DTC	P0016	CRANKSHAFT POSITION – CAMSHAFT POSITION CORRELATION (BANK 1 SENSOR A)

DTC	P0018	CRANKSHAFT POSITION – CAMSHAFT POSITION CORRELATION (BANK 2 SENSOR A)

CIRCUIT DESCRIPTION

DTC No.	DTC Detection Condition	Trouble Area
P0016	Deviation in Crankshaft Position (CKP) sensor signal and Variable Valve Timing (VVT) sensor 1 signal (2 trip detection logic)	• Mechanical system (jumped tooth of timing belt, belt stretched) • ECM
P0018	Deviation in CKP sensor signal and VVT sensor 2 signal (2 trip detection logic)	• Mechanical system (Jumping teeth of timing belt, belt stretched) • ECM

MONITOR DESCRIPTION

The ECM optimizes the valve timing using the VVT system to control the intake valve camshaft. The 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. The VVT controller can advance or retard the intake valve camshaft. The ECM calibrates the valve timing of the VVT system by setting the camshaft to the maximum retard angle when the engine speed is idling. The ECM closes the OCV to retard the cam. The ECM stores this value as VVT learned value. When the difference between the target valve timing and the actual valve timing is more than 5 °, the ECM learns it.

If the learned value meets both of the following conditions ("a" and "b"), the ECM interprets this as a defect in the VVT system and sets a DTC.

(a)   VVT learning value is less than 20°CA or more than 39°CA.

(b)   Above condition continues for 18 seconds or more.

This DTC shows that the camshaft was installed toward the crankshaft at an incorrect angle (ex.: jumping teeth of timing belt).

This monitor runs after the engine is idling for 5 minutes.

WIRING DIAGRAM

A87365
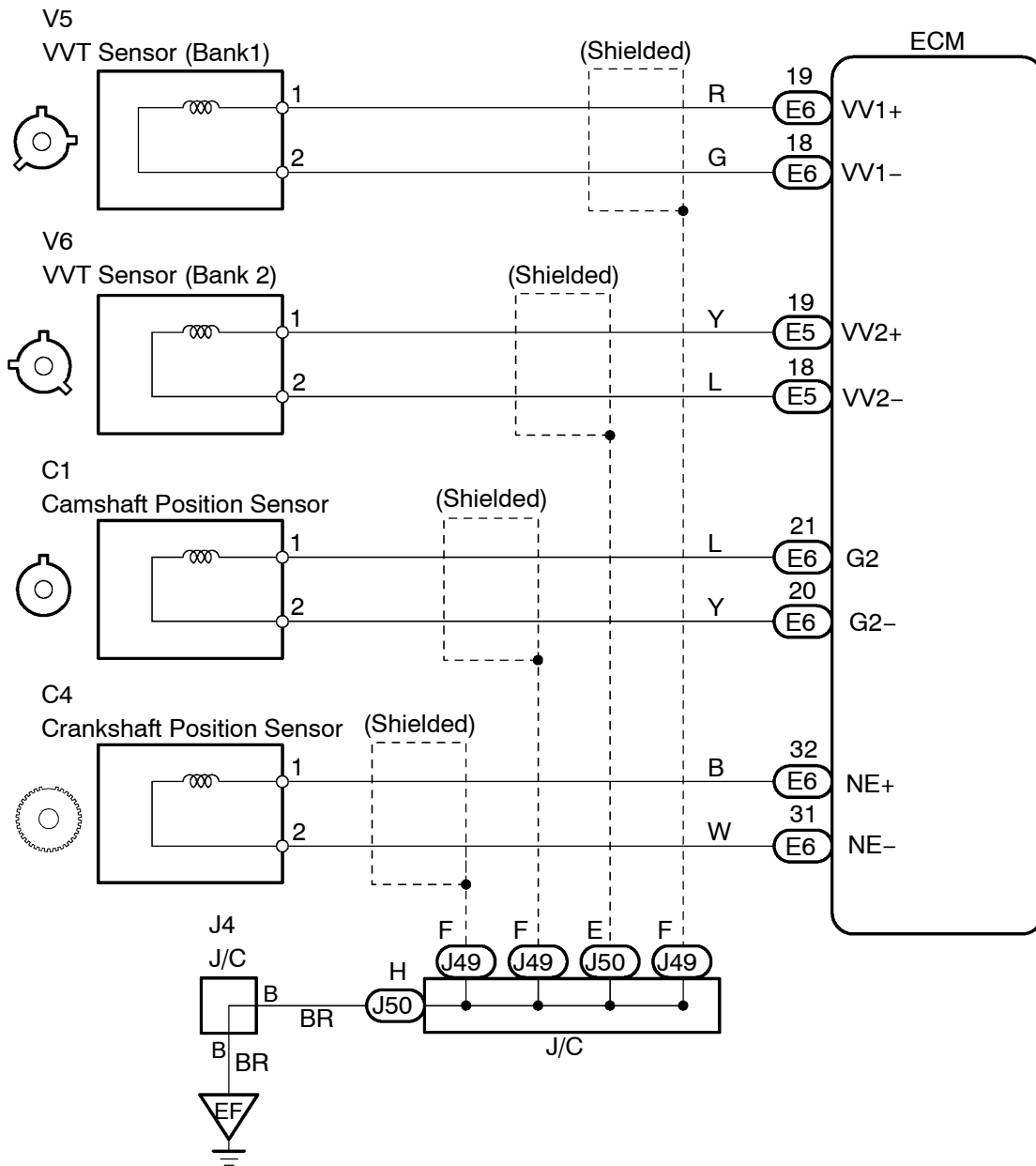
INSPECTION PROCEDURE

INT:

Read freeze frame data using the Intelligent Tester II. Freeze frame data records the engine conditions when a 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	CHECK VALVE TIMING

Matchmarks

Notch

A50965   A88858
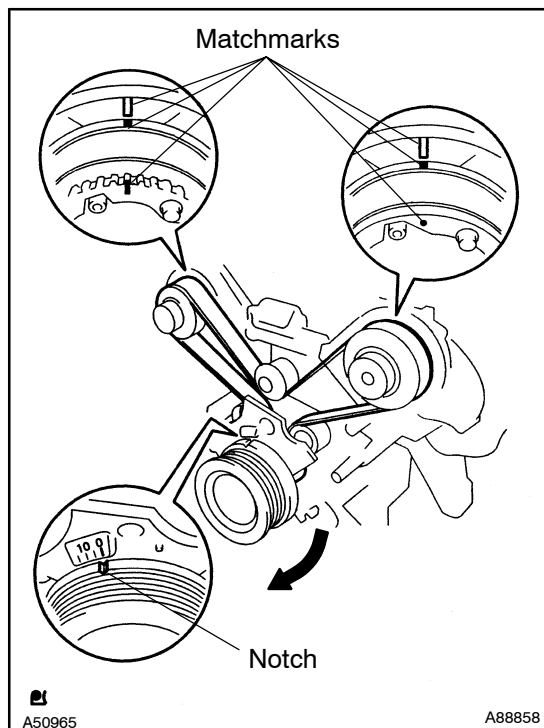
(a) Remove the engine cover.

(b) Remove the drive belt.

(c) Remove the timing belt cover LH and RH.

(d) Turn the crankshaft to align the matchmarks of the crankshaft.

(e) Align the notch of the crankshaft pulley to the "0" position.

(f) Confirm whether the camshaft pulley's matchmark and the matchmark of the cylinder head cover face each other.

(g) Turn the crankshaft clockwise by 360° if these do not face each other. Confirm whether or not these face each other once again.

OK:

The matchmarks of the camshaft pulley and the cylinder head cover face each other when the notch of the crankshaft pulley is in the "0" position.

NG >	**ADJUST VALVE TIMING (See page 14–71)**

OK

REPLACE ECM (See page 10–21)