P0011, P0021 IVT CONTROL

On Board Diagnosis Logic

INFOID:0000000004063698

DTC No.	Trouble diagnosis name	Detecting condition	Possible cause
P0011 0011 (Bank 1) P0021 0021 (Bank 2)	Intake valve timing control performance	There is a gap between angle of target and phase-control angle degree.	• Crankshaft position sensor (POS) • Camshaft position sensor (PHASE) • Intake valve timing control solenoid valve • Accumulation of debris to the signal pick-up portion of the camshaft • Timing chain installation • Foreign matter caught in the oil groove for intake valve timing control

FAIL-SAFE MODE

When the malfunction is detected, the ECM enters fail-safe mode.

Detected items	Engine operating condition in fail-safe mode
Intake valve timing control	The signal is not energized to the solenoid valve and the valve control does not function.

DTC Confirmation Procedure

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CAUTION:
Always drive at a safe speed.
NOTE:
- **If DTC P0011 or P0021 is displayed with DTC P0075 or P0081, first perform trouble diagnosis for DTC P0075 or P0081. Refer to EC-102.**
- If DTC Confirmation Procedure has been previously conducted, always turn ignition switch OFF and wait at least 10 seconds before conducting the next step.

1. Turn ignition swich OFF and wait at least 10 seconds.
2. Turn ignition swich ON.
3. Turn ignition swich OFF and wait at least 10 seconds.

TESTING CONDITION:
Before performing the following procedure, confirm that battery voltage is between 10V and 16V at idle.

WITH CONSULT-III

1. Turn ignition switch ON and select “DATA MONITOR” mode with CONSULT-III.
2. Start engine and warm it up to the normal operating temperature.
3. Maintain the following conditions for at least 6 consecutive seconds. Hold the accelerator pedal as steady as possible.

ENG SPEED	1,200 - 2,000 rpm
COOLAN TEMP/S	More than 60°C (140°F)
B/FUEL SCHDL	More than 3.5 msec
Selector lever	P or N position (A/T) Neutral position (M/T)

4. Stop vehicle with engine running and let engine idle for 10 seconds.
5. Check 1st trip DTC.
6. If the 1st trip DTC is detected, go toEC-93, "Diagnosis Procedure".
   If the 1st trip DTC is not detected, go to next step.
7. Maintain the following conditions for at least 20 consecutive seconds.

ENG SPEED	1,700 - 3,175 rpm (A constant rotation is maintained.)
COOLAN TEMP/S	More than 70°C (158°F)
Selector lever	1st or 2nd position
Driving location uphill	Driving vehicle uphill (Increased engine load will help maintain the driving conditions required for this test.)

8. Check 1st trip DTC.
9. If the 1st trip DTC is detected, go to EC-93, "Diagnosis Procedure".

WITH GST
Follow the procedure “WITH CONSULT-III” above.

Diagnosis Procedure

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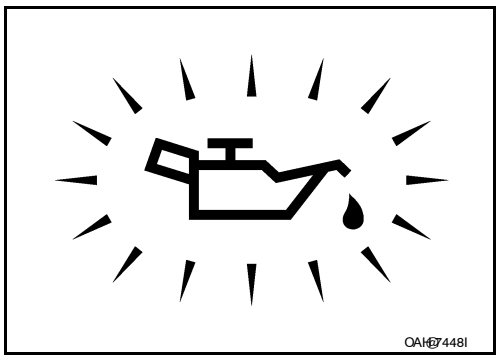
1.CHECK OIL PRESSURE WARNING LAMP

1. Start engine.
2. Check oil pressure warning lamp and confirm it is not illuminated.



OK or NG

OK >> GO TO 2.
KG >> Go to LU-7, "Inspection".

2.CHECK INTAKE VALVE TIMING CONTROL SOLENOID VALVE

Refer to EC-94, "Component Inspection".

OK or NG

OK >> GO TO 3.
NG >> Replace malfunctioning intake valve timing control solenoid valve.

3.CHECK CRANKSHAFT POSITION SENSOR (POS)

Refer to EC-209, "Component Inspection".

OK or NG

OK >> GO TO 4.
NG >> Replace crankshaft position sensor (POS).

4.CHECK CAMSHAFT POSITION SENSOR (PHASE)

Refer to EC-214, "Component Inspection".

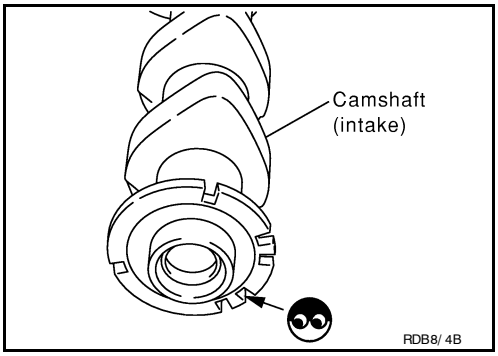
OK or NG

OK >> GO TO 5.
NG >> Replace malfunctioning camshaft position sensor (PHASE).

5.CHECK CAMSHAFT (INTAKE)

Check the following.

- Accumulation of debris on the signal plate of camshaft rear end
- Chipping signal plate of camshaft rear end



OK or NG

OK >> GO TO 6.
NG >> Remove debris and clean the signal plate of camshaft rear end or replace camshaft.

6. CHECK TIMING CHAIN INSTALLATION

Check service records for any recent repairs that may cause timing chain misalignment.
Are there any service records that may cause timing chain misalignment?

Yes or No

Yes >> Check timing chain installation. Refer to EM-60, "Removal and Installation".
No >> GO TO 7.

7. CHECK LUBRICATION CIRCUIT

Refer to EM-60, "Removal and Installation".

OK or NG

OK >> GO TO 8.
NG >> Clean lubrication line.

8. CHECK INTERMITTENT INCIDENT

Refer to GI-37, "Intermittent Incident".

>> **INSPECTION END**

Component Inspection

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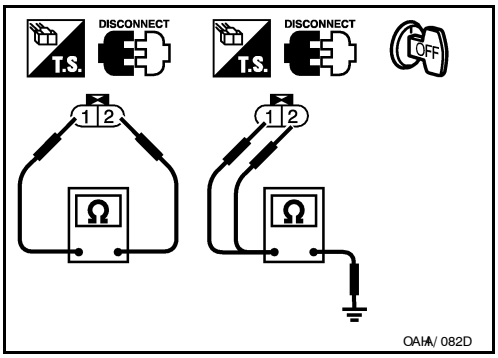
INTAKE VALVE TIMING CONTROL SOLENOID VALVE

1. Disconnect intake valve timing control solenoid valve harness connector.
2. Check resistance between intake valve timing control solenoid valve as follows.



Terminal	Resistance
1 and 2	7.0 - 7.7Ω at 20°C (68°F)
1 or 2 and ground	∞Ω (Continuity should not exist.)

If NG, replace intake valve timing control solenoid valve.
If OK, go to next step.

3. Remove intake valve timing control solenoid valve.

4. Provide 12V DC between intake valve timing control solenoid valve terminals and then interrupt it. Check that the plunger moves as shown in the figure.
CAUTION:
Never apply 12V DC continuously for 5 seconds or more. Doing so may result in damage to the coil in intake valve timing control solenoid valve.
If NG, replace intake valve timing control solenoid valve.
NOTE:
Always replace O-ring when intake valve timing control solenoid valve is removed.