

4 Valve gear

Note

- ◆ After installing camshafts, wait for approx. 30 minutes before starting engine. Hydraulic valve compensation elements have to settle (otherwise valves will strike pistons).
- ◆ After working on the valve gear, turn the engine carefully at least 2 rotations by hand to ensure that none of the valves make contact when the starter is operated.

4.1 Valve gear - exploded view

Note

The diagram shows the cylinder head on cylinder bank 2 (left-side).

1 - Valve

- Do not machine, only grinding-in is permitted
- Mark installation position for re-installation
- Checking ⇒ [page 235](#)
- Valve dimensions ⇒ [page 234](#)
- Checking valve guides ⇒ [page 234](#)

2 - Cylinder head

- See note ⇒ [page 207](#)
- Checking valve guides ⇒ [page 234](#)
- Machining valve seats ⇒ [page 234](#)

3 - Valve stem oil seal

- Renewing: with cylinder head installed ⇒ [page 226](#), with cylinder head removed ⇒ [page 230](#)

4 - Valve spring

5 - Valve spring plate

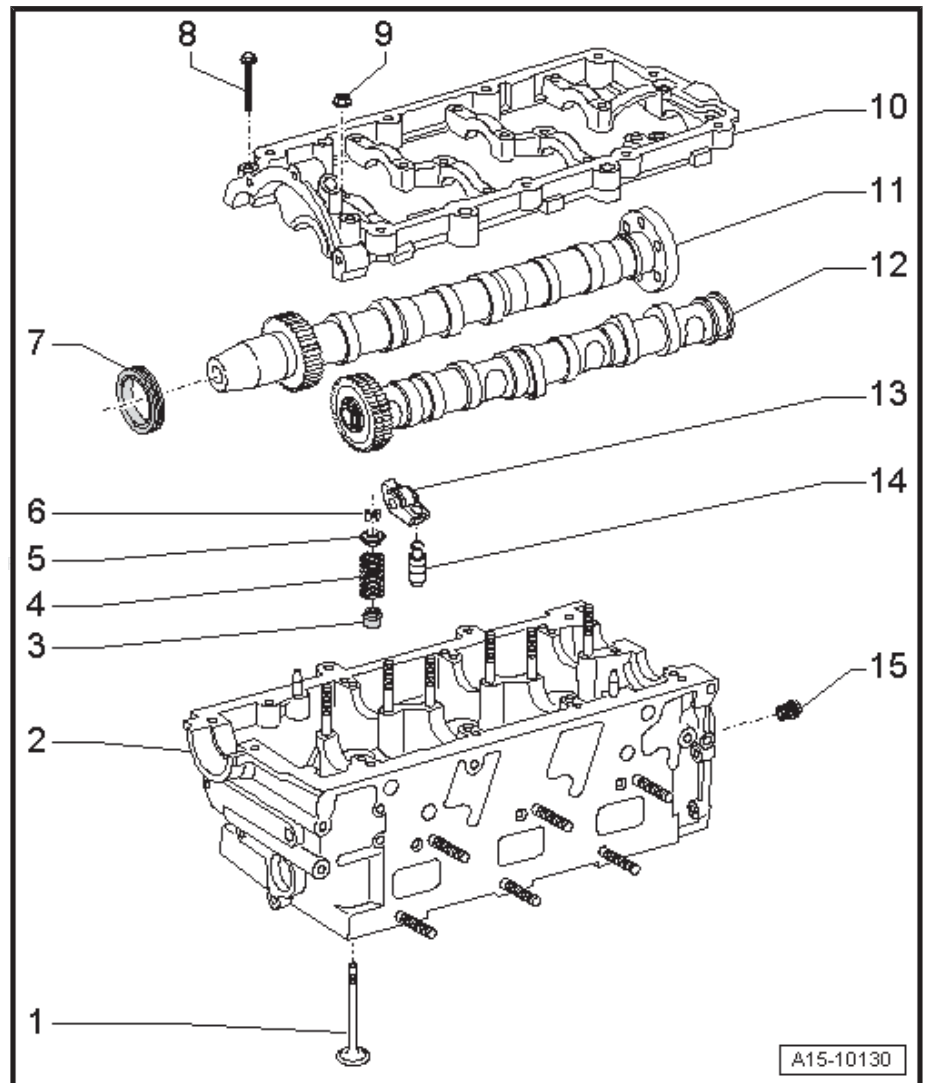
6 - Valve cotters

7 - Camshaft oil seal

- Renewing ⇒ [page 211](#)

8 - Bolt

- Retaining frame on cylinder head (left-side) - tightening torque and sequence ⇒ [page 208](#)
- Retaining frame on cylinder head (right-side) - tightening torque and sequence ⇒ [page 209](#)



**9 - Nut**

- Retaining frame on cylinder head (left-side) - tightening torque and sequence ⇒ [page 208](#)
- Retaining frame on cylinder head (right-side) - tightening torque and sequence ⇒ [page 209](#)

10 - Retaining frame

- With integrated camshaft bearings
- Removing and installing: cylinder head (left-side) ⇒ [page 214](#) , cylinder head (right-side) ⇒ [page 220](#)

11 - Inlet camshaft

- Removing and installing: cylinder head (left-side) ⇒ [page 214](#) , cylinder head (right-side) ⇒ [page 220](#)
- Checking axial clearance ⇒ [page 209](#)
- Check radial clearance with Plastigage (roller rocker fingers removed)
- Radial clearance (new): 0.035 ... 0.085 mm
- Radial clearance: wear limit: 0.1 mm
- Runout: max. 0.01 mm

12 - Exhaust camshaft

- Removing and installing: cylinder head (left-side) ⇒ [page 214](#) , cylinder head (right-side) ⇒ [page 220](#)
- Checking axial clearance ⇒ [page 209](#)
- Check radial clearance with Plastigage (roller rocker fingers removed)
- Radial clearance (new): 0.035 ... 0.085 mm
- Radial clearance: wear limit: 0.1 mm
- Runout: max. 0.01 mm

13 - Roller rocker finger

- Mark installation position with a coloured pen
- Do not interchange
- Check roller bearings for ease of movement
- Lubricate contact surfaces before installing

14 - Hydraulic valve compensation element

- Mark installation position with a coloured pen
- Checking ⇒ [page 233](#)
- Lubricate contact surfaces before installing

15 - Pressure limiting valve, 25 Nm

- Not applicable to more recent versions

Retaining frame on cylinder head (left-side) - tightening torque and sequence

– Tighten bolts and nuts in 2 stages in the sequence shown:

| Stage | Bolts/nuts | Tightening torque |
|-------|------------|---|
| 1. | -1 ... 18- | Screw in by hand until they make contact <ul style="list-style-type: none"> • The retaining frame should make contact with the cylinder head over the full surface |
| 2. | -1 ... 18- | 9 Nm |

