

CYLINDER BLOCK

[QR]

Crankshaft position sensor bolt : 7.0 N·m (0.71 kg·m, 62 in·lb)

19. Installation of remaining components is in reverse order of removal.

How to Select Piston and Bearing DESCRIPTION

EBS00NID

Selection points	Selection parts	Selection items	Selection methods
Between cylinder block and crankshaft	Main bearing	Main bearing grade (bearing thickness)	Determined by match of cylinder block bearing housing grade (inner diameter of housing) and crankshaft journal grade (outer diameter of journal)
Between crankshaft and connecting rod	Connecting rod bearing	Connecting rod bearing grade (bearing thickness)	Combining service grades for connecting rod big end diameter and crankshaft pin outer diameter determine connecting rod bearing selection.
Between cylinder block and piston	Piston and piston pin assembly (piston is available together with piston pin as an assembly.)	Piston grade (piston skirt diameter)	Piston grade = cylinder bore grade (inner diameter of bore)
Between piston and connecting rod*	—	—	—

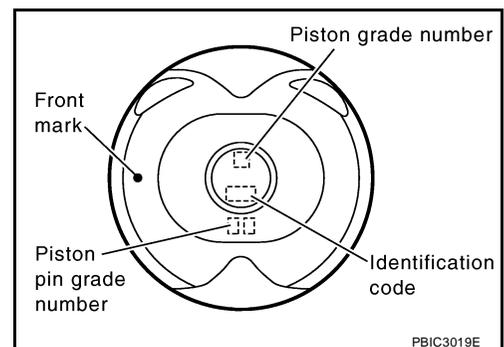
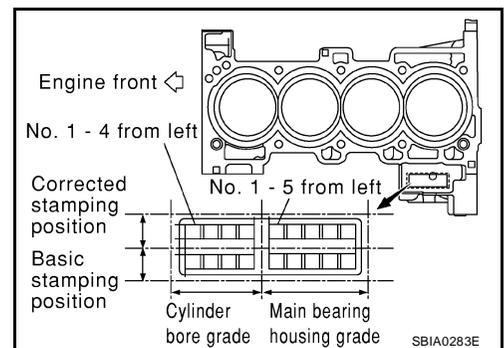
*For the service parts, the grade for fitting cannot be selected between piston pin and connecting rod. (Only grade "0" is available.) The information at the shipment from the plant is described as a reference.

- The identification grade stamped on each part is the grade for the dimension measured in new condition. This grade cannot apply to reused parts.
- For reused or repaired parts, measure the dimension accurately. Determine the grade by comparing the measurement with the values of each selection table.
- For details of the measurement method of each part, the reuse standards and the selection method of the selective fitting parts, refer to the text.

HOW TO SELECT PISTON

When New Cylinder Block Is Used

- Check the cylinder bore grade on rear-left side of cylinder block, and select piston of the same grade.
- If there is a corrected stamp mark on cylinder block, use it as a correct reference.



HOW TO USE THIS MANUAL

EAS001GL

GI

How to Follow Trouble Diagnoses

DESCRIPTION

NOTICE:

Trouble diagnoses indicate work procedures required to diagnose problems effectively. Observe the following instructions before diagnosing.

1. **Before performing trouble diagnoses, read the “Preliminary Check”, the “Symptom Chart” or the “Work Flow”.**
2. **After repairs, re-check that the problem has been completely eliminated.**
3. **Refer to Component Parts and Harness Connector Location for the Systems described in each section for identification/location of components and harness connectors.**
4. **Refer to the Circuit Diagram for quick pinpoint check.**
If you need to check circuit continuity between harness connectors in more detail, such as when a sub-harness is used, refer to Wiring Diagram in each individual section and Harness Layout in PG section for identification of harness connectors.
5. **When checking circuit continuity, ignition switch should be OFF.**
6. **Before checking voltage at connectors, check battery voltage.**
7. **After accomplishing the Diagnostic Procedures and Electrical Components Inspection, make sure that all harness connectors are reconnected as they were.**

HOW TO FOLLOW TEST GROUPS IN TROUBLE DIAGNOSES

1. Description (Check points)

4. Test Group Number

4. Test Group Title

1. Check ABS Actuator Solenoid Valve

1. Disconnect ABS actuator connector.
2. Check resistance inside of ABS actuator.

Code No.	ABS actuator		Standard resistance
41	15	19	4.4 - 6.0 Ω
45	14	19	
51	17	19	
55	16	19	
42	3	19	8.5 - 9.5 Ω
46	1	19	
52	7	19	
56	5	19	

3. Symbols

Check result is OK?

YES >> Check the following items. If NG, repair harness or connector.

- Harness connector E22, E23
- Open and short of harness between actuator connector and control unit.
- Open and short of harness between 8 pin connector and 2 pin connector of actuator.

NO >> GO TO 5.

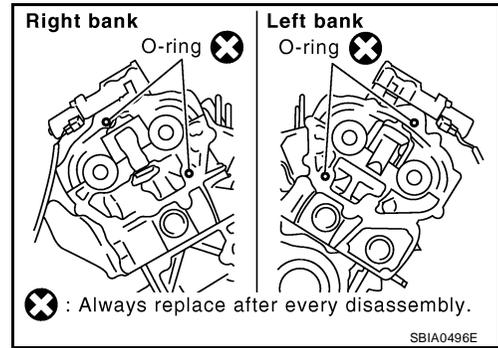
4. Action (Next step)

1. **Work and diagnostic procedure**
Start to diagnose a problem using procedures indicated in enclosed test groups.
2. **Questions and required results**
Questions and required results are indicated in bold type in test group.
The meaning of are as follows:

TIMING CHAIN

[VQ]

- b. Install new O-rings to cylinder head and camshaft bracket (No. 1).



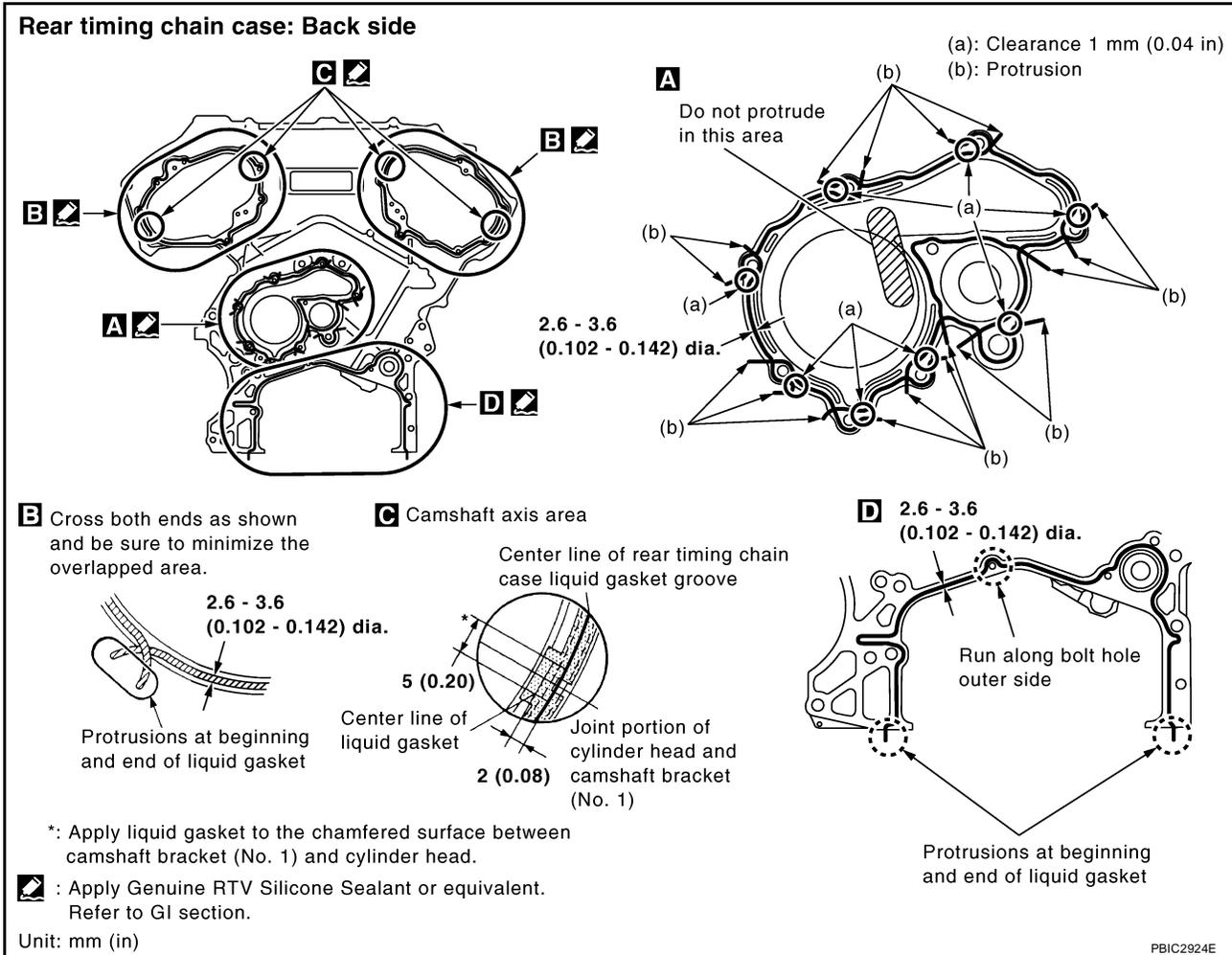
- c. Apply liquid gasket using Tool to rear timing chain case back side as shown.

Tool number : WS39930000 (—)

Use Genuine RTV Silicone Sealant or equivalent. Refer to [GI-47, "Recommended Chemical Products and Sealants"](#).

CAUTION:

- For "A" in the figure, completely wipe out liquid gasket extended on a portion touching at engine coolant.
- Apply liquid gasket on installation position of water pump and cylinder head very completely.



- d. Align rear timing chain case with dowel pins (right and left) on cylinder block and install rear timing chain case.
- Make sure O-rings stay in place during installation to cylinder block, cylinder head and camshaft bracket (No. 1).

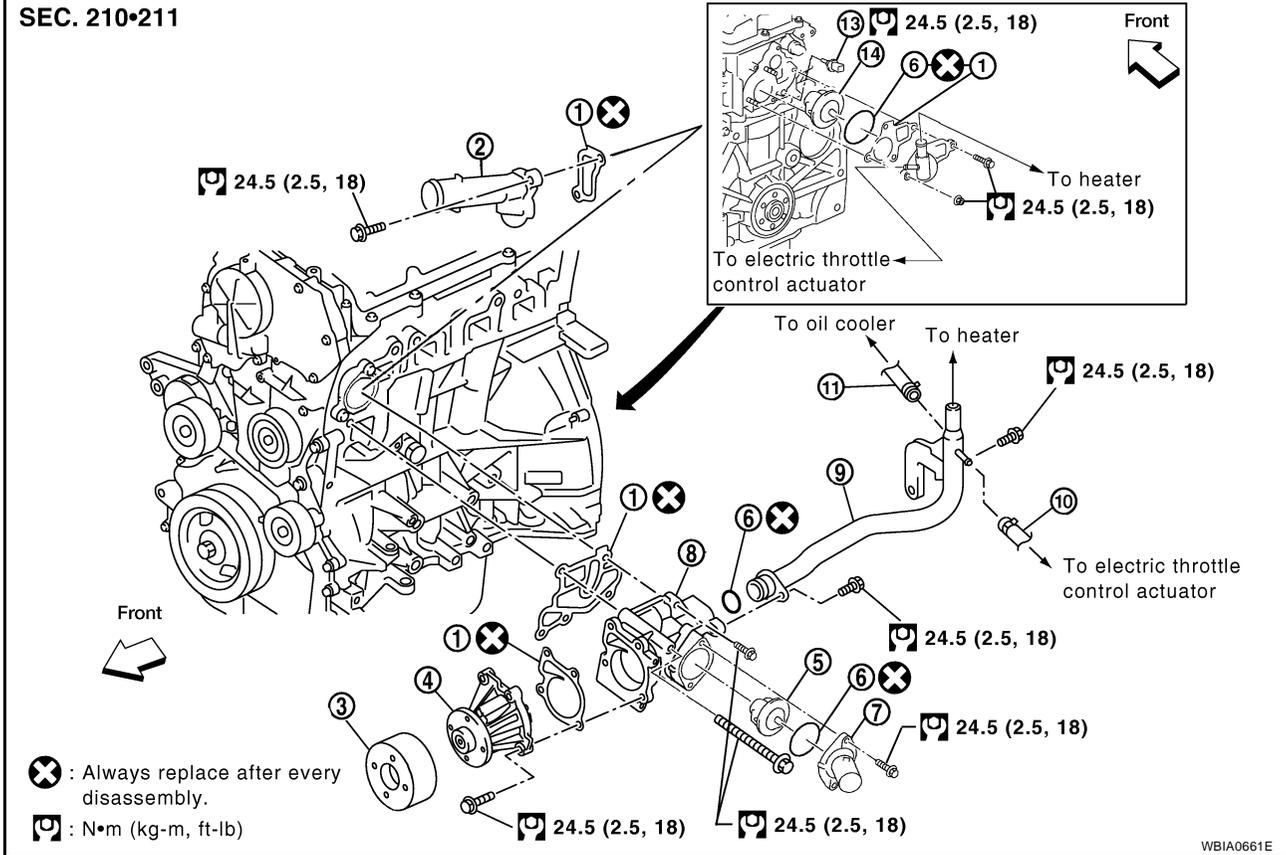
THERMOSTAT AND THERMOSTAT HOUSING

PFP:21200

Removal and Installation Thermostat

EBS00NH0

SEC. 210•211



- | | | |
|---------------------------------------|--------------------------------------|----------------------|
| 1. Gasket | 2. Water outlet | 3. Water pump pulley |
| 4. Water pump | 5. Thermostat | 6. O-ring |
| 7. Water inlet | 8. Water pump and thermostat housing | 9. Heater pipe |
| 10. Water hose | 11. Water hose | 12. Heater outlet |
| 13. Engine coolant temperature sensor | 14. Water control valve | |

REMOVAL

1. Drain engine coolant. Refer to [CO-11, "DRAINING ENGINE COOLANT"](#) and [EM-75, "CYLINDER BLOCK"](#).

CAUTION:

- Perform this step when the engine is cold.
- Do not spill engine coolant on drive belt.

2. Disconnect radiator hose (lower) at water inlet side. Refer to [CO-15, "REMOVAL"](#).
3. Remove water inlet and thermostat.

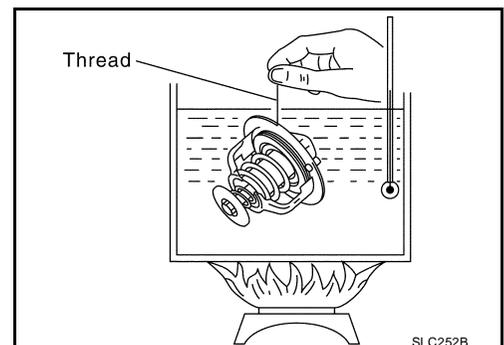
INSPECTION AFTER REMOVAL

- Place a thread so that it is caught in the valves of thermostat. Immerse fully in a container filled with water. Heat while stirring.
- The valve opening temperature is the temperature at which the valve opens and falls from the thread.
- Continue heating. Check the maximum valve lift amount.

NOTE:

The maximum valve lift amount standard temperature for water control valve is the reference value.

- After checking the maximum valve lift amount, lower the water temperature and check the valve closing temperature.



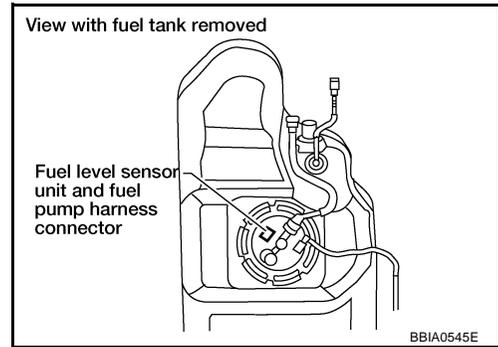
DTC P0181 FTT SENSOR

PFP:22630

Component Description

UBS00L6R

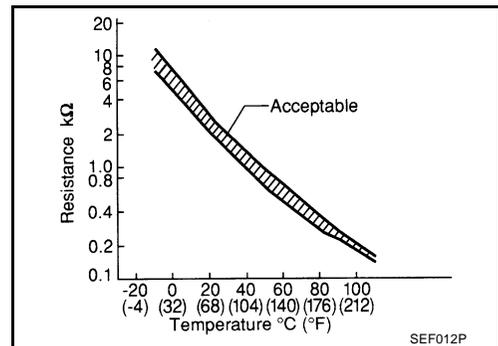
The fuel tank temperature sensor is used to detect the fuel temperature inside the fuel tank. The sensor modifies a voltage signal from the ECM. The modified signal returns to the ECM as the fuel temperature input. The sensor uses a thermistor which is sensitive to the change in temperature. The electrical resistance of the thermistor decreases as temperature increases.



<Reference data>

Fluid temperature °C (°F)	Voltage* V	Resistance kΩ
20 (68)	3.5	2.3 - 2.7
50 (122)	2.2	0.79 - 0.90

*: This data is reference value and is measured between ECM terminal 107 (Fuel tank temperature sensor) 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.

On Board Diagnosis Logic

UBS00L6S

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P0181 0181	Fuel tank temperature sensor circuit range/performance	Rationally incorrect voltage from the sensor is sent to ECM, compared with the voltage signals from engine coolant temperature sensor and intake air temperature sensor.	<ul style="list-style-type: none"> ● Harness or connectors (The sensor circuit is open or shorted) ● Fuel tank temperature sensor

DTC Confirmation Procedure

UBS00L6T

NOTE:

If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next test.

WITH CONSULT-II

1. Turn ignition switch ON.
2. Select "DATA MONITOR" mode with CONSULT-II.
3. Wait at least 10 seconds.
If the result is NG, go to [EC-294, "Diagnostic Procedure"](#) .
If the result is OK, go to following step.
4. Check "COOLAN TEMP/S" value.
If the "COOLAN TEMP/S" is less than 60°C (140°F), the result will be OK.
If the "COOLAN TEMP/S" is above 60°C (140°F), go to the following step.
5. Cool engine down until "COOLAN TEMP/S" is less than 60°C (140°F).
6. Wait at least 10 seconds.
7. If 1st trip DTC is detected, go to [EC-294, "Diagnostic Procedure"](#) .

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm
COOLAN TEMP/S	XXX °C

SEF174Y

DTC P0550 PSP SENSOR

[QR]

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.

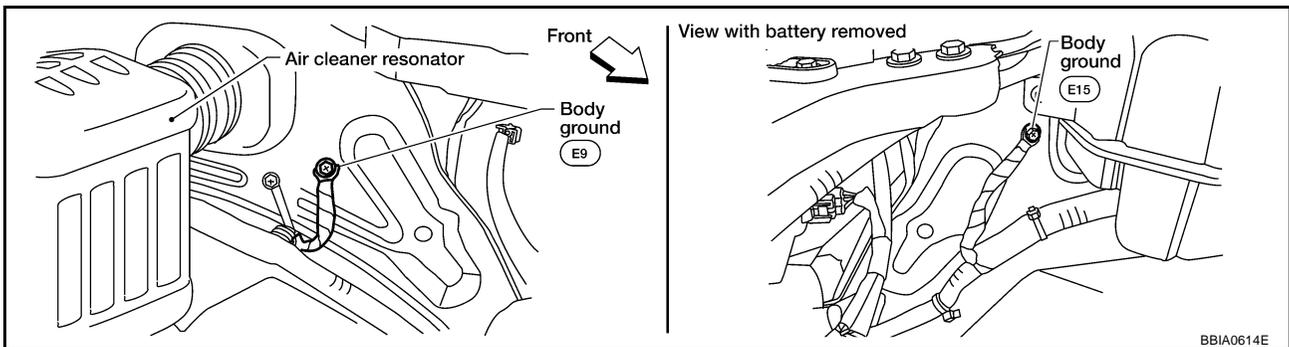
TER-MINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
12	P	Power steering pressure sensor	[Engine is running] ● Steering wheel: Being turned	0.5 - 4.0V
			[Engine is running] ● Steering wheel: Not being turned	0.4 - 0.8V
67	B	Sensor ground	[Engine is running] ● Warm-up condition ● Idle speed	Approximately 0V
68	G	Sensor power supply (Power steering pressure sensor)	[Ignition switch: ON]	Approximately 5V

Diagnostic Procedure

UBS00LAH

1. CHECK GROUND CONNECTIONS

1. Turn ignition switch OFF.
2. Loosen and retighten two ground screws on the body. Refer to [EC-154, "Ground Inspection"](#) .

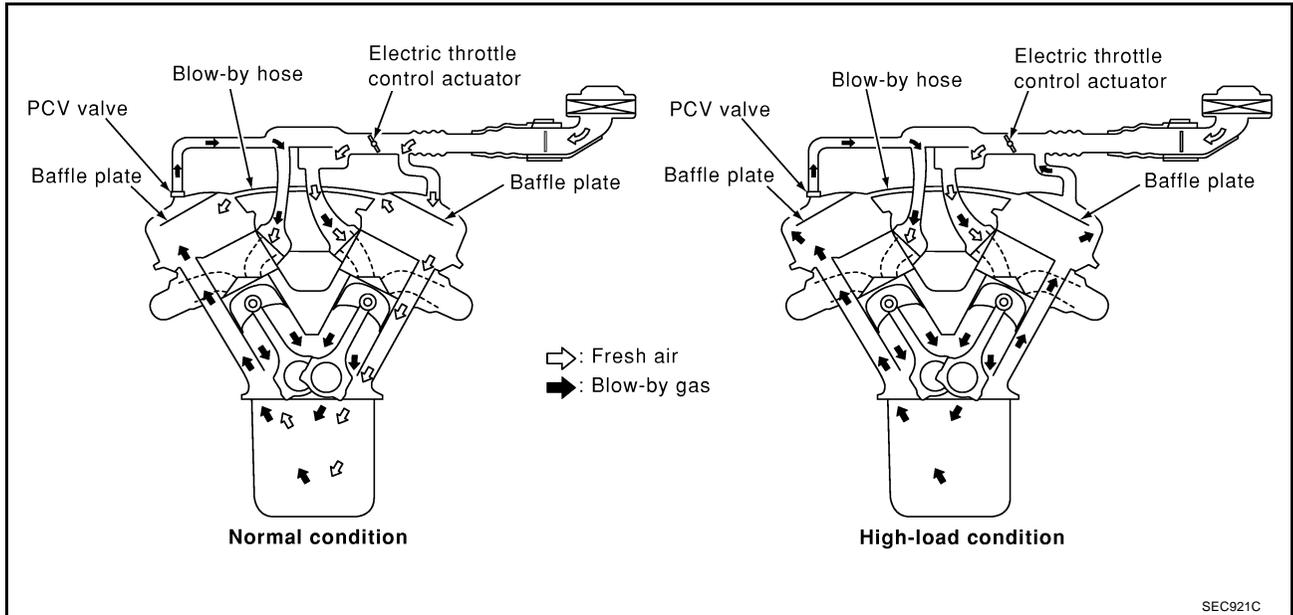


OK or NG

- OK >> GO TO 2.
- NG >> Repair or replace ground connections.

POSITIVE CRANKCASE VENTILATION

Description
SYSTEM DESCRIPTION

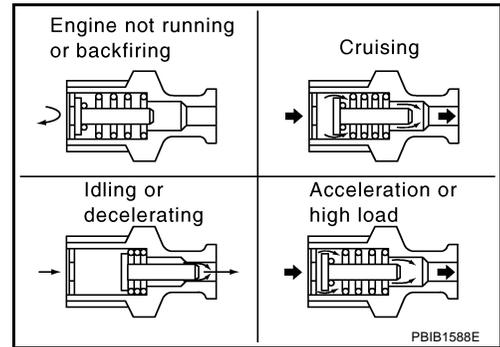


SEC921C

This system returns blow-by gas to the intake manifold.

The positive crankcase ventilation (PCV) valve is provided to conduct crankcase blow-by gas to the intake manifold. During partial throttle operation of the engine, the intake manifold sucks the blow-by gas through the PCV valve. Normally, the capacity of the valve is sufficient to handle any blow-by and a small amount of ventilating air. The ventilating air is then drawn from the air inlet tubes into the crankcase. In this process the air passes through the hose connecting air inlet tubes to rocker cover. Under full-throttle condition, the manifold vacuum is insufficient to draw the blow-by flow through the valve. The flow goes through the hose connection in the reverse direction.

On vehicles with an excessively high blow-by, the valve does not meet the requirement. This is because some of the flow will go through the hose connection to the air inlet tubes under all conditions.

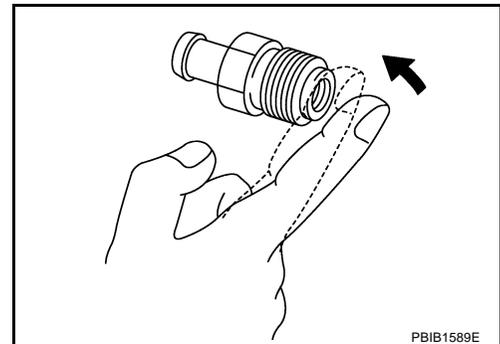


PBIB1588E

Component Inspection
PCV (POSITIVE CRANKCASE VENTILATION) VALVE

UBS00LKC

With engine running at idle, remove PCV valve from rocker cover. A properly working valve makes a hissing noise as air passes through it. A strong vacuum should be felt immediately when a finger is placed over valve inlet.



PBIB1589E

DTC P0127 IAT SENSOR

[VQ]

- b. Select "DATA MONITOR" mode with CONSULT-II.
- 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.
 - Perform the following steps before engine coolant temperature is above 90°C (194°F).
2. Turn ignition switch ON.
3. Select "DATA MONITOR" mode with CONSULT-II.
4. Start engine.
5. Hold vehicle speed at more than 70 km/h (43 MPH) for 100 consecutive seconds.
6. If 1st trip DTC is detected, go to [EC-836, "Diagnostic Procedure"](#) .

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm
COOLAN TEMP/S	XXX °C
VHCL SPEED SE	XXX km/h
B/FUEL SCHDL	XXX msec

SEF189Y

WITH GST

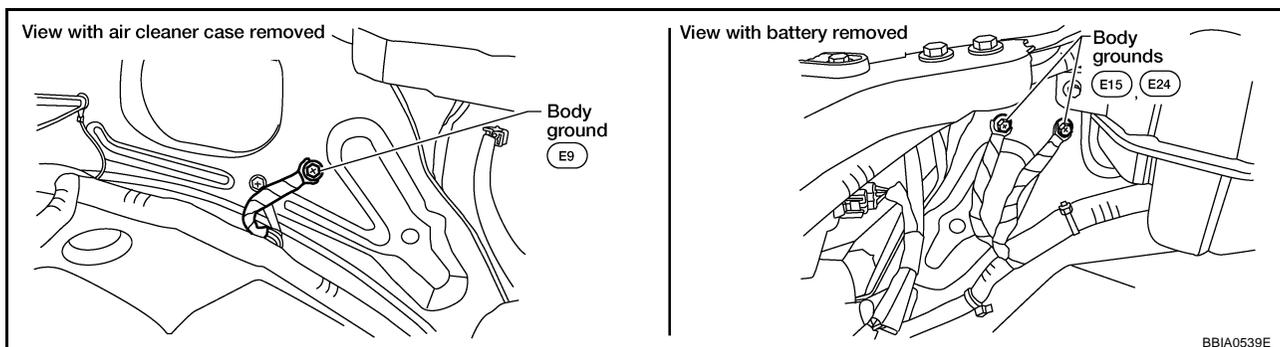
Follow the procedure "WITH CONSULT-II" above.

Diagnostic Procedure

UBS00LN9

1. CHECK GROUND CONNECTIONS

1. Turn ignition switch OFF.
2. Loosen and retighten three ground screws on the body. Refer to [EC-765, "Ground Inspection"](#) .



OK or NG

- OK >> GO TO 2.
- NG >> Repair or replace ground connections.

2. CHECK INTAKE AIR TEMPERATURE SENSOR

Refer to [EC-837, "Component Inspection"](#) .

OK or NG

- OK >> GO TO 3.
- NG >> Replace mass air flow sensor (with intake air temperature sensor).

3. CHECK INTERMITTENT INCIDENT

Refer to [EC-757, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

Refer to [EC-817, "Wiring Diagram"](#) .

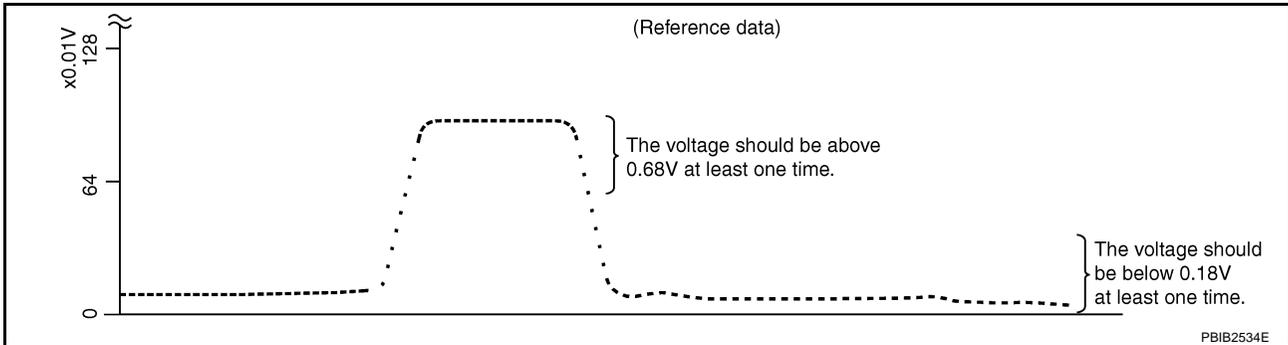
>> INSPECTION END

- Select "FUEL INJECTION" in "ACTIVE TEST" mode, and select "HO2S2 (B1)/(B2)" as the monitor item with CONSULT-II.

ACTIVE TEST	
FUEL INJECTION	25 %
MONITOR	
ENG SPEED	XXX rpm
HO2S2 (B1)	XXX V
HO2S2 (B2)	XXX V

PBIB1672E

- Check "HO2S2 (B1)/(B2)" at idle speed when adjusting "FUEL INJECTION" to $\pm 25\%$.



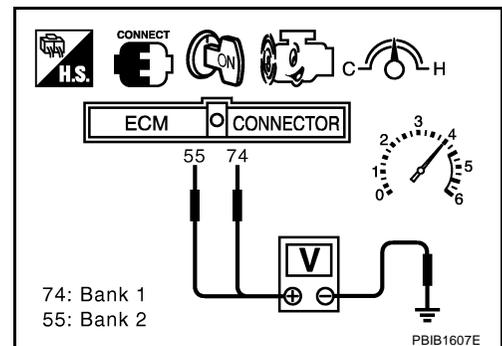
"HO2S2 (B1)/(B2)" should be above 0.68V at least once when the "FUEL INJECTION" is +25%.
 "HO2S2 (B1)/(B2)" should be below 0.18V at least once when the "FUEL INJECTION" is -25%.

CAUTION:

- Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.
- Before installing new oxygen sensor, clean exhaust system threads using Oxygen Sensor Thread Cleaner tool J-43897-18 or J-43897-12 and approved anti-seize lubricant.

⊗ Without CONSULT-II

- Start engine and warm it up to the normal operating temperature.
- Turn ignition switch OFF and wait at least 10 seconds.
- Start engine and keep the engine speed between 3,500 and 4,000 rpm for at least 1 minute under no load.
- Let engine idle for 1 minute.
- Set voltmeter probes between ECM terminal 74 [HO2S2 (B1) signal] or 55 [HO2S2 (B2) signal] and ground.
- Check the voltage when revving up to 4,000 rpm under no load at least 10 times.
 (Depress and release accelerator pedal as soon as possible.)
The voltage should be above 0.68V at least once during this procedure.
If the voltage is above 0.68V at step 6, step 7 is not necessary.
- Keep vehicle at idling for 10 minutes, then check voltage. Or check the voltage when coasting from 80 km/h (50 MPH) in D position with "OD" OFF (A/T), 5th gear position (M/T).
The voltage should be below 0.18V at least once during this procedure.
- If NG, replace heated oxygen sensor 2.



CAUTION:

- Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.

SERVICE DATA AND SPECIFICATIONS (SDS)

[FS5R30A]

SERVICE DATA AND SPECIFICATIONS (SDS)

PFP:00030

General Specifications

UCS0049M

Engine			QR25DE
Transmission model			FS5R30A
Model code number			EA000
Number of speed			5
Synchromesh type			Warner
Shift pattern			 <p style="text-align: center; font-size: small;">SCIA0821E</p>
Gear ratio	1st	3.580	
	2nd	2.077	
	3rd	1.360	
	4th	1.000	
	OD	0.811	
	Reverse	3.636	
Number of teeth	Main gear	Drive	22
		1st	32
		2nd	30
		3rd	29
		4th	—
		OD	24
		Reverse	30
	Counter gear	Drive	32
		1st	13
		2nd	21
		3rd	31
		4th	—
		OD	43
		Reverse	12
Reverse idler gear		22	
Oil capacity (Approx.)	ℓ (US qt, Imp qt)	2.89 (3, 2-1/2)	
Remarks	Reverse synchronizer	Installed	
	Double-cone synchronizer	2nd and 3rd	

Gear End Play

UCS0049N

Unit: mm (in)

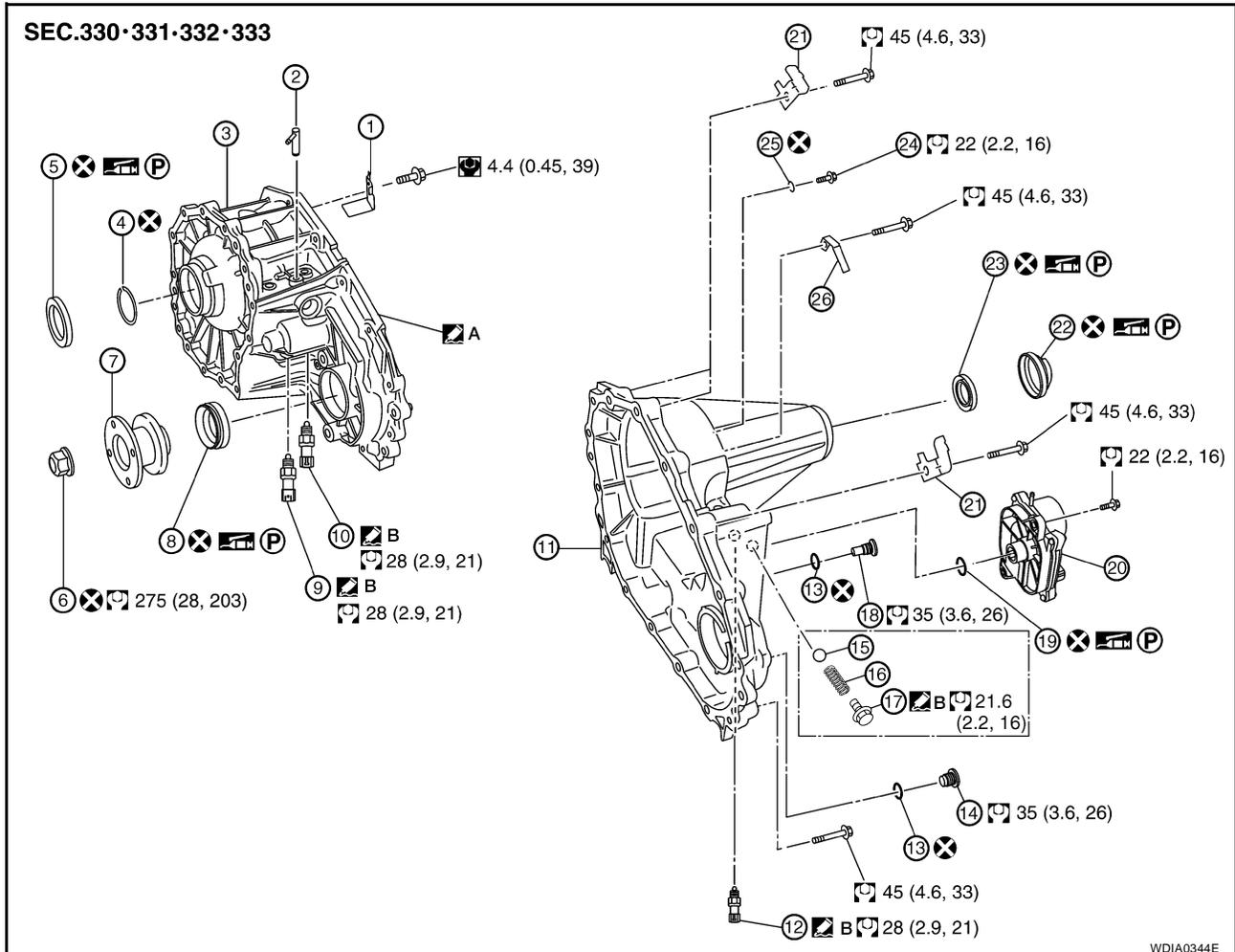
Gear	End play
1st main gear	0.23 - 0.33 (0.0091 - 0.0130)
2nd main gear	0.23 - 0.33 (0.0091 - 0.0130)
3rd main gear	0.06 - 0.16 (0.0024 - 0.0063)
OD counter gear	0.23 - 0.33 (0.0091 - 0.0130)
Reverse main gear	0.33 - 0.43 (0.0130 - 0.0169)

TRANSFER ASSEMBLY

transfer control unit. Refer to [TF-4, "Precautions for Transfer Assembly and Transfer Control Unit Replacement"](#).

Disassembly and Assembly COMPONENTS

EDS00233



WDIA0344E

- | | | |
|--|----------------------------------|---|
| 1. Baffle plate | 2. Breather tube | 3. Front case |
| 4. Snap ring | 5. Input oil seal | 6. Self-lock nut |
| 7. Companion flange | 8. Front oil seal | 9. 4LO switch (gray with green paint) |
| 10. ATP switch (black) | 11. Rear case | 12. Wait detection switch (gray) |
| 13. Gasket | 14. Filler plug | 15. Check ball (M/T models only) |
| 16. Check shift spring (M/T models only) | 17. Check plug (M/T models only) | 18. Drain plug |
| 19. O-ring | 20. Transfer control device | 21. Harness bracket |
| 22. Dust cover | 23. Rear oil seal | 24. Retainer bolt |
| 25. Gasket | 26. Air breather hose clamp | A. Apply Genuine Anaerobic Liquid Gasket or equivalent. |
| B. Apply Genuine Silicone RTV or equivalent. | | |

TROUBLE DIAGNOSIS FOR SYSTEM [M226 WITH ELECTRONIC LOCKING DIFFERENTIAL]

EDS0027S

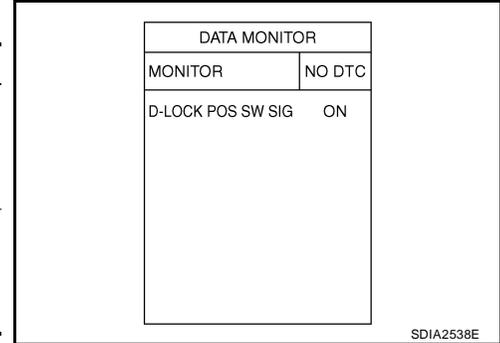
Differential Lock Position Switch DIAGNOSTIC PROCEDURE

1. CHECK DIFFERENTIAL LOCK POSITION SWITCH SIGNAL

Ⓟ With CONSULT-II

1. Start engine.
2. Select "DATA MONITOR" mode for "DIFF LOCK" with CONSULT-II.
3. Read out ON/OFF switching action of "D-LOCK POS SW SIG".

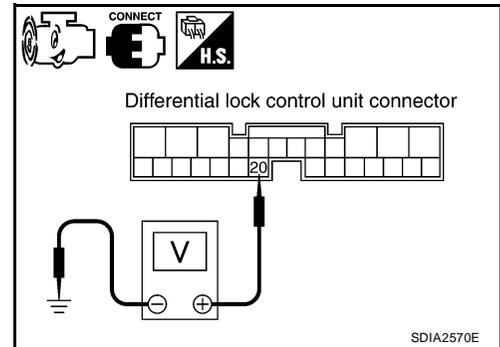
Monitor item	Condition	Display value
D-LOCK POS SW SIG	<ul style="list-style-type: none"> ● Vehicle stopped ● Engine running ● VDC OFF switch (if equipped): ON 	Differential lock mode switch: ON (DIFF LOCK indicator lamp: ON)
	<ul style="list-style-type: none"> ● 4WD shift switch: 4LO 	Differential lock mode switch: OFF (DIFF LOCK indicator lamp: OFF)



ⓧ Without CONSULT-II

1. Start engine.
2. Check voltage between differential lock control unit harness connector terminal and ground.

Connector	Terminal	Condition	Voltage (Approx.)
M70	20 - Ground	<ul style="list-style-type: none"> ● Vehicle stopped ● Engine running ● VDC OFF switch (if equipped): ON 	0V
		<ul style="list-style-type: none"> ● 4WD shift switch: 4LO 	Battery voltage



OK or NG

- OK >> GO TO 5.
NG >> GO TO 2.

2. CHECK GROUND CIRCUIT

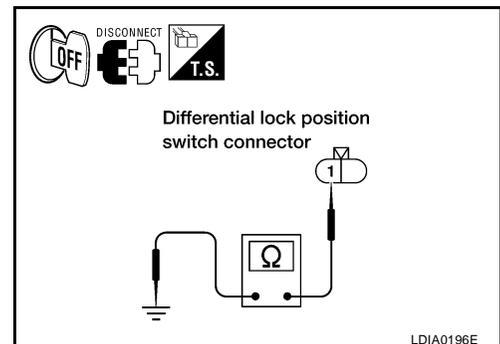
1. Turn ignition switch OFF.
2. Disconnect differential lock position switch harness connector.
3. Check continuity between differential lock position switch harness connector C116 terminal 1 and ground.

Continuity should exist.

Also check harness for short to ground and short to power.

OK or NG

- OK >> GO TO 3.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.



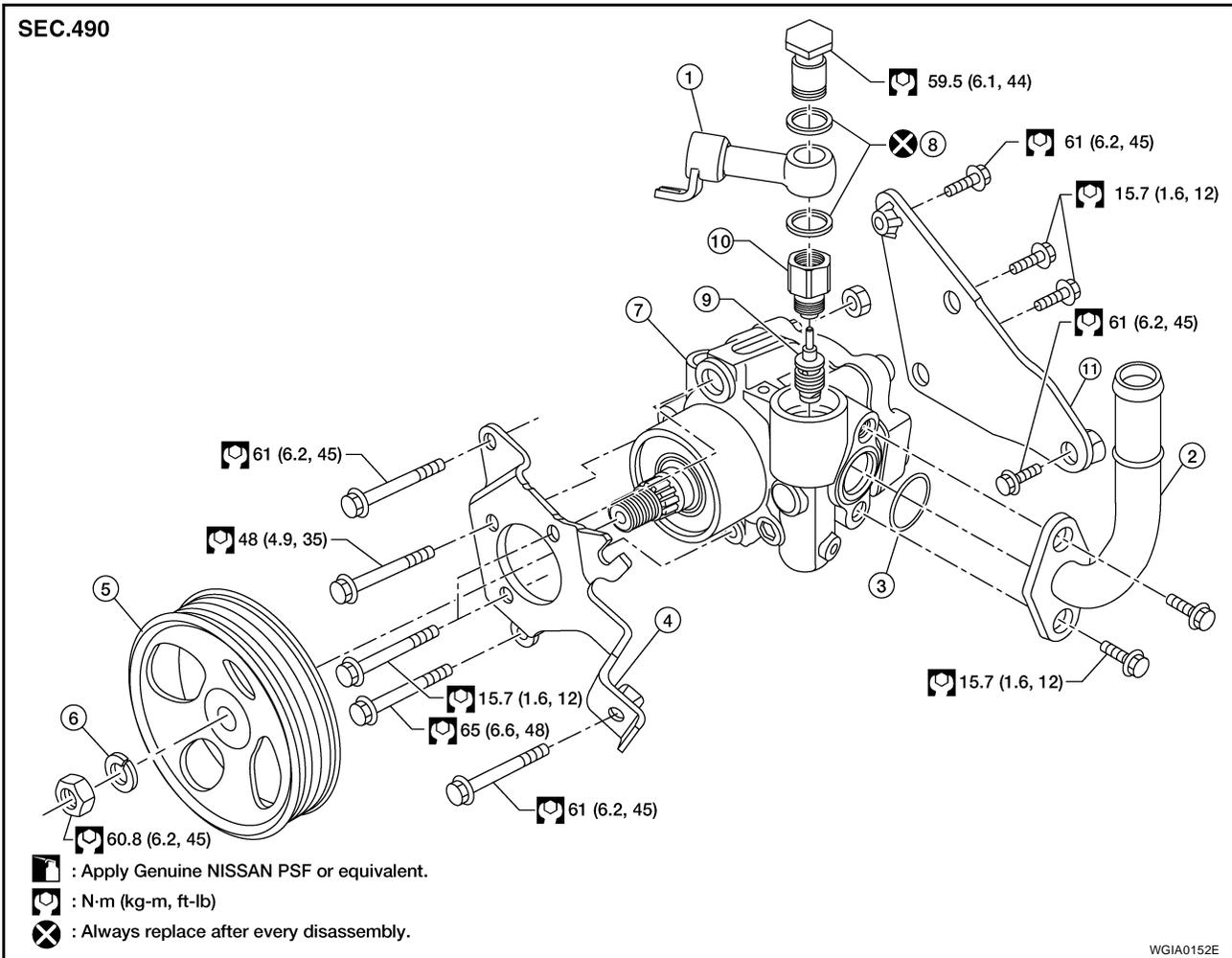
POWER STEERING OIL PUMP

Components

EGS0014J

QR25DE

SEC.490



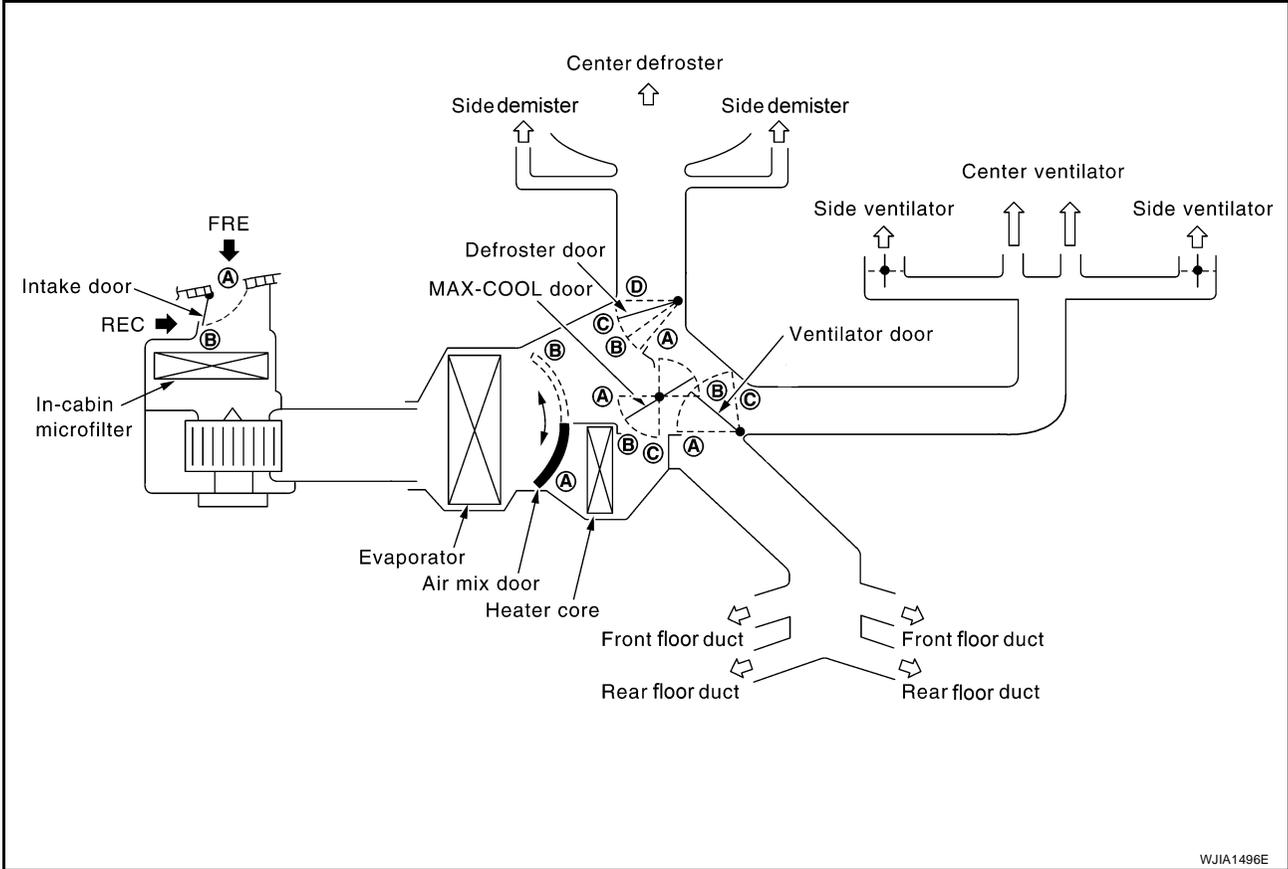
- | | | |
|------------------|-------------------|----------------------------------|
| 1. Joint | 2. Suction pipe | 3. O-ring |
| 4. Front bracket | 5. Pulley | 6. Lock washer |
| 7. Body assembly | 8. Copper washers | 9. Flow control valve and spring |
| 10. Connector | 11. Rear bracket | |

WGIA0152E

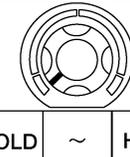
AIR CONDITIONER CONTROL

EJS003Q3

System Description SWITCHES AND THEIR CONTROL FUNCTION



WJIA1496E

Position or switch	MODE SW				DEF SW		REC SW		Temperature dial			OFF SW
	VENT	B/L	FOOT	D/F	ON	OFF	ON	OFF				
									COLD	~	HOT	
Ventilator door	(A)	(B)	(C)	(C)	(C)							(C)
MAX-COOL door	(A)	(B)	(B)	(B)	(C)							(B)
Defroster door	(D)	(D)	(D _{or} C)	(B)	(A)							(C)
Intake door					(B)		(A)	(B)				(B)
Air mix door									(A)		(B)	

WJIA1497E