2002 Nissan-Datsun Altima 2.5 S L4-2.5L (QR25DE)

Testing and Inspection

Ignition System

Notes

Diagnostic Procedure Step 1 - 2

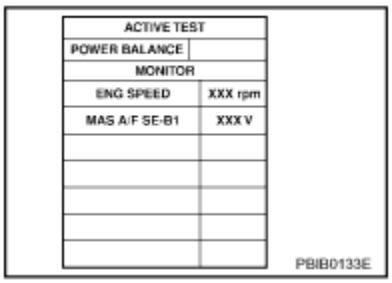
1. CHECK ENGINE START

Turn ignition switch "OFF", and restart engine.
Is engine running?
Yes or No
Yes (With CONSULT-II)>>GO TO 2.
Yes (Without CONSULT-II)>>GO TO 3.
No >> GO TO 4.

2. CHECK OVERALL FUNCTION

With CONSULT-II
1. Perform "POWER BALANCE" in "ACTIVE TEST" mode with CONSULT-II.
2. Make sure that all circuits do not produce a momentary engine speed drop.

OK or NG
OK >> **INSPECTION END**
NG >> GO TO 8.



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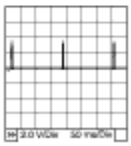
Notes

Diagnostic Procedure Step 3 - 5

3. CHECK OVERALL FUNCTION

Without CONSULT-II

1. Let engine idle.
2. Read the voltage signal between ECM terminals 21, 22, 23, 24 and ground with an oscilloscope.
3. Verify that the oscilloscope screen shows the signal wave as shown below.



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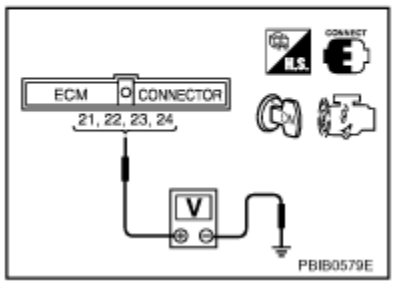

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OK or NG

OK >> **INSPECTION END**
NG >> GO TO 8.

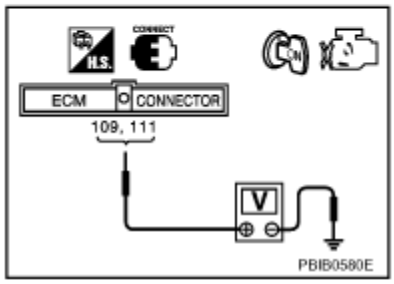
4. CHECK IGNITION COIL POWER SUPPLY CIRCUIT-I

1. Turn ignition switch ON.
2. Check voltage between ECM terminals 109, 111 and ground with CONSULT-II or tester.

Voltage: Battery voltage

OK or NG

OK >> GO TO 5.
NG >> Go to "POWER SUPPLY CIRCUIT FOR ECM" .



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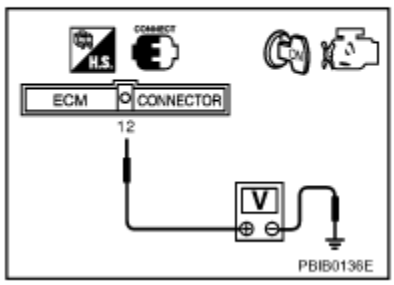
5. CHECK IGNITION COIL POWER SUPPLY CIRCUIT-II

Check voltage between ECM terminal 12 and ground with CONSULT-II or tester.

Voltage: Battery voltage

OK or NG

OK >> GO TO 6.
NG >> Go to "POWER SUPPLY CIRCUIT FOR ECM" .



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Notes

Diagnostic Procedure Step 6 - 9

6. CHECK CONDENSER CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect condenser harness connector.
3. Check harness continuity between ECM terminal 12 and condenser terminal + , condenser terminal – and engine ground. Refer to Wiring Diagram.

   Continuity should exist.

4. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 7.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

7. CHECK CONDENSER

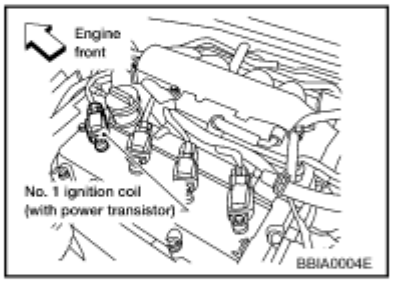
Refer to "Component Inspection" .

OK or NG

OK >> GO TO 8.
NG >> Replace condenser.

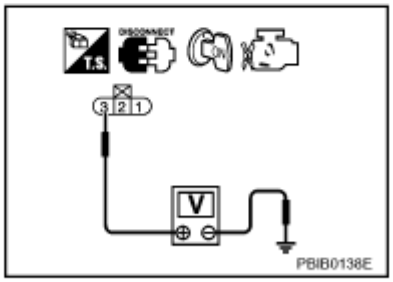
8. CHECK IGNITION COIL POWER SUPPLY CIRCUIT-V

1. Turn ignition switch OFF.
2. Reconnect all harness connectors disconnected.
3. Disconnect ignition coil harness connector.
4. Turn ignition switch ON.



5. Check voltage between ignition coil terminal 3 and ground with CONSULT-II or tester.

   Voltage: Battery voltage



OK or NG

OK >> GO TO 10.
NG >> GO TO 9.

9. DETECT MALFUNCTIONING PART

Check the following.

- Harness for open or short between ignition coil and IPDM E/R
- Harness for open or short between ignition coil and ECM

>> Repair or replace harness or connectors.

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Notes

Diagnostic Procedure Step 10 - 13

10. CHECK IGNITION COIL GROUND CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Check harness continuity between ignition coil terminal 2 and engine ground.
   Refer to Wiring Diagram.

   Continuity should exist.

3. Also check harness for short to power.

OK or NG

OK >> GO TO 11.
NG >> Repair open circuit or short to power in harness or connectors.

11. CHECK IGNITION COIL OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Disconnect ECM harness connector.
2. Check harness continuity between ECM terminals 21, 22, 23, 24 and ignition coil terminal 1.
   Refer to Wiring Diagram.

   Continuity should exist.

3. Also check harness for short to ground and short to power.

OK or NG

OK >> GO TO 12.
NG >> Repair open circuit or short to ground or short to power in harness or connectors.

12. CHECK IGNITION COIL WITH POWER TRANSISTOR

Refer to "Component Inspection" .

OK or NG

OK >> GO TO 13.
NG >> Replace ignition coil with power transistor.

13. CHECK INTERMITTENT INCIDENT

Refer to "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT".

>> **INSPECTION END**

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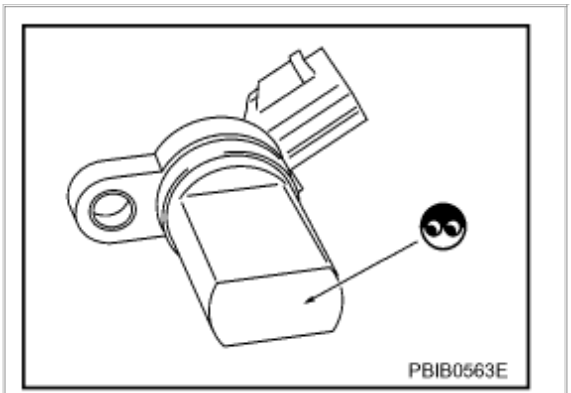
Testing and Inspection

Notes

Component Inspection

CRANKSHAFT POSITION SENSOR (POS)

1. Loosen the fixing bolt of the sensor.
2. Disconnect crankshaft position sensor (POS) harness connector.
3. Remove the sensor.



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4. Visually check the sensor for chipping.

Terminal No. (Polarity)	Resistance Ω [at 25°C (77°F)]
1 (+) - 2 (-)	Except 0 or ∞
1 (+) - 3 (-)	
2 (+) - 3 (-)	

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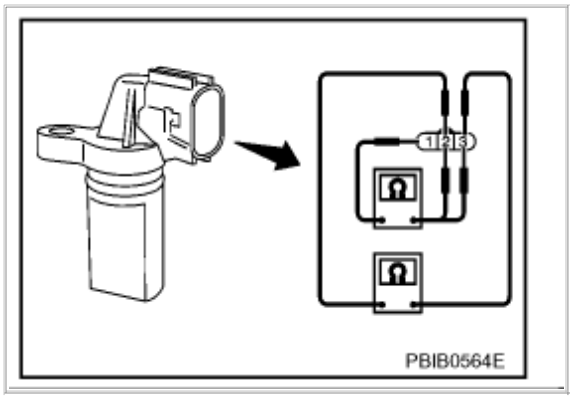

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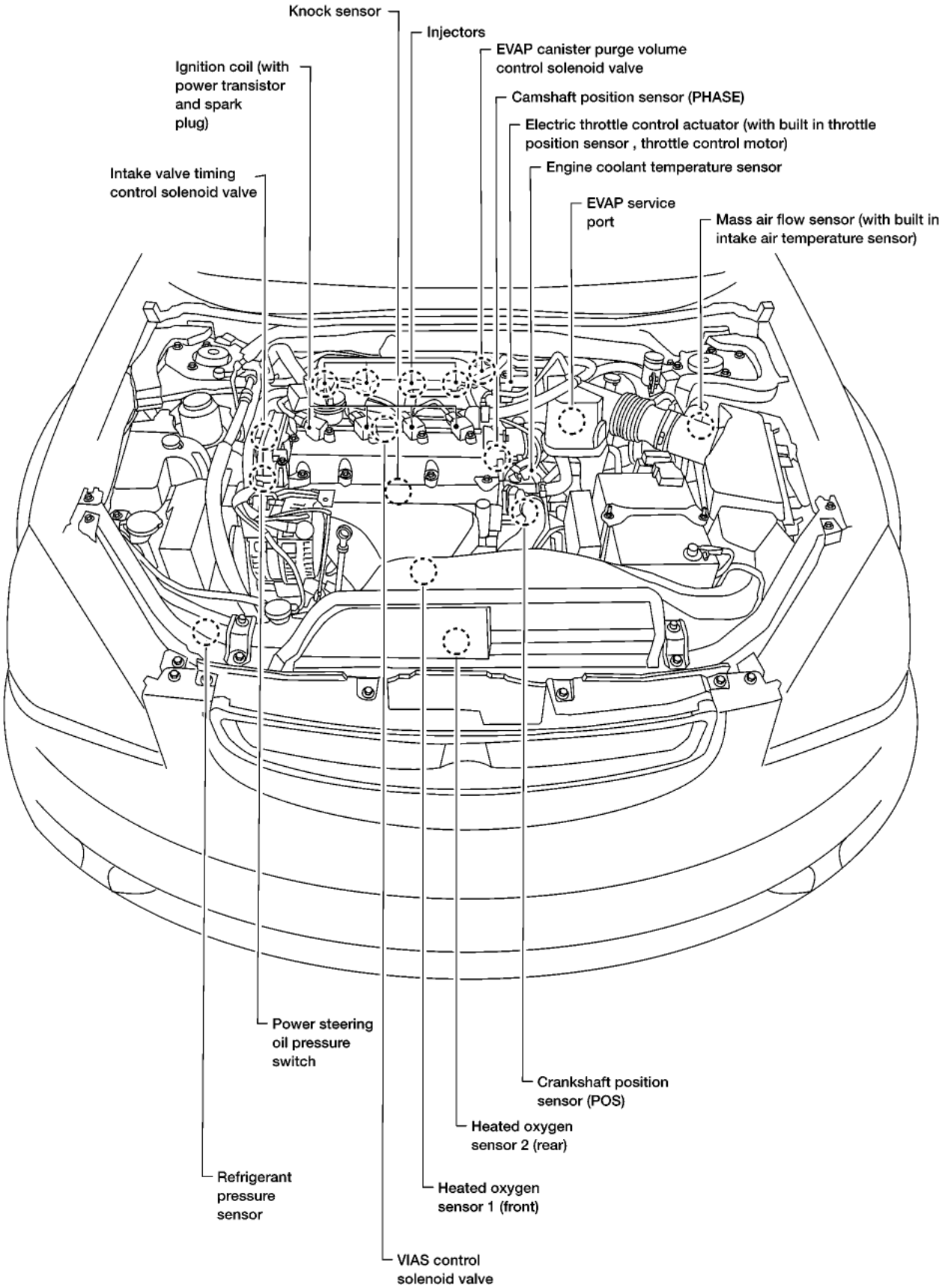
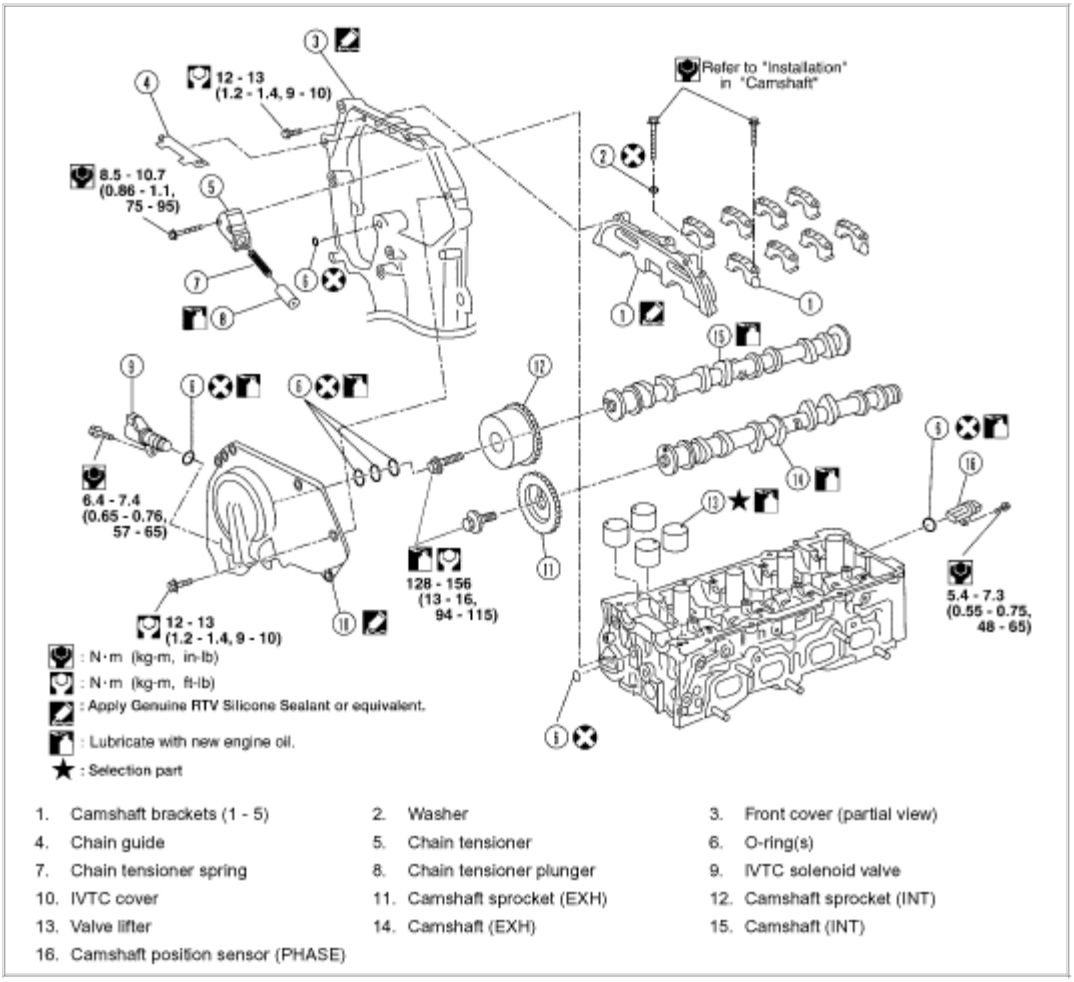
5. Check resistance as shown in the figure.
6. If NG, replace crankshaft position sensor (POS).


Knock sensor
Injectors
EVAP canister purge volume control solenoid valve
Ignition coil (with power transistor and spark plug)
Camshaft position sensor (PHASE)
Electric throttle control actuator (with built in throttle position sensor , throttle control motor)
Intake valve timing control solenoid valve
Engine coolant temperature sensor
EVAP service port
Mass air flow sensor (with built in intake air temperature sensor)
Power steering oil pressure switch
Crankshaft position sensor (POS)
Heated oxygen sensor 2 (rear)
Refrigerant pressure sensor
Heated oxygen sensor 1 (front)
VIAS control solenoid valve

2002 Nissan-Datsun Altima 2.5 S L4-2.5L (QR25DE)

Service and Repair

Notes



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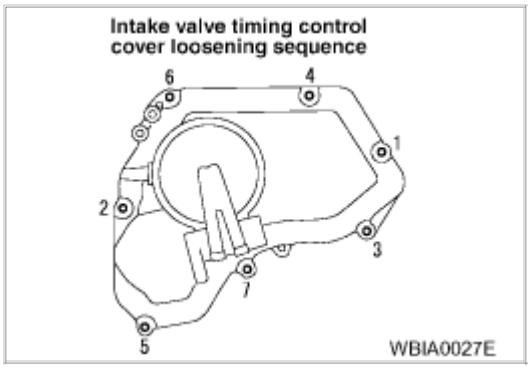
REMOVAL

1. Remove the rocker cover.
2. Remove the front right side tire and wheel using power tool.
3. Remove the RH splash shield using power tool.
4. Remove the auxiliary drive belt.
5. Remove the coolant overflow reservoir tank.
6. Remove the IVTC (intake valve timing control) cover by cutting the sealant using the Tool.



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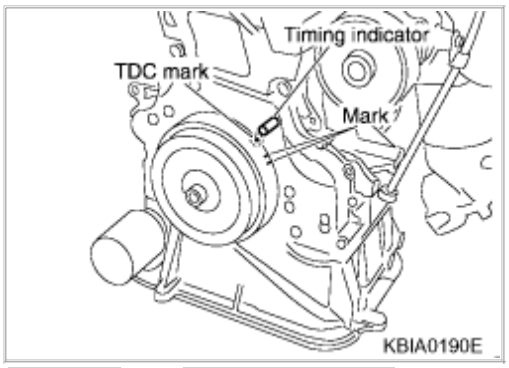
- Loosen the bolts in the order shown.

7. Set the No.1 cylinder at TDC on its compression stroke with the following procedure:

    a. Open the splash cover on RH under cover.



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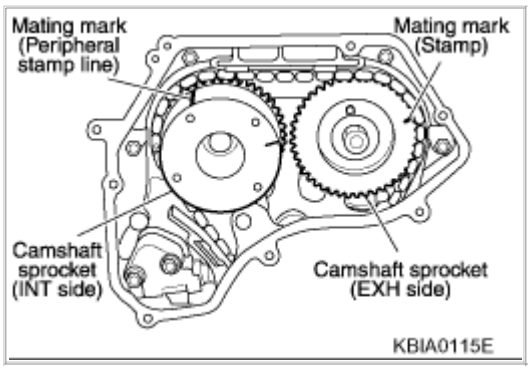
    b. Rotate crankshaft pulley clockwise, and align mating marks for TDC with timing indicator on front cover, as shown.



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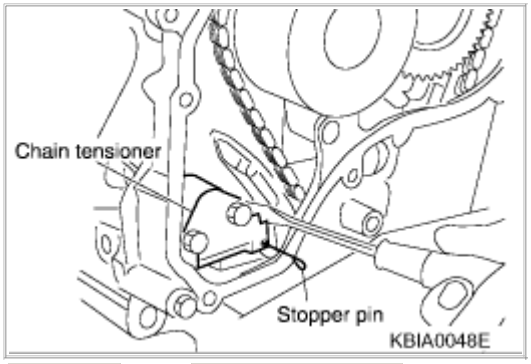
c. At the same time, make sure that the mating marks on camshaft sprockets are lined up with the yellow links in the timing chain, as shown.

- If not, rotate crankshaft pulley one more turn to line up the mating marks to the yellow links, as shown.



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8. Pull the timing chain guide out between the camshaft sprockets through front cover.
9. Remove camshaft sprockets with the following procedure. **CAUTION:**

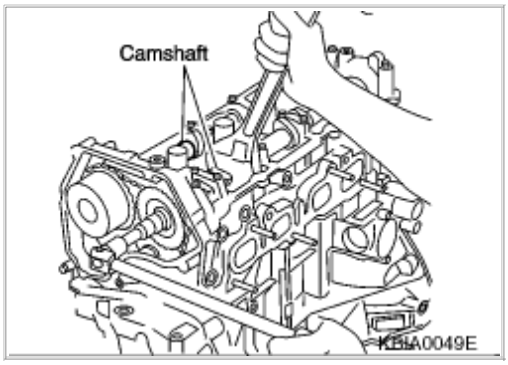
- Do not rotate the crankshaft or camshaft while the timing chain is removed. It causes interference between valve and piston.

NOTE:

- Chain tension holding work is not necessary. Crank sprocket and timing chain do not disconnect structurally while front cover is attached.

a. Line up the mating marks on camshaft sprockets with the yellow links in the timing chain, and paint an indelible mating mark on the sprocket and timing chain link plate.
b. Push in the tensioner plunger and hold. Insert a stopper pin into the hole on tensioner body to hold the chain tensioner. Remove the timing chain tensioner.

- Use a wire with **0.5 mm (0.02 inch)** diameter for a stopper pin.



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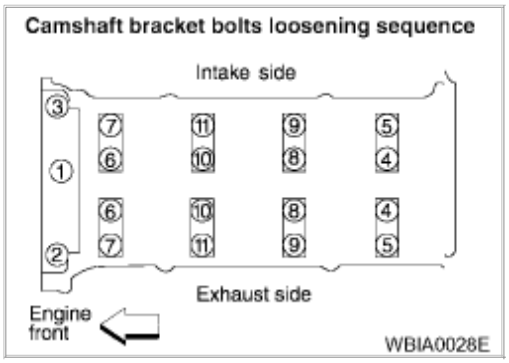
c. Secure the hexagonal part of camshaft with a suitable tool. Loosen the camshaft sprocket mounting bolts and remove the camshaft sprockets.



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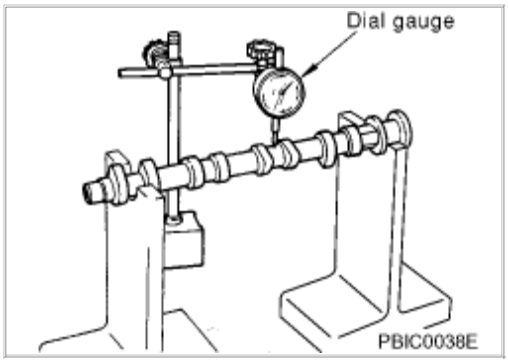
10. Loosen the camshaft bracket bolts in the order shown, and remove the camshaft brackets and camshafts.
    - Remove No.1 camshaft bracket by slightly tapping it with a rubber mallet.
11. Remove the valve lifters.
    - Check mounting positions, and set them aside in the order removed.

INSPECTION AFTER REMOVAL
Camshaft Runout

1. Put the camshaft on a V-block supporting the No.2 and No.5 journals.



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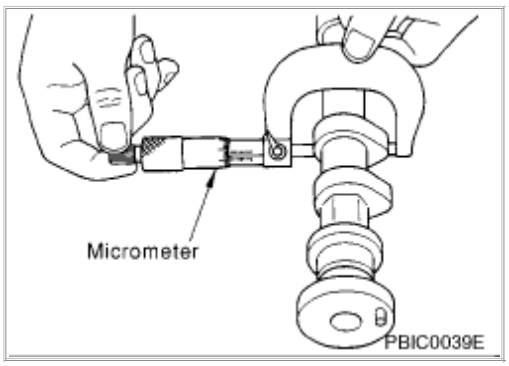
2. Set the dial gauge vertically on the No.3 journal.
3. Turn camshaft in one direction by hand, and measure the camshaft runout on the dial gauge total indicator reading. Standard: **Less than 0.04 mm (0.0016 inch)**

Camshaft Cam Height



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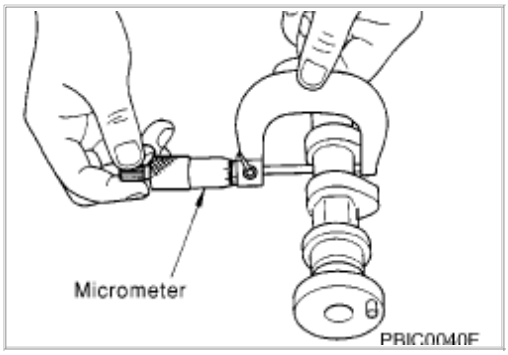
1. Measure the camshaft cam height. Standard intake cam height: **45.665 - 45.855 mm (1.7978 - 1.8053 inch)** Standard exhaust cam height: **43.975 - 44.165 mm (1.7313 - 1.7388 inch)**
2. If wear is beyond the limit, replace the camshaft.

Camshaft Journal Clearance
Outer Diameter of Camshaft Journal



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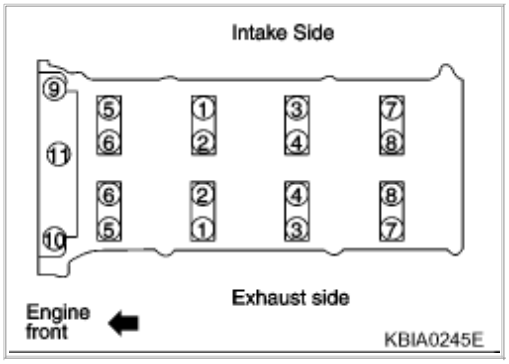
- Measure the outer diameter of the camshaft journal. Standard No.1 outer diameter: **27.935 - 27.955 mm (1.0998 - 1.1006 inch)**

Standard No.2, 3, 4, 5, outer diameter: **23.435 - 23.455 mm (0.9226 - 0.9234 inch)**

Inner Diameter of Camshaft Bracket



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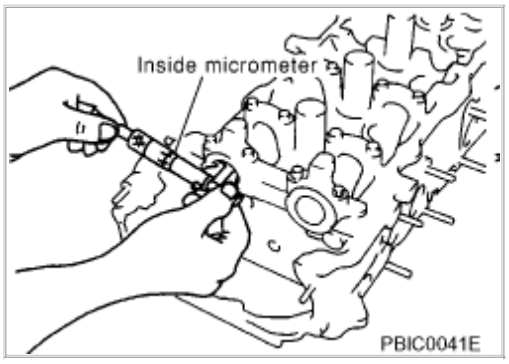
- Tighten the camshaft bracket bolts to the specified torque following the tightening pattern as shown. Refer to Step 4 of "INSTALLATION" for the specified torque sequence.



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- Using inside micrometer, measure inner diameter of camshaft bracket. Standard No. 1: **28.000 - 28.021 mm (1.1024 - 1.1032 inch)**

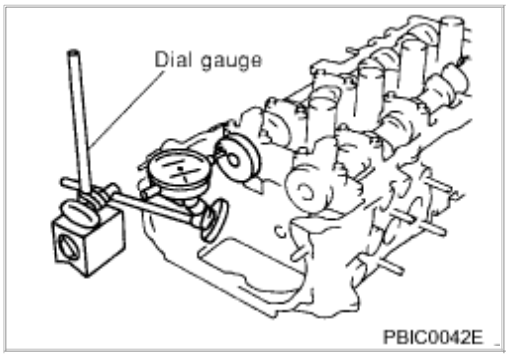
Standard No.2, 3, 4, 5: **23.500 - 23.521 mm (0.9252 - 0.9260 inch)**

Calculation of Camshaft Journal Clearance

- (Journal clearance) = (inner diameter of camshaft bracket) - (outer diameter of camshaft journal) Standard: **0.045 - 0.086 mm (0.0018 - 0.0034 inch)**
- When out of the specified range above, replace either or both the camshaft and the cylinder head assembly.

NOTE: Inner diameter of the camshaft bracket is manufactured together with the cylinder head. If the camshaft bracket is out of specification, replace the whole cylinder head assembly.

Camshaft End Play



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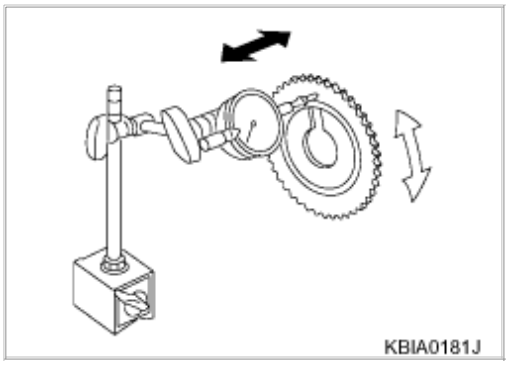
1. Install a dial gauge in the thrust direction on the front end of the camshaft. Measure the end play with the dial gauge while moving the camshaft forward and backward (in direction to axis). Standard end play: **0.115 - 0.188 mm (0.0045 - 0.0074 inch)**
2. If out of the specified range, replace with new camshaft and measure again. If out of the specified range again, replace with new cylinder head assembly.

Camshaft Sprocket Runout

1. Install the camshaft in the cylinder head.
2. Install the camshaft sprocket on the camshaft.



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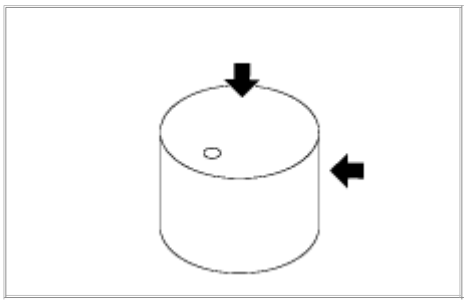
3. Measure camshaft sprocket runout while turning the camshaft by hand. Runout: **Less than 0.15 mm (0.0059 inch)**
4. If it exceeds the specification, replace camshaft sprocket.

Valve Lifter



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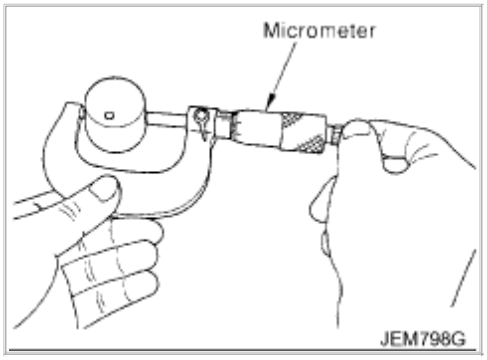
- Check if the surface of the valve lifter has any excessive wear or cracks, replace as necessary.

Valve Lifter Clearance



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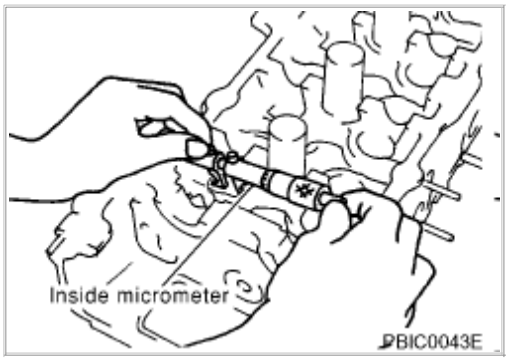
Outer Diameter of Valve Lifter

- Measure the outer diameter of the valve lifter. Valve lifter outer diameter: **33.965 - 33.980 mm (1.3372 - 1.3378 inch)**
- If out of the specified range, replace the valve lifter.

Valve Lifter Hole Diameter



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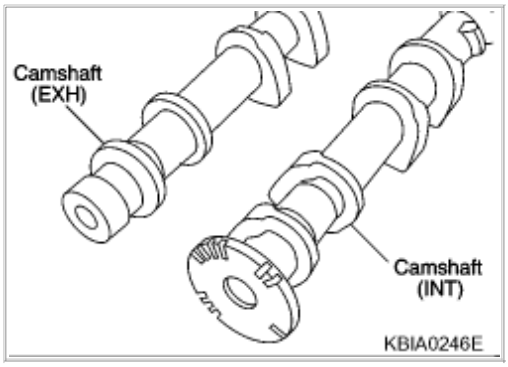
- Using inside micrometer, measure diameter of valve lifter hole of cylinder head. Standard: **34.000 - 34.021 mm (1.3386 - 1.3394 inch)**
- If out of the specified range, replace the cylinder head assembly.

Calculation of Valve Lifter Clearance

- (Valve lifter clearance) = (hole diameter for valve lifter) - (outer diameter of valve lifter) Standard: **0.020 - 0.056 mm (0.0008 - 0.0022 inch)**
- If out of specified range, replace either or both valve lifter and cylinder head assembly.

INSTALLATION

1. Install the valve lifter.
    - Install them in the same position from which they were removed.



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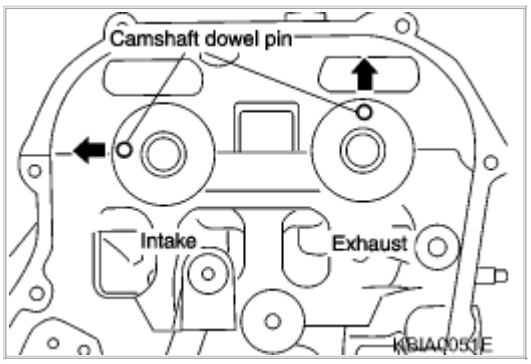
2. Install the camshafts.
    - The distinction between the intake and exhaust camshafts is in a difference of shapes of the back end: Intake: **Signal plate for the camshaft position sensor (PHASE)**

Exhaust: **Cone end shape**



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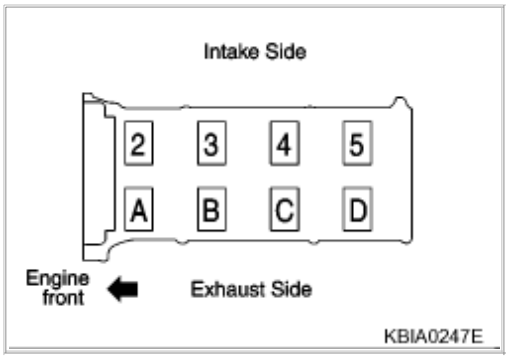
- Install camshafts so that the dowel pins on the front side are positioned as shown.

3. Install camshaft brackets.
    - Install by referring to identification mark on upper surface mark.



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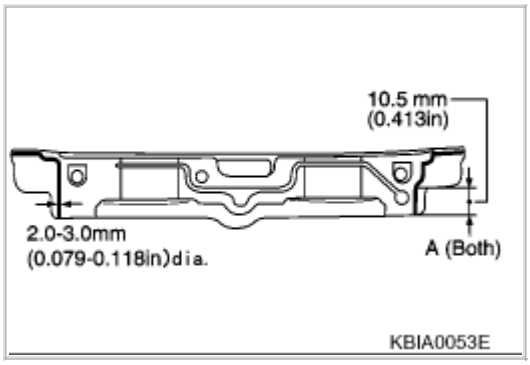
- Install so that identification mark can be correctly read when viewed from the exhaust side.
- Install No. 1 camshaft bracket as follows.



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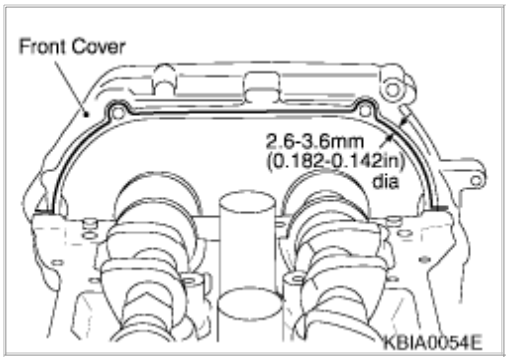
- Apply sealant to No.1 camshaft bracket as shown.
- Use Genuine RTV Silicone Sealant, or equivalent.

CAUTION:

- After installation, be sure to wipe off any excessive sealant leaking from part "A" (both on right and left sides).



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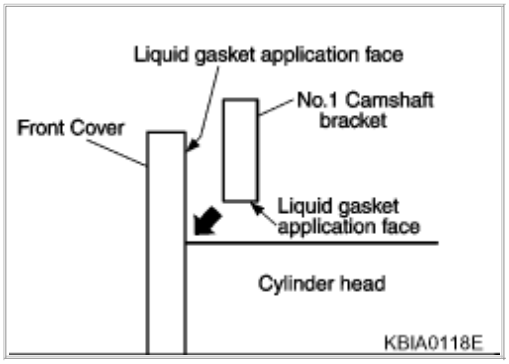
- Apply sealant to camshaft bracket contact surface on the front cover backside.
- Apply sealant to the outside of bolt hole on front cover.



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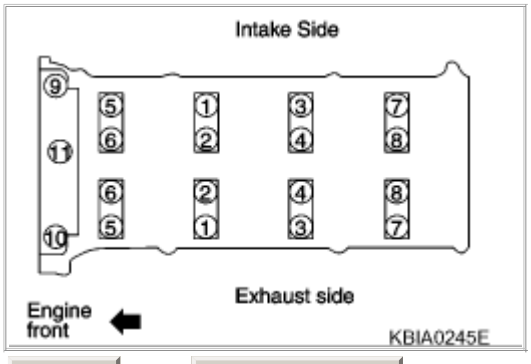
- Position the No.1 camshaft bracket near the mounting position, and install it without disturbing the sealant applied to the surfaces.



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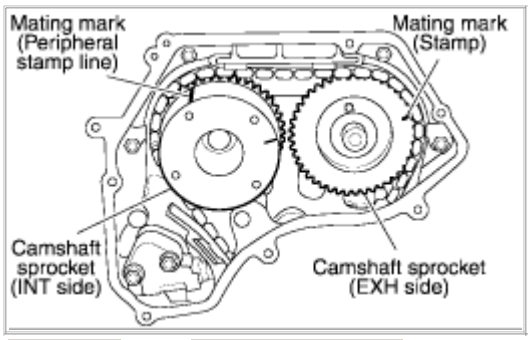
4. Tighten fixing bolts of camshaft brackets as follows.

    a. Tighten in the order from 9 to 11 with tightening torque **2.0 Nm (0.2 kg-m, 17 inch lbs.)** .
    b. Tighten in the order from 1 to 8 with tightening torque **2.0 Nm (0.2 kg-m, 17 inch lbs.)** .
    c. Tighten all bolts in specified order with tightening torque **5.9 Nm (0.6 kg-m, 52 inch lbs.)** .
    d. Tighten in the order from 1 to 11 with tightening torque **9.0 to 11.8 Nm (0.92 to 1.2 kg-m, 80 to 104 inch lbs.)** . **CAUTION:** After tightening fixing bolts of camshaft brackets, be sure to wipe off excessive sealant from the parts listed below.

    - Mating surface of rocker cover.
    - Mating surface of front cover, when installed without the front cover.



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5. Install camshaft sprockets.

    - Install them by lining up the mating marks on each camshaft sprocket with the ones painted on the timing chain during removal.
    - Before installation of chain tensioner, it is possible to re-match the marks on timing chain with the ones on each sprocket.

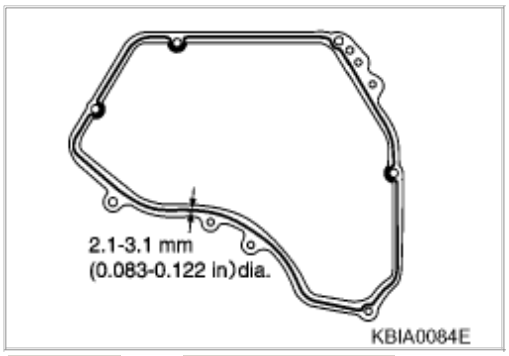
CAUTION:

- Aligned mating marks could slip. Therefore, after matching them, hold the timing chain in place by hand.
- Before and after installing chain tensioner, check again to make sure that mating marks have not slipped.

6. Install chain tensioner. **CAUTION:** After installation, pull the stopper pin off completely, and make sure that the tensioner is fully released.
7. Install chain guide.
8. Install IVTC (intake valve timing control) cover with the following procedure.

    a. Install IVTC solenoid valve to intake valve timing control cover.

b. Install O-ring to front cover side.



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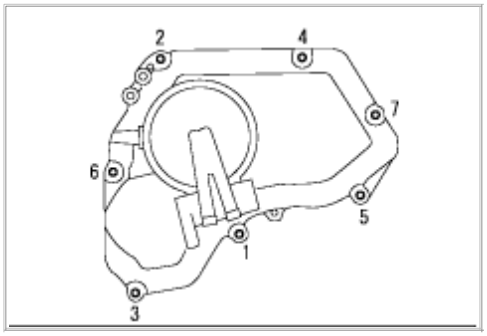
c. Apply Genuine RTV Silicone Sealant to the positions shown in the figure.



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d. Install IVTC cover.

- Tighten the bolts in the numerical order as shown.

9. Check and adjust valve clearances. Refer to Cylinder Head Assembly; Valve Clearance.