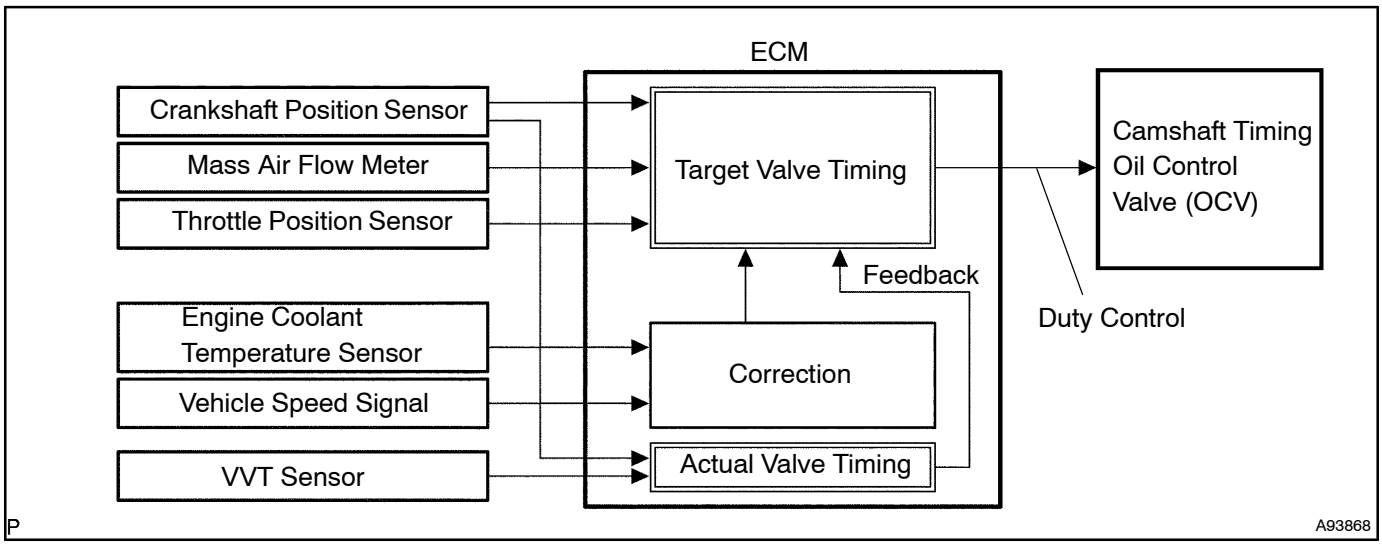
DTC	P0010	CAMSHAFT POSITION ”A” ACTUATOR CIRCUIT (BANK 1)

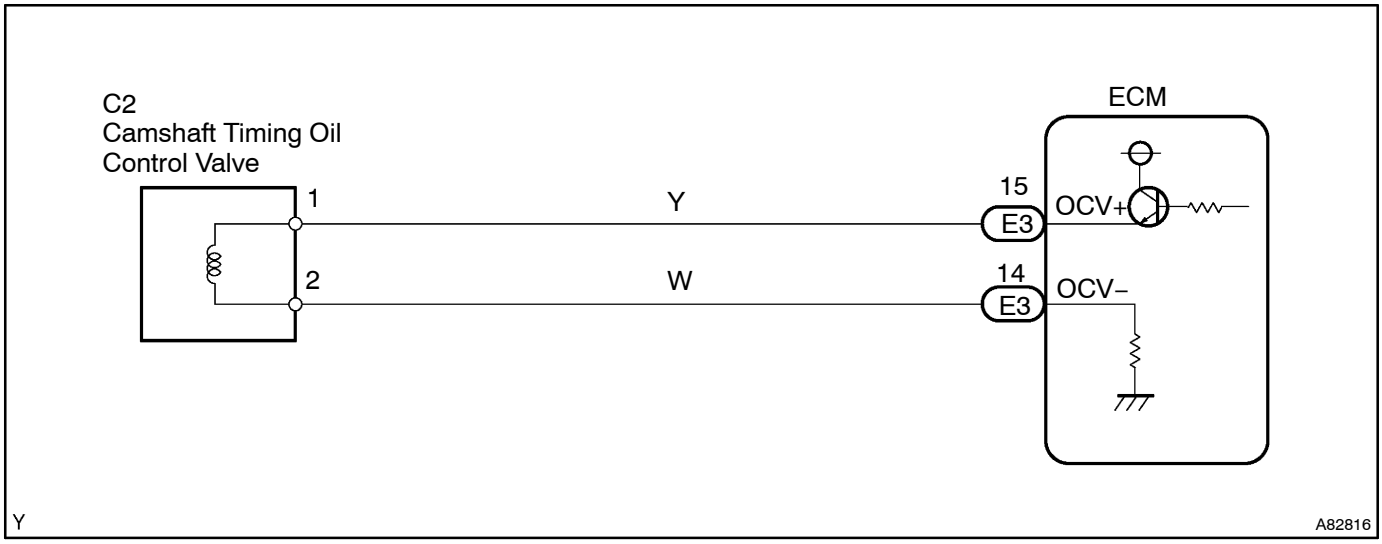
CIRCUIT DESCRIPTION

The Variable Valve Timing (VVT) system includes the ECM, the Oil Control Valve (OCV) and the VVT controller. The ECM sends a target ”duty–cycle” control signal to the OCV. This control signal, applied to the OCV, regulates the oil pressure supplied to the VVT controller. Camshaft timing control is performed based on engine operation condition such as intake air volume, throttle position and engine coolant temperature.
The ECM controls the OCV based on the signals from several sensors. The VVT controller regulates the intake camshaft angle using oil pressure through the OCV. As result, the relative position between the camshaft and the crankshaft is optimized, the engine torque and fuel economy improve, and exhaust emissions decrease. The ECM detects the actual valve timing using signals from the camshaft position sensor and the crankshaft position sensor. The ECM performs feedback control and verifies target valve timing.



DTC No.	DTC Detection Condition	Trouble Area
P0010	Open or short in oil control valve circuit	• Open or short in oil control valve circuit • Oil control valve • ECM

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:
Read freeze frame data using the intelligent tester II. Freeze frame data records the engine condition when malfunction is detected. When troubleshooting, freeze frame data can help determine if the vehicle was running or stopped, 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 BY INTELLIGENT TESTER II (OPERATE OCV)

(a) Connect the intelligent tester II to the DLC3.
(b) Turn the power switch ON (IG).
(c) Turn the intelligent tester II ON.
(d) Put the engine in inspection mode (see page 05–1).
(e) Start the engine and warm it up.
(f) Select the item: Powertrain / Engine and ECT / Active Test / Activate the VVT System (Bank 1).
(g) Using the intelligent tester II, operate the OCV and check the engine speed.
Standard:

Tester Operation	Specified Condition
OCV is OFF	Normal engine speed
OCV is ON	Rough idle or engine stall

NOTICE:
Do not drive the vehicle without deactivating inspection mode, otherwise damaging the transaxle may result.

OK → **CHECK FOR INTERMITTENT PROBLEMS (See page 05–14)**

NG

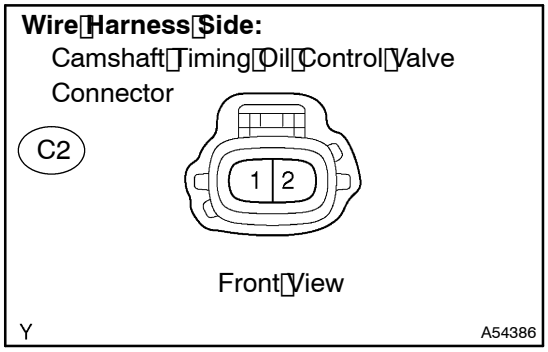
2	INSPECT CAMSHAFT TIMING OIL CONTROL VALVE ASSY(OCV) (See page 10–5)

OK: OCV has no contamination and moves smoothly.

NG → **REPLACE CAMSHAFT TIMING OIL CONTROL VALVE ASSY**

OK

3	CHECK HARNESS AND CONNECTOR (CAMSHAFT TIMING OIL CONTROL VALVE (OCV) – ECM)



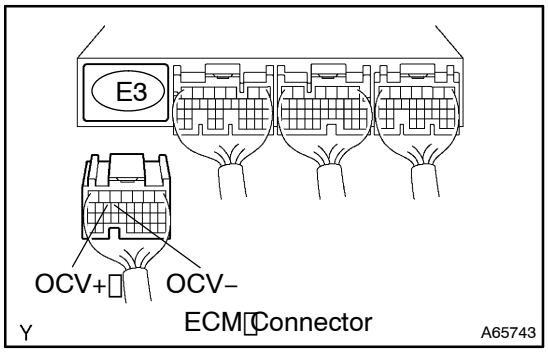
(a) Disconnect the C2 camshaft timing oil control valve connector.
(b) Disconnect the E3 ECM connector.
(c) Check the resistance between the wire harness side connectors.

Standard (Check for open):

Tester Connection	Specified Condition
Oil control valve (C2–1) – OCV+ (E3–15)	Below 1 Ω
Oil control valve (C2–2) – OCV– (E3–14)	Below 1 Ω

Standard (Check for short):

Tester Connection	Specified Condition
Oil control valve (C2–1) or OCV+ (E3–15) – Body ground	10 kΩ or higher
Oil control valve (C2–2) or OCV– (E3–14) – Body ground	10 kΩ or higher

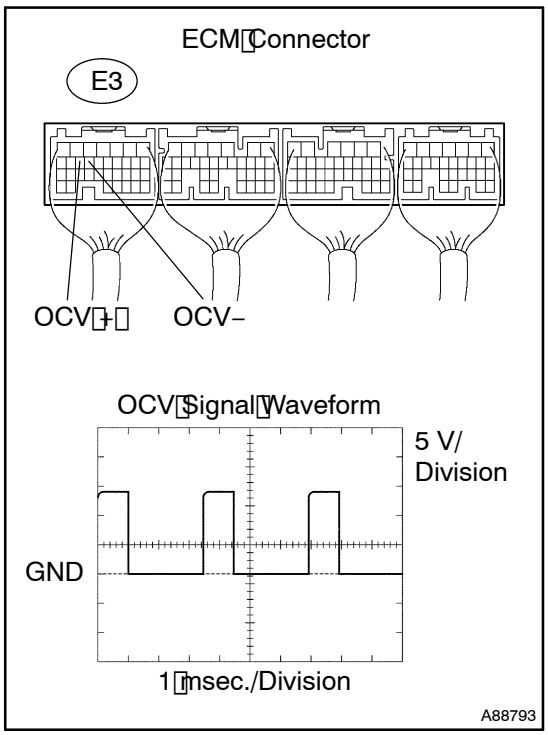


(d) Reconnect the camshaft timing oil control valve connector.
(e) Reconnect the ECM connector.

NG → **REPAIR OR REPLACE HARNESS OR CONNECTOR**

OK

4	INSPECT ECM (OCV SIGNAL)



(a) Put the engine in inspection mode (see page 05–1).
(b) Start the engine and warm it up.
(c) During idling, check the waveform between the specified terminals of the E3 ECM connector using an oscilloscope.

Standard:

Tester Connection	Specified Condition
OCV+ (E3–15) – OCV– (E3–14)	Correct waveform is as shown

NG → **REPLACE ECM (See page 10–24)**

OK

CHECK FOR INTERMITTENT PROBLEMS (See page 05–14)