

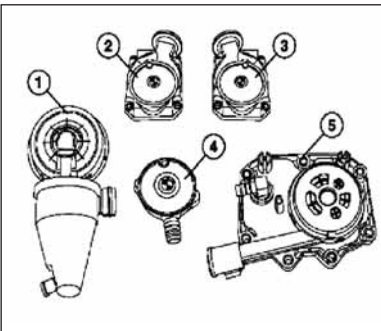
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## Crankcase Ventilation System Check For 1994-2007 BMW Engines

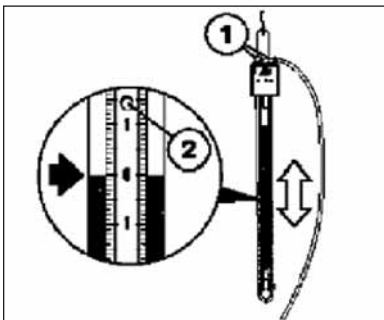
All current BMW engines (M42 (from 1/94), M44, M52, S52, M60, M62 and M73 engines) incorporate a pressure-controlled crankcase ventilation system. If oil consumption issues are being diagnosed, this information can be helpful.

The crankcase ventilation systems use various crankcase ventilation valves depending on the engine type as shown in **Figure 1** below.

Although the valves all look different, they function similarly using a spring and diaphragm assembly to control the crankcase pressure. A properly functioning pressure control valve is designed to maintain a



**Figure 1** Various BMW crankcase ventilation valves: No. 1, used in the M52/S52 engines; Nos. 2 and 3, used in the M73 (two valves per engine); No. 4, used in the M42 from 1/94 production and M44; and No. 5, used in the M60/M62.



**Figure 2** BMW slack tube manometer tool.

slight vacuum (approximately 10 - 15 mbar) in the crankcase which ensures reliable crankcase venting during all engine operating conditions.

A malfunctioning crankcase ventilation valve may cause the following complaints:

- Engine runs rough;
- Whistling noise from crankcase ventilation valve; and
- Check engine light on - possible DME faults stored: misfire all cylinders, oxygen sensor/mixture faults, etc.

To assist in troubleshooting the above complaints a special tool (p/n 99 00 0 001 410) has been developed to quickly check a pressure controlled crankcase ventilation system. Also refer to service information bulletin number 04 08 98 for further information regarding the slack tube manometer tool.

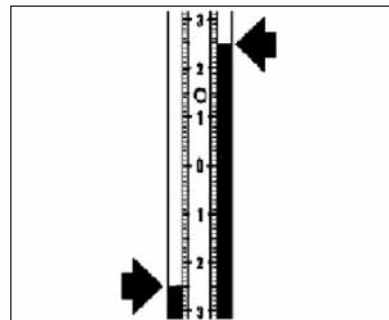
The slack tube manometer tool consists of:

- 1) Slack Tube Manometer
- 2) Connecting Hose
- 3) Modified Oil Filler Cap

Follow the instructions included with the slack tube manometer for the initial tool set up and general operating procedures. Basic operation is as follows:

1) Connect the slack tube manometer to the engine oil filler neck.

2) With both valves (1) open approximately 1/4 turn; zero the



**Figure 3** The values on both sides must be added together to get the proper reading

sliding scale using the knob (2) as shown in **Figure 2**, below.

3) Start the engine and observe the column of water.

4) With all electrical consumers and the air conditioning switched off and engine at operating temperature the reading should indicate from 3.0 - 6.0 inches of water at idle.

5) The values on both sides of the slack tube must be added together to get the proper reading as seen in the illustration below in **Figure 3**, below.

6) Example:  $2.5 + 2.5 = 5.0$  inches of water (The readings may fluctuate 0.1 to 0.2 during the measurement which is normal and does not indicate a defect).

If a crankcase ventilation valve is defective (damaged diaphragm) the column of water will indicate an off the scale reading (all of the water on one side of the slack tube) which indicates a high crankcase vacuum.

7) A higher than normal crankcase vacuum will also cause the crankshaft seals to leak outside air into the crankcase during engine operation. A whistling or howling noise is usually heard coming from the seal areas (front or rear) at idle when this occurs.

## Cylinder Head And Timing Belt Update On 2006-07 Hyundai 2.0L VIN D Engines

A cylinder head and timing belt update on 2006-'07 Hyundai 2.0L VIN D engines allows the 2.0L timing belt system to be changed to an automatic adjustment type from the previous fixed adjustment type.

An updated cylinder head timing belt tensioner and tensioner bolt have been implemented since June 15, 2006, in production on all 2006 and 2007 model year 2.0L equipped vehicles. This information from Hyundai provides the new part information and proper adjustment

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Component	Previous P/N	New P/N	Remarks
Cylinder Head	22100-23760	22100-23780	Tensioner Mounting Bolt Diameter Changed: 10mm to 8mm
Tensioner	24410-23500 24410-23400	24410-23050	Tensioner Adjustment Changed From Fixed Type to Auto Tensioner Type
Tensioner Bolt	24412-23000	24412-23050	Bolt Changed: M10 X 1.25 to M8 X 1.25

**Chart 1** Cylinder head and timing belt part numbers and information for Hyundai 2.0L engines

procedure for the new tensioner system (**Chart 1**, above).

**Vehicles Affected:**

•2006 Elantra, Tiburon and Tucson 2.0L models produced from June 15, 2006 to current.

**Adjustment Procedure:**

1) Install the timing belt tension-

er and tensioner bolt loose enough for the adjuster to rotate. Ensure the stopper is resting against the lower seal cap on the cylinder head.

2) Install the timing belt over the applicable sprockets in this order. See **Figure 4**, page 25: Crankshaft Sprocket (A) Idler Pulley (B)

Camshaft Sprocket (C) Timing Belt Tensioner (D). Ensure there is no slack in the belt between the two shafts.

3) Check the alignment marks on each sprocket. Refer to shop manual for your specific model.

4) Remove the lock pin which holds the tensioner arm in place during ship-

ping.

5) Using a 6mm hex wrench (F), turn the adjuster counterclockwise to make the indicator of the arm (G) line up with the notch on the base (H) and tighten the tensioner bolt. See **Figure 5**, page 25, (Torque to 16-21 ft.lbs., 22-28Nm)

Do not rotate the tensioner clockwise as it will permanently damage the tensioner.

**Rear Engine Oil Leak On 2003-2006 Isuzu Ascenders with 5.3L VIN P Engines**

A rear engine oil leak on 2003-2006 Isuzu Ascenders with 5.3L VIN P engines that upon initial diagnosis seems to be coming from the rear cover gasket area, may actually be caused by engine block porosity on the engine block sealing surface.

If the leak has been determined to be coming from the rear cover gasket area, remove the cover area and inspect the cylinder block for any indications of porosity in the sealing areas. If porosity is found anywhere on the sealing surface, use RTV p/n 8-12778-521-0 to fill in any porosity locations.

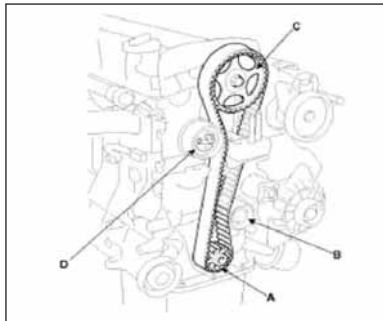
Wipe a small amount of the RTV sealant onto the surface using a plastic scraper to fill in the porosity holes on

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the mating surface of cylinder block. Remove any excessive RTV that may have been applied, especially from the high pressure oil passage as shown with arrow in picture below. Allow the RTV to cure 10 minutes before installing the rear cover. When installing the rear cover, tighten the engine rear cover bolts to 18 ft.lbs.



**Figure 4** Hyundai 2.0L timing belt installation.



**Figure 5** Hyundai 2.0L tensioner bolt torque.

## Head Bolt Caution & Installation For 2001-'02 KIA 1.5L DOHC Engines

The torque values published in the 2001-2002 Rio Service Manuals for the 2001-2002 Kia 1.5L DOHC engine are incorrect.

The manual incorrectly specifies the cylinder head bolt torque values as 36.1 in.lbs. and 18 in.lbs. respectively (before a final 90 degree tightening step). While the values are correct, the units should read ft.lbs. The 2002 manual states to rotate the head bolts two additional 90° turns, only once is correct. The correct listing should read as shown below. Use the head bolt torque sequence in **Figure 7**, page 26, as a reference.

- Torque all bolts in sequence to 36.1 ft.lbs.
- Loosen all bolts in reverse sequence.
- Torque all bolts in sequence to 18 ft.lbs.
- Rotate all bolts in sequence an additional 90° turn.

Also note that the cylinder head bolts used on Rio engines are the (stretch) type that must not be reused, they must be replaced any time they are removed.

The cam carrier on the Rio engine is align bored

with the cylinder head. If either requires replacement, it's necessary to replace both. The cam carrier also requires an oil tight seal between it and the cylinder head. This is accomplished with 4 special O-ring seals (p/n 0K30E-10-122) around

the spark plug cavities, and with a sealant on the mating surfaces.

Kia inadvertently specified sealant to be used on outside surfaces only. This is incorrect. Sealant should be applied to all mating surfaces, while taking care not to allow



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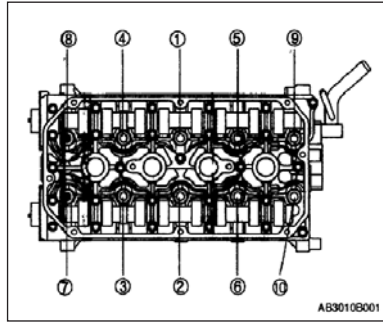
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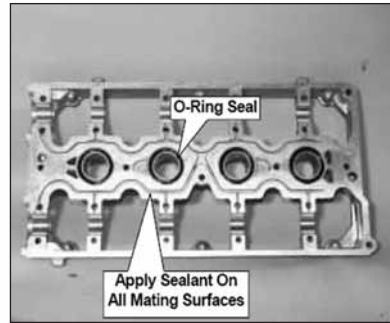
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**Figure 6** Rear engine oil leak on Isuzu Ascenders 5.3L engines.



**Figure 7** KIA 1.5L torque sequence. Use the revised torque specification.



**Figure 8** Use Hylomar adhesive on KIA 1.5L cam carrier.

sealant into oil or coolant passages.

The specified sealant is for close fitting machined surfaces, and eliminates the need to re-torque after the sealant settles and cures. The sealant to be used when replacing or re-installing the Rio's cam carrier is either Hylomar Anaerobic Adhesive

Grade 3000 or an equivalent, such as Permatex Anaerobic Gasket Maker. See **Figure 8**, above.

Note: The part number shown above for the cam carrier O-ring seals will eventually be eliminated. When that occurs, to obtain either component, you'll have to order

the cylinder head/cam carrier assembly.

### Revised Rocker Arm Assembly For 1996-2004 Rover 4.6L Engines

A revised rocker arm assembly for 1996-2004 Rover 4.6L engines has been introduced to address reports of noisy valve train operation.

The affected vehicle models include:

- Range Rover (LP) – WA382672 to YA437311;
- Discovery Series ii (LT) – Up to YA265404; and
- Discovery (U) – WA753113 to XA795263.

Customer complaints of a rattling/tapping noise from the engine found to originate from rocker shaft area may be the result of the hardened pushrod cup being insecure in the rocker arm.

Investigate customer complaints of valve rattling/tapping noise on vehicles within the above VIN ranges and identify rocker arms with loose pushrod cups. If noisy or loose rocker arms are encountered during the inspection, replace all rocker arms with updated parts.

- 602154 left bank rocker arm;
- 602153 right bank rock-

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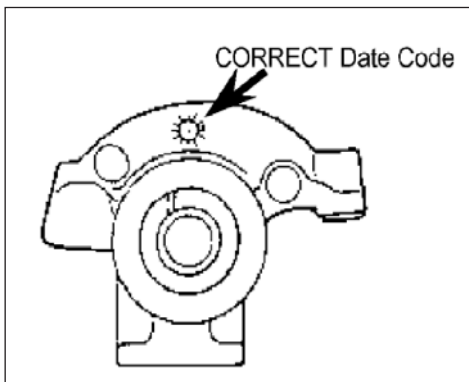
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**Figure 9** Range Rover rocker arm.

er arm.

Only rocker arms with date codes '00' or newer (01) may be used to repair valve trains. Use of early production rocker arms may result in a recurrence of the problem (**Figure 9**, above).

### Engine Noise at 2,200-3,000 RPM For 2005 Porsche 2.7L Boxsters

Believe it or not, not all Porsche engine sounds are desirable. The 2005 Porsche 2.7L Boxster engines may produce a rattling, clicking or knocking sound at engine speeds of 2,200-3,000 rpm.

Porsche reports that upon inspection of complete engines replaced under warranty, it has been determined that engines were being replaced unnecessarily. Until a manufacturing modification was made on March 29, 2005, the replacement engine could exhibit the same noise.

As of March 29, 2005, a crankshaft bearing housing with new thrust blocks made of nodular cast iron is installed on all 2.7L engines.

This began with engine number M962561506314. Engines built prior to the M962561506314 that exhibit the above mentioned noise, can be retrofitted with the new component p/n 996.101.007.07.

### Revised Flywheel Mounting Bolt On 1991-'92 VW 2.8L Engines

A new flywheel mounting bolt has been introduced for 1991-'92 Volkswagen 2.8L engines. Engine builders need to consider that this engine is designed to use new flywheel mounting bolts during assembly. However, the bolts originally used

are no longer available. The replacement bolt will not endure the listed torque for the original bolt.

The replacement bolt (p/n N902 061.03) will not endure the torque specification listed for the old bolt in repair manuals and microfiche. If those values are used, it will result in stripped threads.

The correct torque for the replacement bolt is 22 ft.lbs (30 Nm) plus a 1/4 (90°) turn.

Always use new bolts. The replacement bolt now has a special adhesive applied to the threads and can only be used once. New bolts are not currently available in the aftermarket. **TSG**

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