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| Last Modified: 7-13-2007 | | 1.6 C |
| Service Category: Engine/Hybrid System | | Section: Engine Control |
| Model Year: 2008 | Model: ES350 | Doc ID: RM0000036HF003X |
| Title: 2GR-FE ENGINE CONTROL SYSTEM: SFI SYSTEM: P0017: Crankshaft Position - Camshaft Position Correlation (Bank 1 Sensor B) (2008 ES350) | | |

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|-----|-------|---|
| DTC | P0017 | Crankshaft Position - Camshaft Position Correlation (Bank 1 Sensor B) |
|-----|-------|---|

| | | |
|-----|-------|---|
| DTC | P0019 | Crankshaft Position - Camshaft Position Correlation (Bank 2 Sensor B) |
|-----|-------|---|

DESCRIPTION

Refer to DTC P0335  .

| DTC NO. | DTC DETECTION CONDITION | TROUBLE AREA |
|---------|---|--|
| P0017 | Deviations in crankshaft position sensor and VVT sensor 1 (for exhaust camshaft) 2 signals (2 trip detection logic) | <ul style="list-style-type: none"> • Valve timing • Camshaft timing oil control valve for exhaust camshaft • Camshaft timing oil control valve filter • Exhaust camshaft timing gear assembly • ECM |
| P0019 | Deviations in crankshaft position sensor and VVT sensor 2 (for exhaust camshaft) 2 signals (2 trip detection logic) | |

MONITOR DESCRIPTION

The ECM checks valve timing (VVT learning value) on the exhaust side while the engine is running at a low speed, in order to monitor the gap between current and target valve timings on the exhaust side. The VVT learning value is calculated from the positions of the camshaft and crankshaft. The camshaft will come to the most retarded position when the engine is running at a low speed. If the camshaft position is normal, the VVT learning value should be within the specified range. If the VVT learning value is not within the specified range, the ECM determines this as a malfunction.

MONITOR STRATEGY

| | |
|---|--|
| Related DTCs | Deviation in crankshaft position sensor signal and camshaft position sensor signal (Bank 2 Sensor 2) |
| Required Sensors / Components (Main) | Timing chain/belt |
| Required Sensors / Components (Related) | None |
| Frequency of Operation | Once per driving cycle |
| Duration | Less than 60 seconds |
| MIL Operation | 2 driving cycles |
| Sequence of Operation | None |

TYPICAL ENABLING CONDITIONS

All:

| | |
|--|---|
| The monitor will run whenever these DTCs are not present | P0011, P0012 (VVT System 1-Advance, Retard), P0021, P0022 (VVT System 2-Advance, Retard), P0115, P0116, P0117, P0118 (ECT Sensor) |
|--|---|

| | |
|-------------------|---------------------------|
| VVT feedback mode | Executing |
| VVT | Maximum advanced position |
| Engine RPM | 500 to 1400 rpm |

TYPICAL MALFUNCTION THRESHOLDS

| | |
|---|------------------|
| One of the following conditions is met: | Condition 1 or 2 |
| 1. VVT learning value | Less than 21° CA |
| 2. VVT learning value | More than 46° CA |

WIRING DIAGRAM

Refer to DTC P0335  .

INSPECTION PROCEDURE

HINT:

Read freeze frame data using Techstream. The ECM records vehicle and driving condition information as freeze frame data the moment a DTC is stored. When troubleshooting, freeze frame data can be helpful in determining whether the vehicle was running or stopped, whether the engine was warmed up or not, whether the air fuel ratio was lean or rich, as well as other data recorded at the time of a malfunction.

PROCEDURE

| | |
|----|--|
| 1. | CHECK ANY OTHER DTCs OUTPUT (IN ADDITION TO DTC P0017 AND P0019) |
|----|--|

- (a) Connect Techstream to the DLC3.
- (b) Turn the engine switch on (IG) and turn the tester on.
- (c) Select the following menu items: Powertrain / Engine / Trouble Code.
- (d) Read the DTCs.

Result:

| DISPLAY (DTC OUTPUT) | PROCEED TO |
|-------------------------------|------------|
| P0017 or P0019 | A |
| P0017 or P0019 and other DTCs | B |

HINT:

If any DTCs other than P0017 or P0019 are output, troubleshoot those DTCs first.



B ► GO TO DTC CHART**A**
▼**2. PERFORM ACTIVE TEST BY TECHSTREAM (OPERATE OIL CONTROL VALVE FOR EXHAUST CAMSHAFT)**

- (a) Connect Techstream to the DLC3.
- (b) Start the engine and turn the tester on.
- (c) Warm up the engine.
- (d) Select the following menu items: Powertrain / Engine / Active Test / Control the VVT Exhaust Linear (Bank 1) or Control the VVT Exhaust Linear (Bank 2).
- (e) Check the engine speed while operating the oil control valve using the tester.

OK:

| TESTER OPERATION | SPECIFIED CONDITION |
|------------------|---|
| OCV OFF (-128%) | Normal engine idle speed |
| OCV ON (127%) | Engine idles roughly or stalls (soon after OCV switched from OFF to ON) |



NG ► CHECK VALVE TIMING (CHECK FOR LOOSE AND JUMP TEETH ON TIMING CHAIN)**OK**
▼**3. CHECK WHETHER DTC OUTPUT RECURS (DTC P0017 OR P0019)**

- (a) Connect Techstream to the DLC3.
- (b) Turn the engine switch on (IG) and turn the tester on.
- (c) Clear the DTCs  .
- (d) Start the engine and warm it up.
- (e) Switch the check mode using the tester  .
- (f) Drive the vehicle for more than 10 minutes.
- (g) Read the DTCs using the tester.

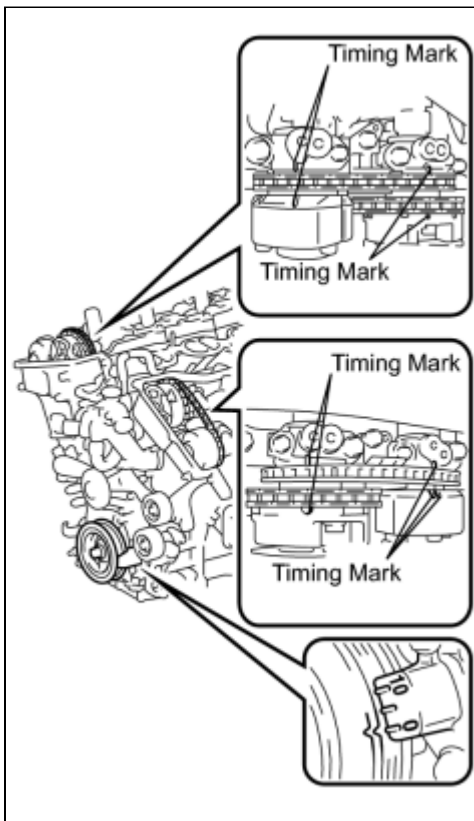
OK:

No DTC output.

NG ► CHECK VALVE TIMING (CHECK FOR LOOSE AND JUMP TEETH ON TIMING CHAIN)

OK  END 

4. CHECK VALVE TIMING (CHECK FOR LOOSE AND JUMP TEETH ON TIMING CHAIN)



(a) Remove the cylinder head covers RH and LH.

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

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

(d) Check if the matchmarks of the camshaft pulley and camshaft bearing cap align.

(e) Turn the crankshaft clockwise by 360° if the matchmarks do not align. Check if they align once again.

OK:

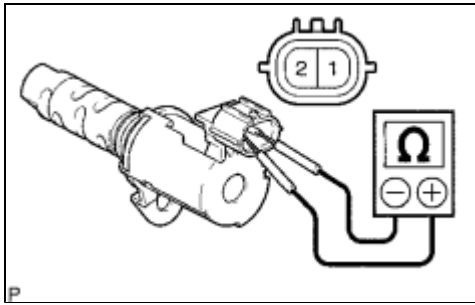
The matchmarks of the camshaft pulley and the camshaft bearing cap align when the notch of the crankshaft pulley is in the "0" position.

NG  ADJUST VALVE TIMING

OK


5. INSPECT CAMSHAFT TIMING OIL CONTROL VALVE ASSEMBLY (FOR EXHAUST CAMSHAFT)

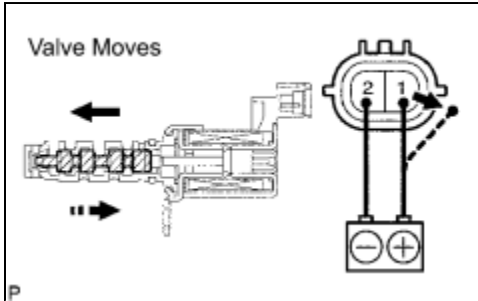
(a) Remove the exhaust camshaft timing oil control valve.



(b) Measure the resistance according to the value(s) in the table below.

Standard resistance:

| TESTER CONNECTION | CONDITION | SPECIFIED CONDITION |
|-------------------|-------------|---------------------|
| 1 - 2 | 20°C (68°F) | 6.9 to 7.9 Ω |



(c) Apply the positive battery voltage to terminal 1 and the negative battery voltage to terminal 2. Check the valve operation.

OK:

Valve moves quickly.

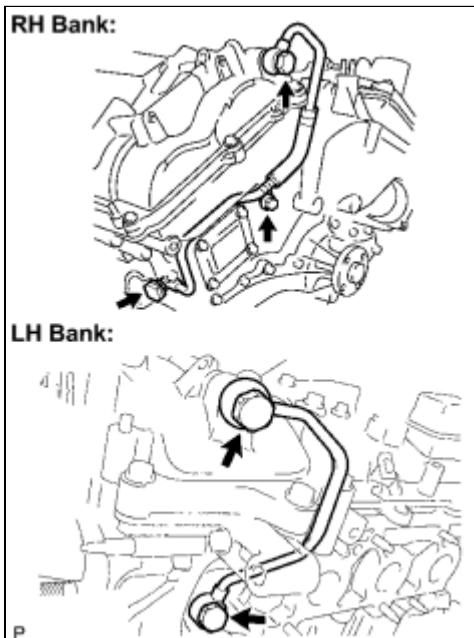
(d) Reinstall the camshaft timing oil control valve.

NG ▶ REPLACE CAMSHAFT TIMING OIL CONTROL VALVE ASSEMBLY

OK



6. CHECK OIL CONTROL VALVE FILTER AND PIPE



(a) Remove the oil pipe No. 1 or oil pipe assembly.

(b) Remove the oil control valve filter.

(c) Check that the filter and pipe are not clogged.

OK:

The filter and pipe are not clogged.

NG  REPLACE OIL CONTROL VALVE FILTER OR PIPE

OK



7. REPLACE CAMSHAFT TIMING GEAR ASSEMBLY

NEXT



8. CHECK WHETHER DTC OUTPUT RECURS

(a) Connect Techstream to the DLC3.

(b) Turn the engine switch on (IG) and turn the tester on.

(c) Clear the DTCs  .

(d) Start the engine and warm it up.

(e) Switch the check mode using the tester  .

(f) Drive the vehicle for more than 10 minutes.

(g) Confirm that no DTC is set using the tester.

OK:

No DTC output.

HINT:

DTC P0017 or P0019 is output when foreign objects in engine oil are caught in some parts of the system. These codes will stay registered even if the system returns to normal after a short time. These foreign objects are then captured by the oil filter, thus eliminating the source of the problem.

NG  REPLACE ECM

OK  END

