

DRIVEABILITY—MALFUNCTION INDICATOR LAMP (MIL) ILLUMINATED—DIAGNOSTIC TROUBLE CODES (DTCS) P0340, P1380, P1381, OR P1383 IN MEMORY—VEHICLES WITH 2.0L ZETEC ENGINE

**Article No.
03-15-14**

FORD: 1998-2000 CONTOUR
1998-2003 ESCORT ZX2

MERCURY: 1998-2000 MYSTIQUE
1999-2002 COUGAR

This article supersedes TSB's **98-9-8** and **99-10-5**.

ISSUE

The Malfunction Indicator Lamp (MIL) may be illuminated and Diagnostic Trouble Codes (DTCs) P1380, P1381, P1383, and/or P0340 may be stored in memory. The vehicle may also have a rough idle or reduced power condition, and/or may stall at an idle.

ACTION

Refer to the following Service Information for diagnostic tips and repair procedures.

SERVICE INFORMATION

Inspect the following areas to help diagnose condition.

- Variable Camshaft Timing (VCT) control system stuck with a machining chip
- VCT hollow oil feed bolt being plugged with debris
- A damaged Variable Camshaft tone ring
- Incorrect base engine timing
- On automatic transmission vehicles only, the flex-plate may be broken
- Excessive crankshaft end-play
- Mis-machined Cylinder Head

NOTE

PROCEED WITH THIS PROCEDURE ONLY IF DTCs P1381, P1383 OR P0340 ARE PRESENT IN KOER AND P1380 IS NOT PRESENT. IF P1380 IS PRESENT, REFER TO POWERTRAIN CONTROL/EMISSIONS DIAGNOSIS (PC/ED) SERVICE MANUAL.

NOTE

IF CODES P1380, P1381, OR P1383 ARE NOT PRESENT IN KOER, VCT AND VALVETRAIN COMPONENTS ARE FUNCTIONING AND ARE PROPERLY ADJUSTED. FAULT CANNOT BE DUPLICATED OR IDENTIFIED AT THIS TIME.

1. If DTC P1381 or P1383 is present in KOER, install 104-pin breakout box.
2. Run engine to normal operating temperature. ECT/CHT = 190-240°F (87-115°C).
3. Select and monitor Parameter Identification Displays (PID): NGS (PIDs) CAMERR, CAMDCR, RCAM, and RPM. WDS (PIDS) VCTADV, VCTADVERR, VCTDC, and RPM.
4. Insert one end of a banana plug jumper into VCT Pin 44 (Pin 45 for vehicles with return-less fuel system) breakout box.
5. Increase engine speed to 2500 rpm and touch the other end of the jumper to PWR GND Pin 103 for approximately 1 second and release.
6. While maintaining 2500 rpm, monitor RCAM (NGS) / VCTADV (WDS) and repeat Step 5: 1 second on, 1 second off for 20 to 30 cycles.
7. Verify that RCAM/ VCTADV (WDS) changes from -15 to +45 (approximately) when Pin 103 is connected.
8. Turn ignition key to locked position and then restart engine.
9. Monitor PIDs previously selected. Vary engine speed from idle to 3000 rpm. If the cycling procedure succeeded, CAMERR (NGS) / VCTADVERR (WDS) will remain zero and RCAM (NGS) / VCTADV (WDS) will vary with rpm.

NOTE: The information in Technical Service Bulletins is intended for use by trained, professional technicians with the knowledge, tools, and equipment to do the job properly and safely. It informs these technicians of conditions that may occur on some vehicles, or provides information that could assist in proper vehicle service. The procedures should not be performed by "do-it-yourselfers". Do not assume that a condition described affects your car or truck. Contact a Ford, Lincoln, or Mercury dealership to determine whether the Bulletin applies to your vehicle.

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10. If the cycling procedure succeeded:

- Clear codes.
- Change oil and filter and restore the vehicle.

NOTE

VEHICLES WITH A VARIABLE CAMSHAFT USE FORD OIL FILTER FL-2005, THIS OIL FILTER HAS AN INTERNAL CHECK VALVE THAT KEEPS THE EXHAUST VALVE CLOSED, WHEN THE ENGINE IS OFF, THIS WILL PREVENT ANY HARD START, OVER-FUELING OR FLOODING CONDITIONS ON INITIAL START UP (FIGURE 1).

NOTE

VEHICLES WITH A VARIABLE CAMSHAFT RUN ON A MINIMUM OIL PRESSURE OF 50 PSI. REGARDLESS, OF THE ENGINE TEMPERATURE.

11. If VCT remains disabled at 3000 rpm (RCAM does not increase from idle reading), refer to PC/ED Service Manual.

Comparison chart on VCT PIDs NGS (New Generation Start Tester) and WDS (World Wide Diagnostic System).

NGS PIDs	WDS PIDs	UNITS
--RCAM VCTA	VCTADV	DEGREES° MODE ON/OFF
CAMERR	VCTADVERR	DEGREES°
CAMDCR	VCTDC	PERCENT %
VCTENA	VCTSYS	NGS = MODE ON/OFF WDS = MODE OL/CL (OL=OPEN LOOP) (CL=CLOSE LOOP)

Parameter Identification Displays (PIDs) Relevant To VCT:

- CAMDCR (NGS) / VCTDC (WDS) = (0 to 99%) is the On-time of the VCT solenoid as requested by the PCM (see Figure 2).
- CAMERR (NGS) / VCTADVERR (WDS) = (0° to 30°) is how many degrees the exhaust cam is 'out' from the requested position. Values "+" mean the cam is not retarded enough and values "-" indicate the cam is over retarded (see Figure 3).
- RCAM (NGS) / VCTADV (WDS) = (-15° to +45°) represents actual position of the cam relative to the crankshaft (see Figure 4).

Normal PID Values (Approximate):

Normal PID Values (Approximate)					
NGS PIDs	WDS PIDs	UNITS	Warm At Idle	1500 RPM	4566 RPM
--RCAM VCTA	VCTADV VCTADV	DEGREES° MODE ON/OFF	(-) 15.00 OFF	(+) 5.00 ON	(+) 45.00 ON
CAMERR	VCTADVERR	DEGREES°	(+ OR -) 0	(+ OR -) 0	(+ OR -) 0
CAMDCR	VCTDC	PERCENT %	(+ OR -) 0	(+) 30	(+) 50
VCTENA	VCTSYS	NGS = MODE ON/OFF WDS = MODE OL/CL (OL = OPEN LOOP) (CL = CLOSE LOOP)	OFF OL	ON/OFF OL/CL	ON CL

DTC(s):

P1380 - VCT Solenoid Malfunction:

Indicates a VCT circuit failure between the PCM and the VCT solenoid, or possible VCT solenoid failure. Check for 3-6 ohms resistance at the VCT Solenoid with the connector disconnected. Check for 12 volts power at the VCT harness, check continuity at the VCT ground and PCM driver. Consult the appropriate Electrical and Vacuum Troubleshooting Manual (EVTM) for circuit location and description (see Figure 5).

P1381 - VCT Over-Advanced:

Indicates the exhaust camshaft would not retard to the position requested by the PCM. These are the following possibilities:

1. The VCT is not moving the Exhaust Camshaft, possible bad VCT Solenoid.
2. The VCT is not moving the Exhaust Camshaft - possible bad Sprocket, sticking Sprocket.
3. The VCT is not moving the Exhaust Camshaft, possible low oil pressure, on VCT systems the engine has to have a minimum of 50 PSI.
4. The VCT is not moving the Exhaust Camshaft, possible wrong oil weight, contaminated oil, or wrong oil filter. Oil filter recommended is FL-2005 (see Figure 6).

P1383 - VCT Over-Retarded: Indicates The Exhaust Camshaft Would Not Advance (Return) To The Position Requested By The PCM.

1. The VCT is not moving the Exhaust Camshaft, possible bad VCT Solenoid.
2. The VCT is not moving the Exhaust Camshaft, possible bad Sprocket or sticking Sprocket.
3. The VCT is not moving the Exhaust Camshaft, possible low oil pressure, on VCT systems the engine has to have a minimum of 50 PSI.
4. The VCT is not moving the Exhaust Camshaft, possible wrong oil weight, contaminated oil, or wrong oil filter. Oil filter recommended is FL-2005 (see Figure 7).

P1381, P1383 & P0340 - VCT Over - Advanced/Retarded:

Indicates the exhaust camshaft would not advance/retard to the position requested by the PCM. These are the following possibilities:

1. The VCT is not moving the Exhaust Camshaft or possible bad VCT Solenoid.
2. The VCT is not moving the Exhaust Camshaft, possible bad Sprocket or sticking Sprocket.
3. The VCT is not moving the Exhaust Camshaft, possible low oil pressure, on VCT systems the engine has to have a minimum of 50 PSI.
4. The VCT is not moving the Exhaust Camshaft, possible wrong oil weight, contaminated oil, or wrong oil filter. Oil filter recommended is FL-2005.
5. The Camshaft Sensor is not reading the correct synchronization from the Camshaft, Possible damaged Tone Ring (see Figure 8).

P0340 - Runs Rough At Idle - Cranks No Start - Starts & Stalls At Idle:

When diagnosing this concerns, unplug the Camshaft position sensor, if the vehicle runs o.k. Look for a damaged Exhaust Camshaft Position Sensor Tone ring, refer to Figure 8 and check the tone ring alignment. For rough idle, cranks/no start, stall at idle or DTC codes P0340, P1383 or P1381, inspect for a broken Flex Plate or Monitor the PIDs on the NGS/WDS (see Figure 9).

OVERVIEW ENGINE COMPONENTS (see Figures10-14).

1. SPROCKET (Figure 10).
2. EXHAUST RETAINER BOLT AND TOOL No # (Figure 11 and Figure 12).
3. VCT SOLENOID (Figure 13).
4. TOP DEAD CENTER AND TIMING PEG ALIGNMENT (Figure 14).

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OTHER APPLICABLE ARTICLES: 99-13-8, 00-3-7

SUPERSEDES: 98-9-8, 99-10-5

WARRANTY STATUS: INFORMATION ONLY

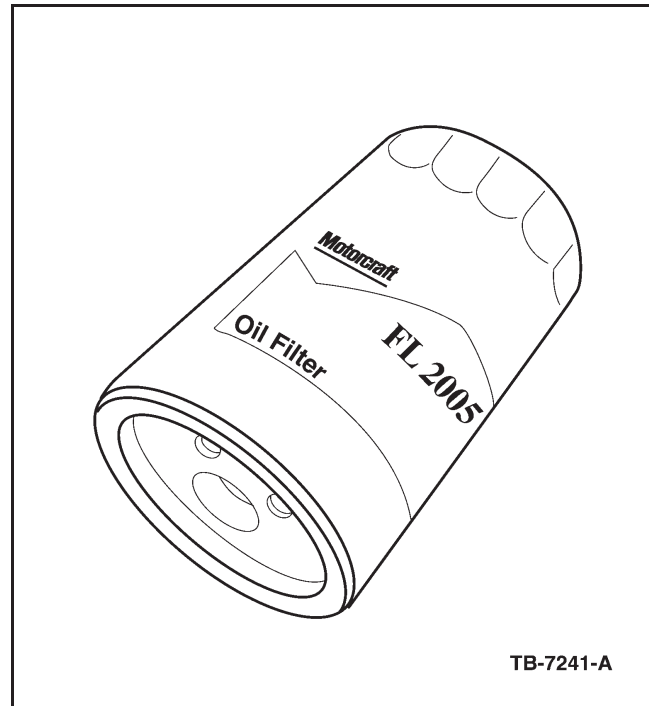
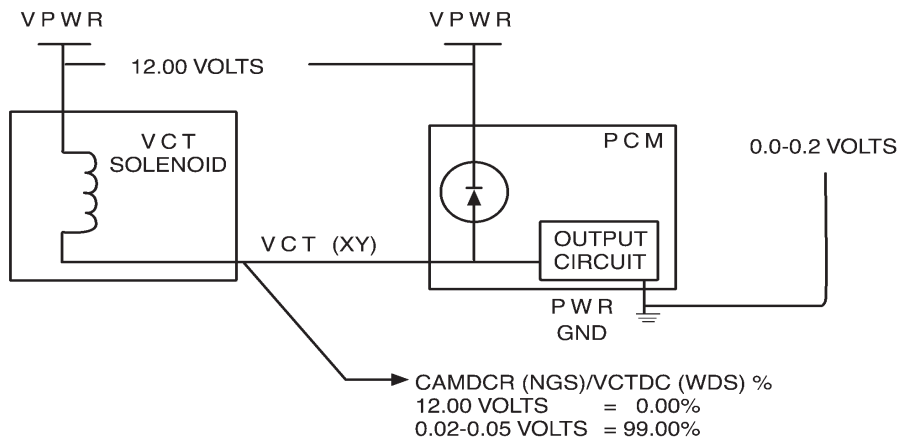


Figure 1 - Article 03-15-14

ACTUATOR/LOAD SCHEMATIC



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Figure 2 - Article 03-15-14

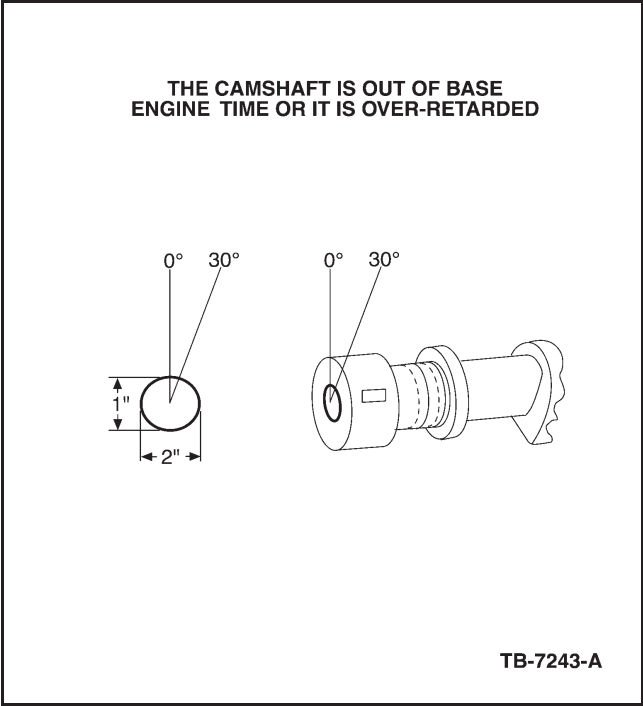


Figure 3 - Article 03-15-14

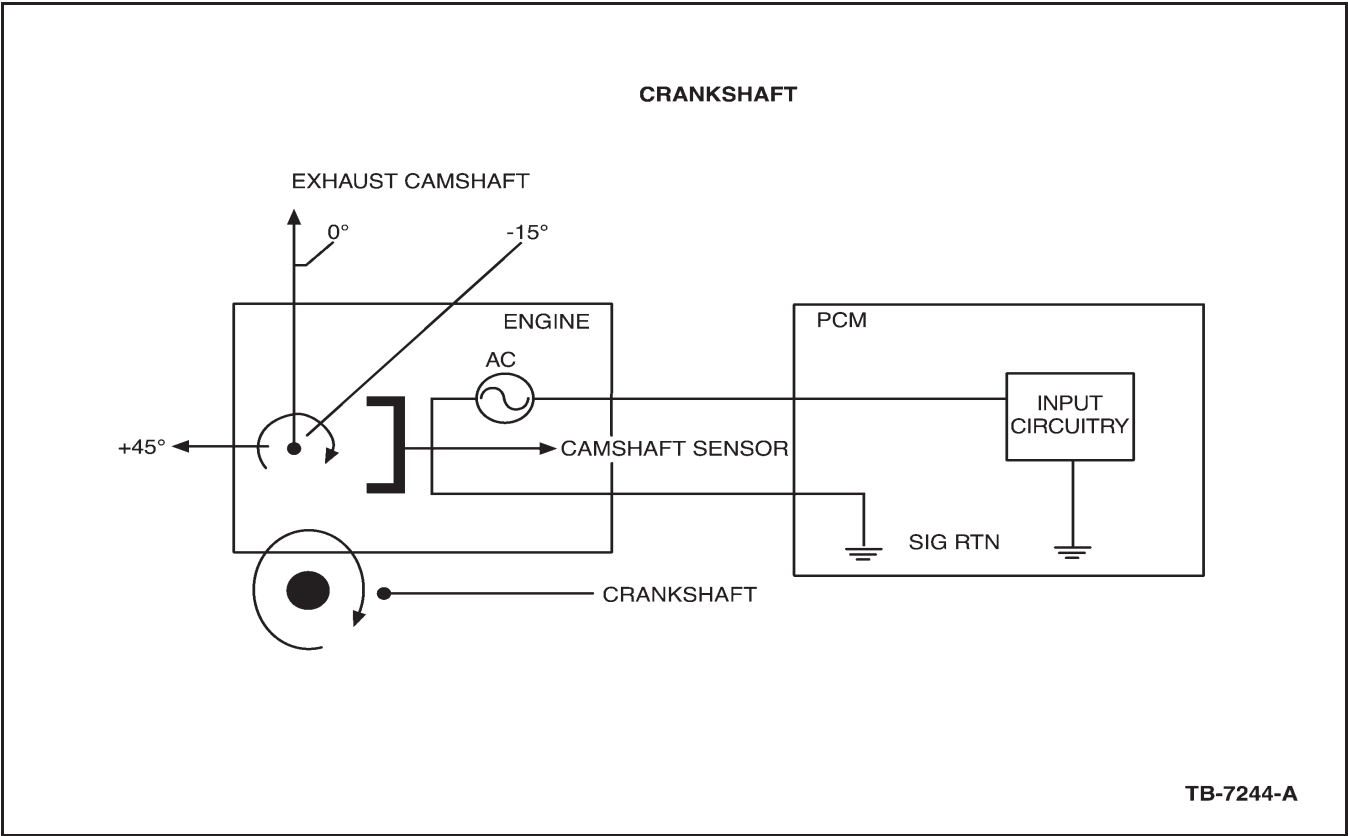
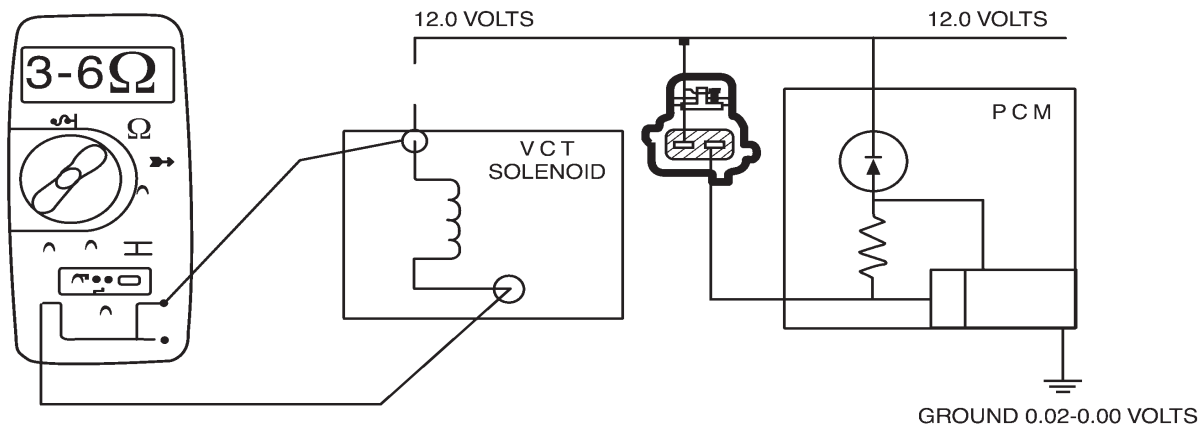
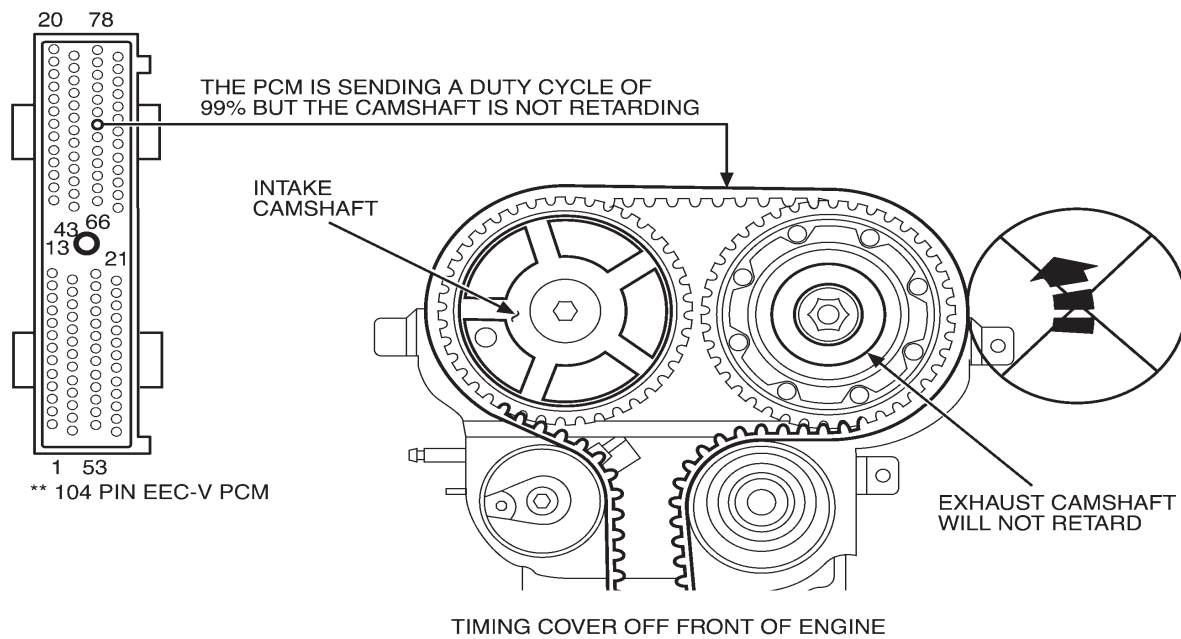


Figure 4 - Article 03-15-14



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Figure 5 - Article 03-15-14



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Figure 6 - Article 03-15-14

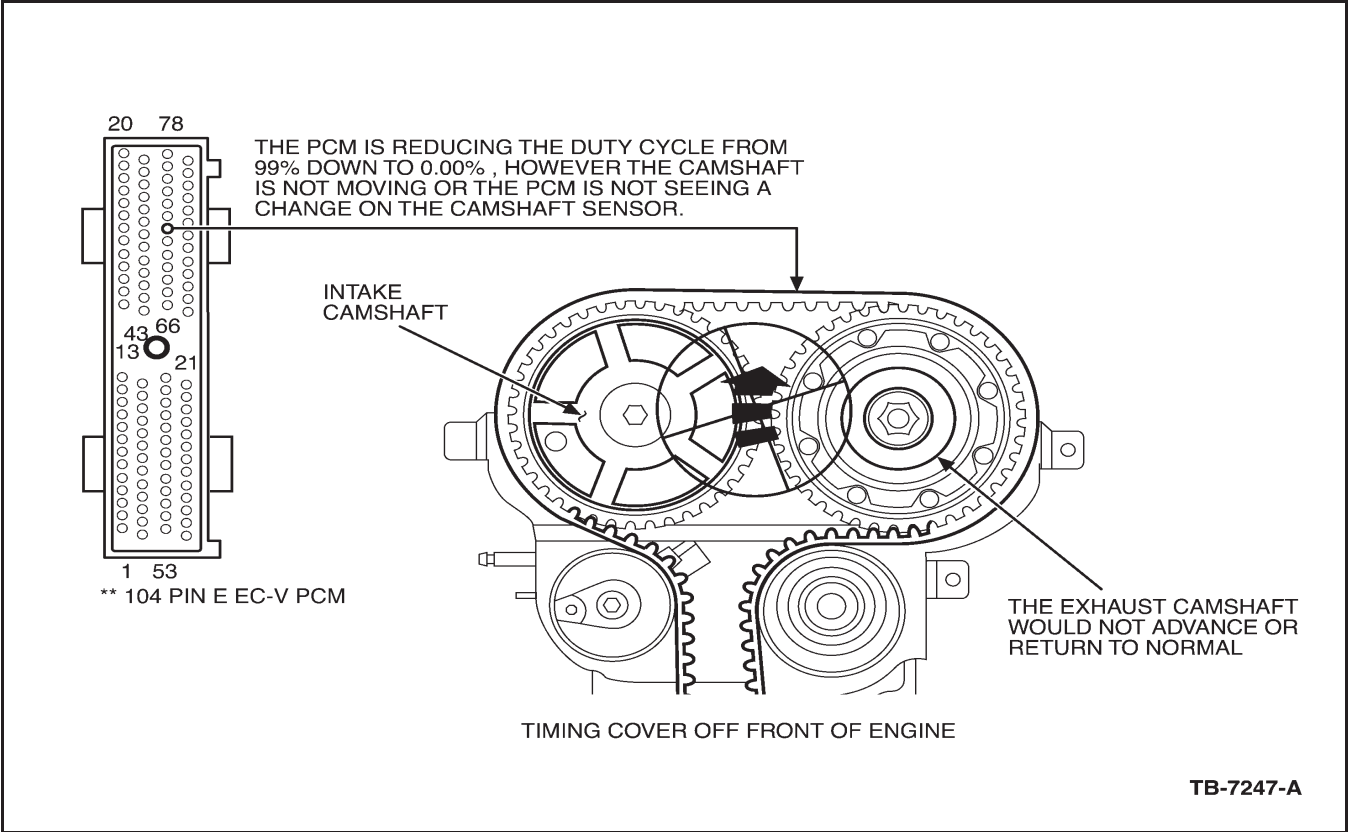


Figure 7 - Article 03-15-14

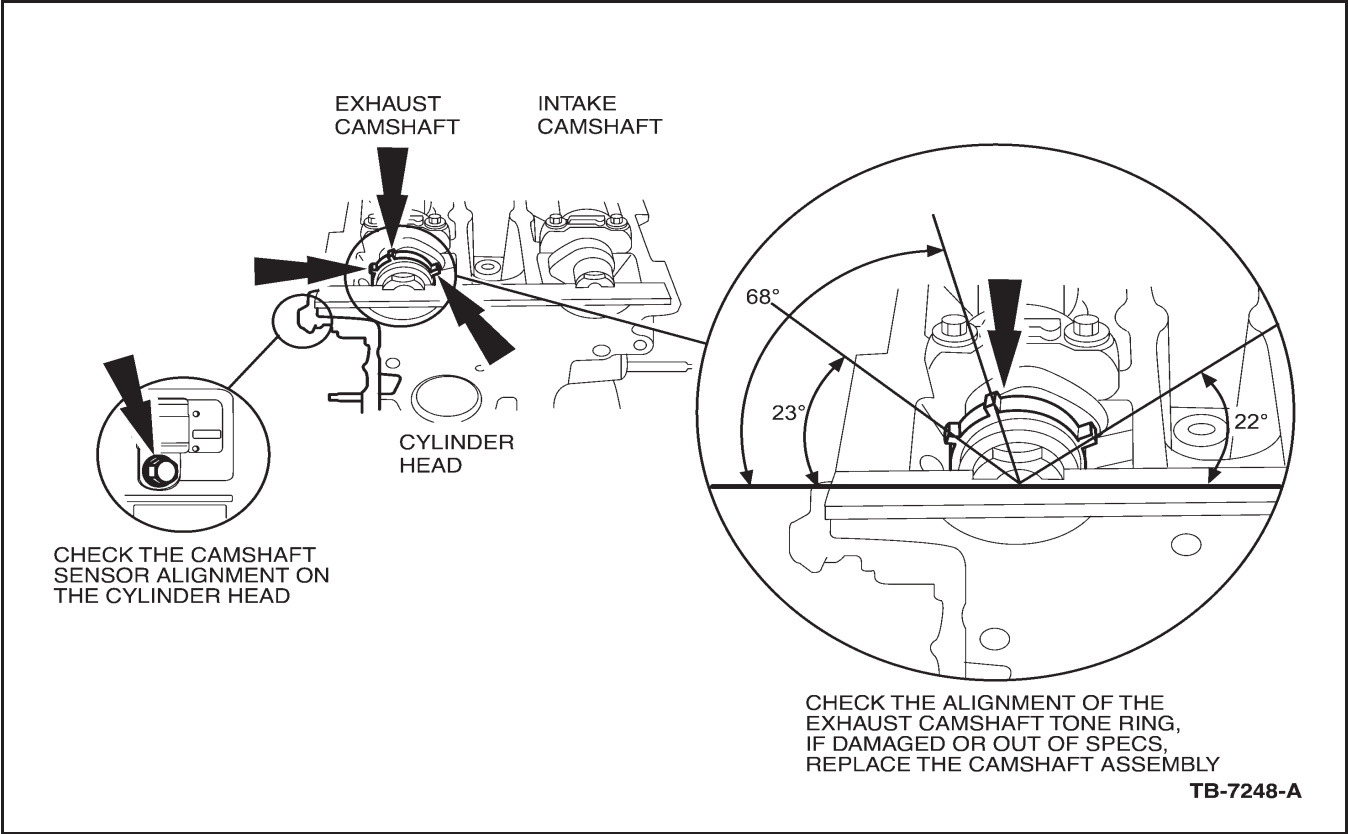
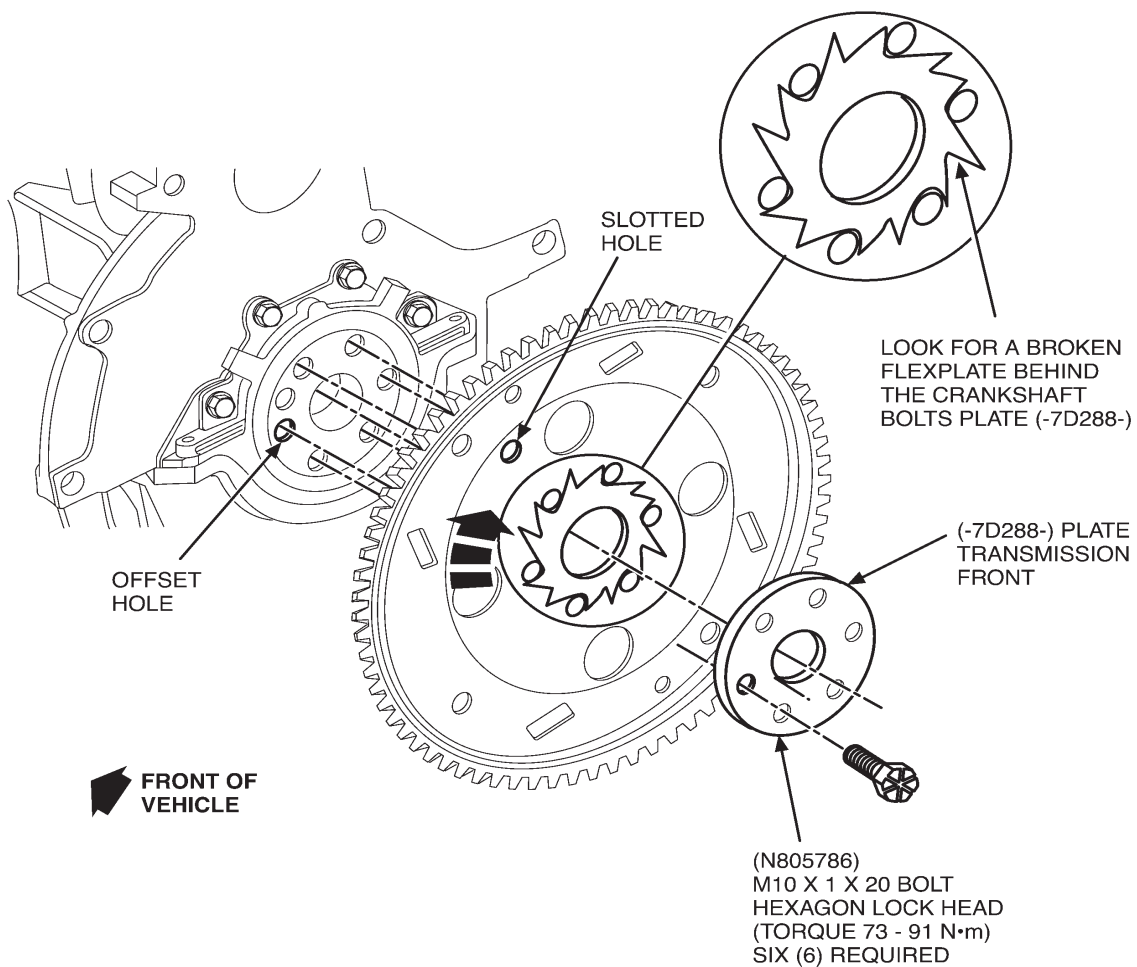


Figure 8 - Article 03-15-14

NGS PIDS	WDS PIDS	UNITS DEGREES°	BROKEN FLEXPLATE AVERAGE READING (-) 55.00 OR (+) 55.00
RCAM VCTA	VCTADV	MODE ON/OFF	ERRATIC
CAMERR	VCTADVERR	DEGREES°	(+ OR -) ± 50.00-75.00
CAMDCR	VCTDC	PERCENT%	(+ OR -) ± 50.00-75.00
VCTENA	VCTSYS	NGS =	
		ON/OFF	ERRATIC
		WDS =	
		OL/CL	ERRATIC



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Figure 9 - Article 03-15-14

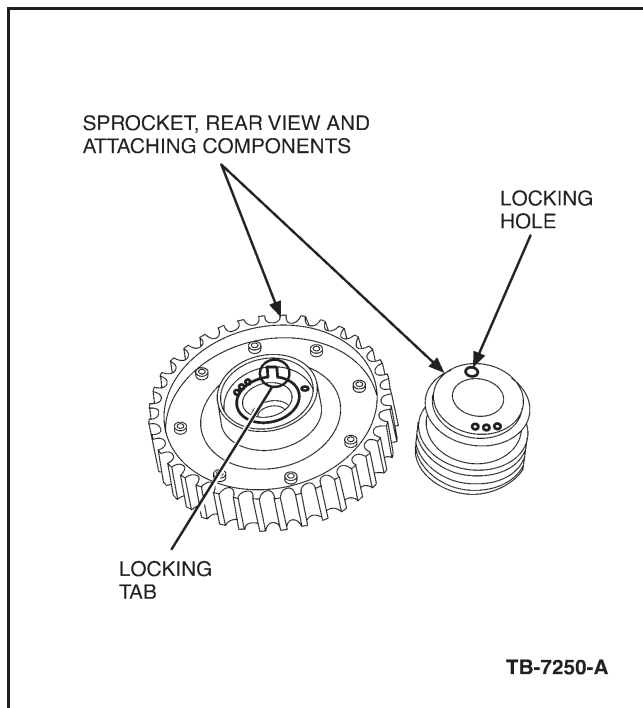


Figure 10 - Article 03-15-14

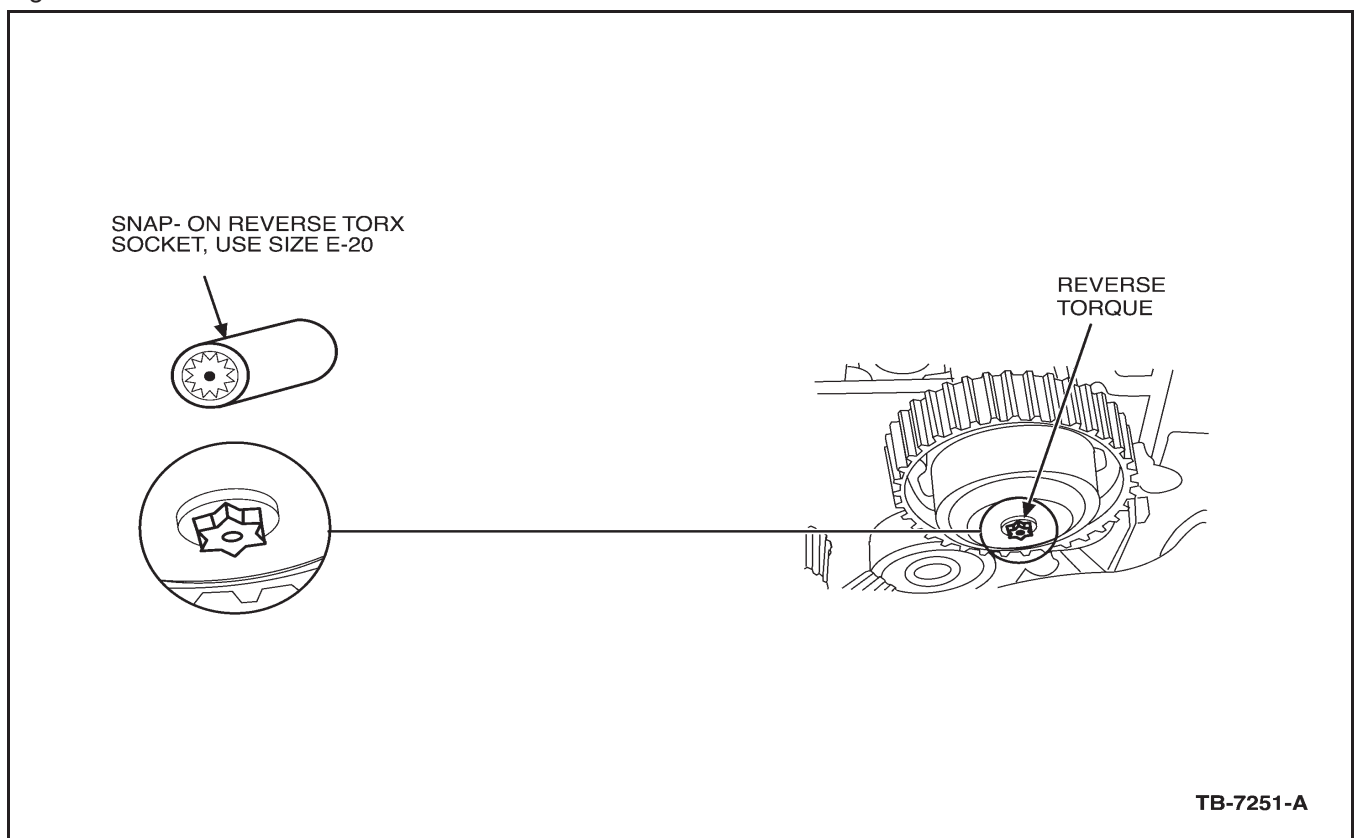


Figure 11 - Article 03-15-14

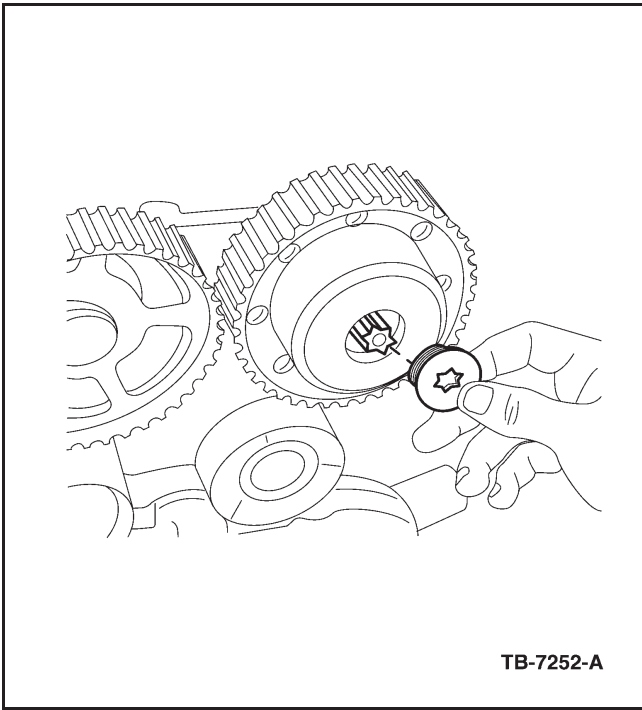


Figure 12 - Article 03-15-14

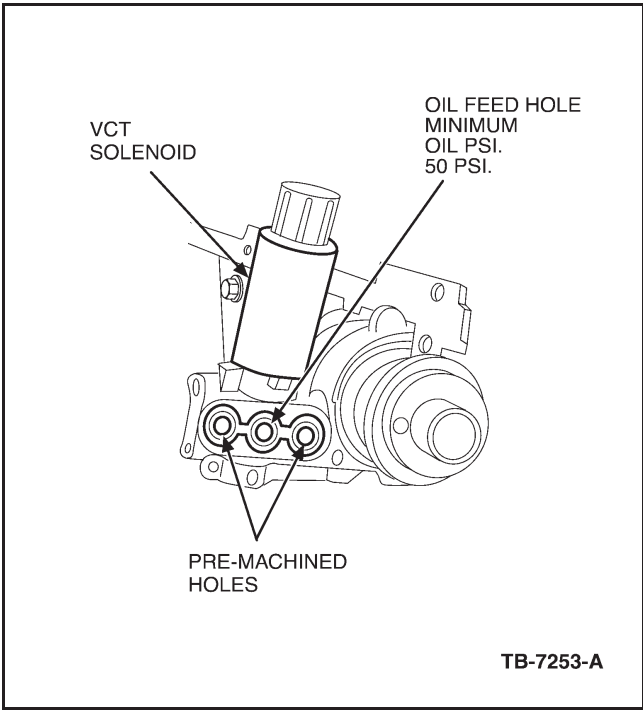


Figure 13 - Article 03-15-14

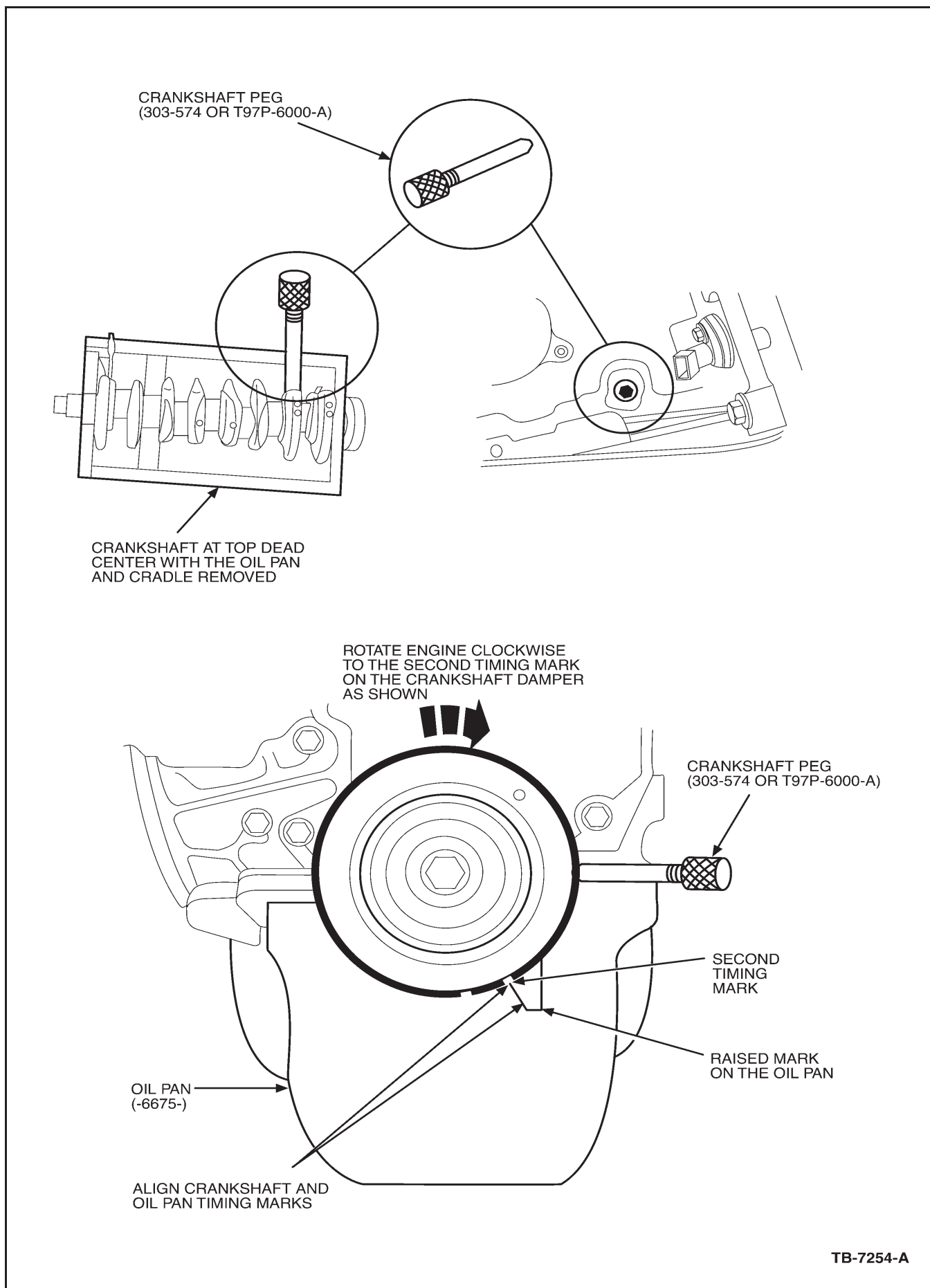


Figure 14 - Article 03-15-14