

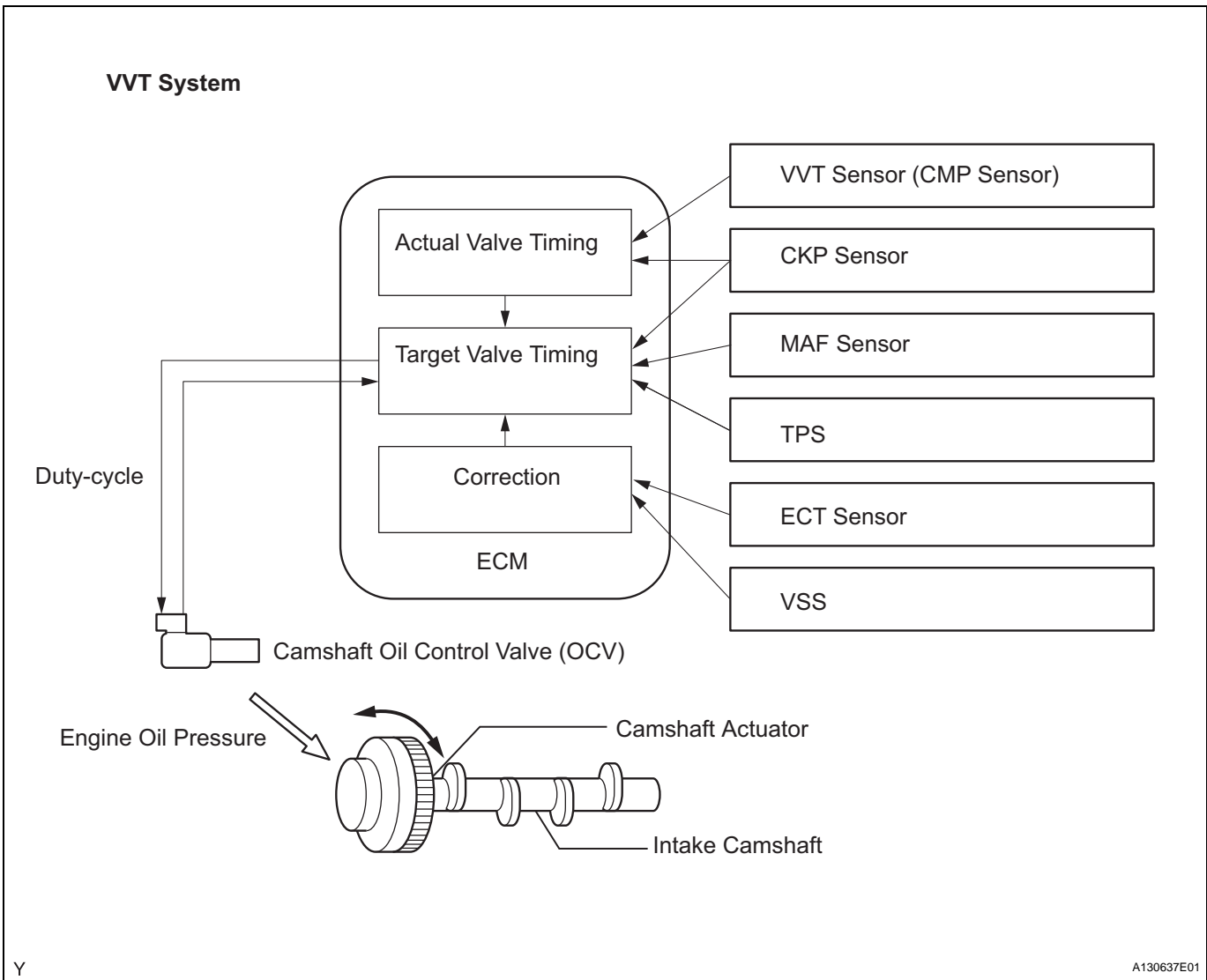
DTC	P0010	Camshaft Position "A" Actuator Circuit (Bank 1)
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DTC	P0020	Camshaft Position "A" Actuator Circuit (Bank 2)
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DESCRIPTION

- This DTC is designed to detect opens or shorts in the camshaft oil control valve (OCV) circuit. If the OCV's duty-cycle is excessively high or low while the engine is running, the ECM will illuminate the MIL and set the DTC.
- The VVT (variable valve timing) system adjusts the intake valve timing to improve the driveability. The engine oil pressure turns the camshaft actuator to adjust the valve timing. The OCV is a solenoid valve and switches the engine oil line. The valve moves when the ECM applies the 12 volts to the solenoid. The ECM changes the energizing time to the solenoid (duty-cycle) in accordance with the camshaft position, crankshaft position, throttle position, etc.

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DTC No.	DTC Detection Condition	Trouble Area
P0010	Open or short in OCV for intake camshaft (bank 1) circuit (1 trip detection logic)	<ul style="list-style-type: none"> • Open or short in OCV for intake camshaft (bank 1) circuit • OCV for intake camshaft (bank 1) • ECM

DTC No.	DTC Detection Condition	Trouble Area
P0020	Open or short in OCV for intake camshaft (bank 2) circuit (1 trip detection logic)	<ul style="list-style-type: none"> Open or short in OCV for intake camshaft (bank 2) circuit OCV for intake camshaft (bank 2) ECM

HINT:

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

MONITOR DESCRIPTION

This DTC is designed to detect opens or shorts in the camshaft oil control valve (OCV) circuit. If the OCV's duty-cycle is excessively high or low while the engine is running, the ECM will illuminate the MIL and set the DTC.

MONITOR STRATEGY

Related DTCs	P0010: VVT OCV range check (bank 1) P0020: VVT OCV range check (bank 2)
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

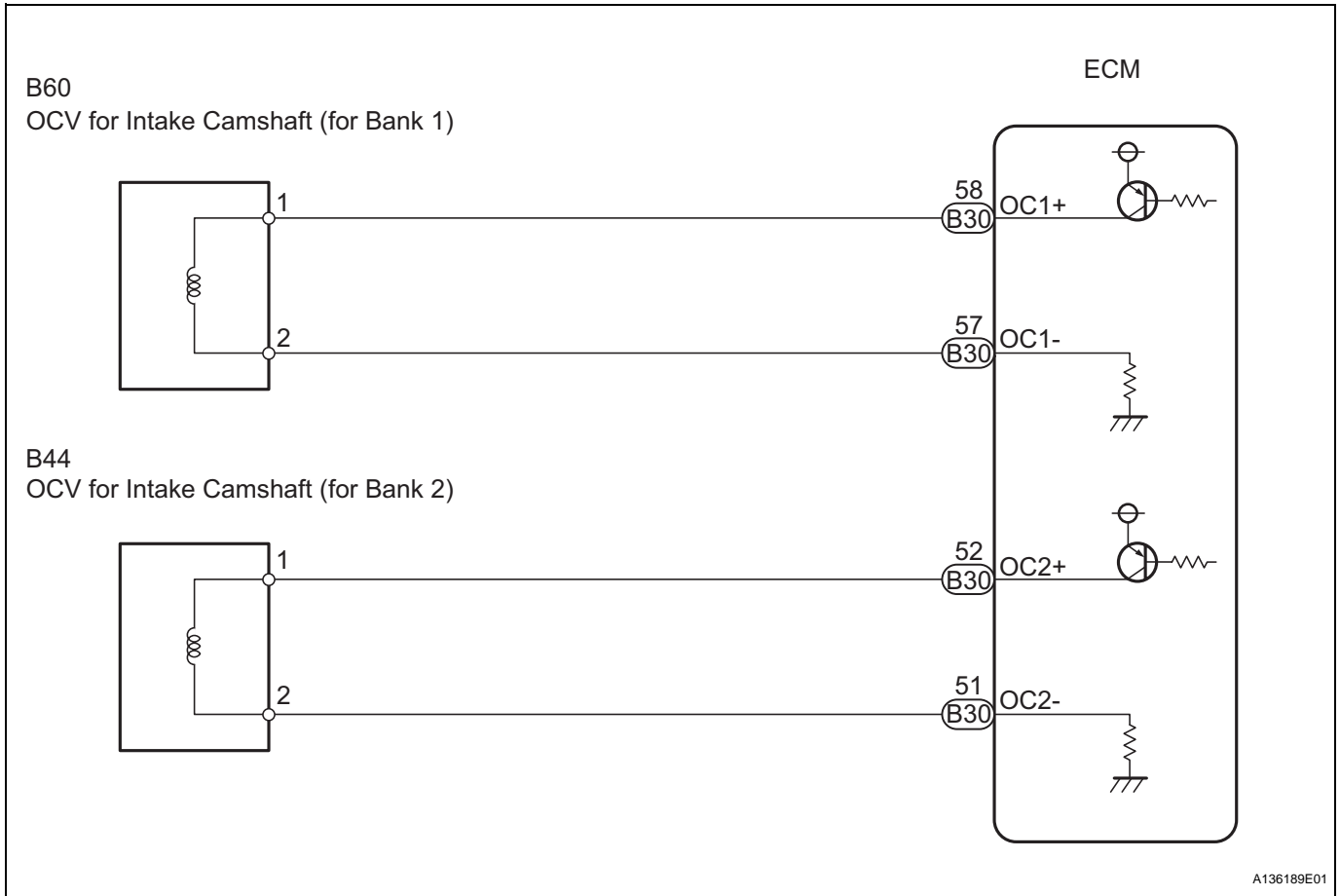
TYPICAL MALFUNCTION THRESHOLDS

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



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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	CHECK DTC
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- (a) Clear DTC after recording the freeze frame data and DTC.
- (b) Turn the ignition switch OFF.
- (c) Allow the engine to idle and check DTC.
- (d) Check that P0010 or P0020 is present.

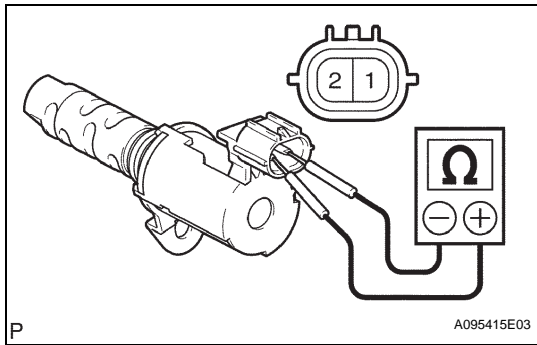
OK:

P0010 or P0020 is present.

OK	CHECK FOR INTERMITTENT PROBLEMS
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2 INSPECT CAMSHAFT TIMING OIL CONTROL VALVE ASSEMBLY

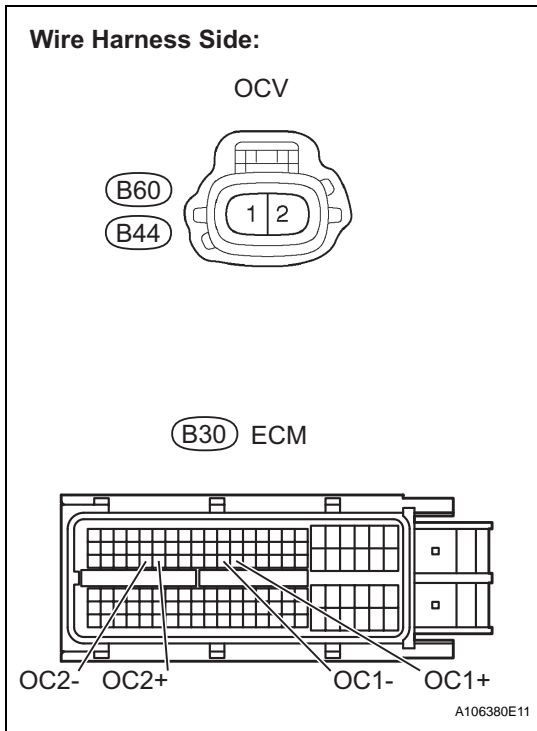


- (a) Disconnect the B44 or B60 OCV connector.
- (b) Measure the resistance between the terminals of the OCV.
Standard resistance:
6.9 to 7.9 Ω at 20°C (68°F)
- (c) Reconnect the OCV connector.

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

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3 CHECK WIRE HARNESS (OCV - ECM)



- (a) Disconnect the B44 or B60 OCV connector.
- (b) Disconnect the B30 ECM connector.
- (c) Measure the resistance of the wire harness side connectors.

Standard resistance

Tester Connection	Specified Condition
B60-1 - B30-58 (OC1+)	Below 1 Ω
B44-1 - B30-52 (OC2+)	Below 1 Ω
B60-2 - B30-57 (OC1-)	Below 1 Ω
B44-2 - B30-51 (OC2-)	Below 1 Ω
B60-1 or B30-58 (OC1+) - Body ground	10 kΩ or higher
B44-1 or B30-52 (OC2+) - Body ground	10 kΩ or higher
B60-2 or B30-57 (OC1-) - Body ground	10 kΩ or higher
B44-2 or B30-51 (OC2-) - Body ground	10 kΩ or higher

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

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

OK

REPLACE ECM