

00 00 252 BMW engine oil service without supplementary service



WARNING

Hot surfaces.

Risk of burning!

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



WARNING

Hot fluids.

Risk of scalding!

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



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).



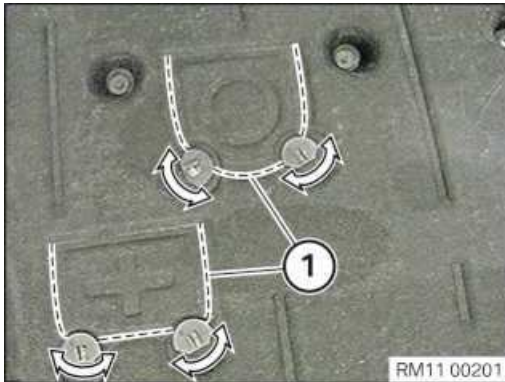
TECHNICAL INFORMATION

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



- Open oil filler cap (1).

2 – Opening the service flap in the front underbody protection



- Open service flaps (1) in front underbody protection in direction of arrow.

3 – Releasing the oil drain plug



WARNING

Hot fluids.

Risk of scalding!

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



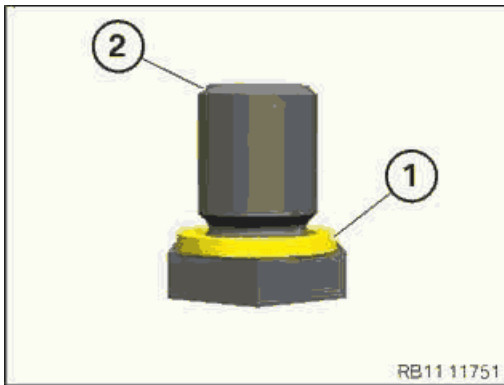
TECHNICAL INFORMATION

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

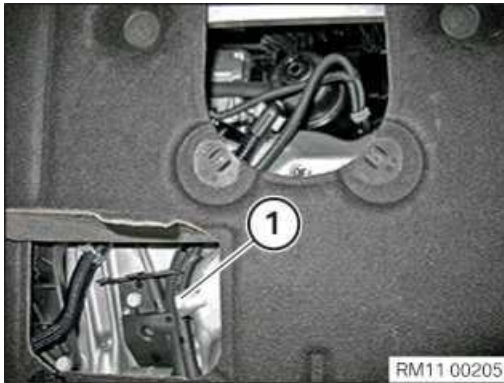


- Release oil drain plug (1).
- Allow the engine oil to drain out fully.

4 – Tightening the oil drain plug



- Renew sealing ring (1) on the oil drain plug (2).
- Parts:** Sealing ring
- Guide in the sealing ring (1) on the oil drain plug (2) and install.



- Guide in oil drain plug (1) and install.
- Tighten oil drain plug (1).

Oil drain plug on oil sump

M12x1.5	Renew the sealing ring.	Tightening torque	25 Nm
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5 – Undoing the oil drain plug on the oil filter cover



WARNING

Hot fluids.

Risk of scalding!

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



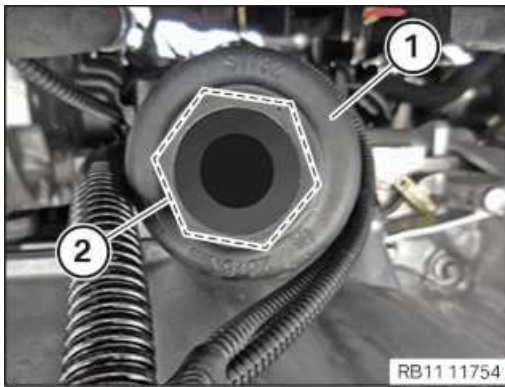
TECHNICAL INFORMATION

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



- Undo the oil drain plug (1) on the oil filter cover (2).
- Feed out and remove oil drain plug (1).
- Catch and dispose of emerging engine oil.

6 – Releasing the oil filter cover



- Release oil filter cover (1) from hexagon head (2).

7 – Checking the non-return valve



- Check the freedom of movement of the non-return valve (1).

8 – Replace oil filter element

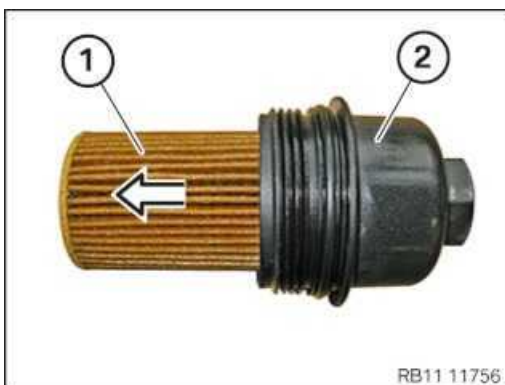


RISK OF DAMAGE

Contaminant or foreign body.

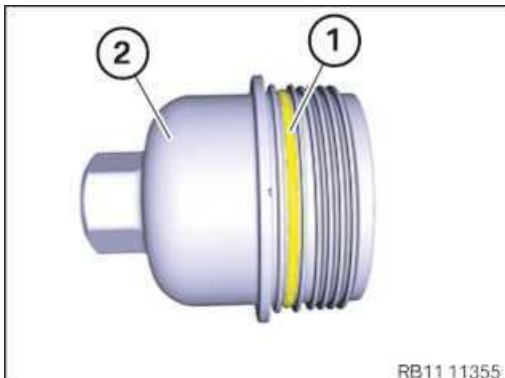
Contamination can result in malfunctions, operating failure or leaks.

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



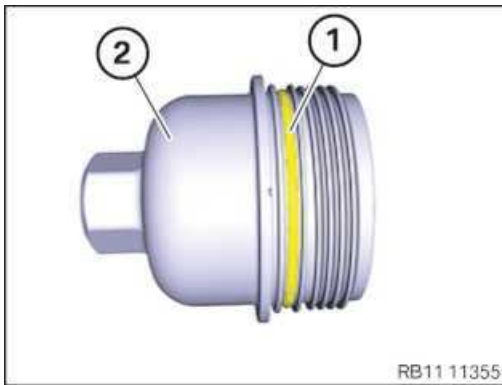
- Guide the fuel filter element (1) out of the fuel filter cover (2) in the direction of the arrow and remove.
- Renew the oil filter element (1).

Parts: Oil filter element

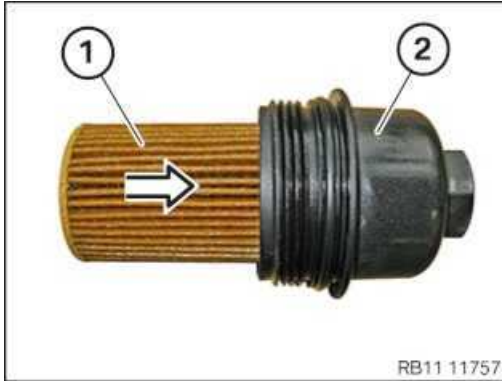


- Guide the sealing ring (1) out at the oil filter cover (2) and remove.
- Renew sealing ring (1).

Parts: Sealing ring



- Feed in and install new sealing ring (1) on the oil filter cover (2).
- Coat new sealing ring (1) with engine oil.



- Feed in and install the new oil filter element (1) on the oil filter cover (2) in the direction of the arrow.
- Make sure the oil filter element (1) engages audibly at the oil filter cover (2).



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TECHNICAL INFORMATION

Elastomers (O-rings) must not come into contact with brake cleaner. Before installing the O-rings, the thread must be free from grease and cleaning agents. Allow the brake cleaner to flash off or blow dry with compressed air.

- Clean thread (1).

Expendable materials

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

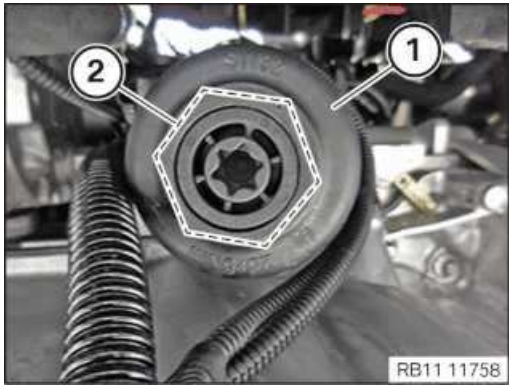
- Make sure that the thread (1) is completely free of engine oil and brake cleaner.
- Coat new sealing ring (2) of the oil drain plug (1) with engine oil.





- Tighten oil drain plug (1) hand-tight.

9 – Tightening the oil filter cap



- Feed in and install oil filter cover (1).
- Tighten oil filter cover (1) at the hexagon head (2).

Oil filter cover to oil filter housing

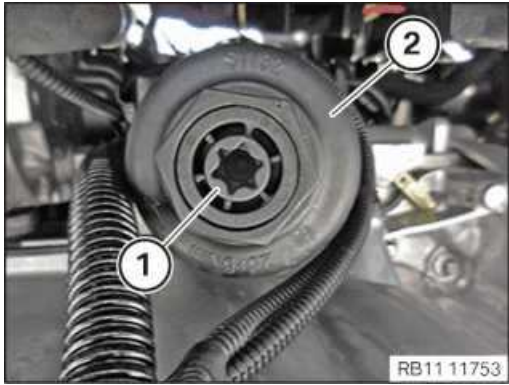
S88.5 x 3	Newsealing ring, lightly oiled.	Tightening torque	27 Nm
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10 – Tightening the oil drain plug on the oil filter cover



- Renew oil drain plug (1) with the sealing ring (2).

Parts: Oil drain plug, sealing ring

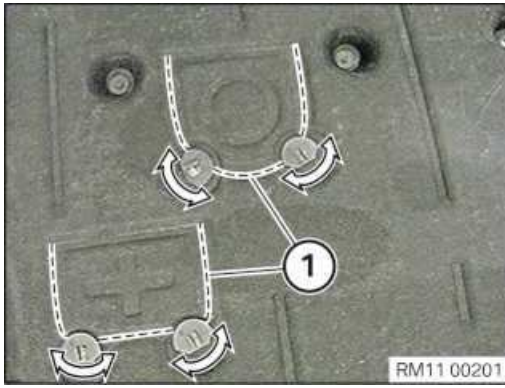


- Feed in and install the oil drain plug (1).
- Tighten the oil drain plug (1) on the oil filter cover (2).

Oil drain plug to oil filter cover

	Renewoil drain plug.	Tightening torque	6 Nm
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11 – Closing the service flap in the front underbody protection



- Close the service flaps (1) in the front underbody protection in the direction of the arrow.

12 – 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 oilB47TÜ1

Capacity of engine oil	5,5 l
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Engine oil: Technically suitable engine oils for BMW Group engines

13 – Installing the oil filler cap



- Close oil filler cap (1).

14 – Check engine oil level

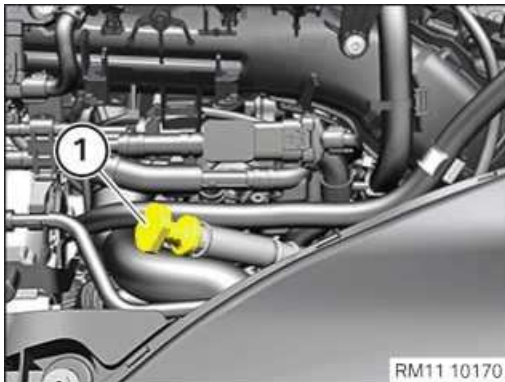
- Park vehicle on a horizontal surface.
- In the case of automatic transmission, shift to selector lever position N or P.
- Accelerator pedal is not pressed.
- Engine is running and is at operating temperature.
- Read off the engine oil level in the instrument cluster (KOMBI) or on the control display.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

► Check engine oil level



TECHNICAL INFORMATION

Always check the engine oil level when the engine is at operating temperature (engine oil temperature > 70°C).



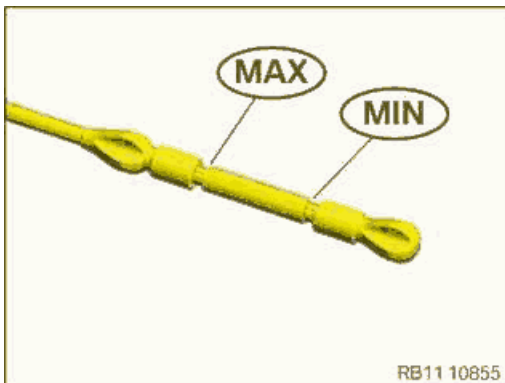
- Park vehicle on a horizontal surface.
- Stop the engine and wait for 5 minutes.
- Pull out the oil dipstick (1) and wipe off using a lint-free cloth.



TECHNICAL INFORMATION

Do not pull out or insert the oil dipstick into the guide tube too quickly or slowly.

- Push the oil dipstick (1) into the guide tube up to the limit position and pull it out again.



TECHNICAL INFORMATION

The engine oil level must be between the minimum mark and the maximum mark of the oil dipstick.

- Read the engine oil level on the oil dipstick.
- Top up engine oil if necessary.

Additional Information

Overview of Tightening Torques

Oil drain plug on oil sump

Used in step 4

M12x1.5	Renew the sealing ring.	Tightening torque	25 Nm
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Oil filter cover to oil filter housing

Used in step 9

S88.5 x 3	New sealing ring, lightly oiled.	Tightening torque	27 Nm
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Oil drain plug to oil filter cover

Used in step 10

	Renew oil drain plug.	Tightening torque	6 Nm
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Overview Technical Data

Engine oilB47TÜ1		Used in step 12
Capacity of engine oil		5,5 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	12

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

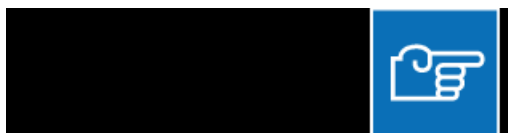
00 00 ... Brake lines and connections: visual inspection for leaks, damage, attachment and correct position

Check brake lines and connections

- Visual inspection in visible area for:
 - Check brake fluid level in expansion tank
 - leaks
 - traces of fluid
 - damage
 - pinched areas
 - correct routing of brake lines
 - correct seating of brake lines in holders

Note:

Detected faults must urgently be repaired after consultation with the customer!

**Note:**

The CBS maintenance jobs can be reset in the car. It is always recommended to reset the CBS jobs via the diagnosis system.

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

Front/rear brake service:

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

A CBS reset is only possible with the diagnosis system with a non-sanded brake pad wear sensor (no CBS display in CID).

Other known causes of CBS reset problems:

- Parking brake engaged
- Brake pedal pressed

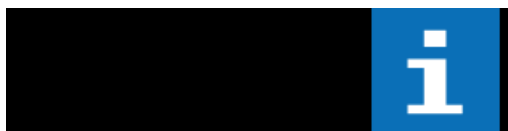
**CBS reset with diagnosis system Note:**

To be able to check or correct the vehicle's on-board date properly, the diagnosis system requires the correctly set tester system date!

The jobs may only be reset after the service measure has been completed.

The CBS jobs can be reset via the diagnosis system on the following path:

- Service functions
- Maintenance
- CBS reset

**CBS reset in the car**

On the vehicle, service operations can be reset at the instrument panel.

Note:

On-board date must be correctly set.

A reset is only possible in the car if:

- no CC message is present
- availability of the service job is under 90 %

Resetting of a service job must always be carried out **after** a maintenance measure has been completed.

The resetting process is interrupted if the time is exceeded or if a terminal is changed.



1. Switch the ignition on.
2. Press the trip distance recorder reset button (1) (referred to as button in the following) for approx. 10 seconds until the 1st service job is displayed in the display (2).
Bring up the next item by briefly pressing the button again. Select the desired service job.
3. If a reset is possible, this is displayed in the instrument cluster as "Reset possible".
Press the button for 3 s to start the reset.
4. Confirm text message "Perform reset?" by pressing the button for 3 seconds again.
The status of the reset is indicated in the display by a progress bar and reads "Reset in progress".
5. The reset is confirmed as "Reset successful" after completion.



CBS reset of inspections/tests required by law

Input the target date for the statutory vehicle inspection by clicking on the scope of maintenance work with the controller in the CBS main menu of the Central Information Display under:

- **Vehicle information**
- **Vehicle status**
- **Service requirements**
- **Vehicle inspection**
- **Enter service appointment**

The target month or the target year can be set and acknowledged by turning and pressing

00 00 ... Check horn, headlight flashers and hazard warning flashers

Horn

Check function.

Note:

In the case of twin-tone fanfares, make sure that both fanfares are working properly.

Headlight flasher

Activate headlight flashers, check high-beam headlights and blue indicator light in instrument panel for correct operation.

Hazard warning lights

Check function.

Note:

After consultation with the customer, rectify faults and issue a separate invoice.

00 00 ... **Check windscreen wash/wipe system**

- Check wiper range for streaks; if necessary, replace [wiper blades](#) after consulting with customer
- The spray jet must emerge uniformly from the washer jet, [adjust nozzle](#) or replace if necessary and issue a separate invoice

00 00 ... **Checking coolant level and concentration, correcting if necessary**

- Check connections, hose clamps and hoses for coolant residues and damage such as e.g. cracks.
- Check coolant composition in expansion tank: Should be -35 °C to -40 °C.
- Check coolant level in expansion tank. Coolant level must be between Min. and Max. marks. If necessary, top up coolant to max. fill level. If there is no coolant, also identify the cause and notify the customer.
- During refill (for special allocation):
 - If needed, [drain coolant](#) volume difference
 - Top up [prescribed coolant](#)

00 00 ... Checking instrument/inscription lighting, interior/luggage compartment/glove box lights and blower

Instrument lighting

Check function of instrument and indicator/warning lights.

Inscription lighting

Check function of light switches; dimmer; controls; heater/air conditioning; rear window demister; radio; (depending on equipment) on-board computer; power windows; electric slide/tilt sunroof; fog lamp.

Interior lighting, glove box light and luggage compartment lights

Check function of footwell lighting, front and rear reading lights, make-up mirror light, mood lighting (door handles, exit, etc.), glove box light, luggage compartment lights, etc..

Note: Lighting may vary, depending on the equipment specification.

Heating

Check function of all blower stages, air distribution and air outlet.

Note

After consultation with the customer, rectify faults and issue a separate invoice.

00 00 ... **Checking lighting system**

- Check lighting system for correct operation:
 - Check headlights, rear lights and associated indicator lights
 - Check headlight adjustment
 - Check side lights, parking lights, low-beam headlight and high-beam headlight for correct operation
 - Check headlight flasher for correct operation
 - Check left/right turn indicators and hazard warning flashers for correct operation
 - Check brake lights for correct operation
 - Check reversing lights and number plate lights for correct operation
 - Check front and rear fog lights for correct operation
 - If necessary ground lights of outside door handles

00 00 ... **Checking of road safety (test drive)**

- **Checking of road safety**
 - Carry out a test drive in order to check the service and Automatic Hold brakes
 - Check steering for play, ease of movement and directional stability
 - If necessary, check that clutch disengages cleanly and that the vehicle drives off smoothly with the engine at operating temperature
 - Visually inspect shock absorbers for leaks
 - Check indicator/warning lamps and Check Control system for correct operation
 - Check due date for statutory roadworthiness and exhaust emission tests and advise customer of test dates

11 00 300 Engine oil consumption measurement

Attention!

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

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

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

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

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

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

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

Measuring oil consumption by weighing:

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

Note:

The engine must not leak any oil.

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

Preparation:

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

Measurement procedure:

11. Check the engine for leaks; if the engine is not tight, the examination will not be meaningful.
12. Prepare the measuring container to be able to capture the oil quantity.
13. Allow the engine to run at idling speed for 5 minutes, during which the engine oil temperature must not drop below 90 °C.
14. Unscrew the main flow oil filter cover (the engine oil will flow back into the oil sump from the oil filter housing).

15. Unscrew the oil drain plug.
16. Allow the engine oil to drain off for 15 minutes.
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.)

Amount of oil added (cm³) - amount of oil drained off (g) : 0.86 g/cm³

Engine oil consumption = _____
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

4.000 cm³ - 2.700 g : 0.86 g/cm³

Engine oil consumption = _____ = 0.78 cm³/km
45,900 km - 44,800 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): _____ at kilometre reading: _____
ccm

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

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

00 00 604 Fuel filter service

- Fuel filter service
 - Replacing the [fuel filter](#)

00 00 009 Pre-delivery check

Quality assurance by BMW Service

Model:
Vehicle identification number:

(Please tick where appropriate)
If necessary Quick Reference Guide: Discussed and handed over

Included with the vehicle: Owner's Handbook(s)
Maintenance record booklet (with national-market version Korea only)
Vehicle key/remote key
If necessary - spare key

The vehicle document case is left in vehicle
the vehicle:
Glove box
Storage box
Luggage compartment

I hereby confirm that I have received the vehicle in perfect condition.
.....
Place and date Signature of vehicle owner

Pre-delivery check by BMW Service

Scopes of inspection: To be kept with the workshop documents

The following work must be carried out on the vehicle by BMW Service prior to delivery.

Model:
Vehicle identification number:

* Denotes optional extra or national-market version. Observe possible changes in this regard.

Scopes of inspection:to be kept with the vehicle documents			
Accessory items	OK	Not OK	not present
Install other accessory items			

Using BMW Group diagnosis system	OK	Not OK	not present
Carry out "CBS pre-delivery check" in the Service Function path under Maintenance			
Deactivate transportation mode			
Perform the following additional work only with SA5GB : Activating stolen vehicle tracking*			
Reset average mileage/kilometres driven			
Enter first registration			
Set on-board date			
Set statutory inspection dates*			
Enter service telephone numbers			
BMW TeleServices*: Activate			
Navigation system*: Activate the roadmap. Check the up-to-dateness of the roadmap and update if necessary.			
Check battery, observe notes in the diagnosis system, if applicable, charge battery			
Delete fault memory			
Carry out vehicle test, eliminate faults if necessary			
Engine compartment	OK	Not OK	not present
Check for cleanliness			
Note: It is possible that the cooling system has been filled above the maximum mark ex works. Do not adjust the coolant level. The normal coolant level is reached while driving the vehicle.			
Fluid tank for washer fluid	OK	Not OK	not present
Check fluid level and top up if necessary, where required with antifreeze additive			
Labels	OK	Not OK	not present
Apply label for BMW Group Mobile Service			
Body, interior equipment, vehicle underbody	OK	Not OK	not present
Check for transportation damage			
Spring blocker*	OK	Not OK	not present
Remove			
Tyres	OK	Not OK	not present
Checking tyre pressure			
Observe the information on tolerance compensation for RDC.			
Initialise Run Flat Indicator (RPA) or tyre pressure control (RDC)			
For winter tyres* attach the label V-max.			
Maintenance record booklet* (with national-market version Korea only)	OK	Not OK	not present
Stamp pre-delivery check / enter vehicle identification number			
Attach documentation (glove box/storage box/luggage compartment)	OK	Not OK	not present
Rider's Manual			
Maintenance record booklet (with national-market version Korea only)			

Contact booklet			
BMW Group Mobile Service brochure			
Include key/remote control (make note of number)			
Indicator/warning lights and Check Control	OK	Not OK	not present
Check and remove fault if applicable			
Service and parking brake	OK	Not OK	not present
Transport and immobilisation periods of 3-6 weeks:			
Check for correct operation			
In event of transportation and immobilisation periods of more than 6 weeks:			
Brake in			
Interior mirror with digital compass*	OK	Not OK	not present
Calibrate system			
Transportation lock* and vehicle cleaning	OK	Not OK	not present
Remove the transportation protective film			
Clean inside and outside of vehicle			
Notes:			

.....
Date

.....
Mechanic

.....
Workshop Supervisor

00 00 ... Seat belts: Check condition of seat belt strap, check function of automatic reel, seat belt locking reel, seat belt buckle, seat belt clip and, if necessary, seat belt clasp

Seat belt strap, automatic reel, seat belt locking reel

Pull out seat belt strap and make sure it emerges without jerking.

Check seat belt strap for damage:

- folding
- unravelling
- pinches
- cracks and tears
- traces of melting

Check the seat belt clip (retaining button) and, if necessary, seat belt clasp of belt tongue on seat belt strap for damage and installation.

Retract seat belt strap; here the automatic reel must retract the seat belt strap automatically and without squeaking noises; the last section of the strap may have to be fed in.

Pull out seat belt strap in short tugs - seat belt locking reel must lock.

Seat belt buckle

The belt tongue on the seat belt strap must easily snap into place with an audible click.

When the "Press" button is pressed, the belt tongue must be ejected from the buckle under spring pressure.

Note:

If the seat belt is damaged, you must replace the seat belt completely after consulting the customer; issue a separate invoice for this work.

Instructions on how to proceed, refer to [Checking automatic seat belt](#).

00 00 602 Service - air filter element

- **Service air filter element**
 - Replace [air filter element](#)
Shorten change intervals for vehicles operated in dusty regions.



TECHNICAL INFORMATION

Use only BMW-approved brake fluids.

For additional information see: SBS-ANL-SBS1996-340396150...

PRELIMINARY WORK

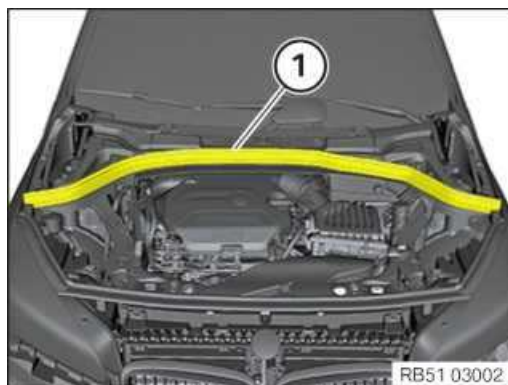
1 – Connect bleeder unit for brake fluid

► Remove the seal for the rear bonnet



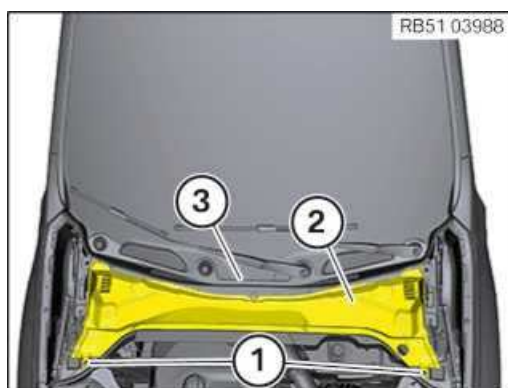
NOTICE

Schematic diagram is for example purposes. Some parts may differ in certain details.



- Pull off rear bonnet seal (1) towards the top and remove.

► Removing front cowl panel cover



- Loosen the expanding rivet (1).
- Feed out and remove front cowl panel cover (2) from the rear cowl panel cover(3).



- 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 .**

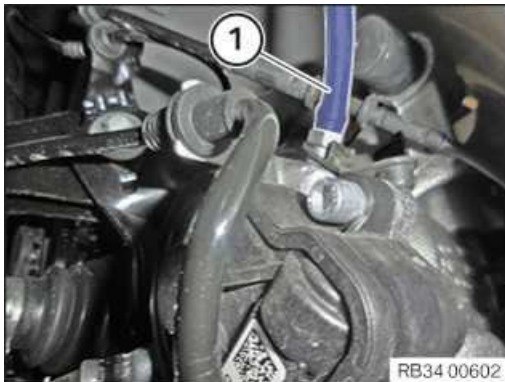
MAIN WORK

2 – 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.

3 – 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
--	--	-------------------	-------

4 – 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.

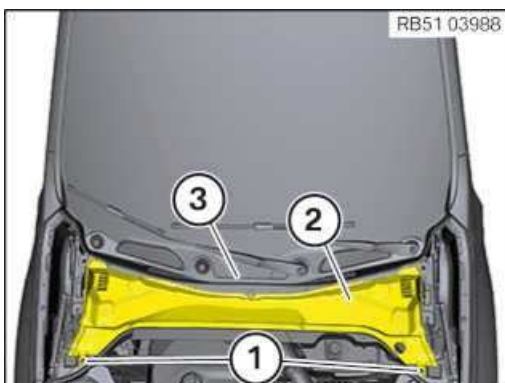


- Switch off bleeder unit (1) and remove from brake fluid expansion tank .
- Check the brake fluid level; if necessary, adjust to maximum mark.



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

► Installing front cowl panel cover



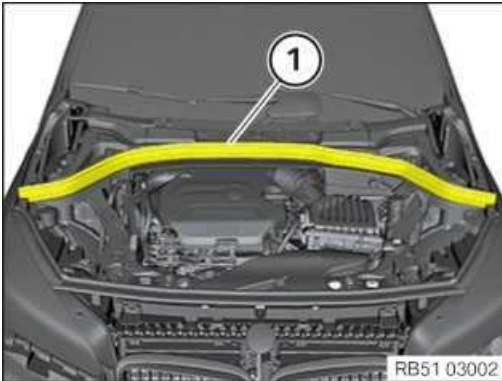
- Insert and install cowl panel cover at front (2) into cowl panel cover at rear (3).
- Check cowl panel cover at front is correctly seated (2).
- Secure expanding rivet (1).

► Install the seal for the bonnet



NOTICE

Schematic diagram is for example purposes. Some parts may differ in certain details.



- Install bonnet seal at rear (1).
- Ensure that the rear bonnet seal (1) is fitted correctly.

POSTPROCESSES

5 – 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).

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](#)

6 – Performing CBS reset (version with 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%.

i

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.

i

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



i

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 trip distance recorder reset button 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 trip distance recorder reset button (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. For this purpose, hold down the trip distance recorder reset button 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 2 3	
		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	5
51 23 265 Removing and installing/replacing left or right gas pressure spring for engine compartment lid	5
51 23 265 Removing and installing/replacing left or right gas pressure spring for engine compartment lid	5
51 23 265 Removing and installing/replacing left or right gas pressure spring for engine compartment lid	5



TECHNICAL INFORMATION

Use only BMW-approved brake fluids.

For additional information see: SBS-ANL-SBS1996-340396150...

PRELIMINARY WORK

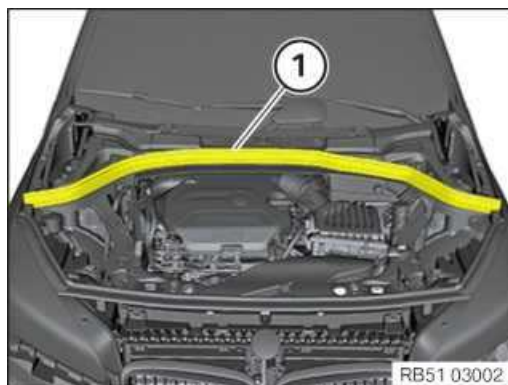
1 – Connect bleeder unit for brake fluid

► Remove the seal for the rear bonnet



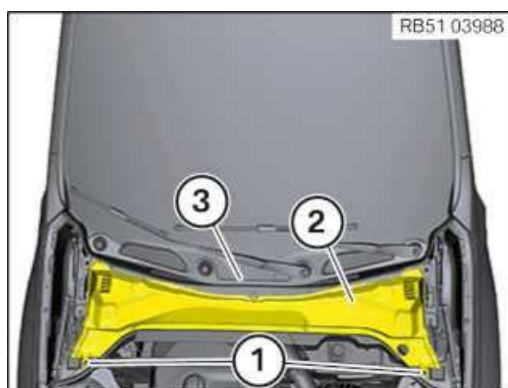
NOTICE

Schematic diagram is for example purposes. Some parts may differ in certain details.



- Pull off rear bonnet seal (1) towards the top and remove.

► Removing front cowl panel cover



- Loosen the expanding rivet (1).
- Feed out and remove front cowl panel cover (2) from the rear cowl panel cover(3).



- 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 .**

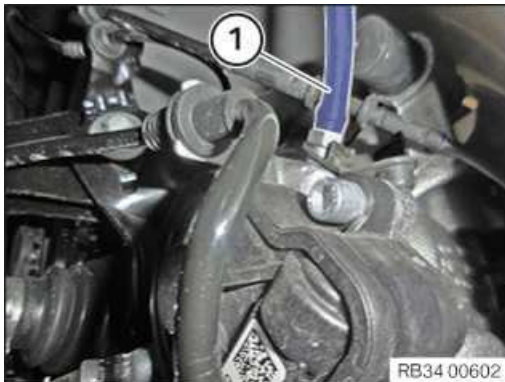
MAIN WORK

2 – 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.

3 – Flushing and bleeding the front axle brake circuit



NOTICE

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

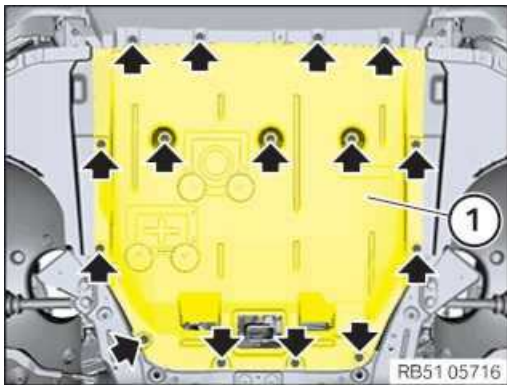


- **Start flushing at the front right.**
- Connect the vent hose with the collecting vessel to the vent valve (1) on front right interior brake calliper.
- Open the vent valve (1) and purge it until clear, bubble-free brake fluid emerges.
- Close vent valve (1).

Vent valve

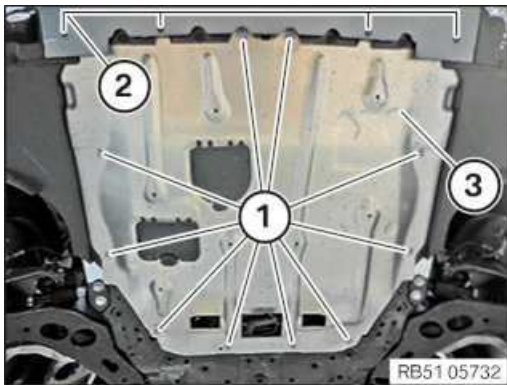
		Tightening torque	10 Nm
--	--	-------------------	-------

4 – Flushing and bleeding the clutch hydraulic system



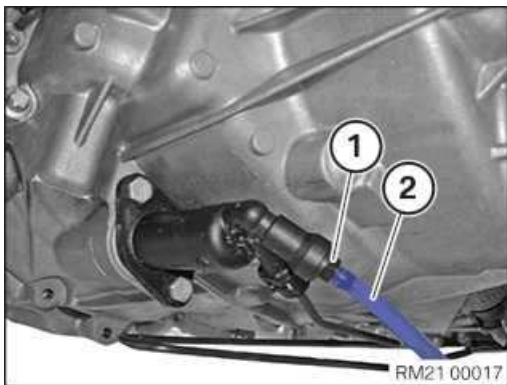
► Removing the front underbody protection

- Remove screws (arrows).
- Thread out and remove the front underbody protection (1) from the bumper panel.



• Equipment specification with metal underride protection:

- Loosen screws (1) and (2).
- Thread out and remove the underride protection (3).

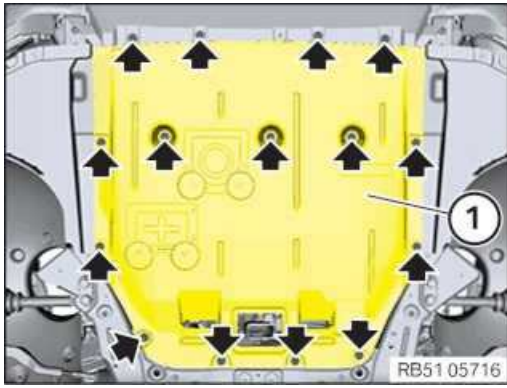


- Remove the dust cap from the vent valve (1).
- Connect the vent hose (2) with the collecting vessel to the vent valve (1) on the clutch slave cylinder.
- Open the vent valve (1) and purge it until clear, bubble-free brake fluid emerges.
- Close vent valve (1).

Clutch slave cylinder vent valve

		Tightening torque	6 Nm
--	--	-------------------	------

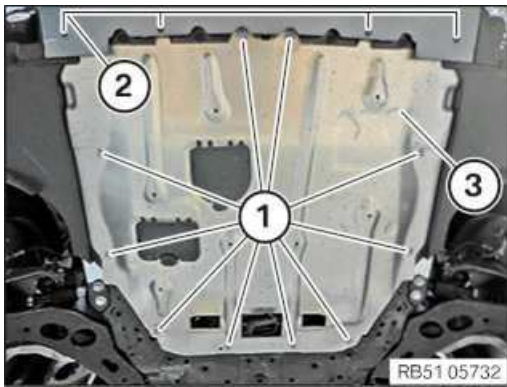
► Installing the front underbody protection



- Guide the front underbody protection (1) in under the bumper panel and position it at the screw points.
- Tighten screws (arrows).

Underbody protection front

Screw for thermoplastic plastic		Tightening torque	2,6 Nm
Hexagon screw M6x20		Tightening torque	8 Nm



- **Equipment specification with metal underride guard:**
- Guide in and attach the underride guard (3).
- Tighten down screws (1) and (2).

Underbody protection front

Screw for thermoplastic plastic		Tightening torque	2,6 Nm
Hexagon screw M6x20		Tightening torque	8 Nm

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.

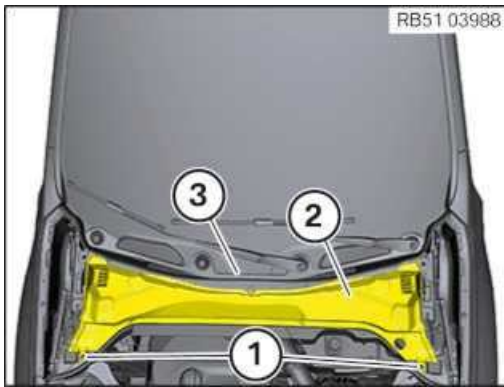


- Switch off bleeder unit (1) and remove from brake fluid expansion tank .
- Check the brake fluid level; if necessary , adjust to maximum mark.



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

► Installing front cowl panel cover



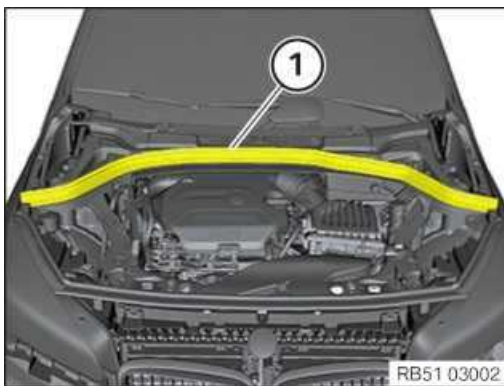
- Insert and install cowl panel cover at front (2) into cowl panel cover at rear (3).
- Check cowl panel cover at front is correctly seated (2).
- Secure expanding rivet (1).

► Install the seal for the bonnet



NOTICE

Schematic diagram is for example purposes. Some parts may differ in certain details.



- Install bonnet seal at rear (1).
- Ensure that the rear bonnet seal (1) is fitted correctly.

POSTPROCESSES

6 – 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).



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](#)

7 – Performing CBS reset (version with 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

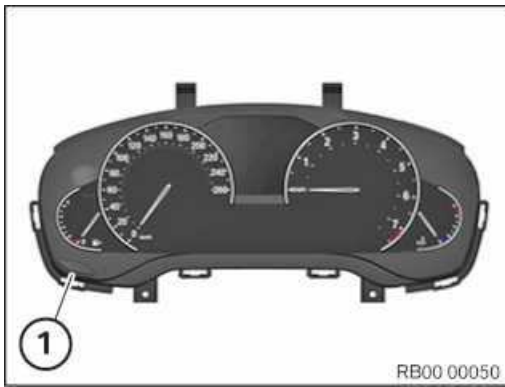
Information for the occurrence of a failed CBS reset:

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



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 trip distance recorder reset button 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 trip distance recorder reset button (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. For this purpose, hold down the trip distance recorder reset button 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 2 3

		Tightening torque	10 Nm
--	--	-------------------	-------

Clutch slave cylinder vent valve

Used in step 4

		Tightening torque	6 Nm
--	--	-------------------	------

Underbody protection front

Used in step 4

Screw for thermoplastic plastic		Tightening torque	2,6 Nm
Hexagon screw M6x20		Tightening torque	8 Nm

Links

Repair instructions

Used in step

51 23 265 Removing and installing/replacing left or right gas pressure spring for engine compartment lid	6
51 23 265 Removing and installing/replacing left or right gas pressure spring for engine compartment lid	6
51 23 265 Removing and installing/replacing left or right gas pressure spring for engine compartment lid	6
51 23 265 Removing and installing/replacing left or right gas pressure spring for engine compartment lid	6

00 00 610 Service - engine oil

- Renew [engine oil and oil filter](#)
- Renew the battery of the remote key(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.
- [Reset](#) CBS display according to factory specification
- Carry over maintenance works in **electronic service booklet**.

Attention!

The job items specified below always refer to the maximum possible scope of a engine oil service. These job items are coupled to the engine oil service. The multipliers refer to the ECE standard intervals. Country specific deviations may apply.

The linked job items are not included in the engine oil service. Invoicing is separate from the engine oil service.

The change interval (motor oil change multiplier) can be taken from the following matrix: The vehicle-specific scope must be read out via ISPA (KeyReader) and printed out.

Component:	Microfilter	Air filter	Spark plugs	Fuel filter
Model series	Multiplier Engine oil change	Multiplier Engine oil change	Multiplier Engine oil change	Multiplier Engine oil change
F45F46, F48 Petrol and diesel fuel	1 (approx. 30 tkm)	2 (approx. 60 tkm)	2 (approx. 60 tkm)	2 (approx. 60 tkm)

- Renew [microfilter](#)
- Replace [air filter element](#)
- **for petrol vehicles:**
Replace [spark plugs](#)
- **for diesel-engine cars:**
Replace [fuel filter](#)

00 00 612 Service - front brakes

- **Service - front brakes**
 - [Replace brake pads](#)
 - Replace the brake pad wear sensor
 - Clean brake air ducts
 - Apply a thin coating of [grease](#) to wheel centring on light alloy wheels
 - [Brake discs](#)
 - Check surface and thickness
 - If necessary: Replace
 - Reset [CBS display](#) according to factory specification
 - Carry over maintenance works in **electronic service booklet** .

Note:

- Replace brake discs when:
 - Drop below the [minimum brake disc thickness](#)
 - Scoring
 - Heat cracks
 - Thickness difference
- Issue a separate invoice for replacement of brake disc

00 00 616 Service - microfilter

- Service - microfilter
 - [Replace microfilter for interior ventilation](#)



RISK OF DAMAGE

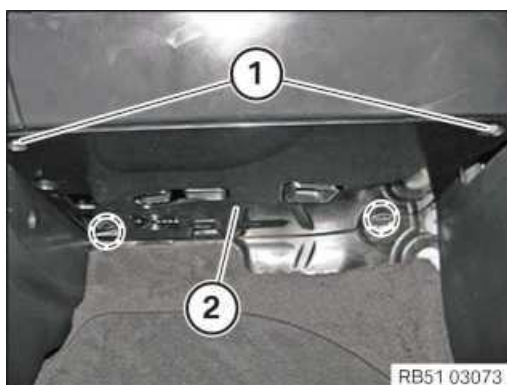
Damage to the heating and air conditioning system.

Use of unapproved microfilters may cause impairment of functions in the air conditioning.

- Only operate the heating and air conditioning system with the specified microfilter.

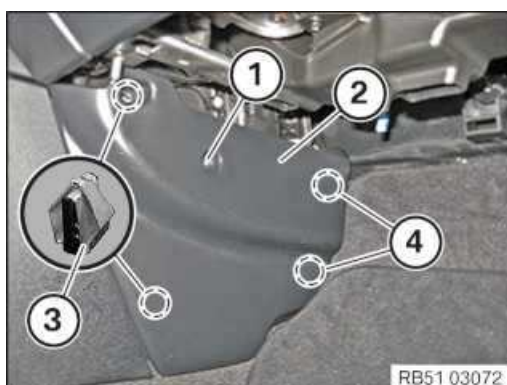
PRELIMINARY WORK

1 – Removing the instrument panel trim at bottom right



- Loosen nuts (1).
- Lower the instrument panel trim slightly at the bottom right (2) and disconnect the plug connection behind it.
- Guide the instrument panel trim at the bottom right (2) from the front guides and remove it.

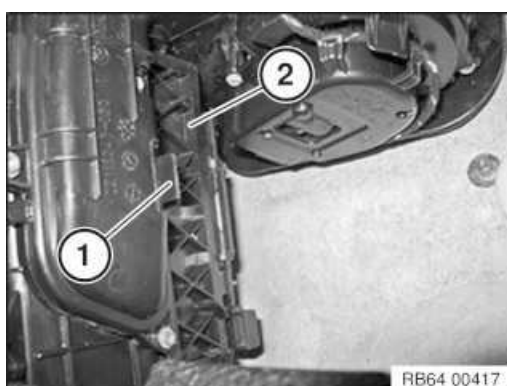
2 – Removing side trim panel for the centre console on the right side



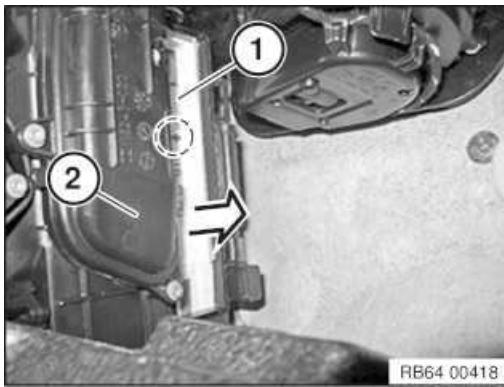
- Loosen screw (1).
- Release the side trim panel for centre console (2) from retaining clips (3).
- Remove the side trim panel for centre console (2) from guides (4) and remove it.

MAIN WORK

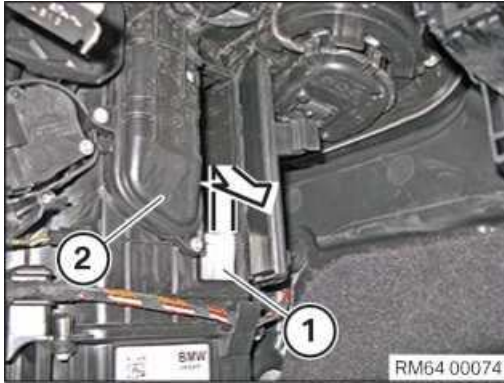
3 – Remove microfilter for passenger compartment ventilation



- Unlock the lock (1).
- Open flap (2).

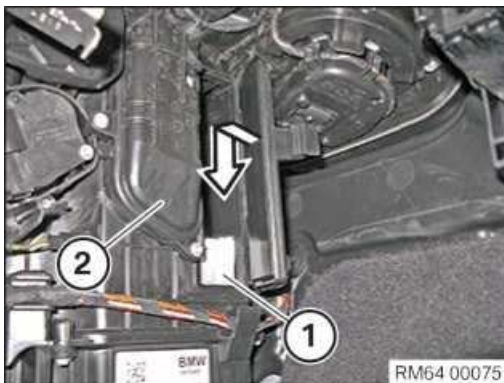


- Remove the upper microfilter (1) from the heating and air-conditioning unit (2) in direction of arrow.



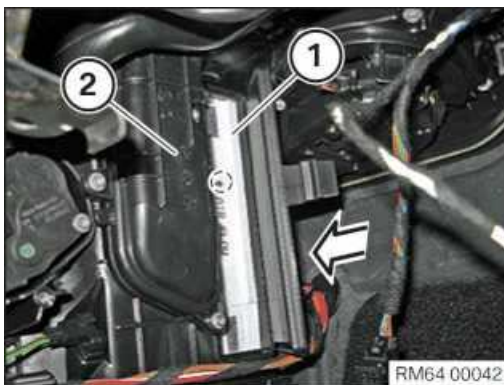
- Remove the lower microfilter (1) from the heating and air-conditioning unit (2) in direction of arrow.

4 – Installing the microfilter for the interior ventilation



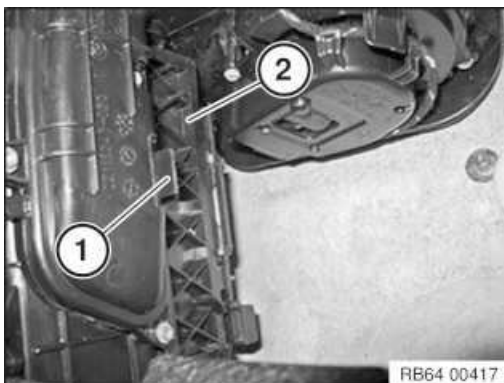
- Install the lower microfilter (1) in the heating and air-conditioning unit (2) in direction of arrow.

Note: Pay attention to the direction of installation of the lower microfilter (1).



- Install the upper microfilter (1) in the heating and air-conditioning unit (2) in direction of arrow.

Note: Pay attention to the direction of installation of the upper microfilter (1) in the marked area.



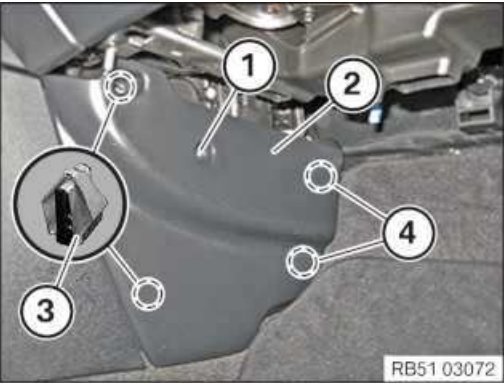
- Close flap (2).
- Lock the lock (1).

5 – Installing side trim panel for the right centre console

i

TECHNICAL INFORMATION

Latch mechanisms, guides and mounting elements must not be damaged or missing.



- Install the side trim panel for the centre console (2) and feed it into the guides (4).
- Engage the side trim panel for the centre console (2) into retaining clips (3).
- Tighten down screw (1).

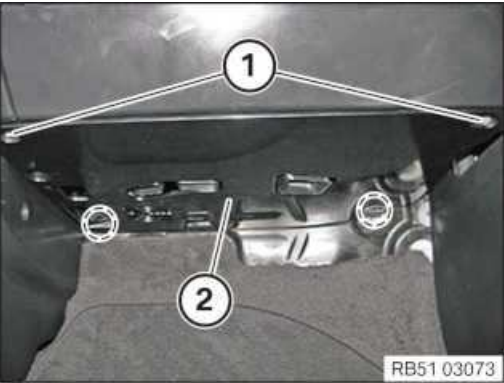
Trim to centre console			
Oval-head screw		Tightening torque	1,8 Nm

6 – Installing the botto right instrument panel trim

i

TECHNICAL INFORMATION

Latch mechanisms, guides and mounting elements must not be damaged or missing.



- Install the lower right instrument panel trim (2) and connect and lock the plug connection.
- Insert the lower right instrument panel trim (2) into the front guides.
- Tighten nuts (1).

Bottom left footwell trim to instrument panel			
M5 hexagon nut		Tightening torque	2 Nm

Additional Information

Overview of Tightening Torques

Trim to centre console			Used in step 5
Oval-head screw		Tightening torque	1,8 Nm
Bottom left footwell trim to instrument panel			Used in step 6
M5 hexagon nut		Tightening torque	2 Nm

00 00 614 Service - rear brakes

- **Service - rear brakes**
 - [Change brake pads](#)
 - Replace the brake pad wear sensor
 - Clean brake air ducts
 - Apply a thin coat of [grease](#) to wheel centering on light-alloy wheels, refer to Service Information Operating Fluids.
 - [Brake discs](#)
 - Check surfaces and thickness.
 - If necessary: Replace and charge separately
 - [Function check of parking brake with roller dynamometer](#)
 - If necessary: Repair the parking brake
 - Reset the [CBS display](#) as per factory specification
 - Carry over maintenance works in **electronic service booklet** .

Note:

- Replace brake discs when:
 - Drop below the [minimum brake disc thickness](#)
 - Scoring
 - Heat cracks
 - Thickness difference
- Issue a separate invoice for replacement of brake disc

00 00 622 Service - spark plugs

- Service - spark plugs
 - [Replace spark plugs](#)

- **Service - vehicle check**

Passenger compartment:

- Check [horn, headlight flashers and hazard warning flashers](#)
- Check [instrument and inscription lighting, passenger compartment and glovebox lighting, blower](#)
- Check [lighting system](#): if necessary, charge separately to adjust the headlights, function of front/rear and vehicle number plate lighting
- [Seat belts](#): 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
- [Check windscreen wiper and washer system for function and setting](#)

Rear/tyres:

- Check [tyres](#) (incl. compact spare wheel if present):
 - Tread depth
 - Tread wear pattern
 - External condition
 - Check inflation pressure and correct if necessary.
[Observe the information on tolerance compensation for RDC.](#)
- If fitted:
Mobility Set: Check expiry date on the tyre sealant bottle. Replace tyre sealant bottle, if necessary (charge separately).
- Check that warning triangle, high-visibility jacket and first-aid kit are present. Check expiry date on first-aid kit (observe national legislation where applicable).
- initialize [Tyre Pressure Control](#)

Engine compartment:

- Check [coolant level and concentration](#), top up if necessary.
Inform customer in event of incorrect fluid level and, if necessary, troubleshoot (charged separately).
- [Window washer and headlight cleaning system](#): checking fluid level, topping up if necessary

Underfloor:

- [Brake lines and connections](#): Check for tightness, damage, mounting and correct position
- [Vehicle underbody](#) including all visible components: Check for damage, correct position, tightness and corrosion
- [Steering components](#): Check for play and damage

Test drive:

- [Check for road safety](#):
 - Brakes
 - Steering
 - Shock Absorbers
 - Transmission
- Reset [CBS display](#) according to factory specification
- **For vehicles with electronic service history:**
Record maintenance work in the **electronic service history**.

00 00 606 Servicing particulate filter



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.



WARNING

Motor vehicle may slip off the vehicle hoist where components are supported.

Danger! Life-threatening injuries!

- Secure the vehicle hoist against lowering and lifting.



WARNING

Motor vehicle may slip off the vehicle hoist if the weight is distributed unevenly.

Danger! Life-threatening injuries!

- Ensure there is a specific weight compensation on the motor vehicle.

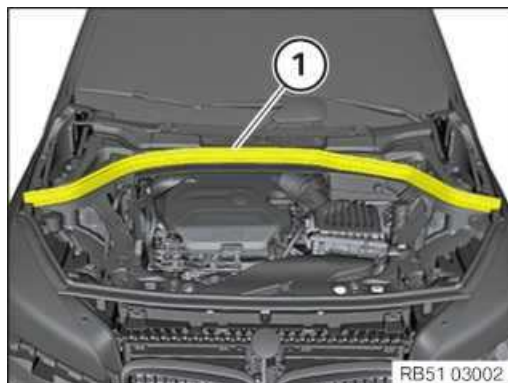
PRELIMINARY WORK

1 – Remove the seal for the rear bonnet



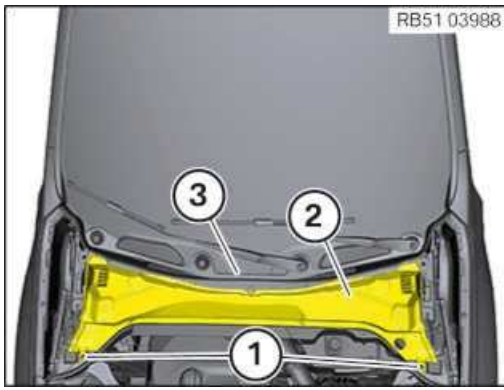
NOTICE

Schematic diagram is for example purposes. Some parts may differ in certain details.



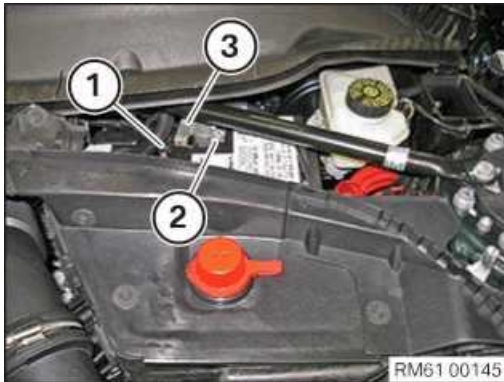
- Pull off rear bonnet seal (1) towards the top and remove.

2 – Removing front cowl panel cover



- Loosen the expanding rivet (1).
- Feed out and remove front cowl panel cover (2) from the rear cowl panel cover(3).

3 – Disconnecting the battery earth lead



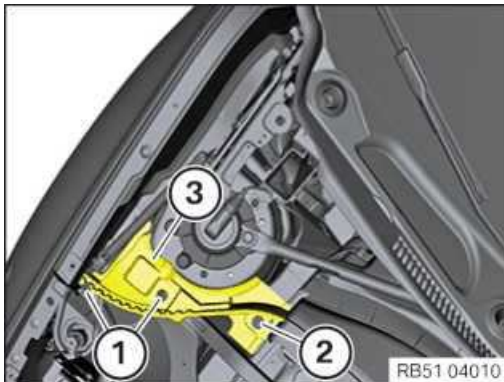
- Unlock plug connection (1) and disconnect.
- Unfasten nut (2).
- Remove the battery earth lead (3) and secure to one side.

4 – Remove suspension cross-brace



TECHNICAL INFORMATION

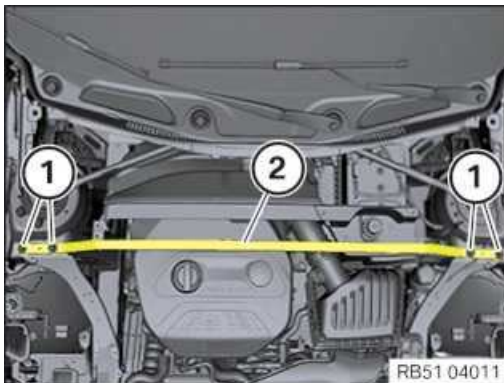
Driving without the strut brace/front end or tension strut is not permitted.



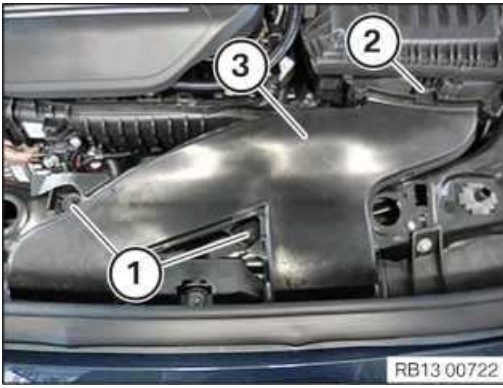
NOTICE

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

- Loosen expanding rivet (1).
- Loosen screw (2).
- Remove the cover (3).
- Loosen screws (1).
- Remove strut brace (2).

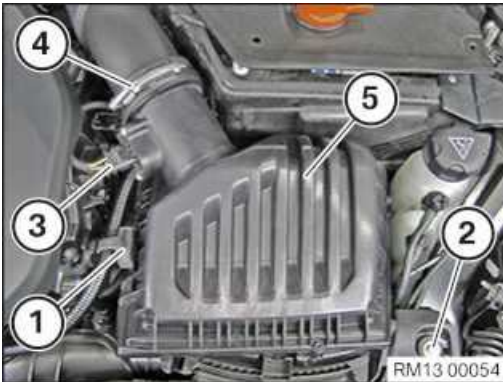


5 – Remove the intake neck for intake silencer housing



- Loosen nuts (1).
- Loosen the lock (2).
- Guide the intake neck (3) out and remove it.

6 – Removing intake silencer housing



- Loosen the holder (1).
- Loosen screw (2).
- Unlock and loosen connector (3).
- Unfasten clamp (4).
- Pull out and remove the intake silencer housing (5) from the rubber mounts towards the top.

7 – Remove vehicle battery

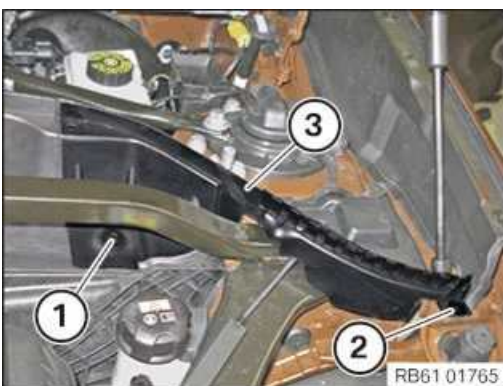


WARNING

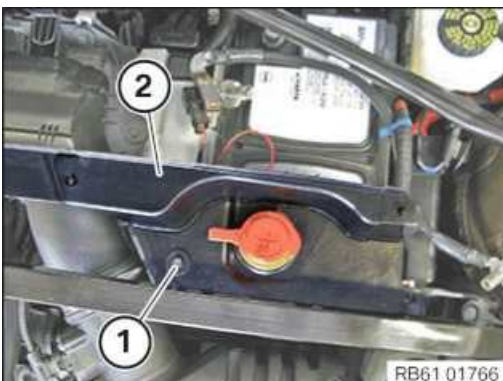
Working on 12 V vehicle electrical system.

Risk of short circuits! Risk of fire!

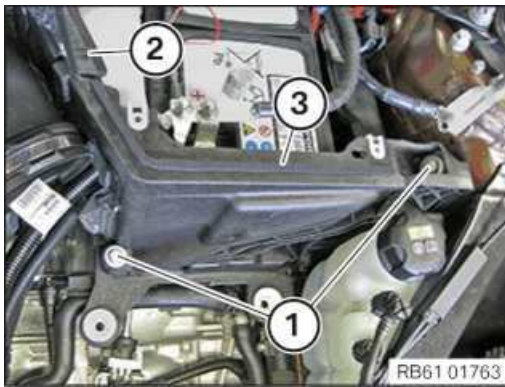
- Detach battery earth lead from battery.
- For additional batteries: Detach all battery earth leads from additional batteries.



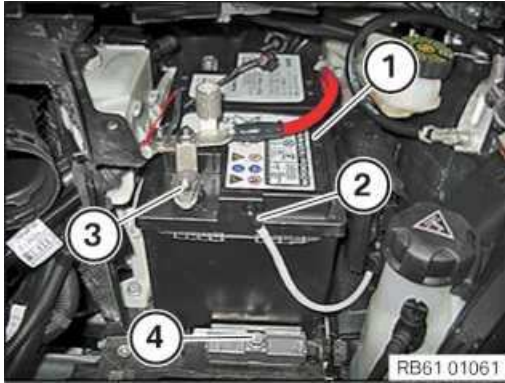
- Release the screw (1) and the expanding rivet (2).
- Remove the fixture for the gasket (3).



- Loosen screw (1).
- Remove the cover (2).



- Loosen screws (1).
- Unscrew the bolt (2) and guide the tension strut (3) out.



- Pull off the vent hose (2).
- Slacken the nut (3) on the positive battery terminal and remove the positive battery terminal.



WARNING

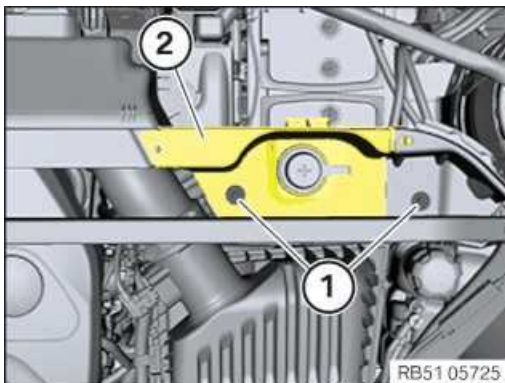
Unprotected battery terminals.

Risk of short circuits! Risk of fire!

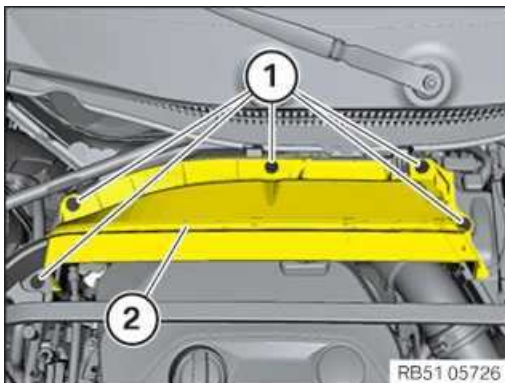
- Cover the vehicle battery.

- Loosen the screw (4) and remove the holder.
- Remove vehicle battery (1).

8 – Removing the upper bulkhead cover



- Loosen screws (1).
- Guide out and remove the cover (2).



- Loosen screws (1).
- Feed out and remove the upper bulkhead cover (2).

9 – Removing the acoustic cover



WARNING

Hot surfaces.

Risk of burning!

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



RISK OF DAMAGE

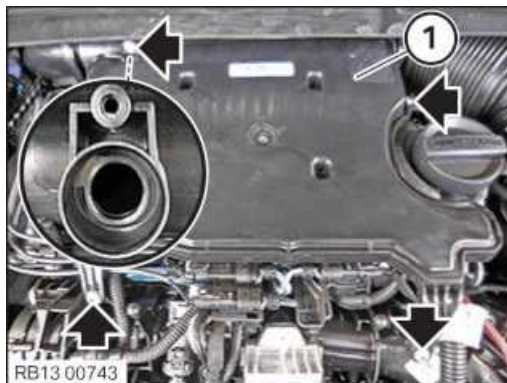
Damage to the acoustic cover.

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 $>20^{\circ}\text{C}$.
- Use only distilled water as an auxiliary material during installation, no lubricants.

- Unclip the acoustic cover from the marked areas towards the top.

10 – Remove resonator

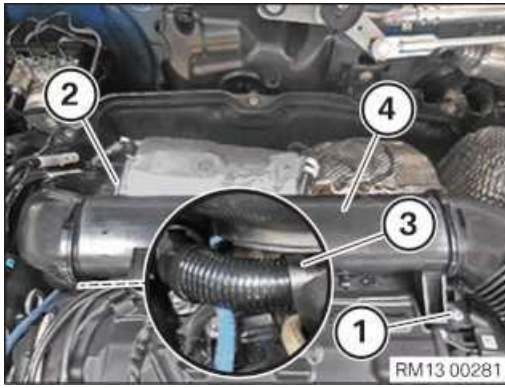


- Remove screws (arrows).
- Guide out and remove the resonator (1).

11 – Removing clean air pipe



- Detach clamp (1) on the clean air pipe.
- Pull off the clean air pipe from the intake silencer housing.



- Loosen screw (1).
- Loosen clamp (2).
- Unlock the ventilation line (3) and pull it off the cylinder head cover.
- Feed out clean air pipe and remove.

12 – Remove electronics box

Prerequisite

Battery earth lead is disconnected.



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.



RISK OF DAMAGE

Damage to wires when disconnecting connectors and plug connections.

Sheared wires can cause a short circuit.

- Do not pull on the wires when disconnecting connectors and plug connections.



TECHNICAL INFORMATION

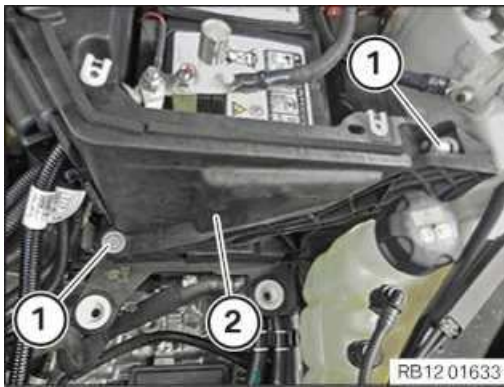
Follow instructions for removing and installing control units.

For additional information see: 12 00 ... Notes on removal and installation of control units

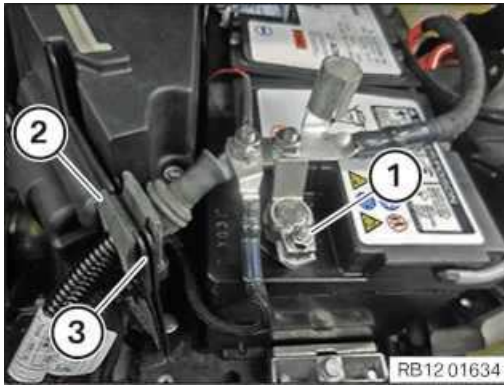


TECHNICAL INFORMATION

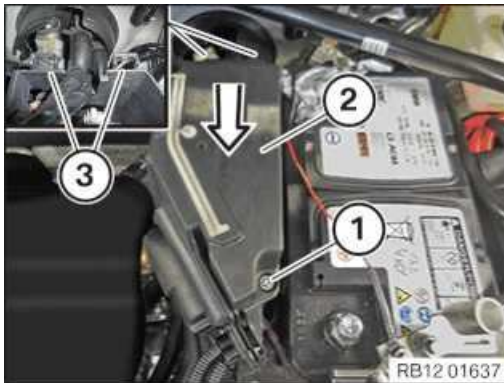
Disconnecting control units may cause fault code entries and functional limitations. Fault code entries must be read out and deleted if necessary.



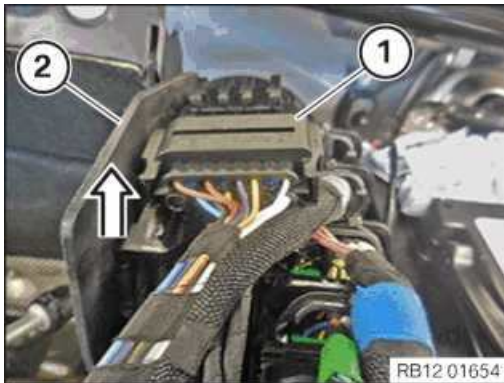
- Loosen screws (1).
- Guide out the tension strut (2) toward the top and remove it.



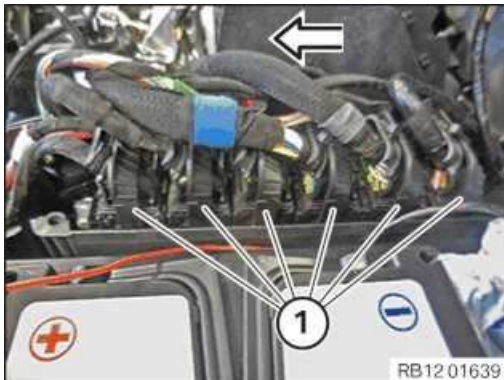
- Undo positive battery terminal (1).
- Feed out positive battery terminal (1) and set aside.
- Guide the positive battery cable (2) out of the holder (3) and lay to one side.



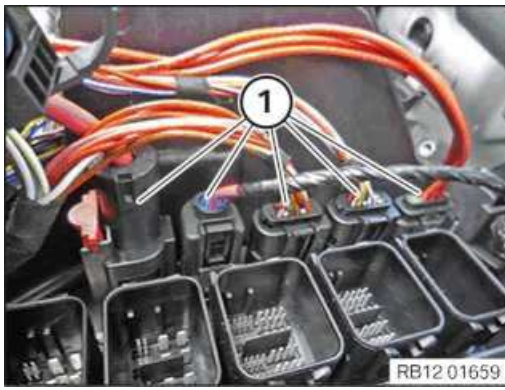
- Loosen screw (1).
- Unlock cover (2) and feed out and remove from the guides (3) in the direction of arrow.



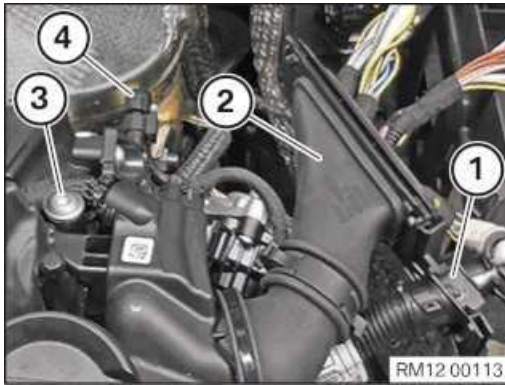
- Feed out connector (1) from the electronics box (2) and remove in the direction of arrow.
- Unlock and loosen connector (1).



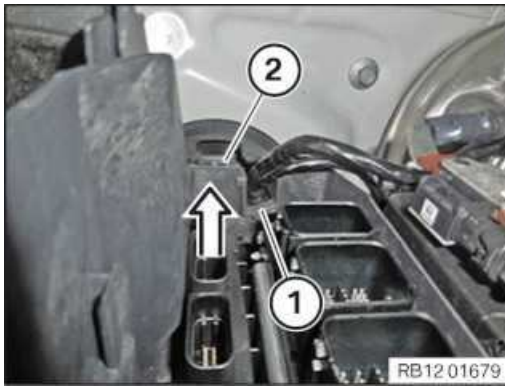
- Unlock and remove the connector (1) in the direction of the arrow.
- Feed out connector (1) and place to one side.



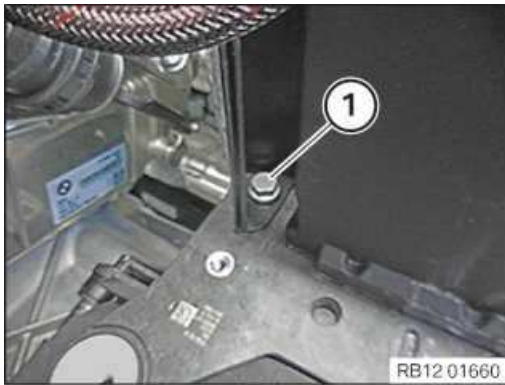
- Unlock and loosen connector (1).



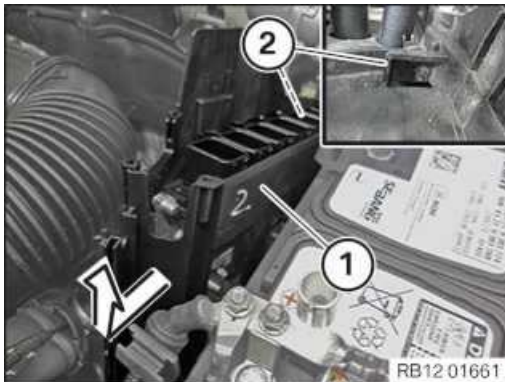
- Detach the wiring harness (1) from the electronics box.
- Detach the wiring harnesses (2) from electronics box.
- Loosen screw (3).
- Set wiring harnesses (1) and (2) aside.
- Unlock the connector (4) and disconnect it from the differential pressure sensor.



- Unlock and loosen holder (1).
- Guide the holder (1) out of the electronics box (2) in direction of arrow and set it aside.

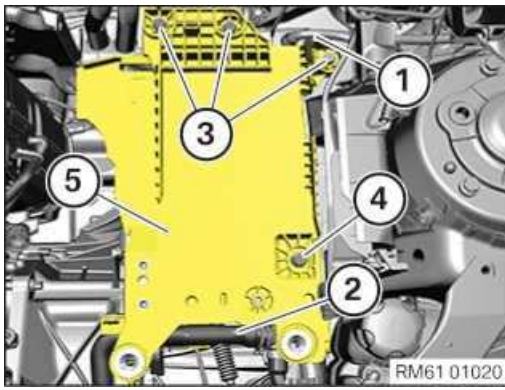


- Loosen screw (1).



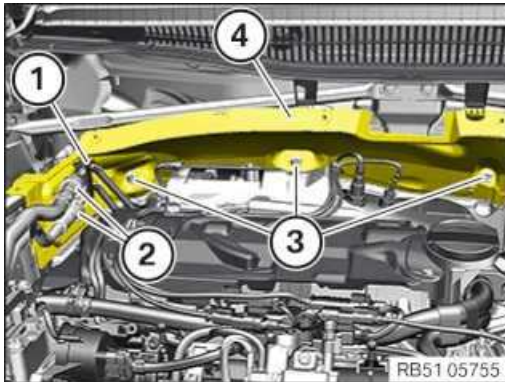
- Guide the electronics box (1) out of the guide (2) in direction of arrow and remove.

13 – Remove battery holder



- Detach the cable clip (1) from the battery holder (5).
- Detach the coolant line (2) from the battery holder (5).
- Loosen screws (3).
- Loosen screw (4).
- Thread out and remove the battery holder (5).

14 – Remove the rear bulkhead upper part



- Unlock the holder (1) and disconnect.
- Guide out and remove the fuel lines (2).
- Loosen screws (3).
- Guide out the rear bulkhead upper part (4) and remove.

15 – Removing heat shield from top exhaust turbocharger



WARNING

Hot surfaces.

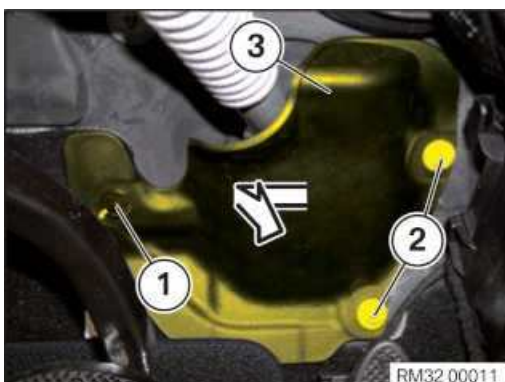
Risk of burning!

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

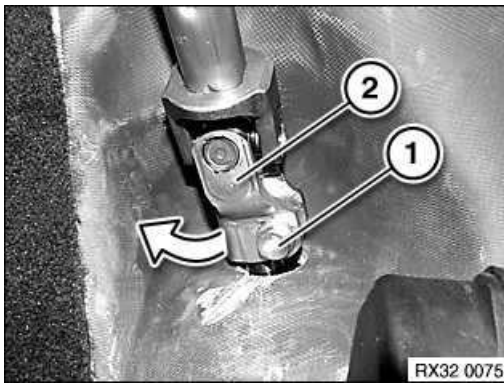


- Release cable from holders.
- Release the screws (1) at the top and bottom of the heat shield.
- Feed out and remove the heat shield (2).

16 – Releasing lower steering shaft from steering gear

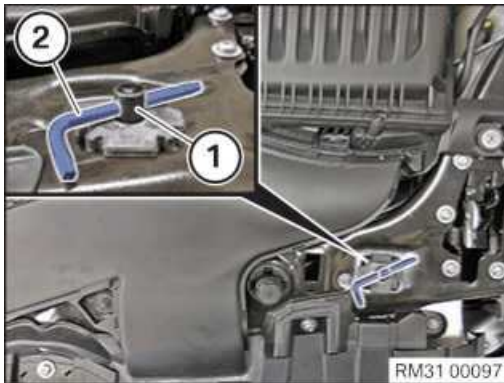


- **If installed:**
- Unfasten nut (1).
- Unscrew the nuts (2) by 1 rotation.
Do not remove the nuts (2) !
- Remove the cover (3) on the steering column in the direction of the arrow.
The side footwell trim must not be disassembled!



- Loosen screw (1).
- Swivel out the universal joint (2) of the bottom steering shaft from the steering gear in the direction of the arrow.

17 – Securing radiator on left and right



NOTICE

Perform the operations on the left and right side.

- Fasten radiator at centring pin (1) with suitable tool (2).

18 – Removing both front wheels

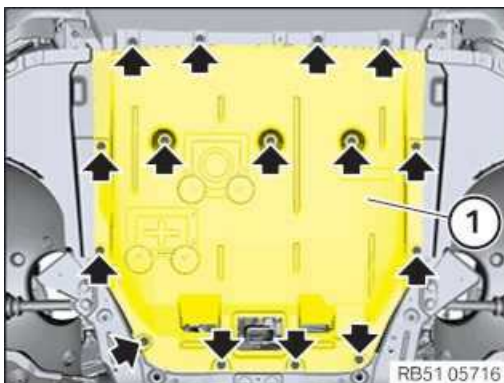


► Removing the wheel

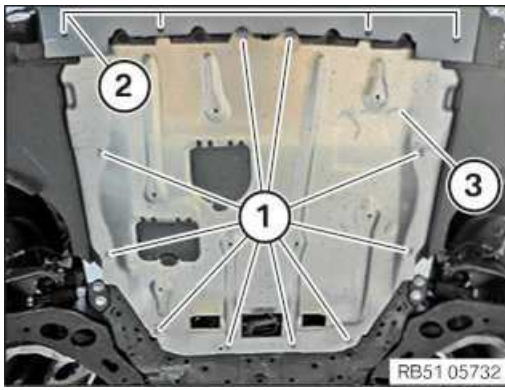
- If several wheels are removed simultaneously: Use a piece of chalk to mark on each tyre the axle and side on which the corresponding wheel is fitted.
- Unscrew the wheel bolts (arrows) and remove the wheel.

Use the matching adapter from tool set (wheel bolt adapter set) to loosen and tighten down the wheel bolt with security code.

19 – Removing the front underbody protection

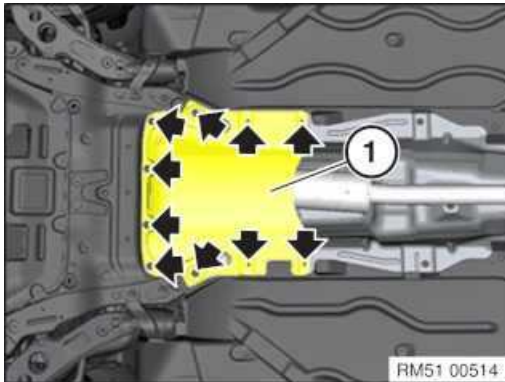


- Remove screws (arrows).
- Thread out and remove the front underbody protection (1) from the bumper panel.



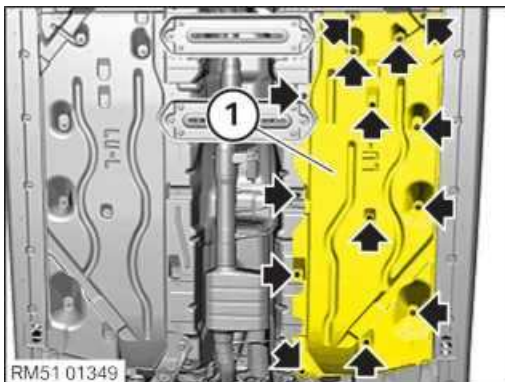
- **Equipment specification with metal underride protection:**
- Loosen screws (1) and (2).
- Thread out and remove the underride protection (3).

20 – If installed: Removing rear underbody protection



- Remove screws (arrows).
- Remove the rear underbody protection (1).

21 – Removing right underbody panelling



- Unscrew all bolts and nuts (arrows).
- Remove the underbody panelling (1).

22 – Removing front left and right wheel arch cover



NOTICE

Perform the operations on the left and right side.

► Remove the front wheel arch trim



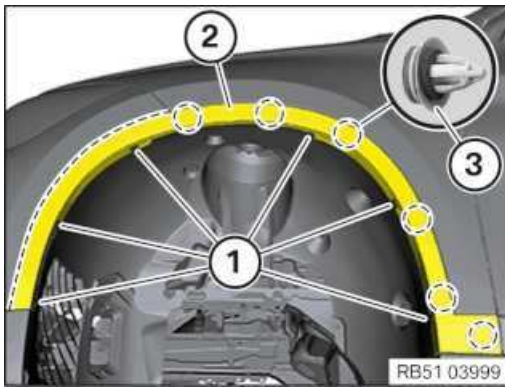
NOTICE

To provide a better overview: Schematic diagram with partially hidden components.



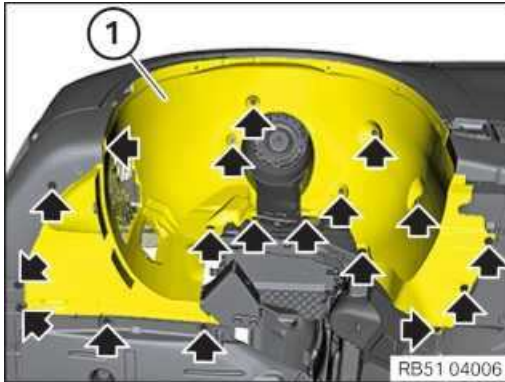
NOTICE

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



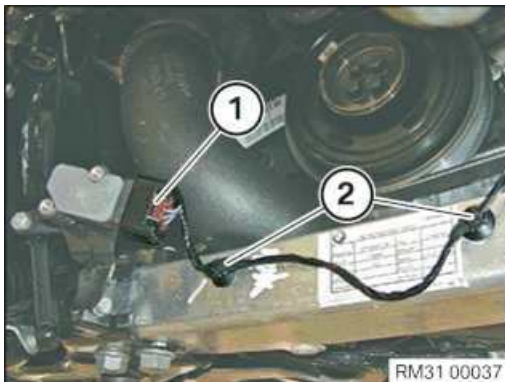
- Remove the blind rivets (1).
- Release the wheel arch trim (2) in the area of the side panel from the clips (3).
- Release the wheel arch trim (2) from the latch mechanisms on the bumper and remove.

► Remove front wheel arch cover



- Unscrew all bolts and nuts (arrows).
- Guide the wheel arch cover (1) out.

23 – With right installation: Detaching ride height sensor cable



- Unlock plug connection (1) and disconnect.
- Release cable clip (2) from deformation element adapter.

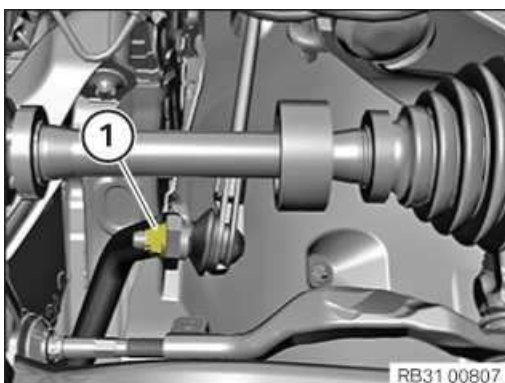
24 – Releasing anti-roll bar on left and right from anti-roll bar link



NOTICE

Perform the operations on the left and right side.

► Detach the anti-roll bar from the anti-roll bar link



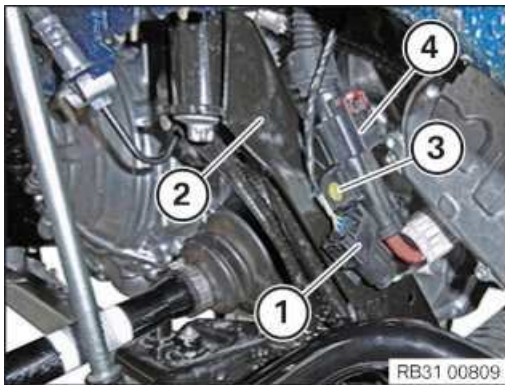
- Unfasten nut (1).
- Note:** Use the Torx socket for counter support.
- Loosen the anti-roll bar link from the anti-roll bar .

25 – Detaching rubber mount from front axle support



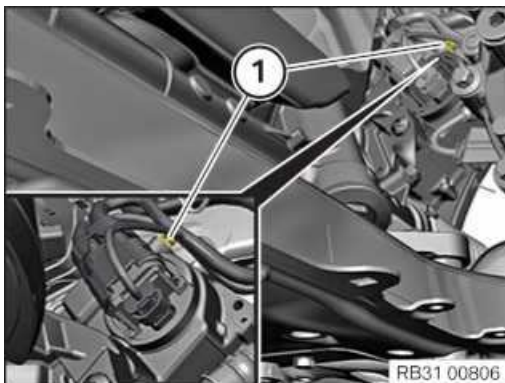
- Spray rubber mount (1) with lubricant and release from holder on front axle support.

26 – Disconnecting plug connections from steering gear



► If installed: Detach connectors from the front axle carrier

- Release the plug connection (1) from the front axle support (2).
- Loosen screw (3).
- Release the plug connection (4) from the front axle support (2).

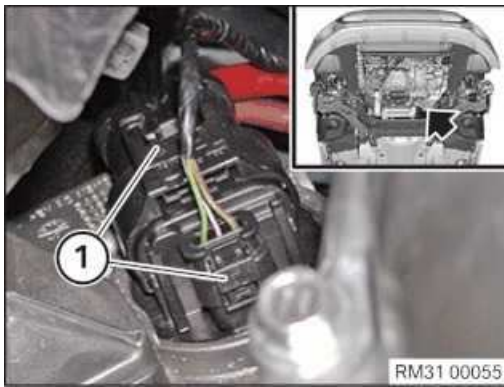


- Disconnect wiring harness (1) from steering gear.



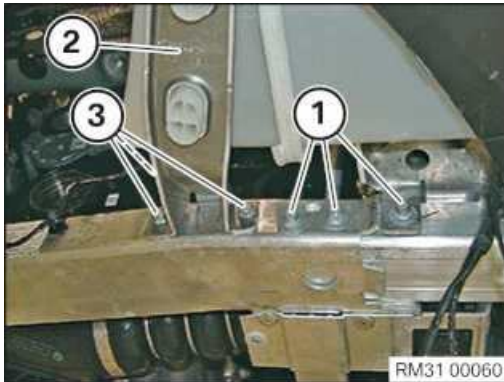
- To unlock the plug connections (see the following work step): unlock plug connections (arrow) with the right hand.

The plug connections can be reached via the left-hand output shaft.



- Unlock plug connections (arrow) (1) and disconnect from the steering gear.
- Make sure when lowering the front axle that the cables are not damaged!

27 – Releasing the mounted part from the front axle support



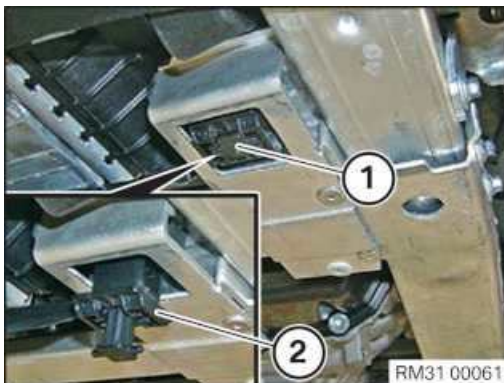
- **Only on right side:** Loosen screws (3) and remove holder for washer fluid reservoir (2).



NOTICE

Perform the operations on the left and right side.

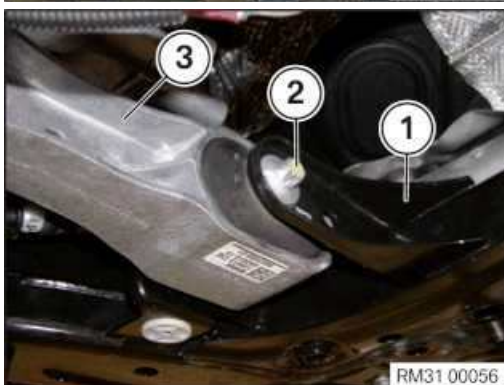
- Loosen screws (1).



NOTICE

Perform the operations on the left and right side.

- Unlock safety catch (1) of the lock (2) from the holder for the charge air cooler.
- Completely remove locks (2).



- Loosen screw (2) of the engine support (3) on the front axle (1).

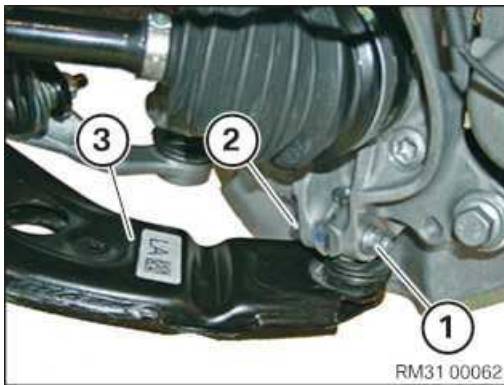


NOTICE

Perform the operations on the left and right side.

- Loosen screws (1).

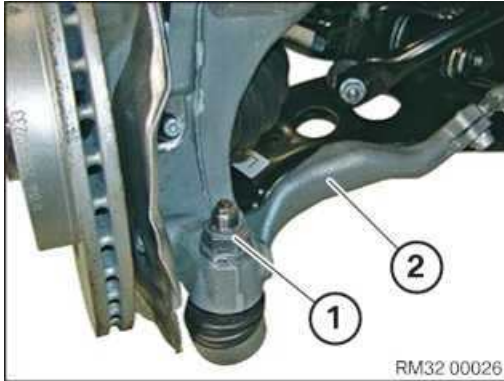
28 – Detaching and removing front axle completely



NOTICE

Perform the operations on the left and right side.

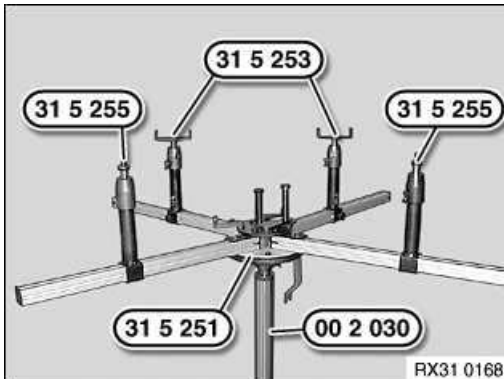
- Unfasten nut (1).
- (2) Pull out screw.
- Detach the wishbone (3) from the swivel bearing .



NOTICE

Perform the operations on the left and right side.

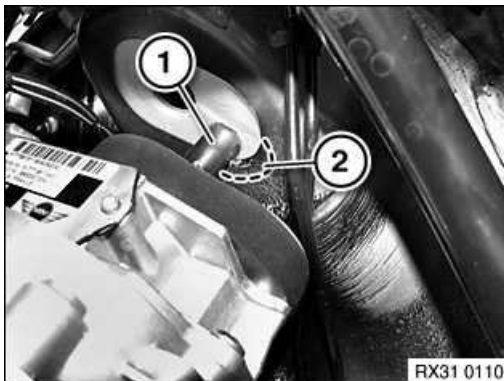
- Unfasten nut (1).
- Detach the track rod (2) from the swivel bearing.



- Fit the special tool completely onto the workshop jack **0 490 133 (00 2 030)** with an auxiliary person.
 - Insert special tools in telescopic supports of a profile rail pair.
 - Insert special tools in telescopic supports of other profile rail pair.
- Note:** In a profile rail pair, two profile rails are connected to one another by gearing.



- Align special tools and to front axle support.
 - Support front axle support by operating workshop jack **0 490 133 (00 2 030)**.
- Note:** The centre of gravity of the front axle support must be positioned centrally over the workshop jack!
- Secure front axle support with special tool to special tool .

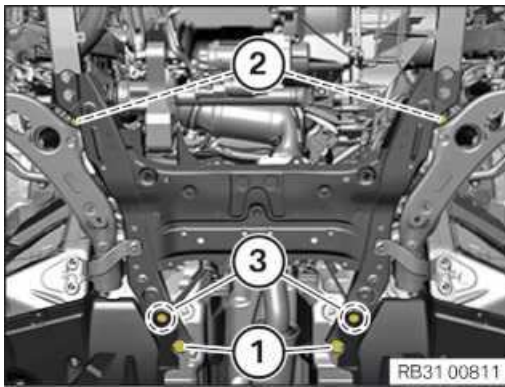


TECHNICAL INFORMATION

Non-compliance with the regulations for installation and disassembly may result in component damage. All work must be performed with care and in compliance with the regulations.

- When raising and lowering the front axle support, make sure that the torsion bar (1) of the electromechanical steering gear (EPS) in area (2) does not collide with the bulkhead!

Note: Collision with the bulkhead may result in damage to the electromechanical steering gear (EPS)!



- If applicable, release the screws in area (3).
- Release screws (1) (front axle support, rear).
- Release screws (2) (front axle support, front).
- Bend the underbody panelling to the side in area (3).
- When lowering, release charge air cooler from its rubber mounts.
- Completely lower and remove the front axle.

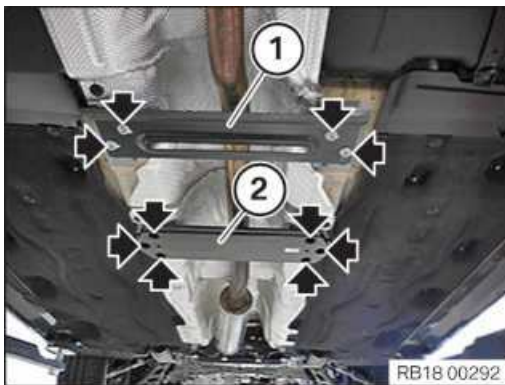


TECHNICAL INFORMATION

Note the information on thread repairs using Helicoil thread inserts.
For more information see: 41 00 ... Notes on repairing threads

- Check threads for damage; if necessary, repair with Helicoil thread inserts.

29 – Removing the connecting support from the tunnel in front and back



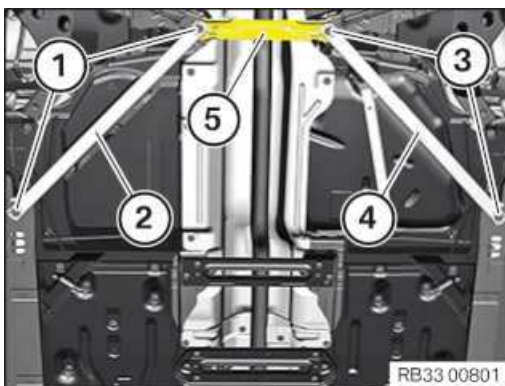
- Unscrew the bolts (arrows) from the connecting support (1).
- Feed out and remove the crossbeam (1).
- Unscrew the bolts (arrows) from the connecting support (2).
- Feed out and remove the crossbeam (2).

30 – Remove the cross strut with the torsion strut



TECHNICAL INFORMATION

Driving without a torsion strut is not permitted.



- Loosen screws (1).
- Thread out torsion strut (2) at left and remove.
- Loosen screws (3).
- Thread out torsion strut (4) at right and remove.
- Feed out and remove the cross-member (5).

31 – Remove exhaust system



WARNING

Hot surfaces.

Risk of burning!

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

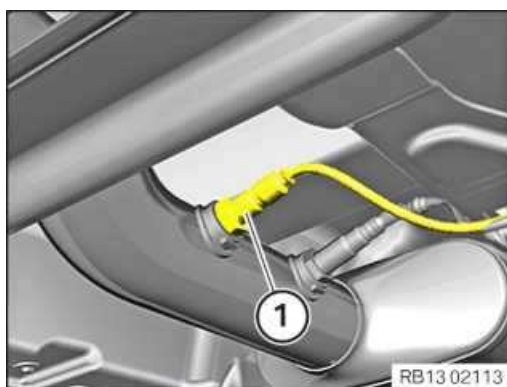


CAUTION

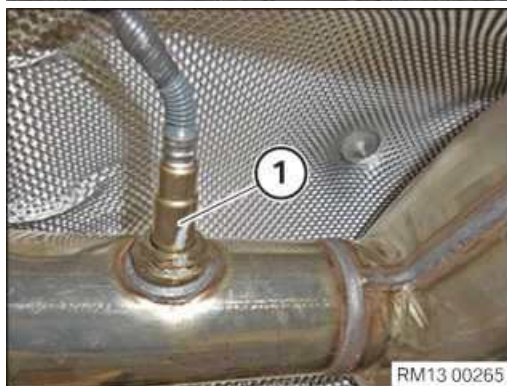
Heavy component.

Heavy components can lead to injury or damage.

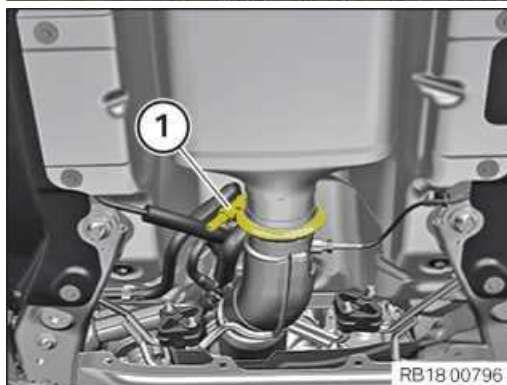
- Remove and install heavy components with the aid of another person/other persons.



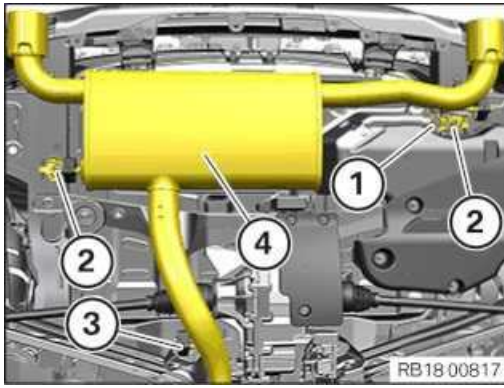
- Release the nitrogen oxide sensor (1) downstream of the SCR catalytic converter, guide it out and set it aside.



- Release the diesel particulate sensor (1), guide it out and set it aside.

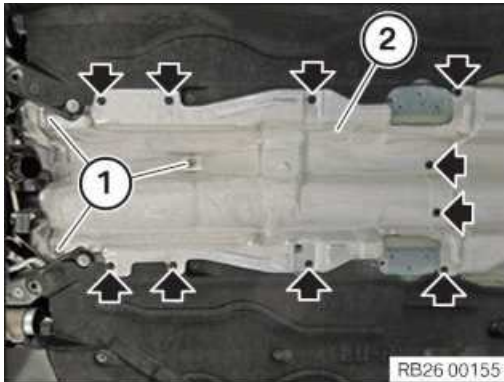


- Loosen V-band clamp (1).



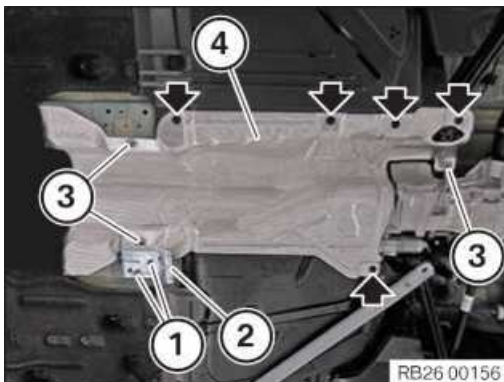
- Loosen screw (1).
- Loosen nuts (2).
- Release the rubber mount (3) of the exhaust system (4).
- Lower and guide out the exhaust system (4) with assistance of a second person and remove it.

32 – Remove front heat shield



- Remove screws (arrows).
- Loosen nuts (1).
- Guide the heat shield (2) out and remove it.

33 – Remove heat shield at rear.



- Loosen screws (1).
- Guide out and remove holder (2).
- Remove screws (arrows).
- Loosen nuts (3).
- Guide the heat shield (4) out and remove it.

34 – Remove propeller shaft



CAUTION

Component with heavy weight.

Danger of injury!

- Note component's centre of gravity.
- Support component using a jack.
- Secure component against falling off the jack.



RISK OF DAMAGE

Damage to propeller shaft during removal.

Non-observance of the removal guidelines for the propeller shaft on the rear axle differential may cause severe damage.

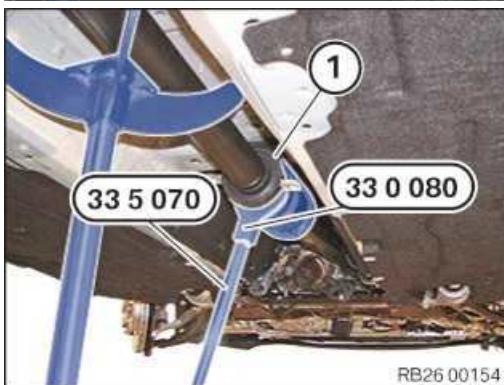
- Do not disassemble the three-hole flange, flexible disc and propeller shaft. The three-hole flange to the rear axle differential is balanced with the flexible disc and propeller shaft.
- Loosen the recessed nut against the direction of travel in clockwise direction. The propeller shaft must be loosened on the recessed nut only and exclusively in the direction of rotation otherwise the anti-twist lock of the bi-hexagonal flange nut is damaged.
- In the event of a damaged anti-twist lock on the bi-hexagonal flange nut: Replace the rear axle differential.



- Install the special tool I between the front and rear propeller shaft.
- Make sure that the arrows on the special tool point forward in the direction of travel.



- Always support the propeller shaft (1) with a conventional jack.



- Protect the propeller shaft (1) with the special tools **0 495 554 (33 5 070)** and from twisting.



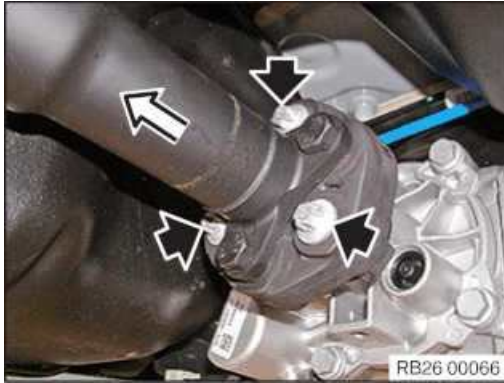
TECHNICAL INFORMATION

Compliance with the following instructions is required to avoid a humming noise from the propeller shaft after refitting the propeller shaft.

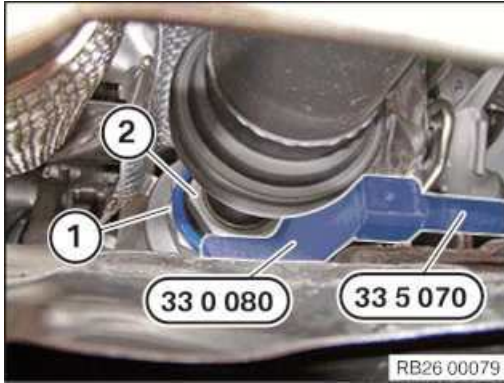
- Mark the installation position of the screw connection (1), the flexible disc (2) and the three-hole flange (3) on the same level.
- Loosen the screw connection (1).



- Loosen screws (1).



- Remove screws (arrows).
- Guide the propeller shaft out in the direction of the arrow and set it aside.

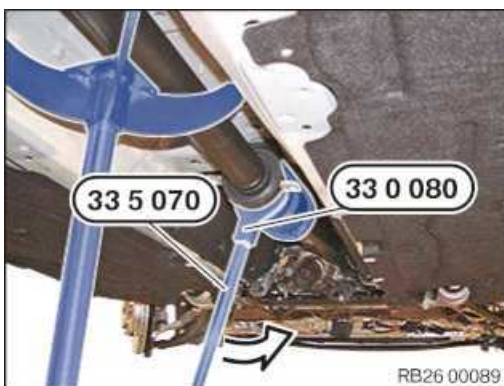


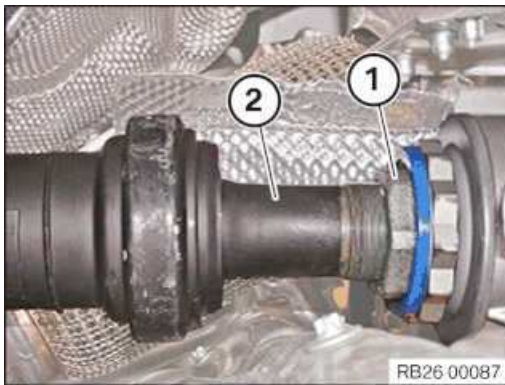
RISK OF DAMAGE

Damage to the transfer box.

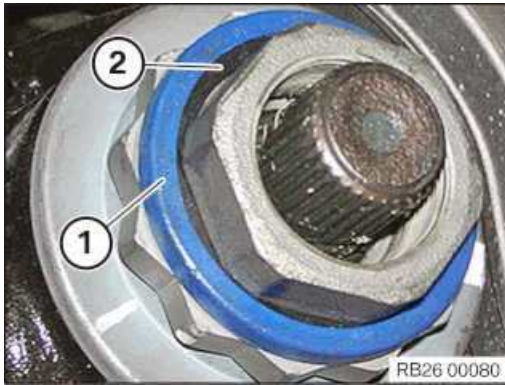
Non-observance of the removal and installation guidelines may cause severe damage to the transfer box.

- Do not use the double hexagon head flange nut as counter support.
- Protect the recessed nut (2) on the transfer box from twisting with the special tools **0 495 554 (33 5 070)** and .
The recessed nut (2) on the transfer box must **not** be used to detach the propeller shaft.
The double hexagon flange nut (1) must **not** be used for counter support.
- Release the front propeller shaft with the special tools **0 495 554 (33 5 070)** and in the direction of the arrow.

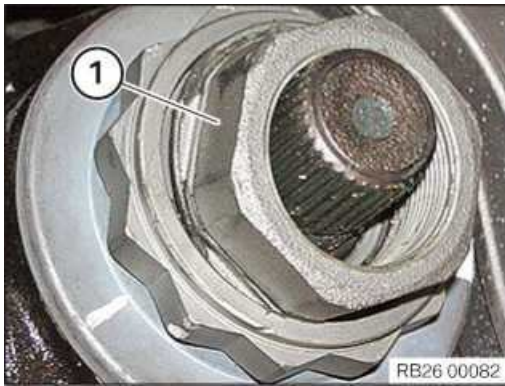




- Thread the propeller shaft (2) out of the recessed nut (1) and remove.



- Thread the retaining clip (1) and the seal (2) out and remove.



- Thread out and remove the recessed nut (1).

35 – Removing starter motor



WARNING

Hot surfaces.

Risk of burning!

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



WARNING

Working on 12 V vehicle electrical system.

Risk of short circuits! Risk of fire!

- Detach battery earth lead from battery.
- For additional batteries: Detach all battery earth leads from additional batteries.



RISK OF DAMAGE



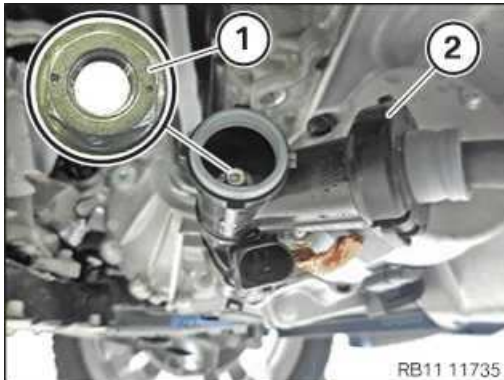
Electrostatic discharge.

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 and loosen connector (1).
- Detach the sealing cap (2) in the direction of the arrow.
- Feed out and remove the sealing cap (2).

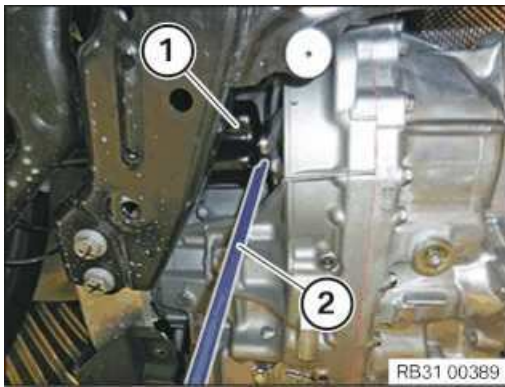


- Unfasten nut (1).
- Feed out the positive battery cable (2) of the starter motor and set it aside.



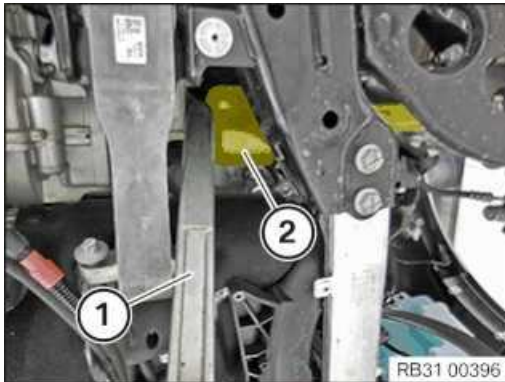
- Loosen screws (1).
- Feed out starter motor and remove.

36 – Partially removing the left output shaft



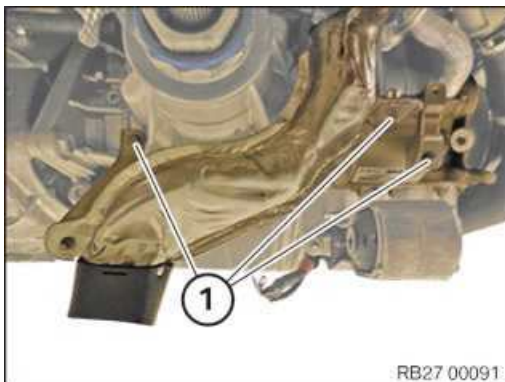
- Protect the output shaft (1) from falling.
- Lever out the output shaft (1) with a mounting lever (2) from the transmission.
- Tie up output shaft (1).

37 – Partially removing right output shaft



- Lever out the output shaft (2) with a mounting lever (1).
- Tie up output shaft (1).

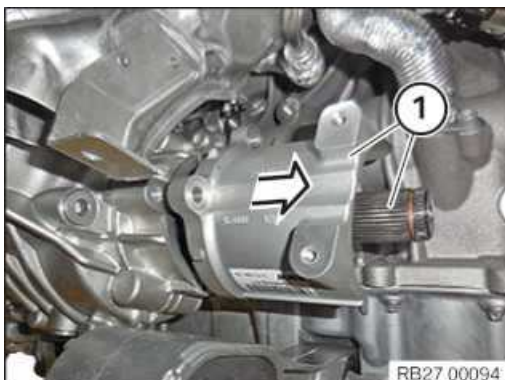
38 – Remove the intermediate shaft with the support tube



- With air duct installation: Loosen screws (1).
- Remove air duct

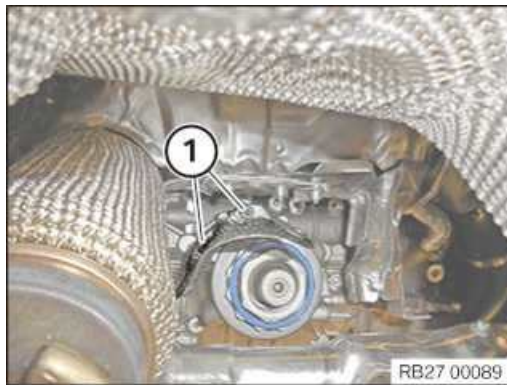


- Loosen screws (1).



- Pull the intermediate shaft with the support tube (1) out of the transfer box.

39 – Remove transfer box (VTG)



- Loosen screws (1).
- Remove heat shield.



- Loosen screws (1).
- Remove the transfer box (VTG).

40 – Remove the monitoring oxygen sensor



WARNING

Hot surfaces.

Risk of burning!

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



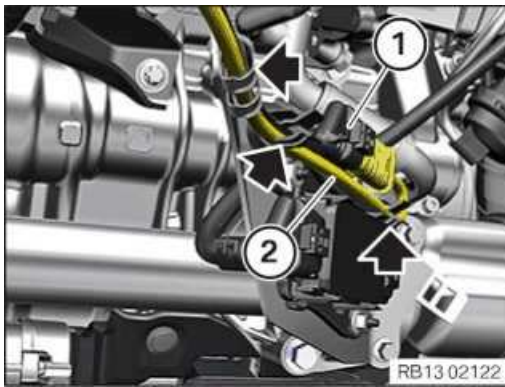
RISK OF DAMAGE



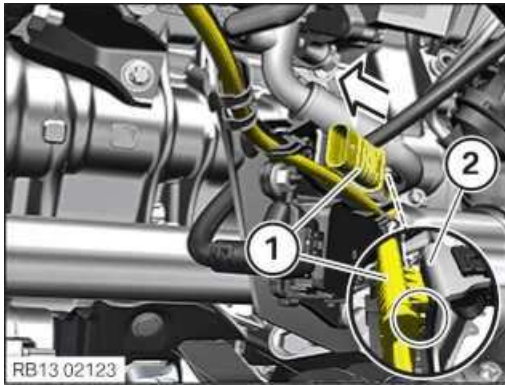
Electrostatic discharge.

Damage to or destruction of electrical components.

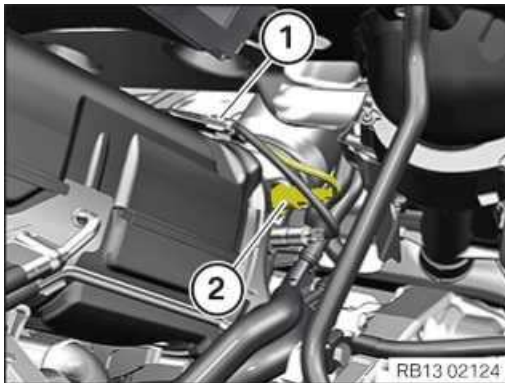
- Leave electrical components in original packaging until just before they are installed. Use the original packaging only for any return shipments. Always package removed components straight away.
- Read and comply with user information on using the associated special tool 12 7 060.
- Only touch the 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.
- Feed oxygen monitor sensor cable (1) out of the clamps (arrows).



- Unlock the connector (1) in the marked area and disconnect it from the holder (2) in the direction of arrow.



- Guide the cable of the monitoring oxygen sensor (2) out of the clamp (1).
- Release the monitoring oxygen sensor (2) using special tool **0 491 074 (11 7 020)**.
- Remove the monitoring oxygen sensor (2).

41 – Removing the nitrogen oxide sensor before SCR catalytic converter



WARNING

Hot surfaces.

Risk of burning!

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



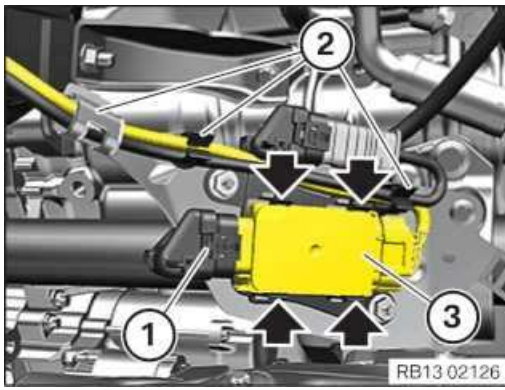
RISK OF DAMAGE



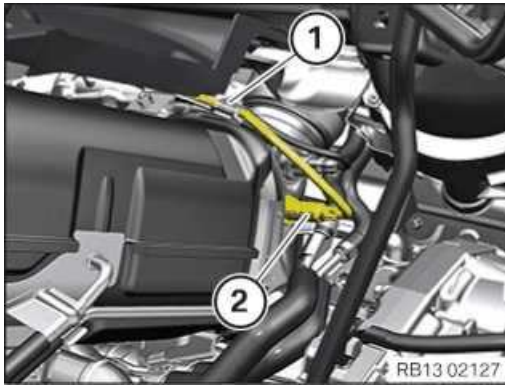
Electrostatic discharge.

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.

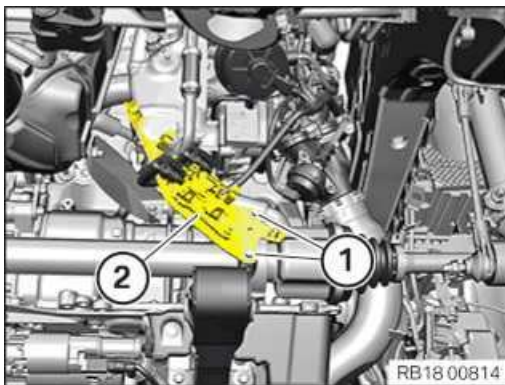


- Unlock plug connection (1) and disconnect.
- Slide the cable of the nitrogen oxide sensor evaluation electronics (3) out of the clamps (2) and remove.
- Unlock (arrows) and remove the evaluation electronics for the nitrogen oxide sensor (3).



- Slide the cable of the nitrogen oxide sensor before the SCR catalytic converter (2) out of the clamps (1) and remove.
- Detach the nitrogen oxide sensor before the SCR catalytic converter (2) using the special tool **0 491 074 (11 7 020)**.
- Guide out and remove the nitrogen oxide sensor upstream of the SCR catalytic converter (2).

42 – Remove holder for oxygen sensor



- Loosen screws (1).
- Thread out the holder (2) for the oxygen sensor and remove.

43 – Remove the exhaust temperature sensor on the catalytic converter



WARNING

Hot surfaces.

Risk of burning!

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



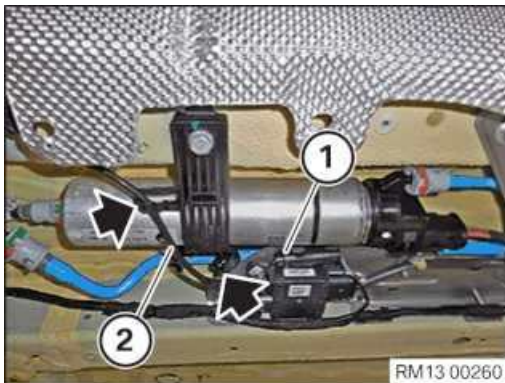
RISK OF DAMAGE



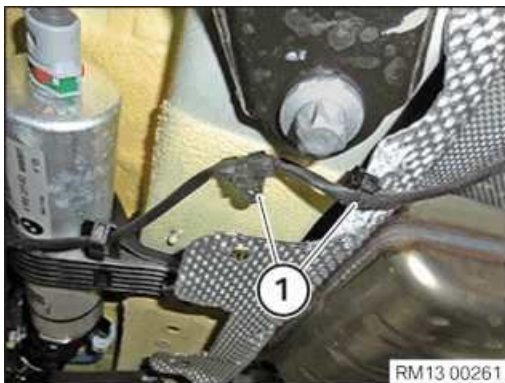
Electrostatic discharge.

Damage to or destruction of electrical components.

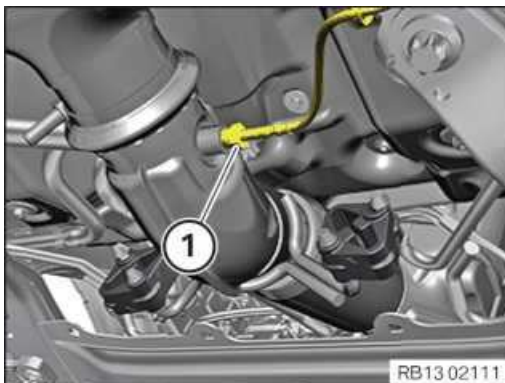
- Leave electrical components in original packaging until just before they are installed. Use the original packaging only for any return shipments. Always package removed components straight away.
- Read and comply with user information on using the associated special tool 12 7 060.
- Only touch the 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 and loosen connector (1).
- Feed out the cable (2) of the exhaust temperature sensor from the clamps (arrows) and remove.



- Loosen the cable clip (1).



- Loosen exhaust temperature sensor (1).
- Feed out and remove exhaust temperature sensor (1).

44 – Removing the exhaust temperature sensor downstream from the catalytic converter on the diesel particulate filter



WARNING

Hot surfaces.

Risk of burning!

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



RISK OF DAMAGE



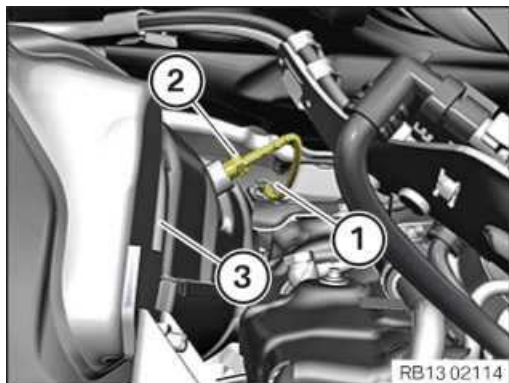
Electrostatic discharge.

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 and loosen connector (1).
- Uncover the exhaust temperature sensor cable.



- Guide the exhaust temperature sensor cable (2) out of the clamp (1) and place it to one side.
- Release the exhaust temperature sensor (2) with conventional tools .
- Feed out and remove the exhaust temperature sensor (2) from the diesel particulate filter (3).

45 – Remove the exhaust temperature sensor on the diesel particulate filter



WARNING

Hot surfaces.

Risk of burning!

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



RISK OF DAMAGE



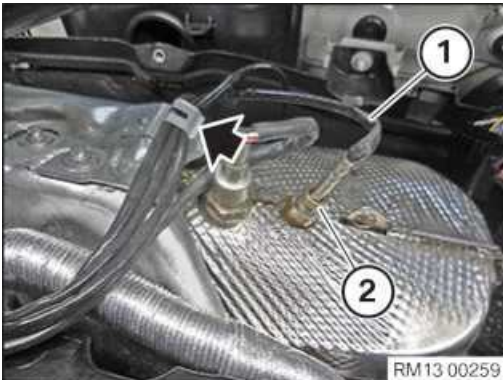
Electrostatic discharge.

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 and disconnect connector (1).
- Put the cable of the exhaust temperature sensor to one side.



- Guide cable (1) of the exhaust temperature sensor out of the clamp (arrow) and remove it.
- Loosen exhaust temperature sensor (2).
- Feed out and remove exhaust temperature sensor (2).

46 – Remove the control sensor



WARNING

Hot surfaces.

Risk of burning!

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



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.
- Detach the connector (2) from the holder .
- Release the front oxygen sensor cable.



- Detach the control sensor (1) with the special tool .
- Feed out and remove the control sensor (1).

MAIN WORK

47 – Removing the diesel particulate filter



WARNING

Hot surfaces.

Risk of burning!

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

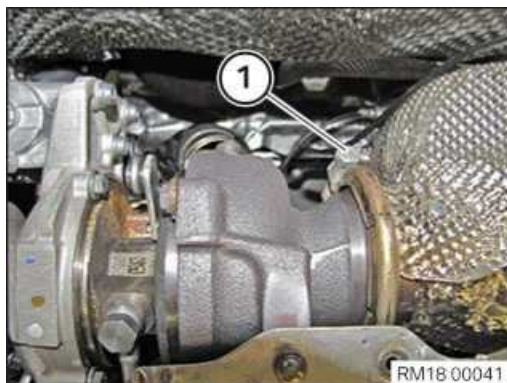


CAUTION

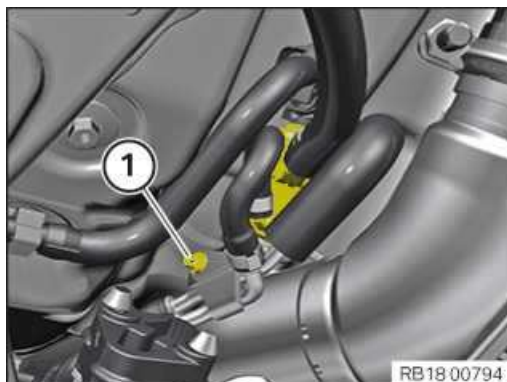
Heavy component.

Heavy components can lead to injury or damage.

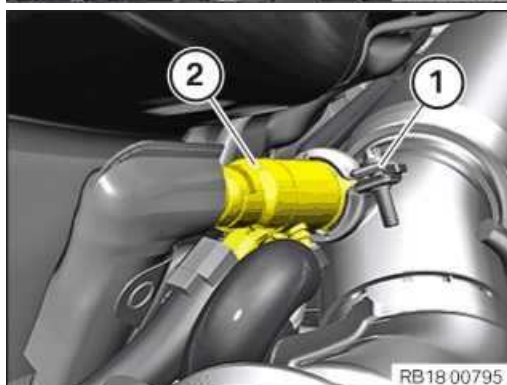
- Remove and install heavy components with the aid of another person/other persons.



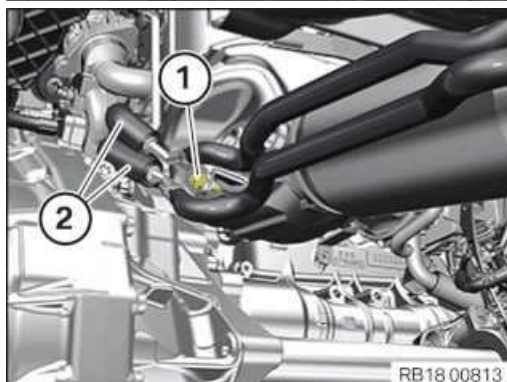
- Loosen V-band clamp (1).
- Feed out V-band clamp (1) and remove.



- Loosen screw (1).



- Loosen V-band clamp (1).
- Remove the SCR metering module (2) and set it aside.



- Loosen screw (1).
- Thread out the coolant lines (2) of the SCR metering module and set aside.

► Remove differential pressure sensor



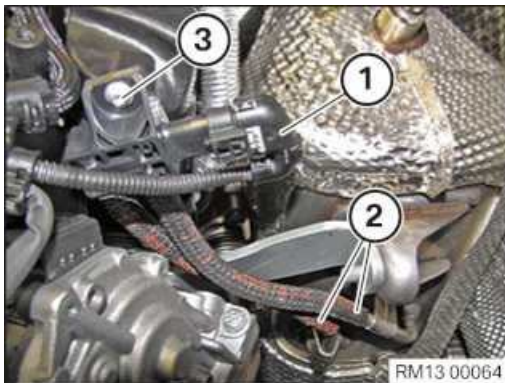
RISK OF DAMAGE



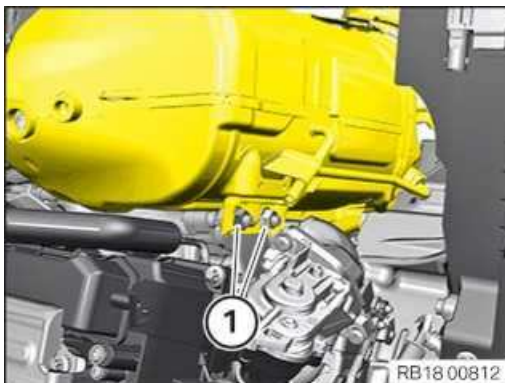
Electrostatic discharge.

Damage to or destruction of electrical components.

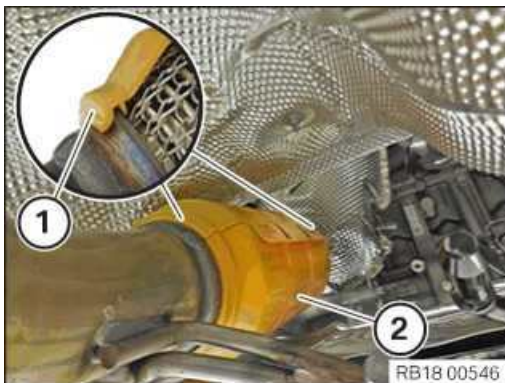
- Leave electrical components in original packaging until just before they are installed. Use the original packaging only for any return shipments. Always package removed components straight away.
- Read and comply with user information on using the associated special tool 12 7 060.
- Only touch the 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.



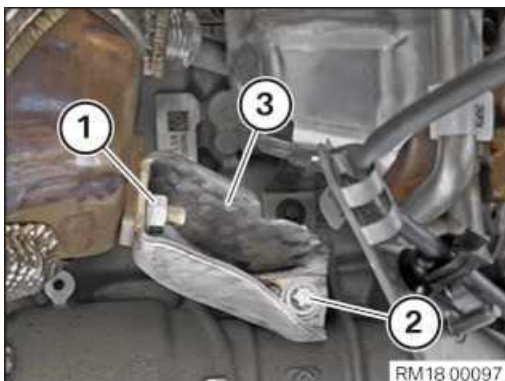
- Unlock and disconnect connector (1).
- Pull off pressure hose (2).
- Loosen screw (3).
- Feed out differential pressure sensor and remove.



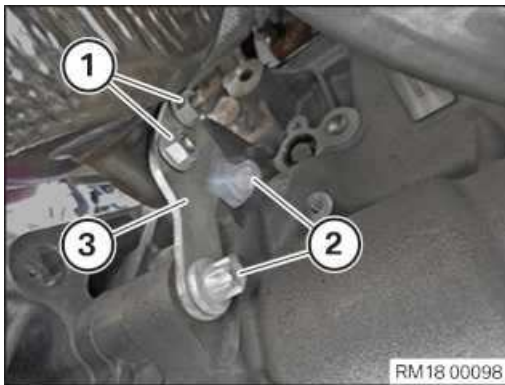
- Loosen nuts (1).



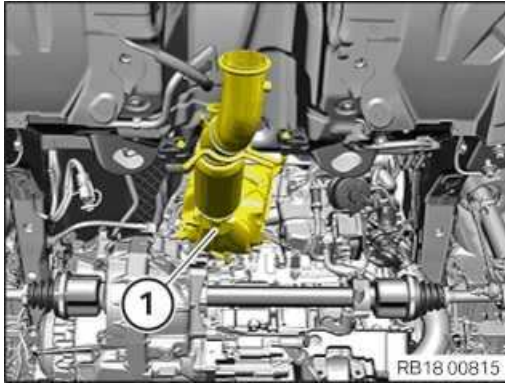
- Mount fitting aid (2).
- Make sure that the fitting aid is correctly position on the edges (1) of the flexible tube.



- Unfasten nut (1).
- Loosen screw (2).
- Remove holder (3).



- Loosen nuts (1).
- Loosen screws (2).
- Remove holder (3).



- Feed out diesel particulate filter (1) toward the bottom and remove.

48 – Installing the diesel particulate filter

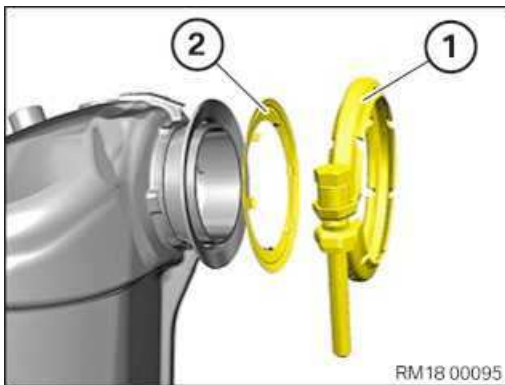


CAUTION

Heavy component.

Heavy components can lead to injury or damage.

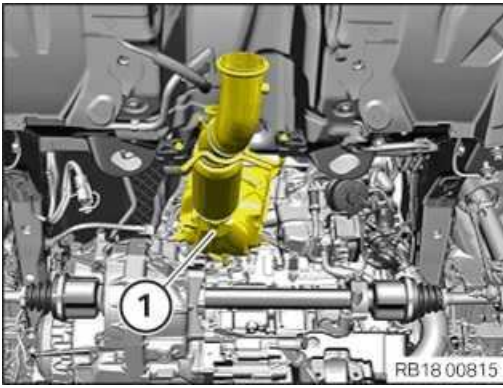
- Remove and install heavy components with the aid of another person/other persons.



- Renew the V-clip (1).
- Parts:** V-band clamp
- Renew the gasket (2).
- Parts:** Gasket



- Before installing the diesel particulate filter: Mount fitting aid (1) for the flexible tube.



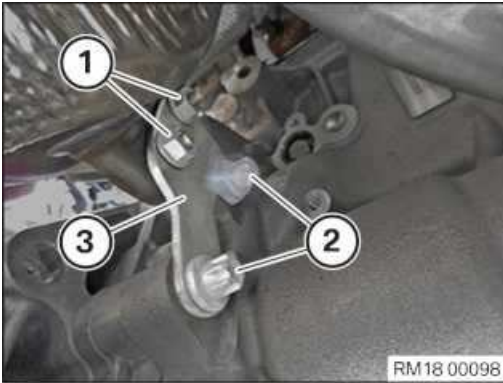
- Carefully insert and install the diesel particulate filter (1).



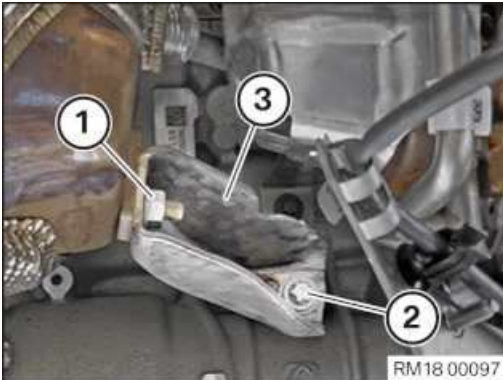
- Feed in and install V-band clamp (1).
- Make sure that the seal between the diesel particulate filter and the exhaust turbocharger is installed correctly.
- Align the diesel particulate filter on the exhaust turbocharger.
- Position V-clip (1).
- Hand-tighten the V-clip (1).



- Tighten nuts (1) by hand.



- Install holder (3).
- Hand-tighten the bolts (2).
- Tighten nuts (1) by hand.



- Install holder (3).
- Tighten the nut (1) hand-tight.
- Hand-tighten the bolt (2).



- Remove fitting aid (1) for the flexible tube.



- Tighten V-band clamp (1).

Diesel particulate filter V-clip to exhaust turbocharger

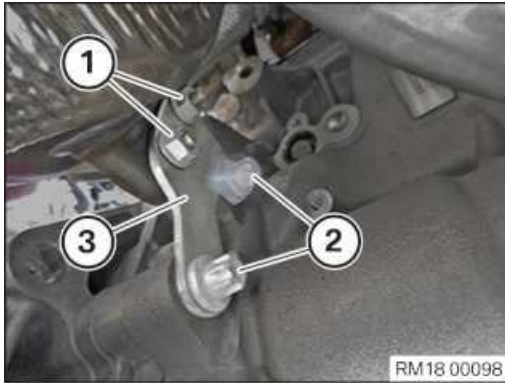
V-band clamp	Renew V-band clamp.	Tightening torque	15 Nm
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- Tighten nuts (1).

Diesel particle filter to holder

M8 hexagon nut		Tightening torque	19 Nm
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- Tighten down screws (2).

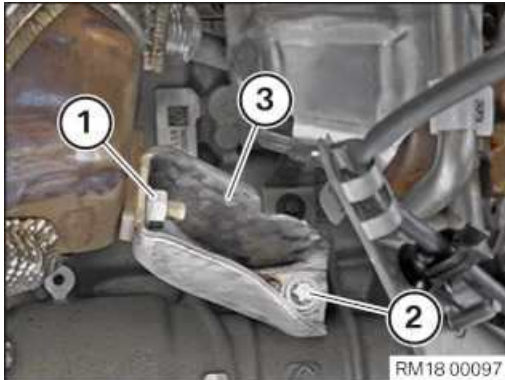
Diesel particulate filter holder to gearbox

M12x75		Tightening torque	66 Nm
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- Tighten nuts (1).

Diesel particle filter to holder

M8 hexagon nut		Tightening torque	19 Nm
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- Tighten down screw (2).

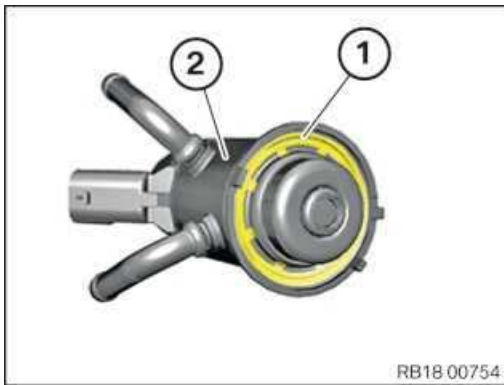
Diesel particulate filter bracket to crankcase

M10x35		Tightening torque	38 Nm
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- Tighten nut (1).

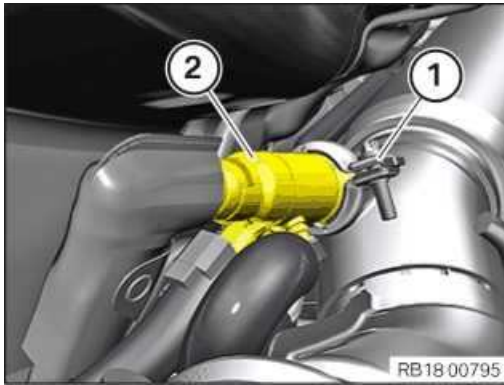
Diesel particle filter to holder

M8 hexagon nut		Tightening torque	19 Nm
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- Renew sealing ring (1) of the SCR metering module (2).

Parts: Sealing ring

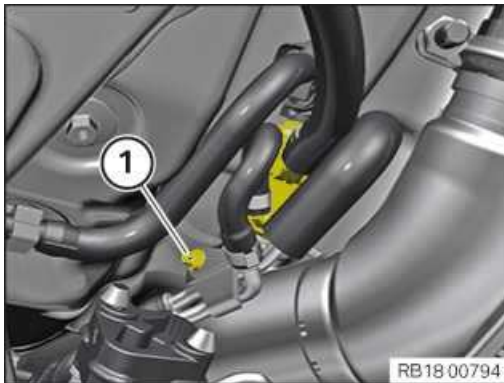


- Insert and install the SCR metering module (2).
- Renew the V-clip (1).
- Tighten V-band clamp (1).

Parts: V-band clamp

SCR metering module V-clip to exhaust system

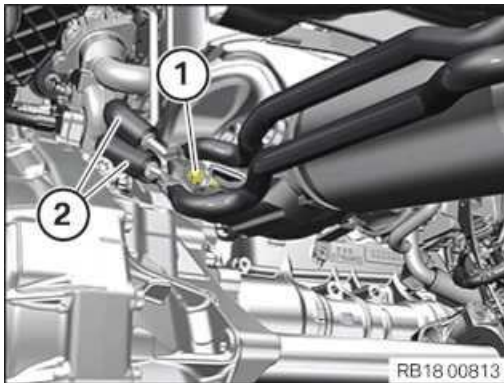
V-band clamp	Renew V-band clamp.	Tightening torque	8 Nm
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- Tighten down screw (1).

Holder for coolant lines to diesel particulate filter

Torx bolt BM6x16		Tightening torque	8 Nm
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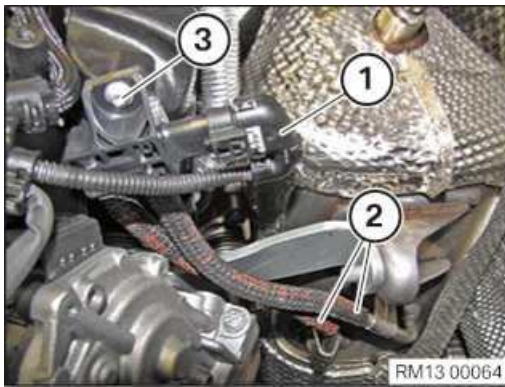


- Thread in and install coolant line (2) of the SCR metering module.
- Tighten down screw (1).

Holder for coolant lines to diesel particulate filter

Torx bolt BM6x16		Tightening torque	8 Nm
---------------------	--	-------------------	------

► Installing differential pressure sensor



- Feed in and install the differential pressure sensor .
- Tighten down screw (3).

Differential pressure sensor to holder

Screw		Tightening torque	4 Nm
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- Check pressure hoses (2).
- Renew any hardened pressure hoses (2).

Parts: Pressure hoses

- Connect the pressure hoses (2) and secure them using 15 mm to 19 mm screw clamps.

Clamp for the pressure hose on the differential pressure sensor

Clamp 15–19mm		Tightening torque	3 Nm
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- Connect and lock the connector (1).
The connector (1) must engage audibly.

POSTPROCESSES

49 – Install the control sensor



TECHNICAL INFORMATION

New oxygen sensors are to be greased lightly and evenly on the thread.

For oxygen sensors that are reused, the following should be observed:

Lightly and evenly grease the oxygen sensor only on the thread. Do not clean and grease that part of the oxygen sensor which protrudes in the exhaust branch (sensor ceramics).

For additional information see: 11 00 ... Overview of consumables in Electronic Parts Catalogue



- Feed in front oxygen sensor (1) and install.
- Tighten front oxygen sensor (1) using special tool .

Control sensor

Control sensor		Tightening torque	50 Nm
----------------	--	-------------------	-------



- Lay and secure cable of oxygen control sensor.
- Secure the connector (2) to the holder.
- Connect connectors (1) and lock.
The connector (1) must engage audibly.

50 – Install the exhaust-gas temperature sensor on the diesel particulate filter



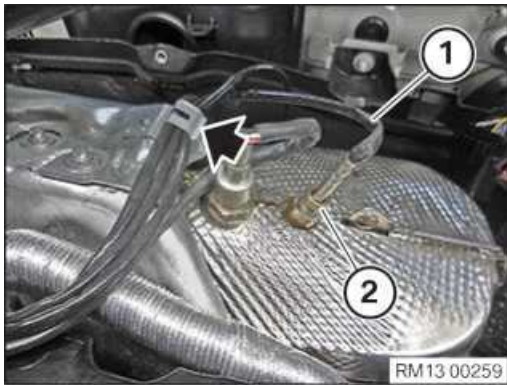
RISK OF DAMAGE

Damage of exhaust temperature sensor.

Damage to exhaust temperature sensors leads to malfunctions.

- Make sure that the gauge tip is not damaged.

- Check the gauge tip (1) for damage and renew the exhaust temperature sensor as needed.



- Feed in and install the exhaust temperature sensor (2).
- Tighten the exhaust temperature sensor (2).

Exhaust temperature sensor to diesel particulate filter

Exhaust-gas temperature sensor		Tightening torque	28 Nm
--------------------------------	--	-------------------	-------

- Insert and install cable (1) of the exhaust temperature sensor in the clamp (arrow).



- Lay and fasten the cable of the exhaust gas temperature sensor.
- Connect connectors (1) and lock.

The connector (1) must engage audibly.

51 – Installing the exhaust temperature sensor downstream from the catalytic converter on the diesel particulate filter

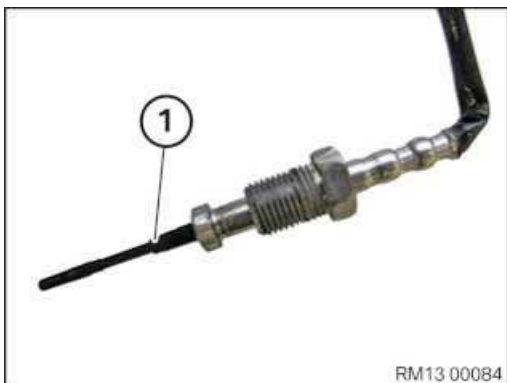


RISK OF DAMAGE

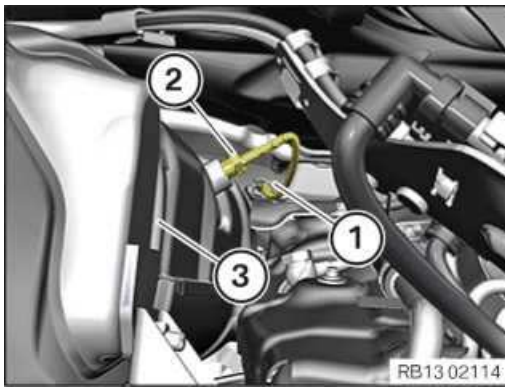
Damage of exhaust temperature sensor.

Damage to exhaust temperature sensors leads to malfunctions.

- Make sure that the gauge tip is not damaged.



- Make sure the gauge tip (1) is not damaged during installation.



- Guide the exhaust temperature sensor (2) into diesel particulate filter (3) and install.
- Tighten the exhaust temperature sensor (2) with conventional tools .

Exhaust temperature sensor to diesel particulate filter

Exhaust-gas temperature sensor		Tightening torque	28 Nm
--------------------------------	--	-------------------	-------

- Insert and install the cable of the exhaust temperature sensor (2) in the clamps (1).
- Lay and fasten the cable of the exhaust gas temperature sensor.
- Connect connectors (1) and lock.
The connector (1) must engage audibly.



52 – Installing exhaust temperature sensor on catalytic converter



RISK OF DAMAGE

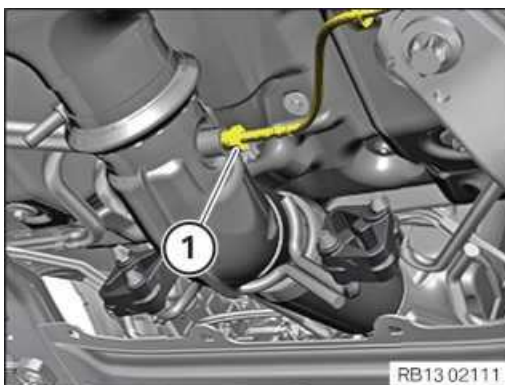
Damage of exhaust temperature sensor.

Damage to exhaust temperature sensors leads to malfunctions.

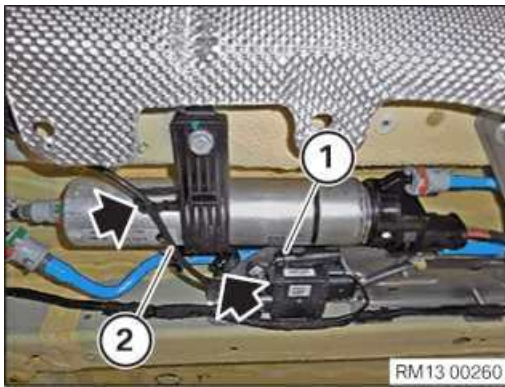
- Make sure that the gauge tip is not damaged.
- Check the gauge tip (1) for damage and replace the exhaust temperature sensor as needed.
- Feed in and install the exhaust temperature sensor (1).
- Tighten the exhaust temperature sensor (1).

Exhaust-gas temperature sensor to exhaust system

Exhaust-gas temperature sensor		Tightening torque	28 Nm
--------------------------------	--	-------------------	-------

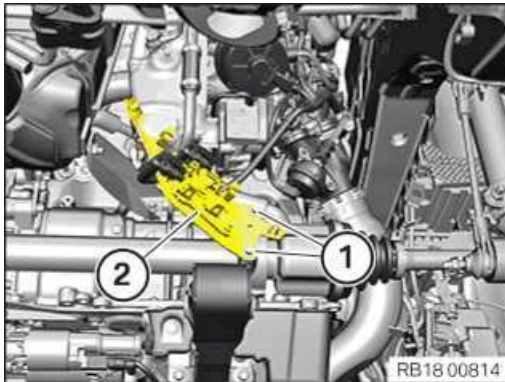


- Secure the cable clips (1).



- Feed cable (2) from exhaust temperature sensor into the clamps (arrows) and install.
- Connect and lock the connector (1).
The connector (1) must engage audibly.

53 – Install holder for oxygen sensor

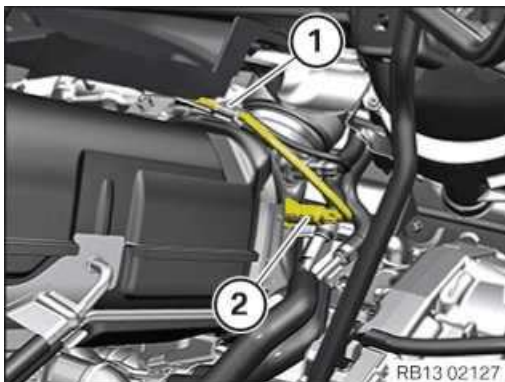


- Insert and install the holder (2).
- Tighten the screws (1).

Oxygen sensor holder to intermediate shaft

Hexagon screw M6x16		Tightening torque	8 Nm
---------------------	--	-------------------	------

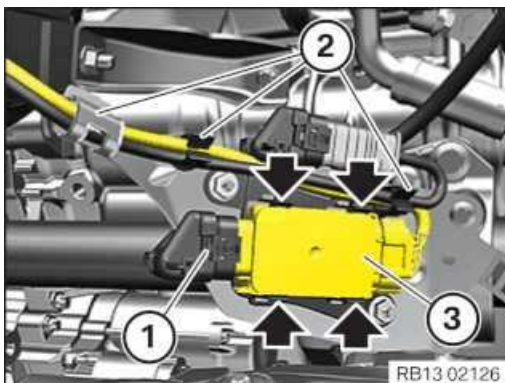
54 – Installing the nitrogen oxide sensor before SCR catalytic converter



- Insert nitrogen oxide sensor before the SCR catalytic converter (2) and install.
- Tighten the nitrogen oxide sensor upstream of the SCR catalytic converter (2).

Nitrogen oxide sensor before SCR catalytic converter

Sensor		Tightening torque	50 Nm
--------	--	-------------------	-------



- Install and lock the evaluation electronics for the nitrogen oxide sensor (3) (arrows).
- Insert the evaluation electronics cable for the nitrogen oxide sensor (3) into the clamps (2) and install.
- Connect connectors (1) and lock.
The connector (1) must engage audibly.

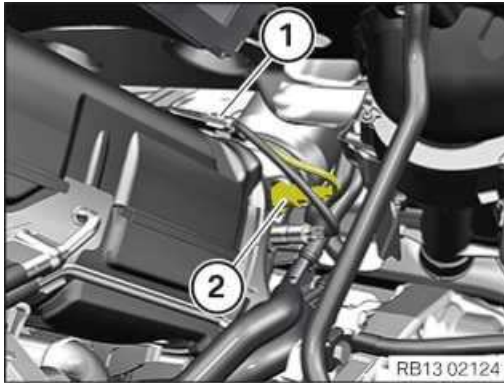
55 – Install the monitoring sensor

New oxygen sensors are to be greased lightly and evenly on the thread.

For oxygen sensors that are reused, the following should be observed:

Lightly and evenly grease the oxygen sensor only on the thread. Do not clean and grease that part of the oxygen sensor which protrudes in the exhaust branch (sensor ceramics).

For additional information see: 11 00 ... Overview of consumables in Electronic Parts Catalogue

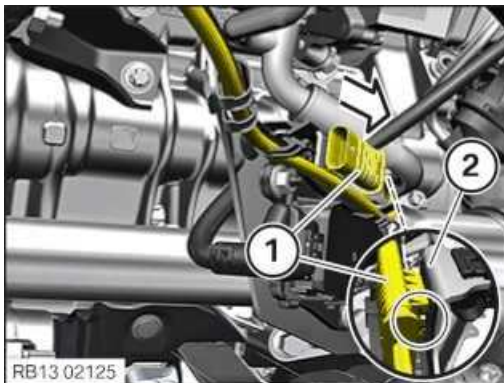


- Feed in the monitoring oxygen sensor (2) and install.
- Tighten the monitoring oxygen sensor (2) with special tool **0 491 074 (11 7 020)**.

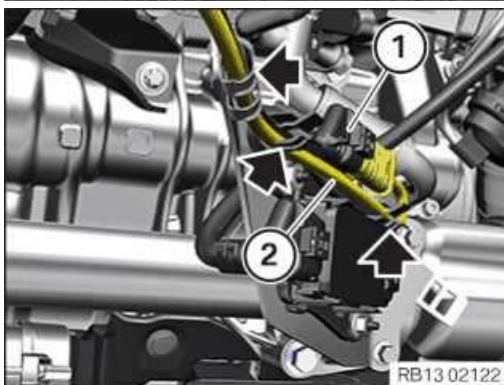
Monitoring sensor

Sensor	Tightening torque
	50 Nm

- Insert the cable of the monitoring oxygen sensor (2) into the clamp (1) and secure it.

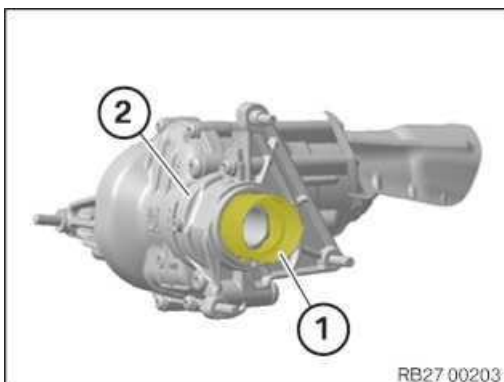


- Connect the connector (1) with the bracket (2) in the direction of arrow.
- Make sure that the connector (1) is locked correctly in the marked area. The connector (1) must engage audibly.



- Insert and attach the cable of the monitoring oxygen sensor (2) to the clamps (arrows).
- Connect connectors (1) and lock. The connector (1) must engage audibly.

56 – Install the transfer box (VTG)



- If intermediate shaft (1) gets caught on transfer box (VTG) (2), renew intermediate shaft (1) and the radial shaft seals in the automatic or manual transmission.



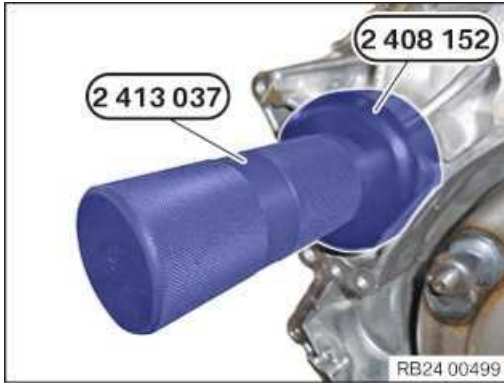
- Screw special tool **2 409 025** into the outer radial shaft seal.
- Turn the screw on the special tool **2 409 025** until the outer radial shaft seal has been pulled out.



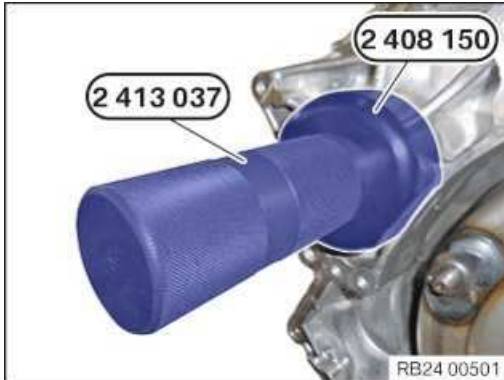
- Insert special tool **2 411 739** into the inner radial shaft seal.



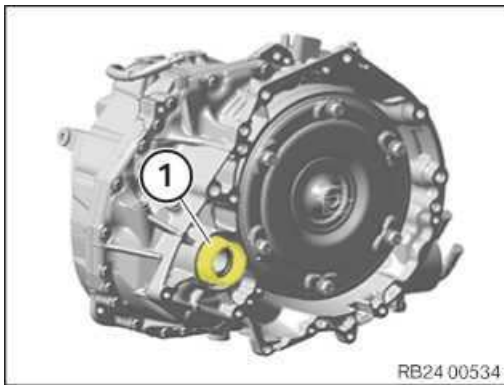
- Screw special tool **2 411 739** into the inner radial shaft seal.
- Turn the screw on the special tool **2 411 739** until the inner radial shaft seal has been pulled out.



- Drive in the inner radial shaft seal using special tools **2 408 152** and **2 413 037** up to the limit position.



- Drive in the outer radial shaft seal using special tools **2 413 037** and **2 408 150** up to the limit position.



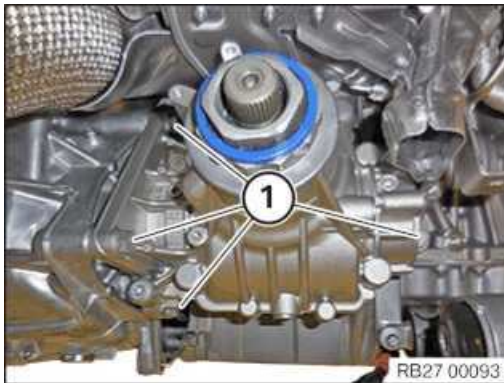
- If necessary, connect the new intermediate shaft (1) to the output flange of the automatic transmission or manual transmission.



- Coat the inside of the output flange (arrows) evenly with approx. 5 g of grease.

Expendable materials

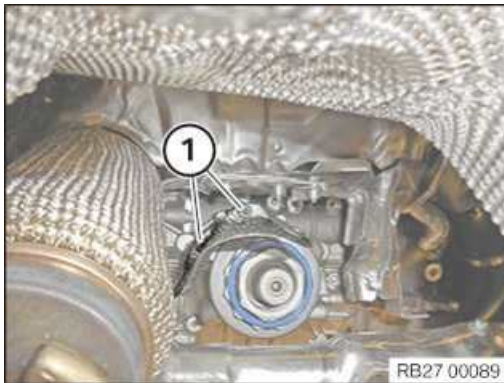
Lubricating grease Optitemp HT 1 LF	50 g, Tube	83230417754
-------------------------------------	------------	-------------



- Install the transfer box (VTG).
- Tighten the screws (1).

Transfer box to transmission

M10		Tightening torque	56 Nm
-----	--	-------------------	-------



- Install heat shield.
 - Renew screws (1).
- Parts:** Bolts
- Tighten the screws (1).

Heat shield to transfer box

M6	Renew screws.	Tightening torque	6 Nm
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► Check the transfer box oil level



RISK OF DAMAGE

Damage to the transmission.

Damage to the transmission through unapproved transmission oil.

- Use only the approved transmission oil.
- After completion of repair work, check transmission oil level.



- Check transfer case oil level, correct:
- Open the oil filler plug (1).
- Check transfer box oil level.
- If necessary, top up transmission oil up to the lower edge of the oil filler plug opening (1).

Transmission oil

Technically suitable transfer box and electrical transmission oils

[Main group 27](#)

- Tighten the oil filler plug (1).

Oil filler plug on transfer box (VTG)

M18x1.5		Tightening torque	35 Nm
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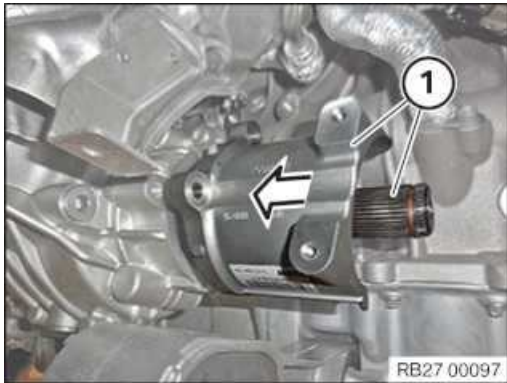
57 – Install the intermediate shaft with the support tube



- Coat gearing of the intermediate shaft uniformly with 5 g of grease.

Expendable materials

Lubricating grease Optitemp HT 1 LF	50 g, Tube	83230417754
-------------------------------------	------------	-------------



- Install the intermediate shaft with support tube (1) in the transfer box.



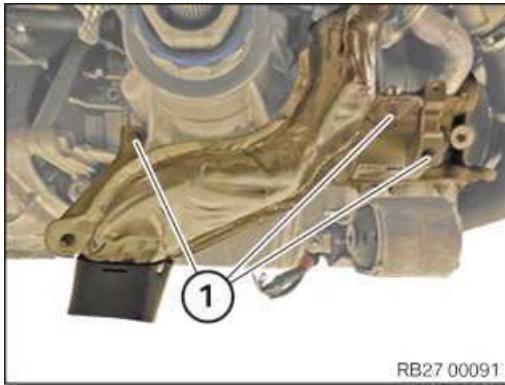
- Position screws (1).

Note: Check for correct screw length! Bolt M8x35 8.8

- Tighten the screws (1).

Intermediate shaft to transfer box

M8x35		Tightening torque	19 Nm
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- If installed: Install air duct.
- Tighten the screws (1).

58 – Installing starter motor



CAUTION

Improper routing of the positive battery cable.

Risk of short circuits!

- Route the positive battery cable without abrasions and do not trap.



- Insert and install the starter motor .
- Tighten the screws (1).

Starter motor to transmission

M8x45		Tightening torque	19 Nm
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- Feed the positive battery cable (2) in on the starter and install.
- Tighten nut (1).

Battery positive lead to starter

M8		Tightening torque	13,5 Nm
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- Insert and install the new sealing cap (2).
- Secure the sealing cap (2) in the direction of the arrow.
- Connect and lock the connector (1).
- Make sure the connector (1) engages audibly.

59 – Installing right output shaft partially

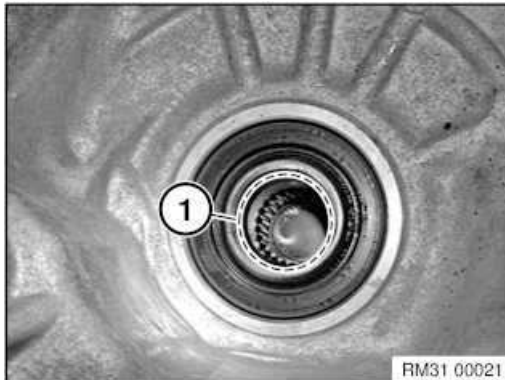


- Renew the circlip (1).

Parts: Circlip

- Slide output shaft into the transmission as far as the limit position.
- Check for secure seat by levering.

60 – Partially installing the left output shaft

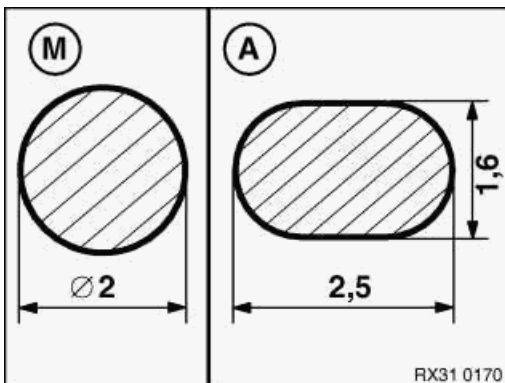


- **With automatic transmission only:**

- Lever out O-ring (1).
- Renew O-ring (1).

Parts: O-ring

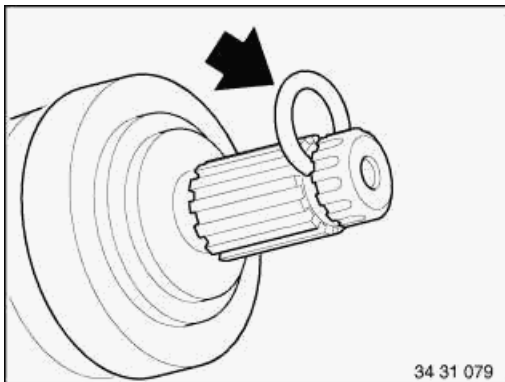
- Insert new O-ring (1).



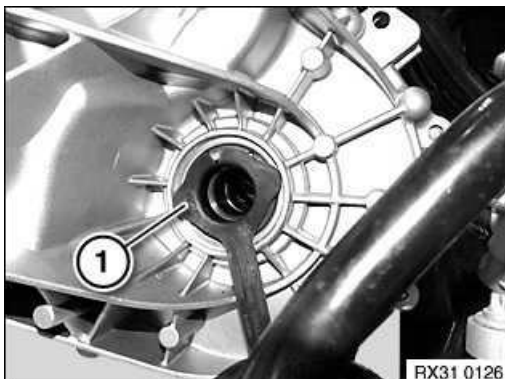
- Do not mix up circlips.

Different types of output shafts fitted:

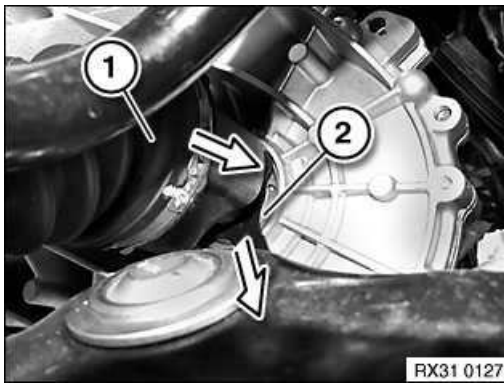
- **M:** Manual transmission
- **A:** Automatic transmission



- Renew circlip (arrow).



- Insert installation protection ring (1) into the radial shaft seal.
- Make sure the tool fits over the lip of the radial shaft seal so there is no damage to sealing ring when the output shaft is inserted.



- Insert output shaft (1) into transmission.
- **Manual gearbox only:** Pull on the handle to remove the installation protection ring (2) and dispose of it.
- Slide output shaft (1) into the transmission as far as the limit position. The output shaft (1) must engage audibly.
- Check for secure seat by levering.

61 – Install propeller shaft.



CAUTION

Component with heavy weight.

Danger of injury!

- Note component's centre of gravity.
- Support component using a jack.
- Secure component against falling off the jack.



RISK OF DAMAGE

Damage to the propeller shaft during installation.

Non-observance of the installation guidelines for the propeller shaft on the rear axle differential may cause severe damage.

- Always renew the recessed nut on the rear axle differential. Screw locking must be available.
- Strictly observe a minimum hardening time of two hours after having screwed in the recessed nut. The hardening time may be longer at lower temperatures.

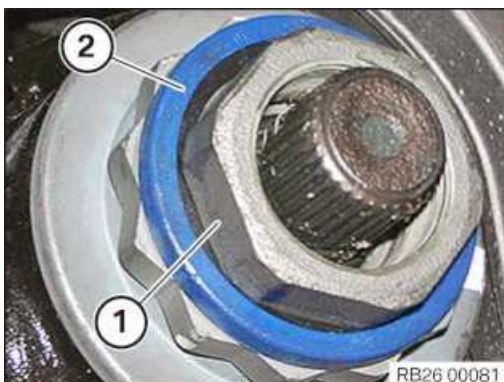


RISK OF DAMAGE

Damage to the transfer box.

Non-observance of the removal and installation guidelines may cause severe damage to the transfer box.

- Do not use the double hexagon head flange nut as counter support.



- Renew recessed nut (1).
Parts: Insert nut
- Renew the retaining clip (2) and the seal.
Parts: Retaining clip, seal
- Insert the seal with the recessed nut (1) and install.
- Insert the retaining clip (2) and install.
- Make sure that recessed nut (1) is screwed in within 5 min.
- Make sure that the hardening time of **minimum 2 h** for the recessed nut is observed.

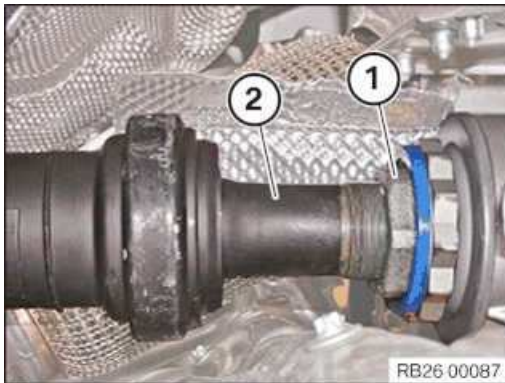
The hardening time must be extended at lower temperatures.



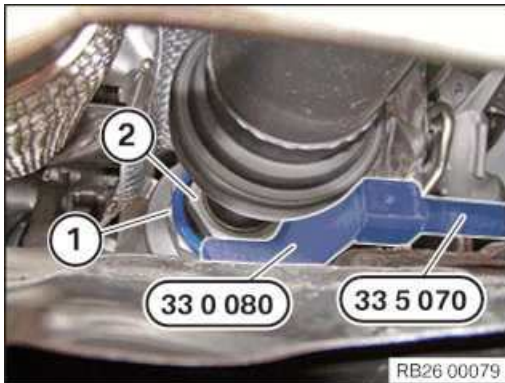
- Insert the propeller shaft (1) and install.
- Always support the propeller shaft (1) with a conventional jack.



- Hand-tighten the bolts (1).



- Push the propeller shaft (2) against the recessed nut (1) up to the limit position.
- Screw the propeller shaft (2) at least 2 thread starts onto the recessed nut (1) by hand.



RISK OF DAMAGE

Damage to the transfer box.

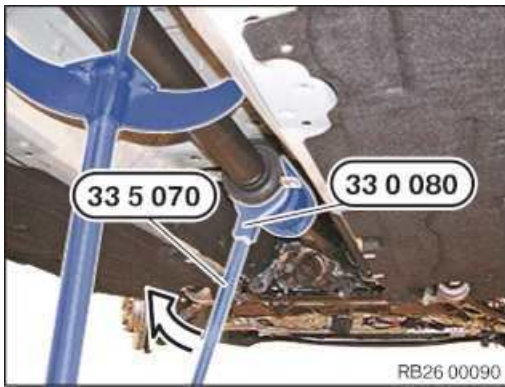
Non-observance of the removal and installation guidelines may cause severe damage to the transfer box.

- Do not use the double hexagon head flange nut as counter support.

- Protect the recessed nut (2) on the transfer box from twisting with the special tools **0 495 554 (33 5 070)** and .

The recessed nut (2) on the transfer box must **not** be used to tighten the propeller shaft.

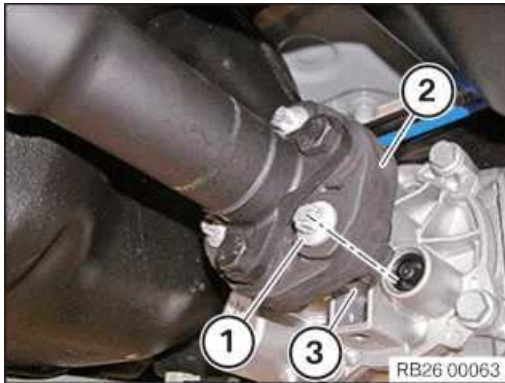
The double hexagon flange nut (1) must **not** be used for counter support.



- Tighten the front propeller shaft with the special tools **0 495 554 (33 5 070)** and in the direction of the arrow.

Propeller shaft to transfer box

		Tightening torque	80 Nm
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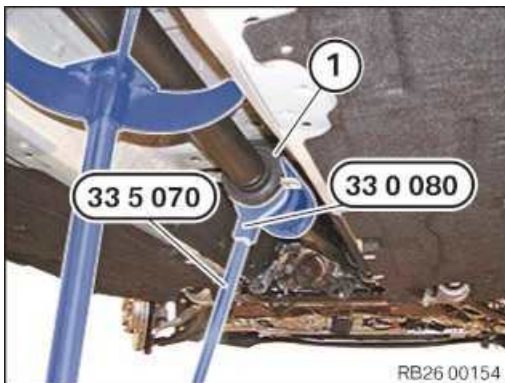
TECHNICAL INFORMATION

Compliance with the following instructions is required to avoid a humming noise from the propeller shaft after refitting the propeller shaft.

- Assemble the screw connection (1) of the flexible disc (2) and the three-hole flange (3) according to the mark.
- Renew screws (1).

Parts: Bolts

- Hand-tighten the bolts (1).
- Protect the propeller shaft (1) with the special tools **0 495 554 (33 5 070)** and from twisting.



- Tighten the bolts with the special tools **0 490 504 (00 9 120)** and .

Flexible disc to rear axle final drive

M12x1.5	Renew screws.	Tightening torque	55 Nm
			90 °



- Tighten the screws (1).

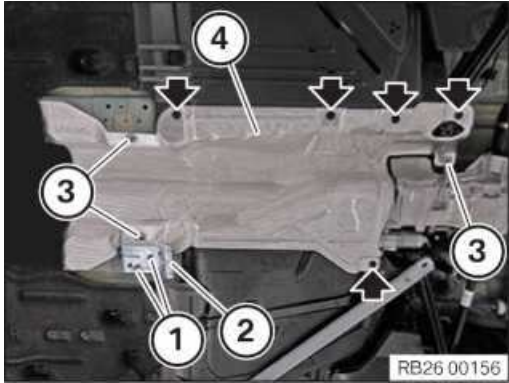
Centre mount to body

M8		Tightening torque	19 Nm
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- Guide the special tool out between the front and rear propeller shaft and remove.

62 – Installing the rear heat shield



- Insert and install the heat shield (4).
- Tighten screws (arrows).

Heat shield to body

Bolts/nut		Tightening torque	3 Nm
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- Tighten nuts (3).

Heat shield to body

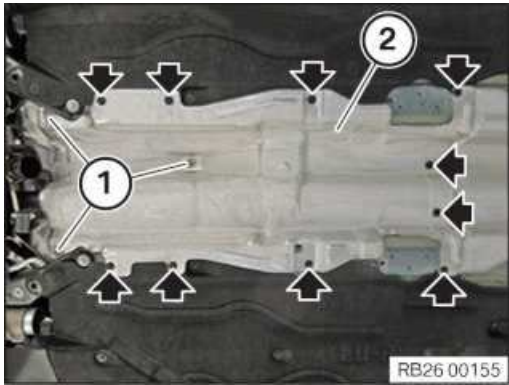
Bolts/nut		Tightening torque	3 Nm
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- Insert and install the holder (2).
- Tighten the screws (1).

Bracket to body

M8		Tightening torque	21 Nm
----	--	-------------------	-------

63 – Install the front heat shield



- Insert and install the heat shield (2).
- Tighten screws (arrows).

Heat shield to body

Bolts/nut		Tightening torque	3 Nm
-----------	--	-------------------	------

- Tighten nuts (1).

Heat shield to body

Bolts/nut		Tightening torque	3 Nm
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64 – Install exhaust system



CAUTION

Component with heavy weight.

Danger of injury!

- Note component's centre of gravity.
- Support component using a jack.
- Secure component against falling off the jack.

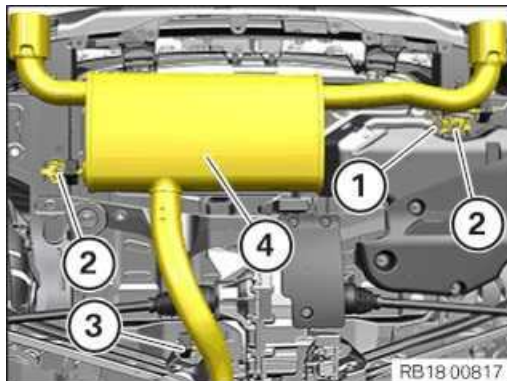


CAUTION

Heavy component.

Heavy components can lead to injury or damage.

- Remove and install heavy components with the aid of another person/other persons.



- Feed in and install the exhaust system (4) with a second person.

- Renew nuts (2).

Parts: Nuts

- Tighten nuts (2).

Exhaust system to body

M8	Replace nuts.	Tightening torque	19 Nm
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- Tighten down screw (1).

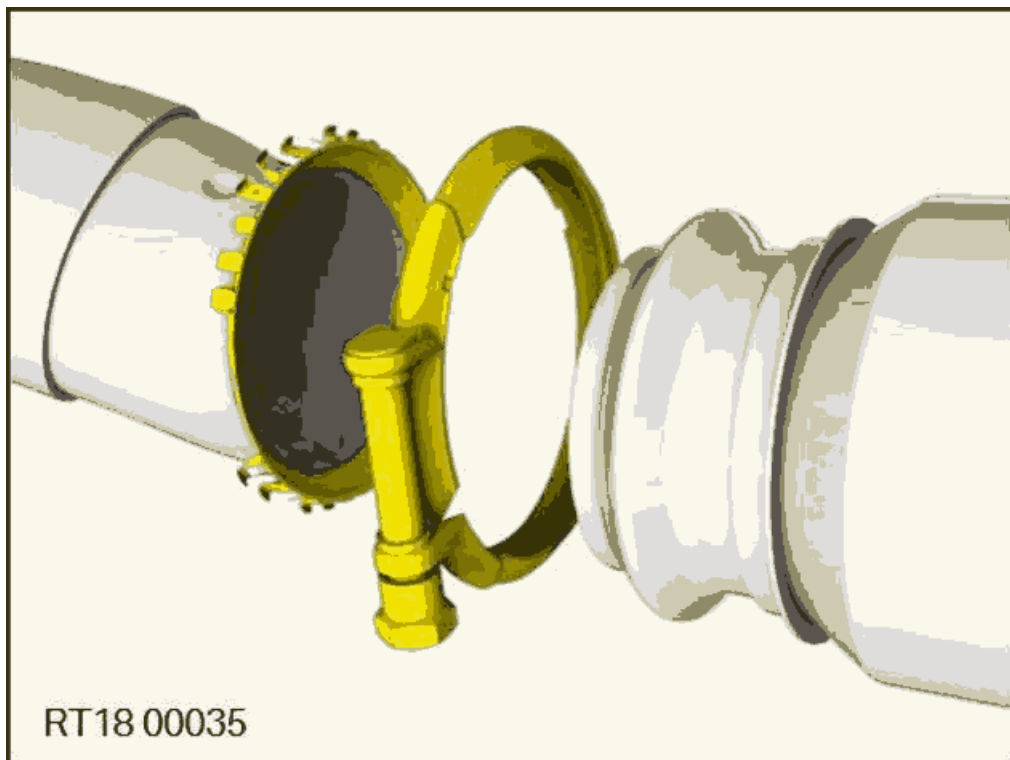
Exhaust bracket on body

Hexagon screw M8x30		Tightening torque	19 Nm
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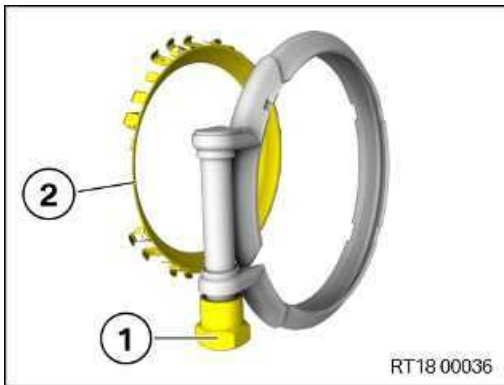
- Check the rubber mount (3) for damage and renew as needed.
- Mount rubber mount (3) on the exhaust system (4).

► Install the V-clip

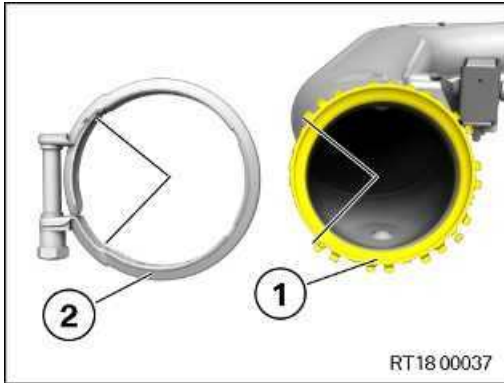
V-band clamp



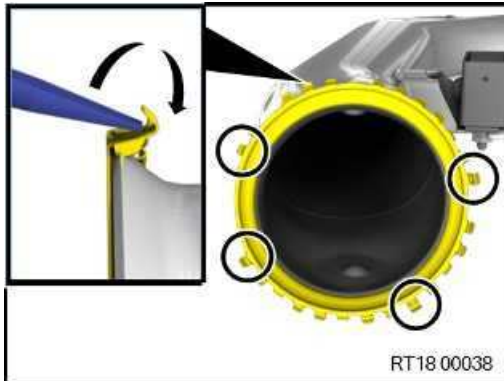
RT18 00035



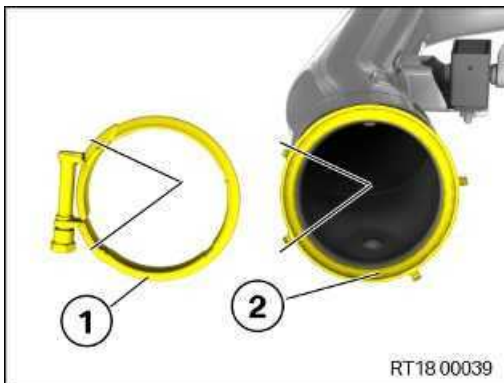
- Unscrew the nut (1) and remove the sealing ring (2).



- Renew the V-clip (2).
- Parts:** V-band clamp
- Mount the sealing ring (1) on the exhaust system.
 - Ensure that the sealing ring (1) for the V-clip (2) is positioned correctly.



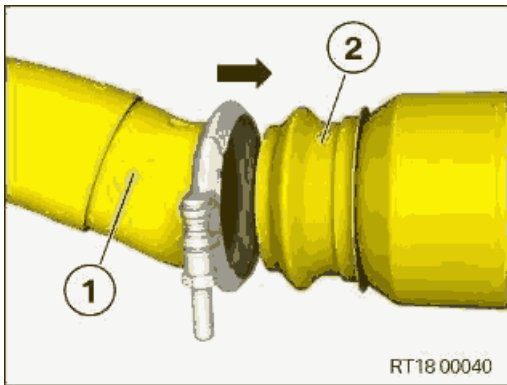
- Bend all sheet metal tabs over with a suitable tool, except those in the marked areas.



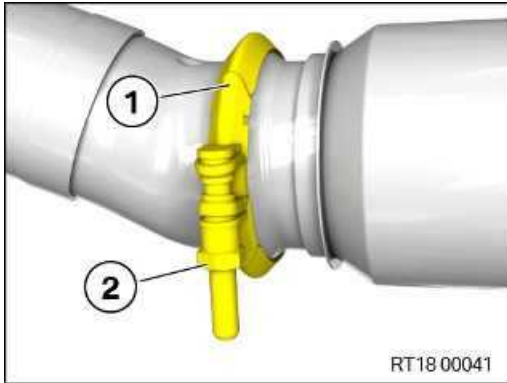
- Mount the V-clip (1) on the sealing ring (2).
- Make sure that the V-clip (1) is positioned correctly on the sealing ring (2).



- Make sure that the V-clip rests against the sheet metal tabs after mounting (marks).



- Connect the exhaust system (1) with the catalytic converter (2) and position correctly.



- Make sure that V-clip (1) is fitted correctly.
- Tighten down screw (2).

V-clip to catalytic converter

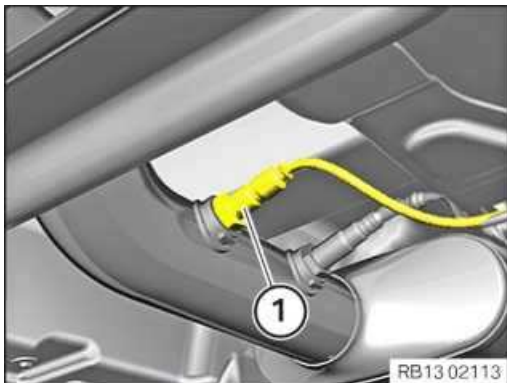
V-band clamp	Renew V-band clamp.	Tightening torque	22 Nm
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- Feed in, install and tighten diesel particulate sensor (1).

Diesel particulate sensor to exhaust system

Sensor		Tightening torque	50 Nm
--------	--	-------------------	-------

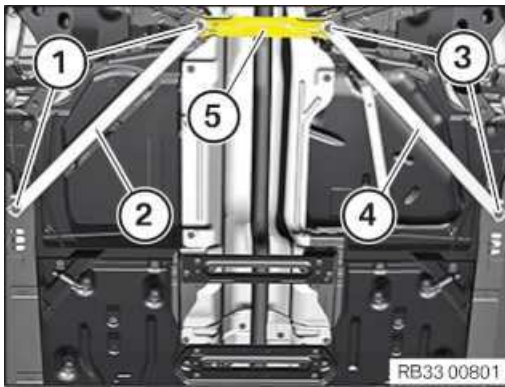


- Feed in, install and tighten nitrogen oxide sensor (1).

Nitrogen oxide sensor downstream of SCR catalytic converter

Sensor		Tightening torque	50 Nm
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65 – Install the cross-member with torsion struts



- Insert and install the cross-member (5).
 - Thread in torsion strut (4) at right and install.
 - Renew screws (3).
- Parts:** Bolts
- Tighten down screws (3).

Cross-member/torsion strut to axle support and mounting

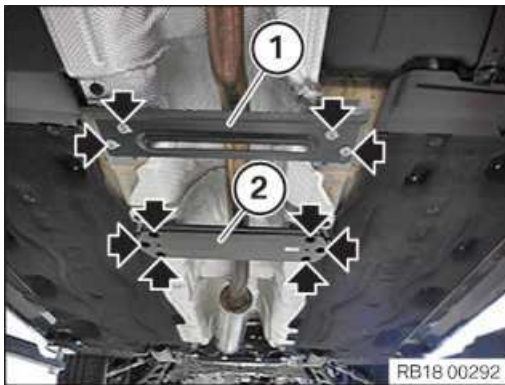
M12x48	Renew screws.	Jointing torque	100 Nm
		Angle of rotation	90 °

- Guide in and install the left torsion strut (2).
 - Renew screws (1).
- Parts:** Bolts
- Tighten the screws (1).

Cross-member/torsion strut to axle support and mounting

M12x48	Renew screws.	Jointing torque	100 Nm
		Angle of rotation	90 °

66 – Install the connecting support on the tunnel in front and back



- Insert and install connecting supports (2).
- Tighten the screws (arrows) from the connecting support (2).

Front connection carrier to body

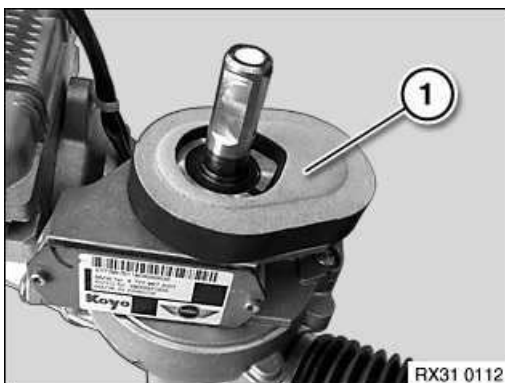
M10x18		Tightening torque	56 Nm
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- Insert and install connecting supports (1).
- Tighten the screws (arrows) from the connecting support (1).

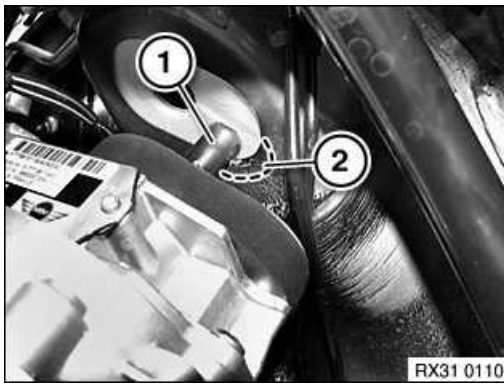
Rear connection carrier to body

M8x18		Tightening torque	28 Nm
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67 – Mount and secure the complete front axle



- Remove the seal (1).
 - Clean surface on steering gear.
 - Renew gasket (1).
- Parts:** Gasket
- Position the seal (1) and glue it on.

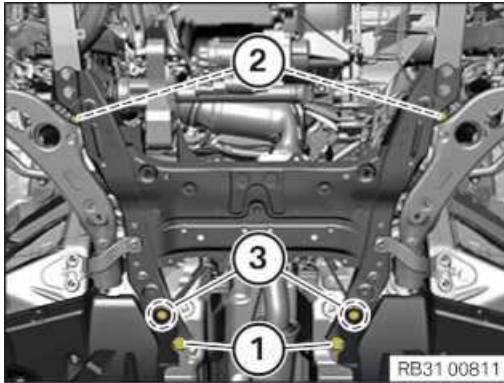


TECHNICAL INFORMATION

Non-compliance with the regulations for installation and disassembly may result in component damage. All work must be performed with care and in compliance with the regulations.

- When raising and lowering the front axle support, make sure that the torsion bar (1) of the electromechanical steering gear (EPS) in area (2) does not collide with the bulkhead!

Note: Collision with the bulkhead may result in damage to the electromechanical steering gear (EPS)!



- Position front axle support.
- Bend underbody panellings in the areas (3) to one side.
- Raise front axle support.
- When raising, insert charge air cooler into the rubber mount of the charge air cooler on cross member.
- Renew screws (1) and (2).

Parts: Bolts

- Tighten the screws (1).

Rear end of front axle support to body

M14 screw	Renew screw.	Tightening torque	175 Nm
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- Tighten down screws (2).

Front axle support, front to body

M12 screw	Renew screw.	Tightening torque	108 Nm
-----------	--------------	-------------------	--------

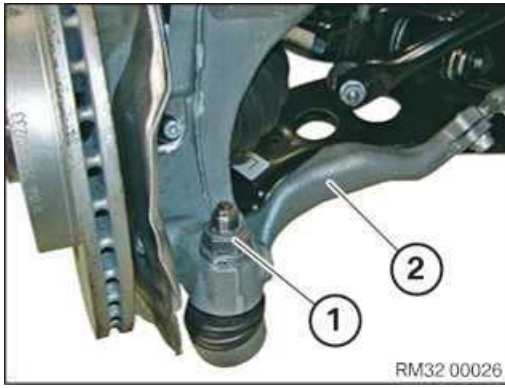
- If necessary, tighten the screws in the areas (3).

Underbody protection to body

Screw		Tightening torque	3 Nm
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- Remove special tool from special tool .
- Lower universal jack **0 490 133 (00 2 030)** with the special tool and place it to the side.



NOTICE

Perform the operations on the left and right side.

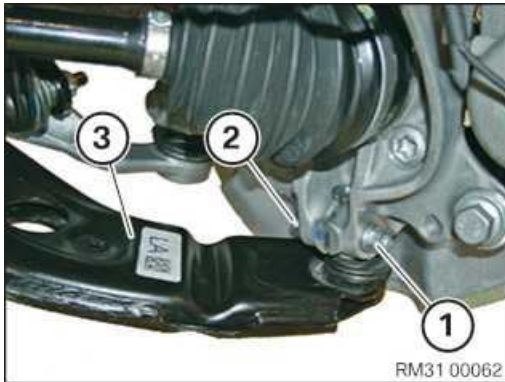
- Position the track rod (2) on the swivel bearing .
- Renew nut (1).

Parts: Nut

- Tighten nut (1).

Track rod end to swivel bearing

M14	Renew nut.	Tightening torque	175 Nm
-----	------------	-------------------	--------



NOTICE

Perform the operations on the left and right side.

- Position the wishbone (3) on the swivel bearing .
- Renew the bolt (2) and the nut (1).

Parts: Bolt, nut

- Insert screw (2).
- Tighten nut (1).

Wishbone to swivel bearing

M10	Exclusively use the screw to tighten! Renew screw and nut.	Tightening torque	60 Nm
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68 – Install the mounted parts on the front axle support



NOTICE

Perform the operations on the left and right side.

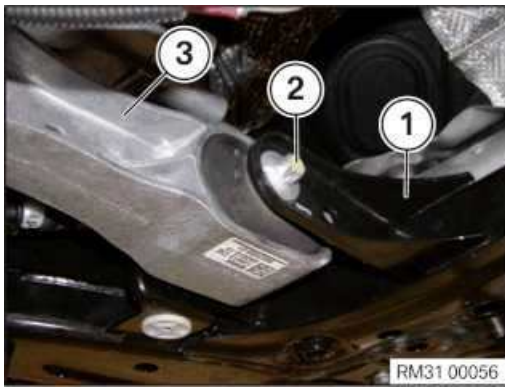
- Renew screws (1).

Parts: Bolts

- Tighten the screws (1).

Holder, wishbone rubber mount, to body

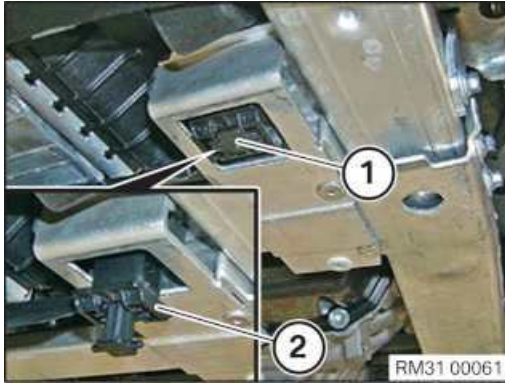
M10 screw	Renew screw.	Jointing torque	56 Nm
		Angle of rotation	90 °



- Position the engine support (3) on the front axle support (1).
- Tighten down screw (2).

Holder with rubber mount to front axle support

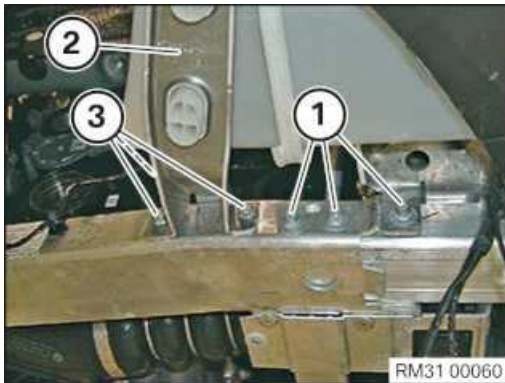
M12 screw		100 Nm
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NOTICE

Perform the operations on the left and right side.

- Position the lock (2).
- Lock the bracket (1) of the lock (2) of the holder for the charge air cooler.



- **Only on right side:** Position the holder for the washer fluid reservoir (2).
- Tighten down screws (3).

Washer fluid reservoir holder to front axle support adapter plate

		Tightening torque	10 Nm
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NOTICE

Perform the operations on the left and right side.

- Tighten the screws (1).

Deformation element, bottom, to adapter plate, front axle carrier

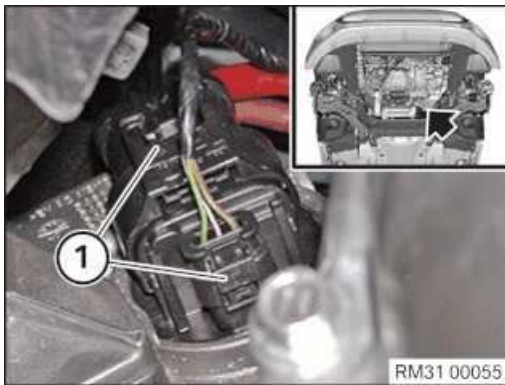
		Tightening torque	11,8 Nm
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69 – Attaching connector at steering gear

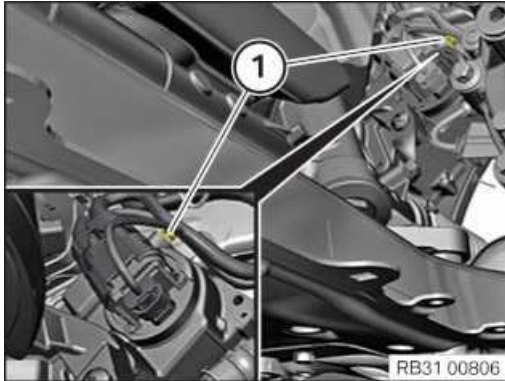


- To connect the connector (see the following step): Connect the connector with the right hand.

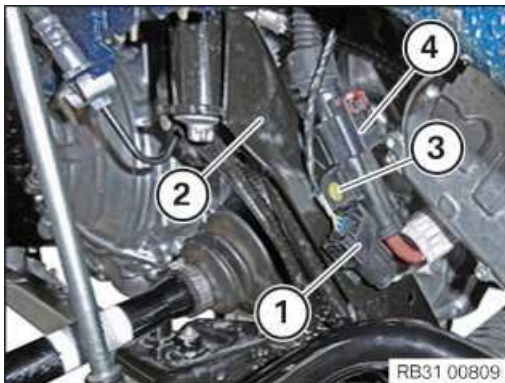
The connectors can be accessed via the left output shaft.



- Connect and lock connector (arrow) (1) with the steering gear.



- Fasten the wiring harness (1) on the steering gear.



► **If installed: Fasten the plug connections at the front axle support**

- Position the plug connection (4) at the front axle support (2).
- Tighten down screw (3).

Holder to front axle support

Oval-head screw TS5 x 16		Tightening torque	2,6 Nm
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- Fasten the plug connection (1) at the front axle support (2).

70 – Securing rubber mount on front axle support



- Check rubber mount (1), replace if necessary.

Parts: Rubber mount

- Spray rubber mount (1) with lubricant and slide onto holder on front axle support.

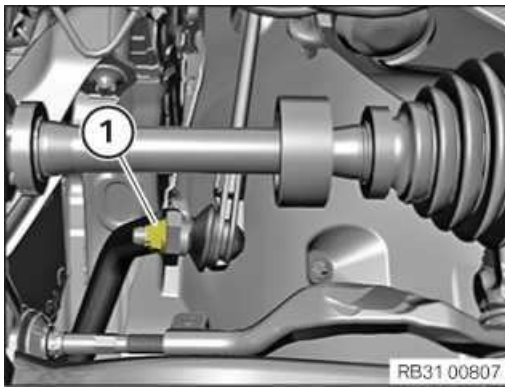
71 – Securing anti-roll bar on left and right on the anti-roll bar link



NOTICE

Perform the operations on the left and right side.

► **Fastening anti-roll bar on the anti-roll bar link**



- Position the anti-roll bar link on the anti-roll bar .
- Renew nut (1).

Parts: Nut

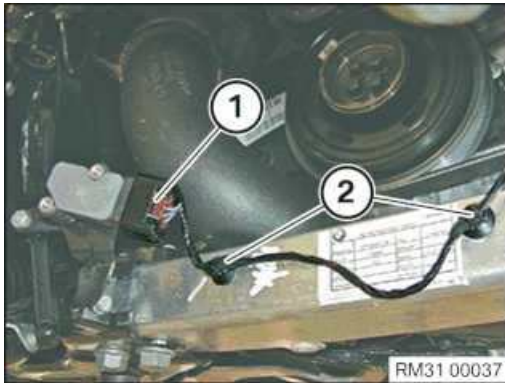
- Tighten nut (1).

Note: Use the Torx socket for counter support.

Anti-roll bar link to anti-roll bar

M10	Renew nut.	Tightening torque	56 Nm
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72 – With right installation: Securing the cable for the ride height sensor



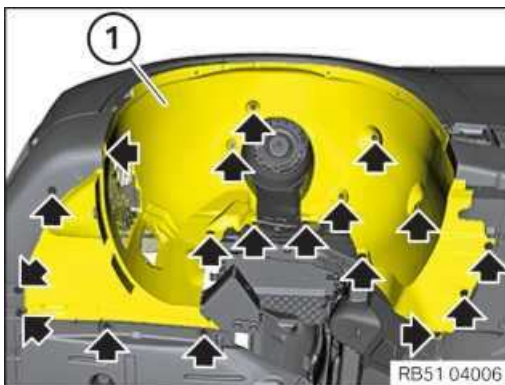
- Secure the cable clip (2) on the adapter of the deformation element.
- Connect connectors (1) and lock.

73 – Installing front left and right wheel arch cover



NOTICE

Perform the operations on the left and right side.



► Installing the front wheel arch cover

- Guide the wheel arch cover (1) in.
- Tighten all bolts and nuts (arrows).

Wheel arch cover to body

Plastic nut		Tightening torque	2,6 Nm
Screw		Tightening torque	2,6 Nm

Wheel arch cover to body

Screw		Tightening torque	2,5 Nm
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Wheel arch cover to body

Plastic nut		Tightening torque	3 Nm
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► Installing front wheel arch trim



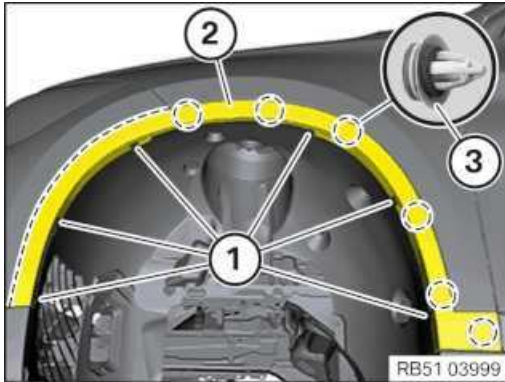
NOTICE

To provide a better overview: Schematic diagram with partially hidden components.



NOTICE

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



- Check the clips (3) for damage and renew where required.
The clips (3) must not be damaged or missing.
- Feed in wheel arch trim (2) and engage on the clips (3).
- Engage wheel arch trim (2) into the latch mechanisms on the bumper panel.
- Mount blind rivet (1) using the special tool **0 496 521 (00 2 230)**.

74 – Installing both front wheels

► Mounting the wheel

► Clean the contact surfaces between the brake disc and the wheel rim

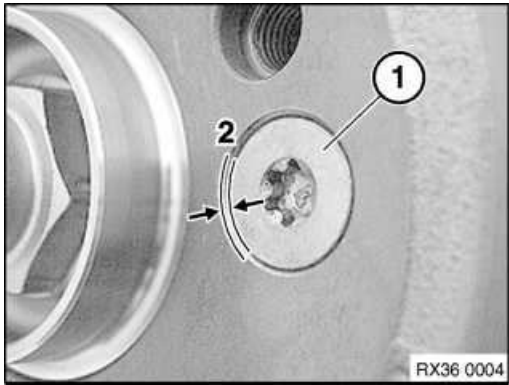


TECHNICAL INFORMATION

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).





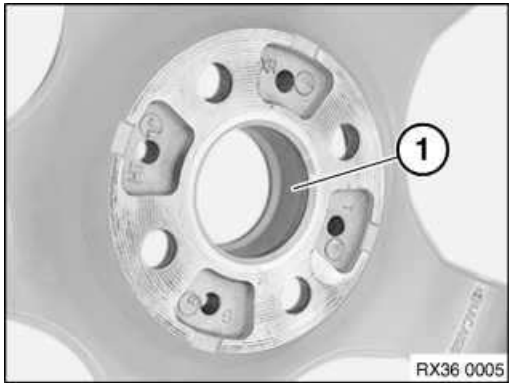
- Renew mounting bolt (1).
- Parts:** Mounting bolt
- Check that the mounting bolt (1) for the brake disc is securely seated.
- The mounting bolt (1) for the brake disc may not protrude under any circumstances on the contact surface (2) between the brake disc and the wheel rim.

Brake disc to rear wheel hub

M8	Renew screw.	Tightening torque	16 Nm
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Brake disc to front wheel hub

M8	Renew screw.	Tightening torque	16 Nm
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- Lightly grease the wheel centring (1) in the wheel rim; refer to additional information for grease for the wheel centring (1).



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.

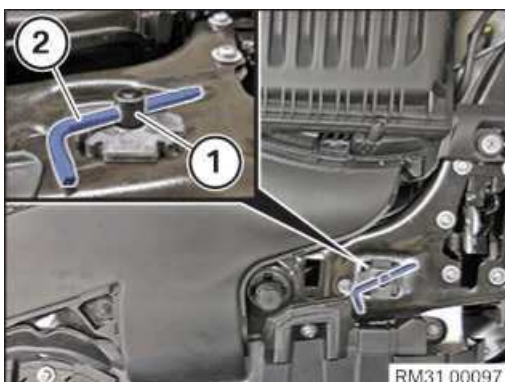
Parts: Wheel bolts

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

Wheel bolts

M 14/AF 17	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 all the wheel bolts in the same order or retighten to the prescribed tightening torque again.	Check	140 Nm

75 – Removing fastener for left and right radiator



NOTICE

Perform the operations on the left and right side.

- Remove suitable tool (2) from the centering pin (1).

76 – Secure the steering shaft at the bottom on the steering gear

76 – Secure the steering shaft at the bottom on the steering gear



- Clean the screw lock residue from the screw thread in the universal joint (2).
- Pivot the universal joint (2) in the direction of the arrow to the steering gear.
- Renew the screw (1).

Parts: Screw

- Tighten down screw (1).

Lower steering shaft to steering gear

M10	Clean screw thread and remove remains of screw locking agent. Renew screw.	Tightening torque	28 Nm
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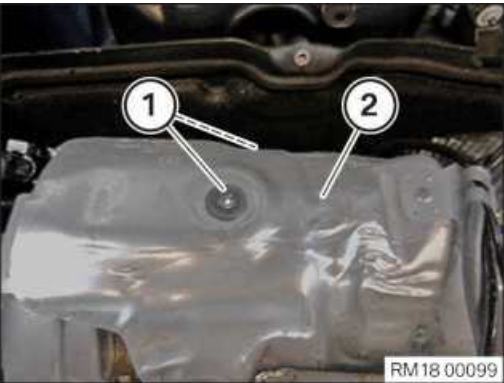


- **If installed:**
- Position the cover on the steering column (2).
- Tighten nuts (1).

Steering column cover to bulkhead

Plastic nut		Tightening torque	3 Nm
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77 – Install the heat shield on the exhaust turbocharger



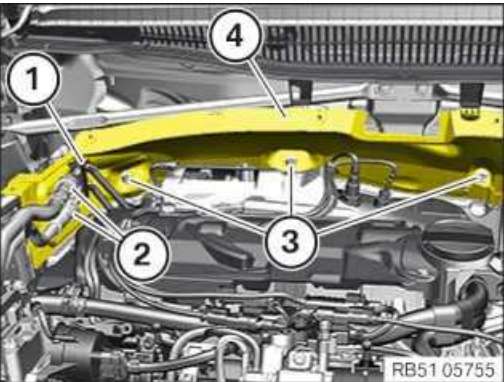
- Feed in and install the heat shield (2).
- Tighten the screws (1) at the top and bottom of the heat shield.

Heat shield for exhaust turbocharger

Torx screw BM 6x12		Tightening torque	10 Nm
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- Fasten the cable at the clips .

78 – Installing rear bulkhead upper part



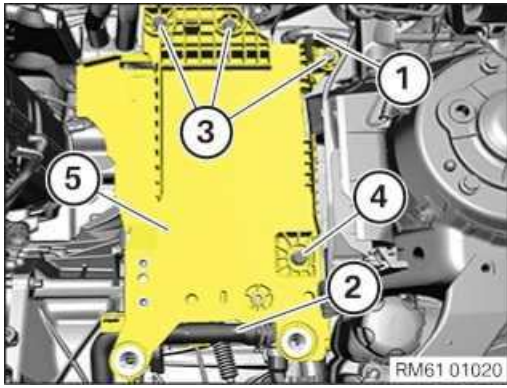
- Feed in and install the rear bulkhead upper part (4).
- Tighten down screws (3).

Rear bulkhead upper part to lower section of bulkhead

Oval-head screw		Tightening torque	5 Nm
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- Feed the fuel line (2) into the holder (1) and install.
 - Connect and lock the holder (1).
- The holder (1) must engage audibly.

79 – Install the battery holder



- Feed in and install the battery holder (5).
- Hand-tighten the bolt (4).
- Hand-tighten the bolts (3).
- Tighten down screw (4).

Battery holder to engine support

Hexagon screw M8x30		Tightening torque	19 Nm
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- Tighten down screws (3).

Battery holder to engine support

Hexagon screw M8x30		Tightening torque	19 Nm
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- Fasten the coolant line (2) on the battery holder (5).
- Fasten the cable clip (1) on the battery holder (5).

80 – Install electronics box

Prerequisite

Battery earth lead is disconnected.

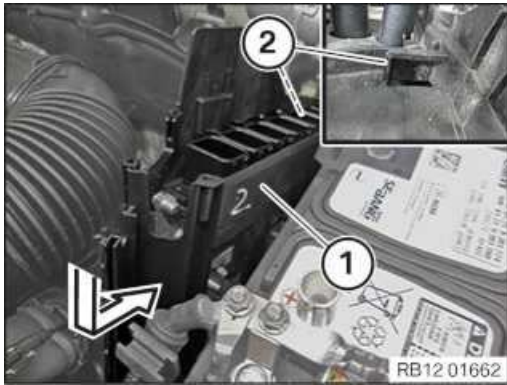


RISK OF DAMAGE

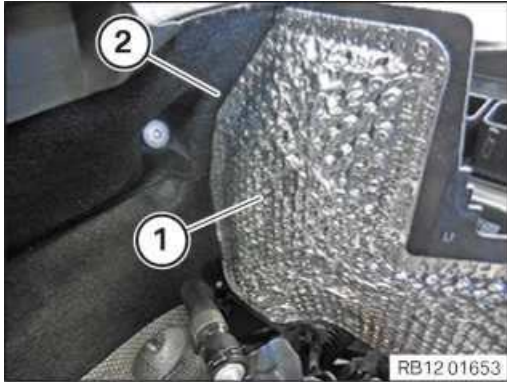
Improper routing of cables and wiring harnesses.

Trapped, crushed or damaged cables may cause short circuits and malfunctions.

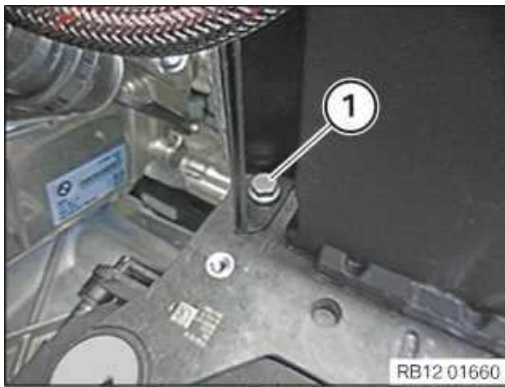
- Route all cables without abrasions, do not trap and crush.



- Guide in and install the electronics box (1) into the guide (2) in direction of arrow.



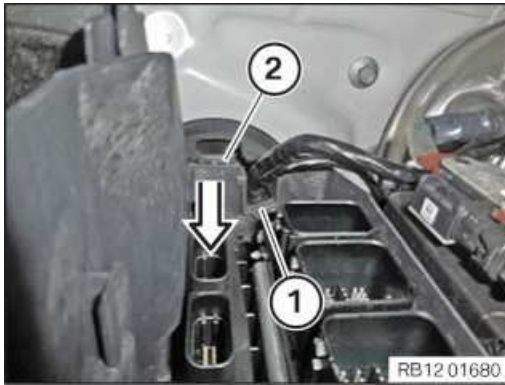
- Make sure that the electronics box (1) is positioned correctly on the bulkhead (2).



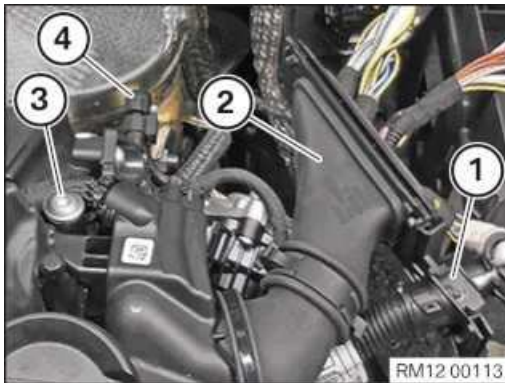
- Tighten down screw (1).

Electronics box to battery tray

M8X16		Tightening torque	15 Nm
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- Guide in and install the holder (1) in the electronics box (2) in direction of arrow.
- Make sure the bracket (1) engages audibly.

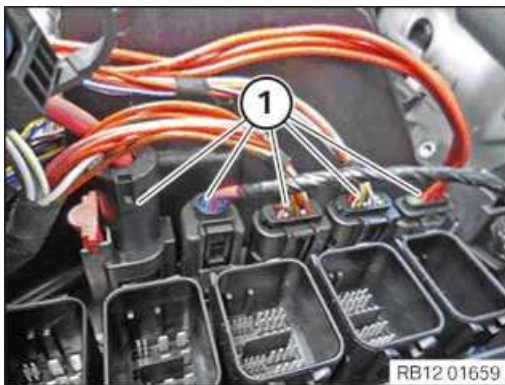


- Lay vehicle wiring harnesses (1) and (2) and mount on electronics box.
- Tighten down screw (3).

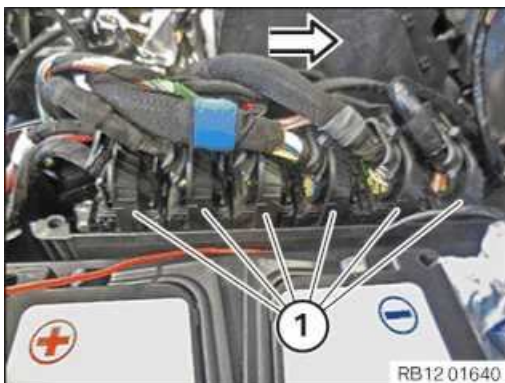
Wiring harness to cylinder head cover

TS5x20		Tightening torque	3,5 Nm
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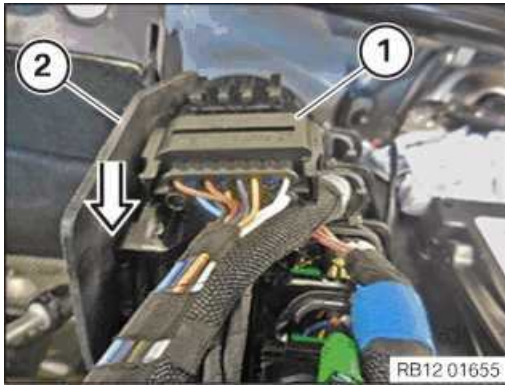
- Attach connector (4) to the differential pressure sensor and lock it audibly.



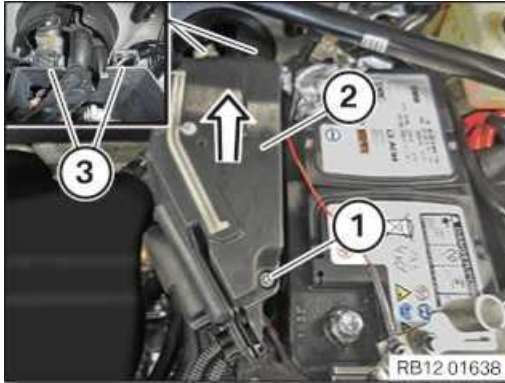
- Connect and lock the connector (1).
- Make sure the connectors (1) engage audibly.



- Connect connector (1) in direction of arrow and lock.
- Make sure the connectors (1) engage audibly.



- Connect and lock the connector (1).
- Make sure the connector (1) engages audibly.
- Insert the connector (1) in the direction of arrow at the electronics box (2) and install.



- Insert the cover (2) into the guides (3) in the direction of arrow and install.
- Make sure the cover audibly engages (2) in the guides (3).
- Tighten down screw (1).

Cover to electronics box

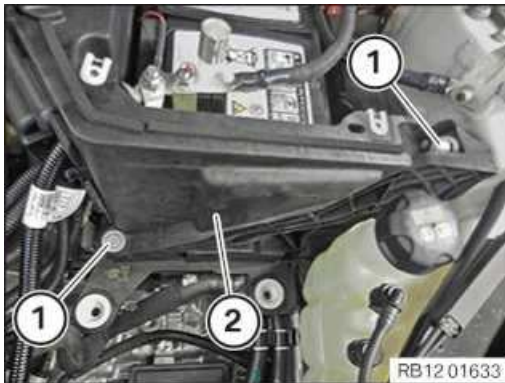
RF5x26.5		Tightening torque	2,5 Nm
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- Thread in positive battery cable (2) on holder (3) and install.
- Feed in and install positive battery terminal (1).
- Tighten positive battery terminal (1).

Positive battery terminal to battery

NutM6		Tightening torque	5 Nm
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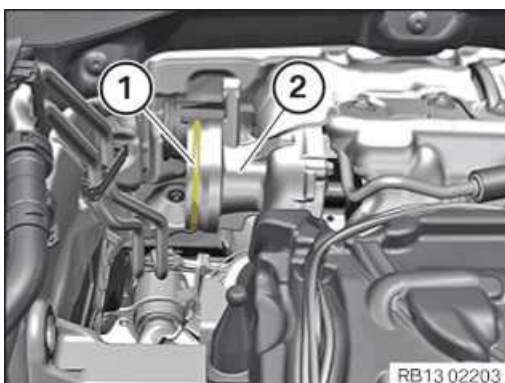


- Feed in and install tension strut (2).
- Tighten the screws (1).

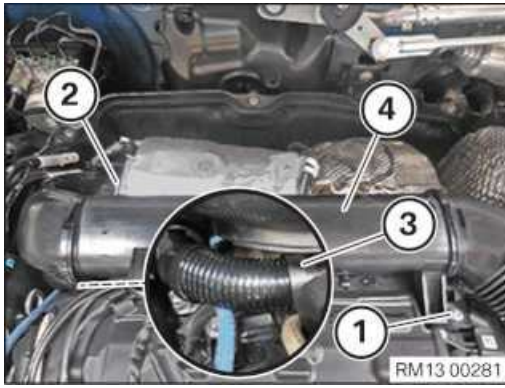
Tension strut to spring strut dome/battery tray

M8		Tightening torque	19 Nm
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81 – Installing clean air pipe



- Check the sealing ring (1) of the exhaust turbocharger (2) for damage and renew it if necessary.



- Feed in clean air pipe and install.
 - Connect clean air pipe to the exhaust turbocharger and lock audibly in the clamps (2).
 - Renew the screw (1).
- Parts:** Screw
- Tighten down screw (1).

Clean air pipe to cylinder head cover

Oval-head screw	Renew screw.	Tightening torque	8 Nm
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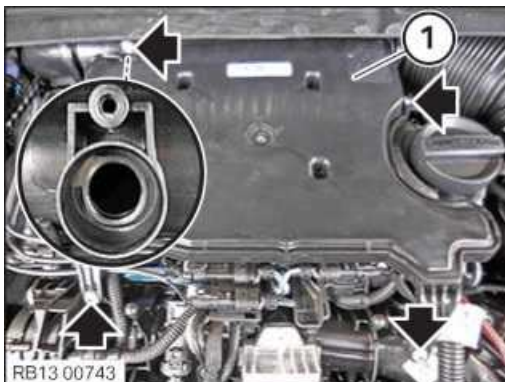
- Connect ventilation line (3) to the cylinder head cover and lock audibly.
- Mount clean air pipe onto the intake filter housing.
- Tighten clamp (1) on the clean air pipe.

Clean air pipe to intake silencer housing

Clamp		Tightening torque	3 Nm
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82 – Install resonator



- Insert and install the resonator (1).
 - Renew the bolts (arrows).
- Parts:** Bolts
- Tighten screws (arrows).

Resonator to manifold and clean air pipe

Screw TS6	Renew screw.	Tightening torque	5 Nm
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83 – 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.



RM11 00932

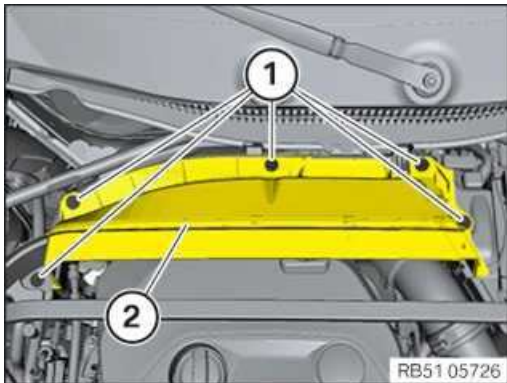
- Check for correct installation of all rubber mounts in the acoustic cover (1).



RB11 03455

- Clip in the acoustic cover into the holders in the indicated areas.
- Make sure that the acoustic cover engages audibly.

84 – Installing the upper bulkhead cover

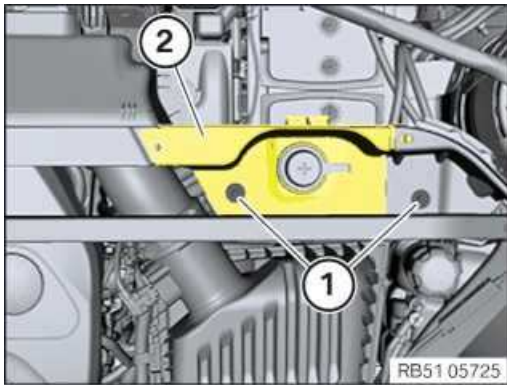


RB51 05726

- Feed in and install cover (2) of the bulkhead at the top.
- Tighten the screws (1).

Cover of top bulkhead

Screw		Tightening torque	2,6 Nm
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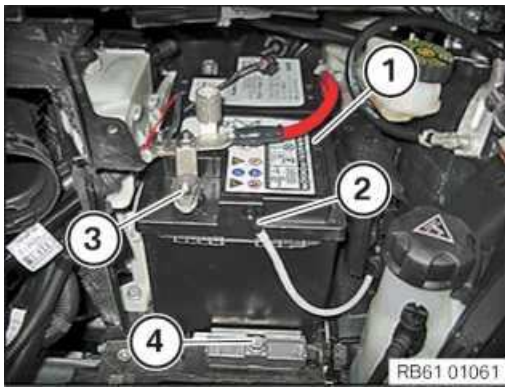
RB51 05725

- Guide in and install cover (2).
- Tighten down screw (1).

Cover of remote positive terminal

Screw		Tightening torque	2,6 Nm
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85 – Install vehicle battery



- Install vehicle battery (1).
- Position the bracket and tighten with the screw (4) .

Battery terminal rail to battery tray

M8		19 Nm
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- Position the vent hose (2) and clip it in.
- Position the positive battery terminal and tighten with the nut (3) .

Battery terminal with IBS positive battery terminal / negative battery terminal

NutM6		5 Nm
-------	--	------

► Check the vent holes of the battery



WARNING

Gas emission.

Danger of injury! Danger of explosion!

- Assign the vent holes correctly.
- Route the vent hose correctly.

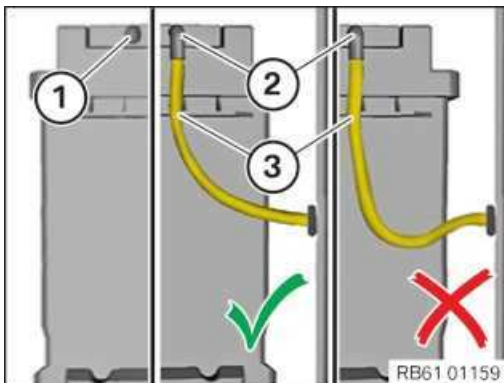


TECHNICAL INFORMATION

The battery has two vent holes, opposite:

One vent hole (1) must be closed correctly with a dummy plug.

The vent hose (3) must be correctly connected and routed at the other vent hole (2).



Check

- Check if the vent hole (1) is correctly closed with a dummy plug.

Result

» No dummy plug.

Measure

- Close the vent hole (1) correctly with a dummy plug.

Check

- Check if the vent hole (2) has a correctly connected vent hose (3).

Result

» The vent hose (3) is not correctly connected.

Measure

- At the vent hole (2), connect the vent hose (3) correctly.

Check

- Check if the vent hose (3) is routed to the outside with a downhill gradient (**no siphon formation!**).

Result

» The vent hose (3) is not correctly routed as shown in the image on the right.

Measure

- Route the vent hose (3) correctly as shown in the centre image.
- Insert tension strut (3) and tighten with screws (1).

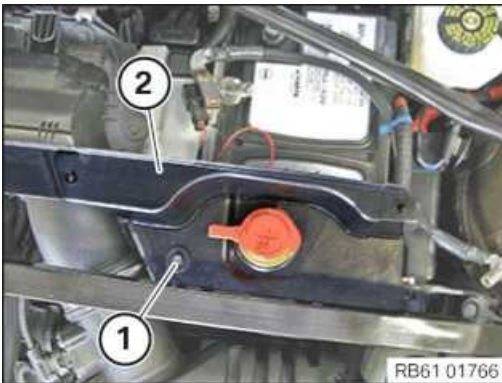
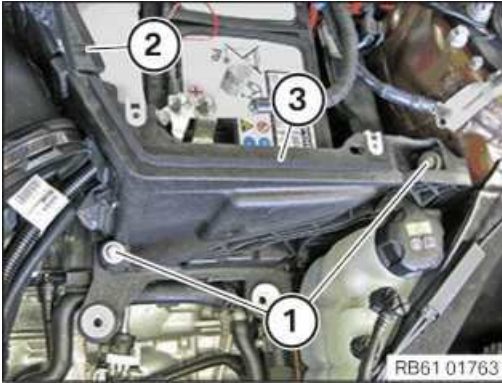
Trailing link

M8		Tightening torque	19 Nm
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- Tighten down screw (2).

Battery cover

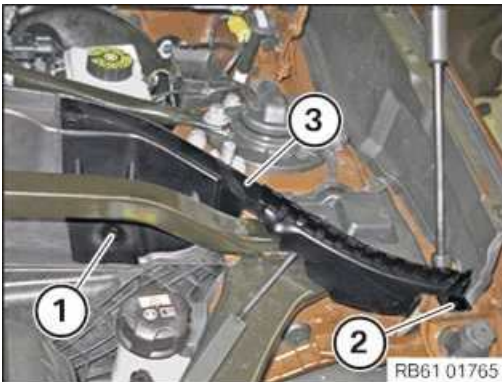
M8			2,8 Nm
----	--	--	--------



- Position the cover (2).
- Tighten down screw (1).

Battery cover

M8			2,8 Nm
----	--	--	--------



- Position the fixture for the gasket (3) and secure with the expanding rivet (2).
- Tighten down screw (1).

Battery cover

M8			2,8 Nm
----	--	--	--------

86 – Connecting the battery earth lead



TECHNICAL INFORMATION

For additional information see:

61 00 ... Safety information on handling the vehicle battery

61 00 / 12 00 ... Notes on disconnecting and connecting the vehicle battery

61 12 ... Notes on the intelligent battery sensor (IBS)



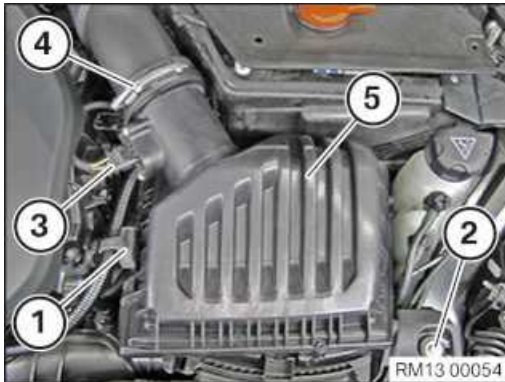
- Remove the protective cover of the positive battery terminal.
- Position the battery earth lead (2).
- Tighten nut (1).

Battery terminal with IBS positive battery terminal / negative battery terminal

NutM6			5 Nm
-------	--	--	------

- If required, connect the connector (3).

87 – Installing intake silencer housing



- Insert the intake silencer housing (5) into the rubber mounts and install it.
Intake filter housing (5) must engage audibly.
- Tighten down screw (2).

Intake silencer housing to lock bridge

M6X30		Tightening torque	8 Nm
-------	--	-------------------	------

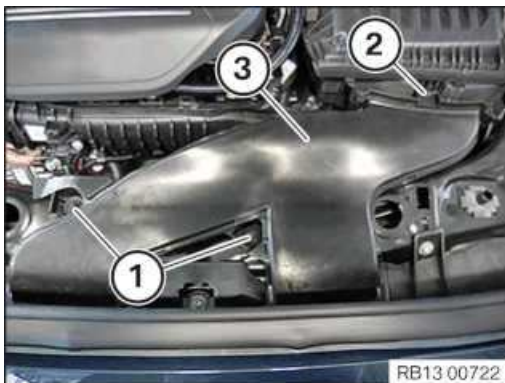
- Tighten clamp (4).

Clean air pipe to intake silencer housing

Clamp		Tightening torque	3 Nm
-------	--	-------------------	------

- Connect and lock the connector (3).
The connector (3) must engage audibly.
- Insert and install the holder (1).

88 – Install the intake neck for the intake filter housing



- Insert and install the intake neck (3).
The lock (2) must engage audibly.
- Tighten nuts (1).

Intake neck to cross connection

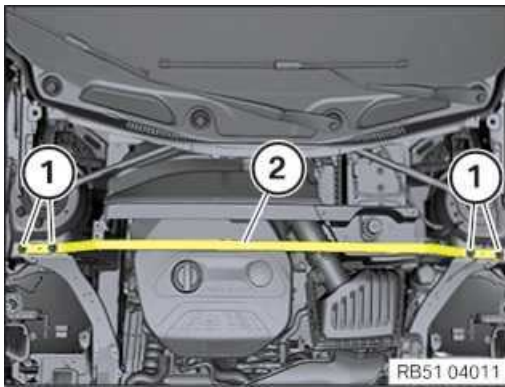
M6		Tightening torque	8 Nm
----	--	-------------------	------

89 – Install strut brace



TECHNICAL INFORMATION

Driving without the strut brace/front end or tension strut is not permitted.



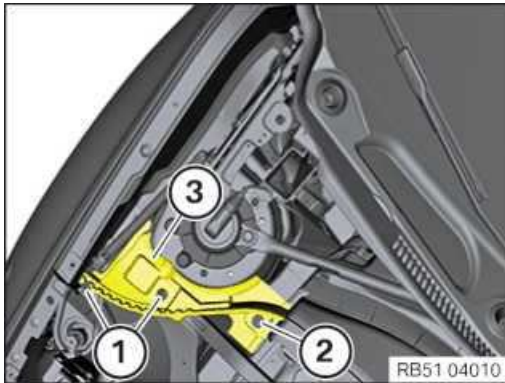
- Install the strut brace (2).
- Renew screws (1).

Parts: Bolts

- Tighten the screws (1).

Cross-brace to spring strut dome

	Renew screw.	Jointing torque	28 Nm
		Angle of rotation	180 °



NOTICE

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

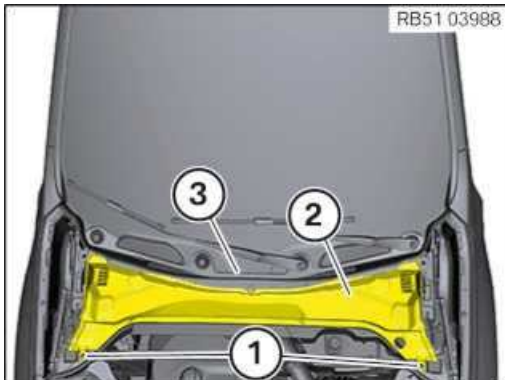
- Install the cover (3).
- Tighten down screw (2).

Cover on body

Hexagon screw		Tightening torque	3 Nm
---------------	--	-------------------	------

- Install the expanding rivet (1).

90 – Installing front cowl panel cover



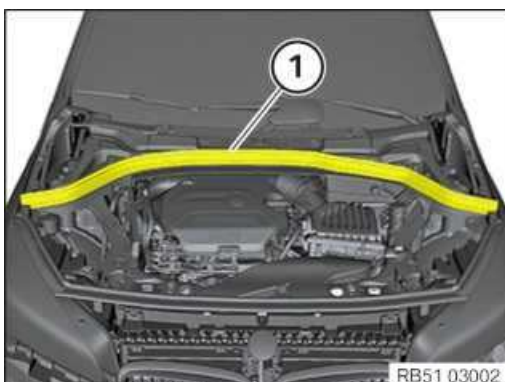
- Insert and install cowl panel cover at front (2) into cowl panel cover at rear (3).
- Check cowl panel cover at front is correctly seated (2).
- Secure expanding rivet (1).

91 – Install the seal for the bonnet



NOTICE

Schematic diagram is for example purposes. Some parts may differ in certain details.



- Install bonnet seal at rear (1).
- Ensure that the rear bonnet seal (1) is fitted correctly.

92 – Checking/topping up oil level in automatic gearbox (AISIN GA8G45)

Prerequisite

Vehicle in horizontal position.

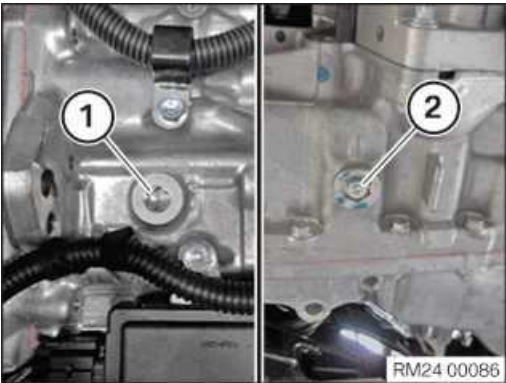
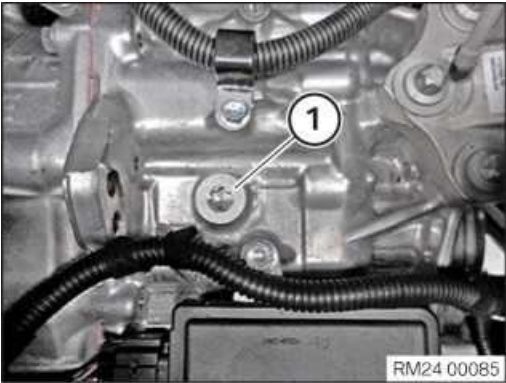


CAUTION

Materials harmful to health.

Contact with fluids harmful to health!

- Note and follow safety information on containers.
- Conduct all work in appropriate personal protective equipment only.



- Move the selector lever to the "P" position.
- Secure vehicle to prevent it rolling.
- Connect diagnosis system.
- Release the oil filler plug (1) using the Torx T55 .
- **Topping up the automatic transmission fluid (the automatic transmission fluid was drained):**
 - Release oil filler plug (1) from engine compartment.
 - Loosen the overflow plug (2) below at the transmission.
 - Top up automatic transmission fluid at oil filler plug (1) until oil emerges at overflow plug (2).
 - Start engine and run at idle speed.
 - Check whether the automatic transmission fluid is leaking at the overflow plug (2) .
 - If there is no automatic transmission fluid leaking at the overflow plug (2) , fill in the automatic transmission fluid to the oil filler plug (1) .
 - Press the footbrake and, when idle, shift through all the gears from "P" to "D" 2 times for more than 2 seconds .
 - Move the selector lever to the "P" position.
 - Check again whether the automatic transmission fluid is leaking at the overflow plug(2) .
 - Read the temperature of the automatic transmission fluid with the diagnosis system.
 - Increase temperature of automatic transmission fluid to 35 °C to 45 °C.
 - Top up automatic transmission fluid until it flows over.
 - Renew sealing rings.
- **Parts:** Sealing ring
- Screw in and fasten oil filler plug (1) and overflow plug (2).

Oil filler plug to transmission housing

M14	Renew the sealing ring.	Tightening torque	45 Nm
-----	-------------------------	-------------------	-------

Overflow screw in oil drain plug

M6	Renew the sealing ring.		8 Nm
----	-------------------------	--	------

- **Check oil level (transmission oil temperature must be between 35 °C and 45 °C):**
- Open the oil filler plug (1).
- Slacken overflow plug (2).
- Start engine and run at idle speed.
- Unscrew and remove overflow plug (2).
- Check whether the automatic transmission fluid is leaking at the overflow plug (2) .
- If there is no automatic transmission fluid leaking at the overflow plug (2) , fill in the automatic transmission fluid to the oil filler plug (1) .
- Top up the automatic transmission fluid until it overflows at the overflow plug (2) .
- Press the footbrake and, when idle, shift through all the gears from "P" to "D" 2 times for more than 2 seconds .
- Move the selector lever to the "P" position.
- Check the oil level again.
- Renew sealing rings.

Parts: Sealing ring

- If the oil escapes slightly from the overflow plug (2) , tighten the overflow plug (2) and the oil filler plug (1) .

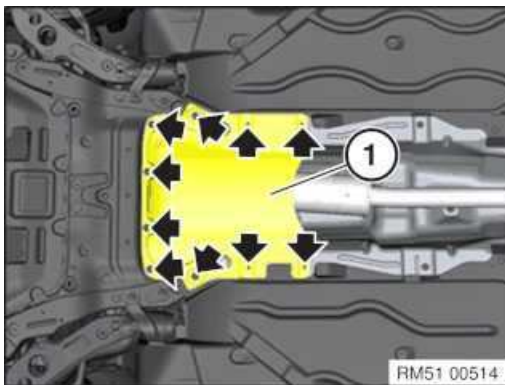
Overflow screw in oil drain plug

M6	Renew the sealing ring.		8 Nm
----	-------------------------	--	------

Oil filler plug to transmission housing

M14	Renew the sealing ring.	Tightening torque	45 Nm
-----	-------------------------	-------------------	-------

93 – If installed: Installing underbody protection at rear

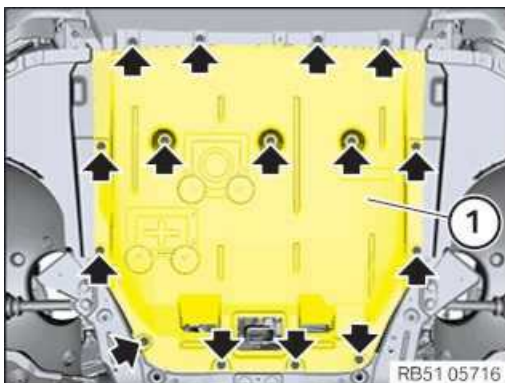


- Position rear underbody protection (1).
- Tighten screws (arrows).

Underbody protection to body

Screw		Tightening torque	3 Nm
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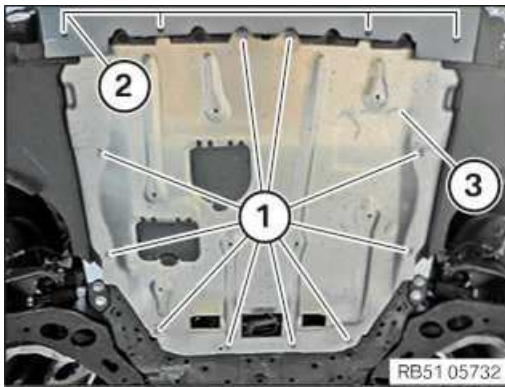
94 – Installing the front underbody protection



- Guide the front underbody protection (1) in under the bumper panel and position it at the screw points.
- Tighten screws (arrows).

Underbody protection front

Screw for thermoplastic plastic		Tightening torque	2,6 Nm
Hexagon screw M6x20		Tightening torque	8 Nm



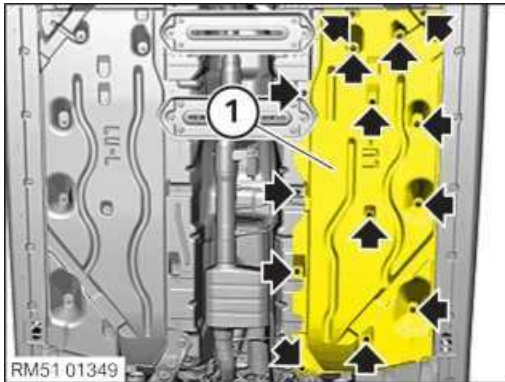
• Equipment specification with metal underride guard:

- Guide in and attach the underride guard (3).
- Tighten down screws (1) and (2).

Underbody protection front

Screw for thermoplastic plastic		Tightening torque	2,6 Nm
Hexagon screw M6x20		Tightening torque	8 Nm

95 – Installing underbody panelling , right



- Correctly position the underbody panelling (1).
- Tighten all bolts and nuts (arrows).

Underbody panelling, side

Hexagon screw		Tightening torque	2,6 Nm
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Underbody panelling, side

Plastic nut		Tightening torque	2,6 Nm
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96 – For diesel particulate filter replacements: Reset adaptation values



NOTICE

This job item is not contained in the flat rate 18 31 080 and must be invoiced separately.

- For diesel particulate filter replacements: register the diesel particulate filter



TECHNICAL INFORMATION



- Registration of the diesel particulate filter **must** be carried out after exchanging the diesel particulate filter and before delivering the vehicle to the customer!



- Register the diesel particulate filter with the diagnosis system.
The registration of the diesel particulate filter is only possible with the diagnosis system.
 - Service functions
 - Power train
 - DDE
 - Register exchange of diesel particulate filter

97 – Perform CBS reset

**Check
Result**

Measure

• [00 00 ... CBS reset](#)

Additional Information

Overview of Tightening Torques

Diesel particulate filter V-clip to exhaust turbocharger

Used in step [48](#)

V-band clamp	Renew V-band clamp.	Tightening torque	15 Nm
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Diesel particle filter to holder

Used in step [48](#)

M8 hexagon nut		Tightening torque	19 Nm
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Diesel particulate filter holder to gearbox

Used in step [48](#)

M12x75		Tightening torque	66 Nm
--------	--	-------------------	-------

Diesel particulate filter bracket to crankcase

Used in step [48](#)

M10x35		Tightening torque	38 Nm
--------	--	-------------------	-------

SCR metering module V-clip to exhaust system

Used in step [48](#)

V-band clamp	Renew V-band clamp.	Tightening torque	8 Nm
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Holder for coolant lines to diesel particulate filter

Used in step [48](#)

Torx bolt BM6x16		Tightening torque	8 Nm
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Differential pressure sensor to holder

Used in step [48](#)

Screw		Tightening torque	4 Nm
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Clamp for the pressure hose on the differential pressure sensor

Used in step [48](#)

Clamp 15–19mm		Tightening torque	3 Nm
---------------	--	-------------------	------

Control sensor

Used in step [49](#)

Control sensor		Tightening torque	50 Nm
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Exhaust temperature sensor to diesel particulate filter

Used in step [50](#) [51](#)

Exhaust-gas temperature sensor		Tightening torque	28 Nm
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Exhaust-gas temperature sensor to exhaust system

Used in step [52](#)

Exhaust-gas temperature sensor		Tightening torque	28 Nm
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Oxygen sensor holder to intermediate shaft

Used in step [53](#)

Hexagon screw M6x16		Tightening torque	8 Nm
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Nitrogen oxide sensor before SCR catalytic converter

Used in step [54](#)

Sensor		Tightening torque	50 Nm
--------	--	-------------------	-------

Monitoring sensor

Used in step [55](#)

Sensor		Tightening torque	50 Nm
--------	--	-------------------	-------

Transfer box to transmissionUsed in step [56](#)

M10		Tightening torque	56 Nm
-----	--	-------------------	-------

Heat shield to transfer boxUsed in step [56](#)

M6	Renew screws.	Tightening torque	6 Nm
----	---------------	-------------------	------

Oil filler plug on transfer box (VTG)Used in step [56](#)

M18x1.5		Tightening torque	35 Nm
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Intermediate shaft to transfer boxUsed in step [57](#)

M8x35		Tightening torque	19 Nm
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Starter motor to transmissionUsed in step [58](#)

M8x45		Tightening torque	19 Nm
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Battery positive lead to starterUsed in step [58](#)

M8		Tightening torque	13,5 Nm
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Propeller shaft to transfer boxUsed in step [61](#)

		Tightening torque	80 Nm
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Flexible disc to rear axle final driveUsed in step [61](#)

M12x1.5	Renew screws.	Tightening torque	55 Nm 90 °
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Centre mount to bodyUsed in step [61](#)

M8		Tightening torque	19 Nm
----	--	-------------------	-------

Heat shield to bodyUsed in step [62](#) [63](#)

Bolts/nut		Tightening torque	3 Nm
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Bracket to bodyUsed in step [62](#)

M8		Tightening torque	21 Nm
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Exhaust system to bodyUsed in step [64](#)

M8	Replace nuts.	Tightening torque	19 Nm
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Exhaust bracket on bodyUsed in step [64](#)

Hexagon screw M8x30		Tightening torque	19 Nm
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V-clip to catalytic converterUsed in step [64](#)

V-band clamp	Renew V-band clamp.	Tightening torque	22 Nm
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Diesel particulate sensor to exhaust systemUsed in step [64](#)

Sensor		Tightening torque	50 Nm
--------	--	-------------------	-------

Nitrogen oxide sensor downstream of SCR catalytic converterUsed in step [64](#)

Sensor		Tightening torque	50 Nm
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Cross-member/torsion strut to axle support and mountingUsed in step [65](#)

M12x48	Renew screws.	Jointing torque	100 Nm
		Angle of rotation	90 °

Front connection carrier to bodyUsed in step [66](#)

M10x18		Tightening torque	56 Nm
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Rear connection carrier to bodyUsed in step [66](#)

M8x18		Tightening torque	28 Nm
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Rear end of front axle support to bodyUsed in step [67](#)

M14 screw	Renew screw.	Tightening torque	175 Nm
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Front axle support, front to bodyUsed in step [67](#)

M12 screw	Renew screw.	Tightening torque	108 Nm
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Underbody protection to bodyUsed in step [67](#) [93](#)

Screw		Tightening torque	3 Nm
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Track rod end to swivel bearingUsed in step [67](#)

M14	Renew nut.	Tightening torque	175 Nm
-----	------------	-------------------	--------

Wishbone to swivel bearingUsed in step [67](#)

M10	Exclusively use the screw to tighten! Renew screw and nut.	Tightening torque	60 Nm
-----	---	-------------------	-------

Holder, wishbone rubber mount, to bodyUsed in step [68](#)

M10 screw	Renew screw.	Jointing torque	56 Nm
		Angle of rotation	90 °

Holder with rubber mount to front axle supportUsed in step [68](#)

M12 screw			100 Nm
-----------	--	--	--------

Washer fluid reservoir holder to front axle support adapter plateUsed in step [68](#)

		Tightening torque	10 Nm
--	--	-------------------	-------

Deformation element, bottom, to adapter plate, front axle carrierUsed in step [68](#)

		Tightening torque	11,8 Nm
--	--	-------------------	---------

Holder to front axle supportUsed in step [69](#)

Oval-head screw TS5 x 16		Tightening torque	2,6 Nm
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Anti-roll bar link to anti-roll barUsed in step [71](#)

M10	Renew nut.	Tightening torque	56 Nm
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Wheel arch cover to bodyUsed in step [73](#)

Plastic nut		Tightening torque	2,6 Nm
Screw		Tightening torque	2,6 Nm

Wheel arch cover to bodyUsed in step [73](#)

Screw		Tightening torque	2,5 Nm
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Wheel arch cover to bodyUsed in step [73](#)

Plastic nut		Tightening torque	3 Nm
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Brake disc to rear wheel hubUsed in step [74](#)

M8	Renew screw.	Tightening torque	16 Nm
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Brake disc to front wheel hubUsed in step [74](#)

M8	Renew screw.	Tightening torque	16 Nm
----	--------------	-------------------	-------

Wheel boltsUsed in step [74](#)

M 14/AF 17	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 all the wheel bolts in the same order or retighten to the prescribed tightening torque again.	Check	140 Nm

Lower steering shaft to steering gearUsed in step [76](#)

M10	Clean screw thread and remove remains of screw locking agent. Renew screw.	Tightening torque	28 Nm
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Steering column cover to bulkheadUsed in step [76](#)

Plastic nut		Tightening torque	3 Nm
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Heat shield for exhaust turbochargerUsed in step [77](#)

Torx screw BM 6x12		Tightening torque	10 Nm
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Rear bulkhead upper part to lower section of bulkheadUsed in step [78](#)

Oval-head screw		Tightening torque	5 Nm
-----------------	--	-------------------	------

Battery holder to engine supportUsed in step [79](#)

Hexagon screw M8x30		Tightening torque	19 Nm
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Electronics box to battery trayUsed in step [80](#)

M8X16		Tightening torque	15 Nm
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Wiring harness to cylinder head coverUsed in step [80](#)

TS5x20		Tightening torque	3,5 Nm
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Cover to electronics boxUsed in step [80](#)

RF5x26.5		Tightening torque	2,5 Nm
----------	--	-------------------	--------

Positive battery terminal to batteryUsed in step [80](#)

NutM6		Tightening torque	5 Nm
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Tension strut to spring strut dome/battery trayUsed in step [80](#)

M8		Tightening torque	19 Nm
----	--	-------------------	-------

Clean air pipe to cylinder head coverUsed in step [81](#)

Oval-head screw	Renew screw.	Tightening torque	8 Nm
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Clean air pipe to intake silencer housingUsed in step [81](#) [87](#)

Clamp		Tightening torque	3 Nm
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Resonator to manifold and clean air pipeUsed in step [82](#)

Screw TS6	Renew screw.	Tightening torque	5 Nm
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Cover of top bulkheadUsed in step [84](#)

Screw		Tightening torque	2,6 Nm
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Cover of remote positive terminalUsed in step [84](#)

Screw		Tightening torque	2,6 Nm
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Battery terminal rail to battery trayUsed in step [85](#)

M8			19 Nm
----	--	--	-------

Battery terminal with IBS positive battery terminal / negative battery terminalUsed in step [85](#) [86](#)

NutM6			5 Nm
-------	--	--	------

Trailing linkUsed in step [85](#)

M8		Tightening torque	19 Nm
----	--	-------------------	-------

Battery coverUsed in step [85](#)

M8			2,8 Nm
----	--	--	--------

Intake silencer housing to lock bridgeUsed in step [87](#)

M6X30		Tightening torque	8 Nm
-------	--	-------------------	------

Intake neck to cross connectionUsed in step [88](#)

M6		Tightening torque	8 Nm
----	--	-------------------	------

Cross-brace to spring strut domeUsed in step [89](#)

	Renew screw.	Jointing torque	28 Nm
		Angle of rotation	180 °

Cover on bodyUsed in step [89](#)

Hexagon screw		Tightening torque	3 Nm
---------------	--	-------------------	------

Oil filler plug to transmission housingUsed in step [92](#)

M14	Renew the sealing ring.	Tightening torque	45 Nm
-----	-------------------------	-------------------	-------

Overflow screw in oil drain plugUsed in step [92](#)

M6	Renew the sealing ring.		8 Nm
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Underbody protection front

Used in step 94

Screw for thermoplastic plastic		Tightening torque	2,6 Nm
Hexagon screw M6x20		Tightening torque	8 Nm

Underbody panelling, side

Used in step 95

Hexagon screw		Tightening torque	2,6 Nm
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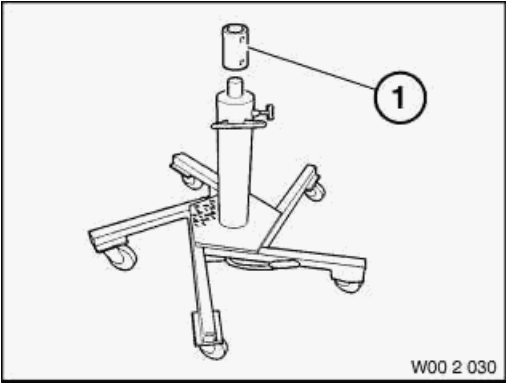
Underbody panelling, side

Used in step 95

Plastic nut		Tightening torque	2,6 Nm
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Overview of Special Tools

0 490 133 (00 2 030) Device



Common

Used in step 28 67

Usage	(universal hydraulic lifter base unit) Chassis and hydraulic lifter - For removing and installing rear axle supports and gearboxes. Also for soft top mounts. Is replaced by 81 22 2 219 012
Included in the tool or work	
Storage location	
Replaced by	
In connection with	
SI-Number	01 05 90 (207)

Consisting of

Pos	BMW Order number	Replaced by	Designation	In Connection with
1	0 490 134 (00 2 031)		Adapter (adapter for gearbox holder) Model series: E30, E31, E32, E34, E36	

0 495 554 (33 5 070) Extension



Common

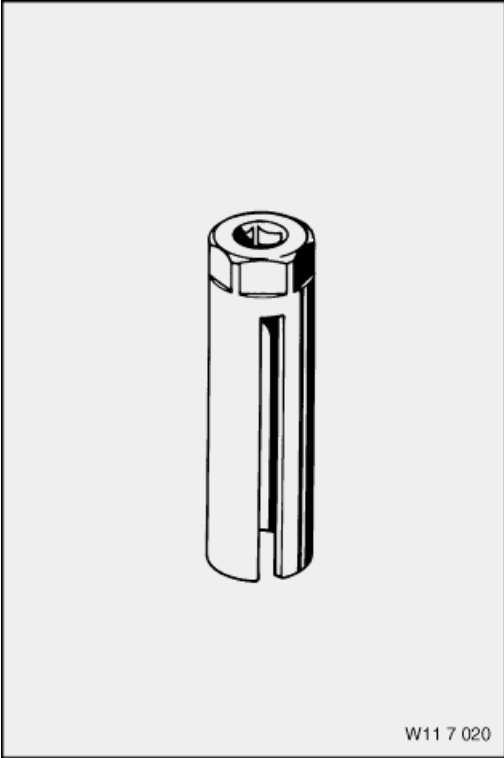
Used in step 34 61

Usage	Pull-out extension for 33 5 040, 33 5 050, 33 5 060.
Included in the tool or work	
Storage location	A18
Replaced by	
In connection with	
SI-Number	01 21 06 (300)

Consisting of

Pos	BMW Order number	Replaced by	Designation	In Connection with
1	0 495 592 (33 5 071)		Extension (Extension (1 item)) discontinued, can only be ordered using complete tool	

0 491 074 (11 7 020) Socket wrench insert



Common		Used in step	40	41	55
Usage	(Socket wrench insert 22 mm) For loosening and tightening the oxygen sensor				
Included in the tool or work					
Storage location	A9				
Replaced by					
In connection with					
SI-Number					

2 409 025 Puller



Common		Used in step	56
Usage	For disassembly of the outer radial shaft seal of the transmission output shaft, right. Contour-graphic silhouette foil is included in the delivery specification. Further information on the contour-graphic silhouette foil is included in service information 00 22 13 (969).		
Included in the tool or work			
Storage location	A76		
Replaced by			
In connection with			
SI-Number	01 53 14 (211)		

2 411 739 Puller



Common		Used in step	56
Usage	For disassembly of the inner radial shaft seal of the output, right. Contour-graphic silhouette foil is included in the delivery specification. Further information on the contour-graphic silhouette foil is included in service information 00 22 13 (969).		
Included in the tool or work			
Storage location	C78		
Replaced by			
In connection with			
SI-Number	01 53 14 (211)		

2 408 152 Striking element



Common

Used in step 56

Usage	For installation of the right radial shaft seal transmission output shaft (inner). Contour-graphic silhouette foil is included in the delivery specification. Further information on the contour-graphic silhouette foil is included in service information 00 22 13 (969).
Included in the tool or work	
Storage location	B78
Replaced by	
In connection with	2413037
SI-Number	01 53 14 (211)

2 413 037 Handle

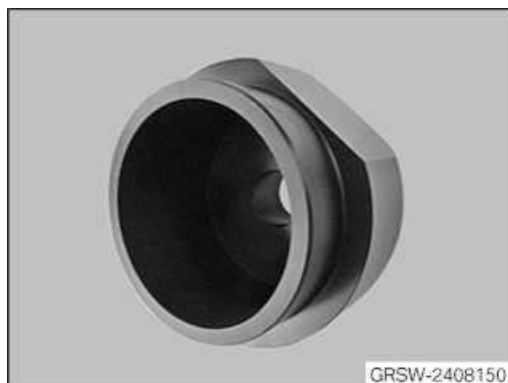


Common

Used in step 56

Usage	Universal drift handle. Contour-graphic silhouette foil is included in the delivery specification. Further information on the contour-graphic silhouette foil is included in service information 00 22 13 (969).
Included in the tool or work	
Storage location	C77
Replaced by	
In connection with	
SI-Number	01 53 14 (211)

2 408 150 Striking element

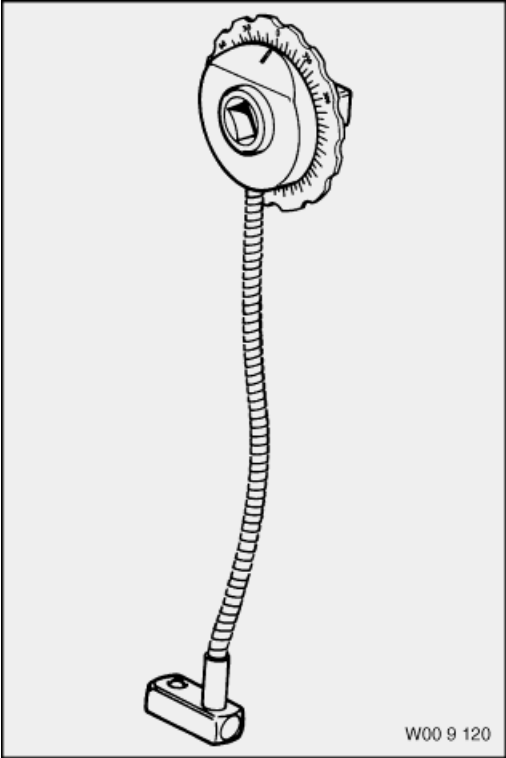


Common

Used in step 56

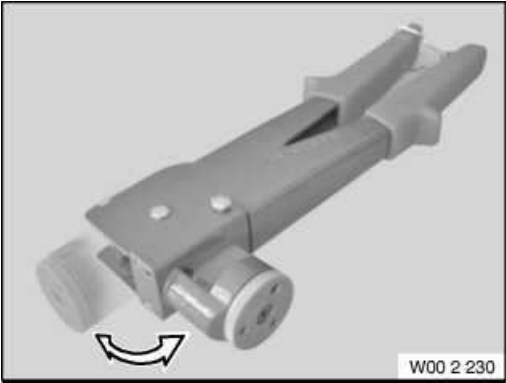
Usage	For installing the right radial shaft seal transmission output shaft (outer). Contour-graphic silhouette foil is included in the delivery specification. Further information on the contour-graphic silhouette foil is included in service information 00 22 13 (969).
Included in the tool or work	
Storage location	B78
Replaced by	
In connection with	2413037
SI-Number	01 53 14 (211)

0 490 504 (00 9 120) Torque angle measuring dial



Common		Used in step 61
Usage	For torsion angle adjustment of cylinder head bolts (all engines) And reinforcement plate front axle support E46	
Included in the tool or work		
Storage location	A4	
Replaced by		
In connection with		
SI-Number		

0 496 521 (00 2 230) Pliers



Common		Used in step 73
Usage	(Blind rivet pliers for plastic rivets) For shaft diameters of 3.5 mm, 3.9 mm and 4.5 mm	
Included in the tool or work		
Storage location	C25	
Replaced by		
In connection with		
SI-Number	01 17 08 (478)	

2 344 011 Tool



Common		Used in step 74
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)	

Replacement tools:

0 495 221 (36 1 323) Wheel stud



Common

Used in step 18

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

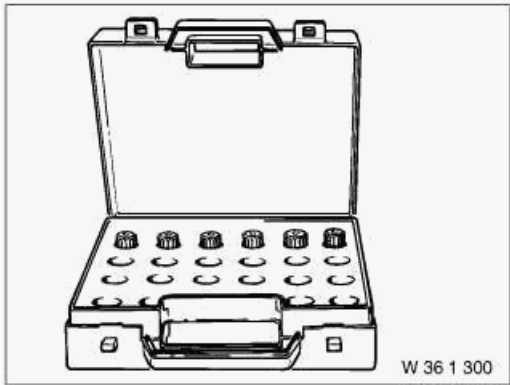


Common

Used in step 18

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 18

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	18
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	18
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



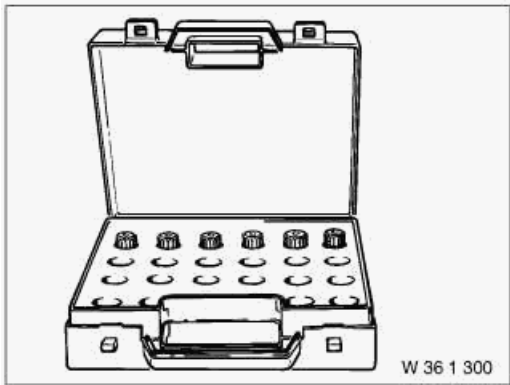
Common		Used in step	18
Usage	(Code 37) With centring bore available separately (see EPC) under 36 13 6 762 342		
Included in the tool or work	0 492 518		
Storage location			
Replaced by			
In connection with			
SI-Number			

0 495 229 (36 1 332) Wheel stud



Common		Used in step	18
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	18
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			

Links

General repair instructions	Used in step
61 20 ... Notes on AGM battery	86
61 12 ... Notes on intelligent battery sensor (IBS)	86
61 00 ... Notes for disconnecting and connecting battery	86
41 00 ... Notes on repairing threads	
61 00 ... Safety information for handling vehicle battery	
Repair instructions	Used in step
61 35 ... Notes on ESD protection (Electro Static Discharge)	12 40 41 43 44 45 46 47
00 00 ... CBS reset	97
00 ... Raising the vehicle using a vehicle hoist	
Operating materials	Used in step
2.0 Grease for wheel centring	74
14.0 Automatic transmission fluid for ZF-transmission GA8HP45Z / GA8HP50Z / GA8HP70Z / GA8HP90Z / GA8P70H / GA8P75H / GA8HP75Z	92
Operating materials	Used in step

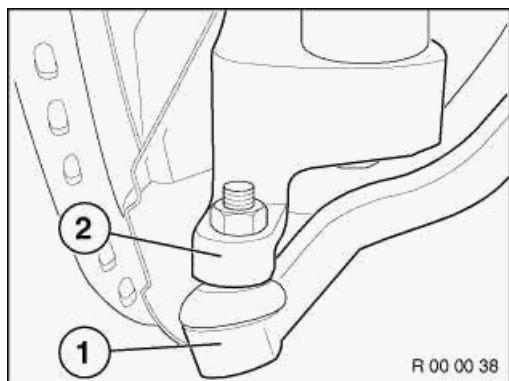
00 00 105 Standard scope of service

- **Standard scope of service**

- Function check of parking brake without roller dynamometer
- Checking Check Control messages
- Checking indicator and warning lights
- For vehicles with slide/tilt sunroof/panorama glass roof:
Check the slide/tilt sunroof guide rails for dirt contamination. Clean if necessary (charged separately). Function check of parking brake without roller dynamometer
- Check filling level of AdBlue (if installed):
After consultation with the customer, add the displayed AdBlue refill quantity.
Refill is for a separate charge.

Recommendation:

- Check [tyres](#) (incl. compact spare wheel if present):
 - Tread depth
 - Tread wear pattern
 - External condition
 - Check inflation pressure and correct if necessary
[Note the information on tolerance compensation for tyre pressure control \(RDC\)!](#)
- After correction of the tyre pressure: [Initialise Tyre Pressure Control \(RDC\)](#).

**Checking play:**

Note:

[Observe notes on checking the steering backlash!](#)

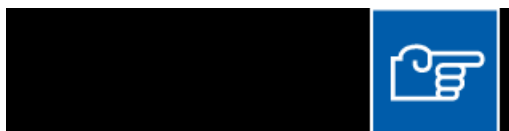
1. Check the tie rod backlash only in loaded condition or in the design position.
2. Checking with front axle raised:
 - To evaluate the play of the steering gear, it is necessary to pressurise the steering gear via its servo system!
 - The combustion engine must be running during hydraulically or electrically assisted steering for this purpose

Steering wheel:

Move steering wheel back and forth and check for play.

Track rod joint:

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

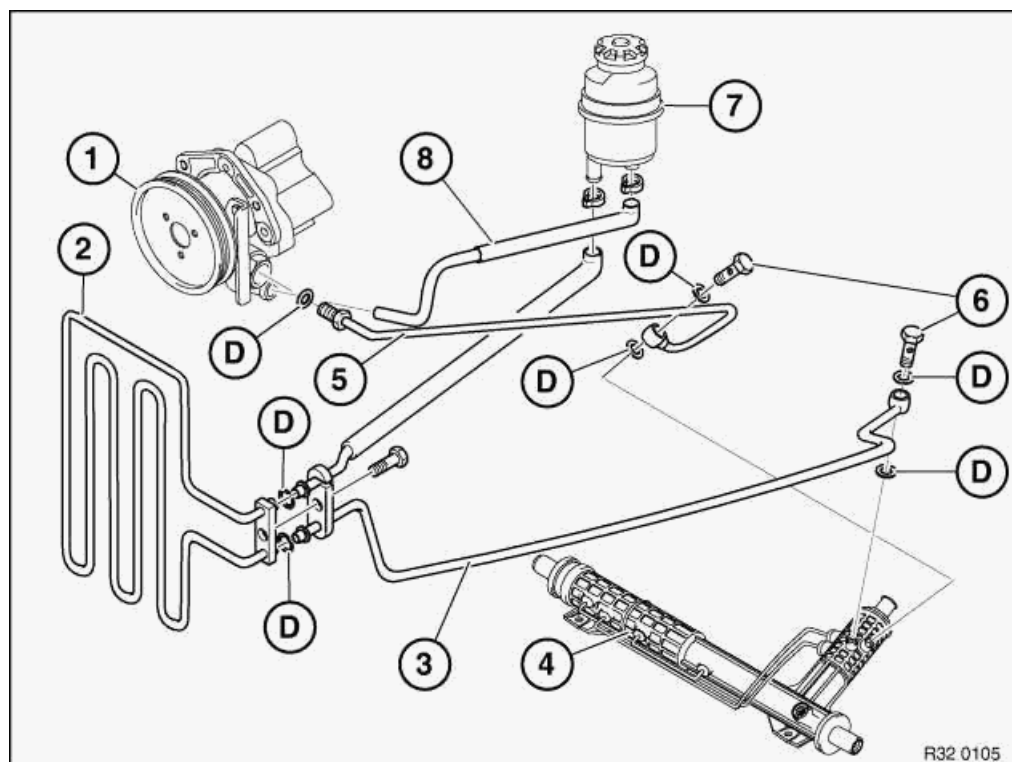
**Check for damage:**

Check gaiter, axle and gaiter for damage (e.g. cracks, holes) and leaks.
Check gaiter for missing tensioning straps.

Check for tightness (only for hydraulically supported steering):

Check all visible connections, hoses, lines and steering box for traces of fluid.

The following image shows the principal arrangement of the hydraulic steering components and lines.



1	Pump	6	Hollow bolt
---	------	---	-------------

2	Power steering cooler	7	Expansion tank
3	Return line	8	Suction hose
4	Steering box	{D}	Sealing ring
5	Pressure line		

00 00 ... Tyres: checking and if necessary correcting inflation pressure, checking condition, tread depth and pattern

- **Checking tyre pressure:**
 - Check tyre pressure in accordance with label on B-pillar
- **Check tyre condition:**
 - Check tread depth of all tyres with tyre tread gauge
 - Check tyre tread surfaces and side walls for incisions and foreign particles such as nails or screws
 - Check tread wear pattern for localized flattening and wear on one side; if necessary, carry out wheel/chassis alignment after consulting with customer and issue a separate invoice for this work

Note:

- For details of approved wheel and tyre combinations, refer to KSD CD
- For reasons of driving safety, only use tyres of the same design and tyre tread on a single vehicle
- Inform customer of any incorrect or worn tyres

00 00 ... Underbody incl. all visible components: Check for damage, correct position, tightness, corrosion

- Visually inspect underbody:
 - For leaks (transmission, fuel system, brake components, steering)
 - For correct routing of electrical line (e.g. brake pad wear sensor, pulse sensor)
 - Check tightness of shock absorber, installation and spring corrosion - rebound
 - Damage to underbody
 - Corrosion on underbody
 - Complete mounting of add-on parts (e.g. underbody panelling)

Important!

If damage to the underbody is identified:

- If necessary, remove trim panels from underbody.
- Check brackets as well as brake- and fuel lines for damage and correct installation position.

Rectify identified faults after consulting with customer and issue a separate invoice.

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

	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

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

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.		
Check the brake pad thickness on the rear axle. -> Wear material thickness $\geq$ 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: $\geq$ Minimum brake disc thickness + 1 mm -> Ideally, install new brake discs.		
Check the brake disc thickness on the rear axle. -> Minimum brake disc thickness: $\geq$ 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.		
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	OK	Comment
Note to customer: Perform the following points for wheels/tyres immediately after the racing track operation and before driving on public streets.		
Check wheels/tyres for damage.		
Check wheels/tyres for minimum tread depth.		
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		

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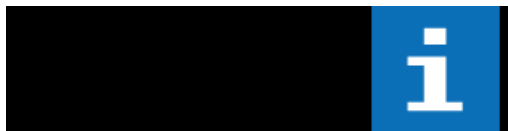
Date	Mechanic	Workshop Supervisor
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00 00 ... Windscreen washer system: checking fluid level, topping up if necessary

- Top up washer fluid reservoir up to edge or mark.

Important!

A pH-neutral BMW window cleaning fluid (antifreeze in winter) must always be added to the water.

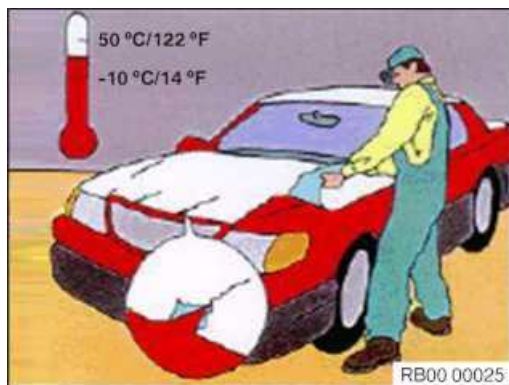
**Note:**

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.

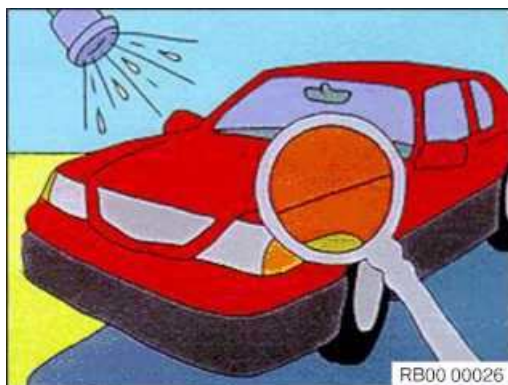
The protective film can be easily removed from the affected surfaces. Polishing is necessary only in exceptional cases.

Further information on the protective film is available in the document "[Frequently asked questions on surface protection](#)".

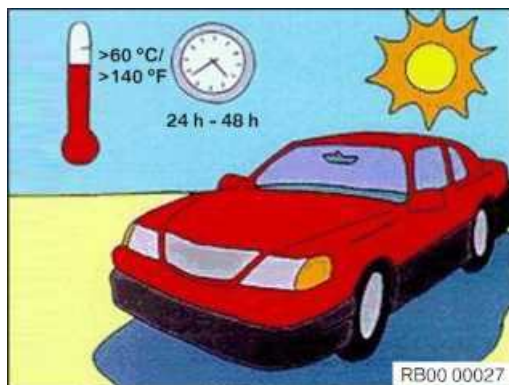
**Instructions for removing the protective film:**

- 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.

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



Danger of injury!

Contact with eyes or skin may result in injury!

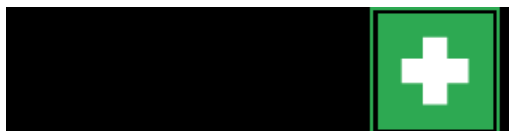
Possible symptoms are:

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



Protective measures/rules of conduct:

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



First aid measures:

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

Note: Do not use solvents/thinners.

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



Danger of poisoning!

Ingesting oil or absorbing through the skin may cause poisoning!

Possible symptoms are:

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



Protective measures/rules of conduct:

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



First aid measures:

- Do not induce vomiting.

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

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

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!

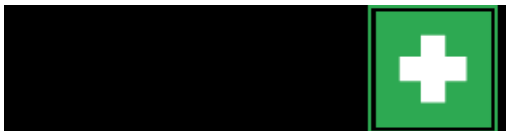
Observe following instructions during use:

- 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.



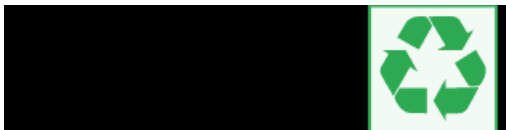
Important!

Follow hazard warnings and wear personal protection equipment!



First Aid:

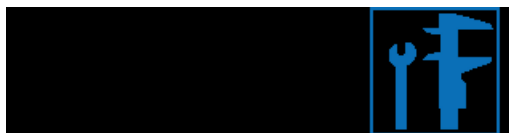
- If product comes in contact with eyes, immediately flush with running water for about 10 - 15 minutes. Seek the advice of eye specialist.
- In the event of skin contact and where applicable an allergic skin reaction, clean the affected areas immediately with soap and water and then apply silicone-free 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.

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.

**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°C degrees.
- Do not spray directly onto cameras/sensors.



Attention!

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

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



Warning!

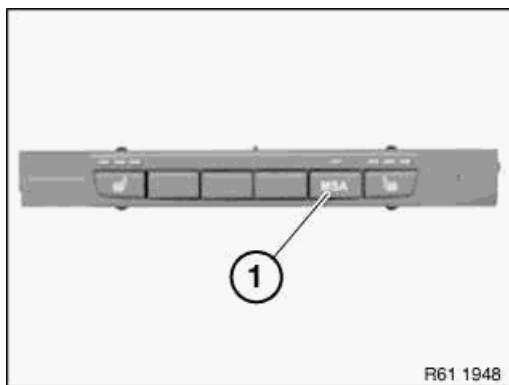
If the engine hood/bonnet contact is pulled upwards (workshop mode), the information "switch closed" is output. The automatic engine start-stop function is active.

An automatic engine start is possible.

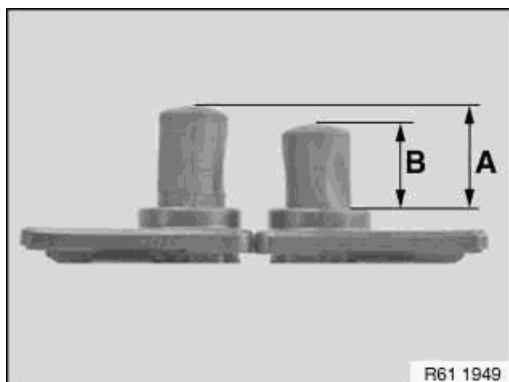
Observe safety precautions when working on MSA vehicles.

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



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](#)

00 Safety instructions for handling oil



Warning!

[Danger of poisoning](#) if oil is ingested/absorbed through the skin!

[Risk of injury](#) if oil comes into contact with eyes and skin!



Recycling:

Observe country-specific waste disposal regulations.



Measures if oil is unintentionally released:

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

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

**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



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.

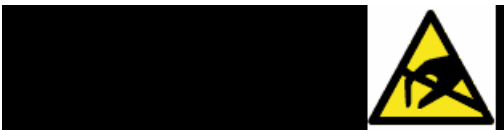
Note:

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



Note (symbol for diagnosis system):

- Connect BMW diagnosis system

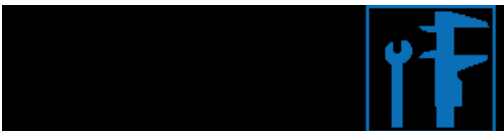


Important!

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

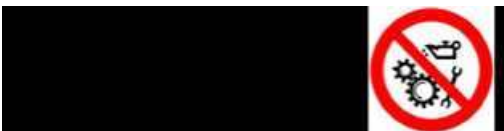
Note:

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.

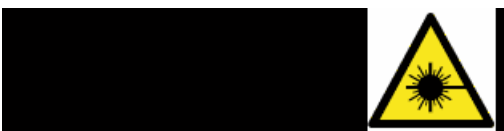


Important!

Do not oil or grease component or tool.

Note:

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



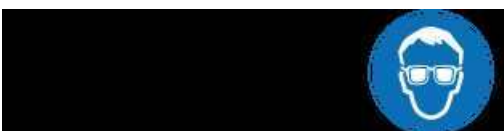
Warning!

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!



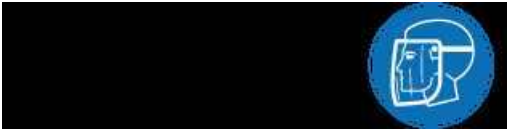
Important!

Use ear protection for the following operations.



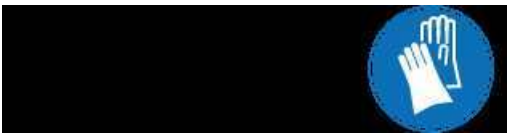
Important!

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.

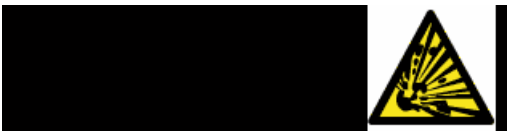
Avoid skin contact.



Important!

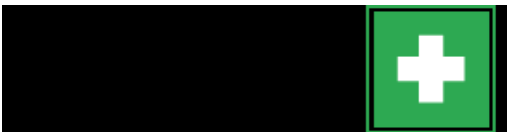
Use eye protection and protective gloves for the following operations.

Avoid eye contact and skin contact.



Warning!

Danger of explosion!



First aid measures:

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

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.

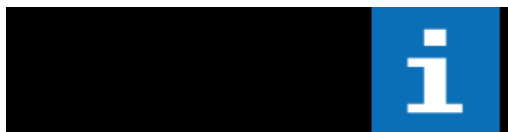


Caution!

Risk of damage!

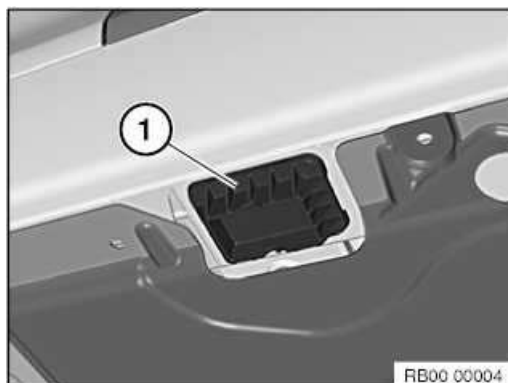
Before driving onto a vehicle hoist, make sure there is sufficient ground clearance between the vehicle hoist and the vehicle.

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



Necessary preliminary work:

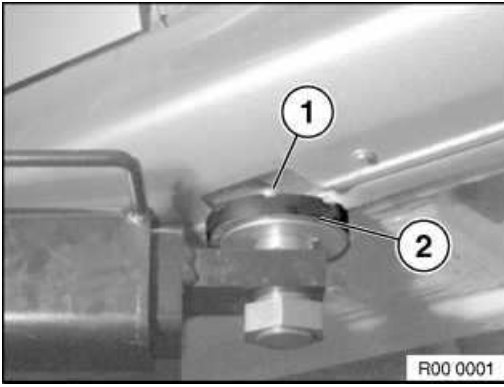
- If necessary, remove jacking points from equipment pack (with new vehicles) and insert from below into openings in front and rear sill areas



Caution!

All four jacking points (1) must be available!

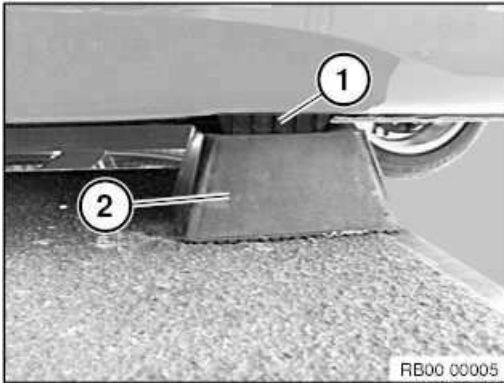
Never raise the vehicle without the jacking points (1)!



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.



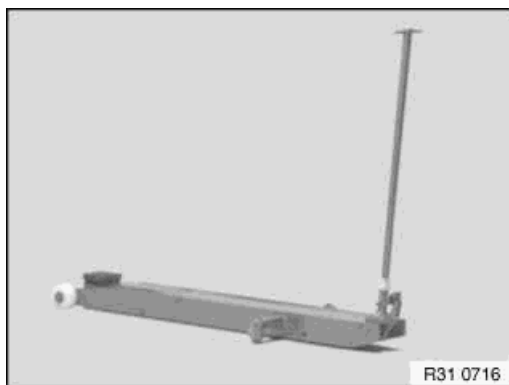
Caution!

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.

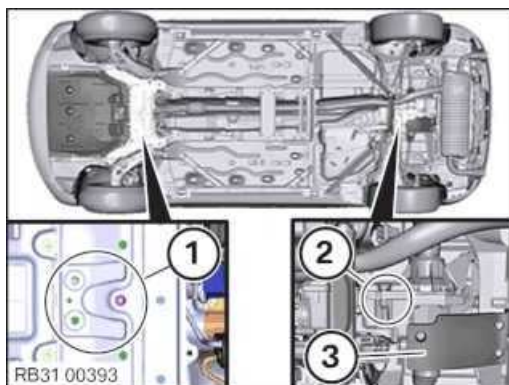
Never raise the vehicle without rubber blocks (or rigid foam blocks)!

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



Observe the following trolley-jack-related notes:

1. Only trolley jacks sold or approved by BMW, with a rubber plate on their mounting, may be used!
2. Trolley jacks must be regularly serviced and always checked for functional reliability before they are used!
3. Check the rubber plate on the trolley jack prior to each use, replacing if necessary.



Warning!

The vehicle may be raised with a trolley jack only at the following mounting point!

- 1 Centre of front axle support

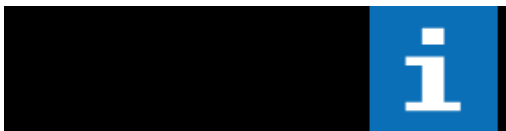
Risk of damage!

Align the rubber plate on the trolley jack with the front axle support so as to prevent contact with and therefore damage to the underbody protection.

- 2 Rear axle final drive

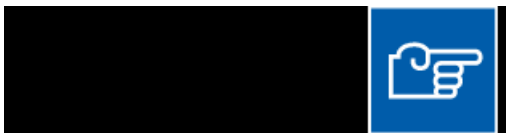
Risk of damage!

Align the rubber plate on the trolley jack with the rear axle differential to prevent contact with and damage to the cover (3).



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

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!**



Introduction

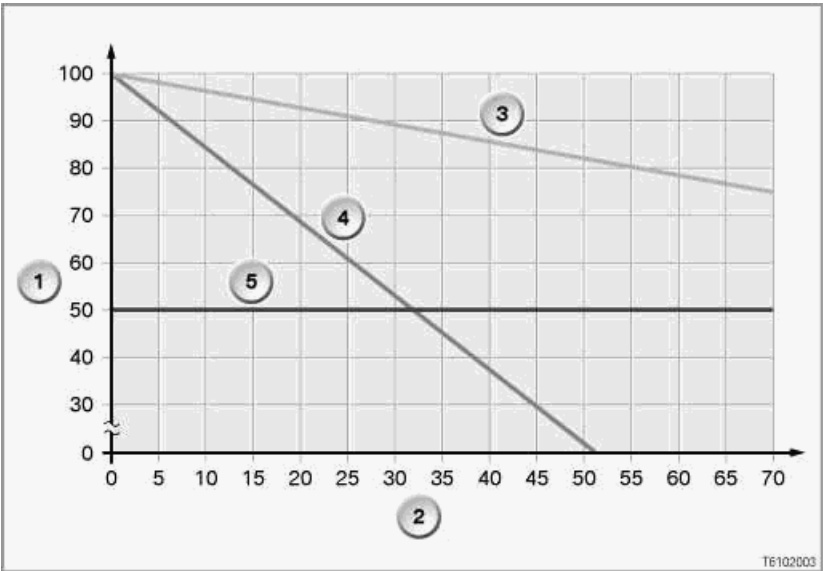
In September 2002, the first so-called VRLA batteries, better known as **AGM batteries** came into use. (VRLA stands for **V**alve **R**egulated **L**ead **A**cid, i.e. lead-acid battery with pressure relief valve; **AGM stands for** **A**bsorbent **G**lass **M**at, i.e. absorbent glass-fibre fleece).

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

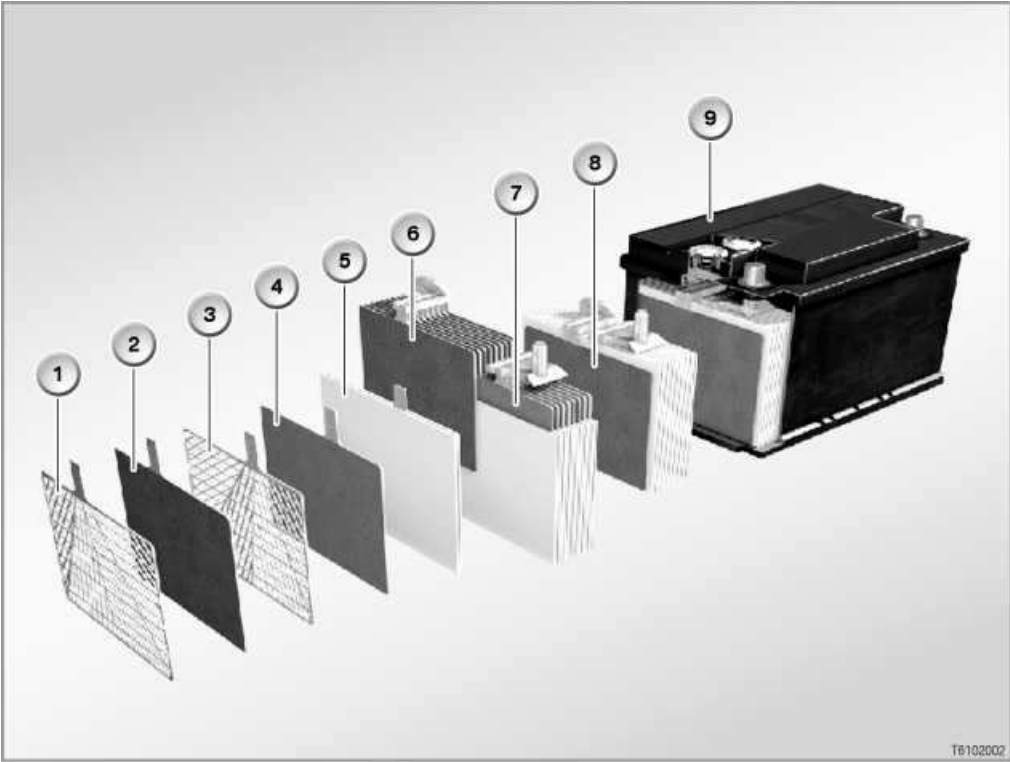


Item	Explanation	Item	Explanation
1	Available capacity [%]	2	Mileage [thousand km]
3	AGM battery	4	Lead-calcium battery
5	50 % capacity limit		

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.



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 $\geq 85^{\circ}\text{C}$ (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

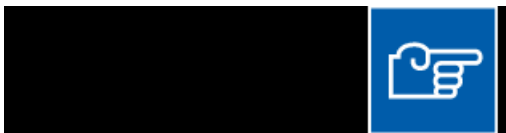


Note:

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](#).

**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 $\geq 85^{\circ}$

[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](#).

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, re-pin 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 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.**

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.

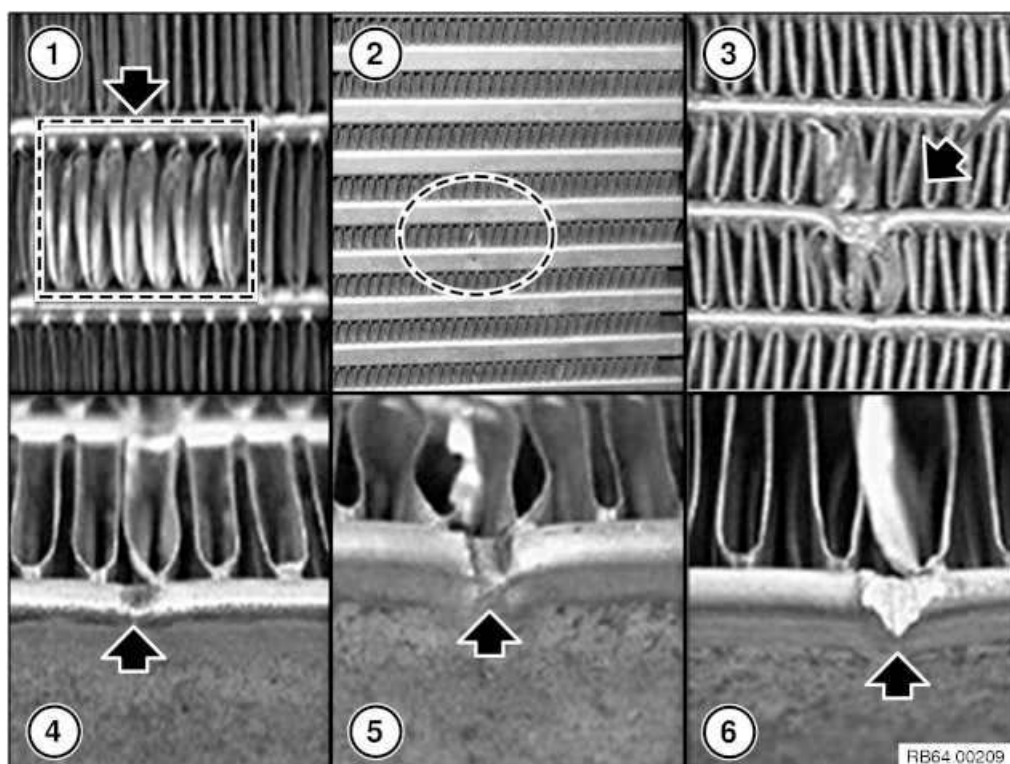
As long as tightness/function are not degraded and an adequate distance of a few mm between the radiator and air conditioning condenser remains in place, **this is not damage in either case.**

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

Note:

The deformations shown in Fig.Â (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.

64 50 ... Note for handling R134a refrigerant

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

Avoid all contact with liquid or gaseous R134a. Wear protective goggles and gloves when working on the refrigerant circuit.

- [Follow safety information for handling R134a refrigerant](#)

Warning!

Although R134a at normal temperature is non-toxic, not inflammable and not explosive in air in any mixture ratio, it is still essential to follow various safety precautions.

As a gas, R134a 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 heating and air conditioning systems or in rooms into which R134a may have escaped. Exposure to flames or high temperatures (≥ 50 °C) may give rise to toxic decomposition products (fluorine gas). 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

R134a must be drawn off, cleaned and returned to the air conditioning 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.

R134a absorbs very small amounts of 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.

**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.



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!](#)



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!

**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.

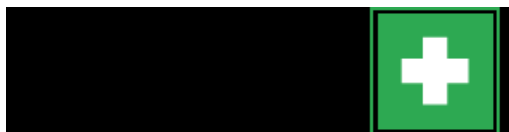
- The pressure gauge on the A/C service unit must be checked for the actual pressure drop prior to repair work.

It is absolutely essential to read and observe the relevant operating instructions for the A/C service unit used!

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.

**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.

**Warning!**

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

Read and comply with the relevant operating instructions for the A/C service station 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:**

- If swallowed: Do NOT induce vomiting, unless expressly instructed to do so by medical personnel. Do not administer anything to an unconscious person through their mouth. Consult a doctor immediately if larger quantities of this substance are swallowed. Loosen tight-fitting items of clothing (e.g. collar, tie, belt or similar).
- Eye contact: Remove contact lenses if worn. In the event of eye contact, rinse eyes for at least 15 minutes with plenty of water. It is essential to use WARM WATER. Consult a doctor.
- Skin contact: In the event of skin contact, rinse immediately with plenty of water. Remove contaminated clothes and shoes. Wash affected clothes before wearing again. Clean shoes thoroughly before reusing. **Call for a doctor.**
- After inhalation: If inhaled, take the person affected outside into fresh air immediately and keep them under supervision. **Call for a doctor.** If breathing difficulties are experienced, administer additional oxygen. If the person affected stops breathing, administer the kiss of life.

**Important!**

Refrigerant is hygroscopic and must therefore be stored in suitable containers that are sealed airtight!

refrigerant oil is non-combustible and non-explosive at normal temperatures. Nevertheless, the following points must be observed:

- Do not store in the vicinity of flames, heat sources or strongly oxidising materials
- Suitable extinguishants are carbon dioxide (CO₂) dry extinguishant and foam



Recycling

Catch and dispose of emerging refrigerant oil.

Observe country-specific waste disposal regulations.

Absorb escaping refrigerant oil with fluid-binding material.

Notify the relevant authorities if larger amounts of refrigerant are discharged into aboveground water supplies, drainage systems or subsoil.

**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!

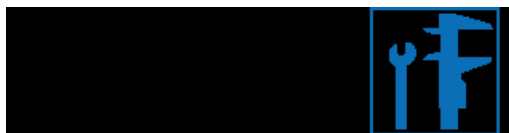
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- Do not smoke!
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**First aid measures:**

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- 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.

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.

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.

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.

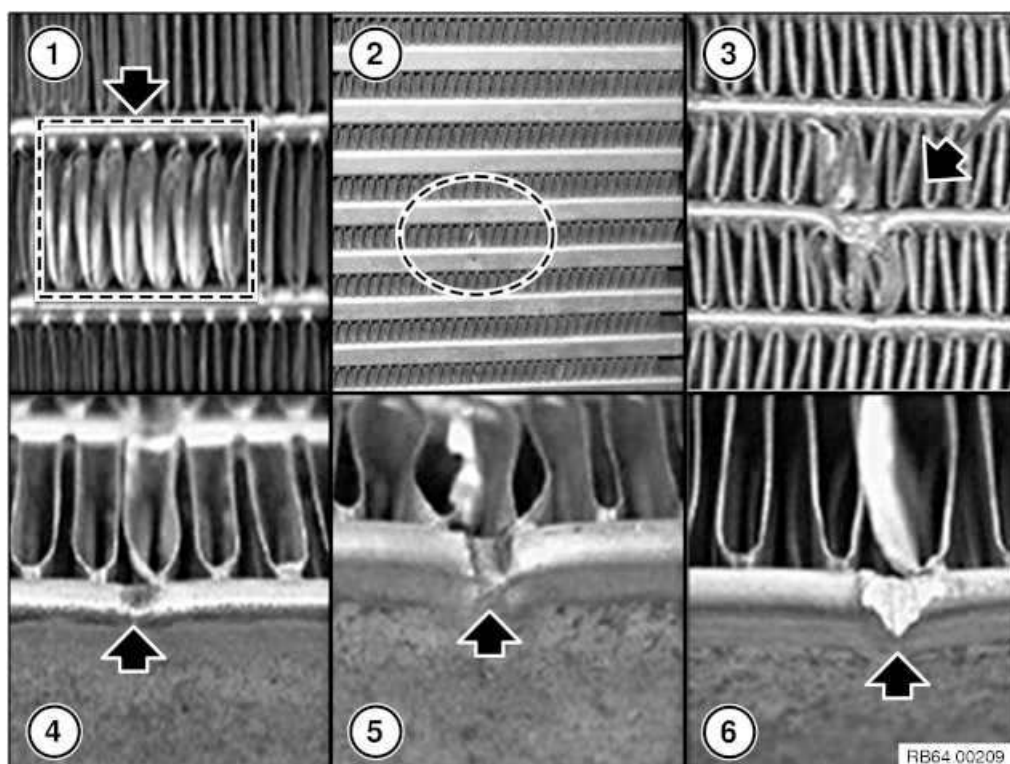
As long as tightness/function are not degraded and an adequate distance of a few mm between the radiator and air conditioning condenser remains in place, **this is not damage in either case.**

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

Note:

The deformations shown in Fig.Â (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 ... Note for handling R134a refrigerant

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

Avoid all contact with liquid or gaseous R134a. Wear protective goggles and gloves when working on the refrigerant circuit.

- [Follow safety information for handling R134a refrigerant](#)

Warning!

Although R134a at normal temperature is non-toxic, not inflammable and not explosive in air in any mixture ratio, it is still essential to follow various safety precautions.

As a gas, R134a 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 heating and air conditioning systems or in rooms into which R134a may have escaped. Exposure to flames or high temperatures (≥ 50 °C) may give rise to toxic decomposition products (fluorine gas). 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

R134a must be drawn off, cleaned and returned to the air conditioning 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.

R134a absorbs very small amounts of moisture. Therefore, seal off opened pipes, air conditioning condenser, evaporator, air conditioning compressor and dryer flask immediately with seal plugs.

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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.

**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.



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!](#)



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)

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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!

**Warning!**

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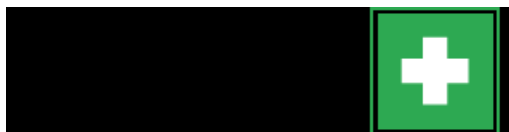
- The pressure gauge on the A/C service unit must be checked for the actual pressure drop prior to repair work.

It is absolutely essential to read and observe the relevant operating instructions for the A/C service unit used!

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.

**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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Read and comply with the relevant operating instructions for the A/C service station used!

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- Wear safety goggles
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- If swallowed: Do NOT induce vomiting, unless expressly instructed to do so by medical personnel. Do not administer anything to an unconscious person through their mouth. Consult a doctor immediately if larger quantities of this substance are swallowed. Loosen tight-fitting items of clothing (e.g. collar, tie, belt or similar).
- Eye contact: Remove contact lenses if worn. In the event of eye contact, rinse eyes for at least 15 minutes with plenty of water. It is essential to use WARM WATER. Consult a doctor.
- Skin contact: In the event of skin contact, rinse immediately with plenty of water. Remove contaminated clothes and shoes. Wash affected clothes before wearing again. Clean shoes thoroughly before reusing. **Call for a doctor.**
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**Important!**

Refrigerant is hygroscopic and must therefore be stored in suitable containers that are sealed airtight!

refrigerant oil is non-combustible and non-explosive at normal temperatures. Nevertheless, the following points must be observed:

- Do not store in the vicinity of flames, heat sources or strongly oxidising materials
- Suitable extinguishants are carbon dioxide (CO₂) dry extinguishant and foam



Recycling

Catch and dispose of emerging refrigerant oil.

Observe country-specific waste disposal regulations.

Absorb escaping refrigerant oil with fluid-binding material.

Notify the relevant authorities if larger amounts of refrigerant are discharged into aboveground water supplies, drainage systems or subsoil.

**Warning!**

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

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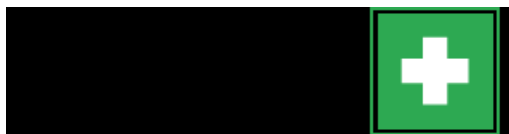
The refrigerant circuit is depressurised AFTER drawing off.

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**Warning!**

[Danger of poisoning](#) if oil is ingested/absorbed through the skin!

[Risk of injury](#) if oil comes into contact with eyes and skin!

Attention!

Risk of damage!

Use only approved oil for the rear axle differential clutch to prevent damage to the clutch of the rear axle differential. See Electronic Parts Catalogue.

**Recycling:**

Catch and dispose of oil of the rear axle differential clutch in a suitable collecting vessel.

Observe country-specific waste disposal regulations.

**Necessary preliminary work:**

- [Remove](#) complete exhaust system.

**Checking oil level:**

Open screw plug (1).

Check oil level.

- Oil must emerge from the opening.

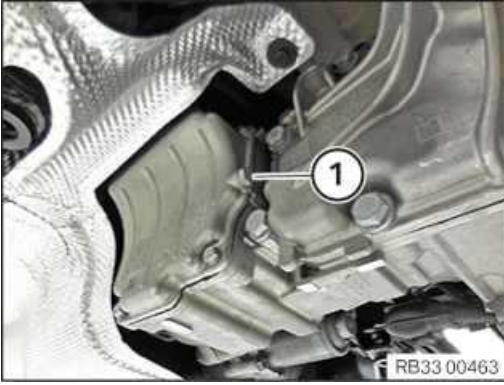
Renew the sealing ring.

Parts: Sealing ring

Apply screw plug (1).

Tightening torque [33 11 2AZ](#).

**Add oil:**



Open screw plug (1).

Slowly top up the [oil](#) until it escapes from the opening.

Wait for 5 minutes.

- The rear axle differential clutch consists of several oil chambers. In order to guarantee equal filling of the oil chambers, the waiting period must be strictly observed.

Top up oil once again.

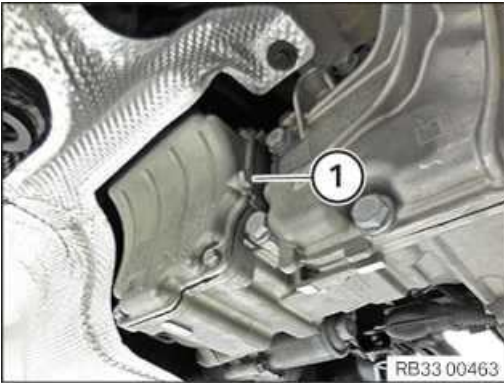
Tighten the screw plug (1) hand-tight.



Connect the diagnosis system to the vehicle.

Bleed and calibrate the clutch of the rear axle differential as follows:

- Service functions, drive, longitudinal torque distribution, bleeding
- 30 s waiting period
- Service function, drive, longitudinal torque distribution, calibration



Open screw plug (1).

Check oil level, topping up if necessary.

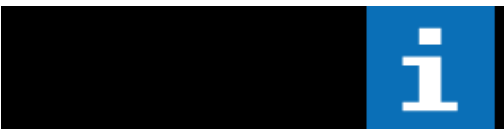
- Oil must emerge from the opening.

Renew the sealing ring.

Parts: Sealing ring

Apply screw plug (1).

Tightening torque [33 11 2AZ](#).



Required follow-up work:

- Completely install the [exhaust system](#).

**Warning!**

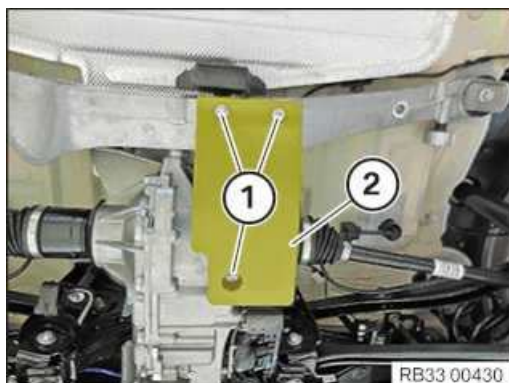
[Danger of poisoning](#) if oil is ingested/absorbed through the skin!

[Risk of injury](#) if oil comes into contact with eyes and skin!

Attention!

Risk of damage!

To avoid serious damage to the rear axle final drive, it is essential to use only [approved gearbox oils](#) in the rear axle final drive.



Loosen screws (1).

Remove cover (2).



Open screw plug (1).

Check oil level.

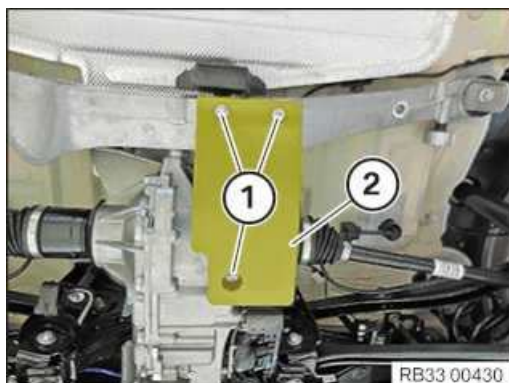
If necessary, pour in final drive oil up to lower edge of opening for screw plug (1).

Renew screw plug (1) with O-ring.

Parts: Plug

Apply screw plug (1).

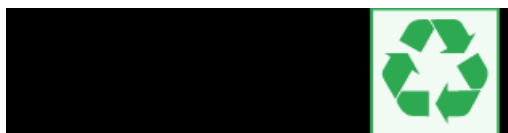
Tightening torque [33 11 1AZ](#).



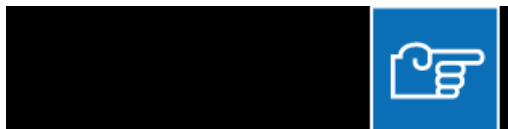
Position cover (2).

Tighten down screws (1).

Tightening torque [33 31 8AZ](#).

**Recycling:**

Catch and dispose of escaping transmission oil.
Observe country-specific waste disposal regulations

**Note:**

Gearbox is at normal operation temperature.

Attention!

Use only the [approved transmission oil](#).

Failure to comply with this instruction will result in serious damage to the transmission.

Capacity, see BMW [operating fluid](#).

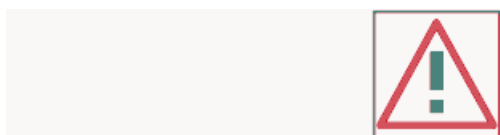
The vehicle must be parked on a level surface in the workshop during transmission oil filling.



Unscrew oil drain plug (1) and allow oil to flow out completely.

Clean oil drain plug and reinstall.

Tightening torque [23 00 2AZ](#).

**Attention!**

Make sure during removal of the filling/level control screw to note the installed filling/level control screw variant.

It is **mandatory** to use variant 1 in transmissions up to production date 08/2015.

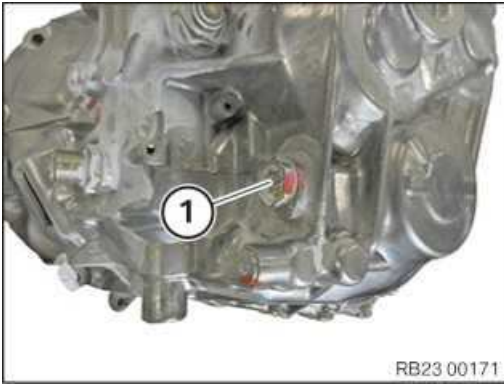
It is **mandatory** to use variant 2 in transmissions from production date 08/2015.

Failure to comply with this instruction will result in leaks on the transmission.



Variant 1 **until** production date 08/2015.

Variant 2 **from** production date 08/2015.



Unscrew filler/fluid level monitoring connector (1) and fill the transmission until the oil overflows.

Allow surplus oil to drain off.

Screw in the filling/level control screw (1).

Parts: Renew the filling/level control screw (1).

Tightening torque [23 00 2AZ](#).

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



Danger of injury!

Contact with eyes or skin may result in injury!

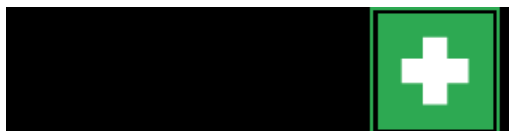
Possible symptoms are:

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



Protective measures/rules of conduct:

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



First aid measures:

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

Note: Do not use solvents/thinners.

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



Danger of poisoning!

Ingesting oil or absorbing through the skin may cause poisoning!

Possible symptoms are:

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



Protective measures/rules of conduct:

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



First aid measures:

- Do not induce vomiting.

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

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