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BMW 3-Series and Z4 (99-05) Includes 2006 325ci/330ci Coupe and Convertible models Haynes Online Manual.

5 Engine management system components - removal and installation

Electronic control module (ECM)

1 Disconnect the cable from the negative battery terminal (see [Chapter 5, Section 1](#)). **Note:** *Disconnecting the battery will erase any fault codes stored in the ECM. Any stored codes should be retrieved before the battery is disconnected. Entrust this task to a BMW dealer or suitably equipped specialist.*

2 Working in the left-hand corner of the engine compartment, loosen the fasteners and remove the cover from the electrical box (see illustration) .

5.2 Loosen the screws and remove the electrical box cover



3 Disconnect the module wiring connectors and remove it from the box (see illustration) .

5.3 The ECM module (A) and one of the electrical connectors (B)



4 Installation is a reversal of removal. **Note:** *If a new module has been installed, it will need to be coded using special test equipment. Entrust this task to a BMW dealer or suitably equipped specialist.* After reconnecting the battery, the vehicle must be driven for several miles under various conditions so that the ECM can learn its basic settings. If the engine runs erratically after being driven, service by a BMW dealer or specialist (using specialized equipment) will be required to reinstate the settings.

Mass airflow sensor (MAF)

M52TU engines

Note:

A new airflow sensor seal may be required on installation.

5 Ensure the ignition is turned off, and disconnect the wiring connector from the sensor (see illustration 5.8).

6 Pull the vacuum hose from the intake ducting, release the retaining clips, and remove the sensor complete with the intake ducting. Recover the seal.

7 Installation is a reversal of removal, but check the condition of the seal and replace if necessary.

M54 and M56 engines

Note:

A new airflow sensor seal may be required on installation.

Note:

The M56 engine also utilizes a mass airflow sensor on the air duct to the secondary air injection pump.

8 Ensure the ignition is turned off, and disconnect the wiring connector from the sensor (see illustration) .

5.8 Mass airflow sensor



9 Release the retaining clips and detach the intake ducting from the sensor, and the sensor from the air cleaner housing. Recover the seal.

10 Installation is a reversal of removal, but check the condition of the seal and replace if necessary.

Throttle position sensor (TPS)

11 The throttle position sensor is integral with the throttle body and cannot be replaced individually. Remove the throttle body as described in [Chapter 4](#).

12 Note that if a new throttle body/position sensor has been installed, it is likely that values in the engine management ECM may need to be cleared and reset. If you don't have a specialized scan tool to clear values, seek assistance from a BMW dealer or suitably equipped specialist. Once cleared, new values will be "learned" as the engine is started and used.

Coolant temperature sensor (ECT)

Warning:

The engine must be completely cool before performing this procedure.

13 The sensor is located in the left side of the cylinder head under the intake manifold. Partially drain the cooling system as described in [Chapter 1](#), and remove the intake manifold, as described in [Chapter 4](#).

14 Disconnect the sensor wiring connector, and unscrew it from the cylinder head.

15 Installation is a reversal of removal. Tighten the sensor to the torque listed in [this Chapter's Specifications](#), and top up the coolant as described in [Chapter 1](#).

Crankshaft position sensor (CKP)

M52TU engines

16 Raise the front of the vehicle and support it securely on jackstands. Remove the screws and remove the engine splash shield.

17 The sensor is located below the starter motor. Disconnect the sensor wiring connector, unscrew the retaining screw and remove the sensor. Recover the seal.

18 Installation is a reversal of removal. Check the condition of the seal and replace if necessary.

M54 and M56 engines

19 Raise the front of the vehicle and support it securely on jackstands. Remove the screws and remove the engine splash shield.

20 Unscrew the bolts and remove the reinforcement plate from between the lower control arms (see [Chapter 2A, Section 12](#)). Note that new bolts will be needed upon installation.

21 The sensor is located under the starter motor. Disconnect the sensor wiring connector, remove the fastener and remove the sensor. Recover the seal.

22 Installation is a reversal of removal. Tighten the fastener to the torque listed in [this Chapter's Specifications](#), use new bolts when installing the front axle reinforcement plate, and tighten the reinforcement plate bolts to the torque listed in the [Chapter 2A Specifications](#).

Camshaft position sensors (CMP)

Intake camshaft

23 Ensure the ignition is turned off, and remove the air cleaner housing as described in [Section 2](#).

24 Disconnect the wiring connector, then unscrew the VANOS (variable valve timing system) solenoid valve to access the sensor (see illustration).

5.24 Unscrew the VANOS solenoid



25 Trace the wiring back from the sensor, and disconnect the wiring connector where it clips to the cable ducting behind the alternator.

26 Remove the retaining fastener and pull the sensor from the cylinder head (see illustration) . Recover the seal.

5.26 Remove the screw and pull out the camshaft position sensor



Exhaust camshaft

27 Ensure the ignition is switched off.

28 Disconnect the sensor wiring connector (see illustration) , remove the retaining fastener and remove the sensor. Recover the seal.

5.28 Disconnect the exhaust camshaft sensor wiring connector



29 Installation is a reversal of removal. Check the condition of the seal and replace it if necessary.

Oxygen sensor (HO2S)

Note:

Ensure that the exhaust system is cool before attempting to remove the oxygen sensor.

30 The oxygen sensors are located at the front exhaust down pipes before and after the catalytic converters.

31 Ensure the ignition is switched off.

32 Apply the parking brake, then raise the front of the vehicle and support it securely on jackstands. Remove the screws and remove the engine splash shield.

Note:

Due to limited access, if the sensor for cylinders 4 to 6 is to be removed, the complete exhaust system must be removed.

33 To allow sufficient clearance, remove the heater/ventilation inlet air ducting from the rear of the engine compartment as follows.

- A. Rotate the three fasteners 90° counterclockwise and remove the cabin filter cover from the rear of the engine compartment. Pull the filter forward and remove it.
- B. Detach the four retaining clips and thread the cable out of the ducting (see illustration 3.7a).
- C. Unscrew the four screws and pull the filter housing forwards and remove it.
- D. Pull up the rubber strip, rotate the two fasteners counterclockwise, and move the dividing panel in the left-hand corner of the engine compartment forward a little.
- E. Unscrew the two screws and remove the inlet ducting upwards and out of the engine compartment (see illustration 3.7b).

34 Pry out the plastic caps, remove the two screws, and remove the plastic cover from over the injectors.

35 Unclip the oxygen sensor cables from the retainer, and disconnect the wiring connectors. Label the connectors to ensure they are installed to their original locations (see illustration) .

5.35 Mark or label the oxygen sensor wiring connector



36 Remove the exhaust manifolds as described in [Chapter 4](#) .

37 Using a oxygen sensor removal socket, unscrew the sensor and remove it from the exhaust pipe.

38 Installation is a reverse of the removal procedure, noting the following points:

- A. Tighten the sensor to the torque listed in [this Chapter's Specifications](#) .
- B. Check that the wiring is correctly routed, and in no danger of contacting the exhaust system.
- C. Ensure that no lubricant or dirt comes into contact with the sensor probe.
- D. Apply a small amount of copper based, high temperature anti-seize grease to the sensor threads prior to installation.

Idle speed control valve

39 Disconnect the cable from the negative battery terminal (see [Chapter 5, Section 1](#)).

40 The idle speed control valve is located below the intake manifold, and above the throttle body.

41 Remove the air cleaner housing as described in [Section 2](#) .

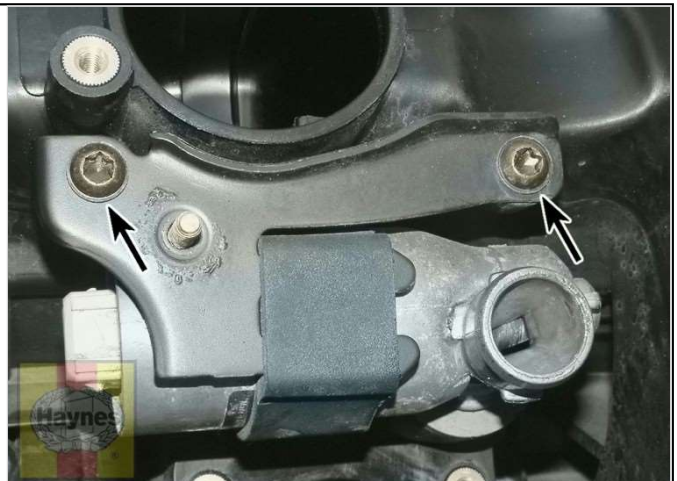
42 Pull the throttle cable outer (if equipped) from the support bracket on the throttle body.

43 Loosen the two clamps and disconnect the intake ducting from the throttle body and idle speed control valve.

44 Disconnect the wiring connectors from the idle speed control valve and the manifold resonance flap actuator solenoid valve.

45 Remove the nut securing the cable support bracket, and the two screws securing the idle speed control valve bracket. Maneuver the valve from the manifold (see illustration) . Discard the seal between the valve and the manifold - a new one must be installed.

5.45 Idle speed control valve mounting screws



46 Apply a small amount of grease to the new seal and install it to the intake manifold. Push the idle speed control valve into place and securely tighten the bracket retaining screws/nuts.

47 The remainder of installation is a reversal of removal.

Fuel pump relay

48 Disconnect the cable from the negative battery terminal (see [Chapter 5, Section 1](#)).

49 Remove the passenger side glove box, as described in [Chapter 11](#) .

50 Insert a flat-bladed screwdriver into the slot in the end of the glove box light and carefully pry it from place. Disconnect the wiring connector as the light is withdrawn.

51 Remove the five screws, release the expanding rivet and remove the glove box frame from the dash (see [Chapter 11](#) if necessary).

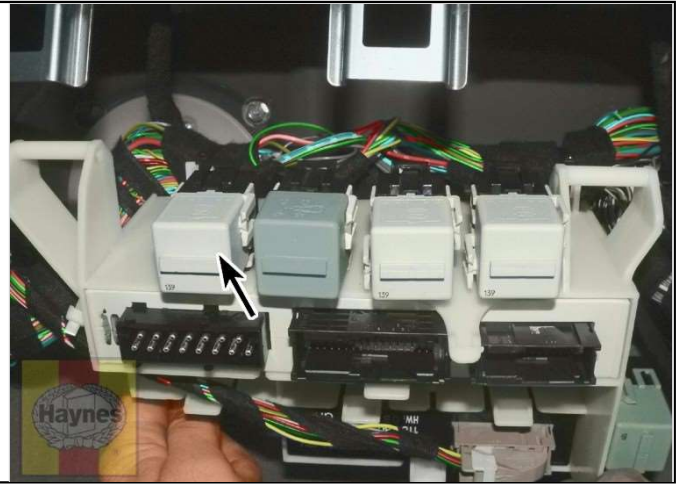
52 Undo the locking levers, and disconnect the wiring connectors from the general control module (see [illustration](#)) .

5.52 Disconnect the general control module wiring connectors



53 Pull the fuel pump relay from the relay plate (see [illustration](#)) .

5.53 Fuel pump relay



54 Installation is a reversal of removal.

Main engine management relay

55 Ensure the ignition is switched off.

56 Working in the left-hand corner of the engine compartment, loosen the four screws, and remove the cover from the electrical box (see illustration 5.2) .

57 Pull the relay from the relay socket (see illustration) .

5.57 Engine management relay



58 Installation is a reversal of removal.

Intake manifold differential pressure sensor

59 Ensure the ignition is switched off, undo the two nuts, lift the front edge, and pull the plastic engine cover to the front and remove it.

60 Disconnect the wiring connector, undo the screws and remove the sensor from the manifold (see illustration) .

5.60 Unscrew the two screws and remove the differential pressure sensor



61 Installation is a reversal of removal.

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