

DTC	P1349	VVT SYSTEM MALFUNCTION (BANK 1)
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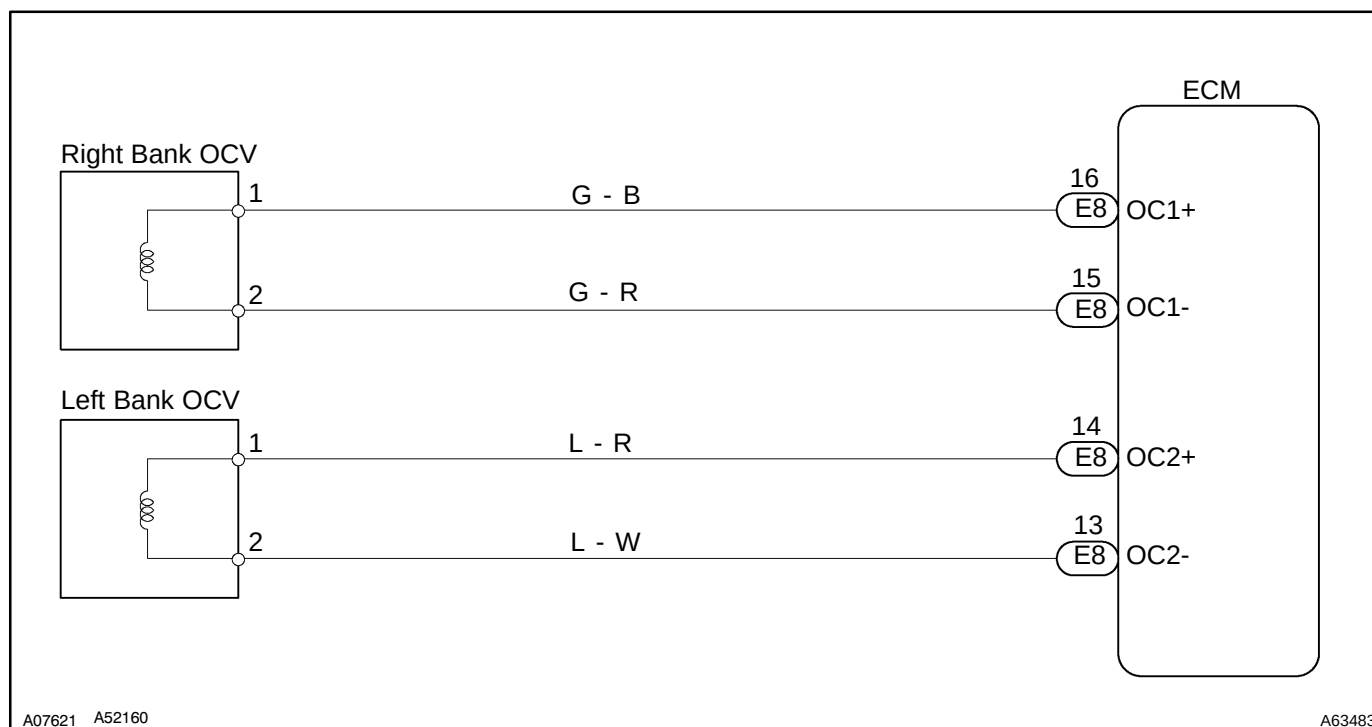
DTC	P1354	VVT SYSTEM MALFUNCTION (BANK 2)
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CIRCUIT DESCRIPTION

The VVT system constantly adjusts intake valve timing based upon operating conditions. The ECM controls the Oil Control Valve (OCV) with a variable duty cycle. The Oil Control Valve then supplies oil to the advance or retard side of the VVT controller. The oil applied to the VVT controller will cause the intake cam to advance or retard depending on the position of the Oil Control Valve. The ECM verifies that the desired camshaft angle has been achieved by monitoring the camshaft position sensor.

DTC No.	DTC Detecting Condition	Trouble Area
P1349 P1354	Condition (a) or (b) continues for after the engine is warmed up and engine speed at 400 - 4,000 rpm: (a) Valve timing does not change from of current valve timing (b) Current valve timing is fixed	• Valve timing • OCV • VVT controller assy • ECM

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:

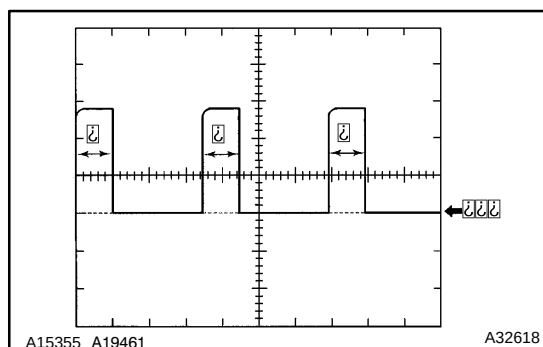
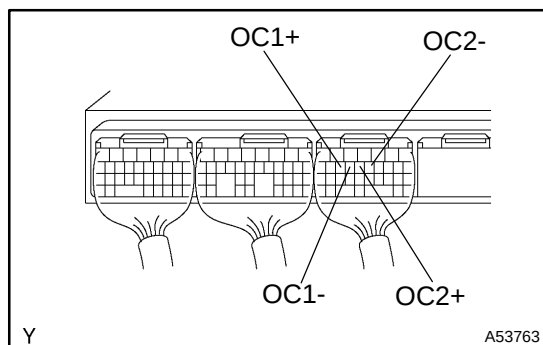
- If DTC P1349 is displayed, check right bank VVT system circuit.
- If DTC P1354 is displayed, check left bank VVT system circuit.
- Read freeze frame data using hand-held tester or OBD II scan tool. Because freeze frame records the engine conditions when the malfunction is detected. When troubleshooting, it is useful for determining whether the vehicle was running or stopped, the engine was warmed up or not, the air-fuel ratio was lean or rich, etc. at the time of the malfunction.

Hand-held Tester:**1 CHECK VALVE TIMING****NG****REPAIR VALVE TIMING****OK****2 PERFORM ACTIVE TEST BY OBD II SCAN TOOL OR HAND-HELD TESTER (OCV)**

- (a) Warm up the engine.
- (b) Select ACTIVE TEST on the hand-held tester.
- (c) Check the engine speed when the OCV is made to operate by the hand-held tester.

Engine speed:**OCV is OFF: Normal engine speed****OCV is ON: Rough idle or engine stall****HINT:**

DTCs 1349 and P1354 are also output after the foreign object is caught in some part of the system in the engine oil and the system returns to normal in a short time. As ECM operates so that foreign objects are ejected, there is no problem about VVT. There is also no problem since the oil filter should get the foreign object in the engine oil.

OK**VVT SYSTEM OK****NG****3 INSPECT ECM**

- (a) Check the output waveform.

HINT:

Using the oscilloscope function of hand-held tester, it is possible to check the function between the ECM and the knock control sensor.

- (1) Connect hand-held tester between the terminals OC1+ and OC1- of the ECM.
- (2) Connect hand-held tester between the terminals OC2+ and OC2- of the ECM.
- (3) Select oscilloscope function.
- (4) Turn the ignition switch ON and check the waveform at the engine stop.

Item	Contents
Terminal	OC1+ ↔ OC1-, OC2+ ↔ OC2-
Equipment Set	5V/DIV, 1ms/DIV
Condition	The engine stops, IG switch ON

HINT:

The waveform shown in the illustration is an example without noise and chattering.

NG**CHECK AND REPLACE ECM****OK**

4 INSPECT CAMSHAFT TIMING GEAR ASSY

- (a) Remove the timing belt.
- (b) Remove the cylinder head cover.
- (c) Remove the OCV.
- (d) Drain oil into the VVT controller assembly.
- (e) Check whether the oil into VVT controller assembly is drained or not.

Result: The oil into VVT controller assembly is drained.

NG

REPLACE VVT CONTROLLER ASSEMBLY, AND THEN GO TO NEXT STEP

OK

5 INSPECT OCV (See page 10-2)

NG

REPLACE OCV, AND THEN GO TO NEXT STEP

OK

6 CHECK BLOCKAGE OF OCV, OIL CHECK VALVE AND OIL PIPE NO.1

NG

REPAIR OR REPLACE

OK

7 CHECK WHETHER OR NOT DTC P1349/P1354 IS STORED

- (a) Clear the DTC (See page 05-5).
- (b) Perform simulation test.
- (c) Check whether or not DTC P1349/P1354 is stored.

Result: DTC P1349/P1354 is not stored.

HINT:

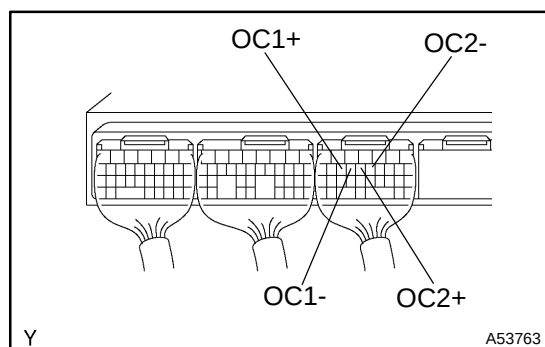
DTCs P1349 and P1354 are also output after the foreign object is caught in some part of the system in the engine oil and the system returns to normal in a short time. As ECM controls so that foreign objects are ejected, there is no problem about VVT. There is also no problem since the oil filter should get the foreign object in the engine oil.

OBDII scan tool (excluding Hand-held Tester):**1 CHECK VALVE TIMING (See page 14-75)****NG****REPAIR VALVE TIMING****OK****2 CHECK OPERATION OF OCV**

- (a) Check the engine speed when disconnecting the OCV connector.
 (b) Check the engine speed when applying battery positive voltage between the terminals of the OCV.

Result:

Result	Check (a)	Check (b)
A	Normal engine speed	Rough idle or engine stall
B	Except 1	Except 1

B**Go to step 4****A****3 INSPECT ECM**

- (a) Check the output waveform.
- (1) Turn the ignition switch ON.
 - (2) Check the waveform between terminals OC1+ and OC1- of the ECM connector.
 - (3) Check the waveform between terminals OC2+ and OC2- of the ECM connector.

Item	Contents
Terminal	OC1+ ↔ OC1-, OC2+ ↔ OC2-
Equipment Set	5V/DIV, 1ms/DIV
Condition	The engine stops, IG switch ON

HINT:

- The correct waveform is as shown.
- DTCs P1349 and P1354 are also output after the foreign object is caught in some part of the system in the engine oil and the system returns to normal in a short time. As ECM controls so that foreign objects are ejected, there is no problem about VVT. There is also no problem since the oil filter should get the foreign object in the engine oil.

OK**VVT SYSTEM OK****NG****CHECK AND REPLACE ECM**

4	INSPECT CAMSHAFT TIMING GEAR ASSY (See step 4 Hand-held Tester)
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NG

REPLACE VVT CONTROLLER ASSEMBLY, AND
THEN GO TO NEXT STEP

OK

5	INSPECT OCV (See page 10-2)
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NG

REPLACE OCV, AND THEN GO TO NEXT STEP

OK

6	CHECK BLOCKAGE OF OCV, OIL CHECK VALVE AND OIL PIPE NO.1
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NG

REPAIR OR REPLACE

OK

7	CHECK WHETHER OR NOT DTC P1349/P1354 IS STORED (See step 7 Hand-held Tester)
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OK

VVT SYSTEM OK

NG

CHECK AND REPLACE ECM
