

**NISSAN ALTIMA**

**MOTOR 3.5L VQ35DE**

**CODIGOS P0011 y P0021**

**IVTC**

**INTAKE VALVE TIMING CONTROL**

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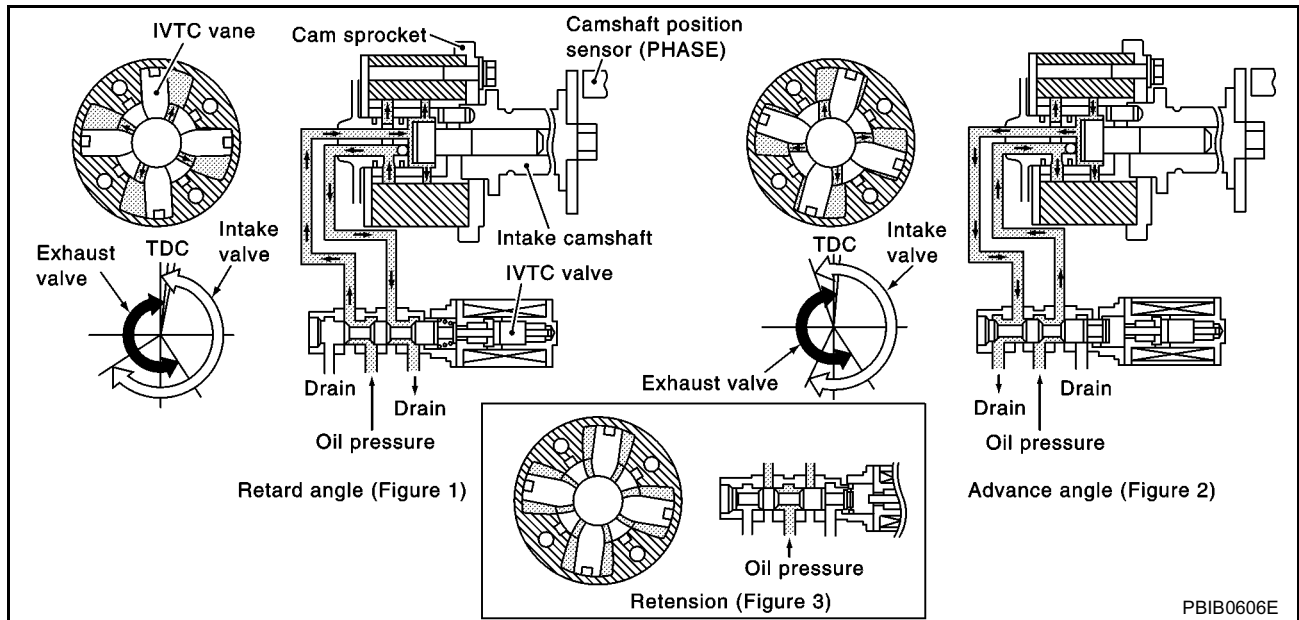
DTC P0011, P0021 IVT CONTROL

PFP:23796

Description  
SYSTEM DESCRIPTION

EBS00BSS

Sensor	Input signal to ECM	ECM function	Actuator
Crankshaft position sensor (POS)	Engine speed	Intake valve timing control	Intake valve timing control solenoid valve
Camshaft position sensor (PHASE)	Engine speed and piston position		
Engine coolant temperature sensor	Engine coolant temperature		
Vehicle speed sensor	Vehicle speed		



This mechanism hydraulically controls cam phases continuously with the fixed operating angle of the intake valve.

The ECM receives signals such as crankshaft position, camshaft position, engine speed, and engine coolant temperature. Then, the ECM sends ON/OFF pulse duty signals to the intake valve timing control solenoid valve depending on driving status. This makes it possible to control the shut/open timing of the intake valve to increase engine torque in low/mid speed range and output in high-speed range.

COMPONENT DESCRIPTION

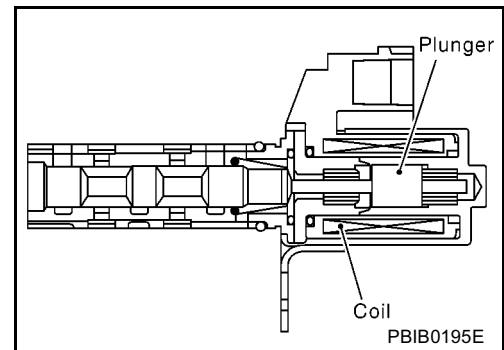
Intake valve timing control solenoid valve is activated by ON/OFF pulse duty (ratio) signals from the ECM.

The intake valve timing control solenoid valve changes the oil amount and direction of flow through intake valve timing control unit or stops oil flow.

The longer pulse width advances valve angle.

The shorter pulse width retards valve angle.

When ON and OFF pulse widths become equal, the solenoid valve stops oil pressure flow to fix the intake valve angle at the control position.



CONSULT-II Reference Value in Data Monitor Mode

EBS00BST

Specification data are reference values.

MONITOR ITEM	CONDITION	SPECIFICATION
INT/V TIM (B1) INT/V TIM (B2)	● Engine: After warming up ● Shift lever: N ● Air conditioner switch: OFF ● No-load	Idle -5° - 5°CA
	When revving engine up to 2,000 rpm quickly	Approx. 0° - 30°CA

# DTC P0011, P0021 IVT CONTROL

[VQ]

MONITOR ITEM	CONDITION		SPECIFICATION
INT/V SOL (B1) INT/V SOL (B2)	<ul style="list-style-type: none"> <li>● Engine: After warming up</li> <li>● Shift lever: N</li> </ul>	Idle	0% - 2%
	<ul style="list-style-type: none"> <li>● Air conditioner switch: OFF</li> <li>● No-load</li> </ul>	When revving engine up to 2,000 rpm quickly	Approx. 25% - 50%

## On Board Diagnosis Logic

EBS00CXB

These self-diagnoses have the one trip detection logic.

DTC No.	Trouble diagnosis name	Detecting condition	Possible cause
P0011 0011 (Bank 1)	Intake valve timing control performance	There is a gap between angle of target and phase-control angle degree.	<ul style="list-style-type: none"> <li>● Harness or connectors (Intake valve timing control solenoid valve circuit is open or shorted.)</li> </ul>
P0021 0021 (Bank 2)			<ul style="list-style-type: none"> <li>● Intake valve timing control solenoid valve</li> <li>● Crankshaft position sensor (POS)</li> <li>● Camshaft position sensor (PHASE)</li> <li>● Accumulation of debris to the signal pick-up portion of the camshaft</li> </ul>

## 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

EBS00BSW

### CAUTION:

Always drive at a safe speed.

### 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.

### TESTING CONDITION:

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

### WITH CONSULT-II

1. Turn ignition switch "ON".
2. Select "DATA MONITOR" mode with CONSULT-II.
3. Maintain the following conditions for at least 20 consecutive seconds.

ENG SPEED	1,700 - 3,175 rpm (A constant rotation is maintained.)
COOLANT TEMPS	70 - 105°C (176 - 194°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.)

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm
B/FUEL SCHDL	XXX msec
COOLAN TENP/S	XXX °C
VHCL SPEED SE	XXX km/h
INT/V TIM (B1)	XXX °CA
INT/V TIM (B2)	XXX °CA
INT/V SOL (B1)	XXX %
INT/V SOL (B2)	XXX %

SEF353Z

4. If the DTC is detected, go to [EC-779, "Diagnostic Procedure"](#).

### WITH GST

Follow the procedure "WITH CONSULT-II" above.



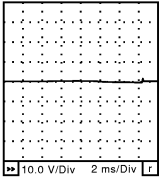
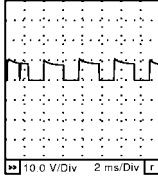
# DTC P0011, P0021 IVT CONTROL

[VQ]

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)
9	R/L	Intake valve timing control solenoid valve (bank 1)	<p>[Engine is running]</p> <ul style="list-style-type: none"> <li>● Warm-up condition</li> <li>● Idle speed</li> </ul>	<p>BATTERY VOLTAGE (11 - 14V)★</p>  <p style="text-align: right; font-size: small;">SEC988C</p>
			<p>[Engine is running]</p> <ul style="list-style-type: none"> <li>● Warm-up condition</li> <li>● Engine speed is 2,500 rpm</li> </ul>	<p>7 - 12V★</p>  <p style="text-align: right; font-size: small;">SEC989C</p>

★: Average voltage for pulse signal (Actual pulse signal can be confirmed by oscilloscope.)

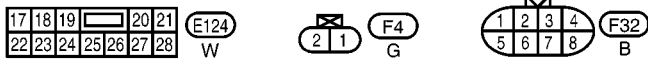
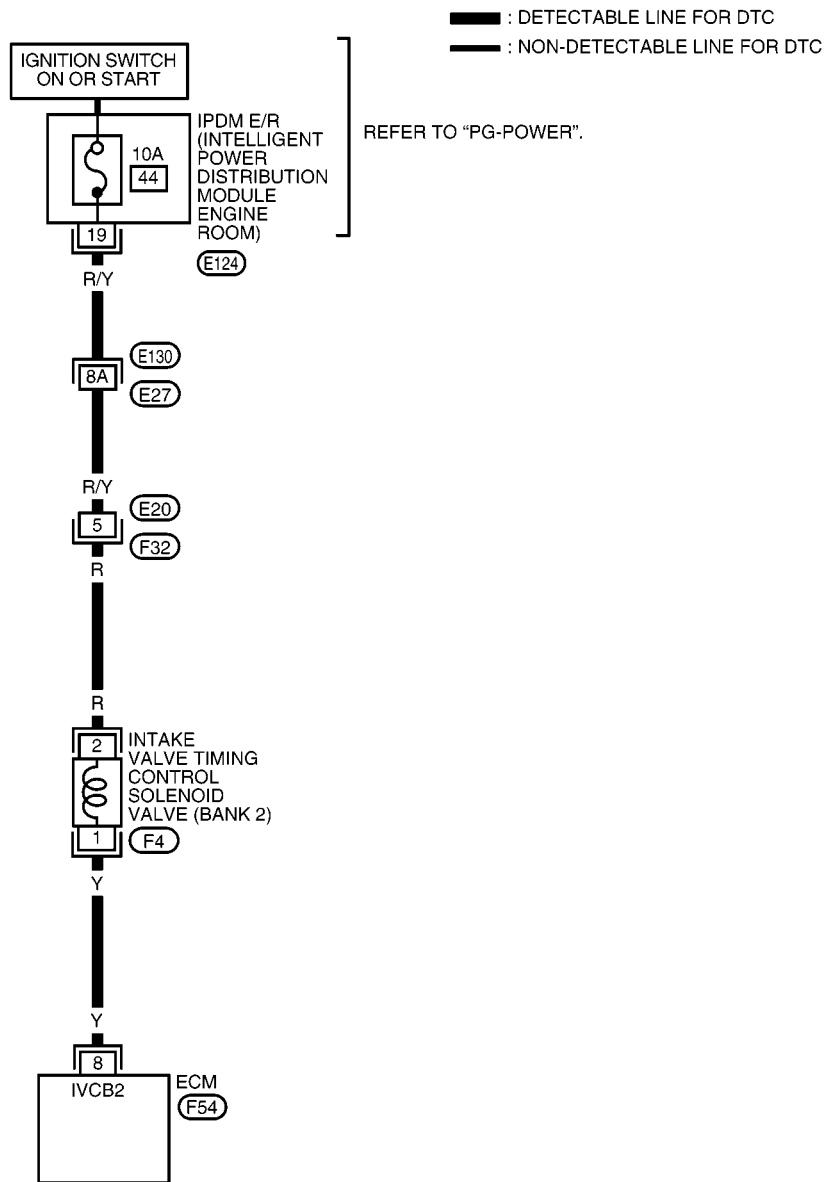
A  
EC  
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# DTC P0011, P0021 IVT CONTROL

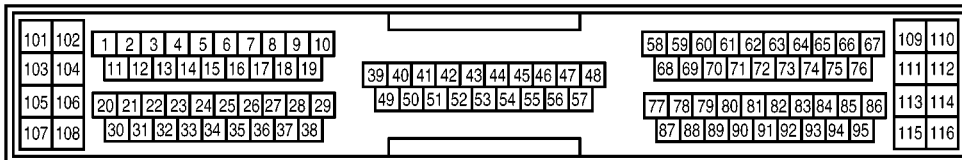
[VQ]

BANK 2

EC-IVCB2-01



REFER TO THE FOLLOWING.  
 (E130) - SUPER MULTIPLE JUNCTION (SMJ)



BBWA0078E

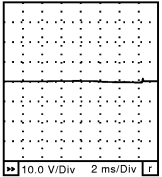
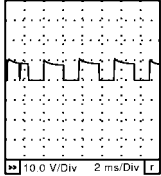
# DTC P0011, P0021 IVT CONTROL

[VQ]

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)
8	Y	Intake valve timing control solenoid valve (bank 2)	<p>[Engine is running]</p> <ul style="list-style-type: none"> <li>● Warm-up condition</li> <li>● Idle speed</li> </ul>	<p>BATTERY VOLTAGE (11 - 14V)★</p> 
			<p>[Engine is running]</p> <ul style="list-style-type: none"> <li>● Warm-up condition</li> <li>● Engine speed is 2,500 rpm</li> </ul>	<p>7 - 12V★</p> 

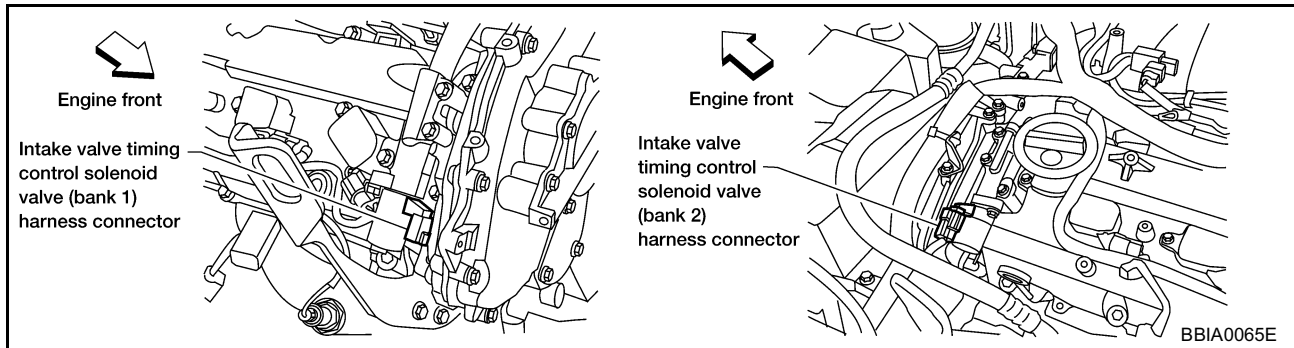
★: Average voltage for pulse signal (Actual pulse signal can be confirmed by oscilloscope.)

## Diagnostic Procedure

EBS00BSX

### 1. CHECK INTAKE VALVE TIMING CONTROL SOLENOID VALVE POWER SUPPLY CIRCUIT

1. Turn ignition switch "OFF".
2. Disconnect intake valve timing control solenoid valve harness connector.

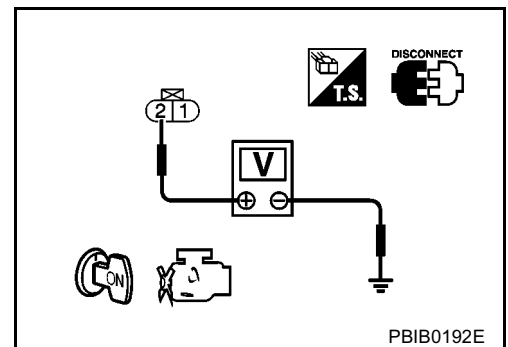


3. Turn ignition switch "ON".
4. Check voltage between intake valve timing control solenoid valve terminal 2 and ground with CONSULT-II or tester.

**Voltage: Battery voltage**

OK or NG

- OK >> GO TO 3.
- NG >> GO TO 2.



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## 2. DETECT MALFUNCTIONING PART

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Check the following.

- Harness connectors E130, E27
- Harness connectors E20, F32
- Harness connectors F44, F101
- IPDM E/R harness connector E124
- 10A fuse
- Harness for open or short between intake valve timing control solenoid valve and fuse

>> Repair harness or connectors.

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## 3. CHECK INTAKE VALVE TIMING CONTROL SOLENOID VALVE OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

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1. Turn ignition switch "OFF".
2. Disconnect ECM harness connector.
3. Check harness continuity between ECM terminal 9 (bank 1) or 8 (bank 2) and intake valve timing control solenoid valve terminal 1. Refer to Wiring Diagram.

**Continuity should exist.**

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

OK or NG

- OK >> GO TO 5.  
NG >> GO TO 4.

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## 4. DETECT MALFUNCTIONING PART

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Check the following.

- Harness connectors F44, F101
- Harness for open and short between ECM and intake valve timing control solenoid valve and fuse

>> Repair open circuit or short to ground or short to power in harness or connectors.

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## 5. CHECK INTAKE VALVE TIMING CONTROL SOLENOID VALVE

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Refer to [EC-781, "Component Inspection"](#) .

OK or NG

- OK >> GO TO 6.  
NG >> Replace intake valve timing control solenoid valve.

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## 6. CHECK CRANKSHAFT POSITION SENSOR (POS)

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Refer to [EC-953, "Component Inspection"](#) .

OK or NG

- OK >> GO TO 7.  
NG >> Replace crankshaft position sensor (POS).

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## 7. CHECK CAMSHAFT POSITION SENSOR (PHASE)

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Refer to [EC-961, "Component Inspection"](#) .

OK or NG

- OK >> GO TO 8.  
NG >> Replace camshaft position sensor (PHASE).



**8. CHECK CAMSHAFT**

Check accumulation of debris to the signal pick-up portion of the camshaft. Refer to [EM-135, "CAMSHAFT"](#) .

OK or NG

OK >> GO TO 9.

NG >> Remove debris and clean the signal pick-up cutout of camshaft.

**9. CHECK INTERMITTENT INCIDENT**

Refer to [EC-764, "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT"](#) .

For wiring diagram, refer to [EC-950](#) for CKP sensor (POS), and [EC-956](#) for CMP sensor (PHASE).

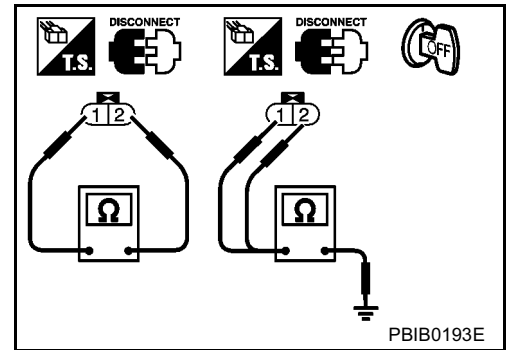
>> INSPECTION END

**Component Inspection  
INTAKE VALVE TIMING CONTROL SOLENOID VALVE**

EBS00D4K

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

Terminals	Resistance
1 and 2	7.0 - 7.5Ω at 20°C (68°F)
1 or 2 and ground	∞Ω (Continuity should not exist)



EBS00D4L

**Removal and Installation  
INTAKE VALVE TIMING CONTROL SOLENOID VALVE**

Refer to [EM-146, "TIMING CHAIN"](#) .