

ENGINE FUEL & EMISSION CONTROL SYSTEM

SECTION **EF & EC**

EF & EC

CONTENTS

PREPARATION	EF & EC- 2
PRECAUTIONS	EF & EC- 3
ENGINE AND EMISSION CONTROL OVERALL SYSTEM	EF & EC- 4
ENGINE AND EMISSION CONTROL DESCRIPTION	EF & EC- 9
ENGINE AND EMISSION CONTROL SYSTEM DESCRIPTION	EF & EC- 14
IDLE SPEED/IGNITION TIMING/IDLE MIXTURE RATIO INSPECTION	EF & EC- 25
TROUBLE DIAGNOSES	EF & EC- 32
FUEL INJECTION CONTROL SYSTEM INSPECTION	EF & EC-129
EVAPORATIVE EMISSION CONTROL SYSTEM (For catalyzer model)	EF & EC-132
CRANKCASE EMISSION CONTROL SYSTEM	EF & EC-134
SERVICE DATA AND SPECIFICATIONS (S.D.S.)	EF & EC-136

When you read wiring diagrams:

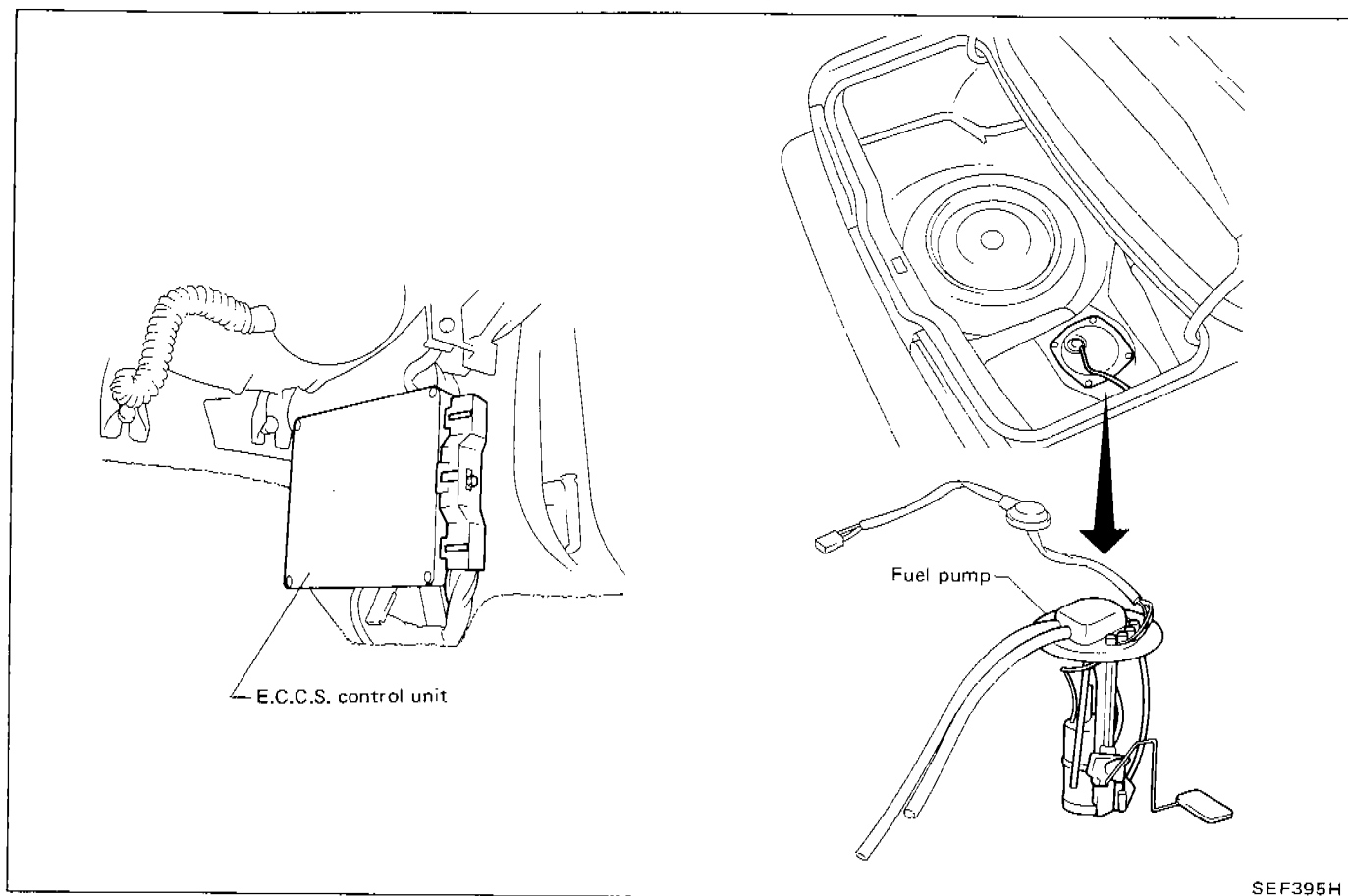
- Read GI section, "HOW TO READ WIRING DIAGRAMS".
- See EL section, "POWER SUPPLY ROUTING" for power distribution circuit.

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

E.C.C.S Wiring Diagram — See pull-out following EL section.

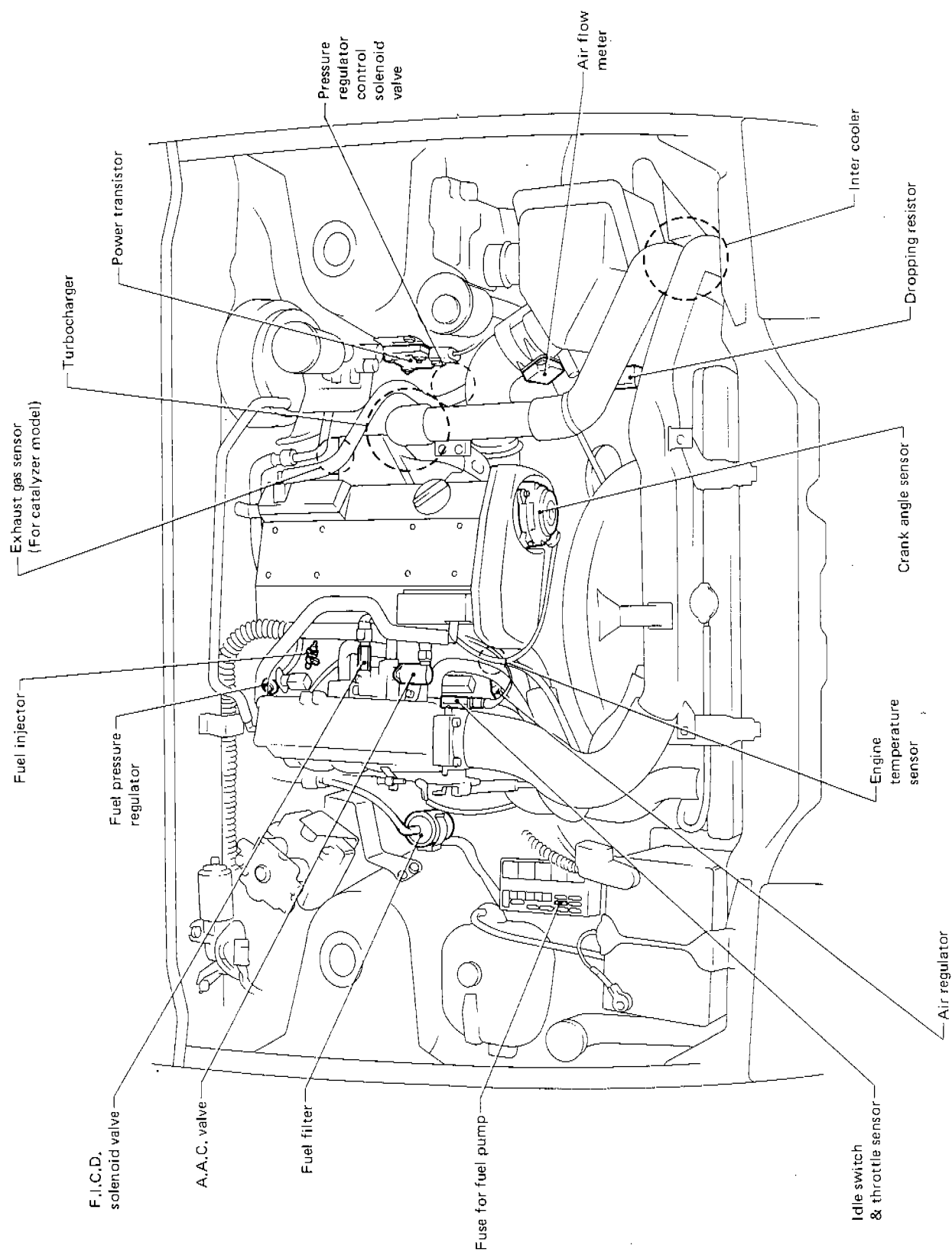
ENGINE AND EMISSION CONTROL OVERALL SYSTEM

E.C.C.S. Component Parts Location



ENGINE AND EMISSION CONTROL OVERALL SYSTEM

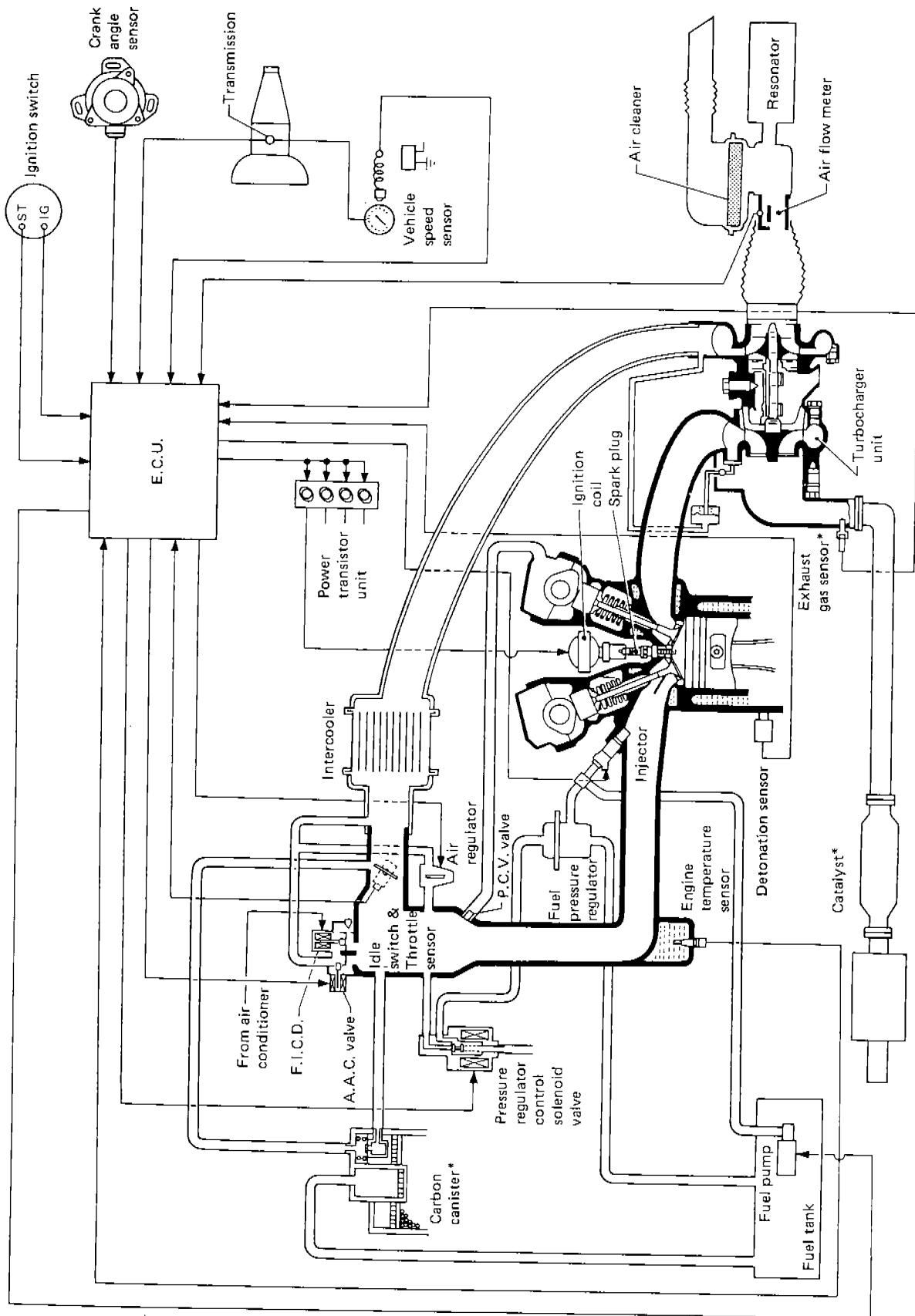
E.C.C.S. Component Parts Location (Cont'd)



SEF396H

ENGINE AND EMISSION CONTROL OVERALL SYSTEM

System Diagram

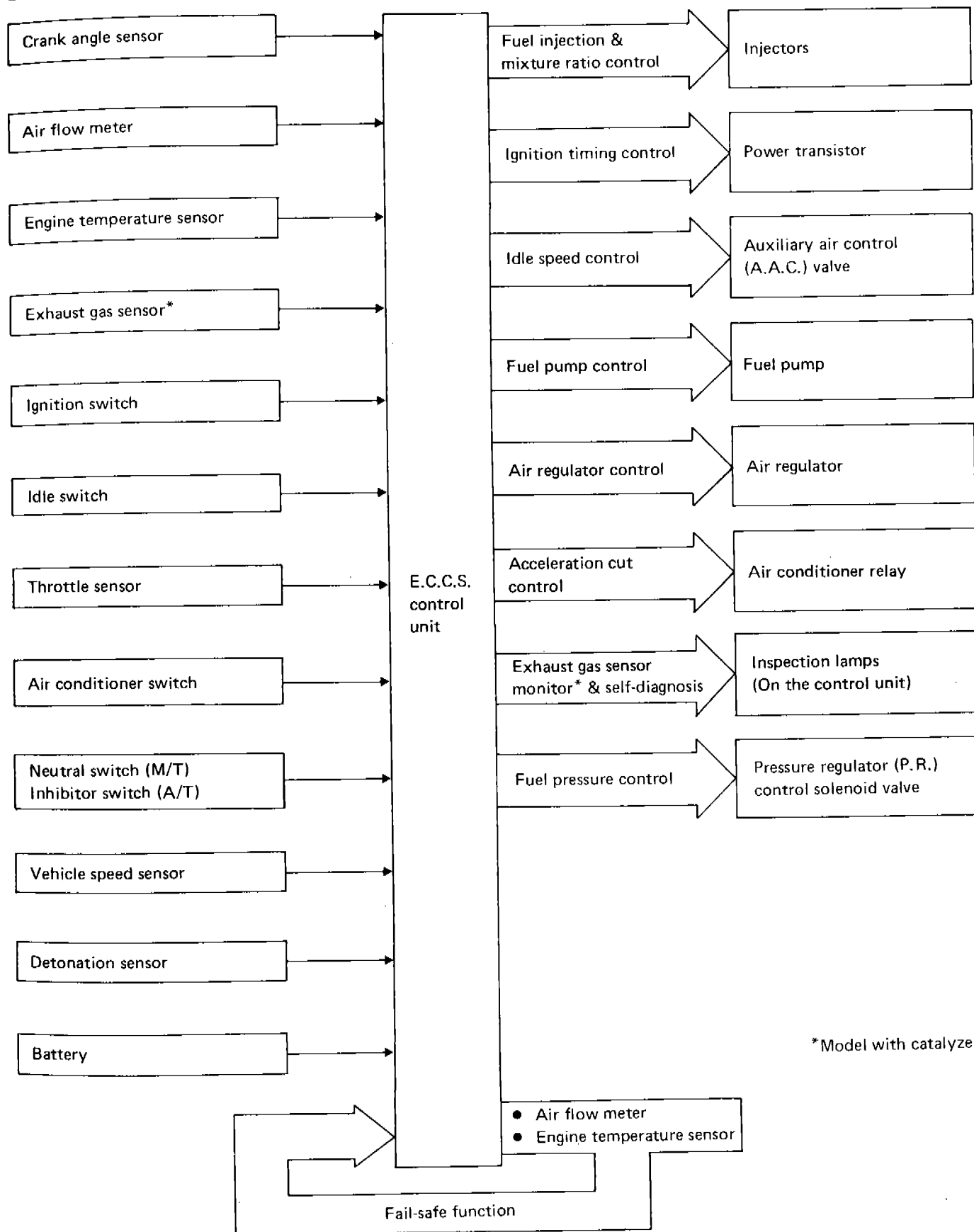


*Model with catalyzer

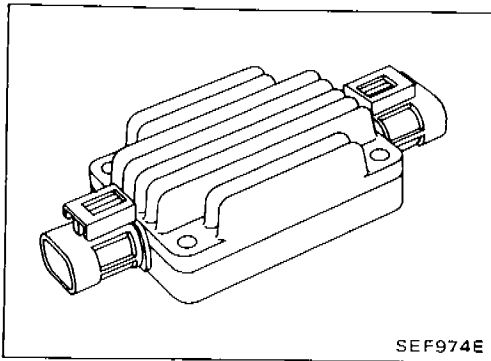
ENGINE AND EMISSION CONTROL OVERALL SYSTEM

System Chart

E.C.C.S. CONTROL

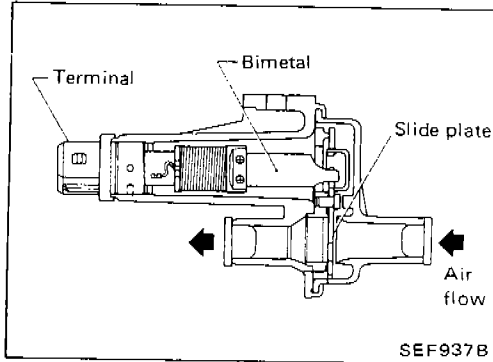


*Model with catalyzer



Power Transistor

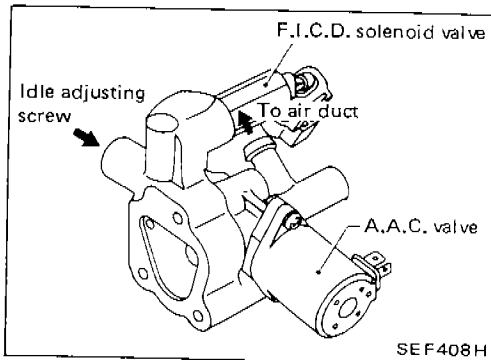
The ignition signal from the E.C.U. is amplified by the power transistor, which turns the ignition coil primary circuit on and off, inducing the proper high voltage in the secondary circuit.



Air Regulator

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

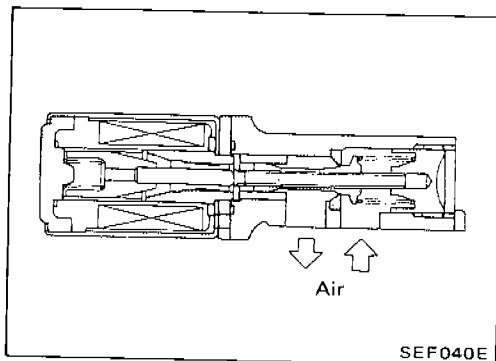
A bimetal, heater and rotary shutter are built into the air regulator. When the bimetal temperature is low, the air by-pass port opens. As the engine starts and electric current flows through a heater, the bimetal begins to turn the shutter to close the by-pass port. The air passage remains closed until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



Idle Air Adjusting (I.A.A.) Unit

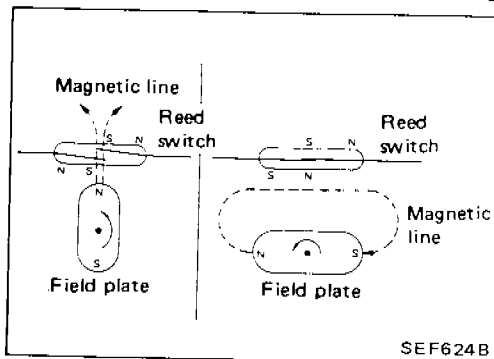
The I.A.A. unit is made up of the A.A.C. valve, F.I.C.D. solenoid valve and idle adjust screw. It receives the signal from the E.C.U. and controls the idle speed at the preset value.

The F.I.C.D. solenoid valve compensates for changes in idle speed caused by the operation of the air compressor.



Auxiliary Air Control (A.A.C.) Valve

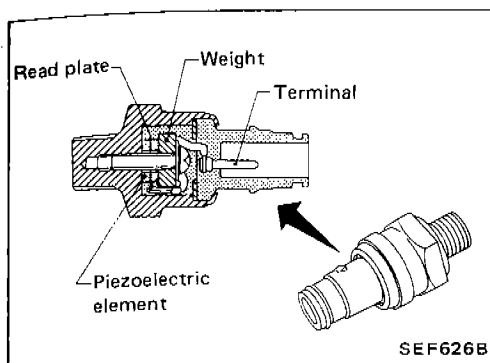
The E.C.U. actuates the A.A.C. valve by an ON/OFF pulse. The longer that ON duty is left on, the larger the amount of air that will flow through the A.A.C. valve.



Vehicle Speed Sensor

The vehicle speed sensor provides a vehicle speed signal to the E.C.U.

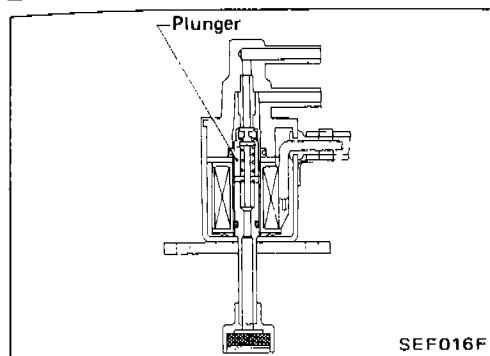
The speed sensor consists of a reed switch and a speedometer pinion, which are installed in the transmission, and transforms vehicle speed into pulse signals.



Detonation Sensor

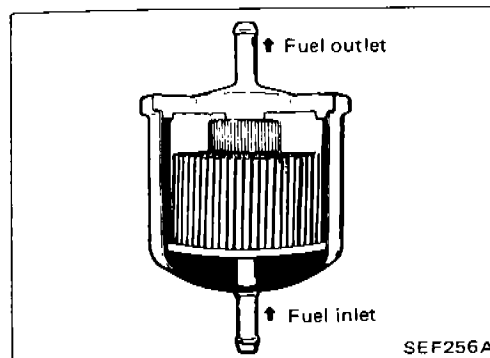
The detonation sensor is attached to the cylinder block and senses engine knocking conditions.

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.



Pressure Regulator (P.R.) Control Solenoid Valve

The solenoid valve responds to the ON/OFF signal from the E.C.U. When it is off, a vacuum signal from the intake manifold is fed into the pressure regulator. When the control unit sends an ON signal, the coil pulls the plunger downward and cuts the vacuum signal.

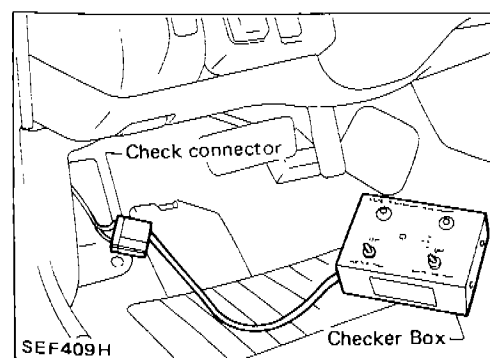


Fuel Filter

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

Carbon Canister (For catalyzer model)

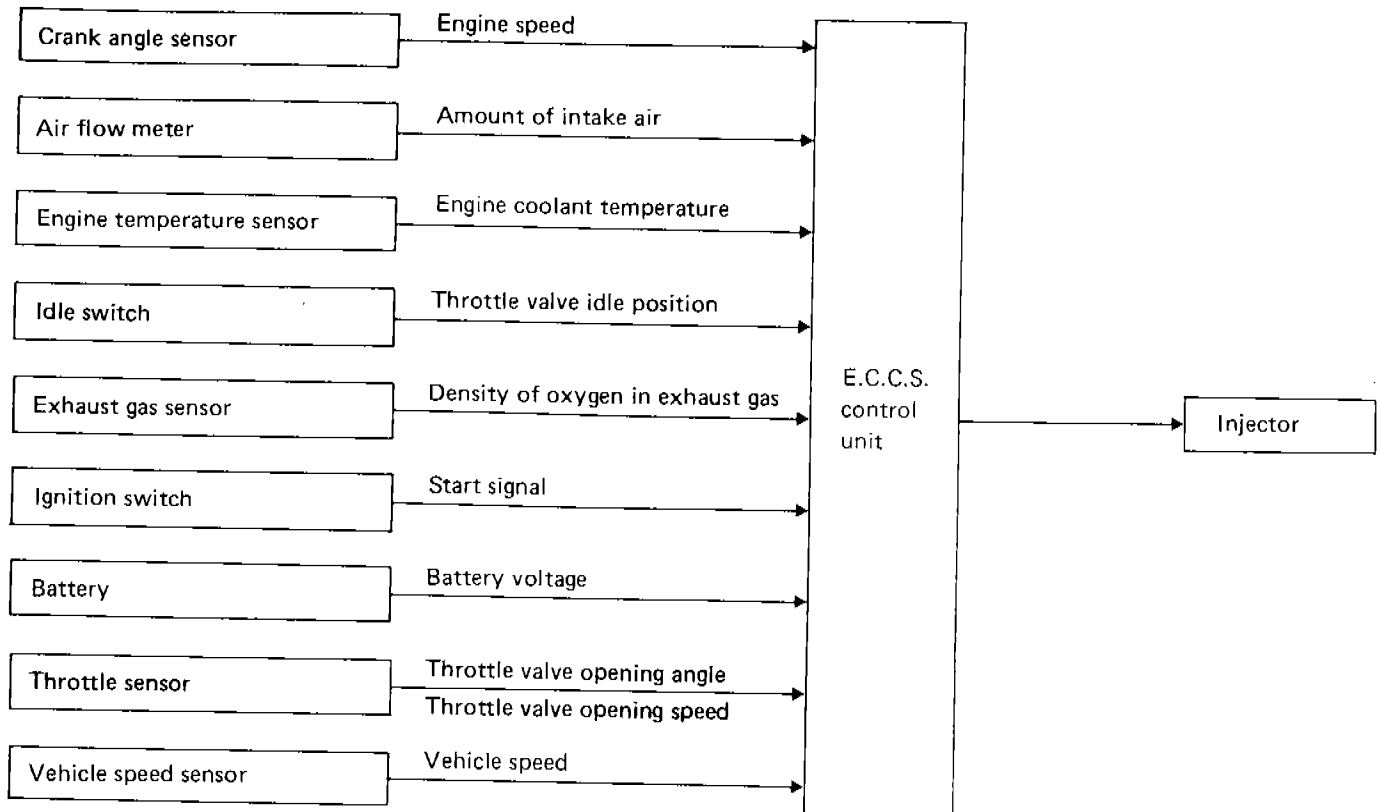
The carbon canister is filled with active charcoal to absorb evaporative gases produced in the fuel tank. These absorbed gases are then delivered to the intake manifold by manifold vacuum for combustion purposes.



Check Connector for E.C.C.S. Checker Box

The check connector for E.C.C.S. Checker Box is in the vicinity of the fuse box.

Fuel Injection Control INPUT/OUTPUT SIGNAL LINE



BASIC FUEL INJECTION CONTROL

The amount of fuel injected from the fuel injector, or the length of time the valve remains open, is determined by the E.C.U. The basic amount of fuel injected is a program value mapped in the E.C.U. ROM memory. In other words, the program value is preset by engine operating conditions determined by input signals (for engine rpm and air intake) from both the crank angle sensor and the air flow meter.

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

<Fuel decrease>

- 1) During deceleration

Fuel Injection Control (Cont'd)

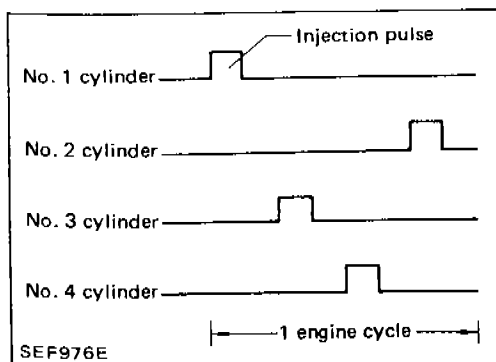
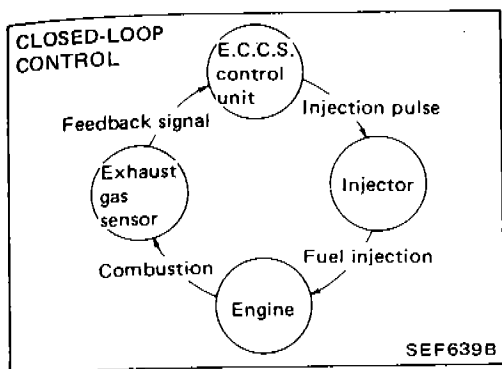
MIXTURE RATIO FEEDBACK CONTROL (For catalyzer model)

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 NO_x emissions. This system uses an exhaust gas sensor in the exhaust manifold to check the air-fuel ratio. The control unit 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 E.C.U. detects any of the following conditions and feedback control stops in order to maintain stabilized fuel combustion.

- 1) Deceleration
- 2) High-load, high-speed operation
- 3) Engine idling
- 4) Malfunctioning of exhaust gas sensor or its circuit
- 5) Insufficient activation of exhaust gas sensor at low engine temperature
- 6) Engine starting

MIXTURE RATIO SELF-LEARNING CONTROL (For catalyzer model)

The air-fuel ratio feedback control system monitors the air-fuel signal transmitted from the exhaust gas sensor. This feedback signal is then sent to the E.C.U. to control the amount of fuel injection to provide a basic air-fuel ratio as close to the theoretical air-fuel ratio as possible. However, the basic air-fuel ratio is not necessarily controlled as originally designed. This is due to manufacturing errors (e.g., air flow meter hot wire) and changes during operation (injector clogging, etc.) of E.C.C.S. parts which directly affect the air-fuel ratio. Accordingly, a difference between the basic and theoretical air-fuel 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.



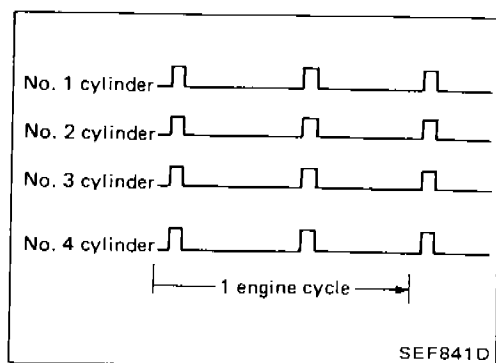
FUEL INJECTION TIMING

Fuel is injected once a cycle for each cylinder in the firing order.

ENGINE AND EMISSION CONTROL SYSTEM DESCRIPTION

Fuel Injection Control (Cont'd)

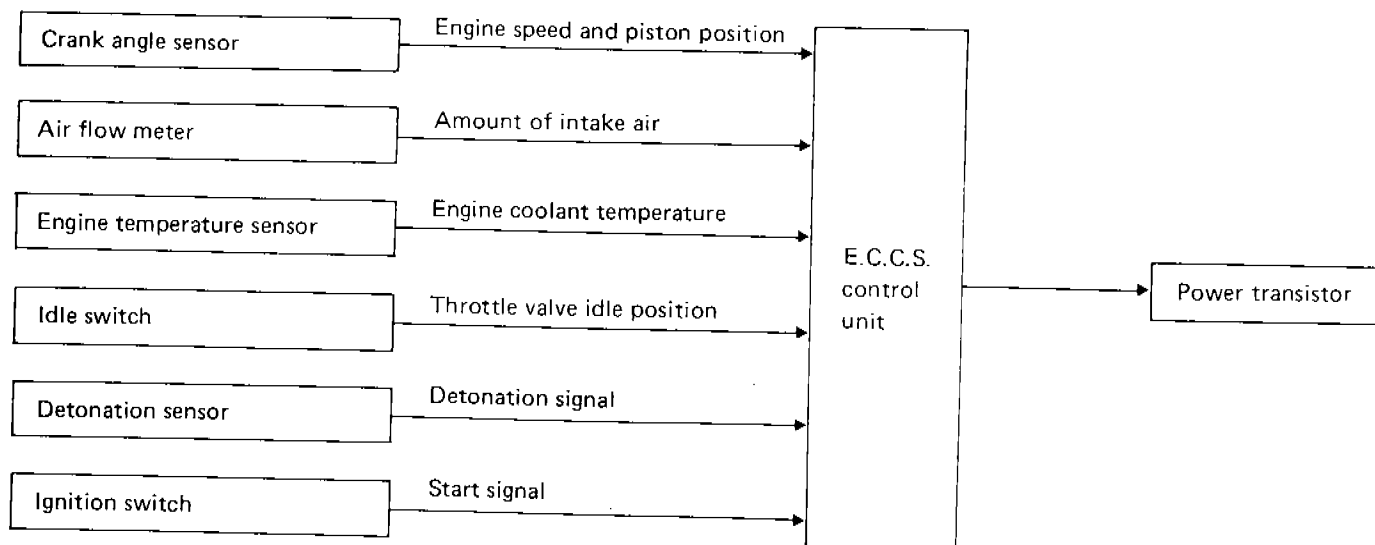
When engine temperature is low, engine starts, or engine load is heavy, fuel is injected into all four cylinders simultaneously twice a cycle.



FUEL SHUT-OFF

Fuel to all cylinders is cut off during deceleration or high-speed operation.

Ignition Timing Control INPUT/OUTPUT SIGNAL LINE



Ignition Timing Control (Cont'd)

SYSTEM DESCRIPTION

The ignition timing is controlled by the E.C.U. 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 ROM located in the E.C.U., in the form of the map shown below.

The E.C.U. detects information such as the injection pulse width and crank angle 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 °B.T.D.C.

In addition to this,

1 At starting

2 During warm-up

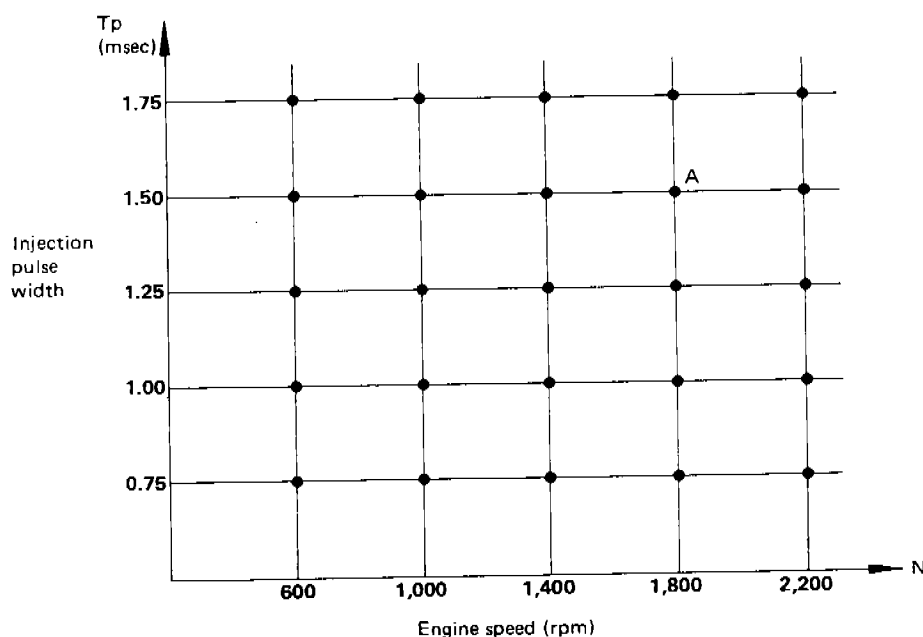
3 At idle

4 At low battery voltage

the ignition timing is revised by the E.C.U. according to the other data stored in the ROM.

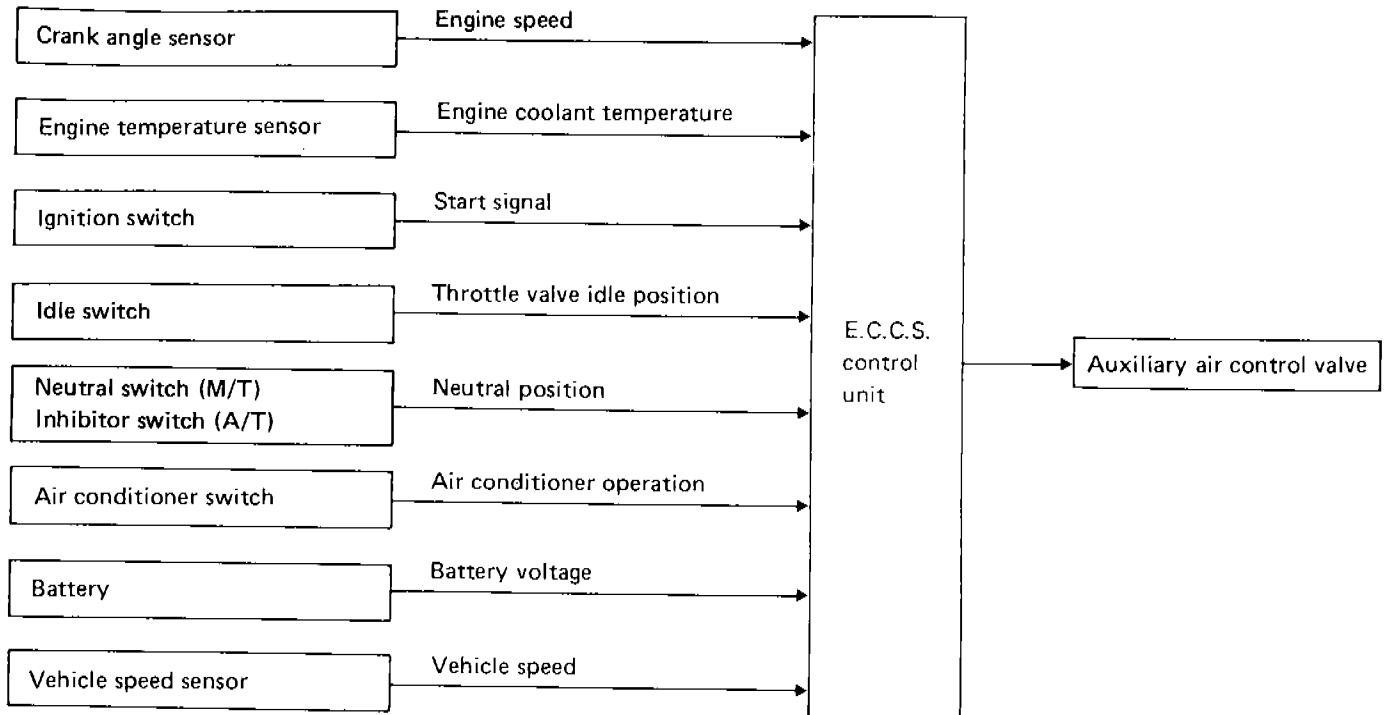
The retard system by detonation sensor is designed only for emergencies. The basic ignition timing is pre-programmed within the anti-knocking zone, even if recommended fuel is used under dry conditions. Consequently, the retard system does not operate under normal driving conditions.

However, if engine knocking occurs, the detonation sensor monitors the condition and the signal is transmitted to the E.C.C.S. control unit. After receiving it, the control unit retards the ignition timing to avoid the knocking condition.



SEC750A

Idle Speed Control INPUT/OUTPUT SIGNAL LINE



SYSTEM DESCRIPTION

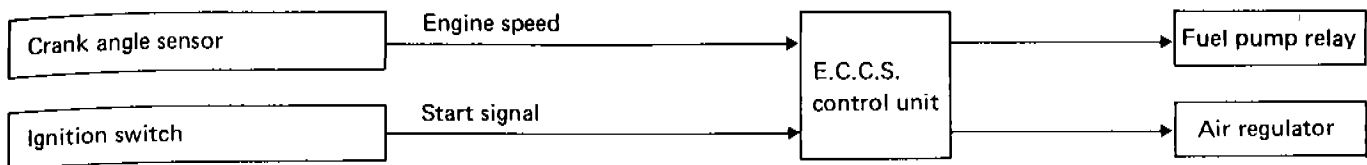
This system automatically controls engine idle speed to a specified level. Idle speed is controlled through fine adjustment of the amount of air which by-passes the throttle valve via A.A.C. valve. The A.A.C. valve repeats ON/OFF operation according to the signal sent from the E.C.U. The crank angle sensor detects the actual engine speed and sends a signal to the E.C.U. The E.C.U.

then controls the ON/OFF time of the A.A.C. valve so that engine speed coincides with the target value memorized in ROM. The target engine speed is the lowest speed at which the engine can operate steadily. The optimum value stored in the ROM is determined by taking into consideration various engine conditions, such as noise and vibration transmitted to the compartment, fuel consumption, and engine load.

ENGINE AND EMISSION CONTROL SYSTEM DESCRIPTION

Fuel Pump Control

INPUT/OUTPUT SIGNAL LINE



SYSTEM DESCRIPTION

The E.C.U. activates the fuel pump for several seconds after the ignition switch is turned on to improve engine startability. If the E.C.U. receives a 1° signal from the crank angle sensor, it knows that the engine is rotating, and causes the pump to rotate. If the 1° signal is not received when the ignition switch is on, the engine stalls. The E.C.U. stops pump operation and prevents battery discharging, thereby improving safety. The E.C.U. does not directly drive the fuel pump. It controls ON/OFF of the fuel pump relay, which in turn controls the fuel pump.

Fuel pump and air regulator ON-OFF control

Ignition switch position	Engine condition	Fuel pump/ Air regulator operation
ON	Stopped	Operates for 5 seconds
	Running	Operates
	After stopped	Stops after 1 second
START	Starting	Operates

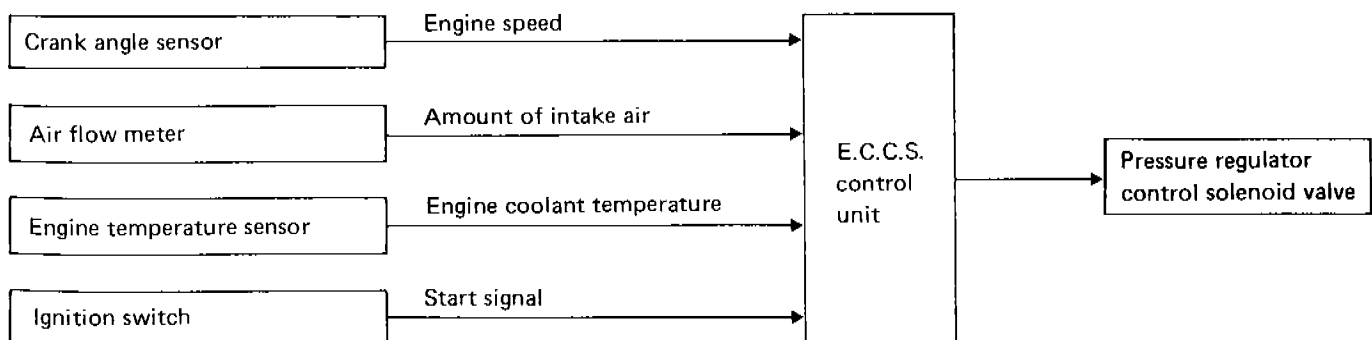
Air Regulator Control

SYSTEM DESCRIPTION

The air regulator is controlled by the E.C.U. at the same time as fuel pump ON-OFF control.

Fuel Pressure Regulator Control

INPUT/OUTPUT SIGNAL LINE



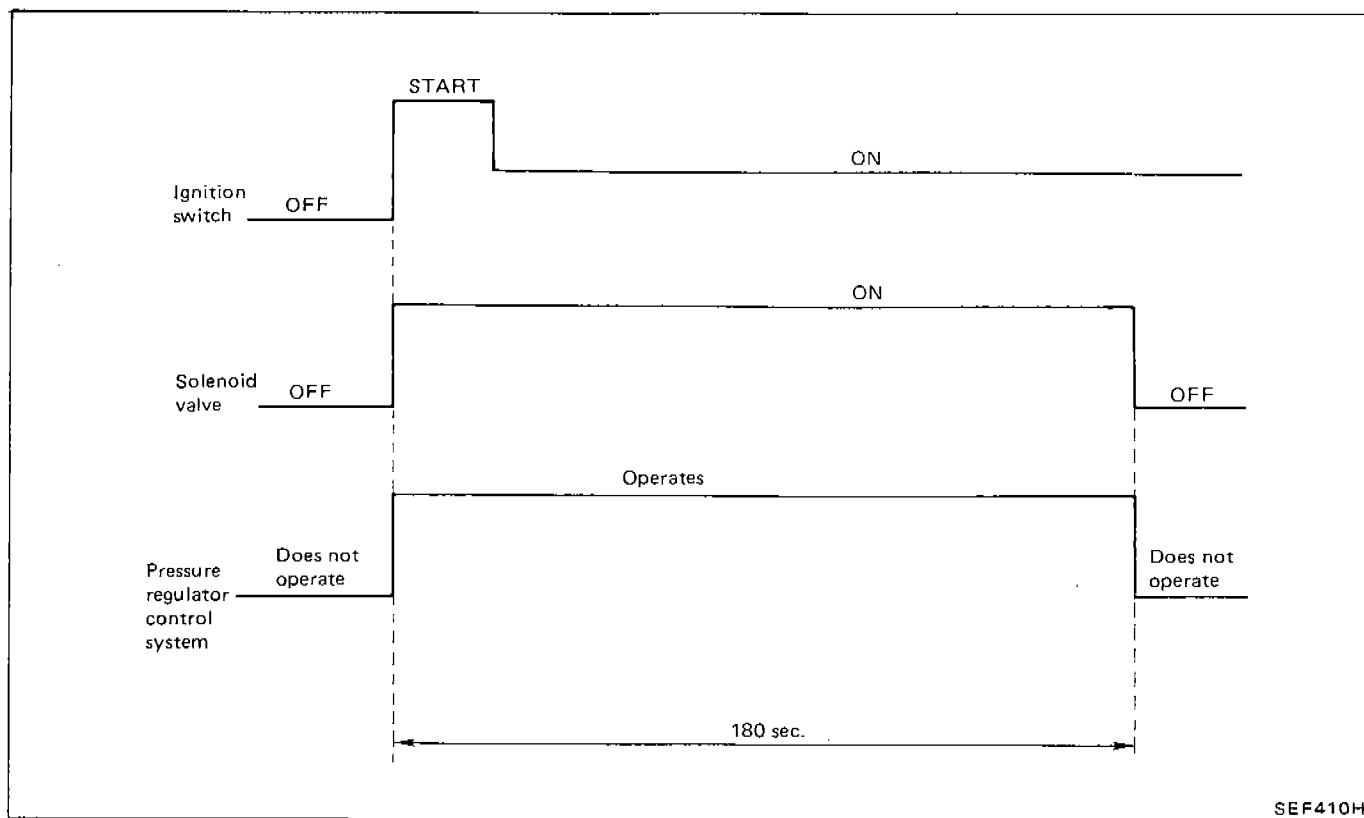
ENGINE AND EMISSION CONTROL SYSTEM DESCRIPTION

Fuel Pressure Regulator Control (Cont'd)

SYSTEM DESCRIPTION

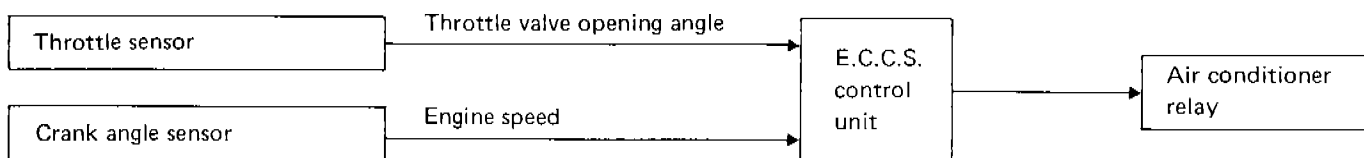
The fuel "pressure-up" control system briefly increases fuel pressure for improved starting performance of a hot engine. Under normal operating conditions, manifold vacuum is applied to the fuel pressure regulator. When starting the engine,

however, the E.C.U. allows current to flow through the ON/OFF solenoid valve in the control vacuum line, opening this line to the atmosphere. As a result, atmospheric pressure is applied, throttling the fuel passage to increase fuel pressure.



Acceleration Cut Control

INPUT/OUTPUT SIGNAL LINE



SYSTEM DESCRIPTION

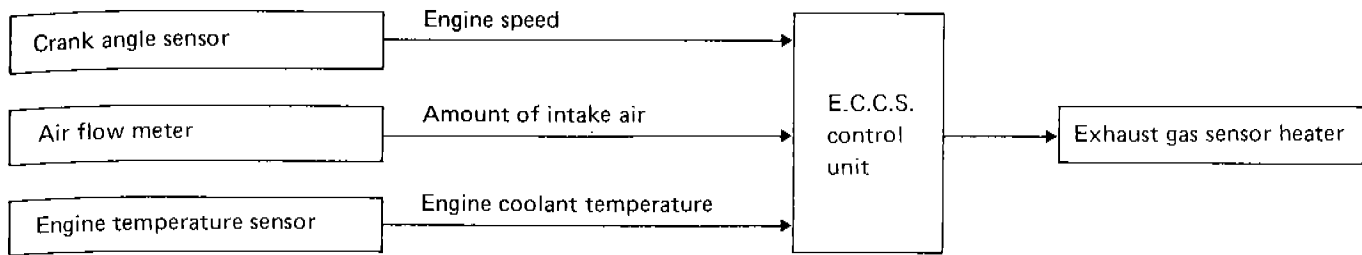
When E.C.U. detects heavy load conditions, air conditioner is turned off for a few seconds.

This system improves acceleration when air conditioner is used.

ENGINE AND EMISSION CONTROL SYSTEM DESCRIPTION

Exhaust Gas Sensor Heater Control (For catalyzer model)

INPUT/OUTPUT SIGNAL LINE



SYSTEM DESCRIPTION

The exhaust gas sensor heater helps activate the sensor quickly to stabilize closed-loop control under all operating conditions.

Fail-safe System

AIR FLOW METER MALFUNCTION

If the air flow meter output voltage is above or below the specified value, the E.C.U. senses an air flow meter malfunction. In case of a malfunction, the throttle sensor substitutes for the air flow meter.

Though air flow meter is malfunctioning, it is possible to drive the vehicle and start the engine. But engine speed will not rise more than 2,000 rpm in order to inform the driver of fail-safe system operation while driving.

ENGINE TEMPERATURE SENSOR MALFUNCTION

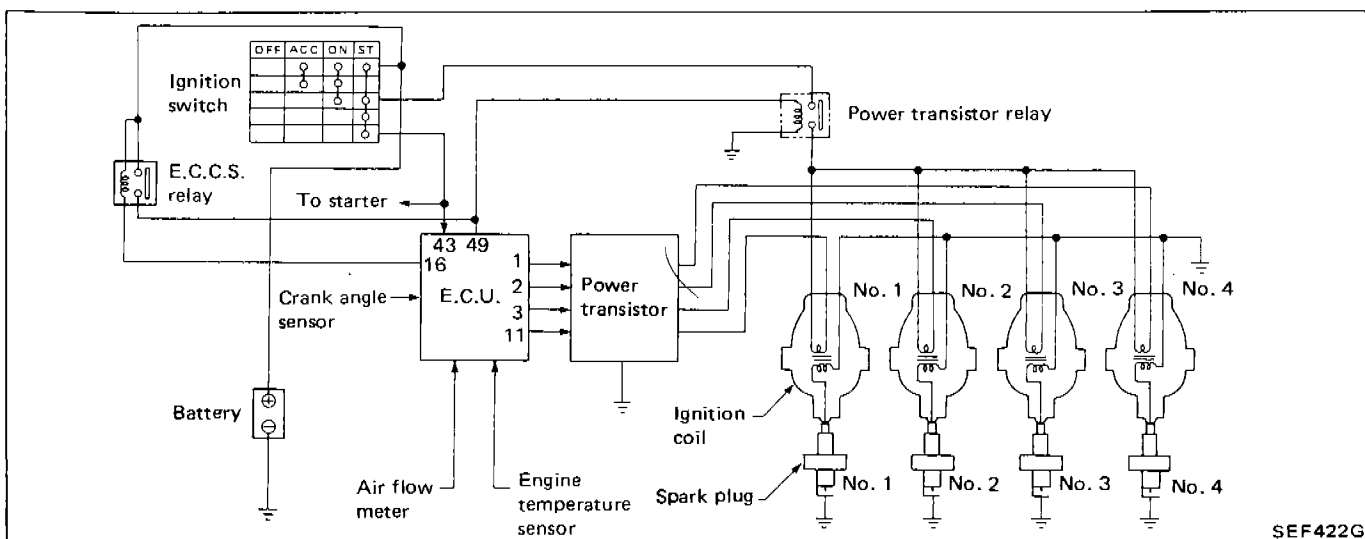
When engine temperature sensor output voltage is below or above the specified value, engine temperature is fixed at the preset value as follows:

Engine condition	Engine temperature preset value °C (°F)
Start	20 (68)
Running	80 (176)

Direct Ignition System

This system has no conventional distributor and high-tension wires. Small, very efficient ignition

coils are fitted directly to each spark plug.



ENGINE AND EMISSION CONTROL SYSTEM DESCRIPTION

Direct Ignition System (Cont'd)

CHECKING IGNITION TIMING AND IDLE SPEED

Checking idle speed

Idle speed:

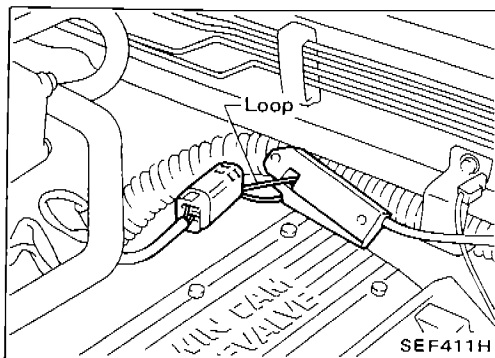
M/T: 850 ± 50 rpm

A/T: 850 ± 50 rpm (in "N" position)

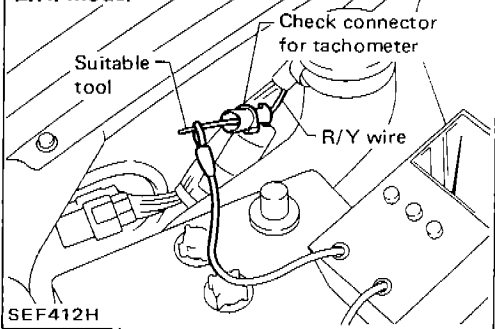
If idle speed is not within specific value, refer to IDLE SPEED/IGNITION TIMING/IDLE MIXTURE RATIO INSPECTION.

- METHOD A (With pulse type tachometer)

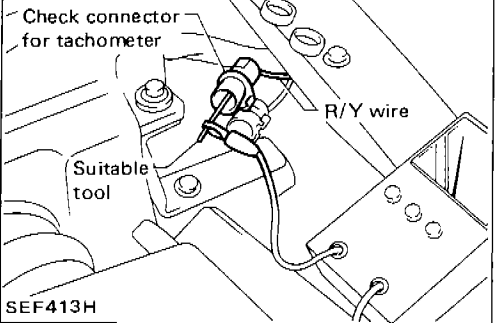
Clamp loop wire as shown.



L.H. model



R.H. model



- METHOD B (With voltage type tachometer)

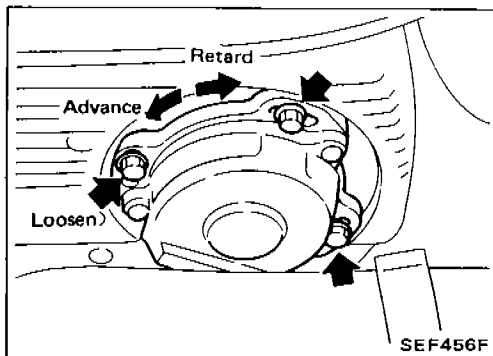
1. Disconnect check connector for tachometer.

2. Connect tachometer using suitable tool.

Checking ignition timing

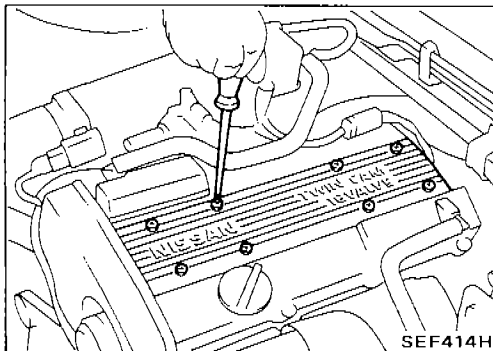
Ignition timing: $15^\circ \pm 2^\circ$ B.T.D.C.

If ignition timing is not within specific value, adjust ignition timing as shown.



- METHOD A (Without Tool)

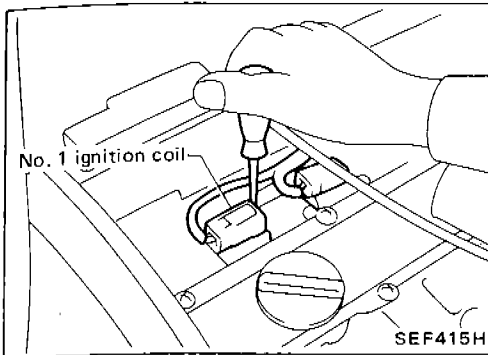
1. Remove ornament cover.



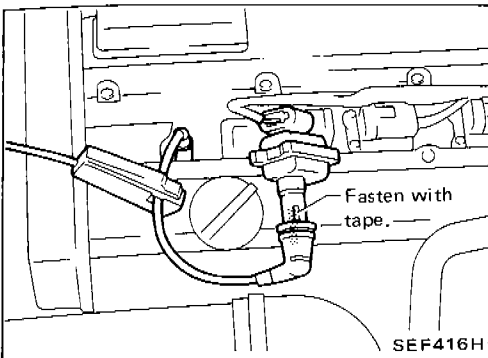
ENGINE AND EMISSION CONTROL SYSTEM DESCRIPTION

Direct Ignition System (Cont'd)

2. Remove No. 1 ignition coil.

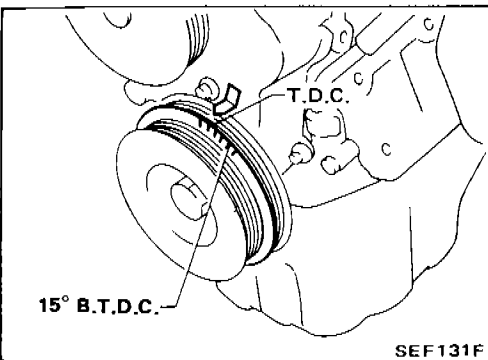


3. Connect No. 1 ignition coil and No. 1 spark plug with suitable high-tension wire as shown, and clamp this wire with timing light clamp.

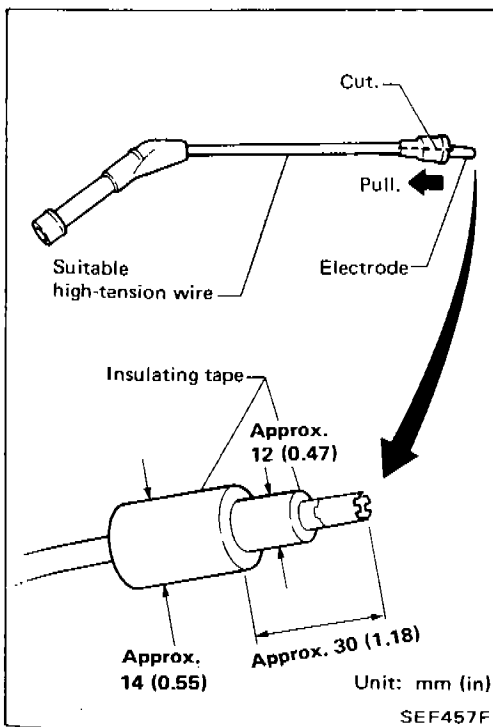


4. Check ignition timing.

5. Install No. 1 ignition coil and ornament cover.



For above procedures, enlarge suitable high-tension wire end with insulating tape as shown.

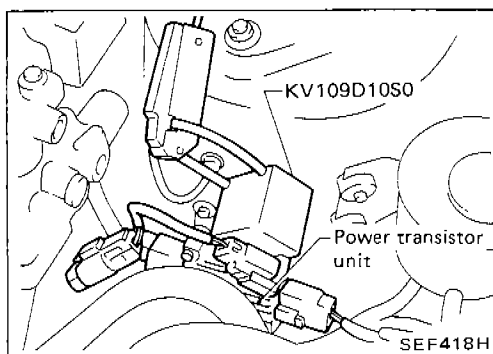
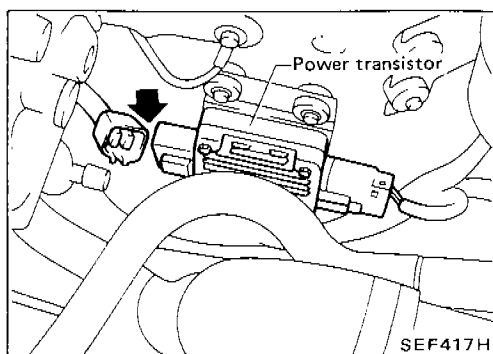


ENGINE AND EMISSION CONTROL SYSTEM DESCRIPTION

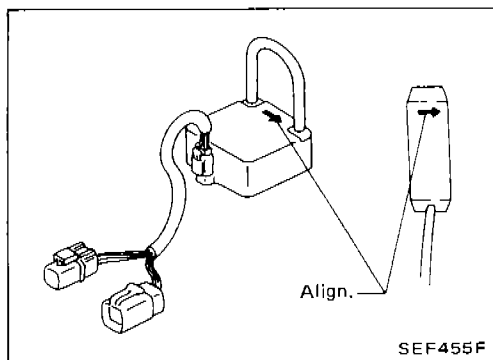
Direct Ignition System (Cont'd)

- METHOD B (With Tool KV109D10S0)

1. Disconnect connector of power transistor unit.



2. Connect Tool and clamp wire as shown.



Align direction marks on Tool and timing light clamp if aligning mark is punched.

IDLE SPEED/IGNITION TIMING/IDLE MIXTURE RATIO INSPECTION

Preparation

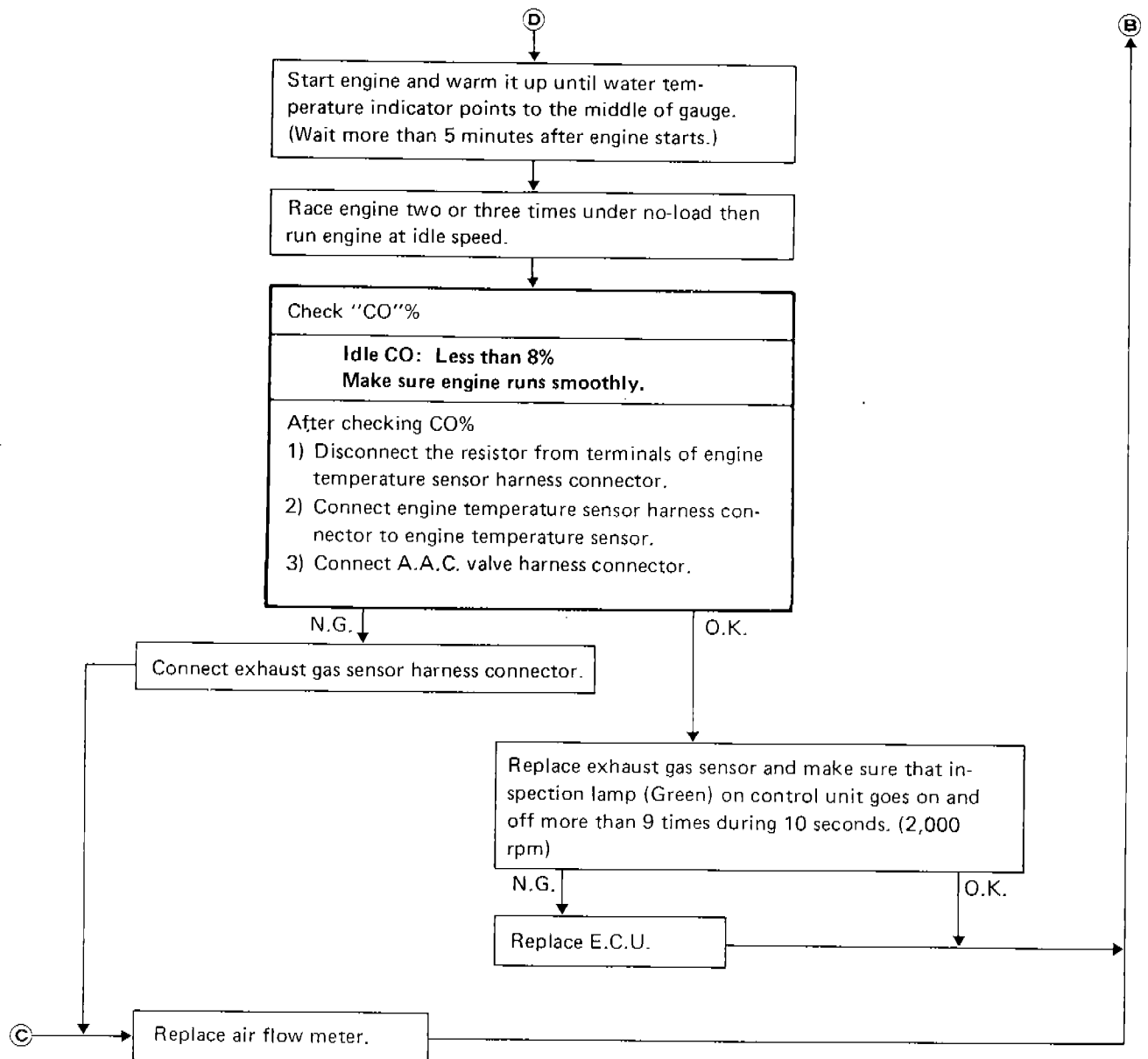
Make sure that the following parts are in good condition.

- Battery
- Ignition system
- Engine oil and coolant levels
- Fuses
- E.C.C.S. harness connectors
- Vacuum hoses
- Air intake system
(oil filler cap, oil level gauge, etc.)
- Fuel pressure
- Engine compression
- Throttle valve
- Fuel pressure regulator control system

Notice

1. Turn off air conditioner and headlamps.
2. During checking and adjusting, make sure engine is at normal operating temperature.
3. Set shift lever in "Neutral" position ("N" or "P" position for automatic transmission).
4. Engage parking brake and lock both front and rear wheels with wheel chocks.
5. Measure "CO"% with air cleaner installed.
6. When measuring "CO" percentage, insert probe more than 40 cm (15.7 in) into tailpipe.
7. Make sure fuel pressure regulator control system does not operate.

IDLE SPEED/IGNITION TIMING/IDLE MIXTURE RATIO INSPECTION

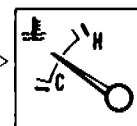


IDLE SPEED/IGNITION TIMING/IDLE MIXTURE RATIO INSPECTION

For non-catalyzer model
[With "CO"-meter]

INSPECTION START

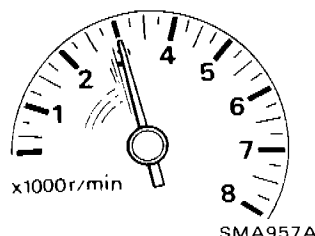
Confirm that engine is at normal operating temperature.



SEF457C

Check and adjust idle speed and ignition timing.

Idle speed: rpm M/T 850±50
A/T 850±50 (in "N" position)
Ignition timing: 15°±2° B.T.D.C.
Refer to page EF & EC-22.



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

Check "CO" with "CO"-meter.

Idle "CO"%:
2.0 or lower

O.K.

N.G.

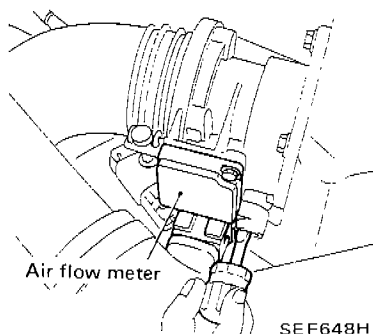
Turn off engine and remove air flow meter from vehicle.

Drill a hole in seal plug which seals air flow meter variable resistor and remove seal plug.

Install air flow meter on vehicle.
Start engine and warm it up until water temperature indicator points to the middle of gauge.

Adjust "CO"% by turning variable resistor on air flow meter.

Idle "CO"%:
2.0 or lower



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

Check idle speed.

Idle speed: rpm M/T 850±50
A/T 850±50 (in "N" position)

N.G.

O.K.

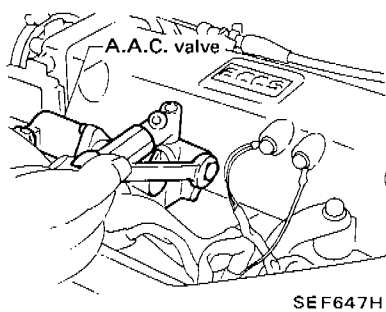
Stop engine.

INSPECTION END

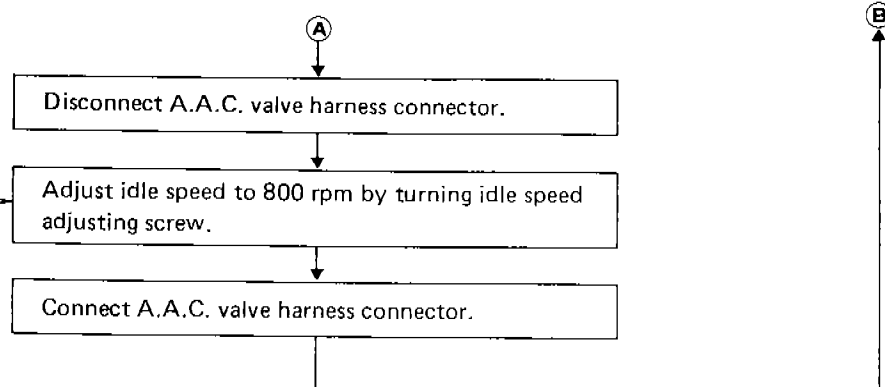
A

B

IDLE SPEED/IGNITION TIMING/IDLE MIXTURE RATIO INSPECTION

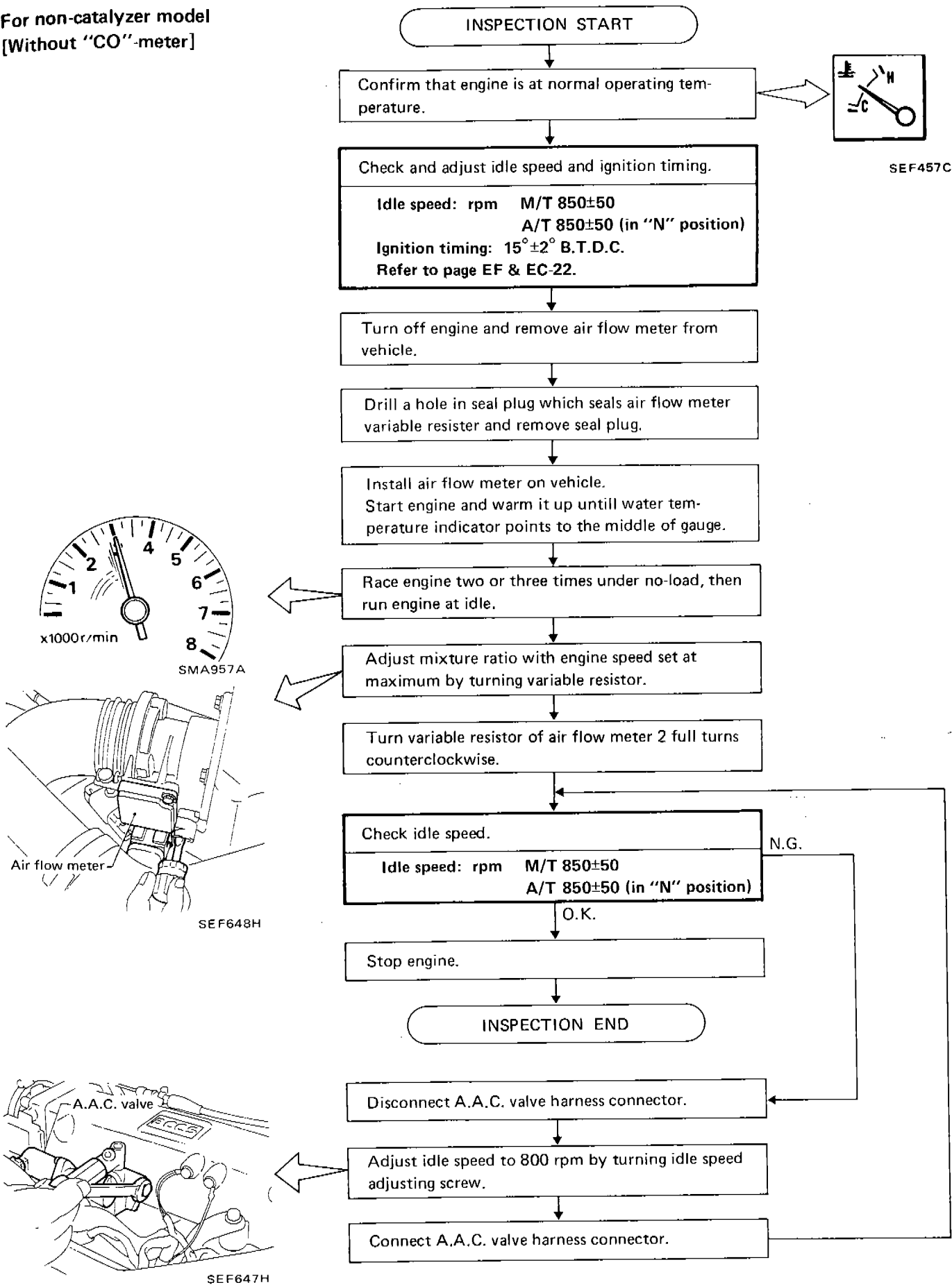


SEF647H



IDLE SPEED/IGNITION TIMING/IDLE MIXTURE RATIO INSPECTION

For non-catalyzer model
[Without "CO"-meter]



TROUBLE DIAGNOSES

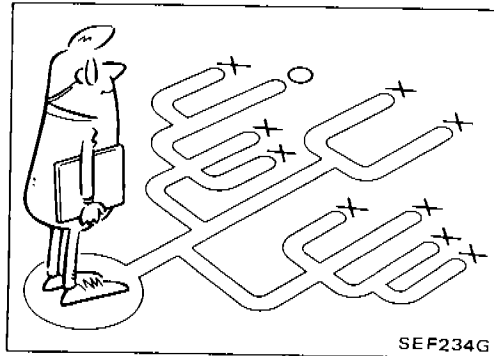
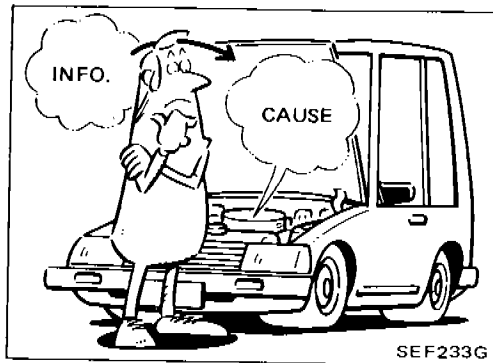
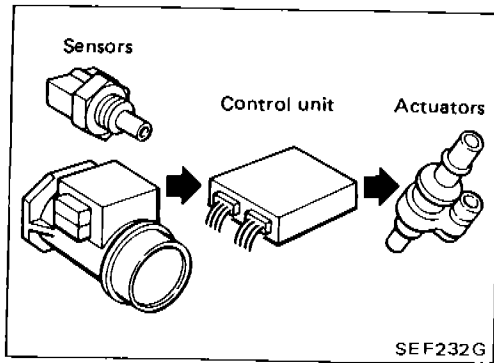
Contents

How to Perform Trouble Diagnoses for Quick and Accurate Repair	EF & EC- 34
Diagnostic Table	EF & EC- 38
1. Impossible to start — no combustion	EF & EC- 39
2. Impossible to start — partial combustion	EF & EC- 40
3. Impossible to start — partial combustion (not affected by throttle position)	EF & EC- 41
4. Impossible to start — partial combustion (throttle position changes combustion quality)	EF & EC- 42
5. Hard to start — before warm-up	EF & EC- 43
6. Hard to start — after warm-up	EF & EC- 44
7. Hard to start — every time	EF & EC- 45
8. Hard to start — morning after a rainy day	EF & EC- 46
9. Abnormal idling — no fast idle	EF & EC- 47
10. Abnormal idling — low idle (after warm-up)	EF & EC- 48
11. Abnormal idling — high idle (after warm-up)	EF & EC- 49
12. Unstable idling — before warm-up	EF & EC- 50
13. Unstable idling — after warm-up	EF & EC- 51
14. Poor driveability — stumble (while accelerating)	EF & EC- 52
15. Poor driveability — surge (while cruising)	EF & EC- 53
16. Poor driveability — lack of power	EF & EC- 54
17. Poor driveability — detonation	EF & EC- 55
18. Engine stall — during start-up	EF & EC- 56
19. Engine stall — while idling	EF & EC- 57
20. Engine stall — while accelerating	EF & EC- 58
21. Engine stall — while cruising	EF & EC- 59
22. Engine stall — while decelerating/just after stopping	EF & EC- 60
23. Engine stall — while loading	EF & EC- 61
24. Backfire — through the intake	EF & EC- 62
25. Backfire — through the exhaust	EF & EC- 63
Self-diagnosis — Description	EF & EC- 64
Self-diagnosis — Mode I & II (Model with catalyzer)	EF & EC- 67
Self-diagnosis — Mode III	EF & EC- 68
Self-diagnosis — Mode IV	EF & EC- 73
Self-diagnosis — Mode V	EF & EC- 75
Diagnostic Procedure	EF & EC- 78
Diagnostic Procedure 1	
POWER SOURCE AND GROUND CIRCUIT FOR E.C.U.	EF & EC- 80
Diagnostic Procedure 2	
CRANK ANGLE SENSOR	EF & EC- 82
Diagnostic Procedure 3	
AIR FLOW METER	EF & EC- 84
Diagnostic Procedure 4	
ENGINE TEMPERATURE SENSOR	EF & EC- 86
Diagnostic Procedure 5	
VEHICLE SPEED SENSOR	EF & EC- 88
Diagnostic Procedure 6	
IGNITION SIGNAL & DETONATION SENSOR	EF & EC- 90
Diagnostic Procedure 7	
IDLE SWITCH	EF & EC- 94
Diagnostic Procedure 8	
EXHAUST GAS SENSOR	EF & EC- 96
Diagnostic Procedure 9	
THROTTLE SENSOR	EF & EC- 98
Diagnostic Procedure 10	
FUEL PUMP	EF & EC-102
Diagnostic Procedure 11	
START SIGNAL	EF & EC-104

TROUBLE DIAGNOSES

Contents (Cont'd)

Diagnostic Procedure 12	
AUXILIARY AIR CONTROL (A.A.C.) VALVE	EF & EC-106
Diagnostic Procedure 13	
I.A.A. CONTROL (F.I.C.D. CONTROL)	EF & EC-108
Diagnostic Procedure 14	
AIR REGURATOR	EF & EC-110
Diagnostic Procedure 15	
INJECTOR	EF & EC-112
Diagnostic Procedure 16	
PRESSURE REGULATOR (P.R.) CONTROL SOLENOID VALVE	EF & EC-114
Diagnostic Procedure 17	
NEUTRAL AND INHIBITOR SWITCH	EF & EC-116
Diagnostic Procedure 18	
ACCELERATION CUT CONTROL	EF & EC-118
Electrical Components Inspection	EF & EC-119



How to Perform Trouble Diagnoses for Quick and Accurate Repair

INTRODUCTION

The engine has an electronic control unit to control major systems such as fuel control, ignition control, idle speed control, etc. The control unit 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 faulty wiring. In this case, careful checking of suspicious circuits may help prevent the replacement of good parts.

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

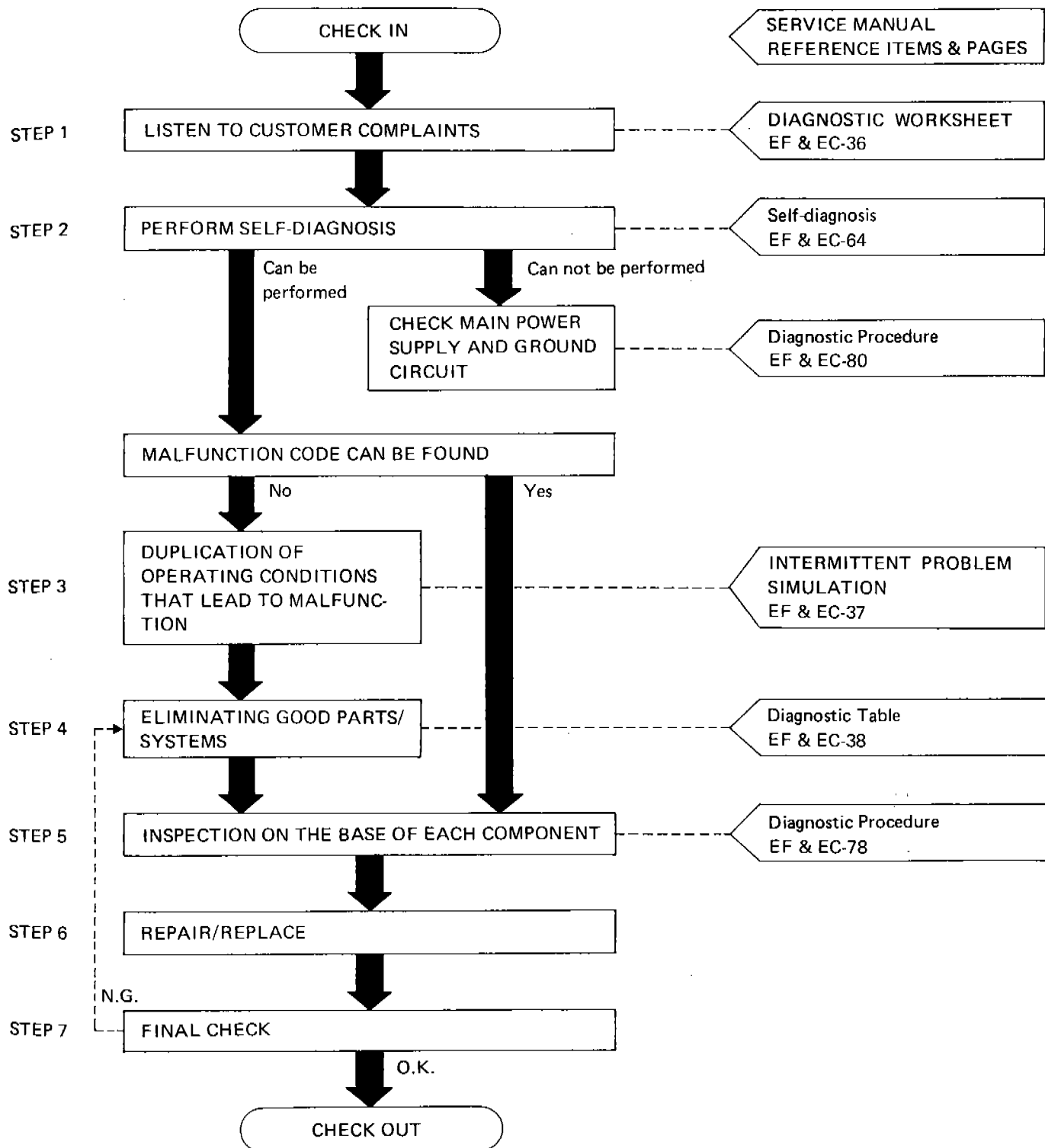
Before undertaking actual checks, take just a few minutes to talk with a customer who approaches with a driveability complaint. The customer is a very good supplier of information on such problems, especially intermittent ones. Through the talks with the customer, find out what symptoms are present and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

TROUBLE DIAGNOSES

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

WORK FLOW



TROUBLE DIAGNOSES

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.

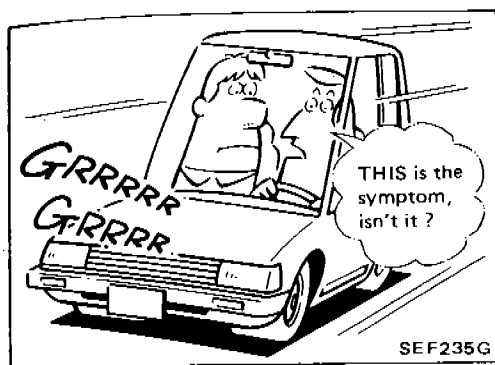
In general, feelings for a problem depend on each customer. It is important to fully understand the symptoms or under what conditions a customer complains.

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

Worksheet sample

Customer name MR/MS		Model & Year	VIN
Engine #		Trans.	Mileage (kilometer)
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 ☐ Detonation ☐ 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 effected	
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	
Check engine light		☐ Turned on ☐ Not turned on	

TROUBLE DIAGNOSES



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	Crank angle sensor	Advanced	Rotate crank angle sensor counterclockwise.
			Retarded	Rotate crank angle sensor clockwise.
3*	Mixture ratio feedback control	Exhaust gas sensor	Suspended	Disconnect exhaust gas sensor harness connector.
		Control unit	Operation check	Perform self-diagnosis (Mode I/II) at 2,000 rpm.
4	Idle speed	I.A.A. unit	Raised	Turn idle adjust screw counterclockwise.
			Lowered	Turn idle adjust screw clockwise.
5	Electric connection (Electric continuity)	Harness connectors and wires	Poor electric connection or faulty wiring	Tap or wiggle.
				Race engine rapidly. See if the torque reaction of the engine unit causes electric breaks.
6	Temperature	Control unit	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 head lights, air conditioner, rear defogger, etc.
9	Idle switch condition	Control unit	ON-OFF switching	Perform self-diagnosis (Mode IV).
10	Ignition spark	Timing light	Spark power check	Try to flash timing light for each cylinder.

*For catalyzer model

TROUBLE DIAGNOSES

Diagnostic Table

To assist with your trouble diagnoses, some typical diagnostic procedures for the following symptoms are described.

REMARKS

In the following pages, the numbers such as ①, ② in the above chart correspond to those in the service procedure described below.

Possible causes can be checked through the service procedure shown by the mark "○".

TROUBLE DIAGNOSES

Diagnostic Table (Cont'd)

SYMPTOM & CONDITION 1 Impossible to start — no combustion

POSSIBLE CAUSES		1	2	3	4	5	6	7
SPECIFICATIONS	Mixture ratio (too lean)	○	○					
	Ignition sparks (weak, missing)				○	○		
	Ignition timing						○	
FUEL SYSTEM	Fuel pump (no operation)	○						
	Fuel pump relay (open circuited)	○						
	Injectors (no operation, clogged)		○					
IGNITION SYSTEM	Ignition switch	○	○	○	○		○	
	E.C.C.S. relay	○	○	○	○		○	
	Power transistor			○	○		○	
	Ignition coil				○		○	
	Spark plugs					○		
CONTROL SYSTEM	Crank angle sensor	○	○		○		○	○

SERVICE PROCEDURE

1 LISTEN

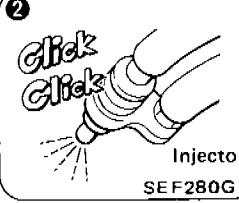


Fuel pump
SEF279G

Listen for fuel pump operating sound.

N.G. → Check fuel pump and/or related circuits.
[See page EF & EC-102.]

2 LISTEN

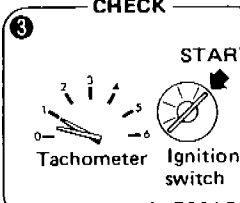


Injector
SEF280G

Listen for injector operating sound.

N.G. → Check injector circuit.
[See page EF & EC-112.]

3 CHECK

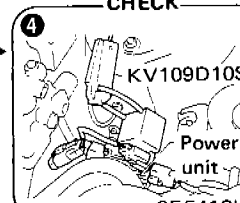


Tachometer Ignition switch
SEF281G

Make sure tachometer needle moves when cranking.

N.G. →

4 CHECK

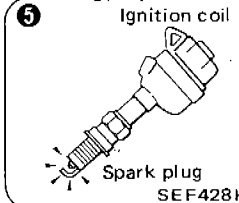


KV109D10S0
Power transistor unit
SEF418H

Check flashes of timing light for weakness.

N.G. → Check ignition signal circuit.
[See page EF & EC-90.]

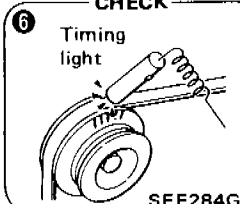
5 CHECK



Ignition coil
Spark plug
SEF428H

Remove spark plugs and check their ignition sparks.

6 CHECK

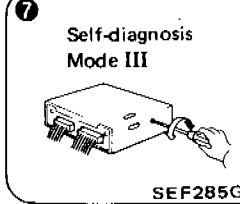


Timing light
SEF284G

Check ignition timing.

N.G. → Adjust ignition timing.
[See page EF & EC-22.]

7 PERFORM



Self-diagnosis Mode III
SEF285G

Perform self-diagnosis Mode III (for crank angle sensor).

N.G. → Check crank angle sensor and/or related circuits.
[See page EF & EC-82.]

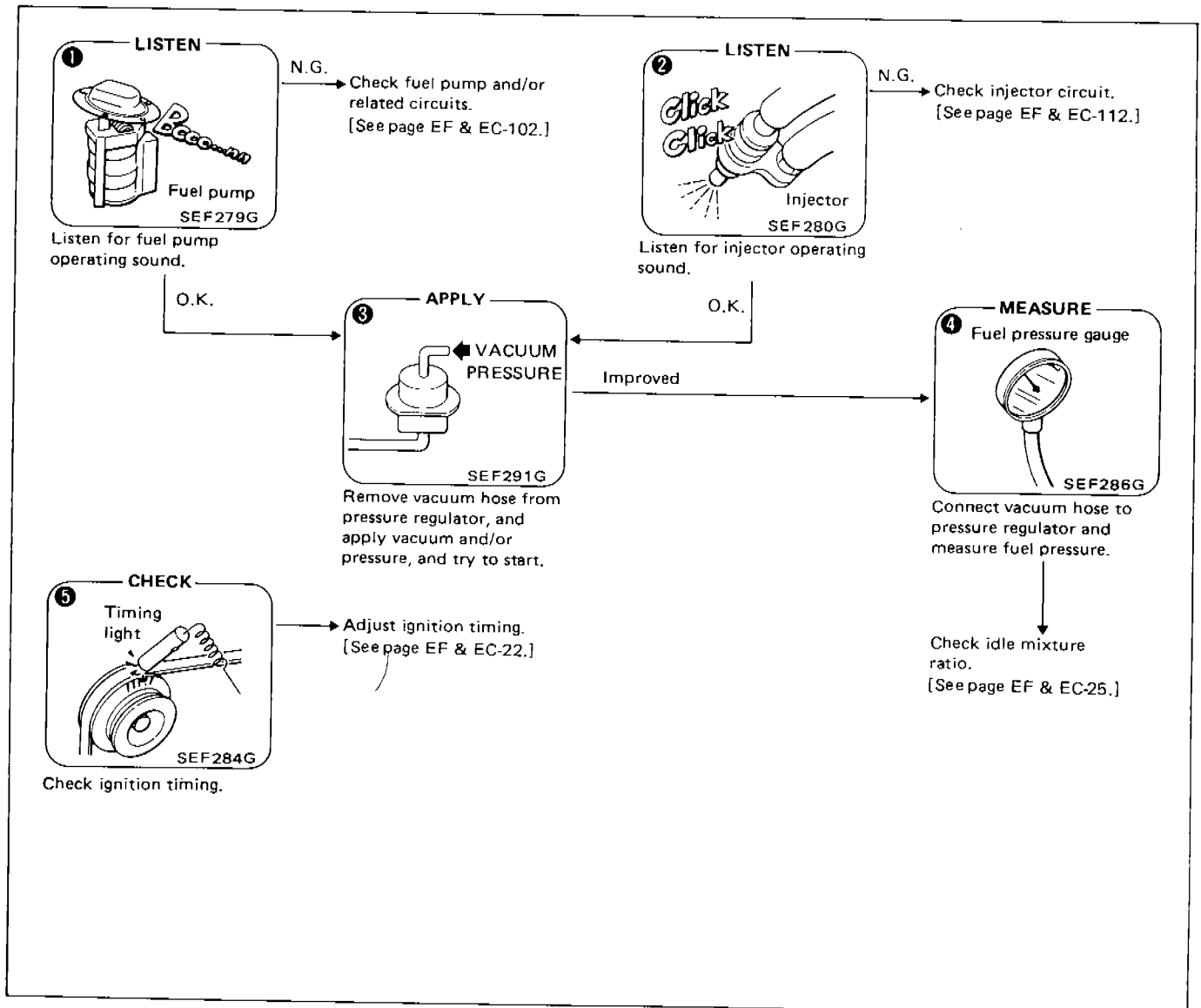
TROUBLE DIAGNOSES

Diagnostic Table (Cont'd)

SYMPTOM & CONDITION 2 Impossible to start — partial combustion

POSSIBLE CAUSES		1	2	3	4	5
SPECIFICATIONS	Mixture ratio	○	○	○		
	Fuel pressure (too low)				○	
	Ignition timing					○
FUEL SYSTEM	Fuel pump	○				
	Fuel pump relay (open circuited)	○				
	Injectors (clogged)		○			

SERVICE PROCEDURE



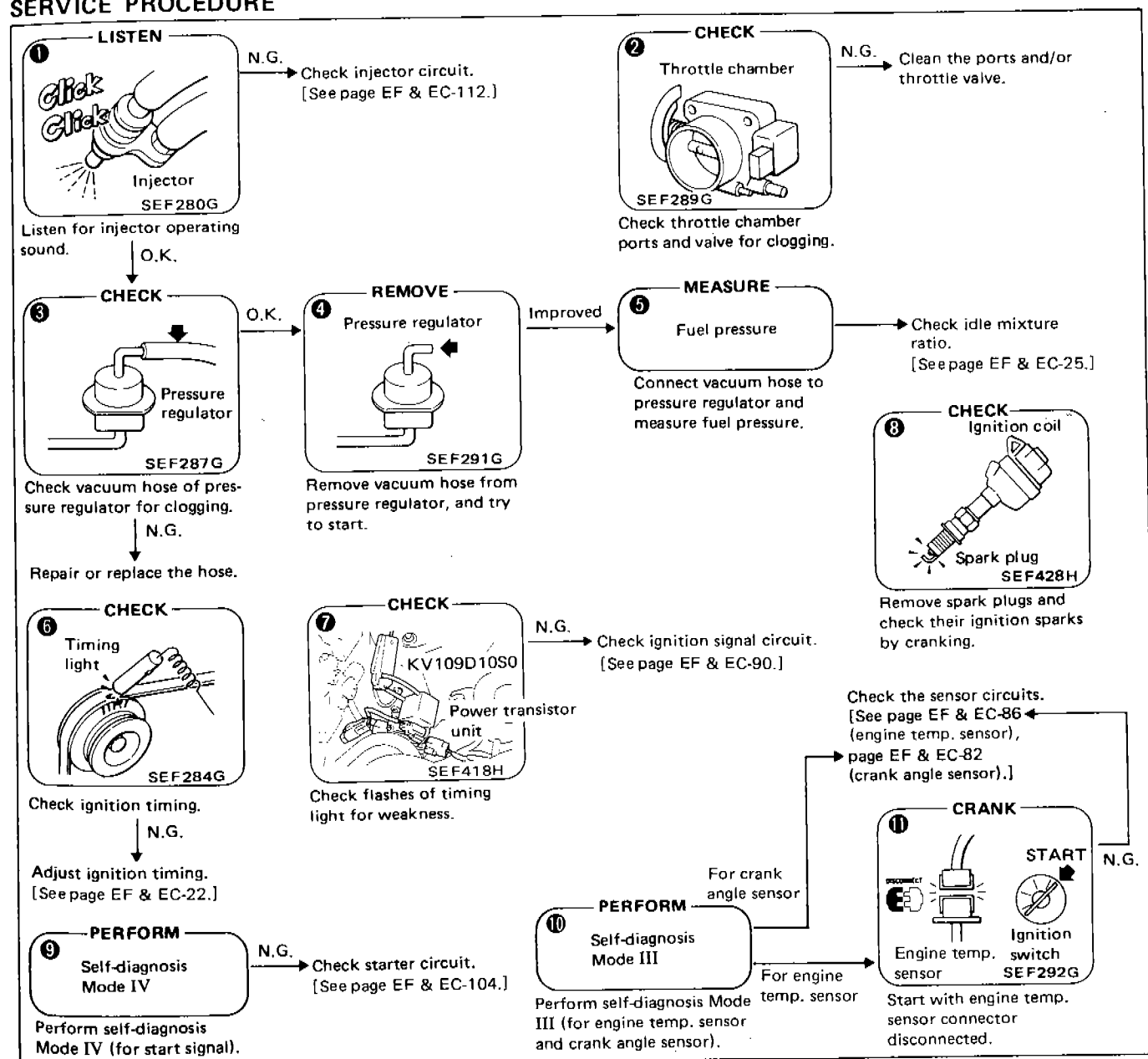
TROUBLE DIAGNOSES

Diagnostic Table (Cont'd)

SYMPTOM & CONDITION 3 Impossible to start — partial combustion (not affected by throttle position)

	POSSIBLE CAUSES	1	2	3	4	5	6	7	8	9	10	11
SPECIFICATIONS	Mixture ratio	○		○	○							
	Fuel pressure (too low)			○	○	○						
	Ignition timing						○					
FUEL SYSTEM	Fuel filter (clogged)					○						
	Fuel line (clogged)					○						
	Injectors (clogged)	○										
	Pressure regulator			○								
	Pressure regulator vacuum hose (clogged)			○								
IGNITION SYSTEM	Spark plugs (wet with fuel)							○	○			
	Ignition switch	○						○	○			
INTAKE SYSTEM	Throttle chamber (with ports clogged)		○									
	Throttle valve (clogged)		○									
CONTROL SYSTEM	Engine temperature sensor									○	○	
	Crank angle sensor	○						○		○	○	

SERVICE PROCEDURE



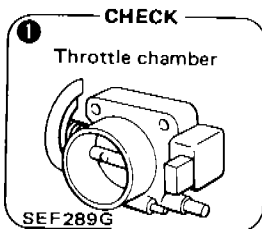
TROUBLE DIAGNOSES

Diagnostic Table (Cont'd)

SYMPTOM & CONDITION **4** Impossible to start — partial combustion (throttle position changes combustion quality)

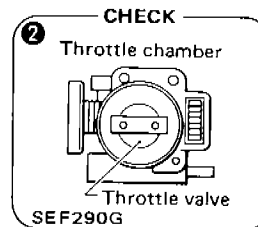
POSSIBLE CAUSES		①	②	③	④	⑤
INTAKE SYSTEM	Throttle chamber (with ports clogged)	○				
	Throttle valve (clogged)		○			
	Air regulator (stuck closed)			○		
CONTROL SYSTEM	Engine temperature sensor				○	
	Idle switch				○	
	Neutral switch					○

SERVICE PROCEDURE



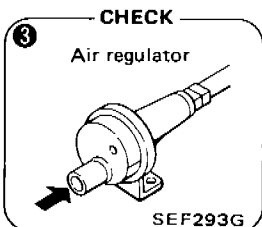
N.G. → Clean the ports.

Check throttle chamber ports for clogging.



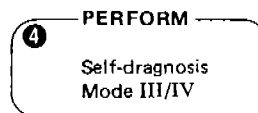
N.G. → Clean the valve.

Check throttle valve for clogging.

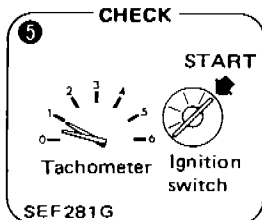


N.G. → Check air regulator and/or its circuit.
[See page EF & EC-110.]

Make sure air regulator stays open before warm-up



Perform self-diagnosis Mode III (for engine temp. sensor), Mode IV (for idle switch).



N.G. → Check neutral switch and/or its circuit.
[See page EF & EC-116.]

Make sure tachometer indicates about 300 rpm while cranking.

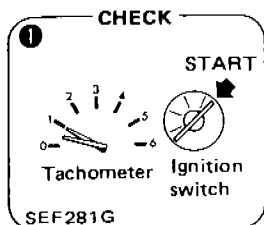
TROUBLE DIAGNOSES

Diagnostic Table (Cont'd)

SYMPTOM & CONDITION 5 Hard to start — before warm-up

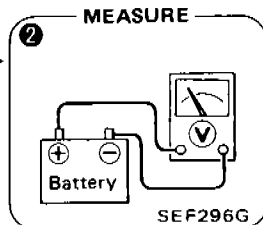
POSSIBLE CAUSES		1	2	3	4	5	6
SPECIFICATIONS	Mixture ratio			○			○
IGNITION SYSTEM	Ignition switch (no start signal)	○			○		
INTAKE SYSTEM	Air regulator			○			
CONTROL SYSTEM	Engine temperature sensor					○	○
	Idle switch				○		
	Neutral switch	○					
OTHERS	Starter (operation too slow)	○					
	Battery (voltage too low)	○	○				

SERVICE PROCEDURE



Make sure tachometer indicates about 300 rpm while cranking.

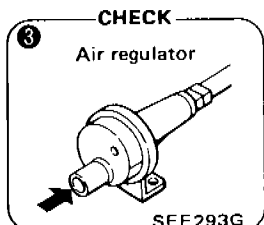
N.G.



Measure battery voltage.

N.G. (less than 12V)

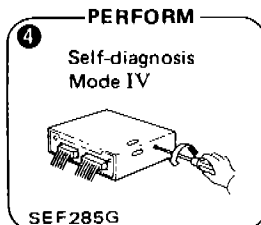
→ Charge the battery.



Make sure air regulator stays open before warm-up.

N.G.

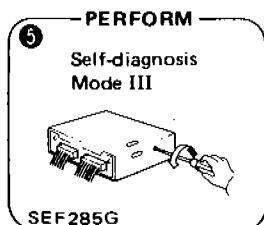
→ Check air regulator and/or its circuit.
[See page EF & EC-110.]



Perform self-diagnosis Mode IV (for start signal and idle switch).

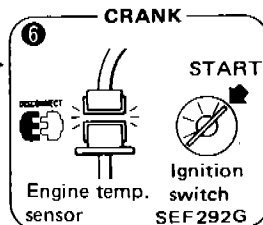
N.G.

→ Check the malfunctioning switches and/or circuits.
[See page EF & EC-104 (start signal), page EF & EC-94 (idle switch).]



Perform self-diagnosis Mode III (for engine temp. sensor).

N.G.



Start with engine temp. sensor connector disconnected.

N.G.

→ Check sensor circuit.
[See page EF & EC-86 (engine temp. sensor).]

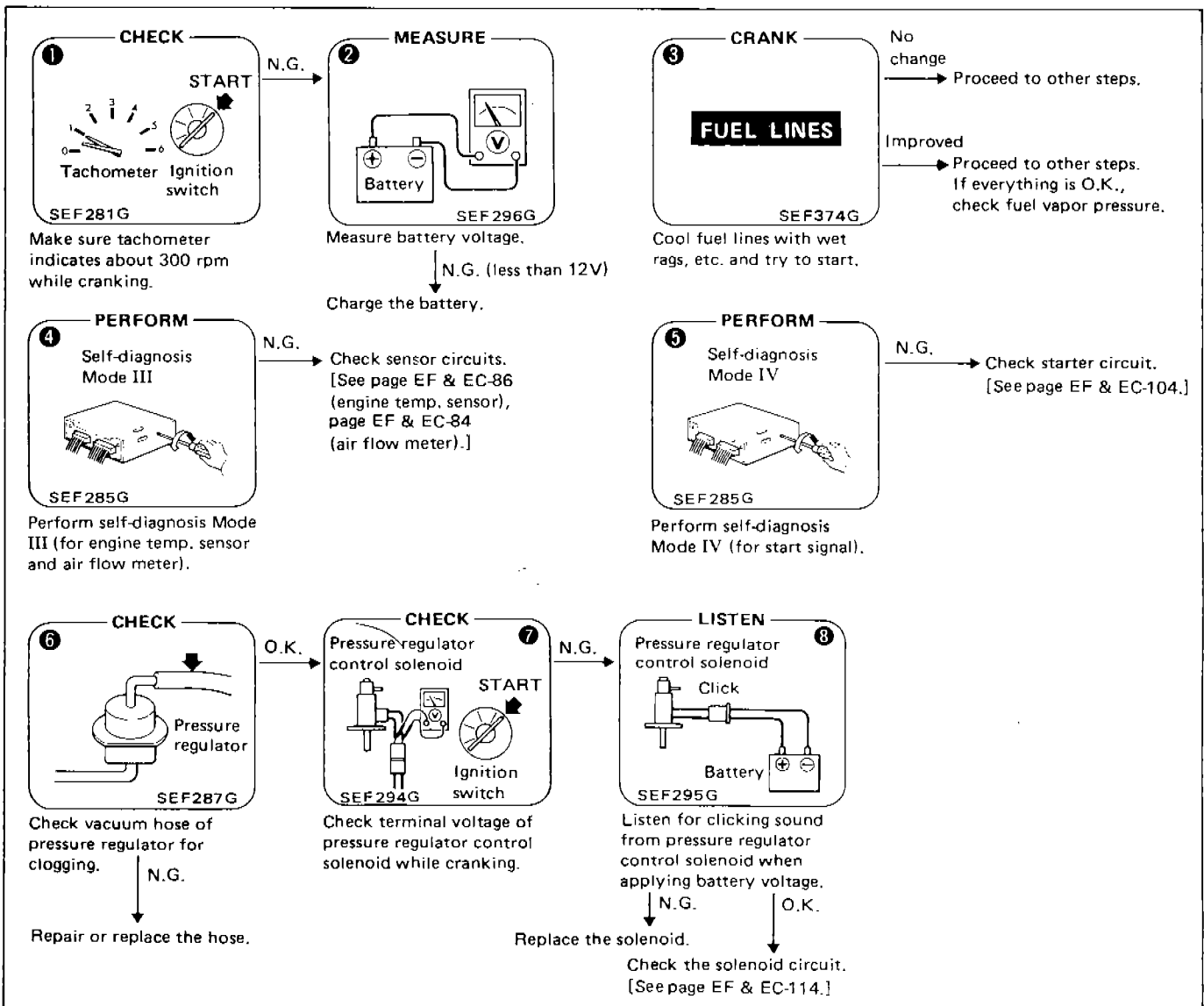
TROUBLE DIAGNOSES

Diagnostic Table (Cont'd)

SYMPTOM & CONDITION 6 Hard to start — after warm-up

POSSIBLE CAUSES		1	2	3	4	5	6	7	8
SPECIFICATIONS	Mixture ratio			○			○		
	Fuel pressure			○			○	○	
FUEL SYSTEM	Fuel line (hot fuel)			○					
	Pressure regulator (low fuel pressure)						○		
	Pressure regulator vacuum hose (clogged)						○		
	Pressure regulator control solenoid							○	○
	Pressure regulator control solenoid vacuum hose						○		
IGNITION SYSTEM	Ignition switch (no start signal)	○				○			
CONTROL SYSTEM	Engine temperature sensor				○				
	Air flow meter				○				
OTHERS	Starter (operation too slow)	○							
	Battery (voltage too low)	○	○						

SERVICE PROCEDURE



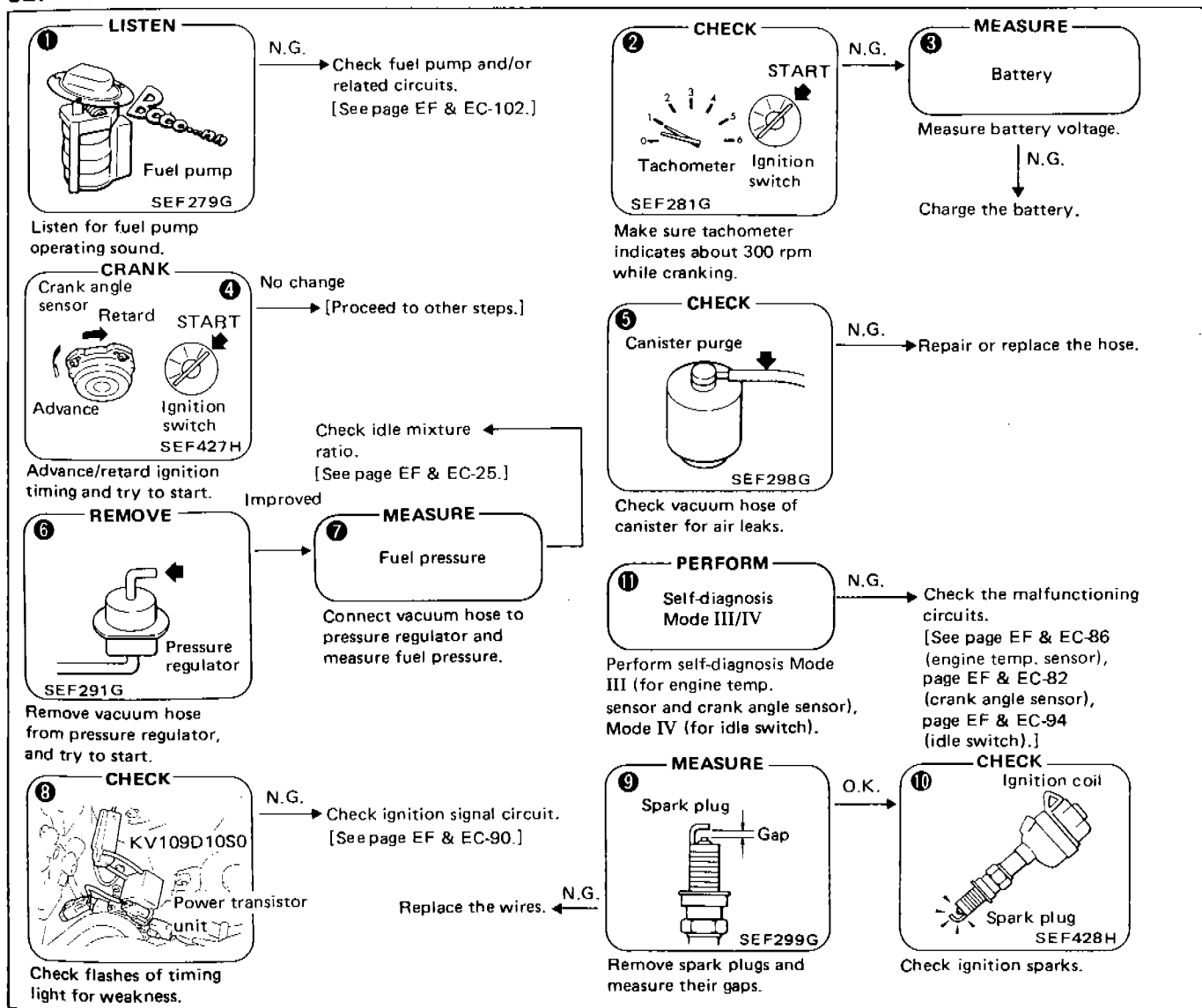
TROUBLE DIAGNOSES

Diagnostic Table (Cont'd)

SYMPTOM & CONDITION 7 Hard to start — every time

POSSIBLE CAUSES		1	2	3	4	5	6	7	8	9	10	11
SPECIFICATIONS	Mixture ratio	○				○	○					
	Fuel pressure						○	○				
	Ignition sparks (missing)								○		○	
	Ignition timing				○							
FUEL SYSTEM	Fuel pump (improper operation)	○										
	Fuel line (clogged)							○				
	Canister (air leaks)					○						
	Pressure regulator (low fuel pressure)						○					
IGNITION SYSTEM	Spark plugs (improper gap)									○		
CONTROL SYSTEM	Crank angle sensor	○							○			○
	Engine temperature sensor											○
	Idle switch											○
	Neutral switch		○									
OTHERS	Starter (operation too slow)		○									
	Battery (voltage too low)		○	○								

SERVICE PROCEDURE



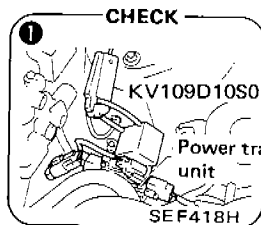
TROUBLE DIAGNOSES

Diagnostic Table (Cont'd)

SYMPTOM & CONDITION 8 **Hard to start — morning after a rainy day**

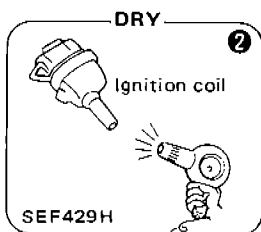
POSSIBLE CAUSES		1	2	3	4
SPECIFICATIONS	Ignition sparks (weak)	○			○
	Power transistor	○			○
	Ignition coil	○	○		○
	Spark plugs (improper gap)			○	○

SERVICE PROCEDURE



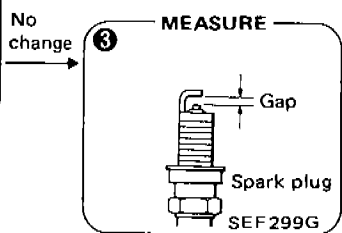
Check flashes of timing light for weakness.

N.G. → Check ignition signal circuit.
[See page EF & EC-90.]



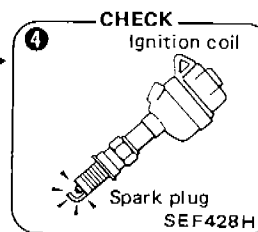
Dry ignition coil and try to start.

Can start → Replace the parts.



Remove spark plugs and measure their gaps.
(For conventional type plug)

O.K. →



Check ignition sparks.

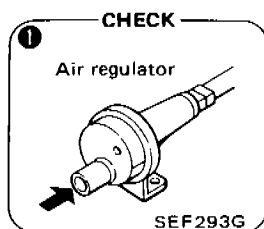
TROUBLE DIAGNOSES

Diagnostic Table (Cont'd)

SYMPTOM & CONDITION 9 Abnormal idling — no fast idle

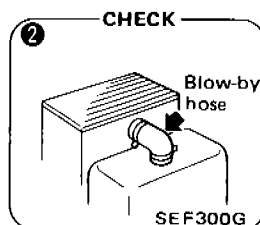
POSSIBLE CAUSES		1	2	3	4	5	6
SPECIFICATIONS	Mixture ratio	○	○		○		
	Ignition timing			○			
INTAKE SYSTEM	Blow-by hose (clogged)		○				
	Air regulator (stuck closed)	○					
CONTROL SYSTEM	Engine temperature sensor					○	○

SERVICE PROCEDURE



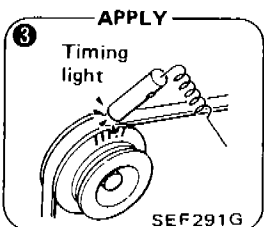
Make sure air regulator stays open before warm-up.

N.G. → Check air regulator and/or its circuit.
[See page EF & EC-110.]



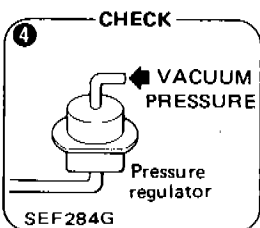
Check blow-by hose for clogging.

N.G. → Clean or replace the hose.



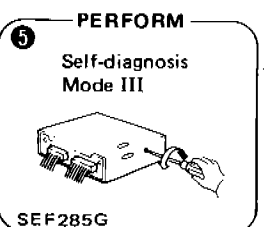
Check ignition timing.

Improved → Adjust ignition timing.
[See page EF & EC-22.]



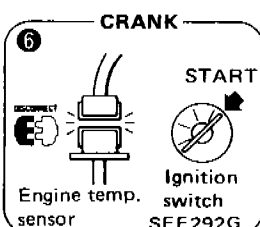
Apply vacuum/pressure to pressure regulator after disconnecting vacuum hose, and check idling.

N.G. → Check idle mixture ratio.
[See page EF & EC-25.]



Perform self-diagnosis Mode III (for engine temp. sensor).

N.G. →



Start with engine temp. sensor connector disconnected.

N.G. → Check sensor circuit.
[See page EF & EC-86 (engine temp. sensor).]

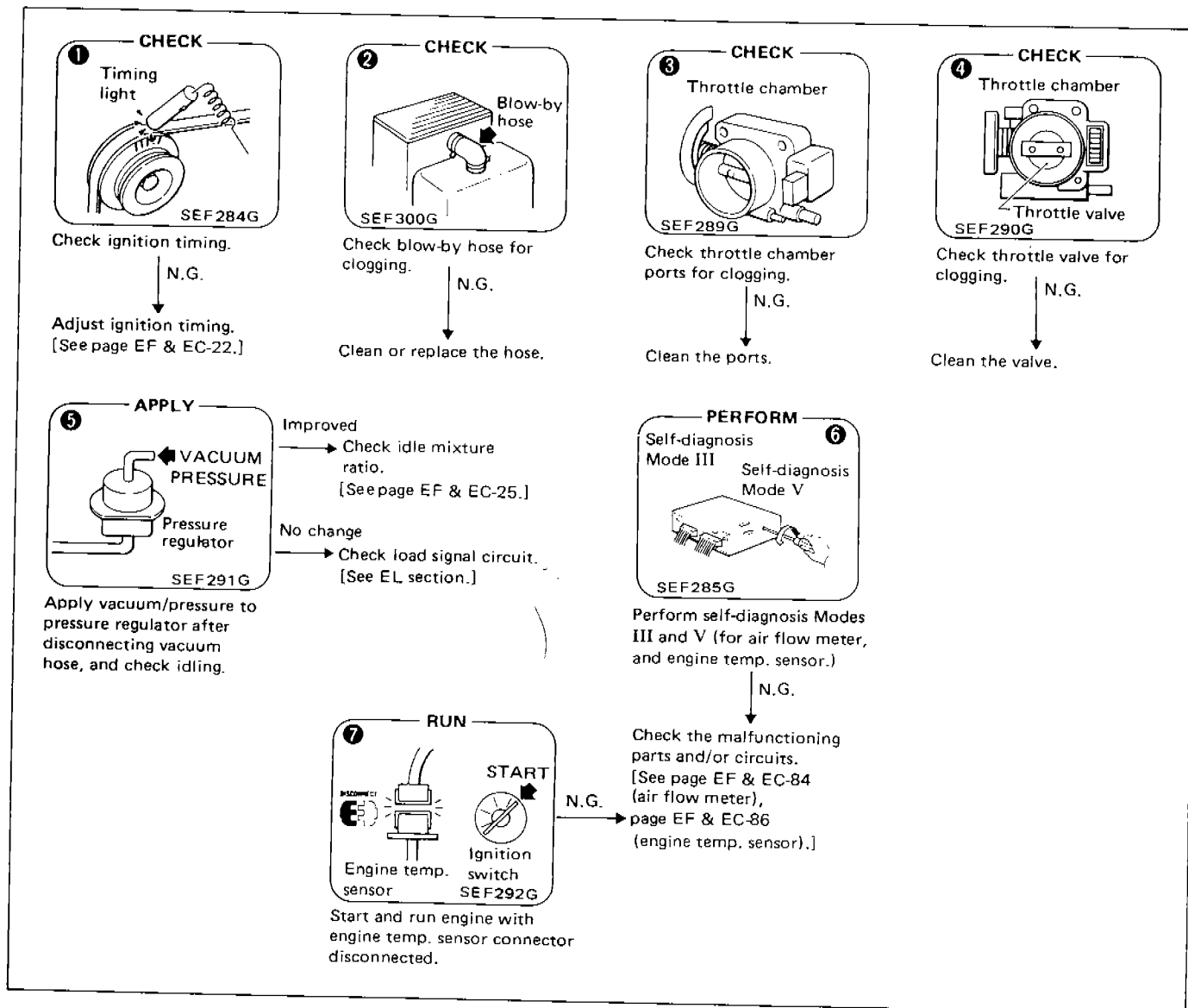
TROUBLE DIAGNOSES

Diagnostic Table (Cont'd)

SYMPTOM & CONDITION 10 Abnormal idling – low idle (after warm-up)

POSSIBLE CAUSES		①	②	③	④	⑤	⑥	⑦
SPECIFICATIONS	Mixture ratio		○			○		
	Ignition timing (too retarded)	○						
INTAKE SYSTEM	Throttle chamber (with ports clogged)			○				
	Throttle valve (clogged)				○			
CONTROL SYSTEM	Crank angle sensor					○		
	Air flow meter					○		
	Engine temperature sensor					○	○	

SERVICE PROCEDURE



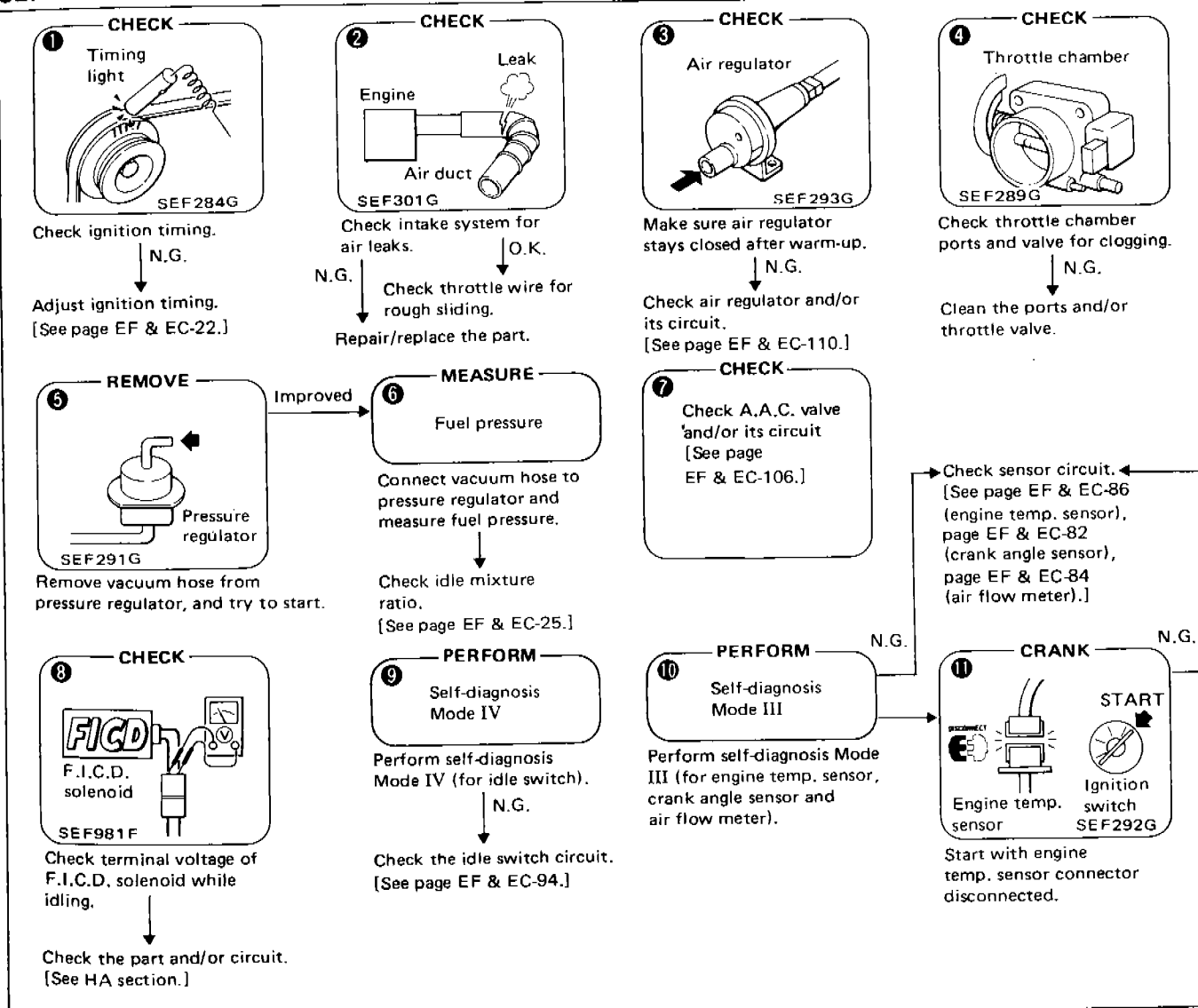
TROUBLE DIAGNOSES

Diagnostic Table (Cont'd)

SYMPTOM & CONDITION 11 Abnormal idling — high idle (after warm-up)

POSSIBLE CAUSES		1	2	3	4	5	6	7	8	9	10	11
SPECIFICATIONS	Mixture ratio		○	○		○	○			○		
	Ignition timing (too advanced)	○										
INTAKE SYSTEM	Air duct (leaks)		○									
	Throttle chamber (air leaks)				○							
	Throttle valve (stuck control wire)				○							
	Intake manifold (gasket) (air leaks)		○									
	Air regulator (stuck open)			○								
	A.A.C. valve						○					
	F.I.C.D. solenoid (remaining ON)							○				
CONTROL SYSTEM	Crank angle sensor										○	
	Air flow meter										○	
	Engine temperature sensor									○	○	
	Idle switch (remaining OFF)						○		○			
OTHERS	Battery (voltage too low)											

SERVICE PROCEDURE



TROUBLE DIAGNOSES

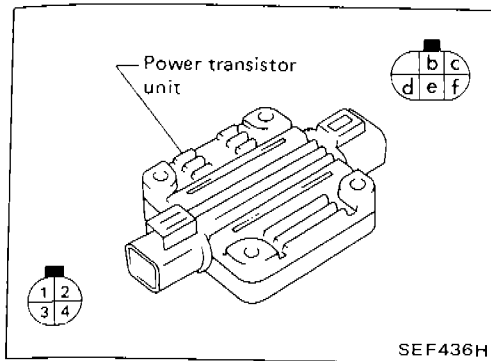
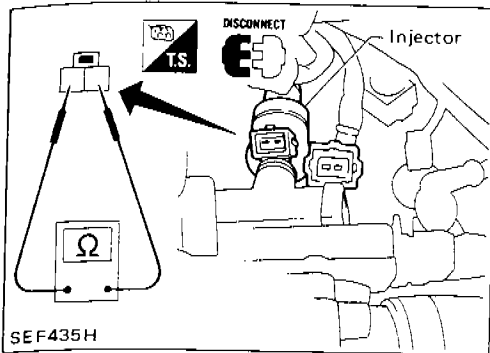
Electrical Components Inspection (Cont'd) INJECTOR

1. Disconnect injector harness connector.
2. Check injector resistance.

Resistance:

2 - 3 Ω

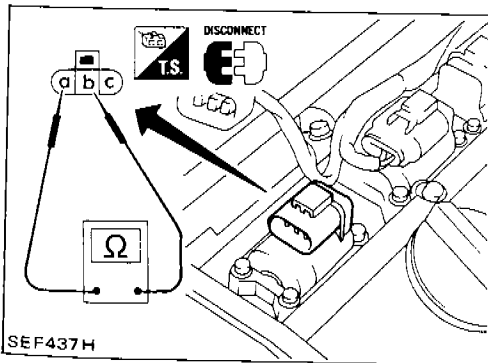
3. Remove injector and check nozzle for clogging if necessary.



POWER TRANSISTOR

1. Disconnect power transistor harness connectors.
2. Check continuity between terminals as shown below:

Terminal combination				Tester polarity	Continuity	Tester polarity	Continuity
1	2	3	4	+	Yes	-	No
d	d	d	d	-		+	
1	2	3	4	+	Yes	-	No
c	b	f	e	-		+	
d	d	d	d	+	Yes	-	Yes
c	b	f	e	-		+	

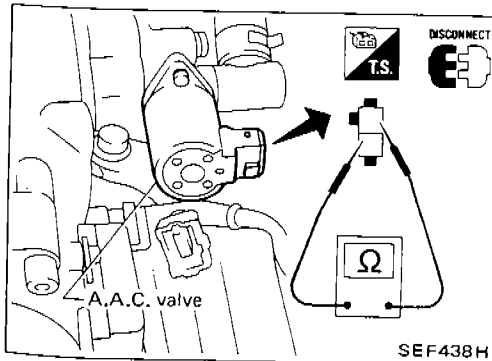


IGNITION COIL

1. Disconnect ignition coil harness connector.
2. Check resistance between terminals ① and ②.

Resistance:

0.6 - 0.8 Ω



A.A.C. VALVE

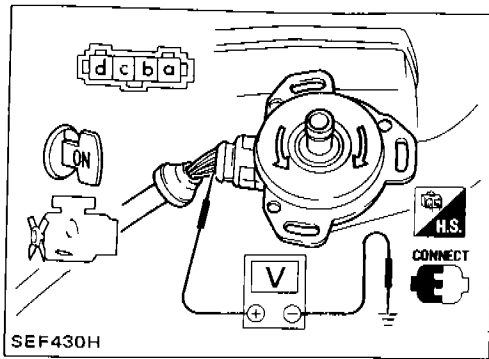
1. Disconnect A.A.C. valve harness connector.
2. Check A.A.C. valve resistance.

Resistance:

Approximately 9 - 10 Ω

TROUBLE DIAGNOSES

Electrical Components Inspection (Cont'd) CRANK ANGLE SENSOR



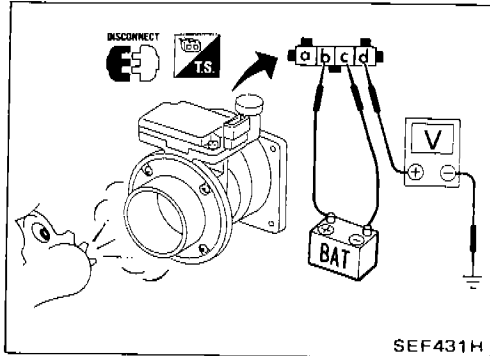
1. Remove crank angle sensor from engine.
2. Check voltage between terminal ① and ground, and terminal ② and ground while rotating the crank angle sensor shaft as shown. At this time make sure that injectors operating sound can be heard.

Voltage:

0V and approximately 5V appear alternately.

After this inspection, malfunction code No. 11 might be displayed though the crank angle sensor is functioning properly. In this case erase the stored memory.

AIR FLOW METER



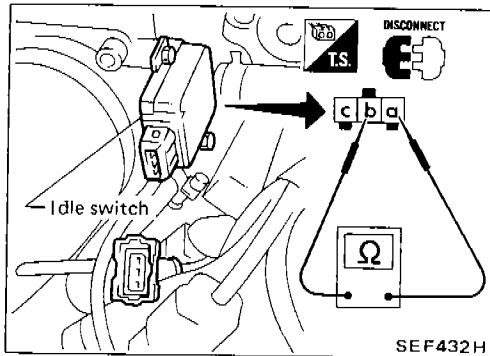
1. Remove air flow meter from vehicle and visually check hot wire air passage for dust.
2. Supply battery voltage between terminals ② and ③.
3. Check voltage between terminal ④ and ground while blowing air flow meter as shown.

Voltage:

When blowing Approximately 2V

Not blowing Approximately 1V

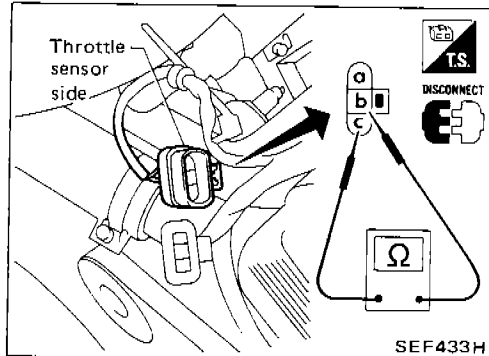
IDLE SWITCH



1. Disconnect idle switch harness connector.
2. Check continuity between terminals ① and ②.

Accelerator pedal	Continuity
Completely released	Yes
Depressed	No

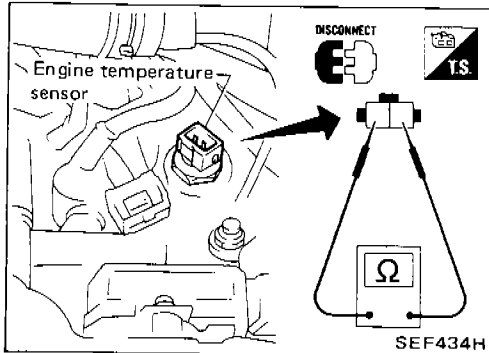
THROTTLE SENSOR



1. Disconnect throttle sensor harness connector.
2. Make sure that resistance between terminals ② and ③ changes when opening throttle valve manually.

Accelerator pedal	Resistance
Completely released	Approximately 1 kΩ
Partially depressed	1 - 9 kΩ
Completely depressed	Approximately 9 kΩ

ENGINE TEMPERATURE SENSOR



1. Disconnect engine temperature sensor harness connector.
2. Check engine temperature sensor resistance.

Temperature °C (°F)	Resistance (kΩ)
20 (68)	Approx. 2.5
80 (176)	Approx. 0.3

TROUBLE DIAGNOSES

Electrical Components Inspection (Cont'd)

*Data are reference values.

TERMI- NAL NO.	ITEM	CONDITION	DATA*
111	Pressure regulator (P.R.) control solenoid valve	Ignition switch "ON" For approximately 3 minutes after starting engine. Water temperature is above 60°C (140°F).	0.8 - 1.0V
		Ignition switch "ON" In approximately 3 minutes after starting engine. Water temperature is above 60°C (140°F).	BATTERY VOLTAGE (11 - 14V)
		Ignition switch "ON" or "START". Water temperature is below 60°C (140°F).	

E.C.U. pin connector terminal layout

101	102	103	104	105	106	107	108	1	2	3	4	5	6	7	8	9	10	21	22	23	24	25	26	27	28	29	30	41	42	43	44	45	46	47	48	49	50
109	110	111	112	113	114	115	116	11	12	13	14	15	16	17	18	19	20	31	32	33	34	35	36	37	38	39	40	51	52	53	54	55	56	57	58	59	60



SEF424H

TROUBLE DIAGNOSES

Electrical Components Inspection (Cont'd)

*Data are reference values.

TERMI- NAL NO.	ITEM	CONDITION	DATA*
49 59	Power source for E.C.U.	Ignition switch "ON"	BATTERY VOLTAGE (11 - 14V)
54	Idle switch (⊖ side)	Ignition switch "ON" └ Throttle valve: idle position	Approximately 8 - 10V
		Ignition switch "ON" └ Throttle valve: Any position except idle position	0V
57	Idle switch (⊕ side)	Ignition switch "ON" └ Throttle valve: idle position	Approximately 8 - 10V
		Ignition switch "ON" └ Throttle valve: Any position except idle position	BATTERY VOLTAGE (11 - 14V)
58	Power source (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		
106	Auxiliary air control (A.A.C.) valve	Engine is running. └ Idle speed	8 - 12V
		Engine is running. └ Steering wheel is turned. └ Air conditioner is operating. └ Rear defogger is "ON". └ Headlamps are in high position.	6 - 8V

TROUBLE DIAGNOSES

Electrical Components Inspection (Cont'd)

*Data are reference values.

TERMI- NAL NO.	ITEM	CONDITION	DATA*
27	Air flow meter	Engine is running. Idle speed Engine speed is approximately 2,500 rpm.	1.6V 2.2V Output voltage varies with engine revolution.
28	Engine temperature sensor	Engine is running.	1.0 - 5.0V Output voltage varies with engine coolant temperature.
29	Exhaust gas sensor	Engine is running. After warming up sufficiently	0 - Approximately 1.0V
38	Throttle sensor	Ignition switch "ON"	0.5 - 4.0V Output voltage varies with the throttle valve opening angle.
41 51	Crank angle sensor (Reference signal)	Engine is running. Do not run engine at high speed under no-load.	0.6 - 0.8V
42 52	Crank angle sensor (Position signal)	Engine is running. Do not run engine at high speed under no-load.	2.0 - 2.6V
43	Start signal	Cranking	8 - 12V
44	Neutral switch & Inhibitor switch	Ignition switch "ON" Neutral/Parking Ignition switch "ON" Except the above gear position	0V 4 - 5V
45	Ignition switch	Ignition switch "OFF" Ignition switch "ON"	0V BATTERY VOLTAGE (11 - 14V)
46	Air conditioner	Engine is running. Both air conditioner switch and blower switch are "ON".	0V

TROUBLE DIAGNOSES

Electrical Components Inspection (Cont'd)

E.C.U. INPUT/OUTPUT SIGNAL INSPECTION

E.C.U. inspection table

*Data are reference values.

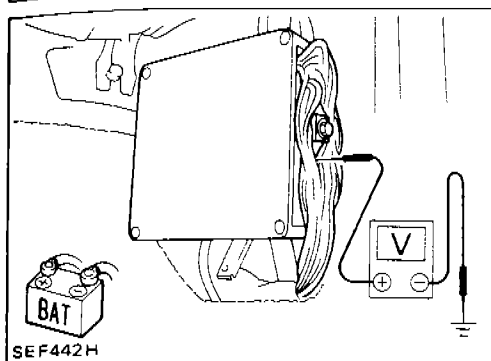
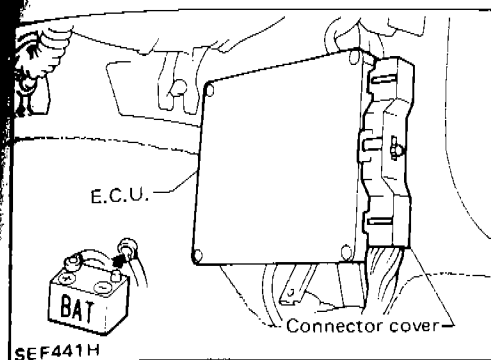
TERMI- NAL NO.	ITEM	CONDITION	DATA*
1	Ignition signal for No. 1 cylinder	Engine is running. └ Idle speed └ Engine speed is approximately 2,500 rpm.	0.06V 0.12 - 0.13V
2	Ignition signal for No. 2 cylinder		
3	Ignition signal for No. 3 cylinder		
11	Ignition signal for No. 4 cylinder		
6	Air conditioner relay	A/C switch "OFF"	BATTERY VOLTAGE (11 - 14V)
		A/C switch "ON"	0 - 1.0V
7	Tachometer	Engine is running. └ Idle speed └ Engine speed is approximately 2,500 rpm.	0.9V 1.7V
16	E.C.C.S. relay	Ignition switch "ON"	0 - 1.0V
		Ignition switch "OFF"	BATTERY VOLTAGE (11 - 14V)
18	Fuel pump relay	Ignition switch "ON" └ For 5 seconds after turning ignition switch "ON"	0.7 - 0.9V
		Engine is running.	
		Ignition switch "ON" └ In 5 seconds after turning ignition switch "ON"	BATTERY VOLTAGE (11 - 14V)
23	Detonation sensor	Engine is running. └ Idle speed	3 - 4V

TROUBLE DIAGNOSES

Electrical Components Inspection

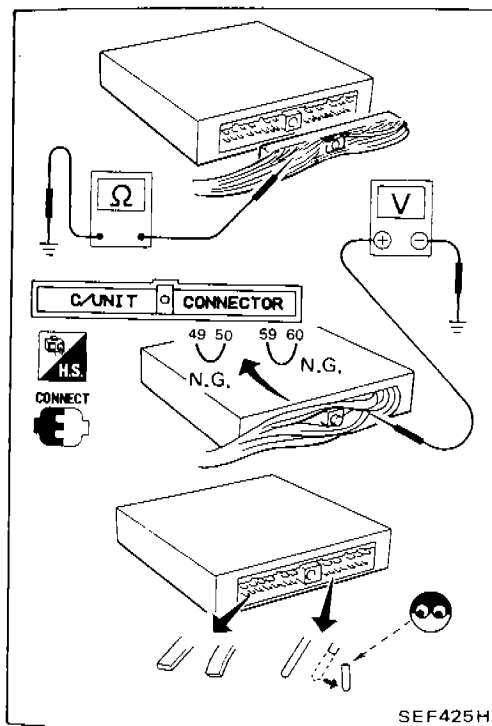
MEASUREMENT VOLTAGE OR RESISTANCE OF E.C.U.

1. Disconnect battery ground cable.
2. Remove dash side panel from vehicle.
3. Disconnect connector cover from E.C.U.
4. Connect battery ground cable.
5. Measure the voltage at each terminal by following "E.C.U. inspection table".



CAUTION:

- a. Perform all voltage measurements with the connectors connected.
- b. Perform all resistance measurements with the connectors disconnected.
- c. Make sure that there are not any bends or breaks on E.C.U. pin terminal before measurements.
- d. Do not touch tester probes between terminals ④9 and ⑤0, ⑤9 and ⑥0.

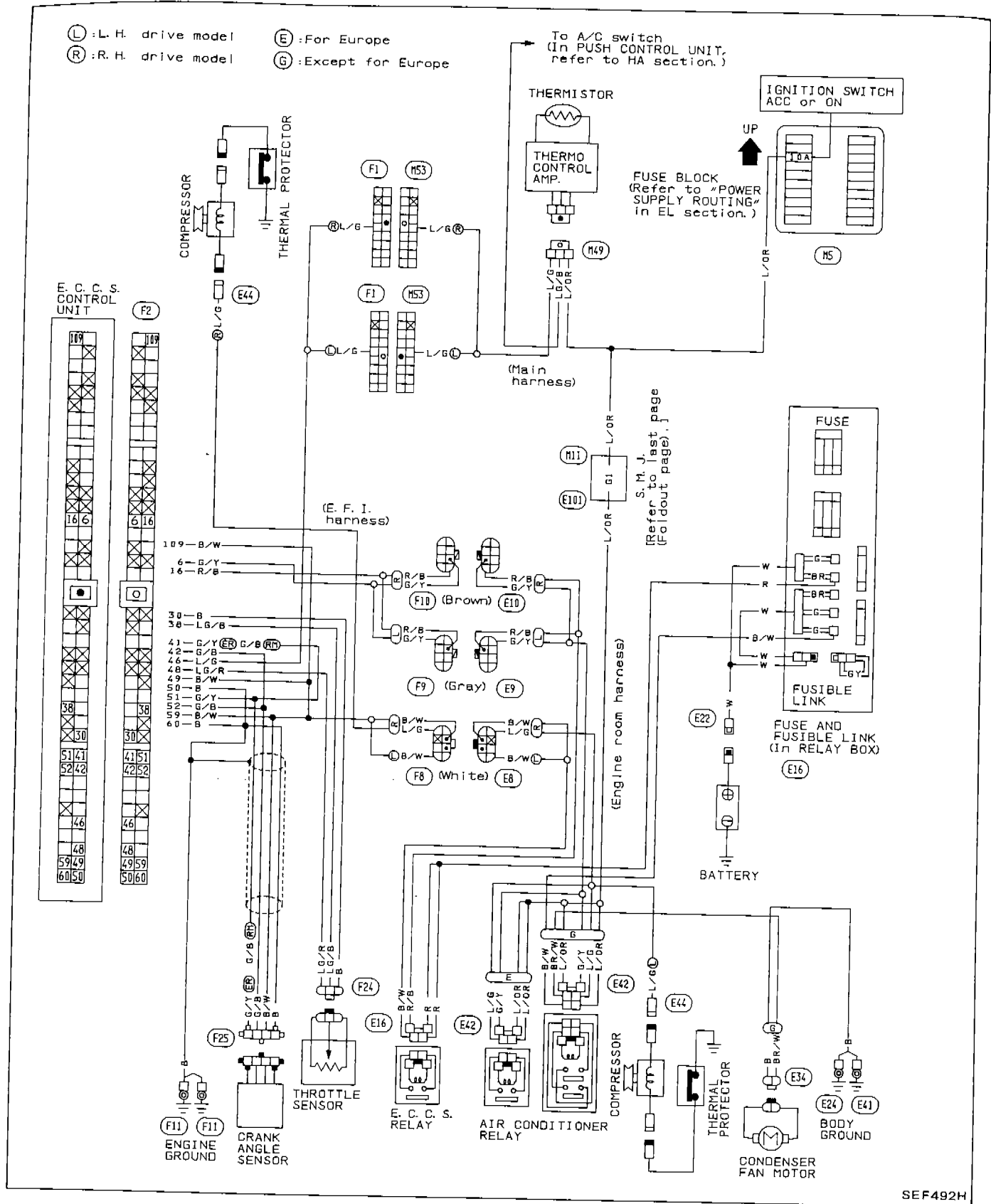


TROUBLE DIAGNOSES

Diagnostic Procedure 18

ACCELERATION CUT CONTROL (Not self-diagnostic item)

- (L) : L. H. drive model (E) : For Europe
(R) : R. H. drive model (G) : Except for Europe



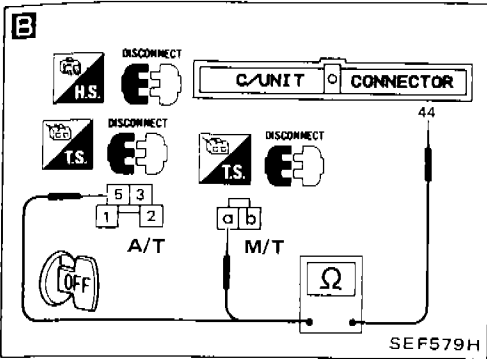
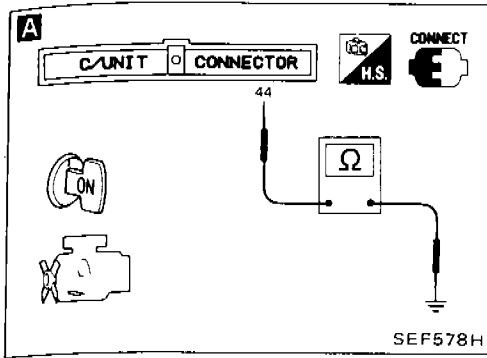
For inspection of this system, refer to HA section.

EF & EC-118

SEF492H

TROUBLE DIAGNOSES

Diagnostic Procedure 17 (Cont'd)



INSPECTION START

A

CHECK INPUT SIGNAL.

- 1) Turn ignition switch "ON".
- 2) Check continuity between terminal ④ and ground.

M/T model

Shift lever position	Continuity
"Neutral"	Yes
Except "Neutral"	No

A/T model

Shift lever position	Continuity
"Neutral" or "Park"	Yes
Except "Neutral" or "Park"	No

O.K.

INSPECTION END

N.G.

B

- 1) Turn ignition switch "OFF".
- M/T model —
- 2) Disconnect E.C.U. harness connector and neutral switch harness connector.
- 3) Check resistance between terminals ④ and ①.
- A/T model —
- 2) Disconnect E.C.U. harness connector and inhibitor relay.
- 3) Check resistance between terminals ④ and ⑤.

Resistance:

Approximately 0Ω

N.G.

Repair or replace harness or connectors.

O.K.

CHECK COMPONENT.

M/T model

- Neutral switch

A/T model

- Inhibitor switch and relay
- (See page EF & EC-127.)

N.G.

Repair or replace.

O.K.

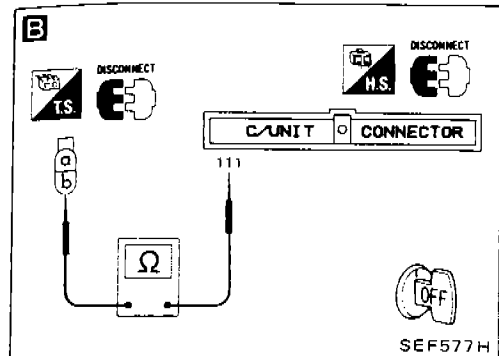
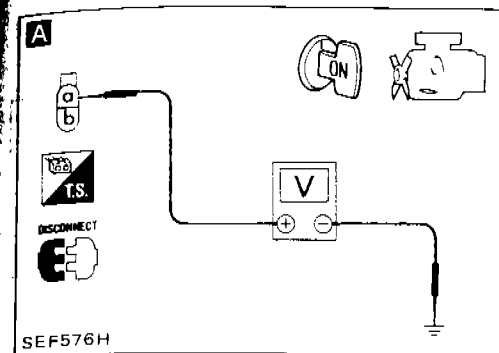
INSPECTION END

Diagnostic Procedure 17

[illegible]

TROUBLE DIAGNOSES

Diagnostic Procedure 16 (Cont'd)



INSPECTION START

A

CHECK POWER SOURCE.

- 1) Disconnect pressure regulator control solenoid valve harness connector.
- 2) Turn ignition switch "ON".
- 3) Check voltage between terminal **b** and ground.

Voltage: Battery voltage

N.G.

Check the following items:

- 1) "10A" fuse
- 2) Ignition switch
- 3) Middle harness connector

O.K.

B

CHECK GROUND CIRCUIT.

- 1) Turn ignition switch "OFF".
- 2) Disconnect E.C.U. harness connector.
- 3) Check resistance between terminals **b** and **111**.

Resistance:

Approximately 0Ω

N.G.

Repair harness or connectors.

O.K.

CHECK COMPONENT

(Pressure regulator control solenoid valve).

Refer to "Electrical Components Inspection".

(See page EF & EC-126.)

N.G.

Replace pressure regulator control solenoid valve.

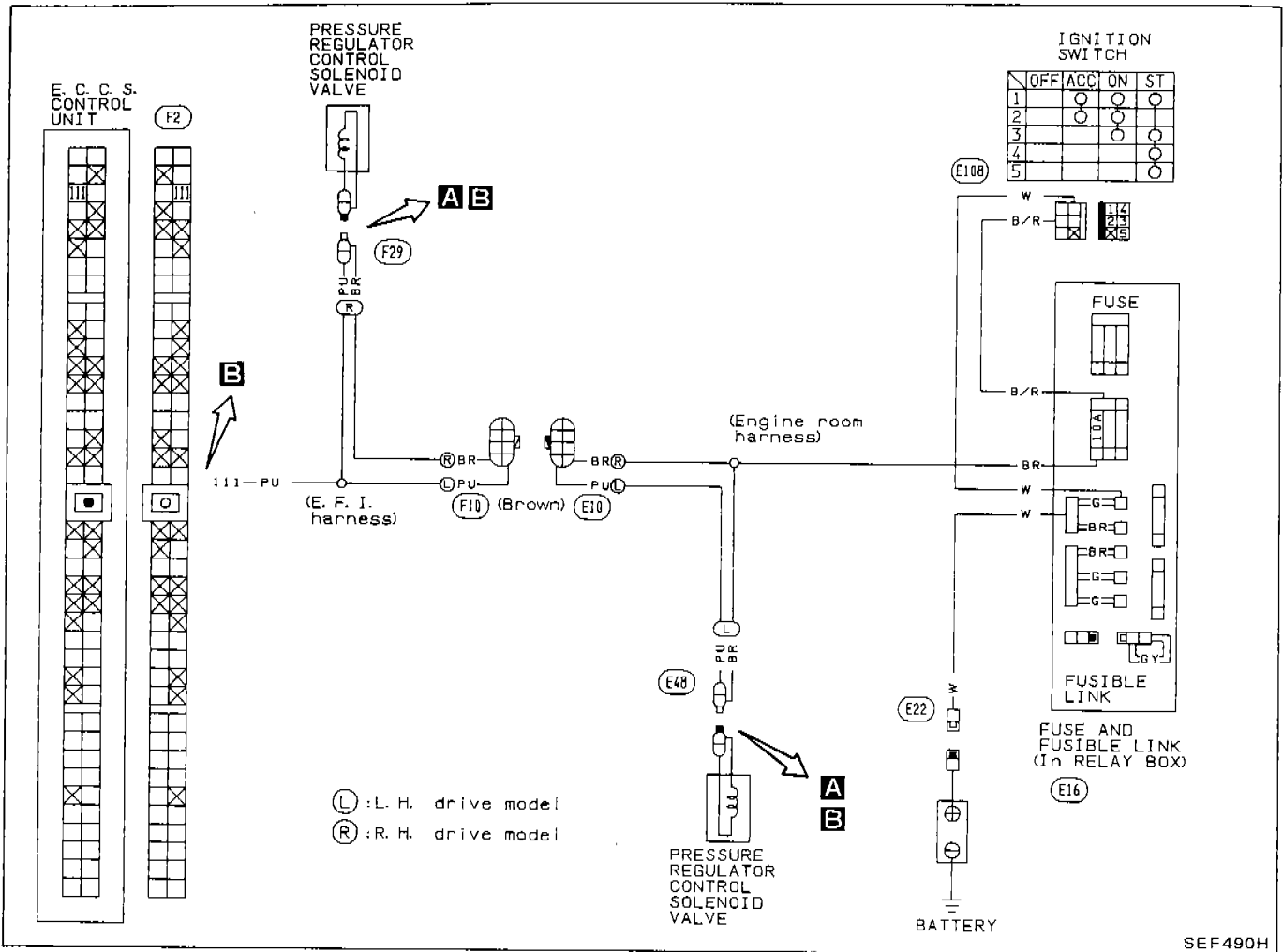
O.K.

INSPECTION END

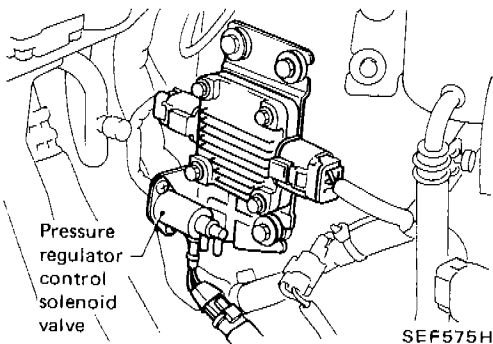
TROUBLE DIAGNOSES

Diagnostic Procedure 16

PRESSURE REGULATOR (P.R.) CONTROL SOLENOID VALVE (Not self-diagnostic item)

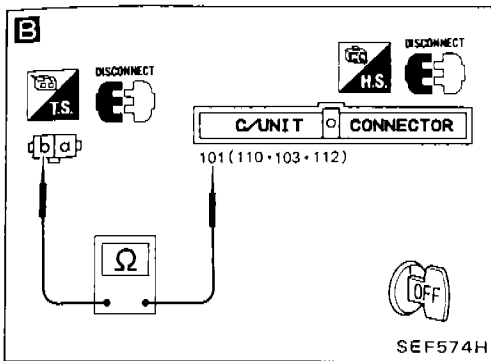
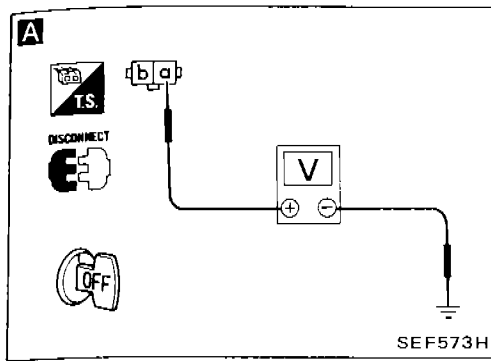


Component location



TROUBLE DIAGNOSES

Diagnostic Procedure 15 (Cont'd)



INSPECTION START

A

CHECK POWER SOURCE.

- 1) Disconnect injector harness connector.
- 2) Check voltage between terminal **a** and ground.

Voltage: Battery voltage

N.G.

Check the following items:

- 1) Dropping resistor (See page EF & EC-128.)
- 2) "BR" fusible link
- 3) Middle harness connector

O.K.

B

CHECK GROUND CIRCUIT.

- 1) Disconnect E.C.U. harness connector.
- 2) Check resistance between terminals **b** and **101** (No. 1 cylinder), **110** (No. 2 cylinder), **103** (No. 3 cylinder), **112** (No. 4 cylinder).

Resistance:

Approximately 0Ω

N.G.

Repair harness or connectors.

O.K.

CHECK COMPONENT (Injector).

Refer to "Electrical Components Inspection". (See page EF & EC-125.)

N.G.

Replace injector.

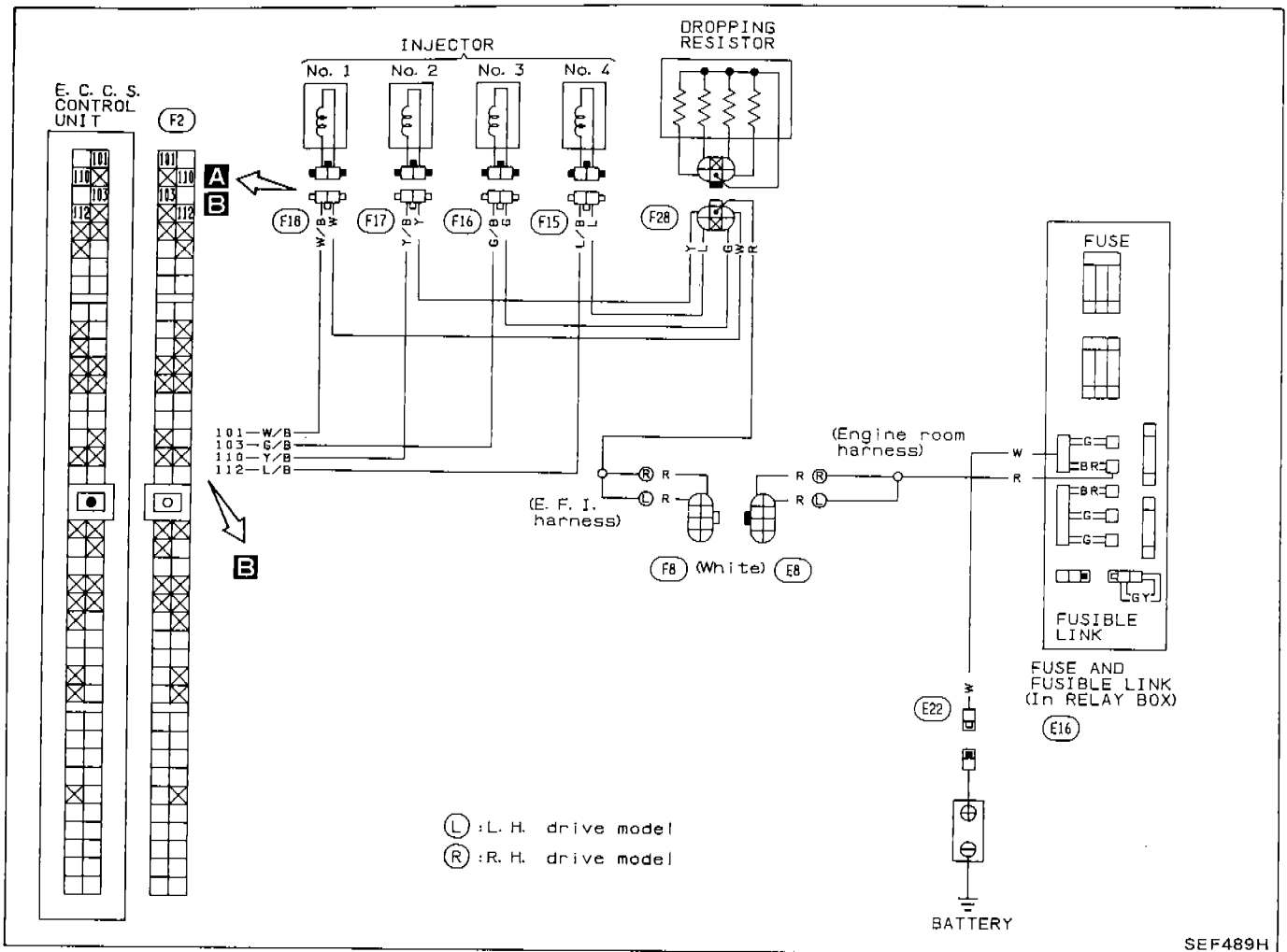
O.K.

INSPECTION END

TROUBLE DIAGNOSES

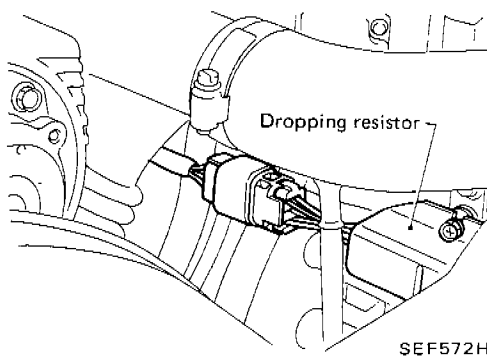
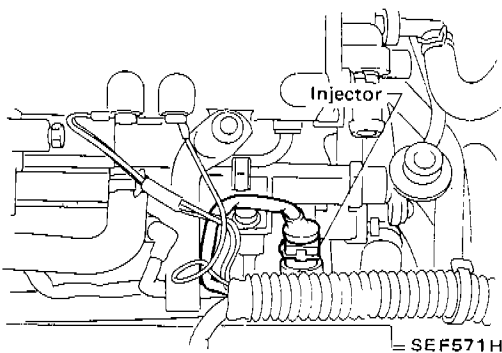
Diagnostic Procedure 15

INJECTOR (Not self-diagnostic item)



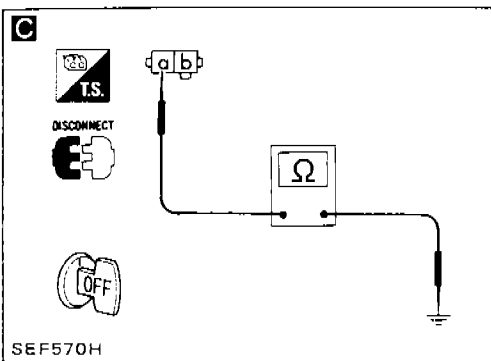
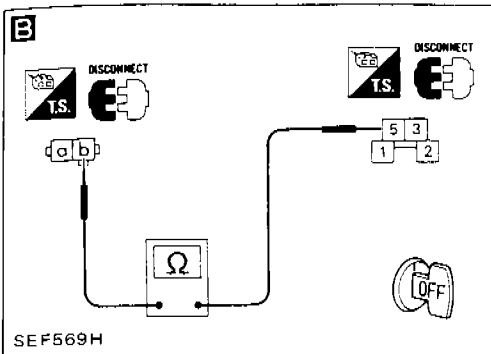
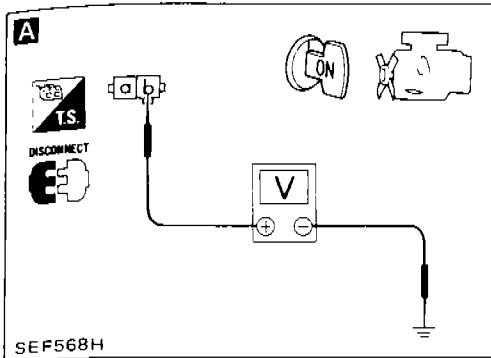
SEF489H

Component location



TROUBLE DIAGNOSES

Diagnostic Procedure 14 (Cont'd)



INSPECTION START

A

CHECK POWER SOURCE.

- 1) Disconnect air regulator harness connector.
- 2) Turn ignition switch "ON".
- 3) Make sure there is battery voltage between terminal **b** and ground for 5 seconds after turning ignition switch "ON".

B

CHECK HARNESS CONTINUITY BETWEEN AIR REGULATOR AND FUEL PUMP RELAY.

- 1) Turn ignition switch "OFF".
- 2) Disconnect fuel pump relay.
- 3) Check continuity between terminals **5** and **b**.
Continuity should exist.

CHECK COMPONENT
(Fuel pump relay).
Refer to "Electrical Components Inspection".
(See page EF & EC-128.)

C

CHECK GROUND CIRCUIT.

- 1) Turn ignition switch "OFF".
- 2) Check continuity between terminal **a** and ground.
Resistance:
Approximately 0Ω

Repair harness or connectors, if necessary.

CHECK COMPONENT
(Air regulator).
Refer to "Electrical Components Inspection".
(See page EF & EC-126.)

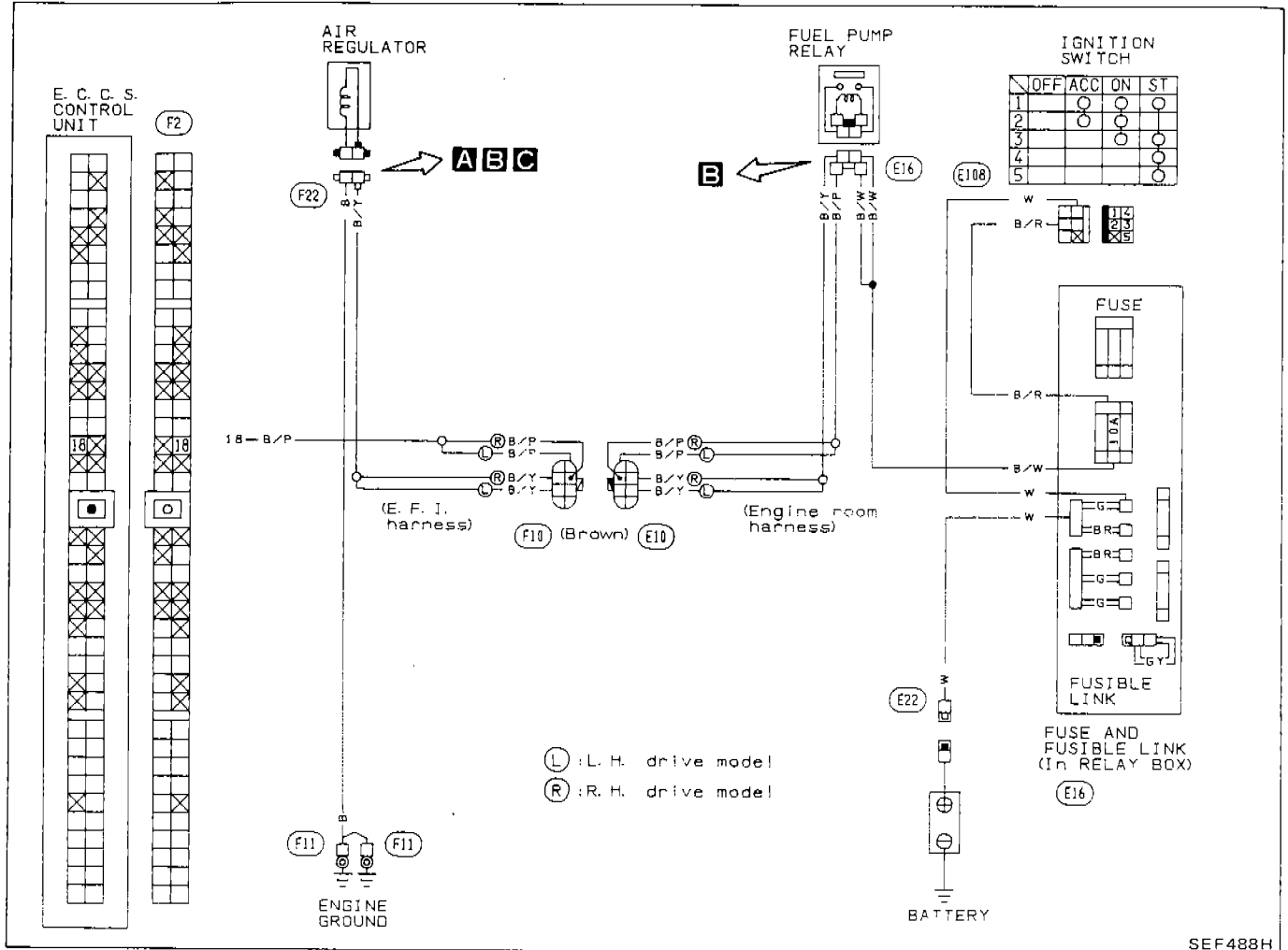
Replace air regulator.

INSPECTION END

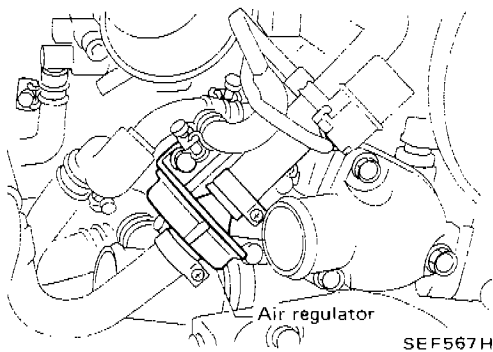
TROUBLE DIAGNOSES

Diagnostic Procedure 14

AIR REGULATOR (Not self-diagnostic item)

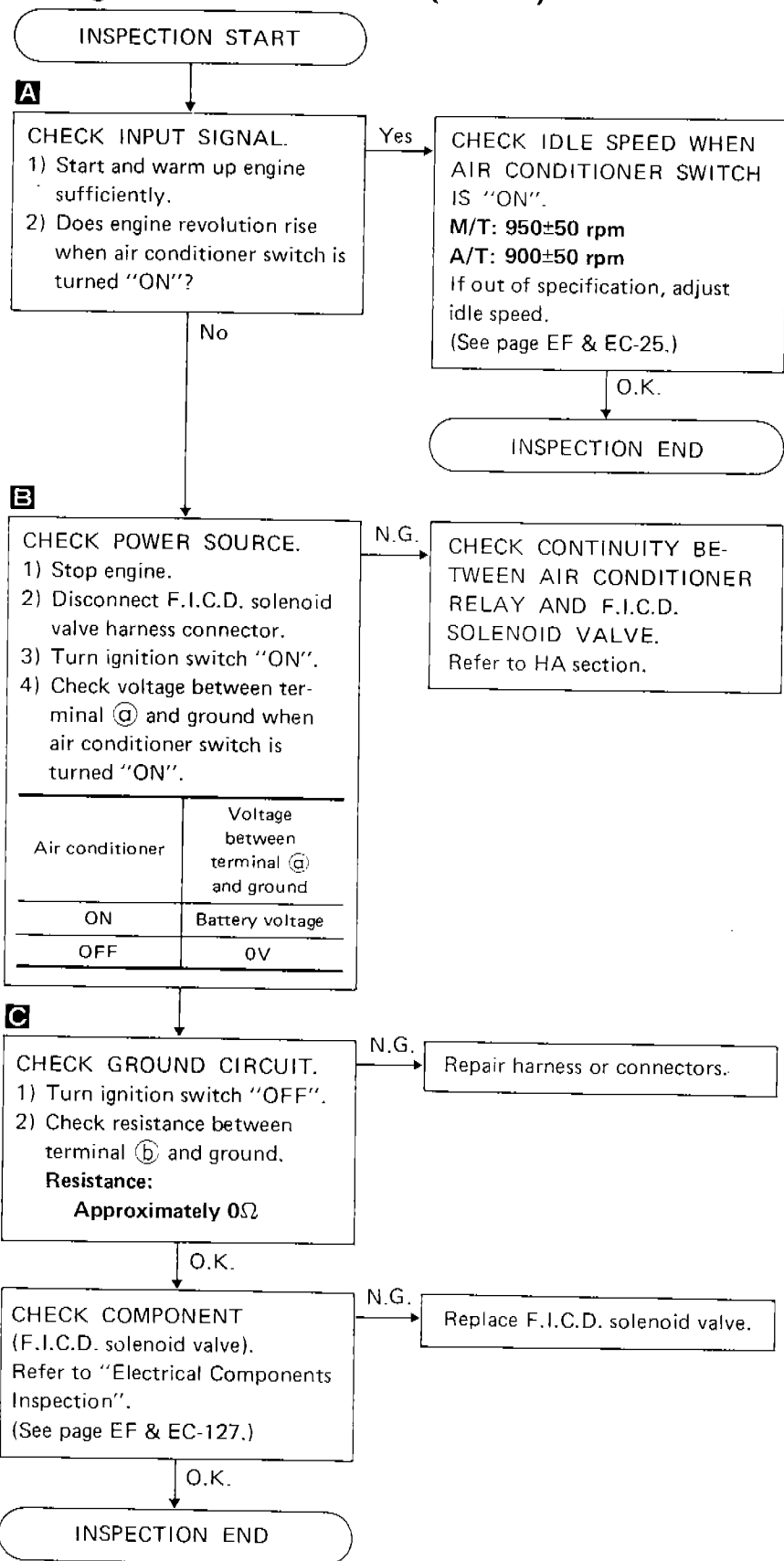
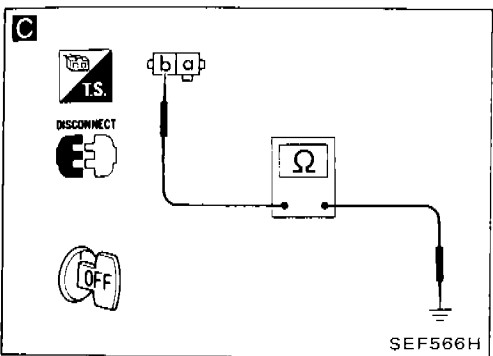
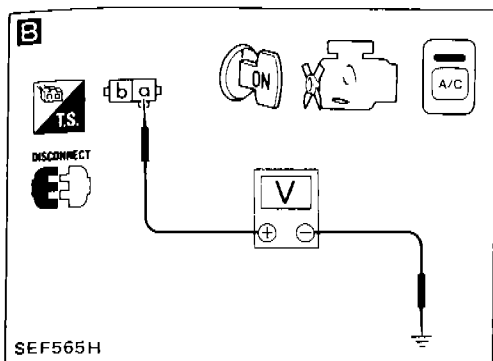
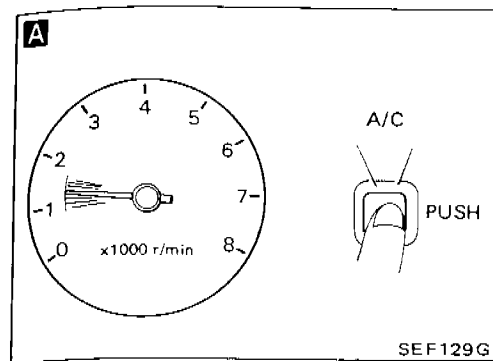


Component location



TROUBLE DIAGNOSES

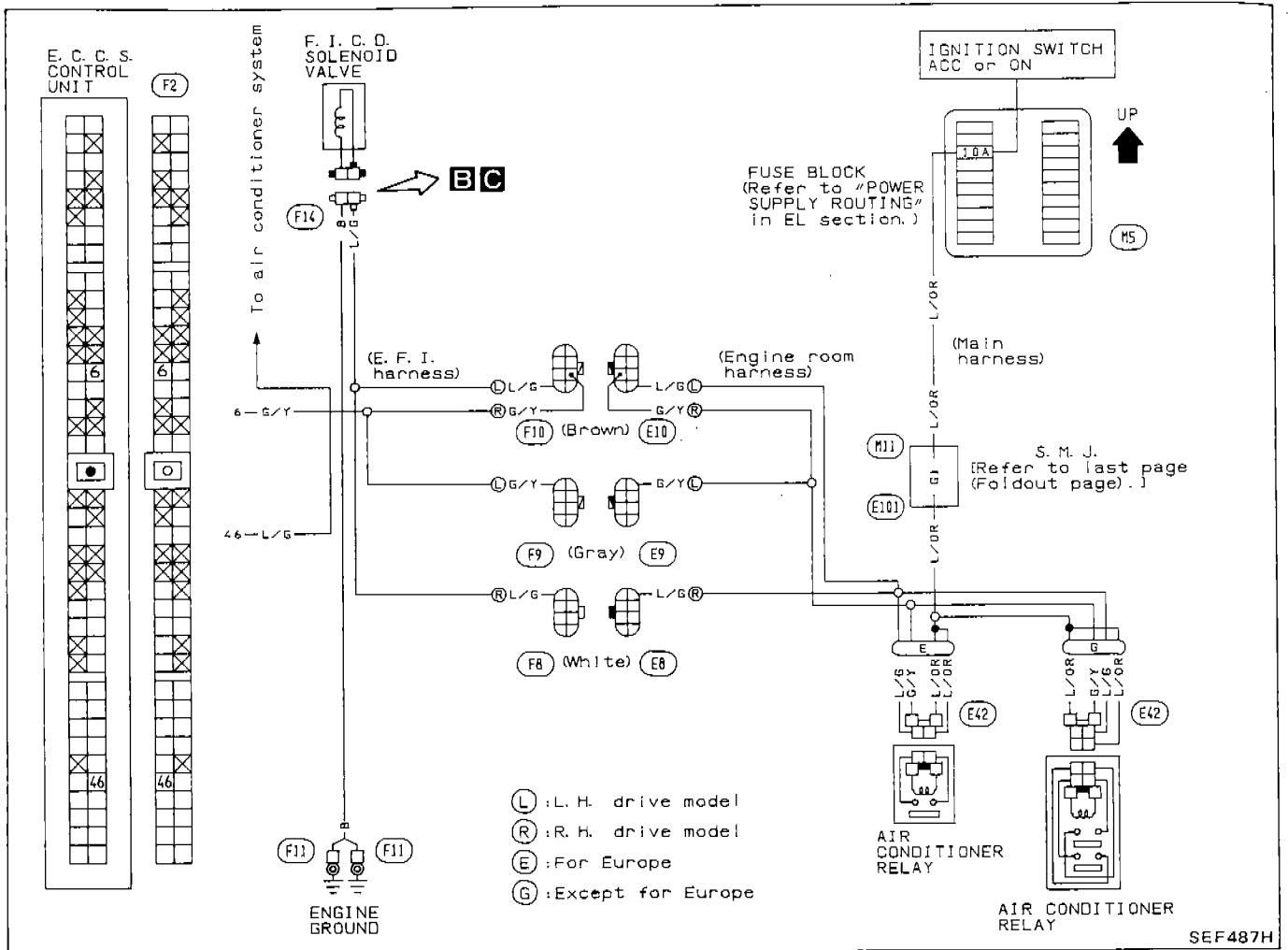
Diagnostic Procedure 13 (Cont'd)



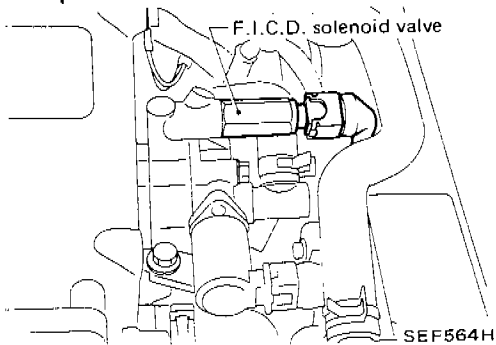
TROUBLE DIAGNOSES

Diagnostic Procedure 13

I.A.A. CONTROL (F.I.C.D. CONTROL) (Not self-diagnostic item)

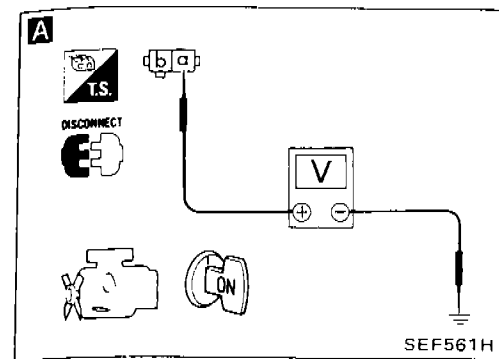


Component location



TROUBLE DIAGNOSES

Diagnostic Procedure 12 (Cont'd)



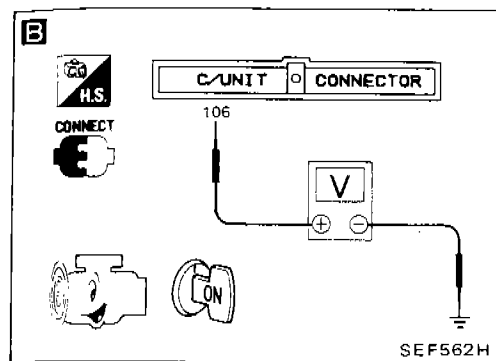
INSPECTION START

CHECK COMPONENT

(A.A.C. valve).

Refer to "Electrical Components Inspection".

(See page EF & EC-125.)



CHECK POWER SOURCE.

- 1) Disconnect A.A.C. valve harness connector.
- 2) Turn ignition switch "ON".
- 3) Check voltage between terminal ⑩ and ground.

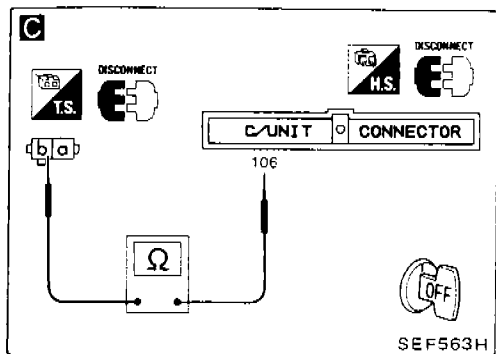
Voltage: Battery voltage

If N.G., repair harness or connectors.

N.G.

Check the following items:

- 1) "10A" fuse
- 2) Ignition switch
- 3) Middle harness connector



CHECK INPUT SIGNAL.

- 1) Reconnect A.A.C. valve harness connector.
- 2) Start engine and warm it up sufficiently.
- 3) Check voltage between E.C.U. terminal ⑩ and ground.

Voltage:

Approximately 6 - 12V

N.G.

CHECK CONTINUITY BETWEEN E.C.U. AND A.A.C. VALVE.

- 1) Stop engine.
- 2) Disconnect E.C.U. harness connector.
- 3) Disconnect A.A.C. valve harness connector.
- 4) Check resistance between terminals ⑩ and ⑥.

Resistance:

Approximately 0Ω

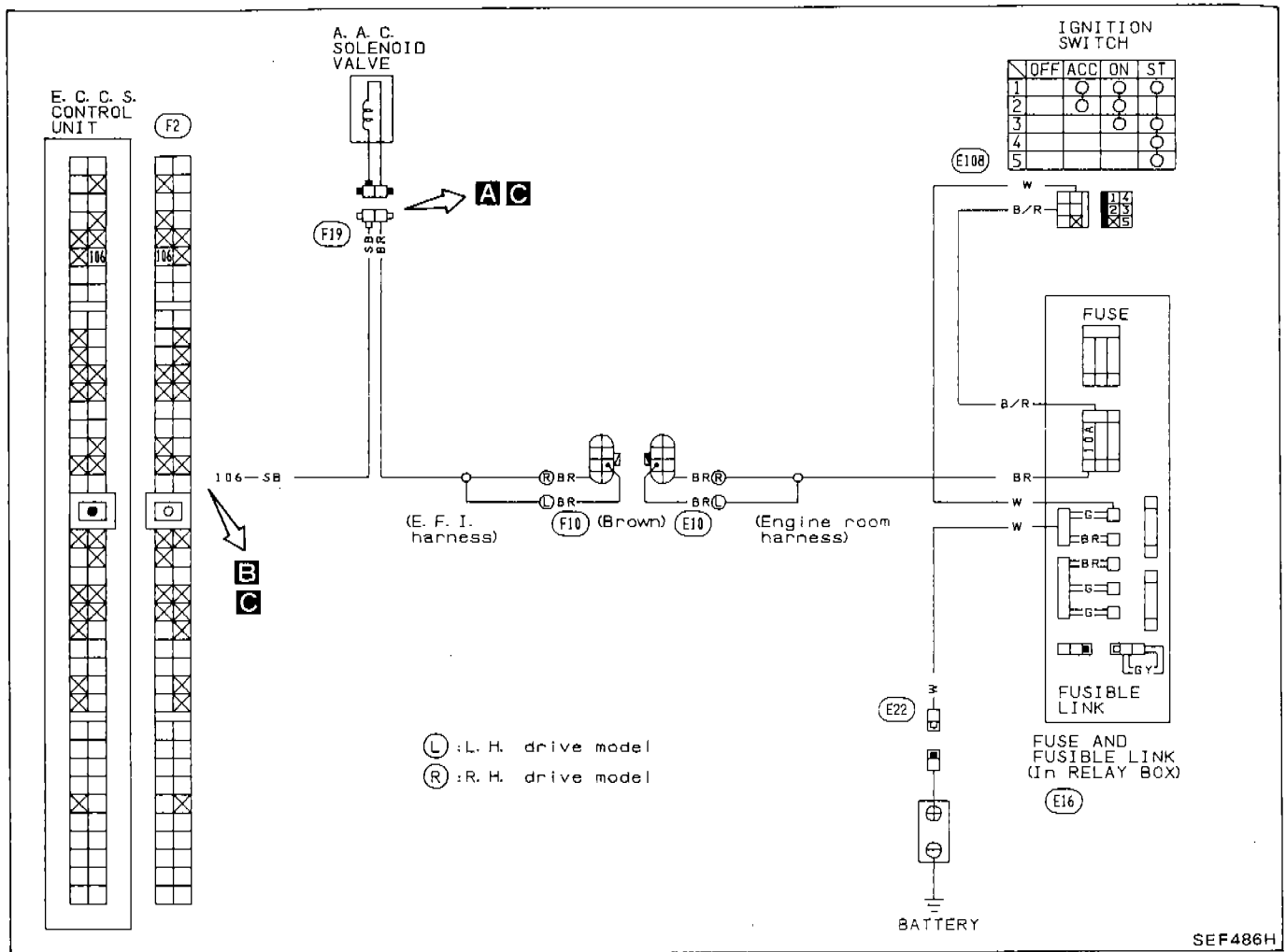
O.K.

INSPECTION END

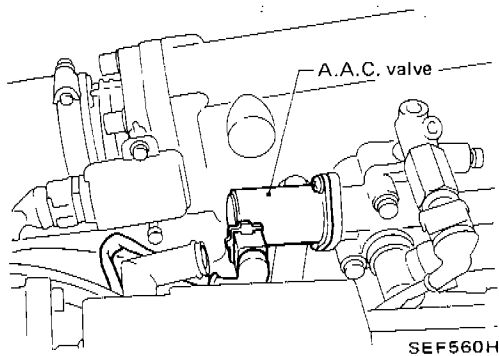
TROUBLE DIAGNOSES

Diagnostic Procedure 12

AUXILIARY AIR CONTROL (A.A.C.) VALVE (Not self-diagnostic item)

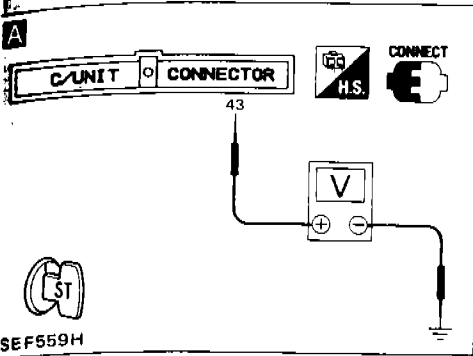


Component location



TROUBLE DIAGNOSES

Diagnostic Procedure 11 (Cont'd)



INSPECTION START

Perform switch ON/OFF diagnosis (in Mode IV).

O.K.

INSPECTION END

N.G.

A
CHECK INPUT SIGNAL.

- 1) Disconnect starter motor "S" terminal.
- 2) Turn ignition switch "START"
- 3) Check voltage between terminal ④ and ground.

Voltage: Battery voltage

If N.G., repair harness and connectors.

N.G.

Check the following items:

- 1) "10A" fuse and "G" fusible link
- 2) Ignition switch
- 3) Middle harness connector

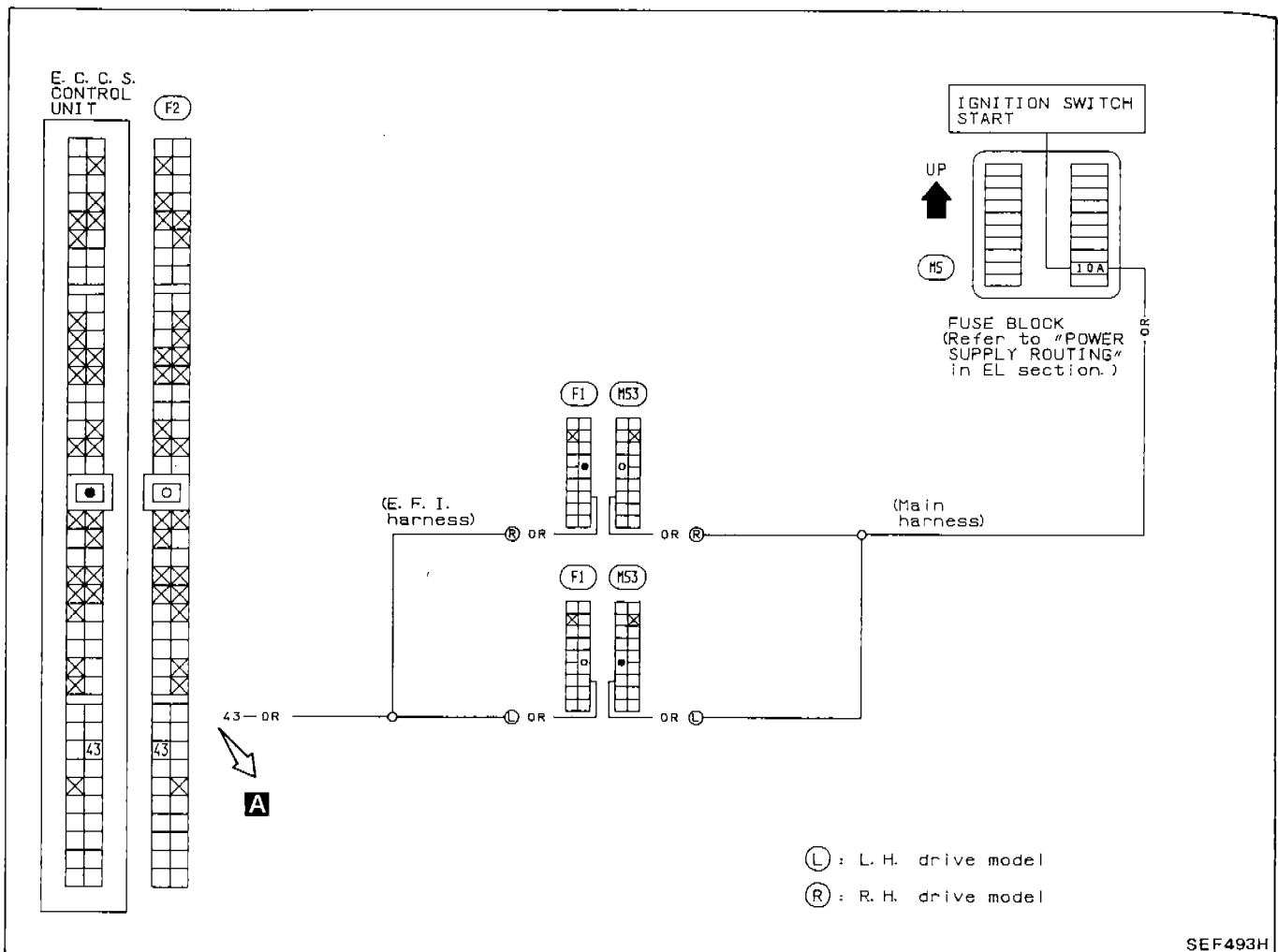
O.K.

INSPECTION END

TROUBLE DIAGNOSES

Diagnostic Procedure 11

START SIGNAL (Switch ON/OFF diagnosis)



TROUBLE DIAGNOSES

Diagnostic Procedure 10 (Cont'd)

INSPECTION START

A

CHECK POWER SOURCE.

- 1) Disconnect fuel pump harness connector.
- 2) Turn ignition switch "ON".
- 3) Make sure there is battery voltage between terminal (b) and ground for 5 seconds after turning ignition switch "ON".

B

CHECK HARNESS CONTINUITY BETWEEN FUEL PUMP AND FUEL PUMP RELAY.

- 1) Turn ignition switch "OFF".
- 2) Disconnect fuel pump relay.
- 3) Disconnect fuel pump harness connector.
- 4) Check continuity between terminals (5) and (b).

CHECK COMPONENT
(Fuel pump relay).
Refer to "Electrical Components Inspection".
(See page EF & EC-128.)

C

CHECK GROUND CIRCUIT.

- 1) Turn ignition switch "OFF".
- 2) Check continuity between terminal (a) and ground.

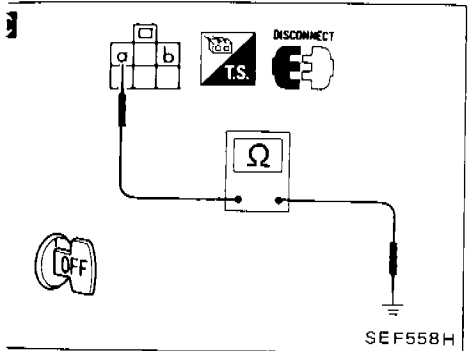
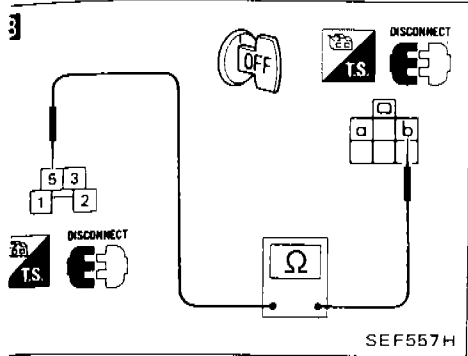
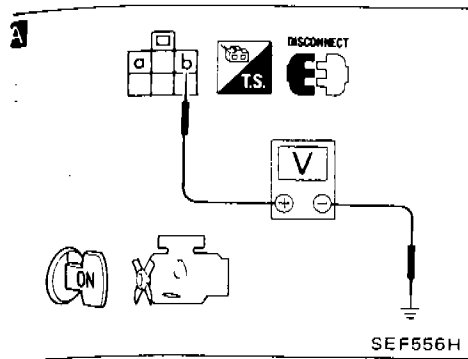
Continuity:
Approximately 0Ω

Repair harness or connectors, if necessary.

CHECK COMPONENT
(Fuel pump).
Refer to "Electrical Components Inspection".
(See page EF & EC-126.)

Replace fuel pump.

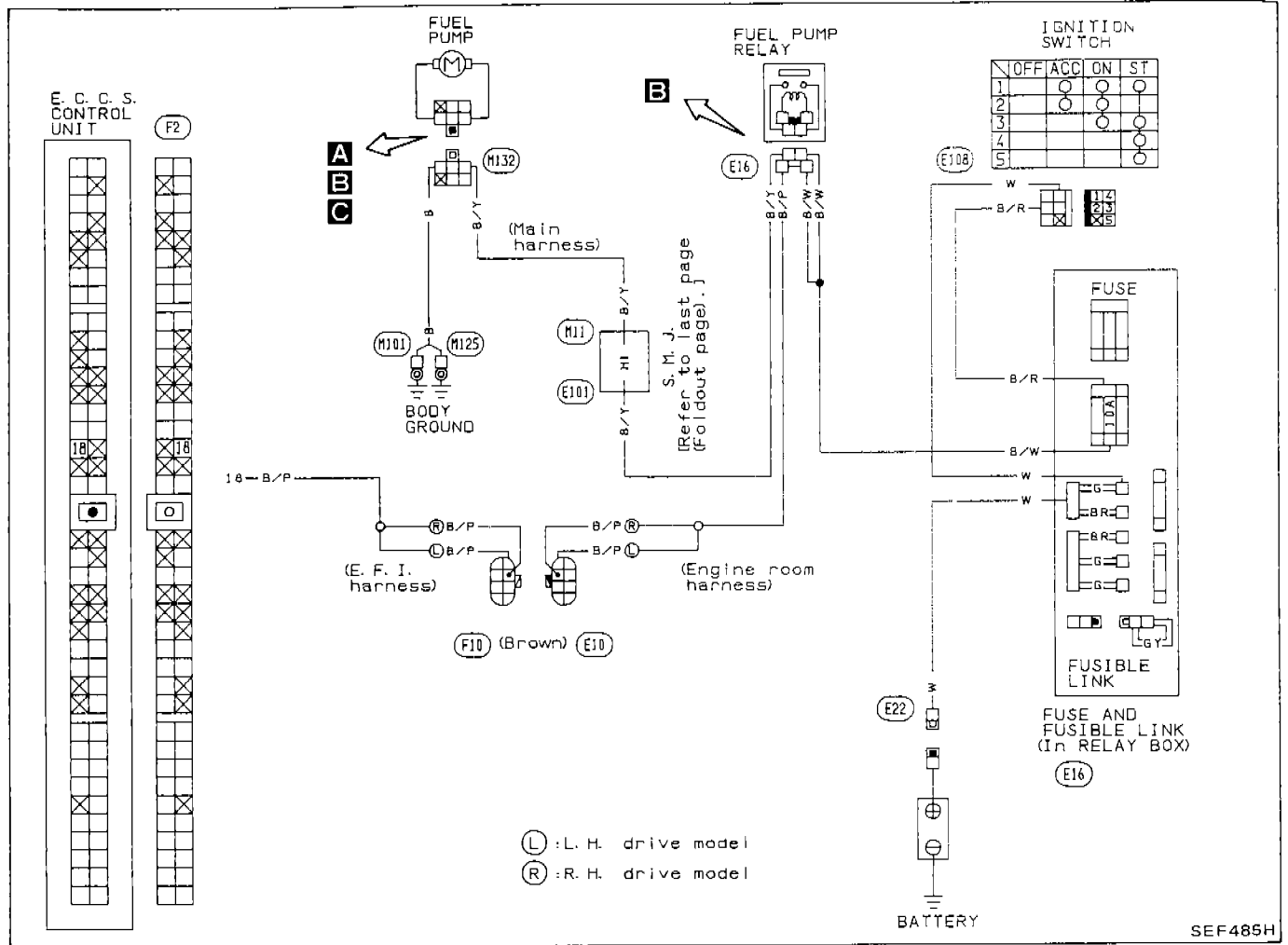
INSPECTION END



TROUBLE DIAGNOSES

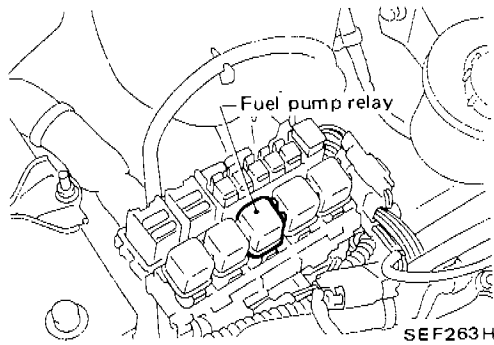
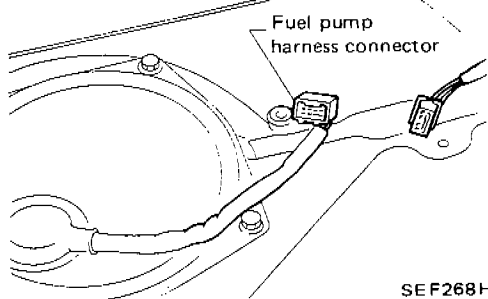
Diagnostic Procedure 10

FUEL PUMP (Not self-diagnostic item)



Component location

In the trunk room



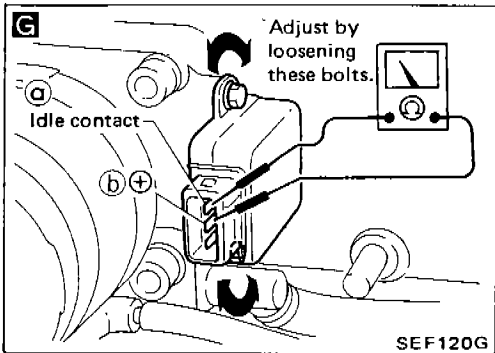
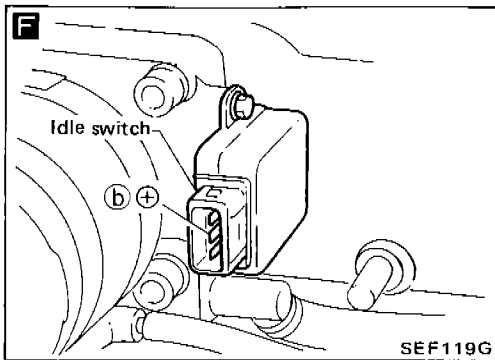
TROUBLE DIAGNOSES

NOTE

EF & EC-101

TROUBLE DIAGNOSES

Diagnostic Procedure 9 (Cont'd)



Disconnect throttle sensor harness connector.

CHECK COMPONENT
(Throttle sensor).
Refer to "Electrical Components Inspection".
(See page EF & EC-124.)

CHECK IDLE SWITCH OFF → ON SPEED.

- 1) Reconnect throttle sensor harness connector.
- F** 2) Disconnect idle switch harness connector.
- 3) Start and warm up engine sufficiently.
- 4) Check idle switch OFF → ON speed with circuit tester, closing throttle valve manually.

Idle switch OFF → ON speed:

M/T Idle speed +
 250 ± 150 rpm

A/T Engine speed (Idle speed in "N" position) +
 250 ± 150 rpm

- G** 5) If N.G., loosen throttle sensor installing screws, then set idle switch OFF → ON speed to the specified value by turning throttle sensor body.
(Connect circuit tester with terminals (a) and (b) on idle switch side and find out OFF → ON point.)
- 6) Tighten throttle sensor installing screws after setting.

TROUBLE DIAGNOSES

Diagnostic Procedure 9 (Cont'd)

INSPECTION START

Perform self-diagnosis (Mode III).
Is code No. 43 indicated?

N.G.

INSPECTION END

O.K.

A

CHECK POWER SOURCE.

- 1) Disconnect throttle sensor harness connector.
- 2) Turn ignition switch "ON".
- 3) Check voltage between terminal $\textcircled{f}$ and ground.

Voltage:

Approximately 5.0V

N.G.

Check the following items.

- B** 1) Harness continuity between throttle sensor harness connector and E.C.U.
- a. Turn ignition switch "OFF".
 - b. Disconnect E.C.U. harness connector.
 - c. Check resistance between $\textcircled{f}$ and $\textcircled{48}$.

Resistance:

Approximately 0Ω

- 2) Middle harness connector
- 3) E.C.C.S. relay

(Refer to page EF & EC-128.)

O.K.

C

CHECK GROUND CIRCUIT.

- 1) Turn ignition switch "OFF" and disconnect E.C.U. harness connector.
- 2) Disconnect throttle sensor harness connector.
- 3) Check resistance between terminal $\textcircled{d}$ and E.C.U. terminal $\textcircled{30}$.

Resistance:

Approximately 0Ω

N.G.

- 1) Check harness continuity between throttle sensor and ground.
- 2) E.C.U. ground circuit.

O.K.

D

CHECK THROTTLE SENSOR CIRCUIT.

Check resistance between terminal $\textcircled{e}$ and E.C.U. terminal $\textcircled{38}$.

Resistance:

Approximately 0Ω

N.G.

Repair or replace harness.

O.K.

E

CHECK INPUT SIGNAL.

- 1) Reconnect E.C.U. harness connector and throttle sensor harness connector.
- 2) Turn ignition switch "ON".
- 3) Make sure that voltage between terminal $\textcircled{38}$ and ground changes when accelerator pedal is depressed.

Voltage:

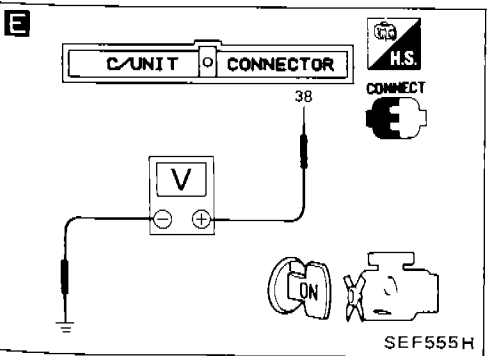
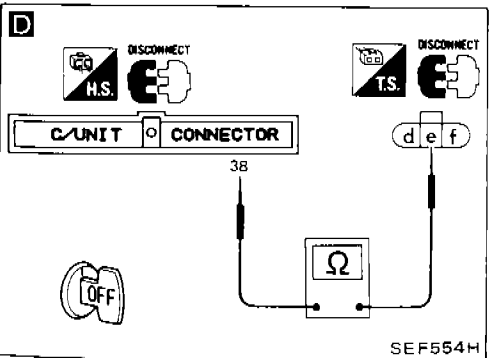
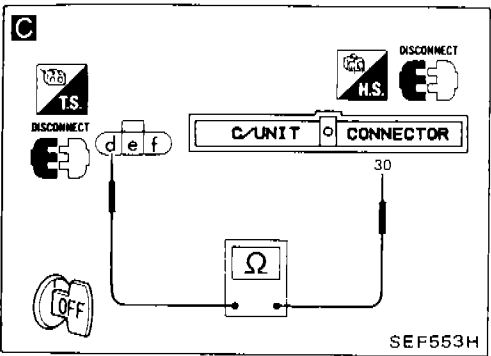
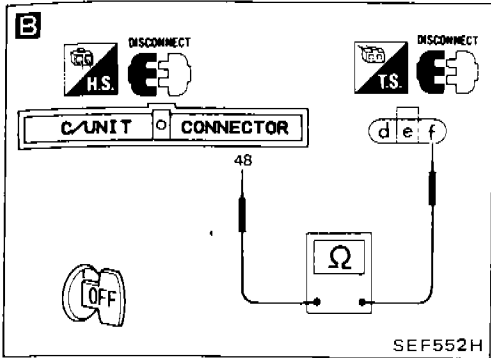
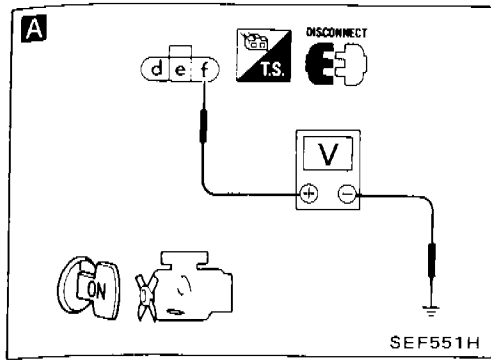
Approximately 0.5 - 4.0V

O.K.

INSPECTION END

N.G.

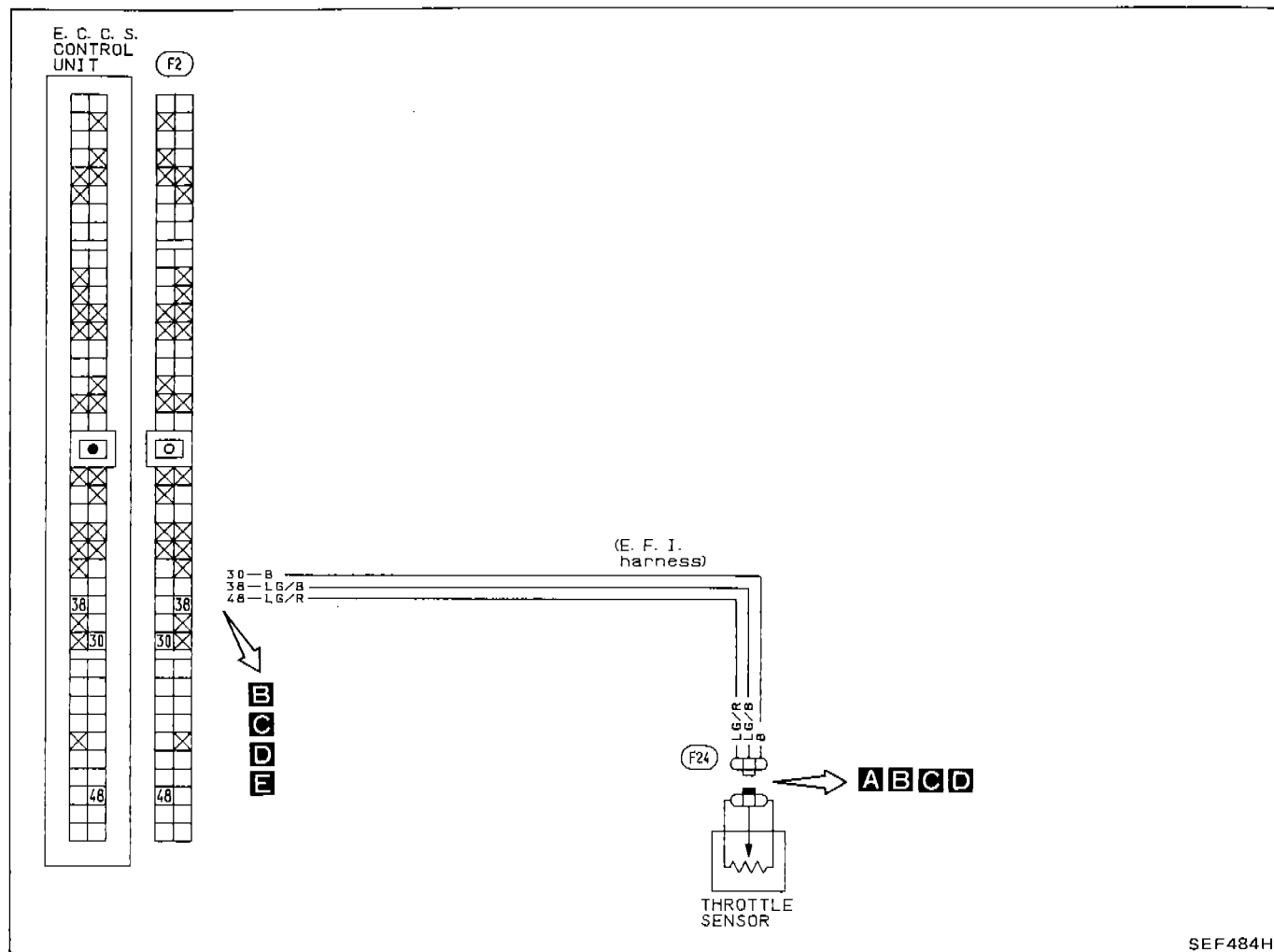
EF & EC-99



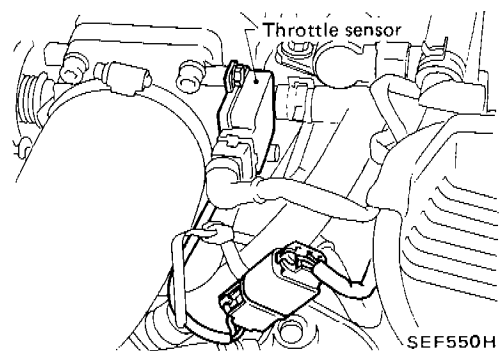
TROUBLE DIAGNOSES

Diagnostic Procedure 9

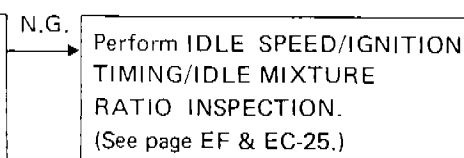
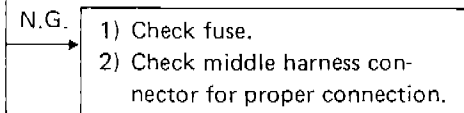
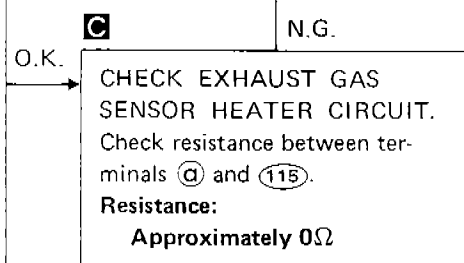
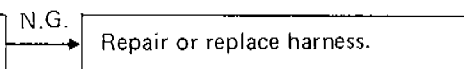
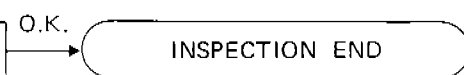
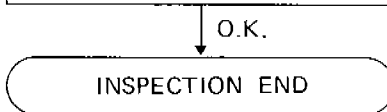
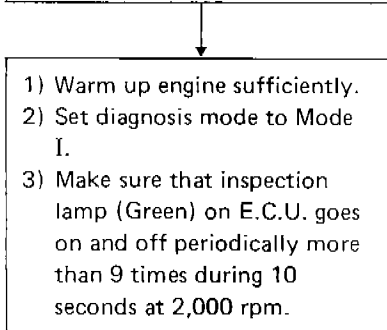
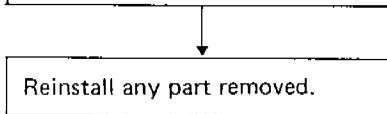
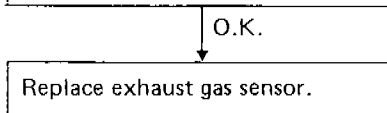
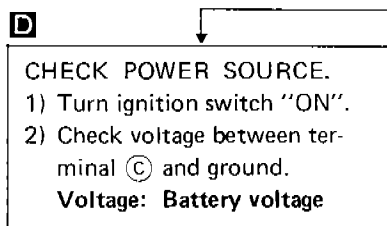
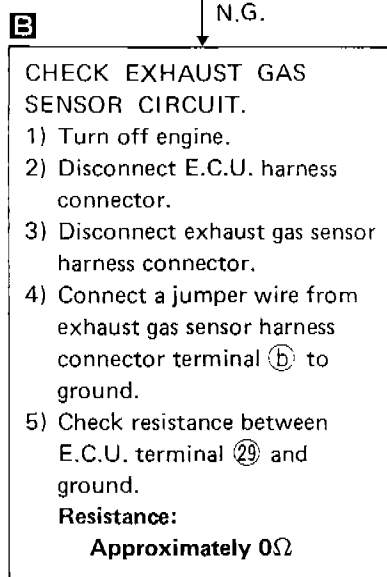
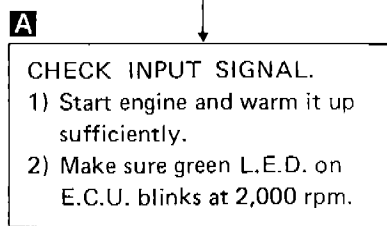
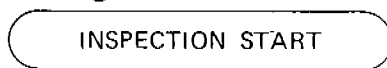
THROTTLE SENSOR (Code No. 43)



Component location



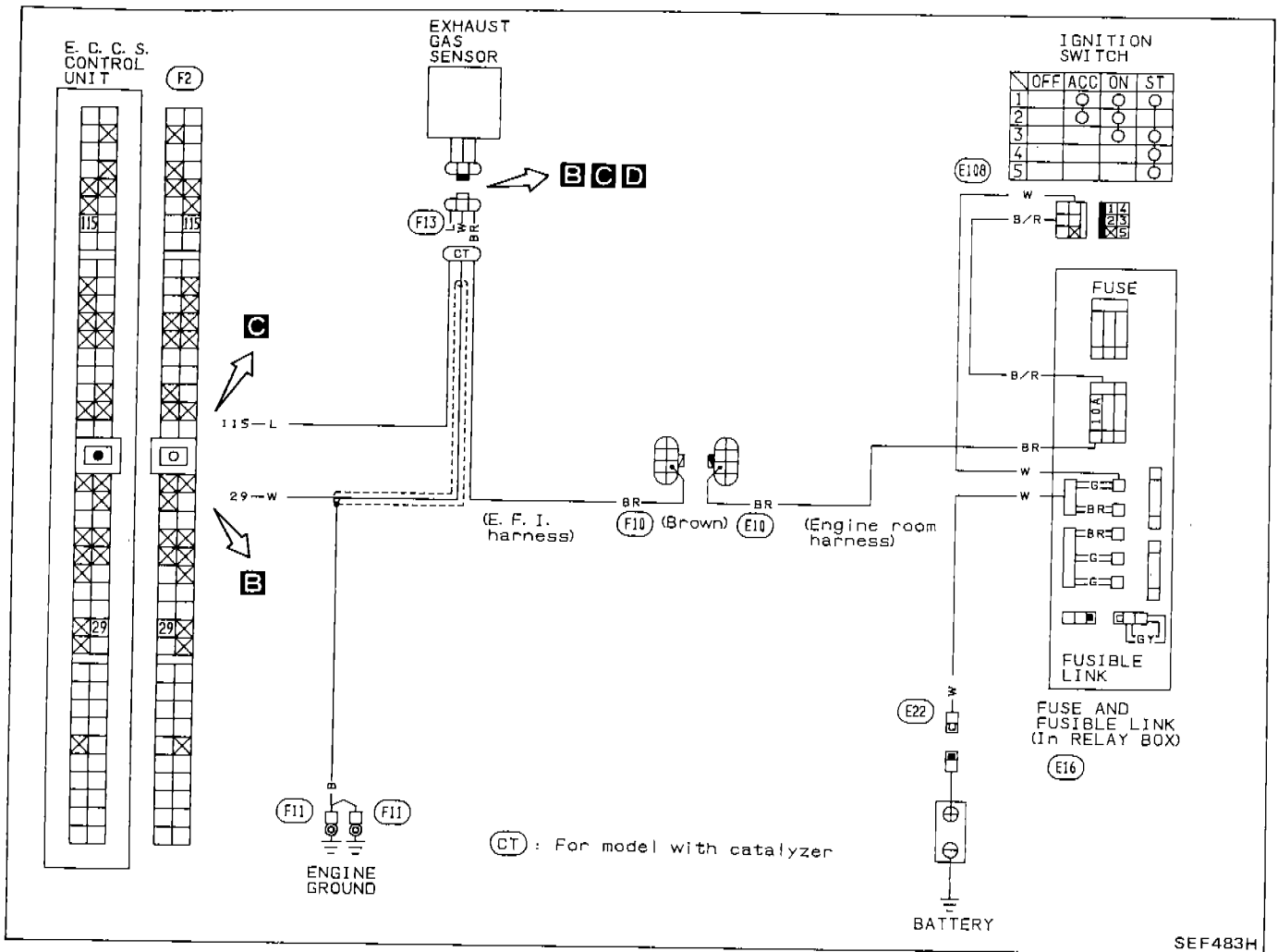
Diagnostic Procedure 8 (Cont'd)



TROUBLE DIAGNOSES

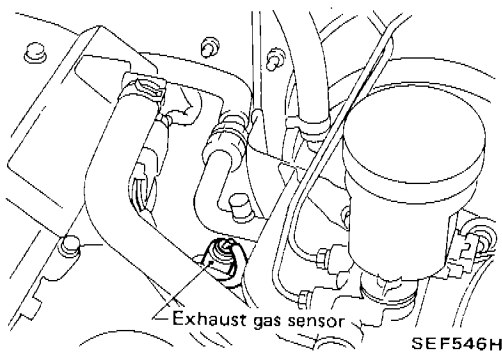
Diagnostic Procedure 8

EXHAUST GAS SENSOR (Not self-diagnostic item)



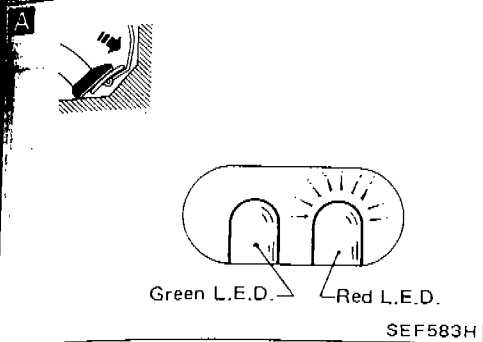
SEF483H

Component location



TROUBLE DIAGNOSES

Diagnostic Procedure 7 (Cont'd)



INSPECTION START

A

CHECK INPUT SIGNAL.
 1) Perform switch ON/OFF diagnosis (in Mode IV).
 2) Make sure red L.E.D. comes "ON" or goes "OFF" when accelerator pedal is depressed.

O.K.

INSPECTION END

B

CHECK POWER SOURCE.
 1) Disconnect idle switch harness connector.
 2) Turn ignition switch "ON".
 3) Check voltage between terminal Ⓔ and ground.
Voltage:
 Approximately 9 - 10V

N.G.

C

CHECK CONTINUITY BETWEEN E.C.U. AND IDLE SWITCH.
 1) Turn ignition switch "OFF".
 2) Disconnect E.C.U. connector.
 3) Disconnect idle switch harness connector.
 4) Check resistance between E.C.U. terminal Ⓢ and terminal Ⓔ.
Resistance:
 Approximately 0Ω
 If N.G., repair or replace harness.

O.K.

CHECK COMPONENT (Idle switch).
 Refer to "Electrical Components Inspection".
 (See page EF & EC-124.)

N.G.

Check if idle switch is installed in proper position.
 If N.G., adjust it by turning idle switch.
 If O.K., replace idle switch.

O.K.

D

CHECK GROUND CIRCUIT.
 Check resistance between E.C.U. terminal Ⓢ and terminal Ⓔ.
Resistance:
 Approximately 0Ω

N.G.

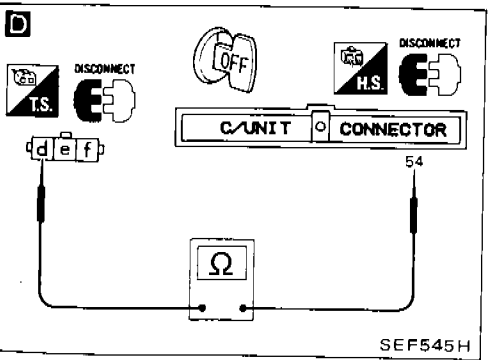
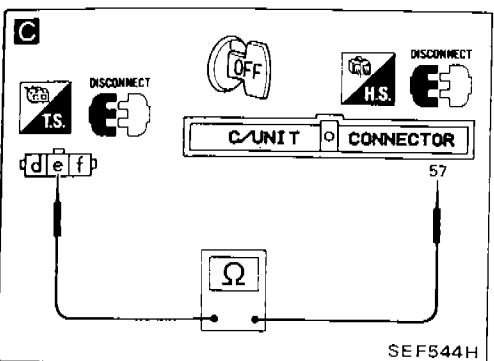
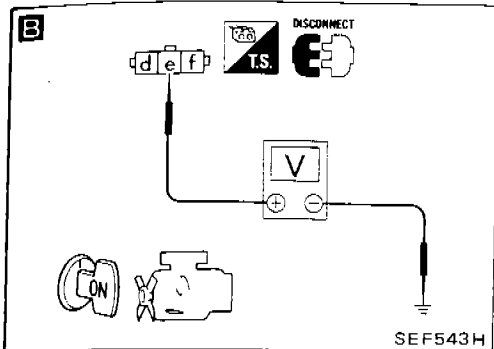
Repair or replace harness.

O.K.

Reinstall any part removed.

CHECK IDLE SWITCH OPERATION.
 1) Perform switch ON/OFF diagnosis (in Mode IV).
 2) Make sure that red L.E.D. comes "ON" or goes "OFF" when accelerator pedal is depressed.

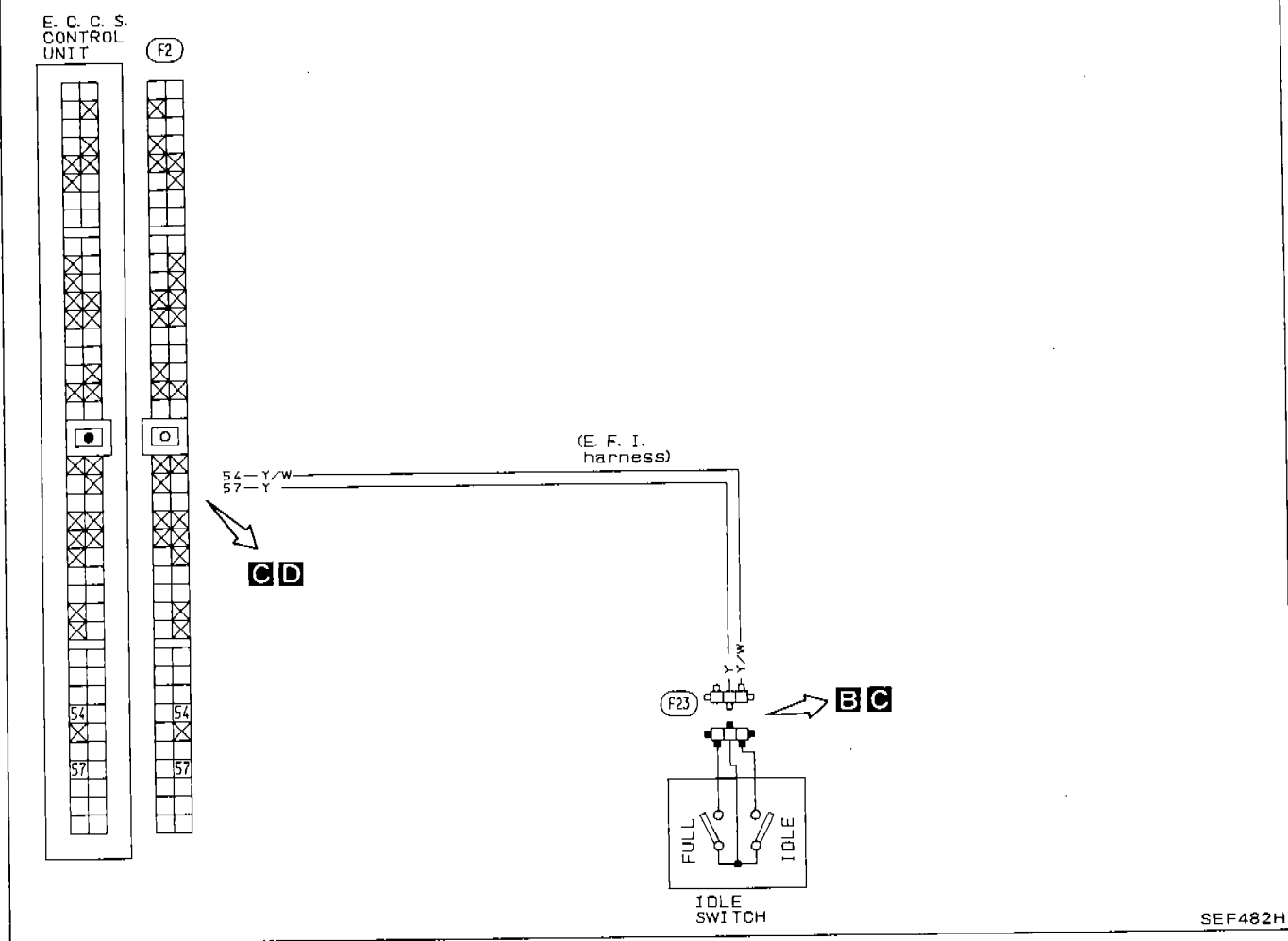
INSPECTION END



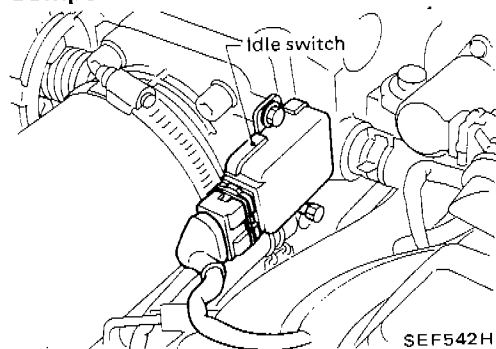
TROUBLE DIAGNOSES

Diagnostic Procedure 7

IDLE SWITCH (Switch ON/OFF diagnosis)



Component location



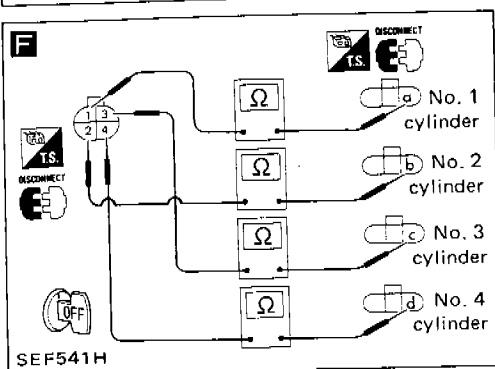
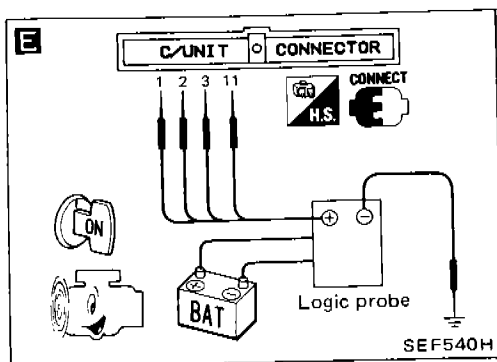
TROUBLE DIAGNOSES

NOTE

EF & EC-93

TROUBLE DIAGNOSES

Diagnostic Procedure 6 (Cont'd)



- E**
- CHECK OUTPUT SIGNAL.**
- 1) Reconnect power transistor harness connector.
 - 2) Reconnect E.C.U. harness connector.
 - 3) Reconnect ignition coil harness connector.
 - 4) Start engine.
 - 5) Make sure that pulse signals exist between E.C.U. terminals ①, ②, ③, ⑪ and ground with logic probe.
- Pulse signal should exist.**

N.G. **CHECK COMPONENT**
(Power transistor).
Refer to "Electrical Components Inspection".
(See page EF & EC-125.)

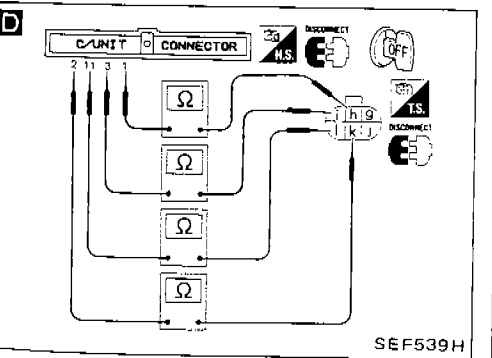
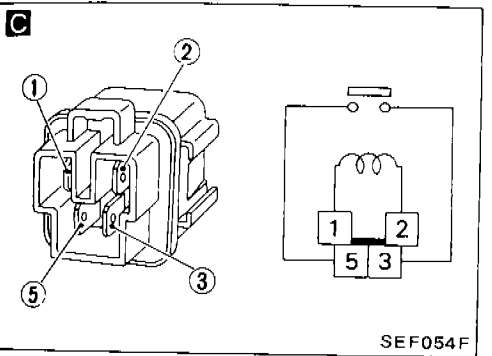
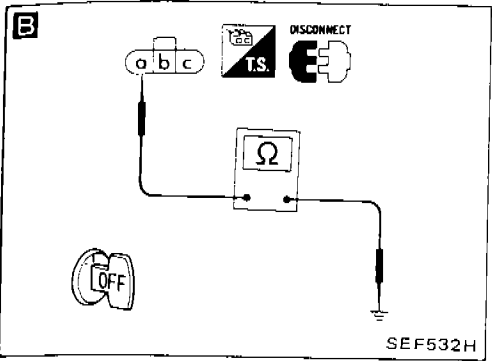
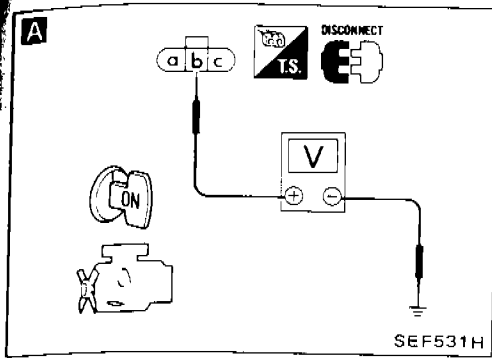
- F**
- CHECK HARNESS CONTINUITY BETWEEN POWER TRANSISTOR AND IGNITION COIL.**
- 1) Stop engine and turn ignition switch "OFF".
 - 2) Disconnect power transistor harness connector and ignition coil harness connector.
 - 3) Check continuity between terminals ① and ①, ② and ②, ③ and ③, ④ and ④.
- Continuity:**
Approximately 0Ω

N.G. **1) Check middle harness connector.**
2) Repair harness or connectors.

O.K.
INSPECTION END

TROUBLE DIAGNOSES

Diagnostic Procedure 6 (Cont'd)



INSPECTION START

Perform self-diagnosis (Mode III).
Is code No. 21 or 34 indicated?

Yes
(Code 21)

No
Yes
(Code 34)

INSPECTION END

CHECK COMPONENT
(Ignition coil).
Refer to "Electrical Components Inspection".
(See page EF & EC-125.)

CHECK COMPONENT
(Detonation sensor).
Refer to "Electrical Components Inspection".
(See page EF & EC-128.)

Replace ignition coil.

A
CHECK POWER SOURCE
1) Turn ignition switch "ON".
2) Check voltage between terminal **b** and ground.
Voltage: Battery voltage

C

Check ignition coil relay.

Condition	Continuity between terminals ③ and ⑤
Supply 12V direct current between terminals ① and ②	Yes
Not supply	No

If N.G., replace relay.

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

Repair harness or connectors.

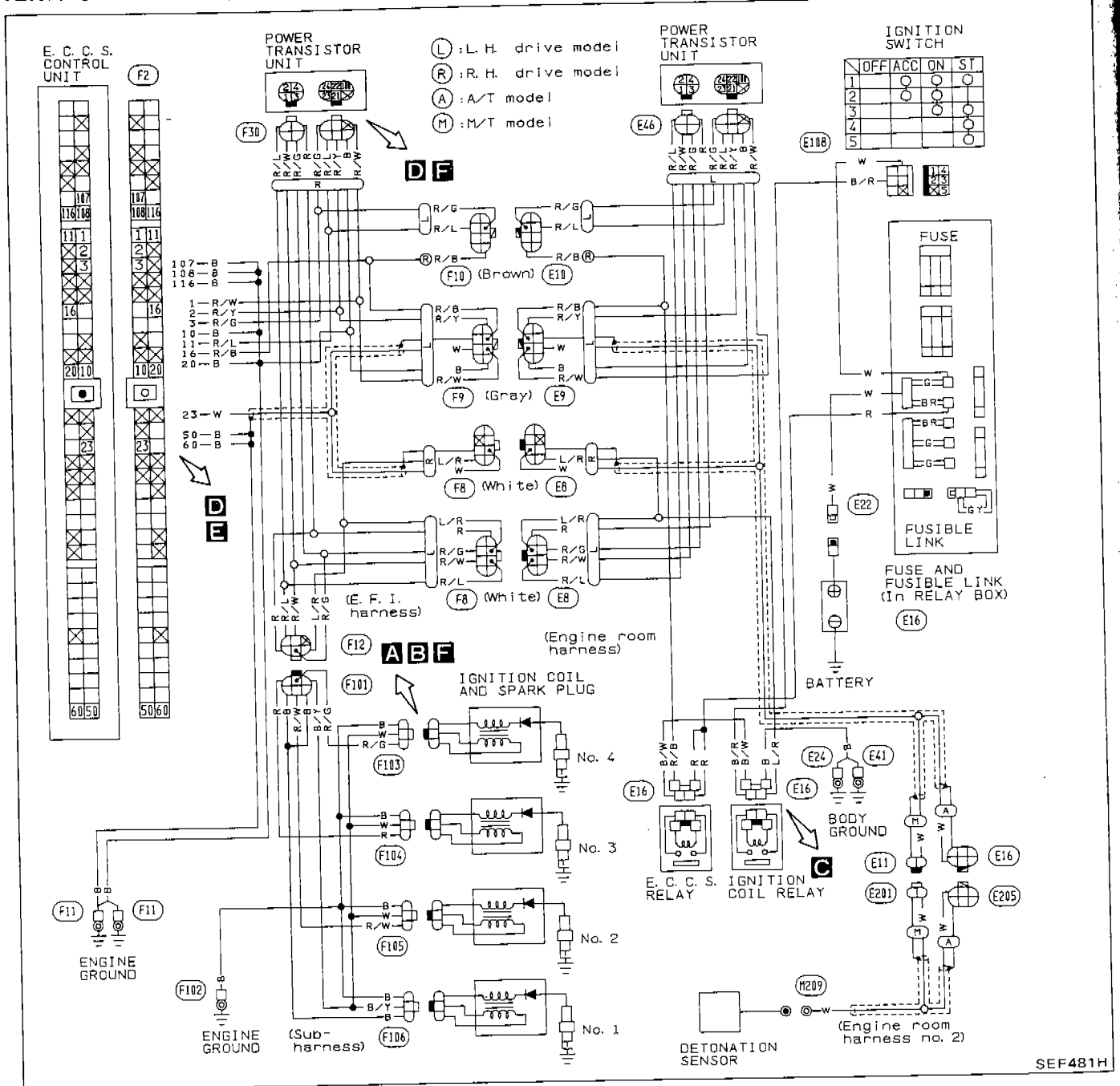
D
CHECK HARNESS CONTINUITY BETWEEN POWER TRANSISTOR AND E.C.U.
1) Disconnect E.C.U. harness connector.
2) Disconnect power transistor harness connector.
3) Check continuity between terminals **h** and ①, ① and ③, **k** and ②, ② and ④.
Continuity: Approximately 0Ω

O.K.

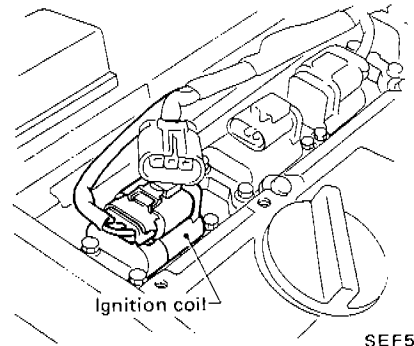
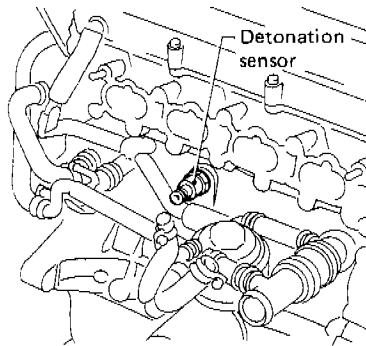
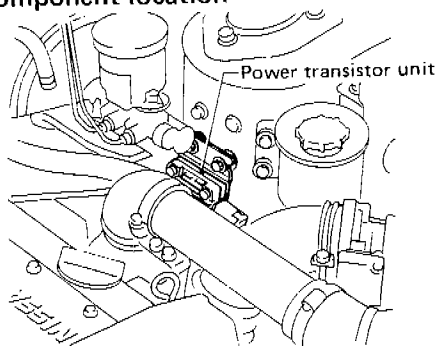
TROUBLE DIAGNOSES

Diagnostic Procedure 6

IGNITION SIGNAL (Code No. 21) & DETONATION SENSOR (Code No. 34)



Component location

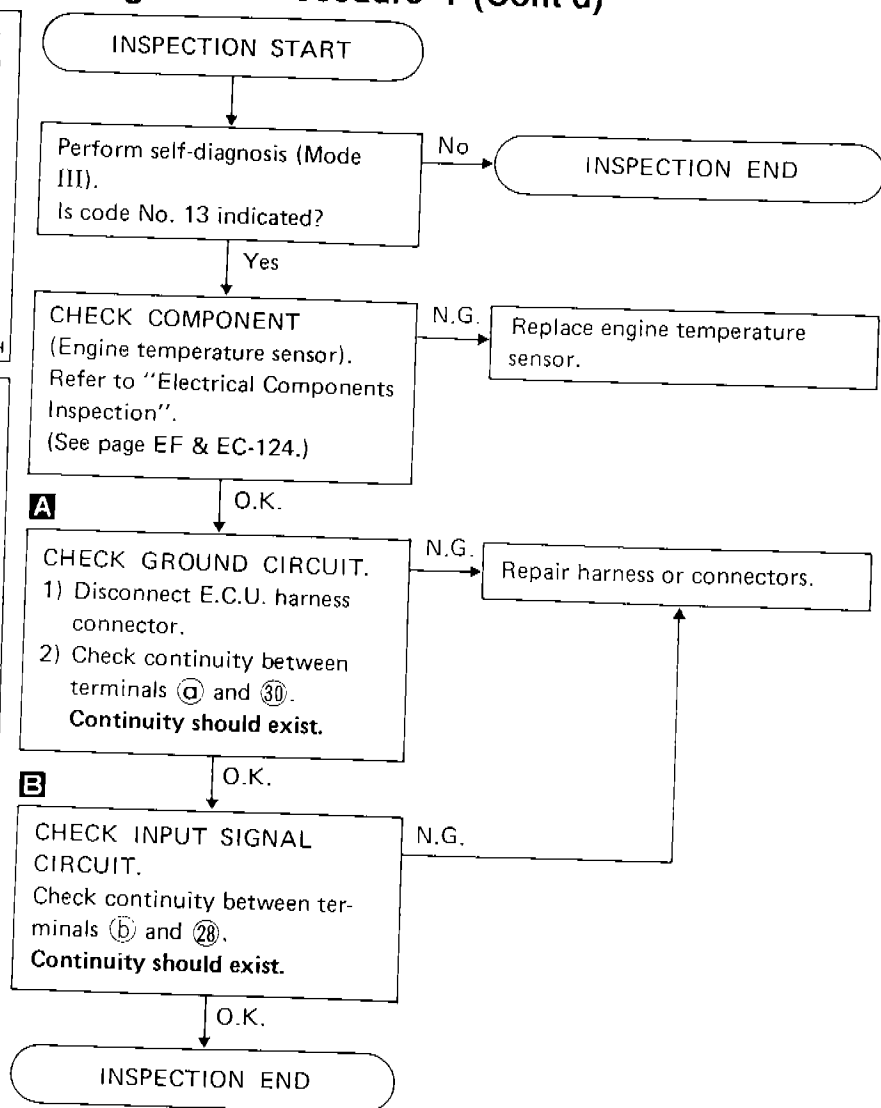
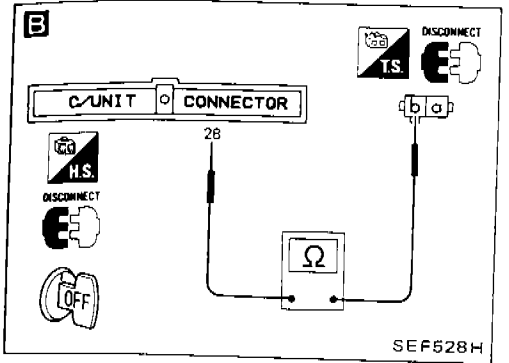
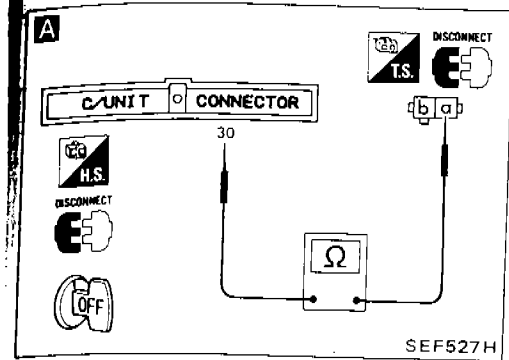


EF & EC-90

SEF530H

TROUBLE DIAGNOSES

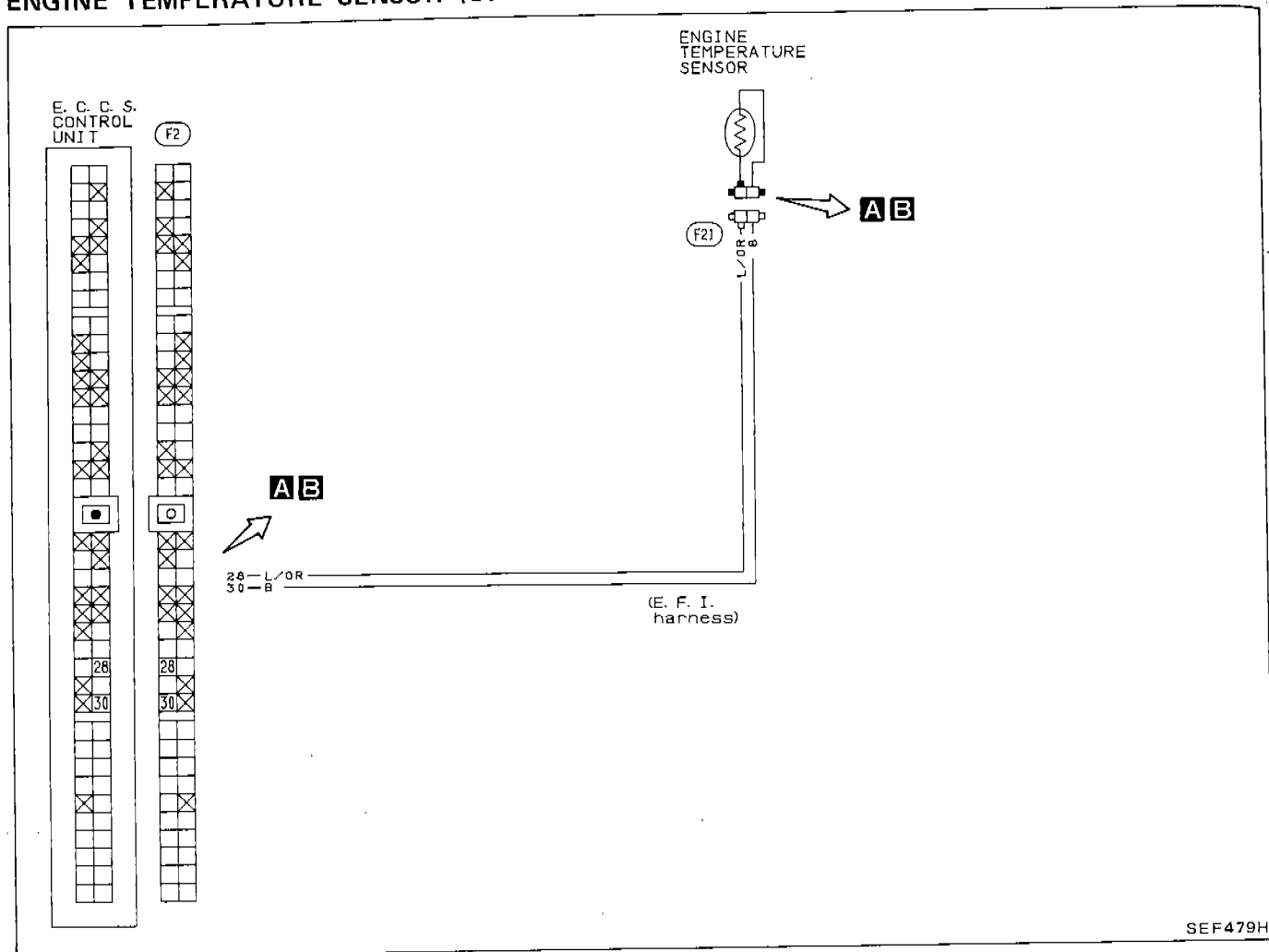
Diagnostic Procedure 4 (Cont'd)



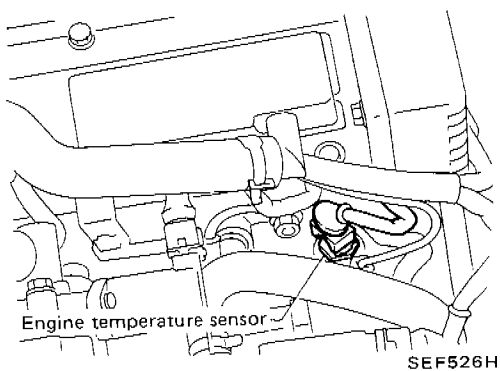
TROUBLE DIAGNOSES

Diagnostic Procedure 4

ENGINE TEMPERATURE SENSOR (Code No. 13)



Component location



TROUBLE DIAGNOSES

Diagnostic Procedure 3 (Cont'd)

INSPECTION START

Perform self-diagnosis (Mode III).
Is Code No. 12 indicated?

INSPECTION END

A

CHECK POWER SOURCE.
1) Disconnect air flow meter harness connector.
2) Turn ignition switch "ON".
3) Check voltage between terminal ⑥ and ground.
Battery voltage should exist.

Repair harness or connectors.

B

CHECK INPUT SIGNAL.
1) Reconnect air flow meter harness connector.
2) Start engine and warm it up sufficiently.
3) Make sure that voltage exists between E.C.U. terminal ②⑦ and ground.

Voltage:
Approximately 1.5V (at idle)

INSPECTION END

C

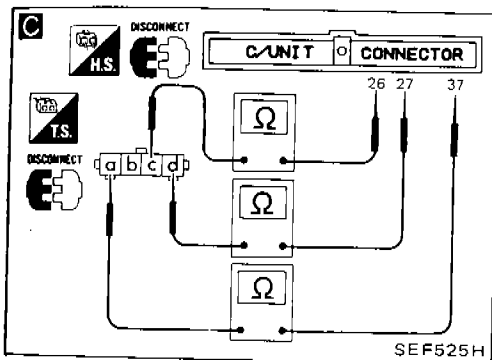
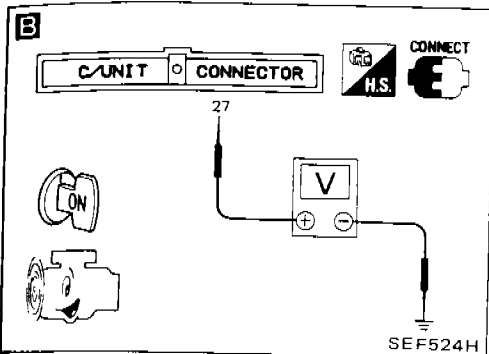
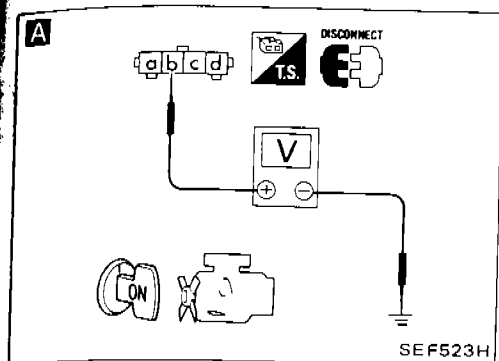
CHECK CONTINUITY BETWEEN E.C.U. AND AIR FLOW METER.

1) Turn ignition switch "OFF".
2) Disconnect E.C.U. harness connector.
3) Disconnect air flow meter harness connector.
4) Check continuity between terminals ① and ③⑦, ② and ②⑥, and ④ and ②⑦.

Resistance:
Approximately 0Ω

O.K.

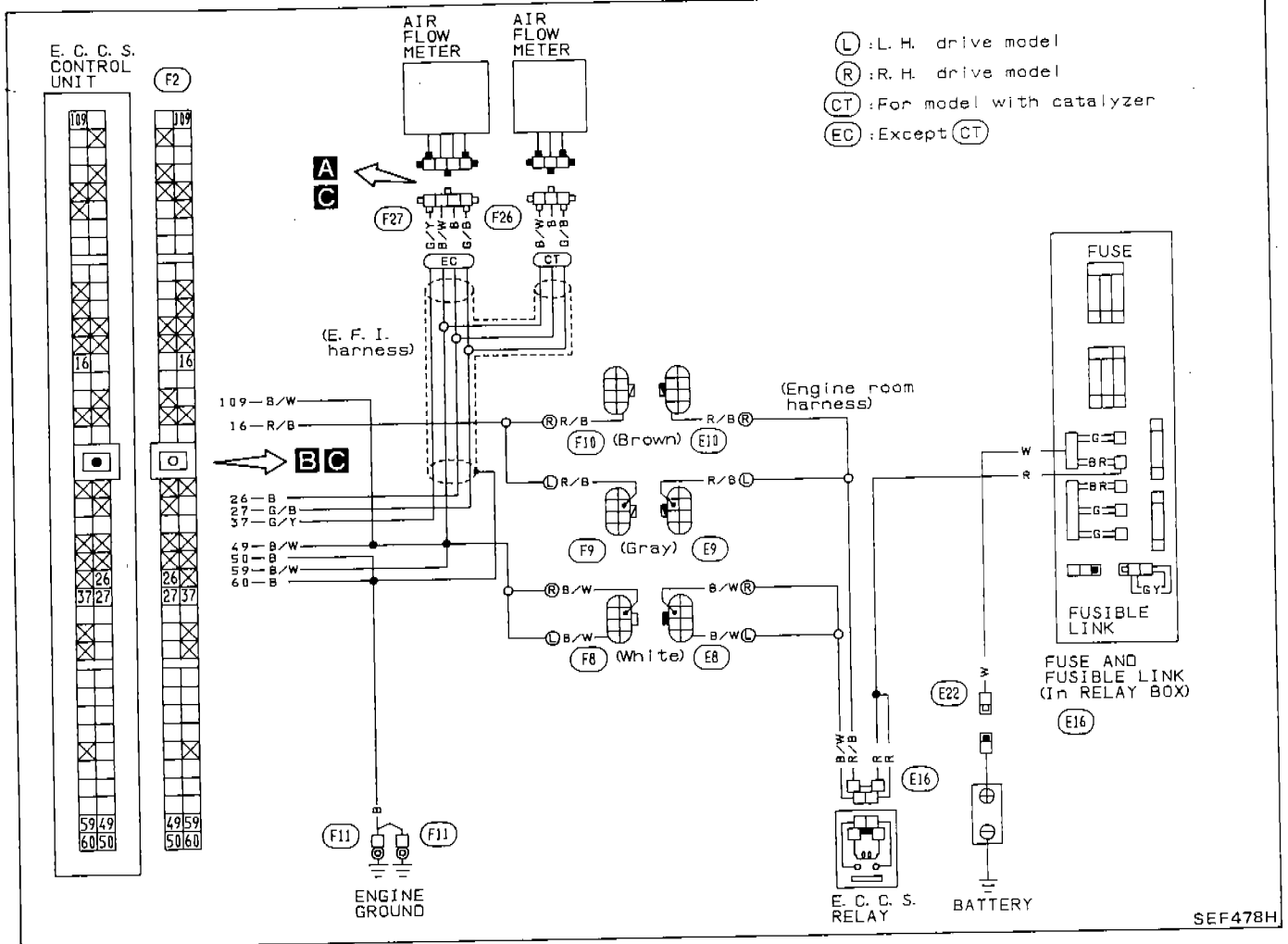
CHECK COMPONENT
(Air flow meter).
Refer to "Electrical Components Inspection".
(See page EF & EC-124.)



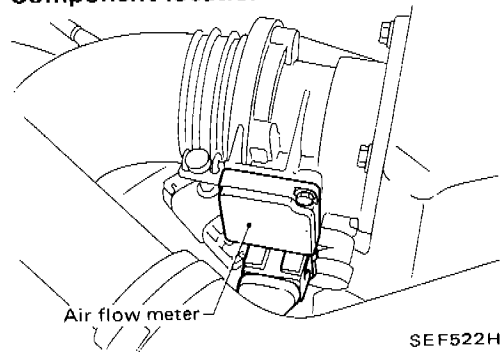
TROUBLE DIAGNOSES

Diagnostic Procedure 3

AIR FLOW METER (Code No. 12)



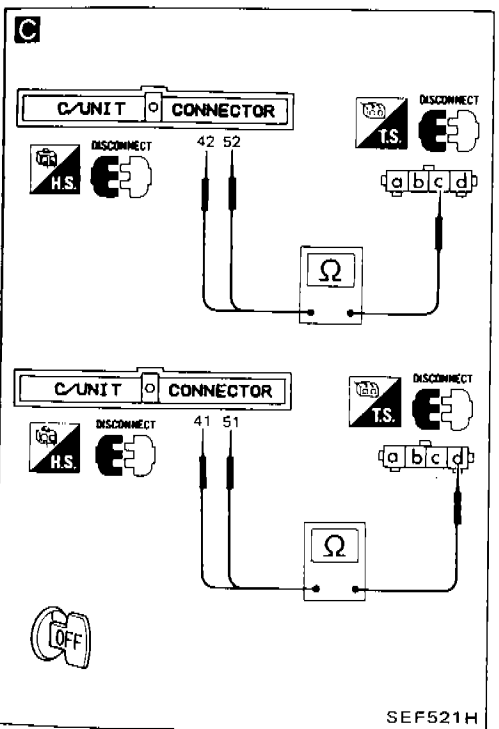
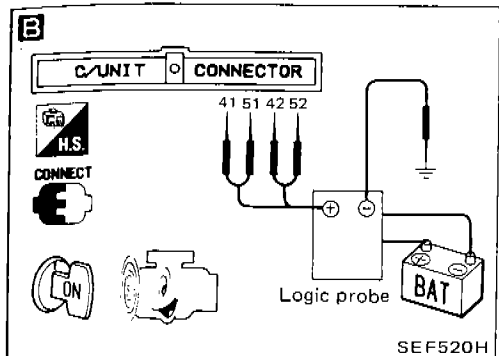
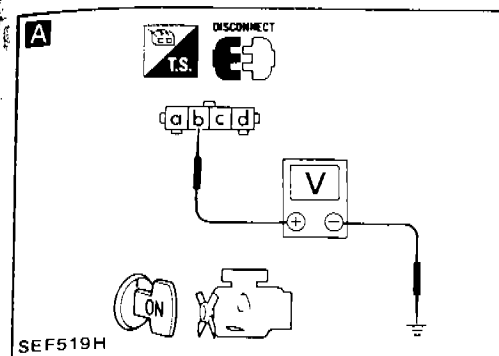
Component location



SEF522H

TROUBLE DIAGNOSES

Diagnostic Procedure 2 (Cont'd)



INSPECTION START

Perform self-diagnosis (Mode III).
Is Code No. 11 indicated?

No

INSPECTION END

Yes

A CHECK POWER SOURCE.

- 1) Disconnect crank angle sensor harness connector.
- 2) Turn ignition switch "ON".
- 3) Check voltage between terminal (b) and ground.
Voltage: Battery voltage

N.G.

Repair harness or connectors.

O.K.

B CHECK INPUT SIGNAL.

- 1) Reconnect crank angle sensor harness connector.
- 2) Start engine.
- 3) Check that pulse signals exist in E.C.U. terminals (42), (52) and (41), (51) with logic probe.
Pulse signals should exist.
(42), (52) : 1° signal
(41), (51) : 180° signal

N.G.

C CHECK CONTINUITY

BETWEEN E.C.U. AND CRANK ANGLE SENSOR.

- 1) Turn ignition switch "OFF".
- 2) Disconnect E.C.U. harness connector.
- 3) Disconnect crank angle sensor harness connector.
- 4) Check continuity between terminal (a) and ground, terminals (c) and (42), (52) and terminals (d) and (41), (51).

Resistance:

Approximately 0Ω

O.K.

CHECK COMPONENT

(Crank angle sensor).

Refer to "Electrical Components Inspection".

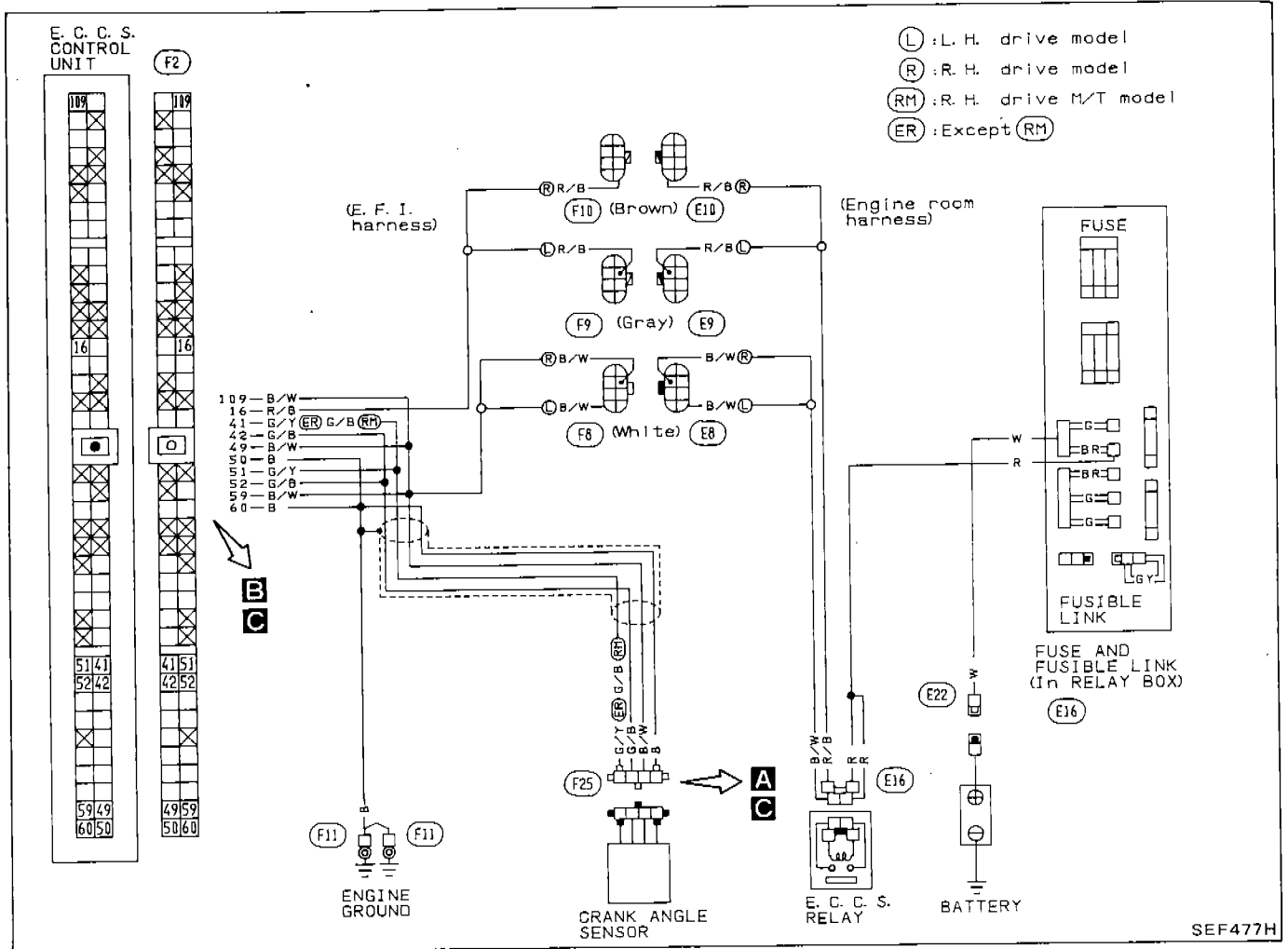
(See page EF & EC-124.)

INSPECTION END

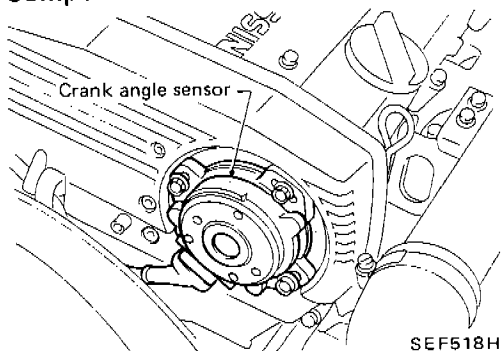
TROUBLE DIAGNOSES

Diagnostic Procedure 2

CRANK ANGLE SENSOR (Code No. 11)

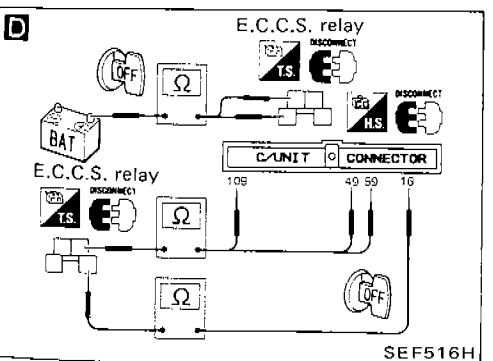
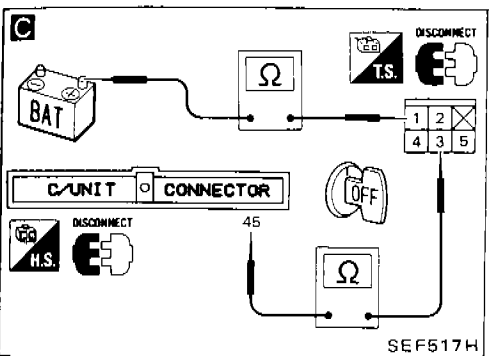
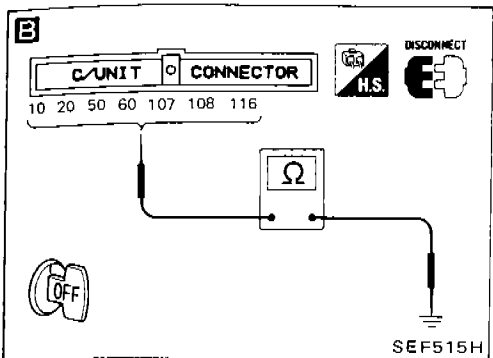
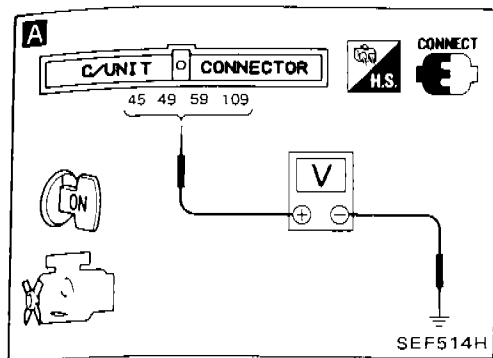


Component location



TROUBLE DIAGNOSES

Diagnostic Procedure 1 (Cont'd)



INSPECTION START

A

CHECK POWER SOURCE FOR E.C.U.

- 1) Turn ignition switch "ON".
- 2) Check voltage between terminals 45, 49, 59, 109 and ground.

Voltage: Battery voltage

N.G.

Check ignition switch and "G" fusible link.

O.K.

C

- 1) Check harness continuity between ignition switch and battery ⊕ terminal.
Continuity should exist.
- 2) Check harness continuity between ignition switch and E.C.U.
Continuity should exist.
If N.G., replace harness or connector.

O.K.

B

- 1) Turn ignition switch "OFF".
- 2) Disconnect connectors from E.C.U.
- 3) Check resistance between terminals 10, 20, 50, 60, 107, 108, 116 and ground.

Resistance:
Approximately 0Ω
If N.G., repair harness or connectors.

N.G.

49, 59, 109

CHECK COMPONENT
(E.C.C.S. relay).
Refer to "Electrical Components Inspection".
(See page EF & EC-128.)
If N.G., replace E.C.C.S. relay.

O.K.

D

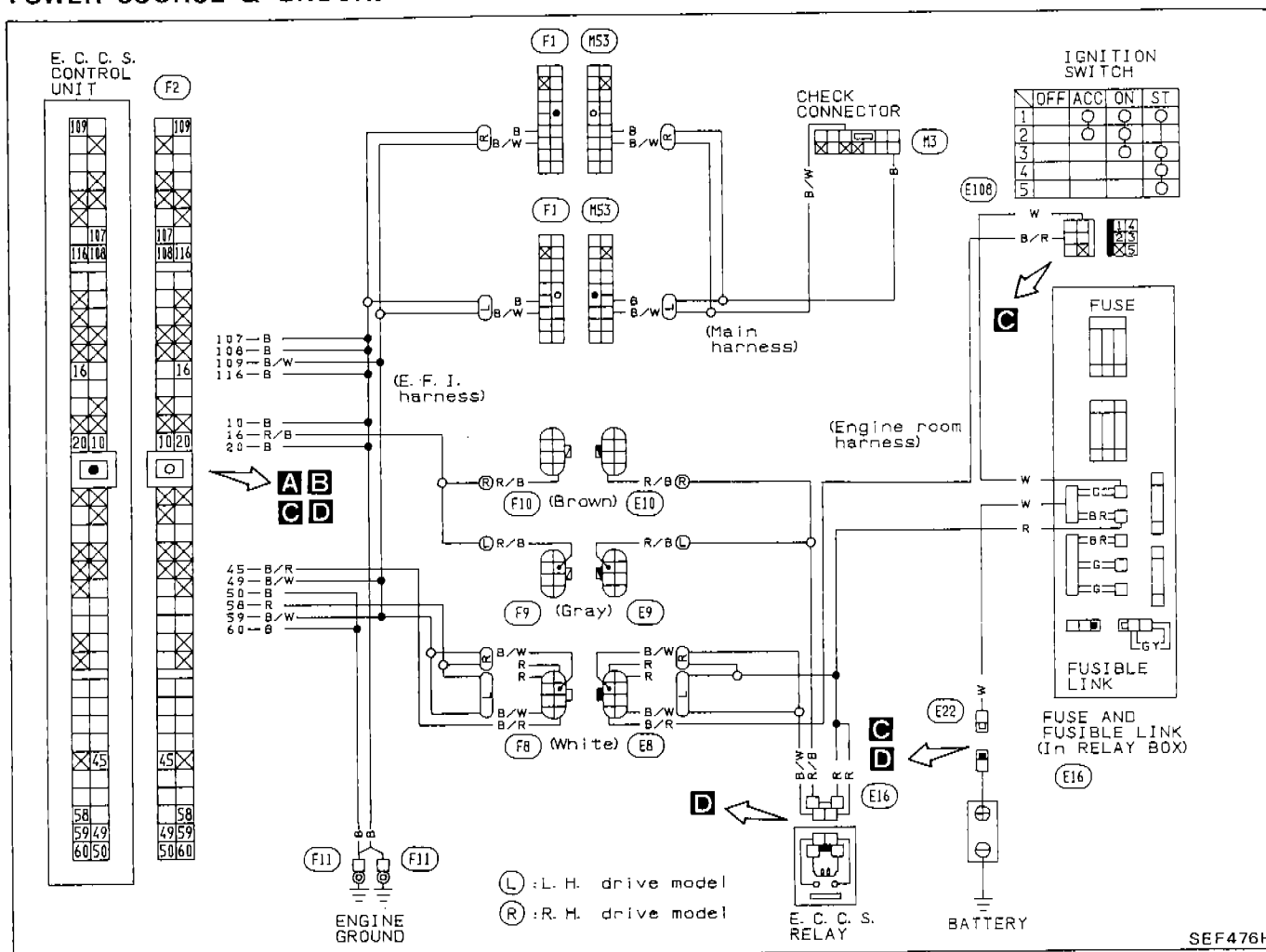
- 1) Check harness continuity between E.C.C.S. relay and E.C.U.
Continuity should exist.
- 2) Check harness continuity between E.C.C.S. relay and battery ⊕ terminal.
Continuity should exist.
If N.G., replace harness or connectors.

INSPECTION END

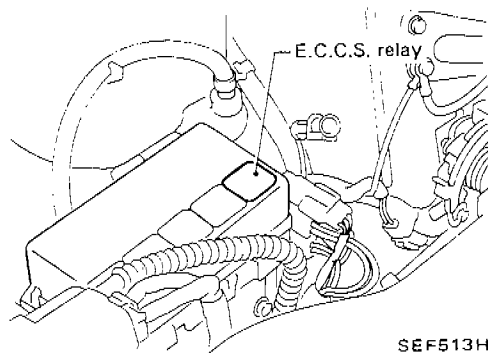
TROUBLE DIAGNOSES

Diagnostic Procedure 1

POWER SOURCE & GROUND CIRCUIT FOR E.C.U. (Not self-diagnostic item)



Component location

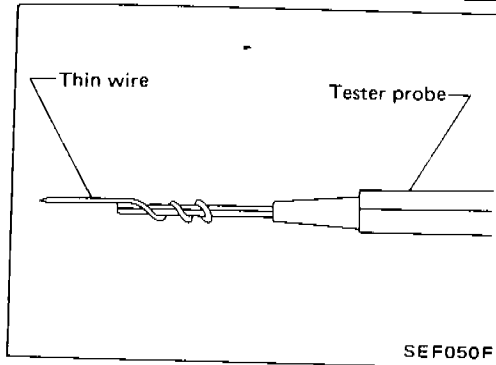
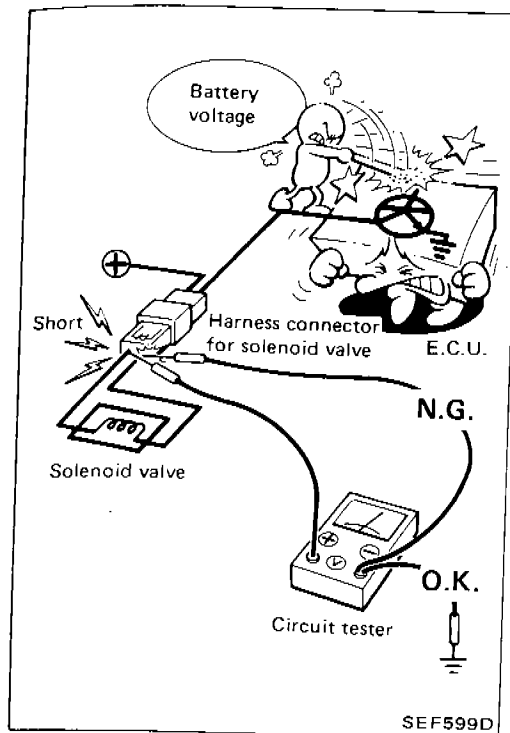


TROUBLE DIAGNOSES

Diagnostic Procedure (Cont'd)

7. When measuring supply voltage of E.C.U. controlled components 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 power transistor of the control unit.

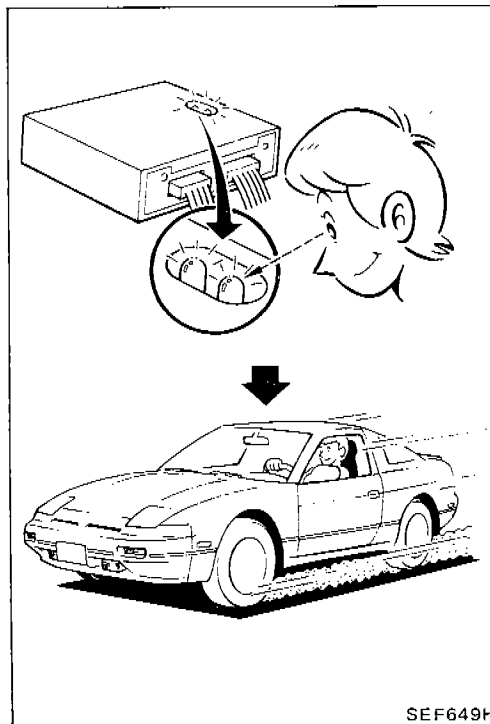
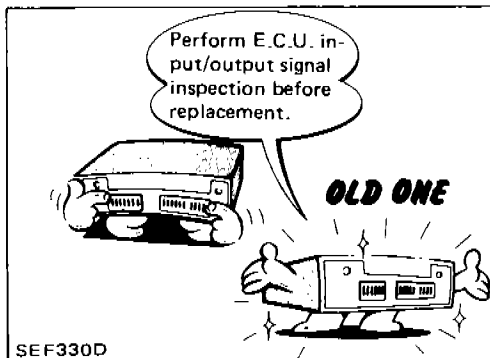
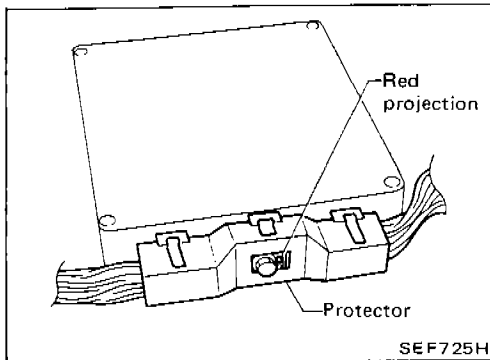
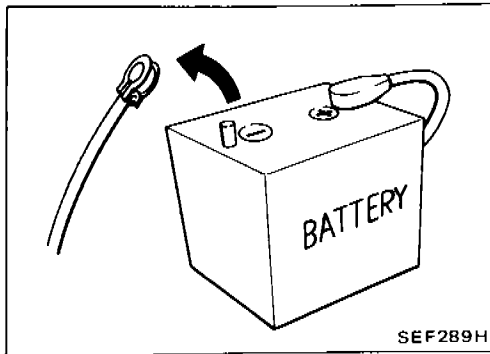


8. Improve tester probe as shown to perform test easily.
9. For the first trouble-shooting procedure, perform **POWER SOURCE & GROUND CIRCUIT FOR E.C.U. check.**

Diagnostic Procedure

CAUTION:

1. Before connecting or disconnecting E.C.U. harness connector to or from any E.C.U., be sure to turn the ignition switch to the "OFF" position and disconnect the negative battery terminal in order not to damage E.C.U. as battery voltage is applied to E.C.U. even if ignition switch is turned off. Otherwise, there may be damage to the E.C.U.
2. When connecting E.C.U. harness connector into E.C.U. or disconnecting it from E.C.U., take care not to damage pin terminal of E.C.U. (Bend or break).
3. Make sure that there are not any bends or breaks on E.C.U. pin terminal, when connecting pin connectors into E.C.U.
4. When connecting E.C.U. harness connector, tighten securing bolt until red projection is in line with connector face.
5. Before replacing E.C.U. perform E.C.U. input/output signal inspection and make sure whether E.C.U. functions properly or not. (See page EF & EC-120.)
6. After performing this "Diagnostic Procedure", perform E.C.C.S. self-diagnosis and driving test.



TROUBLE DIAGNOSES

Self-diagnosis — Mode V (Cont'd)

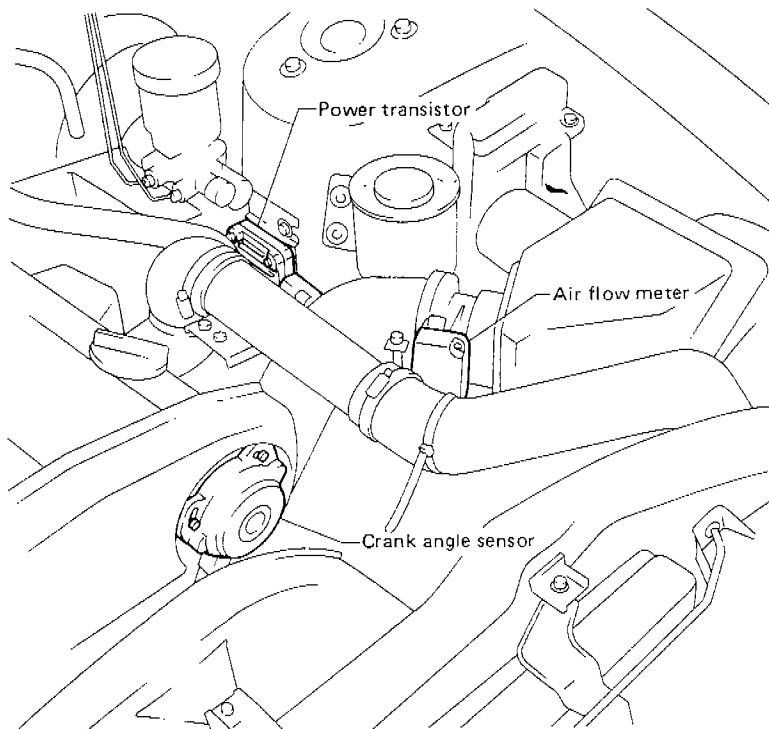
REAL-TIME DIAGNOSTIC INSPECTION

X: Available

—: Not available

Crank Angle Sensor, Air Flow Meter and Ignition Signal

Check sequence	Check items	Check conditions	Check parts			If malfunction, perform the following items.
			Harness connectors	Sensor & actuator	E.C.U. connectors	
1	Tap harness connector or component during real-time diagnosis.	During real-time diagnosis	X	X	X	Go to check item 2.
2	Check harness continuity at connector.	Engine stopped	X	—	—	Go to check item 3.
3	Disconnect harness connector, and then check dust adhesion to harness connector.	Engine stopped	X	—	X	Clean terminal surface.
4	Check pin terminal bend.	Engine stopped	—	—	X	Take out bend.
5	Reconnect harness connector and then recheck harness continuity at connector.	Engine stopped	X	—	—	Replace terminal.
6	Tap harness connector or component during real-time diagnosis.	During real-time diagnosis	X	X	X	If malfunction codes are displayed during real-time diagnosis, replace terminal.



SEF426H

TROUBLE DIAGNOSES

Self-diagnosis — Mode V (Cont'd)

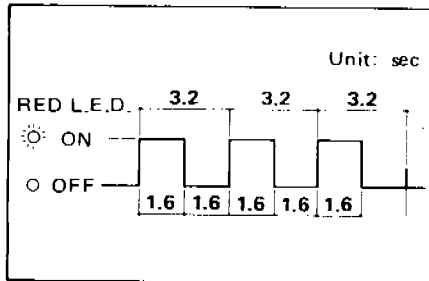
DECODING CHART

Display code

Malfunctioning circuit or parts

Control unit shows a malfunction signal when the following conditions are detected (Compare with Self-diagnosis — Mode III.)

CRANK ANGLE SENSOR



Malfunction of crank angle sensor circuit

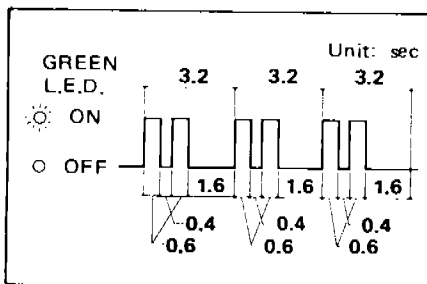
- The 1° or 180° signal is momentarily missing, or, multiple, momentary noise signals enter.

REAL-TIME DIAGNOSTIC INSPECTION

See page EF & EC-77.

SEF047F

AIR FLOW METER



Malfunction of air flow meter circuit

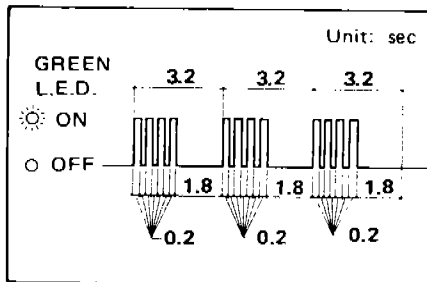
- Abnormal, momentary increase in air flow meter output signal

REAL-TIME DIAGNOSTIC INSPECTION

See page EF & EC-77.

SEF048F

IGNITION SIGNAL



Malfunction of ignition signal

- Signal from the primary ignition coil momentarily drops off.

REAL-TIME DIAGNOSTIC INSPECTION

See page EF & EC-77.

SEF049F

TROUBLE DIAGNOSES

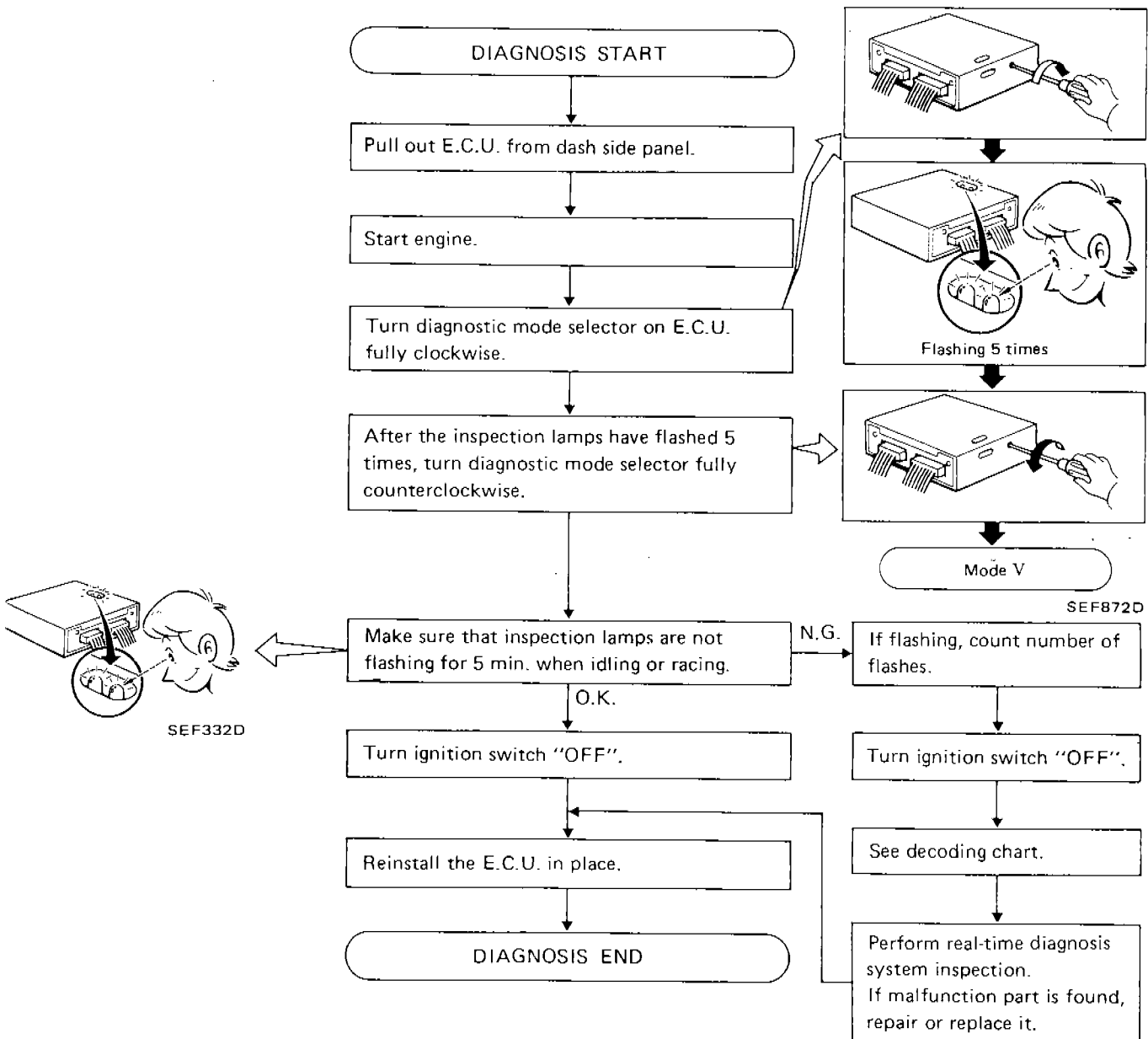
Self-diagnosis — Mode V

In real-time diagnosis, if any of the following items are judged to be faulty, a malfunction is indicated immediately.

- Crank angle sensor (180° signal & 1° signal)
- Ignition signal
- Air flow meter output signal

Consequently, this diagnosis is a very effective measure to diagnose whether the above systems cause the malfunction or not, during driving test. Compared with self-diagnosis, real-time diagnosis is very sensitive, and can detect malfunctioning conditions in a moment. Further, items regarded to be malfunctions in this diagnosis are not stored in E.C.U. memory.

SELF-DIAGNOSTIC PROCEDURE



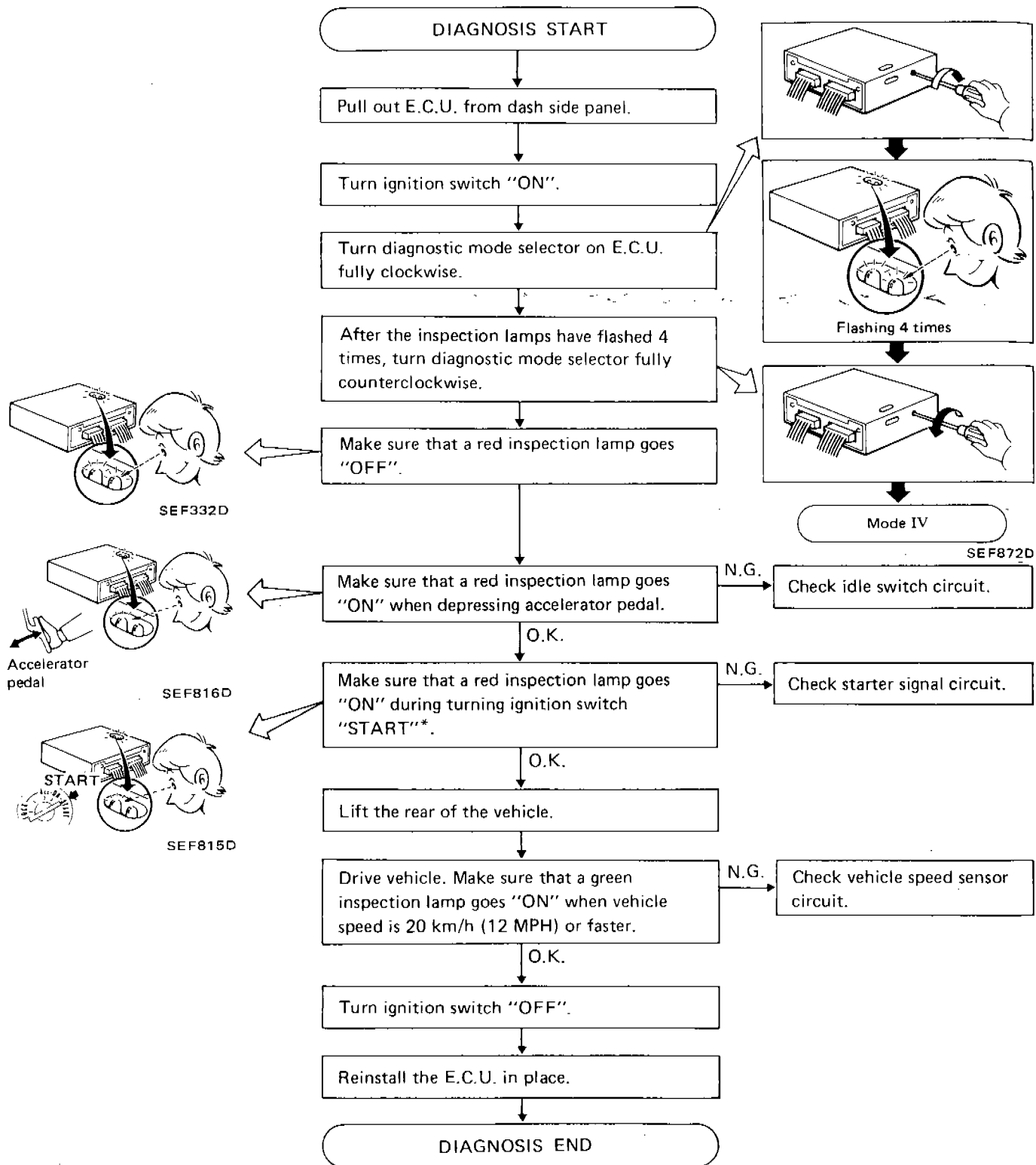
CAUTION:

In real-time diagnosis, pay attention to inspection lamp flashing. E.C.U. displays the malfunction code only once, and does not memorize the inspection.

TROUBLE DIAGNOSES

Self-diagnosis — Mode IV (Cont'd)

SELF-DIAGNOSTIC PROCEDURE



CAUTION:

- *If ignition switch is turned to "START" an even number of times, a red inspection lamp goes "OFF" when depressing accelerator pedal.
- For safety, do not turn front wheel at higher speed than required.

Self-diagnosis — Mode IV

In switches ON/OFF diagnosis system, ON/OFF operation of the following switches can be detected continuously.

- Idle switch
- Ignition switch "START"
- Vehicle speed sensor

(1) Idle switch & Ignition switch "START"

The switches ON/OFF status at the point when mode IV is selected is stored in E.C.U. memory. When either switch is turned from "ON" to "OFF" or "OFF" to "ON", the red L.E.D. on E.C.U. alternately comes on and goes off each time switching is detected.

(2) Vehicle speed sensor

The switches ON/OFF status at the point when mode IV is selected is stored in E.C.U. memory. When vehicle speed is 20 km/h (12 MPH) or slower, the green L.E.D. on E.C.U. is off. When vehicle speed exceeds 20 km/h (12 MPH), the green L.E.D. on E.C.U. comes "ON".

TROUBLE DIAGNOSES

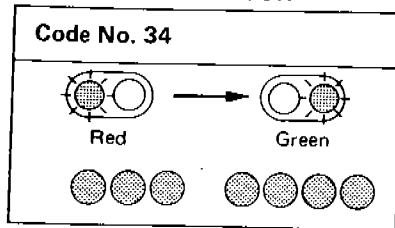
Self-diagnosis — Mode III (Cont'd)

Display code

Malfunctioning circuit or parts

Control unit shows a malfunction signal when the following conditions are detected.

DETONATION SENSOR



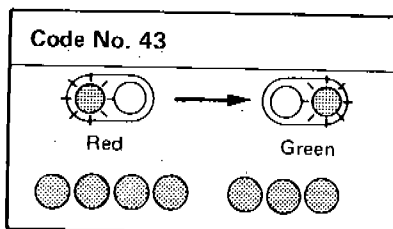
Detonation sensor circuit

- The detonation sensor circuit is open or shorted.

SYSTEM INSPECTION
See page EF & EC-90.

SEF132F

THROTTLE SENSOR

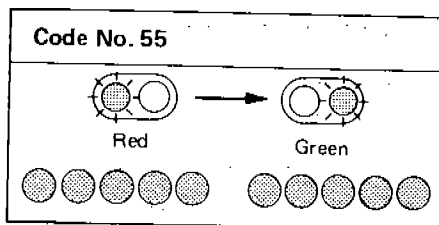


Throttle sensor circuit

- Throttle sensor circuit is open or short.
(Output voltage is too high or too low.)

SYSTEM INSPECTION
See page EF & EC-98.

SEF079G



E.C.C.S.
normal
operation.

SEF984F

Self-diagnosis — Mode IV

In switches ON/OFF diagnosis system, ON/OFF operation of the following switches can be detected continuously.

- Idle switch
- Ignition switch "START"
- Vehicle speed sensor

(1) Idle switch & Ignition switch "START"

The switches ON/OFF status at the point when mode IV is selected is stored in E.C.U. memory. When either switch is turned from "ON" to "OFF" or "OFF" to "ON", the red L.E.D. on E.C.U. alternately comes on and goes off each time switching is detected.

(2) Vehicle speed sensor

The switches ON/OFF status at the point when mode IV is selected is stored in E.C.U. memory. When vehicle speed is 20 km/h (12 MPH) or slower, the green L.E.D. on E.C.U. is off. When vehicle speed exceeds 20 km/h (12 MPH), the green L.E.D. on E.C.U. comes "ON".

TROUBLE DIAGNOSES

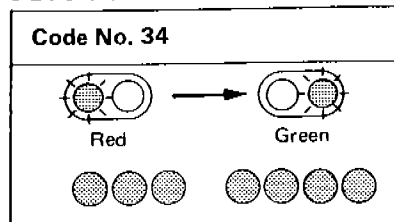
Self-diagnosis — Mode III (Cont'd)

Display code

Malfunctioning circuit or parts

Control unit shows a malfunction signal when the following conditions are detected.

DETONATION SENSOR



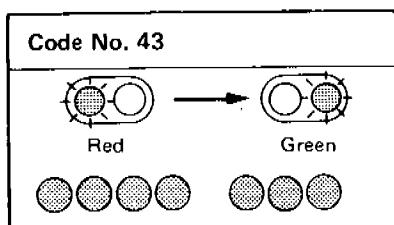
Detonation sensor circuit

- The detonation sensor circuit is open or shorted.

SYSTEM INSPECTION
See page EF & EC-90.

SEF132F

THROTTLE SENSOR

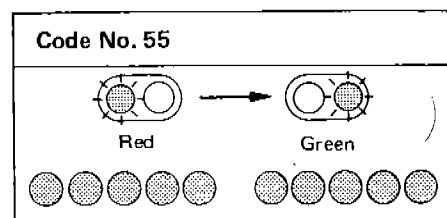


Throttle sensor circuit

- Throttle sensor circuit is open or short.
(Output voltage is too high or too low.)

SYSTEM INSPECTION
See page EF & EC-98.

SEF079G



E.C.C.S.
normal
operation.

SEF984F

TROUBLE DIAGNOSES

Self-diagnosis — Mode III (Cont'd)

DECODING CHART

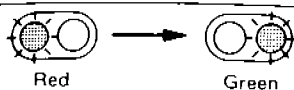
Display code

Malfunctioning circuit or parts

Control unit shows a malfunction signal when the following conditions are detected.

CRANK ANGLE SENSOR

Code No. 11



Crank angle sensor circuit

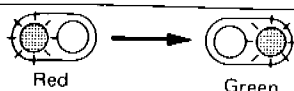
- Either 1° or 180° signal is not entered for the first few seconds during engine cranking.
- Either 1° or 180° signal is not input often enough while the engine speed is higher than the specified rpm.

SYSTEM INSPECTION
See page EF & EC-82.

SEF042F

AIR FLOW METER

Code No. 12



Air flow meter circuit

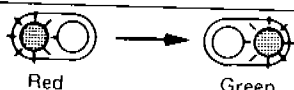
- The air flow meter circuit is open or shorted. (An abnormally high or low voltage is entered.)

SYSTEM INSPECTION
See page EF & EC-84.

SEF043F

ENGINE TEMPERATURE SENSOR

Code No. 13



Engine temperature sensor circuit

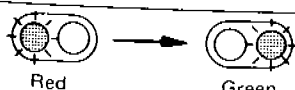
- The engine temperature sensor circuit is open or shorted. (An abnormally high or low output voltage is entered.)

SYSTEM INSPECTION
See page EF & EC-86.

SEF044F

IGNITION SIGNAL

Code No. 21



Ignition signal circuit

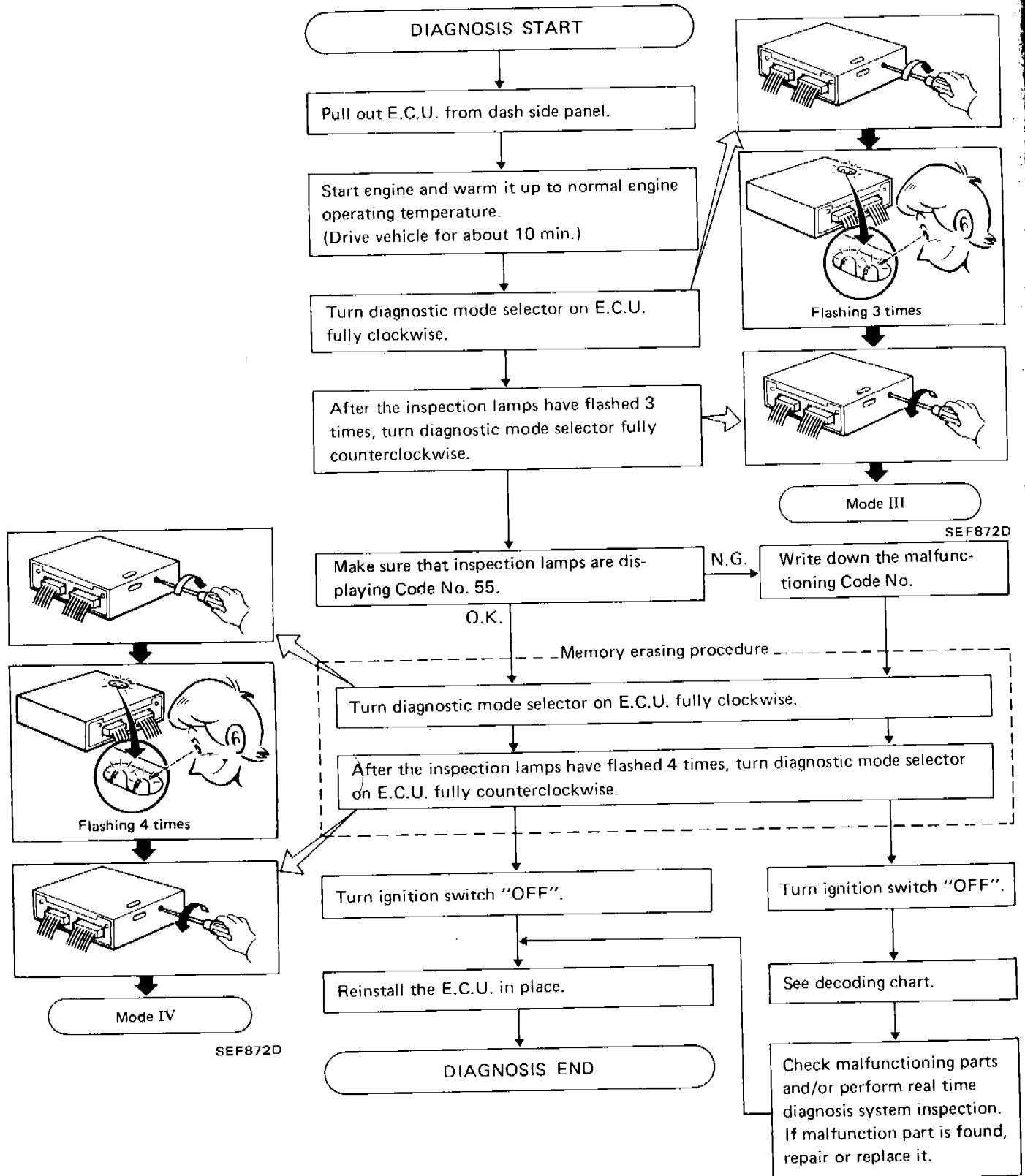
- The circuit between power transistor unit and E.C.U. is opened.

SYSTEM INSPECTION
See page EF & EC-90.

SEF045F

TROUBLE DIAGNOSES

Self-diagnosis — Mode III (Cont'd) SELF-DIAGNOSTIC PROCEDURE



CAUTION:

During displaying Code No. in self-diagnosis mode (Mode III), if the other diagnostic mode should be done, make sure to write down the malfunctioning Code No. before turning diagnostic mode selector on E.C.U. fully clockwise, or select the diagnostic mode after turning switch "OFF". Otherwise self-diagnosis information stored in E.C.U. memory until now would be lost.

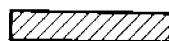
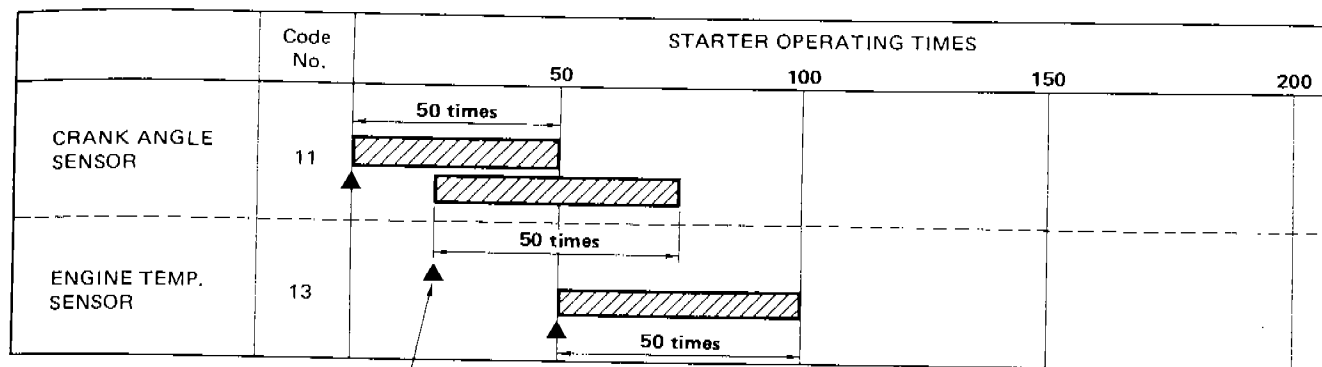
TROUBLE DIAGNOSES

Self-diagnosis — Mode III (Cont'd)

RETENTION OF DIAGNOSTIC RESULTS

The diagnostic result is retained in E.C.U. memory until the starter is operated fifty times after a diagnostic item is judged to be malfunctioning. The diagnostic result will then be cancelled automatically. If a diagnostic item which has been judged to be malfunctioning and stored in memory is again judged to be malfunctioning before the starter is operated fifty times, the second result will replace the previous one. It will be stored in E.C.U. memory until the starter is operated fifty times more.

RETENTION TERM CHART (Example)



: Retention term



: Malfunction detecting point

If the same diagnostic item is judged to be malfunctioning before the starter is operated fifty times, it will be stored in E.C.U. memory until the starter is operated fifty times from this point in time.

SEF793D

Self-diagnosis — Mode III

The E.C.U. constantly monitors the function of these sensors and actuators, regardless of ignition key position. If a malfunction occurs, the information is stored in the E.C.U. and can be retrieved from the memory by turning on the diagnostic mode selector, located on the side of the E.C.U. When activated, the malfunction is indicated by flashing a red and a green L.E.D. (Light Emitting Diode), also located on the E.C.U. Since all the self-diagnostic results are stored in the E.C.U.'s memory even intermittent malfunctions can be diagnosed.

A malfunctioning part's group is indicated by the number of both the red and the green L.E.D.s flashing. First, the red L.E.D. flashes and the green flashes follow. The red L.E.D. refers to the number of tens while the green one refers to the number of units. For example, when the red L.E.D. flashes once and then the green one flashes twice, this means the number "12" showing the air flow meter signal is malfunctioning. In this way, all the problems are classified by the code numbers.

- When engine fails to start, crank engine more than two seconds before starting self-diagnosis.
- Before starting self-diagnosis, do not erase stored memory. If doing so, self-diagnosis function for intermittent malfunctions would be lost.

The stored memory would be lost if:

1. Battery terminal is disconnected.
2. After selecting Mode III, Mode IV is selected.

DISPLAY CODE TABLE

Code No.	Detected items
11	Crank angle sensor circuit
12	Air flow meter circuit
13	Engine temperature sensor circuit
21	Ignition signal circuit
34	Detonation sensor circuit
43	Throttle sensor circuit
55	No malfunctioning in the above circuit

TROUBLE DIAGNOSES

Self-diagnosis — Modes I & II (Model with catalyzer)

In these modes, the control unit provides the mixture ratio monitor presentation and the mixture ratio feedback coefficient monitor presentation.

Mode	L.E.D.	Engine stopped (Ignition switch "ON")	Engine running			
			Open loop condition	Closed loop condition		
Mode I (Monitor A)	Green	ON	*Remains ON or OFF	Blinks		
	Red	ON	OFF			
Mode II (Monitor B)	Green	ON	*Remains ON or OFF	Blinks		
	Red	OFF	*Remains ON or OFF (synchronous with green L.E.D.)	Compensating mixture ratio		
				More than 5% rich	Between 5% lean and 5% rich	More
				OFF	Synchronized with green L.E.D.	Remains ON

*Maintains conditions just before switching to open loop

Modes I & II are not available for non-catalyzer model.

TROUBLE DIAGNOSES

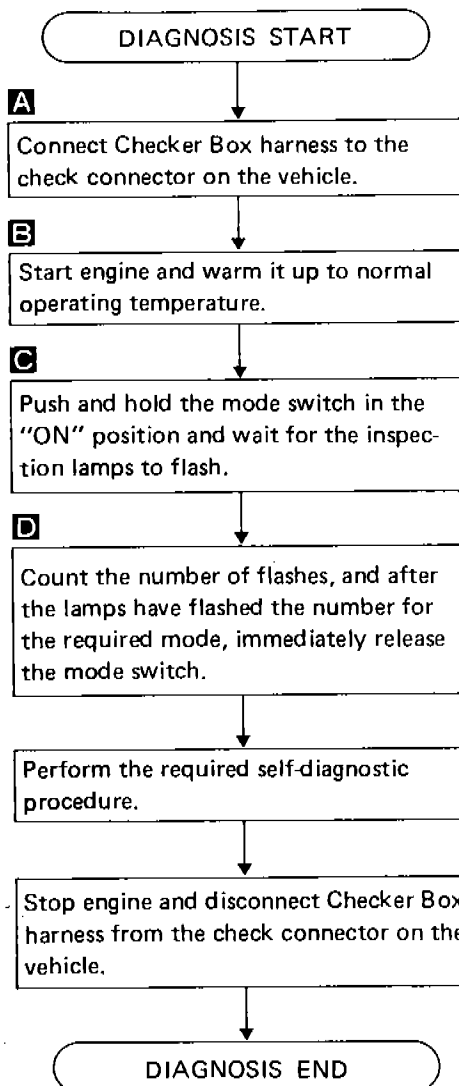
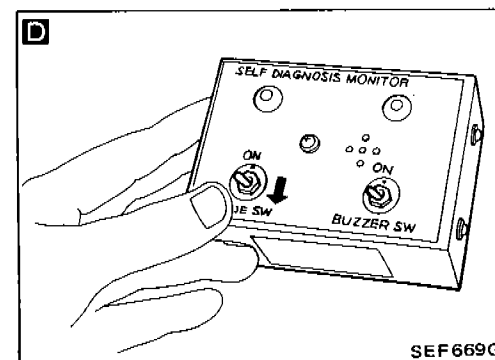
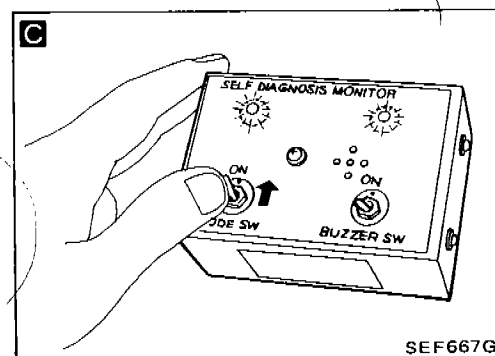
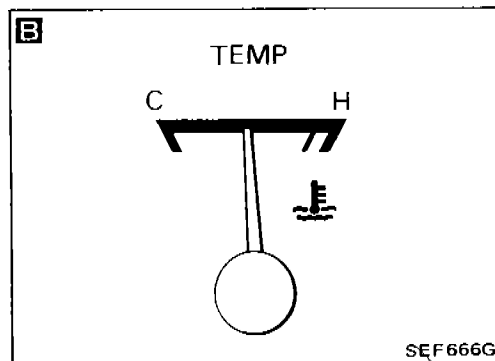
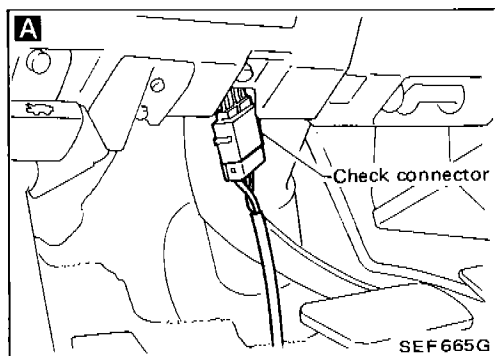
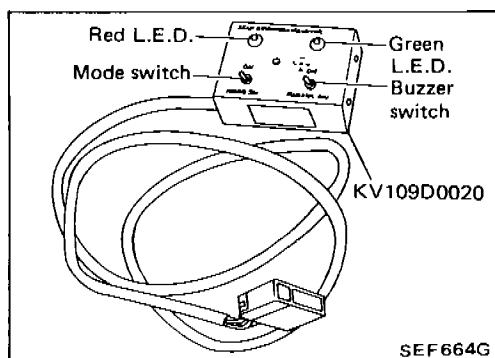
Self-diagnosis — Description (Cont'd)

CHECKER BOX

The Checker Box is used to control and read the self-diagnosis systems on models equipped with the "check connector" harness. It is a tool which can be used to operate the self-diagnosis system easily.

The Checker Box switch is used to trigger each of the self-diagnosis modes. You can read the red and green light emitting diode (L.E.D.) codes in the Checker Box, so it is not necessary to remove the E.C.U. The Checker Box also has an audible tone for each L.E.D. signal, so you can "hear" the codes instead of looking at the L.E.D. if necessary.

Self-diagnostic procedure



- Connect the Checker Box to the check connector only when the ignition key is in the "OFF" position.

- You can erase the stored memory by changing from diagnostic mode to Mode IV using the mode switch on the Checker Box.
- Disconnect the Checker Box from the check connector only when the ignition key is in the "OFF" position and the inspection lamps turn off.

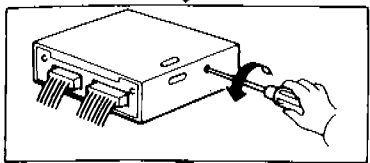
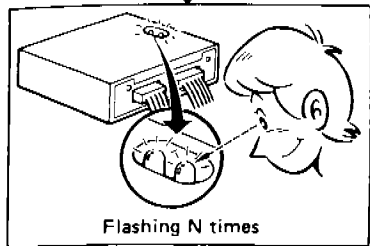
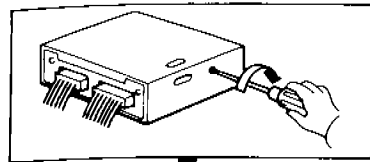
Service procedures and instructions except for the above are the same as those where Checker Box is not used.

TROUBLE DIAGNOSES

Self-diagnosis — Description (Cont'd)

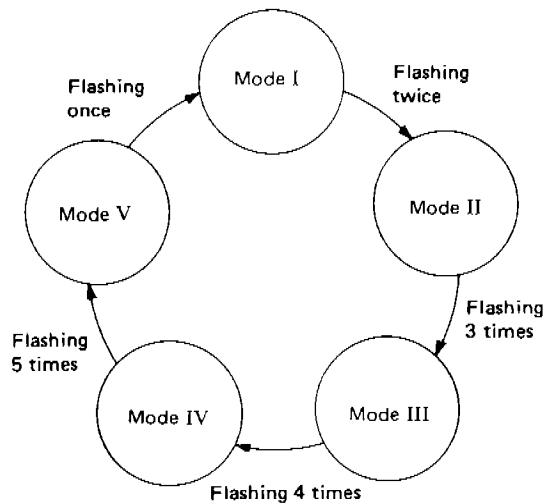
SWITCHING THE MODES

1. Turn ignition switch "ON".
2. Turn diagnostic mode selector on E.C.U. fully clockwise and wait the inspection lamps flash.
3. Count the number of the flashing time, and after the inspection lamps have flashed the number of the required mode, turn diagnostic mode selector fully counterclockwise immediately.



Mode N

SEF872D



SEF989D

When the ignition switch is turned off during diagnosis, in each mode, and then turned back on again after the power to the E.C.U. has dropped off completely, the diagnosis will automatically return to Mode I.

The stored memory would be lost if:

1. Battery terminal is disconnected.
2. After selecting Mode III, Mode IV is selected.

However, if the diagnostic mode selector is kept turned fully clockwise, it will continue to change in the order of Mode I → II → III → IV → V → I ... etc., and in this state the stored memory will not be erased.

Self-diagnosis — Description

The self-diagnosis is useful to diagnose malfunctions in major sensors and actuators of the E.C.C.S. system. There are 5 modes in the self-diagnosis system.

Mode I and Mode II apply only for model with catalyzer.

1. Mode I — Mixture ratio feedback control monitor A

- During closed loop condition:
The green inspection lamp turns ON when lean condition is detected and goes OFF by rich condition.
- During open loop condition:
The green inspection lamp remains ON or OFF.

2. Mode II — Mixture ratio feedback control monitor B

- The green inspection lamp function is the same as Mode I.
- During closed loop condition:
The red inspection lamp turns ON and OFF simultaneously with the green inspection lamp when the mixture ratio is controlled within the specified value.
 - During open loop condition:
The red inspection lamp remains ON or OFF.

3. Mode III — Self-diagnosis

This mode is the same as the former self-diagnosis in self-diagnosis mode.

4. Mode IV — Switches ON/OFF diagnosis

- During this mode, the inspection lamps monitor the switch ON-OFF condition.
- Idle switch
 - Ignition switch "START"
 - Vehicle speed sensor

5. Mode V — Real-time diagnosis

The moment the malfunction is detected, the display will be presented immediately. That is, the condition at which the malfunction occurs can be found by observing the inspection lamps during driving test.

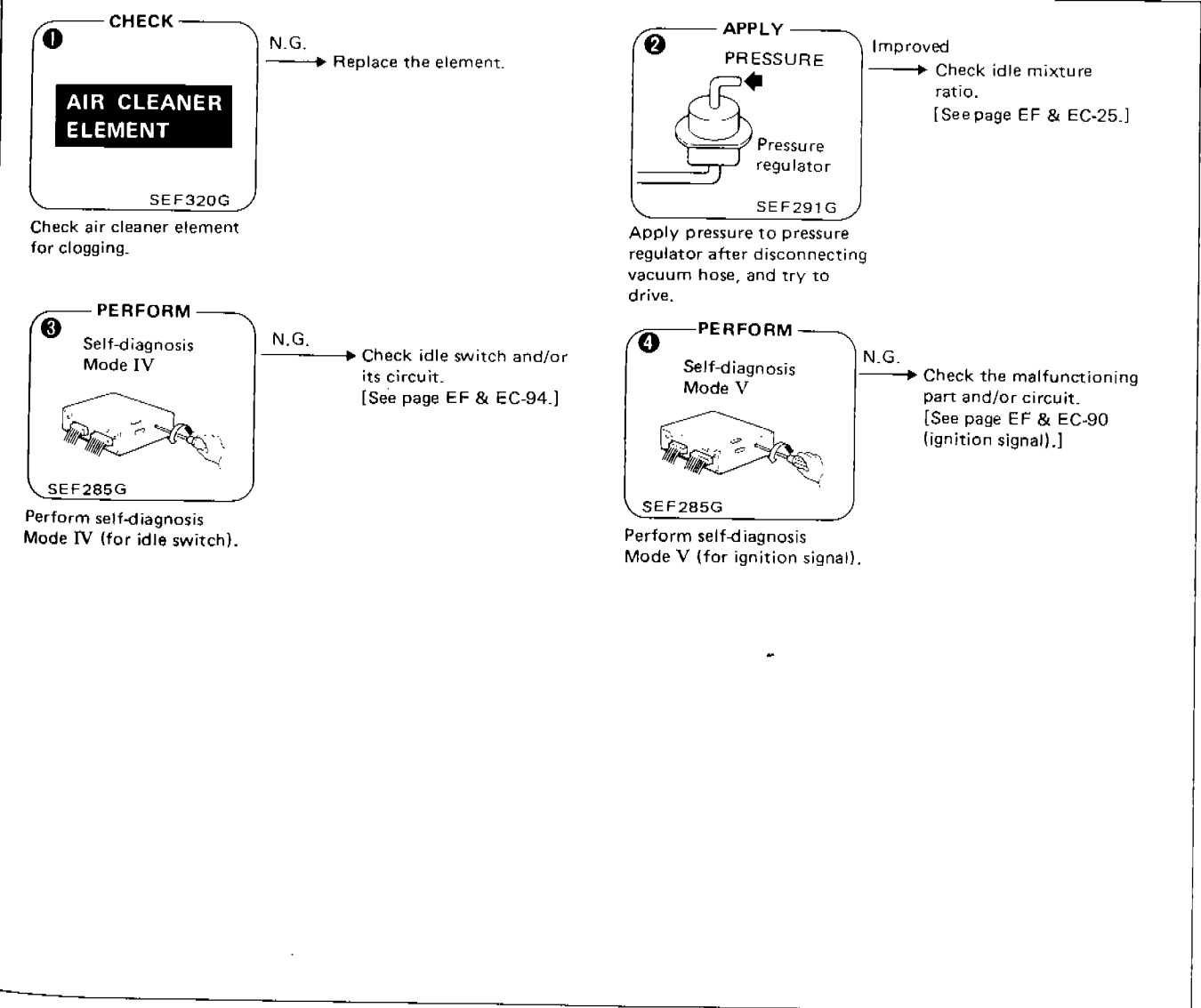
TROUBLE DIAGNOSES

Diagnostic Table (Cont'd)

SYMPTOM & CONDITION 25 Backfire – through the exhaust

POSSIBLE CAUSES		①	②	③	④
SPECIFICATIONS	Mixture ratio (too rich)	○	○		
FUEL SYSTEM	Injectors (fuel leaks)		○		
IGNITION SYSTEM	(missing)				○
INTAKE SYSTEM	Air cleaner element (clogged)	○			
CONTROL SYSTEM	Idle switch (remaining OFF)			○	

SERVICE PROCEDURE



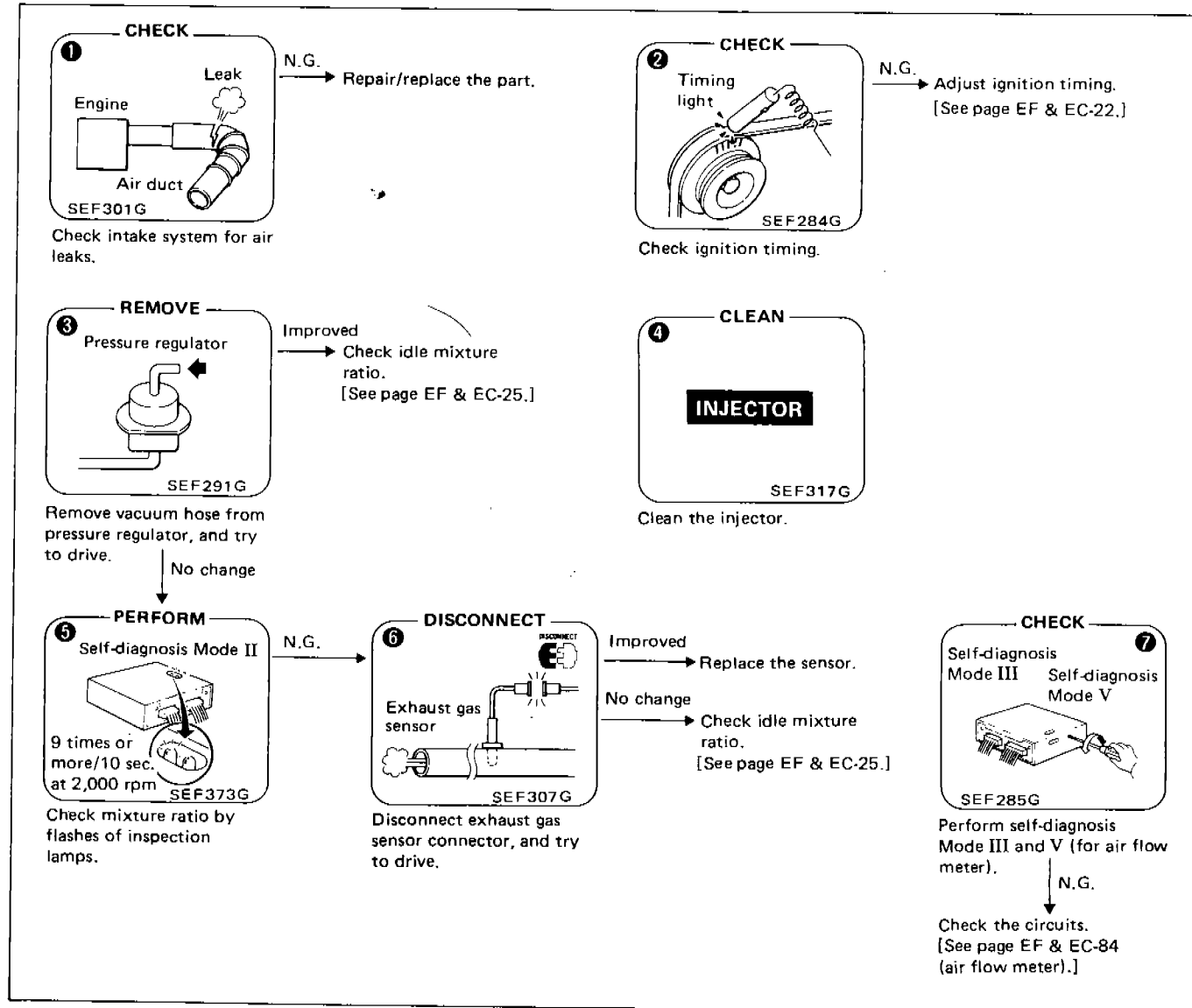
TROUBLE DIAGNOSES

Diagnostic Table (Cont'd)

SYMPTOM & CONDITION 24 Backfire — through the intake

POSSIBLE CAUSES		1	2	3	4	5	6	7
SPECIFICATIONS	Mixture ratio (too lean)	○		○		○	○	
	Ignition timing (too retarded)		○					
FUEL SYSTEM	Injectors (clogged)				○			
INTAKE SYSTEM	Air duct (air leaks)	○						
	Intake manifold (gaskets) (air leaks)	○						
CONTROL SYSTEM	Air flow meter							○
	Exhaust gas sensor					○	○	

SERVICE PROCEDURE



TROUBLE DIAGNOSES

Diagnostic Table (Cont'd)

SYMPTOM & CONDITION 23 Engine stall — while loading

POSSIBLE CAUSES		1	2	3	4	5
SPECIFICATIONS	Ignition timing		○			
	Idle speed (too low)	○				
INTAKE SYSTEM	A.A.C. valve	○		○		
	F.I.C.D. solenoid (remaining OFF)	○			○	
CONTROL SYSTEM	Idle switch (remaining OFF)	○				○

SERVICE PROCEDURE

1 MEASURE

Tachometer



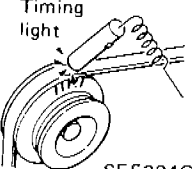
SEF316G

Measure idle speed.

N.G. → Adjust idle speed.
[See page EF & EC-25.]

2 CHECK

Timing light



SEF284G

Check ignition timing.

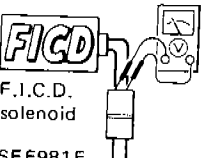
N.G. → Adjust ignition timing.
[See page EF & EC-22.]

3 CHECK

Check A.A.C. valve and/or its circuit.
[See page EF & EC-106.]

4 CHECK

F.I.C.D. solenoid



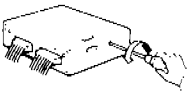
SEF981F

Check terminal voltage of F.I.C.D. solenoid.

→ Check the part and/or circuit.
[See HA section.]

5 PERFORM

Self-diagnosis Mode IV



SEF285G

Perform self-diagnosis Mode IV (for idle switch).

N.G. → Check the idle switch circuit.
[See page EF & EC-94.]

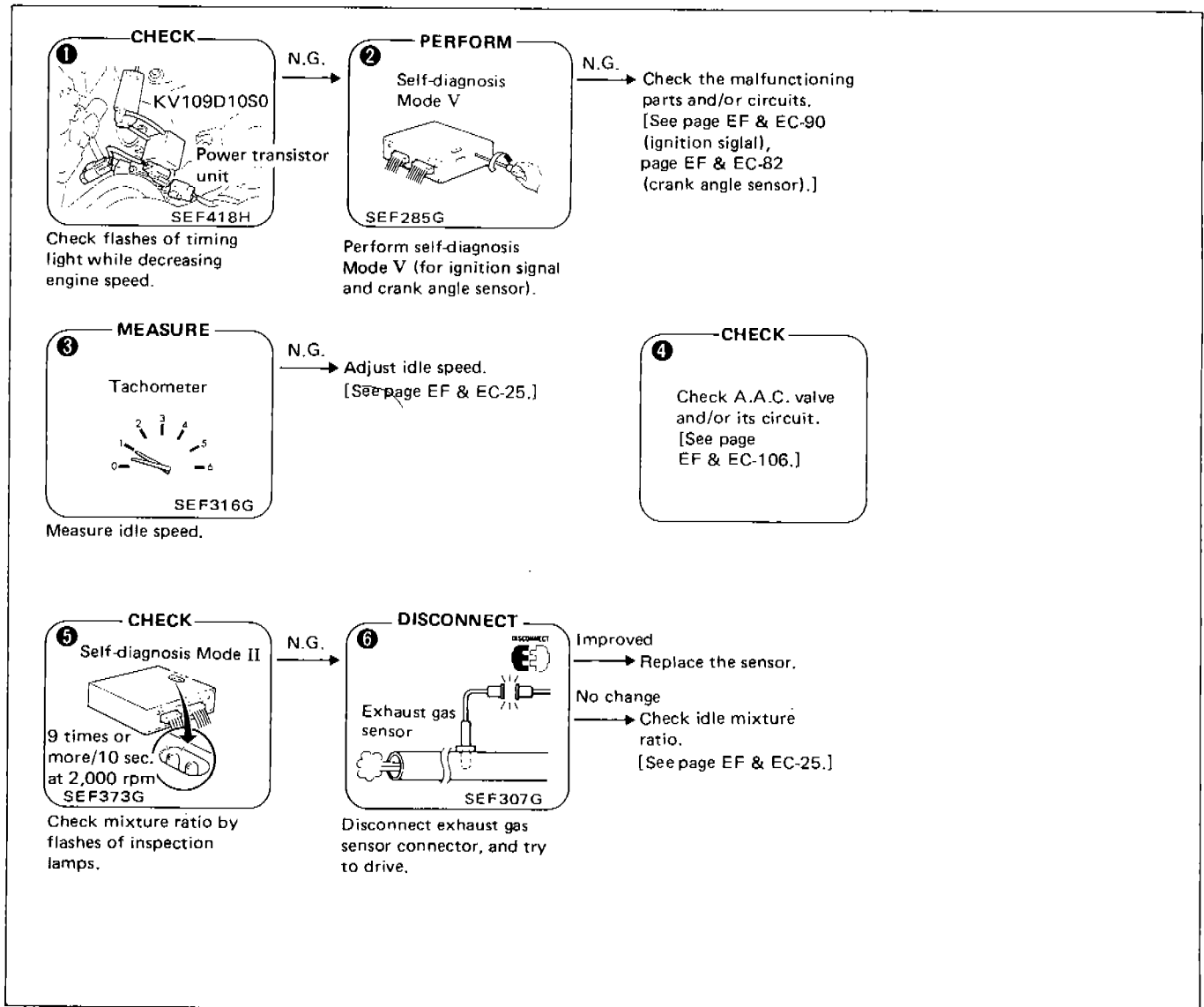
TROUBLE DIAGNOSES

Diagnostic Table (Cont'd)

SYMPTOM & CONDITION 22 Engine stall – while decelerating/just after stopping

POSSIBLE CAUSES		1	2	3	4	5	6
SPECIFICATIONS	Mixture ratio					○	○
	Ignition sparks (missing)	○					
	Idle speed (too low)			○			
IGNITION SYSTEM	(missing)	○	○				
INTAKE SYSTEM	A.A.C. valve			○	○		
CONTROL SYSTEM	Exhaust gas sensor					○	○
	Crank angle sensor		○				
	Idle switch (remaining OFF)			○			

SERVICE PROCEDURE



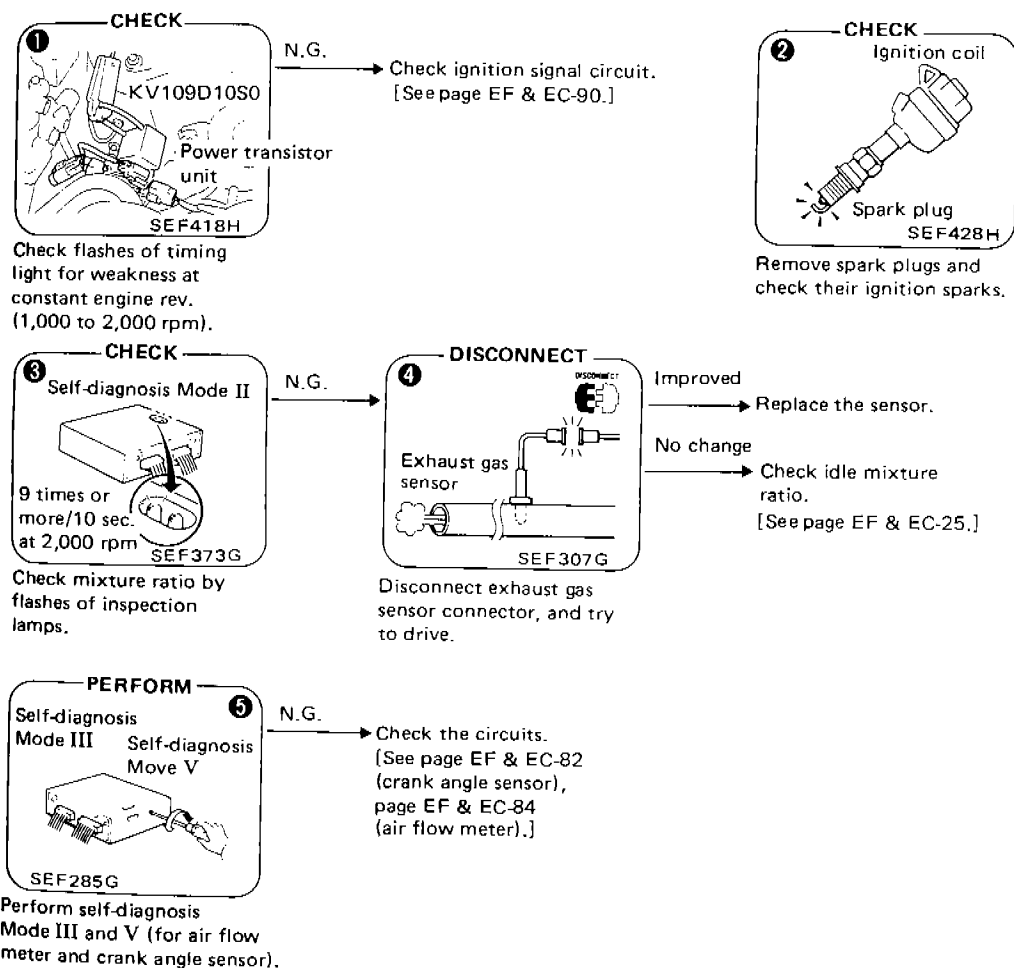
TROUBLE DIAGNOSES

Diagnostic Table (Cont'd)

SYMPTOM & CONDITION 21 Engine stall – while cruising

POSSIBLE CAUSES		①	②	③	④	⑤
SPECIFICATIONS	Mixture ratio			○	○	
	Ignition sparks (weak, missing)	○	○			
CONTROL SYSTEM	Crank angle sensor					○
	Air flow meter					○
	Exhaust gas sensor			○	○	

SERVICE PROCEDURE



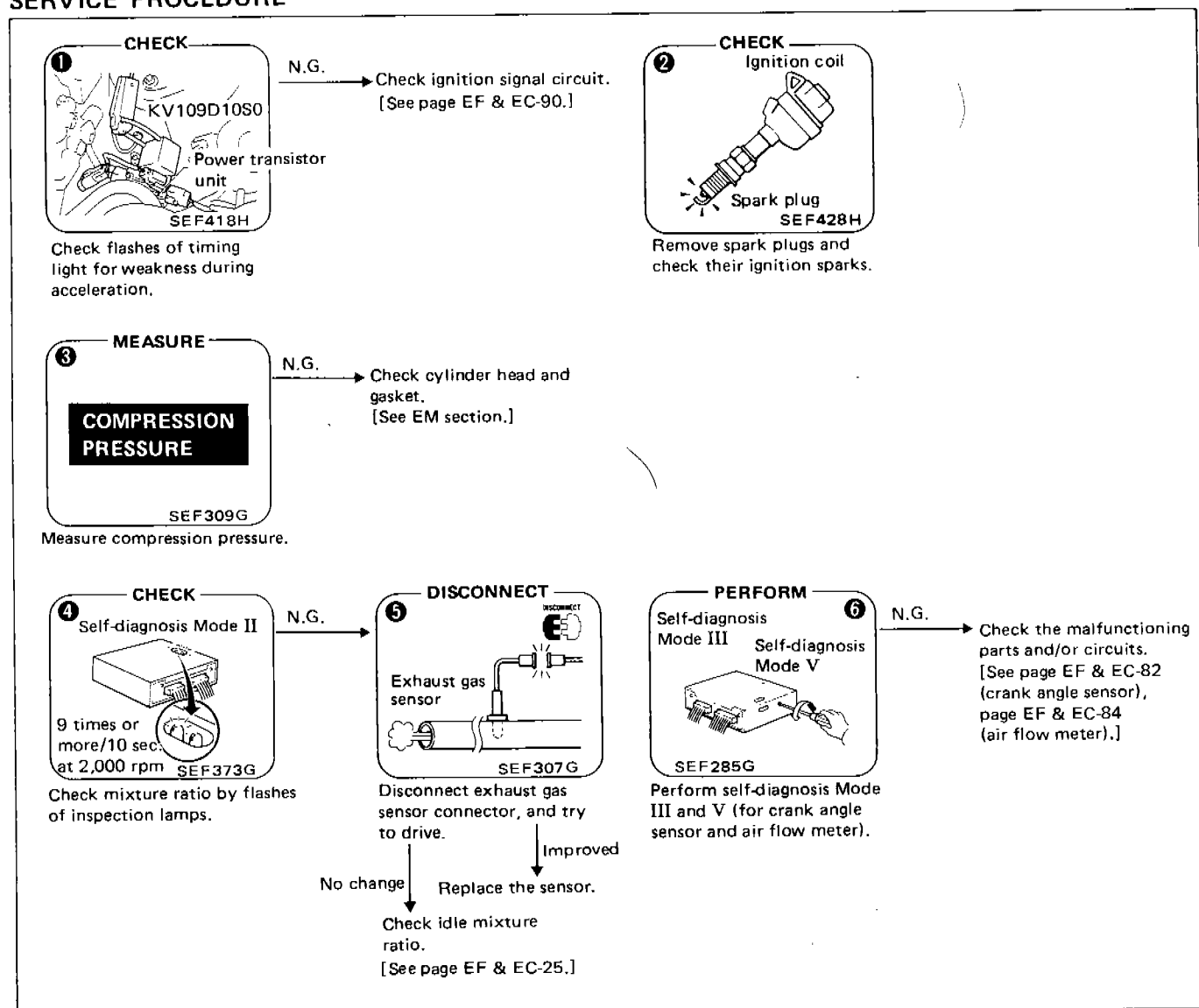
TROUBLE DIAGNOSES

Diagnostic Table (Cont'd)

SYMPTOM & CONDITION 20 Engine stall — while accelerating

POSSIBLE CAUSES		①	②	③	④	⑤	⑥
SPECIFICATIONS	Mixture ratio				○	○	
	Ignition sparks (weak, missing)	○	○				
	Compression pressure (low)			○			
CONTROL SYSTEM	Crank angle sensor	○					○
	Air flow meter						○
	Exhaust gas sensor				○	○	

SERVICE PROCEDURE



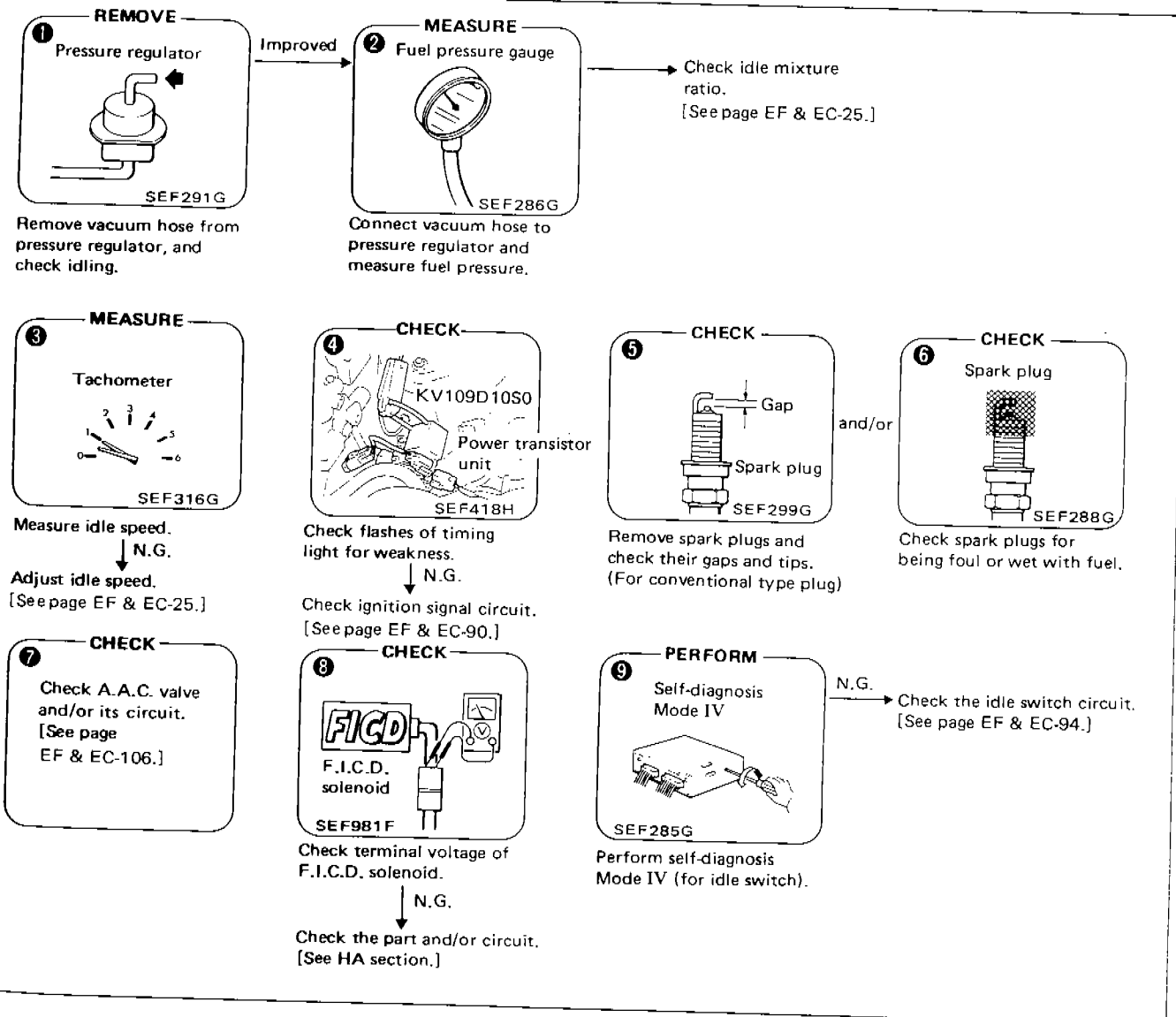
TROUBLE DIAGNOSES

Diagnostic Table (Cont'd)

SYMPTOM & CONDITION 19 Engine stall – while idling

POSSIBLE CAUSES		①	②	③	④	⑤	⑥	⑦	⑧	⑨
SPECIFICATIONS	Mixture ratio (too rich/too lean)	○	○							
	Fuel pressure (low)	○	○							
	Ignition sparks (weak, missing)				○					
	Idle speed (low)			○						
FUEL SYSTEM	Fuel line (clogged)		○							
IGNITION SYSTEM	Spark plugs (wet with fuel, improper gap)					○	○			
INTAKE SYSTEM	A.A.C. valve			○				○		
	F.I.C.D. solenoid (improper operation)			○					○	
CONTROL SYSTEM	Idle switch (remaining OFF)									○
	Neutral switch (remaining OFF)			○						

SERVICE PROCEDURE



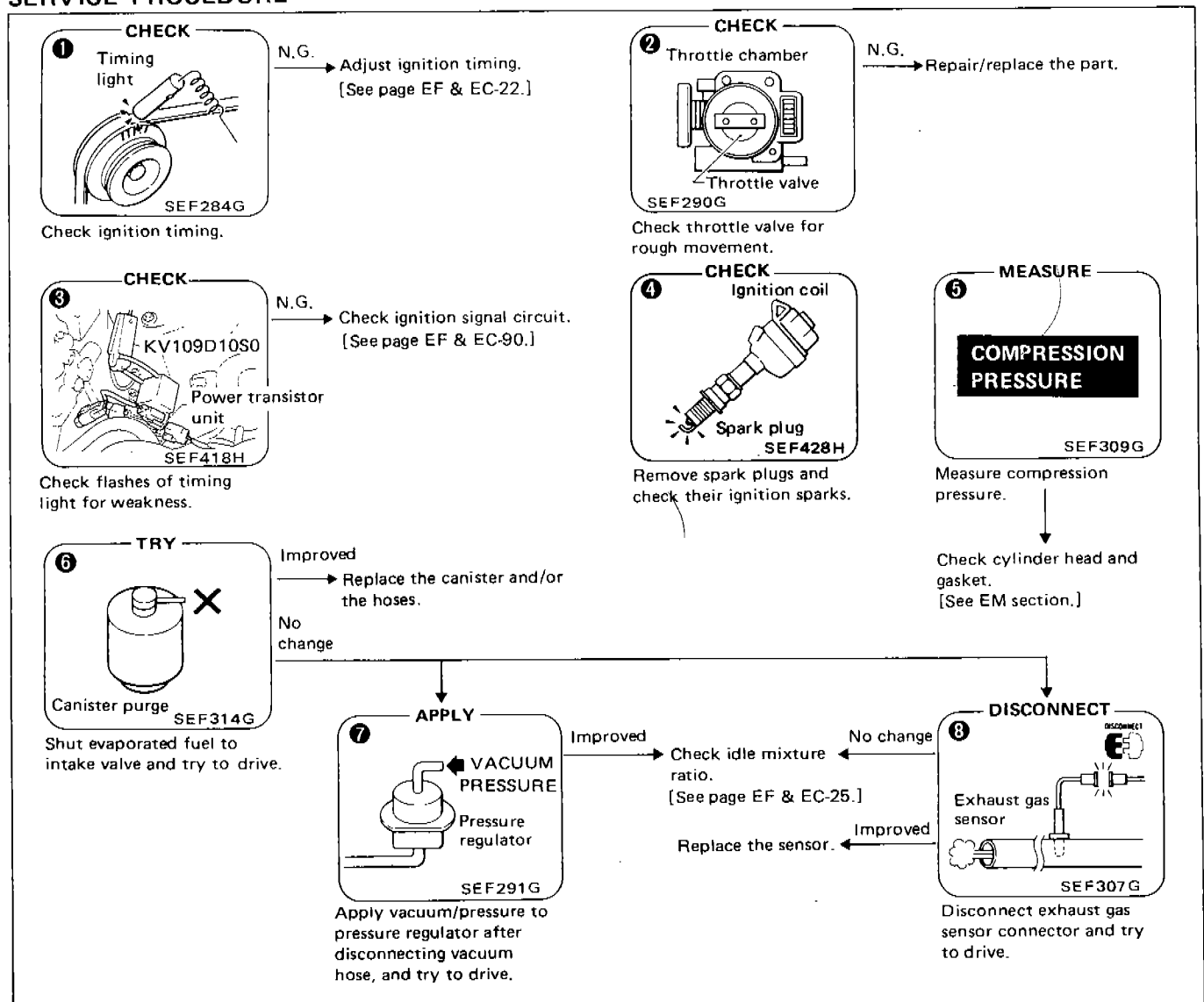
TROUBLE DIAGNOSES

Diagnostic Table (Cont'd)

SYMPTOM & CONDITION 18 Engine stall — during start-up

POSSIBLE CAUSES		1	2	3	4	5	6	7	8
SPECIFICATIONS	Mixture ratio (too rich/too lean)						○	○	○
	Ignition sparks (weak)			○					
	Ignition timing	○							
	Compression pressure (too low)					○			
FUEL SYSTEM	Canister (too much evaporation to intake)						○		
IGNITION SYSTEM	Spark plugs (wet with fuel, improper gap)				○				
INTAKE SYSTEM	Throttle valve (not open enough)		○						
CONTROL SYSTEM	Exhaust gas sensor								○

SERVICE PROCEDURE



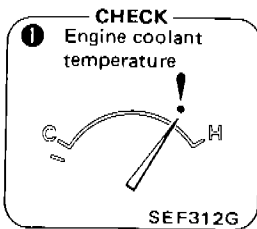
TROUBLE DIAGNOSES

Diagnostic Table (Cont'd)

SYMPTOM & CONDITION 17 Poor driveability — detonation

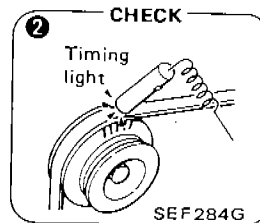
POSSIBLE CAUSES		①	②	③	④	⑤
SPECIFICATIONS	Mixture ratio (too lean)			○	○	
	Fuel pressure (low)			○		
	Ignition timing (too advanced)		○			
FUEL SYSTEM	Fuel filter (clogged)				○	
	Fuel line (clogged)				○	
	Injectors (clogged)				○	
CONTROL SYSTEM	Crank angle sensor (improper 1°-signals)					○
	Air flow meter					○
	Engine temperature sensor					○
OTHERS	Engine coolant temperature (too high)	○				
	Fuel (low octane rating, poor quality)					

SERVICE PROCEDURE



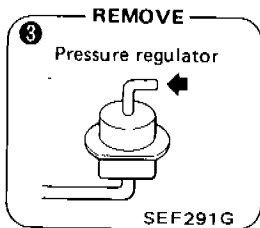
Check engine coolant temperature.

Too high
→ Check cooling system.
[See LC section.]

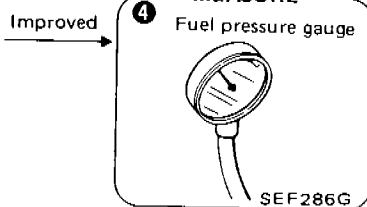


Check ignition timing.

N.G. → Adjust ignition timing.
[See page EF & EC-22.]

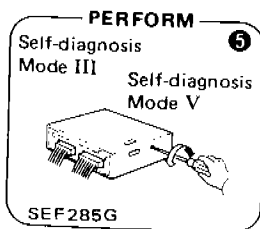


Remove vacuum hose from pressure regulator, and try to drive.



Connect vacuum hose to pressure regulator, and measure fuel pressure while driving.

Improved →



Perform self-diagnosis Mode III and V (for crank angle sensor, air flow meter and engine temp. sensor).

N.G. → Check the malfunctioning parts.
[See page EF & EC-82 (crank angle sensor), page EF & EC-84 (air flow meter), page EF & EC-86 (engine temp. sensor).]

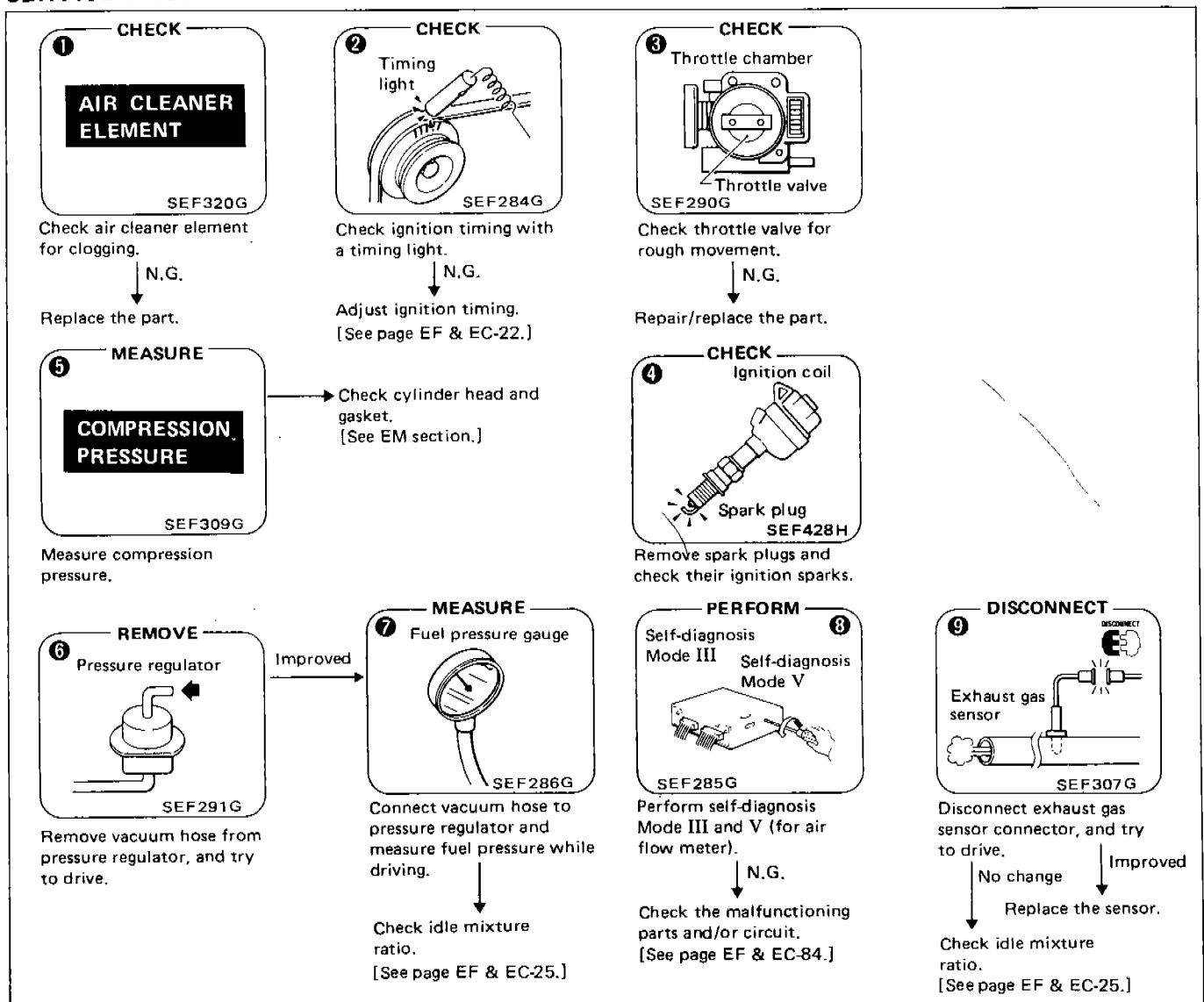
TROUBLE DIAGNOSES

Diagnostic Table (Cont'd)

SYMPTOM & CONDITION 16 Poor driveability — lack of power

POSSIBLE CAUSES		1	2	3	4	5	6	7	8	9
SPECIFICATIONS	Fuel pressure						○	○		
	Ignition timing		○							
	Compression pressure (too low)					○				
FUEL SYSTEM	Fuel pump (low fuel output)							○		
	Fuel filter (clogged)							○		
	Fuel line (clogged)							○		
	Injectors (clogged)							○		
IGNITION SYSTEM	Spark plugs (improper gap)				○					
INTAKE SYSTEM	Air cleaner element (clogged)	○								
	Throttle chamber (clogged)			○						
	Throttle valve (not open enough)			○						
CONTROL SYSTEM	Air flow meter								○	
	Exhaust gas sensor									○

SERVICE PROCEDURE



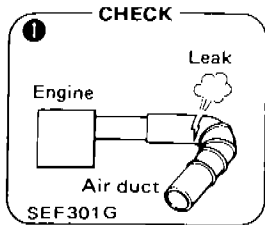
TROUBLE DIAGNOSES

Diagnostic Table (Cont'd)

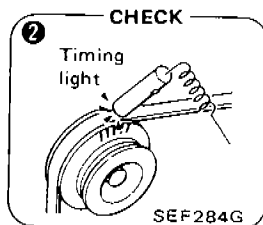
SYMPTOM & CONDITION 15 Poor driveability — surge (while cruising)

POSSIBLE CAUSES		①	②	③	④	⑤	⑥	⑦
SPECIFICATIONS	Mixture ratio (too lean)	○		○	○			○
	Fuel pressure (low)			○	○			
	Ignition timing		○					
IGNITION SYSTEM	(missing)						○	
INTAKE SYSTEM	Air duct (leaks)	○						
	Throttle chamber (air leaks)	○						
	Intake manifold (gasket) (air leaks)	○						
CONTROL SYSTEM	Crank angle sensor						○	
	Air flow meter						○	
	Exhaust gas sensor							○
	Idle switch					○		

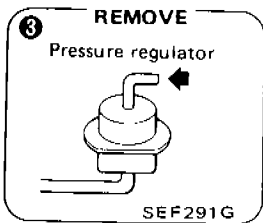
SERVICE PROCEDURE



Check intake system for air leaks.
↓ N.G.
Repair/replace the part.

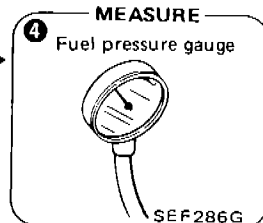


Check ignition timing.
↓ N.G.
Adjust ignition timing.
[See page EF & EC-22.]



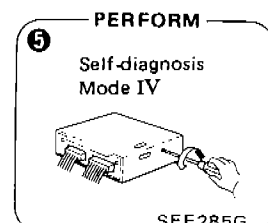
Remove vacuum hose from pressure regulator, and try to drive.

Improved →

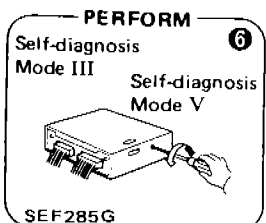


Connect vacuum hose to pressure regulator and measure fuel pressure while driving.

→ Check idle mixture ratio.
[See page EF & EC-25.]



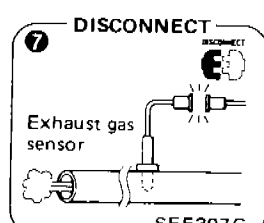
Perform self-diagnosis Mode IV (for idle switch).
↓ N.G.
Check the idle switch circuit.
[See page EF & EC-94.]



Perform self-diagnosis Mode III and V (for crank angle sensor, air flow meter and ignition signal).

N.G. →

Check the malfunctioning parts and/or circuits.
[See page EF & EC-82 (crank angle sensor), page EF & EC-84 (air flow meter), page EF & EC-90 (ignition signal).]



Disconnect exhaust gas sensor connector, and try to drive.

Improved →

Replace the sensor.

No change →

Check idle mixture ratio.
[See page EF & EC-25.]

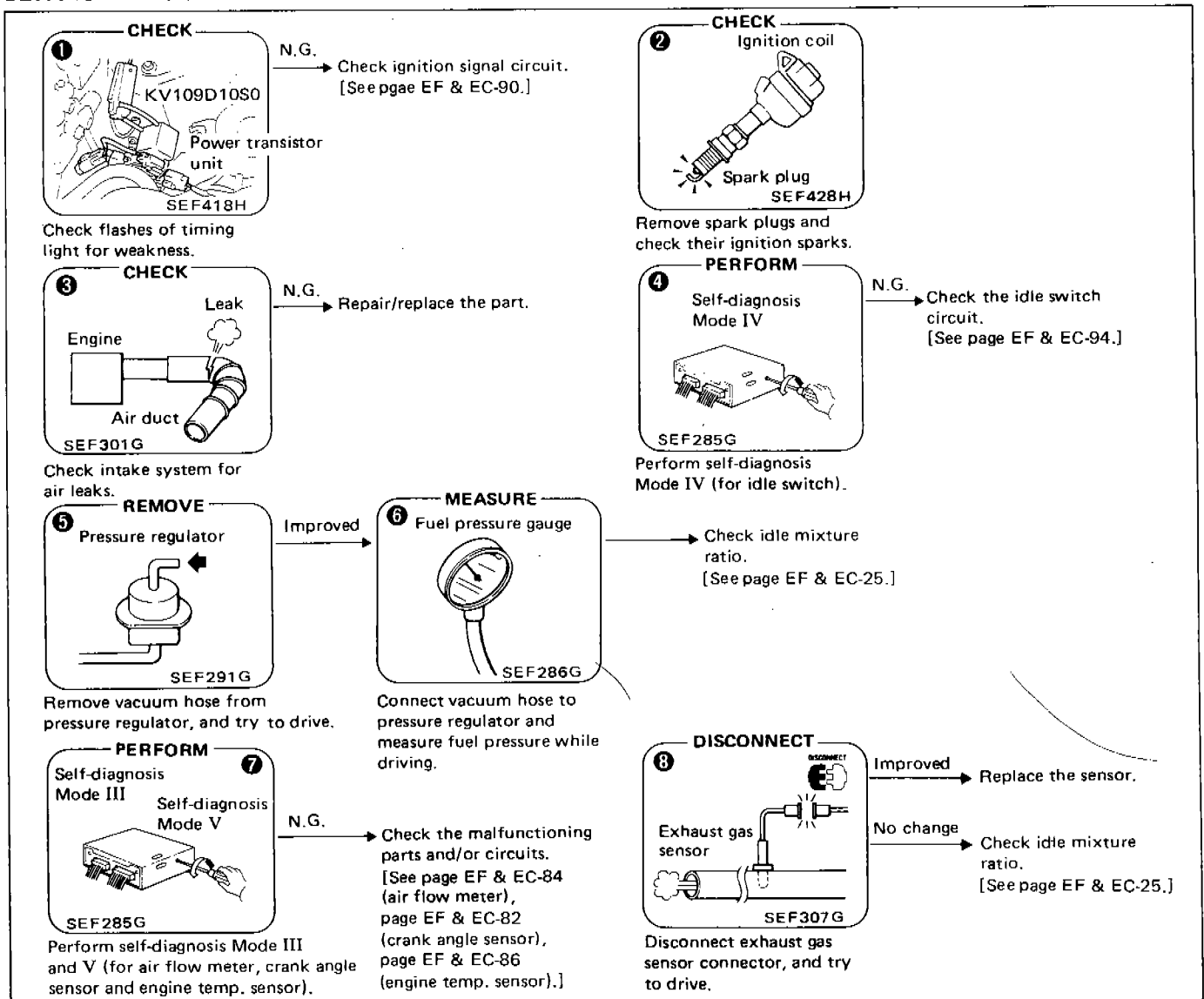
TROUBLE DIAGNOSES

Diagnostic Table (Cont'd)

SYMPTOM & CONDITION 14 Poor driveability — stumble (while accelerating)

POSSIBLE CAUSES		1	2	3	4	5	6	7	8
SPECIFICATIONS	Mixture ratio			○		○	○		○
	Fuel pressure					○	○		
FUEL SYSTEM	Fuel filter (clogged)						○		
	Fuel line (clogged)						○		
	Injectors (clogged)						○		
IGNITION SYSTEM	Power transistor	○	○						
	Ignition coil	○	○						
	Spark plugs (ignition leaks, improper gap)		○						
INTAKE SYSTEM	Air duct (leaks)			○					
CONTROL SYSTEM	Crank angle sensor	○						○	
	Air flow meter							○	
	Engine temperature sensor	○						○	
	Exhaust gas sensor								○
	Idle switch (remaining OFF)				○				
OTHERS	Fuel (poor quality)								

SERVICE PROCEDURE



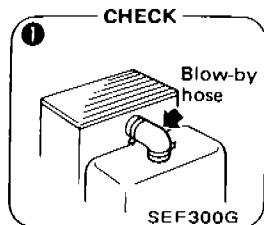
TROUBLE DIAGNOSES

Diagnostic Table (Cont'd)

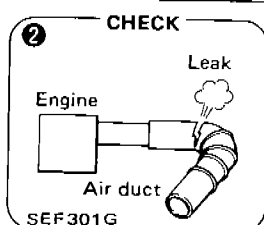
SYMPTOM & CONDITION 13 Unstable idling — after warm-up

POSSIBLE CAUSES		1	2	3	4	5	6	7	8	9
SPECIFICATIONS	Mixture ratio	○	○	○	○					
	Ignition sparks					○	○			
	Ignition timing							○		
	Compression pressure								○	
FUEL SYSTEM	Fuel line (clogged)									
	Canister (air leaks)			○						
	Pressure regulator control solenoid				○					
IGNITION SYSTEM	Power transistor					○	○			
	Ignition coil					○	○			
INTAKE SYSTEM	Blow-by hose (leaks)	○								
	Air duct (leaks)		○							
CONTROL SYSTEM	Idle switch									○

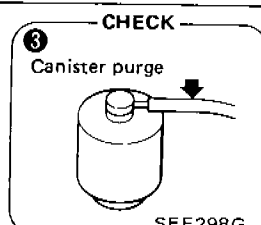
SERVICE PROCEDURE



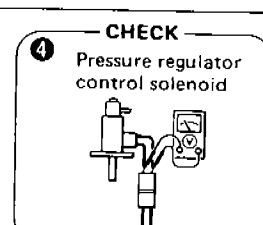
Check blow-by hose for leaks.
↓ N.G.
Repair/replace the hose.



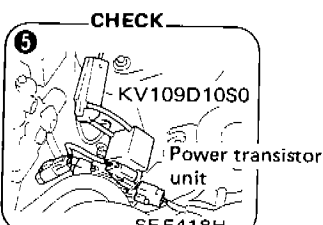
Check intake system for air leaks.
↓ N.G.
Repair/replace the part.



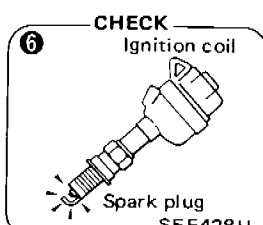
Check purge line for leaks.
↓ N.G.
Repair/replace the hose.



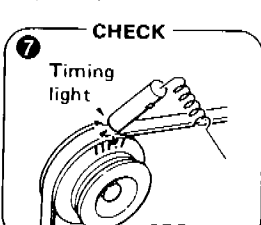
Check terminal voltage of the solenoid while idling.
↓ N.G.
Check the solenoid circuit.
[See page EF & EC-114.]



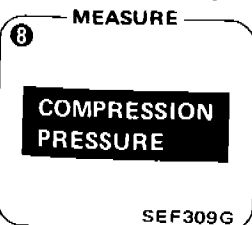
Check flashes of timing light for weakness.
↓ N.G.
Check ignition signal circuit.
[See page EF & EC-90.]



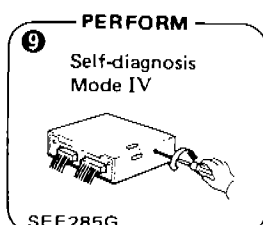
Remove spark plugs and check their ignition sparks.



Check ignition timing.
↓ N.G.
Adjust ignition timing.
[See page EF & EC-22.]



Measure compression pressure.
↓ N.G.
Check cylinder head and gasket.
[See EM section.]



Perform self-diagnosis Mode IV (for idle switch).
↓ N.G.
Check the idle switch circuit.
[See page EF & EC-94.]

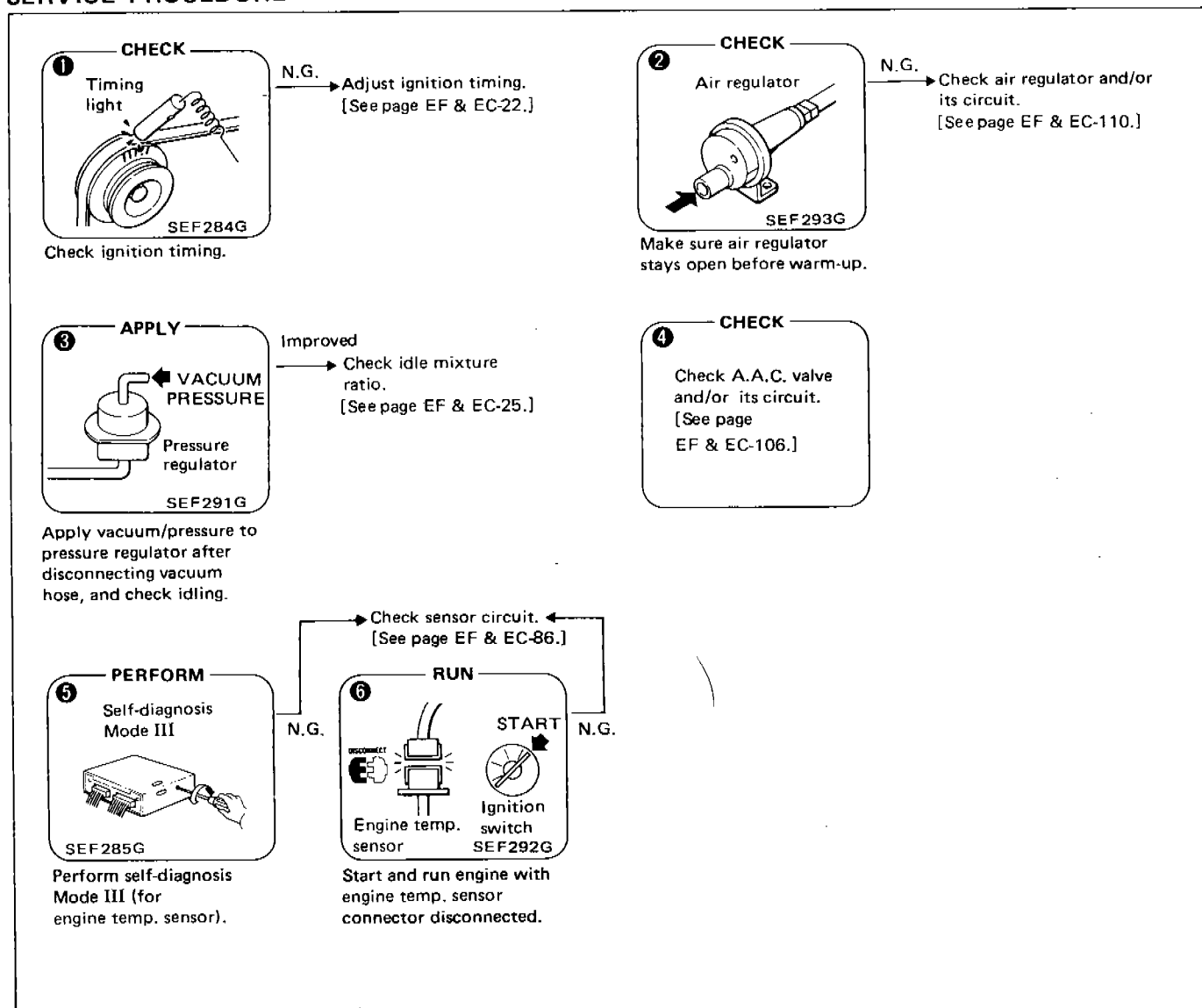
TROUBLE DIAGNOSES

Diagnostic Table (Cont'd)

SYMPTOM & CONDITION 12 Unstable idling — before warm-up

POSSIBLE CAUSES		1	2	3	4	5	6
SPECIFICATIONS	Mixture ratio		○	○			
	Ignition timing	○					
INTAKE SYSTEM	Air regulator (not open enough)		○				
	A.A.C. valve				○		
CONTROL SYSTEM	Engine temperature sensor					○	○

SERVICE PROCEDURE



PRECAUTIONS

E.C.U.

- Do not disassemble E.C.C.S. control unit. (E.C.U.)
- Do not turn diagnosis mode selector forcibly.
- If a battery terminal is disconnected, the memory will return to the ROM value. The E.C.C.S. 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. (Model with catalyzer)
- Do not apply undue force to mounting bracket.
- Before connecting or disconnecting E.C.U. connector, make sure red and green L.E.D.s are off after turning ignition key off.
- Always install specified E.C.U. on car; otherwise, erroneous engine operation may result.
- Disconnect connector by pulling it (not the harness) straight out.

E.C.C.S. HARNESS HANDLING

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

E.C.C.S. PARTS HANDLING

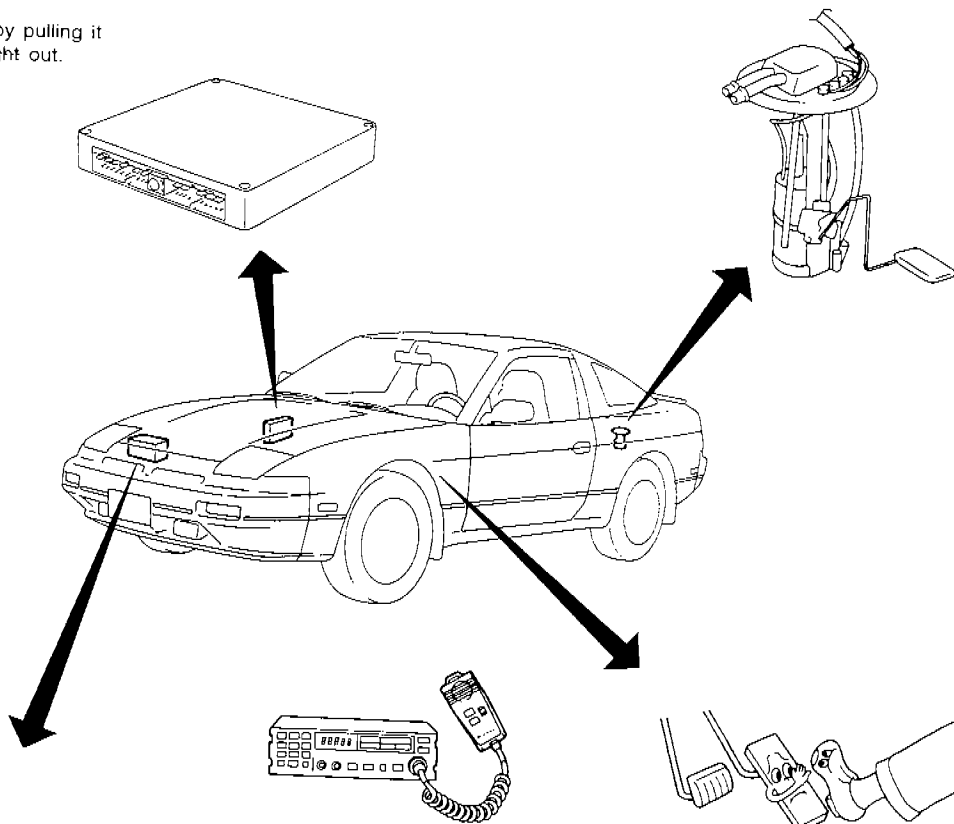
- Handle air flow meter carefully to avoid damage.
- Do not disassemble air flow meter.
- Do not clean air flow meter with detergent.
- Do not shock or jar the crank angle sensor.

INJECTOR

- Do not disconnect injector harness connectors with engine running.
- Do not apply battery power directly to injectors; otherwise injectors will be damaged.

FUEL PUMP

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



BATTERY

- Always use a 12 volt battery as power source.
- Do not disconnect battery cables while the engine is running.
- Do not reverse polarity of battery when connecting it. Otherwise, E.C.U. and/or injectors may be burned.

WIRELESS EQUIPMENT

- When installing a C.B. ham radio or a mobile phone, be sure to observe the following, as installation location may affect the electronic control systems.
 - Keep antenna as far as possible away from electronic control units.
 - Keep antenna feeder line more than 20 cm (7.9 in) away from harness of electronic controls.
Do not let them run parallel for a long distance.
 - Adjust antenna and feeder line so that standing-wave ratio can be kept smaller.
 - Be sure to ground radio to vehicle body.

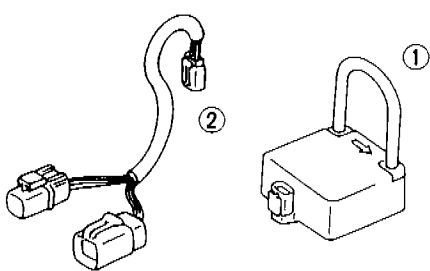
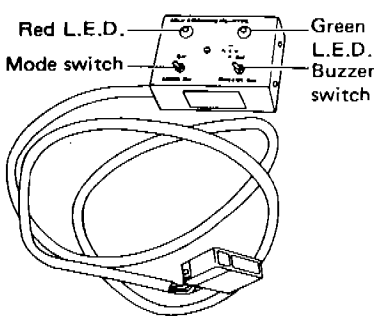
WHEN STARTING

- 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.

SEF398H

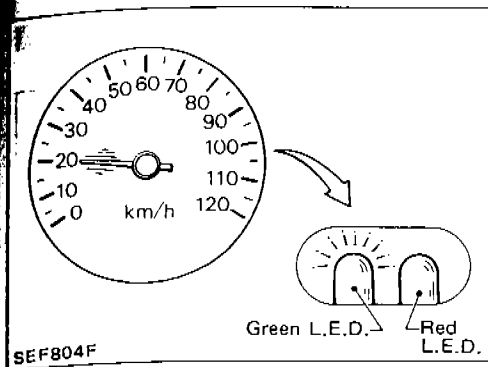
PREPARATION

SPECIAL SERVICE TOOLS

Tool number Tool name	Description
KV109D10S0 Ignition timing adapter coil set ① KV109D0010 Ignition timing adapter coil ② KV109D0015 Adapter harness	 Measuring ignition timing
KV109D0020 Checker Box	 Reading self-diagnosis indication

TROUBLE DIAGNOSES

Diagnostic Procedure 5 (Cont'd)



INSPECTION START

CHECK INPUT SIGNAL.

- 1) Perform switch ON/OFF diagnosis (in Mode IV).
- 2) Make sure green L.E.D. on E.C.U. comes "ON" when vehicle speed reaches 20 km/h (12 MPH).

O.K.

INSPECTION END

N.G.

CHECK COMPONENT

(Vehicle speed sensor).
Refer to "Electrical Components Inspection".
(See page EF & EC-128.)

O.K.

- 1) Repair or replace harness.
- 2) Check middle harness connector for proper connection.
- 3) Check S.M.J.

N.G.

Repair or replace vehicle speed sensor.

Reinstall any part removed.

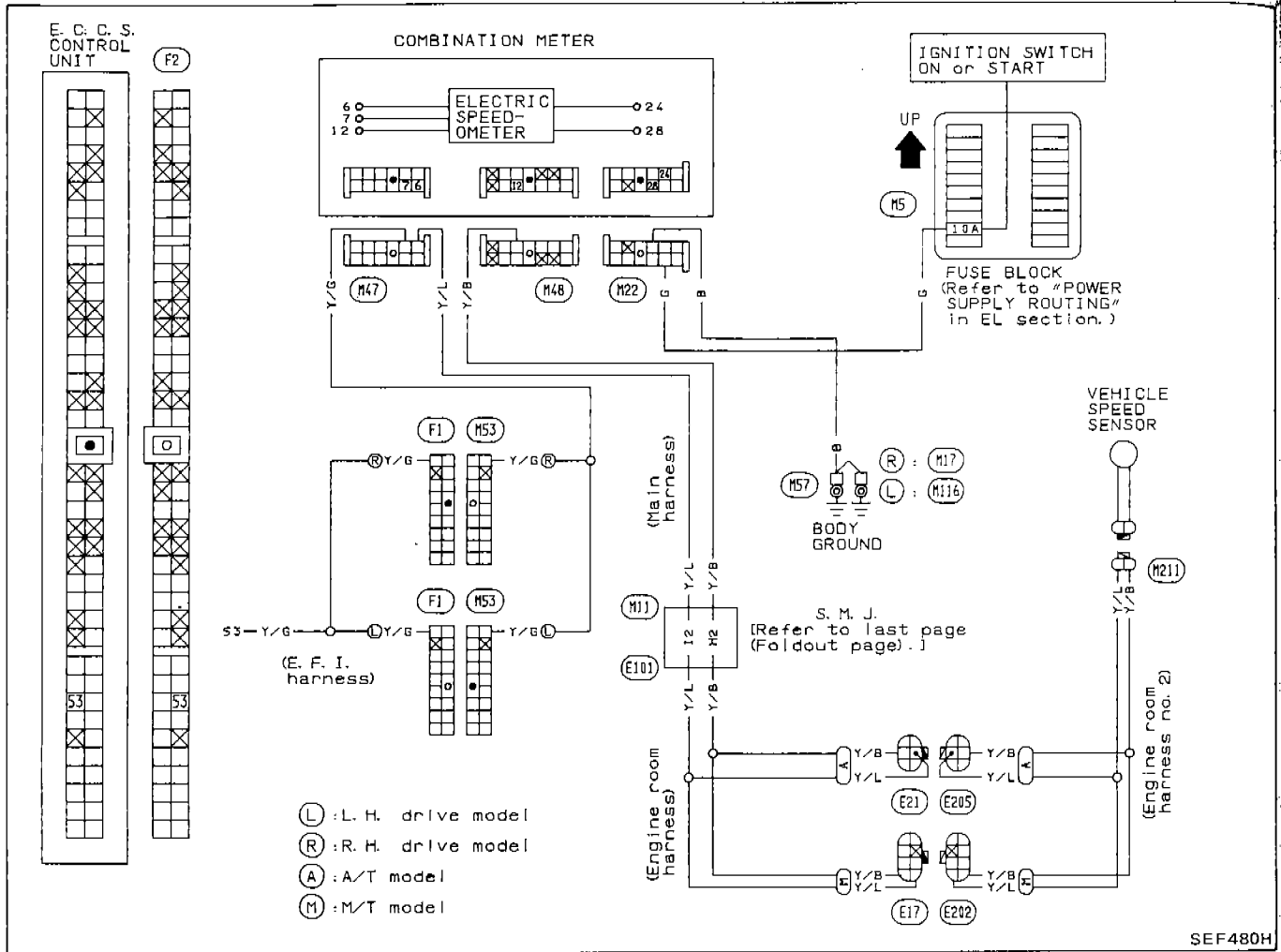
- 1) Perform switch ON/OFF diagnosis (in Mode IV) again.
- 2) Make sure green L.E.D. on E.C.U. comes "ON" when vehicle speed reaches 20 km/h (12 MPH).

INSPECTION END

TROUBLE DIAGNOSES

Diagnostic Procedure 5

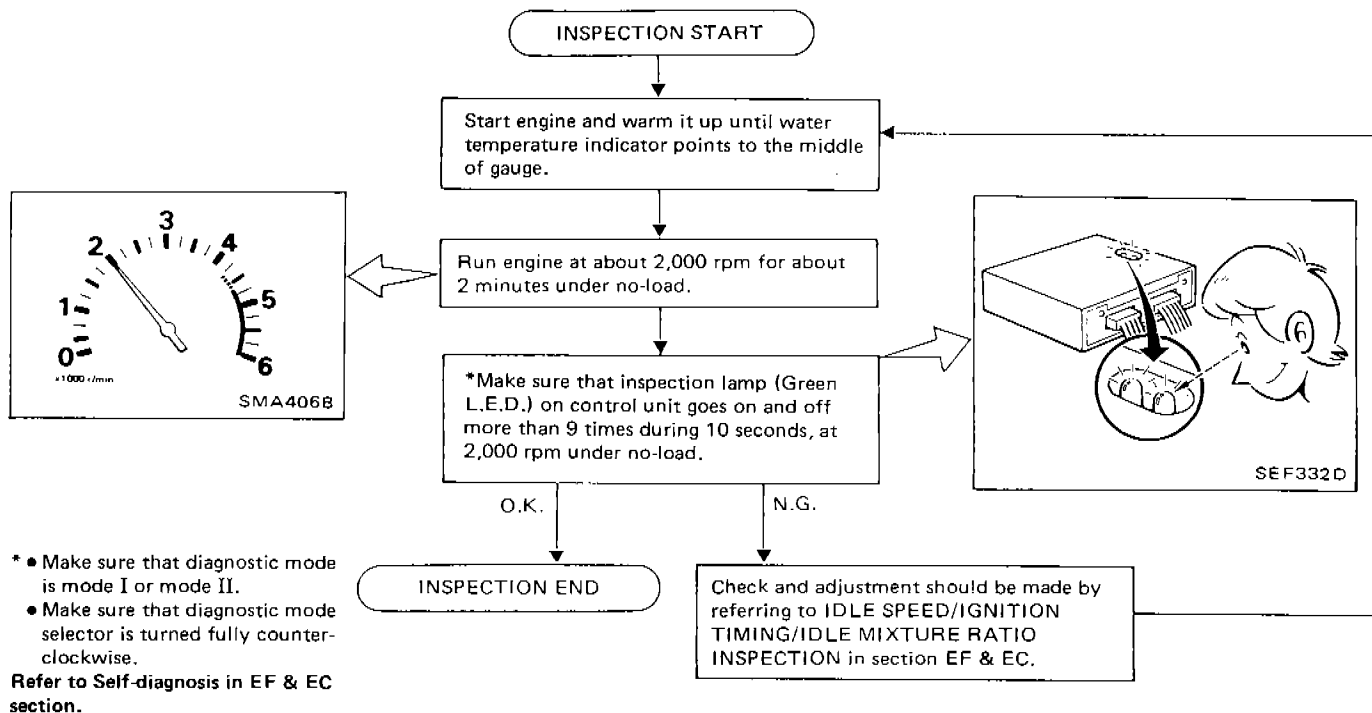
VEHICLE SPEED SENSOR

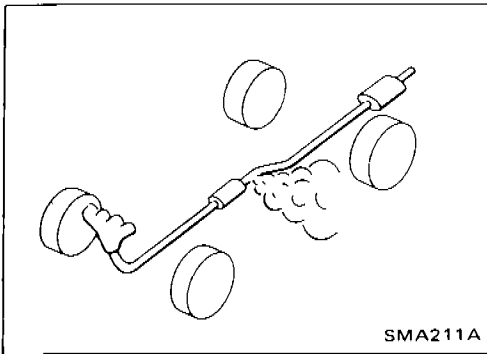


SEF480H

Checking Exhaust Gas Sensor

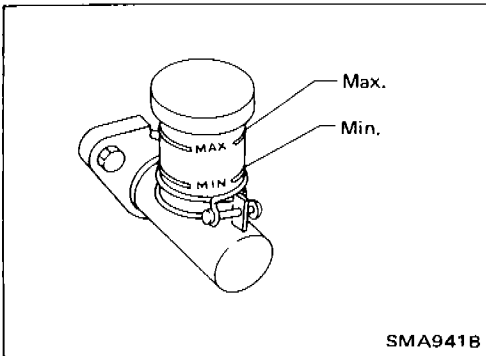
Checking procedure





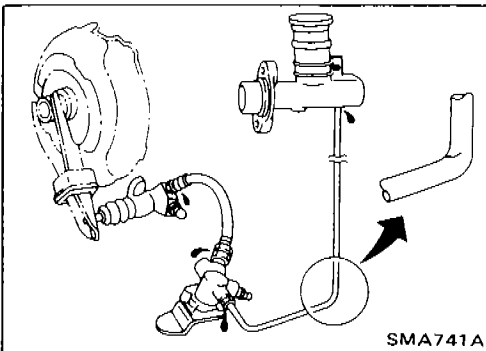
Checking Exhaust System

- Check exhaust pipes, muffler and mounting for improper attachment and for leaks, cracks, damage, loose connections, chafing and deterioration.



Checking Clutch Fluid Level and Leaks

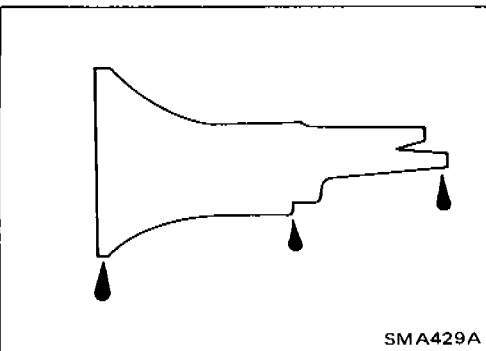
- If fluid level is extremely low, check clutch system for leaks.



Checking Clutch System

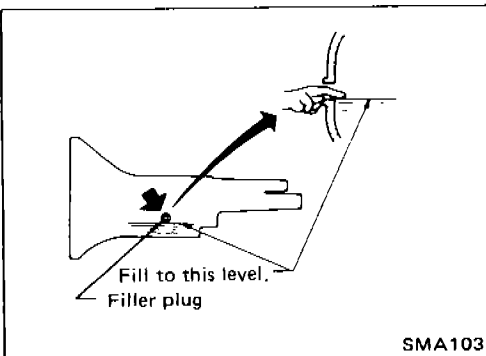
HYDRAULIC TYPE

Check fluid lines and operating cylinder for improper attachment, cracks, damage, loose connections, chafing and deterioration.



Checking M/T Oil

1. Check for oil leakage.



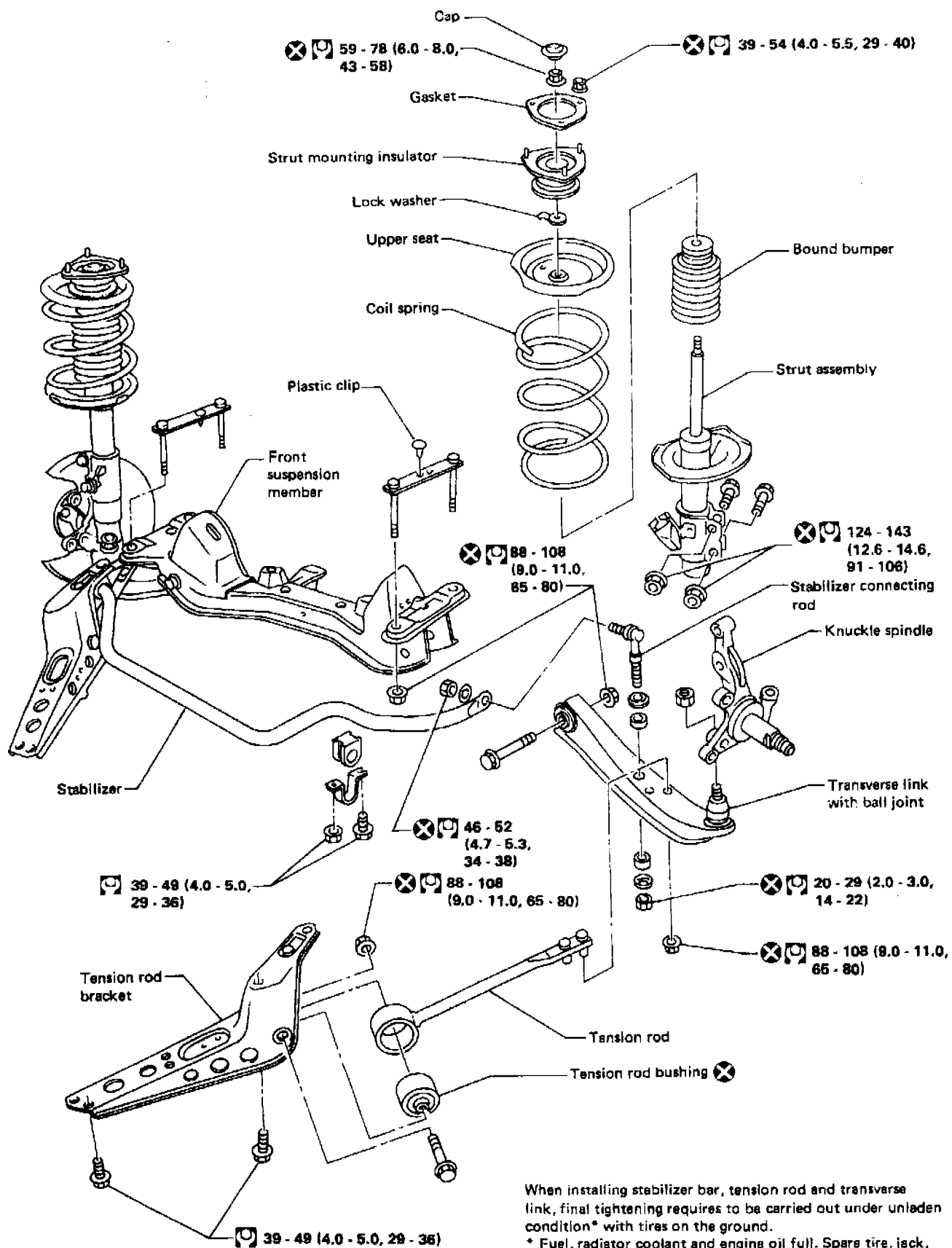
2. Check oil level.

Never start engine while checking oil level.

Filler plug:

: 25 - 34 N·m (2.5 - 3.5 kg-m, 18 - 25 ft-lb)

FRONT SUSPENSION



When installing stabilizer bar, tension rod and transverse link, final tightening requires to be carried out under unladen condition* with tires on the ground.

* Fuel, radiator coolant and engine oil full. Spare tire, jack, hand tools and mats in designated position.

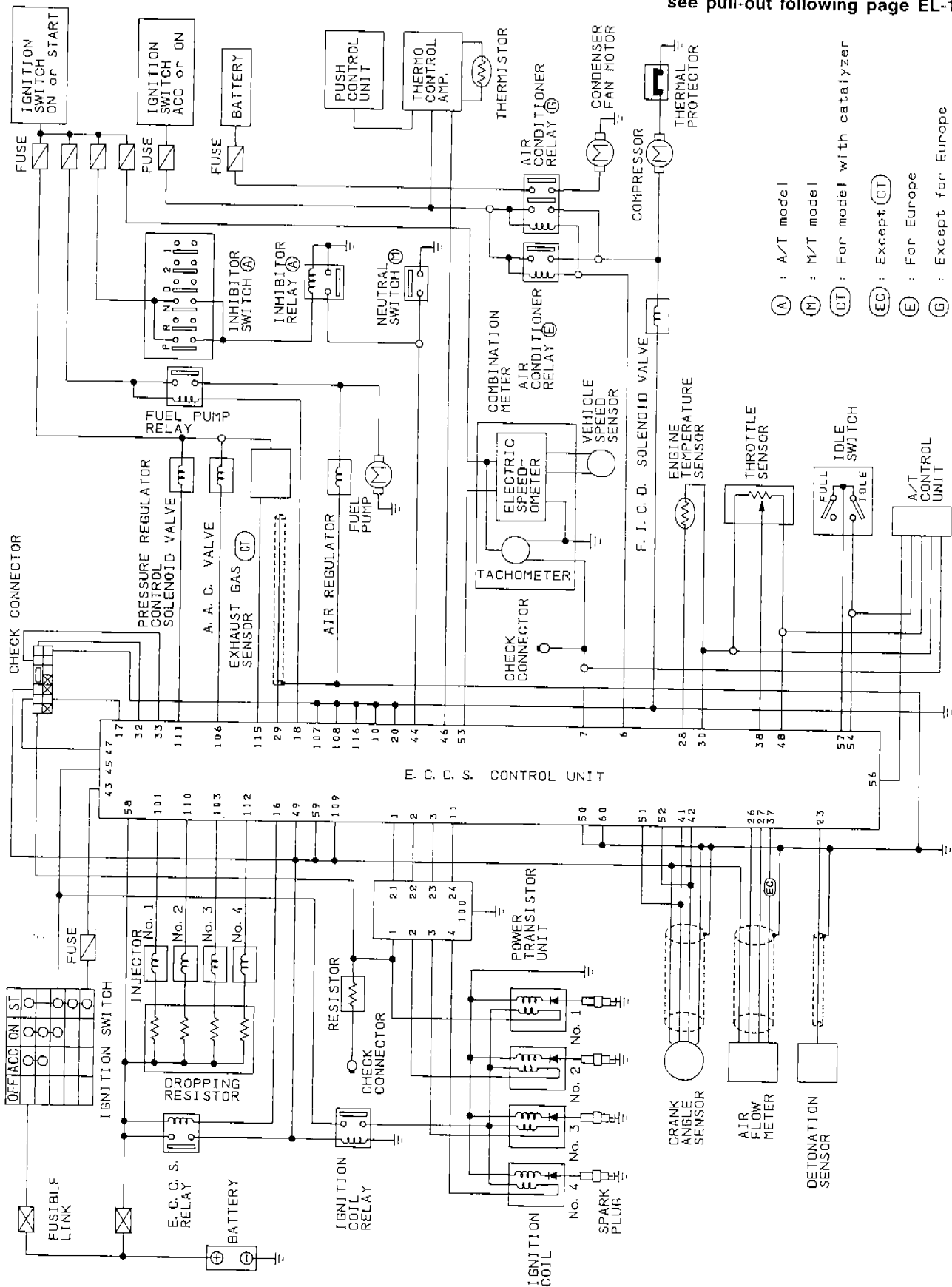
: N·m (kg·m, ft·lb)

SFA550A

ENGINE AND EMISSION CONTROL OVERALL SYSTEM

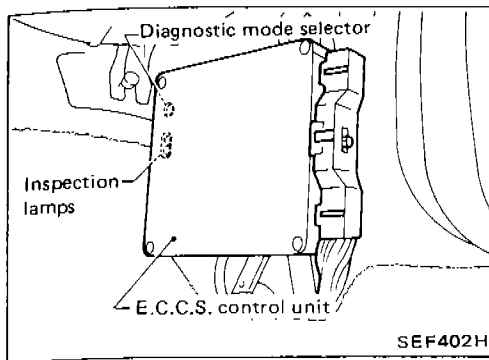
Circuit Diagram

(For Wiring Diagram — see pull-out following page EL-108.)



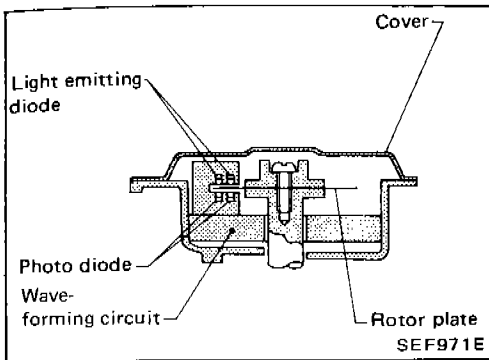
SEF400H

EF & EC-8



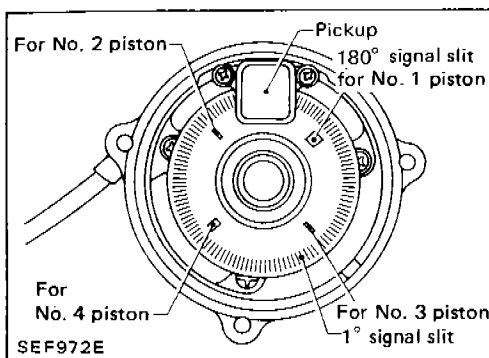
E.C.C.S. Control Unit (E.C.U.)

The E.C.U. consists of a microcomputer, inspection lamps, a diagnostic mode selector, and connectors for signal input and output and for power supply. The unit controls the engine.



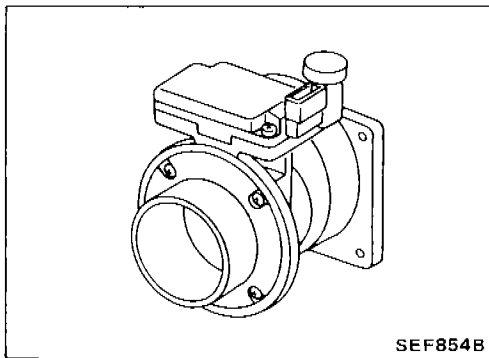
Crank Angle Sensor

The crank angle sensor is a basic component of the entire E.C.C.S. It monitors engine speed and piston position, and sends signals to the E.C.U. to control fuel injection, ignition timing and other functions.



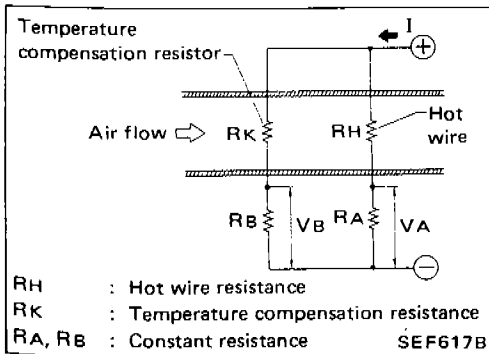
The crank angle sensor has a rotor plate and a wave-forming circuit. The rotor plate has 360 slits for 1° signal and 4 slits for 180° signal. Light Emitting Diodes (L.E.D.) and photo diodes are built in the wave-forming circuit.

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



Air Flow Meter

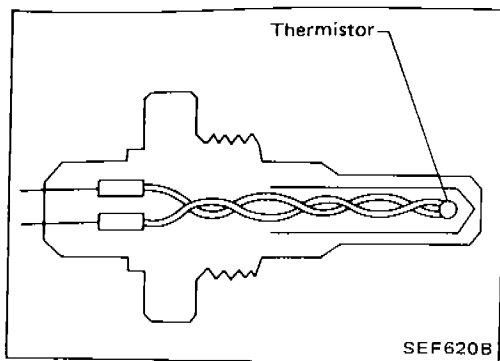
The air flow meter measures the mass flow rate of intake air. Measurements are made so that the control circuit will emit an electrical output signal corresponding to the amount of heat dissipated from a hot wire placed in the stream of intake air. The airflow past the hot wire removes the heat from the hot wire. The temperature of the hot wire is very sensitive to the mass flow rate. The higher the temperature of the hot wire, the greater its resistance value. This temperature change (resistance) is determined by the mass air flow rate. The control circuit accurately regulates current (I) in relation to the varying resistance value (R_H) so that V_A always equals V_B . The air flow meter transmits an output for voltage V_A to the control unit where the output is converted into an intake air signal.



Engine Temperature Sensor

The engine temperature sensor detects the engine temperature, which is dependent on engine coolant, and transmits a signal to the E.C.U.

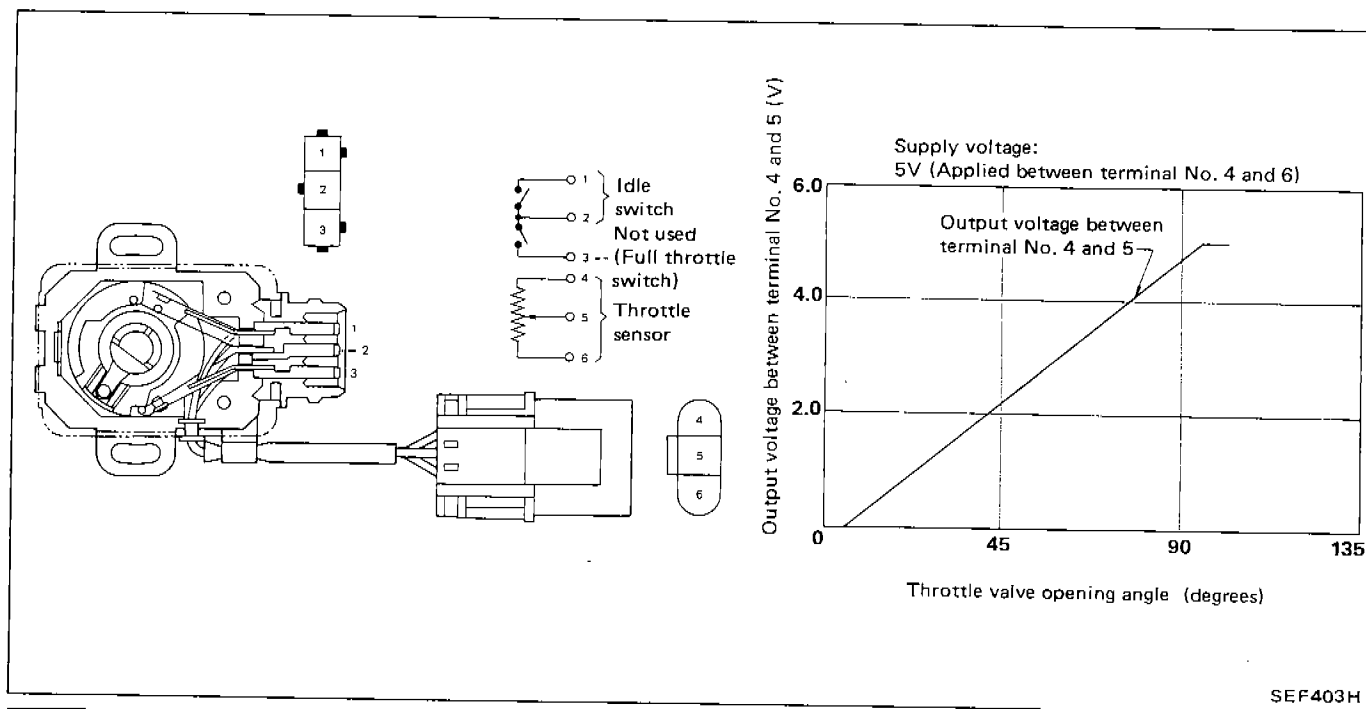
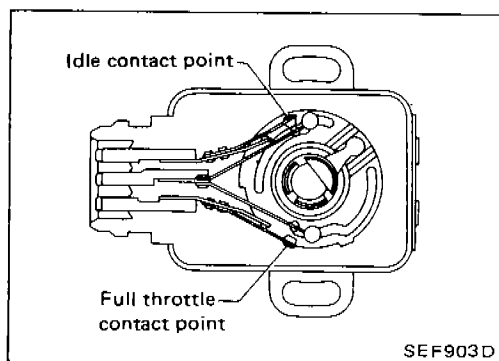
The temperature sensing unit employs a thermistor which is sensitive to the change in temperature. Electrical resistance of the thermistor decreases in response to the temperature rise.



Throttle Sensor and Idle Switch

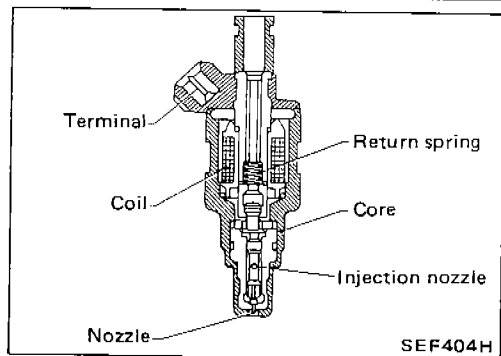
The throttle sensor responds to the accelerator pedal movement. This sensor is a kind of potentiometer which transforms the throttle valve position into output voltage, and emits the voltage signal to the E.C.U. In addition the sensor detects the opening and closing speed of the throttle valve, and feeds the voltage signal to the A/T control unit. The idle switch actuates in response to accelerator pedal movement.

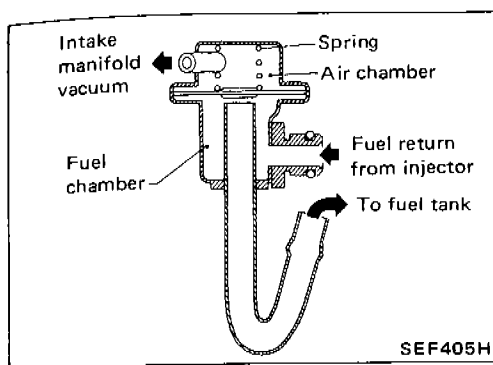
This switch has idle contact and full throttle contact. The idle contact is used for engine control. It closes when the throttle valve is positioned at idle and opens when it is at any other position.



Fuel Injector

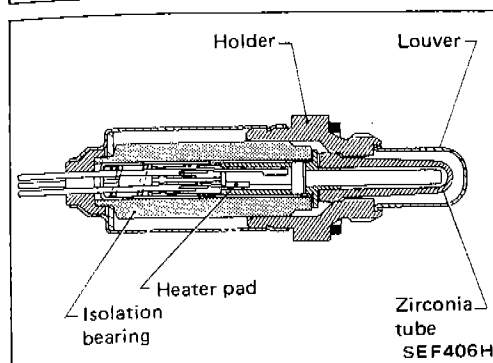
The fuel injector is a small, elaborate solenoid valve. As the E.C.U. sends injection signals to the injector, the coil in the injector pulls the needle valve back and fuel is released into the intake manifold through the nozzle. The injected fuel is controlled by the E.C.U. in terms of injection pulse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





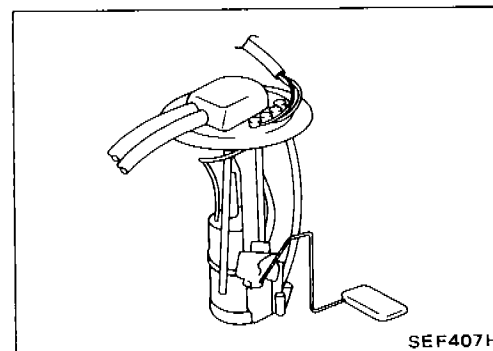
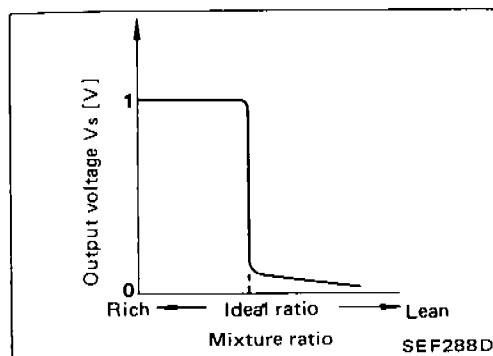
Pressure Regulator

The pressure regulator maintains the fuel pressure at 250.1 kPa (2.501 bar, 2.55 kg/cm², 36.3 psi). Since the injected fuel amount depends on injection pulse duration, it is necessary to maintain the pressure at the above value.



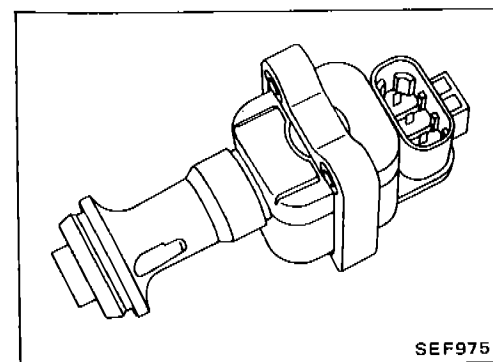
Exhaust Gas Sensor (For catalyzer model)

The exhaust gas 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 exhaust gas sensor detects the amount of oxygen in the exhaust gas and sends the signal of approximately 1V or 0V to the E.C.U. A heater is used to activate the sensor.



Fuel Pump

The fuel pump is an electric turbine type with the turbines directly connected to the motor. This assembly is located in the fuel tank.



Ignition Coil

The ignition coil is a small, molded type.

IDLE SPEED/IGNITION TIMING/IDLE MIXTURE RATIO INSPECTION

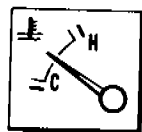
INSPECTION PROCEDURE

For catalyzer model

INSPECTION START

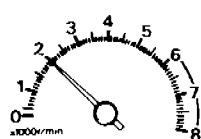
Visually check the following:

- Air cleaner clogging
- Hoses and ducts for leaks
- Electrical connectors
- Gaskets
- Throttle valve and throttle valve switch operation



SEF457C

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



SEF477B

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

Perform E.C.C.S. self-diagnosis. (Select mode III)

O.K.

N.G.

Check, correct or replace malfunctioning parts.

Does engine run smoothly?

O.K.

N.G.

Check and clean injectors, and replace injectors if necessary.

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

Check idle speed.

M/T: 850 ± 50 rpm

A/T: 850 ± 50 rpm (in "N" position)

O.K.

N.G.

Check ignition timing with a timing light. Refer to page EF & EC-22.

$15^\circ \pm 2^\circ$ B.T.D.C.

O.K.

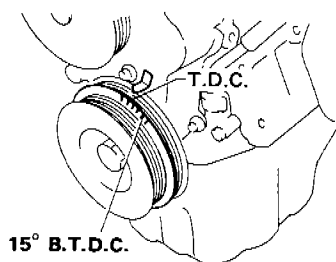
N.G.

Adjust ignition timing by turning crank angle sensor after loosening bolts which secure it.

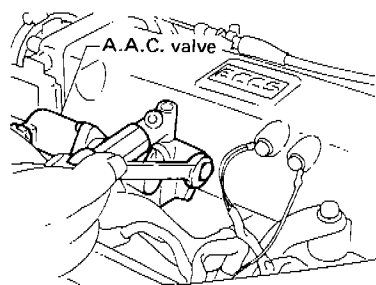
Disconnect A.A.C. valve harness connector.

Adjust idle speed to 800 rpm by turning idle speed adjusting screw.

Connect A.A.C. valve harness connector.



SEF131F

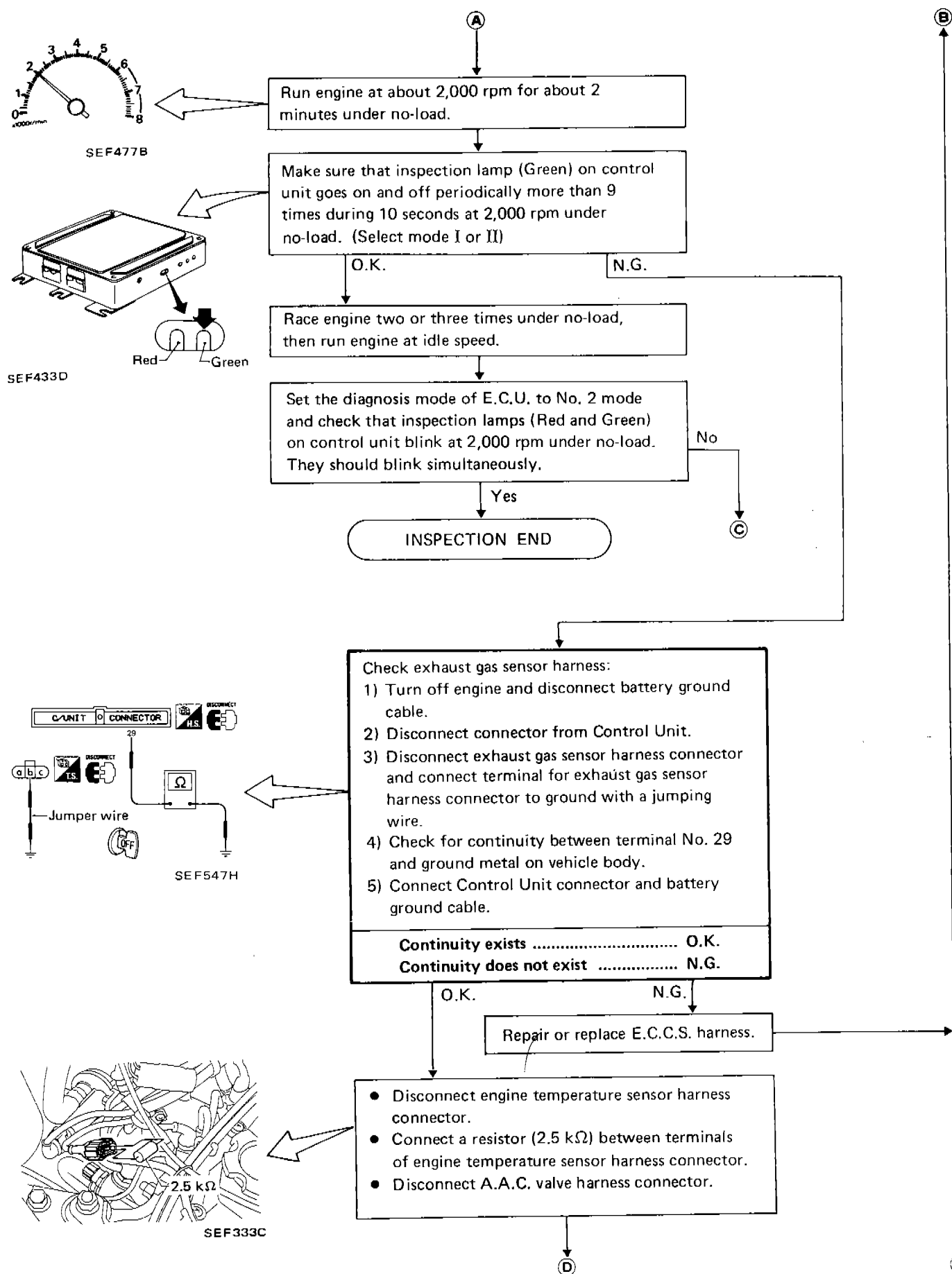


SEF647H

A

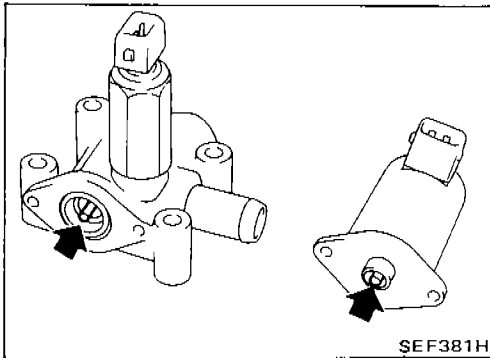
B

IDLE SPEED/IGNITION TIMING/IDLE MIXTURE RATIO INSPECTION

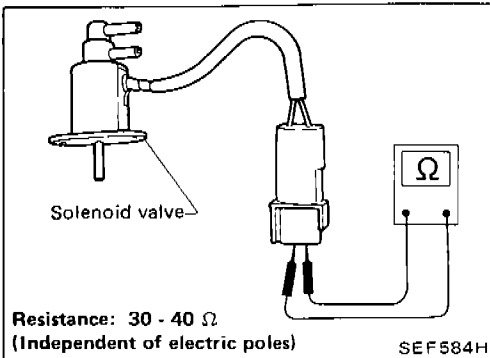


TROUBLE DIAGNOSES

Electrical Components Inspection (Cont'd)



3. Remove A.A.C. valve
4. Check plunger for seizure or sticking.
5. Check spring for damage.



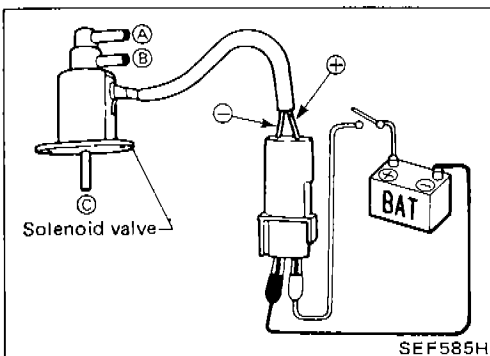
PRESSURE REGULATOR CONTROL SOLENOID VALVE

1. Check it for electric continuity.

Resistance:

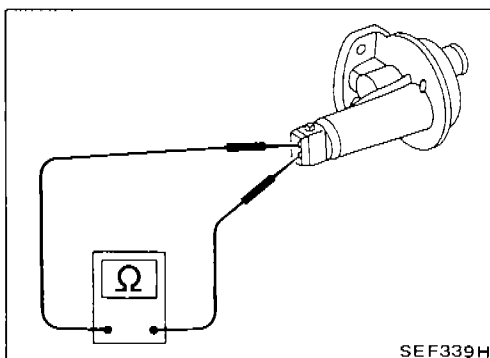
30 - 40 Ω

(Above resistance has no change even if the polarity of the circuit tester is changed when measuring it.)



2. Check the solenoid valve for normal operation. Supply it with battery voltage, and check whether there is continuity between ports A, B and C.

Solenoid valve		OFF	ON
Item			
Continuity		B-C	A-B



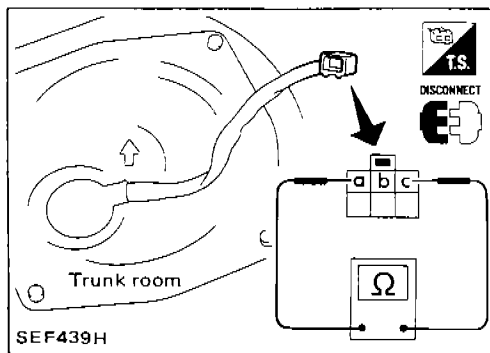
AIR REGULATOR

1. Check air regulator resistance.

Resistance:

Approximately 70 Ω

2. Check air regulator for clogging.



FUEL PUMP

1. Disconnect fuel pump harness connector. Check resistance between terminals Ⓐ and Ⓒ.

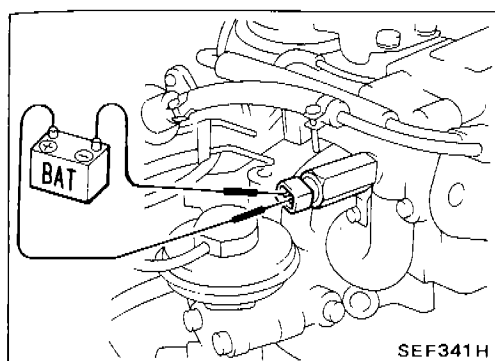
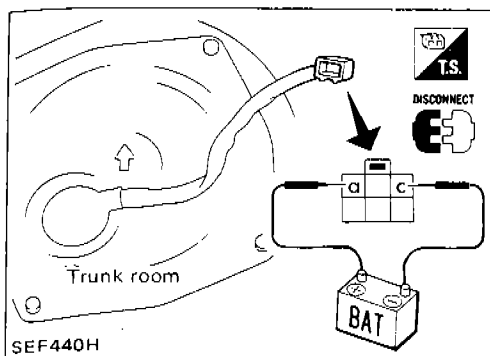
Resistance:

Approximately 0.5 Ω

TROUBLE DIAGNOSES

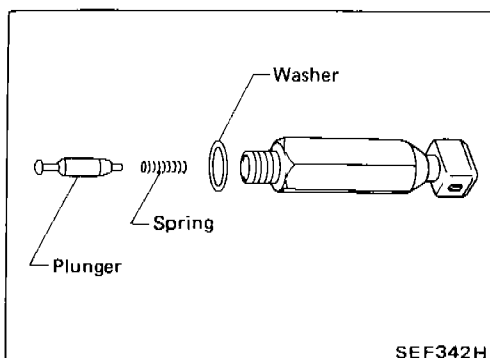
Electrical Components Inspection (Cont'd)

2. Check fuel pump for normal operation by supplying it with battery voltage between terminals ① and ③.

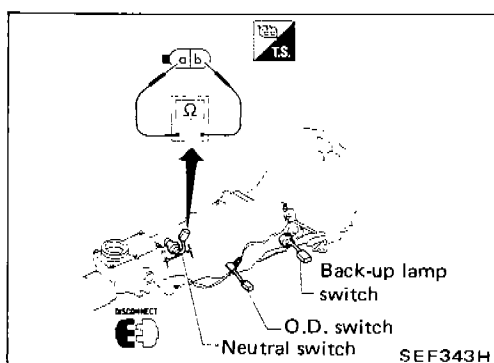


F.I.C.D. SOLENOID VALVE

1. Check that clicking sound is heard when applying 12V direct current to terminals.



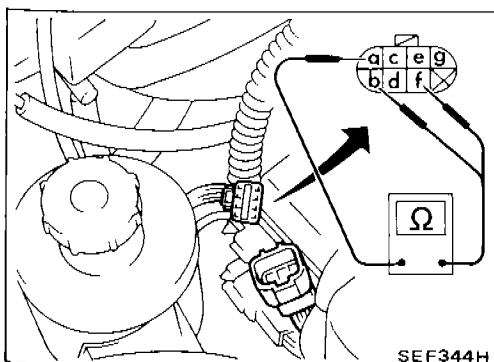
2. Check plunger for seizure or sticking.
3. Check for broken spring.



NEUTRAL SWITCH

Check continuity between terminals ① and ②.

Conditions	Continuity
Shift to Neutral	Yes
Shift to other position	No



INHIBITOR SWITCH

Check continuity between terminals ① and ②, ③.

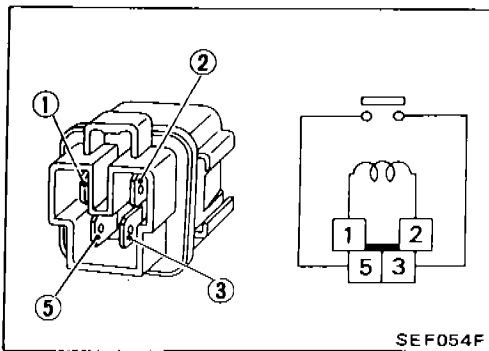
Conditions	Continuity between terminals ① and ②	Continuity between terminals ① and ③
Shift to "P" position	Yes	No
Shift to "N" position	No	Yes
Shift to positions other than "P" and "N"	No	No

TROUBLE DIAGNOSES

Electrical Components Inspection (Cont'd)

E.C.C.S. RELAY, FUEL PUMP RELAY AND INHIBITOR RELAY

Check continuity between terminals ③ and ⑤.



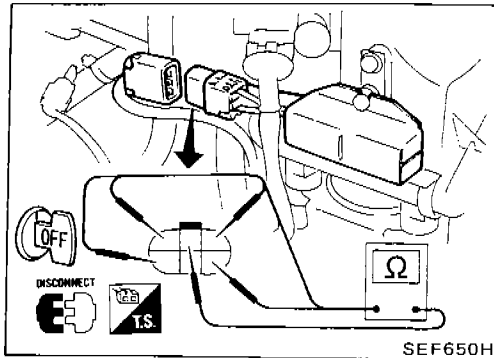
Condition	Continuity
12V direct current supply between terminals ① and ②	Yes
No supply	No

DROPPING RESISTOR

1. Disconnect dropping resistor harness connector.
2. Check dropping resistor resistance.

Resistance:

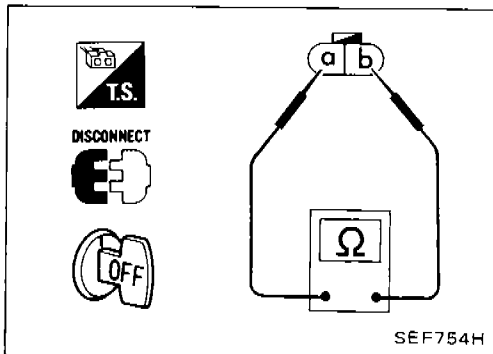
Approximately 6Ω



VEHICLE SPEED SENSOR

1. Jack up rear wheels.
2. Disconnect vehicle speed sensor harness connector.
3. Check continuity between terminals ① and ② while rotating rear wheel by hand.

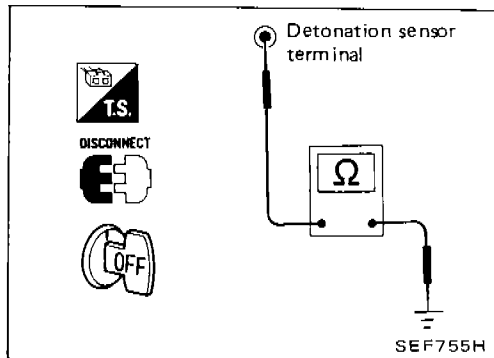
Continuity should be intermittent.



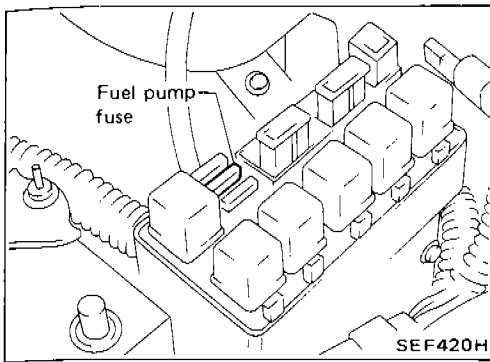
DETONATION SENSOR

1. Disconnect detonation sensor harness.
2. Check continuity between detonation sensor terminal and ground.

Continuity should exist.



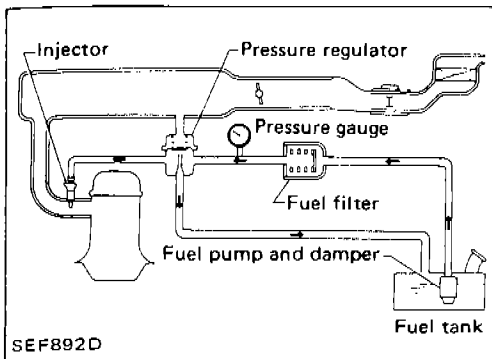
FUEL INJECTION CONTROL SYSTEM INSPECTION



Releasing Fuel Pressure

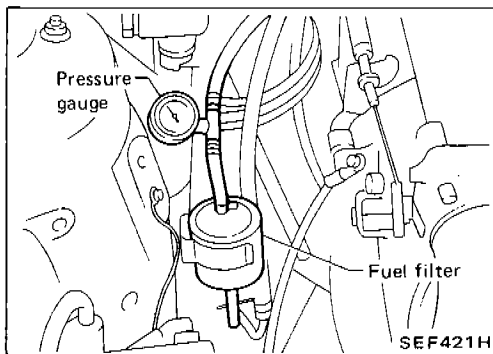
Before disconnecting fuel line, release fuel pressure from fuel line to eliminate danger.

1. Remove fuse for fuel pump.
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.



5. Read the indication of fuel pressure gauge.

At idling:

When fuel pressure regulator valve vacuum hose is connected.

**Approximately 196 kPa
(1.96 bar, 2.0 kg/cm², 28 psi)**

When fuel pressure regulator valve vacuum is disconnected.

**Approximately 245 kPa
(2.45 bar, 2.5 kg/cm², 36 psi)**

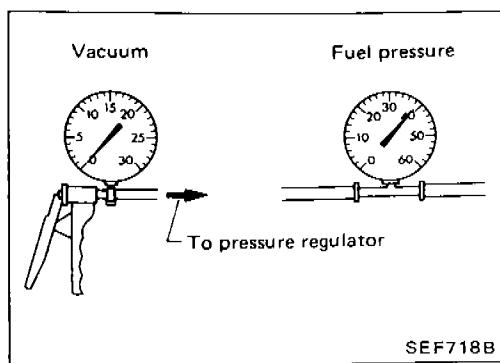
6. Stop engine and disconnect fuel pressure regulator vacuum hose from intake manifold.
7. Plug intake manifold with a rubber cap.
8. Connect variable vacuum source to fuel pressure regulator.

FUEL INJECTION CONTROL SYSTEM INSPECTION

Fuel Pressure Check (Cont'd)

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.

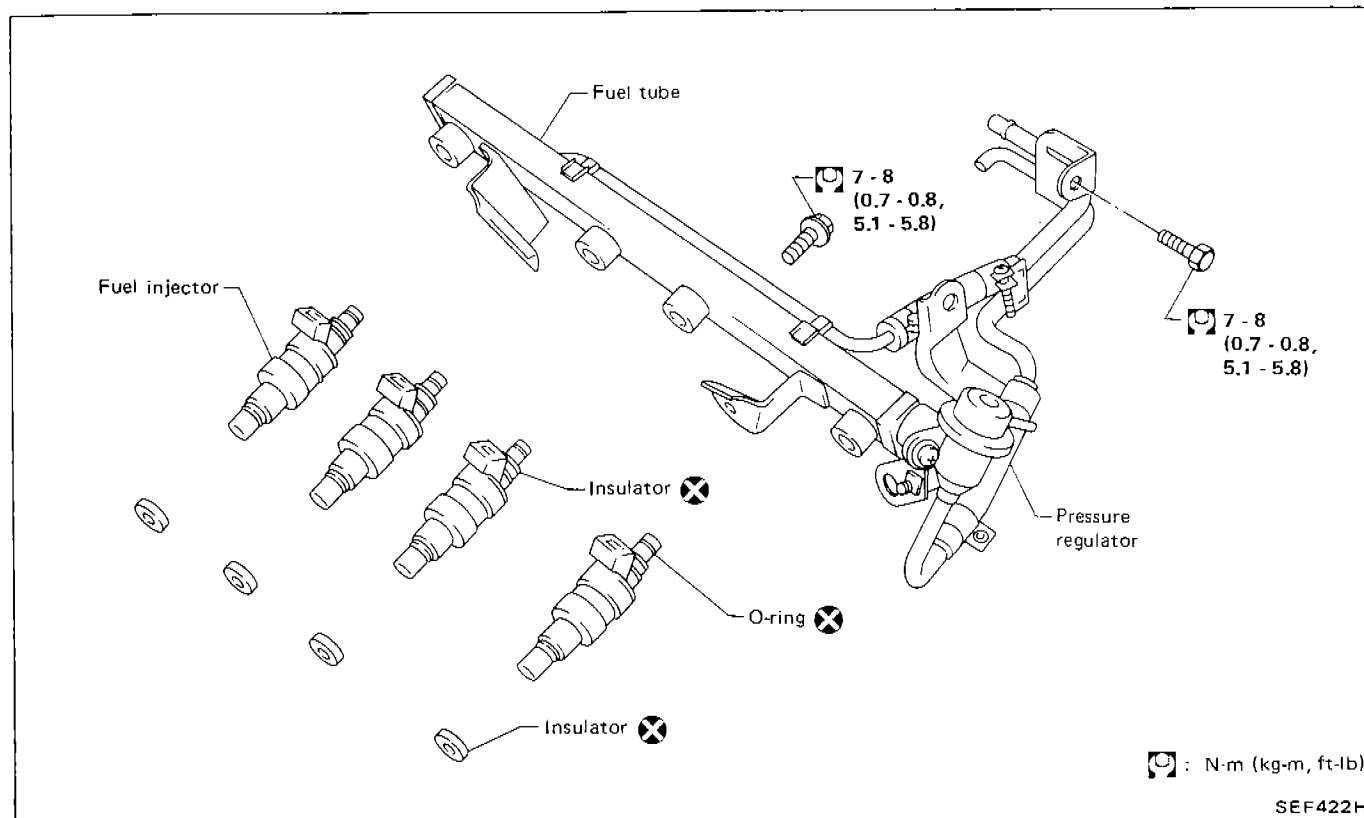


Injector Removal and Installation

1. Release fuel pressure to zero.
2. Remove I.A.A. unit and intake manifold stay.
3. Disconnect pressure regulator vacuum hose.
4. Remove fuel tube assembly fixing bolts.

Be careful not to damage the injector, nor to deform the fuel tube.

5. Remove injectors from fuel tube.



CAUTION:

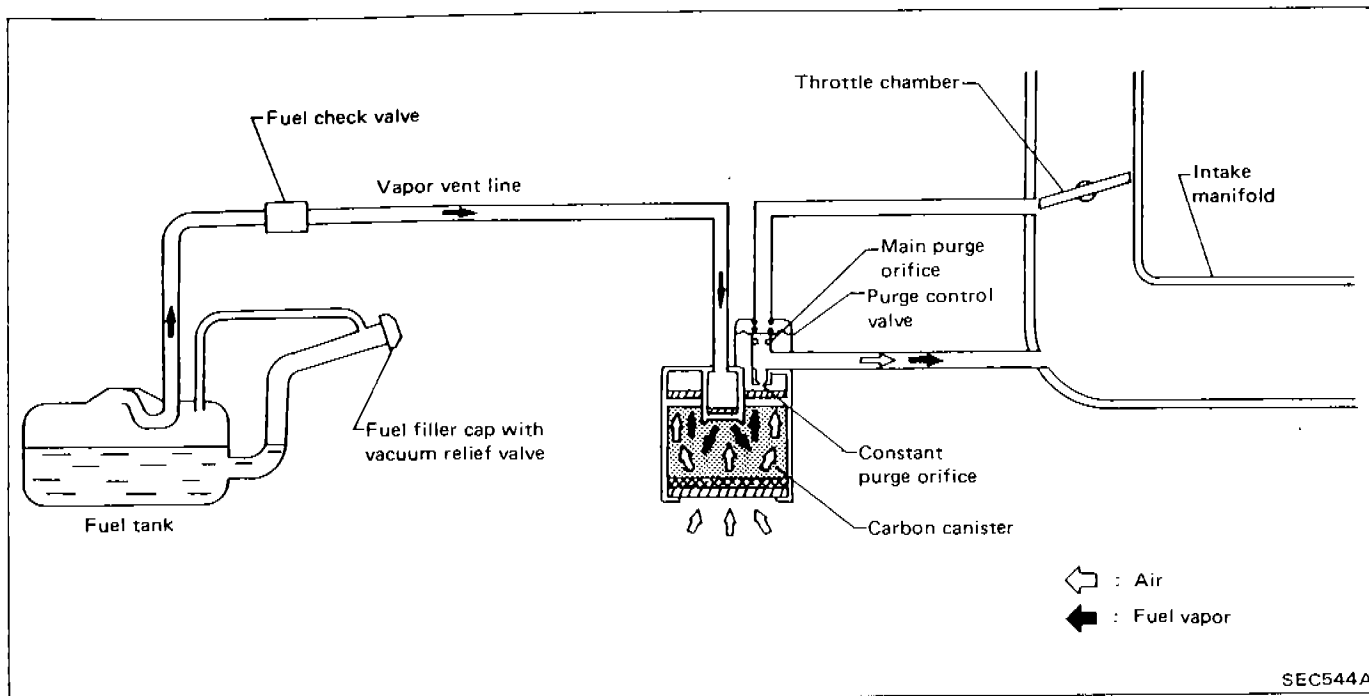
- Do not reuse old O-rings.
- Apply a coat of engine oil (SAE 10W-30) to new O-rings. Do not use solvent for wiping.
- Keep O-rings and their mating parts clean and free from foreign particles (dirt, ravelings, etc.) before installation.
- Do not scratch the O-ring either with tools or finger nails during installation. Be careful not to expand or twist excessively. Do not insert into fuel tube immediately after expansion.

FUEL INJECTION CONTROL SYSTEM INSPECTION

Injector Removal and Installation (Cont'd)

- Do not attempt to rotate or twist fuel injector and pressure regulator when inserting into fuel tube.
 - Do not store O-rings in an area where ozone, oxygen, humidity, etc. are relatively high. Do not expose them to direct sunlight.
 - After properly connecting fuel injector to fuel tube, check connection for fuel leakage.
6. Assemble injectors with fuel tube.
 7. Install fuel tube assembly.

Description

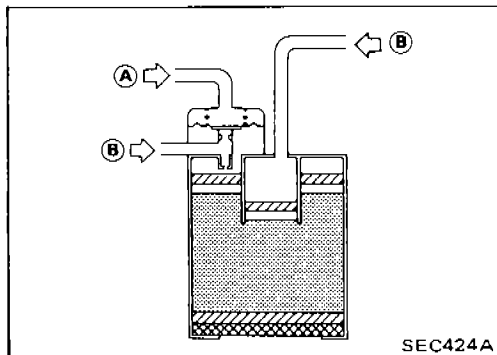


The evaporative emission control system is used to reduce hydrocarbons emitted to the atmosphere from the fuel system. This reduction of hydrocarbons is accomplished by activated charcoals in the carbon canister.

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.



Inspection

CARBON CANISTER

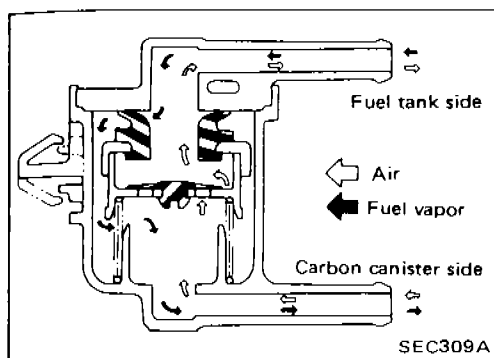
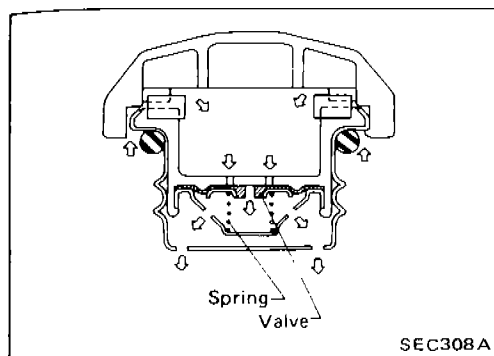
Check carbon canister as follows:

- (A) : Blow air and ensure that there is no leakage.
- (B) : Blow air and ensure that there is leakage.

Inspection (Cont'd)

FUEL TANK VACUUM RELIEF VALVE

1. Wipe clean valve housing.
2. Inhale air through the cap. A slight resistance accompanied by valve clicks indicates that valve is in good mechanical condition. Note also that, by further inhaling air, the resistance should disappear with valve clicks.
3. If valve is clogged or if no resistance is felt, replace cap as an assembly.

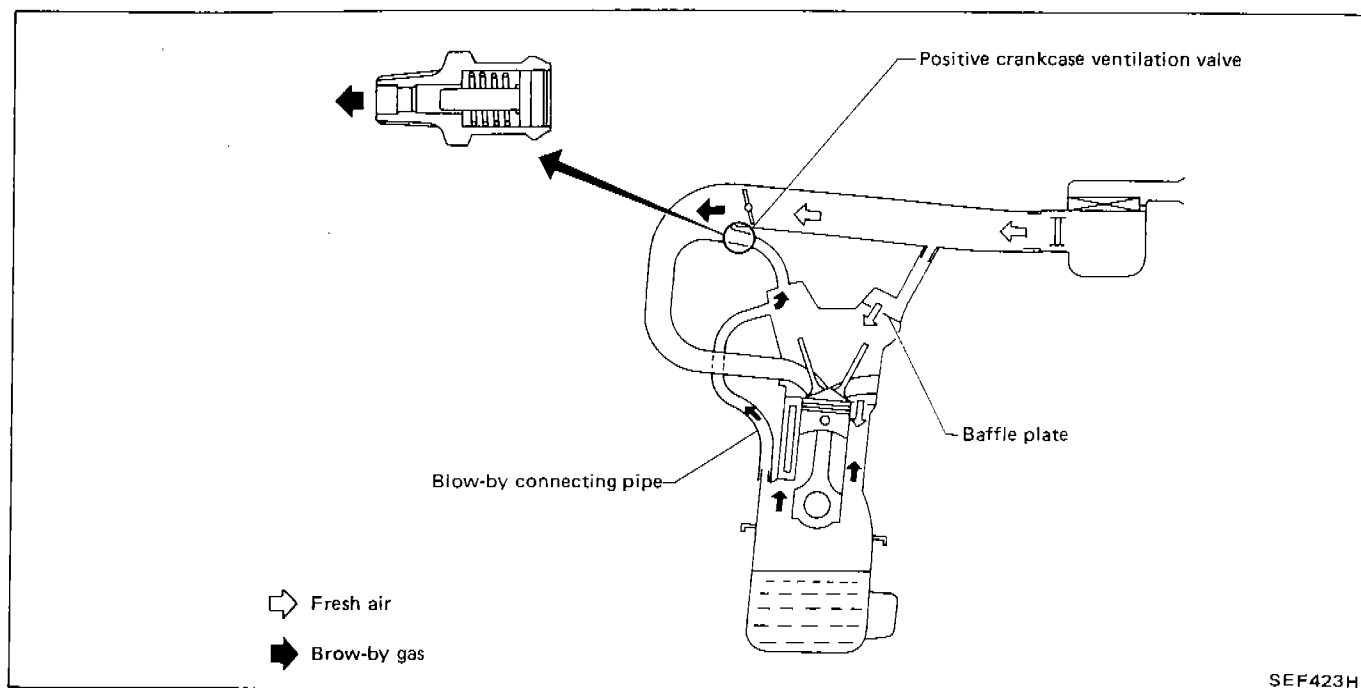


FUEL CHECK VALVE

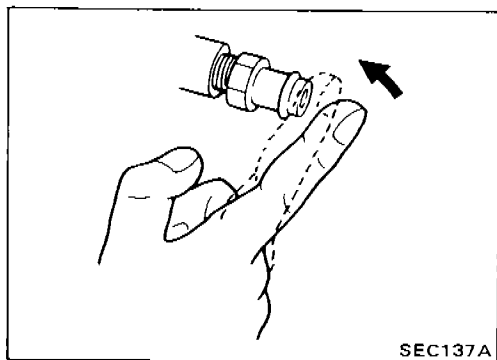
1. Blow air through connector on fuel tank side.
A considerable resistance should be felt and a portion of air flow should be directed toward the canister.
2. Blow air through connector on canister side.
Air flow should be smoothly directed toward fuel tank.
3. If fuel check valve is suspected of not properly functioning in steps 1 and 2 above, replace it.

CRANKCASE EMISSION CONTROL SYSTEM

Description



This system returns blow-by gas to the intake manifold. The positive crankcase ventilation (P.C.V.) 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 P.C.V. 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 cleaner, through the hose connecting air inlet 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 under all conditions.



Inspection

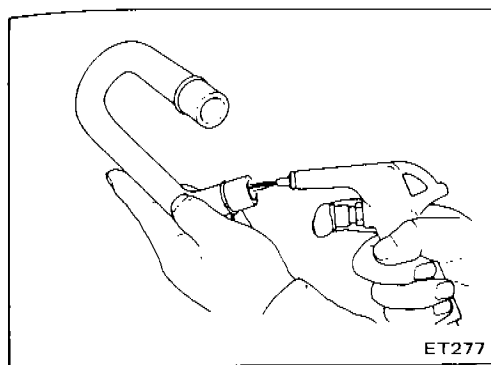
P.C.V. (Positive Crankcase Ventilation) VALVE

With engine running at idle, remove ventilation hose from P.C.V. valve; if 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.

CRANKCASE EMISSION CONTROL SYSTEM

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.



SERVICE DATA AND SPECIFICATIONS (S.D.S.)

General Specifications

PRESSURE REGULATOR	
Regulated pressure	250.1
kPa (bar, kg/cm ² , psi)	(2.501, 2.55, 36.3)

Inspection and Adjustment

AIR FLOW METER	
Output voltage	V
	1.0 - 3.0
ENGINE TEMPERATURE SENSOR	
Thermistor resistance	k Ω
at 20°C (68°F)	Approx. 2.5
at 80°C (176°F)	Approx. 0.3
THROTTLE VALVE SWITCH	
Engine speed when idle switch is changed from "OFF" to "ON"	Idle speed + 250 $\pm$ 150
	rpm
FUEL PRESSURE	
At idle	kPa (bar, kg/cm ² , psi)
	196 (1.96, 2.0, 28)
FUEL INJECTOR	
Coil resistance	Ω
	2 - 3
IDLE SPEED	
M/T model	rpm
A/T model in "N" position	850 $\pm$ 50
IDLE SPEED (A/C ON)	
M/T model	950 $\pm$ 50
A/T model in "N" position	900 $\pm$ 50
IGNITION TIMING (B.T.D.C.)	
M/T	15° $\pm$ 2°
A/T	
IDLE CO	
%	Idle mixture is preset at factory.
AIR REGULATOR	
Ω	Approx. 70
IGNITION COIL	
Primary resistance	Ω
[at 20°C (68°F)]	0.6 - 0.8
Secondary resistance	k Ω
[at 20°C (68°F)]	6 - 8