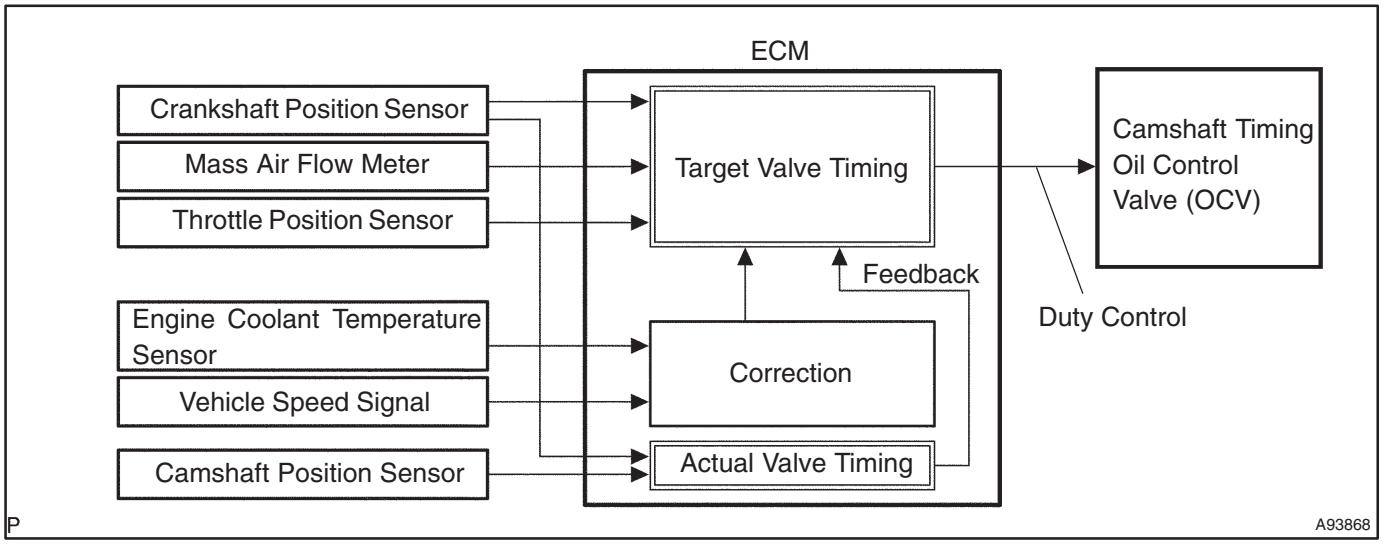
DTC	P0010/39	CAMSHAFT POSITION ”A” ACTUATOR CIRCUIT (BANK 1)

CIRCUIT DESCRIPTION

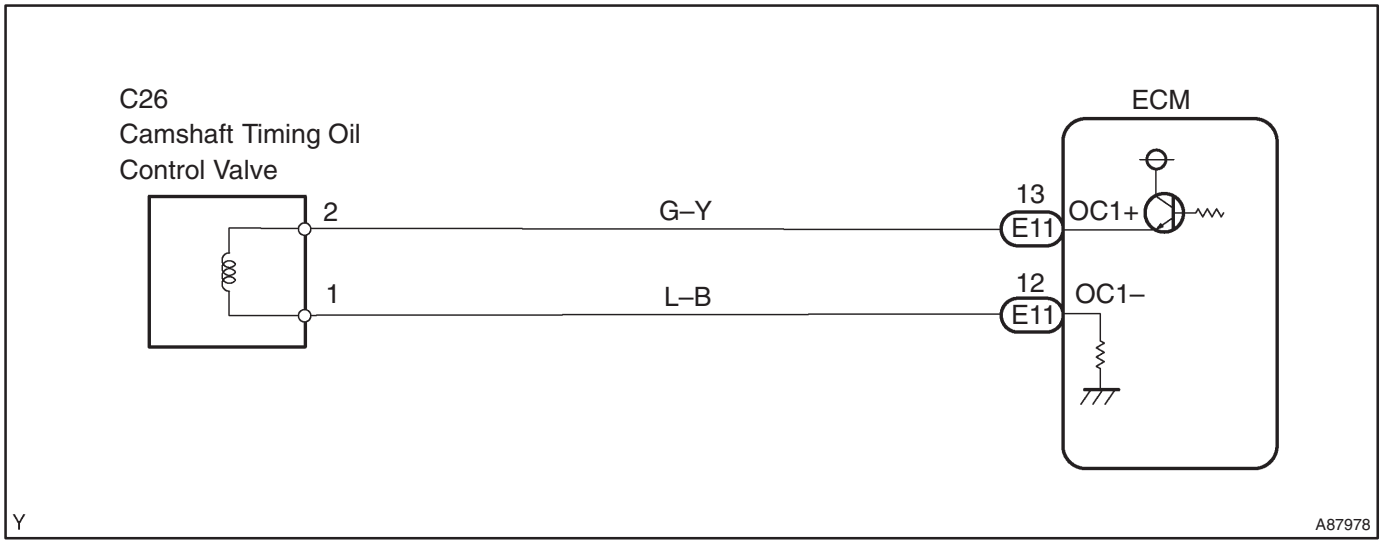
The Variable Valve Timing (VVT) system includes the ECM, Oil Control Valve (OCV) and VVT controller. The ECM sends a target duty–cycle control signal to the OCV. This control signal, applied to the OCV, regulates the oil pressure supplied to the VVT controller. Camshaft timing control is performed based on engine operating conditions 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 a result, the relative position between the camshaft and crankshaft is optimized, the engine torque and the fuel economy improve, and the exhaust emission drops. The ECM detects the actual valve timing using signals from the camshaft and crankshaft position sensors. The ECM performs feedback control and verifies target valve timing.



DTC No.	DTC Detection Condition	Trouble Area
P0010/39	Open or short in OCV circuit (1 trip detection logic)	• Open or short in OCV circuit • OCV • ECM

WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:

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	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 II 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

OK → **CHECK FOR INTERMITTENT PROBLEMS** (**See page 05–8**)

NG

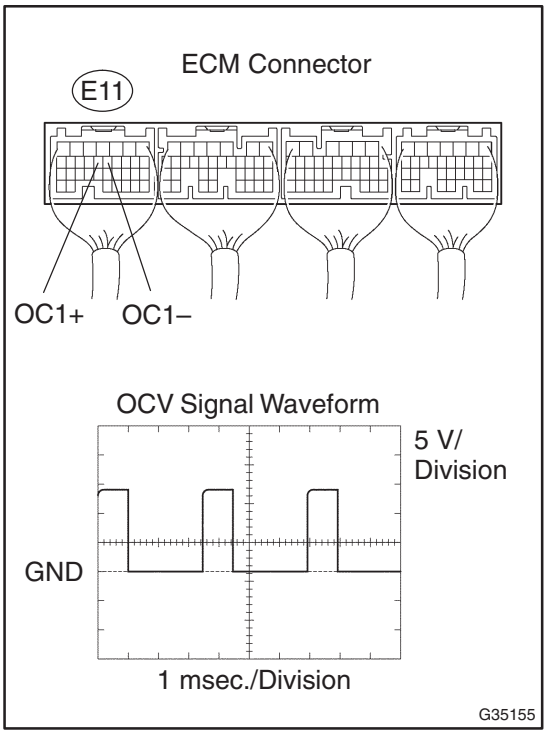
2	INSPECT CAMSHAFT TIMING OIL CONTROL VALVE ASSY(OCV) (See page 10–3)

OK: The OCV has no contamination and moves smoothly.

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

OK

3	INSPECT ECM(OCV SIGNAL)



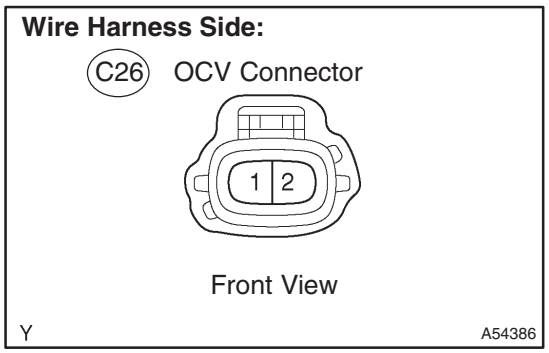
(a) Inspect the ECM using the oscilloscope.
(b) While idling, check the waveform between the terminals of the E11 ECM connector.
OK:

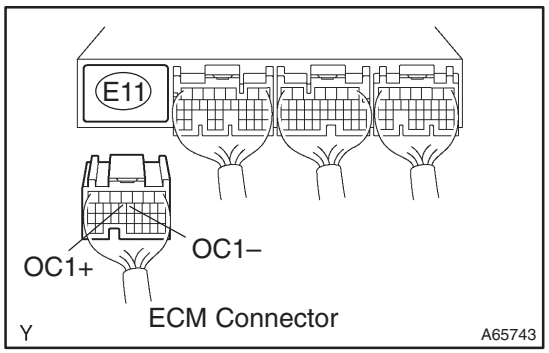
Tester Connection	Specified Condition
OC1+ (E11–13) – OC1– (E11–12)	Correct waveform is as shown on the left

NG → **REPLACE ECM (See page 10–12)**

OK

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





(a) Disconnect the C26 OCV connector.
(b) Disconnect the E11 ECM connector.
(c) Measure the resistance according to the value(s) in the table below.

Standard (Check for open):

Tester Connection	Specified Condition
OCV (C26–2) – OC1+ (E11–13)	Below 1 Ω
OCV (C26–1) – OC1– (E11–12)	Below 1 Ω

Standard (Check for short):

Tester Connection	Specified Condition
OCV (C26–2) or OC1+ (E11–13) – Body ground	10 kΩ or higher
OCV (C26–1) or OC1– (E11–12) – Body ground	10 kΩ or higher

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

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

OK

CHECK FOR INTERMITTENT PROBLEMS (See page 05–8)