

## Section E12

## Engine removal and installation

Before attempting to remove the engine, reference should be made to Chapter G, Section G2 or G2m - Special precautions. The appropriate section should be read carefully, so that details of the different types of hydraulic system and the relevant work (depressurising the system, removing the necessary hydraulic pipes, etc.) are understood.

The operations listed in this section are the basic steps to be followed in removing the engine, and should enable the skilled mechanic to carry out the exercise. However, the sequence of the operations may be varied slightly as the operator becomes more familiar with the work.

Whenever an operation states a simple objective and then refers to another chapter [e.g. Drain the cooling system (see Chapter L)], it should be noted that the full procedure to carry out the operation will be found within that particular chapter.

It should also be noted that as engine specifications can vary dependent upon the destination of the car, it is always advisable to check that all cables, looms, pipes, etc., have been disconnected before lifting the engine out of the vehicle.

The information given in this section refers to the removal of the engine through the bonnet aperture. However, should it be necessary to remove the sub-frame, the engine may be removed complete with the transmission and sub-frame from underneath the car. This method of engine removal is detailed in Chapter H, Sub-frames and Suspension.

**Engine - To remove**

1. Drive the car onto a ramp.
2. Carry out the usual workshop safety precautions.
3. Chock both the front and rear road wheels.
4. Raise the bonnet and fit the wing covers (RH 2684) and liners (RH 2685).
5. Remove the bonnet (see Chapter S).
6. Drain the cooling system (see Chapter L).
7. Depressurise the hydraulic systems (see Chapter G).
8. Disconnect the battery leads.
9. Drain the engine oil (see Section E10).
10. Discharge the refrigeration system (see Chapter C).
11. Remove the radiator top hose and disconnect the bottom radiator hose from the engine. Blank the open connections.

If the engine is not to be replaced straight away, half-fill the radiator with coolant.

12. Remove the radiator header tank and the top half of the fan cowl (see Chapter L).
13. Position a sheet of thin foam rubber on the engine side of the radiator matrix.

14. Remove the viscous fan assembly from the coolant pump pulley (see Chapter L) and withdraw it upwards from the engine compartment.

15. Remove the air intake hose (see Chapter K). Blank the open connections.

16. Support the weight of the exhaust system at the front silencer/catalytic converter. Remove the exhaust system balance pipe and downtake pipes (see Chapter Q).

17. Disconnect and remove the exhaust gas recirculation (E.G.R.) feedpipe (if fitted).

18. Position a jack under the rear of the engine sump. Place a piece of wood between the head of the jack and the sump. Take the weight of the engine.

19. Remove the transmission (see Chapter T).

20. Remove the four nuts and bolts securing the engine rear mountings to the transmission adapter housing.

21. Remove the starter motor.

22. Remove the setscrews securing the transmission adapter housing to the engine and withdraw the housing.

23. Disconnect the fuel pipes (see Chapter K or U). Blank the open connections.

24. Disconnect the fuel evaporative and/or the weakener system hoses (see Chapter K or U).

25. Disconnect the accelerator linkage at the long rod and detach the isolator trapeze from the body.

26. Detach the pipes from the rear of the refrigeration compressor. Blank the open connections to prevent the ingress of dirt.

27. Temporarily clamp the two low pressure hydraulic hoses from the reservoirs to the pumps. Detach the hose from each pump and suitably blank the open connections. Secure each blank using the hose retaining clip. Release the clamp.

28. Disconnect the two high pressure hydraulic hoses that connect the accumulators to the body.

29. Temporarily clamp the two accumulators low pressure return to reservoir hoses. Detach the hoses and suitably blank the open ends. Secure each blank using the hose retaining clip. Release the clamp.

30. Disconnect the main battery lead to the starter. Free the clip that retains the cable to the starter solenoid.

31. Disconnect the starter motor to the body earth braid.

32. Using a syringe remove the oil from the steering pump. Disconnect the cooler to pump hose adjacent to the pump. Disconnect the pump to the steering unit hose at the steering unit.

33. Disconnect the two heater hoses situated below the alternator.

34. Locate the engine loom where it leaves the

## E12 - 2

engine at the rear of 'A' bank rocker cover. Trace along the loom and free it from the securing clips. Detach the engine loom from its connections below the right-hand blower motor, label each connection to assist identification.

On cars fitted with a fuel injection system detach the additional connection situated below the left-hand blower motor.

Ensure that all loom connections (including the transmission loom) are stored on the engine.

35. Detach the two earthing strips from the bonnet catches.
36. Position suitable slings around the front and rear of the engine. **Ensure that the front sling is not positioned under the front pulley or damper.**
37. Connect the slings to suitable lifting equipment and 'take the weight' of the engine.
38. Disconnect the engine front mounting.
39. Check to ensure that no wires, cables, pipes, etc., remain connected to the engine.
40. Carefully lift the engine upwards and slightly forwards checking to ensure that it does not foul any point of the engine compartment.
41. Continue to carefully lift the engine out of the vehicle. Once it is clear, lower it down onto a suitable stand and secure it in the upright position.

#### Engine - To fit

Fit the engine by reversing the procedure given for removal, noting the following.

1. When lowering the engine into position, ensure the flywheel assembly and rear of the engine do not become trapped against the rear crossmember of the front sub-frame.

Also ensure that the sump fits into the space between the steering rack pipes and the sub-frame.

2. With the engine front mounting setscrews slack,

adjust the position of the engine mounting stop plate so that there is a gap of 1,524 mm. (0.060 in.) between the bonded rubber strip on the stop plate and crossmember stop bracket (see Fig. E50). The stop plate has elongated holes to allow adjustment.

3. Connect all pipes, hoses and cables as described in the relevant chapters.
4. Fill all necessary systems with fluids as described in the relevant chapters.
5. Immediately the engine starts for the first time, inspect for obvious leaks. Whilst the engine is warming-up carry out a more detailed inspection of all pipes, hoses and joints for leaks.
6. After the engine is fully warmed-up check all fluid levels and correct as necessary.
7. Road test the vehicle and make any minor adjustments that are found necessary.

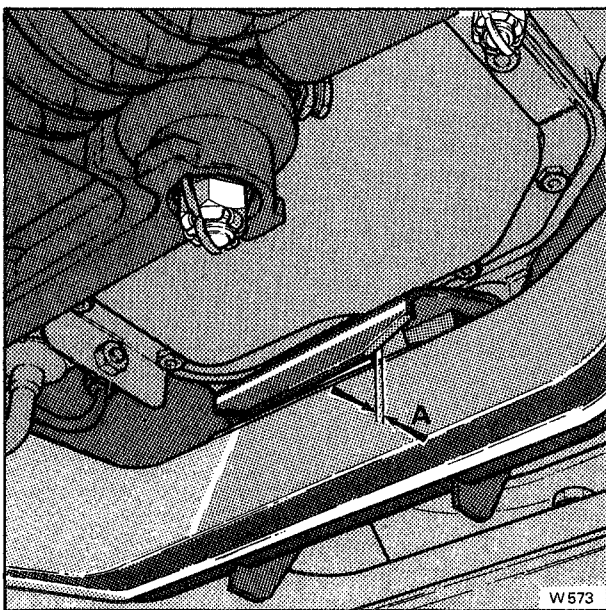


Fig. E50 Setting the stop plate gap  
A Stop plate gap