



Haynes
shows you how

[BMW 3-Series \(92-98\) & Z3 \(96-98\) Haynes Online Manual](#)

4 Engine - removal and installation

Four-cylinder engine

Note:

This is an involved operation. Read through the procedure thoroughly before starting work, and ensure that adequate lifting tackle and/or jacking/support equipment is available. Make notes during disassembly to ensure that all wiring/hoses and brackets are correctly repositioned and routed on installation.

Removal

1 Depressurize the fuel system (see [Chapter 4A](#)), then disconnect the battery negative lead. **Caution:** *If the radio in your vehicle is equipped with an anti-theft system, make sure you have the correct activation code before disconnecting the battery.*

2 Drain the cooling system and engine oil (see [Chapter 1](#)).

3 Remove the manual transmission (see [Chapter 7A](#)) or the automatic transmission (see [Chapter 7B](#)), as applicable.

4 Unless a hoist is available which is capable of lifting the engine out over the front of the vehicle with the vehicle raised, it will now be necessary to remove the axle stands and lower the vehicle to the ground. Ensure that the engine is adequately supported during the lowering procedure.

5 To improve access and working room, temporarily support the engine from underneath the oil pan, using a floor jack and interposed block of wood, then disconnect and withdraw the hoist and lifting tackle used to support the engine during transmission/transmission removal. **Warning:** *Ensure that the engine is securely and safely supported by the jack before disconnecting the lifting tackle.*

6 Remove the radiator (see [Chapter 3](#)).

7 Remove the ignition coil(s) (see [Chapter 5B](#)).

8 Remove the air cleaner/airflow meter assembly (see [Chapter 4A](#)).

9 If not already done, remove the heater/ventilation intake air ducting from the rear of the engine compartment as follows.

- A. Lift the grille from the top of the ducting (on certain coupe models, it will be necessary to remove the securing screws and lift off the complete cowl grille assembly).
- B. Working through the top of the ducting, remove the screws securing the cable ducting to the air ducting and move the cable ducting clear.
- C. Unscrew the nuts and/or screw(s) securing the air ducting to the firewall (where applicable, bend back the heat shielding for access).
- D. Remove the air ducting by pulling upwards.
- E. Move the previously removed cable ducting clear of the valve cover.

10 Remove the drivebelt with reference to [Chapter 1](#) .

11 Unbolt the power steering pump (see [Chapter 10](#)), and move it to one side, leaving the fluid lines connected.

12 Similarly, where applicable, unbolt the air conditioning compressor from the engine, and support it clear of the working area, (see [Chapter 3](#)). **Warning:** *Do not disconnect the refrigerant lines - refer to [Chapter 3](#) for precautions to be taken.*

13 Unbolt the power steering reservoir, and move the reservoir to one side, leaving the fluid lines connected.

14 Unbolt the ground lead(s) from the engine mounting bracket(s).

15 Remove the upper and lower sections of the intake manifold (see [Chapter 4A](#)).

16 Disconnect the heater coolant hoses from the heater pipe and the heater valve on the engine compartment firewall, then disconnect the hoses from the engine, and remove the coolant hose assembly. Note the hose routing to aid installation.

17 Disconnect the wiring from the following components:

- A. Alternator.
- B. Temperature sensors in left-hand side of cylinder head.
- C. Idle speed control valve (mounted on the left-hand side of the engine).
- D. Oil pressure warning light switch (located in the rear of the oil filter housing).
- E. Camshaft and crankshaft position sensors and knock sensors, as applicable (the wiring plugs are attached to a bracket on the left-hand side of the engine - make sure that the connectors are marked to ensure correct installation).

18 Check that all relevant wiring has been disconnected from the engine to enable engine removal.

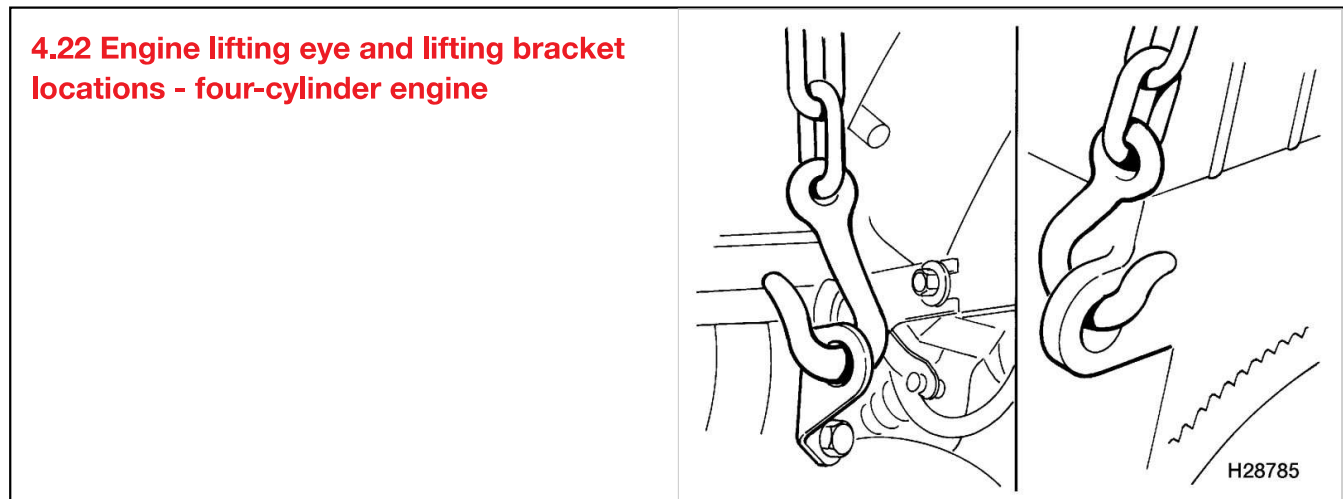
19 Unscrew the securing bolts, and release any clips (noting their locations) and release the wiring harness/wiring ducting assembly from the engine. Note the routing of all wiring, and note the locations of the

brackets to ensure correct installation (note that the oxygen sensor and back-up light switch wiring also forms part of the engine harness). Move the assembly to one side, clear of the engine.

20 Make a final check to ensure that all relevant hoses, pipes and wiring have been disconnected from the engine and moved clear to allow the engine to be lifted out.

21 Install the front intake manifold support bracket (which incorporates the engine lifting bracket - the bracket was removed during the manifold removal procedure) to the cylinder head, and tighten the securing bolts.

22 Reposition the lifting tackle and hoist to support the engine both from the lifting eye at the rear left-hand corner of the cylinder block, and from the lifting bracket at the front of the cylinder head (see illustration) . Raise the hoist to just take the weight of the engine.



23 Unscrew the nuts securing the left- and right-hand engine mounting brackets to the mounting rubbers, then unbolt the mounting brackets from the cylinder block, and remove the mountings.

24 With the aid of an assistant, raise the hoist, and lift the engine from the engine compartment.

Installation

25 Installation is a reversal of removal, bearing in mind the following points.

- A. Tighten all fasteners to the specified torque.
- B. Ensure that all wiring, hoses and brackets are positioned and routed as noted before removal.
- C. Install the drivebelt with reference to [Chapter 1](#) .
- D. Install the lower and upper sections of the intake manifold (see [Chapter 4A](#)).
- E. Install the radiator (see [Chapter 3](#)).
- F. Install the manual transmission or automatic transmission (see [Chapter 7A](#) or [7B](#) respectively).
- G. On completion, refill the engine with oil, and refill the cooling system (see [Chapter 1](#)).

Six-cylinder engine

Note:

This is an involved operation. Read through the procedure thoroughly before starting work, and ensure that adequate lifting tackle and/or jacking/support equipment is available. Make notes during disassembly to ensure that all wiring/hoses and brackets are correctly repositioned and routed on installation.

Removal

26 Follow the procedure outlined in steps 1 through 7.

27 Remove the engine oil filler cap.

28 Remove the plastic cover from the top of the valve cover. To remove the cover, pry out the cover plates and unscrew the two securing nuts, then lift and pull the cover forwards. Manipulate the cover over the oil filler neck.

29 Unbolt the ground lead from the left-hand corner of the upper timing chain cover, and where applicable, unbolt the ground strap from the rear of the valve cover.

30 Release the locking clips, and disconnect the wiring connectors from the ignition coils. Recover the rubber seals if they are loose.

31 Release the spark plug wires from the clips on the valve cover, then move the complete ducting/spark plug wire assembly to one side, clear of the engine.

32 Disconnect the coolant hose from the rear of the coolant pump housing, then disconnect the hose from the heater matrix pipe on the engine compartment firewall, and remove the coolant hose assembly. Note the hose routing to aid installation (see illustrations) .

4.32a Disconnecting the coolant hose from the coolant pump housing - six-cylinder engine

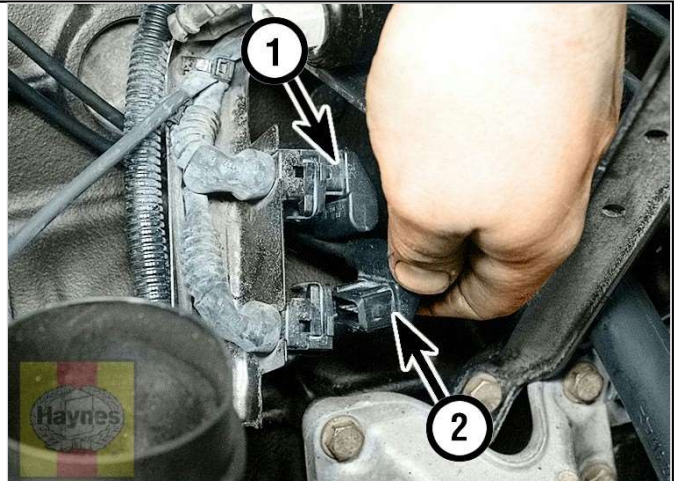


4.32b Removing the coolant hose assembly - six-cylinder engine



33 Disconnect the wiring from the following components (see illustration) :

4.33 Disconnecting the camshaft (1) and crankshaft (2) position sensor wiring plugs - six-cylinder engine



- A. Alternator.
- B. Temperature sensors in left-hand side of cylinder head.
- C. Idle speed control valve (mounted on a bracket on the left-hand side of the engine).
- D. Oil pressure warning light switch (located in the rear of the oil filter housing).
- E. Camshaft and crankshaft position sensors and knock sensors, as applicable (the wiring plugs are attached to a bracket on the left-hand side of the engine - make sure that the connectors are marked to ensure correct installation).
- F. VANOS solenoid valve (where applicable).

34 Check that all relevant wiring has been disconnected from the engine to enable engine removal.

35 Unscrew the securing bolts, and release any clips (noting their locations) and release the wiring harness/wiring ducting assembly, complete with the idle speed control valve and mounting bracket, from the engine. Note the routing of all wiring, and note the locations of the brackets to ensure correct installation (note that the oxygen sensor and back-up light switch wiring also forms part of the engine harness). Move the assembly to one side, clear of the engine.

36 Follow the procedure outlined in steps 9 through 13.

37 Unbolt the intake manifold support brackets from the engine, noting their locations to ensure correct installation.

38 Unbolt the fuel filter bracket/dipstick tube assembly from the engine, then pull the dipstick tube from the cylinder block. Separate the dipstick tube and the fuel filter bracket, then remove the dipstick tube. Move the fuel filter/bracket assembly to one side, clear of the engine (see illustration) .

4.38 Fuel filter bracket/dipstick tube assembly securing bolts (arrows) - six-cylinder engine



39 Follow the procedure outlined in steps 20 through 24 (see illustration) .

4.39 Lifting a six-cylinder engine from the vehicle



Installation

40 Installation is a reversal of removal, bearing in mind the following points.

- A. Tighten all fasteners to the specified torque.
- B. Ensure that all wiring, hoses and brackets are positioned and routed as noted before removal.
- C. Install the drivebelt with reference to [Chapter 1](#) .

D. Install the radiator (see [Chapter 3](#)).

E. Install the manual transmission or automatic transmission (see Chapter [7A](#) or [7B](#) respectively).

F. On completion, refill the engine with oil, and refill the cooling system (see [Chapter 1](#)).

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