

Chapter 2 Part C: K1G engine

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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

Specifications are as for the type 150 engine (see Chapter 2A) except for the following:

General

Model application: BX 14 after August 1988	K1G
Maximum power DIN (BHP)	72 at 5600 rpm
Maximum torque DIN (lbf ft)	78 at 3400 rpm

Valves

Valve clearance (cold):	
Inlet	0.20 mm
Exhaust	0.40 mm

Valve timing

Inlet opens*	7°14' BTDC
Inlet closes*	39° 45' ABDC
Exhaust opens*	54° 30' BBDC
Exhaust closes*	0° 45' BTDC

*With valve clearance of 0.7 mm

Crankshaft

Endfloat	0.052 to 0.452 mm
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Cylinder liners

Protrusion from block - without seal	0.03 to 0.10 mm
Protrusion difference between liners	0.05 mm

Lubrication system

Oil pressure at 90°C (194°F):	
650 rpm	1.5 bar
4000 rpm	4.0 bar
Oil filter	Champion F104
Oil capacity - with filter change	3.5 litres (6.2 pints)
Dipstick minimum to maximum	1.4 litres (2.5 pints)

Torque wrench settings	Nm	lbf ft
Crankshaft pulley	102	74
Camshaft sprocket	82	59
Big-end bearing cap	39	28
Flywheel	66	48
Clutch pressure plate bolts	15	11
Distributor/fuel pump housing	8	6
Camshaft thrust fork	17	13
Thermostat housing	8	6
Main bearing cap casting main bearing bolts:		
Stage 1	21	15
Stage 2	Angle-tighten a further 45°	
Oil pump	8	6
Sump	8	6
Main bearing cap casting to block	8	6
Coolant pump housing:		
8 mm bolt	31	22
6 mm bolts	51	37
Cylinder head bolts:		
Stage 1	21	15
Stage 2	Angle-tighten a further 240°	
Timing belt tensioner	21	15
Timing cover	6	4
Valve cover	5	4
Dipstick tube	15	11
Oil pressure switch	29	21
Oil filter	15	11

1 General information and precautions

General information

The K1G engine is fitted to all Citroën BX 14 models after August 1988. It is an all-alloy unit and although the dimensions, clearances and tolerances are similar to those of the type 150C engine dealt with in Chapter 2A, there are several major differences. These differences include the camshaft drive, which is of toothed belt type, and the oil pump, which is chain-driven from the crankshaft.

Precautions

Because of the unusual layout of the engine and transmission systems, extra care and attention are necessary during maintenance and overhaul procedures which, in many instances, differ from more conventional systems.

Read through the various Sections concerned before tackling any job, and analyse the instructions, so that any snags or possible difficulties can be noted in advance. Because the sub-assembly castings are made from aluminium alloy it is of utmost importance that, where specified, all fastenings are tightened to the correct torque and, in some instances, in the correct sequence.

2 Oil filter - removal and refitting

Refer to Chapter 1, Section 9.

3 Major operations possible with engine in vehicle

Note: *Since the sump and cylinder head can be removed in situ, it is possible to renew the pistons, liners and big-end bearings without removing the engine. However, this is not recommended, since the tasks can be performed more easily with the engine removed*

The following components can be removed and refitted with the engine in the vehicle:

- a) Timing belt and camshaft
- b) Cylinder head
- c) Sump and oil pump
- d) Clutch and flywheel (after removal of gearbox)

4 Major operations requiring engine removal

The engine must be removed for the following operations:

- a) Removal and refitting of the transmission
- b) Removal and refitting of the crankshaft and main bearings
- c) Removal and refitting of the piston and connecting rod assemblies - see Note, Section 3
- d) Renewal of the big-end bearings - see Note, Section 3

5 Valve rocker clearances - checking and adjustment

Refer to Chapter 1, Section 21.

6 Camshaft drivebelt - removal and refitting

Note: *If there is the slightest doubt about the condition of the timing belt then it must be renewed.*

Note: *The following operation can be carried out with the engine in the vehicle.*

Removal

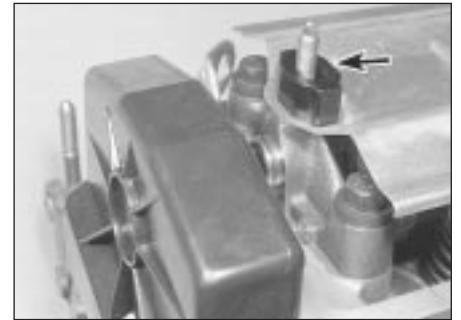
- 1 Disconnect the battery earth lead.
- 2 Remove the hydraulic pump (outer) and the alternator (inner) drivebelts.
- 3 Remove the rocker cover and remove the rubber gasket from the cover (see illustrations).
- 4 Remove the two spacers and baffle plate from the studs (see illustrations).
- 5 Unbolt the upper timing cover, followed by the intermediate cover and lower cover (see illustrations).
- 6 Turn the engine clockwise, using a socket on the crankshaft sprocket bolt, until the small hole in the camshaft sprocket is aligned with the corresponding hole in the cylinder head. Insert the shank of a close-fitting twist drill into the holes (see illustration).
- 7 Align the TDC holes in the flywheel and cylinder block rear flange, then insert a further twist drill or long bolt (see illustration).



6.3a Removing a rocker cover nut



6.3b Removing rocker cover gasket



6.4a Remove rocker cover spacers (arrowed) . . .



6.4b . . . and baffle plate



6.5a Unbolting upper timing cover



6.5b Removing upper timing cover



6.5c Removing intermediate timing cover



6.5d Removing lower timing cover

8 Loosen the timing belt tensioner roller nut (see illustration), turn the tensioner clockwise using a screwdriver or square drive in the special hole, then re-tighten the nut.

9 Mark the normal direction of rotation on the

timing belt, then remove it from the camshaft, coolant pump, and crankshaft sprockets.

Refitting

Caution: Take care not to kink or

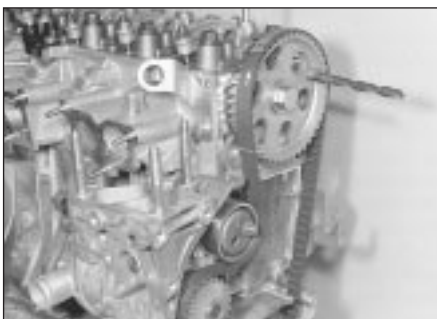
contaminate the timing belt with oil

10 Engage the timing belt with the crankshaft sprocket then, keeping it taut, feed it onto the camshaft sprocket, around the tensioner pulley, and onto the coolant pump sprocket.

11 Loosen the nut and turn the tensioner roller anti-clockwise by hand. Tighten the nut.

12 Citroën dealers use the special tool shown (see illustration) to tension the timing belt. A similar tool may be fabricated using an 8.0 cm long arm and a 1.5 kg (3.3 lb) weight. The torque applied to the roller will approximate 12 Kgf (10.5 lbf in). Pre-tension the timing belt with the tool and tighten the nut, then remove the timing pins and rotate the crankshaft through two complete turns. Loosen the nut and allow the roller to re-position itself. Tighten the nut.

13 If the special tool is not available, an approximate setting may be achieved by turning the roller hub anti-clockwise, until it is



6.6 Camshaft sprocket held at TDC



6.7 Using long bolt (arrowed) to align TDC holes in flywheel and cylinder block



6.8 Loosening timing belt tensioner roller nut

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just possible to turn the timing belt through 90° by finger and thumb midway between the crankshaft and camshaft sprockets. The square in the roller hub should then be directly below the adjustment nut, and the deflection of the belt in the midway position should be approximately 6.0 mm. If using this method, the tension should be re-checked by a Citroën dealer at the earliest opportunity.

14 Refit the lower, intermediate, and upper timing covers, then tighten the bolts (see illustration).

15 Adjust the valve clearances.

16 Refit the baffle plate with its edges pointing downwards, followed by the two spacers.

17 Fit the rubber gasket to the rocker cover, locate the cover in position and tighten the nuts.

18 Refit and tension the hydraulic pump and the alternator drivebelts.

19 Reconnect the battery earth lead.

7 Cylinder head - removal and refitting



Note: The following operation can be carried out with the engine in the vehicle

Note: Illustrations for paragraphs 21 to 26 inclusive can be found in Section 6

Removal

- 1 Disconnect the battery.
- 2 Drain the cooling system.



6.14 Timing cover correctly refitted



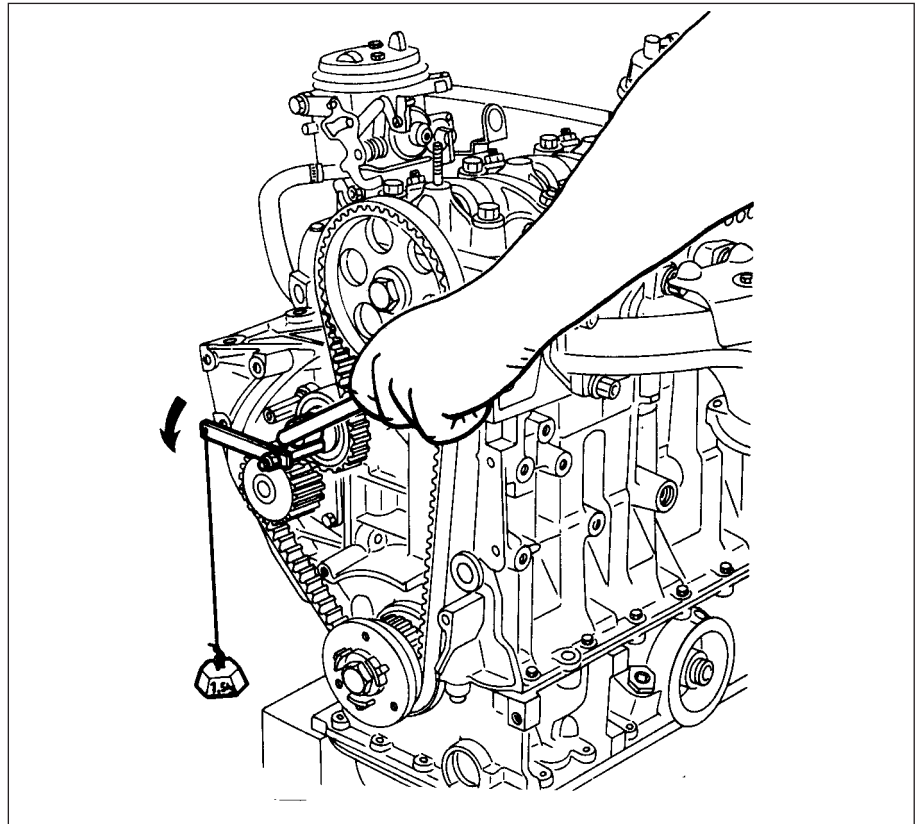
7.6 Unbolting HT lead support



7.8 Water pump hose (arrowed) at thermostat housing



7.9 Removing inlet manifold complete with carburettor



6.12 Using special tool (0132X) to tension timing belt

3 Remove the air cleaner.

4 Disconnect the choke and throttle cables from the carburettor.

5 Unbolt the exhaust downpipe.

6 Disconnect the HT leads from the spark plugs, unbolt the lead support (see illustration), disconnect the HT lead from the coil, and remove the distributor cap. Remove the spark plugs.

7 Disconnect the vacuum hose between the distributor and carburettor.

8 Disconnect the hoses between the fuel pump and carburettor (beware of fuel spillage and take adequate fire precautions) and between the coolant pump and thermostat housing (see illustration).

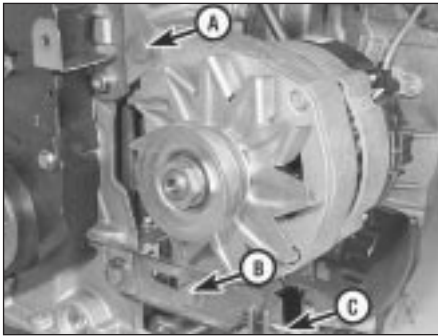
9 Unscrew the nuts and remove the inlet manifold complete with carburettor from the studs on the cylinder head (see illustration). Note that there is no gasket.

10 Unbolt and remove the fuel pump and remove the gasket.

11 Loosen the alternator pivot and adjustment bolts, then unscrew the tension bolt and slip the drivebelt from the pulleys. Remove the pivot and adjustment bolts then remove the alternator (see illustration).

12 Unbolt the pulley from the front of the crankshaft (see illustration).

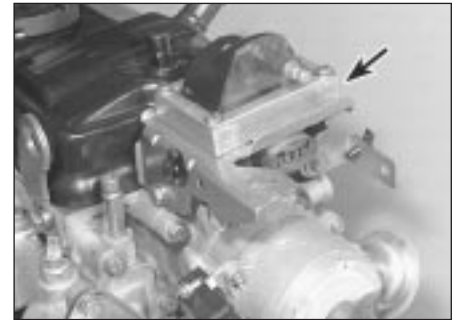
13 Unbolt and remove the coil (see illustration) after unclipping the TDC sensor connector.



7.11 Alternator pivot (A) adjuster (B) and tensioner (C) bolts



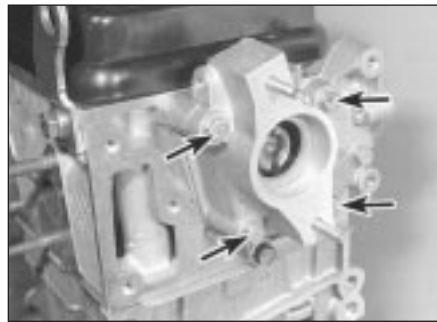
7.12 Unbolting crankshaft pulley



7.13 Ignition coil (arrowed) located above distributor



7.17 Removing thermostat housing



7.18 Distributor mounting flange retaining bolts (arrowed)



7.19 TDC sensor mounting bolt (arrowed)

14 Unbolt the exhaust manifold hot air shroud.

15 Unscrew the brass nuts, remove the washers and remove the exhaust manifold from the studs on the cylinder head. Remove the gaskets.

16 Remove the distributor.

17 Remove the thermostat, then unbolt the thermostat housing from the cylinder head (see illustration).

18 Unbolt the distributor mounting flange from the cylinder head (see illustration).

19 Unbolt the TDC sensor from the flywheel end of the cylinder block and unclip the lead from the timing plate (see illustration).

20 Unbolt and remove the timing plate (see illustration).

21 Unscrew the nuts and remove the rocker cover. Remove the rubber gasket from the cover.

22 Remove the two spacers and baffle plate from the studs.

23 Unbolt the upper timing cover, followed by the intermediate cover and lower cover.

24 Turn the engine clockwise, using a socket on the crankshaft sprocket bolt, until the small hole in the camshaft sprocket is aligned with the corresponding hole in the cylinder head. Insert the shank of a close-fitting twist drill into the holes.

25 Align the TDC holes in the flywheel and cylinder block rear flange, then insert a further twist drill or long bolt.

26 Loosen the timing belt tensioner roller nut, turn the tensioner clockwise using a screwdriver or square drive in the special hole, then re-tighten the nut.

27 Mark the normal direction of rotation on the timing belt, then remove it from the

camshaft, coolant pump, and crankshaft sprockets.

28 Unscrew the tensioner nut and remove the tensioner roller.

29 Progressively loosen the cylinder head bolts using the reverse sequence to that shown for tightening, then remove all the bolts.

30 Lift off the rocker arm assembly (see illustration).

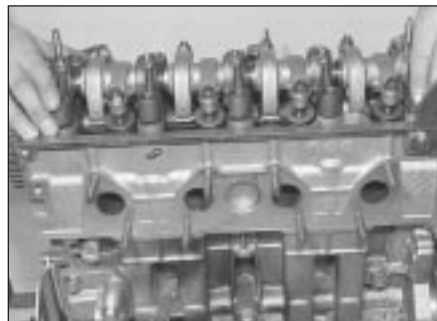
31 Rock the cylinder head to free it from the block, then lift it from the location dowels. The two angled metal rods shown may be used for this purpose (see illustrations).

32 Remove the cylinder head gasket from the block.

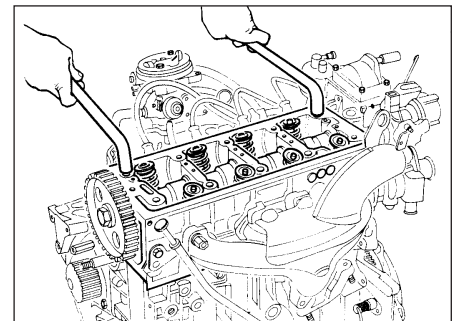
33 Fit liner clamps (see Section 16 in Part A of this Chapter) if it is not proposed to remove the pistons and liners.



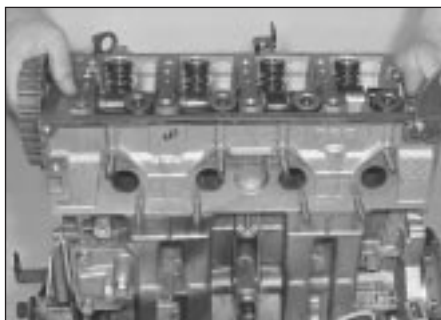
7.20 Timing plate (arrowed)



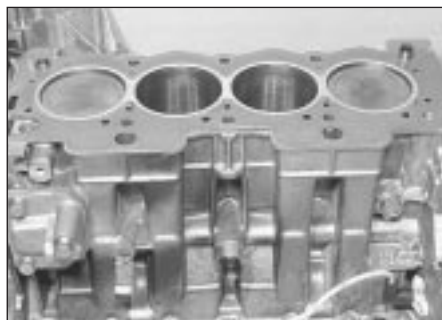
7.30 Removing rocker arm assembly



7.31a Using two metal rods to free cylinder head from cylinder block



7.31b Lifting cylinder head from cylinder block



7.35 Cylinder head gasket correctly located



7.37 Camshaft sprocket held at TDC using twist drill

Refitting

34 Clean the cylinder head and block joint faces thoroughly. Also clean the cylinder head bolt holes.

35 Locate the new cylinder head gasket on the block dowels, with the manufacturer's name uppermost (see illustration).

36 Align the TDC holes in the flywheel and block rear flange and insert a twist drill or long bolt.

37 Align the small hole in the camshaft sprocket with the hole in the cylinder head and insert a twist drill or bolt (see illustration).

38 Lower the cylinder head onto the block so that it engages the two dowels.

39 Refit the rocker arm assembly.

40 Lubricate the cylinder head bolt threads and heads with molybdenum disulphide grease. Insert them and tighten to the initial torque using the sequence shown (see illustration).

41 Using the same sequence, angle-tighten the bolts through the specified angle (see illustration).

42 Refit the timing belt tensioner roller, turn it clockwise and tighten the nut.

43 Engage the timing belt with the crankshaft sprocket then, keeping it taut, feed it onto the camshaft sprocket, around the tensioner

pulley, and onto the coolant pump sprocket.

44 Loosen the nut and turn the tensioner roller anti-clockwise by hand. Tighten the nut.

45 Citroën dealers use the special tool shown in illustration 6.12 to tension the timing belt. A similar tool may be fabricated using an 8.0 cm long arm and a 1.5 kg (3.3 lb) weight. The torque applied to the roller will approximate 12 Kgf (10.5 lbf in). Pre-tension the timing belt with the tool and tighten the nut, then remove the timing pins and rotate the crankshaft through two complete turns. Loosen the nut and allow the roller to re-position itself. Tighten the nut.

46 If the special tool is not available, an approximate setting may be achieved by turning the roller hub anti-clockwise, until it is just possible to turn the timing belt through 90° by finger and thumb midway between the crankshaft and camshaft sprockets. The square in the roller hub should then be directly below the adjustment nut, and the deflection of the belt in the midway position should be approximately 6.0 mm. If using this method, the tension should be re-checked by a Citroën dealer at the earliest opportunity.

47 Refit the lower, intermediate, and upper timing covers, then tighten the bolts - see Section 6.

48 Adjust the valve clearances.

49 Refit the baffle plate with its edges pointing downwards, followed by the two spacers.

50 Fit the rubber gasket to the rocker cover, locate the cover in position and tighten the nuts.

51 Refit the timing plate and tighten the bolts.

52 Refit the TDC sensor and tighten the bolt. Fix the lead in the plastic clip on the timing plate. Note that the main body of the TDC sensor should be 1.0 mm from the flywheel.

53 Apply jointing compound to the distributor mounting flange, then refit it to the cylinder head and tighten the bolts.

54 Apply jointing compound to the thermostat housing, then refit it to the cylinder head and tighten the bolts to the specified torque.

55 Refit the thermostat.

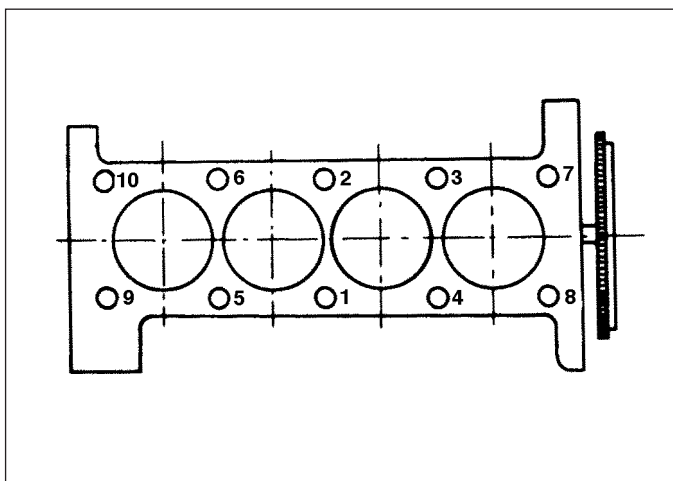
56 Refit the distributor.

57 Refit the exhaust manifold together with new gaskets. Refit the nuts and washers, and tighten securely.

58 Refit the exhaust manifold hot air shroud and tighten the bolts.

59 Locate the coil and bracket over the distributor and tighten the bolts.

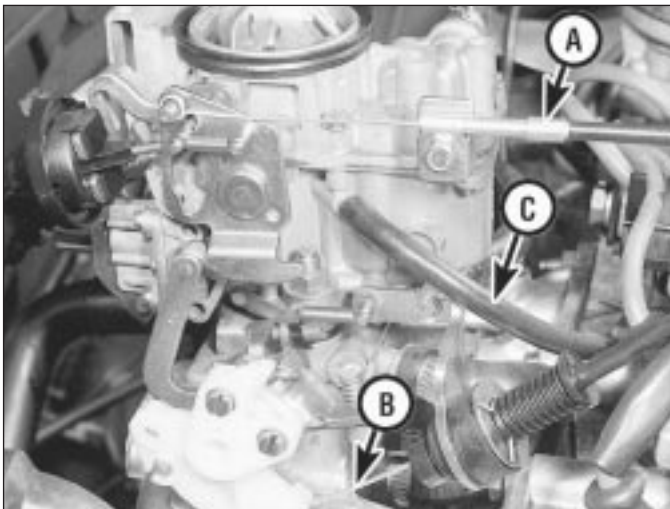
60 Position the pulley on the front of the crankshaft. Insert and tighten the bolts.



7.40 Cylinder head bolt tightening sequence



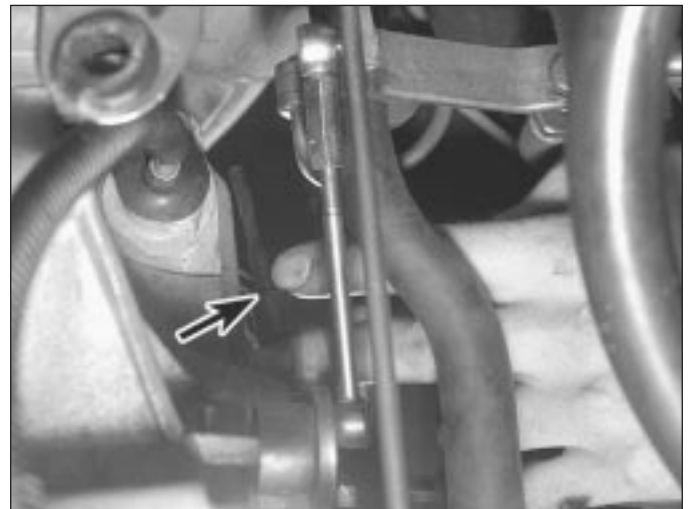
7.41 Angle-tightening cylinder head bolts



8.8 Carburettor connections

A Choke cable
B Throttle cable

C Distributor vacuum
hose



8.14 Speedometer cable rubber cotter pin (arrowed)

61 Refit the alternator and insert the pivot and adjustment bolts. Slip the drivebelt onto the pulleys and tighten the tension bolt until the deflection of the belt midway between the pulleys is approximately 6.0 mm under firm thumb pressure. Tighten the pivot and adjustment bolts.

62 Refit the fuel pump with a new gasket and tighten the bolts.

63 Thoroughly clean the mating faces of the inlet manifold and cylinder head and apply jointing compound.

64 Refit the inlet manifold complete with carburettor and tighten the nuts.

65 Reconnect the hose between the fuel pump and carburettor and tighten the clips.

66 Reconnect the vacuum hose between the distributor and carburettor.

67 Refit and tighten the spark plugs.

68 Refit the HT leads and distributor cap.

69 Reconnect the exhaust downpipe.

70 Reconnect the choke and throttle cables to the carburettor.

71 Refit the air cleaner.

72 Replenish the cooling system.

73 Reconnect the battery.

8 Engine/transmission - removal and refitting



Removal

1 The engine/transmission is removed by lifting it upwards out of engine compartment.

2 Remove the bonnet.

3 Remove the battery.

4 Raise the front of the car, and support it securely on axle stands placed under the body sill jacking points.

5 Drain the cooling system.

6 Drain the engine oil.

7 Drain the transmission oil.

8 Disconnect the choke and throttle cables from the carburettor (see illustration).

9 Remove the air cleaner.

10 Disconnect the fuel supply hose from the fuel pump, and the return hose from the T-union.

11 Remove the radiator.

12 Remove both driveshafts.

13 Unbolt and remove the front downpipe

from the exhaust manifold, and also the front section of the exhaust system, noting the support bracket on the transmission.

14 Pull out the rubber cotter pin and disconnect the speedometer cable from the transmission (see illustration).

15 Disconnect the gearchange control rods by prising the sockets off the balljoints with an open-ended spanner (see illustration).

16 Remove the bolt from the engine rear mounting (see illustration).

17 Unbolt the rear mounting yoke and the driveshaft support bearing bracket, then remove them.

18 Release the clips which hold the suspension levelling pipeline to the underside of the engine and transmission.

19 Loosen the mounting and belt adjuster link bolts on the hydraulic pump and remove the drivebelt.

20 Set the suspension height control lever in the "low" position and then gently release the screw on the hydraulic pressure regulator through one turn (see illustration).

21 Disconnect the small pipe union on the hydraulic pressure regulator and the one on

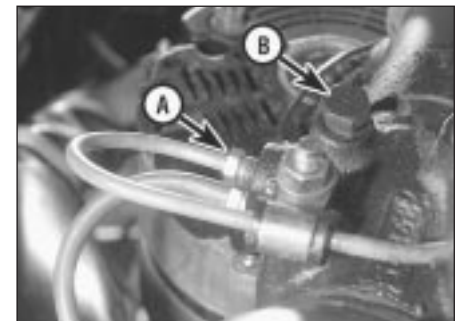
2C



8.15 Using an open-ended spanner (arrowed) to disconnect a gearchange rod balljoint



8.16 Engine rear mounting and yoke



8.20 Hydraulic pressure regulator

A Pipe union B Pressure relief screw



8.22 Unbolting hydraulic pump/regulator assembly



8.24 Clutch cable connection at release lever



8.26 Heater hose connection at carburettor (arrowed)



8.27 Earth cables at transmission (arrowed)



8.28 Temperature switch/oil pressure switch/reversing light switch wiring connector (arrowed)



8.30a Left-hand engine mounting through-bolt (arrowed)

the security valve. Release the fixing clips and withdraw the disconnected section of pipeline from below the car, noting carefully its routing.

22 Unbolt the hydraulic pump/regulator assembly from the cylinder block bracket (see illustration).

23 Raise the assembly and rest it on the crossmember with the hydraulic flexible hose still connected.

24 Disconnect the clutch cable from the release lever on the transmission (see illustration).

25 Disconnect the heater hoses from the engine.

26 Disconnect the heater hose from the carburettor (see illustration).

27 Disconnect the earth cables from the transmission casing (see illustration).

28 Disconnect the wiring from the alternator and the plug which serves the temperature switch, oil pressure switch and reversing light switch (see illustration).

29 Connect a suitable hoist to the engine lifting eyes and take the weight of the engine/transmission.

30 Unscrew the through-bolt of the left-hand mounting, then unbolt and remove the mounting bracket (see illustrations).

31 Unscrew the through-bolt from the right-hand engine mounting (see illustration).

32 Swivel the engine/transmission so that the transmission faces towards the left-hand front corner of the engine compartment.

33 Raise the hoist slowly and lift the engine/transmission out of the engine compartment (see illustration).

34 The transmission can be separated from

the engine after removing the following components:

- a) Starter motor
- b) TDC sensor
- c) Flywheel cover plate
- d) Reversing light switch lead connections

35 Undo and remove the clutch bellhousing-to-engine bolts.

Refitting

36 Refitting is a reversal of removal, but observe the following points:

- a) Use a plastic protective sleeve to prevent damage to the oil seal lips when fitting the right-hand driveshaft
- b) Adjust the clutch cable
- c) Refill the engine and transmission with oil
- d) Refill the cooling system
- e) Tension the drivebelts



8.30b Removing left-hand engine mounting bracket



8.31 Right-hand engine mounting through-bolt (arrowed)



8.33 Lifting engine/transmission unit from vehicle

- f) Top-up the hydraulic system
g) The use of self-locking pliers will facilitate reconnection of the gearchange rod balljoints (see illustration)

9 Engine dismantling - general information

Refer to Section 8 in Part A of this Chapter.

10 Engine dismantling - ancillary items

Refer to Section 9 in Part A of this Chapter.

11 Engine - separation from transmission

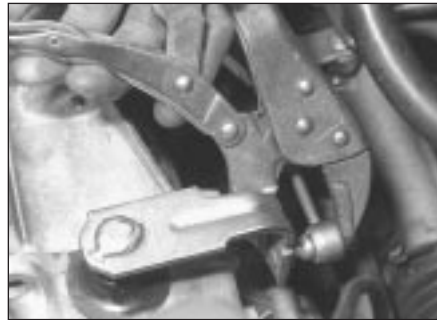


Refer to Section 10 in Part A of this Chapter.

12 Engine - complete dismantling



- 1 Disconnect the HT leads from the spark plugs, unbolt the lead support, disconnect the HT lead from the coil, and remove the distributor cap. Remove the spark plugs.
- 2 Disconnect the vacuum hose between the distributor and carburettor.
- 3 Disconnect the hoses between the fuel pump and carburettor (beware of fuel spillage and take adequate fire precautions) and between the coolant pump and thermostat housing.
- 4 Unscrew the nuts and remove the inlet manifold complete with carburettor from the studs on the cylinder head. Note that there is no gasket.



8.36 Reconnecting a gearchange rod balljoint

- 5 Unbolt and remove the fuel pump, then remove the gasket.
- 6 Loosen the alternator pivot and adjustment bolts, then unscrew the tension bolt and slip the drivebelt from the pulleys. Remove the pivot and adjustment bolts, then remove the alternator.
- 7 Unbolt the pulley from the front of the crankshaft.
- 8 Unbolt and remove the coil after unclipping the TDC sensor connector.
- 9 Unbolt the exhaust manifold hot air shroud.
- 10 Unscrew the brass nuts, remove the washers and remove the exhaust manifold from the studs on the cylinder head. Remove the gaskets.
- 11 Remove the distributor.
- 12 Remove the thermostat, then unbolt the thermostat housing from the cylinder head.
- 13 Unbolt the distributor mounting flange from the cylinder head.
- 14 Unbolt the TDC sensor from the flywheel end of the cylinder block and unclip the lead from the timing plate.
- 15 Unbolt and remove the timing plate.
- 16 Unscrew and remove the oil filter, using a strap wrench if necessary.
- 17 Unscrew and remove the oil pressure switch.
- 18 Unscrew the mounting bolt and pull the

engine oil dipstick holder from the main bearing cap casting. Remove the dipstick from the holder (see illustration).

19 Unscrew the nuts and remove the rocker cover. Remove the rubber gasket from the cover.

20 Remove the two spacers and baffle plate from the studs.

21 Unbolt the upper timing cover, followed by the intermediate cover and lower cover.

22 Turn the engine clockwise, using a socket on the crankshaft sprocket bolt, until the small hole in the camshaft sprocket is aligned with the corresponding hole in the cylinder head. Insert the shank of a close-fitting twist drill into the holes.

23 Align the TDC holes in the flywheel and cylinder block rear flange, then insert a further twist drill or long bolt.

24 Loosen the timing belt tensioner roller nut, turn the tensioner clockwise using a screwdriver or square drive in the special hole, then re-tighten the nut.

25 Mark the normal direction of rotation on the timing belt, then remove it from the camshaft, coolant pump, and crankshaft sprockets.

26 Unscrew the tensioner nut and remove the tensioner roller.

27 Progressively loosen the cylinder head bolts using the reverse sequence to that shown, then remove all the bolts.

28 Lift off the rocker arm assembly.

29 Rock the cylinder head to free it from the block, then lift it from the location dowels. Two angled metal rods may be used for this purpose.

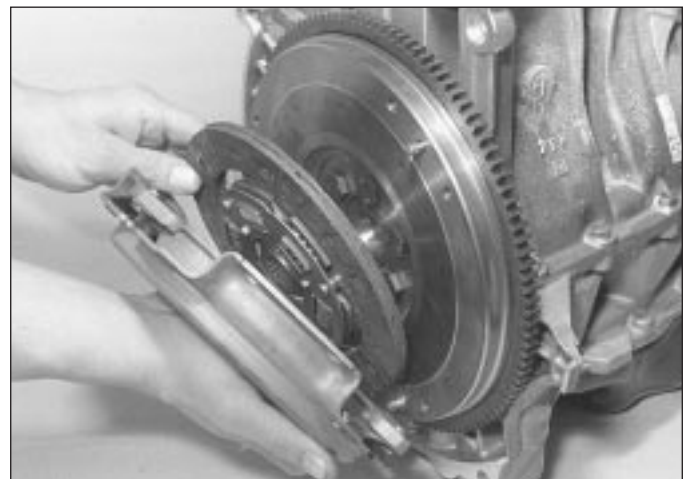
30 Remove the cylinder head gasket from the block.

31 Fit liner clamps (see Section 16 in Part A of this Chapter) if it is not proposed to remove the pistons and liners.

32 Progressively loosen the clutch pressure plate bolts and remove the pressure plate and friction disc from the flywheel (see illustration).



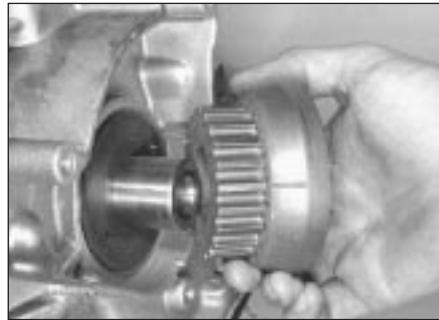
12.18 Unbolting dipstick holder upper mounting



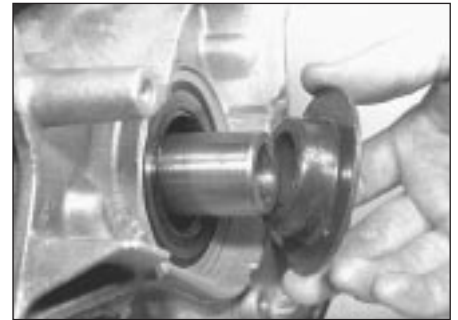
12.32 Removing clutch pressure plate and friction disc



12.34a Removing crankshaft sprocket bolt . . .



12.34b . . . the hub/sprocket . . .



12.34c . . . and timing belt guide plate

33 Unbolt the coolant pump housing from the side of the block and prise out the O-ring.
 34 Have an assistant hold the flywheel stationary with a wide-bladed screwdriver inserted between the starter ring gear teeth,



12.35 Prising out crankshaft front oil seal

then unscrew the crankshaft sprocket bolt and remove the hub/sprocket and timing belt guide plate (see illustrations).

35 Using a screwdriver, prise the front oil seal from the block and main bearing casting (see illustration).

36 Hold the flywheel stationary and unscrew the flywheel bolts. Lift the flywheel from the dowel on the crankshaft rear flange.

37 Prise out the crankshaft rear oil seal using a screwdriver.

38 Invert the engine and support it on blocks of wood.

39 Unscrew the nuts and bolts securing the sump to the main bearing casting, then remove it by carefully prising it free of the jointing compound (see illustration).

40 Unbolt the oil pump and tilt it to release the drive sprocket from the chain (see illustrations).

41 Support the block on its flywheel end.

42 Mark the liners for position, starting with No 1 (at the flywheel end). Similarly mark the big-end bearing caps.

43 Temporarily refit the crankshaft sprocket bolt and turn the crankshaft so that Nos 1 and 4 pistons are at bottom dead centre (BDC).

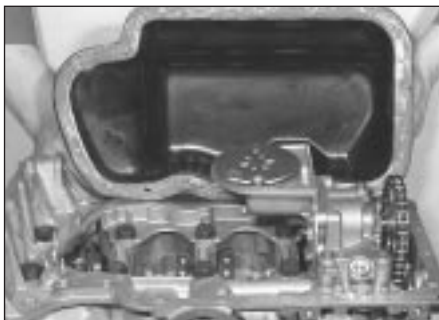
44 Unscrew the nuts and remove the big-end bearing caps (see illustration). Remove the lower big-end shells, keeping them identified for position.

45 Remove the clamps and withdraw the liners, complete with pistons, from the block (see illustration).

46 Remove the liner bottom O-rings.

47 Repeat the procedure for Nos 2 and 3 pistons and liners.

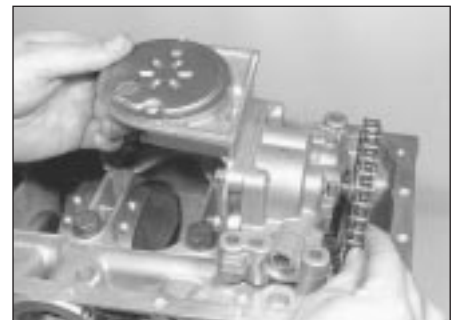
48 Invert the engine again and unscrew the bolts securing the main bearing cap casting to the block (see illustrations).



12.39 Removing the sump



12.40a Unscrew oil pump retaining bolts . . .



12.40b . . . and remove oil pump



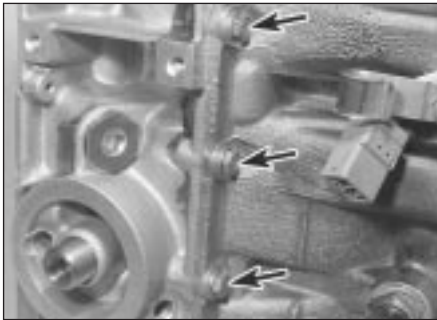
12.44 Removing a big-end bearing cap



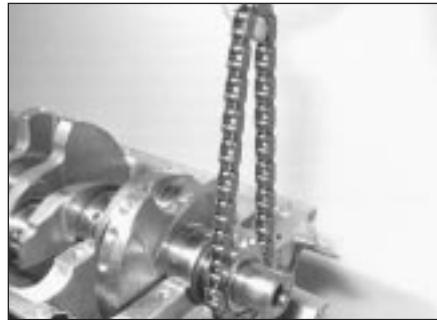
12.45 Removing a liner/piston assembly



12.48a Unscrew main bearing cap casting front bolts . . .



12.48b ... and side bolts (arrowed)



12.50 Removing oil pump chain from crankshaft



12.51a Removing a main bearing shell ...



12.51b ... and endfloat thrustwasher

49 Progressively unscrew the main bearing bolts and lift the main bearing cap casting from the block. Gently tap it with a wooden or soft-headed mallet to release it. Prise out the

main bearing shells, keeping them identified for location.

50 Remove the oil pump sprocket and chain from the crankshaft (see illustration).

51 Lift the crankshaft from the block and remove the main bearing shells, keeping them identified for location. Also remove the endfloat thrustwashers from No 2 main bearing location (see illustrations).

13 Engine - examination and renovation



General information

1 Refer to Section 12 in Part A of this Chapter.

Camshaft drivebelt

2 The drivebelt should be renewed when the engine is overhauled, or if it has become contaminated with oil. There is no specified renewal mileage. When handling the timing belt, do not bend it sharply as this may damage the internal fibres.

Camshaft

3 Refer to Section 12 in Part A of this Chapter but note that there is no camshaft lubrication manifold, as the camshaft runs in an oil bath.

All other components

4 Refer to Section 12 in Part A of this Chapter.

14 Cylinder head - dismantling, decarbonising, inspection and reassembly



2C



14.1a Using home-made tool to hold camshaft sprocket stationary



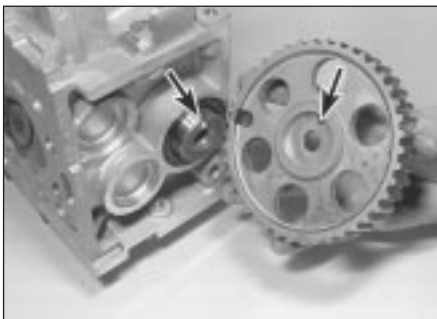
14.1b Unscrew camshaft sprocket bolt ...

Dismantling

1 Remove the twist drill from the camshaft sprocket, then hold the sprocket stationary using an oil filter strap wrench or tool as shown. Unscrew the bolt and remove the sprocket (see illustrations).

2 Unbolt and remove the camshaft thrust fork (see illustration).

3 Prise out the oil seal, and carefully withdraw the camshaft from the cylinder head (see illustrations).



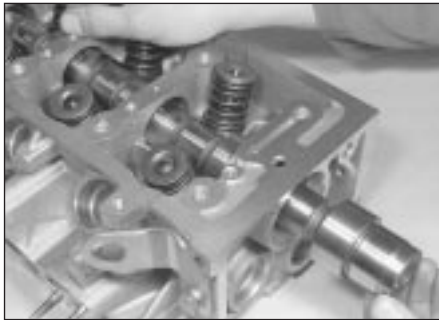
14.1c ... and remove bolt, washer and sprocket - note location peg and cut-out (arrowed)



14.2 Camshaft thrust fork (arrowed)



14.3a Prise out camshaft oil seal ...



14.3b ... and withdraw camshaft



14.4a Compress valve spring and remove split collets ...



14.4b ... the retainer ...



14.4c ... the spring ...



14.4d ... the spring seat ...



14.4e ... and the valve

4 Remove the valves and springs, keeping them in order by inserting them in a card having suitable holes punched in it, numbered from 1 to 8. Discard the valve stem oil seals (see illustrations).

Decarbonising

5 Refer to Section 13 in Part A of this Chapter.

Inspection

6 Refer to Section 13 in Part A of this Chapter.

Reassembly

7 Refit the valves and springs with reference to Section 13 in Part A of this Chapter.

8 Oil the camshaft bearings and insert the camshaft into the cylinder head.

9 Refit the camshaft thrust fork, and tighten the bolt.

10 Dip the new oil seal in oil then press it into the cylinder head until flush, using a metal tube or large socket and hammer.

11 Refit the camshaft sprocket so that the location peg enters the cut-out. Insert and tighten the bolt while holding the sprocket stationary, using the method described in paragraph 1.

15 Engine reassembly - general information

Refer to Section 14 in Part A of this Chapter.

16 Engine - preparation for reassembly

Refer to Section 15 in Part A of this Chapter.

17 Cylinder liners - checking protrusion

Refer to Section 16 in Part A of this Chapter.

18 Engine - complete reassembly

Note: Maintain conditions of absolute cleanliness when reassembling the engine

Crankshaft

1 With the cylinder block upside-down on the bench, press the main bearing upper shells into position. Note that the grooved bearings are fitted to positions No 2 and 4.

2 Smear a little grease on the thrustwashers and locate them each side of No 2 bearing with their grooves facing outwards.

3 Oil the bearings and lower the crankshaft into position (see illustration).

4 Check that the crankshaft endfloat is as given in the *Specifications*, using a feeler blade between a thrustwasher and the crankshaft web. The thrustwashers are

available in four thicknesses.

5 Fit the oil pump sprocket and chain to the front of the crankshaft, locating the sprocket on the Woodruff key.

6 Press the main bearing lower shells into position in the main bearing cap casting, noting that the grooved bearings are fitted to positions No 2 and 4.

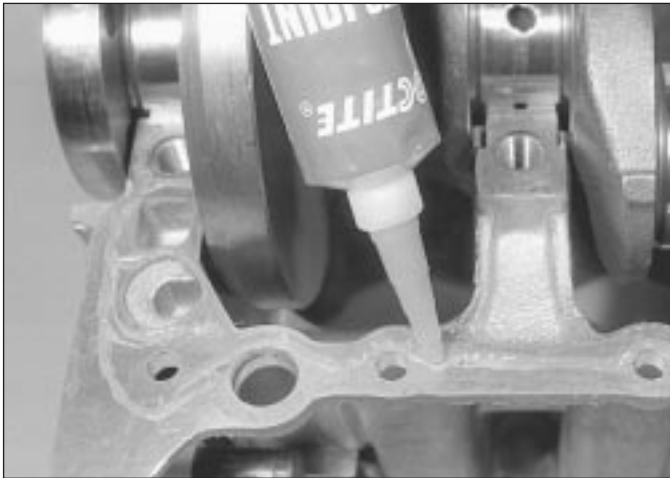
7 Apply jointing compound to the mating face, then lower the main bearing cap casting into position over the crankshaft (see illustrations). At the same time, feed the oil pump chain through the aperture.

8 Insert the main bearing bolts dry, then tighten them evenly to the initial torque wrench setting. Angle-tighten the bolts by a further 45° (see illustration)

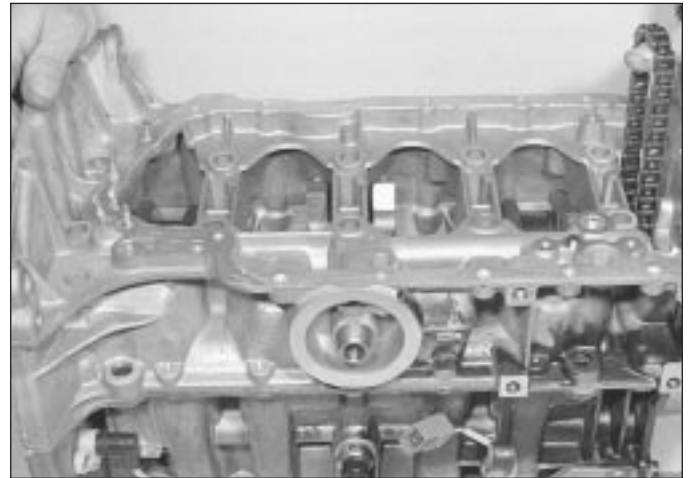
9 Refit the bolts securing the main bearing cap casting to the block, and tighten them to the specified torque.



18.3 Oiling main bearing shells



18.7a Apply jointing compound to crankcase mating face . . .



18.7b . . . then lower main bearing cap casting into position

Pistons and liners

- 10 Support the cylinder block on its flywheel end.
 11 Check that the lower big-end bearing shells are fitted to the big-end caps and the upper shells to the connecting rods.
 12 Oil the liner bores and piston rings.
 13 Position the piston ring end gaps at 120° from each other, so that none is in line with another.
 14 Fit a piston ring compressor to each piston in turn and push the pistons in their respective liners using a hammer handle (see illustrations). Make sure that the arrows on the piston crowns face the front (timing belt

end) of the liners.

- 15 Fit the bottom O-rings to the liners, taking care not to twist them.
 16 Check that the crankshaft rotates freely, then position Nos 1 and 4 crankpins at bottom dead centre (BDC). Oil the crankpins.
 17 Insert No 1 liner/piston into the block and guide the connecting rod big-end onto the crankpin. Refit the big-end bearing cap and tighten the nuts evenly to the specified torque (see illustration).
 18 Check that the crankshaft rotates freely while holding the liner in position with a clamp. Temporarily refit the crankshaft sprocket bolt to turn the crankshaft.

- 19 Repeat the procedure to fit the remaining pistons and liners.

Oil pump

- 20 Support the block upside-down on the bench.
 21 Check that the oil pump location pin is fitted to the main bearing casting, then refit the oil pump, tilting it to engage the drive sprocket with the chain. Insert and tighten the bolts.

Sump

- 22 Apply jointing compound to the mating faces of the sump and main bearing casting. Refit the sump, insert the bolts and tighten them to the specified torque.

Crankshaft rear oil seal

- 23 Dip the new crankshaft rear oil seal in clean engine oil and locate it over the rear of the crankshaft (see illustration).
 24 Citroën dealers use a special tool (0132U) to fit the seal but it can be fitted by using the flywheel. Temporarily locate the flywheel on the crankshaft using four bolts, then tighten the bolts evenly until the flywheel contacts the rear flange. Remove the flywheel and use a metal tube or block of wood to drive the oil seal fully into position.



18.8 Angle-tightening main bearing cap bolts



18.14a Fitting a piston ring compressor



18.14b Using a hammer handle to push a piston into its liner



18.17 Tightening a big-end bearing cap nut



18.23 Crankshaft rear oil seal located over rear of crankshaft



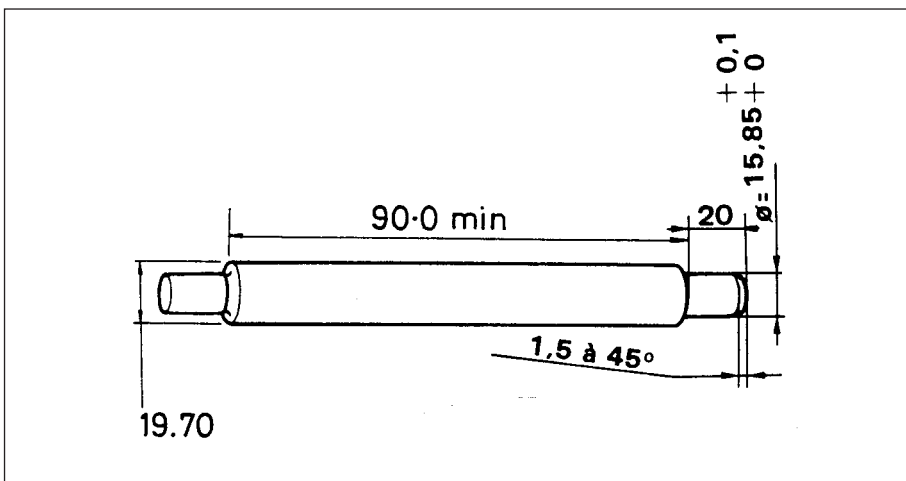
18.25 Applying locking fluid to a flywheel bolt



18.27 Crankshaft front oil seal located over front of crankshaft



18.28 Tightening crankshaft sprocket bolt



18.31a Clutch centralising tool dimensions

Dimensions in mm

Flywheel

25 Apply locking fluid to the threads of the flywheel bolts. Locate the flywheel on the crankshaft dowel then insert the bolts and tighten them to the specified torque while holding the flywheel stationary with a

wide-bladed screwdriver inserted between the starter ring gear teeth (see illustration).

Crankshaft front oil seal

26 Support the engine upright.
27 Dip the crankshaft front oil seal in clean engine oil, locate it over the front of the

crankshaft and drive it in flush with the front of the block using a metal tube or socket (see illustration). There is no seating, so take care not to drive it in too far.

28 Fit the oil seal flange, followed by the hub/sprocket. Insert the sprocket bolt and spacer, and tighten the bolt to the specified torque while holding the flywheel stationary (see illustration).

Coolant pump housing

29 Refit the coolant pump housing, together with a new O-ring, and tighten the bolts to the specified torque.

Clutch friction disc and pressure plate

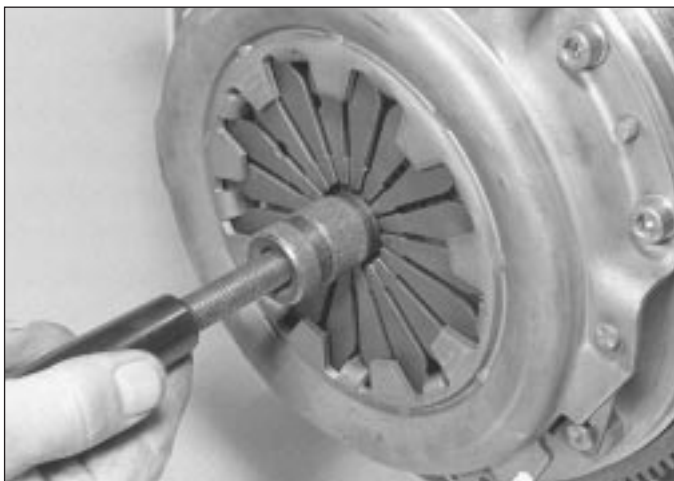
30 Locate the clutch friction disc and pressure plate on the flywheel with the dowels engaged. Insert the bolts finger-tight.

31 Centralise the friction disc using a universal tool, or by making a wooden adapter to the dimensions shown (see illustrations).

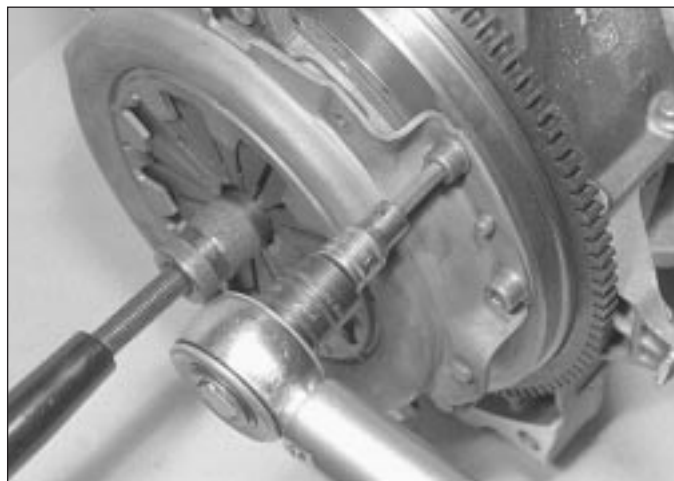
32 Tighten the pressure plate bolts evenly to the specified torque (see illustration).

Cylinder head

33 Clean the cylinder head and block joint faces thoroughly. Also clean the cylinder head bolt holes.



18.31b Centralising clutch friction disc using a universal tool



18.32 Tightening a clutch pressure plate bolt

34 Locate the new cylinder head gasket on the block dowels, with the manufacturer's name uppermost.

35 Align the TDC holes in the flywheel and block rear flange, then insert a twist drill or long bolt.

36 Align the small hole in the camshaft sprocket with the hole in the cylinder head, then insert a twist drill or bolt.

37 Lower the cylinder head onto the block so that it engages the two dowels.

38 Refit the rocker arm assembly.

39 Lubricate the cylinder head bolt threads and heads with molybdenum disulphide grease. Insert them and tighten to the initial torque using the sequence shown (see illustration 7.40).

40 Using the same sequence, angle-tighten the bolts through the specified angle.

Timing belt and covers

41 Refit the timing belt tensioner roller, turn it clockwise and tighten the nut.

42 Engage the timing belt with the crankshaft sprocket then, keeping it taut, feed it onto the camshaft sprocket, around the tensioner pulley, and onto the coolant pump sprocket.

43 Loosen the nut and turn the tensioner roller anti-clockwise by hand. Tighten the nut.

44 Citroën dealers use the special tool shown (see illustration 6.12) to tension the timing belt. A similar tool may be fabricated using an 8.0 cm long arm and a 1.5 kg (3.3 lb) weight. The torque applied to the roller will approximate 12 kgf cm (10.5 lbf in). Pre-tension the timing belt with the tool and tighten the nut, then remove the timing pins and rotate the crankshaft through two complete turns. Loosen the nut and allow the roller to re-position itself. Tighten the nut.

45 If the special tool is not available, an approximate setting may be achieved by turning the roller hub anti-clockwise, until it is just possible to turn the timing belt through 90° by finger and thumb midway between the

crankshaft and camshaft sprockets. The square in the roller hub should then be directly below the adjustment nut, and the deflection of the belt in the midway position should be approximately 6.0 mm. If using this method, the tension should be re-checked by a Citroën dealer at the earliest opportunity.

46 Refit the lower, intermediate and upper timing covers, then tighten the bolts.

Remaining components

47 Adjust the valve clearances.

48 Refit the baffle plate with its edges pointing downwards, followed by the two spacers.

49 Fit the rubber gasket to the rocker cover, locate the cover in position and tighten the nuts.

50 Apply a little sealant to the end of the engine oil dipstick holder and insert it in the main bearing cap casting. Insert and tighten the mounting bolt.

51 Insert and tighten the oil pressure switch.

52 Smear a little oil on the sealing ring and tighten the oil filter into position by hand only.

53 Refit the timing plate and tighten the bolts.

54 Refit the TDC sensor and tighten the bolt. Fix the lead in the plastic clip on the timing plate. Note that the main body of the TDC sensor should be 1.0 mm from the flywheel.

55 Apply jointing compound to the distributor mounting flange, then refit it to the cylinder head and tighten the bolts.

56 Apply jointing compound to the thermostat housing, then refit it to the cylinder head and tighten the bolts to the specified torque.

57 Refit the thermostat.

58 Refit the distributor.

59 Refit the exhaust manifold together with new gaskets. Refit the nuts and washers and tighten securely.

60 Refit the exhaust manifold hot air shroud and tighten the bolts.

61 Locate the coil and bracket over the distributor and tighten the bolts.

62 Position the pulley on the front of the crankshaft. Insert and tighten the bolts.

63 Refit the alternator and insert the pivot and adjustment bolts. Slip the drivebelt onto the pulleys and tighten the tension bolt until the deflection of the belt midway between the pulleys is approximately 6.0 mm under firm thumb pressure. Tighten the pivot and adjustment bolts.

64 Refit the fuel pump with a new gasket and tighten the bolts.

65 Thoroughly clean the mating faces of the inlet manifold and cylinder head and apply jointing compound.

66 Refit the inlet manifold complete with carburettor and tighten the nuts.

67 Reconnect the hose between the fuel pump and carburettor and tighten the clips.

68 Reconnect the vacuum hose between the distributor and carburettor.

69 Refit and tighten the spark plugs.

70 Refit the HT leads and distributor cap.

19 Engine - reconnection to transmission



Refer to Section 18 in Part A of this Chapter.

20 Engine - initial start-up after overhaul



1 Refer to Section 19 in Part A of this Chapter.

2 Note that the cylinder head bolts of this engine do not require re-tightening and the timing belt does not require re-tensioning.

3 If new bearings and/or pistons have been fitted, treat the engine as new, and run it in at reduced speeds. Also change the engine oil at 1000 miles (1500 km).