

11 Engine

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| Engine | M70 |
| Engine | M60 |
| Engine | M73 |

11 Engine M70

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| | General information | 11- 0/1 |
| 11 00 039 | Cylinder compression – check | 11- 0/1 |
| 00 00 249 | BMW engine oil service | 11- 0/2 |
| 11 00 050 | Engine – remove and install | 11- 0/3 |
| 11 12 002 | Cylinder head cover, right or left – remove and install/seal | 11-12/1 |
| 105 | Cylinder head, left – remove and install | 11-12/1 |
| 11 13 010 | Oil pan, upper section – remove and install or replace | 11-13/1 |
| 11 14 102 | Timing gear, upper section – remove and install, seal or replace | 11-14/1 |
| 110 | Timing gear cover, lower section – remove and install, seal or replace | 11-14/1 |
| 115 | Timing gear, lower section – remove and install, seal or replace | 11-14/2 |
| 11 22 000 | Flywheel – replace | 11-22/1 |
| 11 23 031 | Vibration damper hub – replace | 11-23/1 |
| 11 28 010 | Alternator drive belt – replace | 11-28/1 |
| 11 31 002 | Camshaft, left or right – replace | 11-31/1 |
| 051 | Timing chain – replace | 11-31/1 |
| 11 33 062 | All hydraulic valve clearance compensation elements – replace | 11-33/1 |
| 11 51 000 | Water pump – remove and install or replace | 11-51/1 |
| 11 53 000 | Coolant thermostat – remove and install or replace | 11-53/1 |
| 11 61 056 | Sealing flange for air intake manifold, left or right – replace | 11-61/1 |
| 11 62 145 | All exhaust manifolds – remove and install or replace | 11-62/1 |

For additional work, refer to “Construction Group Repair Instructions”

General Information

M70

Cylinder configuration:

Cylinders 1 ... 6, viewed in direction of travel, are arranged on the right side of the vehicle, starting with cylinder 1.

Cylinders 7 ... 12, viewed in direction of travel, are arranged on the left side of the vehicle, starting with cylinder 7.

Air manifold, throttle body and air filter with mass air flow sensor for each cylinder bank are arranged on the opposite side to their respective bank.

The operations described apply to both cylinder banks: if special explanations are required, the procedures for each cylinder bank are described separately.

General instructions for operations on valve timing:

If operations on the cylinder head are performed where the camshaft was removed, please note the following:

The hydraulic valve tappets expand without load being applied by the camshaft and, after installation, require some time before they compress back down. This means that, if parts are assembled in rapid sequence, even the "closed" valves may still be open and in direct contact with the piston.

Note the following wait periods between installation of the camshaft and mounting of the cylinder head:

| | |
|---------------------------|----------|
| ambient temperature 20° C | 4 mins. |
| 10° C - 20° C | 11 mins. |
| 0° C - 10° C | 30 mins. |

After assembly of the camshaft and the timing chain, wait for the following periods before turning the engine crankshaft:

| | |
|---------------------------|----------------|
| ambient temperature 20° C | after 10 mins. |
| 10° C - 20° C | after 30 mins. |
| 0° C - 10° C | after 75 mins. |

General instructions for work involving the gaskets:

Apply a bead of cement to all contact points and a thin, even coat of Hylomar SQ 32M** to determine the location of the gaskets.

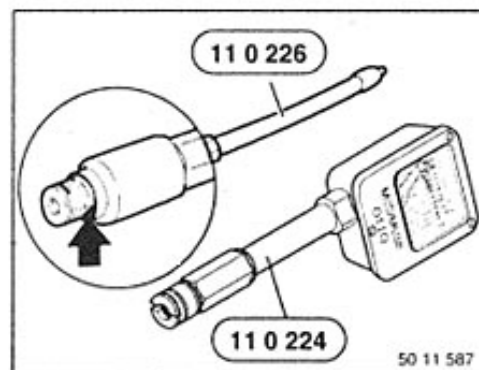
** Refer to BMW Parts Service

11 00 039 Checking compression of all cylinders (M70)

Caution!

High voltage – danger of death!
Disconnect power supply from ignition coils.
Disconnect fuel pump relay and DME main relay.

Note instructions on compression check, refer to General Data MG12



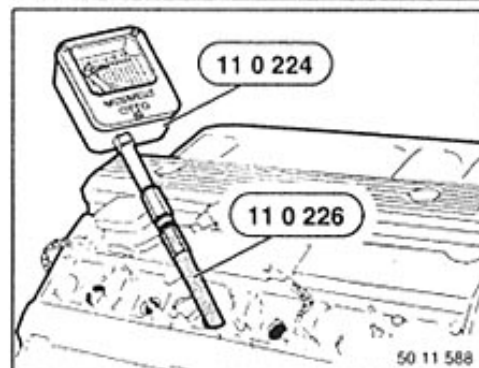
Removing all spark plugs, refer to 12 12 011

Insert special tool 11 0 226 in spark plug thread by hand.

Note:

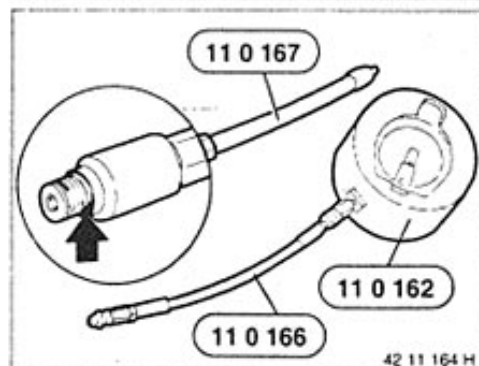
Check condition of seal and replace if necessary.

Connect up special tool 11 0 224 (compression tester).



Depress accelerator and actuate starter until compression stops rising.

Compression pressure

**Note:**

special tool 11 0 162 / 166 / 167 can still be re-used.

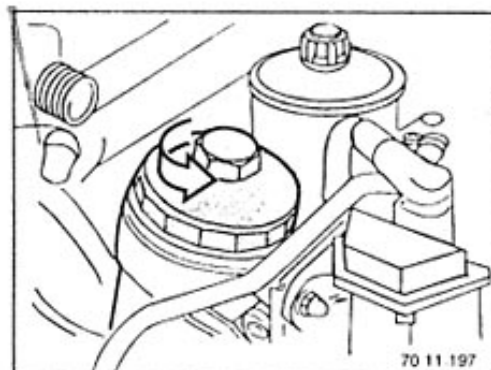
Refer to Technical Data

00 00 249 BMW engine oil service

M70

(change engine oil and oil filter)

The oil change should be performed at operating temperature.

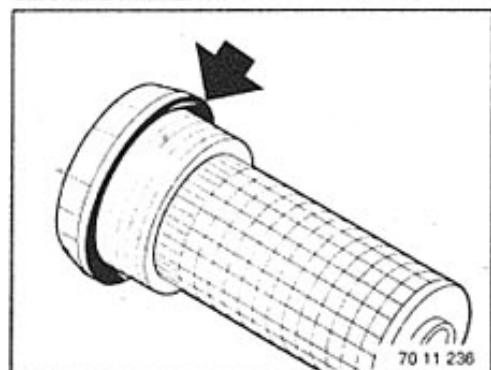


Drain oil from oil filter into oil pan by opening the oil filter cover.



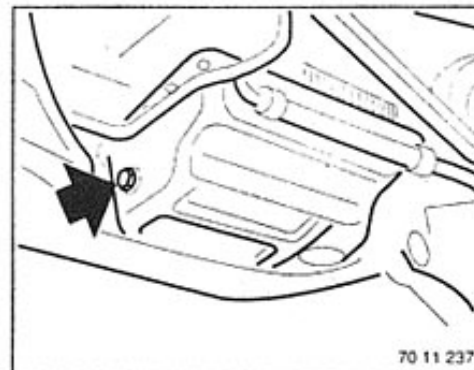
Remove oil filter from oil filter cover.

Installation:
Note installation direction of filter.
Filter must locate in cover.



Installation:
Replace O-ring in oil filter cover.
Tightening torque 11 42 2AZ*

* Refer to Technical Data



Once oil filter housing has been drained, open oil drain plug.
Drain or draw off the oil.

Installation:
Fit a new seal.
Tightening torque 11 13 1AZ*

Fill with engine oil

Switch on engine and run at idle speed until oil indicator lamp goes out.

Switch off engine and check oil level (vehicle on level ground).
Engine oil grades **

* Refer to Technical Data
** Refer to BMW Operating Fluids

11 00 050 Removing and installing engine

M70

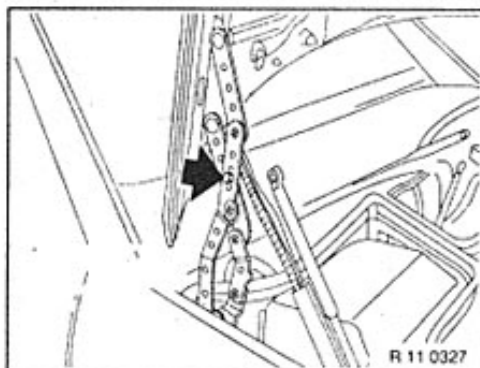
Remove radiator and expansion tank, refer to 17 11 500.



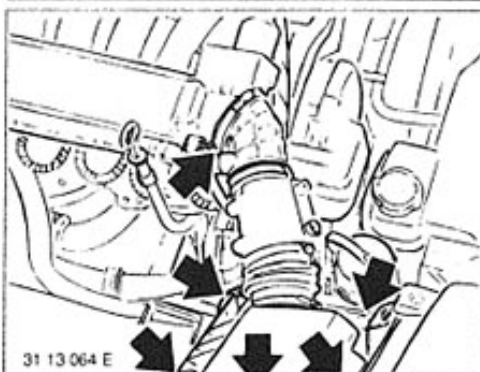
Remove transmission, refer to 23 00 025, 24 00 026.

Caution!

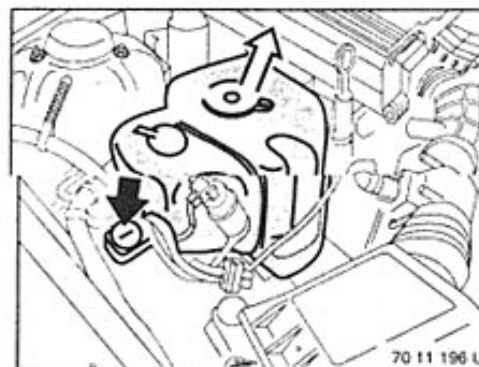
To prevent damage to the heating connections, special tool 00 0 200 or special tool 11 0 010 used for removal of transmission must remain in place until engine is attached to special tool 11 0 100.



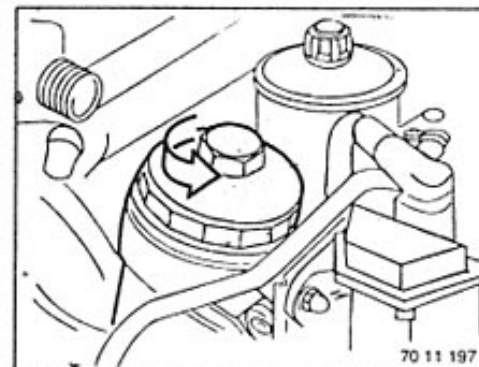
Lift engine hood into assembly position. Disconnect damper strut on engine hood, completely open engine hood and secure with one screw on each side (left and right).



Remove complete mass air flow sensor with suction gaiter and upper section of filter from left and right sides.

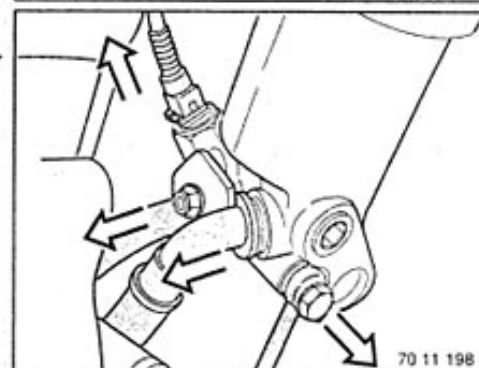


Remove windshield wash container and place to one side.

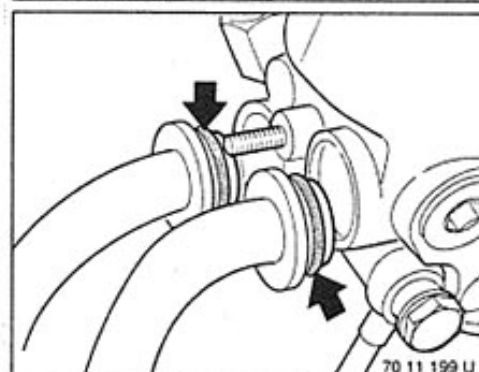


Drain oil from oil filter into the oil pan by opening the oil filter cover.

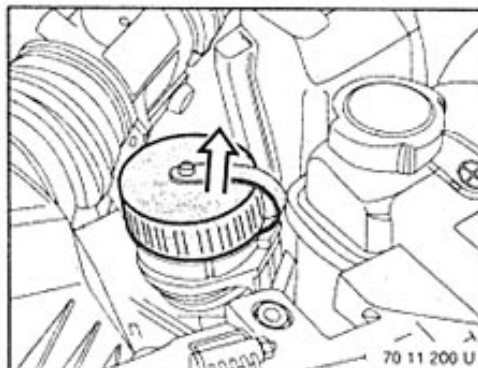
Installation:
Fit new gasket.



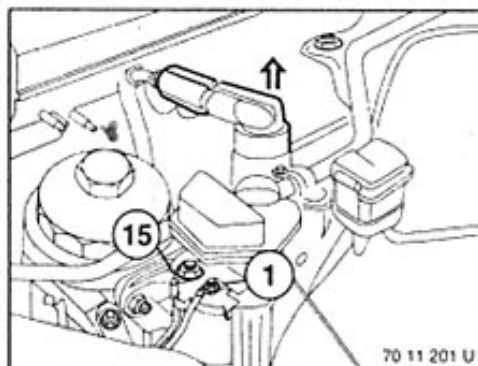
Disconnect oil lines from oil filter. Remove connector.



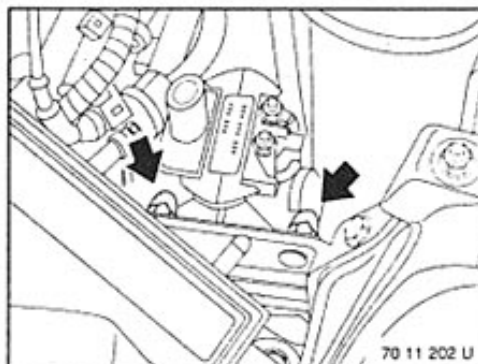
Installation:
Fit new seals.



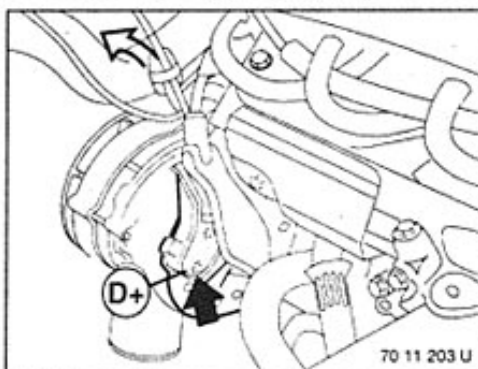
Unclip diagnostic plug.



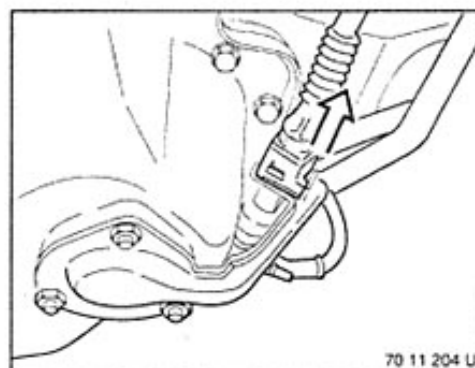
Disconnect ignition leads and connections on left and right ignition coils.



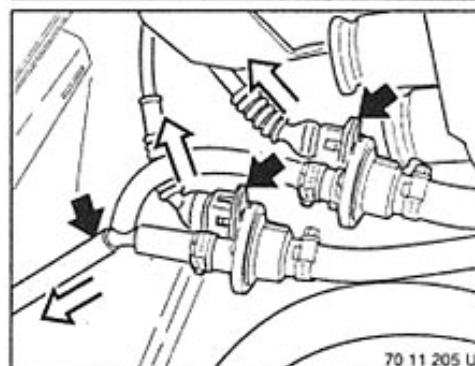
Unscrew right ignition coil.



Unscrew lead for D+ (thin lead) on the alternator and pull out of rubber cap.

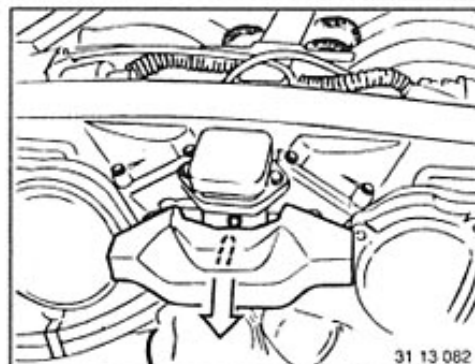


Disconnect oil level sender plug.

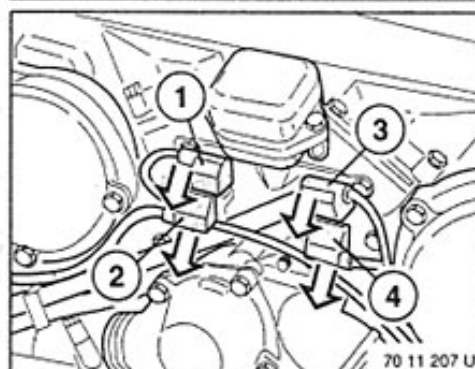


Pull both plugs off of tank venting valves.
Disconnect hose.

Important!
Don't mix up plugs.



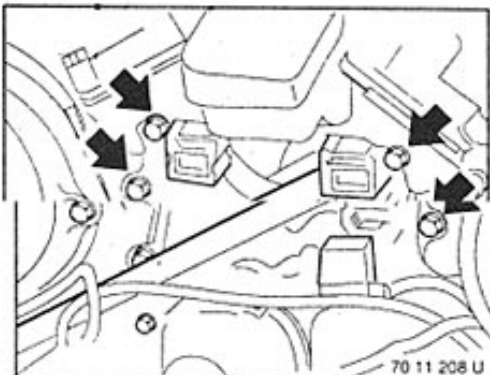
Pull off oil catching tray



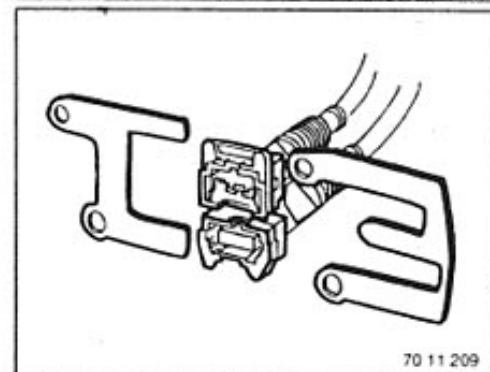
Pull off plugs (1 ... 4).

Installation:

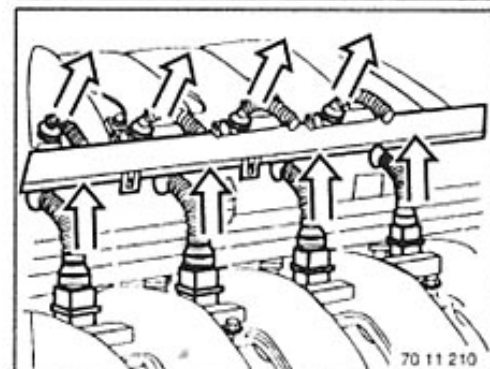
| | |
|---------------------|---------------|
| 1 = Pulse sender | Cyl. 1 ... 6 |
| 2 = Cyl. Identifier | Cyl. 1 ... 6 |
| 3 = Cyl. Identifier | Cyl. 7 ... 12 |
| 4 = Pulse sender | Cyl. 7 ... 12 |



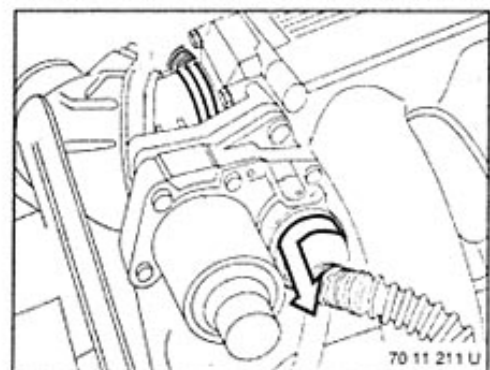
Unscrew bracket.



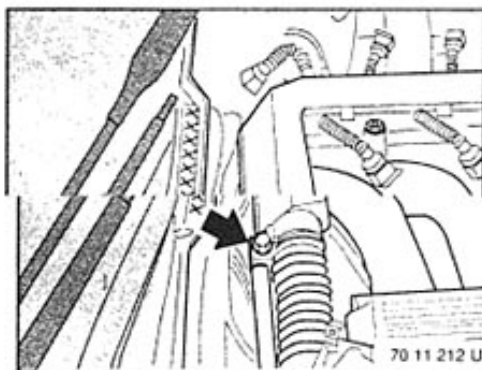
Pull plugs out of holders.



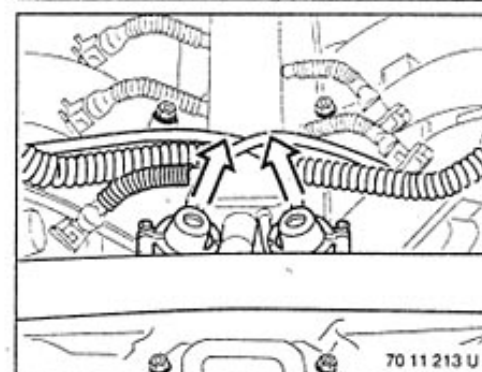
Pull plugs off of fuel injectors.



Disconnect plugs on left and right throttle valve assemblies.

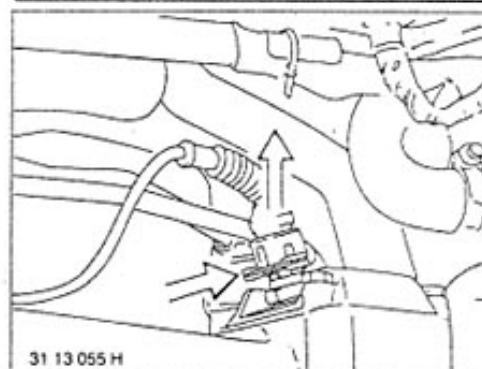


Unscrew electric lead duct on rear end of engine.

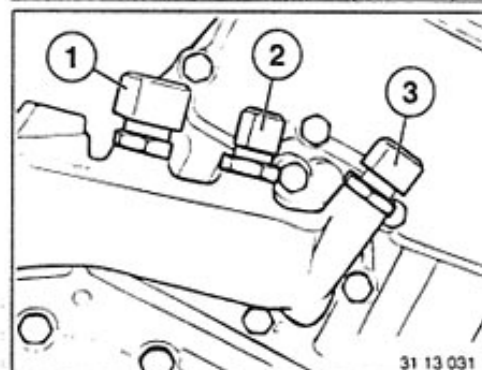


Pull vacuum hoses off of pressure regulators.

Installation:
Note arrangement of hoses.



Pull off both plugs on air intake manifold.



Pull off plugs on temperature sensors on rear end of engine.