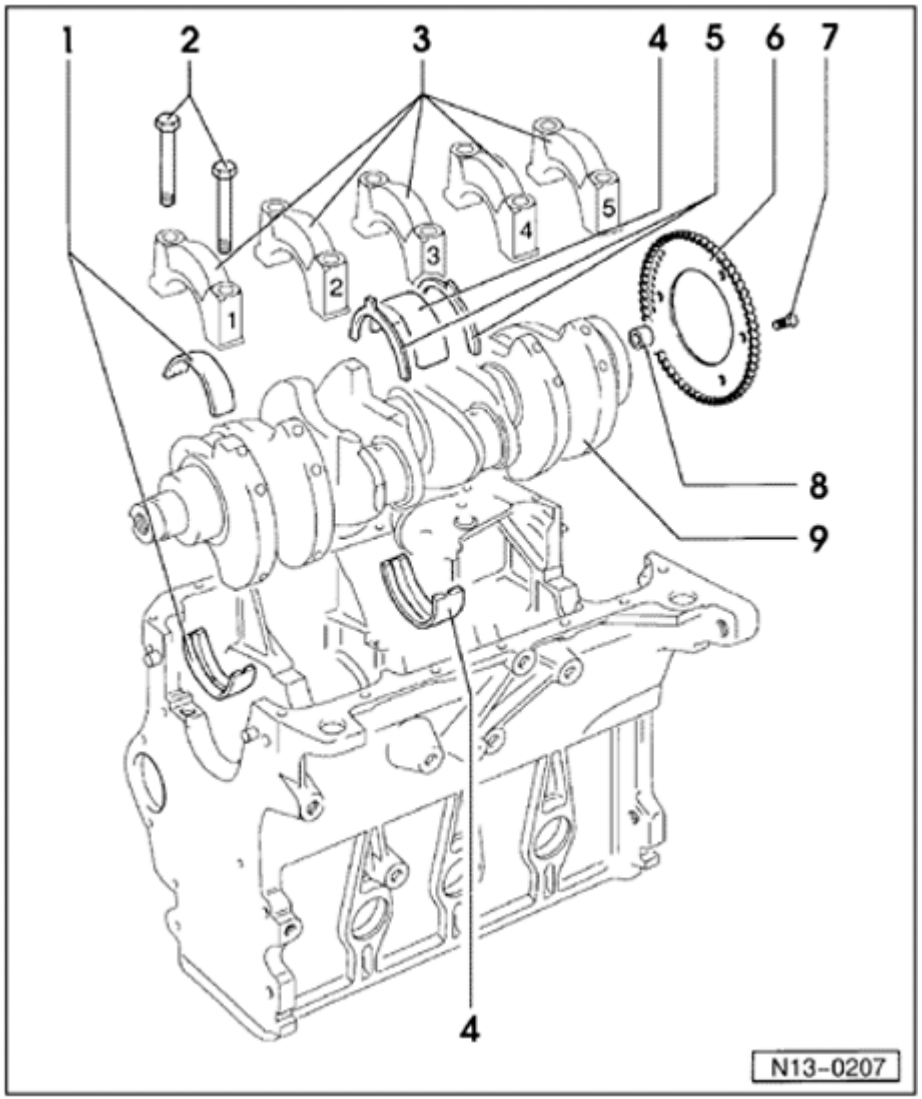
13-46



Crankshaft, removing and installing

Note:

For engine disassembly and assembly, mount engine to an assembly stand using VW540 holding fixture.

1 - Main bearing shells 1, 2, 4 and 5

- Install shell without lubrication groove in main bearing cap
- Install shell with lubrication groove in cylinder block
- Do not interchange used main bearing shells (mark accordingly)

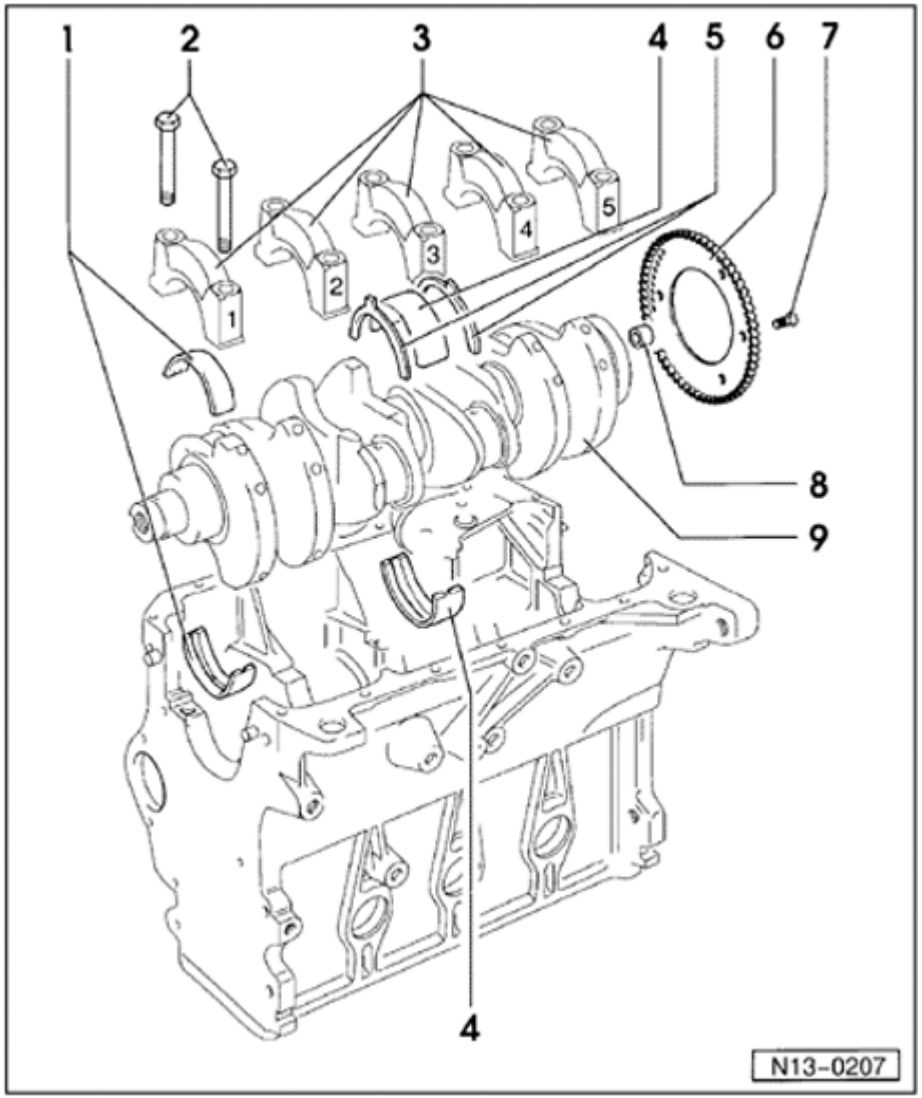
2 - Main bearing cap bolts

- Always replace
- 65 Nm (48 ft lb) + additional 1/4 turn (90 °)
- To measure radial play in crankshaft, tighten to 65 Nm (48 ft lb) but not any further

3 - Main bearing caps

- Bearing cap 1: belt pulley side
- Retaining tabs for cylinder block/bearing cap must overlap

13-47



4 - Main bearing shell 3

- Install shell without lubrication groove in main bearing cap
- Install shell with lubrication groove in cylinder block
- Do not interchange used main bearing shells (mark accordingly)

5 - Thrust plates

- For bearing cap, bearing 3
- Check location point

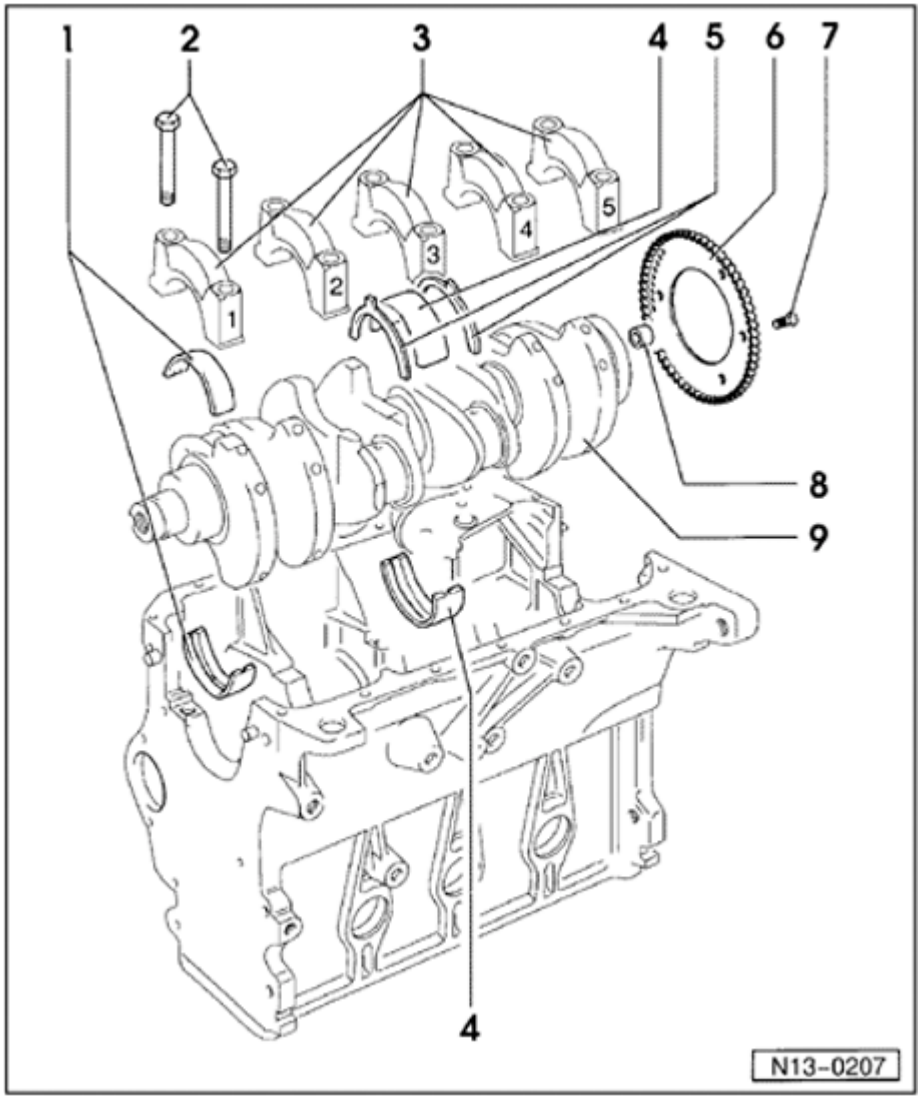
6 - Sensor wheel

- Always replace when bolts are removed
- For engine speed (RPM) sensor -G28-
- Installation only possible in one position; bore holes are offset
- Removing and installing⇒ Fig. ⇒ 1

7 - Sensor wheel screws

- Always replace
- Always replace sensor wheel when bolts are removed
- 10 Nm (7 ft lb) + additional 1/4 turn (90 °)

13-48



8 - Needle bearing

- Removing and installing ⇒ Page 13-50

9 - Crankshaft

- Axial play when new: 0.07-0.23 mm (0.003-0.009 in.)
- Wear limit: 0.30 mm (0.012 in.)
  - Radial clearance is measured using Plastigage®
- New: 0.02-0.04 mm (0.0008-0.0016 in.)
- Wear limit: 0.15 mm (0.006 in.)
- Do not turn crankshaft when measuring radial play
- Crankshaft dimensions ⇒ Page 13-52

13-49

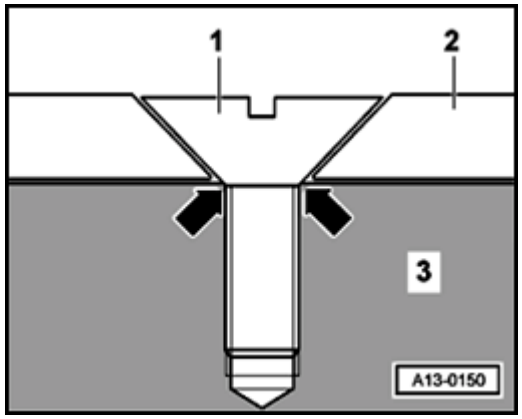


Fig. 1 Removing and installing sensor wheel

- Always replace sensor wheel -2- when screws -1- are removed.

Note:

- *After tightening a second time, the attachment point of the countersunk screws of the sensor wheel are so deformed that the screw heads sit against crankshaft (arrows) -3- and the sensor wheel is loose underneath the screws.*
- *Installation of the sensor wheel is only possible in one position; bore holes are offset.*

Tightening torque

Component	Tightening torque
Sensor wheel to crankshaft	10 Nm (7 ft lb) + 90° 1) 2)
1) Replace bolts.	
2) 90° are equivalent to 1/4 turn.	

Crankshaft needle bearing, removing and installing

Note:

- *A pilot needle bearing must be installed in the crankshaft of engines for vehicles with manual transmission. Install if necessary.*
- *A pilot needle bearing must not be installed in the crankshaft of engines for vehicles with automatic transmission. Remove if necessary.*

Special tools and equipment

- 21/1 Kukko puller and 22/1 Kukko support

or

- 10-202 puller
- VW207C drift

or

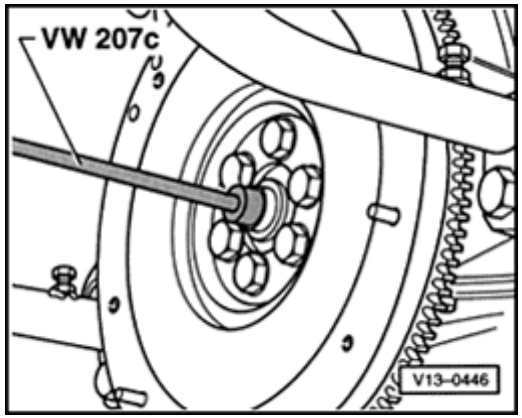
- 3176 centering mandrel

Removing

- Pull out using puller -A-, e.g. 21/2 Kukko extractor and 22/1 Kukko support or 10-202 puller.

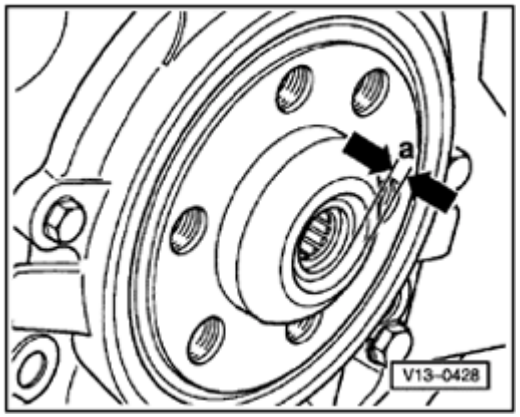
13-51

Installing



- Drive in using VW207C drift and/or 3176 centering mandrel.

  When needle bearing is installed, side with inscription must be visible.



Installation of needle bearing:

Dimension -a- = 1.5 mm (0.059 in.)

Crankshaft dimensions

Reconditioning dimension	Crankshaft journal diameter - mm (in.)	Connecting rod journal diameter - mm (in.)
maximum size (from nominal)	-0.017 (0.0007)	-0.022 (0.0009)
Basic dimension (nominal)	54.00 (2.126)	47.80 (1.882)
minimum size (from nominal)	-0.037 (0.0015)	-0.042 (0.0017)
maximum size (from nominal)	-0.017 (0.0007)	-0.022 (0.0009)
1st undersize (nominal)	53.75 (2.116)	47.55 (1.872)
minimum size (from nominal)	-0.037 (0.0015)	-0.042 (0.0017)
maximum size (from nominal)	-0.017 (0.0007)	-0.022 (0.0009)
2nd undersize (nominal)	53.50 (2.106)	47.30 (1.862)
minimum size (from nominal)	-0.037 (0.0015)	-0.042 (0.0017)
maximum size (from nominal)	-0.017 (0.0007)	-0.022 (0.0009)
3rd undersize (nominal)	53.25 (2.096)	47.05 (1.852)
minimum size (from nominal)	-0.037 (0.0015)	-0.042 (0.0017)