11 00 039 Checking compression of all cylinders (N57)

Special tools required:

- 11 0 235
- 11 8 880

Necessary preliminary work:

- Remove all glow elements.

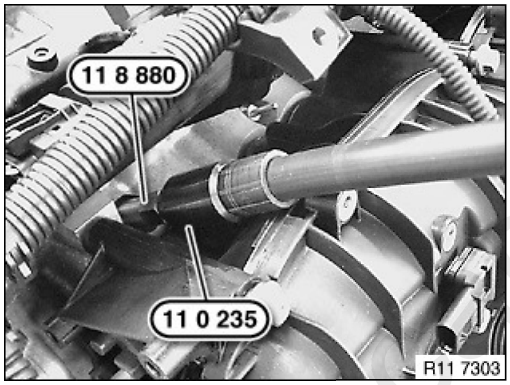
Warning!

On vehicles with manual gearbox:

There must be no drive position engaged during the starting operation.

Important!

To prevent the injection system from injecting, it is necessary to disconnect the injection system plug connections.



Screw in special tools 11 8 880 and 11 0 235 .*Note:*
The compression check on all cylinders must have a constant battery voltage. If necessary, connect an auxiliary battery.

The number of engine revolutions must be the same for each cylinder during the compression check (the measuring result could be distorted).

Compression pressure.

Assemble engine.

Clear DDE fault memory.

Check function of DDE.

00 Danger of injury if oil comes into contact with eyes and skin



Danger of injury!

Contact with eyes or skin may result in injury!

Possible symptoms are:

- Impaired sight
- Irritation of the eyes
- Reddening of the skin
- Rough and cracked skin



Protective measures/rules of conduct:

- Wear safety goggles.
- Wear oil-resistant protective gloves.
- Observe country-specific safety regulations.



First aid measures:

- Eye contact: Immediately flush eyes with lots of water for at least 15 minutes. In the case that it is available, use an eye wash bottle. If eye irritation persists, consult a doctor.
- Skin contact: Wash off with soap and water immediately. If irritation persists, consult a doctor.

  Note: Do not use solvents/thinners.

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00 Danger of poisoning if oil is ingested/absorbed through the skin



Danger of poisoning!

Ingesting oil or absorbing through the skin may cause poisoning!

Possible symptoms are:

- Headaches
- Dizziness
- Stomach aches
- Vomiting
- Diarrhoea
- Cramps/fits
- Unconsciousness



Protective measures/rules of conduct:

- Fill oil in appropriately marked containers only.
- Do not fill oil in containers meant for drinking out of. (bottles for beverages, glasses or cups)
- Observe country-specific safety regulations.



First aid measures:

- Do not induce vomiting.

  If the person affected is still conscious, he/she must rinse out their mouth with water, drink plenty of water and consult a doctor immediately.

  Do not administer anything to an unconscious person via their mouth; place them in a stable position on their side. Call the emergency doctor immediately.

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11 00 000 Differences among engine block versions (N57TÜ)

Engine generation = N57

Distinguishing features:

Lengthwise = **D**

Displacement = **3.0 l**

Power stage = **S** /T /O / U

S= Top power stage (3 exhaust turbocharger).

T= Top power stage (2 exhaust turbocharger).

O = Upper power stage.

U= Lower power stage.

Expansion stage = **1 (TU)** (first technical update)

Expansion stage = **2 (TU)** (second technical update)

	Power in kilowatts (KW)	Displacement in litres			
N57 D30 S1	280 KW	3 l			
N57 D30 T1	230 KW	3 l			
N57 D30 O1	190 KW	3 l			
N57 D30 U1	%	3 l			

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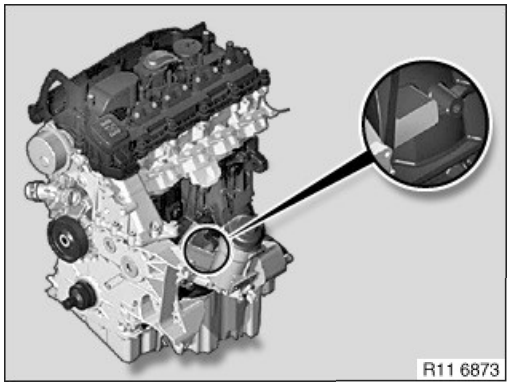
Engine identification

Engine number at the marked surface.

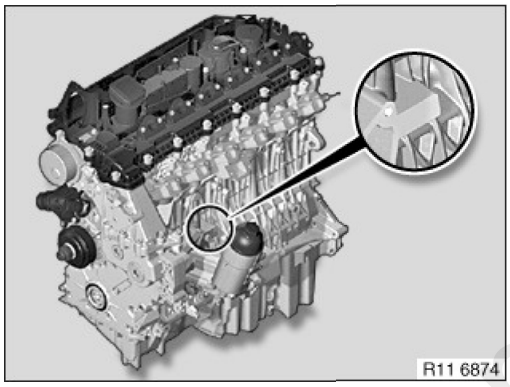
Replacement drives are already assigned a number containing the identification and engine number at the factory.

The old drive number must be imprinted for replacement crankcases.

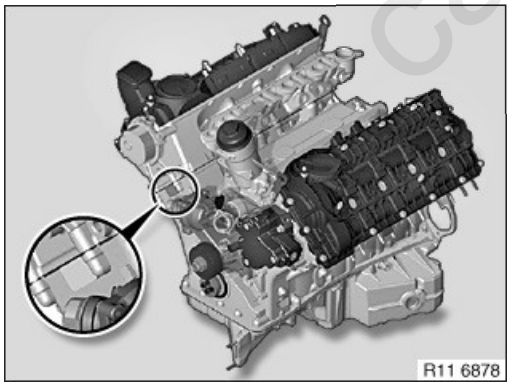
Magnesium crank cases feature a label, the engine number does not need to be embossed.



M47 / M47TU / M47T2

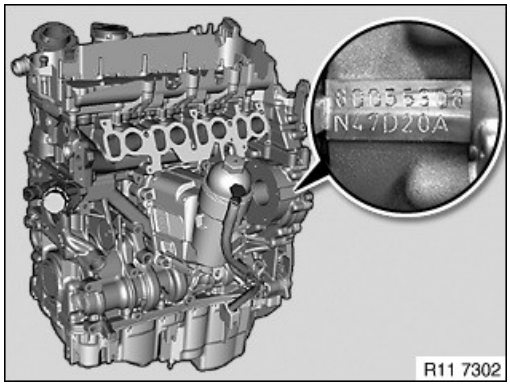


M57 / M57TU / M57T2

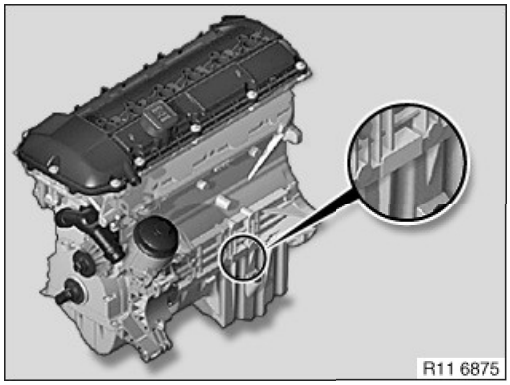


M67 / M67TU

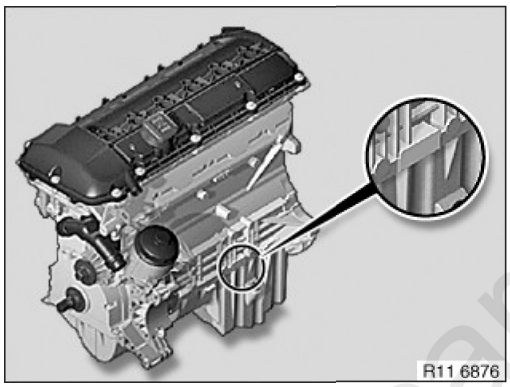
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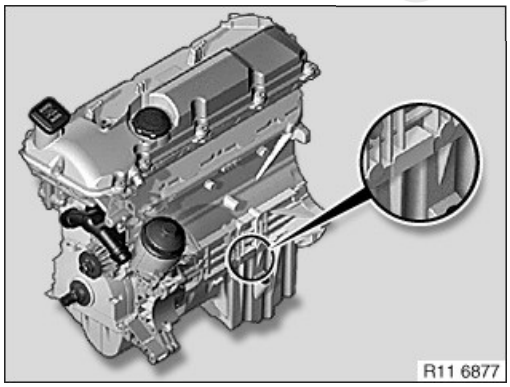
N47 / N47S / N47C / N47T / N57 / N57S / N57T



M52 / M52TU

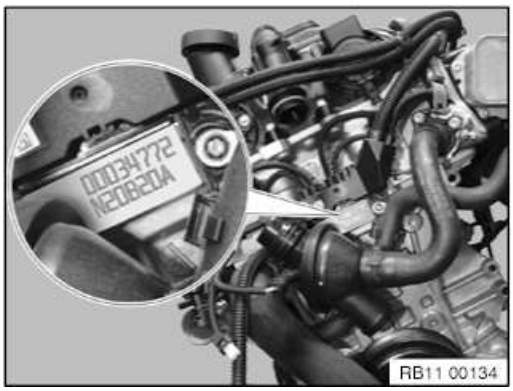


M54

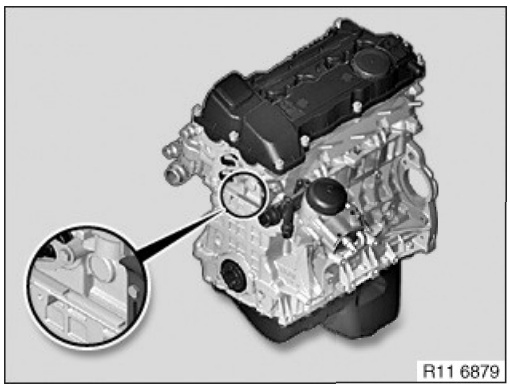


M56

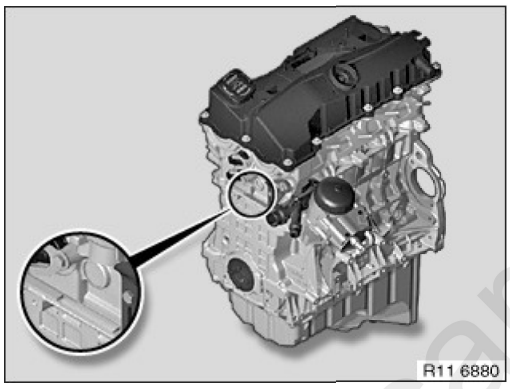
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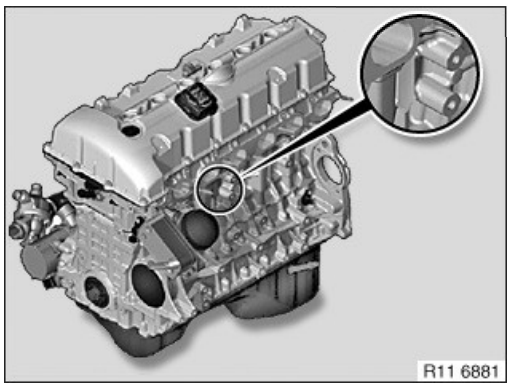
N20 / N26



N40 / N45 / N45T / N43

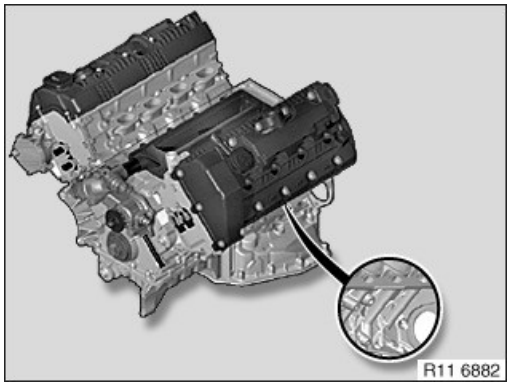


N42 / N46 / N46T

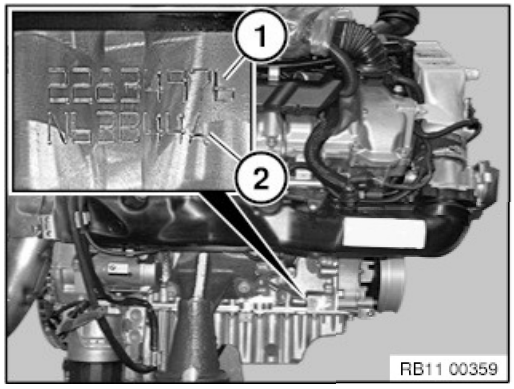


N51 / N52 / N52K / N52T / N53 / N54 / N55

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N62 / N62TU



Position (1) engine number.

PositionÂ (2) engine code letters.

N63, N63O1. N63O2

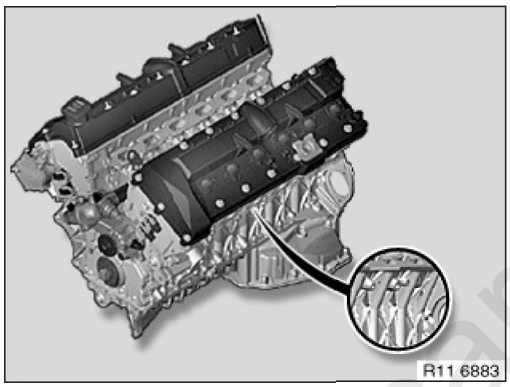
S63

N74, N74O1,

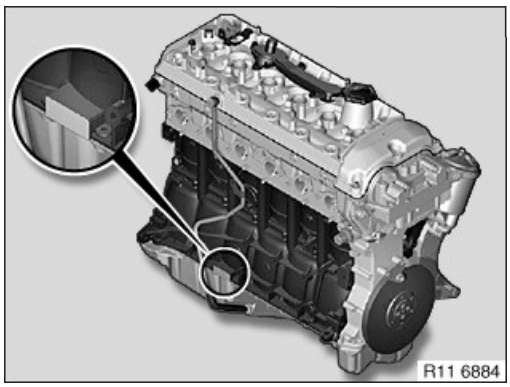
S63T0 to engine number 2001 0052 on right side cyl. 1-4.

S63T0 from engine number 2001 0053 on left side cyl.l 5-8.

E72 Vehicles must be imprinted on the left side cyl. 5-8.

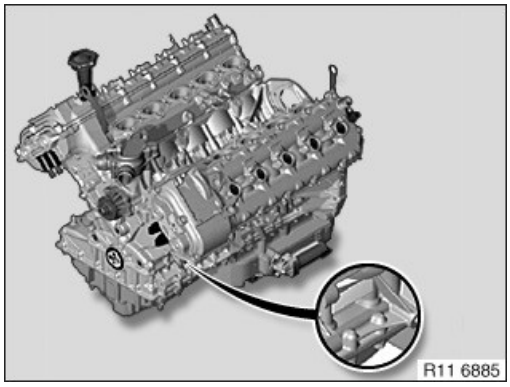


N73



S54

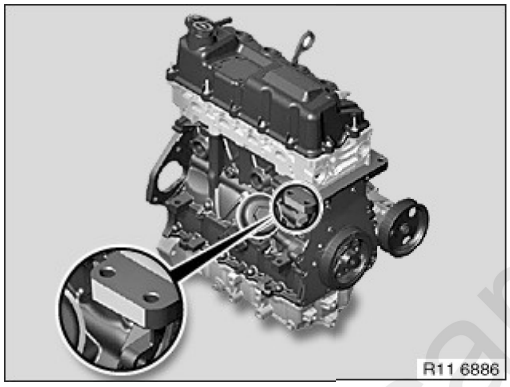
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S85 / S65



S55

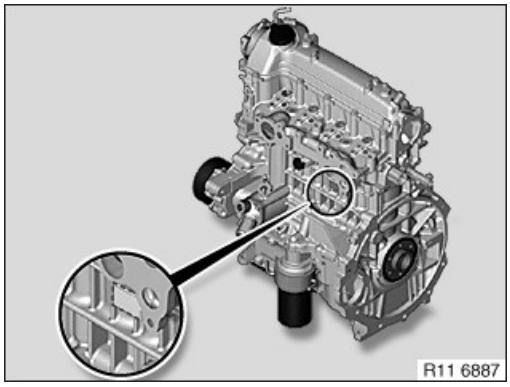


W10 / W11



W16

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W17



W20

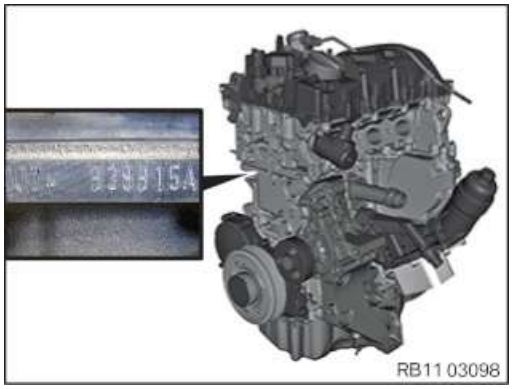


N12 / N13 / N14 / N16 / N18

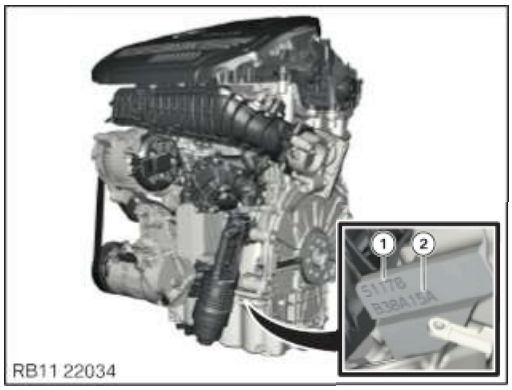


B37 / B38**A** / B47 / B48**A**
in the area of the oil sump

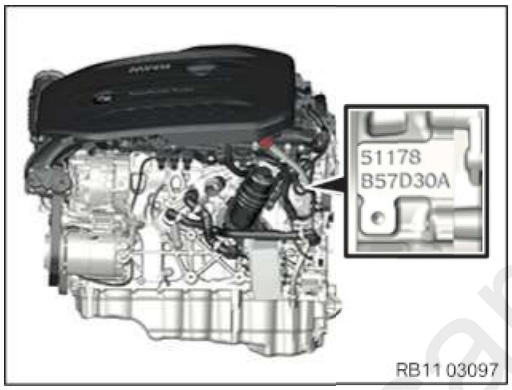
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B38**B** / B48**B**



B38



B57



B58

Assemble engine.

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11 00 300 Engine oil consumption measurement

Attention!

This procedure for measuring oil consumption may not be used for the S 85 due to the oil pan design.

Many complaints about oil consumption are caused by the oil level being measured using the wrong method.

The oil consumption should be measured after a distance of 7,500 km at the earliest, as the process of running in the engine will not have been essentially completed and the engine oil consumption stabilised until this distance has been covered.

Engine oil consumption that may occur in an engine can only be determined by the customer on the basis of the refilled engine oil quantity. As soon as the engine oil level falls below the MAX mark on the dipstick, many customers top up the engine oil without paying attention to a number of basic rules, such as the vehicle must be standing on level ground, a certain period of time must be left to allow the oil to flow back to the sump. In such cases, the available container sizes (e. g. 1-litre can) make it easy to top up above the MAX mark. Too much added engine oil is damaging to the engine and is consumed more quickly due to the splash effect.

It is therefore recommended to allow the engine oil level to the MIN mark and only then to add the required engine oil quantity. The distance between the marks is equivalent to approx. 1.0 to 1.5 litres.

The procedure for checking the oil level is given in the Owner's Handbook for the vehicle concerned.

The service delegates will only deal with claims made under warranty if exact measurements by weighing are available (see below).

Measuring oil consumption by weighing:

To assess a warranty or goodwill claim, only the following oil consumption measurement method by weighing can be accepted (this must have been carried out by a BMW contractual partner):

Note:

The engine must not leak any oil.

Engine oil may only be drained off when the engine is at its normal operating temperature. The engine oil temperature must be at least 90 °C and read off on the diagnosis system.

Preparation:

1. Eliminate any leaks and traces of oil before measuring the engine oil consumption.
2. Allow the engine to run at idling speed for 5 minutes, during which the engine oil temperature must not drop below 90 °C.
3. Unscrew the main flow oil filter cover (the engine oil will flow back into the oil sump from the oil filter housing).
4. Unscrew the oil drain plug.
5. Allow the engine oil to drain off for 15 minutes.
   If necessary, remove the fan/fan cowl.
6. Turn the engine once through 360 degrees by the vibration damper.
7. Allow the engine oil to drain off for 15 minutes.
8. Retighten the primary flow oil filter.
9. Pour in the specified engine oil quantity for the engine type in question (with filter change).
10. Drive the vehicle for a distance of at least 1,000 km/500 miles. Increasing the mileage will produce significantly better measuring results.
    Measurement procedure:
11. Check the engine for leaks; if the engine is not tight, the examination will not be meaningful.
12. Prepare the measuring container to be able to capture the oil quantity.
13. Allow the engine to run at idling speed for 5 minutes, during which the engine oil temperature must not drop below 90 °C.
14. Unscrew the main flow oil filter cover (the engine oil will flow back into the oil sump from the oil filter housing).
15. Unscrew the oil drain plug.
16. Allow the engine oil to drain off for 15 minutes.

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If necessary, remove the fan/fan cowl.

17. Turn the engine once through 360 degrees by the vibration damper.
18. Allow the engine oil to drain off for 15 minutes.
19. Weight the **amount of drained engine oil**. (Engine oil has a density of about 0.86 g/cm³ at room temperature.)

$$\text{Engine oil consumption} = \frac{\text{Amount of oil added (cm³) - amount of oil drained off (g): 0.86 g/cm³}}{\text{mileage reading when draining - mileage reading when adding engine oil}}$$

Example:

Volume of oil added at mileage reading 44,800: 4.000 cm³

Weight of oil added at mileage reading 45,900: 2.700 g

$$\text{Engine oil consumption} = \frac{\text{4.000 cm3 - 2.700 g : 0.86 g/cm³}}{\text{45,900 km - 44,800 km}} = 0.78 \text{ cm³/km}$$

0.78 cm³/km = 0.78 l/1,000 km

Test certificate for engine oil consumption:

Vehicle data: _____

BMW (type): _____

Chassis number: _____

Added oil quantity (in ccm): _____ ccm at kilometre reading:_____

less drained off oil quantity (in g) : 0.86 (g/ccm) _____ ccm at kilometre reading:_____

=> oil consumption: _____ ccm => mileage: _____ km

Oil consumption [l/1000 km] =

_____ *[ccm] oil consumption* _____ [km] mileage

Oil consumption after balancing out: _____ l/1000 km

Oil grade: _____

Oil grade: _____

Viscosity: _____

Cause of damage: _____

_____ _____

Dealer address Signature

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11 00 ... Engine oil consumption measurement

Procedure for engine oil consumption measurement, see following documents:

- Engine oil consumption measurement (all without S85)
- Engine oil consumption measurement (only S85 with one oil drain plug)
- Engine oil consumption measurement (only S85 with two oil drain plugs)
- Record on oil consumption measurement

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11 . . . . . Equipment recoding special tool number of the transverse member for fixing the engine in the installation location

Equipment recoding from 00 0 200 to 00 6 0 000

Designation	Special tool new	Special tool previous
Cross-member, previous	---	00 0 200
Cross-member, new	00 6 000	---
Mounting bridge	00 6 001	00 0 201
Spindle with hook	00 6 002	00 0 202
Extension	00 6 003	00 0 203
Adapter support	00 6 004	00 0 204
Extension	00 6 005	00 0 205
Chain with hook	00 6 006	00 0 209
Set of supports	00 6 010	00 0 206
Set of supports	00 6 020	00 0 207
Set of supports	00 6 030	00 0 208
Connector	00 6 031	---
Profile strip (2 x)	00 6 032	---
Supports (4 x)	00 6 033	---
Set of supports	00 6 040	---
Profile strip	00 6 041	00 0 451
Supports (2 x)	00 6 042	00 0 452
Supports, short (2 x)	00 6 043	---
Set of supports	00 6 050	---
Profile strip (2 x)	00 6 051	---
Supports, short (2 x)	00 6 052	---
Supports, long (2 x)	00 6 053	---
Support, long	00 6 060	---
Supports (2 x)	00 6 070	---

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11 00 ... Handling components after flood damage

Flood damage can occur if the permissible fording depth of a vehicle is exceeded. Ingress of water can cause damage to the engine (water shock) or components.

Because dirt particles generally enter into the component with the water (e.g. starter motor, wiring harness), the components need to be thoroughly inspected.

Residual moisture in the components leads to corrosion (increased contact resistance in the component), which can lead to a component failure at a later time.

If water ingress into the electrical components cannot be ruled out, it is recommended to replace the component to ensure correct functioning through the vehicle lifetime.

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11 00 091 Installing the replacement engine (N57 D30 U/O 0/1)

Special tools required:

- 11 4 180
- 11 5 320
- 11 8 740
- 11 8 741
- 11 9 260
- 11 9 265

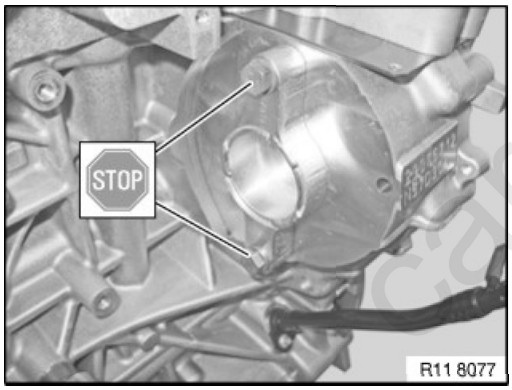
Important!

Do not remove transportation retainer (adapter) of high pressure pump without special tool.

Risk of damage to timing chain drive.

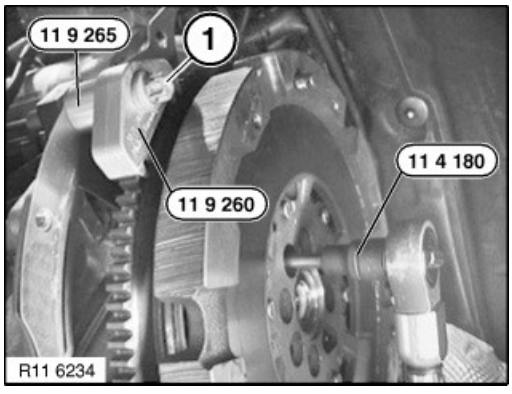
Necessary preliminary work:

- Remove engine.
- Convert all assemblies.



Important!

Do not remove transportation retainer without special tool 11 8 740 .



Manual gearbox:

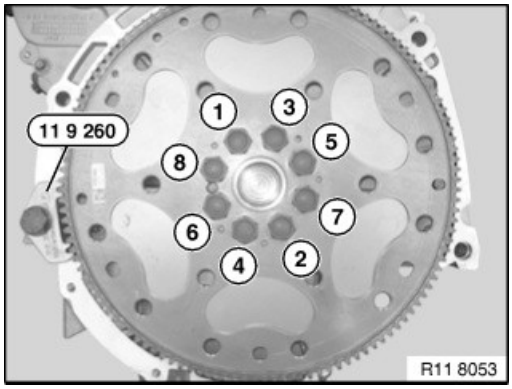
Install flywheel.

Installation note:
Replace screws.

Insert flywheel bolt with special tool 11 4 180 .

Secure flywheel with transmission bolt (1) and special tool 11 9 260 / 11 9 265 .

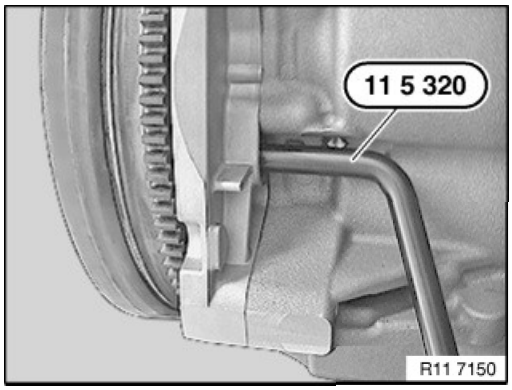
Tightening torque: 11 22 2AZ.



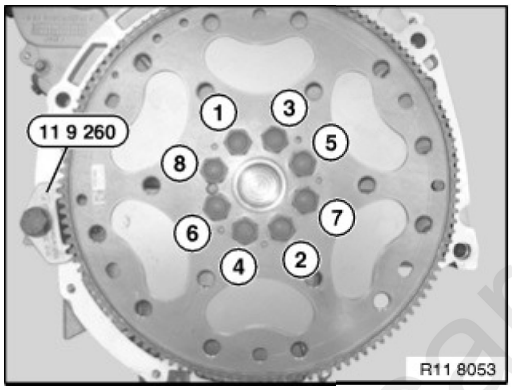
Install flywheel.

Screw in bolts (1 to 8).

Installation note:
Replace screws.



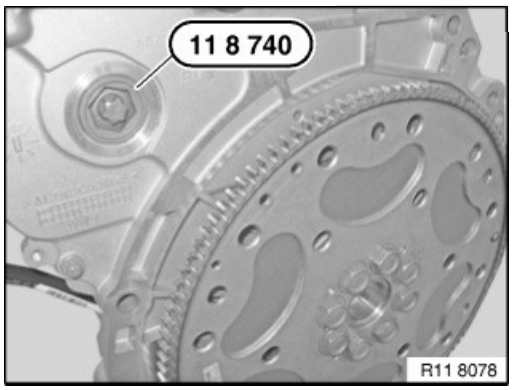
Secure engine in TDC setting with special tool 11 5 320 .



Fit special tool11 9 260 .

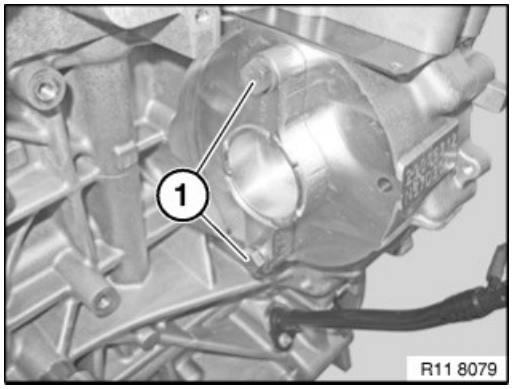
Tighten bolts in sequence (1 to 8).

Tightening torque: 11 22 2AZ.

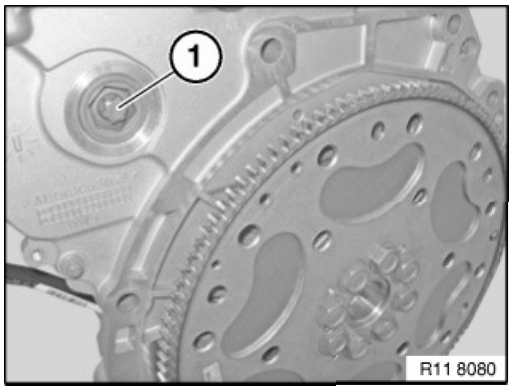


Screw in special tool 11 8 740 .

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Release screws (1).

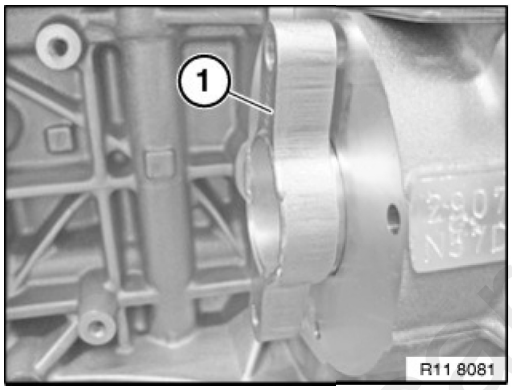


Important!

Special tool 11 8 741 remains in timing case housing.

Central bolt (1) remains in camshaft sprocket.

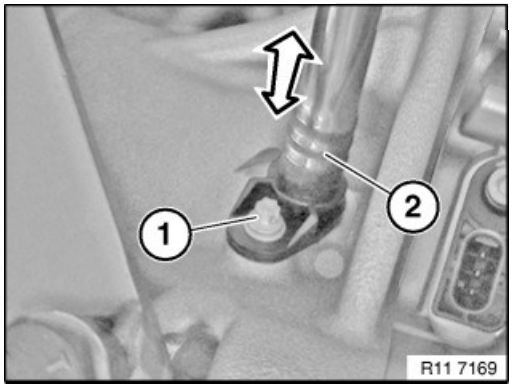
Remove central bolt (1).*Note:*
Central bolt (1) is supported on special tool 11 8 740 until transportation retainer is pressed out towards rear.



Remove transportation retainer (1).

Install high pressure pump.

Transportation retainer (1) must be sent back to BMW (obligatory return).



Release screw (1).

Tightening torque: 11 00 1AZ.

Remove vacuum line (2) in direction of arrow.

Installation note:
Replace O-ring on vacuum line.

Assemble engine.

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Mounting engine on assembly stand (N57)

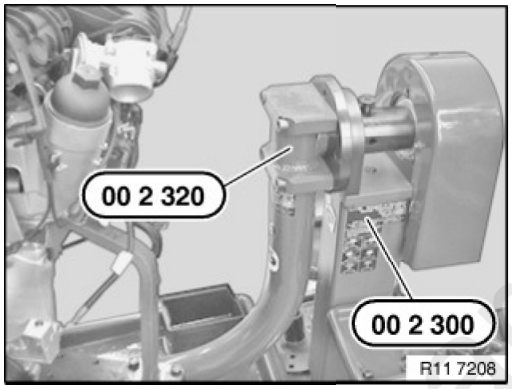
Special tools required:

- 00 2 300
- 00 2 320
- 00 2 322
- 00 2 328

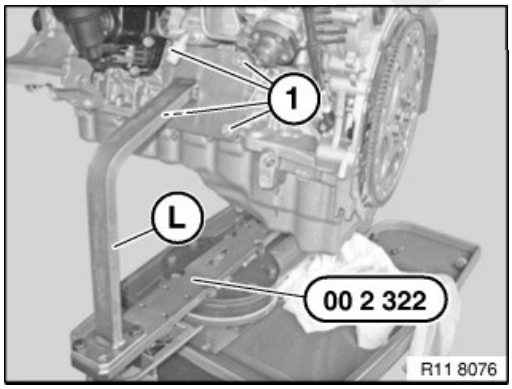
Important!
Pay attention to manufacturer's information

Necessary preliminary tasks:

- Remove engine.
- Remove engine support arm on left and right.

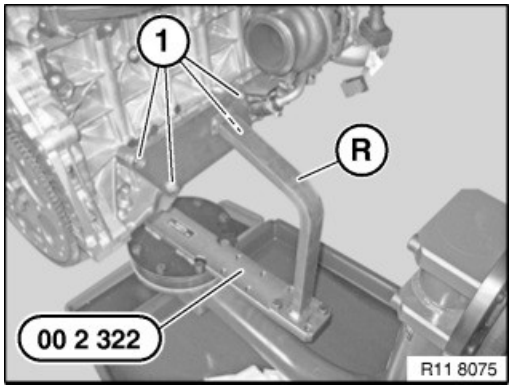


Prepare special tool 00 2 300 together with the special tool 00 2 320 .



Attach special tool 00 2 328 to fixture (L) on left of engine support arm with screws (1).

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Attach special tool 00 2 328 to fixture (R) on right of engine support arm with screws (1).

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11 00 ... Overview of consumables (Electronic Parts Catalogue)

1.0 Sealing compound for **injection**.

	Repair instructions (engine)	Designation, Electronic Parts Catalogue	Part number, Electronic Parts Catalogue	Application examples
1.1	S55, S65, S85	Loctite 171000 primer	83 19 7 515 683	For hardening Loctite 193140 sealing compound
1.2	S55, S65, S85	Loctite 193140 liquid sealing compound	83 19 0 439 030	Sealing between crankcase upper and lower halves
1.7	W20	Dow Corning liquid sealing compound	07 58 0 397 777	Sealing between crankcase upper and lower halves Sealing of oil sump

2.0 Sealing compound for **application**.

	Designation in repair instructions	Designation, Electronic Parts Catalogue	Part number, Electronic Parts Catalogue	Application examples
2.1	M41, M47, M47TU, M47T2, M50, M51, M52, M52TU, M54, M57, M57TU, M57T2, M60, M62 N12, N14, N16, N18 N20, N26 N40, N42, N45, N45N, N46, N46N, N43, N47, N47top, N47C N47D1 N51, N52, N52N, N53, N54, N55, N57, N57T, N62, N62TU, N63, N63O1 N73, N73H, N74 S14, S38, S50, S52, S54, S62, S65, S85	Drei Bond 1209 liquid sealing compound	07 58 9 062 376	For sealing junction points on crankcase
2.2	N12, N13, N14, N16, N18, N20, N26, N40, N42,N43, N45, N46, N51, N52, N53, N54, N55 W10, W11, W16,	Loctite 5970 liquid sealing compound	83 19 0 404 517	Sealing between crankcase upper and lower sections.
2.2	N47top, N47D1, N47C1 N57D1 N57S1, B32 ,B36 ,B37 ,B38 ,B42 ,B46 ,B47 ,B48 ,B57 ,B58	Loctite 5970 liquid sealing compound	83 19 0 404 517	Timing case cover sealing, oil sump, coolant pump, component carrier.
2.3	N12, N14, N16, N18 W16	Loctite 648 liquid sealing compound	07 58 9 067 732	Sealing between the seal plug and crankcase
2.4	N12, N13, N14, N16, N18 W16	Loctite 121078 liquid sealing compound	83 19 2 223 765	Sealing between cover sleeve and crankcase

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3.0 **Cleaning agent**.

	Designation in repair instructions	Designation, Electronic Parts Catalogue	Part number, Electronic Parts Catalogue	Application examples
3.1	N12, N13, N14, N18, N20, N26, N45, N46, N45T, N46T, N43, N51, N52, N52Kp, N52TU, N53, N55, N63, N63S, N63 Hybrid, N63O1, N63O2 N73, N74 B37, B38 B47, B48, B58	Cold cleaner (chlorine free)	83 19 0 026 956	Cleaning assemblies, washing engine
3.2	M47, M47T1 M47T2, M57 M57T1, M57T2 N47 K/U/O/T 0/1 N47C	Universal cleaner	83 19 2 360 981	Clean intake pipe.
3.3	All	Brake cleaner	83 19 2 365 214	Clean.

4.0 Lubricant for **application**.

	Designation in repair instructions	Designation, Electronic Parts Catalogue	Part number, Electronic Parts Catalogue	Application examples
4.1	N12, N13, N18, N20, N26, N42, N46, N46TU, N51, N52, N52KP, N52TU, N55, N62, N62TU, N63O0, N63O1, N63O2, N73 S55, S63T0 B38, B48, B58	Lubricating grease Longtime PD1	83 19 2 160 340	For greasing the splined shaft on actuator drive/gearing of intermediate shaft.
4.2	M47, M47TU, M47T2, M57, M57TU, M57T2,	High-temperature assembly paste	83 23 0 309 003	For greasing the thread on the exhaust turbocharger.
4.3	N12, N13, N14, N16, N18 N20, N26, N40, N42, N45, N45TU N46, N46TU, N43. N51, N52, N52Kp, N52TU, N53, N54, N55. N62, N62TU, N63O0, N63O1, N63O2 N73, N73H, N74. S63T1, S65, S85. B38, B48, B58	High temperature paste	83 19 2 158 851 83 19 2 158 852	For greasing the threads on the oxygen sensors.

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4.4	N47, N47O1 N47C1, N47T N47D1 N57 N57D1 N63O0, N63O1, N63O2 S63, S63T0	Copper paste	81 22 9 400 794	For greasing the double hex head bolt on the exhaust turbocharger. For greasing the central bolt on the VANOS gear.
4.5	M47, M47TU, M47T2 M57, M57TU, M57T2 N47, N47O1 N47C1, N47T N47D1 N57 N57D1	High-temperature grease (UrethynE2).	83 23 0 441 070	For greasing the injectors or injector shafts. Solenoid valve and piezo injector.
4.6	N47T0, N47T1 N57T0, N57T1, N57S1 B47T0,	Assembly paste	83 29 9 407 778	For lubricating the O-rings of the pressure pipes. Multistage turbocharging assembly.
4.7	W20	Assembly paste, grease	No longer greased.	For greasing the torsion splined shaft.
4.8	N63O1, N63O2	Assembly paste, grease	83 23 9 407 778	For greasing the central bolt on the crankshaft.
4.9	W20	Assembly paste, grease	83 23 9 407 778	Grease O-ring on alternator.

5.0 lubricant for **filling**

	Designation in repair instructions	**Designation, Electronic Parts Catalogue**	**Part number, Electronic Parts Catalogue**	**Application examples**
5.1	M47, M57	Exhaust turbocharger additive	83 19 2 362 168	For filling the exhaust turbocharger after the renewal.
5.2	B32, B36, B37, B38, B42, B46, B47, B48, B58	Exhaust turbocharger additive, petrol MSP	83 19 2 457 276	For filling the exhaust turbocharger after the renewal.

6.0 Lubricants to loosen locked **screw connections.**

	Designation in repair instructions	**Designation, Electronic Parts Catalogue**	**Part number, Electronic Parts Catalogue**	**Application examples**
6.1	M47, M47TU, M47TU2, M57, M57TU, M57TU2. N47, N47C, N47D1, N57, N57D1, N57S1 W16, W17, B37, B47, B57	Brunox lubricating grease	83 23 0 418 567	For releasing the glow elements.
6.2	E89 F10, F11.	Brunox lubricating grease	83 23 0 418 567	For releasing and tightening the screw connection of the rubber mounts.

7.0 **Leak detection spray and contact spray**

	Designation in repair instructions	**Designation, Electronic Parts Catalogue**	**Part number, Electronic Parts Catalogue**	**Application examples**

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7.1	Petrol: N13, N20, N26, N54, N55 B38, B48, B58 Diesel fuel: M47, M47TU, M47TU2, M57, M57TU, M57TU2. N47, N47C, N47D1, N57, N57D1, B37, B47	Leak detection spray	83 19 9 407 861	Check charge air path for tightness. Example: leakage on charge air hose or charge air cooler.
7.2	S55	Contact spray	81 22 9 400 208	For cleaning and protecting of electrical plug connections.

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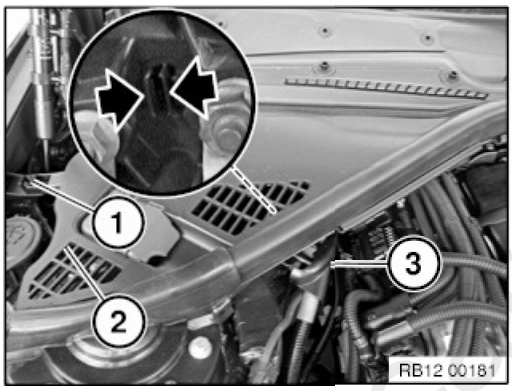
11 00 50 Removing and installing/renewing engine N57T

Special tools required:

- 11 0 070
- 17 2 050
- 00 9 030

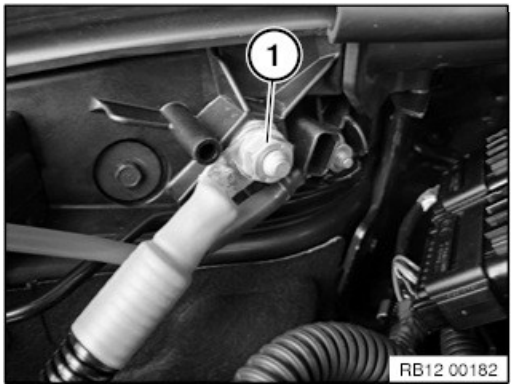
Necessary preliminary tasks:

- Move engine compartment lid into service position.
- Disconnect negative battery cable.
- Remove electronics box.
- Remove acoustic cover at rear.
- Remove radiator.
- Remove left pressure pipe.
- Remove right pressure pipe.
- Draw off A/C system.
- Remove front output shafts (AWD only).
- Remove transmission.



Unlock lock (1) and slightly raise service cover (2) until lock of cover (3) is accessible.

Unlock lock and remove cover (3).

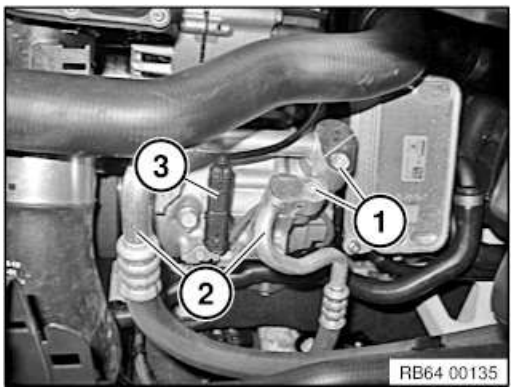


Slacken nut (1).

Tightening torque 12 52 4AZ.

Remove positive battery cable from battery positive terminal.

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Release screws (1).

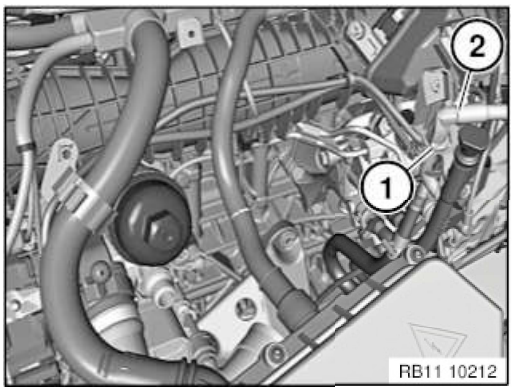
Tightening torque 64 52 1AZ.

Remove pressure and intake pipes (2) and set aside.

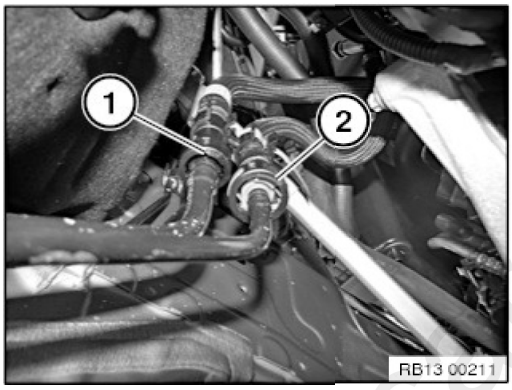
Unfasten plug connection (3) and disconnect.

Installation note:
Replace sealing rings.

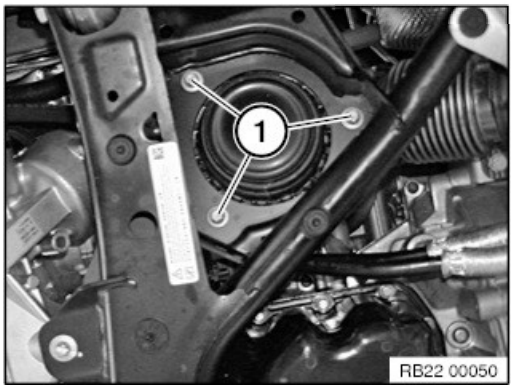
Use special tool 00 9 030 to install sealing rings without damaging them.



Unlock quick-release fasteners (1) and detach vacuum line (2).



Unlock and disconnect the fuel delivery line (2) and return line (1).

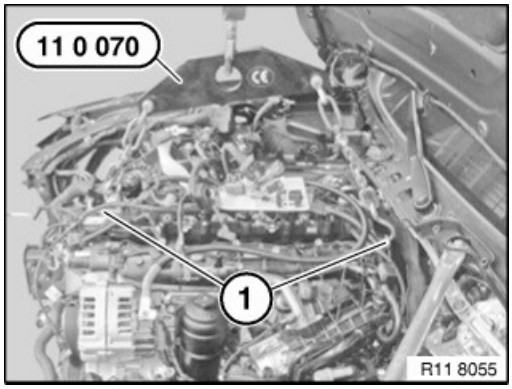


Pull the vacuum lines off the engine mounts.

Release screws (1) on left and right engine mounts.

Tightening torque 22 11 1AZ.

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Suspend special tool from lifting eyes (1) at front and rear.

11 0 070 Lift out engine with special tool.

Assemble engine.

Check cooling system for leaks.

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00 Safety information for working on vehicles with automatic engine start-stop function (MSA)



Warning!

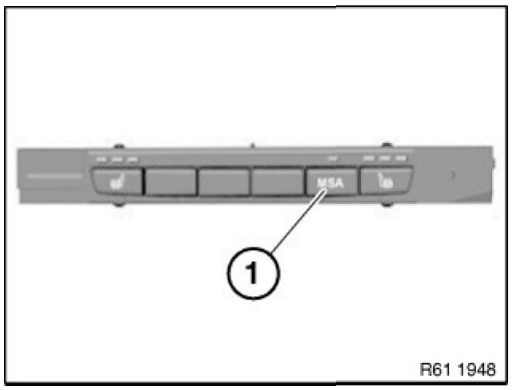
If the engine hood/bonnet contact is pulled upwards (workshop mode), the information "switch closed" is output. The automatic engine start-stop function is active.

An automatic engine start is possible.

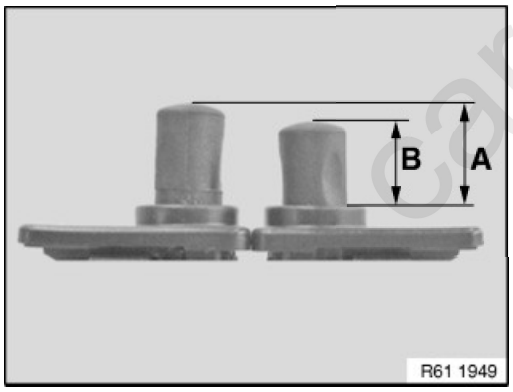
Observe safety precautions when working on MSA vehicles.

Before carrying out practical work on the engine, always ensure that the MSA functionality is deactivated so as to prevent automatic engine starting while work is being carried out in the engine compartment.

MSA function is deactivated by:



- Deactivate MSA by means of button (1) in passenger compartment
- Open seat belt buckle and driver's door



- Open engine bonnet/hood and ensure that engine hood/bonnet contact is not in workshop mode
  - Workshop mode

    A = 10 mm
  - Basic setting (engine hood/bonnet open)

    B = 7 mm

To make sure that the engine hood/bonnet contact is at the basic setting, if necessary press the hood/bonnet contact up to the limit position before starting work and slowly release.



When working with diagnosis tools:

- Observe instructions in diagnosis tool

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Note:
For further information on automatic engine start-stop function (MSA):

- Refer to the Service Information (bulletin) (for manual transmissions) Service Information (bulletin) 61 01 07 335
- Refer to the Service Information (bulletin) (for automatic transmissions or twin-clutch gearboxes) Service Information (bulletin) 61 01 10 629

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00 Safety instructions for handling oil



Warning!

Danger of poisoning if oil is ingested/absorbed through the skin!

Risk of injury if oil comes into contact with eyes and skin!



Recycling:

Observe country-specific waste disposal regulations.



Measures if oil is unintentionally released:

- Personal precautionary measures: Danger of slipping! Keep non-involved persons away from the work area. Wear personal protective clothing/equipment.
- Environmental protection measures: Prevent oil from draining into drain channels, sewerage systems, pits, cellars, water and the ground.
- Limiting spread: Use oil blocks to prevent the surface spread of oil.
- Cleaning procedure: Bind and dispose of escaped oil with nonflammable absorbents.

  Note: Do not flush oil away with water or aqueous cleaning agents.

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11 00 670 Secure the engine in installation position (F30, F31, F32, F33, F34,F36)



Special tools required:

- 00 6 100
- 00 6 130
- 2 318 635
- 00 6 050



Warning!

Danger of injury!

Observe following instructions relating to special tool:

1. Prior to each use, check the special tools for defects, modifications and operational reliability.
2. Damaged/modified special tools must not be used!
3. No changes or modifications may be made to the special tools!
4. Keep special tools dry, clean and free of grease.



Note:

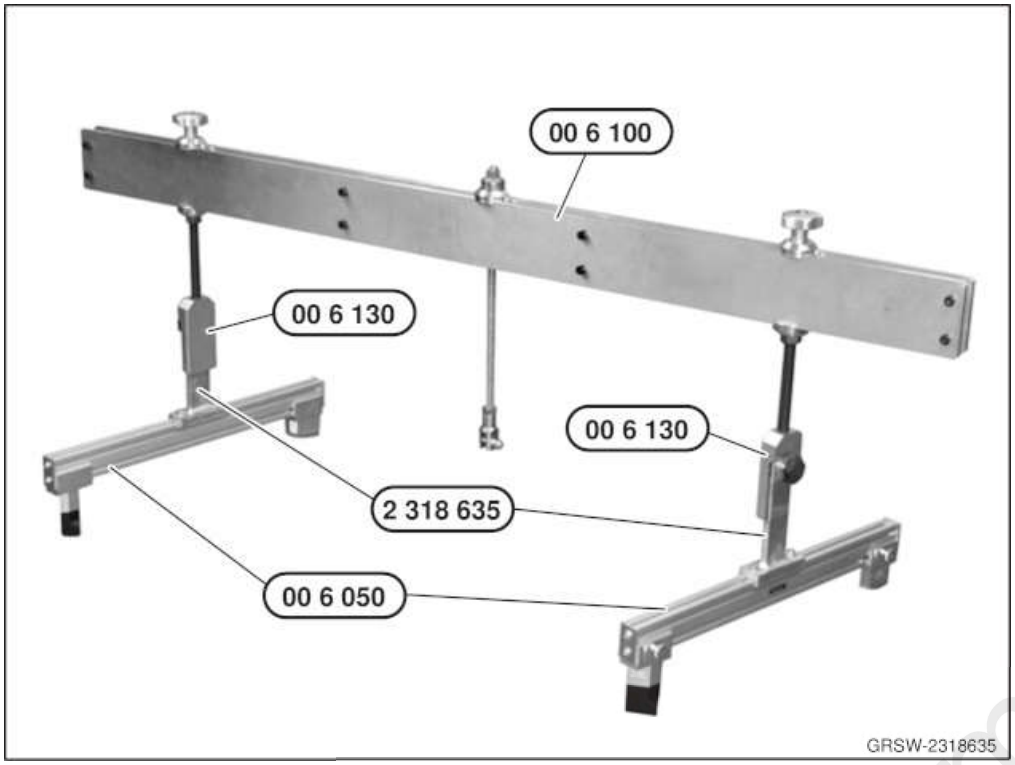
- Numbering system for special tools has been re-encoded.



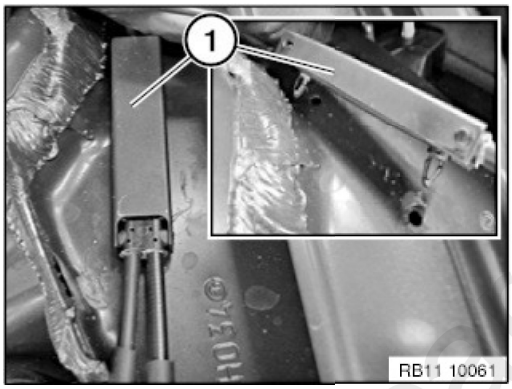
Necessary preliminary tasks:

- Secure the engine compartment lid in the service position.
- Remove acoustic cover
- Remove underbody protection
- F33 convertible only, remove front-end struts.

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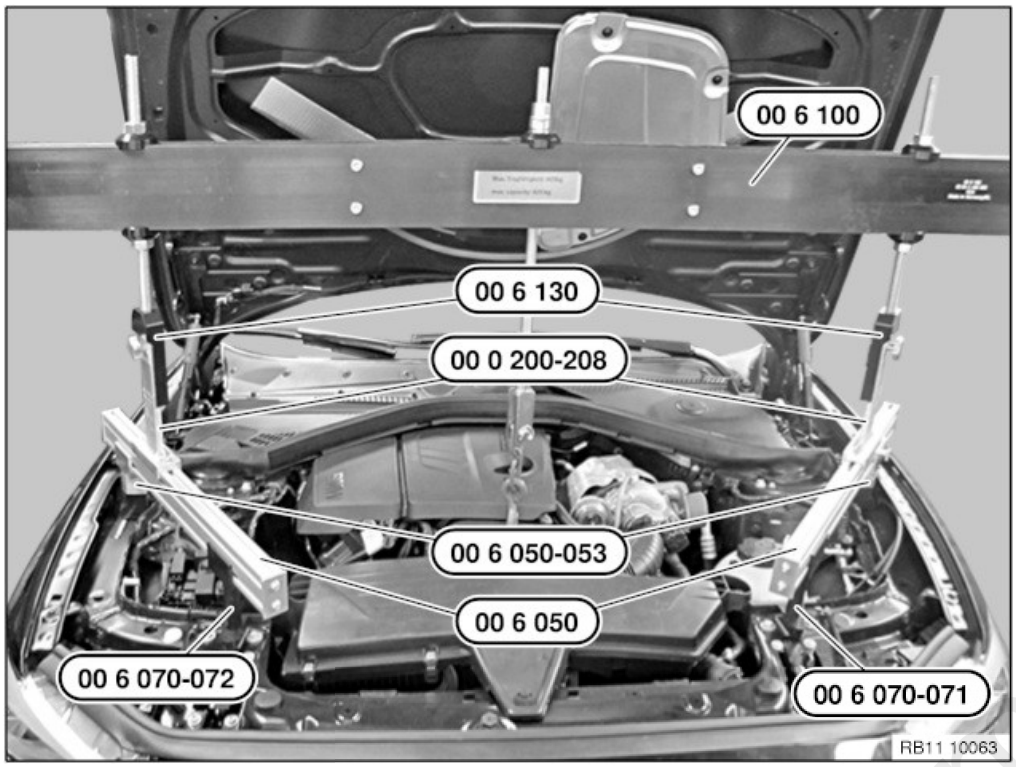


Completion of the traverse 00 6 100 : complete with the adapters 00 6 130 , the T-pieces 2 318 635 and the supports00 6 050 , 00 6 070-072, 00 6 070-071, 00 6 050-053.



Unclip Bowden cable (1) for hood opening.

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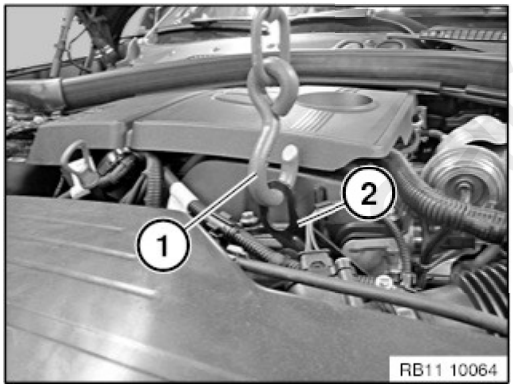
Important!
Risk of damage!

Position transverse member 00 6 100 on contact points with a second person helping.

Warning!
Danger of injury!

Align all struts and feet.

Tighten down all screws and nuts on cross-member 00 6 100 .



Attach chain with hook (1) into lifting lug or towing hook (2), depending on the engine.



Warning!

Danger of injury!

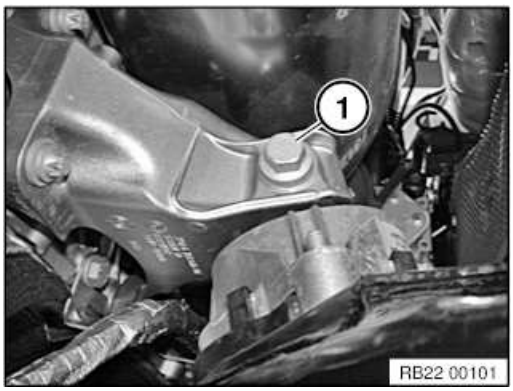
Tighten down all screws and nuts on transverse member 00 6 100 .

Important!

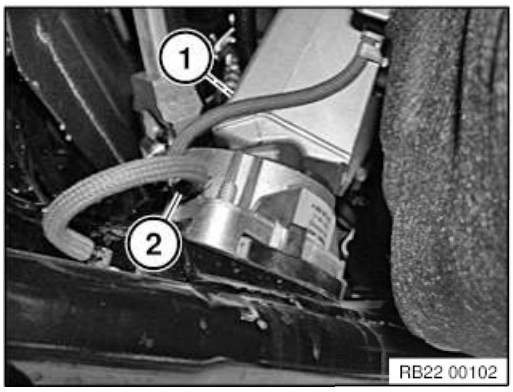
Before lifting the engine, check the lifting lugs for damage (cracks) and to ensure they are seated securely.

Avoid a change of engine position in the transverse or longitudinal direction.

Always make sure there is sufficient clearance between the engine (or its add-on parts) and the body.



Undo the bolt (1) on the right-hand engine mount.
Tightening torque 22 11 2AZ



Unclip the vacuum hose from the left engine mount.
Loosen the nut (1) on the left engine mount.
Tightening torque 22 11 2AZ
Raise engine approx. 10 mm with cross member.

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11 00 ... Service engine oil (N57 D30 U/O/T 1)



Warning!

Risk of scalding!

Carry out work on the vehicle only when wearing oil- and heat-resistant protective gloves incl. forearm protection, face guard and protective apron.



Attention!

Carry out engine oil service only when the engine is at operating temperature.

Observe the exact engine oil filling capacity.

Overfilling the engine with engine oil will result in **engine damage**.

Attention!

Risk of damage!

When working on the engine oil, coolant or fuel circuit, it is essential always to protect the alternator against dirt contamination.

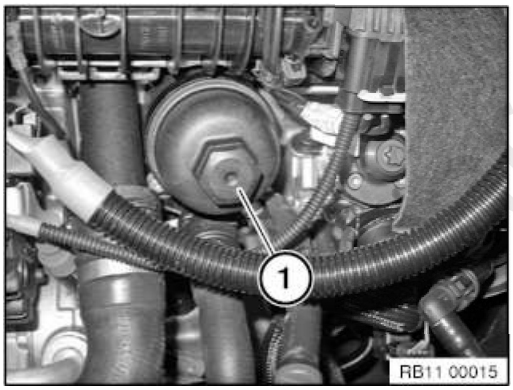
Cover alternator with suitable materials.



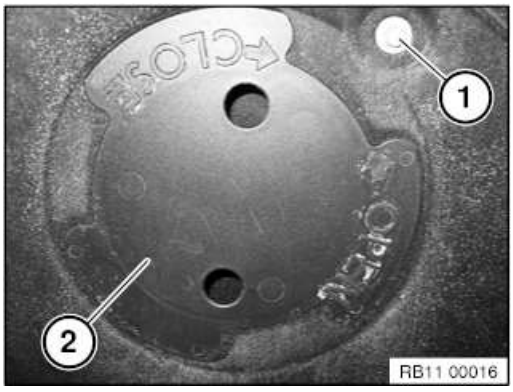
Recycling:

Catch and dispose of drained engine oil in a suitable collecting vessel.

Observe country-specific waste disposal regulations.



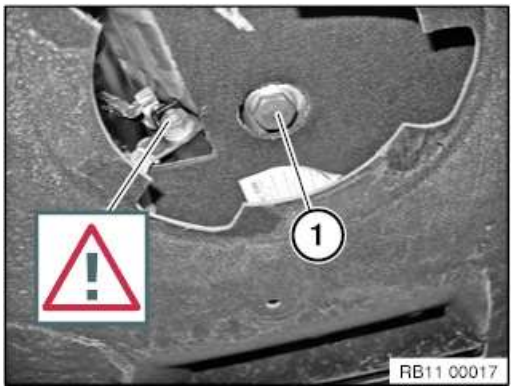
Release oil filter cover (1) with a suitable tool.*Note:*
Engine oil flows out of the oil filter housing and back into the oil sump.



F10, F11

Release screw (1).

Open and close service opening (2) in direction of arrow.

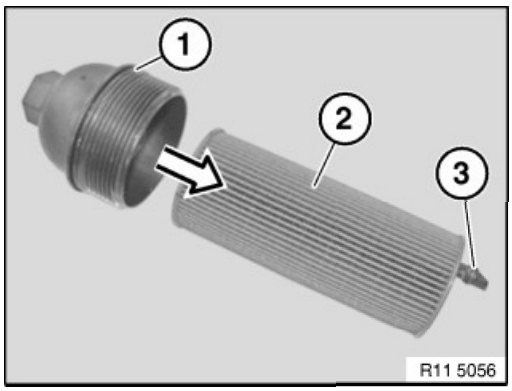


Attention!
Risk of shorting at starter motor!

Open oil drain plug (1) of oil sump and drain engine oil.

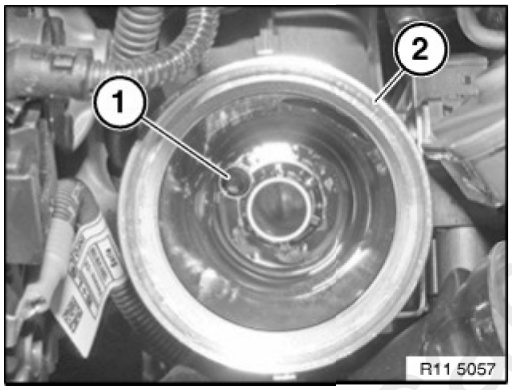
Tightening torque 11 13 1AZ.

Installation note:
Replace sealing ring.

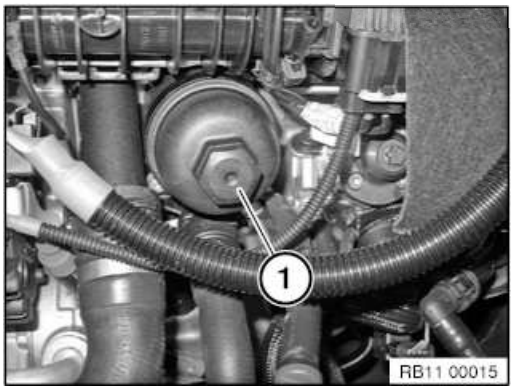


Pull out oil filter element (2) in direction of arrow.*Installation note:*
Replace oil filter element (2) and sealing ring (1).

Note:
Moisten sealing ring (1) on oil filter cover and sealing ring (3) on oil filter element guide with engine oil.



Note:
Observe the guide bore (1) for oil filter element in oil filter housing (2).



Secure oil filter cover (1) with a suitable tool.

Tightening torque 11 42 1AZ.

Note:
Pour in engine oil.

Start engine and run at idle until oil pressure indicator light goes out.

Switch off engine.

Check oil filter cover (1) and screw plug on oil sump for tightness.

Assemble engine.

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Checking oil level:

- Park vehicle on a horizontal surface
- Using the oil dipstick, check the engine oil level after five minutes on the engine at operating temperature
- Top up engine oil if necessary

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11 12 729 Checking cylinder head for watertightness (N57O/T 0/1)

Special tools required:

- 2 318 431
- 2 337 568

Important!

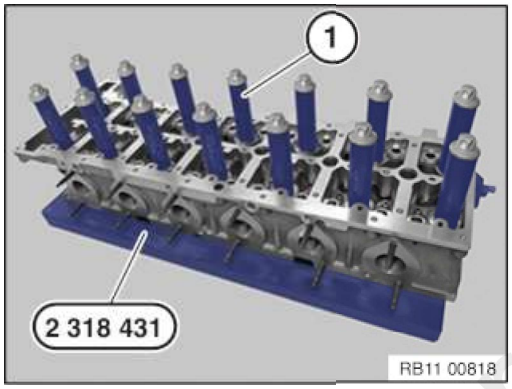
Pressure-test cylinder head to max. **3** bar.

Heat cylinder head to 60 °.

Check for formation of bubbles in a water bath.

Necessary preliminary tasks:

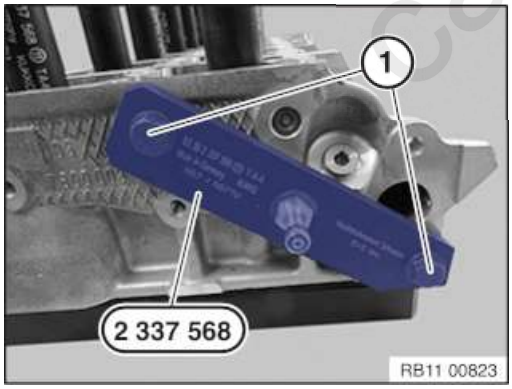
- Remove cylinder head.
- Disassemble cylinder head.



Note:
Mounting special tool 2 318 431

Secure special tool 2 318 431 with the original cylinder head bolts (1).

Tightening torque: **25 Nm**.



Secure special tool2 337 568 with bolts (1).*Note:*
Compressed air at valve (1) must not exceed **3 bar**.

Heat cylinder head to 60 °.

Check for formation of bubbles in a water bath.

Assemble engine.

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11 12 ... Clean intake plenum (N47, N57)

Necessary preliminary work:

- Remove intake plenum

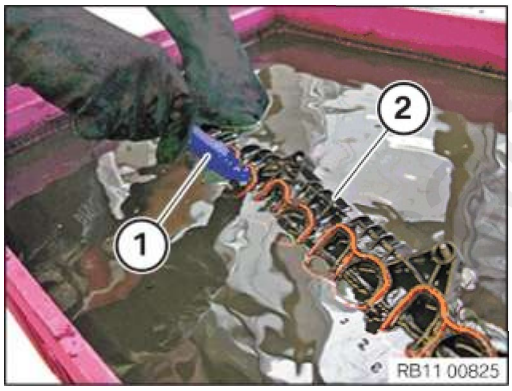
Dismantle intake plenum:

- Remove throttle body
- If applicable, remove adjuster
- If applicable, remove the preheating control unit
- If applicable, remove charging pressure sensor

Wear protective goggles and gloves.

Caution!
Never place electrical components in cleaning agent!

- Put on personal protective clothing/equipment!
- Prepare cleaning agent: Mix 2 parts water with 1 part BMW universal cleaner (part number: 83 19 2 360 981) mixed
- Place intake plenum in cleaning agent
- Adhere to an application time of at least 1 h



Wear protective goggles and gloves.

Caution!
Do not clean electrical components with a parts cleaning unit or high pressure cleaner.

- Remove the intake plenum (2) from the cleaning agent
- Clean the openings of the intake plenum (2) and swirl flaps using the brush (1)

  (Part number: 83 19 2 298 237)
- Clean throttle valve, exhaust-gas recirculation valve, mixing tube and mounted parts with brush (1) if necessary
- Clean the intake plenum (2) with a parts cleaning unit or a high-pressure cleaner.
- Check all seals for damage and replace if necessary.

Pay attention to country specific instructions for disposal.

obdiagn.com

Required follow-up work:

Assemble intake plenum:

- Installing the throttle body
- If applicable, install adjuster
- If applicable, install preheating control unit
- If applicable, install charging pressure sensor

- Install intake plenum

cardiagn.com

11 12 800 Cleaning cylinder heat intake channels and intake plenum (N47, N57)

Special tools required:

- 11 6 480
- 11 5 320
- 2 356 969
- 2 356 966
- 2 356 967
- 00 9 120

Necessary preliminary work:

- Disconnect battery negative cable
- Removing intake plenum
- Remove electric fan if necessary
- Remove underbody protection
- Remove stiffening plate if necessary

Dismantle intake plenum:

- Remove throttle body
- If applicable, remove adjuster
- If applicable, remove preheating control unit
- If applicable, remove charging pressure sensor



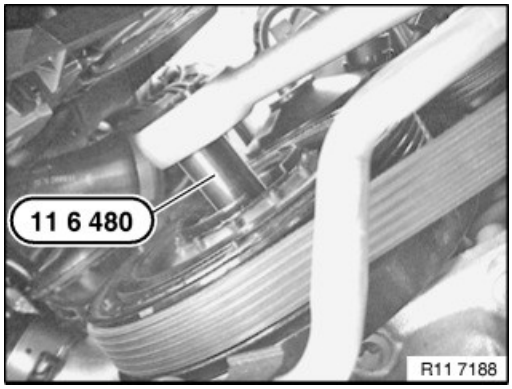
Wear protective goggles and gloves.



Caution!
Never place electrical components in cleaning agent!

- Wear personal protective clothing/equipment
- Prepare cleaning agent: Mix 2 parts water with 1 part BMW universal cleaner (see Section 3.2)
- Place intake plenum in cleaning agent
- Observe application time of at least 1 hour

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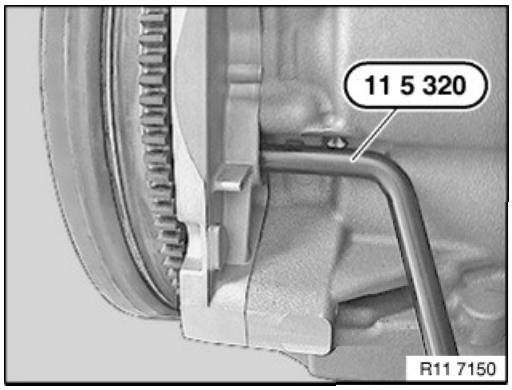
Crank engine to cylinder no. 1 TDC setting:

Crank engine with special tool11 6 480 to TDC firing position of cylinder 1.

Caution!

Do not crank engine in reverse direction.

Note:
Figure N47D.



Remove protective cap of timing case cover.

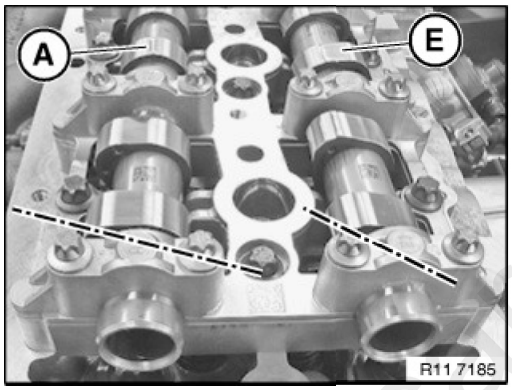
Crank engine at central bolt with special tool 11 6 480

Block crankshaft with special tool 11 5 320 in the TDC firing position of cylinder 1.

Caution!

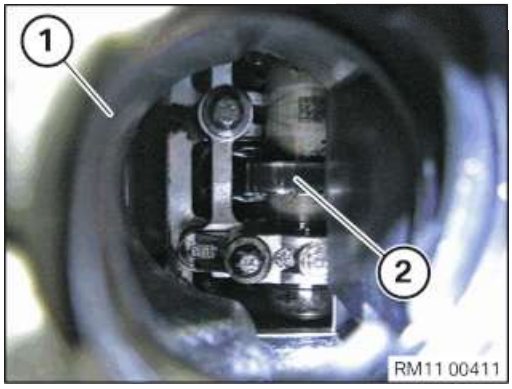
Do not turn the engine back.

Special tool 11 6 480 must be removed before starting the engine.



The cam on the intake camshaft (E) points obliquely upwards at cylinder No. 1.

The cam on the exhaust camshaft (A) points obliquely outward to the left at cylinder No. 1.



Note:
Visual inspection via oil filler cap (1) if necessary. Remove oil filler neck if necessary.

Cam (2) on exhaust camshaft points obliquely outward to the left at cylinder No. 1.

Figure N47.

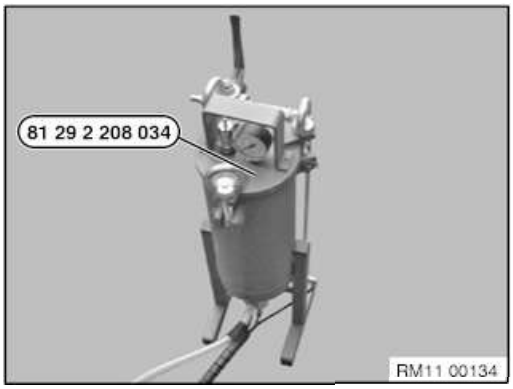
cardiagn.com

Cleaning intake ports: Caution!

Risk of engine damage!

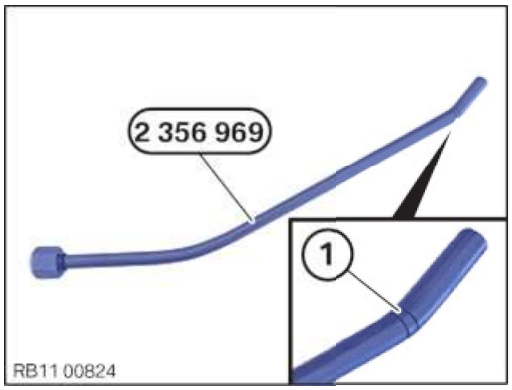
When cleaning the intake ports, it must be ensured that the intake valves of the corresponding cylinder are closed.

Start with the 1st cylinder when cleaning the intake ports.



The following are required:

- Blasting tool 81 29 2 208 034
- Walnut shell granulate
- Vacuum cleaner



Caution!

Front area of sensors is marked with two notches. These can additionally be highlighted in colour.

During the blasting process, only pull the wands out of the vacuum adapter until the mark becomes visible.

Blasting wand for swirl ports:

- 2 356 969



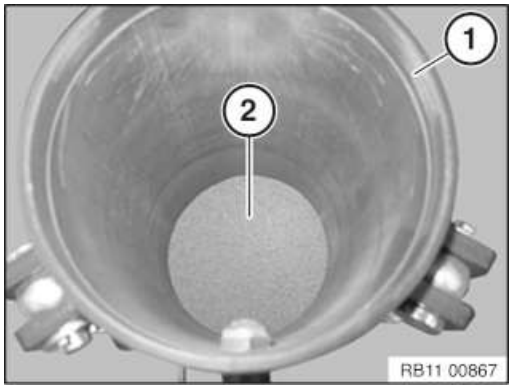
Vacuum adapter for tangential swirl port:

- 2 356 966

Vacuum adapter for swirl port:

- 2 356 967

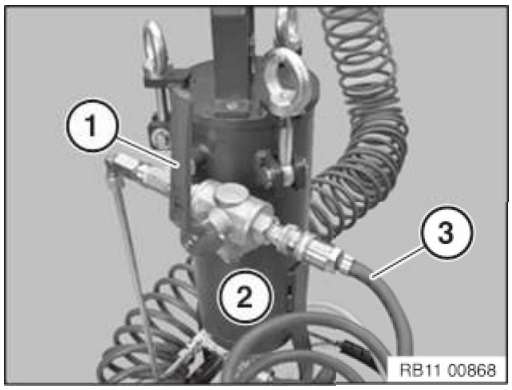
mgrdiagn.com



Note:
Use 2 litres of granulate per cleaning operation; this corresponds to a blasting duration of approx. 20 seconds.

Open blasting tool (1) and pour in 2 litres of granulate (2).

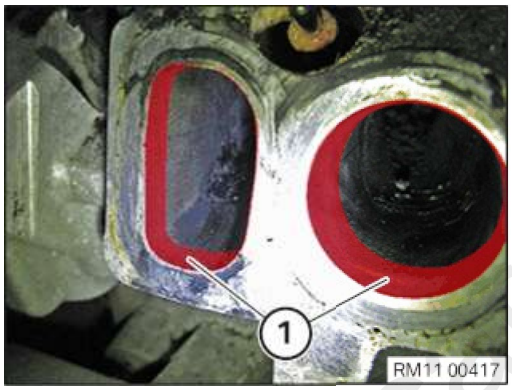
Close the device again.



Note:
Operating pressure 6 - 8 bar.

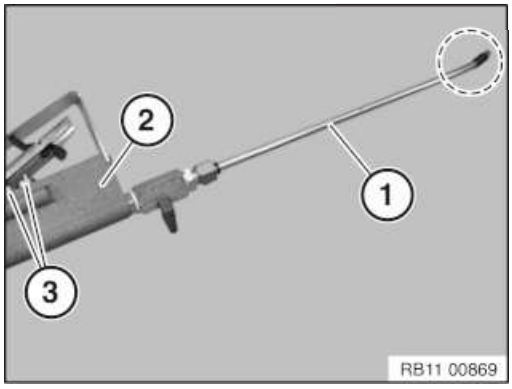
Close main valve (1) on blasting tool (2).

Connect compressed air (3).



Cleaning the swirl port of 1st cylinder:

Prior to the blasting process, clean the front area of both intake ports (1) of first cylinder with a suitable tool (e.g. plastic scraper, brushes 83 19 2 298 237).



Screw together blasting wand 2 356 969 (1) and actuator (2).

Open blasting tool and pour in 2 l granulate.

Close the device again.

Note:
Actuator (3) has two stages!

In stage one, only compressed air flows through the blasting wand.

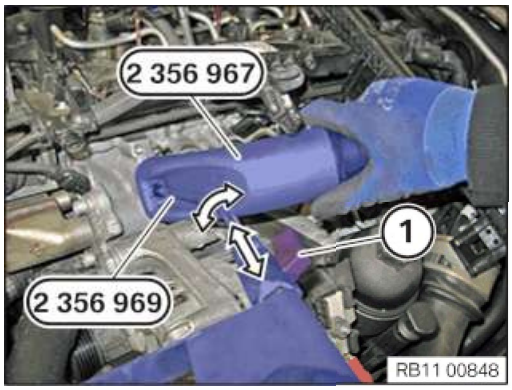
In stage two (operation is fully pressed), granulate is added (blasting process).

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Connect vacuum adapter 2 356 967 to vacuum cleaner. Hold vacuum adapter 2 356 967 against swirl port at no. 1 cylinder.

Open the main valve on the blasting tool and switch the vacuum cleaner on.



Caution!

Danger of injury!

Risk of damage!

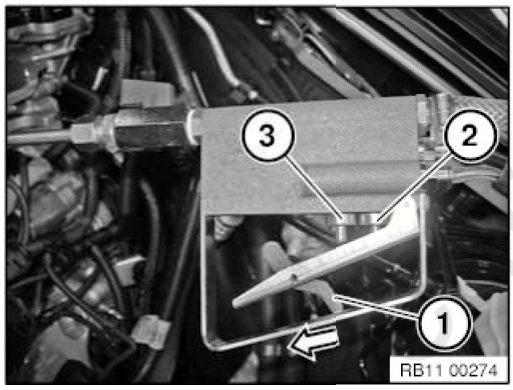
Second person required to assist.

Blasting wand may only be pulled out until the mark becomes visible.

Wear safety goggles

Insert blasting wand 2 356 969 in the adapter 2 356 967 .

Open the actuator valve (1).



Slide locking lever (1) to the front in direction of arrow.

Operate compressed-air valve (2) at stage one; compressed air can now flow in.

Fully operate valve (3) at stage two; walnut shell granulate is now injected.

Clean intake port, rotating the blasting wand and moving it vertically up and down.

Blasting wand may only be pulled out until the mark becomes visible.

When you notice that the collection container is becoming empty, continue operation for at least 10 seconds at stage one in order to swirl up and draw off the remaining granulate.

Close operation valve. Close main valve, check pressure drop at the pressure gauge.

Evaluate result if necessary.

If necessary, repeat procedure.



Cleaning the tangential swirl port of 1st cylinder:

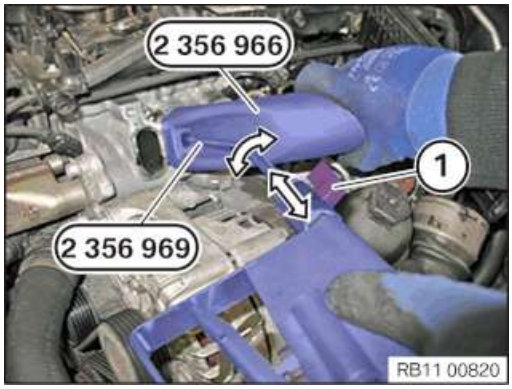
Open blasting tool and pour in 2 l granulate.

Close the device again.

Connect vacuum adapter 2 356 966 to vacuum cleaner. Hold vacuum adapter 2 356 966 on swirl port of first cylinder.

Open the main valve on the blasting tool and switch the vacuum cleaner on.

.com



Caution!

Danger of injury!

Risk of damage!

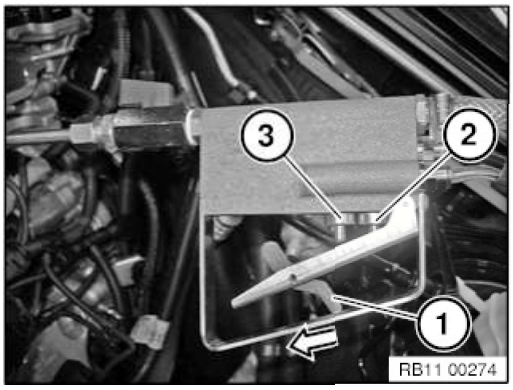
Second person required to assist.

Blasting wand may only be pulled out until the mark becomes visible.

Wear safety goggles

Insert blasting wand 2 356 969 in the adapter 2 356 966 .

Open the actuator valve (1).



Slide locking lever (1) to the front in direction of arrow.

Operate compressed-air valve (2) at stage one; compressed air can now flow in.

Fully operate valve (3) at stage two; walnut shell granulate is now injected.

Clean intake port, rotating the blasting wand and moving it vertically up and down.

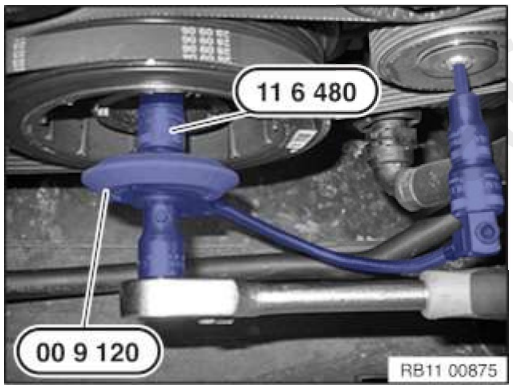
Blasting wand may only be pulled out until the mark becomes visible.

When you notice that the collection container is becoming empty, continue operation for at least 10 seconds at stage one in order to swirl up and draw off the remaining granulate.

Close operation valve. Close main valve, check pressure drop at the pressure gauge.

Evaluate result if necessary.

If necessary, repeat procedure.



Cleaning the other cylinders:

Caution!

Do not crank engine in reverse direction.

Remove special tool for securing the crankshaft.

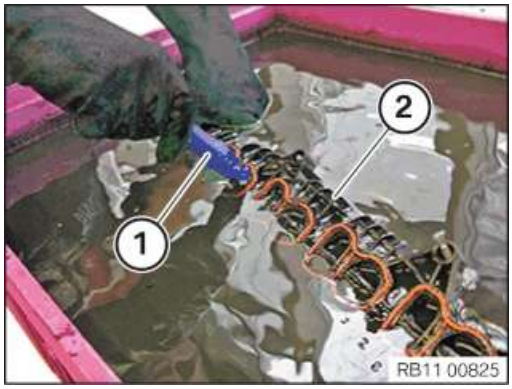
Proceed in the standard firing order while using the same procedure to clean the swirl ports at the remaining cylinders.

Firing order:

- **1 3 4 2** (4-cylinder engine)
- **1 5 3 6 2 4** (6-cylinder engine)

Thereby, turn motor on the central screw with 00 9 120 and 11 6 480 respectively by **180°** (4-cylinder-engine) and/or **120°** (6-cylinder-engine).

Note:
Figure M47.



Wear protective goggles and gloves.

Caution!
Do not clean electrical components with a parts cleaning unit or high pressure cleaner!

- Remove the intake plenum (2) from the cleaning agent
- Clean the openings on intake plenum (2) and swirl flap using the brush (1)

  (Part number: 83 19 2 298 237)
- Clean throttle valve, exhaust-gas recirculation valve, mixing tube and mounted parts with the brush (1) if necessary
- Then clean intake plenum (2) with a parts cleaning unit or a high-pressure cleaner
- Check all seals for damage and replace if necessary.

Observe country-specific waste disposal regulations.

Required follow-up work:

Dismantle intake plenum:

- Installing the throttle body
- If applicable, install adjuster
- If applicable, install preheating control unit
- If applicable, install charging pressure sensor

- Crank the engine at the central bolt at minimum twice

- Install intake plenum
- If necessary, install an electric fan
- Install underbody protection
- If necessary, install stiffening plate
- Connect battery earth lead
- Reset the quantity correction under:
  - Service functions
  - 01 Drive
  - Digital Diesel Electronics
  - Reset correction values of injectors

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11 12 100 Removing and installing cylinder head (N57 D30U/O/T 0/1)

Special tools required:

- 00 2 530
- 00 9 120
- 11 4 470
- 11 5 320
- 11 6 050
- 11 6 480
- 11 8 760

Important!

There must be no coolant, water and engine oil in any of the threaded holes in the engine block.

Fit new cylinder head bolts.

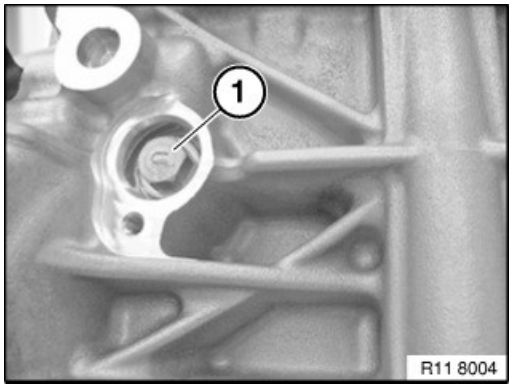
Do not wash off bolt coating.

Jointing torque and angle of rotation must be observed without fail (**risk of damage!**).

Reworking of cylinder head is not permitted.

Necessary preliminary tasks:

- Remove cylinder head cover.
- Remove injector nozzles.
- Remove intake plenum.
- Undo negative lead from battery.
- Undo exhaust turbocharger from exhaust manifold.
- Drain and dispose of coolant.
- Remove exhaust-gas recirculation cooler
- Disconnect coolant hoses.



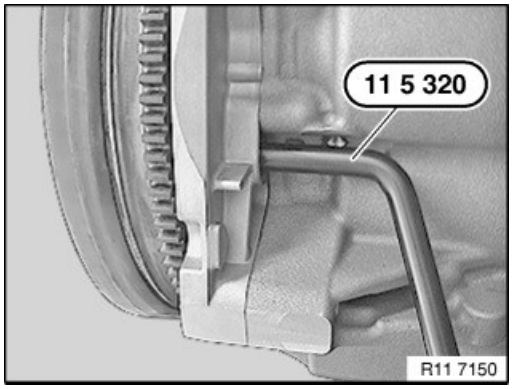
Open coolant drain plug on engine block.

Tightening torque 11 11 2AZ.

Installation note:

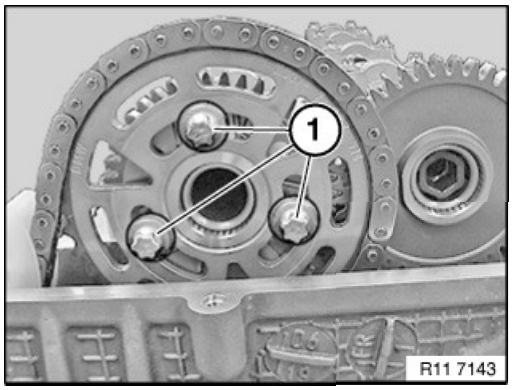
Replace gasket.

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Crank engine with special tool 11 6 480 in direction of rotation until piston of cylinder 1 is in TDC position.

Use special tool 11 5 320 to secure flywheel in TDC firing position of cylinder 1.

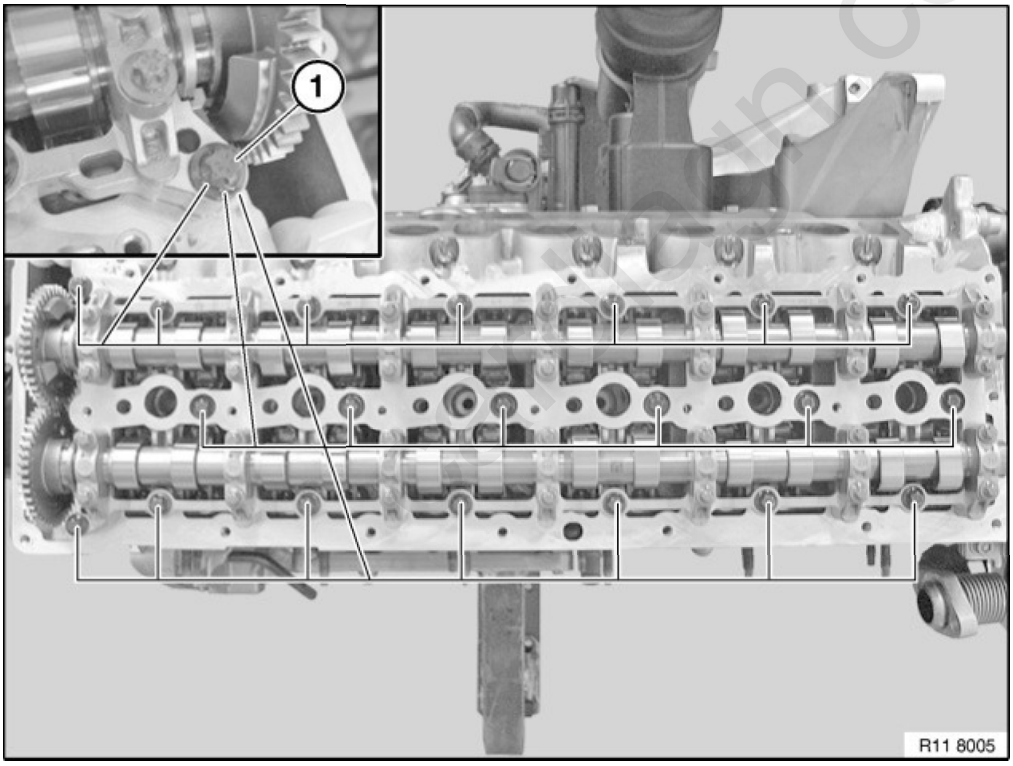


Remove chain tensioner at top.

Release camshaft bolts (1).

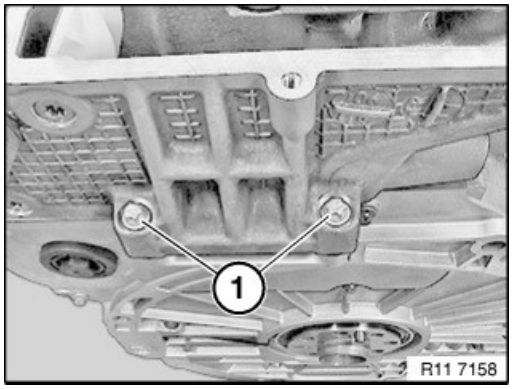
Tightening torque 11 31 1AZ.

Remove camshaft sprocket.

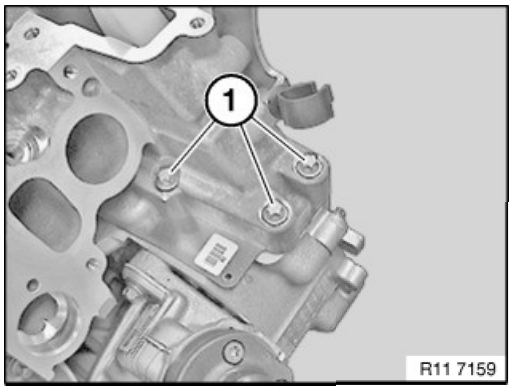


Release screws (1) from outside inwards in 1/2 turns.

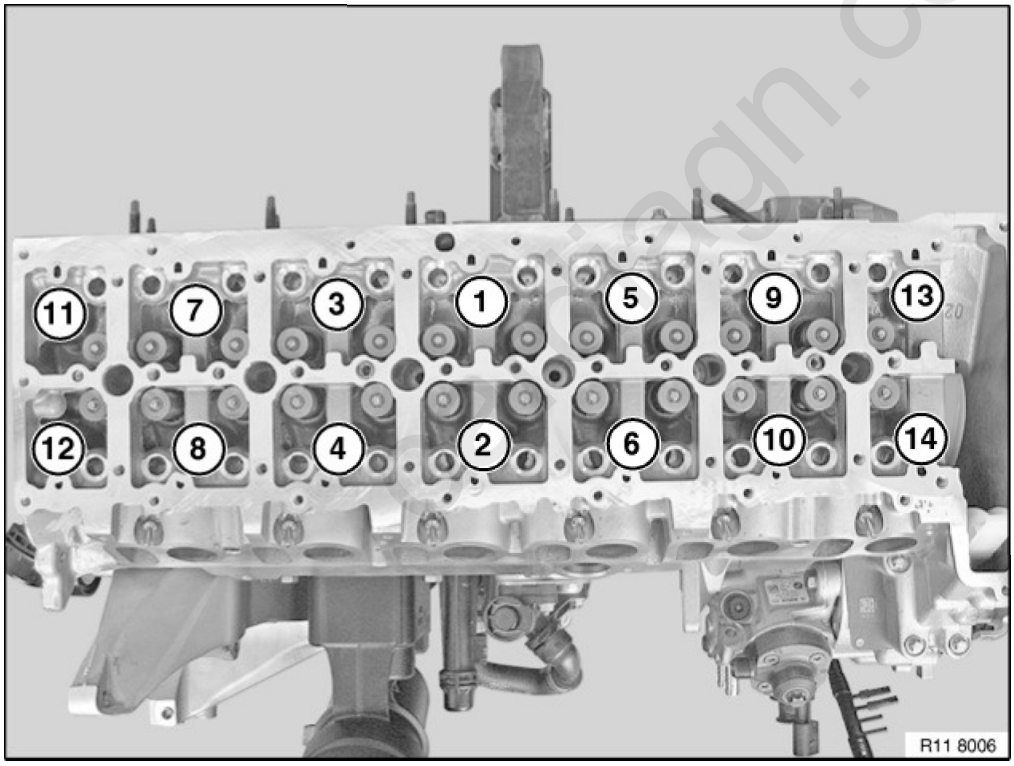
Remove camshaft carrier.



Release screws (1).

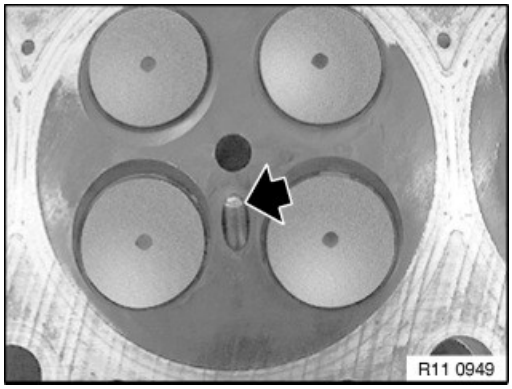


Release screws (1).



Release screws (1 to 14) from outside inwards in 1/2 turns.

Remove cylinder head.

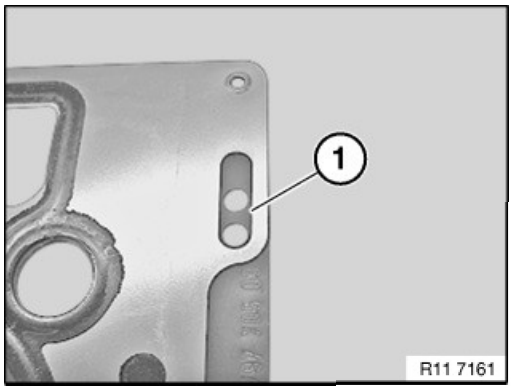


Important!

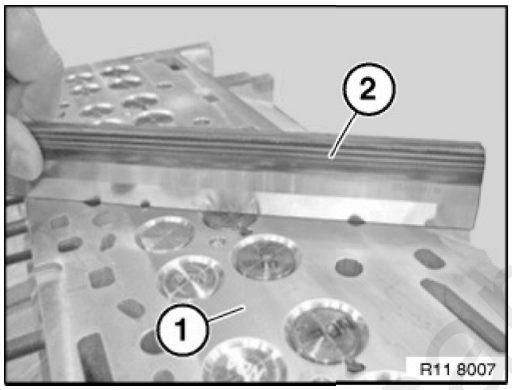
The glow elements protrude at the sealing surface and may be damaged when the cylinder head is put down.

Set down cylinder head in such a way that glow elements are not damaged.

If necessary, remove glow elements with special tool 11 6 050 .



Installation note:
Without work on the engine block which alters the piston protrusion, use a new cylinder head gasket with the same thickness marking (number of holes).

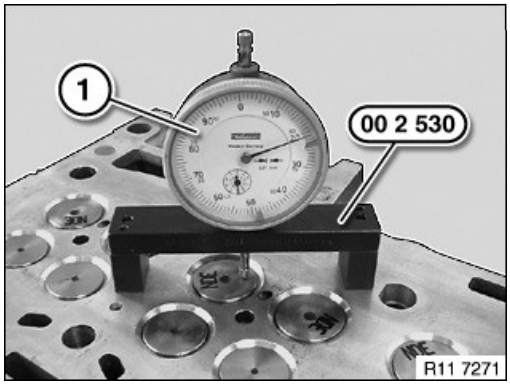


Clean sealing surfaces with special tool 11 4 470 .

Check evenness of cylinder head (1) with a straightedge (2).

Max. deviation from flatness (longitudinal) **0.10 mm**.

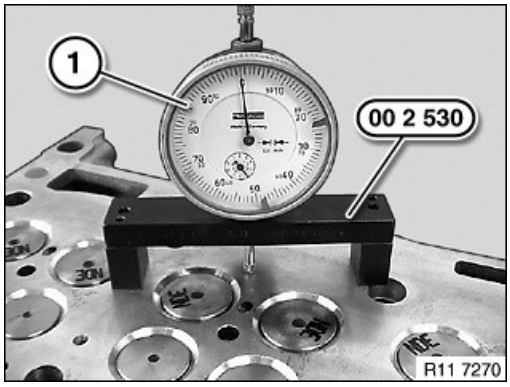
Max. deviation from flatness (transverse) **0.05 mm**.



Position special tool 00 2 530 with dial gauge (1) on valve.

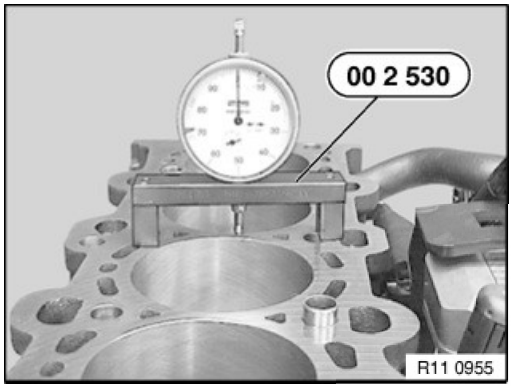
Determine valve underprotrusion.

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Position special tool 00 2 530 with dial gauge (1) on cylinder head.

Set dial gauge (1) to zero.

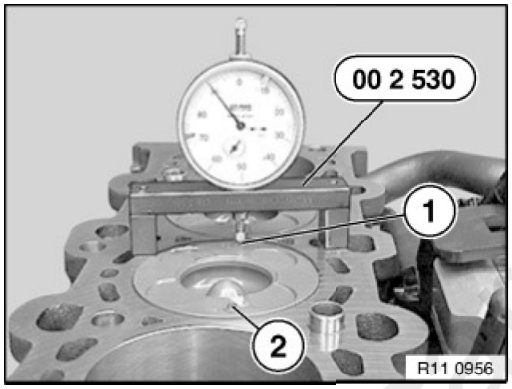


Clean sealing surfaces with special tool 11 4 470 .

If work is carried out on the crank drive or piston, the gasket thickness must be redetermined.

Measuring the piston protrusion:

Fit dial gauge with measuring fixture special tool 00 2 530 on cleaned cylinder sealing surface and set under preload to zero.

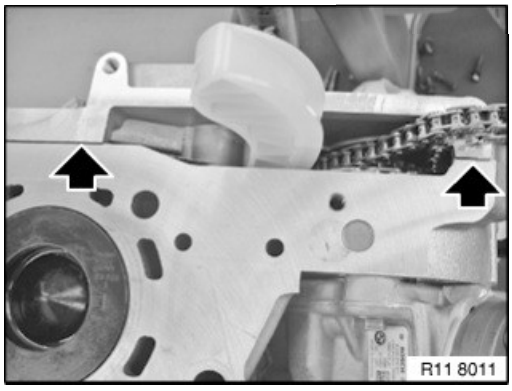


Clean piston at measuring points (1 and 2).

Fit dial gauge at measuring point (1) on cleaned piston and determine highest point by rotating crankshaft.

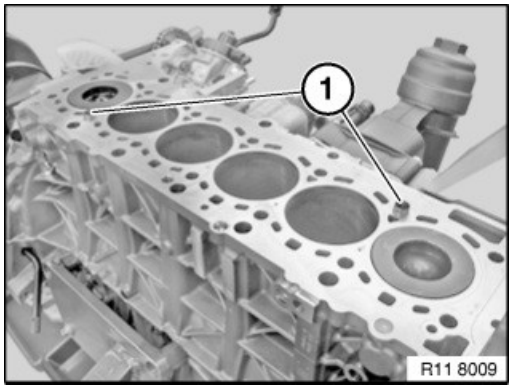
Measure and note down piston protrusion at measuring points (1 and 2) on all 4 pistons.

Installation note:
Determine thickness of cylinder head gasket.



Installation note:
Coat transition from crankcase to gear case cover with Drei Bond 1209 sealing compound.

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Check fitting sleeves (1) for damage and correct installation position.

Clean sealing surfaces with special tool 11 4 470 .

Reinstall cylinder head gasket.

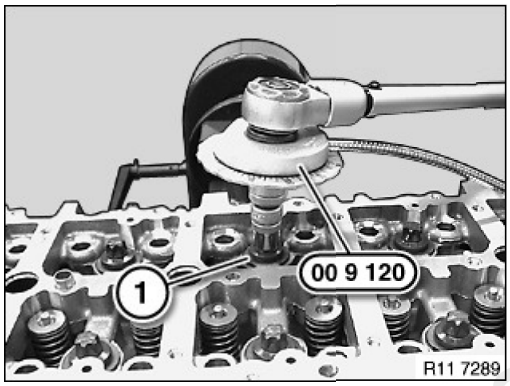
Important!

There must be no coolant, water and engine oil in any of the threaded holes in the engine block.

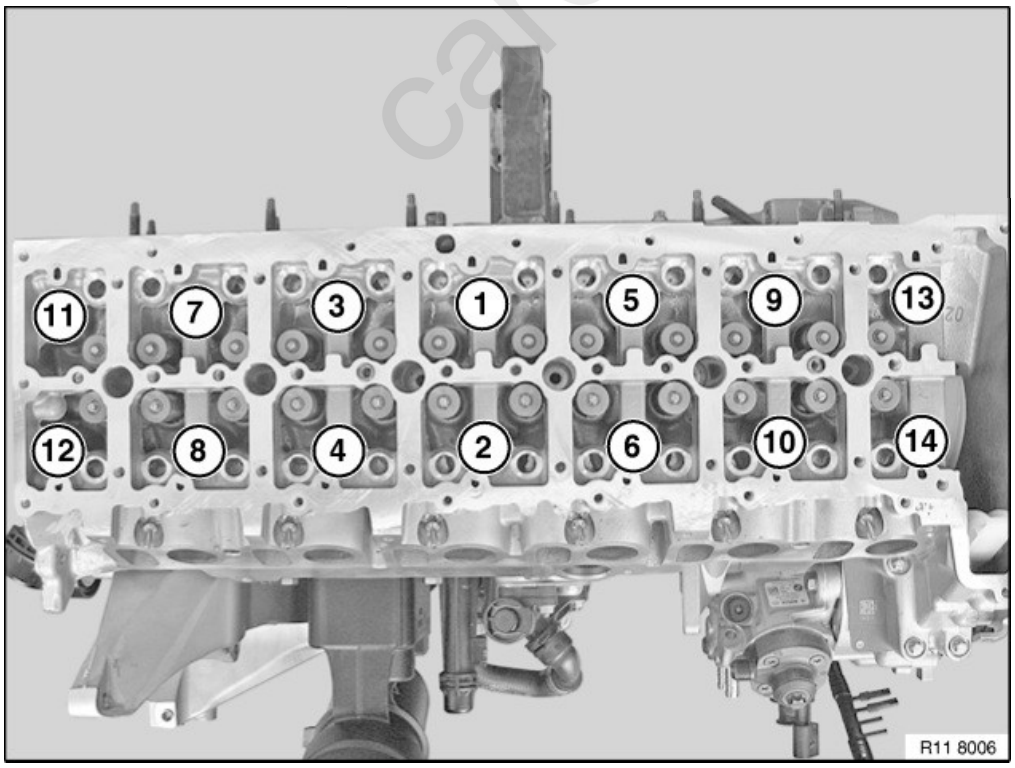
Fit new cylinder head bolts.

Do not wash off bolt coating.

Jointing torque and angle of rotation must be observed without fail (**risk of damage!**).



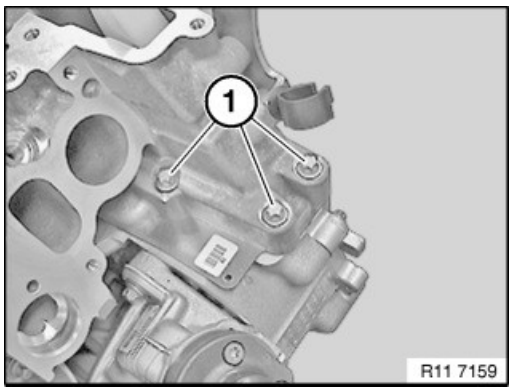
Secure cylinder head bolts (1) with special tool 00 9 120 .



Tighten cylinder head bolts in sequence (1 to 14).

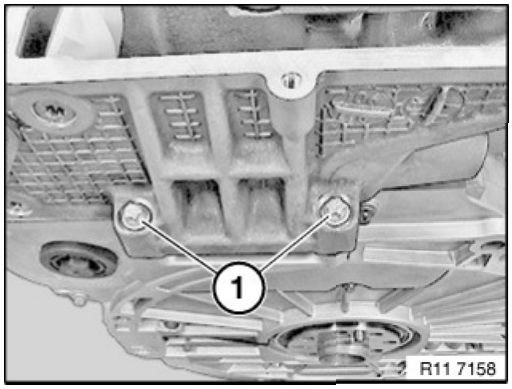
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Tightening torque: 11 12 1 AZ.



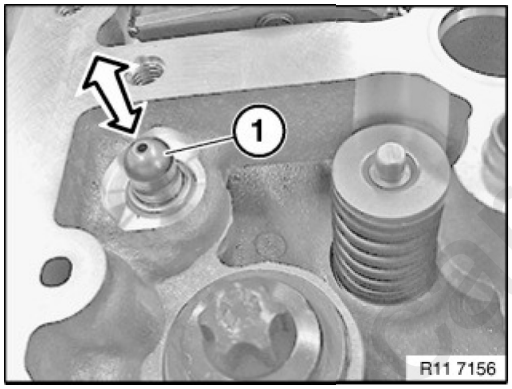
Install and tighten down screws (1).

Tightening torque: 11 00 4 AZ.

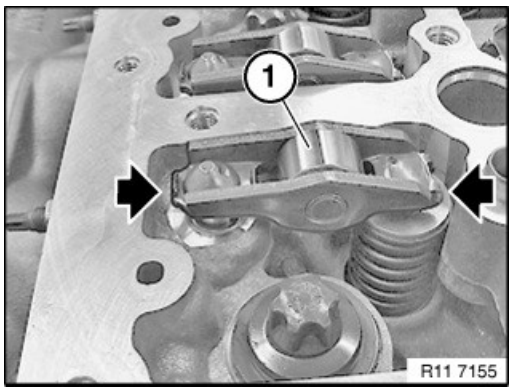


Install and tighten down screws (1).

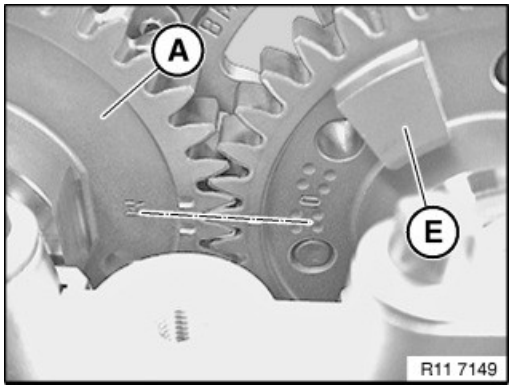
Tightening torque: 11 00 4 AZ.



Make sure that the hydraulic valve clearance compensating element (1) is installed in the correct position.

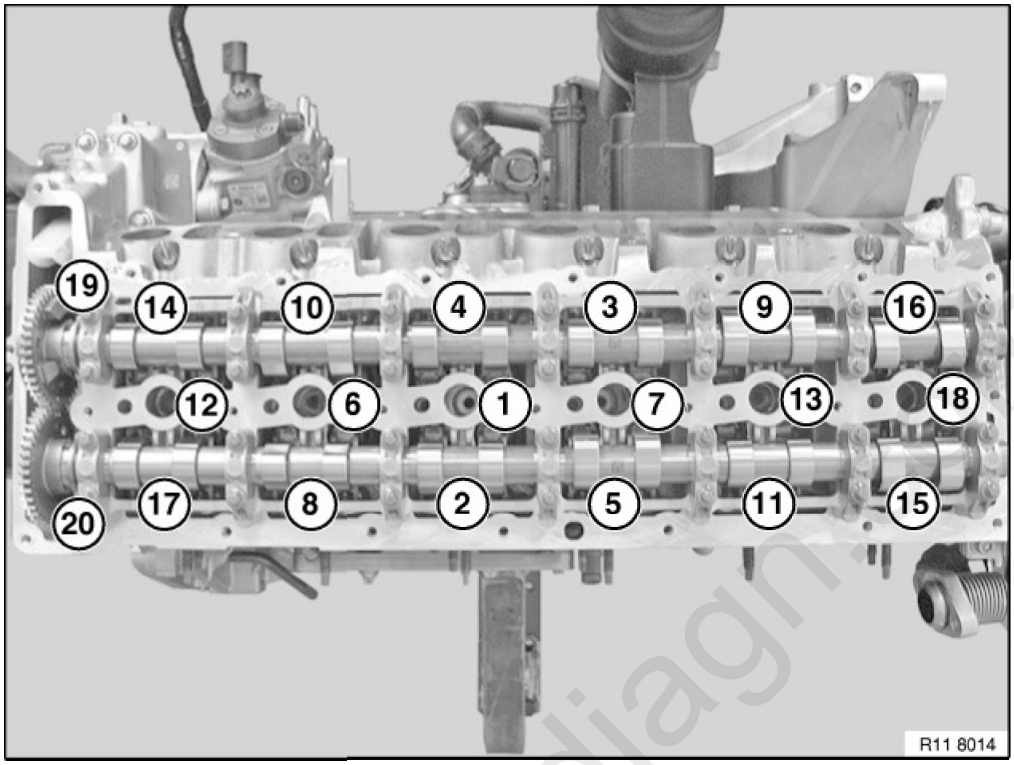


Make sure roller cam followers (1) are in correct installation position.



Important!

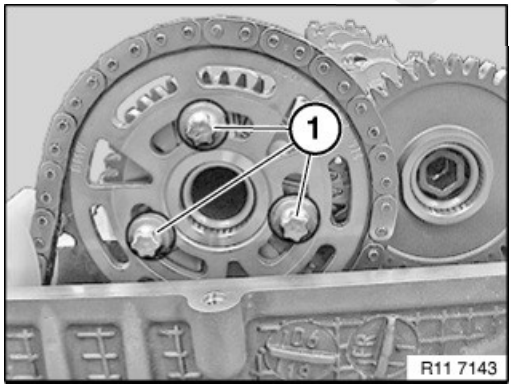
The camshaft sprockets (A and E) must be adjusted to the marking before the camshaft carrier is mounted on the cylinder head. **Risk of damage!** to engine valves.



Place camshaft carrier on cylinder head.

Tighten bolts in sequence (1 to 20).

Tightening torque: 11 31 3 AZ.



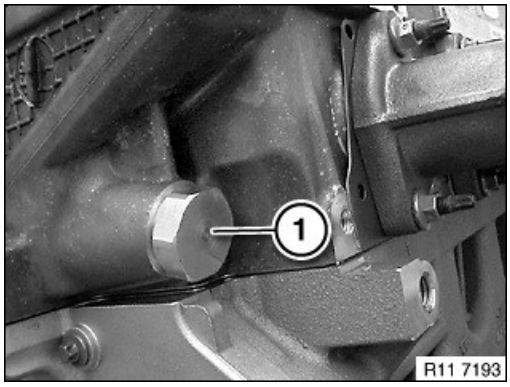
Install chain sprocket with timing chain.

Insert bolts (1).

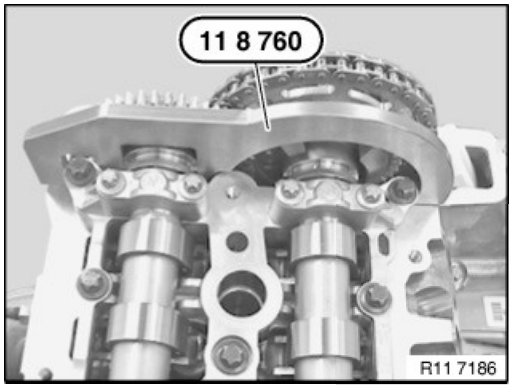
Join bolts (1) to 10 Nm.

Release bolts (1) through 90°.

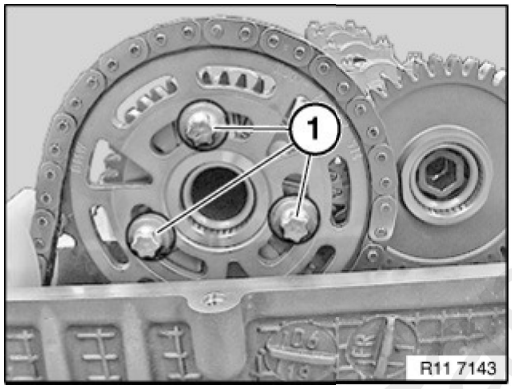
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Install chain tensioner (1).



Place special tool 11 8 760 on mounting flats of exhaust camshaft.*Note:* Special tool 11 8 760 must lie flush on cylinder head.



Tighten camshaft bolts (1).

Tightening torque: 11 31 1AZ.

Assemble engine.

Check timing.

Remove all special tools.

Cooling system must be topped up, bled and checked for watertightness.

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11 12 000 Removing and installing/sealing cylinder head cover (N57 D30 U/O/T 0/1)

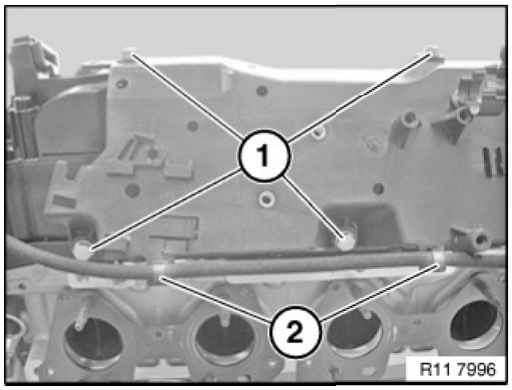
Important!

When working on the oil, coolant or fuel circuit, you must protect the alternator against contamination.

Cover alternator with suitable materials.

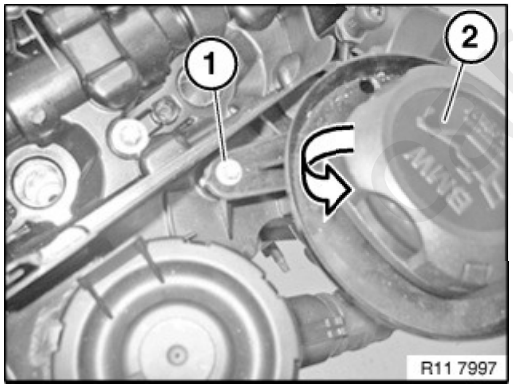
Necessary preliminary work:

- Remove intake plenum.
- Remove all injectors.
- Remove pressure accumulator.
- Release engine wiring harness in area of cylinder head cover.



Release screws (1).

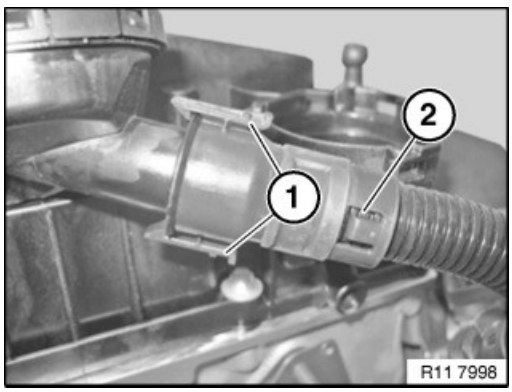
Lay cable clip (2) to one side.



Release screw (1).

Turn oil filler neck (2) in direction of arrow to stop.

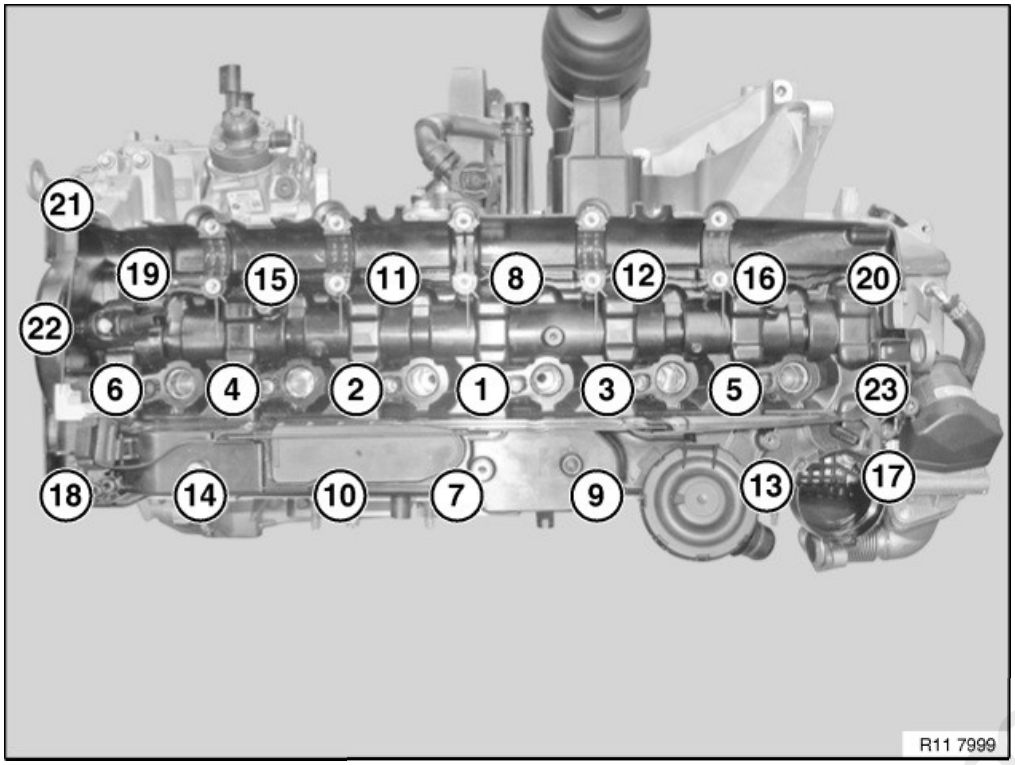
Lift out oil filler neck (2).



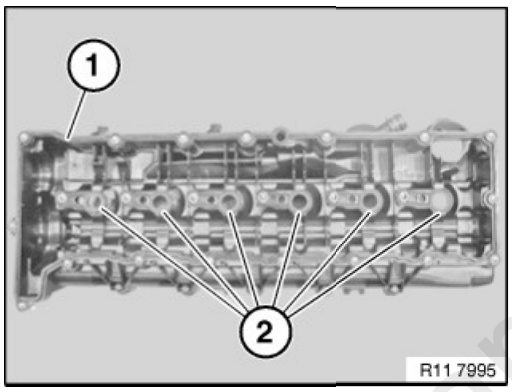
Press locking hooks (1) down.

Remove hose (2) for engine ventilation.

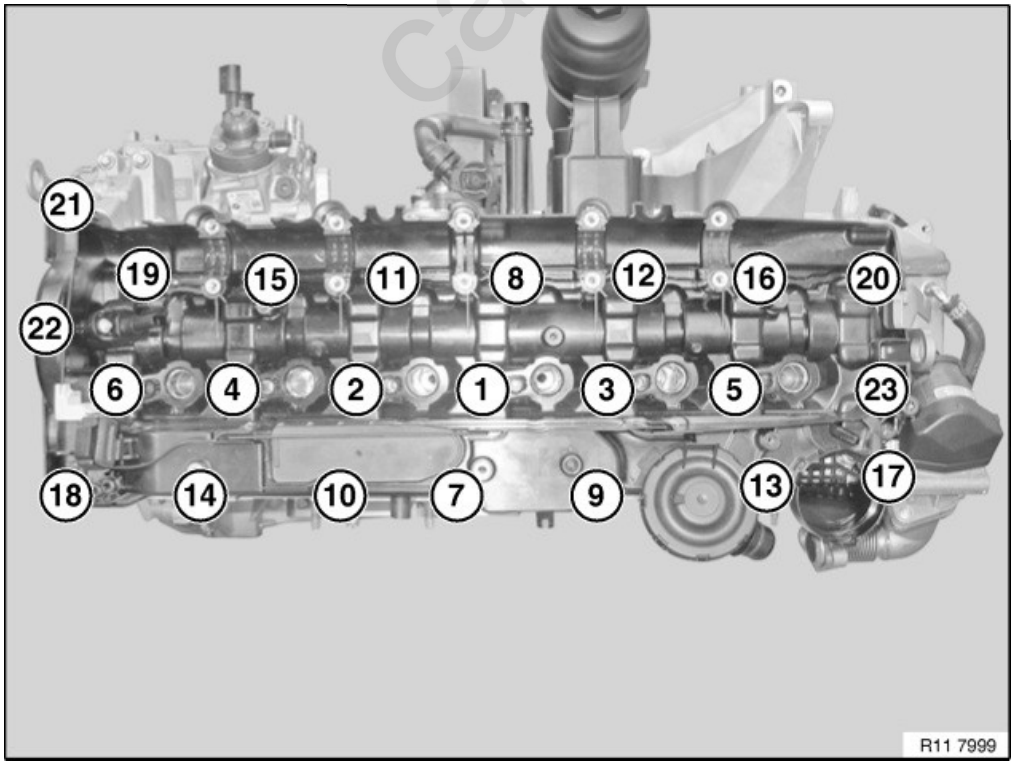
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Undo cylinder head cover bolts in the sequence 23 to 1.



Replace profile seals (1 and 2).



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Install cylinder head cover with new profile seal.

Secure cylinder head cover bolts in the sequence 1 to 23.

Tightening torque: 11 12 4AZ.



Assemble engine.

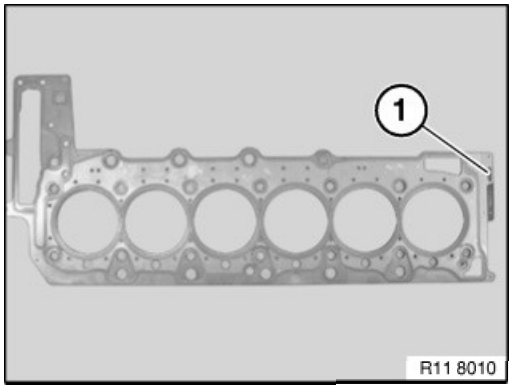
Check engine for leak tightness.

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11 12 501 Replacing cylinder head gasket (N57 D30 U/O/T 0/1)

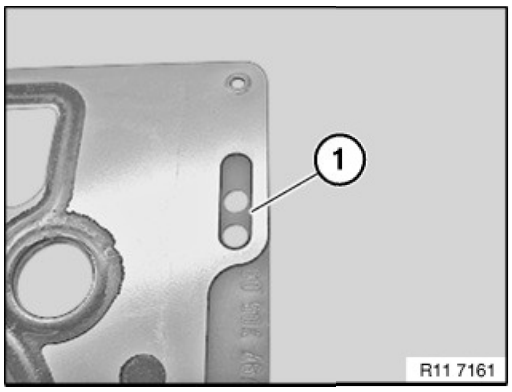
Necessary preliminary tasks:

- Remove cylinder head.



The cylinder head gasket is designed as a beaded metal gasket.

Pay attention to gasket thickness (1).



Highest piston protrusion at measuring points (1 and 2) of all 4 pistons determines thickness of cylinder head gasket.

Piston protrusion up to 0.92 mm

- Install 1-hole cylinder head gasket.

Piston protrusion >0.92 ... 1.03 mm

- Install 2-hole cylinder head gasket.

Piston protrusion greater than >1.03 ... 1.18 mm

- Install 3-hole cylinder head gasket.

Assemble engine.

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11 13 000 Removing and installing, sealing or replacing oil sump (N57 D30 O/T 1)

Special tools required:

- 00 0 200
- 00 0 201
- 00 0 202
- 00 0 204
- 00 0 208
- 11 0 000
- 11 8 780
- 11 4 472
- 11 4 471

Necessary preliminary work:

- Remove starter motor.
- Drain engine oil.
- Remove oil dipstick guide tube.
- Remove front axle differential (AWD).
- Removing bearing support (all-wheel drive).
- Lower front axle support.

Note:

Front axle alignment is not required.

Caution!

Engines with surface sealant:

Application time of sealing bead max. 12 minutes.

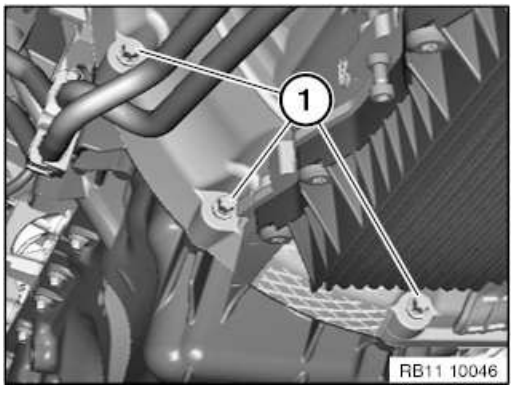


Illustration: Automatic transmission

Release screws (1) from transmission.

Automatic transmission: Tightening torque 24 00 1AZ.

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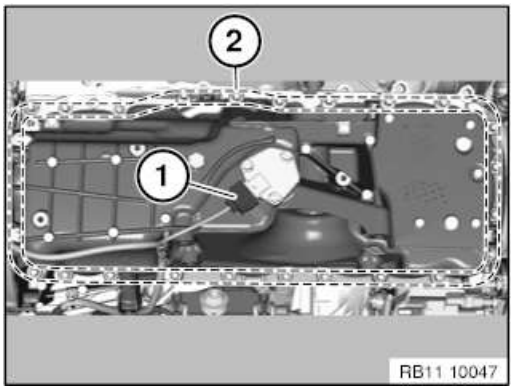


Illustration: 4WD

Installation note:

Renew gasket.

Unplug connector (1) from oil level switch and unclip cable in area of oil sump.

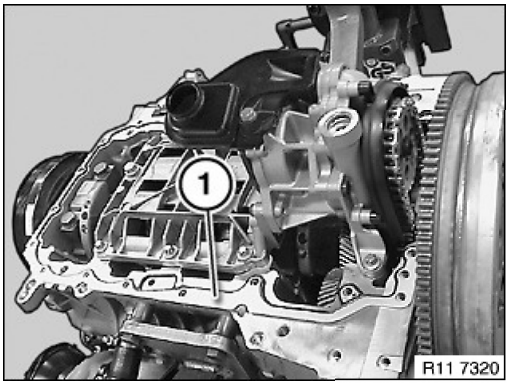
Modify oil level sensor if replacing oil sump.

Release oil sump bolts along dashed line (2).

Tightening torque 11 13 2AZ.

Detach oil sump downward.

Installation note:
Tighten down all screws diagonally and evenly.

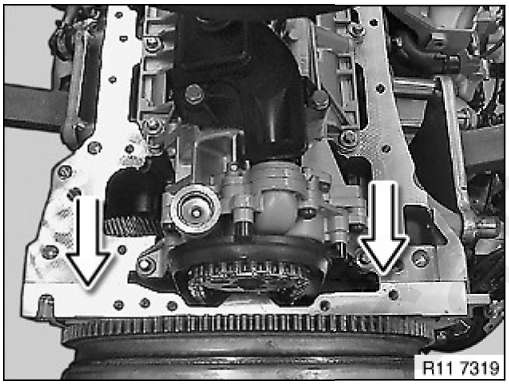


Graphic N47T

Only on vehicles with gasket

Remove gasket (1).

Remove gasket debris from sealing surface and clean sealing surface.



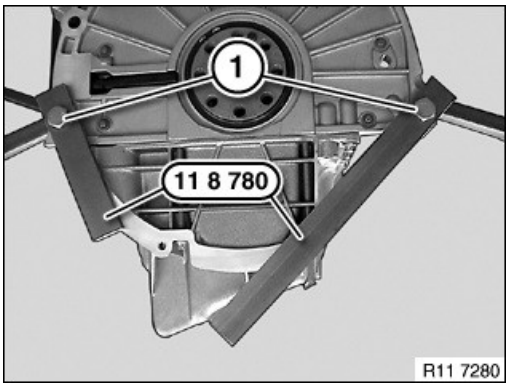
Installation note:
Use liquid sealant 2.1 Drei Bond.

Apply Drei Bond liquid sealant lightly and evenly in the area of the arrows on the differential cover to the engine block.

Caution!

Oil sump gasket must not be lubricated.

Install oil sump with a new gasket.

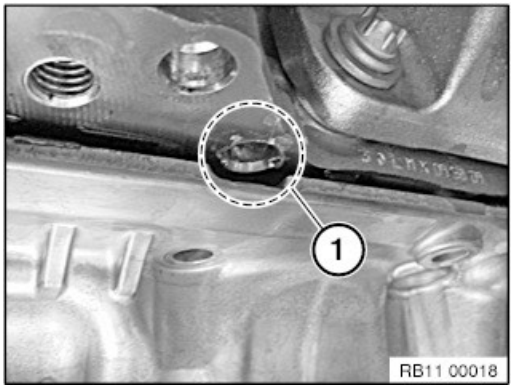


Installation note:
Special tool 11 8 780 is only necessary if the engine or the transmission is removed.

Position special tool 11 8 780 with transmission bolts (1) so that engine oil sump is exactly flush with engine block.

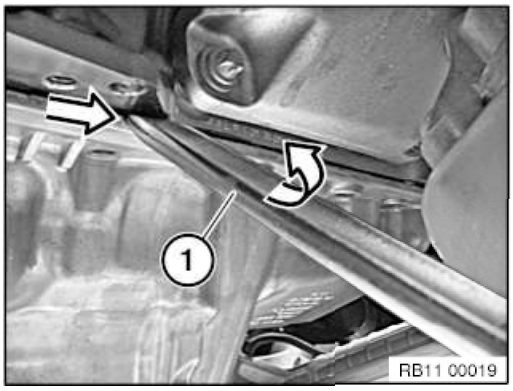
Attaching the oil sump.

.com

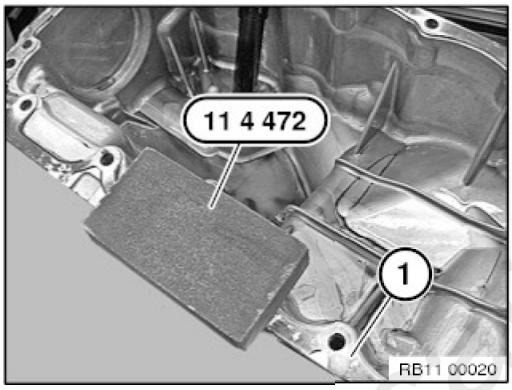


Engines with liquid seal: Caution!

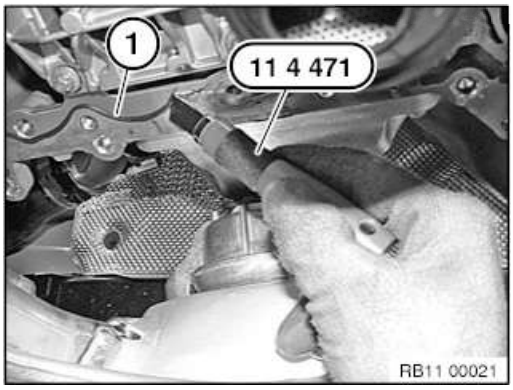
The oil sump can only be loosened in the areas (1) where an aperture is present in the oil sump.



Use a suitable crow bar (1) at the appropriate point to release the oil sump in direction of arrow.

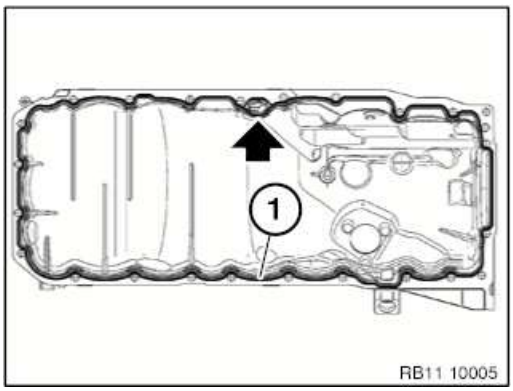


Clean sealing surface (1) with special tool 11 4 472 .*Installation note:* Sealing surfaces must be free of oil, grease and cleaning agents.



Clean sealing surface (1) with special tool 11 4 471 .*Installation note:* Sealing surfaces must be free of oil, grease and cleaning agents.

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Apply sealing compound:

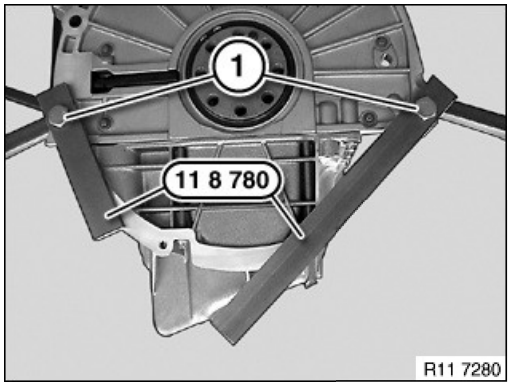
Apply the sealing compound in area (1).

Make sure that the sealing bead runs along the inner edge.

The oil return channel must be completely surrounded (see arrow).

Installation note:
The oil sump must be installed approximately 10 minutes after application of the sealing compound.

Sealant height approximately 2 to 2.5 mm.



Installation note:
Special tool 11 8 780 is only necessary if the engine or the transmission is removed.

Position special tool 11 8 780 with transmission bolts (1) so that engine oil sump is exactly flush with engine block.

Attaching the oil sump.

Assemble engine.

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