

►Cylinder heads, installing

Repairs to cylinder heads and valves are described in **150 Cylinder Heads**.

- With engine on engine stand and pistons, cylinders, gas-kets, and air guides installed, rotate engine on stand so that left side cylinders are up.
- Install cylinder head sealing rings in cylinders 1, 2, and 3.

NOTE —

Prior to cylinder head installation be sure to remove temporary cylinder hold down nuts.

- Lubricate cylinder head studs, nuts and washers lightly with Optimoly®HT (Porsche part number 901 104 382 02) or equivalent. Starting with cylinder head 3, install left side cylinder heads.

- ◀ Using screwdriver as guide, slide head washers over head studs.

- Install head nuts and hand tighten only. Temporarily fit camshaft case in position on heads. Alignment pins on cylinder heads must line up with alignment holes in camshaft case. Position cylinder heads as required until machined sealing surfaces meet. Temporarily install a few camshaft case mounting nuts (hand tight) to hold case in position.

NOTE —

Sealing surfaces on heads and camshaft cases must be clean, flat, and without burrs.

- Use cross pattern to torque cylinder head nuts.

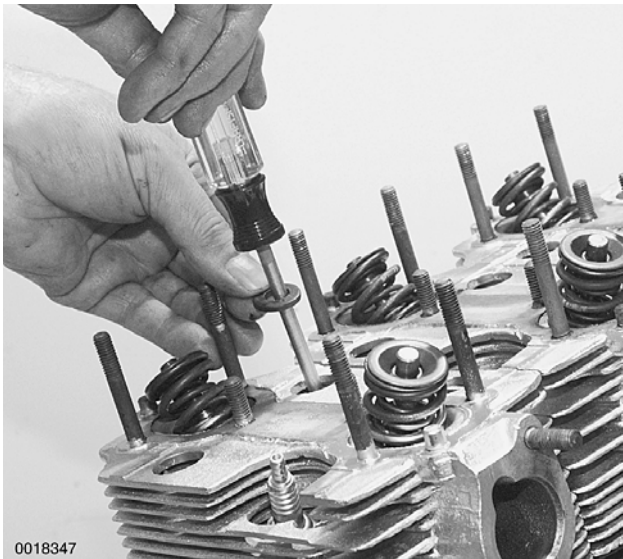
Tightening Torques

• Cylinder head to crankcase	
Step 1	15 Nm (11 ft-lb)
Step 2	+90° (¼ turn)

- Remove camshaft case from cylinder heads 1 - 3. Rotate engine on stand so that right side cylinders 4 - 6 are up.
- Starting with cylinder 6, install right side cylinder heads.
- Slide head washers over head studs.
- Install head nuts and hand tighten only. Temporarily fit camshaft case in position on heads. Alignment pins on cylinder heads must line up with alignment holes in the camshaft case. Position cylinder heads as required until machined sealing surfaces meet. Temporarily install a few camshaft case mounting nuts (hand tight) to hold case in position.
- Use cross pattern to torque cylinder head nuts.

Tightening Torques

• Cylinder head to crankcase	
Step 1	15 Nm (11 ft-lb)
Step 2	+90° (¼ turn)



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- Remove camshaft case from cylinder heads 4 - 6.
- Rotate engine on stand. Working on left side bottom of crankcase, install oil pressure line.

▶ Camshaft cases, camshafts and camshaft timing chains, installing

Additional camshaft timing chain information can be found in **152 Camshaft Timing Chains**.

CAUTION —

Install camshaft cases and camshafts on left or right side according to marks made during disassembly.

- Use Loctite® 574 or equivalent to coat machined sealing surfaces on camshaft cases.
- Place new sealing O-rings on oil return tubes.
- Holding oil return tubes in place, guide right camshaft case over its mounting studs.

NOTE —

Two piece oil return tube replacement is covered in 170 Engine Lubrication.

- ▶ Install 18 retaining nuts (**arrows**) and tighten after making sure oil return tubes are correctly positioned.
 - There are fifteen M8 (13 mm head) nuts.
 - There are three M8 (8 mm allen head) nuts (**A**).

Tightening torque

- Camshaft case to cylinder head 25 Nm (18 ft-lb)

- Install right timing chain housing with new gasket.

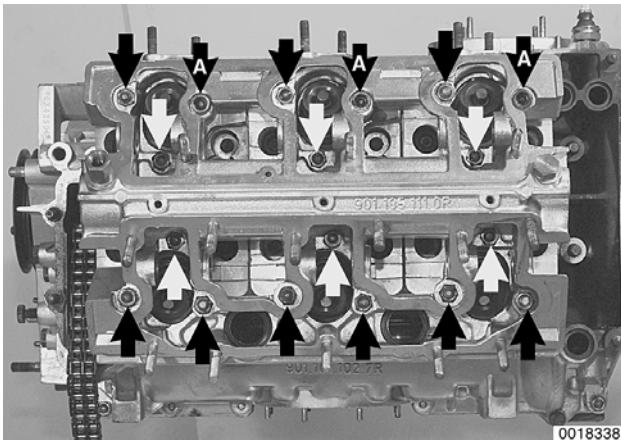
Tightening torque

- Timing chain housing to crankcase 25 Nm (18 ft-lb)

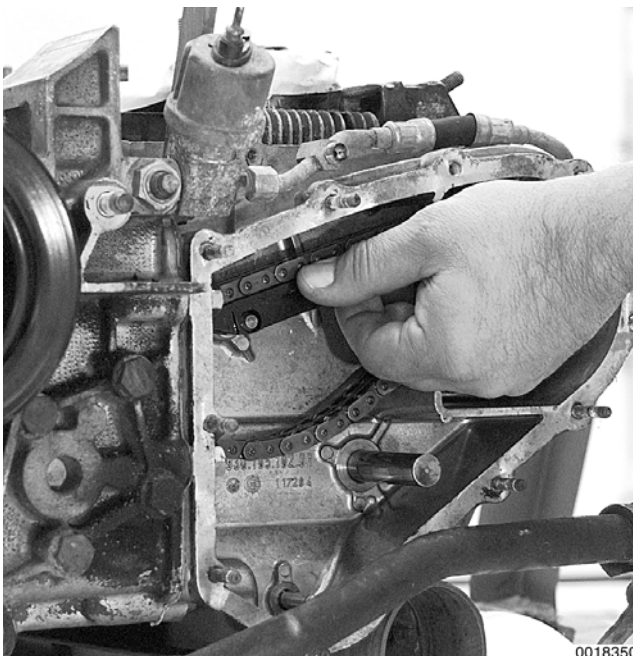
- Slide right camshaft into camshaft case.
- Install camshaft end cover with new O-ring and gasket. Install end cover retaining bolts and tighten.
- Install right camshaft thrust spacer, sprocket shims, woodruff key and sprocket flange.
- Install right camshaft sprocket to timing chain. Slide sprocket over sprocket flange.
- Install sprocket washer and mounting fastener finger tight.

- ▶ Install right timing chain guide rail in housing.

- Install right timing chain tensioner and idler sprocket assembly using new O-ring. Tighten tensioner mounting nuts.
- Install left camshaft, camshaft case, timing chain guide rail, camshaft sprocket assembly and timing chain as described in previous steps.



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