 1) Turn ignition switch "ON" wait for at least 5 seconds and then start engine. 2) Select "DATA MONITOR" mode with CONSULT. ☆ **NO FAIL** OR 2) Perform diagnostic test mode II (Self-diagnostic results) with ECM. **Malfunction indicator lamp and red LED display diagnostic trouble code No. 55.**

How to Execute On-board Diagnostic System in Diagnostic Test Mode II (Cont'd)

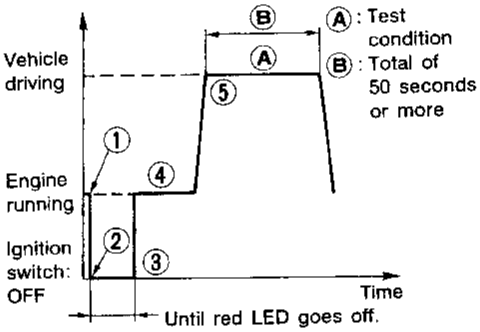
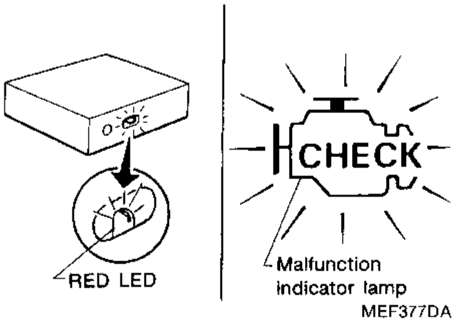
Detected items	Display Diagnostic trouble code No.	How to perform diagnostic test mode II (Self-diagnostic results) judgement	
		Illustration	Method
Engine coolant temperature sensor circuit	13	 ☆MONITOR ☆NO FAIL CMPS•RPM (REF) 800rpm MAS AIR/FL SE 1.55V COOLAN TEMP/S 79°C O2 SEN 0.80V M/R F/C MNT RICH VHCL SPEED SE 0km/h BATTERY VOLT 14.0V THRL POS SEN 0.50V EGR TEMP SEN 2.4V RECORD SEF557N  MEF377DA	**PERFORM DIAGNOSTIC TEST MODE II (SELF-DIAGNOSTIC RESULTS).** 1) Turn ignition switch "ON" or start engine. 2) Select "DATA MONITOR" mode with CONSULT. ☆ **NO FAIL** OR 2) Perform diagnostic test mode II (Self-diagnostic results) with ECM. **Malfunction indicator lamp and red LED display diagnostic trouble code No. 55.**
Vehicle speed sensor circuit*	14	 ■VEHICLE SPEED SEN CKT■ AFTER TOUCH START. DRIVE VEHICLE AT 10km/h (6mph) OR MORE WITHIN 15 sec. NEXT START MEF559D  ☆ MONITOR ☆ NO FAIL ☐ VHCL SPEED SE 20km/h NEUT POSI SW OFF RECORD MEF560D  MEF377DA	**CHECK OVERALL FUNCTION.** 1) Jack up drive wheels. 2) Start engine. 3) Perform "VEHICLE SPEED SEN CKT" in "FUNCTION TEST" mode with CONSULT. OR 2) Start engine. 3) Read vehicle speed sensor signal in "DATA MONITOR" mode with CONSULT. **CONSULT value should be the same as the speedometer indication.** OR 1) Start engine and warm it up sufficiently. 2) Shift to a suitable gear position and maintain the following test drive conditions for at least 5 seconds. Driving conditions (1) Engine speed: 2,600±400 rpm (2) Intake manifold vacuum: −28.0±14.7 kPa (−210±110 mmHg, −8.27±4.33 inHg) (3) Vehicle speed 5 km/h (3MPH) or more 3) If malfunction indicator lamp comes on during test drive, perform diagnostic test mode II (Self-diagnostic results) with ECM. **Malfunction indicator lamp and red LED display diagnostic trouble code No. 55.**

*: Diagnostic test mode II (Self-diagnostic results) is not performed but this method provides results which are equal to the self-diagnostic results.

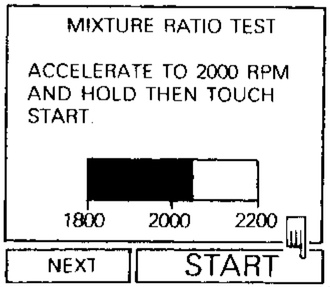
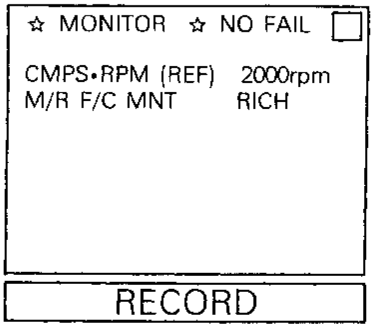
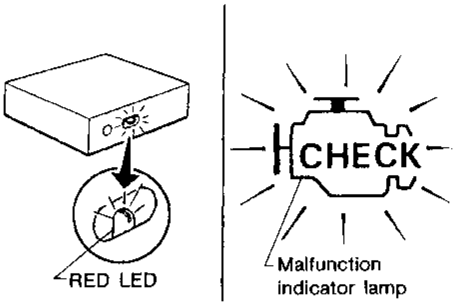
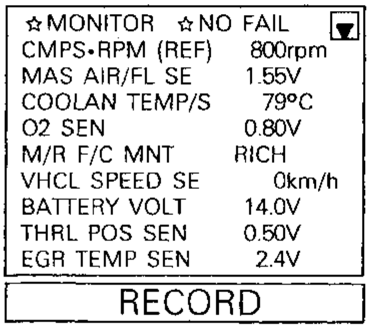
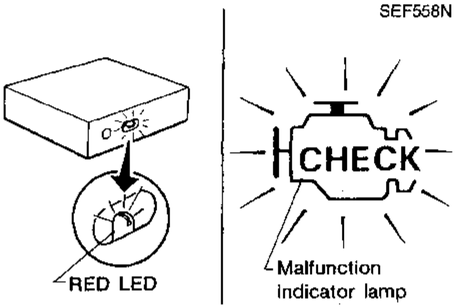
How to Execute On-board Diagnostic System in Diagnostic Test Mode II (Cont'd)

Detected items	Display Diagnostic trouble code No.	How to perform diagnostic test mode II (Self-diagnostic results) judgement	
		Illustration	Method
Ignition signal circuit	21	 ☆MONITOR ☆NO FAIL CMPS•RPM (REF) 800rpm MAS AIR/FL SE 1.55V COOLAN TEMP/S 79°C O2 SEN 0.80V M/R F/C MNT RICH VHCL SPEED SE 0km/h BATTERY VOLT 14.0V THRL POS SEN 0.50V EGR TEMP SEN 2.4V RECORD SEF558N  MEF377DA	**PERFORM DIAGNOSTIC TEST MODE II (SELF-DIAGNOSTIC RESULTS).** 1) Start engine. 2) Select "DATA MONITOR" mode with CONSULT. ☆ **NO FAIL** OR 2) Turn ignition switch "OFF" and then "ON". 3) Perform diagnostic test mode II (Self-diagnostic results) with ECM. **Malfunction indicator lamp and red LED display diagnostic trouble code No. 55.**
ECM	31	 ☆MONITOR ☆NO FAIL CMPS•RPM (REF) 800rpm MAS AIR/FL SE 1.55V COOLAN TEMP/S 79°C O2 SEN 0.80V M/R F/C MNT RICH VHCL SPEED SE 0km/h BATTERY VOLT 14.0V THRL POS SEN 0.50V EGR TEMP SEN 2.4V RECORD SEF559N  MEF377DA	**PERFORM DIAGNOSTIC TEST MODE II (SELF-DIAGNOSTIC RESULTS).** 1) Turn ignition switch "ON". 2) Select "DATA MONITOR" mode with CONSULT. ☆ **NO FAIL** OR 2) Perform diagnostic test mode II (Self-diagnostic results) with ECM. **Malfunction indicator lamp and red LED display diagnostic trouble code No. 55.**

How to Execute On-board Diagnostic System in Diagnostic Test Mode II (Cont'd)

Detected items	Display Diagnostic trouble code No.	How to perform diagnostic test mode II (Self-diagnostic results) judgement	
		Illustration	Method
EGR function	32	**A** **ROAD TEST** **Test conditions** Drive vehicle under the following conditions with suitable gear position. (1) Engine speed: 2,500 ± 300 rpm (2) Intake manifold vacuum: A/T models: −38.0 ± 4.7 kPa (−285 ± 35 mmHg, −11.22 ± 1.38 inHg) M/T models: −42.0 ± 4.7 kPa (−315 ± 35 mmHg, −12.40 ± 1.38 inHg) **Driving mode**  ① Start engine and warm it up sufficiently. ② Turn off ignition switch and keep it off until red LED goes off. ③ Start engine and make sure that air conditioning switch and rear defogger are turned "OFF" during test drive. ④ Keep engine running for at least 30 seconds. ⑤ Shift to suitable gear position and drive in "Test condition" for a total of 95 seconds or more. Note: If engine stalls or ignition switch is turned off within step ⑤, return to step ②. SEF560N **B**  MEF377DA	**PERFORM DIAGNOSTIC TEST MODE II (SELF-DIAGNOSTIC RESULTS).** 1) Turn ignition switch "ON". 2) Perform diagnostic test mode II (Self-diagnostic results) with ECM. Make sure that diagnostic trouble code No. 12, 13, 35 or 43 are not displayed. 3) Perform test drive under the following conditions. (1) Warm up engine sufficiently. (2) Use test driving modes indicated in figure **A**. 4) If malfunction indicator lamp comes on during test drive, perform diagnostic test mode II (Self-diagnostic results) with ECM. **B** **Malfunction indicator lamp and red LED display diagnostic trouble code No. 55.**

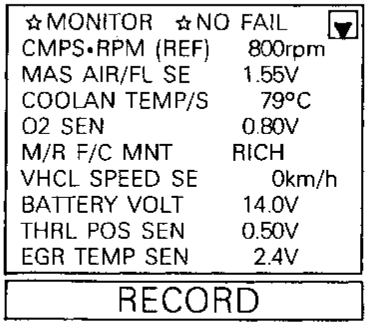
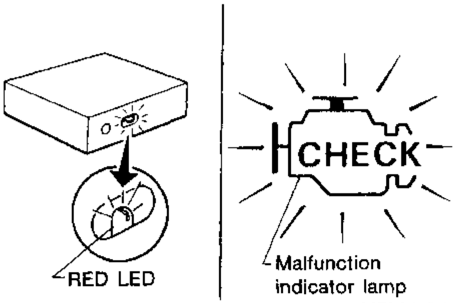
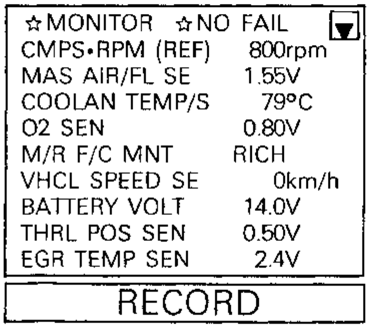
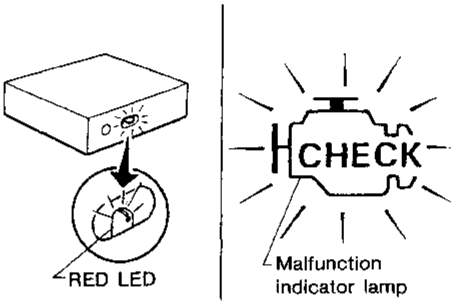
How to Execute On-board Diagnostic System in Diagnostic Test Mode II (Cont'd)

Detected items	Display Diagnostic trouble code No.	How to perform diagnostic test mode II (Self-diagnostic results) judgement	
		Illustration	Method
Heated oxygen sensor circuit*	33	 MIXTURE RATIO TEST ACCELERATE TO 2000 RPM AND HOLD THEN TOUCH START. 1800 2000 2200 NEXT START SEF115I  ☆ MONITOR ☆ NO FAIL ☐ CMPS•RPM (REF) 2000rpm M/R F/C MNT RICH RECORD SEF561N  MEF377DA	**CHECK OVERALL FUNCTION.** 1) Start engine and warm it up sufficiently. 2) Perform "MIXTURE RATIO TEST" in "FUNCTION TEST" mode with CONSULT. OR 2) Make sure that "M/R F/C MNT(R)" in "DATA MONITOR" mode indicates "RICH" and "LEAN" periodically more than 5 times during 10 seconds at 2,000 rpm OR 2) Make sure that malfunction indicator lamp and red LED on ECM go on and off periodically more than 5 times during 10 seconds at 2,000 rpm in Diagnostic Test Mode II.
Knock sensor circuit	34	 ☆MONITOR ☆NO FAIL ▼ CMPS•RPM (REF) 800rpm MAS AIR/FL SE 1.55V COOLAN TEMP/S 79°C O2 SEN 0.80V M/R F/C MNT RICH VHCL SPEED SE 0km/h BATTERY VOLT 14.0V THRL POS SEN 0.50V EGR TEMP SEN 2.4V RECORD SEF558N  MEF377DA	**PERFORM DIAGNOSTIC TEST MODE II (SELF-DIAGNOSTIC RESULTS).** 1) Start engine. 2) Select "DATA MONITOR" mode with CONSULT. ☆ **NO FAIL** OR 2) Turn ignition switch "OFF" and then "ON". 3) Perform diagnostic test mode II (Self-diagnostic results) with ECM. **Malfunction indicator lamp and red LED display diagnostic trouble code No. 55.**

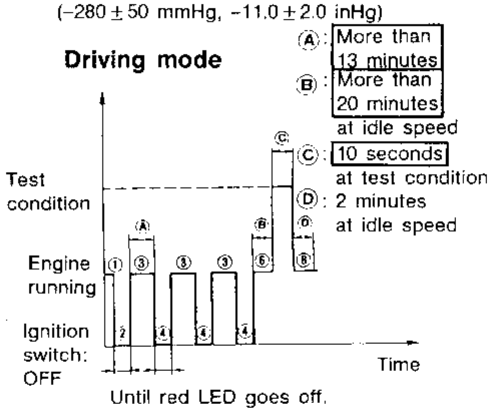
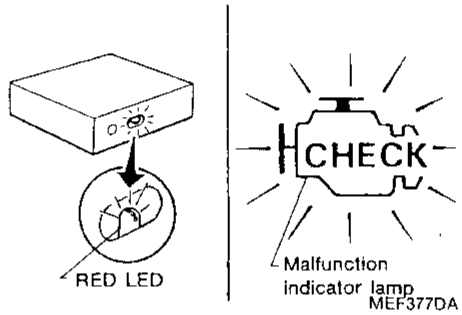
*: Diagnostic test mode II (Self-diagnostic results) is not performed but this method provides results which are equal to the self-diagnostic results.

GI MA EM LC EF & EC FE CL MT AT FA RA BR ST BF HA EL IDX

How to Execute On-board Diagnostic System in Diagnostic Test Mode II (Cont'd)

Detected items	Display Diagnostic trouble code No.	How to perform diagnostic test mode II (Self-diagnostic results) judgement	
		Illustration	Method
EGR temperature sensor circuit	35	 ☆MONITOR ☆NO FAIL ▼ CMPS•RPM (REF) 800rpm MAS AIR/FL SE 1.55V COOLAN TEMP/S 79°C O2 SEN 0.80V M/R F/C MNT RICH VHCL SPEED SE 0km/h BATTERY VOLT 14.0V THRL POS SEN 0.50V EGR TEMP SEN 2.4V RECORD SEF558N  MEF377DA	**PERFORM DIAGNOSTIC TEST MODE II (SELF-DIAGNOSTIC RESULTS).** 1) Start engine and warm it up sufficiently. 2) Select "DATA MONITOR" mode with CONSULT. ☆ **NO FAIL** OR 2) Turn ignition switch "OFF" and then "ON". 3) Perform diagnostic test mode II (Self-diagnostic results) with ECM. **Malfunction indicator lamp and red LED display diagnostic trouble code No. 55.**
Throttle position sensor circuit	43	 ☆MONITOR ☆NO FAIL ▼ CMPS•RPM (REF) 800rpm MAS AIR/FL SE 1.55V COOLAN TEMP/S 79°C O2 SEN 0.80V M/R F/C MNT RICH VHCL SPEED SE 0km/h BATTERY VOLT 14.0V THRL POS SEN 0.50V EGR TEMP SEN 2.4V RECORD SEF558N  MEF377DA	**PERFORM DIAGNOSTIC TEST MODE II (SELF-DIAGNOSTIC RESULTS).** 1) Jack up drive wheels 2) Start engine. 3) Shift to a suitable gear position (Except "P" or "N"), and run engine at vehicle speed of 5 km/h (3 MPH) or higher for at least 1 second. 4) Select "DATA MONITOR" mode with CONSULT. ☆ **NO FAIL** OR 4) Turn ignition switch "OFF" and then "ON". 5) Perform diagnostic test mode II (Self-diagnostic results) with ECM. **Malfunction indicator lamp and red LED display diagnostic trouble code No. 55.**

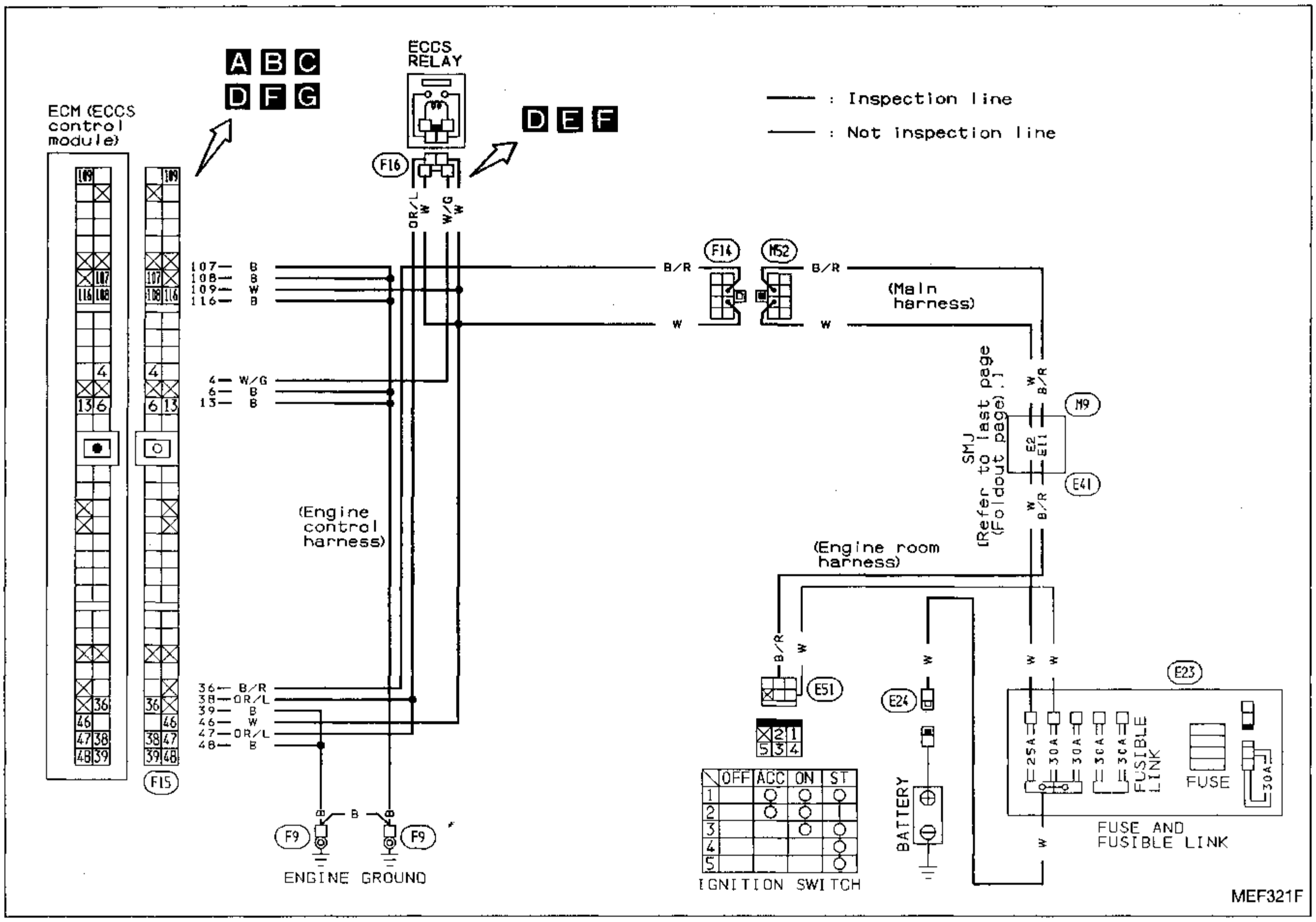
How to Execute On-board Diagnostic System in Diagnostic Test Mode II (Cont'd)

Detected items	Display Diagnostic trouble code No.	How to perform diagnostic test mode II (Self-diagnostic results) judgement	
		Illustration	Method
Injector leak	45	**A** **ROAD TEST** **Test conditions** Drive vehicle under the following conditions with suitable gear position. (1) Engine speed: 2,500 ± 500 rpm (2) Intake manifold vacuum: -37 ± 7 kPa (-280 ± 50 mmHg, -11.0 ± 2.0 inHg)  ① Start engine and warm it up sufficiently. ② Turn off ignition switch and keep it off until red LED goes off. ③ Start engine and keep it running for more than 13 minutes. ④ Turn off ignition switch and keep it off until red LED goes off. ⑤ Repeat steps ③ through ④ for a total of 3 times. ⑥ Start engine and keep it at idle for more than 20 minutes. If engine stalls or ignition turns off within 13 minutes after engine is started, return to step ②. If over 13 minutes, restart step ⑥. ⑦ Shift to suitable gear position and drive in "Test condition" for at least 10 seconds. If the following conditions occur during step ⑦, return to step ⑥. ● Engine races over 4,000 rpm or hardly accelerates for more than 10 seconds. ● Engine stalls or ignition turns off. ⑧ Keep engine at idle speed for more than 2 minutes. SEF562NC **B**  MEF377DA	**PERFORM DIAGNOSTIC TEST MODE II (SELF-DIAGNOSTIC RESULTS).** 1) Perform test drive as indicated in figure **A**. 2) If malfunction indicator lamp comes on during test drive, perform diagnostic test mode II (Self-diagnostic results) with ECM. **B** **Malfunction indicator lamp and red LED display diagnostic trouble code No. 55.**

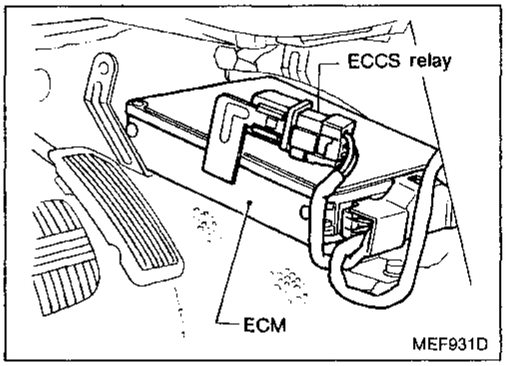
1994 Sentra Service Manual
AM93-017 (NTB93-143)
Revised October 1993

Diagnostic Procedure 1

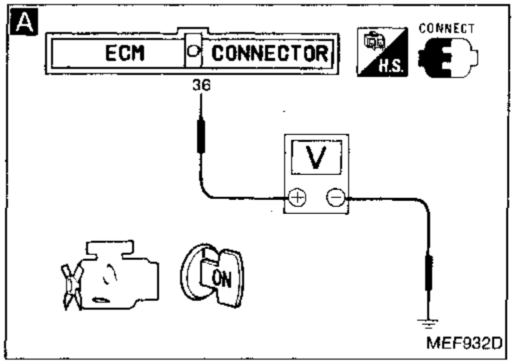
MAIN POWER SUPPLY AND GROUND CIRCUIT (Not self-diagnostic item)

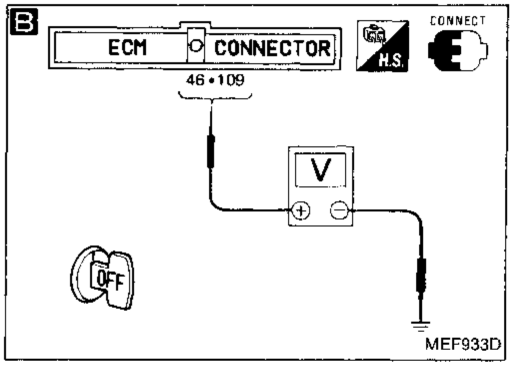


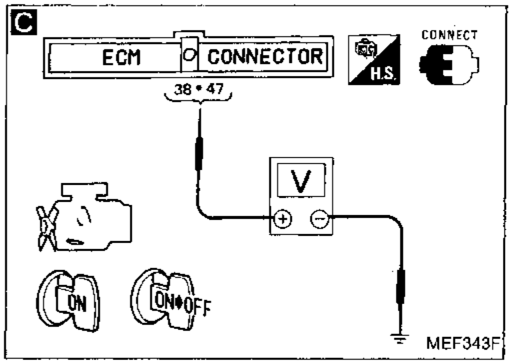
Harness layout



MAIN POWER SUPPLY AND GROUND CIRCUIT (Not self-diagnostic item)







INSPECTION START

Start engine.
Is engine running?

No

A CHECK POWER SUPPLY-1.
1) Turn ignition switch "ON".
2) Check voltage between ECM terminal ㊱ and ground with CONSULT or tester.
Voltage: Battery voltage
If NG, check the following.
- Harness connectors F14, M52
- Harness connectors M9, E41
- Harness continuity between ECM and ignition switch

If NG, repair harness or connectors.

OK

Go to "CHECK GROUND CIRCUIT" on next page.

Yes

B CHECK POWER SUPPLY-II.
1) Stop engine.
2) Check voltage between ECM terminals ㊻, (109) and ground with CONSULT or tester.
Voltage: Battery voltage

NG

Check the following.
- Harness connectors F14, M52
- Harness connectors M9, E41
- 25A fusible link
- Harness continuity between ECM and battery

If NG, repair harness or connectors.

OK

C CHECK POWER SUPPLY-III.
1) Turn ignition switch "ON" and then "OFF".
2) Check voltage between ECM terminals ㊳, ㊼ and ground with CONSULT or tester.
Voltage:
Ignition switch "ON" and for a few seconds after turning ignition switch "OFF"
Battery voltage
A few seconds after turning ignition switch "OFF"
Approximately 0V

OK

Go to "CHECK GROUND CIRCUIT" on next page.

Case-1: Battery voltage does not exist for a few seconds.
Case-2: Battery voltage exists for more than a few seconds.

NG

Case-2

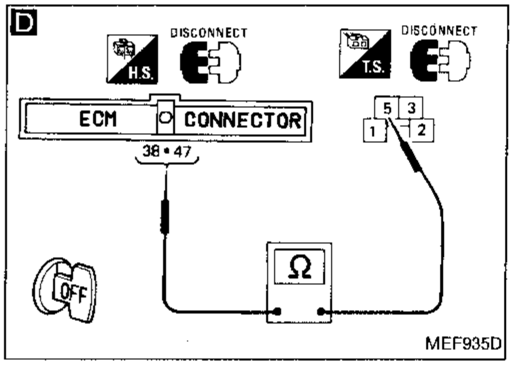
Go to "CHECK COMPONENT (ECCS relay)" on next page.

Case-1

Ⓐ

MAIN POWER SUPPLY AND GROUND CIRCUIT (Not self-diagnostic item)

D



MEF935D

Ⓐ

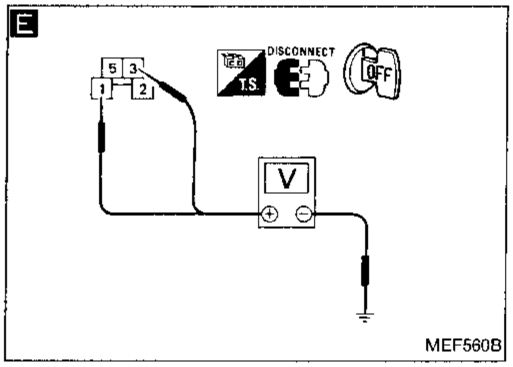
D CHECK HARNESS CONTINUITY BETWEEN ECCS RELAY AND ECM.

1) Disconnect ECM harness connector.
2) Disconnect ECCS relay.
3) Check harness continuity between ECM terminals ㊳, ㊼ and terminal ⑤.
   Continuity should exist.

NG → Repair harness or connectors.

OK ↓

E



MEF560B

E CHECK VOLTAGE BETWEEN ECCS RELAY AND GROUND.

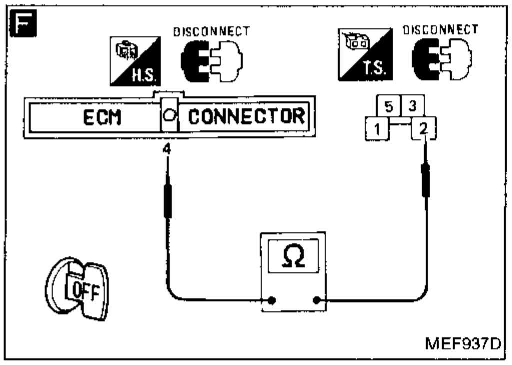
1) Check voltage between terminals ①, ③ and ground with CONSULT or tester.
   Voltage: Battery voltage

NG → Check the following.
- Harness continuity between ECCS relay and harness connector (F14)

If NG, repair harness or connectors.

OK ↓

F



MEF937D

F CHECK OUTPUT SIGNAL CIRCUIT.

1) Check harness continuity between ECM terminal ④ and terminal ②.
   Continuity should exist.

NG → Repair harness or connectors.

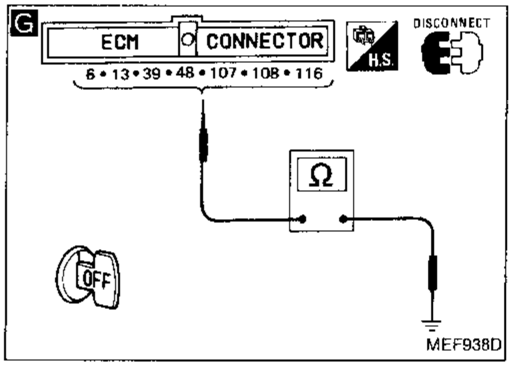
OK ↓

CHECK COMPONENT (ECCS relay).
Refer to "Electrical Components Inspection".
(See page EF & EC-188.)

NG → Replace ECCS relay.

OK ↓

G



MEF938D

G CHECK GROUND CIRCUIT.

1) Turn ignition switch "OFF".
2) Disconnect ECM harness connector.
3) Check harness continuity between ECM terminals ⑥, ⑬, ㊴, ㊽, (107), (108), (116) and engine ground.
   Continuity should exist.

NG → Repair harness or connectors.

OK ↓

Disconnect and reconnect harness connectors in the circuit, and retest.

↓ Trouble is not fixed.

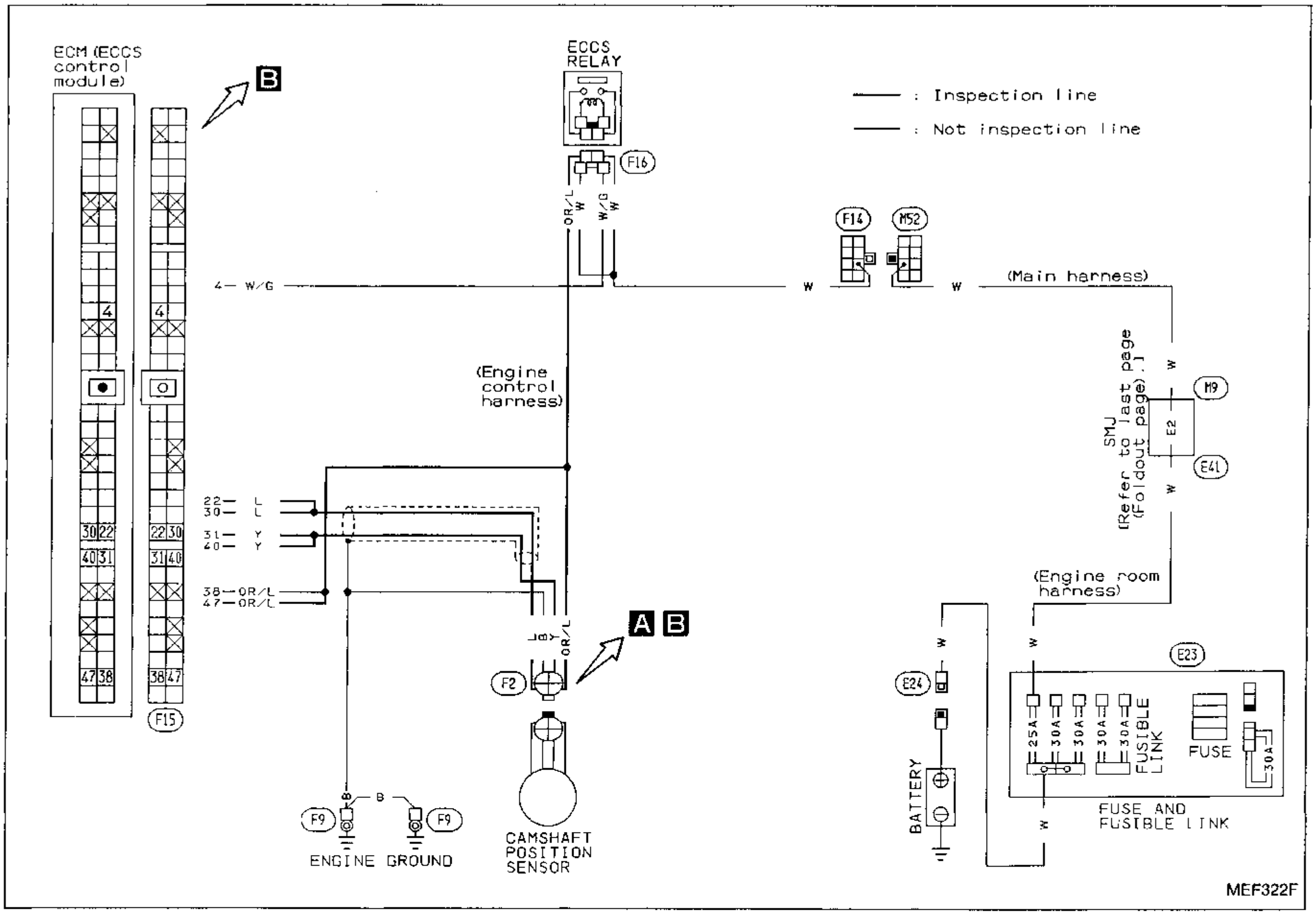
Check ECM pin terminals for damage or the connection of ECM harness connector. Reconnect ECM harness connector and retest.

↓

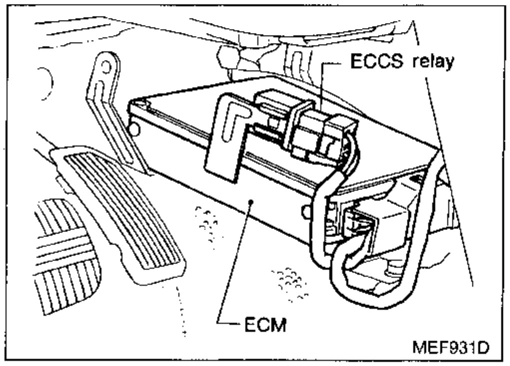
INSPECTION END

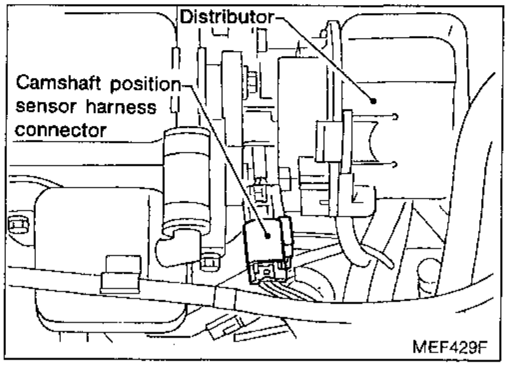
Diagnostic Procedure 2

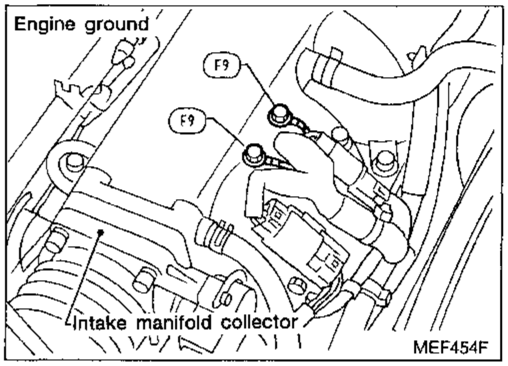
CAMSHAFT POSITION SENSOR (Diagnostic trouble code No. 11)



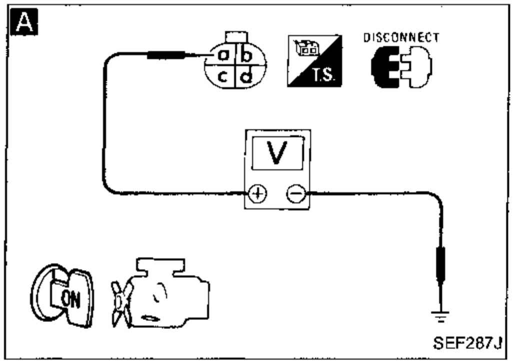
Harness layout

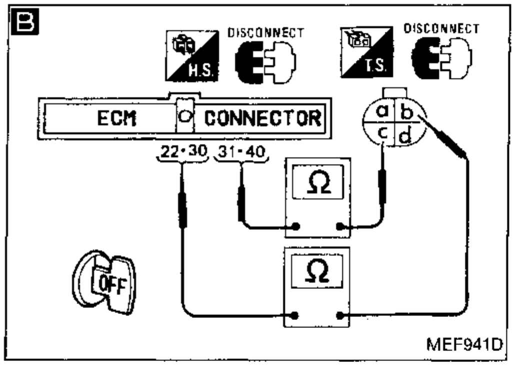


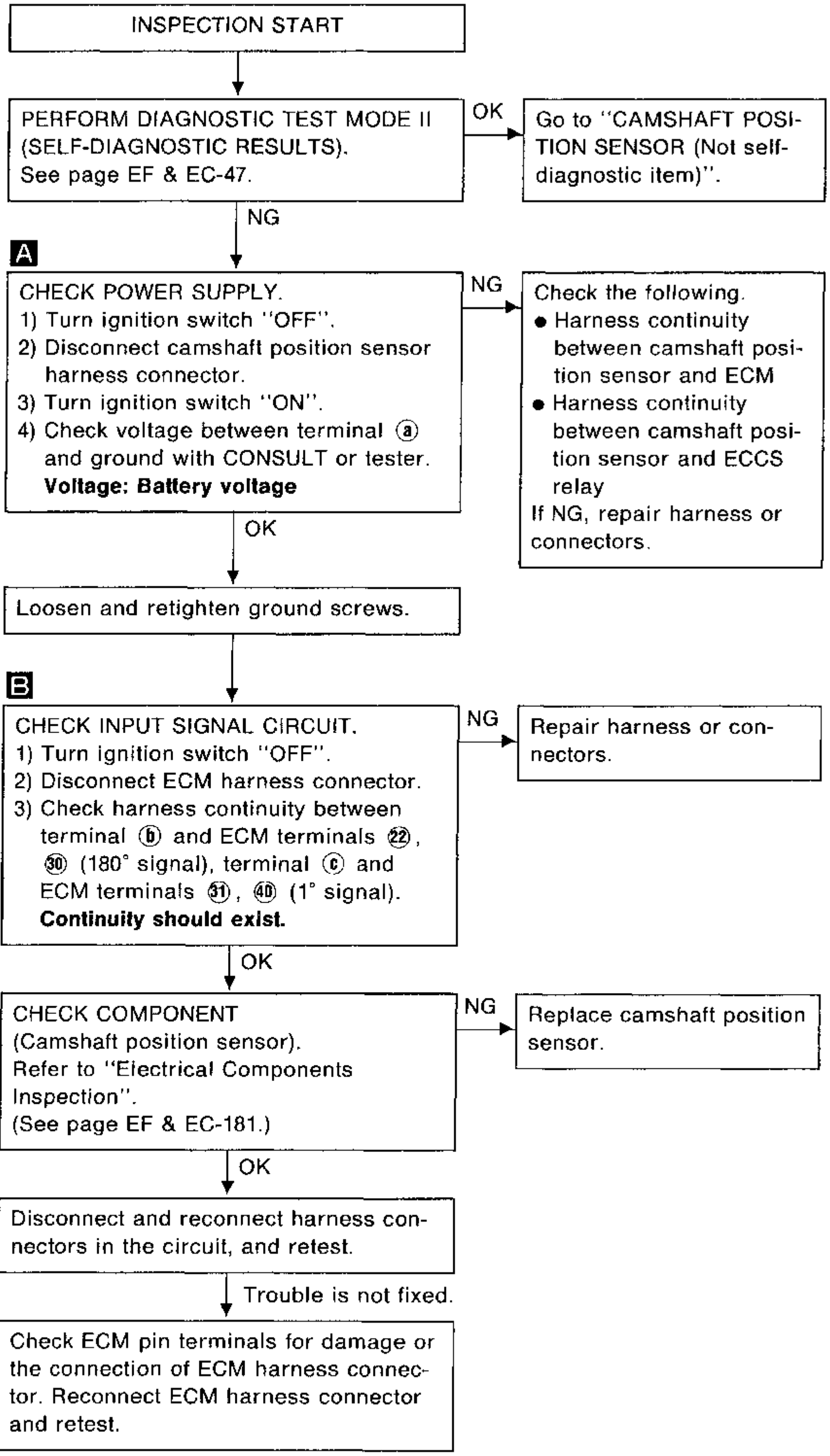




CAMSHAFT POSITION SENSOR (Diagnostic trouble code No. 11)







INSPECTION START

↓

PERFORM DIAGNOSTIC TEST MODE II (SELF-DIAGNOSTIC RESULTS). See page EF & EC-47.

OK → Go to "CAMSHAFT POSITION SENSOR (Not self-diagnostic item)".

↓ NG

A

CHECK POWER SUPPLY.
1) Turn ignition switch "OFF".
2) Disconnect camshaft position sensor harness connector.
3) Turn ignition switch "ON".
4) Check voltage between terminal ⓐ and ground with CONSULT or tester.
Voltage: Battery voltage

NG → Check the following.
- Harness continuity between camshaft position sensor and ECM
- Harness continuity between camshaft position sensor and ECCS relay

If NG, repair harness or connectors.

↓ OK

Loosen and retighten ground screws.

↓

B

CHECK INPUT SIGNAL CIRCUIT.
1) Turn ignition switch "OFF".
2) Disconnect ECM harness connector.
3) Check harness continuity between terminal ⓑ and ECM terminals ㉒, ㉚ (180° signal), terminal ⓒ and ECM terminals ㉛, ㊵ (1° signal).
Continuity should exist.

NG → Repair harness or connectors.

↓ OK

CHECK COMPONENT (Camshaft position sensor). Refer to "Electrical Components Inspection". (See page EF & EC-181.)

NG → Replace camshaft position sensor.

↓ OK

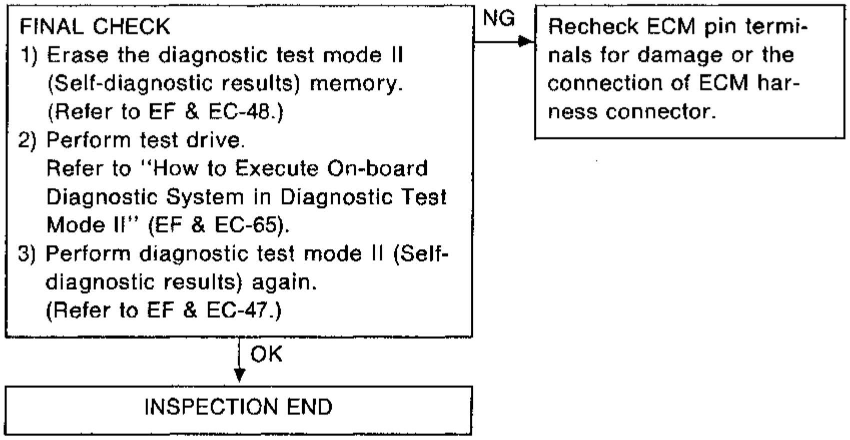
Disconnect and reconnect harness connectors in the circuit, and retest.

↓ Trouble is not fixed.

Check ECM pin terminals for damage or the connection of ECM harness connector. Reconnect ECM harness connector and retest.

CAMSHAFT POSITION SENSOR (Diagnostic trouble code No. 11)

Perform FINAL CHECK by the following procedure after repair is completed.



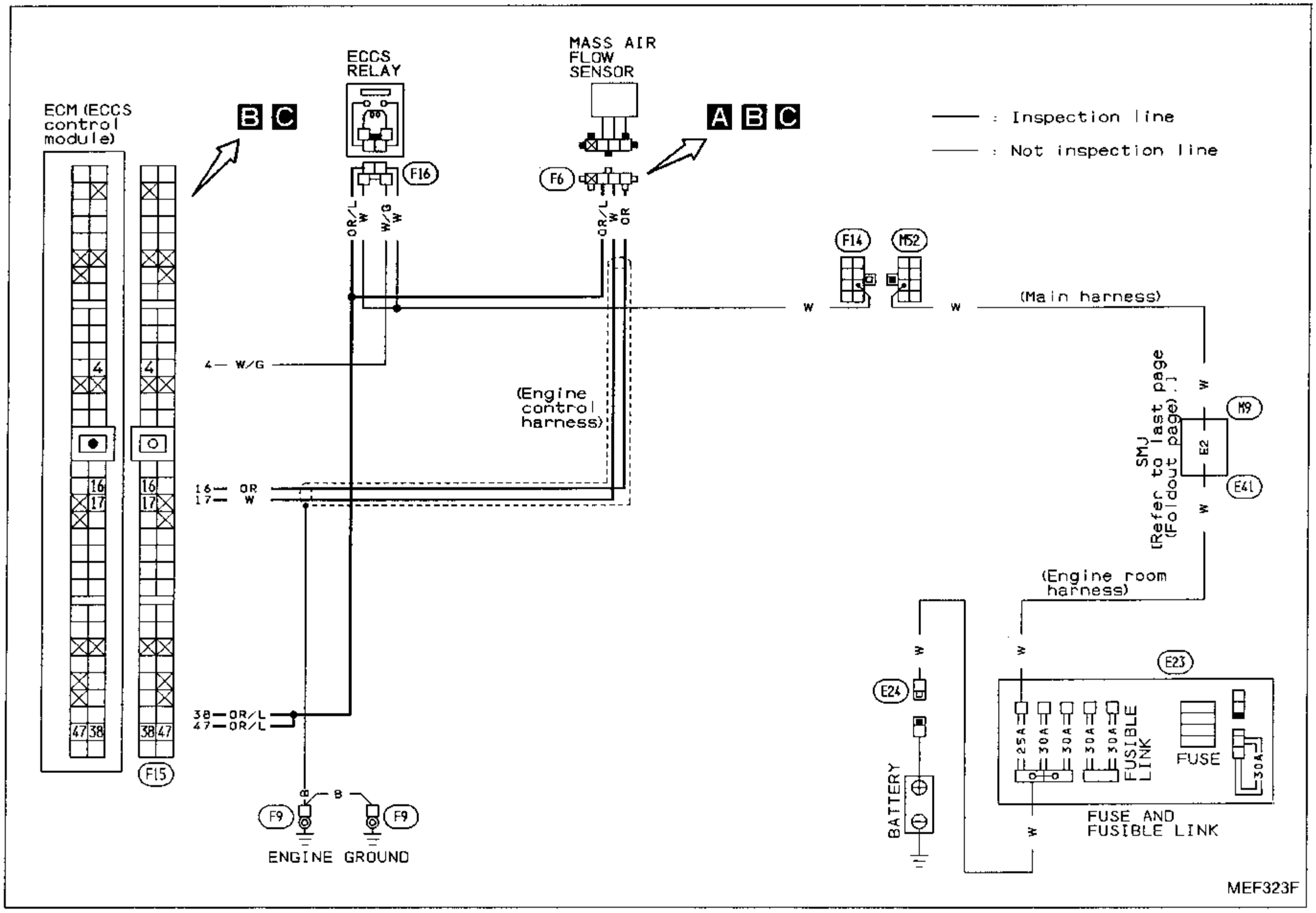
FINAL CHECK
1) Erase the diagnostic test mode II (Self-diagnostic results) memory. (Refer to EF & EC-48.)
2) Perform test drive. Refer to "How to Execute On-board Diagnostic System in Diagnostic Test Mode II" (EF & EC-65).
3) Perform diagnostic test mode II (Self-diagnostic results) again. (Refer to EF & EC-47.)

Recheck ECM pin terminals for damage or the connection of ECM harness connector.

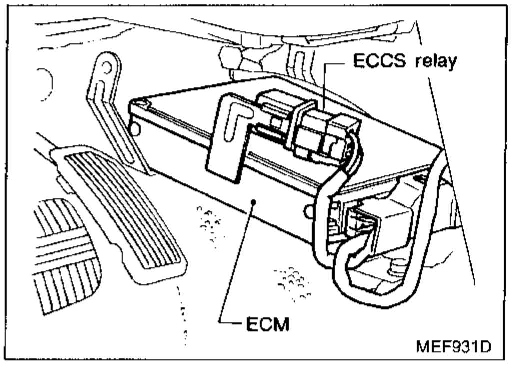
INSPECTION END

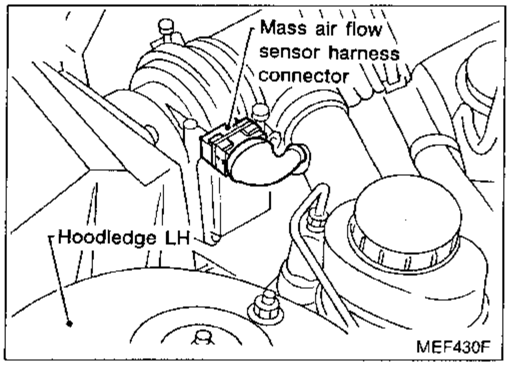
Diagnostic Procedure 3

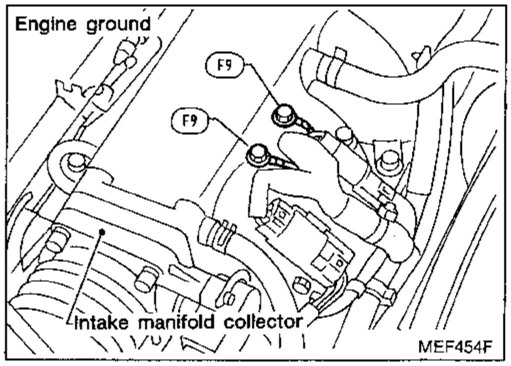
MASS AIR FLOW SENSOR (Diagnostic trouble code No. 12) (Malfunction indicator lamp item)



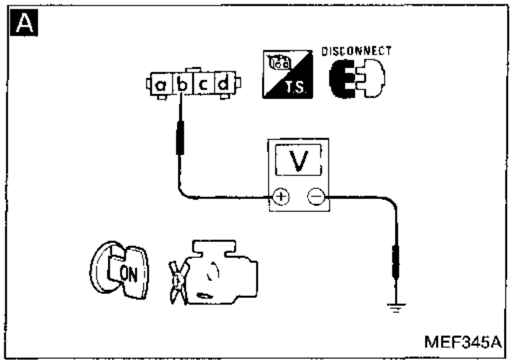
Harness layout

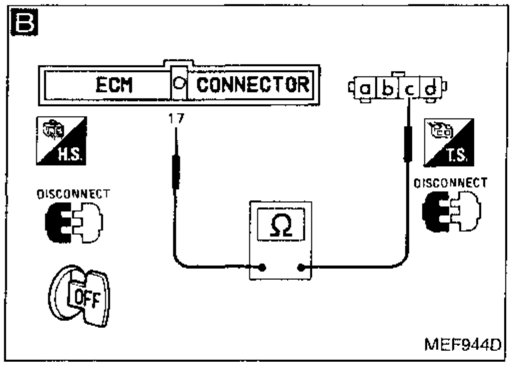


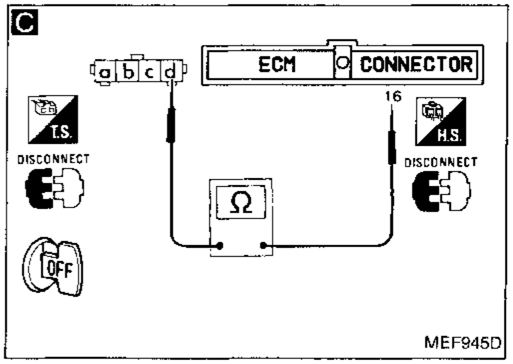




MASS AIR FLOW SENSOR (Diagnostic trouble code No. 12) (Malfunction indicator lamp item)







INSPECTION START

PERFORM DIAGNOSTIC TEST MODE II (SELF-DIAGNOSTIC RESULTS). See page EF & EC-47.

OK → INSPECTION END

NG

A

CHECK POWER SUPPLY.
1) Turn ignition switch "OFF".
2) Disconnect mass air flow sensor harness connector.
3) Turn ignition switch "ON".
4) Check voltage between terminal ⓑ and ground with CONSULT or tester.
Voltage: Battery voltage

NG → Check the following.
- Harness continuity between mass air flow sensor and ECM
- Harness continuity between mass air flow sensor and ECCS relay

If NG, repair harness or connectors.

OK

B

CHECK GROUND CIRCUIT.
1) Turn ignition switch "OFF".
2) Disconnect ECM harness connector.
3) Loosen and retighten ground screws.
4) Check harness continuity between terminal ⓒ and ECM terminal ⑰.
Continuity should exist.

NG → Repair harness or connectors.

OK

C

CHECK INPUT SIGNAL CIRCUIT.
1) Check harness continuity between terminal ⓓ and ECM terminal ⑯.
Continuity should exist.

NG → Repair harness or connectors.

OK

CHECK COMPONENT
(Mass air flow sensor).
Refer to "Electrical Components Inspection".
(See page EF & EC-181.)

NG → Replace mass air flow sensor.

OK

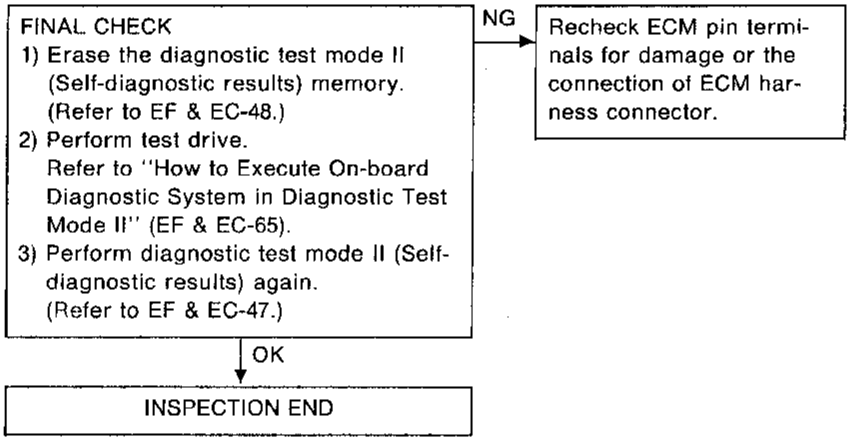
Disconnect and reconnect harness connectors in the circuit, and retest.

Trouble is not fixed.

Check ECM pin terminals for damage or the connection of ECM harness connector. Reconnect ECM harness connector and retest.

MASS AIR FLOW SENSOR (Diagnostic trouble code No. 12) (Malfunction indicator lamp item)

Perform FINAL CHECK by the following procedure after repair is completed.



FINAL CHECK

1) Erase the diagnostic test mode II (Self-diagnostic results) memory. (Refer to EF & EC-48.)
2) Perform test drive. Refer to "How to Execute On-board Diagnostic System in Diagnostic Test Mode II" (EF & EC-65).
3) Perform diagnostic test mode II (Self-diagnostic results) again. (Refer to EF & EC-47.)

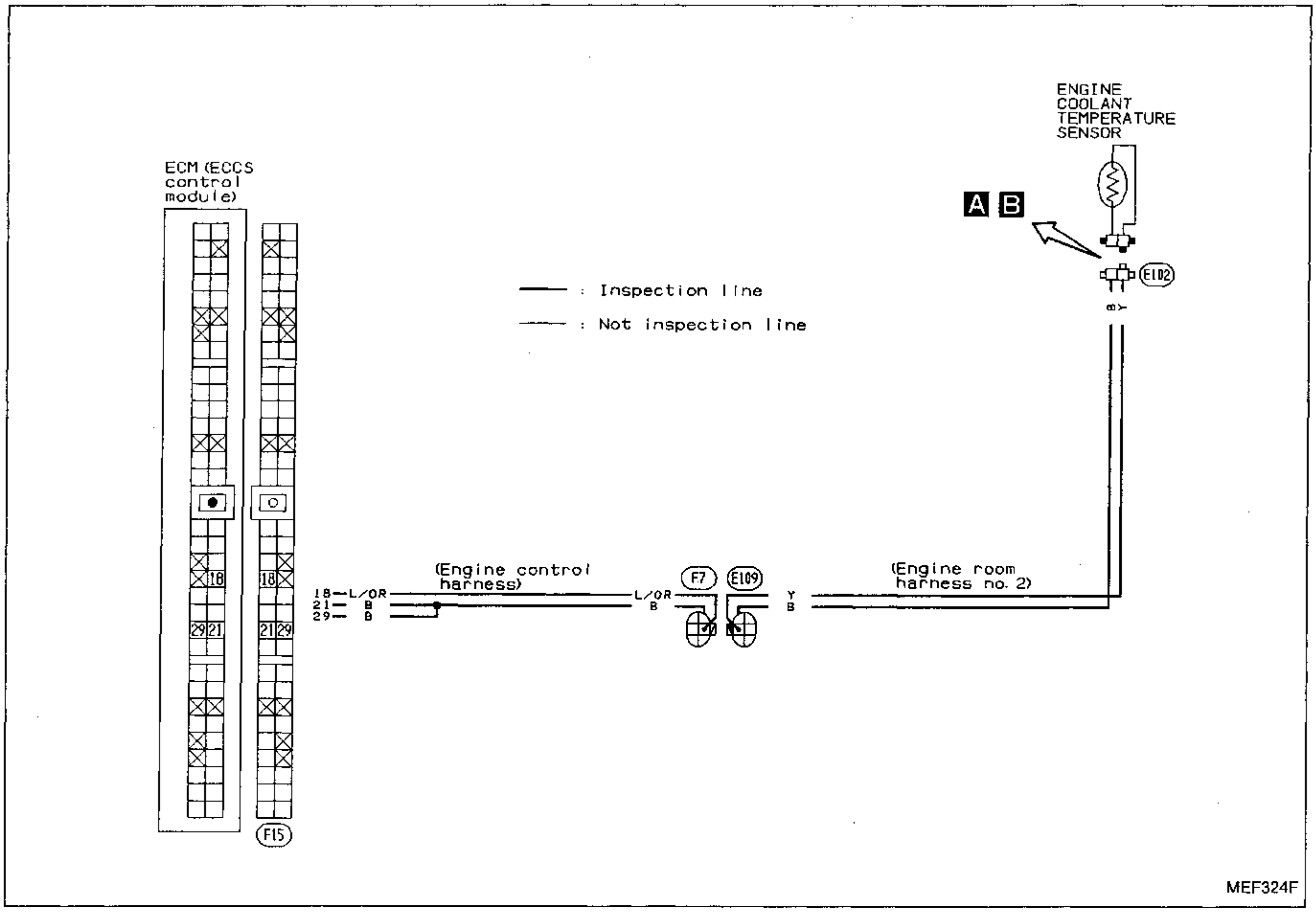
NG → Recheck ECM pin terminals for damage or the connection of ECM harness connector.

OK ↓

INSPECTION END

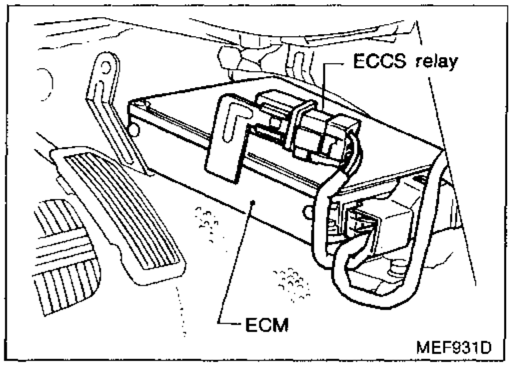
Diagnostic Procedure 4

ENGINE COOLANT TEMPERATURE SENSOR (Diagnostic trouble code No. 13) (Malfunction indicator lamp item)

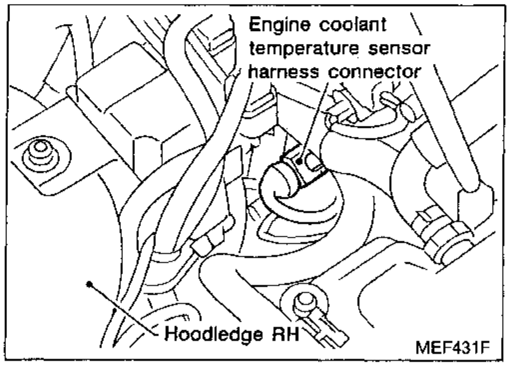


MEF324F

Harness layout

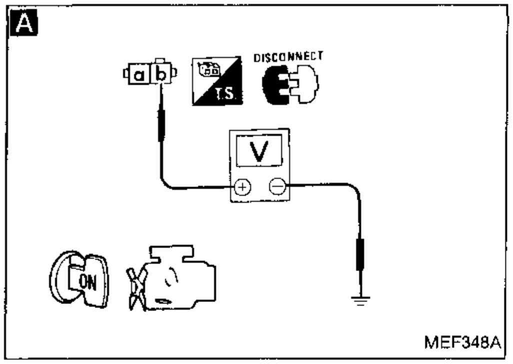


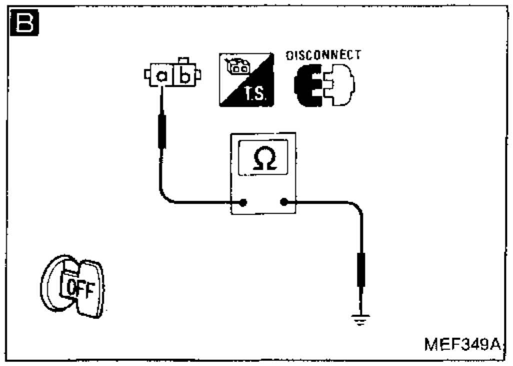
MEF931D

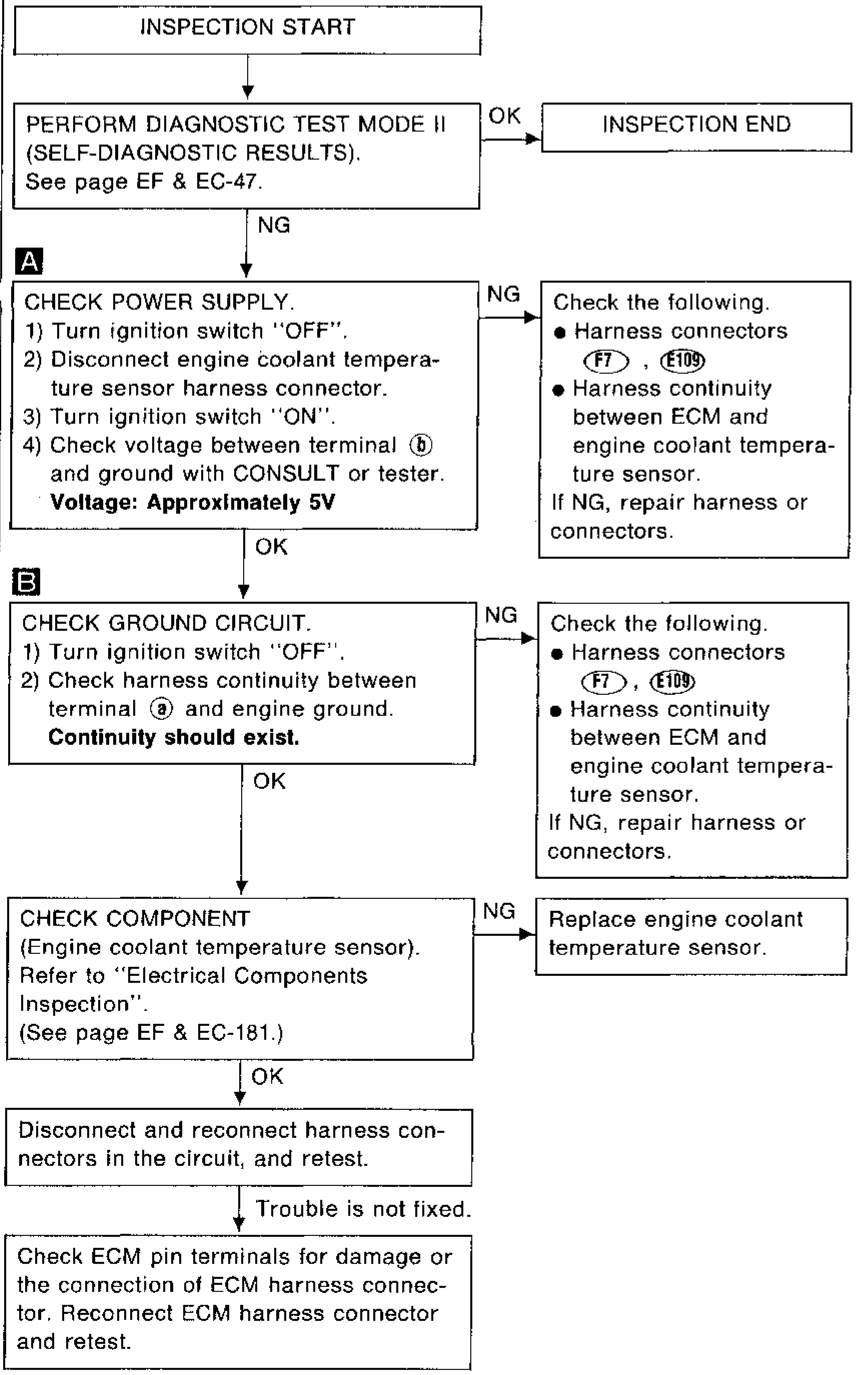


MEF431F

ENGINE COOLANT TEMPERATURE SENSOR (Diagnostic trouble code No. 13) (Malfunction indicator lamp item)







INSPECTION START

PERFORM DIAGNOSTIC TEST MODE II (SELF-DIAGNOSTIC RESULTS).
See page EF & EC-47.

OK → INSPECTION END

NG ↓ A

CHECK POWER SUPPLY.
1) Turn ignition switch "OFF".
2) Disconnect engine coolant temperature sensor harness connector.
3) Turn ignition switch "ON".
4) Check voltage between terminal ⓑ and ground with CONSULT or tester.
Voltage: Approximately 5V

NG → Check the following.
- Harness connectors F7 , E109
- Harness continuity between ECM and engine coolant temperature sensor.

If NG, repair harness or connectors.

OK ↓ B

CHECK GROUND CIRCUIT.
1) Turn ignition switch "OFF".
2) Check harness continuity between terminal ⓐ and engine ground.
Continuity should exist.

NG → Check the following.
- Harness connectors F7 , E109
- Harness continuity between ECM and engine coolant temperature sensor.

If NG, repair harness or connectors.

OK ↓

CHECK COMPONENT
(Engine coolant temperature sensor).
Refer to "Electrical Components Inspection".
(See page EF & EC-181.)

NG → Replace engine coolant temperature sensor.

OK ↓

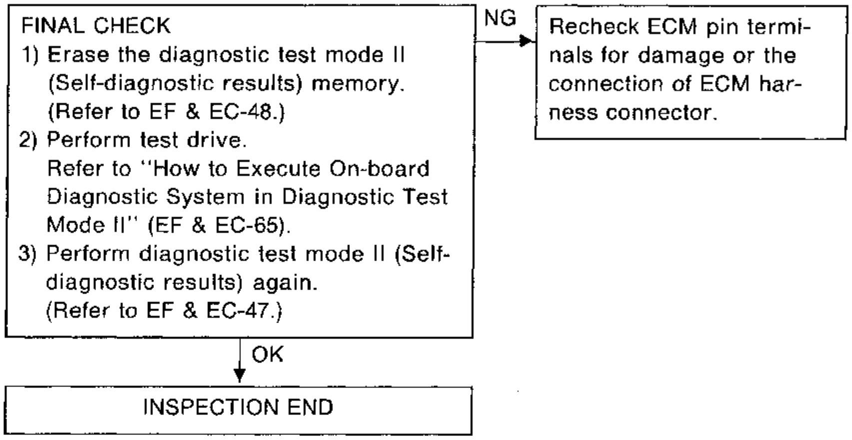
Disconnect and reconnect harness connectors in the circuit, and retest.

↓ Trouble is not fixed.

Check ECM pin terminals for damage or the connection of ECM harness connector. Reconnect ECM harness connector and retest.

ENGINE COOLANT TEMPERATURE SENSOR (Diagnostic trouble code No. 13) (Malfunction indicator lamp item)

Perform FINAL CHECK by the following procedure after repair is completed.



FINAL CHECK

1) Erase the diagnostic test mode II (Self-diagnostic results) memory. (Refer to EF & EC-48.)
2) Perform test drive. Refer to "How to Execute On-board Diagnostic System in Diagnostic Test Mode II" (EF & EC-65).
3) Perform diagnostic test mode II (Self-diagnostic results) again. (Refer to EF & EC-47.)

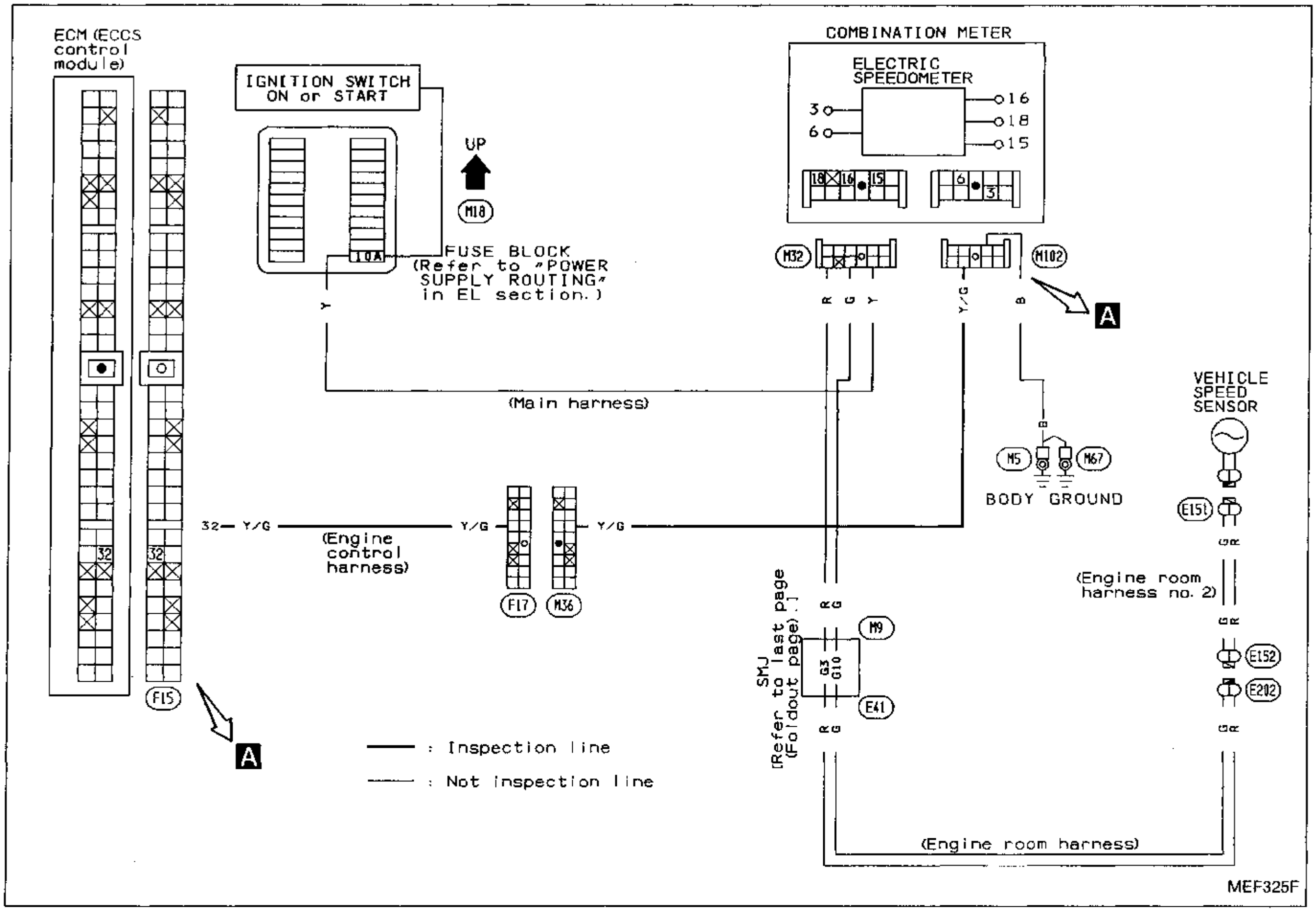
NG → Recheck ECM pin terminals for damage or the connection of ECM harness connector.

OK → INSPECTION END

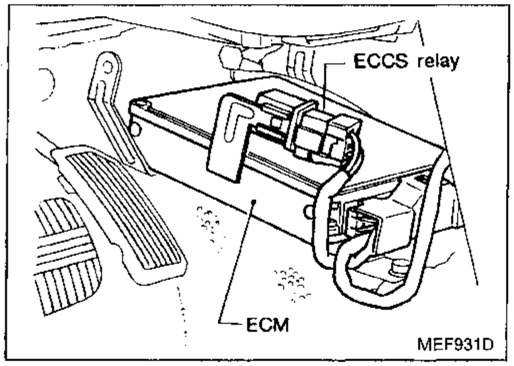
Diagnostic Procedure 5

VEHICLE SPEED SENSOR (Diagnostic trouble code No. 14)

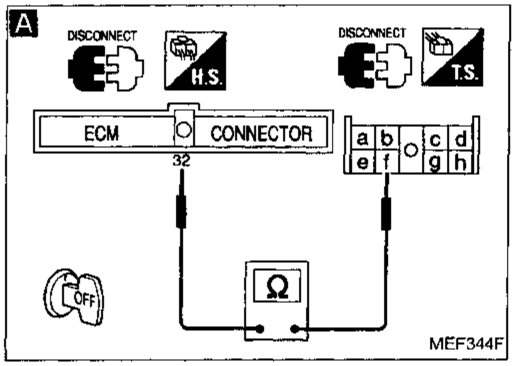
CHECK (Malfunction indicator lamp item)



Harness layout



VEHICLE SPEED SENSOR (Diagnostic trouble code No. 14) (Malfunction indicator lamp item)



INSPECTION START

CHECK OVERALL FUNCTION.
See page EF & EC-66.

OK → INSPECTION END

NG ↓

CHECK SPEEDOMETER FUNCTION.
Make sure that speedometer functions properly.

NG → Check vehicle speed sensor and its circuit.
(Refer to EL section.)

OK ↓

A

CHECK INPUT SIGNAL CIRCUIT.
1) Turn ignition switch "OFF".
2) Disconnect ECM harness connector and combination meter harness connector.
3) Check harness continuity between ECM terminal ㉜ and terminal ⓕ.
Continuity should exist.

NG → Check the following.
- Harness connectors (F17), (M36)
- Harness continuity between ECM and combination meter

If NG, repair harness or connectors.

OK ↓

Disconnect and reconnect harness connectors in the circuit, and retest.

Trouble is not fixed. ↓

Check ECM pin terminals for damage or the connection of ECM harness connector. Reconnect ECM harness connector and retest.

Perform FINAL CHECK by the following procedure after repair is completed.

FINAL CHECK
1) Erase the diagnostic test mode II (Self-diagnostic results) memory.
(Refer to EF & EC-48.)
2) Perform test drive.
Refer to "How to Execute On-board Diagnostic System in Diagnostic Test Mode II" (EF & EC-65).
3) Perform diagnostic test mode II (Self-diagnostic results) again.
(Refer to EF & EC-47.)

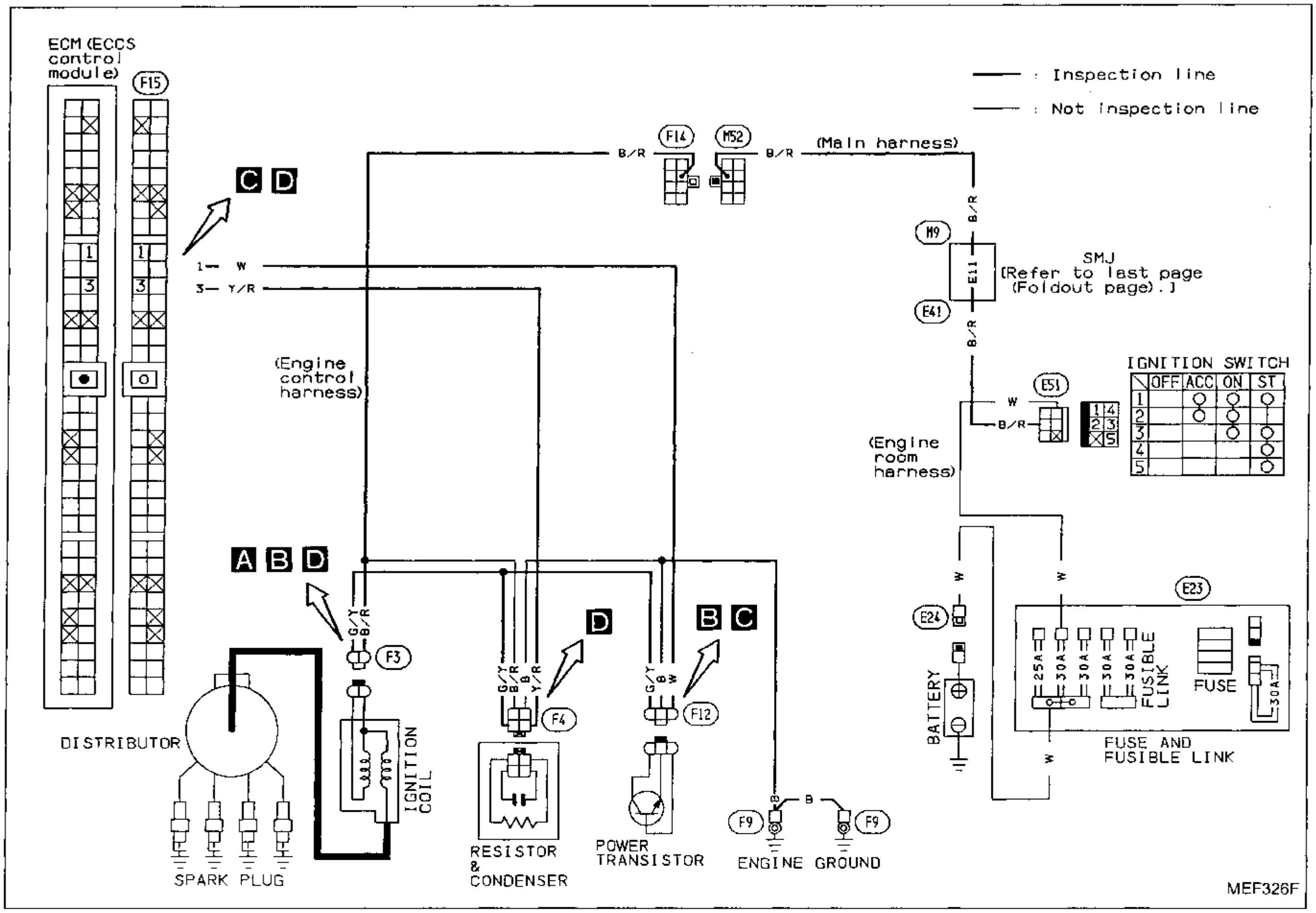
NG → Recheck ECM pin terminals for damage or the connection of ECM harness connector.

OK ↓

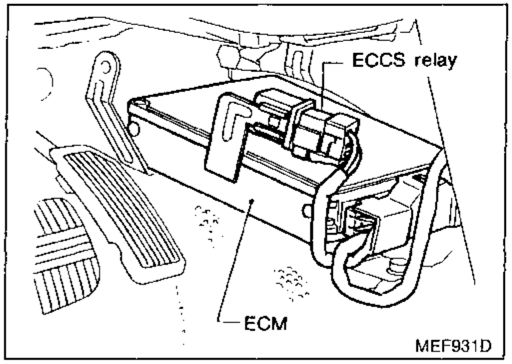
INSPECTION END

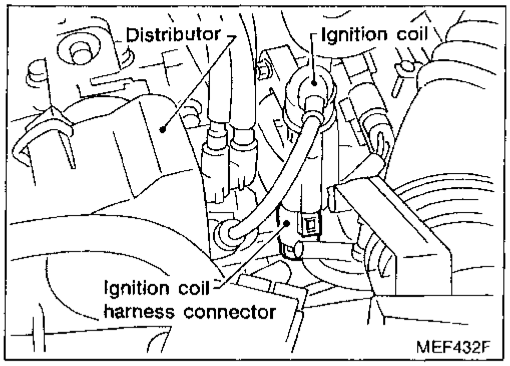
Diagnostic Procedure 6

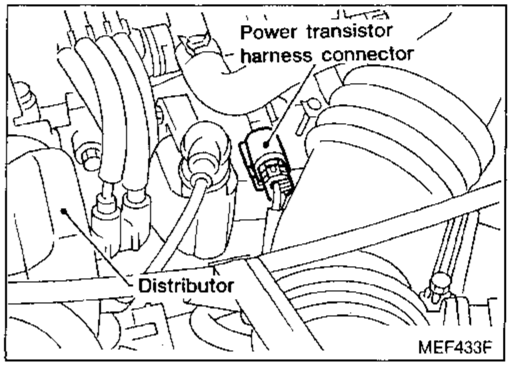
IGNITION SIGNAL (Diagnostic trouble code No. 21)

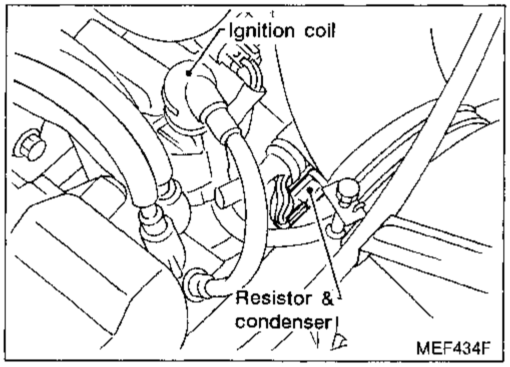


Harness layout

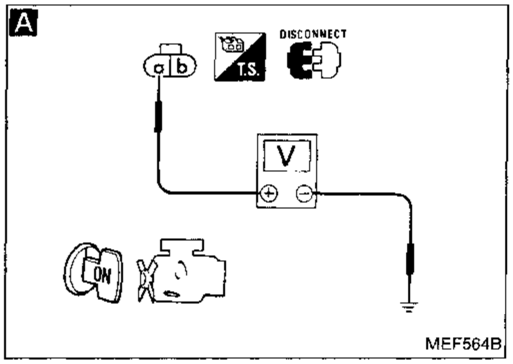


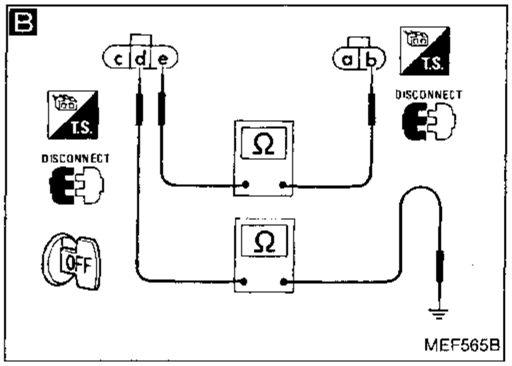


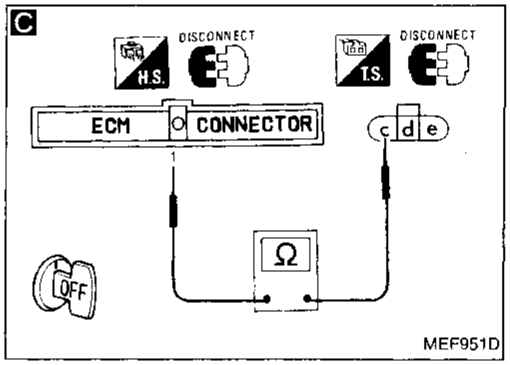




IGNITION SIGNAL (Diagnostic trouble code No. 21)







INSPECTION START

↓

PERFORM DIAGNOSTIC TEST MODE II (SELF-DIAGNOSTIC RESULTS).
See page EF & EC-47.

OK → INSPECTION END

↓ NG

Turn ignition switch "OFF", and restart engine.
Is engine running?

Yes → Ⓐ

↓ No

A

CHECK POWER SUPPLY.
1) Turn ignition switch "OFF".
2) Disconnect ignition coil harness connector.
3) Turn ignition switch "ON".
4) Check voltage between terminal ⓐ and ground with CONSULT or tester.
Voltage: Battery voltage

NG → Check the following.
- Harness connectors F14, M52
- Harness connectors M9, E41
- Harness continuity between ignition coil and ignition switch

If NG, repair harness or connectors.

↓ OK

B

CHECK GROUND CIRCUIT.
1) Turn ignition switch "OFF".
2) Disconnect power transistor harness connector.
3) Check harness continuity between terminal ⓑ and terminal ⓔ, terminal ⓓ and engine ground.
Continuity should exist.

NG → Repair harness or connectors.

↓ OK

C

CHECK OUTPUT SIGNAL CIRCUIT.
1) Disconnect ECM harness connector.
2) Check harness continuity between ECM terminal ① and terminal ⓒ.
Continuity should exist.

NG → Repair harness or connectors.

↓ OK

CHECK COMPONENTS
(Ignition coil, power transistor).
Refer to "Electrical Components Inspection".
(See page EF & EC-182.)

NG → Replace malfunctioning component(s).

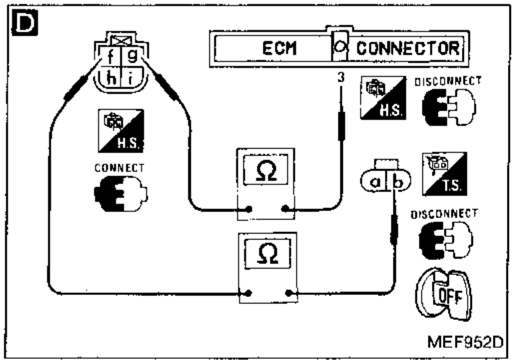
↓ OK

Disconnect and reconnect harness connectors in the circuit, and retest.

↓ Trouble is not fixed.

Check ECM pin terminals for damage or the connection of ECM harness connector. Reconnect ECM harness connector and retest.

IGNITION SIGNAL (Diagnostic trouble code No. 21)



Ⓐ

↓

D

CHECK INPUT SIGNAL CIRCUIT.
1) Stop engine.
2) Disconnect ignition coil harness connector.
3) Strip tape covering resistor & condenser.
4) Disconnect ECM harness connector.
5) Check harness continuity between terminal ⓑ and terminal ⓕ, terminal ⓖ and ECM terminal ③.
Continuity should exist.

NG → Repair harness or connectors.

↓ OK

CHECK COMPONENT
(Resistor).
Refer to "Electrical Components Inspection".
(See page EF & EC-188.)

NG → Replace resistor & condenser.

↓ OK

Disconnect and reconnect harness connectors in the circuit, and retest.

↓ Trouble is not fixed.

Check ECM pin terminals for damage or the connection of ECM harness connector. Reconnect ECM harness connector and retest.

Perform FINAL CHECK by the following procedure after repair is completed.

FINAL CHECK
1) Erase the diagnostic test mode II (Self-diagnostic results) memory. (Refer to EF & EC-48.)
2) Perform test drive. Refer to "How to Execute On-board Diagnostic System in Diagnostic Test Mode II" (EF & EC-65).
3) Perform diagnostic test mode II (Self-diagnostic results) again. (Refer to EF & EC-47.)

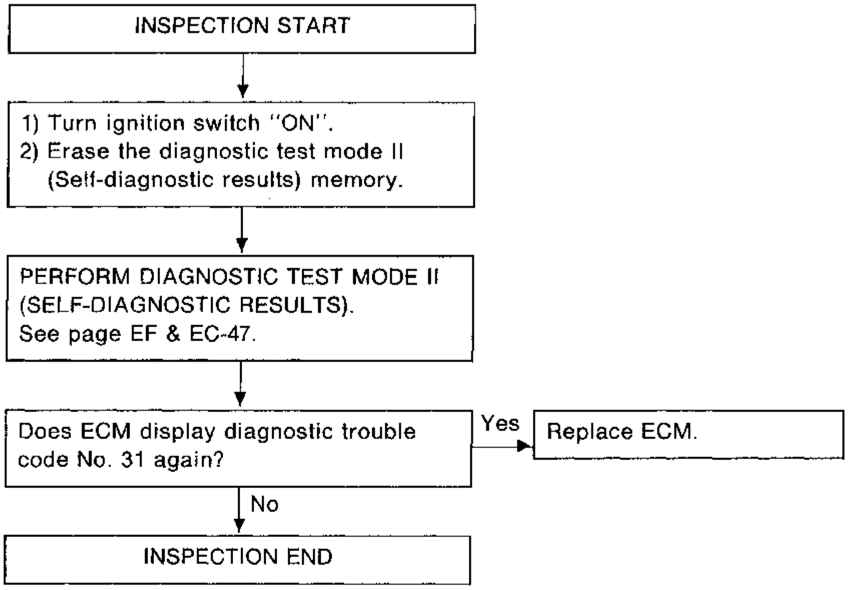
NG → Recheck ECM pin terminals for damage or the connection of ECM harness connector.

↓ OK

INSPECTION END

Diagnostic Procedure 7

ECM (ECCS CONTROL MODULE) (Diagnostic trouble code No.31) CHECK (Malfunction indicator lamp item)



INSPECTION START

1) Turn ignition switch "ON".
2) Erase the diagnostic test mode II (Self-diagnostic results) memory.

PERFORM DIAGNOSTIC TEST MODE II (SELF-DIAGNOSTIC RESULTS).
See page EF & EC-47.

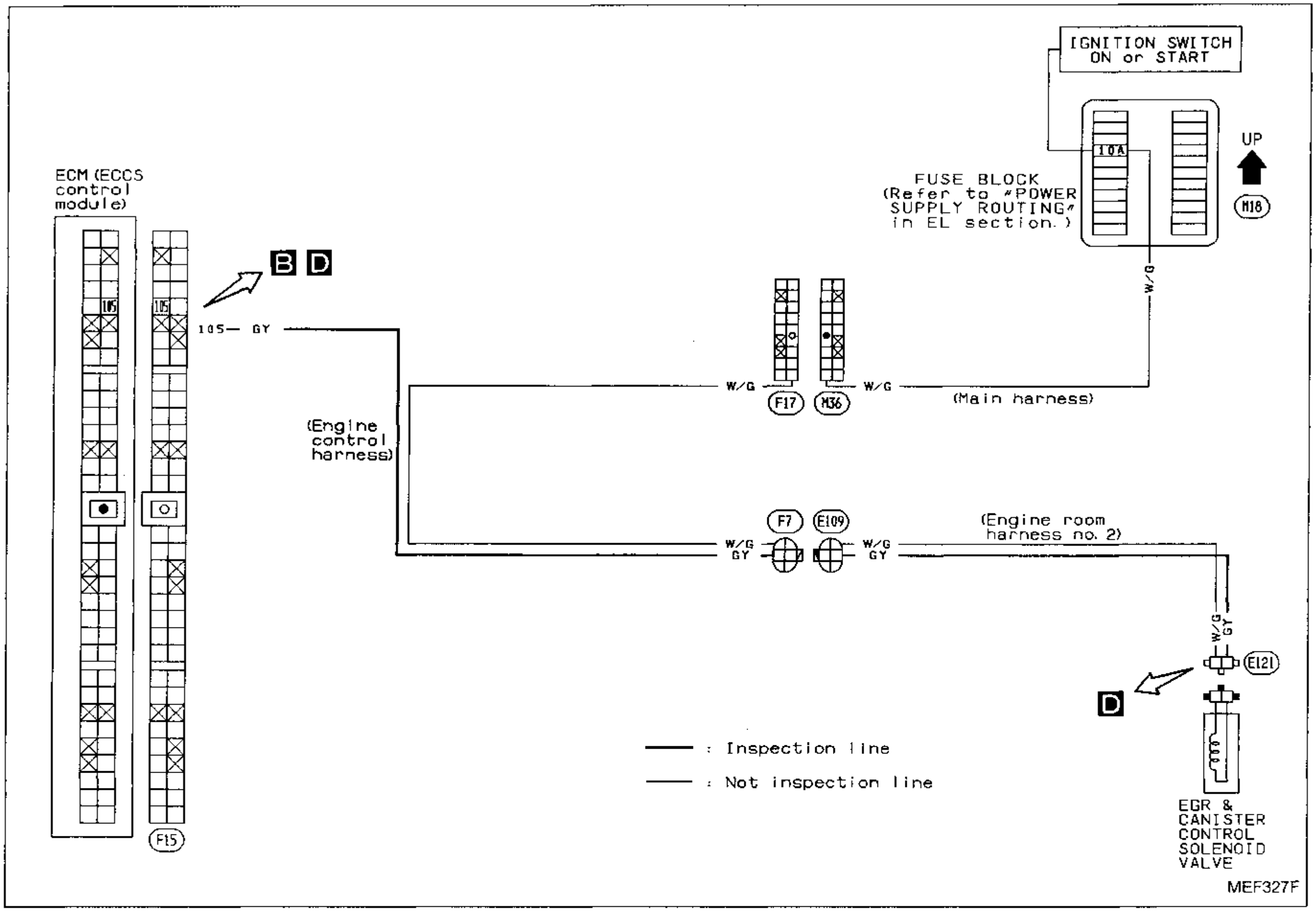
Does ECM display diagnostic trouble code No. 31 again?

Replace ECM.

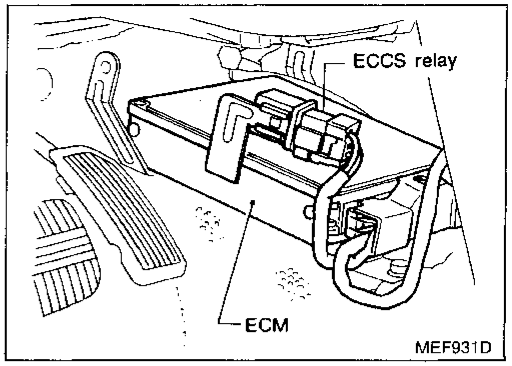
INSPECTION END

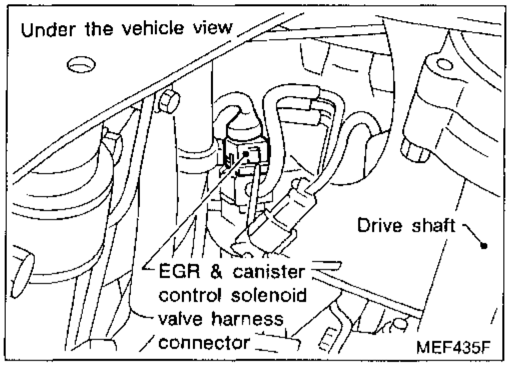
Diagnostic Procedure 8

EGR FUNCTION (Diagnostic trouble code No. 32)
(Malfunction indicator lamp item)

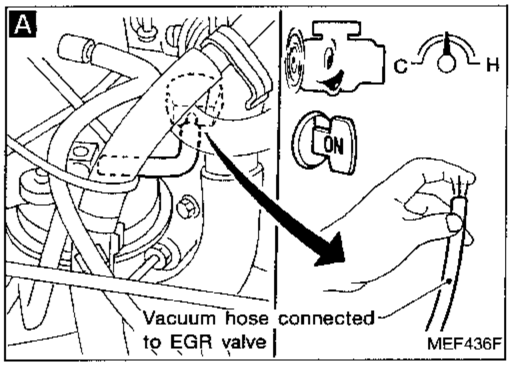


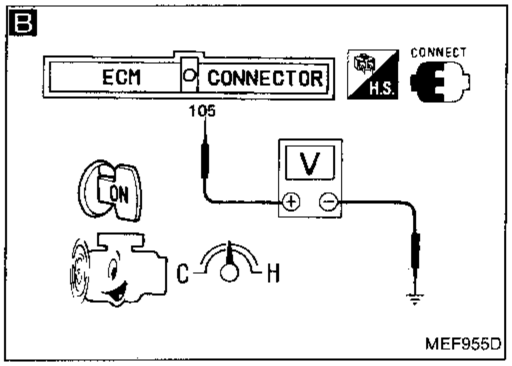
Harness layout

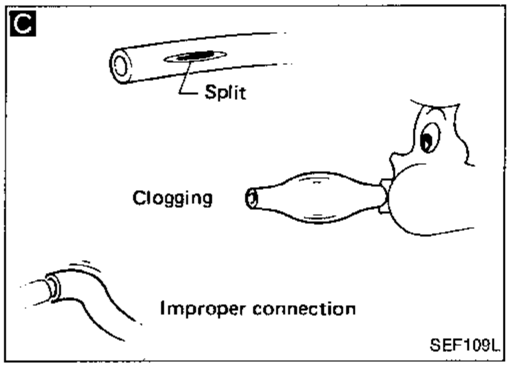


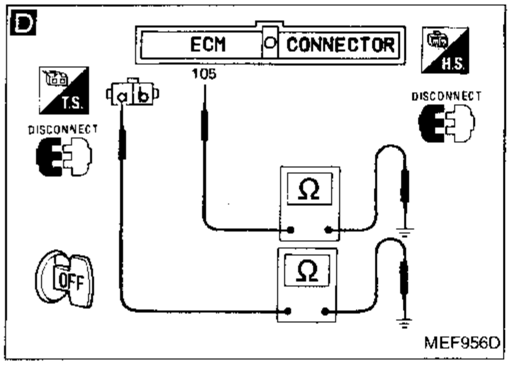


EGR FUNCTION (Diagnostic trouble code No. 32) CHECK (Malfunction indicator lamp item)









INSPECTION START

↓

PERFORM DIAGNOSTIC TEST MODE II (SELF-DIAGNOSTIC RESULTS).
See page EF & EC-47.

OK → Go to EGR CONTROL (Not self-diagnostic item).

↓ NG

A CHECK VACUUM SOURCE TO EGR VALVE.
1) Start engine and warm it up sufficiently.
2) Keep engine speed at about 2,000 rpm.
3) Disconnect vacuum hose to EGR valve.
4) Make sure that vacuum exists.
Vacuum should exist.

OK → CHECK COMPONENTS (EGR valve, and EGRC-BPT valve).
Refer to "Electrical Components Inspection".
(See pages EF & EC-186, 187.)

↓ NG

Replace malfunctioning component(s).

↓ NG

B CHECK CONTROL FUNCTION.
1) Check voltage between ECM terminal (105) and ground under the following conditions with CONSULT or tester.
Voltage:
Engine speed is 4,000 rpm
0.6 - 0.8V
Engine speed is 2,000 rpm.
Battery voltage

OK → **C** CHECK VACUUM HOSE.
1) Check vacuum hose for clogging, cracks and proper connection.

↓ NG

D CHECK OUTPUT SIGNAL CIRCUIT.
1) Stop engine.
2) Disconnect ECM harness connector.
3) Disconnect EGR & canister control solenoid valve harness connector.
4) Check harness continuity between ECM terminal (105) and ground, terminal ⓐ and ground.
Continuity should not exist.

NG → Check the following.
- Harness connectors (F7), (E109)
- Harness continuity between ECM and EGR & canister control solenoid valve

If NG, repair harness or connectors.

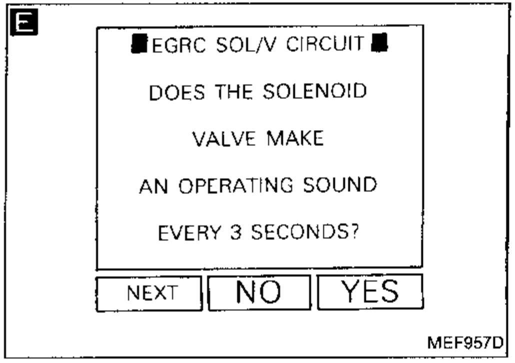
↓ OK

Ⓐ

GI
MA
EM
LC
EF & EC
FE
CL
MT
AT
FA
RA
BR
ST
BF
HA
EL
IDX

EGR FUNCTION (Diagnostic trouble code No. 32) (Malfunction indicator lamp item)

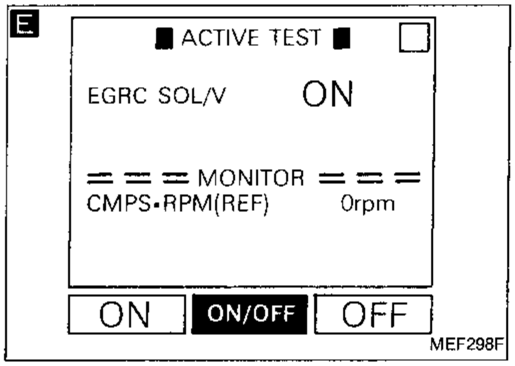
E


■EGRC SOL/V CIRCUIT■

DOES THE SOLENOID VALVE MAKE AN OPERATING SOUND EVERY 3 SECONDS?

MEF957D

E


■ ACTIVE TEST ■ ☐

EGRC SOL/V ON

=== MONITOR ===

CMPS•RPM(REF) 0rpm

MEF298F

Ⓐ

A

CHECK COMPONENT
(EGR & canister control solenoid valve).
1) Reconnect ECM harness connector and EGR & canister control solenoid valve harness connector.
2) Turn ignition switch "ON".
3) Perform "EGRC SOL/V CIRCUIT" in "FUNCTION TEST" mode with CONSULT.

OR

1) Reconnect ECM harness connector and EGR & canister control solenoid valve harness connector.
2) Turn ignition switch "ON".
3) Turn EGR & canister control solenoid valve "ON" and "OFF" in "ACTIVE TEST" mode with CONSULT and check operating sound.

OR

Refer to "Electrical Components Inspection".
(See page EF & EC-186.)

NG → Replace EGR & canister control solenoid valve.

↓ OK

Disconnect and reconnect harness connectors in the circuit, and retest.

↓ Trouble is not fixed.

Check ECM pin terminals for damage or the connection of ECM harness connector. Reconnect ECM harness connector and retest.

↓

Check resistance of EGR temperature sensor.
(See page EF & EC-187.)

Perform FINAL CHECK by the following procedure after repair is completed.

FINAL CHECK
1) Erase the diagnostic test mode II (Self-diagnostic results) memory.
(Refer to EF & EC-48.)
2) Perform test drive.
Refer to "How to Execute On-board Diagnostic System in Diagnostic Test Mode II" (EF & EC-65).
3) Perform diagnostic test mode II (Self-diagnostic results) again.
(Refer to EF & EC-47.)

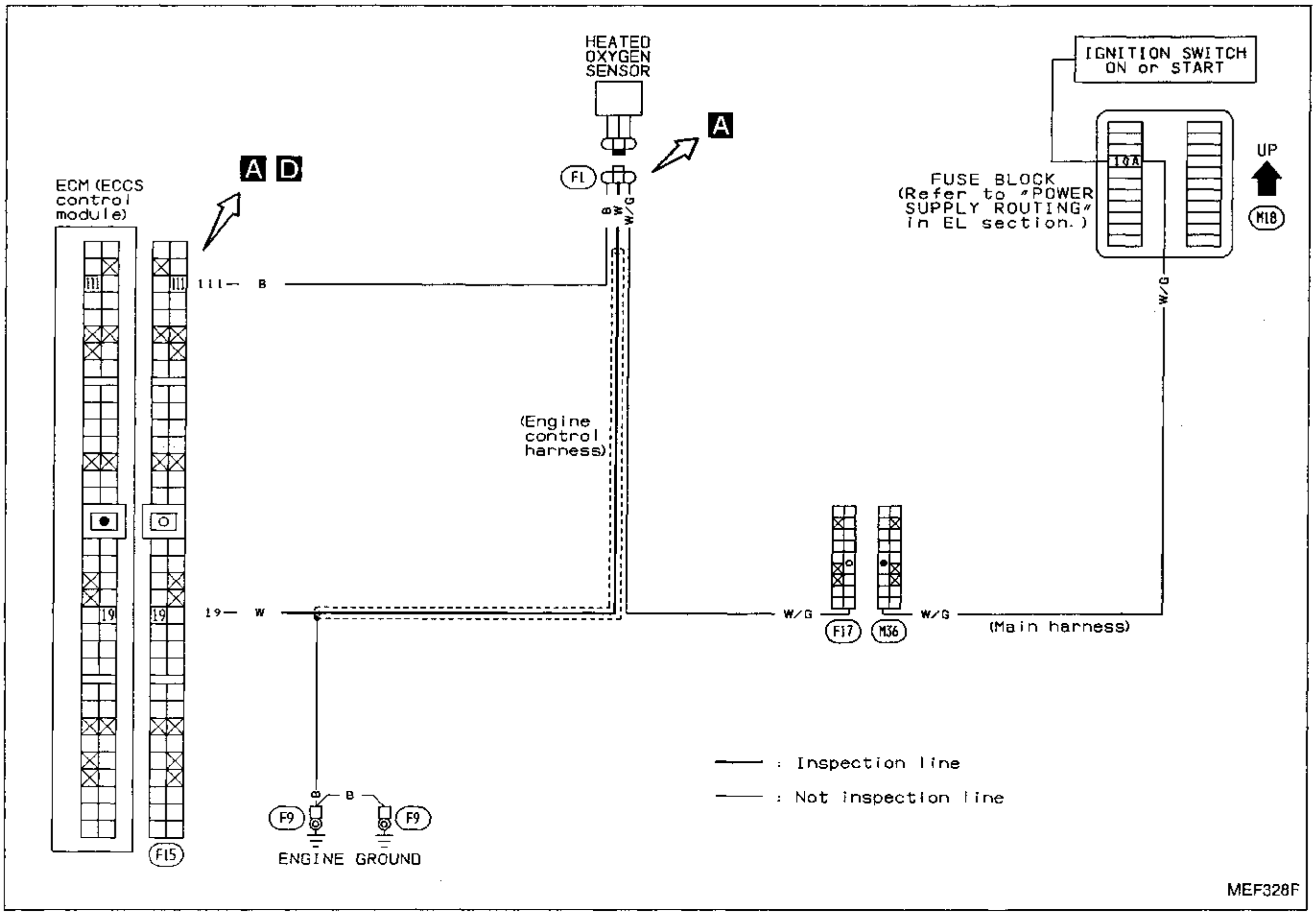
NG → Recheck ECM pin terminals for damage or the connection of ECM harness connector.

↓ OK

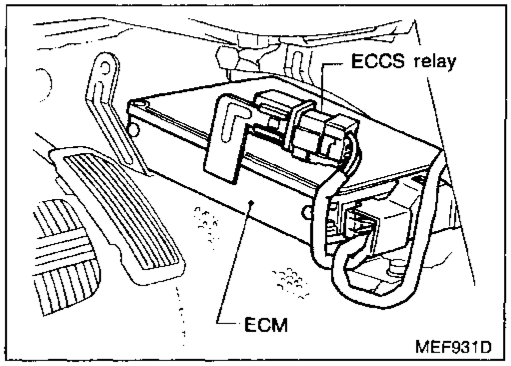
INSPECTION END

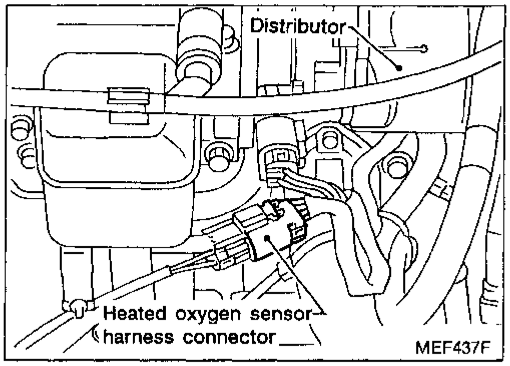
Diagnostic Procedure 9

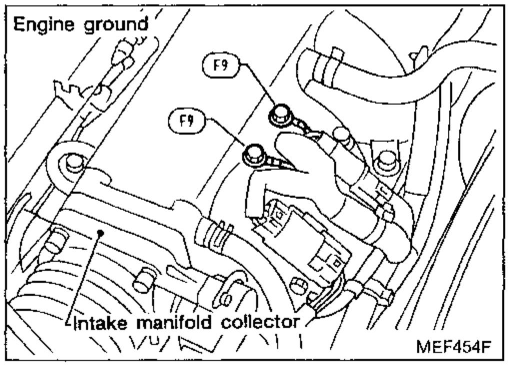
HEATED OXYGEN SENSOR (Diagnostic trouble code No. 33) (Malfunction indicator lamp item)



Harness layout

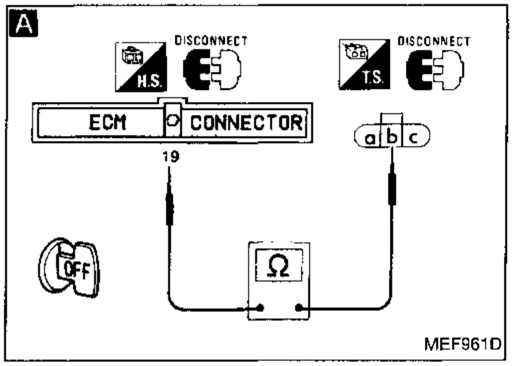






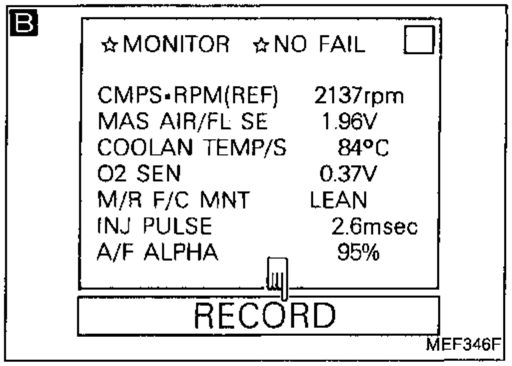
HEATED OXYGEN SENSOR (Diagnostic trouble code No. 33) (Malfunction indicator lamp item)

A



MEF961D

B



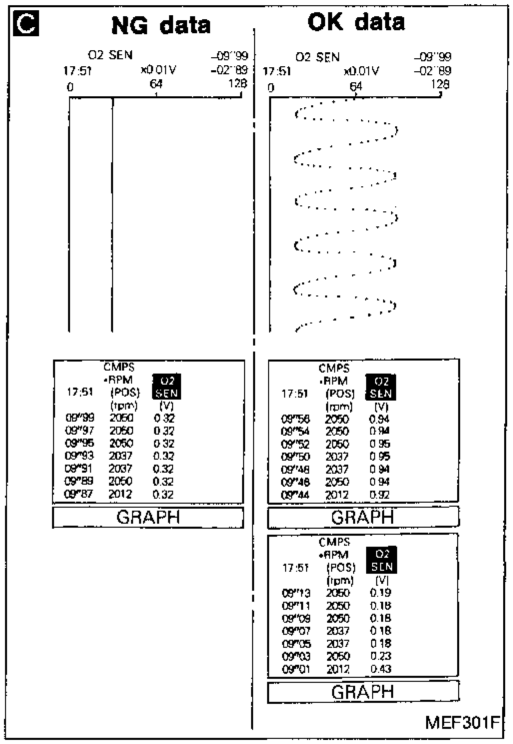
☆MONITOR ☆NO FAIL ☐

CMPS•RPM(REF) 2137rpm
MAS AIR/FL SE 1.96V
COOLAN TEMP/S 84°C
O2 SEN 0.37V
M/R F/C MNT LEAN
INJ PULSE 2.6msec
A/F ALPHA 95%

RECORD

MEF346F

C



NG data

17:51	CMPS •RPM (POS) (rpm)	O2 SEN (V)
09"99	2050	0.32
09"97	2050	0.32
09"95	2050	0.32
09"93	2037	0.32
09"91	2037	0.32
09"89	2050	0.32
09"87	2012	0.32

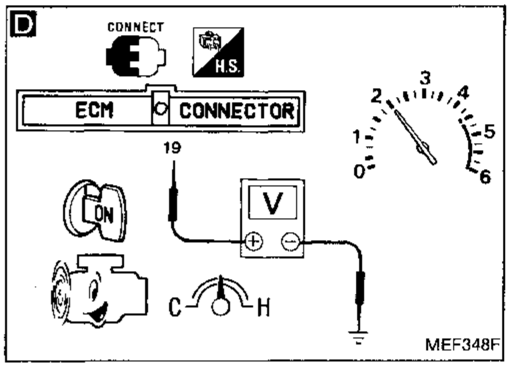
OK data

17:51	CMPS •RPM (POS) (rpm)	O2 SEN (V)
09"56	2050	0.94
09"54	2050	0.94
09"52	2050	0.95
09"50	2037	0.95
09"48	2037	0.94
09"46	2050	0.94
09"44	2012	0.92

17:51	CMPS •RPM (POS) (rpm)	O2 SEN (V)
09"13	2050	0.19
09"11	2050	0.18
09"09	2050	0.18
09"07	2037	0.18
09"05	2037	0.18
09"03	2050	0.23
09"01	2012	0.43

MEF301F

D



MEF348F

INSPECTION START

CHECK OVERALL FUNCTION.
See page EF & EC-69.

OK → INSPECTION END

NG

A

CHECK INPUT SIGNAL CIRCUIT.

1) Turn ignition switch "OFF".
2) Disconnect heated oxygen sensor harness connector and ECM harness connector.
3) Check harness continuity between ECM terminal ⑲ and terminal ⓑ.
Continuity should exist.

NG → Repair harness or connectors.

OK

Loosen and retighten ground screws.

CHECK VOLTAGE.

1) Reconnect heated oxygen sensor harness connector and ECM harness connector.
2) Start engine and warm it up sufficiently.
B 3) Select "DATA MONITOR" mode with CONSULT.
4) Touch "RECORD" on CONSULT with engine speed held at approximately 2,000 rpm.
C 5) Check "O2 SEN" voltage.
① **Approx. 0.3 volts (No voltage fluctuations) ... NG**
② **Other than ① above ... OK**

OR

D

3) Check voltage between ECM terminal ⑲ and ground, with engine speed held at approximately 2,000 rpm.
① **Approx. 0.3 volts (No voltage fluctuations) ... NG**
② **Other than ① above ... OK**

NG → Replace heated oxygen sensor.

OK

Disconnect and reconnect harness connectors in the circuit, and retest.

Trouble is not fixed.

Check ECM pin terminals for damage or the connection of ECM harness connector. Reconnect ECM harness connector and retest.

HEATED OXYGEN SENSOR (Diagnostic trouble code No. 33) (Malfunction indicator lamp item)

Perform FINAL CHECK by the following procedure after repair is completed.

FINAL CHECK
1) Erase the diagnostic test mode II (Self-diagnostic results) memory. (Refer to EF & EC-48.)
2) Perform test drive. Refer to "How to Execute On-board Diagnostic System in Diagnostic Test Mode II" (EF & EC-65).
3) Perform diagnostic test mode II (Self-diagnostic results) again. (Refer to EF & EC-47.)

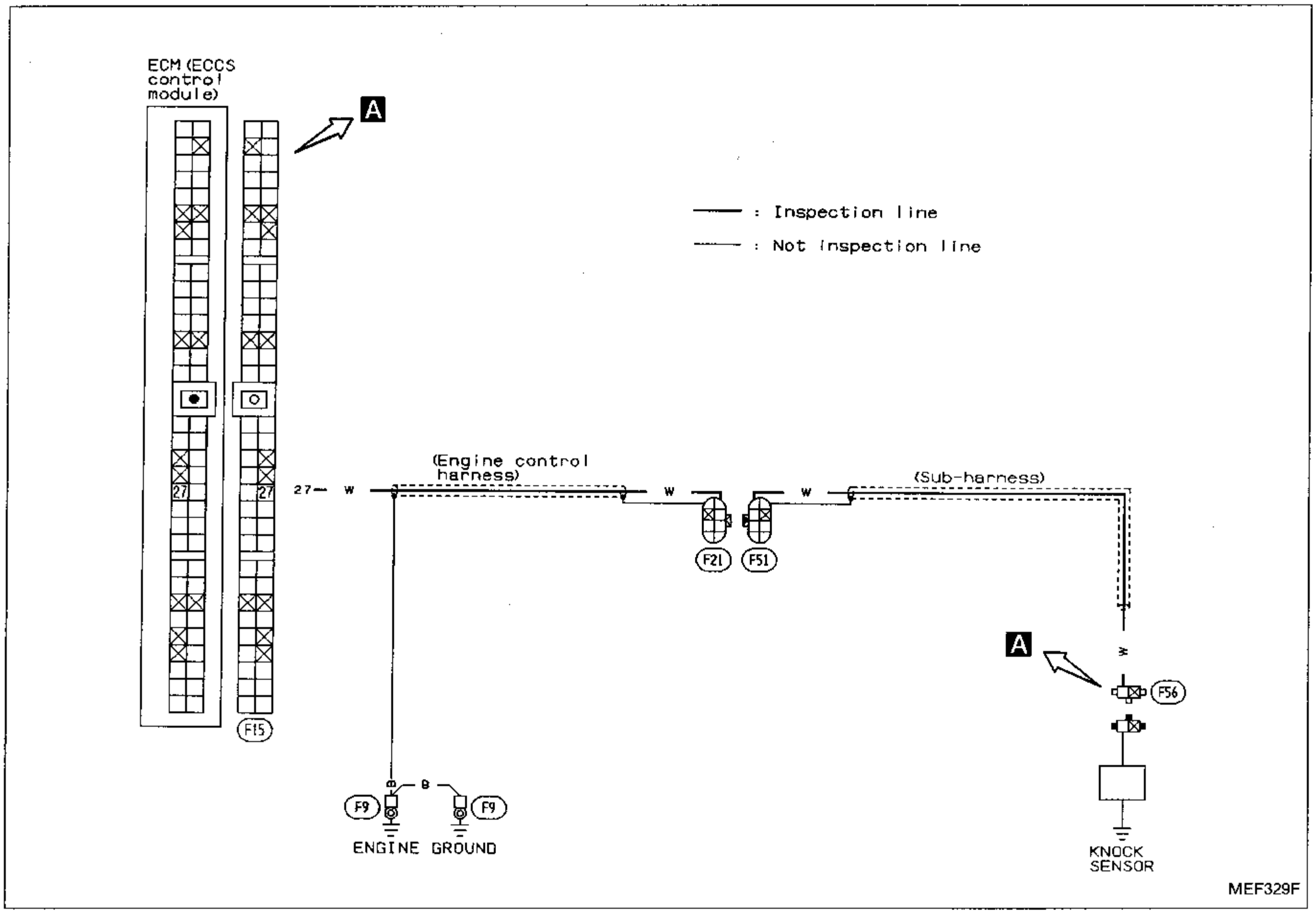
NG → Recheck ECM pin terminals for damage or the connection of ECM harness connector.

↓ OK

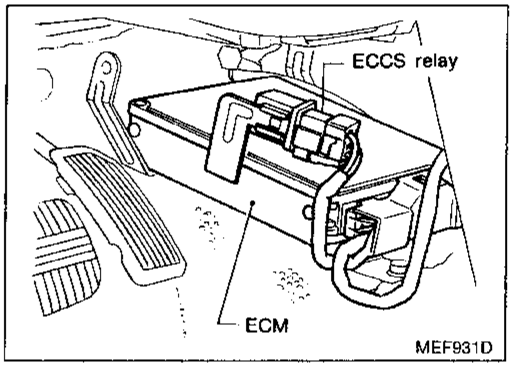
INSPECTION END

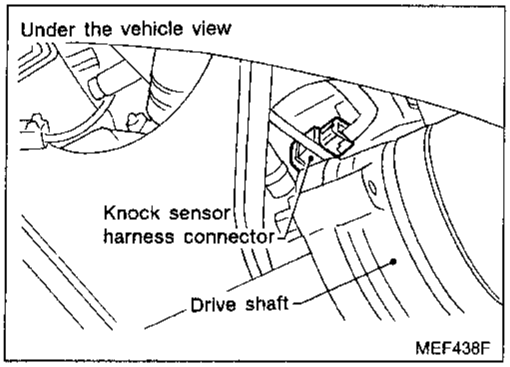
Diagnostic Procedure 10

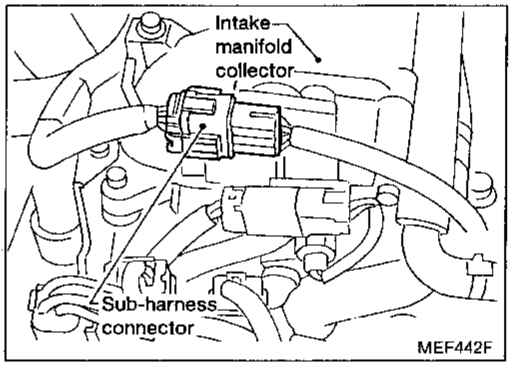
KNOCK SENSOR (Diagnostic trouble code No. 34)

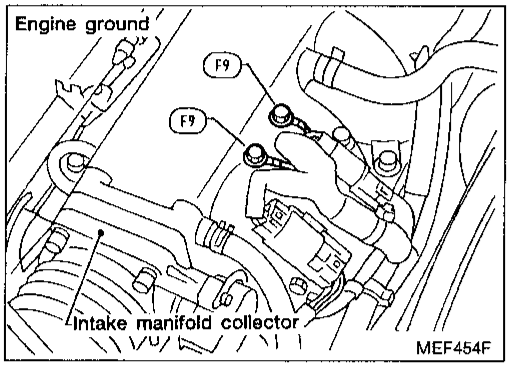


Harness layout

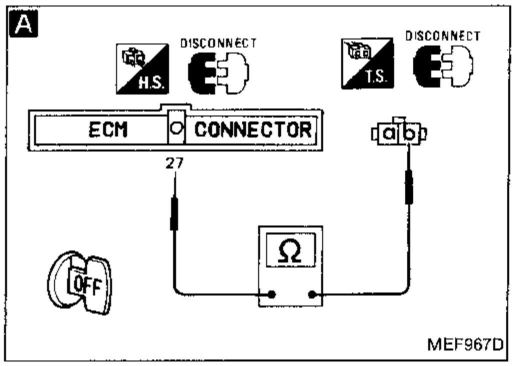








KNOCK SENSOR (Diagnostic trouble code No. 34)



MEF967D

INSPECTION START

↓

PERFORM DIAGNOSTIC TEST MODE II (SELF-DIAGNOSTIC RESULTS).
See page EF & EC-47.

OK → INSPECTION END

↓ NG

Loosen and retighten ground screws.

↓

A

CHECK INPUT SIGNAL CIRCUIT.
1) Turn ignition switch "OFF".
2) Disconnect ECM harness connector and knock sensor harness connector.
3) Check harness continuity between terminal ⓑ and ECM terminal ㉗ .
Continuity should exist.

NG → Check the following.
- Harness connectors, F21 , F51
- Harness continuity between ECM and knock sensor

If NG, repair harness or connectors.

↓ OK

CHECK COMPONENT
(Knock sensor).
Refer to "Electrical Components Inspection".
(See pages EF & EC-185.)

NG → Replace knock sensor.

↓ OK

Disconnect and reconnect harness connectors in the circuit, and retest.

↓ Trouble is not fixed.

Check ECM pin terminals for damage or the connection of ECM harness connector. Reconnect ECM harness connector and retest.

Perform FINAL CHECK by the following procedure after repair is completed.

FINAL CHECK
1) Erase the diagnostic test mode II (Self-diagnostic results) memory.
(Refer to EF & EC-48.)
2) Perform test drive.
Refer to "How to Execute On-board Diagnostic System in Diagnostic Test Mode II" (EF & EC-65).
3) Perform diagnostic test mode II (Self-diagnostic results) again.
(Refer to EF & EC-47.)

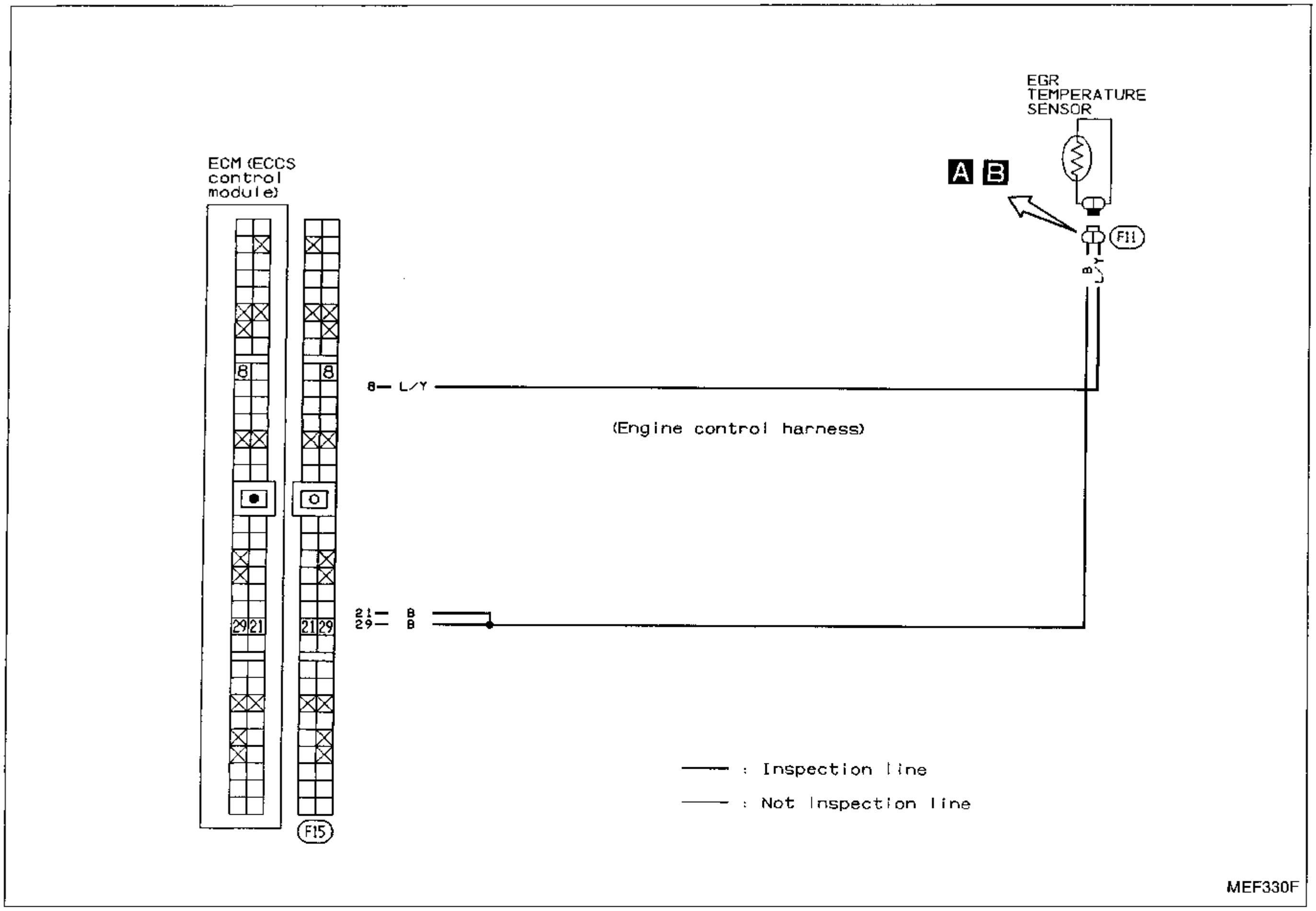
NG → Recheck ECM pin terminals for damage or the connection of ECM harness connector.

↓ OK

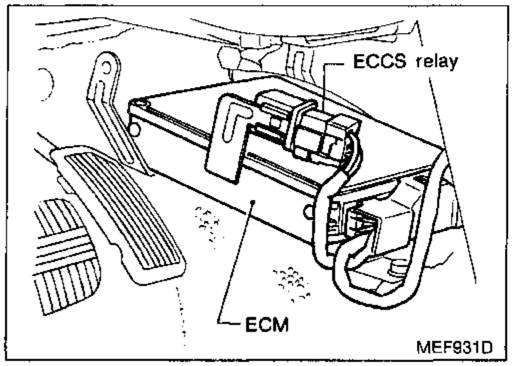
INSPECTION END

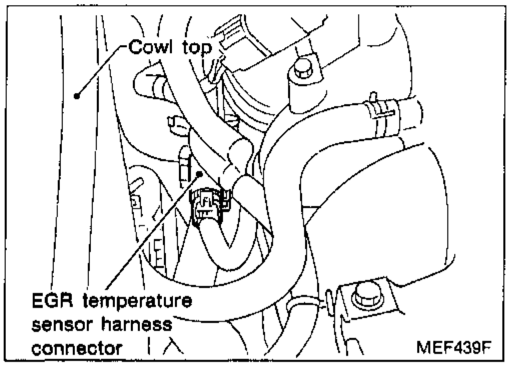
Diagnostic Procedure 11

EGR TEMPERATURE SENSOR (Diagnostic trouble code No. 35) (Malfunction indicator lamp item)



Harness layout

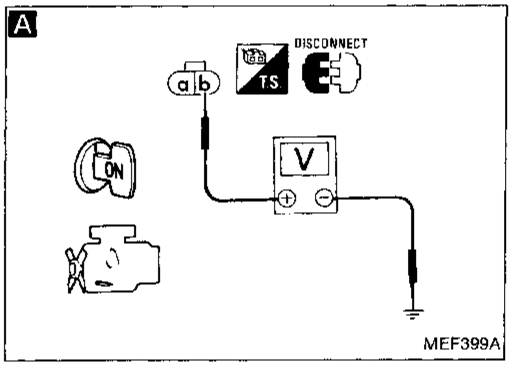




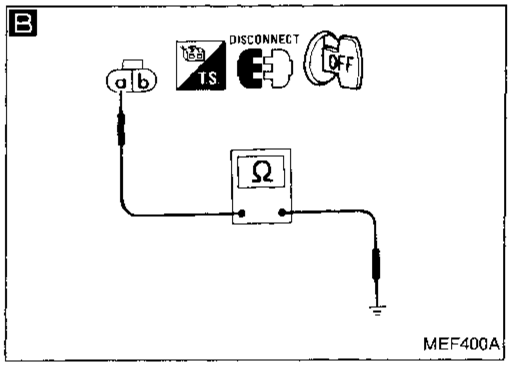
EGR TEMPERATURE SENSOR (Diagnostic trouble code No. 35)

CHECK (Malfunction indicator lamp item)

A



B



INSPECTION START

↓

PERFORM DIAGNOSTIC TEST MODE II (SELF-DIAGNOSTIC RESULTS).
See page EF & EC-47.

OK → INSPECTION END

↓ NG

A CHECK POWER SUPPLY.

1) Turn ignition switch "OFF".
2) Disconnect EGR temperature sensor harness connector.
3) Turn ignition switch "ON".
4) Check voltage between terminal ⓑ and ground with CONSULT or tester.
   Voltage: Approximately 5V

NG → Repair harness or connectors.

↓ OK

B CHECK GROUND CIRCUIT.

1) Turn ignition switch "OFF".
2) Check harness continuity between terminal ⓐ and engine ground.
   Continuity should exist.

NG → Repair harness or connectors.

↓ OK

CHECK COMPONENT
(EGR temperature sensor).
Refer to "Electrical Components Inspection".
(See page EF & EC-187.)

NG → Replace EGR temperature sensor.

↓ OK

Disconnect and reconnect harness connectors in the circuit, and retest.

↓ Trouble is not fixed.

Check ECM pin terminals for damage or the connection of ECM harness connector. Reconnect ECM harness connector and retest.

Perform FINAL CHECK by the following procedure after repair is completed.

FINAL CHECK

1) Erase the diagnostic test mode II (Self-diagnostic results) memory.
   (Refer to EF & EC-48.)
2) Perform test drive.
   Refer to "How to Execute On-board Diagnostic System in Diagnostic Test Mode II" (EF & EC-65).
3) Perform diagnostic test mode II (Self-diagnostic results) again.
   (Refer to EF & EC-47.)

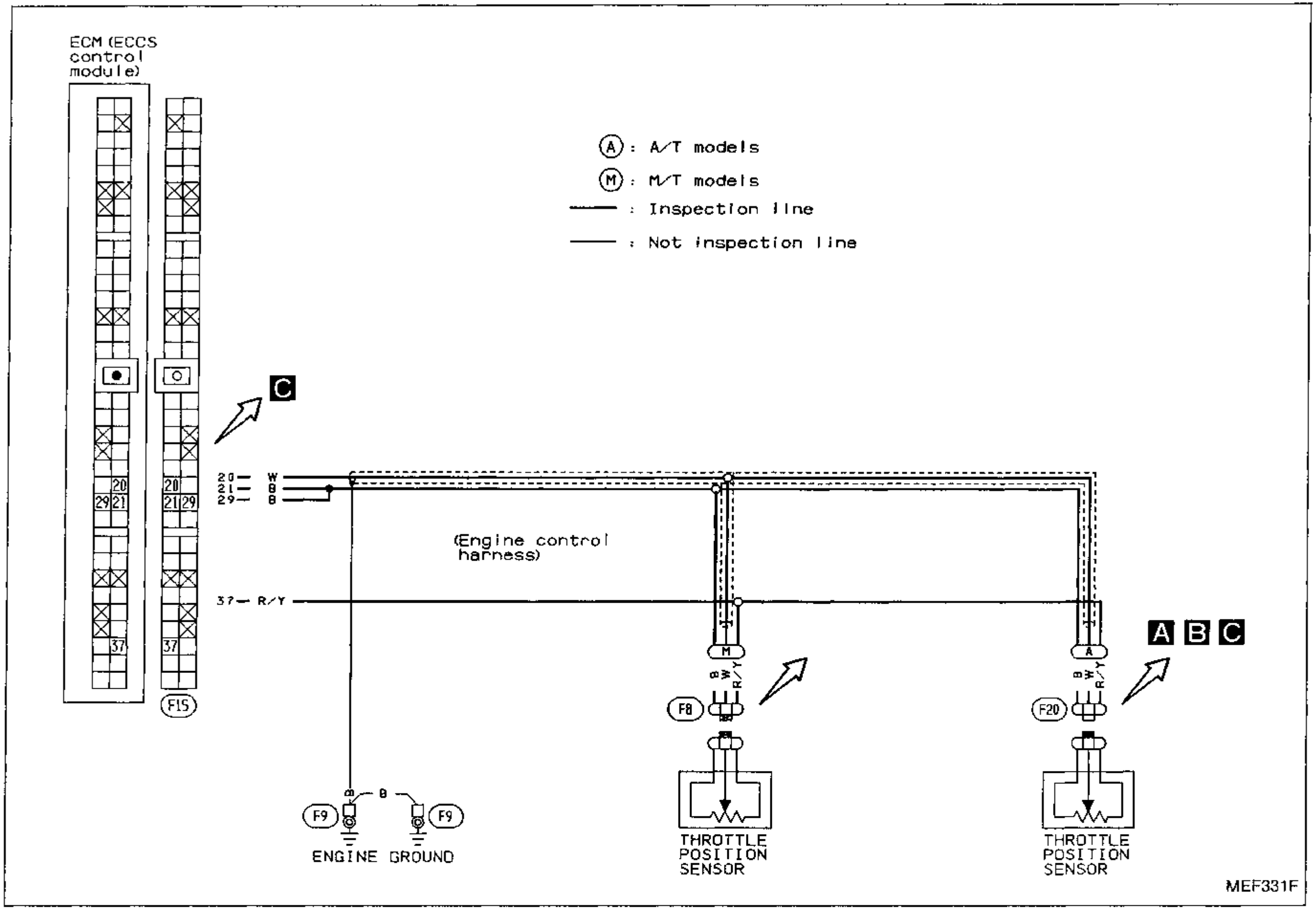
NG → Recheck ECM pin terminals for damage or the connection of ECM harness connector.

↓ OK

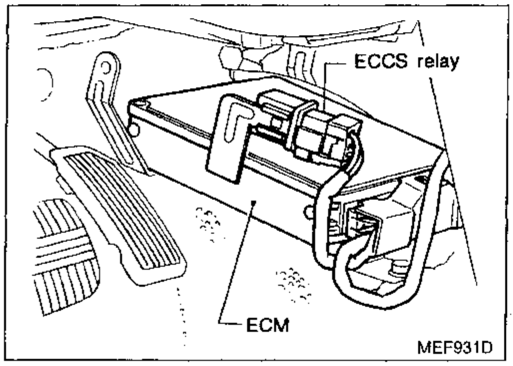
INSPECTION END

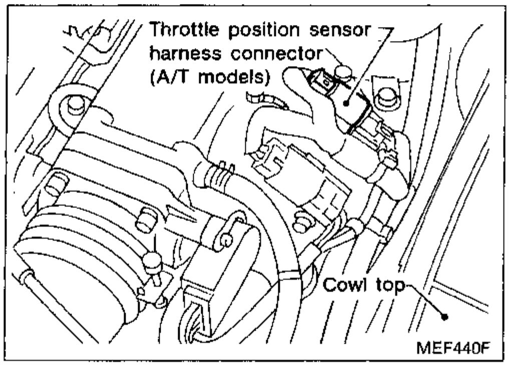
Diagnostic Procedure 12

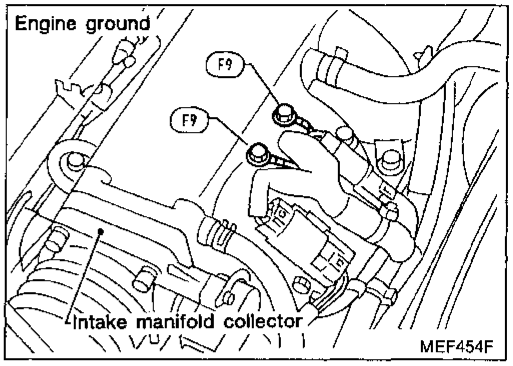
THROTTLE POSITION SENSOR (Diagnostic trouble code No. 43) (Malfunction indicator lamp item)



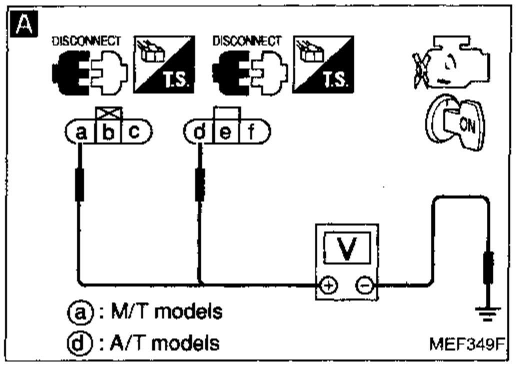
Harness layout

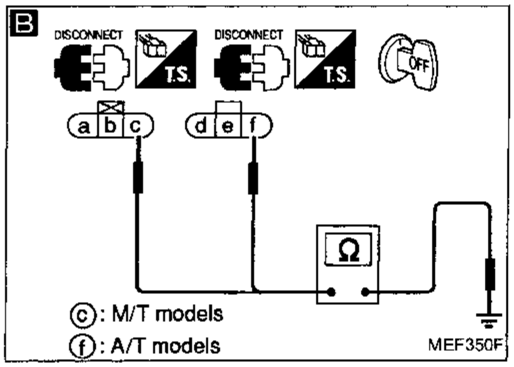


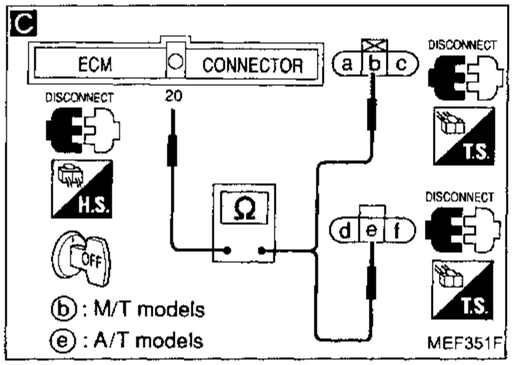




THROTTLE POSITION SENSOR (Diagnostic trouble code No. 43) (Malfunction indicator lamp item)







INSPECTION START

↓

PERFORM DIAGNOSTIC TEST MODE II (SELF-DIAGNOSTIC RESULTS).
See page EF & EC-47.

OK → INSPECTION END

↓ NG

A CHECK POWER SUPPLY.
1) Turn ignition switch "OFF".
2) Disconnect throttle position sensor harness connector.
3) Turn ignition switch "ON".
4) Check voltage between terminal ⓐ or ⓓ and ground with CONSULT or tester.
Voltage: Approximately 5V

NG → Repair harness or connectors.

↓ OK

B CHECK GROUND CIRCUIT.
1) Turn ignition switch "OFF".
2) Loosen and retighten ground screws.
3) Check harness continuity between terminal ⓒ or ⓕ and engine ground.
Continuity should exist.

NG → Repair harness or connectors.

↓ OK

C CHECK INPUT SIGNAL CIRCUIT.
1) Disconnect ECM harness connector.
2) Check harness continuity between ECM terminal ⑳ and terminal ⓑ or ⓔ.
Continuity should exist.

NG → Repair harness or connectors.

↓ OK

CHECK COMPONENT
(Throttle position sensor).
Refer to "Electrical Components Inspection".
(See page EF & EC-183.)

NG → Replace throttle position sensor.

↓ OK

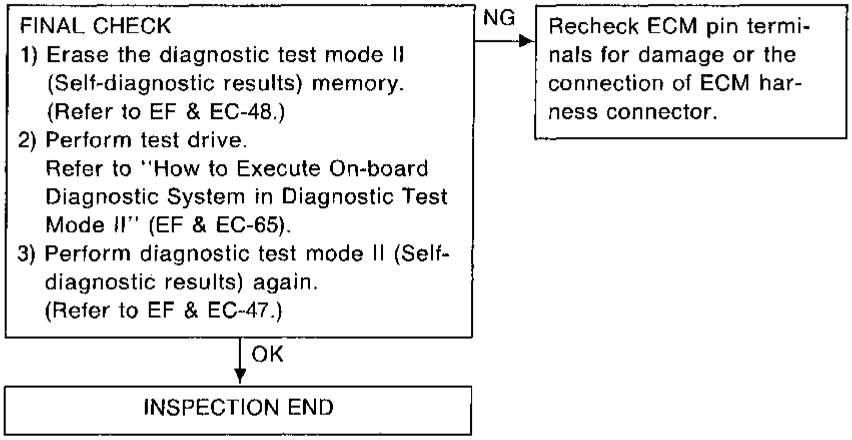
Disconnect and reconnect harness connectors in the circuit, and retest.

↓ Trouble is not fixed.

Check ECM pin terminals for damage or the connection of ECM harness connector. Reconnect ECM harness connector and retest.

THROTTLE POSITION SENSOR (Diagnostic trouble code No. 43) (Malfunction indicator lamp item)

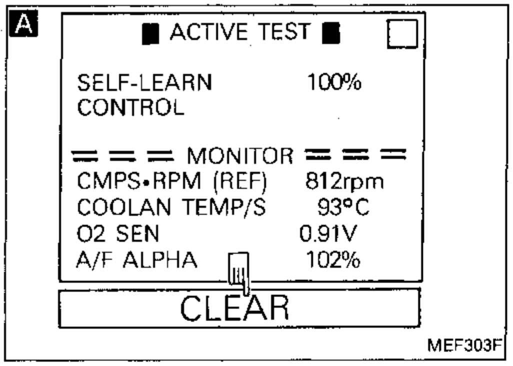
Perform FINAL CHECK by the following procedure after repair is completed.



FINAL CHECK
1) Erase the diagnostic test mode II (Self-diagnostic results) memory. (Refer to EF & EC-48.)
2) Perform test drive. Refer to "How to Execute On-board Diagnostic System in Diagnostic Test Mode II" (EF & EC-65).
3) Perform diagnostic test mode II (Self-diagnostic results) again. (Refer to EF & EC-47.)

Recheck ECM pin terminals for damage or the connection of ECM harness connector.

INSPECTION END


A

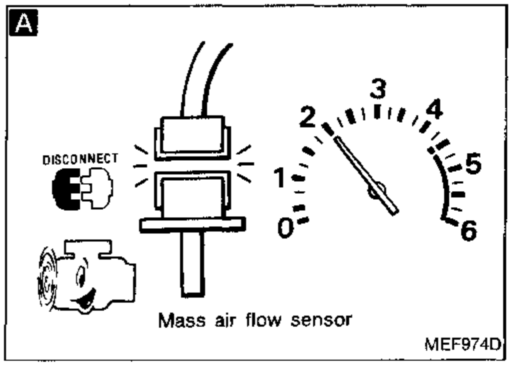
■ ACTIVE TEST ■ ☐

SELF-LEARN CONTROL 100%

=== MONITOR ===
CMPS•RPM (REF) 812rpm
COOLAN TEMP/S 93°C
O2 SEN 0.91V
A/F ALPHA 102%

CLEAR

MEF303F



Diagnostic Procedure 13

INJECTOR LEAK (Diagnostic trouble code No. 45) (Malfunction indicator lamp item)

INSPECTION START

↓

A

Clear the self-learning data
1) Start engine and warm it up sufficiently.
2) Select "SELF-LEARNING CONT" in "ACTIVE TEST" mode with CONSULT.
3) Clear the self-learning control coefficient by touching "CLEAR".

OR

2) Disconnect mass air flow sensor harness connector, and restart and run engine for at least 30 seconds at 2,000 rpm.
3) Stop engine and reconnect mass air flow sensor harness connector.
4) Make sure diagnostic trouble code No. 12 is displayed in Diagnostic Test Mode II.
5) Erase the diagnostic test mode II (Self-diagnostic results) memory. Make sure diagnostic trouble code No. 55 is displayed in Diagnostic Test Mode II.

↓

PERFORM DIAGNOSTIC TEST MODE II (SELF-DIAGNOSTIC RESULTS).
See page EF & EC-47.

OK → INSPECTION END

↓ NG

Remove injector assembly.
(See page EF & EC-190.)
Keep fuel hose and all injectors connected to injector gallery.

↓

Turn ignition switch "ON".
Make sure fuel does not drip from injector.

Drips → Replace the injectors from which fuel is dripping.

↓ Does not drip

Disconnect and reconnect harness connectors in the circuit, and retest.

↓ Trouble is not fixed.

Check ECM pin terminals for damage or the connection of ECM harness connector. Reconnect ECM harness connector and retest.

INJECTOR LEAK (Diagnostic trouble code No. 45) (Malfunction indicator lamp item)

Perform FINAL CHECK by the following procedure after repair is completed.

FINAL CHECK
1) Erase the diagnostic test mode II (Self-diagnostic results) memory. (Refer to EF & EC-48.)
2) Clear the self-learning data again. (See previous page.)
3) Perform test drive. Refer to "How to Execute On-board Diagnostic System in Diagnostic Test Mode II" (EF & EC-65).
4) Perform diagnostic test mode II (Self-diagnostic results) again. (Refer to EF & EC-47.)

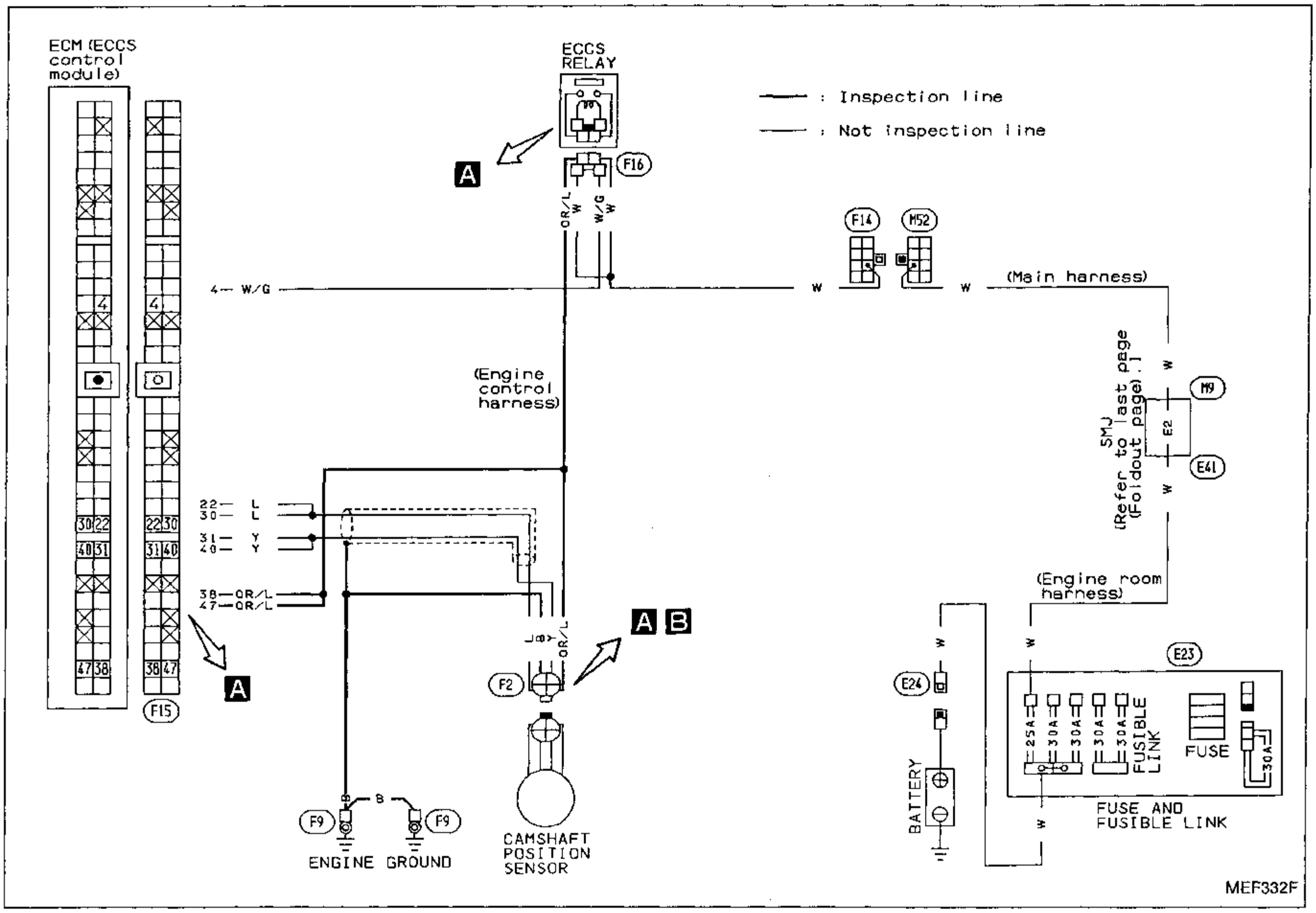
NG → Recheck ECM pin terminals for damage or the connection of ECM harness connector.

↓ OK

INSPECTION END

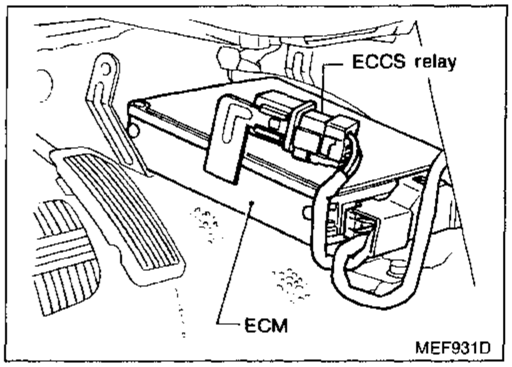
Diagnostic Procedure 14

CAMSHAFT POSITION SENSOR (Not self-diagnostic item)

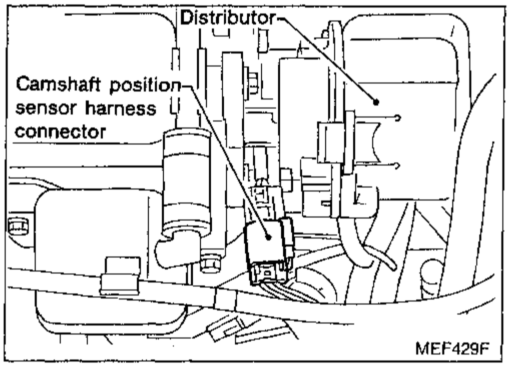


MEF332F

Harness layout



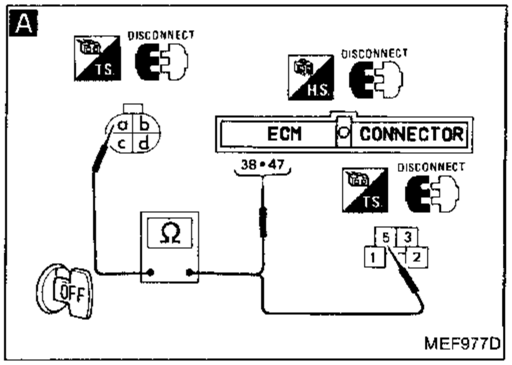
MEF931D

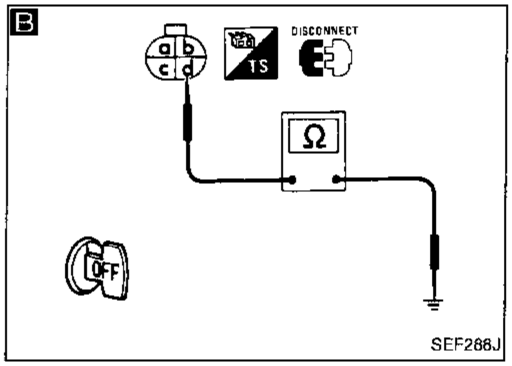


MEF429F

GI
MA
EM
LC
EF & EC
FE
CL
MT
AT
FA
RA
BR
ST
BF
HA
EL
IDX

CAMSHAFT POSITION SENSOR (Not self-diagnostic item)





INSPECTION START

A

CHECK POWER SUPPLY CIRCUIT.
1) Turn ignition switch "OFF".
2) Disconnect camshaft position sensor harness connector.
3) Disconnect ECM harness connector and ECCS relay.
4) Check harness continuity between terminal ⓐ and terminal ⑤, ECM terminals ㊳, ㊼.
Continuity should exist.

NG → Repair harness or connectors.

OK

B

CHECK GROUND CIRCUIT.
1) Check harness continuity between terminal ⓓ and engine ground.
Continuity should exist.

NG → Repair harness or connectors.

OK

CHECK COMPONENT
(Camshaft position sensor).
Refer to "Electrical Components Inspection".
(See page EF & EC-181.)

NG → Replace camshaft position sensor.

OK

Disconnect and reconnect harness connectors in the circuit, and retest.

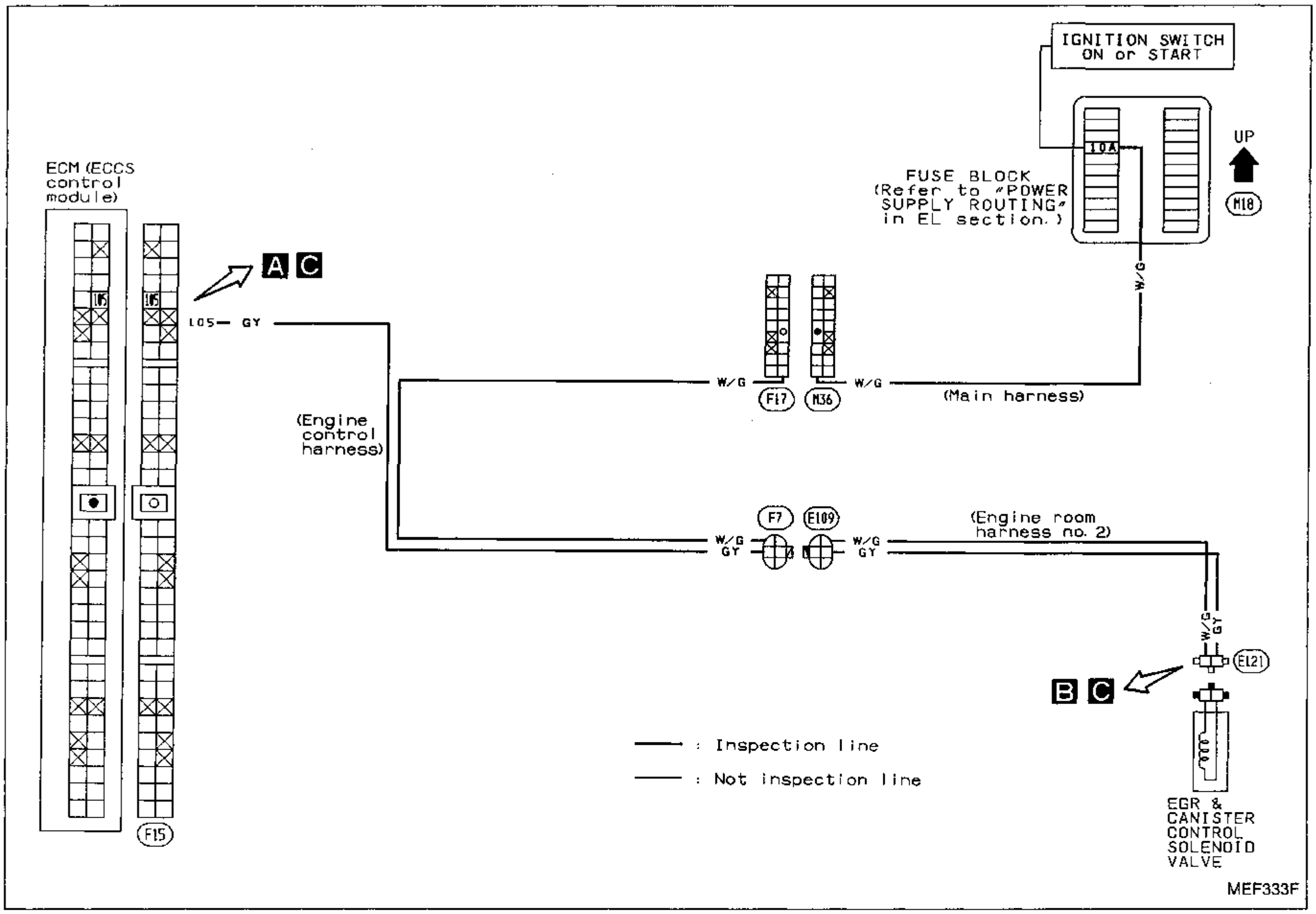
Trouble is not fixed.

Check ECM pin terminals for damage or the connection of ECM harness connector. Reconnect ECM harness connector and retest.

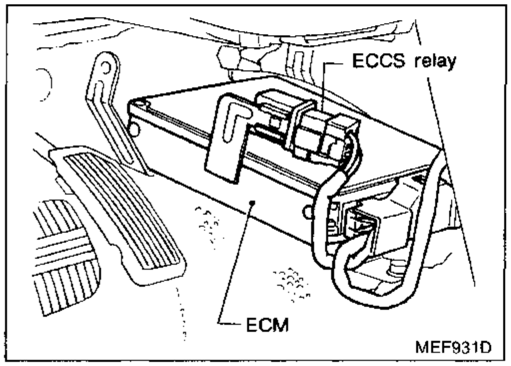
INSPECTION END

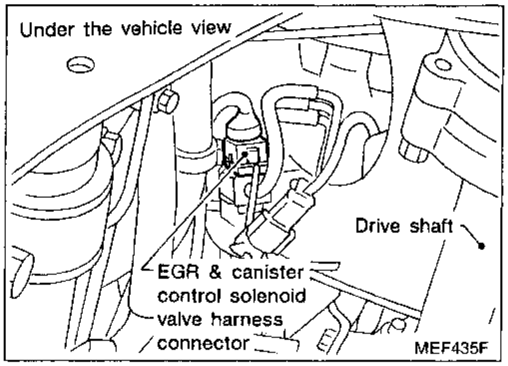
Diagnostic Procedure 15

EGR CONTROL (Not self-diagnostic item)



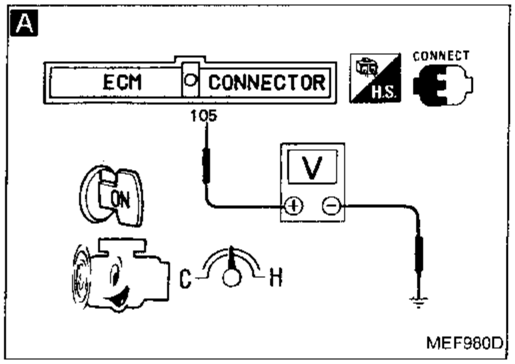
Harness layout



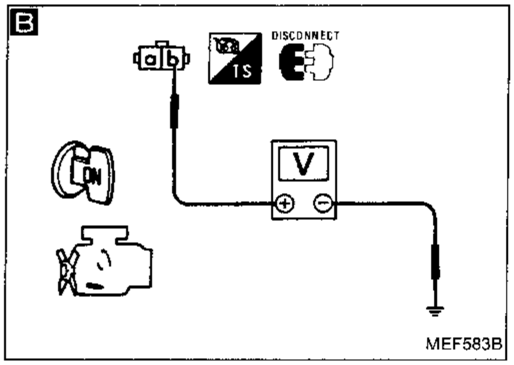


EGR CONTROL (Not self-diagnostic item)

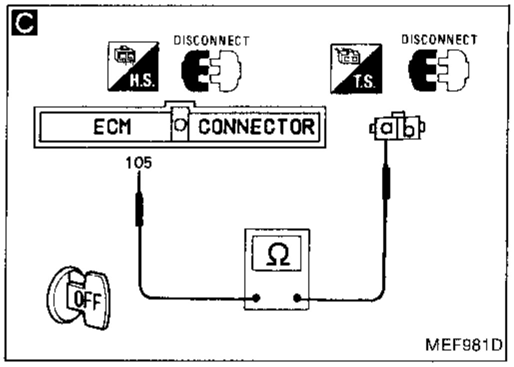
A



B



C



INSPECTION START

↓

A

CHECK CONTROL FUNCTION.
1) Start engine and warm it up sufficiently.
2) Check voltage between ECM terminal (105) and ground under the following conditions with CONSULT or tester.
Voltage:
Engine speed is 4,000 rpm
0.6 - 0.8V
Engine speed is 2,000 rpm
Battery voltage

OK → Go to "CHECK COMPONENT (EGR & canister control solenoid valve)".

NG ↓

B

CHECK POWER SUPPLY.
1) Stop engine.
2) Disconnect EGR & canister control solenoid valve harness connector.
3) Turn ignition switch "ON".
4) Check voltage between terminal ⓑ and ground with CONSULT or tester.
Voltage: Battery voltage

NG → Check the following.
- Harness connectors (F17), (M36)
- Harness connectors (F7), (E109)
- 10A fuse
- Harness continuity between EGR & canister control solenoid valve and fuse

If NG, repair harness or connectors.

OK ↓

C

CHECK OUTPUT SIGNAL CIRCUIT.
1) Turn ignition switch "OFF".
2) Disconnect ECM harness connector.
3) Check harness continuity between ECM terminal (105) and terminal ⓐ.
Continuity should exist.

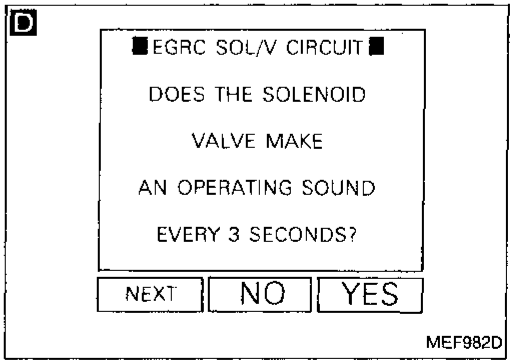
NG → Check the following.
- Harness connectors (F7), (E109)
- Harness continuity between ECM and EGR & canister control solenoid valve

If NG, repair harness or connectors.

OK ↓

Ⓐ

EGR CONTROL (Not self-diagnostic item)

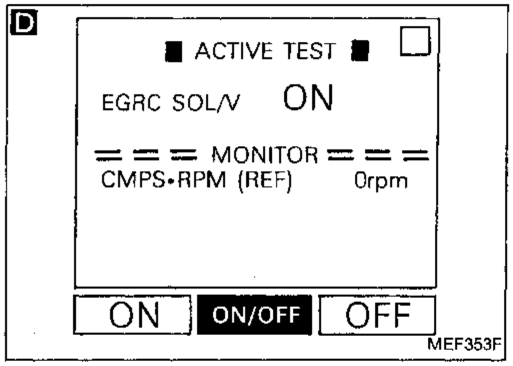

D

■EGRC SOL/V CIRCUIT■

DOES THE SOLENOID VALVE MAKE AN OPERATING SOUND EVERY 3 SECONDS?

NEXT | NO | YES

MEF982D


D

■ ACTIVE TEST ■ ☐

EGRC SOL/V ON

=== MONITOR ===

CMPS•RPM (REF) 0rpm

ON | ON/OFF | OFF

MEF353F

Ⓐ

D

CHECK COMPONENT
(EGR & canister control solenoid valve).

1) Reconnect ECM harness connector and EGR & canister control solenoid valve harness connector.
2) Turn ignition switch "ON".
3) Perform "EGRC SOL/V CIRCUIT" in "FUNCTION TEST" mode with CONSULT.

OR

1) Reconnect ECM harness connector and EGR & canister control solenoid valve harness connector.
2) Turn ignition switch "ON".
3) Turn EGR & canister control solenoid valve "ON" and "OFF" in "ACTIVE TEST" mode with CONSULT and check operating sound.

OR

Refer to "Electrical Components Inspection".
(See page EF & EC-186.)

NG → Replace EGR & canister control solenoid valve.

OK ↓

Disconnect and reconnect harness connectors in the circuit, and retest.

Trouble is not fixed. ↓

Check ECM pin terminals for damage or the connection of ECM harness connector. Reconnect ECM harness connector and retest.

↓

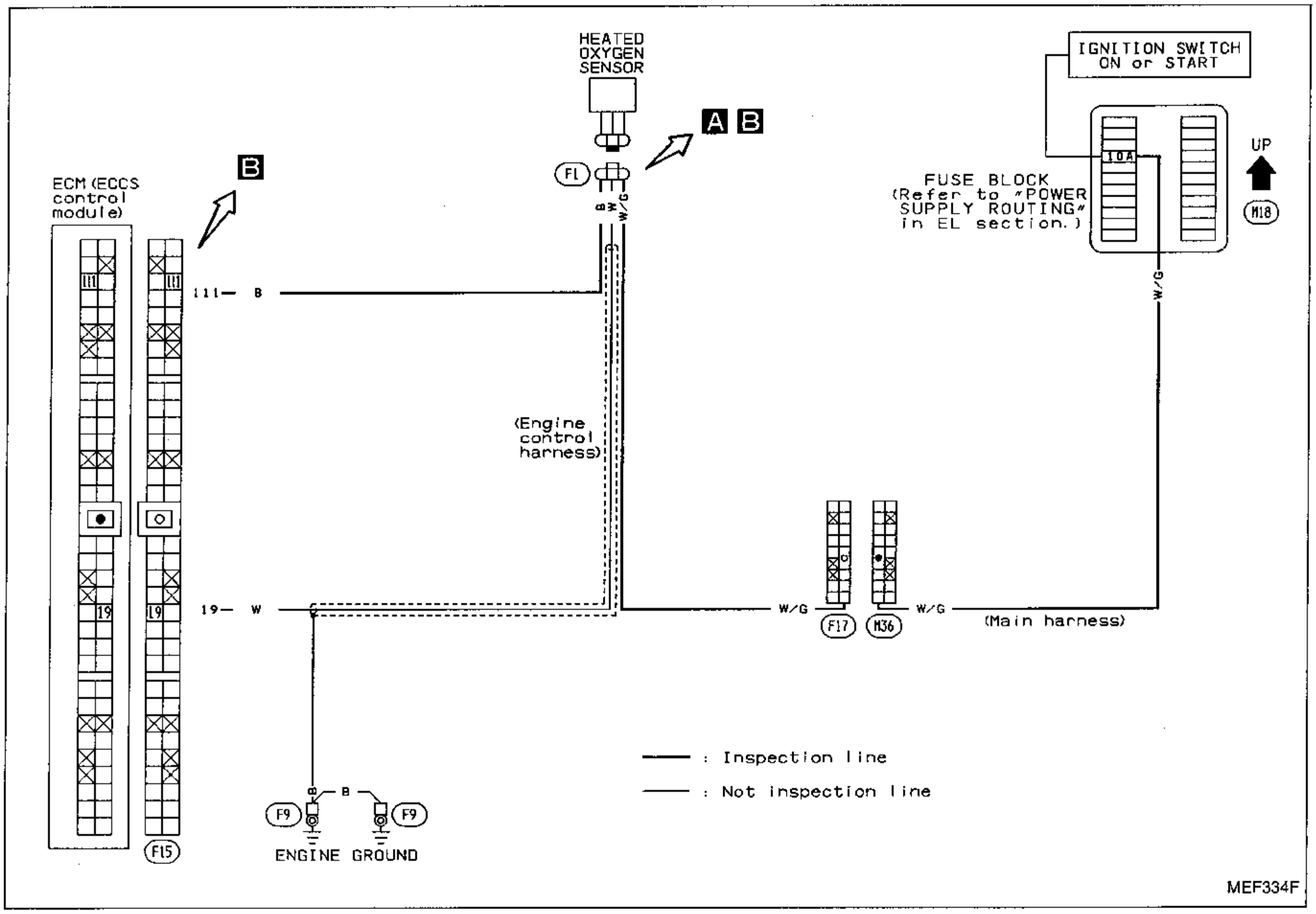
Check resistance of EGR temperature sensor.
(See page EF & EC-187.)

↓

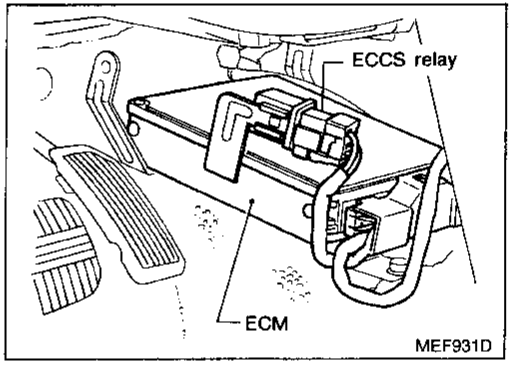
INSPECTION END

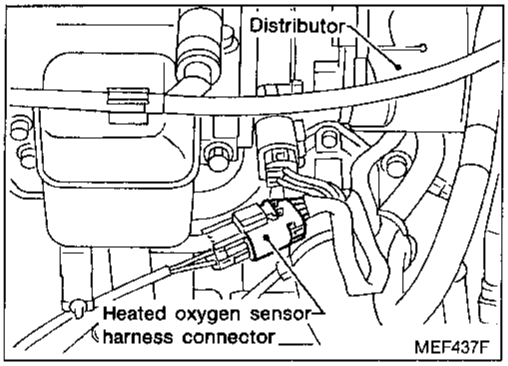
Diagnostic Procedure 16

HEATED OXYGEN SENSOR HEATER (Not self-diagnostic item)

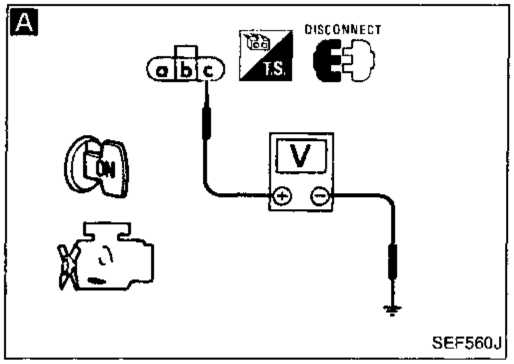


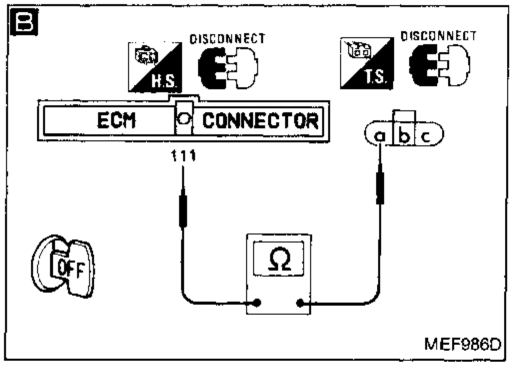
Harness layout





HEATED OXYGEN SENSOR HEATER (Not self-diagnostic item)





INSPECTION START

A

CHECK POWER SUPPLY.
1) Disconnect heated oxygen sensor harness connector.
2) Turn ignition switch "ON".
3) Check voltage between terminal ⓒ and ground.
Voltage: Battery voltage

NG → Check the following.
- Harness connectors F17, M36
- 10A fuse
- Harness continuity between heated oxygen sensor and fuse

If NG, repair harness or connectors.

OK ↓

B

CHECK GROUND CIRCUIT.
1) Turn ignition switch "OFF".
2) Disconnect ECM harness connector.
3) Check harness continuity between terminal ⓐ and ECM terminal (111).
Continuity should exist.

NG → Repair harness or connectors.

OK ↓

CHECK COMPONENT
(Heated oxygen sensor heater).
Refer to "Electrical Components Inspection".
(See page EF & EC-183.)

NG → Replace heated oxygen sensor.

OK ↓

Disconnect and reconnect harness connectors in the circuit, and retest.

Trouble is not fixed. ↓

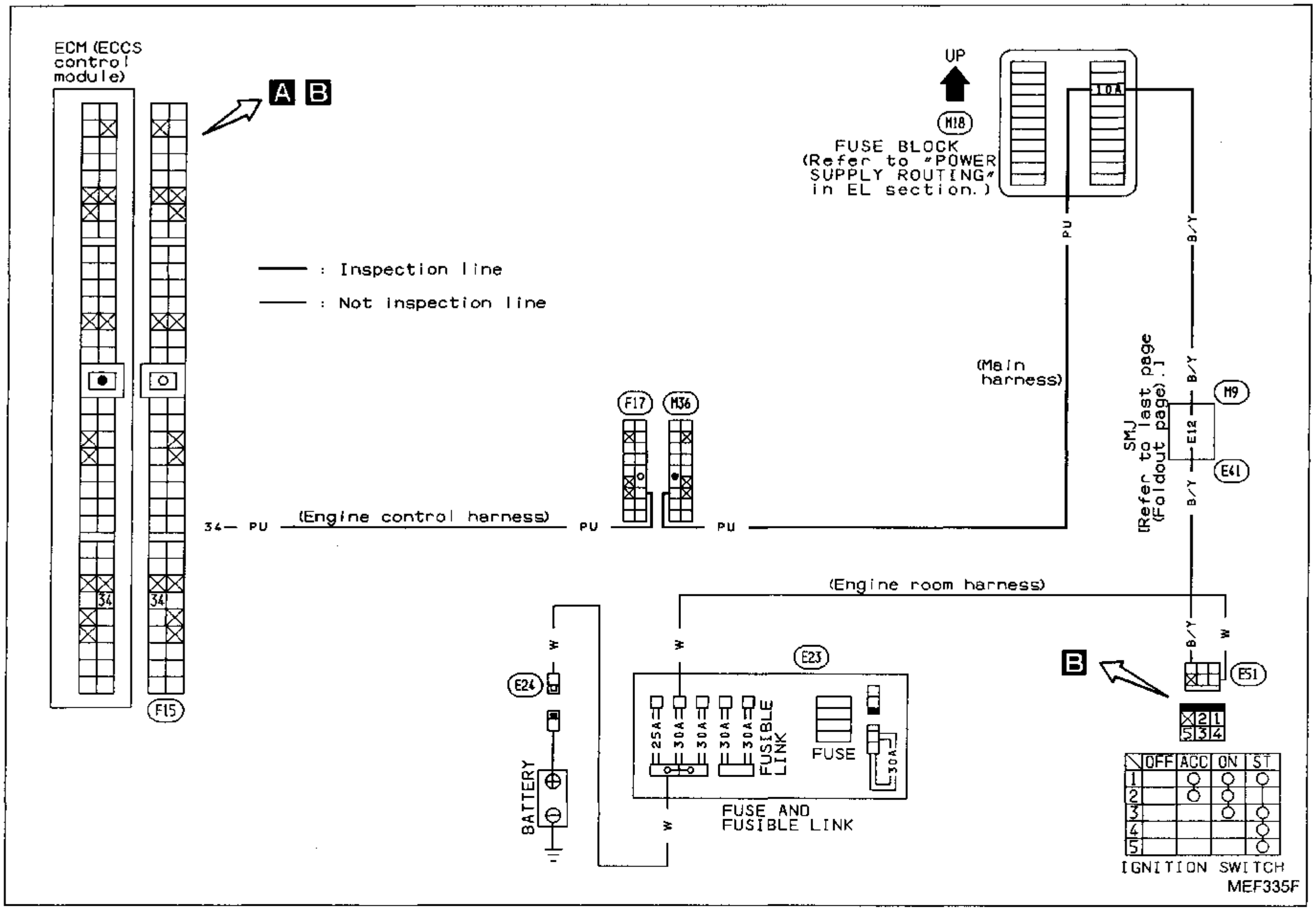
Check ECM pin terminals for damage or the connection of ECM harness connector. Reconnect ECM harness connector and retest.

↓

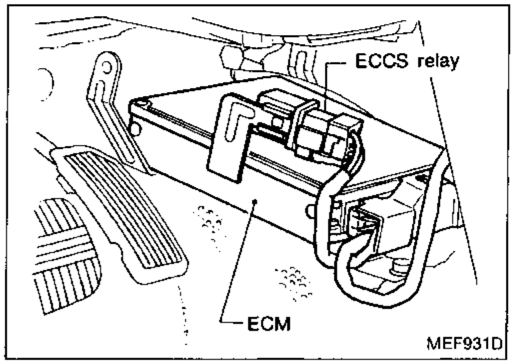
INSPECTION END

Diagnostic Procedure 17

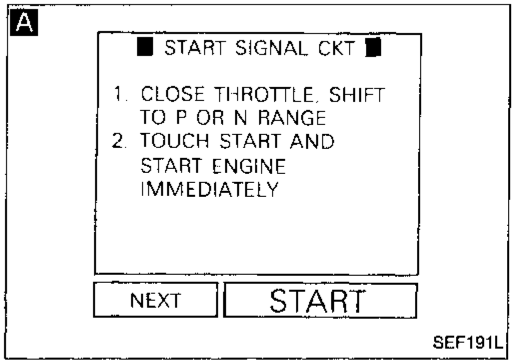
START SIGNAL (Not self-diagnostic item)



Harness layout



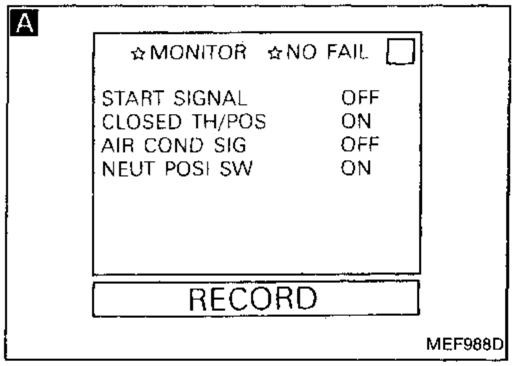
START SIGNAL (Not self-diagnostic item)



■ START SIGNAL CKT ■

1. CLOSE THROTTLE, SHIFT TO P OR N RANGE
2. TOUCH START AND START ENGINE IMMEDIATELY

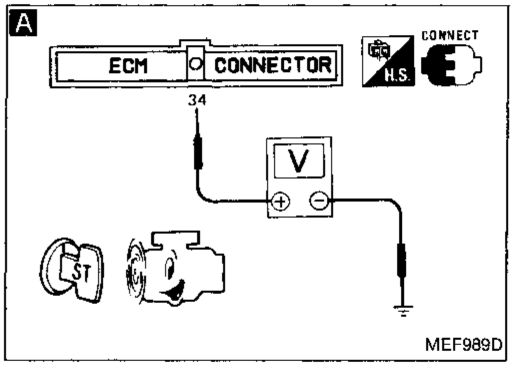
SEF191L



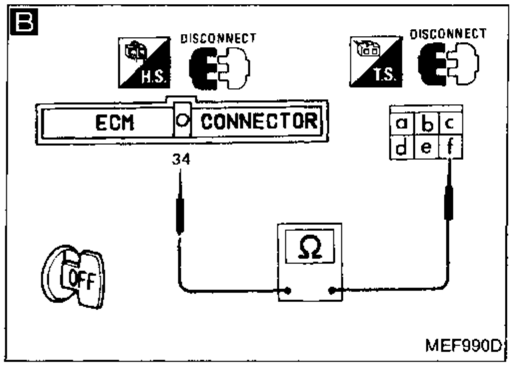
☆MONITOR ☆NO FAIL ☐

START SIGNAL	OFF
CLOSED TH/POS	ON
AIR COND SIG	OFF
NEUT POSI SW	ON

MEF988D



MEF989D



MEF990D

INSPECTION START

A

CHECK OVERALL FUNCTION.

1) Turn ignition switch "ON".
2) Perform "START SIGNAL CKT" in "FUNCTION TEST" mode with CONSULT.

— OR —

1) Turn ignition switch "ON".
2) Check "START SIGNAL" in "DATA MONITOR" mode with CONSULT.

IGN "ON"	OFF
IGN "START"	ON

— OR —

1) Turn ignition switch to "START".
2) Check voltage between ECM terminal ㉞ and ground.

Voltage:

Ignition switch "START"

Battery voltage

Except above

Approximately 0V

OK → INSPECTION END

NG ↓

B

CHECK INPUT SIGNAL CIRCUIT.

1) Turn ignition switch "OFF".
2) Disconnect ECM harness connector and ignition switch harness connector.
3) Check harness continuity between ECM terminal ㉞ and terminal ⓕ.

Continuity should exist.

NG → Check the following.
- Harness connectors F17, M36
- Harness connectors M9, E41
- 10A fuse
- Harness continuity between ECM and ignition switch

If NG, repair harness or connectors.

OK ↓

Disconnect and reconnect harness connectors in the circuit, and retest.

↓ Trouble is not fixed.

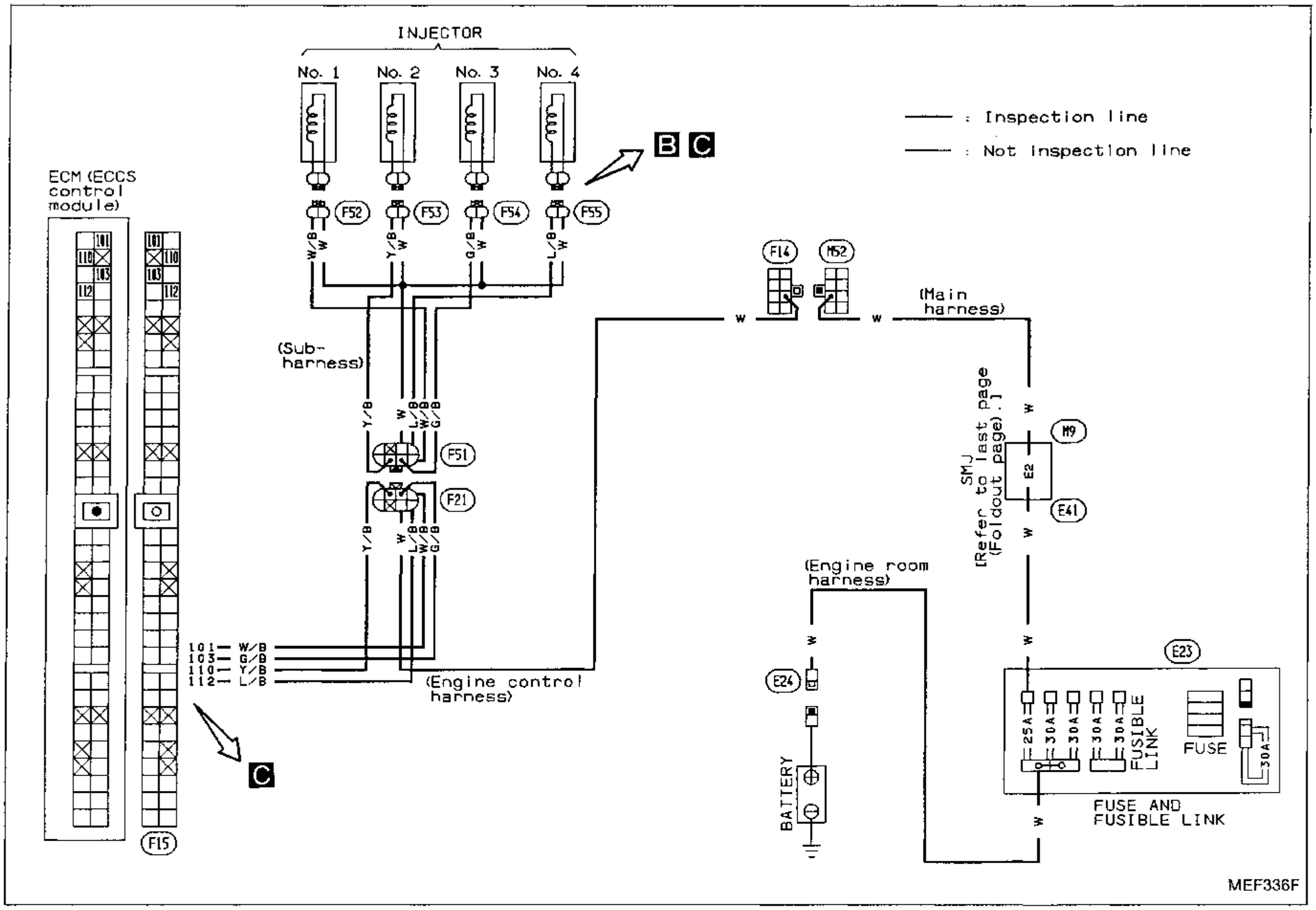
Check ECM pin terminals for damage or the connection of ECM harness connector. Reconnect ECM harness connector and retest.

↓

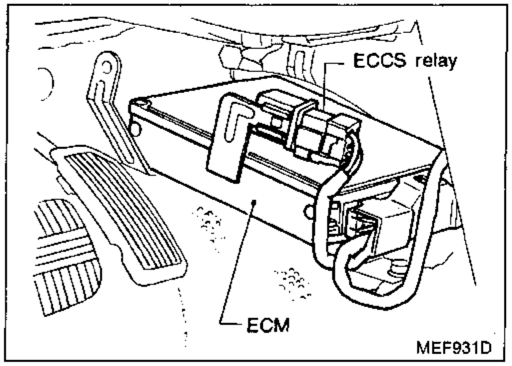
INSPECTION END

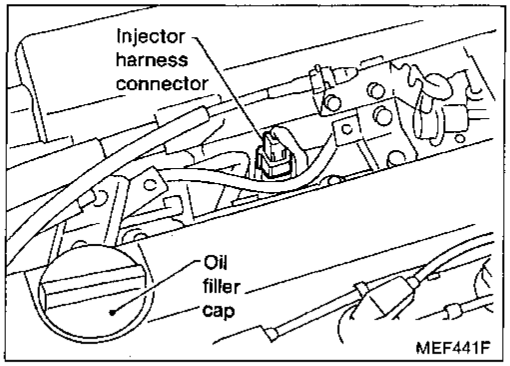
Diagnostic Procedure 18

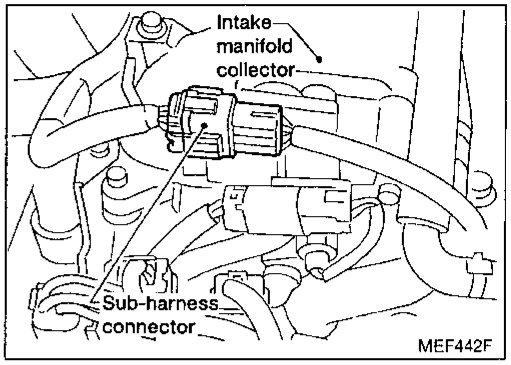
INJECTOR (Not self-diagnostic item)



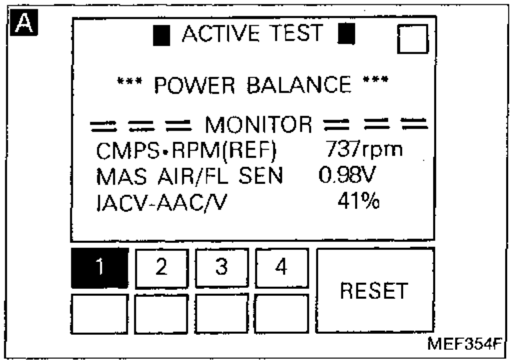
Harness layout







INJECTOR (Not self-diagnostic item)



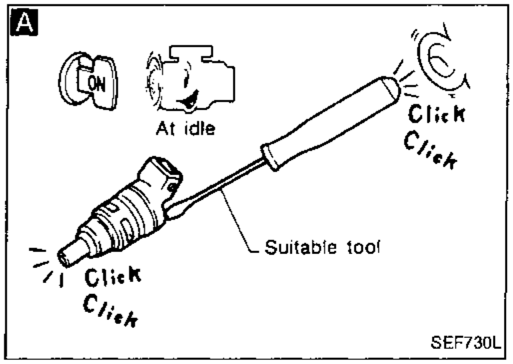
■ ACTIVE TEST ■ ☐

*** POWER BALANCE ***

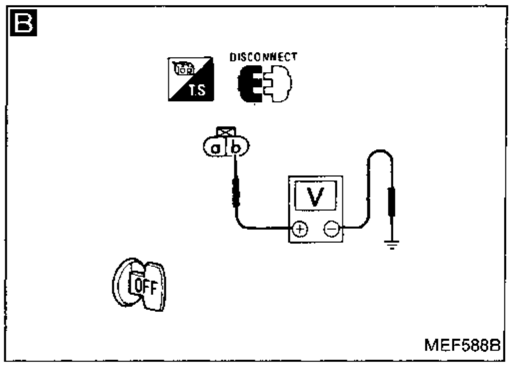
═══ MONITOR ═══

```
CMPS•RPM(REF)     737rpm
MAS AIR/FL SEN    0.98V
IACV-AAC/V          41%
```

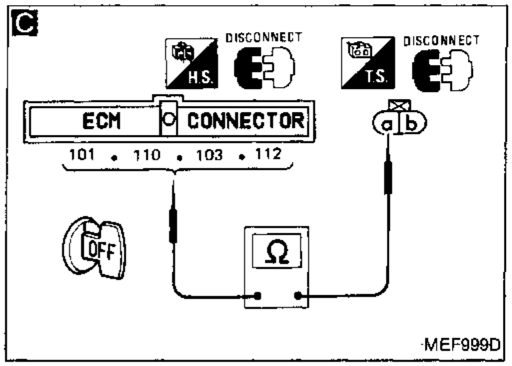
MEF354F



SEF730L



MEF588B



MEF999D

INSPECTION START

A

CHECK OVERALL FUNCTION.
1) Start engine.
2) Perform "POWER BALANCE" in "ACTIVE TEST" mode with CONSULT.
3) Make sure that each circuit produces a momentary engine speed drop.

— OR —

2) Listen to each injector operating sound.
Clicking noise should be heard.

OK → INSPECTION END

NG

B

CHECK POWER SUPPLY.
1) Stop engine.
2) Disconnect injector harness connector.
3) Check voltage between terminal ⓑ and ground with CONSULT or tester.
Voltage: Battery voltage

NG → Check the following.
- Harness connectors F21, F51
- Harness connectors F14, M52
- Harness connectors M9, E41
- 25A fusible link
- Harness continuity between injector and battery

If NG, repair harness or connectors.

OK

C

CHECK OUTPUT SIGNAL CIRCUIT.
1) Disconnect ECM harness connector.
2) Check harness continuity between terminal ⓐ and ECM terminals 101, 103, 110, 112.
Continuity should exist.

NG → Check the following.
- Harness connectors F21, F51
- Harness continuity between ECM and injector

If NG, repair harness or connectors.

OK

CHECK COMPONENT (Injector).
Refer to "Electrical Components Inspection".
(See page EF & EC-186.)

NG → Replace injector.

OK

Disconnect and reconnect harness connectors in the circuit, and retest.

Trouble is not fixed.

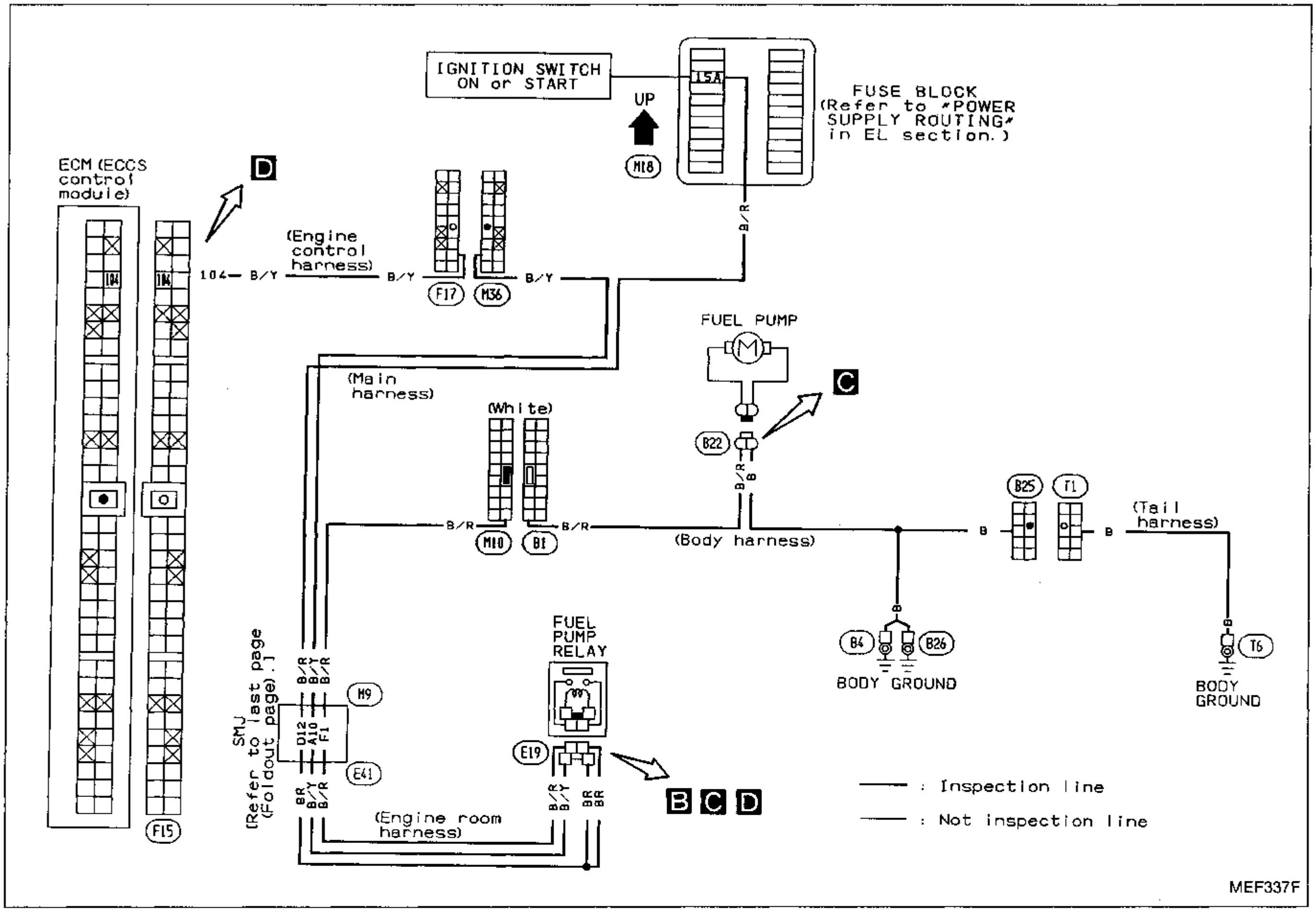
Check ECM pin terminals for damage or the connection of ECM harness connector. Reconnect ECM harness connector and retest.

INSPECTION END

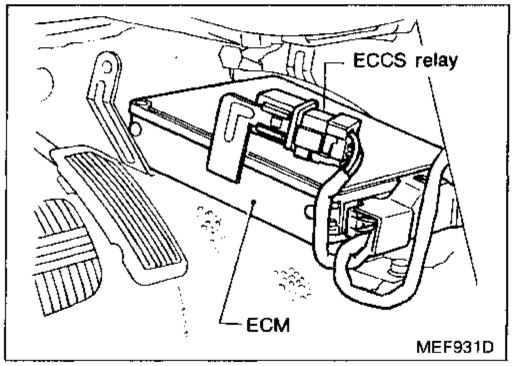
GI
MA
EM
LC
EF & EC
FE
CL
MT
AT
FA
RA
BR
ST
BF
HA
EL
IDX

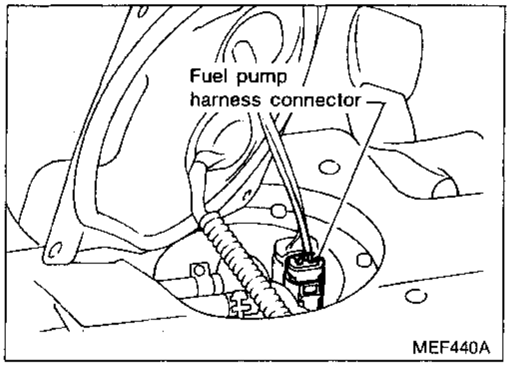
Diagnostic Procedure 19

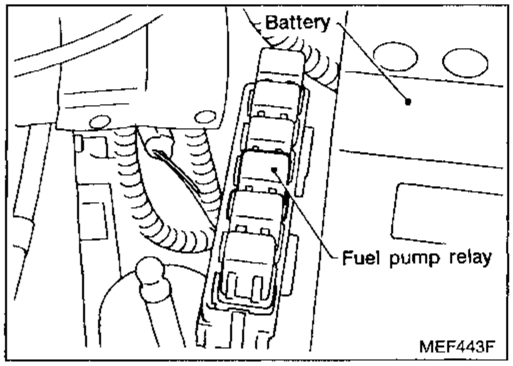
FUEL PUMP (Not self-diagnostic item)



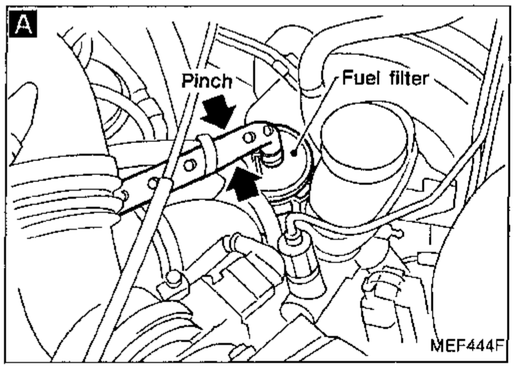
Harness layout

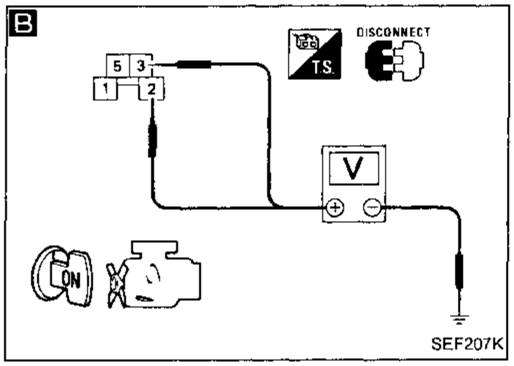


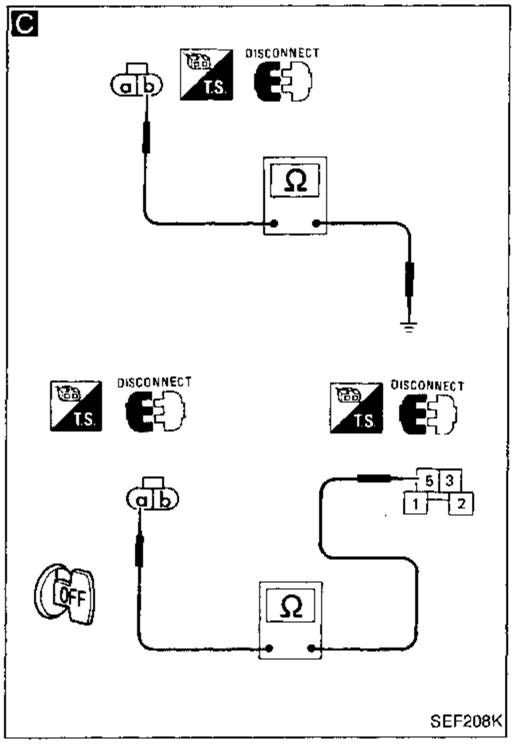


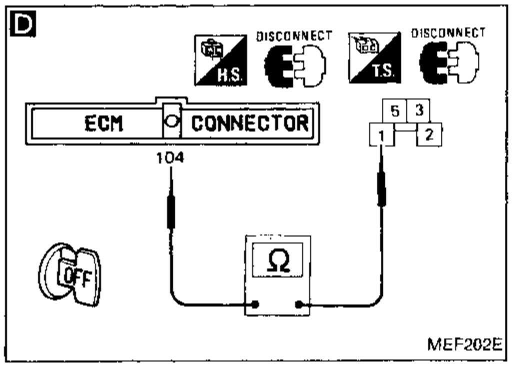


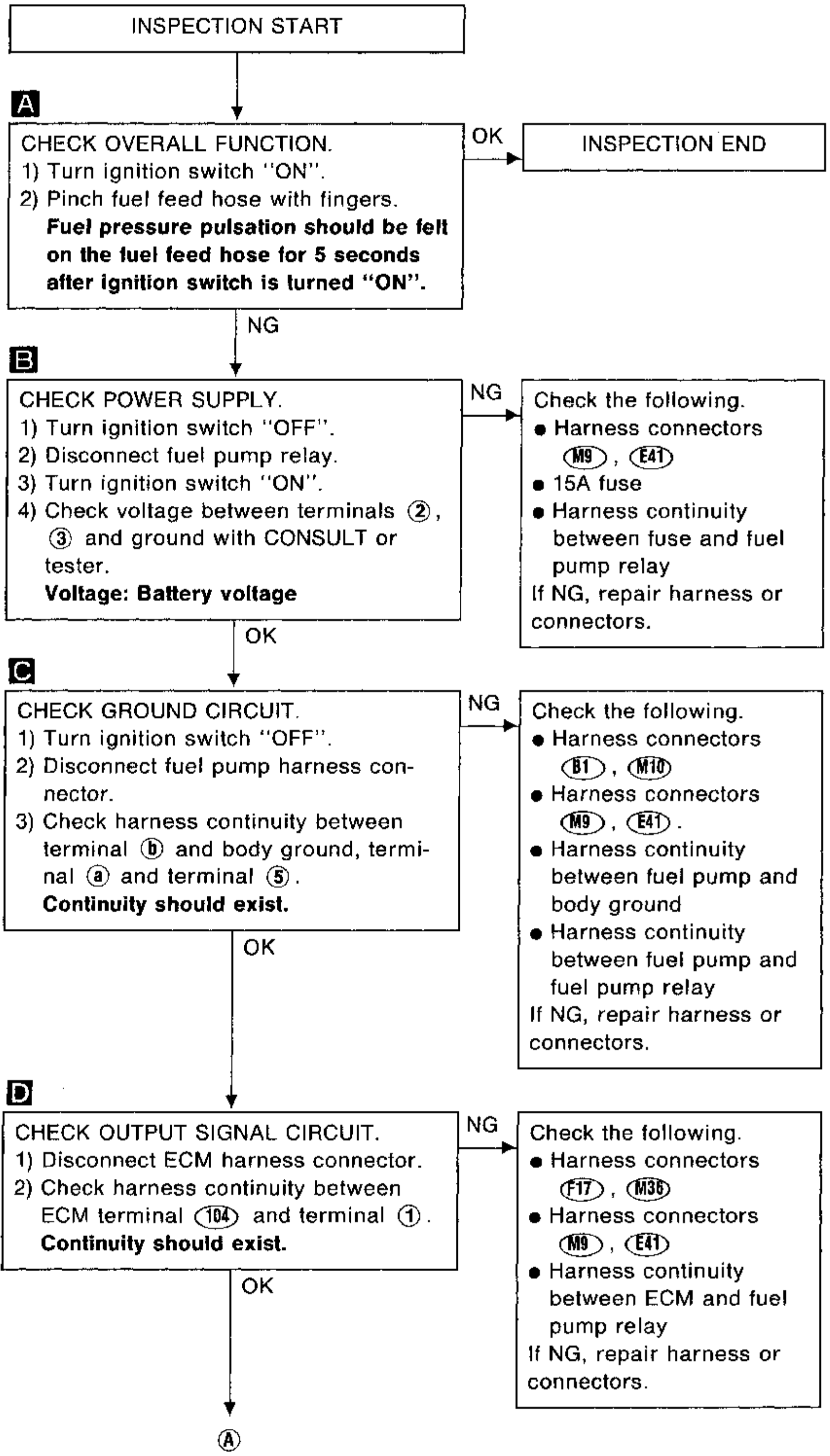
FUEL PUMP (Not self-diagnostic item)











INSPECTION START

A

CHECK OVERALL FUNCTION.
1) Turn ignition switch "ON".
2) Pinch fuel feed hose with fingers.
Fuel pressure pulsation should be felt on the fuel feed hose for 5 seconds after ignition switch is turned "ON".

OK → INSPECTION END

NG ↓

B

CHECK POWER SUPPLY.
1) Turn ignition switch "OFF".
2) Disconnect fuel pump relay.
3) Turn ignition switch "ON".
4) Check voltage between terminals ②, ③ and ground with CONSULT or tester.
Voltage: Battery voltage

NG → Check the following.
- Harness connectors M9, E41
- 15A fuse
- Harness continuity between fuse and fuel pump relay

If NG, repair harness or connectors.

OK ↓

C

CHECK GROUND CIRCUIT.
1) Turn ignition switch "OFF".
2) Disconnect fuel pump harness connector.
3) Check harness continuity between terminal ⓑ and body ground, terminal ⓐ and terminal ⑤.
Continuity should exist.

NG → Check the following.
- Harness connectors B1, M10
- Harness connectors M9, E41.
- Harness continuity between fuel pump and body ground
- Harness continuity between fuel pump and fuel pump relay

If NG, repair harness or connectors.

OK ↓

D

CHECK OUTPUT SIGNAL CIRCUIT.
1) Disconnect ECM harness connector.
2) Check harness continuity between ECM terminal 104 and terminal ①.
Continuity should exist.

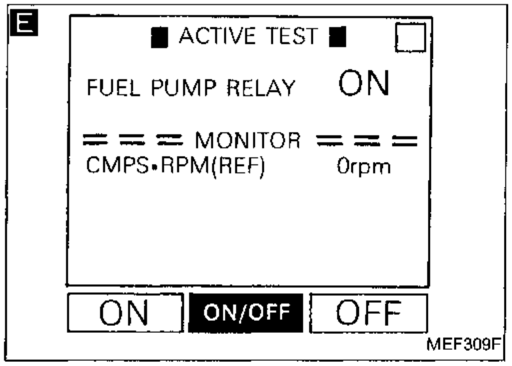
NG → Check the following.
- Harness connectors F17, M36
- Harness connectors M9, E41
- Harness continuity between ECM and fuel pump relay

If NG, repair harness or connectors.

OK ↓

Ⓐ

FUEL PUMP (not self-diagnostic item)



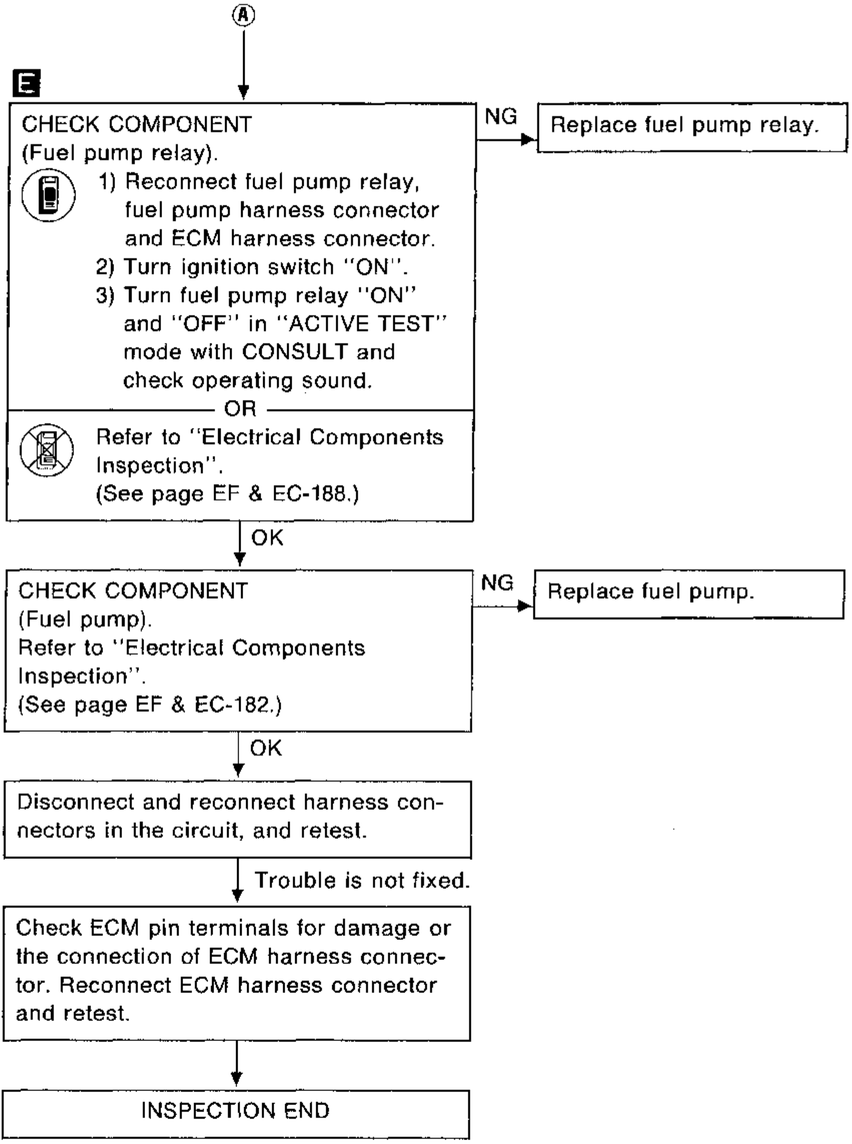
■ ACTIVE TEST ■ ☐

FUEL PUMP RELAY ON

=== MONITOR ===

CMPS•RPM(REF) 0rpm

MEF309F



CHECK COMPONENT
(Fuel pump relay).

1) Reconnect fuel pump relay, fuel pump harness connector and ECM harness connector.
2) Turn ignition switch "ON".
3) Turn fuel pump relay "ON" and "OFF" in "ACTIVE TEST" mode with CONSULT and check operating sound.

OR

Refer to "Electrical Components Inspection".
(See page EF & EC-188.)

NG → Replace fuel pump relay.

OK ↓

CHECK COMPONENT
(Fuel pump).
Refer to "Electrical Components Inspection".
(See page EF & EC-182.)

NG → Replace fuel pump.

OK ↓

Disconnect and reconnect harness connectors in the circuit, and retest.

Trouble is not fixed. ↓

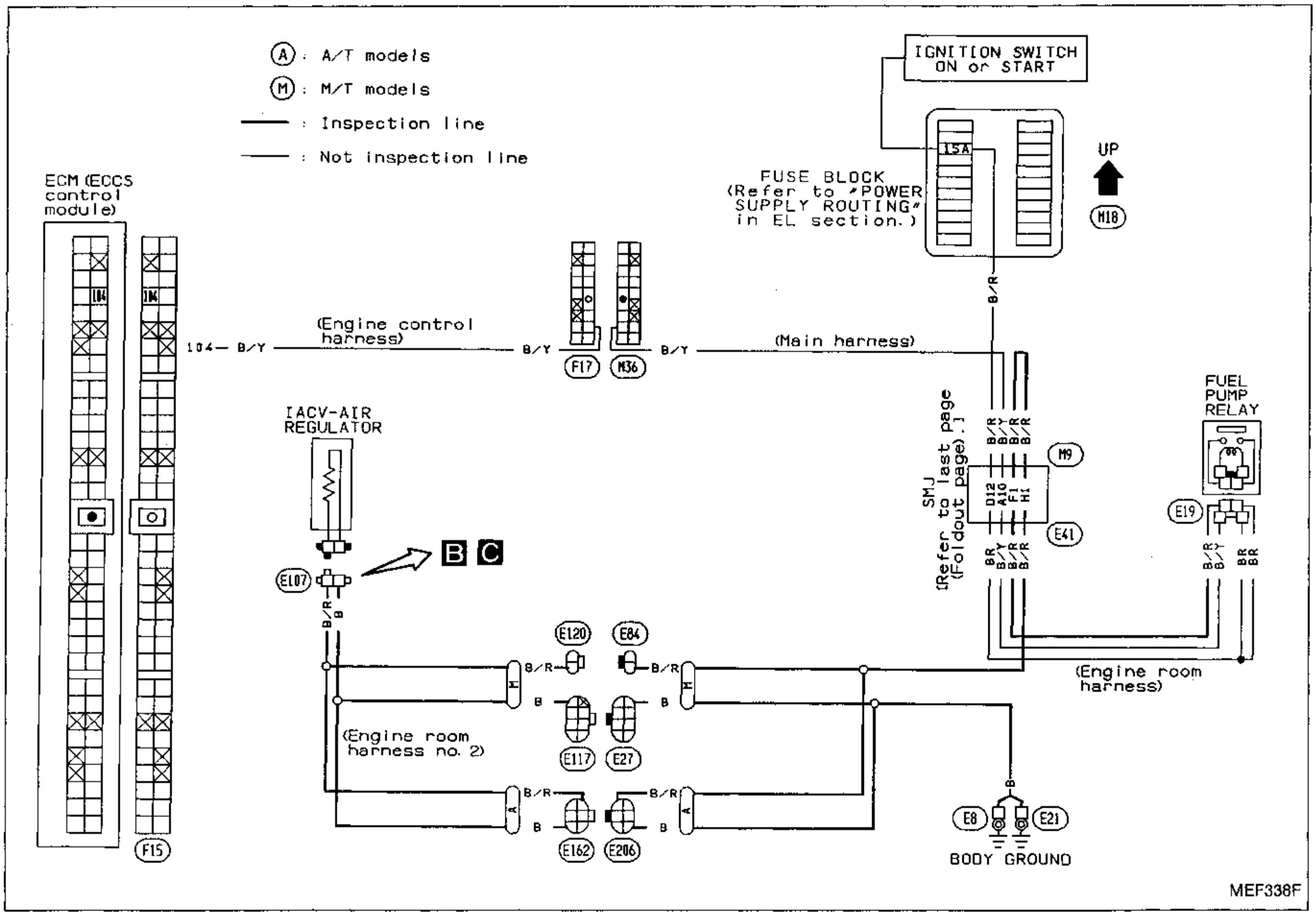
Check ECM pin terminals for damage or the connection of ECM harness connector. Reconnect ECM harness connector and retest.

↓

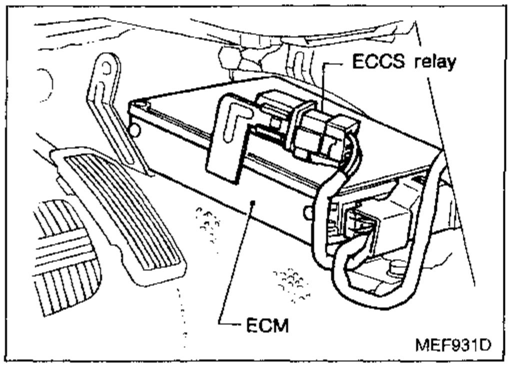
INSPECTION END

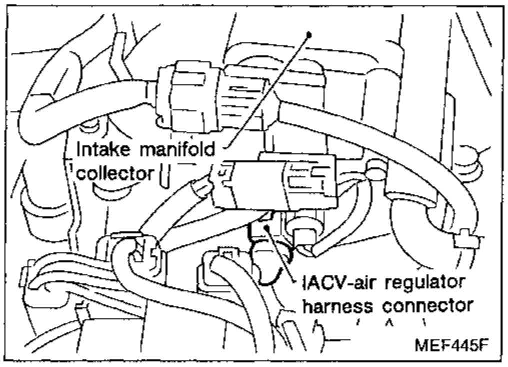
Diagnostic Procedure 20

IACV-AIR REGULATOR (Not self-diagnostic item)



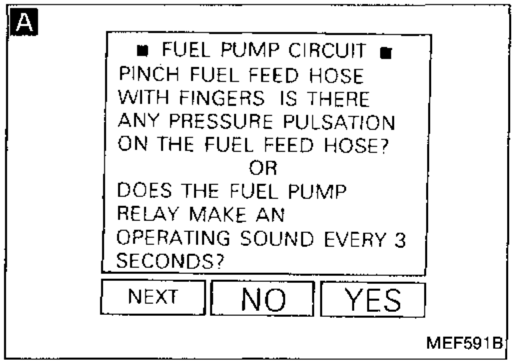
Harness layout





IACV-AIR REGULATOR (Not self-diagnostic item)

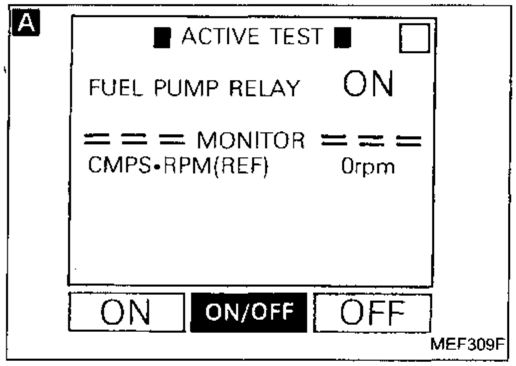
A



■ FUEL PUMP CIRCUIT ■
PINCH FUEL FEED HOSE WITH FINGERS IS THERE ANY PRESSURE PULSATION ON THE FUEL FEED HOSE?
OR
DOES THE FUEL PUMP RELAY MAKE AN OPERATING SOUND EVERY 3 SECONDS?

MEF591B

A



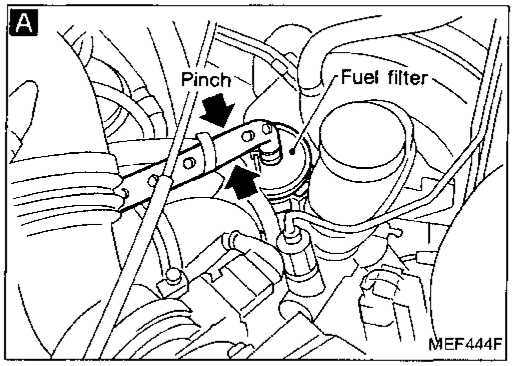
■ ACTIVE TEST ■ ☐

FUEL PUMP RELAY ON

=== MONITOR ===
CMPS•RPM(REF) 0rpm

MEF309F

A



MEF444F

INSPECTION START

↓

A CHECK CONTROL FUNCTION.

1) Turn ignition switch "ON".

2) Perform "FUEL PUMP CIRCUIT" in "FUNCTION TEST" mode with CONSULT.

OR

2) Turn fuel pump relay "ON" and "OFF" in "ACTIVE TEST" mode with CONSULT and check operating sound.

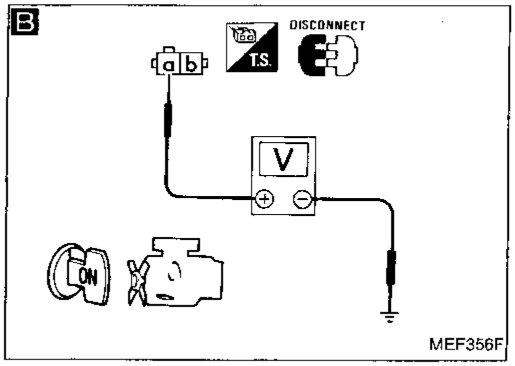
OR

2) Pinch fuel feed hose with fingers.
Fuel pressure pulsation should be felt on the fuel feed hose for 5 seconds after ignition switch is turned "ON".

NG → Check fuel pump control circuit.
(See page EF & EC-116.)

OK ↓

B



MEF356F

B CHECK POWER SUPPLY.

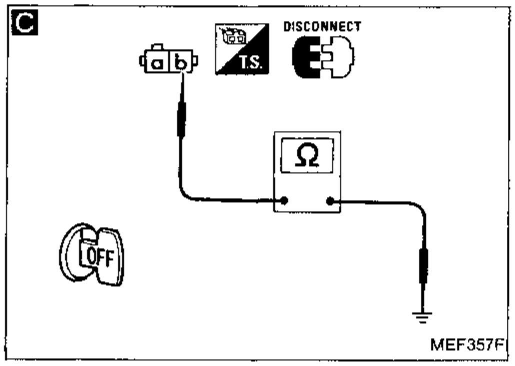
1) Turn ignition switch "OFF".
2) Disconnect IACV-air regulator harness connector.
3) Turn ignition switch "ON".
4) Check voltage between terminal ⓐ and ground with CONSULT or tester.
Battery voltage should exist for 5 seconds after ignition switch is turned "ON".

NG → Check the following.
- Harness connectors E120, E84 (M/T model)
  E162, E206 (A/T model)
- Harness connectors M9, E41
- Harness continuity between IACV-air regulator and fuel pump relay

If NG, repair harness or connectors.

OK ↓

C



MEF357F

C CHECK GROUND CIRCUIT.

1) Turn ignition switch "OFF".
2) Check harness continuity between terminal ⓑ and body ground.
Continuity should exist.

NG → Check the following.
- Harness connectors E117, E27 (M/T model)
  E162, E206 (A/T model)
- Harness continuity between IACV-air regulator and body ground

If NG, repair harness or connectors.

OK ↓

CHECK COMPONENT
(IACV-air regulator).
Refer to "Electrical Components Inspection".
(See page EF & EC-185.)

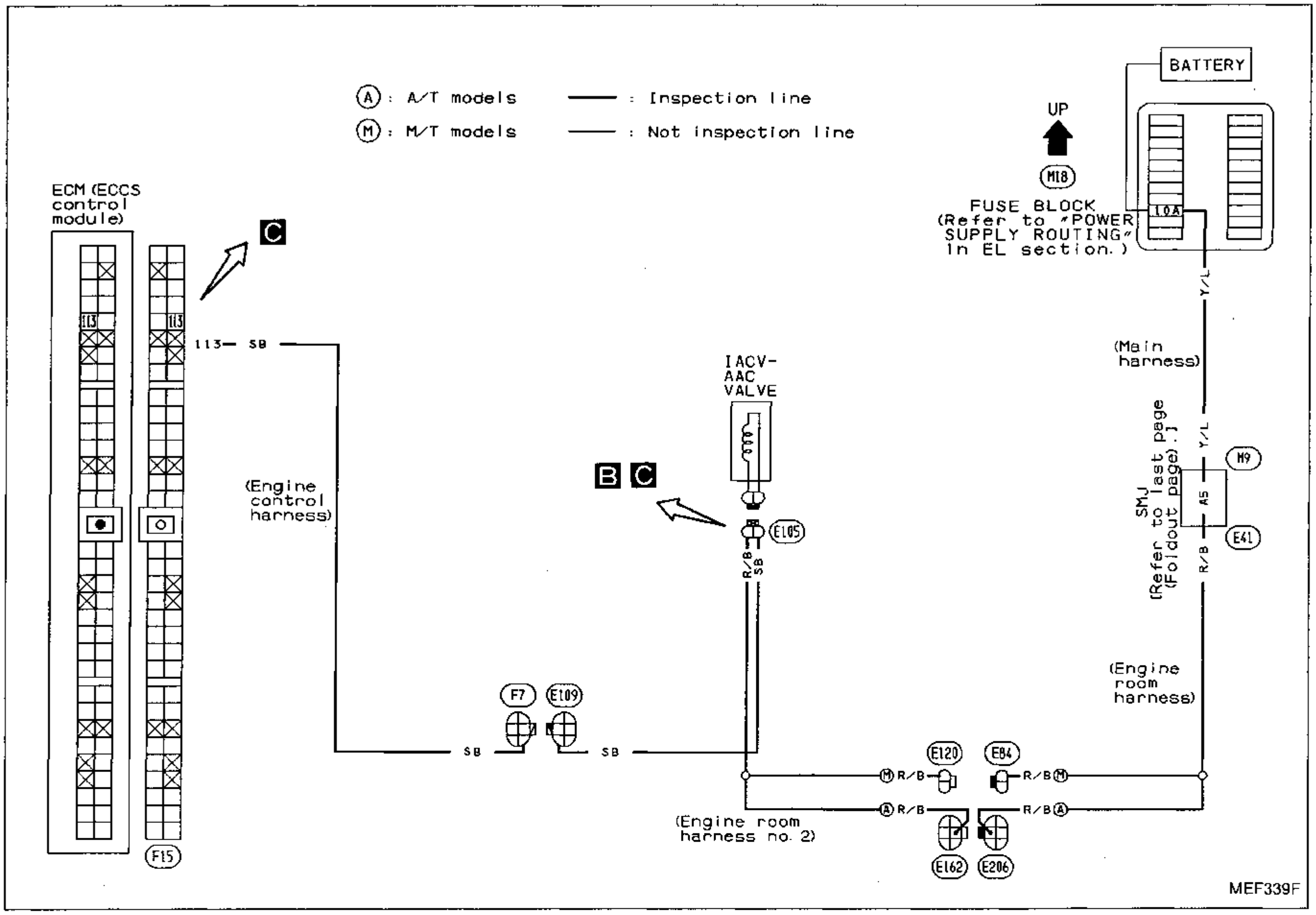
NG → Replace IACV-air regulator.

OK ↓

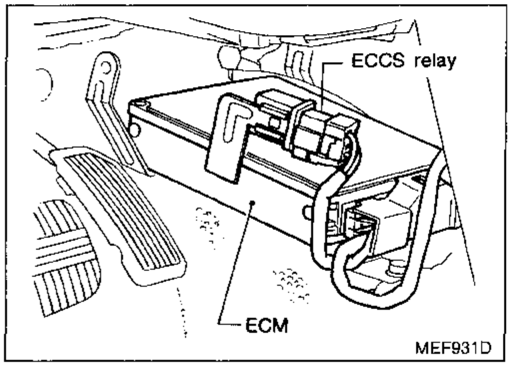
INSPECTION END

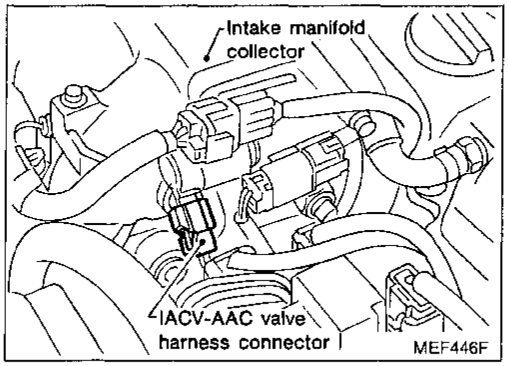
Diagnostic Procedure 21

IACV-AAC VALVE (Not self-diagnostic item)

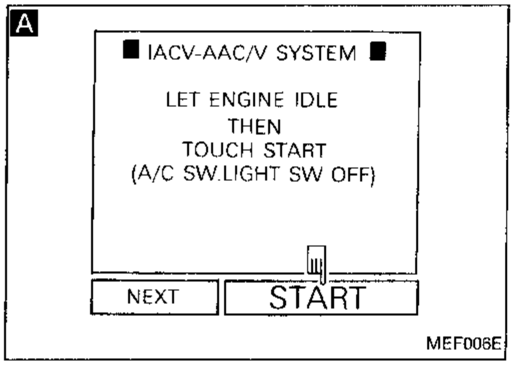


Harness layout



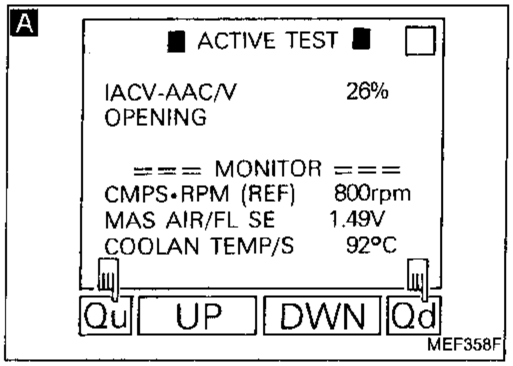


IACV-AAC VALVE (Not self-diagnostic item)



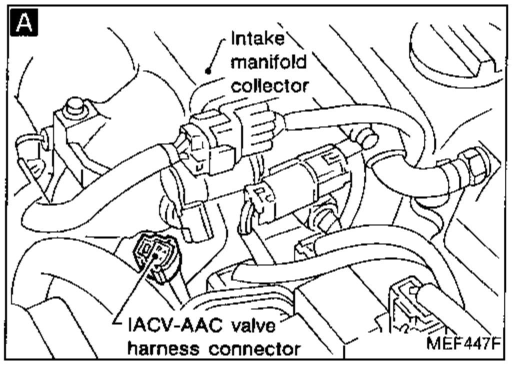
■ IACV-AAC/V SYSTEM ■

LET ENGINE IDLE
THEN
TOUCH START
(A/C SW.LIGHT SW OFF)



■ ACTIVE TEST ■ ☐

IACV-AAC/V OPENING	26%
=== MONITOR ===	
CMPS•RPM (REF)	800rpm
MAS AIR/FL SE	1.49V
COOLAN TEMP/S	92°C



INSPECTION START

A

CHECK OVERALL FUNCTION.
1) Start engine and warm it up sufficiently.
2) Check idle speed.
800 ± 50 rpm
(A/T in "N" position)
If NG, adjust idle speed.
3) Perform "IACV-AAC/V SYSTEM" in "FUNCTION TEST" mode with CONSULT.

OR

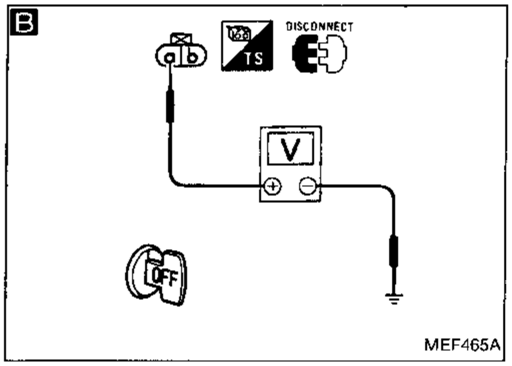
3) Select "IACV-AAC/V OPENING" in "ACTIVE TEST" mode with CONSULT.
4) When touching "Qu" and "Qd", check that engine speed changes according to the IACV-AAC valve opening percentage.

OR

3) Disconnect IACV-AAC valve harness connector.
4) Make sure that idle speed drops.

OK → INSPECTION END

NG ↓



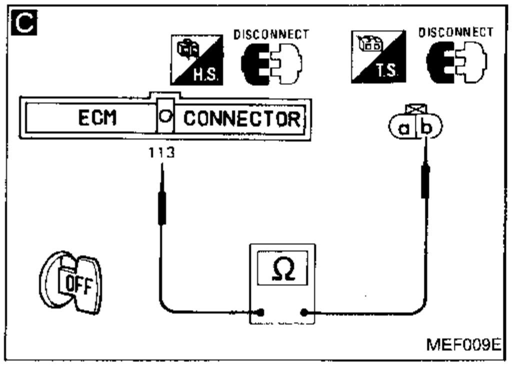
B

CHECK POWER SUPPLY.
1) Stop engine.
2) Disconnect IACV-AAC valve harness connector.
3) Check voltage between terminal ⓐ and ground with CONSULT or tester.
Voltage: Battery voltage

NG → Check the following.
- Harness connectors M9, E41
- Harness connectors E120, E84 (M/T model)
  E162, E206 (A/T model)
- 10A fuse
- Harness continuity between IACV-AAC valve and fuse

If NG, repair harness or connectors.

OK ↓



C

CHECK OUTPUT SIGNAL CIRCUIT.
1) Disconnect ECM harness connector.
2) Check harness continuity between ECM terminal (113) and terminal ⓑ.
Continuity should exist.

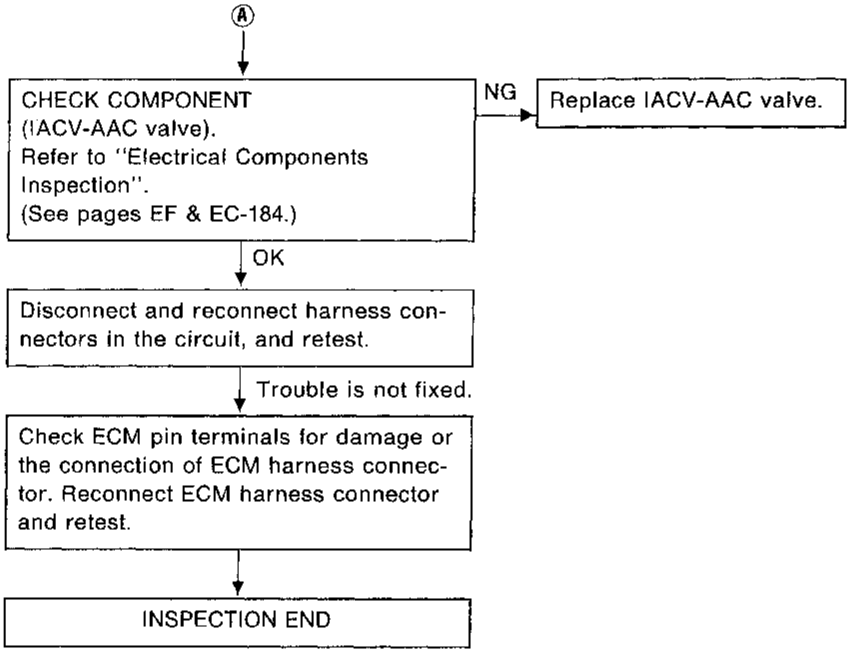
NG → Check the following.
- Harness connectors F7, E109
- Harness continuity between ECM and IACV-AAC valve

If NG, repair harness or connectors.

OK ↓

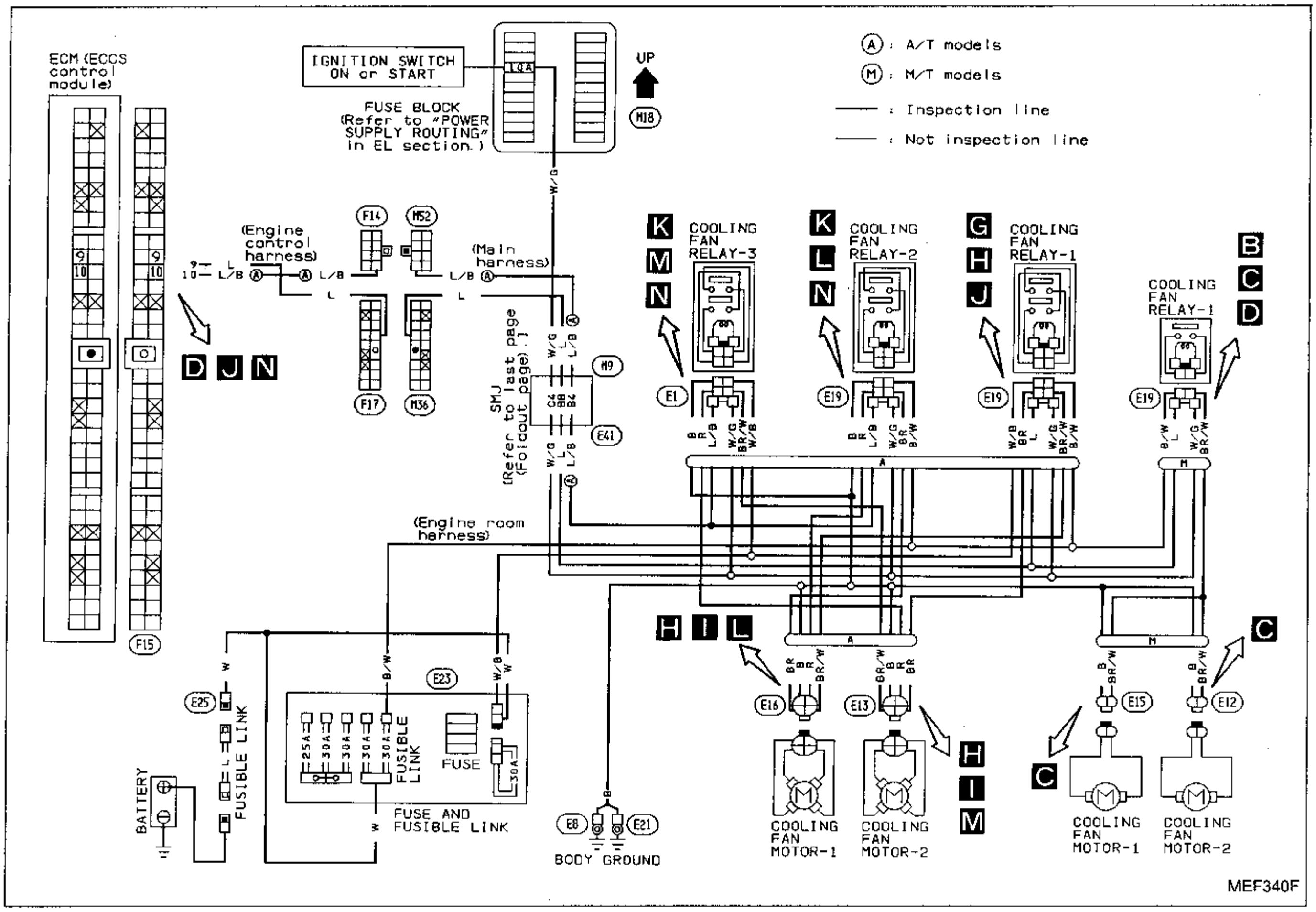
Ⓐ

IACV-AAC VALVE (Not self-diagnostic item)



Diagnostic Procedure 22

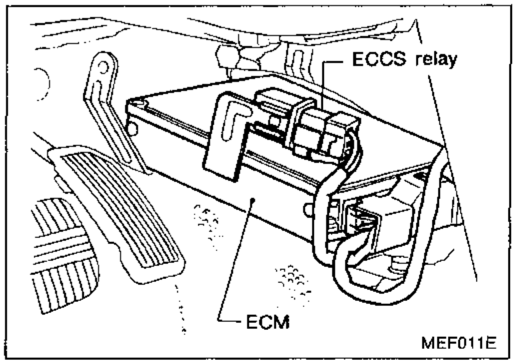
COOLING FAN CONTROL (Not self-diagnostic item)

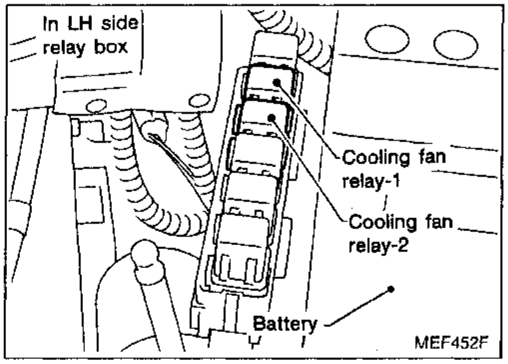


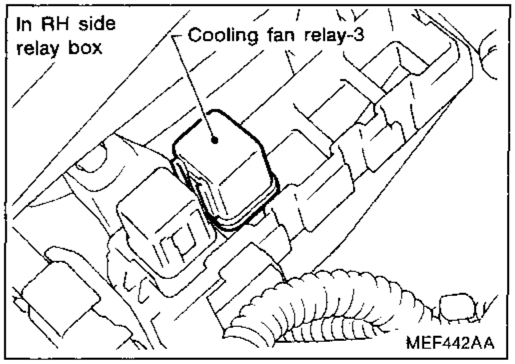
MEF340F

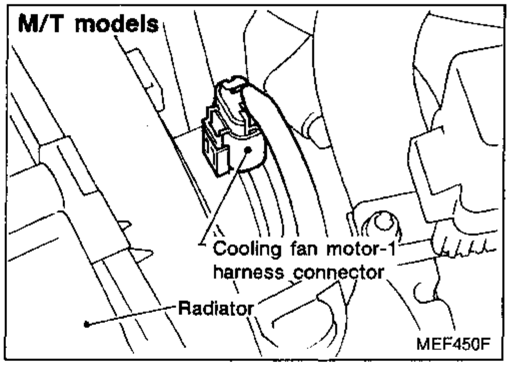
COOLING FAN CONTROL (Not self-diagnostic item)

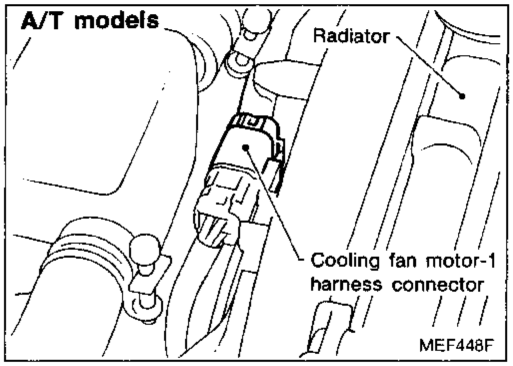
Harness layout

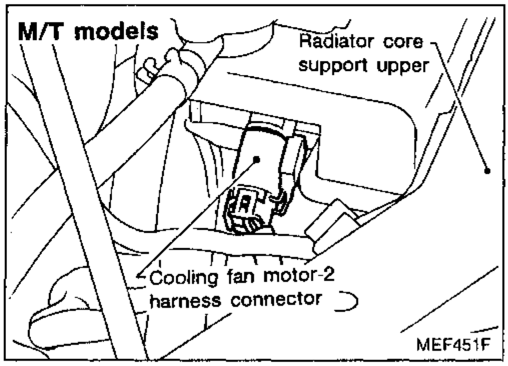


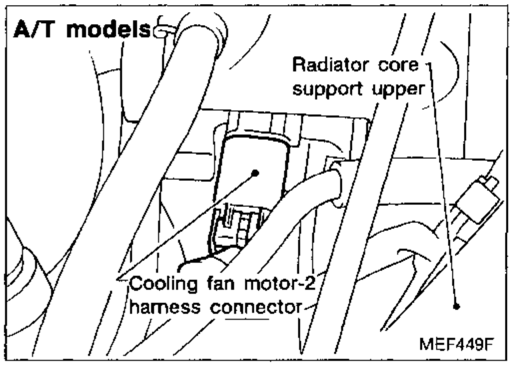




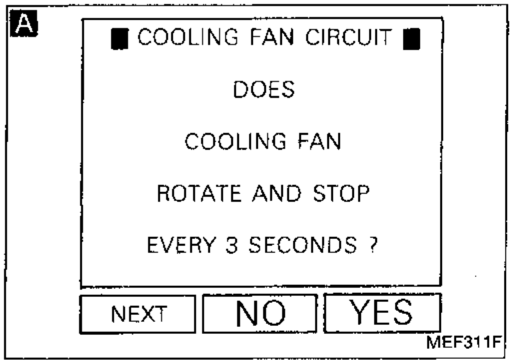








COOLING FAN CONTROL (Not self-diagnostic item)



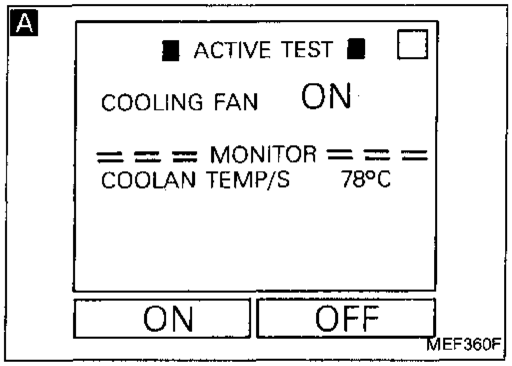
■ COOLING FAN CIRCUIT ■

DOES

COOLING FAN

ROTATE AND STOP

EVERY 3 SECONDS ?

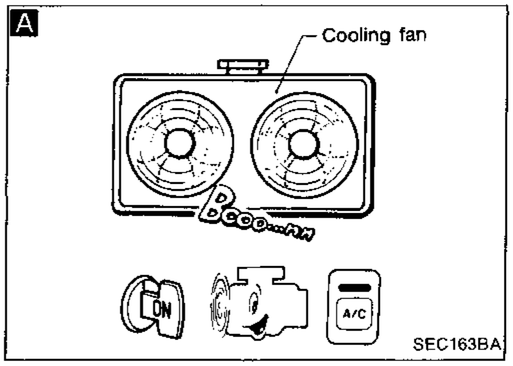


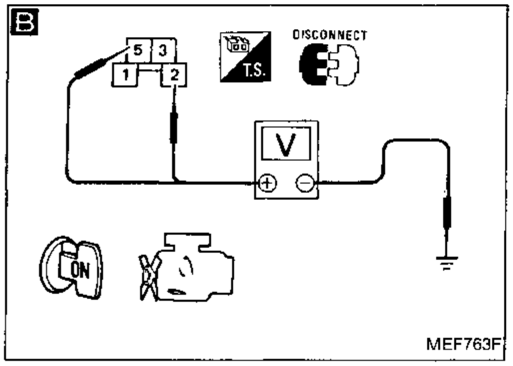
■ ACTIVE TEST ■ ☐

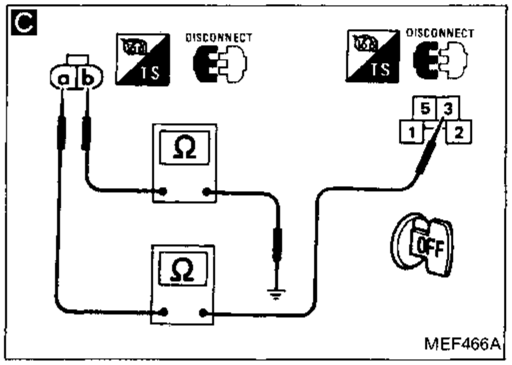
COOLING FAN ON

= = = MONITOR = = =

COOLAN TEMP/S 78°C







M/T models

INSPECTION START

↓

A CHECK OVERALL FUNCTION.

1) Turn ignition switch "ON".
2) Perform "COOLING FAN CIRCUIT" in "FUNCTION TEST" mode with CONSULT.

OR

1) Turn ignition switch "ON".
2) Perform "COOLING FAN" in "ACTIVE TEST" mode with CONSULT.

OR

1) Start engine.
2) Set temperature lever at full cold position.
3) Turn air conditioner switch "ON".
4) Turn blower fan switch "ON".
5) Run engine at idle for a few minutes with air conditioner operating.
6) Make sure that cooling fan operates.

OK → INSPECTION END

NG ↓

Turn air conditioner switch and blower fan switch "OFF".

↓

B CHECK POWER SUPPLY.

1) Turn ignition switch "OFF".
2) Disconnect cooling fan relay-1.
3) Turn ignition switch "ON".
4) Check voltage between terminals ②, ⑤ and ground with CONSULT or tester.

Voltage: Battery voltage

NG → Check the following.

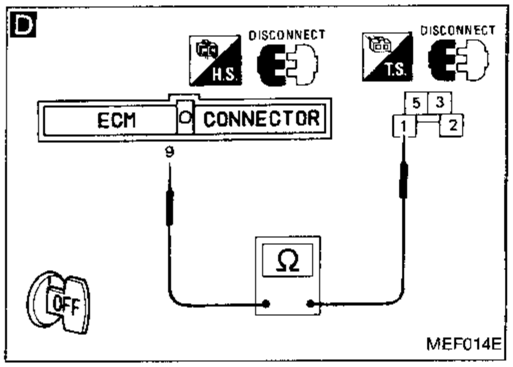
- Harness connectors (M9), (E41)
- "L" fusible link
- 30A fusible link
- 10A fuse
- Harness continuity between battery and cooling fan relay-1
- Harness continuity between fuse and cooling fan relay-1

If NG, repair harness or connectors.

OK ↓

Ⓐ

COOLING FAN CONTROL (Not self-diagnostic item)



Ⓐ

C

CHECK GROUND CIRCUIT.
1) Turn ignition switch "OFF".
2) Disconnect cooling fan motor-1 harness connector and cooling fan motor-2 harness connector.
3) Check harness continuity between terminal ⓐ and terminal ③, terminal ⓑ and body ground.
Continuity should exist.

NG → Repair harness or connectors.

OK ↓

D

CHECK OUTPUT SIGNAL CIRCUIT.
1) Disconnect ECM harness connector.
2) Check harness continuity between ECM terminal ⑨ and terminal ①.
Continuity should exist.

NG → Check the following.
- Harness connectors F17, M36
- Harness connectors M9, E41
- Harness continuity between ECM and cooling fan relay-1

If NG, repair harness or connectors.

OK ↓

CHECK COMPONENT
(Cooling fan relay-1).
Refer to "Electrical Components Inspection".
(See page EF & EC-188.)

NG → Replace cooling fan relay.

OK ↓

CHECK COMPONENTS
(Cooling fan motors).
Refer to "Electrical Components Inspection".
(See page EF & EC-187.)

NG → Replace cooling fan motors.

OK ↓

Disconnect and reconnect harness connectors in the circuit, and retest.

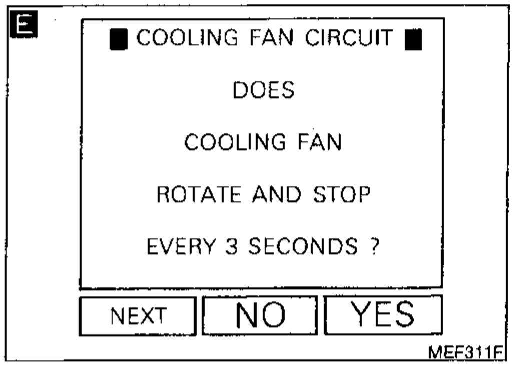
↓ Trouble is not fixed.

Check ECM pin terminals for damage or the connection of ECM harness connector. Reconnect ECM harness connector and retest.

↓

INSPECTION END

COOLING FAN CONTROL (Not self-diagnostic item)



■ COOLING FAN CIRCUIT ■

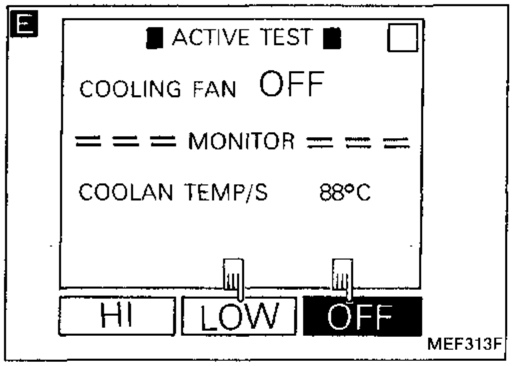
DOES

COOLING FAN

ROTATE AND STOP

EVERY 3 SECONDS ?

MEF311F



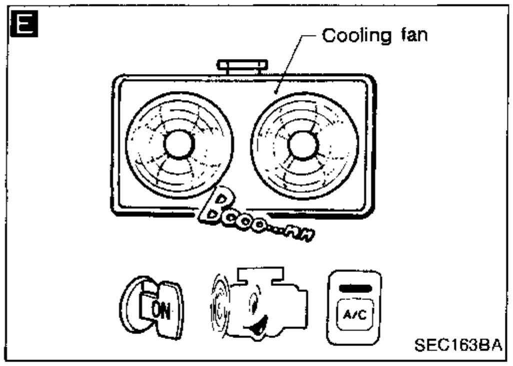
■ ACTIVE TEST ■ ☐

COOLING FAN OFF

=== MONITOR ===

COOLAN TEMP/S 88°C

MEF313F



SEC163BA

A/T models

INSPECTION START

CHECK COOLING FAN LOW SPEED OPERATION.

1) Disconnect cooling fan relay-2 and cooling fan relay-3.

2) Turn ignition switch "ON".

3) Perform "COOLING FAN CIRCUIT" in "FUNCTION TEST" mode with CONSULT.

OR

2) Turn ignition switch "ON".

3) Perform "COOLING FAN" in "ACTIVE TEST" mode with CONSULT.

OR

2) Start engine.

3) Set temperature lever at full cold position.

4) Turn air conditioner switch "ON".

5) Turn blower fan switch "ON".

6) Run engine at idle for a few minutes with air conditioner operating.

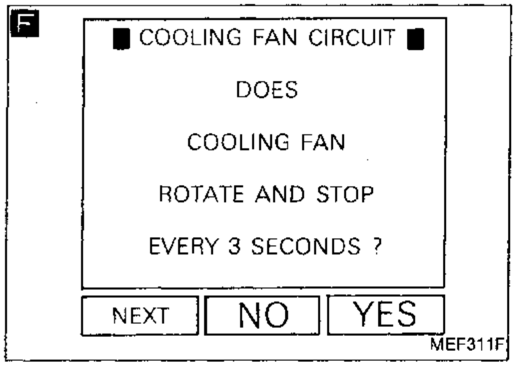
7) Make sure that cooling fan operates at low speed.

NG → Check cooling fan low speed control circuit. (Go to PROCEDURE A.)

OK ↓

Ⓐ

COOLING FAN CONTROL (Not self-diagnostic item)



F

■ COOLING FAN CIRCUIT ■

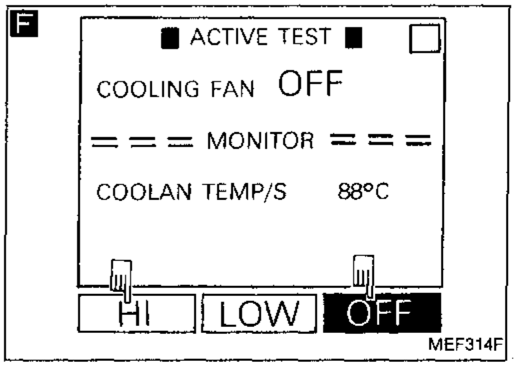
DOES

COOLING FAN

ROTATE AND STOP

EVERY 3 SECONDS ?

MEF311F



F

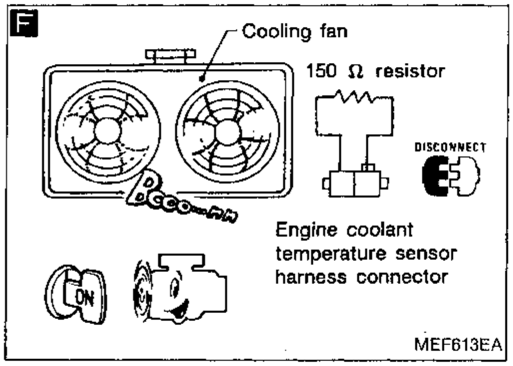
■ ACTIVE TEST ■ ☐

COOLING FAN OFF

=== MONITOR ===

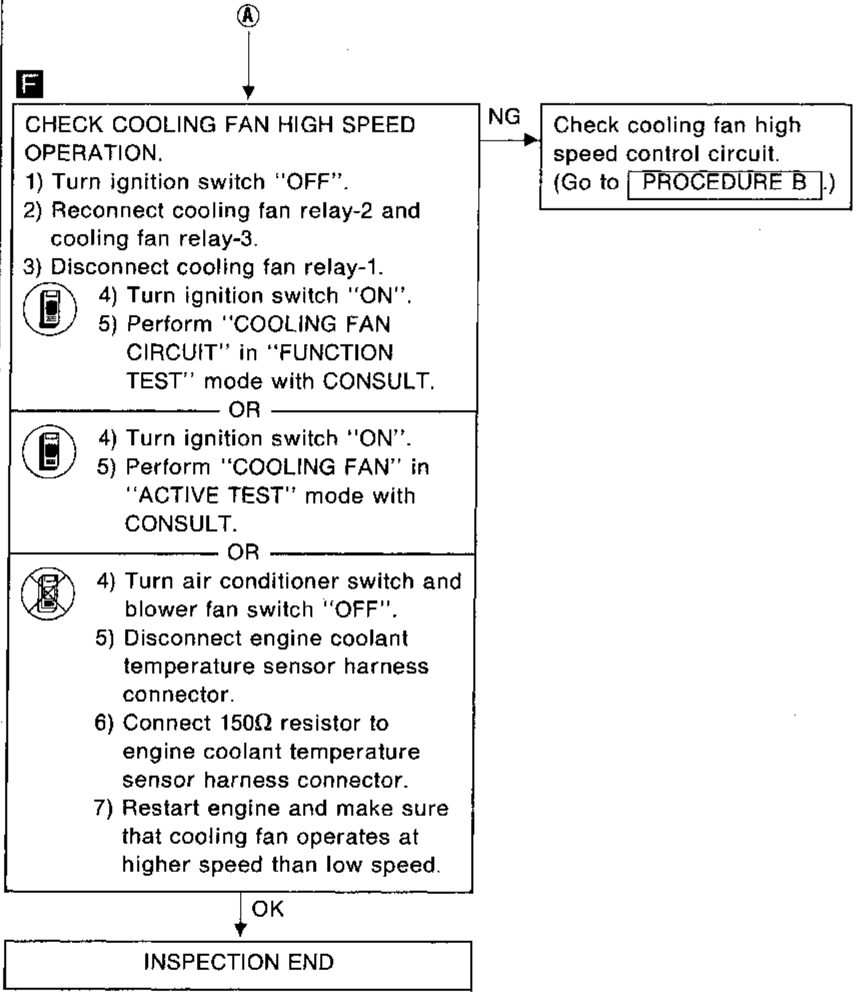
COOLAN TEMP/S 88°C

MEF314F



F

MEF613EA



Ⓐ

F

CHECK COOLING FAN HIGH SPEED OPERATION.
1) Turn ignition switch "OFF".
2) Reconnect cooling fan relay-2 and cooling fan relay-3.
3) Disconnect cooling fan relay-1.
4) Turn ignition switch "ON".
5) Perform "COOLING FAN CIRCUIT" in "FUNCTION TEST" mode with CONSULT.

OR

4) Turn ignition switch "ON".
5) Perform "COOLING FAN" in "ACTIVE TEST" mode with CONSULT.

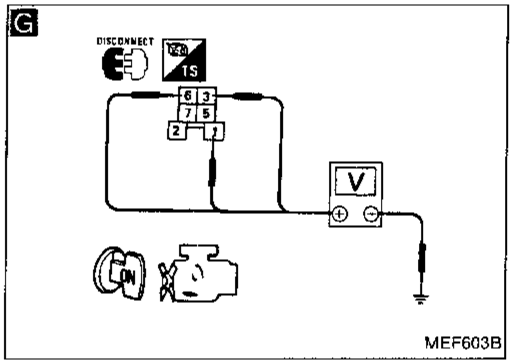
OR

4) Turn air conditioner switch and blower fan switch "OFF".
5) Disconnect engine coolant temperature sensor harness connector.
6) Connect 150Ω resistor to engine coolant temperature sensor harness connector.
7) Restart engine and make sure that cooling fan operates at higher speed than low speed.

NG → Check cooling fan high speed control circuit. (Go to PROCEDURE B.)

OK → INSPECTION END

COOLING FAN CONTROL (Not self-diagnostic item)



PROCEDURE A

INSPECTION START

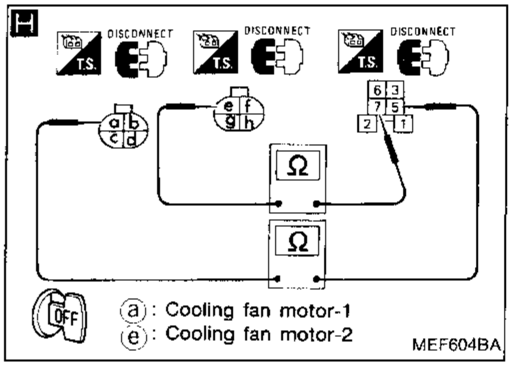
G

CHECK POWER SUPPLY.
1) Turn ignition switch "OFF".
2) Disconnect cooling fan relay-1.
3) Turn ignition switch "ON".
4) Check voltage between terminals ①, ③, ⑥ and ground with CONSULT or tester.
Voltage: Battery voltage

NG → Check the following.
- Harness connectors M9, E41
- 10A fuse
- 30A fusible link
- "L" fusible link
- Harness continuity between cooling fan relay-1 and fuse
- Harness continuity between cooling fan relay-1 and battery

If NG, repair harness or connectors.

OK ↓



ⓐ: Cooling fan motor-1
ⓔ: Cooling fan motor-2

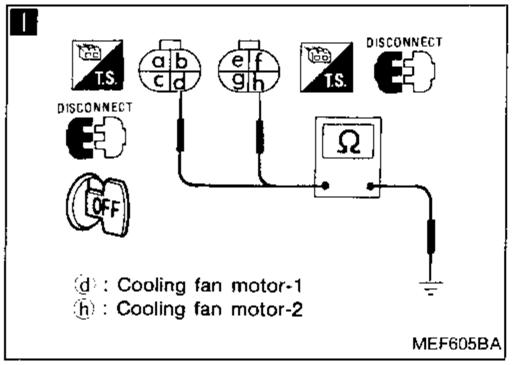
CHECK GROUND CIRCUIT.
1) Turn ignition switch "OFF".
2) Disconnect cooling fan motor-1 harness connector and cooling fan motor-2 harness connector.

H 3) Check harness continuity between terminal ⑤ and terminal ⓐ, terminal ⑦ and terminal ⓔ.
Continuity should exist.

I 4) Check harness continuity between terminals ⓓ, ⓗ and body ground.
Continuity should exist.

NG → Repair harness or connectors.

OK ↓



ⓓ: Cooling fan motor-1
ⓗ: Cooling fan motor-2

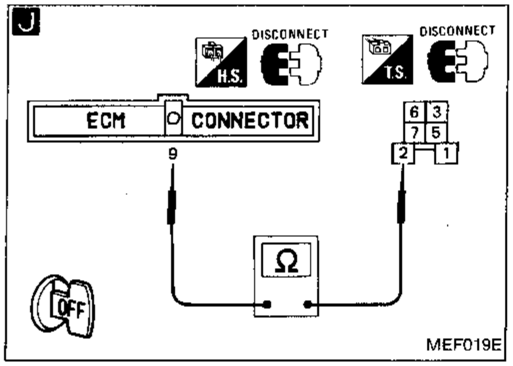
J

CHECK OUTPUT SIGNAL CIRCUIT.
1) Disconnect ECM harness connector.
2) Check harness continuity between ECM terminal ⑨ and terminal ②.
Continuity should exist.

NG → Check the following.
- Harness connectors F17, M36
- Harness connectors M9, E41
- Harness continuity between cooling fan relay-1 and ECM

If NG, repair harness or connectors.

OK ↓



CHECK COMPONENT
(Cooling fan relay-1).
Refer to "Electrical Components Inspection".
(See page EF & EC-188.)

NG → Replace cooling fan relay.

OK ↓

Ⓐ

COOLING FAN CONTROL (Not self-diagnostic item)

Ⓐ

CHECK COMPONENT
(Cooling fan motors).
Refer to "Electrical Components Inspection".
(See page EF & EC-187.)

NG → Replace cooling fan motors.

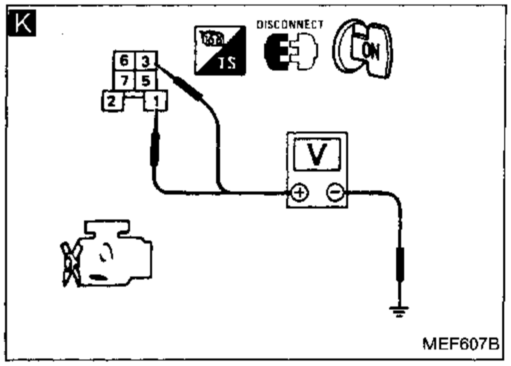
OK

Disconnect and reconnect harness connectors in the circuit, and retest.

Trouble is not fixed.

Check ECM pin terminals for damage or the connection of ECM harness connector. Reconnect ECM harness connector and retest.

INSPECTION END



MEF607B

PROCEDURE B

INSPECTION START

K

CHECK POWER SUPPLY.
1) Turn ignition switch "OFF".
2) Disconnect cooling fan relay-2 and cooling fan relay-3.
3) Turn ignition switch "ON".
4) Check voltage between terminals ①, ③ and ground with CONSULT or tester.
Voltage: Battery voltage

NG → Check the following.
- Harness connectors M9, E41
- 10A fuse
- 30A fusible link
- "L" fusible link
- Harness continuity between cooling fan relay-2, 3 and fuse
- Harness continuity between cooling fan relay-2, 3 and battery

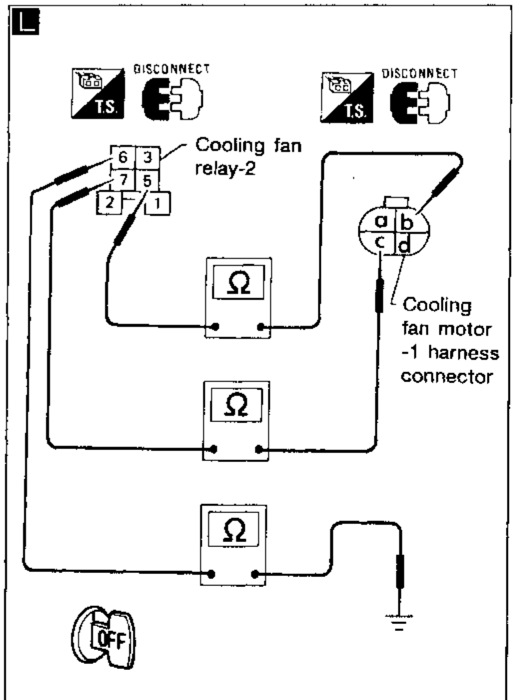
If NG, repair harness or connectors.

OK

Ⓑ

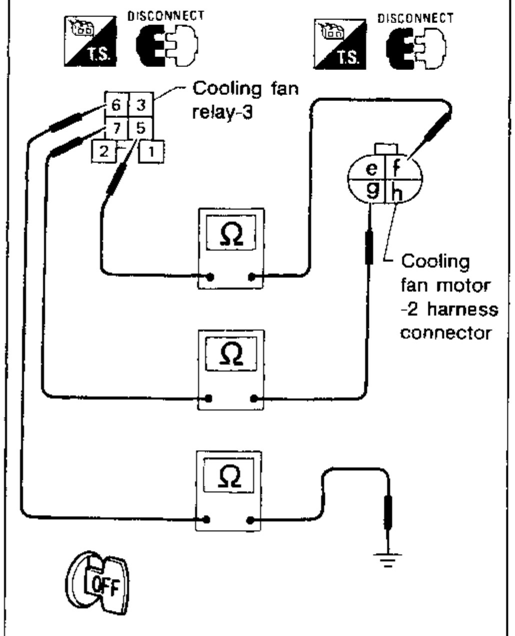
COOLING FAN CONTROL (Not self-diagnostic item)

L



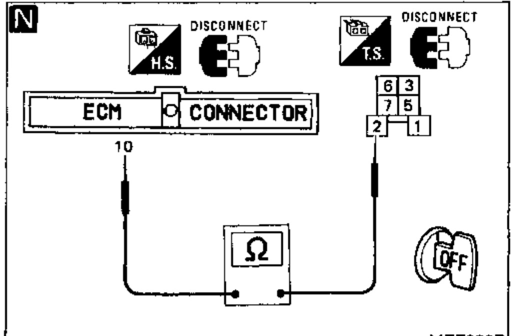
MEF608BA

M



MEF609BA

N



MEF020E

Ⓑ

CHECK GROUND CIRCUIT.
1) Turn ignition switch "OFF".
2) Disconnect cooling fan motor-1 harness connector and cooling fan motor-2 harness connector.
L 3) Check harness continuity between terminal ⑤ and terminal ⓑ, terminal ⑦ and terminal ⓒ, terminal ⑥ and body ground.
Continuity should exist.
M 4) Check harness continuity between terminal ⑤ and terminal ⓕ, terminal ⑦ and terminal ⓖ, terminal ⑥ and body ground.
Continuity should exist.

NG → Repair harness or connectors.

OK ↓

N CHECK OUTPUT SIGNAL CIRCUIT.
1) Disconnect ECM harness connector.
2) Check harness continuity between ECM terminal ⑩ and terminal ②.
Continuity should exist.

NG → Check the following.
- Harness connectors F14, M52
- Harness connectors M9, E41
- Harness continuity between cooling fan relay-2, 3 and ECM

If NG, repair harness or connectors.

OK ↓

CHECK COMPONENT
(Cooling fan relay-2, 3).
Refer to "Electrical Components Inspection".
(See page EF & EC-188.)

NG → Replace cooling fan relays.

OK ↓

CHECK COMPONENTS
(Cooling fan motors).
Refer to "Electrical Components Inspection".
(See page EF & EC-187.)

NG → Replace cooling fan motors.

OK ↓

Disconnect and reconnect harness connectors in the circuit, and retest.

Trouble is not fixed. ↓

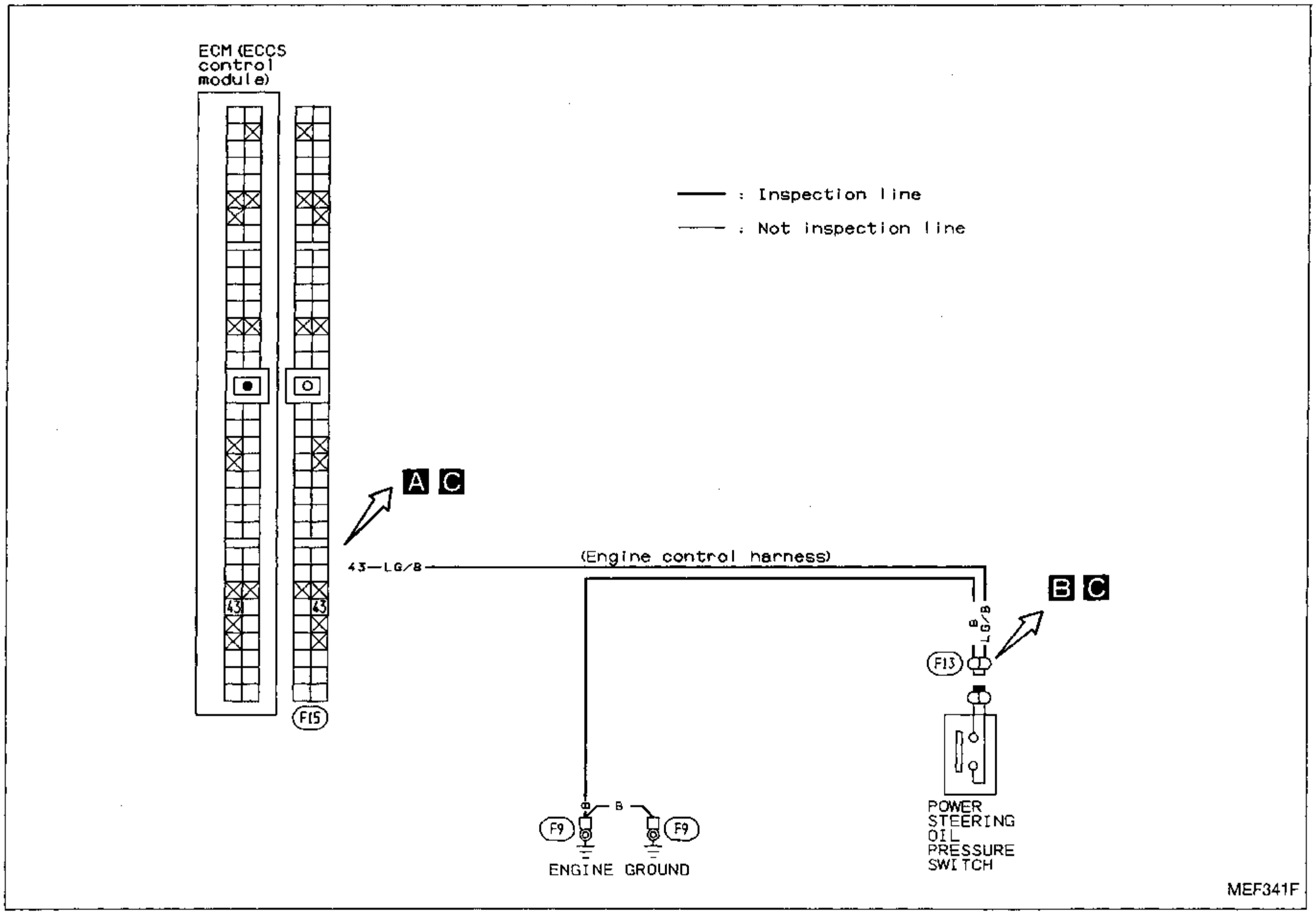
Check ECM pin terminals for damage or the connection of ECM harness connector. Reconnect ECM harness connector and retest.

↓

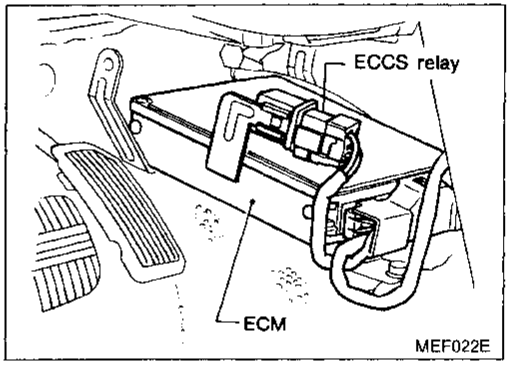
INSPECTION END

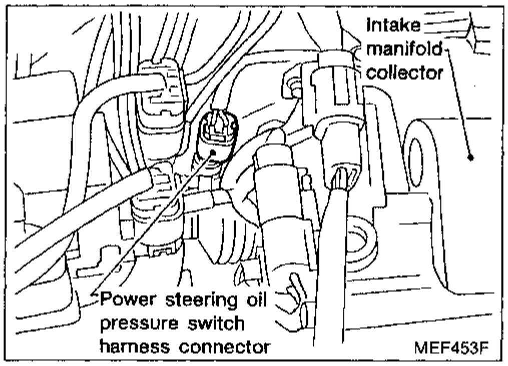
Diagnostic Procedure 23

POWER STEERING OIL PRESSURE SWITCH (Not self-diagnostic item)

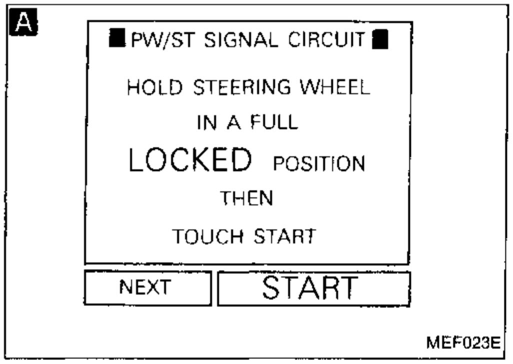


Harness layout





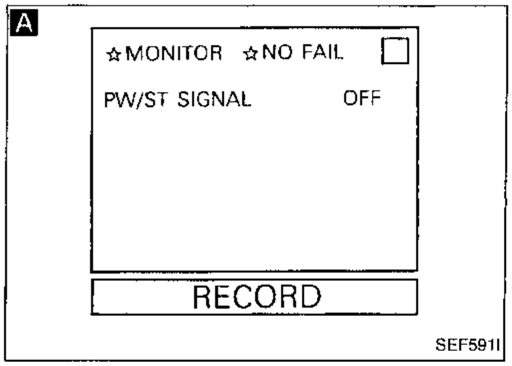
POWER STEERING OIL PRESSURE SWITCH (Not self-diagnostic item)



■PW/ST SIGNAL CIRCUIT■

HOLD STEERING WHEEL
IN A FULL
LOCKED POSITION
THEN
TOUCH START

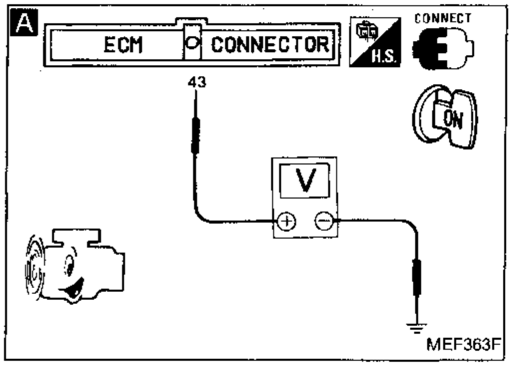
MEF023E



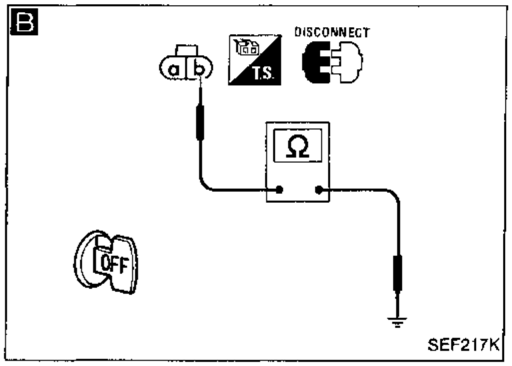
☆MONITOR ☆NO FAIL ☐

PW/ST SIGNAL OFF

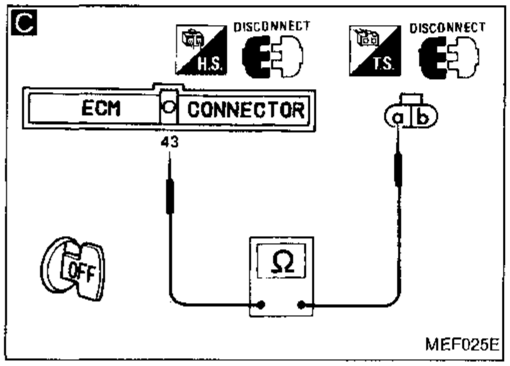
SEF591I



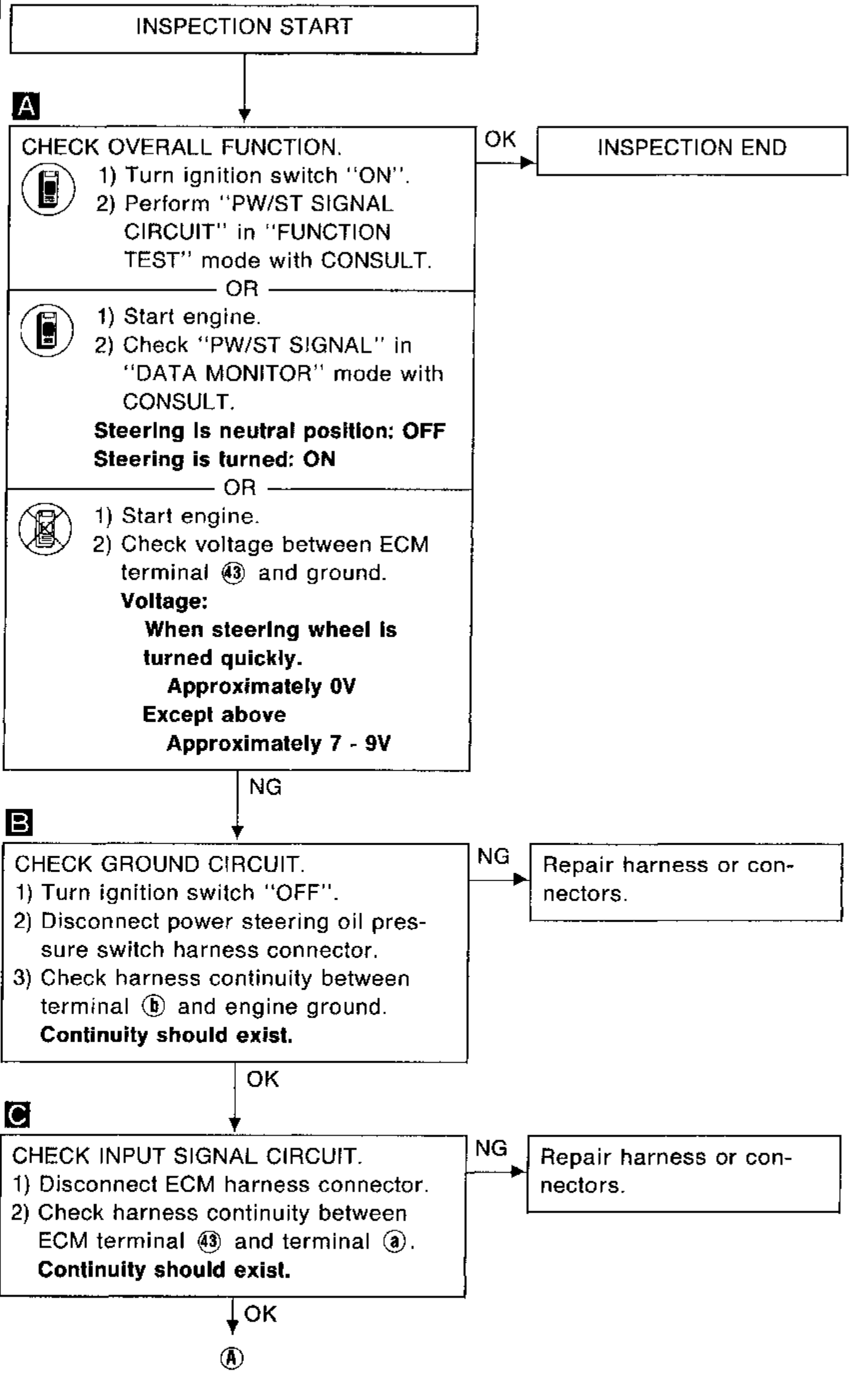
MEF363F



SEF217K



MEF025E



INSPECTION START

A

CHECK OVERALL FUNCTION.
1) Turn ignition switch "ON".
2) Perform "PW/ST SIGNAL CIRCUIT" in "FUNCTION TEST" mode with CONSULT.

OR

1) Start engine.
2) Check "PW/ST SIGNAL" in "DATA MONITOR" mode with CONSULT.
Steering is neutral position: OFF
Steering is turned: ON

OR

1) Start engine.
2) Check voltage between ECM terminal ㊸ and ground.
Voltage:
When steering wheel is turned quickly.
Approximately 0V
Except above
Approximately 7 - 9V

OK → INSPECTION END

NG ↓

B

CHECK GROUND CIRCUIT.
1) Turn ignition switch "OFF".
2) Disconnect power steering oil pressure switch harness connector.
3) Check harness continuity between terminal ⓑ and engine ground.
Continuity should exist.

NG → Repair harness or connectors.

OK ↓

C

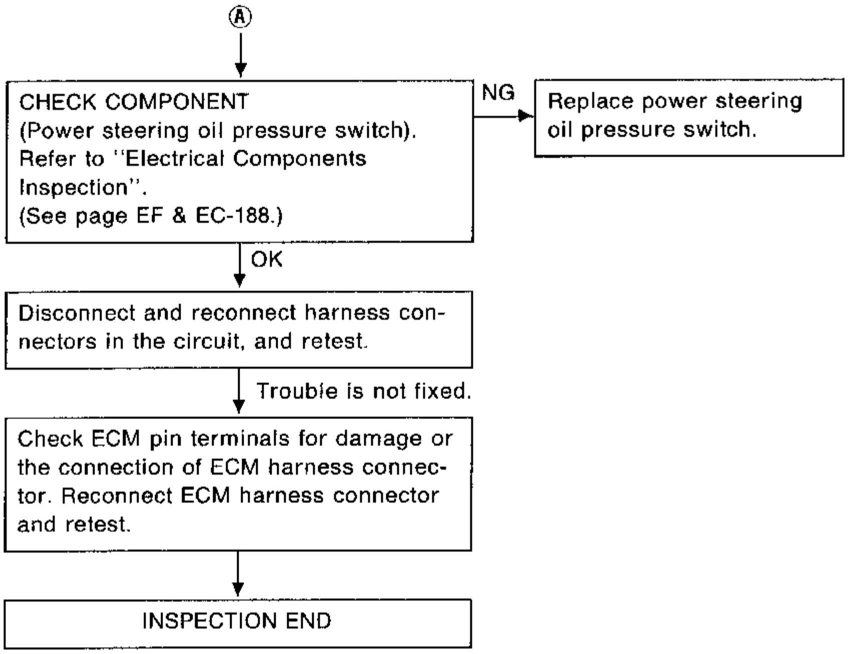
CHECK INPUT SIGNAL CIRCUIT.
1) Disconnect ECM harness connector.
2) Check harness continuity between ECM terminal ㊸ and terminal ⓐ.
Continuity should exist.

NG → Repair harness or connectors.

OK ↓

Ⓐ

POWER STEERING OIL PRESSURE SWITCH (Not self-diagnostic item)



Ⓐ

CHECK COMPONENT
(Power steering oil pressure switch).
Refer to "Electrical Components Inspection".
(See page EF & EC-188.)

NG → Replace power steering oil pressure switch.

OK

Disconnect and reconnect harness connectors in the circuit, and retest.

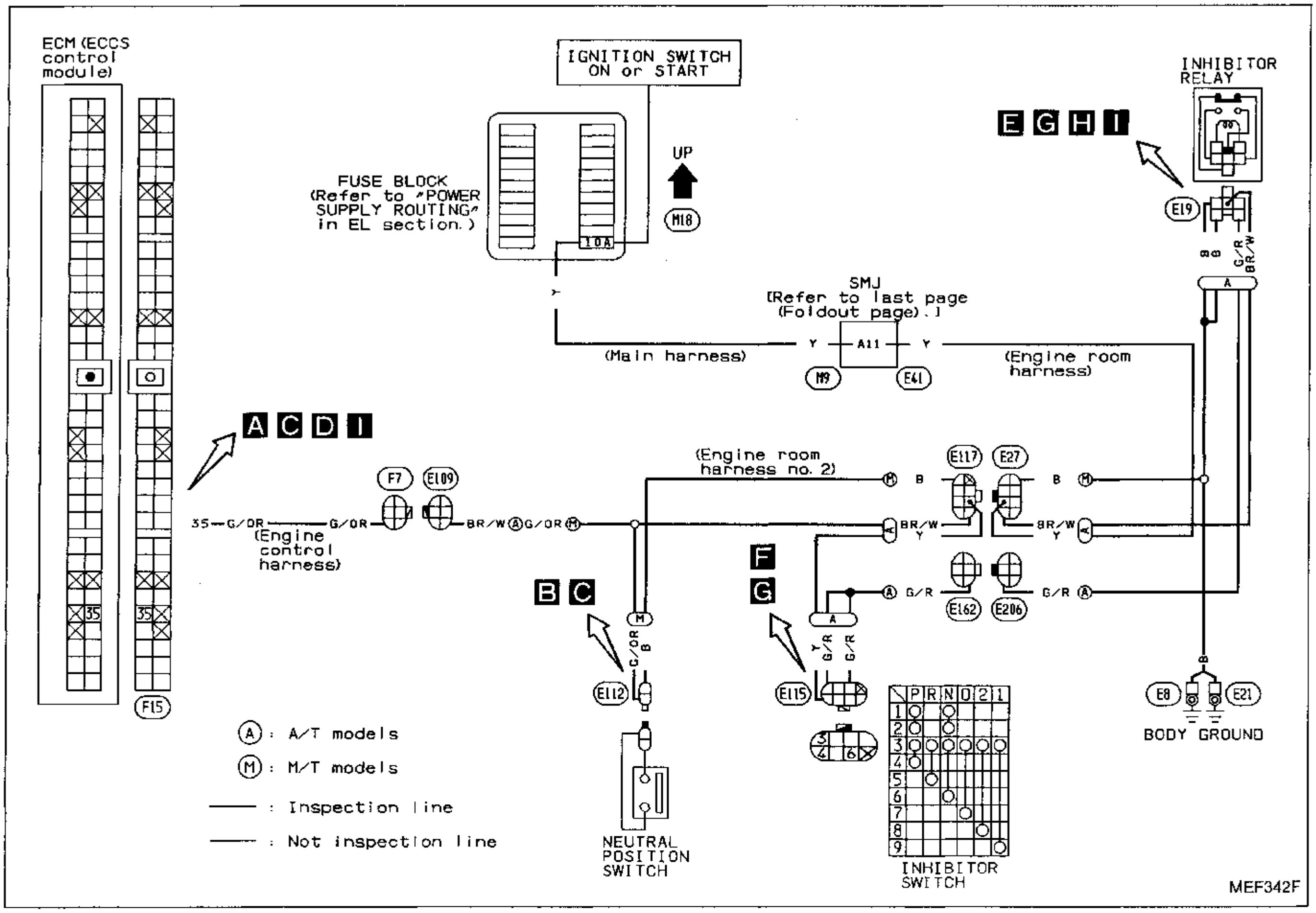
Trouble is not fixed.

Check ECM pin terminals for damage or the connection of ECM harness connector. Reconnect ECM harness connector and retest.

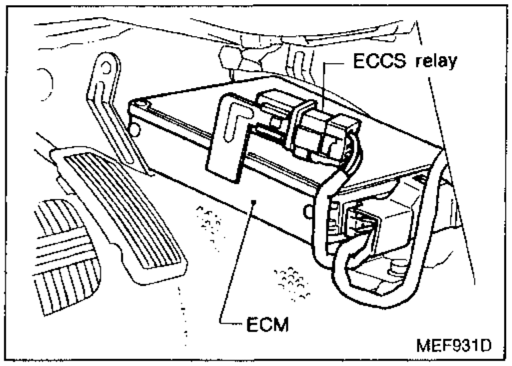
INSPECTION END

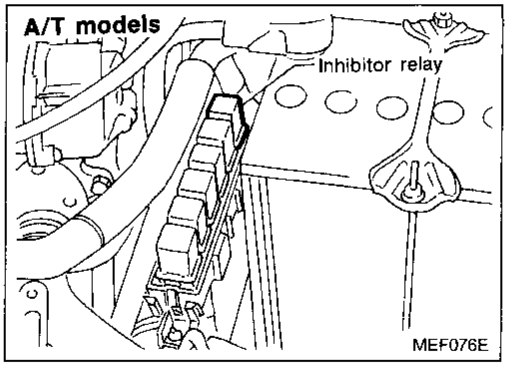
Diagnostic Procedure 24

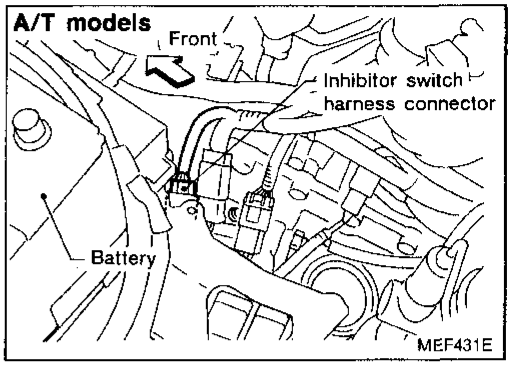
NEUTRAL POSITION/INHIBITOR SWITCH (Not self-diagnostic item)

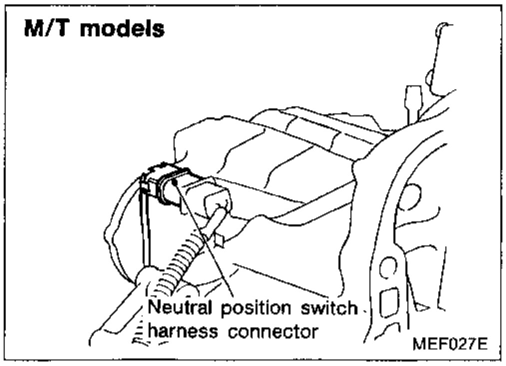


Harness layout

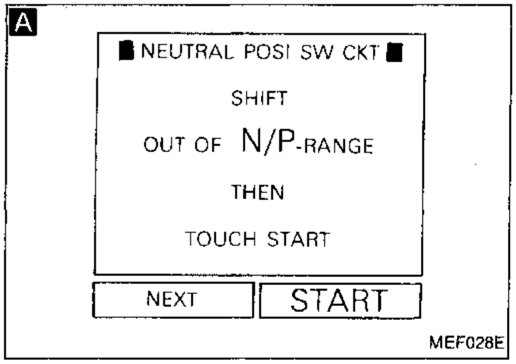








NEUTRAL POSITION/INHIBITOR SWITCH (Not self-diagnostic item)



■ NEUTRAL POSI SW CKT ■

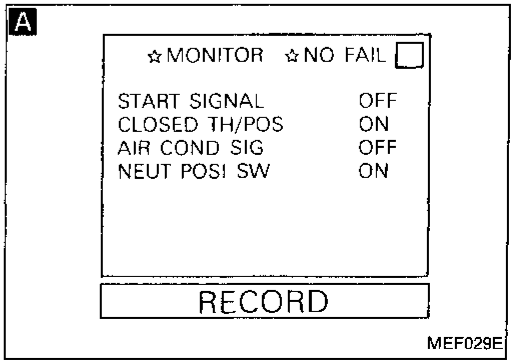
SHIFT

OUT OF N/P-RANGE

THEN

TOUCH START

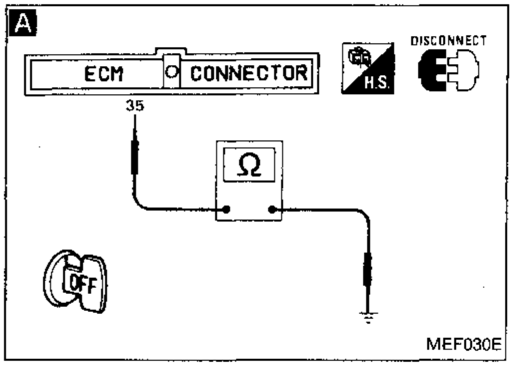
MEF028E



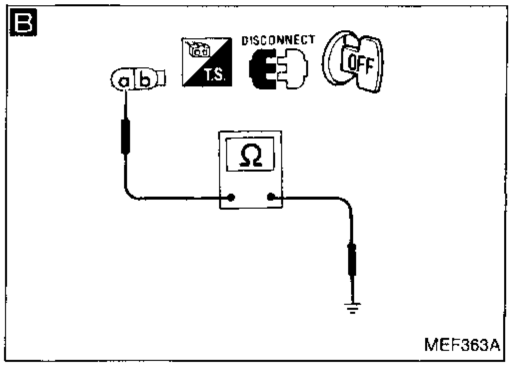
☆MONITOR ☆NO FAIL ☐

START SIGNAL	OFF
CLOSED TH/POS	ON
AIR COND SIG	OFF
NEUT POSI SW	ON

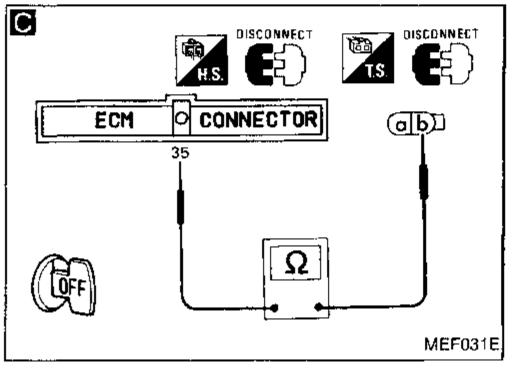
MEF029E



MEF030E



MEF363A



MEF031E

Neutral position switch

INSPECTION START

↓

A

CHECK OVERALL FUNCTION.

1) Turn ignition switch "ON".
2) Perform "NEUTRAL POSI SW CKT" in "FUNCTION TEST" mode with CONSULT.

OR

1) Turn ignition switch "ON".
2) Check "NEUT POSI SW" in "DATA MONITOR" mode with CONSULT.
Neutral position: ON
Except above: OFF

OR

1) Set shift lever to the neutral position.
2) Disconnect ECM harness connector.
3) Check harness continuity between ECM terminal ㉟ and body ground.
Continuity should exist.

OK → INSPECTION END

NG ↓

Turn ignition switch "OFF".

↓

B

CHECK GROUND CIRCUIT.

1) Disconnect neutral position switch harness connector.
2) Check harness continuity between terminal ⓐ and body ground.
Continuity should exist.

NG → Check the following.
- Harness connectors E117, E27
- Harness continuity between neutral position switch and body ground

If NG, repair harness or connectors.

OK ↓

Disconnect ECM harness connector.

↓

C

CHECK INPUT SIGNAL CIRCUIT.

1) Check harness continuity between ECM terminal ㉟ and terminal ⓑ.
Continuity should exist.

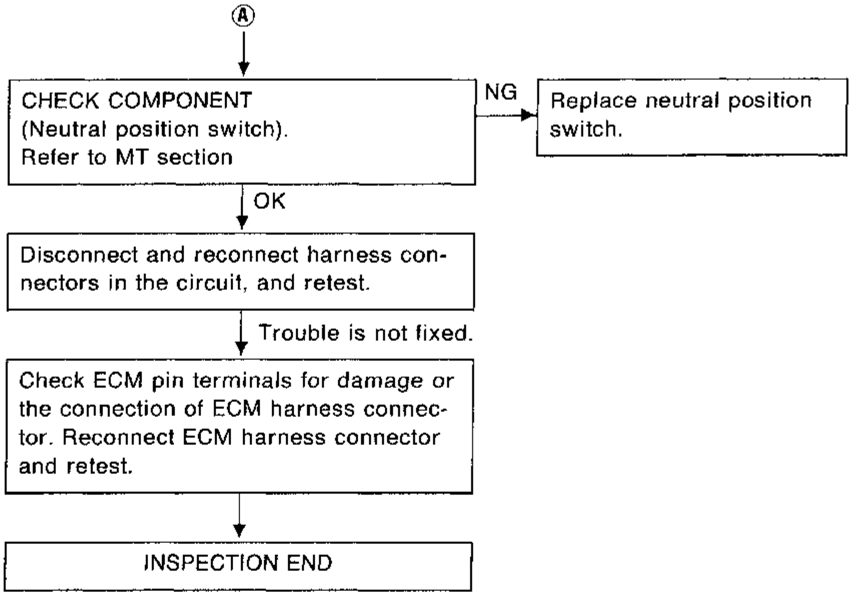
NG → Check the following.
- Harness connectors F7, E109
- Harness continuity between ECM and neutral position switch

If NG, repair harness or connectors.

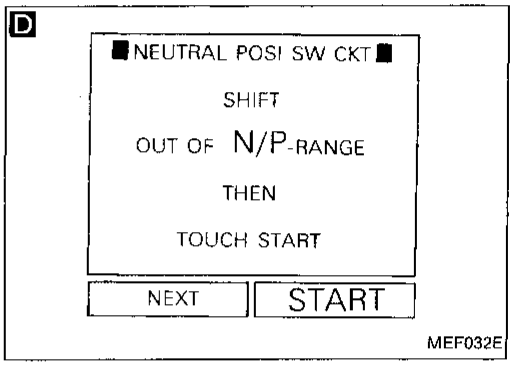
OK ↓

Ⓐ

NEUTRAL POSITION/INHIBITOR SWITCH (Not self-diagnostic item)



NEUTRAL POSITION/INHIBITOR SWITCH (Not self-diagnostic item)



■NEUTRAL POSI SW CKT■

SHIFT

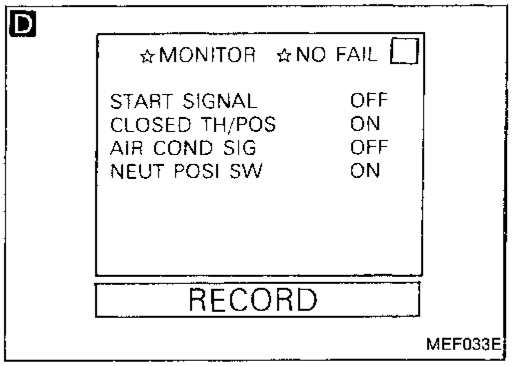
OUT OF N/P-RANGE

THEN

TOUCH START

NEXT | START

MEF032E

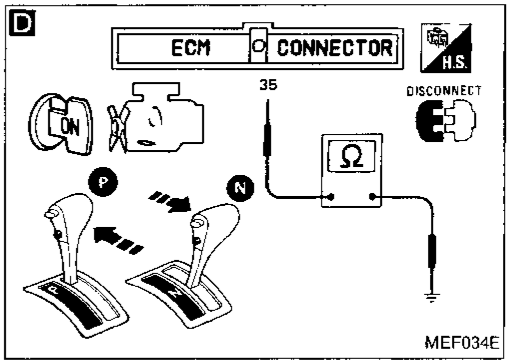


☆MONITOR ☆NO FAIL ☐

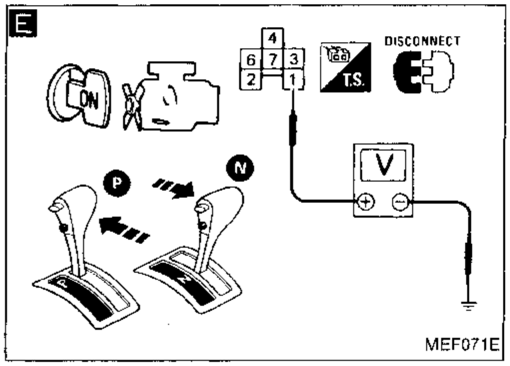
START SIGNAL	OFF
CLOSED TH/POS	ON
AIR COND SIG	OFF
NEUT POSI SW	ON

RECORD

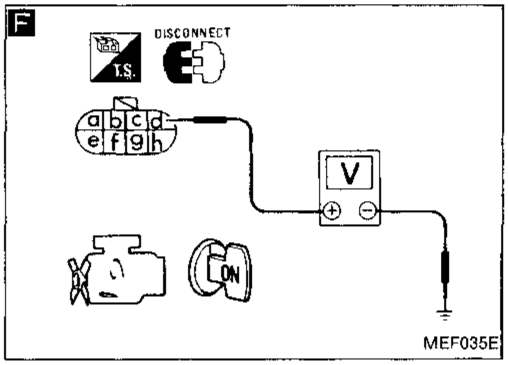
MEF033E



MEF034E



MEF071E



MEF035E

Inhibitor switch

INSPECTION START

↓

D CHECK OVERALL FUNCTION.
1) Turn ignition switch "ON".
2) Perform "NEUTRAL POSI SW CKT" in "FUNCTION TEST" mode with CONSULT.

OR

1) Turn ignition switch "ON".
2) Check "NEUTRAL POSI SW" in "DATA MONITOR" mode with CONSULT.
"N" or "P": ON
Except above: OFF

OR

1) Shift selector lever to "P" position.
2) Disconnect ECM harness connector.
3) Turn ignition switch "ON".
4) Check harness continuity between ECM terminal ㉟ and body ground.
Continuity should exist.
5) Shift selector lever to "N" position.
6) Check harness continuity between ECM terminal ㉟ and body ground.
Continuity should exist.

OK → INSPECTION END

NG ↓

E CHECK POWER SUPPLY.
1) Turn ignition switch "OFF".
2) Disconnect inhibitor relay.
3) Make sure that selector lever is in "N" position.
4) Turn ignition switch "ON".
5) Check voltage between terminal ① and ground with CONSULT or tester.
Voltage: Battery voltage
6) Shift selector lever into "P" position.
7) Check voltage between terminal ① and ground with CONSULT or tester.
Voltage: Battery voltage

OK ↓ Ⓐ

NG →

Check the following.

F CHECK HARNESS CONTINUITY BETWEEN INHIBITOR SWITCH AND BATTERY.
1) Turn ignition switch "OFF".
2) Disconnect inhibitor switch harness connector.
3) Turn ignition switch "ON".
4) Check voltage between terminal ⓓ and ground with CONSULT or tester.
Voltage: Battery voltage
If NG, check the following.
- Harness connectors M9, E41
- Harness connectors E117, E27
- 10A fuse
- Harness continuity between fuse and inhibitor switch

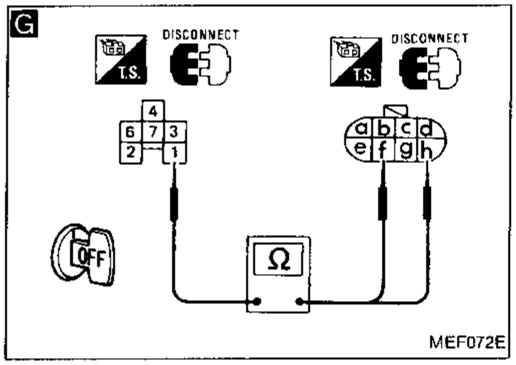
If NG, repair harness or connectors.

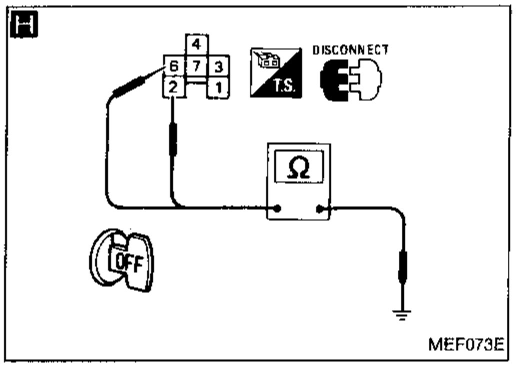
G CHECK HARNESS CONTINUITY BETWEEN INHIBITOR SWITCH AND INHIBITOR RELAY.
1) Turn ignition switch "OFF".
2) Check harness continuity between terminal ① and ⓕ ("N" position), terminal ① and ⓗ ("P" position).
Continuity should exist.
If NG, check the following.
- Harness connectors E162, E206
- Harness continuity between inhibitor switch and inhibitor relay

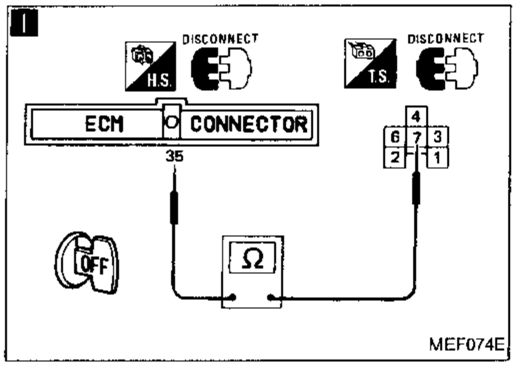
If NG, repair harness or connectors.

CHECK COMPONENT (Inhibitor switch).
Refer to AT section.

NEUTRAL POSITION/INHIBITOR SWITCH (Not self-diagnostic item)







Ⓐ

H

CHECK GROUND CIRCUIT.
1) Turn ignition switch "OFF".
2) Check harness continuity between terminals ②, ⑥ and body ground.
Continuity should exist.

NG → Repair harness or connectors.

OK ↓

I

CHECK INPUT SIGNAL CIRCUIT.
1) Check harness continuity between ECM terminal ㉟ and terminal ⑦.
Continuity should exist.

NG → Check the following.
- Harness connectors F7, E109
- Harness connectors E117, E27
- Harness continuity between ECM and inhibitor relay

If NG, repair harness or connectors.

OK ↓

CHECK COMPONENT
(Inhibitor relay).
Refer to AT section.

NG → Replace inhibitor relay.

OK ↓

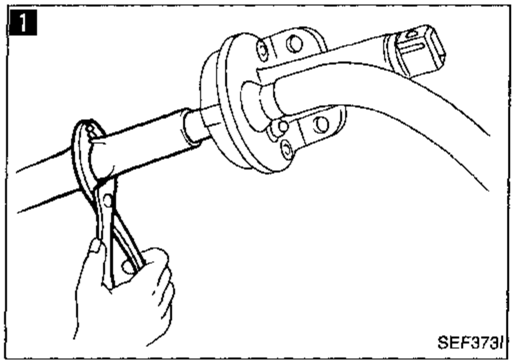
Disconnect and reconnect harness connectors in the circuit, and retest.

↓ Trouble is not fixed.

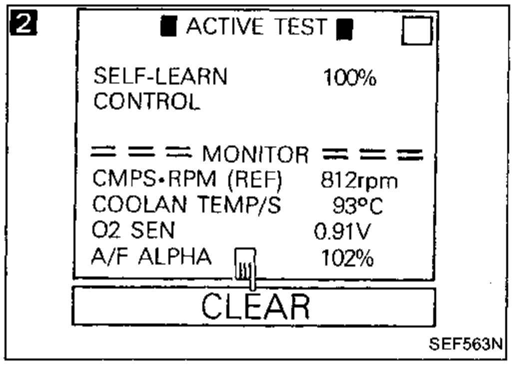
Check ECM pin terminals for damage or the connection of ECM harness connector. Reconnect ECM harness connector and retest.

↓

INSPECTION END



SEF373I



■ ACTIVE TEST ■

SELF-LEARN CONTROL 100%

=== MONITOR ===

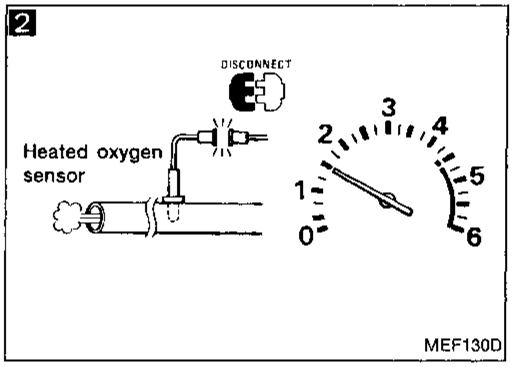
CMPS•RPM (REF) 812rpm

COOLAN TEMP/S 93°C

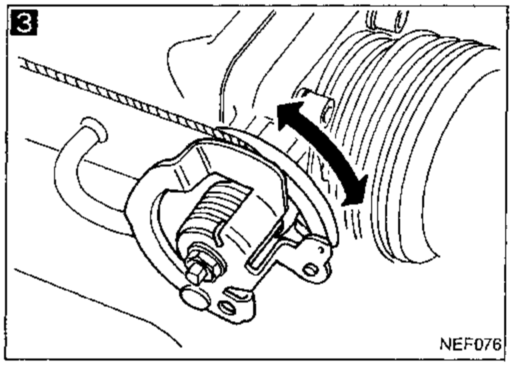
O2 SEN 0.91V

A/F ALPHA 102%

SEF563N



MEF130D



NEF076

Diagnostic Procedure 25 — Symptom — High Idling after Warm-up

1

CHECK IACV-AIR REGULATOR.
When pinching the IACV-air regulator hose, does the engine speed drop?

Yes → Check IACV-air regulator and circuit. (See page EF & EC-119.)

No ↓

2

CHECK INTAKE AIR LEAK.

1. Select "SELF-LEARNING CONT" in "ACTIVE TEST" mode.
2. Clear the self-learning control coefficient by touching "CLEAR".
3. Does the engine speed drop?

OR

1. Disconnect heated oxygen sensor harness connector.
2. After racing engine at 2,000 rpm under no-load for about 30 seconds, does the engine speed drop?

Yes → Discover air leak location and repair.

No ↓

3

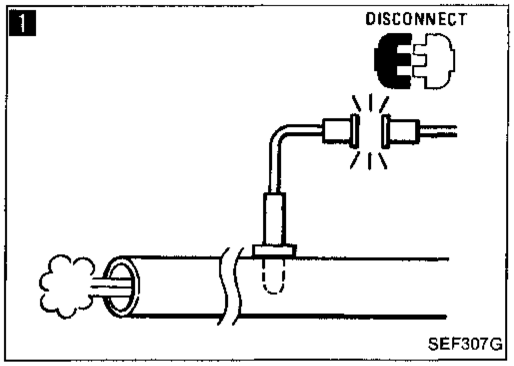
CHECK THROTTLE LINKAGE.

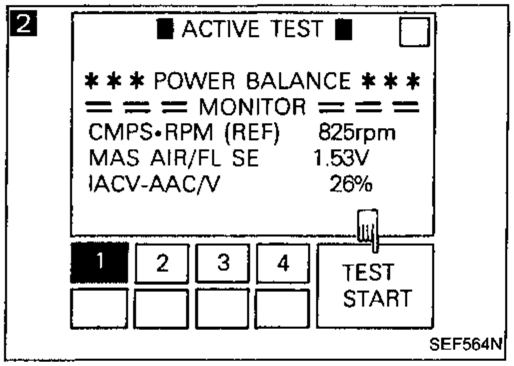
1. Check that throttle linkage moves smoothly.
2. Confirm that throttle valve both fully opens and fully closes.

NG → Repair throttle linkage or sticking of throttle valve.

OK ↓

INSPECTION END



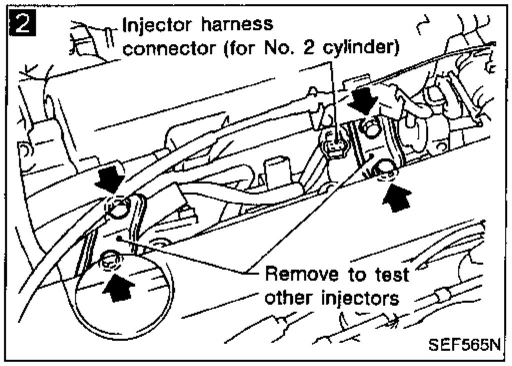


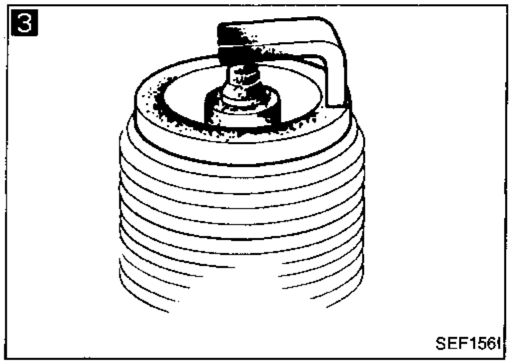
■ ACTIVE TEST ■ ☐

* * * POWER BALANCE * * *

= = = MONITOR = = =

CMPS•RPM (REF)	825rpm
MAS AIR/FL SE	1.53V
IACV-AAC/V	26%





Diagnostic Procedure 26 — Symptom — Hunting

1

CHECK HEATED OXYGEN SENSOR.
When disconnecting heated oxygen sensor harness connector, is the hunting fixed?

- Yes → Check heated oxygen sensor. (See page EF & EC-183.)
- No ↓

2

PERFORM POWER BALANCE TEST.

1. Perform "POWER BALANCE" in "ACTIVE TEST" mode.
2. Is there any cylinder which does not produce a momentary engine speed drop?

OR

When disconnecting each injector harness connector one at a time, is there any cylinder which does not produce a momentary engine speed drop?

- No → Go to **4**.
- Yes ↓

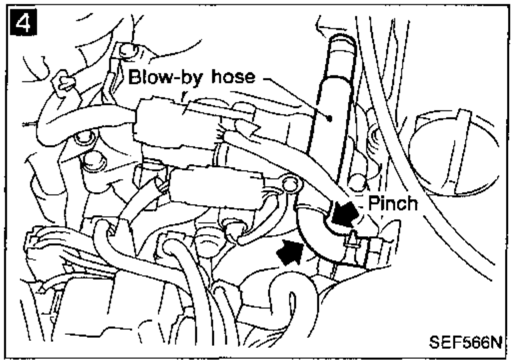
3

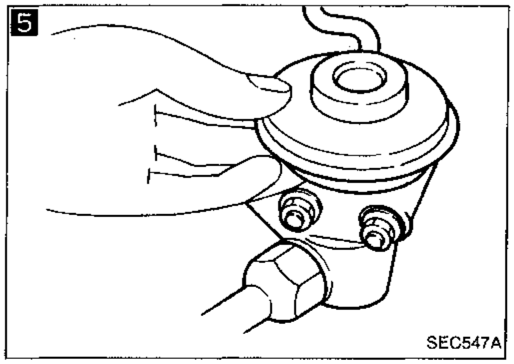
CHECK SPARK PLUGS.
Remove the spark plugs and check for fouling, etc.

- NG → Repair or replace spark plug(s).
- OK ↓

(Go to Ⓐ on next page.)

Diagnostic Procedure 26 — Symptom — Hunting (Cont'd)





Ⓐ

4

CHECK FOR INTAKE AIR LEAK.
When pinching blow-by hose (lowering the blow-by air supply), does the engine speed rise?

Yes → Discover air leak location and repair.

No ↓

5

CHECK EGR VALVE
Check EGR valve for sticking.

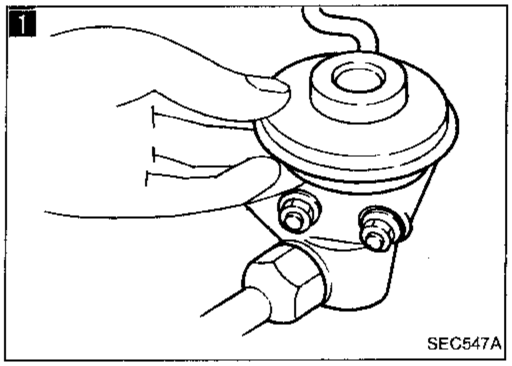
NG → Repair or replace.

OK ↓

INSPECTION END

Diagnostic Procedure 27 — Symptom — Unstable Idle

1

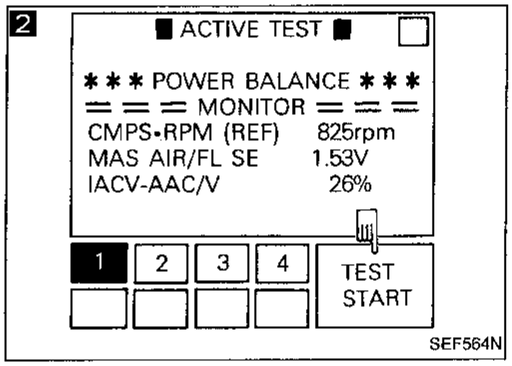

SEC547A

CHECK EGR VALVE.
Check EGR valve for sticking.

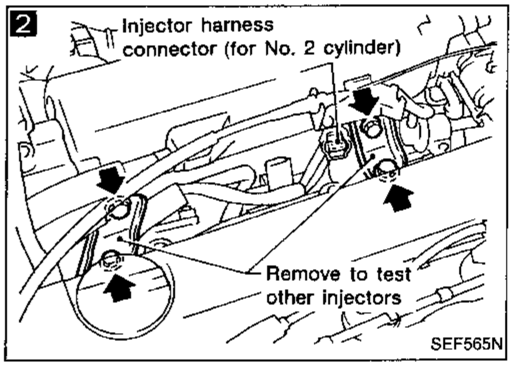
NG → Repair or replace.

OK ↓

2


■ ACTIVE TEST ■ ☐
* * * POWER BALANCE * * *
= = = MONITOR = = =
CMPS•RPM (REF) 825rpm
MAS AIR/FL SE 1.53V
IACV-AAC/V 26%

SEF564N



SEF565N

PERFORM POWER BALANCE TEST.
1. Perform "POWER BALANCE" in "ACTIVE TEST" mode.
2. Is there any cylinder which does not produce a momentary engine speed drop?

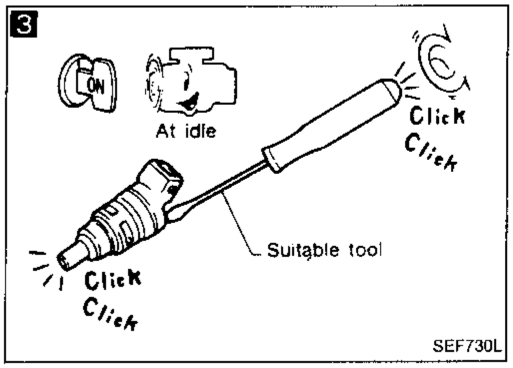
OR

When disconnecting each injector harness connector one at a time, is there any cylinder which does not produce a momentary engine speed drop?

No → Go to **6**.

Yes ↓

3



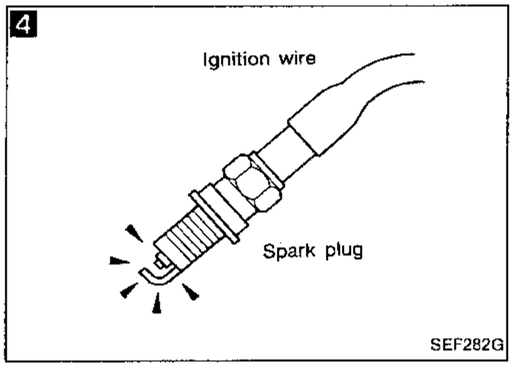
SEF730L

CHECK INJECTOR.
Does each injector make an operating sound at idle?

No → Check injector(s) and circuit(s).

Yes ↓

4



SEF282G

CHECK IGNITION SPARK.
1. Disconnect ignition wire from spark plug.
2. Connect a known good spark plug to the ignition wire.
3. Place end of spark plug against a suitable ground and crank engine.
4. Check for spark.

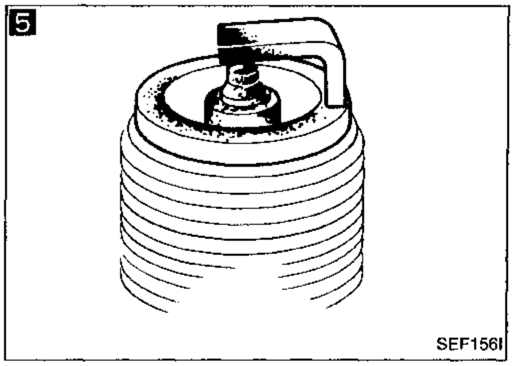
NG → Check ignition coil, power transistor and their circuits. (See page EF & EC-86.)

OK ↓

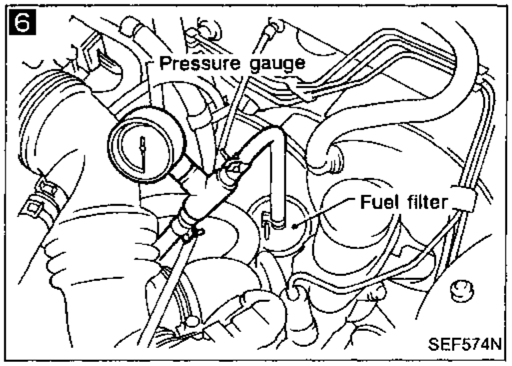
(Go to Ⓐ on next page.)

Diagnostic Procedure 27 — Symptom — Unstable Idle (Cont'd)

5

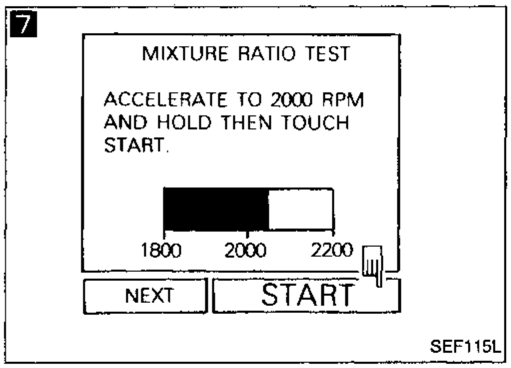

SEF156I

6



SEF574N

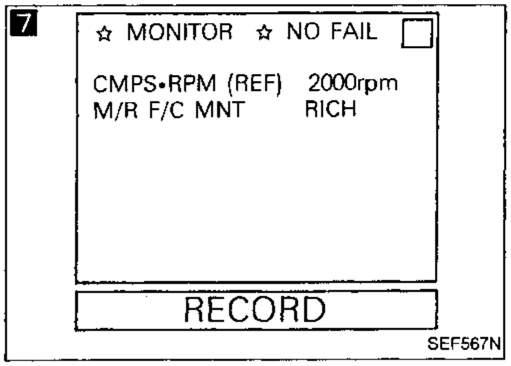
7


MIXTURE RATIO TEST

ACCELERATE TO 2000 RPM AND HOLD THEN TOUCH START.

SEF115L

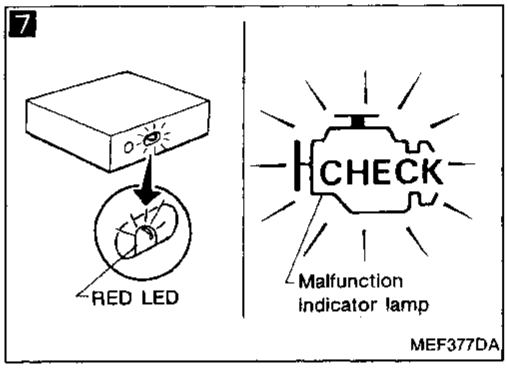
7


☆ MONITOR ☆ NO FAIL ☐

CMPS•RPM (REF) 2000rpm
M/R F/C MNT RICH

SEF567N

7



MEF377DA

Ⓐ

5

CHECK SPARK PLUGS.
Remove the spark plugs and check for fouling, etc.

NG → Repair or replace spark plug(s).

OK ↓

6

CHECK FUEL PRESSURE.
1. Release fuel pressure to zero. (Refer to page EF & EC-191.)
2. Install fuel pressure gauge and check fuel pressure.
   At idle:
   Approx. 245 kPa
   (2.5 kg/cm^2, 36 psi)

NG → Check fuel pump and circuit.

OK ↓

7

CHECK HEATED OXYGEN SENSOR.
1. Start engine and warm it up sufficiently.
2. Perform "MIXTURE RATIO TEST" in "FUNCTION TEST" mode.

OR

2. See "M/R F/C MNT" in "Data monitor" mode.
3. Maintaining engine at 2,000 rpm under no-load (engine is warmed up sufficiently.), check that the monitor fluctuates between "LEAN" and "RICH" more than 5 times during 10 seconds.

RICH→LEAN→RICH→
1 time 2 times
LEAN→RICH.......

OR

2. Set "Heated oxygen sensor monitor" in Diagnostic Test Mode II. (See page EF & EC-49.)
3. Maintaining engine at 2,000 rpm under no-load, check to make sure that the RED LED on the ECM or the malfunction indicator lamp on the instrument panel goes ON and OFF more than 5 times during 10 seconds.

NG → Replace heated oxygen sensor.

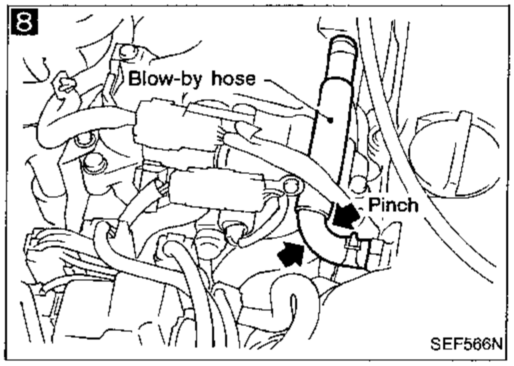
OK ↓

(Go to Ⓑ on next page.)

Diagnostic Procedure 27 — Symptom — Unstable Idle (Cont'd)

Ⓑ

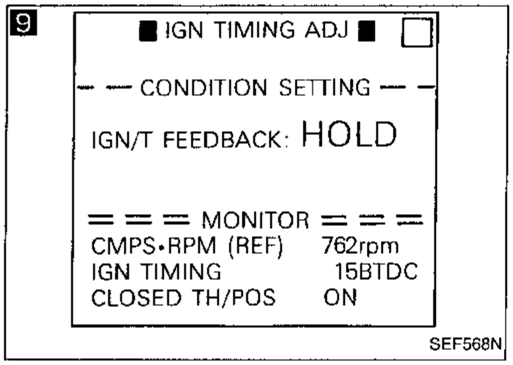
8



CHECK FOR INTAKE AIR LEAK.
When pinching blow-by hose (lowering the blow-by air supply), does the engine speed rise?

- Yes → Discover air leak location and repair.
- No ↓

9



9

■ IGN TIMING ADJ ■ ☐

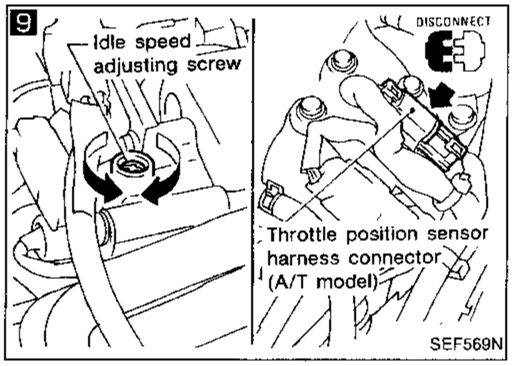
— — CONDITION SETTING — —

IGN/T FEEDBACK: HOLD

= = = MONITOR = = =

CMPS•RPM (REF)	762rpm
IGN TIMING	15BTDC
CLOSED TH/POS	ON

SEF568N



CHECK IDLE ADJ. SCREW CLOGGING.

1. Perform "IGN TIMING ADJ" in "WORK SUPPORT" mode.
2. Can you set engine speed at 750±50 rpm (in "N" position) by turning idle adjusting screw?

OR

1. Disconnect throttle position sensor harness connector.
2. Can you set engine speed at 750±50 rpm (in "N" position) by turning idle speed adjusting screw?

- No → Check for IAS clogging or throttle valve clogging.
- Yes ↓

10

10

COMPRESSION PRESSURE

SEF309G

CHECK COMPRESSION PRESSURE.

- Check compression pressure.

Standard:
kPa (kg/cm^2, psi)/300 rpm
1,226 (12.5, 178)
Minimum:
kPa (kg/cm^2, psi)/300 rpm
1,030 (10.5, 149)
Difference between each cylinder:
kPa (kg/cm^2, psi)/300 rpm
98 (1.0, 14)

- NG → Check pistons, piston rings, valves, valve seats and cylinder head gaskets.
- OK ↓

CHECK ECM HARNESS CONNECTOR.
Check the ECM pin terminals for damage or poor connection of ECM harness connector.

- NG → Repair or replace.
- OK ↓

Reconnect ECM harness connector and retest.

↓ Trouble is not fixed.

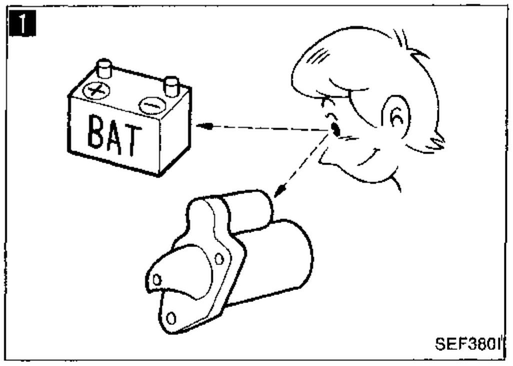
TRY A KNOWN GOOD ECM*.

↓

INSPECTION END

*: ECM may be the cause of a problem, but this is rarely the case.

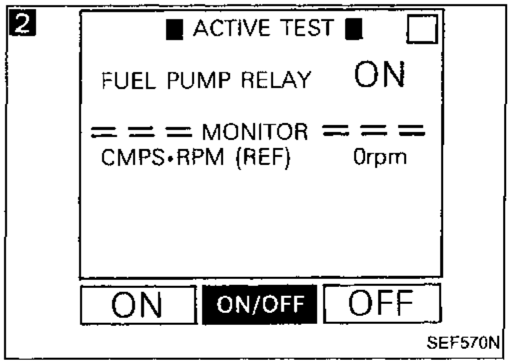
Diagnostic Procedure 28 — Symptom — Hard to Start or Impossible to Start when the Engine is Cold



1

CHECK BATTERY AND STARTER.
Check battery and starter condition.
(Refer to EL section.)

- NG → Repair or replace.
- OK ↓



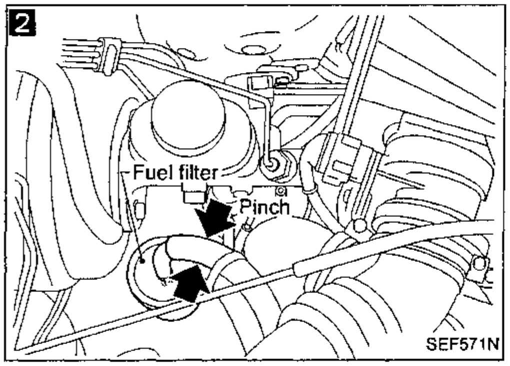
■ ACTIVE TEST ■ ☐

FUEL PUMP RELAY ON

=== MONITOR ===

CMPS•RPM (REF) 0rpm

ON | ON/OFF | OFF



2

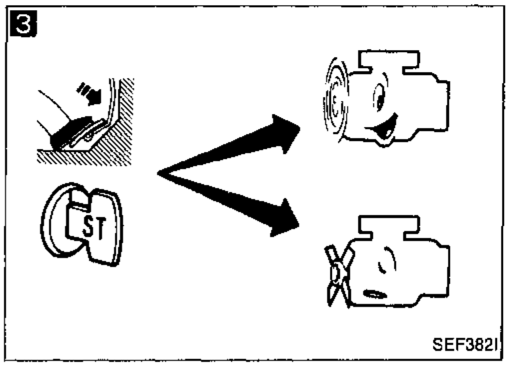
CHECK FUEL PRESSURE.

1. Turn ignition switch "ON".
2. Perform "FUEL PUMP RELAY" in "ACTIVE TEST" mode.
3. Pinch fuel feed hose with fingers.
Is fuel pressure pulsation felt on the fuel feed hose?

OR

1. Pinch fuel feed hose with fingers.
2. When cranking the engine, is there any pressure on the fuel feed hose?

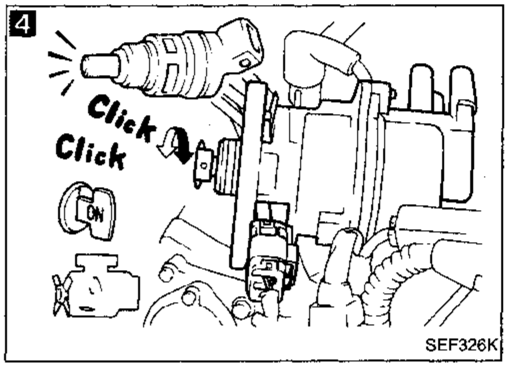
- No → Check fuel pump and circuit. (See page EF & EC-116.)
- Yes ↓



3

CHECK IACV-AIR REGULATOR AND IACV-AAC VALVE.
When pressing accelerator pedal fully, can you start the engine.

- Yes → Check IACV-AAC valve, IACV-air regulator and circuits. (See pages EF & EC-121, 119.)
- No ↓



4

CHECK INJECTOR.

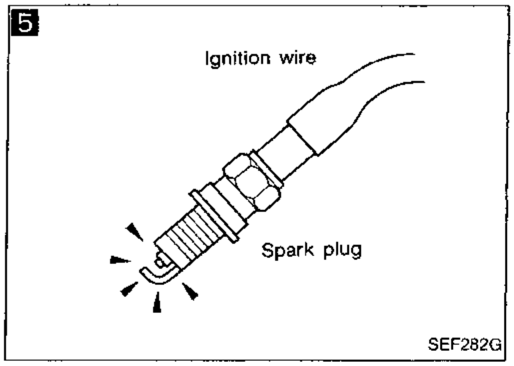
1. Remove distributor from engine. (Camshaft position sensor harness connector should remain connected.)
2. Disconnect ignition wires.
3. Turn ignition switch ON. (Do not start engine.)
4. When rotating distributor shaft slowly by hand, does each injector make an operating sound?

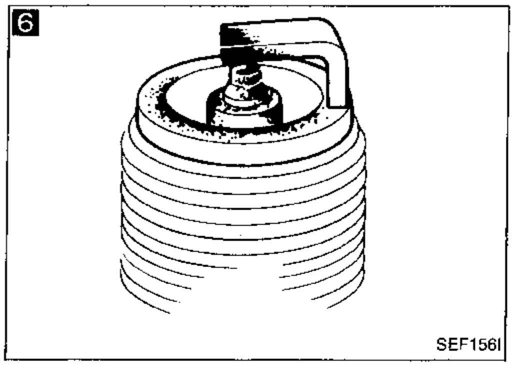
- No → Check injector(s) and circuit(s).
- Yes ↓

(Go to Ⓐ on next page.)

GI
MA
EM
LC
EF & EC
FE
CL
MT
AT
FA
RA
BR
ST
BF
HA
EL
IDX

Diagnostic Procedure 28 — Symptom — Hard to Start or Impossible to Start when the Engine is Cold (Cont'd)





Ⓐ

5

CHECK IGNITION SPARK.
1. Disconnect ignition wire from spark plug.
2. Connect a known good spark plug to the ignition wire.
3. Place end of spark plug against a suitable ground and crank engine.
4. Check for spark.

NG → Check ignition coil, power transistor and their circuits. (See page EF & EC-86.)

OK

6

CHECK SPARK PLUGS.
Remove the spark plugs and check for fouling, etc.

NG → Repair or replace spark plug(s).

OK

CHECK ECM HARNESS CONNECTOR.
Check the ECM pin terminals for damage or poor connection of ECM harness connector.

NG → Repair or replace.

OK

Reconnect ECM harness connector and retest.

Trouble is not fixed.

CHECK ECM POWER SUPPLY AND GROUND CIRCUIT.
Refer to page EF & EC-72.

NG → Repair or replace.

OK

TRY A KNOWN GOOD ECM*.

INSPECTION END

*: ECM may be the cause of a problem, but this is rarely the case.

Diagnostic Procedure 29 — Symptom — Hard to Start or Impossible to Start when the Engine is Hot

1

CHECK FUEL PRESSURE.

1. Turn ignition switch "ON".
2. Perform "FUEL PUMP RELAY" in "ACTIVE TEST" mode.
3. Pinch fuel feed hose with fingers.

Is fuel pressure pulsation felt on the fuel feed hose?

OR

1. Pinch fuel feed hose with fingers.
2. When cranking the engine, is there any pressure on the fuel feed hose?

No → Check fuel pump and circuit. (See page EF & EC-116.)

Yes ↓

2

CHECK FUEL VAPOR.

1. Disconnect fuel pressure regulator vacuum hose and plug hose.
2. Can you start engine?

Yes → Check fuel properties.

No ↓

3

CHECK INJECTOR.

Does each injector make an operating sound at idle?

No → Check injector(s) and circuit(s).

Yes ↓

4

CHECK IGNITION SPARK.

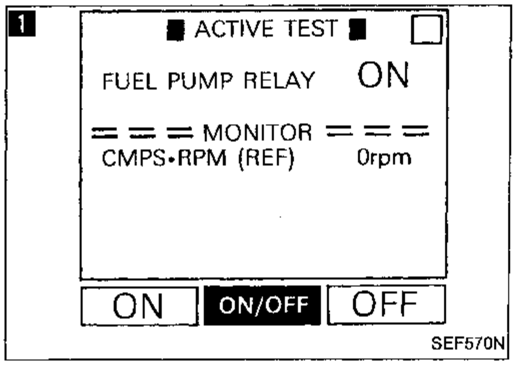
1. Disconnect ignition wire from spark plug.
2. Connect a known good spark plug to the ignition wire
3. Place end of spark plug against a suitable ground and crank engine.
4. Check for spark.

NG → Check ignition coil, power transistor and circuits. (See page EF & EC-86.)

OK ↓

(Go to Ⓐ on next page.)

1



■ ACTIVE TEST ■ ☐

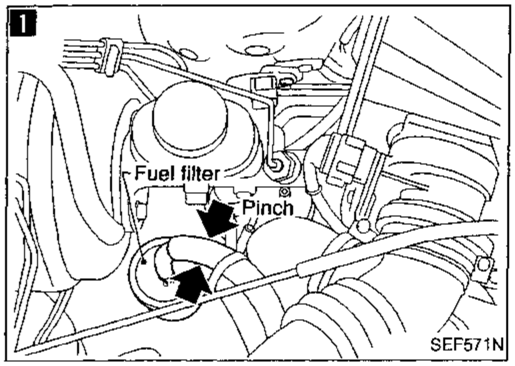
FUEL PUMP RELAY ON

=== MONITOR ===

CMPS•RPM (REF) 0rpm

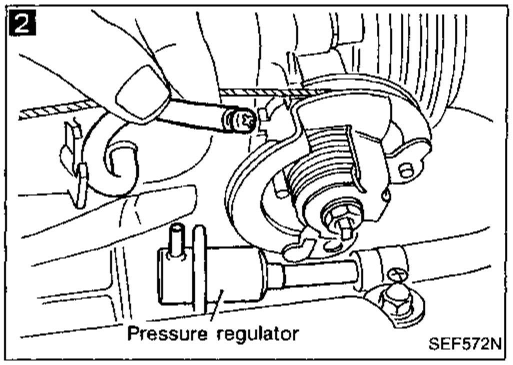
SEF570N

1



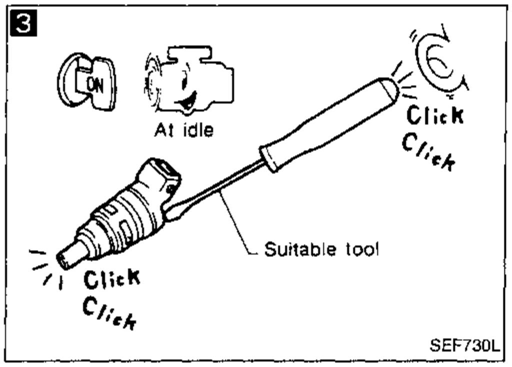
SEF571N

2



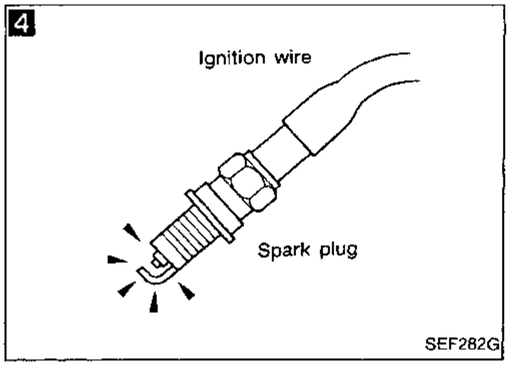
SEF572N

3



SEF730L

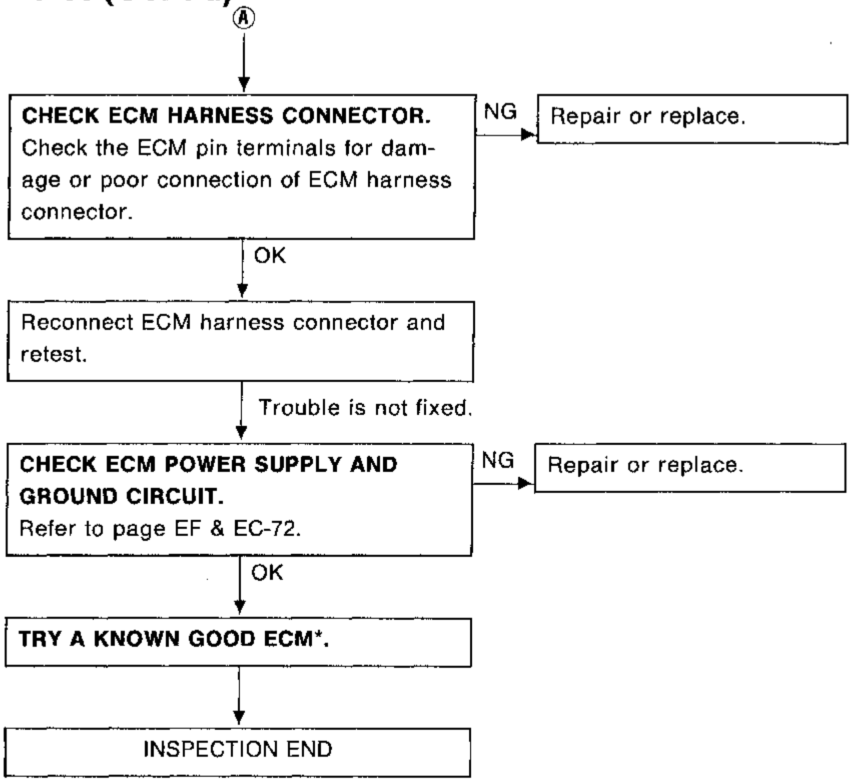
4



SEF282G

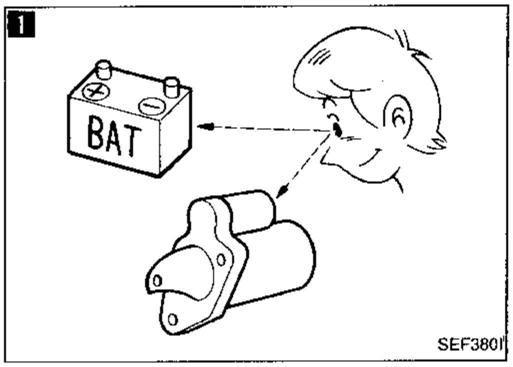
GI
MA
EM
LC
EF & EC
FE
CL
MT
AT
FA
RA
BR
ST
BF
HA
EL
IDX

Diagnostic Procedure 29 — Symptom — Hard to Start or Impossible to Start when the Engine is Hot (Cont'd)



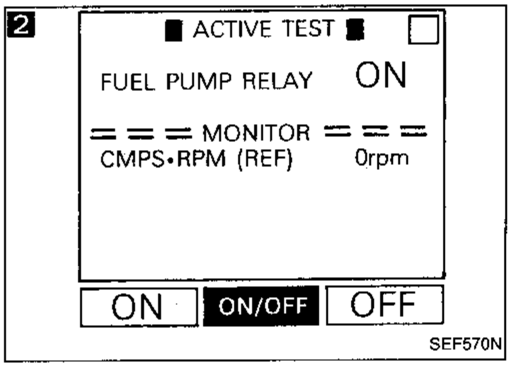
*: ECM may be the cause of a problem, but this is rarely the case.

1



SEF380I

2


■ ACTIVE TEST ■ ☐

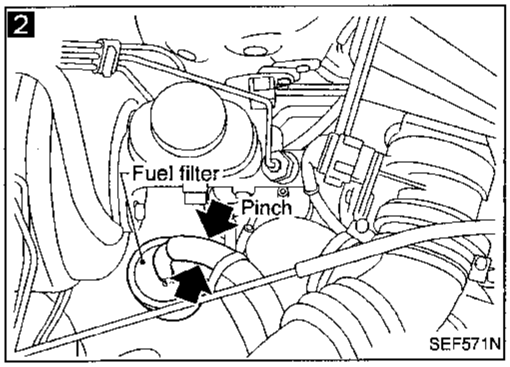
FUEL PUMP RELAY ON

= = = MONITOR = = =

CMPS•RPM (REF) 0rpm

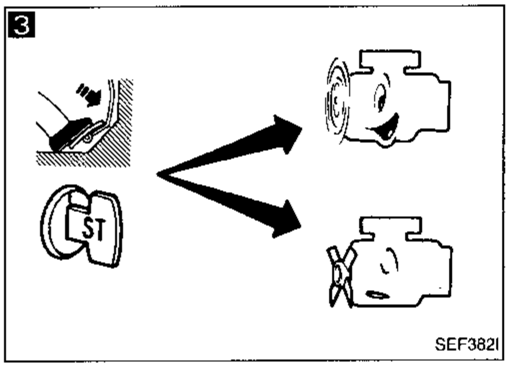
SEF570N

2



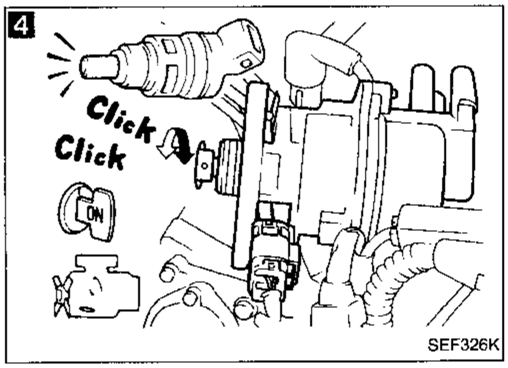
SEF571N

3



SEF382I

4



SEF326K

Diagnostic Procedure 30 — Symptom — Hard to Start or Impossible to Start under Normal Conditions

1

CHECK BATTERY AND STARTER.
Check battery and starter operation.
(Refer to EL section.)

NG → Repair or replace.

OK ↓

2

CHECK FUEL PRESSURE.

1. Turn ignition switch "ON".
2. Perform "FUEL PUMP RELAY" in "ACTIVE TEST" mode.
3. Pinch fuel feed hose with fingers.
Is fuel pressure pulsation felt on the fuel feed hose?

OR

1. Pinch fuel feed hose with fingers.
2. When cranking the engine, is there any pressure on the fuel feed hose?

No → Check fuel pump and circuit. (See page EF & EC-116.)

Yes ↓

3

CHECK INJECTOR FOR LEAKAGE.
When pressing accelerator pedal fully, can you start the engine.

Yes → Check injector(s) for leakage.

No ↓

4

CHECK INJECTOR.

1. Remove distributor from engine. (Camshaft position sensor harness connector should remain connected.)
2. Disconnect ignition wires.
3. Turn ignition switch ON. (Do not start engine.)
4. When rotating distributor shaft slowly by hand, does each injector make an operating sound?

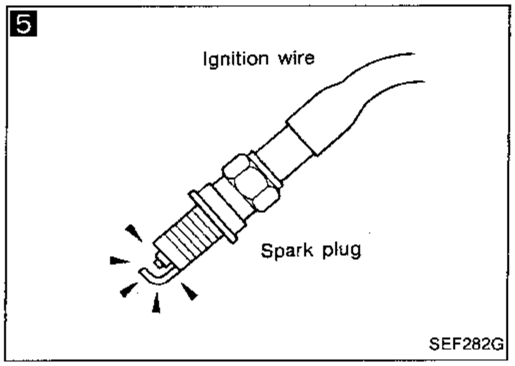
No → Check injectors and circuits.

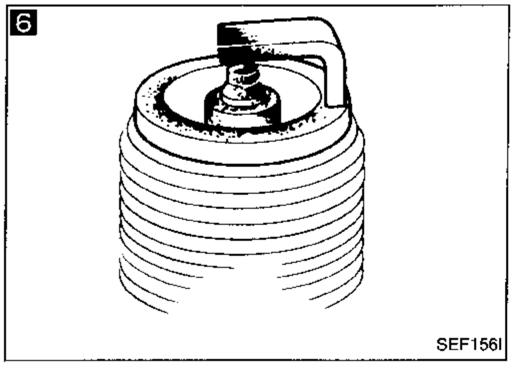
Yes ↓

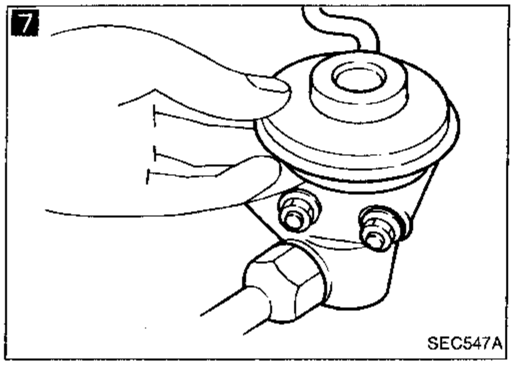
(Go to Ⓐ on next page.)

GI
MA
EM
LC
EF & EC
FE
CL
MT
AT
FA
RA
BR
ST
BF
HA
EL
IDX

Diagnostic Procedure 30 — Symptom — Hard to Start or Impossible to Start under Normal Conditions (Cont'd)







Ⓐ

5

CHECK IGNITION SPARK.
1. Disconnect ignition wire from spark plug.
2. Connect a known good spark plug to the ignition wire.
3. Place end of spark plug against a suitable ground and crank engine.
4. Check for spark.

NG → Check ignition coil, power transistor and circuits. (See page EF & EC-86.)

OK

6

CHECK SPARK PLUGS.
Remove the spark plugs and check for fouling, etc.

NG → Repair or replace spark plug(s).

OK

7

CHECK EGR VALVE.
Check EGR valve for sticking.

NG → Repair or replace.

OK

CHECK ECM HARNESS CONNECTOR.
Check the ECM pin terminals for damage or poor connection of ECM harness connector.

NG → Repair or replace.

OK

Reconnect ECM harness connector and retest.

Trouble is not fixed.

CHECK ECM POWER SUPPLY AND GROUND CIRCUIT.
Refer to page EF & EC-72.

NG → Repair or replace.

OK

TRY A KNOWN GOOD ECM*.

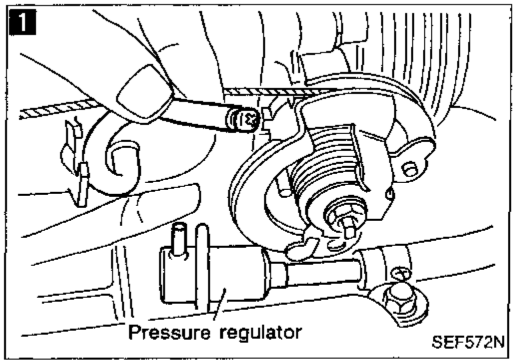
Trouble is fixed. → Replace ECM.

Trouble is not fixed.

INSPECTION END

*: ECM may be the cause of a problem, but this is rarely the case.

Diagnostic Procedure 31 — Symptom — Hesitation when the Engine is Hot

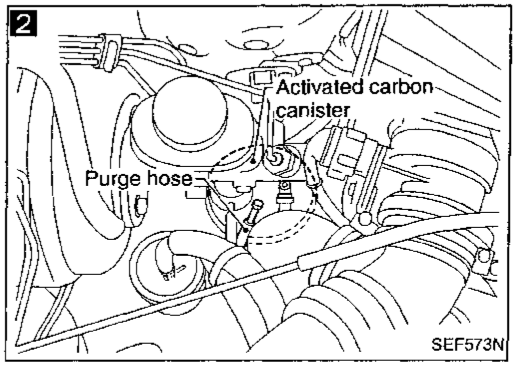


1

CHECK FUEL VAPOR.
1. Disconnect fuel pressure regulator vacuum hose and plug hose.
2. Perform cruise test.
3. Does the hesitation disappear?

Yes → Check fuel properties.

No ↓

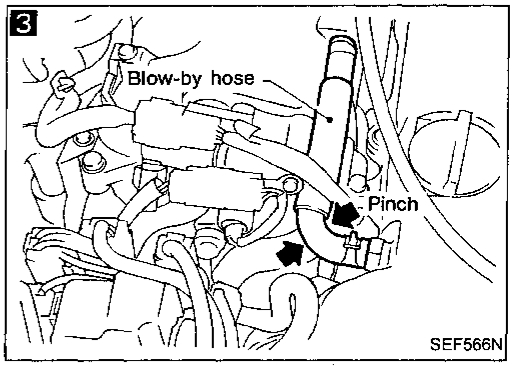


2

CHECK CANISTER PURGE.
1. Disconnect canister purge line hose and plug hose.
2. Perform cruise test.
3. Does the hesitation disappear?

Yes → Check purge and vacuum line.

No ↓



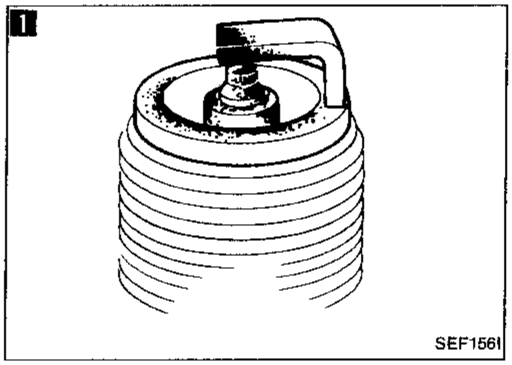
3

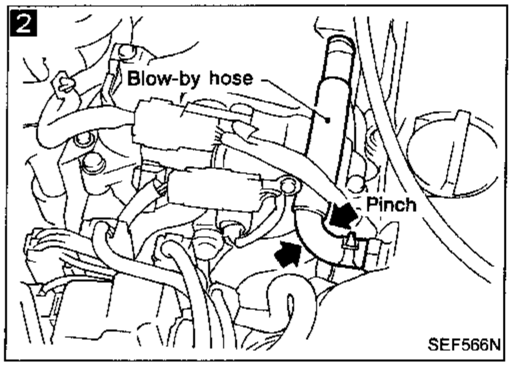
CHECK FOR INTAKE AIR LEAK.
When pinching blow-by hose (lowering the blow-by air supply), does the engine speed rise?

Yes → Discover air leak location and repair.

No ↓

INSPECTION END





Diagnostic Procedure 32 — Symptom — Hesitation when the Engine is Cold

1

CHECK SPARK PLUGS.
Remove spark plugs and check for fouling, etc.

NG → Repair or replace spark plug(s).

OK ↓

2

CHECK FOR INTAKE AIR LEAK.
When pinching blow-by hose (lowering the blow-by air supply), does the engine speed rise?

Yes → Discover air leak location and repair.

No ↓

TRY A KNOWN GOOD MASS AIR FLOW SENSOR.

Trouble is fixed. → Replace mass air flow sensor.

Trouble is not fixed. ↓

CHECK FOR INTAKE VALVE DEPOSITS.
If there are deposits on intake valves, clean them.

↓

INSPECTION END

Diagnostic Procedure 33 — Symptom — Hesitation under Normal Conditions

1

CHECK SPARK PLUGS.
Remove spark plugs and check for fouling, etc.

NG → Repair or replace spark plug(s).

OK ↓

2

CHECK HEATED OXYGEN SENSOR.

1. Start engine and warm it up sufficiently.
2. Perform "MIXTURE RATIO TEST" in "FUNCTION TEST" mode.

OR

2. See "M/R F/C MNT" in "Data monitor" mode.
3. Maintaining engine at 2,000 rpm under no-load (engine is warmed up sufficiently.), check that the monitor fluctuates between "LEAN" and "RICH" more than 5 times during 10 seconds.

RICH→LEAN→RICH→
1 time 2 times
LEAN→RICH.......

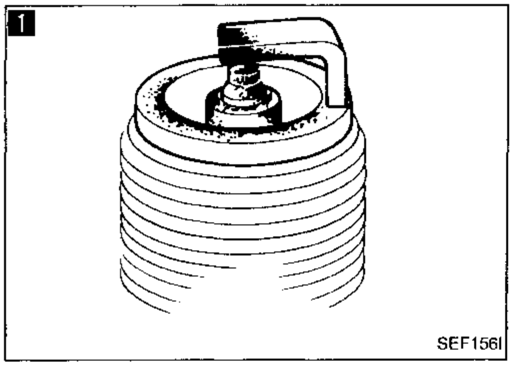
OR

2. Set "Heated oxygen sensor monitor" in Diagnostic Test Mode II. (See page EF & EC-49.)
3. Maintaining engine at 2,000 rpm under no-load, check that the RED LED on the ECM or the malfunction indicator lamp on the instrument panel goes ON and OFF more than 5 times during 10 seconds.

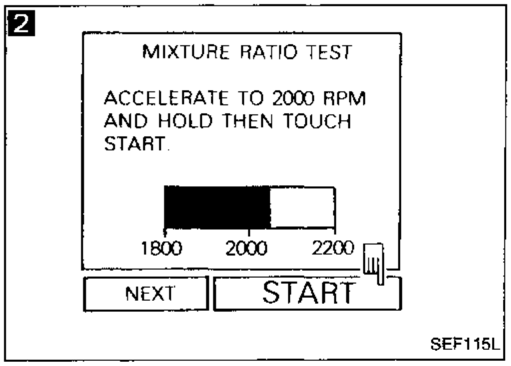
NG → Replace heated oxygen sensor.

OK ↓

(Go to Ⓐ on next page.)



SEF156I



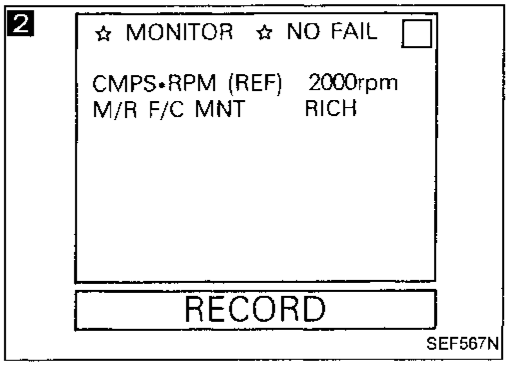
MIXTURE RATIO TEST

ACCELERATE TO 2000 RPM AND HOLD THEN TOUCH START.

1800 2000 2200

NEXT START

SEF115L

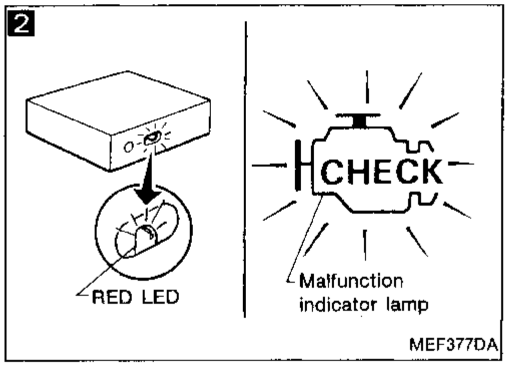


☆ MONITOR ☆ NO FAIL ☐

CMPS•RPM (REF) 2000rpm
M/R F/C MNT RICH

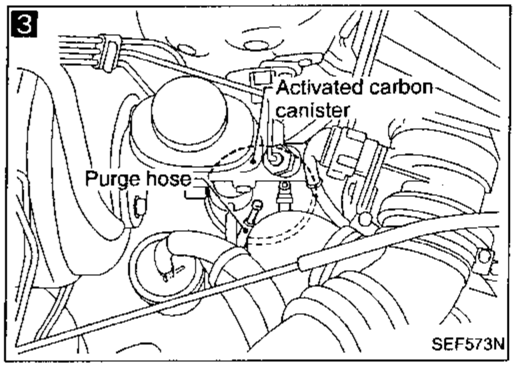
RECORD

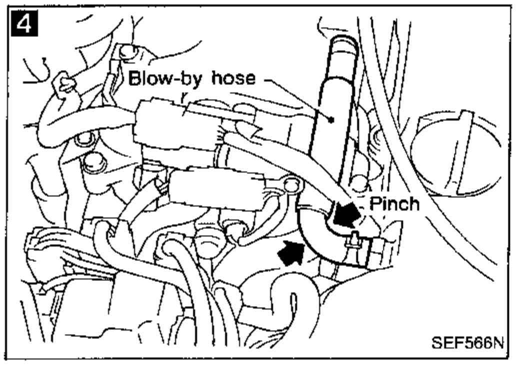
SEF567N



MEF377DA

Diagnostic Procedure 33 — Symptom — Hesitation under Normal Conditions (Cont'd)





Ⓐ

3 **CHECK CANISTER PURGE.**
1. Disconnect canister purge line hose and plug hose.
2. Perform cruise test.
3. Does the hesitation disappear?

Yes → Check purge and vacuum line.

No ↓

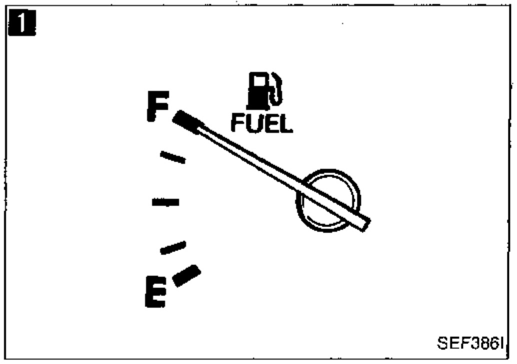
4 **CHECK FOR INTAKE AIR LEAK.**
When pinching blow-by hose (lowering the blow-by air supply), does the engine speed rise?

Yes → Discover air leak location and repair.

No ↓

INSPECTION END

Diagnostic Procedure 34 — Symptom — Engine Stalls when Turning

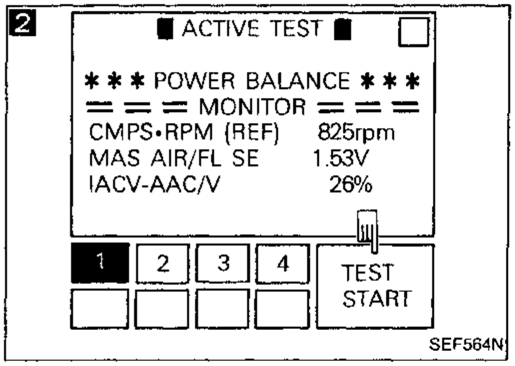


1

CHECK FUEL LEVEL.
Check to see that there is enough fuel in tank.

NG → Fill fuel tank with fuel.

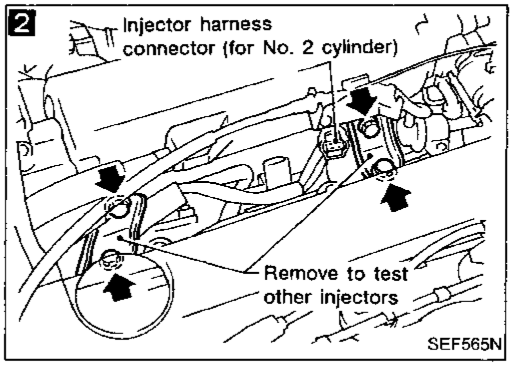
OK ↓



* * * POWER BALANCE * * *
= = = MONITOR = = =

CMPS•RPM (REF)	825rpm
MAS AIR/FL SE	1.53V
IACV-AAC/V	26%

1 2 3 4



2

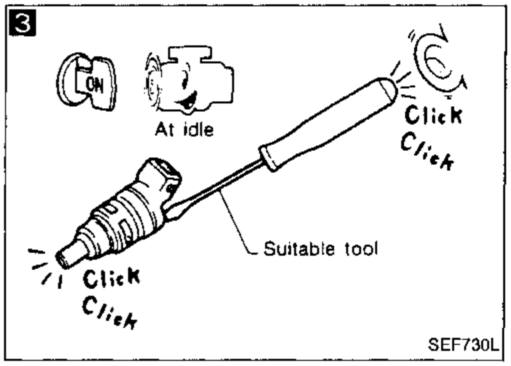
PERFORM POWER BALANCE TEST.
1. Perform "POWER BALANCE" in "ACTIVE TEST" mode.
2. Is there any cylinder which does not produce a momentary engine speed drop?

OR

When disconnecting each injector harness connector one at a time, is there any cylinder which does not produce a momentary engine speed drop?

No → Go to **5**.

Yes ↓

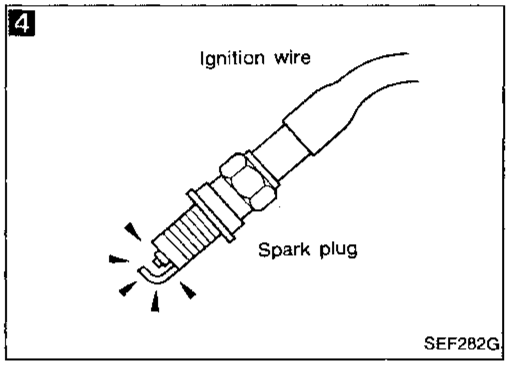


3

CHECK INJECTOR.
Does each injector make an operating sound at idle?

No → Check injector(s) and circuit(s).

Yes ↓



4

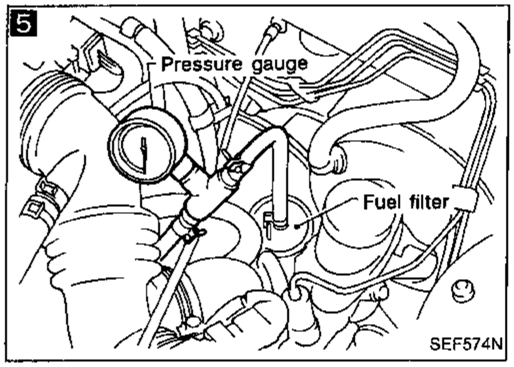
CHECK IGNITION SPARK.
1. Disconnect ignition wire from spark plug.
2. Connect a known good spark plug to the ignition wire.
3. Place end of spark plug against a suitable ground and crank engine.
4. Check for spark.

NG → Check ignition coil, power transistor and circuits. (See page EF & EC-86.)

OK ↓

(Go to Ⓐ on next page.)

Diagnostic Procedure 34 — Symptom — Engine Stalls when Turning (Cont'd)



Ⓐ

5

CHECK FUEL PRESSURE.
1. Release fuel pressure to zero. (Refer to page EF & EC-189.)
2. Install fuel pressure gauge and check fuel pressure.
   At idle:
   Approx. 245 kPa
   (2.5 kg/cm², 36 psi)
   A few seconds after ignition switch is turned OFF to ON:
   Approx. 294 kPa
   (3.0 kg/cm², 43 psi)

NG → Check fuel pressure regulator diaphragm.

OK ↓

CHECK ECM HARNESS CONNECTOR.
Check the ECM pin terminals for damage or poor connection of ECM harness connector.

NG → Repair or replace.

OK ↓

Reconnect ECM harness connector and retest.

↓ Trouble is not fixed.

CHECK ECM POWER SUPPLY AND GROUND CIRCUIT.
Refer to page EF & EC-72.

NG → Repair or replace.

OK ↓

TRY A KNOWN GOOD ECM*.

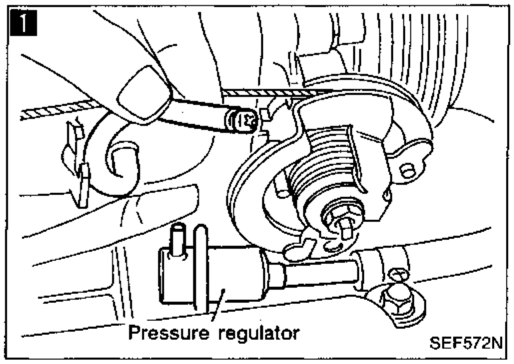
↓

INSPECTION END

*: ECM may be the cause of a problem, but this is rarely the case.

Diagnostic Procedure 35 — Symptom — Engine Stalls when the Engine is Hot

1



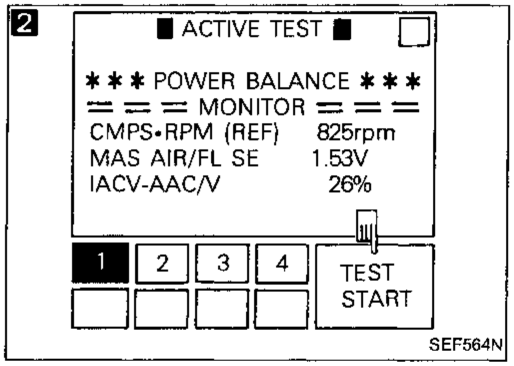
CHECK FUEL VAPOR.

1. Disconnect fuel pressure regulator vacuum hose and plug hose.
2. Perform cruise test.
3. Does the engine stall disappear?

Yes → Check fuel properties.

No ↓

2

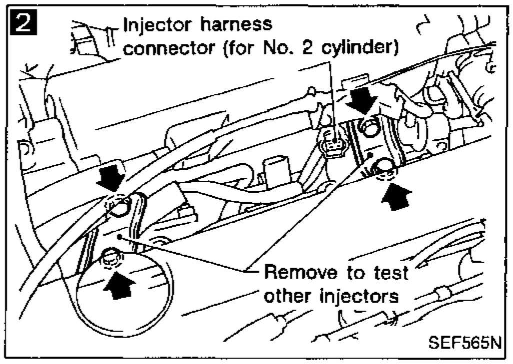


■ ACTIVE TEST ■

✱✱✱ POWER BALANCE ✱✱✱

═ ═ ═ MONITOR ═ ═ ═

CMPS•RPM (REF)	825rpm
MAS AIR/FL SE	1.53V
IACV-AAC/V	26%



PERFORM POWER BALANCE TEST.

1. Perform "POWER BALANCE" in "ACTIVE TEST" mode.
2. Is there any cylinder which does not produce a momentary engine speed drop?

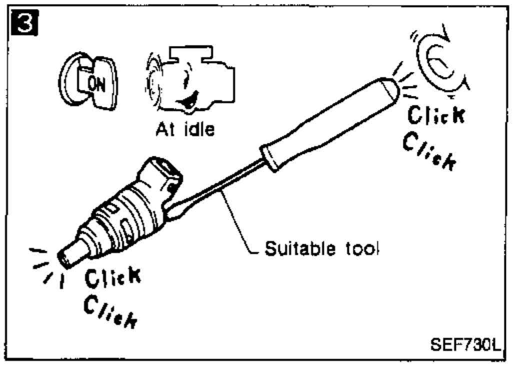
OR

When disconnecting each injector harness connector one at a time, is there any cylinder which does not produce a momentary engine speed drop?

No → Go to **5** .

Yes ↓

3



CHECK INJECTOR.

Does each injector make an operating sound at idle?

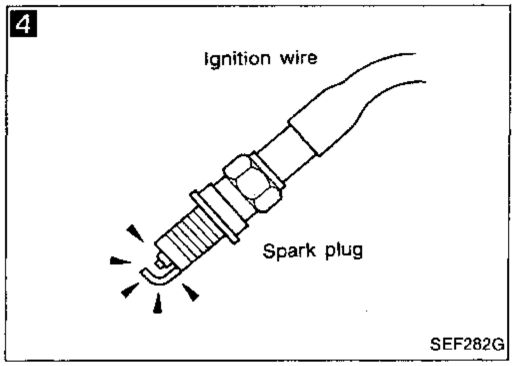
No → Check injector(s) and circuit(s).

Yes ↓

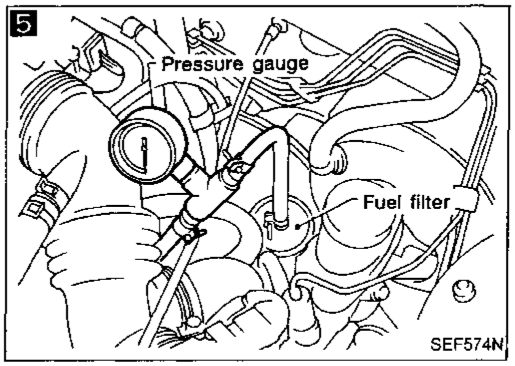
(Go to Ⓐ on next page.)

Diagnostic Procedure 35 — Symptom — Engine Stalls when the Engine is Hot (Cont'd)

4



5



Ⓐ

4

CHECK IGNITION SPARK.
1. Disconnect ignition wire from spark plug.
2. Connect a known good spark plug to the ignition wire.
3. Place end of spark plug against a suitable ground and crank engine.
4. Check for spark.

NG → Check ignition coil, power transistor and their circuits. (See page EF & EC-86.)

OK ↓

5

CHECK FUEL PRESSURE.
1. Release fuel pressure to zero. (Refer to page EF & EC-189.)
2. Install fuel pressure gauge and check fuel pressure.

At idle:
Approx. 245 kPa
(2.5 kg/cm^2, 36 psi)
A few seconds after ignition switch is turned OFF to ON:
Approx. 294 kPa
(3.0 kg/cm^2, 43 psi)

NG → Check fuel pressure regulator diaphragm.

OK ↓

CHECK ECM HARNESS CONNECTOR.
Check the ECM pin terminals for damage or poor connection of ECM harness connector.

NG → Repair or replace.

OK ↓

Reconnect ECM harness connector and retest.

↓ Trouble is not fixed.

CHECK ECM POWER SUPPLY AND GROUND CIRCUIT.
Refer to page EF & EC-72.

NG → Repair or replace.

OK ↓

TRY A KNOWN GOOD ECM*.

Trouble is fixed. → Replace ECM

↓ Trouble is not fixed.

INSPECTION END

*: ECM may be the cause of a problem, but this is rarely the case.

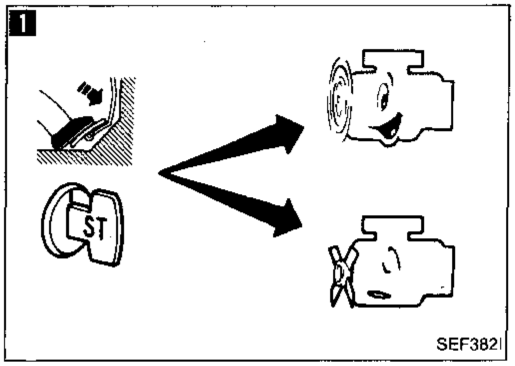
Diagnostic Procedure 36 — Symptom — Engine Stalls when the Engine is Cold

1

CHECK IACV-AIR REGULATOR AND IACV-AAC VALVE.
When the engine is cold, can you start the engine when pressing accelerator pedal fully?

NG → Check IACV-AAC valve, IACV-air regulator and circuits. (See pages EF & EC-121, 119.)

OK ↓



2

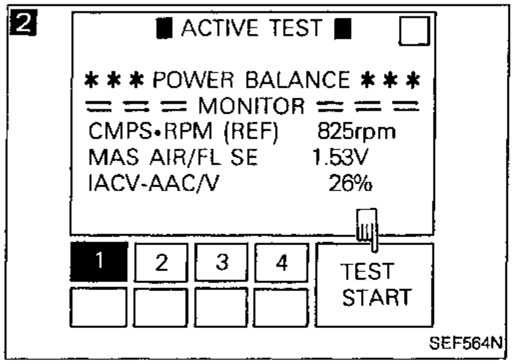
PERFORM POWER BALANCE TEST.
1. Perform "POWER BALANCE" in "ACTIVE TEST" mode.
2. Is there any cylinder which does not produce a momentary engine speed drop?

— OR —

When disconnecting each injector harness connector one at a time, is there any cylinder which does not produce a momentary engine speed drop?

NG → Go to **6** .

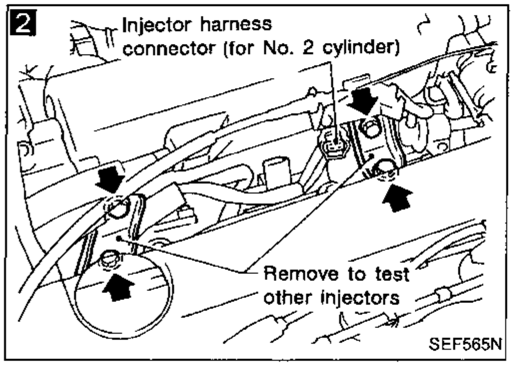
OK ↓



■ ACTIVE TEST ■ ☐

✱✱✱ POWER BALANCE ✱✱✱
═ ═ ═ MONITOR ═ ═ ═

CMPS•RPM (REF)	825rpm
MAS AIR/FL SE	1.53V
IACV-AAC/V	26%

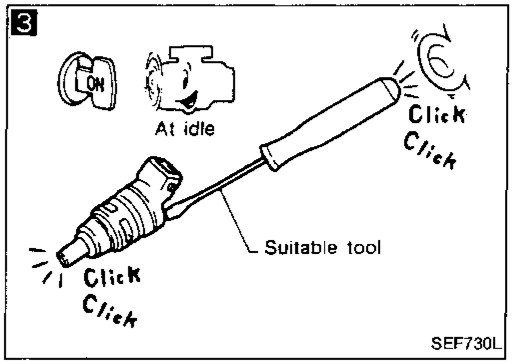


3

CHECK INJECTOR.
Does each injector make an operating sound at idle?

NG → Check injector(s) and circuit(s).

OK ↓



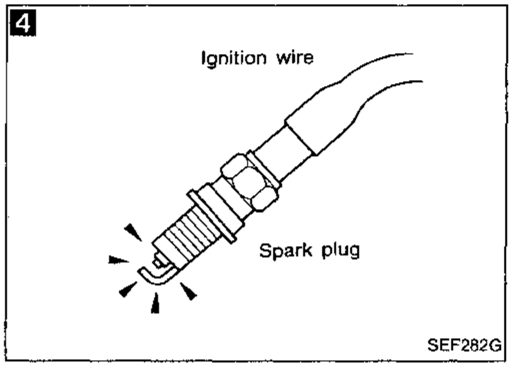
4

CHECK IGNITION SPARK.
1. Disconnect ignition wire from spark plug.
2. Connect a known good spark plug to the ignition wire.
3. Place end of spark plug against a suitable ground and crank engine.
4. Check for spark.

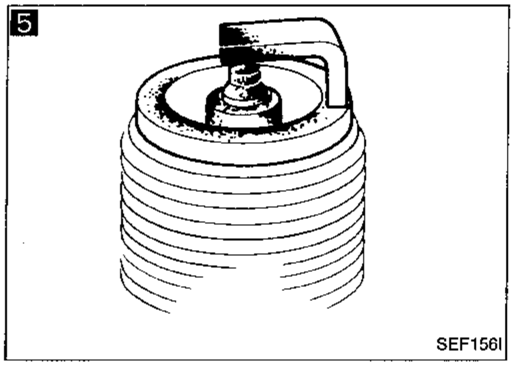
NG → Check ignition coil, power transistor and circuits. (See page EF & EC-86.)

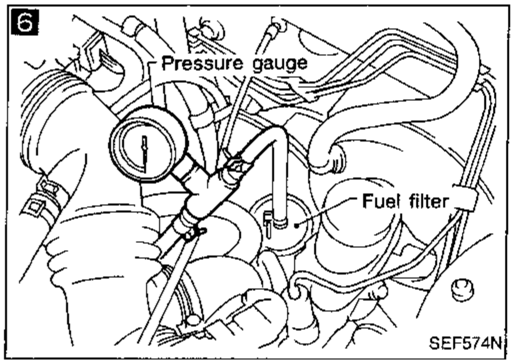
OK ↓

(Go to Ⓐ on next page.)



Diagnostic Procedure 36 — Symptom — Engine Stalls when the Engine is Cold (Cont'd)





Ⓐ

5

CHECK SPARK PLUGS.
Remove the spark plugs and check for fouling, etc.

NG: Repair or replace spark plug(s).

OK

6

CHECK FUEL PRESSURE.
1. Release fuel pressure to zero. (Refer to page EF & EC-189.)
2. Install fuel pressure gauge and check fuel pressure.
   At idle:
   Approx. 245 kPa
   (2.5 kg/cm^2, 36 psi)
   A few seconds after ignition switch is turned OFF to ON:
   Approx. 294 kPa
   (3.0 kg/cm^2, 43 psi)

NG: Check fuel pressure regulator diaphragm.

OK

CHECK ECM HARNESS CONNECTOR.
Check the ECM pin terminals for damage or poor connection of ECM harness connector.

NG: Repair or replace.

OK

Reconnect ECM harness connector and retest.

Trouble is not fixed.

CHECK ECM POWER SUPPLY AND GROUND CIRCUIT.
Refer to page EF & EC-72.

NG: Repair or replace.

OK

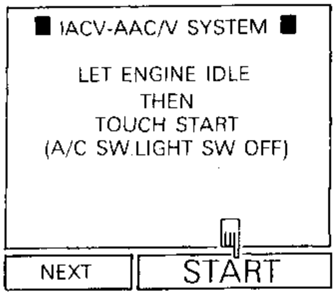
TRY A KNOWN GOOD ECM*.

INSPECTION END

*: ECM may be the cause of a problem, but this is rarely the case.

Diagnostic Procedure 37 — Symptom — Engine Stalls when Stepping on the Accelerator Momentarily

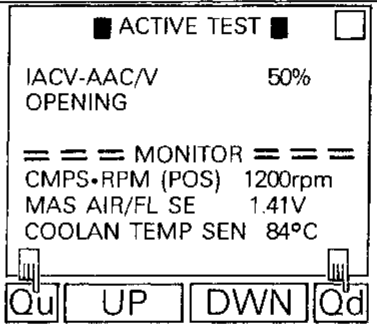
1


■ IACV-AAC/V SYSTEM ■

LET ENGINE IDLE
THEN
TOUCH START
(A/C SW.LIGHT SW OFF)

MEF134D

1

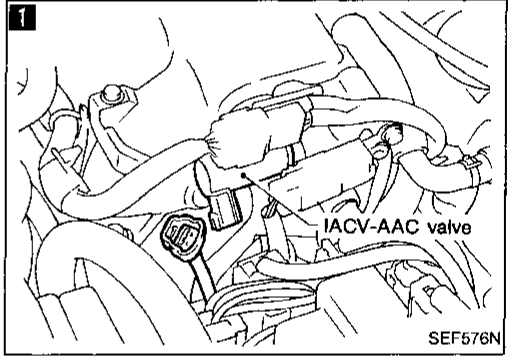

■ ACTIVE TEST ■

IACV-AAC/V OPENING 50%

=== MONITOR ===
CMPS•RPM (POS) 1200rpm
MAS AIR/FL SE 1.41V
COOLAN TEMP SEN 84°C

SEF575N

1



SEF576N

1

CHECK IACV-AAC VALVE.

1. Start engine and warm it up sufficiently.
2. Perform "IACV-AAC/V SYSTEM" in "FUNCTION TEST" mode.

OR

1. Select "IACV-AAC/V OPENING" in "ACTIVE TEST" mode.
2. When touching "Qu" and "Qd", does the engine speed change according to the percent of IACV-AAC valve opening?

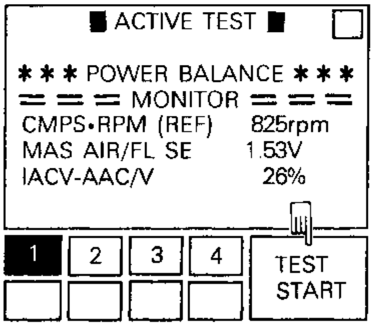
OR

When disconnecting IACV-AAC valve harness connector, does the engine speed drop?

No → Check IACV-AAC valve and circuit. (See page EF & EC-121.)

Yes ↓

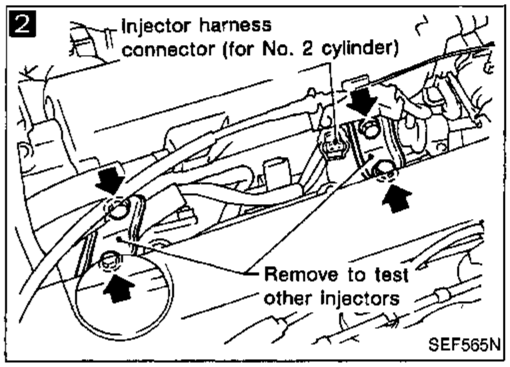
2


■ ACTIVE TEST ■

*** POWER BALANCE ***
=== MONITOR ===
CMPS•RPM (REF) 825rpm
MAS AIR/FL SE 1.53V
IACV-AAC/V 26%

SEF564N

2



SEF565N

2

PERFORM POWER BALANCE TEST.

1. Perform "POWER BALANCE" in "ACTIVE TEST" mode.
2. Is there any cylinder which does not produce a momentary engine speed drop?

OR

When disconnecting each injector harness connector one at a time, is there any cylinder which does not produce a momentary engine speed drop?

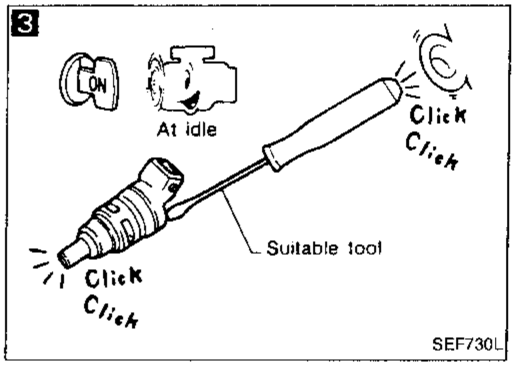
No → Go to **5**.

Yes ↓

(Go to Ⓐ on next page.)

Diagnostic Procedure 37 — Symptom — Engine Stalls when Stepping on the Accelerator Momentarily (Cont'd)

Ⓐ

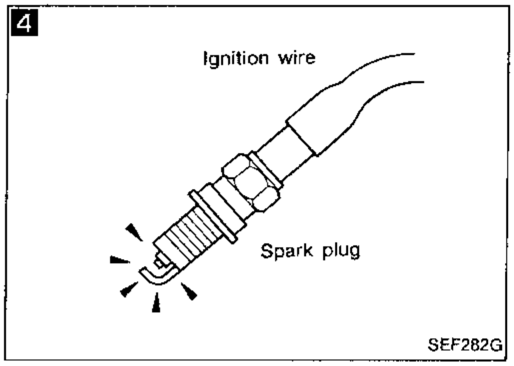


3

CHECK INJECTOR.
Does each injector make an operating sound at idle?

No → Check injector(s) and their circuit(s).

Yes ↓



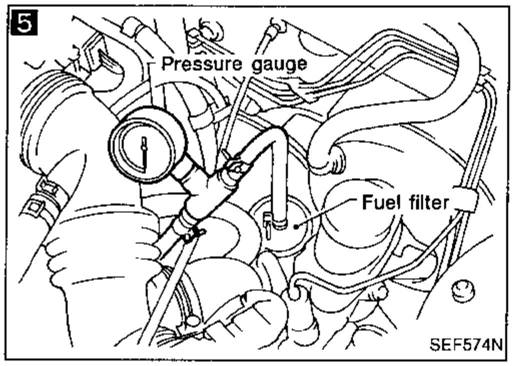
4

CHECK IGNITION SPARK.

1. Disconnect ignition wire from spark plug.
2. Connect a known good spark plug to the ignition wire.
3. Place end of spark plug against an earth point with engine cranking.
4. Check for spark.

NG → Check ignition coil, power transistor and their circuits. (See page EF & EC-86.)

OK ↓



5

CHECK FUEL PRESSURE.

1. Release fuel pressure to zero. (Refer to page EF & EC-189.)
2. Install fuel pressure gauge and check fuel pressure.
   At idle:
   Approx. 245 kPa
   ($2.5\ kg/cm^2$, 36 psi)
   A few seconds after ignition switch is turned OFF to ON:
   Approx. 294 kPa
   ($3.0\ kg/cm^2$, 43 psi)

NG → Check fuel pressure regulator diaphragm.

OK ↓

CHECK ECM HARNESS CONNECTOR.
Check the ECM pin terminals for damage or poor connection of ECM harness connector.

NG → Repair or replace.

OK ↓

Reconnect ECM harness connector and retest.

Trouble is not fixed. ↓

CHECK ECM POWER SUPPLY AND GROUND CIRCUIT.
Refer to page EF & EC-72.

NG → Repair or replace.

OK ↓

TRY A KNOWN GOOD ECM*.

↓

INSPECTION END

*: ECM may be the cause of a problem, but this is rarely the case.

Diagnostic Procedure 38 — Symptom — Engine Stalls after Decelerating

1

CHECK IACV-AAC VALVE.

1. Start engine and warm it up sufficiently.
2. Perform "IACV-AAC/V SYSTEM" in "FUNCTION TEST" mode.

OR

1. Select "IACV-AAC/V OPENING" in "ACTIVE TEST" mode.
2. When touching "Qu" and "Qd", does the engine speed change according to the percent of IACV-AAC valve opening?

OR

When disconnecting IACV-AAC valve harness connector, does the engine speed drop?

No → Check IACV-AAC valve and circuit. (See page EF & EC-121.)

Yes ↓

2

CHECK IDLE ADJ. SCREW CLOGGING.

1. Perform "IGN TIMING ADJ" in "WORK SUPPORT" mode.
2. Can you set engine speed at 750±50 rpm (in "N" position) by turning idle adjusting screw?

OR

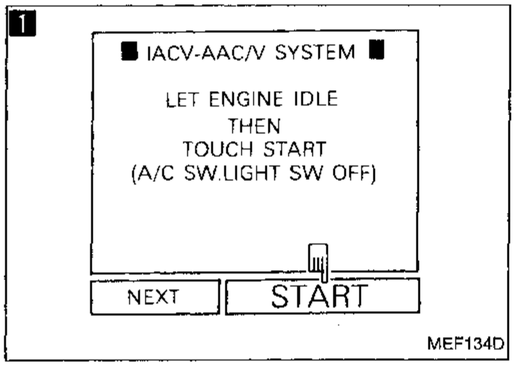
1. Disconnect throttle position sensor harness connector.
2. Can you set engine speed at 750±50 rpm (in "N" position) by turning idle adjusting screw?

No → Check for IAS clogging or throttle body clogging.

Yes ↓

(Go to Ⓐ on next page.)

1

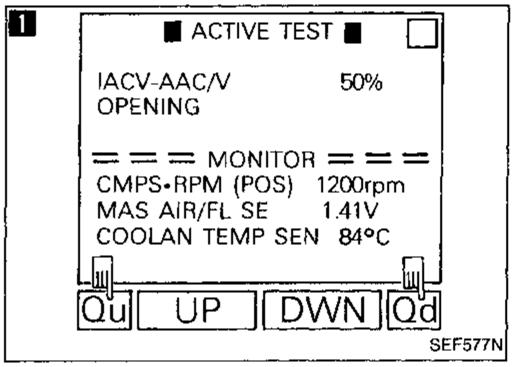


■ IACV-AAC/V SYSTEM ■

LET ENGINE IDLE
THEN
TOUCH START
(A/C SW.LIGHT SW OFF)

MEF134D

1



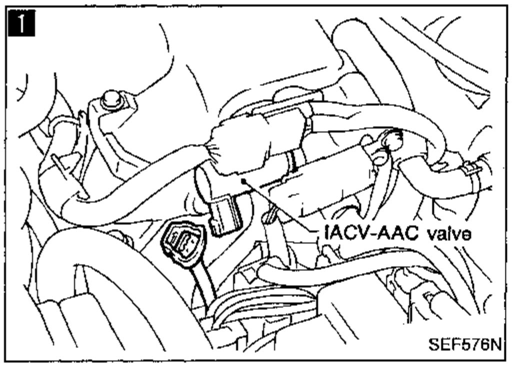
■ ACTIVE TEST ■

IACV-AAC/V OPENING 50%

= = = MONITOR = = =
CMPS•RPM (POS) 1200rpm
MAS AIR/FL SE 1.41V
COOLAN TEMP SEN 84°C

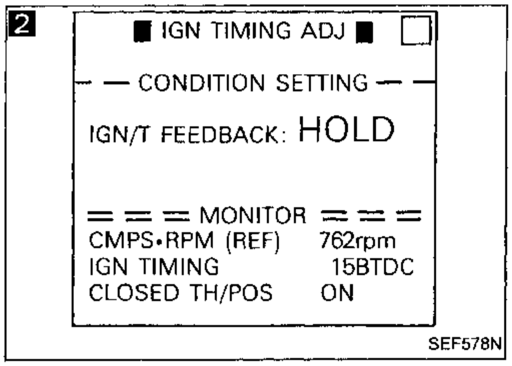
SEF577N

1



SEF576N

2



■ IGN TIMING ADJ ■

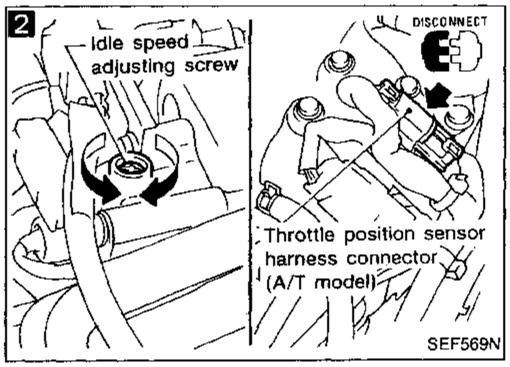
— CONDITION SETTING —

IGN/T FEEDBACK: HOLD

= = = MONITOR = = =
CMPS•RPM (REF) 762rpm
IGN TIMING 15BTDC
CLOSED TH/POS ON

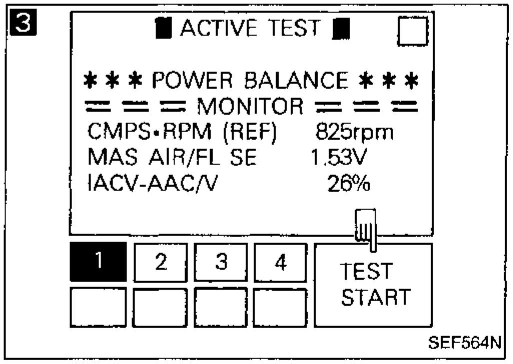
SEF578N

2



SEF569N

Diagnostic Procedure 38 — Symptom — Engine Stalls after Decelerating (Cont'd)

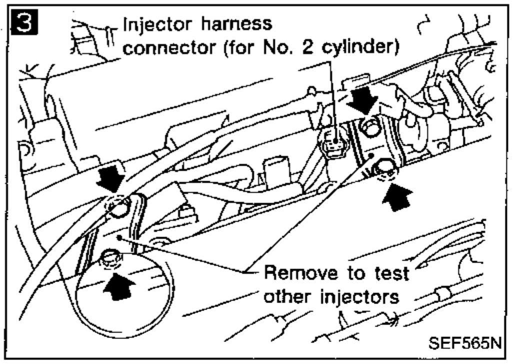


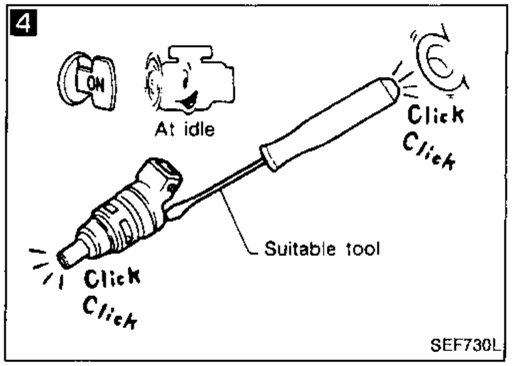
■ ACTIVE TEST ■ ☐

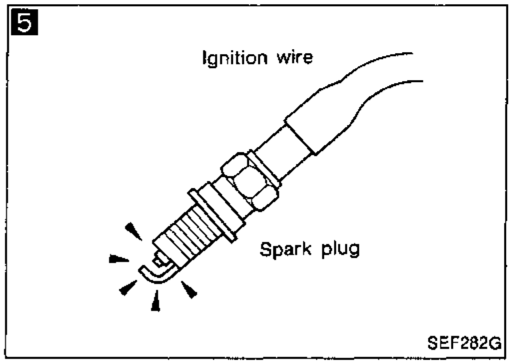
✱✱✱ POWER BALANCE ✱✱✱

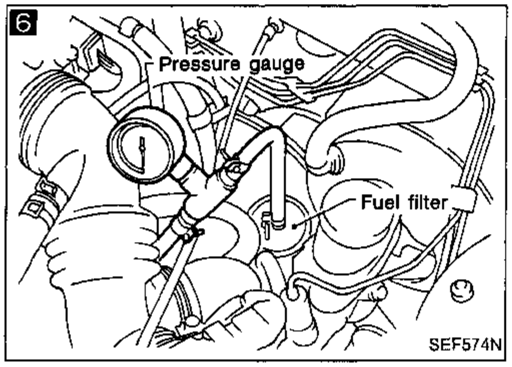
═══ MONITOR ═══

CMPS•RPM (REF)	825rpm
MAS AIR/FL SE	1.53V
IACV-AAC/V	26%









Ⓐ

3 **PERFORM POWER BALANCE TEST.**

1. Perform "POWER BALANCE" in "ACTIVE TEST" mode.
2. Is there any cylinder which does not produce a momentary engine speed drop?

OR

When disconnecting each injector harness connector one at a time, is there any cylinder which does not produce a momentary engine speed drop?

No → Go to **6**.

Yes ↓

4 **CHECK INJECTOR.**

Does each injector make an operating sound at idle?

No → Check injector(s) and circuit(s).

Yes ↓

5 **CHECK IGNITION SPARK.**

1. Disconnect ignition wire from spark plug.
2. Connect a known good spark plug to the ignition wire.
3. Place end of spark plug against a suitable ground and crank engine.
4. Check for spark.

No → Check ignition coil, power transistor and circuits. (See page EF & EC-86.)

Yes ↓

6 **CHECK FUEL PRESSURE.**

1. Release fuel pressure to zero. (Refer to page EF & EC-189.)
2. Install fuel pressure gauge and check fuel pressure.

At idle:

Approx. 245 kPa

(2.5 kg/cm^2, 36 psi)

A few seconds after ignition switch is turned OFF to ON:

Approx. 294 kPa

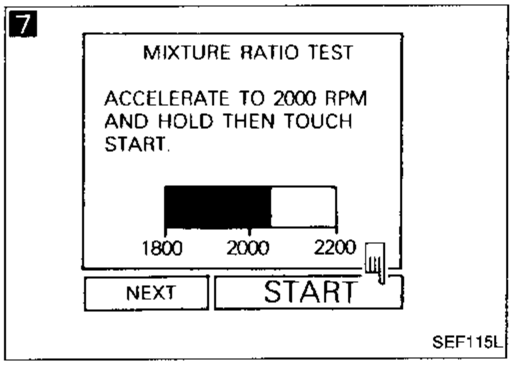
(3.0 kg/cm^2, 43 psi)

NG → Check fuel pressure regulator diaphragm.

OK ↓

(Go to Ⓑ on next page.)

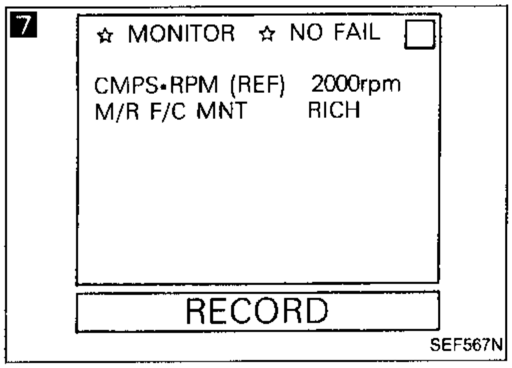
Diagnostic Procedure 38 — Symptom — Engine Stalls after Decelerating (Cont'd)



MIXTURE RATIO TEST

ACCELERATE TO 2000 RPM AND HOLD THEN TOUCH START.

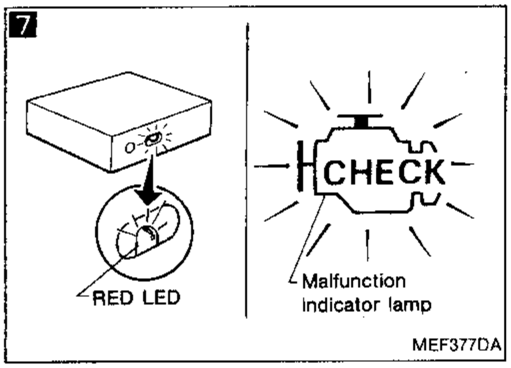
SEF115L



☆ MONITOR ☆ NO FAIL ☐

CMPS•RPM (REF) 2000rpm
M/R F/C MNT RICH

SEF567N



MEF377DA

(B)

↓

7

CHECK HEATED OXYGEN SENSOR.

1. Start engine and warm it up sufficiently.
2. Perform "MIXTURE RATIO TEST" in "FUNCTION TEST" mode.

— OR —

2. See "M/R F/C MNT" in "Data monitor" mode.
3. Maintaining engine at 2,000 rpm under no-load (engine is warmed up sufficiently.), check that the monitor fluctuates between "LEAN" and "RICH" more than 5 times during 10 seconds.

RICH→LEAN→RICH→
1 time 2 times
LEAN→RICH.......

— OR —

1. Set "Heated oxygen sensor monitor" in Diagnostic Test Mode II. (See page EF & EC-49.)
2. Maintaining engine at 2,000 rpm under no-load, check that the RED LED on the ECM or the malfunction indicator lamp on the instrument panel goes ON and OFF more than 5 times during 10 seconds.

NG → Replace heated oxygen sensor.

↓ OK

CHECK ECM HARNESS CONNECTOR.
Check the ECM pin terminals for damage or poor connection of ECM harness connector.

NG → Repair or replace.

↓ OK

Reconnect ECM harness connector and retest.

↓ Trouble is not fixed.

CHECK ECM POWER SUPPLY AND GROUND CIRCUIT.
Refer to page EF & EC-72.

NG → Repair or replace.

↓ OK

TRY A KNOWN GOOD ECM*.

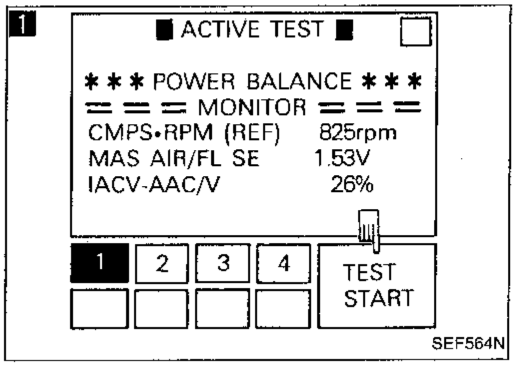
↓

INSPECTION END

*: ECM may be the cause of a problem, but this is rarely the case.

Diagnostic Procedure 39 — Symptom — Engine Stalls when Accelerating or when Driving at Constant Speed

1



■ ACTIVE TEST ■

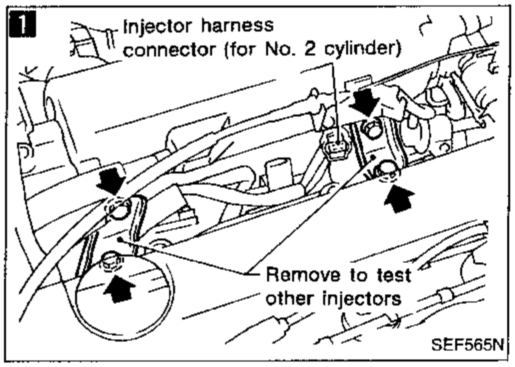
*** POWER BALANCE ***

=== MONITOR ===

CMPS•RPM (REF)	825rpm
MAS AIR/FL SE	1.53V
IACV-AAC/V	26%

SEF564N

1



SEF565N

PERFORM POWER BALANCE TEST.

1. Perform "POWER BALANCE" in "ACTIVE TEST" mode.
2. Is there any cylinder which does not produce a momentary engine speed drop?

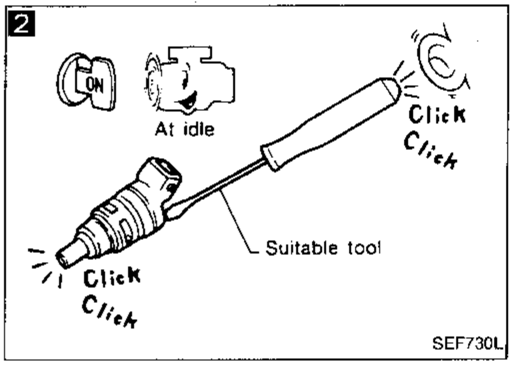
— OR —

When disconnecting each injector harness connector one at a time, is there any cylinder which does not produce a momentary engine speed drop?

No → Go to **4** .

Yes ↓

2



SEF730L

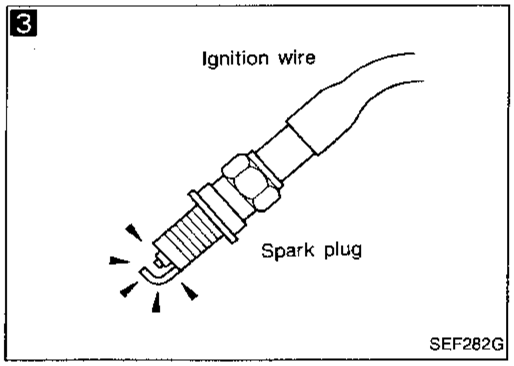
CHECK INJECTOR.

Does each injector make an operating sound at idle?

No → Check injector(s) and circuit(s).

Yes ↓

3



SEF282G

CHECK IGNITION SPARK.

1. Disconnect ignition wire from spark plug.
2. Connect a known good spark plug to the ignition wire.
3. Place end of spark plug against a suitable ground and crank engine.
4. Check for spark.

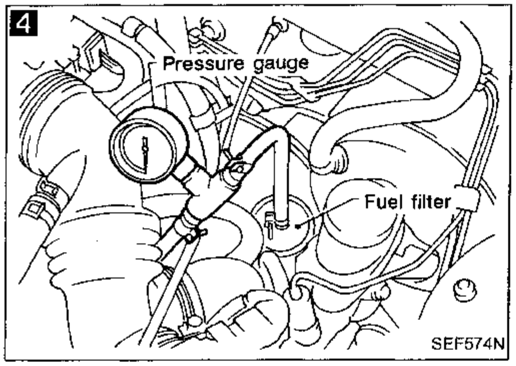
No → Check ignition coil, power transistor and circuits. (See page EF & EC-86.)

Yes ↓

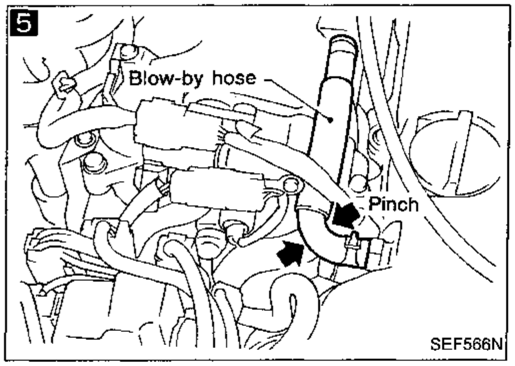
(Go to Ⓐ on next page.)

Diagnostic Procedure 39 — Symptom — Engine Stalls when Accelerating or when Driving at Constant Speed (Cont'd)

4



5



Ⓐ

4

CHECK FUEL PRESSURE.

1. Release fuel pressure to zero. (Refer to page EF & EC-189.)
2. Install fuel pressure gauge and check fuel pressure.

At idle:

Approx. 245 kPa
(2.5 kg/cm^2, 36 psi)

A few seconds after ignition switch is turned OFF to ON:

Approx. 294 kPa
(3.0 kg/cm^2, 43 psi)

NG → Check fuel pump, circuit and fuel pressure regulator.

OK ↓

5

CHECK FOR INTAKE AIR LEAK.

When pinching blow-by hose (lowering the blow-by air supply), does the engine speed rise?

Yes → Discover air leak location and repair.

No ↓

CHECK ECM HARNESS CONNECTOR.

Check the ECM pin terminals for damage or poor connection of ECM harness connector.

NG → Repair or replace.

OK ↓

Reconnect ECM harness connector and retest.

↓ Trouble is not fixed.

CHECK ECM POWER SUPPLY AND GROUND CIRCUIT.

Refer to page EF & EC-72.

Yes → Repair or replace.

No ↓

TRY A KNOWN GOOD ECM*.

↓

INSPECTION END

*: ECM may be the cause of a problem, but this is rarely the case.

GI
MA
EM
LC
EF & EC
FE
CL
MT
AT
FA
RA
BR
ST
BF
HA
EL
IDX

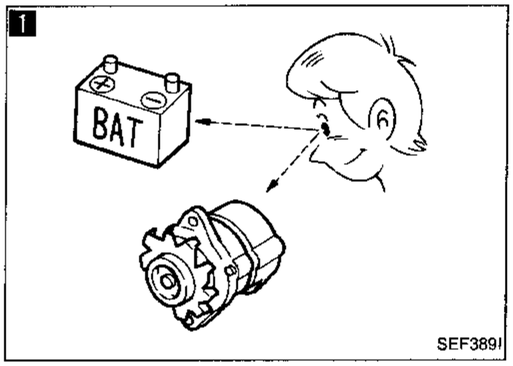
Diagnostic Procedure 40 — Symptom — Engine Stalls when the Electrical Load is Heavy

1

CHECK BATTERY AND ALTERNATOR.
Check battery and alternator condition.
(Refer to EL section.)

NG → Repair or replace.

OK ↓



2

PERFORM POWER BALANCE TEST.

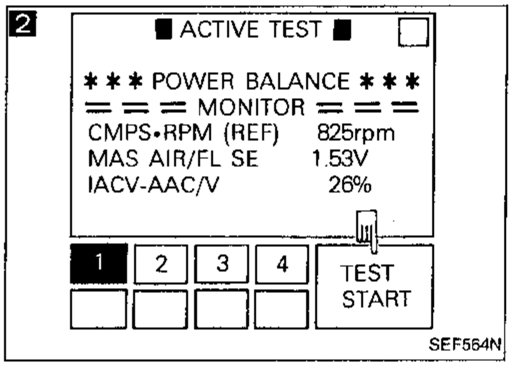
1. Perform "POWER BALANCE" in "ACTIVE TEST" mode.
2. Is there any cylinder which does not produce a momentary engine speed drop?

OR

When disconnecting each injector harness connector one at a time, is there any cylinder which does not produce a momentary engine speed drop?

No → Go to **5** .

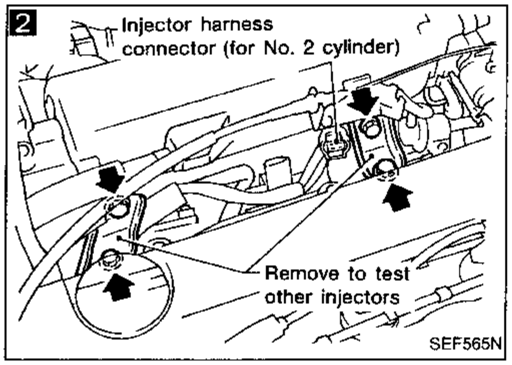
Yes ↓



■ ACTIVE TEST ■ ☐
*** POWER BALANCE ***
=== MONITOR ===

CMPS•RPM (REF)	825rpm
MAS AIR/FL SE	1.53V
IACV-AAC/V	26%

1 2 3 4 TEST START

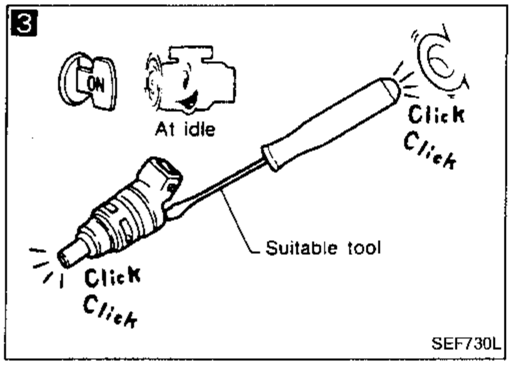


3

CHECK INJECTOR.
Does each injector make an operating sound at idle?

No → Check injector(s) and circuit(s).

Yes ↓



4

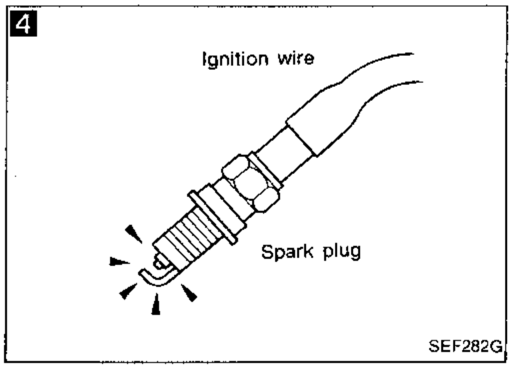
CHECK IGNITION SPARK.

1. Disconnect ignition wire from spark plug.
2. Connect a known good spark plug to the ignition wire.
3. Place end of spark plug against a suitable ground and crank engine.
4. Check for spark.

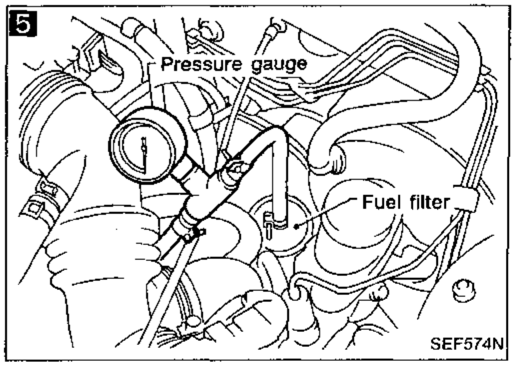
NG → Check ignition coil, power transistor and circuits. (See page EF & EC-86.)

OK ↓

(Go to Ⓐ on next page.)



Diagnostic Procedure 40 — Symptom — Engine Stalls when the Electrical Load is Heavy (Cont'd)



Ⓐ

5

CHECK FUEL PRESSURE.
1. Release fuel pressure to zero. (Refer to page EF & EC-189.)
2. Install fuel pressure gauge and check fuel pressure.
   At idle:
   Approx. 245 kPa
   (2.5 kg/cm^2, 36 psi)
   A few seconds after ignition switch is turned OFF to ON:
   Approx. 294 kPa
   (3.0 kg/cm^2, 43 psi)

NG → Check fuel pressure regulator diaphragm.

↓ OK

CHECK ECM HARNESS CONNECTOR.
Check the ECM pin terminals for damage or poor connection of ECM harness connector.

NG → Repair or replace.

↓ OK

Reconnect ECM harness connector and retest.

↓ Trouble is not fixed.

CHECK ECM POWER SUPPLY AND GROUND CIRCUIT.
Refer to page EF & EC-72.

NG → Repair or replace.

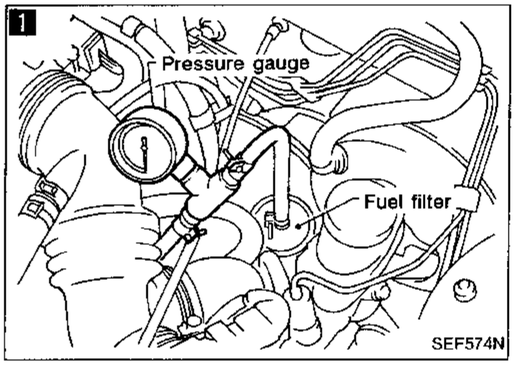
↓ OK

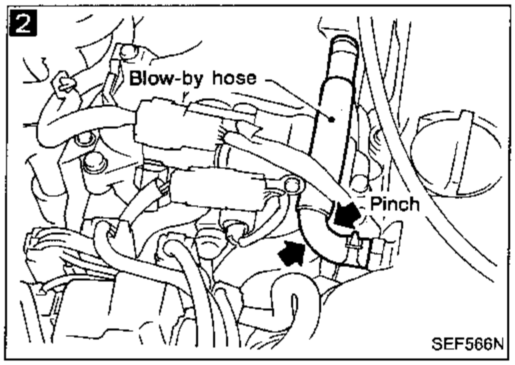
TRY A KNOWN GOOD ECM*.

↓

INSPECTION END

*: ECM may be the cause of a problem, but this is rarely the case.





Diagnostic Procedure 41 — Symptom — Lack of Power and Stumble

1

CHECK FUEL PRESSURE.

1. Release fuel pressure to zero. (Refer to page EF & EC-189.)
2. Install fuel pressure gauge and check fuel pressure.

At idle:

Approx. 245 kPa
(2.5 kg/cm², 36 psi)

A few seconds after ignition switch is turned OFF to ON:

Approx. 294 kPa
(3.0 kg/cm², 43 psi)

NG → Check fuel pressure regulator diaphragm.

OK ↓

2

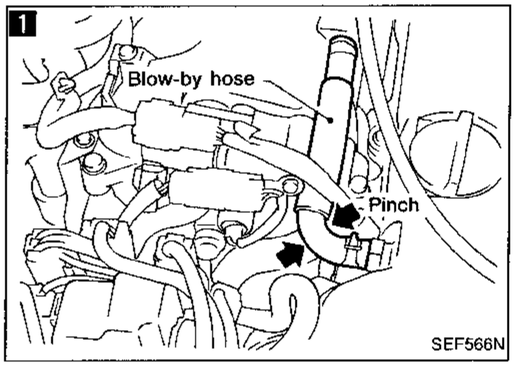
CHECK FOR INTAKE AIR LEAK.

When pinching blow-by hose (lowering the blow-by air supply), does the engine speed rise?

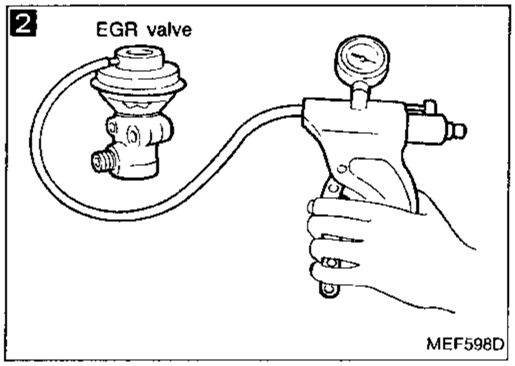
Yes → Discover air leak location and repair.

No ↓

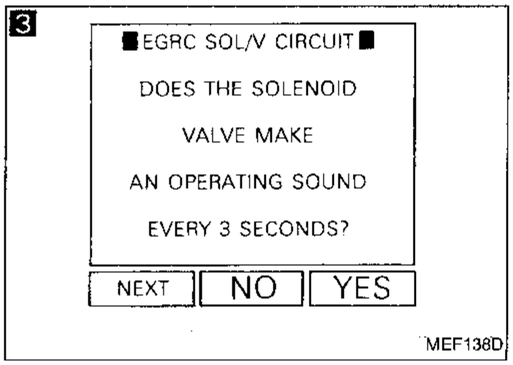
INSPECTION END



SEF566N



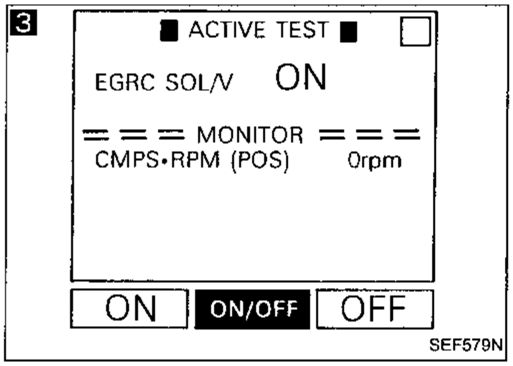
MEF598D



■EGRC SOL/V CIRCUIT■

DOES THE SOLENOID VALVE MAKE AN OPERATING SOUND EVERY 3 SECONDS?

MEF138D



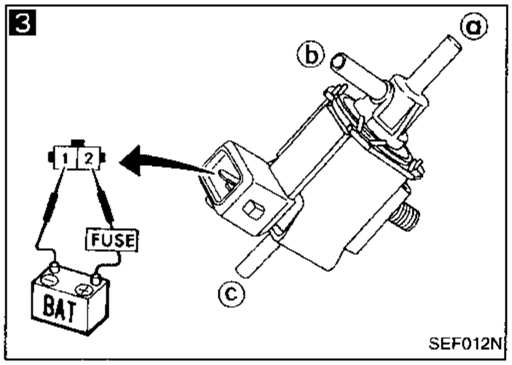
■ ACTIVE TEST ■ ☐

EGRC SOL/V ON

=== MONITOR ===

CMPS•RPM (POS) 0rpm

SEF579N



SEF012N

Diagnostic Procedure 42 — Symptom — Knock

1

CHECK FOR INTAKE AIR LEAK.
When pinching blow-by hose (lowering the blow-by air supply), does the engine speed rise?

Yes → Discover air leak location and repair.

No ↓

2

CHECK EGR OPERATION.
1. Apply vacuum directly to the EGR valve using a handy vacuum pump.
2. Check to see that the engine runs rough or dies.

No → Check EGR valve for sticking.

Yes ↓

3

CHECK EGR & CANISTER CONTROL SOLENOID VALVE.

1. Start engine and warm it up sufficiently.
2. Perform "EGRC SOL/V CIRCUIT" in "FUNCTION TEST" mode.

OR

1. Turn ignition switch "ON".
2. Select "EGRC SOL/V" in "ACTIVE TEST" mode.
3. Turn EGR & canister control solenoid valve ON and OFF.
4. Check operating sound.

OR

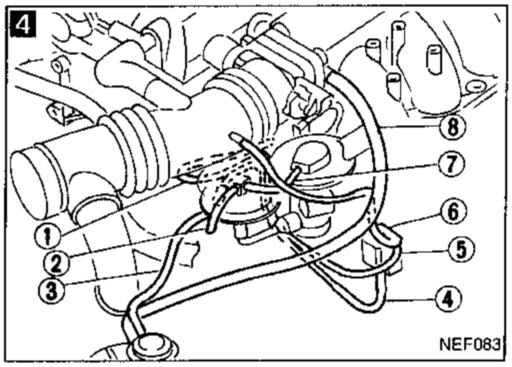
1. Disconnect EGR & canister control solenoid valve harness connector.
2. Supply EGR & canister control solenoid valve terminals with battery current and check operating sound.

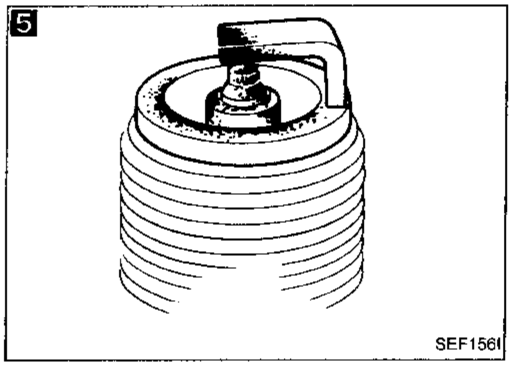
NG → Check solenoid valve and circuit.

OK ↓

(Go to Ⓐ on next page.)

Diagnostic Procedure 42 — Symptom — Knock (Cont'd)





Ⓐ

4

CHECK VACUUM HOSES.
Check the following vacuum hoses for clogging, cracks and poor connection.

① Throttle body to vacuum gallery
② EGRC-BPT valve to three-way connector
③ Activated carbon canister to three-way connector
④ EGR & canister control solenoid valve to vacuum gallery
⑤ EGR & canister control solenoid valve to vacuum gallery
⑥ Air duct to EGR & canister control solenoid valve
⑦ EGR valve to EGRC-BPT valve
⑧ Activated carbon canister to intake manifold collector

NG → Repair or replace.

OK ↓

5

CHECK FOR OIL LEAK TO COMBUSTION CHAMBER.
Remove spark plugs and check for fouling with oil.

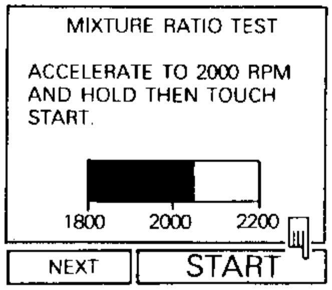
Yes → Check pistons, piston rings, valves, valve seats, valve oil seal, engine oil level, etc.

No ↓

INSPECTION END

Diagnostic Procedure 43 — Symptom — Surge

1

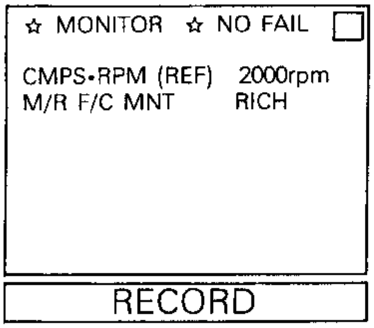


MIXTURE RATIO TEST

ACCELERATE TO 2000 RPM AND HOLD THEN TOUCH START.

SEF115L

1

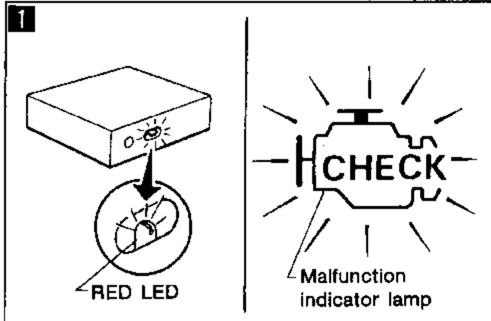


☆ MONITOR ☆ NO FAIL ☐

CMPS•RPM (REF) 2000rpm
M/R F/C MNT RICH

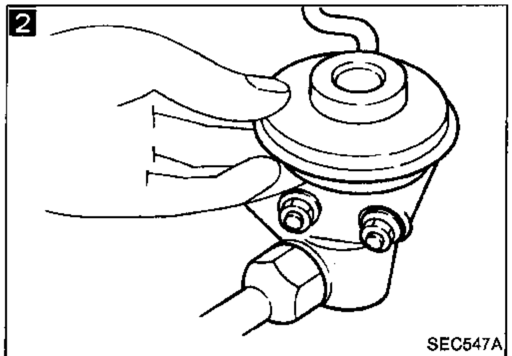
SEF567N

1



MEF377DA

2



SEC547A

1

CHECK HEATED OXYGEN SENSOR.

1. Start engine and warm it up sufficiently.
2. Perform "MIXTURE RATIO TEST" in "FUNCTION TEST" mode.

OR

2. See "M/R F/C MNT" in "Data monitor" mode.
3. Maintaining engine at 2,000 rpm under no-load (engine is warmed up sufficiently.), check that the monitor fluctuates between "LEAN" and "RICH" more than 5 times during 10 seconds.

RICH→LEAN→RICH→
1 time 2 times
LEAN→RICH.......

OR

1. Set "Heated oxygen sensor monitor" in Diagnostic Test Mode II. (See page EF & EC-49.)
2. Maintaining engine at 2,000 rpm under no-load, check that the RED LED on the ECM or the malfunction indicator lamp on the instrument panel goes ON and OFF more than 5 times during 10 seconds.

NG → Replace heated oxygen sensor.

↓ OK

2

CHECK EGR VALVE.
Check EGR valve for sticking.

NG → Repair or replace.

↓ OK

Reconnect ECM harness connector and retest.

↓ Trouble is not fixed.

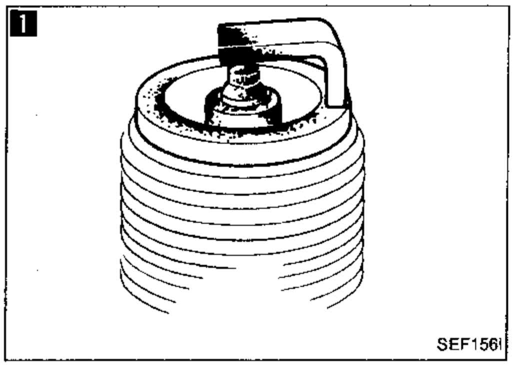
TRY A KNOWN GOOD ECM*.

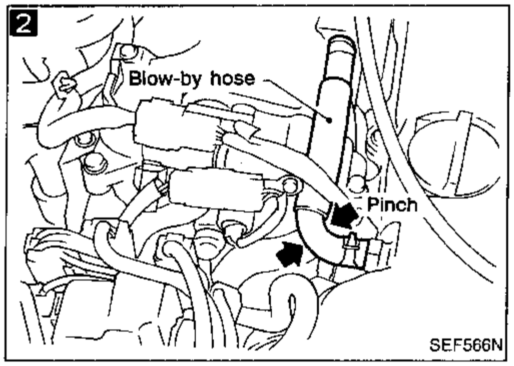
↓

INSPECTION END

*: ECM may be the cause of a problem, but this is rarely the case.

GI
MA
EM
LC
EF & EC
FE
CL
MT
AT
FA
RA
BR
ST
BF
HA
EL
IDX





Diagnostic Procedure 44 — Symptom — Backfire through the Intake

1

CHECK SPARK PLUGS.
Remove the spark plugs and check for fouling, etc.

NG → Repair or replace spark plug(s).

↓ OK

2

CHECK INTAKE AIR LEAK.
When pinching blow-by hose (lowering the blow-by air supply), does the engine speed rise?

Yes → Discover air leak location and repair.

↓ No

CHECK FOR INTAKE VALVE DEPOSITS.
If there are deposits on intake valves, remove them.

↓

INSPECTION END

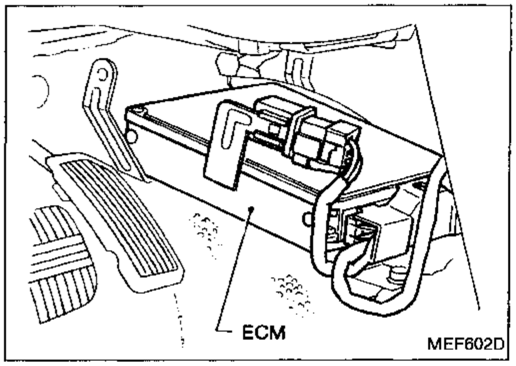
Diagnostic Procedure 45 — Backfire through the Exhaust

CHECK ENGINE COOLANT TEMPERATURE SENSOR.
Check engine coolant temperature sensor and its circuit. (See page EF & EC-81.)

NG → Replace or repair.

↓ OK

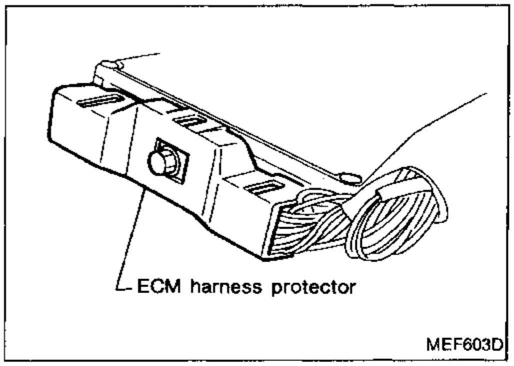
INSPECTION END



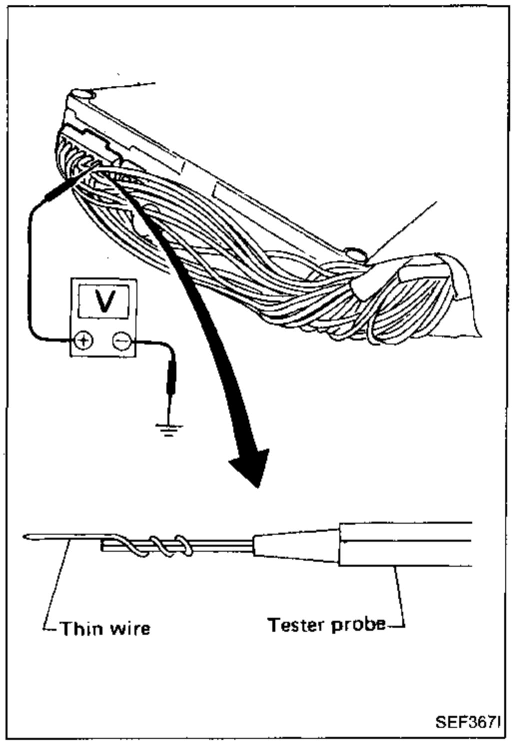
Electrical Components Inspection

ECM INPUT/OUTPUT SIGNAL INSPECTION

1. ECM is located behind the center console panel. For this inspection, remove the center console under cover.

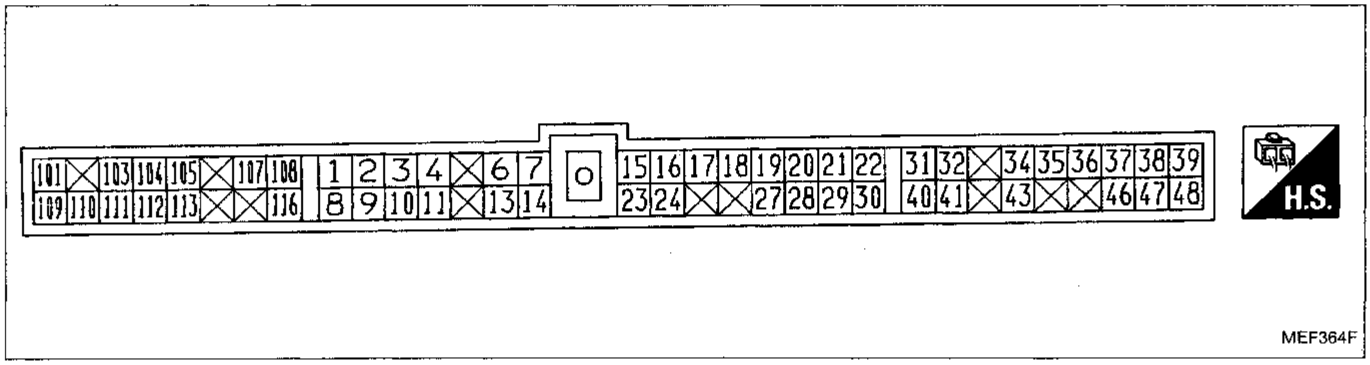


2. Remove ECM harness protector.



3. Perform all voltage measurements with the connectors connected. Extend tester probe as shown to perform tests easily.

ECM HARNESS CONNECTOR TERMINAL LAYOUT



ECM inspection table

*Data are reference values.

TER-MINAL NO.	ITEM	CONDITION	*DATA
1	Ignition signal	Engine is running. └ Idle speed	0.2 - 0.3V
		Engine is running. └ Engine speed is 2,000 rpm.	Approximately 0.7V
3	Ignition check	Engine is running. └ Idle speed	Approximately 12V
4	ECCS relay (Self-shutoff)	Engine is running. Ignition switch "OFF" └ For approximately a few seconds after turning ignition switch "OFF"	0 - 1V
		Ignition switch "OFF" └ Approximately a few seconds after turning ignition switch "OFF"	BATTERY VOLTAGE (11 - 14V)
8	EGR temperature sensor	Engine is running. (Warm-up condition) └ EGR system is not operating.	Less than 4.5V
		Engine is running. (Warm-up condition) └ EGR system is operating.	0 - 1.0V
9	Cooling fan relay (Low speed)	Engine is running. └ Cooling fan is not operating.	BATTERY VOLTAGE (11 - 14V)
		Engine is running. └ Cooling fan is operating.	0.6 - 0.8V
10	Cooling fan relay (High speed)	Engine is running. ├ Cooling fan is not operating. └ Cooling fan is operating at low speed.	BATTERY VOLTAGE (11 - 14V)
		Engine is running. └ Cooling fan is operating at high speed.	0.6 - 0.8V
11	Air conditioner relay	Engine is running. └ Both A/C switch and blower switch are "ON".	0.6 - 0.8V
		Engine is running └ A/C switch is "OFF".	BATTERY VOLTAGE (11 - 14V)

Electrical Components Inspection (Cont'd)

*Data are reference values.

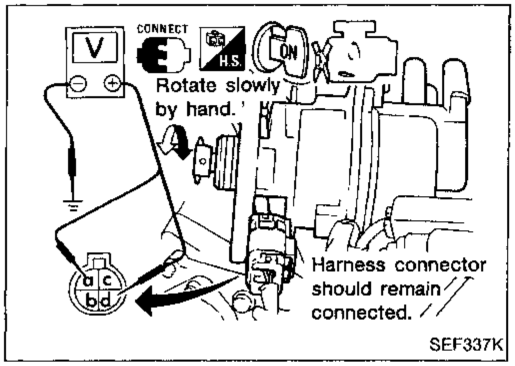
TERMINAL NO.	ITEM	CONDITION	*DATA
16	Mass air flow sensor	Engine is running. (Warm-up condition) └ Idle speed	1.3 - 1.7V
		Engine is running. (Warm-up condition) └ Engine sped is 2,000 rpm.	1.7 - 2.1V
18	Engine coolant temperature sensor	Engine is running.	0 - 5.0V Output voltage varies with engine water temperature.
19	Heated oxygen sensor	Engine is running. └ After warming up sufficiently.	0 - Approximately 1.0V
20	Throttle position sensor	Ignition switch "ON" └ Accelerator pedal released	0.45 - 0.55V
		Ignition switch "ON" └ Accelerator pedal fully depressed	Approximately 4V
22 30	Camshaft position sensor (Reference signal)	Engine is running. └ **Do not run engine at high speed under no-load.**	0.2 - 0.5V
27	Knock sensor	Engine is running. └ Idle speed	2.0 - 3.0V
31 40	Camshaft position sensor (Position signal)	Engine is running. └ **Do not run engine at high speed under no-load.**	2.0 - 3.0V
34	Start signal	Ignition switch "ON"	Approximately 0V
		Ignition switch "START"	BATTERY VOLTAGE (11 - 14V)
35	Neutral position/Inhibitor switch	Ignition switch "ON" └ Neutral position	0V
		Ignition switch "ON" └ Except the above gear position	Approximately 6V
36	Ignition switch	Ignition switch "OFF"	0V
		Ignition switch "ON"	BATTERY VOLTAGE (11 - 14V)
37	Throttle position sensor power supply	Ignition switch "ON"	Approximately 5V
38 47	Power supply for ECM	Ignition switch "ON"	BATTERY VOLTAGE (11 - 14V)

Electrical Components Inspection (Cont'd)

*Data are reference values.

TER-MINAL NO.	ITEM	CONDITION	*DATA
41	Air conditioner switch	Engine is running. └ Both air conditioner switch and blower switch are "ON".	Approximately 0V
		Engine is running. └ Air conditioner switch is "OFF".	BATTERY VOLTAGE (11 - 14V)
43	Power steering oil pressure switch	Engine is running. └ Steering wheel is being turned.	0V
		Engine is running. └ Steering wheel is not being turned.	7 - 9V
46	Power supply (Back-up)	Ignition switch "OFF"	BATTERY VOLTAGE (11 - 14V)
101	Injector No. 1	Engine is running	BATTERY VOLTAGE (11 - 14V)
103	Injector No. 3		
110	Injector No. 2		
112	Injector No. 4		
104	Fuel pump relay	Ignition switch "ON" └ For 5 seconds after turning ignition switch "ON" Engine is running.	0.7 - 0.9V
		Ignition switch "ON" └ 5 seconds after turning ignition switch "ON"	BATTERY VOLTAGE (11 - 14V)
105	EGR & canister control solenoid valve	Engine is running. (Warm-up condition) └ Engine speed is 2,000 rpm	BATTERY VOLTAGE (11 - 14V)
		Engine is running. (Warm-up condition) └ Engine speed is 4,000 rpm	0.6 - 0.8V
111	Heated oxygen sensor heater	Engine is running. └ Engine speed is below 3,200 rpm.	0V
		Engine is running. └ Engine speed is above 3,200 rpm.	BATTERY VOLTAGE (11 - 14V)
113	IACV-AAC valve	Engine is running. └ Idle speed	11 - 14V
		Engine is running. ├ Steering wheel is being turned. ├ Air conditioner is operating. ├ Rear defogger is "ON". └ Headlamp are in high position.	5 - 11V

Electrical Components Inspection (Cont'd)



SEF337K

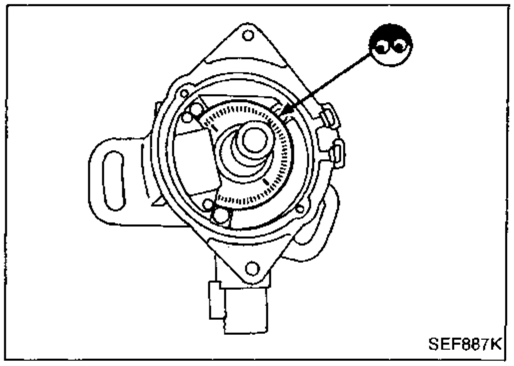
CAMSHAFT POSITION SENSOR

1. Remove distributor from engine. (Camshaft position sensor harness connector should remain connected.)
2. Disconnect ignition wires.
3. Turn ignition switch "ON".
4. Rotate distributor shaft slowly by hand and check voltage between terminals ⓐ, ⓓ and ground.

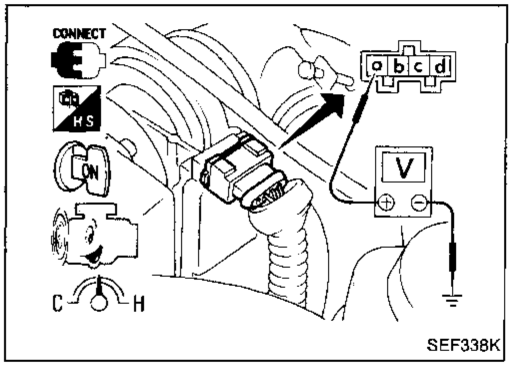
Terminal	Voltage
ⓐ (180° signal)	Tester's pointer fluctuates between 5V and 0V.
ⓓ (1° signal)	

If NG, replace distributor assembly with camshaft position sensor.

5. Visually check signal plate for damage or dust.



SEF887K



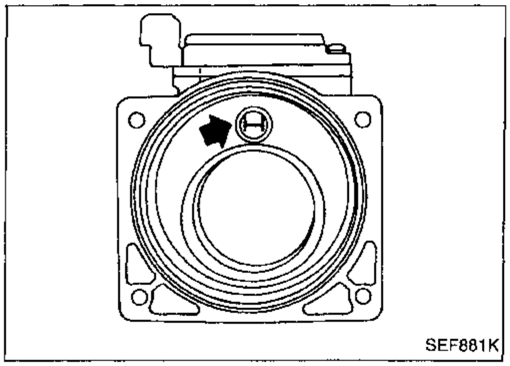
SEF338K

MASS AIR FLOW SENSOR

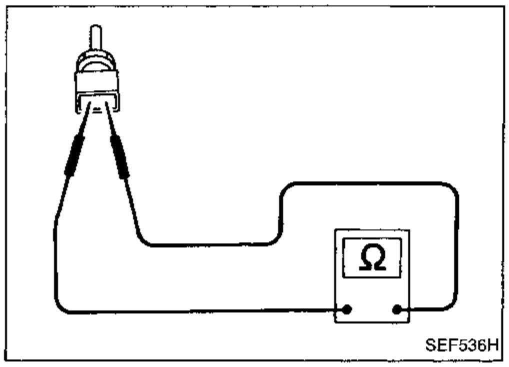
1. Peel mass air flow sensor harness connector rubber as shown in the figure if the harness connector is connected.
2. Turn ignition switch "ON".
3. Start engine and warm it up sufficiently.
4. Check voltage between terminal ⓐ and ground.

Conditions	Voltage V
Ignition switch "ON" (Engine stopped.)	Less than 1.0
Idle (Engine is warm-up sufficiently.)	1.3 - 1.7V

5. If NG, remove mass air flow sensor from air duct. Check hot film for damage or dust.



SEF881K



SEF536H

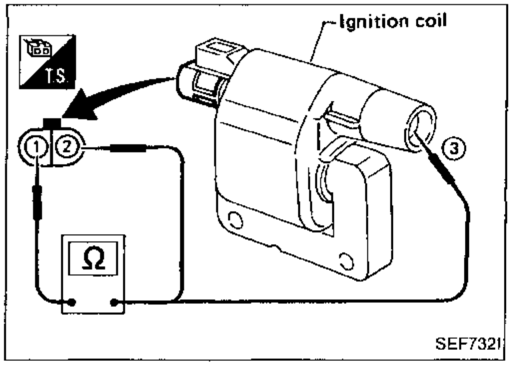
ENGINE COOLANT TEMPERATURE SENSOR

1. Disconnect engine coolant temperature sensor harness connector.
2. Check resistance as shown in the figure.

Temperature °C (°F)	Resistance kΩ
20 (68)	2.1 - 2.9
50 (122)	0.68 - 1.0
80 (176)	0.30 - 0.33

If NG, replace engine coolant temperature sensor.

Electrical Components Inspection (Cont'd)

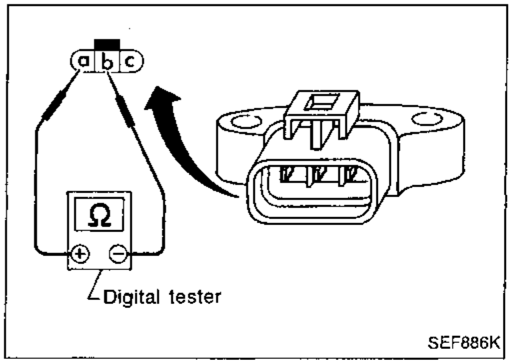


IGNITION COIL

1. Disconnect ignition coil harness connector.
2. Check resistance as shown in the figure.

Terminal	Resistance
① - ②	Approximately 1.0Ω
① - ③	Approximately 10 kΩ

If NG, replace ignition coil.

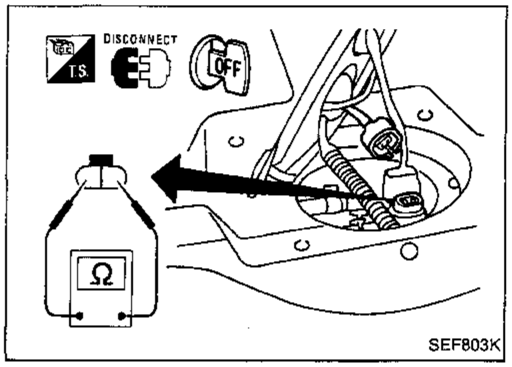


POWER TRANSISTOR

1. Disconnect power transistor harness connector.
2. Check power transistor continuity between terminals with a digital tester as shown in the figure.

	⊖ terminal side					
⊕ terminal side	Terminal ⓐ		Terminal ⓑ		Terminal ⓒ	
	Resistance Ω	Result	Resistance Ω	Result	Resistance Ω	Result
Terminal ⓐ	—	—	∞	OK	∞	OK
	—	—	Not ∞ or 0	NG	Not ∞ or 0	NG
	—	—	0	NG	0	NG
Terminal ⓑ	∞	NG	—	—	∞	NG
	Not ∞ or 0	OK	—	—	Not ∞ or 0	OK
	0	NG	—	—	0	NG
Terminal ⓒ	∞	NG	∞	NG	—	—
	Not ∞ or 0	OK	Not ∞ or 0	OK	—	—
	0	NG	0	NG	—	—

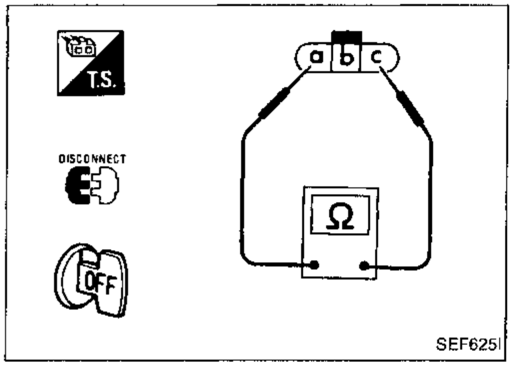
If NG, replace power transistor.



FUEL PUMP

1. Disconnect fuel pump harness connector.
2. Check resistance between terminals ⓐ and ⓑ.
   Resistance: Approximately 0.7Ω
   If NG, replace fuel pump.

Electrical Components Inspection (Cont'd)



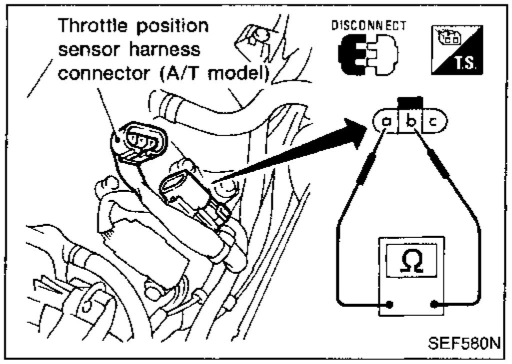
SEF625I

HEATED OXYGEN SENSOR HEATER

Check resistance between terminals ⓐ and ⓒ.

Resistance: 3 - 1,000Ω

If NG, replace heated oxygen sensor.



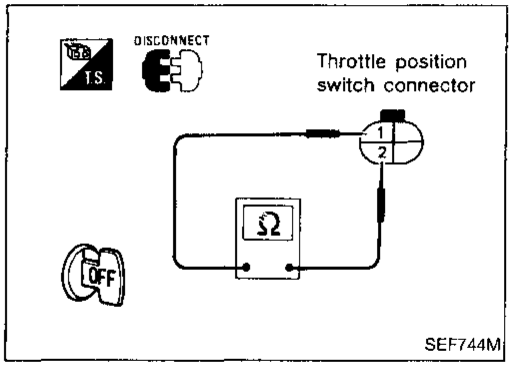
SEF580N

THROTTLE POSITION SENSOR

1. Disconnect throttle position sensor harness connector.
2. Make sure that resistance between terminals ⓐ and ⓑ changes when opening throttle valve manually.

Accelerator pedal conditions	Resistance kΩ
Completely released	Approximately 1
Partially released	1 - 10
Completely depressed	Approximately 10

If NG, replace throttle position sensor.



SEF744M

CLOSED THROTTLE POSITION SWITCH (Idle position) — A/T model only

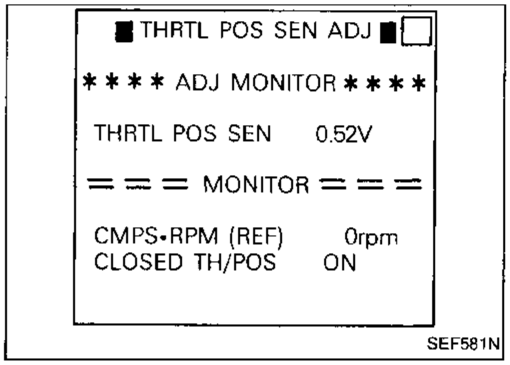
1. Warm up engine sufficiently.
- Make sure fast idle cam holds cam follower lever released.
2. Disconnect throttle position switch harness connector.
3. Check continuity between terminals ① and ②.

Accelerator pedal condition	Continuity
Released	Yes
Depressed	No

If NG, replace closed throttle position switch.

Adjustment

If throttle position sensor, closed throttle position switch or wide open throttle position switch is replaced or removed, it is necessary to install in proper position, by following the procedure as shown below:



■ THRTL POS SEN ADJ ■☐

* * * * ADJ MONITOR * * * *

THRTL POS SEN 0.52V

= = = MONITOR = = =

CMPS•RPM (REF) 0rpm
CLOSED TH/POS ON

SEF581N

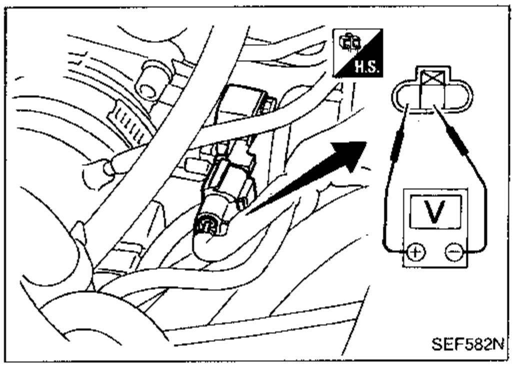
MT model;

1. Install throttle position sensor body in throttle body. Do not tighten bolts. Leave bolts loose.
2. Connect throttle position sensor harness connector.
3. Start engine and warm it up sufficiently.
4. Perform "THRTL POS SEN ADJ" in "WORK SUPPORT" mode.

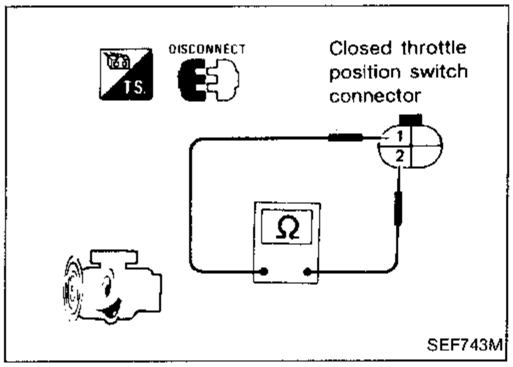
   Measure output voltage of throttle position sensor using voltmeter.

GI
MA
EM
LC
EF & EC
FE
CL
MT
AT
FA
RA
BR
ST
BF
HA
EL
IDX

Electrical Components Inspection (Cont'd)



5. Adjust by rotating throttle position sensor body so that output voltage is 0.45 to 0.55V.
6. Tighten mounting bolts.
7. Disconnect throttle position sensor harness connector for a few seconds and then reconnect it.



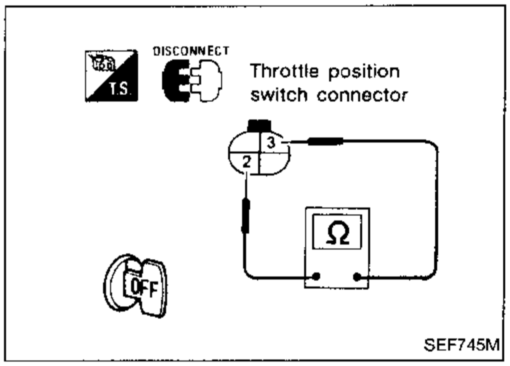
AT model;

1. Install throttle position sensor in throttle body. Do not tighten bolts. Leave bolts loose.
2. Connect throttle position sensor and closed throttle position switch harness connector.
3. Start engine and warm it up sufficiently.
4. Disconnect closed throttle position switch harness connector.
5. Check closed throttle position switch OFF → ON engine speed with circuit tester, closing throttle valve manually.

   Closed throttle position switch continuity OFF → ON engine speed:

   A/T: Engine speed in "N" position

   1,050±150 rpm

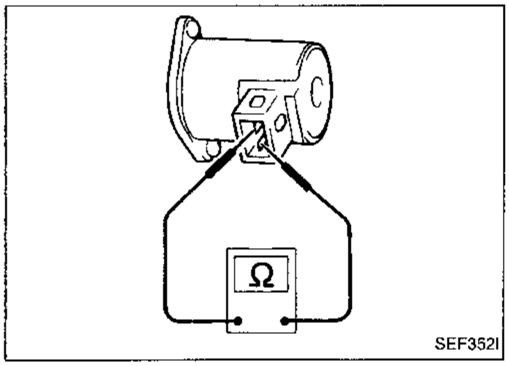


WIDE OPEN THROTTLE POSITION SWITCH — A/T model only

1. Disconnect throttle position switch harness connector.
2. Check continuity between terminals ② and ③.

Accelerator pedal condition	Continuity
Released	No
Depressed	Yes

If NG, replace wide open throttle position switch.



IACV-AAC VALVE

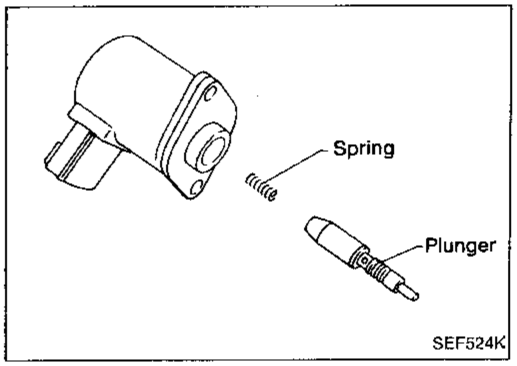
Disconnect IACV-AAC valve harness connector.

- Check IACV-AAC valve resistance.

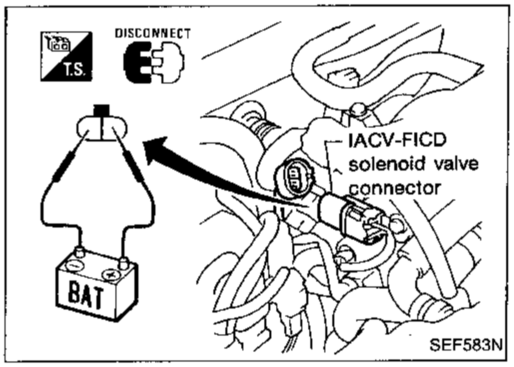
  Resistance:

  Approximately 10Ω

Electrical Components Inspection (Cont'd)



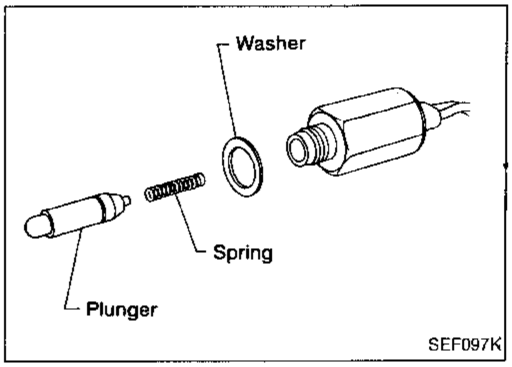
- Check plunger for seizing or sticking.
- Check for broken spring.



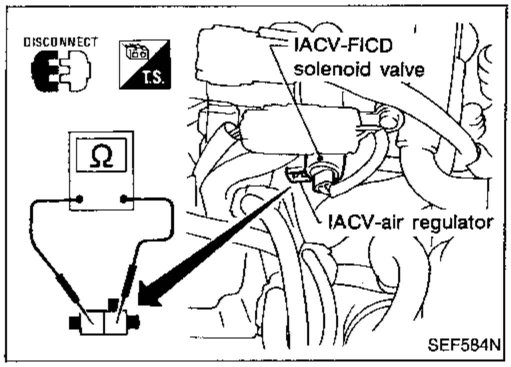
IACV-FICD SOLENOID VALVE

Disconnect IACV-FICD solenoid valve harness connector.

- Check for clicking sound when applying 12V direct current to terminals.



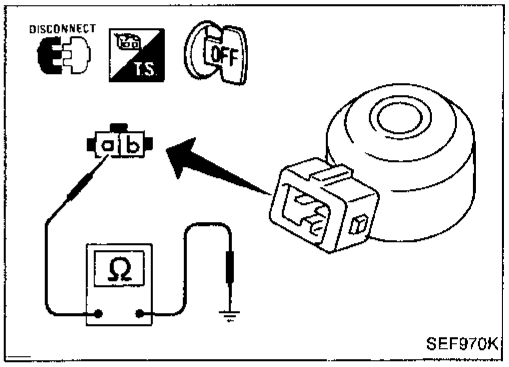
- Check plunger for seizing or sticking.
- Check for broken spring.



IACV-AIR REGULATOR

Disconnect IACV-air regulator harness connector.

- Check IACV-air regulator resistance.
  Resistance:
  Approximately 70 - 80Ω
- Check IACV-air regulator for clogging.



KNOCK SENSOR

1. Disconnect knock sensor harness connector.
2. Check continuity between terminal ⓐ and ground.

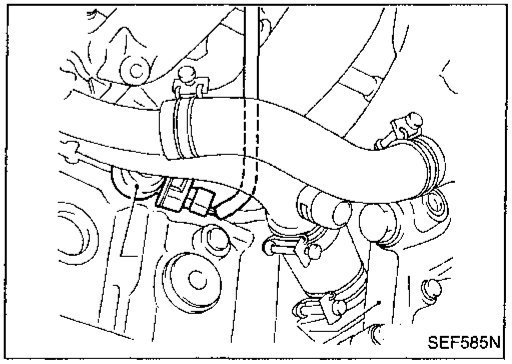
Continuity should exist.

- It is necessary to use an ohmmeter which can measure more than 10 MΩ.

CAUTION:

Discard any knock sensor which has been dropped or undergone shocks; use a new one.

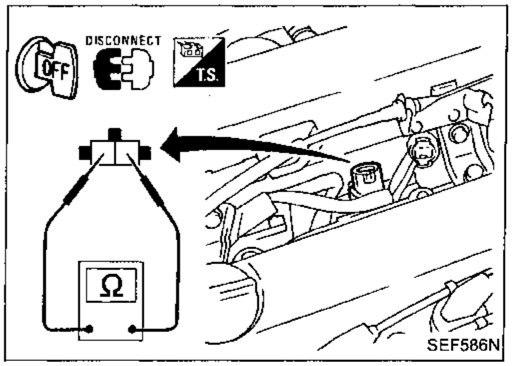
Electrical Components Inspection (Cont'd)



Installation

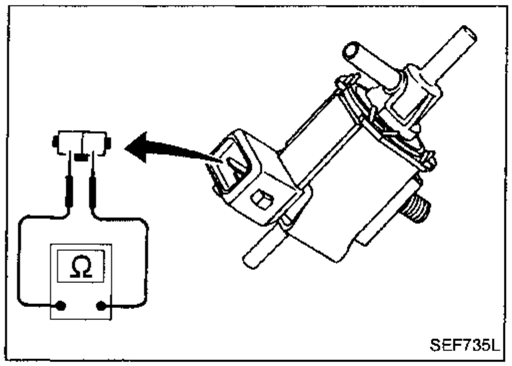
Install knock sensor with connector side facing engine front.

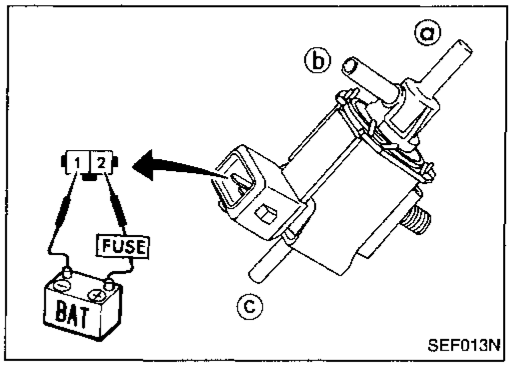
- When installing knock sensor, ensure both upper and lower sides of knock sensor and cylinder block mating surface are clean and free from foreign particles.
- When tightening knock sensor, be careful not to apply excessive force to connector.
- Make sure knock sensor is not in contact with any adjacent part after installing.



INJECTOR

1. Disconnect injector harness connector.
2. Check resistance between terminals as shown in the figure.
   Resistance: 10 - 14Ω
   If NG, replace injector.



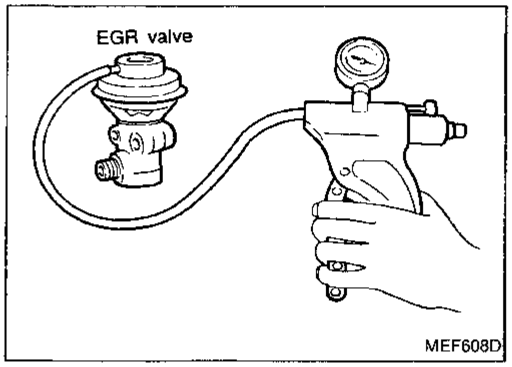


EGR & CANISTER CONTROL SOLENOID VALVE

1. Disconnect solenoid valve connector and check resistance between solenoid terminals.
   Resistance: 30 - 40Ω
2. Check solenoid valve, following the table as shown below:

Conditions	Air passage continuity between ⓐ and ⓑ	Air passage continuity between ⓑ and ⓒ
12V direct current supply between terminals ① and ②	Yes	No
No supply	No	Yes

If NG, replace EGR & canister control solenoid valve.



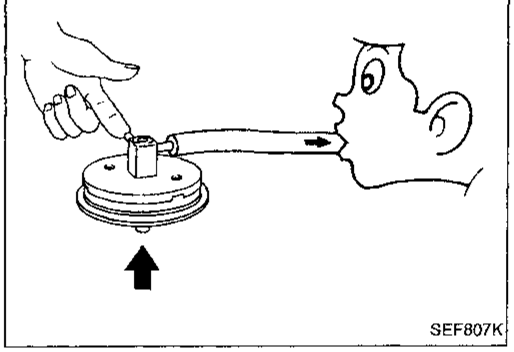
EGR VALVE

Apply vacuum to EGR vacuum port with a hand vacuum pump.

EGR valve spring should lift.

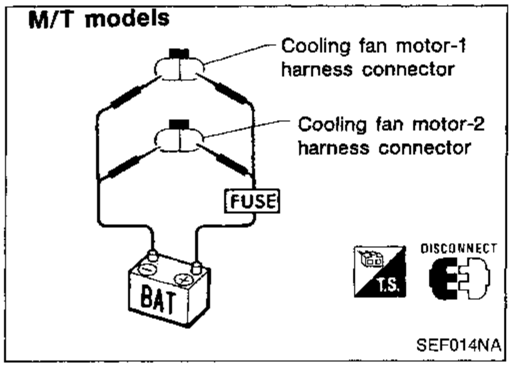
If NG, replace EGR valve.

Electrical Components Inspection (Cont'd)


SEF807K

EGRC-BPT VALVE

Plug one of two ports of EGRC-BPT valve.
Apply a pressure above 0.490 kPa (50 mmH_2O, 1.97 inH_2O) to check for leakage. If a leak is noted, replace valve.



SEF014NA

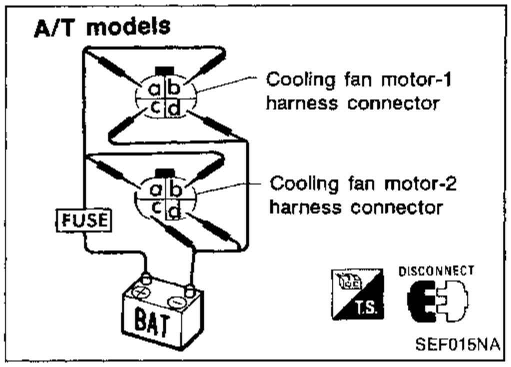
COOLING FAN MOTORS-1 AND -2

M/T models:

1. Disconnect cooling fan motor harness connectors.
2. Supply cooling fan motor terminals with battery voltage and check operation.

Cooling fan motor should operate.

If NG, replace cooling fan motor.



SEF015NA

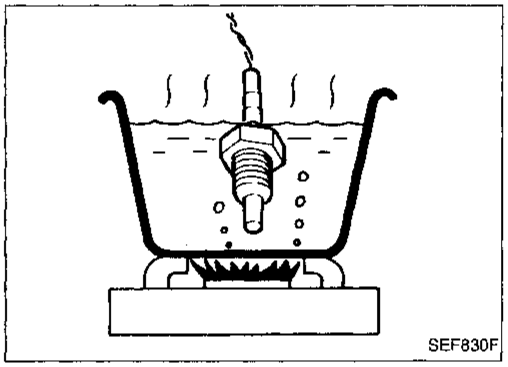
A/T models:

1. Disconnect cooling fan motor harness connectors.
2. Supply cooling fan motor terminals with battery voltage and check operation.

	Speed	Terminals	
		(⊕)	(⊖)
Cooling fan motor-1	Low	ⓑ	ⓒ
	High	ⓐ, ⓑ	ⓒ, ⓓ
Cooling fan motor-2	Low	ⓑ	ⓒ
	High	ⓐ, ⓑ	ⓒ, ⓓ

Cooling fan motor should operate.

If NG, replace cooling fan motor.


SEF830F

EGR TEMPERATURE SENSOR

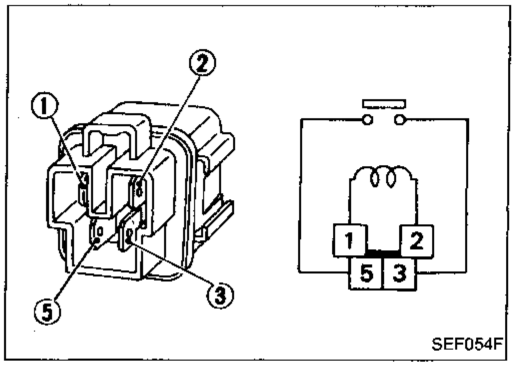
Check resistance change and resistance value at 100°C (212°F).

- **Resistance should decrease in response to temperature increase.**

  Resistance: 100°C (212°F)
  85.3 ± 8.53 kΩ

  If NG, replace EGR temperature sensor.

Electrical Components Inspection (Cont'd)



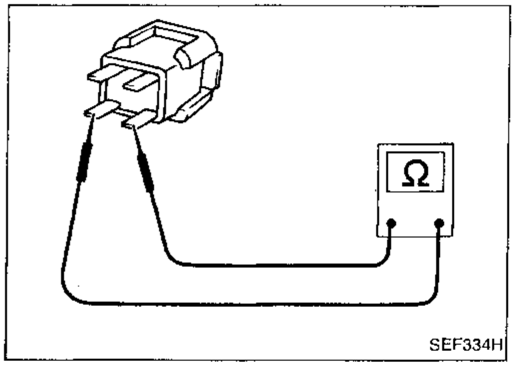
SEF054F

ECCS RELAY, COOLING FAN RELAY-1 FOR M/T MODELS AND FUEL PUMP RELAY

Check continuity between terminals ③ and ⑤.

Conditions	Continuity
12V direct current supply between terminals ① and ②	Yes
No current supply	No

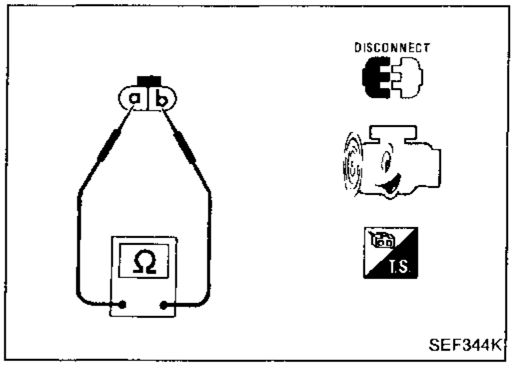
If NG, replace relay.



SEF334H

RESISTOR

1. Disconnect resistor harness connector.
2. Check resistance between terminals ⓐ and ⓑ.
   Resistance: Approximately 2.2 kΩ
   If NG, replace resistor.



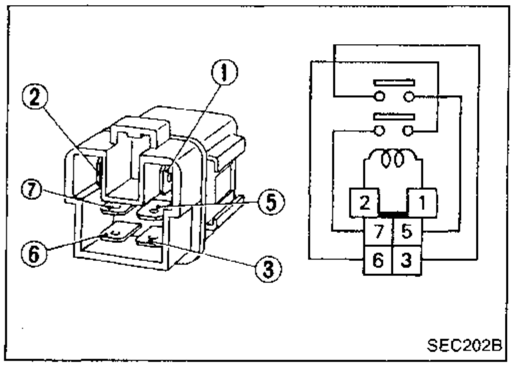
SEF344K

POWER STEERING OIL PRESSURE SWITCH

1. Disconnect power steering oil pressure switch harness connector then start engine.
2. Check continuity between terminals ⓐ and ⓑ.

Conditions	Continuity
Steering wheel is being turned	Yes
Steering wheel is not being turned	No

If NG, replace power steering oil pressure switch.



SEC202B

COOLING FAN RELAYS-1, -2 AND -3 FOR A/T MODELS

Check continuity between terminals ③ and ⑤, ⑥ and ⑦.

Conditions	Continuity
12V direct current supply between terminals ① and ②	Yes
No current supply	No

If NG, replace relay.

INHIBITOR SWITCH

Refer to AT section.

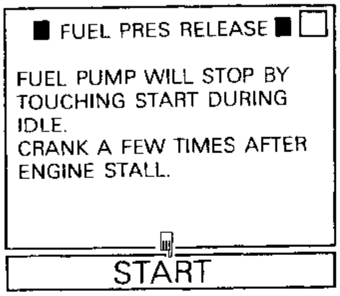
NEUTRAL POSITION SWITCH

Refer to MT section.

Releasing Fuel Pressure

Before disconnecting fuel line, release fuel pressure from fuel line to eliminate danger.

1. Turn ignition switch "ON".
2. Perform "FUEL PRESSURE RELEASE" in "WORK SUPPORT" mode with CONSULT.
3. Start engine.
4. After engine stalls, crank it two or three times to release all fuel pressure.
5. Turn ignition switch off.



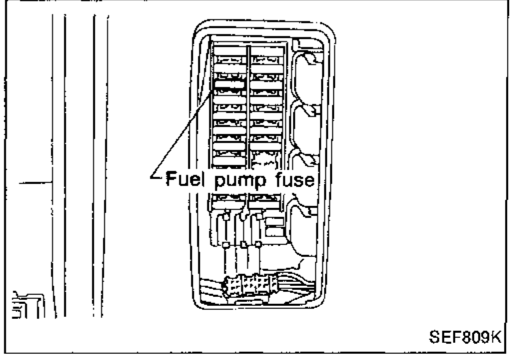
■ FUEL PRES RELEASE ■ ☐

FUEL PUMP WILL STOP BY TOUCHING START DURING IDLE.
CRANK A FEW TIMES AFTER ENGINE STALL.

START

SEF823K

1. Remove fuel pump fuse.
2. Start engine.
3. After engine stalls, crank it two or three times to release all fuel pressure.
4. Turn ignition switch off and reconnect fuel pump fuse.



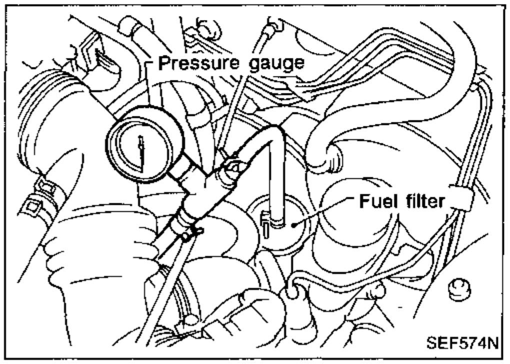
SEF809K

Fuel Pressure Check

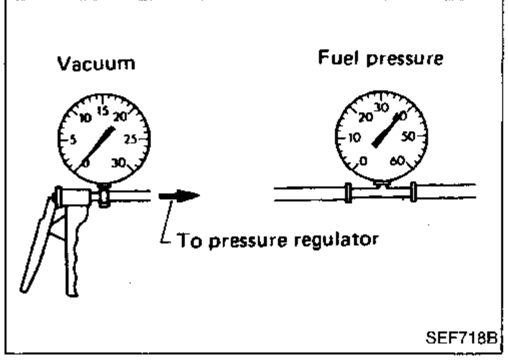
a. When reconnecting fuel line, always use new clamps.
b. Make sure that clamp screw does not contact adjacent parts.
c. Use a torque driver to tighten clamps.
d. Use Pressure Gauge to check fuel pressure.
e. Do not perform fuel pressure check while fuel pressure regulator control system is operating; otherwise, fuel pressure gauge might indicate incorrect readings.

1. Release fuel pressure to zero.
2. Disconnect fuel hose between fuel filter and fuel tube (engine side).
3. Install pressure gauge between fuel filter and fuel tube.
4. Start engine and check for fuel leakage.
5. Read the indication of fuel pressure gauge.
   At idling: Approximately 245 kPa
   (2.5 kg/cm^2, 36 psi)
   A few seconds after ignition switch is turned OFF to ON: Approximately 294 kPa
   (3.0 kg/cm^2, 43 psi)
6. Stop engine and disconnect fuel pressure regulator vacuum hose from intake manifold.
7. Plug intake manifold with a rubber cap.
8. Connect variable vacuum source to fuel pressure regulator.
9. Start engine and read indication of fuel pressure gauge as vacuum is changed.

Fuel pressure should decrease as vacuum increases. If results are unsatisfactory, replace fuel pressure regulator.

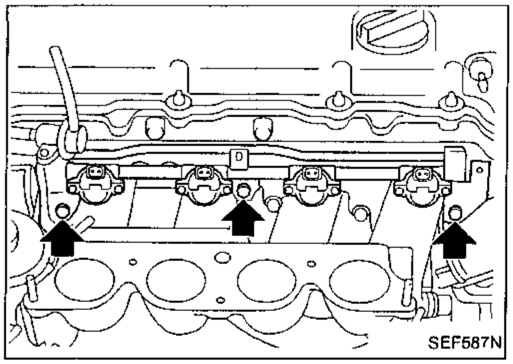


SEF574N

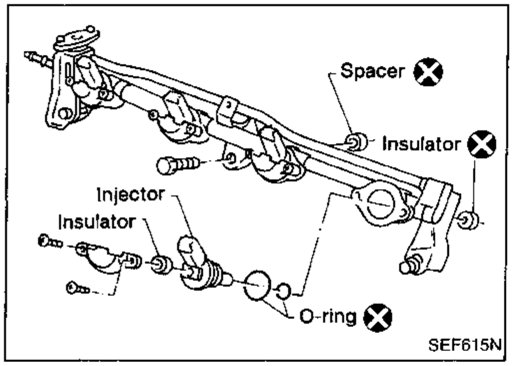


SEF718B

Injector Removal and Installation



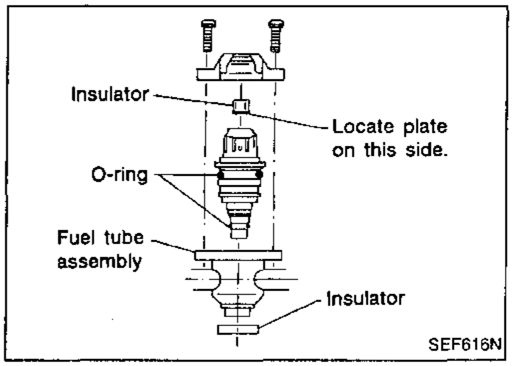
1. Release fuel pressure to zero.
2. Remove intake manifold collector (Refer to CYLINDER HEAD in EM section).
3. Disconnect vacuum hose from pressure regulator.
4. Disconnect fuel hoses from fuel tube assembly.
5. Disconnect injector harness connectors.
6. Remove injectors with fuel tube assembly.



7. Push out any malfunctioning injector from fuel tube assembly.

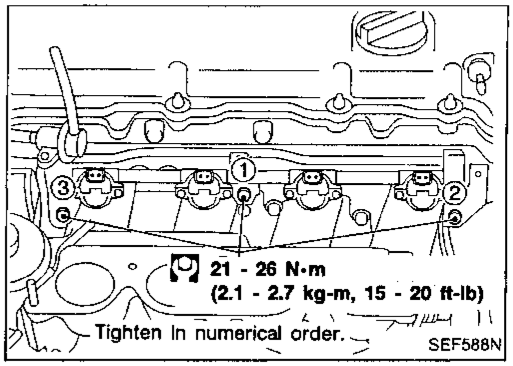
Do not extract injector by pinching connector.

8. Replace or clean injector as necessary.



9. Install injector to fuel tube assembly.

Always replace O-rings and insulators with new ones.
Lubricate O-rings with a smear of silicone oil.



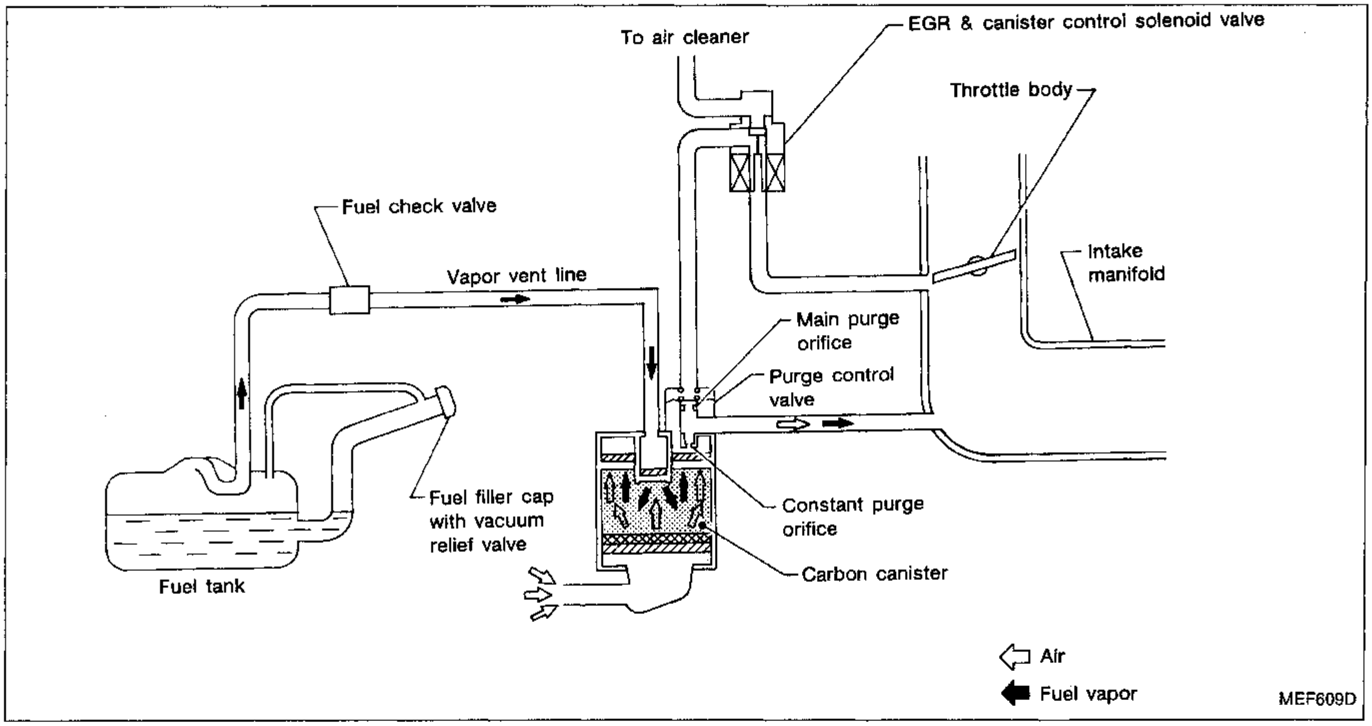
10. Install injectors with fuel tube assembly to intake manifold.
11. Install fuel hoses to fuel tube assembly.

Lubricate fuel hoses with a smear of silicone oil.

12. Reinstall any parts removed in reverse order of removal.

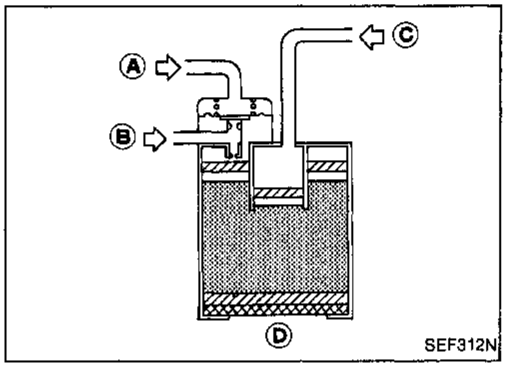
CAUTION:
After properly connecting fuel hose to injector and fuel tube assembly, check connection for fuel leakage.

Description



MEF609D

The evaporative emission system is used to reduce hydrocarbons emitted into the atmosphere from the fuel system. This reduction of hydrocarbons is accomplished by activated charcoals in the carbon canister.
The fuel vapor from the sealed fuel tank is led into the canister which contains activated carbon and the vapor is stored there when the engine is not running.
The canister retains the fuel vapor until the canister is purged by the air drawn through the bottom of the canister to the intake manifold when the engine is running. When the engine runs at idle, the purge control valve is closed.
Only a small amount of stored vapor flows into the intake manifold through the constant purge orifice. As the engine speed increases, and the throttle vacuum rises higher, the purge control valve opens and the vapor is sucked into the intake manifold through both the main purge orifice and the constant purge orifice.



SEF312N

Inspection

ACTIVATED CARBON CANISTER

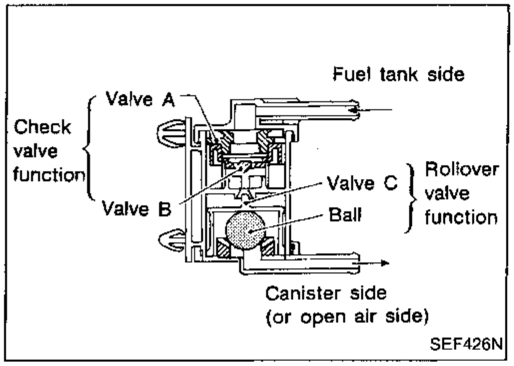
Check carbon canister as follows:

1. Blow air in port Ⓐ and ensure that there is no leakage.
2.

- Apply vacuum to port Ⓐ.
- Cover port Ⓓ with hand.
- Blow air in port Ⓒ and ensure free flow out of port Ⓑ.

Inspection (Cont'd)

FUEL CHECK VALVE (With rollover valve)

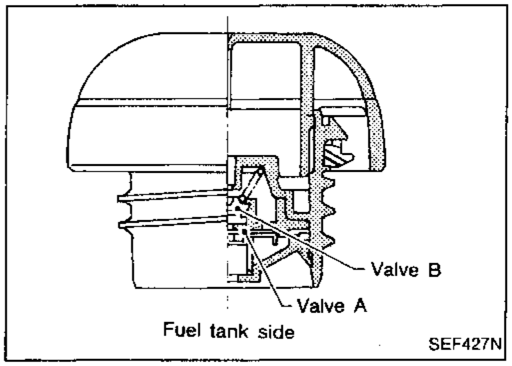


Check valve operation

1. Blow air through connector on fuel tank side.
   A considerable resistance should be felt and a portion of air flow should be directed toward the canister side.
2. Blow air through connector on canister side.
   Air flow should be smoothly directed toward fuel tank side.
3. If fuel check valve is suspected of not properly functioning in steps 1 and 2 above, replace it.

Rollover valve operation

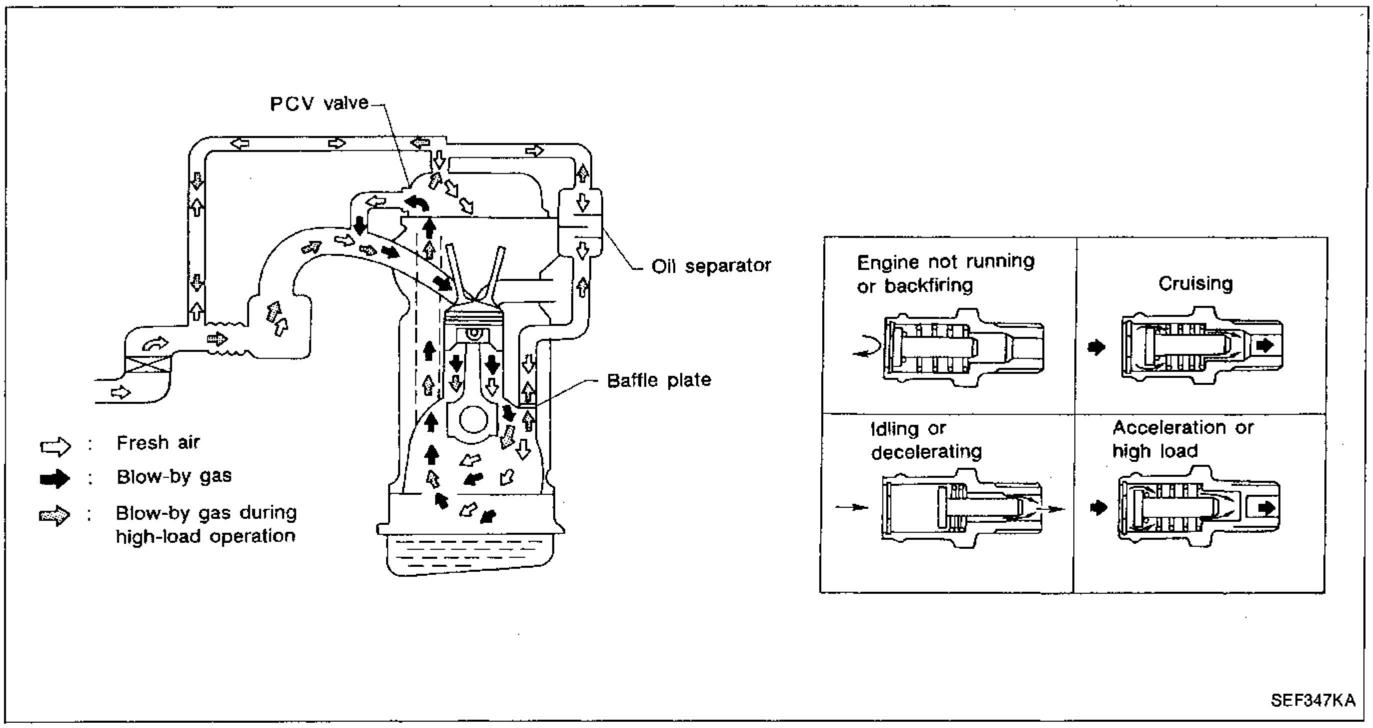
Ensure that continuity of air passage does not exist when the installed rollover valve is tilted to 90° or 180°.



FUEL TANK VACUUM RELIEF VALVE

1. Wipe clean valve housing.
2. Suck air through the cap. A slight resistance accompanied by valve clicks indicates that valve A is in good mechanical condition. Note also that, by further sucking air, the resistance should disappear with valve clicks.
3. Blow air on fuel tank side and ensure that continuity of air passage exists through valve B.
4. If valve is clogged or if no resistance is felt, replace cap as an assembly.

Description



SEF347KA

This system returns blow-by gas to both the intake manifold and air inlet tubes.

The positive crankcase ventilation (PCV) valve is provided to conduct crankcase blow-by gas to the intake manifold.

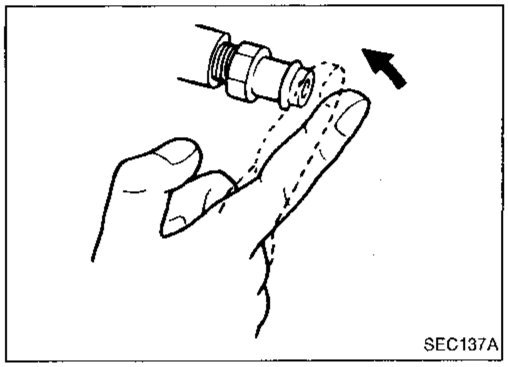
During partial throttle operation of the engine, the intake manifold sucks the blow-by gas through the PCV valve.

Normally, the capacity of the valve is sufficient to handle any blow-by and a small amount of ventilating air.

The ventilating air is then drawn from the air inlet tubes, through the hose connecting air inlet tubes to rocker cover, into the crankcase.

Under full-throttle condition, the manifold vacuum is insufficient to draw the blow-by flow through the valve, and its flow goes through the hose connection in the reverse direction.

On vehicles with an excessively high blow-by some of the flow will go through the hose connection to the air inlet tubes under all conditions.



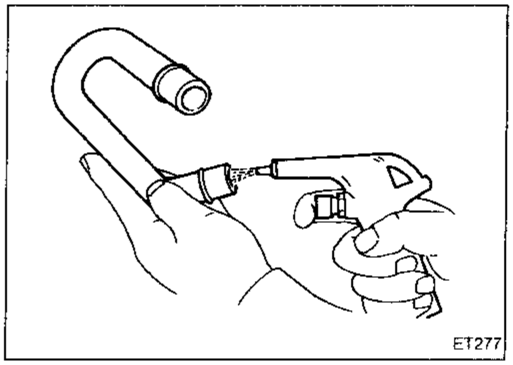
SEC137A

Inspection

PCV (Positive Crankcase Ventilation)

With engine running at idle, remove ventilation hose from PCV valve; if the valve is working properly, a hissing noise will be heard as air passes through it and a strong vacuum should be felt immediately when a finger is placed over valve inlet.

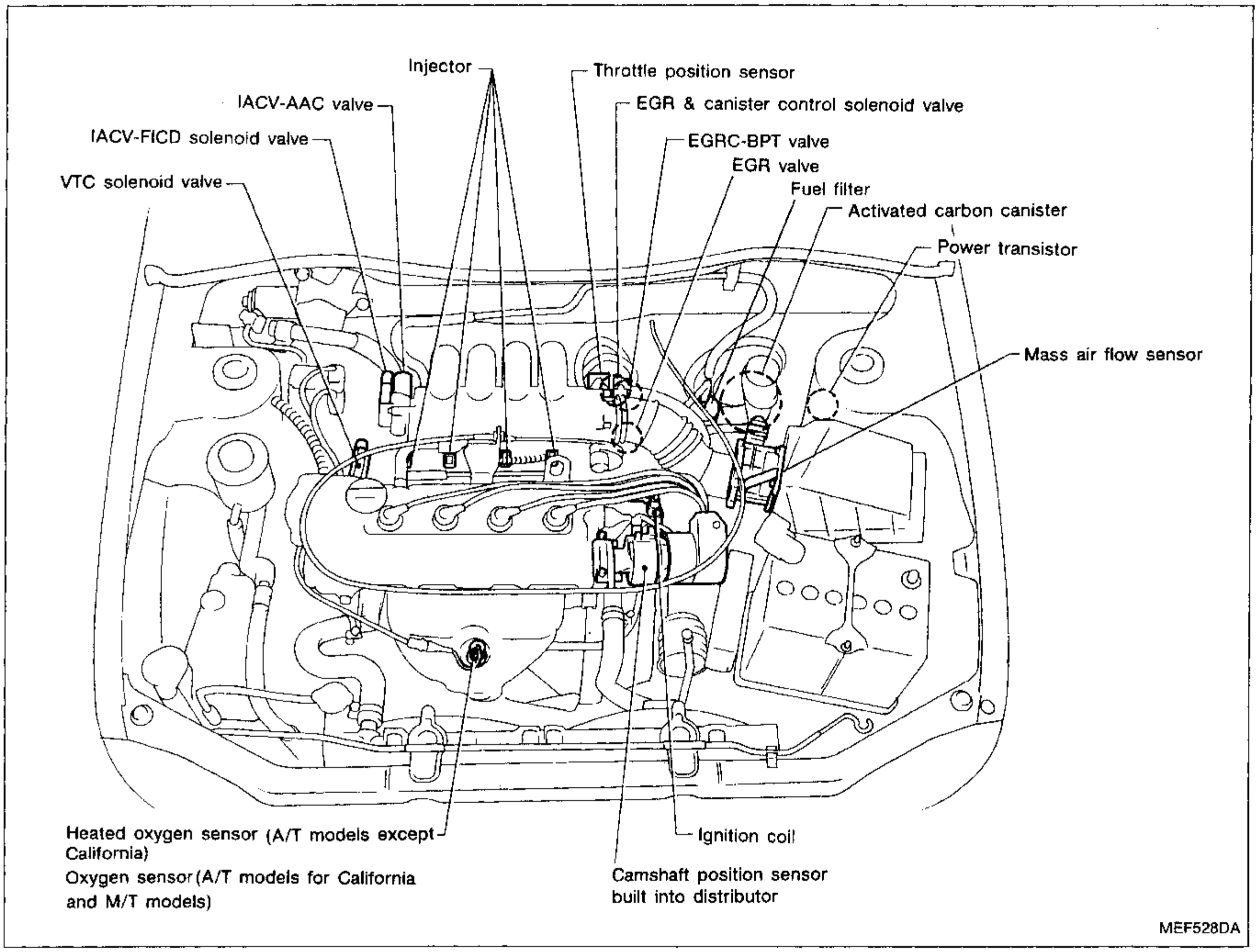
Inspection (Cont'd)

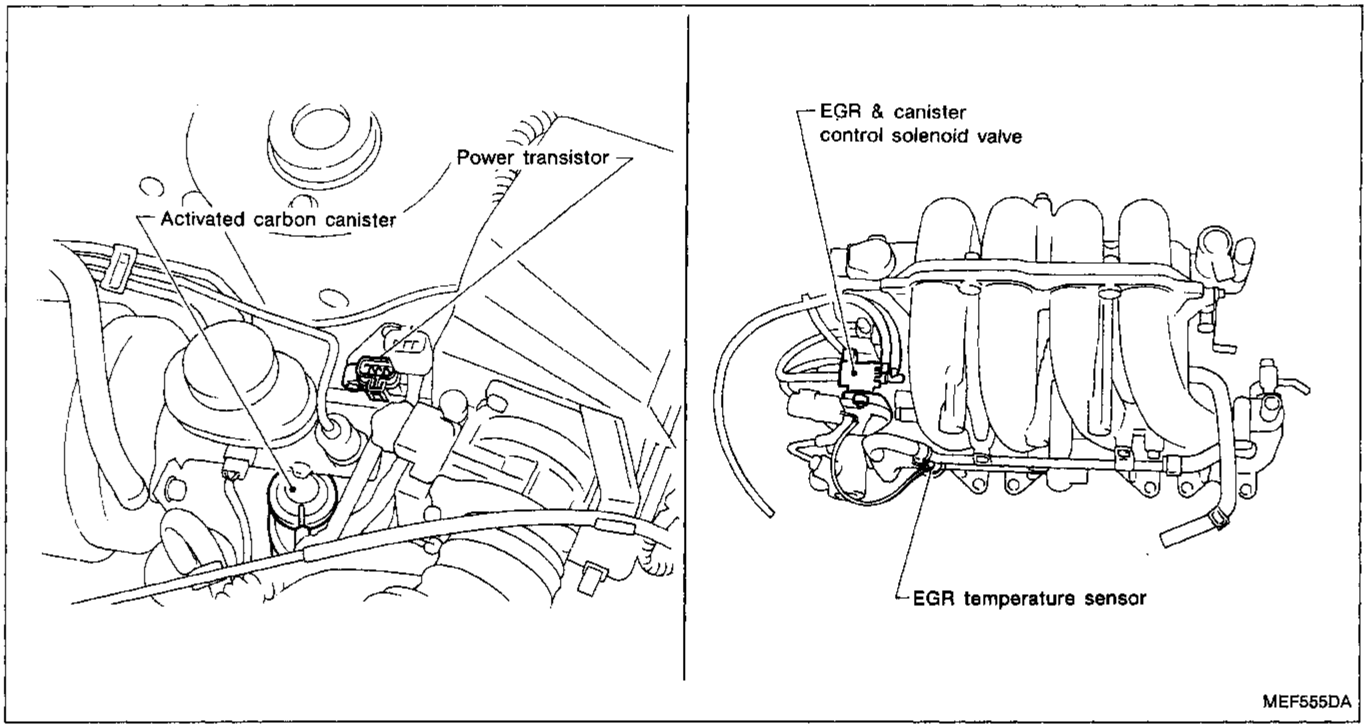


VENTILATION HOSE

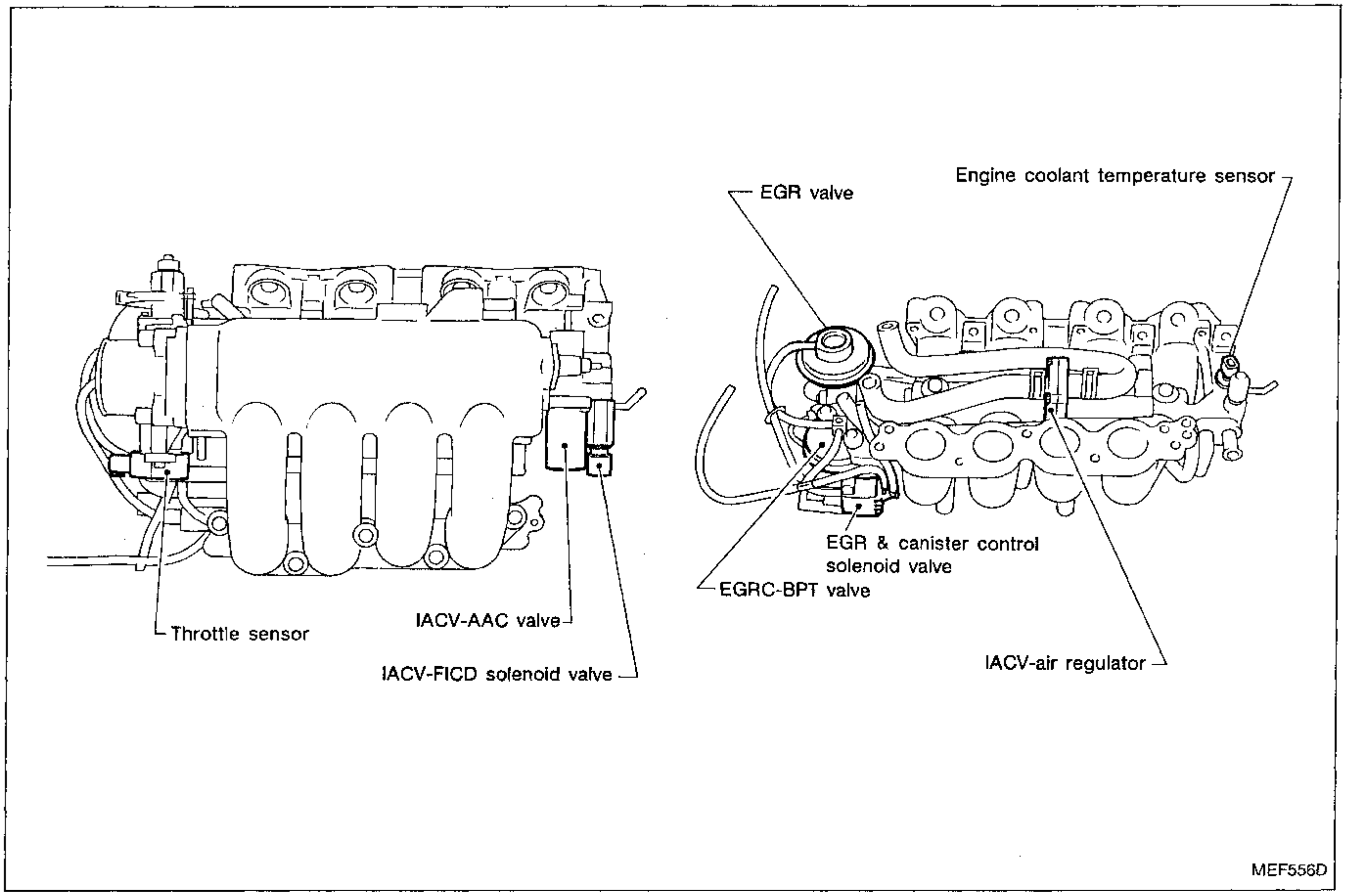
1. Check hoses and hose connections for leaks.
2. Disconnect all hoses and clean with compressed air. If any hose cannot be freed of obstructions, replace.

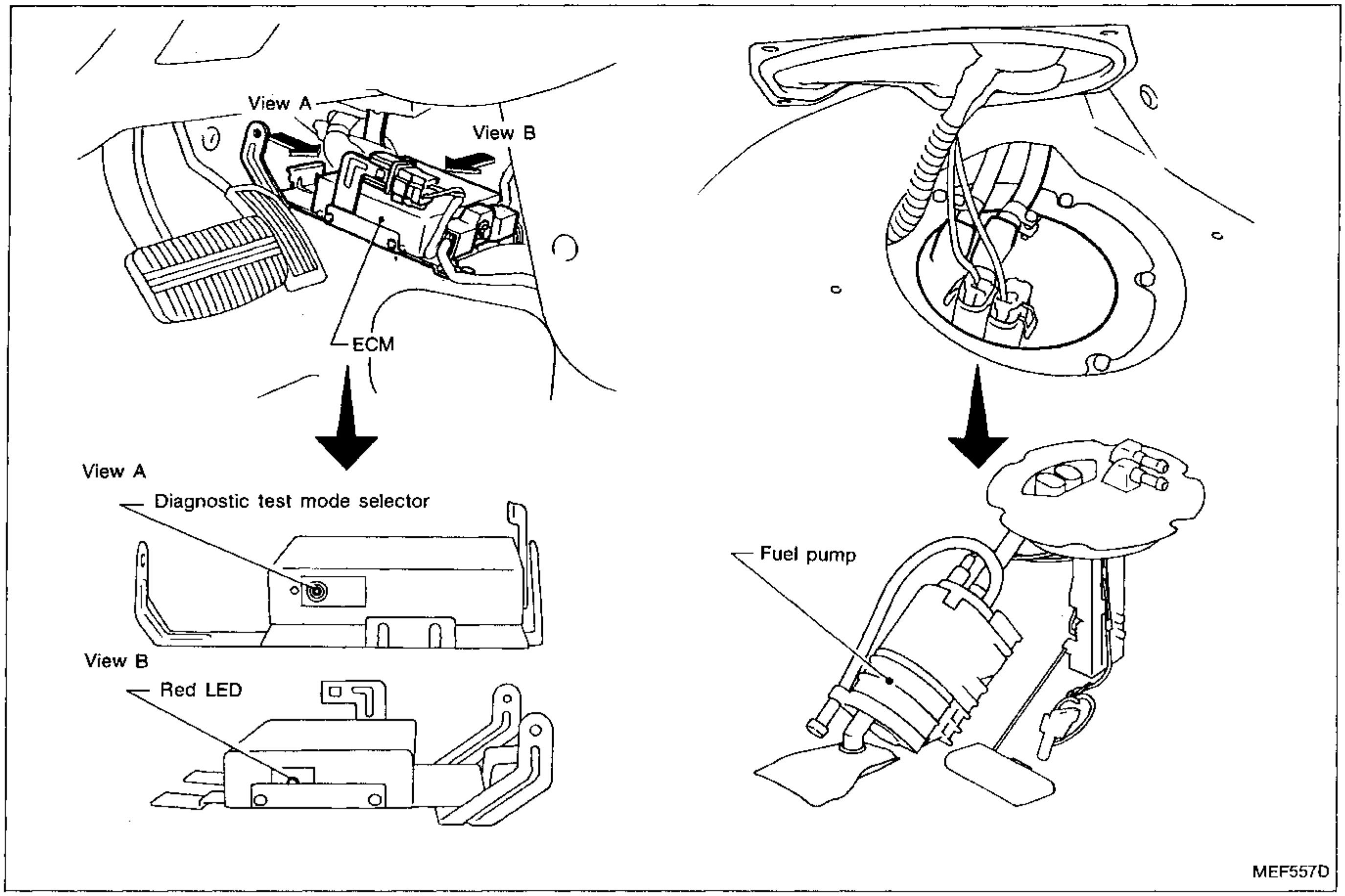
ECCS Component Parts Location



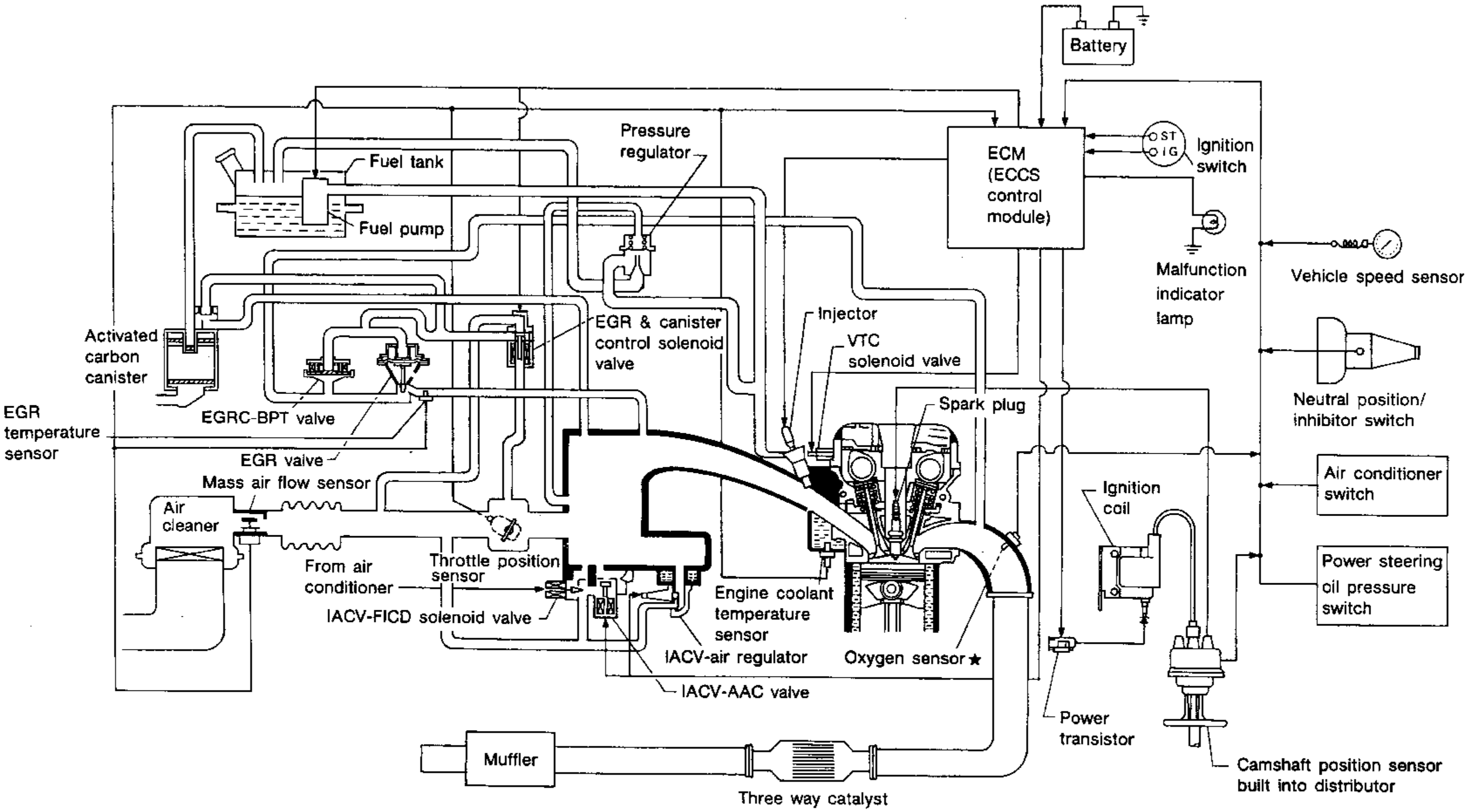


ECCS Component Parts Location (Cont'd)





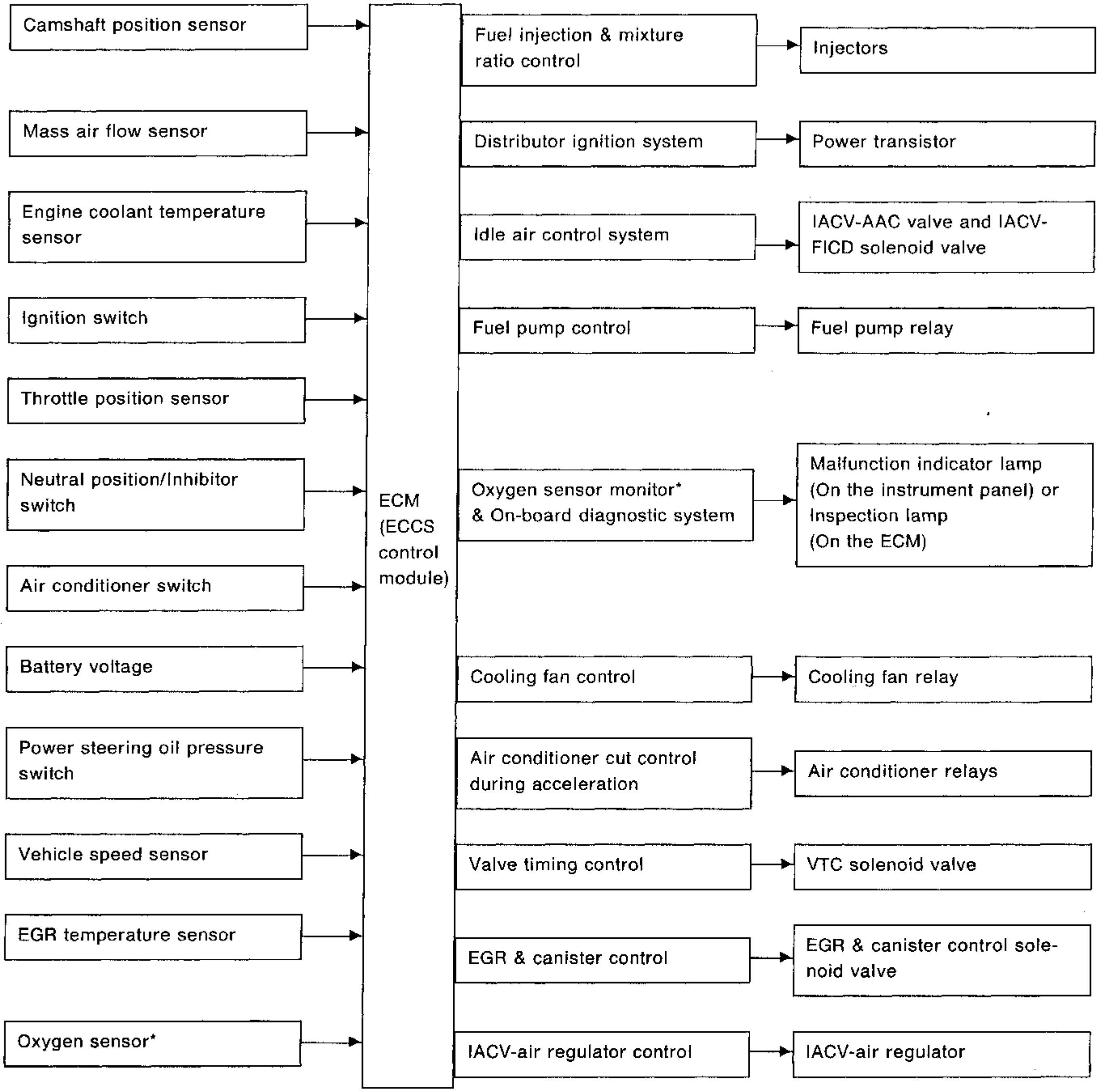
System Diagram



★Heated oxygen sensor (A/T models except for California)
Oxygen sensor (A/T models for California and M/T models)

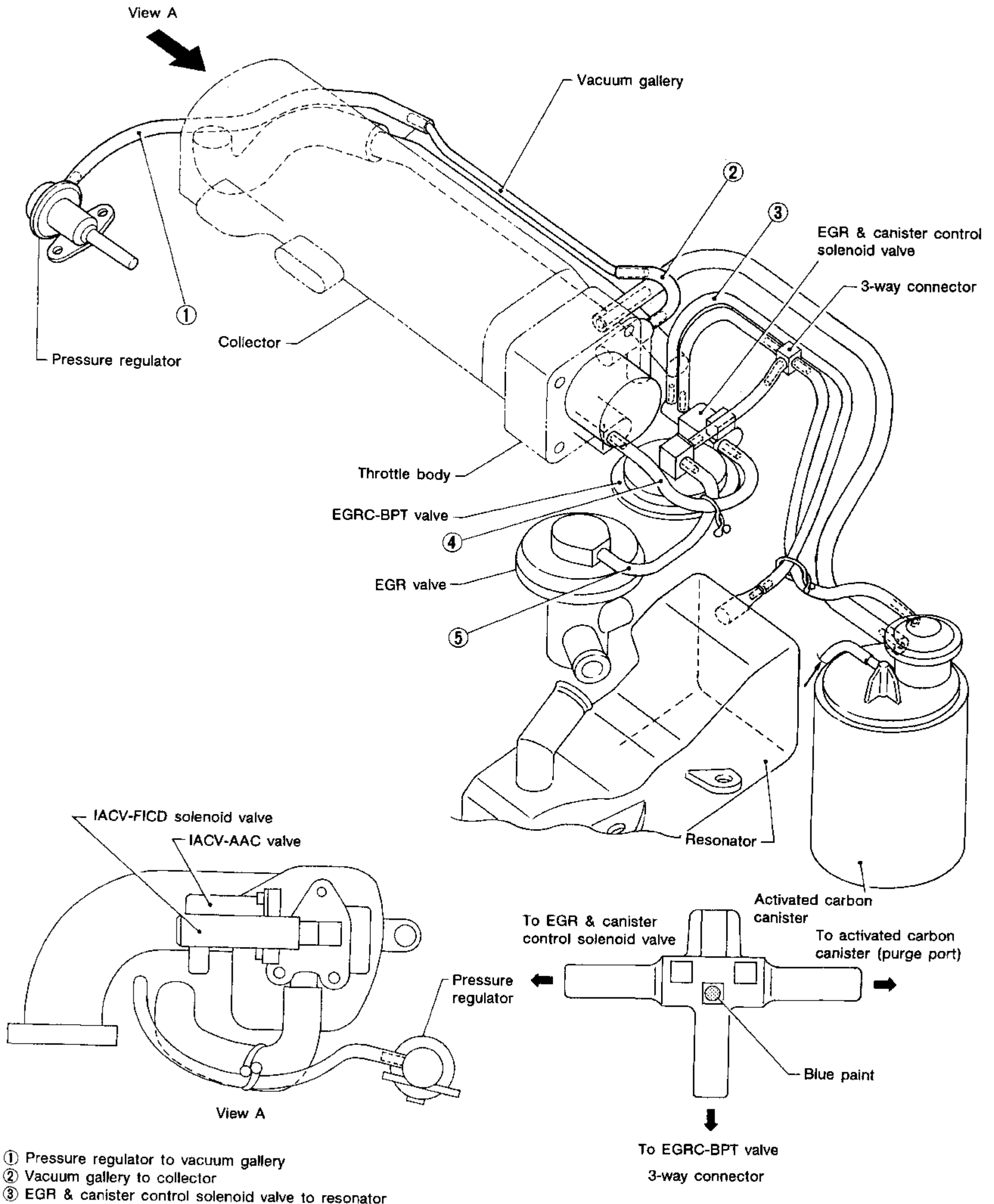
SEF558DA

System Chart



*: Heated oxygen sensor (A/T models except for California)
Oxygen sensor (A/T models for California and M/T models)

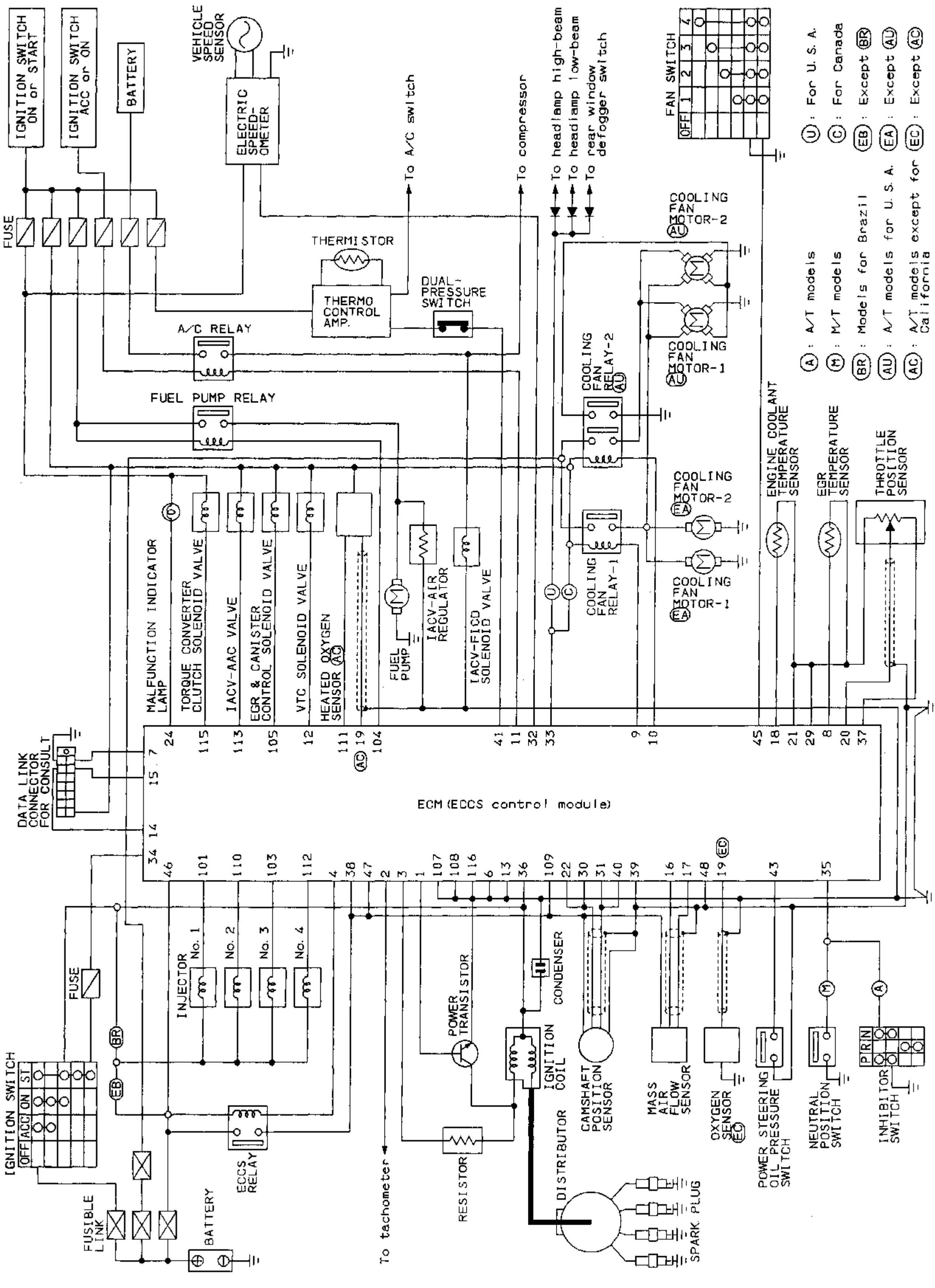
Vacuum Hose Drawing



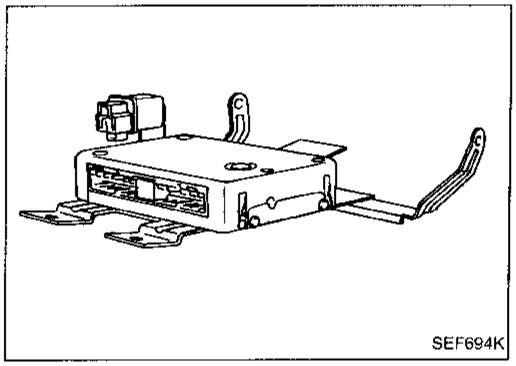
① Pressure regulator to vacuum gallery
② Vacuum gallery to collector
③ EGR & canister control solenoid valve to resonator
④ EGR & canister control solenoid valve to throttle body
⑤ EGR valve to EGRC-BPT valve

MEF561D

Circuit Diagram

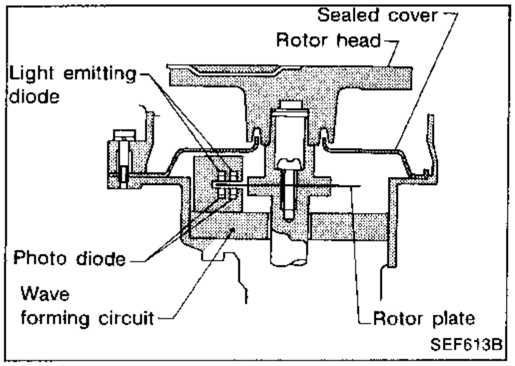


MEF268F



Engine Control Module (ECM)-ECCS Control Module

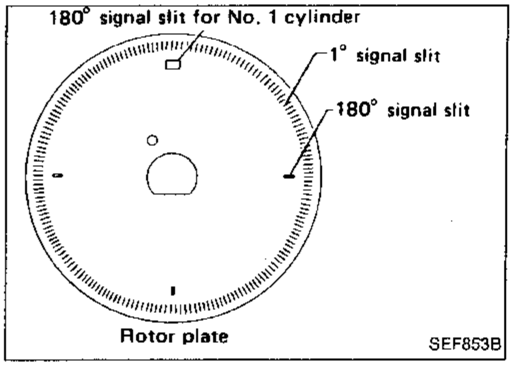
The ECM consists of a microcomputer, inspection lamp, a diagnostic test mode selector, and connectors for signal input and output and for power supply. The unit controls the engine.



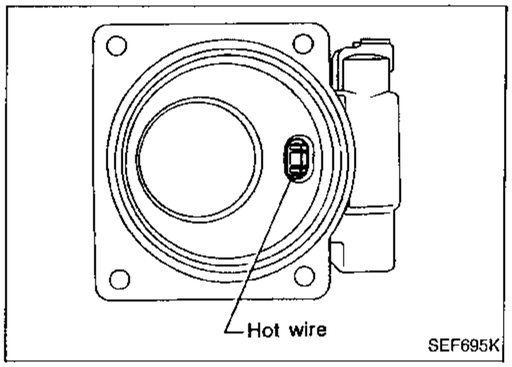
Camshaft Position Sensor (CMPS)

The camshaft position sensor is a basic component of the entire ECCS. It monitors engine speed and piston position, and sends signals to the ECM to control fuel injection, ignition timing and other functions.

The camshaft position sensor has a rotor plate and a wave-forming circuit. The rotor plate has 360 slits for 1° signal and 4 slits for 180° signal. Light Emitting Diodes (LED) and photo diodes are built in the wave-forming circuit.



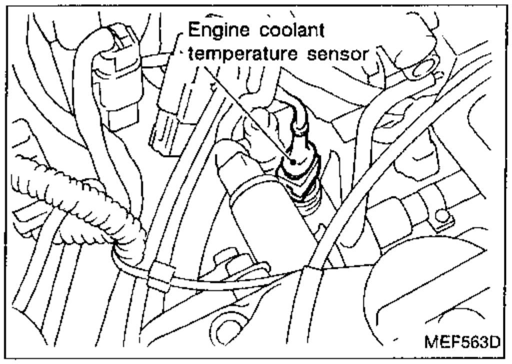
When the rotor plate passes between the LED and the photo diode, the slits in the rotor plate continually cut the light being transmitted to the photo diode from the LED. This generates rough-shaped pulses which are converted into on-off pulses by the wave-forming circuit, which are sent to the ECM.



Mass Air Flow Sensor (MAFS)

The mass air flow sensor measures the intake air flow rate by taking a part of the entire flow. Measurements are made in such a manner that the ECM receives electrical output signals varied by the amount of heat emitting from the hot wire placed in the stream of the intake air.

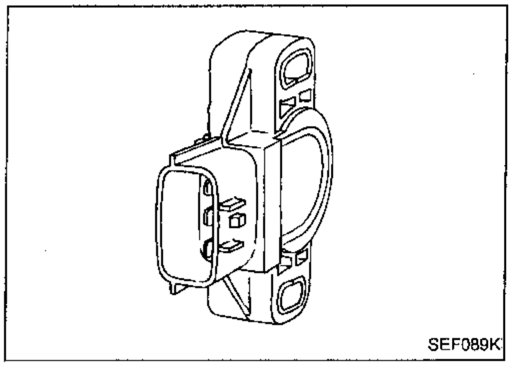
When intake air flows into the intake manifold through a route around the hot wire, the heat generated from the hot wire is taken away by the air. The amount of heat depends on the air flow. On the other hand, the temperature of the hot wire is automatically controlled to a certain number of degrees. Therefore, it is necessary to supply the hot wire with more electric current in order to maintain the temperature of the hot wire. The ECM knows the air flow by means of the electric change.



Engine Coolant Temperature Sensor (ECTS)

The engine coolant temperature sensor, located on the intake manifold, detects engine coolant temperature and transmits a signal to the ECM.

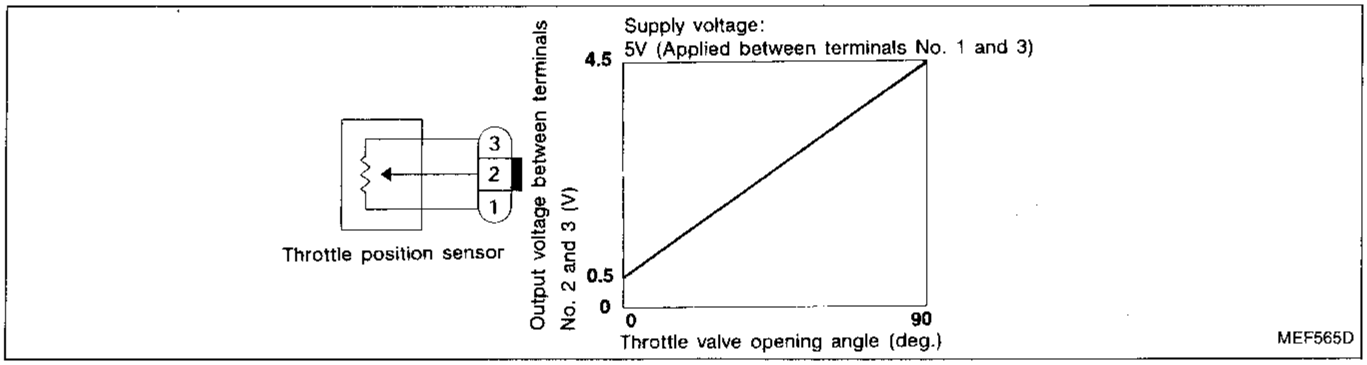
The temperature sensing unit employs a thermistor which is sensitive to the change in temperature. Electrical resistance of the thermistor decreases in response to the temperature rise.

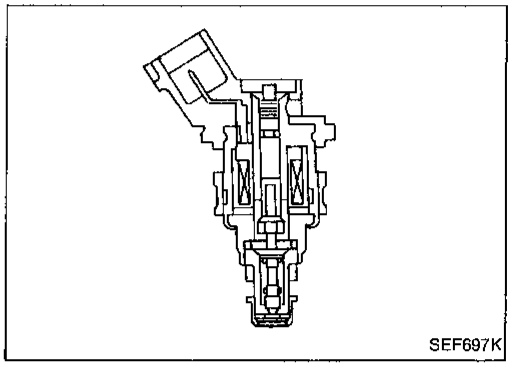


Throttle Position Sensor (TPS) & Soft Closed Throttle Position (CTP) Switch

The throttle position sensor responds to the accelerator pedal movement. This sensor is a kind of potentiometer which transforms the throttle position into output voltage, and emits the voltage signal to the ECM. In addition, the sensor detects the opening and closing speed of the throttle valve and feeds the voltage signal to the ECM.

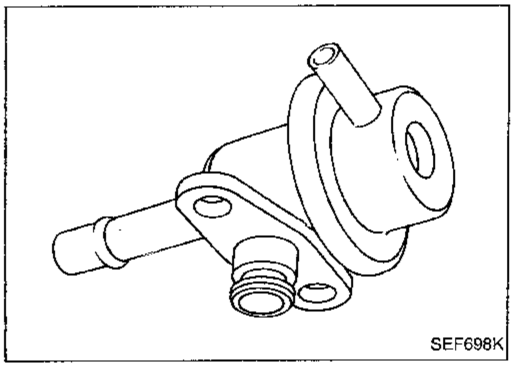
Idle position of the throttle valve is determined by the ECM receiving the signal from the throttle position sensor. This system is called "soft closed throttle position switch". This one controls engine operation such as fuel cut.





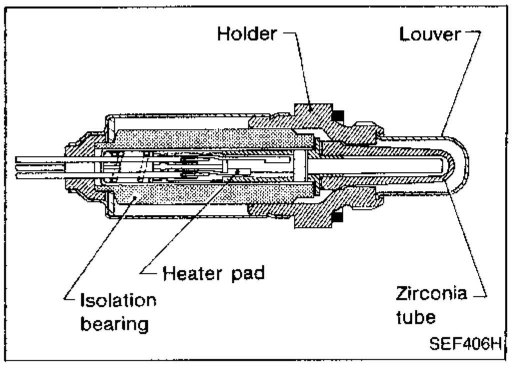
Fuel Injector

The fuel injector is a small, elaborate solenoid valve. As the ECM sends injection signals to the injector, the coil in the injector pulls the needle valve back and fuel is released into the intake manifold through the nozzle. The injected fuel is controlled by the ECM in terms of injection pulse duration.



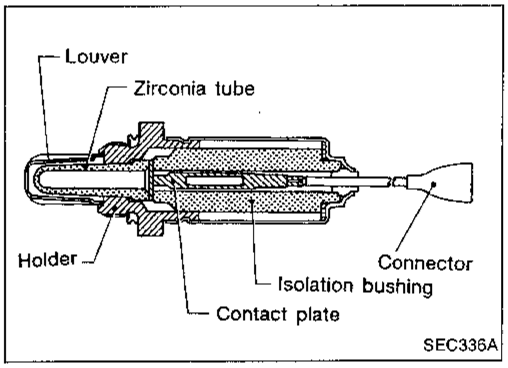
Pressure Regulator

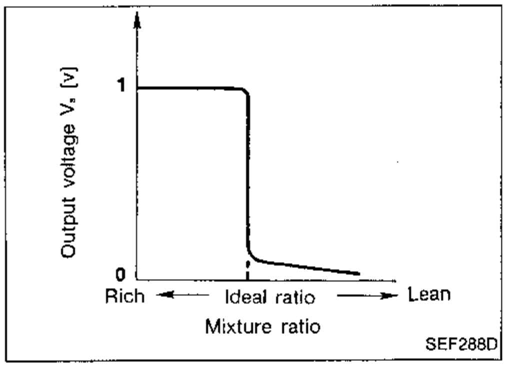
The pressure regulator maintains the fuel pressure at 299.1 kPa (3.05 kg/cm^2, 43.4 psi). Since the injected fuel amount depends on injection pulse duration, it is necessary to maintain the pressure at the above value.



Heated Oxygen Sensor (HO2S)

The heated oxygen sensor, which is placed into the exhaust outlet, monitors the amount of oxygen in the exhaust gas.
The sensor has a closed-end tube made of ceramic zirconia. The outer surface of the tube is exposed to exhaust gas, and the inner surface to atmosphere. The zirconia of the tube compares the oxygen density of exhaust gas with that of atmosphere, and generates electricity. In order to improve generating power of the zirconia, its tube is coated with platinum. The voltage is approximately 1V in a richer condition of the mixture ratio than the ideal air-fuel ratio, while approximately 0V in leaner conditions. The radical change from 1V to 0V occurs at around the ideal mixture ratio. In this way, the heated oxygen sensor detects the amount of oxygen in the exhaust gas and sends the signal of approximately 1V or 0V to the ECM. A heater is used to activate the sensor.

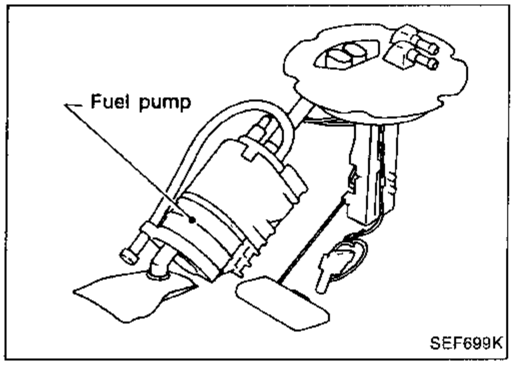




Oxygen Sensor (O2S) (Zirconia type)

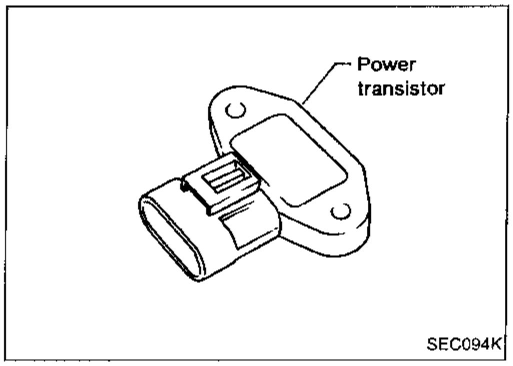
The oxygen sensor, which is placed into the exhaust manifold, monitors the amount of oxygen in the exhaust gas.
The sensor has a closed-end tube made of ceramic zirconia. The outer surface of the tube is exposed to exhaust gas, and the inner surface to atmosphere. The zirconia of the tube compares the oxygen density of exhaust gas with that of atmosphere, and generates electricity. In order to improve generating power of the zirconia, its tube is coated with platinum. The voltage is approximately 1V in a richer condition of the mixture ratio than the ideal air fuel ratio, while approximately 0V in leaner conditions. The radical change from 1V to 0V occurs at around the ideal mixture ratio. In this way, the oxygen sensor detects the amount of oxygen in the exhaust gas and sends the signal of approximately 1V or 0V to the ECM.

GI
MA
EM
LC
EF & EC
FE
CL
MT
AT
FA
RA
BR
ST
BF
HA
EL
IDX



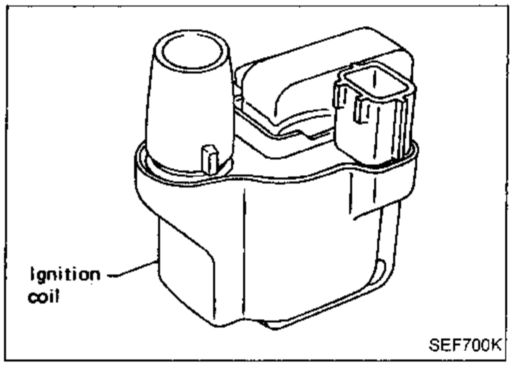
Fuel Pump

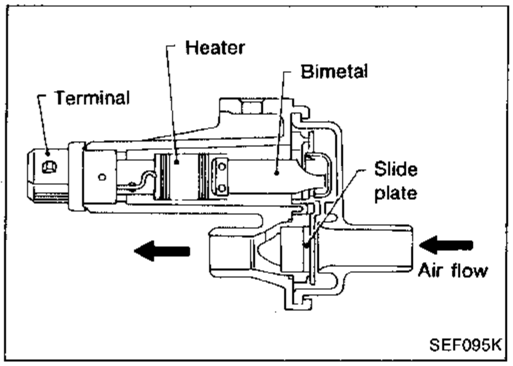
A turbine type design fuel pump is used and is situated in the fuel tank.



Power Transistor & Ignition Coil

The ignition signal from the ECM is amplified by the power transistor, which turns the ignition coil primary circuit on and off, inducing the proper high voltage in the secondary circuit. The ignition coil is a small, semi-molded type.

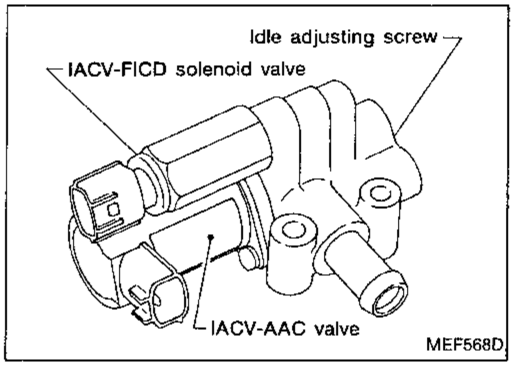




Idle Air Control Valve (IACV)-Air Regulator

The IACV-air regulator provides an air by-pass when the engine is cold for a fast idle during warm-up.

A bimetal, heater and rotary shutter are built into the IACV-air regulator. When the bimetal temperature is low, the air by-pass port opens. As the engine starts and electric current flows through a heater, the bimetal begins to turn the shutter to close the by-pass port. The air passage remains closed until the engine stops and the bimetal temperature drops.

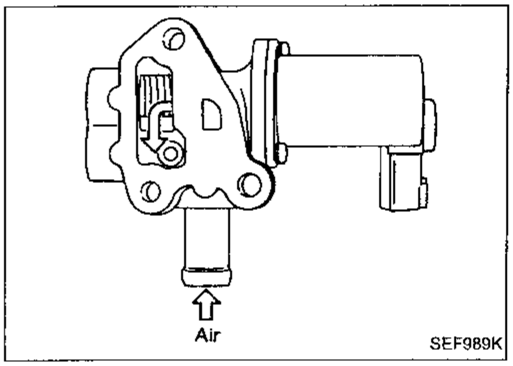


Idle Air Adjusting (IAA) Unit

The IAA unit is made up of the IACV-AAC valve, IACV-FICD solenoid valve and idle adjusting screw. It receives the signal from the ECM and controls the idle speed at the preset value.

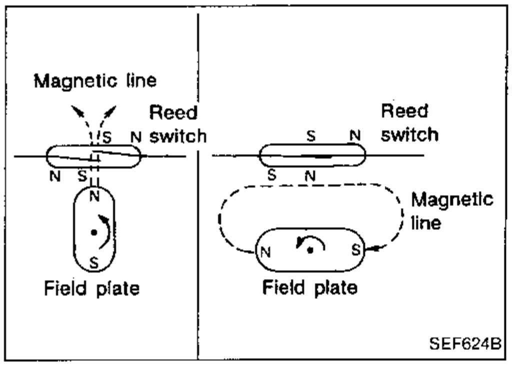
Idle Air Control Valve (IACV)-Fast Idle Control Device (FICD) Solenoid Valve

When air conditioner switch is on, additional air is supplied by the IACV-FICD solenoid valve.



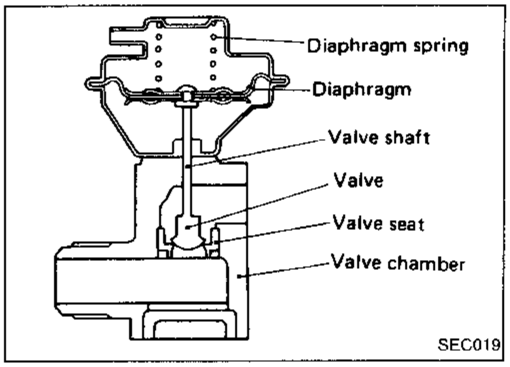
Idle Air Control Valve (IACV)-Auxiliary Air Control (AAC) Valve

The ECM actuates the IACV-AAC valve by an ON/OFF pulse. The longer that ON duty is left on, the larger the amount of air that will flow through the IACV-AAC valve.



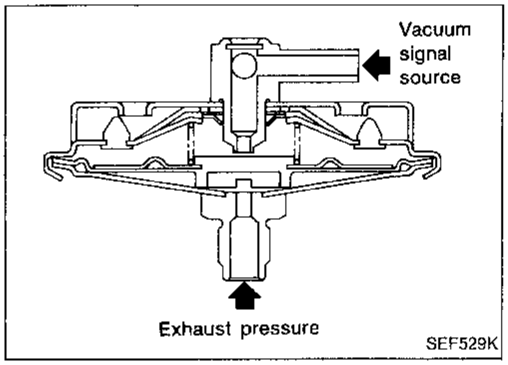
Vehicle Speed Sensor (VSS)

The vehicle speed sensor provides a vehicle speed signal to the ECM.
The speed sensor consists of a reed switch, which is installed in the speedometer unit and transforms vehicle speed into a pulse signal.



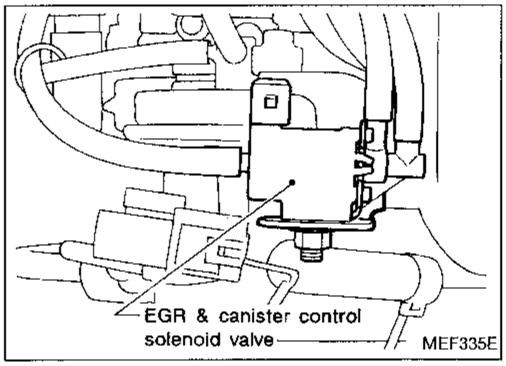
Exhaust Gas Recirculation (EGR) Valve

The EGR valve controls the quantity of exhaust gas to be led to the intake manifold through vertical movement of the taper valve connected to the diaphragm, to which vacuum is applied in response to the opening of the throttle valve.



EGR Control (EGRC)-BPT Valve

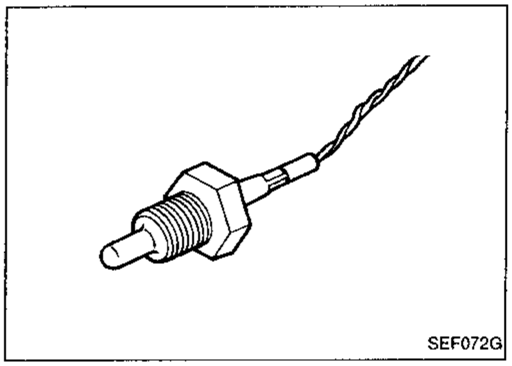
The EGRC-BPT valve monitors exhaust pressure to activate the diaphragm, controlling throttle body vacuum applied to the EGR valve. In other words, recirculated exhaust gas is controlled in response to positioning of the EGR valve or to engine operation.



Exhaust Gas Recirculation (EGR) & Canister Control Solenoid Valve

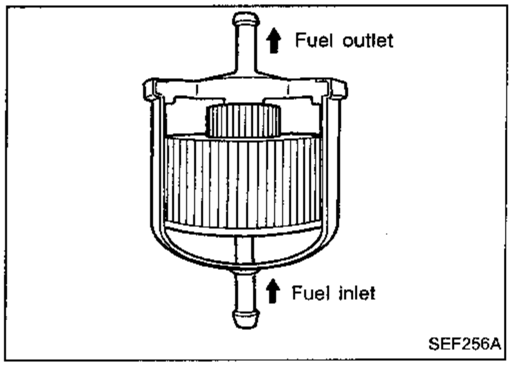
The EGR and canister systems are controlled only by the ECM. At both low- and high-speed revolutions of engine, the solenoid valve turns on and accordingly the EGR valve and canister cut the exhaust gas and fuel vapor leading to the intake manifold.

GI
MA
EM
LC
EF & EC
FE
CL
MT
AT
FA
RA
BR
ST
BF
HA
EL
IDX



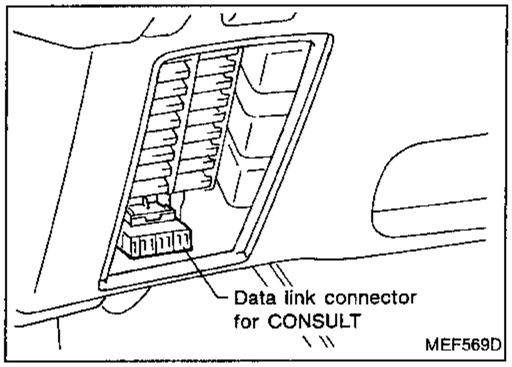
EGR Temperature Sensor

The EGR temperature sensor monitors in exhaust gas temperature and transmits a signal to the ECM. The temperature sensing unit employs a thermistor which is sensitive to the change in temperature. Electric resistance of the thermistor decreases in response to the temperature rise.



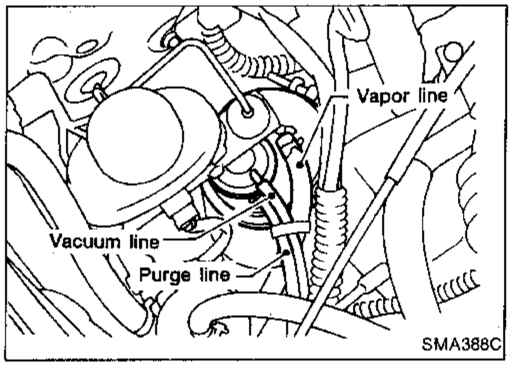
Fuel Filter

The specially designed fuel filter has a metal case in order to withstand high fuel pressure.



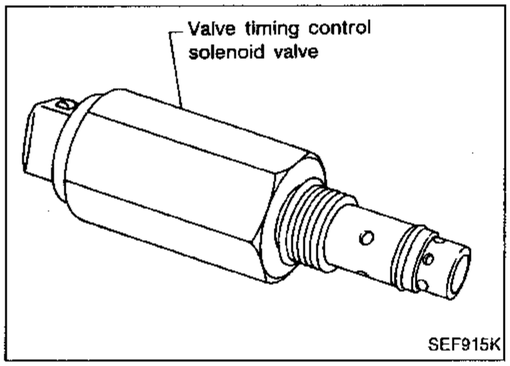
Data Link Connector For CONSULT

The data link connector for CONSULT is located behind the fuse box cover.



Activated Carbon Canister

The carbon canister is filled with active charcoal to absorb evaporative gases produced in the fuel tank. These absorbed gases are then delivered to the intake manifold by manifold vacuum for combustion purposes.

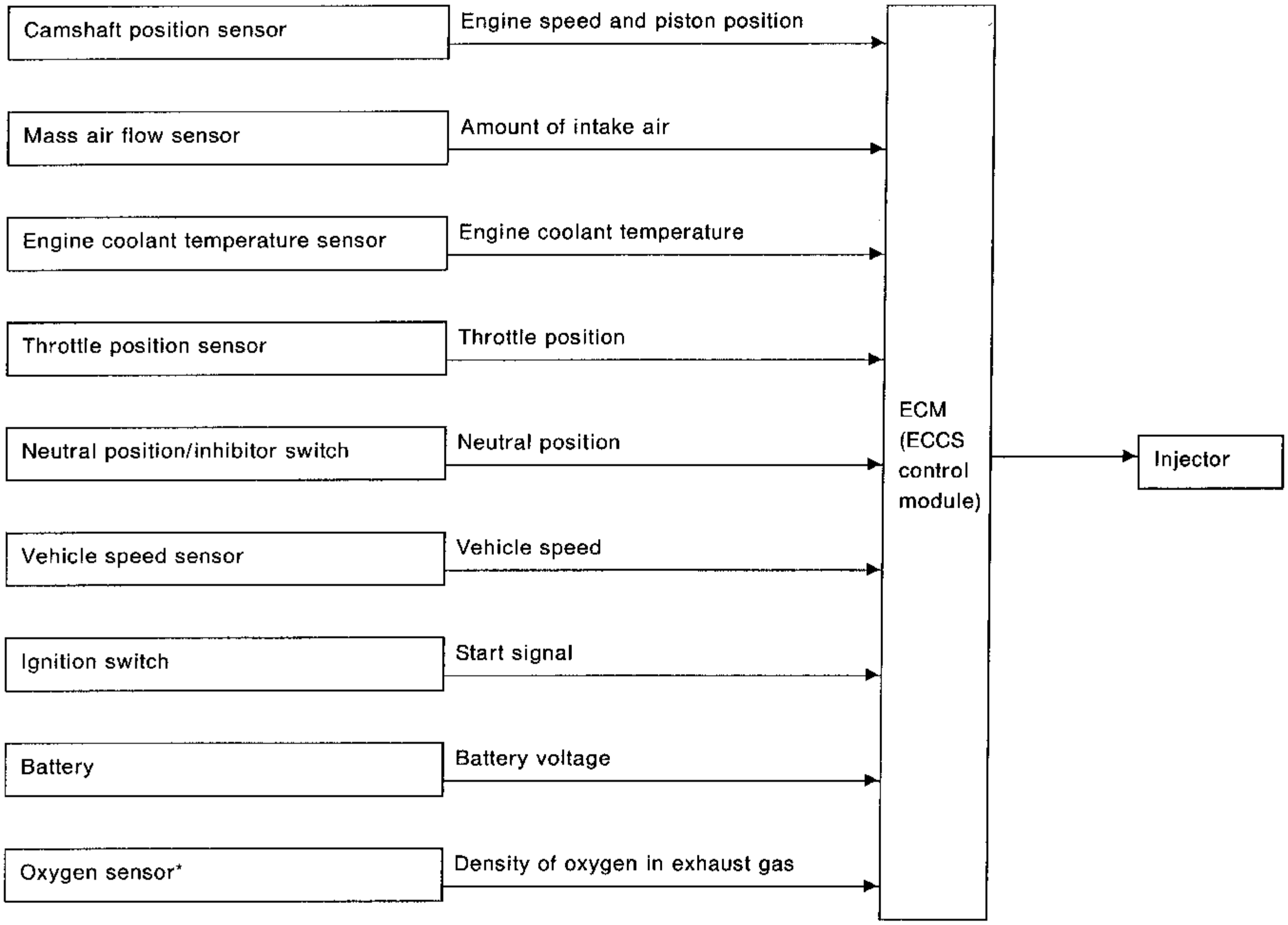


Valve Timing Control (VTC) Solenoid Valve

The valve timing control solenoid valve is installed on the cylinder head and controls oil pressure which regulates the position of the intake camshaft.

Multiport Fuel Injection (MFI) System

INPUT/OUTPUT SIGNAL LINE



*: Heated oxygen sensor (A/T models except for California)
Oxygen sensor (A/T models for California and M/T models)

BASIC MULTIPORT FUEL INJECTION SYSTEM

The amount of fuel injected from the fuel injector, or the length of time the valve remains open, is determined by the ECM. The basic amount of fuel injected is a program value mapped in the ECM memory. In other words, the program value is preset by engine operating conditions determined by input signals (for engine speed and air intake) from both the camshaft position sensor and the mass air flow sensor.

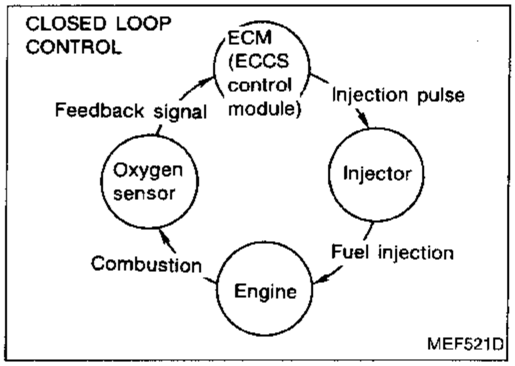
VARIOUS FUEL INJECTION INCREASE/DECREASE COMPENSATION

In addition, the amount of fuel injection is compensated for to improve engine performance under various operating conditions as listed below.

<Fuel increase>
1) During warm-up
2) When starting the engine
3) During acceleration
4) Hot-engine operation
5) When selector lever is changed from "N" to "D" (A/T models only)

<Fuel decrease>
1) During deceleration

Multiport Fuel Injection (MFI) System (Cont'd)



MIXTURE RATIO FEEDBACK CONTROL

Mixture ratio feedback system is designed to precisely control the mixture ratio to the stoichiometric point so that the three way catalyst can reduce CO, HC and NOx emissions. This system uses an oxygen sensor* in the exhaust manifold to check the air-fuel ratio. The ECM adjusts the injection pulse width according to the sensor voltage so the mixture ratio will be within the range of the stoichiometric air-fuel ratio.

This stage refers to the closed loop control condition. The open loop control condition refers to that under which the ECM detects any of the following conditions and feedback control stops in order to maintain stabilized fuel combustion.

1) Deceleration
2) High-load operation
3) Engine idling
4) Malfunction of oxygen sensor* or its circuit
5) Insufficient activation of oxygen sensor at low engine coolant temperature.
6) Engine starting
7) Hot-engine operation
8) When all of the following conditions are met:

- Ignition switch "ON"
- Soft closed throttle position switch "ON"
- Neutral position switch "OFF"
- Engine running at idle speed
- Vehicle running at slow speed

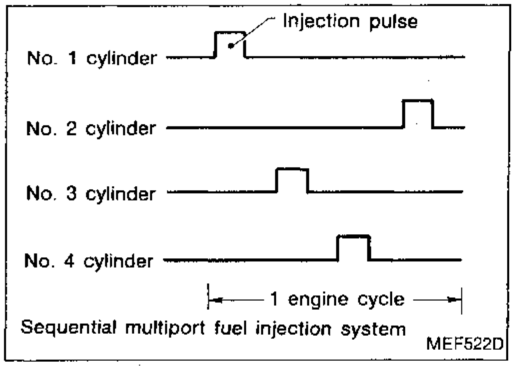
MIXTURE RATIO SELF-LEARNING CONTROL

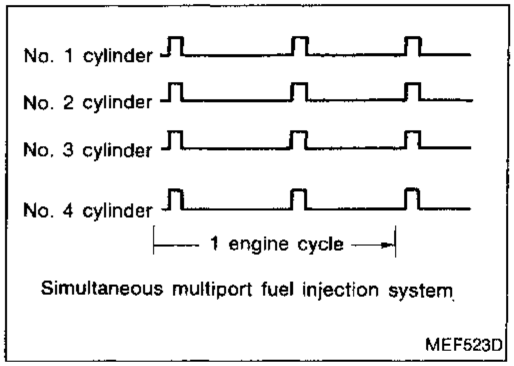
The mixture ratio feedback control system monitors the mixture ratio signal transmitted from the oxygen sensor*. This feedback signal is then sent to the ECM to control the amount of fuel injection to provide a basic mixture ratio as close to the theoretical mixture ratio as possible. However, the basic mixture ratio is not necessarily controlled as originally designed. This is due to manufacturing errors (e.g., mass air flow sensor hot wire) and changes during operation (injector clogging, etc.) of ECCS parts which directly affect the mixture ratio.

Accordingly, a difference between the basic and theoretical mixture ratios is quantitatively monitored in this system. It is then computed in terms of "fuel injection duration" to automatically compensate for the difference between the two ratios.

*: Heated oxygen sensor (A/T models except for California)
Oxygen sensor (A/T models for California and M/T models)

Multiport Fuel Injection (MFI) System (Cont'd)





FUEL INJECTION TIMING

Two types of fuel injection systems are used — simultaneous multiport fuel injection system and sequential multiport fuel injection system. In the former, fuel is injected into all four cylinders simultaneously twice each engine cycle.

In other words, pulse signals of the same width are simultaneously transmitted from the ECM to the four injectors two times for each engine cycle.

In the sequential multiport fuel injection system, fuel is injected into each cylinder during each engine cycle according to the firing order.

When the engine is being started and/or if the fail-safe system (CPU of ECM) is operating, simultaneous multiport fuel injection system is used.

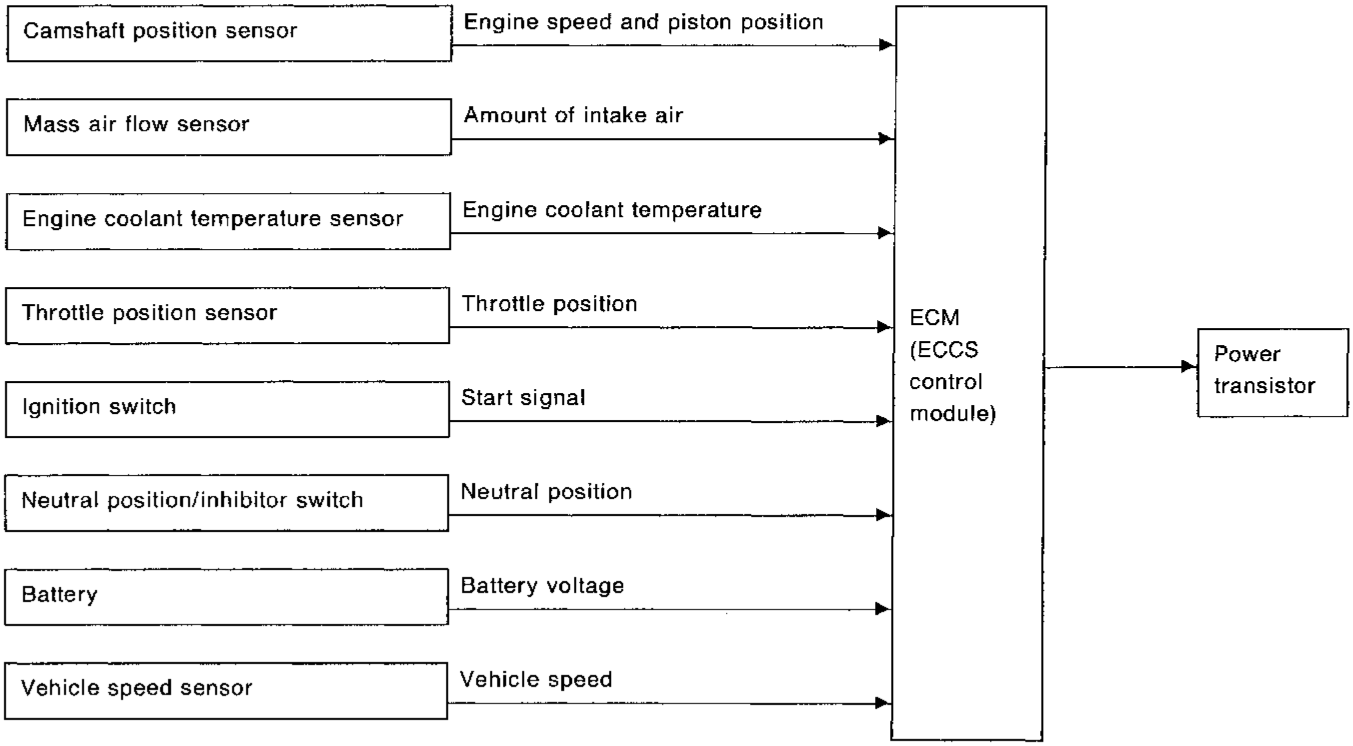
When the engine is running sequential multiport fuel injection system is used.

FUEL SHUT-OFF

Fuel to each cylinder is cut off during deceleration or operation of the engine at excessively high speeds.

Distributor Ignition (DI) System

INPUT/OUTPUT SIGNAL LINE



GI
MA
EM
LC
EF & EC
FE
CL
MT
AT
FA
RA
BR
ST
BF
HA
EL
IDX

Distributor Ignition (DI) System (Cont'd)

SYSTEM DESCRIPTION

The ignition timing is controlled by the ECM in order to maintain the best air-fuel ratio in response to every running condition of the engine.

The ignition timing data is stored in the ECM located in the ECM, in the form of the map shown below.

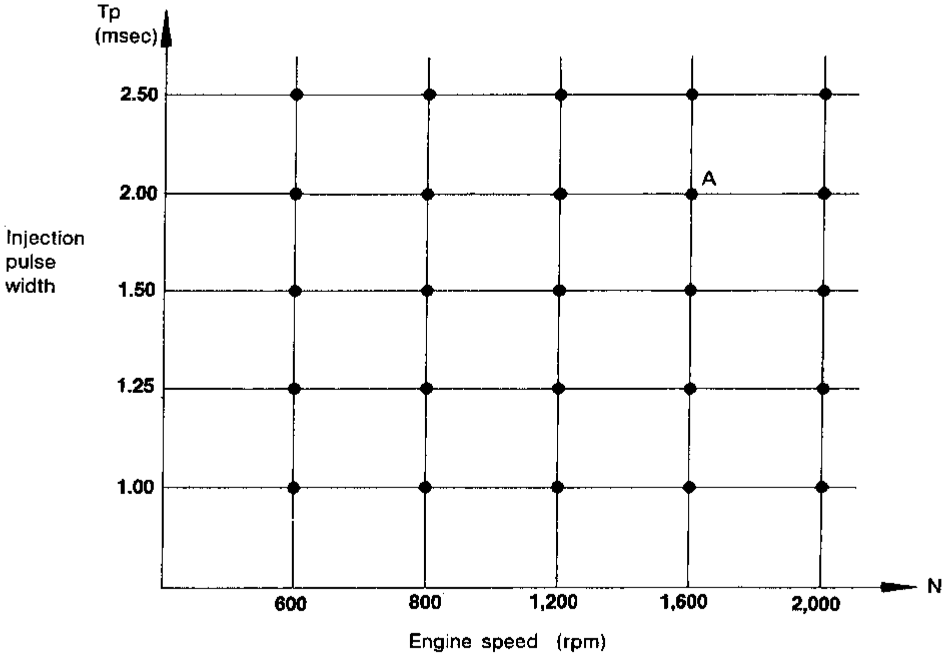
The ECM detects information such as the injection pulse width and camshaft position sensor signal which varies every moment. Then responding to this information, ignition signals are transmitted to the power transistor.

e.g. N: 1,600 rpm, Tp: 2.00 msec.
A °BTDC

In addition to this,

1) At starting
2) During warm-up
3) At idle
4) At low battery voltage
5) At acceleration
6) Hot-engine operation
7) During high-load operation (VTC on)

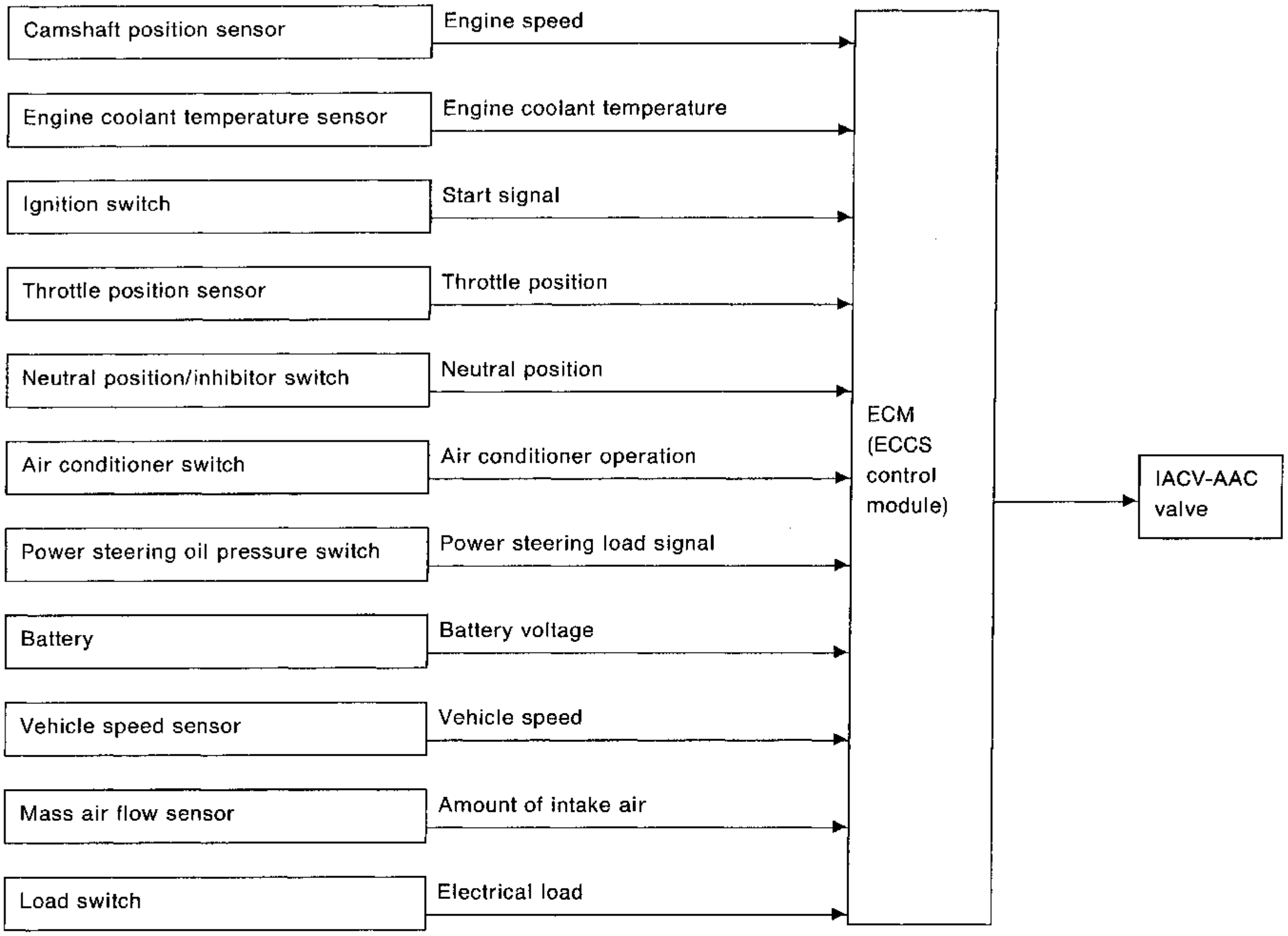
the ignition timing is revised by the ECM according to the other data stored in the ECM.



SEC986K

Idle Air Control (IAC) System

INPUT/OUTPUT SIGNAL LINE

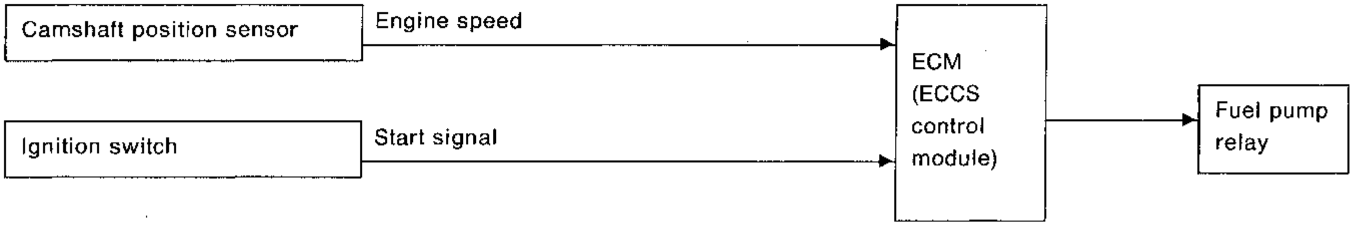


SYSTEM DESCRIPTION

This system automatically controls engine idle speed to a specified level. Idle speed is controlled through fine adjustment of the amount of air which by-passes the throttle valve via IACV-AAC valve. The IACV-AAC valve repeats ON/OFF operation every 6.4 msec. according to the signal sent from the ECM. The camshaft position sensor detects the actual engine speed and sends a signal to the ECM. The ECM then controls the ON/OFF time of the IACV-AAC valve so that engine speed coincides with the target value memorized in ECM. The target engine speed is the lowest speed at which the engine can operate steadily. The optimum value stored in the ECM is determined by taking into consideration various engine conditions, such as warming up and engine load (air conditioner, electrical load).

Fuel Pump Control

INPUT/OUTPUT SIGNAL LINE



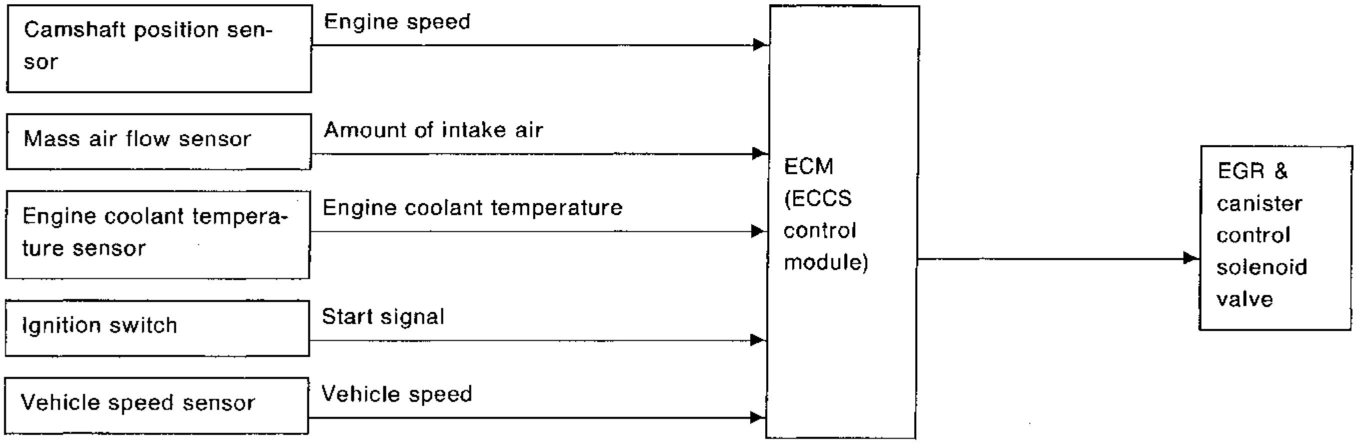
SYSTEM DESCRIPTION

The ECM activates the fuel pump for 5 seconds after the ignition switch is turned on to improve engine startability. If the ECM receives a 180° signal from the camshaft position sensor, it knows that the engine is rotating, and causes the pump to perform. If the 180° signal is not received when the ignition switch is on, the engine stalls. The ECM stops pump operation and prevents battery discharging, thereby improving safety. The ECM does not directly drive the fuel pump. It controls the ON/OFF fuel pump relay, which in turn controls the fuel pump.

Condition	Fuel pump operation
Ignition switch is turned to ON.	Operates for 5 seconds
Engine running and cranking	Operates
When engine is stopped	Stops in 1 second
Except as shown above	Stops

Exhaust Gas Recirculation (EGR) & Canister Control

INPUT/OUTPUT SIGNAL LINE



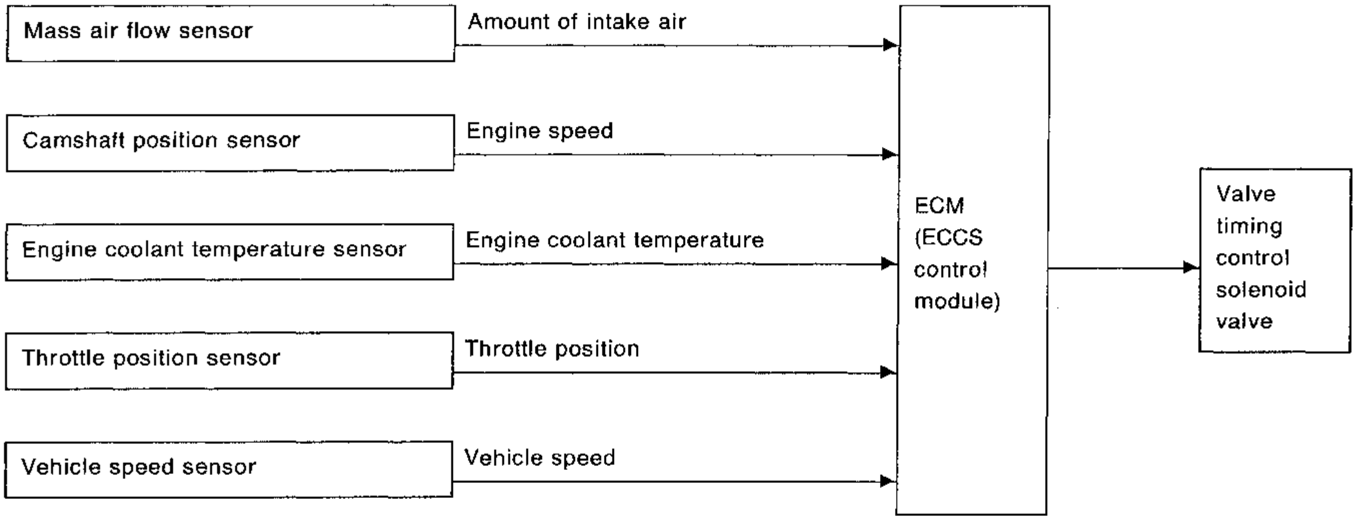
SYSTEM DESCRIPTION

In addition, a system is provided which precisely cuts and controls port vacuum applied to the EGR and canister to suit engine operating conditions. This cut-and-control operation is accomplished through the ECM. When the ECM detects any of the following conditions, current flows through the solenoid valve in the EGR and canister control vacuum line. This causes the port vacuum to be discharged into the atmosphere so that the EGR valve and canister remain closed.

1) During warm-up
2) Engine starting
3) High-speed engine operation
4) Engine idling
5) Excessively high engine coolant temperature
6) Mass air flow sensor malfunction

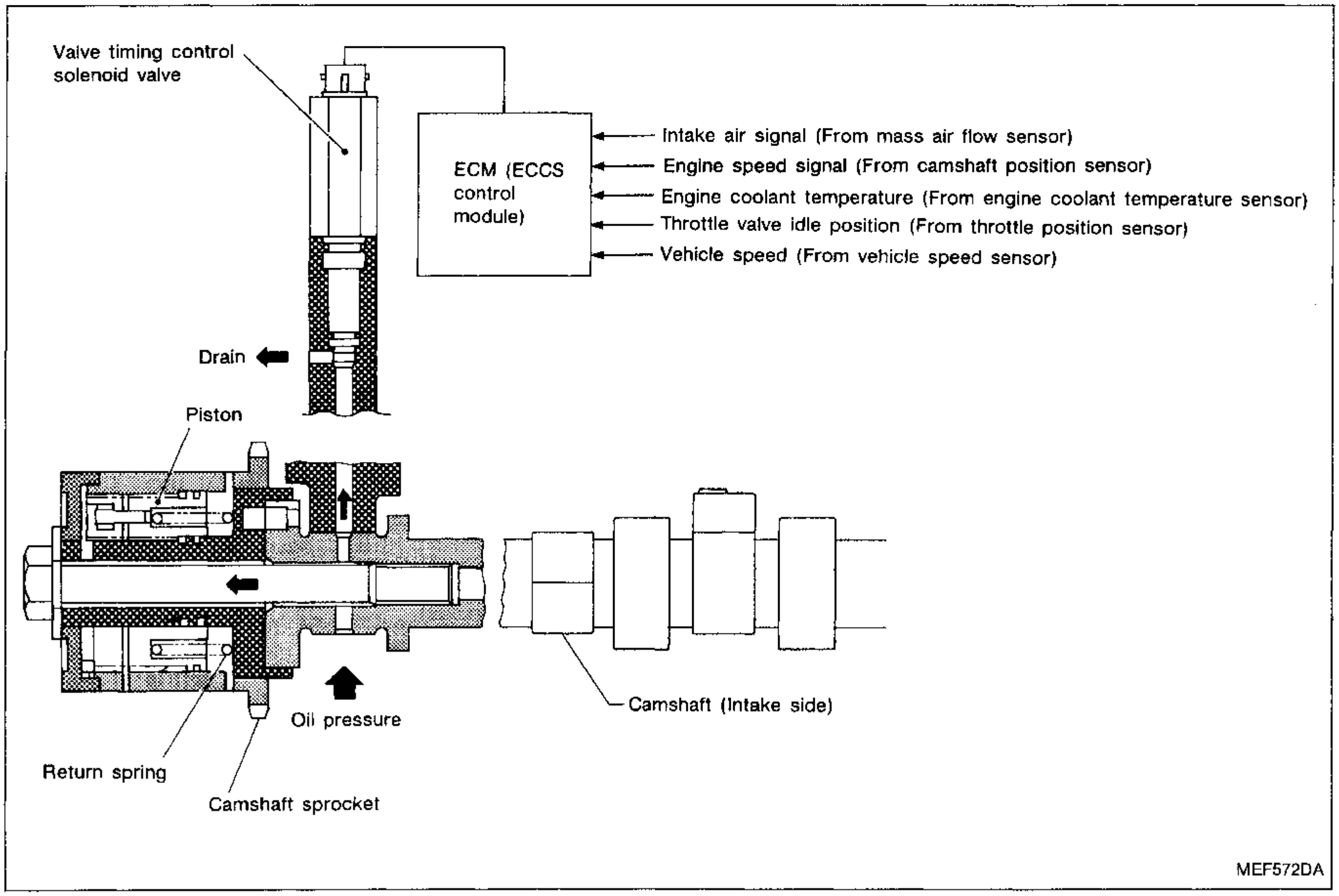
Valve Timing Control (VTC)

INPUT/OUTPUT SIGNAL LINE



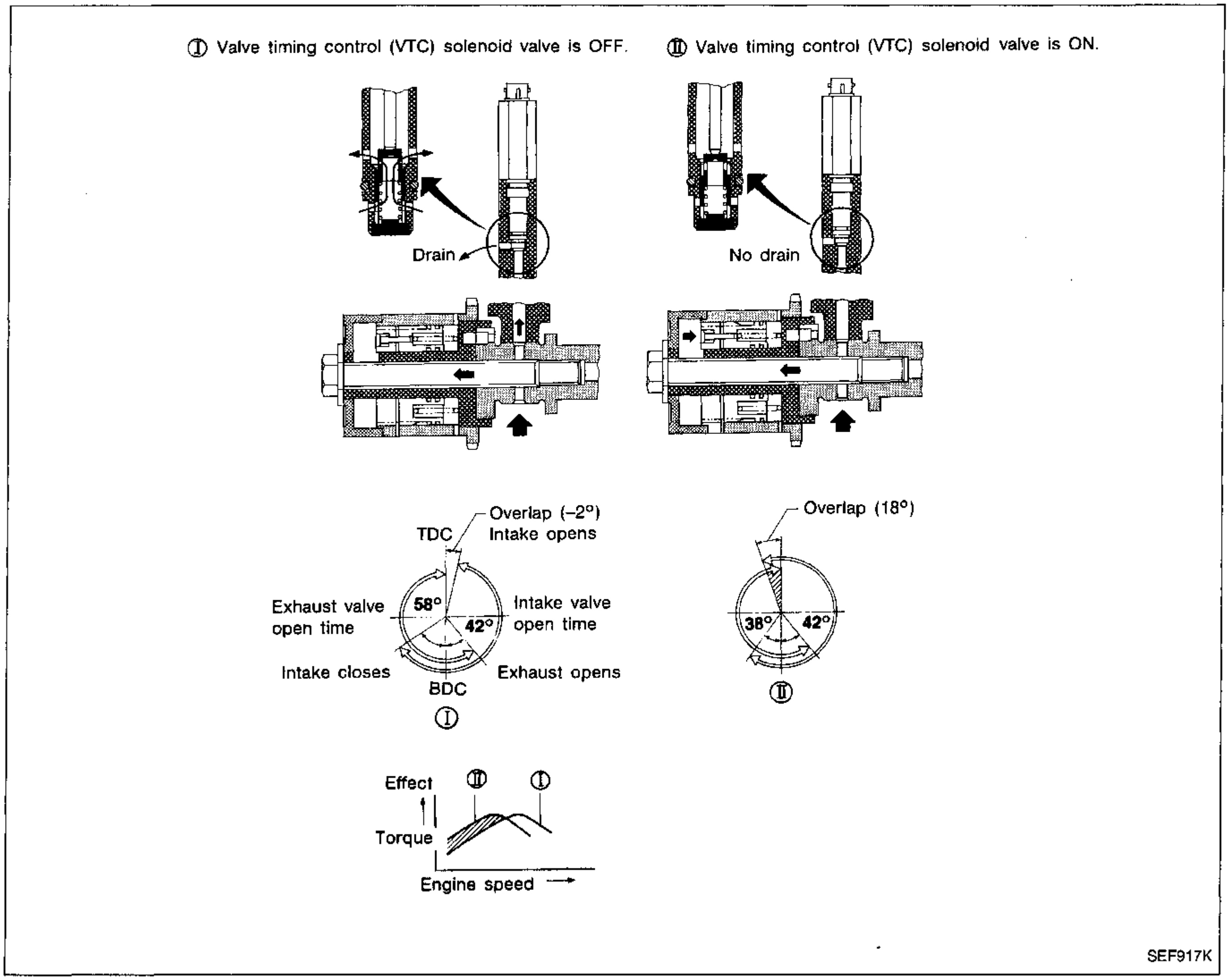
SYSTEM DESCRIPTION

The valve timing control system is utilized to increase engine performance. Intake valve opening and closing time is controlled, according to the engine operating conditions, by the ECM.
Engine coolant temperature signals, engine speed, amount of intake air, throttle position, vehicle speed and gear position are used to determine intake valve timing.
The intake camshaft pulley position is regulated by oil pressure, which is controlled by the valve timing control solenoid valve.



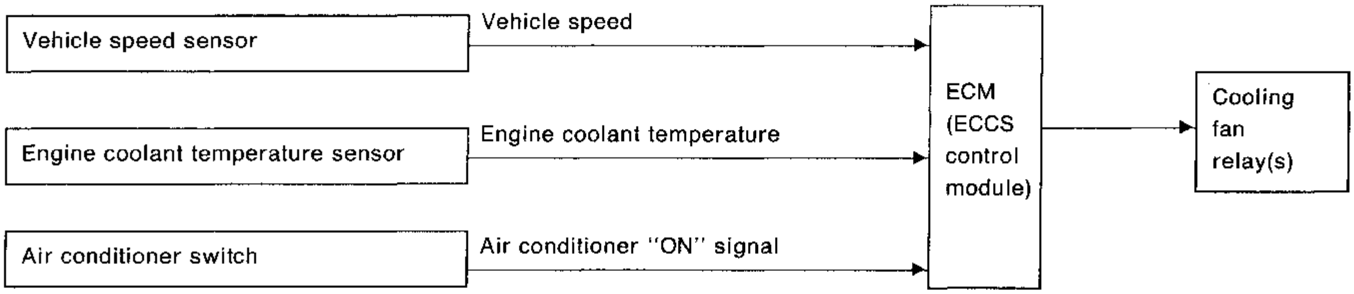
OPERATION

Engine operating condition	Valve timing control solenoid valve	Intake valve opening and closing time	Valve overlap	Engine torque curve
● Vehicle is running. ● Engine coolant temperature is 70°C (158°F) or more. ● Engine load is high. ● Engine speed is between 1,500 rpm and 4,300 rpm.	ON	Advance	Increased	(II)
● Engine speed is 6,600 rpm or more.				
Those other than above	OFF	Normal	Normal	(I)



Cooling Fan Control

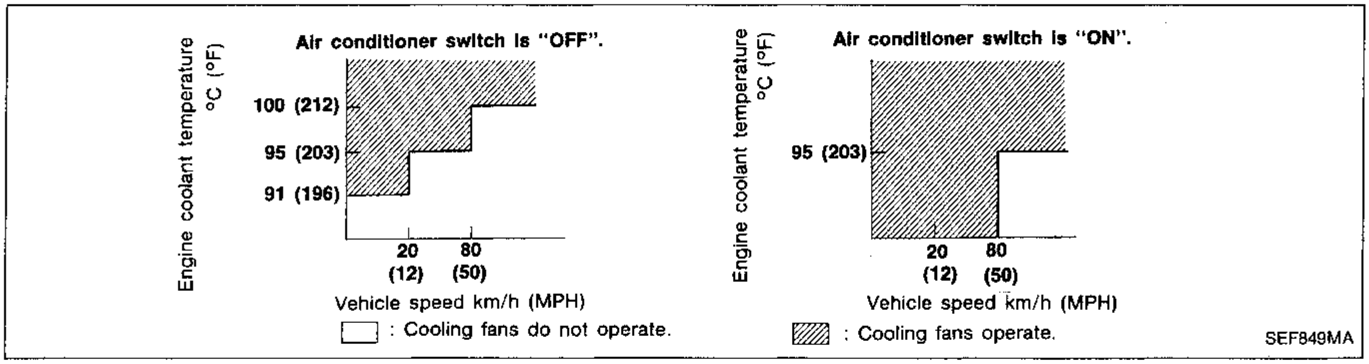
INPUT/OUTPUT SIGNAL LINE



EXCEPT A/T MODELS FOR U.S.A.

The ECM controls the cooling fan corresponding to the vehicle speed, engine coolant temperature, and air conditioner ON signal. The control system has 2-step control [ON/OFF].

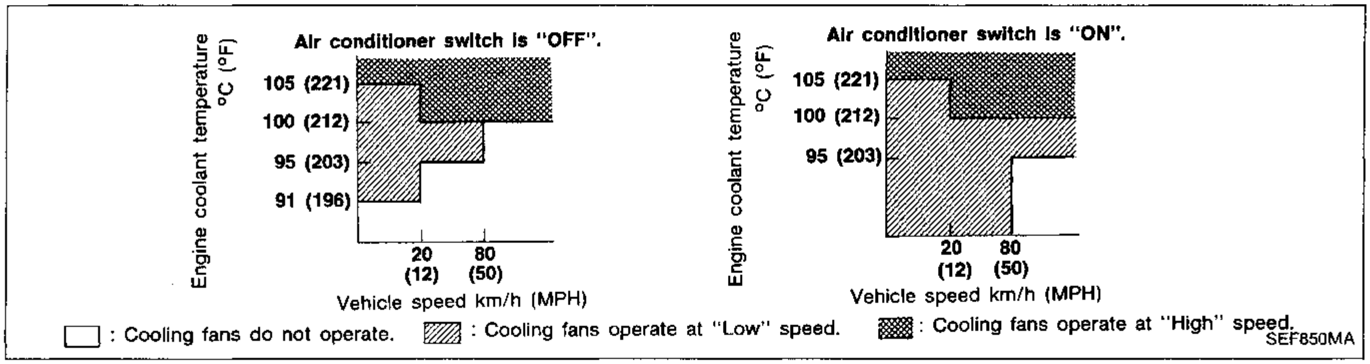
Operation



A/T MODELS FOR U.S.A.

The ECM controls the cooling fan corresponding to the vehicle speed, engine coolant temperature, and air conditioner ON signal. The control system has 3-step control [HIGH/LOW/OFF].

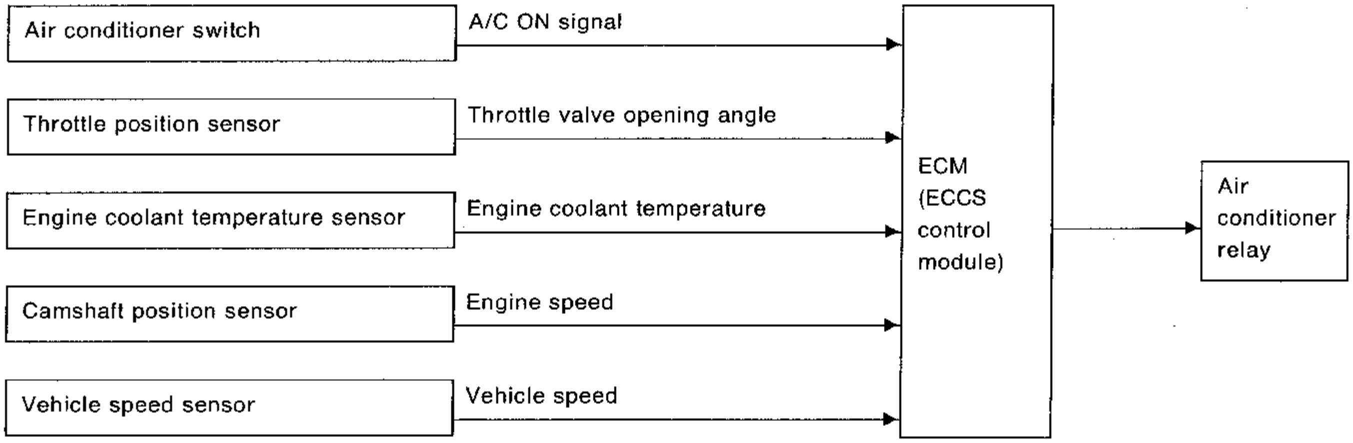
Operation



GI MA EM LC EF & EC FE CL MT AT FA RA BR ST BF HA EL IDX

Air Conditioner Cut Control During Acceleration

INPUT/OUTPUT SIGNAL LINE

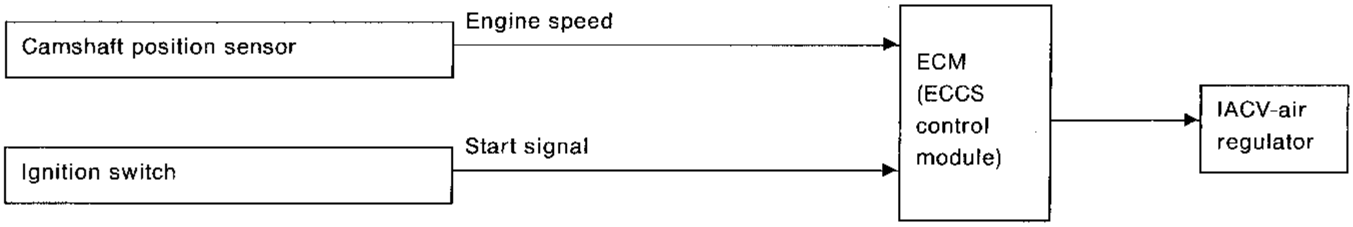


SYSTEM DESCRIPTION

When the accelerator pedal is fully depressed or engine coolant temperature is extremely high, the air conditioner is turned off for a few seconds. This system improves acceleration when the air conditioner is used.

Idle Air Control Valve (IACV)-Air Regulator Control

INPUT/OUTPUT SIGNAL LINE



SYSTEM DESCRIPTION

The IACV-air regulator is controlled by the ECM at the same time as fuel pump ON-OFF control.

Condition	IACV-air regulator operation
Ignition switch is turned to ON	Operates for 5 seconds
While engine is running and cranking	Operates
When engine is stopped	OFF in 1 second
Except as shown above	OFF

Fail-safe System

CPU MALFUNCTION OF ECM

Outline

The fail-safe system makes engine starting possible if there is something malfunctioning in the ECM's CPU circuit. In former models, engine starting was difficult under the conditions mentioned above. But with the provisions provided in this fail-safe system, it is possible to start the engine.

Fail-safe system activating condition when ECM is malfunctioning

The computing function of the ECM was judged to be malfunctioning.
When the fail-safe system activates, i.e. if the ECM detects a malfunction condition in the CPU of ECM, the MALFUNCTION INDICATOR LAMP on the instrument panel lights to warn the driver.

Engine control, with fail-safe system, operates when ECM is malfunctioning

When the fail-safe system is operating, fuel injection, ignition timing, fuel pump operation, IACV-AAC valve operation and cooling fan operation are controlled under certain limitations.

Operation

	Operation
Fuel injection	Simultaneous multiport fuel injection system
Ignition timing	Ignition timing is fixed at the preset value.
Fuel pump	Fuel pump relay is "ON" when engine is running and "OFF" when engine stalls.
IACV-AAC valve	Full open
Cooling fans	Cooling fan relay "ON"

Cancellation of fail-safe system when ECM is malfunctioning

Activation of the fail-safe system is canceled each time the ignition switch is turned OFF. The system is reactivated if all of the above-mentioned activating conditions are satisfied after turning the ignition switch from OFF to ON.

MASS AIR FLOW SENSOR MALFUNCTION

If the mass air flow sensor output voltage is above or below the specified value, the ECM senses an mass air flow sensor malfunction. In case of a malfunction, the throttle position sensor substitutes for the mass air flow sensor.
Though mass air flow sensor is malfunctioning, it is possible to drive the vehicle and start the engine. But engine speed will not rise more than 2,400 rpm in order to inform the driver of fail-safe system operation while driving.

Operation

Engine condition	Starter switch	Fail-safe system	Fail-safe functioning
Stopped	ANY	Does not operate	—
Cranking	ON	Operates	Engine will be started by a pre-determined injection pulse on ECM.
Running	OFF		Engine speed will not rise above 2,400 rpm

Fail-safe System (Cont'd)

ENGINE COOLANT TEMPERATURE SENSOR MALFUNCTION

When engine coolant temperature sensor output voltage is below or above the specified value, water temperature is fixed at the preset value as follows:

Operation

Condition	Engine coolant temperature decided
Just as ignition switch is turned ON or Start	40°C (104°F)
More than 4 minutes after ignition ON or Start	80°C (176°F)
Except as shown above	40 - 80°C (104 - 176°F) (Depends on the time)

THROTTLE POSITION SENSOR MALFUNCTION

Description

When the output signal of throttle position sensor is abnormal the ECM judges it as a malfunctioning of throttle position sensor.

The ECM does not use the throttle position sensor signal, but judges the idle position by the amount of fuel injected and the engine speed.

Operation

	Driving condition
When engine is idling	Normal
When accelerating	Poor acceleration

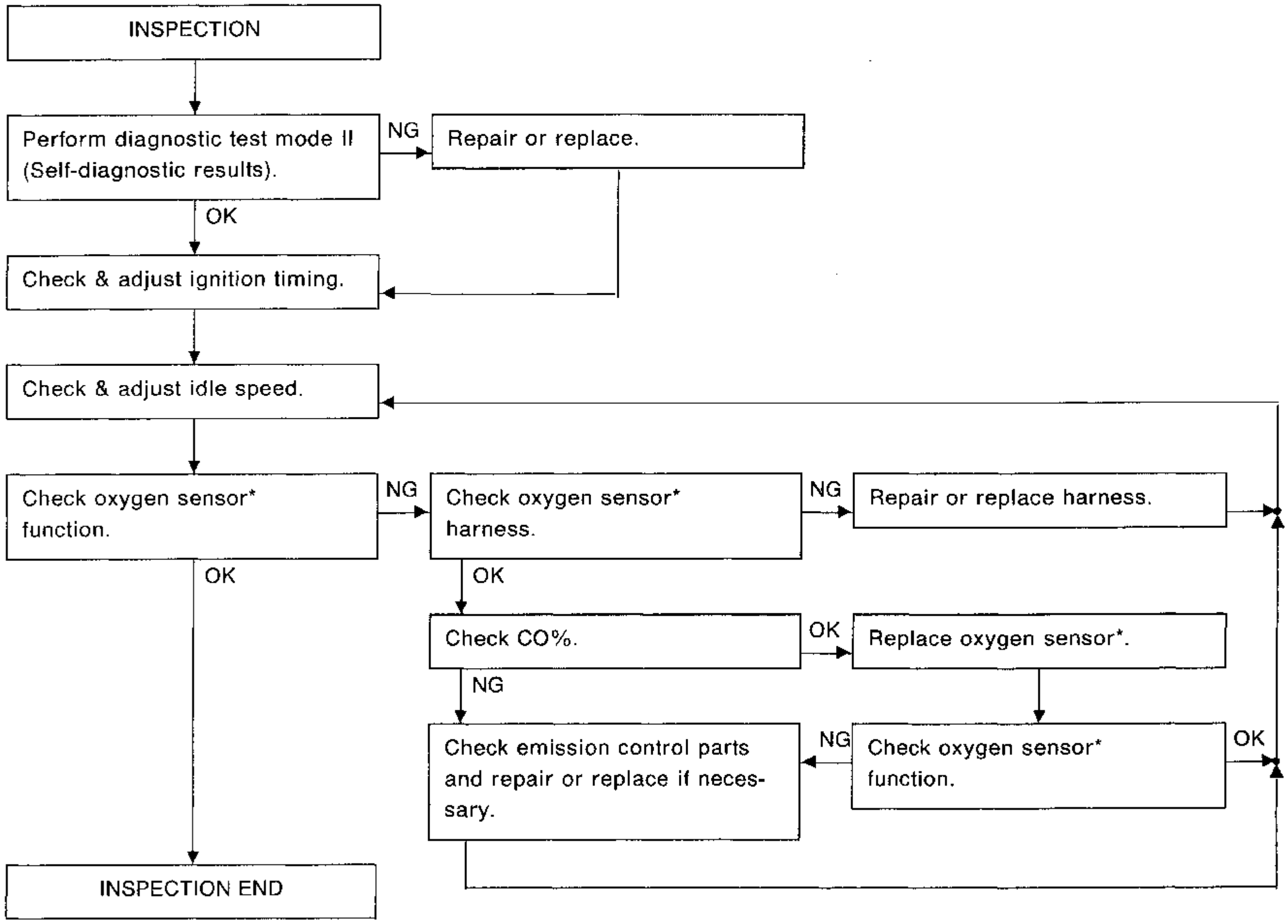
IDLE SPEED/IGNITION TIMING/IDLE MIXTURE RATIO INSPECTION

PREPARATION

1. Make sure that the following parts are in good order.
- Battery
- Ignition system
- Engine oil and coolant levels
- Fuses
- ECM harness connector
- Vacuum hoses
- Air intake system
  (Oil filler cap, oil level gauge, etc.)
- Fuel pressure
- Engine compression
- Throttle valve

2. On air conditioner equipped models, checks should be carried out while the air conditioner is "OFF".
3. On automatic transaxle equipped models, when checking idle rpm, ignition timing and mixture ratio, checks should be carried out while shift lever is in "N" position.
4. When measuring "CO" percentage, insert probe more than 40 cm (15.7 in) into tail pipe.
5. Turn off headlamps, heater blower, rear defogger.
6. Keep front wheels pointed straight ahead.
7. Make the check after the cooling fan has stopped.

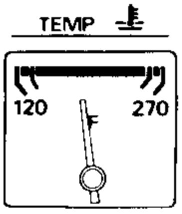
Overall inspection sequence



*: Heated oxygen sensor (A/T models except for California)
Oxygen sensor (A/T models for California and M/T models)

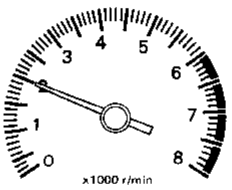
START

Visually check the following:
- Air cleaner clogging
- Hoses and ducts for leaks
- EGR valve operation
- Electrical connectors
- Gasket
- Throttle valve and throttle position sensor operation



SEF246F

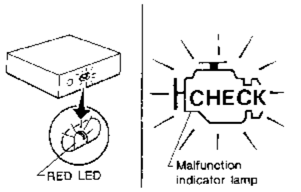
Start engine and warm it up until water temperature indicator points to the middle of gauge. Ensure engine stays below 1,000 rpm.



SEF247F

Open engine hood and run engine at about 2,000 rpm for about 2 minutes under no-load.

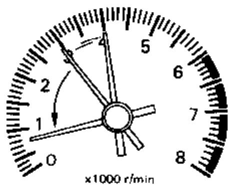
Perform diagnostic test mode II (Self-diagnostic results).



MEF377DA

OK / NG

NG: Repair or replace components as necessary.



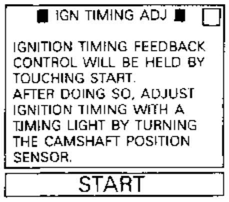
SEF248F

Run engine at about 2,000 rpm for about 2 minutes under no-load.
Race engine two or three times under no-load, then run engine at idle speed.

1) Select "IGN TIMING ADJ" in "WORK SUPPORT" mode.
2) Touch "START".

OR

1) Turn off engine and disconnect throttle position sensor harness connector.
2) Start engine.

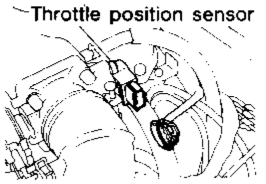


■ IGN TIMING ADJ ■ ☐

IGNITION TIMING FEEDBACK CONTROL WILL BE HELD BY TOUCHING START.
AFTER DOING SO, ADJUST IGNITION TIMING WITH A TIMING LIGHT BY TURNING THE CAMSHAFT POSITION SENSOR.

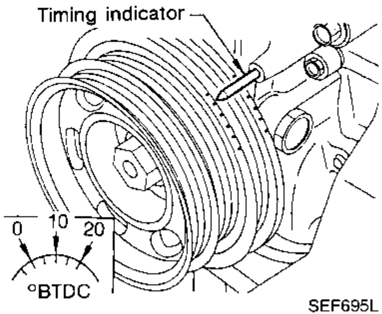
START

SEF479N



MEF633D

Race engine (2,000 - 3,000 rpm) 2 or 3 times under no-load and then run engine at idle speed.



SEF695L

Check ignition timing with a timing light.

10°±2° BTDC (in "N" position)

OK → Ⓐ

NG → Ⓘ

IDLE SPEED/IGNITION TIMING/IDLE MIXTURE RATIO INSPECTION

Ⓐ

Ⓘ

Adjust ignition timing to the specified value by turning distributor after loosing bolts which secure distributor.

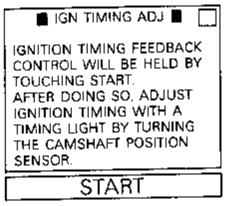
10°±2° BTDC (in "N" position)

Ⓔ

1) Select "IGN TIMING ADJ" in "WORK SUPPORT" mode.
2) Touch "START".

OR

1) Turn off engine and disconnect throttle position sensor harness connector.
2) Start engine.

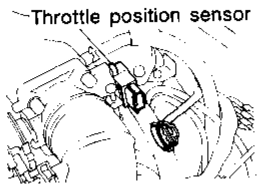


■ IGN TIMING ADJ ■ ☐

IGNITION TIMING FEEDBACK CONTROL WILL BE HELD BY TOUCHING START. AFTER DOING SO, ADJUST IGNITION TIMING WITH A TIMING LIGHT BY TURNING THE CAMSHAFT POSITION SENSOR.

START

SEF479N



MEF633D

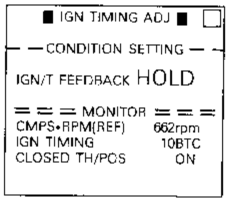
Check idle speed.

- Read idle speed in "IGN TIMING ADJ" in "WORK SUPPORT" mode.

OR

- Check idle speed.

M/T: 600±50 rpm
A/T: 725±50 rpm (in "N" position)



■ IGN TIMING ADJ ■ ☐

— CONDITION SETTING —

IGN/T FEEDBACK HOLD

═══ MONITOR ═══

CMPS•RPM(REF)	662rpm
IGN TIMING	10BTC
CLOSED TH/POS	ON

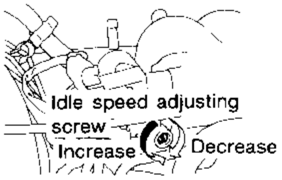
SEF480N

OK / NG

Race engine (2,000 - 3,000 rpm) 2 or 3 times under no-load and run engine at idle speed.

Adjust idle speed by turning idle speed adjusting screw.

M/T: 600±50 rpm
A/T: 725±50 rpm (in "N" position)

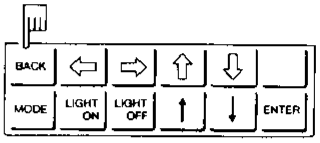


SEF705K

1) Touch "BACK".

OR

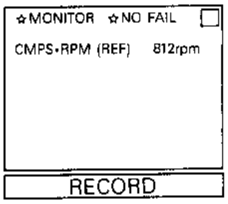
1) Turn off engine and connect throttle position sensor harness connector.
2) Start engine.



SEF913J

Race engine (2,000 - 3,000 rpm) 2 or 3 times under no-load and run engine at idle speed.

Ⓙ

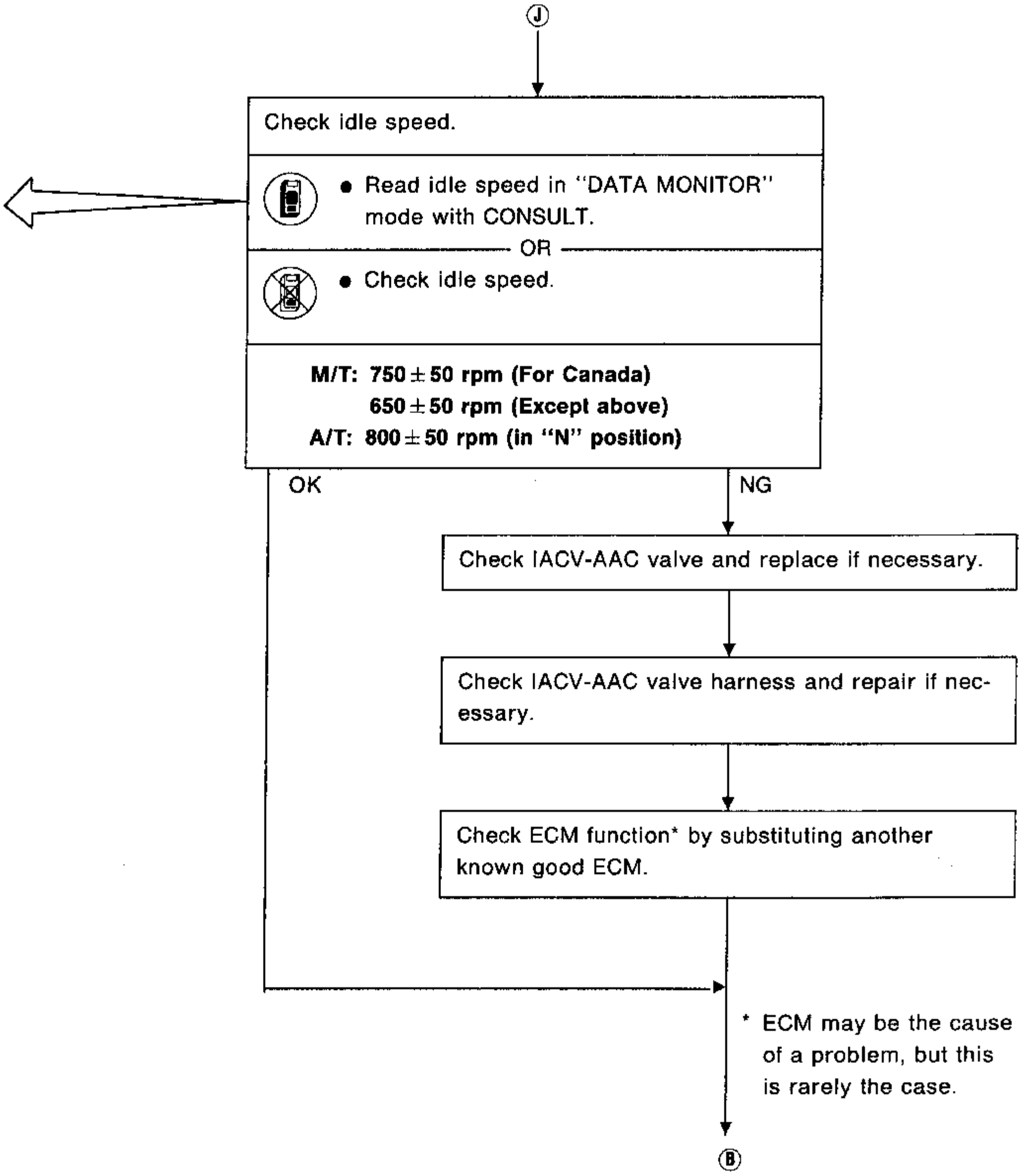


★MONITOR ★NO FAIL ☐

CMPS·RPM (REF) 812rpm

RECORD

SEF481N



Check idle speed.

- Read idle speed in "DATA MONITOR" mode with CONSULT.

OR

- Check idle speed.

M/T: 750 ± 50 rpm (For Canada)
650 ± 50 rpm (Except above)
A/T: 800 ± 50 rpm (in "N" position)

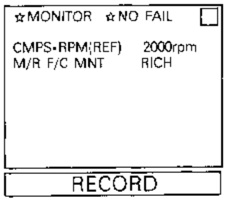
Check IACV-AAC valve and replace if necessary.

Check IACV-AAC valve harness and repair if necessary.

Check ECM function* by substituting another known good ECM.

* ECM may be the cause of a problem, but this is rarely the case.

Ⓑ



☆MONITOR ☆NO FAIL ☐

CMPS•RPM(REF)	2000rpm
M/R F/C MNT	RICH

RECORD

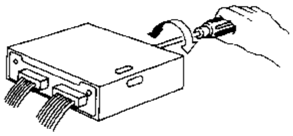
SEF482N

1. See "M/R F/C MNT" in "Data monitor" mode.
2. Run engine at about 2,000 rpm for about 2 minutes under no-load.
3. Maintaining engine at 2,000 rpm under no-load (engine is warmed up sufficiently.), check that the monitor fluctuates between "LEAN" and "RICH" more than 5 times during 10 seconds.

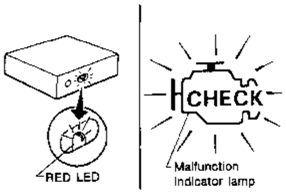
RICH → LEAN → RICH →
1 time 2 times
LEAN → RICH .....

NG → Ⓒ

OR



SEF987K



MEF377DA

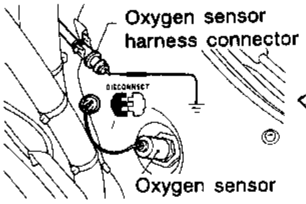
1. Set "Oxygen sensor monitor*" in the Diagnostic test mode II. (See page EF & EC-239.)
2. Run engine at about 2,000 rpm for about 2 minutes under no-load.
3. Maintaining engine at 2,000 rpm under no-load, check to make sure that the RED LED on the ECM or the malfunction indicator lamp on the instrument panel goes ON and OFF more than 5 times during 10 seconds.

OK

END

*: Heated oxygen sensor (A/T models except for California)
Oxygen sensor (A/T models for California and M/T models)

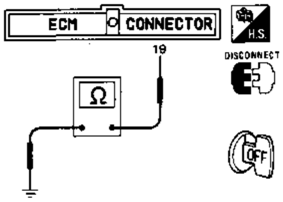
Ⓒ



MEF587D

Check oxygen sensor harness*:
1) Turn off engine and disconnect battery ground cable.
2) Disconnect ECM SMJ harness connector from ECM.
3) Disconnect oxygen sensor harness connector* and connect main harness side terminal for oxygen sensor* to ground with a jumper wire.
4) Check for continuity between terminal No. 19 of ECM SMJ harness connector and body ground.

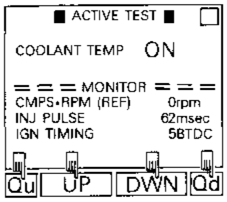
Continuity exists .... **OK**
Continuity does not exist .... **NG**



MEF589D

NG: Repair or replace harness. → Ⓔ

OK: Connect ECM SMJ harness connector to ECM.

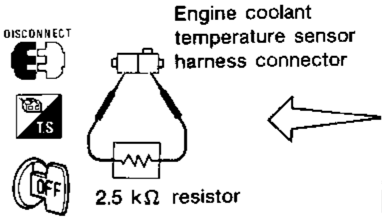

■ ACTIVE TEST ■
COOLANT TEMP ON
=== MONITOR ===
CMPS•RPM (REF) 0rpm
INJ PULSE 62msec
IGN TIMING 5BTDC

SEF483N

1) Connect battery ground cable.
2) Select "ENG TEMPERATURE" in "ACTIVE TEST" mode.
3) Set "ENGINE TEMP" to 20°C (68°F) by touching "Qu" and "Qd" and "UP", "DOWN".

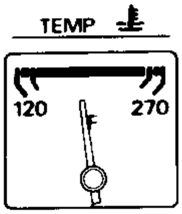
OR

1) Disconnect engine coolant temperature sensor harness connector.
2) Connect a resistor (2.5 kΩ) between terminals of engine coolant temperature sensor harness connector.
3) Connect battery ground cable.



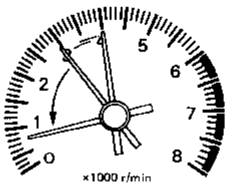
MEF537D

Start engine and warm it up until water temperature indicator points to middle of gauge.



SEF246F

Race engine two or three times under no-load, then run engine at idle speed.



SEF248F

Ⓓ

*: Heated oxygen sensor (A/T models except for California)
Oxygen sensor (A/T models for California and M/T models)

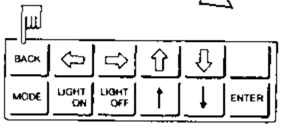
Ⓓ

Check "CO"%.

Idle CO: Less than 7%

After checking CO%,

1) Touch "BACK".



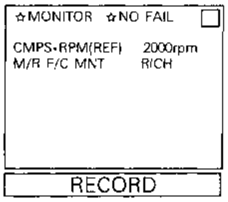
SEF913J

1) Disconnect the resistor from terminals of engine coolant temperature sensor harness connector.
2) Connect engine coolant temperature sensor harness connector to engine coolant temperature sensor.

OK

NG

Replace oxygen sensor*.



☆MONITOR ☆NO FAIL ☐

CMPS•RPM(REF)	2000rpm
M/R F/C MNT	RICH

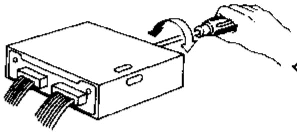
RECORD

SEF482N

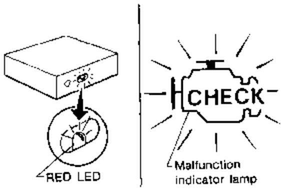
1. See "M/R F/C MNT" in "Data monitor" mode.
2. Maintaining engine at 2,000 rpm under no-load (engine is warmed up sufficiently.), check that the monitor fluctuates between "LEAN" and "RICH" more than 5 times during 10 seconds.

RICH → LEAN → RICH →
1 time 2 times
LEAN → RICH .....

OR



SEF987K



MEF377DA

1. Set "Oxygen sensor monitor*" in the Diagnostic test mode II. (See page EF & EC-239.)
2. Maintaining engine at 2,000 rpm under no-load, check to make sure that the RED LED on the ECM or the malfunction indicator lamp on the instrument panel goes ON and OFF more than 5 times during 10 seconds.

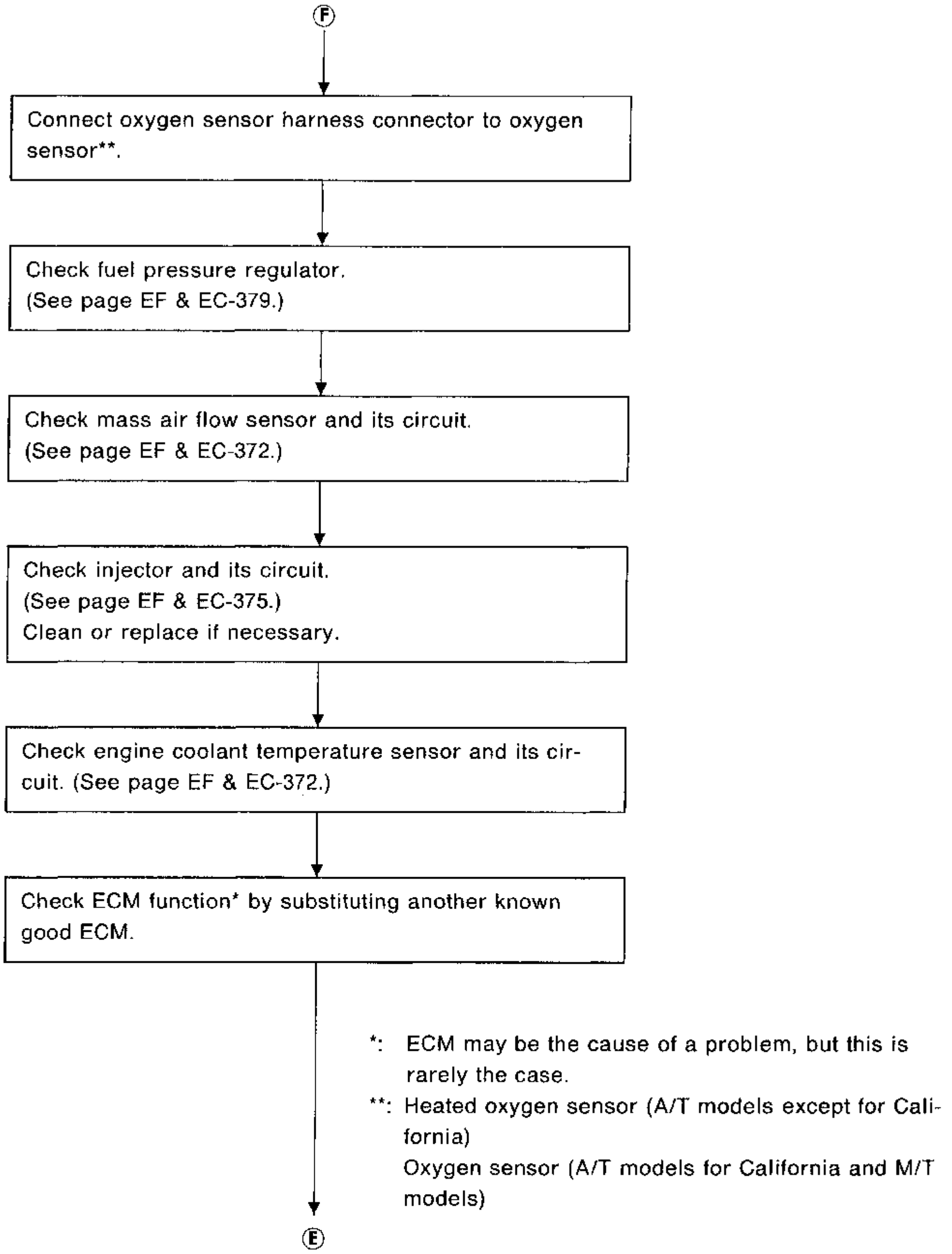
NG

OK

*: Heated oxygen sensor (A/T models except for California)
Oxygen sensor (A/T models for California and M/T models)

Ⓕ

Ⓔ



Connect oxygen sensor harness connector to oxygen sensor**.

Check fuel pressure regulator.
(See page EF & EC-379.)

Check mass air flow sensor and its circuit.
(See page EF & EC-372.)

Check injector and its circuit.
(See page EF & EC-375.)
Clean or replace if necessary.

Check engine coolant temperature sensor and its circuit. (See page EF & EC-372.)

Check ECM function* by substituting another known good ECM.

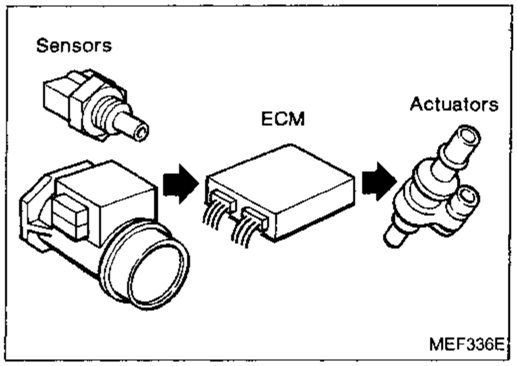
*: ECM may be the cause of a problem, but this is rarely the case.

**: Heated oxygen sensor (A/T models except for California)
Oxygen sensor (A/T models for California and M/T models)

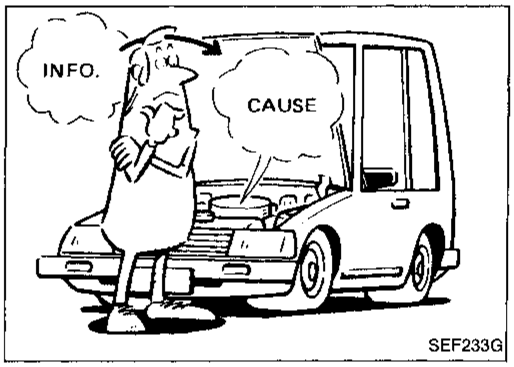
Contents

GI
MA
EM
LC
EF & EC
FE
CL
MT
AT
FA
RA
BR
ST
BF
HA
EL
IDX

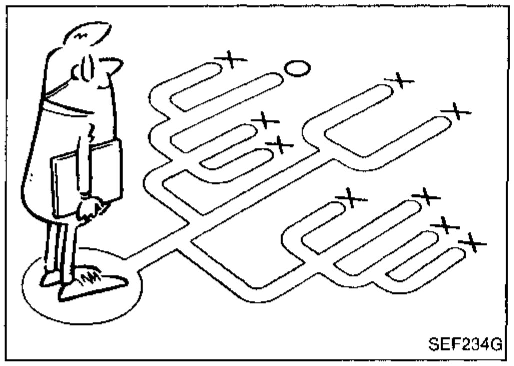
Contents (Cont'd)



MEF336E



SEF233G



SEF234G

How to Perform Trouble Diagnoses for Quick and Accurate Repair

INTRODUCTION

The engine has an ECM to control major systems such as fuel control, ignition control, idle air control system, etc. The ECM accepts input signals from sensors and instantly drives actuators. It is essential that both kinds of signals are proper and stable. At the same time, it is important that there are no conventional problems such as vacuum leaks, fouled spark plugs, or other problems with the engine.

It is much more difficult to diagnose a problem that occurs intermittently rather than continuously. Most intermittent problems are caused by poor electric connections or improper wiring. In this case, careful checking of suspected circuits may help prevent the replacement of good parts.

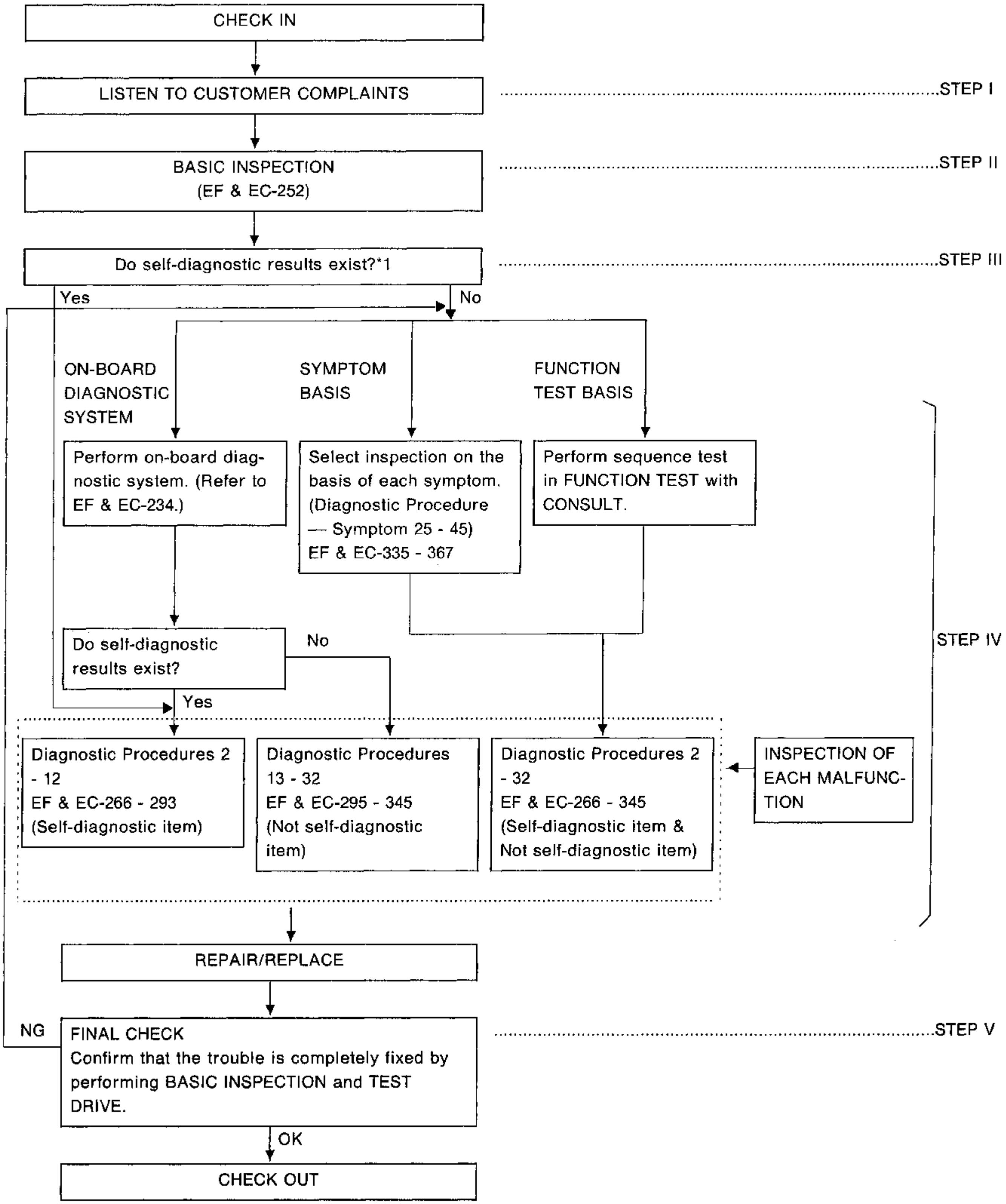
A visual check only may not find the cause of the problems, so a road test with a circuit tester connected to a suspected circuit should be performed.

Before undertaking actual checks, take just a few minutes to talk with a customer who approaches with a driveability complaint. The customer is a very good supplier of information on such problems, especially intermittent ones. Through interaction with the customer, find out what symptoms are present and under what conditions they occur.

Start your diagnosis by looking for "conventional" problems first. This is one of the best ways to troubleshoot driveability problems on an electronically controlled engine vehicle.

How to Perform Trouble Diagnoses for Quick and Accurate Repair (Cont'd)

WORK FLOW



***1: If the on-board diagnostic system cannot be performed, check main power supply and ground circuit. (See Diagnostic Procedure 1)**

***2: If the trouble is not duplicated, see INTERMITTENT PROBLEM SIMULATION (EF & EC-233).**

How to Perform Trouble Diagnoses for Quick and Accurate Repair (Cont'd)

DESCRIPTION FOR WORK FLOW

STEP	DESCRIPTION
STEP I	Identify the trouble using the "DIAGNOSTIC WORKSHEET" as shown on the next page.
STEP II	Be sure to carry out the Basic Inspection, or the results of inspections thereafter may be misinterpreted.
STEP III	Check the self-diagnostic results stored in the ECM of the failed vehicle.
STEP IV	Perform inspection often selecting from the following three tests according to the trouble observed. 1. DIAGNOSTIC TEST MODE II (Self-diagnostic results) Follow the diagnostic test mode II (self-diagnostic results) procedure for each item described in "How to Execute Diagnostic test mode II (Self-diagnostic results)". Non-self-diagnostic procedures described for some items will also provide results which are equal to the self-diagnostic results. 2. SYMPTOM BASIS This inspection is of a simplified method. When performing inspection of a part, the corresponding system must be checked thoroughly by selecting the appropriate check item from Diagnostic Procedures 2 - 24. 3. FUNCTION TEST BASIS (Sequence test) In this inspection, the CONSULT judges "OK" or "NG" on each system in place of a technician. When performing inspection of a part, the corresponding system must be checked thoroughly by selecting the appropriate check item from Diagnostic Procedures 2 - 24. 4. Diagnostic Procedure ● This inspection program is prepared using the data obtained when disconnection of harness or connectors has occurred in the respective circuit. ● Inspection of the "Not self-diagnostic item" does not actually start with the execution of diagnostic test mode II. However, inspection is started by assuming that the diagnostic test mode II has already been performed. ● When a system having the diagnostic test mode II function contains any circuit placed outside the range of this diagnostic test mode II function, it is arranged that the "Not self-diagnostic item" of such a system will be performed when the self-diagnostic result is OK. Example: CAMSHAFT POSITION SENSOR
STEP V	1. FINAL CHECK item is not described in the "Not self-diagnostic item". However, this FINAL CHECK must be performed without fail in order to ensure that the trouble has been repaired, and also that the unit disassembled in the course of the repair work has been reassembled correctly. 2. If the same trouble phenomenon is observed again in the final check: Go back to STEP IV, and perform the inspection using a method which is different from the previous method. 3. If the cause of the trouble is still unknown even after conducting step 2 above, check the circuit of each system for a short by using the voltage available at the "ECM INPUT/OUTPUT SIGNAL INSPECTION" terminal.

KEY POINTS

WHAT ..... Vehicle & engine model
WHEN ..... Date, Frequencies
WHERE..... Road conditions
HOW ..... Operating conditions, Weather conditions, Symptoms

SEF907L

How to Perform Trouble Diagnoses for Quick and Accurate Repair (Cont'd)

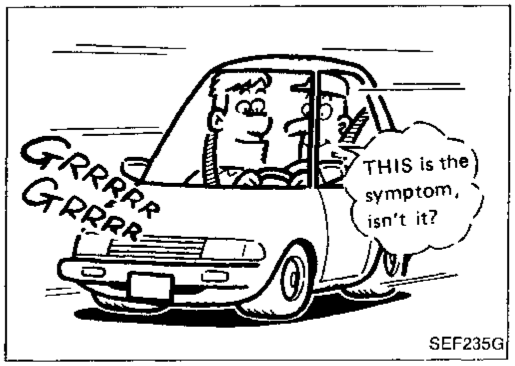
DIAGNOSTIC WORKSHEET

There are many kinds of operating conditions that lead to malfunctions on engine components.
A good grasp of such conditions can make trouble-shooting faster and more accurate.
In general, feelings for a problem depend on each customer. It is important to fully understand the symptoms or under what conditions a customer complains.
Make good use of a diagnostic worksheet such as the one shown below in order to utilize all the complaints for trouble-shooting.

Worksheet sample

Customer name MR/MS	Model & Year	VIN
Engine #	Trans.	Mileage
Incident Date	Manuf. Date	In Service Date

Symptoms	☐ Startability	☐ Impossible to start ☐ No combustion ☐ Partial combustion ☐ Partial combustion affected by throttle position ☐ Partial combustion NOT affected by throttle position ☐ Possible but hard to start ☐ Others [ ]
	☐ Idling	☐ No fast idle ☐ Unstable ☐ High idle ☐ Low idle ☐ Others [ ]
	☐ Driveability	☐ Stumble ☐ Surge ☐ Knock ☐ Lack of power ☐ Intake backfire ☐ Exhaust backfire ☐ Others [ ]
	☐ Engine stall	☐ At the time of start ☐ While idling ☐ While accelerating ☐ While decelerating ☐ Just after stopping ☐ While loading
Incident occurrence		☐ Just after delivery ☐ Recently ☐ In the morning ☐ At night ☐ In the daytime
Frequency		☐ All the time ☐ Under certain conditions ☐ Sometimes
Weather conditions		☐ Not affected
	Weather	☐ Fine ☐ Raining ☐ Snowing ☐ Others [ ]
	Temperature	☐ Hot ☐ Warm ☐ Cool ☐ Cold ☐ Humid °F
Engine conditions		☐ Cold ☐ During warm-up ☐ After warm-up Engine speed 0 2,000 4,000 6,000 8,000 rpm
Road conditions		☐ In town ☐ In suburbs ☐ Highway ☐ Off road (up/down)
Driving conditions		☐ Not affected ☐ At starting ☐ While idling ☐ At racing ☐ While accelerating ☐ While cruising ☐ While decelerating ☐ While turning (RH/LH) Vehicle speed 0 10 20 30 40 50 60 MPH
Malfunction indicator lamp		☐ Turned on ☐ Not turned on



How to Perform Trouble Diagnoses for Quick and Accurate Repair (Cont'd)

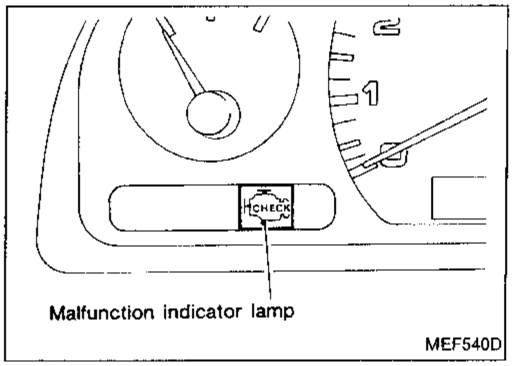
INTERMITTENT PROBLEM SIMULATION

In order to duplicate an intermittent problem, it is effective to create similar conditions for component parts, under which the problem might occur.

Perform the activity listed under Service procedure and note the result.

	Variable factor	Influential part	Target condition	Service procedure
1	Mixture ratio	Pressure regulator	Made lean	Remove vacuum hose and apply vacuum.
			Made rich	Remove vacuum hose and apply pressure.
2	Ignition timing	Camshaft position sensor	Advanced	Rotate distributor clockwise.
			Retarded	Rotate distributor counterclockwise.
3	Mixture ratio feedback control	Oxygen sensor*	Suspended	Disconnect oxygen sensor harness connector*.
		ECM	Operation check	Perform diagnostic test mode II (Self-diagnostic results) at 2,000 rpm
4	Idle speed	IACV-AAC valve	Raised	Turn idle adjusting screw counterclockwise.
			Lowered	Turn idle adjusting screw clockwise.
5	Electrical connection (Electric continuity)	Harness connectors and wires	Poor electrical connection or improper wiring	Tap or wiggle.
				Race engine rapidly. See if the torque reaction of the engine unit causes electric breaks.
6	Temperature	ECM	Cooled	Cool with an icing spray or similar device.
			Warmed	Heat with a hair drier. **[WARNING: Do not overheat the unit.]**
7	Moisture	Electric parts	Damp	Wet. **[WARNING: Do not directly pour water on components. Use a mist sprayer.]**
8	Electric loads	Load switches	Loaded	Turn on headlamps, air conditioner, rear defogger, etc.
9	Ignition spark	Timing light	Spark power check	Try to flash timing light for each cylinder.

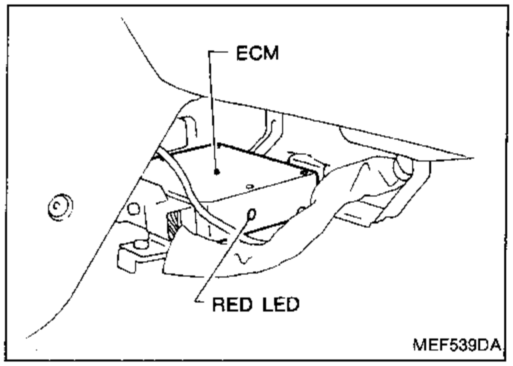
*: Heated oxygen sensor (A/T models except for California)
Oxygen sensor (A/T models for California and M/T models)



On-board Diagnostic System

MALFUNCTION INDICATOR LAMP

A malfunction indicator lamp has been adopted on all models. This light blinks simultaneously with the RED LED on the ECM.



ECM LED

The ECM has only one RED LED.

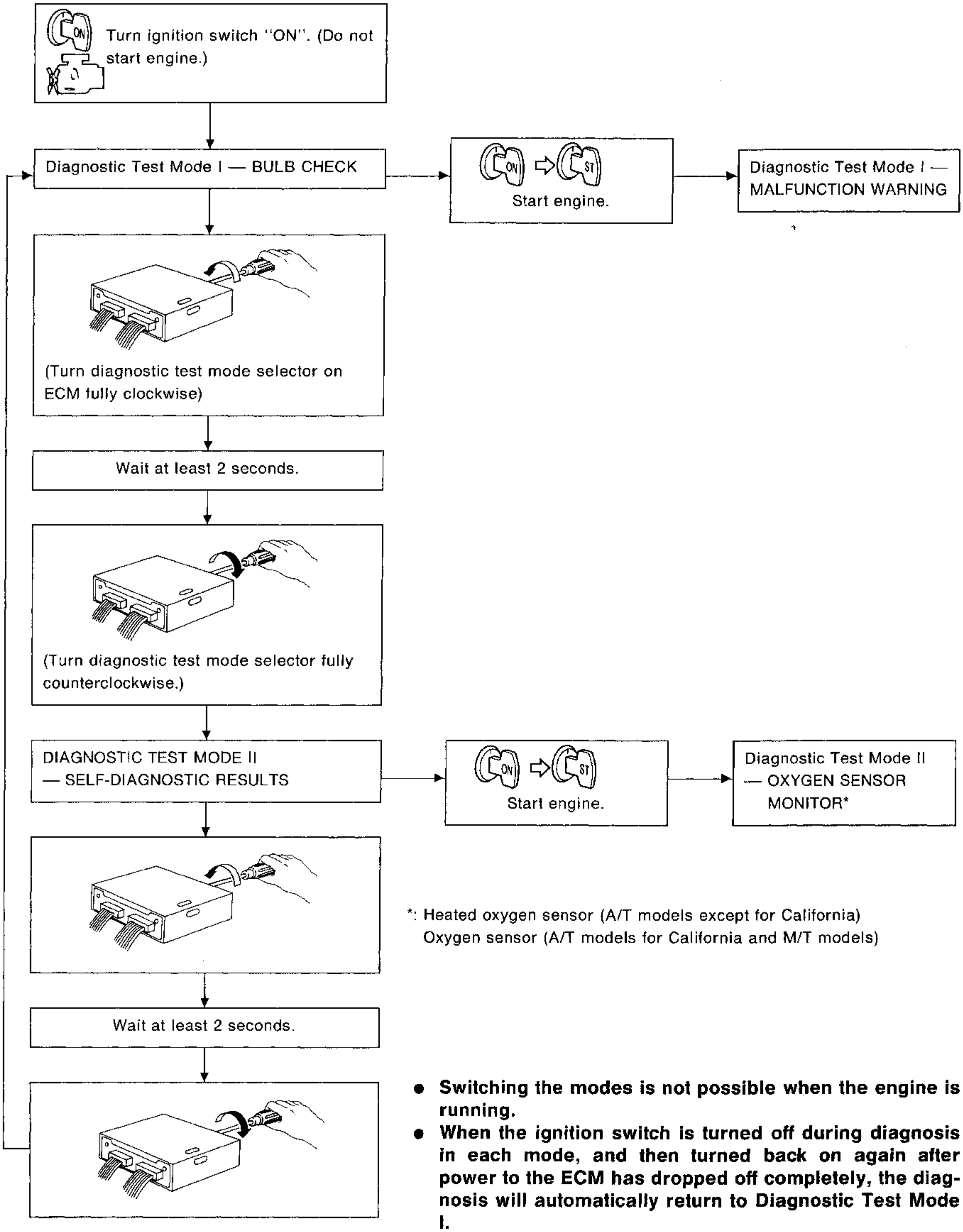
ON-BOARD DIAGNOSTIC SYSTEM FUNCTION

Condition		Diagnostic Test Mode	
		Diagnostic Test Mode I	Diagnostic Test Mode II
Ignition switch in "ON" position	Engine stopped	BULB CHECK	SELF-DIAGNOSTIC RESULTS
	Engine running	MALFUNCTION WARNING	OXYGEN SENSOR MONITOR*

*: Heated oxygen sensor (A/T models except for California)
Oxygen sensor (A/T models for California and M/T models)

On-board Diagnostic System (Cont'd)

HOW TO SWITCH DIAGNOSTIC TEST MODES



*: Heated oxygen sensor (A/T models except for California)
Oxygen sensor (A/T models for California and M/T models)

- **Switching the modes is not possible when the engine is running.**
- **When the ignition switch is turned off during diagnosis in each mode, and then turned back on again after power to the ECM has dropped off completely, the diagnosis will automatically return to Diagnostic Test Mode I.**

On-board Diagnostic System — Diagnostic Test Mode I

DIAGNOSTIC TEST MODE I — BULB CHECK

In this mode, the RED LED in the ECM and the MALFUNCTION INDICATOR LAMP in the instrument panel stay "ON".
If either remain "OFF", check the bulb in the MALFUNCTION INDICATOR LAMP or the RED LED

DIAGNOSTIC TEST MODE I — MALFUNCTION WARNING

MALFUNCTION INDICATOR LAMP and RED LED	Condition
ON	When the following malfunctions (malfunction indicator lamp item) are detected or the ECM's CPU is malfunctioning.
OFF	OK

Diagnostic trouble code No.	Malfunction
12	Mass air flow sensor circuit
13	Engine coolant temperature sensor circuit
14	Vehicle speed sensor circuit
31	ECM (ECCS control module)
32	EGR function
33	Oxygen sensor circuit*
35	EGR temperature sensor circuit
43	Throttle position sensor circuit
45	Injector leak

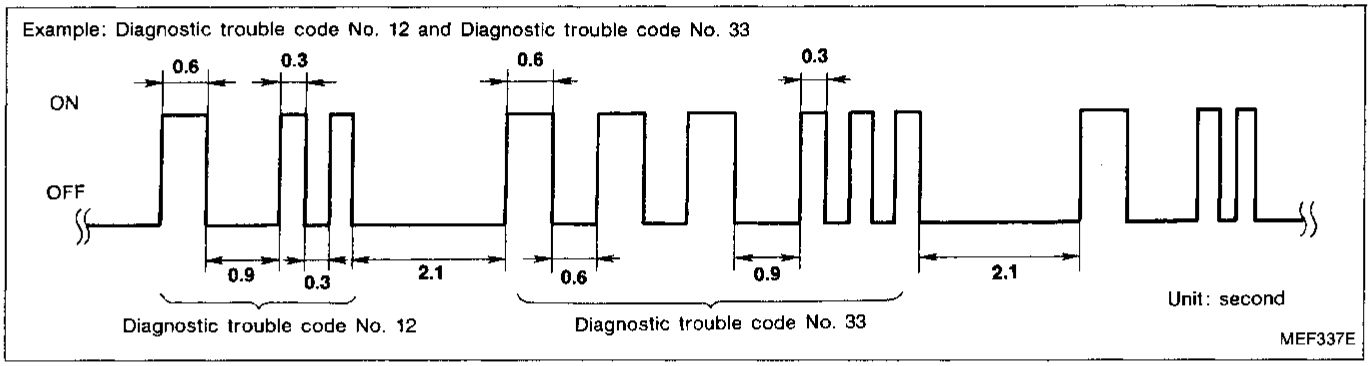
*: Heated oxygen sensor (A/T models except for California)
Oxygen sensor (A/T models for California and M/T models)

- **These Diagnostic Trouble Code Numbers are clarified in Diagnostic Test Mode II — SELF-DIAGNOSTIC RESULTS.**
- **The RED LED and the MALFUNCTION INDICATOR LAMP will turn off when normal condition is detected. At this time, the Diagnostic Test Mode II — SELF-DIAGNOSTIC RESULTS memory must be cleared as the contents remain stored.**

On-board Diagnostic System — Diagnostic Test Mode II (Self-diagnostic results)

DESCRIPTION

In this mode, a diagnostic trouble code is indicated by the number of flashes from the RED LED or the MALFUNCTION INDICATOR LAMP as shown below:



Long (0.6 second) blinking indicates the number of ten digits and short (0.3 second) blinking indicates the number of single digits.
For example, the red LED flashes once for 0.6 seconds and then it flashes twice for 0.3 seconds. This indicates the number "12" and refers to a malfunction in the mass air flow sensor. In this way, all the problems are classified by their diagnostic trouble code numbers.
The diagnostic results will remain in ECM memory.

Display diagnostic trouble code table

Diagnostic trouble code No.	Detected items	
11*	Camshaft position sensor circuit	X
12 CHECK	Mass air flow sensor circuit	X
13 CHECK	Engine coolant temperature sensor circuit	X
14 CHECK	Vehicle speed sensor circuit	X
21*	Ignition signal circuit	X
31 CHECK	ECM	X
32 CHECK	EGR function	X
33 CHECK	Oxygen sensor circuit**	X
35 CHECK	EGR temperature sensor circuit	X
43 CHECK	Throttle position sensor circuit	X
45 CHECK	Injector leak	X
55 CHECK	No malfunction in the above circuits	X

X: Available
CHECK : Malfunction indicator lamp item
*: Check items causing a malfunction of camshaft position sensor circuit first, if both diagnostic trouble code No. 11 and 21 are displayed at the same time.
**: Heated oxygen sensor (A/T models except for California)
Oxygen sensor (A/T models for California and M/T models)

On-board Diagnostic System — Diagnostic Test Mode II (Self-diagnostic results) (Cont'd)

Diagnostic trouble code No.	Detected items	Malfunction is detected when ...	Check item (remedy)
*11	Camshaft position sensor circuit	• Either 1° or 180° signal is not entered for the first few seconds during engine cranking. • Either 1° or 180° signal is not input often enough while the engine speed is higher than the specified rpm.	• Harness and connector (If harness and connector are normal, replace camshaft position sensor.)
12	Mass air flow sensor circuit	• The mass air flow sensor circuit is open or shorted. (An abnormally high or low voltage is entered.)	• Harness and connector (If harness and connector are normal, replace mass air flow sensor.)
13	Engine coolant temperature sensor circuit	• The engine coolant temperature sensor circuit is open or shorted. (An abnormally high or low output voltage is entered.)	• Harness and connector • Engine coolant temperature sensor
14	Vehicle speed sensor circuit	• The vehicle speed sensor circuit is open or shorted.	• Harness and connector • Vehicle speed sensor (reed switch)
*21	Ignition signal circuit	• The ignition signal in the primary circuit is not entered during engine cranking or running.	• Harness and connector • Power transistor unit
31	ECM	• ECM calculation function is malfunctioning.	[Replace ECM (ECCS control module).]
32	EGR function	• EGR valve does not operate. (EGR valve spring does not lift.)	• EGR valve • EGR & canister control solenoid valve
33	Oxygen sensor circuit**	• The oxygen sensor circuit** is open or shorted. (An abnormally high or low output voltage is entered.)	• Harness and connector • Oxygen sensor** • Fuel pressure • Injectors • Intake air leaks
35	EGR temperature sensor circuit	• The EGR temperature sensor circuit is open or shorted. (An abnormally high or low voltage is entered.)	• Harness and connector • EGR temperature sensor
43	Throttle position sensor circuit	• The throttle position sensor circuit is open or shorted. (An abnormally high or low voltage is entered.)	• Harness and connector • Throttle position sensor
45	Injector leak	• Fuel leaks from injector.	• Injector

*: Check items causing a malfunction of camshaft position sensor circuit first, if both diagnostic trouble codes No. 11 and 21 come out at the same time.

**: Heated oxygen sensor (A/T models except for California)
Oxygen sensor (A/T models for California and M/T models)

On-board Diagnostic System — Diagnostic Test Mode II (Self-diagnostic results) (Cont'd)

HOW TO ERASE DIAGNOSTIC TEST MODE II (SELF-DIAGNOSTIC RESULTS)

The diagnostic trouble code is erased from the backup memory on the ECM when the diagnostic test mode is changed from Diagnostic Test Mode II to Diagnostic Test Mode I. (Refer to "HOW TO SWITCH DIAGNOSTIC TEST MODES".)

- **When the battery terminal is disconnected, the diagnostic trouble code will be lost from the backup memory within 24 hours.**
- **Before starting on-board diagnostic system, do not erase the stored memory before beginning on-board diagnostic system.**

On-board Diagnostic System — Diagnostic Test Mode II (Oxygen sensor monitor**)

DESCRIPTION

In this mode, the MALFUNCTION INDICATOR LAMP and RED LED display the condition of the fuel mixture (lean or rich) which is monitored by the oxygen sensor**.

MALFUNCTION INDICATOR LAMP and RED LED	Fuel mixture condition in the exhaust gas	Air fuel ratio feedback control condition
ON	Lean	Closed loop system
OFF	Rich	
*Remains ON or OFF	Any condition	Open loop system

*: Maintains conditions just before switching to open loop.

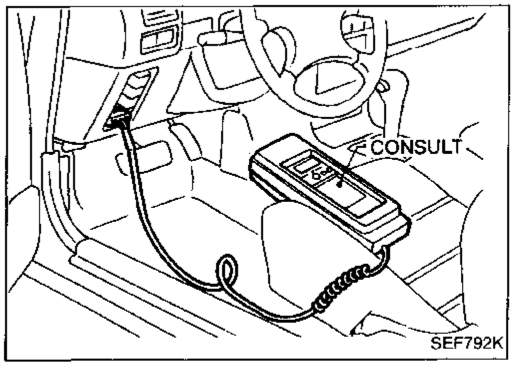
HOW TO CHECK OXYGEN SENSOR**

1. Set Diagnostic Test Mode II. (Refer to "HOW TO SWITCH DIAGNOSTIC TEST MODES".)
2. Start engine and warm it up until engine coolant temperature indicator points to the middle of the gauge.
3. Run engine at about 2,000 rpm for about 2 minutes under no-load conditions.
4. Make sure RED LED or MALFUNCTION INDICATOR LAMP goes ON and OFF more than 5 times every 10 seconds; measured at 2,000 rpm under no-load.

**: Heated oxygen sensor (A/T models except for California)
Oxygen sensor (A/T models for California and M/T models)

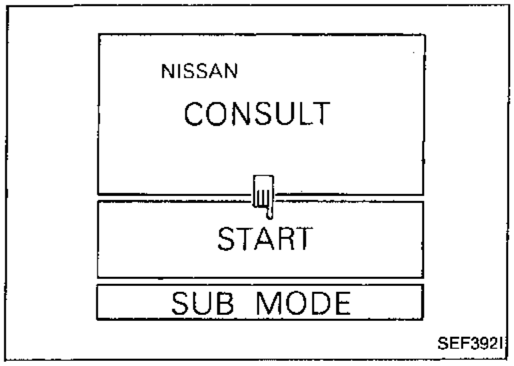
Consult

CONSULT INSPECTION PROCEDURE



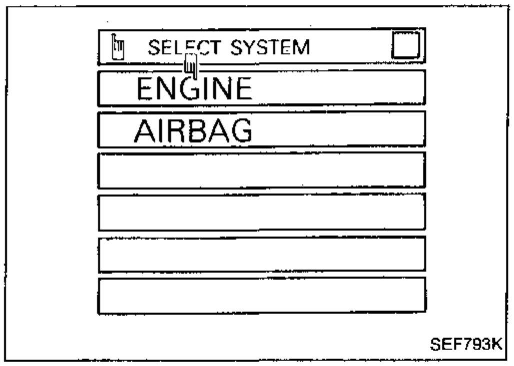
SEF792K

1. Turn off ignition switch.
2. Connect "CONSULT" to data link connector for CONSULT. (Data link connector for CONSULT is located behind the fuse box cover.)



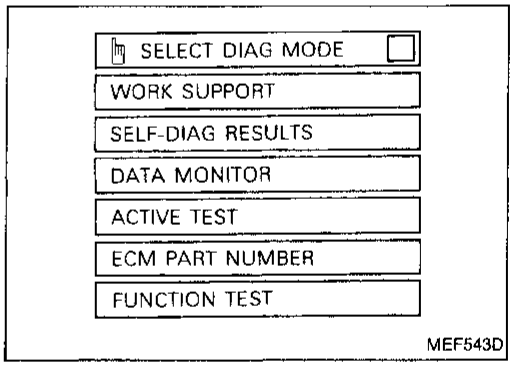
SEF392I

3. Turn on ignition switch.
4. Touch "START".



SEF793K

5. Touch "ENGINE".



MEF543D

6. Perform each diagnostic test mode according to the inspection sheet as follows:

For further information, see the CONSULT Operation Manual.

Consult (Cont'd)

ECCS COMPONENT PARTS APPLICATION

ECCS COMPONENT PARTS		DIAGNOSTIC TEST MODE				
		WORK SUPPORT	SELF-DIAGNOSTIC RESULTS	DATA MONITOR	ACTIVE TEST	FUNCTION TEST
INPUT	Camshaft position sensor		X	X		
	Mass air flow sensor		X	X		
	Engine coolant temperature sensor		X	X	X	
	Oxygen sensors*		X	X		X
	Vehicle speed sensors		X	X		X
	Throttle position sensor	X	X	X		X
	EGR temperature sensor		X	X		
	Ignition switch (start signal)			X		X
	Air conditioner switch			X		
	Neutral position switch			X		X
	Power steering oil pump switch			X		X
	Load switch			X		
	Battery			X		
OUT-PUT	Injectors		X	X	X	
	Power transistor (ignition timing)	X	X (Ignition signal)	X	X	X
	IACV-AAC valve	X		X	X	X
	Valve timing control solenoid valve			X	X	X
	EGR & canister control solenoid valve		X	X	X	X
	Air conditioner relay			X		
	Fuel pump relay	X		X	X	X
	Cooling fan			X	X	X

*: Heated oxygen sensor (A/T models except for California)
Oxygen sensor (A/T models for California and M/T models)

X: Applicable

Consult (Cont'd)

FUNCTION

Diagnostic test mode	Function
Work support	This mode enables a technician to adjust some devices faster and more accurately by following the indications on the CONSULT unit.
Self-diagnostic results	Self-diagnostic results can be read and erased quickly.
Data monitor	Input/Output data in the ECM can be read.
Active test	Diagnostic Test Mode in which CONSULT drives some actuators apart from the ECMs and also shifts some parameters in a specified range.
ECM part number	ECM part number can be read.
Function test	Conducted by CONSULT instead of a technician to determine whether each system is "OK" or "NG".

WORK SUPPORT MODE

WORK ITEM	CONDITION	USAGE
THRL POS SEN ADJ	CHECK THE THROTTLE POSITION SENSOR SIGNAL. ADJUST IT TO THE SPECIFIED VALUE BY ROTATING THE SENSOR BODY UNDER THE FOLLOWING CONDITIONS. ● IGN SW "ON" ● ENG NOT RUNNING ● ACC PEDAL NOT PRESSED	When adjusting throttle position sensor initial position.
IGNITION TIMING ADJ	● IGNITION TIMING FEEDBACK CONTROL WILL BE HELD BY TOUCHING "START". AFTER DOING SO, ADJUST IGNITION TIMING WITH A TIMING LIGHT BY TURNING THE CAMSHAFT POSITION SENSOR.	When adjusting initial ignition timing.
IACV-AAC/V ADJ	SET ENGINE SPEED AT THE SPECIFIED VALUE UNDER THE FOLLOWING CONDITIONS. ● ENGINE WARMED UP ● NO-LOAD	When adjusting idle speed.
FUEL PRESSURE RELEASE	● FUEL PUMP WILL STOP BY TOUCHING "START" DURING IDLING. CRANK A FEW TIMES AFTER ENGINE STALLS.	When releasing fuel pressure from fuel line.

Consult (Cont'd)

SELF-DIAGNOSTIC RESULTS MODE

DIAGNOSTIC ITEM	DIAGNOSTIC ITEM IS DETECTED WHEN ...	CHECK ITEM (REMEDY)
CAMSHAFT POSITION SEN*	• Either 1° or 180° signal is not entered for the first few seconds during engine cranking. • Either 1° or 180° signal is not input often enough while the engine speed is higher than the specified rpm.	• Harness and connector (If harness and connector are normal, replace camshaft position sensor.)
MASS AIR FLOW SEN	• The mass air flow sensor circuit is open or shorted. (An abnormally high or low voltage is entered.)	• Harness and connector (If harness and connector are normal, replace mass air flow sensor.)
COOLANT TEMP SEN	• The engine coolant temperature sensor circuit is open or shorted. (An abnormally high or low output voltage is entered.)	• Harness and connector • Engine coolant temperature sensor
VEHICLE SPEED SEN	• The vehicle speed sensor circuit is open or shorted.	• Harness and connector • Vehicle speed sensor (reed switch)
IGN SIGNAL-PRIMARY*	• The ignition signal in primary circuit is not entered during engine cranking or running.	• Harness and connector • Power transistor unit
ECM	• ECM calculation function is malfunctioning.	[Replace ECM (ECCS control module).]
EGRC SOLENOID/V**	• EGR valve does not operate. (EGR valve spring does not lift.)	• EGR valve • EGR & canister control solenoid valve
OXYGEN SEN	• The oxygen sensor circuit*1 is open or shorted. (An abnormally high or low output voltage is entered.)	• Harness and connector • Oxygen sensor*1 • Fuel pressure • Injectors • Intake air leaks
EGR TEMP SENSOR**	• The EGR temperature sensor circuit is open or shorted. (An abnormally high or low voltage is entered.)	• Harness and connector • EGR temperature sensor
THROTTLE POSI SEN	• The throttle position sensor circuit is open or shorted. (An abnormally high or low voltage is entered.)	• Harness and connector • Throttle position sensor
INJECTOR-LEAK**	• Fuel leaks from injector.	• Injector

*: Check items causing a malfunction of camshaft position sensor circuit first, if both "CAMSHAFT POSITION SENSOR" and "IGN SIGNAL-PRIMARY" come out at the same time.

: The diagnostic item marked "" is applicable to vehicles for California only.

*1: Heated oxygen sensor (A/T models except for California)
Oxygen sensor (A/T models for California and M/T models)

Consult (Cont'd)

DATA MONITOR MODE

Remarks:

**: Heated oxygen sensor (A/T models except for California)
Oxygen sensor (A/T models for California and M/T models)

- Specification data are reference values.
- Specification data are output/input values which are detected or supplied by the ECM at the connector.

* Specification data may not be directly related to their components signals/values/operations.

i.e. Adjust ignition timing with a timing light before monitoring IGN TIMING, because the monitor may show the specification data in spite of the ignition timing not being adjusted to the specification data. This IGN TIMING monitors the data calculated by the ECM according to the signals input from the camshaft position sensor and other ignition timing related sensors.

MONITOR ITEM	CONDITION		SPECIFICATION	CHECK ITEM WHEN OUTSIDE SPEC.
CMPS, RPM (REF)	• Tachometer: Connect • Run engine and compare tachometer indication with the CONSULT value.		Almost the same speed as the CONSULT value.	• Harness and connector • Camshaft position sensor
MAS AIR/FL SE	• Engine: After warming up, idle the engine • A/C switch "OFF" • Shift lever "N"	Idle	0.7 - 1.1V	• Harness and connector • Mass air flow sensor
		2,000 rpm	1.1 - 1.5V	
COOLAN TEMP/S	• Engine: After warming up		More than 70°C (158°F)	• Harness and connector • Engine coolant temperature sensor
O2 SEN	• Engine: After warming up	Maintaining engine speed at 2,000 rpm	0 - 0.3V ↔ Approx. 0.6 - 1.0V	• Harness and connector • Oxygen sensor** • Intake air leaks • Injectors
M/R F/C MNT			LEAN ↔ RICH Changes more than 5 times during 10 seconds.	
VHCL SPEED SE	• Turn drive wheels and compare speedometer indication with the CONSULT value		Almost the same speed as the CONSULT value	• Harness and connector • Vehicle speed sensor
BATTERY VOLT	• Ignition switch: ON (Engine stopped)		11 - 14V	• Battery • ECM power supply circuit
THRTL POS SEN	• Ignition switch: ON (Engine stopped)	Throttle valve fully closed	0.45 - 0.55V	• Harness and connector • Throttle position sensor • Throttle position sensor adjustment
		Throttle valve fully opened	Approx. 4.0V	
EGR TEMP SEN	• Engine: After warming up		Less than 4.5V	• Harness and connector • EGR temperature sensor
START SIGNAL	• Ignition switch: ON → START		OFF → ON	• Harness and connector • Starter switch
CLOSED TH/POS	• Ignition switch: ON (Engine stopped)	Throttle valve: Idle position	ON	• Harness and connector • Throttle position sensor • Throttle position sensor adjustment
		Throttle valve: Slightly open	OFF	
AIR COND SIG	• Engine: After warming up, idle the engine	A/C switch "OFF"	OFF	• Harness and connector • Air conditioner switch
		A/C switch "ON"	ON	
NEUT POSI SW	• Ignition switch: ON	Shift lever "P" or "N"	ON	• Harness and connector • Neutral position switch
		Except above	OFF	

Consult (Cont'd)

MONITOR ITEM	CONDITION		SPECIFICATION	CHECK ITEM WHEN OUTSIDE SPEC.
PW/ST SIGNAL	• Engine: After warming up, idle the engine	Steering wheel in neutral position (forward direction)	OFF	• Harness and connector • Power steering oil pressure switch
		The steering wheel is turned	ON	
FUEL PUMP RLY	• Ignition switch is turned to ON (Operates for 5 seconds) • Engine running and cranking • When engine is stopped (stops in 1.0 seconds)		ON	• Harness and connector • Fuel pump relay
	Except as shown above		OFF	
COOLING FAN	• After warming up engine, idle the engine. • A/C switch "OFF"	Engine coolant temperature is 90°C (194°F) or less	OFF	• Harness and connector • Cooling fan relay • Cooling fan
		Engine coolant temperature is 91°C (196°F) or more	ON	
INJ PULSE	• Engine: After warming up • A/C switch "OFF" • Shift lever "N" • No-load	Idle	2.5 - 3.3 msec.	• Harness and connector • Injector • Mass air flow sensor • Intake air system
		2,000 rpm	2.5 - 3.3 msec.	
IGN TIMING	ditto	Idle	10° BTDC	• Harness and connector • Camshaft position sensor
		2,000 rpm	More than 20° BTDC	
IACV-AAC/V	ditto	Idle	20 - 40%	• Harness and connector • IACV-AAC valve
		2,000 rpm	—	
A/F ALPHA	• Engine: After warming up	Maintaining engine speed at 2,000 rpm	75 - 125%	• Harness and connector • Injectors • Mass air flow sensor • Oxygen sensor • Canister purge line • Intake air system
AIR COND RLY	• Air conditioner switch OFF → ON		OFF → ON	• Harness and connector • Air conditioner switch • Air conditioner relay
EGRC SOL/V	• Engine: After warming up • A/C switch "OFF" • Shift lever "N" • No-load	Idle	ON	• Harness and connector • EGR & canister control solenoid valve
		2,000 rpm	OFF	

GI
MA
EM
LC
EF & EC
FE
CL
MT
AT
FA
RA
BR
ST
BF
HA
EL
IDX

Consult (Cont'd)

ACTIVE TEST MODE

TEST ITEM	CONDITION	JUDGMENT	CHECK ITEM (REMEDY)
FUEL INJECTION	• Engine: Return to the original trouble condition • Change the amount of fuel injection using CONSULT.	If trouble symptom disappears, see CHECK ITEM.	• Harness and connector • Fuel injectors • Oxygen sensor*
IACV-AAC/V OPENING	• Engine: After warming up, idle the engine. • Change the IACV-AAC valve opening percent using CONSULT.	Engine speed changes according to the opening percent.	• Harness and connector • IACV-AAC valve
ENG COOLANT TEMP	• Engine: Return to the original trouble condition • Change the engine coolant temperature using CONSULT.	If trouble symptom disappears, see CHECK ITEM.	• Harness and connector • Engine coolant temperature sensor • Fuel injectors
IGNITION TIMING	• Engine: Return to the original trouble condition • Timing light: Set • Retard the ignition timing using CONSULT.	If trouble symptom disappears, see CHECK ITEM.	• Adjust initial ignition timing
POWER BALANCE	• Engine: After warming up, idle the engine. • A/C switch "OFF" • Shift lever "N" • Cut off each injector signal one at a time using CONSULT.	Engine runs rough or dies.	• Harness and connector • Compression • Injectors • Power transistor • Spark plugs • Ignition coils
COOLING FAN	• Ignition switch: ON • Turn the cooling fan "ON" and "OFF" using CONSULT.	Cooling fan moves and stops.	• Harness and connector • Cooling fan motor
FUEL PUMP RLY	• Ignition switch: ON (Engine stopped) • Turn the fuel pump relay "ON" and "OFF" using CONSULT and listen to operating sound.	Fuel pump relay makes the operating sound.	• Harness and connector • Fuel pump relay
EGRC SOLENOID VALVE	• Ignition switch: ON • Turn solenoid valve "ON" and "OFF" with the CONSULT and listen to operating sound.	Solenoid valve makes an operating sound.	• Harness and connector • Solenoid valve
SELF-LEARNING CONT	• In this test, the coefficient of self-learning control mixture ratio returns to the original coefficient by touching "CLEAR" on the screen.		

*: Heated oxygen sensor (A/T models except for California)
Oxygen sensor (A/T models for California and M/T models)

Consult (Cont'd)

FUNCTION TEST MODE

FUNCTION TEST ITEM	CONDITION	JUDGEMENT		CHECK ITEM (REMEDY)
SELF-DIAG RESULTS	● Ignition switch: ON (Engine stopped) ● Displays the results of on-board diagnostic system.	—		Objective system
CLOSED THROTTLE POSI (CLOSED THROTTLE POSITION SWITCH CIRCUIT)	● Ignition switch: ON (Engine stopped) ● Closed throttle position switch circuit is tested when throttle is opened and closed fully. ("IDLE POSITION" is the test item name for the vehicles in which idle is selected by throttle position sensor.)	Throttle valve: opened	OFF	● Harness and connector ● Throttle position sensor (Closed throttle position switch) ● Throttle position sensor (Closed throttle position switch) adjustment ● Throttle linkage ● Verify operation in DATA MONITOR mode.
		Throttle valve: closed	ON	
THROTTLE POSI SEN CKT	● Ignition switch: ON (Engine stopped) ● Throttle position sensor circuit is tested when throttle is opened and closed fully.	Range (Throttle valve fully opened — Throttle valve fully closed)	More than 3.0V	● Harness and connector ● Throttle position sensor ● Throttle position sensor adjustment ● Throttle linkage ● Verify operation in DATA MONITOR mode.
NEUTRAL POSI SW CKT	● Ignition switch: ON (Engine stopped) ● Neutral position switch circuit is tested when shift lever is manipulated.	OUT OF N/P-RANGE	OFF	● Harness and connector ● Neutral position switch/ Inhibitor switch ● Linkage + Inhibitor switch adjustment
		IN N-RANGE	ON	
FUEL PUMP CIRCUIT	● Ignition switch: ON (Engine stopped) ● Fuel pump circuit is tested by checking the pulsation in fuel pressure when fuel tube is pinched.	There is pressure pulsation on the fuel feed hose.		● Harness and connector ● Fuel pump ● Fuel pump relay ● Fuel filter clogging ● Fuel level
EGRC SOL/V CIRCUIT	● Ignition switch: ON (Engine stopped) ● EGR control S/V circuit is tested by checking solenoid valve operating noise.	The solenoid valve makes an operating sound every 3 seconds.		● Harness and connector ● EGRC-solenoid valve
VALVE TIMING S/V CKT	● Ignition switch: ON (Engine stopped) ● Valve timing S/V circuit is tested by checking solenoid valve operating noise.	The solenoid valve makes an operating sound every 3 seconds.		● Harness and connector ● Valve timing solenoid valve
COOLING FAN CIRCUIT	● Ignition switch: ON (Engine stopped) ● Cooling fan circuit is tested when cooling fan is rotated.	The cooling fan rotates and stops every 3 seconds.		● Harness and connector ● Cooling fan motor ● Cooling fan relay

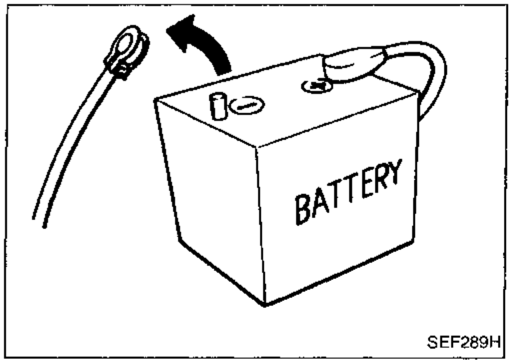
Consult (Cont'd)

FUNCTION TEST ITEM	CONDITION	JUDGEMENT		CHECK ITEM (REMEDY)
START SIGNAL CIRCUIT	● Ignition switch: ON → START ● Start signal circuit is tested when engine is started by operating the starter. Battery voltage and water temperature before cranking, and average battery voltage, mass air flow sensor output voltage and cranking speed during cranking are displayed.	Start signal: OFF → ON		● Harness and connector ● Ignition switch
PW/ST SIGNAL CIRCUIT	● Ignition switch: ON (Engine running) ● Power steering circuit is tested when steering wheel is rotated fully and then set to a straight line running position.	Locked position	ON	● Harness and connector ● Power steering oil pressure switch ● Power steering oil pump
		Neutral position	OFF	
VEHICLE SPEED SEN CKT	● Vehicle speed sensor circuit is tested when vehicle is running at a speed of 10 km/h (6 MPH) or higher.	Vehicle speed sensor input signal is greater than 4 km/h (2 MPH)		● Harness and connector ● Vehicle speed sensor ● Electric speedometer
IGN TIMING ADJ	● After warming up, idle the engine. ● Ignition timing adjustment is checked by reading ignition timing with a timing light and checking whether it agrees with specifications.	The timing light indicates the same value on the screen.		● Adjust ignition timing (by moving camshaft position sensor or distributor) ● Camshaft position sensor drive mechanism
MIXTURE RATIO TEST	● Air-fuel ratio feedback circuit (injection system, ignition system, vacuum system, etc.) is tested by examining the oxygen sensor* output at 2,000 rpm under non-loaded state.	● O_2 SEN COUNT: More than 5 times during 10 seconds (O_2 SEN-R COUNT: More than 5 times during 10 seconds)		● INJECTION SYS (Injector, fuel pressure regulator, harness or connector) ● IGNITION SYS (Spark plug, power transistor, ignition coil, harness or connector) ● VACUUM SYS (Intake air leaks) ● Oxygen sensor circuit* ● Oxygen sensor operation* ● Fuel pressure high or low ● Mass air flow sensor

*: Heated oxygen sensor (A/T models except for California)
Oxygen sensor (A/T models for California and M/T models)

Consult (Cont'd)

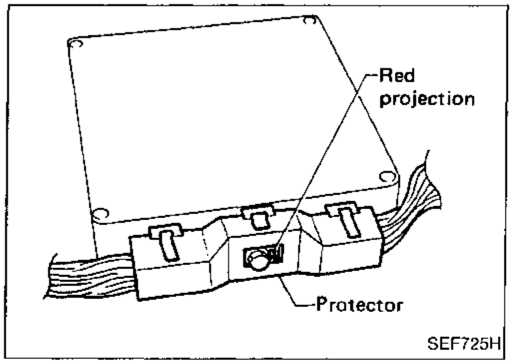
FUNCTION TEST ITEM	CONDITION	JUDGEMENT	CHECK ITEM (REMEDY)
POWER BALANCE	● After warming up, idle the engine. ● Injector operation of each cylinder is stopped one after another, and resultant change in engine rotation is examined to evaluate combustion of each cylinder. (This is only displayed for models where a sequential multiport fuel injection system system is used.)	Difference in engine speed is greater than 25 rpm before and after cutting off the injector of each cylinder.	● Injector circuit (Injector, harness or connector) ● Ignition circuit (Spark plug, power transistor, ignition coil, harness or connector) ● Compression ● Valve timing
IACV-AAC/V SYSTEM	● After warming up, idle the engine. ● IACV-AAC valve system is tested by detecting change in engine speed when IACV-AAC valve opening is changed to 0%, 20% and 80%.	Difference in engine speed is greater than 150 rpm between when valve opening is at 80% (102 steps) and at 20% (25 steps).	● Harness and connector ● IACV-AAC valve ● Air passage restriction between air inlet and IACV-AAC valve ● IAS (Idle adjusting screw) adjustment



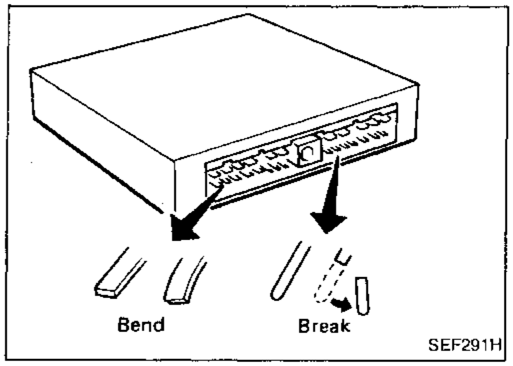
Diagnostic Procedure

CAUTION:

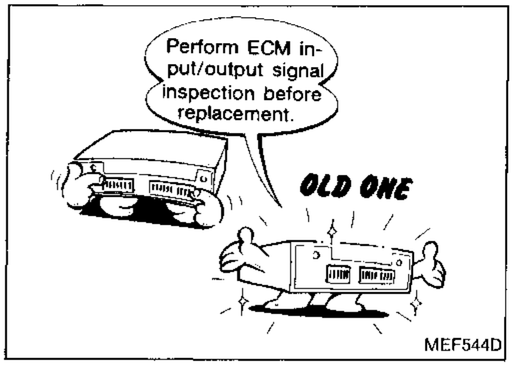
1. **Before connecting or disconnecting the ECM harness connector to or from any ECM, be sure to turn the ignition switch to the "OFF" position and disconnect the negative battery terminal in order not to damage ECM as battery voltage is applied to ECM even if ignition switch is turned off. Failure to do so may damage the ECM.**



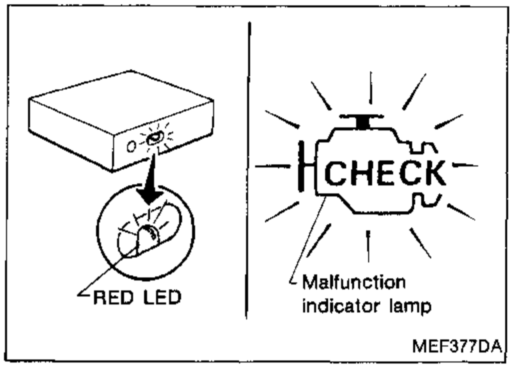
2. **When connecting ECM harness connector, tighten securing bolt until red projection is in line with connector face.**



3. **When connecting or disconnecting pin connectors into or from ECM, take care not to damage pin terminals (bend or break).**
4. **Make sure that there are not any bends or breaks on ECM pin terminal, when connecting pin connectors.**

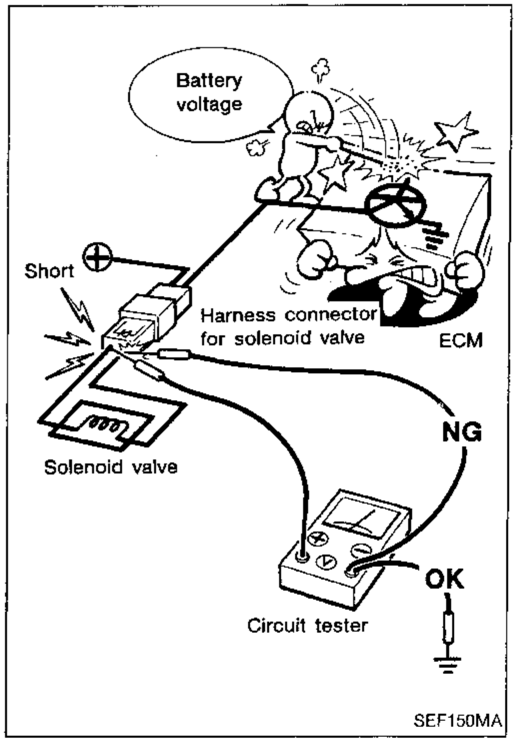


5. **Before replacing ECM, perform ECM input/output signal inspection and make sure whether ECM functions properly or not. (See page EF & EC-368.)**



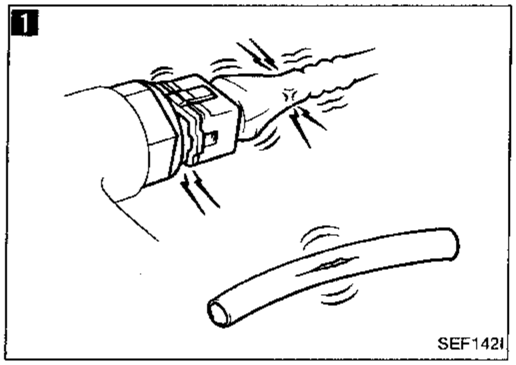
6. **After performing this "Diagnostic Procedure", perform diagnostic test mode II (Self-diagnostic results) and driving test.**

Diagnostic Procedure (Cont'd)



7. When measuring ECM controlled components supply voltage with a circuit tester, separate one tester probe from the other.
If the two tester probes accidentally make contact with each other during measurement, the circuit will be shorted, resulting in damage to the ECM power transistor.

Basic Inspection

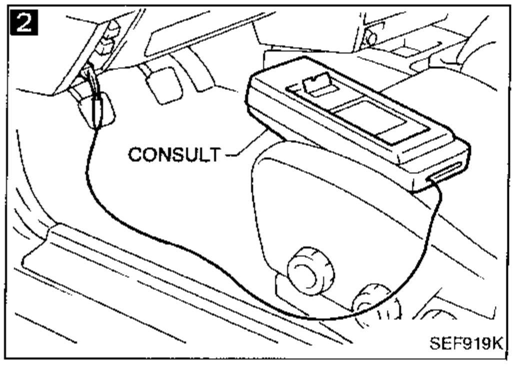


1

BEFORE STARTING

1. Check service records for any recent repairs that may indicate a related problem, or the current need for scheduled maintenance.
2. Open engine hood and check the following:

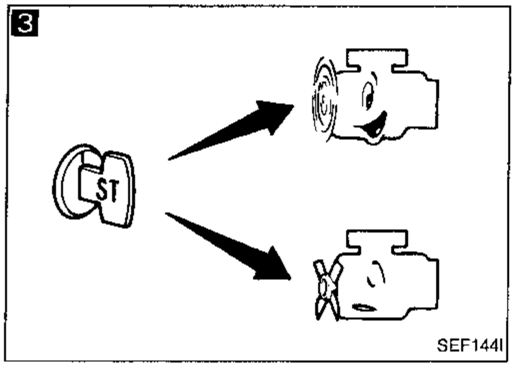
- Harness connectors for proper connections
- Vacuum hoses for splits, kinks, and proper connections
- Wiring for proper connections, pinches, and cuts



2

CONNECT CONSULT TO THE VEHICLE

Connect "CONSULT" to the data link connector for CONSULT and select "ENGINE" from the menu. (Refer to page EF & EC-240.)

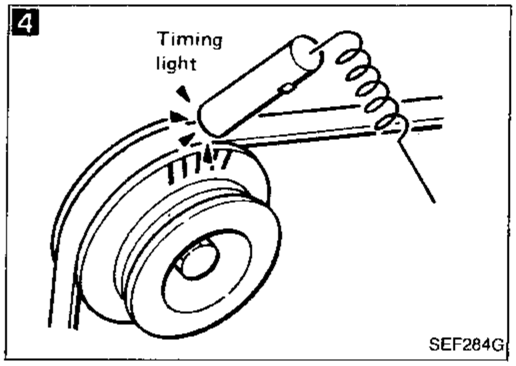


3

DOES ENGINE START?

No → Go to **6** .

Yes ↓



4

CHECK IGNITION TIMING.

Warm up engine sufficiently and check ignition timing at idle using timing light. (Refer to page EF & EC-219.)

Ignition timing:

10° ± 2° BTDC

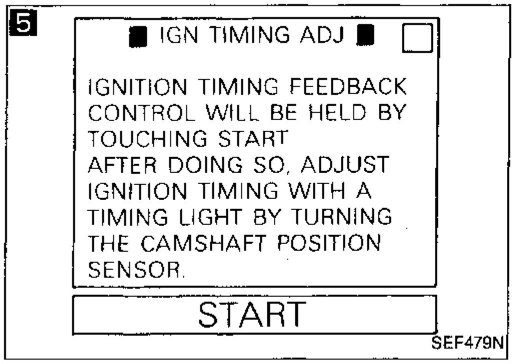
NG → Adjust ignition timing by turning camshaft position sensor.

OK ↓

(Go to Ⓐ on next page.)

Basic Inspection (Cont'd)

5



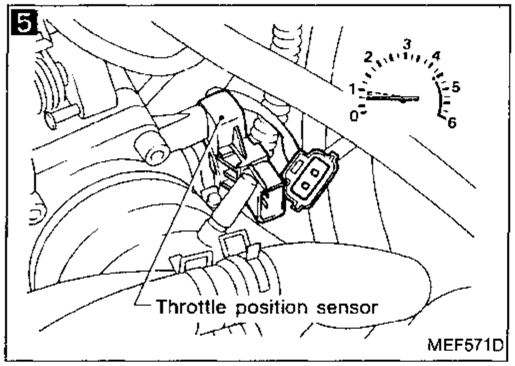
■ IGN TIMING ADJ ■ ☐

IGNITION TIMING FEEDBACK CONTROL WILL BE HELD BY TOUCHING START
AFTER DOING SO, ADJUST IGNITION TIMING WITH A TIMING LIGHT BY TURNING THE CAMSHAFT POSITION SENSOR.

START

SEF479N

5



MEF571D

Ⓐ

5

CHECK IDLE ADJ. SCREW INITIAL SET RPM.

1. Select "IGNITION TIMING ADJ" in "WORK SUPPORT" mode.
2. When touching "START", does engine speed fall to 600±50 rpm (M/T), 725±50 rpm (A/T) (in "N" position)?

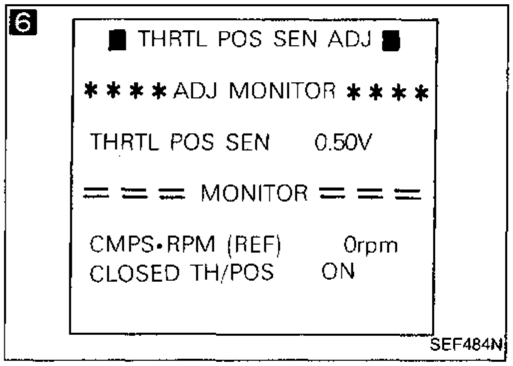
OR

When disconnecting throttle position sensor harness connector, does engine speed fall to 600±50 rpm (M/T), 725±50 rpm (A/T) (in "N" position)?

No → Adjust engine speed by turning idle adjusting screw.

Yes ↓

6



■ THRTL POS SEN ADJ ■

****ADJ MONITOR****

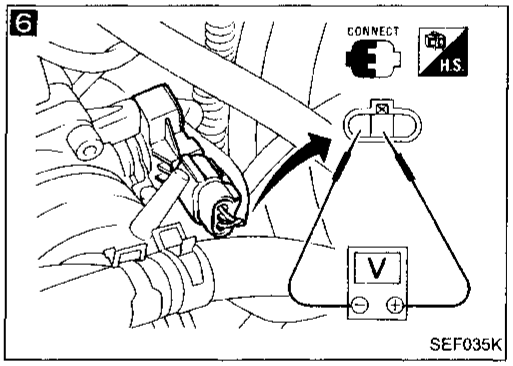
THRTL POS SEN 0.50V

=== MONITOR ===

CMPS•RPM (REF) 0rpm
CLOSED TH/POS ON

SEF484N

6



SEF035K

6

CHECK THROTTLE POSITION SENSOR IDLE POSITION.

1. Perform "THRTL POS SEN ADJ" in "WORK SUPPORT" mode.
2. Check that output voltage of throttle position sensor is 0.45 to 0.55V. (Throttle valve fully closes.) and "IDLE POSITION" stays "ON".

OR

Measure output voltage of throttle position sensor using voltmeter, and check that it is 0.45 to 0.55V. (Throttle valve fully closed.)

NG →

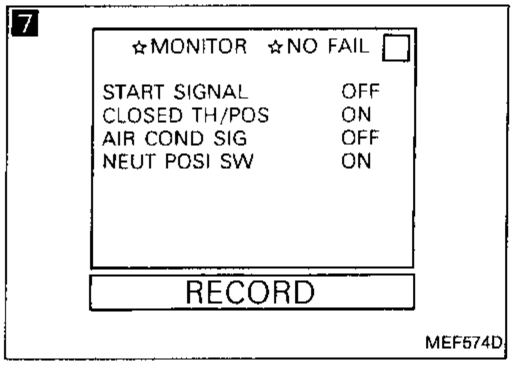
1. Adjust output voltage by rotating throttle position sensor body.
2. Disconnect throttle position sensor harness connector for a few seconds and then reconnect it.
3. Confirm that "IDLE POSITION" stays "ON".

OK ↓

(Go to Ⓑ on next page.)

Basic Inspection (Cont'd)

7

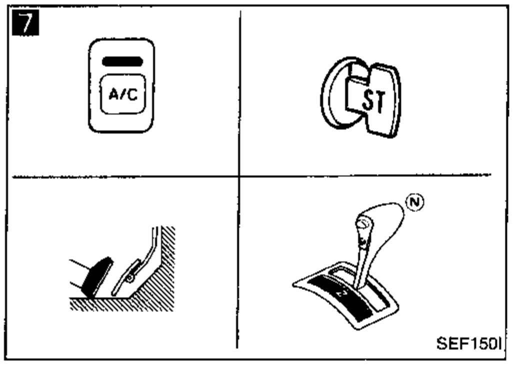


☆MONITOR ☆NO FAIL ☐

START SIGNAL	OFF
CLOSED TH/POS	ON
AIR COND SIG	OFF
NEUT POSI SW	ON

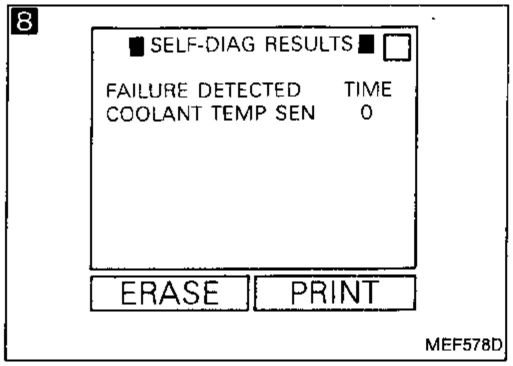
MEF574D

7



SEF150I

8

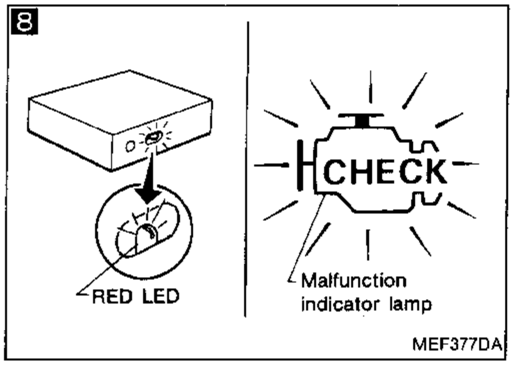


■SELF-DIAG RESULTS■ ☐

FAILURE DETECTED	TIME
COOLANT TEMP SEN	0

MEF578D

8



MEF377DA

Ⓑ

7

CHECK SWITCH INPUT SIGNAL.

Select the following switches in "DATA MONITOR" mode,

a) Start signal,
b) Idle position,
c) Air conditioner signal,
d) Neutral position (Park positioning) switch,

and check the switches' ON-OFF operation.

OR

Remove ECM from behind audio system panel and check the above switches' ON-OFF operation using voltmeter at each ECM terminal.

Switch	Condition	Voltage (V)
Start signal	IGN ON → IGN START	0→ Battery Voltage
Idle position	—	—
A/C signal	A/C OFF → A/C ON (Engine running)	Battery voltage → 0 - 0.3
Neutral position (parking) Switch	Shift lever is Neutral position → Except neutral position	0→ Battery voltage

NG → Repair or replace the malfunctioning switch or its circuit.

OK

8

READ SELF-DIAGNOSTIC RESULTS.

1. Perform "SELF-DIAG RESULTS" mode.
2. Read out self-diagnostic results.
3. Is a failure detected?

OR

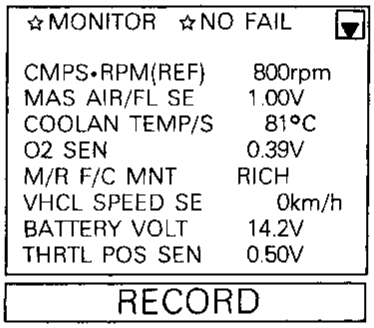
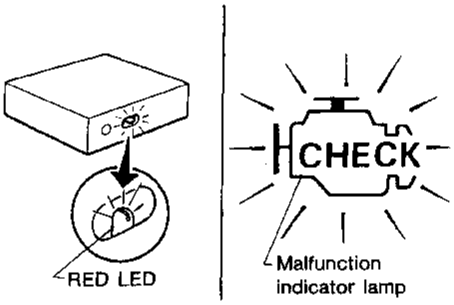
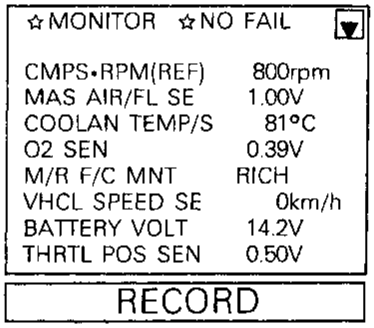
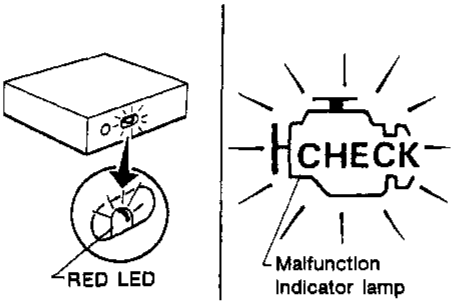
1. Set "Self-diagnostic results mode" in Diagnostic Test Mode II. (Refer to page EF & EC-237.)
2. Count the number of RED LED flashes and read out the diagnostic trouble codes.
3. Are the diagnostic trouble codes shown?

Yes → Go to the relevant inspection procedure.

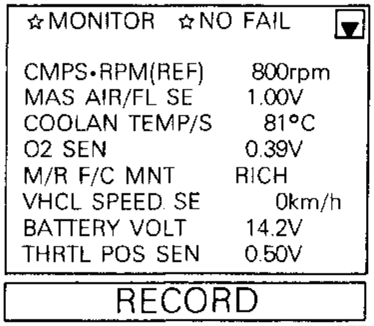
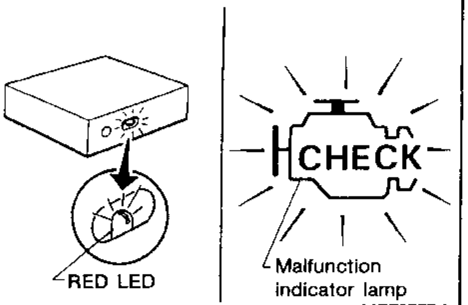
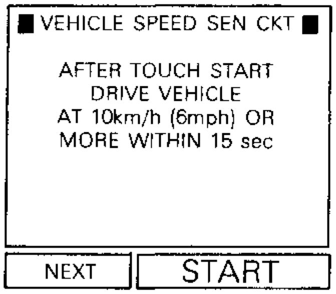
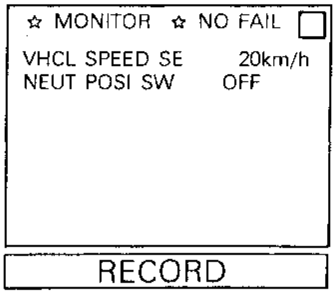
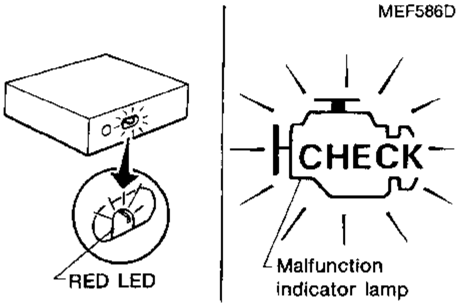
No

INSPECTION END

How to Execute On-board Diagnostic System in Diagnostic Test Mode II

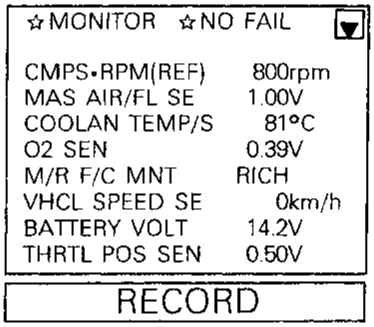
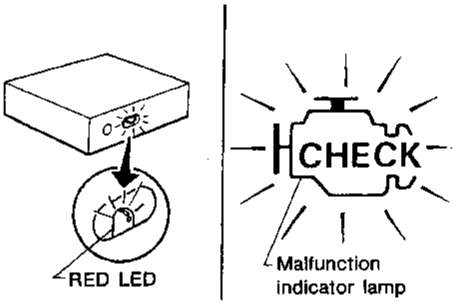
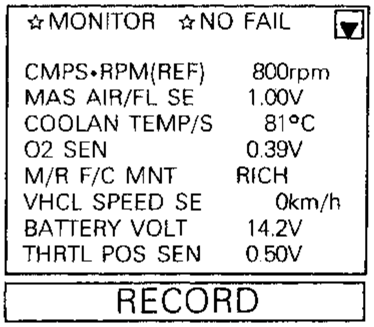
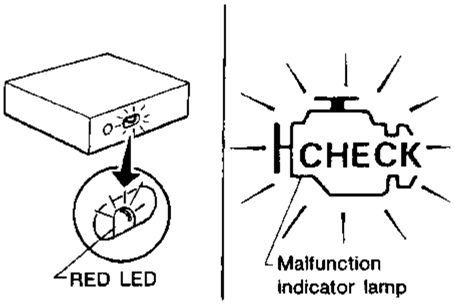
Detected items	Display Diagnostic trouble code No.	How to perform on-board diagnostic system judgement	
		Illustration	Method
Camshaft position sensor circuit	11	 ☆MONITOR ☆NO FAIL CMPS•RPM(REF) 800rpm MAS AIR/FL SE 1.00V COOLAN TEMP/S 81°C O2 SEN 0.39V M/R F/C MNT RICH VHCL SPEED SE 0km/h BATTERY VOLT 14.2V THRTL POS SEN 0.50V RECORD SEF485N  MEF377DA	**PERFORM DIAGNOSTIC TEST MODE II (SELF-DIAGNOSTIC RESULTS).** 1) Start engine. 2) Select "DATA MONITOR" mode with CONSULT. ☆ **NO FAIL** OR 2) Turn ignition switch "OFF" and then "ON". 3) Perform diagnostic test mode II (Self-diagnostic results) with ECM. **Malfunction indicator lamp and red LED display diagnostic trouble code No. 55.**
Mass air flow sensor circuit	12	 ☆MONITOR ☆NO FAIL CMPS•RPM(REF) 800rpm MAS AIR/FL SE 1.00V COOLAN TEMP/S 81°C O2 SEN 0.39V M/R F/C MNT RICH VHCL SPEED SE 0km/h BATTERY VOLT 14.2V THRTL POS SEN 0.50V RECORD SEF485N  MEF377DA	**PERFORM DIAGNOSTIC TEST MODE II (SELF-DIAGNOSTIC RESULTS).** 1) Turn ignition switch "ON" wait for at least 5 seconds and then start engine. 2) Select "DATA MONITOR" mode with CONSULT. ☆ **NO FAIL** OR 2) Perform diagnostic test mode II (Self-diagnostic results) with ECM. **Malfunction indicator lamp and red LED display diagnostic trouble code No. 55.**

How to Execute On-board Diagnostic System in Diagnostic Test Mode II (Cont'd)

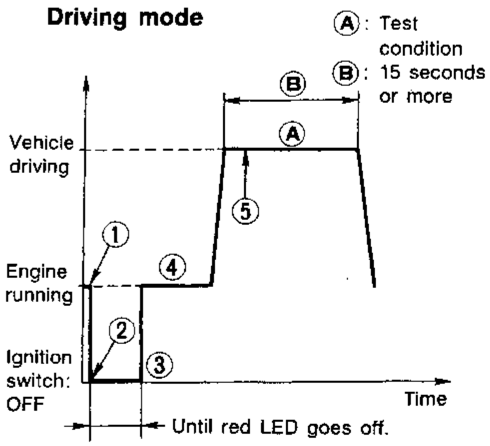
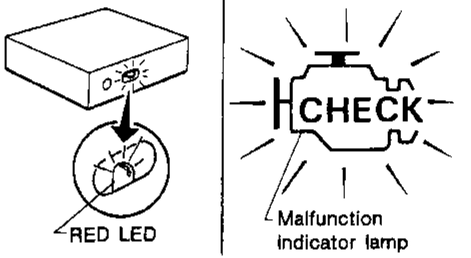
Detected items	Display Diagnostic trouble code No.	How to perform on-board diagnostic system judgement	
		Illustration	Method
Engine coolant temperature sensor circuit	13	 ☆MONITOR ☆NO FAIL CMPS•RPM(REF) 800rpm MAS AIR/FL SE 1.00V COOLAN TEMP/S 81°C O2 SEN 0.39V M/R F/C MNT RICH VHCL SPEED SE 0km/h BATTERY VOLT 14.2V THRTL POS SEN 0.50V RECORD SEF485N  MEF377DA	**PERFORM DIAGNOSTIC TEST MODE II (SELF-DIAGNOSTIC RESULTS).** 1) Turn ignition switch "ON" or start engine. 2) Select "DATA MONITOR" mode with CONSULT. ☆ **NO FAIL** OR 2) Perform diagnostic test mode II (Self-diagnostic results) with ECM. **Malfunction indicator lamp and red LED display diagnostic trouble code No. 55.**
Vehicle speed sensor circuit*	14	 ■ VEHICLE SPEED SEN CKT ■ AFTER TOUCH START DRIVE VEHICLE AT 10km/h (6mph) OR MORE WITHIN 15 sec NEXT START MEF585D  ☆ MONITOR ☆ NO FAIL ☐ VHCL SPEED SE 20km/h NEUT POSI SW OFF RECORD MEF586D  MEF377DA	**CHECK OVERALL FUNCTION.** 1) Jack up drive wheels. 2) Start engine. 3) Perform "VEHICLE SPEED SEN CKT" in "FUNCTION TEST" mode with CONSULT. OR 2) Start engine. 3) Read vehicle speed sensor signal in "DATA MONITOR" mode with CONSULT. **CONSULT value should be the same as the speedometer indication.** OR 1) Start engine and warm it up sufficiently. 2) Shift to a suitable gear position and maintain the following test drive conditions for at least 5 seconds. Driving conditions (1) Engine speed: 3,000±1,000 rpm (2) Intake manifold vacuum: −33.3±13.3 kPa (−250±100 mmHg, −9.84±3.94 inHg) (3) Vehicle speed 5 km/h (3MPH) or more 3) If malfunction indicator lamp comes on during test drive, perform diagnostic test mode II (Self-diagnostic results) with ECM. **Malfunction indicator lamp and red LED display diagnostic trouble code No. 55.**

*: Diagnostic test mode II (Self-diagnostic results) is not performed but this method provides results which are equal to the self-diagnostic results.

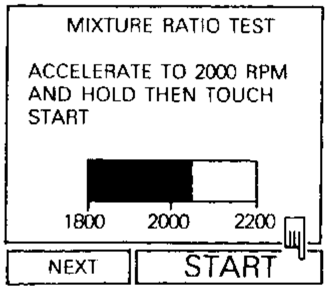
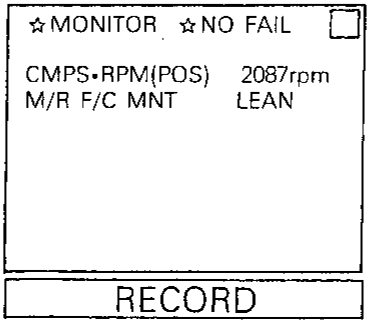
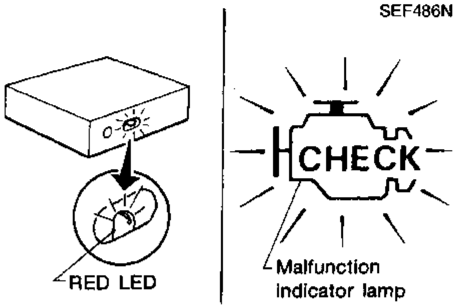
How to Execute On-board Diagnostic System in Diagnostic Test Mode II (Cont'd)

Detected items	Display Diagnostic trouble code No.	How to perform on-board diagnostic system judgement	
		Illustration	Method
Ignition signal circuit	21	 ☆MONITOR ☆NO FAIL CMPS•RPM(REF) 800rpm MAS AIR/FL SE 1.00V COOLAN TEMP/S 81°C O2 SEN 0.39V M/R F/C MNT RICH VHCL SPEED SE 0km/h BATTERY VOLT 14.2V THRTL POS SEN 0.50V RECORD SEF485N  MEF377DA	**PERFORM DIAGNOSTIC TEST MODE II (SELF-DIAGNOSTIC RESULTS).** 1) Start engine. 2) Select "DATA MONITOR" mode with CONSULT. ☆ **NO FAIL** OR 2) Turn ignition switch "OFF" and then "ON". 3) Perform diagnostic test mode II (Self-diagnostic results) with ECM.' **Malfunction indicator lamp and red LED display diagnostic trouble code No. 55.**
ECM	31	 ☆MONITOR ☆NO FAIL CMPS•RPM(REF) 800rpm MAS AIR/FL SE 1.00V COOLAN TEMP/S 81°C O2 SEN 0.39V M/R F/C MNT RICH VHCL SPEED SE 0km/h BATTERY VOLT 14.2V THRTL POS SEN 0.50V RECORD SEF485N  MEF377DA	**PERFORM DIAGNOSTIC TEST MODE II (SELF-DIAGNOSTIC RESULTS).** 1) Turn ignition switch "ON". 2) Select "DATA MONITOR" mode with CONSULT. ☆ **NO FAIL** OR 2) Perform diagnostic test mode II (Self-diagnostic results) with ECM. **Malfunction indicator lamp and red LED display diagnostic trouble code No. 55.**

How to Execute On-board Diagnostic System in Diagnostic Test Mode II (Cont'd)

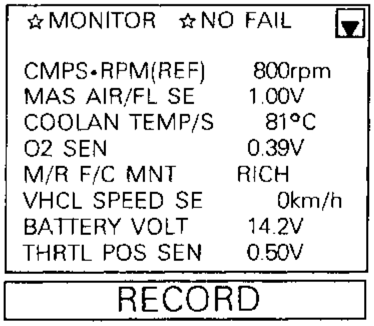
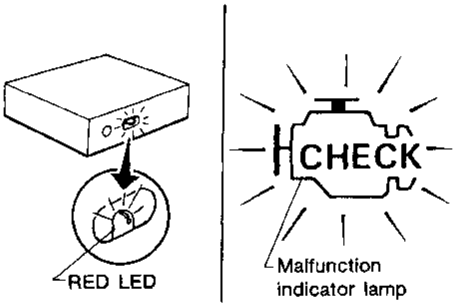
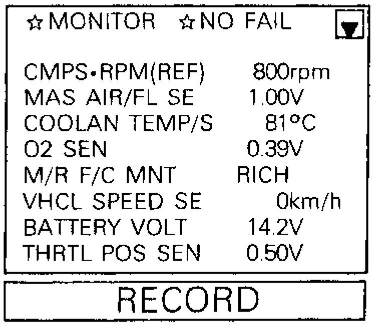
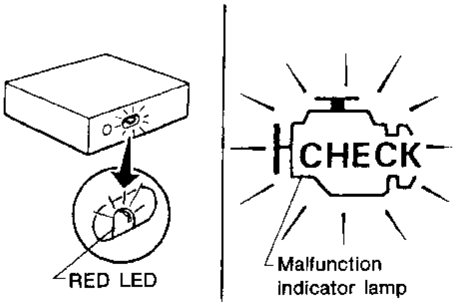
Detected items	Display Diagnostic trouble code No.	How to perform on-board diagnostic system judgement	
		Illustration	Method
EGR function	32	**A** **ROAD TEST** **Test condition** Drive vehicle under the following conditions with a suitable gear position. (1) Engine speed: A/T: 2,575 ± 625 rpm M/T: 2,725 ± 475 rpm (2) Intake manifold vacuum: A/T: −35 ± 2 kPa (−263 ± 15 mmHg, −10.3 ± 0.6 inHg) M/T: −46.5 ± 6.5 kPa (−348.8 ± 48.8 mmHg, −13.73 ± 1.92 inHg) **Driving mode**  ① Start engine and warm it up sufficiently ② Turn off ignition switch and keep it off until red LED goes off. ③ Start engine and make sure that air conditioner switch and rear defogger are turned "OFF" during test drive. ④ Keep engine running for at least 4 minutes. ⑤ Shift to suitable gear position and drive in "Test condition" for total 20 seconds or more. Note: If engine stalls or ignition switch is turned off within step ⑤, return to step ②. SEF601N **B**  MEF377DA	**PERFORM DIAGNOSTIC TEST MODE II (SELF- DIAGNOSTIC RESULTS).** 1) Turn ignition switch "ON". 2) Perform diagnostic test mode II (Self-diagnostic results) with ECM. Make sure that diagnostic trouble code No. 11 or 12 is not displayed. 3) Perform test drive under the following conditions. (1) Warm up engine sufficiently. (2) Use test driving modes indicated in figure **A** . 4) If malfunction indicator lamp comes on during test drive, perform diagnostic test mode II (Self-diagnostic results) with ECM. **B** **Malfunction indicator lamp and red LED display diagnostic trouble code No. 55.**

How to Execute On-board Diagnostic System in Diagnostic Test Mode II (Cont'd)

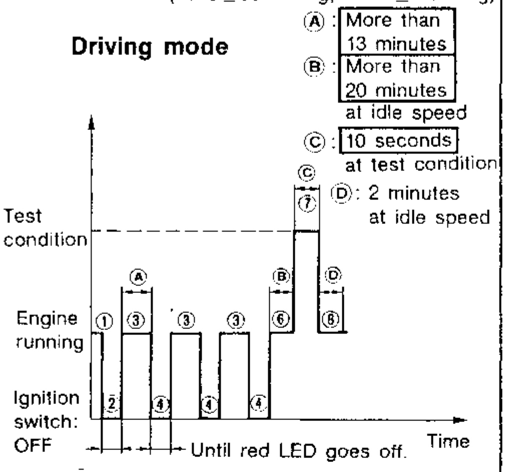
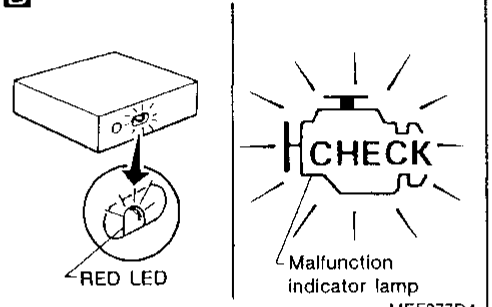
Detected items	Display Diagnostic trouble code No.	How to perform on-board diagnostic system judgement	
		Illustration	Method
Heated oxygen sensor/Oxygen sensor circuit*	33	 MIXTURE RATIO TEST ACCELERATE TO 2000 RPM AND HOLD THEN TOUCH START SEF115L  ☆MONITOR ☆NO FAIL ☐ CMPS•RPM(POS) 2087rpm M/R F/C MNT LEAN SEF486N  MEF377DA	**CHECK OVERALL FUNCTION.** 1) Start engine and warm it up sufficiently. 2) Perform "MIXTURE RATIO TEST" in "FUNCTION TEST" mode with CONSULT. OR 2) Make sure that "M/R F/C MNT(R)" in "DATA MONITOR" mode indicates "RICH" and "LEAN" periodically more than 5 times during 10 seconds at 2,000 rpm OR 2) Make sure that malfunction indicator lamp and red LED on ECM go on and off periodically more than 5 times during 10 seconds at 2,000 rpm in diagnostic test mode II (Self-diagnostic results).

*: Diagnostic test mode II (self-diagnostic results) is not performed but this method provides results which are equal to the self-diagnostic results.

How to Execute On-board Diagnostic System in Diagnostic Test Mode II (Cont'd)

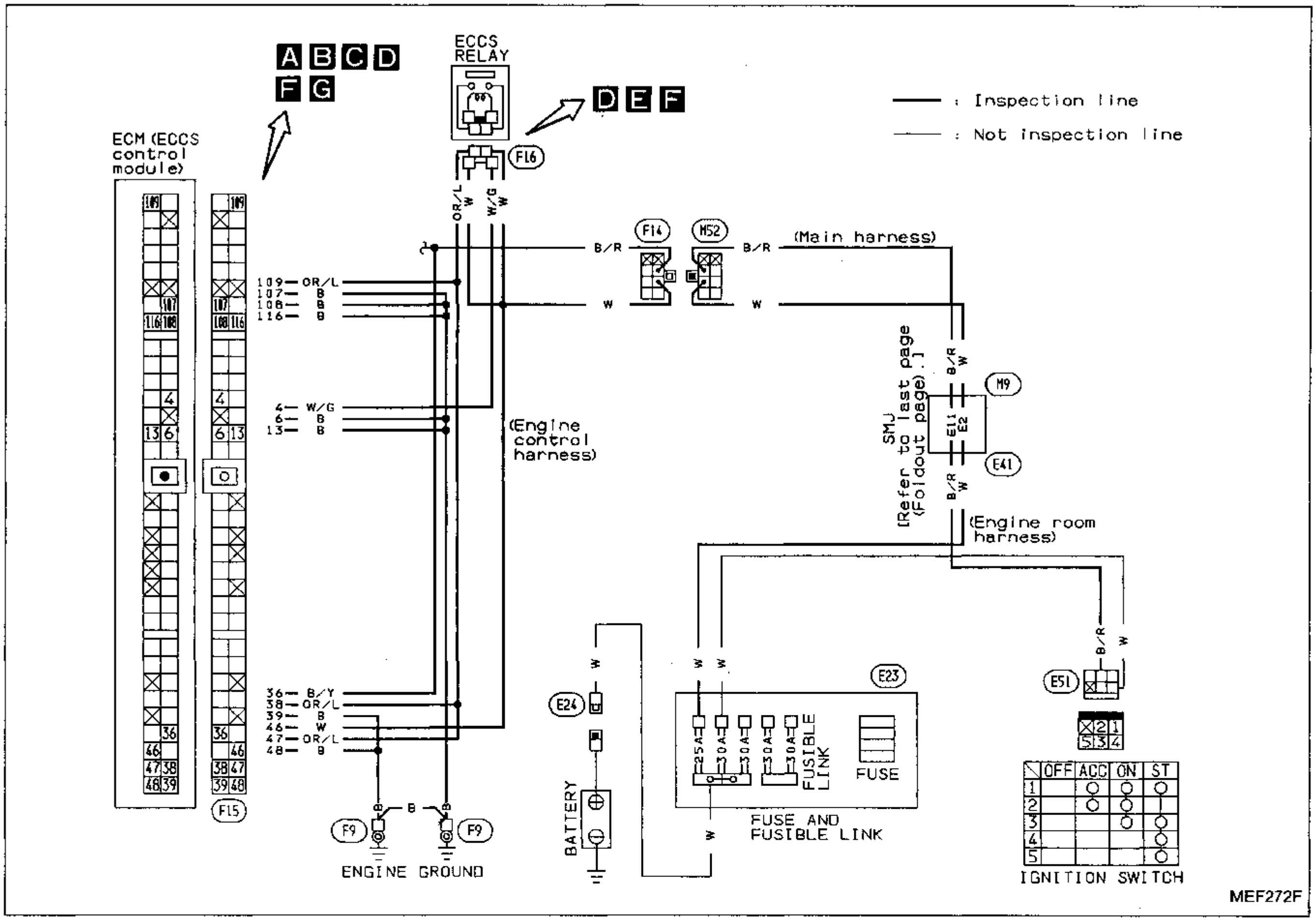
Detected items	Display Diagnostic trouble code No.	How to perform on-board diagnostic system judgement	
		Illustration	Method
EGR temperature sensor circuit	35	 ☆MONITOR ☆NO FAIL CMPS•RPM(REF) 800rpm MAS AIR/FL SE 1.00V COOLAN TEMP/S 81°C O2 SEN 0.39V M/R F/C MNT RICH VHCL SPEED SE 0km/h BATTERY VOLT 14.2V THRTL POS SEN 0.50V RECORD SEF485N  MEF377DA	**PERFORM DIAGNOSTIC TEST MODE II (SELF-DIAGNOSTIC RESULTS).** 1) Start engine and warm it up sufficiently. 2) Perform test drive more than 15 minutes. 3) Select "DATA MONITOR" mode with CONSULT. **☆ NO FAIL** OR 2) Perform test drive more than 15 minutes. 3) Turn ignition switch "OFF" and then "ON". 4) Perform diagnostic test mode II (Self-diagnostic results) with ECM. **Malfunction indicator lamp and red LED display diagnostic trouble code No. 55.**
Throttle position sensor circuit	43	 ☆MONITOR ☆NO FAIL CMPS•RPM(REF) 800rpm MAS AIR/FL SE 1.00V COOLAN TEMP/S 81°C O2 SEN 0.39V M/R F/C MNT RICH VHCL SPEED SE 0km/h BATTERY VOLT 14.2V THRTL POS SEN 0.50V RECORD SEF485N  MEF377DA	**PERFORM DIAGNOSTIC TEST MODE II (SELF-DIAGNOSTIC RESULTS).** 1) Jack up drive wheels 2) Start engine. 3) Shift to a suitable gear position (Except "P" or "N"), and run engine at vehicle speed of 5 km/h (3 MPH) or higher for at least 10 seconds. 4) Select "DATA MONITOR" mode with CONSULT. **☆ NO FAIL** OR 4) Turn ignition switch "OFF" and then "ON". 5) Perform diagnostic test mode II (Self-diagnostic results) with ECM. **Malfunction indicator lamp and red LED display diagnostic trouble code No. 55.**

How to Execute On-board Diagnostic System in Diagnostic Test Mode II (Cont'd)

Detected items	Display Diagnostic trouble code No.	How to perform on-board diagnostic system judgement	
		Illustration	Method
Injector leak	45	**A** **ROAD TEST** **Test conditions** Drive vehicle under the following conditions with suitable gear position. (1) Engine speed: A/T: 2,000 ± 500 rpm M/T: 2,500 ± 500 rpm (2) Intake manifold vacuum: A/T: −30 ± 10 kPa (−225 ± 75 mmHg, −8.9 ± 3.0 inHg) M/T: −47 ± 13 kPa (−353 ± 98 mmHg, −13.9 ± 3.8 inHg)  ① Start engine and warm it up sufficiently. ② Turn off ignition switch and keep it off until red LED goes off. ③ Start engine and keep it running for more than 13 minutes. ④ Turn off ignition switch and keep it off until red LED goes off. ⑤ Repeat steps ③ through ④ for a total of 3 times. ⑥ Start engine and keep it at idle speed for more than 20 minutes. If engine stalls or ignition is turned off under 13 minutes after engine is starting, return to step ②. If over 13 minutes, restart step ⑥. ⑦ Shift to suitable gear position and drive in "Test condition" for at least 10 seconds. If following condition occurs during step ⑦, return to step ⑥. ● Engine is raced over 4,000 rpm or hardly accelerated for more than 10 seconds. ● Engine stalls or ignition is turned off. ⑧ Keep engine at idle speed for more than 2 minutes. SEF602NA **B**  MEF377DA	**PERFORM DIAGNOSTIC TEST MODE II (SELF-DIAGNOSTIC RESULTS).** 1) Perform engine racing test as indicated in figure **A** 2) If malfunction indicator lamp comes on during test drive, perform diagnostic test mode II (Self-diagnostic results) with ECM. **B** **Malfunction indicator lamp and red LED display diagnostic trouble code No. 55.**

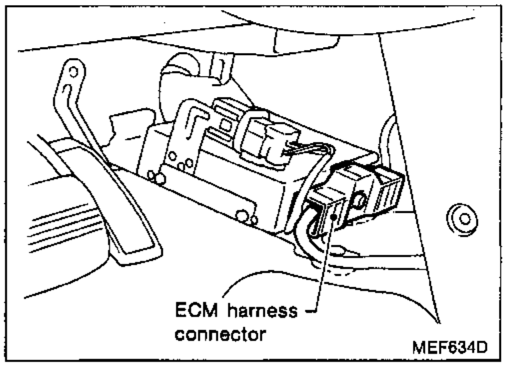
Diagnostic Procedure 1

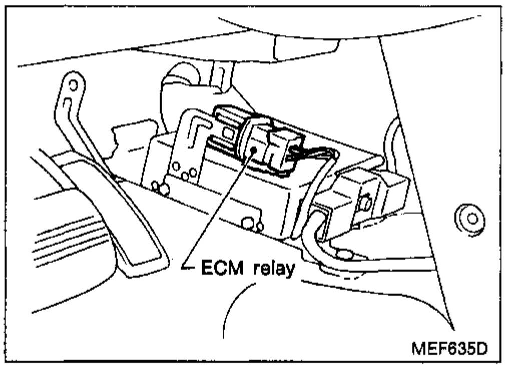
MAIN POWER SUPPLY AND GROUND CIRCUIT (Not self-diagnostic item)



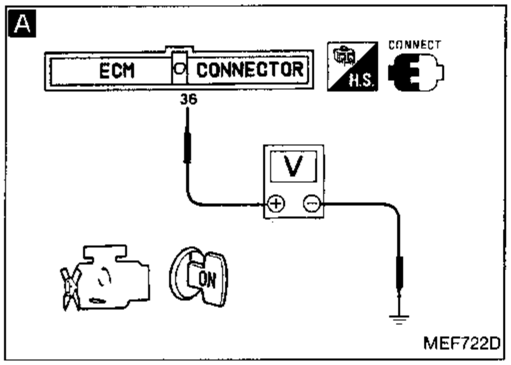
	OFF	ACC	ON	ST
1		○	○	○
2		○	○	
3			○	○
4				○
5				○

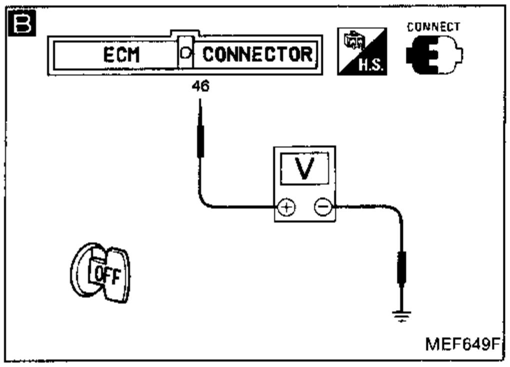
Harness layout

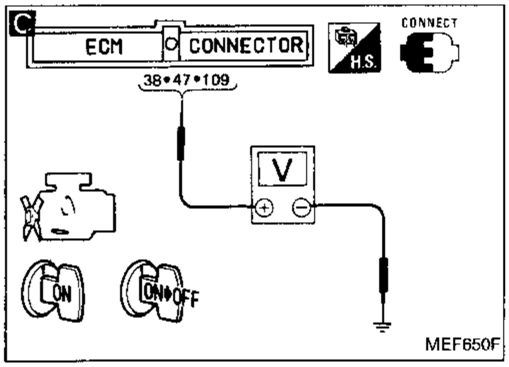




MAIN POWER SUPPLY AND GROUND CIRCUIT (Not self-diagnostic item)







INSPECTION START

Start engine.
Is engine running?

No → **A**

CHECK POWER SUPPLY-1.

1) Turn ignition switch "ON".
2) Check voltage between ECM terminal ㊱ and ground with CONSULT or tester.
   Voltage:
   Battery voltage

If NG, check the following.

- Harness connectors F14, M52
- Harness connectors M9, E41
- Harness continuity between ECM and ignition switch

If NG, repair harness or connectors.

OK

Go to "CHECK GROUND CIRCUIT".

Yes → **B**

CHECK POWER SUPPLY-II.

1) Stop engine.
2) Check voltage between ECM terminal ㊻ and ground with CONSULT or tester.
   Voltage: Battery voltage

NG

Check the following.

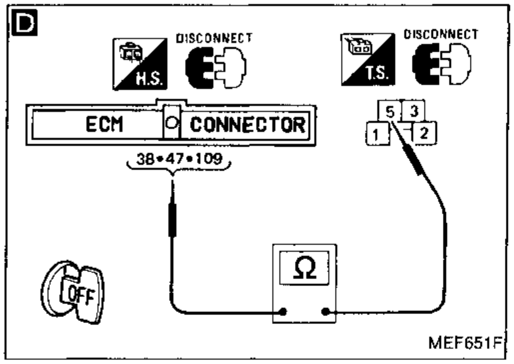
- Harness connectors F14, M52
- Harness connectors M9, E41
- 25A fusible link
- Harness continuity between ECM and battery

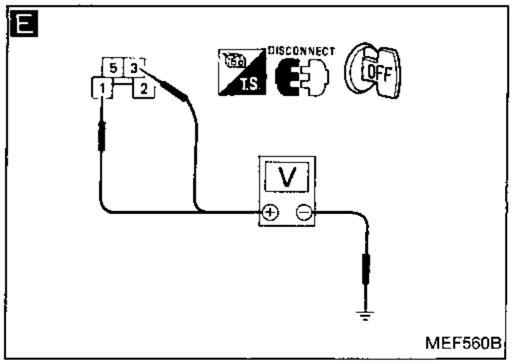
If NG, repair harness or connectors.

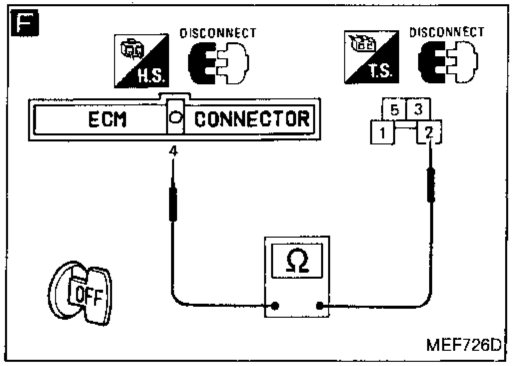
OK

Ⓐ

MAIN POWER SUPPLY AND GROUND CIRCUIT (Not self-diagnostic item)







Ⓐ

C

CHECK POWER SUPPLY-III.
1) Turn ignition switch "ON" and then "OFF".
2) Check voltage between terminals ㊳, ㊼, (109) and ground with CONSULT or tester.
Voltage:
Ignition switch "ON" and for a few seconds after turning ignition switch "OFF"
Battery voltage
A few seconds after turning ignition switch "OFF"
Approximately 0V

OK → Go to "CHECK GROUND CIRCUIT".

Case-1: Battery voltage does not exist for a few second.
Case-2: Battery voltage exists for more than a few seconds.

NG

Case-2 → Go to "CHECK COMPONENT (ECCS relay)".

Case-1

D

CHECK HARNESS CONTINUITY BETWEEN ECCS RELAY AND ECM.
1) Disconnect ECM harness connector.
2) Disconnect ECCS relay.
3) Check harness continuity between ECM terminals ㊳, ㊼, (109) and terminal ⑤.
Continuity should exist.

NG → Repair harness or connectors.

OK

E

CHECK VOLTAGE BETWEEN ECCS RELAY AND GROUND.
1) Check voltage between terminals ①, ③ and ground with CONSULT or tester.
Voltage: Battery voltage

NG → Check the following.
- Harness continuity between ECCS relay and harness connector (F14)

If NG, repair harness or connectors.

OK

F

CHECK OUTPUT SIGNAL CIRCUIT.
1) Check harness continuity between ECM terminal ④ and terminal ②.
Continuity should exist.

NG → Repair harness or connectors.

OK

CHECK COMPONENT
(ECCS relay).
Refer to "Electrical Components Inspection".
(See page EF & EC-377.)

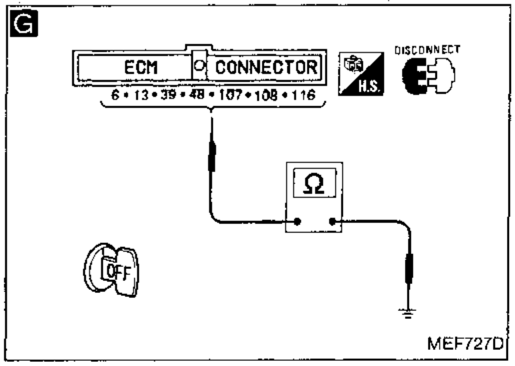
NG → Replace ECCS relay.

OK

Ⓑ

MAIN POWER SUPPLY AND GROUND CIRCUIT (Not self-diagnostic item)

G



Ⓑ

G

CHECK GROUND CIRCUIT.
1) Turn ignition switch "OFF".
2) Disconnect ECM harness connector.
3) Check harness continuity between ECM terminals ⑥, ⑬, ㊴, ㊽, (107), (108), (116) and engine ground.
Continuity should exist.

NG → Repair harness or connectors.

OK ↓

Disconnect and reconnect harness connectors in the circuit, and retest.

Trouble is not fixed. ↓

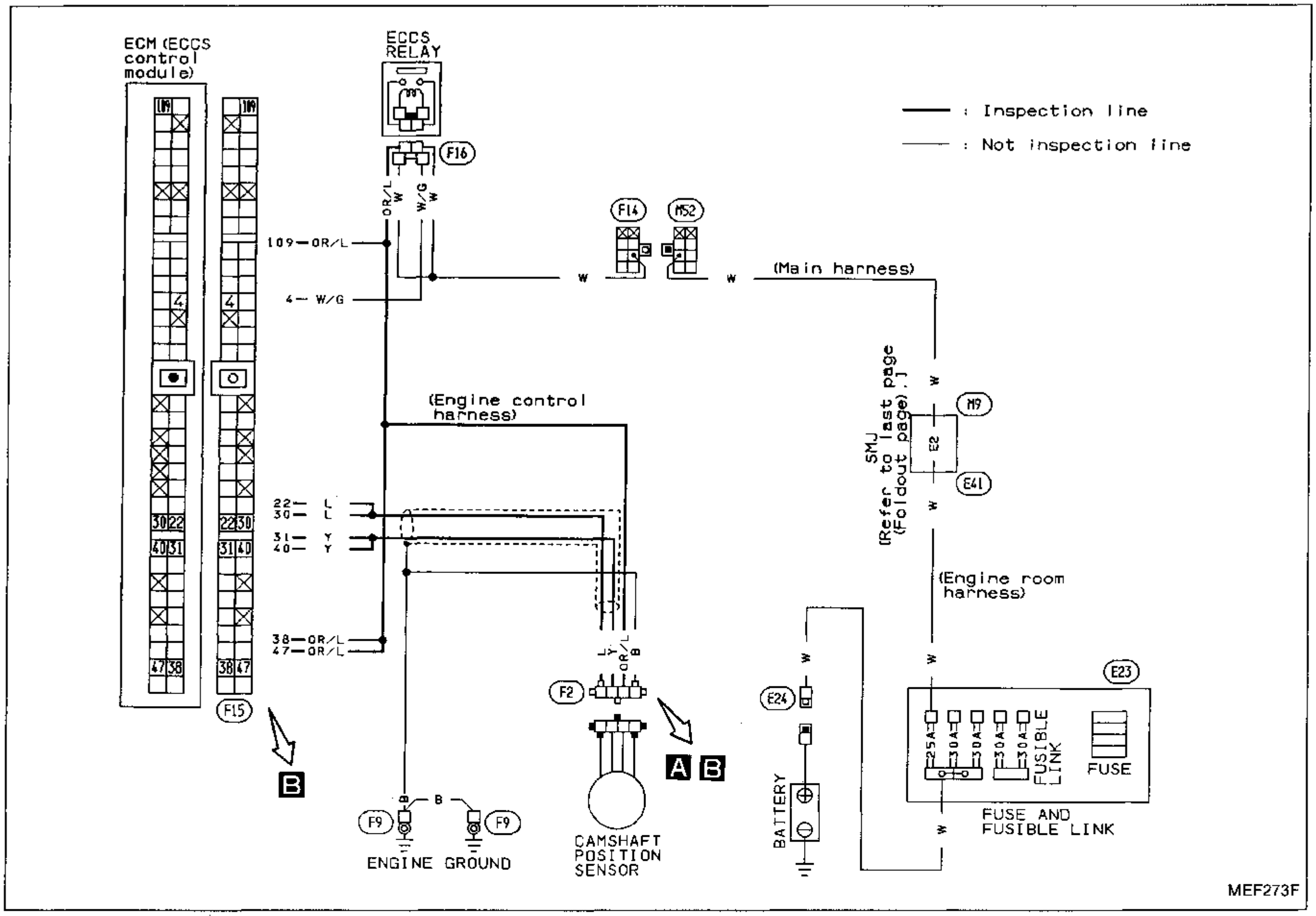
Check ECM pin terminals for damage or the connection of ECM harness connector. Reconnect ECM harness connector and retest.

↓

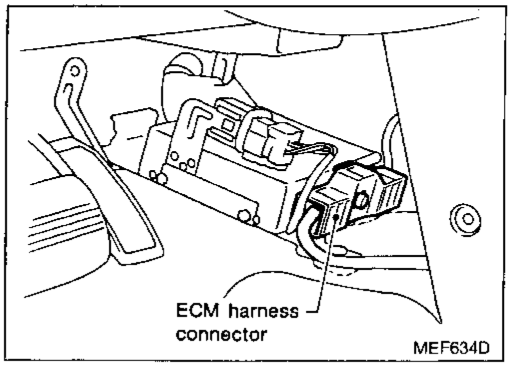
INSPECTION END

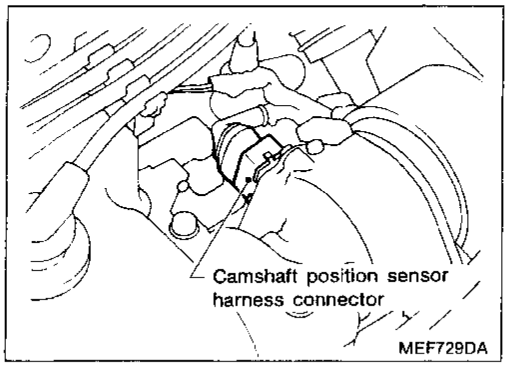
Diagnostic Procedure 2

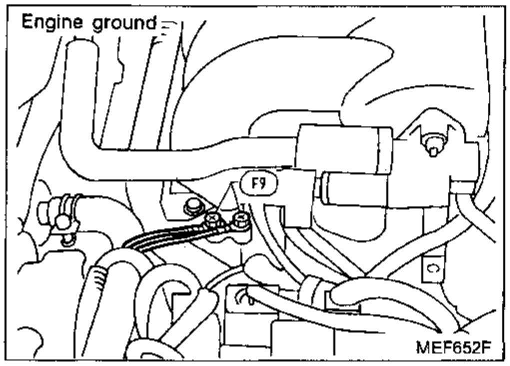
CAMSHAFT POSITION SENSOR (Diagnostic trouble code No. 11)



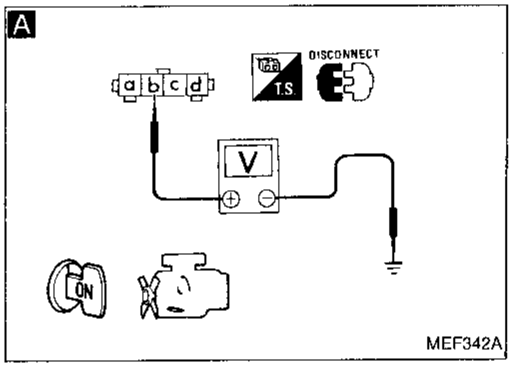
Harness layout

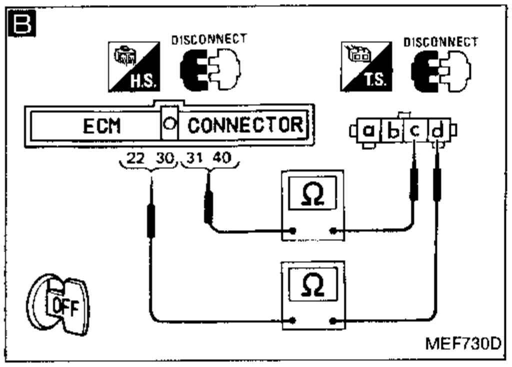






CAMSHAFT POSITION SENSOR (Diagnostic trouble code No. 11)





INSPECTION START

PERFORM DIAGNOSTIC TEST MODE II (SELF-DIAGNOSTIC RESULTS).
See page EF & EC-255.

OK → Go to "CAMSHAFT POSITION SENSOR (Not self-diagnostic item)".

NG

A

CHECK POWER SUPPLY.
1) Turn ignition switch "OFF".
2) Disconnect camshaft position sensor harness connector.
3) Turn ignition switch "ON".
4) Check voltage between terminal ⓑ and ground with CONSULT or tester.
Voltage: Battery voltage

NG → Check the following.
- Harness continuity between camshaft position sensor and ECM
- Harness continuity between camshaft position sensor and ECCS relay

If NG, repair harness or connectors.

OK

Loosen and retighten ground screws.

B

CHECK INPUT SIGNAL CIRCUIT.
1) Turn ignition switch "OFF".
2) Disconnect ECM harness connector.
3) Check harness continuity between terminal ⓓ and ECM terminals ㉒, ㉚ (180° signal), terminal ⓒ and ECM terminals ㉛, ㊵ (1° signal).
Continuity should exist.

NG → Repair harness or connectors.

OK

CHECK COMPONENT
(Camshaft position sensor).
Refer to "Electrical Components Inspection".
(See page EF & EC-372.)

NG → Replace camshaft position sensor.

OK

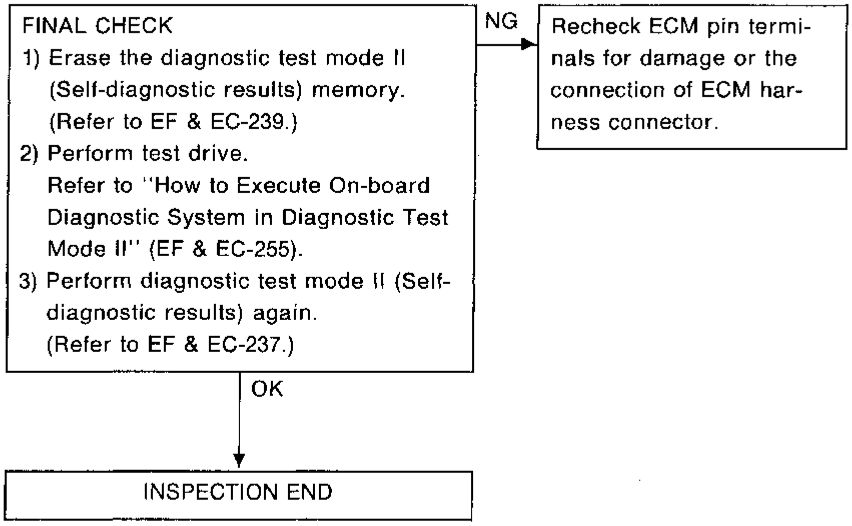
Disconnect and reconnect harness connectors in the circuit, and retest.

Trouble is not fixed.

Check ECM pin terminals for damage or the connection of ECM harness connector. Reconnect ECM harness connector and retest.

CAMSHAFT POSITION SENSOR (Diagnostic trouble code No. 11)

Perform FINAL CHECK by the following procedure after repair is completed.



FINAL CHECK
1) Erase the diagnostic test mode II (Self-diagnostic results) memory. (Refer to EF & EC-239.)
2) Perform test drive. Refer to "How to Execute On-board Diagnostic System in Diagnostic Test Mode II" (EF & EC-255).
3) Perform diagnostic test mode II (Self-diagnostic results) again. (Refer to EF & EC-237.)

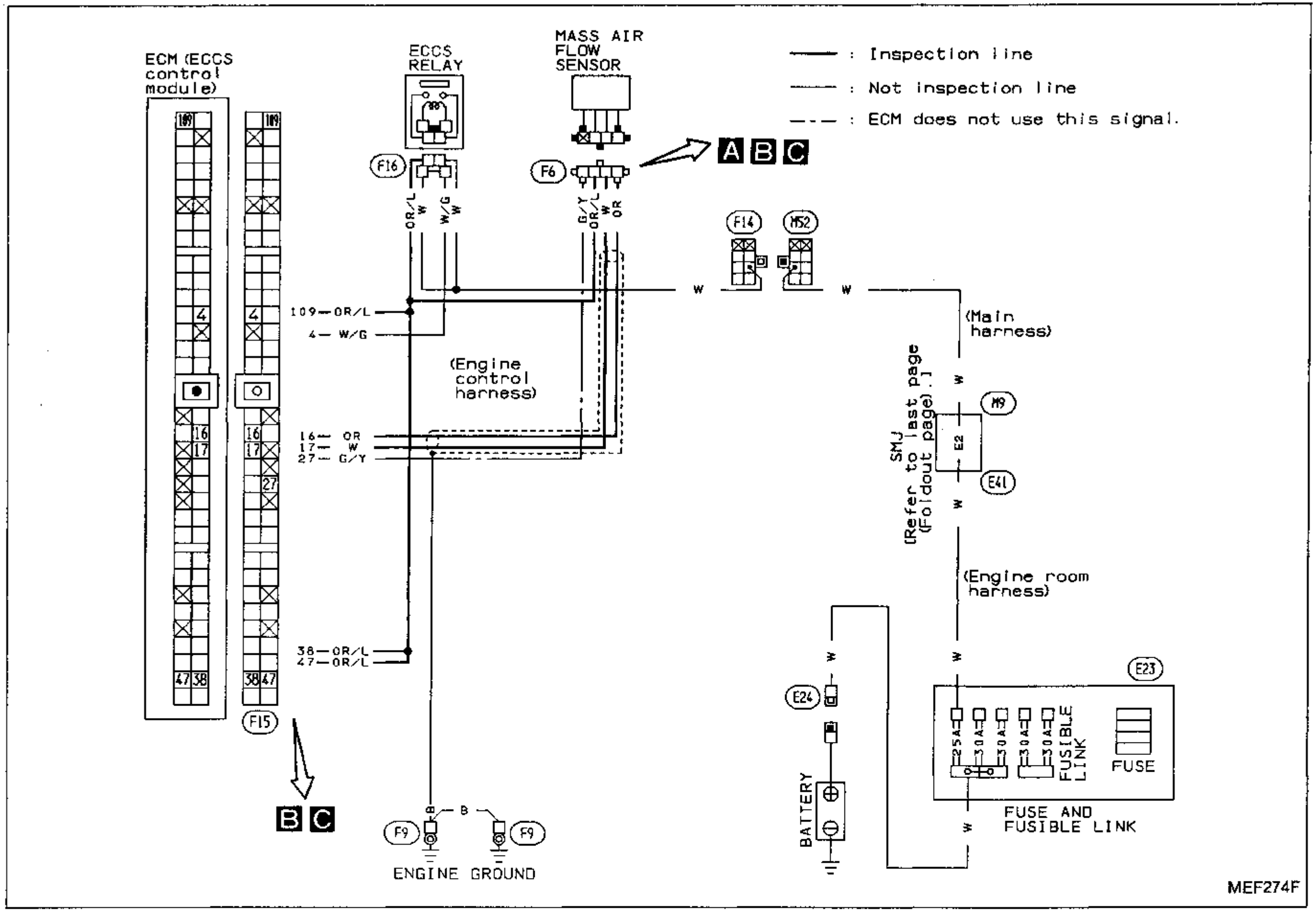
NG → Recheck ECM pin terminals for damage or the connection of ECM harness connector.

OK ↓

INSPECTION END

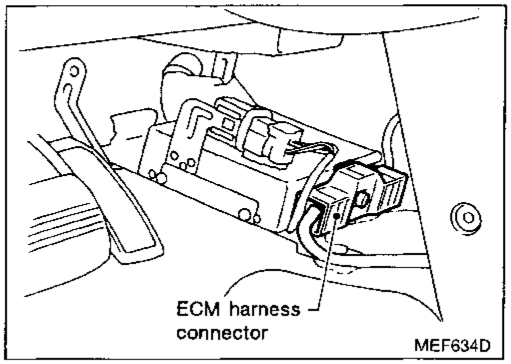
Diagnostic Procedure 3

MASS AIR FLOW SENSOR (Diagnostic trouble code No. 12) (Malfunction indicator lamp item)

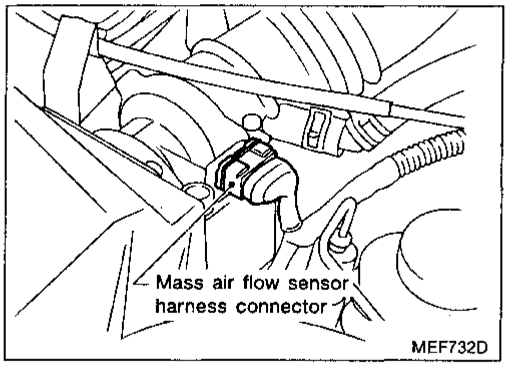


MEF274F

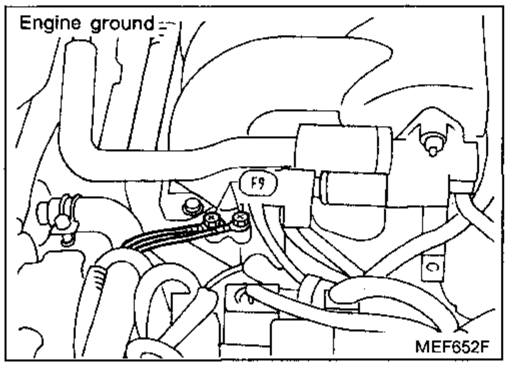
Harness layout



MEF634D

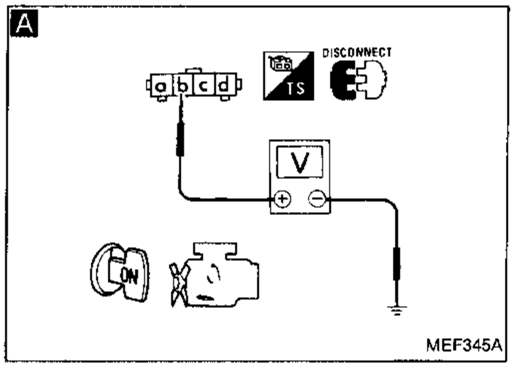


MEF732D

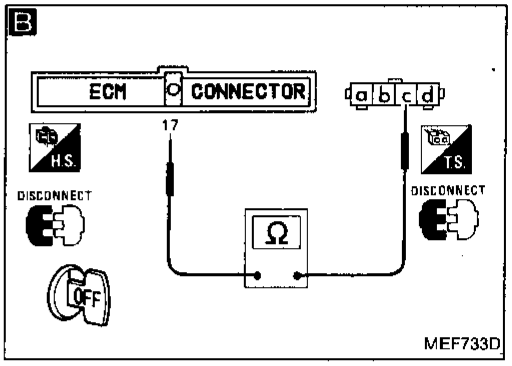


MEF652F

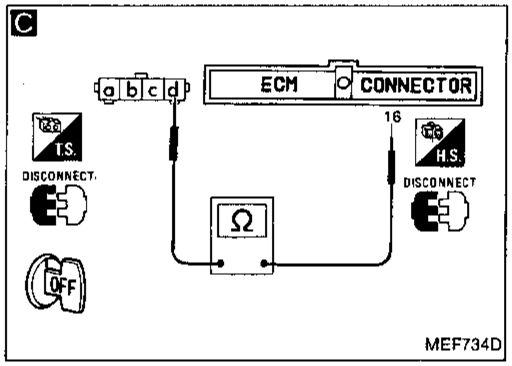
MASS AIR FLOW SENSOR (Diagnostic trouble code No. 12)



MEF345A



MEF733D



MEF734D

CHECK (Malfunction indicator lamp item)

INSPECTION START

PERFORM DIAGNOSTIC TEST MODE II (SELF-DIAGNOSTIC RESULTS). See page EF & EC-255.

OK → INSPECTION END

NG ↓

A

CHECK POWER SUPPLY.
1) Turn ignition switch "OFF".
2) Disconnect mass air flow sensor harness connector.
3) Turn ignition switch "ON".
4) Check voltage between terminal ⓑ and ground with CONSULT or tester.
Voltage: Battery voltage

NG → Check the following.
- Harness continuity between mass air flow sensor and ECM
- Harness continuity between mass air flow sensor and ECCS relay

If NG, repair harness or connectors.

OK ↓

B

CHECK GROUND CIRCUIT.
1) Turn ignition switch "OFF".
2) Disconnect ECM harness connector.
3) Loosen and retighten ground screws.
4) Check harness continuity between terminal ⓒ and ECM terminal ⑰.
Continuity should exist.

NG → Repair harness or connectors.

OK ↓

C

CHECK INPUT SIGNAL CIRCUIT.
1) Check harness continuity between terminal ⓓ and ECM terminal ⑯.
Continuity should exist.

NG → Repair harness or connectors.

OK ↓

CHECK COMPONENT (Mass air flow sensor). Refer to "Electrical Components Inspection". (See page EF & EC-372.)

NG → Replace mass air flow sensor.

OK ↓

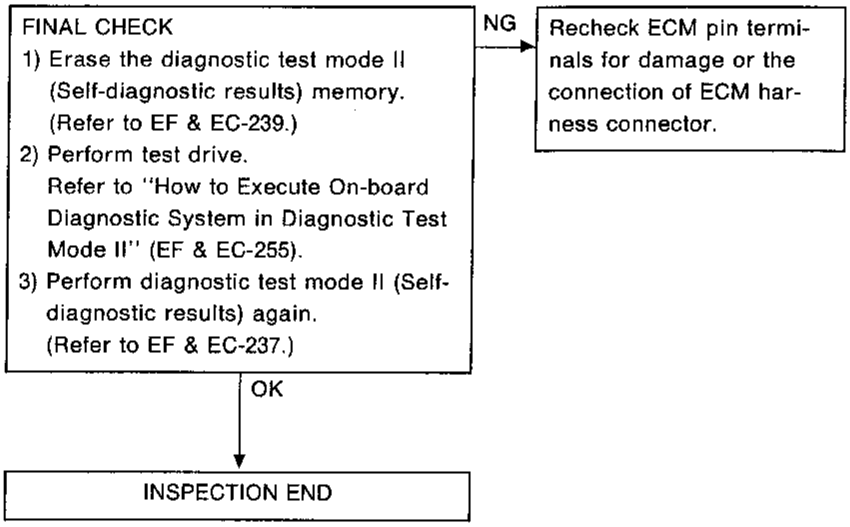
Disconnect and reconnect harness connectors in the circuit, and retest.

Trouble is not fixed. ↓

Check ECM pin terminals for damage or the connection of ECM harness connector. Reconnect ECM harness connector and retest.

MASS AIR FLOW SENSOR (Diagnostic trouble code No. 12) (Malfunction indicator lamp item)

Perform FINAL CHECK by the following procedure after repair is completed.



FINAL CHECK
1) Erase the diagnostic test mode II (Self-diagnostic results) memory. (Refer to EF & EC-239.)
2) Perform test drive. Refer to "How to Execute On-board Diagnostic System in Diagnostic Test Mode II" (EF & EC-255).
3) Perform diagnostic test mode II (Self-diagnostic results) again. (Refer to EF & EC-237.)

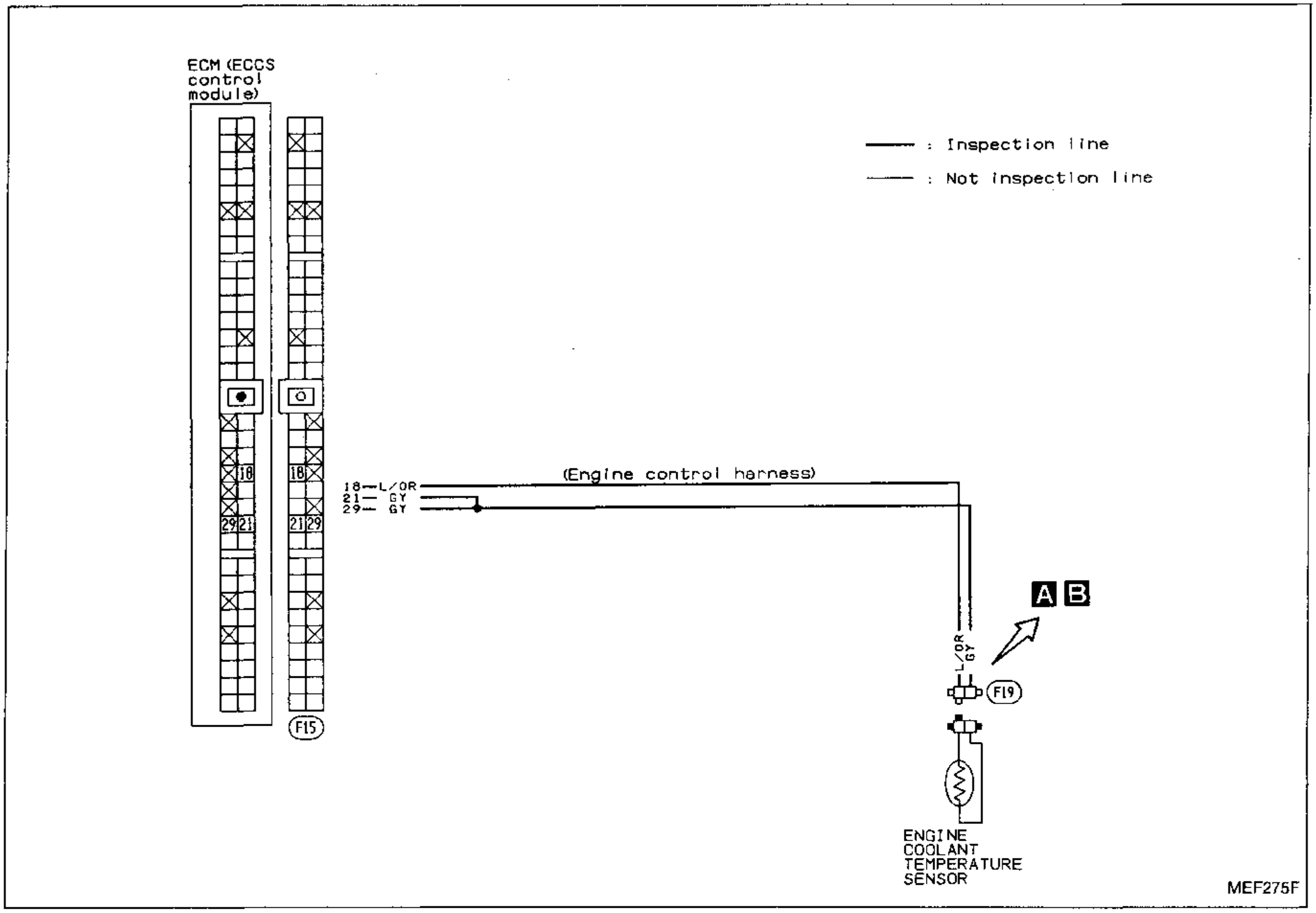
NG → Recheck ECM pin terminals for damage or the connection of ECM harness connector.

OK ↓

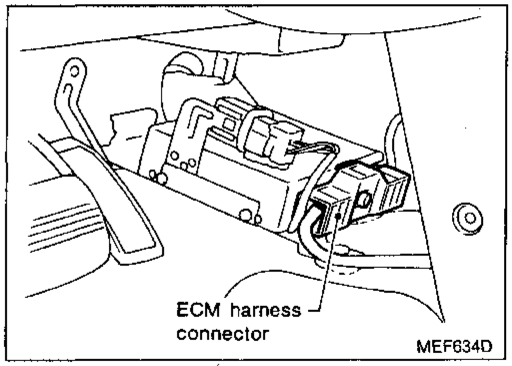
INSPECTION END

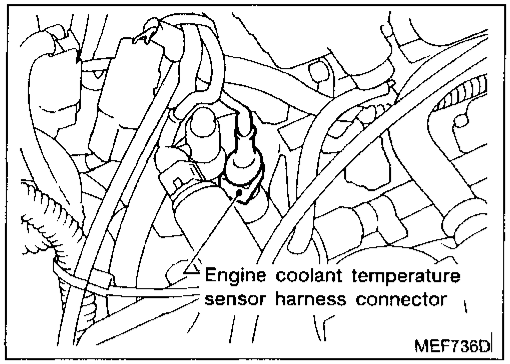
Diagnostic Procedure 4

ENGINE COOLANT TEMPERATURE SENSOR (Diagnostic trouble code No. 13) (Malfunction indicator lamp item)

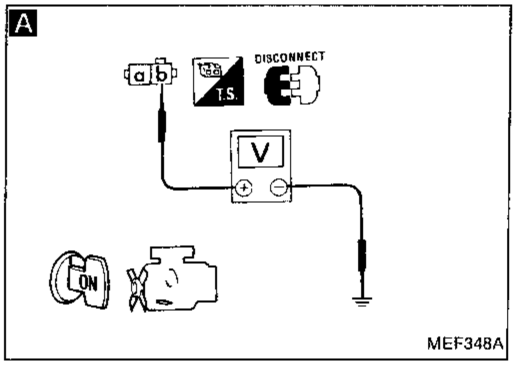


Harness layout

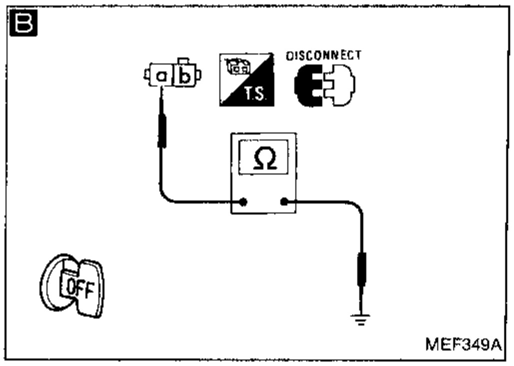




ENGINE COOLANT TEMPERATURE SENSOR (Diagnostic trouble code No. 13)



MEF348A



MEF349A

CHECK (Malfunction indicator lamp item)

INSPECTION START

PERFORM DIAGNOSTIC TEST MODE II (SELF-DIAGNOSTIC RESULTS). See page EF & EC-255.

OK → INSPECTION END

NG

A CHECK POWER SUPPLY.
1) Turn ignition switch "OFF".
2) Disconnect engine coolant temperature sensor harness connector.
3) Turn ignition switch "ON".
4) Check voltage between terminal ⓑ and ground with CONSULT or tester.
Voltage: Approximately 5V

NG → Repair harness or connectors.

OK

B CHECK GROUND CIRCUIT.
1) Turn ignition switch "OFF".
2) Check harness continuity between terminal ⓐ and engine ground.
Continuity should exist.

NG → Repair harness or connectors.

OK

CHECK COMPONENT (Engine coolant temperature sensor). Refer to "Electrical Components Inspection". (See page EF & EC-372.)

NG → Replace engine coolant temperature sensor.

OK

Disconnect and reconnect harness connectors in the circuit, and retest.

Trouble is not fixed.

Check ECM pin terminals for damage or the connection of ECM harness connector. Reconnect ECM harness connector and retest.

Perform FINAL CHECK by the following procedure after repair is completed.

FINAL CHECK
1) Erase the diagnostic test mode II (Self-diagnostic results) memory. (Refer to EF & EC-239.)
2) Perform test drive. Refer to "How to Execute On-board Diagnostic System in Diagnostic Test Mode II" (EF & EC-255).
3) Perform diagnostic test mode II (Self-diagnostic results) again. (Refer to EF & EC-237.)

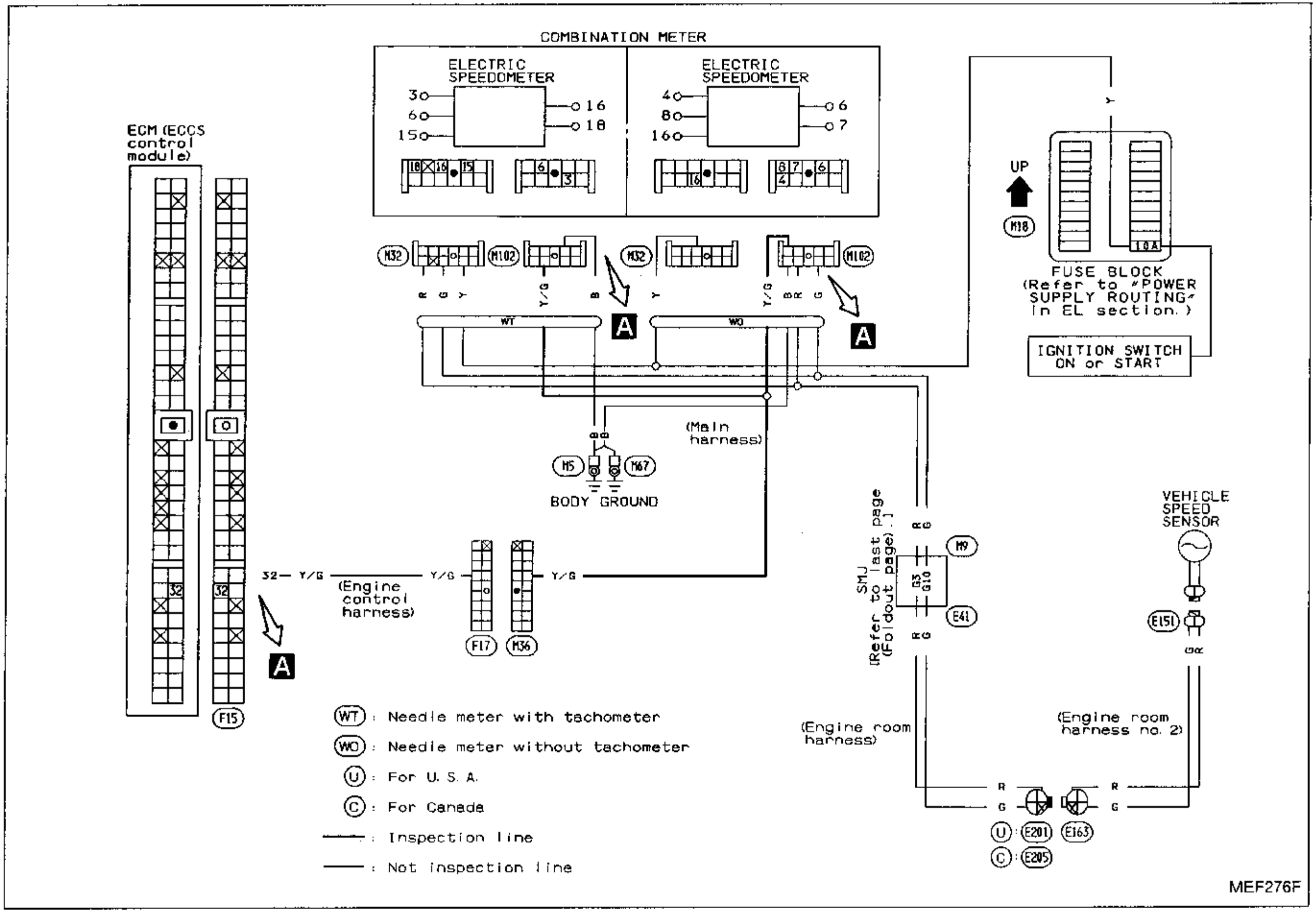
NG → Recheck ECM pin terminals for damage or the connection of ECM harness connector.

OK

INSPECTION END

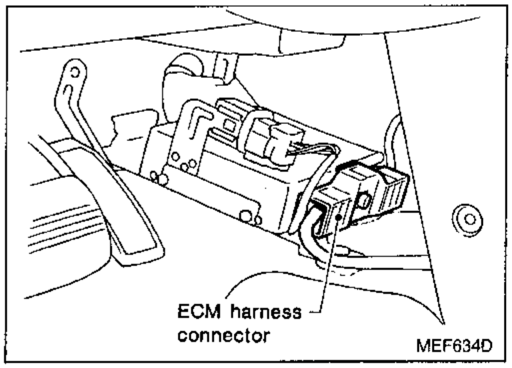
Diagnostic Procedure 5

VEHICLE SPEED SENSOR (Diagnostic trouble code No. 14) (Malfunction indicator lamp item)



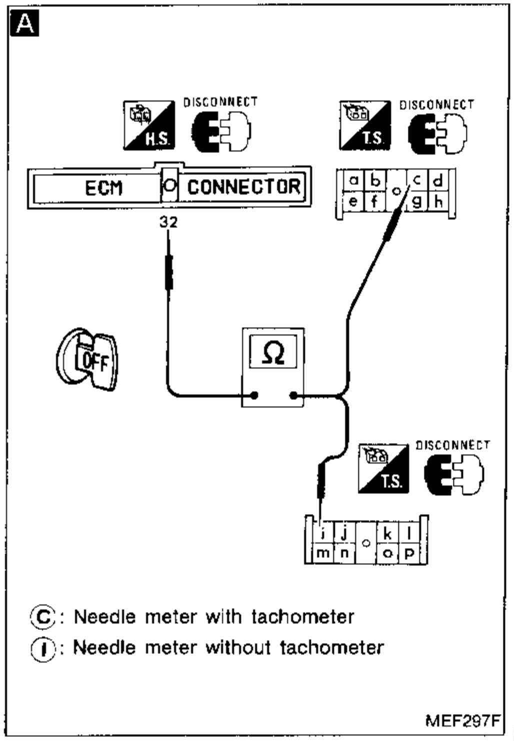
MEF276F

Harness layout



MEF634D

VEHICLE SPEED SENSOR (Diagnostic trouble code No. 14)



ⓒ: Needle meter with tachometer

ⓘ: Needle meter without tachometer

(Malfunction indicator lamp item)

INSPECTION START

↓

CHECK OVERALL FUNCTION.
See page EF & EC-255.

OK → INSPECTION END

NG ↓

CHECK SPEEDOMETER FUNCTION.
Make sure that speedometer functions properly.

NG → Check vehicle speed sensor and its circuit.
(Refer to EL section.)

OK ↓

A

CHECK INPUT SIGNAL CIRCUIT.
1) Turn ignition switch "OFF".
2) Disconnect ECM harness connector and combination meter harness connector.
3) Check harness continuity between ECM terminal ㉜ and terminal ⓒ (Needle meter with tachometer), ⓘ (Needle meter without tachometer).
Continuity should exist.

NG → Check the following.
- Harness connectors F17, M36
- Harness continuity between ECM and combination meter

If NG, repair harness or connectors.

OK ↓

Disconnect and reconnect harness connectors in the circuit, and retest.

↓ Trouble is not fixed.

Check ECM pin terminals for damage or the connection of ECM harness connector. Reconnect ECM harness connector and retest.

Perform FINAL CHECK by the following procedure after repair is completed.

FINAL CHECK
1) Erase the diagnostic test mode II (Self-diagnostic results) memory. (Refer to EF & EC-239.)
2) Perform test drive.
Refer to "How to Execute On-board Diagnostic System in Diagnostic Test Mode II" (EF & EC-255).
3) Perform diagnostic test mode II (Self-diagnostic results) again.
(Refer to EF & EC-237.)

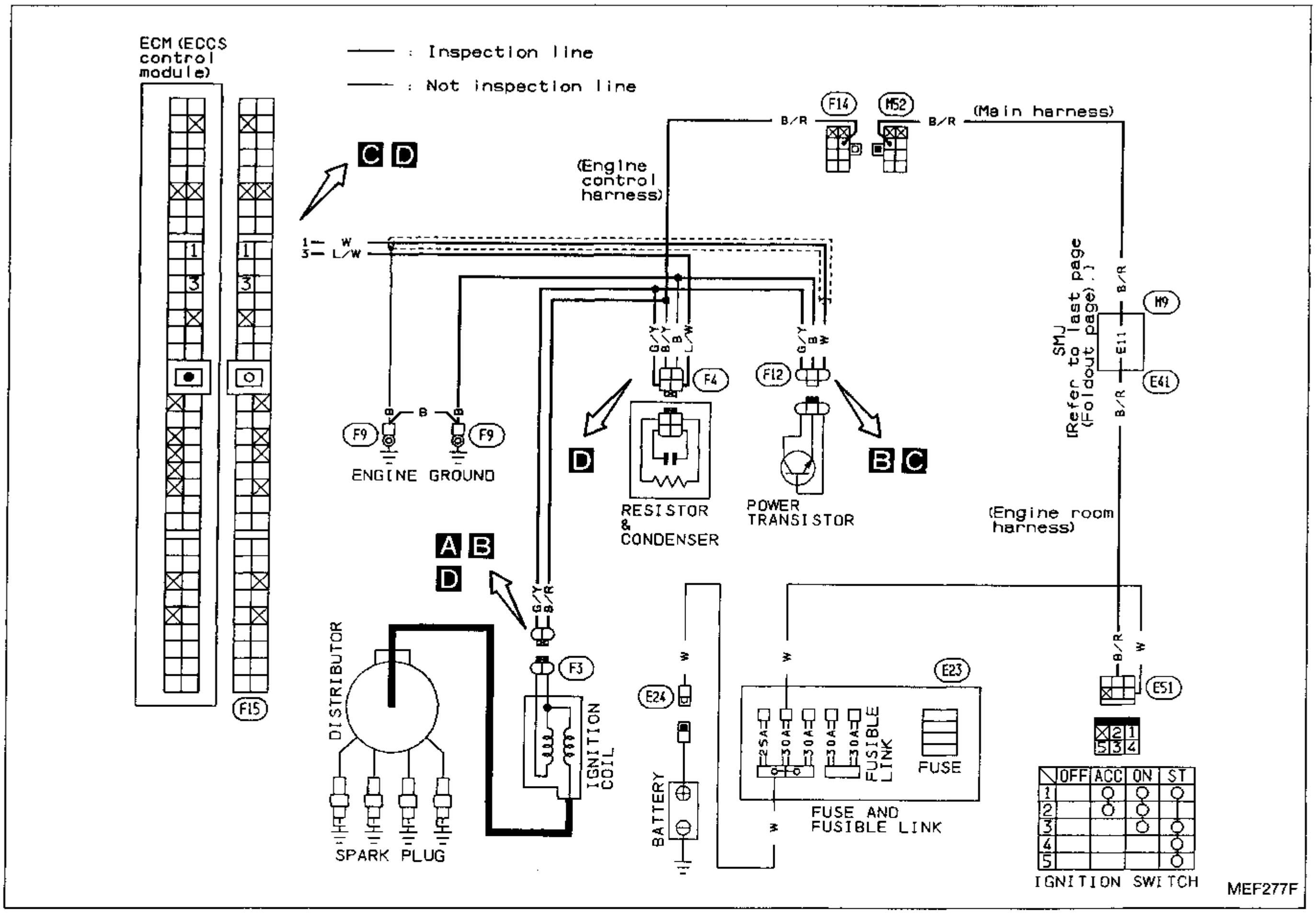
NG → Recheck ECM pin terminals for damage or the connection of ECM harness connector.

OK ↓

INSPECTION END

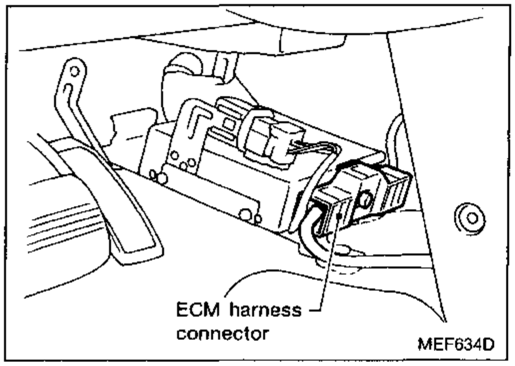
Diagnostic Procedure 6

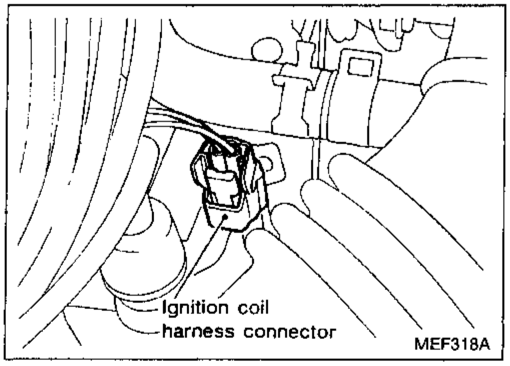
IGNITION SIGNAL (Diagnostic trouble code No. 21)

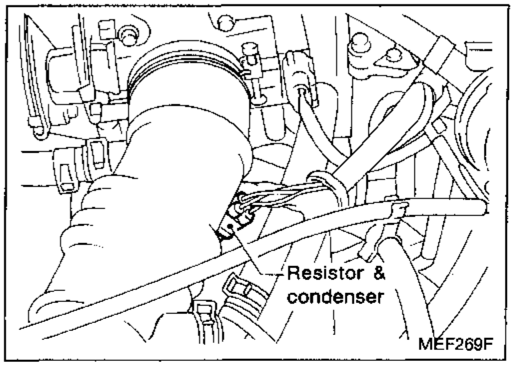


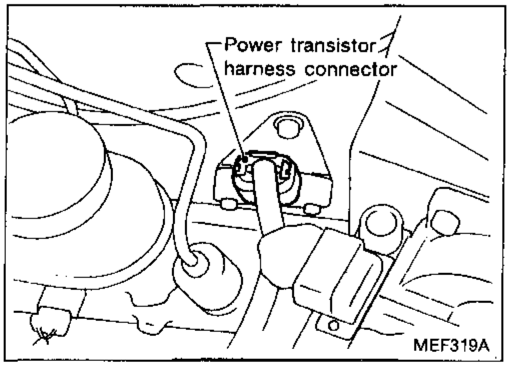
Diagnostic Procedure 6 (Cont'd)

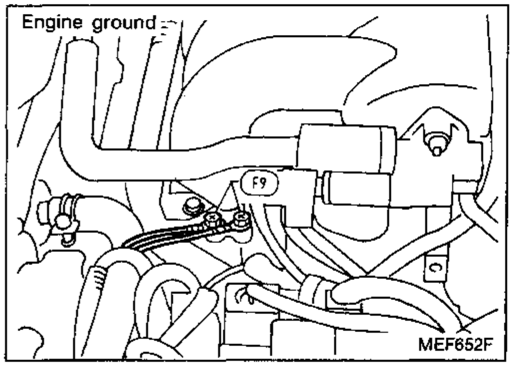
Harness layout



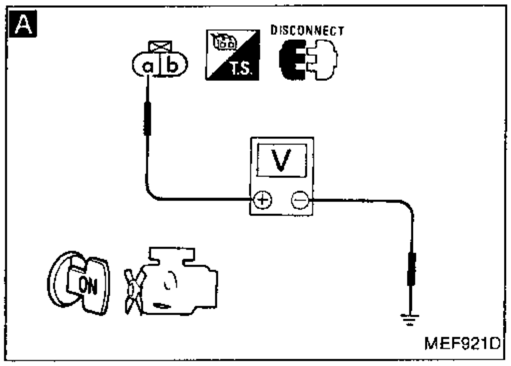


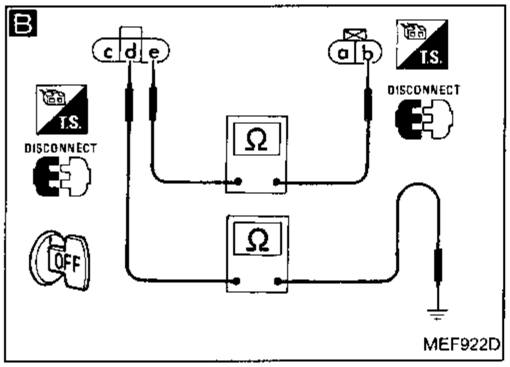


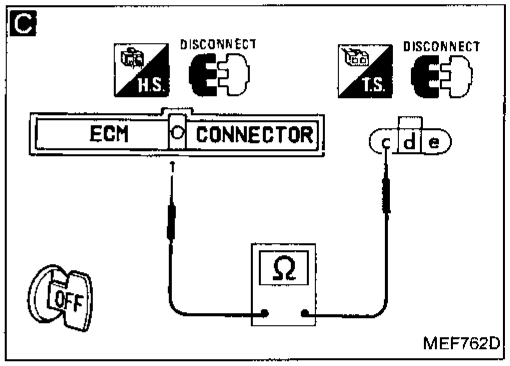




IGNITION SIGNAL (Diagnostic trouble code No. 21)







INSPECTION START

↓

PERFORM DIAGNOSTIC TEST MODE II (SELF-DIAGNOSTIC RESULTS).
See page EF & EC-255.

OK → INSPECTION END

↓ NG

Turn ignition switch "OFF", and restart engine.
Is engine running?

Yes → Ⓐ

↓ No

A

CHECK POWER SUPPLY.
1) Turn ignition switch "OFF".
2) Disconnect ignition coil harness connector.
3) Turn ignition switch "ON".
4) Check voltage between terminal ⓐ and ground with CONSULT or tester.
Voltage: Battery voltage

NG → Check the following.
- Harness connectors F14, M52
- Harness connectors M9, E41
- Harness continuity between ignition coil and ignition switch

If NG, repair harness or connectors.

↓ OK

B

CHECK GROUND CIRCUIT.
1) Turn ignition switch "OFF".
2) Disconnect power transistor harness connector.
3) Loosen and retighten ground screws.
4) Check harness continuity between terminal ⓑ and terminal ⓔ, terminal ⓓ and engine ground.
Continuity should exist.

NG → Repair harness or connectors.

↓ OK

C

CHECK OUTPUT SIGNAL CIRCUIT.
1) Disconnect ECM harness connector.
2) Check harness continuity between ECM terminal ① and terminal ⓒ.
Continuity should exist.

NG → Repair harness or connectors.

↓ OK

CHECK COMPONENTS
(Ignition coil, power transistor).
Refer to "Electrical Components Inspection".
(See page EF & EC-373.)

NG → Replace malfunctioning component(s).

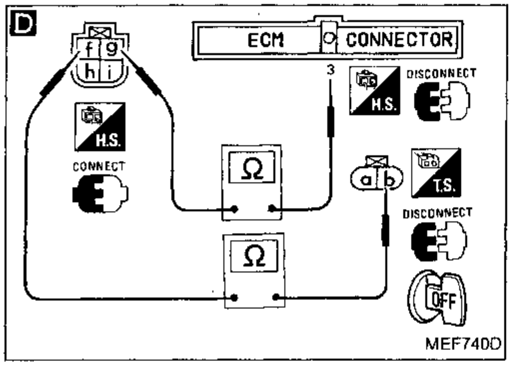
↓ OK

Disconnect and reconnect harness connectors in the circuit, and retest.

↓ Trouble is not fixed.

Check ECM pin terminals for damage or the connection of ECM harness connector. Reconnect ECM harness connector and retest.

IGNITION SIGNAL (Diagnostic trouble code No. 21)



Ⓐ

D

CHECK INPUT SIGNAL CIRCUIT.
1) Stop engine.
2) Disconnect ignition coil harness connector.
3) Strip tape covering resistor & condenser.
4) Disconnect ECM harness connector.
5) Check harness continuity between terminal ⓑ and terminal ⓕ, terminal ⓖ and ECM terminal ③.
Continuity should exist.

NG → Repair harness or connectors.

OK ↓

CHECK COMPONENT
(Resistor).
Refer to "Electric Components Inspection".
(See page EF & EC-378.)

NG → Replace resistor & condenser.

OK ↓

Disconnect and reconnect harness connectors in the circuit, and retest.

Trouble is not fixed. ↓

Check ECM pin terminals for damage or the connection of ECM harness connector. Reconnect ECM harness connector and retest.

Perform FINAL CHECK by the following procedure after repair is completed.

FINAL CHECK
1) Erase the diagnostic test mode II (Self-diagnostic results) memory. (Refer to EF & EC-239.)
2) Perform test drive. Refer to "How to Execute On-board Diagnostic System in Diagnostic Test Mode II" (EF & EC-255).
3) Perform diagnostic test mode II (Self-diagnostic results) again. (Refer to EF & EC-237.)

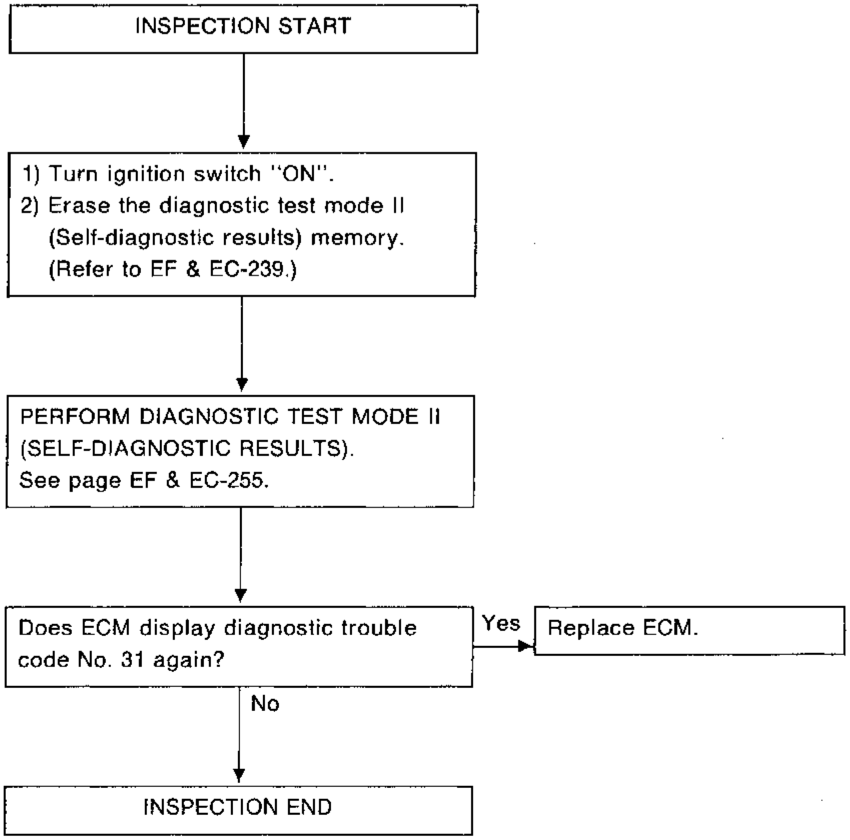
NG → Recheck ECM pin terminals for damage or the connection of ECM harness connector.

OK ↓

INSPECTION END

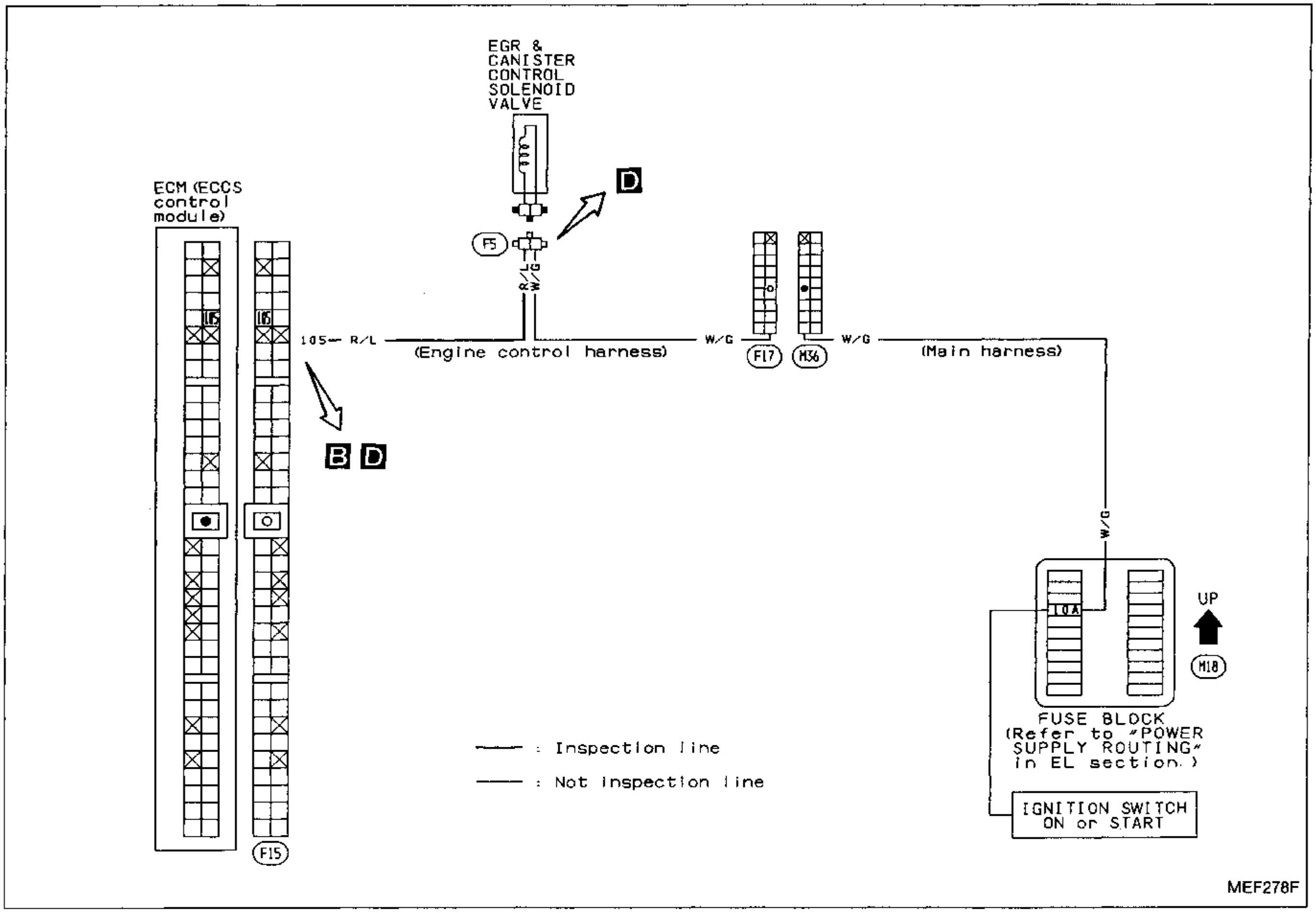
Diagnostic Procedure 7

ECM (ECCS CONTROL MODULE) (Diagnostic trouble code No. 31)
CHECK (Malfunction indicator lamp item)

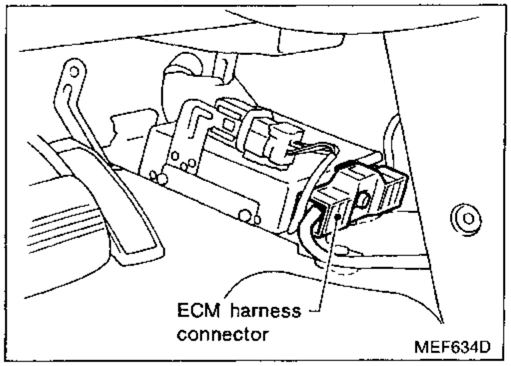


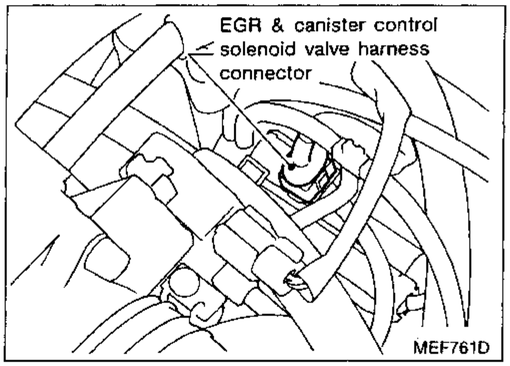
Diagnostic Procedure 8

EGR FUNCTION (Diagnostic trouble code No. 32)
(Malfunction indicator lamp item)



Harness layout





EGR FUNCTION (Diagnostic trouble code No. 32)

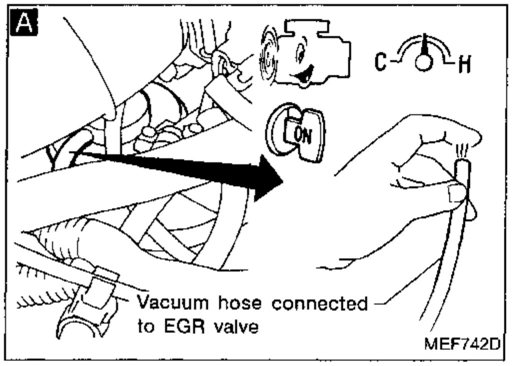
(Malfunction indicator lamp item)

INSPECTION START

PERFORM DIAGNOSTIC TEST MODE II (SELF-DIAGNOSTIC RESULTS).
See page EF & EC-255.

OK → Go to EGR CONTROL (Not self-diagnostic item).

NG ↓



A CHECK VACUUM SOURCE TO EGR VALVE.

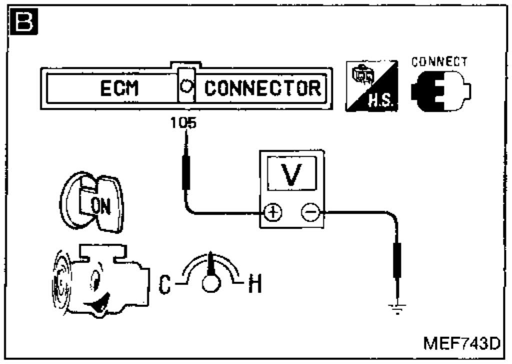
1) Start engine and warm it up sufficiently.
2) Keep engine speed at about 2,000 rpm.
3) Disconnect vacuum hose to EGR valve.
4) Make sure that vacuum exists.

Vacuum should exist.

OK → CHECK COMPONENTS (EGR valve and EGRC-BPT valve).
Refer to "Electrical Components Inspection".
(See page EF & EC-378.)

NG → Replace malfunctioning component(s).

NG ↓



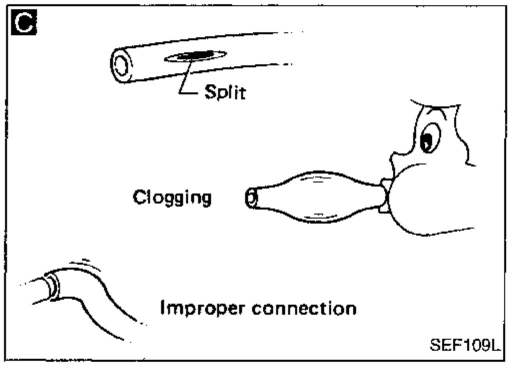
B CHECK CONTROL FUNCTION.

1) Check voltage between ECM terminal ⑩⑤ and ground under the following conditions with CONSULT or tester.

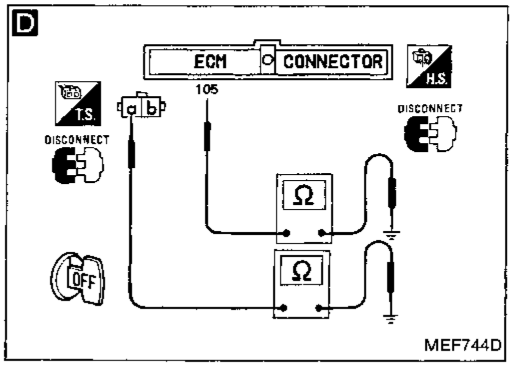
Voltage:

Engine speed is 4,000 rpm
0.6 - 0.8V
Engine speed is 2,000 rpm
Battery voltage

OK → **C** CHECK VACUUM HOSE.
1) Check vacuum hose for clogging, cracks and proper connection.



NG ↓



D CHECK OUTPUT SIGNAL CIRCUIT.

1) Stop engine.
2) Disconnect ECM harness connector.
3) Disconnect EGR & canister control solenoid valve harness connector.
4) Check harness continuity between ECM terminal ⑩⑤ and ground, terminal ⓐ and ground.

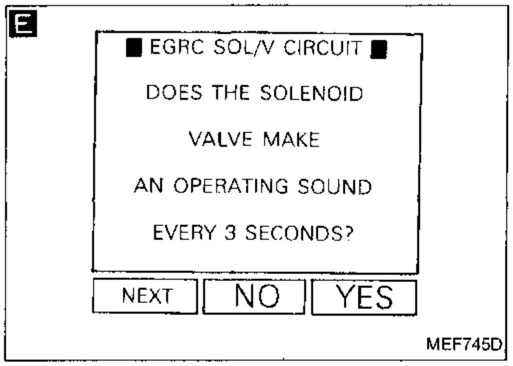
Continuity should not exist.

NG → Repair harness or connectors between ECM and EGR & canister control solenoid valve.

OK ↓

Ⓐ

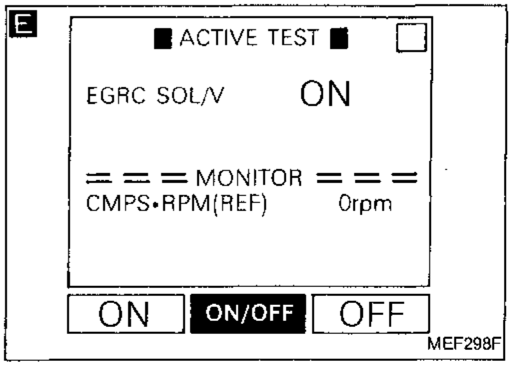
EGR FUNCTION (Diagnostic trouble code No. 32)



■ EGRC SOL/V CIRCUIT ■

DOES THE SOLENOID VALVE MAKE AN OPERATING SOUND EVERY 3 SECONDS?

MEF745D



■ ACTIVE TEST ■

EGRC SOL/V ON

=== MONITOR ===

CMPS•RPM(REF) 0rpm

MEF298F

(Malfunction indicator lamp item)

Ⓐ

CHECK COMPONENT
(EGR & canister control solenoid valve).

1) Reconnect ECM harness connector and EGR & canister control solenoid valve harness connector.
2) Turn ignition switch "ON".
3) Perform "EGRC SOL/V CIRCUIT" in "FUNCTION TEST" mode with CONSULT.

OR

3) Turn EGR & canister control solenoid valve "ON" and "OFF" in "ACTIVE TEST" mode with CONSULT and check operating sound.

OR

Refer to "Electrical Components Inspection".
(See page EF & EC-377.)

NG → Replace EGR & canister control solenoid valve.

OK

Disconnect and reconnect harness connectors in the circuit, and retest.

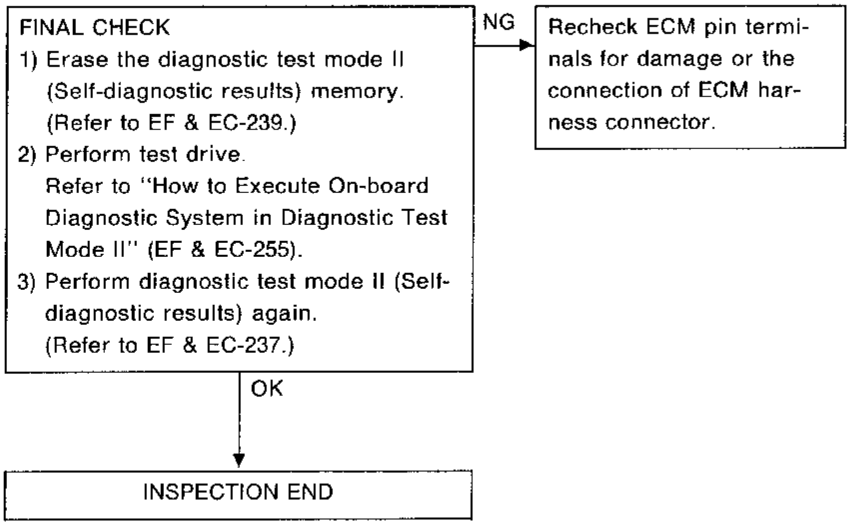
Trouble is not fixed.

Check ECM pin terminals for damage or the connection of ECM harness connector. Reconnect ECM harness connector and retest.

Check resistance of EGR temperature sensor.
(See page EF & EC-378.)

EGR FUNCTION (Diagnostic trouble code No. 32) (Malfunction indicator lamp item)

Perform FINAL CHECK by the following procedure after repair is completed.



FINAL CHECK

1) Erase the diagnostic test mode II (Self-diagnostic results) memory. (Refer to EF & EC-239.)
2) Perform test drive. Refer to "How to Execute On-board Diagnostic System in Diagnostic Test Mode II" (EF & EC-255).
3) Perform diagnostic test mode II (Self-diagnostic results) again. (Refer to EF & EC-237.)

NG

Recheck ECM pin terminals for damage or the connection of ECM harness connector.

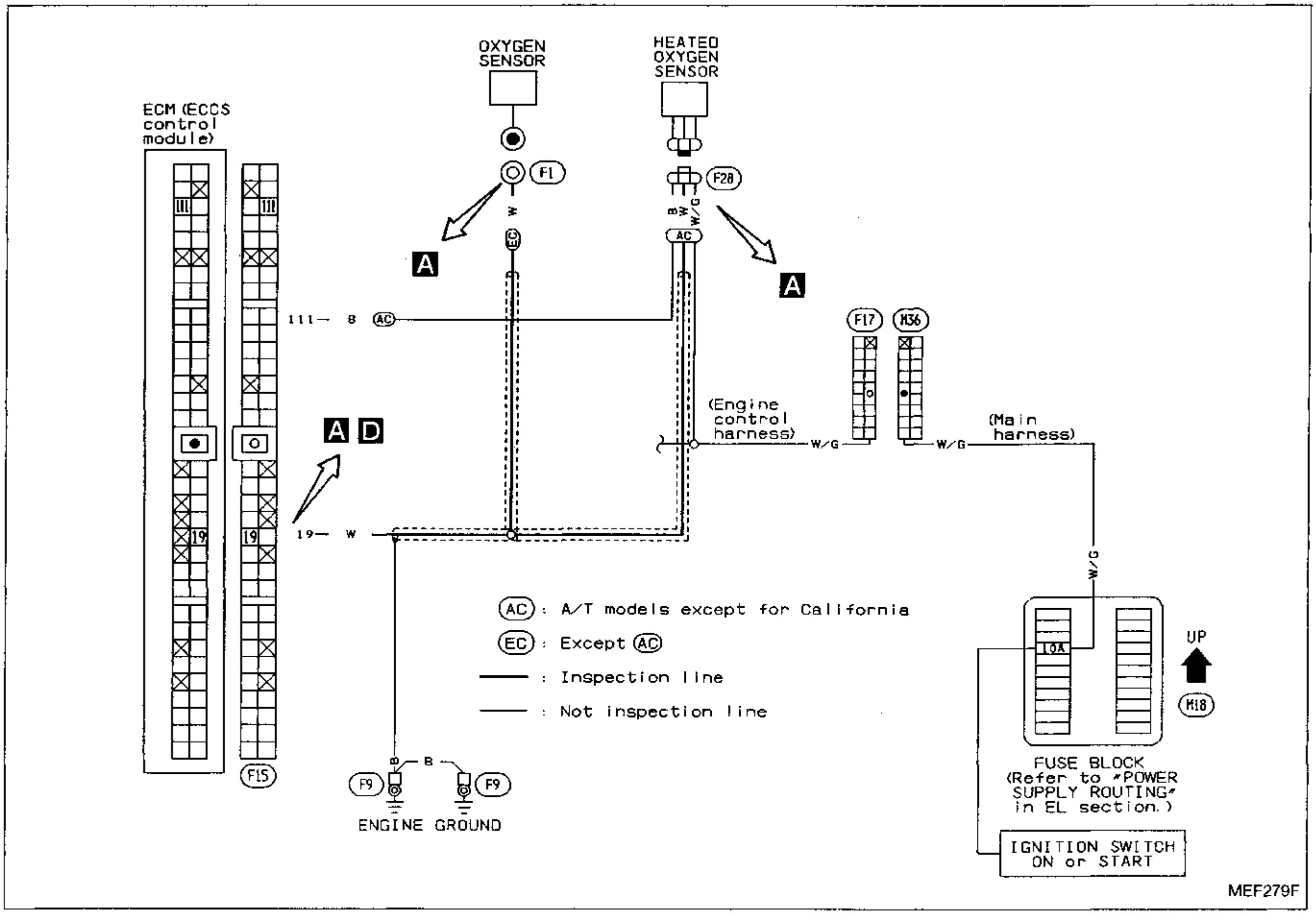
OK

INSPECTION END

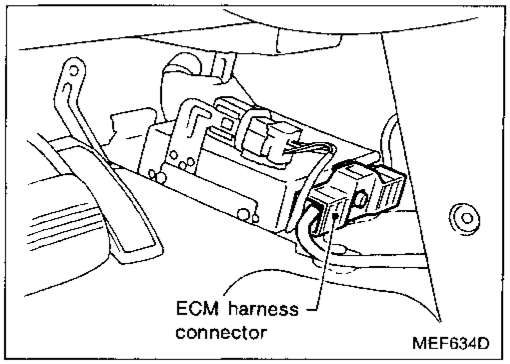
Diagnostic Procedure 9

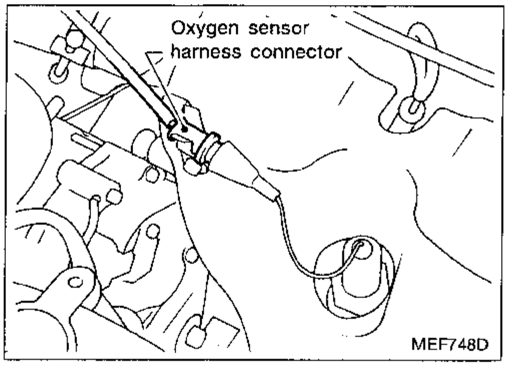
OXYGEN SENSOR/HEATED OXYGEN SENSOR (Diagnostic trouble code No. 33)

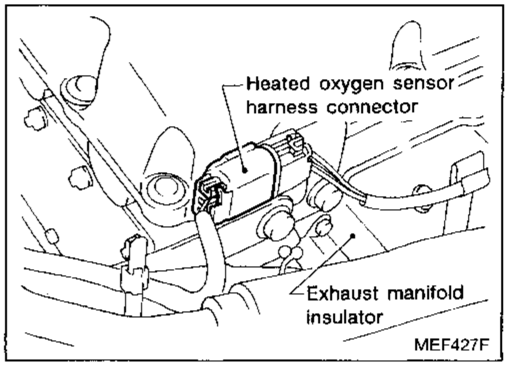
CHECK (Malfunction indicator lamp item)

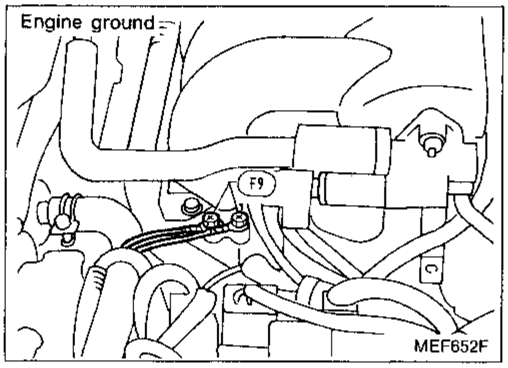


Harness layout

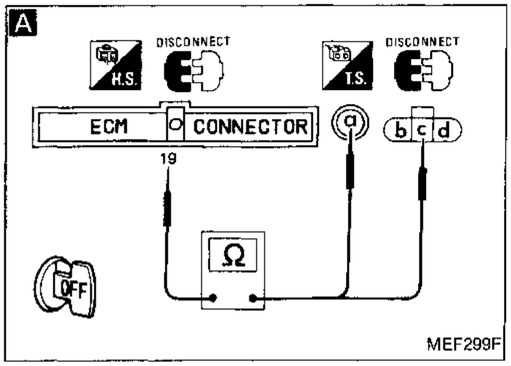


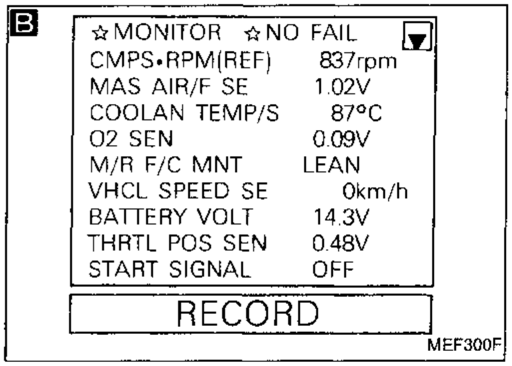






OXYGEN SENSOR/HEATED OXYGEN SENSOR (Diagnostic trouble code No. 33)

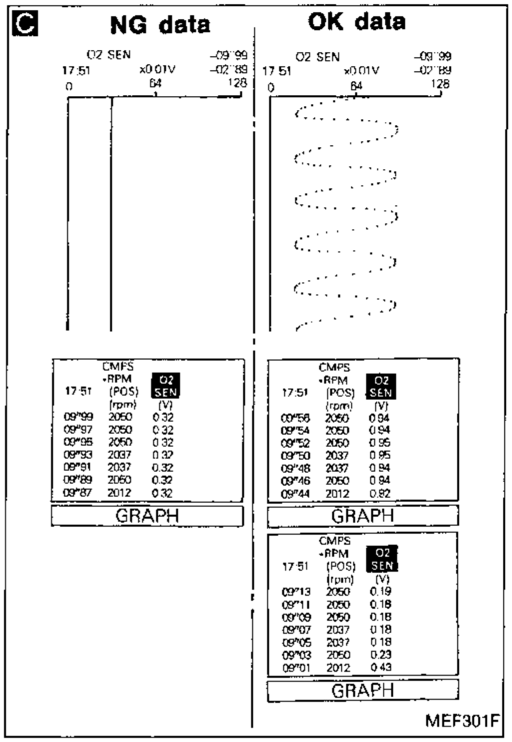




☆MONITOR ☆NO FAIL

CMPS•RPM(REF)	837rpm
MAS AIR/F SE	1.02V
COOLAN TEMP/S	87°C
O2 SEN	0.09V
M/R F/C MNT	LEAN
VHCL SPEED SE	0km/h
BATTERY VOLT	14.3V
THRTL POS SEN	0.48V
START SIGNAL	OFF

RECORD



NG data

17:51	CMPS •RPM (POS) (rpm)	O2 SEN (V)
09"99	2050	0.32
09"97	2050	0.32
09"95	2050	0.32
09"93	2037	0.32
09"91	2037	0.32
09"89	2050	0.32
09"87	2012	0.32

GRAPH

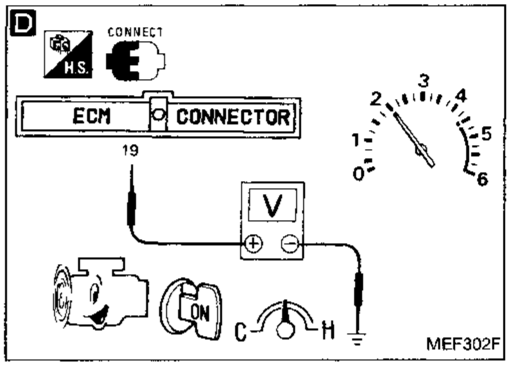
OK data

17:51	CMPS •RPM (POS) (rpm)	O2 SEN (V)
09"56	2050	0.94
09"54	2050	0.94
09"52	2050	0.95
09"50	2037	0.95
09"48	2037	0.94
09"46	2050	0.94
09"44	2012	0.92

GRAPH

17:51	CMPS •RPM (POS) (rpm)	O2 SEN (V)
09"13	2050	0.19
09"11	2050	0.18
09"09	2050	0.18
09"07	2037	0.18
09"05	2037	0.18
09"03	2050	0.23
09"01	2012	0.43

GRAPH



(Malfunction indicator lamp item)

INSPECTION START

↓

CHECK OVERALL FUNCTION.
See page EF & EC-255.

OK → INSPECTION END

↓ NG

A

CHECK INPUT SIGNAL CIRCUIT.
1) Turn ignition switch "OFF".
2) Disconnect ECM harness connector and oxygen sensor harness connector or heated oxygen sensor harness connector.
3) Check harness continuity between ECM terminal ⑲ and terminal ⓐ or ⓒ.
Continuity should exist.

NG → Repair harness or connectors.

↓ OK

Loosen and retighten ground screws.

↓

CHECK VOLTAGE.
1) Reconnect ECM harness connector and oxygen sensor harness connector or heated oxygen sensor harness connector.
2) Start engine and warm it up sufficiently.
B 3) Select "DATA MONITOR" mode with CONSULT.
4) Touch "RECORD" on CONSULT with engine speed held at approximately 2,000 rpm.
C 5) Check "O2 SEN" voltage.
① **Approx. 0.3 volts (No voltage fluctuations) ... NG**
② **Other than ① above ... OK**

OR

D 3) Check voltage between ECM terminal ⑲ and ground, with engine speed held at approximately 2,000 rpm.
① **Approx. 0.3 volts (No voltage fluctuations) ... NG**
② **Other than ① above ... OK**

NG → Replace oxygen sensor or heated oxygen sensor.

↓ OK

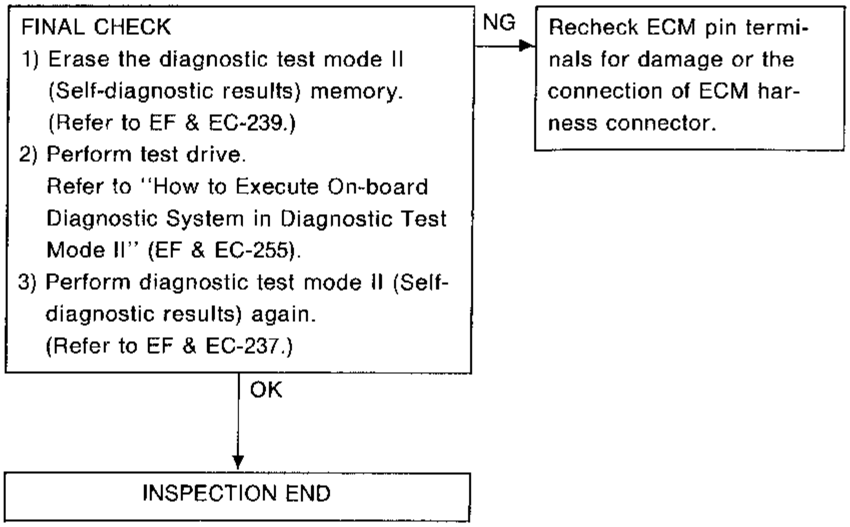
Disconnect and reconnect harness connectors in the circuit, and retest.

↓ Trouble is not fixed.

Check ECM pin terminals for damage or the connection of ECM harness connector. Reconnect ECM harness connector and retest.

OXYGEN SENSOR/HEATED OXYGEN SENSOR (Diagnostic trouble code No. 33) (Malfunction indicator lamp item)

Perform FINAL CHECK by the following procedure after repair is completed.



FINAL CHECK

1) Erase the diagnostic test mode II (Self-diagnostic results) memory. (Refer to EF & EC-239.)
2) Perform test drive. Refer to "How to Execute On-board Diagnostic System in Diagnostic Test Mode II" (EF & EC-255).
3) Perform diagnostic test mode II (Self-diagnostic results) again. (Refer to EF & EC-237.)

NG → Recheck ECM pin terminals for damage or the connection of ECM harness connector.

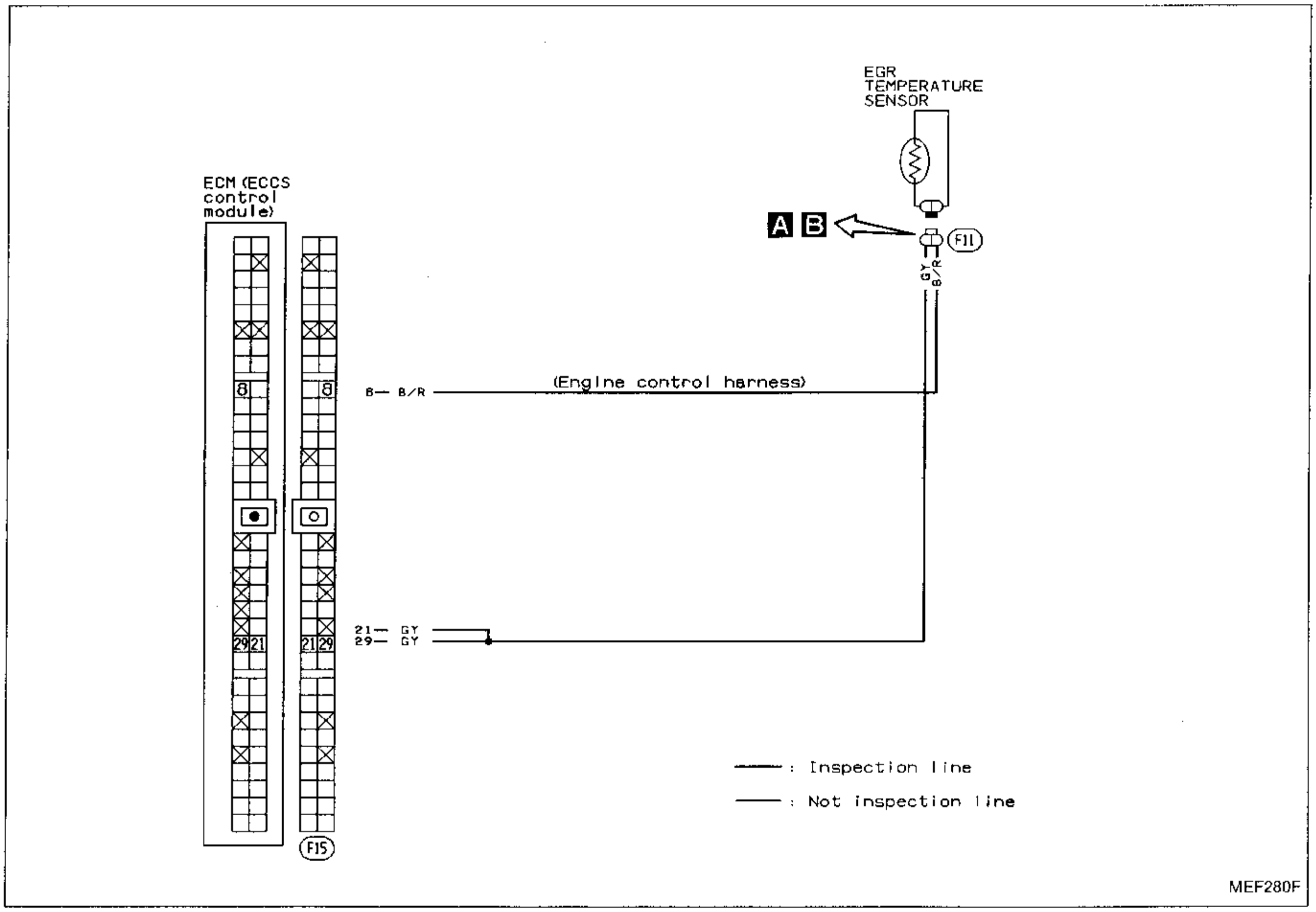
OK ↓

INSPECTION END

Diagnostic Procedure 10

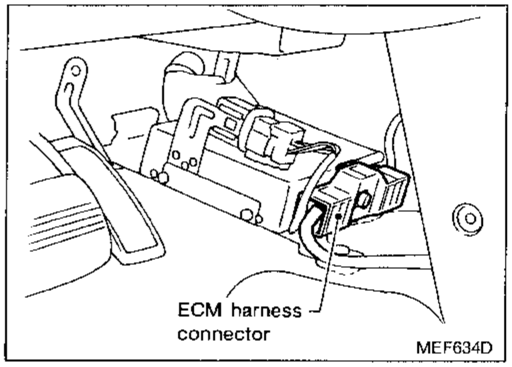
EGR TEMPERATURE SENSOR (Diagnostic trouble code No. 35)

(Malfunction indicator lamp item)

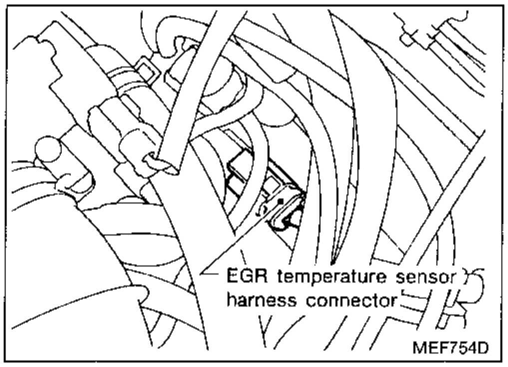


MEF280F

Harness layout

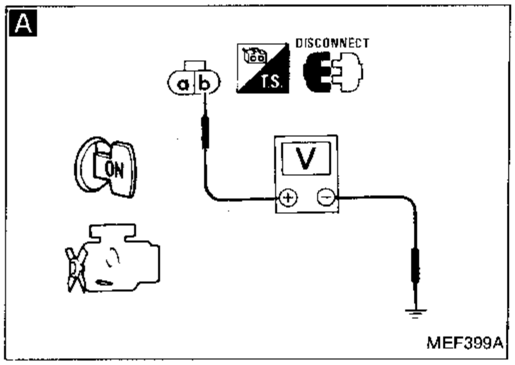


MEF634D

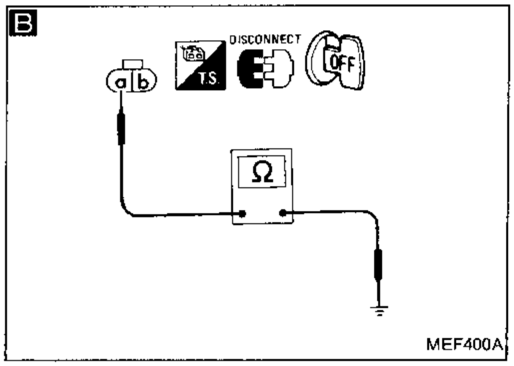


MEF754D

EGR TEMPERATURE SENSOR (Diagnostic trouble code No. 35)

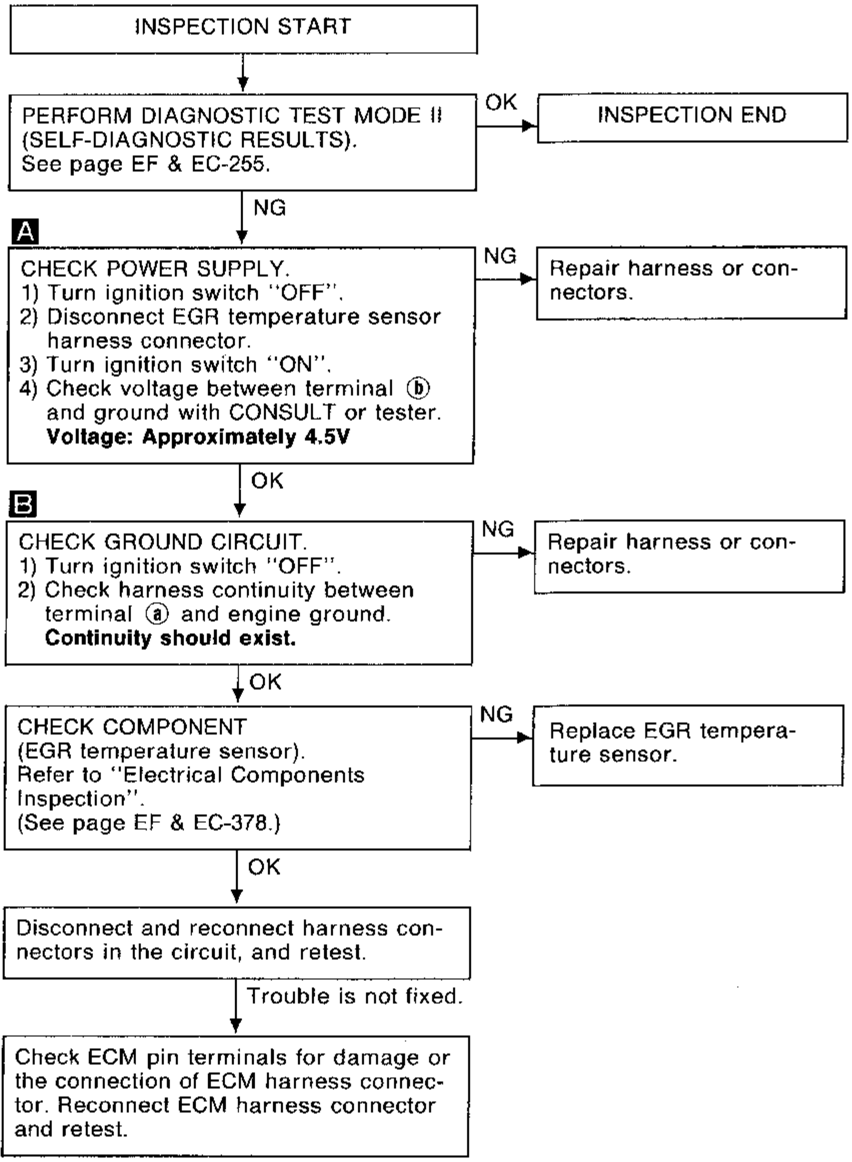


MEF399A



MEF400A

CHECK (Malfunction indicator lamp item)



INSPECTION START

PERFORM DIAGNOSTIC TEST MODE II (SELF-DIAGNOSTIC RESULTS).
See page EF & EC-255.

OK → INSPECTION END

NG ↓

A CHECK POWER SUPPLY.
1) Turn ignition switch "OFF".
2) Disconnect EGR temperature sensor harness connector.
3) Turn ignition switch "ON".
4) Check voltage between terminal ⓑ and ground with CONSULT or tester.
Voltage: Approximately 4.5V

NG → Repair harness or connectors.

OK ↓

B CHECK GROUND CIRCUIT.
1) Turn ignition switch "OFF".
2) Check harness continuity between terminal ⓐ and engine ground.
Continuity should exist.

NG → Repair harness or connectors.

OK ↓

CHECK COMPONENT
(EGR temperature sensor).
Refer to "Electrical Components Inspection".
(See page EF & EC-378.)

NG → Replace EGR temperature sensor.

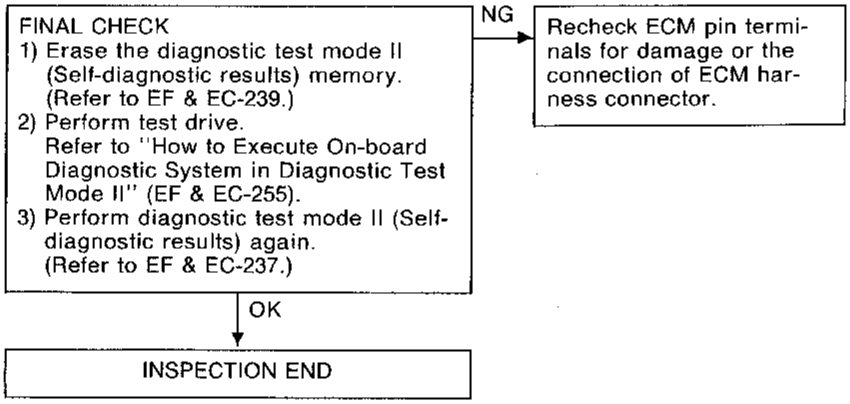
OK ↓

Disconnect and reconnect harness connectors in the circuit, and retest.

Trouble is not fixed. ↓

Check ECM pin terminals for damage or the connection of ECM harness connector. Reconnect ECM harness connector and retest.

Perform FINAL CHECK by the following procedure after repair is completed.



FINAL CHECK
1) Erase the diagnostic test mode II (Self-diagnostic results) memory.
(Refer to EF & EC-239.)
2) Perform test drive.
Refer to "How to Execute On-board Diagnostic System in Diagnostic Test Mode II" (EF & EC-255).
3) Perform diagnostic test mode II (Self-diagnostic results) again.
(Refer to EF & EC-237.)

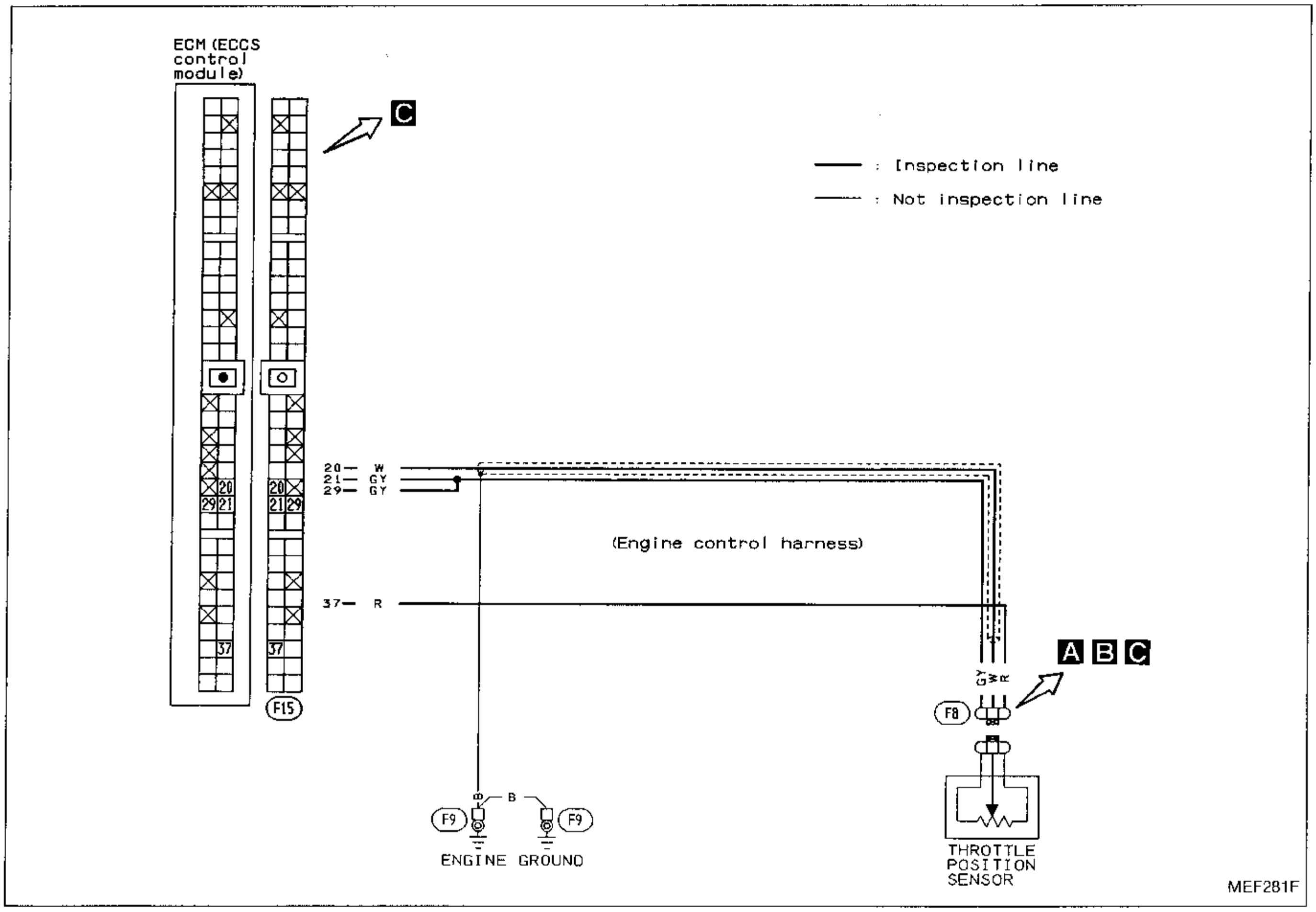
NG → Recheck ECM pin terminals for damage or the connection of ECM harness connector.

OK ↓

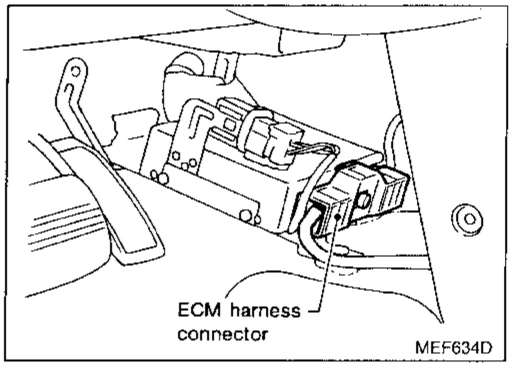
INSPECTION END

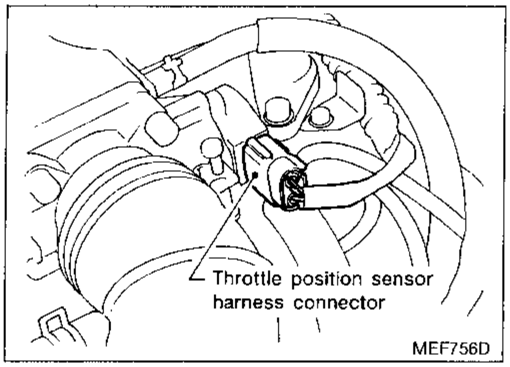
Diagnostic Procedure 11

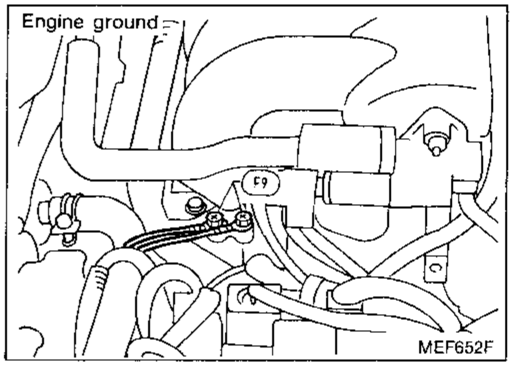
THROTTLE POSITION SENSOR (Diagnostic trouble code No. 43)
(Malfunction indicator lamp item)



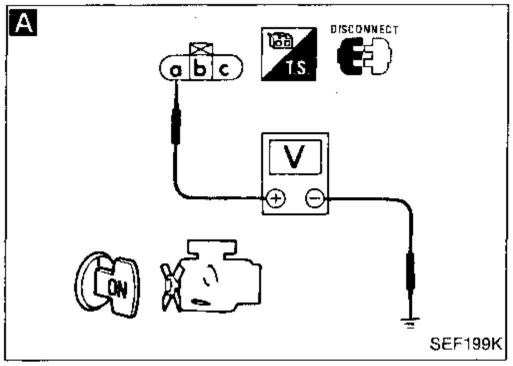
Harness layout

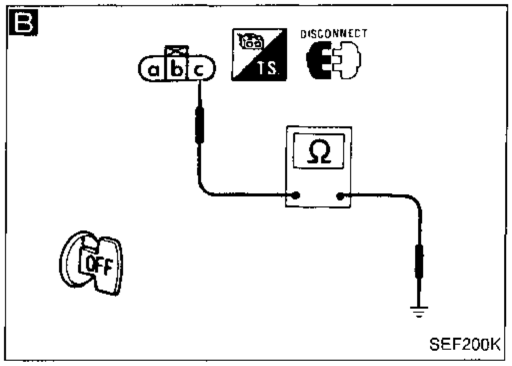


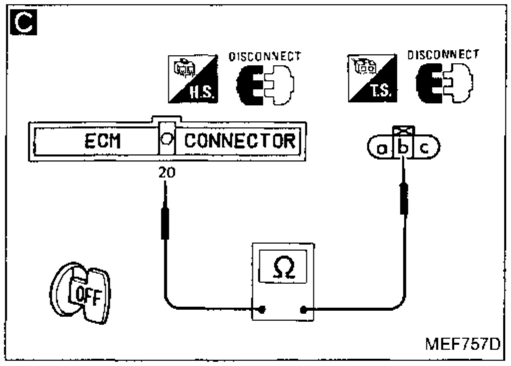




THROTTLE POSITION SENSOR (Diagnostic trouble code No. 43)







CHECK (Malfunction indicator lamp item)

INSPECTION START

↓

PERFORM DIAGNOSTIC TEST MODE II (SELF-DIAGNOSTIC RESULTS).
See page EF & EC-255.

OK → INSPECTION END

NG ↓

A

CHECK POWER SUPPLY.
1) Turn ignition switch "OFF".
2) Disconnect throttle position sensor harness connector.
3) Turn ignition switch "ON".
4) Check voltage between terminal ⓐ and ground with CONSULT or tester.
Voltage: Approximately 5V

NG → Repair harness or connectors.

OK ↓

B

CHECK GROUND CIRCUIT.
1) Turn ignition switch "OFF".
2) Loosen and retighten ground screws.
3) Check harness continuity between terminal ⓒ and engine ground.
Continuity should exist.

NG → Repair harness or connectors.

OK ↓

C

CHECK INPUT SIGNAL CIRCUIT.
1) Disconnect ECM harness connector.
2) Check harness continuity between ECM terminal ⑳ and terminal ⓑ.
Continuity should exist.

NG → Repair harness or connectors.

OK ↓

CHECK COMPONENT
(Throttle position sensor).
Refer to "Electrical Components Inspection".
(See pages EF & EC-373.)

NG → Replace throttle position sensor.

OK ↓

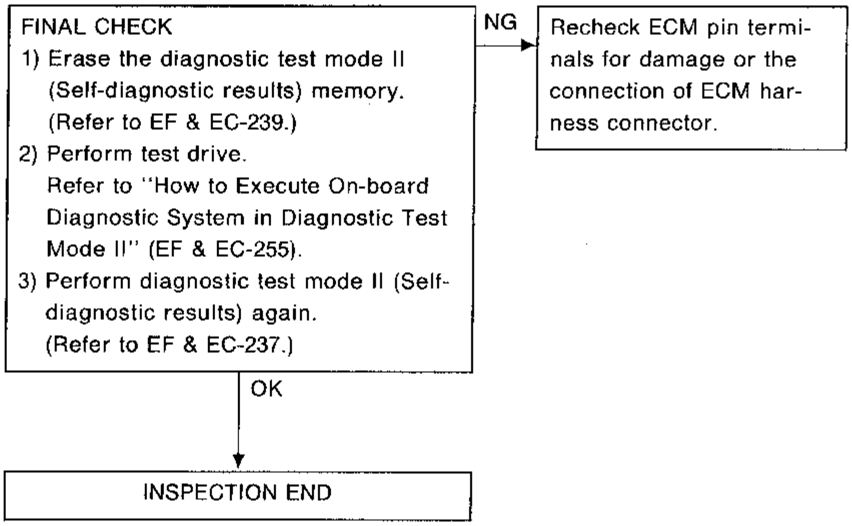
Disconnect and reconnect harness connectors in the circuit, and retest.

↓ Trouble is not fixed.

Check ECM pin terminals for damage or the connection of ECM harness connector. Reconnect ECM harness connector and retest.

THROTTLE POSITION SENSOR (Diagnostic trouble code No. 43) (Malfunction indicator lamp item)

Perform FINAL CHECK by the following procedure after repair is completed.

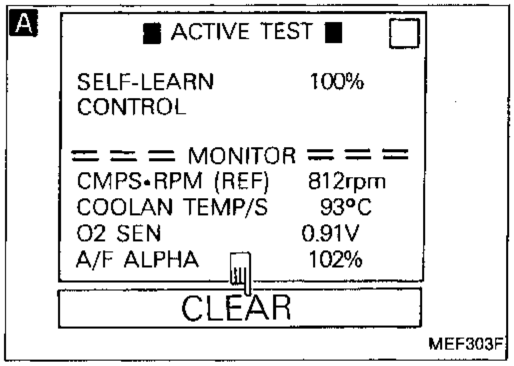


FINAL CHECK
1) Erase the diagnostic test mode II (Self-diagnostic results) memory. (Refer to EF & EC-239.)
2) Perform test drive. Refer to "How to Execute On-board Diagnostic System in Diagnostic Test Mode II" (EF & EC-255).
3) Perform diagnostic test mode II (Self-diagnostic results) again. (Refer to EF & EC-237.)

NG → Recheck ECM pin terminals for damage or the connection of ECM harness connector.

OK ↓

INSPECTION END



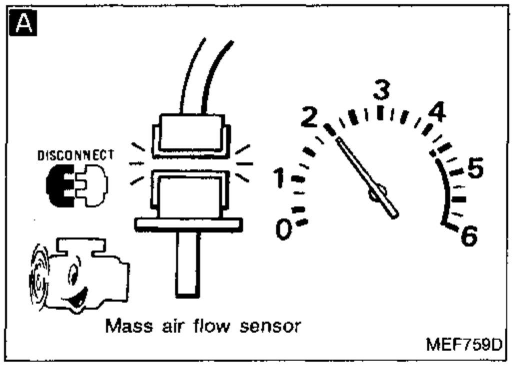
■ ACTIVE TEST ■

SELF-LEARN CONTROL 100%

=== MONITOR ===
CMPS•RPM (REF) 812rpm
COOLAN TEMP/S 93°C
O2 SEN 0.91V
A/F ALPHA 102%

CLEAR

MEF303F



MEF759D

Diagnostic Procedure 12

INJECTOR LEAK (Diagnostic trouble code No. 45) (Malfunction indicator lamp item)

INSPECTION START

↓

A

Clear the self-learning data
1) Start engine and warm it up sufficiently.
2) Select "SELF-LEARNING CONT" in "ACTIVE TEST" mode with CONSULT.
3) Clear the self-learning control coefficient by touching "CLEAR".

OR

2) Disconnect mass air flow sensor harness connector, and restart and run engine for at least 30 seconds at 2,000 rpm.
3) Stop engine and reconnect mass air flow sensor harness connector.
4) Make sure diagnostic trouble code No. 12 is displayed in Diagnostic Test Mode II.
5) Erase the diagnostic test mode II (Self-diagnostic results) memory. Make sure diagnostic trouble code No. 55 is displayed in Diagnostic Test Mode II.

↓

PERFORM DIAGNOSTIC TEST MODE II (SELF-DIAGNOSTIC RESULTS).
See page EF & EC-255.

OK → INSPECTION END

NG ↓

Remove injector assembly.
(See page EF & EC-380.)
Keep fuel hose and all injectors connected to injector gallery.

↓

Turn ignition switch "ON".
Make sure fuel does not drip from injector.

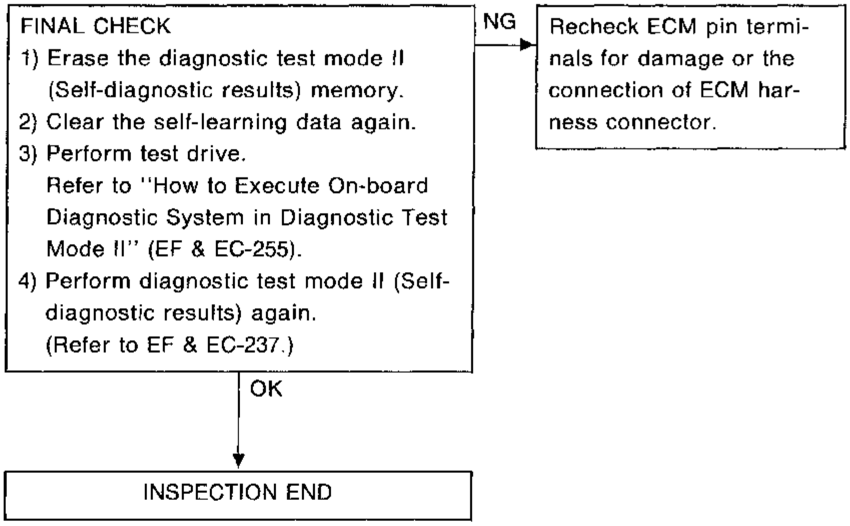
Drips → Replace the injectors from which fuel is dripping.

Does not drip ↓

Check ECM pin terminals for damage or the connection of ECM harness connector. Reconnect ECM harness connector and retest.

INJECTOR LEAK (Diagnostic trouble code No. 45)
(Malfunction indicator lamp item)

Perform FINAL CHECK by the following procedure after repair is completed.



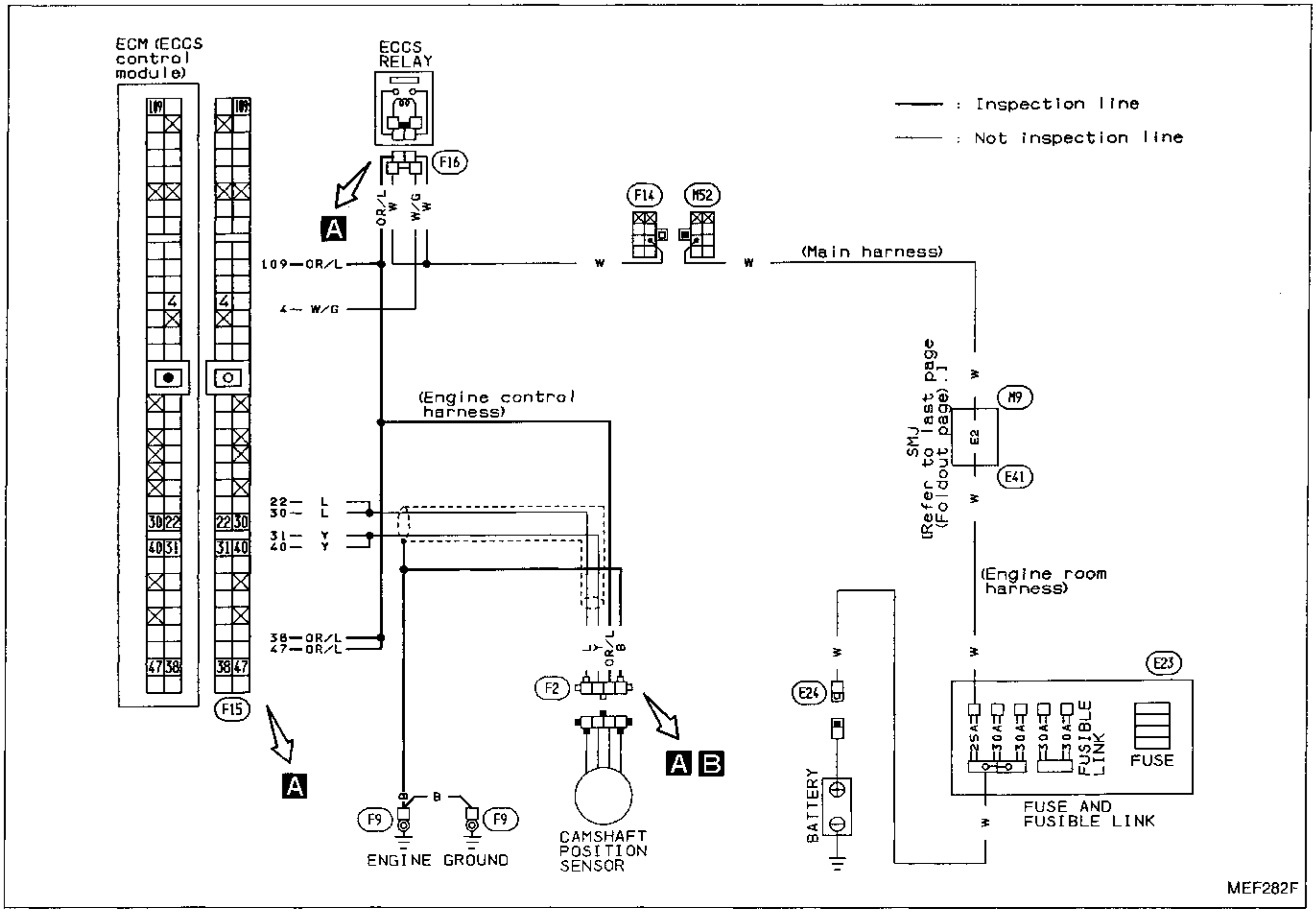
FINAL CHECK
1) Erase the diagnostic test mode II (Self-diagnostic results) memory.
2) Clear the self-learning data again.
3) Perform test drive. Refer to "How to Execute On-board Diagnostic System in Diagnostic Test Mode II" (EF & EC-255).
4) Perform diagnostic test mode II (Self-diagnostic results) again. (Refer to EF & EC-237.)

Recheck ECM pin terminals for damage or the connection of ECM harness connector.

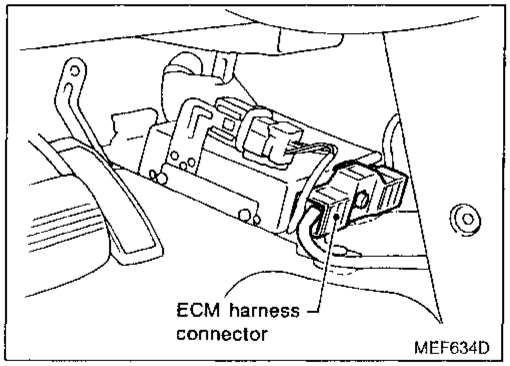
INSPECTION END

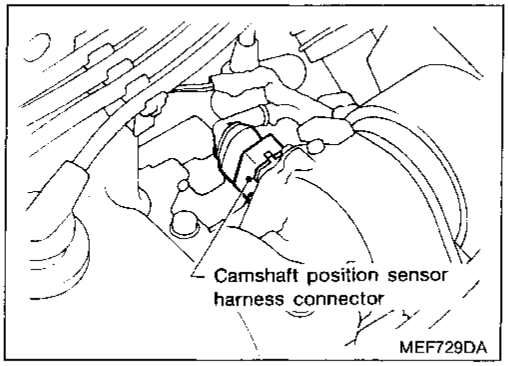
Diagnostic Procedure 13

CAMSHAFT POSITION SENSOR (Not self-diagnostic item)



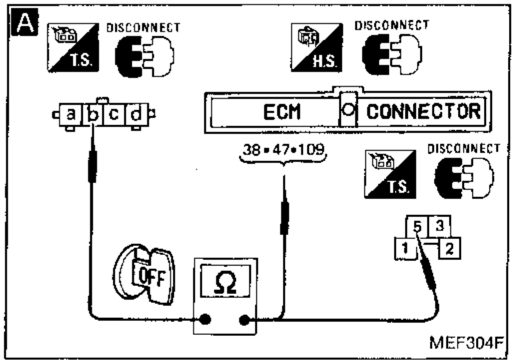
Harness layout

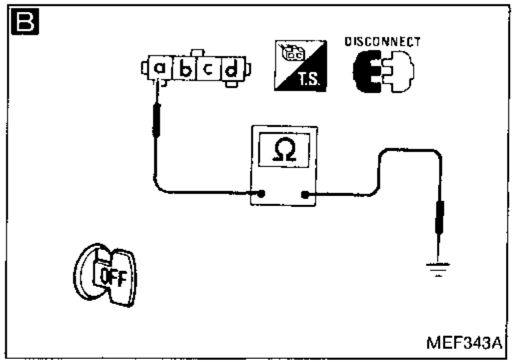




GI
MA
EM
LC
EF & EC
FE
CL
MT
AT
FA
RA
BR
ST
BF
HA
EL
IDX

CAMSHAFT POSITION SENSOR (Not self-diagnostic item)





INSPECTION START

↓

A

CHECK POWER SUPPLY CIRCUIT.

1) Turn ignition switch "OFF".
2) Disconnect camshaft position sensor harness connector.
3) Disconnect ECM harness connector and ECCS relay.
4) Check harness continuity between terminal ⓑ and terminal ⑤, ECM terminals ㊳, ㊼, (109).

Continuity should exist.

NG → Repair harness or connectors.

↓ OK

B

CHECK GROUND CIRCUIT.

1) Loosen and retighten ground screws.
2) Check harness continuity between terminal ⓐ and engine ground.

Continuity should exist.

NG → Repair harness or connectors.

↓ OK

CHECK COMPONENT
(Camshaft position sensor).
Refer to "Electrical Components Inspection".
(See page EF & EC-372.)

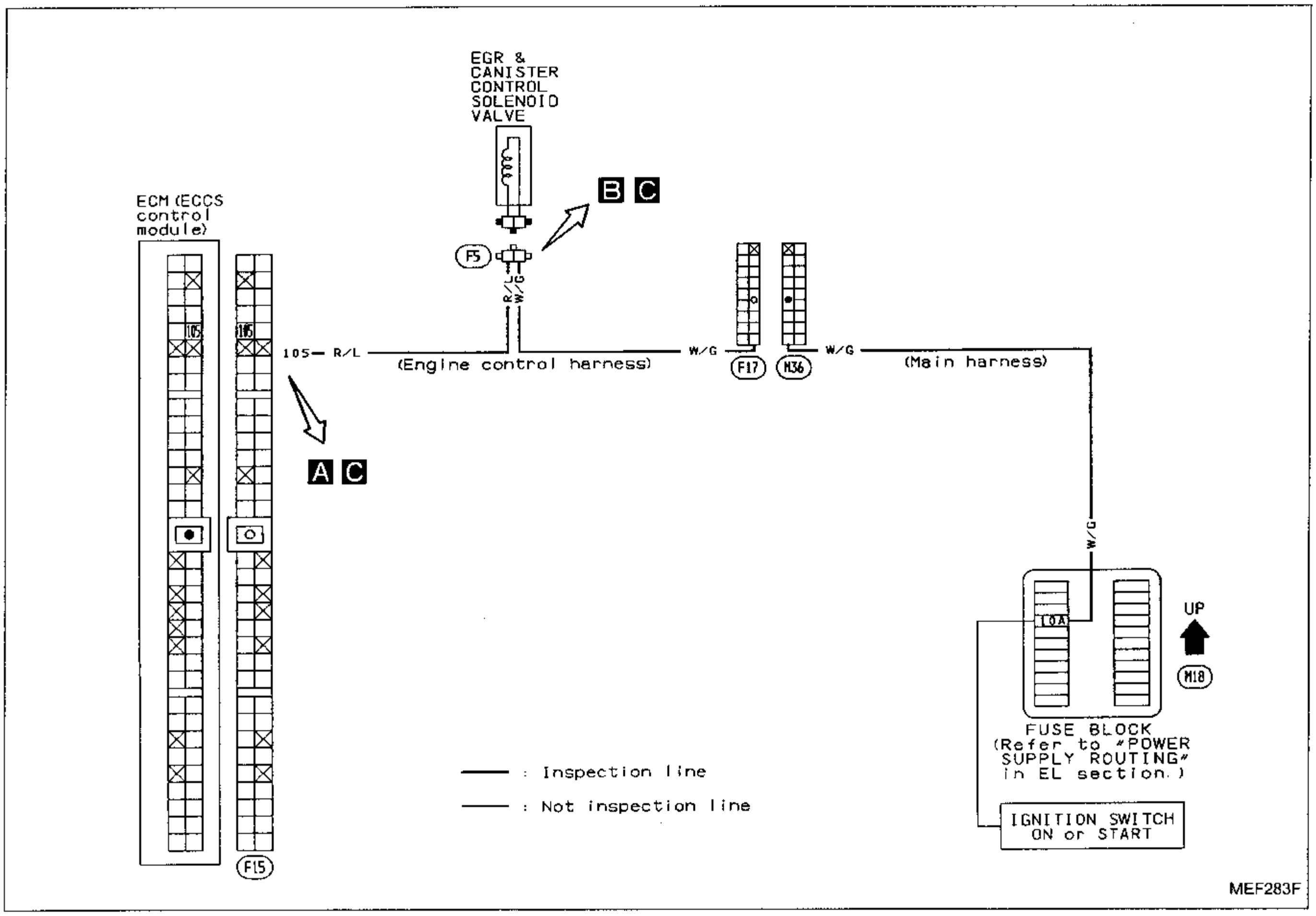
NG → Replace camshaft position sensor.

↓ OK

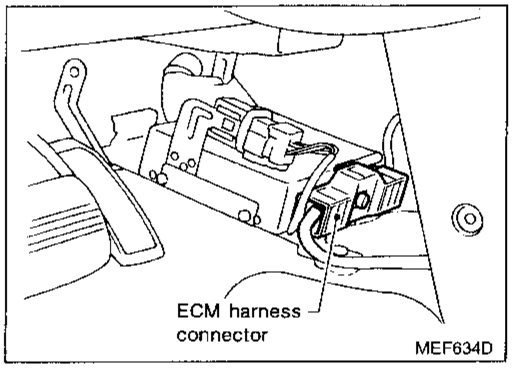
INSPECTION END

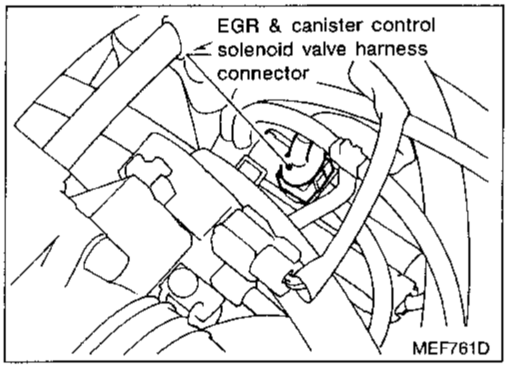
Diagnostic Procedure 14

EGR CONTROL (Not self-diagnostic item)



Harness layout

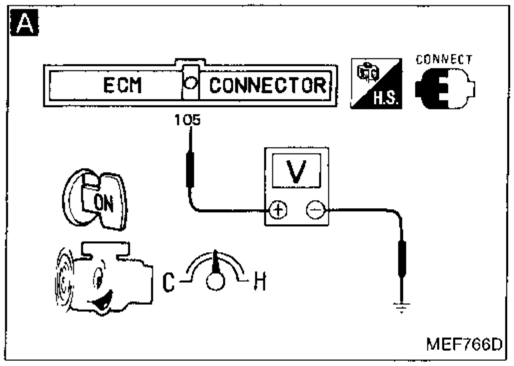




EGR CONTROL (Not self-diagnostic item)

INSPECTION START

A



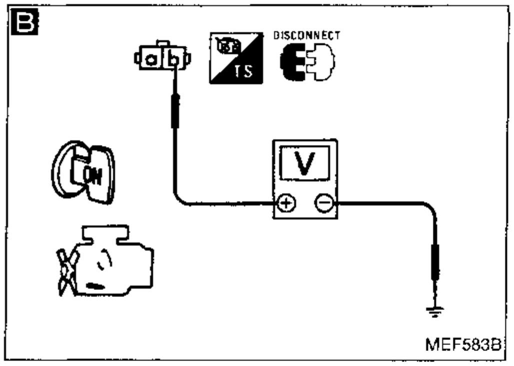
MEF766D

CHECK CONTROL FUNCTION.
1) Start engine and warm it up sufficiently.
2) Perform diagnostic test mode II (Self-diagnostic results) with ECM. (Refer to page EF & EC-255.)
Make sure that diagnostic trouble code No. 12 is not displayed.
3) Check voltage between ECM terminal (105) and ground under the following conditions with CONSULT or tester.
Voltage:
Engine speed is 4,000 rpm
0.6 - 0.8V
Engine speed is 2,000 rpm
Battery voltage

OK → Go to "CHECK COMPONENT (EGR & canister control solenoid valve)".

NG ↓

B



MEF583B

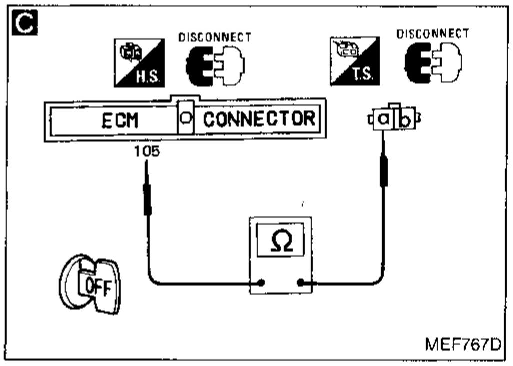
CHECK POWER SUPPLY.
1) Stop engine.
2) Disconnect EGR & canister control solenoid valve harness connector.
3) Turn ignition switch "ON".
4) Check voltage between terminal ⓑ and ground with CONSULT or tester.
Voltage: Battery voltage

NG → Check the following.
- Harness connectors (F17), (M36)
- 10A fuse
- Harness continuity between EGR & canister control solenoid valve and fuse

If NG, repair harness or connectors.

OK ↓

C



MEF767D

CHECK OUTPUT SIGNAL CIRCUIT.
1) Turn ignition switch "OFF".
2) Disconnect ECM harness connector.
3) Check harness continuity between ECM terminal (105) and terminal ⓐ.
Continuity should exist.

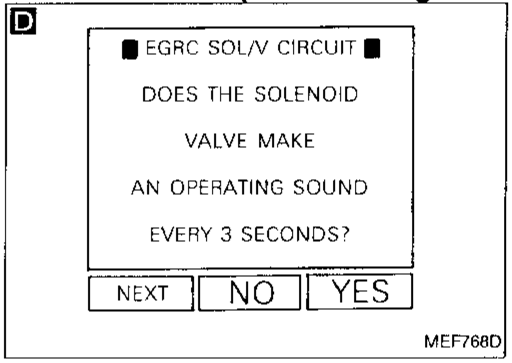
NG → Repair harness or connectors.

OK ↓

Ⓐ

EGR CONTROL (Not self-diagnostic item)

D

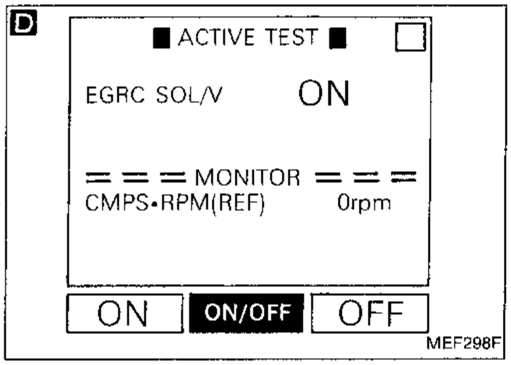


■ EGRC SOL/V CIRCUIT ■

DOES THE SOLENOID VALVE MAKE AN OPERATING SOUND EVERY 3 SECONDS?

MEF768D

D



■ ACTIVE TEST ■ ☐

EGRC SOL/V ON

=== MONITOR ===

CMPS•RPM(REF) 0rpm

MEF298F

Ⓐ

D

CHECK COMPONENT
(EGR & canister control solenoid valve).

1) Reconnect ECM harness connector and EGR & canister control solenoid valve harness connector.
2) Turn ignition switch "ON".
3) Perform "EGRC SOL/V CIRCUIT" in "FUNCTION TEST" mode with CONSULT.

OR

3) Turn EGR & canister control solenoid valve "ON" and "OFF" in "ACTIVE TEST" mode with CONSULT and check operating sound.

OR

Refer to "Electrical Components Inspection".
(See page EF & EC-377.)

NG → Replace EGR & canister control solenoid valve.

OK ↓

Disconnect and reconnect harness connectors in the circuit, and retest.

Trouble is not fixed. ↓

Check ECM pin terminals for damage or the connection of ECM harness connector. Reconnect ECM harness connector and retest.

↓

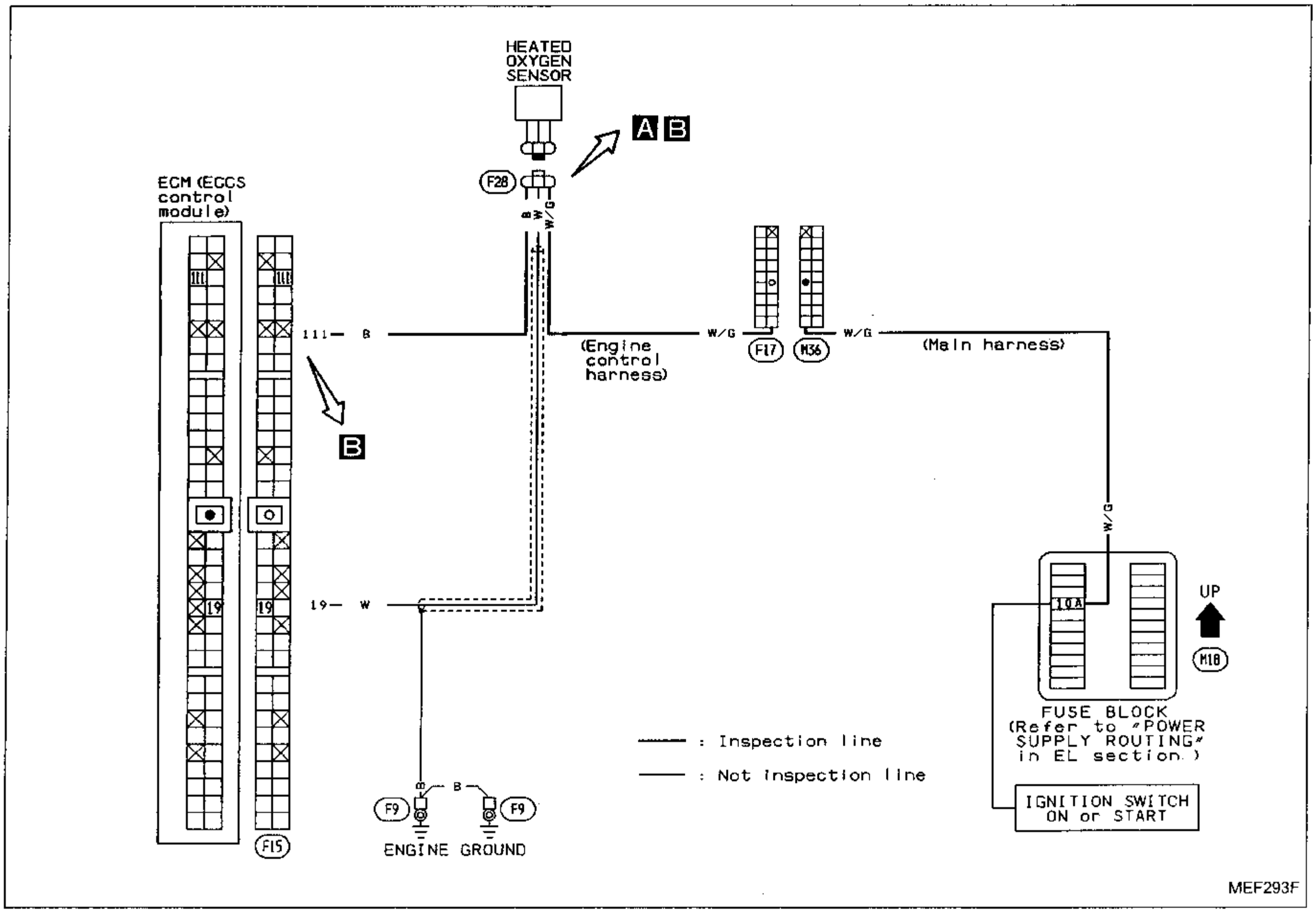
Check resistance of EGR temperature sensor.
(See page EF & EC-378.)

↓

INSPECTION END

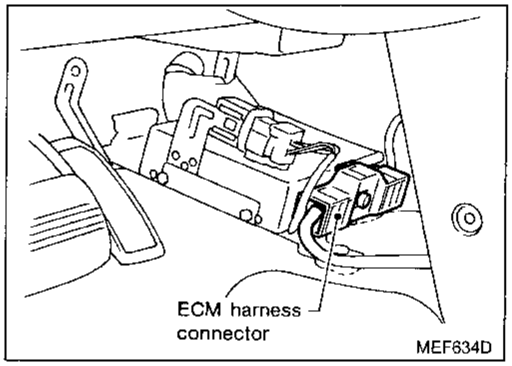
Diagnostic Procedure 15

HEATED OXYGEN SENSOR HEATER (Not self-diagnostic item)

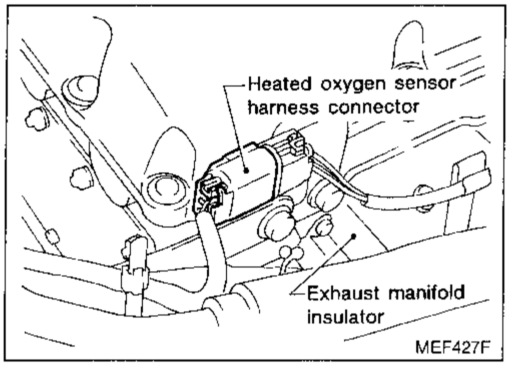


MEF293F

Harness layout



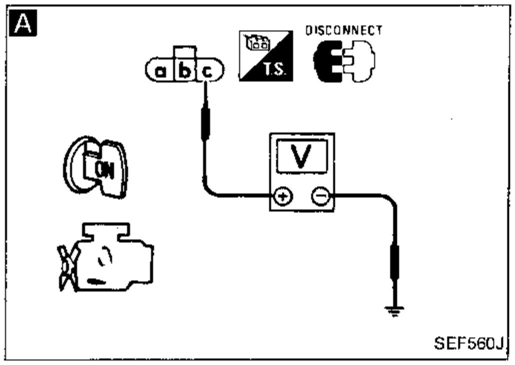
MEF634D



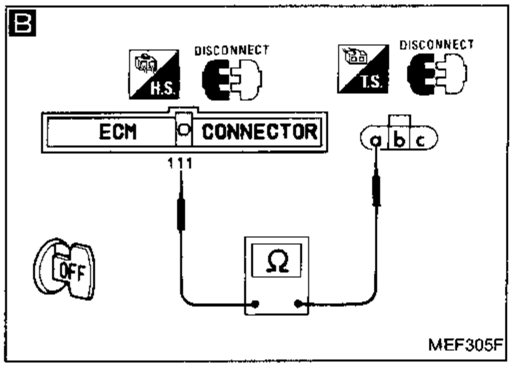
MEF427F

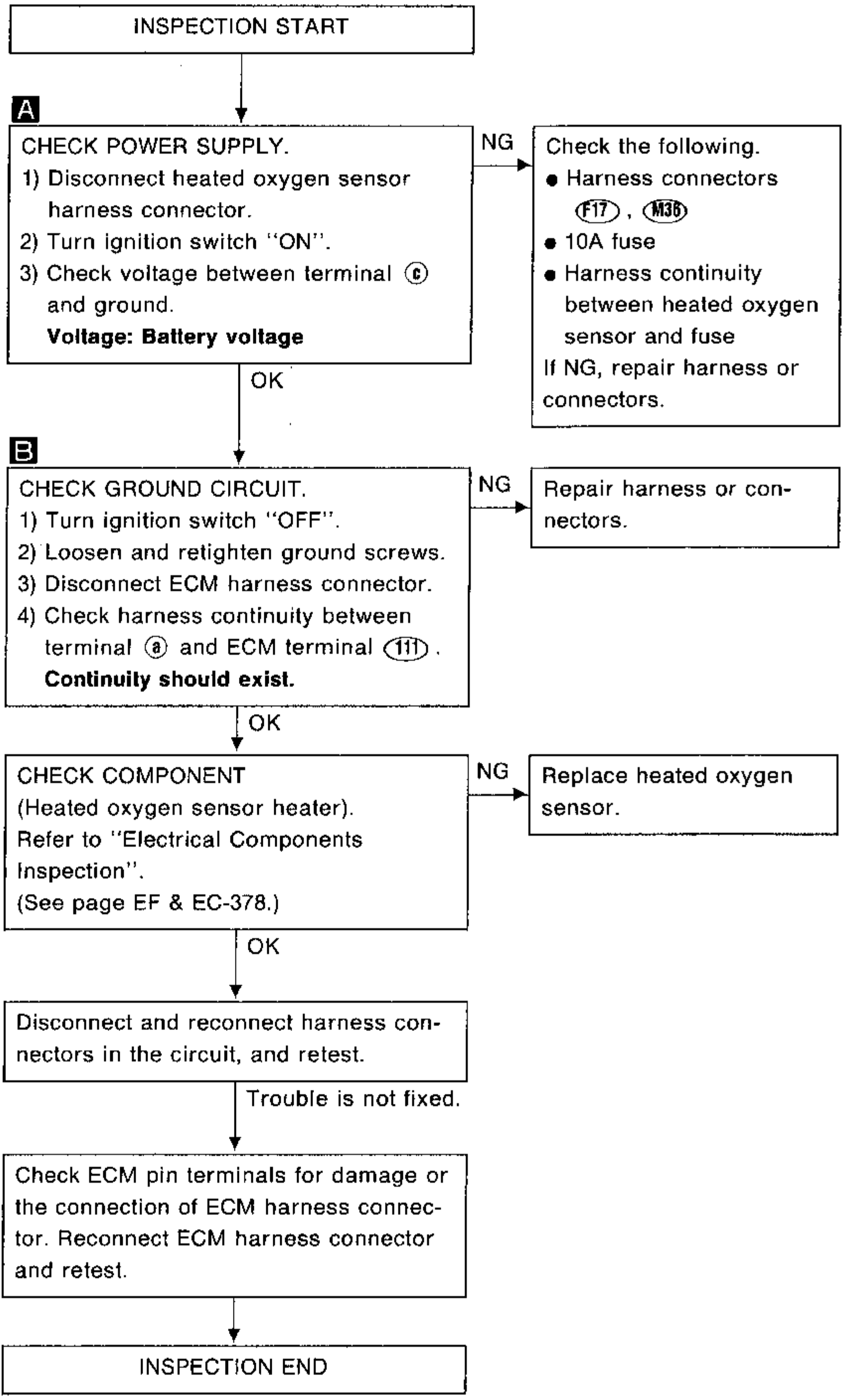
HEATED OXYGEN SENSOR HEATER (Not self-diagnostic item)

A



B





INSPECTION START

A CHECK POWER SUPPLY.
1) Disconnect heated oxygen sensor harness connector.
2) Turn ignition switch "ON".
3) Check voltage between terminal ⓒ and ground.
Voltage: Battery voltage

NG → Check the following.
- Harness connectors (F17), (M36)
- 10A fuse
- Harness continuity between heated oxygen sensor and fuse

If NG, repair harness or connectors.

OK ↓

B CHECK GROUND CIRCUIT.
1) Turn ignition switch "OFF".
2) Loosen and retighten ground screws.
3) Disconnect ECM harness connector.
4) Check harness continuity between terminal ⓐ and ECM terminal (111).
Continuity should exist.

NG → Repair harness or connectors.

OK ↓

CHECK COMPONENT
(Heated oxygen sensor heater).
Refer to "Electrical Components Inspection".
(See page EF & EC-378.)

NG → Replace heated oxygen sensor.

OK ↓

Disconnect and reconnect harness connectors in the circuit, and retest.

Trouble is not fixed. ↓

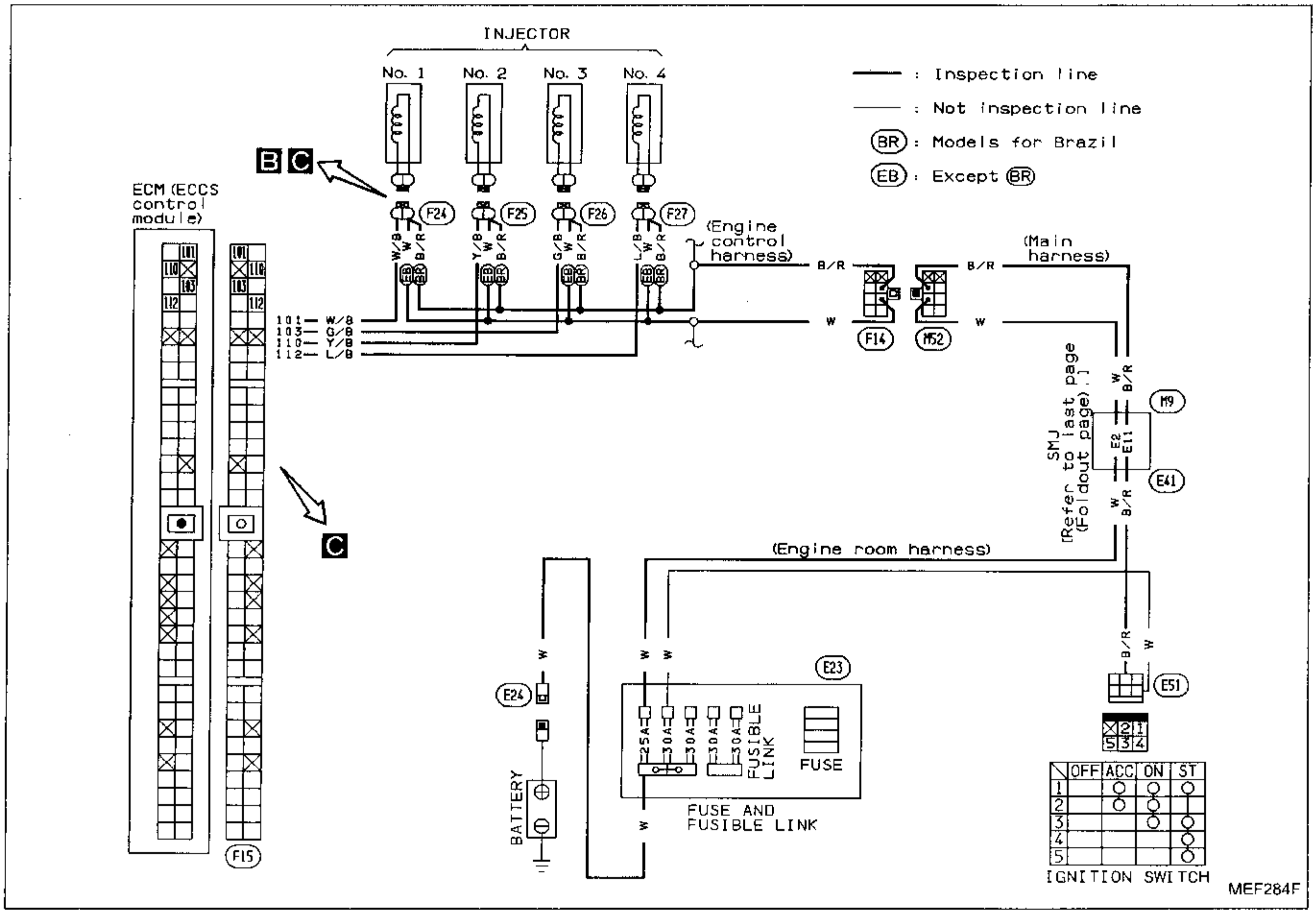
Check ECM pin terminals for damage or the connection of ECM harness connector. Reconnect ECM harness connector and retest.

↓

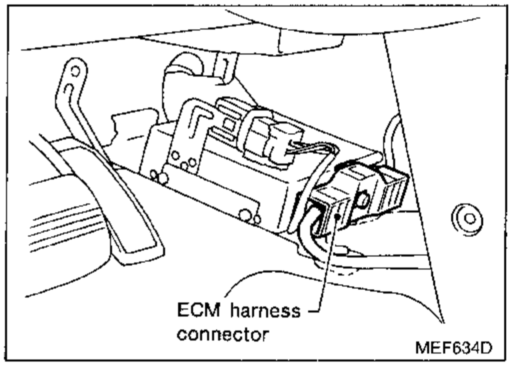
INSPECTION END

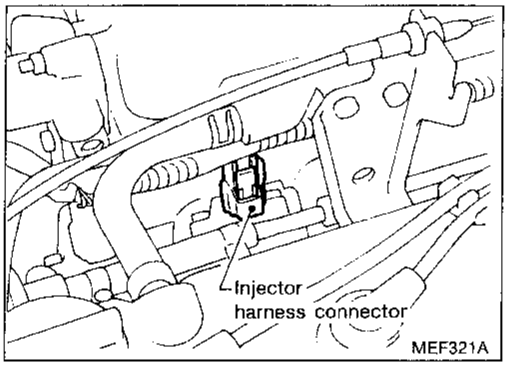
Diagnostic Procedure 16

INJECTOR (Not self-diagnostic item)

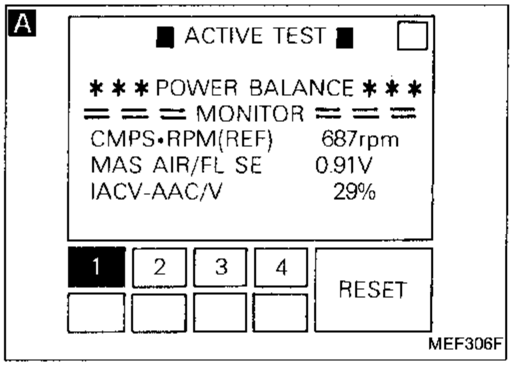


Harness layout





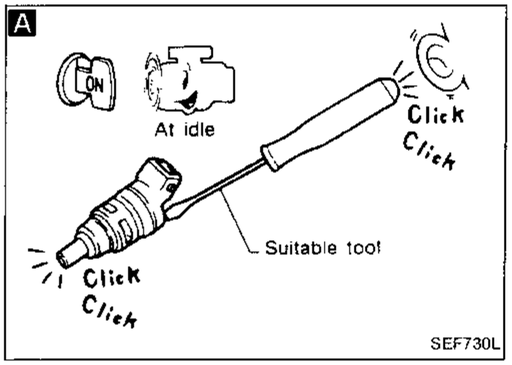
INJECTOR (Not self-diagnostic item)



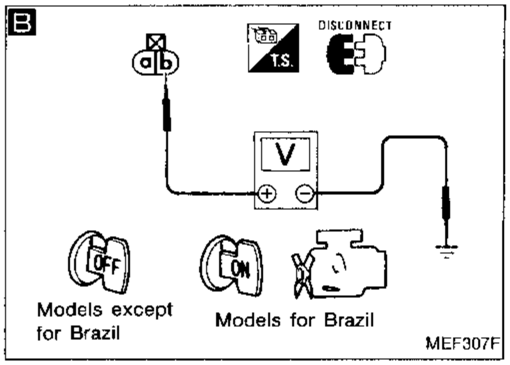
■ ACTIVE TEST ■ ☐

*** POWER BALANCE ***
=== MONITOR ===
CMPS•RPM(REF) 687rpm
MAS AIR/FL SE 0.91V
IACV-AAC/V 29%

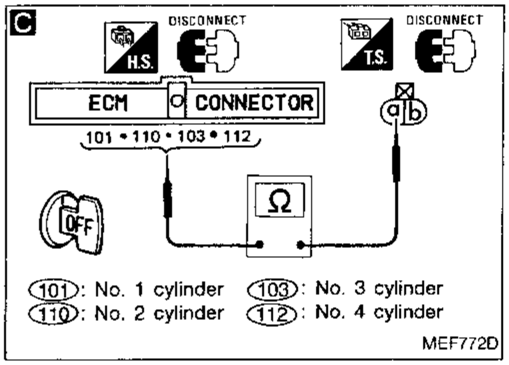
MEF306F



SEF730L



MEF307F



101: No. 1 cylinder
110: No. 2 cylinder
103: No. 3 cylinder
112: No. 4 cylinder

MEF772D

INSPECTION START

A

CHECK OVERALL FUNCTION.
1) Start engine.
2) Perform "POWER BALANCE" in "ACTIVE TEST" mode with CONSULT.
3) Search for circuit which does not produce a momentary engine speed drop.

OR

2) Search for circuit which does not produce injector operating sound.

OK → INSPECTION END

NG ↓

B

CHECK POWER SUPPLY.
1) Stop engine.
2) Disconnect injector harness connector.
3) Turn ignition switch "ON" (Only models for Brazil).
4) Check voltage between terminal ⓑ and ground.

Voltage: Battery voltage

NG → Check the following.
- Harness connectors F14, M52
- Harness connectors M9, E41
- 25A fusible link
- Harness continuity between battery and injector
- Harness continuity between ignition switch and injector

If NG, repair harness or connectors.

OK ↓

C

CHECK OUTPUT SIGNAL CIRCUIT.
1) Turn ignition switch "OFF" (Only models for Brazil).
2) Disconnect ECM harness connector.
3) Check harness continuity between terminal ⓐ and ECM terminals 101, 110, 103, 112.

Continuity should exist.

NG → Repair harness or connectors.

OK ↓

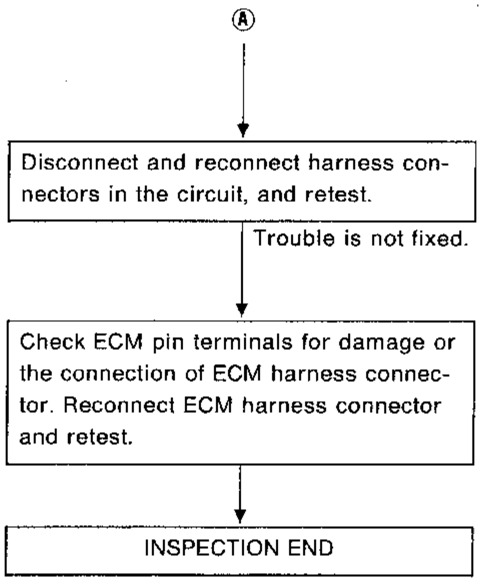
CHECK COMPONENT
(Injector).
Refer to "Electrical Components Inspection".
(See page EF & EC-375.)

NG → Replace injector.

OK ↓

Ⓐ

INJECTOR (Not self-diagnostic item)



Disconnect and reconnect harness connectors in the circuit, and retest.

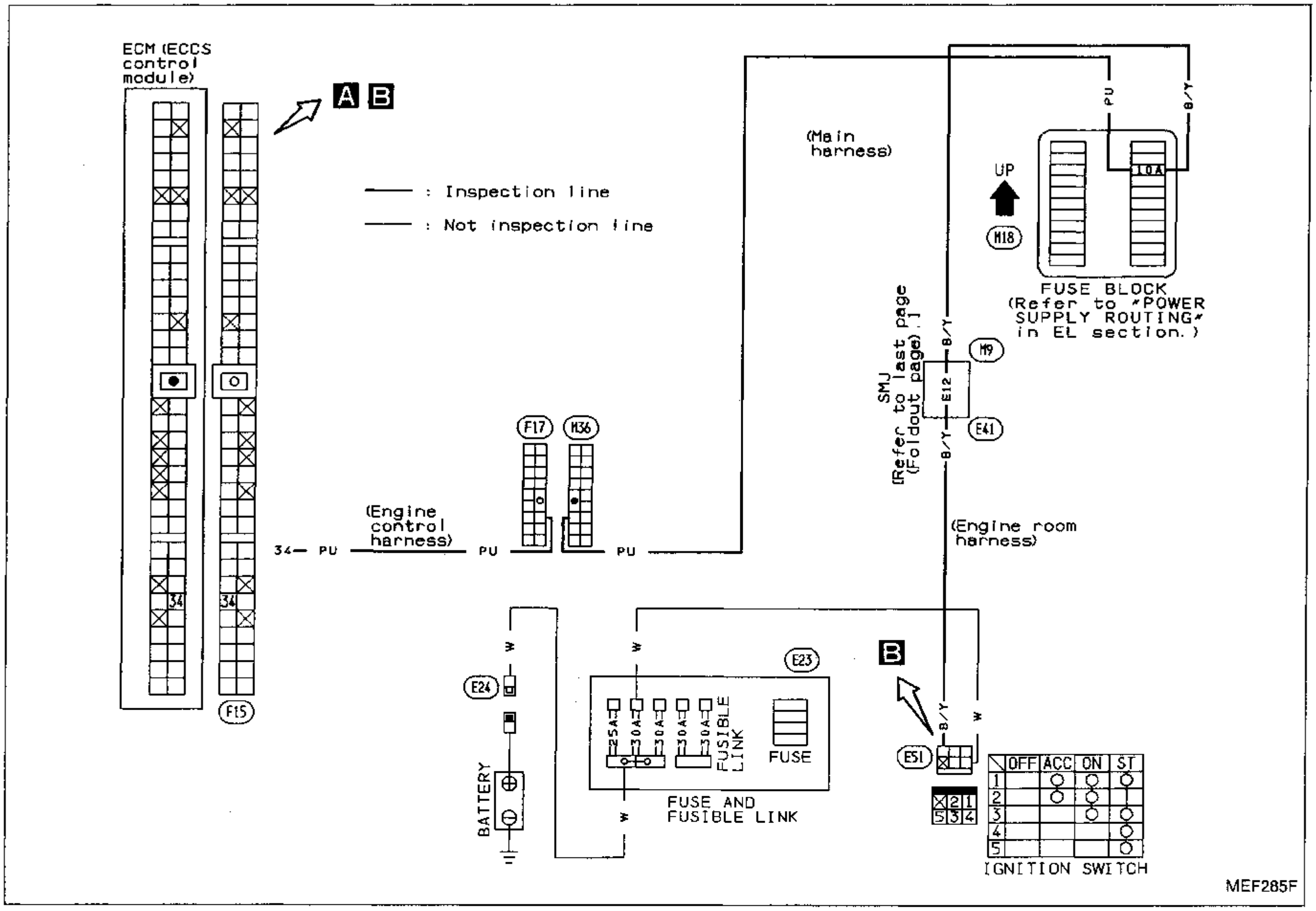
Trouble is not fixed.

Check ECM pin terminals for damage or the connection of ECM harness connector. Reconnect ECM harness connector and retest.

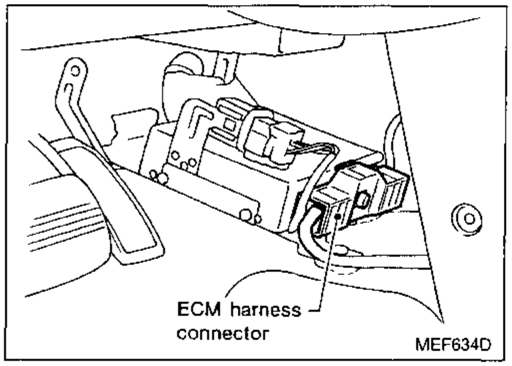
INSPECTION END

Diagnostic Procedure 17

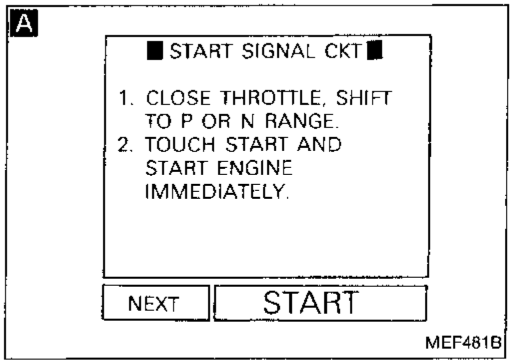
START SIGNAL (Not self-diagnostic item)



Harness layout



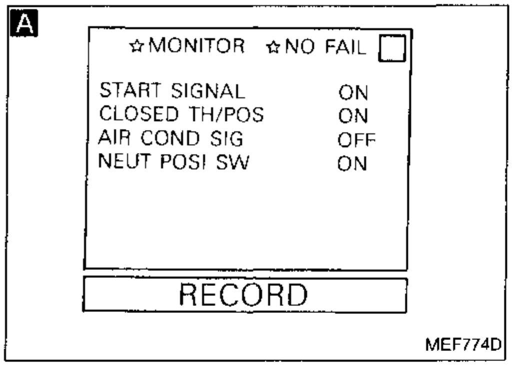
START SIGNAL (Not self-diagnostic item)



■ START SIGNAL CKT ■

1. CLOSE THROTTLE, SHIFT TO P OR N RANGE.
2. TOUCH START AND START ENGINE IMMEDIATELY.

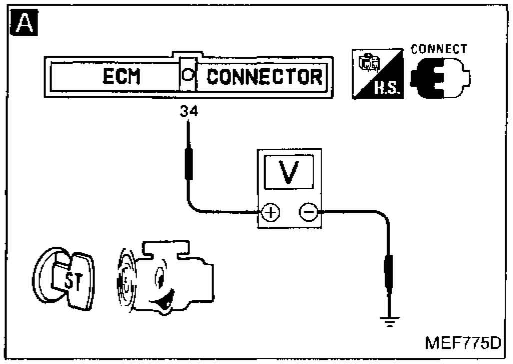
MEF481B



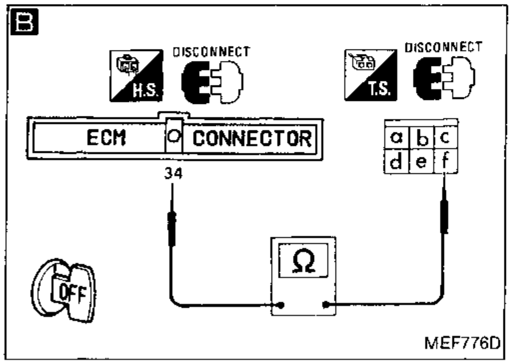
☆MONITOR ☆NO FAIL ☐

START SIGNAL	ON
CLOSED TH/POS	ON
AIR COND SIG	OFF
NEUT POSI SW	ON

MEF774D



MEF775D



MEF776D

INSPECTION START

↓

A

CHECK OVERALL FUNCTION.

1) Turn ignition switch "ON".
2) Perform "START SIGNAL CKT" in "FUNCTION TEST" mode with CONSULT.

OR

1) Turn ignition switch "ON".
2) Check "START SIGNAL" in "DATA MONITOR" mode with CONSULT.

IGN "ON"	OFF
IGN "START"	ON

OR

1) Turn ignition switch to "START".
2) Check voltage between ECM terminal ㉞ and ground.

Voltage:

Ignition switch "START"
Battery voltage
Except above
Approximately 0V

OK → INSPECTION END

↓ NG

B

CHECK INPUT SIGNAL CIRCUIT.

1) Turn ignition switch "OFF"
2) Disconnect ECM harness connector and ignition switch harness connector.
3) Check harness continuity between ECM terminal ㉞ and terminal ⓕ.

Continuity should exist.

NG → Check the following.

- Harness connectors F17, M36
- 10A fuse
- Harness connectors M9, E41
- Harness continuity between ECM and ignition switch

If NG, repair harness or connectors.

↓ OK

Disconnect and reconnect harness connectors in the circuit, and retest.

↓ Trouble is not fixed.

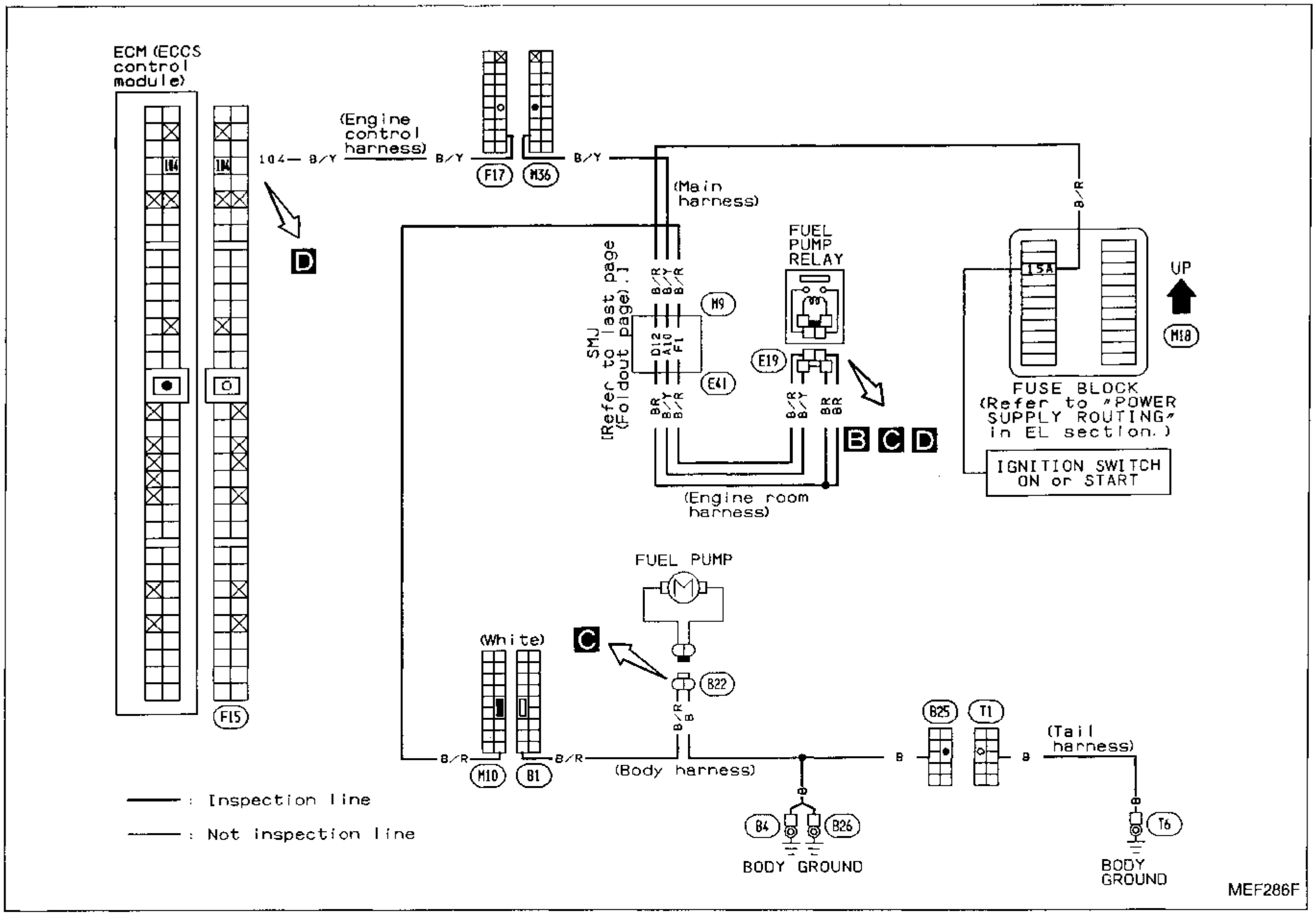
Check ECM pin terminals for damage or the connection of ECM harness connector. Reconnect ECM harness connector and retest.

↓

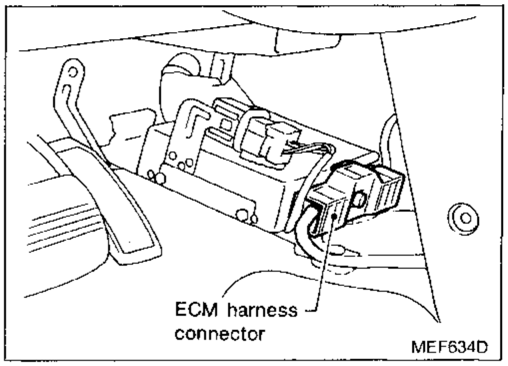
INSPECTION END

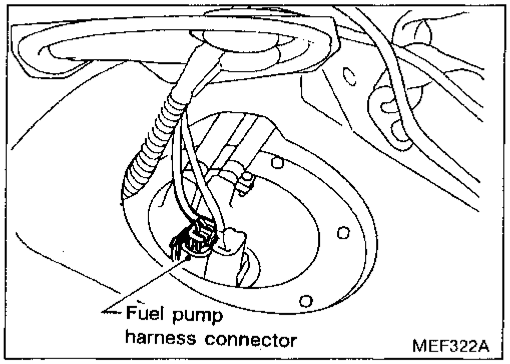
Diagnostic Procedure 18

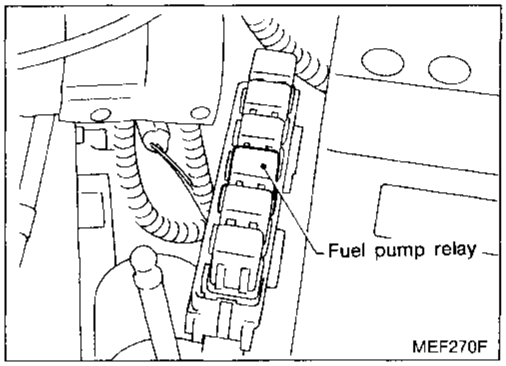
FUEL PUMP (Not self-diagnostic item)



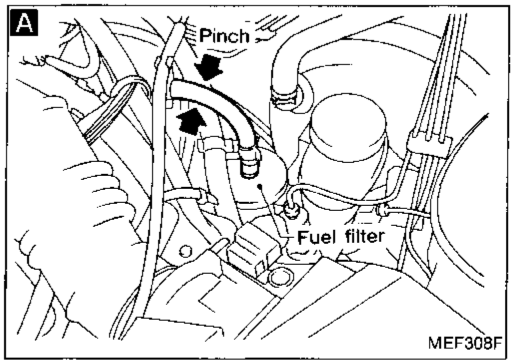
Harness layout







FUEL PUMP (Not self-diagnostic item)



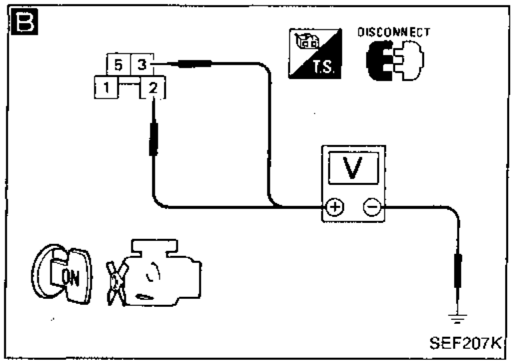
INSPECTION START

A

CHECK OVERALL FUNCTION.
1) Turn ignition switch "ON".
2) Pinch fuel feed hose with fingers.
Fuel pressure pulsation should be felt on the fuel feed hose for 5 seconds after ignition switch is turned "ON".

OK → INSPECTION END

NG ↓



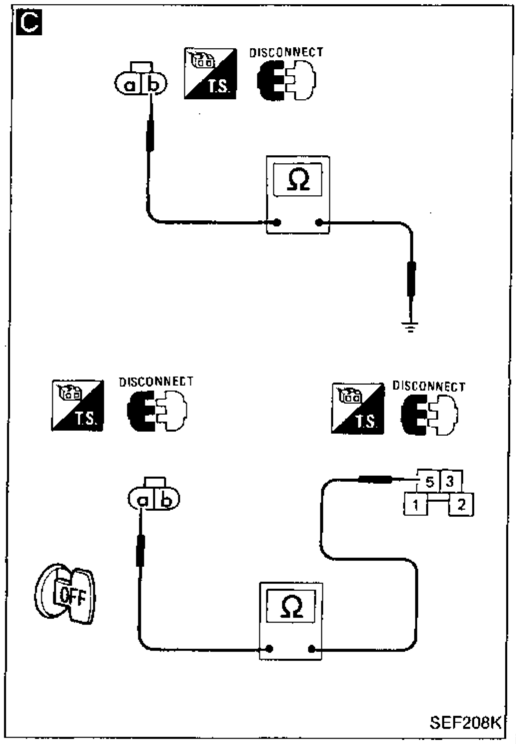
B

CHECK POWER SUPPLY.
1) Turn ignition switch "OFF".
2) Disconnect fuel pump relay.
3) Turn ignition switch "ON".
4) Check voltage between terminals ②, ③ and ground with CONSULT or tester.
Voltage: Battery voltage

NG → Check the following.
- Harness connectors (M9), (E41)
- 15A fuse
- Harness continuity between fuse and fuel pump relay

If NG, repair harness or connectors.

OK ↓



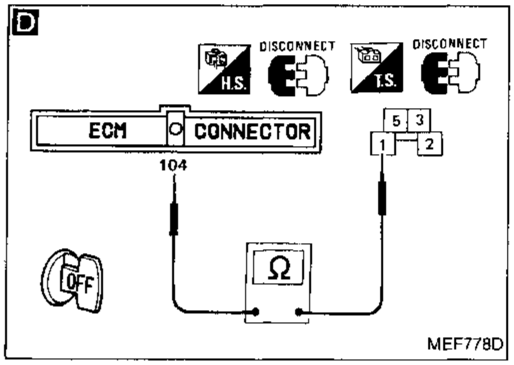
C

CHECK GROUND CIRCUIT.
1) Turn ignition switch "OFF".
2) Disconnect fuel pump harness connector.
3) Check harness continuity between terminal ⓑ and body ground, terminal ⓐ and terminal ⑤.
Continuity should exist.

NG → Check the following.
- Harness connectors (B1), (M10)
- Harness connectors (M9), (E41).
- Harness continuity between fuel pump and body ground
- Harness continuity between fuel pump and fuel pump relay

If NG, repair harness or connectors.

OK ↓



D

CHECK OUTPUT SIGNAL CIRCUIT.
1) Disconnect ECM harness connector.
2) Check harness continuity between ECM terminal (104) and terminal ①.
Continuity should exist.

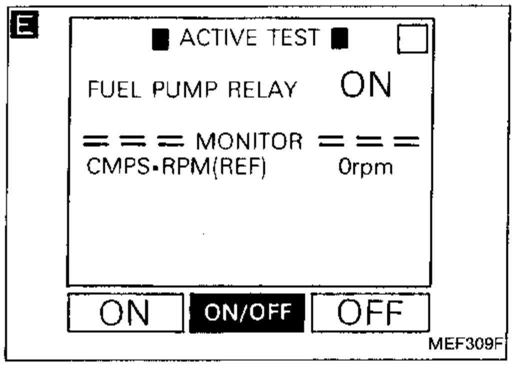
NG → Check the following.
- Harness connectors (F17), (M36)
- Harness connectors (M9), (E41)
- Harness continuity between ECM and fuel pump relay

If NG, repair harness or connectors.

OK ↓

Ⓐ

FUEL PUMP (Not self-diagnostic item)



Ⓐ

CHECK COMPONENT
(Fuel pump relay).
1) Reconnect fuel pump relay, fuel pump harness connector and ECM harness connector.
2) Turn ignition switch "ON".
3) Turn fuel pump relay "ON" and "OFF" in "ACTIVE TEST" mode with CONSULT and check operating sound.

OR

Refer to "Electrical Components Inspection".
(See page EF & EC-377.)

NG → Replace fuel pump relay.

OK ↓

CHECK COMPONENT
(Fuel pump).
Refer to "Electrical Components Inspection".
(See page EF & EC-373.)

NG → Replace fuel pump.

OK ↓

Disconnect and reconnect harness connectors in the circuit, and retest.

Trouble is not fixed. ↓

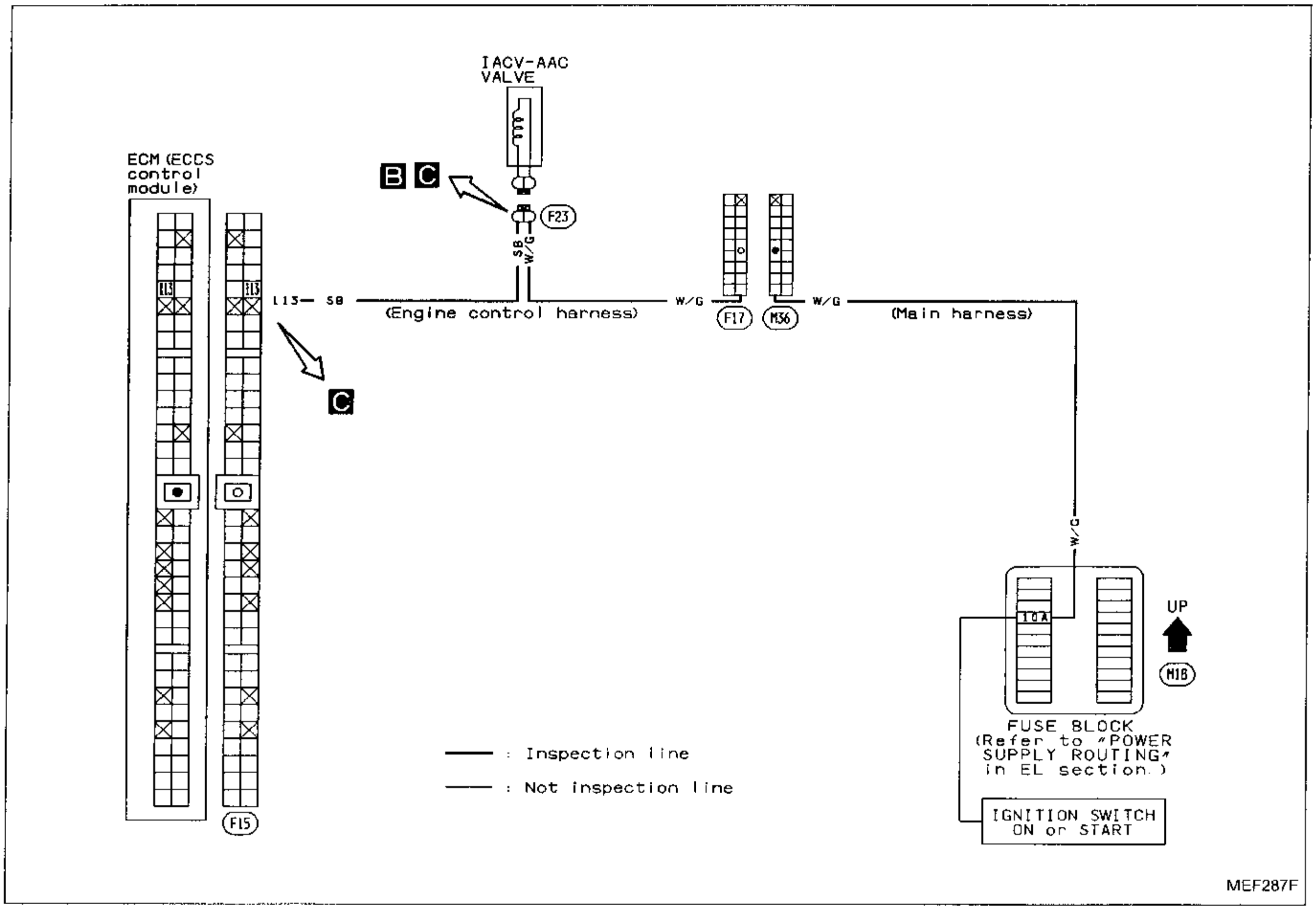
Check ECM pin terminals for damage or the connection of ECM harness connector. Reconnect ECM harness connector and retest.

↓

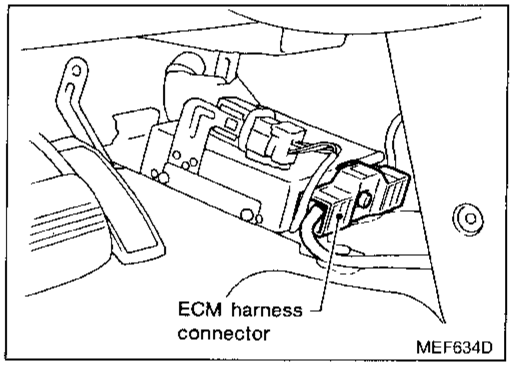
INSPECTION END

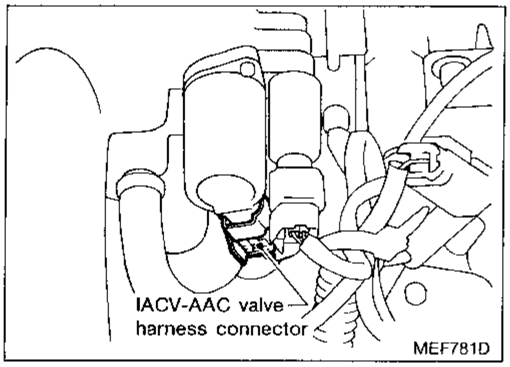
Diagnostic Procedure 19

IACV-AAC VALVE (Not self-diagnostic item)

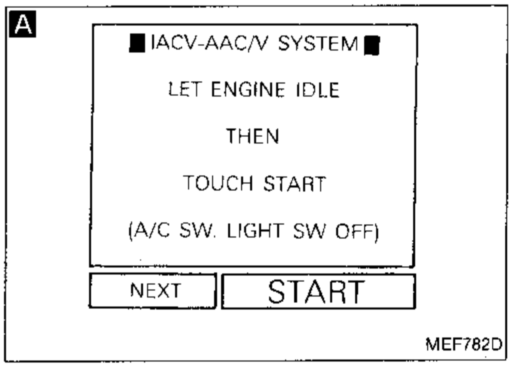


Harness layout





IACV-AAC VALVE (Not self-diagnostic item)



■ IACV-AAC/V SYSTEM ■

LET ENGINE IDLE

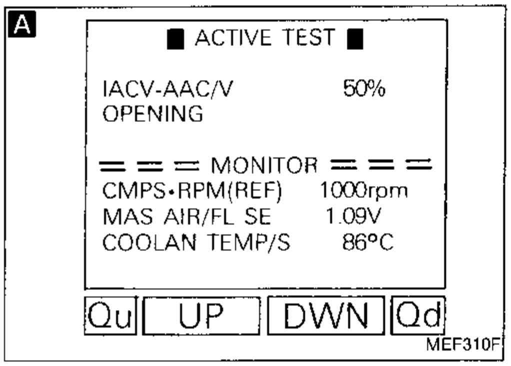
THEN

TOUCH START

(A/C SW. LIGHT SW OFF)

NEXT | START

MEF782D



■ ACTIVE TEST ■

IACV-AAC/V OPENING 50%

=== MONITOR ===

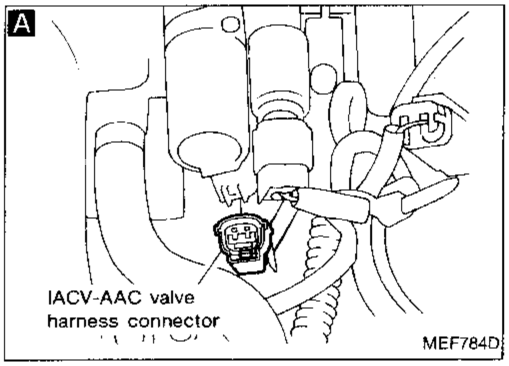
CMPS•RPM(REF) 1000rpm

MAS AIR/FL SE 1.09V

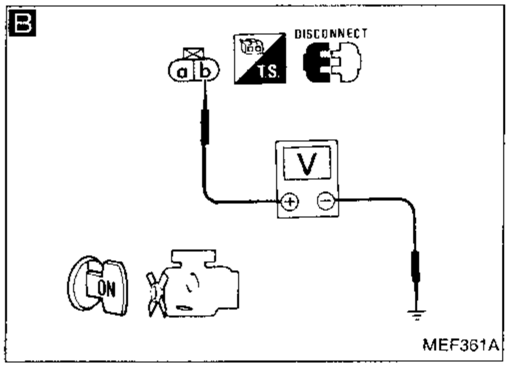
COOLAN TEMP/S 86°C

Qu | UP | DWN | Qd

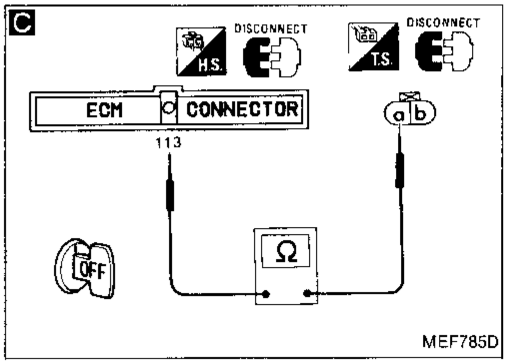
MEF310F



MEF784D



MEF361A



MEF785D

INSPECTION START

A

CHECK OVERALL FUNCTION.

1) Start engine and warm it up sufficiently.

2) Check idle speed.

M/T: 750 ± 50 rpm (for Canada)

650 ± 50 rpm (Except for Canada)

A/T: 800 ± 50 rpm (in "N" position)

If NG, adjust idle speed.

3) Perform "IACV-AAC/V SYSTEM" in "FUNCTION TEST" mode with CONSULT.

OR

3) Select "IACV-AAC/V OPENING" in "ACTIVE TEST" mode with CONSULT.

4) When touching "Qu" and "Qd", check that engine speed changes according to the IACV-AAC valve opening percentage.

OR

3) Disconnect IACV-AAC valve harness connector.

4) Make sure that idle speed drops.

OK → INSPECTION END

NG ↓

B

CHECK POWER SUPPLY.

1) Stop engine.

2) Disconnect IACV-AAC valve harness connector.

3) Turn ignition switch "ON".

4) Check voltage between terminal ⓑ and ground with CONSULT or tester.

Voltage: Battery voltage

NG → Check the following.

- Harness connectors (F17), (M36)
- 10A fuse
- Harness continuity between IACV-AAC valve and fuse

If NG, repair harness or connectors.

OK ↓

C

CHECK OUTPUT SIGNAL CIRCUIT.

1) Turn ignition switch "OFF".

2) Disconnect ECM harness connector.

3) Check harness continuity between ECM terminal (113) and terminal ⓐ.

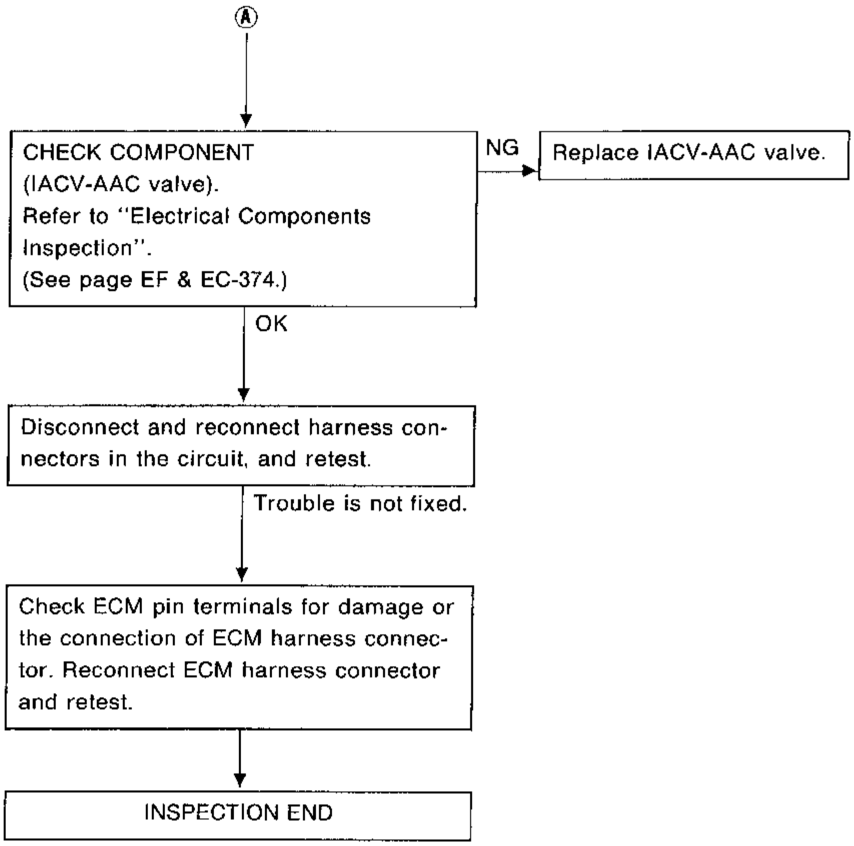
Continuity should exist.

NG → Repair harness or connectors.

OK ↓

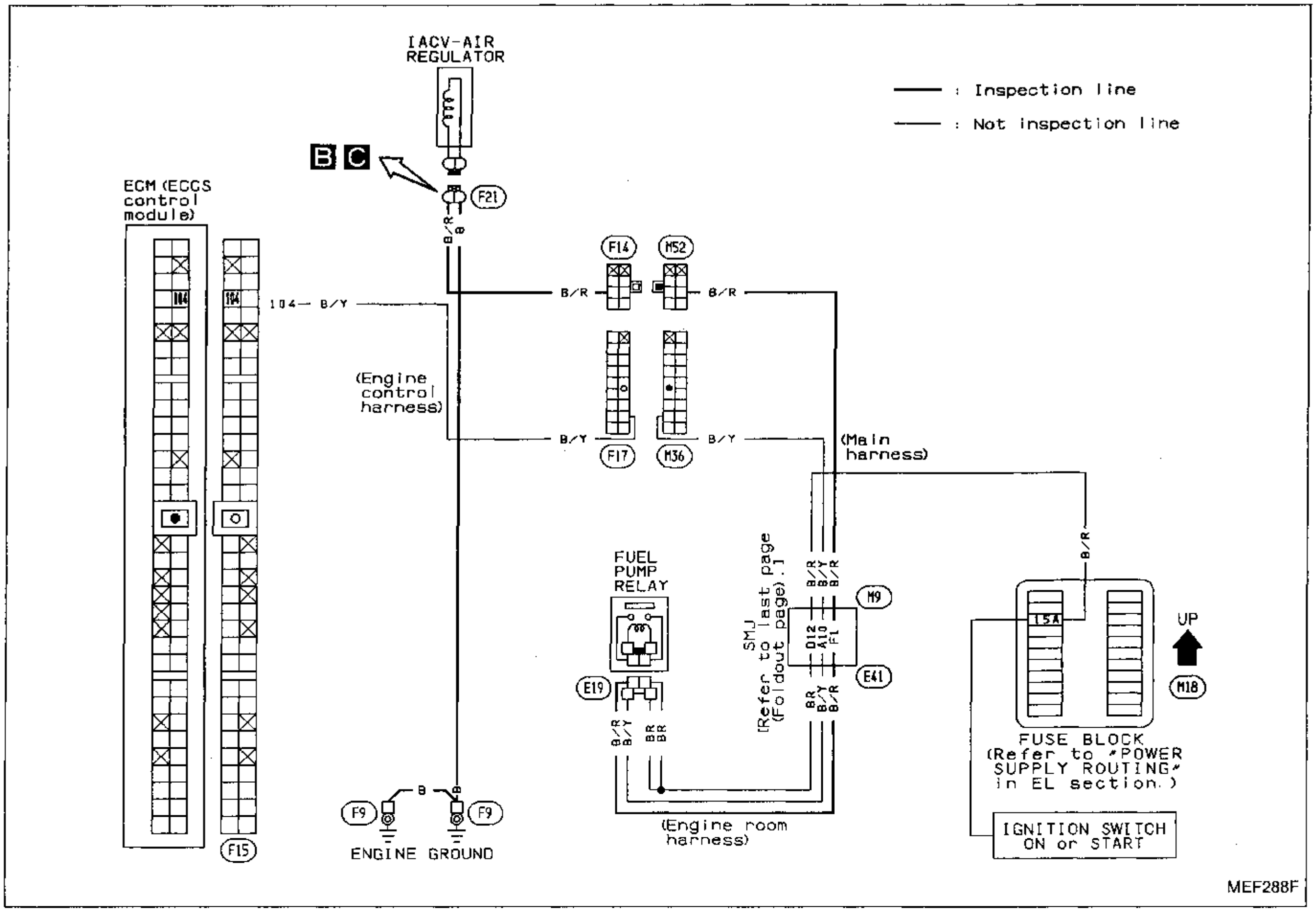
Ⓐ

IACV-AAC VALVE (Not self-diagnostic item)

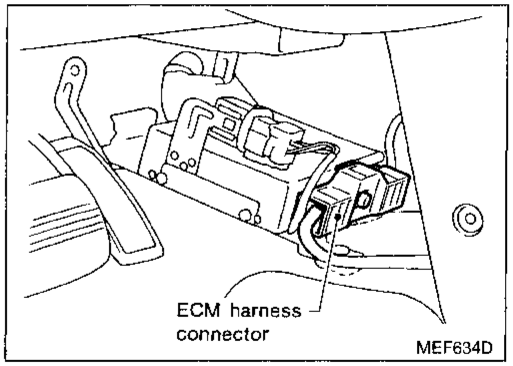


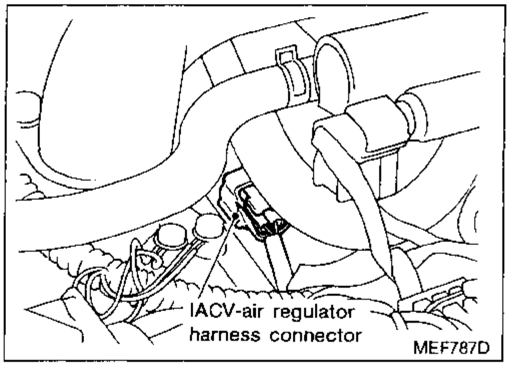
Diagnostic Procedure 20

IACV-AIR REGULATOR (Not self-diagnostic item)

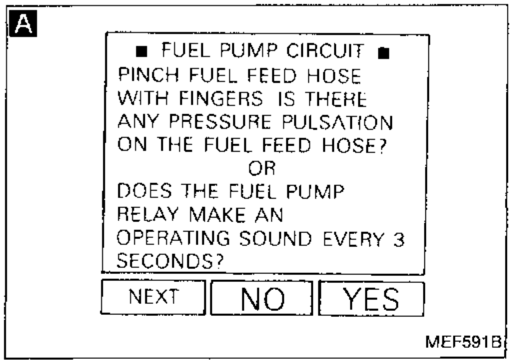


Harness layout



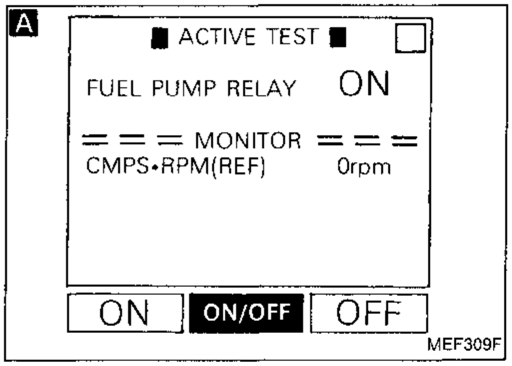


IACV-AIR REGULATOR (Not self-diagnostic item)



■ FUEL PUMP CIRCUIT ■
PINCH FUEL FEED HOSE WITH FINGERS IS THERE ANY PRESSURE PULSATION ON THE FUEL FEED HOSE?
OR
DOES THE FUEL PUMP RELAY MAKE AN OPERATING SOUND EVERY 3 SECONDS?

MEF591B

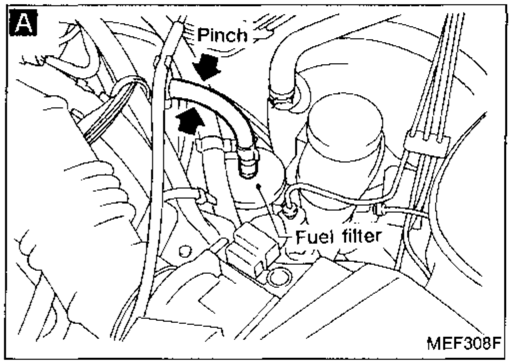


■ ACTIVE TEST ■

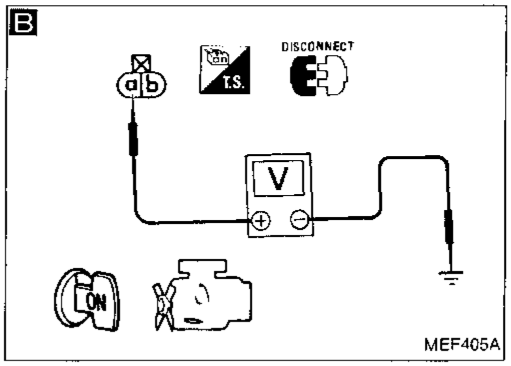
FUEL PUMP RELAY ON

=== MONITOR ===
CMPS•RPM(REF) 0rpm

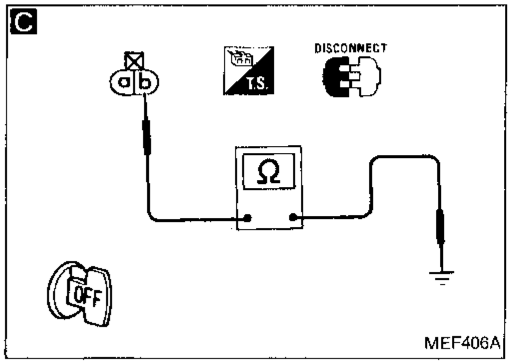
MEF309F



MEF308F



MEF405A



MEF406A

INSPECTION START

↓

A

CHECK CONTROL FUNCTION.
1) Turn ignition switch "ON".
2) Perform "FUEL PUMP CIRCUIT" in "FUNCTION TEST" mode with CONSULT.
— OR —
2) Turn fuel pump relay "ON" and "OFF" in "ACTIVE TEST" mode with CONSULT and check operating sound.
— OR —
2) Pinch fuel feed hose with fingers.
Fuel pressure pulsation should be felt on the fuel feed hose for 5 seconds after ignition switch is turned "ON".

NG → Check fuel pump control circuit.
(See page EF & EC-116.)

↓ OK

B

CHECK POWER SUPPLY.
1) Turn ignition switch "OFF".
2) Disconnect IACV-air regulator harness connector.
3) Turn ignition switch "ON".
4) Check voltage between terminal ⓐ and ground with CONSULT or tester.
Battery voltage should exist for 5 seconds after ignition switch is turned "ON".

NG → Check the following.
- Harness connectors F14, M52
- Harness connectors M9, E41
- Harness continuity between IACV-air regulator and fuel pump relay

If NG, repair harness or connectors.

↓ OK

C

CHECK GROUND CIRCUIT.
1) Turn ignition switch "OFF".
2) Check harness continuity between terminal ⓑ and engine ground.
Continuity should exist.

NG → Repair harness or connectors.

↓ OK

CHECK COMPONENT
(IACV-air regulator).
Refer to "Electrical Components Inspection".
(See page EF & EC-375.)

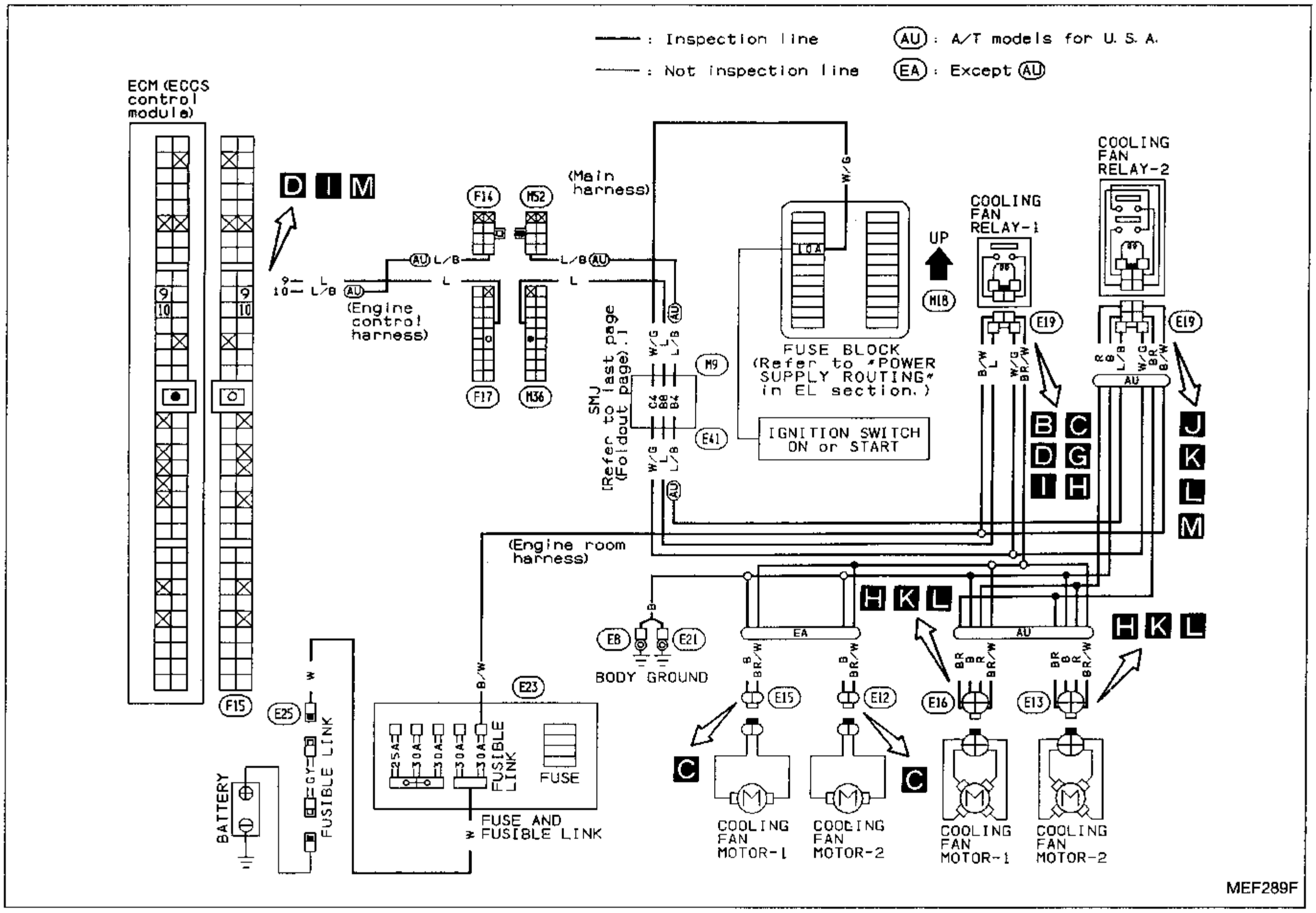
NG → Replace IACV-air regulator.

↓ OK

INSPECTION END

Diagnostic Procedure 21

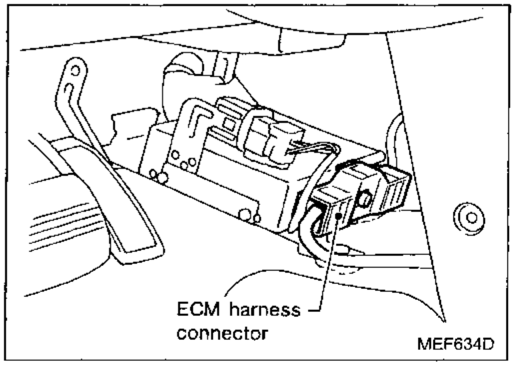
COOLING FAN CONTROL (Not self-diagnostic item)



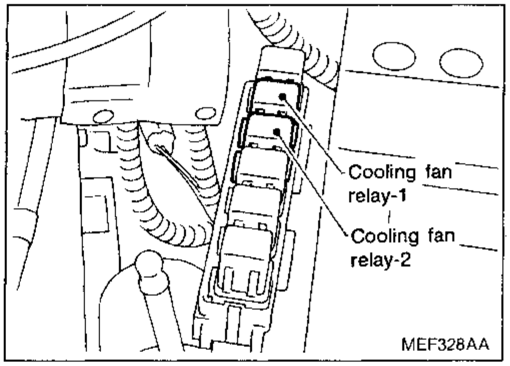
MEF289F

COOLING FAN CONTROL (Not self-diagnostic item)

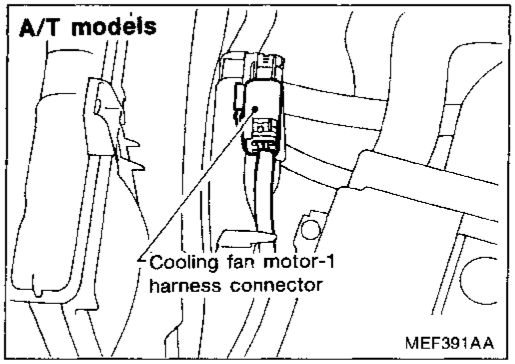
Harness layout



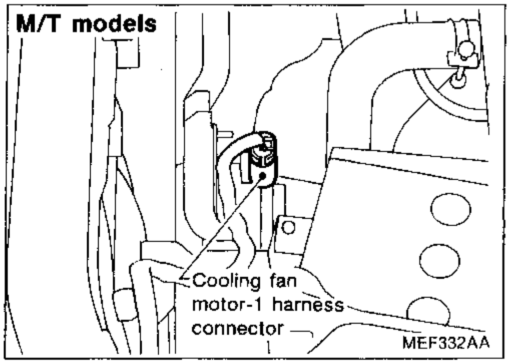
MEF634D



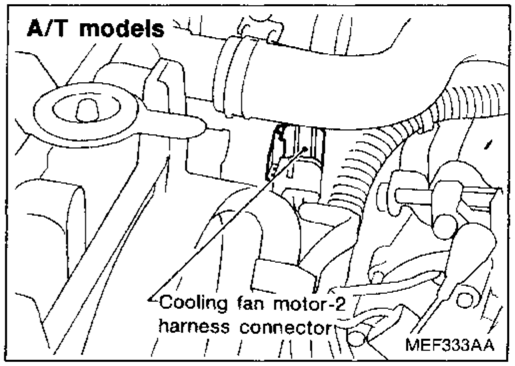
MEF328AA


A/T models

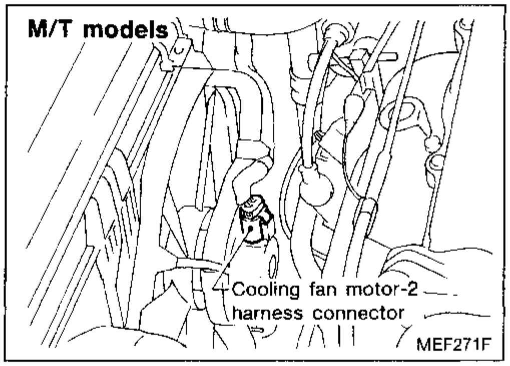
MEF391AA


M/T models

MEF332AA


A/T models

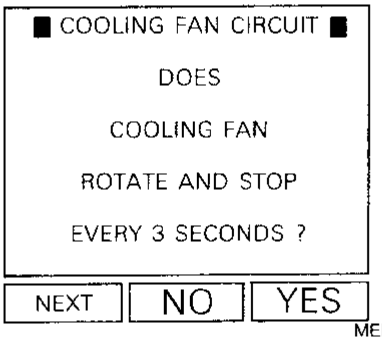
MEF333AA


M/T models

MEF271F

COOLING FAN CONTROL (Not self-diagnostic item)

A



■ COOLING FAN CIRCUIT ■

DOES

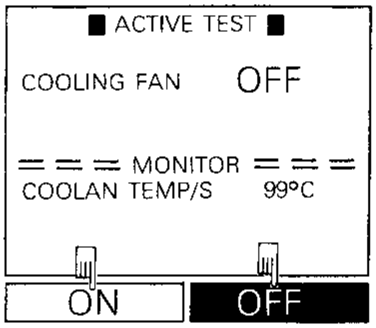
COOLING FAN

ROTATE AND STOP

EVERY 3 SECONDS ?

MEF311F

A



■ ACTIVE TEST ■

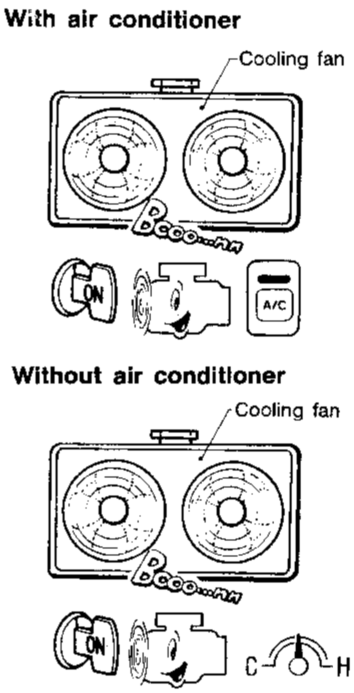
COOLING FAN OFF

=== MONITOR ===

COOLAN TEMP/S 99°C

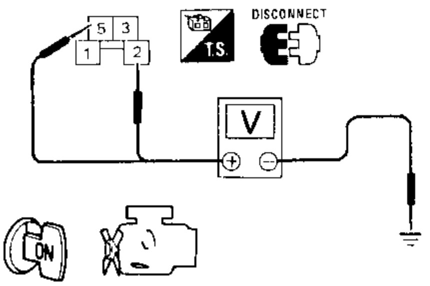
MEF312F

A



SEF997IA

B



MEF365A

Except A/T models for U.S.A.

INSPECTION START

↓

A

CHECK OVERALL FUNCTION.

1) Turn ignition switch "ON".
2) Perform "COOLING FAN CIRCUIT" in "FUNCTION TEST" mode with CONSULT.

OR

1) Turn ignition switch "ON".
2) Select "COOLING FAN" in "ACTIVE TEST" mode with CONSULT.

OR

With air conditioner

1) Start engine.
2) Set temperature lever at full cold position.
3) Turn air conditioner switch "ON".
4) Turn blower fan switch "ON".
5) Run engine at idle for a few minutes with air conditioner operating.
6) Make sure that cooling fan operates.

Without air conditioner

1) Start engine.
2) Keep engine speed at about 2,000 rpm until engine is warmed up sufficiently.
3) Make sure that cooling fan begins to operate during warm-up.

OK → INSPECTION END

↓ NG

B

CHECK POWER SUPPLY.

1) Turn air conditioner switch "OFF".
2) Turn blower fan switch "OFF".
(Step 1) and 2) are only performed for models with air conditioner.)
3) Stop engine.
4) Disconnect cooling fan relay-1.
5) Turn ignition switch "ON".
6) Check voltage between terminals ②, ⑤ and ground.

Voltage: Battery voltage

NG → Check the following.

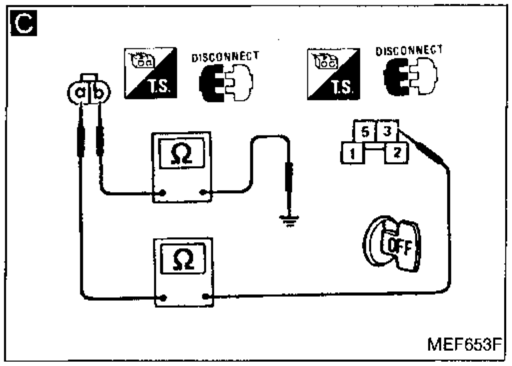
- Harness connectors M9, E41
- "GY" fusible link
- 30A fusible link
- 10A fuse
- Harness continuity between fuse and cooling fan relay-1
- Harness continuity between battery and cooling fan relay-1

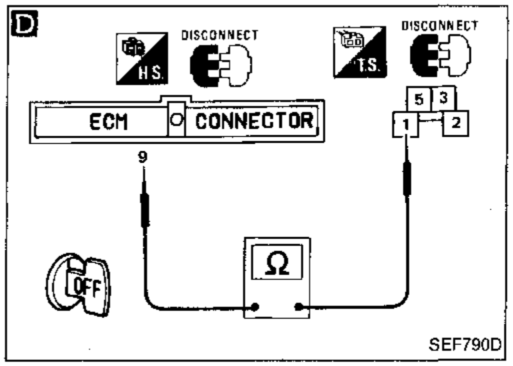
If NG, repair harness or connectors.

↓ OK

Ⓐ

COOLING FAN CONTROL (Not self-diagnostic item)





Ⓐ

C CHECK GROUND CIRCUIT.
1) Turn ignition switch "OFF".
2) Disconnect cooling fan motor-1 harness connector and cooling fan motor-2 harness connector.
3) Check harness continuity between terminal ⓐ and terminal ③, terminal ⓑ and body ground.
Continuity should exist.

NG → Repair harness or connectors.

OK ↓

D CHECK OUTPUT SIGNAL CIRCUIT.
1) Disconnect ECM harness connector.
2) Check harness continuity between ECM terminal ⑨ and terminal ①.
Continuity should exist.

NG → Check the following.
- Harness connectors F17, M36
- Harness connectors M9, E41
- Harness continuity between ECM and cooling fan relay-1

If NG, repair harness or connectors.

OK ↓

CHECK COMPONENT
(Cooling fan relay-1).
Refer to "Electrical Components Inspection".
(See page EF & EC-377.)

NG → Replace cooling fan relay.

OK ↓

CHECK COMPONENTS
(Cooling fan motors).
Refer to "Electrical Components Inspection".
(See page EF & EC-375.)

NG → Replace cooling fan motors.

OK ↓

Disconnect and reconnect harness connectors in the circuit, and retest.

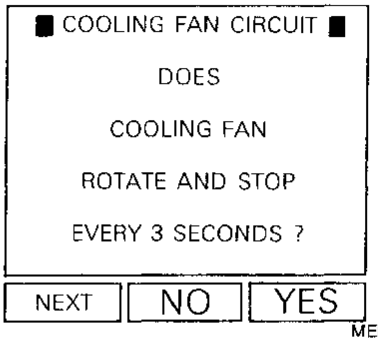
Trouble is not fixed. ↓

Check ECM pin terminals for damage or the connection of ECM harness connector. Reconnect ECM harness connector and retest.

↓

INSPECTION END

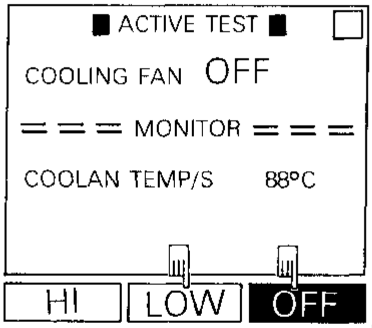
COOLING FAN CONTROL (Not self-diagnostic item)



■ COOLING FAN CIRCUIT ■

DOES COOLING FAN ROTATE AND STOP EVERY 3 SECONDS ?

MEF311F



■ ACTIVE TEST ■ ☐

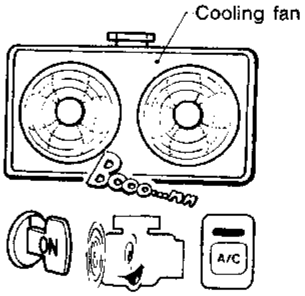
COOLING FAN OFF

=== MONITOR ===

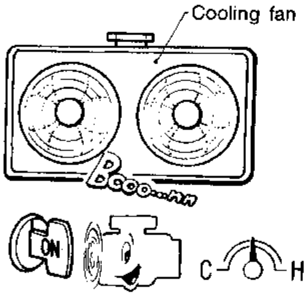
COOLAN TEMP/S 88°C

MEF313F

With air conditioner



Without air conditioner



SEF997IA

A/T models for U.S.A.

INSPECTION START

↓

CHECK COOLING FAN LOW SPEED OPERATION.

1) Disconnect cooling fan relay-2.

2) Turn ignition switch "ON".

3) Perform "COOLING FAN CIRCUIT" in "FUNCTION TEST" mode with CONSULT.

— OR —

2) Turn ignition switch "ON".

3) Perform "COOLING FAN" in "ACTIVE TEST" mode with CONSULT.

— OR —

With air conditioner

1) Start engine.

2) Set temperature lever at full cold position.

3) Turn air conditioner switch "ON".

4) Turn blower fan switch "ON".

5) Run engine at idle for a few minutes with air conditioner operating.

6) Make sure that cooling fan operates at low speed.

Without air conditioner

1) Start engine.

2) Keep engine speed at about 2,000 rpm until engine is warmed up sufficiently.

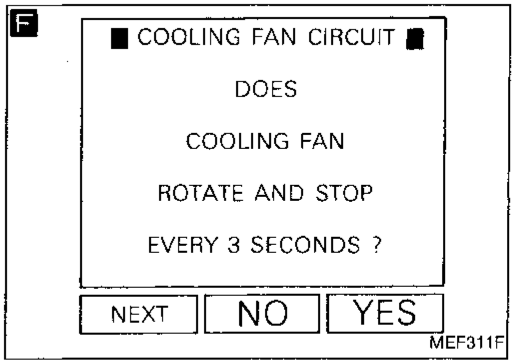
3) Make sure that cooling fan begins to operate at low speed during warm-up.

NG → Check cooling fan low speed control circuit. (Go to PROCEDURE A.)

↓ OK

Ⓐ

COOLING FAN CONTROL (Not self-diagnostic item)



■ COOLING FAN CIRCUIT ■

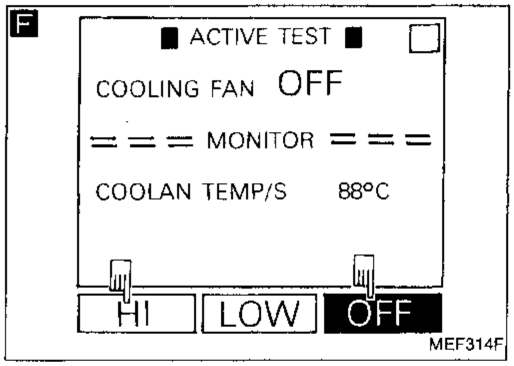
DOES

COOLING FAN

ROTATE AND STOP

EVERY 3 SECONDS ?

MEF311F



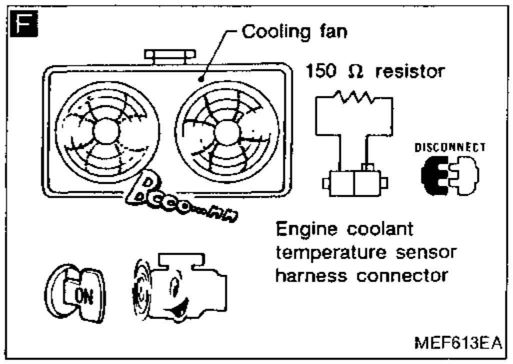
■ ACTIVE TEST ■

COOLING FAN OFF

=== MONITOR ===

COOLAN TEMP/S 88°C

MEF314F



MEF613EA

Ⓐ

CHECK COOLING FAN HIGH SPEED OPERATION.

1) Turn ignition switch "OFF".
2) Reconnect cooling fan relay-2.
3) Disconnect cooling fan relay-1.
4) Turn ignition switch "ON".
5) Perform "COOLING FAN CIRCUIT" in "FUNCTION TEST" mode with CONSULT.

OR

4) Turn ignition switch "ON".
5) Perform "COOLING FAN" in "ACTIVE TEST" mode with CONSULT.

OR

4) Turn air conditioner switch and blower fan switch "OFF" (Models with air conditioner).
5) Disconnect engine coolant temperature sensor harness connector.
6) Connect 150Ω resistor to engine coolant temperature sensor harness connector.
7) Restart engine and make sure that cooling fan operates at higher speed than low speed.

NG → Check cooling fan high speed control circuit. (Go to PROCEDURE B.)

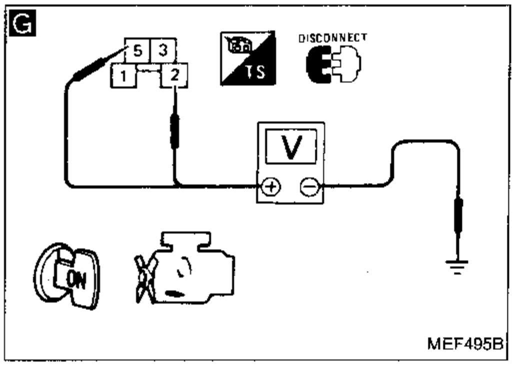
↓ OK

INSPECTION END

COOLING FAN CONTROL (Not self-diagnostic item)

PROCEDURE A

INSPECTION START



MEF495B

G CHECK POWER SUPPLY.

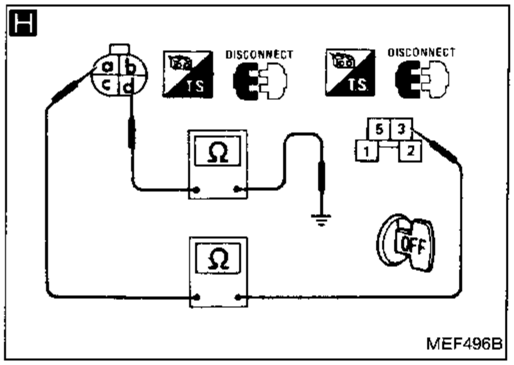
1) Stop engine.
2) Disconnect cooling fan relay-1.
3) Turn ignition switch "ON".
4) Check voltage between terminals ②, ⑤ and ground.

Voltage: Battery voltage

NG → Check the following.
- Harness connectors (M9), (E41)
- 10A fuse
- 30A fusible link
- "GY" fusible link
- Harness continuity between cooling fan relay-1 and fuse
- Harness continuity between cooling fan relay-1 and battery

If NG, repair harness or connectors.

OK ↓



MEF496B

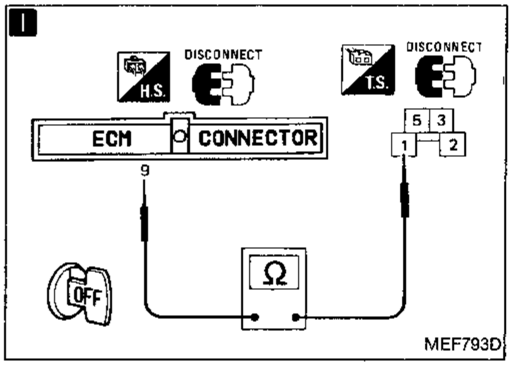
H CHECK GROUND CIRCUIT.

1) Turn ignition switch "OFF".
2) Disconnect cooling fan motor-1 harness connector and cooling fan motor-2 harness connector.
3) Check harness continuity between terminal ③ and terminal ⓐ, terminal ⓓ and body ground.

Continuity should exist.

NG → Repair harness or connectors.

OK ↓



MEF793D

I CHECK OUTPUT SIGNAL CIRCUIT.

1) Disconnect ECM harness connector.
2) Check harness continuity between ECM terminal ⑨ and terminal ①.

Continuity should exist.

NG → Check the following.
- Harness connectors (F17), (M36)
- Harness connectors (M9), (E41)
- Harness continuity between cooling fan relay-1 and ECM

If NG, repair harness or connectors.

OK ↓

CHECK COMPONENT
(Cooling fan relay-1).
Refer to "Electrical Components Inspection".
(See page EF & EC-377.)

NG → Replace cooling fan relay.

OK ↓

Ⓐ

COOLING FAN CONTROL (Not self-diagnostic item)

Ⓐ

CHECK COMPONENT
(Cooling fan motors).
Refer to "Electrical Components Inspection".
(See page EF & EC-375.)

NG → Replace cooling fan motors.

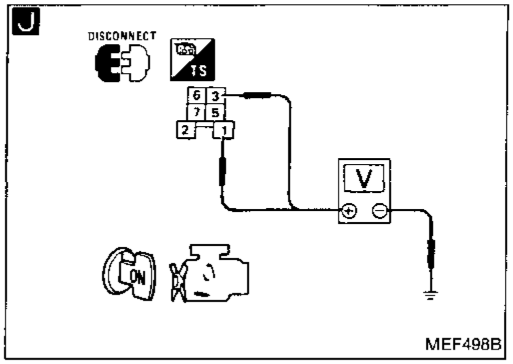
OK

Disconnect and reconnect harness connectors in the circuit, and retest.

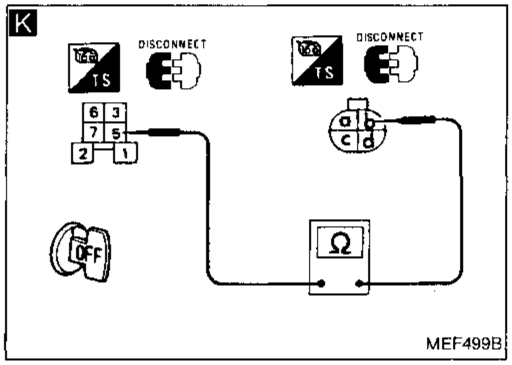
Trouble is not fixed.

Check ECM pin terminals for damage or the connection of ECM harness connector. Reconnect ECM harness connector and retest.

INSPECTION END



MEF498B



MEF499B

PROCEDURE B

INSPECTION START

J

CHECK POWER SUPPLY.
1) Stop engine.
2) Disconnect cooling fan relay-2.
3) Turn ignition switch "ON".
4) Check voltage between terminals ①, ③ and ground.
Voltage: Battery voltage

NG → Check the following.
- Harness connectors (M9), (E41)
- 10A fuse
- 30A fusible link
- "GY" fusible link
- Harness continuity between cooling fan relay-2 and fuse
- Harness continuity between cooling fan relay-2 and battery

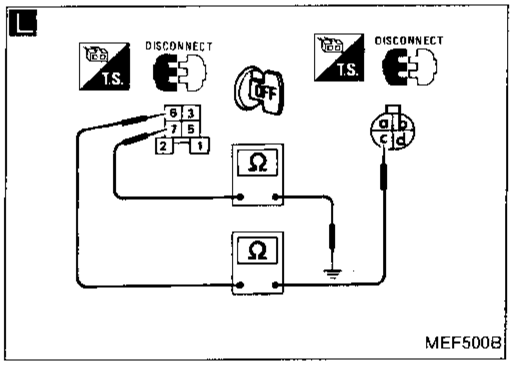
If NG, repair harness or connectors.

OK

Ⓐ

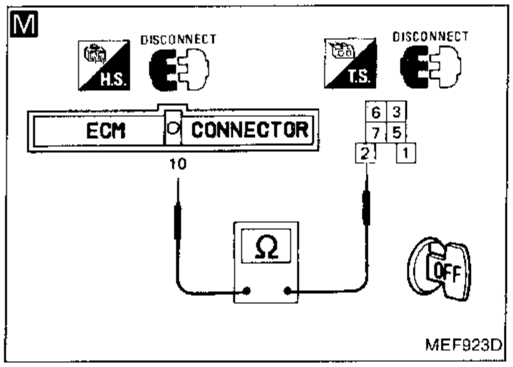
COOLING FAN CONTROL (Not self-diagnostic item)

L



MEF500B

M



MEF923D

Ⓐ

CHECK GROUND CIRCUIT.
1) Turn ignition switch "OFF".
2) Disconnect cooling fan motor-1 harness connector and cooling fan motor-2 harness connector.
K 3) Check harness continuity between terminal ⓑ and terminal ⑤.
Continuity should exist.
L 4) Check harness continuity between terminal ⓒ and terminal ⑥, terminal ⑦ and body ground.
Continuity should exist.

NG → Repair harness or connectors.

OK

M

CHECK OUTPUT SIGNAL CIRCUIT.
1) Disconnect ECM harness connector.
2) Check harness continuity between ECM terminal ⑩ and terminal ②.
Continuity should exist.

NG → Check the following.
- Harness connectors F14, M52
- Harness connectors M9, E41
- Harness continuity between cooling fan relay-2 and ECM

If NG, repair harness or connectors.

OK

CHECK COMPONENT
(Cooling fan relay-2).
Refer to "Electrical Components Inspection".
(See page EF & EC-377.)

NG → Replace cooling fan relay.

OK

CHECK COMPONENTS
(Cooling fan motors).
Refer to "Electrical Components Inspection".
(See page EF & EC-375.)

NG → Replace cooling fan motors.

OK

Disconnect and reconnect harness connectors in the circuit, and retest.

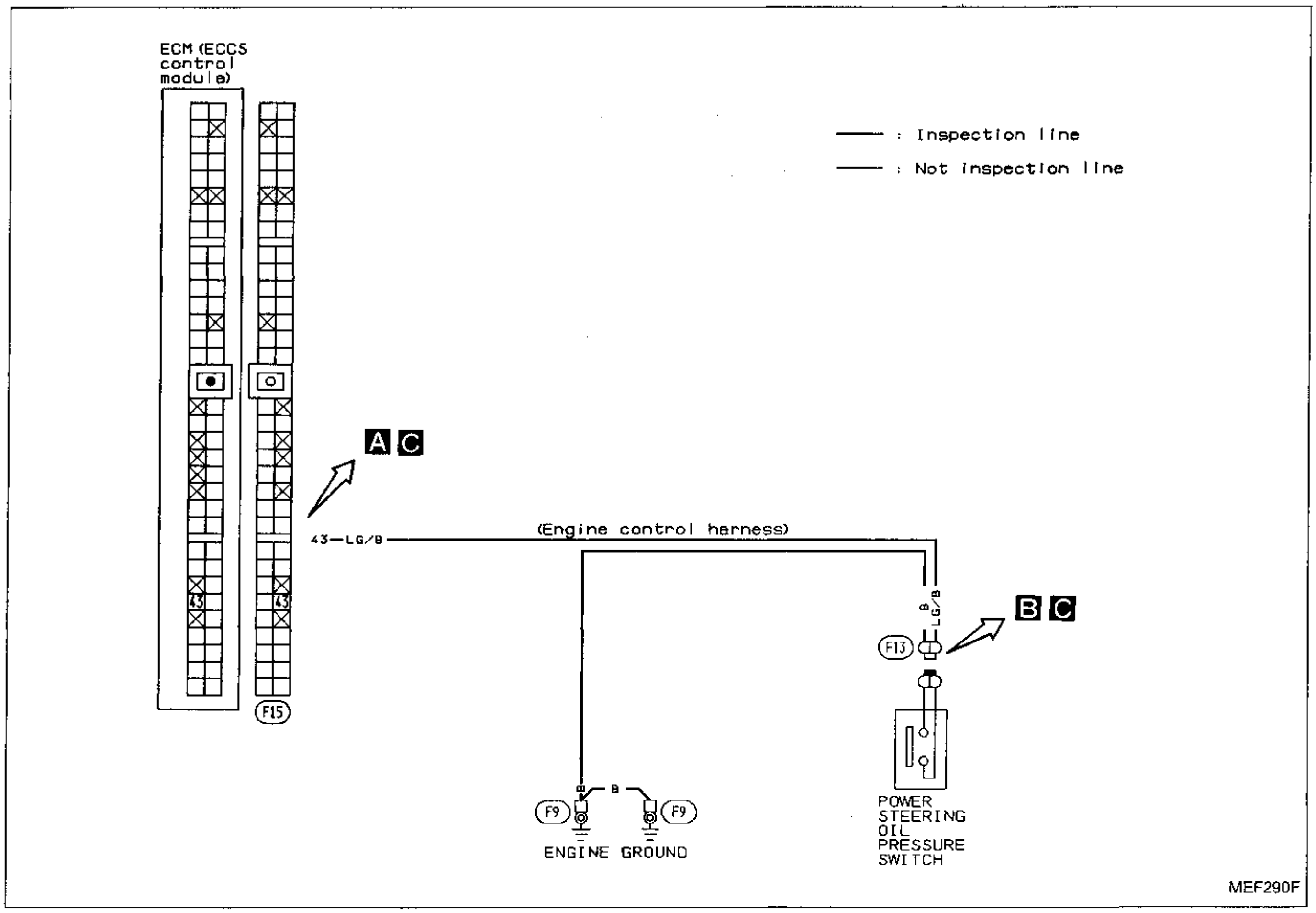
Trouble is not fixed.

Check ECM pin terminals for damage or the connection of ECM harness connector. Reconnect ECM harness connector and retest.

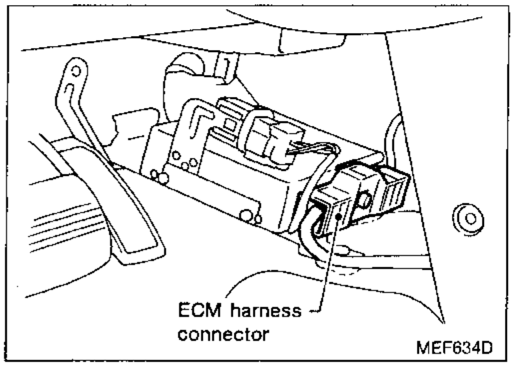
INSPECTION END

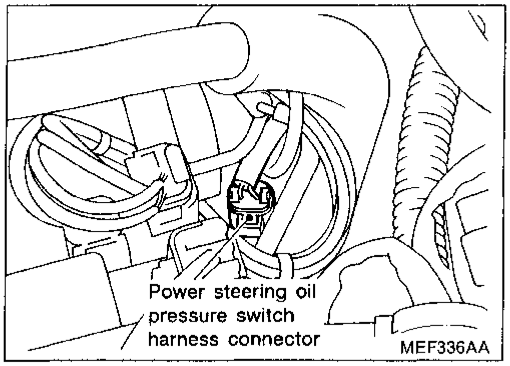
Diagnostic Procedure 22

POWER STEERING OIL PRESSURE SWITCH (Not self-diagnostic item)



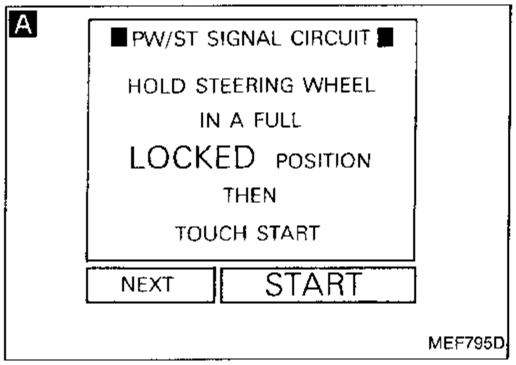
Harness layout





POWER STEERING OIL PRESSURE SWITCH (Not self-diagnostic item)

A



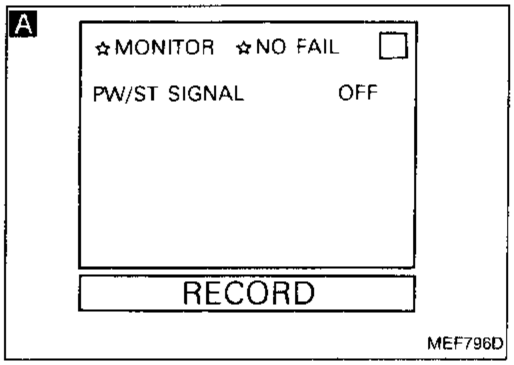
■PW/ST SIGNAL CIRCUIT■

HOLD STEERING WHEEL
IN A FULL
LOCKED POSITION
THEN
TOUCH START

NEXT START

MEF795D

A

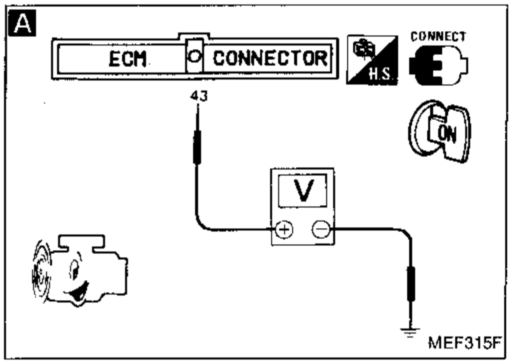


☆MONITOR ☆NO FAIL ☐

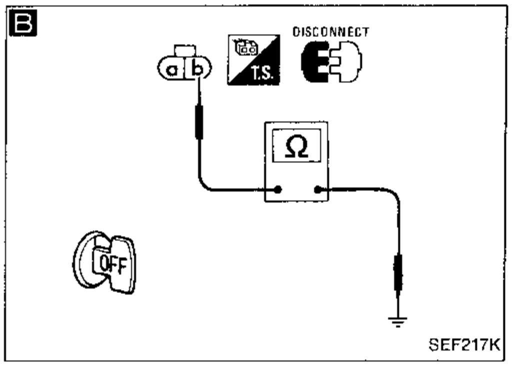
PW/ST SIGNAL OFF

RECORD

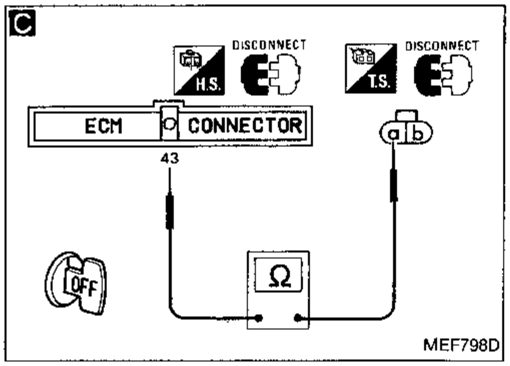
MEF796D



MEF315F



SEF217K



MEF798D

INSPECTION START

↓

A

CHECK OVERALL FUNCTION.

1) Turn ignition switch "ON".
2) Perform "PW/ST SIGNAL CIRCUIT" in "FUNCTION TEST" mode with CONSULT.

OR

1) Start engine.
2) Check "PW/ST SIGNAL" in "DATA MONITOR" mode with CONSULT.

Steering is neutral position: OFF

Steering is turned: ON

OR

1) Start engine.
2) Check voltage between ECM terminal ㊸ and ground.

Voltage:

When steering wheel is turned quickly.
Approximately 0V
Except above
Approximately 5V

OK → INSPECTION END

NG ↓

B

CHECK GROUND CIRCUIT.

1) Turn ignition switch "OFF".
2) Disconnect power steering oil pressure switch harness connector.
3) Check harness continuity between terminal ⓑ and engine ground.

Continuity should exist.

NG → Repair harness or connectors.

OK ↓

C

CHECK INPUT SIGNAL CIRCUIT.

1) Disconnect ECM harness connector.
2) Check harness continuity between ECM terminal ㊸ and terminal ⓐ.

Continuity should exist.

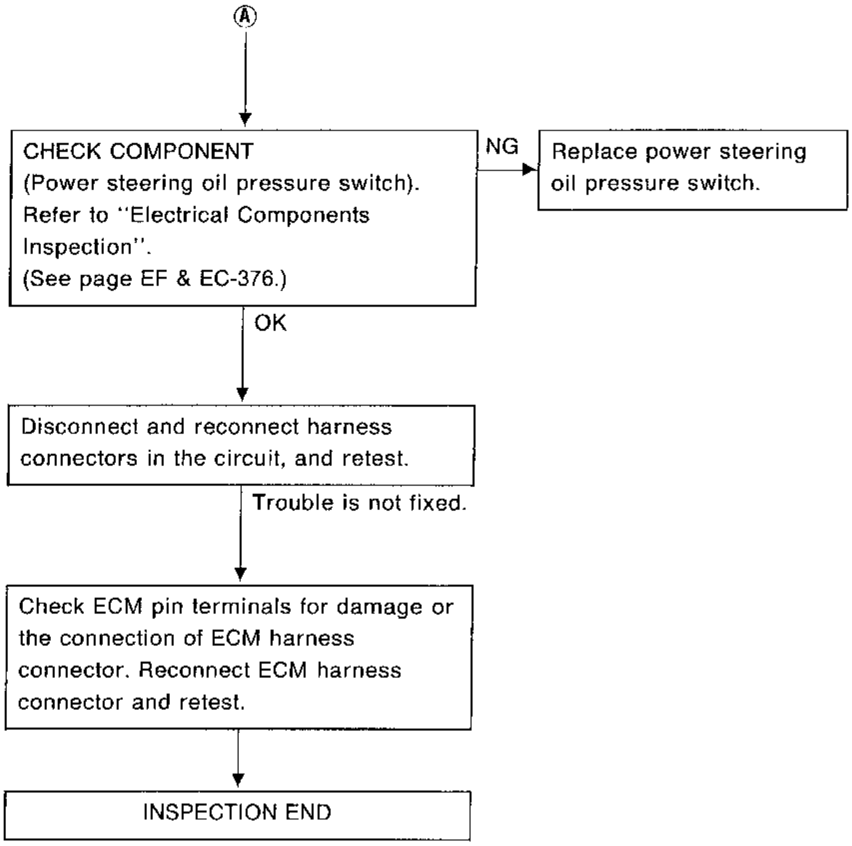
NG → Repair harness or connectors.

OK ↓

Ⓐ

GI MA EM LC EF & EC FE CL MT AT FA RA BR ST BF HA EL IDX

POWER STEERING OIL PRESSURE SWITCH (Not self-diagnostic item)



CHECK COMPONENT (Power steering oil pressure switch). Refer to "Electrical Components Inspection". (See page EF & EC-376.)

Replace power steering oil pressure switch.

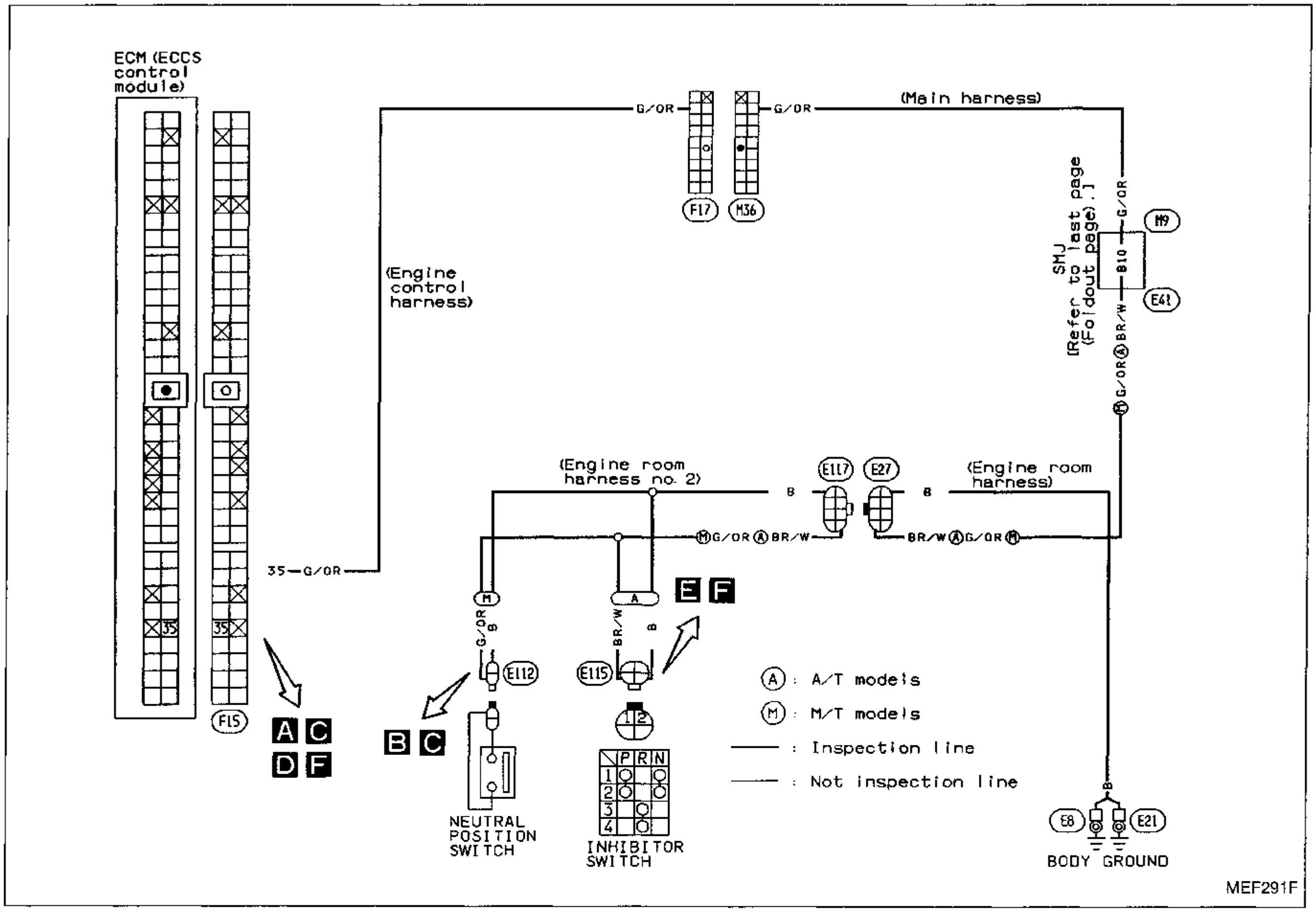
Disconnect and reconnect harness connectors in the circuit, and retest.

Check ECM pin terminals for damage or the connection of ECM harness connector. Reconnect ECM harness connector and retest.

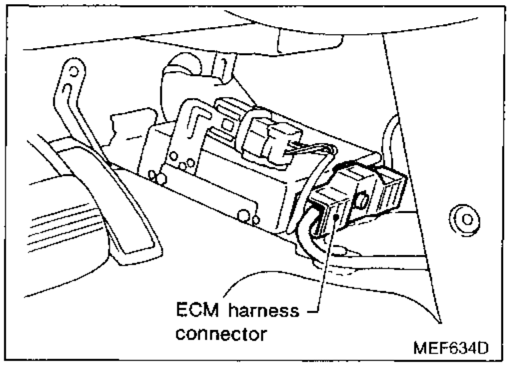
INSPECTION END

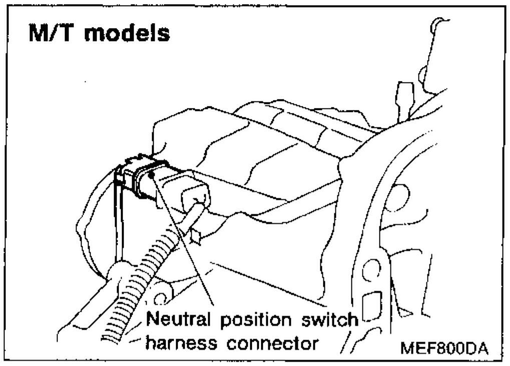
Diagnostic Procedure 23

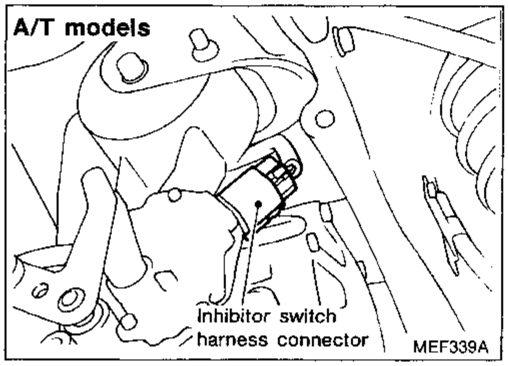
NEUTRAL POSITION/INHIBITOR SWITCH (Not self-diagnostic item)



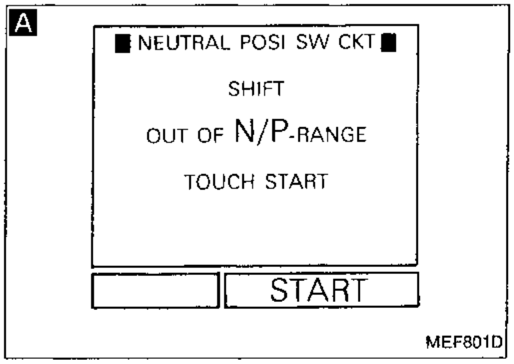
Harness layout







NEUTRAL POSITION/INHIBITOR SWITCH (Not self-diagnostic item)



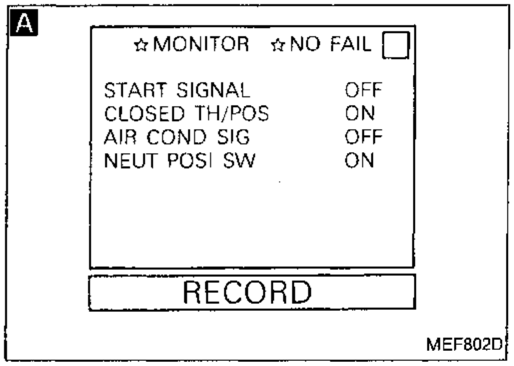
■ NEUTRAL POSI SW CKT ■

SHIFT

OUT OF N/P-RANGE

TOUCH START

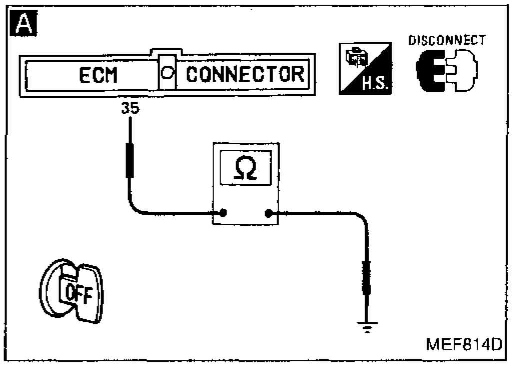
MEF801D



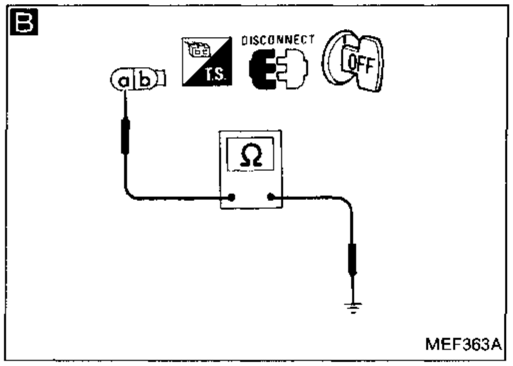
☆MONITOR ☆NO FAIL ☐

START SIGNAL OFF
CLOSED TH/POS ON
AIR COND SIG OFF
NEUT POSI SW ON

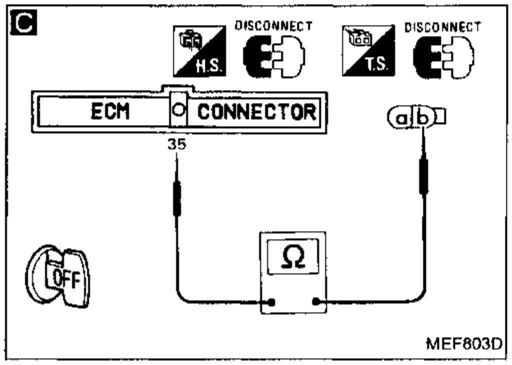
MEF802D



MEF814D



MEF363A



MEF803D

NEUTRAL POSITION SWITCH

INSPECTION START

↓

A CHECK OVERALL FUNCTION.

1) Turn ignition switch "ON".
2) Perform "NEUTRAL POSI SW CKT" in "FUNCTION TEST" mode with CONSULT.

OR

1) Turn ignition switch "ON".
2) Check "NEUT POSI SW" in "DATA MONITOR" mode with CONSULT.

Neutral position position: ON
Except above: OFF

OR

1) Set shift lever to the neutral position.
2) Disconnect ECM harness connector.
3) Check harness continuity between ECM terminal ㉟ and body ground.
Continuity should exist.

OK → INSPECTION END

NG ↓

Turn ignition switch "OFF".

↓

B CHECK GROUND CIRCUIT.

1) Disconnect neutral position switch harness connector.
2) Check harness continuity between terminal ⓐ and body ground.
Continuity should exist.

NG → Check the following.
- Harness connectors E27, E117
- Harness continuity between neutral position switch and body ground

If NG, repair harness or connectors.

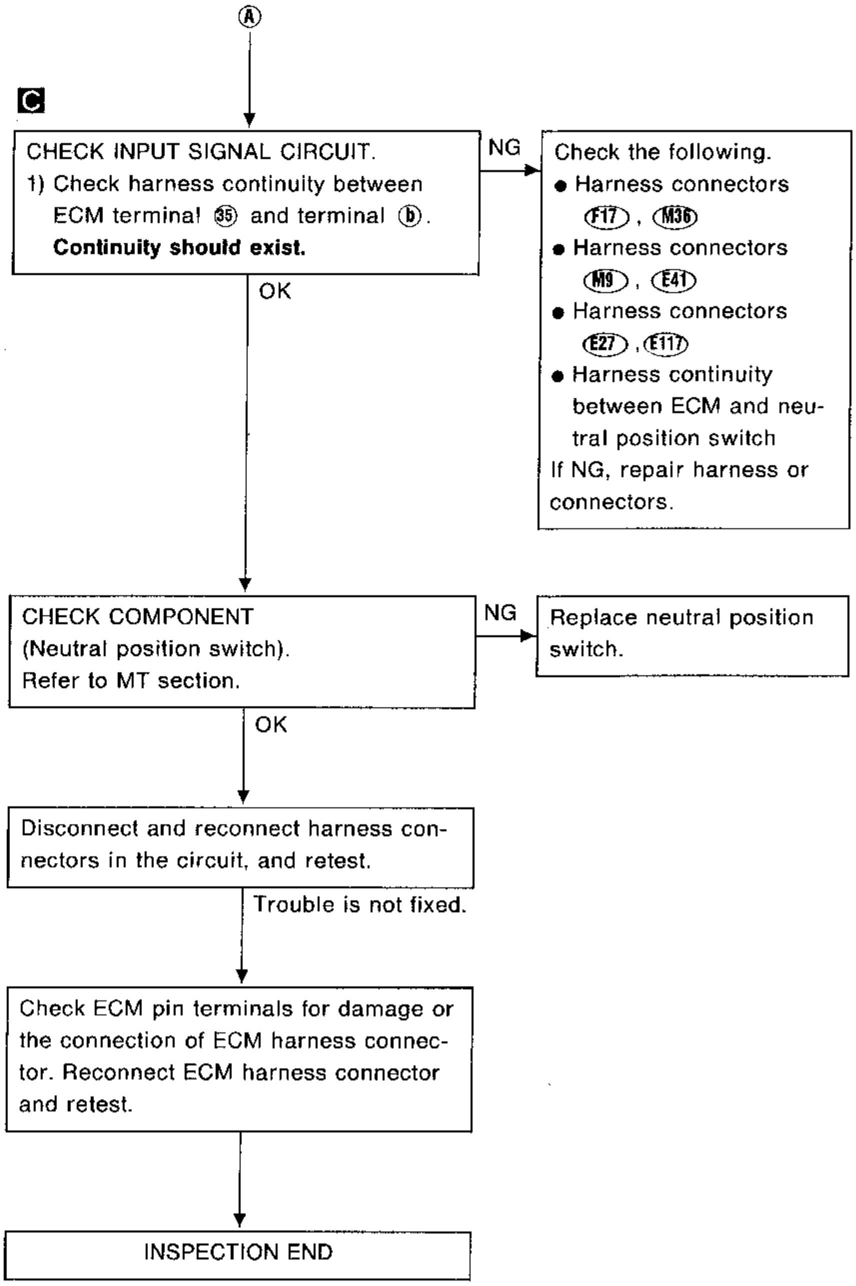
OK ↓

Disconnect ECM harness connector.

↓

Ⓐ

NEUTRAL POSITION/INHIBITOR SWITCH (Not self-diagnostic item)



CHECK INPUT SIGNAL CIRCUIT.
1) Check harness continuity between ECM terminal ㉟ and terminal ⓑ.
Continuity should exist.

Check the following.
- Harness connectors F17, M36
- Harness connectors M9, E41
- Harness connectors E27, E117
- Harness continuity between ECM and neutral position switch

If NG, repair harness or connectors.

CHECK COMPONENT
(Neutral position switch).
Refer to MT section.

Replace neutral position switch.

Disconnect and reconnect harness connectors in the circuit, and retest.

Check ECM pin terminals for damage or the connection of ECM harness connector. Reconnect ECM harness connector and retest.

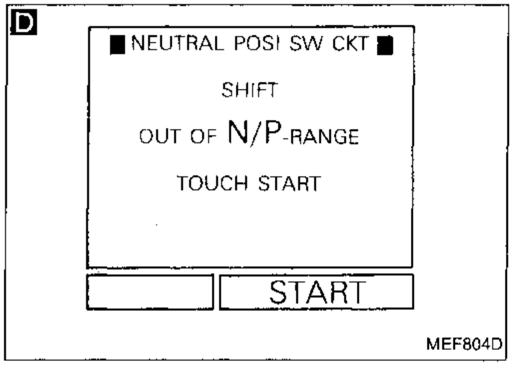
INSPECTION END

NEUTRAL POSITION/INHIBITOR SWITCH (Not self-diagnostic item)

INHIBITOR SWITCH

INSPECTION START

D

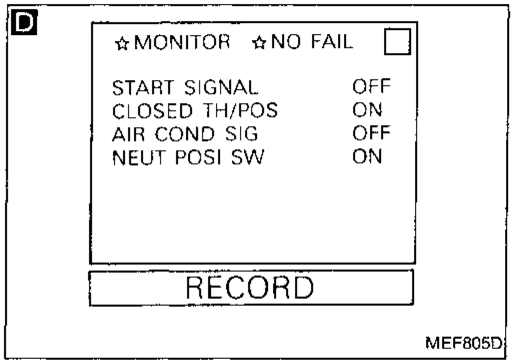

■ NEUTRAL POSI SW CKT ■

SHIFT

OUT OF N/P-RANGE

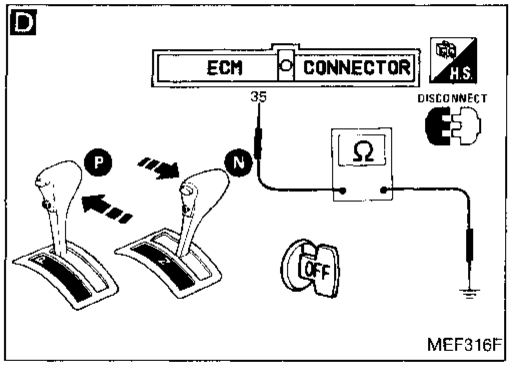
TOUCH START

MEF804D


☆MONITOR ☆NO FAIL ☐

START SIGNAL OFF
CLOSED TH/POS ON
AIR COND SIG OFF
NEUT POSI SW ON

MEF805D



MEF316F

CHECK OVERALL FUNCTION.

1) Turn ignition switch "ON".
2) Perform "NEUTRAL POSI SW CKT" in "FUNCTION TEST" mode with CONSULT.

OR

1) Turn ignition switch "ON".
2) Check "NEUTRAL POSI SW" in "DATA MONITOR" mode with CONSULT.
"N" or "P": ON
Except above: OFF

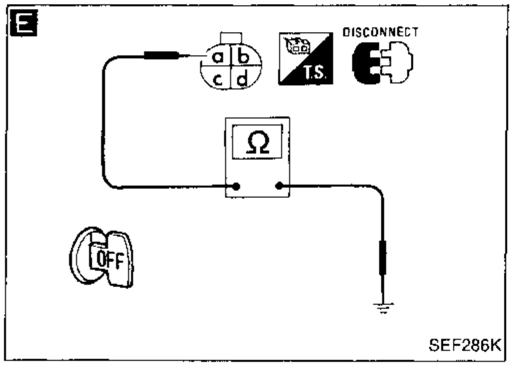
OR

1) Shift selector lever to "P" position.
2) Disconnect ECM harness connector.
3) Check harness continuity between ECM terminal ㉟ and body ground.
Continuity should exist.
4) Shift selector lever to "N" position.
5) Check harness continuity between ECM terminal ㉟ and body ground.
Continuity should exist.

OK → INSPECTION END

NG ↓

E



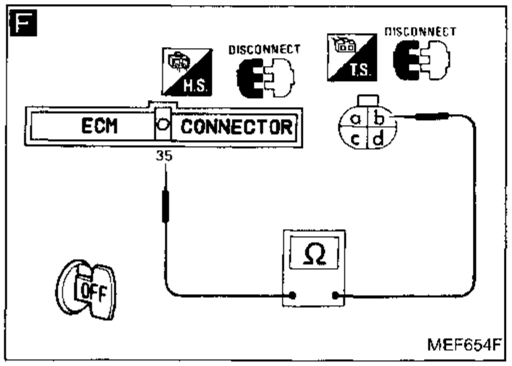
SEF286K

CHECK GROUND CIRCUIT.
1) Turn ignition switch "OFF".
2) Disconnect inhibitor switch harness connector.
3) Check harness continuity between terminal ⓐ and body ground.
Continuity should exist.

NG → Check the following.
- Harness connectors E27, E117
- Harness continuity between inhibitor switch and body ground

If NG, repair harness or connectors.

OK ↓



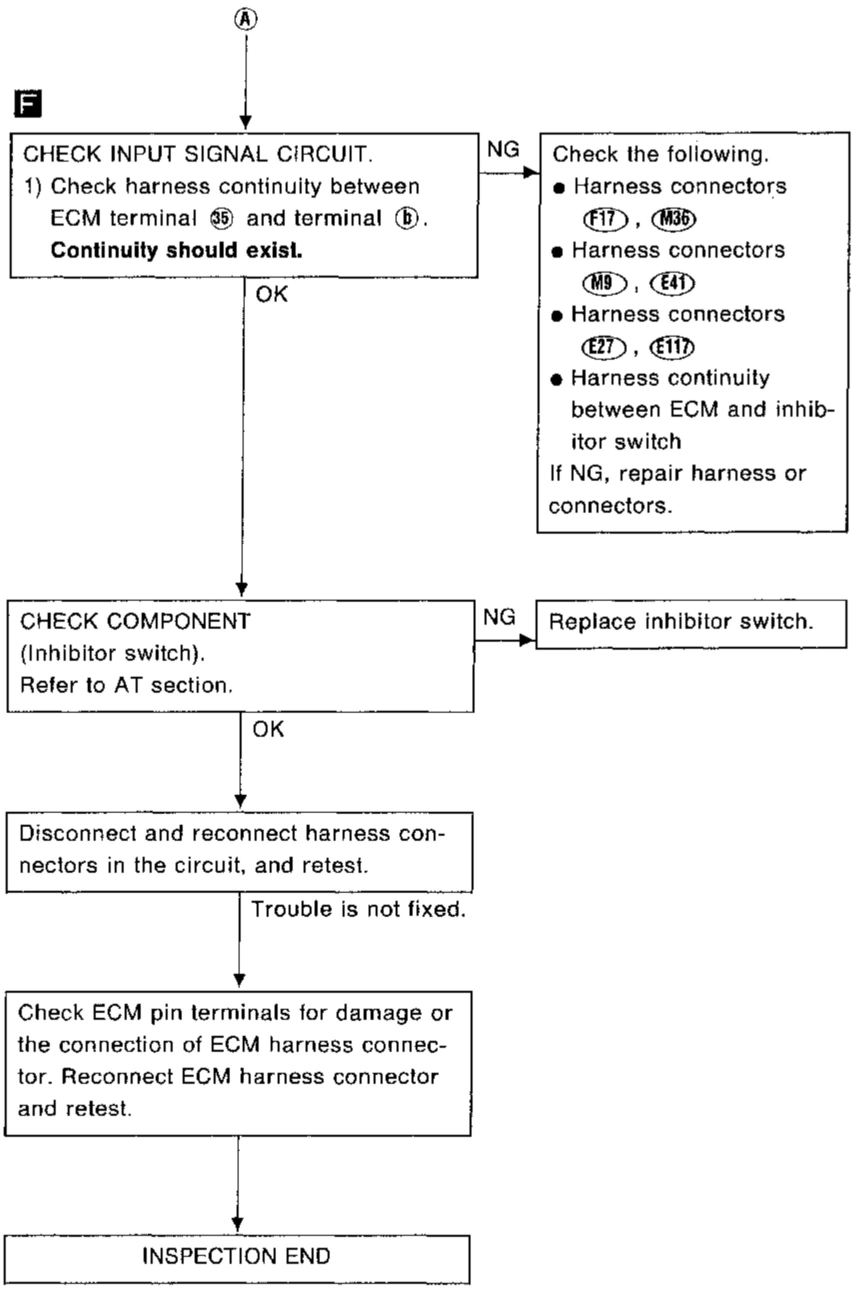
MEF654F

Disconnect ECM harness connector.

↓

Ⓐ

NEUTRAL POSITION/INHIBITOR SWITCH (Not self-diagnostic item)



CHECK INPUT SIGNAL CIRCUIT.
1) Check harness continuity between ECM terminal ㉟ and terminal ⓑ.
Continuity should exist.

Check the following.
- Harness connectors F17, M36
- Harness connectors M9, E41
- Harness connectors E27, E117
- Harness continuity between ECM and inhibitor switch

If NG, repair harness or connectors.

CHECK COMPONENT
(Inhibitor switch).
Refer to AT section.

Replace inhibitor switch.

Disconnect and reconnect harness connectors in the circuit, and retest.

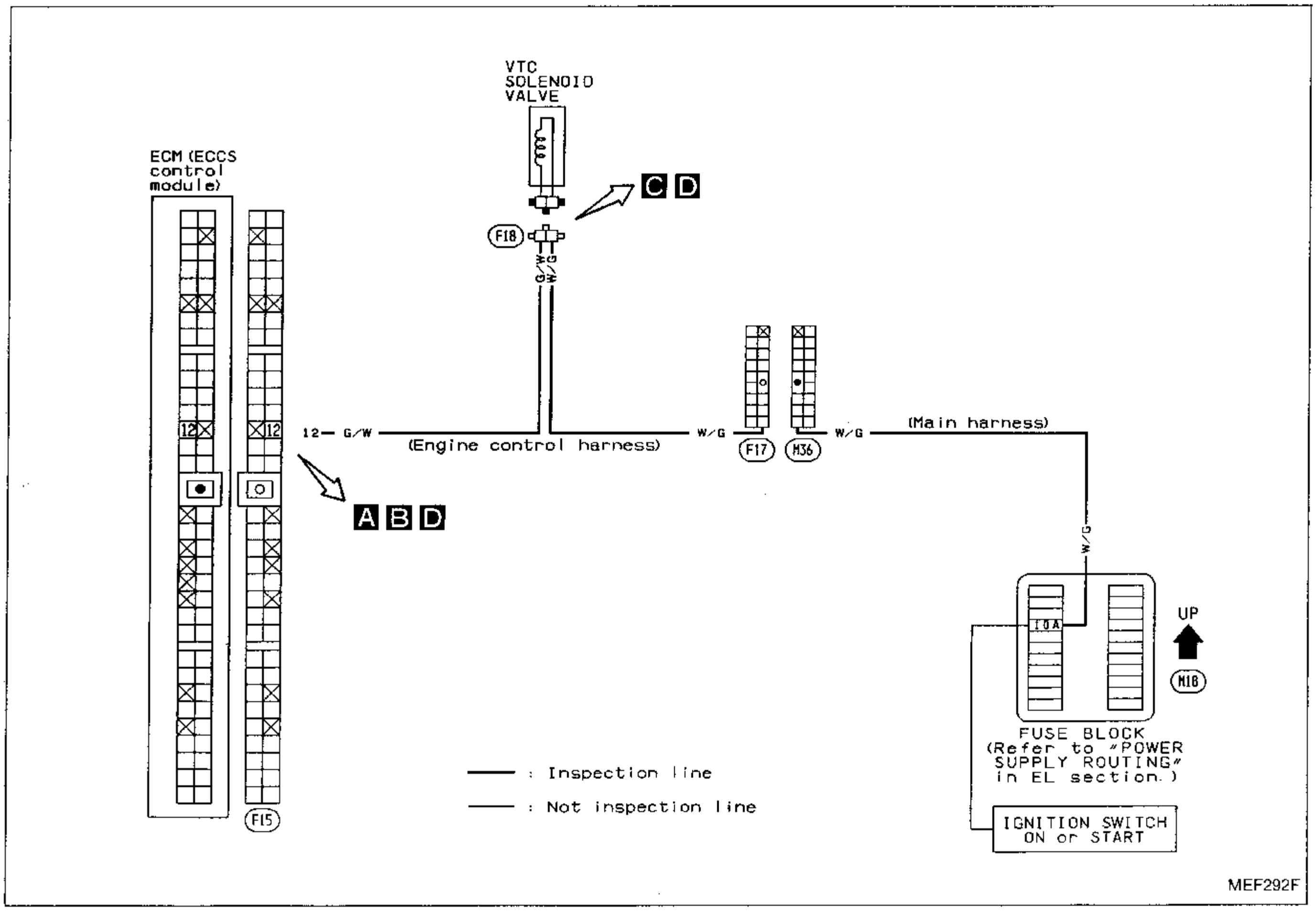
Check ECM pin terminals for damage or the connection of ECM harness connector. Reconnect ECM harness connector and retest.

INSPECTION END

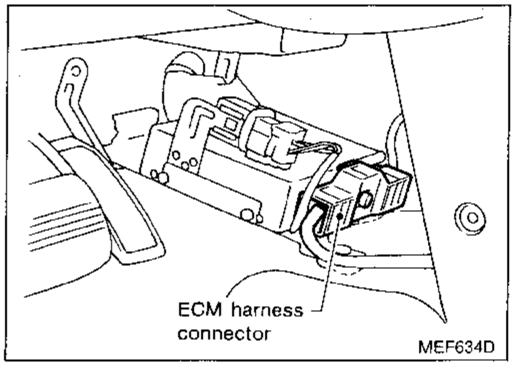
GI
MA
EM
LC
EF & EC
FE
CL
MT
AT
FA
RA
BR
ST
BF
HA
EL
IDX

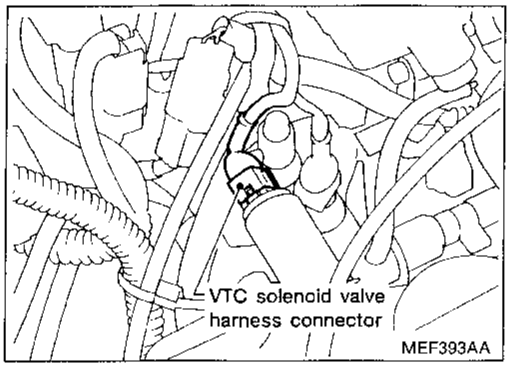
Diagnostic Procedure 24

VALVE TIMING CONTROL (Not self-diagnostic item)



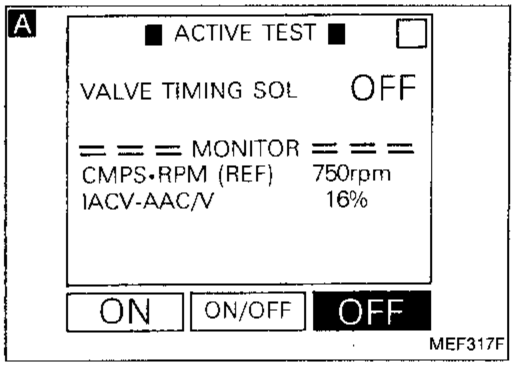
Harness layout





VALVE TIMING CONTROL (Not self-diagnostic item)

A



■ ACTIVE TEST ■ ☐

VALVE TIMING SOL OFF

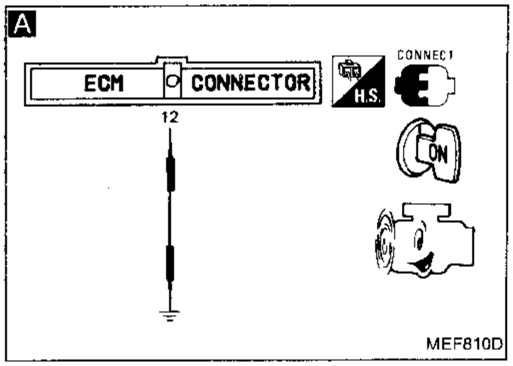
═ ═ ═ MONITOR ═ ═ ═

CMPS•RPM (REF) 750rpm

IACV-AAC/V 16%

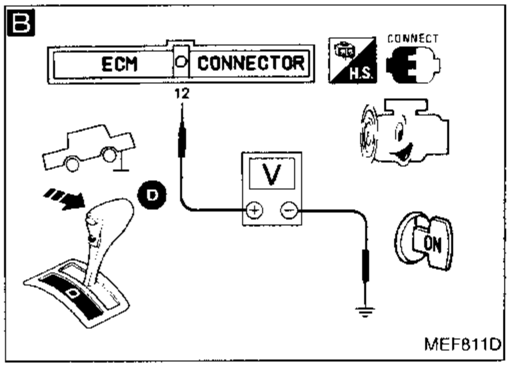
MEF317F

A



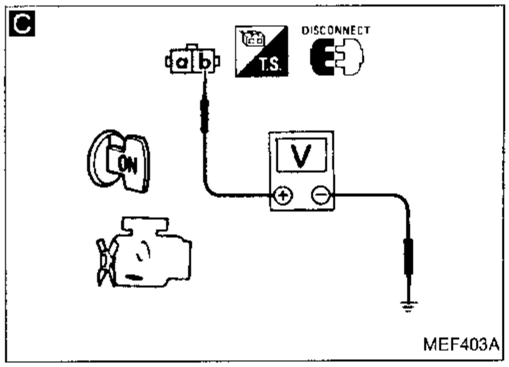
MEF810D

B



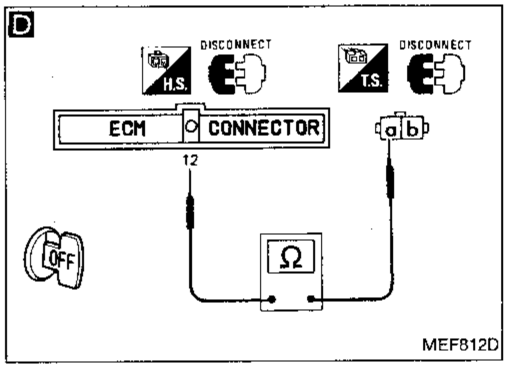
MEF811D

C



MEF403A

D



MEF812D

INSPECTION START

↓

A CHECK MECHANICAL FUNCTION.

1) Start engine and run it at idle.
2) Perform "VALVE TIMING SOL" in "ACTIVE TEST" mode with CONSULT and make sure that improper idle condition occurs.

OR

1) Connect a suitable jumper wire between ECM terminal ⑫ and body ground.
2) Start engine and make sure that improper idle condition occurs.

Occurs → INSPECTION END

Does not occur ↓

B CHECK ELECTRICAL CONTROL FUNCTION.

1) Stop engine.
2) Jack up drive wheels.
3) Start engine and warm it up sufficiently.
4) Shift selector lever to any position except "N" or "P".
5) Check voltage between ECM terminal ⑫ and ground under the following conditions with CONSULT or tester.

Voltage:

Quickly depress accelerator pedal, then quickly release it.

Approximately 0V

At idle

Battery voltage

OK → CHECK COMPONENTS (VTC solenoid valve and VTC valve). Refer to "Electrical Components Inspection". (See page EF & EC-378.)

NG ↓ Replace malfunctioning component(s).

NG ↓

C CHECK POWER SUPPLY.

1) Stop engine.
2) Disconnect VTC solenoid valve harness connector.
3) Turn ignition switch "ON".
4) Check voltage between terminal ⓑ and ground.

Voltage: Battery voltage

NG → Check the following.

- Harness connectors (F17), (M36)
- 10A fuse
- Harness continuity between VTC solenoid valve and fuse

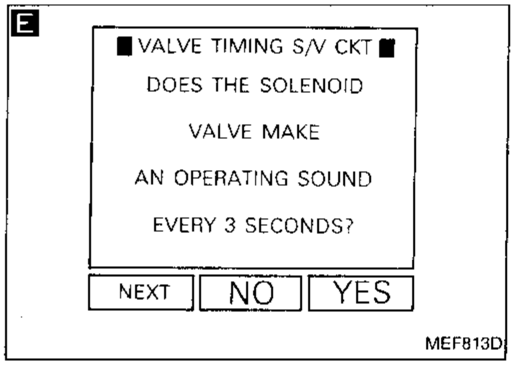
If NG, repair harness or connectors.

OK ↓

Ⓐ

VALVE TIMING CONTROL (Not self-diagnostic item)

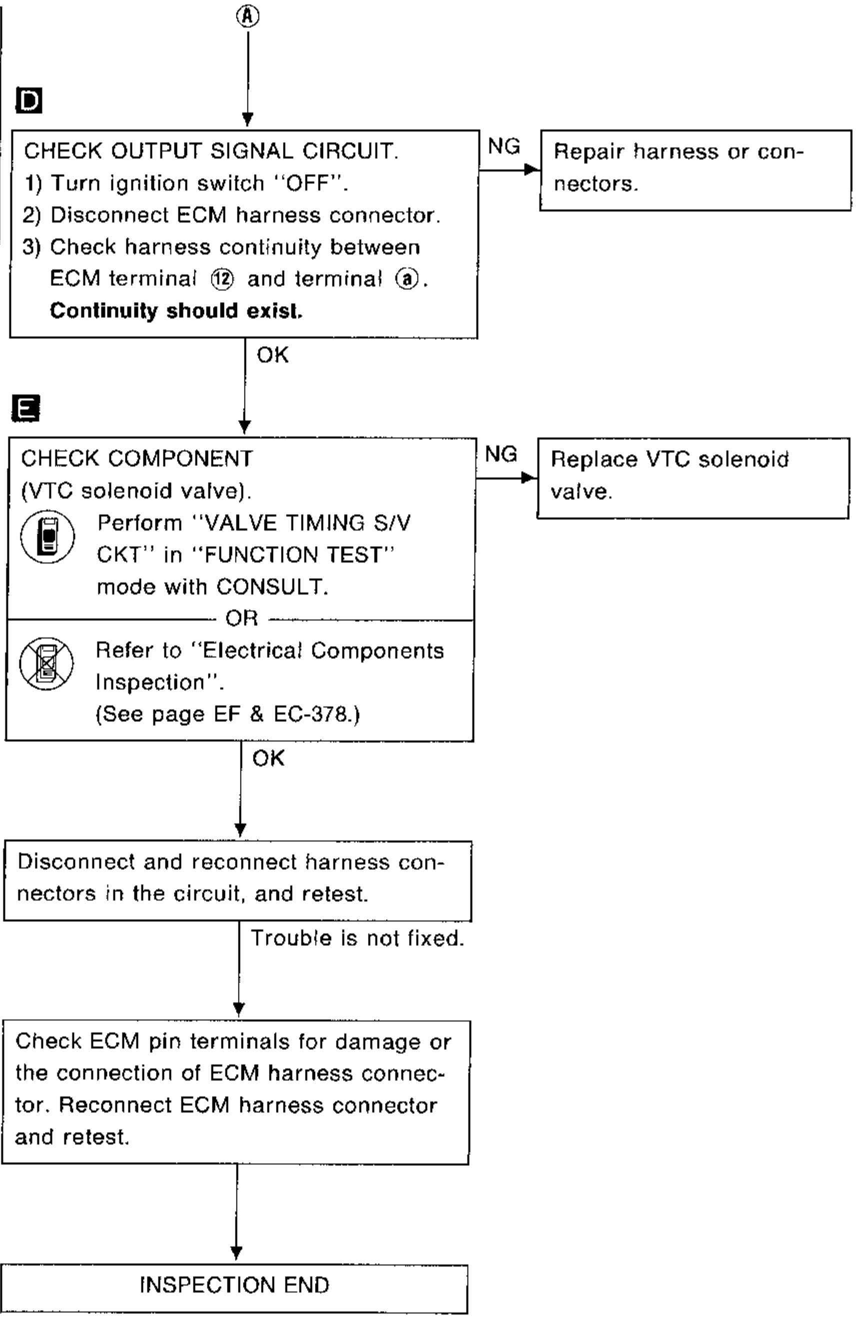
E



■ VALVE TIMING S/V CKT ■

DOES THE SOLENOID VALVE MAKE AN OPERATING SOUND EVERY 3 SECONDS?

MEF813D



Ⓐ

D CHECK OUTPUT SIGNAL CIRCUIT.
1) Turn ignition switch "OFF".
2) Disconnect ECM harness connector.
3) Check harness continuity between ECM terminal ⑫ and terminal ⓐ.
Continuity should exist.

NG → Repair harness or connectors.

OK ↓

E CHECK COMPONENT (VTC solenoid valve).

Perform "VALVE TIMING S/V CKT" in "FUNCTION TEST" mode with CONSULT.

OR

Refer to "Electrical Components Inspection".
(See page EF & EC-378.)

NG → Replace VTC solenoid valve.

OK ↓

Disconnect and reconnect harness connectors in the circuit, and retest.

Trouble is not fixed. ↓

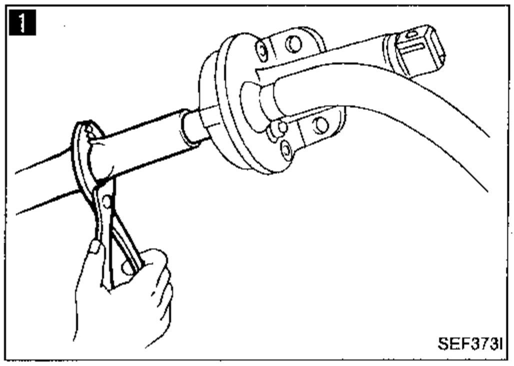
Check ECM pin terminals for damage or the connection of ECM harness connector. Reconnect ECM harness connector and retest.

↓

INSPECTION END

Diagnostic Procedure 25 — Symptom — High Idling after Warm-up

1

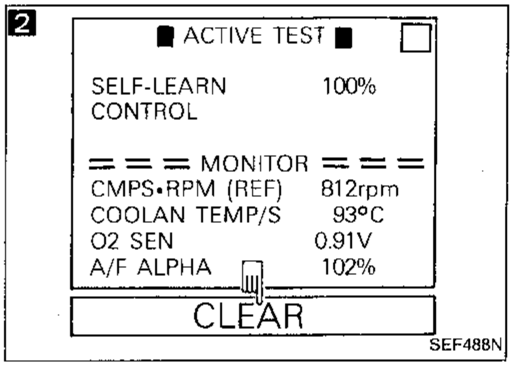


CHECK IACV-AIR REGULATOR.
When pinching the IACV-air regulator hose, does the engine speed drop?

Yes → Check IACV-air regulator and circuit. (See page EF & EC-313.)

No ↓

2



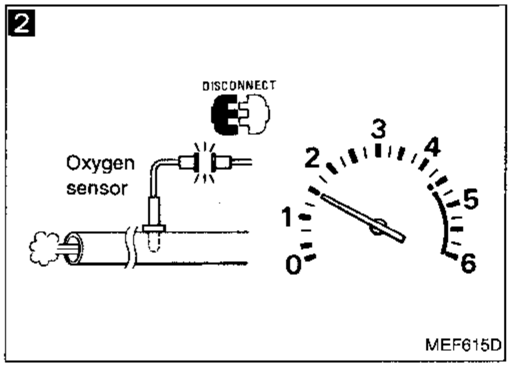
■ ACTIVE TEST ■ ☐

SELF-LEARN CONTROL	100%

=== MONITOR ===

CMPS•RPM (REF)	812rpm
COOLAN TEMP/S	93°C
O2 SEN	0.91V
A/F ALPHA	102%

CLEAR



CHECK INTAKE AIR LEAK.

1. Select "SELF-LEARNING CONT" in "ACTIVE TEST" mode.
2. Clear the self-learning control coefficient by touching "CLEAR".
3. Does the engine speed drop?

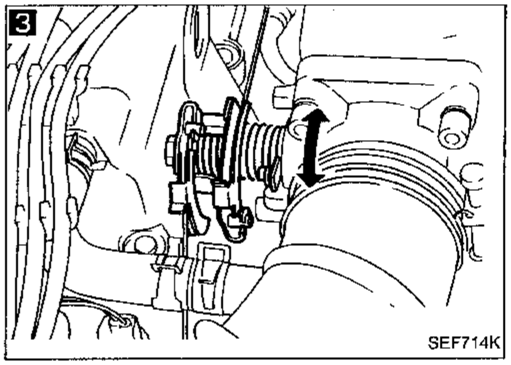
OR

1. Disconnect oxygen sensor harness connector*.
2. After racing engine at 2,000 rpm under no-load for about 30 seconds, does the engine speed drop?

Yes → Discover air leak location and repair.

No ↓

3



CHECK THROTTLE LINKAGE.

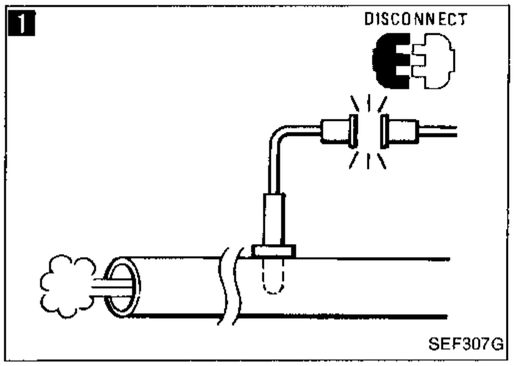
1. Check that throttle linkage moves smoothly.
2. Confirm that throttle valve both fully opens and fully closes.

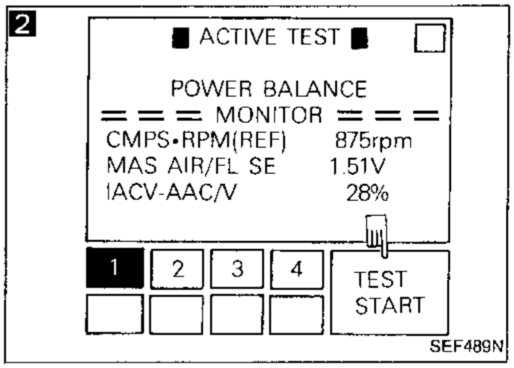
NG → Repair throttle linkage or sticking of throttle valve.

OK ↓

INSPECTION END

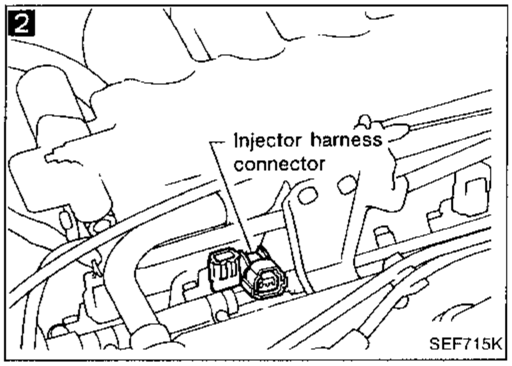
*: Heated oxygen sensor (A/T models except for California)
Oxygen sensor (A/T models for California and M/T models)

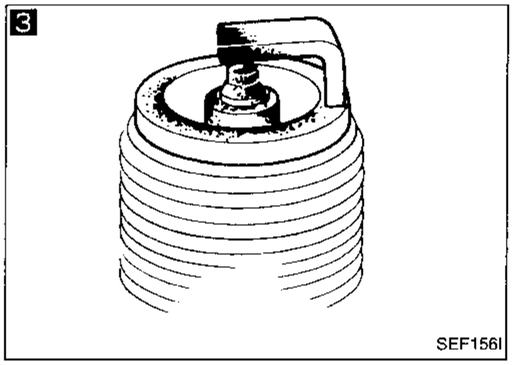


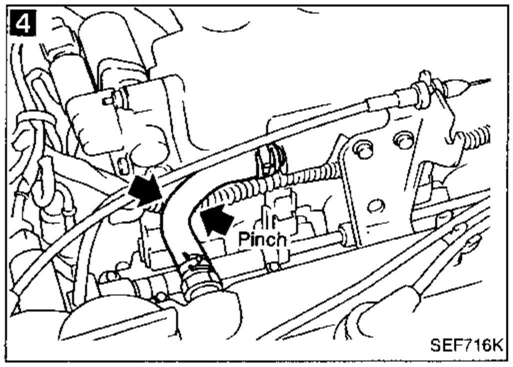


■ ACTIVE TEST ■

POWER BALANCE
=== MONITOR ===
CMPS•RPM(REF) 875rpm
MAS AIR/FL SE 1.51V
IACV-AAC/V 28%







Diagnostic Procedure 26 — Symptom — Hunting

1

CHECK OXYGEN SENSOR*.
When disconnecting oxygen sensor harness connector*, is the hunting fixed?

- Yes → Check oxygen sensor*. (See page EF & EC-285.)
- No ↓

2

PERFORM POWER BALANCE TEST.
1. Perform "POWER BALANCE" in "ACTIVE TEST" mode.
2. Is there any cylinder which does not produce a momentary engine speed drop?

OR

When disconnecting each injector harness connector one at a time, is there any cylinder which does not produce a momentary engine speed drop?

- No → Go to **4**.
- Yes ↓

3

CHECK SPARK PLUGS.
Remove the spark plugs and check for fouling, etc.

- NG → Repair or replace spark plug(s).
- OK ↓

4

CHECK FOR INTAKE AIR LEAK.
When pinching blow-by hose (lowering the blow-by air supply), does the engine speed rise?

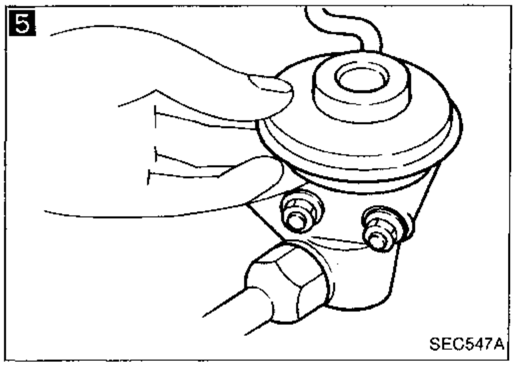
- Yes → Discover air leak location and repair.
- No ↓

(Go to Ⓐ on next page.)

*: Heated oxygen sensor (A/T models except for California)
Oxygen sensor (A/T models for California and M/T models)

Diagnostic Procedure 26 — Symptom — Hunting (Cont'd)

Ⓐ



SEC547A

5

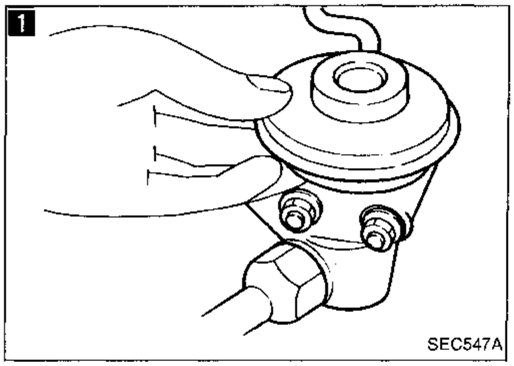
CHECK EGR VALVE
Check EGR valve for sticking.

NG → Repair or replace.

OK ↓

INSPECTION END

Diagnostic Procedure 27 — Symptom — Unstable Idle



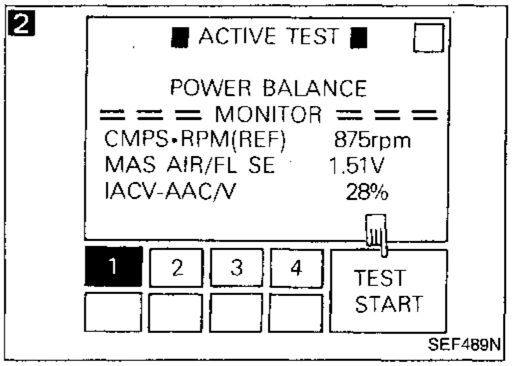
SEC547A

1

CHECK EGR VALVE.
Check EGR valve for sticking.

NG → Repair or replace.

OK ↓



■ ACTIVE TEST ■ ☐

POWER BALANCE
═ ═ ═ MONITOR ═ ═ ═

CMPS•RPM(REF)	875rpm
MAS AIR/FL SE	1.51V
IACV-AAC/V	28%

1 2 3 4 TEST START

SEF489N

2

PERFORM POWER BALANCE TEST.

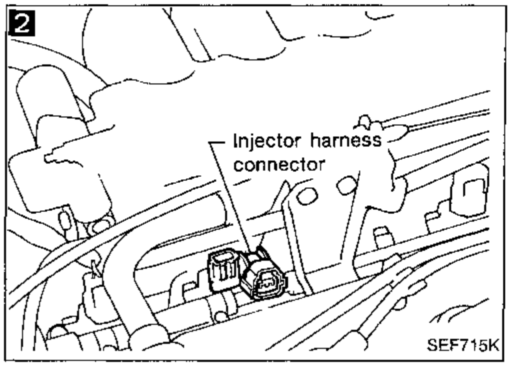
1. Perform "POWER BALANCE" in "ACTIVE TEST" mode.
2. Is there any cylinder which does not produce a momentary engine speed drop?

OR

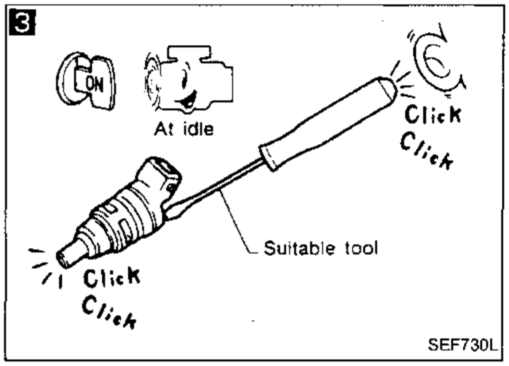
When disconnecting each injector harness connector one at a time, is there any cylinder which does not produce a momentary engine speed drop?

No → Go to **6**.

Yes ↓



SEF715K



SEF730L

3

CHECK INJECTOR.
Does each injector make an operating sound at idle?

No → Check injector(s) and circuit(s).

Yes ↓

4

CHECK IGNITION SPARK.

1. Disconnect ignition wire from spark plug.
2. Connect a known good spark plug to the ignition wire.
3. Place end of spark plug against a suitable ground and crank engine.
4. Check for spark.

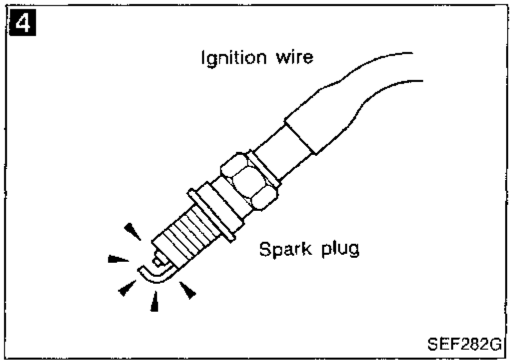
NG → Check ignition coil, power transistor and their circuits. (See page EF & EC-373.)

OK ↓

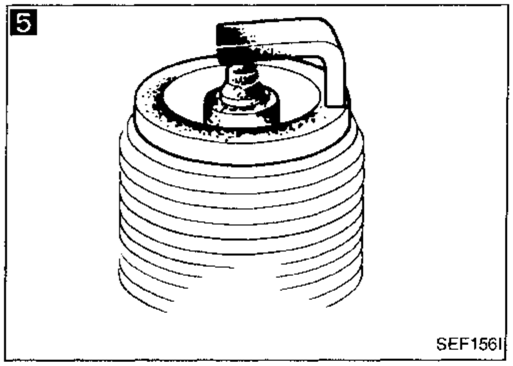
(Go to Ⓐ on next page.)

Diagnostic Procedure 27 — Symptom — Unstable Idle (Cont'd)

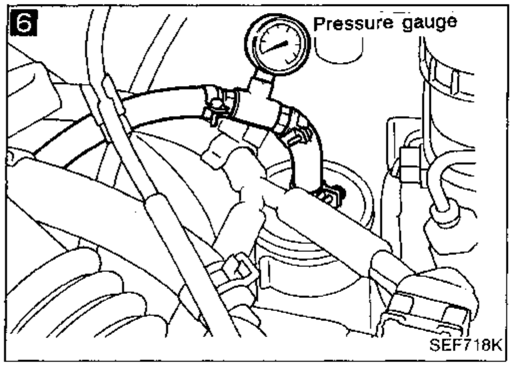
4



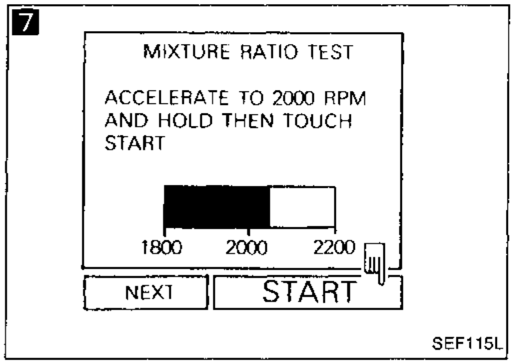
5



6



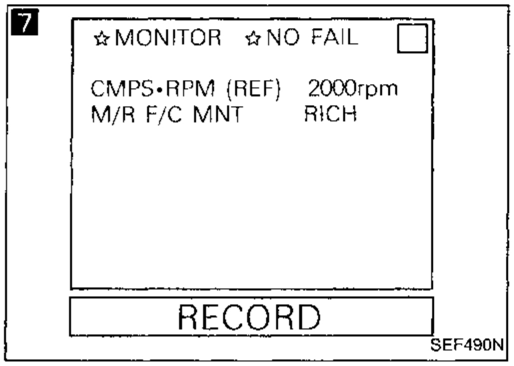
7



MIXTURE RATIO TEST

ACCELERATE TO 2000 RPM AND HOLD THEN TOUCH START

7



☆MONITOR ☆NO FAIL ☐

CMPS•RPM (REF) 2000rpm
M/R F/C MNT RICH

Ⓐ

↓

5

CHECK SPARK PLUGS.
Remove the spark plugs and check for fouling, etc.

NG → Repair or replace spark plug(s).

OK ↓

6

CHECK FUEL PRESSURE.

1. Release fuel pressure to zero. (Refer to page EF & EC-379.)
2. Install fuel pressure gauge and check fuel pressure.
   At idle:
   Approx. 245 kPa
   (2.5 kg/cm^2, 36 psi)

NG → Check fuel pump and circuit.

OK ↓

7

CHECK OXYGEN SENSOR*.

1. Start engine and warm it up sufficiently.
2. Perform "MIXTURE RATIO TEST" in "FUNCTION TEST" mode.

OR

2. See "M/R F/C MNT" in "Data monitor" mode.
3. Maintaining engine at 2,000 rpm under no-load (engine is warmed up sufficiently.), check that the monitor fluctuates between "LEAN" and "RICH" more than 5 times during 10 seconds.

RICH→LEAN→RICH→
1 time 2 times
LEAN→RICH.......

OR

2. Set "Oxygen sensor monitor*" in Diagnostic Test Mode II. (See page EF & EC-239.)
3. Maintaining engine at 2,000 rpm under no-load, check to make sure that the RED LED on the ECM or the malfunction indicator lamp on the instrument panel goes ON and OFF more than 5 times during 10 seconds.

NG → Replace oxygen sensor*.

OK ↓

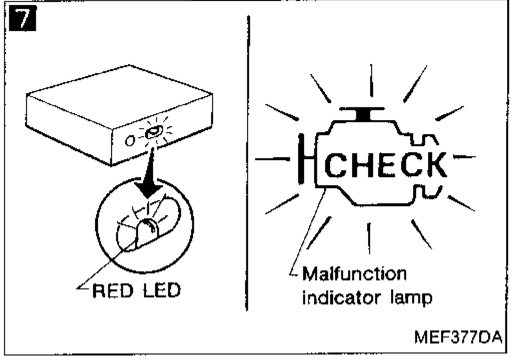
(Go to Ⓑ on next page.)

*: Heated oxygen sensor (A/T models except for California)
Oxygen sensor (A/T models for California and M/T models)

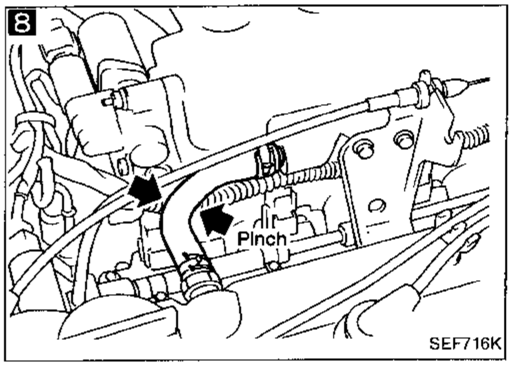
Diagnostic Procedure 27 — Symptom — Unstable Idle (Cont'd)

Ⓑ

7



8



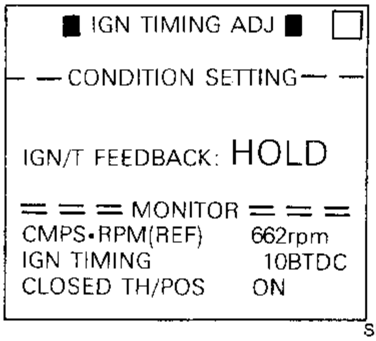
8

CHECK FOR INTAKE AIR LEAK.
When pinching blow-by hose (lowering the blow-by air supply), does the engine speed rise?

Yes → Discover air leak location and repair.

No ↓

9



■ IGN TIMING ADJ ■ ☐

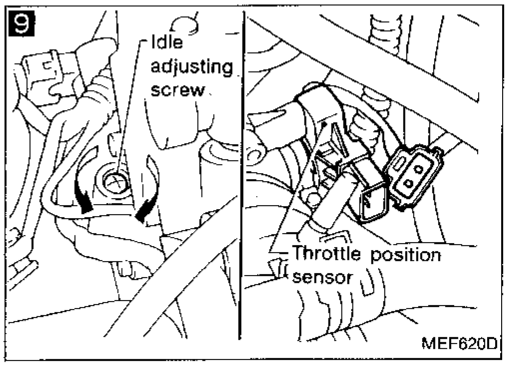
— CONDITION SETTING —

IGN/T FEEDBACK: HOLD

═ ═ ═ MONITOR ═ ═ ═

CMPS·RPM(REF)	662rpm
IGN TIMING	10BTDC
CLOSED TH/POS	ON

9



9

CHECK IDLE ADJ. SCREW CLOGGING.

1. Perform "IGNITION TIMING ADJ" in "WORK SUPPORT" mode.
2. Can you set engine speed at 600±50 rpm (M/T), 725±50 rpm (A/T, in "N" position) by turning idle adjusting screw?

OR

1. Disconnect throttle position sensor harness connector.
2. Can you set engine speed at 600±50 rpm (M/T), 725±50 rpm (A/T, in "N" position) by turning idle speed adjusting screw?

No → Check for IAS clogging or throttle valve clogging.

Yes ↓

10

COMPRESSION PRESSURE

SEF309G

10

CHECK COMPRESSION PRESSURE.

- Check compression pressure.

Standard:
kPa (kg/cm^2, psi)/350 rpm
1,324 (13.5, 192)
Minimum:
kPa (kg/cm^2, psi)/350 rpm
1,128 (11.5, 164)
Difference between each cylinder:
kPa (kg/cm^2, psi)/350 rpm
98 (1.0, 14)

NG → Check pistons, piston rings, valves, valve seats and cylinder head gaskets.

OK ↓

CHECK ECM HARNESS CONNECTOR.
Check the ECM pin terminals for damage or poor connection of ECM harness connector.

NG → Repair or replace.

OK ↓

Disconnect and reconnect ECM harness connector and retest.

Trouble is not fixed. ↓

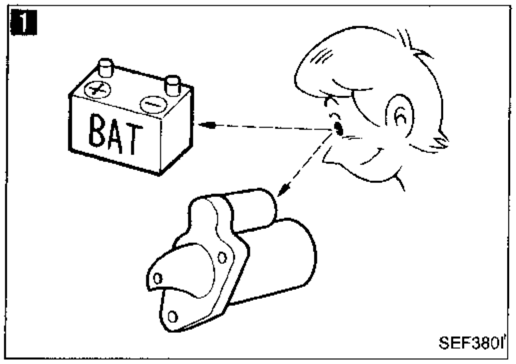
TRY A KNOWN GOOD ECM*.

↓

INSPECTION END

*: ECM may be the cause of a problem, but this is rarely the case.

Diagnostic Procedure 28 — Symptom — Hard to Start or Impossible to Start when the Engine is Cold

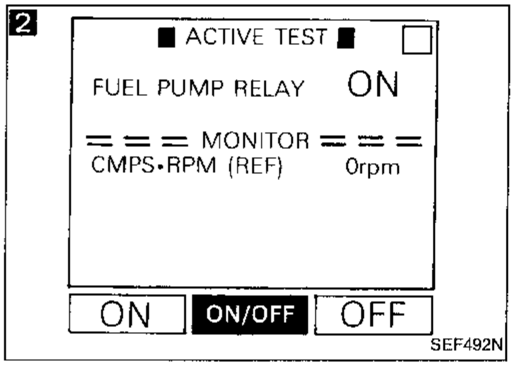


1

CHECK BATTERY AND STARTER.
Check battery and starter condition.
(Refer to EL section.)

NG → Repair or replace.

OK ↓

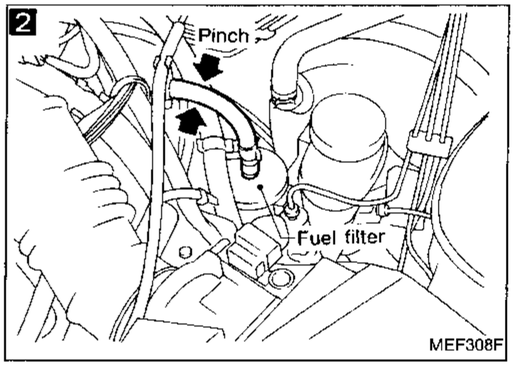


■ ACTIVE TEST ■ ☐

FUEL PUMP RELAY ON

=== MONITOR ===

CMPS•RPM (REF) 0rpm



2

CHECK FUEL PRESSURE.

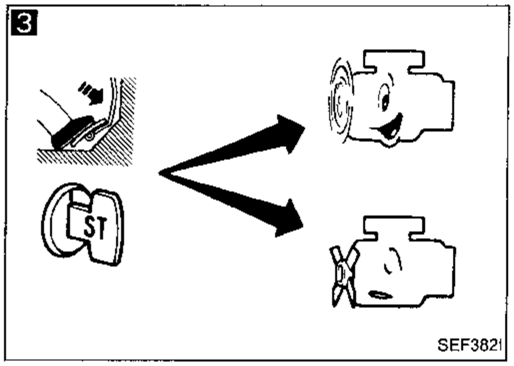
1. Turn ignition switch "ON".
2. Perform "FUEL PUMP RELAY" in "ACTIVE TEST" mode.
3. Pinch fuel feed hose with fingers.
   Is fuel pressure pulsation felt on the fuel feed hose?

OR

1. Pinch fuel feed hose with fingers.
2. When cranking the engine, is there any pressure on the fuel feed hose?

No → Check fuel pump and circuit. (See page EF & EC-373.)

Yes ↓

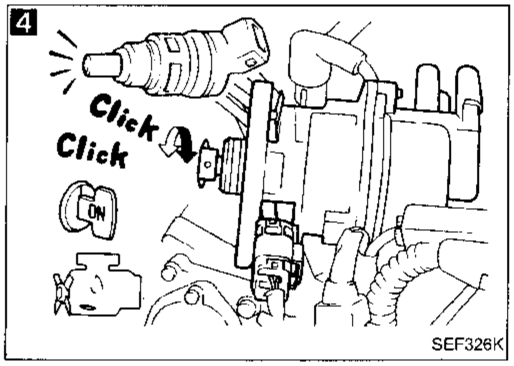


3

CHECK IACV-AIR REGULATOR AND IACV-AAC VALVE.
When pressing accelerator pedal fully, can you start the engine.

Yes → Check IACV-AAC valve, IACV-air regulator and circuits. (See pages EF & EC-374, 375.)

No ↓



4

CHECK INJECTOR.

1. Remove distributor from engine. (Camshaft position sensor harness connector should remain connected.)
2. Disconnect ignition wires.
3. Turn ignition switch ON. (Do not start engine.)
4. When rotating distributor shaft slowly by hand, does each injector make an operating sound?

No → Check injector(s) and circuit(s).

Yes ↓

5

CHECK IGNITION SPARK.

1. Disconnect ignition wire from spark plug.
2. Connect a known good spark plug to the ignition wire.
3. Place end of spark plug against a suitable ground and crank engine.
4. Check for spark.

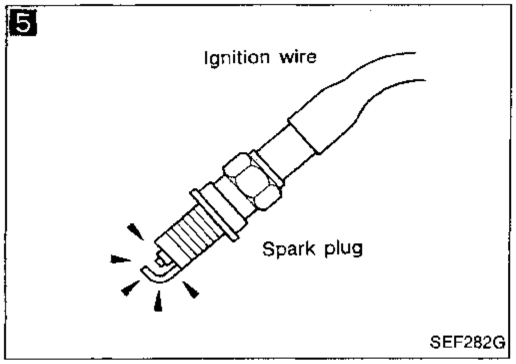
NG → Check ignition coil, power transistor and their circuits. (See page EF & EC-373.)

OK ↓

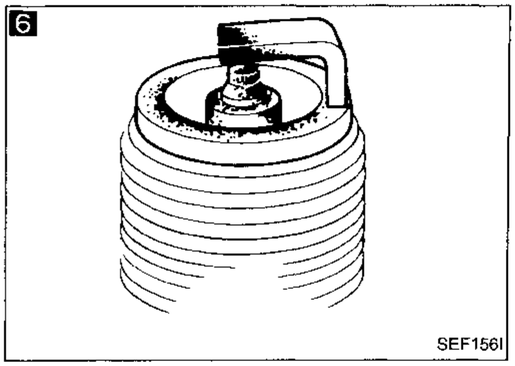
(Go to Ⓐ on next page.)

Diagnostic Procedure 28 — Symptom — Hard to Start or Impossible to Start when the Engine is Cold (Cont'd)

5



6



Ⓐ

6

CHECK SPARK PLUGS.
Remove the spark plugs and check for fouling, etc.

NG → Repair or replace spark plug(s).

OK ↓

CHECK ECM HARNESS CONNECTOR.
Check the ECM pin terminals for damage or poor connection of ECM harness connector.

NG → Repair or replace.

OK ↓

Disconnect and reconnect ECM harness connector and retest.

↓ Trouble is not fixed.

CHECK ECM POWER SUPPLY AND GROUND CIRCUIT.
Refer to page EF & EC-262.

NG → Repair or replace.

OK ↓

TRY A KNOWN GOOD ECM*.

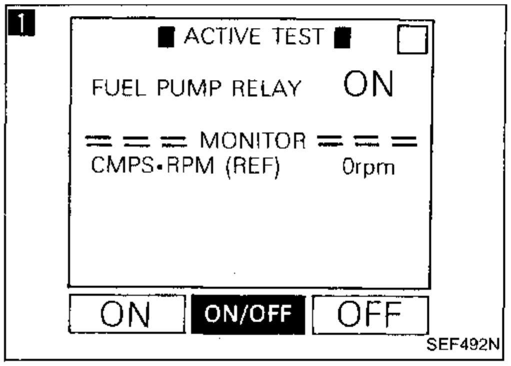
↓

INSPECTION END

*: ECM may be the cause of a problem, but this is rarely the case.

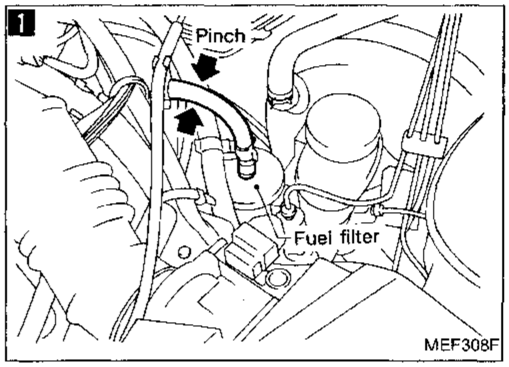
Diagnostic Procedure 29 — Symptom — Hard to Start or Impossible to Start when the Engine is Hot

1



■ ACTIVE TEST ■ ☐
FUEL PUMP RELAY ON
=== MONITOR ===
CMPS•RPM (REF) 0rpm

1



1

CHECK FUEL PRESSURE.

1. Turn ignition switch "ON".
2. Perform "FUEL PUMP RELAY" in "ACTIVE TEST" mode.
3. Pinch fuel feed hose with fingers.
   Is fuel pressure pulsation felt on the fuel feed hose?

OR

1. Pinch fuel feed hose with fingers.
2. When cranking the engine, is there any pressure on the fuel feed hose?

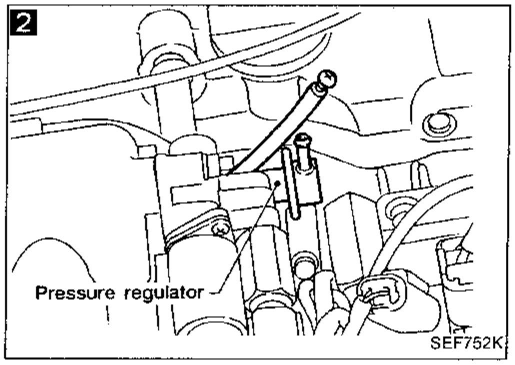
No → Check fuel pump and circuit. (See page EF & EC-373.)

↓ Yes

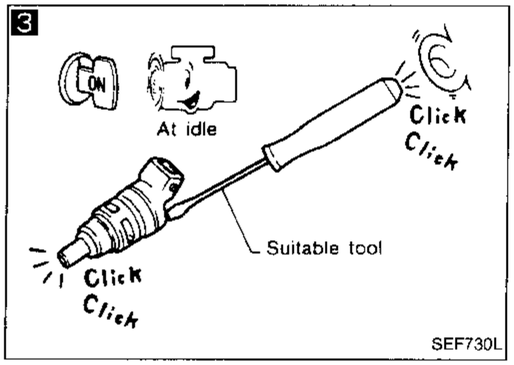
Ⓐ

Diagnostic Procedure 29 — Symptom — Hard to Start or Impossible to Start when the Engine is Hot (Cont'd)

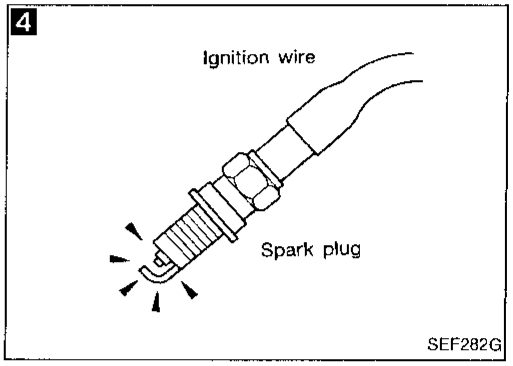
2

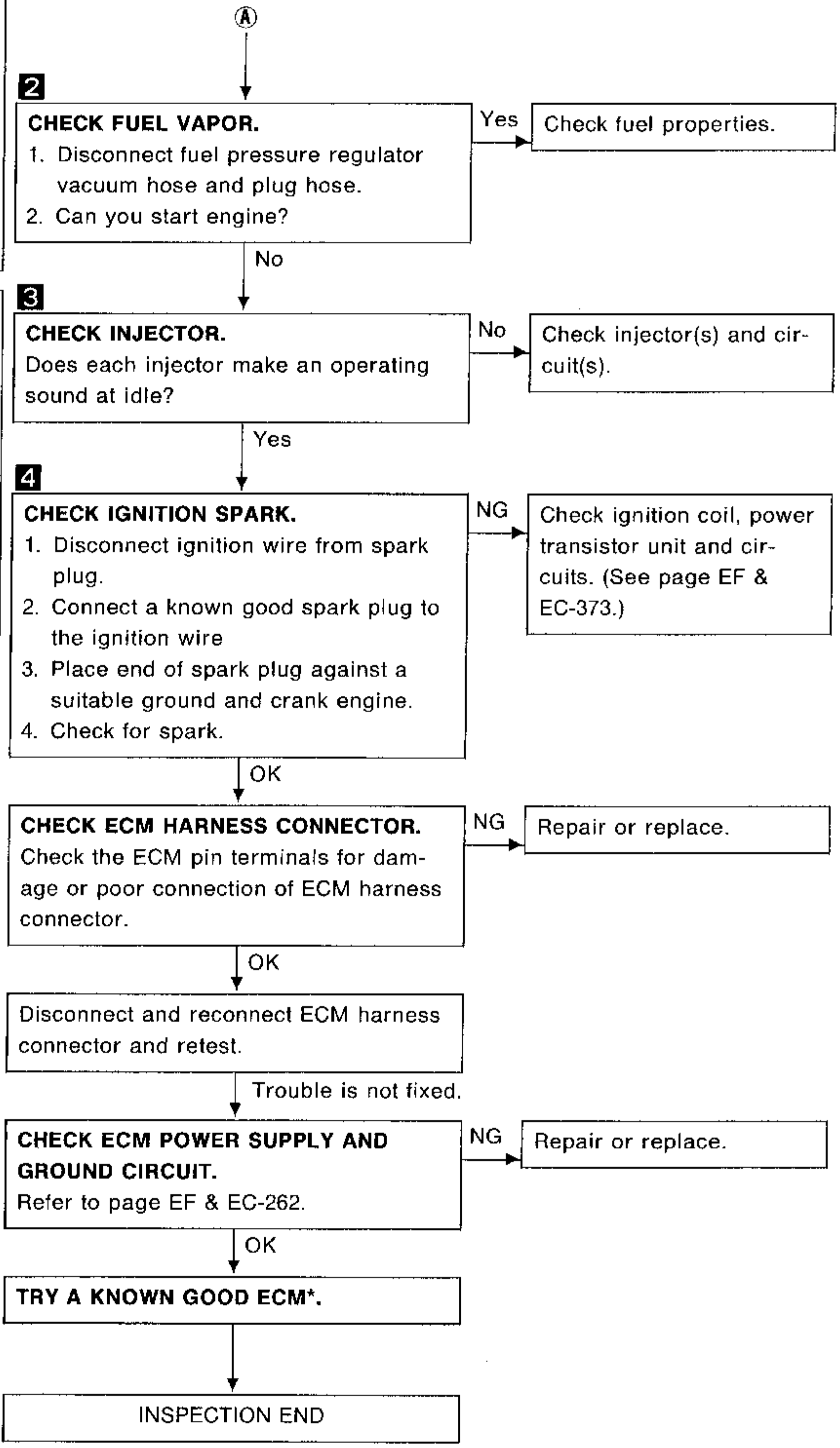


3



4





2 **CHECK FUEL VAPOR.**
1. Disconnect fuel pressure regulator vacuum hose and plug hose.
2. Can you start engine?

Yes → Check fuel properties.

No ↓

3 **CHECK INJECTOR.**
Does each injector make an operating sound at idle?

No → Check injector(s) and circuit(s).

Yes ↓

4 **CHECK IGNITION SPARK.**
1. Disconnect ignition wire from spark plug.
2. Connect a known good spark plug to the ignition wire
3. Place end of spark plug against a suitable ground and crank engine.
4. Check for spark.

NG → Check ignition coil, power transistor unit and circuits. (See page EF & EC-373.)

OK ↓

CHECK ECM HARNESS CONNECTOR.
Check the ECM pin terminals for damage or poor connection of ECM harness connector.

NG → Repair or replace.

OK ↓

Disconnect and reconnect ECM harness connector and retest.

Trouble is not fixed. ↓

CHECK ECM POWER SUPPLY AND GROUND CIRCUIT.
Refer to page EF & EC-262.

NG → Repair or replace.

OK ↓

TRY A KNOWN GOOD ECM*.

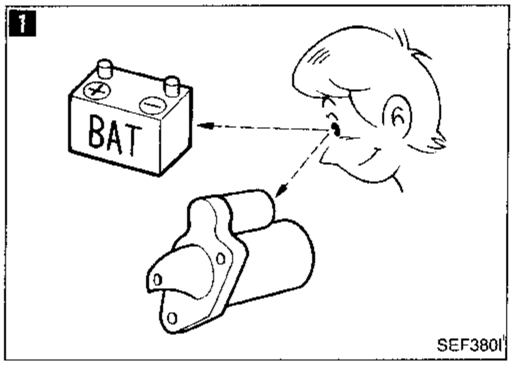
↓

INSPECTION END

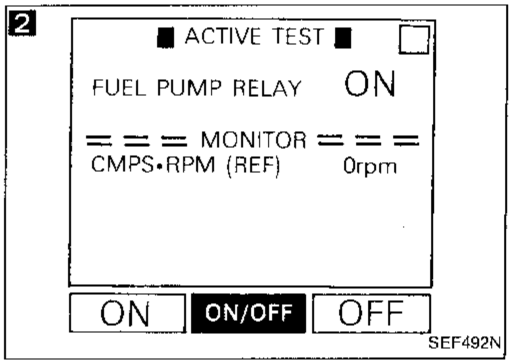
*: ECM may be the cause of a problem, but this is rarely the case.

Diagnostic Procedure 30 — Symptom — Hard to Start or Impossible to Start under Normal Conditions

1



2

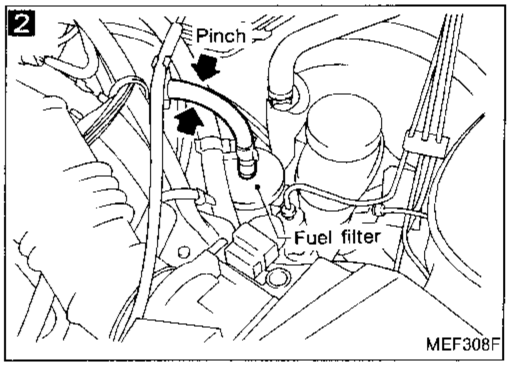

■ ACTIVE TEST ■ ☐

FUEL PUMP RELAY ON

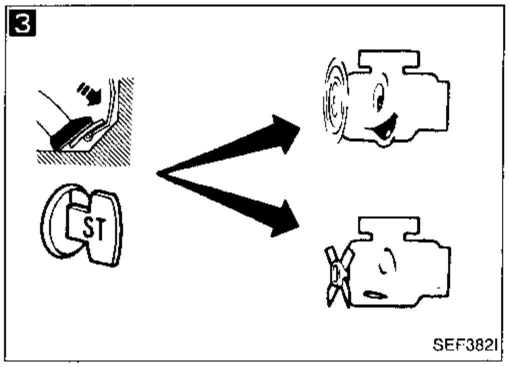
=== MONITOR ===

CMPS•RPM (REF) 0rpm

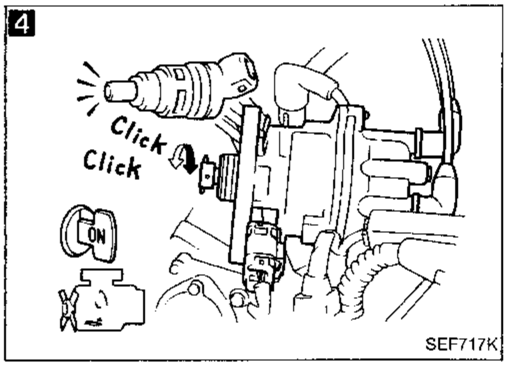
2



3



4



1

CHECK BATTERY AND STARTER.
Check battery and starter operation.
(Refer to EL section.)

NG → Repair or replace.

↓ OK

2

CHECK FUEL PRESSURE.
1. Turn ignition switch "ON".
2. Perform "FUEL PUMP RELAY" in "ACTIVE TEST" mode.
3. Pinch fuel feed hose with fingers.
Is fuel pressure pulsation felt on the fuel feed hose?

OR

1. Pinch fuel feed hose with fingers.
2. When cranking the engine, is there any pressure on the fuel feed hose?

No → Check fuel pump and circuit. (See page EF & EC-373.)

↓ Yes

3

CHECK INJECTOR FOR LEAKAGE.
When pressing accelerator pedal fully, can you start the engine.

Yes → Check injector(s) for leakage.

↓ No

4

CHECK INJECTOR.
1. Remove distributor from engine. (Camshaft position sensor harness connector should remain connected.)
2. Turn ignition switch ON. (Do not start engine.)
3. When rotating distributor shaft slowly by hand, does each injector make an operating sound?

No → Check injectors and circuits.

↓ Yes

5

CHECK IGNITION SPARK.
1. Disconnect ignition wire from spark plug.
2. Connect a known good spark plug to the ignition wire.
3. Place end of spark plug against a suitable ground and crank engine.
4. Check for spark.

NG → Check ignition coil, power transistor unit and circuits. (See page EF & EC-373.)

↓ OK

(Go to Ⓐ on next page.)

Diagnostic Procedure 30 — Symptom — Hard to Start or Impossible to Start under Normal Conditions (Cont'd)

Ⓐ

6

CHECK SPARK PLUGS.
Remove the spark plugs and check for fouling, etc.

NG → Repair or replace spark plug(s).

↓ OK

7

CHECK EGR VALVE.
Check EGR valve for sticking.

NG → Repair or replace.

↓ OK

CHECK ECM HARNESS CONNECTOR.
Check the ECM pin terminals for damage or poor connection of ECM harness connector.

NG → Repair or replace.

↓ OK

Disconnect and reconnect ECM harness connector and retest.

↓ Trouble is not fixed.

CHECK ECM POWER SUPPLY AND GROUND CIRCUIT.
Refer to page EF & EC-262.

NG → Repair or replace.

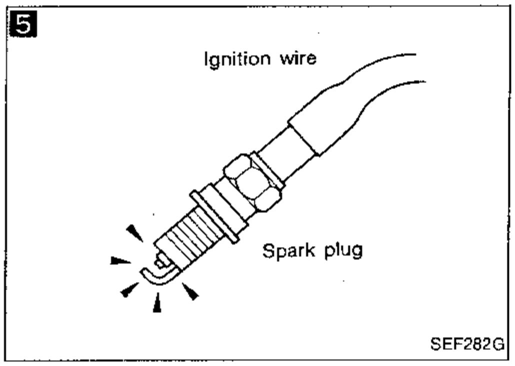
↓ OK

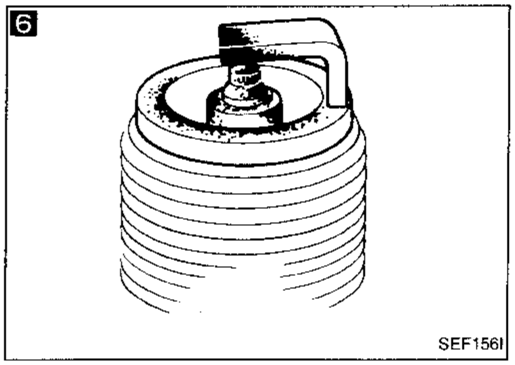
TRY A KNOWN GOOD ECM*.

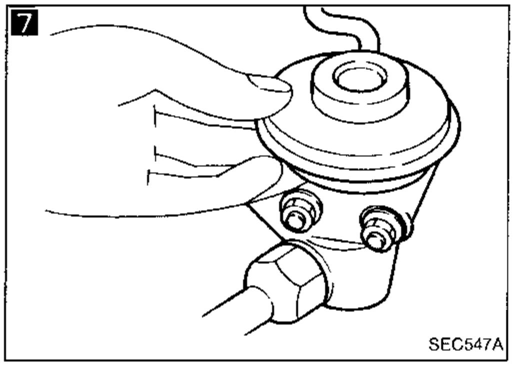
↓

INSPECTION END

*: ECM may be the cause of a problem, but this is rarely the case.







Diagnostic Procedure 31 — Symptom — Hesitation when the Engine is Hot

1

CHECK FUEL VAPOR.
1. Disconnect fuel pressure regulator vacuum hose and plug hose.
2. Perform cruise test.
3. Does the hesitation disappear?

Yes → Check fuel properties.

↓ No

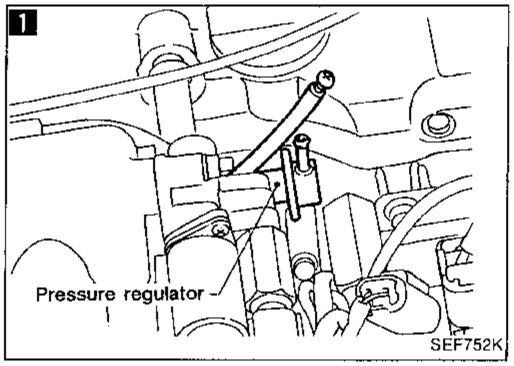
2

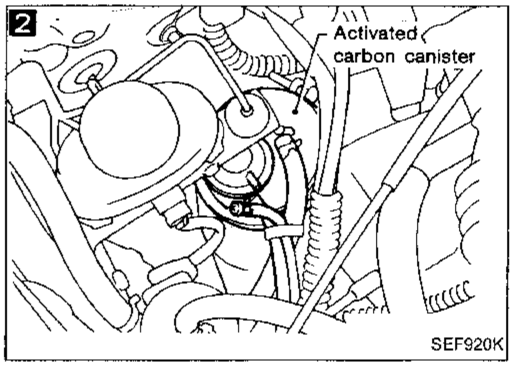
CHECK CANISTER PURGE.
1. Disconnect canister purge line hose and plug hose.
2. Perform cruise test.
3. Does the hesitation disappear?

Yes → Check purge and vacuum line.

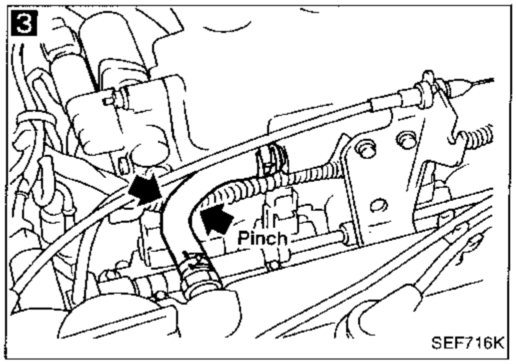
↓ No

Ⓐ





Diagnostic Procedure 31 — Symptom — Hesitation when the Engine is Hot (Cont'd)



Ⓐ

3

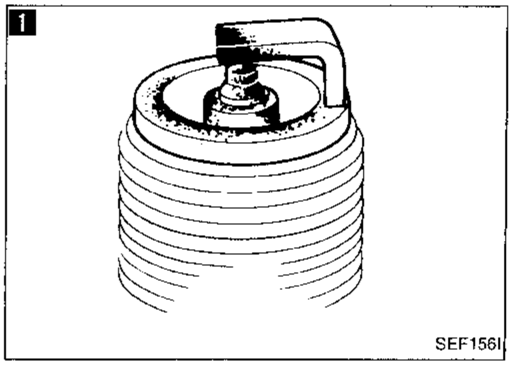
CHECK FOR INTAKE AIR LEAK.
When pinching blow-by hose (lowering the blow-by air supply), does the engine speed rise?

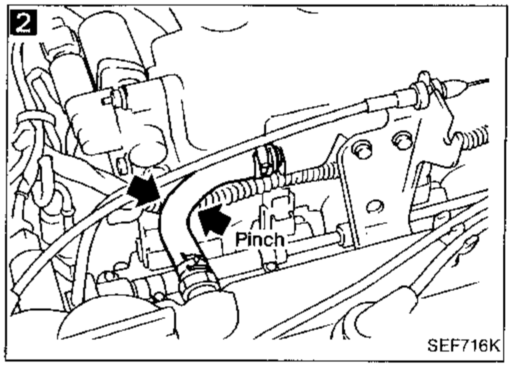
Yes → Discover air leak location and repair.

No ↓

INSPECTION END

Diagnostic Procedure 32 — Symptom — Hesitation when the Engine is Cold





1

CHECK SPARK PLUGS.
Remove spark plugs and check for fouling, etc.

NG → Repair or replace spark plug(s).

OK ↓

2

CHECK FOR INTAKE AIR LEAK.
When pinching blow-by hose (lowering the blow-by air supply), does the engine speed rise?

Yes → Discover air leak location and repair.

No ↓

Disconnect and reconnect mass air flow sensor connector.

Trouble is not fixed. ↓

TRY A KNOWN GOOD MASS AIR FLOW SENSOR.

Trouble is fixed. → Replace mass air flow sensor.

Trouble is not fixed. ↓

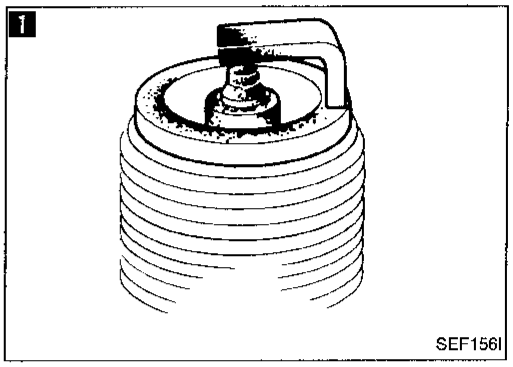
CHECK FOR INTAKE VALVE DEPOSITS.
If there are deposits on intake valves, clean them.

↓

INSPECTION END

Diagnostic Procedure 33 — Symptom — Hesitation under Normal Conditions

1

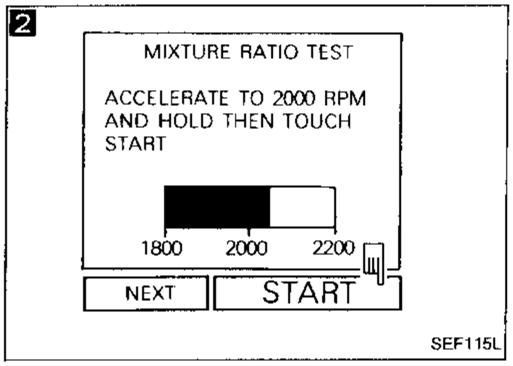

SEF156I

CHECK SPARK PLUGS.
Remove spark plugs and check for fouling, etc.

NG → Repair or replace spark plug(s).

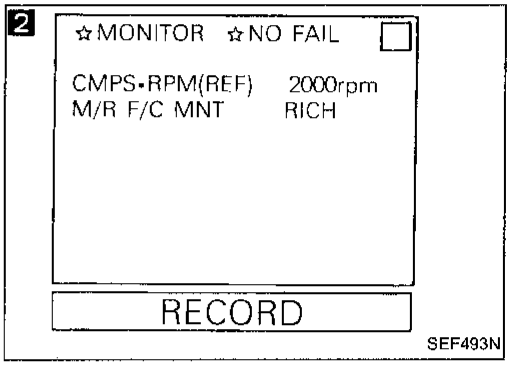
OK ↓

2


MIXTURE RATIO TEST

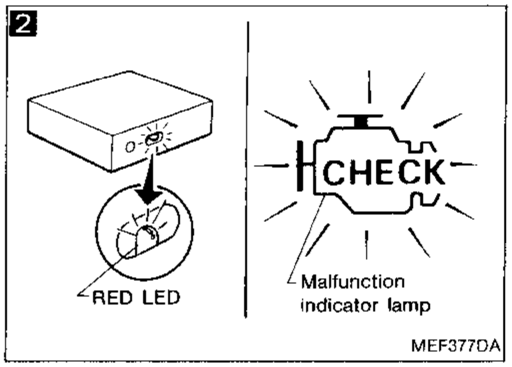
ACCELERATE TO 2000 RPM
AND HOLD THEN TOUCH
START

SEF115L


☆MONITOR ☆NO FAIL ☐

CMPS•RPM(REF) 2000rpm
M/R F/C MNT RICH

SEF493N



MEF377DA

CHECK OXYGEN SENSOR*.

1. Start engine and warm it up sufficiently.
2. Perform "MIXTURE RATIO TEST" in "FUNCTION TEST" mode.

OR

2. See "M/R F/C MNT" in "DATA MONITOR" mode.
3. Maintaining engine at 2,000 rpm under no-load (with engine warmed up sufficiently.), check to make sure that the monitor fluctuates between "LEAN" and "RICH" more than 5 times during 10 seconds.

RICH→LEAN→RICH→
1 time 2 times
LEAN→RICH.......

OR

2. Set "Oxygen sensor monitor*" in Diagnostic Test Mode II. (See page EF & EC-239.)
3. Maintaining engine at 2,000 rpm under no-load, check that the RED LED on the ECM or the malfunction indicator lamp on the instrument panel goes ON and OFF more than 5 times during 10 seconds.

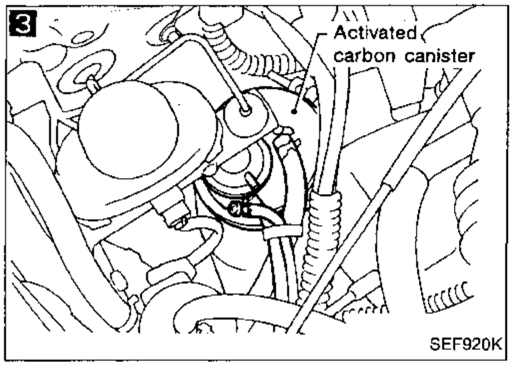
NG → Replace oxygen sensor*.

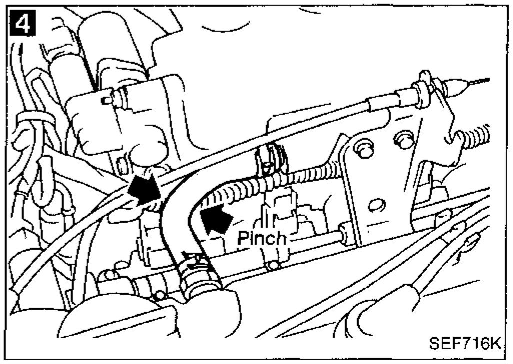
OK ↓

(Go to Ⓐ next page.)

*: Heated oxygen sensor (A/T models except for California)
Oxygen sensor (A/T models for California and M/T models)

Diagnostic Procedure 33 — Symptom — Hesitation under Normal Conditions (Cont'd)





Ⓐ

3

CHECK CANISTER PURGE.
1. Disconnect canister purge line hose and plug hose.
2. Perform cruise test.
3. Does the hesitation disappear?

Yes → Check purge and vacuum line.

No ↓

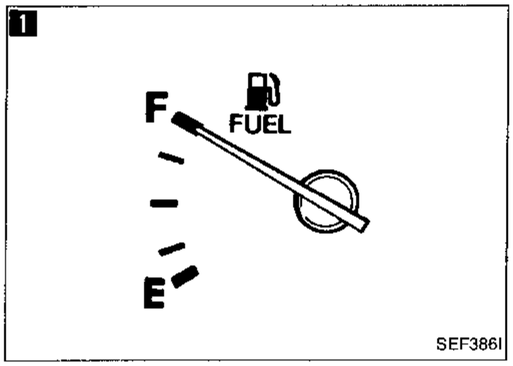
4

CHECK FOR INTAKE AIR LEAK.
When pinching blow-by hose (lowering the blow-by air supply), does the engine speed rise?

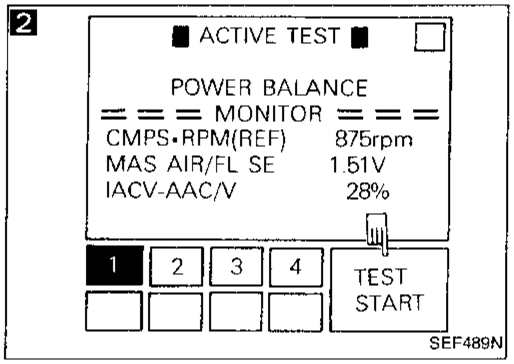
Yes → Discover air leak location and repair.

No ↓

INSPECTION END



SEF386I



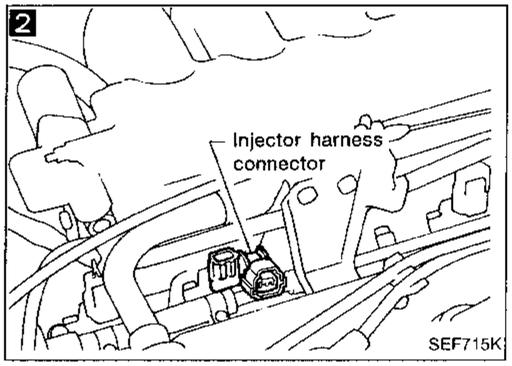
■ ACTIVE TEST ■ ☐

POWER BALANCE

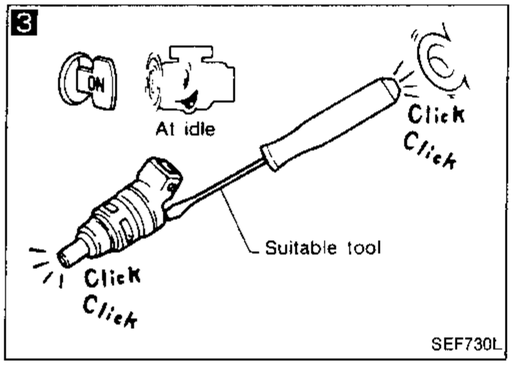
=== MONITOR ===

CMPS·RPM(REF)	875rpm
MAS AIR/FL SE	1.51V
IACV-AAC/V	28%

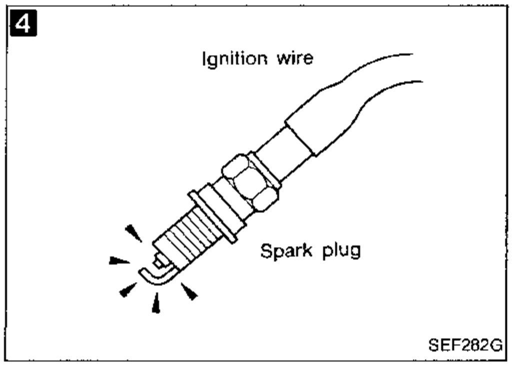
SEF489N



SEF715K



SEF730L



SEF282G

Diagnostic Procedure 34 — Symptom — Engine Stalls when Turning

1

CHECK FUEL LEVEL.
Check to see that there is enough fuel in tank.

NG → Fill fuel tank with fuel.

OK ↓

2

PERFORM POWER BALANCE TEST.

1. Perform "POWER BALANCE" in "ACTIVE TEST" mode.
2. Is there any cylinder which does not produce a momentary engine speed drop?

OR

When disconnecting each injector harness connector one at a time, is there any cylinder which does not produce a momentary engine speed drop?

No → Go to **5**.

Yes ↓

3

CHECK INJECTOR.
Does each injector make an operating sound at idle?

No → Check injector(s) and circuit(s).

Yes ↓

4

CHECK IGNITION SPARK.

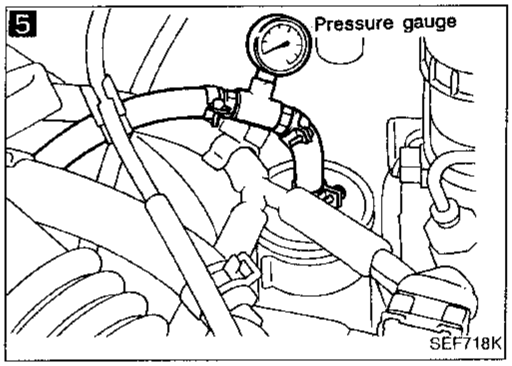
1. Disconnect ignition wire from spark plug.
2. Connect a known good spark plug to the ignition wire.
3. Place end of spark plug against a suitable ground and crank engine.
4. Check for spark.

NG → Check ignition coil, power transistor unit and circuits. (See page EF & EC-373.)

OK ↓

(Go to Ⓐ on next page.)

Diagnostic Procedure 34 — Symptom — Engine Stalls when Turning (Cont'd)



Ⓐ

5

CHECK FUEL PRESSURE.
1. Release fuel pressure to zero. (Refer to page EF & EC-379.)
2. Install fuel pressure gauge and check fuel pressure.
   At idle:
   Approx. 245 kPa
   ($2.5\ kg/cm^2$, 36 psi)
   The moment throttle valve is fully open:
   Approx. 294 kPa
   ($3.0\ kg/cm^2$, 43 psi)

NG → Check fuel pressure regulator diaphragm.

OK ↓

CHECK ECM HARNESS CONNECTOR.
Check the ECM pin terminals for damage or poor connection of ECM harness connector.

NG → Repair or replace.

OK ↓

Disconnect and reconnect ECM harness connector and retest.

↓ Trouble is not fixed.

CHECK ECM POWER SUPPLY AND GROUND CIRCUIT.
Refer to page EF & EC-262.

NG → Repair or replace.

OK ↓

TRY A KNOWN GOOD ECM*.

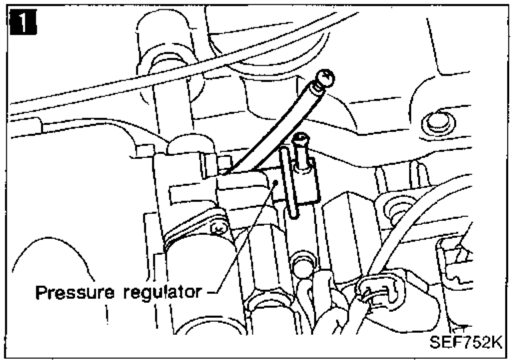
↓

INSPECTION END

*: ECM may be the cause of a problem, but this is rarely the case.

GI
MA
EM
LC
EF & EC
FE
CL
MT
AT
FA
RA
BR
ST
BF
HA
EL
IDX

Diagnostic Procedure 35 — Symptom — Engine Stalls when the Engine is Hot

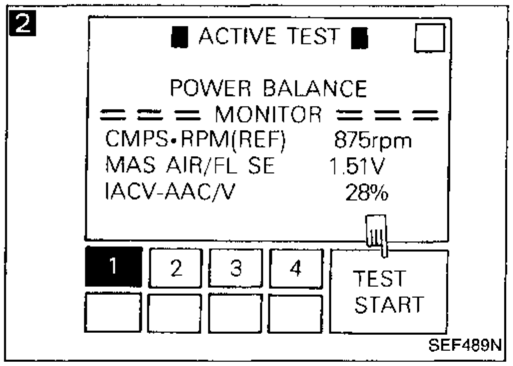


1

CHECK FUEL VAPOR.
1. Disconnect fuel pressure regulator vacuum hose and plug hose.
2. Perform cruise test.
3. Does the engine stall disappear?

Yes → Check fuel properties.

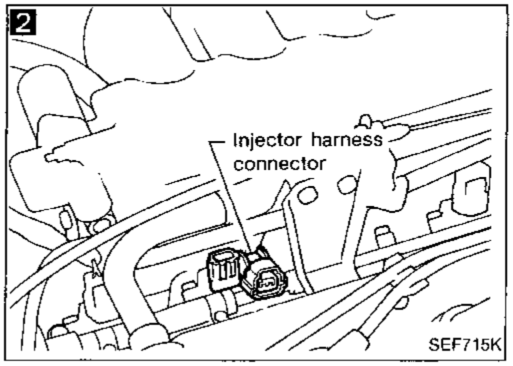
No ↓



■ ACTIVE TEST ■

POWER BALANCE
=== MONITOR ===

CMPS•RPM(REF)	875rpm
MAS AIR/FL SE	1.51V
IACV-AAC/V	28%



2

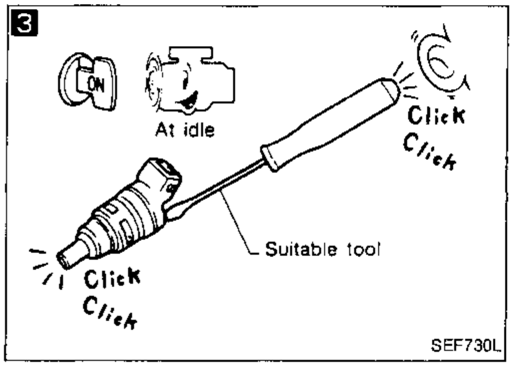
PERFORM POWER BALANCE TEST.
1. Perform "POWER BALANCE" in "ACTIVE TEST" mode.
2. Is there any cylinder which does not produce a momentary engine speed drop?

OR

When disconnecting each injector harness connector one at a time, is there any cylinder which does not produce a momentary engine speed drop?

No → Go to **5** .

Yes ↓



3

CHECK INJECTOR.
Does each injector make an operating sound at idle?

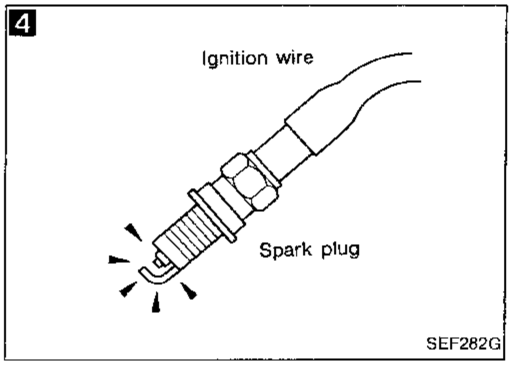
No → Check injector(s) and circuit(s).

Yes ↓

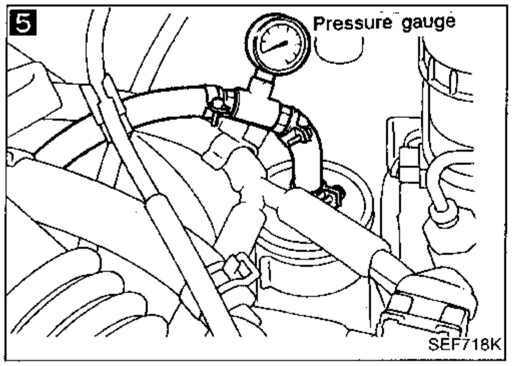
(Go to Ⓐ on next page.)

Diagnostic Procedure 35 — Symptom — Engine Stalls when the Engine is Hot (Cont'd)

4



5



Ⓐ

4

CHECK IGNITION SPARK.
1. Disconnect ignition wire from spark plug.
2. Connect a known good spark plug to the ignition wire.
3. Place end of spark plug against a suitable ground and crank engine.
4. Check for spark.

NG → Check ignition coil, power transistor unit and their circuits. (See page EF & EC-373.)

OK ↓

5

CHECK FUEL PRESSURE.
1. Release fuel pressure to zero. (Refer to page EF & EC-379.)
2. Install fuel pressure gauge and check fuel pressure.

At idle:
Approx. 245 kPa
(2.5 kg/cm^2, 36 psi)
The moment throttle valve is fully open:
Approx. 294 kPa
(3.0 kg/cm^2, 43 psi)

NG → Check fuel pressure regulator diaphragm.

OK ↓

CHECK ECM HARNESS CONNECTOR.
Check the ECM pin terminals for damage or poor connection of ECM harness connector.

NG → Repair or replace.

OK ↓

Disconnect and reconnect ECM harness connector and retest.

↓ Trouble is not fixed.

CHECK ECM POWER SUPPLY AND GROUND CIRCUIT.
Refer to page EF & EC-262.

NG → Repair or replace.

OK ↓

TRY A KNOWN GOOD ECM*.

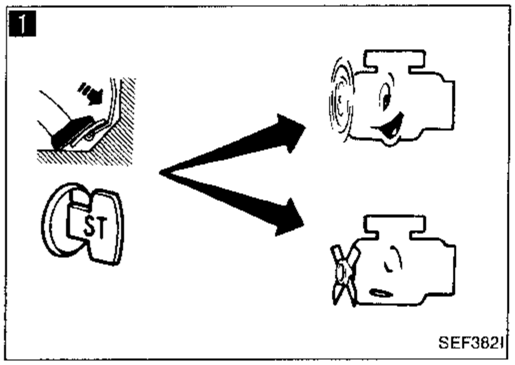
↓

INSPECTION END

*: ECM may be the cause of a problem, but this is rarely the case.

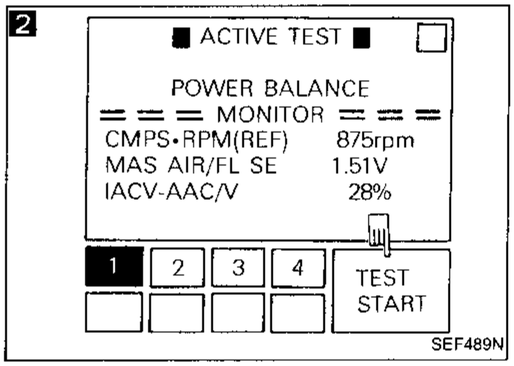
Diagnostic Procedure 36 — Symptom — Engine Stalls when the Engine is Cold

1



SEF382I

2


■ ACTIVE TEST ■ ☐

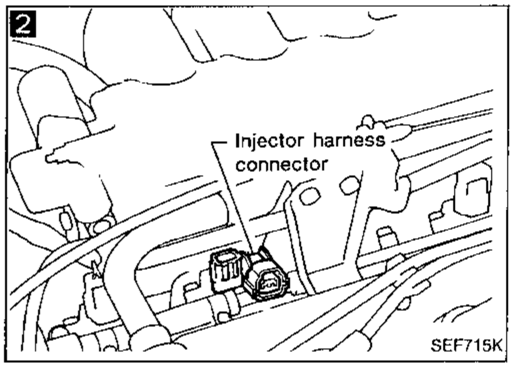
POWER BALANCE

=== MONITOR ===

CMPS•RPM(REF)	875rpm
MAS AIR/FL SE	1.51V
IACV-AAC/V	28%

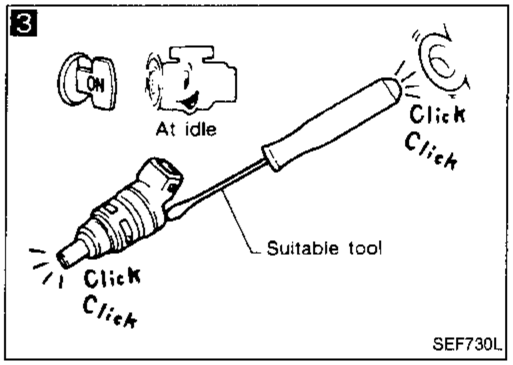
SEF489N

2



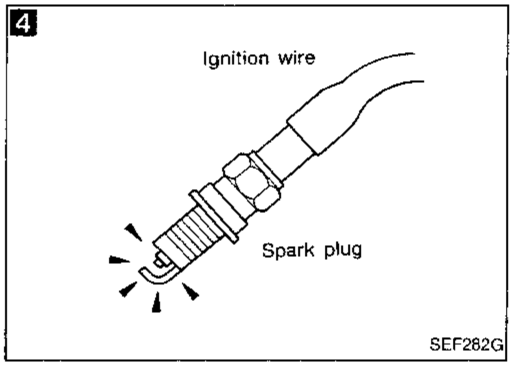
SEF715K

3



SEF730L

4



SEF282G

1

CHECK IACV-AIR REGULATOR AND IACV-AAC VALVE.
When the engine is cold, can you start the engine when pressing accelerator pedal fully?

NG → Check IACV-AAC valve, IACV-air regulator and circuits. (See pages EF & EC-374, 375.)

OK ↓

2

PERFORM POWER BALANCE TEST.

1. Perform "POWER BALANCE" in "ACTIVE TEST" mode.
2. Is there any cylinder which does not produce a momentary engine speed drop?

OR

When disconnecting each injector harness connector one at a time, is there any cylinder which does not produce a momentary engine speed drop?

NG → Go to 6 .

OK ↓

3

CHECK INJECTOR.
Does each injector make an operating sound at idle?

NG → Check injector(s) and circuit(s).

OK ↓

4

CHECK IGNITION SPARK.

1. Disconnect ignition wire from spark plug.
2. Connect a known good spark plug to the ignition wire.
3. Place end of spark plug against a suitable ground and crank engine.
4. Check for spark.

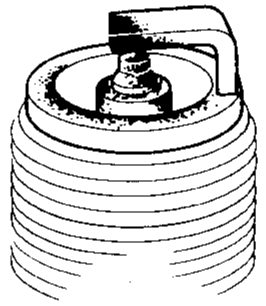
NG → Check ignition coil, power transistor unit and circuits. (See page EF & EC-373.)

OK ↓

(Go to Ⓐ on next page.)

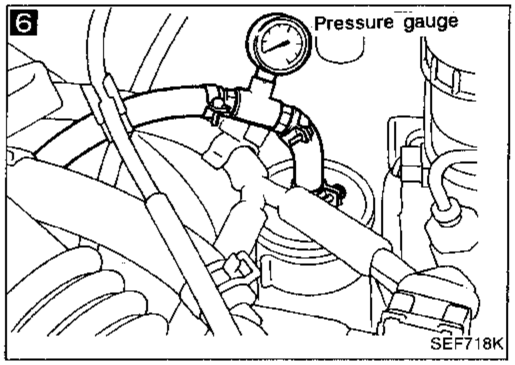
Diagnostic Procedure 36 — Symptom — Engine Stalls when the Engine is Cold (Cont'd)

5



SEF156I

6



SEF718K

Ⓐ

5

CHECK SPARK PLUGS.
Remove the spark plugs and check for fouling, etc.

NG → Repair or replace spark plug(s).

OK

6

CHECK FUEL PRESSURE.

1. Release fuel pressure to zero. (Refer to page EF & EC-379.)
2. Install fuel pressure gauge and check fuel pressure.

At idle:
Approx. 245 kPa
(2.5 kg/cm², 36 psi)
The moment throttle valve is fully open:
Approx. 294 kPa
(3.0 kg/cm², 43 psi)

NG → Check fuel pressure regulator diaphragm.

OK

CHECK ECM HARNESS CONNECTOR.
Check the ECM pin terminals for damage or poor connection of ECM harness connector.

NG → Repair or replace.

OK

Disconnect and reconnect ECM harness connector and retest.

Trouble is not fixed.

CHECK ECM POWER SUPPLY AND GROUND CIRCUIT.
Refer to page EF & EC-262.

NG → Repair or replace.

OK

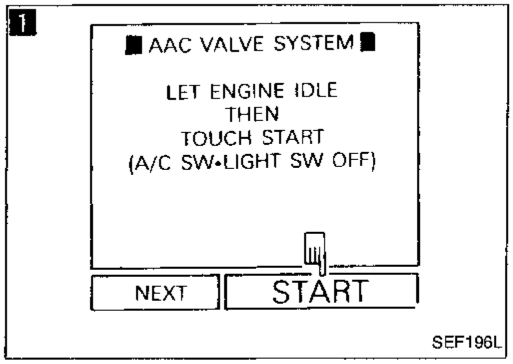
TRY A KNOWN GOOD ECM*.

INSPECTION END

*: ECM may be the cause of a problem, but this is rarely the case.

Diagnostic Procedure 37 — Symptom — Engine Stalls when Stepping on the Accelerator Momentarily

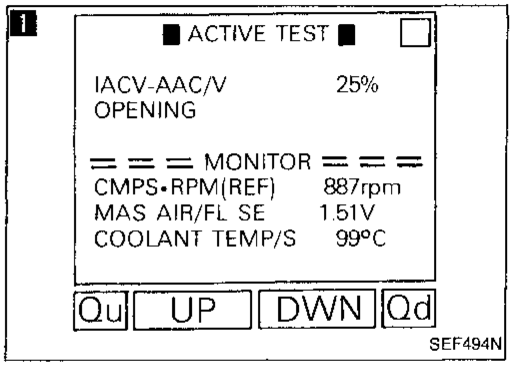
1



■ AAC VALVE SYSTEM ■

LET ENGINE IDLE
THEN
TOUCH START
(A/C SW•LIGHT SW OFF)

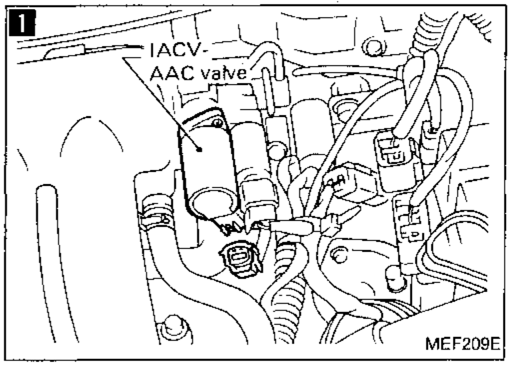
SEF196L



■ ACTIVE TEST ■

IACV-AAC/V OPENING	25%
═══ MONITOR ═══	
CMPS•RPM(REF)	887rpm
MAS AIR/FL SE	1.51V
COOLANT TEMP/S	99°C

SEF494N



MEF209E

CHECK IACV-AAC VALVE.

1. Start engine and warm it up sufficiently.
2. Perform "IACV-AAC/V SYSTEM" in "FUNCTION TEST" mode.

OR

2. Select "IACV-AAC/V OPENING" in "ACTIVE TEST" mode.
3. When touching "Qu" and "Qd", does the engine speed change according to the percent of IACV-AAC valve opening?

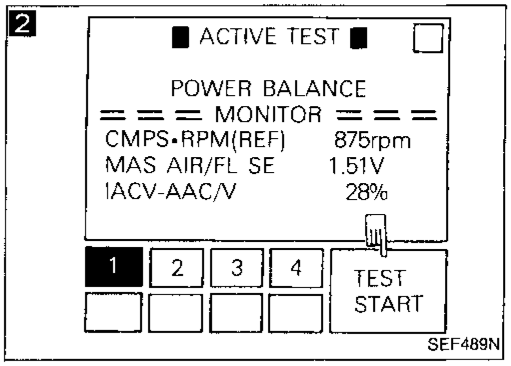
OR

When disconnecting IACV-AAC valve harness connector, does the engine speed drop?

No → Check IACV-AAC valve and circuit. (See page EF & EC-374.)

Yes ↓

2

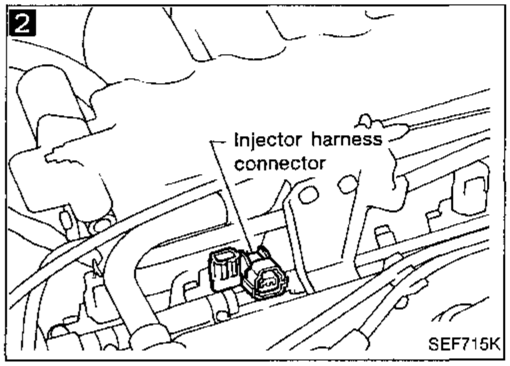


■ ACTIVE TEST ■

POWER BALANCE

═══ MONITOR ═══	
CMPS•RPM(REF)	875rpm
MAS AIR/FL SE	1.51V
IACV-AAC/V	28%

SEF489N



SEF715K

PERFORM POWER BALANCE TEST.

1. Perform "POWER BALANCE" in "ACTIVE TEST" mode.
2. Is there any cylinder which does not produce a momentary engine speed drop?

OR

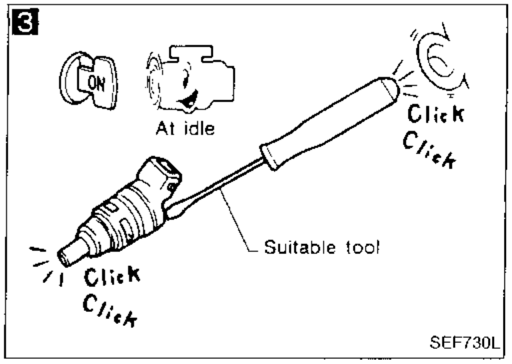
When disconnecting each injector harness connector one at a time, is there any cylinder which does not produce a momentary engine speed drop?

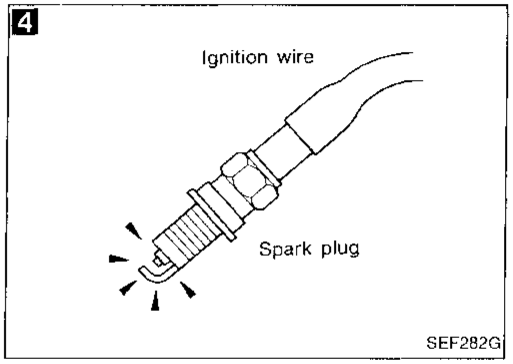
No → Go to **5**.

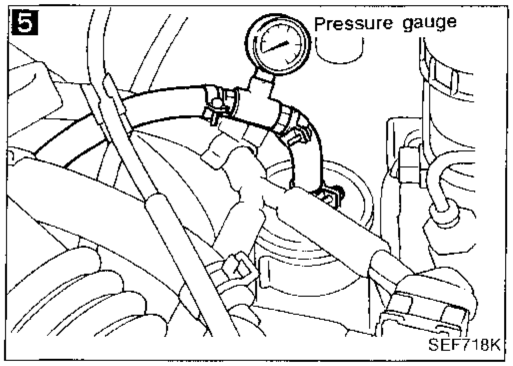
Yes ↓

(Go to Ⓐ on next page.)

Diagnostic Procedure 37 — Symptom — Engine Stalls when Stepping on the Accelerator Momentarily (Cont'd)







Ⓐ

3

CHECK INJECTOR.
Does each injector make an operating sound at idle?

No → Check injector(s) and their circuit(s).

Yes

4

CHECK IGNITION SPARK.

1. Disconnect ignition wire from spark plug.
2. Connect a known good spark plug to the ignition wire.
3. Place end of spark plug against an earth point with engine cranking.
4. Check for spark.

NG → Check ignition coil, power transistor unit and their circuits. (See page EF & EC-373.)

OK

5

CHECK FUEL PRESSURE.

1. Release fuel pressure to zero. (Refer to page EF & EC-379.)
2. Install fuel pressure gauge and check fuel pressure.
   At idle:
   Approx. 245 kPa
   (2.5 kg/cm^2, 36 psi)
   The moment throttle valve is fully open:
   Approx. 294 kPa
   (3.0 kg/cm^2, 43 psi)

NG → Check fuel pressure regulator diaphragm.

OK

CHECK ECM HARNESS CONNECTOR.
Check the ECM pin terminals for damage or poor connection of ECM harness connector.

NG → Repair or replace.

OK

Disconnect and reconnect ECM harness connector and retest.

Trouble is not fixed.

CHECK ECM POWER SUPPLY AND GROUND CIRCUIT.
Refer to page EF & EC-262.

NG → Repair or replace.

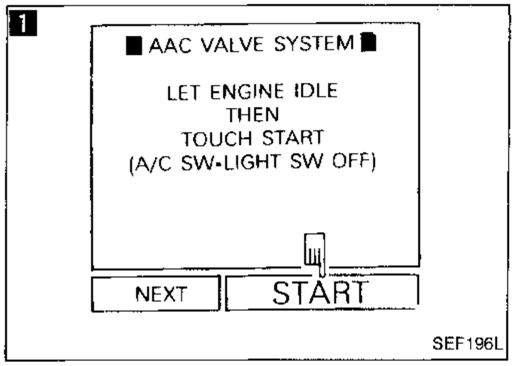
OK

TRY A KNOWN GOOD ECM*.

INSPECTION END

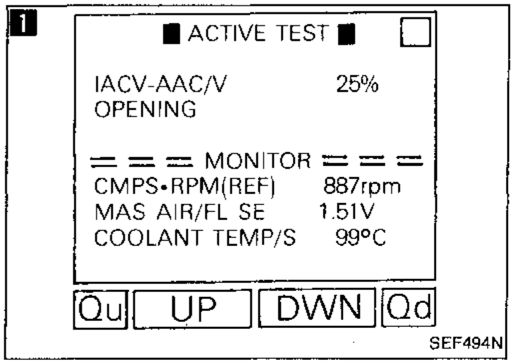
*: ECM may be the cause of a problem, but this is rarely the case.

Diagnostic Procedure 38 — Symptom — Engine Stalls after Decelerating



■ AAC VALVE SYSTEM ■

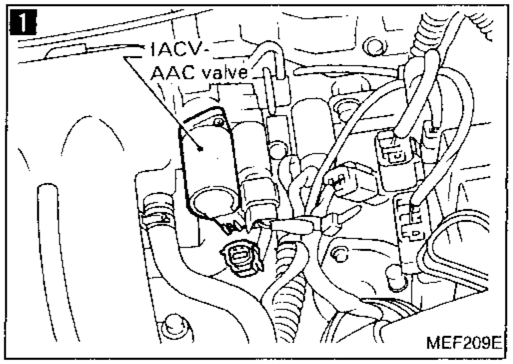
LET ENGINE IDLE
THEN
TOUCH START
(A/C SW•LIGHT SW OFF)

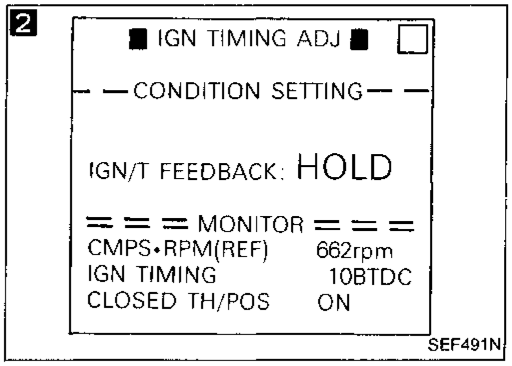


■ ACTIVE TEST ■

IACV-AAC/V OPENING 25%

=== MONITOR ===
CMPS•RPM(REF) 887rpm
MAS AIR/FL SE 1.51V
COOLANT TEMP/S 99°C



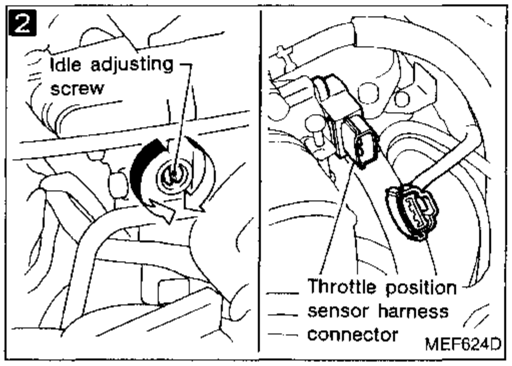


■ IGN TIMING ADJ ■

— — CONDITION SETTING — —

IGN/T FEEDBACK: HOLD

=== MONITOR ===
CMPS•RPM(REF) 662rpm
IGN TIMING 10BTDC
CLOSED TH/POS ON



1

CHECK IACV-AAC VALVE.

1. Start engine and warm it up sufficiently.
2. Perform "IACV-AAC/V SYSTEM" in "FUNCTION TEST" mode.

OR

2. Select "IACV-AAC/V OPENING" in "ACTIVE TEST" mode.
3. When touching "Qu" and "Qd", does the engine speed change according to the percent of IACV-AAC valve opening?

OR

When disconnecting IACV-AAC valve harness connector, does the engine speed drop?

No → Check IACV-AAC valve and circuit. (See page EF & EC-374.)

Yes ↓

2

CHECK IDLE ADJ. SCREW CLOGGING.

1. Perform "IGNITION TIMING ADJ" in "WORK SUPPORT" mode.
2. Can you set engine speed at 600±50 rpm (M/T), 725±50 rpm (A/T, in "N" position) by turning idle adjusting screw?

OR

1. Disconnect throttle position sensor harness connector.
2. Can you set engine speed at 600±50 rpm (M/T), 725±50 rpm (A/T, in "N" position) by turning idle adjusting screw?

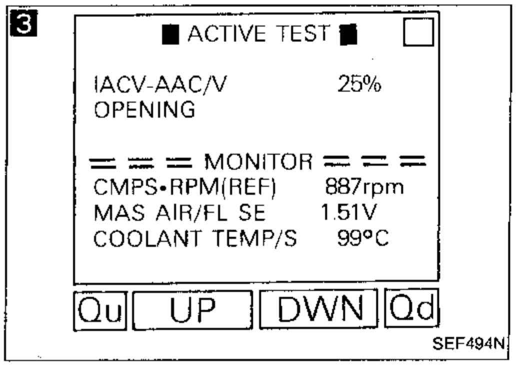
No → Check for IAS clogging or throttle body clogging.

Yes ↓

(Go to Ⓐ on next page.)

Diagnostic Procedure 38 — Symptom — Engine Stalls after Decelerating (Cont'd)

3



■ ACTIVE TEST ■ ☐

IACV-AAC/V OPENING 25%

=== MONITOR ===

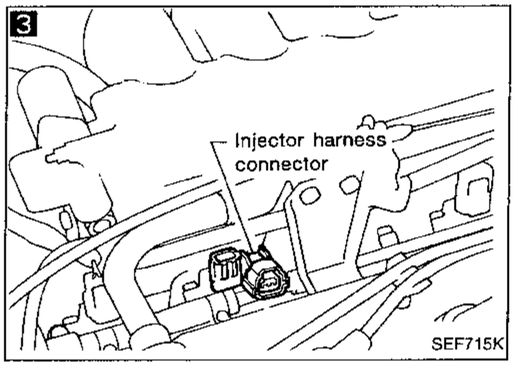
CMPS•RPM(REF) 887rpm

MAS AIR/FL SE 1.51V

COOLANT TEMP/S 99°C

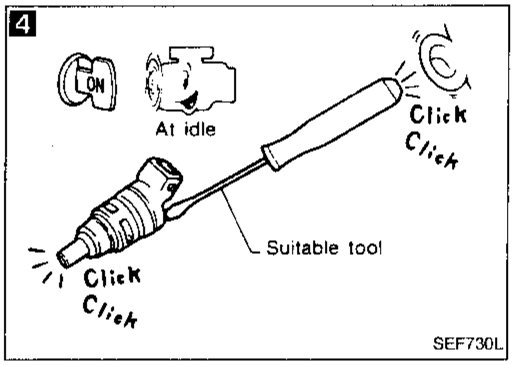
SEF494N

3



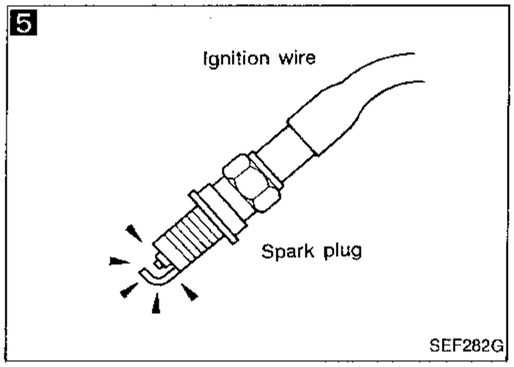
SEF715K

4



SEF730L

5



SEF282G

Ⓐ

3

PERFORM POWER BALANCE TEST.

1. Perform "POWER BALANCE" in "ACTIVE TEST" mode.
2. Is there any cylinder which does not produce a momentary engine speed drop?

— OR —

When disconnecting each injector harness connector one at a time, is there any cylinder which does not produce a momentary engine speed drop?

No → Go to **6**.

Yes ↓

4

CHECK INJECTOR.

Does each injector make an operating sound at idle?

No → Check injector(s) and circuit(s).

Yes ↓

5

CHECK IGNITION SPARK.

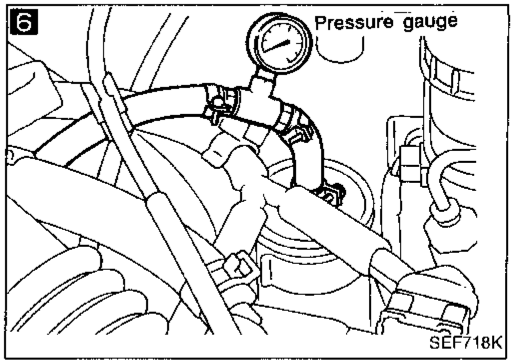
1. Disconnect ignition wire from spark plug.
2. Connect a known good spark plug to the ignition wire.
3. Place end of spark plug against a suitable ground and crank engine.
4. Check for spark.

No → Check ignition coil, power transistor and circuits. (See page EF & EC-373.)

Yes ↓

(Go to Ⓑ on next page.)

Diagnostic Procedure 38 — Symptom — Engine Stalls after Decelerating (Cont'd)



Ⓑ

6

CHECK FUEL PRESSURE.

1. Release fuel pressure to zero. (Refer to page EF & EC-379.)
2. Install fuel pressure gauge and check fuel pressure.

At idle:

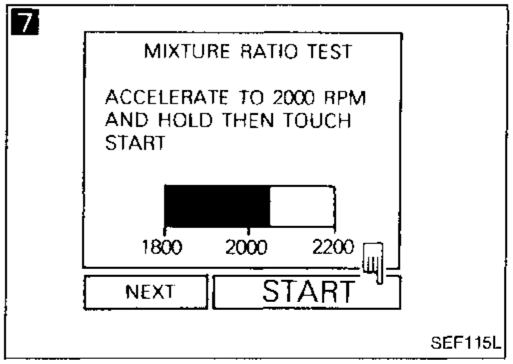
Approx. 245 kPa
(2.5 kg/cm², 36 psi)

The moment throttle valve is fully open:

Approx. 294 kPa
(3.0 kg/cm², 43 psi)

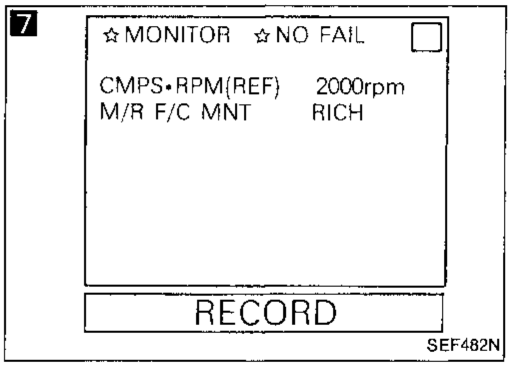
NG → Check fuel pressure regulator diaphragm.

OK ↓



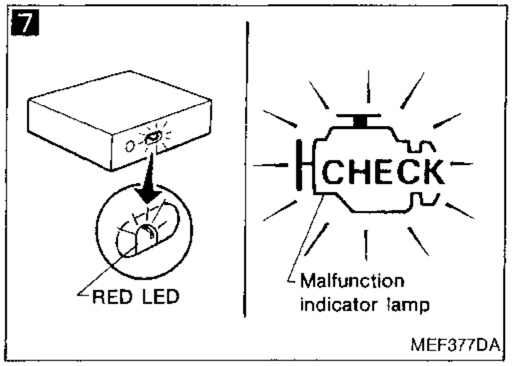
MIXTURE RATIO TEST

ACCELERATE TO 2000 RPM AND HOLD THEN TOUCH START



☆MONITOR ☆NO FAIL ☐

CMPS•RPM(REF) 2000rpm
M/R F/C MNT RICH



7

CHECK OXYGEN SENSOR*.

1. Start engine and warm it up sufficiently.
2. Perform "MIXTURE RATIO TEST" in "FUNCTION TEST" mode.

OR

2. See "M/R F/C MNT" in "DATA MONITOR" mode.
3. Maintaining engine at 2,000 rpm under no-load (with engine warmed up sufficiently.), check to make sure that the monitor fluctuates between "LEAN" and "RICH" more than 5 times during 10 seconds.

RICH→LEAN→RICH→
1 time 2 times
LEAN→RICH.......

OR

2. Set "Oxygen sensor monitor*" in Diagnostic Test Mode II. (See page EF & EC-239.)
3. Maintaining engine at 2,000 rpm under no-load, check that the RED LED on the ECM or the malfunction indicator lamp on the instrument panel goes ON and OFF more than 5 times during 10 seconds.

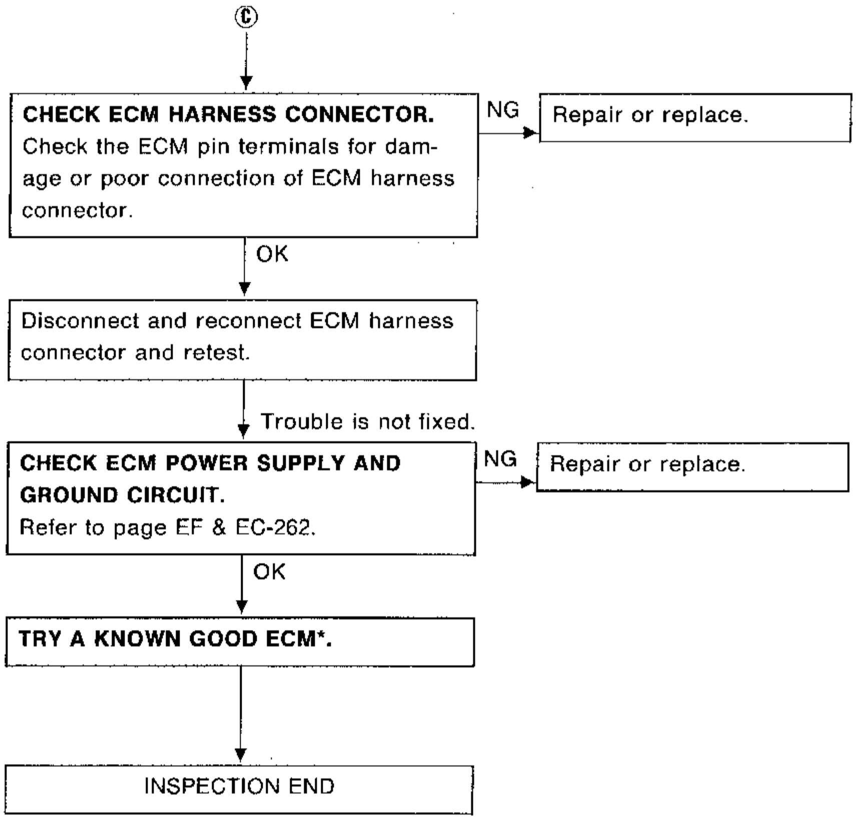
NG → Replace oxygen sensor*.

OK ↓

(Go to Ⓒ on next page.)

*: Heated oxygen sensor (A/T models except for California)
Oxygen sensor (A/T models for California and M/T models)

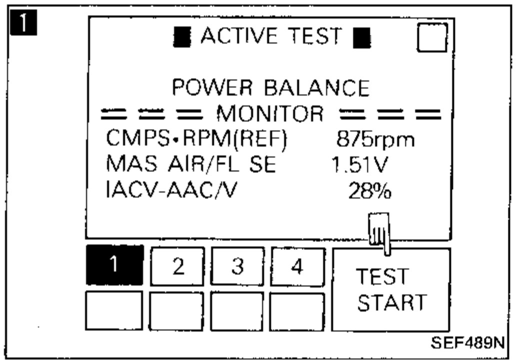
Diagnostic Procedure 38 — Symptom — Engine Stalls after Decelerating (Cont'd)



*: ECM may be the cause of a problem, but this is rarely the case.

Diagnostic Procedure 39 — Symptom — Engine Stalls when Accelerating or when Driving at Constant Speed

1



■ ACTIVE TEST ■ ☐

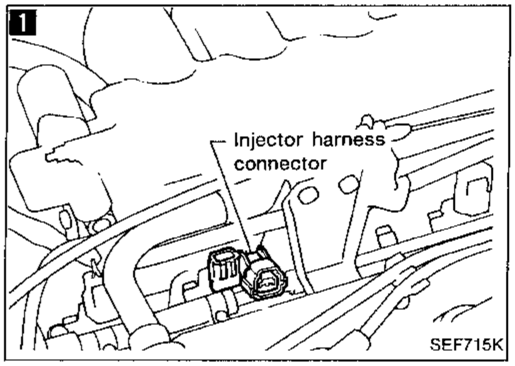
POWER BALANCE

=== MONITOR ===

CMPS•RPM(REF)	875rpm
MAS AIR/FL SE	1.51V
IACV-AAC/V	28%

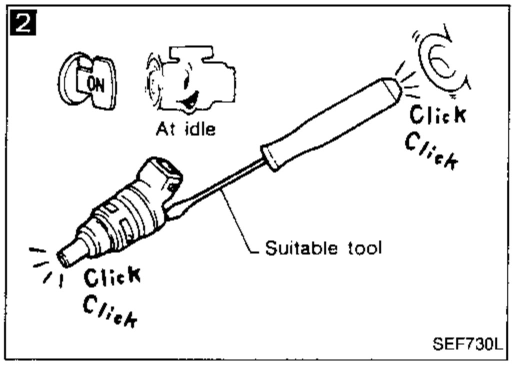
SEF489N

1



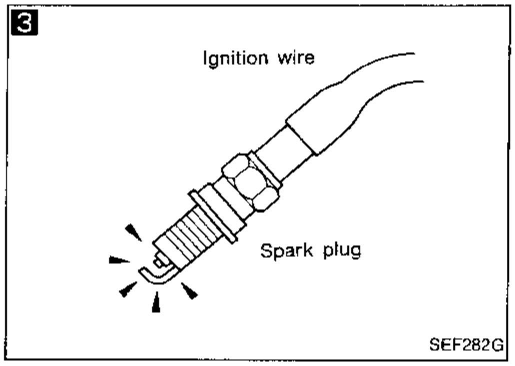
SEF715K

2



SEF730L

3



SEF282G

1

PERFORM POWER BALANCE TEST.

1. Perform "POWER BALANCE" in "ACTIVE TEST" mode.
2. Is there any cylinder which does not produce a momentary engine speed drop?

OR

When disconnecting each injector harness connector one at a time, is there any cylinder which does not produce a momentary engine speed drop?

No → Go to **4** .

Yes ↓

2

CHECK INJECTOR.

Does each injector make an operating sound at idle?

No → Check injector(s) and circuit(s).

Yes ↓

3

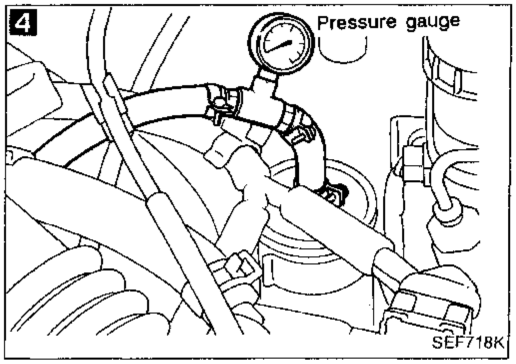
CHECK IGNITION SPARK.

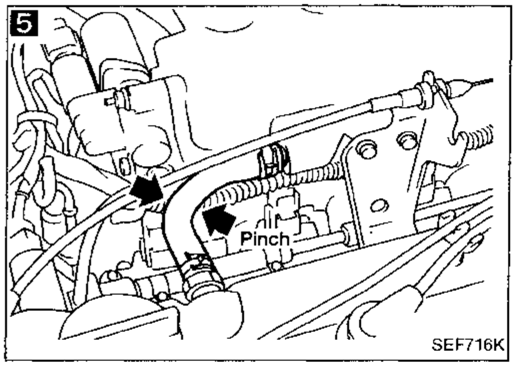
1. Disconnect ignition wire from spark plug.
2. Connect a known good spark plug to the ignition wire.
3. Place end of spark plug against a suitable ground and crank engine.
4. Check for spark.

No → Check ignition coil, power transistor unit and circuits. (See page EF & EC-373.)

Yes ↓

(Go to Ⓐ on next page.)





Diagnostic Procedure 39 — Symptom — Engine Stalls when Accelerating or when Driving at Constant Speed (Cont'd)

Ⓐ

4

CHECK FUEL PRESSURE.

1. Release fuel pressure to zero. (Refer to page EF & EC-379.)
2. Install fuel pressure gauge and check fuel pressure.

At idle:

Approx. 245 kPa
($2.5 kg/cm^2$, 36 psi)

The moment throttle valve is fully open:

Approx. 294 kPa
($3.0 kg/cm^2$, 43 psi)

NG → Check fuel pump, circuit and fuel pressure regulator.

OK ↓

5

CHECK FOR INTAKE AIR LEAK.

When pinching blow-by hose (lowering the blow-by air supply), does the engine speed rise?

Yes → Discover air leak location and repair.

No ↓

CHECK ECM HARNESS CONNECTOR.

Check the ECM pin terminals for damage or poor connection of ECM harness connector.

NG → Repair or replace.

OK ↓

Disconnect and reconnect ECM harness connector and retest.

↓ Trouble is not fixed.

CHECK ECM POWER SUPPLY AND GROUND CIRCUIT.

Refer to page EF & EC-262.

Yes → Repair or replace.

No ↓

TRY A KNOWN GOOD ECM*.

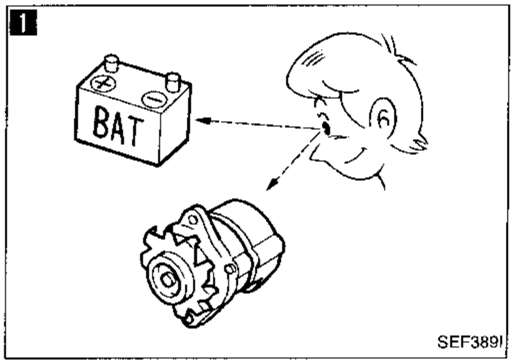
↓

INSPECTION END

*: ECM may be the cause of a problem, but this is rarely the case.

GI
MA
EM
LC
EF & EC
FE
CL
MT
AT
FA
RA
BR
ST
BF
HA
EL
IDX

Diagnostic Procedure 40 — Symptom — Engine Stalls when the Electrical Load is Heavy

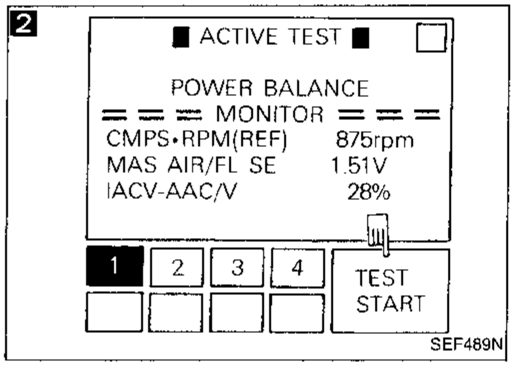


1

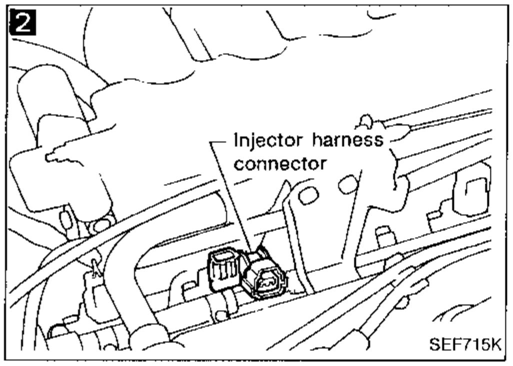
CHECK BATTERY AND ALTERNATOR.
Check battery and alternator condition.
(Refer to EL section.)

NG → Repair or replace.

OK ↓



■ ACTIVE TEST ■ ☐
POWER BALANCE
=== MONITOR ===
CMPS•RPM(REF) 875rpm
MAS AIR/FL SE 1.51V
IACV-AAC/V 28%
1 2 3 4 TEST START



2

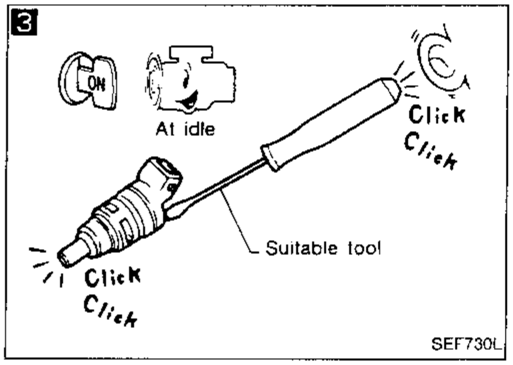
PERFORM POWER BALANCE TEST.
1. Perform "POWER BALANCE" in "ACTIVE TEST" mode.
2. Is there any cylinder which does not produce a momentary engine speed drop?

OR

When disconnecting each injector harness connector one at a time, is there any cylinder which does not produce a momentary engine speed drop?

No → Go to **5**.

Yes ↓

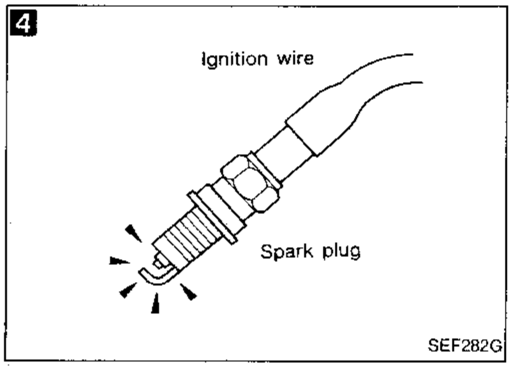


3

CHECK INJECTOR.
Does each injector make an operating sound at idle?

No → Check injector(s) and circuit(s).

Yes ↓



4

CHECK IGNITION SPARK.
1. Disconnect ignition wire from spark plug.
2. Connect a known good spark plug to the ignition wire.
3. Place end of spark plug against a suitable ground and crank engine.
4. Check for spark.

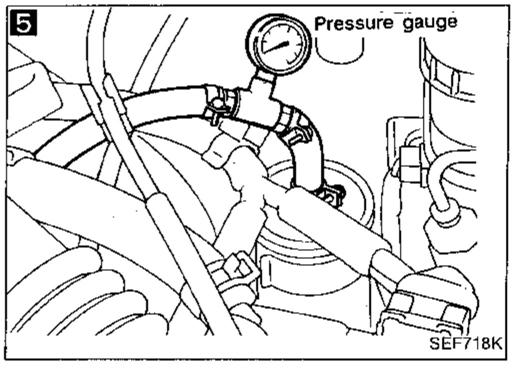
NG → Check ignition coil, power transistor unit and circuits. (See page EF & EC-373.)

OK ↓

(Go to Ⓐ on next page.)

Diagnostic Procedure 40 — Symptom — Engine Stalls when the Electrical Load is Heavy (Cont'd)

5



Ⓐ

5

CHECK FUEL PRESSURE.
1. Release fuel pressure to zero. (Refer to page EF & EC-379.)
2. Install fuel pressure gauge and check fuel pressure.
   At idle:
   Approx. 245 kPa (2.5 kg/cm², 36 psi)
   The moment throttle valve is fully open:
   Approx. 294 kPa (3.0 kg/cm², 43 psi)

NG → Check fuel pressure regulator diaphragm.

OK ↓

CHECK ECM HARNESS CONNECTOR.
Check the ECM pin terminals for damage or poor connection of ECM harness connector.

NG → Repair or replace.

OK ↓

Disconnect and reconnect ECM harness connector and retest.

↓ Trouble is not fixed.

CHECK ECM POWER SUPPLY AND GROUND CIRCUIT.
Refer to page EF & EC-262.

NG → Repair or replace.

OK ↓

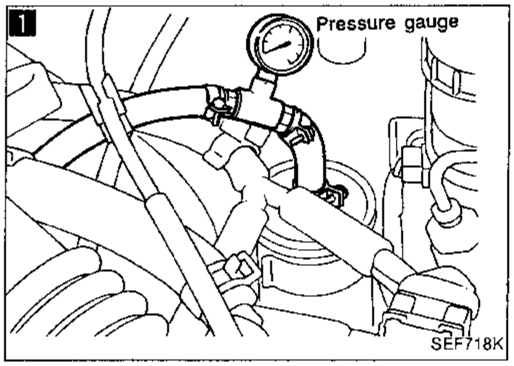
TRY A KNOWN GOOD ECM*.

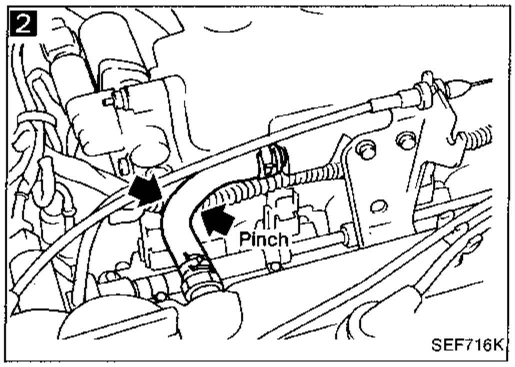
↓

INSPECTION END

*: ECM may be the cause of a problem, but this is rarely the case.

Diagnostic Procedure 41 — Symptom — Lack of Power and Stumble





1

CHECK FUEL PRESSURE.

1. Release fuel pressure to zero. (Refer to page EF & EC-379.)
2. Install fuel pressure gauge and check fuel pressure.

At idle:

Approx. 245 kPa
(2.5 kg/cm^2, 36 psi)

The moment throttle valve is fully open:

Approx. 294 kPa
(3.0 kg/cm^2, 43 psi)

NG → Check fuel pressure regulator diaphragm.

OK ↓

2

CHECK FOR INTAKE AIR LEAK.

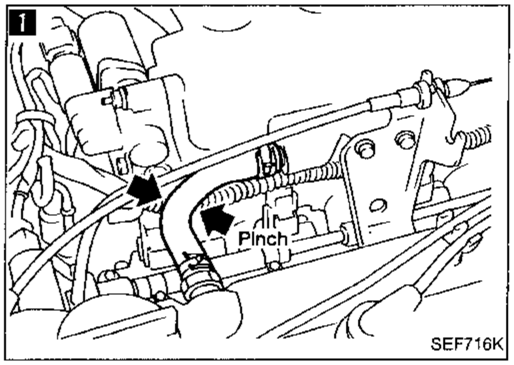
When pinching blow-by hose (lowering the blow-by air supply), does the engine speed rise?

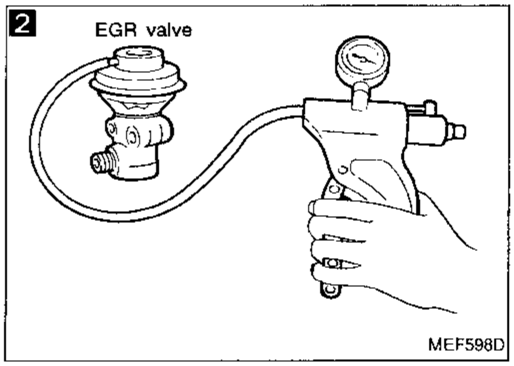
Yes → Discover air leak location and repair.

No ↓

INSPECTION END

Diagnostic Procedure 42 — Symptom — Knock





1

CHECK FOR INTAKE AIR LEAK.

When pinching blow-by hose (lowering the blow-by air supply), does the engine speed rise?

Yes → Discover air leak location and repair.

No ↓

2

CHECK EGR OPERATION.

1. Apply vacuum directly to the EGR valve using a handy vacuum pump.
2. Check to see that the engine runs rough or dies.

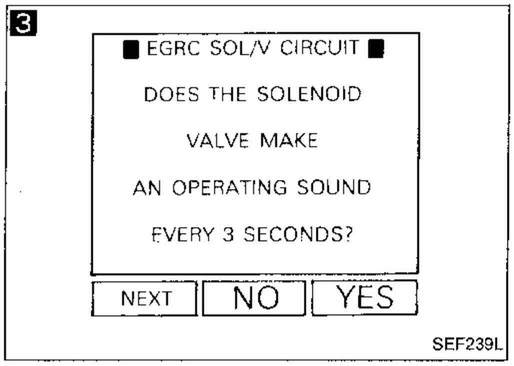
No → Check EGR valve for sticking.

Yes ↓

(Go to Ⓐ on next page.)

Diagnostic Procedure 42 — Symptom — Knock (Cont'd)

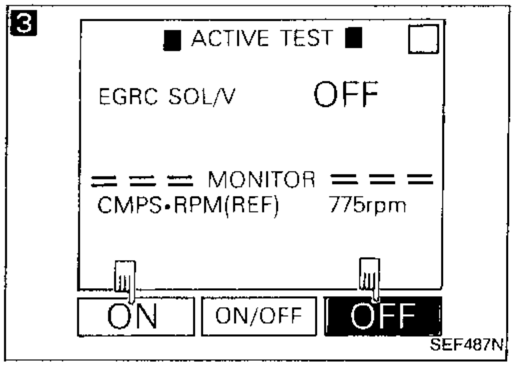
Ⓐ



■ EGRC SOL/V CIRCUIT ■

DOES THE SOLENOID VALVE MAKE AN OPERATING SOUND EVERY 3 SECONDS?

SEF239L



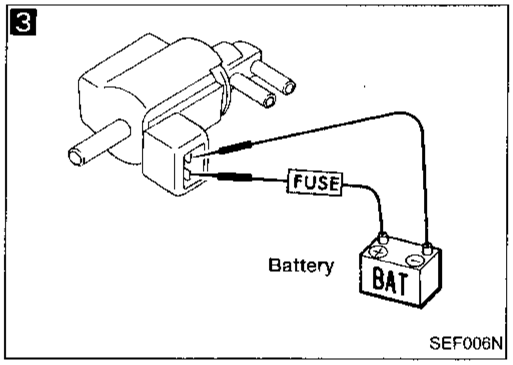
■ ACTIVE TEST ■ ☐

EGRC SOL/V OFF

=== MONITOR ===

CMPS•RPM(REF) 775rpm

SEF487N



SEF006N

3 **CHECK EGR & CANISTER CONTROL SOLENOID VALVE.**

1. Start engine and warm it up sufficiently.
2. Perform "EGRC SOL/V CIRCUIT" in "FUNCTION TEST" mode.

— OR —

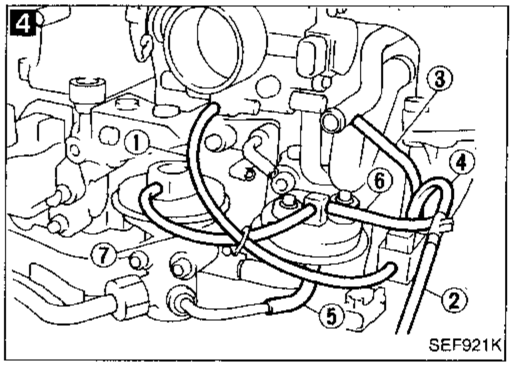
1. Turn ignition switch "ON".
2. Select "EGRC SOLENOID VALVE" in "ACTIVE TEST" mode.
3. Turn EGR & canister control solenoid valve ON and OFF.
4. Check operating sound.

— OR —

1. Disconnect EGR & canister control solenoid valve harness connector.
2. Supply EGR & canister control solenoid valve terminals with battery current and check operating sound.

NG → Check solenoid valve and circuit.

OK ↓



SEF921K

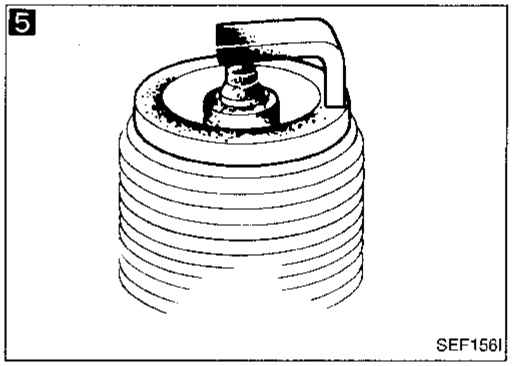
4 **CHECK VACUUM HOSES.**

Check the following vacuum hoses for clogging, cracks and poor connection.

① Throttle body to EGR & canister control solenoid valve
② Activated carbon canister to 3-way connector
③ EGR & canister canister control solenoid valve to vacuum gallery
④ EGR & canister control solenoid valve to 3-way connector
⑤ EGRC-BPT valve to EGR tube
⑥ EGRC-BPT valve to 3-way connector
⑦ EGR valve to EGRC-BPT valve

NG → Repair or replace.

OK ↓



SEF156I

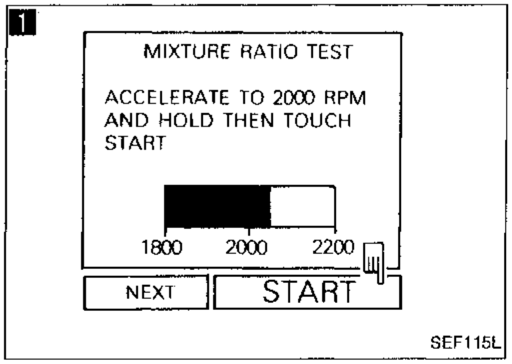
5 **CHECK FOR OIL LEAK TO COMBUSTION CHAMBER.**

Remove spark plugs and check for fouling with oil.

Yes → Check pistons, piston rings, valves, valve seats, valve oil seal, engine oil level, etc.

No ↓

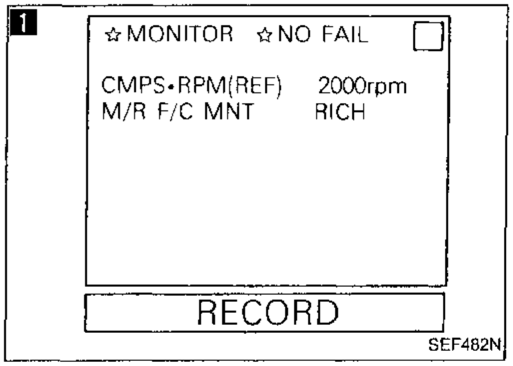
INSPECTION END



MIXTURE RATIO TEST

ACCELERATE TO 2000 RPM AND HOLD THEN TOUCH START

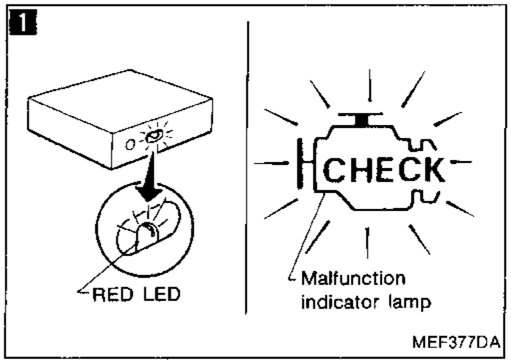
SEF115L



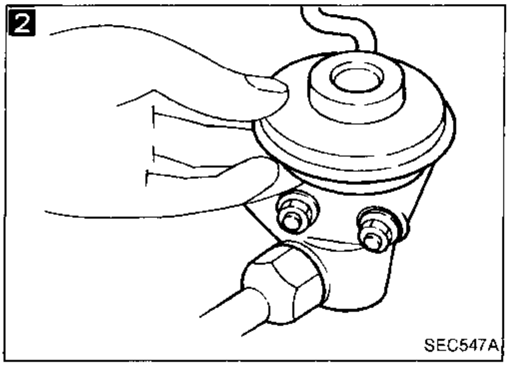
☆MONITOR ☆NO FAIL ☐

CMPS•RPM(REF) 2000rpm
M/R F/C MNT RICH

SEF482N



MEF377DA



SEC547A

Diagnostic Procedure 43 — Symptom — Surge

1

CHECK OXYGEN SENSOR.

1. Start engine and warm it up sufficiently.
2. Perform "MIXTURE RATIO TEST" in "FUNCTION TEST" mode.

OR

2. See "M/R F/C MNT" in "DATA MONITOR" mode.
3. Maintaining engine at 2,000 rpm under no-load (with engine warmed up sufficiently.), check to make sure that the monitor fluctuates between "LEAN" and "RICH" more than 5 times during 10 seconds.

$\textbf{RICH}\rightarrow\underbrace{\textbf{LEAN}\rightarrow\textbf{RICH}}_{\textbf{1 time}}\rightarrow\underbrace{\textbf{LEAN}\rightarrow\textbf{RICH}}_{\textbf{2 times}}$.......

OR

2. Set "Oxygen sensor monitor" in the Diagnostic Test Mode II. (See page EF & EC-239.)
3. Maintaining engine at 2,000 rpm under no-load, check that the RED LED on the ECM or the malfunction indicator lamp on the instrument panel goes ON and OFF more than 5 times during 10 seconds.

NG → Replace oxygen sensor.

OK ↓

2

CHECK EGR VALVE.

Check EGR valve for sticking.

NG → Repair or replace.

OK ↓

Disconnect and reconnect ECM harness connector and retest.

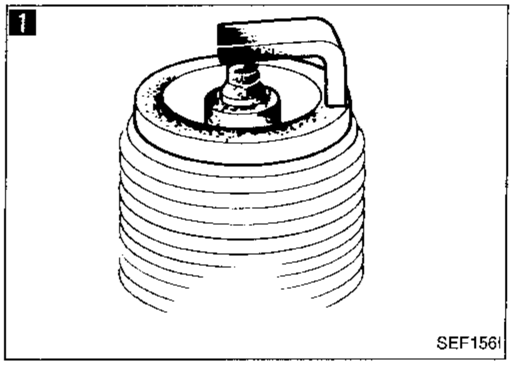
↓ Trouble is not fixed.

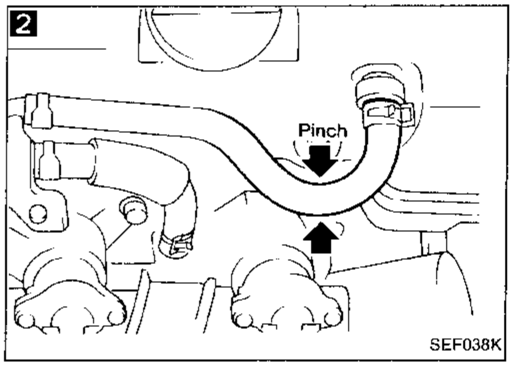
TRY A KNOWN GOOD ECM*.

↓

INSPECTION END

*: ECM may be the cause of a problem, but this is rarely the case.





Diagnostic Procedure 44 — Symptom — Backfire through the Intake

1

CHECK SPARK PLUGS.
Remove the spark plugs and check for fouling, etc.

NG → Repair or replace spark plug(s).

OK ↓

2

CHECK INTAKE AIR LEAK.
When pinching blow-by hose (lowering the blow-by air supply), does the engine speed rise?

Yes → Discover air leak location and repair.

No ↓

CHECK FOR INTAKE VALVE DEPOSITS.
If there are deposits on intake valves, remove them.

↓

INSPECTION END

Diagnostic Procedure 45 — Symptom — Backfire through the Exhaust

CHECK ENGINE COOLANT TEMPERATURE SENSOR.
Check engine coolant temperature sensor and its circuit. (See page EF & EC-372.)

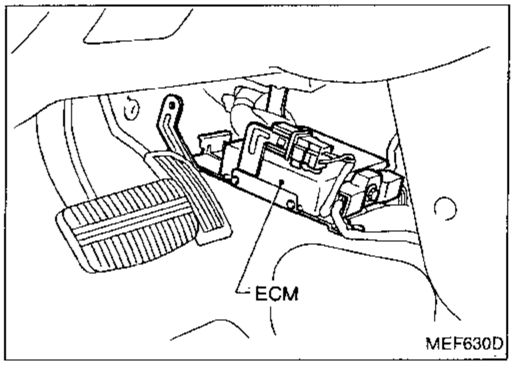
NG → Replace or repair.

OK ↓

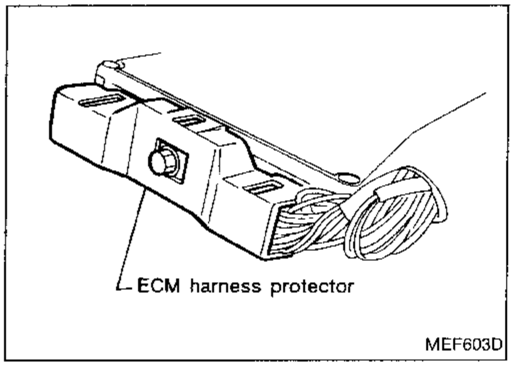
INSPECTION END

Electrical Components Inspection

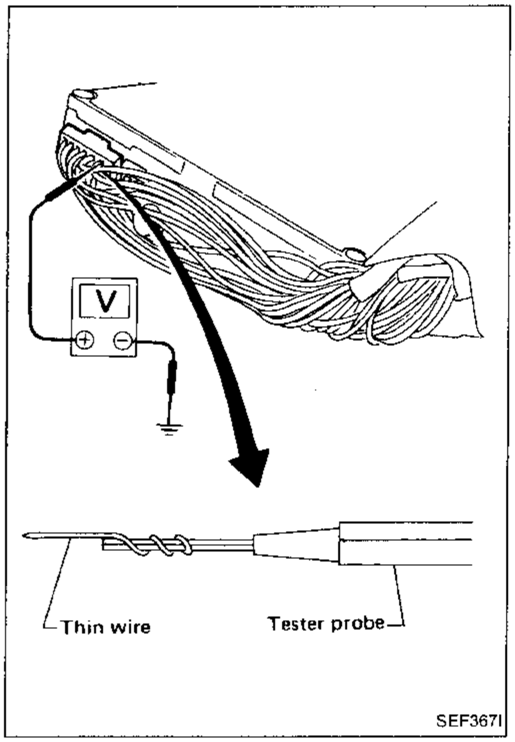
ECM INPUT/OUTPUT SIGNAL INSPECTION



1. ECM is located behind the center console panel. For this inspection, remove the center console under cover.

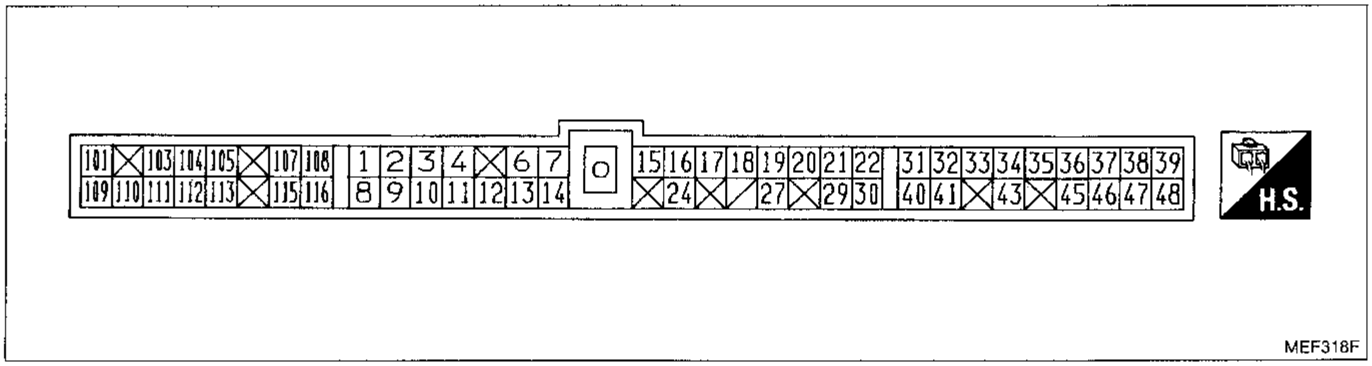


2. Remove ECM harness protector.



3. Perform all voltage measurements with the connectors connected. Extend tester probe as shown to perform tests easily.

ECM HARNESS CONNECTOR TERMINAL LAYOUT



ECM inspection table

*Data are reference values.

TERMINAL NO.	ITEM	CONDITION	*DATA
1	Ignition signal	Engine is running. Idle speed	0.3 - 0.5V
		Engine is running. Engine speed is 2,000 rpm	Approximately 0.9V
3	Ignition check	Engine is running. Idle speed	Approximately 13V
4	ECCS relay (Self-shutoff)	Engine is running. Ignition switch "OFF" For a few seconds after turning ignition switch "OFF"	0 - 1V
		Ignition switch "OFF" A few seconds after turning ignition switch "OFF"	BATTERY VOLTAGE (11 - 14V)
8	EGR temperature sensor	Engine is running. EGR system is not operating.	2 - 4V
		Engine is running. EGR system is operating.	0 - 2V
9	Cooling fan relay (Low speed)	Engine is running. Cooling fan is not operating.	BATTERY VOLTAGE (11 - 14V)
		Engine is running. Cooling fan is operating.	0.6 - 0.8V
10	Cooling fan relay (High speed)	Engine is running. Cooling fan is not operating. Cooling fan is operating at low speed.	BATTERY VOLTAGE (11 - 14V)
		Engine is running. Cooling fan is operating at high speed.	0.6 - 0.8V
11	Air conditioner relay	Engine is running. Both A/C switch and blower switch are "ON".	Approximately 0V
		Engine is running. A/C switch is "OFF".	BATTERY VOLTAGE (11 - 14V)
12	VTC solenoid valve	Engine is running. Idle speed.	BATTERY VOLTAGE (11 - 14V)
		Engine is running. Quickly depress accelerator pedal, then quickly release it.	Approximately 0V

GI
MA
EM
LC
EF & EC
FE
CL
MT
AT
FA
RA
BR
ST
BF
HA
EL
IDX

Electrical Components Inspection (Cont'd)

*Data are reference values.

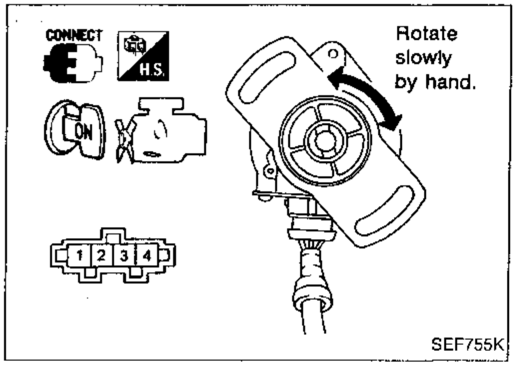
TERMINAL NO.	ITEM	CONDITION	*DATA
16	Mass air flow sensor	Engine is running.	0.8 - 3.0V Output voltage varies with engine speed.
18	Engine coolant temperature sensor	Engine is running.	0 - 5.0V Output voltage varies with engine water temperature.
19	Oxygen sensor/Heated oxygen sensor	Engine is running. └ After warming up sufficiently	0 - Approximately 1.0V
20	Throttle position sensor	Ignition switch "ON"	0.4 - Approximately 5V Output voltage varies with the throttle valve opening angle.
22 30	Camshaft position sensor (Reference signal)	Engine is running. └ **Do not run engine at high speed under no-load.**	0.1 - 1.3V
31 40	Camshaft position sensor (Position signal)	Engine is running. └ **Do not run engine at high speed under no-load.**	2.0 - 3.0V
34	Start signal	Ignition switch "ON"	Approximately 0V
		Ignition switch "START"	BATTERY VOLTAGE (11 - 14V)
35	Neutral position switch/Inhibitor switch	Ignition switch "ON" ├ "N" or "P" position (A/T) └ Neutral position (M/T)	0V
		Ignition switch "ON" └ Except the above gear position	BATTERY VOLTAGE (11 - 14V)
36	Ignition switch	Ignition switch "OFF"	0V
		Ignition switch "ON"	BATTERY VOLTAGE (11 - 14V)
37	Throttle position sensor power supply	Ignition switch "ON"	Approximately 5V
38 47	Power supply for ECM	Ignition switch "ON"	BATTERY VOLTAGE (11 - 14V)
41	Air conditioner switch	Engine is running. └ Both air conditioner switch and blower switch are "ON".	Approximately 0V
		Engine is running. └ Air conditioner switch is "OFF".	BATTERY VOLTAGE (11 - 14V)

Electrical Components Inspection (Cont'd)

*Data are reference values.

TERMINAL NO.	ITEM	CONDITION	*DATA
43	Power steering oil pressure switch	Engine is running. └ Steering wheel is being turned.	0V
		Engine is running. └ Steering wheel is not being turned.	Approximately 5V
45	Fan switch	Engine is running. └ Fan switch is "ON".	Approximately 0V
		Engine is running. └ Fan switch is "OFF".	BATTERY VOLTAGE (11 - 14V)
46	Power supply (Back-up)	Ignition switch "OFF"	BATTERY VOLTAGE (11 - 14V)
101	Injector No. 1	Engine is running.	BATTERY VOLTAGE (11 - 14V)
103	Injector No. 3		
110	Injector No. 2		
112	Injector No. 4		
104	Fuel pump relay	Ignition switch "ON" └ For 5 seconds after turning ignition switch "ON" Engine is running.	Approximately 0V
		Ignition switch "ON" └ 5 seconds after turning ignition switch "ON"	BATTERY VOLTAGE (11 - 14V)
105	EGR & canister control solenoid valve	Engine is running. (Warm-up condition) └ Idle speed	Approximately 0V
		Engine is running. (Warm-up condition) └ Engine speed is about 2,000 rpm.	BATTERY VOLTAGE (11 - 14V)
111	Heated oxygen sensor heater	Ignition switch "ON"	BATTERY VOLTAGE (11 - 14V)
		Engine is running. └ Engine speed is below 6,000 rpm	Approximately 0V
113	IACV-AAC valve	Engine is running. └ Idle speed	11 - 14V
		Engine is running. ├ Steering wheel is being turned. ├ Air conditioner is operating. ├ Rear defogger is "ON". └ Headlamp is "ON".	5 - 11V

Electrical Components Inspection (Cont'd)



Rotate slowly by hand.

SEF755K

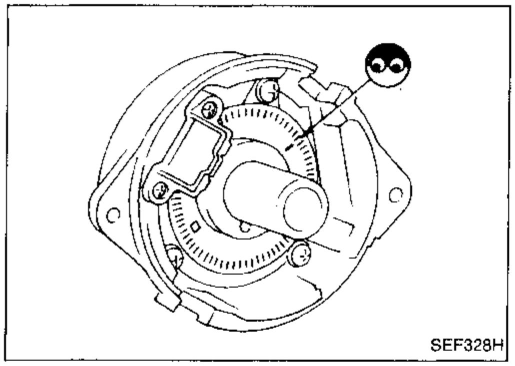
CAMSHAFT POSITION SENSOR

1. Remove distributor from engine. (Camshaft position sensor harness connector should remain connected.)
2. Disconnect ignition wires.
3. Turn ignition switch "ON".
4. Rotate distributor shaft slowly by hand and check voltage between terminals ②, ① and ground.

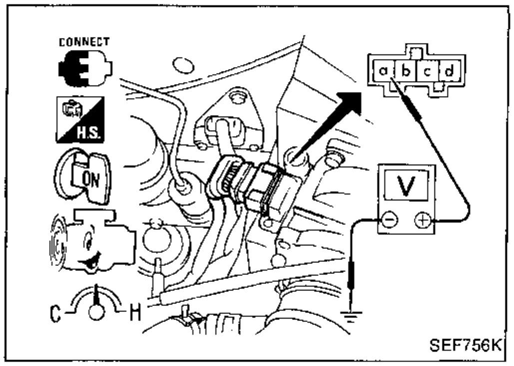
Terminal	Voltage
① (180° signal)	Tester's pointer fluctuates between 5V and 0V.
② (1° signal)	

If NG, replace distributor assembly with camshaft position sensor.

5. Visually check signal plate for damage or dust.



SEF328H



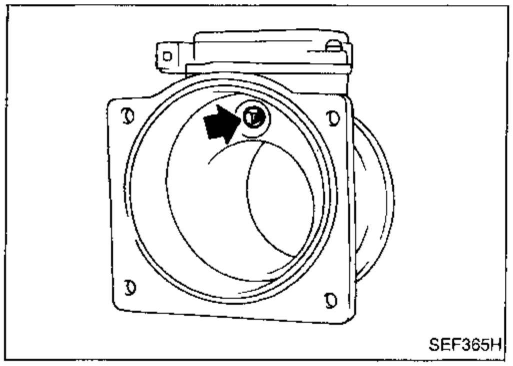
SEF756K

MASS AIR FLOW SENSOR

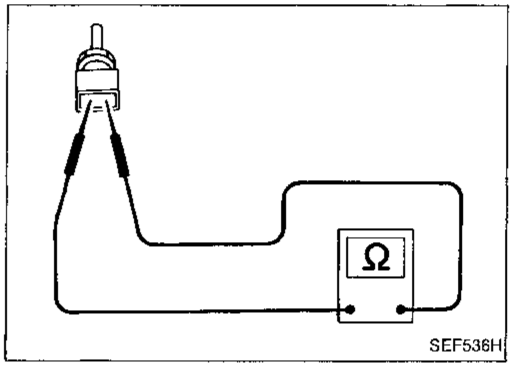
1. Peel mass air flow sensor harness connector rubber as shown in the figure if the harness connector is connected.
2. Turn ignition switch "ON".
3. Start engine and warm it up sufficiently.
4. Check voltage between terminal ⓐ and ground.

Conditions	Voltage V
Ignition switch "ON" (Engine stopped.)	Less than 1.0
Idle (Engine is warm-up sufficiently.)	0.7 - 1.1

5. If NG, remove mass air flow sensor from air duct. Check hot wire for damage or dust.



SEF365H



SEF536H

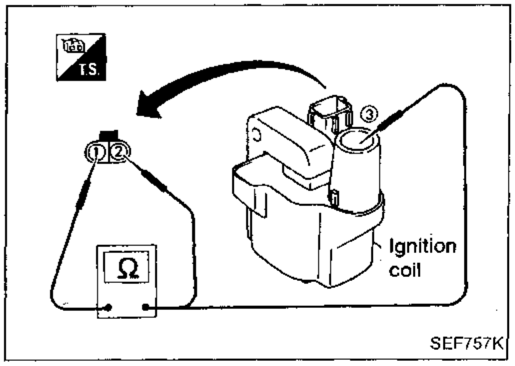
ENGINE COOLANT TEMPERATURE SENSOR

1. Disconnect engine coolant temperature sensor harness connector.
2. Check resistance as shown in the figure.

Temperature °C (°F)	Resistance kΩ
20 (68)	2.3 - 2.7
90 (194)	0.24 - 0.26
110 (230)	0.14 - 0.15

If NG, replace engine coolant temperature sensor.

Electrical Components Inspection (Cont'd)



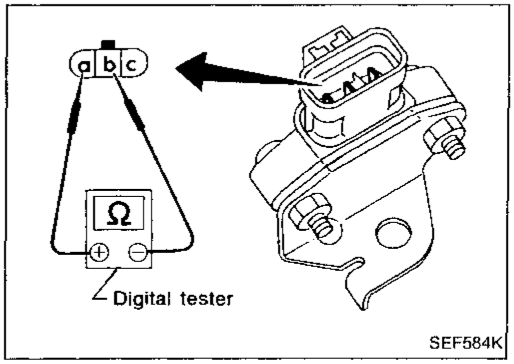
SEF757K

IGNITION COIL

1. Disconnect ignition coil harness connector.
2. Check resistance as shown in the figure.

Terminal	Resistance
① - ②	Approximately 0.9 Ω
① - ③	Approximately 13.0 kΩ

If NG, replace ignition coil.



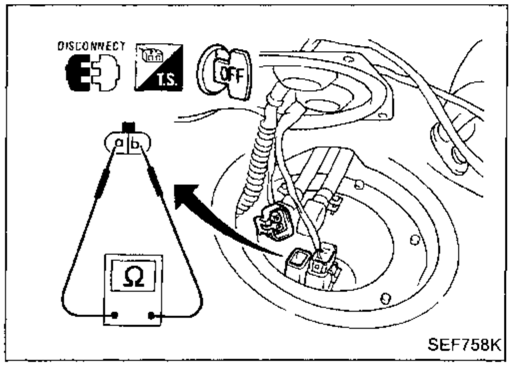
SEF584K

POWER TRANSISTOR

1. Disconnect power transistor harness connector.
2. Check power transistor continuity between terminals with a digital tester as shown in the figure.

	⊖ terminal side					
	Terminal ⓐ		Terminal ⓑ		Terminal ⓒ	
⊕ terminal side	Resistance Ω	Result	Resistance Ω	Result	Resistance Ω	Result
Terminal ⓐ	—	—	∞	OK	∞	OK
	—	—	Not ∞ or 0	NG	Not ∞ or 0	NG
	—	—	0	NG	0	NG
Terminal ⓑ	∞	NG	—	—	∞	NG
	Not ∞ or 0	OK	—	—	Not ∞ or 0	OK
	0	NG	—	—	0	NG
Terminal ⓒ	∞	NG	∞	NG	—	—
	Not ∞ or 0	OK	Not ∞ or 0	OK	—	—
	0	NG	0	NG	—	—

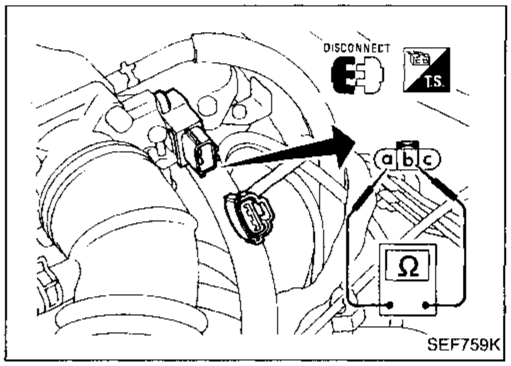
If NG, replace power transistor.



SEF758K

FUEL PUMP

1. Disconnect fuel pump harness connector.
2. Check resistance between terminals ⓐ and ⓑ.
   Resistance: Approximately 0.7Ω
   If NG, replace fuel pump.



SEF759K

THROTTLE POSITION SENSOR

1. Disconnect throttle position sensor harness connector.
2. Make sure that resistance between terminals ⓐ and ⓑ changes when opening throttle valve manually.

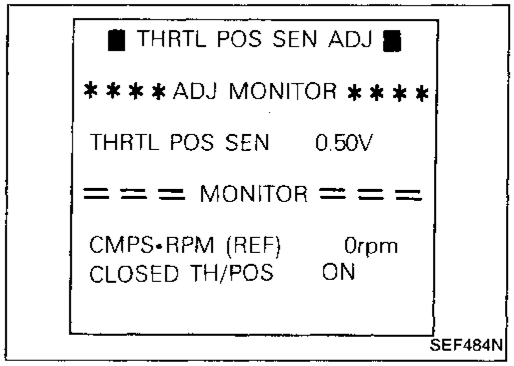
Accelerator pedal conditions	Resistance kΩ
Completely released	Approximately 0.5
Partially released	0.5 - 4
Completely depressed	Approximately 4

If NG, replace throttle position sensor.

Electrical Components Inspection (Cont'd)

Adjustment

If throttle position sensor is replaced or removed, it is necessary to install in proper position, by following the procedure as shown below:


■ THRTL POS SEN ADJ ■

∗∗∗∗ADJ MONITOR ∗∗∗∗

THRTL POS SEN 0.50V

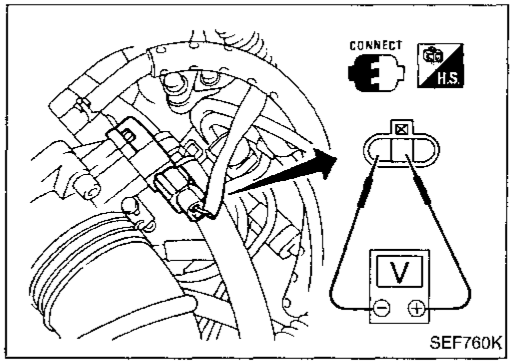
=== MONITOR ===

CMPS•RPM (REF) 0rpm
CLOSED TH/POS ON

SEF484N

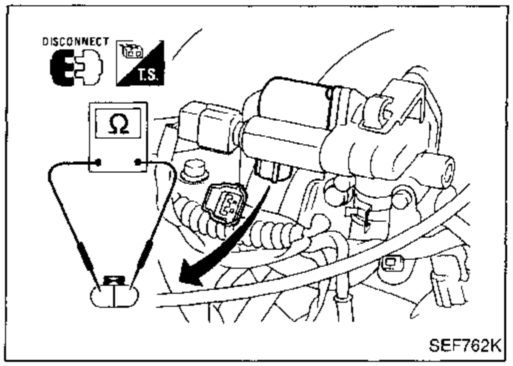
1. Install throttle position sensor body in throttle body. Do not tighten bolts. Leave bolts loose.
2. Connect throttle position sensor harness connector.
3. Start engine and warm it up sufficiently.
4. Perform "THRTL POS SEN ADJ" in "WORK SUPPORT" mode.

   Measure output voltage of throttle position sensor using voltmeter.



SEF760K

5. Adjust by rotating throttle position sensor body so that output voltage is 0.45 to 0.55V.
6. Tighten mounting bolts.
7. Disconnect throttle position sensor harness connector for a few seconds and then reconnect it.



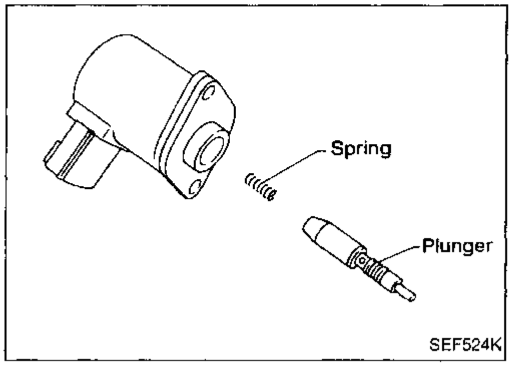
SEF762K

IACV-AAC VALVE

- Check IACV-AAC valve resistance.

  Resistance:

  Approximately 10Ω

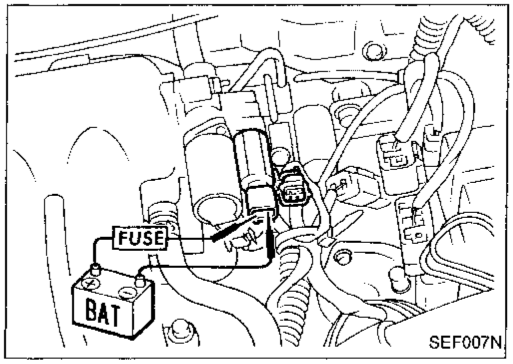


SEF524K

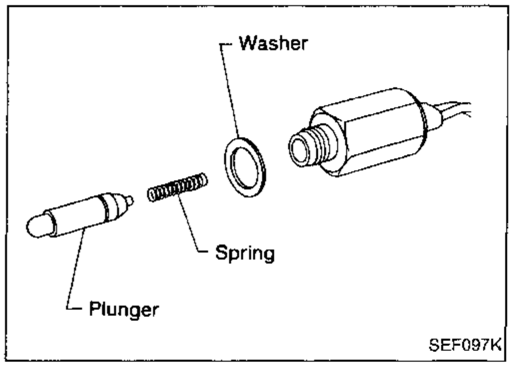
- Check plunger for seizing or sticking.
- Check for broken spring.

Electrical Components Inspection (Cont'd)

IACV-FICD SOLENOID VALVE

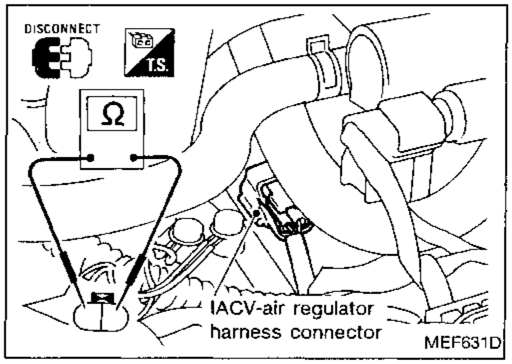


- Check for clicking sound when applying 12V direct current to terminals.



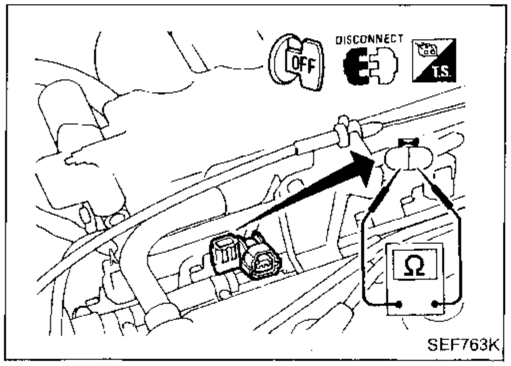
- Check plunger for seizing or sticking.
- Check for broken spring.

IACV-AIR REGULATOR



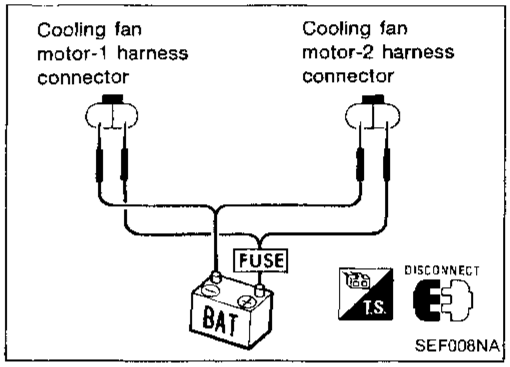
- Check IACV-air regulator resistance.
  Resistance:
  Approximately 70 - 80Ω
- Check IACV-air regulator for clogging.

INJECTOR



1. Disconnect injector harness connector.
2. Check resistance between terminals as shown in the figure.
   Resistance: Approximately 10Ω
   If NG, replace injector.

COOLING FAN MOTOR



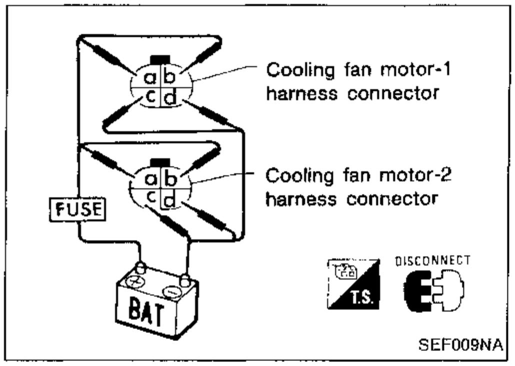
Except A/T models for U.S.A.

1. Disconnect cooling fan motor harness connectors.
2. Supply cooling fan motor terminals with battery voltage and check operation.

Cooling fan motor should operate.

If NG, replace cooling fan motor.

Electrical Components Inspection (Cont'd)



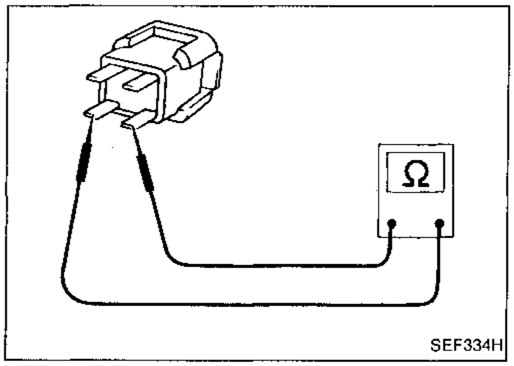
A/T models for U.S.A.

1. Disconnect cooling fan motor harness connectors.
2. Supply cooling fan motor terminals with battery voltage and check operation.

	Speed	Terminals	
		⊕	⊖
Cooling fan motor-1	Low	ⓑ	ⓒ
	High	ⓐ, ⓑ	ⓒ, ⓓ
Cooling fan motor-2	Low	ⓑ	ⓒ
	High	ⓐ, ⓑ	ⓒ, ⓓ

Cooling fan motor should operate.

If NG, replace cooling fan motor.

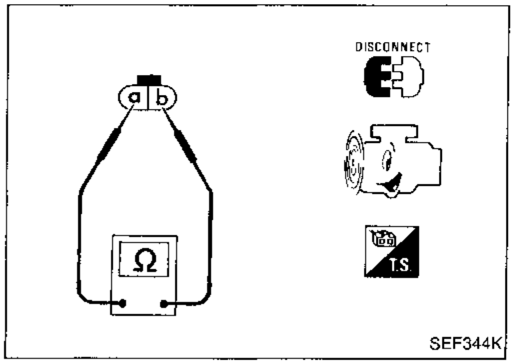


RESISTOR

1. Disconnect resistor harness connector.
2. Check resistance between terminals.

Resistance: Approximately 2.2kΩ

If NG, replace resistor.



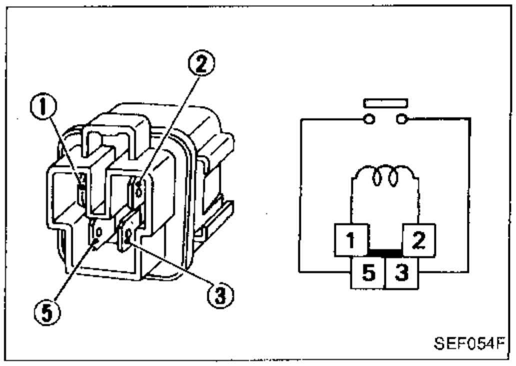
POWER STEERING OIL PRESSURE SWITCH

1. Disconnect power steering oil pressure switch harness connector.
2. Start engine.
3. Check continuity between terminals ⓐ and ⓑ.

Conditions	Continuity
Steering wheel is being turned	Yes
Steering wheel is not being turned	No

If NG, replace power steering oil pressure switch.

Electrical Components Inspection (Cont'd)

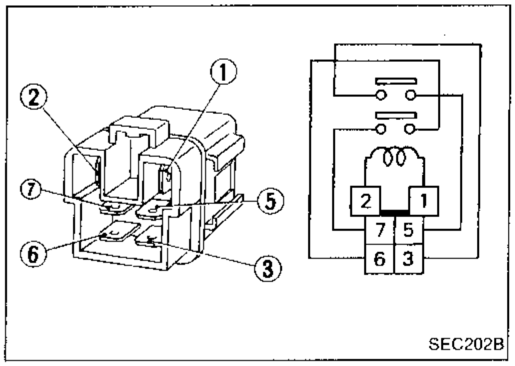


ECCS RELAY, COOLING FAN RELAY-1 AND FUEL PUMP RELAY

Check continuity between terminals ③ and ⑤.

Conditions	Continuity
12V direct current supply between terminals ① and ②	Yes
No current supply	No

If NG, replace relay.

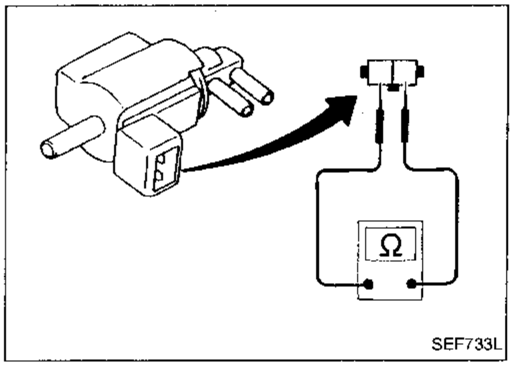


COOLING FAN RELAY-2

Check continuity between terminals ③ and ⑤, ⑥ and ⑦.

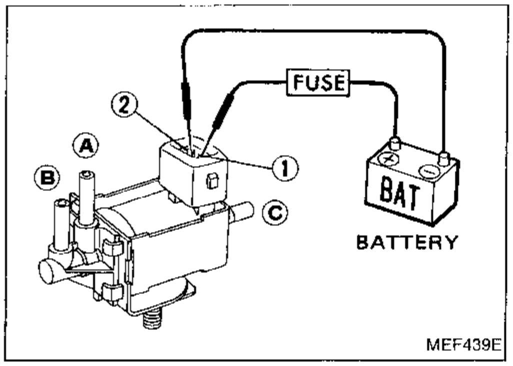
Conditions	Continuity
12V direct current supply between terminals ① and ②	Yes
No current supply	No

If NG, replace relay.



EGR & CANISTER CONTROL SOLENOID VALVE

1. Disconnect solenoid valve connector and check resistance between solenoid terminals.
   Resistance:
   30 - 40Ω



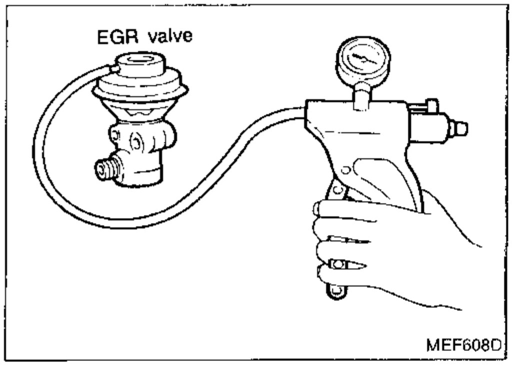
2. Check solenoid valve, following the table as shown below:

Conditions	Air passage continuity between Ⓐ and Ⓑ	Air passage continuity between Ⓑ and Ⓒ
12V direct current supply between terminals	Yes	No
No supply	No	Yes

If NG, replace EGR & canister control solenoid valve.

GI
MA
EM
LC
EF & EC
FE
CL
MT
AT
FA
RA
BR
ST
BF
HA
EL
IDX

Electrical Components Inspection (Cont'd)

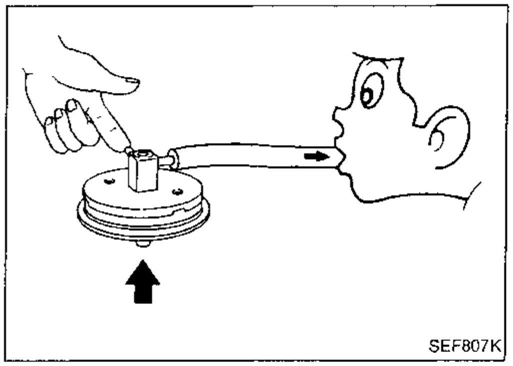


EGR VALVE

Apply vacuum to EGR vacuum port with a hand vacuum pump.

EGR valve spring should lift.

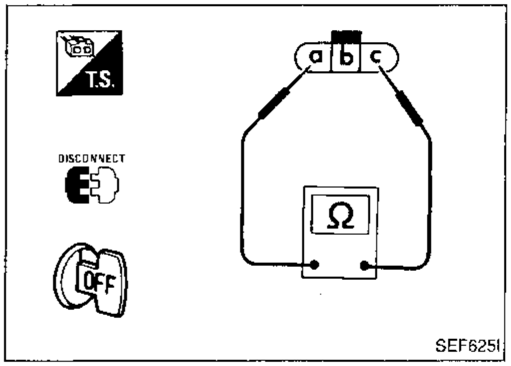
If NG, replace EGR valve.



EGRC-BPT VALVE

Plug one of two ports of EGRC-BPT valve.

Apply a pressure above 0.490 kPa (50 mmH_2O, 1.97 inH_2O) to check for leakage. If a leak is noted, replace valve.

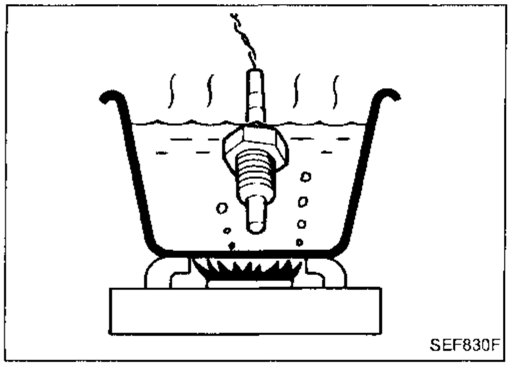


HEATED OXYGEN SENSOR HEATER

Check resistance between terminals ⓐ and ⓒ.

Resistance: 3 - 1,000Ω

If NG, replace heated oxygen sensor.



EGR TEMPERATURE SENSOR

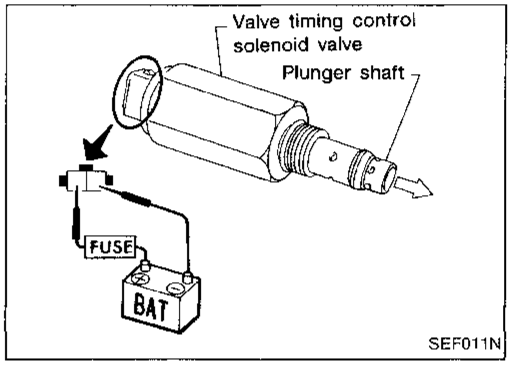
Check resistance change and resistance value at 100°C (212°F).

- **Resistance should decrease in response to temperature increase.**

  Resistance: 100°C (212°F)

  85.3 ± 8.53 kΩ

  If NG, replace EGR temperature sensor.



VTC SOLENOID VALVE

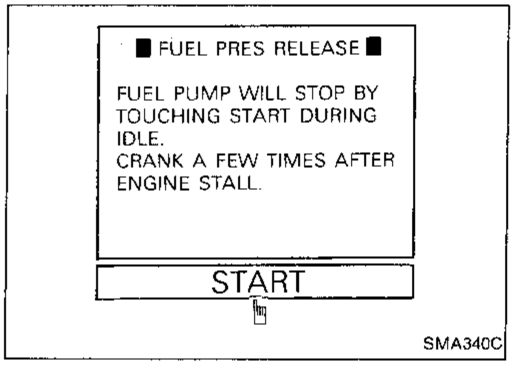
1. Supply VTC solenoid valve terminals with battery voltage.
2. Make sure that plunger shaft protrudes.
   If NG, replace VTC solenoid valve.

INHIBITOR SWITCH

Refer to AT section.

NEUTRAL POSITION SWITCH

Refer to MT section.



■ FUEL PRES RELEASE ■

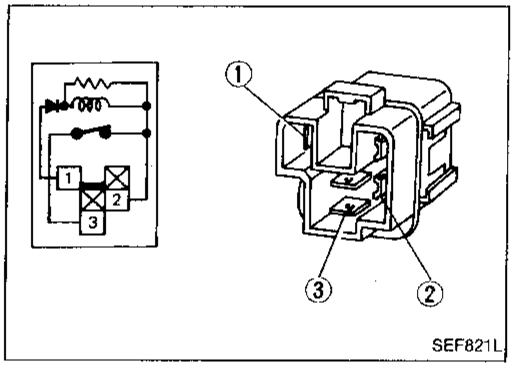
FUEL PUMP WILL STOP BY TOUCHING START DURING IDLE.
CRANK A FEW TIMES AFTER ENGINE STALL.

SMA340C

Releasing Fuel Pressure

Before disconnecting fuel line, release fuel pressure from fuel line to eliminate danger.

1. Turn ignition switch "ON".
2. Perform "FUEL PRESSURE RELEASE" in "WORK SUPPORT" mode with CONSULT.
3. Start engine.
4. After engine stalls, crank it two or three times to release all fuel pressure.
5. Turn ignition switch off.



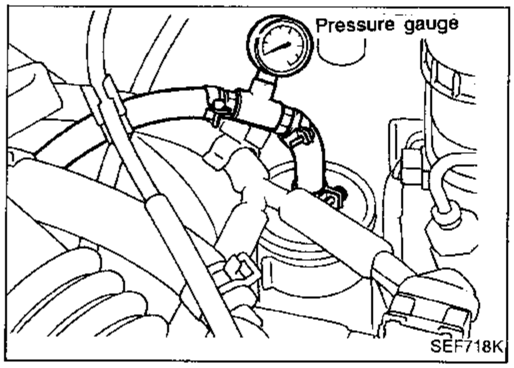
SEF821L

1. Remove fuel pump fuse.
2. Start engine.
3. After engine stalls, crank it two or three times to release all fuel pressure.
4. Turn ignition switch off and reconnect fuel pump fuse.

Fuel Pressure Check

a. When reconnecting fuel line, always use new clamps.
b. Make sure that clamp screw does not contact adjacent parts.
c. Use a torque driver to tighten clamps.
d. Use Pressure Gauge to check fuel pressure.
e. Do not perform fuel pressure check while fuel pressure regulator control system is operating; otherwise, fuel pressure gauge might indicate incorrect readings.

1. Release fuel pressure to zero.
2. Disconnect fuel hose between fuel filter and fuel tube (engine side).
3. Install pressure gauge between fuel filter and fuel tube.
4. Start engine and check for fuel leakage.



SEF718K

5. Read the indication of fuel pressure gauge.

   At idling:

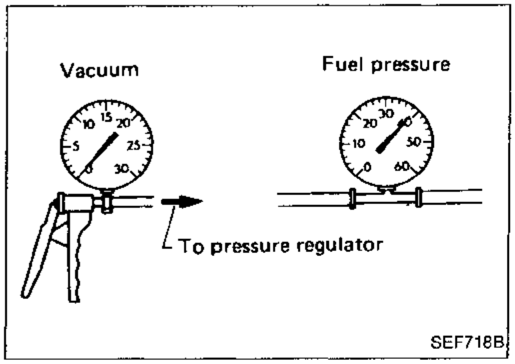
   When fuel pressure regulator valve vacuum hose is connected.

   Approximately 245 kPa
   (2.5 kg/cm^2, 36 psi)

   When fuel pressure regulator valve vacuum hose is disconnected.

   Approximately 294 kPa
   (3.0 kg/cm^2, 43 psi)

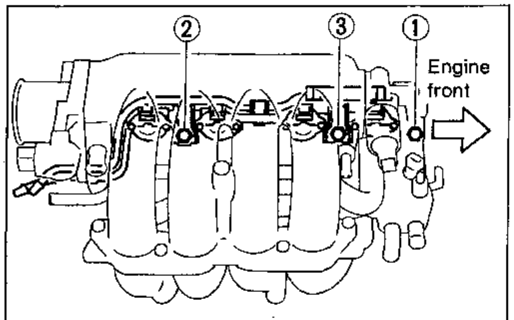
Fuel Pressure Check (Cont'd)



6. Stop engine and disconnect fuel pressure regulator vacuum hose from intake manifold.
7. Plug intake manifold with a rubber cap.
8. Connect variable vacuum source to fuel pressure regulator.
9. Start engine and read indication of fuel pressure gauge as vacuum is changed.

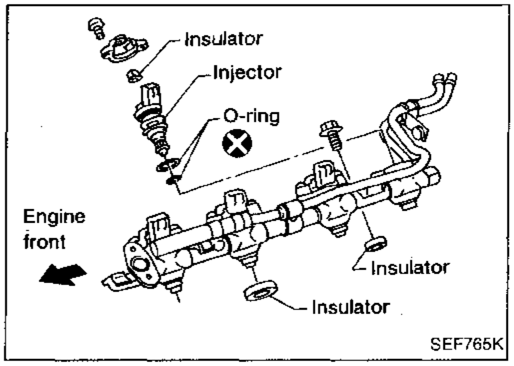
Fuel pressure should decrease as vacuum increases. If results are unsatisfactory, replace fuel pressure regulator.

Injector Removal and Installation



Loosen in numerical order.

1. Release fuel pressure to zero.
2. Disconnect injector harness connectors.
3. Disconnect vacuum hose from pressure regulator.
4. Disconnect fuel hoses from fuel tube assembly.
5. Remove injectors with fuel tube assembly.

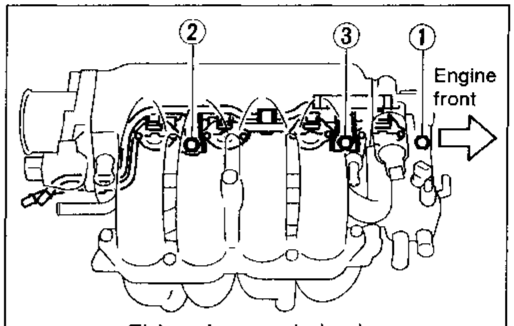


6. Push out any malfunctioning injector from fuel tube assembly.

Do not extract injector by pinching connector.

7. Replace or clean injector as necessary.
8. Install injector to fuel tube assembly.

Always replace O-rings and insulators with new ones.
Lubricate O-rings with a smear of silicone oil.



Tighten in numerical order.

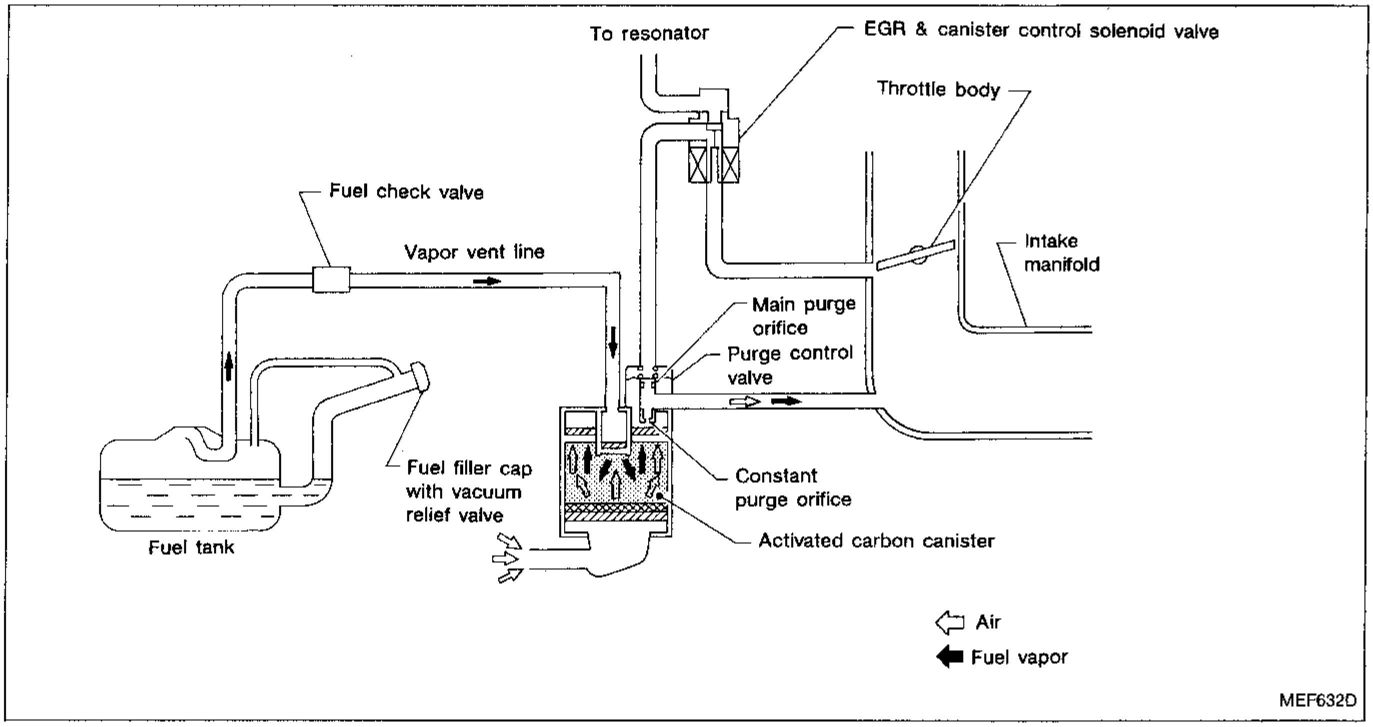
9. Install injectors with fuel tube assembly to intake manifold. Tighten fuel tube bolts to the specified torque.
   Tightening procedure:
   1) **Tighten all bolts to 9.3 to 10.8 N·m (0.95 to 1.1 kg-m, 6.9 to 8.0 ft-lb).**
   2) **Tighten all bolts to 16 to 21 N·m (1.6 to 2.1 kg-m, 12 - 15 ft-lb).**
10. Install fuel tubes to fuel tube assembly.

Lubricate fuel tubes with a smear of silicone oil.

11. Reinstall any parts removed in reverse order of removal.

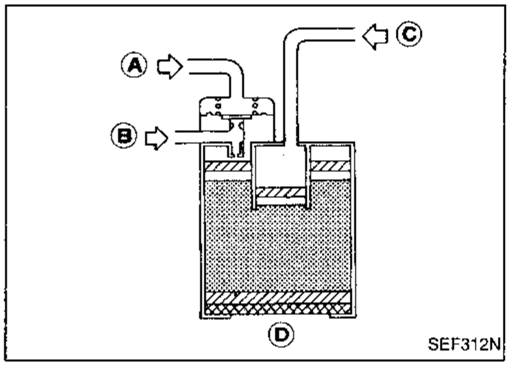
CAUTION:
After properly connecting fuel hose to injector and fuel tube assembly, check connection for fuel leakage.

Description



MEF632D

The evaporative emission system is used to reduce hydrocarbons emitted into the atmosphere from the fuel system. This reduction of hydrocarbons is accomplished by activated charcoals in the carbon canister.
The fuel vapor from the sealed fuel tank is led into the canister which contains activated carbon and the vapor is stored there when the engine is not running.
The canister retains the fuel vapor until the canister is purged by the air drawn through the bottom of the canister to the intake manifold when the engine is running. When the engine runs at idle, the purge control valve is closed.
Only a small amount of stored vapor flows into the intake manifold through the constant purge orifice. As the engine speed increases, and the throttle vacuum rises higher, the purge control valve opens and the vapor is sucked into the intake manifold through both the main purge orifice and the constant purge orifice.



SEF312N

Inspection

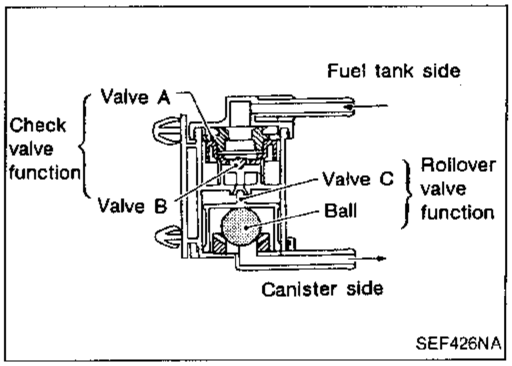
ACTIVATED CARBON CANISTER

Check carbon canister as follows:

1. Blow air in port Ⓐ and ensure that there is no leakage.
2.

- Apply vacuum to port Ⓐ.
- Cover port Ⓓ with hand.
- Blow air in port Ⓒ and ensure free flow out of port Ⓑ.

Inspection (Cont'd)



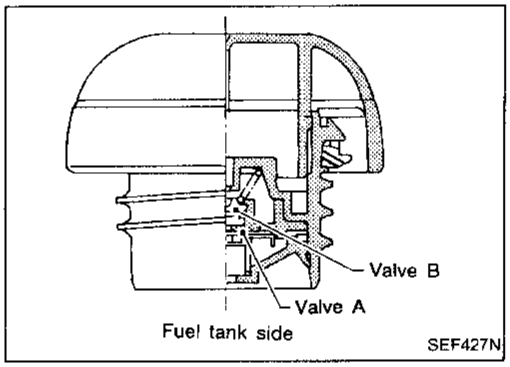
FUEL CHECK VALVE (With rollover valve)

Check valve operation

1. Blow air through connector on fuel tank side.
   A considerable resistance should be felt and a portion of air flow should be directed toward the canister side.
2. Blow air through connector on canister side.
   Air flow should be smoothly directed toward fuel tank side.
3. If fuel check valve is suspected of not properly functioning in steps 1 and 2 above, replace it.

Rollover valve operation

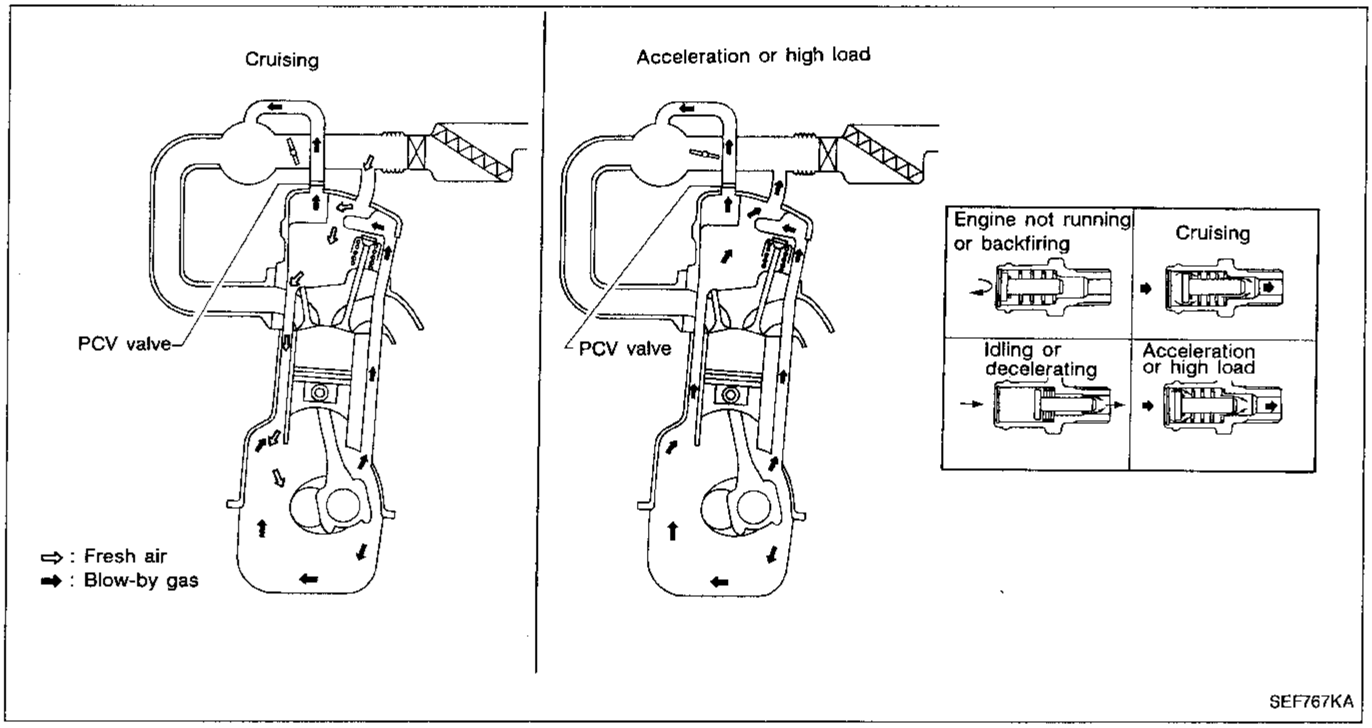
Ensure that continuity of air passage does not exist when the installed rollover valve is tilted to 90° or 180°.



FUEL TANK VACUUM RELIEF VALVE

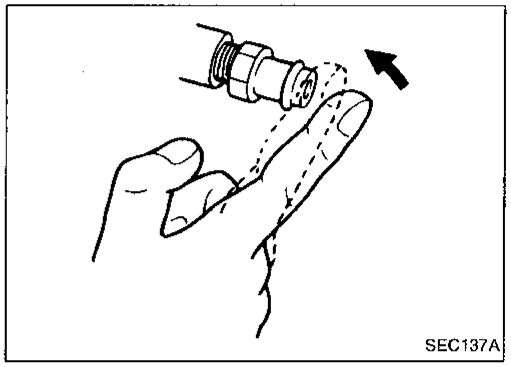
1. Wipe clean valve housing.
2. Suck air through the cap. A slight resistance accompanied by valve clicks indicates that valve A is in good mechanical condition. Note also that, by further sucking air, the resistance should disappear with valve clicks.
3. Blow air on fuel tank side and ensure that continuity of air passage exists through valve B.
4. If valve is clogged or if no resistance is felt, replace cap as an assembly.

Description



SEF767KA

This system returns blow-by gas to both the intake manifold and air inlet tubes.
The positive crankcase ventilation (PCV) valve is provided to conduct crankcase blow-by gas to the intake manifold.
During partial throttle operation of the engine, the intake manifold sucks the blow-by gas through the PCV valve.
Normally, the capacity of the valve is sufficient to handle any blow-by and a small amount of ventilating air.
The ventilating air is then drawn from the air inlet tubes, through the hose connecting air inlet tubes to rocker cover, into the crankcase.
Under full-throttle condition, the manifold vacuum is insufficient to draw the blow-by flow through the valve, and its flow goes through the hose connection in the reverse direction.
On vehicles with an excessively high blow-by some of the flow will go through the hose connection to the air inlet tubes under all conditions.



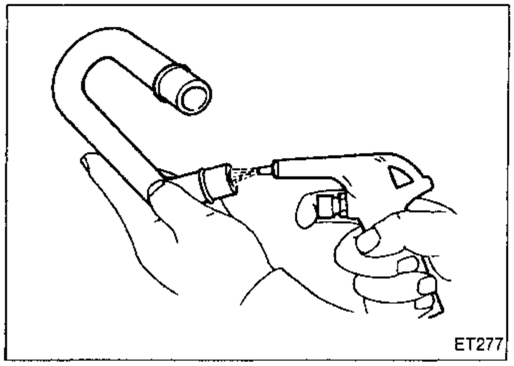
SEC137A

Inspection

PCV (Positive Crankcase Ventilation)

With engine running at idle, remove ventilation hose from PCV valve; if the valve is working properly, a hissing noise will be heard as air passes through it and a strong vacuum should be felt immediately when a finger is placed over valve inlet.

Inspection (Cont'd)



VENTILATION HOSE

1. Check hoses and hose connections for leaks.
2. Disconnect all hoses and clean with compressed air. If any hose cannot be freed of obstructions, replace.

General Specifications

PRESSURE REGULATOR Fuel pressure at idling kPa (kg/cm^2, psi)	
Vacuum hose is connected	Approximately 245 (2.5, 36)
Vacuum hose is disconnected	Approximately 294 (3.0, 43)

Inspection and Adjustment

Idle speed*1 rpm	
No-load*2 (in "N" position)	M/T: 750 ± 50 (for Canada) 650 ± 50 (except for Canada) A/T: 800 ± 50
Air conditioner: ON (in "N" position)	As above
Ignition timing	10° ± 2° BTDC
Throttle position sensor idle position V	0.40 - 0.60

*1: Feedback controlled and needs no adjustments
*2: Under the following conditions:
- Air conditioner switch: OFF
- Electric load: OFF (Lights, heater, fan & rear defogger)

IGNITION COIL

Primary voltage V	12
Primary resistance [at 20°C (68°F)] Ω	Approximately 0.9
Secondary resistance [at 20°C (68°F)] kΩ	Approximately 13.0

MASS AIR FLOW SENSOR

Supply voltage V	Battery voltage (11 - 14)
Output voltage V	0.7 - 1.1*

*: Engine is warmed up sufficiently and idling under no-load.

ENGINE COOLANT TEMPERATURE SENSOR

Temperature °C (°F)	Resistance kΩ
20 (68)	2.3 - 2.7
90 (194)	0.24 - 0.26
110 (230)	0.14 - 0.15

EGR TEMPERATURE SENSOR

Resistance [at 100°C (212°F)] kΩ	85.3 ± 8.53

FUEL PUMP

Resistance Ω	Approximately 0.2

IACV-AAC VALVE

Resistance Ω	Approximately 10.0

INJECTOR

Resistance Ω	Approximately 10.0

RESISTOR

Resistance kΩ	Approximately 2.2

THROTTLE POSITION SENSOR

Accelerator pedal conditions	Resistance kΩ
Completely released	Approximately 0.5
Partially released	0.5 - 4
Completely depressed	Approximately 4

GI
MA
EM
LC
EF & EC
FE
CL
MT
AT
FA
RA
BR
ST
BF
HA
EL
IDX

General Specifications

PRESSURE REGULATOR Fuel pressure at idling kPa (kg/cm², psi)	
Vacuum hose is connected	Approximately 245 (2.5, 36)
Vacuum hose is disconnected	Approximately 294 (3.0, 43)

Inspection and Adjustment

Idle speed*1 rpm	
No-load*2 (in "N" position)	800 ± 50
Air conditioner: ON (in "N" position)	850 ± 50
Ignition timing	15° ± 2° BTDC
Throttle position sensor idle position V	0.45 - 0.55

*1: Feedback controlled and needs no adjustments
*2: Under the following conditions:
- Air conditioner switch: OFF
- Electric load: OFF (Lights, heater, fan & rear defogger)

IGNITION COIL

Primary voltage V	12
Primary resistance [at 20°C (68°F)] Ω	Approximately 1.0
Secondary resistance [at 20°C (68°F)] kΩ	Approximately 10.0

MASS AIR FLOW SENSOR

Supply voltage V	Battery voltage (11 - 14)
Output voltage V	1.3 - 1.7*

*: Engine is warmed up sufficiently and idling under no-load.

ENGINE COOLANT TEMPERATURE SENSOR

Temperature °C (°F)	Resistance kΩ
20 (68)	2.1 - 2.9
50 (122)	0.68 - 1.00
80 (176)	0.30 - 0.33

EGR TEMPERATURE SENSOR

Resistance [at 100°C (212°F)] kΩ	85.3 ± 8.53

HEATED OXYGEN SENSOR HEATER

Resistance Ω	3 - 1,000

FUEL PUMP

Resistance Ω	Approximately 0.7

IACV-AAC VALVE

Resistance Ω	Approximately 10.0

INJECTOR

Resistance Ω	10 - 14

RESISTOR

Resistance kΩ	Approximately 2.2

THROTTLE POSITION SENSOR

Accelerator pedal conditions	Resistance kΩ
Completely released	Approximately 1
Partially released	1 - 10
Completely depressed	Approximately 10