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PAUL REDEHOFT

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Conversion Calculator

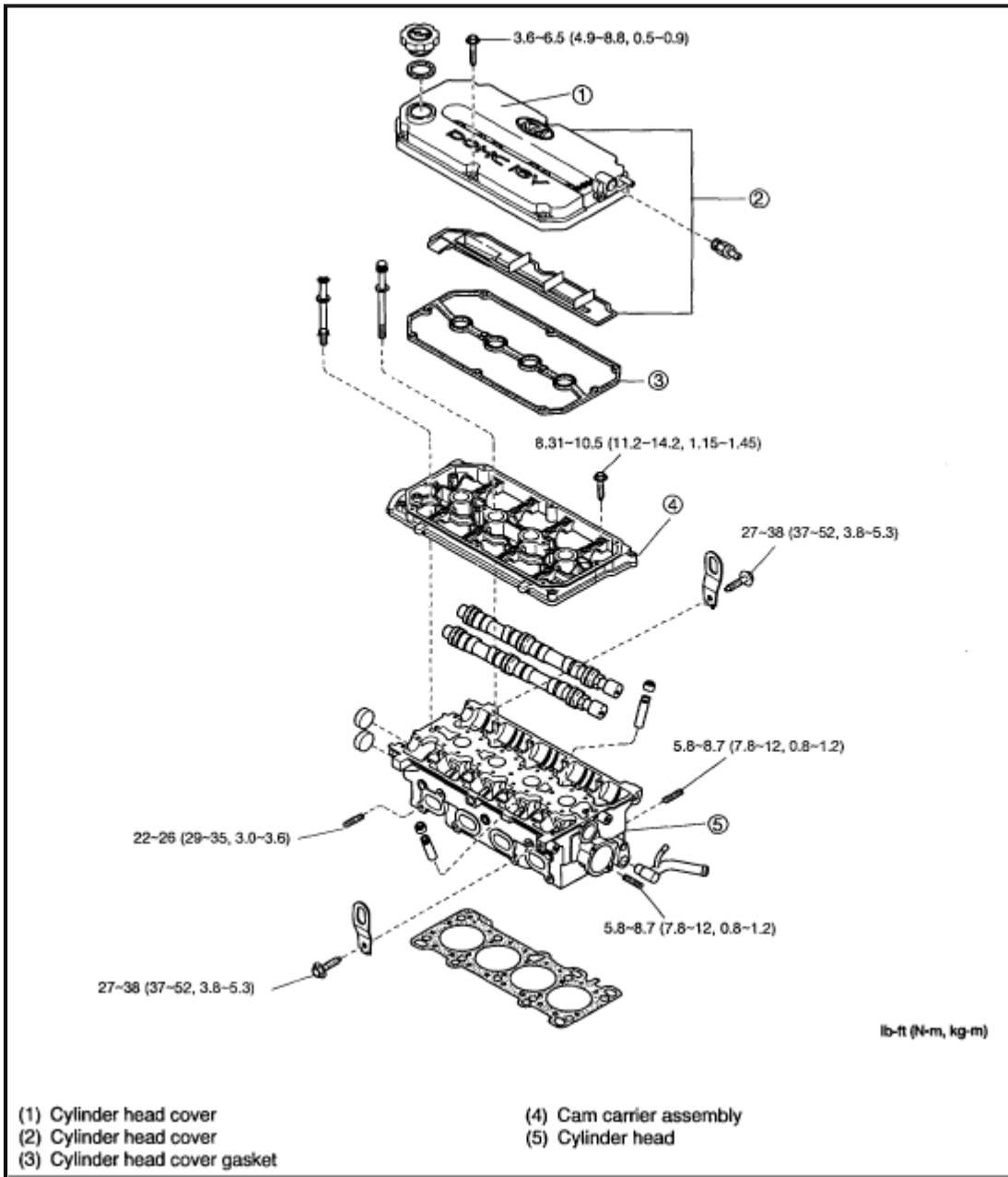
2003 Kia Rio L4-1.6L DOHC 16V

Vehicle Level → [Engine, Cooling and Exhaust](#) → [Engine](#) → [Cylinder Head Assembly](#) → [Service and Repair](#) ←

Service and Repair

[Notes](#)

CYLINDER HEAD



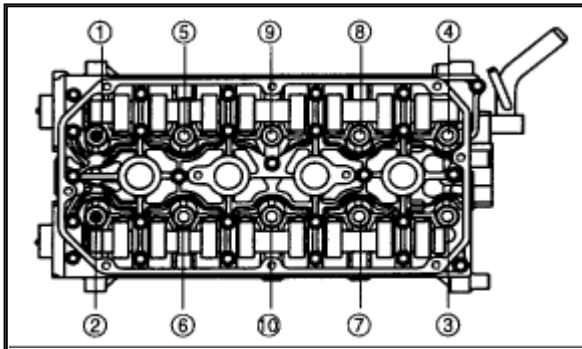
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COMPONENT

DISASSEMBLY

1. Drain the coolant and disconnect the upper radiator hose.
2. Remove the breather hose (between the air cleaner and the head cover).
3. Remove the air-intake hose.
4. Remove the vacuum hose, fuel hose and coolant hose
5. Remove the cables from the [spark plugs](#). The cables should be removed by holding the boot portion.
6. Remove the ignition coil.
7. Remove the power steering oil pump and bracket.
8. Remove the [intake manifold](#).
9. Remove the heat protector and [exhaust manifold](#) assembly.
10. Remove the coolant pump pulley and the crankshaft pulley.
11. Remove the timing belt cover.
12. Remove the [timing belt tensioner](#) pulley.
13. Remove the [timing belt](#).
14. Remove the head cover and cam carrier assembly.



Zoom

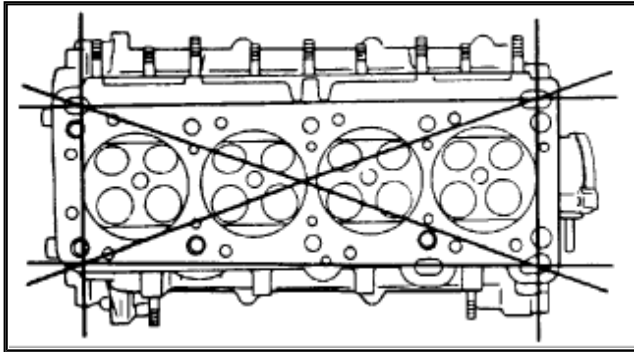
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15. Remove the cylinder head assembly. The cylinder head bolts should be removed by using Special Tool, Cylinder Head Bolt Wrench, in the sequence as shown in the illustration in two or three steps.
16. Remove the gasket pieces from cylinder block top surface and cylinder head bottom surface. **NOTE:** Make sure that the gasket pieces do not fall in the engine

INSPECTION

1. Clean all components.
2. Remove gasket fragments, dirt, oil, grease, carbon, moisture, residue, and other foreign materials. **CYLINDER HEAD**

1. Inspect cylinder head for damage, cracks, and leakage of oil and water. Replace cylinder head if necessary.

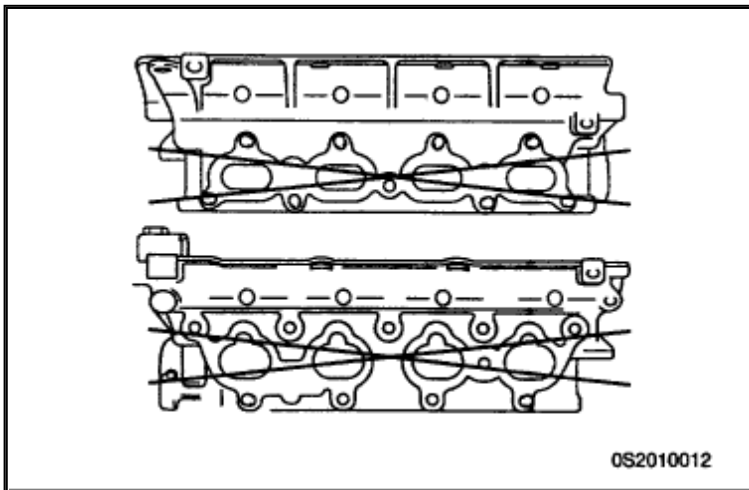


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2. Measure cylinder head mating surface in six directions as shown in figure. Distortion: **0.0012 inch (0.03 mm)** maximum **NOTE:** Before resurfacing cylinder head, check following repair or replace cylinder head if necessary

- Sunken valve seats.
- Damage at intake and [exhaust manifold](#) mating surfaces.
- [Camshaft](#) oil clearances and end play.

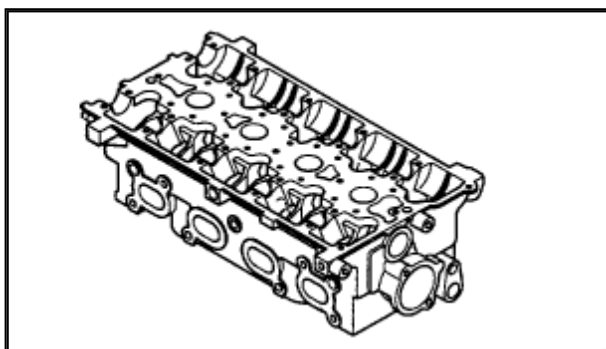


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3. Grind cylinder head mating surface if distortion exceeds specification. Distortion: **0.0012 inch (0.03 mm)** maximum
4. Check cylinder head height by measuring from cylinder deck surface to cylinder head cover gasket surface.
5. If cylinder head height is not within specification, replace cylinder head. Height: **5.031 - 5.039 inch (127.8 - 128 mm)**
6. Measure intake and [exhaust manifold](#) mating surface distortion at two

directions shown in figure. Distortion: **0.002 inch (0.05 mm)** maximum



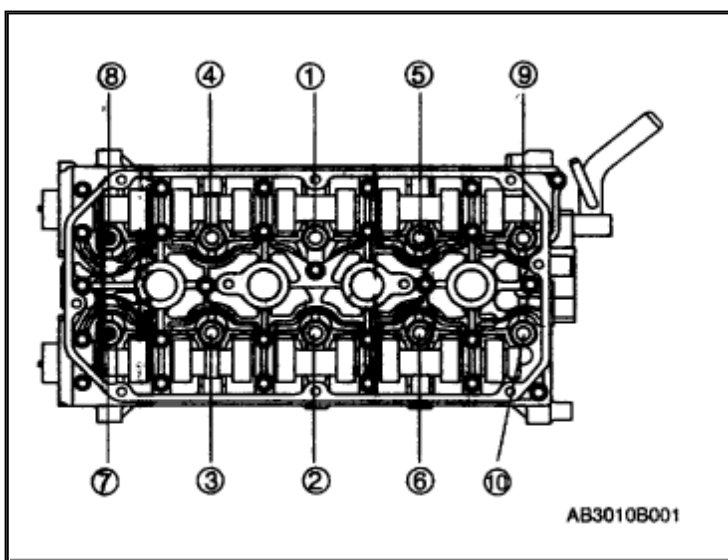
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7. If distortion exceeds specification, resurface or replace cylinder head.
Distortion: **0.002 inch (0.05 mm)** maximum

REASSEMBLY

1. Clean all gasket surfaces of the cylinder block and the cylinder head.
2. Install a new [cylinder head gasket](#) onto the cylinder head assembly. Apply sealant to the gasket and do not reuse the old cylinder head gasket.
 - a. Tighten cylinder head bolts in order shown. Tightening torque: **36.1 ft. lbs. (49 Nm, 5 kg-m)**
 - b. Loosen bolts in reverse of order shown.
 - c. Retighten cylinder head bolts in order shown. Tightening torque: **18 ft. lbs. (25 Nm, 2.5 kg-m)**
 - d. Mark cylinder head bolts for rotational reference.



Zoom

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- e. Rotate cylinder head bolts **90°(1/4 Turn)** in order shown. **CAUTION:**
- Do not rotate [crankshaft](#) without [timing belt](#).
 - Make sure that all pistons are positioned in the middle of cylinder before installing cylinder head.
 - Two bolts (No. 7 and No. 8) are shorter than other bolts. Never install the two bolts in other position. (for A6D)
 - Do not reuse the old cylinder head bolts.
3. Install the [timing belt tensioner](#) pulley.
 4. Install the [timing belt](#) on the camshaft sprocket, marking sure that the tension side is tightened by turning the camshaft sprocket in reverse, all timing marks are in alignment.
 5. Adjust the timing according to "[Timing Belt](#)".
 6. Install the rocker cover and tighten the bolts to the specified torque.
Tightening torque: Rocker cover bolt **3.6 - 6.5 ft. lbs. (5 - 9 Nm, 0.5 - 0.9 kg-m)**
 7. Install the timing belt cover.
 8. Install the new [intake manifold gasket](#) and the [intake manifold](#). Tighten the nuts and bolts to the specified torque.
 9. Install the [exhaust manifold gasket](#) and the [exhaust manifold](#). Tighten the exhaust manifold attaching nuts to the specified torque.
 10. Install the surge tank and tighten the nuts and bolts to the specified torque.
Tightening torque: Manifold nuts and bolts (both intake and exhaust) **11 - 14 ft. lbs. (15 - 20 Nm, 1.5 - 2.0 kg-m)** Tightening torque: Surge tank to inlet manifold nuts and bolts **11 - 14 ft. lbs. (15 - 20 Nm, 1.5 - 2.0 kg-m)**
 11. Install the power steering oil pump and bracket.
 12. Install the ignition coil.
 13. Install the air intake hose.
 14. Connect the vacuum hose, fuel hose and water hose.
 15. Install breather hose.