DTC	P0011/59	CAMSHAFT POSITION ”A” –TIMING OVER–ADVANCED OR SYSTEM PERFORMANCE (BANK 1)

DTC	P0012/59	CAMSHAFT POSITION ”A” –TIMING OVER–RETARDED (BANK 1)

CIRCUIT DESCRIPTION

Refer to DTC P0010 on page 05–38.

DTC No.	DTC Detection Condition	Trouble Area
P0011/59	Advanced cam timing: After engine is warmed up, valve timing does not change from current valve timing while driving at engine speed of 550 to 4,000 rpm (1 trip detection logic)	• Valve timing • Oil Control Valve (OCV) • Camshaft timing gear assy • ECM
P0012/59	Retarded cam timing: After engine is warmed up, valve timing does not change from current valve timing while driving at engine speed of 550 to 4,000 rpm (2 trip detection logic)	• Valve timing • OCV • Camshaft timing gear assy • ECM

WIRING DIAGRAM

Refer to DTC P0010 on page 05–38.

INSPECTION PROCEDURE

HINT:

Advanced timing over (Valve timing is out of specified range)	P0011
Retarded timing over (Valve timing is out of specified range)	P0012

- If DTC P0011 or P0012 is displayed, check the VVT system circuit.
- Read freeze frame data using the intelligent tester II. Freeze frame data record the engine condition when malfunctions are detected. When troubleshooting, freeze frame data can help determine if the vehicle was moving or stationary, if the engine was warmed up or not, if the air–fuel ratio was lean or rich, and other data from the time the malfunction occurred.

1	CHECK VALVE TIMING (See page 14–44)

(a) Check for looseness or a jumped tooth of the timing chain.
OK: The matchmarks of the crankshaft pulley and camshaft pulley are aligning.

NG → ADJUST VALVE TIMING (See page 14–44)

OK

2	PERFORM ACTIVE TEST USING INTELLIGENT TESTER II(OPERATE OCV)

(a) Start the engine and warm it up.
(b) Turn the ignition switch to OFF.
(c) Connect the intelligent tester II to the DLC3.
(d) Turn the ignition switch to ON and turn the intelligent tester ll ON.
(e) Select the following menu items: Powertrain / Engine and ECT / Active Test / Activate the VVT System (Bank 1).
(f) Check the engine speed when operating the OCV using the intelligent tester II.
OK:

Tester Operation	Specified Condition
OCV is OFF	Normal engine speed
OCV is ON	Rough idling or engine stalling

NG → **Go to step 4**

OK

3	CHECK IF DTC OUTPUT RECURS(DTC P0011 OR P0012)

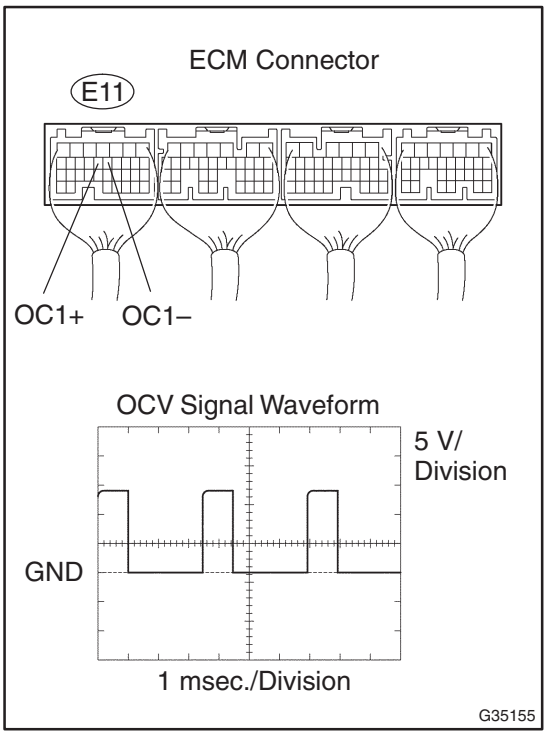
(a) Connect the intelligent tester II to the DLC3.
(b) Turn the ignition switch to ON and turn the intelligent tester ll ON.
(c) Clear DTCs using the intelligent tester II (see page 05–18).
(d) Start the engine and warm it up.
(e) Switch the ECM from normal mode to check mode using the intelligent tester II (see page 05–21).
(f) Drive the vehicle for 10 minutes or more.
(g) Read output DTCs using the intelligent tester II.
OK: No DTC output.

OK → **VVT SYSTEM OK**

HINT:
DTC P0011 or P0012 may be set when foreign objects in the engine oil are caught in some parts of the system. The DTC will remain set even if the system returns to normal after a short time. Foreign objects are filtered out by the oil filter.

NG

4	INSPECT ECM(OCV SIGNAL)



(a) Inspect the ECM using the oscilloscope.
(b) While idling, check the waveform between the terminals of the E11 ECM connector.

OK:

Tester Connection	Specified Condition
OC1+ (E11–13) – OC1– (E11–12)	Correct waveform is as shown on the left

NG → **REPLACE ECM (See page 10–12)**

OK

5	INSPECT OIL CONTROL VALVE FILTER

OK: The filter is not clogged.

NG → **REPLACE OIL CONTROL VALVE FILTER**

OK

6	INSPECT CAMSHAFT TIMING OIL CONTROL VALVE ASSY(OCV) (See page 10–3)

OK: The OCV has no contamination and moves smoothly.

OK → **Go to step 8**

NG

7	REPLACE CAMSHAFT TIMING OIL CONTROL VALVE ASSY(OCV)

NEXT

8	INSPECT CAMSHAFT TIMING GEAR ASSY (See page 14–59)

OK: The camshaft timing gear rotates smoothly when applying pressure.

OK	Go to step 10

NG

9	REPLACE CAMSHAFT TIMING GEAR ASSY

NEXT

10	CHECK FOR BLOCKAGE(OCV, OIL CHECK VALVE AND OIL HOLE)

OK: No blockage.

NG	REPAIR OR REPLACE

OK

11	CHECK IF DTC OUTPUT RECURS(DTC P0011 OR P0012)

(a) Connect the intelligent tester II to the DLC3.
(b) Turn the ignition switch to ON and turn the intelligent tester ll ON.
(c) Clear DTCs using the intelligent tester II (see page 05–18).
(d) Start the engine and warm it up.
(e) Switch the ECM from normal mode to check mode using the intelligent tester II (see page 05–21).
(f) Drive the vehicle for 10 minutes or more.
(g) Read output DTCs using the intelligent tester II.
OK: No DTC output.

OK	VVT SYSTEM OK

HINT:
DTC P0011 or P0012 may be set when foreign objects in the engine oil are caught in some parts of the system. The DTC will remain set even if the system returns to normal after a short time. Foreign objects are filtered out by the oil filter.

NG

REPLACE ECM (See page 10–12)