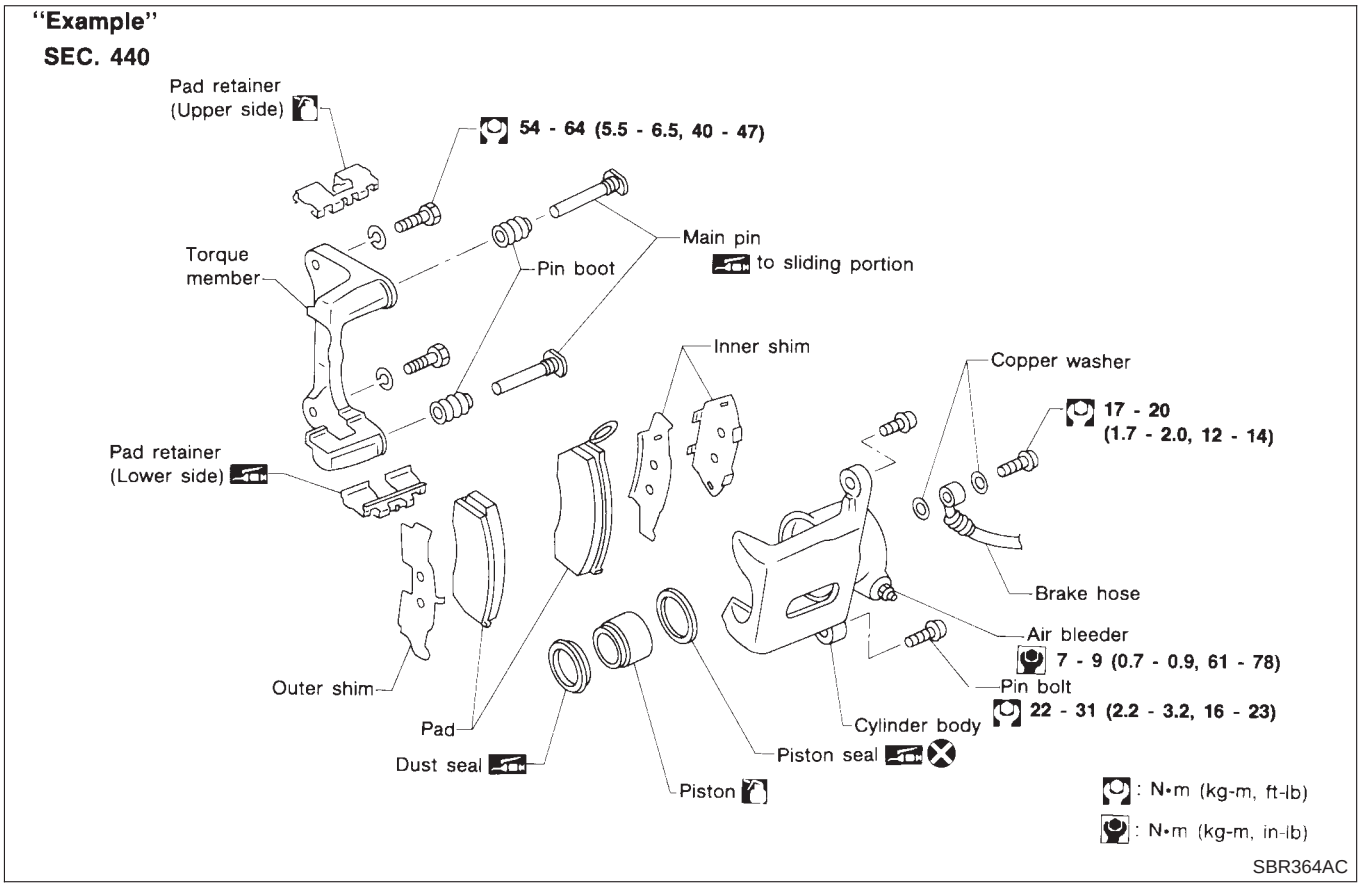
HOW TO USE THIS MANUAL

- The captions **WARNING** and **CAUTION** warm you of steps that must be followed to prevent personal injury and/or damage to some part of the vehicle.
  WARNING indicates the possibility of personal injury if instructions are not followed.
  CAUTION indicates the possibility of component damage if instructions are not followed.
  BOLD TYPED STATEMENTS except **WARNING** and **CAUTION** give you helpful information.
- **ALPHABETICAL INDEX** is provided at the end of this manual so that you can rapidly find the item and page you are searching for.
- **A QUICK REFERENCE INDEX**, a black tab (e.g. BR) is provided on the first page. You can quickly find the first page of each section by matching it to the section's black tab.
- **THE CONTENTS** are listed on the first page of each section.
- **THE TITLE** is indicated on the upper portion of each page and shows the part or system.
- **THE PAGE NUMBER** of each section consists of two letters which designate the particular section and a number (e.g. "BR-5").
- **THE LARGE ILLUSTRATIONS** are exploded views (See below.) and contain tightening torques, lubrication points, section number of the **PARTS CATALOG** (e.g. SEC. 440) and other information necessary to perform repairs.
  The illustrations should be used in reference to service matters only. When ordering parts, refer to the appropriate **PARTS CATALOG**.



- **THE SMALL ILLUSTRATIONS** show the important steps such as inspection, use of special tools, knacks of work and hidden or tricky steps which are not shown in the previous large illustrations.
  Assembly, inspection and adjustment procedures for the complicated units such as the automatic transaxle or transmission, etc. are presented in a step-by-step format where necessary.
- The **UNITS** given in this manual are primarily expressed as the SI UNIT (International System of Unit), and alternatively expressed in the metric system and in the yard/pound system.
  "Example"
  Tightening torque:
  59 - 78 N·m (6.0 - 8.0 kg-m, 43 - 58 ft-lb)
- **TROUBLE DIAGNOSES** are included in sections dealing with complicated components.

CHASSIS AND BODY MAINTENANCE

=NJMA0043S0202

Abbreviations: R = Replace I = Inspect: Correct or replace if necessary

MAINTENANCE OPERATION		MAINTENANCE INTERVAL						Reference pages
Perform on a kilometer basis, but on an annual basis when driving less than 20,000 km (12,000 miles) per year.	km x 1,000 (miles x 1,000) Months	20 (12) 12	40 (24) 24	60 (36) 36	80 (48) 48	100 (60) 60	120 (72) 72	
Underhood and under vehicle								
Headlamp aiming		I	I	I	I	I	I	EL-65
Wheel alignment (if necessary, balance & rotate wheels)		I	I	I	I	I	I	SU-14 SU-7
Brake pads, rotors & other brake components★		I	I	I	I	I	I	BR-27 BR-28
Foot brake, parking brake & clutch (for free play, stroke & operation)		I	I	I	I	I	I	BR-12 BR-48 CL-9
Brake booster vacuum hoses, connections, check valve			I		I		I	BR-21
Brake & clutch, systems and fluid (for level and leaks)		I	I	I	I	I	I	BR-8
Brake fluid★			R		R		R	BR-8
Power steering fluid and lines (for level and leaks)		I	I	I	I	I	I	ST-7
Supplemental air bag systems	See NOTE (1)							RS-25
Ventilation air filter★		R	R	R	R	R	R	HA-96
Manual transaxle gear oil (check for leakage. Use genuine NISSAN XZ gear oil or exact equivalent)		I	I	I	I	I	I	MT-14 MT-15
Steering gear & linkage, axle & suspension parts, drive shafts, exhaust system★			I		I		I	ST-7 SU-6 SU-18 FE-32
Body corrosion	See NOTE (3)							BT-6

NOTE:

(1) Inspect after 10 years, then every 2 years.

(2) Check expiration date of the tyre sealant bottle. Replace if necessary.

(3) Inspect once per year.

★ Maintenance items with "★" should be performed more frequently according to "Maintenance Under Severe Driving Conditions".

NVH Troubleshooting — Engine Noise

NJEM0005S01

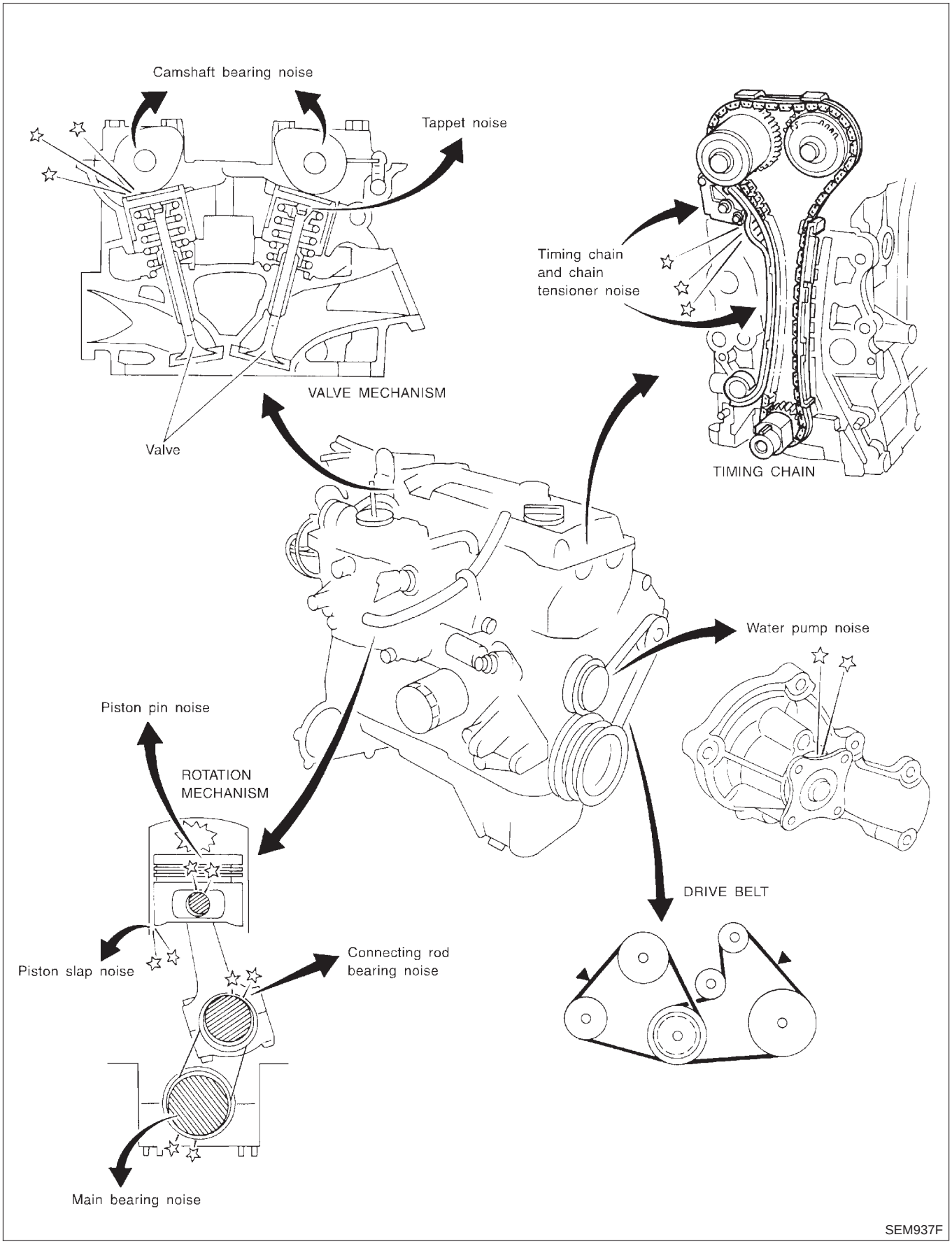
Use the chart below to help you find the cause of the symptom.

1. Locate the area where noise occurs.
2. Confirm the type of noise.
3. Specify the operating condition of engine.
4. Check specified noise source.

If necessary, repair or replace these parts.

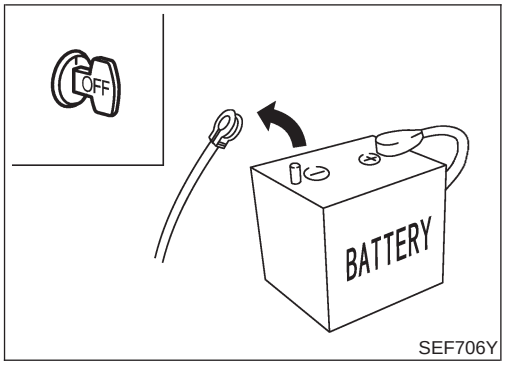
Location of noise	Type of noise	Operating condition of engine						Source of noise	Check item	Reference page
		Before warm-up	After warm-up	When starting	When idling	When racing	While driving			
Top of Engine Rocket Cover Cylinder Head	Ticking or click	C	A	—	A	B	—	Tappet noise	● Valve clearance	EM-44
	Rattle	C	A	—	A	B	C	Camshaft bearing noise	● Camshaft journal clearance ● Camshaft runout	EM-38
Crankshaft Pulley Cylinder block (Side of Engine) Oil pan	Slap or knock	—	A	—	B	B	—	Piston pin noise	● Piston and piston pin clearance ● Connecting rod bushing clearance	EM-56, 61
	Slap or rap	A	—	—	B	B	A	Piston slap noise	● Piston-to-bore clearance ● Piston ring side clearance ● Piston ring end gap ● Connecting rod bend and torsion	EM-56, 57, 58
	Knock	A	B	C	B	B	B	Connecting rod-bearing noise	● Connecting rod bearing clearance (Big end) ● Connecting rod bushing clearance (Small end)	EM-60, 61
	Knock	A	B	—	A	B	C	Main bearing noise	● Main bearing oil clearance ● Crankshaft runout	EM-59
Front of Engine Timing Chain Cover	Tapping or ticking	A	A	—	B	B	B	Timing chain and chain tensioner noise	● Timing chain cracks and wear ● Timing chain tensioner operation	EM-27
Front of Engine	Squeak or fizzing	A	B	—	B	—	C	Other drive belts (sticking or slipping)	● Drive belts deflection	EM-16
	Creaking	A	B	A	B	A	B	Other drive belts (slipping)	● Idler pulley bearing operation	
	Squall or creak	A	B	—	B	A	B	Water pump noise	● Water pump operation	LC-14

A: Closely related B: Related C: Sometimes related —: Not related


Camshaft bearing noise
Tappet noise
VALVE MECHANISM
Valve
Timing chain
and chain
tensioner noise
TIMING CHAIN
Water pump noise
Piston pin noise
ROTATION
MECHANISM
DRIVE BELT
Piston slap noise
Connecting rod
bearing noise
Main bearing noise
SEM937F

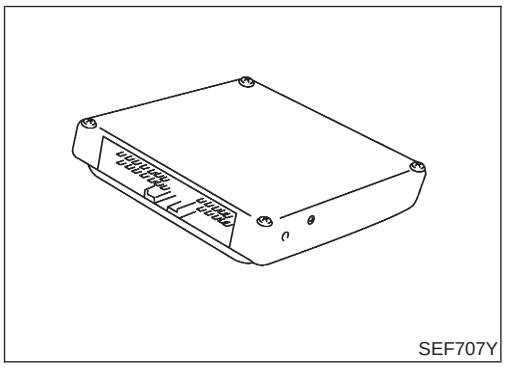
Engine Fuel & Emission Control System

=NJEC0004

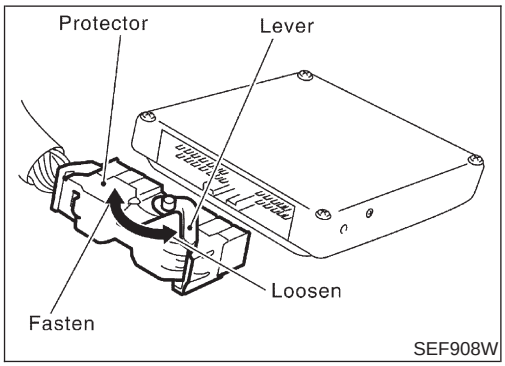


SEF706Y

- Always use a 12 volt battery as power source.
- Do not attempt to disconnect battery cables while engine is running.
- Before connecting or disconnecting the ECM harness connector, turn ignition switch OFF and disconnect negative battery terminal. Failure to do so may damage the ECM because battery voltage is applied to ECM even if ignition switch is turned off.

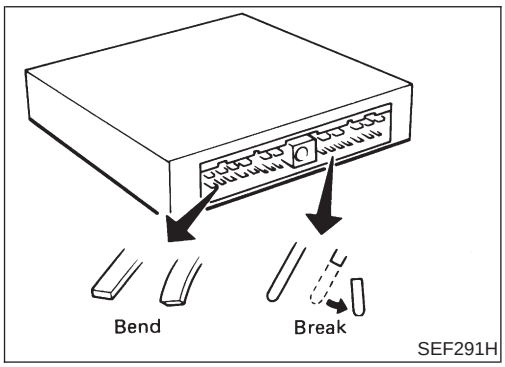

SEF707Y

- Do not disassemble ECM.
- If a battery terminal is disconnected, the memory will return to the ECM value.
  The ECM will now start to self-control at its initial value. Engine operation can vary slightly when the terminal is disconnected. However, this is not an indication of a problem. Do not replace parts because of a slight variation.



SEF908W

- When connecting or disconnecting ECM harness connector, use lever as shown.
  When connecting, fasten connector securely with lever moved until it stops.



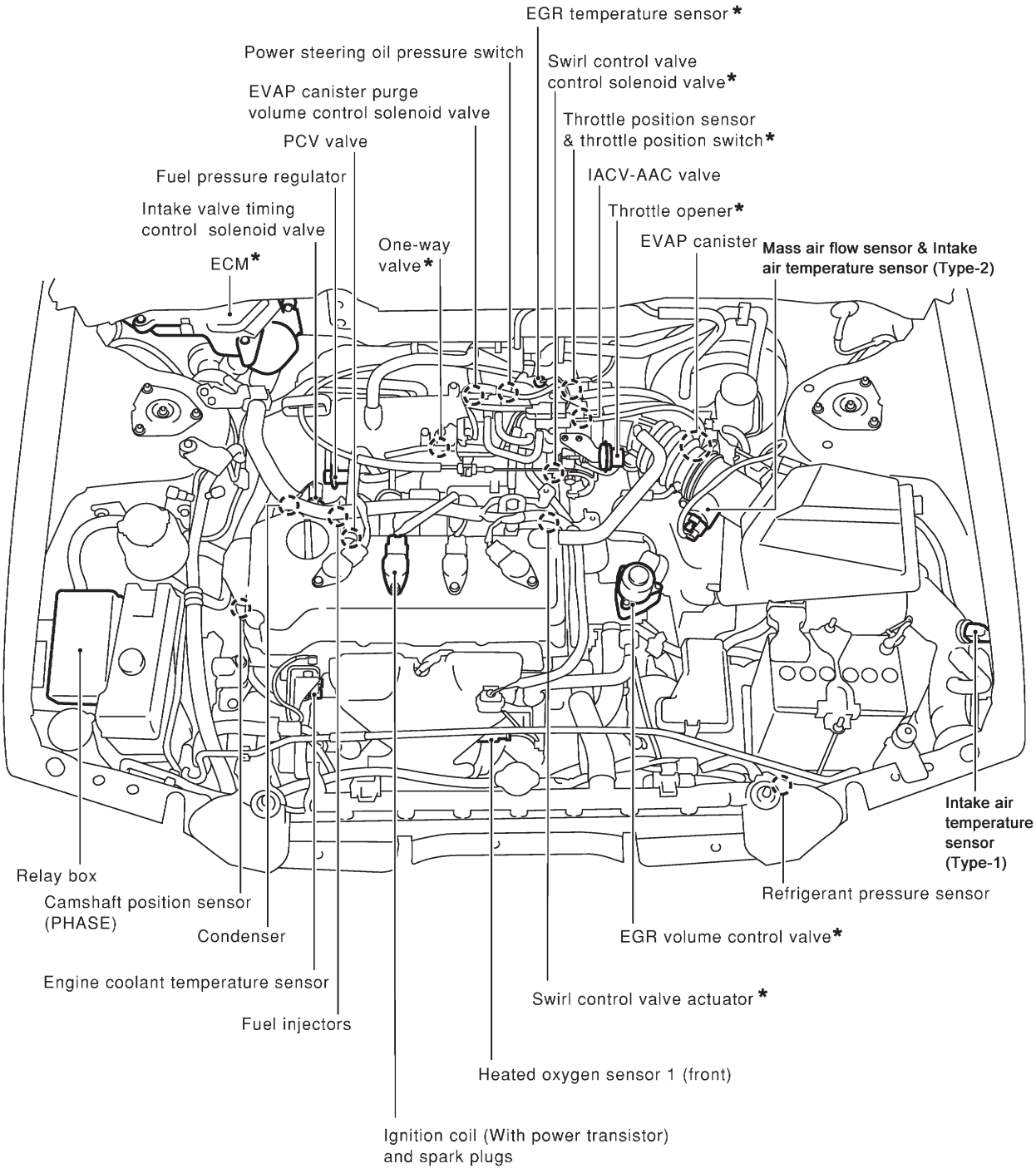
SEF291H

- When connecting or disconnecting pin connectors into or from ECM, take care not to damage pin terminals (bend or break).
  Make sure that there are not any bends or breaks on ECM pin terminals when connecting pin connectors.
- Securely connect ECM harness connectors.
  A Poor connection can cause an extremely high (surge) voltage to develop in coil and condenser, thus resulting in damage to ICs.
- Keep ECM harness at least 10 cm (4 in) away from adjacent harness, to prevent an ECM system malfunctions due to receiving external noise, degraded operation of ICs, etc.
- Keep ECM parts and harness dry.

Engine Control Component Parts Location

NJEC0009

For more details of ECM location, refer to “ELECTRICAL UNIT LOCATION” in EL section (EL-517).



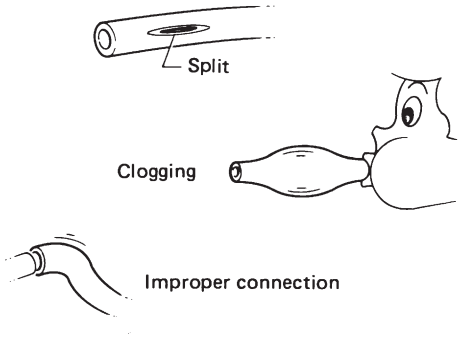
*: where fitted

View with engine cover removed

NEF344A

6	CHECK VACUUM HOSE

1. Stop engine.
2. Remove the vacuum hose.
3. Check the vacuum hose for splits, kinks and clogging.



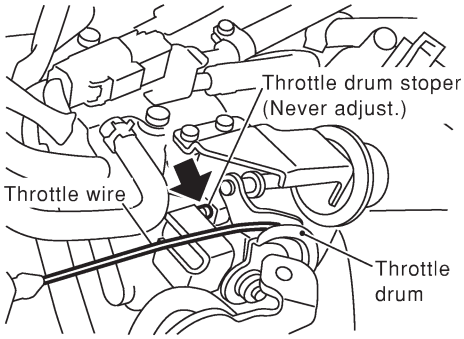
SEF109L

OK or NG

OK	▶	1. Clean vacuum port by blowing air. 2. GO TO 4.
NG	▶	1. Replace vacuum hose. 2. GO TO 4.

7	CHECK THROTTLE DRUM OPERATION

Confirm that throttle drum moves to contact the stopper.



SEF850Y

OK or NG

OK	▶	GO TO 10.
NG	▶	GO TO 8.

8	CHECK ACCELERATOR WIRE INSTALLATION

1. Stop engine.
2. Check accelerator wire for slack.

OK or NG

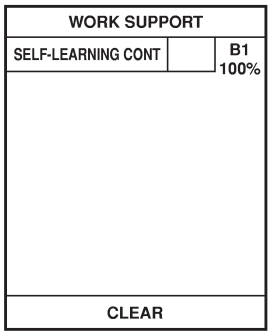
OK	▶	GO TO 9.
NG	▶	1. Adjust accelerator wire. Refer to FE-3, "Adjusting Accelerator Wire". 2. GO TO 7.

Diagnostic Procedure (Cont'd)

5	CLEAR THE SELF-LEARNING DATA

With CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Select "SELF-LEARN CONTROL" in "WORK SUPPORT" mode with CONSULT-II.
3. Clear the self-learning control coefficient by touching "START".



SEF215Z

4. Run engine for at least 10 minutes at idle speed.
   Is the 1st trip DTC P0171 or P0172 detected? Is it difficult to start engine?

Without CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Turn ignition switch "OFF".
3. Disconnect mass air flow sensor harness connector, and restart and run engine for at least 5 seconds at idle speed.
4. Stop engine and reconnect mass air flow sensor harness connector.
5. Make sure 1st trip DTC P0100 is displayed.
6. Erase the 1st trip DTC memory. Refer to "How to Erase Emission-related Diagnostic Information", EC-70.
7. Make sure DTC P0000 is displayed.
8. Run engine for at least 10 minutes at idle speed.
   Is the 1st trip DTC 0171 or 0172 detected? Is it difficult to start engine?

Yes or No

Yes	▶	Perform trouble diagnosis for DTC P0171, P0172. Refer to EC-297, 305.
No	▶	GO TO 6.

6	CHECK INPUT SIGNAL CIRCUIT

1. Disconnect heated oxygen sensor 1 (front) harness connector and ECM harness connector.
2. Check harness continuity between ECM terminal 62 and heated oxygen sensor 1 (front) harness connector terminal 2. Refer to wiring diagram.
   Continuity should exist.
3. Check harness continuity between ECM terminal 62 (or terminal 2) and ground.
   Continuity should not exist.
4. Also check harness for short to power.

OK or NG

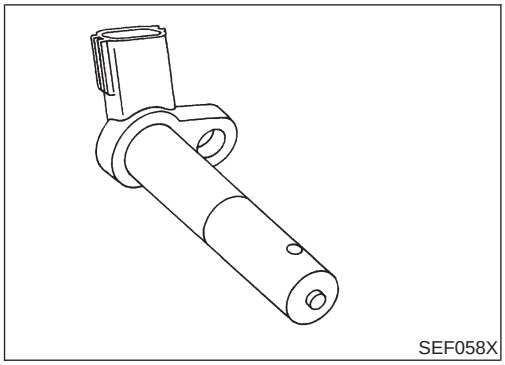
OK	▶	GO TO 7.
NG	▶	Repair open circuit or short to ground or short to power in harness or connectors.

7	CHECK HEATED OXYGEN SENSOR 1 HEATER (FRONT)

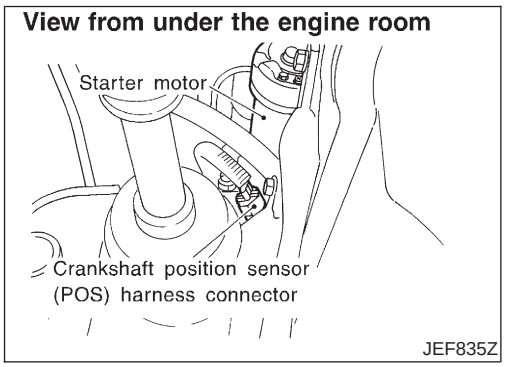
Refer to "Component Inspection", EC-257.

OK or NG

OK	▶	GO TO 8.
NG	▶	Replace heated oxygen sensor 1 (front).



SEF058X



JEF835Z

Component Description

NJEC1741

The crankshaft position sensor (POS) is located on the right-rear wall of the cylinder block in relation to the signal plate at the rear end of the crankshaft.
The sensor consists of a permanent magnet, and hall IC.
When the engine is running, the high and low parts of the teeth cause the gap with the sensor to change.
The changing gap causes the magnetic field near the sensor to change.
Due to the changing magnetic field, the voltage from the sensor changes.
The ECM receives the voltage signal and detects the fluctuation of the engine revolution.

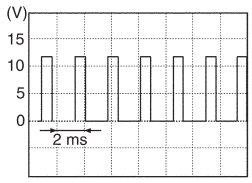
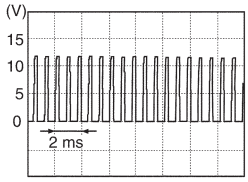
ECM Terminals and Reference Value

NJEC1742

Specification data are reference values and are measured between each terminal and ground.

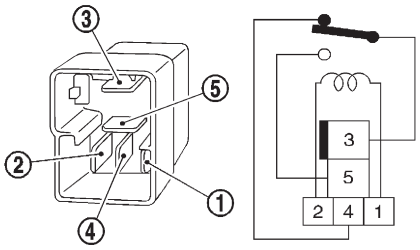
CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

TERMINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (AC Voltage)
85	R	Crankshaft position sensor (POS)	**[Engine is running]** ● **Warm-up condition** ● Idle speed	3 - 4V  SEF979W
			[Engine is running] ● Engine speed is 2,000 rpm	3 - 4V  SEF980W

6	CHECK COOLING FAN RELAYS-2 AND -4

Check continuity between cooling fan relay-2, -3 terminals 3 and 4, 3 and 5 under the following conditions.



Conditions	Continuity	
	terminals 3 and 4	terminals 3 and 5
12V direct current supply between terminals 1 and 2	No	Yes
No current supply	Yes	No

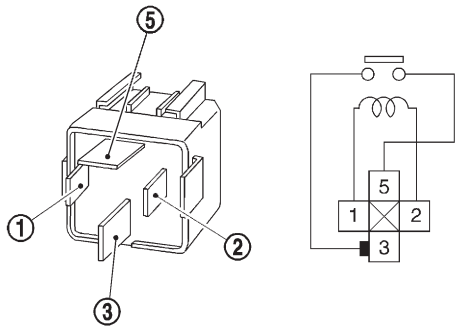
SEF900Y

OK or NG

OK	▶	GO TO 7.
NG	▶	Replace cooling fan relays.

7	CHECK COOLING FAN RELAY-3

Check continuity between cooling fan relay-3 terminals 3 and 5 under the following conditions.



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

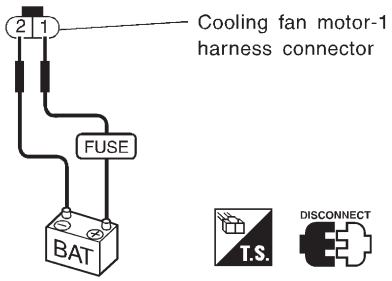
SEF901Y

OK or NG

OK	▶	GO TO 8.
NG	▶	Replace cooling fan relay.

8	CHECK COOLING FAN MOTORS

Supply battery voltage between the following terminals and check operation.

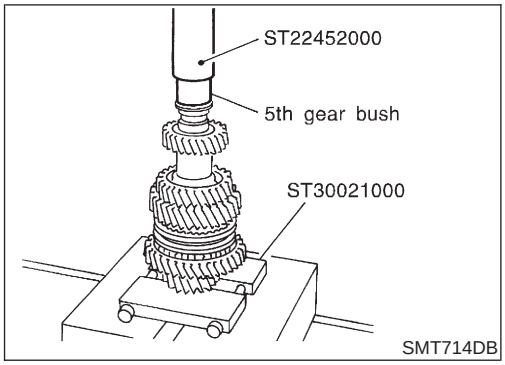


	Terminals	
	(+)	(–)
Cooling fan motor-1	1	2
Cooling fan motor-2	1	2

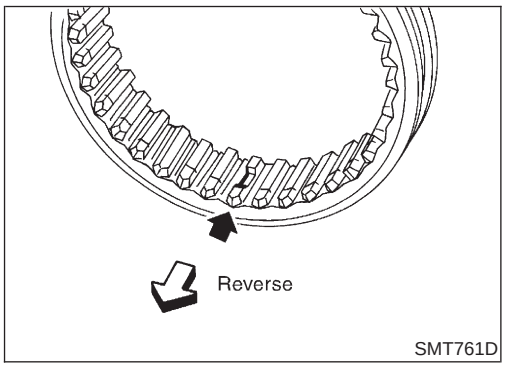
SEF902Y

OK or NG

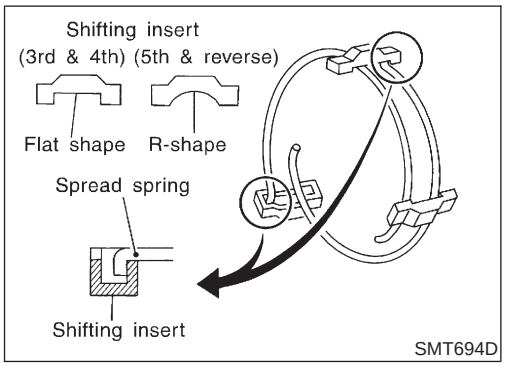
OK	▶	GO TO 9.
NG	▶	Replace cooling fan motors.



14. Install 5th gear bushing with its flange surface facing the 4th main gear side.

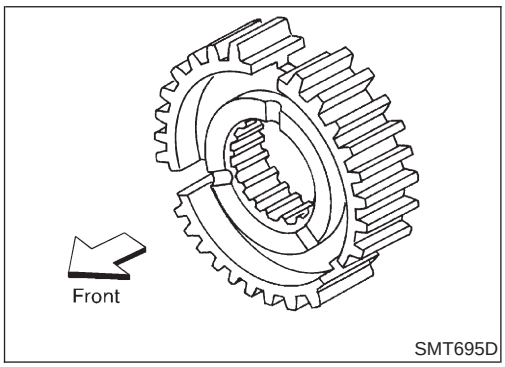


15. Install 5th needle bearing, 5th main gear, and 5th gear baulk ring onto mainshaft.



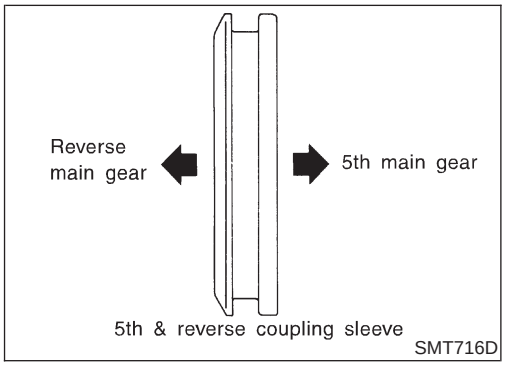
16. Being careful of the following points, install spread spring, shifting insert, and 5th & reverse synchronizer hub onto 5th & reverse coupling sleeve.

- Pay attention to the shape of spread spring and shifting insert for correct assembly.
  Do not install spread spring hook onto the same shifting insert.



- Install synchronizer hub with its three grooves facing the front side (5th main gear side).

CAUTION:
Do not reuse 5th & reverse synchronizer hub.

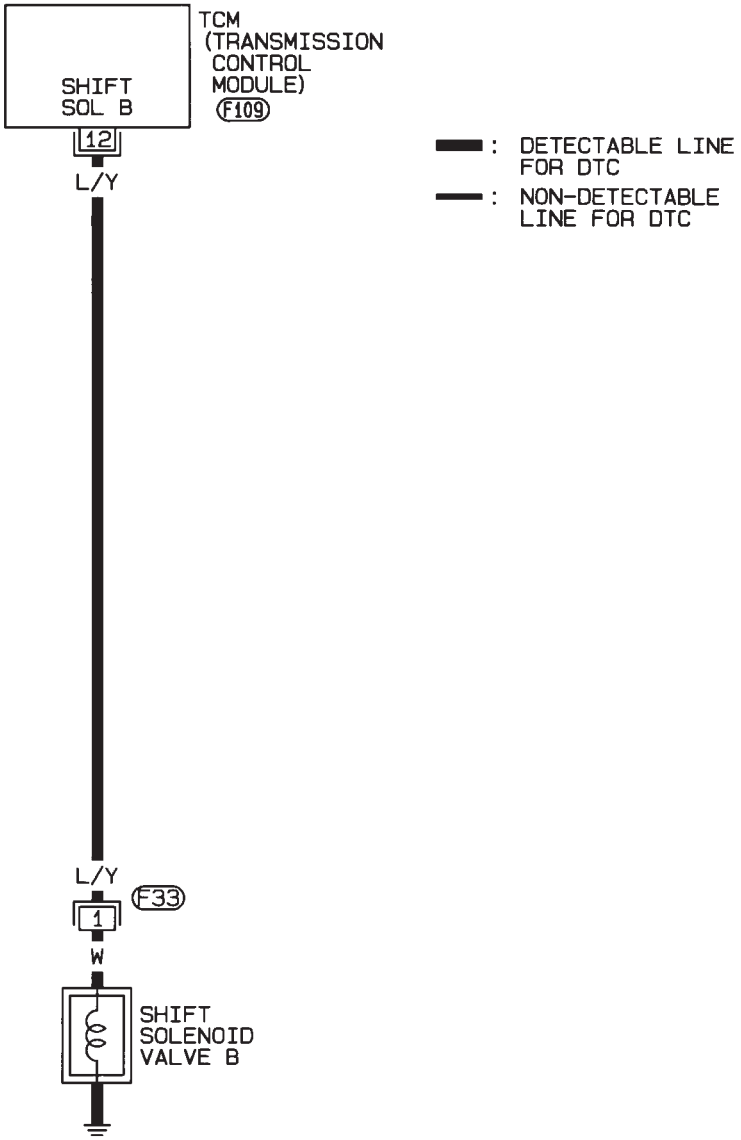


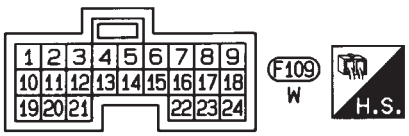
- Install 5th & reverse coupling sleeve with its chamfered surface facing the reverse main gear side.

Wiring Diagram — AT — SSV/B

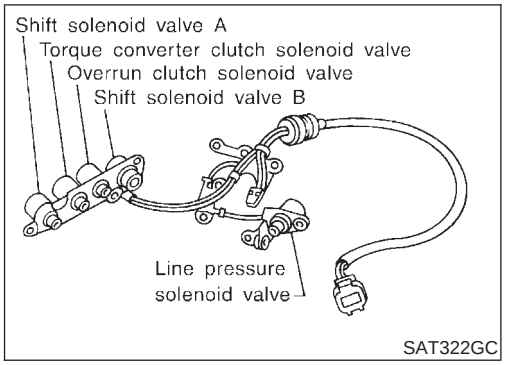
NJAT0211

AT-SSV/B-01

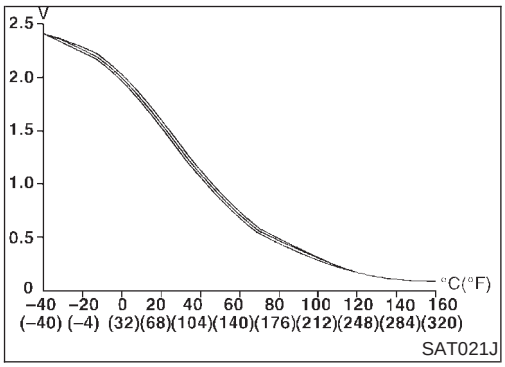




HAT080



SAT322GC



SAT021J

Description

NJAT0319

The A/T fluid temperature sensor detects the A/T fluid temperature and sends a signal to the TCM.

CONSULT-II REFERENCE VALUE IN DATA MONITOR MODE

NJAT0319S01

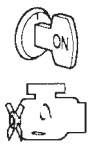
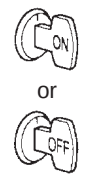
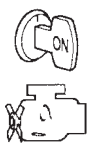
Remarks: Specification data are reference values.

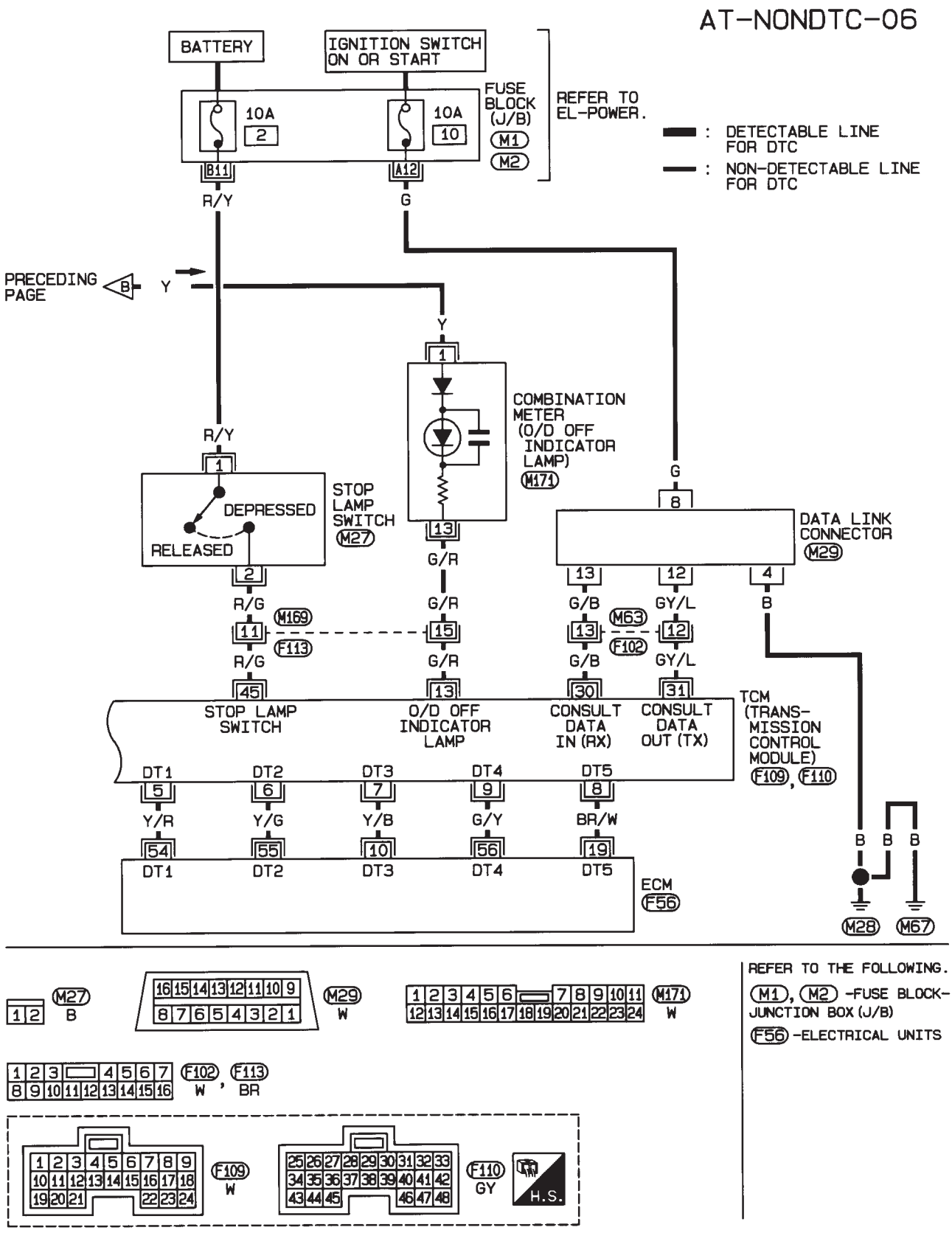
Monitor item	Condition	Specification	
A/T fluid temperature sensor	Cold [20°C (68°F)] ↓ Hot [80°C (176°F)]	Approximately 1.5V ↓ Approximately 0.5V	Approximately 2.5 kΩ ↓ Approximately 0.3 kΩ

TCM TERMINALS AND REFERENCE VALUE

NJAT0319S02

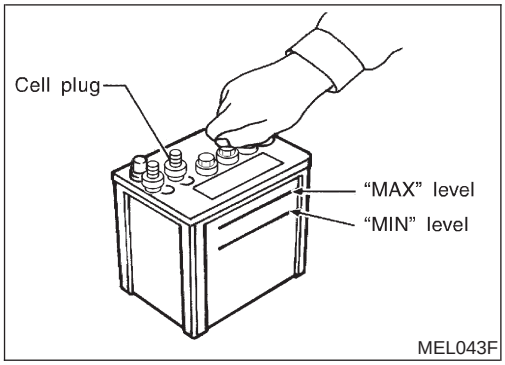
Remarks: Specification data are reference values.

Terminal No.	Wire color	Item	Condition		Judgement standard
10	BR/R	Power source		When turning ignition switch to “ON”.	Battery voltage
				When turning ignition switch to “OFF”.	1V or less
19	BR/R	Power source		Same as No. 10	
28	R/B	Power source (Memory back-up)		When turning ignition switch to “OFF”.	Battery voltage
				When turning ignition switch to “ON”.	Battery voltage
42	B	Ground (A/T fluid temperature sensor)		—	—
47	BR	A/T fluid temperature sensor		When ATF temperature is 20°C (68°F).	Approximately 1.5V
				When ATF temperature is 80°C (176°F).	Approximately 0.5V

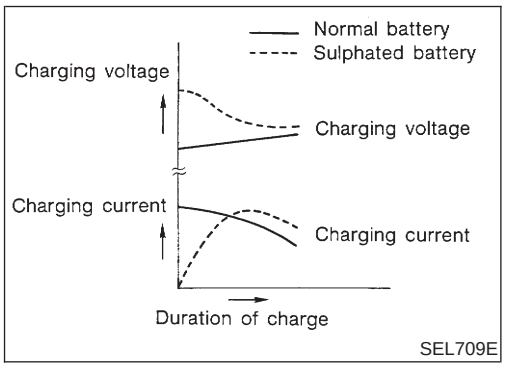


REFER TO THE FOLLOWING.
M1, M2 -FUSE BLOCK-JUNCTION BOX (J/B)
F56 -ELECTRICAL UNITS

HAT146



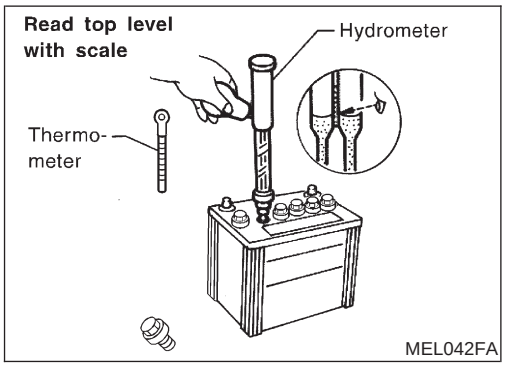
- Remove the cell plug using a suitable tool.
- Add distilled water up to the MAX level.



Sulphation

NJSC0003S0201

A battery will be completely discharged if it is left unattended for a long time and the specific gravity will become less than 1.100. This may result in sulphation on the cell plates.
To determine if a battery has been "sulphated", note its voltage and current when charging it. As shown in the figure, less current and higher voltage are observed in the initial stage of charging sulphated batteries.
A sulphated battery may sometimes be brought back into service by means of a long, slow charge, 12 hours or more, followed by a battery capacity test.



SPECIFIC GRAVITY CHECK

NJSC0003S03

1. Read hydrometer and thermometer indications at eye level.

2. Convert into specific gravity at 20°C (68°F).

Example:

- When electrolyte temperature is 35°C (95°F) and specific gravity of electrolyte is 1.230, converted specific gravity at 20°C (68°F) is 1.240.
- When electrolyte temperature is 0°C (32°F) and specific gravity of electrolyte is 1.210, converted specific gravity at 20°C (68°F) is 1.196.