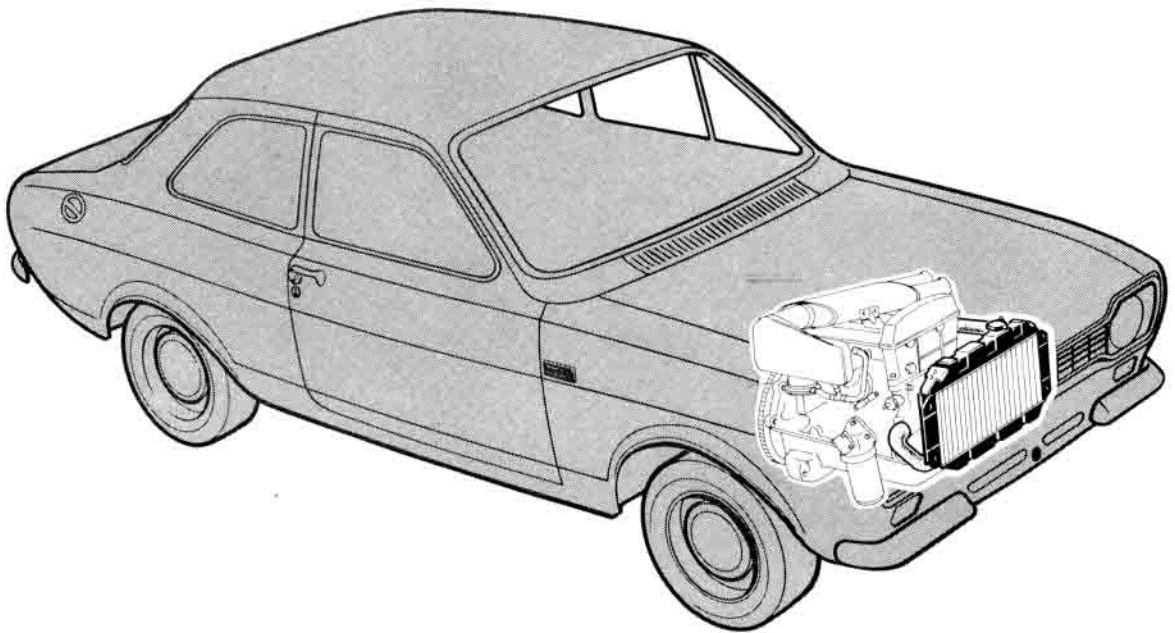


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COOLING SYSTEM
(LOTUS)



ESCORT TWIN CAM

GENERAL DESCRIPTION

The pressurised cooling system is of the impeller-assisted thermo-syphon type with the water pump integral with the engine front cover.

Coolant is circulated from the base of the radiator up through the pump and into the cylinder block. The coolant then circulates through the cylinder block and cylinder head to the thermostat, located on the cylinder head. At operating temperature hot coolant is returned to the radiator top tank. The coolant then flows down the radiator tubes and is cooled by air passing through the radiator, induced by the fan. The fan is belt-driven from the crankshaft pulley in tandem with the generator.

The thermostat in conjunction with a by-pass tube, cast in the cylinder head, assists in the rapid warming up of the engine and controls the normal engine running temperature.

A coolant temperature gauge on the facia warns the driver of any cooling irregularities.

The corrugated fin high efficiency radiator is located in the front of the engine compartment and incorporates a pressure cap and drain plug. It is connected to the cylinder head and water pump by reinforced neoprene hoses.

In production the system is filled with a 50% solution of Ford Antifreeze Plus. (A tag is usually fitted on the radiator filler neck or a sticker on the windscreen when antifreeze has been used.) This antifreeze offers adequate cooling system and engine protection for two years or 36,000 miles (whichever occurs first).

The coolant is used as a source of heat for the interior heater.

SERVICE AND REPAIR OPERATIONS

With the exception of Operation No. 8501-B, detailed on the following pages, the remainder of the operations relating to the cooling system may be carried out as detailed in Section 8 of the basic Escort manual.

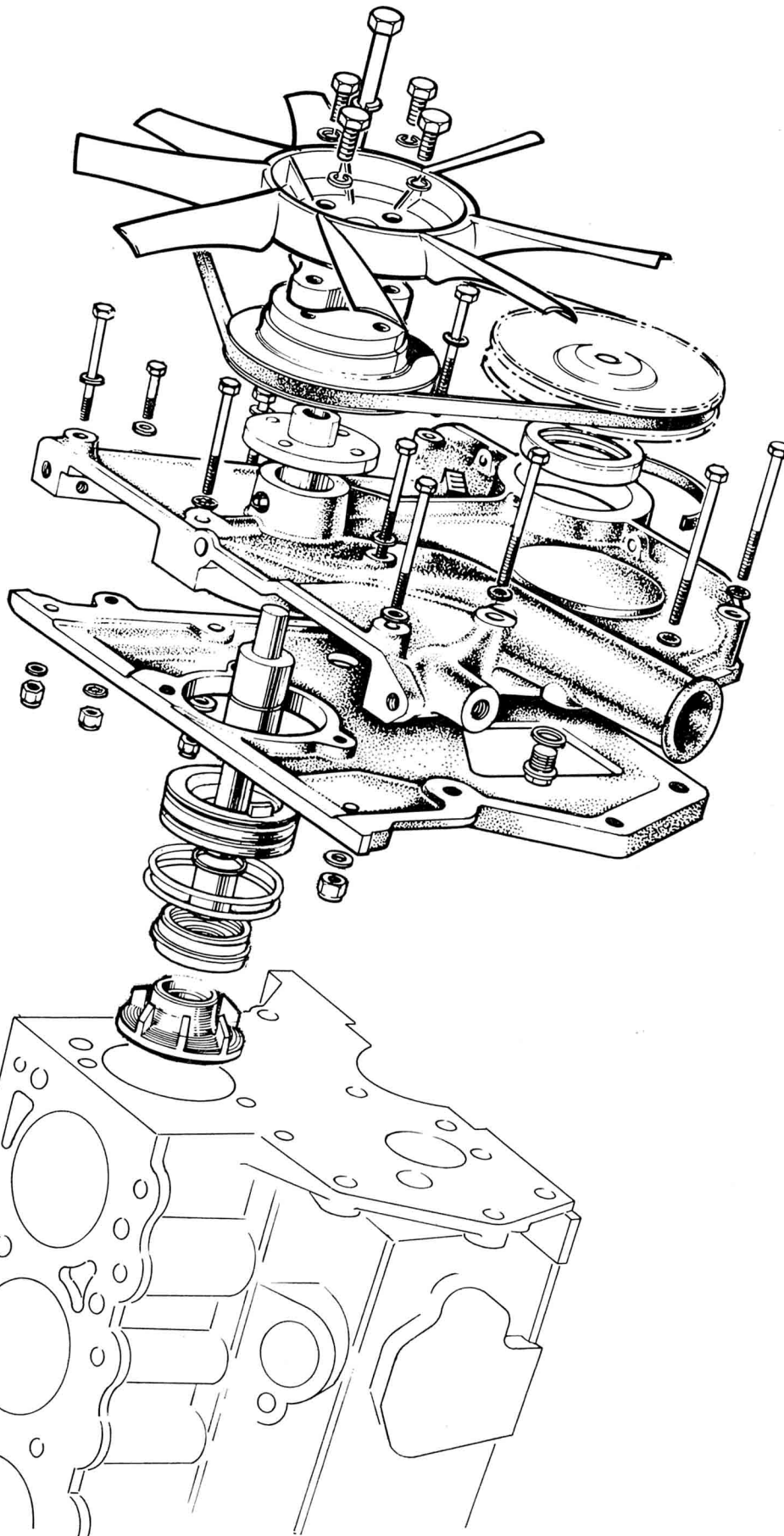
OP 8501-B WATER PUMP - OVERHAUL**Tools Required**

370	Taper base
CP.4111	Hub remover
P.8000-4B	Water pump overhaul kit
P.8008-A	Slave ring
550	Driver handle
P.6150	Crankshaft front cover oil seal aligner
P.6161	Crankshaft front oil seal remover/replacer

To Remove

1. Drain the engine coolant by opening the drain plugs on the radiator and cylinder block.
2. Disconnect the radiator hoses at the engine.
3. Remove the radiator assembly.
4. Remove the air cleaner.
5. Remove the camshaft cover.
6. Remove the fan belt and then remove the fan and the water pump pulley.
7. Remove the crankshaft pulley, using suitable levers.
8. Remove the timing chain tension adjuster.
9. Remove the camshaft sprockets and disconnect the timing chain.
10. Unscrew the cylinder head bolts evenly and lift off the cylinder head and gasket.
NOTE - Do not lay the cylinder head flat on its face as damage to the valves can occur while the camshafts are still fitted.
11. Jack up the front of the car and fit supporting stands.
12. Place a sling around the inner engine mounting brackets and using a crane support the weight of the engine. Unscrew the nut securing the insulator to the mounting bracket.
13. Suitably scribe the steering shaft and flexible joint to ensure correct alignment on re-assembly and remove the clamping bolt.
14. 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.
15. Support the engine front crossmember with a jack and remove the four mounting bolts, replacing each one **in turn** with a 3 in. (7.62 cm.) long bolt and washer.
16. Carefully lower the engine until the crossmember is supported on the long bolts. Remove the jack.
17. Drain the engine oil, unscrew the bolts securing the sump to the cylinder block and allow the sump to rest on the crossmember. Remove the old gaskets.

T/9/341/C



Timing Case and Water Pump Assembly

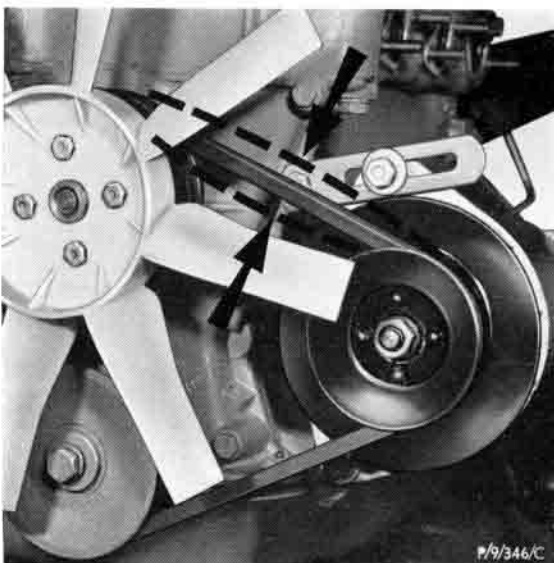
18. Remove the front cover.
19. Remove the crankshaft oil slinger.
20. Remove the auxiliary shaft sprocket.
21. Remove the front cover backplate and gaskets.
22. Withdraw the bearing retainer clip from the slot in the housing.
23. Remove the pump pulley hub from the shaft using Tool No. CP.4111.
24. Press the impeller, seal, slinger, shaft and bearing assembly out of the housing, using the ring and thrust block adaptors, details 'd' and 'e' of Tool No. P.4000-4B together with P.8008A and 370 base on a suitable press. Adaptor detail 'e' is hollow and fits over the shaft and bears against the outer diameter of the bearing.
25. Press the impeller off the end of the shaft, using adaptors, details 'a' and 'b', ensuring that the vanes avoid the slots.
26. Remove the pump seal from the shaft.
27. Carefully split the slinger bush with a chisel to detach it from the shaft.
28. Remove the insert from the front cover.

To Install

29. Press the shaft and bearing assembly into the housing (short end of shaft to the front of the housing) until the groove in the shaft is in line with the groove inside the housing, again using the ring and thrust block adaptors, details 'd' and 'e'.
30. Refit the bearing retainer clip in the groove of the bearing and housing.
31. Press the pump pulley hub on to the front end of the shaft until the end of the shaft is flush with the end of the hub, using the split ring (detail 'a') and thrust block adaptor (detail 'e').
32. Fit a new slinger bush (flanged end first) on the rear end of the shaft, using driver (detail 'f').
33. Fit the pump seal on the slinger bush with the carbon thrust face towards the impeller and press it into the housing using the replacer (detail 'k').
34. Fit the "O" ring to the insert and fit the insert to the front cover.
35. Press the impeller on to the shaft, using the adaptor details 'a' and 'b' until a clearance of 0.030 in. (0.762 mm.) is obtained between the impeller blades and the insert face. Ensure that load is applied to the shaft.
36. Fit the front cover backplate. Align the water pump aperture with the front cover and seal aligner Tool No. P.6150 before tightening the single bolt to 5 to 7 lb. ft. (0.69 to 0.97 kg.m.).
37. Fit the auxiliary shaft sprocket. Tighten the retaining bolts to 12 to 15 lb. ft. (1.66 to 2.07 kg.m.) and turn up the locking plate tabs.
38. Locate the timing chain in position around the crankshaft and auxiliary shaft sprockets and around the water pump aperture in the backplate.
39. Fit the oil slinger to the crankshaft with the dished face away from the sprocket.
40. Fit a new oil seal to the front cover using Tool No. P.6161 and a 550 handle.
41. Coat the front cover joint faces with ESEE-M4G-1008A jointing compound and fit the front cover, aligning the seal with Tool No. P.6150. Tighten the $\frac{1}{2}$ in. nuts and bolts evenly to 5 to 7 lb. ft. (0.69 to 0.97 kg.m.) and the $\frac{5}{16}$ in. to 10 to 15 lb. ft. (1.38 to 2.07 kg.m.) and remove the aligner.
42. Locate a new gasket on the cylinder head to the timing cover joint.

ESCORT TWIN CAM

43. Fit the crankshaft pulley aligning the pulley slot with the crankshaft key. Tighten the retaining bolt to 24 to 28 lb. ft. (3.32 to 3.87 kg.m.).
44. Fit new gaskets on the block flange using ESEE-M4G-1008A jointing compound at each end on the front cover and rear oil seal carrier. Fit the cork strips again using ESEE-M4G-1008A. Refit the sump and then tighten the bolts evenly to a torque of 7 to 9 lb. ft. (0.97 to 1.24 kg.m.) in the sequence given on page 28 of Section 6/1.
45. Place a jack under the engine front crossmember and raise this until it abuts the chassis. (Ensure the engine mountings re-engage with the mounting bracket.) Replace each long bolt **in turn** with the original bolts, to facilitate correct crossmember alignment. Tighten to a torque of 25 to 30 lb. ft. (3.46 to 4.15 kg.m.). Remove the supporting jack.
46. Engage and tighten the engine mounting securing nuts.
47. Lower the crane and remove the sling from around the engine.
48. Replace the water pump pulley and the fan. Fit the fan belt and adjust the tension so that there is $\frac{1}{2}$ in. (12.7 mm.) total movement.
49. Engage the steering shaft with the flexible joint while ensuring to re-align the marks previously made and tighten the clamp bolt.
50. Fit the bolts securing the lower end of the steering column and also the two crosshead screws at the top end of the column.
51. Reconnect the multi-plug connectors behind the facia panel.
52. Fit the cylinder head assembly. Locate the cylinder head gasket on the cylinder block using the locating studs Tool No. PT. 4063A screwed into diagonally opposite bolt holes in the block face. Fit the cylinder head assembly engaging the breather pipe in its bore. Screw the cylinder head bolts home before removing the locating studs and then tighten in sequence to 60 to 65 lb. ft. (8.29 to 8.98 kg.m.). Tighten the three front cover bolts to 10 to 15 lb. ft. (1.38 to 2.07 kg.m.).
53. Fit the camshaft sprockets and timing chain. Align the timing mark on the crankshaft pulley with the lower mark on the front cover and the timing marks on the sprockets adjacent to each other and level with the camshaft cover mounting face. Fit the exhaust sprocket first. Tighten the retaining bolts to 25 to 30 lb. ft. (3.46 to 4.15 kg.m.).



Fan Belt Tension

54. Adjust the timing chain tension to give $\frac{1}{2}$ in. (12.7 mm.) free movement between the camshaft sprockets. Ensure that there are no tight spots by turning the engine through several revolutions.
 55. Fit the camshaft cover and tighten the retaining nuts evenly.
 56. Fit the air cleaner.
 57. Replace the radiator assembly.
 58. Refit the radiator top and bottom hoses and tighten the clips.
 59. Refill the radiator with a 50% solution of Ford Antifreeze Plus.
 60. Retime the ignition (see Operation No. 12100-A in Section 10 of this supplement).
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