DTC P0700 TCU REQUEST FOR MIL ON

GENERAL DESCRIPTION

The TCM can request activation of the MIL lamp Via a communication line to the ECM. This is only a request from TCM to ECM to turn the MIL on. The fault code is stored in the TCM. Select Transaxle system on the scan tool and monitor DTC related automatic transaxle system. DO ALL REPAIRS associated with A/T malfunction.

DTC DETECTING CONDITION

DTC DETECTING CONDITION AND POSSIBLE CAUSE

Item	Detecting Condition	Possible Cause
DTC Strategy	• TCU request via CAN	• Transaxle system
Enable Conditions	• Battery voltage > 10V • Engine speed > 32 RPM • Time after ignition ON > 0.5sec.	
Threshold Value	• Failure from TCU	
Diagnostic Time	• 10 ms	
MIL On Condition	• Controlled by TCM	

MONITOR DTC STATUS

1. This is only a request from TCM to ECM to turn the MIL on. The fault code is stored in the TCM. The Freeze Frame Data is stored in the ECM under the P0700 request code. Be sure to retrieve freeze frame data before clearing code P0700 from ECM.
2. Check the transaxle system.

P0760

DTC P0760: SHIFT CONTROL SOLENOID VALVE C CIRCUIT MALFUNCTION

COMPONENT LOCATION

Refer to DTC P0750 .

GENERAL DESCRIPTION

Refer to DTC P0750 .

DTC DESCRIPTION

The PCM/TCM checks the 2nd brake drive Control Signal by monitoring the feedback signal from the solenoid valve drive circuit. If an unexpected signal is monitored, (For example, high voltage is detected when low voltage is expected or low voltage is detected when high voltage is expected) the PCM/TCM judges that 2nd Brake drive control solenoid circuit is malfunctioning and sets this code.

DTC DETECTING CONDITION

DTC DETECTING CONDITION

Item	Detecting Condition	Possible cause
DTC Strategy	• Check voltage range	• Open or short in circuit • Faulty 2-4 SOLENOID VALVE • Faulty PCM/TCM
Enable Conditions	• 16V > Actuator (TCU) power supply voltage >10V • Lever Position: "P, N" • The MAX feed back voltage < 4V • PWM duty > 25% • Delay time = 1sec	
Threshold Value	• 0.1V > The MAX feed back voltage > 4V	
Diagnostic Time	• More than 1 sec	
Fail Safe	• Locked in 3rd gear	

SPECIFICATION

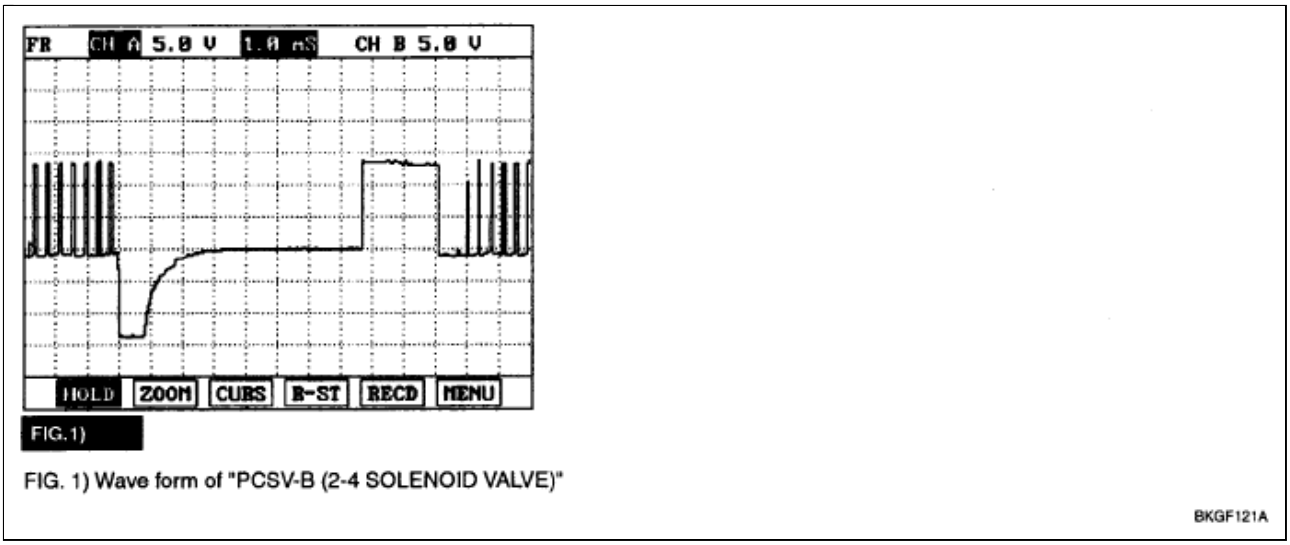
Refer to DTC P0743 .

SCHEMATIC DIAGRAM

Refer to DTC P0743 .

SIGNAL WAVEFORM

Fig 1: PCSV-B (2-4 Solenoid Valve) - Signal Waveform

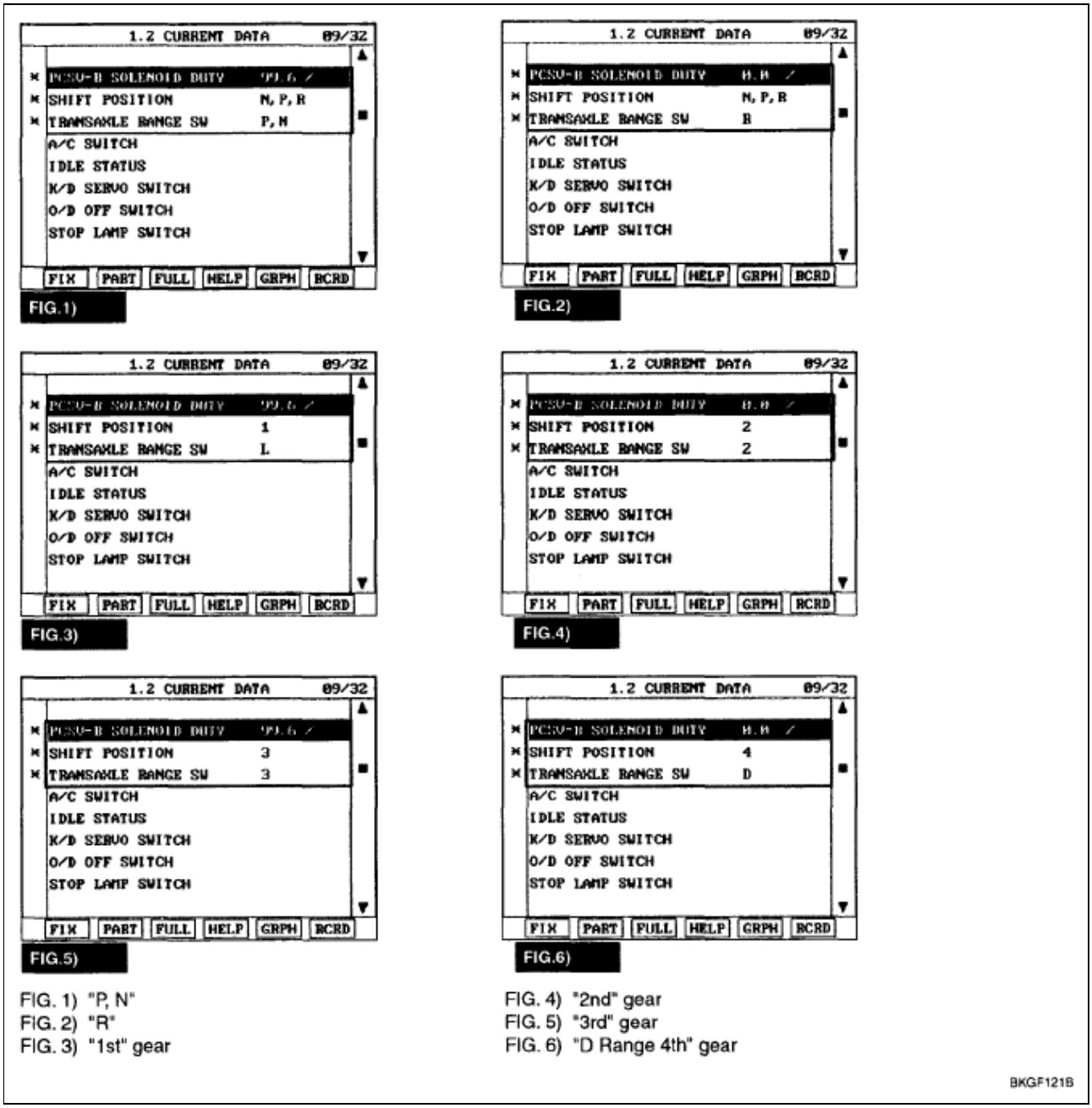


Courtesy of KIA MOTORS AMERICA, INC.

MONITOR SCAN TOOL DATA

1. Connect scan tool to data link connector (DLC).
2. Engine "ON".
3. Monitor the "PCSV-B (2-4 SOLENOID VALVE)" parameter on the scan tool.
4. Shift gear at each position.

Fig 2: Scan Tool Data Screen Display - PCSV-B (2-4 Solenoid Valve) Parameter



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5. Does "PCSV-B (2-4 SOLENOID VALVE)" follow the reference data?

YES

1. Fault is intermittent caused by poor contact in the sensor's and/or TCM (PCM)'s connector or was repaired and TCM (PCM) memory was not cleared. Thoroughly check connectors for looseness, poor connection, bending, corrosion, contamination, deterioration or damage. Repair or replace as necessary and go to "VERIFICATION OF VEHICLE REPAIR " procedure.

NO

1. Go to "TERMINAL & CONNECTOR INSPECTION " procedure.

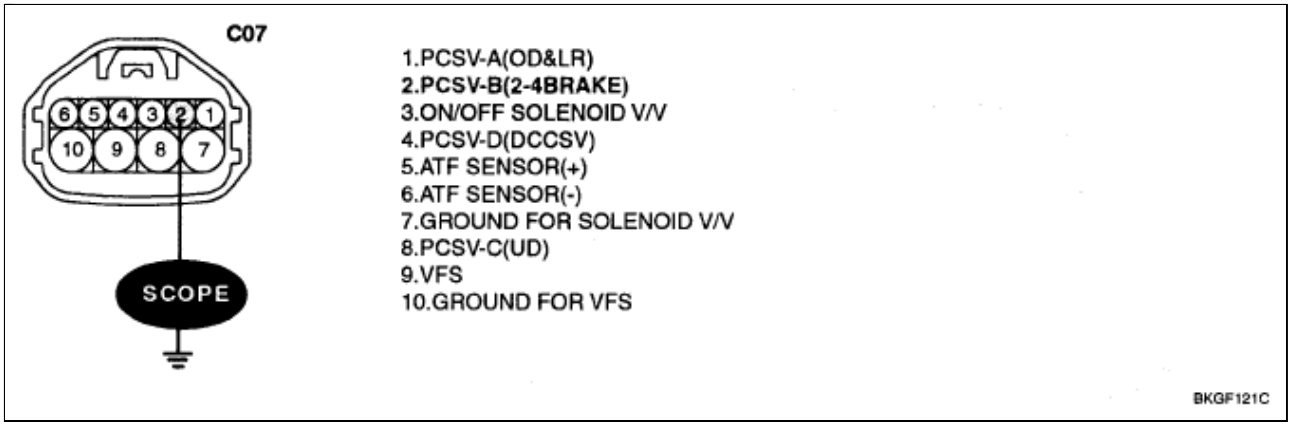
TERMINAL & CONNECTOR INSPECTION

Refer to DTC P0743 .

POWER SUPPLY CIRCUIT INSPECTION

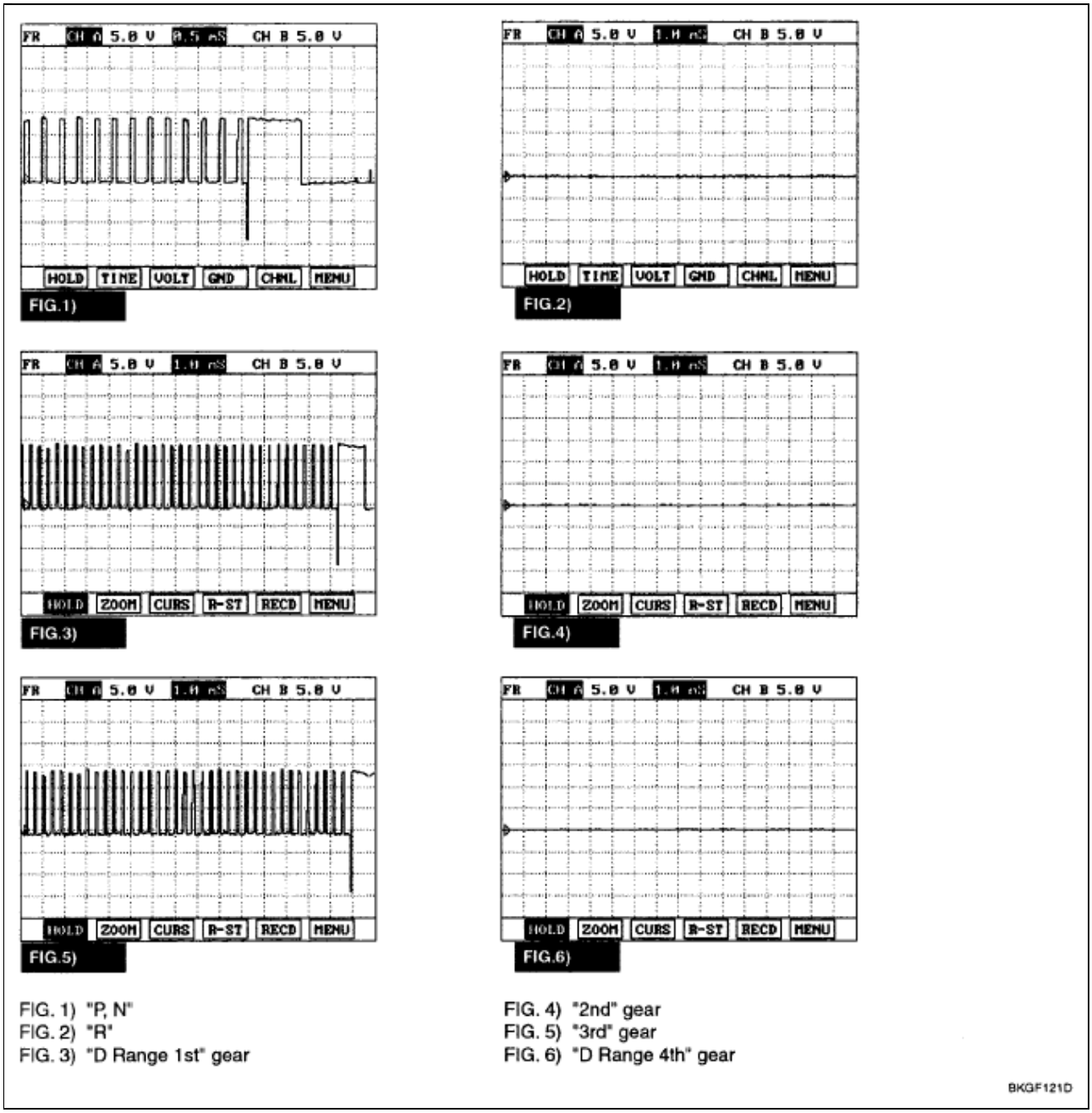
1. Connect "A/T SOLENOID VALVE" connector and install device for measuring wave form.
2. Turn on the Engine and operate PCSV-B (2-4 SOLENOID VALVE).
3. Measure wave form between terminal "2" of the sensor harness connector and chassis ground.

Fig 3: Measuring Wave Form Between Terminal 2 Of Sensor Harness Connector And Chassis Ground



Courtesy of KIA MOTORS AMERICA, INC.

Fig 4: PCSV-B (2-4 Solenoid Valve) - Signal Waveform



Courtesy of KIA MOTORS AMERICA, INC.

4. Is measured normally operating wave form?

   YES

   1. Go to "SIGNAL CIRCUIT INSPECTION " procedure.

   NO

   1. Check for open in harness. Repair as necessary and go to "VERIFICATION OF VEHICLE REPAIR " procedure.

SIGNAL CIRCUIT INSPECTION

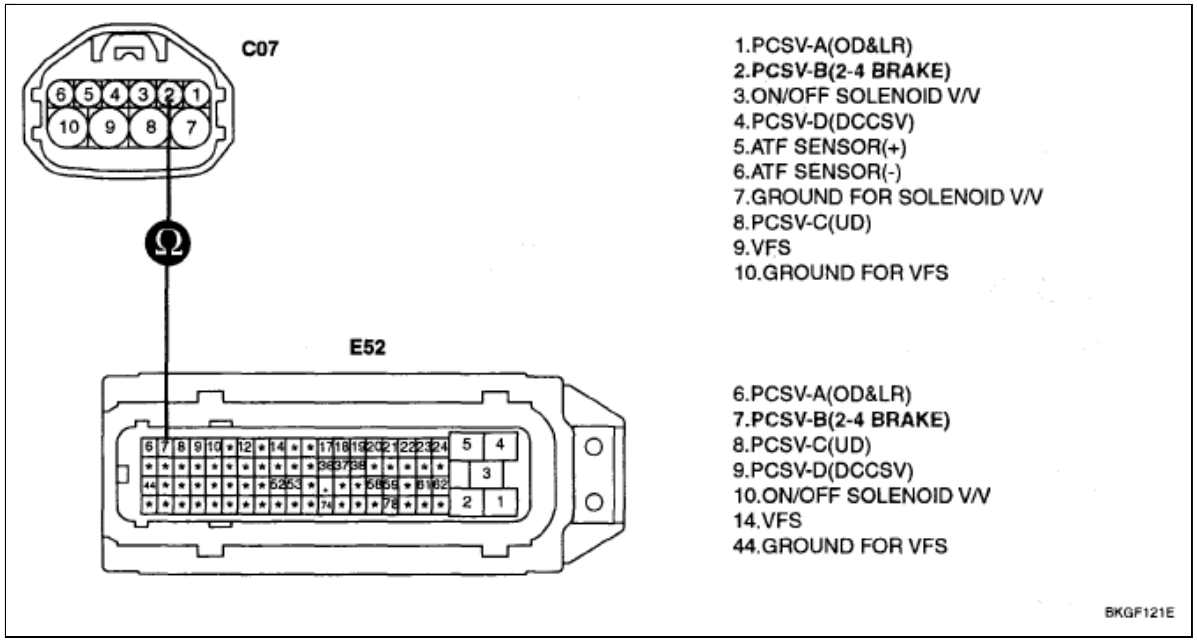
1. Check signal circuit open inspection

   1. Ignition "OFF".

2. Disconnect "A/T SOLENOID VALVE" connector and "PCM/TCM" connector.
3. Measure resistance between terminal "2" of the ATM SOLENOID VALVE harness connector and terminal "7" of the PCM/TCM harness connector.

   Specification: approx. 0 Ω

   Fig 5: Measuring Resistance Between Terminal 2 Of ATM Solenoid Valve Harness Connector And Terminal 7 Of PCM/TCM Harness Connector



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4. Is resistance within specifications?

   YES

   1. Go to step 2.

   NO

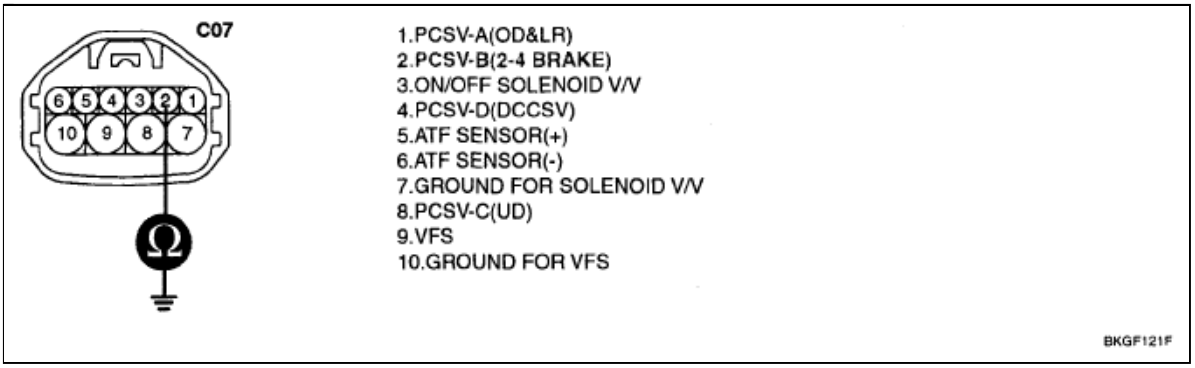
   1. Check for open in harness. Repair as necessary and go to "VERIFICATION OF VEHICLE REPAIR " procedure.

2. Check signal circuit short inspection

   1. Ignition "OFF".
   2. Disconnect "A/T SOLENOID VALVE" connector and "PCM/TCM" connector.
   3. Measure resistance between terminal "2" of the ATM SOLENOID VALVE harness and chassis ground.

      Specification: Infinite

Fig 6: Measuring Resistance Between Terminal 2 Of ATM Solenoid Valve Harness And Chassis Ground



Courtesy of KIA MOTORS AMERICA, INC.

4. Is resistance within specifications?

YES

1. Go to step 3.

NO

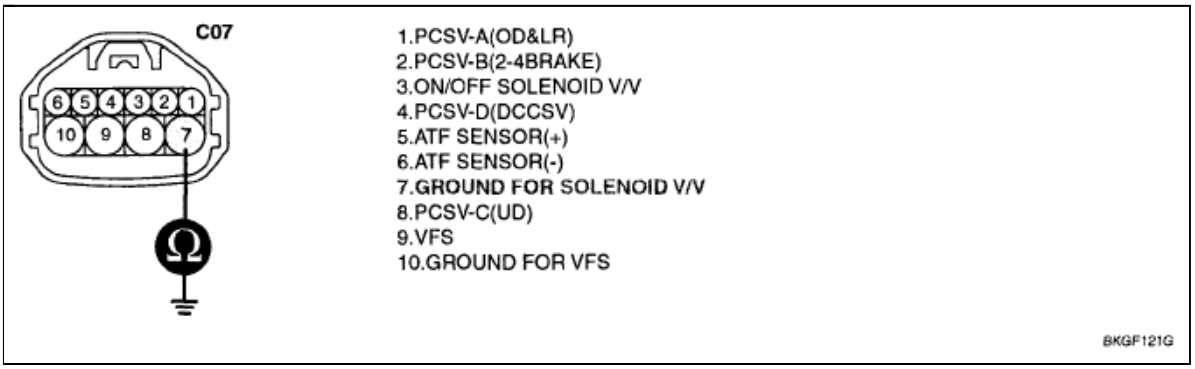
1. Check for short to ground in harness. Repair as necessary and go to "VERIFICATION OF VEHICLE REPAIR " procedure.

3. Check signal circuit ground inspection

1. Ignition "OFF".
2. Disconnect "A/T SOLENOID VALVE" connector and "PCM/TCM" connector.
3. Measure resistance between terminal "7" of the ATM SOLENOID VALVE harness and chassis ground.

   Specification: approx. 0Ω

Fig 7: Measuring Resistance Between Terminal 7 Of ATM Solenoid Valve Harness And Chassis Ground



Courtesy of KIA MOTORS AMERICA, INC.

4. Is resistance within specifications?

YES

1. Go to "COMPONENT INSPECTION " procedure.

NO

1. Check for short to ground in harness. Repair as necessary and Go to "VERIFICATION OF VEHICLE REPAIR " procedure.

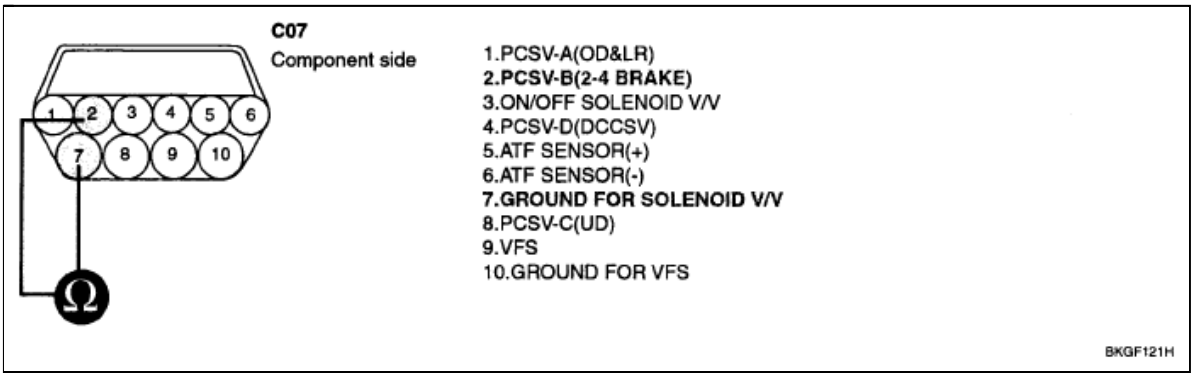
COMPONENT INSPECTION

1. CHECK SOLENOID VALVE

    1. Ignition "OFF".
    2. Disconnect "A/T SOLENOID VALVE" connector.
    3. Measure resistance between terminal "2" and terminal "7" of the ATM SOLENOID VALVE harness connector.

        Specification: Approximately 3.5±0.2Ω [(25°C (77°F)]

        Fig 8: Measuring Resistance Between Terminal 2 And Terminal 7 Of ATM Solenoid Valve Harness Connector

        Courtesy of KIA MOTORS AMERICA, INC.

    4. Is resistance within specification?

        YES

        1. Go to step 2.

        NO

        1. Replace PCSV-B (2-4 SOLENOID VALVE) as necessary and go to "VERIFICATION OF VEHICLE REPAIR " procedure.

2. CHECK PCM/TCM

    1. Connect scan tool to data link connector (DLC).
    2. Ignition "ON" & Engine "OFF".
    3. Select A/T solenoid valve actuator test and operate actuator test.
    4. Can you hear operating sound for using PCSV-B (2-4 SOLENOID VALVE) Actuator Testing Function?

        YES

        1. Go to "VERIFICATION OF VEHICLE REPAIR " procedure.

NO

1. Replace PCM/TCM as necessary and go to "VERIFICATION OF VEHICLE REPAIR " procedure.

ACTUATOR TEST CONDITION

1. IG SWITCH ON
2. TRANSAXLE RANGE SWITCH is normal
3. P RANGE
4. Vehicle Speed 0 mph (0 km/h)
5. Throttle position sensor < 1V
6. IDLE SWITCH ON
7. ENGINE RPM 0

VERIFICATION OF VEHICLE REPAIR

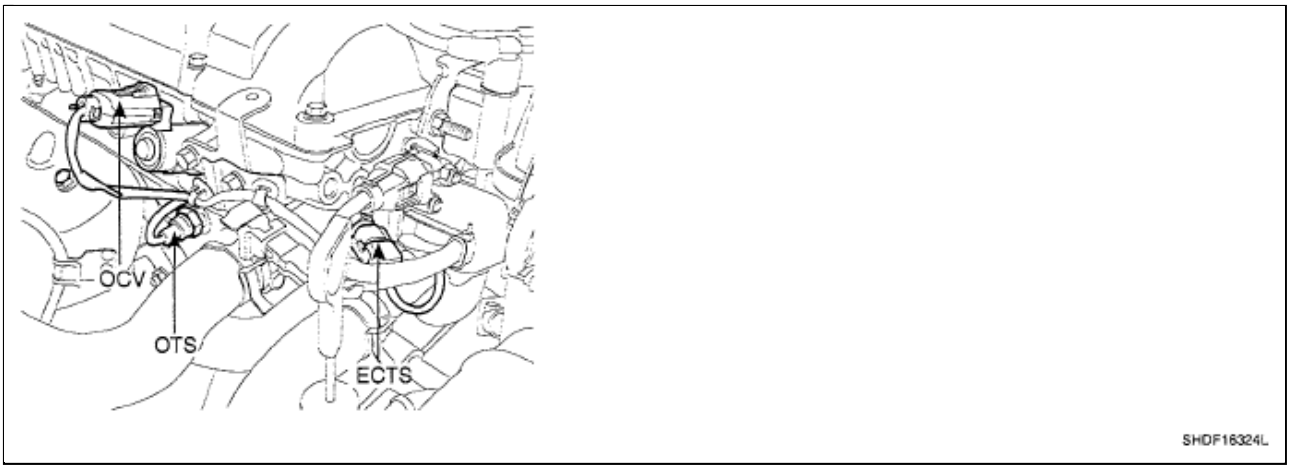
Refer to DTC P0743 .

P0011

DTC P0011 "A" CAMSHAFT POSITION-TIMING OVER-ADVANCED OR SYSTEM PERFORMANCE (BANK 1)

COMPONENT LOCATION

Fig 1: Identifying OCV, OTS And ECTS



Courtesy of KIA MOTORS AMERICA, INC.

GENERAL DESCRIPTION

The CVVT (Continuously Variable Valve Timing) system is installed to the chain sprocket of the exhaust camshaft. There is no variation in valve timing of the exhaust cam because the exhaust camshaft is driven by the timing belt. The timing of the intake cam is varied by the relative operation the CVVT vane to the housing. The CVVT controller regulates the intake camshaft angle using oil pressure through the OCV (Oil Control Valve). As result, the relative position between the camshaft and the crankshaft becomes optimal, and the engine torque improves, fuel economy improves, exhaust emissions decrease by changing the valve open/close timing of the intake camshaft.

DTC DESCRIPTION

The deviation of the camshaft position from the target point is evaluated during stable driving condition. The ECM accumulates this deviation for a certain period and sets DTC P0011 when the accumulated deviation is too high. The target camshaft position is predetermined value depending on engine speed and throttle angle in the ECM.

DTC DETECTING CONDITION

DTC DETECTING CONDITION AND POSSIBLE CAUSE

Item	Detecting Condition	Possible Cause
DTC Strategy	• Monitor deviation between camshaft position set point and actual value	• Faulty Oil leak • Faulty Oil pump • Faulty Intake valve control solenoid
Enable Conditions	• No relevant failure • 11V < Battery voltage < 16V	

	• CVVT control: enabled • Camshaft set point moved more than 5 times for this Driving Cycle • Stable camshaft set-point moving by more than 1.125° CRK moving • Camshaft position set point-actual > 5° CRK • 600-1700 RPM < Engine speed < 5000 RPM • 20°C (68°F) < Engine oil temperature < 100°C (212°F)
Threshold Value	• Integral of Camshaft position set point - Camshaft position actual value > 150°CRK/sec.
Diagnostic Time	• Approx. 38-300 seconds depending on CAM deviation
MIL On Condition	• 2 Driving Cycles

SPECIFICATION

INTAKE OCV RESISTANCE SPECIFICATIONS

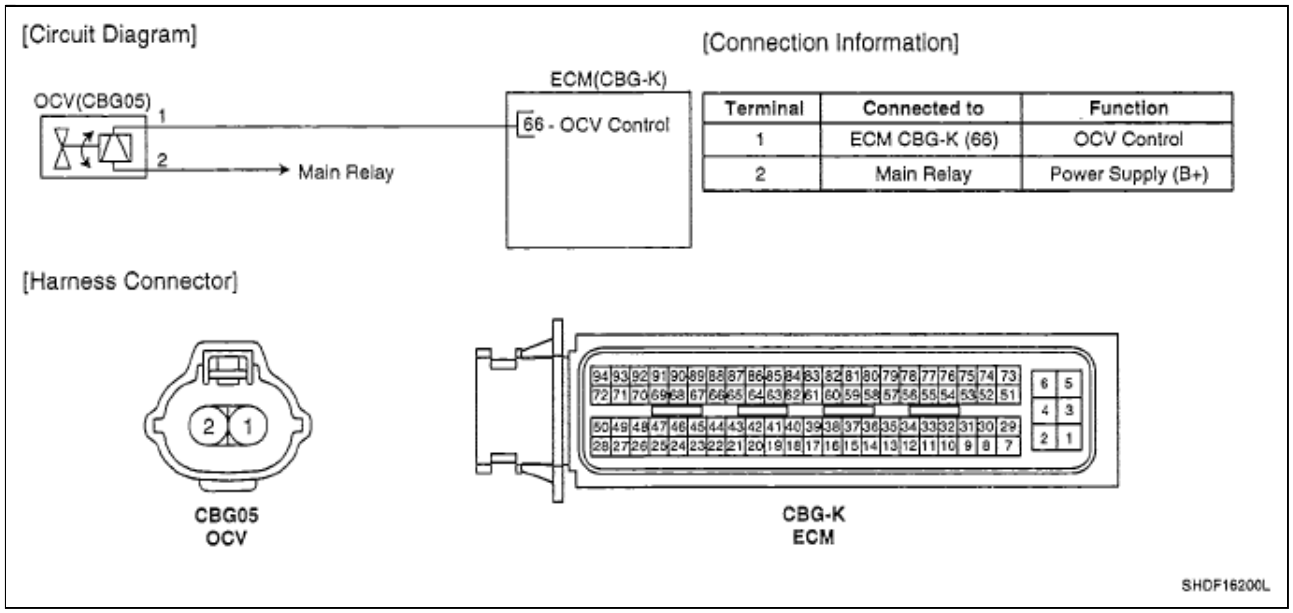
Intake OCV	Normal Parameter
Insulation Resistance (Ω)	Above 50 MΩ

RESISTANCE SPECIFICATIONS

Temp. (°C)	Temp. (°F)	Resistance (Ω)
0	32	6.2-7.4
10	50	6.5-7.7
20	68	6.9-7.9
30	86	7.1-8.3
40	104	7.4-8.6
50	122	7.7-8.9
60	140	8.0-9.2
70	158	8.3-9.5
80	176	8.6-9.8
90	194	8.9-10.1
100	212	9.2-10.4

SCHEMATIC DIAGRAM

Fig 2: CVVT Oil Control Valve - Circuit Diagram



Terminal	Connected to	Function
1	ECM CBG-K (66)	OCV Control
2	Main Relay	Power Supply (B+)

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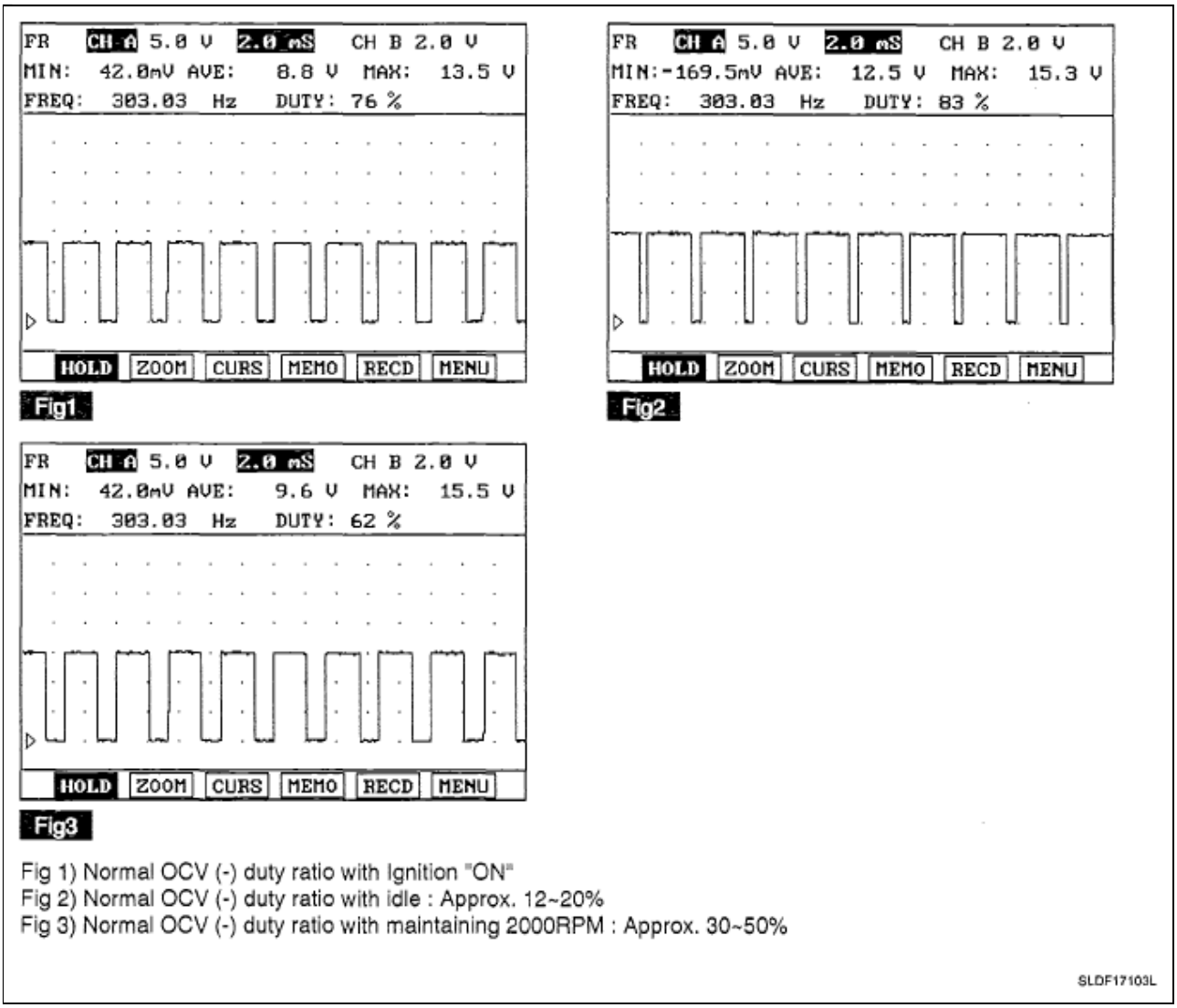
SIGNAL WAVEFORM AND DATA

Fig 3: Signal Waveform And Data

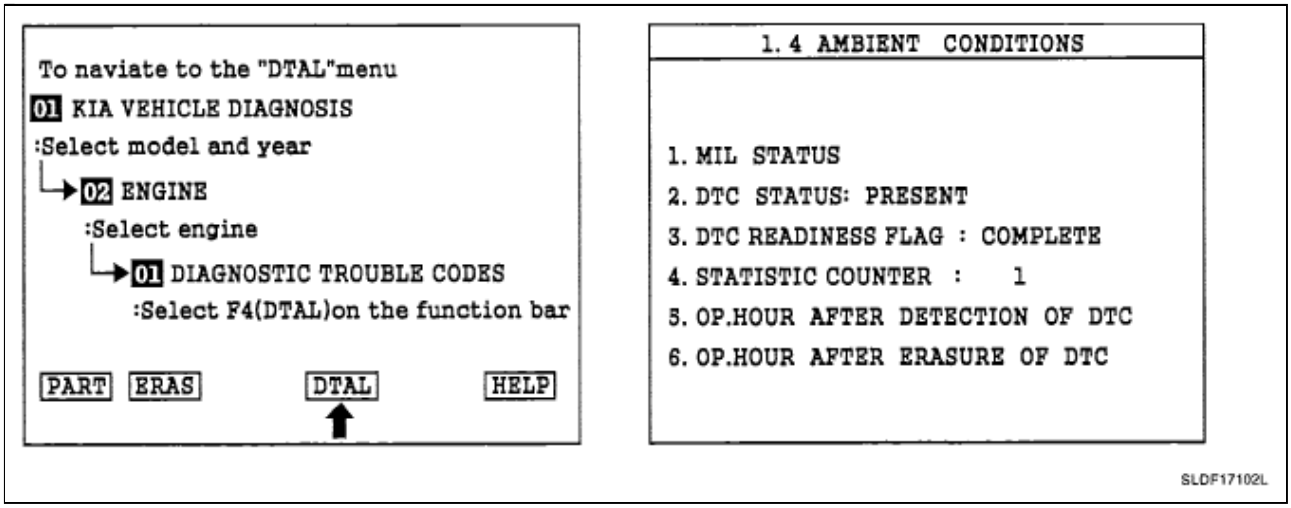


Courtesy of KIA MOTORS AMERICA, INC.

MONITOR DTC STATUS

1. Connect scan tool and select "Diagnostic Trouble Codes (DTCs)" mode.
2. Press F4 (DTAL) to select DTC information from the DTCs menu.
3. Confirm that "DTC Readiness Flag" indicates "Complete". If not, drive the vehicle within conditions noted in the freeze frame data or enable conditions.
4. Read "DTC Status" parameter.

Fig 4: Scan Tool Display - DTC STATUS PARAMETER



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5. Is parameter displayed "History (Not Present) fault"?

> *NOTE:*
>
> 1. *History (Not Present) fault: DTC occurred but has been cleared.*
> 2. *Present fault: DTC is occurring at present time.*

YES

1. Fault is intermittent caused by poor contact in the sensor's and/or ECM's connector or was repaired and ECM memory was not cleared. Thoroughly check connectors for looseness, poor connection, bending, corrosion, contamination, deterioration, or damage. Repair or replace as necessary and then go to "VERIFICATION OF VEHICLE REPAIR " procedure.

NO

1. Go to next step as below.

COMPONENT INSPECTION

CHECK OCV AND FILTER

1. Check resistance of OCV.
    1. Ignition "OFF"
    2. Disconnect intake OCV connector.
    3. Measure resistance between terminals 1 and 2 of the intake OCV connector (Component side).

       Specification: Approx. 6.9-7.9Ω at 20°C (68°F)
    4. Is resistance within the specification?

       YES

        1. Go to next step as below.

NO

1. Replace OCV and then go to "VERIFICATION OF VEHICLE REPAIR " procedure.

2. Check operation of OCV

    1. Start the engine and let it idle.
    2. With OCV connector still disconnected, connect 12V and a ground to 2 and 1 of the OCV (Component side).

        SPECIFICATION:

        VOLTAGE SPECIFICATIONS

Test Condition	Disconnect OCV connector	Apply battery voltage
Normal Value	Normal engine speed	Rough idle or engine stall

    3. Has a problem been found?

        YES

        1. Go to next step as below.

        NO

        1. Go to "CHECK CVVT (CONTINUOUSLY VARIABLE VALVE TIMING) ASSEMBLY " procedure.

3. Check OCV and Filter.

    1. Ignition "OFF"
    2. Check OCV filter for sticking or contamination.
    3. Remove the OCV and visually check the spool column of OCV for contamination.
    4. Has a problem been found?

        YES

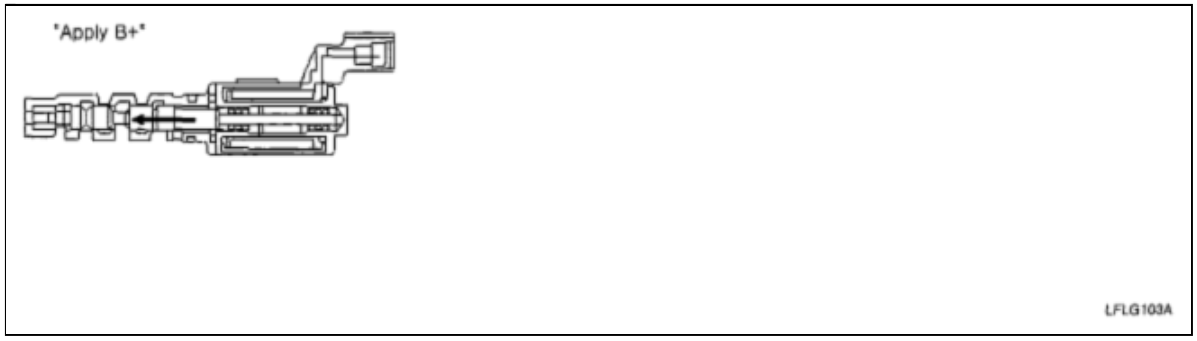
        1. Clean or replace as necessary and then go to "VERIFICATION OF VEHICLE REPAIR " procedure.

        NO

        1. Go to next step as below.

    5. Apply 12V and a ground to 2 and 1 terminals of the OCV (Component side).
    6. Verify that a "clicking" sound is heard when applying the battery voltage.
    7. Repeat this procedure 4 or 5 times to ensure intake OCV reliability.

Fig 5: Checking OCV Operation



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8. Is OCV working properly?

YES

1. Go to next step as below.

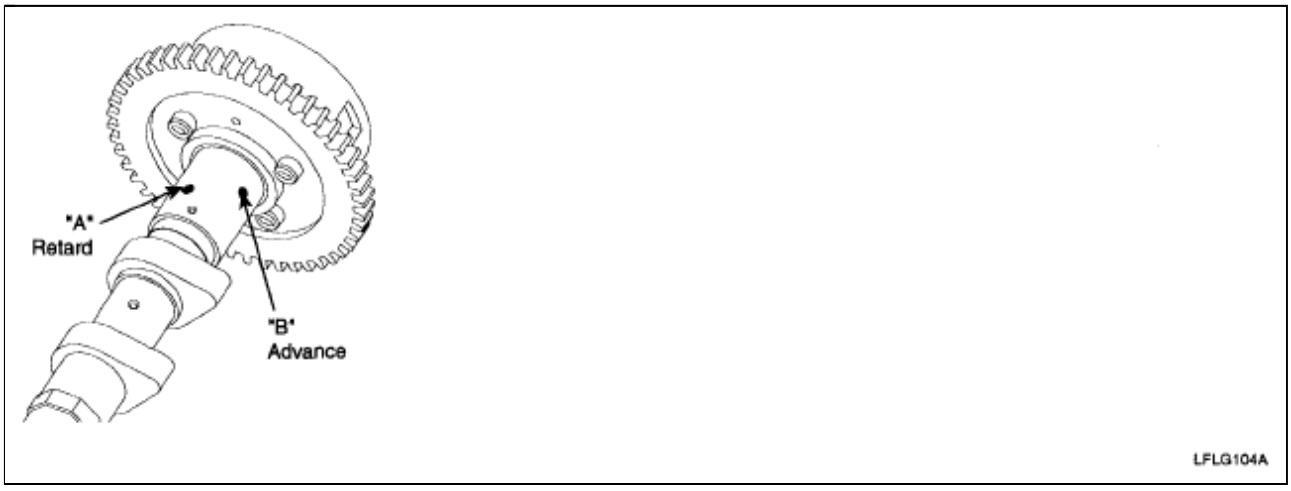
NO

1. Check OCV for contamination, deterioration, or damage. Substitute with a known-good OCV and check for proper operation. If the problem is corrected, replace OCV and then go to "VERIFICATION OF VEHICLE REPAIR " procedure.

CHECK CVVT (CONTINUOUSLY VARIABLE VALVE TIMING) ASSEMBLY

1. Remove the CVVT assembly. Refer to CYLINDER HEAD ASSEMBLY .
2. Check that the CVVT assembly is locked.
3. The one of the 2 holes on the cam journal is for advances (upper) and the rest is for retards (lower). Apply masking tape to all oil path holes except the one advance hole ("B") indicated by the arrow as shown in the figure.

   Fig 6: Identifying Oil Path Holes



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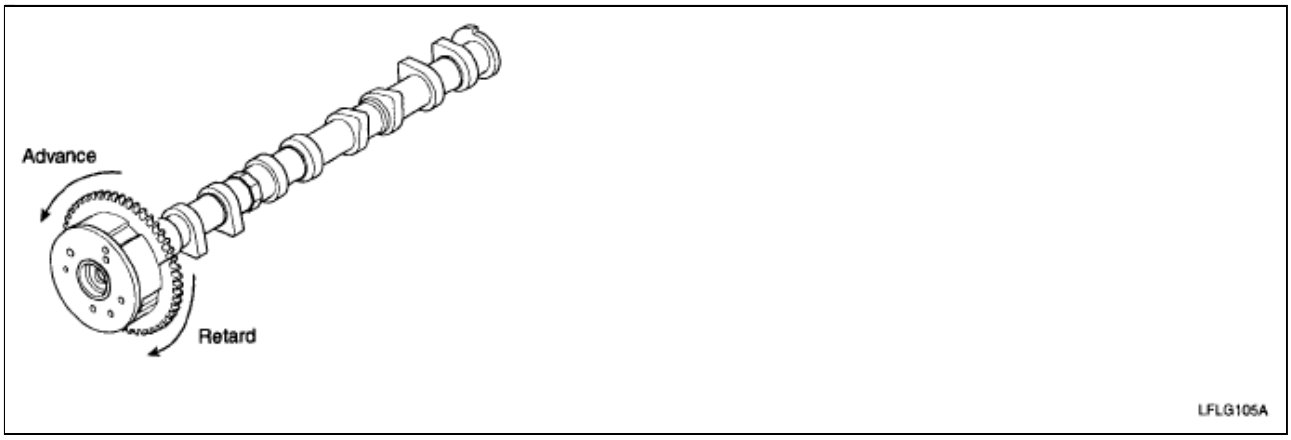
4. To release the CVVT lock pin, wrap some tape around the tip of an air pressure adapter and apply low air pressure of approx. 150 kPa (1.5 kg/cm^2 , 21 psi) to the exposed camshaft port. Wrap a shop towel or rag around the CVVT because residual oil may leak out of the unit when applying air pressure.
5. With low air pressure applied, turn the CVVT to the ADVANCE direction as indicated in the figure.

NOTE: If too much air leaks when applying the low air pressure, the CVVT lock pin may not release and the CVVT may not turn.

Fig 7: Identifying Advance And Retarding Direction Of CVVT



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6. Allow the CVVT assembly to move in the ADVANCE and DELAY directions to ensure there is no binding and that it moves freely. (Movable smoothly in the range about 20°)
7. Turn the CVVT by hand and make sure it locks in the maximum delay angle position.
8. Is CVVT assembly working properly?

   YES

   1. System is okay.

   NO

   1. Replace the CVVT assembly and go to "VERIFICATION OF VEHICLE REPAIR " procedure.

TERMINAL AND CONNECTOR INSPECTION

1. Many malfunctions in the electrical system are caused by poor harness(es) and terminals. Faults can also be caused by interference from other electrical systems, and mechanical or chemical damage.
2. Thoroughly check connectors for looseness, poor connection, bending, corrosion, contamination, deterioration, or damage.
3. Has a problem been found?

   YES

   1. Repair as necessary and go to "VERIFICATION OF VEHICLE REPAIR " procedure.

   NO

   1. Check valve timing. Refer to "DTC P0016 CRANKSHAFT POSITION-CAMSHAFT POSITION CORRELATION (BANK 1 SENSOR A) " procedure. Repair as necessary and go to "VERIFICATION OF VEHICLE REPAIR " procedure.

VERIFICATION OF VEHICLE REPAIR

After a repair, it is essential to verify that the fault has been corrected.

1. Connect scan tool and select "Diagnostic Trouble Codes (DTCs)" mode.
2. Press F4 (DTAL) and confirm that "DTC Readiness Flag" indicates "Complete". If not, drive the vehicle within conditions noted in the freeze frame data or enable conditions.
3. Read "DTC Status" parameter.
4. Is parameter displayed "History (Not Present) fault"?

   YES

   1. System performing to specification at this time. Clear the DTC

   NO

   1. Go to the applicable troubleshooting procedure.