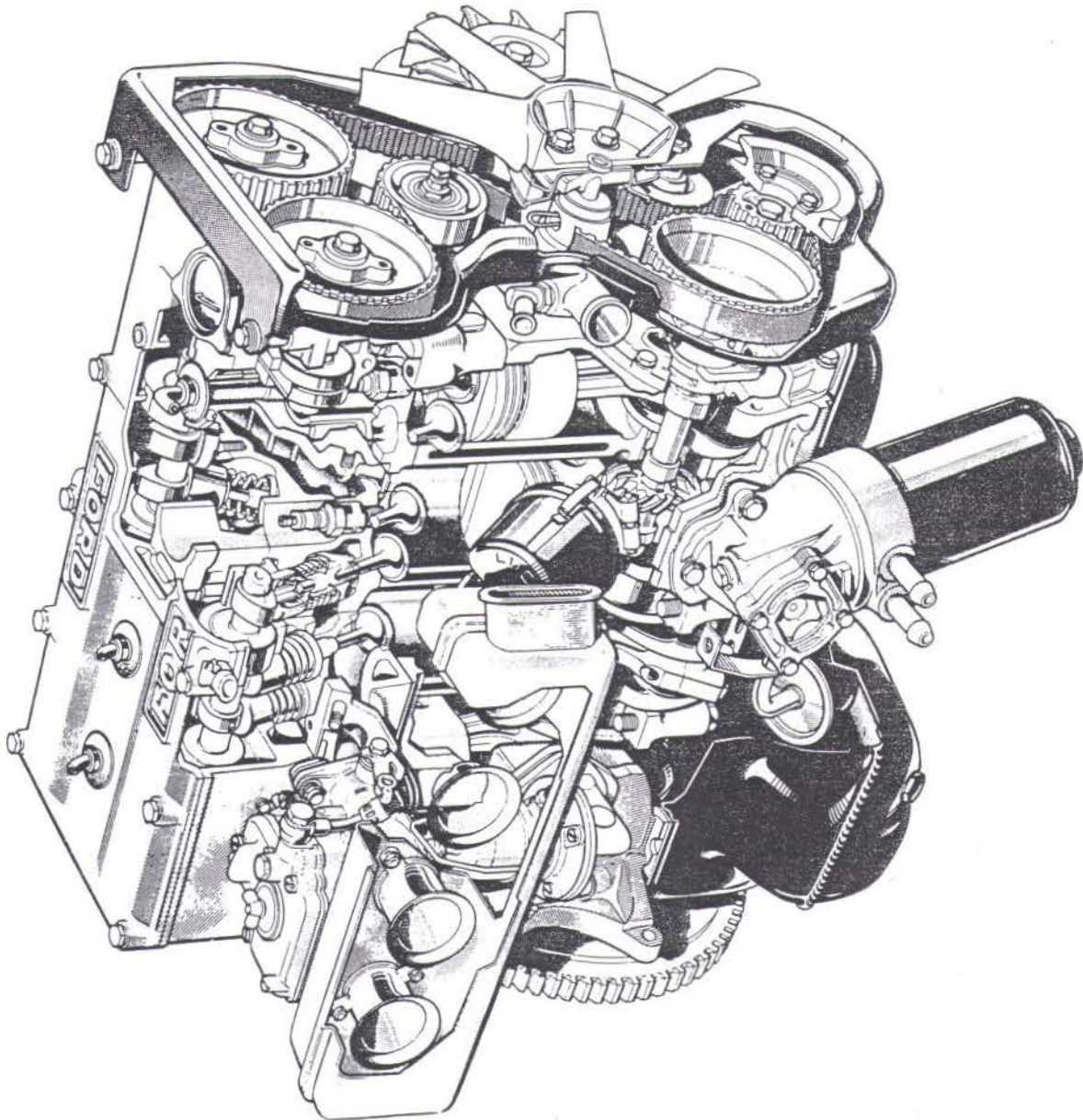


# ESCORT RS 1600

## Supplementary Workshop Manual





THE BDA ENGINE

### 21 ENGINE

#### GENERAL DESCRIPTION

The engine is a four cylinder, twin overhead camshaft unit with a bore of 80.978mm (3.188 in) and a stroke of 77.724mm (3.060 in). The capacity is 1,601cc (97.75 cu. in.) and the compression ratio is 10 : 1.

The cylinder bores are machined directly in the cylinder block, which is cast integral with the upper half of the crankcase, and are provided with full length water jacketing.

The cylinder head is an aluminium casting with fully machined wedge-shaped combustion chambers. There are two inlet and two exhaust valves for each cylinder, and they are inclined at an angle of  $20^{\circ}$  to the vertical ( $40^{\circ}$  included angle). The ports for each pair of valves are siamesed.

The two overhead camshafts are mounted in a separate carrier and operate the valves by acting directly on piston-type tappets. The camshafts are driven at half engine speed by a single row toothed belt from a pulley on the crankshaft via a pulley on an auxiliary shaft and a tension adjusting idler. A second idler mounted on the front cover provides the necessary belt wrap-around for the crankshaft pulley. The camshafts each run in six bearings machined directly in the aluminium casting of the carrier. A 'half-moon' thrust washer locates each shaft axially in the carrier and controls end-float. An oil seal at the front of the carrier and a sealing plug (located by a pin) at the rear prevent oil leakage from the carrier.

The auxiliary shaft is a modification of the camshaft normally used in the push rod overhead valve unit and is retained to drive the oil pump, distributor and fuel pump. The front journal of the auxiliary shaft has a groove machined in its periphery to regulate the supply of oil to the camshafts and tappet gear. The sump is a steel fabrication and has a rear well for the lubricating oil. The engine lubrication system is the force feed type incorporating a full flow oil filter. The oil pump which is mounted externally on the engine, is of the eccentric bi-rotor type incorporating a non-adjustable plunger type relief valve. An oil cooler is fitted

fitted as standard to all vehicles and is located in front of the radiator grille on the left-hand side. The oil 'take-off' is from an adaptor assembled with the oil filter bowl. An oil restrictor is fitted into the top face of the block.

An oil filler is located on the camshaft cover. Crankcase ventilation is by a closed system, crankcase fumes being discharged directly into the carburettor air intake cover.

Later engines are fitted with a revised oil drain and crankcase breathing system incorporating a revised front cover, modified cylinder head and additional oil hose. Where this is fitted the brass restrictor in the cylinder blockface is omitted. (See P.14)

#### CRANKSHAFT AND BEARINGS

The cast iron dynamically balanced crankshaft is Tufftrided and runs in five main bearings having steel-backed lead/bronze liners.

#### PISTONS

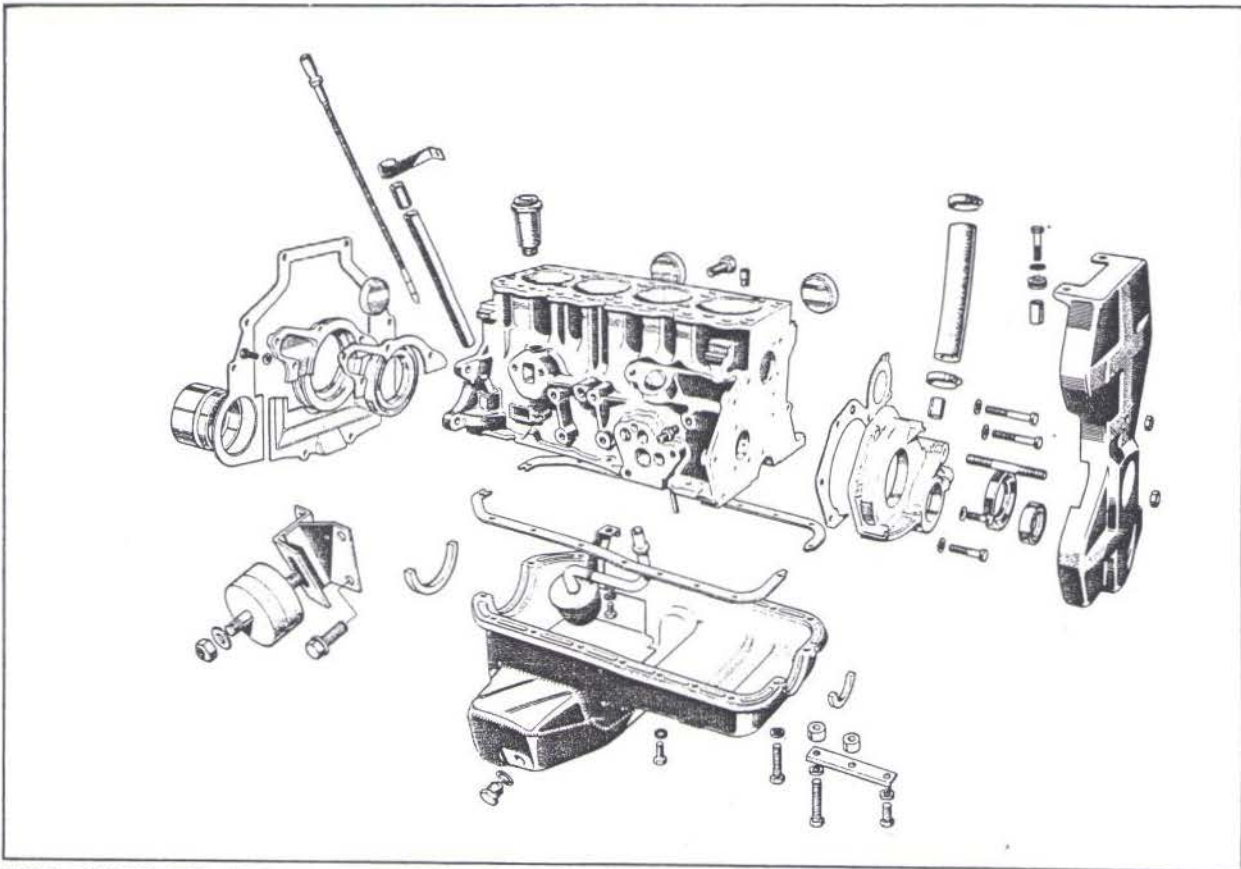
Pistons are graded as listed below and the grades are stamped on the crown of the piston. These should be a clearance of 0.0762 to 0.081mm (0.003 to 0.0036 in) between the piston and piston bore.

GRADE	DIAMETER
2	80.879 to 80.886mm (3.1842 to 3.1845 in)
3	80.886 to 80.894mm (3.1845 to 3.1848 in)
4	80.894 to 80.902mm (3.1848 to 3.1851 in)
5	80.902 to 80.909mm (3.1851 to 3.1854 in)

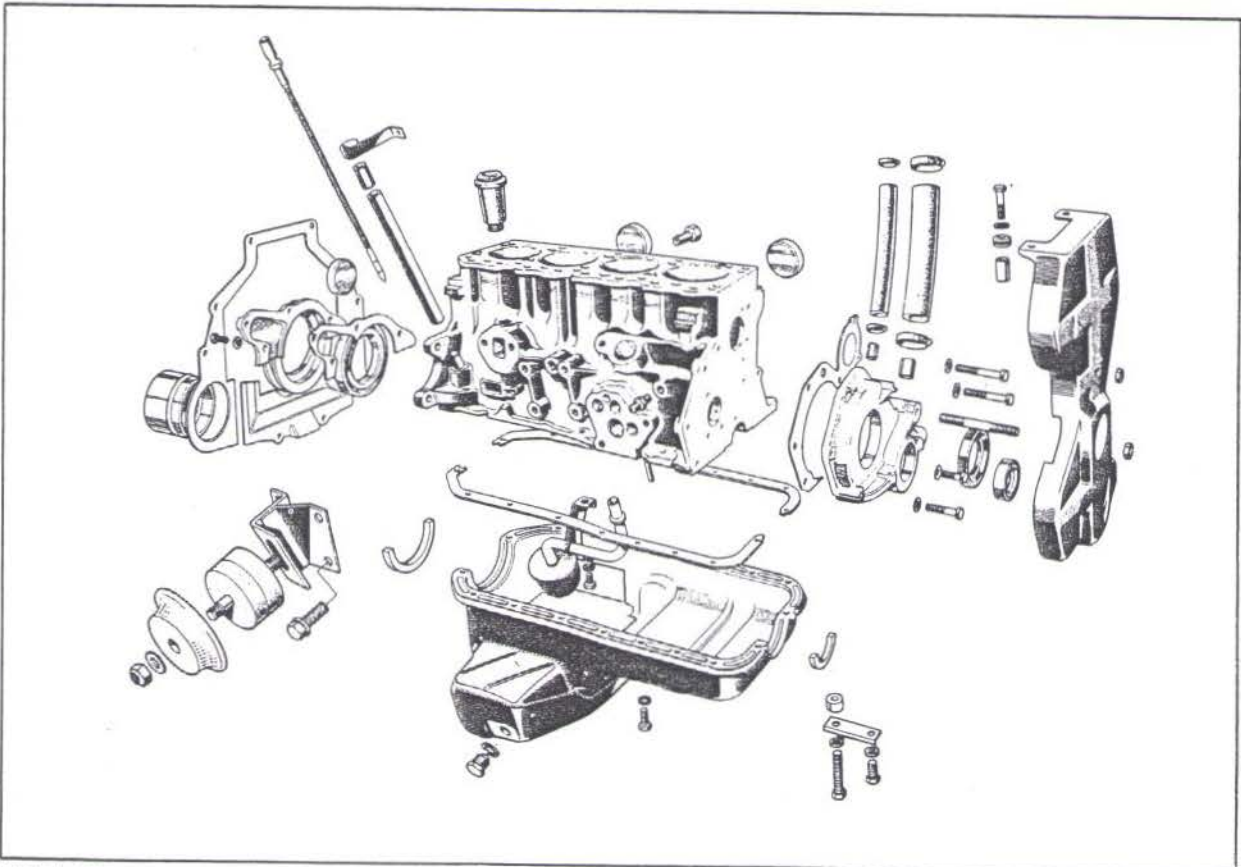
Select a new piston pin from the grades listed below:-

GRADE	DIAMETER
Black	20.627 to 20.630mm (0.8121 to 0.8122 in)
Green	20.630 to 20.632mm (0.8122 to 0.8123 in)





THE CYLINDER ASSEMBLY - PRE 4/72



THE CYLINDER ASSEMBLY - POST 4/72

## ENGINE ASSEMBLY-REMOVE AND INSTALL

## TO REMOVE

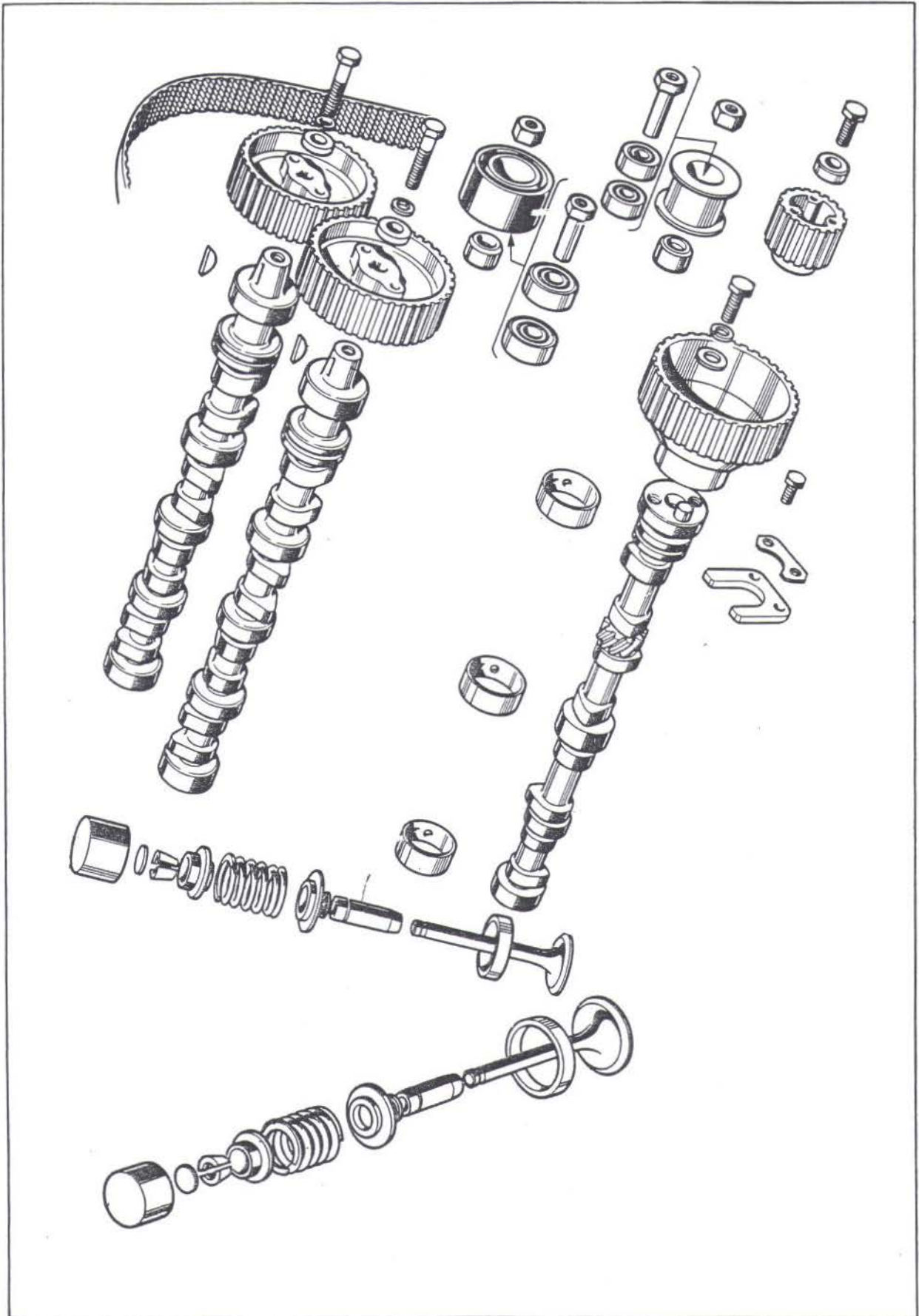
1. Open the boot and disconnect the battery lead.
2. Remove the bonnet and fit wing covers.
3. Disconnect the choke and throttle cables at the carburettors, the oil pressure gauge pipe at the engine adaptor and the water temperature sender unit lead. Remove the exhaust manifold retaining nuts and pull the manifold to one side.
4. Drain the cooling system. Disconnect the radiator hoses at the engine and remove the radiator. Then disconnect the heater hoses at the bulkhead. Drain the engine oil.
5. Disconnect the fuel supply pipe at the fuel pump and plug the open end of the supply line. Also, disconnect the brake servo hose at the induction manifold and the oil cooler hoses at the oil filter bowl connections.
6. Disconnect the high tension lead and distributor lead from the coil, and disconnect the lead from the solenoid at the starter motor.
7. Suitably scribe the steering shaft and flexible joint to ensure correct alignment on reassembly and remove the clamping bolt.
8. From inside the driving compartment, unscrew the two bolts securing the lower end of the steering column to the floor pan. Then unscrew the two crosshead screws securing the top end of the column to the fascia panel, disconnect the two multi-plug connectors and withdraw the assembly.
9. Jack up the front and rear of the car and fit stands.
10. Support the engine front crossmember with a jack and remove the four mounting bolts, replacing each one in turn with a 8.00cm (3 in) long bolt and washer. Unscrew the four bolts securing the stabiliser bar to the chassis after bending back the locking tabs.
11. Lower the engine until the crossmember is supported on the long bolts.
12. Attach a sling to the engine and support its weight using a suitable crane.
13. Disconnect the left-hand side engine mounting bracket from the block and the rubber insulator from the crossmember. Remove the bracket and insulator as a unit.
14. Remove the rubber insulator from the right-hand side crossmember and engine mounting brackets.

15. Remove the two top bell-housing bolts, then from underneath the car remove the three bolts securing the flywheel dust cover to the bell housing. Remove the two bolts securing the starter motor and move it forwards to disengage the starter pinion. Remove the remainder of the bell-housing to engine bolts.
16. Support the gearbox with a jack, and pull the engine carefully forwards and upwards with the crane until it is free of the engine compartment.
17. Place the engine on blocks on the floor.

### TO INSTALL

18. Position the engine assembly in the engine compartment and engage the unit on the main drive gear shaft. Ensure that the adaptor plate is correctly positioned on the rear of the engine and the bell-housing is located on the dowels.
19. Secure the engine brackets and rubber insulators to the crossmember brackets at each side.
20. Refit the bell-housing bolts, remembering that the two topmost bolts secure the clutch fluid supply pipe brackets.
21. Replace the starter motor and the lower dust cover.
22. Place a jack under the engine front crossmember and raise this until it abuts the chassis. Replace each long bolt in turn with the original bolts to ensure correct crossmember alignment. Tighten to a torque of 3.5 to 4.2Kg. m. (25 to 30 lb. ft.). Remove the supporting jack.
23. Locate the stabiliser bar and brackets in position and engage the retaining bolts. Do not tighten these until the car is resting on its four wheels.
24. Engage the steering shaft with the flexible joint while ensuring to re-align the marks previously made and tighten the clamp bolt.
25. Fit the bolts securing the lower end of the steering column and also the two crosshead screws at the top end of the column.
26. Reconnect the multi-plug connectors behind the facia panel.
27. Replace the radiator, connect the hoses to the engine, the heater hoses to the bulkhead and close the drain taps.
28. Reconnect the oil cooler hoses at the oil filter bowl, the brake servo hose to the induction manifold and the oil pressure gauge pipe to the engine. Refit the exhaust manifold to the





THE CAMSHAFT AND VALVES



- engine and tighten the nuts to a torque of 1.5 to 2.0 kg. m. (12 to 15 lb. ft.)
29. Reconnect the choke and throttle cables to the carburettors, the high tension lead and distributor lead to the coil and the water temperature sender unit lead. Also, reconnect the starter motor lead.
  30. Remove the plug from the fuel supply line and connect the line to the fuel pump.
  31. Jack up the front and rear of the car, remove the stands, lower the car to the ground and remove the jacks.
  32. Tighten the stabiliser bar retaining bolts to a torque of 2.00 to 2.5 kg. m. (15 to 18 lb. ft.)
  33. Reconnect the battery lead and close the boot.
  34. Refill the cooling system with a 50% solution of Ford Anti-freeze Plus.
  35. Refill the engine sump with approved oil.
  36. Start the engine and check for oil and water leaks.

### TIMING BELT COVER-REMOVE AND INSTALL

(engine removed)

#### TO REMOVE

1. Remove the cooling fan.
2. Remove the two front cam-cover bolts, two idler stud nuts, bottom retaining bolt and remove the timing belt cover.

#### TO INSTALL

3. Locate the timing belt cover on the idler studs and replace the nuts, cam-cover bolts and bottom retaining bolt. Torque the bolts to 0.55 to 0.83 kg. m. (4 to 6 lb. ft.)
4. Refit the cooling fan and torque the bolts to 7 to 9 lb. ft. (0.97 to 1.24 kg. m.).

## TIMING BELT-ADJUST

(timing belt cover removed)

1. Rotate the engine forwards until No. 1 piston is at T. D. C. on the compression stroke. At this point the timing marks on the front of the camshaft pulleys will be aligned. Check the belt tension with a Burroughs gauge between the exhaust camshaft pulley and the front cover idler. The tension should be between 75 to 80 Burroughs Units. Alternatively; the tension can be checked by measuring the deflection (total movement) half way along the longest run (see Page ). This should be 20.0mm. ( $\frac{3}{4}$  inch) with all of the slack on the longest run.
2. If the belt tension is incorrect, slacken the adjuster locknut and adjust as necessary. Retighten the locknut.
3. Repeat sub-operation 1.

## TIMING BELT-RENEW

(timing belt cover removed)

## TO REMOVE

1. Remove the fan belt together with the water pump pulley.
2. Remove the crankshaft fan belt pulley and the front cover idler retaining nut.
3. Slacken the adjuster pulley and pull it off the stud. The belt can now be removed with the idler pulley.

## TO INSTALL

4. Degrease the toothed pulleys thoroughly and then spray them with a pure molybdenum disulphide air drying bonding resin.
5. Ensure that all the pulleys timing marks are correctly aligned with No. 1 piston at T. D. C. on the compression stroke (see P. 26) and then refit the belt and front cover idler with the large bearing shoulder to the rear. With the belt in position refit the adjuster pulley.

## ESCORT RS 1600

### VALVE CLEARANCES - ADJUST

#### TOOLS REQUIRED

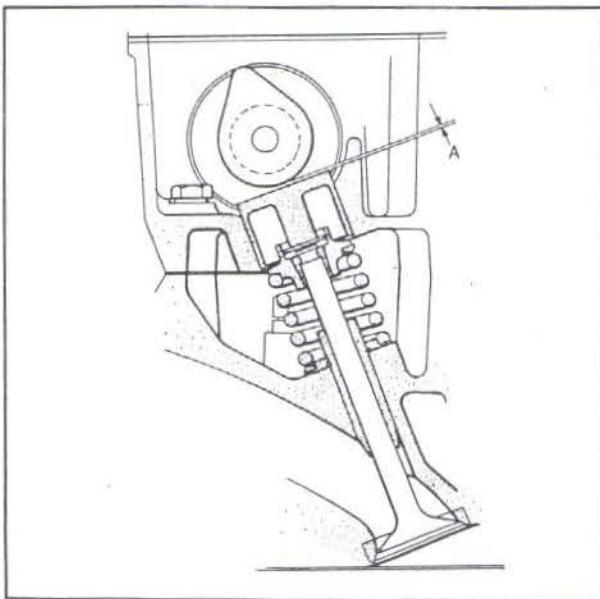
Set of eight Eclipse Catalogue No. 845 strip magnets .

The valve clearances should be, inlet 0.13 to 0.18 mm (0.005 to 0.007 in.) and exhaust 0.15 to 0.20 mm. (0.006 to 0.008 in.). In order to check the clearances of a pair of valves, remove the cam cover turn the camshaft until the toe of the cam is  $180^{\circ}$  to the tappet being checked. Then select a feeler blade or blades that can just be inserted between the tappet and the heel of the cam to measure the clearance. Note the clearance and repeat the procedure for the other valves.

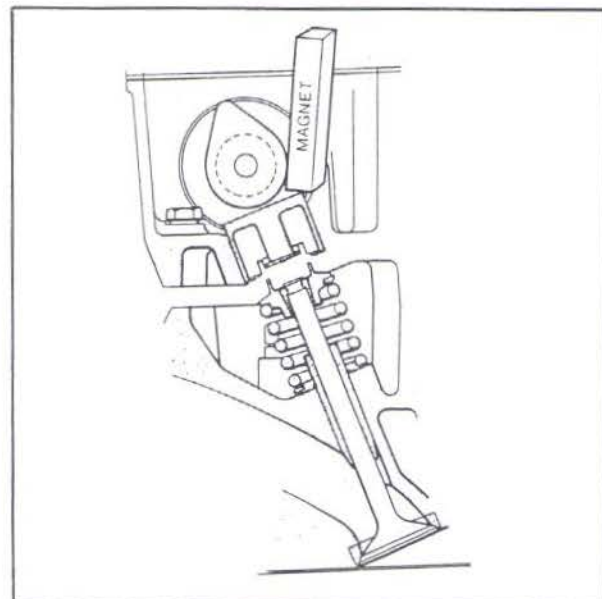
If the clearances require adjusting, the camshaft carrier must be removed in one of the following ways:

#### 1. ENGINE ON STAND

Remove the cam cover and then slacken and remove all the cam carrier bolts except the centre row end bolts. Invert the engine, remove the two end bolts and carefully lower the carrier



MEASURING THE VALVE CLEARANCE



LIFTING THE CAM CARRIER



from the engine to avoid misplacing any of the shims.

The correct valve clearance is obtained by fitting a different size shim in the recess in the valve spring retainer. A thinner shim will be needed to increase the clearance, and a thicker one to reduce the clearance. The shim's thickness should be measured accurately with a micrometer.

The correct thickness needed in each case can be calculated from the following formula:

$$\text{Shim thickness required} = A + B - C$$

where A is the actual valve clearance

B is the existing shim thickness

and C is the correct valve clearance

On no account use more than one shim for each valve

After adjusting the clearances the carrier can be assembled to the head in the reverse order to that detailed above. The bolts should be evenly tightened to a torque of 1.00 to 1.40 kg. m. (8 to 10 lb. ft.). Fit the cam cover and tighten the bolts fingertight. Align the timing marks on the pulleys and fit the belt, cover and cooling fan. Torque the cam cover bolts to 0.55 to 0.83 kg. m. (4 to 6 lb. ft.)

## 2. ENGINE IN SITU

1. Open the boot and disconnect the battery.
2. Drain the cooling system and disconnect the radiator hoses.
3. Remove the radiator.
4. Remove the cooling fan.
5. Remove the two idler stud nuts and the bottom bracket bolt and remove the timing belt cover.
6. Remove the fan belt together with the water pump pulley.

7. Remove the crankshaft fan belt pulley and the front cover idler retaining nut. Rotate the engine to align the timing marks.
8. Slacken the adjuster pulley and pull it off the stud. The belt can now be removed together with the idler pulley.
9. Slacken the fifteen cam carrier bolts evenly until all the valves have closed.
10. Carefully clean the area around the tappet buckets, and the heads of the buckets themselves, to get rid of surplus oil.
11. Position the eight magnets (eclipse Catalogue No. 845) one to each of the exhaust valve tappets, turning the camshaft as necessary to ensure that the magnets pick up on the tappets. Remove the cam carrier bolts, evenly, lift the exhaust side of the cam carrier clear of the cylinder head, at the same time push down the inlet valve tappets so that the shims do not become misplaced. Completely invert the cam carrier and replace any shims that have become dislodged, into the correct valve cap. Ensure that any displaced tappets are also returned to the correct bores.

Important. If, during sub-operation 11, any of the shims become misplaced, they should be put back in the valve collet retainers in any order and the following sub-operations 16 to 23 carried out. Then, after realigning the engine timing marks, repeat sub-operations 8 to 13 above.

12. Remove the incorrect shim (s) from the tappet buckets or valve collet retainers, select shims of the correct thickness, and replace them, along with the correct old shims, in their respective valve collet retainers. Lightly grease each shim to ensure it 'sticks' on the valve stem.
13. Remove the tappet buckets and magnets from the cam carrier.

### TO INSTALL

14. Thoroughly clean the tappet buckets and the cam carrier in a proprietary de-greasing agent, lightly grease the buckets and replace them in their respective positions in the carrier. Replace the magnets on top of the buckets.
15. Position a gasket on the cylinder head using Hylomar sealer (ensure that the gasket is correctly fitted and that the two locating dowels are in the cylinder head).
16. Locate the cam carrier on the valve collet retainers remove the magnets and rotate

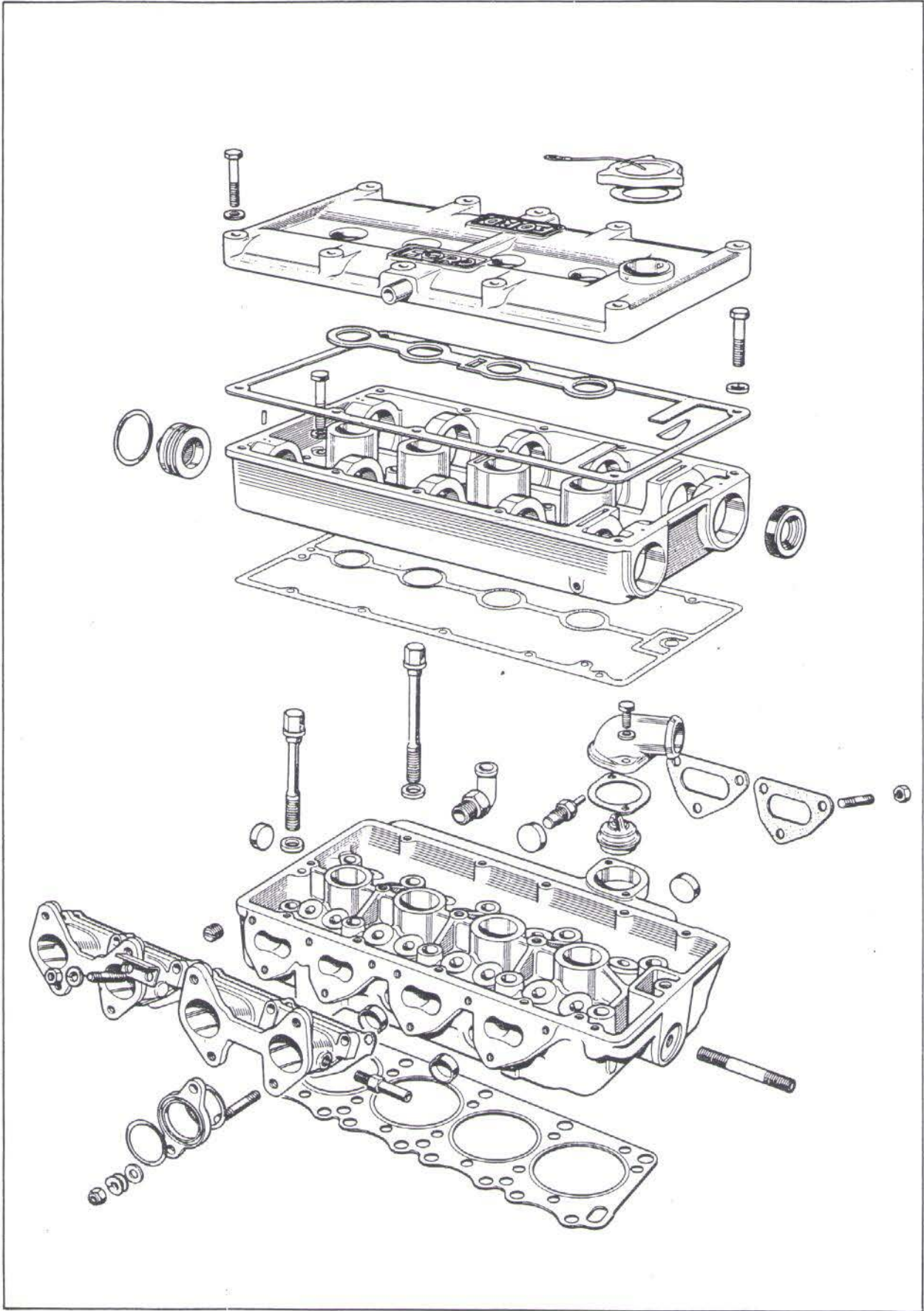
camshaft so that the timing marks are approximately aligned.

17. Tighten the carrier bolts evenly to a torque of 1.1 to 1.4 kg. m. (8 to 10 lb. ft.)
18. Degrease the toothed pulleys thoroughly and then spray them with a pure molybdenum disulphide air drying bonding resin.
19. Ensure that all the pulley timing marks are correctly aligned and then refit the belt and front cover idler, with the large bearing shoulder to the rear. Roughly tension the belt.

Note: Until this rough tensioning is carried out the aligning mark on the auxiliary shaft pulley may be slightly higher than the corresponding mark on the crankshaft pulley; as the belt is tensioned the two marks should come into line.

20. Check the valve clearances. If they are incorrect repeat sub-operations 8 to 14 and 17 to 22 above.
21. Secure the front cover idler nut, tightening it to a torque of 4.10 to 4.8 kg. m. (30 to 35 lb. ft.) and then replace the crankshaft fan belt pulley, securing with three bolts.
22. Rotate the engine through one revolution, until the pulley timing marks are all aligned. Check the belt tension with a Burroughs gauge between the exhaust camshaft pulley and the front cover idler. The tension should be between 75 and 80 Burroughs units. Alternatively: the tension can be checked by measuring the deflection (total movement) half way along the longest run (see P. 26). This should be 20.0 mm (0.75in.) with all of the slack on the longest run.
23. If the belt tension is incorrect, slacken the adjuster locknut and adjust as necessary. Retighten the locknut.
24. Repeat sub-operation 22 (and 23 if necessary).
25. Replace the fan belt and position the water pump pulley on its boss.
26. Locate the timing belt cover on the idler studs and replace the nuts and bottom bracket bolt.
27. Refit the cooling fan and torque the bolts to 1.00 to 1.25 kg. m. (7 to 9 lb. ft.)
28. Check the fan belt tension and adjust if necessary to give 13 mm. total free play.
29. Refit the radiator assembly and replace the top and bottom hoses.
30. Reconnect the rear heater hose.
31. Refill the cooling system with a 50% solution of Ford Antifreeze Plus
32. Reconnect the battery.





THE CYLINDER HEAD AND CAM CARRIER

## TIMING BELT AND PULLEYS

The camshafts and auxiliary shaft are driven at half engine speed by a single row toothed belt from a pulley on the crankshaft. Belt tension is controlled by an eccentric adjustable idler located on the front face of the cylinder head.

When correctly adjusted the belt tension should be checked with a Burroughs gauge or a spring balance, between the exhaust camshaft pulley and the front cover idler. (See Sub-operation 22 above)

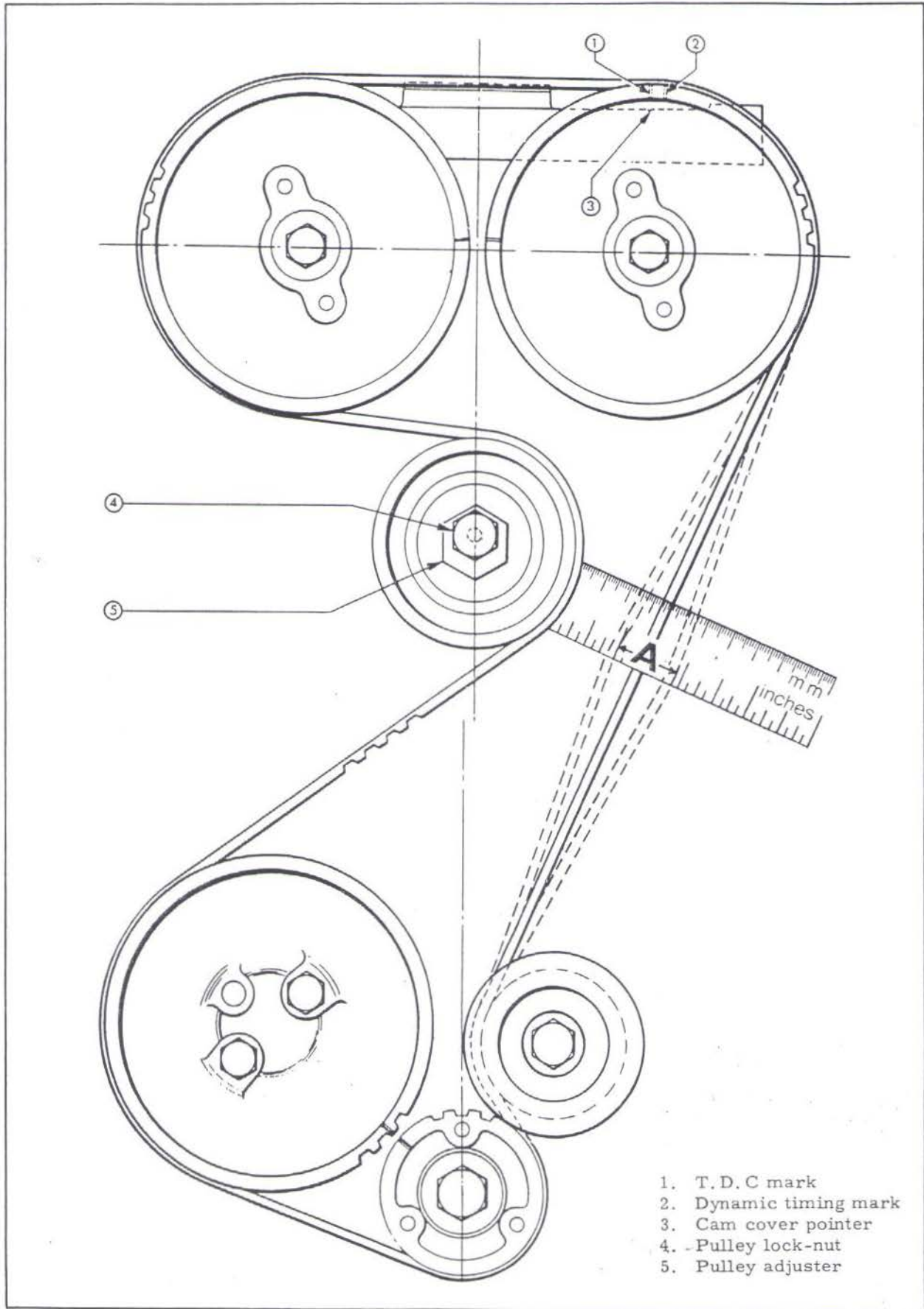
The tension should only be checked when the engine is cold.

35. Both inlet and exhaust camshaft pulleys are interchangeable. They are each located by a key on the tapered end of the camshaft, and are retained by a centre bolt and large flat washer. These bolts should be tightened to a torque of 2.8 to 3.5 kg. m. (20 to 25 lb. ft.). The auxiliary shaft is located by a dowel and is retained by two bolts and spring washers. These bolts should be tightened to a torque of 2.1 to 2.8 kg. m. (15 to 20 lb. ft.)

## VALVE TIMING

It is essential for maximum performance that the valve timing is correctly set. This is achieved by aligning all the timing marks on the pulleys as shown in the diagram opposite.

Note: The marks on the camshaft pulleys do not line up in a straight line.



THE TIMING BELTS AND PULLEYS



## CAMSHAFT - REMOVE AND INSTALL

(cam carrier removed)

## TOOLS REQUIRED

6182                      Camshaft pulley remover

## TO REMOVE

1. Remove the camshaft pulley centre bolt and washer.
2. Screw the pulley remover Tool No. 6182 to the pulley boss and remove the pulley from its taper. Remove the key from its slot.
3. Extract the pin locating the rear sealing plug, remove the crescent shaped thrust washer from near the front of the cam carrier and extract the camshaft rearwards, pushing the sealing plug out in the process.
4. Push the front oil seal out of the carrier.

## TO INSTALL

5. Relocate the camshaft in the carrier.
6. Fit a new oil seal. Push it too far into its housing, and tap it forwards gently with the camshaft until the front face of the seal is flush with the bottom of the chamfer in the carrier.
7. Replace the crescent shaped thrust washer.
8. Replace the sealing plug with a new 'O' ring in the rear of the carrier and locate with the small pin.
9. Refit the pulley locating key in its slot in the camshaft nose and replace the pulley, securing the centre bolt to a torque of 2.7 to 3.5 kg. m. (20 to 25 lb. ft.)

## CYLINDER HEAD

The cylinder head is an aluminium casting with fully machined wedge-shaped combustion chambers giving a compression ratio of 10:1.

## ESCORT RS 1600

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### CYLINDER HEAD-REMOVE AND INSTALL

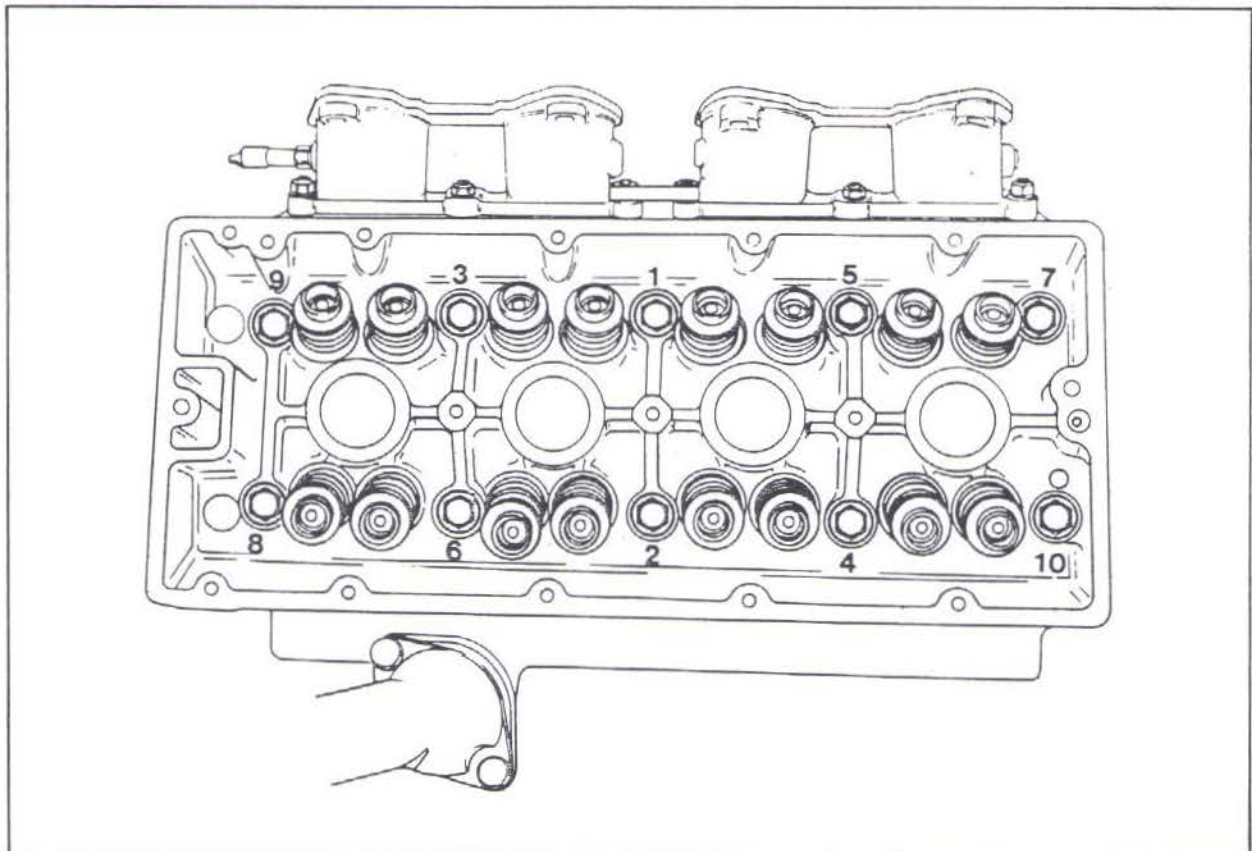
(cam carrier removed)

#### TOOLS REQUIRED

PT. 4063-A Cylinder head gasket locating studs.

#### TO REMOVE

1. Disconnect oil drain tube. (Two tubes with revised oil drain system)
2. Remove dipstick tube support bracket from inlet manifold.
3. Slacken the head bolts evenly and remove the cylinder head and carburettor assembly complete with gasket.



CYLINDER HEAD BOLT TIGHTENING SEQUENCE

TO INSTALL

4. Screw the gasket locating studs Tool No. PT. 4063-A into diagonally opposite corners of the cylinder block.
5. Position the new cylinder head gasket, copper side uppermost, on the block face and install the cylinder head assembly. Ensure that the crankcase beather pipe is correctly located in the head.
6. Refit the cylinder head bolts before removing the locating studs, remembering that the short bolt should be located in position 7 on the diagram. Tighten the bolts in the sequence shown to 8.3 to 9.0 kg. m. (60 to 65 lb. ft.), taking care not to damage any valve assembly.

Do not under any circumstances ream the valve guides, as this destroys the oil retention properties of the metal.

The valve seats must be recut, with the appropriate cutters, and the valves lapped in to ensure that the seal is concentric with the valve stem bore.

Recut the seats with the appropriate cutters fitted to pilot Tool No. 316-10 in handle Tool No. 316X. Where necessary the seats may be narrowed with top face and port cutters. If there is a hard glazed carbon deposit on the seat this may be removed with a glaze breaker.

Cutter Tool Number

Seat-45°	Top Face-15°	Glaze Breaker-45°
317-25	317T-25	317G-25

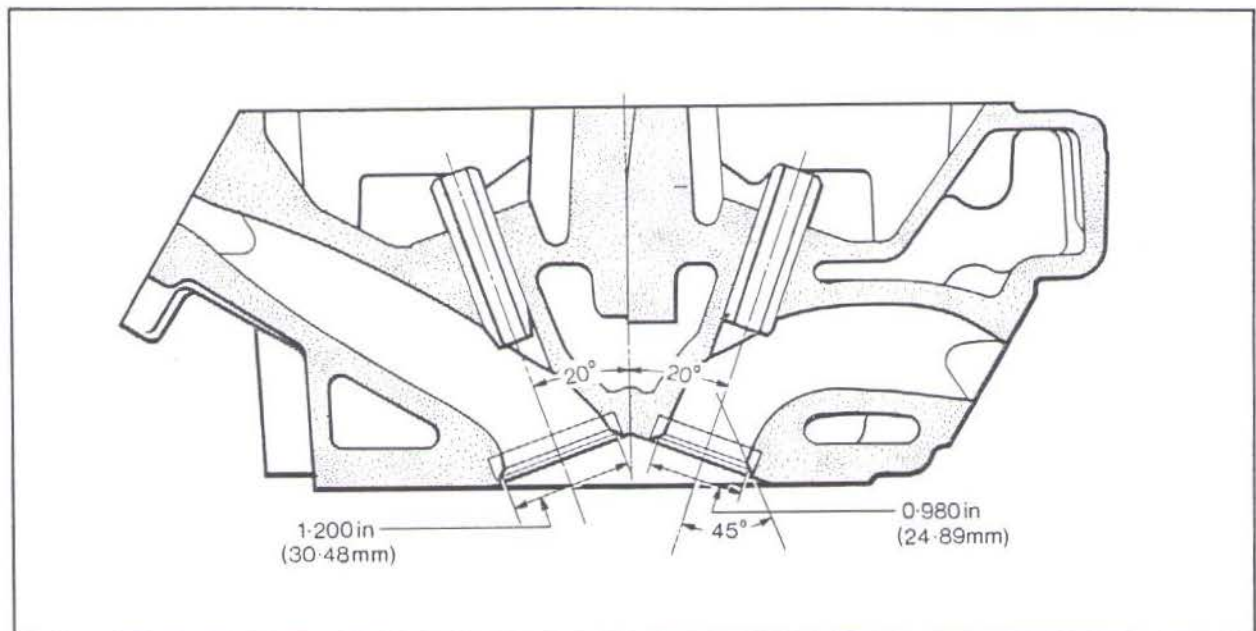
The valve seat inserts can be replaced if they become damaged or burnt.

# ESCORT RS 1600

## Valve Seats Inserts

	Outer Diameter	Recess Diameter
Inlet	33.10 to 33.12 mm.	33.02 to 33.05 mm.
Exhaust	27.64 to 27.66 mm.	27.56 to 27.58 mm.

Remove the inserts by machining two grooves  $180^{\circ}$  apart and using a small chisel remove the remaining metal in the grooves, when the insert can be prised out of its location. Care must be taken during this operation to avoid damage to the sides and bottom of the recess. Machine the recess to the dimension appropriate to the selected replacement insert (see table). When fitting new inserts the cylinder head should be heated to a temperature of  $120^{\circ}\text{C}$  maximum and the valve seat inserts cooled to a temperature not lower than  $-30^{\circ}\text{C}$ . The inserts can then be inserted using a suitable replacer tool. Then allow the cylinder head to cool slowly and evenly in air.



CROSS SECTION THROUGH THE CYLINDER HEAD



VALVES-REMOVE AND INSTALL

TOOLS REQUIRED

CP. 6118-B	Lever	}	Valve Spring Compressor
6118-6	Universal Joint		
P. 6118-7	Adaptor		
P. 6118-8	Bolt and Washers		

TO REMOVE

1. Compress the valve springs and extract the collets. Remove the valve spring retainer and valve spring.
2. Remove the valve.

TO INSTALL

3. Fit the valve springs and retainer and compress to fit the collets.

VALVE GUIDES-RENEW

TOOLS REQUIRED

6180/1 Valve guide remover

6180/2 Valve guide replacer

TO REMOVE

1. Remove the valve spring lower seat.
2. Remove the valve guide using Tool No. 6180/1.

## ESCORT RS 1600

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### TO INSTALL

3. Heat the cylinder head to 100 - 150°C locate a circlip on the new valve guide and press a new guide into the cylinder head up to the circlip, using Tool No. 6180/2.

Note: Do not ream the valve guide bore.

4. Refit the valve lower seat.

### FRONT COVER

The front cover is an aluminium casting incorporating the crankshaft and auxiliary shaft front oil seals, a boss for the crankshaft pulley wrap around idler and an oil drain tube. (Two oil drain breather tubes are fitted in revised engines.)

Front Cover, Water pump, Crankshaft pulley, Auxiliary shaft pulley and idler - remove and install.

### SUMP REMOVED

### TOOLS REQUIRED

- 6181 Auxiliary Shaft front cover aligner.
- 550 Driver Handle
- P6161 Crankshaft front oil seal remover/replacer,

1. Remove the crankshaft pulley
2. Remove the auxiliary shaft pulley
3. Disconnect the cam carrier oil drain tube and remove the front cover together with the gasket.
4. Push the auxiliary shaft oil seal out of the front cover by hand.
5. Suitably support the cover and remove the crankshaft oil seal from the rear, using remover/replacer Tool No. P6161 fitted to a 550 handle.

6. Remove the nylon alternator adjusting bracket and the heater hose from the water pump.
7. Remove the three bolts and carefully extract the water pump assembly.

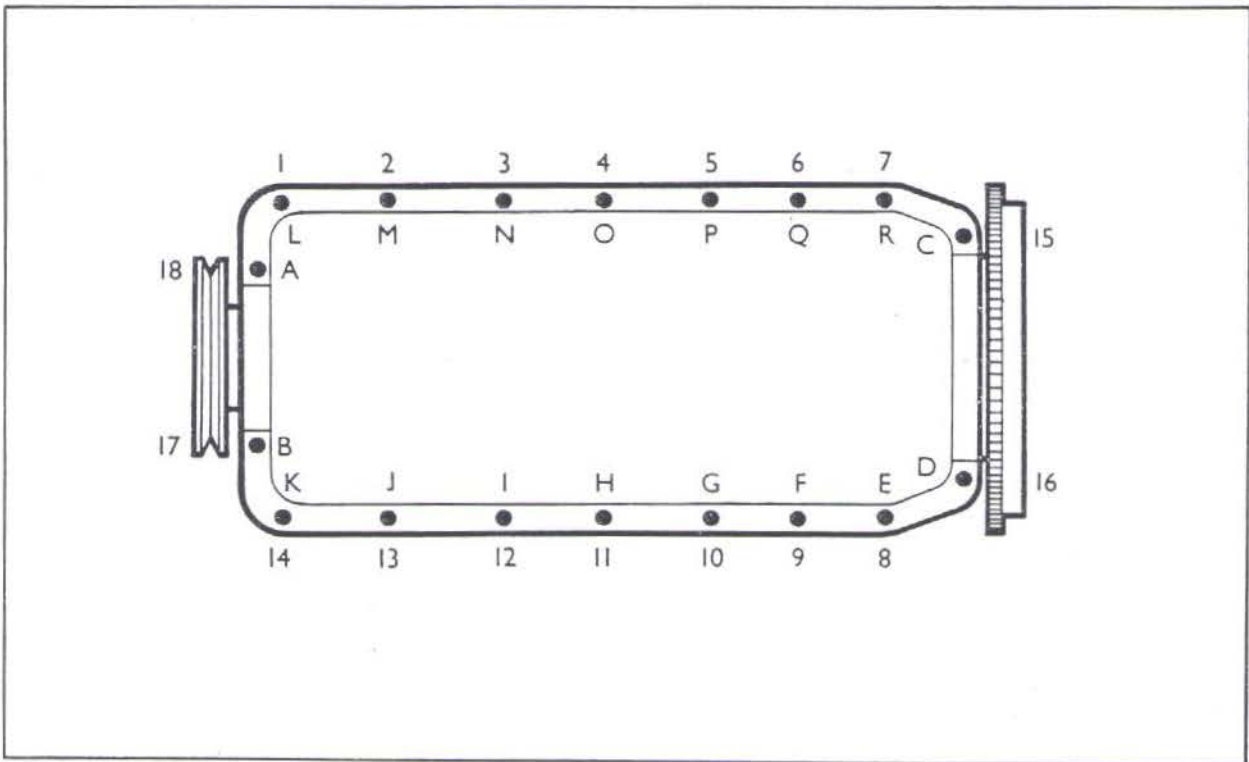
## TO INSTALL

8. Clean the front face of the cylinder block and locate a new gasket with a light smear of Hylomar sealer on the block face.
9. Fit the water pump assembly, secure with the three bolts and tighten to a torque 2.25 to 2.50 kg. m. (16 to 18 lb. ft.)
10. Using the replacer part of Tool No. P6161 drive a new crankshaft oil seal into the front cover.
11. By hand carefully insert the auxiliary shaft oil seal into the front cover ensuring that the front faces of the seal and cover are flush.
12. Locate the aligner Tool No. 6181 on the end of the auxiliary shaft.
13. Fit the front cover over the aligner, ensuring that the lower face of the cover is flush with the lower face of the crankcase. Replace the cover bolts and tighten evenly to a torque of 0.70 to 1.00 kg. m. (5 to 7 lb. ft.)
14. Remove the aligner by tightening the centre bolt. Smear MS4 silicon grease on the bearing surface of both seals.
15. Replace the cylinder head to front cover oil drain tubes. Locate the auxiliary shaft pulley on its dowel and replace the bolts, tightening them to a torque of 2.00 to 2.80 kg. m. (15 to 20 lb. ft.)
16. Locate the toothed pulley on the keyed nose of the crankshaft. Replace the bolt and tighten to a torque 4.0 to 4.5 kg. m. (29 to 34 lb. ft.)

## ESCORT RS 1600

### SUMP

The fabricated steel sump has a rear well, incorporating a longitudinal baffle, for the lubricating oil and is bolted to the base of the cylinder block. A drain plug is located in the right-hand side. Tighten all bolts to 0.97 to 1.24 kg. m. (7 to 9 lb. ft.) following the sequence given in alphabetical order and retighten following the numbered sequence .

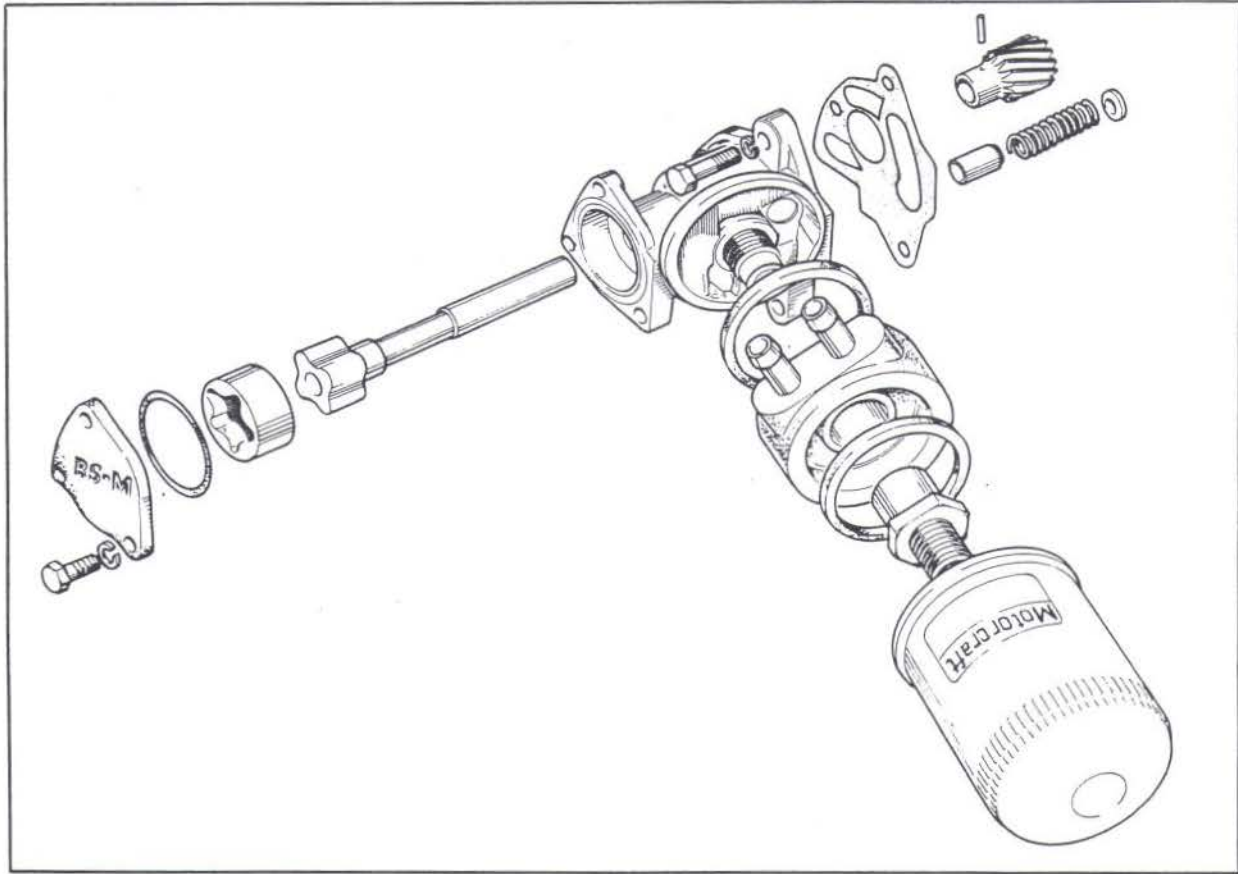


THE SUMP - TIGHTENING SEQUENCE



## THE OIL PUMP

The oil pump and filter assembly is bolted to the right-hand side of the cylinder block and can be removed with the engine in place. The oil pump, which is driven by a skew gear on the engine auxiliary shaft is of the eccentric bi-rotor type and has, the full flow element filter bolted to a mounting flange intergral with the oil pump body, or a replaceable cartridge type filter. (Illustrated below)



THE OIL PUMP

For any other Service or Repair Operations on this engine i. e. replacing pistons, removing and installing the sump gasket etc., you should refer to the Workshop Manual for the Capri range.

Similarly special tool requirements for the engine over and above those listed at the back of this supplement are as for the Capri range.

### 22 IGNITION SYSTEM

The ignition system consists of a Lucas distributor, an oil filled coil and Motorcraft Powertip spark plugs. The distributor is mounted on the right-hand side of the engine, and driven by a skew gear from the camshaft.

The ignition advance is controlled according to engine speed by governor weights within the distributor body. The oil filled coil is used in conjunction with a special starter solenoid, and a ballast resistor wire. This arrangement ensures that during starting, full battery voltage is applied to the coil to facilitate engine firing. All high tension leads are of the suppressor type.

### DISTRIBUTOR ASSEMBLY - REMOVE AND INSTALL

#### To Remove

1. Disconnect the high tension leads from the spark plugs.
2. Disconnect the high tension lead and the low tension lead from the coil.
3. Remove distributor cap.
4. Turn the engine until the timing mark on the camshaft pulley is in alignment with the T.D.C. mark on the cam cover with No. 1 piston on the compression stroke. The rotor should now point towards No. 1 spark plug.
5. Unscrew the bolt retaining the distributor clamp on the engine and carefully withdraw the distributor.

#### To Install

6. Fit the distributor with the low tension terminal adjacent to the cylinder block. Position the rotor, with the electrode towards the low tension terminal, prior to inserting the distributor into the cylinder block. As the gears mesh the rotor will rotate clockwise into alignment with No. 1 H. T. electrode in the distributor cap.

7. If necessary re-position the clamp, without turning the distributor, so that the hole is in line with the one in the cylinder block. Fit the retaining bolt and tighten.

A. To Adjust the Timing without the use of a Timing Light

- (a) Slightly turn the distributor body as necessary until the contact breaker points are just opening when the rotor is adjacent to No. 1 H. T. electrode in the distributor cap.

NOTE- Excessive movement from the specified position would indicate that the gears are meshing one or more teeth out. Remove the distributor and refit if this occurs.

- (b) Tighten the distributor body clamp bolt sufficiently to hold the distributor in position. Do not over-tighten.

8. Replace the distributor cap.
9. Reconnect the spark plug leads (firing order 1, 3, 4, 2 anti-clockwise rotation).
10. Reconnect the low tension lead to the coil.

B. To Adjust Timing using a Timing Light

- (a) Connect the leads of the timing light, using the clips provided, in accordance with the manufacturer's instructions.
- (b) Check that the ignition timing mark on the exhaust camshaft pulley and cam cover are visible and mark with chalk or paint if necessary.
- (c) Start the engine and allow it to idle.
- (d) Point the timing light at the timing marks. Check that the ignition mark on the camshaft pulley is adjacent to the mark on the cam cover.

If the mark on the pulley is to the right of the cam cover mark, the engine is too far advanced. Slacken the distributor body clamp and turn body anti-clockwise slightly to retard the ignition.

Should the mark be to the left of the cam cover mark, the distributor body should be turned clockwise slightly to advance the ignition.

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- (e) After making an adjustment, tighten the clamp sufficiently to hold the distributor in position. Do not over-tighten.

The operation of the governor weights may be checked by opening and closing the throttle. As the throttle is gradually opened, the pulley notch should move away from the cam cover indicator to the right; and as the throttle is closed the notch will move to the left in line with the indicator. Any tendency for erratic advance shown by the notch jumping suddenly away from the indicator shows that the governor weights are binding, or that the springs are weak.

11. A slight readjustment to the distributor may be necessary and should be carried out on the road in the following manner:-

- (i) Warm up the engine to normal operating temperature.
- (ii) Accelerate in top gear on wide throttle opening from 20 m.p.h. (32 k.p.h.) to 40 m.p.h. (64 k.p.h.).
- (iii) If heavy pinking occurs, retard the ignition until a trace pink can just be heard under these conditions of acceleration.

NOTE-It is not necessary to advance the ignition beyond the initial setting (except under high altitude operating conditions). Also, there is no need to use fuel of a higher octane rating than 97 (B.S. 4 star grade).

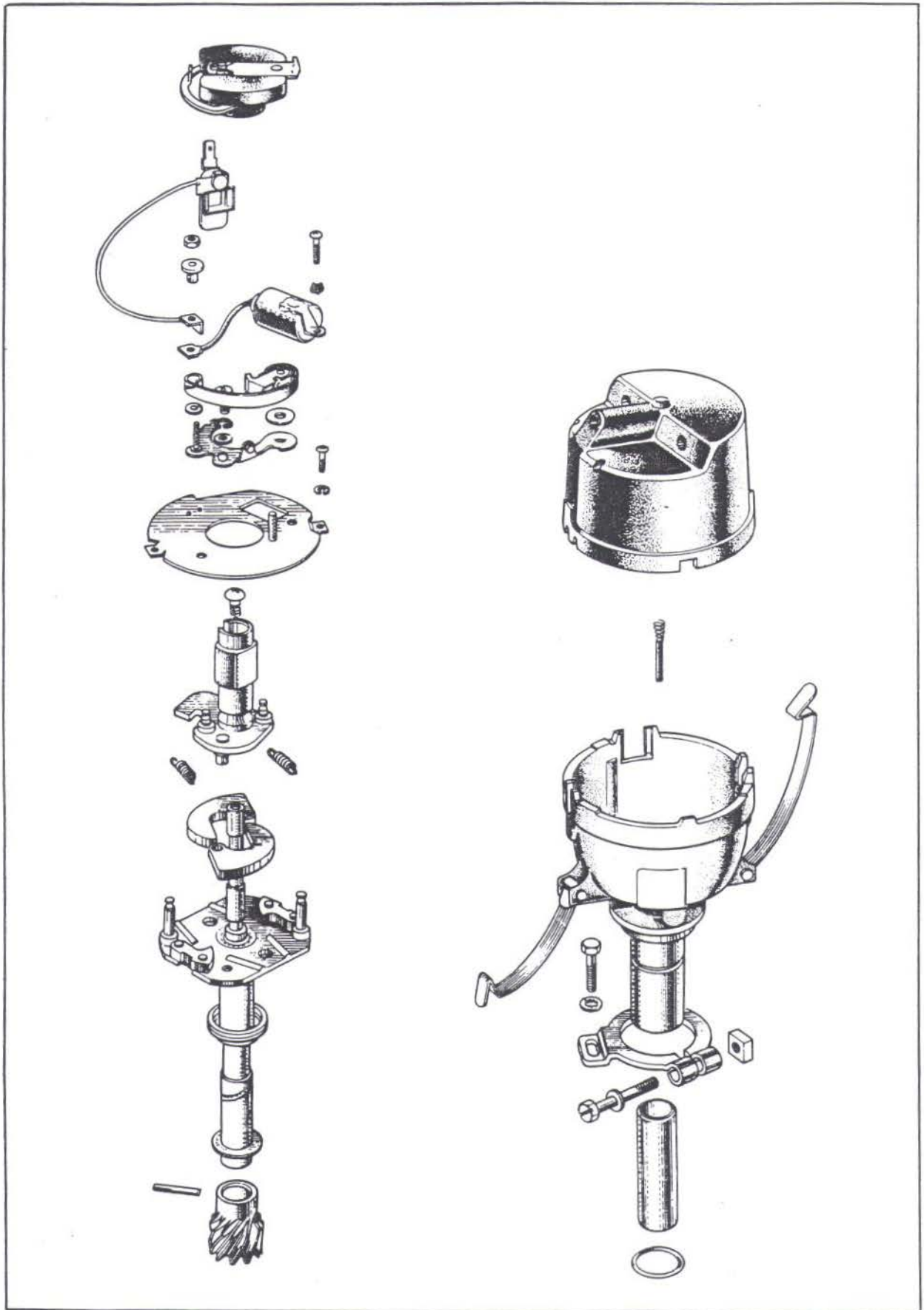
### DISTRIBUTOR ASSEMBLY - TEST AND ADJUST

#### Tools Required

Proprietary distributor tester.

The following instructions indicate the general principles to be followed for testing the distributor on a tester. The method of testing, however, may vary for machines of different manufacture: for specific instructions refer to the equipment manufacturer's handbook.

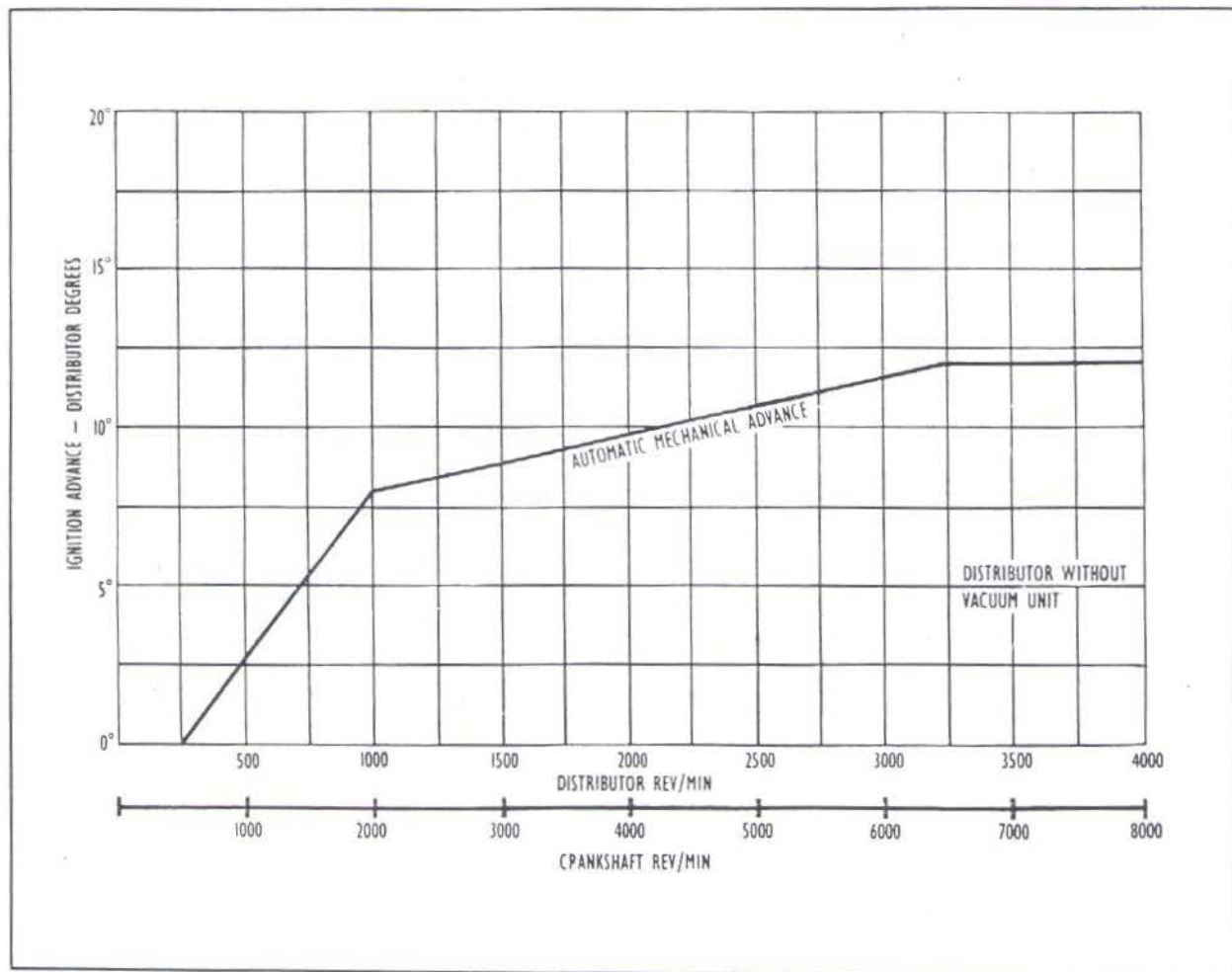




THE DISTRIBUTOR

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1. Mount the distributor on the tester, using an adaptor shaft, where necessary, to connect the drive from the machine to the distributor gear. Check that the distributor is free to rotate and that the adaptor shaft has the correct end-float, usually 1/16in. (1.59mm).
2. Make the necessary electrical connections and zero, the instrument if required.
3. DWELL ANGLE
  - (a) Turn the cylinder selector to the figure corresponding to the number of lobes on the cam of the distributor; in this case four.
  - (b) Turn the test selector switch to the cam angle position and operate the distributor at approximately 1,000 rev./min. (crankshaft).
  - (c) Adjust the distributor breaking point gap to a dwell angle of  $57^{\circ}$  to  $63^{\circ}$ .
  - (d) Increase the speed up to a maximum of 5,000 rev./min. (crankshaft) and check the dwell reading, which must again be between  $57^{\circ}$  to  $63^{\circ}$ . If the reading changes more than  $3^{\circ}$  check for a worn distributor shaft or worn bushings.



DISTRIBUTOR ADVANCE CURVE

## 4. Mechanical Operation

- (a) Make the necessary connections for the stroboscopic timing light or sparking protractor, refer to equipment manufacturer's handbook.
- (b) Adjust the speed control to vary the distributor speed between 400 and 5,000 rev./min. (crankshaft). Erratic or thin faint flashes of light preceding the regular flashes as the speed of rotation is increased can be due to weak breaker arm spring tension.
- (c) Operate the distributor at approximately 2,500 rev/min. (crankshaft).
- (d) Move the protractor scale with the adjustment control so that the zero degree mark on the scale is opposite one of the neon flashes. The balance of all the flashes should come within plus or minus  $1^{\circ}$ , evenly spaced around the protractor scale. A larger variation than  $1^{\circ}$  or erratic or wandering flashes may be caused by a worn cam or distributor shaft or a bent distributor shaft.

## 5. Distributor spark advance

The spark advance is checked to determine if the ignition timing advances in proper relation to engine speed and load.

Normally, this should not require adjustment as it is pre-set during manufacture.

However, incorrect assembly, weakening of the advance springs or wear will change the advance curves and rectification will be necessary if engine performance is not to be affected.

- (a) Operate the distributor in the direction of rotation (anti-clockwise) and adjust the speed to 300 rev./min. (distributor). Move the protractor scale so that one of the flashes lines up with the zero degree mark.
- (b) Slowly increase the speed and check the advance at the other speeds quoted in the specification. Operate the distributor both up and down the speed range.

*Rear spring "U" bolts	..	..	..	..	2.50 to 3.60	( 18 to 26)
*Rear spring front hanger	..	..	..	..	3.04 to 3.73	( 22 to 27)
*Rear spring rear shackle nuts	..	..	..	..	1.15 to 1.45	( 8 to 10)
Spring centre bolt	..	..	..	..	2.07 to 2.49	( 15 to 18)

\*These items to be tightened with components in the kerb position, i. e. the car must be resting on its wheels.

16. MANUAL TRANSMISSION AND CLUTCH

Clutch

Type	..	..	..	..	..	Single dry plate, diaphragm spring
Actuation	..	..	..	..	..	Hydraulic

Master Cylinder

Bore diameter	..	..	..	..	..	1.77 cm. ( 0.70 in.)
---------------	----	----	----	----	----	----------------------

Slave Cylinder

Bore diameter	..	..	..	..	..	2.22 cm. ( 0.875 in.)
---------------	----	----	----	----	----	-----------------------

Clutch Disc

Lining outside diameter	..	..	..	..	..	20.5 cm. ( 8.09 in.)
Lining inside diameter	..	..	..	..	..	14.6 cm. ( 5.75 in.)
Total friction area	..	..	..	..	..	304.1 sq. cm. (47.36 sq. in.)

Pressure Plate

Diameter	..	..	..	..	..	22.35 cm. ( 8.5 in.)
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Gearbox

Ratios:

-First	..	..	..	..	..	2.972
-Second	..	..	..	..	..	2.010
-Third	..	..	..	..	..	1.397
-Top	..	..	..	..	..	1.000
-Reverse	..	..	..	..	..	3.324

Main Drive Gear

Number of teeth	..	..	..	..	..	19
Inside diameter gear end	..	..	..	..	..	2.4702 to 2.4719 cm. (0.9725 to 0.9732in.)
Mainshaft pilot end diameter	..	..	..	..	..	1.492 to 1.498 cm. (0.5895 to 0.590in.)

Counter shaft

-Number of teeth	..	..	}	Reverse	30	
					26	
					22	
					19	
					17	
-End-float	..	..	..	..	0.203 to 0.508 mm.	(0.008 to 0.020 in.)
-Bore diameter	..	..	..	..	2.370 to 2.372 cm.	(0.933 to 0.934 in.)
-Thrust washer thickness	..	..	..	..	0.155 to 0.160 cm.	(0.061 to 0.063 in.)
-Number of rollers	..	..	..	..	40	
-Countershaft diameter	..	..	..	..	1.732 to 1.733 cm.	(0.6818 to 0.6823 in.)



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## First Gear:

-End-float	..	..	..	..	0.127 to 0.432 mm.	(0.005 to 0.017 in.)
-Internal diameter	..	..	..	..	3.028 to 3.030 cm.	(1.192 to 1.193 in.)
-Number of teeth	..	..	..	..	32	

## Second Gear:

-End-float	..	..	..	..	0.127 to 0.432 mm.	(0.005 to 0.017 in.)
-Internal diameter	..	..	..	..	3.701 to 3.703 cm.	(1.457 to 1.458 in.)
-Number of teeth	..	..	..	..	28	

## Third Gear

-End-float	..	..	..	..	0.127 to 0.432 mm.	(0.005 to 0.017 in.)
-Internal diameter	..	..	..	..	3.495 to 3.498 cm.	(1.376 to 1.377 in.)
-Number of teeth	..	..	..	..	23	

## Reverse Idler Gear:

-Internal diameter	..	..	..	..	1.905 to 1.907 cm.	(0.7500 to 0.7508 in.)
-Shaft diameter	..	..	..	..	1.896 to 1.898 cm.	(0.7465 to 0.7470 in.)
-Number of teeth	..	..	..	..	22	

## Speedometer

-Number of teeth	..	..	..	..	23	
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## Speedometer Driving Gear:

-Number of teeth	..	..	..	..	7	
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## Lubrication:

-Oil capacity	..	..	..	..	2.56 U.S. pints, 1.21 litres	(2.13 Imp. pints)
-Grade of oil	..	..	..	..	S. A. E. 80 E. P.	

## Tightening Torques. kg. m. (lb. ft.)

Clutch pressure plate to flywheel	..	..	1.66 to 2.07	( 12 to 15)
Clutch housing to transmission case	..	..	5.53 to 6.22	( 40 to 45)
Transmission case drain and filler plugs	..	..	3.46 to 4.15	( 25 to 30)
Transmission extension to transmission case	..	..	4.15 to 4.84	( 30 to 35)

## 21. ENGINE

### General

Type	4 cylinder in-line twin O. H. C.
Bore	80.993 mm. (3.1887 in.)
Stroke	77.724 mm. (3.060 in.)
Cubic capacity	1,601 cc (97.75 cu. in.)
Compression ratio	10 : 1
Maximum brake horsepower (nett)	115 PS at 6,500 rev. /min.
Maximum torque (nett)	14.4 mkg. (112 lbft.) at 4,000 rev. /min.
Firing order	1, 3, 4, 2
Location of No. 1 cylinder	Next to radiator
Idling speed	600 rev. /min.
Engine mounting	3 point suspension on shear type bounded rubber mounting.

Dimensions

Length (fan to clutch face)	60.00 cm.	(23.63 in.)
Width-without exhaust manifold and carburettors	44.45 cm.	(17.50 in.)
Height (crank $\text{\textcircled{C}}$ to top of engine less air cleaner)	39.37 cm.	(15.50 in.)

Camshafts

Material	.. .. .	'Monikrom' High Duty Cast Iron
Drive	.. .. .	Powergrip Toothed Belt
Pulley location	.. .. .	Taper and key with central bolt
Thrust	.. .. .	Taken by 'half-moon' washer in groove in cam-carrier
End float	.. .. .	0.051 to 0.203 mm. (0.002 to 0.008 in.)
Number of bearings	.. .. .	5
Journal diameter	.. .. .	47.48 to 47.99 mm. (1.8735 to 1.8740 in.)
Bearing clearance	.. .. .	0.051 to 0.089 mm. (0.0020 to 0.0035 in.)
Bearings	.. .. .	Direct in aluminium cam carrier
Cam lift - exhaust and inlet	.. .. .	8.76 mm (0.345 in.)
Cam heel to nose dimension	.. .. .	38.20 to 38.25 mm. (1.504 to 1.506 in.)

Crankshaft and Main Bearings

Material	.. .. .	Nodular Graphite Cast Iron (tufrided)
Number of main bearings	.. .. .	5
Main bearing journal diameter	.. .. -Red	53.988 to 54.003 mm. (2.1255 to 2.1261 in.)
Regrind diameter 0.254 mm.	.. .. .	53.721 to 53.734 mm. (2.1152 to 2.1157 in.)
0.508 mm.	.. .. .	53.480 to 53.492 mm. (2.1055 to 2.1060 in.)
Main journal length - Front	.. .. .	31.70 to 31.95 mm. (1.248 to 1.258 in.)
-Centre	.. .. .	31.62 to 31.67 mm. (1.247 to 1.249 in.)
-Rear	.. .. .	34.75 to 35.26 mm. (1.368 to 1.385 in.)
-Intermediate	.. .. .	32.32 to 32.59 mm. (1.273 to 1.283 in.)
Main journal fillet radius -Front	.. .. .	2.44 to 2.79 mm. (0.09 to 0.110 in.)
-Intermediate	.. .. .	2.44 to 2.79 mm. (0.096 to 0.110 in.)
-Rear	.. .. .	Double radius of .100 and .110
-Centre	.. .. .	Double radius of .07 and .08
Main bearings	.. .. .	Steel-backed lead/bronze (Vandervell)
Undersize bearings available	.. .. .	0.25 mm. (0.010 in.), 0.51 mm. (0.020 in.)
		0.76 mm. (0.030 in.) on inside diameter
Oversize bearings available	.. .. .	0.37 mm. (0.015 in.) o/s on outside diameter (each size)
Bearing bore in block	.. .. .	57.683 to 57.696 mm. (2.2710 to 2.2715 in.) standard
Crankshaft balance within	.. .. .	0.75 gm. cm. (0.202 oz. in.)
Crank throw	.. .. .	38.76 to 38.86 mm. (1.526 to 1.530 in.)
Crankpin journal diameter	.. .. .	49.195 to 49.215 mm. (1.9368 to 1.9376 in.)
Crankpin journal length	.. .. .	26.97 to 27.08 mm. (1.062 to 1.066 in.)
Crankpin journal fillet radius	.. .. .	2.03 to 2.39 mm. (0.080 to 0.094 in.)
Crankshaft end float	.. .. .	0.08 to 0.28 mm. (0.003 to 0.011 in.)
Thrust washer thickness	.. .. .	2.31 to 2.36 mm. (0.091 to 0.093 in.)
Spigot bearing bore	.. .. .	20.98 to 21.01 mm. (0.826 to 0.827 in.)
Crankshaft nose diameter	.. .. .	25.35 to 25.37 mm. (0.998 to 0.909 in.)
Crankshaft rear flange diameter	.. .. .	79.360 to 79.380 mm. (3.1244 to 3.1252)

Cylinder block

Standard Cylinder Bore diameter	.. .. .	Graded
Grade point	.. .. .	Across block 59.44 mm. (2.34 in.) down from head face
-Grade 2	.. .. .	80.962 to 80.970 mm. (3.1875 to 3.1878 in.)
-Grade 3	.. .. .	80.970 to 80.977 mm. (3.1878 to 3.1881 in.)
-Grade 4	.. .. .	80.977 to 80.985 mm. (3.1881 to 3.1884 in.)
-Grade 5	.. .. .	80.985 to 80.993 mm. (3.1884 to 3.1837 in.)
Cylinder liners available	.. .. .	Standard and 0.51 mm. (0.020 in.) o/s on outside diameter

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Bore for cylinder liners	84.112 to 84.138mm (3.3115 to 3.3125 in.)
Camshaft Drive	
Rubber toothed belt-Pitch x Width	9.53 x 25.4 mm. (0.375 x 1.00 in.)
Belt length	1.39 m. (54.75 in.)
Number of teeth	146
Belt tension	Provided by eccentric mounted idler pulley.
Belt tension with cold engine	19 mm. (0.75 in.) free play measured half way between the crankshaft idler pulley and the exhaust camshaft pulley.
	Note: Turn the exhaust camshaft pulley so that all slack is along the section to be measured.
 Cam Carrier and Tappets	
Camshaft bearing journal inside diameter	47.649 to 47.676 mm. (1.8760 to 1.8770 in.)
Camshaft thrust plate slot width	3.18 to 3.23 mm. (0.125 to 0.127 in.)
Camshaft thrust plate width	3.12 to 3.15 mm. (0.123 to 0.124 in.)
Tappet bore diameter	30.480 to 30.493 mm. (1.2000 to 1.2005 in.)
Tappet to bore clearance	0.03 to 0.05 mm. (0.001 to 0.002 in.)
Tappet skirt length	22.66 to 22.71 mm. (0.892 to 0.894 in.)
Tappet boss length (from top face)	19.48 to 19.58 mm. (0.767 to 0.771 in.)
Tappet shim thickness	1.27 to 1.93 mm. (0.050 to 0.076 in.)
	in steps of 0.025 mm. (0.001 in.)
Tappet outside diameter	30.442 mm. to 30.455 mm. (1.1985 to 1.1990 in.)
 Connecting Rods and Big End Bearings	
Type	'H' section steel forging
Weight - Small end	269 to 273 grams
- Big end	385 to 389 grams
- Total	654 to 662 grams
Length between centres	125.15 to 125.20 mm. (4.927 to 4.929 in.)
Big end bearings	Steel backed lead/bronze (Vandervell)
Big end bore	52.896 to 52.908 mm. (2.0825 to 2.0830 in.)
Bearing liner wall thickness	1.826 to 1.836 mm. (0.0719 to 0.0723 in.)
Undersize bearings available	0.25 mm. (0.010 in.) 0.51 mm. (0.020 in.)
	on inside diameter
Crankpin to bearing	0.010 to 0.061 mm. (0.0004 to 0.0024 in.)
End float on crankpin	0.10 to 0.25 mm. (0.004 to 0.010 in.)
Effective bearing length	21.08 to 22.10 mm. (0.83 to 0.87 in.)
Small end bush	Steel-backed bronze
Small end bush inside diameter	Graded
-Grade -Black	20.634 to 20.640 mm. (0.81240 to 0.81255 in.)
-Green	20.640 to 20.643 mm. (0.81255 to 0.81270 in.)
 Cylinder Head	
Type	Aluminium alloy, 4 valves per cylinder at 40° included angles
Bore for valve guide (inlet and exhaust)	11.902 to 11.920 mm. (0.4686 to 0.4693 in.)
Valve guide outside diameter inlet and exhaust	11.933 to 11.946 mm. (0.4698 to 0.4703 in.)
Valve guide inside diameter (inlet and exhaust)	7.142 to 7.160 mm. (0.2812 to 0.2819 in.)
Valve guide length - Inlet	33.18 to 33.69 mm. (1.700 to 1.720 in.)
-Exhaust	42.16 to 42.67 mm. (1.660 to 1.680 in.)
Valve seat angle (inlet and exhaust)	45°
Valve seat width (inlet and exhaust)	3.91 mm. (0.154 in.)
Inlet seat insert outside diameter	33.09 to 33.12 mm. (1.303 to 1.304 in.)
Exhaust seat insert outside diameter	27.64 to 27.66 mm. (1.088 to 1.089 in.)
Head recess inside diameter (inlet seat)	33.02 to 33.05 mm (1.300 to 1.301 in.)
Head recess inside diameter (exhaust seat)	27.56 to 27.58 mm. (1.085 to 1.086 in.)



Valves

Valve Stem diameter	-Inlet	..	..	..	7.092 to 7.112 mm.	(0.2792 to 0.2800 in.)
	-Exhaust	..	..	..	7.079 to 7.099 mm.	(0.2787 to 0.2795 in.)
Valve Stem to guide clearance	- Inlet	..	..	..	0.030 to 0.069 mm.	(0.0012 to 0.0027 in.)
	- Exhaust	..	..	..	0.043 to 0.081 mm.	(0.0017 to 0.0032 in.)
Valve head diameter	-Inlet	..	..	..	30.90 to 30.91 mm.	(1.218 to 1.222 in.)
	-Exhaust	..	..	..	27.35 to 27.45 mm.	(0.998 to 1.002 in.)
Valve length (inlet and exhaust)		..	..	..	98.43 to 98.30 mm.	(3.875 to 3.870 in.)
Valve face angle		..	..	..	45°	
Valve face width		..	..	..	2.26 mm.	(0.089 in.)

Valve Springs

Free length	..	..	..	..	37.59 mm.	(1.48 in.)
Internal diameter	..	..	..	..	20.37 to 20.67 mm.	(0.802 to 0.814 in.)
Total number of coils	..	..	..	..	6	
Wire diameter	..	..	..	..	3.84 to 3.89 mm.	(0.151 to 0.153 in.)
Fitted length (valve closed)	..	..	..	..	31.98 to 32.44 mm.	(1.259 to 1.277 in.)
Valve spring load at 32.08 mm.	..	..	..	..	19.95 to 2.22 kg.	(44 to 49 lb.)
	24.21 mm.	..	..	..	51.40 to 55.80 kg.	(113 to 123 lb.)

Valve Timing and Clearances

Inlet valve at full lift	..	..	..	..	107° to 113° A. T. D. C.	
Exhaust valve at full lift	..	..	..	..	107° to 113° B. T. D. C.	
Tappet clearance (cold)	-Inlet	..	..	..	0.13 to 0.18 mm.	(0.005 to 0.007 in.)
	-Exhaust	..	..	..	0.15 to 0.20 mm.	(0.006 to 0.008 in.)

Flywheel and Ring Gear

Type					Ring gear shrunk on	
Number of teeth on ring gear - inertia type starter					110	
Ring gear fitting temperature	..	..	..	..	316°C	(600°F)
Maximum run-out	..	..	..	..	0.13 mm.	(0.005 in.)
Clutch pilot spigot bearing	..	..	..	..	Sintered bronze	
Flywheel weight	..	..	..	..	7.04 kg.	(15.5 lb.)

Auxiliary Shaft

Material	..	..	..	..	Special Ford cast iron alloy	
Drive	..	..	..	..	Powergrip toothed belt	
Pulley location	..	..	..	..	Dowel and two bolts	
Bearings	..	..	..	..	Steel backed, white metal bush	
Oversize bearing available	..	..	..	..	0.51 mm. (0.020 in.) o/s on outside dia.	
					Standard on inside diameter.	
Journal diameter	..	..	..	..	39.606 to 39.627 mm.	(1.5597 to 1.5605 in.)
Bearing -Inside diameter	..	..	..	..	39.881 to 39.893 mm.	(1.5615 to 1.5620 in.)
Bearing length	-Front and rear	..	..	..	20.07 mm.	(0.79 in.)
	-Centre	..	..	..	17.27 mm.	(0.68 in.)
Bearing clearance	..	..	..	..	0.025 to 0.052 mm.	(0.001 to 0.0023 in.)
Bearing bore in cylinder block	..	..	..	..	42.888 to 42.913 mm.	(1.6885 to 1.6895 in.)
End-float	..	..	..	..	0.064 to 0.191 mm.	(0.0025 to 0.0075 in.)
Thrust plate thickness	..	..	..	..	4.47 to 4.52 mm.	(0.176 to 0.178 in.)



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## Pistons

Type .. .. .	Solid skirt
Material .. .. .	Aluminium alloy tin plated
Weight .. .. .	382.5 grams.
Number of rings .. .. .	2 compression, 1 oil control
Width of grooves -Compression .. .. .	1.63 to 1.65 mm. (0.064 to 0.065 in.)
-Oil control .. .. .	4.000 to 4.026 mm. (0.1575 to 0.1585 in.)
Piston pin bore diameter .. .. .	20.630 to 20.635 mm. (0.8122 to 0.8124 in.)
Piston pin bore offset .. .. .	1.02 mm. (0.040 in.) towards thrust face
Piston clearance in bore .. .. .	0.076 to 0.091 mm. (0.0030 to 0.0036 in.)
Effective piston diameter .. .. .	Graded
Grade - 2 .. .. .	80.879 to 80.886 mm. (3.1842 to 3.1845 in.)
- 3 .. .. .	80.886 to 80.894 mm. (3.1845 to 3.1848 in.)
- 4 .. .. .	80.894 to 80.902 mm. (3.1848 to 3.1851 in.)
- 5 .. .. .	80.902 to 80.909 mm. (3.1851 to 3.1854 in.)
Compression height .. .. .	44.58 to 44.63 mm. (1.755 to 1.757 in.)
Clearance between piston crown and block top face at T, D, C. .. .. .	0.178 to 0.584 mm. (0.007 to 0.023 in.)

## Piston Pins

Type .. .. .	Fully floating retained end circlips
Material .. .. .	Machined seamless tubing
Length .. .. .	70.99 to 71.37 mm. (2.795 to 2.810 in.)
Outside diameter .. .. .	Graded
Grade - Black .. .. .	20.627 to 20.630 mm. (0.8121 to 0.8122 in.)
- Green .. .. .	20.630 to 20.632 mm. (0.8122 to 0.8123 in.)
Weight .. .. .	119.5 grams
Clearance in piston .. .. .	0.003 mm. (0.0001 in.) selected
Clearance in small end bush .. .. .	0.005 to 0.013 mm. (0.0002 to 0.00045 in.) selected

## Piston Rings

Top Compression Ring: .. .. .	
Material .. .. .	Cast iron, chrome plated
Radial thickness .. .. .	3.10 to 3.30 mm. (0.122 to 0.130 in.)
Width .. .. .	1.562 to 1.588 mm. (0.0615 to 0.0625 in.)
Ring to groove clearance .. .. .	0.038 to 0.089 mm. (0.0015 to 0.0035 in.)
Ring gap .. .. .	0.41 to 0.53 mm. (0.0016 to 0.021 in.)
Load to compress ring to correct gap .. .. .	3.02 to 4.38 kg. (6.65 to 9.65 lb.) applied diametrically at a point 90° from gap

## Lower Compression Ring:

Material .. .. .	Cast iron alloy
Type .. .. .	Externally stepped on lower edge
Radial thickness .. .. .	3.71 to 3.96 mm. (0.146 to 0.156 in.)
Width .. .. .	1.562 to 1.588 mm. (0.0615 to 0.0625 in.)
Ring to groove clearance .. .. .	0.038 to 0.089 mm. (0.0015 to 0.0035 in.)
Ring gap .. .. .	0.41 to 0.53 mm. (0.016 to 0.021 in.)
Load to compress ring to correct gap .. .. .	5.41 to 7.89 kg. (11.9 to 17.4 lb.) applied diametrically at a point 90° from gap

## Oil Control Ring:

Material .. .. .	Cast iron alloy
Type .. .. .	Micro-land scraper with slotted channel
Radial thickness .. .. .	3.10 to 3.30 mm. (0.122 to 0.130 in.)
Width .. .. .	3.94 to 3.96 mm. (0.155 to 0.156 in.)
Ring to groove clearance .. .. .	0.038 to 0.089 mm. (0.0015 to 0.0035 in.)
Ring gap .. .. .	0.41 to 0.53 mm.
Load to compress ring to correct gap .. .. .	4.04 to 5.79 kg. (8.89 to 12.75 lb.) applied diametrically at a point 90°

Lubrication System

Type .. .. .	Wet sump, pressure feed system with full flow filter
Method - Main bearings, jackshaft, and big end bearings .. .. .	Pressure fed
- Piston pin and cylinder wall .. .. .	Splash and from oil squirt in connecting rods
- Camshafts .. .. .	Controlled pressure feed from jackshaft front journal
- Tappets .. .. .	Splash from camshaft bearing oil
Oil pump .. .. .	Eccentric bi-rotor
Oil pressure .. .. .	3.87 to 4.57 kg./sq. cm. (55 to 65 lb/sq. in.)
Oil filter type .. .. .	Full flow
Sump capacity (including oil filter) .. .. .	3.7 litres (6.5 imp. pints)
Oil filter capacity .. .. .	0.69 litres (1.2 Imp. pints)
Oil cooler capacity .. .. .	0.69 litres (1.2 Imp. pints)
Grade of oil - Temperature Range .. .. .	S. A. E. Viscosity No.
- Under 23°C (-10°F) .. .. .	5W/20
- 23°C to 7°C (-10°F to +20°F) .. .. .	10W/30
- Over 32°C (+90°F) .. .. .	20W/50
Crankcase ventilation .. .. .	Closed into air box

Oil Pump

Capacity .. .. .	5.72 litres/min (1.26 Imp galls/min) at 2,000 rev./min.
Pump body bore diameter .. .. .	12.70 to 12.73 mm (0.500 to 0.501 in)
Drive shaft diameter .. .. .	12.649 to 12.662 mm (0.4980 to 0.498 in)
Drive shaft to body clearance .. .. .	0.038 to 0.076 mm (0.0015 to 0.003 in)
Inner and outer rotor clearance .. .. .	0.15 mm maximum (0.006 in)
Outer rotor and housing clearance .. .. .	0.25 mm maximum (0.010 in)
Inner and outer rotor end float .. .. .	0.13 mm maximum (0.005 in)

Tightening Torques, kg. m. (lb/sq. in.)

Cylinder head	7/16 in. - 14 UNC	8.30 to 8.99	(60 to 65)
Main bearing	7/16 in. - 14 UNC	8.99 to 9.68	(65 to 70)
Connecting rod	3/8 in. - 24 UNF	4.15 to 4.84	(30 to 35)
Flywheel to crankshaft	3/8 in. - 24 UNF	6.91 to 7.60	(50 to 55)
*Oil filter centre bolt (early engines)	3/8 in. - 24 UNF	1.66 to 2.07	(12 to 15)
Camshaft pulley	3/8 in. - 24 UNF	2.77 to 3.46	(20 to 25)
Auxiliary shaft pulley	5/16 in. - 18 UNC	2.07 to 2.77	(15 to 20)
Crankshaft pulley	7/16 in. - 20 UNF	3.18 to 3.87	(24 to 28)
Cam carrier to head	1/4 in. - 20 UNC	1.11 to 1.38	(8 to 10)
Idler pulley nut	7/16 in. - 20 UNF	4.15 to 4.84	(30 to 35)
Sump	1/4 in. - 20 UNC	0.83 to 1.11	(6 to 8)
Alternator to bracket	5/16 in. - 24 UNF	2.07 to 2.49	(15 to 18)
Cam cover	1/4 in. - 20 UNC	0.24 to 0.29	20 to 25 lb. in.
Auxiliary shaft thrust plate bolts	1/4 in. - 20 UNC	0.35 to 0.45	(2.50 to 3.2)

COOLING SYSTEM

Capacity

Complete system - with heater	7.10 litres	(12.5 imp. pints)
Complete system - without heater	5.96 litres	(10.5 imp. pints)
Anti-freeze	Ford Anti-freeze plus Part. No. M97B18C in 50% solution of anti-freeze and water.	

Specific Gravity Readings at Constant Temperature 16°C (60°F)

Specific Gravity (providing no other additive is in the coolant)	Proportion of Anti-freeze (by volume)	Remains Fluid to		Solidifies at	
		°C	°F	°C	°F
1.080	50%	-37°	-34	-58°	-72°
1.065	40%	-26°	-13	-48°	-54°
1.050	30%	-16°	+3	-39°	-38°
1.042	25%	-13°	+9	-29°	-20°
1.034	20%	-9°	+15	-19°	-3°
1.026	15%	-7°	+20	-14°	+7°
1.016	10%	-4°	+25	-8°	+17°

Radiator

Type	..	..	..	..	..	Modern high efficiency fin
Core width	..	..	..	..	..	43.82 cm. (17.25 in.)
Core height	..	..	..	..	..	35.87 cm. (14.12 in.)
Core depth	..	..	..	..	..	3.23 cm. (1.27 in.)
Frontal area	..	..	..	..	..	1574.3 sq. cm. (244 sq in.)
Number of tubes	..	..	..	..	..	56
Cap	..	..	..	..	..	0.914 kg./sq. cm. (13 p. s. i.)

Fan

Number of blades	..	..	..	..	..	8
Diameter	..	..	..	..	..	30.48 cm. (12.0 in.)
Ratio : fan to engine	..	..	..	..	..	1 : 1

Thermostat

Type	..	..	..	..	..	Wax
Location	..	..	..	..	..	Left-hand side of cylinder head
Starts to open	..	..	..	..	..	85° to 89° C (185° to 192° F)
Fully open	..	..	..	..	..	99° to 102° C (210° to 216° F)

Fan Belt

Width	..	..	..	..	..	9.7 mm. (0.38 in.)
Outside length	..	..	..	..	..	8.12.3 mm. (32 in.)
Free play	..	..	..	..	..	13 mm. (0.5 in.)
Tension	..	..	..	..	..	20.43 to 24.97 kg. (45 to 55 lb)

FUEL SYSTEM

Fuel Tank .. .. . 40.9 litres (9 Imp. galls.)  
 Capacity .. .. .

Carburettor

Type	2 twin choke Weber 40 DCOE 48	or 2 twin choke Dell'Orto 40 DHLAE
Jet sizes:	Weber	Dell'Orto
Main venturi	30 mm.	30 mm.
Auxiliary venturi	4.5 mm.	1
Main jet	110	120
Idling jet	45/F9	45
Accelerator pump jet	35	33
Accelerator pump inlet valve bleed	80	-
Progression holes	1 x 120 and 2 x 100	-
Starting jet	F5/60	70
Emulsion tube	F16	5
Air correction jet	200	200
Needle Valve	200	150
Starting air jet	60	70
Float level	8.5 mm. including gasket	16.5-17.0 mm. including gasket
Float weight	26 gms.	20 gms. +0.2
Petrol level	29 mm. + $\frac{1}{2}$ mm.	27.5 mm.
Float stroke	6.5 mm.	-

Fuel Pump

Dell'Orto

Type .. .. .	Mechanical
Inlet depression .. .. .	21.59 cm. Hg. (8.5 in. Hg.)
Delivery pressure .. .. .	0.25 to 0.35 kg./sq.cm. (3.5 to 5 lb/sq.in.)
Diaphragm spring test length .. .. .	16.27 mm. (0.641 in.)
Diaphragm spring test pressure .. .. .	4.31 to 4.54 kg. (9.25 to 10 lb.)
Rocker arm spring test length .. .. .	11.18 mm. (0.44 in.)
Rocker arm spring test pressure .. .. .	2.268 to 2.495 kg. (5 to 5.5 lb.)

Weber

Type .. .. .	Mechanical
Delivery Pressure .. .. .	0.088 to 0.175 (1.25 to 2.50 lb/sq.in.)
Diaphragm spring last length .. .. .	11.883mm (0.468 in.)
Diaphragm spring test pressure .. .. .	1.474 to 1.588 kg (3.25 to 3.50 lb)
Other data as Dell'Orto pump	



# ESCORT RS 1600

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## Distributor

Type	..	..	..	..	Lucas 23 D4 40953A
Automatic advance	..	..	..	..	Mechanical
Drive	..	..	..	..	Skew gear from auxiliary shaft
Rotation	..	..	..	..	Anti-clockwise
Ignition timing-static	..	..	..	..	T, D, C,
-dynamic	..	..	..	..	10° B. T. D. C. at 1,500 rev/min.
Condenser capacity	..	..	..	..	0.21 to 0.25 microfarad
Contact breaker points gap	..	..	..	..	0.36 to 0.41 mm. (0.014 to 0.016 in.)
Dwell angle	..	..	..	..	57° to 63°
Firing order	..	..	..	..	1, 3, 4, 2
Breaker arm spring tension	..	..	..	..	481.9 to 567 grams (17 to 21 ozs.)
High tension lead resistance	..	..	..	..	164 to 295 ohms/cm (5000 to 9000 ohms ft.)
Rotor cut-out speed	..	..	..	..	6,500 engine rev./min.

## Sparking plugs

Size	..	..	..	..	14 mm.
Type	..	..	..	..	Motorcraft AG12
Gap	..	..	..	..	0.46 to 0.51 mm. (0.018 to 0.020 in.)

## COIL

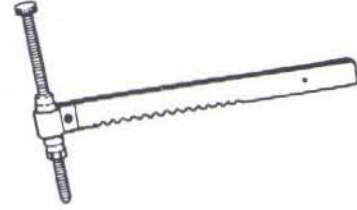
Type	..	..	..	..	12 volt, oil filled type for use with ballast resistor
Output	..	..	..	..	30 KV.

## ALTERNATOR

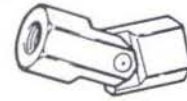
Type	..	..	..	..	Lucas 17ACR
Maximum Charge	..	..	..	..	35 amps

SPECIAL TOOLS

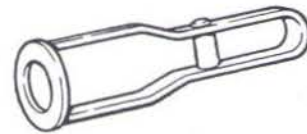
CP 6118-B Valve Spring Compressor  
(Main Tool)



P 6118-6 Valve Spring Compressor  
(Adaptor)



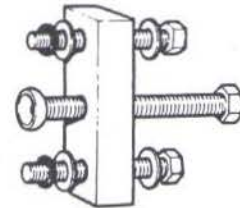
P 6118-7 Valve Spring Compressor  
(Adaptor)



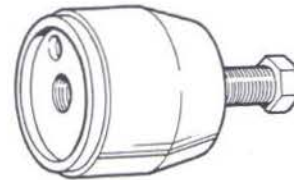
P 6180/2 Valve Guide Replacer



P 6182 Camshaft Pulley Remover



P 6181 Front Cover Aligner



P 6118-8 Valve Spring Compressor  
(Adaptor Bolt)



P 6180/1 Valve Guide Remover

