

DTC	P1346/18	VVT Sensor Malfunction
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DTC	P1349/59	VVT System Malfunction
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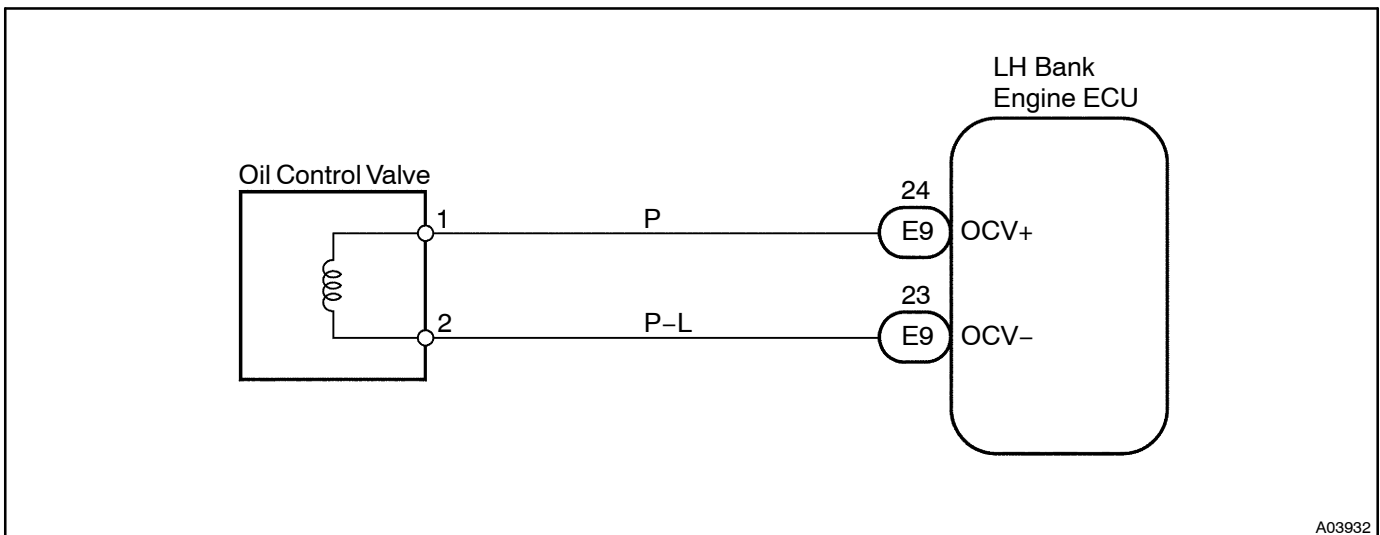
CIRCUIT DESCRIPTION

VVT system controls the intake valve timing to proper timing in response to driving condition.

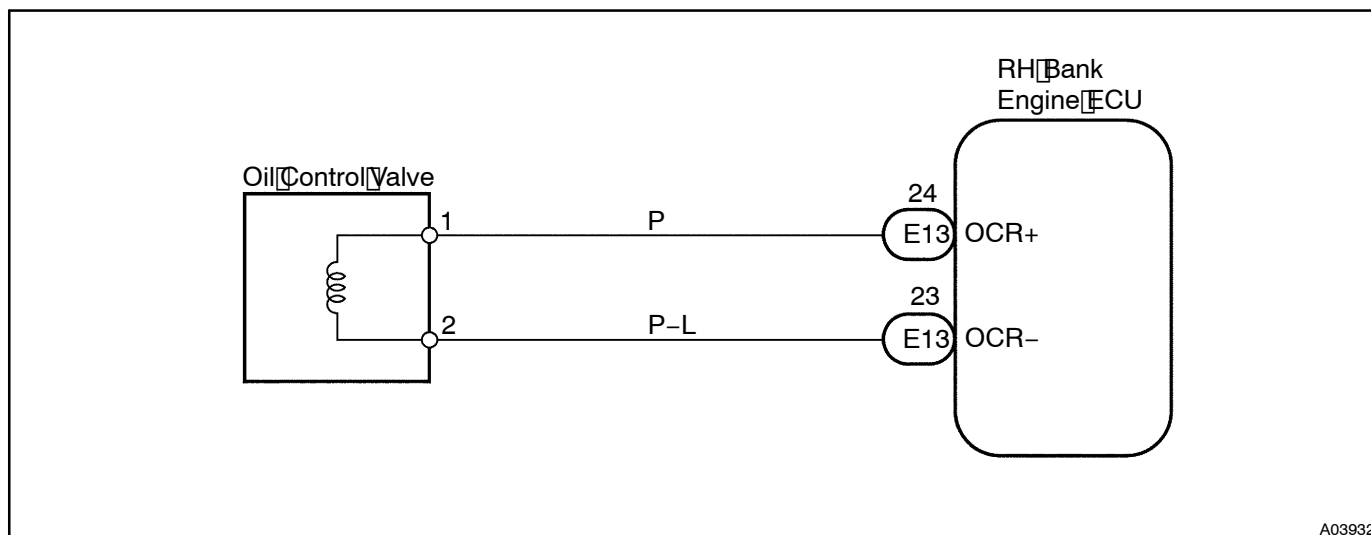
ECU controls OCV (Oil Control Valve) to make the intake valve timing properly, and, oil pressure controlled with OCV is supplied to the VVT controller, and then, VVT controller changes relative position between the camshaft and the crankshaft.

DTC No.	DTC Detecting Condition	Trouble Area
P1346/18	When retard of VVT is out of upper limit (49°) or lower limit (20°) for 5 secs. or more.	<ul style="list-style-type: none"> • Valve timing • Oil control valve • VVT controller assembly • Engine ECU
P1349/59	<p>When advance angle of VVT is more than 63.5° continuously for 5 secs. Or more and even though control to prevent a foreign object from being caught is performed, symptom is not fixed.</p> <p>Conditions (a) or (b) continues for 5 secs. or more:</p> <p>(a) When the condition that the difference between the objected value and the actual advance angle is more than 10° CA continues.</p> <p>(b) Advance angle of VVT does not change from current advance angle.</p>	

WIRING DIAGRAM



A03932



INSPECTION PROCEDURE

HINT:

- LH and RH bank engine ECU detect this DTC code respectively. The inspection procedures are same for both LH and RH bank engine ECU and described in this manual. Even though terminal name and part name on the side of RH bank are described in parenthesis, perform the inspection for only ECU that has detected DTC.
- If DTC P1349/59 is displayed, check left bank VVT system circuit.
- Read freeze frame data using hand-held tester. 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 warmed up or hot, the air-fuel ratio lean or rich, etc. at the time of the malfunction.

When using hand-held tester

1	Check valve timing (See page EM-14).
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NG

Repair valve timing.

OK

2 Check operation of OCV.

PREPARATION:

- Start the engine and warm it up.
- Connect the hand-held tester and select VVT from ACTIVE TEST menu.

CHECK:

Check the engine speed when operate the OCV by the hand-held tester.

OK:

OCV is OFF:

Normal engine speed

OCV is ON:

Rough idle or engine stall

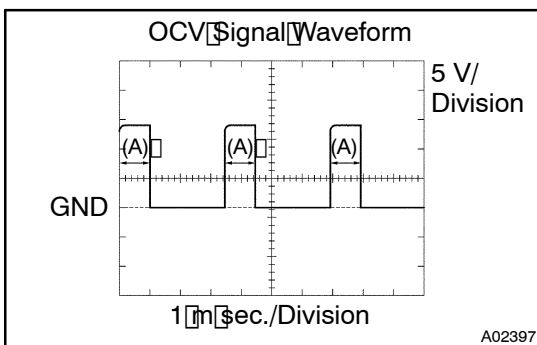
OK

VVT system is OK.*

*: DTC P1349 is 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 engine ECU 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.

NG

3 Check voltage between terminals OCV+ and OCV- of engine ECU connector.



Reference: INSPECTION USING OSCILLOSCOPE

Turn the ignition switch ON, check waveform between terminals OCV+ and OCV- of the engine ECU connector.

HINT:

- The correct waveform is as shown.
- The waveform frequency (A) is lengthened as the engine speed becomes higher.

NG

Check and replace engine ECU
(See page N-20).

OK

4 Check VVT controller assembly.



PREPARATION:

- (a) Remove the cylinder head cover.
- (b) Remove the timing chain (See page EM-14).
- (c) Remove the oil control valve.
- (d) Drain oil into the VVT controller assembly (See page EM-14).

CHECK:

Check whether the oil into VVT controller assembly is drained or not.

OK:

The oil into VVT controller assembly is drained.

NG

Replace VVT controller assembly, and then go to step 5.

OK

5 Check oil control valve (See page EM-41).

NG

Replace oil control valve, and then go to step 6.

OK

6 Check blockage of oil control valve, oil check valve and oil pipe No.1.

NG

Repair or replace.

OK

7 Check whether or not DTC P1349 is stored.

PREPARATION:

- (a) Clear the DTC (See page DI-4)
- (b) Perform simulation test.

CHECK:

Check whether or not DTC P1349 is stored (See page DI-4)

OK:

DTC P1349 is not stored

OK

VVT system is OK.*

*: DTC P1349 is 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 engine ECU 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.

NG

Replace engine ECU

When not using hand-held tester

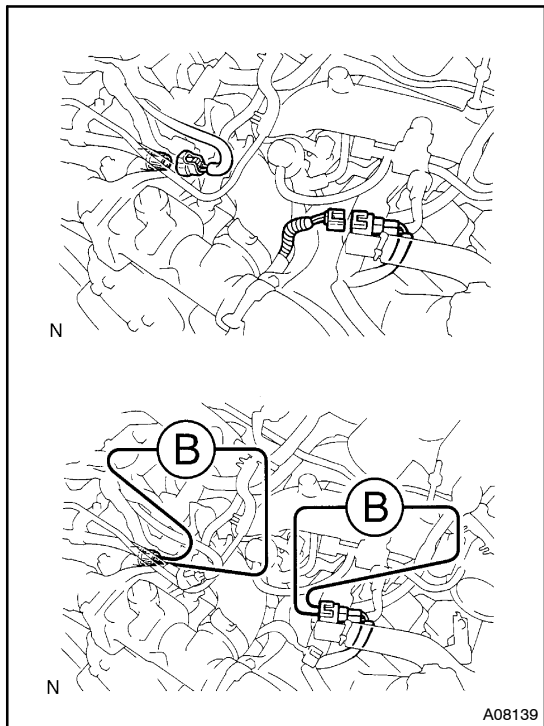
1 Check valve timing (See page EM-14)

NG

Repair valve timing.

OK

2 Check operation of OCV.



PREPARATION:

Start the engine.

CHECK:

- Check the engine speed when disconnect the OCV connector.
- Check the engine speed when apply battery voltage to the OCV connector.

RESULT:

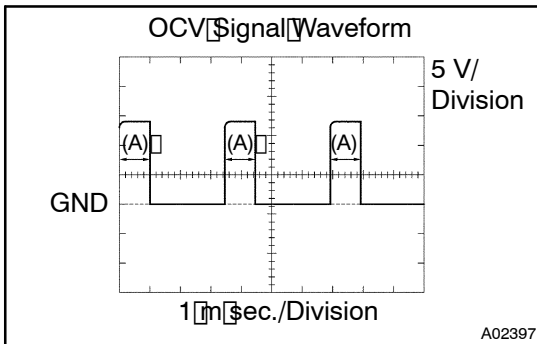
Result	Check (a)	Check (b)
1	Normal engine speed	Rough idle or engine stall
2	Except 1	

2

Go to step 4.

1

3 Check voltage between terminals OCV+ and OCV- of engine ECU connector.



Reference: INSPECTION USING OSCILLOSCOPE

Turn the ignition switch ON, check waveform between terminals OCV+ and OCV- of the engine ECU connector.

HINT:

- The correct waveform is as shown.
- The waveform frequency (A) is lengthened as the engine speed becomes higher.

OK

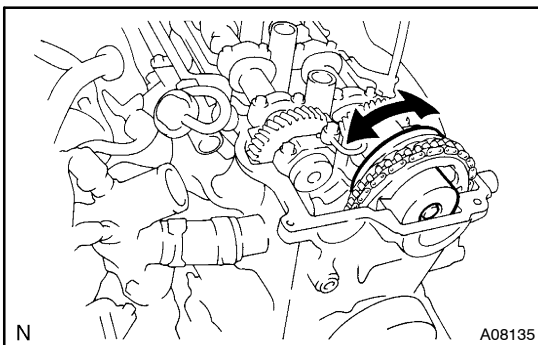
VVT system is OK.*

*: DTC P1349 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 engine ECU 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.

NG

Check and replace engine ECU (See page IN-20).

4 Check VVT controller assembly.



PREPARATION:

- Remove the cylinder head cover.
- Remove the timing chain (See page EM-14).
- Remove the oil control valve.
- Drain oil into the VVT controller assembly (See page EM-14).

CHECK:

Check whether the oil into VVT controller assembly is drained or not.

OK:

The oil into VVT controller assembly is drained.

NG

Replace VVT controller assembly, and then go to step 5.

OK

5 Check oil control valve (See page FI-35).

NG

Replace oil control valve, and then go to step 6.

OK

6 Check blockage of oil control valve, oil check valve and oil pipe No.1.

NG

Repair or replace.

OK

7 Check whether or not DTC P1349 is stored.

PREPARATION:

- (a) Clear the DTC (See page DI-4)
- (b) Perform simulation test.

CHECK:

Check whether or not DTC P1349 is stored (See page DI-4)

OK:

DTC 59 is not stored

OK

VVT system is OK.*

*: DTC P1349 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 engine ECU 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.

NG

Replace engine ECU