

Chapter 2 Part D:





Engine repair procedures 1.8 litre 16 valve

The following information is a revision of, or supplementary to, that given for the 1.8 litre engine in Part C of this Chapter

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Degrees of difficulty

Easy , suitable for novice with little experience		Fairly easy , suitable for beginner with some experience		Fairly difficult , suitable for competent DIY mechanic		Difficult , suitable for experienced DIY mechanic		Very difficult , suitable for expert DIY or professional	
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Specifications

General

Code:	
GTi 16V with catalytic converter	KR
Compression ratio	10:1

Cylinder head

Minimum height	118.1 mm - measured through cylinder head bolt hole
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Valves

Head diameter:	
Inlet	32.0 mm
Exhaust	28.0 mm
Stem diameter:	
Inlet	6.97 mm
Exhaust	6.94 mm
Overall length:	
Inlet	95.5 mm
Exhaust	98.2 mm

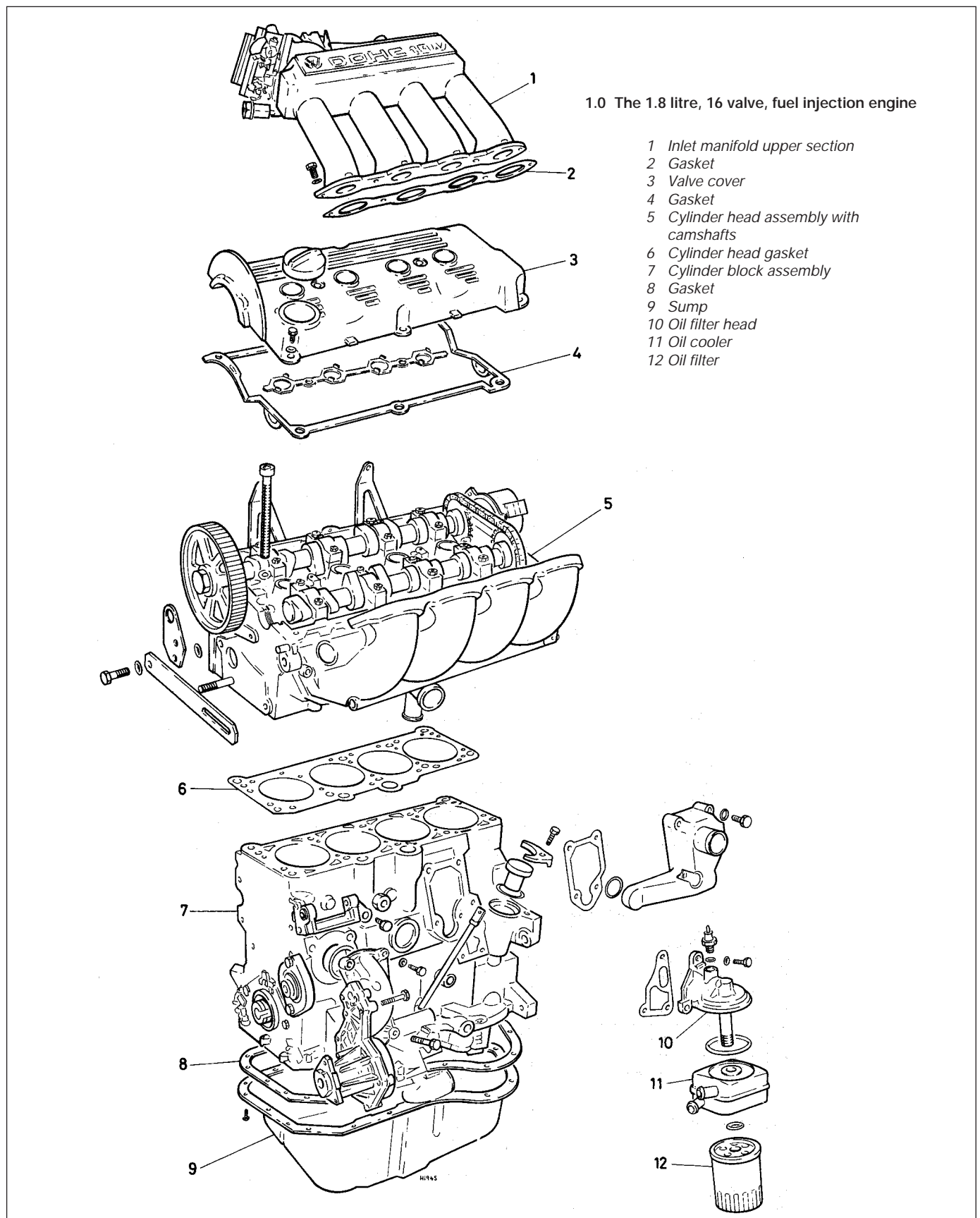
Valve timing

Nil valve clearance at 1.0 mm valve lift

Inlet opens	3° ATDC
Inlet closes	35° ABDC
Exhaust opens	43° BBDC
Exhaust closes	3° BTDC

Torque wrench settings

	Nm	lbf ft
Vibration damper	20	15
Intermediate shaft sprocket bolt	65	48
Valve cover	10	7
Oil cooler	25	19
Camshaft sprocket bolt	65	48
Camshaft bearing caps	15	11
Oil temperature sender	10	7
Oil pump cover	10	7
Oil pump mounting bolts	20	15
Oil jet	10	7
Crankshaft sprocket bolt (oiled)	180	133



1 General information

The 1.8 litre, 16-valve engine fitted to GTi models from October 1986, incorporates double overhead camshafts, one operating the exhaust valves and the other the inlet valves. There are four valves per cylinder which operate simultaneously in pairs and provide the engine with a much improved breathing capability over the 8-valve version, thus resulting in greater power output. A single camshaft sprocket is attached to the exhaust camshaft and a chain and sprocket at the opposite end of the cylinder head is used to drive the inlet camshaft (see illustration).

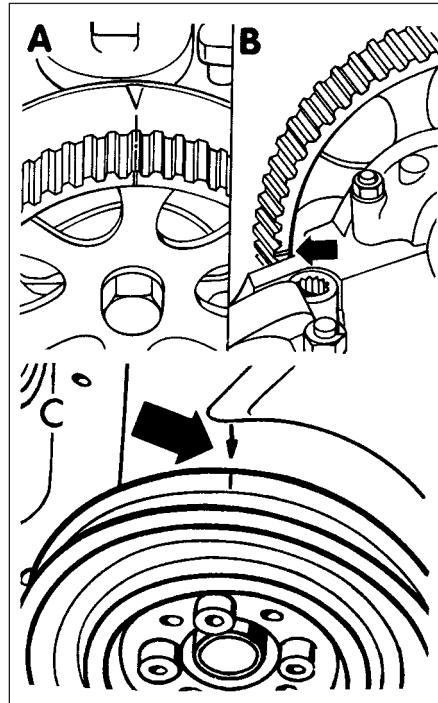
Most overhaul procedures for the 16-valve engine are basically the same as those described for the 8-valve engine in Part C of this Chapter. The following Sections describe procedures which differ.

2 Timing belt and sprockets - removal and refitting



Besides the timing mark on the camshaft sprocket referred to in Part C of this Chapter, Section 9, an additional timing mark is provided on the outside of the camshaft sprocket which aligns with a mark on the valve cover (see illustration). This means that if the timing belt alone is being renewed, it is not necessary to remove the valve cover in order to check the alignment marks.

When fitting the timing belt, it is recommended that VW tool 210 is used to set the tension accurately as this is more critical with the DOHC arrangement (see illustration). Using this tool, the tension should be set to record a reading of between 13 and 14 on the scale. The tool can be obtained from a VW dealer.



2.1 Valve timing marks

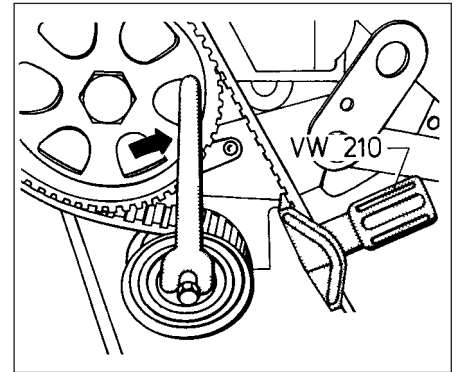
- A Camshaft sprocket outer marks
- B Camshaft sprocket inner marks
- C Crankshaft vibration damper marks

3 Camshafts - removal and refitting



Removal

- 1 Remove the camshaft sprocket cover.
- 2 Unbolt and remove the upper section of inlet manifold.
- 3 Unbolt and remove the valve cover after disconnecting the HT leads from the spark plugs. Remove the main gasket and the



2.2 Adjusting timing belt tension using VW tool 210

central gasket from around the spark plug locations.

4 Align the timing marks with reference to Part C of this Chapter, then check also that the marks on the chain sprockets are aligned (see illustration).

5 Remove the timing belt and camshaft sprocket with reference to Part C of this Chapter.

6 Note the fitted positions of the camshaft bearing caps, if necessary marking them to ensure correct refitting (see illustration).

7 Progressively unscrew the nuts and bolts from the end caps and bearing cap Nos. 1 and 3 on the exhaust camshaft.

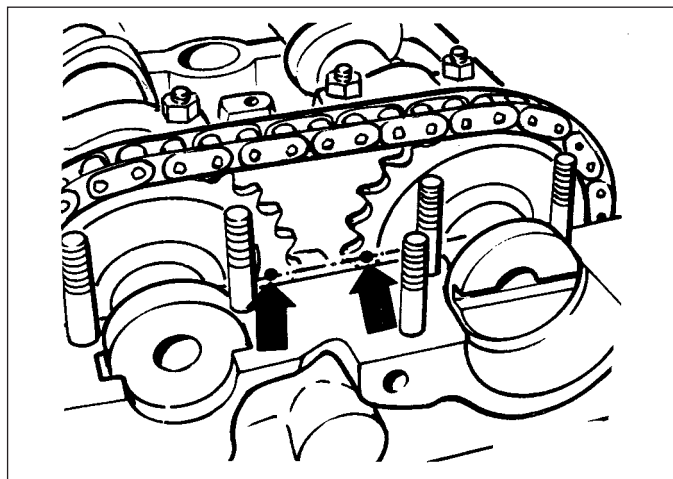
8 Progressively unscrew the bolts from bearing cap Nos. 2 and 4. The exhaust valve springs will force the exhaust camshaft up as the bolts are loosened. Remove the bearing caps keeping them identified for position.

9 Working on the inlet camshaft, progressively unscrew the nuts and bolts from the end cap and bearing cap Nos. 5 and 7.

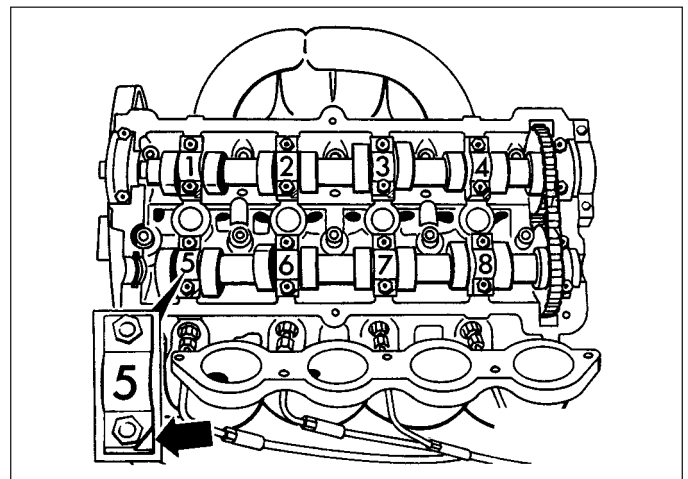
10 Progressively unscrew the bolts from bearing cap Nos. 6 and 8, then remove all the caps keeping them identified for position.

11 Lift both camshafts from the cylinder head then release them from the drive chain.

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3.4 TDC timing marks in alignment on camshaft drive chain sprockets



3.6 Camshaft bearing cap identification
Inset shows recessed corner position (arrowed)

12 If necessary, remove the hydraulic bucket tappets. Check the camshafts and drive chain for wear.

Refitting

13 Lubricate all bucket tappets and camshaft journals with clean engine oil, then insert the tappets in their original bores.

14 Locate the drive chain on the camshaft sprockets so that the timing marks are aligned as shown in **illustration 3.4**, then lower the camshafts into position on the cylinder head. Recheck the timing mark alignment.

15 Fit a new oil seal to the front end of the exhaust camshaft.

16 When refitting the bearing caps, make sure that they are located the correct way round. The numbers must be readable from the inlet manifold side of the head. The recessed corners of the caps must also face the inlet manifold side of the head.

17 Refit bearing cap Nos. 6 and 8, then progressively tighten the bolts to the specified torque.

18 Refit the inlet camshaft end cap and bearing cap Nos. 5 and 7, then progressively tighten the nuts and bolts to the specified torque.

19 Refit bearing cap Nos. 2 and 4, then progressively tighten the bolts to the specified torque.

20 Refit the exhaust camshaft end caps and bearing cap Nos. 1 and 3, then progressively tighten the nuts and bolts to the specified torque.

21 Refit the camshaft sprocket and timing belt with reference to Part C of this Chapter and Section 2.

22 Check that all timing marks, including the drive chain sprocket marks, are aligned.

23 Refit the valve cover together with new gaskets and reconnect the spark plug HT leads.

24 Refit the inlet manifold upper section and the camshaft sprocket cover.

4 Cylinder head - dismantling and overhaul

Exhaust valves on the 16 valve engine are filled with sodium to provide improved heat dissipation. Special precautions are necessary when disposing of this type of valve, particularly where recycling of scrap metal is concerned.

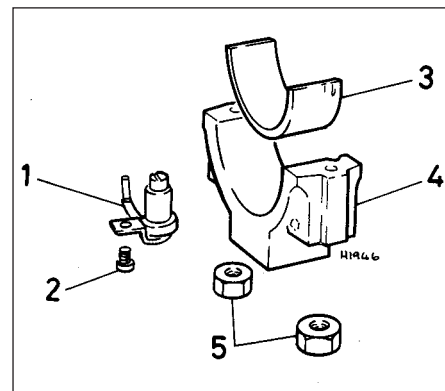
To render each valve safe, it should be wiped dry then cut through the stem with a hacksaw. Throw the valve into a bucket of water, keeping well away from it until the chemical reaction has subsided.

5 Pistons and connecting rods - removal and refitting



The big-end caps on 16 valve engines are fitted with oil jets which direct a stream of oil to the underside of the pistons, mainly for cooling purposes (**see illustration**).

The oil jets are secured to the caps by small screws which must be coated with thread-locking fluid before inserting them and tightening to the specified torque.



5.1 Big-end cap components

- 1 Oil jet
- 2 Screw
- 3 Bearing shell
- 4 Cap
- 5 Nuts