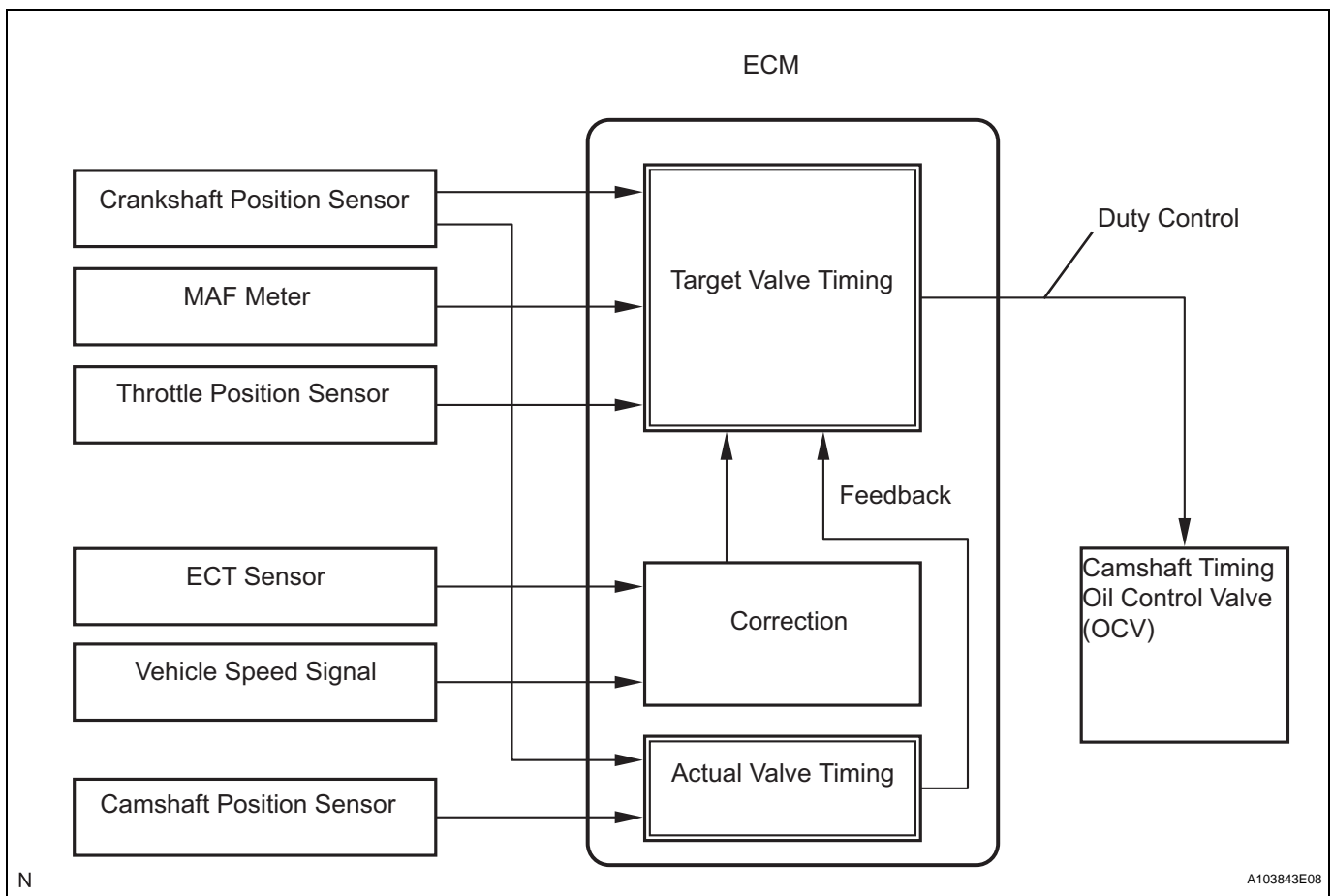


DTC**P0010****Camshaft Position "A" Actuator Circuit (Bank 1)****DESCRIPTION**

The Variable Valve Timing (VVT) system includes the ECM, OCV and VVT controller. The ECM sends a target duty-cycle control signal to the OCV. This control signal regulates the oil pressure supplied to the VVT controller. Camshaft timing control is performed according to engine operating conditions such as the intake air volume, throttle valve position and engine coolant temperature. The ECM controls the OCV, based on the signals transmitted by several sensors. The VVT controller regulates the intake camshaft angle using oil pressure through the OCV. As a result, the relative positions of the camshaft and crankshaft are optimized, the engine torque and fuel economy improve, and the exhaust emissions decrease under overall driving conditions. The ECM detects the actual intake valve timing using signals from the camshaft and crankshaft position sensors, and performs feedback control. This is how the target intake valve timing is verified by the ECM.

ES

DTC No.	DTC Detection Conditions	Trouble Areas
P0010	Open or short in OCV circuit (1 trip detection logic)	<ul style="list-style-type: none"> • Open or short in OCV circuit • OCV • ECM

HINT:

This DTC relates to the Oil Control Valve (OCV).

MONITOR DESCRIPTION

The ECM optimizes the valve timing using the VVT system to control the intake camshaft. The VVT system includes the ECM, the OCV and the VVT controller. The ECM sends a target duty-cycle control signal to the OCV. This control signal regulates the oil pressure supplied to the VVT controller. The VVT controller can advance or retard the intake camshaft.

After the ECM sends the target duty-cycle control signal to the OCV, the ECM monitors the OCV current to establish an actual duty-cycle. The ECM determines the existence of a malfunction and sets the DTC when the actual duty-cycle ratio varies from the target duty-cycle ratio.

MONITOR STRATEGY

Related DTCs	P0010: VVT OCV range check
Required Sensors/Components (Main)	VVT OCV
Required Sensors/Components (Related)	-
Frequency of Operation	Continuous
Duration	1 second
MIL Operation	Immediate
Sequence of Operation	None

TYPICAL ENABLING CONDITIONS

Monitor runs whenever following DTCs not present	None
All of following conditions met	-
Starter	OFF
Ignition switch	ON
Time after ignition switch OFF to ON	0.5 seconds or more

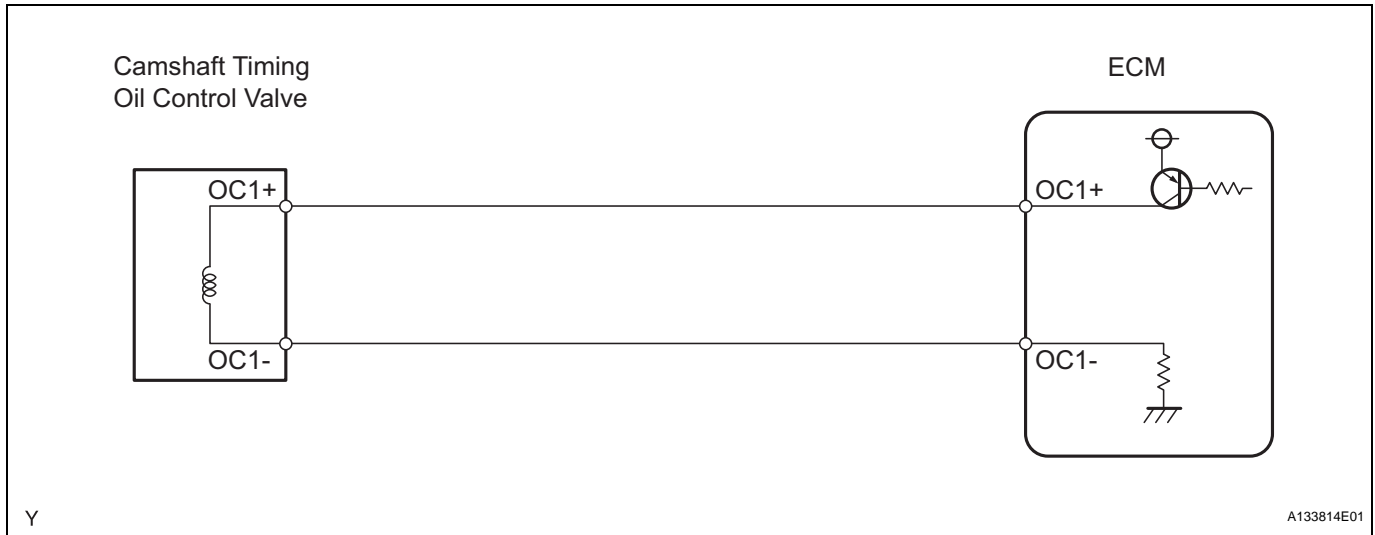
TYPICAL MALFUNCTION THRESHOLDS

One of following conditions met	-
A. All of following conditions met	-
Battery voltage	11 to 13 V
Target duty ratio	Less than 70 %
Output signal duty ratio	100 %
B. All of following conditions met	-
Battery voltage	13 V or more
Target duty ratio	Less than 80 %
Output signal duty ratio	100 %
C. Both of following conditions met	-
Current cut status	Not cut
Output signal duty ratio	3 % or less

COMPONENT OPERATING RANGE

VVT OCV duty ratio	3 to 100 %
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WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:

Read freeze frame data using the intelligent tester. Freeze frame data records 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

PERFORM ACTIVE TEST USING INTELLIGENT TESTER (OPERATE OCV)

- Connect the intelligent tester to the DLC3.
- Start the engine and turn the tester ON.
- Warm up the engine.
- On the tester, select the following menu items:
DIAGNOSIS / ENHANCED OBD II / ACTIVE TEST / VVT CTRL B1.
- Check the engine speed while operating the Oil Control Valve (OCV) using the tester.

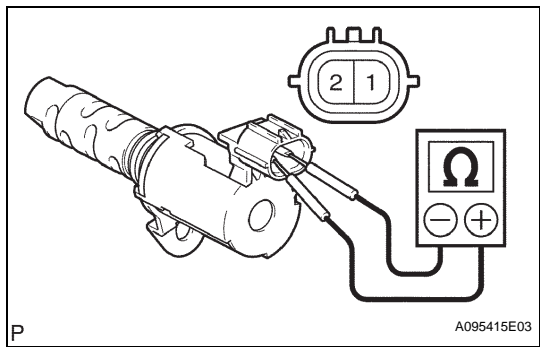
OK

Tester Operations	Specified Conditions
OCV OFF	Normal engine speed
OCV ON	Engine idles roughly or stalls (soon after OCV switched from OFF to ON)

OK
CHECK FOR INTERMITTENT PROBLEMS
NG
ES

2

INSPECT CAMSHAFT TIMING OIL CONTROL VALVE ASSEMBLY



- (a) Disconnect the B17 OCV connector.
(b) Measure the resistance between the terminals of the OCV.
Standard resistance:
6.9 to 7.9 Ω at 20°C (68°F)
(c) Reconnect the OCV connector.

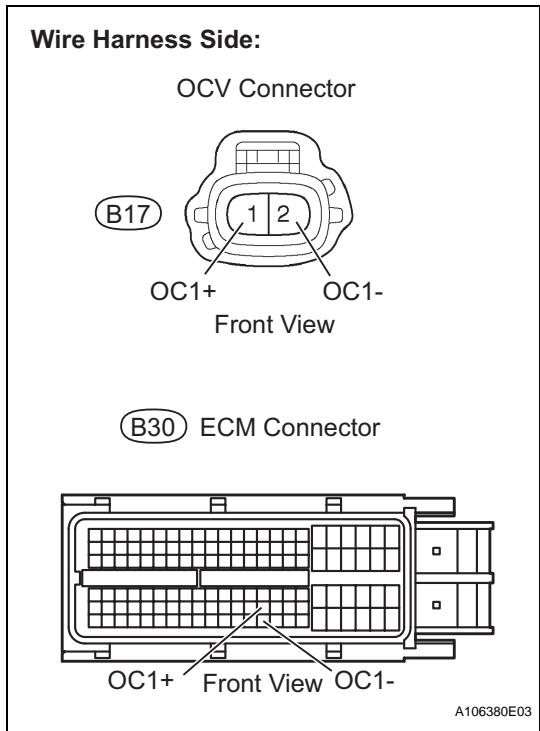
NG

REPLACE CAMSHAFT TIMING OIL CONTROL VALVE ASSEMBLY

OK

3

CHECK HARNESS AND CONNECTOR (OCV - ECM)



- (a) Disconnect the B17 OCV connector.
(b) Disconnect the B30 ECM connector.
(c) Measure the resistance of the wire harness side connectors.

Standard resistance (check for open)

Tester Connections	Specified Conditions
B17-1 (OC1+) - B30-100 (OC1+)	Below 1 Ω
B17-2 (OC1-) - B30-123 (OC1-)	Below 1 Ω

Standard resistance (check for short)

Tester Connections	Specified Conditions
B17-1 (OC1+) or B30-100 (OC1+) - Body ground	10 k Ω or higher
B17-2 (OC1-) or B30-123 (OC1-) - Body ground	10 k Ω or higher

- (d) Reconnect the OCV connector.
(e) Reconnect the ECM connector.

NG

REPAIR OR REPLACE HARNESS OR CONNECTOR

OK

REPLACE ECM