51 11 993 Additional work: mounting the number plate baseplate/number plate

1 – Install the number plate baseplate for the number plate

WARNING

Malfunction of the sensors of the driver assistance systems.

Incorrect assembly of the number plate leads to a malfunction of the sensors of the driver assistance systems.

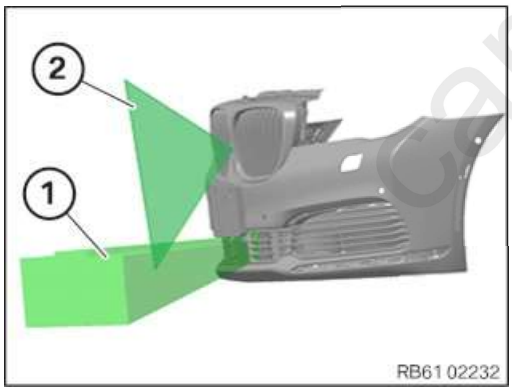
- Fix number plate and number plate baseplate only according to the dimensions specified in the repair instructions.
- Secure number plate and number plate baseplate on the bumper panel **without pre-drilling** , otherwise there is a risk of damage to the underlying cables.
- Only use number plate baseplates that have been approved for the vehicle type.

TECHNICAL INFORMATION

The number plate must be precisely mounted on the number plate baseplate and must not protrude on the underside.
The number plate carrier must not be installed on the front bumper.

TECHNICAL INFORMATION

In the European version with basic bumper panel, the number plate is installed without number plate baseplate.



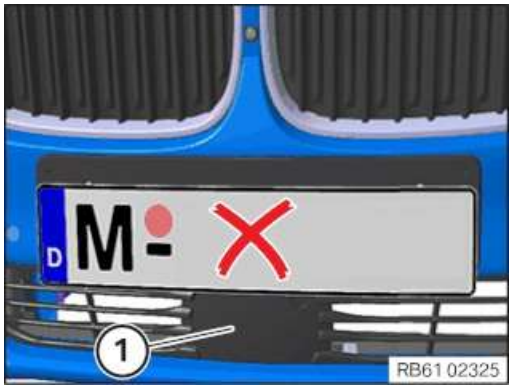
▸ **Positioning the number plate**

- Position the number plate or number plate baseplate correctly.
- Make sure that the angle of radiation of the ACC sensor (1) is not obstructed.
- Make sure that the angle of radiation of the front camera (2) is not obstructed.

▹ **Detect possible fault pattern due to incorrect assembly and rectify**

Check

- Check number plate for correct position.



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Result

» The number plate is positioned too low.

» The angle of radiation of the ACC sensor (1) is partially covered.

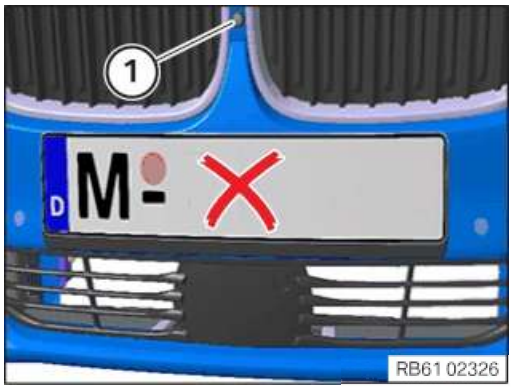
» Malfunction of the ACC sensor (1) is possible.

Measure

- Position the number plate correctly.

Check

- Check number plate for correct position.



Result

» The number plate is positioned too high.

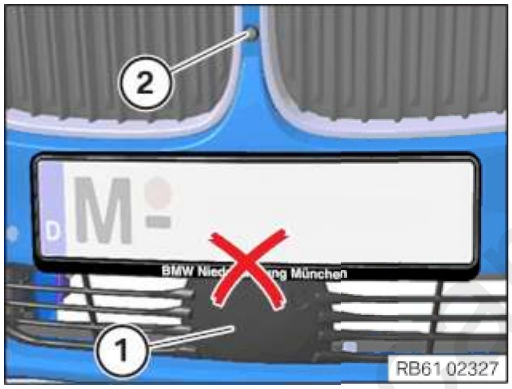
» The angle of radiation of the front camera (1) is partially covered.

Measure

- Position the number plate correctly.

Check

- Check installation of the number plate carrier.



Result

» The angle of radiation of the ACC sensor (1) is partially covered.

» Malfunction of the ACC sensor (1) is possible.

» The angle of radiation of the front camera (2) is partially covered.

Measure

- Remove the number plate carrier.



- With Check Control messages due to incorrect assembly of the number plate or the number plate baseplate: Position the number plate or the number plate baseplate correctly.

carsdiagn.com



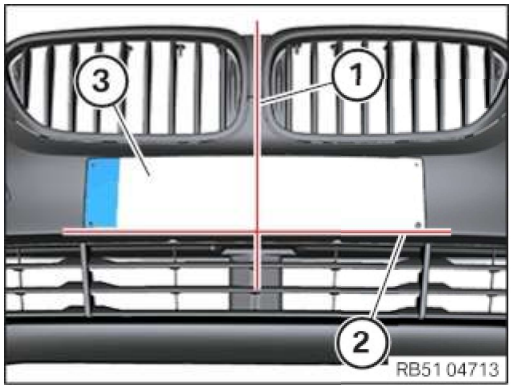
CAUTION

Laser beam.

Danger of injury!

- Do not look into the laser beam.

- Park the vehicle and the special tool 2 407 566 on a flat and even surface.
- Mount the laser on the tripod.
- Switch on laser (Position without automatic level).
- Activate laser horizontally and vertically.



TECHNICAL INFORMATION

In the European version with basic bumper panel, the number plate is installed without number plate baseplate.

- **With European version with bumper panel (Basic):**

  Mark the centre of the number plate (3).

  Position and centre align the special tool for the vehicle.

  Align the vertical laser beam (1) with the centre of the vehicle (e.g. BMW badge).

  Align the horizontal laser beam (2) at two symmetrical corners on the vehicle.

  Align the horizontal laser beam (2) with the edge of the bumper panel.

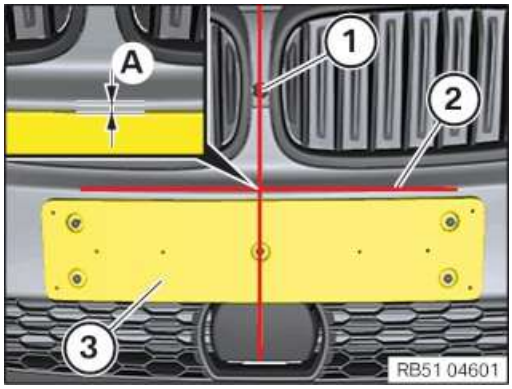
  Align the number plate (3) on both laser beams (1) and (2) and mark the attachment points in all four corners.

  Screw down the number plate (3) at the marked attachment points **without pre-drilling**. Use only short screws (TS 5x13) for this purpose.

Car registration number

Screw TS 5x13		Tightening torque	0,7 Nm

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- **With European version with M Aerodynamic package:**

  Position and centre align the special tool for the vehicle.

  Align the vertical laser beam (1) with the centre of the vehicle (e.g. BMW badge).

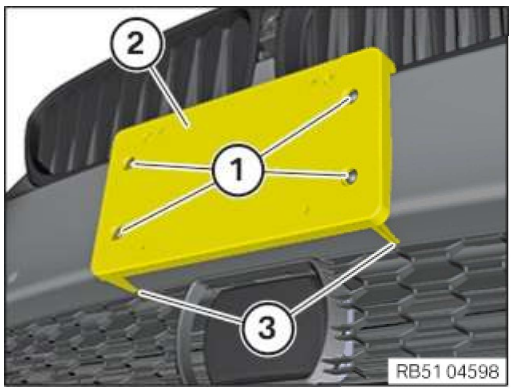
  Align the horizontal laser beam (2) at two symmetrical corners on the vehicle.

  Align the horizontal laser beam (2) as shown.

  Move the horizontal laser beam (2) vertically down by dimension (A).
- Align the number plate baseplate (3) on the horizontal laser beam and mark the attachment points.
- Screw down the number plate baseplate (3) at the marked attachment points **without pre-drilling**.

License plate baseplate

Screw TS 5x16		Tightening torque	0,7 Nm



- **With US version, Chinese version and Japanese version:**

  Attach the number plate baseplate (2) with the guides (3) in the bumper panel.

  Align the number plate baseplate (3) on the bumper panel.

  Screw down the screws (1) **without pre-drilling**.

License plate baseplate

Screw TS 5x16		Tightening torque	0,7 Nm

Additional Information

Overview of Tightening Torques

Car registration number Used in step 1

Screw TS 5x13		Tightening torque	0,7 Nm

License plate baseplate Used in step 1

Screw TS 5x16		Tightening torque	0,7 Nm

Overview of Special Tools

2 407 566 Laser



Common Used in step 1

Usage	For aligning a number plate or a support for a number plate on the vehicle (front bumper). Delivery specification 1 x Kreuz-laser and 1 x tripod.
Included in the tool or work	
Storage location	
Replaced by	
In connection with	
SI-Number	01 05 15 (235)

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Overview Technical Data

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00 00 252 BMW engine oil service without supplementary service

WARNING

Hot fluids.

Risk of scalding!

- Conduct all work in the vehicle wearing appropriate personal protective equipment only.

WARNING

Hot surfaces.

Risk of burning!

- Perform all work only on components that have cooled down.

RISK OF DAMAGE

Contaminant or foreign body.

Contamination can result in malfunctions, operating failure or leaks.

- Adhere to the utmost cleanliness.
- Protect components from contamination e.g. by covering.
- Close off line connections with seal plugs.

RISK OF DAMAGE

Engine damage caused by excessively filling the engine with engine oil.

Filling an excessive quantity of engine oil may cause engine damage.

- Observe the exact engine oil filling capacity.
- Drain the engine oil.

TECHNICAL INFORMATION

Make sure the vehicle is at operating temperature for engine oil service (engine oil temperature > 70 °C).

TECHNICAL INFORMATION

Collect and dispose of emerging fluids. Observe country-specific waste disposal regulations.

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PRELIMINARY WORK

1 – Removing the acoustic cover

WARNING

Hot surfaces.

Risk of burning!

- Perform all work only on components that have cooled down.

RISK OF DAMAGE

Damage to the acoustic cover.

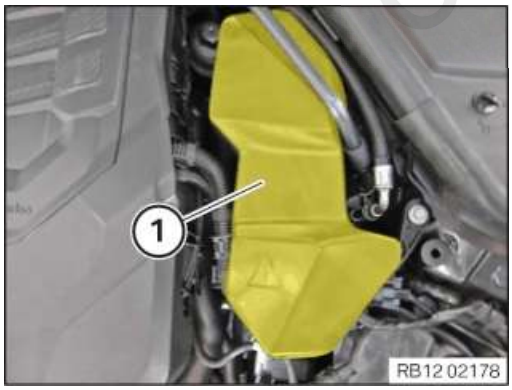
Jerky movements during disassembly and excessive application of force during installation may result in breakage of the acoustic cover.

- Disassemble or mount the acoustic cover carefully.
- Disassemble or mount snap-lock couplings of the ball pivots one after the other.
- Disassemble or mount acoustic cover only at temperatures >20 °C.
- Use only distilled water as an auxiliary material during installation, no lubricants.



- Unclip the acoustic cover (1) from the holders in the **marked** areas towards the top.

2 – Remove the cover of the DME control unit

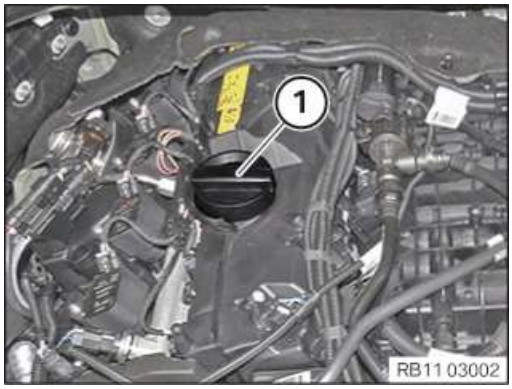


- Pull the cover (1) toward the top and remove.

MAIN WORK

3 – Removing the oil filler cap

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- Open oil filler cap (1).

4 – Removing the oil filter element

WARNING

Hot fluids.

Risk of scalding!

- Conduct all work in the vehicle wearing appropriate personal protective equipment only.

WARNING

Hot surfaces.

Risk of burning!

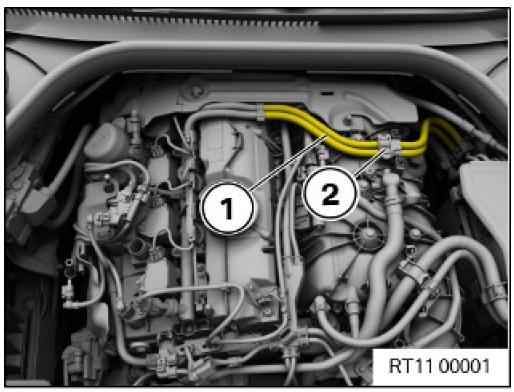
- Perform all work only on components that have cooled down.

RISK OF DAMAGE

Contaminant or foreign body.

Contamination can result in malfunctions, operating failure or leaks.

- Adhere to the utmost cleanliness.
- Protect components from contamination e.g. by covering.
- Close off line connections with seal plugs.

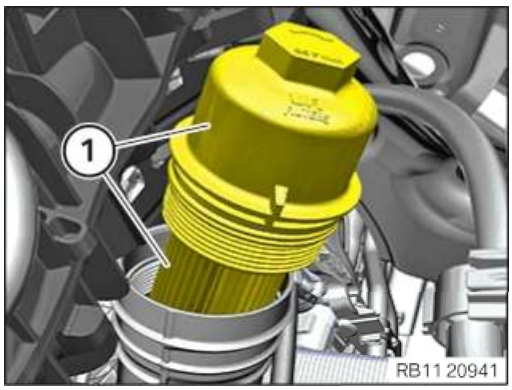


- Unclip engine wiring harness (1) from holder (2) and place it aside.

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- Loosen the oil filter cover (1).



TECHNICAL INFORMATION

Collect and dispose of emerging fluids. Observe country-specific waste disposal regulations.

- Guide out and remove the oil filter cover in the upward direction with oil filter element (1).

5 – Releasing the oil drain plug

WARNING

Hot fluids.

Risk of scalding!

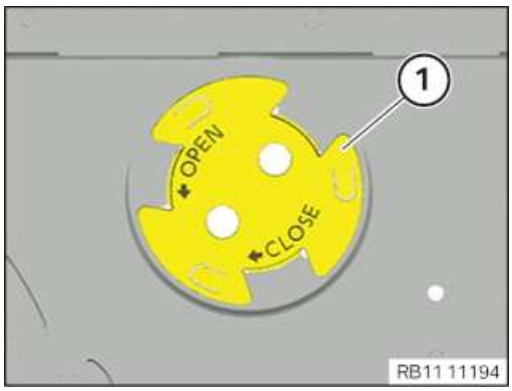
- Conduct all work in the vehicle wearing appropriate personal protective equipment only.

WARNING

Hot surfaces.

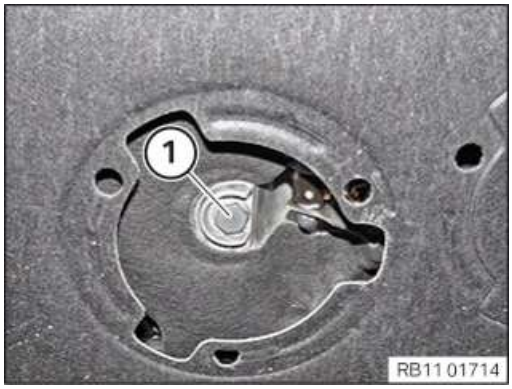
Risk of burning!

- Perform all work only on components that have cooled down.



- Turn and remove service cap (1).

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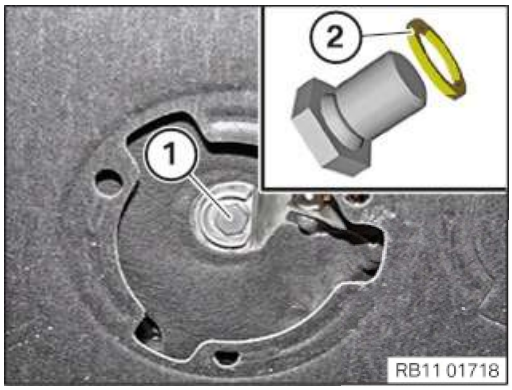
- Open oil drain plug (1) from the oil sump.

TECHNICAL INFORMATION

Collect and dispose of emerging fluids. Observe country-specific waste disposal regulations.

- Allow the engine oil to drain out fully.

6 – Tightening the oil drain plug

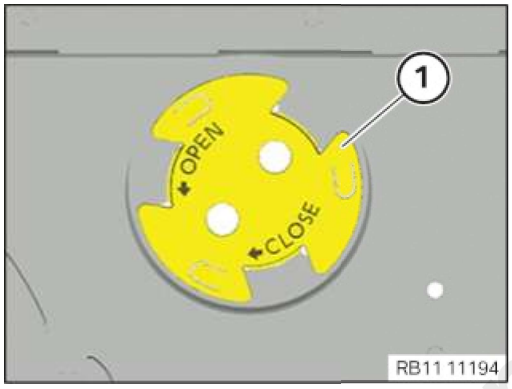


- Renew sealing ring (2).

  Parts: Sealing ring
- Position oil drain plug (1) on the oil sump and tighten.

Oil drain plug

M12x16	Renew the sealing ring.	Tightening torque	25 Nm



- Install service cap (1).

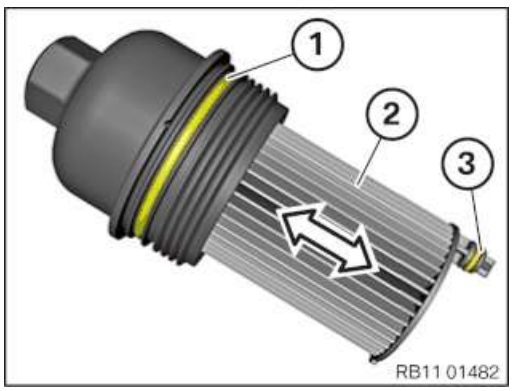
7 – Replace oil filter element

RISK OF DAMAGE

Contaminant or foreign body.

Contamination can result in malfunctions, operating failure or leaks.

- Adhere to the utmost cleanliness.
- Protect components from contamination e.g. by covering.
- Close off line connections with seal plugs.



- Renew the O-ring (1) and the oil filter element (2).

  Parts: O-ring, oil filter element
- Ensure that O-rings (1) and (3) are installed **correctly**.
- Coat the O-rings (1) and (3) with engine oil.
- Push the oil filter element (2) into the oil filter cover .

  The oil filter element (2) must engage audibly.

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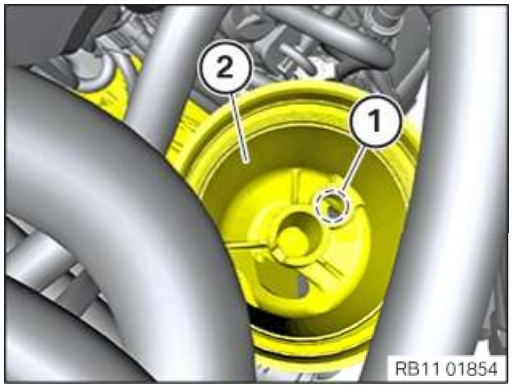
8 – Installing the oil filter element

RISK OF DAMAGE

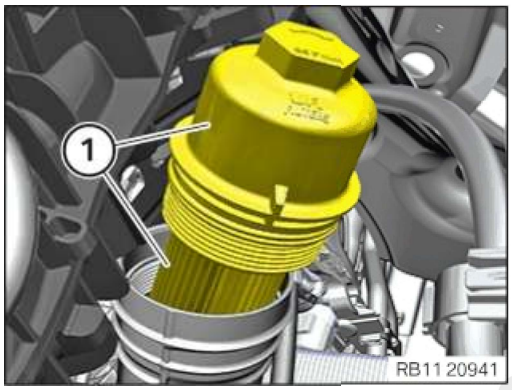
Contaminant or foreign body.

Contamination can result in malfunctions, operating failure or leaks.

- Adhere to the utmost cleanliness.
- Protect components from contamination e.g. by covering.
- Close off line connections with seal plugs.



- Position the oil filter cover with the oil filter element in guide bore hole (1) in oil filter housing (2).



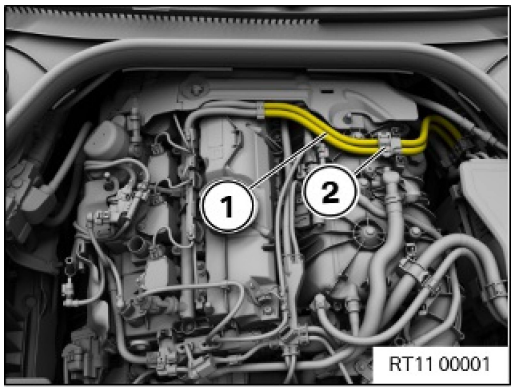
- Install the oil filter cover (1) including oil filter element.



- Tighten the oil filter cover (1).

Oil filter cover to oil filter module

O-ring lightly oiled.	Tightening torque	25 Nm



- Clip in the engine wiring harness (1) in the holder (2).

9 – Topping up the engine oil

RISK OF DAMAGE

Damage to the petrol particulate filter.

Vehicles equipped with a petrol particulate filter must be operated with low-ash engine oil only.

- Use BMW Longlife-04 , BMW Longlife-12 FE or BMW Longlife-17 FE+ engine oils or engine oils approved by BMW matching the same specifications only.
- For additional information see: Overview of approved engine oils for BMW Group engines.

RISK OF DAMAGE

Engine damage caused by excessively filling the engine with engine oil.

Filling an excessive quantity of engine oil may cause engine damage.

- Observe the exact engine oil filling capacity.
- Drain the engine oil.

- Pour in engine oil.

Engine oil B48B20O1/B46B20O1

Filling capacity, engine oil change with oil filter element	5,25 l

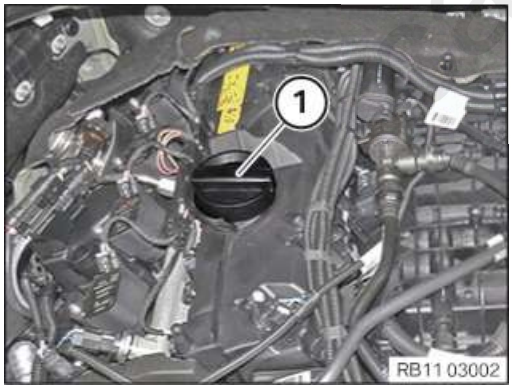
Engine oil: Technically suitable engine oils for BMW Group engines

Engine oil

Filling capacity, engine oil change with oil filter element	5,25 l

Engine oil: Technically suitable engine oils for BMW Group engines

10 – Installing the oil filler cap



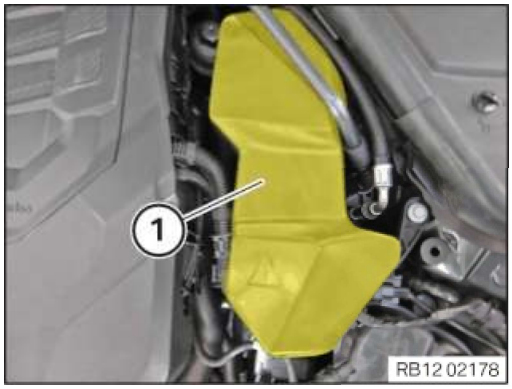
- Close oil filler cap (1).

11 – Check engine oil level

- Park vehicle on a horizontal surface.
- In the case of automatic transmission, shift to selector lever position N or P.
- Accelerator pedal is not pressed.
- Engine is running and is at operating temperature.
- Read off the engine oil level in the instrument cluster (KOMBI) or on the control display.
- Top up engine oil if necessary.

POSTPROCESSES

12 – Installing the cover of the DME control unit



- Insert and install cover (1) into guides.

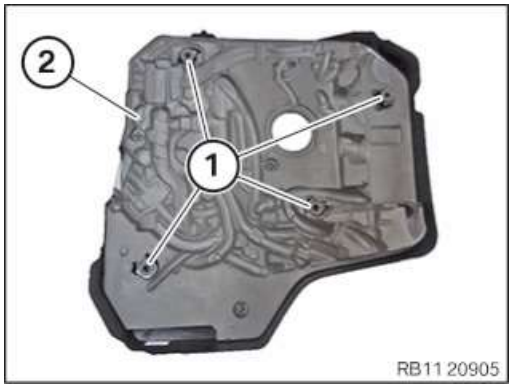
13 – Install acoustic cover

RISK OF DAMAGE

Damage to the acoustic cover.

Jerky movements during disassembly and excessive application of force during installation may result in breakage of the acoustic cover.

- Disassemble or mount the acoustic cover carefully.
- Disassemble or mount snap-lock couplings of the ball pivots one after the other.
- Disassemble or mount acoustic cover only at temperatures >20 °C.
- Use only distilled water as an auxiliary material during installation, no lubricants.



- Check all rubber mounts (1) of acoustic cover (2) for correct seating.

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- Clip in the acoustic cover (1) into the holders in the **marked** areas.

  The acoustic cover (1) must audibly engage into place.

Additional Information

Overview of Tightening Torques

Oil drain plug			Used in step 6
M12x16	Renew the sealing ring.	Tightening torque	25 Nm

Oil filter cover to oil filter module			Used in step 8
O-ring lightly oiled.		Tightening torque	25 Nm

Overview Technical Data

Engine oil B48B20O1/B46B20O1	Used in step 9
Filling capacity, engine oil change with oil filter element	5,25 l
Engine oil: Technically suitable engine oils for BMW Group engines	

Engine oil	Used in step 9
Filling capacity, engine oil change with oil filter element	5,25 l
Engine oil: Technically suitable engine oils for BMW Group engines	

Links

Operating materials	**Used in step**
3.0 Technically appropriate engine oils for BMW Group engines	9

Parts

Parts required

Designation	**Used in step**
Seals, oil filter element to full-flow oil filter and to oil filter cover	8
Seal, oil filter cover to full-flow oil filter	8

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00 00 262 BMW rapid inspection

1 Carry out a quick inspection



NOTICE

A checklist can be printed off for quick inspection. See Additional Information.

- Print out document.
- Work through check list.
- Hand over the checklist to the customer.

Additional Information

Links

Technical service information	Used in step
BMW quick inspection	1
BMW i quick inspection	1
MINI quick inspection	1

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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).

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15. Unscrew the oil drain plug.
16. Allow the engine oil to drain off for 15 minutes.
    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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00 00 610 Engine oil service

WARNING

Hot fluids.

Risk of scalding!

- Conduct all work in the vehicle wearing appropriate personal protective equipment only.

WARNING

Hot surfaces.

Risk of burning!

- Perform all work only on components that have cooled down.

RISK OF DAMAGE

Contaminant or foreign body.

Contamination can result in malfunctions, operating failure or leaks.

- Adhere to the utmost cleanliness.
- Protect components from contamination e.g. by covering.
- Close off line connections with seal plugs.

RISK OF DAMAGE

Engine damage caused by excessively filling the engine with engine oil.

Filling an excessive quantity of engine oil may cause engine damage.

- Observe the exact engine oil filling capacity.
- Drain the engine oil.

TECHNICAL INFORMATION

Make sure the vehicle is at operating temperature for engine oil service (engine oil temperature > 70 °C).

TECHNICAL INFORMATION

Collect and dispose of emerging fluids. Observe country-specific waste disposal regulations.

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PRELIMINARY WORK

1 – Removing the acoustic cover

WARNING

Hot surfaces.

Risk of burning!

- Perform all work only on components that have cooled down.

RISK OF DAMAGE

Damage to the acoustic cover.

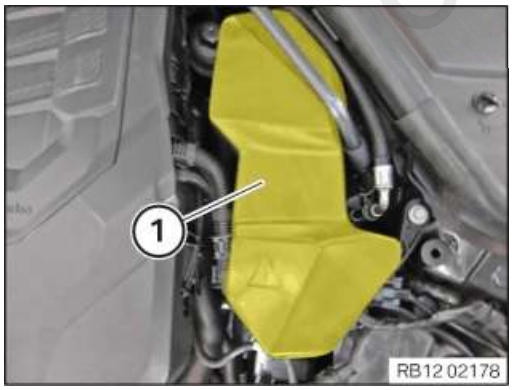
Jerky movements during disassembly and excessive application of force during installation may result in breakage of the acoustic cover.

- Disassemble or mount the acoustic cover carefully.
- Disassemble or mount snap-lock couplings of the ball pivots one after the other.
- Disassemble or mount acoustic cover only at temperatures >20 °C.
- Use only distilled water as an auxiliary material during installation, no lubricants.



- Unclip the acoustic cover (1) from the holders in the **marked** areas towards the top.

2 – Remove the cover of the DME control unit

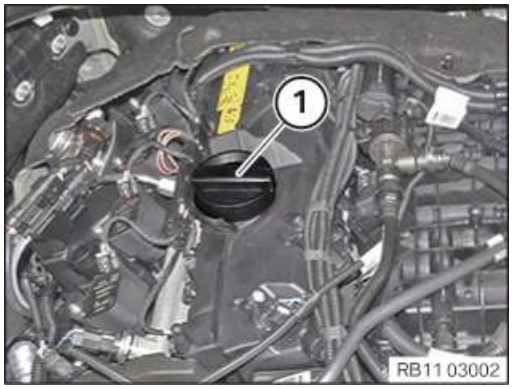


- Pull the cover (1) toward the top and remove.

MAIN WORK

3 – Removing the oil filler cap

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- Open oil filler cap (1).

4 – Removing the oil filter element

WARNING

Hot fluids.

Risk of scalding!

- Conduct all work in the vehicle wearing appropriate personal protective equipment only.

WARNING

Hot surfaces.

Risk of burning!

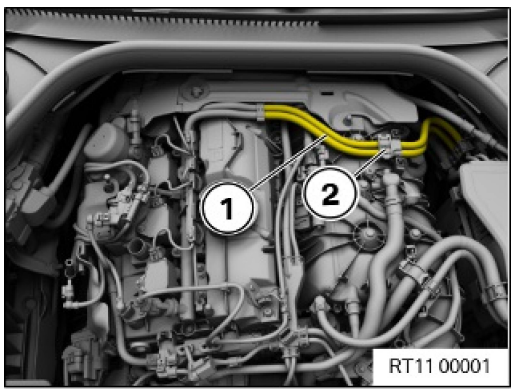
- Perform all work only on components that have cooled down.

RISK OF DAMAGE

Contaminant or foreign body.

Contamination can result in malfunctions, operating failure or leaks.

- Adhere to the utmost cleanliness.
- Protect components from contamination e.g. by covering.
- Close off line connections with seal plugs.

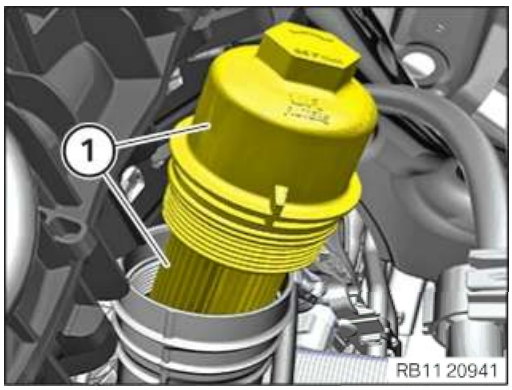


- Unclip engine wiring harness (1) from holder (2) and place it aside.

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- Loosen the oil filter cover (1).



TECHNICAL INFORMATION

Collect and dispose of emerging fluids. Observe country-specific waste disposal regulations.

- Guide out and remove the oil filter cover in the upward direction with oil filter element (1).

5 – Releasing the oil drain plug

WARNING

Hot fluids.

Risk of scalding!

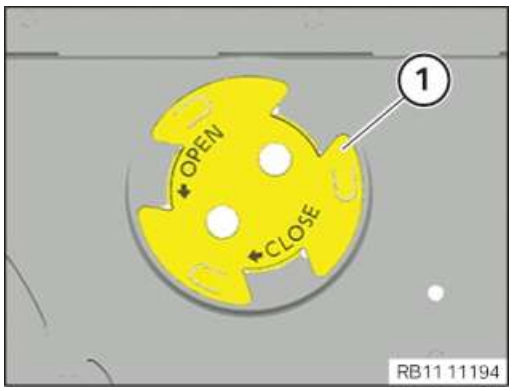
- Conduct all work in the vehicle wearing appropriate personal protective equipment only.

WARNING

Hot surfaces.

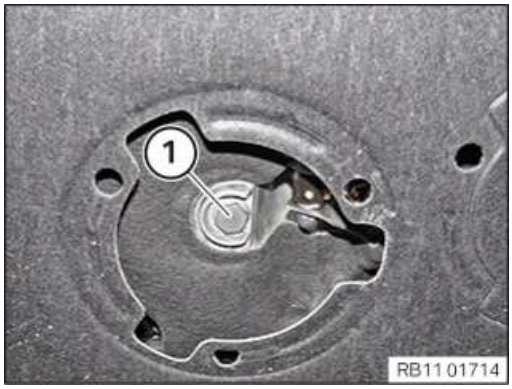
Risk of burning!

- Perform all work only on components that have cooled down.



- Turn and remove service cap (1).

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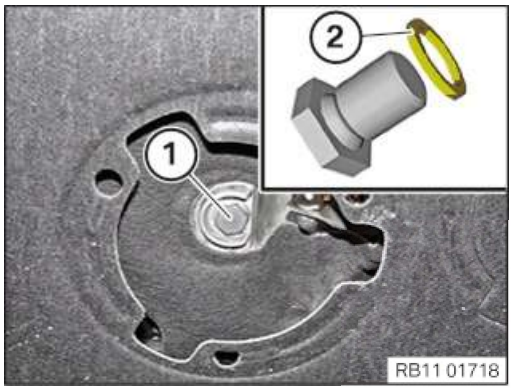
- Open oil drain plug (1) from the oil sump.

TECHNICAL INFORMATION

Collect and dispose of emerging fluids. Observe country-specific waste disposal regulations.

- Allow the engine oil to drain out fully.

6 – Tightening the oil drain plug

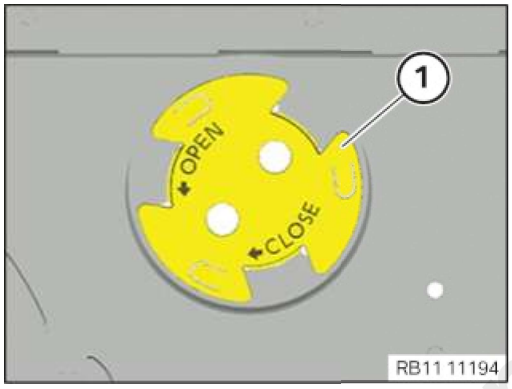


- Renew sealing ring (2).

  Parts: Sealing ring
- Position oil drain plug (1) on the oil sump and tighten.

Oil drain plug

M12x16	Renew the sealing ring.	Tightening torque	25 Nm



- Install service cap (1).

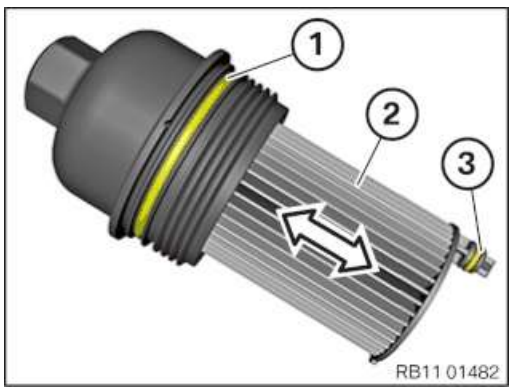
7 – Replace oil filter element

RISK OF DAMAGE

Contaminant or foreign body.

Contamination can result in malfunctions, operating failure or leaks.

- Adhere to the utmost cleanliness.
- Protect components from contamination e.g. by covering.
- Close off line connections with seal plugs.



- Renew the O-ring (1) and the oil filter element (2).

  Parts: O-ring, oil filter element
- Ensure that O-rings (1) and (3) are installed **correctly**.
- Coat the O-rings (1) and (3) with engine oil.
- Push the oil filter element (2) into the oil filter cover .

  The oil filter element (2) must engage audibly.

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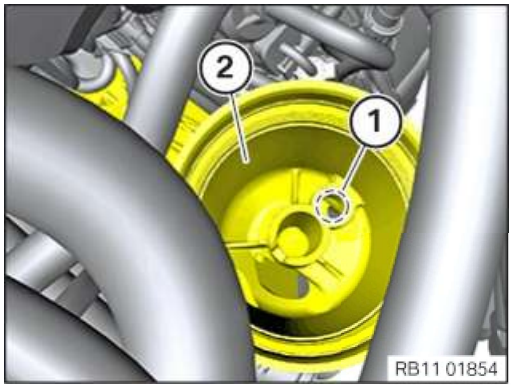
8 – Installing the oil filter element

RISK OF DAMAGE

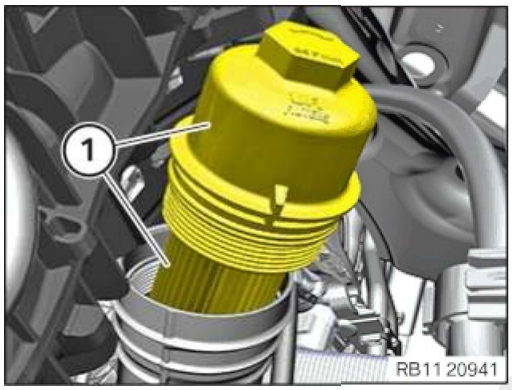
Contaminant or foreign body.

Contamination can result in malfunctions, operating failure or leaks.

- Adhere to the utmost cleanliness.
- Protect components from contamination e.g. by covering.
- Close off line connections with seal plugs.



- Position the oil filter cover with the oil filter element in guide bore hole (1) in oil filter housing (2).



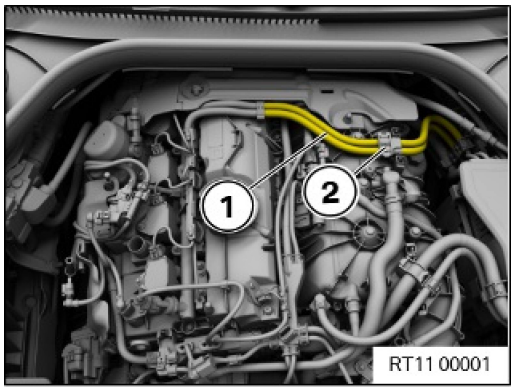
- Install the oil filter cover (1) including oil filter element.



- Tighten the oil filter cover (1).

Oil filter cover to oil filter module

O-ring lightly oiled.	Tightening torque	25 Nm



- Clip in the engine wiring harness (1) in the holder (2).

9 – Topping up the engine oil

RISK OF DAMAGE

Damage to the petrol particulate filter.

Vehicles equipped with a petrol particulate filter must be operated with low-ash engine oil only.

- Use BMW Longlife-04 , BMW Longlife-12 FE or BMW Longlife-17 FE+ engine oils or engine oils approved by BMW matching the same specifications only.
- For additional information see: Overview of approved engine oils for BMW Group engines.

RISK OF DAMAGE

Engine damage caused by excessively filling the engine with engine oil.

Filling an excessive quantity of engine oil may cause engine damage.

- Observe the exact engine oil filling capacity.
- Drain the engine oil.

- Pour in engine oil.

Engine oil B48B20O1/B46B20O1

Filling capacity, engine oil change with oil filter element	5,25 l

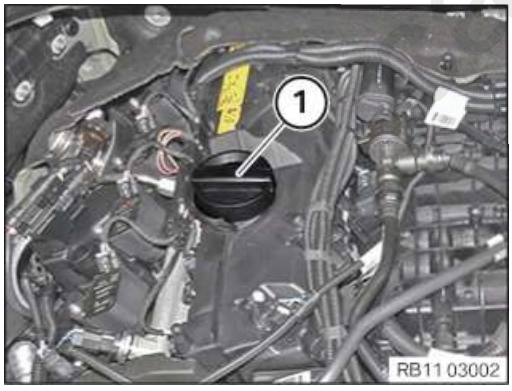
Engine oil: Technically suitable engine oils for BMW Group engines

Engine oil

Filling capacity, engine oil change with oil filter element	5,25 l

Engine oil: Technically suitable engine oils for BMW Group engines

10 – Installing the oil filler cap



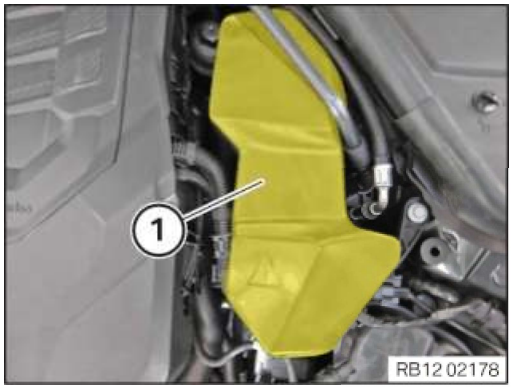
- Close oil filler cap (1).

11 – Check engine oil level

- Park vehicle on a horizontal surface.
- In the case of automatic transmission, shift to selector lever position N or P.
- Accelerator pedal is not pressed.
- Engine is running and is at operating temperature.
- Read off the engine oil level in the instrument cluster (KOMBI) or on the control display.
- Top up engine oil if necessary.

POSTPROCESSES

12 – Installing the cover of the DME control unit



- Insert and install cover (1) into guides.

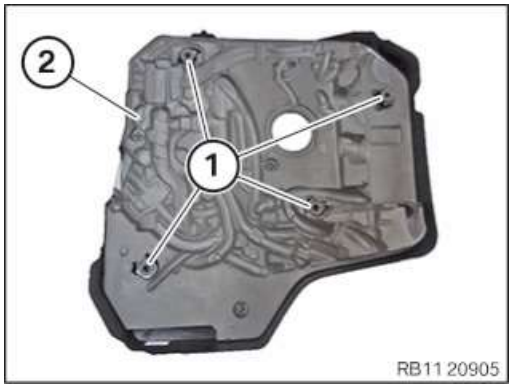
13 – Install acoustic cover

RISK OF DAMAGE

Damage to the acoustic cover.

Jerky movements during disassembly and excessive application of force during installation may result in breakage of the acoustic cover.

- Disassemble or mount the acoustic cover carefully.
- Disassemble or mount snap-lock couplings of the ball pivots one after the other.
- Disassemble or mount acoustic cover only at temperatures >20 °C.
- Use only distilled water as an auxiliary material during installation, no lubricants.



- Check all rubber mounts (1) of acoustic cover (2) for correct seating.

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- Clip in the acoustic cover (1) into the holders in the **marked** areas.

  The acoustic cover (1) must audibly engage into place.

14 – Performing a CBS reset (equipment specification without the reset button for the trip distance recorder in the instrument cluster (KOMBI))

Prerequisite

Scope of maintenance work is performed.

On-board date is set correctly.

No CC message is present.

Availability of the scope of maintenance work is under 90%.

TECHNICAL INFORMATION

The CBS scope of maintenance work can be reset in the car. In general, however, the reset of CBS functions (CBS reset) with the diagnosis system is recommended.

It is only possible to code the country-specific statutory intervals with the diagnosis system.

TECHNICAL INFORMATION

Information for the occurrence of a failed CBS reset:

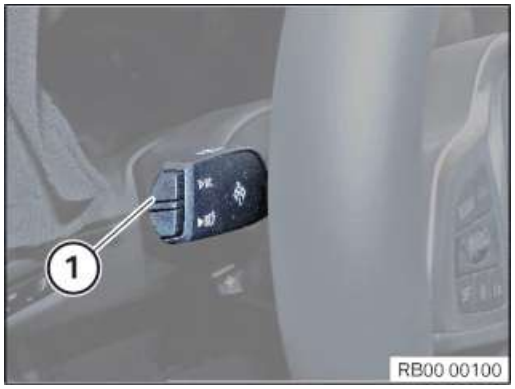
For front/rear brake service:

- A CBS reset is only possible in the vehicle with a worn brake pad wear sensor (CBS display in CID active).
- With a brake pad wear sensor that is not worn (no CBS display in the CID), a CBS reset is only possible with the diagnosis system.

Other known causes of CBS reset problems:

- Parking brake engaged
- Brake pedal pressed

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TECHNICAL INFORMATION

The reset procedure (CBS reset) is cancelled due to a timeout or a terminal change.

- Generate PWF status "Residing".
- Generate PWF status "PAD": For this purpose, press the START-STOP button three times.
- Press on-board computer button on the turn signal/high beam switch for (1) approx. 10 s, until the 1st scope of maintenance work appears on the display.

  The next position is reached by briefly pressing the on-board computer button on the turn signal/high beam switch (1)again.
- Select the desired service job.

  If a CBS reset is possible, "Reset possible" is displayed on the instrument cluster (KOMBI).
- Confirm the "Perform reset?" text message. Press the on-board computer button on the turn signal/high beam switch for (1) 3 s.

  The CBS reset is confirmed as "Reset successful" after it is performed.

15 – Replacing the battery of the radio remote control(s)

- Replace the battery of the radio remote control(s).

  For vehicles with shortened oil service interval SA8KM, SA8KL and SA8KP: Renew the battery of the remote key(s) at every 2nd engine oil service.

Additional Information

Overview of Tightening Torques

Oil drain plug — Used in step 6

M12x16	Renew the sealing ring.	Tightening torque	25 Nm

Oil filter cover to oil filter module — Used in step 8

O-ring lightly oiled.	Tightening torque	25 Nm

Overview Technical Data

Engine oil B48B20O1/B46B20O1 — Used in step 9

Filling capacity, engine oil change with oil filter element	5,25 l

Engine oil: Technically suitable engine oils for BMW Group engines

Engine oil — Used in step 9

Filling capacity, engine oil change with oil filter element	5,25 l

Engine oil: Technically suitable engine oils for BMW Group engines

Links

Operating materials	Used in step
3.0 Technically appropriate engine oils for BMW Group engines	9

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Parts

Parts required

Designation	Used in step
Seals, oil filter element to full-flow oil filter and to oil filter cover	8
Seal, oil filter cover to full-flow oil filter	8

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00 00 009 Free pre-delivery check

PRELIMINARY WORK

1 – If fitted: Removing the outer skin protection

- For a separate charge: Remove outer skin protection at least 48 h before handover to customer.

2 – Checking the vehicle for transportation damage

Check

- Check body, vehicle underbody and interior equipment for transport damage.

Result

» Transport damage present.

Measure

- Rectify transport damage.

3 – Check if the motor vehicle has spring blockers installed

Check

- Check if the spring struts have spring blockers installed.

Result

» Spring blockers installed.

Measure

- Remove the spring blockers (charge separately).

00 00 741 Pre-delivery check, spring blockers

4 – Check the indicator lights and warning lights

Check

- Check the indicator lights and warning lights in the instrument cluster (KOMBI).

Result

» The indicator lights and/or warning lights in the instrument cluster (KOMBI) are illuminated.

Measure

- Eliminate the causes for the warning messages.

5 – Checking Check Control messages

Check

- Check for Check Control messages in the CID.

Result

» Check Control messages are present in the CID.

Measure

-

▸ **Reading out the fault memory**

- Connect diagnosis system.



Check

- Read out fault memory.

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Result

» A fault memory entry is present.

Measure

- Delete the fault memory, work through the test module if applicable.

MAIN WORK

6 – Resetting transport mode and the performing pre-delivery check with the diagnosis system



- Connect diagnosis system:
  - Service functions
  - Maintenance
  - CBS pre-delivery check
- Perform the pre-delivery check with the diagnosis system.

  The transport mode is reset.

7 – Enabling the navigation map and checking the version

- Enable the navigation map via ISTA.

Check

- Check the navigation map is up to date.

Result

» Navigation map in the vehicle not up to date.

Measure

- For a separate charge: Install the most recent navigation map.

▸ **Navigation map enabling with the USB stick**

- Insert the USB stick into the PC slot.
- Download the enabling code.
  - Open the Aftersales Assistance Portal.
  - Select Parts and accessories.
  - Select "SWEEPING TECHNOLOGY" (enabling code - download).
  - Enter the dealer number and vehicle identification number.
  - Select the enabling code download.
  - Select the enabling code and select the download button.
  - Confirm the general terms and conditions.
  - Save and/or open the ZIP file available to download.
  - Select the file starting with "FSC_".
  - Copy enabling code file to the USB stick.

TECHNICAL INFORMATION

In order to use the USB stick to enable several vehicles, simply save all the enabling code files on the USB stick.

- Enable the navigation map.

» It is paramount to exactly follow the steps as described above to successfully enable the component on the motor vehicle.

8 – Check the tyre settings in the central information display (CID)

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– – Check the tyre settings in the central information display (CID)

Check

- Check for correct tyre setting in the central information display (CID).

desired state

- The mounted tyres match the tyre setting in the central information display (CID).

Result

» Incorrect tyre setting in the central information display (CID).

Measure

- Adjust the tyre setting in the central information display (CID).

  Open the menu:

  - Select **My vehicle** in the menu.
  - Select **Vehicle status** in the menu.
  - Select **Tyre pressure control (RDC)** from the menu.

  Enter the settings:

  - Select **Tyre settings** from the menu.
  - Select tyres: Summer tyres / winter tyres.
  - Select the tyre type that is mounted at the rear axle.
  - Select the load status of the vehicle.
  - Confirm the settings.

  Starting measurement of the current tyre pressure. The progress of the measurement is displayed.

9 – Activating automatic driving lights control

- Activate button for the automatic driving lights control on the light operating unit.

10 – Checking tyre pressure

TECHNICAL INFORMATION

It is essential to observe the notes on tolerance compensation.

For more information see: Service Information 00 02 14 (064) Inflation pressure measurement on vehicles with tyre pressure indicator RDC (SA2VB)

- Query the tyre pressure in the Central Information Display (CID):
  - Select **My vehicle** in the menu.
  - Select **Vehicle status** in the menu.
  - Select **Tyre pressure control RDC** from the menu.

Check

- Check the tyre pressure. Compare the nominal pressure to the actual pressure.

Result

» Tyre pressure is too low or too high.

Measure

- Use a tyre inflator to bring the tyre pressure to the nominal pressure.

  Resetting the tyre pressure control (RDC) is not necessary.

11 – Top up the washer fluid for the window washer system

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- Top up the fluid tank for the window washer system up to the maximum mark.

POSTPROCESSES

12 – Installing accessory items

- Install all items included in the delivery (floor mats, etc.) in the vehicle.

13 – If part of the accessories kit package: Charge the BMW display key



- Connect the charging cable (3) to the BMW display key (1) and the USB port in the vehicle.
- Place the BMW display key (1) into the oddments tray (2) below the centre armrest.

14 – If part of the accessories kit package: Depositing the radio remote control in the centre console

- Remove the radio remote control from the accessories kit package in the luggage compartment.
- Deposit the radio remote control in the centre console of the vehicle.

15 – Attaching the label for BMW breakdown assistance

- Attach the label for BMW breakdown assistance at the specified place in the vehicle.

16 – For winter tyres: Attach the label for maximum speed

- Attach the label for maximum speed at the edge of the driver's field of view.

17 – Clean vehicle

- Check engine compartment for cleanliness.
- Clean motor vehicle exterior.
- Clean the vehicle interior, in particular the displays and high-gloss surfaces.

18 – Korea national-market version: Enter pre-delivery check in Service Booklet

- Stamp pre-delivery check in the Service Booklet.
- Enter vehicle identification number in Service Booklet.

Additional Information

Links

Functional descriptions	Used in step
Terminal control, Parking-Residing-Driving	14

Repair instructions	Used in step
00 00 ... Work instruction for removing the protective film	1

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Technical service information	Used in step
Inflation pressure measurement in vehicles with tyre pressure display RDC (SA2VB)	10

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00 00 744 Pre-delivery check of service and electromechanical holding brake for transport and immobilisation periods of more than 6 weeks

1 Bedding in the service and parking brake

- Check service and parking brakes.

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00 00 742 Pre-delivery check of service and parking brakes with transport and immobilisation periods of 3-6 weeks

1 Checking the service and parking brake for function

Check

- Check that the service and parking brakes are functioning properly.

Result

» Function limitations.

Measure

- Service the service and parking brake.

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00 00 602 Service - air filter element

WARNING

Hot surfaces.

Risk of burning!

- Perform all work only on components that have cooled down.

1 – Removing air filter element

Prerequisite

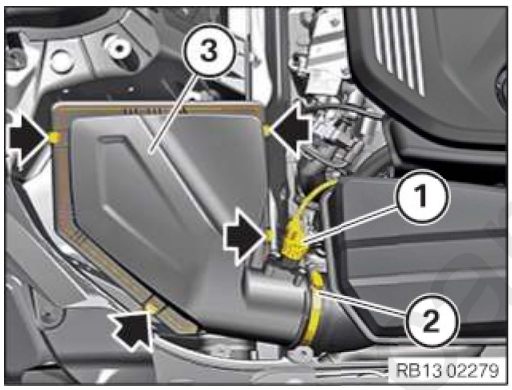
Ignition is switched off.

RISK OF DAMAGE

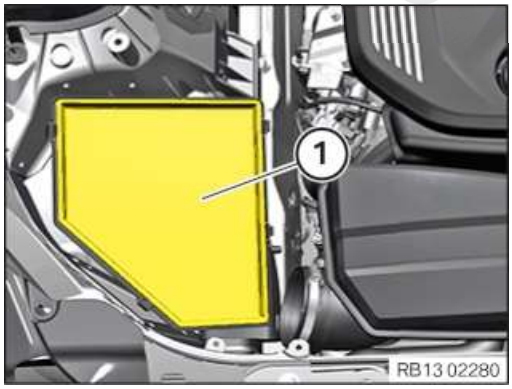
Damage to the clean air line. Damage to the air filter.

For changing the air filter insert, if the upper section of intake filter housing is only raised and not completely removed, the clean air line and the air filter insert may be damaged.

- Do not lift upper section of intake filter housing by force.
- Unfasten clamp.
- Remove upper section of intake filter housing completely.



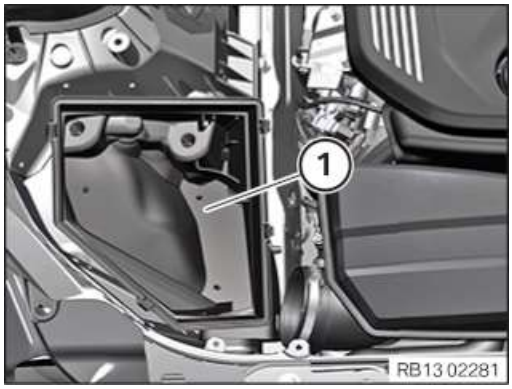
- Unlock and loosen connector (1).
- Unfasten clamp (2).
- Unlock clamps (arrows).
- Remove the upper section of the intake filter housing (3).



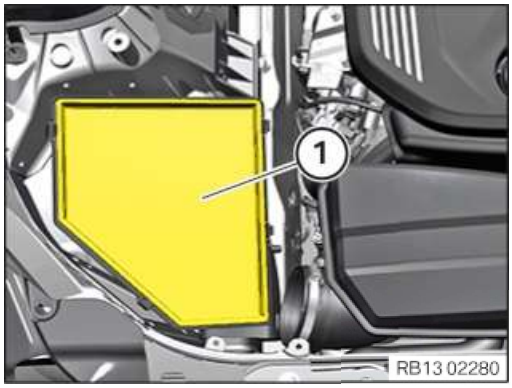
- Remove the air filter element (1).

2 – Installing the air filter element

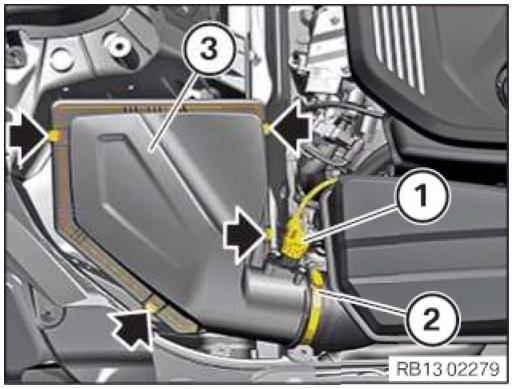
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- Clean lower section of intake filter housing (1).



- Install the air filter element (1).



- Lock clamps (arrows).

  The clamps (arrows) must engage audibly.
- Tighten clamp (2).

Clean air pipe to upper section of intake filter housing

Clamp		Tightening torque	3 Nm

- Connect connectors (1) and lock.

  The connector (1) must engage audibly.

Additional Information

Overview of Tightening Torques

Clean air pipe to upper section of intake filter housing Used in step 2

Clamp		Tightening torque	3 Nm

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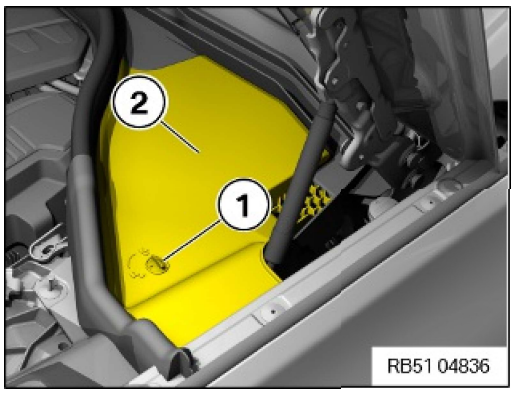
00 00 618 Service - brake fluid

TECHNICAL INFORMATION

Use only BMW-approved brake fluids.
For additional information see: SBS-ANL-SBS1996-340396150...

PRELIMINARY WORK

1 – Remove the cover of the engine compartment at the rear left



- Loosen the lock (1).
- Remove rear left cover of engine compartment (2).

2 – Connect bleeder unit for brake fluid





- To guarantee correct bleeding of the brake system, it is essential to adhere to the following procedure!
- Fill new brake fluid in the expansion tank up to the lower edge of thread (1).
- Bleed the hose of the bleeder unit before connecting.

TECHNICAL INFORMATION

Use only BMW-approved brake fluids, see operating fluids.

RISK OF DAMAGE

Paint damage.

Mechanical or chemical action may lead to paint damage.

- Cover up working area with specified covering material only.

- Connect the bleeder unit (1) to the brake fluid expansion tank and switch it on.

  Observe the operating instructions of the corresponding equipment manufacturer.

- **Do not exceed the filling pressure of** 2 bar**.**

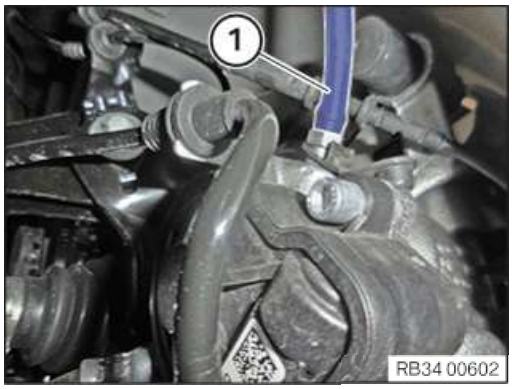
mdiag.com

MAIN WORK

3 – Rinsing and bleeding the rear axle brake circuit

NOTICE

Description is for right component only. The procedure on the left side is identical.



- **Start flushing at the rear right.**
- Connect the vent hose with the collecting vessel to the vent valve (1) on rear right brake caliper.
- Open the vent valve (1) and purge it until clear, bubble-free brake fluid emerges.
- Close vent valve.

Vent valve

		Tightening torque	10 Nm

- Carry out the same procedure on the rear left wheel brake.

4 – Flushing and bleeding the front axle brake circuit

NOTICE

Description is for right component only. The procedure on the left side is identical.



- **Start flushing at the front right.**
- Connect the vent hose with the collecting vessel to the vent valve (1) on front right interior brake calliper.
- Open the vent valve (1) and purge it until clear, bubble-free brake fluid emerges.
- Close vent valve (1).

Vent valve

		Tightening torque	10 Nm

POSTPROCESSES

5 – Close bleeder unit for brake fluid

RISK OF DAMAGE

Paint damage.

Mechanical or chemical action may lead to paint damage.

- Cover up working area with specified covering material only.

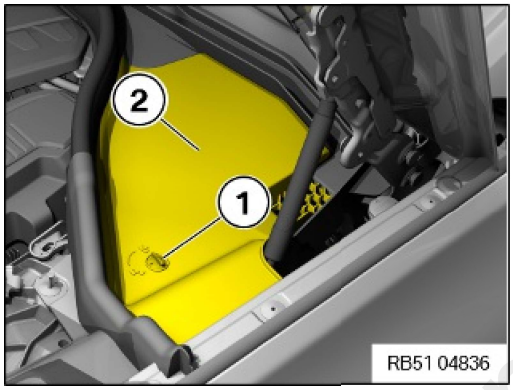


- Switch off bleeder unit (1) and remove from brake fluid expansion tank .
- Check the brake fluid level; if necessary, adjust to maximum mark.



- Check the seal (1) on the sealing cap, renew if necessary.
- Mount the sealing cap on the brake fluid expansion tank.

6 – Install the cover of the engine compartment on the rear left



- Position the engine compartment cover at the rear left (2) .
- Close lock (1).

7 – With active pedestrian protection (SA8TF): check the gas pressure springs for bonnet



Check

TECHNICAL INFORMATION

Not all models with active pedestrian protection have an expiry date printed on the gas pressure spring.

- Check expiry date of the gas pressure spring for bonnet (1).

  Alternatively, if there is no printed expiry date, the gas pressure spring for bonnet should be renewed every five years starting from the production date of the vehicle.

desired state

- The expiry date of both gas pressure springs for bonnet (1) must be after the next brake fluid service (24 months).

  Gas pressure springs without a printed expiry date are also subject to maintenance and they must be renewed regularly.

Result

» The expiry date of the two engine compartment lid gas pressure springs () must extend to the time of the next brake fluid service (24 months).

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Measure

- Renew both gas pressure springs for bonnet.

51 23 265 Removing and installing/replacing left or right gas pressure spring for engine compartment lid
51 23 265 Removing and installing/replacing left or right gas pressure spring for engine compartment lid
51 23 265 Removing and installing/replacing left or right gas pressure spring for engine compartment lid
51 23 265 Removing and installing/replacing left or right gas pressure spring for engine compartment lid

8 – Performing a CBS reset (equipment specification without the reset button for the trip distance recorder in the instrument cluster (KOMBI))

Prerequisite

Scope of maintenance work is performed.

On-board date is set correctly.

No CC message is present.

Availability of the scope of maintenance work is under 90%.

TECHNICAL INFORMATION

The CBS scope of maintenance work can be reset in the car. In general, however, the reset of CBS functions (CBS reset) with the diagnosis system is recommended.

It is only possible to code the country-specific statutory intervals with the diagnosis system.

TECHNICAL INFORMATION

Information for the occurrence of a failed CBS reset:

For front/rear brake service:

- A CBS reset is only possible in the vehicle with a worn brake pad wear sensor (CBS display in CID active).

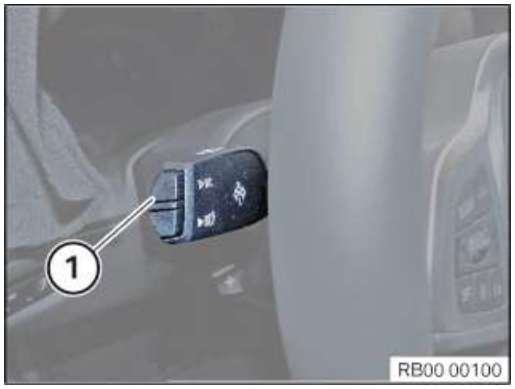
- With a brake pad wear sensor that is not worn (no CBS display in the CID), a CBS reset is only possible with the diagnosis system.

Other known causes of CBS reset problems:

- Parking brake engaged

- Brake pedal pressed

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TECHNICAL INFORMATION

The reset procedure (CBS reset) is cancelled due to a timeout or a terminal change.

- Generate PWF status "Residing".
- Generate PWF status "PAD": For this purpose, press the START-STOP button three times.
- Press on-board computer button on the turn signal/high beam switch for (1) approx. 10 s, until the 1st scope of maintenance work appears on the display.

  The next position is reached by briefly pressing the on-board computer button on the turn signal/high beam switch (1)again.
- Select the desired service job.

  If a CBS reset is possible, "Reset possible" is displayed on the instrument cluster (KOMBI).
- Confirm the "Perform reset?" text message. Press the on-board computer button on the turn signal/high beam switch for (1) 3 s.

  The CBS reset is confirmed as "Reset successful" after it is performed.

Additional Information

Overview of Tightening Torques

Vent valve			Used in step 34
		Tightening torque	10 Nm

Links

Repair instructions	**Used in step**
51 23 265 Removing and installing/replacing left or right gas pressure spring for engine compartment lid	7
51 23 265 Removing and installing/replacing left or right gas pressure spring for engine compartment lid	7
51 23 265 Removing and installing/replacing left or right gas pressure spring for engine compartment lid	7
51 23 265 Removing and installing/replacing left or right gas pressure spring for engine compartment lid	7

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00 00 612 Service - front brakes

WARNING

Vehicle may slip off the vehicle hoist if the vehicle hoist is handled incorrectly.

Danger! Life-threatening injuries!

- Observe safety information on raising the vehicle using a vehicle hoist.
- For additional information see: 00 ... Raising the vehicle using a vehicle hoist.

TECHNICAL INFORMATION

General information on changing the brake pads:

For vehicles older than 48 months it is recommended to replace the retaining spring or expanding spring.

The brake pad wear sensor must be replaced once it has been removed because the brake pad wear sensor loses its retention capability in the brake pad.

A CBS reset must be done after every brake pad exchange:

A CBS reset in the vehicle is possible in the event of a **partially ground down** brake pad wear sensor. The CBS display in the Central Information Display (CID) is active.

In the event of a brake pad wear sensor that is **not partially ground down**, a CBS reset is only possible with the diagnosis system. No CBS display in the Central Information Display (CID).

If bonded brake pads are installed, the brake pads must be renewed after releasing the adhesive strip.

TECHNICAL INFORMATION

To prevent damage to the surface coating: With floating callipers on the brake caliper mounting bracket or with fixed callipers in the brake caliper housing, do not clean the contact surfaces for the brake pads to the extent that it is possible.

Clean the contact surfaces with brake cleaner (BMW part number 83 19 2 154 780). Next, apply a thin coat of brake pad paste (BMW part number 83 19 2 158 851 for 3 g) or 83 19 2 158 852 fr 100 g).

Spread brake pad paste on the marked surfaces with a brush.

For additional information see: 34 00 ... brake pad paste

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PRELIMINARY WORK

1 – Removing both front wheels

▸ **Removing the wheel**



- In vehicles with M Carbon ceramic brake: The wheel assembly jack must be used to remove the wheel (see workshop equipment).

  This process is intended to prevent damage to the brake disc.



- If several wheels are removed simultaneously: Use a piece of chalk to mark on each tyre the axle and side on which the corresponding wheel is fitted.
- Release the wheel bolts (arrows) crosswise and remove the wheel.
- To release and tighten wheel bolts with a security code: Use a suitable adapter from the tool set .

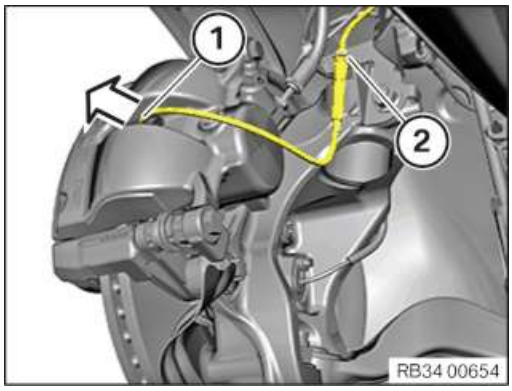
2 – Removing front brake pad wear sensor

TECHNICAL INFORMATION

The brake pad wear sensor must be replaced once it has been removed because the brake pad wear sensor loses its retention capability in the brake pad.

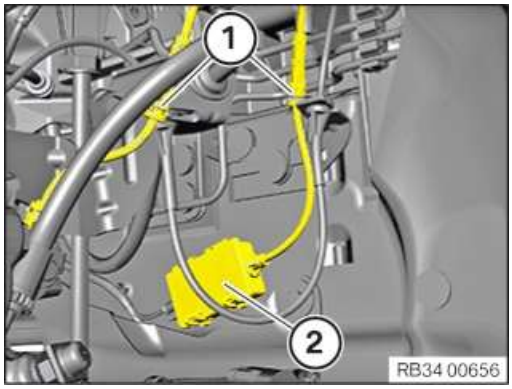
If a brake pad wear sensor that has already been ground has to be replaced even though the minimum brake pad thickness has not yet been reached, you must observe the following:

The new sliding contact must be filed down with a file to the same length as the sanded sliding contact.



- Remove brake pad wear sensor (1) out of the brake pad in the direction of the arrow.
- Detach the brake pad wear sensor cable from the bracket (2).

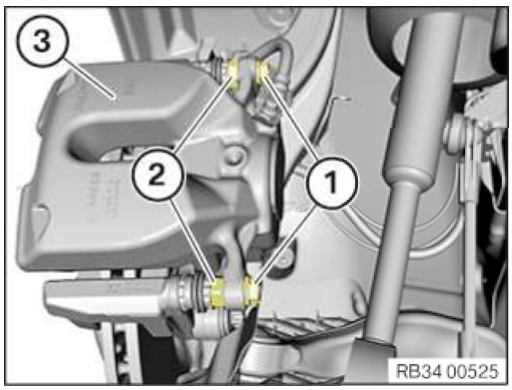
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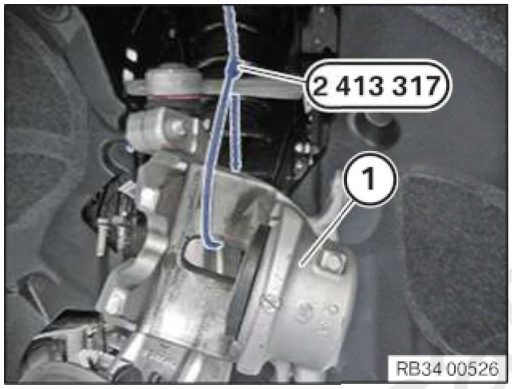
- Detach the brake pad wear sensor from the brackets (1).
- Open sealing cap (2) and disconnect the plug connection.

MAIN WORK

3 – Remove front brake pads

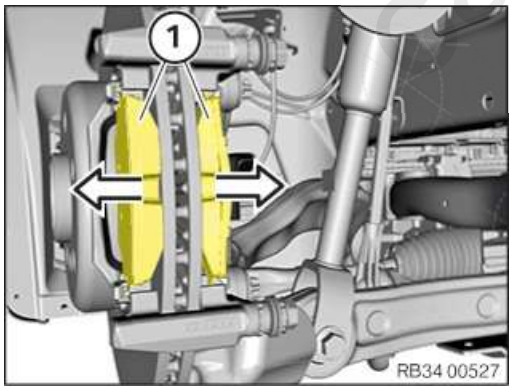


- Release the screws (1); if necessary use the hexagon head (2) for counter support.
- Remove the brake caliper (3).



- Tie up the brake caliper (1) using the special tool (cable strap) 2 413 317.

  The brake caliper must not hang on the brake hose.



- Remove the brake pads (1) in the direction of arrow.
- Mark any worn brake pads.

  If the brake pad wear exists on one side, they must not be mixed up.



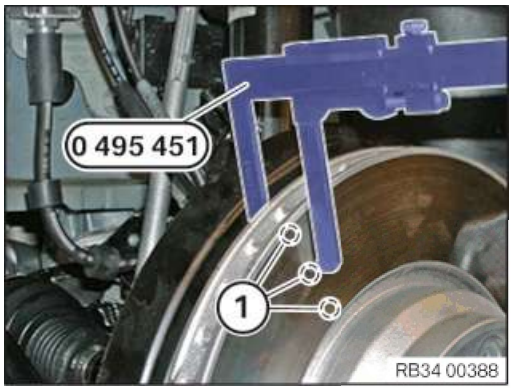
TECHNICAL INFORMATION

When pressing the brake piston back, note the brake fluid level in the expansion tank.

Overflowing brake fluid will damage the paintwork.

- Push the brake pistons (1) back with the special tool 2 352 960.

4 – Measure minimum brake disc thickness (front brake)



- Check minimum brake disc thickness:

  Place the special tool at three measuring points in area (1) and measure.

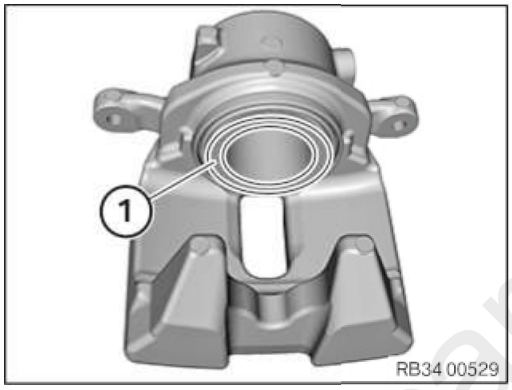
  Compare measuring result and lowest value with setpoint value.

  New brake pads must only be installed if the brake disk thickness is greater than the minimum brake disc thickness.

Minimum brake disc thickness (nominal dimension 330x24)

Minimum brake disc thickness (brake disc 330x24)	22,4 mm

5 – Grease the brake pads, caliper carriers and brake calipers with brake pad paste (17-inch brake)

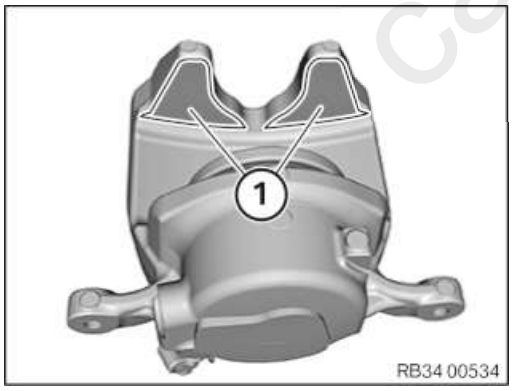


- Clean the contact surfaces (1) of the brake piston using brake cleaner.

Expendable materials

Brake cleaner2.0	500 ml, Spray can	83192365214
	20 , Canister	83192365215

- Check dust boots for damage; renew if necessary.

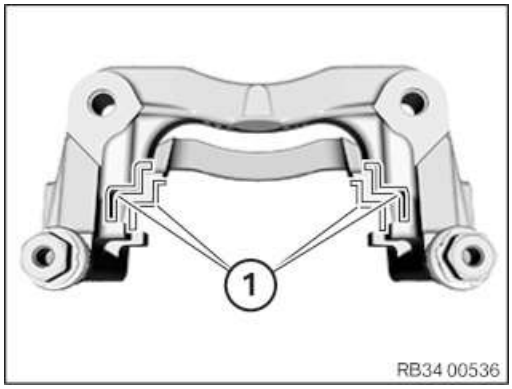


- Clean contact surfaces (1) of the brake caliper with brake cleaner and apply a thin layer of brake pad paste.

Expendable materials

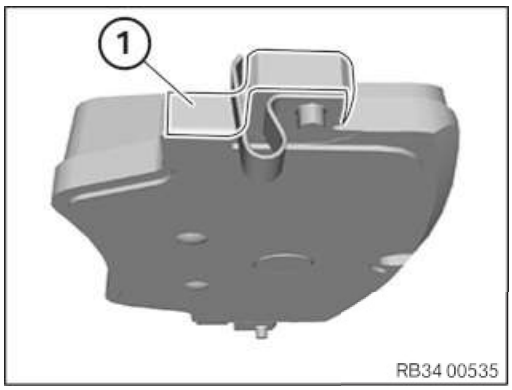
Brake block paste * TU = Trade Unit. TU numbers cannot be ordered! For invoicing purposes only.	3 g, Bag	83192158851
	100 g, Tube	83192158852
	5 g, TU*	83230140233

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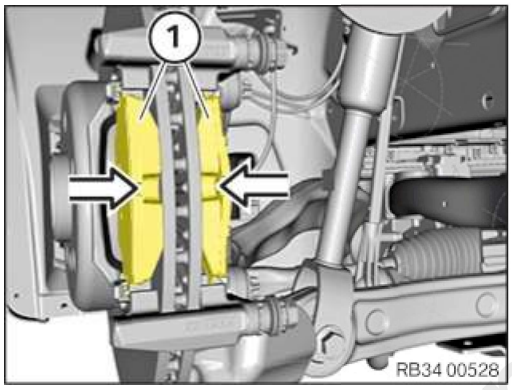
- Clean contact surfaces with brake cleaner.

  The contact surfaces (1) for the brake pads should not be cleaned mechanically if possible in order to avoid damaging the surface coating.
- Carefully clean highly contaminated contact surfaces (1) using a suitable tool (e.g. brass wire brush, nylon brush).
- Coat contact surfaces (1) thinly with brake pad paste.



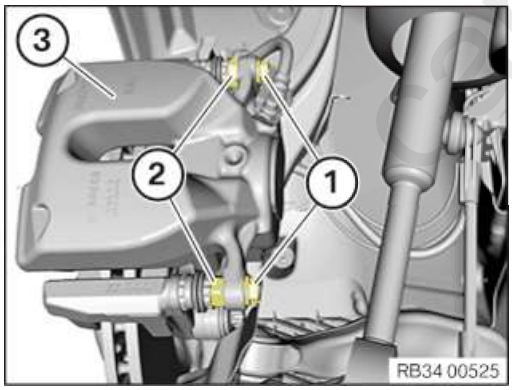
- Apply a thin coating of brake pad paste to both sides of the T-head of the brake pad in area (1).

6 – Installing the front brake pads



- If applicable, observe the identification of the removed brake pads.

  If the brake pads are worn on one side, they must not be mixed up.
- Install the brake pads (1) in the brake calliper in the direction of the arrow.



- Remove the special tool (cable strap) 2 413 317.
- Install the brake caliper (3).
- Renew screws.

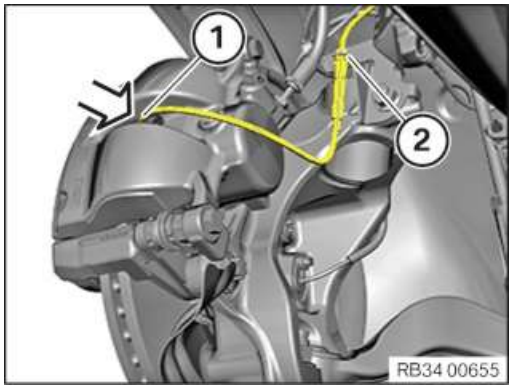
  Parts: Bolts
- Tighten the screws (1), if applicable, hold against the hexagon head (2).

Guide bolt (brake caliper on caliper carrier)

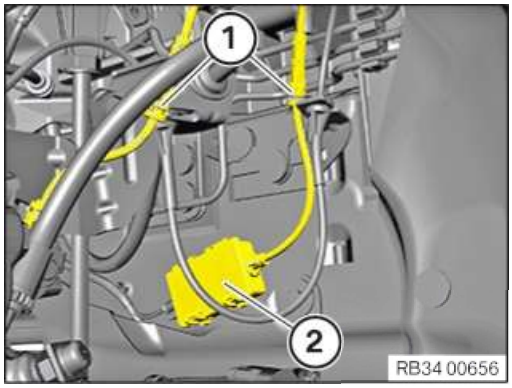
M8	Renew screws.		35 Nm

POSTPROCESSES

7 – Installing front brake pad wear sensor



- Attach the brake pad wear sensor to the bracket (2).
- Install the brake pad wear sensor (1) in the brake pad in the direction of the arrow.
- Make sure the brake pad wear sensor is fitted correctly in the brake pad.



- Attach cable of brake pad wear sensor in brackets (1).
- Connect the plug connection .
- Close sealing cap (2).

8 – Installing both front wheels

▸ **Mounting the wheel**



TECHNICAL INFORMATION

The contact surface between the brake disc and the wheel rim must be clean and free from oil and grease. There is otherwise a risk of the wheel becoming loose at a later time.

- Remove dirt, grease residues and corrosion from the contact surface with a drill and the special tool 2 344 011.

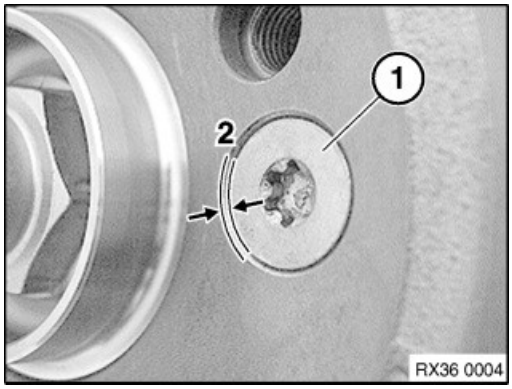
  Do not operate special tool 2 344 011 with an impact screwdriver.
- Degrease the contact surfaces with the universal cleaner (see BMW Group Parts).
- In the event of grease residue in the area of the wheel bolt holes, remove and clean the brake disc.



- Remove dirt, grease residues and corrosion from the contact surface with a drill and the special tool 2 344 011.

  Do not operate special tool 2 344 011 with an impact screwdriver.
- Degrease the contact surfaces with the universal cleaner (see BMW Group Parts).

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- Check that the mounting bolt (1) for the brake disc is securely seated.

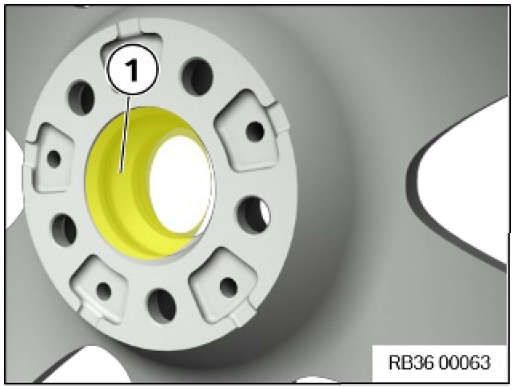
  The mounting bolt (1) for the brake disc may not protrude under any circumstances on the contact surface (2) between the brake disc and the wheel rim.

Brake disc to front wheel hub

M8	Renew screw.	Tightening torque	16 Nm

Brake disc to rear wheel hub

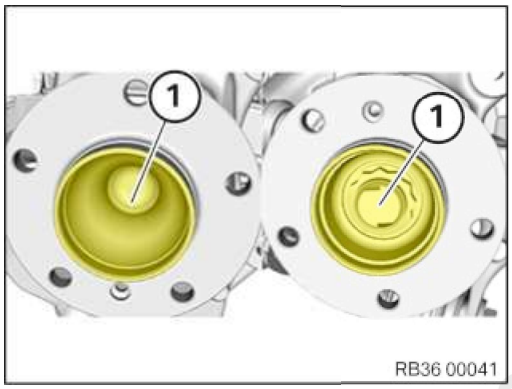
M8	Renew screw.	Tightening torque	16 Nm



- Thinly grease the wheel centring (1) in the wheel rim.

Expendable materials

Brake block paste * TU = Trade Unit. TU numbers cannot be ordered! For invoicing purposes only.	3 g, Bag	83192158851
	100 g, Tube	83192158852
	5 g, TU*	83230140233



- Lightly grease the front and rear wheel hubs in this area (1) to protect from corrosion.

Expendable materials

Brake block paste * TU = Trade Unit. TU numbers cannot be ordered! For invoicing purposes only.	3 g, Bag	83192158851
	100 g, Tube	83192158852
	5 g, TU*	83230140233



- In vehicles with M Carbon ceramic brake: The wheel assembly jack must be used to install the wheel (see workshop equipment).

  This process is intended to prevent damage to the brake disc.

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TECHNICAL INFORMATION

Never use impact screwdrivers or electric screwdrivers to screw in and tighten the wheel bolts.

The wheel rim must rest uniformly against the brake disc.

In the case of non-original BMW wheel bolts/wheel rims, it may be necessary to retighten the wheel bolts on account of setting properties (refer to the documentation from the manufacturer).

Do not apply oil to new wheel bolts.

- Renew corroded wheel bolts.

  Parts: Wheel bolts
- Clean the wheel bolts.
- Check wheel bolts and threads for damage, renew the wheel bolts if necessary.
- Join and tighten the wheel bolts (arrows).

Wheel bolts

M14 / SW17	Screw in wheel bolts and evenly tighten crosswise by hand in order to centre the wheel rim. Tighten wheel bolts to the prescribed tightening torque with a calibrated torque wrench in a crosswise sequence. Check all the wheel bolts in the same order or retighten to the prescribed tightening torque again.	Tightening torque Check	140 Nm 140 Nm

9 – Commissioning/bedding in new brake pads and brake discs

TECHNICAL INFORMATION

When exchanging brake pads, reset the CBS display in accordance with factory specification (CBS reset).

Carry out test braking while driving at low speed because the effectiveness of the brakes may be reduced during the initial braking operations.

Exaggerated emergency and continuous braking operations for faster bedding-in are not permitted.

Advise the customer not to perform intentional emergency braking operations for the first 200 km after the brakes have been replaced.

- Fully depress brake pedal several times so that brake pads contact brake discs.
- Adjust the brake fluid level to the maximum mark.
- Perform a functional check on the brake test stand to ensure compliance of the brake system with statutory guidelines.
- Attach mirror tag to inside mirror.

10 – Performing a CBS reset (equipment specification without the reset button for the trip distance recorder in the instrument cluster (KOMBI))

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Prerequisite

Scope of maintenance work is performed.

On-board date is set correctly.

No CC message is present.

Availability of the scope of maintenance work is under 90%.

TECHNICAL INFORMATION

The CBS scope of maintenance work can be reset in the car. In general, however, the reset of CBS functions (CBS reset) with the diagnosis system is recommended.

It is only possible to code the country-specific statutory intervals with the diagnosis system.

TECHNICAL INFORMATION

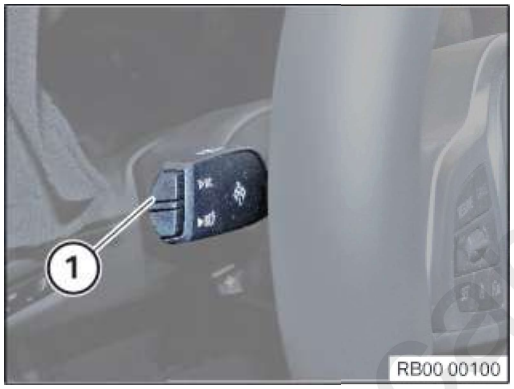
Information for the occurrence of a failed CBS reset:

For front/rear brake service:

- A CBS reset is only possible in the vehicle with a worn brake pad wear sensor (CBS display in CID active).
- With a brake pad wear sensor that is not worn (no CBS display in the CID), a CBS reset is only possible with the diagnosis system.

Other known causes of CBS reset problems:

- Parking brake engaged
- Brake pedal pressed



TECHNICAL INFORMATION

The reset procedure (CBS reset) is cancelled due to a timeout or a terminal change.

- Generate PWF status "Residing".
- Generate PWF status "PAD": For this purpose, press the START-STOP button three times.
- Press on-board computer button on the turn signal/high beam switch for (1) approx. 10 s, until the 1st scope of maintenance work appears on the display.

  The next position is reached by briefly pressing the on-board computer button on the turn signal/high beam switch (1)again.
- Select the desired service job.

  If a CBS reset is possible, "Reset possible" is displayed on the instrument cluster (KOMBI).
- Confirm the "Perform reset?" text message. Press the on-board computer button on the turn signal/high beam switch for (1) 3 s.

  The CBS reset is confirmed as "Reset successful" after it is performed.

Additional Information

Overview of Tightening Torques

Guide bolt (brake caliper on caliper carrier) Used in step 6

M8	Renew screws.		35 Nm

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Brake disc to front wheel hub Used in step 8

M8	Renew screw.	Tightening torque	16 Nm

Brake disc to rear wheel hub Used in step 8

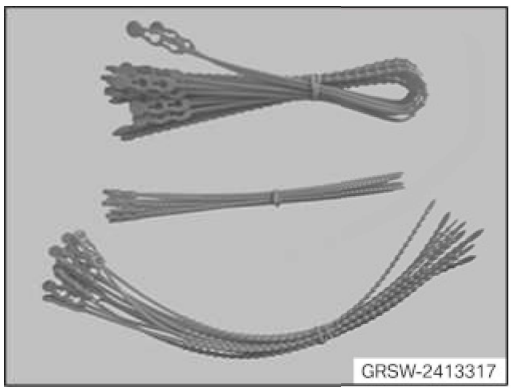
M8	Renew screw.	Tightening torque	16 Nm

Wheel bolts Used in step 8

M14 / SW17	Screw in wheel bolts and evenly tighten crosswise by hand in order to centre the wheel rim. Tighten wheel bolts to the prescribed tightening torque with a calibrated torque wrench in a crosswise sequence. Check all the wheel bolts in the same order or retighten to the prescribed tightening torque again.	Tightening torque Check	140 Nm 140 Nm

Overview of Special Tools

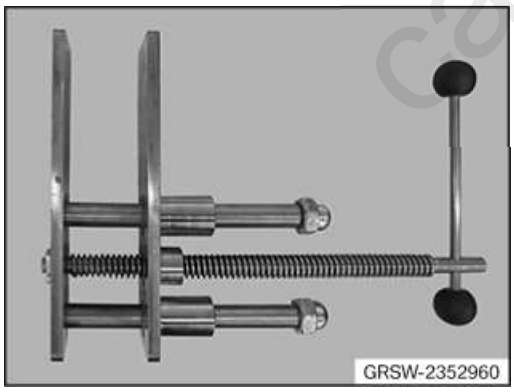
2 413 317 Cable strap



Common Used in step 36

Usage	The "Cable ties" parts set consists of 3 items as follows: ABV232 Length: 320 mm colour: RedABV250 Length: 500 mm colour: RedABVS270 Length: 665 mm colour: Red
Included in the tool or work	
Storage location	
Replaced by	
In connection with	
SI-Number	01 47 15 (332)

2 352 960 Reset



Common Used in step 3

Usage	Set back to brake piston. Replacement for 34 1 050 (83300492455).
Included in the tool or work	
Storage location	Individual
Replaced by	
In connection with	
SI-Number	

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2 344 011 Tool



Common	Used in step 8
Usage	Tool (wheel hub grinder) for cleaning the connection of the wheel rim (wheel contact face) to the wheel hub.
Included in the tool or work	
Storage location	
Replaced by	
In connection with	
SI-Number	08 08 12 (872)

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Replacement tools:

0 495 221 (36 1 323) Wheel stud



Common	Used in step 1
Usage	(Code 30) Code 39 available separately, (see EPC) under 36 13 1 181 259
Included in the tool or work	0 492 518
Storage location	
Replaced by	
In connection with	
SI-Number	

0 495 224 (36 1 326) Wheel stud



Common	Used in step 1
Usage	(Code 33) With centring bore available separately, (see EPC) under 36 13 6 765 546
Included in the tool or work	0 492 518
Storage location	
Replaced by	
In connection with	
SI-Number	

0 495 225 (36 1 327) Wheel stud



Common	Used in step 1
Usage	(Code 34) With centring bore available separately (see EPC) under 36 13 6 765 547
Included in the tool or work	0 492 518
Storage location	
Replaced by	
In connection with	
SI-Number	

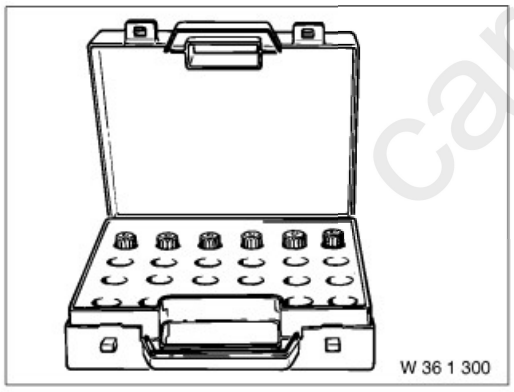
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0 495 226 (36 1 328) Wheel stud



Common	Used in step 1
Usage	(Code 35) With centring bore available separately, (see EPC) under 36 13 6 762 340
Included in the tool or work	0 492 518
Storage location	
Replaced by	
In connection with	
SI-Number	

0 495 227 (36 1 329) Wheel stud



Common	Used in step 1
Usage	(Code 36) With centring bore available separately (see EPC) under 36 13 6 762 341
Included in the tool or work	0 492 518
Storage location	
Replaced by	
In connection with	
SI-Number	

0 495 228 (36 1 331) Wheel stud



Common	Used in step 1
Usage	(Code 37) With centring bore available separately (see EPC) under 36 13 6 762 342
Included in the tool or work	0 492 518
Storage location	
Replaced by	
In connection with	
SI-Number	

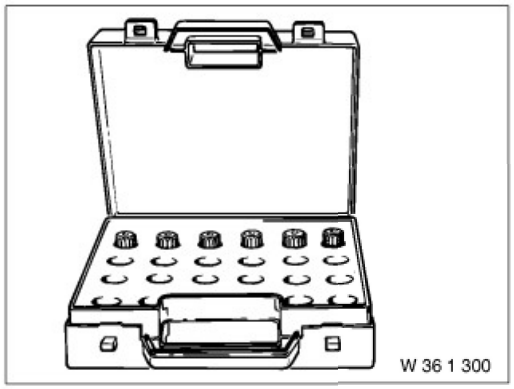
cardiagn.com

0 495 229 (36 1 332) Wheel stud



Common	Used in step 1
Usage	(Code 38) With centring bore available separately (see EPC) under 36 13 6 762 343
Included in the tool or work	0 492 518
Storage location	
Replaced by	
In connection with	
SI-Number	

0 495 230 (36 1 333) Wheel stud



Common	Used in step 1
Usage	(Code 40) With centring bore available separately (see EPC) under 36 13 6 762 344
Included in the tool or work	0 492 518
Storage location	
Replaced by	
In connection with	
SI-Number	

Overview Technical Data

Minimum brake disc thickness (nominal dimension 330x24)	Used in step 4
Minimum brake disc thickness (brake disc 330x24)	22,4 mm

Links

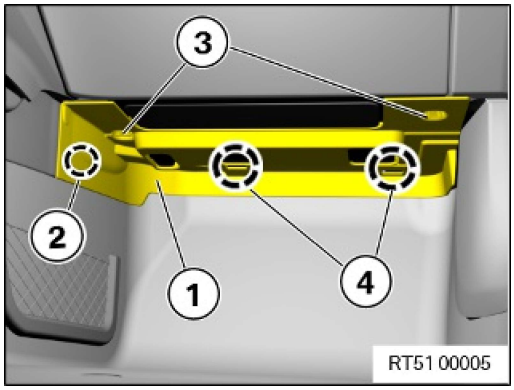
Repair instructions	Used in step
34 00 x01 Guideline for applying brake pad paste on brake pads and caliper carrier	

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00 00 616 Service - microfilter

PRELIMINARY WORK

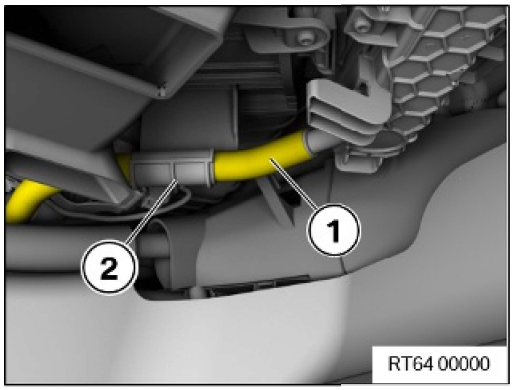
1 – Remove the right footwell trim



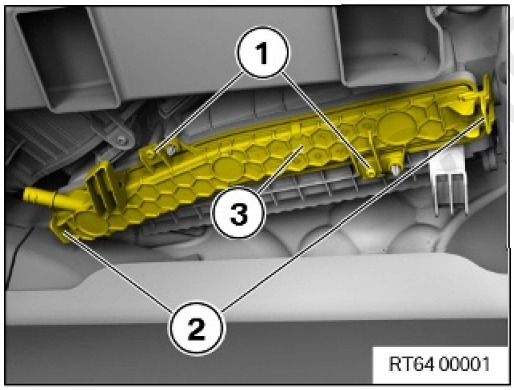
- Turn the locks (3) by 90°.
- Feed the footwell trim (1) out of the guide (2).
- Detach the footwell trim (1) inward out of the guides (4).
- Unlock associated plug connection and disconnect.

MAIN WORK

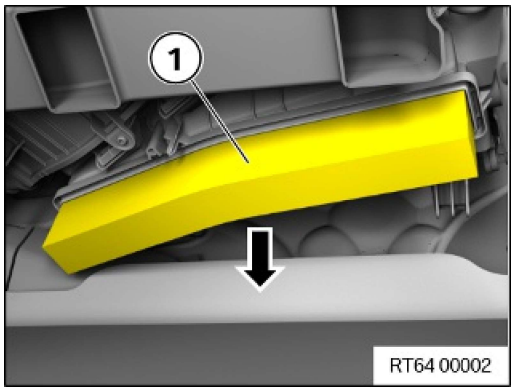
2 – Remove microfilter



- Pull off the water drain hose (1).
- Thread the water drain hose (1) out of the bracket (2).

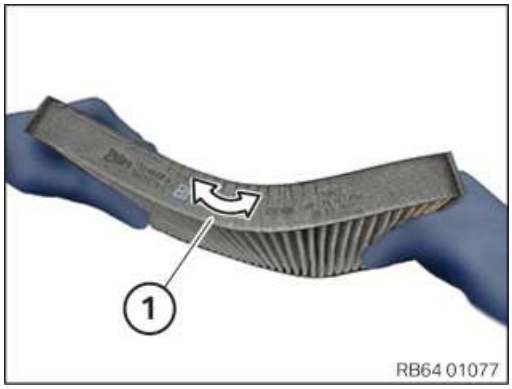


- Loosen screws (1).
- Release latch mechanisms (2) and remove cover (3).

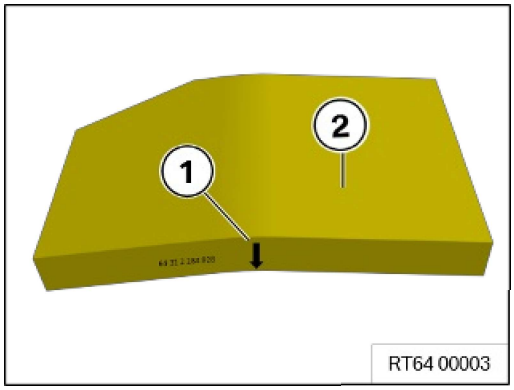


- Remove microfilter (1).

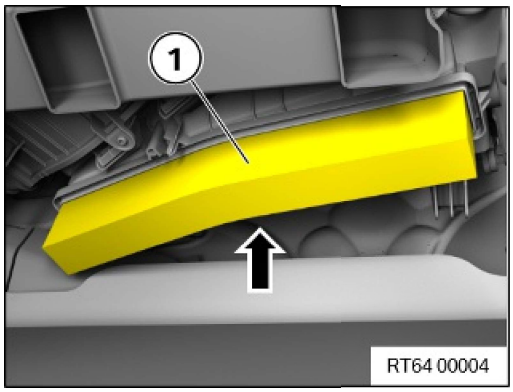
3 – Install microfilter



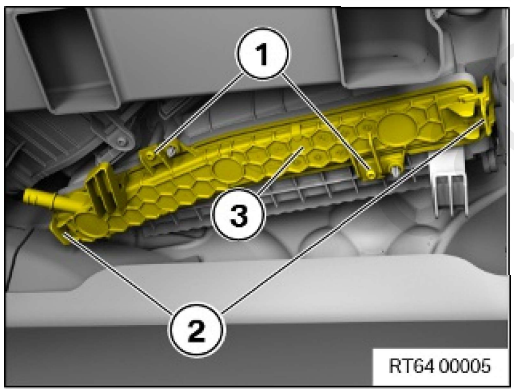
- Pre-bend microfilter (1) slightly as shown in the graphic.



- Please note that the arrow (1) on the microfilter (2) must always point in the direction of travel during installation.



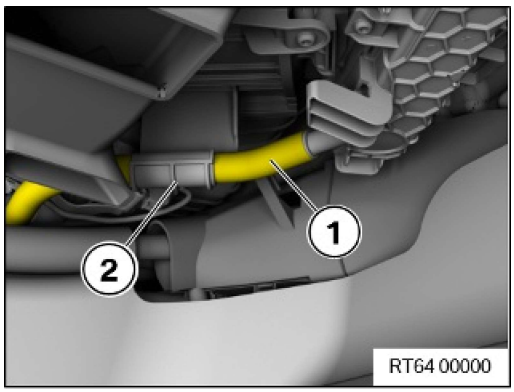
- Push the microfilter (1) up into the blower housing.



- Make sure that the cover (3) is correctly inserted into the latch mechanisms (2) of the blower housing.
- Tighten the screws (1).

Microfilter lid on heating and air-conditioning unit

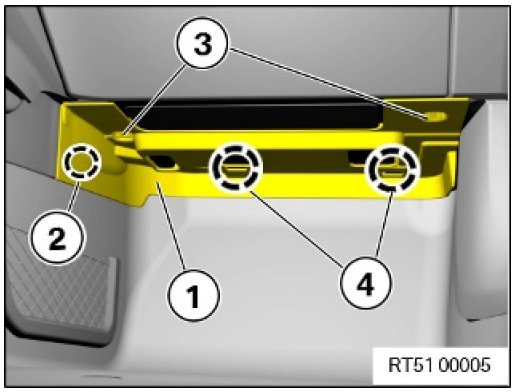
Screw		Tightening torque	2.8 Nm



- Connect water drain hose (1).
- Insert the water drain hose (1) into the holder (2).

xdiagn.com

4 – Install the right footwell trim panel



- Connect associated connector.
- Attach the footwell trim (1) to the guides (4) and fold up.
- Guide the footwell trim (1) into the guide (2) of the centre console.
- Position locks (3) correctly and turn by 90°.

Additional Information

Overview of Tightening Torques

Microfilter lid on heating and air-conditioning unit Used in step 3

Screw		Tightening torque	2.8 Nm

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00 00 614 Service - rear brakes

WARNING

Vehicle may slip off the vehicle hoist if the vehicle hoist is handled incorrectly.

Danger! Life-threatening injuries!

- Observe safety information on raising the vehicle using a vehicle hoist.
- For additional information see: 00 ... Raising the vehicle using a vehicle hoist.

CAUTION

Effects on other persons.

Danger of injury! Risk of damage!

- Make sure that no other persons are in or around the vehicle.

TECHNICAL INFORMATION

During work on the rear brake, it must be ensured that the button for the electromechanical parking brake cannot be pressed.

TECHNICAL INFORMATION

General information on changing the brake pads:

For vehicles older than 48 months it is recommended to replace the retaining spring or expanding spring.

The brake pad wear sensor must be replaced once it has been removed because the brake pad wear sensor loses its retention capability in the brake pad.

A CBS reset must be done after every brake pad exchange:

A CBS reset in the vehicle is possible in the event of a **partially ground down** brake pad wear sensor. The CBS display in the Central Information Display (CID) is active.

In the event of a brake pad wear sensor that is **not partially ground down**, a CBS reset is only possible with the diagnosis system. No CBS display in the Central Information Display (CID).

If bonded brake pads are installed, the brake pads must be renewed after releasing the adhesive strip.

TECHNICAL INFORMATION

To prevent damage to the surface coating: With floating callipers on the brake caliper mounting bracket or with fixed callipers in the brake caliper housing, do not clean the contact surfaces for the brake pads to the extent that it is possible.

Clean the contact surfaces with brake cleaner (BMW part number 83 19 2 154 780). Next, apply a thin coat of brake pad paste (BMW part number 83 19 2 158 851 for 3 g) or 83 19 2 158 852 fr 100 g).

Spread brake pad paste on the marked surfaces with a brush.

For additional information see: 34 00 ... brake pad paste

PRELIMINARY WORK

1 – Removing both rear wheels

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. – Removing both rear wheels

▶ **Removing the wheel**



- In vehicles with M Carbon ceramic brake: The wheel assembly jack must be used to remove the wheel (see workshop equipment).

  This process is intended to prevent damage to the brake disc.



- If several wheels are removed simultaneously: Use a piece of chalk to mark on each tyre the axle and side on which the corresponding wheel is fitted.
- Release the wheel bolts (arrows) crosswise and remove the wheel.
- To release and tighten wheel bolts with a security code: Use a suitable adapter from the tool set .

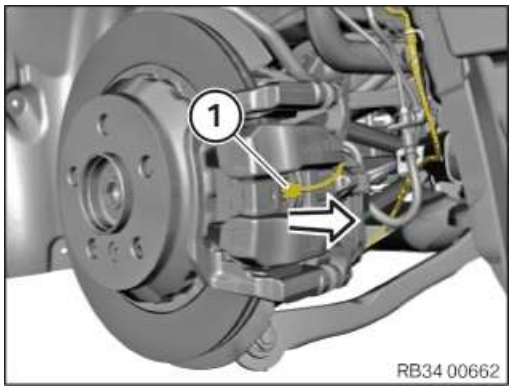
2 – Removing the brake pad wear sensor, rear

TECHNICAL INFORMATION

The brake pad wear sensor must be replaced once it has been removed because the brake pad wear sensor loses its retention capability in the brake pad.

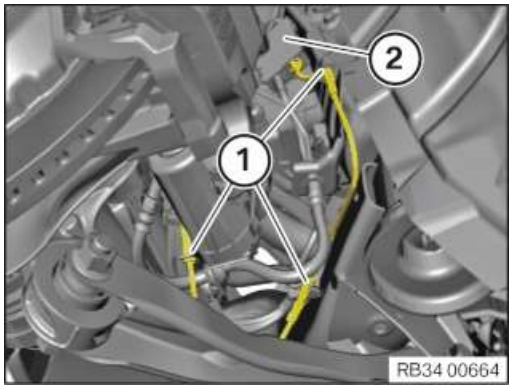
If a brake pad wear sensor that has already been ground has to be replaced even though the minimum brake pad thickness has not yet been reached, you must observe the following:

The new sliding contact must be filed down with a file to the same length as the sanded sliding contact.



- Remove the brake pad wear sensor (1) from the brake pad.

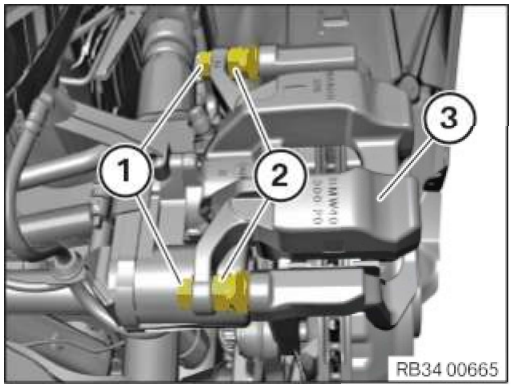
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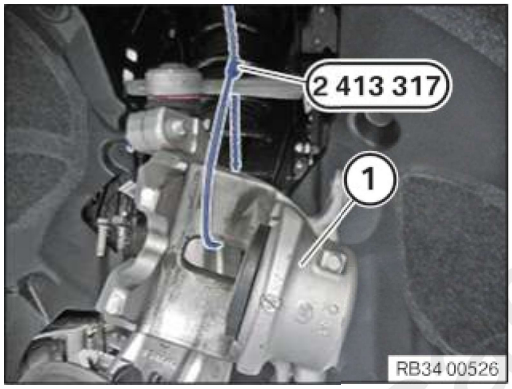
- Detach the brake pad wear sensor from the brackets (1).
- Open cover (2) and disconnect the plug connection.

MAIN WORK

3 – Remove rear brake pads

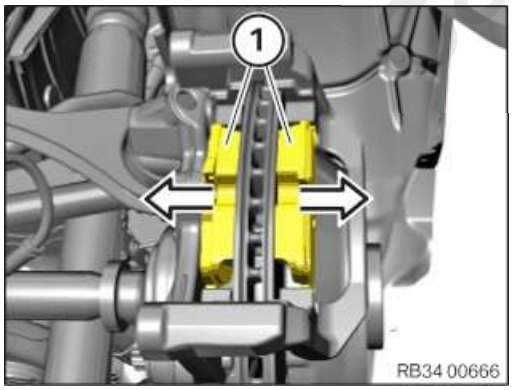


- Release the screws (1); if necessary use the hexagon head (2) for counter support.
- Remove brake caliper (3).



- Tie up brake calliper (1) using special tool (cable strap) 2 413 317.

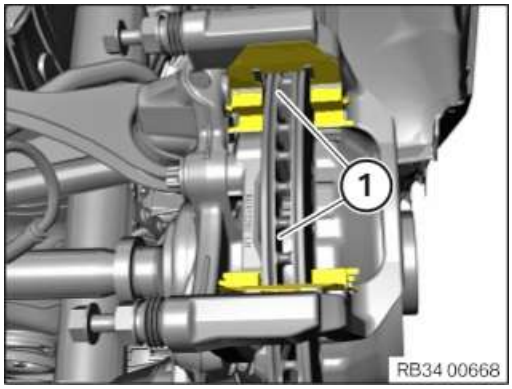
  The brake caliper must not hang on the brake hose.



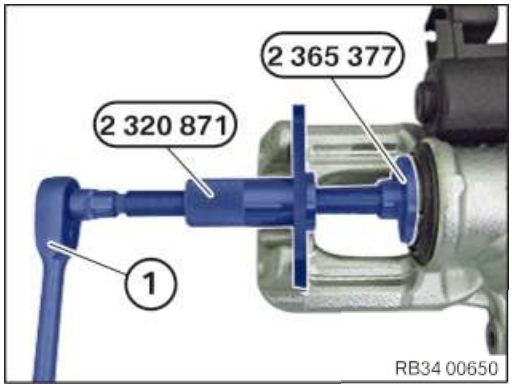
- Remove the brake pads (1) from the brake caliper in direction of arrow.
- Mark any worn brake pads.

  If the brake pad wear exists on one side, they must not be mixed up.

carmanualsdiagram.com



- Remove the sliding plates (1).



TECHNICAL INFORMATION

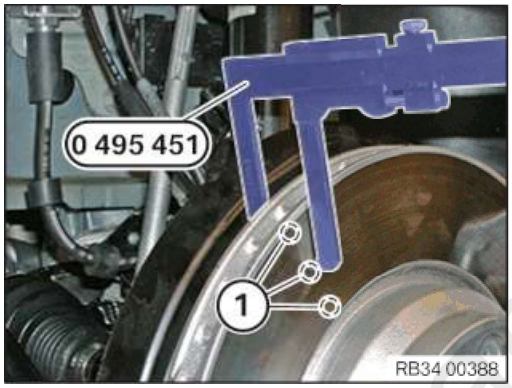
When pressing the brake piston back, note the brake fluid level in the expansion tank.

Overflowing brake fluid will damage the paintwork.

- Press back the brake piston using the special tools and .
- Use the reversible ratchet (1) to turn the brake piston back to the first end stop.

  Avoid turning the actuator!

4 – Measure minimum brake disc thickness (rear brake)



- Check minimum brake disc thickness:

  Place the special tool at three measuring points in area (1) and measure.

  Compare measuring result and lowest value with setpoint value.

  New brake pads may only be installed if the brake disk thickness is greater than the minimum brake disc thickness.

Minimum brake disc thickness (nominal dimension 330x20)

Minimum brake disc thickness (brake disc 330x20)	18,4 mm

Minimum brake disc thickness (nominal dimension 345x24)

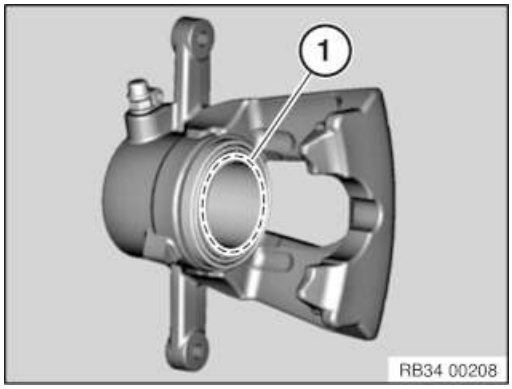
Minimum brake disc thickness (brake disc 345x24)	22,4 mm

Minimum brake disc thickness (nominal dimension 370x24)

Minimum brake disc thickness (brake disc 370x24)	22,4 mm

5 – Grease brake pads, caliper carrier and brake caliper with brake pad paste

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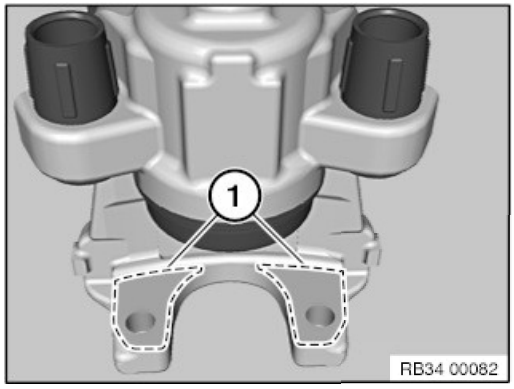


- Clean contact surface (1) of the brake piston with brake cleaner and apply a thin coat of brake pad paste.

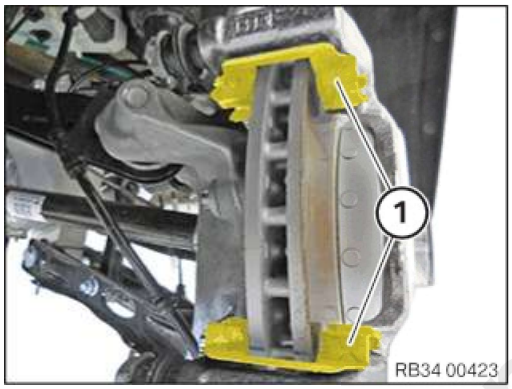
Expendable materials

Brake block paste * TU = Trade Unit. TU numbers cannot be ordered! For invoicing purposes only.	3 g, Bag	83192158851
	100 g, Tube	83192158852
	5 g, TU*	83230140233

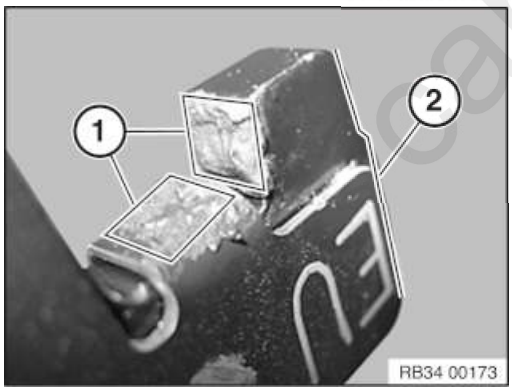
- Check dust boots for damage; renew if necessary.



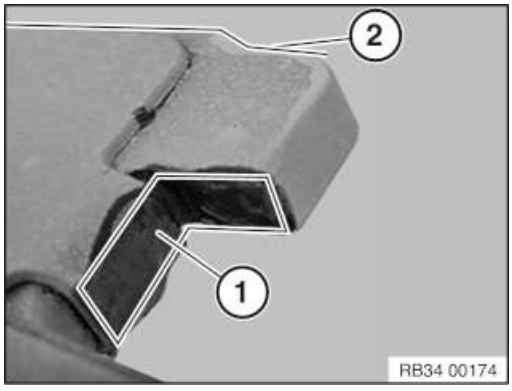
- Clean contact surface (1) of the brake piston with brake cleaner and apply a thin coat of brake pad paste.



- Mount the sliding plates (1).

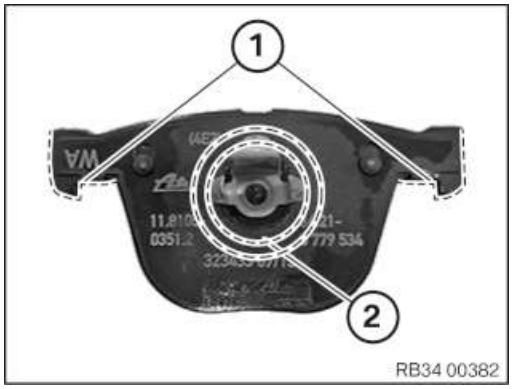


- Apply a thin coat of brake pad paste to the T-head of the inner brake pad in the areas (1) and (2).

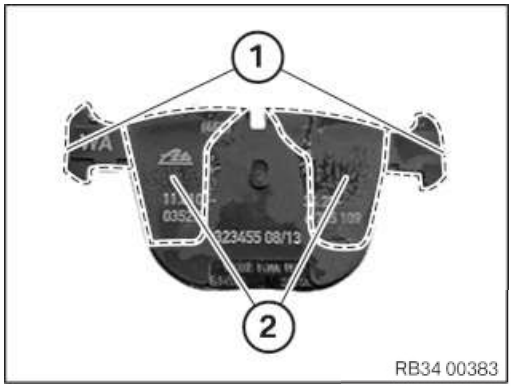


- Apply a thin coat of brake pad paste to the T-head of the inner brake pad in the areas (1) and (2).

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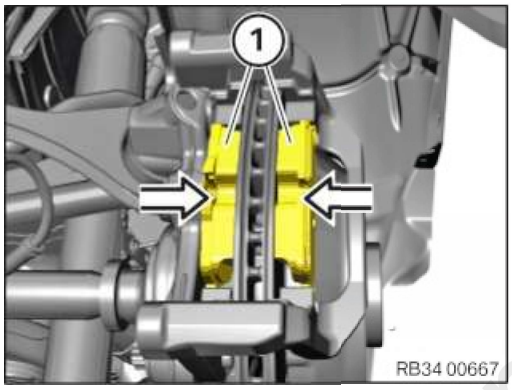


- Apply a thin coat of brake pad paste to the contact surface in the areas (1) and (2).

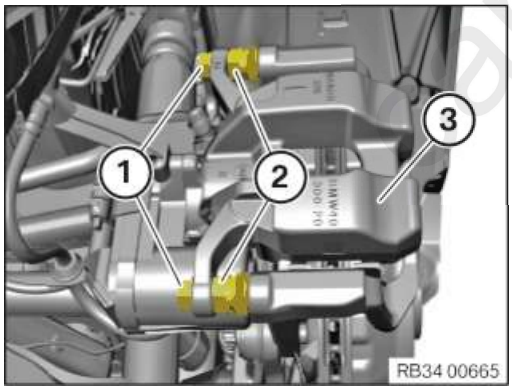


- Apply a thin coat of brake pad paste to the contact surface in the areas (1) and (2).

6 – Install rear brake pads



- Install the brake pads (1) in the direction of the arrow.



- Remove the special tool (cable strap) 2 413 317.
- Mount brake caliper (3).
- Renew screws (1).

  Parts: Bolts

- Tighten the screws (1), if applicable, hold against the hexagon head (2).

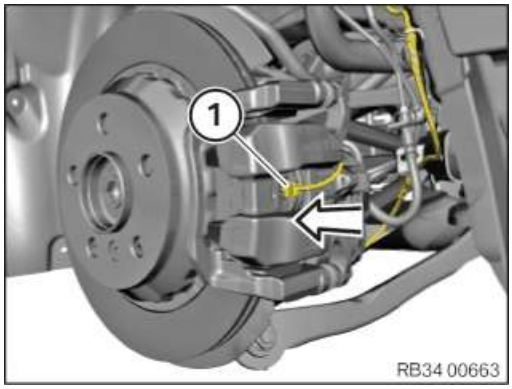
Guide bolt (brake caliper on caliper carrier)

M8			35 Nm

POSTPROCESSES

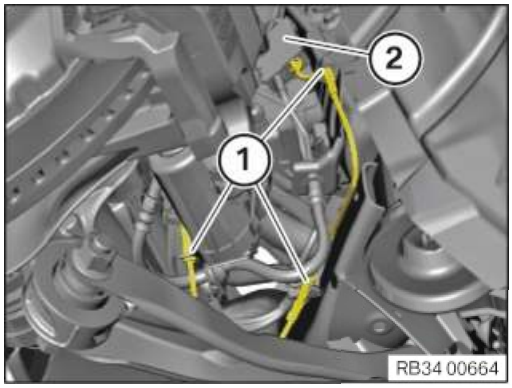
7 – Install rear brake pad sensor

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- Install the brake pad wear sensor (2) in the brake pad in the direction of the arrow.

  Ensure brake pad wear sensor fits correctly in brake pad.



- Attach cable of brake pad wear sensor in brackets (1).
- Connect the plug connection and close the cover (2).

8 – Installing both rear wheels

▸ **Mounting the wheel**



TECHNICAL INFORMATION

The contact surface between the brake disc and the wheel rim must be clean and free from oil and grease. There is otherwise a risk of the wheel becoming loose at a later time.

- Remove dirt, grease residues and corrosion from the contact surface with a drill and the special tool 2 344 011.

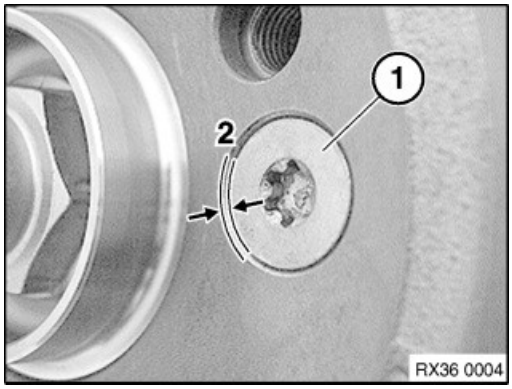
  Do not operate special tool 2 344 011 with an impact screwdriver.
- Degrease the contact surfaces with the universal cleaner (see BMW Group Parts).
- In the event of grease residue in the area of the wheel bolt holes, remove and clean the brake disc.



- Remove dirt, grease residues and corrosion from the contact surface with a drill and the special tool 2 344 011.

  Do not operate special tool 2 344 011 with an impact screwdriver.
- Degrease the contact surfaces with the universal cleaner (see BMW Group Parts).

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- Check that the mounting bolt (1) for the brake disc is securely seated.

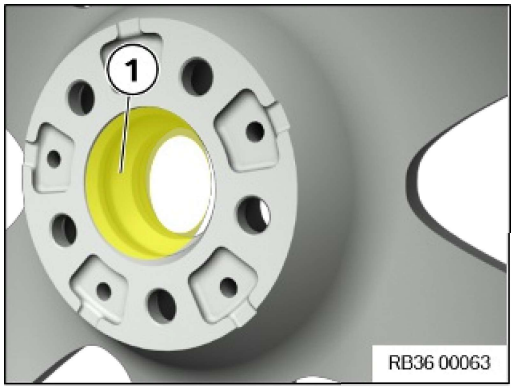
  The mounting bolt (1) for the brake disc may not protrude under any circumstances on the contact surface (2) between the brake disc and the wheel rim.

Brake disc to front wheel hub

M8	Renew screw.	Tightening torque	16 Nm

Brake disc to rear wheel hub

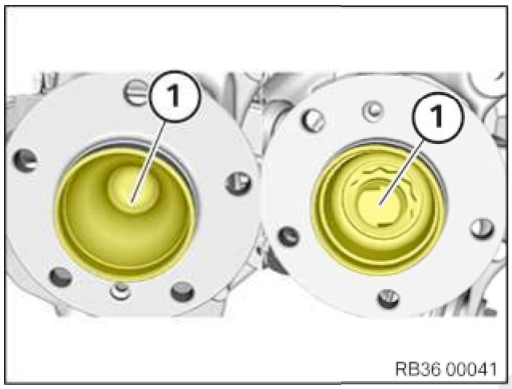
M8	Renew screw.	Tightening torque	16 Nm



- Thinly grease the wheel centring (1) in the wheel rim.

Expendable materials

Brake block paste * TU = Trade Unit. TU numbers cannot be ordered! For invoicing purposes only.	3 g, Bag	83192158851
	100 g, Tube	83192158852
	5 g, TU*	83230140233



- Lightly grease the front and rear wheel hubs in this area (1) to protect from corrosion.

Expendable materials

Brake block paste * TU = Trade Unit. TU numbers cannot be ordered! For invoicing purposes only.	3 g, Bag	83192158851
	100 g, Tube	83192158852
	5 g, TU*	83230140233



- In vehicles with M Carbon ceramic brake: The wheel assembly jack must be used to install the wheel (see workshop equipment).

  This process is intended to prevent damage to the brake disc.

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TECHNICAL INFORMATION

Never use impact screwdrivers or electric screwdrivers to screw in and tighten the wheel bolts.

The wheel rim must rest uniformly against the brake disc.

In the case of non-original BMW wheel bolts/wheel rims, it may be necessary to retighten the wheel bolts on account of setting properties (refer to the documentation from the manufacturer).

Do not apply oil to new wheel bolts.

- Renew corroded wheel bolts.

  Parts: Wheel bolts
- Clean the wheel bolts.
- Check wheel bolts and threads for damage, renew the wheel bolts if necessary.
- Join and tighten the wheel bolts (arrows).

Wheel bolts

M14 / SW17	Screw in wheel bolts and evenly tighten crosswise by hand in order to centre the wheel rim. Tighten wheel bolts to the prescribed tightening torque with a calibrated torque wrench in a crosswise sequence. Check all the wheel bolts in the same order or retighten to the prescribed tightening torque again.	Tightening torque Check	140 Nm 140 Nm

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9 – Start-up or bedding-in of new brake pads and discs (rear brake)

TECHNICAL INFORMATION

When exchanging brake pads, reset the CBS display in accordance with factory specification (CBS reset).

Carry out test braking while driving at low speed because the effectiveness of the brakes may be reduced during the initial braking operations.

Exaggerated emergency and continuous braking operations for faster bedding-in are not permitted.

Advise the customer not to perform intentional emergency braking operations for the first 200 km after the brakes have been replaced.

- Fully depress brake pedal several times so that brake pads contact brake discs.
- Switch the ignition on.

  Use the parking brake button to open, close and open the parking brake again.
- Switch off ignition.
- Adjust the brake fluid level to the maximum mark.
- Perform a functional check on the brake test stand to ensure compliance of the brake system with statutory guidelines.
- Attach mirror tag to inside mirror.

10 – Performing a CBS reset (equipment specification without the reset button for the trip distance recorder in the instrument cluster (KOMBI))

Prerequisite

Scope of maintenance work is performed.

On-board date is set correctly.

No CC message is present.

Availability of the scope of maintenance work is under 90%.

TECHNICAL INFORMATION

The CBS scope of maintenance work can be reset in the car. In general, however, the reset of CBS functions (CBS reset) with the diagnosis system is recommended.

It is only possible to code the country-specific statutory intervals with the diagnosis system.

TECHNICAL INFORMATION

Information for the occurrence of a failed CBS reset:

For front/rear brake service:

- A CBS reset is only possible in the vehicle with a worn brake pad wear sensor (CBS display in CID active).

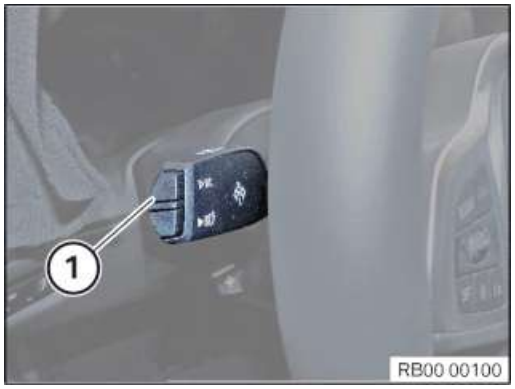
- With a brake pad wear sensor that is not worn (no CBS display in the CID), a CBS reset is only possible with the diagnosis system.

Other known causes of CBS reset problems:

- Parking brake engaged

- Brake pedal pressed

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TECHNICAL INFORMATION

The reset procedure (CBS reset) is cancelled due to a timeout or a terminal change.

- Generate PWF status "Residing".
- Generate PWF status "PAD": For this purpose, press the START-STOP button three times.
- Press on-board computer button on the turn signal/high beam switch for (1) approx. 10 s, until the 1st scope of maintenance work appears on the display.

  The next position is reached by briefly pressing the on-board computer button on the turn signal/high beam switch (1)again.
- Select the desired service job.

  If a CBS reset is possible, "Reset possible" is displayed on the instrument cluster (KOMBI).
- Confirm the "Perform reset?" text message. Press the on-board computer button on the turn signal/high beam switch for (1) 3 s.

  The CBS reset is confirmed as "Reset successful" after it is performed.

Additional Information

Overview of Tightening Torques

Guide bolt (brake caliper on caliper carrier) — Used in step 6

M8			35 Nm

Brake disc to front wheel hub — Used in step 8

M8	Renew screw.	Tightening torque	16 Nm

Brake disc to rear wheel hub — Used in step 8

M8	Renew screw.	Tightening torque	16 Nm

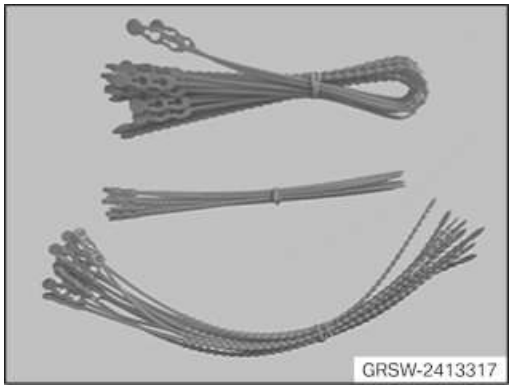
Wheel bolts — Used in step 8

M14 / SW17	Screw in wheel bolts and evenly tighten crosswise by hand in order to centre the wheel rim.	Tightening torque	140 Nm
	Tighten wheel bolts to the prescribed tightening torque with a calibrated torque wrench in a crosswise sequence.	Check	140 Nm
	Check all the wheel bolts in the same order or retighten to the prescribed tightening torque again.		

Overview of Special Tools

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2 413 317 Cable strap



Common	Used in step 36
Usage	The "Cable ties" parts set consists of 3 items as follows: ABV232 Length: 320 mm colour: RedABV250 Length: 500 mm colour: RedABVS270 Length: 665 mm colour: Red
Included in the tool or work	
Storage location	
Replaced by	
In connection with	
SI-Number	01 47 15 (332)

2 344 011 Tool

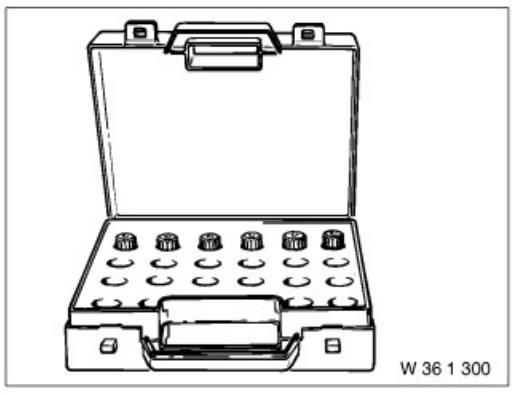


Common	Used in step 8
Usage	Tool (wheel hub grinder) for cleaning the connection of the wheel rim (wheel contact face) to the wheel hub.
Included in the tool or work	
Storage location	
Replaced by	
In connection with	
SI-Number	08 08 12 (872)

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Replacement tools:

0 495 221 (36 1 323) Wheel stud



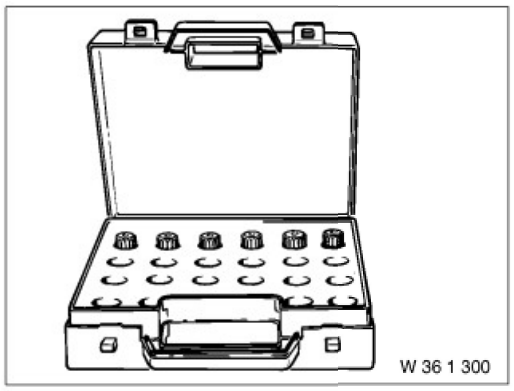
Common	Used in step 1
Usage	(Code 30) Code 39 available separately, (see EPC) under 36 13 1 181 259
Included in the tool or work	0 492 518
Storage location	
Replaced by	
In connection with	
SI-Number	

0 495 224 (36 1 326) Wheel stud



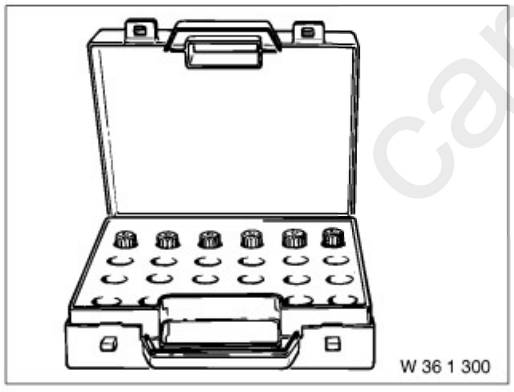
Common	Used in step 1
Usage	(Code 33) With centring bore available separately, (see EPC) under 36 13 6 765 546
Included in the tool or work	0 492 518
Storage location	
Replaced by	
In connection with	
SI-Number	

0 495 225 (36 1 327) Wheel stud



Common	Used in step 1
Usage	(Code 34) With centring bore available separately (see EPC) under 36 13 6 765 547
Included in the tool or work	0 492 518
Storage location	
Replaced by	
In connection with	
SI-Number	

0 495 226 (36 1 328) Wheel stud



Common	Used in step 1
Usage	(Code 35) With centring bore available separately, (see EPC) under 36 13 6 762 340
Included in the tool or work	0 492 518
Storage location	
Replaced by	
In connection with	
SI-Number	

0 495 227 (36 1 329) Wheel stud



Common	Used in step 1
Usage	(Code 36) With centring bore available separately (see EPC) under 36 13 6 762 341
Included in the tool or work	0 492 518
Storage location	
Replaced by	
In connection with	
SI-Number	

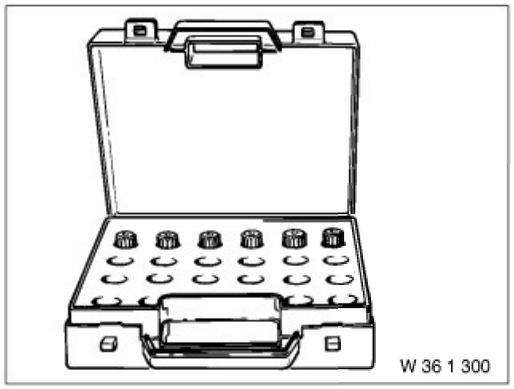
cardiagn.com

0 495 228 (36 1 331) Wheel stud



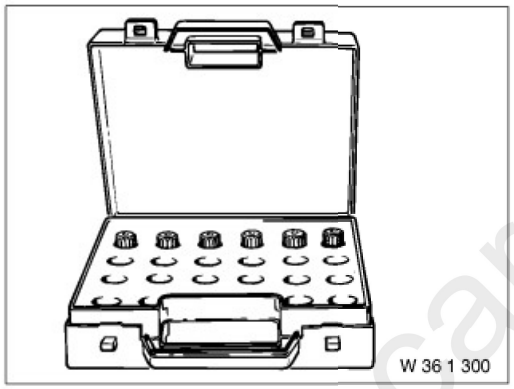
Common	Used in step 1
Usage	(Code 37) With centring bore available separately (see EPC) under 36 13 6 762 342
Included in the tool or work	0 492 518
Storage location	
Replaced by	
In connection with	
SI-Number	

0 495 229 (36 1 332) Wheel stud



Common	Used in step 1
Usage	(Code 38) With centring bore available separately (see EPC) under 36 13 6 762 343
Included in the tool or work	0 492 518
Storage location	
Replaced by	
In connection with	
SI-Number	

0 495 230 (36 1 333) Wheel stud



Common	Used in step 1
Usage	(Code 40) With centring bore available separately (see EPC) under 36 13 6 762 344
Included in the tool or work	0 492 518
Storage location	
Replaced by	
In connection with	
SI-Number	

Overview Technical Data

Minimum brake disc thickness (nominal dimension 330x20)	Used in step 4
Minimum brake disc thickness (brake disc 330x20)	18,4 mm

Minimum brake disc thickness (nominal dimension 345x24)	Used in step 4
Minimum brake disc thickness (brake disc 345x24)	22,4 mm

Minimum brake disc thickness (nominal dimension 370x24)	Used in step 4
Minimum brake disc thickness (brake disc 370x24)	22,4 mm

Links

Repair instructions	Used in step
34 00 x01 Guideline for applying brake pad paste on brake pads and caliper carrier	

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00 00 622 Service - spark plugs

PRELIMINARY WORK

1 – Removing the acoustic cover

WARNING

Hot surfaces.

Risk of burning!

- Perform all work only on components that have cooled down.

RISK OF DAMAGE

Damage to the acoustic cover.

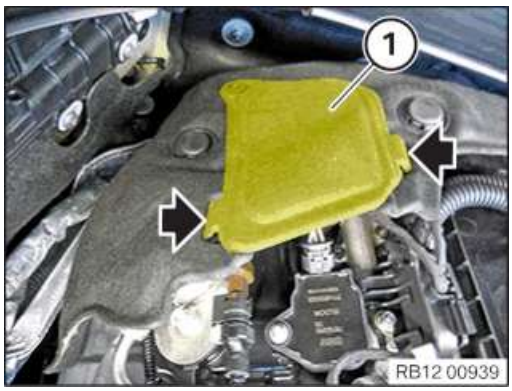
Jerky movements during disassembly and excessive application of force during installation may result in breakage of the acoustic cover.

- Disassemble or mount the acoustic cover carefully.
- Disassemble or mount snap-lock couplings of the ball pivots one after the other.
- Disassemble or mount acoustic cover only at temperatures >20 °C.
- Use only distilled water as an auxiliary material during installation, no lubricants.



- Unclip the acoustic cover (1) from the holders in the **marked** areas towards the top.

2 – Removing the service opening in sound insulation on top of engine



- Detach service opening (1) (arrows) and set it aside.

3 – Remove ignition coils

carmanualsdiagram.com

WARNING

Hot surfaces.

Risk of burning!

- Perform all work only on components that have cooled down.

RISK OF DAMAGE

Damage to the ignition coil.

The silicone hose of the ignition coil must not be contaminated by fuel as this can lead to failure of the ignition coil.

- Cover ignition coils using suitable covers when working on the fuel system, if necessary remove them.
- Do not oil or grease the silicone tube of the spark plug connector. The silicone tube is coated with talc to reduce the pulling forces.

RISK OF DAMAGE

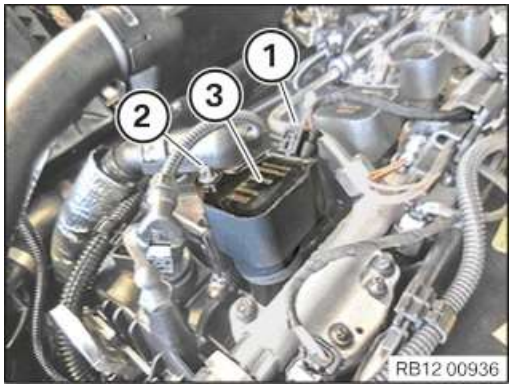
Electrostatic discharge.

Damage to or destruction of electrical components.

- Leave electrical components in original packaging until just before they are installed. Use the original packaging only for any return shipments. Always package removed components straight away.
- Read and comply with user information on using the associated special tool 12 7 060.
- Only touch the housings of electrical components. Do not touch pins or multi-pin connectors directly.
- Wear electrically conductive clothing and antistatic shoes (with ESD symbol).
- For additional information see: 61 35 Information on electrostatic discharge (ESD) protection.

NOTICE

The description is for one component only. The procedure is identical for all further components.



- Unlock and loosen connector (1).
- Loosen screw (2).
- Remove the ignition coil (3).

MAIN WORK

4 – Removing all spark plugs

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WARNING

Hot surfaces.

Risk of burning!

- Perform all work only on components that have cooled down.

CAUTION

Swirling dirt particles caused by compressed air.

Danger of injury!

- Collect dirt particles, e.g. when blowing out, use cloth to do so.



- Wear safety goggles.

TECHNICAL INFORMATION

Clean spark plug slot with compressed air.

The spark plug shaft must be cleaned using compressed air after having removed the ignition coils and before removing the spark plugs. After having removed the spark plugs, once again check the sealing surface for contamination and (if necessary) clean using a moist cloth or clean using compressed air.

Deposits that are not removed according to instructions may enter the combustion chamber and lead to uncontrolled combustion. Remaining deposits on the spark plug sealing surfaces may lead to leaks and the spark plugs may come loose during engine operation.

Spark plug threads must not be greased or oiled. Insufficiently tightened spark plugs may cause leaks and the sparks plugs may come loose during engine operation.

TECHNICAL INFORMATION

Exclusively swivelling extensions may be used for the reversible ratchet. Rigid mounting tool and variable plug connections with rigid option may not be used; there is a risk that the insulator breaks.

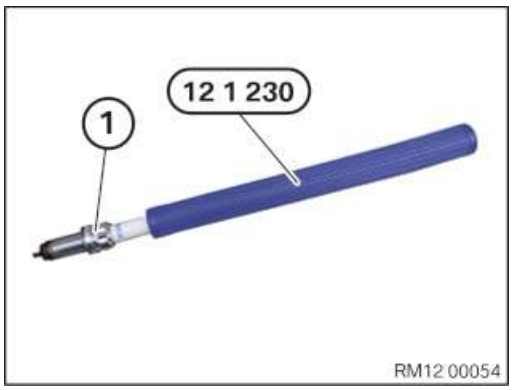


- Unscrew the spark plugs with the special tool 0 495 560 (12 1 220) and an extension.

5 – Installing all spark plugs

TECHNICAL INFORMATION

Exclusively swivelling extensions may be used for the reversible ratchet. Rigid mounting tool and variable plug connections with rigid option may not be used; there is a risk that the insulator breaks.



- Insert spark plug (1) into special tool 0 496 065 (12 1 230).



TECHNICAL INFORMATION

Do not drop spark plug into spark plug shaft! This can lead to a reduction of the electrode gap and can thus impair smooth running of the engine, especially in idle position.

- First screw spark plug into engine using special tool 0 496 065 (12 1 230) until it is hand-tight.



- Tighten spark plugs with torque wrench, special tool 0 495 560 (12 1 220) and extension with joint.

Spark plugs

M12x1.25		Tightening torque	23 Nm

POSTPROCESSES

6 – Installing the ignition coils

RISK OF DAMAGE

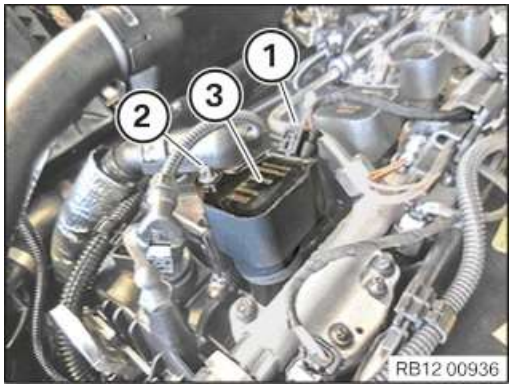
Damage to the ignition coil.

The silicone hose of the ignition coil must not be contaminated by fuel as this can lead to failure of the ignition coil.

- Cover ignition coils using suitable covers when working on the fuel system, if necessary remove them.
- Do not oil or grease the silicone tube of the spark plug connector. The silicone tube is coated with talc to reduce the pulling forces.

NOTICE

The description is for one component only. The procedure is identical for all further components.



- Insert and install the ignition coil (3).
- Tighten down screw (2).

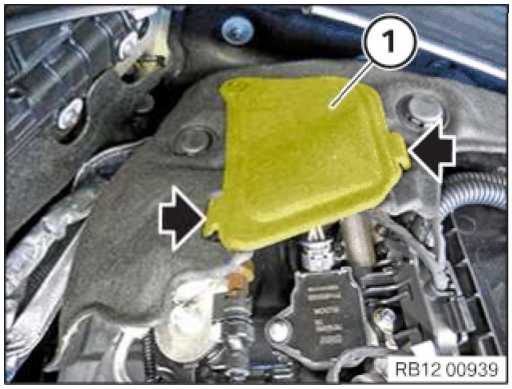
Ignition coil to cylinder head cover

Screw M6		Tightening torque	8 Nm

- Connect and lock the connector (1).

  The connector (1) must engage audibly.

7 – Installing the service opening in sound insulation on top of engine



- Insert and install sound insulation (1) (arrows).

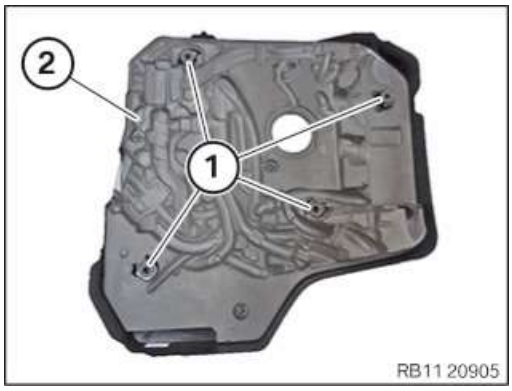
8 – Install acoustic cover

RISK OF DAMAGE

Damage to the acoustic cover.

Jerky movements during disassembly and excessive application of force during installation may result in breakage of the acoustic cover.

- Disassemble or mount the acoustic cover carefully.
- Disassemble or mount snap-lock couplings of the ball pivots one after the other.
- Disassemble or mount acoustic cover only at temperatures >20 °C.
- Use only distilled water as an auxiliary material during installation, no lubricants.



- Check all rubber mounts (1) of acoustic cover (2) for correct seating.

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- Clip in the acoustic cover (1) into the holders in the **marked** areas.

  The acoustic cover (1) must audibly engage into place.

Additional Information

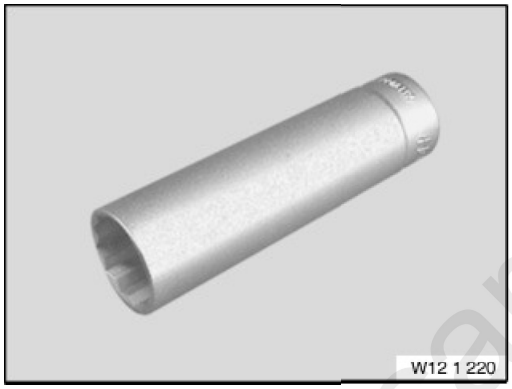
Overview of Tightening Torques

Spark plugs			Used in step 5
M12x1.25		Tightening torque	23 Nm

Ignition coil to cylinder head cover			Used in step 6
Screw M6		Tightening torque	8 Nm

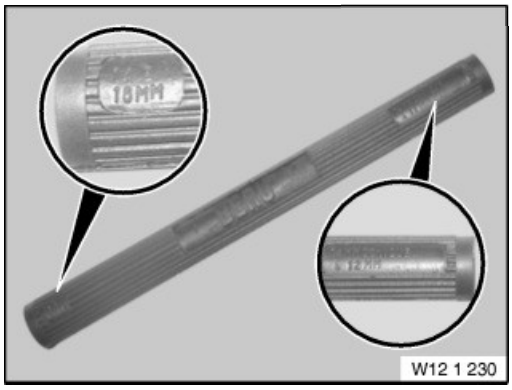
Overview of Special Tools

0 495 560 (12 1 220) Socket



Common	Used in step 45
Usage	For removing and installing the spark plugs (WAF 14 bihexal).
Included in the tool or work	
Storage location	C18
Replaced by	
In connection with	
SI-Number	01 20 06 (299)

0 496 065 (12 1 230) Fitting aid



Common	Used in step 5
Usage	Fitting aid for spark plug installation. Original BERU ZMH 001 rubber hose 0 890 00 001.
Included in the tool or work	
Storage location	individual
Replaced by	
In connection with	
SI-Number	01 04 07 (352)

Links

Repair instructions	**Used in step**
61 35 ... Notes on ESD protection (Electro Static Discharge)	3

carflagn.com

00 00 622 Service - spark plugs

PRELIMINARY WORK

1 – Removing the acoustic cover

WARNING

Hot surfaces.

Risk of burning!

- Perform all work only on components that have cooled down.

RISK OF DAMAGE

Damage to the acoustic cover.

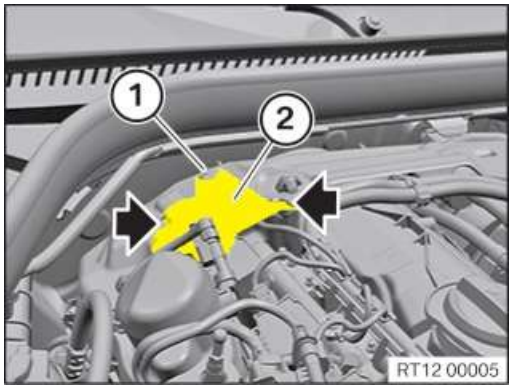
Jerky movements during disassembly and excessive application of force during installation may result in breakage of the acoustic cover.

- Disassemble or mount the acoustic cover carefully.
- Disassemble or mount snap-lock couplings of the ball pivots one after the other.
- Disassemble or mount acoustic cover only at temperatures >20 °C.
- Use only distilled water as an auxiliary material during installation, no lubricants.



- Unclip the acoustic cover (1) from the holders in the **marked** areas towards the top.

2 – Release the service opening of the sound insulation at the top of the engine



- Detach the service opening (2) in the marked areas (arrows) and twist it to the side at the pivot point (1).

3 – Remove all ignition coils.

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NOTICE

The description is for one component only. The procedure is identical for all further components.

▸ **Removing the ignition coil**

WARNING

Hot surfaces.

Risk of burning!

- Perform all work only on components that have cooled down.

RISK OF DAMAGE

Damage to the ignition coil.

The silicone hose of the ignition coil must not be contaminated by fuel as this can lead to failure of the ignition coil.

- Cover ignition coils using suitable covers when working on the fuel system, if necessary remove them.
- Do not oil or grease the silicone tube of the spark plug connector. The silicone tube is coated with talc to reduce the pulling forces.

RISK OF DAMAGE

Electrostatic discharge.

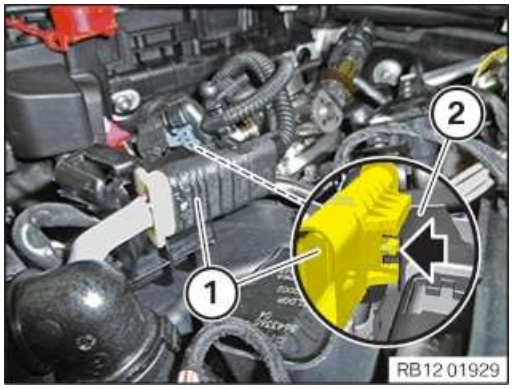
Damage to or destruction of electrical components.

- Leave electrical components in original packaging until just before they are installed. Use the original packaging only for any return shipments. Always package removed components straight away.
- Read and comply with user information on using the associated special tool 12 7 060.
- Only touch the housings of electrical components. Do not touch pins or multi-pin connectors directly.
- Wear electrically conductive clothing and antistatic shoes (with ESD symbol).
- For additional information see: 61 35 Information on electrostatic discharge (ESD) protection.

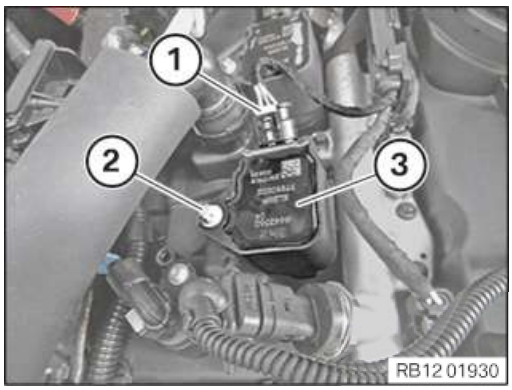


- Unlock plug connection (1) and disconnect.

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- Unlock connector (1) (arrow) and disconnect it from holder (2).



- Unlock plug connection (1) and disconnect.
- Loosen screw (2).
- Remove ignition coil (3).

MAIN WORK

4 – Removing all spark plugs

WARNING

Hot surfaces.

Risk of burning!

- Perform all work only on components that have cooled down.

CAUTION

Swirling dirt particles caused by compressed air.

Danger of injury!

- Collect dirt particles, e.g. when blowing out, use cloth to do so.

- Wear safety goggles.

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TECHNICAL INFORMATION

Clean spark plug slot with compressed air.

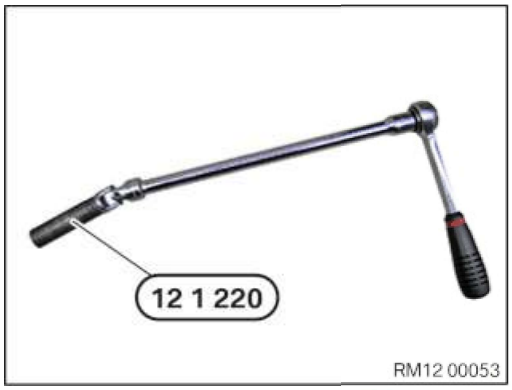
The spark plug shaft must be cleaned using compressed air after having removed the ignition coils and before removing the spark plugs. After having removed the spark plugs, once again check the sealing surface for contamination and (if necessary) clean using a moist cloth or clean using compressed air.

Deposits that are not removed according to instructions may enter the combustion chamber and lead to uncontrolled combustion. Remaining deposits on the spark plug sealing surfaces may lead to leaks and the spark plugs may come loose during engine operation.

Spark plug threads must not be greased or oiled. Insufficiently tightened spark plugs may cause leaks and the sparks plugs may come loose during engine operation.

NOTICE

The description is for one component only. The procedure is identical for all further components.



TECHNICAL INFORMATION

Exclusively swivelling extensions may be used for the reversible ratchet. Rigid mounting tool and variable plug connections with rigid option may not be used; there is a risk that the insulator breaks.

- Mount the special tool 0 495 560 (12 1 220) on a pivoting extension.

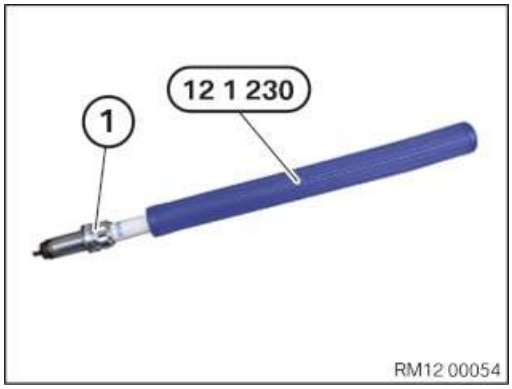


- Unscrew spark plugs with the special tool 0 495 560 (12 1 220) and a pivoting extension.

5 – Installing all spark plugs

NOTICE

The description is for one component only. The procedure is identical for all further components.



- Insert spark plug (1) into special tool 0 496 065 (12 1 230).



TECHNICAL INFORMATION

Do not drop spark plug into spark plug shaft! This can lead to a reduction of the electrode gap and can thus impair smooth running of the engine, especially in idle position.

- Screw in the spark plugs in the engine with the special tool 0 496 065 (12 1 230) until hand-tight.



TECHNICAL INFORMATION

Exclusively swivelling extensions may be used for the reversible ratchet. Rigid mounting tool and variable plug connections with rigid option may not be used; there is a risk that the insulator breaks.

- Tighten the spark plugs with the torque wrench, the special tool 0 495 560 (12 1 220) and a swivelling extension.

Spark plugs

M12x1.25		Tightening torque	23 Nm

POSTPROCESSES

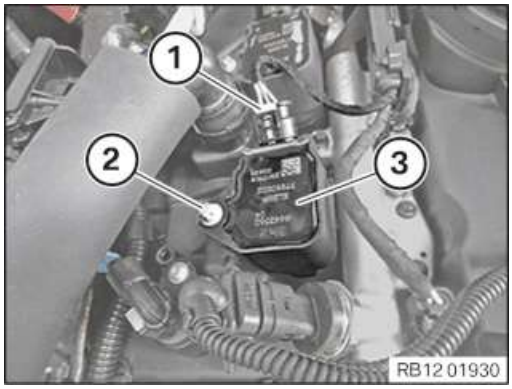
6 – Install all ignition coils

NOTICE

The description is for one component only. The procedure is identical for all further components.

▶ **Install ignition coil.**

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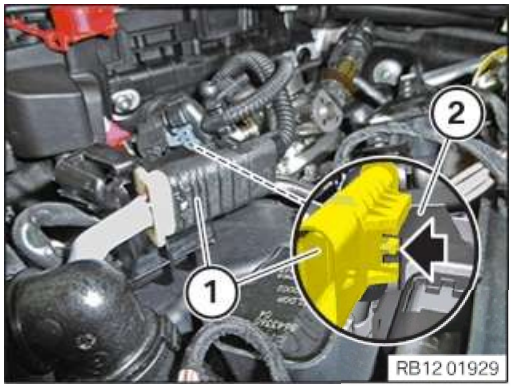
- Install ignition coil (3).
- Tighten down screw (2).

Ignition coil

Screw		Tightening torque	8 Nm

- Connect connectors (1) and lock.

  The connector (1) must engage audibly.



- Connect and lock connector (1) with holder (2) (arrow).

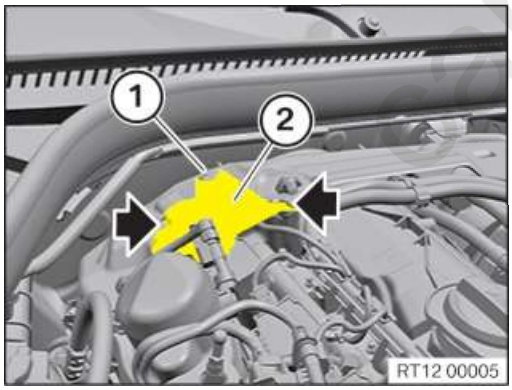
  The connector (1) must engage audibly.



- Connect connectors (1) and lock.

  The connector (1) must engage audibly.

7 – Mounting the service opening in sound insulation on top of engine



- Turn the sound insulation (2) at the pivot point (1) to the installation position and guide it in where marked (arrows).

8 – Install acoustic cover

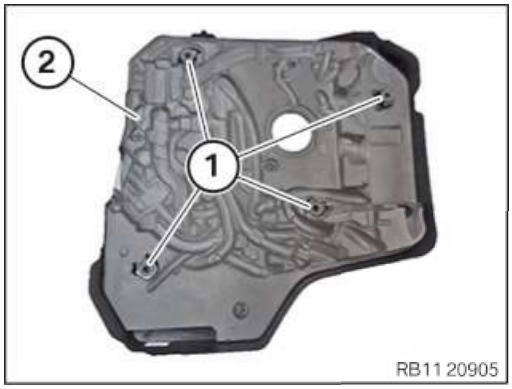
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RISK OF DAMAGE

Damage to the acoustic cover.

Jerky movements during disassembly and excessive application of force during installation may result in breakage of the acoustic cover.

- Disassemble or mount the acoustic cover carefully.
- Disassemble or mount snap-lock couplings of the ball pivots one after the other.
- Disassemble or mount acoustic cover only at temperatures >20 °C.
- Use only distilled water as an auxiliary material during installation, no lubricants.



- Check all rubber mounts (1) of acoustic cover (2) for correct seating.



- Clip in the acoustic cover (1) into the holders in the **marked** areas.

  The acoustic cover (1) must audibly engage into place.

Additional Information

Overview of Tightening Torques

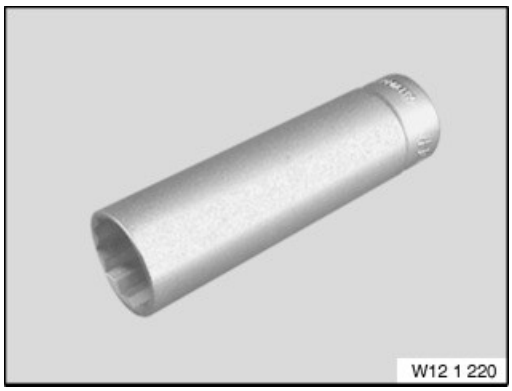
Spark plugs			Used in step 5
M12x1.25		Tightening torque	23 Nm

Ignition coil			Used in step 6
Screw		Tightening torque	8 Nm

Overview of Special Tools

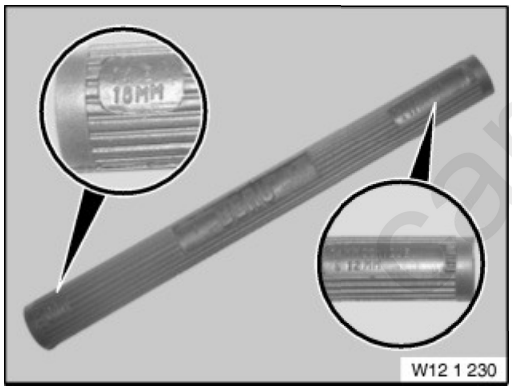
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0 495 560 (12 1 220) Socket



Common	Used in step 45
Usage	For removing and installing the spark plugs (WAF 14 bihexal).
Included in the tool or work	
Storage location	C18
Replaced by	
In connection with	
SI-Number	01 20 06 (299)

0 496 065 (12 1 230) Fitting aid



Common	Used in step 5
Usage	Fitting aid for spark plug installation. Original BERU ZMH 001 rubber hose 0 890 00 001.
Included in the tool or work	
Storage location	individual
Replaced by	
In connection with	
SI-Number	01 04 07 (352)

Links

Repair instructions	Used in step
61 35 ... Notes on ESD protection (Electro Static Discharge)	3

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00 00 624 Service - vehicle check

TECHNICAL INFORMATION

Repair possible defects for a separate charge after discussion with the customer.

PRELIMINARY WORK

1 – Check lighting system

Check

- Check function of the front and rear lights.
- Check function of the motor vehicle number plate light.
- Check headlight adjustment.

Result

» Functional limitation of the lighting system.

Measure

- Repair lighting system.

  If necessary, adjust headlight and charge separately.

63 10 014 Adjusting fog lights
63 10 004 Adjusting headlights
63 10 004 Adjusting headlights
63 10 014 Adjusting fog lights

2 – Check horn, headlight flashers and hazard warning flashers

- Operate the horn and check the function of both fanfares.
- Operate the headlight flasher, check the function of the high beam headlight and blue indicator light in the instrument cluster (KOMBI).
- Check function of hazard warning lights system.

3 – Check the wiper and window washer system

Check

- Check the wiper range for streaks.

Result

» Streaks in the wiper range.

Measure

- For a separate charge: Renew the wiper blades.

Check

- Check the washer jets and spray jet.

Result

» The spray jet does not exit or exits unevenly.

Measure

- Adjust the washer jets.

Measure

- For a separate charge: If applicable, renew the washer jets.

4 – Check blower

- Check function of blower.
- Check air distribution and air leak for all blower speeds.

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5 – Check the interior lighting

- Check the function of the operating element.
- Check the function of the indicator lights and warning lights.
- If applicable, check the function of additional instrument lighting.
- Check the function of the inscription lighting of the light switch.
- If applicable, check the function of additional inscription lighting.
- Check the function of the interior lighting.
- Check the function of the glove box light.
- Check the function of the luggage compartment lights.

6 – Check seat belts

Check

- Check condition of seat belt strap.
- Check function of automatic reel.
- Check seat belt locking reel, seat belt buckle, seat belt clip and, if necessary, seat belt clasp for damage.

Result

» Damage or functional limitations.

Measure

- Repair damage and functional limitations.

72 00 ... Replacing the seat belt clip

7 – Checking the warning triangle, high-visibility jacket and first-aid kit

Check

- Check whether or not the warning triangle, high-visibility jacket and first-aid kit are available.
- Check expiry date on the first-aid kit.

Result

» Warning triangle, high-visibility jacket and first-aid kit not present.

» First-aid kit has expired.

» First-aid kit will expire prior to the next vehicle check.

Measure

- Install the warning triangle, high-visibility jacket and first-aid kit.

Measure

- Renew first-aid kit.

8 – Check Mobility Set

Check

- Check expiry date on the tyre sealant bottle.

Result

» Expiry date exceeded.

» Expiry date exceeded before next vehicle check.

Measure

- Replace tyre sealant bottle and charge separately.

MAIN WORK

9 – Check tyres (if available, compact spare wheel also)

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Check

- Check the tread depth of all tyres with the tyre tread gauge.
- Check the tyre tread surface and flanks for cuts and foreign objects such as nails or screws.
- Check tread wear pattern for worn out areas and for one-sided wear.

Result

» Tyres worn or damaged.

Measure

- Replace the tyres against a separate invoice and, if required, carry out the wheel alignment.

Check

- Check the tyre pressure.

Result

» Tyre pressure too low or too high.

Measure

- Adapt the tyre pressures as per the specification.

10 – Check vehicle underbody and all other visible components

Check

- Carry out visual inspection of the vehicle underbody.
  - Check for tightness (transmission, fuel system, components of the brake, steering)
  - Check for correct routing of the electrical lines (e.g. brake pad wear sensor)
  - Check for tightness (shock absorber)
  - Check the installation and corrosion on the springs in the rebound state
  - Check vehicle underbody for damage
  - Check complete mounting of mounted parts (e.g. underbody panellings)

Result

» Check for damage or leaks on the vehicle underbody

Measure

- If necessary, remove trim panels from underbody.

  Check brackets, brake lines and fuel lines for damage and correct mounting orientation.

Measure

- Eliminate possible defects for a separate charge after discussion with the customer.

11 – Check brake lines and the brake line connections

Check

- In the visible areas, perform visual connection for:
  - Leakages
  - traces of fluid
  - damage
  - pinched areas
  - correct routing of brake lines
  - correct seating of brake lines in holders
- Check brake fluid level in brake fluid expansion tank

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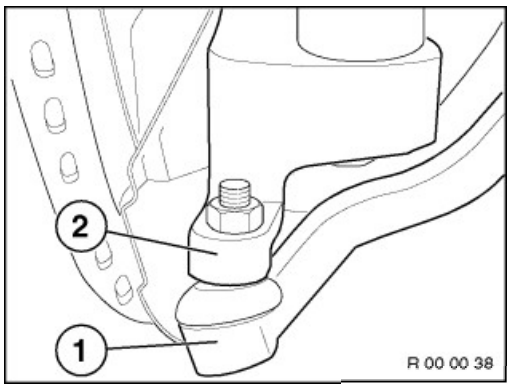
Result

» Leaks, damage.

Measure

- Repair detected defects for a separate charge after discussion with the customer.

12 – Check the components of the steering



Check

- Move the steering wheel in both directions while checking for play.

desired state

- There is no play between the track rod joint (1) and track rod arm (2).

Result

» There is play.

Measure

- Eliminate possible defects for a separate charge after discussion with the customer.

Check

- Check gaiters and sleeves for damage (e.g. cracks and holes) and tightness.
- Check gaiter for missing tensioning straps.

Result

» Damage or leaks.

Measure

- Eliminate possible defects for a separate charge after discussion with the customer.

POSTPROCESSES

13 – Checking the coolant level and coolant composition

- Check the connections, hose clamps and hoses for coolant residues and damage such as e.g. cracks.
- Check coolant composition in all coolant expansion tanks.

Expendable materials

Technically suitable antifreeze and corrosion inhibitor	

Main group 17

Check

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- Check the coolant level in both coolant expansion tanks.

  The filling level in the coolant expansion tank must be between the minimum and maximum mark.

- Inform customer in event of incorrect fluid level and, if necessary, troubleshoot (charged separately).

Result

» Coolant level below the minimum mark.

» Coolant level above the maximum mark.

Measure

- Adjust filling level in the coolant expansion tank to the desired filling level.

  The according amount of coolant must be supplemented or drawn off.

14 – Check the engine compartment for leakage from the top

Check

- Carry out visual inspection of the engine compartment.
  - Check general leak-tightness (engine, cooling system, fuel system, hoses and pipes)
  - Check the electric cables are correctly routed.

Result

» Damage or leakage present.

Measure

- Eliminate possible defects for a separate charge after discussion with the customer.

15 – Top up the washer fluid for the window washer system

- Top up the fluid tank for the window washer system up to the maximum mark.

16 – Check the tyre settings in the central information display (CID)

Check

- Check for correct tyre setting in the central information display (CID).

desired state

- The mounted tyres match the tyre setting in the central information display (CID).

Result

» Incorrect tyre setting in the central information display (CID).

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Measure

- Adjust the tyre setting in the central information display (CID).

  Open the menu:

  - Select **My vehicle** in the menu.
  - Select **Vehicle status** in the menu.
  - Select **Tyre pressure control (RDC)** from the menu.

  Enter the settings:

  - Select **Tyre settings** from the menu.
  - Select tyres: Summer tyres / winter tyres.
  - Select the tyre type that is mounted at the rear axle.
  - Select the load status of the vehicle.
  - Confirm the settings.

  Starting measurement of the current tyre pressure. The progress of the measurement is displayed.

17 – Performing a CBS reset (equipment specification without the reset button for the trip distance recorder in the instrument cluster (KOMBI))

Prerequisite

Scope of maintenance work is performed.

On-board date is set correctly.

No CC message is present.

Availability of the scope of maintenance work is under 90%.

TECHNICAL INFORMATION

The CBS scope of maintenance work can be reset in the car. In general, however, the reset of CBS functions (CBS reset) with the diagnosis system is recommended.

It is only possible to code the country-specific statutory intervals with the diagnosis system.

TECHNICAL INFORMATION

Information for the occurrence of a failed CBS reset:

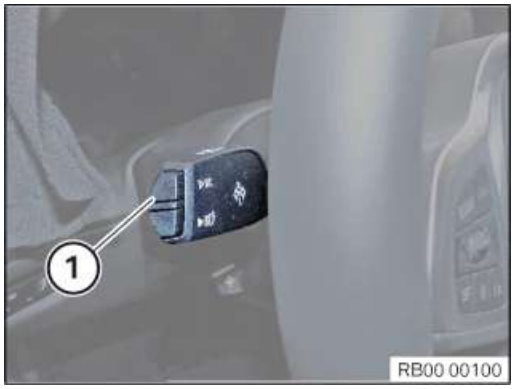
For front/rear brake service:

- A CBS reset is only possible in the vehicle with a worn brake pad wear sensor (CBS display in CID active).
- With a brake pad wear sensor that is not worn (no CBS display in the CID), a CBS reset is only possible with the diagnosis system.

Other known causes of CBS reset problems:

- Parking brake engaged
- Brake pedal pressed

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TECHNICAL INFORMATION

The reset procedure (CBS reset) is cancelled due to a timeout or a terminal change.

- Generate PWF status "Residing".
- Generate PWF status "PAD": For this purpose, press the START-STOP button three times.
- Press on-board computer button on the turn signal/high beam switch for (1) approx. 10 s, until the 1st scope of maintenance work appears on the display.

  The next position is reached by briefly pressing the on-board computer button on the turn signal/high beam switch (1)again.
- Select the desired service job.

  If a CBS reset is possible, "Reset possible" is displayed on the instrument cluster (KOMBI).
- Confirm the "Perform reset?" text message. Press the on-board computer button on the turn signal/high beam switch for (1) 3 s.

  The CBS reset is confirmed as "Reset successful" after it is performed.

18 – Checking for road safety and performing test drive

Check

- Check the service brake and the parking brake.
- Check steering for play, ease of movement and correct straight-ahead driving.
- Inspect the shock absorbers visually for leaks.
- Check that the indicator lights, the warning lights and the Check Control function correctly.
- Check the due date on the German Technical Inspection Agency (TÜV) badge and, if necessary, inform the customer of the due date for the inspection.

Result

» Defects were detected.

Measure

- Eliminate possible defects for a separate charge after discussion with the customer.

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Additional Information

Links

Repair instructions	Used in step
63 10 014 Adjusting fog lights	1
63 10 004 Adjusting headlights	1
63 10 004 Adjusting headlights	1
63 10 014 Adjusting fog lights	1
61 61 021 Replacing left or right windscreen wiper blade	3
61 61 041 Replacing both wiper blades	3
72 00 ... Replacing the seat belt clip	6

36 10 300 Remove or install front or rear wheel

32 00 155 Kinematics Diagnosis System wheel alignment with ride height measurement without loading the vehicle

36 11 003 RDC resetting

Operating materials	Used in step

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00 00 105 Standard scope of service

TECHNICAL INFORMATION

Repair possible defects for a separate charge after discussion with the customer.

1 – Check the function of the parking brake without roller est stand

Check

- Check the function of the parking brake, e.g., when the vehicle is driven into the workshop.

Result

» Function of the parking brake is limited.

Measure

- Repair parking brake.

2 – Check the indicator lights and warning lights

Check

- Check the indicator lights and warning lights in the instrument cluster (KOMBI).

Result

» The indicator lights and/or warning lights in the instrument cluster (KOMBI) are illuminated.

Measure

- Eliminate the causes for the warning messages.

3 – Checking Check Control messages

Check

- Check for Check Control messages in the CID.

Result

» Check Control messages are present in the CID.

Measure

-

▸ **Reading out the fault memory**

- Connect diagnosis system.



Check

- Read out fault memory.

Result

» A fault memory entry is present.

Measure

- Delete the fault memory, work through the test module if applicable.

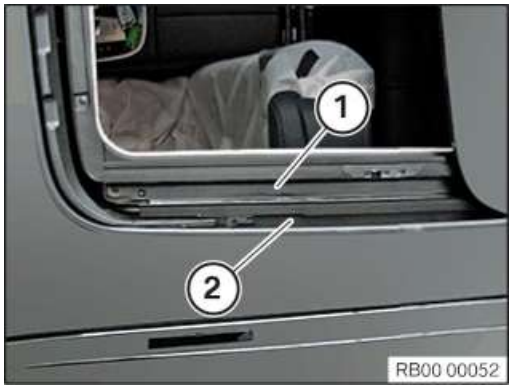
4 – For slide/tilt sunroof or panorama glass roof: Check the guide rails and water drain channels for contamination

Prerequisite

The glass slide/tilt sunroof panel is open.

Check

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- Check guide rail (1) and water drain channel (2) on left and right for contamination.

Result

» Guide rails and water drain channels are contaminated.

Measure

- Clean guide rails and water drain channels and issue a separate invoice.

  Check whether water drain hoses are clear.

5 – Recommendation: Check tyres

▸ **Check tyres (if available, compact spare wheel also)**

Check

- Check the tread depth of all tyres with the tyre tread gauge.
- Check the tyre tread surface and flanks for cuts and foreign objects such as nails or screws.
- Check tread wear pattern for worn out areas and for one-sided wear.

Result

» Tyres worn or damaged.

Measure

- Replace the tyres against a separate invoice and, if required, carry out the wheel alignment.

Check

- Check the tyre pressure.

Result

» Tyre pressure too low or too high.

Measure

- Adapt the tyre pressures as per the specification.

6 – Transferring service history

Prerequisite

All completed maintenance work is documented in the Service History.



- Transfer the completed maintenance work from the Service History to the vehicle.
- Connect diagnosis system:
  - Service functions
  - Maintenance
  - Transferring service history

Additional Information

Links

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Repair instructions	Used in step
36 10 300 Remove or install front or rear wheel	5
32 00 155 Kinematics Diagnosis System wheel alignment with ride height measurement without loading the vehicle	5
36 11 003 RDC resetting	5

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00 00 ... Vehicle care measures for inventory vehicles (new and used vehicles) as well as vehicles to be taken off the road that are in the hands of customers

Action	Vehicles	Execution
Remove the protective transportation film	New vehicles	Do not remove the protective film if the vehicle is kept outdoors; Note the instructions on how to remove protective film
Release parking brake	New vehicles	In general
	Used vehicles	In general
	Customer vehicles to be taken off the road (note to customers)	In general
Engage gear or selector lever position "P" for automatic transmission	New vehicles	In general
	Used vehicles	In general
	Customer vehicles to be taken off the road (note to customers)	In general
Check the covers of the interior equipment	New vehicles	In general
Increase the tyre pressure to 3.5 bar	New vehicles	In general
	Used vehicles	In general
	Customer vehicles to be taken off the road (note to customers)	In general
Charge battery	New vehicles	See battery charging calendar
	Used vehicles	See battery charging calendar

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	Customer vehicles to be taken off the road (note to customers)	Every 6 weeks; Every 12 weeks for vehicle batteries that have been disconnected from the vehicle electrical system; Notify customers of vehicle-specific procedures for electric or hybrid vehicles
Change the brake fluid and reset CBS	Used vehicles	Change before vehicle handover to customer if service is due shortly (see CBS display -> Brake fluid service)
Check convertible top for potential damage	New vehicles	Generally before handover to the customer
	Used vehicles	Generally before handover to the customer
If possible, keep convertibles in roofed areas	New vehicles	In general
	Used vehicles	In general
	Customer vehicles to be taken off the road (note to customers)	In general
Check for damage to paint, the exterior or interior	New vehicles	Generally before handover to the customer
	Used vehicles	Generally before handover to the customer
Change engine oil and oil filter at engine operating temperature	New vehicles	No change
	Used vehicles (not applicable to vehicles with Premium Selection certificate)	Prior to handover to customers as from a 12 month immobilisation period
	Customer vehicles to be taken off the road (note to customers)	Prior to handover to customers as from a 12 month immobilisation period

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Check coolant composition	Used vehicles	In general
	Customer vehicles to be taken off the road (note to customers)	In general
Dry the parking brake and footbrake by applying the brake	New vehicles	In general
	Used vehicles	In general
	Customer vehicles to be taken off the road (note to customers)	In general
Apply surface protection: vehicle surface wash including interior vehicle cleaning and subsequent paint and chrome-part care. Clean the rubber seals of the flaps and doors and apply talc or rubber care product. Use materials approved by BMW for cleaning and vehicle preservation to recondition engines, engine compartments, vehicle underbodies, axles and assemblies.	Used vehicles	In general
	Customer vehicles to be taken off the road (note to customers)	In general
Switch on the air conditioning for approximately 10 min each month	New vehicles	Required to ensure circulation of the refrigerant oil
	Used vehicles	Required to ensure circulation of the refrigerant oil
	Customer vehicles to be taken off the road (note to customers)	Required to ensure circulation of the refrigerant oil

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00 00 ... When driving on a race track

Caution!

The customer must be informed that, in particular, the brake pads, wear indicator and the flat tyre monitor installed as standard are not designed for race track operation. The vehicle is also not designed for motor sport competition racing.

Excessive loading of the vehicle, e.g. by operating it on a race track or in motor sport competition racing, is not covered by the warranty.

If the customer still wants to drive on a race track, the following aspects must be considered/checked, at least:

The vehicle, or rather the engine, should be carefully run in before operating it on the race track. A run in period of at least 2000 km.

Recommendation: Carry out an oil change after the run in period.

For driving on a race track, the following extensions must be considered and implemented on the vehicle.

Model: .....

Vehicle identification number: .....

Scope of checks before driving on the race track:		
Vehicle check	**OK**	**Comment**
Perform a comprehensive vehicle check service. -> Scope of the vehicle check service		
Engine	**OK**	**Comment**
Perform oil-level check.. -> If necessary, top up to the maximum level.		
Transfer box (affects only F39 X2 M35i / F40 M135i xDrive / F54 JCW ALL4 / F60 JCW ALL4)	**OK**	**Comment**
Perform transfer box oil change.		
Cooling	**OK**	**Comment**
Visual inspection of the radiator for contamination. -> Draw off contamination.		
Brake system	**OK**	**Comment**
Check the age of the brake fluid - see Service Booklet/Service history. -> The age of the brake fluid should not exceed 1 year.		
Check filling level in brake fluid expansion tank. -> If necessary, top up to the maximum level.		
Check the brake pad thickness on the front axle. -> Wear material thickness ≥ 9 mm -> Ideally, install new brake pads.		
Recommendation for M-vehicles: Use Sport brake pads, if available for that model.		

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Check the brake pad thickness on the rear axle. -> Wear material thickness ≥ rear axle ≥ 8 mm -> Ideally, install new brake pads. **Recommendation for M-vehicles:** Use Sport brake pads, if available for that model.		
Check the brake disc thickness on the front axle. -> Minimum brake disc thickness: ≥ Minimum brake disc thickness + 1 mm -> Ideally, install new brake discs.		
Check the brake disc thickness on the rear axle. -> Minimum brake disc thickness: ≥ Minimum brake disc thickness + 1 mm -> Ideally, install new brake discs.		
Visual inspection of the brake line and brake hose for tightness, damage and porosity.		
Wheels / tyres	**OK**	**Comment**
Check wheels/tyres for suitability for operation on the race track -> Winter tyres, all-season tyres and tyres on steel rims are absolutely unsuitable. **Recommendation:** Use Sport tyres.		
Check the tyre pressure of all the tyres and adjust, if required. -> In order to increase the service life and tyre performance, a reduction in the tyre pressure is recommended for the race track. To do this, proceed as follows: 1. Drive the tyres warm. 2. Set the tyre pressure according to the prescribed value on the tyre pressure label for partial loads. 3. Initialise RDC. **Note:** The display of tyre inflation pressure is possible only up to an operating temperature of systems of 120 °C. At higher temperatures, which can be reached during racing operation, the display is suppressed and a CC message is issued. After cooling down, the system functions again without limitations. **Background:** The tyre pressure increases due to the increase in temperature in the tyre when operated on the race track. This reduces the contact surface of the tyre to the road, leading to an increased temperature load on the running surface. The adjustment of the tyre pressure in tyres that have been driven warm as opposed to tyres in a cold state leads to a reduction in the pressure and thus, due to an increased tyre contact area, to a more equal load on the tyre.		

Extensions when driving on a race track:		
Warm up	**OK**	**Comment**
Drive a warming up lap. > Bring the engine up to operating temperature. Fast driving at a medium rpm level and medium dynamics.		
Cool down	**OK**	**Comment**
Drive a cooling down lap. -> Fast driving at a medium rpm level and medium dynamics. Avoid brake load as far as possible.		

Scope of checks after driving on the race track:		
Engine	**OK**	**Comment**
Carry out an oil-level check according to the Owner's Handbook. -> If necessary, top up to the maximum oil level.		

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Front axle transmission (only affects G15 with N63 engine)	**OK**	**Comment**
Perform oil change on front axle transmission.		
Transfer box (affects only F39 X2 M35i / F40 M135i xDrive / F54 JCW ALL4 / F60 JCW ALL4)	**OK**	**Comment**
Perform transfer box oil change.		
Rear axle differential (only affects G29 Z4 M40i / G20 M340i / G20 M340i xDrive)	**OK**	**Comment**
If an adjusted rear axle differential is installed. -> Perform oil change.		
Cooling	**OK**	**Comment**
Visual inspection of the radiator for contamination. -> Draw off contamination.		
Brake system	**OK**	**Comment**
Check filling level in brake fluid expansion tank. -> If necessary, top up to the maximum level.		
Check the brake pad thickness on the front axle. -> Replace brake pads when the remaining brake pad thickness is undershot (min. thickness 3.7 mm)		
Check the dust boots on the brake calipers of the front axle for damage.		
Check the brake pad thickness on the rear axle. -> Replace brake pads when the remaining brake pad thickness is undershot (min. thickness 3.7 mm)		
Check the dust boots on the brake calipers of the rear axle for damage.		
Check the brake disc thickness and their state on the front axle. -> Replace brake discs when: • Drop below the minimum brake disc thickness • Scoring • Heat cracks • Thickness difference		
Check the brake disc thickness and their state on the rear axle. -> Replace brake discs when: • Drop below the minimum brake disc thickness • Scoring • Heat cracks • Thickness difference		
Wheels / tyres **Note to customer:** Perform the following points for wheels/tyres immediately after the racing track operation and before driving on public streets.	**OK**	**Comment**
Check wheels/tyres for damage.		
Check wheels/tyres for minimum tread depth.		

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Check the tyre pressure of all the tyres and adjust, if required. 1. Allow tyres to cool down. 2. Set the tyre pressure according to the prescribed value on the tyre pressure label. 3. Initialise RDC. **Background:** Adjustment of the tyre pressure in cold tyres, as otherwise it can lead to tyre pressure control warning messages due to the low pressure.		
Vehicle check	**OK**	**Comment**
Perform a comprehensive vehicle check service. -> Scope of the vehicle check service		

....

Date Mechanic Workshop Supervisor

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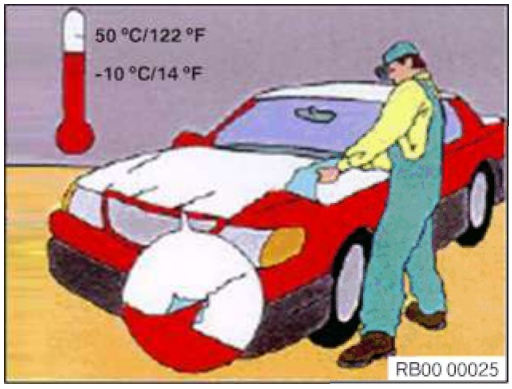
00 00 ... Work instruction for removing the protective film

Note:
The protective film is applied to new vehicles at the works. The dealer must guarantee only expert removal of the protective film.

The protective film should be removed 48 hours before vehicle handover to the customer.

The protective film can be easily removed from the affected surfaces. Polishing is necessary only in exceptional cases.

Further information on the protective film is available in the document "Frequently asked questions on surface protection".

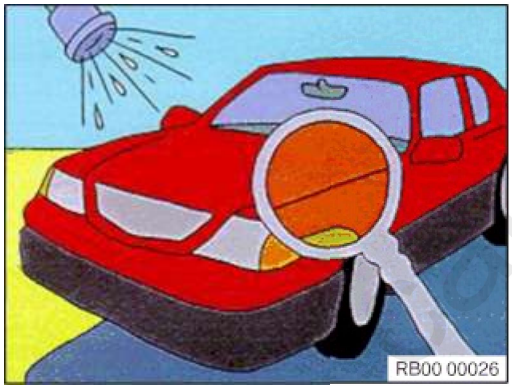


Instructions for removing the protective film:

- In order to reduce the amount of force required, the film can be torn at the edge and pulled off in narrower strips.
- Remove the film in a surface temperature range of -10 °C to +50 °C.

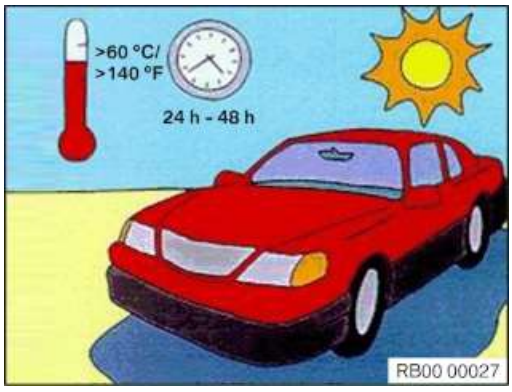
  Excessively high temperatures can lead to adhesive residue being left on the surface.

  In order to achieve the recommended temperature for pulling off the adhesive film from the vehicle after direct exposure to the sun, it is possible to carry out a car wash with applied protective film in order to cool the vehicle down.



Car wash and surface inspection:

- Check vehicle surface after the car wash.
- Any adhesive residue left on the vehicle surface can be removed by rubbing by hand or using a cleaning agent R2 (part number 83 19 0 417 324) or stain remover (part number 83 11 9 407 816) and a lint-free cloth.



Procedure in the event of paint swelling:

- Any paint swelling normally disappears within 48 hours.
- Higher temperatures (infrared lamp) accelerate this process.
- Polishing of the surfaces is necessary only in rare cases if the heat treatment does not result in success.

64 00 ... Information on using cleaning agent/paints (personal protection equipment)



Warning!

Use of cleaning agents/paints not compliant with instructions can cause serious injuries or burns!

Handling cleaning agents/paints can trigger allergic skin and respiratory reactions!



Important!

Observe following instructions:

- Store cleaning agents/paints only in a secure cabinet.
- Keep cleaning agents/paints away from naked flames and other sources of ignition.
- Protect cleaning agents/paints from high temperatures and direct sunlight.
- Always keep an eye douche on hand, change the water regularly (once a month).



Important!

Observe following instructions before use:

- Manufacturer's instructions (on container/packaging)
- Hazard warnings (on container/packaging)
- Manufacturer's instructions on package insert
- Material safety data sheet of manufacturer
- Product information in EPC
- National market regulations



Important!

Observe following instructions during use:

- Do not eat, drink or smoke while working with these products.
- Avoid direct contact with skin and eyes.
- Wear personal protective clothing/equipment.
- Ensure that all enclosed areas are well ventilated or extract fumes directly.
- Immediately change working clothes soiled with cleaning agent/paint.
- After finishing work, wash your hands and apply protective skin cream.



Important!

Follow hazard warnings and wear personal protection equipment!

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First Aid:

- If product comes in contact with eyes, immediately flush with running water for about 10 - 15 minutes. Seek the advice of eye specialist.
- In the event of skin contact and where applicable an allergic skin reaction, clean the affected areas immediately with soap and water and then apply silicone-free skin cream. Seek advice of physician.
- If an adhesive product is swallowed, rinse mouth/parts of mouth thoroughly with running water. Drink 1-2 glasses of water. Do not induce vomiting. Consult a doctor.
- After inhaling vapours ensure ample supply of fresh air. Keep calm, keep respiratory tracks clear and call doctor.



Recycling:

Dispose of cleaning agents/paints in a professional manner!

Observe national/country-specific disposal regulations.

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64 53 ... Instructions for desiccant insert replacement



Special tools required:

- 32 1 270

A desiccant insert that is in a correctly functioning, sealed heating and air conditioning system does **not** have to be changed at regular service-inspection intervals.

However, the dryer flask or desiccant insert must absolutely be replaced in the event of:

- contamination of the refrigerant with swarf (e.g. when the compressor is clamped).
- With depressurised and/or completely drained refrigerant circuit.
- With a refrigerant circuit, which was closed using special tool 32 1 270 but remains open for more than 24 hours.

The desiccant insert cannot be replaced in the following vehicles:

- *1-Series E8x, 3-Series E9x* from 12/2008
- *E84, E89*
- *1-Series F2x, 3-Series F3x*
- *BMW i 01 without heat pump*

In these vehicles, the condenser for the heating and air conditioning system must be replaced.

- *BMW i 01 with heat pump*

On this vehicle the low pressure battery must be replaced.

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61 00 ... Notes on handling the high pressure cleaner



Warning!

Only used a high pressure cleaner approved by BMW!

Only specially trained persons of 16 years of age or older may work with the high pressure cleaner.

Check the high pressure cleaner and electrical wiring for visible damage.

Only use at a suitable location.



Attention!

Pay attention to following hazard warnings:

- Danger of injury due to water jet
- Contact with hazardous substances in spray
- Risk of skidding on wet floor
- Risk of stumbling due to hoses and cables
- Comply with notes and instructions on handling cleaning agents !
- Risk of scalding when cleaning with hot water.
- On electric or hybrid cars, the safety instructions for handling with hybrid cars are to be complied with.



Warning!

The following personal protective equipment is to be used:

- Safety goggles/face guard
- Suitable gloves
- Apron
- Rubber boots
- Ear protectors
- Safety shoes



Attention!

Notes on washing a vehicle with a high pressure cleaner:

- Do not wash directly on gaskets and control units during engine

  washes.
- A minimum distance of 30 cm must be adhered to for tyres and tyre valves.
- A minimum distance of 30 cm must be adhered to for the soft top and painted parts.
- Do not use if engine is still hot.
- Do not exceed maximum water temperature of 60 degrees.
- Do not spray directly onto cameras/sensors.

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Attention!

- For your own safety, we recommend that you do not wash on the high-voltage components in electric or hybrid vehicles.

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



Warning!

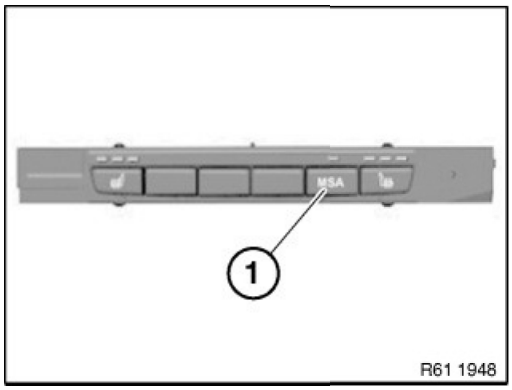
If the engine hood/bonnet contact is pulled upwards (workshop mode), the information "switch closed" is output. The automatic engine start-stop function is active.

An automatic engine start is possible.

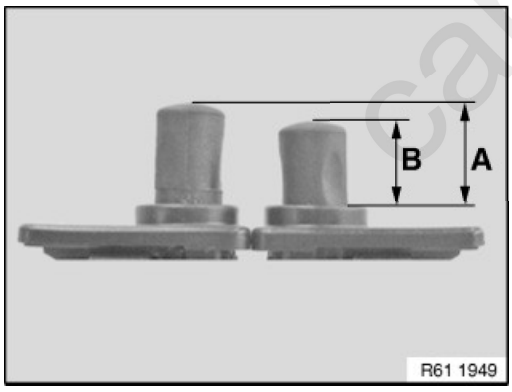
Observe safety precautions when working on MSA vehicles.

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 01 ... Symbols used and information in repair instructions



Warning!

Precautionary rules and measures which protect mechanics and other personnel against injury (including life-threatening injuries).

For example: **Warning!**

Risk of scalding!

Only perform this work after engine has cooled down.



Important!

Specific instructions and precautionary measures which prevent damage to the vehicle or to vehicle parts. Failure to comply with the above will invalidate any warranty claims.

The caution symbol is used in all repair instructions.

However, use of the warning word "Caution!" is not binding in every case.

The notes, instructions and precautionary measures mentioned above retain their validity.



Warning!

High-voltage system - danger to life!

Before beginning work, follow the applicable safety rules and perform the necessary preliminary work.

Note:
High-voltage symbol for hybrid cars (electrically powered vehicles) E72 and MINI E.



Warning!

High-voltage system - danger to life!

Before beginning work, follow the applicable safety rules and perform the necessary preliminary work.

Note:
High-voltage symbol for hybrid car (electrically powered vehicle) from F04.



Note:
Particular information on improved procedures for operation, testing, adjustment and upkeep.

Also indicates the end of a repair section.



Recycling:

Observe country-specific waste disposal regulations

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General information:
Refers to other instructions: such as e.g.:

Necessary preliminary tasks;

Further instructions: refer to operating instructions for balancing machine.



Replacement:

Carry out programming/encoding.

Note:
Many electronic control units must be programmed/coded (e.g. when replaced).



Note (symbol for diagnosis system):

- Connect BMW diagnosis system



Important!
Read and comply with notes on protection against damage from electrostatic discharge (ESD protection).

Note:
Electronic control units and other electronic components - if handled incorrectly - can be damaged or destroyed by electrostatic discharge.



Special tools required: *Note:*
List of special tools needed in these repair instructions.



Important!
Do not oil or grease component or tool.

Note:
Oil and grease will impair or damage the function of the component or tool.



Warning!
Laser beam!

For example:

Adjusting device emits laser beam. Do not look into the beam!

Note on laser class.



Important!
Use eye protection for the following operations.

For example:

Fuel can emerge spontaneously at high speed when the fuel delivery line is released!

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Important!
Use ear protection for the following operations.



Important!
Use eye protection and ear protection for the following operations.



Important!
Use face protection for the following operations.



Important!
Use protective gloves for the following operations.
Avoid skin contact.



Important!
Use eye protection and protective gloves for the following operations.
Avoid eye contact and skin contact.



Warning!
Danger of explosion!



First aid measures:
Note on first aid measures that need to be administered immediately.

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00 02 001 Raising the vehicle using a vehicle lift



Warning!

Danger to life!

Read and follow operating instructions for vehicle hoist.

Do not exceed approved load-carrying capacity and load distribution of vehicle hoist.

Weight compensation may be necessary due to the loading situation of the vehicle.

This also applies in the event of considerable removal of parts or conversions on the vehicle.

Note:

The vehicle hoist must comply with the relevant statutory/country-specific accident prevention regulations and be serviced according to the regulations.



Caution!

Risk of damage!

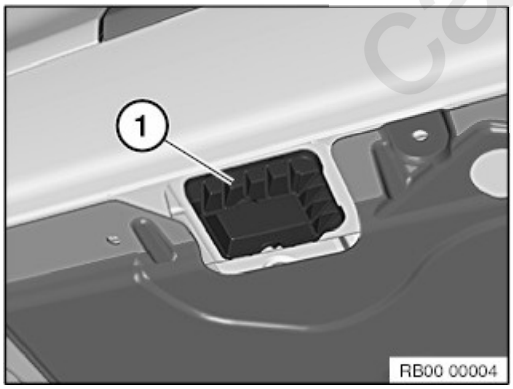
Before driving onto a vehicle hoist, make sure there is sufficient ground clearance between the vehicle hoist and the vehicle.

The vehicle may only be raised with the vehicle hoist at the four jacking points.



Necessary preliminary work:

- For new vehicles: If necessary, remove jacking points from equipment pack and insert from below into openings in front and rear sill areas

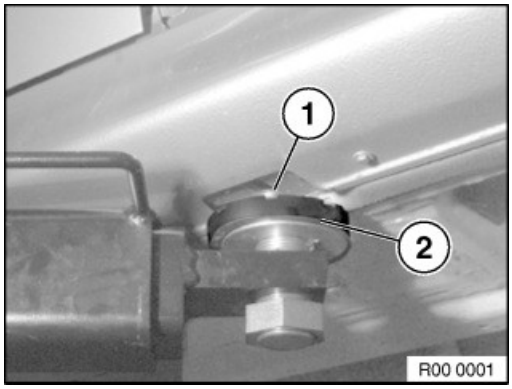


Caution!

All four jacking points (1) must be available!

Never raise the vehicle without the jacking points (1)!

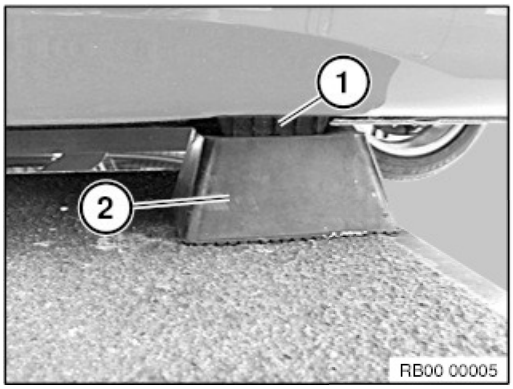
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Caution!

Risk of damage!

Align support plates (2) of lifting platform arms to jacking points (1) in such a way that no adjoining components are touched and thereby damaged.



Caution!

Risk of damage!

Align the rubber block (2) with the jacking points (1) in such a way that no adjoining components are touched and thereby damaged.

Never raise the vehicle without rubber blocks (or rigid foam blocks)!

There is a major risk of damage to the vehicle underbody!

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00 00 ... Microencapsulated screws



Screw securing adhesive is a means of preventing a screwed connection from being loosened by external influences.

Once the screw has been coated with adhesive, the adhesive remains inactive until such time that it is activated by the encapsulation breaking when the screw is inserted and then cures (hardens) at room temperature.



Installation note:

- Screw connection must be completed within 20 mins. (start of curing)
- Microencapsulated screws must not be retightened
- Thread of nut must be cleaned beforehand in event of repeated use

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61 12 ... Information on intelligent battery sensor (IBS)

Notice! Do not connect the charger to the 12 V charging socket

The 12 V charging socket is supplied with voltage by the rear power distribution box via relay. This relay drops out after terminal 15 OFF. This means that a trickle charger connected at the 12 V charging socket will be disconnected from the battery. Only charge the battery via the jump start terminal point. Only then can the voltage supply be registered by the vehicle.

Warning! Danger of destruction in event of mechanical strain

- Do not introduce any additional connections at the battery negative terminal.
- Do not modify the grounding cable. The ground cable also serves heat dissipation.
- Do not establish any connection between the IBS and the sensor screw.
- Do not use force when disconnecting the pole shoe from the battery terminal:
  - Do not pull on the ground cable.
  - Do not place any tools under the IBS to lever off the pole shoe.
- Do not use IBS connections as levers.
- Use a torque wrench and set tightening torque in accordance with repair instructions.
- Do not release or tighten down sensor screw (Torx screw).
- Avoid contact between IBS and ground.

Warning! Danger of destruction to IBS and wiring upon battery replacement

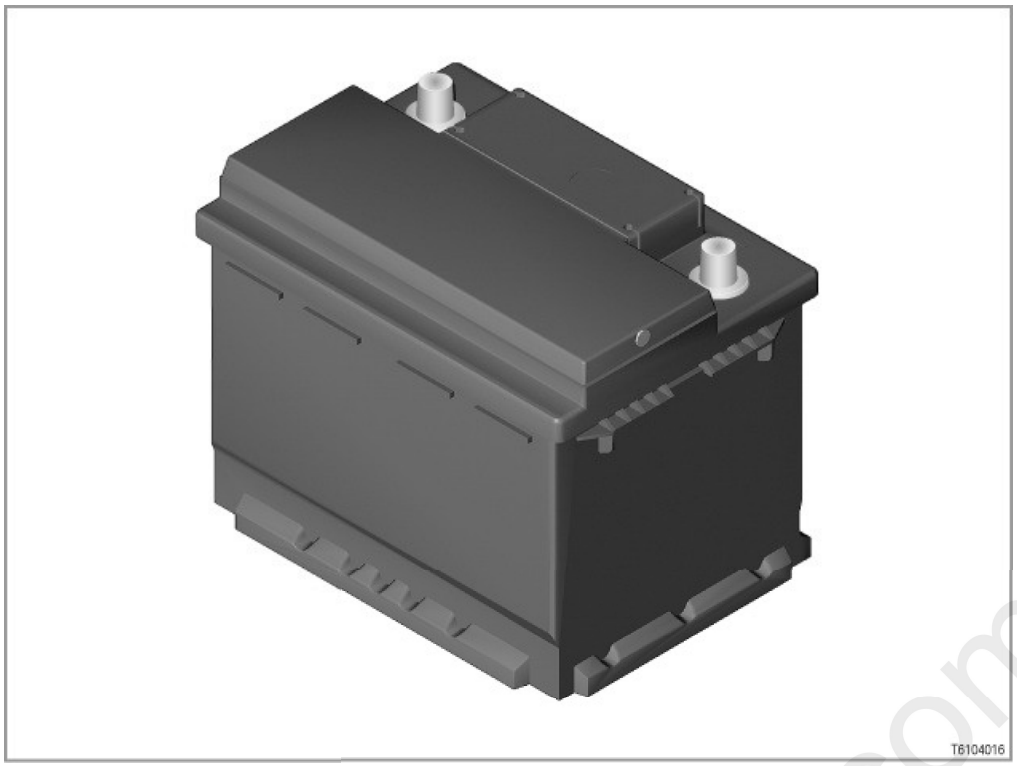
- The IBS and wiring can be destroyed by mechanical strain upon battery replacement. Therefore avoid mechanical strain.
- The size (capacity) of the battery required for the car is coded in the Car Access System (CAS).
- Use the battery size (capacity) installed as standard upon battery replacement.
- Recode the Car Access System (CAS) when installing a battery with a different capacity.
- Register battery replacement via Service functions in diagnosis system.
- Delete fault code entries in the Digital Engine Electronics (DME) associated with battery replacement.
- Always proceed in accordance with the repair instructions.

Note: Battery draining possible in spite of the intelligent battery sensor IBS being fault-free.

- A battery can be drained (e.g. with lights or radio switched on) even when the IBS functions perfectly in conjunction with power management.
- **For this reason, only exchange the IBS when there is a corresponding fault code entry!**

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61 20 ... Notes on AGM battery



Introduction

In September 2002, the first so-called VRLA batteries, better known as **AGM batteries** came into use. (VRLA stands for **V**alve **R**egulated **L**ead **A**cid, i.e. lead-acid battery with pressure relief valve; **AGM stands for A**bsorbent **G**lass **M**at, i.e. absorbent glass-fibre fleece).

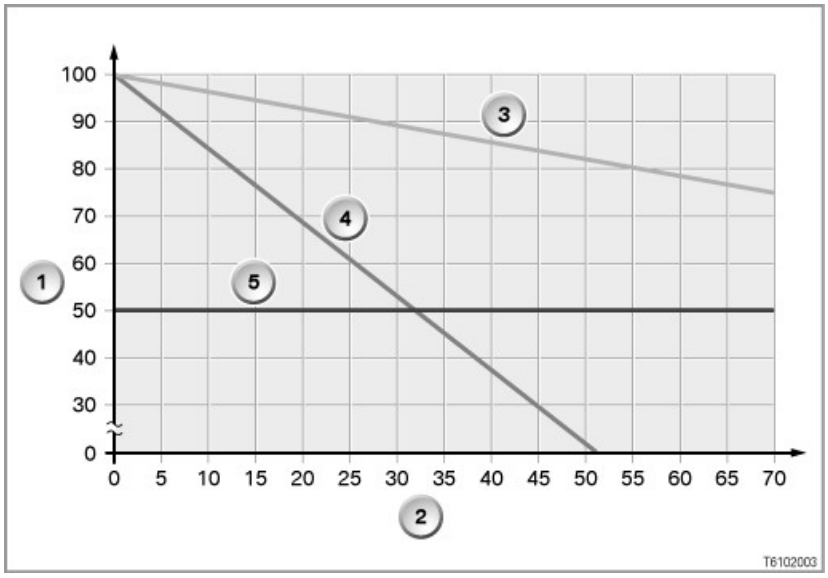
The constantly increasing energy demand of modern vehicle electrical systems calls for ever more powerful battery solutions. A modern luxury-class vehicle has some 100 actuator motors that have to be fed with electrical current. Added to these are safety, environmental and comfort elements which are increasingly becoming standard features, such as e.g. Antilock Brake System (ABS), Dynamic Stability Control (DSC), steering assistance (EPS), electronic chassis and suspension control, air conditioning and navigation system. Current consumption is considerable even when the vehicle is not in use.

The somewhat higher price compared with a battery of similar size is fully balanced by the following benefits:

- greatly longer service life
- improved starting reliability at low temperatures
- reliable starting of engines with high starting current requirements, e.g. high-performance diesel engines
- 100 % freedom from maintenance
- low risk in the event of an accident (reduced environmental risk)

Service life of AGM batteries

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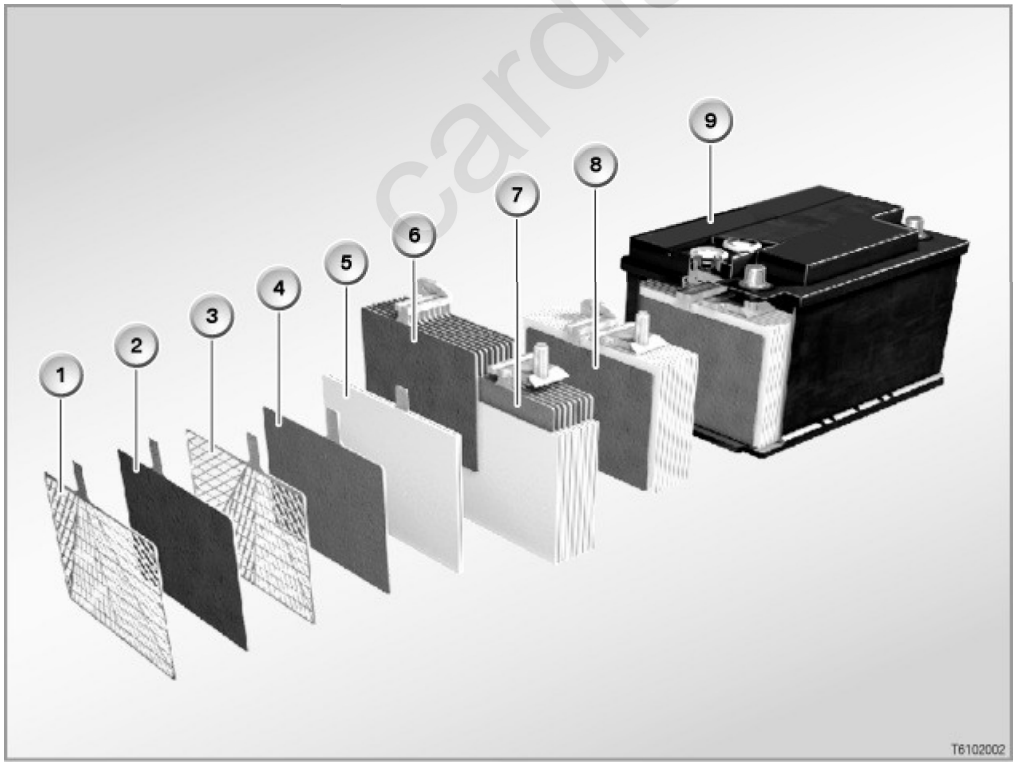


Item	Explanation	Item	Explanation
1	Available capacity [%]	2	Mileage [thousand km]
3	AGM battery	4	Lead-calcium battery
5	50 % capacity limit		

In contrast to conventional lead-calcium batteries, the sulphuric acid in a battery with fleece technology is not held freely in the battery housing. Rather, 100% of the sulphuric acid is bound into the mats of the glass-fibre fleece (separators). For this reason, no battery acid can escape if the battery housing is damaged. In addition, the AGM battery is sealed to be airtight. This is possible because the gases are converted back into water by the permeability of the separators.

Brief component description

The AGM battery has a black housing and the so-called "Magic Eye" is missing.



Item	Explanation	Item	Explanation

1	Positive grille with silver alloy	2	Positive plate
3	Negative grille	4	Negative plate
5	Separator made of glass-fibre fleece	6	Set of positive plates
7	Set of negative plates	8	Block of plates
9	Block box with base strips		

Construction

The AGM battery differs from the conventional lead calcium battery as follows:

- larger plates: Larger plates allow a 25% larger power density.
- Separators made of glass-fibre fleece: These can cause an up to 3-times higher cycle stability to be reached. This improves the cold starting capability, the power consumption and service life.
- Airtight housing with pressure relief valve (please refer to "How it works"):
  The inspection plugs are sealed and can not be opened.
- Battery acid bound in glass-fibre fleece: Battery acid is not found free in the housing as before, but is rather bound 100% in the glass-fibre fleece. This gives increased security against the acid escaping and thus reduces the environmental risk.

How it works

The AGM battery differs from conventional batteries in its non-polluting and substance-retaining behaviour during charging.

When a battery is charged, the electrolysis process emits the gases oxygen and hydrogen.

- In a conventional wet lead calcium battery, the two gases hydrogen and oxygen are dissipated into the atmosphere.
- In an AGM battery, the two gases are converted back into water: The oxygen which is created at the positive electrode during charging passes through the permeable glass fibre fleece to the negative electrode. At the negative electrode the oxygen reacts with the arriving hydrogen ions in the electrolyte to form water (oxygen cycle).

In this manner, the gas and thus also the electrolyte are not lost.

Only in the event of an excessively heavy build-up of gas, i.e. excessively high pressure build-up (20 to 200 mbar), does the pressure relief valve discharge the gas. In this process, the pressure relief valve does not allow any oxygen in the air to enter. Because the pressure in the battery is regulated by a valve, the AGM battery is also known as the VRLA battery (valve-regulated lead acid).

Notes for Service department

It is necessary when handling an AGM battery to observe some particular points pertaining to battery changing and installation location.

Charging

Warning! Do not charge the AGM battery with > 14.8 V. Do not use rapid-charging programs!

> When charging removed batteries (so-called stand-alone batteries), do not exceed the maximum charging voltage of 14.8 V at room temperature. Also, for charging via the external start connection point, the maximum charging voltage of 14.8 V at room temperature must not be exceeded. The battery can be damaged even if the AGM battery is only briefly charged with a charging voltage higher than 14.8 V. A charging voltage of more than 14.8 V is usually used in quick-charging routines.

Installation location

Warning! Do not install the AGM battery in the engine compartment.

> The AGM battery must not be installed in the engine compartment on account of the high spatial temperature differences, otherwise its service life will be significantly shortened.

Housing

Warning! Do not open AGM batteries.

On no account may AGM batteries be opened, as the ingress of oxygen from the atmosphere would cause the battery to lose its chemical balance, rendering it unserviceable.

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61 00 ... Notes on handling optical fibres



Important!

To avoid damage when handling optical fibres, comply with the following points:

- The minimum permitted bending radius is 25 mm
- Do not subject optical fibres to compressive and tensile load
- Protect optical fibres against the effects of heat ≥85 °C (e.g. during welding work, drying work with infrared beams or hot air blower)
- Fibre-optic cables are permitted to show only one junction point (bridge), replace fibre-optic cables if necessary



Note:
The optical fibres are coloured differently as follows:

- Green = **MOST** (**M**edia **O**riented **S**ystems **T**ransport) optical fibre
- Yellow = **ISIS** (**I**ntelligent **S**afety and **I**ntegration **S**ystem) optical fibre
- Orange=repair fibre-optic cables

Follow notes for processing cables and optical fibres.

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61 00 ... Notes on handling wiring harnesses and cables



The following applies in general:

To avoid damage, observe the following instructions:

- Avoid compressive and tensile loads
- To ensure professional repairs, perform repair work only with BMW-approved or recommended special tools and spare parts
- Make sure cables are laid without kinks or abrasions
- Ensure non-contacting routing at sharp-edged body parts; use edge protection if necessary
- Secure additionally laid cables/leads with cable ties

The following additionally applies:

Shielded lines

Interference radiation and interference resistance can lead to neutral zones at contact points in the shielding. Consequently, distinctions have to be drawn between the following types:

Coaxial lines

- Shielded coaxial cables RTK031 may only be repaired with a special crimping tool.
- For aerial lines only the bushing contact may be repaired.
- RG174 Lines and the bushing contact may not be repaired.

CVBS lines

- CVBS cables may not be repaired.
- CVBS cables must be replaced in their entirety.

HSD lines

- HSD cables may not be repaired.
- HSD cables must be replaced in their entirety.

Optical fibre cable:

Note:
Fibre-optic cables are coloured differently as follows:

- Green = **MOST** (**M**edia **O**riented **S**ystems **T**ransport) optical fibres
- Yellow = **ISIS** (**I**ntelligent **S**afety and **I**ntegration **S**ystem) optical fibres
- Orange=repair fibre-optic cables

Attention!

- Optical fibres are permitted to show only one junction point (bridge). Replace optical fibres if necessary
- Smallest permissible bending radius is 25 mm
- Avoid effects of heat ≥ 85 °

Treating cables and fibre-optic cables

FlexRay (twisted cables):

It is possible to repair the FlexRay. In the event of damage, the cables can be joined with conventional butt connectors and heat-shrink tubing.

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Note:

- FlexRay lines may only reveal one separation point (bride); renew complete line if necessary.
- If possible, maintain twisted cable after repair.
- After repairs, twist cables as close as possible to the connector/separation point.
- Twisting must be as symmetrical as possible.

Airbag lines:

Repairing airbag cables

Ribbon cables:

Repairing ribbon cables

Replacing wiring harnesses

Repair wiring harnesses mainly cover the full equipment of the vehicle. If certain optional equipment is not installed in the vehicle, note the following:

- If necessary, secure the remaining connectors.
- If necessary, seal the remaining connectors outside the vehicle interior, for example, with butyl tape in such a way that moisture ingress can be eliminated permanently.
- If necessary, repin the connector of the repair wiring harness.

Note:
Repair wiring harnesses can be equipped with an **additional socket housing** (30-pin, for example), **which was not provided on the previous vehicle-side wiring harness**. This socket housing also cannot be found in the wiring diagram.

Procedure

The separation point between the vehicle-side wiring harness and the repair wiring harness is located **in the vehicle interior** (in the footwell, for example):

- Cut the additional socket housing and connect the lines to the vehicle-side wiring harness using a butt connector.
- Alternatively, a suitable pin housing can be fitted on the vehicle-side wiring harness and connected to the additional socket housing.

  However, this is permitted only if the following conditions are met:

  - Carpets must not protrude visibly or become deformed due to the installation of the additional plug connection.
  - It must be possible to install the adjacent components (for example, trims, trim panels, etc.) correctly after installing the additional plug connection.
  - All the attachment points of the adjacent components (for example, trims, trim panels, etc.) must engage correctly.
  - There must be no rattling noise due to the installation of the additional plug connection.
  - The additional plug connection must not damage the adjacent components/wiring harnesses, etc..

The separation point between the vehicle-side wiring harness and the repair wiring harness is located **outside the vehicle interior** (in the

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wheel arch, for example):

- Cut the additional socket housing and connect the lines to the vehicle-side wiring harness using a butt connector.
- **Using the additional socket housing is not permitted with a separation point outside the vehicle interior.**

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64 52 ... Instructions for opening and part exchange in refrigerant circuit



Special tools required:

- 00 9 030
- 32 1 270

Warning!

- Avoid contact with refrigerant and refrigerant oil
- Follow safety informations for handling refrigerant
- Follow safety information for handling refrigerant oil

Attention!

- Always use new O-rings each time A/C connections are opened (refer to Electronic Parts Catalogue) They must **not** be coated.
  Use special tool 00 9 030 to install sealing rings without damaging them.
- Open the referigerant circuit for as short of a period as possible.
- Close all components and lines in the refrigerant circuit and return parts **immediately** following the removals at openings with special tool 32 1 270 to prevent penetration of moisture or foreign objects.
- If the refrigerant circuit was closed at the openings with special tool 32 1 270 but it remains open for more than 24 h, the dryer insert for the air conditioning must be replaced.

I. **Part replacement as preliminary work fur further repair work and part replacement based on gradual leakage.**
(minor leak, e.g. hairline crack)

Procedure:

- Draw off heating and air conditioning system, then determine drawn-off amount of refrigerant oil
- Carry out part replacement
- Replace removed refrigerant oil and additionally top up with new refrigerant oil according to components replaced:
  - Compressor: refer to Notes on compressor replacement
  - Evaporator: 10 ml
  - Capacitor: 20 ml
  - Desiccant insert / dryer flask: 20 ml
  - Each replaced refrigerant line: 10 ml
  - Condenser with integrated dryer flask: 40 ml
  - Safety pressure switch and gasket: no additional refrigerant oil
  - Only I01: Radiator, high-voltage battery unit: 20 ml
- Evacuate and fill air conditioning system

II. **Part replacement due to sudden leakage**
(major leak, e.g. line disconnection due to accident)

Procedure:

- Draw off heating and air conditioning system, then determine drawn-off amount of refrigerant oil
- Carry out part replacement
- Replace removed refrigerant oil and additionally top up with new refrigerant oil according to components replaced:
  - Compressor: refer to Notes on compressor replacement
  - Evaporator: 35 ml
  - Capacitor: 35 ml
  - Desiccant insert / dryer flask: 55 ml
  - Each replaced refrigerant line: 35 ml

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    - Condenser with integrated dryer flask: 55 ml
    - Safety pressure switch and gasket: no additional refrigerant oil
    - Only I01: Radiator, high-voltage battery unit: 35 ml
- Evacuate and fill A/C system

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64 53 ... Instructions for replacement of air conditioning capacitors and radiator/coolers

Attention!

Even when they are correctly installed or due to normal driving, radiators (oil cooler, radiator, charge air cooler) or air conditioning condensers may show slight impressions or deformations on their discs (1).

A slight sag with a large radius for the air conditioning condenser is also permissible.

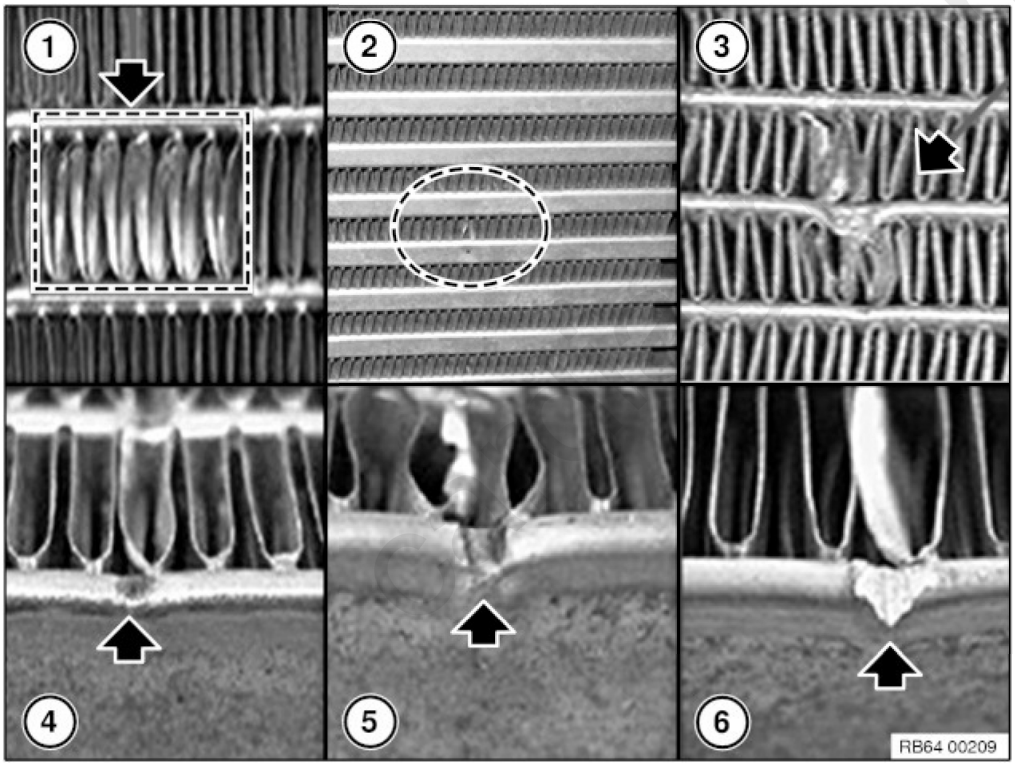
As long as tightness/function are not degraded and an adequate distance of a few mm between the radiator and air conditioning condenser remains in place, **this is not damage in either case.**

Radiators or air conditioning condensers are not to be replaced in these cases!

Note:

The deformations shown in Fig. (1) can be bent back with a standard fin comb..

Damage to lines carrying media or on the flat pipe require exchange of the radiator or air conditioning condenser (2-6).



Dryer flask (integrated in the air conditioning condenser):

Round dents/depressions are permitted.

The air conditioning condenser is not to be replaced in this case.

64 50 ... Instructions for handling R1234yf refrigerant

Work on the refrigerant circuit may only be carried out by experts!

Avoid all contact with liquid or gaseous R1234yf. Wear protective goggles and gloves when working on the refrigerant circuit.

- Follow safety information for handling refrigerant R1234yf!

Warning!

> Although R1234yf at normal temperature is non-toxic, non-flammable and not explosive in air in any mixture ratio, it is still essential to follow various safety precautions. **At higher temperatures, R1234yf is inflammable.**

As a gas, R1234yf is colourless, odourless and heavier than air. If it enters the atmosphere, this may result in an imperceptible danger of asphyxiation or in cardiac palpitations, especially in workshop pits. Ventilate rooms adequately; if necessary, turn on installed extractor systems.

Store filled refrigerant pressure flasks so that they are not subject to direct sunlight or other heat sources (at maximum 45 °C). Also avoid exposing them to mechanical stress (e.g. by dropping).

Do not weld or solder on to filled air conditioning systems or in rooms into which R1234yf may have leaked. Exposure to flames or high temperatures (≥ 50 °C) may give rise to toxic products of decomposition (hydrofluoric acid). For this reason, do not smoke either.

In the event of fire, carbon dioxide (CO2), extinguishing powder and a sprayed water jet are deemed to be suitable extinguishing agents. Cool reservoirs at risk with a sprayed water jet (risk of bursting!).

If the protective caps on the filler valves are difficult to open, there is a risk of injury from leaking valve inserts (high pressure).

The filled refrigerant circuit of the A/C system is subject to excess pressure. Before carrying out repairs on the A/C system, it is absolutely essential to draw off the refrigerant.

- Before conducting repairs, check the actual pressure drop on the pressure gauge of the A/C service station

R1234yf must be drawn off, cleaned and returned to the A/C system using an A/C service station following the relevant operating instructions.

For a properly functioning A/C system, it is essential to have the greatest possible levels of cleanliness when working on the A/C system and the longest possible evacuation (at least 30 minutes dehumidification from refrigerant circuit) before each filling of the A/C system.

R1234yf easily absorbs moisture. Therefore, seal off opened pipes, air conditioning condenser, evaporator, air conditioning compressor and dryer flask immediately with seal plugs.

- If air conditioning has been completely drained by a leak, accident or repair, the desiccant insert must be replaced as excessive moisture may have entered the system.

With replacement parts, the plugs may only be removed immediately before the lines are connected. In the event of warranty claims, the old parts must be provided with plugs to be able to determine the cause of the damage.

Installation note:

After each refilling of an air conditioning, check that protective caps of filling valves are hand-tight. They serve as additional seals.

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64 50 ... Notes on the refrigerant (R134a, R1234yf) and refrigerant oil



Attention!

Specific to the country , **2 different refrigerants** (R134a, R1234yf) are used.

Specific to the country, the vehicle and the year of manufacture **2 different refrigerant oils** (ND-8, Sanden SP-A2) are used.

Before carrying out repairs on the refrigerant circuit, always determine which refrigerant/refrigerant oil is used in the vehicle!

Refrigerant: This information can be found on the **type plate** on the bonnet.

Refrigerant oil: This information can be found on the **type plate** on the front flap in vehicles with a production date from 2013.

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R1234yf refrigerant is used **in the following countries**:

Observe notes on handling R1234yf refrigerant!

Europe				Asia	America
Belgium	Great Britain	Malta	Sweden	Israel	USA
Bosnia and Herzegovina	Ireland	Macedonia	Switzerland	Turkey	Canada
Bulgaria	Iceland	The Netherlands	Slovakia	India*	
Denmark	Italy	Norway	Slovenia	South Korea	
Germany	Croatia	Austria	Spain		
Estonia	Latvia	Poland	Czech Republic		
Finland	Liechtenstein	Portugal	Hungary		
France	Lithuania	Romania	Cyprus		
Greece	Luxembourg	Serbia			

*Only applies to vehicle models with Europe version. All other vehicle models have R134a.

Introduction of R1234yf refrigerant:

European countries listed in the table, Turkey and Israel:

- BMW i as of 09/2013
- from 07/2016, BMW, MINI, RR

USA and Canada:

- from 07/2016 BMW, BMW i, MINI

South Korea:

- from 11/2018 BMW, BMW i, MINI

The introduction date may vary slightly according to the specific country and model.

The refrigerant R134a will continue to be used **in all other countries**.

Observe notes on handling R134a refrigerant!

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Refrigerant oil Sanden SP-A2 is used for both, R1234yf and R134a.

Observe notes on handling refrigerant oil!

Attention!

I01, I12 with production date up to 08/2014:

In the national-market version with R134a a **wrong refrigerant oil** is present on the type plate

Always use Sanden SP-A2

(Part number of Sanden SP-A2: 2 339 920)

Attention!

Only vehicles with a production date from 09/2013 and **R1234yf** refrigerant/Sanden **SP-A2** refrigerant oil can be filled using the A/C service station for **R1234yf**.

In addition to vehicles with a production date from 09/2013, also all previous vehicles **without the electric A/C compressor** with **R134a** refrigerant and both **ND-8** and Sanden **SP-A2** refrigerant oil can be filled using the A/C service station for **R134a**.

Exception:

BMW i and hybrid vehicles (with an electric A/C compressor) that are filled with **R134a** refrigerant/Sanden **SP-A2** refrigerant oil. These vehicles must be injected with Sanden **SP-A2** refrigerant oil.

When filling the refrigerant circuit with R134a, always ensure you use the correct, vehicle-specific refrigerant oil type!

The previous ND-8 refrigerant oil must not be mixed with Sanden SP-A2 refrigerant oil!

In other words, the refrigerant oil ND-8 must not be filled in refrigerant circuits which were filled with Sanden SP-A2 in the factory.

Sanden SP-A2 refrigerant oil may be mixed with ND-8 refrigerant oil in vehicles without an electric A/C compressor.

In other words, the refrigerant oil Sanden SP-A2 must be filled in refrigerant circuits which were filled with ND-8 in the factory.

However, this is permitted **only** in vehicles **starting from** F-series.

Note the overview of the refrigerant oil to be filled.

To prevent inadmissibly mixing the different refrigerant oil types, rinse the A/C service station hoses after each drawing off/filling procedure!

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64 50 ... Safety information for handling refrigerant R1234yf



R1234yf is non-toxic at normal temperature, non-flammable and not explosive in conjunction with air at any mixture ratio.

As a gas, R1234yf is colourless, odourless and heavier than air. If it enters the atmosphere, this may result in an imperceptible danger of asphyxiation or in cardiac palpitations, especially in workshop pits. Ventilate rooms adequately; if necessary, turn on installed extractor systems.

Store filled refrigerant pressure flasks so that they are not subject to direct sunlight or other heat sources (at maximum 45 °C). Also avoid exposing them to mechanical stress (e.g. by dropping).

Do not weld or solder on to filled air conditioning systems or in rooms into which R1234yf may have leaked. Exposure to flames or high temperatures (≥ 50 °C) may give rise to toxic products of decomposition (hydrofluoric acid). For this reason, do not smoke either.

In the event of fire, carbon dioxide (CO2), extinguishing powder and a sprayed water jet are deemed to be suitable extinguishing agents. Cool reservoirs at risk with a sprayed water jet (risk of bursting!).

If the protective caps on the filler valves are difficult to open, there is a risk of injury from leaking valve inserts (high pressure).

The filled refrigerant circuit of the A/C system is subject to excess pressure. Before carrying out repairs on the A/C system, it is absolutely essential to draw off the refrigerant.

After each refilling of an air conditioning, check that protective caps of the filling valves are hand-tight. They serve as additional seals.



Warning!

Work on the refrigerant circuit may only be carried out by experts!

Danger of injury!

Refrigerant circuit is under high pressure!

Draw off the refrigerant **before** any repairs on the refrigerant circuit!

The refrigerant circuit is only depressurised **after** drawing off.

- Check the pressure gauge on the A/C service station for actual pressure drops before repair.

The corresponding operating instructions of the A/C service station used must be observed!

Avoid all contact with liquid or gaseous R1234yf.

At high temperatures, R1234yf is inflammable!



Protective measures/rules of conduct:

- Wear safety goggles
- Wear oil-resistant protective gloves
- Do not smoke!
- Observe country-specific safety regulations.

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First aid measures:

- Eye contact: In the event of contact with the eyes, rinse immediately with plenty of running water and consult an ophthalmologist.
- Skin contact: In the event of contact with skin, remove affected clothing immediately and rinse with plenty of water.
- After inhalation: If refrigerant vapours are inhaled in greater concentrations, remove the person affected to an area of fresh air and keep them under supervision. Call for a doctor. If breathing problems are experienced, breathe additional oxygen. If the person affected is breathing with difficulty or has stopped breathing, incline the person's head at the neck and administer the kiss of life.

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64 50 ... Safety informations for handling tetrafluorethane refrigerant R134a



Warning!

Danger of injury!

Refrigerant circuit is under high pressure! Work on the refrigerant circuit may only be carried out by experts!

Draw off refrigerant without fail BEFORE all repair work on the refrigerant circuit.

The refrigerant circuit is depressurised AFTER drawing off.

- The pressure gauge on the A/C service unit must be checked for the actual pressure drop prior to repair work.

It is absolutely essential to read and observe the relevant operating instructions for the A/C service unit used!



Protective measures/rules of conduct:

- Wear safety goggles
- Wear oil-resistant protective gloves
- Do not smoke!
- Observe country-specific safety regulations.



First aid measures:

- Eye contact: In the event of contact with the eyes, rinse immediately with plenty of running water and consult an ophthalmologist.
- Skin contact: In the event of contact with skin, remove affected clothing immediately and rinse with plenty of water.
- After inhalation: If refrigerant vapours are inhaled in greater concentrations, remove the person affected to an area of fresh air and keep them under supervision. Call for a doctor. If breathing problems are experienced, breathe additional oxygen. If the person affected is breathing with difficulty or has stopped breathing, incline the person's head at the neck and administer the kiss of life.

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64 53 ... Instructions for desiccant insert replacement



Special tools required:

- 32 1 270

A desiccant insert that is in a correctly functioning, sealed heating and air conditioning system does **not** have to be changed at regular service-inspection intervals.

However, the dryer flask or desiccant insert must absolutely be replaced in the event of:

- contamination of the refrigerant with swarf (e.g. when the compressor is clamped).
- With depressurised and/or completely drained refrigerant circuit.
- With a refrigerant circuit, which was closed using special tool 32 1 270 but remains open for more than 24 hours.

The desiccant insert cannot be replaced in the following vehicles:

- *1-Series E8x, 3-Series E9x* from 12/2008
- *E84, E89*
- *1-Series F2x, 3-Series F3x*
- *BMW i 01 without heat pump*

In these vehicles, the condenser for the heating and air conditioning system must be replaced.

- *BMW i 01 with heat pump*

On this vehicle the low pressure battery must be replaced.

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64 50 ... Instructions for handling R1234yf refrigerant

Work on the refrigerant circuit may only be carried out by experts!

Avoid all contact with liquid or gaseous R1234yf. Wear protective goggles and gloves when working on the refrigerant circuit.

- Follow safety information for handling refrigerant R1234yf!

Warning!

> Although R1234yf at normal temperature is non-toxic, non-flammable and not explosive in air in any mixture ratio, it is still essential to follow various safety precautions. **At higher temperatures, R1234yf is inflammable.**

As a gas, R1234yf is colourless, odourless and heavier than air. If it enters the atmosphere, this may result in an imperceptible danger of asphyxiation or in cardiac palpitations, especially in workshop pits. Ventilate rooms adequately; if necessary, turn on installed extractor systems.

Store filled refrigerant pressure flasks so that they are not subject to direct sunlight or other heat sources (at maximum 45 °C). Also avoid exposing them to mechanical stress (e.g. by dropping).

Do not weld or solder on to filled air conditioning systems or in rooms into which R1234yf may have leaked. Exposure to flames or high temperatures (≥ 50 °C) may give rise to toxic products of decomposition (hydrofluoric acid). For this reason, do not smoke either.

In the event of fire, carbon dioxide (CO2), extinguishing powder and a sprayed water jet are deemed to be suitable extinguishing agents. Cool reservoirs at risk with a sprayed water jet (risk of bursting!).

If the protective caps on the filler valves are difficult to open, there is a risk of injury from leaking valve inserts (high pressure).

The filled refrigerant circuit of the A/C system is subject to excess pressure. Before carrying out repairs on the A/C system, it is absolutely essential to draw off the refrigerant.

- Before conducting repairs, check the actual pressure drop on the pressure gauge of the A/C service station

R1234yf must be drawn off, cleaned and returned to the A/C system using an A/C service station following the relevant operating instructions.

For a properly functioning A/C system, it is essential to have the greatest possible levels of cleanliness when working on the A/C system and the longest possible evacuation (at least 30 minutes dehumidification from refrigerant circuit) before each filling of the A/C system.

R1234yf easily absorbs moisture. Therefore, seal off opened pipes, air conditioning condenser, evaporator, air conditioning compressor and dryer flask immediately with seal plugs.

- If air conditioning has been completely drained by a leak, accident or repair, the desiccant insert must be replaced as excessive moisture may have entered the system.

With replacement parts, the plugs may only be removed immediately before the lines are connected. In the event of warranty claims, the old parts must be provided with plugs to be able to determine the cause of the damage.

Installation note:

After each refilling of an air conditioning, check that protective caps of filling valves are hand-tight. They serve as additional seals.

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64 52 ... Instructions for opening and part exchange in refrigerant circuit



Special tools required:

- 00 9 030
- 32 1 270

Warning!

- Avoid contact with refrigerant and refrigerant oil
- Follow safety informations for handling refrigerant
- Follow safety information for handling refrigerant oil

Attention!

- Always use new O-rings each time A/C connections are opened (refer to Electronic Parts Catalogue) They must **not** be coated.
  Use special tool 00 9 030 to install sealing rings without damaging them.
- Open the referigerant circuit for as short of a period as possible.
- Close all components and lines in the refrigerant circuit and return parts **immediately** following the removals at openings with special tool 32 1 270 to prevent penetration of moisture or foreign objects.
- If the refrigerant circuit was closed at the openings with special tool 32 1 270 but it remains open for more than 24 h, the dryer insert for the air conditioning must be replaced.

I. **Part replacement as preliminary work fur further repair work and part replacement based on gradual leakage.**
(minor leak, e.g. hairline crack)

Procedure:

- Draw off heating and air conditioning system, then determine drawn-off amount of refrigerant oil
- Carry out part replacement
- Replace removed refrigerant oil and additionally top up with new refrigerant oil according to components replaced:
  - Compressor: refer to Notes on compressor replacement
  - Evaporator: 10 ml
  - Capacitor: 20 ml
  - Desiccant insert / dryer flask: 20 ml
  - Each replaced refrigerant line: 10 ml
  - Condenser with integrated dryer flask: 40 ml
  - Safety pressure switch and gasket: no additional refrigerant oil
  - Only I01: Radiator, high-voltage battery unit: 20 ml
- Evacuate and fill air conditioning system

II. **Part replacement due to sudden leakage**
(major leak, e.g. line disconnection due to accident)

Procedure:

- Draw off heating and air conditioning system, then determine drawn-off amount of refrigerant oil
- Carry out part replacement
- Replace removed refrigerant oil and additionally top up with new refrigerant oil according to components replaced:
  - Compressor: refer to Notes on compressor replacement
  - Evaporator: 35 ml
  - Capacitor: 35 ml
  - Desiccant insert / dryer flask: 55 ml
  - Each replaced refrigerant line: 35 ml

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    - Condenser with integrated dryer flask: 55 ml
    - Safety pressure switch and gasket: no additional refrigerant oil
    - Only I01: Radiator, high-voltage battery unit: 35 ml
- Evacuate and fill A/C system

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64 53 ... Instructions for replacement of air conditioning capacitors and radiator/coolers

Attention!

Even when they are correctly installed or due to normal driving, radiators (oil cooler, radiator, charge air cooler) or air conditioning condensers may show slight impressions or deformations on their discs (1).

A slight sag with a large radius for the air conditioning condenser is also permissible.

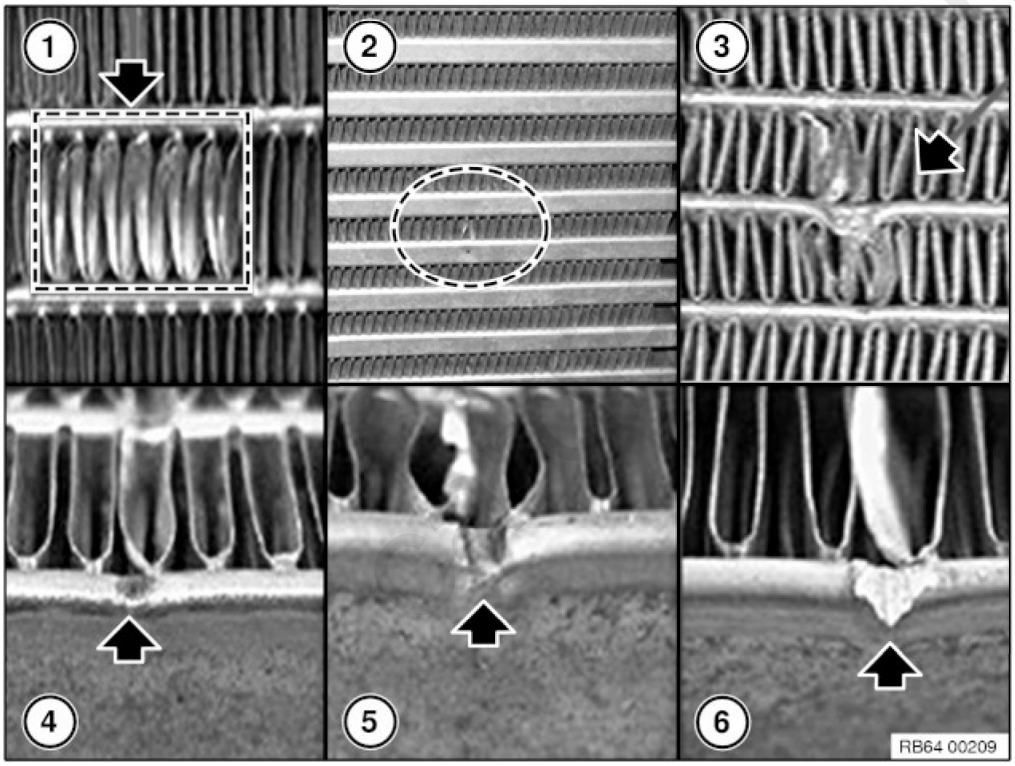
As long as tightness/function are not degraded and an adequate distance of a few mm between the radiator and air conditioning condenser remains in place, **this is not damage in either case.**

Radiators or air conditioning condensers are not to be replaced in these cases!

Note:

The deformations shown in Fig. (1) can be bent back with a standard fin comb..

Damage to lines carrying media or on the flat pipe require exchange of the radiator or air conditioning condenser (2-6).



Dryer flask (integrated in the air conditioning condenser):

Round dents/depressions are permitted.

The air conditioning condenser is not to be replaced in this case.

64 50 ... Notes on the refrigerant (R134a, R1234yf) and refrigerant oil



Attention!

Specific to the country , **2 different refrigerants** (R134a, R1234yf) are used.

Specific to the country, the vehicle and the year of manufacture **2 different refrigerant oils** (ND-8, Sanden SP-A2) are used.

Before carrying out repairs on the refrigerant circuit, always determine which refrigerant/refrigerant oil is used in the vehicle!

Refrigerant: This information can be found on the **type plate** on the bonnet.

Refrigerant oil: This information can be found on the **type plate** on the front flap in vehicles with a production date from 2013.

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R1234yf refrigerant is used **in the following countries**:

Observe notes on handling R1234yf refrigerant!

Europe				Asia	America
Belgium	Great Britain	Malta	Sweden	Israel	USA
Bosnia and Herzegovina	Ireland	Macedonia	Switzerland	Turkey	Canada
Bulgaria	Iceland	The Netherlands	Slovakia	India*	
Denmark	Italy	Norway	Slovenia	South Korea	
Germany	Croatia	Austria	Spain		
Estonia	Latvia	Poland	Czech Republic		
Finland	Liechtenstein	Portugal	Hungary		
France	Lithuania	Romania	Cyprus		
Greece	Luxembourg	Serbia			

*Only applies to vehicle models with Europe version. All other vehicle models have R134a.

Introduction of R1234yf refrigerant:

European countries listed in the table, Turkey and Israel:

- BMW i as of 09/2013
- from 07/2016, BMW, MINI, RR

USA and Canada:

- from 07/2016 BMW, BMW i, MINI

South Korea:

- from 11/2018 BMW, BMW i, MINI

The introduction date may vary slightly according to the specific country and model.

The refrigerant R134a will continue to be used **in all other countries**.

Observe notes on handling R134a refrigerant!

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Refrigerant oil Sanden SP-A2 is used for both, R1234yf and R134a.

Observe notes on handling refrigerant oil!

Attention!

I01, I12 with production date up to 08/2014:

In the national-market version with R134a a **wrong refrigerant oil** is present on the type plate

Always use Sanden SP-A2

(Part number of Sanden SP-A2: 2 339 920)

Attention!

Only vehicles with a production date from 09/2013 and **R1234yf** refrigerant/Sanden **SP-A2** refrigerant oil can be filled using the A/C service station for **R1234yf**.

In addition to vehicles with a production date from 09/2013, also all previous vehicles **without the electric A/C compressor** with **R134a** refrigerant and both **ND-8** and Sanden **SP-A2** refrigerant oil can be filled using the A/C service station for **R134a**.

Exception:

BMW i and hybrid vehicles (with an electric A/C compressor) that are filled with **R134a** refrigerant/Sanden **SP-A2** refrigerant oil. These vehicles must be injected with Sanden **SP-A2** refrigerant oil.

When filling the refrigerant circuit with R134a, always ensure you use the correct, vehicle-specific refrigerant oil type!

The previous ND-8 refrigerant oil must not be mixed with Sanden SP-A2 refrigerant oil!

In other words, the refrigerant oil ND-8 must not be filled in refrigerant circuits which were filled with Sanden SP-A2 in the factory.

Sanden SP-A2 refrigerant oil may be mixed with ND-8 refrigerant oil in vehicles without an electric A/C compressor.

In other words, the refrigerant oil Sanden SP-A2 must be filled in refrigerant circuits which were filled with ND-8 in the factory.

However, this is permitted **only** in vehicles **starting from** F-series.

Note the overview of the refrigerant oil to be filled.

To prevent inadmissibly mixing the different refrigerant oil types, rinse the A/C service station hoses after each drawing off/filling procedure!

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64 50 ... Safety information for handling refrigerant R1234yf



R1234yf is non-toxic at normal temperature, non-flammable and not explosive in conjunction with air at any mixture ratio.

As a gas, R1234yf is colourless, odourless and heavier than air. If it enters the atmosphere, this may result in an imperceptible danger of asphyxiation or in cardiac palpitations, especially in workshop pits. Ventilate rooms adequately; if necessary, turn on installed extractor systems.

Store filled refrigerant pressure flasks so that they are not subject to direct sunlight or other heat sources (at maximum 45 °C). Also avoid exposing them to mechanical stress (e.g. by dropping).

Do not weld or solder on to filled air conditioning systems or in rooms into which R1234yf may have leaked. Exposure to flames or high temperatures (≥ 50 °C) may give rise to toxic products of decomposition (hydrofluoric acid). For this reason, do not smoke either.

In the event of fire, carbon dioxide (CO2), extinguishing powder and a sprayed water jet are deemed to be suitable extinguishing agents. Cool reservoirs at risk with a sprayed water jet (risk of bursting!).

If the protective caps on the filler valves are difficult to open, there is a risk of injury from leaking valve inserts (high pressure).

The filled refrigerant circuit of the A/C system is subject to excess pressure. Before carrying out repairs on the A/C system, it is absolutely essential to draw off the refrigerant.

After each refilling of an air conditioning, check that protective caps of the filling valves are hand-tight. They serve as additional seals.



Warning!

Work on the refrigerant circuit may only be carried out by experts!

Danger of injury!

Refrigerant circuit is under high pressure!

Draw off the refrigerant **before** any repairs on the refrigerant circuit!

The refrigerant circuit is only depressurised **after** drawing off.

- Check the pressure gauge on the A/C service station for actual pressure drops before repair.

The corresponding operating instructions of the A/C service station used must be observed!

Avoid all contact with liquid or gaseous R1234yf.

At high temperatures, R1234yf is inflammable!



Protective measures/rules of conduct:

- Wear safety goggles
- Wear oil-resistant protective gloves
- Do not smoke!
- Observe country-specific safety regulations.

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First aid measures:

- Eye contact: In the event of contact with the eyes, rinse immediately with plenty of running water and consult an ophthalmologist.
- Skin contact: In the event of contact with skin, remove affected clothing immediately and rinse with plenty of water.
- After inhalation: If refrigerant vapours are inhaled in greater concentrations, remove the person affected to an area of fresh air and keep them under supervision. Call for a doctor. If breathing problems are experienced, breathe additional oxygen. If the person affected is breathing with difficulty or has stopped breathing, incline the person's head at the neck and administer the kiss of life.

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64 50 ... Safety informations for handling tetrafluorethane refrigerant R134a



Warning!

Danger of injury!

Refrigerant circuit is under high pressure! Work on the refrigerant circuit may only be carried out by experts!

Draw off refrigerant without fail BEFORE all repair work on the refrigerant circuit.

The refrigerant circuit is depressurised AFTER drawing off.

- The pressure gauge on the A/C service unit must be checked for the actual pressure drop prior to repair work.

It is absolutely essential to read and observe the relevant operating instructions for the A/C service unit used!



Protective measures/rules of conduct:

- Wear safety goggles
- Wear oil-resistant protective gloves
- Do not smoke!
- Observe country-specific safety regulations.



First aid measures:

- Eye contact: In the event of contact with the eyes, rinse immediately with plenty of running water and consult an ophthalmologist.
- Skin contact: In the event of contact with skin, remove affected clothing immediately and rinse with plenty of water.
- After inhalation: If refrigerant vapours are inhaled in greater concentrations, remove the person affected to an area of fresh air and keep them under supervision. Call for a doctor. If breathing problems are experienced, breathe additional oxygen. If the person affected is breathing with difficulty or has stopped breathing, incline the person's head at the neck and administer the kiss of life.

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