

DTC P1396 (VVT Solenoid
Malfunction - B bank) –
Diagnosis and Repair

MODEL 1997 MY-ON
XK8 Range
VIN
001001-011682

Issue:

This bulletin outlines the proper procedure for diagnosis and repair if a 1997 MY-ON XK8 stores a DTC P1396 (Variable Valve Timing [VVT] solenoid malfunction - B bank). The procedure covers diagnosis of the VVT solenoid, the VVT actuator, and the camshaft position sensor reductor.

A limited number of engines, in vehicles within the above VIN range, may have a reductor misalignment which would result in DTC P1396 being stored.

Action:

When diagnosing the cause of a DTC P1396 on a 1997 MY XK8 vehicle within the above VIN range, proceed as follows:

CHECKING THE VVT SOLENOID AND THE VVT ACTUATOR

1. Load the PDU at the base station and connect the PDU to the data link connector.
2. Use the PDU to display the recorded DTC(s). If DTC P1396 is recognized as the system fault, proceed to step 3.
3. Disconnect the B bank VVT solenoid connector (Illustration 1.)

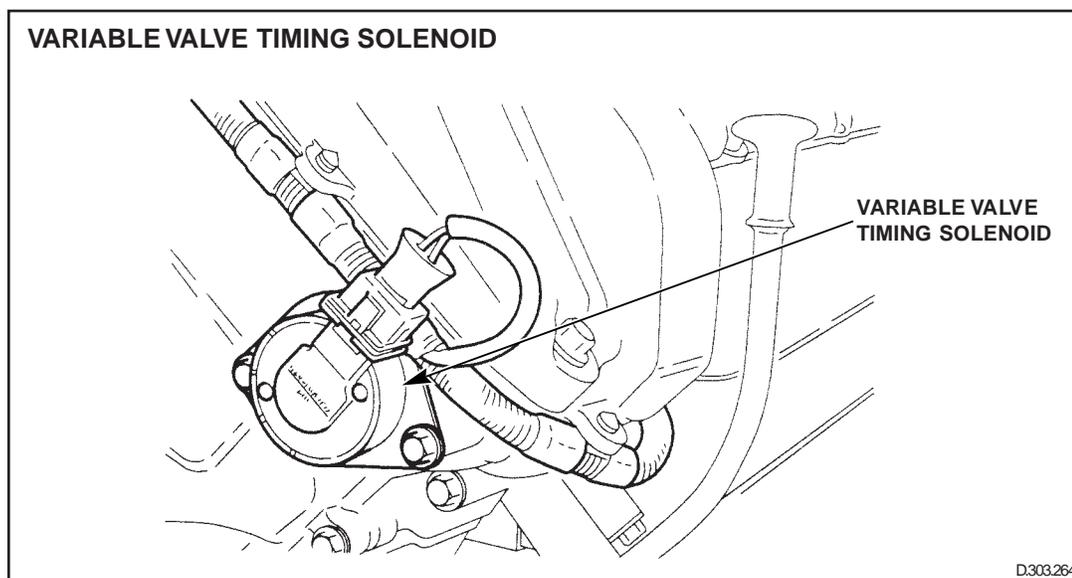


ILLUSTRATION 1

4. After removing the securing screws, remove the VVT solenoid from the timing cover.
5. Remove and discard the O-ring seal from the solenoid.
6. Apply battery voltage to the solenoid connector pins to verify that the solenoid plunger operates correctly.

⚠ WARNING: The following steps involve working at the front of the engine while it is running. Use care to avoid the drive belts and pulleys. It is recommended that you have an assistant start and stop the engine.

VVT ACTUATING VALVE (SHOWN WITH TIMING COVER REMOVED)

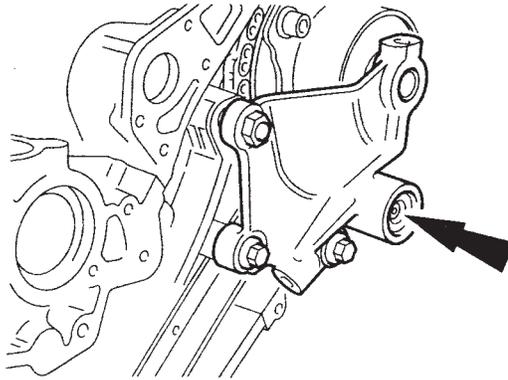


ILLUSTRATION 2

7. Insert a suitable rod through the VVT solenoid mounting opening in the timing cover, into the actuating valve (Illustration 2.)
8. Cover the area surrounding the rod and the timing cover opening with absorbent material to absorb any oil spilled when the engine is run.

CAUTION: Ensure that the absorbent material will not contact the belt or pulleys.

9. Start the engine.
10. With the engine at ambient temperature and running at idle, press on the rod to operate the actuating valve, which will in turn operate the VVT actuator. When the engine is cold, the idle speed will become uneven when the VVT operates. This verifies that the VVT actuator operates correctly.

NOTE: The oil pressure must be above 1.5 bar (21.8 psi) to operate the VVT actuator. (Low oil pressure warning light off.)

11. Stop the engine.
12. Remove and discard the absorbent material.
13. Remove the rod and clean the surrounding area.
14. Reinstall the VVT solenoid with a new O-ring.
15. Reconnect the harness to the VVT solenoid connector.

CHECKING THE CAMSHAFT POSITION SENSOR RELUCTOR

1. Remove the engine cover, coil cover and the coils from the B bank.
2. Remove the EVAP purge valve.
3. Remove the harness clips from the camshaft cover.
4. Loosen the camshaft cover securing bolts and lift the cover with the bolts from the camshaft carrier.
5. Remove the securing bolts from the cover.
6. Remove and discard the seals from the bolts.
7. Remove and discard the outer and inner gaskets from the camshaft cover.
8. Rotate the crankshaft until you can observe the position of the camshaft position sensor reluctor. The reluctor (Illustration 3) should be centered in the drive slot without a noticeable gap at either side. Illustration 3, for example, shows a gap at the arrow meaning that the reluctor is advanced. If the gap were at the other side, the reluctor would be retarded. If the reluctor is not positioned properly, proceed to step 9, otherwise proceed to step 12, then refer to DTC summaries manual for other possible causes for DTC P1396.

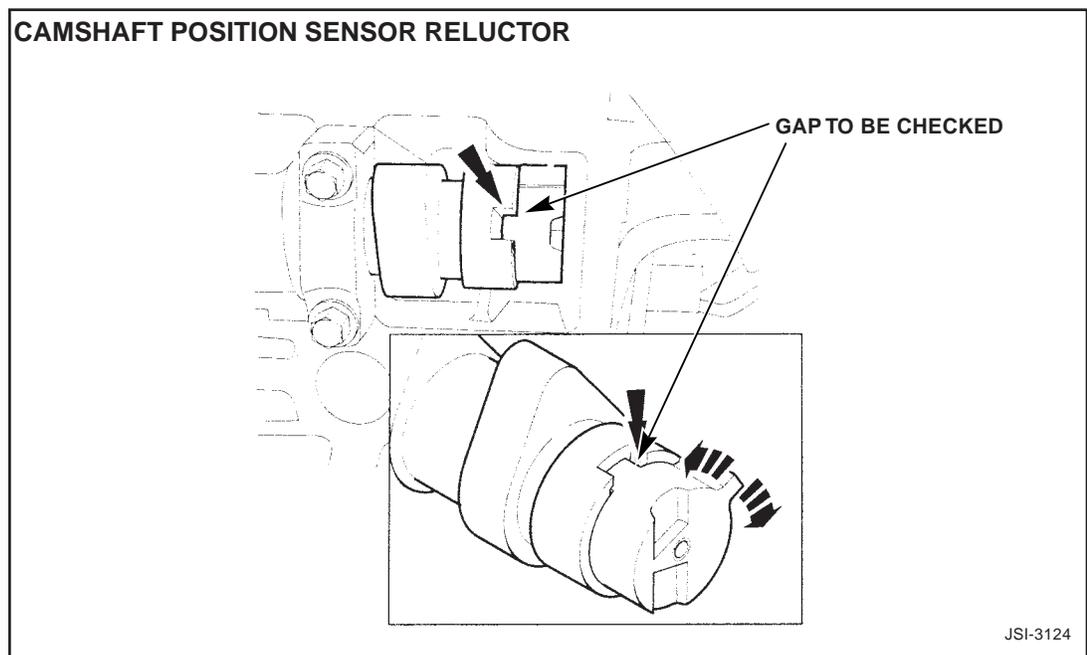


ILLUSTRATION 3

9. Use suitable locking pliers to hold the camshaft on the unfinished area between cylinders 3 and 4, at the cast-in flat projection.
10. Lightly strike the reluctor lobe, while tensioning the camshaft in the opposite direction, to re-position the rotor against the opposite face of the slot.
11. Remove the locking pliers from the camshaft.

12. Install new spark plug seals and a camshaft cover gasket (Illustration 4).

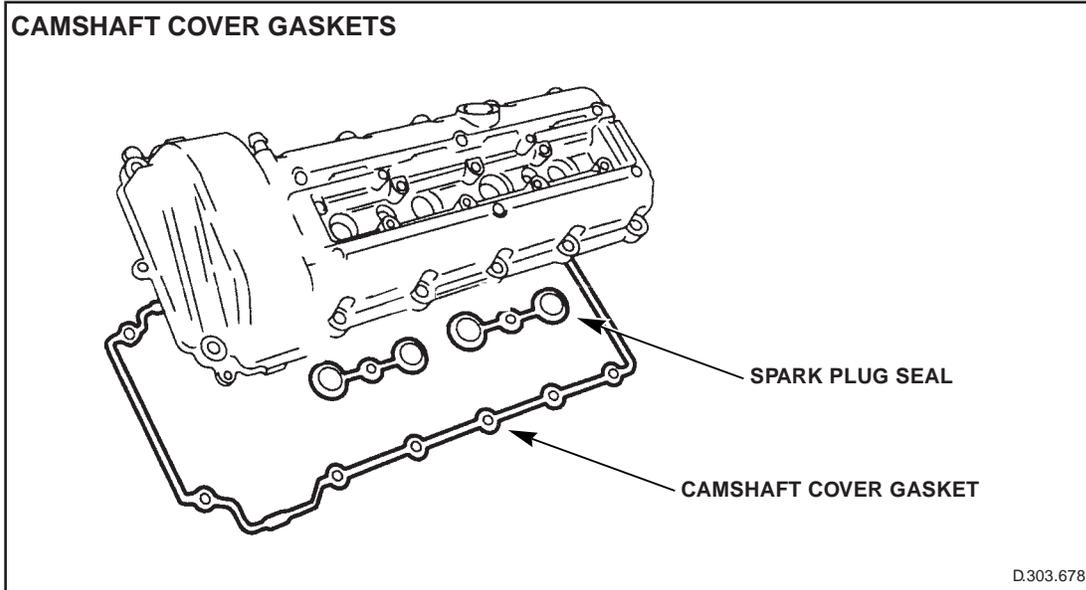


ILLUSTRATION 4

13. Install new sealing rings (Illustration 5) on the securing bolts and then install the bolts in the camshaft cover.

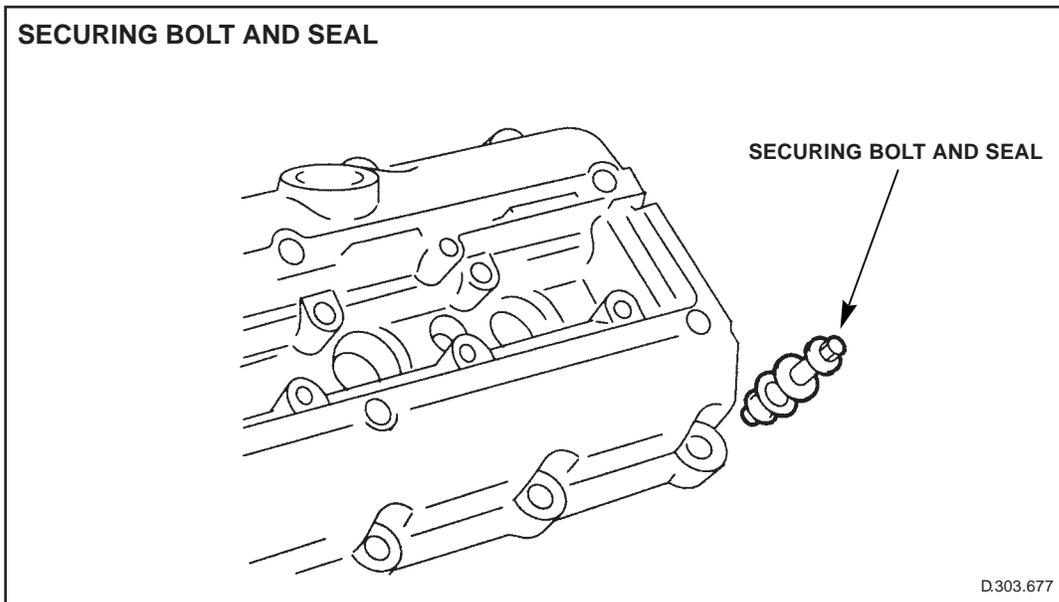


ILLUSTRATION 5

14. Apply a bead of approved RTV sealant to the two areas where the joint between the front cover and the cylinder head is exposed (Illustration 6).

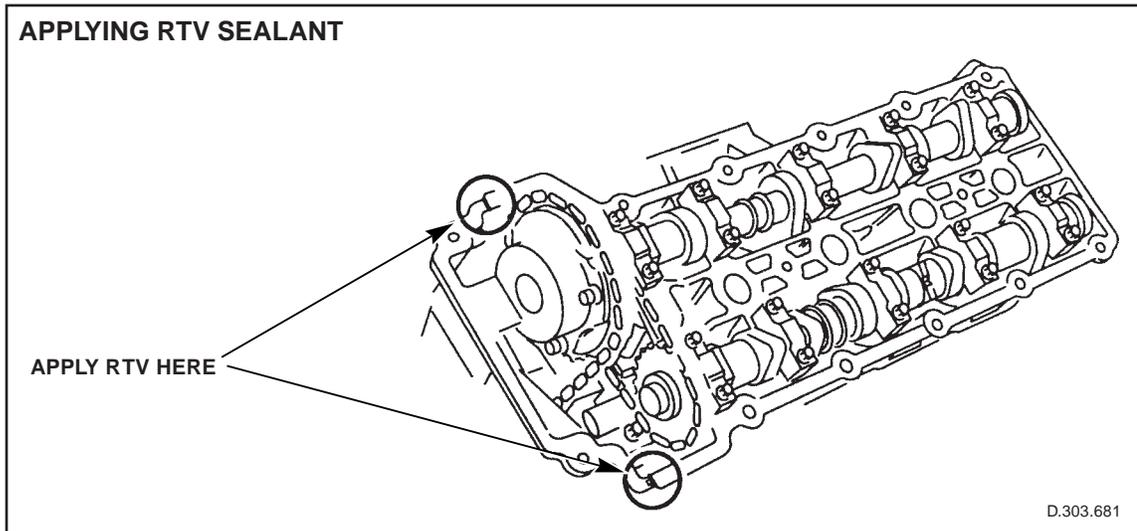


ILLUSTRATION 6

NOTE: Install the camshaft cover immediately after applying the sealant. Position the cover with the retaining bolts to avoid smearing the sealant bead.

15. Torque the camshaft cover securing bolts to 9-11 Nm, according to the sequence in Illustration 7.

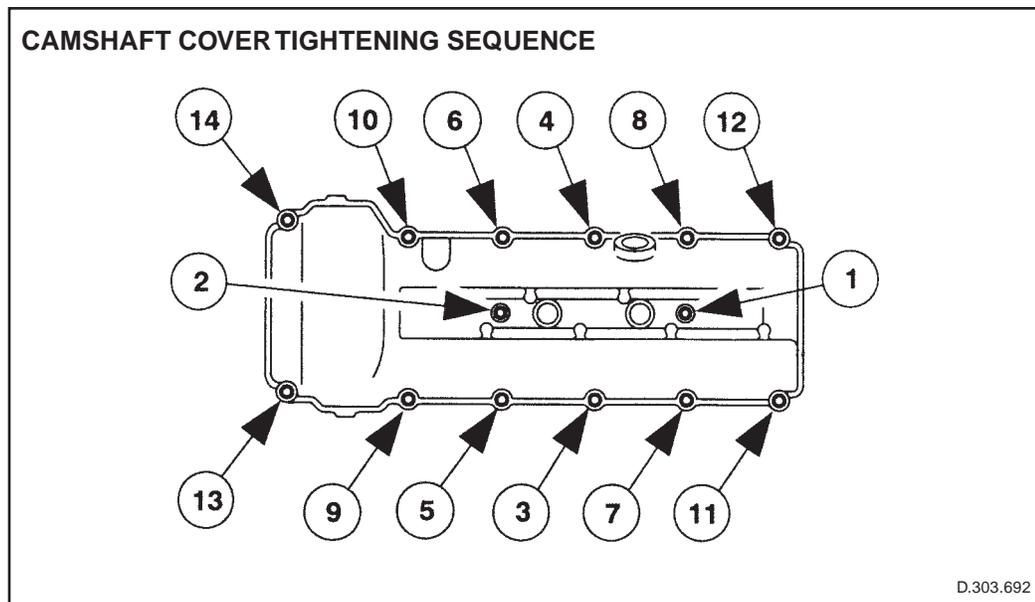


ILLUSTRATION 7

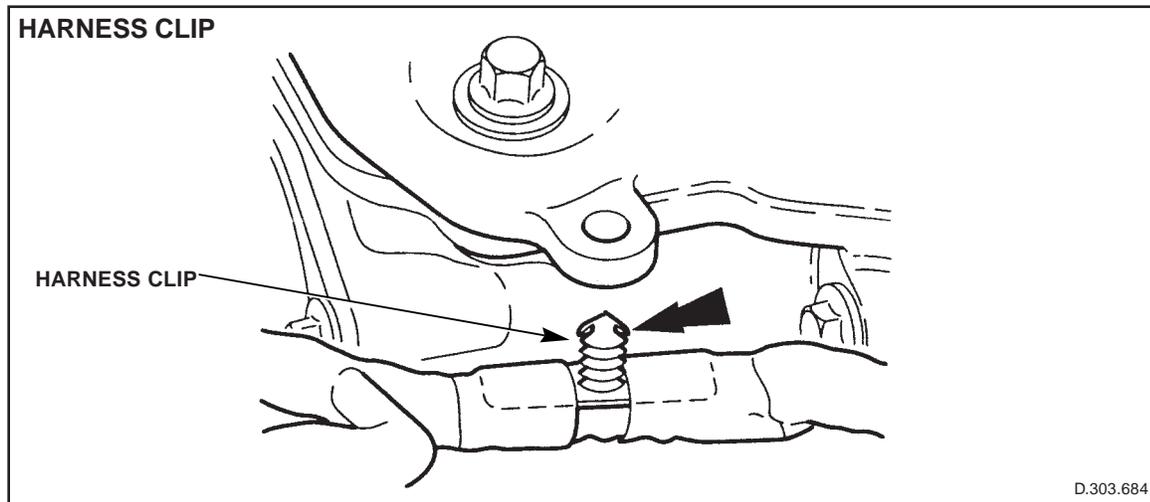


ILLUSTRATION 8

16. Reinstall the harness clips on the camshaft cover (Illustration 8).
17. Reinstall the EVAP purge valve.
18. Reinstall the ignition coils, the coil cover and the engine cover.
19. Clear the DTC by using the PDU.

ROAD TEST

1. Start the engine and select the Drive 2 range.
2. With the coolant temperature between 30°C and 80°C, accelerate from idle to 4200 RPM (in the Drive 2 range) several times to initiate the VVT diagnostics.
2. Use the PDU to check if DTC P1396 was reset. If so, continue with PDU diagnostics.

Parts Information:

<u>DESCRIPTION</u>	<u>PART NUMBER</u>	<u>QTY</u>
O-ring	KSC 145624	1
Seal/isolator ring	NCA 2575CA	14
Spark plug seal	NCA 2578BB	2
Cam cover gasket	NCA 2516AD	1

Warranty Information:

<u>FAULT CODE</u>	<u>R.O. NUMBER</u>	<u>DESCRIPTION</u>	<u>TIME ALLOWANCE</u>
AN ** **	18.91.19	Camshaft reluctor modification	1.70 hrs.
	10.10.10	Drive in/drive out	0.15 hrs.

** **

GD GH	Solenoid unserviceable
GG GH	Bush carrier unserviceable
GB GH	Actuator unserviceable
HB GC	Reluctor misaligned