PRECAUTIONS

Precautions (Cont'd)

- Before proceeding with disassembly, thoroughly clean the outside of the transaxle. It is important to prevent the internal parts from becoming contaminated by dirt or other foreign matter.
- Disassembly should be done in a clean work area.
- Use lint-free cloth or towels for wiping parts clean. Common shop rags can leave fibers that could interfere with the operation of the transaxle.
- Place disassembled parts in order for easier and proper assembly.
- All parts should be carefully cleaned with a general purpose, non-flammable solvent before inspection or reassembly.
- Gaskets, seals and O-rings should be replaced any time the transaxle is disassembled.
- It is very important to perform functional tests whenever they are indicated.
- The valve body contains precision parts and requires extreme care when parts are removed and serviced. Place disassembled valve body parts in order for easier and proper assembly. Care will also prevent springs and small parts from becoming scattered or lost.
- Properly installed valves, sleeves, plugs, etc. will slide along bores in valve body under their own weight.
- Before assembly, apply a coat of recommended ATF to all parts. Apply petroleum jelly to protect O-rings and seals, or hold bearings and washers in place during assembly. Do not use grease.
- Extreme care should be taken to avoid damage to O-rings, seals and gaskets when assembling.
- Replace ATF cooler if excessive foreign material is found in oil pan or clogging strainer. Refer to "ATF COOLER SERVICE" (Refer to AT-8).
- After overhaul, refill the transaxle with new ATF.
- When the A/T drain plug is removed, only some of the fluid is drained. Old A/T fluid will remain in torque converter and ATF cooling system.
 - Always follow the procedures under "Changing A/T Fluid" in the MA section when changing A/T fluid.

Service Notice or Precautions

FAIL-SAFE

The TCM has an electronic Fail-Safe (limp home mode). This allows the vehicle to be driven even if a major electrical input/output device circuit is damaged.

Under Fail-Safe, the vehicle always runs in third gear, even with a shift lever position of "1", "2" or "D". The customer may complain of sluggish or poor acceleration.

When the ignition key is turned "ON" following Fail-Safe operation, O/D OFF indicator lamp blinks for about 8 seconds. (For "TCM SELF-DIAGNOSTIC PROCEDURE (No Tools)", refer to AT-45.)

Fail-Safe may occur without electrical circuit damage if the vehicle is driven under extreme conditions (such as excessive wheel spin followed by sudden braking). To recover normal shift pattern, turn the ignition key "OFF" for 5 seconds, then "ON".

The blinking of the O/D OFF indicator lamp for about 8 seconds will appear only once and be cleared. The customer may resume normal driving conditions.

Always follow the "WORK FLOW" (Refer to AT-53).

The SELF-DIAGNOSIS results will be as follows:

The first SELF-DIAGNOSIS will indicate damage to the vehicle speed sensor or the revolution sensor.

During the next SELF-DIAGNOSIS, performed after checking the sensor, no damages will be indicated.

TORQUE CONVERTER SERVICE

The torque converter should be replaced under any of the following conditions:

- External leaks in the hub weld area.
- Converter hub is scored or damaged.
- Converter pilot is broken, damaged or fits poorly into crankshaft.
- Steel particles are found after flushing the cooler and cooler lines.
- Pump is damaged or steel particles are found in the converter.
- Vehicle has TCC shudder and/or no TCC apply. Replace only after all hydraulic and electrical diagnoses have been made. (Converter clutch material may be glazed.)
- Converter is contaminated with engine coolant containing antifreeze.
- Internal failure of stator roller clutch.
- Heavy clutch debris due to overheating (blue converter).

CL

EM

000 0

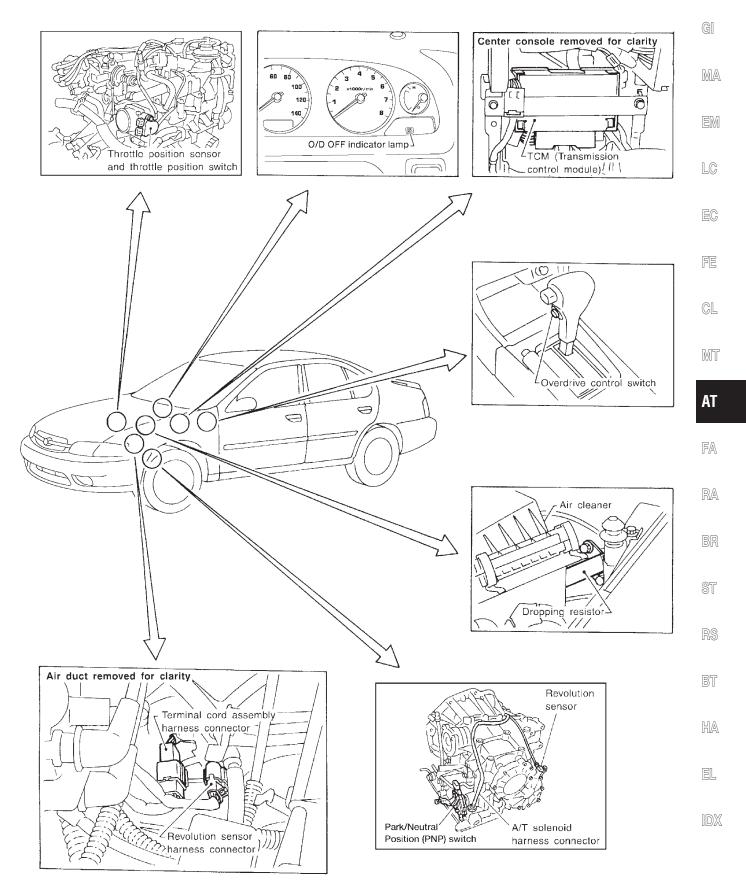
AT

FA

HA

EL

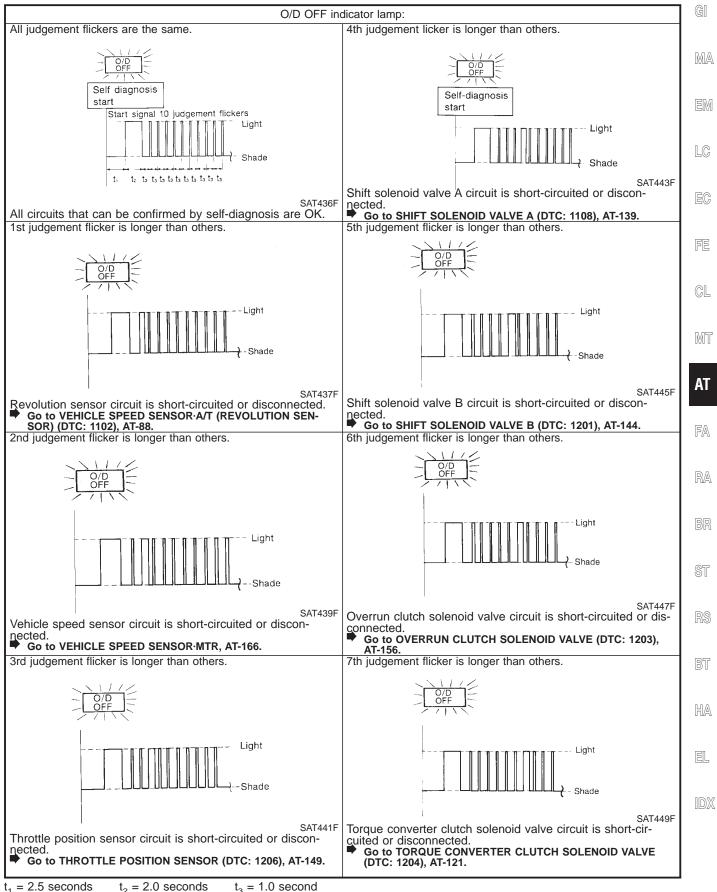
A/T Electrical Parts Location



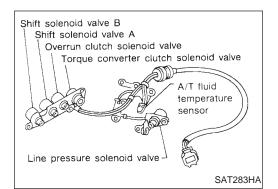
ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION

Diagnostic Procedure Without CONSULT-II (Cont'd)

JUDGEMENT OF SELF-DIAGNOSIS CODE



AT-47



Line Pressure Solenoid Valve

DESCRIPTION

The line pressure solenoid valve regulates the oil pump discharge pressure to suit the driving condition in response to a signal sent from the TCM.

The line pressure duty cycle value is not consistent when the closed throttle position switch is "ON". To confirm the line pressure duty cycle at low pressure, the accelerator (throttle) should be open until the closed throttle position switch is "OFF".

CONSULT REFERENCE VALUE IN DATA MONITOR MODE

Remarks: Specification data are reference values.

Monitor item	Condition	Specification
Line pressure solenoid valve duty	Small throttle opening (Low line pressure) ↓ Large throttle opening (High line pressure)	Approximately 24% ↓ Approximately 95%

Note: The line pressure duty cycle value is not consistent when the closed throttle position switch is "ON". To confirm the line pressure duty cycle at low pressure, the accelerator (throttle) should be open until the closed throttle position switch is "OFF".

TCM TERMINALS AND REFERENCE VALUE

Remarks: Specification data are reference values.

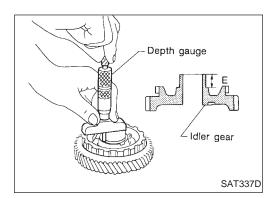
Terminal No.	Wire color	ltem	Condition		Judgement standard
1	R/W	Line pressure	(P)	When releasing accelerator pedal after warming up engine.	1.5 - 2.5V
I	r./vv	solenoid valve	-	When depressing accelerator pedal fully after warming up engine.	0.5V or less
	D/D	Line pressure solenoid valve	5-2-	When releasing accelerator pedal after warming up engine.	5 - 14V
2	P/B	(with dropping resistor)	X	When depressing accelerator pedal fully after warming up engine.	0.5V or less

ON BOARD DIAGNOSIS LOGIC

Diagnostic trouble code	Malfunction is detected when	Check items (Possible cause)
E L/PRESS SOL/CIRC E P0745 MO TOOLS : MIL Code No. 1205	TCM detects an improper voltage drop when it tries to operate the solenoid valve.	 Harness or connectors (The solenoid circuit is open or shorted.) Line pressure solenoid valve

ASSEMBLY

Adjustment 1 (Cont'd)



- d. Measure dimension "E" between the end of idler gear and the idler gear bearing inner race mating surface of idler gear.
- Measure dimension "E" in at least two places.

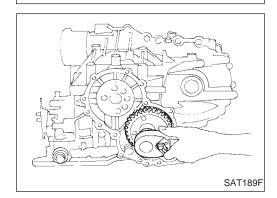
e. Select proper thickness of reduction pinion gear bearing adjusting shim.

Proper shim thickness = A – E – 0.05 mm (0.0020 in)*

(* ... Bearing preload)

Reduction pinion gear bearing adjusting shims: Refer to SDS, AT-308.

- Adjusting shim
- 3. Install reduction gear and reduction gear bearing adjusting shim selected in step 2-e on transmission case.
- 4. Press idler gear bearing inner race on idler gear.
- 5. Press idler gear on reduction gear.
- Press idler gear until idler gear fully contacts adjusting shim.



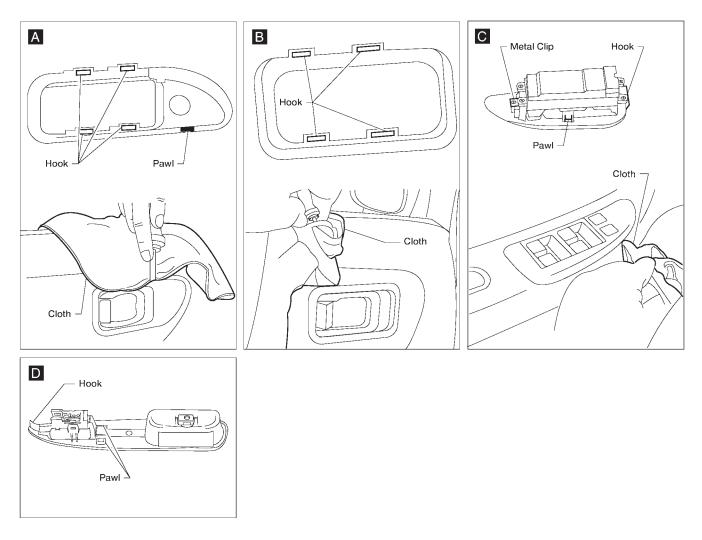
- 6. Tighten idler gear lock nut to the specified torque. Refer to AT-271.
- Lock idler gear with parking pawl when tightening lock nut.

- Idler gear (J25765-A)
- 7. Measure turning torque of reduction pinion gear.
- When measuring turning torque, turn reduction pinion gear in both directions several times to seat bearing rollers correctly.

Turning torque of reduction pinion gear:

0.05 - 0.39 N·m (0.5 - 4.0 kg-cm, 0.43 - 3.47 in-lb) If turning torque is out of specification, decrease or increase thickness of reduction pinion gear bearing adjusting shim.

INTERIOR TRIM Door Trim (Cont'd)

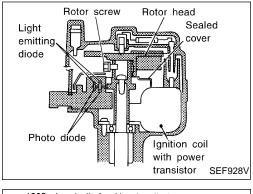


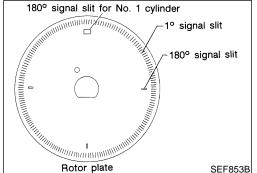
TROUBLE DIAGNOSIS FOR DTC P0110

Intake Air Temperature Sensor (Cont'd)

	OR —	G]
	3) Perform "Diagnostic Test Mode II (Self-diagnostic results)" with ECM.4) If 1st trip DTC is detected, go to "DIAGNOSTIC"	MA
	PROCEDURE", EC-134.	EM
		LC
DATA MONITOR	Procedure for malfunction B	LU
MONITORING NO FAIL	CAUTION: Always drive vehicle at a safe speed.	EC
COOLAN TEMP/S XXX °C VHCL SPEED SE XXX km/h	TESTING CONDITION:	LU
	This test may be conducted with the drive wheels lifted in the shop or by driving the vehicle. If a road test is expected to be easier, it is unnecessary to lift the vehicle.	FE
	 Wait until engine coolant temperature is less than 90°C (194°F). (a) Turn ignition switch "ON". 	CL
PEF233U	(b) Select "DATA MONITOR" mode with CONSULT- II.	MT
FUEL SYS #1 OPEN FUEL SYS #2 UNUSED CALC LOAD 0% COOLANTITEMP 289C SHORT FT #1 0% LONG FT #1 0% ENGINE SPD 0RPM	 (c) Check the engine coolant temperature. (d) If the engine coolant temperature is not less than 90°C (194°F), turn ignition switch "OFF" and cool down engine. 	AT
VEHICLE SPD 0km/h IGN ADVANCE 5.0° INTAKE AIR 25°C MAF 0.0gm/sec THROTTLE POS 0%	 Perform the following steps before engine coolant temperature is above 90°C (194°F). Turn ignition switch "ON". 	FA
O2S LOCATION 3 O2S B1,S1 0.380V O2FT B1,S1 0% O2S B1,S2 0.000V	3) Select "DATA MONITOR" mode with CONSULT-II.4) Start engine.	RA
SEF950N	 Hold vehicle speed more than 70 km/h (43 MPH) for 105 consecutive seconds. 	BR
	6) If 1st trip DTC is detected, go to "DIAGNOSTIC PROCEDURE", EC-134.	
	 OR — OR —	ST
	(a) Turn ignition switch "ON".(b) Select MODE 1 with GST.	RS
	 (c) Check the engine coolant temperature. (d) If the engine coolant temperature is not less than 90°C (194°F), turn ignition switch "OFF" and cool down engine. 	BT
	 Perform the following steps before engine coolant temperature is above 90°C (194°F). 	HA
	 Start engine. Hold vehicle speed more than 70 km/h (43 MPH) for 105 consecutive seconds. Select MODE 7 with CST 	EL
	4) Select MODE 7 with GST. 5) If 1st trip DTC is detected to to "DIAGNOSTIC.	IDX

5) If 1st trip DTC is detected, go to "DIAGNOSTIC PROCEDURE", EC-134.





Camshaft Position Sensor (CMPS)

COMPONENT DESCRIPTION

The camshaft position sensor is a basic component of the engine control system. It monitors engine speed and piston position. These input signals to the ECM are used to control fuel injection, ignition timing and other functions.

The camshaft position sensor has a rotor plate and a waveforming circuit. The rotor plate has 360 slits for a 1° (POS) signal and 4 slits for a 180° (REF) signal. The wave-forming circuit consists of Light Emitting Diodes (LED) and photo diodes.

The rotor plate is positioned between the LED and the photo diode. The LED transmits light to the photo diode. As the rotor plate turns, the slits cut the light to generate rough-shaped pulses. These pulses are converted into on-off signals by the wave-forming circuit and sent to the ECM.

The distributor is not repairable and must be replaced as an assembly except distributor cap and rotor head.

The rotor screw which secures distributor rotor head to the distributor shaft must be torqued properly. \bigcirc : 3.3 - 3.9 N·m(0.34 - 0.40 kg-m, 29.5 - 34.7 in-lb)

MT

FE

CL

GI

MA

EM

ECM TERMINALS AND REFERENCE VALUE

Specification data are reference values and are measured between each terminal and (43)(ECM ground).

TER- MINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)	AT FA
4	W/G	ECM relay (Self-shutoff)	Engine is running. Ignition switch "OFF" For a few seconds after turning ignition switch "OFF"	0 - 1V	RA
			Ignition switch "OFF" A few seconds passed after turning igni- tion switch "OFF"	BATTERY VOLTAGE (11 - 14V)	ST
			Engine is running. (Warm-up condition)	Approximately 2.5V	RS BT
40	B/W	Camshaft position sensor		0.2ms SEF195T	HA
τv		(Position signal)	Engine is running.	Approximately 2.3 - 2.5V (V) 10 5 0	EL
				0.2ms SEF196T	UL22/A

A/T Diagnosis Communication Line

COMPONENT DESCRIPTION

The malfunction information related to A/T (Automatic Transmission) is transferred through the line (circuit) from TCM (Transmission control module) to ECM. Therefore, be sure to erase the malfunction information such as DTC not only in TCM but also ECM after the A/T related repair.

ECM TERMINALS AND REFERENCE VALUE

Specification data are reference values and are measured between each terminal and (3)(ECM ground).

TER- MINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
7	PU	A/T check signal	Ignition switch "ON" Engine is running.	0 - 4.0V

ON BOARD DIAGNOSIS LOGIC

Diagnostic Trouble Code No.	Malfunction is detected when	Check Items (Possible Cause)
P1605 0804	 An incorrect signal from TCM (Transmission control module) is sent to ECM. 	 Harness or connectors (The communication line circuit between ECM and TCM is open or shorted.) Dead (Weak) battery TCM

DATA MONITOR		
MONITORING NO FAIL		
CMPS-RPM(REF)	KXX rpm	

DIAGNOSTIC TROUBLE CODE CONFIRMATION PROCEDURE

NOTE:

If "DIAGNOSTIC TROUBLE CODE CONFIRMATION PROCE-DURE" has been previously conducted, always turn ignition switch "OFF" and wait at least 5 seconds before conducting the next test.

TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is more than 11V.

- 1) Turn ignition switch "ON".
 - 2) Select "DATA MONITOR" mode with CONSULT-II.
- 3) Start engine and wait at least 40 seconds.
- 4) If 1st trip DTC is detected, go to "DIAGNOSTIC PROCEDURE", EC-437.
- - 2) Start engine and wait at least 40 seconds.
 - 3) Select "MODE 7" with GST.
 - 4) If 1st trip DTC is detected, go to "DIAGNOSTIC PROCEDURE", EC-437.
- - 2) Start engine and wait at least 40 seconds.

EC-434

System Description

TURN SIGNAL OPERATION

With the hazard switch in the OFF position and the ignition switch in the ON or START position, power is supplied:

- through 10A fuse [No. 11], located in the fuse block (J/B)]
- to hazard switch terminal 2
- through terminal ① of the hazard switch
- to combination flasher unit terminal ①
- through terminal ③ of the combination flasher unit
- to turn signal switch terminal ①.

Ground is supplied to combination flasher unit terminal (2) through body grounds (M_2) and (M_61) .

LH turn

When the turn signal switch is moved to the LH position, power is supplied from turn signal switch terminal (3) to:

- front turn signal lamp LH terminal ③
- combination meter terminal (1)
- rear combination lamp LH terminal ④.

Ground is supplied to the front turn signal lamp LH terminal (2) through body grounds (10) and (13). Ground is supplied to the rear combination lamp LH terminal (2) through body grounds (16) and (19). Ground is supplied to combination meter terminal (6) through body grounds (12) and (12).

With power and ground supplied, the combination flasher unit controls the flashing of the LH combination lamps.

RH turn

When the turn signal switch is moved to the RH position, power is supplied from turn signal switch terminal (2) to:

- front turn signal lamp RH terminal (3)
- combination meter terminal 48
- rear combination lamp RH terminal ④.

Ground is supplied to the front turn signal lamp RH terminal (2) through body grounds (E10) and (E34). Ground is supplied to the rear combination lamp RH terminal (2) through body grounds (T6) and (T9). Ground is supplied to combination meter terminal (3) through body grounds (M2) and (M61). With power and ground supplied, the combination flasher unit controls the flashing of the RH combination lamps.

HAZARD LAMP OPERATION

Power is supplied at all times to hazard switch terminal ③ through:

• 10A fuse [No. 20, located in the fuse block (J/B)].

With the hazard switch in the ON position, power is supplied:

- through terminal ① of the hazard switch
- to combination flasher unit terminal ①
- through terminal (3) of the combination flasher unit
- to hazard switch terminal ④.

Ground is supplied to combination flasher unit terminal (2) through body grounds (M2) and (M61). Power is supplied through terminal (5) of the hazard switch to:

- front turn signal lamp LH terminal ③
- combination meter terminal (1)

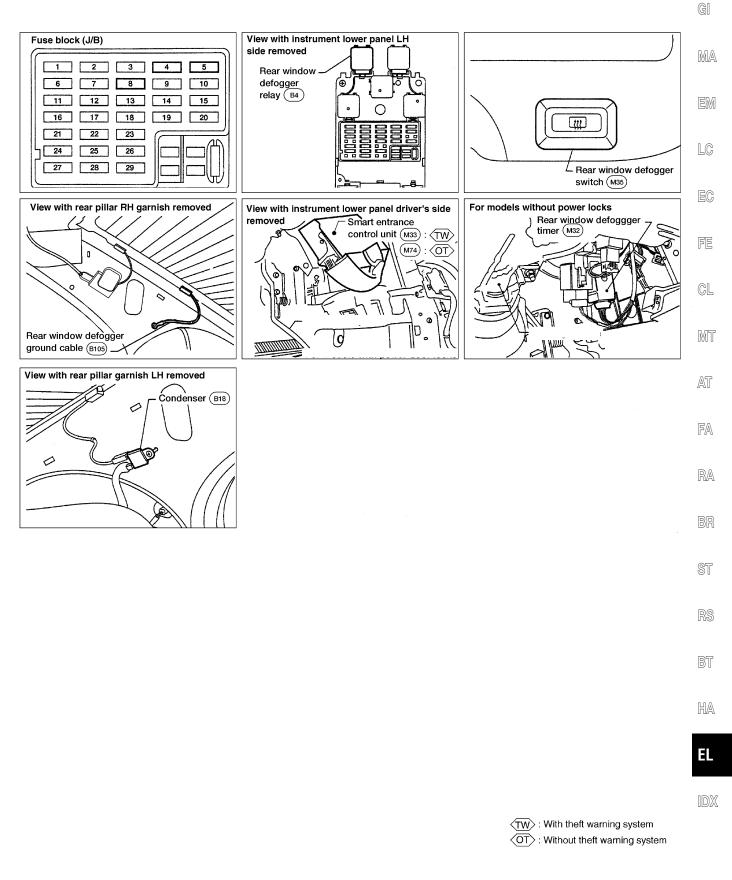
• rear combination lamp LH terminal ④.

Power is supplied through terminal (6) of the hazard switch to:

- front turn signal lamp RH terminal (3)
- rear combination lamp RH terminal ④
- combination meter terminal 48.

Ground is supplied to terminal (2) of each front turn signal lamp through body grounds (E10) and (E34). Ground is supplied to terminal (2) of each rear combination lamp through body grounds (T6) and (T9). Ground is supplied to combination meter terminal (36) through body grounds (M2) and (M61). With power and ground supplied, the combination flasher unit controls the flashing of the hazard warning lamps.

Component Parts and Harness Connector Location

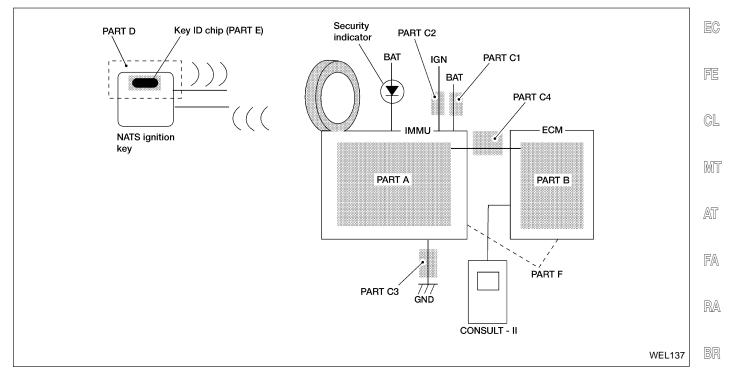


NVIS (NISSAN VEHICLE IMMOBILIZER SYSTEM — NATS) (WITH SELF-FUNCTION CHECK)

Trouble Diagnoses (Cont'd) SYMPTOM MATRIX CHART 2 (Non self-diagnosis related item)

	1 5	/	-
SYMPTOM	DIAGNOSTIC PROCEDURE (Reference page)	SYSTEM (Malfunctioning part or mode)	GI
		Security ind.	- MA
Security ind. does not light up.	PROCEDURE 8	Open circuit between Fuse and NATS	- 0002-7
	(EL-264)	Continuation of initialization mode	EM
		NATS IMMU	_

DIAGNOSTIC SYSTEM DIAGRAM



ST

LC

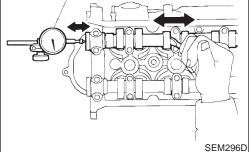
RS BT

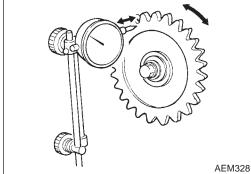
HA

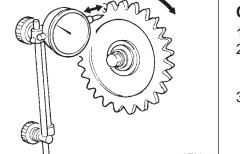
EL

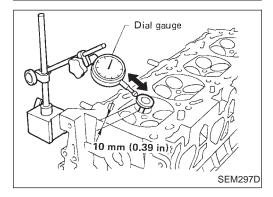
IDX











CYLINDER HEAD Inspection (Cont'd) **CAMSHAFT END PLAY**

- Install camshaft in cylinder head. Refer to EM-30.
- Measure camshaft end play. 2. Camshaft end play: Standard 0.070 - 0.148 mm (0.0028 - 0.0058 in) Limit

0.20 mm (0.0079 in)

- 3. If end play exceeds the limit, replace camshaft and remeasure camshaft end play.
- 4. If end play still exceeds the limit after replacing camshaft, replace cylinder head.

CAMSHAFT SPROCKET RUNOUT

- Install sprocket on camshaft. 1.
- Measure camshaft sprocket runout. 2. Runout (Total indicator reading): Limit 0.12 mm (0.0047 in)
- 3. If it exceeds the limit, replace camshaft sprocket.

VALVE GUIDE CLEARANCE

1. Measure valve deflection as shown in figure. (Valve and valve guide mostly wear in this direction.)

Valve intake and exhaust deflection limit (Dial qauge reading): 0.2 mm (0.008 in)

If it exceeds the limit, check valve to valve guide clearance. 2.

a. Measure valve stem diameter and valve guide inner diameter.

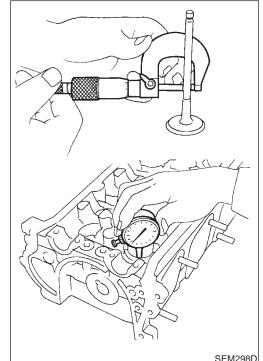
b. Check that clearance is within specification.

Valve to valve guide clearance = Valve guide inner diameter - Valve stem diameter:

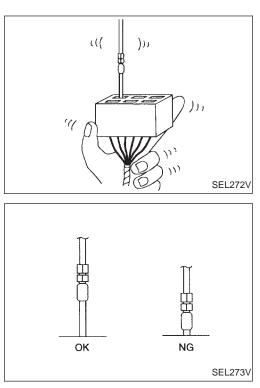
Unit: mm (in)

		()
	Standard	Limit
Intake	0.020 - 0.053 (0.0008 - 0.0021)	0.08 (0.0031)
Exhaust	0.040 - 0.073 (0.0016 - 0.0029)	0.1 (0.004)

- If it exceeds the limit, replace valve and remeasure clear-C. ance.
- If clearance still exceeds the limit after replacing valve, replace the valve guide.



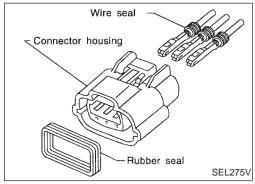
HOW TO CHECK TERMINAL



How to Check Enlarged Contact Spring of Terminal (Cont'd)

4. While moving the connector, check whether the male terminal can be easily inserted or not.

If the male terminal can be easily inserted into the female terminal, replace the female terminal.



Waterproof Connector Inspection

If water enters the connector, it can short interior circuits. This may lead to intermittent problems.

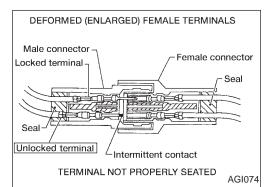
Check the following items to maintain the original waterproof characteristics.

RUBBER SEAL INSPECTION

- Most waterproof connectors are provided with a rubber seal between the male and female connectors. If the seal is missing, the waterproof performance may not meet specifications.
- The rubber seal may come off when connectors are disconnected. Whenever connectors are reconnected, make sure the rubber seal is properly installed on either side of male or female connector.

WIRE SEAL INSPECTION

The wire seal must be installed on the wire insertion area of a waterproof connector. Be sure that the seal is installed properly.



Terminal Lock Inspection

Check for unlocked terminals by pulling wire at the end of connector.

Unlocked terminal may create intermittent signals in the circuit.

Fluids and Lubricants

	Capao	Capacity (Approximate)		 Recommended fluids and lubricants
	US measure	Imp measure	Liter	- Recommended huids and lubricants
Engine oil Drain and refill				
With oil filter change	3-5/8 qt	3 qt	3.4	– ● API Certification Mark*2
Without oil filter change	3-3/8 qt	2-7/8 qt	3.2	API grade SG/SH, Energy Conserving I & II
Dry engine (engine overhaul)	4 qt	3-3/8 qt	3.8	 or API grade SJ, Energy Conserving*2 ILSAC grade GF-I & GF-II*2
Cooling system (Reservoir tank included)	7-3/8 qt	6-1/8 qt	7.0	50% Genuine NISSAN Anti-freeze Coolant or equivalent 50% Demineralized water or distilled water
Manual transaxle gear oil	9-1/2 - 10-1/8 pt	7-7/8 - 8-1/2 pt	4.5 - 4.8	API GL-4, 80W - 90 SUPER MULTI
Automatic transaxle fluid	10 qt	8-1/4 qt	9.4	NISSAN Matic 'D' (Continental U.S. and Alaska) or Canada NISSAN Automatic Trans- mission Fluid. *1
Power steering fluid	1 qt	3/4 qt	0.9	Genuine NISSAN PSF II or equivalent *4
Brake & clutch fluid	_	_	_	Genuine NISSAN Brake Fluid*3 or equivalent DOT 3 (US FMVSS No. 116)
Multi-purpose grease	_	—	_	NLGI No. 2 (Lithium soap base)

*1: Dexron™ III/Mercon™ or equivalent may also be used. Outside the continental United States and Alaska contact a Nissan dealership for more information regarding suitable fluids, including recommended brand(s) of Dexron™ III/Mercon™ Automatic Transmission Fluid. For further details, see "SAE Viscosity Number". Available in mainland U.S.A. through your Nissan dealer. Genuine NISSAN PSF, Canada NISSAN Automatic Transmission Fluid, Dexron[™] III/Mercon[™], or equivalent ATF may also be used. *2:

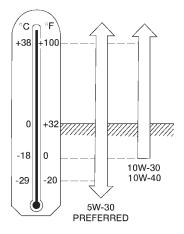
*3:

*4:

SAE Viscosity Number

Outside Temperature Range Anticipated Before Next Oil Change

GASOLINE ENGINE OIL



WMA001

SAE 5W-30 viscosity oil is preferred for all temperatures. SAE 10W-30 and 10W-40 viscosity oil may be used if the ambient temperature is above -18°C (0°F).