| DTC | P1340 | CAMSHAFT POSITION SENSOR "A" (BANK 1 SENSOR 2) |
|---|---|---|

| DTC | P1341 | CAMSHAFT POSITION SENSOR "A" (BANK 1 SENSOR 2 ) |
|---|---|---|

HINT:
- DTC P1340 indicates a malfunction related to the Camshaft Position (CMP) sensor (+) circuit.
- DTC P1341 indicates a malfunction related to the CMP sensor (−) circuit.

## CIRCUIT DESCRIPTION

The CMP sensor, like the Crankshaft Position (CKP) sensor, consists of a magnet and an iron core wrapped in copper wire. The camshaft has a tooth and the CMP sensor is installed so that it can detect the tooth passing by. When the camshaft rotates and the tooth passes by the CMP sensor, the magnet on the CMP sensor creates a magnetic field and voltage is generated in the copper wire. When the camshaft makes one full rotation, voltage will be generated in the CMP sensor once. The CKP sensor is roughly the same. When the crankshaft makes one rotation, its 34 teeth pass by the CKP sensor and voltage is generated 34 times. The camshaft rotates at half the speed of the crankshaft. Therefore, the CMP sensor generates voltage once in the time the crankshaft makes 2 rotations.
The ECM detects generation of these voltages to indicate the cylinder.

| DTC No. | DTC Detection Condition | Trouble Area |
|---|---|---|
| P1340 | No CMP sensor No. 1 signal to ECM during cranking (2 trip detection logic) | • Open or short in CMP sensor circuit<br>• CMP sensor<br>• Camshaft timing gear<br>• ECM |
| P1340 | No CMP sensor No. 1 signal to ECM in appropriate timing with 600 rpm or more (misalignment of crankshaft/camshaft) (1 trip detection logic) | • Open or short in CMP sensor circuit<br>• CMP sensor<br>• Camshaft timing gear<br>• ECM |
| P1341 | While crankshaft rotates twice, CMP sensor signal is input to ECM 12 times or more (1 trip detection logic) | • Open or short in CMP sensor circuit<br>• CMP sensor<br>• Camshaft timing gear<br>• ECM |

## MONITOR DESCRIPTION

If there is no signal from the CMP sensor even though the engine is turning, or if the rotation of the camshaft and the crankshaft is not synchronized, the ECM interprets this as a malfunction of the sensor.
This monitor runs for 5 seconds (the first 5 seconds of engine idle) after the engine is started.

## WIRING DIAGRAM

Refer to DTC P0016 on .

# INSPECTION PROCEDURE



5 V/DIV

(a) Ground →

(b) Ground →

20 msec/DIV

A93276
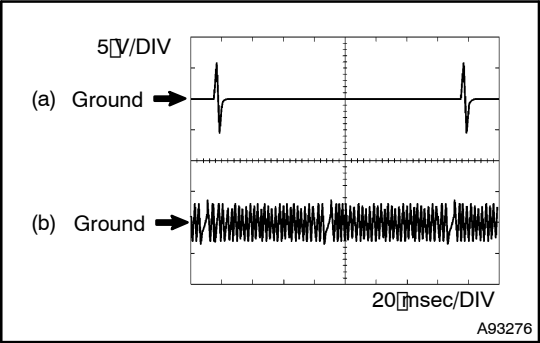
## WAVEFORMS (REFERENCE)

(a)    CMP sensor

(b)    CKP sensor

| ECM Terminal Name | (a) Between G2 and G2−<br>(b) Between NE+ and NE− |
|---|---|
| Tester Range | 5 V/DIV, 20 msec/DIV |
| Condition | Idle after engine warmed−up |

NOTE:

The wavelength becomes shorter as engine rpm increases.

HINT:

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.
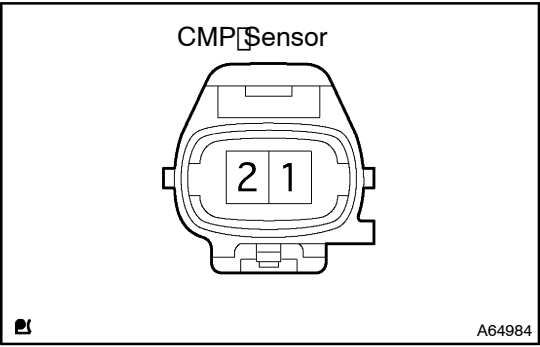
| 1 | INSPECT CAMSHAFT POSITION SENSOR |
|---|---|



A54993



CMP Sensor

2 1

A64984
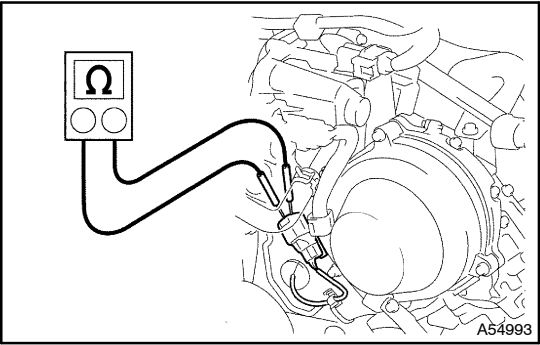
(a)    Disconnect the C1 CMP sensor connector.

(b)    Measure the resistance between the terminals of the CMP sensor.

**Standard:**

| Tester Connection | Specified Condition |
|---|---|
| 1 − 2 | 835 to 1,400 Ω at cold |
| 1 − 2 | 1,060 to 1,645 Ω at hot |

**NOTICE:**

**In the above chart, the terms "cold" and "hot" refer to the temperature of the coils. "Cold" means approximately −10°C to 50°C (14°F to 122°F). "Hot" means approximately 50°C to 100°C (122°F to 212°F).**
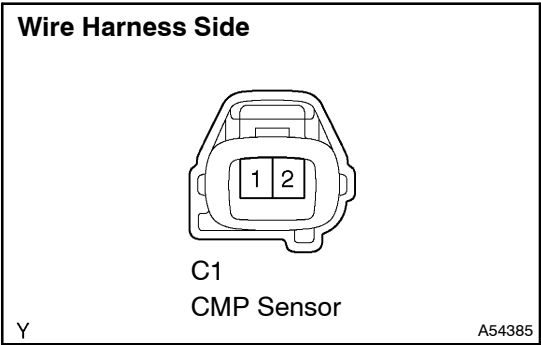
(c)    Reconnect the CMP sensor connector.

| NG | REPLACE CAMSHAFT POSITION SENSOR (See page 14−111) |
|---|---|

| OK |
|---|

| 2 | CHECK WIRE HARNESS (CMP SENSOR – ECM) |
|---|---|

**Wire Harness Side**

C1
CMP Sensor

Y                                    A54385

(a) Disconnect the C1 CMP sensor connector.
(b) Disconnect the E6 ECM connector.
(c) Measure the resistance between the wire harness side connectors.
**Standard:**

| Tester Connection | Specified Condition |
|---|---|
| C1–1 – E6–21 (G2) | Below 1 Ω |
| C1–2 – E6–20 (G2–) | Below 1 Ω |
| C1–1 or E6–21 (G2) – Body ground | 10 kΩ or higher |
| C1–2 or E6–20 (G2–) – Body ground | 10 kΩ or higher |
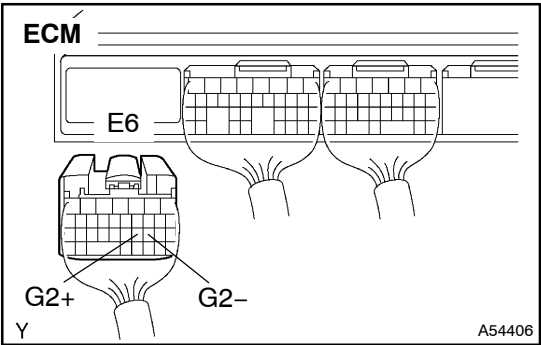
(d) Reconnect the ECM connector.
(e) Reconnect the CMP sensor connector.

**ECM**

E6

G2+        G2–

Y                                    A54406

| NG > | REPAIR OR REPLACE HARNESS AND CONNECTOR |
|---|---|

OK

| 3 | CHECK SENSOR INSTALLATION |
|---|---|

| NG > | TIGHTEN SENSOR |
|---|---|

OK

| 4 | CHECK VALVE TIMING |
|---|---|



Matchmarks

Notch

A50965        A88858
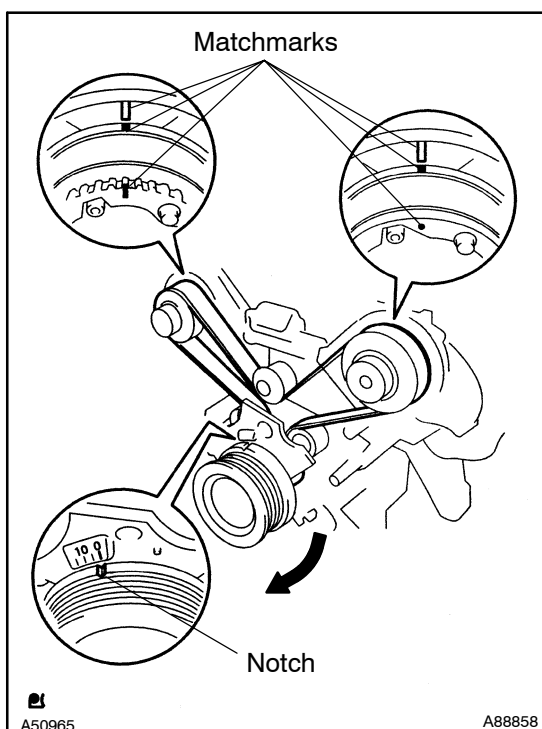
(a) Remove the engine cover.

(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) |
|---|