32 00 620 Adjusting rear axle

TECHNICAL INFORMATION

The vehicle ride height may change due to turning the eccentric bolts (setting camber and toe). If available, activate automatic ride height measurement in the wheel alignment equipment to accurately set the camber and toe.

TECHNICAL INFORMATION

When adjusting the camber, the toe is also always changed. The camber must therefore be adjusted first.

TECHNICAL INFORMATION

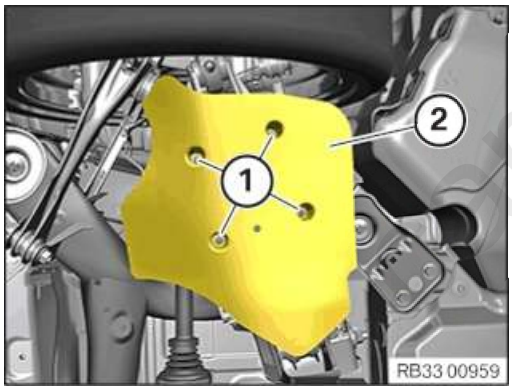
After an adjustment of the rear axle which alters the driving axis, check the alignment of the active cruise control (ACC).

NOTICE

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

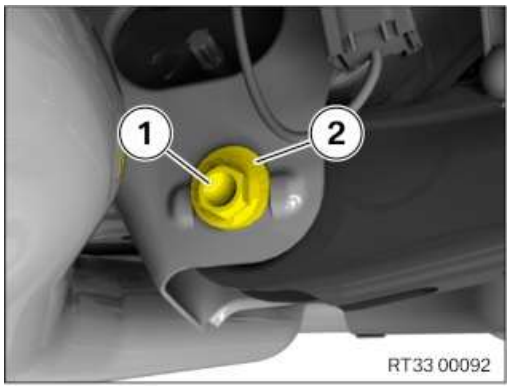
PRELIMINARY WORK

1 – Removing the cover of camber control arm

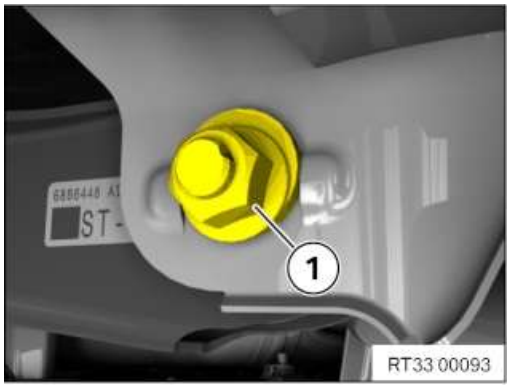


- Loosen nuts (1).
- Remove the cover (2) of camber control arm.

2 – Adjusting camber



- Turn the eccentric bolt (1) and adjust the camber to the setpoint value using the eccentric (2).



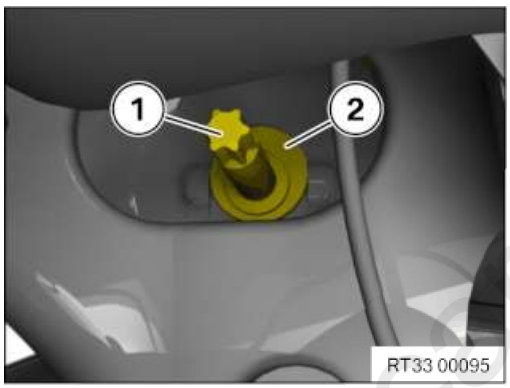
- Tighten the nut (1) in normal position.

Note: Use the eccentric bolt as counter support.

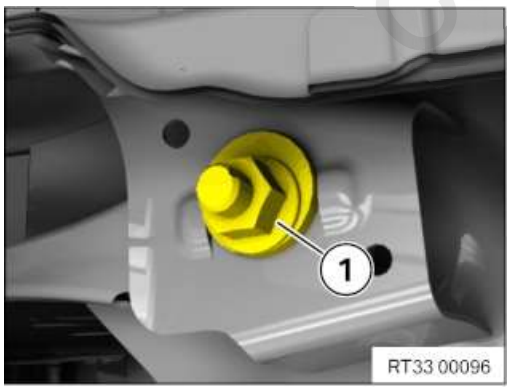
Camber control arm to rear axle support

M14	Renew eccentric bolt, nut and eccentric washer. Tighten in normal position.	Tightening torque	175 Nm

3 – Adjusting the toe



- Turn the eccentric bolt (1) and adjust the toe to the setpoint value using the eccentric (2).



- Tighten the nut (1) in normal position.

Note: Use the eccentric bolt as counter support.

Toe arm to rear axle support

M12	Replace the eccentric bolt, cam and disc. Tighten in normal position.	Tightening torque	108 Nm

POSTPROCESSES

4 – Installing the cover of the camber control arm

cardiagn.com



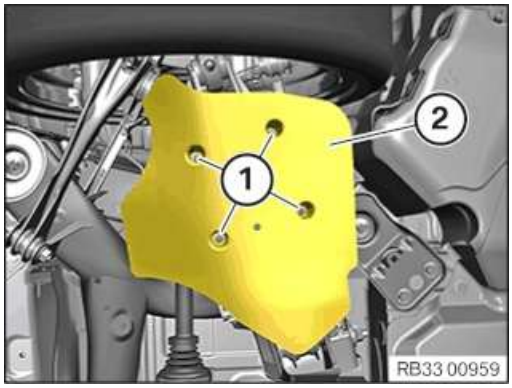
- It is imperative to note the installation location and direction of installation (1).

  Direction of installation (1):

  The arrow on the cover points in the direction of travel.

  Installation location:

  - **L** = left
  - **R** = right



- Position the cover (2) of the camber control arm on the camber control arm.
- Renew nuts (1).

  Parts: Nuts
- Tighten nuts (1).

Cover to camber control arm

M6	Replace nuts.	Tightening torque	6 Nm

5 – Adjusting front radar sensor (FRS)

TECHNICAL INFORMATION

Notes on adjusting the ACC sensor are a fundamental requirement for these repair instructions and must be complied with at all times.

For additional information see: 66 31 ... Notes on adjusting the ACC sensor

TECHNICAL INFORMATION

If there is a "Sensor misaligned" fault memory entry and the sensor cannot be aligned correctly using the adjusting screw, a front impact damage may be suspected.

In this case, the vehicle must be inspected thoroughly for damage. Damaged parts must be renewed if necessary. Then adjust the ACC sensor again.

A damaged/bent holder indicates mechanical misuse of the vehicle and must not be charged as a warranty case.

▸ **Checking vehicle and components for damage**

Check

- In the visible areas, visually check for:
  - damage
  - Deformation

Result

» Damage or deformation.

Measure

- Identify and renew damaged, deformed vehicle parts.

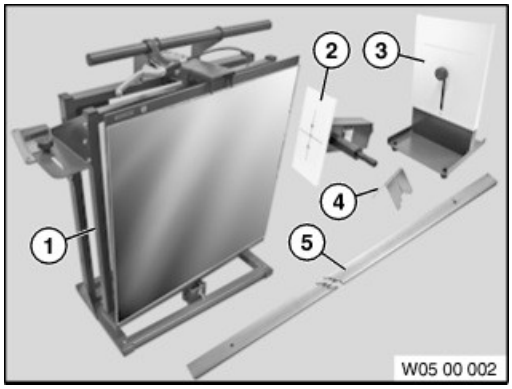
Result

» No damage or deformation

Measure

- Adjust the front radar sensor (FRS).

cardiagn.com



- Stage special tools 0 442 898 and 2 338 466.
- Set up special tool as per enclosed operating instructions.



- Connect diagnosis system.
  - Service functions
  - Driver assistance
  - Front radar sensor (FRS)
  - Front radar sensor start-up (FRS)



NOTICE

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

- Turn the screw (1) with the standard tool to adjust the front radar sensor (FRS).

  Standard tools:

  (Shaft length > 90 mm)

Additional Information

Overview of Tightening Torques

Camber control arm to rear axle support — Used in step 2

M14	Renew eccentric bolt, nut and eccentric washer. Tighten in normal position.	Tightening torque	175 Nm

Toe arm to rear axle support — Used in step 3

M12	Replace the eccentric bolt, cam and disc. Tighten in normal position.	Tightening torque	108 Nm

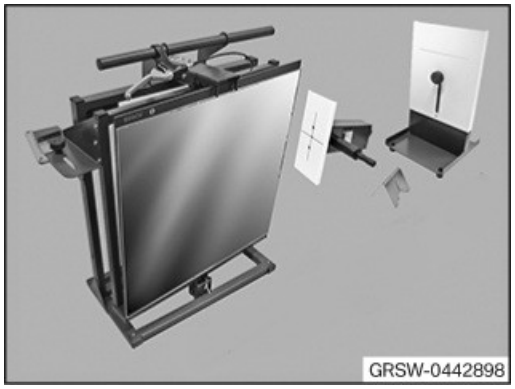
Cover to camber control arm — Used in step 4

M6	Replace nuts.	Tightening torque	6 Nm

Overview of Special Tools

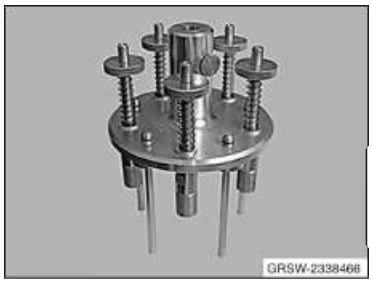
cardiagn.com

0 442 898 Measuring device



Common	Used in step 5
Usage	ACC adjusting device. Using this adjusting device, an ACC sensor built into the vehicle can be adjusted in the workshop. Is replaced from 11/2021 by 83 30 5 A40 812.
Included in the tool or work	
Storage location	Individual
Replaced by	
In connection with	
SI-Number	02 04 05 (208)

2 338 466 Holder



Common	Used in step 5
Usage	Replacement for holder 36 1 100 (0493771). Holder has longer guide pins and lengthened magnetic guides.
Included in the tool or work	
Storage location	Individual
Replaced by	
In connection with	
SI-Number	

Links

Functional descriptions	Used in step
Mirror adjustment for start-up of the front radar sensor	5
Mirror adjustment for start-up of the front radar sensor	5
Mirror adjustment to start up the front radar sensor long range	5
Mirror adjustment to start up the front radar sensor long range	5

Repair instructions	Used in step
66 31 010 Instructions for ACC adjusting device	5

cardiagn.com

32 00 621 Adjusting rear axle and renewing with eccentric screws

Prerequisite

- Vehicle stands on the vehicle hoist for wheel alignment with hydraulic jack.

TECHNICAL INFORMATION

The vehicle ride height may change due to turning the eccentric bolts (setting camber and toe). If available, activate automatic ride height measurement in the wheel alignment equipment to accurately set the camber and toe.

TECHNICAL INFORMATION

When adjusting the camber, the toe is also always changed. The camber must therefore be adjusted first.

TECHNICAL INFORMATION

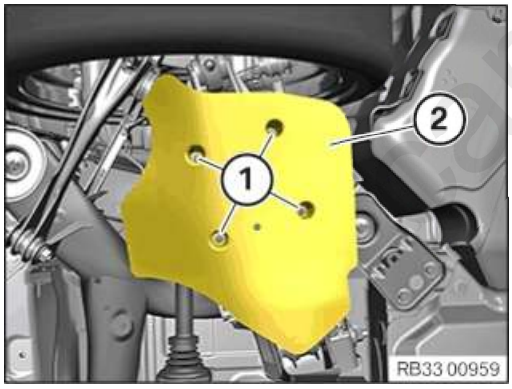
After an adjustment of the rear axle which alters the driving axis, check the alignment of the active cruise control (ACC).

NOTICE

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

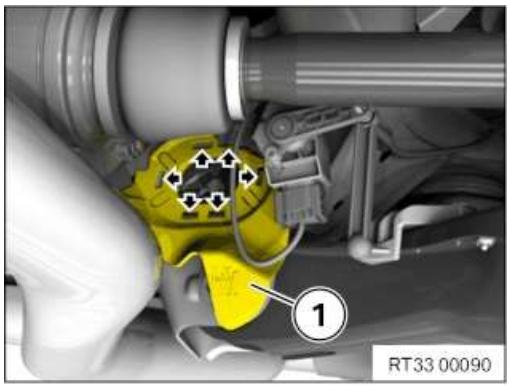
PRELIMINARY WORK

1 – Removing the cover of camber control arm



- Loosen nuts (1).
- Remove the cover (2) of camber control arm.

2 – Removing the stoneguard



- Loosen the stoneguard (1) at the latch mechanisms (arrows) and remove.

3 – Tensioning the coil spring

▸ **Preparing the special tool (G22/G23/G26/G42)**

TECHNICAL INFORMATION

Different variants may be installed depending on the vehicle equipment.



- **Basic version:**

  Spindle = Special tools and

  Upper spring cup = Special tool 5 A36 B04

  Lower spring cup = Special tool 5 A36 B05

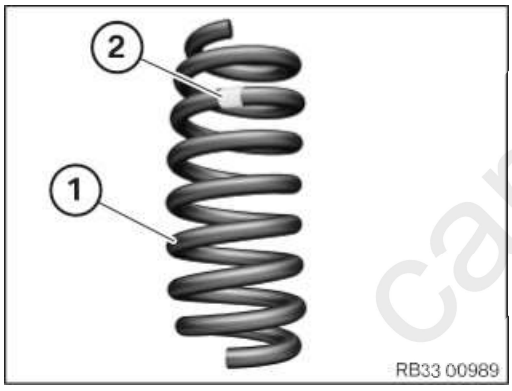


- **BMW M Performance Automobile (Sport) and Alpina:**

  Spindle = special tools , and

  Upper spring cup = Special tool

  Lower spring cup = Special tool



TECHNICAL INFORMATION

Incorrect assembly is possible. Ensure correct installation position.

- Pay attention to the identification of the mounting orientation of coil springs (1) with a label (2) .

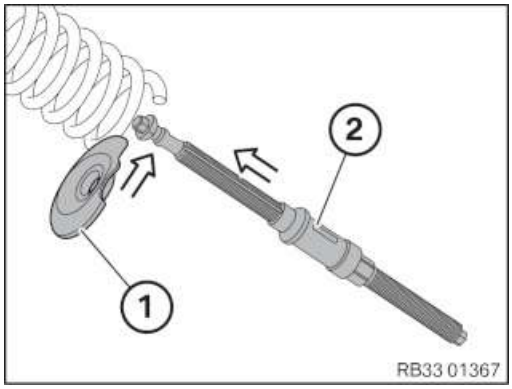
  The label (2) is attached at the top end of the coil spring (1) and is marked as “top”

- Check the label (2) on the coil spring (1) .
- If label (2) is missing on the installed coil spring (1), it is imperative to identify the mounting orientation of coil spring (1) .

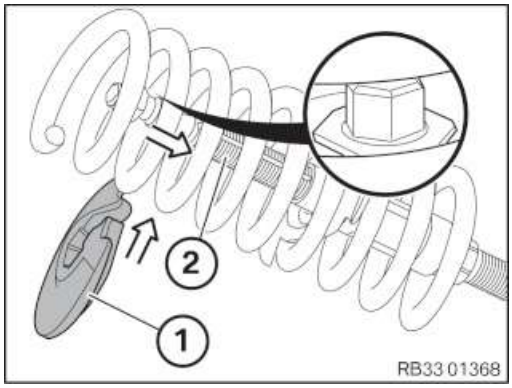
  The identification is required if the coil spring is installed again as per the repair overview.

Note: Mark the installation position of the coil spring, by attaching an adhesive tape at the top end of spring.

carmagn.com

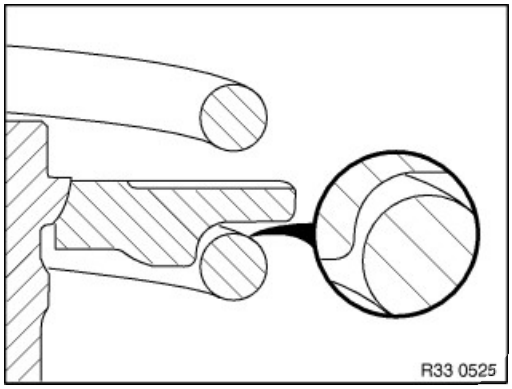


- Insert the bottom spring cup (1) sideways in the direction of arrow in the coil spring and turn up to the lowest coil.
- Insert the spindle (2) from below in the direction of arrow through the camber control arm and the bottom spring cup (1).

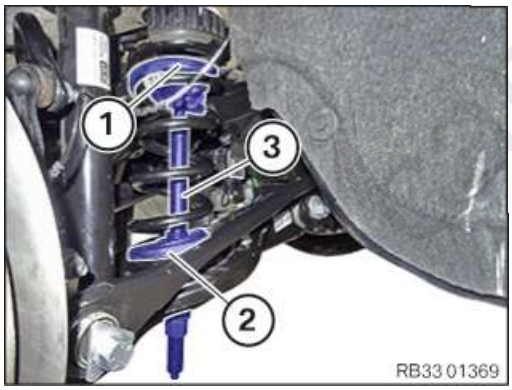


- Insert the top spring cup (1) sideways in the direction of arrow in the coil spring, feed in to the spindle (2) and turn it upwards as far as possible.

  Check the position of the spindle (2) with the hexagon in the top spring cup (1), correct if necessary.
- Pull the spindle (2) downwards in the direction of arrow.



- Check the position of the spring cup in the coil spring at the top and bottom and, if necessary, correct it.



- Align the top spring cup (1) and the bottom spring cup (2) with the spindle (3) in the centre to reach the highest possible contact surface on the coil spring.



RISK OF DAMAGE

Compression of coil spring to solid height.

Damage of the coil spring.

- Do not compress coil spring to solid height.
- Make sure there is a gap between the spring coils.

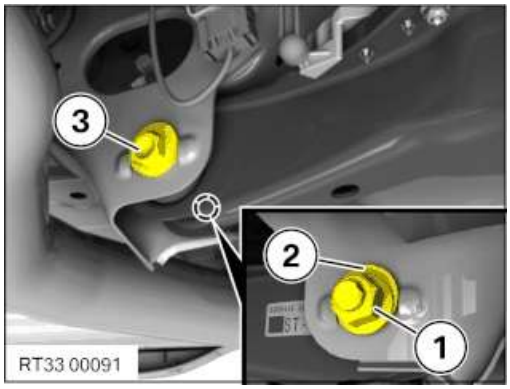
- Tension the coil spring using special tools and . In doing so, counter support at the spindle with the special tool and the standard tool (1).

  Standard tool:

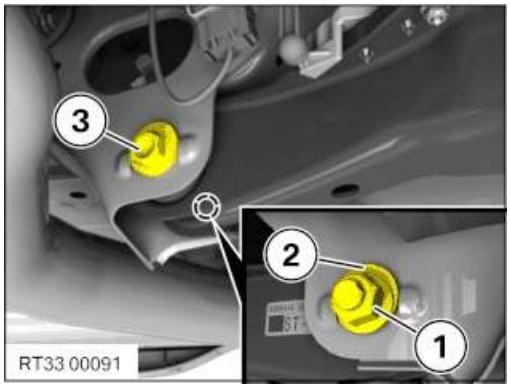
rdiagn.com

4 – Replacing eccentric bolt for the camber control arm

4 – Replacing eccentric bolt for the camber control arm



- Loosen nut (1).
- Remove the eccentric washer (2).
- Remove the eccentric bolt (3).



TECHNICAL INFORMATION

The vehicle ride height may change as a result of turning the eccentric bolts for the adjustment of toe and camber. When renewing the bolts, make sure the eccentric bolts are correctly positioned to keep the ride height change to a minimum during the adjustment work.

- Renew eccentric bolt (3), the eccentric washer (2) and the nut (1).

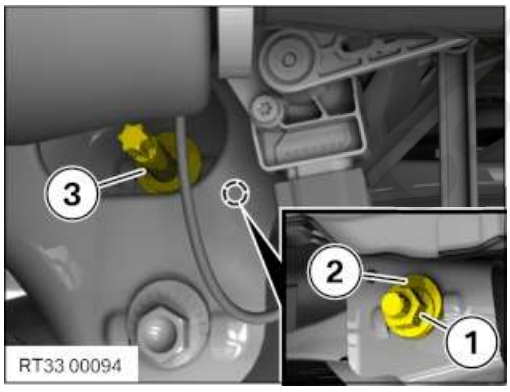
  Parts: Eccentric bolt, eccentric washer, nut
- Install the new eccentric screws (3).

  During installation, position eccentric bolt (3) in such a way that the eccentric points upward vertically.
- Install the new eccentric washers (2).

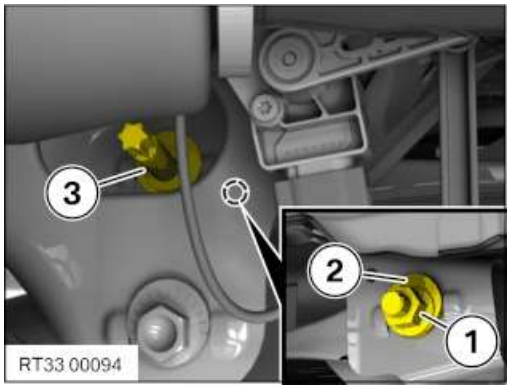
Note: It is essential to ensure the correct position of the eccentric and eccentric washer on the rear axle support.

- Tighten nut (1) to 5 Nm.

5 – Replacing eccentric bolt for the track control arm



- Loosen nut (1).
- Remove eccentric washer (2).
- Remove the eccentric bolt (3).



TECHNICAL INFORMATION

The vehicle ride height may change as a result of turning the eccentric bolts for the adjustment of toe and camber. When renewing the bolts, make sure the eccentric bolts are correctly positioned to keep the ride height change to a minimum during the adjustment work.

- Renew eccentric bolt (3), the eccentric washer (2) and the nut (1).

  Parts: Eccentric bolt, eccentric washer, nut

- Install the new eccentric screws (3).

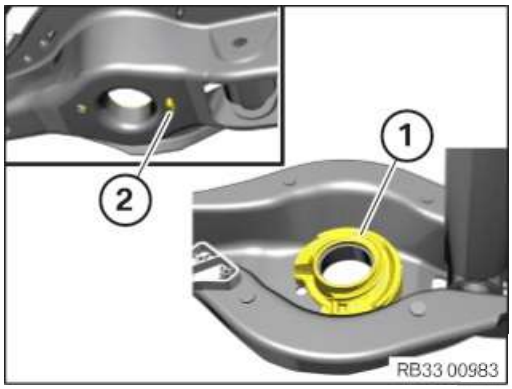
  During renewal, position eccentric bolt (3) such that the eccentric points vertically upwards.

- Install the new eccentric washers (2).

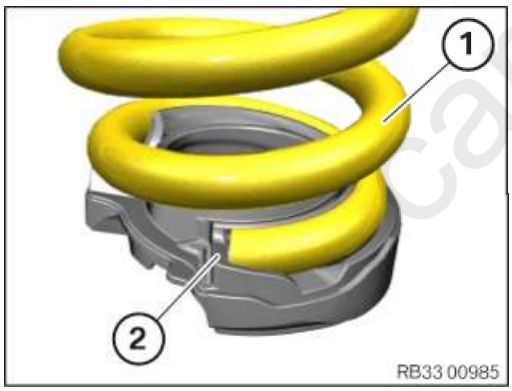
Note: It is essential to ensure the correct position of the eccentric and eccentric washer on the rear axle support.

- Tighten nut (1) to 5 Nm.

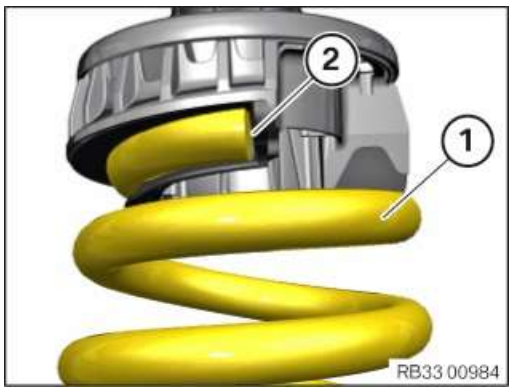
6 – Relieve tension on coil spring



- Check the lower spring pad (1) for damage and renew if necessary.
- Check the position of the lower spring pad (1) on the camber control arm with the plastic tab (2) and correct if necessary.



- Position the coil spring (1) in such a way that the coil spring end is in form-fit contact with the lower spring pad (2).



- Position the upper spring pad on the coil spring (1) in such a way that the coil spring end (2) is in form-fit contact with the upper spring pad.

carldiagn.com



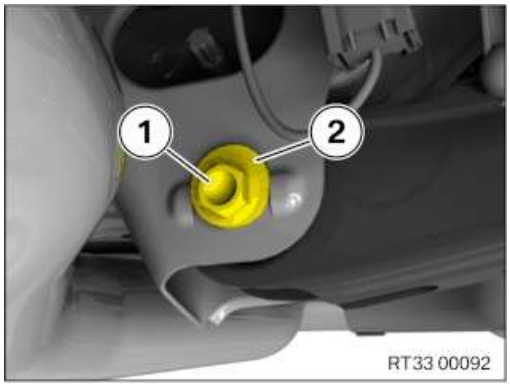
- Slacken the coil spring with the special tools and . In doing so, counter support at the spindle with the special tool and the standard tool (1).

  Standard tool:

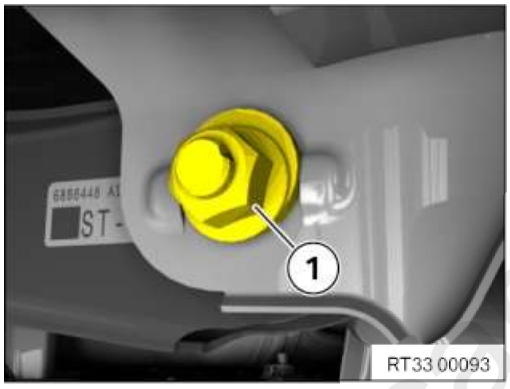
  Pay attention to the mounting orientation when releasing the coil spring, correct if necessary.
- Remove special tools.

MAIN WORK

7 – Adjusting camber



- Turn the eccentric bolt (1) and adjust the camber to the setpoint value using the eccentric (2).



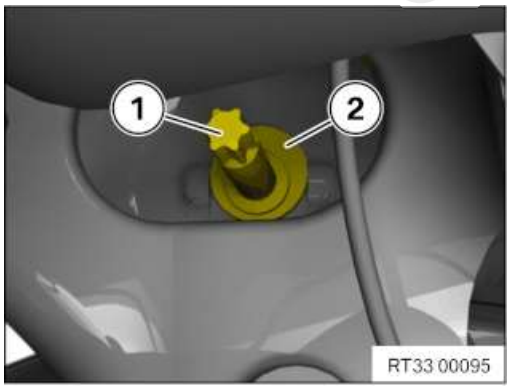
- Tighten the nut (1) in normal position.

Note: Use the eccentric bolt as counter support.

Camber control arm to rear axle support

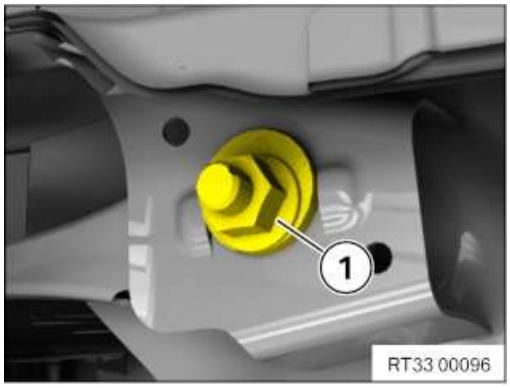
M14	Renew eccentric bolt, nut and eccentric washer. Tighten in normal position.	Tightening torque	175 Nm

8 – Adjusting the toe



- Turn the eccentric bolt (1) and adjust the toe to the setpoint value using the eccentric (2).

cardiagn.com



- Tighten the nut (1) in normal position.

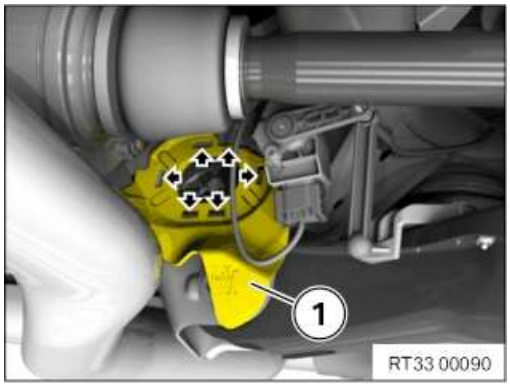
Note: Use the eccentric bolt as counter support.

Toe arm to rear axle support

M12	Replace the eccentric bolt, cam and disc. Tighten in normal position.	Tightening torque	108 Nm

POSTPROCESSES

9 – Installing the stoneguard



- Observe the marking of the installation location on the stoneguard (1)

  The arrow on the stoneguard (1) is pointing downwards.
- Install the stoneguard (1) and clip into the latch mechanisms (arrows).

10 – Installing the cover of the camber control arm

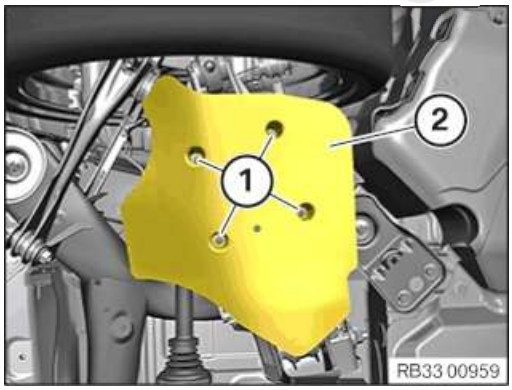


- It is imperative to note the installation location and direction of installation (1).

  Direction of installation (1):

  The arrow on the cover points in the direction of travel.

  Installation location:
  - **L** = left
  - **R** = right



- Position the cover (2) of the camber control arm on the camber control arm.
- Renew nuts (1).

  Parts: Nuts
- Tighten nuts (1).

Cover to camber control arm

M6	Replace nuts.	Tightening torque	6 Nm

11 – Adjusting front radar sensor (FRS)

cardiagn.com

TECHNICAL INFORMATION

Notes on adjusting the ACC sensor are a fundamental requirement for these repair instructions and must be complied with at all times.

For additional information see: 66 31 ... Notes on adjusting the ACC sensor

TECHNICAL INFORMATION

If there is a "Sensor misaligned" fault memory entry and the sensor cannot be aligned correctly using the adjusting screw, a front impact damage may be suspected.

In this case, the vehicle must be inspected thoroughly for damage. Damaged parts must be renewed if necessary. Then adjust the ACC sensor again.

A damaged/bent holder indicates mechanical misuse of the vehicle and must not be charged as a warranty case.

▸ **Checking vehicle and components for damage**

Check

- In the visible areas, visually check for:
  - damage
  - Deformation

Result

» Damage or deformation.

Measure

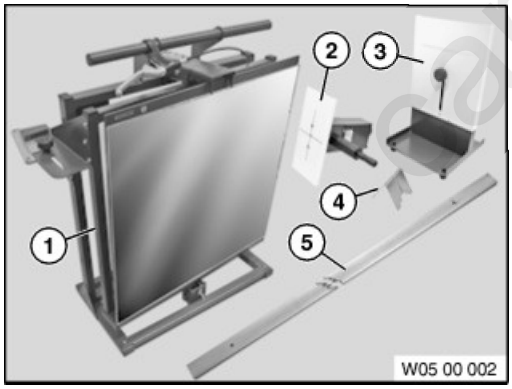
- Identify and renew damaged, deformed vehicle parts.

Result

» No damage or deformation

Measure

- Adjust the front radar sensor (FRS).
- Stage special tools 0 442 898 and 2 338 466.
- Set up special tool as per enclosed operating instructions.





- Connect diagnosis system.
  - Service functions
  - Driver assistance
  - Front radar sensor (FRS)
  - Front radar sensor start-up (FRS)

carqiagn.com



NOTICE

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

- Turn the screw (1) with the standard tool to adjust the front radar sensor (FRS).

  Standard tools:

  (Shaft length > 90 mm)

Additional Information

Overview of Tightening Torques

Camber control arm to rear axle support — Used in step 7

M14	Renew eccentric bolt, nut and eccentric washer. Tighten in normal position.	Tightening torque	175 Nm

Toe arm to rear axle support — Used in step 8

M12	Replace the eccentric bolt, cam and disc. Tighten in normal position.	Tightening torque	108 Nm

Cover to camber control arm — Used in step 10

M6	Replace nuts.	Tightening torque	6 Nm

Overview of Special Tools

5 A36 B04 Spring cups



Common — Used in step 3

Usage	Spring cup for disassembly and installation of suspension springs on the rear axle in connection with the spring tensioner basic unit, SWZ 33 5 010 or SWZ 33 5 100.
Included in the tool or work	
Storage location	Individual
Replaced by	
In connection with	
SI-Number	01 23 21 (851)

carDiagn.com

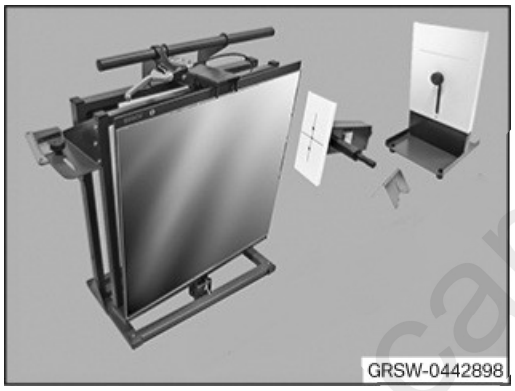
5 A36 B05 Spring cups



Common Used in step 3

Usage	Spring cup for disassembly and installation of suspension springs on the rear axle in connection with the spring tensioner basic unit, SWZ 33 5 010 or SWZ 33 5 100.
Included in the tool or work	
Storage location	Individual
Replaced by	
In connection with	
SI-Number	01 23 21 (851)

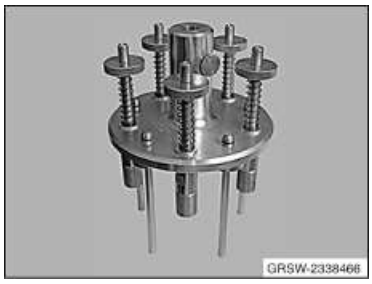
0 442 898 Measuring device



Common Used in step 11

Usage	ACC adjusting device. Using this adjusting device, an ACC sensor built into the vehicle can be adjusted in the workshop. Is replaced from 11/2021 by 83 30 5 A40 812.
Included in the tool or work	
Storage location	Individual
Replaced by	
In connection with	
SI-Number	02 04 05 (208)

2 338 466 Holder



Common Used in step 11

Usage	Replacement for holder 36 1 100 (0493771). Holder has longer guide pins and lengthened magnetic guides.
Included in the tool or work	
Storage location	Individual
Replaced by	
In connection with	
SI-Number	

Links

Functional descriptions	Used in step

cardiagn.com

Mirror adjustment for start-up of the front radar sensor	11
Mirror adjustment for start-up of the front radar sensor	11
Mirror adjustment to start up the front radar sensor long range	11
Mirror adjustment to start up the front radar sensor long range	11

Repair instructions	**Used in step**
66 31 010 Instructions for ACC adjusting device	11

cardiagn.com

32 00 601 Adjusting toe-in on front axle

TECHNICAL INFORMATION

Camber and toe-in influence each other. Adjust the toe-in first in order to simplify the adjustment procedure. The camber adjustment is performed only with the replacement of the swivel bearing. There are various swivel bearings (+/ -30') for this purpose.

TECHNICAL INFORMATION

Changes in axle geometry caused by accidents must under no circumstances be rectified by camber adjustment.

TECHNICAL INFORMATION

Before a toe adjustment and after the electromechanical steering gear (EPS) has been renewed, a start-up (initialisation) of the electromechanical steering gear (EPS) must be carried out.

PRELIMINARY WORK

1 – Performing start-up (initialisation) of the electromechanical steering



- Connect vehicle to the diagnosis system.
- Service function "EPS: Perform start-up (initialisation) of the steering.

2 – Moving the steering wheel to the straight-ahead position (centre position)



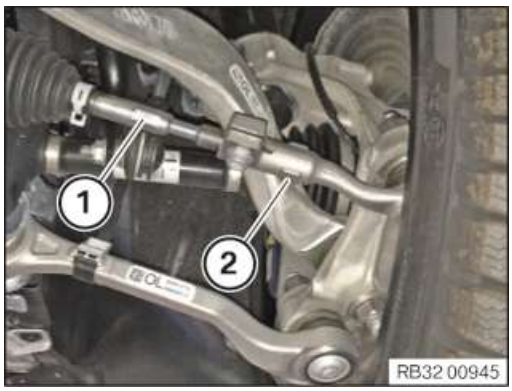
- Connect vehicle to diagnosis system.
- Select EPS sprocket angle under "Control unit functions / diagnosis request".
- Turn the steering wheel, adjust the EPS sprocket angle = 0° (centre position).
- Mount the steering wheel in this position (sprocket angle = 0°) with the steering wheel clamp.

cardiagn.com

3 – Adjusting toe-in on front axle



- Slacken screw (1).



- Clean thread on track rod.

  Twist track rod (1), grip track rod end (2) if necessary in order to adjust the toe-in to the setpoint value.



- Tighten down screw (1).

Track rod end to track rod

M10	Tightening torque	32 Nm

cardiagn.com

4 – Check the straight-ahead driving position of the steering wheel

Check

- For straight-ahead driving, check the correct straight-ahead driving position of the steering wheel.

Result

» The steering wheel has an inclination during straight-ahead driving.

Measure

- Check and adjust the toe-in on the front axle.

Additional Information

Overview of Tightening Torques

Overview of Tightening Torques

Track rod end to track rod Used in step 3

M10		Tightening torque	32 Nm

cardiagn.com

32 00 150 Carry out Kinematics Diagnosis System wheel alignment with vehicle load up to design position

Prerequisite

- Only BMW approved wheel and tyre combinations are installed on the vehicle. The right and left tread depth differs by max 2 mm.

TECHNICAL INFORMATION

Basically a **wheel alignment must always be carried out with ride height measurement without vehicle load**.

For more information see: 32 00 155 Kinematics Diagnosis System wheel alignment with ride height measurement without loading the vehicle.

Carry out wheel alignment with vehicle load up to design position, if the technical prerequisites for a **wheel alignment with ride height measurement without vehicle load** are not fulfilled or if it is a damaged vehicle.

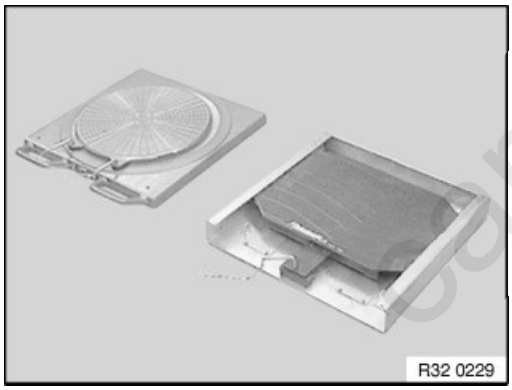
TECHNICAL INFORMATION

Before a toe adjustment and after the electromechanical steering gear (EPS) has been renewed, a start-up (initialisation) of the electromechanical steering gear (EPS) must be carried out.

PRELIMINARY WORK

1 – Preliminary work before wheel alignment

- Correctly adjust tyre pressure.
- Check chassis components for damage and repair, if necessary.
- Drive the vehicle onto the axle alignment test stand so the front wheels and rear wheels are positioned in the centre of the rotating/sliding plates.



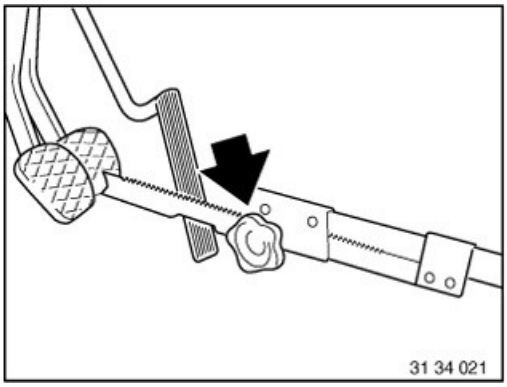
TECHNICAL INFORMATION

Please observe the regulations of the various equipment manufacturers.

- Position pickups/ride height sensors on the vehicle.
- In the Kinematics Diagnosis System, enter the customer and vehicle data.
- Identify the equipment specifications of the vehicle and select the vehicle.

  If the spring strut does not feature a label to identify the suspension, the type of chassis and suspension can be identified by the part number in the Electronic Parts Catalogue.
- Enter tyre pressure and tread depth.
- Remove locking pins from both rotating and sliding plates.

carsdiagn.com



- Install the brake pedal tensioner.

2 – Moving vehicle into normal position

- Check vehicle interior and luggage compartment (including spare wheel well) for load status, if applicable, unload vehicle.
- Place specified DIN load into motor vehicle.

DIN normal position loading

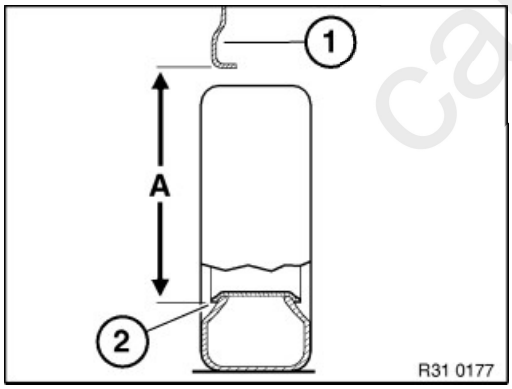
	Vehicle has a full tank.
	Vehicle is completely assembled.
Per front seat (seat in centre position)	68 kg
On the centre rear seat	68 kg
Centred in the luggage compartment	21 kg

3 – Moving vehicle into design position

- Lay weights in the area of the spring strut until the vehicle ride height is within the tolerance!

Tolerance for ride height at design level

Tolerance for setpoint value	max. 2 mm
Difference between left and right	max. 2 mm



- Measuring vehicle ride height (A): (1)Attach the tape measure to the bottom rim flange (2) and measure the distance to the lower wheel arch edge.

MAIN WORK

4 – Perform chassis alignment check

- Perform the introductory wheel alignment in accordance with equipment manufacturer's instructions.
- If necessary, adjust the front axle and the rear axle.
- Perform the final wheel alignment in accordance with equipment manufacturer's instructions.
- Save and print out test record.

cardiagn.com

POSTPROCESSES

5 – Removing the wheel alignment equipment

- Insert locking pins into both rotary and sliding plates.
- Remove quick releases.
- Remove weights from the vehicle.

Additional Information

Overview Technical Data

DIN normal position loading	Used in step 2
	Vehicle has a full tank.
	Vehicle is completely assembled.
Per front seat (seat in centre position)	68 kg
On the centre rear seat	68 kg
Centred in the luggage compartment	21 kg

Tolerance for ride height at design level	Used in step 3
Tolerance for setpoint value	max. 2 mm
Difference between left and right	max. 2 mm

Links

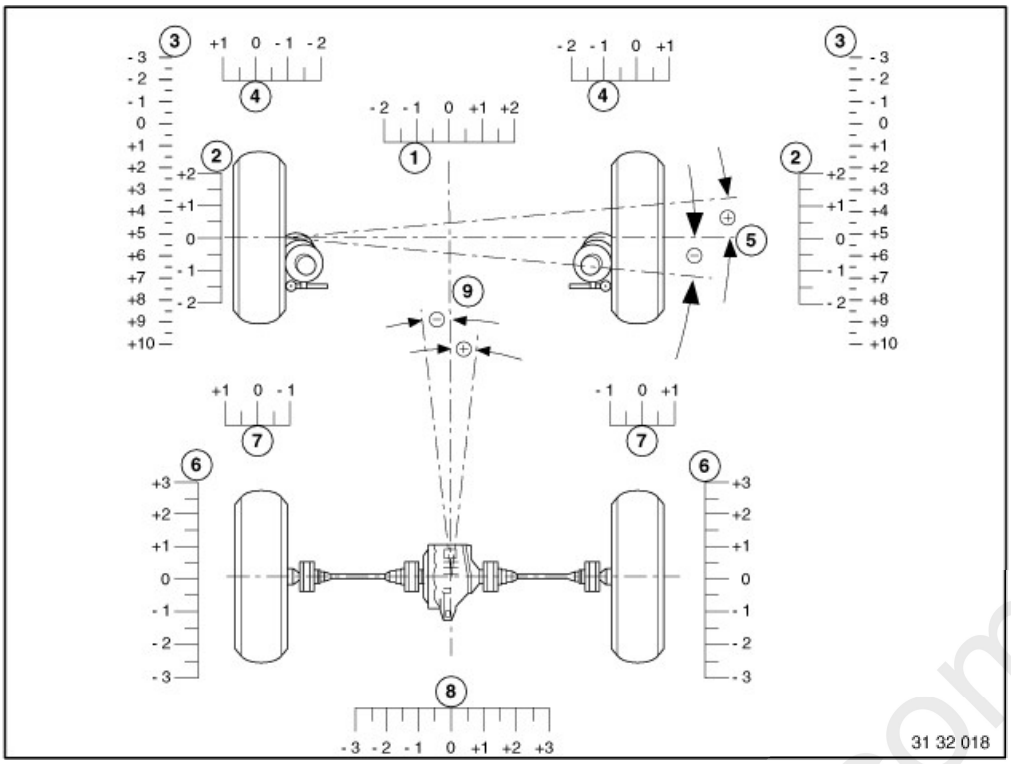
General repair instructions	**Used in step**
32 00 ... KDS data statuses	

Repair instructions	**Used in step**
32 00 ... General information and definitions	
32 00 155 Kinematics Diagnosis System wheel alignment with ride height measurement without loading the vehicle	

Graphic	**Used in step**
32 00 ... General chassis and suspension definitions	

cardiagn.com

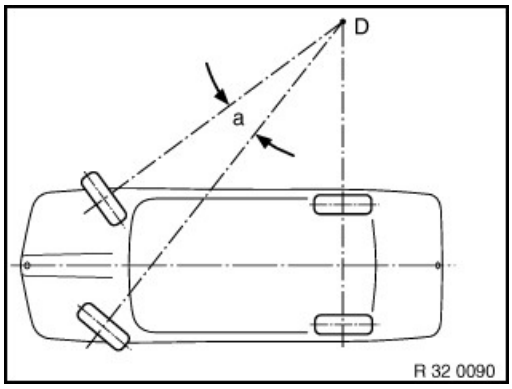
32 00 ... General chassis and suspension definitions



1. Toe
2. Camber
3. Caster (with 10° or 20° wheel lock)
4. Toe angle difference (with 20° wheel lock)
5. Wheel misalignment
6. Camber
7. Rear-wheel position
8. Toe
9. Geometrical driving axis

cardiagn.com

32 00 ... General information and definitions



Toe angle difference

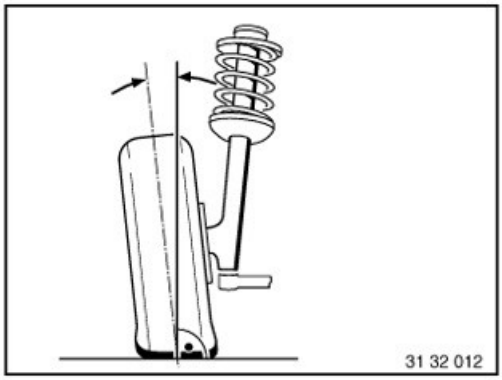
a Toe difference angle

D Centre point of operating circle

The toe angle difference is the angle adjustment of the inner cornering wheel relative to the outer cornering wheel when negotiating a curve. Steering is designed in such a way that angular position of wheels changes as steering lock progresses.

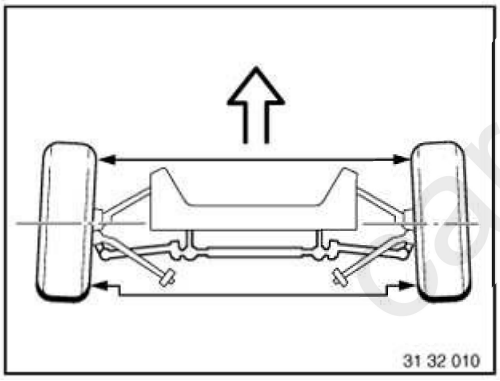
A correctly adjusted toe angle difference produces equal values for left and right lock with consideration of factory tolerances.

Toe angle difference provides information on corresponding operation of steering trapezoid for left or right steering lock from centre position.



Camber

Inclination of the wheel from the perpendicular.

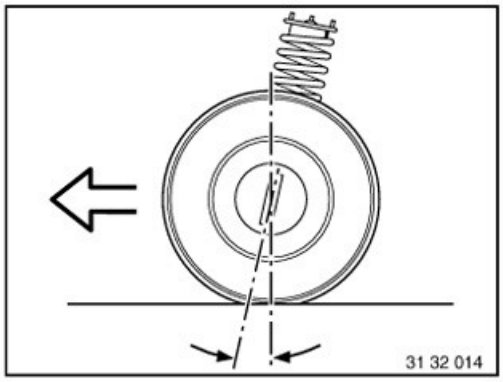


Toe

Reduction in distance of front of front wheels to rear of front wheels. The toe-in prevents the wheels from moving apart during driving and thus:

- the wheels from vibrating and grinding
- excessive tire wear
- excessive strain on the steering linkage and its links/joints
- heavy vehicle steering

Measurement is performed in ”straight-ahead mode”.

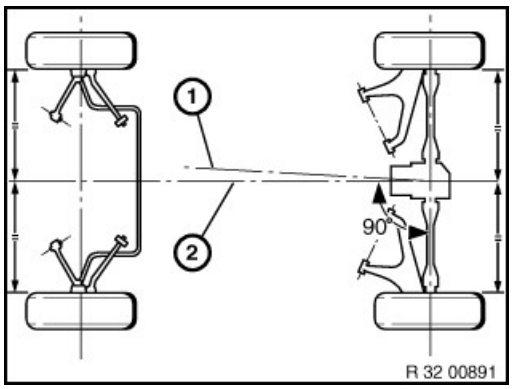


Castor

Is the inclination of the kingpin in the direction of travel viewed from the side. The line through the centre point of the spring strut support bearing and the control arm ball joint corresponds to the ”kingpin”.

Thanks to caster, wheels are pulled and not pushed. In a similar manner to king pin inclination, when driving in curves or around corners, returning forces are reproduced to help return wheels to straight-ahead position.

cardiagn.com



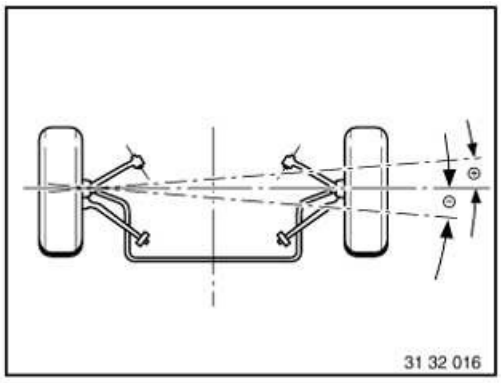
Geometrical driving axis 1

Is the angle bisector from the total rear-wheel toe.

Front-wheel measurements are taken in reference to this axis.

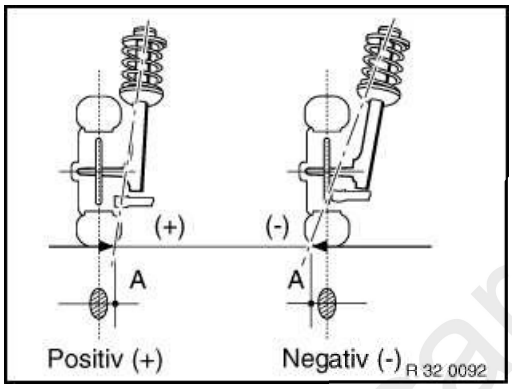
Symmetrical axis 2

Centre line running through front and rear axles.



Wheel misalignment

Angle by which one front wheel is displaced more towards front or rear than the other front wheel. The wheel offset angle is positive when the right wheel is displaced towards the front and negative when it is displaced towards the rear.



Kingpin offset/scrub radius

Is the distance from the centre of the wheel contact face to the intersection point of the kingpin extension.The line through the centre point of the spring strut support bearing and the control arm ball joint corresponds to the ”kingpin”.

The scrub radius is influenced by camber, kingpin angle and wheel offset of the wheel rim.

cardiagn.com

32 00 ... KDS data statuses

Setpoint values for wheel alignment are not published in ISTA.

The current nominal values can be found in the BMW Group Dealer and Importer Portal (S-Gate).

See:

- BMW Group Dealer and Importer Portal B2D (S-Gate)
  - Select Aftersales
  - Select Dealer equipment catalogue
  - Select WE
  - Select BMW WE
  - Select Wheel alignment
  - Select KDS nominal values
  - Select e.g. Beissbarth KDS software update, copy data

We recommend that the data records are updated on a regular basis.

Contact your National Sales Company if you do not have access to the portals listed.

cardiagn.com

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

Prerequisite

- Only BMW approved wheel and tyre combinations are installed on the vehicle. The tread depth on the left and right differs by a maximum of 2 millimetres.

TECHNICAL INFORMATION

Only carry out **wheel alignment using a Kinematics Diagnosis System with ride height measurement and without vehicle load** if the technical prerequisites have been complied with.

If the technical prerequisites are not complied with or this process concerns a damaged vehicle, carry out **wheel alignment using a Kinematics Diagnosis System with vehicle load up to design position**.

For more information see: 32 00 150 Carry out Kinematics Diagnosis System wheel alignment with vehicle load up to design position.

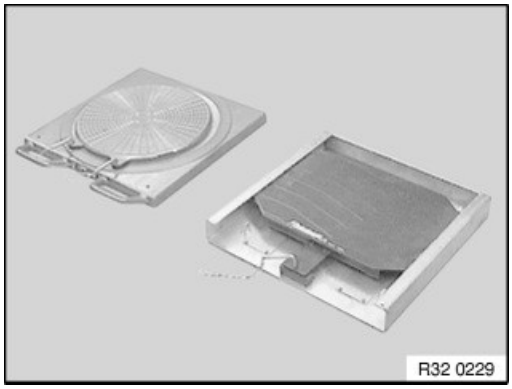
TECHNICAL INFORMATION

Before a toe adjustment and after the electromechanical steering gear (EPS) has been renewed, a start-up (initialisation) of the electromechanical steering gear (EPS) must be carried out.

cardiagn.com

1 – Preliminary work before wheel alignment

- Correctly adjust tyre pressure.
- Check chassis components for damage and repair, if necessary.



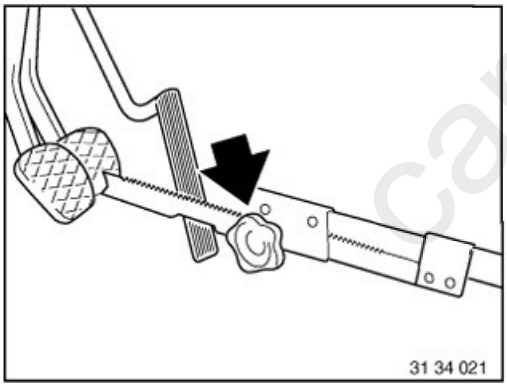
- Drive the vehicle onto the axle alignment test stand so the front wheels and rear wheels are positioned in the centre of the rotating/sliding plates.

TECHNICAL INFORMATION

Please observe the regulations of the various equipment manufacturers.

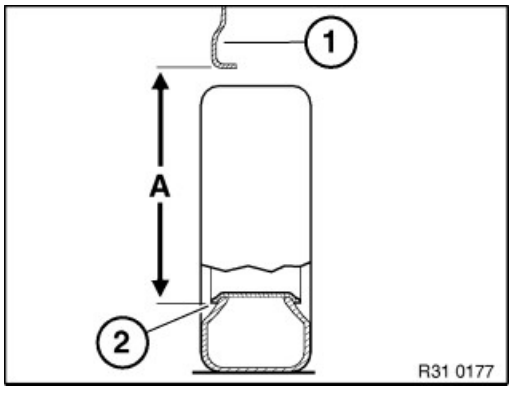
- Position pickups/ride height sensors on the vehicle.
- In the Kinematics Diagnosis System, enter the customer and vehicle data.
- Identify the equipment specifications of the vehicle and select the vehicle.

  If the spring strut does not feature a label to identify the suspension, the type of chassis and suspension can be identified by the part number in the Electronic Parts Catalogue.
- Enter tyre pressure and tread depth.
- Remove locking pins from both rotating and sliding plates.



- Install the brake pedal tensioner.

2 – Measuring vehicle ride height



- Determine ride height (A): For this purpose, attach the tape measure centrally on the rim flange (2) and measure towards the wheel arch lower edge (1).
- Load or unload the vehicle to keep the ride height within the prescribed tolerances.

Ride height with vehicle load tolerance

Minimum value	min. - 20 mm
Maximum value	max. + 40 mm

cardiagn.com

MAIN WORK

3 – Perform chassis alignment check

- Perform the introductory wheel alignment in accordance with equipment manufacturer's instructions.
- If necessary, adjust the front axle and the rear axle.
- Perform the final wheel alignment in accordance with equipment manufacturer's instructions.
- Save and print out test record.

POSTPROCESSES

4 – Removing the wheel alignment equipment

- Insert locking pins into both rotary and sliding plates.
- Remove quick releases.
- Remove weights from the vehicle.

Additional Information

Overview Technical Data

Ride height with vehicle load tolerance	Used in step 2
Minimum value	min. - 20 mm
Maximum value	max. + 40 mm

Links

General repair instructions	Used in step
32 00 ... KDS data statuses	

Repair instructions	Used in step
32 00 ... General information and definitions	
32 00 150 Carry out Kinematics Diagnosis System wheel alignment with vehicle load up to design position	

Graphic	Used in step
32 00 ... General chassis and suspension definitions	

cardiagn.com

32 00 ... Notes on replacement of steering gear/steering column/steering shaft following accident damage

Steering gear facts:

In the event of accidents or driving conditions similar to accidents, shock-like loads can cause different types of damage to steering boxes. When a steering box is externally undamaged, it is sometimes only possible to identify damage with great difficulty and with great effort. However, damage of this nature poses an unacceptable risk to the vehicle because it can result in failure of the steering system.

Because of the disproportionate amount of effort involved, it is generally not sensible to check thoroughly all the individual components of the steering box and as an alternative it is necessary to take into account other components which can be checked more easily.

Steering gear procedure:

The steering box must be replaced if one or more of the following points apply:

A. Visible or noticeable damage to the steering box
   - Version with electric steering box (EPS): Examine in particular the control unit with all plug connections for damage and hairline cracks.

B. Unacceptable torque increase and jamming when the steering box is turned from lock to lock (without hydraulic/electrical assistance)

C. Fire damage

D. Damage, permanent deformation or fractures to:
   - Wheel rims in the event of a negative result from the wheel alignment check
   - Spring struts, steering stubs, wheel carriers
   - Wishbones
   - Struts or trailing links or anti-roll bar with this function
   - Body-side screwing/attachment points for wheel guide/control components
   - Front axle support
   - Pitman arms
   - Track rods
   - Steering box fixtures
   - Steering column

   A lopsided steering wheel, significant deviations of camber/track values and noises when cranking the steering can be additional indications for the damage/deformations listed here.

Note:

If the steering box replacement work which is required for safety reasons is refused by the customer or an insurance company for cost reasons, a memorandum to that effect must be drawn up and countersigned by the party bearing the costs of the accident repair.

For corresponding specimen of memorandum, refer to Service Information (bulletin) 320188(828) Appendix 1

Actual situation of the steering column and steering shaft:

In the event of accidents or driving conditions similar to accidents, shock-like loads can cause different types of damage to the steering shaft and steering column. In case no external damaged of the steering column and the steering shaft can be noticed, it is sometimes only possible to identify damage with great difficulty and with great effort.

Proceedure for steering column and steering shaft:

The steering column and steering shaft must be replaced if one or more of the following points apply:

- Visible or noticeable damage, deformation or breakage of the steering column or steering shaft
- Damage, permanent deformation or breakage of the track rod
- Unacceptable torque increase and jamming when the steering column is cranked from limit position to limit position (without hydraulic/electrical assistance)

cardiagn.com

- If the wheel alignment nominal data cannot be reached after all the damaged wheel components are changed (exceedance of the permissible wheel alignment tolerances). If required, enclose the measurement protocol of the invoice/certificate.
- Positive check for activated crash system of the steering column:
- If no damage is visible on the steering column, the mechanical steering column must be checked for an activated crash system:
    1. Open steering column lock
    2. Pull steering wheel out towards the driver (towards the body) until the physical limit position is reached, but do not use excessive force
    3. Push steering wheel towards engine compartment (approx. 20-30 mm away from body) into the comfort position and lock

       If no end stop is present when pulling out the steering column or the gaiter of the steering column shroud has tension, the crash system has activated and the steering column is to be renewed.

Note:

If the steering column/steering shaft replacement work which is required for safety reasons is rejected by the customer or an insurance company for cost reasons, a memorandum to that effect must be drawn up and countersigned by the party bearing the costs of the accident repair.

For corresponding specimen of the memorandum, refer to Service Information 320188(828) Appendix 1

Attention!

The vehicle's operating licence will be invalidated whenever the function of any of its safety components is compromised!

This guideline is binding for all accident repairs to BMW, MINI and Rolls Royce vehicles!

cardiagn.com

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

Warning!

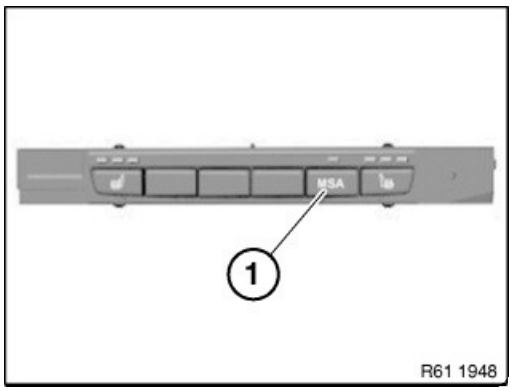
If the engine hood/bonnet contact is pulled upwards (workshop mode), the information "switch closed" is output. The automatic engine start-stop function is active.

An automatic engine start is possible.

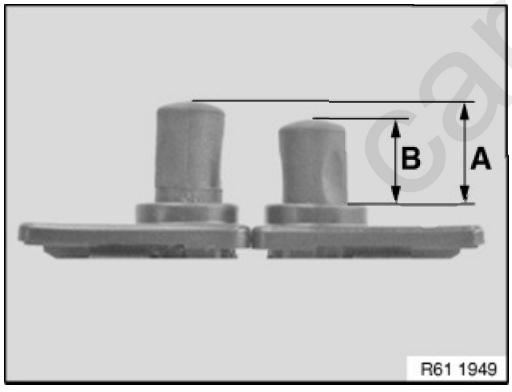
Observe safety precautions when working on MSA vehicles.

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

cardiagn.com

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

cardiagn.com

32 00 ... Troubleshooting chassis mechanics

For "Chassis mechanics" troubleshooting, work through the troubleshooting tree with the aid of the Diagnosis and Information System.

See Diagnosis and Information System under the following structure tree:

- Activities
- Function structure
- Non-electrical diagnosis
- Chassis and suspension
- Malfunction
- Wheel alignment

cardiagn.com

32 00 ... Notes on replacement of steering gear/steering column/steering shaft following accident damage

Steering gear facts:

In the event of accidents or driving conditions similar to accidents, shock-like loads can cause different types of damage to steering boxes. When a steering box is externally undamaged, it is sometimes only possible to identify damage with great difficulty and with great effort. However, damage of this nature poses an unacceptable risk to the vehicle because it can result in failure of the steering system.

Because of the disproportionate amount of effort involved, it is generally not sensible to check thoroughly all the individual components of the steering box and as an alternative it is necessary to take into account other components which can be checked more easily.

Steering gear procedure:

The steering box must be replaced if one or more of the following points apply:

A. Visible or noticeable damage to the steering box
   - Version with electric steering box (EPS): Examine in particular the control unit with all plug connections for damage and hairline cracks.

B. Unacceptable torque increase and jamming when the steering box is turned from lock to lock (without hydraulic/electrical assistance)

C. Fire damage

D. Damage, permanent deformation or fractures to:
   - Wheel rims in the event of a negative result from the wheel alignment check
   - Spring struts, steering stubs, wheel carriers
   - Wishbones
   - Struts or trailing links or anti-roll bar with this function
   - Body-side screwing/attachment points for wheel guide/control components
   - Front axle support
   - Pitman arms
   - Track rods
   - Steering box fixtures
   - Steering column

   A lopsided steering wheel, significant deviations of camber/track values and noises when cranking the steering can be additional indications for the damage/deformations listed here.

Note:

If the steering box replacement work which is required for safety reasons is refused by the customer or an insurance company for cost reasons, a memorandum to that effect must be drawn up and countersigned by the party bearing the costs of the accident repair.

For corresponding specimen of memorandum, refer to Service Information (bulletin) 320188(828) Appendix 1

Actual situation of the steering column and steering shaft:

In the event of accidents or driving conditions similar to accidents, shock-like loads can cause different types of damage to the steering shaft and steering column. In case no external damaged of the steering column and the steering shaft can be noticed, it is sometimes only possible to identify damage with great difficulty and with great effort.

Proceedure for steering column and steering shaft:

The steering column and steering shaft must be replaced if one or more of the following points apply:

- Visible or noticeable damage, deformation or breakage of the steering column or steering shaft
- Damage, permanent deformation or breakage of the track rod
- Unacceptable torque increase and jamming when the steering column is cranked from limit position to limit position (without hydraulic/electrical assistance)

cardiagn.com

- If the wheel alignment nominal data cannot be reached after all the damaged wheel components are changed (exceedance of the permissible wheel alignment tolerances). If required, enclose the measurement protocol of the invoice/certificate.
- Positive check for activated crash system of the steering column:
- If no damage is visible on the steering column, the mechanical steering column must be checked for an activated crash system:
    1. Open steering column lock
    2. Pull steering wheel out towards the driver (towards the body) until the physical limit position is reached, but do not use excessive force
    3. Push steering wheel towards engine compartment (approx. 20-30 mm away from body) into the comfort position and lock

       If no end stop is present when pulling out the steering column or the gaiter of the steering column shroud has tension, the crash system has activated and the steering column is to be renewed.

Note:

If the steering column/steering shaft replacement work which is required for safety reasons is rejected by the customer or an insurance company for cost reasons, a memorandum to that effect must be drawn up and countersigned by the party bearing the costs of the accident repair.

For corresponding specimen of the memorandum, refer to Service Information 320188(828) Appendix 1

Attention!

The vehicle's operating licence will be invalidated whenever the function of any of its safety components is compromised!

This guideline is binding for all accident repairs to BMW, MINI and Rolls Royce vehicles!

cardiagn.com

32 11 100 Replacing gaiter for steering box on left or right

TECHNICAL INFORMATION

Perform wheel alignment after installation.

NOTICE

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

PRELIMINARY WORK

1 – Determine which variant of the steering gear is installed

Prerequisite

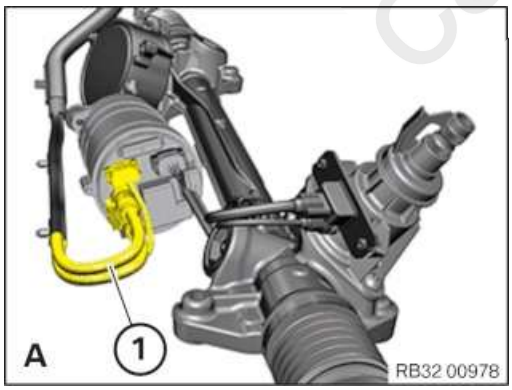
If necessary, cover of the steering assembly has been removed.

TECHNICAL INFORMATION

Different variants may be installed depending on the vehicle equipment.

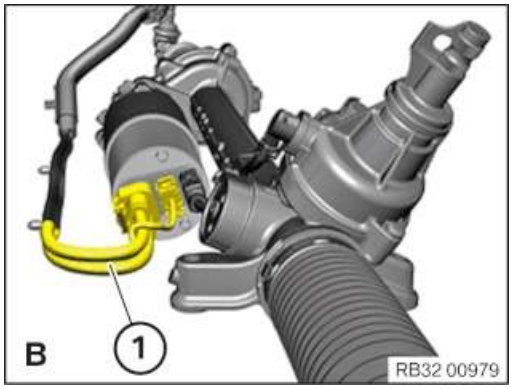


- Determine which variant of the steering gear (1) is installed.
- **It is mandatory** to use the special tools described in the relevant steps (variant A or B) when installing and removing the gaiter and tie rod.



- **Version A:**

  Plug connections of the wiring harness (1) at steering gear arranged on top of each other.



- **Version B:**

  Plug connections of the wiring harness (1) at steering gear arranged next to each other.

2 – Remove front left or right wheel

▸ **Removing the wheel**



TECHNICAL INFORMATION

A wheel lift is recommended for easier wheel removal and installation without exertion (see Retailer Equipment Catalogue).

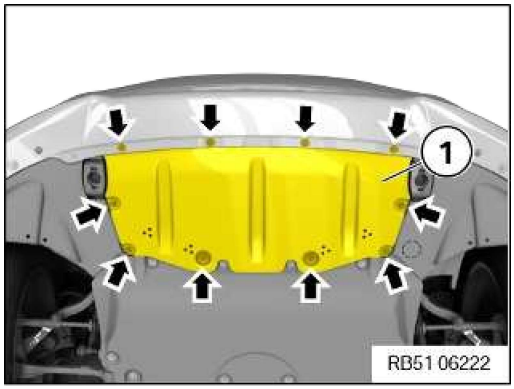
- **In vehicles with M Carbon ceramic brake: The wheel lift must be used to remove the wheel.**

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



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

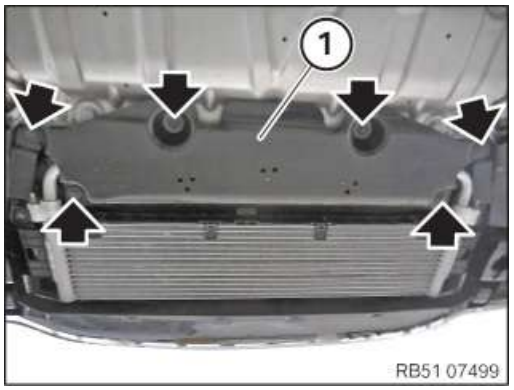
3 – Removing the front underbody protection



- **Version A:**

  Remove screws (arrows).

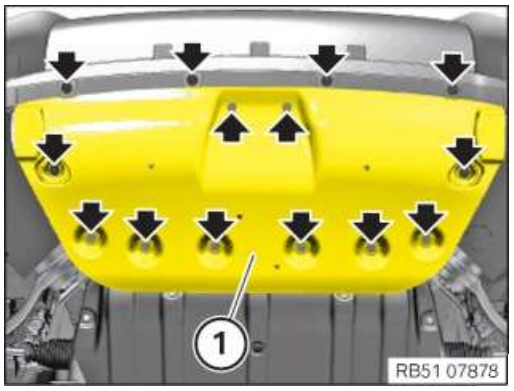
  Feed front underbody protection (1) backwards out of the bumper panel.



- **Version B:**

  Remove screws (arrows).

  Guide out front underbody protection (1) and remove it.

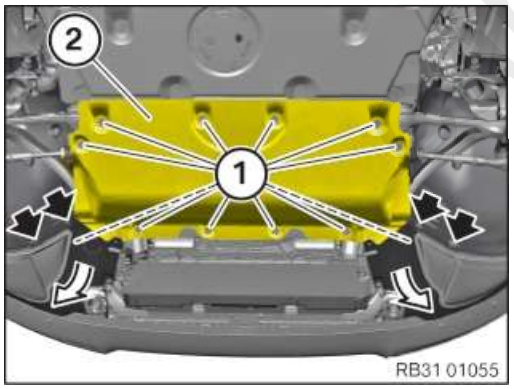


- **Version C:**

  Remove screws (arrows).

  Guide out front underbody protection (1) and remove it.

4 – Remove the underbody protection of the steering gear



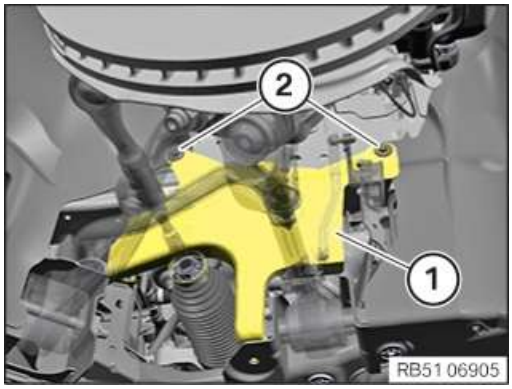
- Unscrew the screws (arrows) of the wheel arch cover on wheel arch cover.
- Fold the bottom wheel arch cover in the direction of arrow to one side.
- Loosen screws (1).
- Remove underbody protection of the steering gear (2).

5 – Remove the cover of the steering assembly

Prerequisite

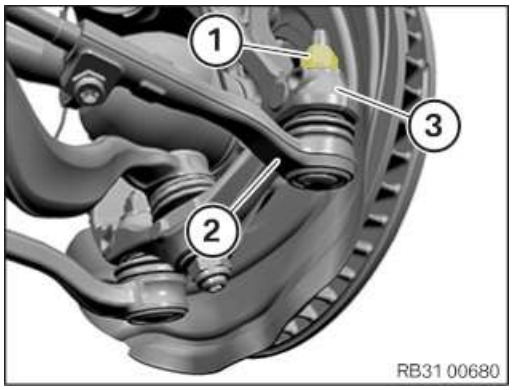
Underbody protection of the steering gear is removed.

rdiagn.com

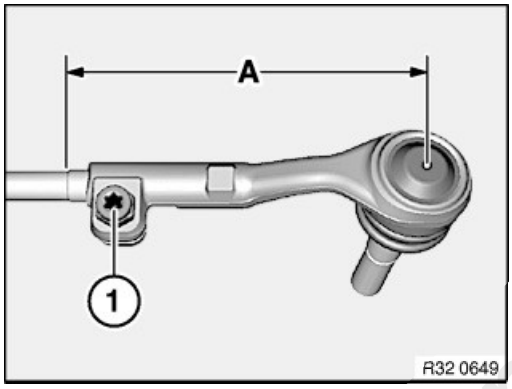


- Loosen screws (2).
- Remove the cover (1).

6 – Removing the track rod end



- Release nut (1). If necessary, counter support at the Torx socket.
- Detach the track rod end (2) from the swivel bearing (3).



- Determine dimension (A) to simplify the subsequent toe adjustment on the front axle.
- Slacken screw (1).
- Unscrew track rod end.

  If necessary, use an open-end spanner for counter support at the track rod.

MAIN WORK

7 – Removing the gaiter for the steering gear

TECHNICAL INFORMATION

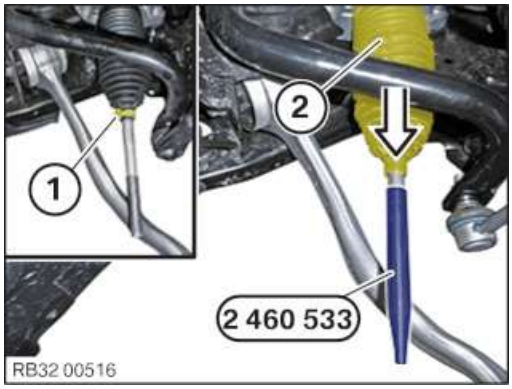
Different variants may be installed depending on the vehicle equipment.

▸ **Version A: Removing the gaiter for the steering gear**



- Cut diagonally across the ear hose clamp (1) using special tool 0 494 152 (32 1 260).
- Remove the ear hose clamp (1).

cardiagn.com

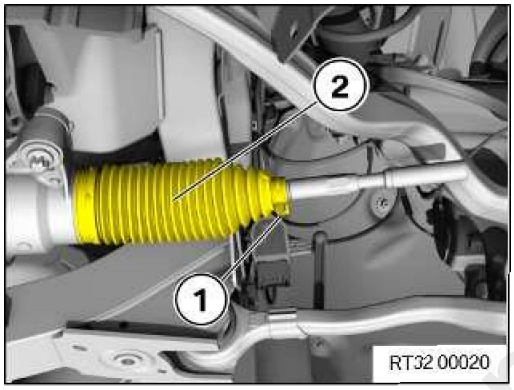


- Release and remove clip(1).
- If the gaiter (2) is reused, **it is necessary** to thread the special tool on the track rod.
- Pull down the gaiter (2) and remove.

▸ **Version B: Removing the gaiter for the steering gear**

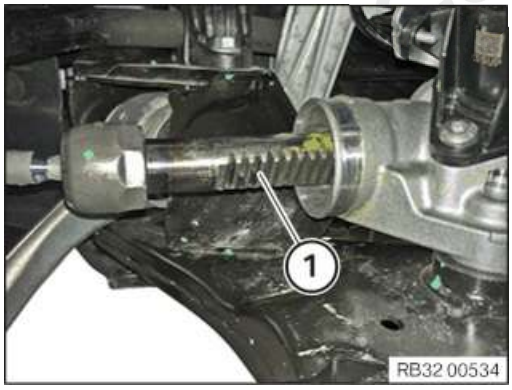


- Cut open ear hose clamp (1) with special tool 0 494 152 (32 1 260).
- Remove the ear hose clamp (1).



- Release and remove clip(1).
- Pull down the gaiter (2) from the steering gear and remove.

8 – Checking the rack for damage



Check

- Check the polished surface (1) for damage (corrosion).

Result

» The surface is corroded.

Measure

- Replace electromechanical steering gear.

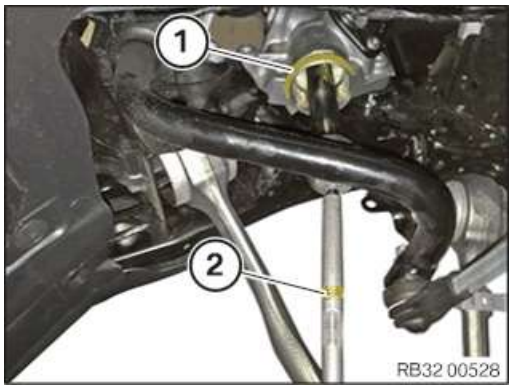
9 – Installing the gaiter for the steering gear

cardiagn.com

TECHNICAL INFORMATION

Different variants may be installed depending on the vehicle equipment.

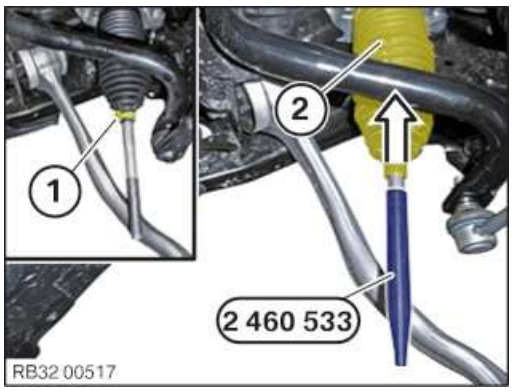
▸ Version A: Installing the gaiter for the steering gear



- Grease around the electromechanical steering gear and the track rod in area (1) and (2).

Expendable materials

Lubricating grease FB-1	100 g, Tube	83 23 2 208 093



- Screw the special tool on the track rod.
- Check the gaiter(2) and renew if necessary.
- Slide the gaiter (2) over the special tool and correctly position.
- Check the hose clamp (1) and renew where required.
- Install the hose clamp (1).
- Remove special tool .

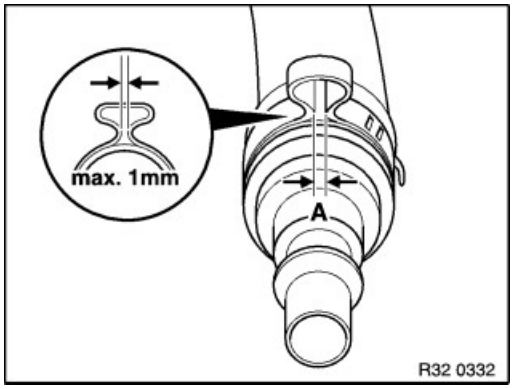


- Replace ear hose clamp (1).

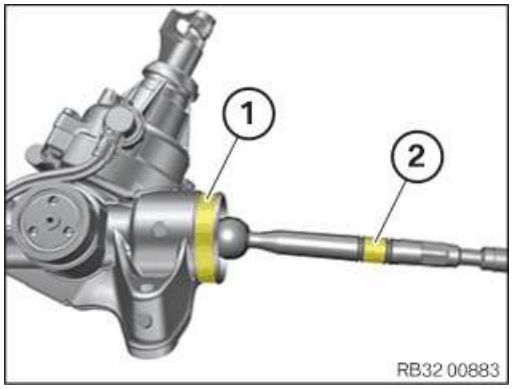
  Parts: Ear hose clamp
- Position the ear hose clamp (1).
- Attach the hook fastener of the ear hose clamp (1) and press together the ear hose clamp using special tool 0 494 152 (32 1 260).

Ear hose clamp gap dimension

Dimension [A]	max. 1 mm



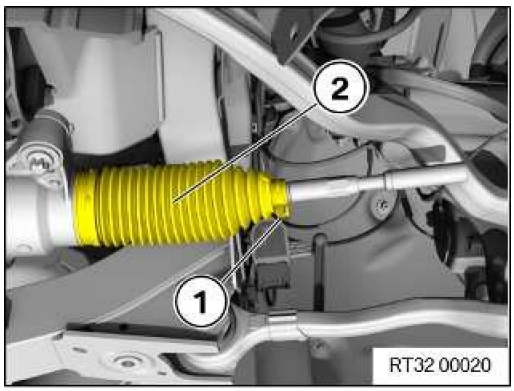
▸ Version B: Installing the gaiter for the steering gear



- Grease the electromechanical steering gear and the track rod in areas (1) and (2).

Expendable materials

Lubricating grease FB-1	100 g, Tube	83 23 2 208 093



- Check gaiter (2), renew if necessary.
- Push up the gaiter (2) and position it.
- Secure hose clamp (1).

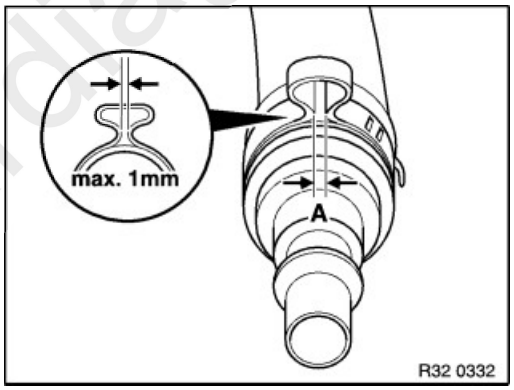


- Replace ear hose clamp (1).

  Parts: Ear hose clamp
- Position the ear hose clamp (1).
- Attach the hook fastener of the ear hose clamp (1) and press together the ear hose clamp using special tool 0 494 152 (32 1 260).

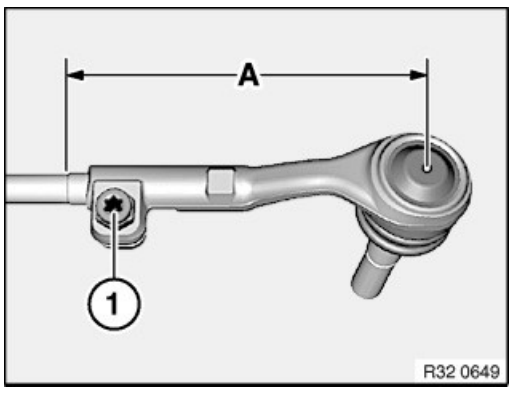
Ear hose clamp gap dimension

Dimension [A]	max. 1 mm



POSTPROCESSES

10 – Installing track rod end



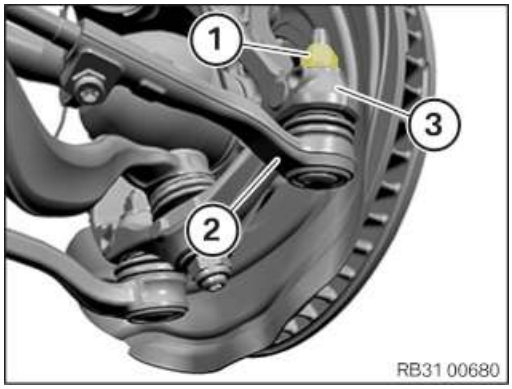
- Screw on the track rod end on the track rod up to the dimension (A), which was determined before removal.

  If necessary, use an open-end spanner for counter support at the track rod.
- Tighten down screw (1).

Track rod end to track rod

M10		Tightening torque	32 Nm

cardiagn.com



- Position the track rod end (2) on the swivel bearing (3).
- Renew nut (1).

  Parts: Nut
- Tighten nut (1). If necessary, counter support at the Torx socket.

Track rod end to swivel bearing

M14	Renew nut.	Tightening torque	165 Nm

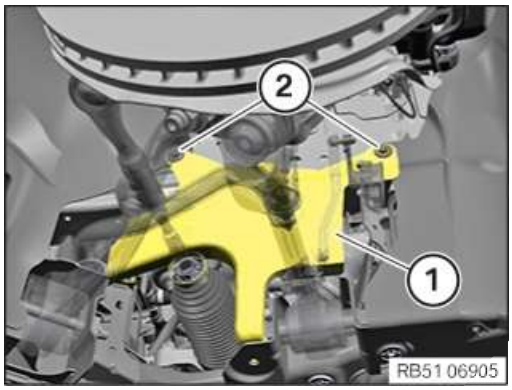
11 – Install the cover of the steering assembly

Prerequisite

Underbody protection of the steering gear is removed.

TECHNICAL INFORMATION

When tightening the screws, the cover can twist and cause chafe marks on the anti-roll bar (risk of corrosion).
Hold the cover while tightening the screws. Then check the position of the cover.

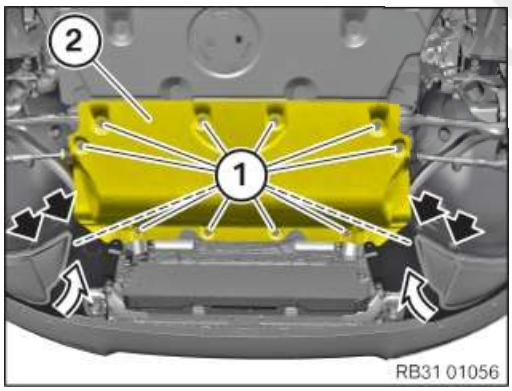


- Position the cover (1).
- Tighten the screws (2).

Cover, steering unit

Screw		Tightening torque	3 Nm

12 – Install the underbody protection of the steering gear



- Position the underbody protection of the steering gear (2).
- Tighten the screws (1).

Underbody protection of the steering gear

Hexagon screw for thermoplastic		Tightening torque	2.6 Nm
Hexagon bolt M6x20		Tightening torque	8 Nm

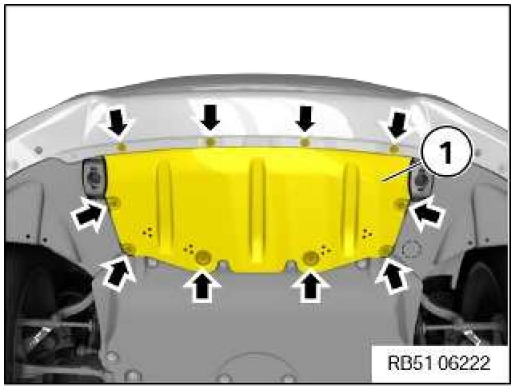
- Position the bottom wheel arch cover in the direction of arrow.
- Tighten the screws (arrows) of the bottom wheel arch cover on the wheel arch cover.

Wheel arch trim panel, front

Thermoplastic hexagon screw		Tightening torque	2,6 Nm

13 – Installing the front underbody protection

.diagn.com



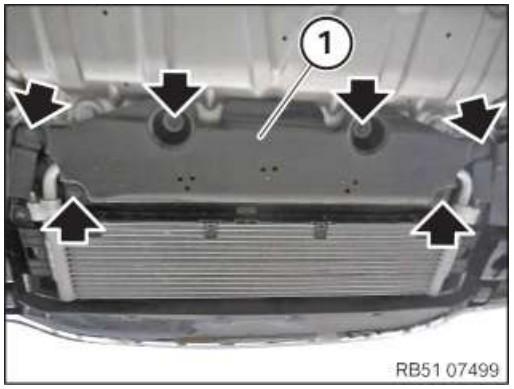
- **Version A:**

  Feed in the front underbody protection (1) towards the front under the bumper panel and position.

  Tighten screws (arrows).

Underbody protection front

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



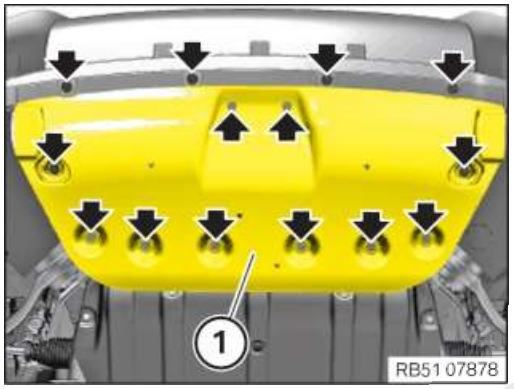
- **Version B:**

  Feed in and position the front underbody protection (1).

  Tighten screws (arrows).

Underbody protection front

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



- **Version C:**

  Feed in and install front underbody protection (1).

  Tighten screws (arrows).

Underbody protection front

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

14 – Install front left or right wheel



▸ **Mounting the wheel**

TECHNICAL INFORMATION

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

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

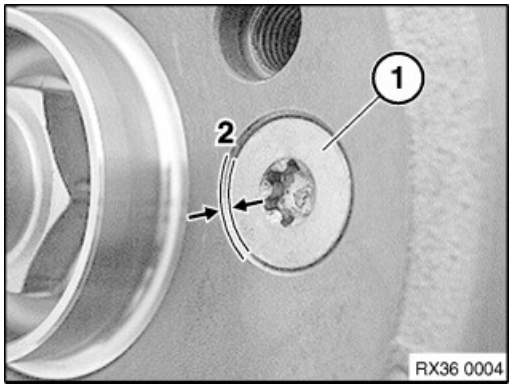
  Do not operate special tool 2 344 011 with an impact screwdriver.
- Degrease the contact surfaces with the universal cleaner (see BMW Group Parts).
- In the event of grease residue in the area of the wheel bolt holes, remove and clean the brake disc.

cardiagn.com



- 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).



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

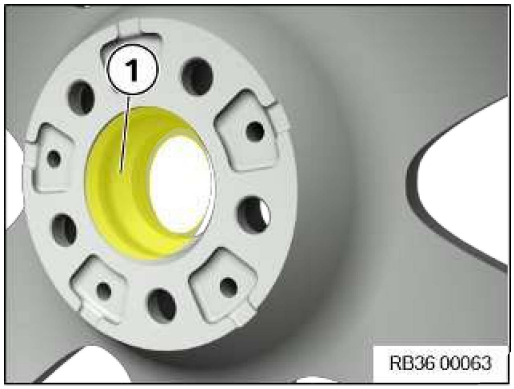
  The mounting bolt (1) for the brake disc **may not** protrude on the contact surface (2) between the brake disc and the wheel rim.

Brake disc to front wheel hub

M8	Renew screw.	Tightening torque	16 Nm

Brake disc to rear wheel hub

M8	Renew screw.	Tightening torque	16 Nm



TECHNICAL INFORMATION

Wheel hubs and wheel centering on the models G80, G82 and G83 **must not** be greased.

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

Expendable materials

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



TECHNICAL INFORMATION

Wheel hubs and wheel centering on the models G80, G82 and G83 **must not** be greased.

- Apply a thin layer of grease to the front and rear wheel hubs (1) to protect against corrosion.

Expendable materials

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

carsiagn.com

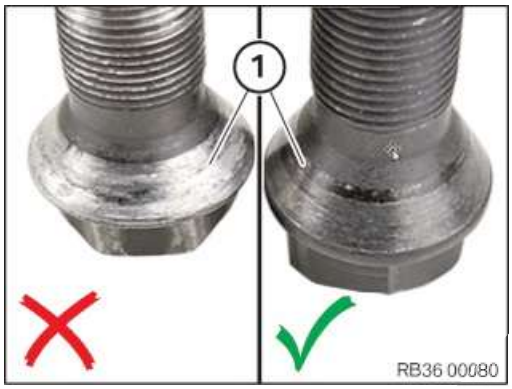


TECHNICAL INFORMATION

A wheel lift is recommended for easier wheel removal and installation without exertion (see Retailer Equipment Catalogue).

- **In vehicles with M Carbon ceramic brake: The wheel lift must be used to install the wheel.**

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



Check

- **Check wheel bolts for wear.**

Result

» Places (> 30%) of the bearing surfaces (1) of the taper on the screw head show a silver wear.

Measure

- Replace wheel bolts.

  Parts: Wheel bolts

cardiagn.com



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 the corroded wheel bolts (arrows).

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

Wheel bolts

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

15 – Perform chassis alignment check

- Perform the introductory wheel alignment in accordance with equipment manufacturer's instructions.
- If necessary, adjust the front axle and the rear axle.
- Perform the final wheel alignment in accordance with equipment manufacturer's instructions.
- Save and print out test record.

Additional Information

Overview of Tightening Torques

Track rod end to track rod — Used in step 10

M10		Tightening torque	32 Nm

Track rod end to swivel bearing — Used in step 10

M14	Renew nut.	Tightening torque	165 Nm

Cover, steering unit — Used in step 11

Screw		Tightening torque	3 Nm

cardiagn.com

Underbody protection of the steering gear — Used in step 12

Hexagon screw for thermoplastic		Tightening torque	2.6 Nm
Hexagon bolt M6x20		Tightening torque	8 Nm

Wheel arch trim panel, front — Used in step 12

Thermoplastic hexagon screw		Tightening torque	2,6 Nm

Underbody protection front — Used in step 13

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

Brake disc to front wheel hub — Used in step 14

M8	Renew screw.	Tightening torque	16 Nm

Brake disc to rear wheel hub — Used in step 14

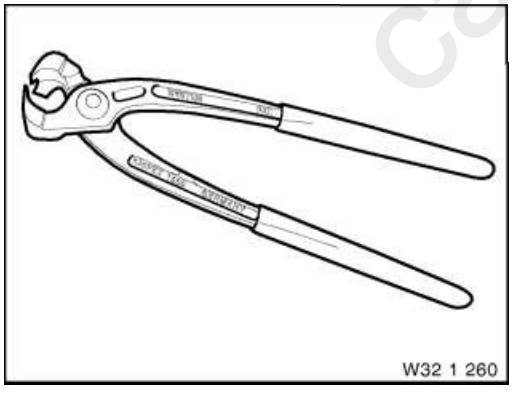
M8	Renew screw.	Tightening torque	16 Nm

Wheel bolts — Used in step 14

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

Overview of Special Tools

0 494 152 (32 1 260) Pliers



Common — Used in step 79

Usage	For opening and fastening hose clamps
Included in the tool or work	
Storage location	Individual
Replaced by	
In connection with	
SI-Number	01 02 01 (667)

cardiagn.com

2 344 011 Tool



Common	Used in step 14
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)

cardiagn.com

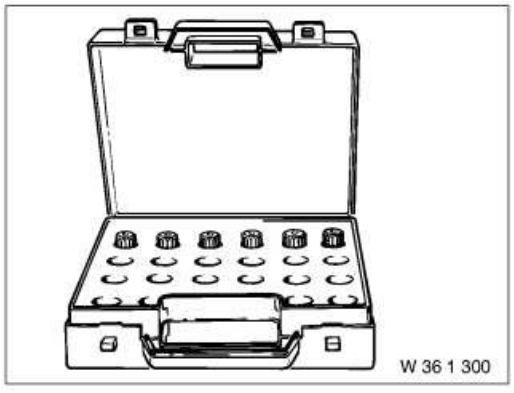
Replacement tools:

0 495 221 (36 1 323) Wheel stud



Common	Used in step 2
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 2
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 2
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 2
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 2
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 2
Usage	(Code 37) With centring bore available separately (see EPC) under 36 13 6 762 342
Included in the tool or work	0 492 518
Storage location	
Replaced by	
In connection with	
SI-Number	

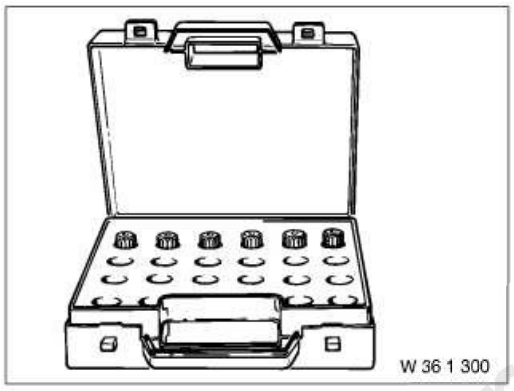
cardiagn.com

0 495 229 (36 1 332) Wheel stud



Common	Used in step 2
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	

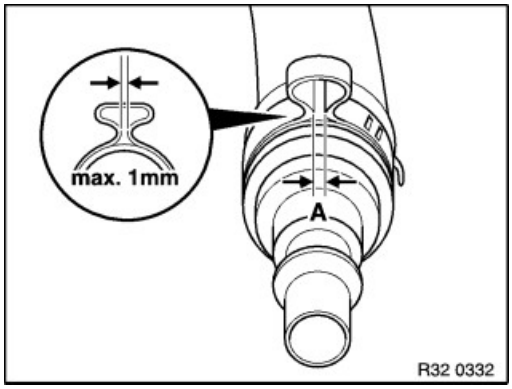
0 495 230 (36 1 333) Wheel stud



Common	Used in step 2
Usage	(Code 40) With centring bore available separately (see EPC) under 36 13 6 762 344
Included in the tool or work	0 492 518
Storage location	
Replaced by	
In connection with	
SI-Number	

Overview Technical Data

Ear hose clamp gap dimension	Used in step 9
Dimension [A]	max. 1 mm



Links

Repair instructions	Used in step
00 02 001 Raising the vehicle using a vehicle lift	214

cardiagn.com

32 00 ... Notes on replacement of steering gear/steering column/steering shaft following accident damage

Steering gear facts:

In the event of accidents or driving conditions similar to accidents, shock-like loads can cause different types of damage to steering boxes. When a steering box is externally undamaged, it is sometimes only possible to identify damage with great difficulty and with great effort. However, damage of this nature poses an unacceptable risk to the vehicle because it can result in failure of the steering system.

Because of the disproportionate amount of effort involved, it is generally not sensible to check thoroughly all the individual components of the steering box and as an alternative it is necessary to take into account other components which can be checked more easily.

Steering gear procedure:

The steering box must be replaced if one or more of the following points apply:

A. Visible or noticeable damage to the steering box
   - Version with electric steering box (EPS): Examine in particular the control unit with all plug connections for damage and hairline cracks.

B. Unacceptable torque increase and jamming when the steering box is turned from lock to lock (without hydraulic/electrical assistance)

C. Fire damage

D. Damage, permanent deformation or fractures to:
   - Wheel rims in the event of a negative result from the wheel alignment check
   - Spring struts, steering stubs, wheel carriers
   - Wishbones
   - Struts or trailing links or anti-roll bar with this function
   - Body-side screwing/attachment points for wheel guide/control components
   - Front axle support
   - Pitman arms
   - Track rods
   - Steering box fixtures
   - Steering column

   A lopsided steering wheel, significant deviations of camber/track values and noises when cranking the steering can be additional indications for the damage/deformations listed here.

Note:

If the steering box replacement work which is required for safety reasons is refused by the customer or an insurance company for cost reasons, a memorandum to that effect must be drawn up and countersigned by the party bearing the costs of the accident repair.

For corresponding specimen of memorandum, refer to Service Information (bulletin) 320188(828) Appendix 1

Actual situation of the steering column and steering shaft:

In the event of accidents or driving conditions similar to accidents, shock-like loads can cause different types of damage to the steering shaft and steering column. In case no external damaged of the steering column and the steering shaft can be noticed, it is sometimes only possible to identify damage with great difficulty and with great effort.

Proceedure for steering column and steering shaft:

The steering column and steering shaft must be replaced if one or more of the following points apply:

- Visible or noticeable damage, deformation or breakage of the steering column or steering shaft
- Damage, permanent deformation or breakage of the track rod
- Unacceptable torque increase and jamming when the steering column is cranked from limit position to limit position (without hydraulic/electrical assistance)

cardiagn.com

- If the wheel alignment nominal data cannot be reached after all the damaged wheel components are changed (exceedance of the permissible wheel alignment tolerances). If required, enclose the measurement protocol of the invoice/certificate.
- Positive check for activated crash system of the steering column:
- If no damage is visible on the steering column, the mechanical steering column must be checked for an activated crash system:
    1. Open steering column lock
    2. Pull steering wheel out towards the driver (towards the body) until the physical limit position is reached, but do not use excessive force
    3. Push steering wheel towards engine compartment (approx. 20-30 mm away from body) into the comfort position and lock

       If no end stop is present when pulling out the steering column or the gaiter of the steering column shroud has tension, the crash system has activated and the steering column is to be renewed.

Note:

If the steering column/steering shaft replacement work which is required for safety reasons is rejected by the customer or an insurance company for cost reasons, a memorandum to that effect must be drawn up and countersigned by the party bearing the costs of the accident repair.

For corresponding specimen of the memorandum, refer to Service Information 320188(828) Appendix 1

Attention!

The vehicle's operating licence will be invalidated whenever the function of any of its safety components is compromised!

This guideline is binding for all accident repairs to BMW, MINI and Rolls Royce vehicles!

cardiagn.com

32 13 905 Start-up of electromechanical steering gear (EPS) / initialisation (after vehicle diagnosis)

TECHNICAL INFORMATION

Before a toe adjustment and after the electromechanical steering gear (EPS) has been renewed, a start-up (initialisation) of the electromechanical steering gear (EPS) must be carried out.

1 Performing start-up (initialisation) of the electromechanical steering



- Connect vehicle to the diagnosis system.
- Service function "EPS: Perform start-up (initialisation) of the steering.

cardiagn.com

32 21 231 Replacing left or right track rod

TECHNICAL INFORMATION

On G20 vehicles up to 04/2019 **you must** always renew both track rods (right and left).

TECHNICAL INFORMATION

Perform wheel alignment after installation.

NOTICE

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

PRELIMINARY WORK

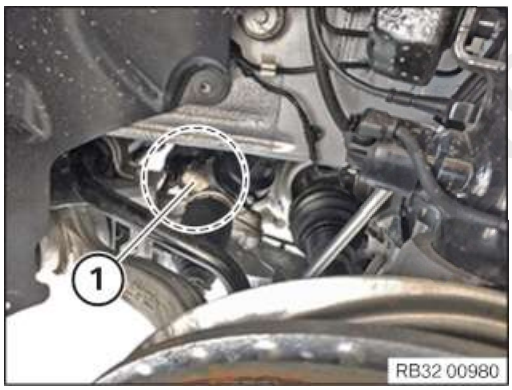
1 – Determine which variant of the steering gear is installed

Prerequisite

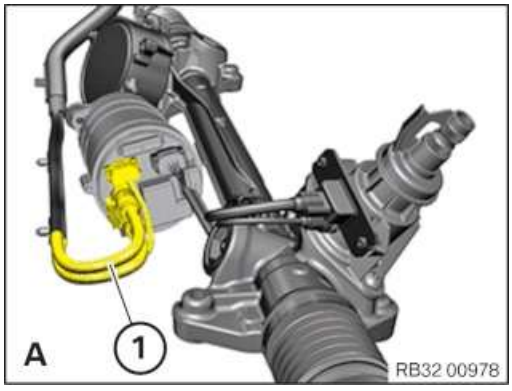
If necessary, cover of the steering assembly has been removed.

TECHNICAL INFORMATION

Different variants may be installed depending on the vehicle equipment.

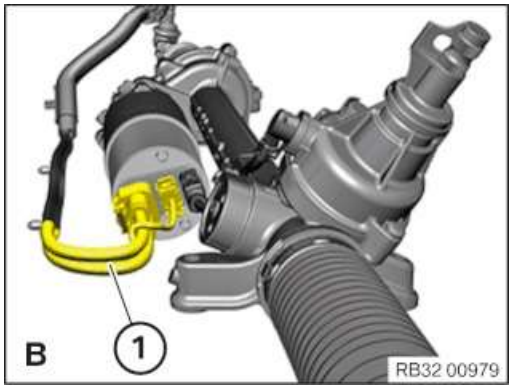


- Determine which variant of the steering gear (1) is installed.
- **It is mandatory** to use the special tools described in the relevant steps (variant A or B) when installing and removing the gaiter and tie rod.



- **Version A:**

  Plug connections of the wiring harness (1) at steering gear arranged on top of each other.



- **Version B:**

  Plug connections of the wiring harness (1) at steering gear arranged next to each other.

2 – Remove front left or right wheel

▸ **Removing the wheel**



TECHNICAL INFORMATION

A wheel lift is recommended for easier wheel removal and installation without exertion (see Retailer Equipment Catalogue).

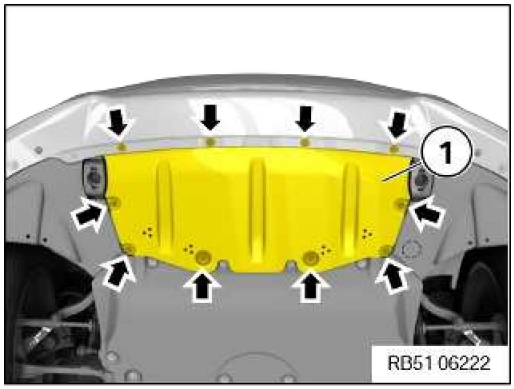
- **In vehicles with M Carbon ceramic brake: The wheel lift must be used to remove the wheel.**

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



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

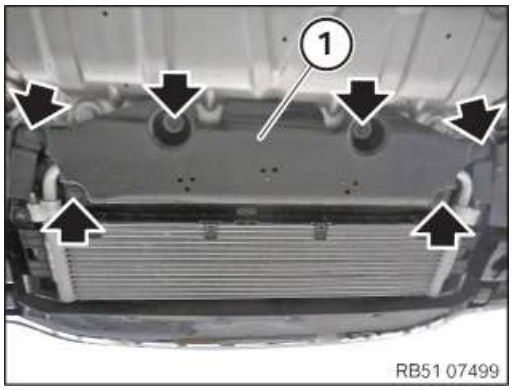
3 – Removing the front underbody protection



- **Version A:**

  Remove screws (arrows).

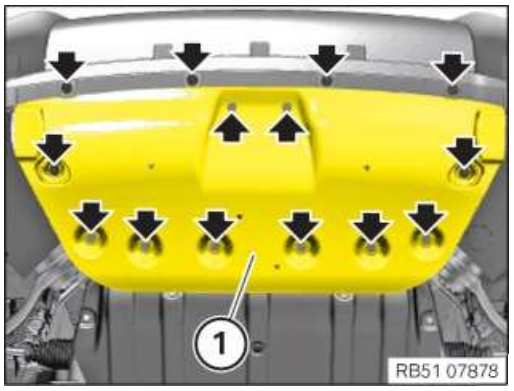
  Feed front underbody protection (1) backwards out of the bumper panel.



- **Version B:**

  Remove screws (arrows).

  Guide out front underbody protection (1) and remove it.

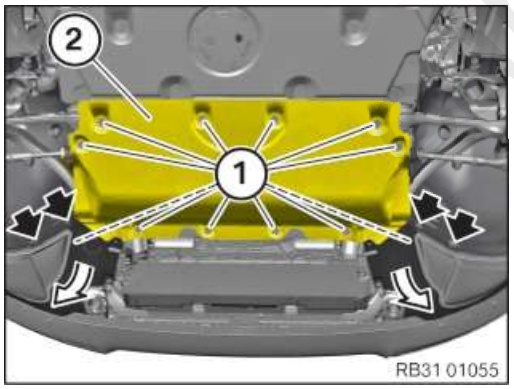


- **Version C:**

  Remove screws (arrows).

  Guide out front underbody protection (1) and remove it.

4 – Remove the underbody protection of the steering gear



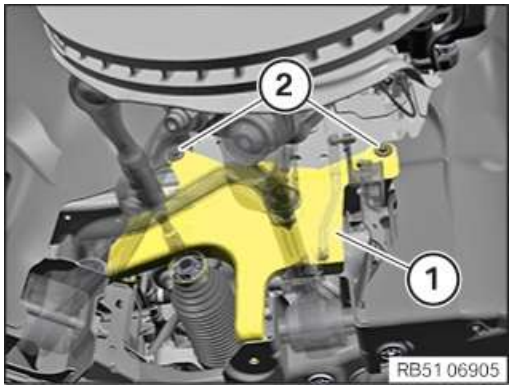
- Unscrew the screws (arrows) of the wheel arch cover on wheel arch cover.
- Fold the bottom wheel arch cover in the direction of arrow to one side.
- Loosen screws (1).
- Remove underbody protection of the steering gear (2).

5 – Remove the cover of the steering assembly

Prerequisite

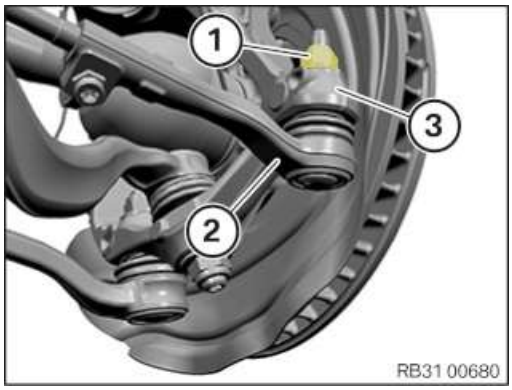
Underbody protection of the steering gear is removed.

rdiagn.com

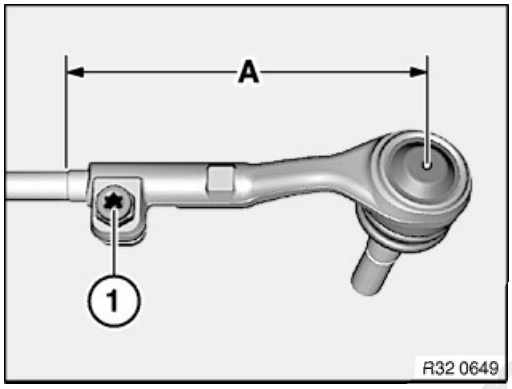


- Loosen screws (2).
- Remove the cover (1).

6 – Removing the track rod end



- Release nut (1). If necessary, counter support at the Torx socket.
- Detach the track rod end (2) from the swivel bearing (3).



- Determine dimension (A) to simplify the subsequent toe adjustment on the front axle.
- Slacken screw (1).
- Unscrew track rod end.

  If necessary, use an open-end spanner for counter support at the track rod.

7 – Removing the gaiter for the steering gear

TECHNICAL INFORMATION

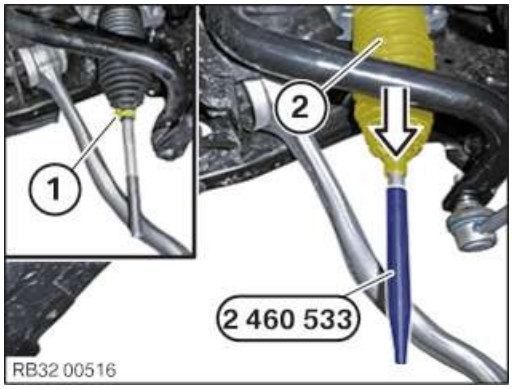
Different variants may be installed depending on the vehicle equipment.

▸ **Version A: Removing the gaiter for the steering gear**



- Cut diagonally across the ear hose clamp (1) using special tool 0 494 152 (32 1 260).
- Remove the ear hose clamp (1).

cardiagn.com

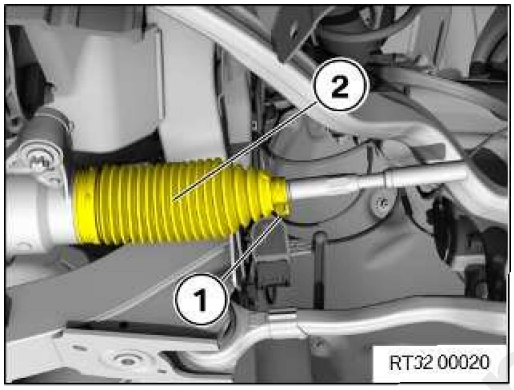


- Release and remove clip(1).
- If the gaiter (2) is reused, **it is necessary** to thread the special tool on the track rod.
- Pull down the gaiter (2) and remove.

▸ **Version B: Removing the gaiter for the steering gear**

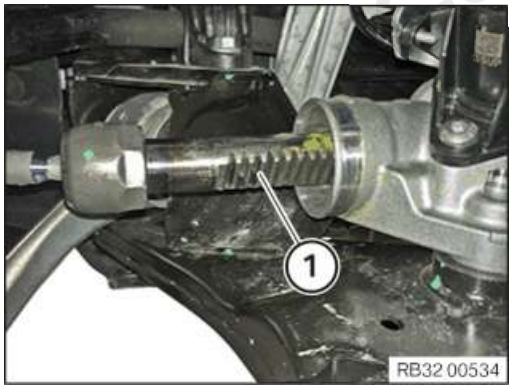


- Cut open ear hose clamp (1) with special tool 0 494 152 (32 1 260).
- Remove the ear hose clamp (1).



- Release and remove clip(1).
- Pull down the gaiter (2) from the steering gear and remove.

8 – Checking the rack for damage



Check

- Check the polished surface (1) for damage (corrosion).

Result

» The surface is corroded.

Measure

- Replace electromechanical steering gear.

MAIN WORK

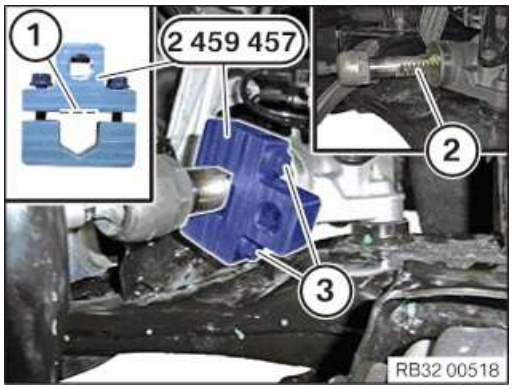
9 – Removing track rod

cardiagn.com

TECHNICAL INFORMATION

Different variants may be installed depending on the vehicle equipment.

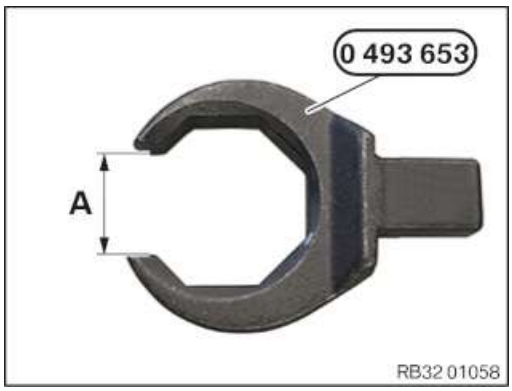
▸ Version A: Removing track rod



- Position the flattened side (1) of the special tool on the flattened side of the rack (2).
- Tighten the screws (3).

Special tool to rack

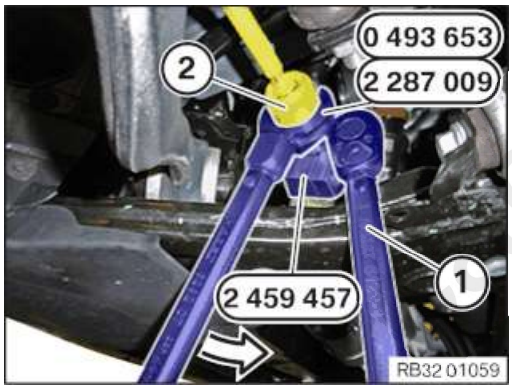
	Tightening torque	15 Nm



NOTICE

The following steps are only required for work on the right track rod.

- When using the special tool , determine the dimension (A) and increase it to 30 mm.
- After use, protect the special tool against corrosion.



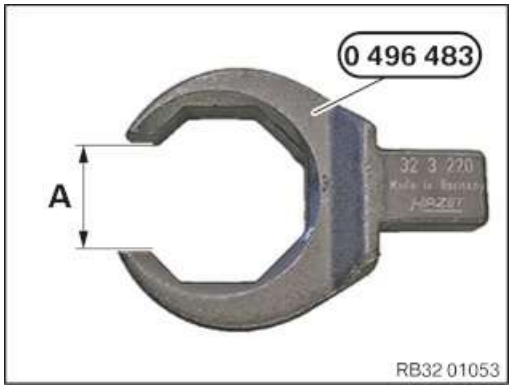
- With a standard tool (1), counter support on the special tool .

  Make sure that the tools for holding the rack and releasing the track rod have the same length.
- Release the track rod (2) with the suitable special tool or in the direction of arrow and remove it.

▸ Version B: Removing track rod

TECHNICAL INFORMATION

In order to avoid damage of the steering shaft and its bearing, the rack must be positioned in the steering gear as far as possible.



NOTICE

The following steps are only required for work on the right track rod.

- Determine the dimension (A) on the special tool and increase to 30 mm.
- After use, protect special tool against corrosion.



- Release the track rod (1) with the special tool and remove.

10 – Installing the track rod

TECHNICAL INFORMATION

Different variants may be installed depending on the vehicle equipment.

▸ Version A: Installing the track rod



- Thread the track rod (2).
- With a standard tool (1), counter support on the special tool .

  Make sure that the tools for holding the rack and tightening the track rod have the same length.
- Tighten the track rod (2) with the suitable special tool or in the direction of arrow.

Track rod to steering box

	Tightening torque	110 Nm



- Loosen screws (1).
- Remove special tool .

▸ Version B: Installing the track rod

TECHNICAL INFORMATION

In order to avoid damage of the steering shaft and its bearing, the rack must be positioned in the steering gear as far as possible.



- Thread the track rod (1) by hand.
- Tighten the track rod (1) using special tool .

Track rod to steering box

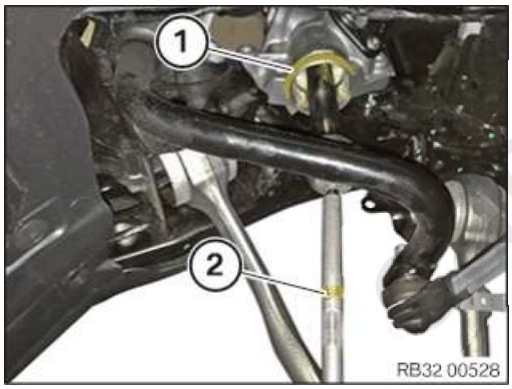
	Tightening torque	105 Nm

POSTPROCESSES

11 – Installing the gaiter for the steering gear

TECHNICAL INFORMATION

Different variants may be installed depending on the vehicle equipment.

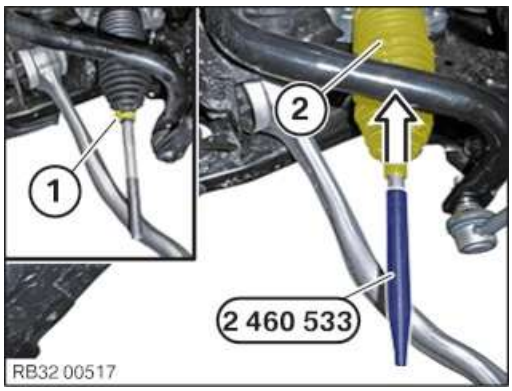


▸ **Version A: Installing the gaiter for the steering gear**

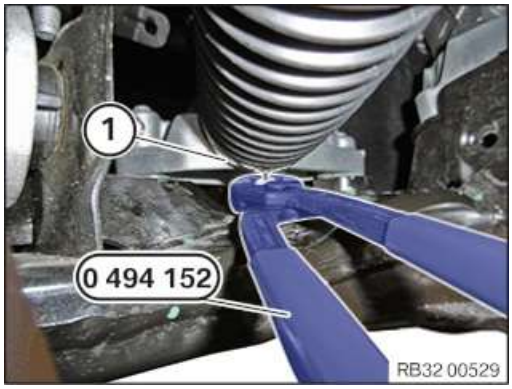
- Grease around the electromechanical steering gear and the track rod in area (1) and (2).

Expendable materials

Lubricating grease FB-1	100 g, Tube	83 23 2 208 093



- Screw the special tool on the track rod.
- Check the gaiter(2) and renew if necessary.
- Slide the gaiter (2) over the special tool and correctly position.
- Check the hose clamp (1) and renew where required.
- Install the hose clamp (1).
- Remove special tool .

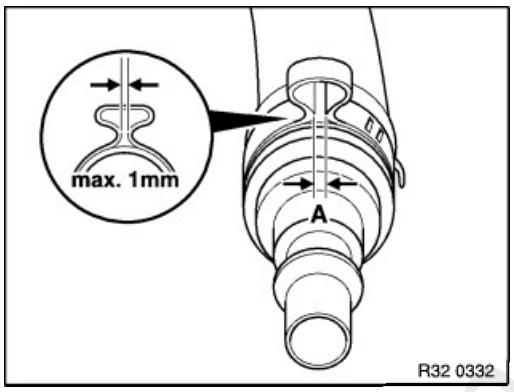


- Replace ear hose clamp (1).

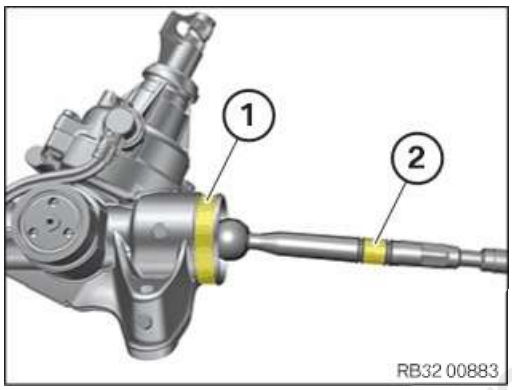
  Parts: Ear hose clamp
- Position the ear hose clamp (1).
- Attach the hook fastener of the ear hose clamp (1) and press together the ear hose clamp using special tool 0 494 152 (32 1 260).

Ear hose clamp gap dimension

Dimension [A]	max. 1 mm



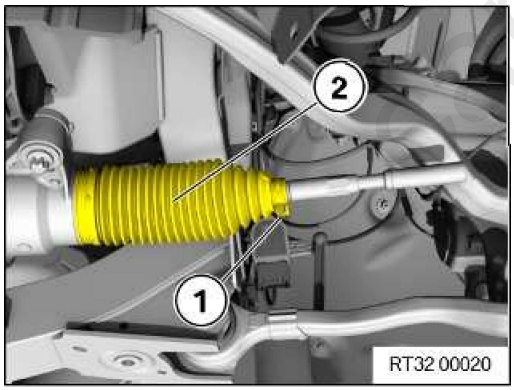
▸ **Version B: Installing the gaiter for the steering gear**



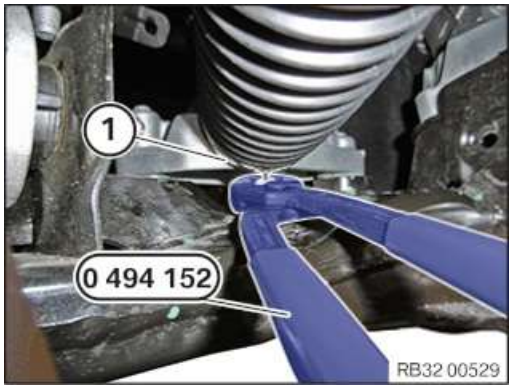
- Grease the electromechanical steering gear and the track rod in areas (1) and (2).

Expendable materials

Lubricating grease FB-1	100 g, Tube	83 23 2 208 093



- Check gaiter (2), renew if necessary.
- Push up the gaiter (2) and position it.
- Secure hose clamp (1).

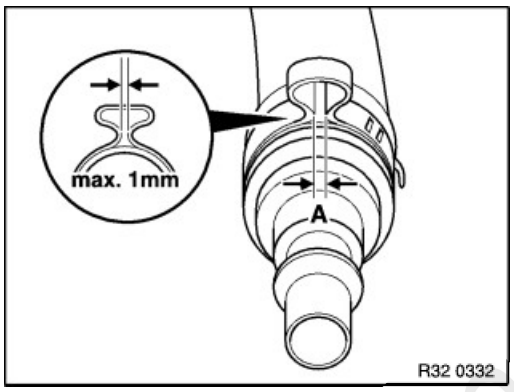


- Replace ear hose clamp (1).

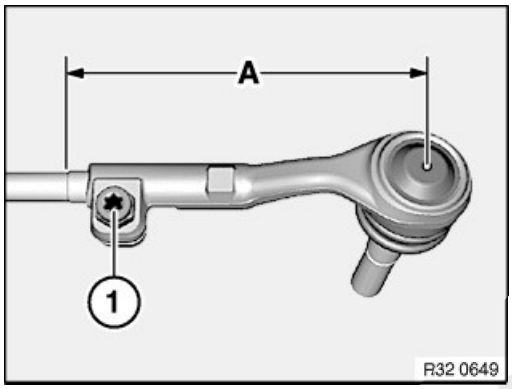
  Parts: Ear hose clamp
- Position the ear hose clamp (1).
- Attach the hook fastener of the ear hose clamp (1) and press together the ear hose clamp using special tool 0 494 152 (32 1 260).

Ear hose clamp gap dimension

Dimension [A]	max. 1 mm



12 – Installing track rod end

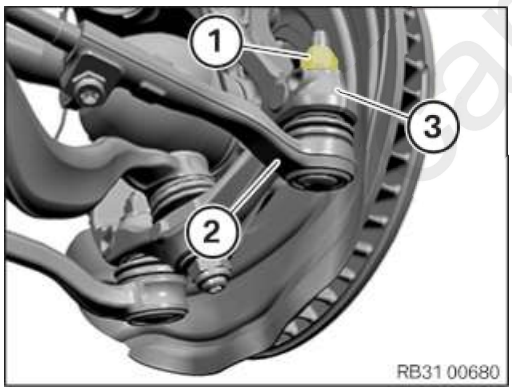


- Screw on the track rod end on the track rod up to the dimension (A), which was determined before removal.

  If necessary, use an open-end spanner for counter support at the track rod.
- Tighten down screw (1).

Track rod end to track rod

M10		Tightening torque	32 Nm



- Position the track rod end (2) on the swivel bearing (3).
- Renew nut (1).

  Parts: Nut
- Tighten nut (1). If necessary, counter support at the Torx socket.

Track rod end to swivel bearing

M14	Renew nut.	Tightening torque	165 Nm

13 – Install the cover of the steering assembly

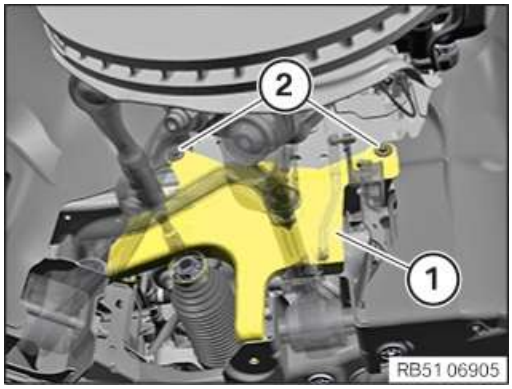
Prerequisite

Underbody protection of the steering gear is removed.

TECHNICAL INFORMATION

When tightening the screws, the cover can twist and cause chafe marks on the anti-roll bar (risk of corrosion).
Hold the cover while tightening the screws. Then check the position of the cover.

cardiagn.com

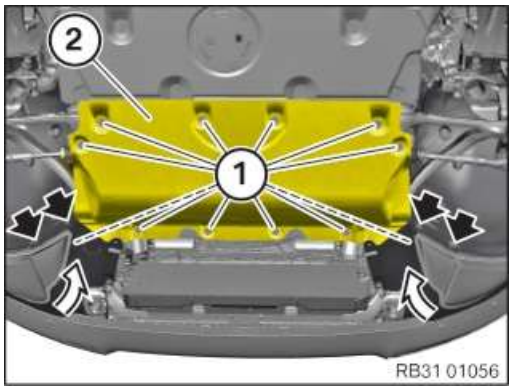


- Position the cover (1).
- Tighten the screws (2).

Cover, steering unit

Screw		Tightening torque	3 Nm

14 – Install the underbody protection of the steering gear



- Position the underbody protection of the steering gear (2).
- Tighten the screws (1).

Underbody protection of the steering gear

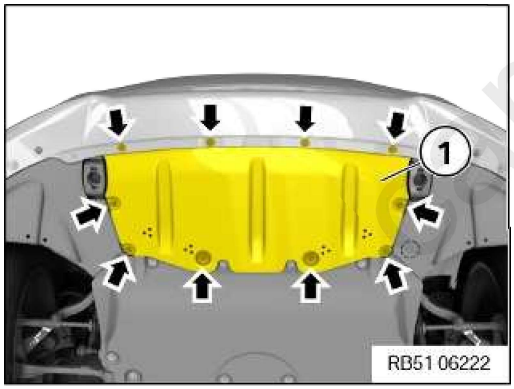
Hexagon screw for thermoplastic		Tightening torque	2.6 Nm
Hexagon bolt M6x20		Tightening torque	8 Nm

- Position the bottom wheel arch cover in the direction of arrow.
- Tighten the screws (arrows) of the bottom wheel arch cover on the wheel arch cover.

Wheel arch trim panel, front

Thermoplastic hexagon screw		Tightening torque	2,6 Nm

15 – Installing the front underbody protection



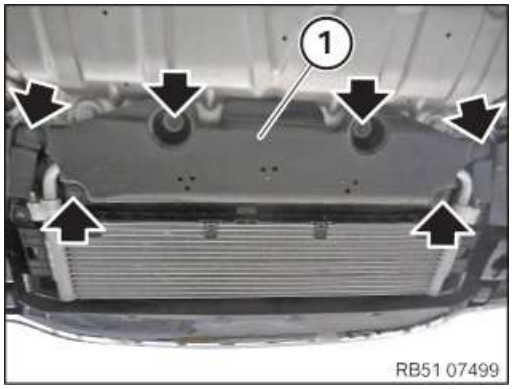
- **Version A:**

  Feed in the front underbody protection (1) towards the front under the bumper panel and position.

  Tighten screws (arrows).

Underbody protection front

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



- **Version B:**

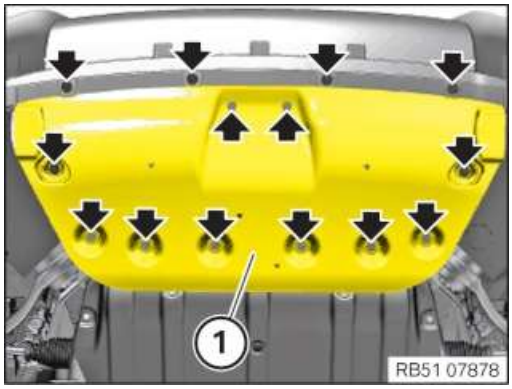
  Feed in and position the front underbody protection (1).

  Tighten screws (arrows).

Underbody protection front

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

carmanualsdiagram.com



- **Version C:**

  Feed in and install front underbody protection (1).

  Tighten screws (arrows).

Underbody protection front

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

16 – Install front left or right wheel

▸ **Mounting the wheel**



TECHNICAL INFORMATION

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

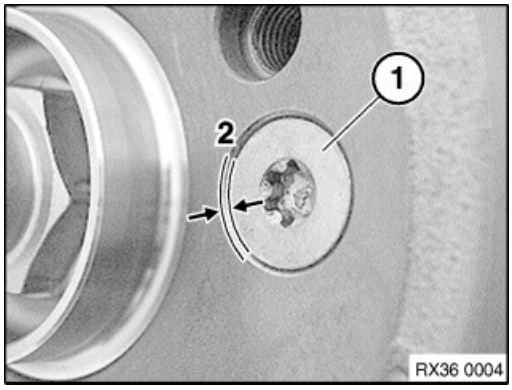
- Remove dirt, grease residues and corrosion from the contact surface with a drill and the special tool 2 344 011.

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



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

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



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

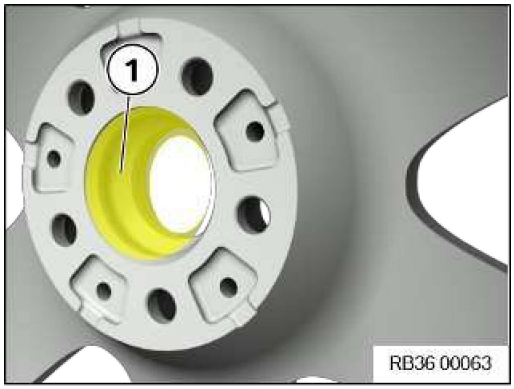
  The mounting bolt (1) for the brake disc **may not** protrude on the contact surface (2) between the brake disc and the wheel rim.

Brake disc to front wheel hub

M8	Renew screw.	Tightening torque	16 Nm

Brake disc to rear wheel hub

M8	Renew screw.	Tightening torque	16 Nm



TECHNICAL INFORMATION

Wheel hubs and wheel centering on the models G80, G82 and G83 **must not** be greased.

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

Expendable materials

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



TECHNICAL INFORMATION

Wheel hubs and wheel centering on the models G80, G82 and G83 **must not** be greased.

- Apply a thin layer of grease to the front and rear wheel hubs (1) to protect against corrosion.

Expendable materials

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



TECHNICAL INFORMATION

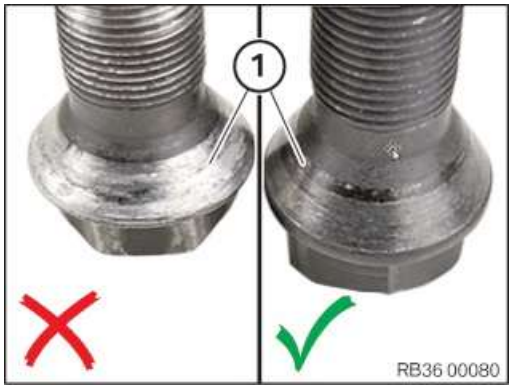
A wheel lift is recommended for easier wheel removal and installation without exertion (see Retailer Equipment Catalogue).

- **In vehicles with M Carbon ceramic brake: The wheel lift must be used to install the wheel.**

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

Check

cardiagn.com



- **Check wheel bolts for wear.**

Result

» Places (> 30%) of the bearing surfaces (1) of the taper on the screw head show a silver wear.

Measure

- Replace wheel bolts.

  Parts: Wheel bolts



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 the corroded wheel bolts (arrows).

  Parts: Wheel bolts

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

Wheel bolts

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

17 – Perform chassis alignment check

cardiagn.com

- Perform the introductory wheel alignment in accordance with equipment manufacturer's instructions.
- If necessary, adjust the front axle and the rear axle.
- Perform the final wheel alignment in accordance with equipment manufacturer's instructions.
- Save and print out test record.

Additional Information

Overview of Tightening Torques

Special tool to rack			Used in step 9
		Tightening torque	15 Nm

Track rod to steering box			Used in step 10
		Tightening torque	110 Nm

Track rod to steering box			Used in step 10
		Tightening torque	105 Nm

Track rod end to track rod			Used in step 12
M10		Tightening torque	32 Nm

Track rod end to swivel bearing			Used in step 12
M14	Renew nut.	Tightening torque	165 Nm

Cover, steering unit			Used in step 13
Screw		Tightening torque	3 Nm

Underbody protection of the steering gear			Used in step 14
Hexagon screw for thermoplastic		Tightening torque	2.6 Nm
Hexagon bolt M6x20		Tightening torque	8 Nm

Wheel arch trim panel, front			Used in step 14
Thermoplastic hexagon screw		Tightening torque	2,6 Nm

Underbody protection front			Used in step 15
Hexagon screw for thermoplastic		Tightening torque	2,6 Nm
Hexagon screw M6x20		Tightening torque	8 Nm

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

Brake disc to rear wheel hub			Used in step 16
M8	Renew screw.	Tightening torque	16 Nm

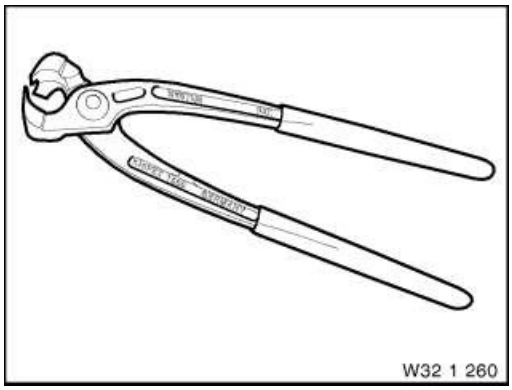
cardiagn.com

Wheel bolts Used in step 16

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

Overview of Special Tools

0 494 152 (32 1 260) Pliers



Common Used in step 711

Usage	For opening and fastening hose clamps
Included in the tool or work	
Storage location	Individual
Replaced by	
In connection with	
SI-Number	01 02 01 (667)

2 344 011 Tool



Common Used in step 16

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 2

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	

carlagn.com

0 495 224 (36 1 326) Wheel stud



Common	Used in step 2
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 2
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 2
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 2
Usage	(Code 36) With centring bore available separately (see EPC) under 36 13 6 762 341
Included in the tool or work	0 492 518
Storage location	
Replaced by	
In connection with	
SI-Number	

cardiagn.com

0 495 228 (36 1 331) Wheel stud



Common	Used in step 2
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 2
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

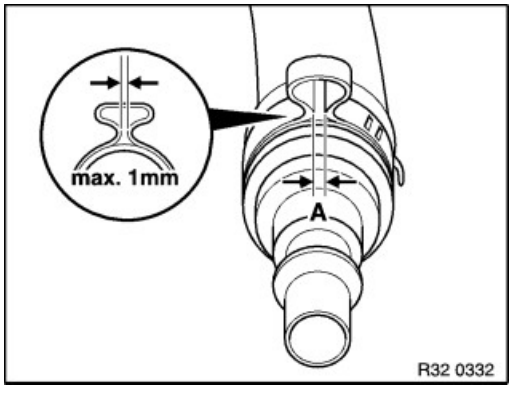


Common	Used in step 2
Usage	(Code 40) With centring bore available separately (see EPC) under 36 13 6 762 344
Included in the tool or work	0 492 518
Storage location	
Replaced by	
In connection with	
SI-Number	

Overview Technical Data

Ear hose clamp gap dimension Used in step 11

Dimension [A]	max. 1 mm



Links

carlagn.com

Repair instructions	Used in step
00 02 001 Raising the vehicle using a vehicle lift	216

cardiagn.com

32 21 151 Replacing left or right track rod end

TECHNICAL INFORMATION

Perform wheel alignment after installation.

NOTICE

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

PRELIMINARY WORK

1 – Remove front left or right wheel

▸ **Removing the wheel**



TECHNICAL INFORMATION

A wheel lift is recommended for easier wheel removal and installation without exertion (see Retailer Equipment Catalogue).

- **In vehicles with M Carbon ceramic brake: The wheel lift must be used to remove the wheel.**

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

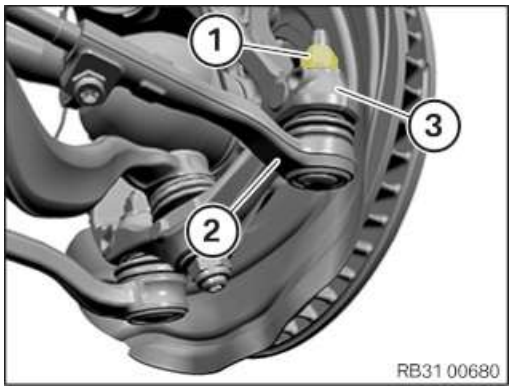


- If several wheels are removed at the same time: Use a piece of chalk to mark on each tyre the axle and side on which the corresponding wheel is fitted.
- Release the wheel bolts (arrows) crosswise and remove the wheel.
- To release and tighten wheel bolts with a security code: Use the correct adapter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

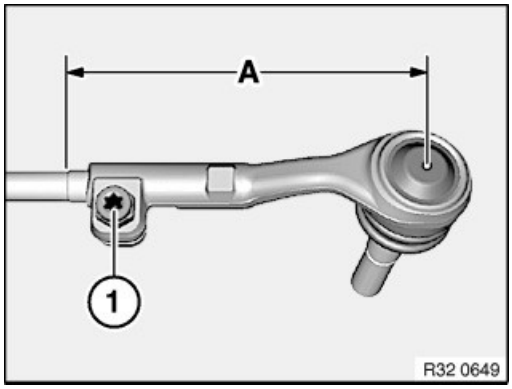
cardiagn.com

MAIN WORK

2 – Removing the track rod end



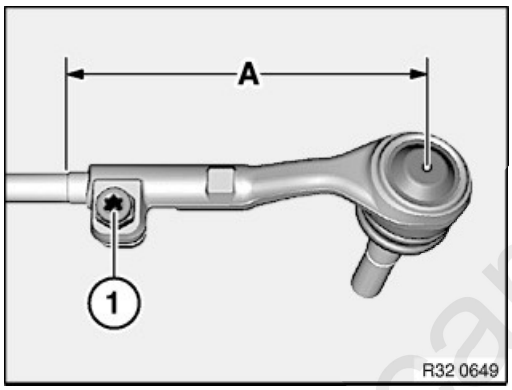
- Release nut (1). If necessary, counter support at the Torx socket.
- Detach the track rod end (2) from the swivel bearing (3).



- Determine dimension (A) to simplify the subsequent toe adjustment on the front axle.
- Slacken screw (1).
- Unscrew track rod end.

  If necessary, use an open-end spanner for counter support at the track rod.

3 – Installing track rod end

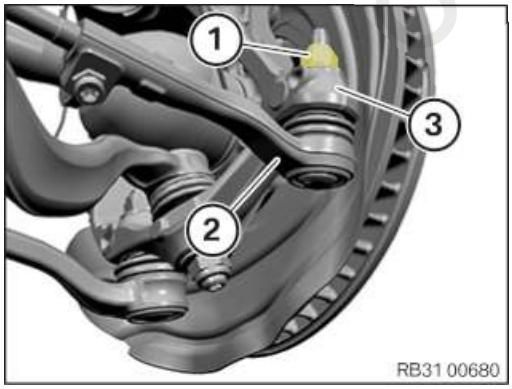


- Screw on the track rod end on the track rod up to the dimension (A), which was determined before removal.

  If necessary, use an open-end spanner for counter support at the track rod.
- Tighten down screw (1).

Track rod end to track rod

M10		Tightening torque	32 Nm



- Position the track rod end (2) on the swivel bearing (3).
- Renew nut (1).

  Parts: Nut
- Tighten nut (1). If necessary, counter support at the Torx socket.

Track rod end to swivel bearing

M14	Renew nut.	Tightening torque	165 Nm

POSTPROCESSES

4 – Install front left or right wheel

▸ **Mounting the wheel**

carlion.com



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.

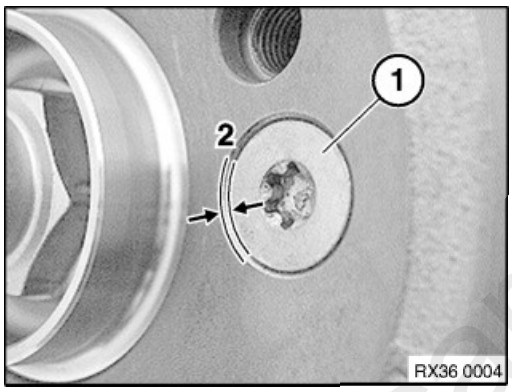
- Remove dirt, grease residues and corrosion from the contact surface with a drill and the special tool 2 344 011.

  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).



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

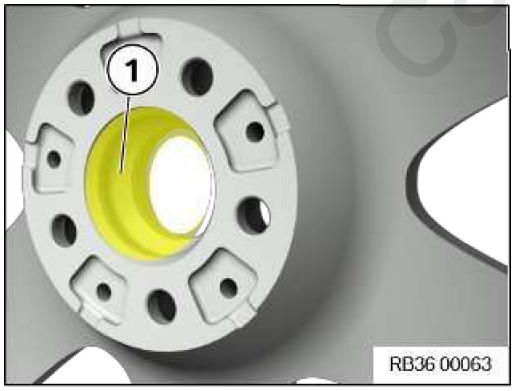
  The mounting bolt (1) for the brake disc **may not** protrude on the contact surface (2) between the brake disc and the wheel rim.

Brake disc to front wheel hub

M8	Renew screw.	Tightening torque	16 Nm

Brake disc to rear wheel hub

M8	Renew screw.	Tightening torque	16 Nm



TECHNICAL INFORMATION

Wheel hubs and wheel centering on the models G80, G82 and G83 **must not** be greased.

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

Expendable materials

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

cardiagn.com



TECHNICAL INFORMATION

Wheel hubs and wheel centering on the models G80, G82 and G83 **must not** be greased.

- Apply a thin layer of grease to the front and rear wheel hubs (1) to protect against corrosion.

Expendable materials

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



TECHNICAL INFORMATION

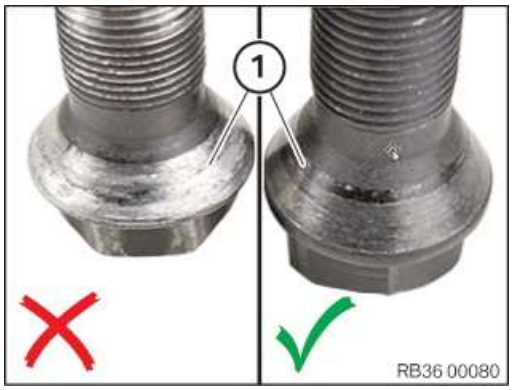
A wheel lift is recommended for easier wheel removal and installation without exertion (see Retailer Equipment Catalogue).

- **In vehicles with M Carbon ceramic brake: The wheel lift must be used to install the wheel.**

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

Check

- **Check wheel bolts for wear.**



Result

» Places (> 30%) of the bearing surfaces (1) of the taper on the screw head show a silver wear.

Measure

- Replace wheel bolts.

  Parts: Wheel bolts



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 the corroded wheel bolts (arrows).

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

Wheel bolts

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

5 – Perform chassis alignment check

- Perform the introductory wheel alignment in accordance with equipment manufacturer's instructions.
- If necessary, adjust the front axle and the rear axle.
- Perform the final wheel alignment in accordance with equipment manufacturer's instructions.
- Save and print out test record.

Additional Information

Overview of Tightening Torques

Track rod end to track rod — Used in step 3

M10		Tightening torque	32 Nm

Track rod end to swivel bearing — Used in step 3

M14	Renew nut.	Tightening torque	165 Nm

cardiagn.com

Brake disc to front wheel hub — Used in step 4

M8	Renew screw.	Tightening torque	16 Nm

Brake disc to rear wheel hub — Used in step 4

M8	Renew screw.	Tightening torque	16 Nm

Wheel bolts — Used in step 4

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

Overview of Special Tools

2 344 011 Tool



Common — Used in step 4

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 1

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

cardiagn.com

0 495 224 (36 1 326) Wheel stud



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

0 495 225 (36 1 327) Wheel stud



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

0 495 226 (36 1 328) Wheel stud



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

cardiagn.com

0 495 227 (36 1 329) Wheel stud



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

0 495 228 (36 1 331) Wheel stud



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

0 495 229 (36 1 332) Wheel stud



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

0 495 230 (36 1 333) Wheel stud



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

Links

Repair instructions	Used in step

cartiagn.com

cardiagn.com

32 31 070 Removing and installing / replacing lower section of steering shaft

RISK OF DAMAGE

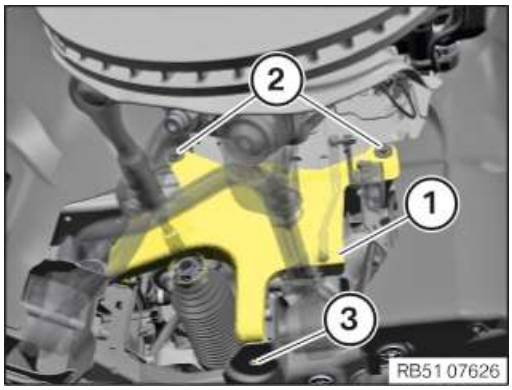
Damage to steering column switch cluster (SZL).

The steering column switch cluster (SZL) or the coil spring cassette may be damaged by twisting of the steering wheel if the lower steering shaft (or the universal joint) is separated from the steering gear or from the steering column.

- After disconnecting the steering shaft (or the universal joint) from the steering gear or from the steering column, secure the steering wheel against twisting.

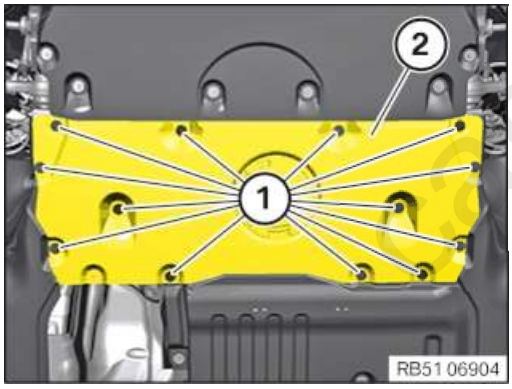
PRELIMINARY WORK

1 – Remove the cover of the steering assembly



- Loosen screws (2) and (3).
- Remove the cover (1).

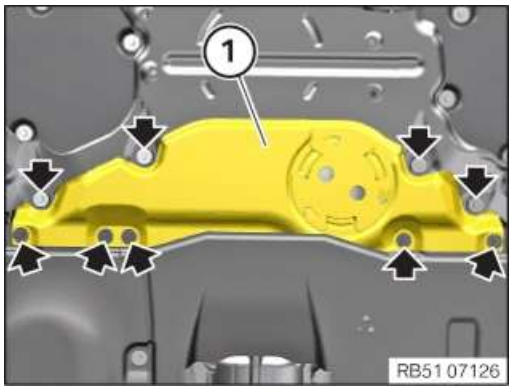
2 – Removing the centre underbody protection



- **Variant with rear wheel drive:**

  Loosen screws (1).

  Remove centre underbody protection (2) .

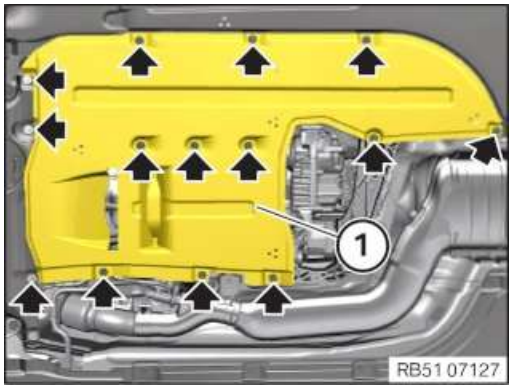


- **Version with all-wheel drive:**

  Remove screws (arrows).

  Feed out and remove the centre underbody protection (1).

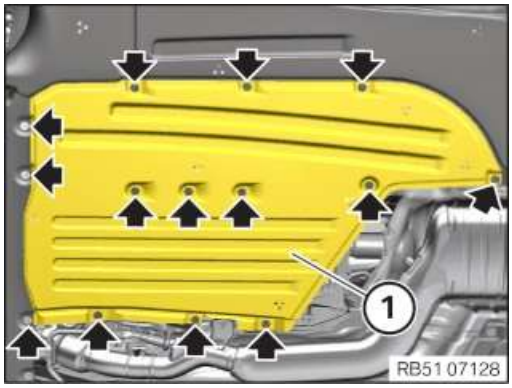
3 – Remove rear underbody protection



- **Version A:**

  Remove screws (arrows).

  Feed out the rear underbody protection (1).



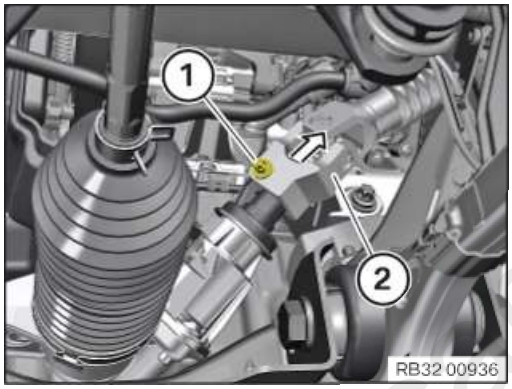
- **Version B:**

  Remove screws (arrows).

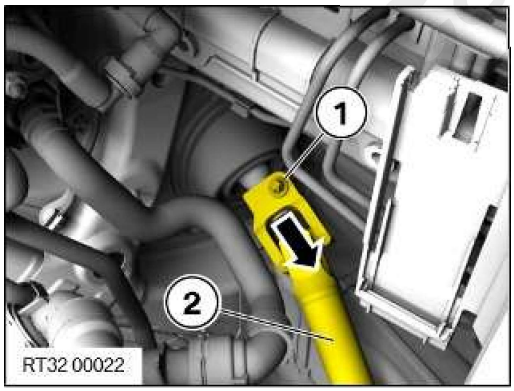
  Guide out rear underbody protection (1) and remove it.

MAIN WORK

4 – Remove lower section of steering shaft



- Loosen the clamping bolt (1).
- Pull down bottom steering shaft (2) from steering gear in direction of arrow.

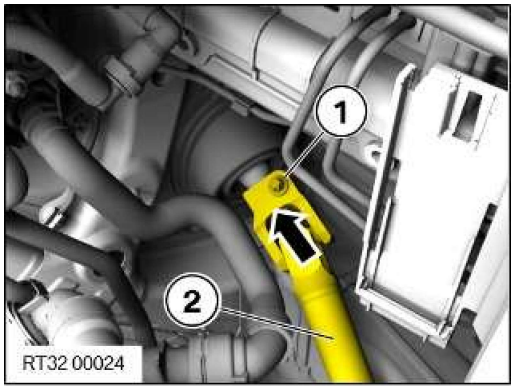


- Pull out the steering column with the bottom steering shaft to the maximum length in the direction of the arrow.
- Loosen the clamping bolt (1).
- Pull down bottom steering shaft (2) in the direction of the arrow off the steering column .
- Feed out bottom steering shaft (2) and remove.

5 – If reusing: Recut thread

- Clean the screw thread of the steering shaft at the bottom to remove all remnants of screw locking agent.
- Recut screw thread.

6 – Installing steering shaft, bottom



TECHNICAL INFORMATION

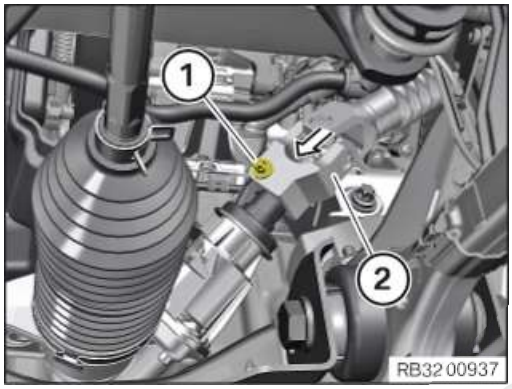
The steering shaft can only be installed in one position.
The steering shaft is encoded for the steering column and the steering gear.
Position clamping bolt in the groove of steering gear or steering column.

- Pull the steering column out to the maximum length.
- Guide in and position bottom steering spindle (2).
- Slide the bottom steering spindle (2) onto the steering column in the direction of the arrow.
- Renew the clamping bolt (1).

  Parts: Clamping bolt
- Tighten the clamping bolt (1).

Lower steering shaft to steering column

M8	Recut screw thread. Renew clamping bolt. No retorquing permitted!	Tightening torque	28 Nm



TECHNICAL INFORMATION

The steering shaft can only be installed in one position.
The steering shaft is encoded for the steering column and the steering gear.
Position clamping bolt in the groove of steering gear or steering column.

- Slide the bottom steering spindle (2) onto the steering gear in the direction of the arrow.
- Renew the clamping bolt (1).

  Parts: Clamping bolt
- Tighten the clamping bolt (1).

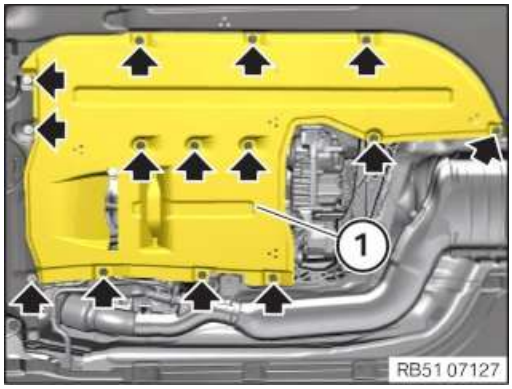
Universal joint to steering box

M8	Recut screw thread. Renew clamping bolt. No retorquing permitted!	Tightening torque	28 Nm

POSTPROCESSES

7 – Installing underbody protection at rear

carlagn.com



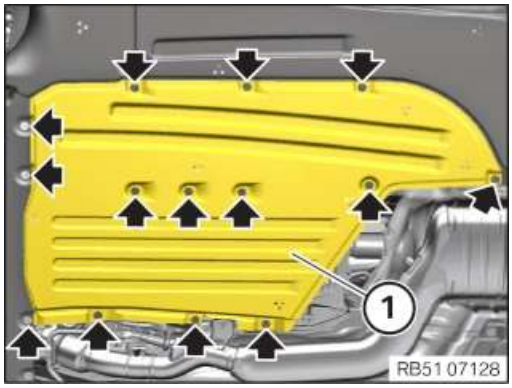
- **Version A:**

  Insert and install the rear underbody protection (1).

  Tighten screws (arrows).

Underbody protection

Hexagon screw		Tightening torque	3 Nm



- **Version B:**

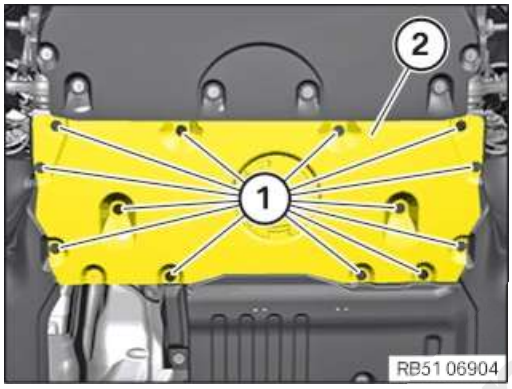
  Insert and install the rear underbody protection (1).

  Tighten screws (arrows).

Underbody protection

Hexagon screw		Tightening torque	3 Nm

8 – Installing the centre underbody protection



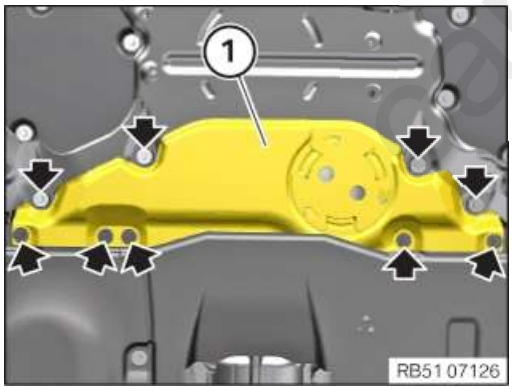
- **Variant with rear wheel drive:**

  Position central underbody protection (2).

  Tighten the screws (1).

Underbody protection

Hexagon screw		Tightening torque	3 Nm



- **Version with all-wheel drive:**

  Guide in centre underbody protection (1) and install.

  Tighten screws (arrows).

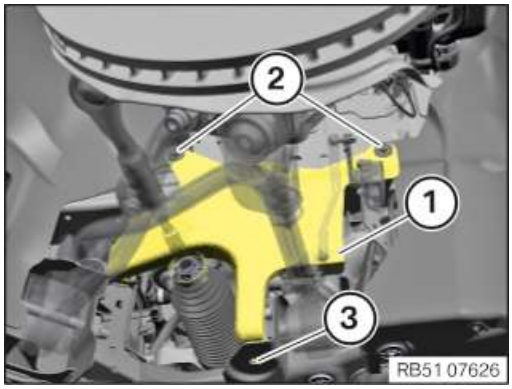
Underbody protection

Hexagon screw		Tightening torque	3 Nm

9 – Install the cover of the steering assembly

TECHNICAL INFORMATION

When tightening the screws, the cover can twist and cause chafe marks on the anti-roll bar (risk of corrosion).
Hold the cover while tightening the screws. Then check the position of the cover.



- Position the cover (1).
- Tighten down screws (2) and (3).

Cover, steering unit

Screw		Tightening torque	3 Nm

10 – Checking the airbag for function

Check
- Turn steering wheel in both directions to the limit position.

Result
» The airbag indicator light lights up.

Measure
- Renew the coil spring cassette.

11 – Check the straight-ahead driving position of the steering wheel

Check
- For straight-ahead driving, check the correct straight-ahead driving position of the steering wheel.

Result
» The steering wheel has an inclination during straight-ahead driving.

Measure
- Carry out a toe adjustment at the front axle.

Additional Information

Overview of Tightening Torques

Lower steering shaft to steering column Used in step 6

M8	Recut screw thread. Renew clamping bolt. No retorquing permitted!	Tightening torque	28 Nm

Universal joint to steering box Used in step 6

M8	Recut screw thread. Renew clamping bolt. No retorquing permitted!	Tightening torque	28 Nm

Underbody protection Used in step 78

Hexagon screw		Tightening torque	3 Nm

Cover, steering unit Used in step 9

Screw		Tightening torque	3 Nm

Links

Repair instructions	Used in step

cardiagn.com

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

32 00 601 Adjusting toe-in on front axle

cardiagn.com

32 31 020 Removing and installing/replacing steering column shroud lower section

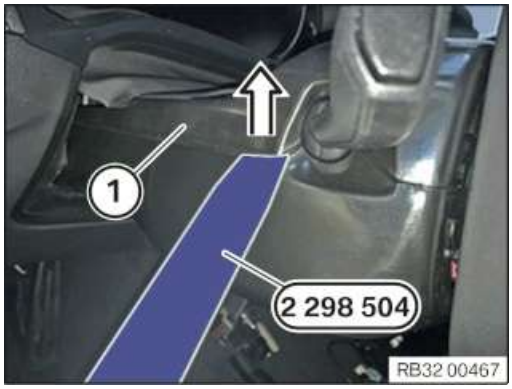
PRELIMINARY WORK

1 – Adjust the steering column position



- Adjust the length of the steering column to the maximum length in the direction of arrow (1).
- Move the steering column to the lowest steering column position in the direction of arrow (2).

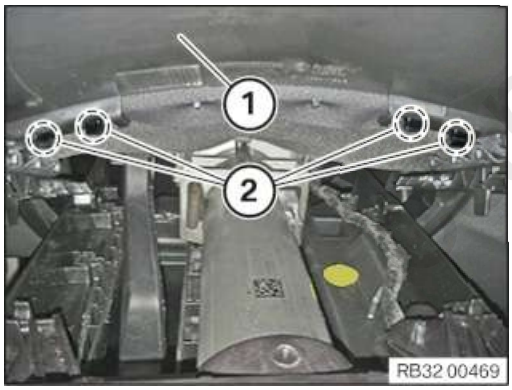
2 – Removing steering column shroud upper section



NOTICE

Perform the operations on the left and right side.

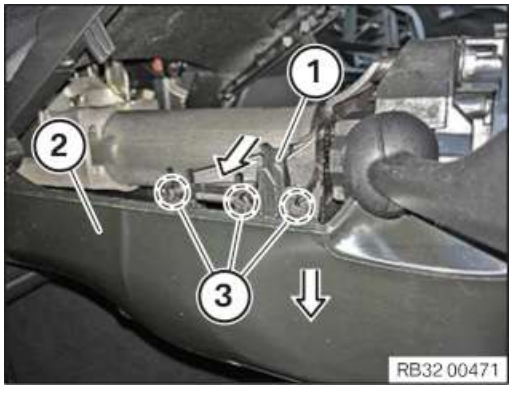
- Unlock the steering column shroud upper section (1) with the special tool 2 298 504 and fold up.



- Unclip the steering column shroud upper section (1) from the brackets (2).
- Remove the steering column shroud upper section (1).

MAIN WORK

3 – Removing steering column shroud lower section



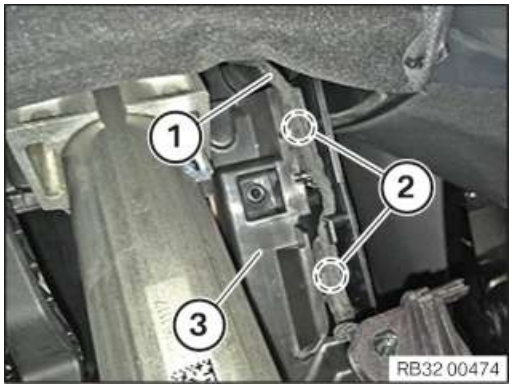
NOTICE

Perform the operations on the left and right side.

- Push the retaining lug (1) to the outside in the direction of the arrow and unclip the steering column shroud lower section (2) from the holders (3) in the direction of the arrow to the bottom at the same time.

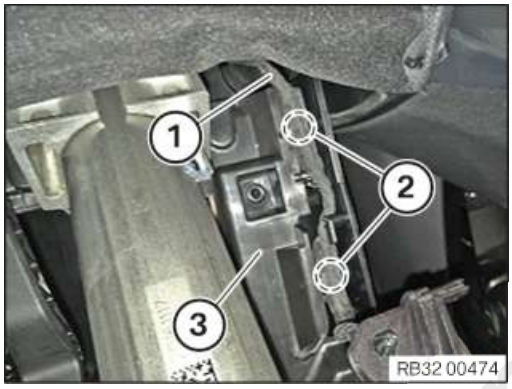


- Fold the steering column shroud lower section down.
- Unlock and disconnect connector (1).

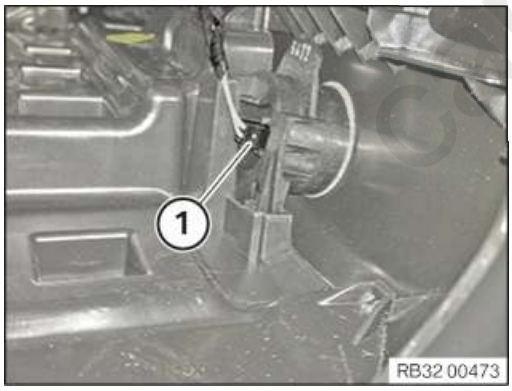


- Detach the cable (1) from the brackets (2).
- Remove the steering column shroud lower section (3).

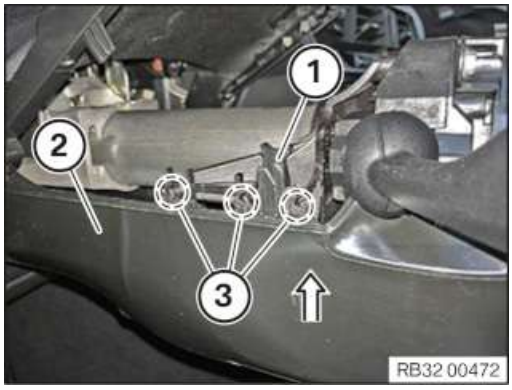
4 – Install steering column shroud lower section



- Position the steering column shroud lower section (3).
- Secure the line (1) on the brackets (2).



- Connect the connector (1).



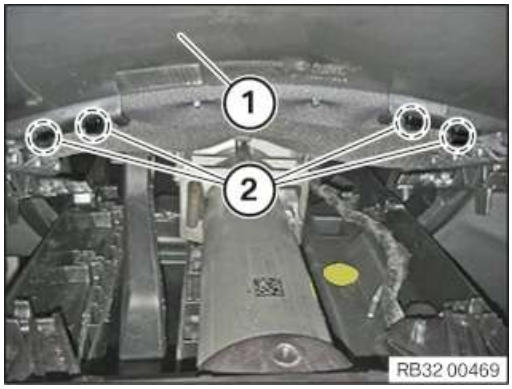
NOTICE

Perform the operations on the left and right side.

- Align the steering column shroud lower section (2) to the steering column using the retaining lug (1).
- Push the steering column shroud lower section (2) up in the direction of the arrow until the brackets (3) engage.

cardiagn.com

5 – Fit steering column shroud upper section



- Clip in the steering column shroud upper section (1) at the brackets (2).



NOTICE

Perform the operations on the left and right side.

- Clip in the steering column shroud upper section (1)into the guide (2).



NOTICE

Perform the operations on the left and right side.

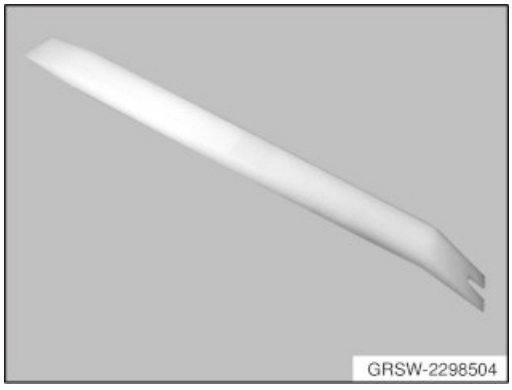
- Press the upper section of the steering column shroud (1) downwards in direction of arrow.

  The upper section of the steering column shroud must engage audibly and perceptibly.

Additional Information

Overview of Special Tools

2 298 504 Wedge



Common	Used in step 2
Usage	Wedge with angled lug
Included in the tool or work	
Storage location	C34
Replaced by	
In connection with	
SI-Number	01 03 12 (792)

cardiagn.com

32 31 004 Removing and installing/replacing steering column shroud upper section

PRELIMINARY WORK

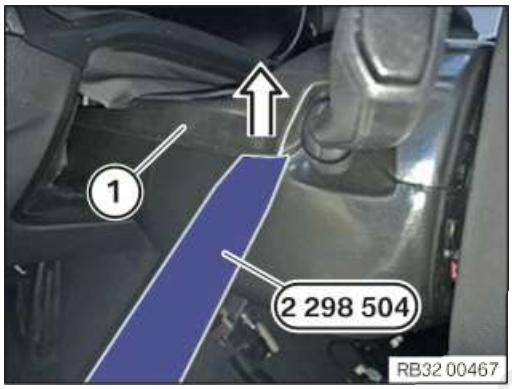
1 – Adjust the steering column position



- Adjust the length of the steering column to the maximum length in the direction of arrow (1).
- Move the steering column to the lowest steering column position in the direction of arrow (2).

MAIN WORK

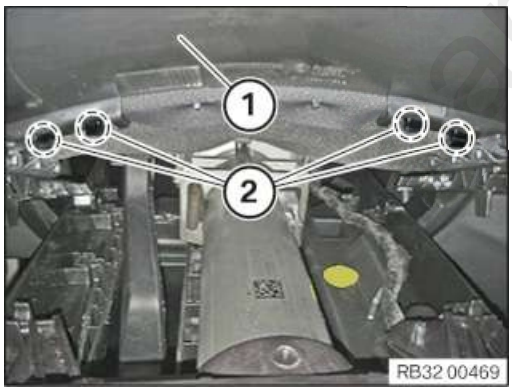
2 – Removing steering column shroud upper section



NOTICE

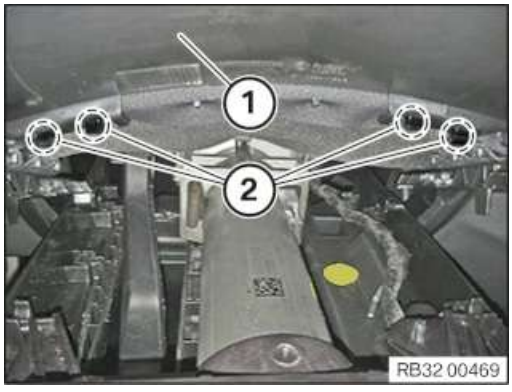
Perform the operations on the left and right side.

- Unlock the steering column shroud upper section (1) with the special tool 2 298 504 and fold up.



- Unclip the steering column shroud upper section (1) from the brackets (2).
- Remove the steering column shroud upper section (1).

3 – Fit steering column shroud upper section



- Clip in the steering column shroud upper section (1) at the brackets (2).

audiagn.com



NOTICE

Perform the operations on the left and right side.

- Clip in the steering column shroud upper section (1)into the guide (2).



NOTICE

Perform the operations on the left and right side.

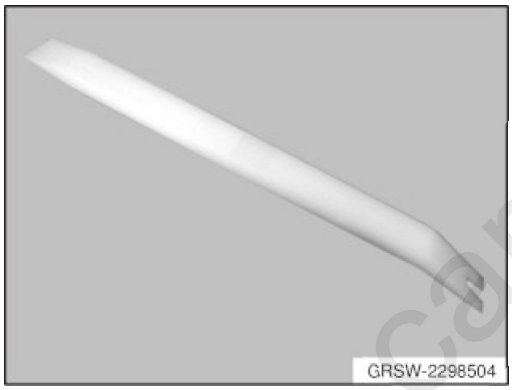
- Press the upper section of the steering column shroud (1) downwards in direction of arrow.

  The upper section of the steering column shroud must engage audibly and perceptibly.

Additional Information

Overview of Special Tools

2 298 504 Wedge



Common		Used in step 2
Usage	Wedge with angled lug	
Included in the tool or work		
Storage location	C34	
Replaced by		
In connection with		
SI-Number	01 03 12 (792)	

carlagn.com

32 31 104 Replacing steering shaft collar

RISK OF DAMAGE

Damage to steering column switch cluster (SZL).

The steering column switch cluster (SZL) or the coil spring cassette may be damaged by twisting of the steering wheel if the lower steering shaft (or the universal joint) is separated from the steering gear or from the steering column.

- After disconnecting the steering shaft (or the universal joint) from the steering gear or from the steering column, secure the steering wheel against twisting.

PRELIMINARY WORK

1 – Removing the front left wheel

▸ **Removing the wheel**



TECHNICAL INFORMATION

A wheel lift is recommended for easier wheel removal and installation without exertion (see Retailer Equipment Catalogue).

- **In vehicles with M Carbon ceramic brake: The wheel lift must be used to remove the wheel.**

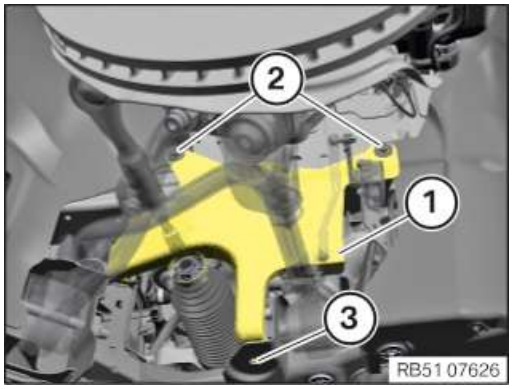
  This process is intended to prevent damage to the brake disc.



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

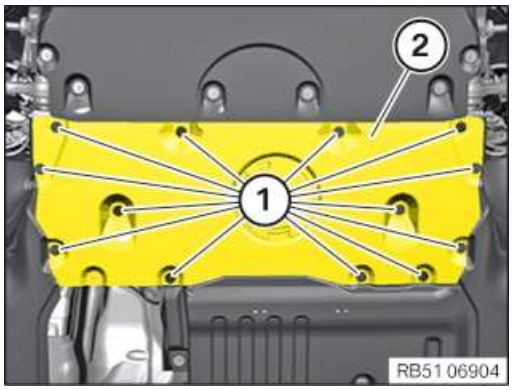
2 – Remove the cover of the steering assembly

cardiagn.com



- Loosen screws (2) and (3).
- Remove the cover (1).

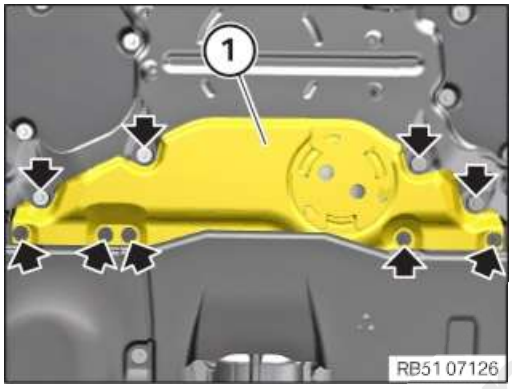
3 – Removing the centre underbody protection



- **Variant with rear wheel drive:**

  Loosen screws (1).

  Remove centre underbody protection (2) .

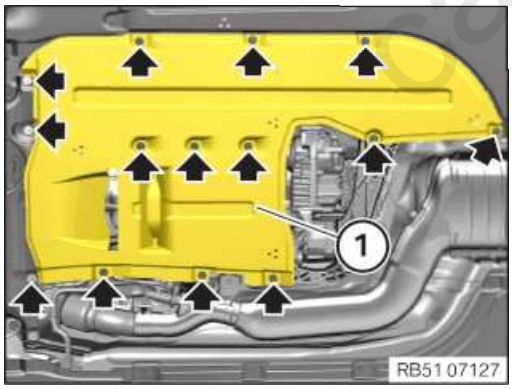


- **Version with all-wheel drive:**

  Remove screws (arrows).

  Feed out and remove the centre underbody protection (1).

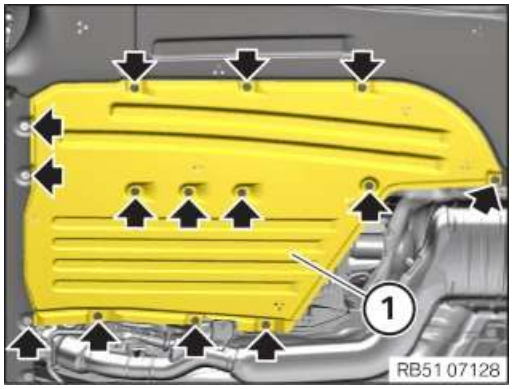
4 – Remove rear underbody protection



- **Version A:**

  Remove screws (arrows).

  Feed out the rear underbody protection (1).



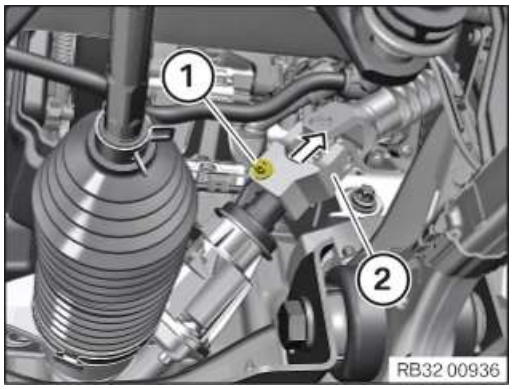
- **Version B:**

  Remove screws (arrows).

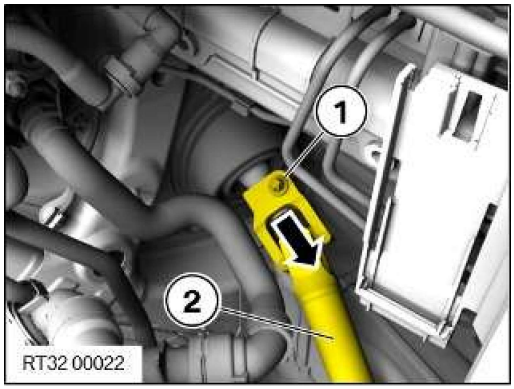
  Guide out rear underbody protection (1) and remove it.

cardiagn.com

5 – Remove lower section of steering shaft



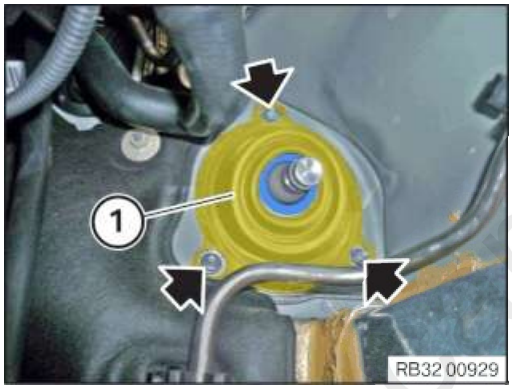
- Loosen the clamping bolt (1).
- Pull down bottom steering shaft (2) from steering gear in direction of arrow.



- Pull out the steering column with the bottom steering shaft to the maximum length in the direction of the arrow.
- Loosen the clamping bolt (1).
- Pull down bottom steering shaft (2) in the direction of the arrow off the steering column .
- Feed out bottom steering shaft (2) and remove.

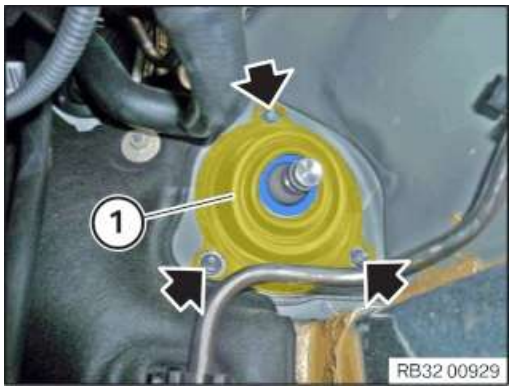
MAIN WORK

6 – Removing the steering shaft collar



- Unscrew the nuts (arrows).
- Pull the steering shaft collar down (1) from the steering column and remove.

7 – Installing the steering shaft collar



- Slide steering shaft collar (1) onto the steering column.
- Tighten the nuts (arrows).

Bearing plate to bulkhead

M6		Tightening torque	8 Nm

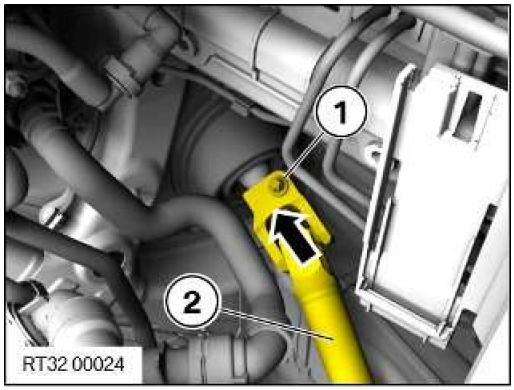
POSTPROCESSES

8 – If reusing: Recut thread

carfdiagn.com

- Clean the screw thread of the steering shaft at the bottom to remove all remnants of screw locking agent.
- Recut screw thread.

9 – Installing steering shaft, bottom



TECHNICAL INFORMATION

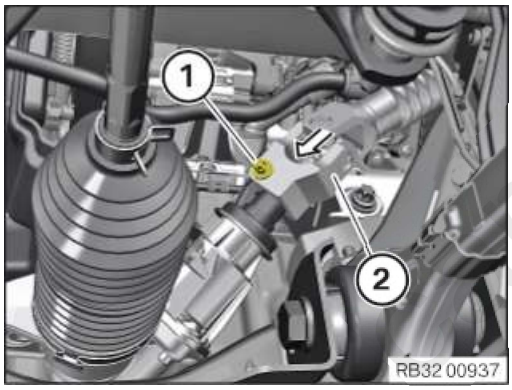
The steering shaft can only be installed in one position.
The steering shaft is encoded for the steering column and the steering gear.
Position clamping bolt in the groove of steering gear or steering column.

- Pull the steering column out to the maximum length.
- Guide in and position bottom steering spindle (2).
- Slide the bottom steering spindle (2) onto the steering column in the direction of the arrow.
- Renew the clamping bolt (1).

  Parts: Clamping bolt
- Tighten the clamping bolt (1).

Lower steering shaft to steering column

M8	Recut screw thread. Renew clamping bolt. No retorquing permitted!	Tightening torque	28 Nm



TECHNICAL INFORMATION

The steering shaft can only be installed in one position.
The steering shaft is encoded for the steering column and the steering gear.
Position clamping bolt in the groove of steering gear or steering column.

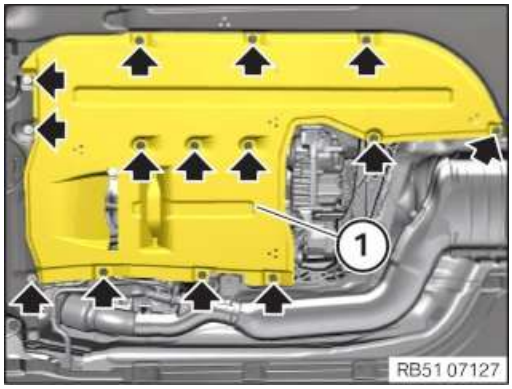
- Slide the bottom steering spindle (2) onto the steering gear in the direction of the arrow.
- Renew the clamping bolt (1).

  Parts: Clamping bolt
- Tighten the clamping bolt (1).

Universal joint to steering box

M8	Recut screw thread. Renew clamping bolt. No retorquing permitted!	Tightening torque	28 Nm

10 – Installing underbody protection at rear



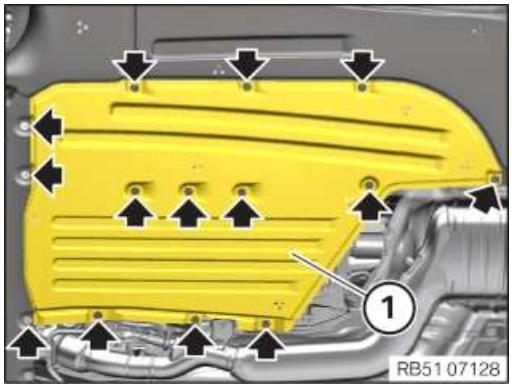
- **Version A:**

  Insert and install the rear underbody protection (1).

  Tighten screws (arrows).

Underbody protection

Hexagon screw		Tightening torque	3 Nm



- **Version B:**

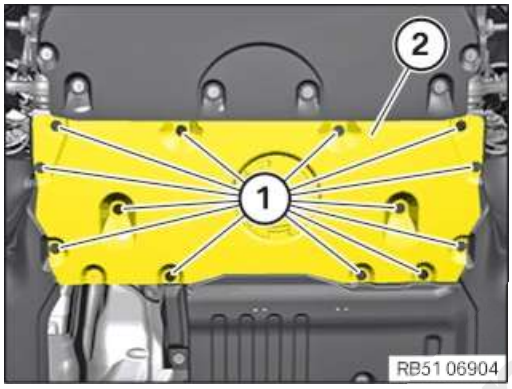
  Insert and install the rear underbody protection (1).

  Tighten screws (arrows).

Underbody protection

Hexagon screw		Tightening torque	3 Nm

11 – Installing the centre underbody protection



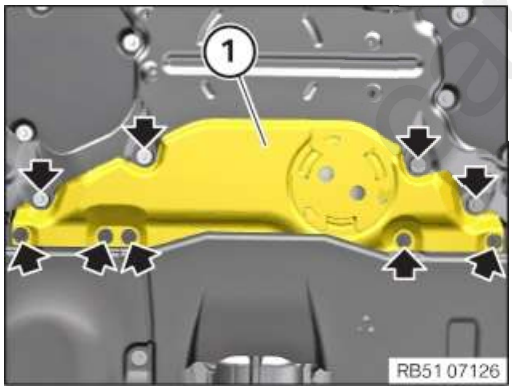
- **Variant with rear wheel drive:**

  Position central underbody protection (2).

  Tighten the screws (1).

Underbody protection

Hexagon screw		Tightening torque	3 Nm



- **Version with all-wheel drive:**

  Guide in centre underbody protection (1) and install.

  Tighten screws (arrows).

Underbody protection

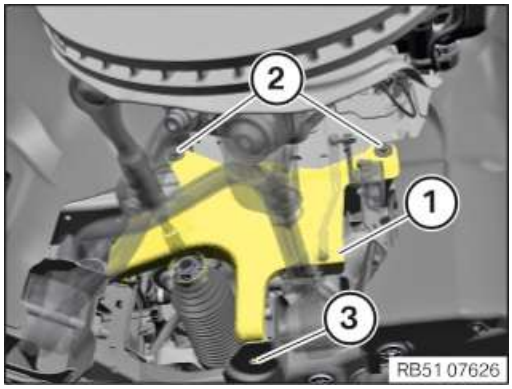
Hexagon screw		Tightening torque	3 Nm

12 – Install the cover of the steering assembly

TECHNICAL INFORMATION

When tightening the screws, the cover can twist and cause chafe marks on the anti-roll bar (risk of corrosion).
Hold the cover while tightening the screws. Then check the position of the cover.

cardiagn.com



- Position the cover (1).
- Tighten down screws (2) and (3).

Cover, steering unit

Screw		Tightening torque	3 Nm

13 – Attaching the front left wheel

▸ **Mounting the wheel**



TECHNICAL INFORMATION

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

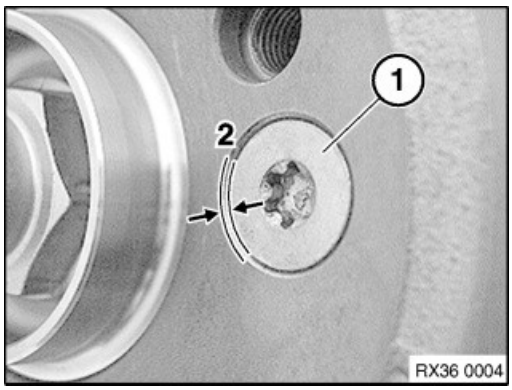
- Remove dirt, grease residues and corrosion from the contact surface with a drill and the special tool 2 344 011.

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



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

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



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

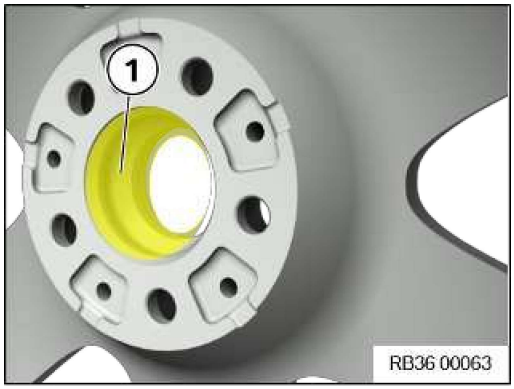
  The mounting bolt (1) for the brake disc **may not** protrude on the contact surface (2) between the brake disc and the wheel rim.

Brake disc to front wheel hub

M8	Renew screw.	Tightening torque	16 Nm

Brake disc to rear wheel hub

M8	Renew screw.	Tightening torque	16 Nm



TECHNICAL INFORMATION

Wheel hubs and wheel centering on the models G80, G82 and G83 **must not** be greased.

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

Expendable materials

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



TECHNICAL INFORMATION

Wheel hubs and wheel centering on the models G80, G82 and G83 **must not** be greased.

- Apply a thin layer of grease to the front and rear wheel hubs (1) to protect against corrosion.

Expendable materials

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



TECHNICAL INFORMATION

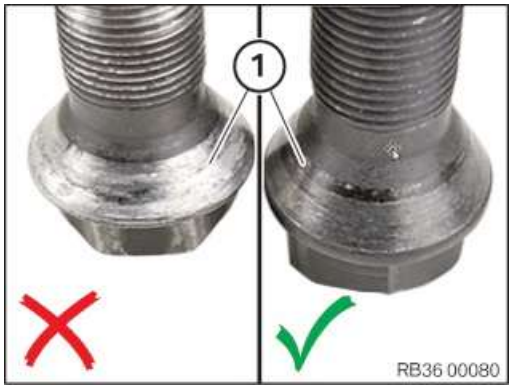
A wheel lift is recommended for easier wheel removal and installation without exertion (see Retailer Equipment Catalogue).

- **In vehicles with M Carbon ceramic brake: The wheel lift must be used to install the wheel.**

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

Check

cardiagn.com



- **Check wheel bolts for wear.**

Result

» Places (> 30%) of the bearing surfaces (1) of the taper on the screw head show a silver wear.

Measure

- Replace wheel bolts.

  Parts: Wheel bolts



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 the corroded wheel bolts (arrows).

  Parts: Wheel bolts

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

Wheel bolts

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

14 – Checking the airbag for function

Check

- Turn steering wheel in both directions to the limit position.

Result

» The airbag indicator light lights up.

cardiagn.com

Measure

- Renew the coil spring cassette.

15 – Check the straight-ahead driving position of the steering wheel

Check

- For straight-ahead driving, check the correct straight-ahead driving position of the steering wheel.

Result

» The steering wheel has an inclination during straight-ahead driving.

Measure

- Carry out a toe adjustment at the front axle.

Additional Information

Overview of Tightening Torques

Bearing plate to bulkhead — Used in step 7

M6		Tightening torque	8 Nm

Lower steering shaft to steering column — Used in step 9

M8	Recut screw thread. Renew clamping bolt. No retorquing permitted!	Tightening torque	28 Nm

Universal joint to steering box — Used in step 9

M8	Recut screw thread. Renew clamping bolt. No retorquing permitted!	Tightening torque	28 Nm

Underbody protection — Used in step 1011

Hexagon screw		Tightening torque	3 Nm

Cover, steering unit — Used in step 12

Screw		Tightening torque	3 Nm

Brake disc to front wheel hub — Used in step 13

M8	Renew screw.	Tightening torque	16 Nm

Brake disc to rear wheel hub — Used in step 13

M8	Renew screw.	Tightening torque	16 Nm

Wheel bolts — Used in step 13

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

cardiagn.com

Overview of Special Tools

2 344 011 Tool



Common	Used in step 13
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



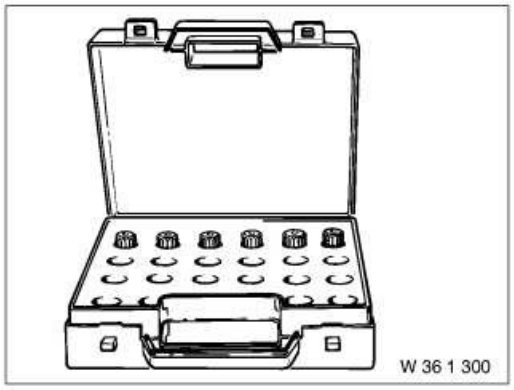
Common	Used in step 1
Usage	(Code 30) Code 39 available separately, (see EPC) under 36 13 1 181 259
Included in the tool or work	0 492 518
Storage location	
Replaced by	
In connection with	
SI-Number	

0 495 224 (36 1 326) Wheel stud



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

0 495 225 (36 1 327) Wheel stud



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

cardiagn.com

0 495 226 (36 1 328) Wheel stud



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

0 495 227 (36 1 329) Wheel stud



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

0 495 228 (36 1 331) Wheel stud



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

0 495 229 (36 1 332) Wheel stud



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

cardiagn.com

0 495 230 (36 1 333) Wheel stud



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

Links

Repair instructions	Used in step
00 02 001 Raising the vehicle using a vehicle lift	113
32 00 155 Kinematics Diagnosis System wheel alignment with ride height measurement without loading the vehicle	
32 00 601 Adjusting toe-in on front axle	

cardiagn.com

32 33 010 Removing and installing the sports steering wheel

WARNING

Pyrotechnic components.

Danger! Life-threatening injuries!

- All work on pyrotechnic parts may be carried out by technically experienced and appropriately trained personnel only.
- Replace any damaged part or ones that have been dropped.
- For additional information see: 72 00 Safety regulations on handling components with gas generators.

TECHNICAL INFORMATION

Steering wheel must be replaced if airbag unit has been deployed.

Only with M Sport steering wheel: Impact plate must be replaced if airbag unit has been deployed.

For additional information see: 72 12 ... Procedure after airbag deployment as result of an accident

TECHNICAL INFORMATION

A wheel alignment is not necessary after the removal, installation or replacement.

PRELIMINARY WORK

1 – Deactivating the 48 V electrical system

Prerequisite

Ignition is switched off.

WARNING

Deactivation of the 12 V vehicle electrical system.

Risk of short circuits! Risk of fire!

- Make sure that **no battery charger** is connected to the jump start terminal point in the engine compartment.
- For vehicles with additional electrical systems (48 V electrical system, high-voltage vehicle electrical system), it is mandatory to deactivate them **before** disconnecting the vehicle battery.

WARNING

Deactivation of the 48 V electrical system.

Risk of short circuits! Risk of fire!

- Make sure that **no charger** is connected to the jump start support point in the engine compartment.

cardiagn.com

RISK OF DAMAGE

Damage to 48-V battery

If a 48-V battery that is disconnected from the electrical system is activated, the battery electronics will be damaged.

- Only carry out activation of the 48V electrical system with a completely connected 48-V battery.

TECHNICAL INFORMATION

Follow notes for 48-V battery. See further information 6120 ... Notes on 48-V battery.



- Deactivate the 48V electrical system by opening the bonnet.

  The deactivation takes place automatically.



Check

TECHNICAL INFORMATION

Zero voltage (48V electrical system is switched off) is displayed only in PAD mode.

- Press the START-STOP button quickly 3 times without stepping on the brake pedal to establish the PAD mode.
- Check isolation from the supply in the instrument cluster in PAD mode.

desired state

- The Check Control message "48V electrical system switched off." (1) is displayed.

Result

» **The absence of voltage** cannot be determined by means of the Check Control message "48V electrical system switched off:" (1). Work is not permitted to be started.

Measure

- Carry out the service function "48 V electrical system deactivation".
  - Vehicle management > Service functions > Voltage supply > Deactivate 48 V electrical system

Only when the Check Control message “48 V electrical system switched off.” (1) is displayed in the instrument cluster is it permitted to disconnect the 12 V battery.

If the absence of voltage is not indicated clearly, contact Technical Support.

Result

» The Check Control message signals that the 48V electrical system has been switched off.

Measure

- Exit PAD mode by pressing the START-STOP button once without depressing the brake pedal.

  The work “Disconnecting the negative battery cable of the 48-V battery” can be started.



- Unlock and disconnect plug connection (1) of the CAN bus.
- Release the clip (2).



- Loosen nut (1).
- Pull off negative battery cable (2) of the 48-V battery from the negative battery terminal, set it aside and secure it.



WARNING

Unprotected battery terminals.

Risk of short circuits! Risk of fire!

- Cover the vehicle battery.

- Cover the vehicle battery with the special tool as shown.
- Position the battery earth lead (1) as shown.

2 – Disconnecting all battery earth leads



- See additional information.

3 – Removing the airbag unit (sports steering wheel)

WARNING

Airbag unit.

Danger! Life-threatening injuries!

- Before performing any work on the airbag, always disconnect the battery earth lead from the battery.
- Airbag unit may only be set down with the cushion (airbag itself) facing upwards.
- For additional information see: 72 00 ... Safety regulations on handling airbag system components/gas generators

RISK OF DAMAGE

Damage to the steering wheel.

Incorrect handling of the tool may damage the steering wheel.

- Ensure the tool is positioned correctly (angle and inclination).
- When unlocking, do not use "levering" action. Instead, press in the Torx screwdriver toward the centre of steering wheel only.

TECHNICAL INFORMATION

The procedure/sequence of the airbag module release function must be observed! First unlock the right side of the airbag module!

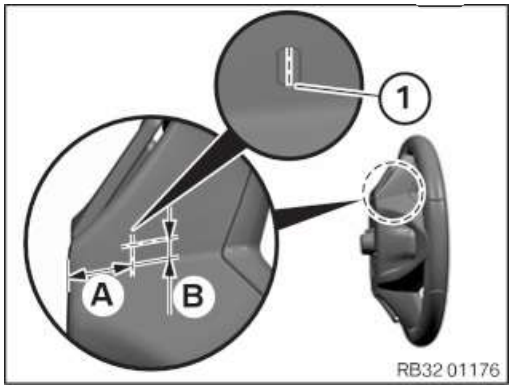


NOTICE

Perform the operations on the left and right side.

- Feel or measure the mark (1) to unlock the airbag unit (see following step).

  The mark (1) is difficult to detect.



NOTICE

Perform the operations on the left and right side.

- Cut the mark (1) carefully with a knife to 4 mm length.

  Dimension (A) = 2.5 cm

  Dimension (B) = 1.0 cm



- Insert the Torx screwdriver (1) T10 on the right diagonally upwards through the cut opening on the rear side of the steering wheel up to the limit position (until a springing resistance can be felt).
- While unlocking the right side, the airbag unit in the "4 O'CLOCK" area must be pressed lightly against the limit position (resistance point in the centre between the horn symbol and the "airbag" inscription).
- Press the Torx screwdriver (1) T10 on the right inwards in the direction of arrow until it audibly disengages twice.
- Let go of the airbag unit. The right side of the module is now unlocked.



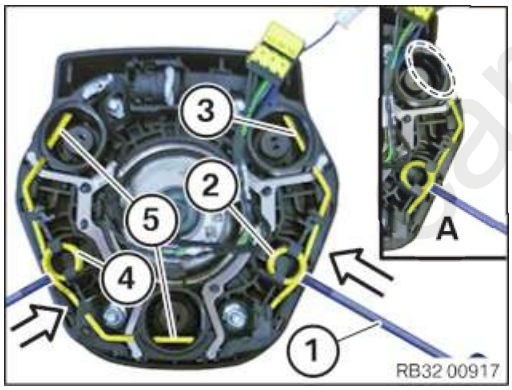
- Insert the Torx screwdriver (1) T10 on the left on the steering wheel diagonally upwards through the cut opening on the rear side of the steering wheel up to the limit position (until the springing resistance is felt).
- While unlocking the left side, the airbag unit in the "10 o'clock" area must be pressed lightly against the limit position with your free hand (resistance point in the area of the left horn symbol).
- Press the Torx screwdriver (1) T10 on the left inwards on the steering wheel in the direction of arrow until it audibly disengages once.
- Release the airbag module. Airbag module is not unlocked and can be removed:



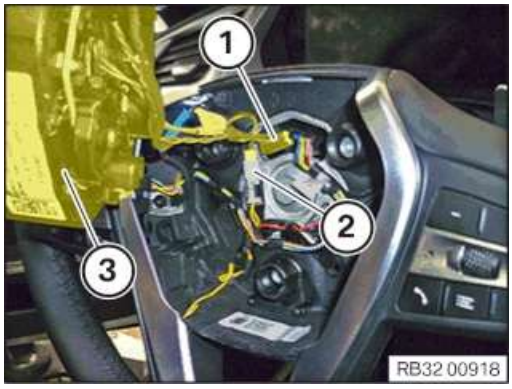
NOTICE

To provide a better overview: Diagram with airbag unit removed.

- To unlock the airbag unit, press the Torx screwdriver T10 (1) diagonally upwards in the direction of arrow to the centre of steering wheel.



- With the Torx screwdriver T10 (1), press the wire spring clip (2) and (4) in the direction of arrow to the centre of steering wheel. Lock (3) and (5) unlocked.



- Unlock and disconnect the plug connections (1) and (2).
- Remove airbag unit (3).

cardiagn.com



- Move the steering wheel and wheels to the straight-ahead position.
- Unlock plug connection (1) and disconnect.
- If installed: Unlock plug connection (2) and disconnect.
- Release the screw (3) and pull off and remove the steering wheel.

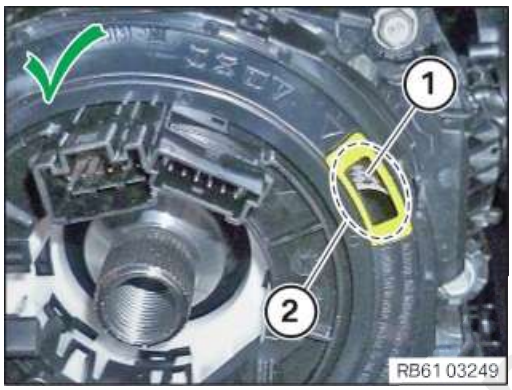
5 – Installing the sports steering wheel

▸ **Check the neutral position of the clock spring**

TECHNICAL INFORMATION

Different variants may be installed depending on the vehicle equipment.

▹ **Version A: Checking the visibility of the marking on the coil spring**



Check

- Check the visibility of the marking (1) on the coil spring in the inspection glass (2) .

Result

» The mark (1) on the coil spring is not visible.

Measure

- Turn the coil spring cassette until the mark (1) on the coil spring becomes visible in the inspection glass (2).

◃

▹ **Version B: Checking the visibility of the marking on the coil spring**



Check

- Check the visibility of the marking (1) on the coil spring in the inspection glass (2) .

cardiagn.com

Result

» The mark (1) on the coil spring is not visible.

Measure

- Turn the coil spring cassette until the mark (1) on the coil spring becomes visible in the inspection glass (2).

◁

Check



- Check if a microencapsulated screw (3) is installed.

Result

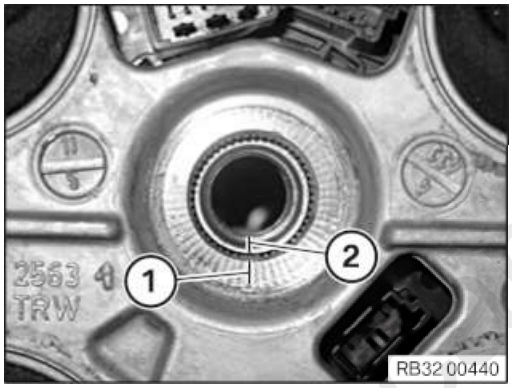
» Screw (3) is micro-encapsulated.

Measure

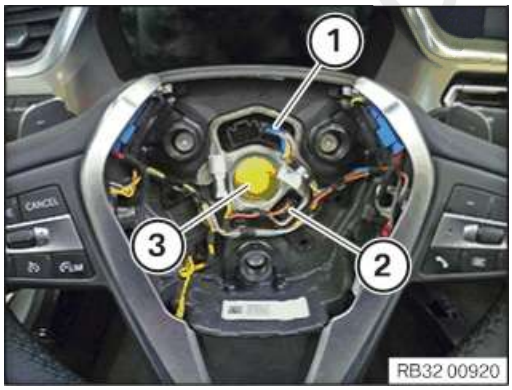
- Clean thread in the steering column.

  Renew the screw (3).

  Parts: Screw



- Align mark (1) on steering wheel to mark (2) on steering column.
- Connect steering wheel.



- Connect connectors (1) and lock.
- If installed: Connect connectors (2) and lock.
- Tighten screw (3) .

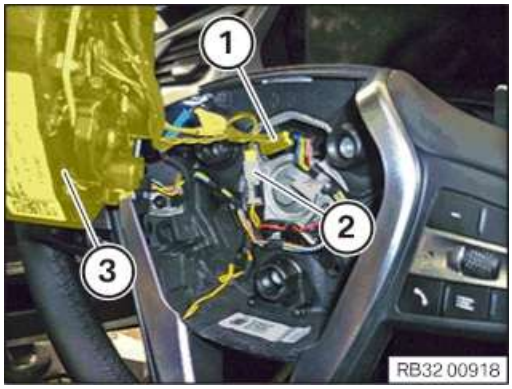
Steering wheel to steering column

M14	Only for a micro-encapsulated screw: Renew screw.	Tightening torque	62,5 Nm

POSTPROCESSES

6 – Installing the airbag unit (sports steering wheel)

carmanualsdiagn.com



- Position airbag unit (3).
- Connect connectors (1) and (2) lock.



- Press the airbag unit (1) with even pressure in the direction of the arrow into the steering wheel.

  The airbag unit (1) must engage audibly and perceptibly.

7 – Connecting all battery earth leads



- See additional information.

8 – Activating the 48 V electrical system

Prerequisite

Ignition is switched off.

RISK OF DAMAGE

Damage to 48-V battery

If a 48-V battery that is disconnected from the electrical system is activated, the battery electronics will be damaged.

- Only carry out activation of the 48V electrical system with a completely connected 48-V battery.

cardiagn.com



- Lift battery earth lead (1).
- Remove special tool .



- Release the negative battery cable (2) of the 48-V battery from the mounting.
- Position the negative battery cable (2) of the 48-V battery on the negative battery terminal.
- Tighten nut (1).

Negative battery cable to 48-V battery

Nut M8		Tightening torque	19 Nm



- Connect the connector (1) of the CAN bus and lock it.
- Clip in clip (2).



- Activate the 48V electrical system by closing the bonnet.

  The activation takes place automatically.

9 – Checking the airbag for function

Check

- Turn steering wheel in both directions to the limit position.

Result

» The airbag indicator light lights up.

Measure

- Renew the coil spring cassette.

Additional Information

Overview of Tightening Torques

cardiagn.com

Steering wheel to steering column			Used in step 5
M14	Only for a micro-encapsulated screw: Renew screw.	Tightening torque	62,5 Nm

Negative battery cable to 48-V battery			Used in step 8
Nut M8		Tightening torque	19 Nm

Overview of Special Tools

Links

Repair instructions (PRE)	Used in step
Notes on 48-V battery	18

General repair instructions	Used in step
72 00 ... Safety regulations for handling components with gas generators	3
72 12 ... Procedure after airbag deployment as result of an accident	

Repair instructions	Used in step
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	27
61 20 900 Disconnecting and connecting battery earth lead	27
61 20 900 Disconnecting and connecting battery earth lead	27
61 20 900 Disconnecting and connecting battery earth lead	27
61 20 900 Disconnecting and connecting battery earth lead	27
61 20 900 Disconnecting and connecting battery earth lead	27
61 20 900 Disconnecting and connecting battery earth lead	27
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	27
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	27
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	27
61 20 900 Disconnecting and connecting battery earth lead	27
61 20 900 Disconnecting and connecting battery earth lead	27
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	27
61 20 900 Disconnecting and connecting battery earth lead	27
61 20 900 Disconnecting and connecting battery earth lead	27
61 20 900 Disconnecting and connecting battery earth lead	27
61 20 900 Disconnecting and connecting battery earth lead	27
61 20 900 Disconnecting and connecting battery earth lead	27
61 20 900 Disconnecting and connecting battery earth lead	27
61 20 900 Disconnecting and connecting battery earth lead	27
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	27
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	27
61 20 900 Disconnecting and connecting battery earth lead	27
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	27
61 20 900 Disconnecting and connecting battery earth lead (Plug-in Hybrid Electric Vehicle)	27

carmagn.com

61 20 900 Disconnecting and connecting battery earth lead	27
61 20 900 Disconnecting and connecting battery earth lead	27
61 20 900 Disconnecting and connecting battery earth lead	27
61 20 900 Disconnecting and connecting battery earth lead	27
61 20 900 Disconnecting and connecting battery earth lead	27
61 20 900 Disconnecting and connecting battery earth lead	27
61 20 900 Disconnecting and connecting battery earth lead	27
61 20 900 Disconnecting and connecting battery earth lead	27
61 20 900 Disconnecting and connecting battery earth lead	27
61 20 900 Disconnecting and connecting battery earth lead	27
61 20 900 Disconnecting and connecting battery earth lead	27
61 20 900 Disconnecting and connecting battery earth lead	27
61 20 900 Disconnecting and connecting battery earth lead	27
61 20 900 Disconnecting and connecting battery earth lead	27
61 20 900 Disconnecting and connecting battery earth lead	27
61 20 900 Disconnecting and connecting battery earth lead	27
61 20 900 Disconnecting and connecting battery earth lead	27
61 20 900 Disconnecting and connecting battery earth lead	27
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	27
61 20 900 Disconnecting and connecting battery earth lead	27
61 20 900 Disconnecting and connecting battery earth lead	27
61 20 900 Disconnecting and connecting battery earth lead	27

cardiagn.com

32 33 016 Removing and installing/replacing the cover for the sports steering wheel

WARNING

Pyrotechnic components.

Danger! Life-threatening injuries!

- All work on pyrotechnic parts may be carried out by technically experienced and appropriately trained personnel only.
- Replace any damaged part or ones that have been dropped.
- For additional information see: 72 00 Safety regulations on handling components with gas generators.

TECHNICAL INFORMATION

Steering wheel must be replaced if airbag unit has been deployed.
Only with M Sport steering wheel: Impact plate must be replaced if airbag unit has been deployed.
For additional information see: 72 12 ... Procedure after airbag deployment as result of an accident

PRELIMINARY WORK

1 – Deactivating the 48 V electrical system

Prerequisite

Ignition is switched off.

WARNING

Deactivation of the 12 V vehicle electrical system.

Risk of short circuits! Risk of fire!

- Make sure that **no battery charger** is connected to the jump start terminal point in the engine compartment.
- For vehicles with additional electrical systems (48 V electrical system, high-voltage vehicle electrical system), it is mandatory to deactivate them **before** disconnecting the vehicle battery.

WARNING

Deactivation of the 48 V electrical system.

Risk of short circuits! Risk of fire!

- Make sure that **no charger** is connected to the jump start support point in the engine compartment.

cardiagn.com

RISK OF DAMAGE

Damage to 48-V battery

If a 48-V battery that is disconnected from the electrical system is activated, the battery electronics will be damaged.

- Only carry out activation of the 48V electrical system with a completely connected 48-V battery.

TECHNICAL INFORMATION

Follow notes for 48-V battery. See further information 6120 ... Notes on 48-V battery.



- Deactivate the 48V electrical system by opening the bonnet.

  The deactivation takes place automatically.



Check

TECHNICAL INFORMATION

Zero voltage (48V electrical system is switched off) is displayed only in PAD mode.

- Press the START-STOP button quickly 3 times without stepping on the brake pedal to establish the PAD mode.
- Check isolation from the supply in the instrument cluster in PAD mode.

desired state

- The Check Control message "48V electrical system switched off." (1) is displayed.

Result

» **The absence of voltage** cannot be determined by means of the Check Control message "48V electrical system switched off:" (1). Work is not permitted to be started.

Measure

- Carry out the service function "48 V electrical system deactivation".
  - Vehicle management > Service functions > Voltage supply > Deactivate 48 V electrical system

Only when the Check Control message “48 V electrical system switched off.” (1) is displayed in the instrument cluster is it permitted to disconnect the 12 V battery.

If the absence of voltage is not indicated clearly, contact Technical Support.

Result

» The Check Control message signals that the 48V electrical system has been switched off.

Measure

- Exit PAD mode by pressing the START-STOP button once without depressing the brake pedal.

  The work “Disconnecting the negative battery cable of the 48-V battery” can be started.



- Unlock and disconnect plug connection (1) of the CAN bus.
- Release the clip (2).



- Loosen nut (1).
- Pull off negative battery cable (2) of the 48-V battery from the negative battery terminal, set it aside and secure it.



WARNING

Unprotected battery terminals.

Risk of short circuits! Risk of fire!

- Cover the vehicle battery.

- Cover the vehicle battery with the special tool as shown.
- Position the battery earth lead (1) as shown.

2 – Disconnecting all battery earth leads



- See additional information.

3 – Removing the airbag unit (sports steering wheel)

WARNING

Airbag unit.

Danger! Life-threatening injuries!

- Before performing any work on the airbag, always disconnect the battery earth lead from the battery.
- Airbag unit may only be set down with the cushion (airbag itself) facing upwards.
- For additional information see: 72 00 ... Safety regulations on handling airbag system components/gas generators

RISK OF DAMAGE

Damage to the steering wheel.

Incorrect handling of the tool may damage the steering wheel.

- Ensure the tool is positioned correctly (angle and inclination).
- When unlocking, do not use "levering" action. Instead, press in the Torx screwdriver toward the centre of steering wheel only.

TECHNICAL INFORMATION

The procedure/sequence of the airbag module release function must be observed! First unlock the right side of the airbag module!

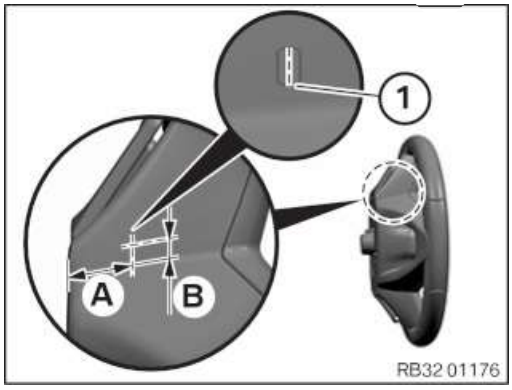


NOTICE

Perform the operations on the left and right side.

- Feel or measure the mark (1) to unlock the airbag unit (see following step).

  The mark (1) is difficult to detect.



NOTICE

Perform the operations on the left and right side.

- Cut the mark (1) carefully with a knife to 4 mm length.

  Dimension (A) = 2.5 cm

  Dimension (B) = 1.0 cm



- Insert the Torx screwdriver (1) T10 on the right diagonally upwards through the cut opening on the rear side of the steering wheel up to the limit position (until a springing resistance can be felt).
- While unlocking the right side, the airbag unit in the "4 O'CLOCK" area must be pressed lightly against the limit position (resistance point in the centre between the horn symbol and the "airbag" inscription).
- Press the Torx screwdriver (1) T10 on the right inwards in the direction of arrow until it audibly disengages twice.
- Let go of the airbag unit. The right side of the module is now unlocked.



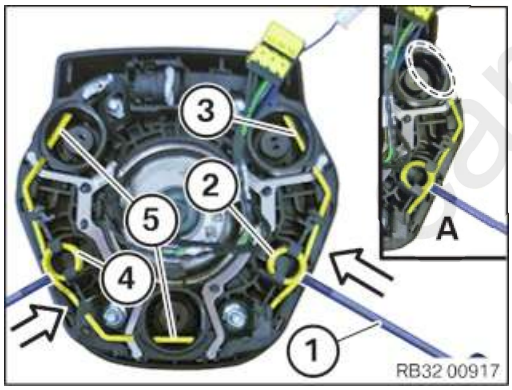
- Insert the Torx screwdriver (1) T10 on the left on the steering wheel diagonally upwards through the cut opening on the rear side of the steering wheel up to the limit position (until the springing resistance is felt).
- While unlocking the left side, the airbag unit in the "10 o'clock" area must be pressed lightly against the limit position with your free hand (resistance point in the area of the left horn symbol).
- Press the Torx screwdriver (1) T10 on the left inwards on the steering wheel in the direction of arrow until it audibly disengages once.
- Release the airbag module. Airbag module is not unlocked and can be removed:



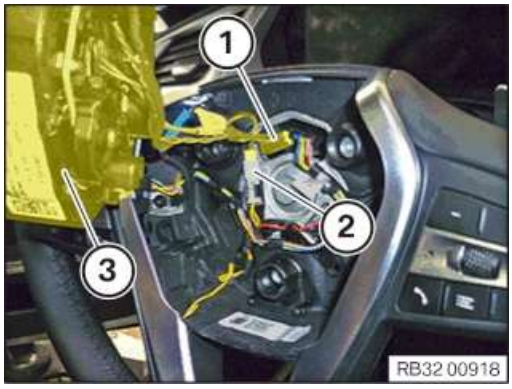
NOTICE

To provide a better overview: Diagram with airbag unit removed.

- To unlock the airbag unit, press the Torx screwdriver T10 (1) diagonally upwards in the direction of arrow to the centre of steering wheel.



- With the Torx screwdriver T10 (1), press the wire spring clip (2) and (4) in the direction of arrow to the centre of steering wheel. Lock (3) and (5) unlocked.



- Unlock and disconnect the plug connections (1) and (2).
- Remove airbag unit (3).

4 – If installed: Removing the shift paddles for the automatic transmission

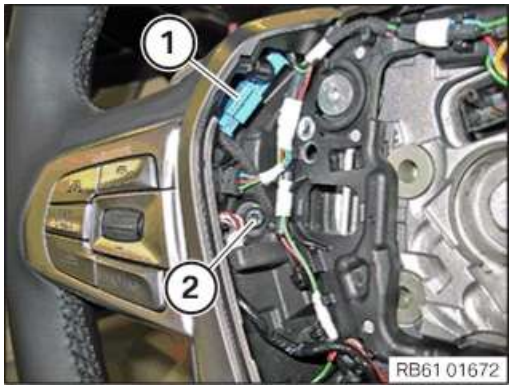
- For invoicing refer to 61 31 112

cardiagn.com

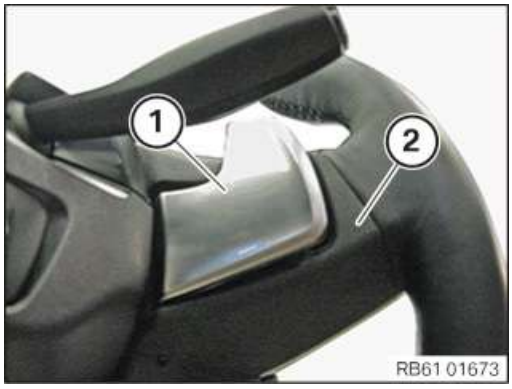
▸ **Removing the shift paddle for the automatic transmission**

NOTICE

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



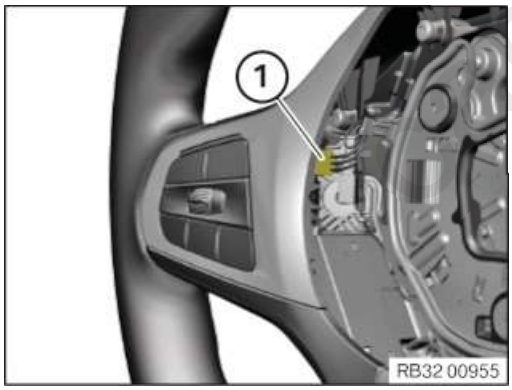
- Disconnect connector (1) and remove cable to shift paddle.
- Loosen screw (2).



- Remove shift paddle (1) from steering wheel (2) and remove associated access line.

MAIN WORK

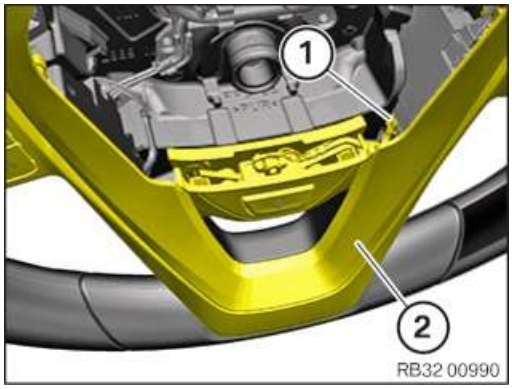
5 – Removing the cover for sports steering wheel



- Unlock plug connection (1) and disconnect.



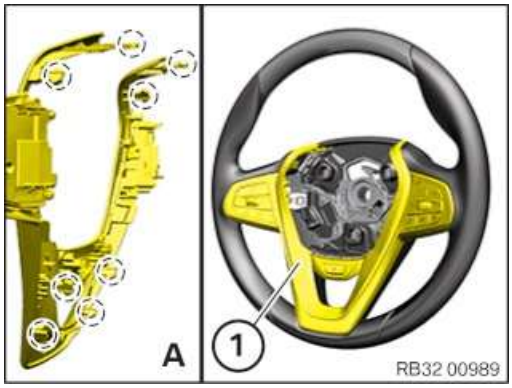
- Unscrew the screws (1) on the back of the steering wheel.



NOTICE

The following work step(s) is / are to be carried out if the specified component(s) is/are fitted.

- After releasing the cover, release, unlock and disconnect the plug connection (1) for the steering wheel heating from the holder.

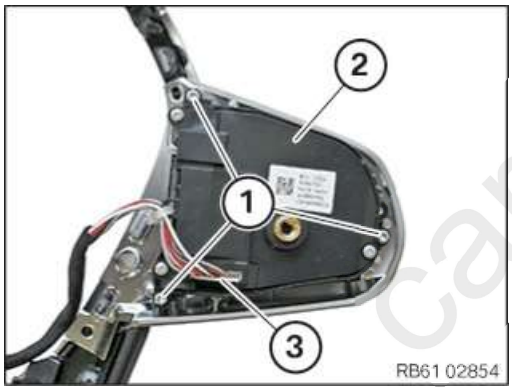


- Carefully release the cover (1) from the latch mechanisms (A).
- Remove the cover (2).

6 – Remove both leather sports steering wheel switches

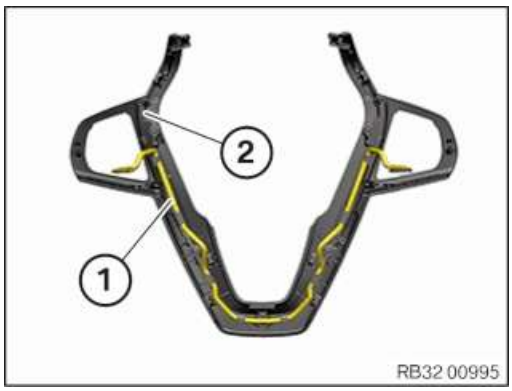
NOTICE

The operations shown only for one side must be carried out on both sides.



- Loosen screws (1) on the switch (2).
- Remove switch (2) from the design trim.
- Unlock plug connection (3) and disconnect.

7 – Removing the wiring harness for the switches on the Sport leather steering wheel



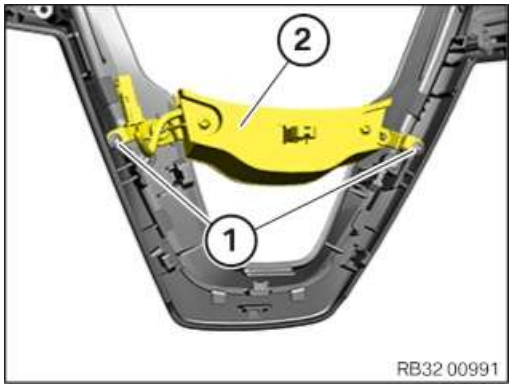
- Guide the wiring harness (1) out of the cover (2) and remove.

8 – Remounting the heated steering wheel button

cardiagn.com

NOTICE

The following work step(s) is / are to be carried out if the specified component(s) is/are fitted.

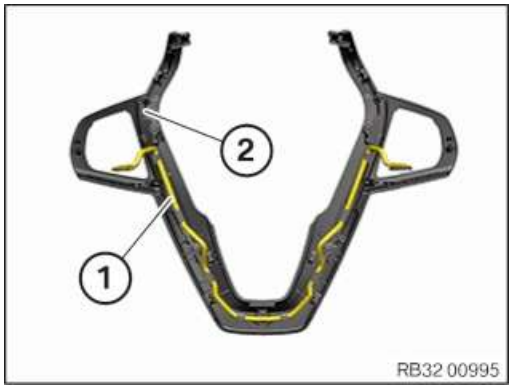


- Loosen screws (1).
- Remove the button for the steering wheel heating (2).
- Position the button for the steering wheel heating (2) on the new cover.
- Tighten the screws (1).

Steering wheel heating button to decorative trim/cover

		Tightening torque	2 Nm

9 – Installing wiring harness for the switch on the sport leather steering wheel

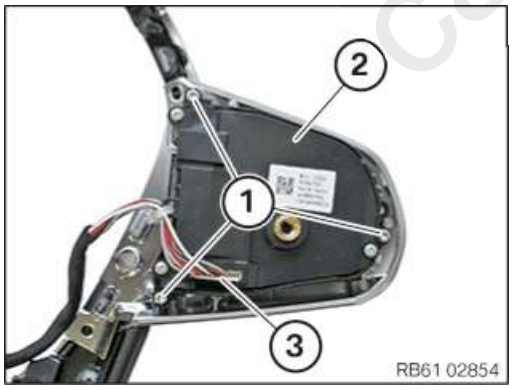


- Position wiring harness (1) on the cover (2) and guide in.

10 – Install both sport leather steering wheel switches

NOTICE

The operations shown only for one side must be carried out on both sides.



- Position the switch (2) into design trim and tighten with screws (1).

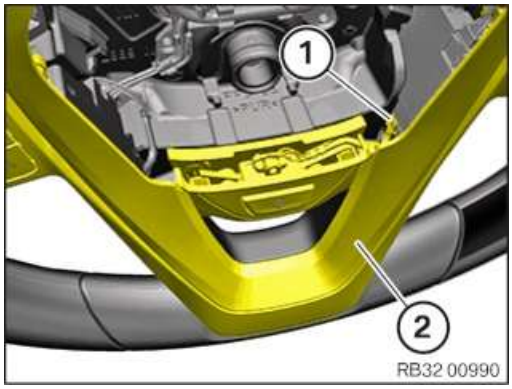
MFL switch

Screw TS5x12		Tightening torque	1,5 Nm

- Connect connectors (3) and lock.

11 – Installing cover for the sport steering wheel

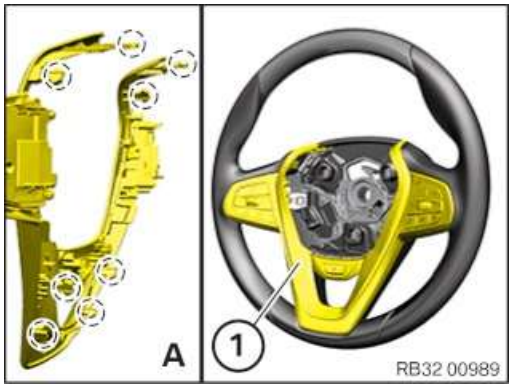
cardiagn.com



NOTICE

The following work step(s) is / are to be carried out if the specified component(s) is/are fitted.

- Position the cover (2).
- Connect the connector (1) for the steering-wheel heating and lock it.
- Attach the connector (1) for the steering wheel heating to the holder.



- Check latch mechanisms (A) for damage.

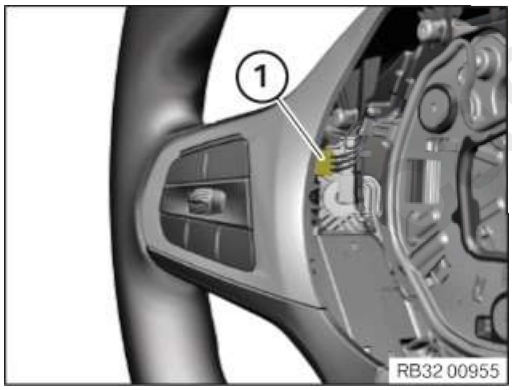
  The latch mechanisms (A) must not be damaged or missing.
- Carefully clip in cover (1) at catches (A).



- Tighten screws (1) on the back of the steering wheel.

Decorative trim to steering wheel

Screw TS5x12		Tightening torque	1,5 Nm



- Connect connectors (1) and lock.

POSTPROCESSES

12 – If installed: Installing the shift paddles for the automatic transmission

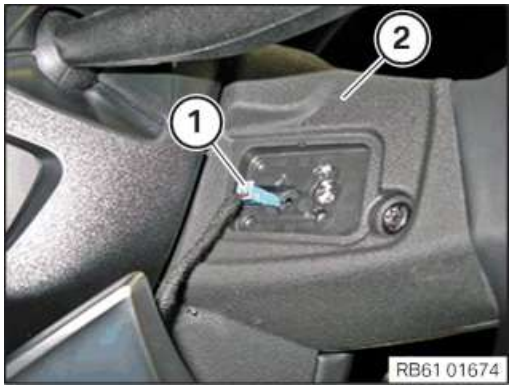
- For invoicing refer to 61 31 112

▸ **Installing the shift paddle for the automatic transmission**

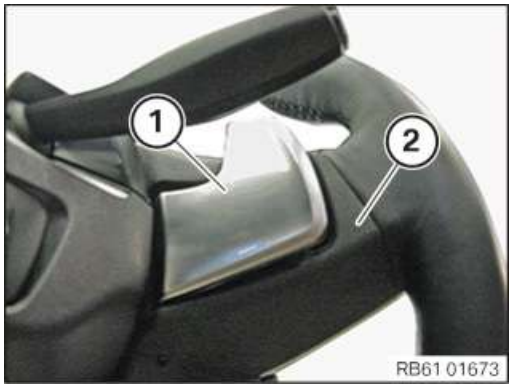
NOTICE

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

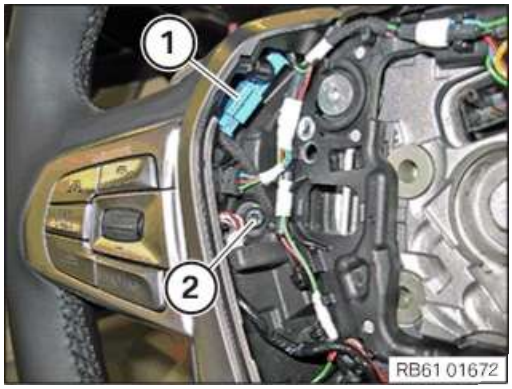
.com



- Insert the access line (1) into the rear of the steering wheel (2).



- Position the shift paddle (1) on the steering wheel (2).



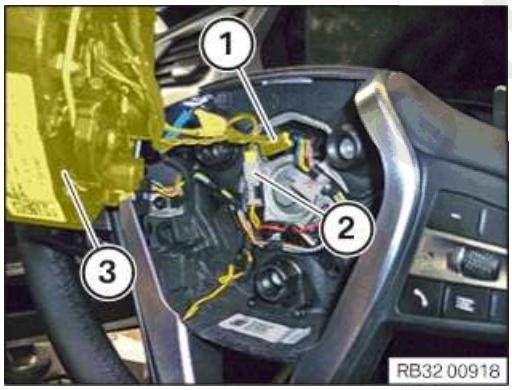
- Tighten down screw (2).

Shift paddle to steering wheel

Screw TS5x12		Tightening torque	2 Nm

- Insert the cable and connect the connector (1).

13 – Installing the airbag unit (sports steering wheel)



- Position airbag unit (3).
- Connect connectors (1) and (2) lock.



- Press the airbag unit (1) with even pressure in the direction of the arrow into the steering wheel.

  The airbag unit (1) must engage audibly and perceptibly.

14 – Connecting all battery earth leads

bmwdiagn.com



- See additional information.

15 – Activating the 48 V electrical system

Prerequisite

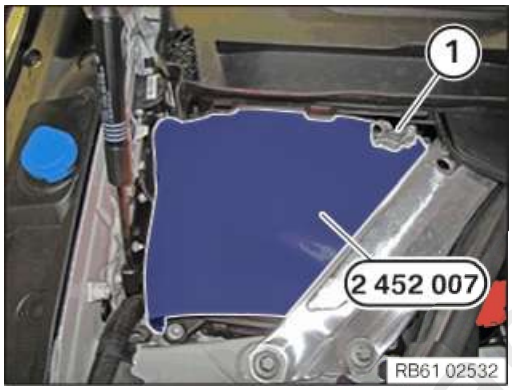
Ignition is switched off.

RISK OF DAMAGE

Damage to 48-V battery

If a 48-V battery that is disconnected from the electrical system is activated, the battery electronics will be damaged.

- Only carry out activation of the 48V electrical system with a completely connected 48-V battery.



- Lift battery earth lead (1).
- Remove special tool .



- Release the negative battery cable (2) of the 48-V battery from the mounting.
- Position the negative battery cable (2) of the 48-V battery on the negative battery terminal.
- Tighten nut (1).

Negative battery cable to 48-V battery

Nut M8		Tightening torque	19 Nm



- Connect the connector (1) of the CAN bus and lock it.
- Clip in clip (2).



- Activate the 48V electrical system by closing the bonnet.
  The activation takes place automatically.

Additional Information

Overview of Tightening Torques

Steering wheel heating button to decorative trim/cover			Used in step 8
		Tightening torque	2 Nm

MFL switch			Used in step 10
Screw TS5x12		Tightening torque	1,5 Nm

Decorative trim to steering wheel			Used in step 11
Screw TS5x12		Tightening torque	1,5 Nm

Shift paddle to steering wheel			Used in step 12
Screw TS5x12		Tightening torque	2 Nm

Negative battery cable to 48-V battery			Used in step 15
Nut M8		Tightening torque	19 Nm

Overview of Special Tools

Links

Repair instructions (PRE)	**Used in step**
Notes on 48-V battery	115

General repair instructions	**Used in step**
72 00 ... Safety regulations for handling components with gas generators	3
72 12 ... Procedure after airbag deployment as result of an accident	

Repair instructions	**Used in step**
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	214
61 20 900 Disconnecting and connecting battery earth lead	214
61 20 900 Disconnecting and connecting battery earth lead	214
61 20 900 Disconnecting and connecting battery earth lead	214
61 20 900 Disconnecting and connecting battery earth lead	214
61 20 900 Disconnecting and connecting battery earth lead	214
61 20 900 Disconnecting and connecting battery earth lead	214
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	214

cardiagn.com

61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	214
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	214
61 20 900 Disconnecting and connecting battery earth lead	214
61 20 900 Disconnecting and connecting battery earth lead	214
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	214
61 20 900 Disconnecting and connecting battery earth lead	214
61 20 900 Disconnecting and connecting battery earth lead	214
61 20 900 Disconnecting and connecting battery earth lead	214
61 20 900 Disconnecting and connecting battery earth lead	214
61 20 900 Disconnecting and connecting battery earth lead	214
61 20 900 Disconnecting and connecting battery earth lead	214
61 20 900 Disconnecting and connecting battery earth lead	214
61 20 900 Disconnecting and connecting battery earth lead	214
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	214
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	214
61 20 900 Disconnecting and connecting battery earth lead	214
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	214
61 20 900 Disconnecting and connecting battery earth lead (Plug-in Hybrid Electric Vehicle)	214
61 20 900 Disconnecting and connecting battery earth lead	214
61 20 900 Disconnecting and connecting battery earth lead	214
61 20 900 Disconnecting and connecting battery earth lead	214
61 20 900 Disconnecting and connecting battery earth lead	214
61 20 900 Disconnecting and connecting battery earth lead	214
61 20 900 Disconnecting and connecting battery earth lead	214
61 20 900 Disconnecting and connecting battery earth lead	214
61 20 900 Disconnecting and connecting battery earth lead	214
61 20 900 Disconnecting and connecting battery earth lead	214
61 20 900 Disconnecting and connecting battery earth lead	214
61 20 900 Disconnecting and connecting battery earth lead	214
61 20 900 Disconnecting and connecting battery earth lead	214
61 20 900 Disconnecting and connecting battery earth lead	214
61 20 900 Disconnecting and connecting battery earth lead	214
61 20 900 Disconnecting and connecting battery earth lead	214
61 20 900 Disconnecting and connecting battery earth lead	214
61 20 900 Disconnecting and connecting battery earth lead	214
61 20 900 Disconnecting and connecting battery earth lead	214
61 20 900 Disconnecting and connecting battery earth lead	214
61 20 900 Disconnecting and connecting battery earth lead	214
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	214
61 20 900 Disconnecting and connecting battery earth lead	214
61 20 900 Disconnecting and connecting battery earth lead	214
61 20 900 Disconnecting and connecting battery earth lead	214

cardiagn.com

32 33 020 Replacing the M Sport steering wheel

WARNING

Pyrotechnic components.

Danger! Life-threatening injuries!

- All work on pyrotechnic parts may be carried out by technically experienced and appropriately trained personnel only.
- Replace any damaged part or ones that have been dropped.
- For additional information see: 72 00 Safety regulations on handling components with gas generators.

TECHNICAL INFORMATION

A wheel alignment is not necessary after the removal, installation or replacement.

TECHNICAL INFORMATION

Steering wheel must be replaced if airbag unit has been deployed.

Only with M Sport steering wheel: Impact plate must be replaced if airbag unit has been deployed.

For additional information see: 72 12 ... Procedure after airbag deployment as result of an accident

PRELIMINARY WORK

1 – Deactivating the 48 V electrical system

Prerequisite

Ignition is switched off.

WARNING

Deactivation of the 12 V vehicle electrical system.

Risk of short circuits! Risk of fire!

- Make sure that **no battery charger** is connected to the jump start terminal point in the engine compartment.
- For vehicles with additional electrical systems (48 V electrical system, high-voltage vehicle electrical system), it is mandatory to deactivate them **before** disconnecting the vehicle battery.

WARNING

Deactivation of the 48 V electrical system.

Risk of short circuits! Risk of fire!

- Make sure that **no charger** is connected to the jump start support point in the engine compartment.

cardiagn.com

RISK OF DAMAGE

Damage to 48-V battery

If a 48-V battery that is disconnected from the electrical system is activated, the battery electronics will be damaged.

- Only carry out activation of the 48V electrical system with a completely connected 48-V battery.

TECHNICAL INFORMATION

Follow notes for 48-V battery. See further information 6120 ... Notes on 48-V battery.



- Deactivate the 48V electrical system by opening the bonnet.

  The deactivation takes place automatically.



Check

TECHNICAL INFORMATION

Zero voltage (48V electrical system is switched off) is displayed only in PAD mode.

- Press the START-STOP button quickly 3 times without stepping on the brake pedal to establish the PAD mode.
- Check isolation from the supply in the instrument cluster in PAD mode.

desired state

- The Check Control message "48V electrical system switched off." (1) is displayed.

Result

» **The absence of voltage** cannot be determined by means of the Check Control message "48V electrical system switched off:" (1). Work is not permitted to be started.

Measure

- Carry out the service function "48 V electrical system deactivation".
  - Vehicle management > Service functions > Voltage supply > Deactivate 48 V electrical system

Only when the Check Control message “48 V electrical system switched off.” (1) is displayed in the instrument cluster is it permitted to disconnect the 12 V battery.

If the absence of voltage is not indicated clearly, contact Technical Support.

Result

» The Check Control message signals that the 48V electrical system has been switched off.

Measure

- Exit PAD mode by pressing the START-STOP button once without depressing the brake pedal.

  The work “Disconnecting the negative battery cable of the 48-V battery” can be started.



- Unlock and disconnect plug connection (1) of the CAN bus.
- Release the clip (2).



- Loosen nut (1).
- Pull off negative battery cable (2) of the 48-V battery from the negative battery terminal, set it aside and secure it.



WARNING

Unprotected battery terminals.

Risk of short circuits! Risk of fire!

- Cover the vehicle battery.

- Cover the vehicle battery with the special tool as shown.
- Position the battery earth lead (1) as shown.

2 – Disconnecting all battery earth leads



- See additional information.

3 – Removing airbag unit (M Sport steering wheel)

WARNING

Airbag unit.

Danger! Life-threatening injuries!

- Before performing any work on the airbag, always disconnect the battery earth lead from the battery.
- Airbag unit may only be set down with the cushion (airbag itself) facing upwards.
- For additional information see: 72 00 ... Safety regulations on handling airbag system components/gas generators

RISK OF DAMAGE

Damage to the steering wheel.

Incorrect handling of the tool may damage the steering wheel.

- Ensure the tool is positioned correctly (angle and inclination).
- When unlocking, do not use "levering" action. Instead, press in the Torx screwdriver toward the centre of steering wheel only.



NOTICE

Perform the operations on the left and right side.

- Locate the mark (1) for unlocking the airbag unit on the steering wheel by touching it.



NOTICE

Perform the operations on the left and right side.

- Cut the mark (1) carefully with a knife (2) to an approx. length of 4 mm .

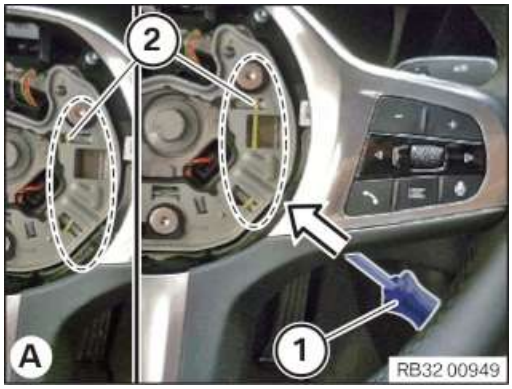


TECHNICAL INFORMATION

Different variants may be installed depending on the vehicle equipment.

- In case of vehicles with shift paddles (2) made of carbon-fibre-reinforced plastic, use a Torx socket T15 (1) for unlocking the airbag unit.

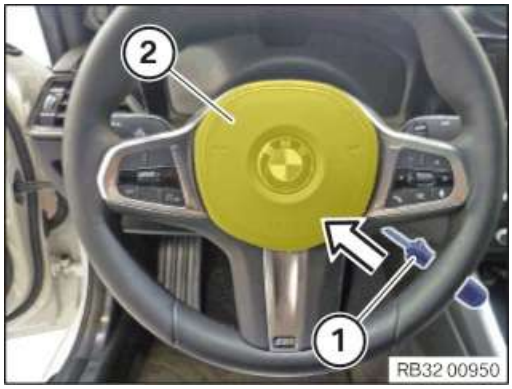
bmwdiagn.com



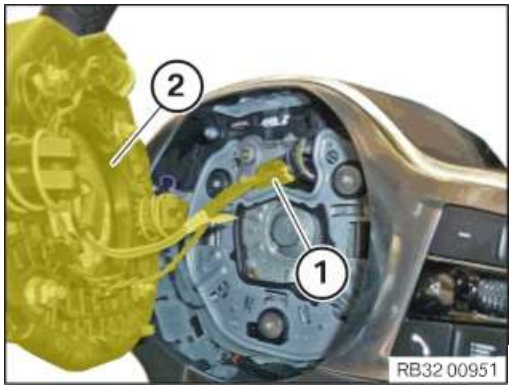
NOTICE

To provide a better overview: Diagram with airbag unit removed.

- Insert the Torx socket T15 (1) diagonally upwards until a resilient resistance is felt.
- Press in Torx socket T15(1) straight in the direction of arrow towards the centre of the steering wheel in order to unlock the wire spring clip (2) or to unlock the airbag unit (A).



- Press in the wire spring clip with Torx socket T15 (1) in the direction of arrow and lift the airbag unit (2) on the unlocked side.
- Repeat procedure on left side and carefully release airbag unit (2) from the steering wheel.



- Unlock plug connection (1) and disconnect.
- Remove the airbag unit (2).

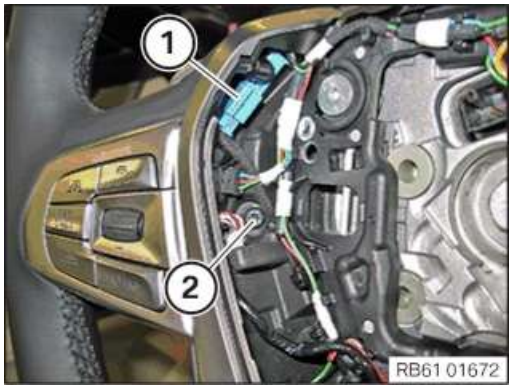
4 – If installed: Removing the shift paddles for the automatic transmission

- For invoicing refer to 61 31 112

▸ **Removing the shift paddle for the automatic transmission**

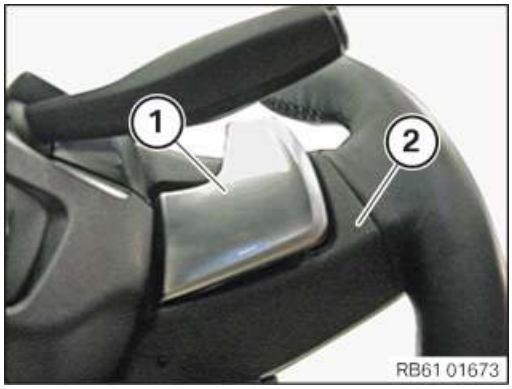
NOTICE

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



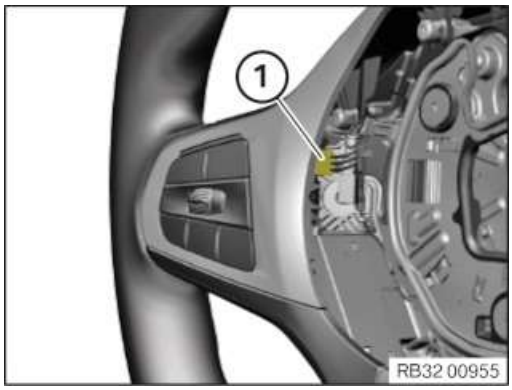
- Disconnect connector (1) and remove cable to shift paddle.
- Loosen screw (2).

cardiagn.com



- Remove shift paddle (1) from steering wheel (2) and remove associated access line.

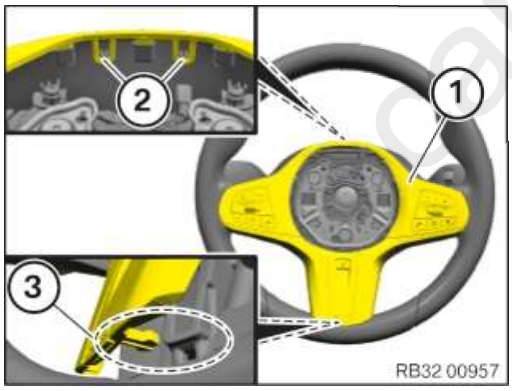
5 – Removing decorative trim for the M Sport steering wheel (SA710)



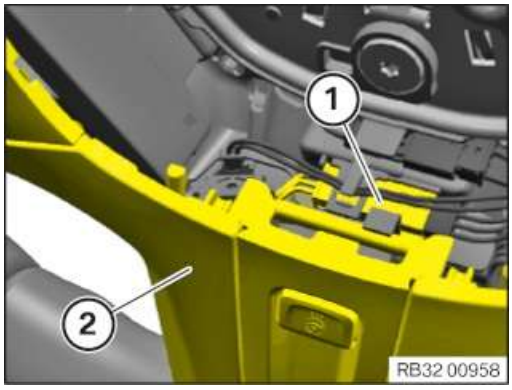
- Unlock plug connection (1) and disconnect.



- Unscrew the screws (1) on the back of the steering wheel.



- Carefully detach the decorative trim (1) from the latch mechanisms (2).
- Carefully release the decorative trim (1) from the steering wheel in the area (3).



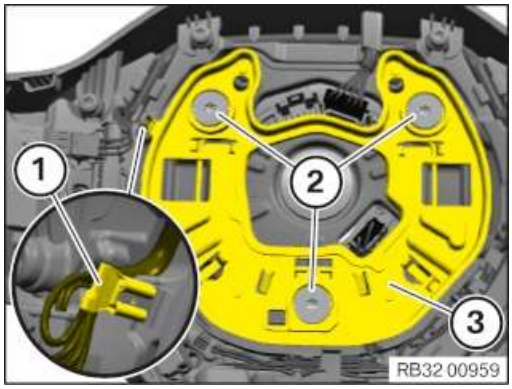
NOTICE

The following work step(s) is / are to be carried out if the specified component(s) is/are fitted.

- Loosen the plug connection (1) for the steering wheel heating from the holder, unlock and disconnect.
- Remove decorative trim (2).

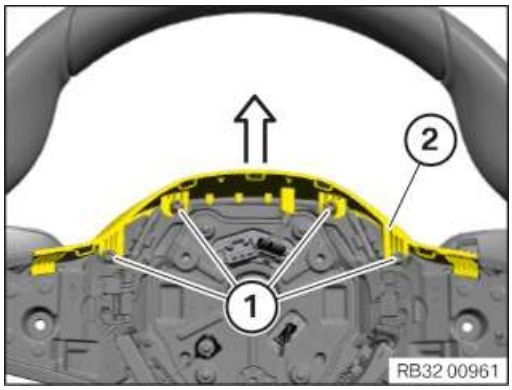
6 – Removing the impact plate (M Sport steering wheel)

cardiagn.com



- Disconnect (1) grounding cable.
- Loosen screws (2).
- Remove impact plate (3).

7 – Remove cover

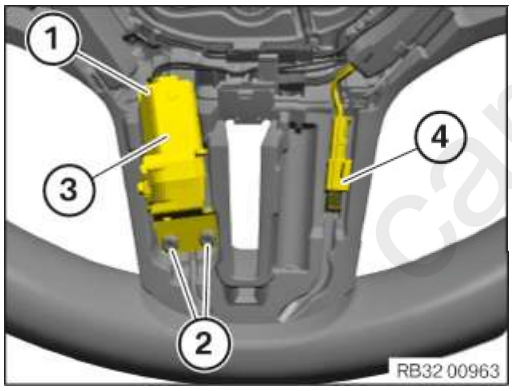


- Loosen screws (1).
- Pull down and remove cover (2) in direction of arrow.

8 – Disconnecting the plug connection for the steering wheel heating

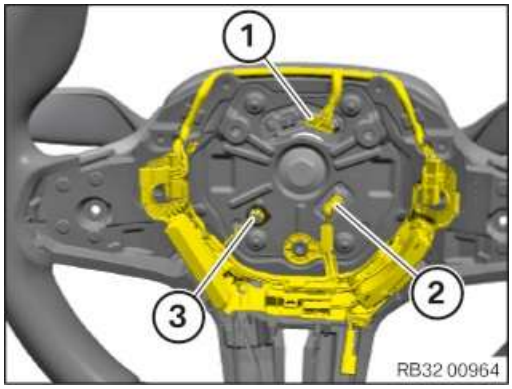
NOTICE

The following work step(s) is / are to be carried out if the specified component(s) is/are fitted.



- Unlock and disconnect the plug connection (1) on the vibration actuator (3).
- Loosen screws (2).
- Remove the vibration actuator (3).
- Unlock plug connection (4) and disconnect.

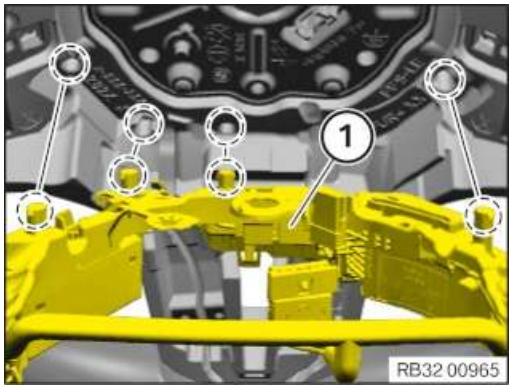
9 – Removing wiring harness (M Sport steering wheel)



- (1)(2)
- Release the earth cable eyelet (3) from the steering wheel.

Note: The eyelet of the earth cable has been damaged during removal and must not be reused.

cardiagn.com



- Release the wiring harness (1) from the steering wheel and remove.

MAIN WORK

10 – Removing the steering wheel/M Sport steering wheel



TECHNICAL INFORMATION

When releasing the screw, have an auxiliary person brace the steering wheel in order to reduce torque on the steering column!

- Move the steering wheel and wheels to the straight-ahead position.
- Loosen screw (1).
- Pull down the steering wheel and remove.

11 – When the airbag unit has been actuated: Replacing the M Sport steering wheel and the horn plate



- Renew the M Sport steering wheel (1) and the horn plate (2).

  Parts: M Sport steering wheel, horn plate

12 – SZL greases



TECHNICAL INFORMATION

In order to avoid noises, when replacing the steering wheel, SZL must be greased.

- Lightly grease the steering column switch cluster on the mount for the steering wheel driver (1).

Expendable materials

Lubricating grease Renolit CX-CVM 1	100 g, Bag	83192286016

13 – Installing the steering wheel/M Sport steering wheel

cardiagn.com

▶ **Check the neutral position of the clock spring**

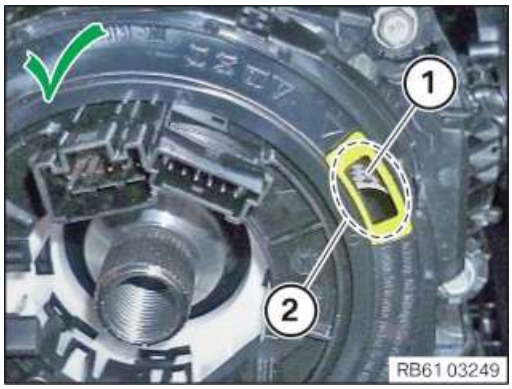
TECHNICAL INFORMATION

Different variants may be installed depending on the vehicle equipment.

▷ **Version A: Checking the visibility of the marking on the coil spring**

Check

- Check the visibility of the marking (1) on the coil spring in the inspection glass (2) .



Result

» The mark (1) on the coil spring is not visible.

Measure

- Turn the coil spring cassette until the mark (1) on the coil spring becomes visible in the inspection glass (2).

◁

▷ **Version B: Checking the visibility of the marking on the coil spring**

Check

- Check the visibility of the marking (1) on the coil spring in the inspection glass (2) .



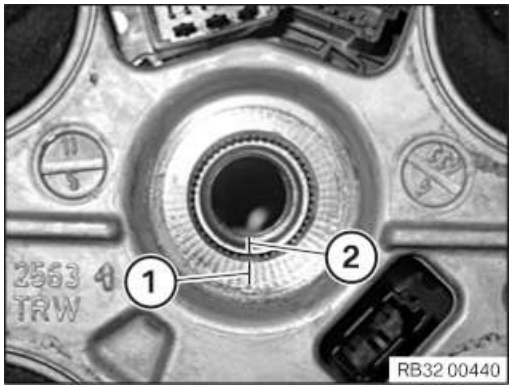
Result

» The mark (1) on the coil spring is not visible.

Measure

- Turn the coil spring cassette until the mark (1) on the coil spring becomes visible in the inspection glass (2).

◁



- Align mark (1) on steering wheel to mark (2) on steering column.
- Position the steering wheel.

Check



- A micro-encapsulated screw (1) may be fitted.

  Check the screw connection.

Result

» Screw (1) is micro-encapsulated.

Measure

- Clean thread in the steering column.

  Renew the screw (1).

  Parts: Screw



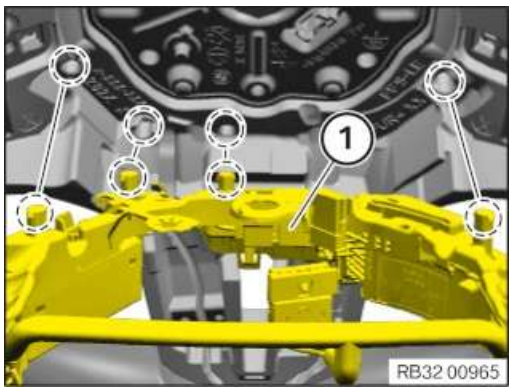
- Tighten down screw (1).

Steering wheel to steering column

M14	Only for a micro-encapsulated screw: Renew screw.	Tightening torque	62,5 Nm

POSTPROCESSES

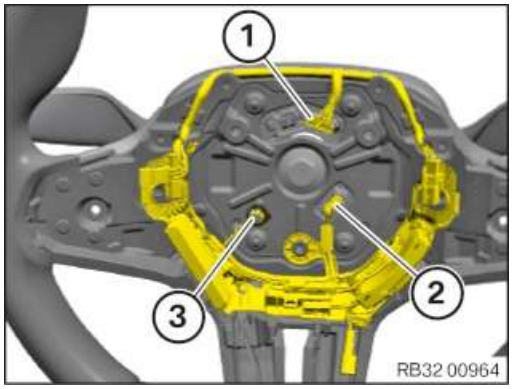
14 – Installing the wiring harness (M Sport steering wheel)



- Replace wiring harness (1).

  Parts: Wiring harness

- Position the wiring harness (1) with the brackets on the steering wheel.



- Guide in and secure wiring harness to the steering wheel.
- Attach the earth cable eyelet (3) to the steering wheel.

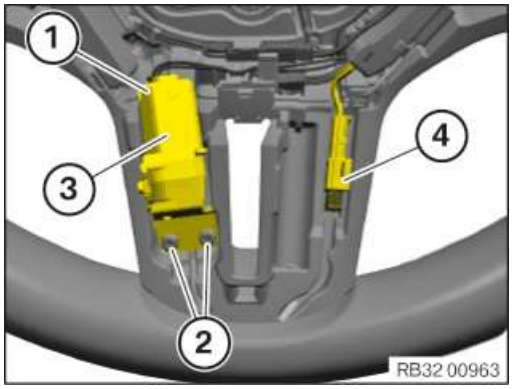
Note: The eyelet of the earth cable (wiring harness) must not be reused.

- Connect and lock connectors (1) and (2).

15 – Connecting the connector for the steering wheel heating

NOTICE

The following work step(s) is / are to be carried out if the specified component(s) is/are fitted.



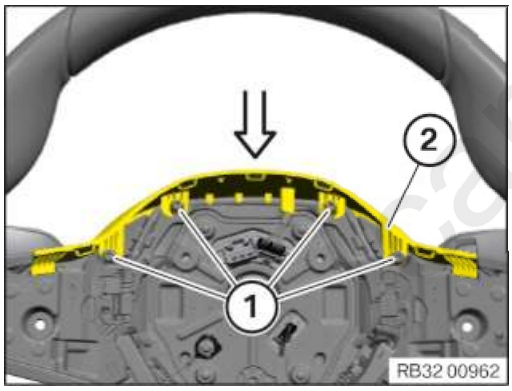
- Connect connectors (4) and lock.
- Position vibration actuator (3).
- Tighten the screws (2).

Balance weight/vibration actuator on steering wheel

Screw		Tightening torque	2,2 Nm

- Connect connectors (1) and lock.

16 – Install the cover

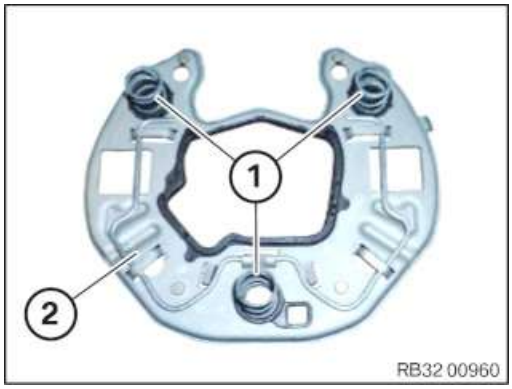


- Feed in and position cover (2) in direction of arrow.
- Tighten the screws (1).

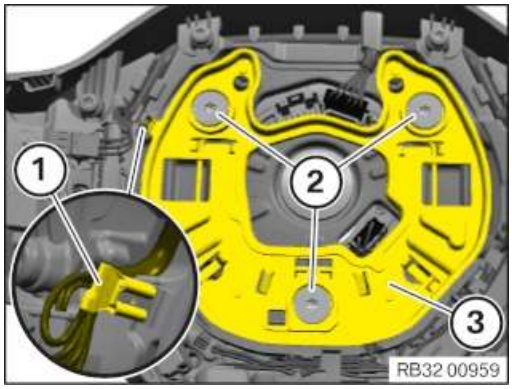
Steering wheel cover

Screw TS5x12		Tightening torque	2 Nm

17 – Install the impact plate (M Sport steering wheel)



- Check the position of the springs (1) on the impact plate (2) and correct it if necessary.



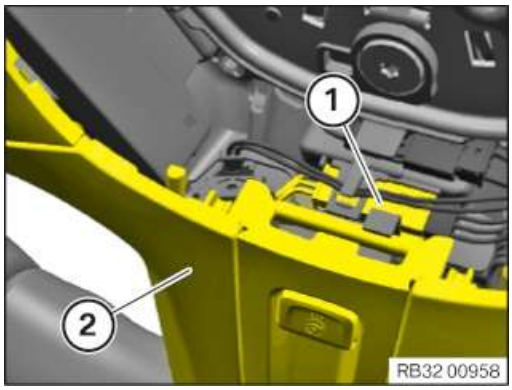
- Position impact plate (3).
- Tighten the screws (2).

Impact plate on steering wheel

Screw		Tightening torque	6,5 Nm

- Connect earth cable (1).

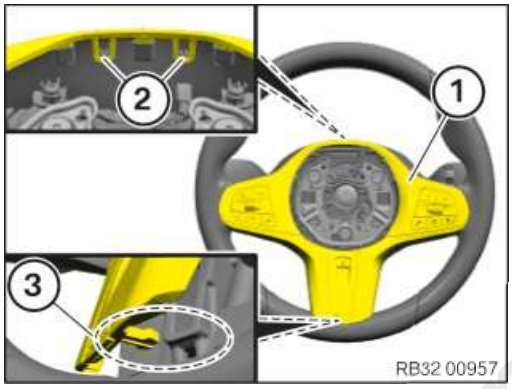
18 – Installing the decorative trim for the M Sport steering wheel (SA710)



NOTICE

The following work step(s) is / are to be carried out if the specified component(s) is/are fitted.

- Position the decorative trim (2).
- Connect and lock the connector for the steering-wheel heating.
- Fasten the plug connection (1) for the steering wheel heating to the holder.



- Check the latch mechanisms (2) and (3) for damage.

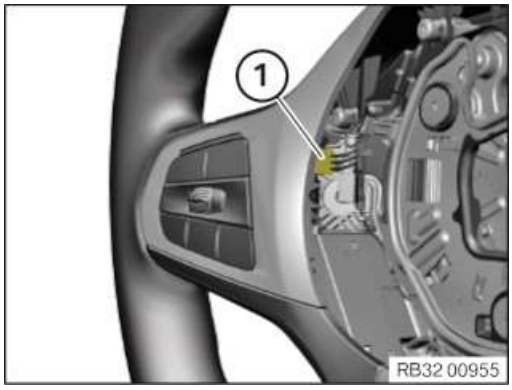
  The latch mechanisms (2)and (3) must not be damaged or missing.
- Carefully clip in the decorative trim (1) at the latch mechanisms (2) and (3).



- Tighten screws (1) on the back of the steering wheel.

Decorative trim to steering wheel

Screw TS5x12		Tightening torque	1,5 Nm



- Connect connectors (1) and lock.

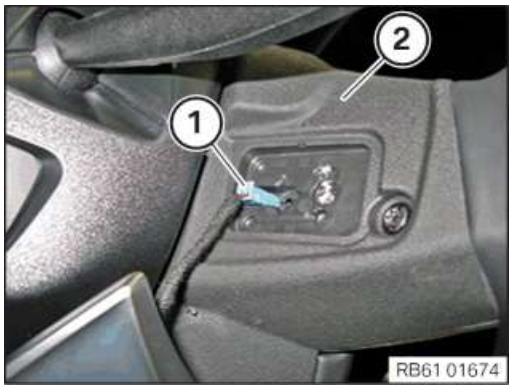
19 – If installed: Installing the shift paddles for the automatic transmission

- For invoicing refer to 61 31 112

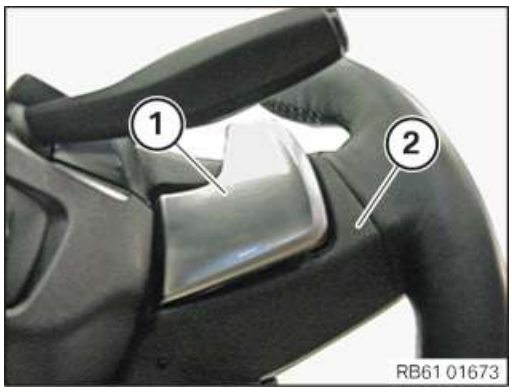
▸ **Installing the shift paddle for the automatic transmission**

NOTICE

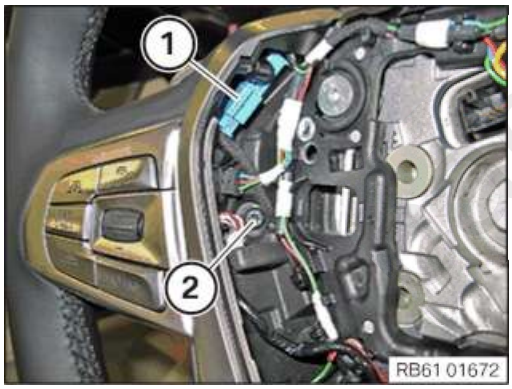
Description is for left component only. Procedure on the right side is identical.



- Insert the access line (1) into the rear of the steering wheel (2).



- Position the shift paddle (1) on the steering wheel (2).



- Tighten down screw (2).

Shift paddle to steering wheel

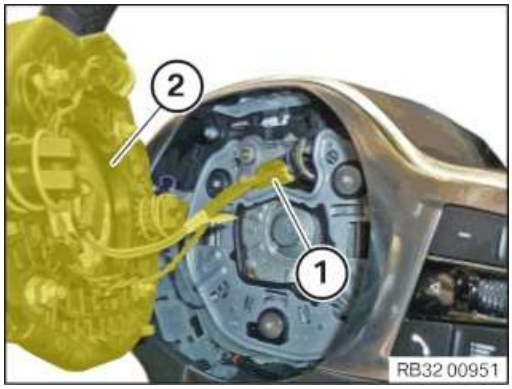
Screw TS5x12		Tightening torque	2 Nm

- Insert the cable and connect the connector (1).

20 – Installing the airbag unit (M Sport steering wheel)

TECHNICAL INFORMATION

After replacing the airbag unit (M sport steering wheel) or after a possible conversion of standard steering wheel and airbag unit to M-sports steering wheel, a software update or a programming/encoding via ISTA must be performed!



- Connect and lock the connector (1) of the airbag unit (2).



- Press the airbag unit further (1) with even pressure in the direction of the arrow into the steering wheel.

  The airbag unit (1) must engage audibly and perceptibly.

21 – Connecting all battery earth leads



- See additional information.

22 – Activating the 48 V electrical system

Prerequisite

Ignition is switched off.

RISK OF DAMAGE

Damage to 48-V battery

If a 48-V battery that is disconnected from the electrical system is activated, the battery electronics will be damaged.

- Only carry out activation of the 48V electrical system with a completely connected 48-V battery.

cardiagn.com



- Lift battery earth lead (1).
- Remove special tool .



- Release the negative battery cable (2) of the 48-V battery from the mounting.
- Position the negative battery cable (2) of the 48-V battery on the negative battery terminal.
- Tighten nut (1).

Negative battery cable to 48-V battery

Nut M8		Tightening torque	19 Nm



- Connect the connector (1) of the CAN bus and lock it.
- Clip in clip (2).



- Activate the 48V electrical system by closing the bonnet.

  The activation takes place automatically.

Additional Information

Overview of Tightening Torques

Steering wheel to steering column Used in step 13

M14	Only for a micro-encapsulated screw: Renew screw.	Tightening torque	62,5 Nm

Balance weight/vibration actuator on steering wheel Used in step 15

Screw		Tightening torque	2,2 Nm

cardiagn.com

Steering wheel cover			Used in step 16
Screw TS5x12		Tightening torque	2 Nm

Impact plate on steering wheel			Used in step 17
Screw		Tightening torque	6,5 Nm

Decorative trim to steering wheel			Used in step 18
Screw TS5x12		Tightening torque	1,5 Nm

Shift paddle to steering wheel			Used in step 19
Screw TS5x12		Tightening torque	2 Nm

Negative battery cable to 48-V battery			Used in step 22
Nut M8		Tightening torque	19 Nm

Overview of Special Tools

Links

Repair instructions (PRE)	Used in step
Notes on 48-V battery	122

General repair instructions	Used in step
72 00 ... Safety regulations for handling components with gas generators	
72 12 ... Procedure after airbag deployment as result of an accident	

Repair instructions	Used in step
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	221
61 20 900 Disconnecting and connecting battery earth lead	221
61 20 900 Disconnecting and connecting battery earth lead	221
61 20 900 Disconnecting and connecting battery earth lead	221
61 20 900 Disconnecting and connecting battery earth lead	221
61 20 900 Disconnecting and connecting battery earth lead	221
61 20 900 Disconnecting and connecting battery earth lead	221
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	221
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	221
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	221
61 20 900 Disconnecting and connecting battery earth lead	221
61 20 900 Disconnecting and connecting battery earth lead	221
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	221
61 20 900 Disconnecting and connecting battery earth lead	221
61 20 900 Disconnecting and connecting battery earth lead	221
61 20 900 Disconnecting and connecting battery earth lead	221
61 20 900 Disconnecting and connecting battery earth lead	221
61 20 900 Disconnecting and connecting battery earth lead	221
61 20 900 Disconnecting and connecting battery earth lead	221
61 20 900 Disconnecting and connecting battery earth lead	221

cardiagn.com

61 20 900 Disconnecting and connecting battery earth lead	221
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	221
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	221
61 20 900 Disconnecting and connecting battery earth lead	221
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	221
61 20 900 Disconnecting and connecting battery earth lead (Plug-in Hybrid Electric Vehicle)	221
61 20 900 Disconnecting and connecting battery earth lead	221
61 20 900 Disconnecting and connecting battery earth lead	221
61 20 900 Disconnecting and connecting battery earth lead	221
61 20 900 Disconnecting and connecting battery earth lead	221
61 20 900 Disconnecting and connecting battery earth lead	221
61 20 900 Disconnecting and connecting battery earth lead	221
61 20 900 Disconnecting and connecting battery earth lead	221
61 20 900 Disconnecting and connecting battery earth lead	221
61 20 900 Disconnecting and connecting battery earth lead	221
61 20 900 Disconnecting and connecting battery earth lead	221
61 20 900 Disconnecting and connecting battery earth lead	221
61 20 900 Disconnecting and connecting battery earth lead	221
61 20 900 Disconnecting and connecting battery earth lead	221
61 20 900 Disconnecting and connecting battery earth lead	221
61 20 900 Disconnecting and connecting battery earth lead	221
61 20 900 Disconnecting and connecting battery earth lead	221
61 20 900 Disconnecting and connecting battery earth lead	221
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	221
61 20 900 Disconnecting and connecting battery earth lead	221
61 20 900 Disconnecting and connecting battery earth lead	221
61 20 900 Disconnecting and connecting battery earth lead	221

cardiagn.com

32 33 015 Replacing the sports steering wheel

WARNING

Pyrotechnic components.

Danger! Life-threatening injuries!

- All work on pyrotechnic parts may be carried out by technically experienced and appropriately trained personnel only.
- Replace any damaged part or ones that have been dropped.
- For additional information see: 72 00 Safety regulations on handling components with gas generators.

TECHNICAL INFORMATION

Steering wheel must be replaced if airbag unit has been deployed.
Only with M Sport steering wheel: Impact plate must be replaced if airbag unit has been deployed.
For additional information see: 72 12 ... Procedure after airbag deployment as result of an accident

TECHNICAL INFORMATION

A wheel alignment is not necessary after the removal, installation or replacement.

PRELIMINARY WORK

1 – Deactivating the 48 V electrical system

Prerequisite
Ignition is switched off.

WARNING

Deactivation of the 12 V vehicle electrical system.

Risk of short circuits! Risk of fire!

- Make sure that **no battery charger** is connected to the jump start terminal point in the engine compartment.
- For vehicles with additional electrical systems (48 V electrical system, high-voltage vehicle electrical system), it is mandatory to deactivate them **before** disconnecting the vehicle battery.

WARNING

Deactivation of the 48 V electrical system.

Risk of short circuits! Risk of fire!

- Make sure that **no charger** is connected to the jump start support point in the engine compartment.

cardiagn.com

RISK OF DAMAGE

Damage to 48-V battery

If a 48-V battery that is disconnected from the electrical system is activated, the battery electronics will be damaged.

- Only carry out activation of the 48V electrical system with a completely connected 48-V battery.

TECHNICAL INFORMATION

Follow notes for 48-V battery. See further information 6120 ... Notes on 48-V battery.



- Deactivate the 48V electrical system by opening the bonnet.

  The deactivation takes place automatically.



Check

TECHNICAL INFORMATION

Zero voltage (48V electrical system is switched off) is displayed only in PAD mode.

- Press the START-STOP button quickly 3 times without stepping on the brake pedal to establish the PAD mode.
- Check isolation from the supply in the instrument cluster in PAD mode.

desired state

- The Check Control message "48V electrical system switched off." (1) is displayed.

Result

» **The absence of voltage** cannot be determined by means of the Check Control message "48V electrical system switched off:" (1). Work is not permitted to be started.

Measure

- Carry out the service function "48 V electrical system deactivation".
  - Vehicle management > Service functions > Voltage supply > Deactivate 48 V electrical system

Only when the Check Control message “48 V electrical system switched off.” (1) is displayed in the instrument cluster is it permitted to disconnect the 12 V battery.

If the absence of voltage is not indicated clearly, contact Technical Support.

Result

» The Check Control message signals that the 48V electrical system has been switched off.

Measure

- Exit PAD mode by pressing the START-STOP button once without depressing the brake pedal.

  The work “Disconnecting the negative battery cable of the 48-V battery” can be started.



- Unlock and disconnect plug connection (1) of the CAN bus.
- Release the clip (2).



- Loosen nut (1).
- Pull off negative battery cable (2) of the 48-V battery from the negative battery terminal, set it aside and secure it.



WARNING

Unprotected battery terminals.

Risk of short circuits! Risk of fire!

- Cover the vehicle battery.

- Cover the vehicle battery with the special tool as shown.
- Position the battery earth lead (1) as shown.

2 – Disconnecting all battery earth leads



- See additional information.

3 – Removing the airbag unit (sports steering wheel)

WARNING

Airbag unit.

Danger! Life-threatening injuries!

- Before performing any work on the airbag, always disconnect the battery earth lead from the battery.
- Airbag unit may only be set down with the cushion (airbag itself) facing upwards.
- For additional information see: 72 00 ... Safety regulations on handling airbag system components/gas generators

RISK OF DAMAGE

Damage to the steering wheel.

Incorrect handling of the tool may damage the steering wheel.

- Ensure the tool is positioned correctly (angle and inclination).
- When unlocking, do not use "levering" action. Instead, press in the Torx screwdriver toward the centre of steering wheel only.

TECHNICAL INFORMATION

The procedure/sequence of the airbag module release function must be observed! First unlock the right side of the airbag module!

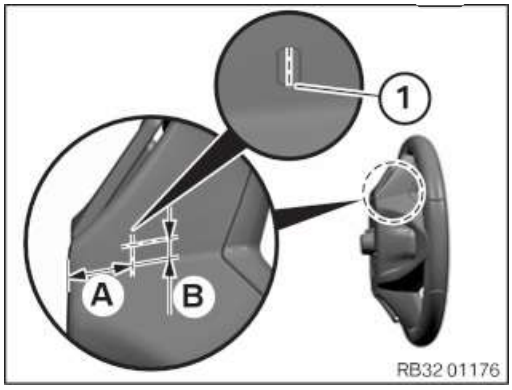


NOTICE

Perform the operations on the left and right side.

- Feel or measure the mark (1) to unlock the airbag unit (see following step).

  The mark (1) is difficult to detect.



NOTICE

Perform the operations on the left and right side.

- Cut the mark (1) carefully with a knife to 4 mm length.

  Dimension (A) = 2.5 cm

  Dimension (B) = 1.0 cm



- Insert the Torx screwdriver (1) T10 on the right diagonally upwards through the cut opening on the rear side of the steering wheel up to the limit position (until a springing resistance can be felt).
- While unlocking the right side, the airbag unit in the "4 O'CLOCK" area must be pressed lightly against the limit position (resistance point in the centre between the horn symbol and the "airbag" inscription).
- Press the Torx screwdriver (1) T10 on the right inwards in the direction of arrow until it audibly disengages twice.
- Let go of the airbag unit. The right side of the module is now unlocked.



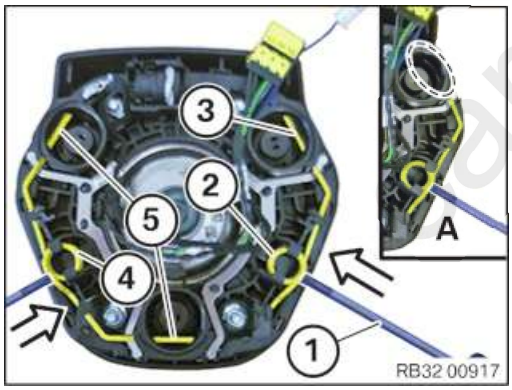
- Insert the Torx screwdriver (1) T10 on the left on the steering wheel diagonally upwards through the cut opening on the rear side of the steering wheel up to the limit position (until the springing resistance is felt).
- While unlocking the left side, the airbag unit in the "10 o'clock" area must be pressed lightly against the limit position with your free hand (resistance point in the area of the left horn symbol).
- Press the Torx screwdriver (1) T10 on the left inwards on the steering wheel in the direction of arrow until it audibly disengages once.
- Release the airbag module. Airbag module is not unlocked and can be removed:



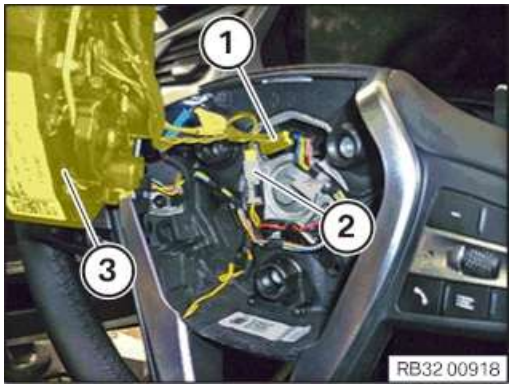
NOTICE

To provide a better overview: Diagram with airbag unit removed.

- To unlock the airbag unit, press the Torx screwdriver T10 (1) diagonally upwards in the direction of arrow to the centre of steering wheel.



- With the Torx screwdriver T10 (1), press the wire spring clip (2) and (4) in the direction of arrow to the centre of steering wheel. Lock (3) and (5) unlocked.



- Unlock and disconnect the plug connections (1) and (2).
- Remove airbag unit (3).

4 – If installed: Removing the shift paddles for the automatic transmission

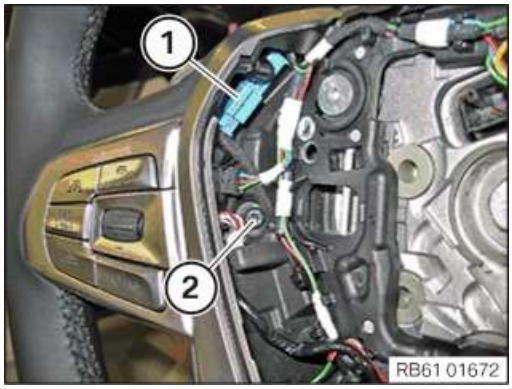
- For invoicing refer to 61 31 112

cardiagn.com

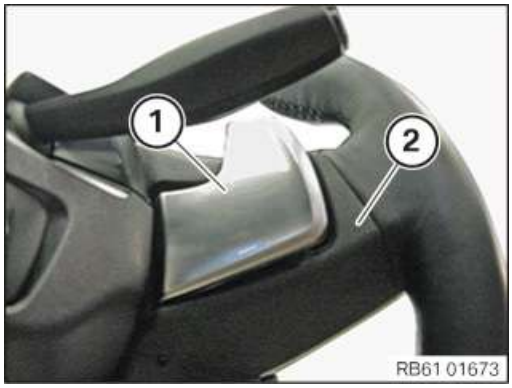
▸ **Removing the shift paddle for the automatic transmission**

NOTICE

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

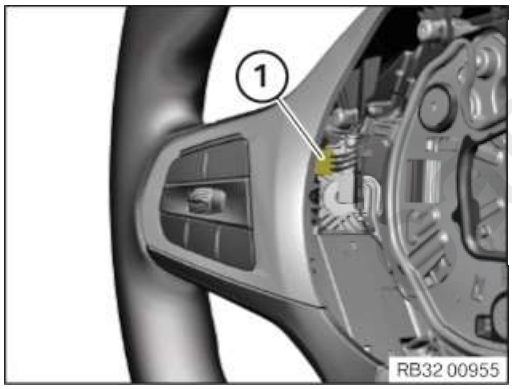


- Disconnect connector (1) and remove cable to shift paddle.
- Loosen screw (2).



- Remove shift paddle (1) from steering wheel (2) and remove associated access line.

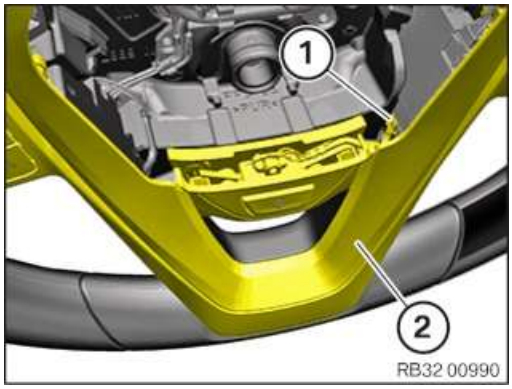
5 – Removing the cover for sports steering wheel



- Unlock plug connection (1) and disconnect.



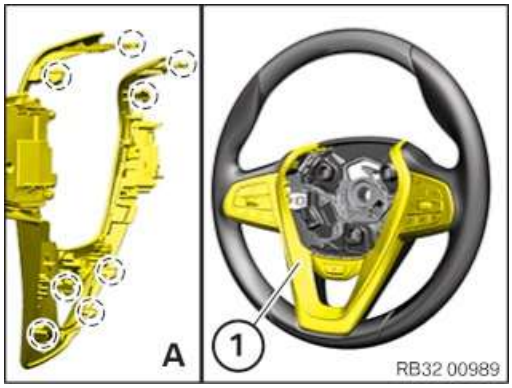
- Unscrew the screws (1) on the back of the steering wheel.



NOTICE

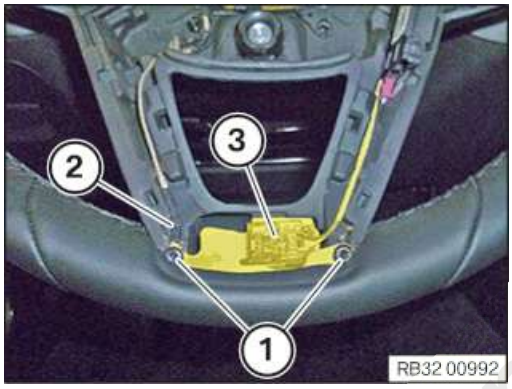
The following work step(s) is / are to be carried out if the specified component(s) is/are fitted.

- After releasing the cover, release, unlock and disconnect the plug connection (1) for the steering wheel heating from the holder.



- Carefully release the cover (1) from the latch mechanisms (A).
- Remove the cover (2).

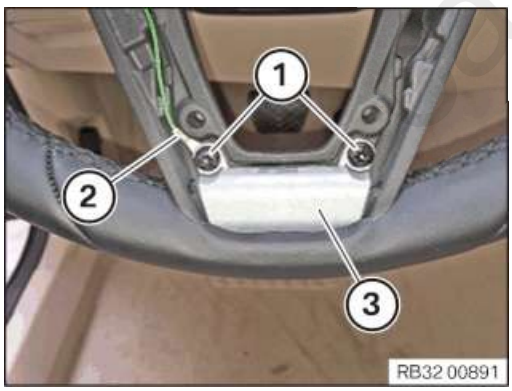
6 – Remove wiring harness



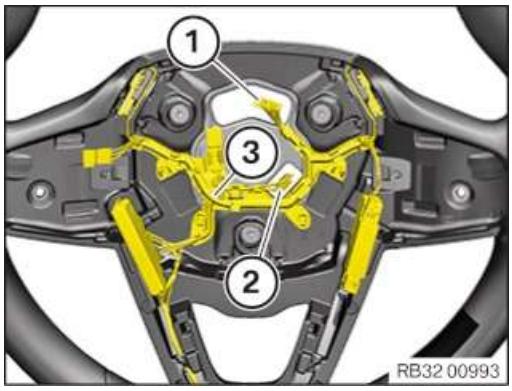
NOTICE

The following work step(s) is / are to be carried out if the specified component(s) is/are fitted.

- Disconnect the plug connection for the vibration actuator.
- Loosen screws (1).
- Release grounding cable (2) from steering wheel.
- Remove the vibration actuator (3).

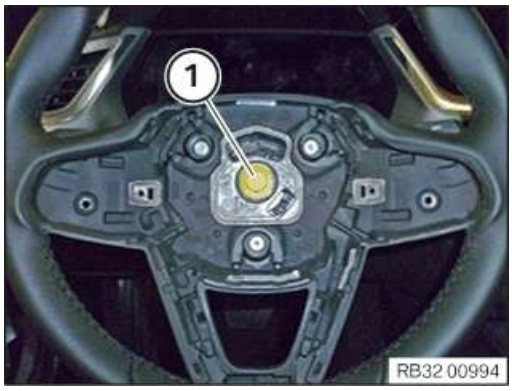


- Loosen screws (1).
- Loosen the grounding cable (2) from the steering wheel.
- If necessary, remove the balance weight (3).



- Unlock plug connection (1) and disconnect.
- If necessary, unlock the plug connection (2) and disconnect.
- Release the wiring harness (3) from the steering wheel and remove.

7 – Removing the steering wheel



TECHNICAL INFORMATION

When releasing the screw, have an auxiliary person brace the steering wheel in order to reduce torque on the steering column!

- Move the steering wheel and wheels to the straight-ahead position.
- Release the screw (1) and remove the steering wheel.

8 – SZL greases



TECHNICAL INFORMATION

In order to avoid noises, when replacing the steering wheel, SZL must be greased.

- Lightly grease the steering column switch cluster on the mount for the steering wheel driver (1).

Expendable materials

Lubricating grease Renolit CX-CVM 1	100 g, Bag	83192286016

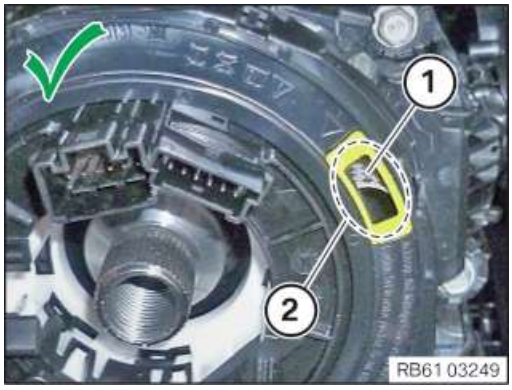
9 – Installing the steering wheel

▸ **Check the neutral position of the clock spring**

TECHNICAL INFORMATION

Different variants may be installed depending on the vehicle equipment.

▹ **Version A: Checking the visibility of the marking on the coil spring**



Check

- Check the visibility of the marking (1) on the coil spring in the inspection glass (2) .

Result

» The mark (1) on the coil spring is not visible.

cardiagn.com

Measure

- Turn the coil spring cassette until the mark (1) on the coil spring becomes visible in the inspection glass (2).

◁

▷ **Version B: Checking the visibility of the marking on the coil spring**

Check



- Check the visibility of the marking (1) on the coil spring in the inspection glass (2) .

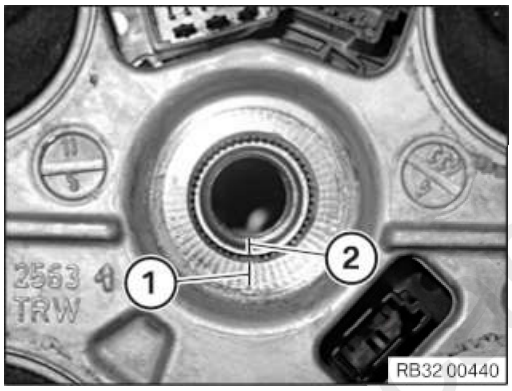
Result

» The mark (1) on the coil spring is not visible.

Measure

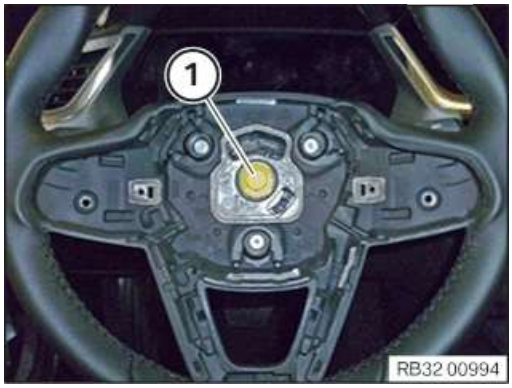
- Turn the coil spring cassette until the mark (1) on the coil spring becomes visible in the inspection glass (2).

◁



- Align mark (1) on steering wheel to mark (2) on steering column.
- Position the steering wheel.

Check



NOTICE

The following work step(s) is / are to be carried out if the specified component(s) is/are fitted.

- Check the screw connection.

Result

» Screw (1) is micro-encapsulated.

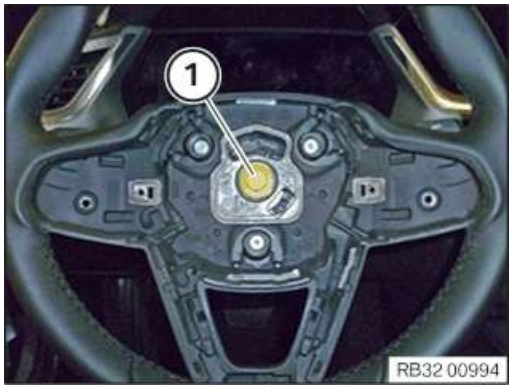
Measure

- Clean thread in the steering column.

  Renew the screw (1).

  Parts: Screw

carldiagn.com



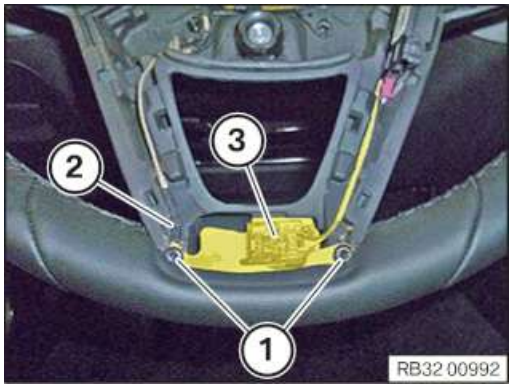
- Tighten down screw (1).

Steering wheel to steering column

M14	Only for a micro-encapsulated screw: Renew screw.	Tightening torque	62,5 Nm

POSTPROCESSES

10 – Install the wiring harness



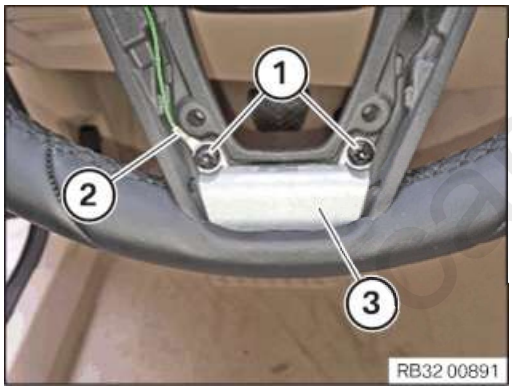
NOTICE

The following work step(s) is / are to be carried out if the specified component(s) is/are fitted.

- Position vibration actuator (3).
- Connect the connector for the vibration actuator (3) and lock.
- Position the grounding cable (2).
- Tighten the screws (1).

Balance weight/vibration actuator on steering wheel

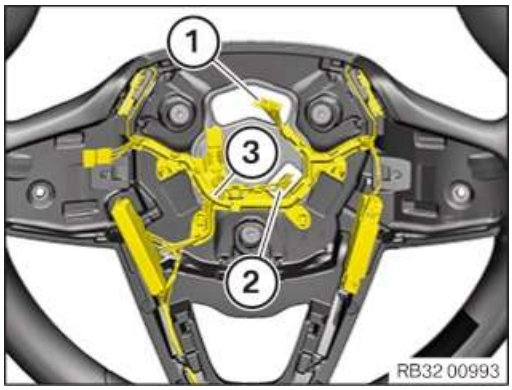
Screw		Tightening torque	2,2 Nm



- If necessary, position balance weight (3).
- Position the grounding cable (2).
- Tighten the screws (1).

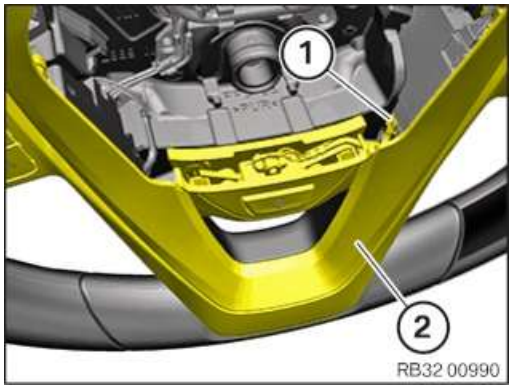
Balance weight/vibration actuator on steering wheel

Screw		Tightening torque	2,2 Nm



- Position and secure wiring harness (3) to the steering wheel.
- Connect connectors (1) and lock.
- Connect further connectors (2) and lock, if required.

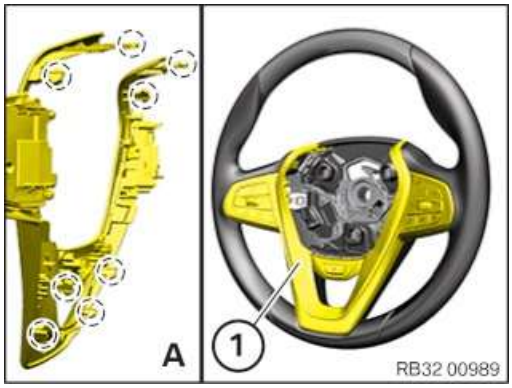
11 – Installing cover for the sport steering wheel



NOTICE

The following work step(s) is / are to be carried out if the specified component(s) is/are fitted.

- Position the cover (2).
- Connect the connector (1) for the steering-wheel heating and lock it.
- Attach the connector (1) for the steering wheel heating to the holder.



- Check latch mechanisms (A) for damage.

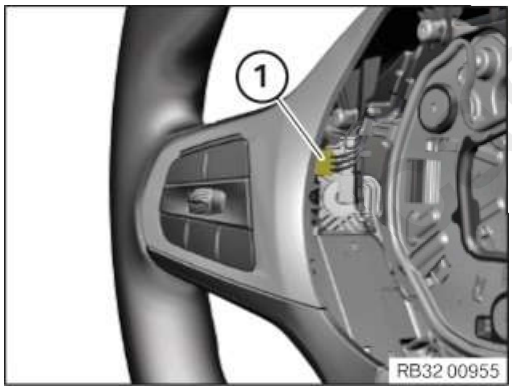
  The latch mechanisms (A) must not be damaged or missing.
- Carefully clip in cover (1) at catches (A).



- Tighten screws (1) on the back of the steering wheel.

Decorative trim to steering wheel

Screw TS5x12		Tightening torque	1,5 Nm



- Connect connectors (1) and lock.

12 – If installed: Installing the shift paddles for the automatic transmission

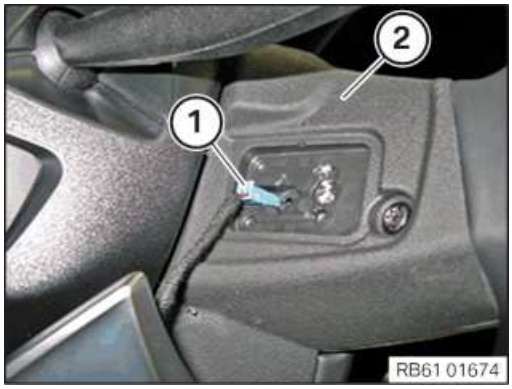
- For invoicing refer to 61 31 112

▸ **Installing the shift paddle for the automatic transmission**

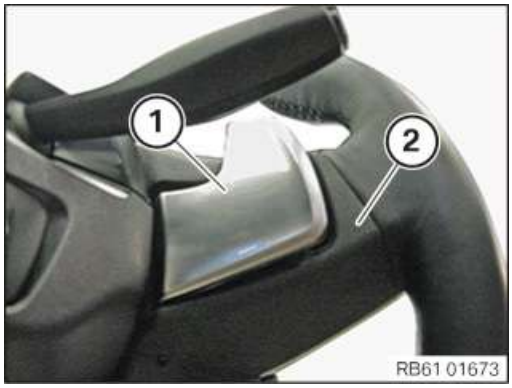
NOTICE

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

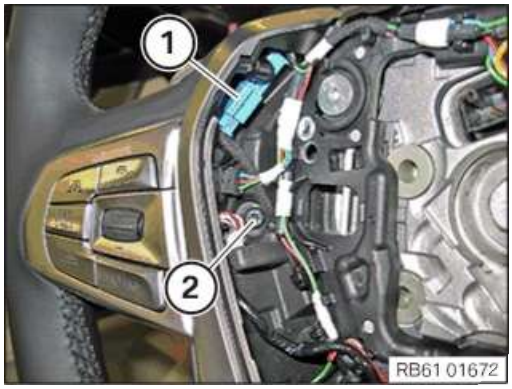
.diagn.com



- Insert the access line (1) into the rear of the steering wheel (2).



- Position the shift paddle (1) on the steering wheel (2).



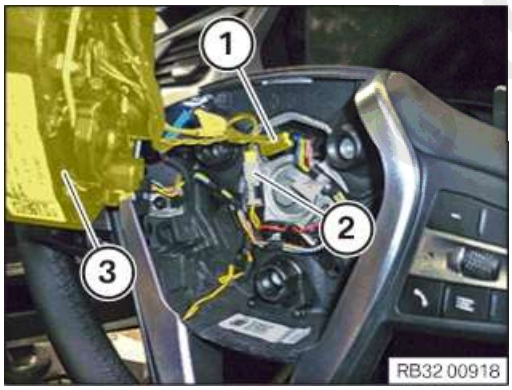
- Tighten down screw (2).

Shift paddle to steering wheel

Screw TS5x12		Tightening torque	2 Nm

- Insert the cable and connect the connector (1).

13 – Installing the airbag unit (sports steering wheel)



- Position airbag unit (3).
- Connect connectors (1) and (2) lock.



- Press the airbag unit (1) with even pressure in the direction of the arrow into the steering wheel.

  The airbag unit (1) must engage audibly and perceptibly.

14 – Connecting all battery earth leads

bmwdiagn.com



- See additional information.

15 – Activating the 48 V electrical system

Prerequisite

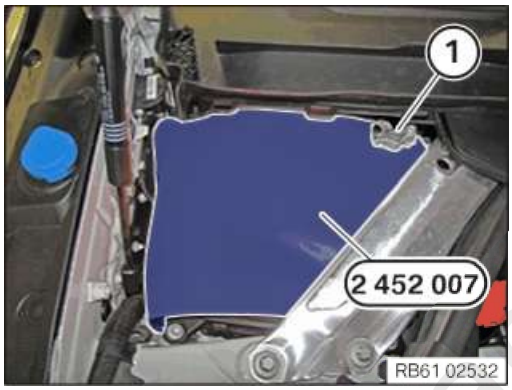
Ignition is switched off.

RISK OF DAMAGE

Damage to 48-V battery

If a 48-V battery that is disconnected from the electrical system is activated, the battery electronics will be damaged.

- Only carry out activation of the 48V electrical system with a completely connected 48-V battery.



- Lift battery earth lead (1).
- Remove special tool .



- Release the negative battery cable (2) of the 48-V battery from the mounting.
- Position the negative battery cable (2) of the 48-V battery on the negative battery terminal.
- Tighten nut (1).

Negative battery cable to 48-V battery

Nut M8		Tightening torque	19 Nm



- Connect the connector (1) of the CAN bus and lock it.
- Clip in clip (2).



16 – Checking the airbag for function

- Activate the 48V electrical system by closing the bonnet.
  The activation takes place automatically.

Check

- Turn steering wheel in both directions to the limit position.

Result

» The airbag indicator light lights up.

Measure

- Renew the coil spring cassette.

Additional Information

Overview of Tightening Torques

Steering wheel to steering column			Used in step 9
M14	Only for a micro-encapsulated screw: Renew screw.	Tightening torque	62,5 Nm

Balance weight/vibration actuator on steering wheel			Used in step 10
Screw		Tightening torque	2,2 Nm

Decorative trim to steering wheel			Used in step 11
Screw TS5x12		Tightening torque	1,5 Nm

Shift paddle to steering wheel			Used in step 12
Screw TS5x12		Tightening torque	2 Nm

Negative battery cable to 48-V battery			Used in step 15
Nut M8		Tightening torque	19 Nm

Overview of Special Tools

Links

Repair instructions (PRE)	Used in step
Notes on 48-V battery	115

General repair instructions	Used in step
72 00 ... Safety regulations for handling components with gas generators	3
72 12 ... Procedure after airbag deployment as result of an accident	

Repair instructions	Used in step

cardiagn.com

61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	214
61 20 900 Disconnecting and connecting battery earth lead	214
61 20 900 Disconnecting and connecting battery earth lead	214
61 20 900 Disconnecting and connecting battery earth lead	214
61 20 900 Disconnecting and connecting battery earth lead	214
61 20 900 Disconnecting and connecting battery earth lead	214
61 20 900 Disconnecting and connecting battery earth lead	214
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	214
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	214
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	214
61 20 900 Disconnecting and connecting battery earth lead	214
61 20 900 Disconnecting and connecting battery earth lead	214
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	214
61 20 900 Disconnecting and connecting battery earth lead	214
61 20 900 Disconnecting and connecting battery earth lead	214
61 20 900 Disconnecting and connecting battery earth lead	214
61 20 900 Disconnecting and connecting battery earth lead	214
61 20 900 Disconnecting and connecting battery earth lead	214
61 20 900 Disconnecting and connecting battery earth lead	214
61 20 900 Disconnecting and connecting battery earth lead	214
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	214
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	214
61 20 900 Disconnecting and connecting battery earth lead	214
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	214
61 20 900 Disconnecting and connecting battery earth lead (Plug-in Hybrid Electric Vehicle)	214
61 20 900 Disconnecting and connecting battery earth lead	214
61 20 900 Disconnecting and connecting battery earth lead	214
61 20 900 Disconnecting and connecting battery earth lead	214
61 20 900 Disconnecting and connecting battery earth lead	214
61 20 900 Disconnecting and connecting battery earth lead	214
61 20 900 Disconnecting and connecting battery earth lead	214
61 20 900 Disconnecting and connecting battery earth lead	214
61 20 900 Disconnecting and connecting battery earth lead	214
61 20 900 Disconnecting and connecting battery earth lead	214
61 20 900 Disconnecting and connecting battery earth lead	214
61 20 900 Disconnecting and connecting battery earth lead	214
61 20 900 Disconnecting and connecting battery earth lead	214
61 20 900 Disconnecting and connecting battery earth lead	214
61 20 900 Disconnecting and connecting battery earth lead	214
61 20 900 Disconnecting and connecting battery earth lead	214
61 20 900 Disconnecting and connecting battery earth lead	214
61 20 900 Disconnecting and connecting battery earth lead	214
61 20 900 Disconnecting and connecting battery earth lead	214
61 20 900 Disconnecting and connecting battery earth lead	214
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	214

cardiagn.com

61 20 900 Disconnecting and connecting battery earth lead 214
61 20 900 Disconnecting and connecting battery earth lead 214
61 20 900 Disconnecting and connecting battery earth lead 214

cardiagn.com

72 12 ... Procedure after airbag deployment as result of an accident

Replace all components that were affected by the accident and check all others!

Check and/or replace following components after airbag deployment:

- Components
  - Sensor B-pillar (left/right)
  - Sensor front door (left/right)
  - Sensor seat, Driver-/passenger's side
  - Airbag control unit, vehicle interior
  - Sensor, pedestrian protection
  - Front sensor (engine compartment)
- Procedure
  - Inspect visually for mechanical damage (housing, plug connections). Replace damaged components.
  - Connect BMW diagnosis system
  - Read fault memory
  - Disconnect the vehicle battery and adhere to the waiting period (at least 30 seconds)
  - Rectify faults
  - Reconnect the vehicle battery and adhere to the waiting period (at least 10 seconds)
  - Delete fault memory
  - Switch off ignition and wait at least 2 minutes (no consumers may be switched on during this period such as interior light, radio, etc.)
  - Switch the ignition on (wait for at least 10 seconds)
  - Delete fault memory
  - If you cannot delete the fault memory: Replace the component that is causing the fault

Replace the airbag control unit in the following cases only:

- In the case of visible external damage
- In the case of a corresponding fault memory entry (airbag indicator light is illuminated)

Cables and connectors

- Components and procedure
  - Check cables and connectors for damage, replace if necessary.
    (e. g. corrosion, correct engagement, bent pin)

Seat belt system

- Components
  - Automatic reel
  - Seat belt tensioner
  - Seat belt height adjustment
  - End fitting pretensioner
  - Seat belt buckle
- Procedure
  - Check components, replace if necessary
  - Additional door lock: Check for foreign body, remove it if necessary.

Seats

- Components
  - Seat
  - Airbag module
  - Active head restraint
- Procedure
  - Check seats (functional check of seat mechanism), replace if necessary
  - Check seat connection

cardiagn.com

- Replace gas generator of active head restraint

  If the severity of the crash has not caused any other damage to the seat, only the triggered gas generator needs to be replaced.
  External feature: The triggered head restraint is folded forwards and engaged.
  The repair work can be carried out in the vehicle with the rear panel removed. The entire system can be pushed back into its original position and the new gas generator installed.
  The gas generator can be replaced up to 5 times.
- Replace airbag module and seat cover with upholstery

Driver's airbag

- Components
  - Airbag module
  - Steering wheel
  - Steering column (if damaged)
- Procedure
  - Check components, replace if necessary
  - Replace steering wheel
  - Only with M Sport steering wheel: Replacing impact plate

Front passenger airbag

- Components
  - Airbag module
  - Dashboard trim panel (must be replaced!)
  - Supporting tube (if damaged)
- Procedure
  - Check components, replace if necessary

Side airbag, front/rear

- Components
  - Airbag module
  - Door trim panel
  - Door in white
  - Seat
- Procedure
  - Check components; replace if necessary

Head airbag

- Components
  - Airbag module
  - A-pillar trim panel
  - Roofliner
  - Cover, B-pillar (if damaged)
  - C-pillar trim panel (if damaged)
  - Connection/mount (on side frame)
- Procedure
  - Check components, replace if necessary

Knee airbag

- Components
  - Trim panel (driver's side)
  - Lower section of glove box
  - Knee protection(Driver- and passenger's side)
- Procedure
  - Check components, replace if necessary

cardiagn.com

Passive knee protection

- Components
  - Trim panel (driver's side)
  - Glove box incl. knee protection (passenger's side)
- Procedure
  - Check components for damage, replace if necessary
  - Check retaining elements

cardiagn.com

32 34 030 Removing and installing/replacing airbag unit

Prerequisite

- Equipment specification:
  - **M Sport steering wheel**

WARNING

Pyrotechnic components.

Danger! Life-threatening injuries!

- All work on pyrotechnic parts may be carried out by technically experienced and appropriately trained personnel only.
- Replace any damaged part or ones that have been dropped.
- For additional information see: 72 00 Safety regulations on handling components with gas generators.

WARNING

Airbag unit.

Danger! Life-threatening injuries!

- Before performing any work on the airbag, always disconnect the battery earth lead from the battery.
- Airbag unit may only be set down with the cushion (airbag itself) facing upwards.
- For additional information see: 72 00 ... Safety regulations on handling airbag system components/gas generators

TECHNICAL INFORMATION

After replacing the airbag unit (M sport steering wheel) or after a possible conversion of standard steering wheel and airbag unit to M-sports steering wheel, a software update or a programming/encoding via ISTA must be performed!

TECHNICAL INFORMATION

Steering wheel must be replaced if airbag unit has been deployed.

Only with M Sport steering wheel: Impact plate must be replaced if airbag unit has been deployed.

For additional information see: 72 12 ... Procedure after airbag deployment as result of an accident

PRELIMINARY WORK

1 – Deactivating the 48 V electrical system

Prerequisite

Ignition is switched off.

carsiagn.com

WARNING

Deactivation of the 12 V vehicle electrical system.

Risk of short circuits! Risk of fire!

- Make sure that **no battery charger** is connected to the jump start terminal point in the engine compartment.
- For vehicles with additional electrical systems (48 V electrical system, high-voltage vehicle electrical system), it is mandatory to deactivate them **before** disconnecting the vehicle battery.

WARNING

Deactivation of the 48 V electrical system.

Risk of short circuits! Risk of fire!

- Make sure that **no charger** is connected to the jump start support point in the engine compartment.

RISK OF DAMAGE

Damage to 48-V battery

If a 48-V battery that is disconnected from the electrical system is activated, the battery electronics will be damaged.

- Only carry out activation of the 48V electrical system with a completely connected 48-V battery.

TECHNICAL INFORMATION

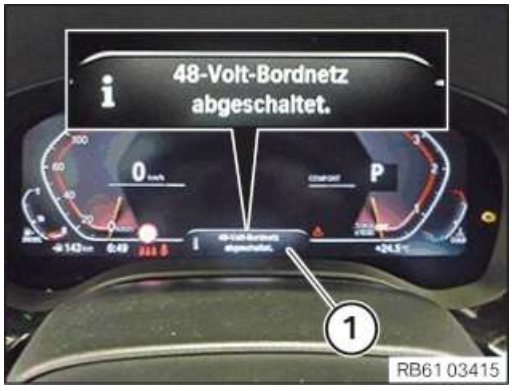
Follow notes for 48-V battery. See further information 6120 ... Notes on 48-V battery.



- Deactivate the 48V electrical system by opening the bonnet.

  The deactivation takes place automatically.

Check



TECHNICAL INFORMATION

Zero voltage (48V electrical system is switched off) is displayed only in PAD mode.

- Press the START-STOP button quickly 3 times without stepping on the brake pedal to establish the PAD mode.
- Check isolation from the supply in the instrument cluster in PAD mode.

desired state

- The Check Control message "48V electrical system switched off." (1) is displayed.

Result

» **The absence of voltage** cannot be determined by means of the Check Control message "48V electrical system switched off:" (1). Work is not permitted to be started.

Measure

- Carry out the service function "48 V electrical system deactivation".
  - Vehicle management > Service functions > Voltage supply > Deactivate 48 V electrical system

  Only when the Check Control message “48 V electrical system switched off.” (1) is displayed in the instrument cluster is it permitted to disconnect the 12 V battery.

  If the absence of voltage is not indicated clearly, contact Technical Support.

Result

» The Check Control message signals that the 48V electrical system has been switched off.

Measure

- Exit PAD mode by pressing the START-STOP button once without depressing the brake pedal.

  The work “Disconnecting the negative battery cable of the 48-V battery” can be started.



- Unlock and disconnect plug connection (1) of the CAN bus.
- Release the clip (2).



- Loosen nut (1).
- Pull off negative battery cable (2) of the 48-V battery from the negative battery terminal, set it aside and secure it.

tdiagn.com



WARNING

Unprotected battery terminals.

Risk of short circuits! Risk of fire!

- Cover the vehicle battery.

- Cover the vehicle battery with the special tool as shown.
- Position the battery earth lead (1) as shown.

2 – Disconnecting all battery earth leads



- See additional information.

MAIN WORK

3 – Removing airbag unit (M Sport steering wheel)

WARNING

Airbag unit.

Danger! Life-threatening injuries!

- Before performing any work on the airbag, always disconnect the battery earth lead from the battery.
- Airbag unit may only be set down with the cushion (airbag itself) facing upwards.
- For additional information see: 72 00 ... Safety regulations on handling airbag system components/gas generators

RISK OF DAMAGE

Damage to the steering wheel.

Incorrect handling of the tool may damage the steering wheel.

- Ensure the tool is positioned correctly (angle and inclination).
- When unlocking, do not use "levering" action. Instead, press in the Torx screwdriver toward the centre of steering wheel only.

cardiagn.com



NOTICE

Perform the operations on the left and right side.

- Locate the mark (1) for unlocking the airbag unit on the steering wheel by touching it.



NOTICE

Perform the operations on the left and right side.

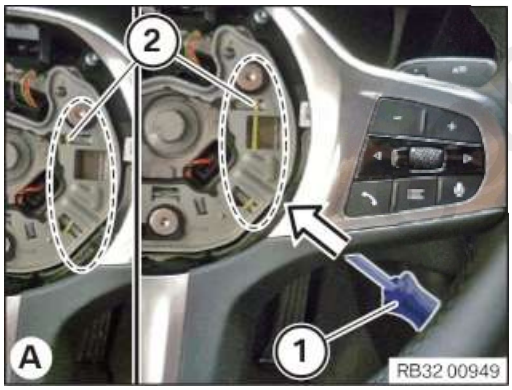
- Cut the mark (1) carefully with a knife (2) to an approx. length of 4 mm .



TECHNICAL INFORMATION

Different variants may be installed depending on the vehicle equipment.

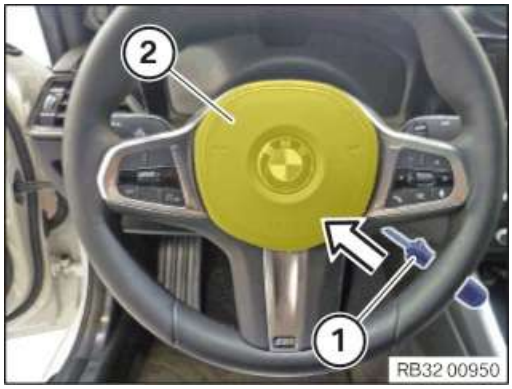
- In case of vehicles with shift paddles (2) made of carbon-fibre-reinforced plastic, use a Torx socket T15 (1) for unlocking the airbag unit.



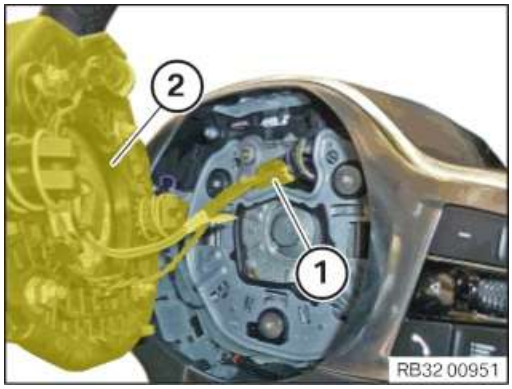
NOTICE

To provide a better overview: Diagram with airbag unit removed.

- Insert the Torx socket T15 (1) diagonally upwards until a resilient resistance is felt.
- Press in Torx socket T15(1) straight in the direction of arrow towards the centre of the steering wheel in order to unlock the wire spring clip (2) or to unlock the airbag unit (A).



- Press in the wire spring clip with Torx socket T15 (1) in the direction of arrow and lift the airbag unit (2) on the unlocked side.
- Repeat procedure on left side and carefully release airbag unit (2) from the steering wheel.



- Unlock plug connection (1) and disconnect.
- Remove the airbag unit (2).

4 – When the airbag unit has been actuated: Replacing the M Sport steering wheel and the horn plate



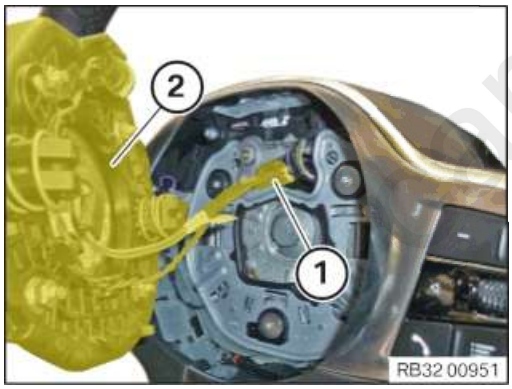
- Renew the M Sport steering wheel (1) and the horn plate (2).

  Parts: M Sport steering wheel, horn plate

5 – Installing the airbag unit (M Sport steering wheel)

TECHNICAL INFORMATION

After replacing the airbag unit (M sport steering wheel) or after a possible conversion of standard steering wheel and airbag unit to M-sports steering wheel, a software update or a programming/encoding via ISTA must be performed!



- Connect and lock the connector (1) of the airbag unit (2).



- Press the airbag unit further (1) with even pressure in the direction of the arrow into the steering wheel.

  The airbag unit (1) must engage audibly and perceptibly.

POSTPROCESSES

6 – Connecting all battery earth leads

mordiagn.com



- See additional information.

7 – Activating the 48 V electrical system

Prerequisite

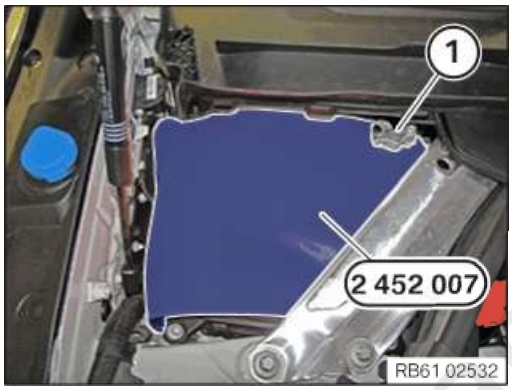
Ignition is switched off.

RISK OF DAMAGE

Damage to 48-V battery

If a 48-V battery that is disconnected from the electrical system is activated, the battery electronics will be damaged.

- Only carry out activation of the 48V electrical system with a completely connected 48-V battery.



- Lift battery earth lead (1).
- Remove special tool .



- Release the negative battery cable (2) of the 48-V battery from the mounting.
- Position the negative battery cable (2) of the 48-V battery on the negative battery terminal.
- Tighten nut (1).

Negative battery cable to 48-V battery

Nut M8		Tightening torque	19 Nm



- Connect the connector (1) of the CAN bus and lock it.
- Clip in clip (2).



- Activate the 48V electrical system by closing the bonnet.
  The activation takes place automatically.

Additional Information

Overview of Tightening Torques

Negative battery cable to 48-V battery			Used in step 7
Nut M8		Tightening torque	19 Nm

Overview of Special Tools

Links

Repair instructions (PRE)	Used in step
Notes on 48-V battery	17

General repair instructions	Used in step
72 12 ... Procedure after airbag deployment as result of an accident	
72 00 ... Safety regulations for handling components with gas generators	

Repair instructions	Used in step
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	26
61 20 900 Disconnecting and connecting battery earth lead	26
61 20 900 Disconnecting and connecting battery earth lead	26
61 20 900 Disconnecting and connecting battery earth lead	26
61 20 900 Disconnecting and connecting battery earth lead	26
61 20 900 Disconnecting and connecting battery earth lead	26
61 20 900 Disconnecting and connecting battery earth lead	26
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	26
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	26
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	26
61 20 900 Disconnecting and connecting battery earth lead	26
61 20 900 Disconnecting and connecting battery earth lead	26
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	26
61 20 900 Disconnecting and connecting battery earth lead	26
61 20 900 Disconnecting and connecting battery earth lead	26
61 20 900 Disconnecting and connecting battery earth lead	26
61 20 900 Disconnecting and connecting battery earth lead	26
61 20 900 Disconnecting and connecting battery earth lead	26

cardiagn.com

61 20 900 Disconnecting and connecting battery earth lead 26
61 20 900 Disconnecting and connecting battery earth lead 26
61 20 900 Disconnecting and connecting battery earth lead 26
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads) 26
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads) 26
61 20 900 Disconnecting and connecting battery earth lead 26
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads) 26
61 20 900 Disconnecting and connecting battery earth lead (Plug-in Hybrid Electric Vehicle) 26
61 20 900 Disconnecting and connecting battery earth lead 26
61 20 900 Disconnecting and connecting battery earth lead 26
61 20 900 Disconnecting and connecting battery earth lead 26
61 20 900 Disconnecting and connecting battery earth lead 26
61 20 900 Disconnecting and connecting battery earth lead 26
61 20 900 Disconnecting and connecting battery earth lead 26
61 20 900 Disconnecting and connecting battery earth lead 26
61 20 900 Disconnecting and connecting battery earth lead 26
61 20 900 Disconnecting and connecting battery earth lead 26
61 20 900 Disconnecting and connecting battery earth lead 26
61 20 900 Disconnecting and connecting battery earth lead 26
61 20 900 Disconnecting and connecting battery earth lead 26
61 20 900 Disconnecting and connecting battery earth lead 26
61 20 900 Disconnecting and connecting battery earth lead 26
61 20 900 Disconnecting and connecting battery earth lead 26
61 20 900 Disconnecting and connecting battery earth lead 26
61 20 900 Disconnecting and connecting battery earth lead 26
61 20 900 Disconnecting and connecting battery earth lead 26
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads) 26
61 20 900 Disconnecting and connecting battery earth lead 26
61 20 900 Disconnecting and connecting battery earth lead 26
61 20 900 Disconnecting and connecting battery earth lead 26
32 33 020 Replacing the M sports steering wheel

cardiagn.com

32 34 030 Removing and installing/replacing airbag unit

WARNING

Pyrotechnic components.

Danger! Life-threatening injuries!

- All work on pyrotechnic parts may be carried out by technically experienced and appropriately trained personnel only.
- Replace any damaged part or ones that have been dropped.
- For additional information see: 72 00 Safety regulations on handling components with gas generators.

TECHNICAL INFORMATION

Steering wheel must be replaced if airbag unit has been deployed.

Only with M Sport steering wheel: Impact plate must be replaced if airbag unit has been deployed.

For additional information see: 72 12 ... Procedure after airbag deployment as result of an accident

PRELIMINARY WORK

1 – Deactivating the 48 V electrical system

Prerequisite

Ignition is switched off.

WARNING

Deactivation of the 12 V vehicle electrical system.

Risk of short circuits! Risk of fire!

- Make sure that **no battery charger** is connected to the jump start terminal point in the engine compartment.
- For vehicles with additional electrical systems (48 V electrical system, high-voltage vehicle electrical system), it is mandatory to deactivate them **before** disconnecting the vehicle battery.

WARNING

Deactivation of the 48 V electrical system.

Risk of short circuits! Risk of fire!

- Make sure that **no charger** is connected to the jump start support point in the engine compartment.

RISK OF DAMAGE

Damage to 48-V battery

If a 48-V battery that is disconnected from the electrical system is activated, the battery electronics will be damaged.

- Only carry out activation of the 48V electrical system with a completely connected 48-V battery.

cardiagn.com

TECHNICAL INFORMATION

Follow notes for 48-V battery. See further information 6120 ... Notes on 48-V battery.



- Deactivate the 48V electrical system by opening the bonnet.

  The deactivation takes place automatically.

Check



TECHNICAL INFORMATION

Zero voltage (48V electrical system is switched off) is displayed only in PAD mode.

- Press the START-STOP button quickly 3 times without stepping on the brake pedal to establish the PAD mode.
- Check isolation from the supply in the instrument cluster in PAD mode.

desired state

- The Check Control message "48V electrical system switched off." (1) is displayed.

Result

» **The absence of voltage** cannot be determined by means of the Check Control message "48V electrical system switched off:" (1). Work is not permitted to be started.

Measure

- Carry out the service function "48 V electrical system deactivation".
  - Vehicle management > Service functions > Voltage supply > Deactivate 48 V electrical system

  Only when the Check Control message “48 V electrical system switched off.” (1) is displayed in the instrument cluster is it permitted to disconnect the 12 V battery.

  If the absence of voltage is not indicated clearly, contact Technical Support.

Result

» The Check Control message signals that the 48V electrical system has been switched off.

Measure

- Exit PAD mode by pressing the START-STOP button once without depressing the brake pedal.

  The work “Disconnecting the negative battery cable of the 48-V battery” can be started.

carmagn.com



- Unlock and disconnect plug connection (1) of the CAN bus.
- Release the clip (2).



- Loosen nut (1).
- Pull off negative battery cable (2) of the 48-V battery from the negative battery terminal, set it aside and secure it.



WARNING

Unprotected battery terminals.

Risk of short circuits! Risk of fire!

- Cover the vehicle battery.

- Cover the vehicle battery with the special tool as shown.
- Position the battery earth lead (1) as shown.

2 – Disconnecting all battery earth leads



- See additional information.

MAIN WORK

3 – Removing the airbag unit (sports steering wheel)

cardiag.com

WARNING

Airbag unit.

Danger! Life-threatening injuries!

- Before performing any work on the airbag, always disconnect the battery earth lead from the battery.
- Airbag unit may only be set down with the cushion (airbag itself) facing upwards.
- For additional information see: 72 00 ... Safety regulations on handling airbag system components/gas generators

RISK OF DAMAGE

Damage to the steering wheel.

Incorrect handling of the tool may damage the steering wheel.

- Ensure the tool is positioned correctly (angle and inclination).
- When unlocking, do not use "levering" action. Instead, press in the Torx screwdriver toward the centre of steering wheel only.

TECHNICAL INFORMATION

The procedure/sequence of the airbag module release function must be observed! First unlock the right side of the airbag module!

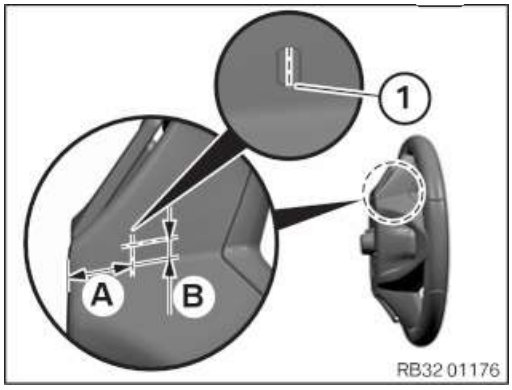


NOTICE

Perform the operations on the left and right side.

- Feel or measure the mark (1) to unlock the airbag unit (see following step).

  The mark (1) is difficult to detect.



NOTICE

Perform the operations on the left and right side.

- Cut the mark (1) carefully with a knife to 4 mm length.

  Dimension (A) = 2.5 cm

  Dimension (B) = 1.0 cm



- Insert the Torx screwdriver (1) T10 on the right diagonally upwards through the cut opening on the rear side of the steering wheel up to the limit position (until a springing resistance can be felt).
- While unlocking the right side, the airbag unit in the "4 O'CLOCK" area must be pressed lightly against the limit position (resistance point in the centre between the horn symbol and the "airbag" inscription).
- Press the Torx screwdriver (1) T10 on the right inwards in the direction of arrow until it audibly disengages twice.
- Let go of the airbag unit. The right side of the module is now unlocked.



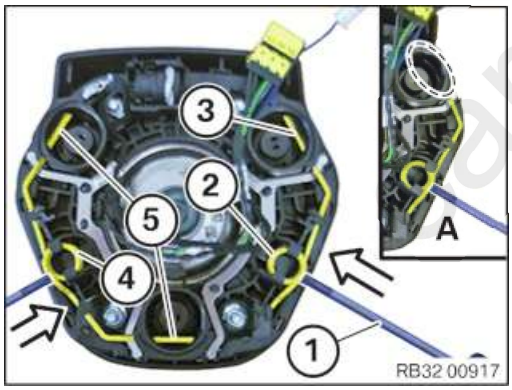
- Insert the Torx screwdriver (1) T10 on the left on the steering wheel diagonally upwards through the cut opening on the rear side of the steering wheel up to the limit position (until the springing resistance is felt).
- While unlocking the left side, the airbag unit in the "10 o'clock" area must be pressed lightly against the limit position with your free hand (resistance point in the area of the left horn symbol).
- Press the Torx screwdriver (1) T10 on the left inwards on the steering wheel in the direction of arrow until it audibly disengages once.
- Release the airbag module. Airbag module is not unlocked and can be removed:



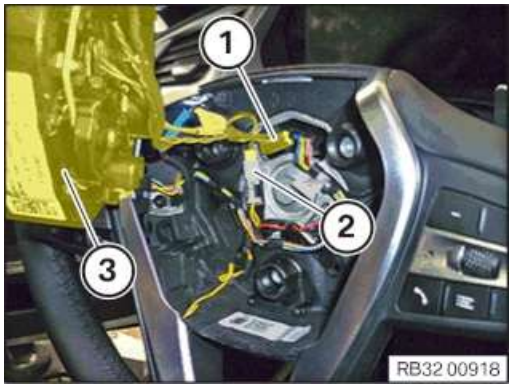
NOTICE

To provide a better overview: Diagram with airbag unit removed.

- To unlock the airbag unit, press the Torx screwdriver T10 (1) diagonally upwards in the direction of arrow to the centre of steering wheel.



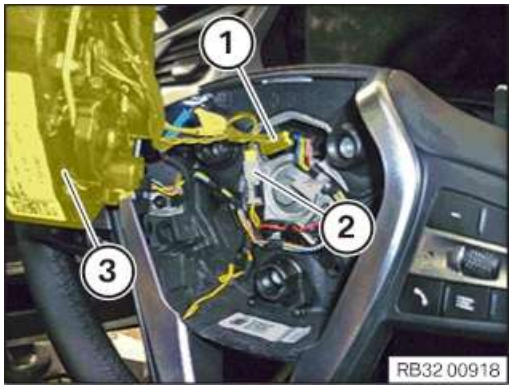
- With the Torx screwdriver T10 (1), press the wire spring clip (2) and (4) in the direction of arrow to the centre of steering wheel. Lock (3) and (5) unlocked.



- Unlock and disconnect the plug connections (1) and (2).
- Remove airbag unit (3).

4 – Installing the airbag unit (sports steering wheel)

cardiagn.com



- Position airbag unit (3).
- Connect connectors (1) and (2) lock.



- Press the airbag unit (1) with even pressure in the direction of the arrow into the steering wheel.

  The airbag unit (1) must engage audibly and perceptibly.

POSTPROCESSES

5 – Connecting all battery earth leads



- See additional information.

6 – Activating the 48 V electrical system

Prerequisite

Ignition is switched off.

RISK OF DAMAGE

Damage to 48-V battery

If a 48-V battery that is disconnected from the electrical system is activated, the battery electronics will be damaged.

- Only carry out activation of the 48V electrical system with a completely connected 48-V battery.

cardiagn.com



- Lift battery earth lead (1).
- Remove special tool .



- Release the negative battery cable (2) of the 48-V battery from the mounting.
- Position the negative battery cable (2) of the 48-V battery on the negative battery terminal.
- Tighten nut (1).

Negative battery cable to 48-V battery

Nut M8		Tightening torque	19 Nm



- Connect the connector (1) of the CAN bus and lock it.
- Clip in clip (2).



- Activate the 48V electrical system by closing the bonnet.

  The activation takes place automatically.

Additional Information

Overview of Tightening Torques

Negative battery cable to 48-V battery Used in step 6

Nut M8		Tightening torque	19 Nm

Overview of Special Tools

Links

Repair instructions (PRE)	Used in step

cardiagn.com

Notes on 48-V battery	16

General repair instructions	Used in step
72 00 ... Safety regulations for handling components with gas generators	3
72 12 ... Procedure after airbag deployment as result of an accident	

Repair instructions	Used in step
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	25
61 20 900 Disconnecting and connecting battery earth lead	25
61 20 900 Disconnecting and connecting battery earth lead	25
61 20 900 Disconnecting and connecting battery earth lead	25
61 20 900 Disconnecting and connecting battery earth lead	25
61 20 900 Disconnecting and connecting battery earth lead	25
61 20 900 Disconnecting and connecting battery earth lead	25
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	25
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	25
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	25
61 20 900 Disconnecting and connecting battery earth lead	25
61 20 900 Disconnecting and connecting battery earth lead	25
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	25
61 20 900 Disconnecting and connecting battery earth lead	25
61 20 900 Disconnecting and connecting battery earth lead	25
61 20 900 Disconnecting and connecting battery earth lead	25
61 20 900 Disconnecting and connecting battery earth lead	25
61 20 900 Disconnecting and connecting battery earth lead	25
61 20 900 Disconnecting and connecting battery earth lead	25
61 20 900 Disconnecting and connecting battery earth lead	25
61 20 900 Disconnecting and connecting battery earth lead	25
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	25
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	25
61 20 900 Disconnecting and connecting battery earth lead	25
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	25
61 20 900 Disconnecting and connecting battery earth lead (Plug-in Hybrid Electric Vehicle)	25
61 20 900 Disconnecting and connecting battery earth lead	25
61 20 900 Disconnecting and connecting battery earth lead	25
61 20 900 Disconnecting and connecting battery earth lead	25
61 20 900 Disconnecting and connecting battery earth lead	25
61 20 900 Disconnecting and connecting battery earth lead	25
61 20 900 Disconnecting and connecting battery earth lead	25
61 20 900 Disconnecting and connecting battery earth lead	25
61 20 900 Disconnecting and connecting battery earth lead	25
61 20 900 Disconnecting and connecting battery earth lead	25
61 20 900 Disconnecting and connecting battery earth lead	25
61 20 900 Disconnecting and connecting battery earth lead	25
61 20 900 Disconnecting and connecting battery earth lead	25
61 20 900 Disconnecting and connecting battery earth lead	25
61 20 900 Disconnecting and connecting battery earth lead	25

cardiagn.com

61 20 900 Disconnecting and connecting battery earth lead	25
61 20 900 Disconnecting and connecting battery earth lead	25
61 20 900 Disconnecting and connecting battery earth lead	25
61 20 900 Disconnecting and connecting battery earth lead	25
61 20 900 Disconnecting and connecting battery earth lead	25
61 20 900 Disconnecting and connecting the battery earth lead (all battery earth leads)	25
61 20 900 Disconnecting and connecting battery earth lead	25
61 20 900 Disconnecting and connecting battery earth lead	25
61 20 900 Disconnecting and connecting battery earth lead	25

cardiagn.com

72 00 ... Safety regulations for handling components with gas generators

It is essential to comply with the regulations as specified in the law relating to the use of explosives when working on airbag units and seat belt tensioners.

Airbags, seat belt tensioners etc. are pyrotechnical objects. Pyrotechnical objects are assigned to different danger classes on the basis of the quantity of propellant that they contain. The assignment can be ascertained from the identification marking on the product:

Important!

> Failure to comply with the warning notices and repair instructions for gas generator components can cause accidental deployment and result in injury and vehicle damage!

This applies in particular to the following components:

- Airbag modules (driver's/front passenger airbags, side airbags)
- Seat belt tensioner
- Head airbag
- Active knee protection
- Active head restraint
- Safety battery terminal

1. Regulations

The regulations quoted in the following refer to the Federal Republic of Germany.

In all other countries, the relevant legislation and regulations must be observed in each case. Country-specific legal regulations that go beyond this information or court decisions based thereon must be followed in each case or given precedence over these regulations.

The following components used by BMW:

- Pyrotechnical restraint systems are subject to danger class PT1
- Gas generators are pyrotechnical objects belonging to danger class T1

Handling, transporting and storing non-fired gas generators are subject to the ”Explosive Materials Act”.

The relevant trade supervisory authority must be notified at least 2 weeks before pyrotechnical objects are handled for the first time. Here the relevant authority must be notified in writing of the person responsible (e.g. dealership owner, holder of general power of attorney or if necessary workshop supervisor). A certificate of qualification, i.e. specific training, is not required for the person responsible.

2. Dismantling and installation

- Inspection, testing and installation work may only be carried out by expert trained personnel in BMW Service.
- Work on components of the airbag system should only ever be carried out with the battery disconnected, the negative terminal post covered and the plug connection of the cable leading to the gas generator disconnected. If only the battery is disconnected, the following prescribed waiting period must be observed without fail:
  - 1 mins.
- In the event of breaks in work, a component with a gas generator that has been removed must be secured against access by other persons.
- Individual components must never be repaired. Instead, always replace them.
- Do not treat airbag system components with cleaning agents or grease.
- Components of the airbag system must not be exposed to temperatures in excess of 75 °C.
- Airbag system components, including electronic diagnostic components, which have been dropped from heights in excess of 0.5 m must not be reinstalled in the vehicles.
- Do not remove components of the airbag system from the original packaging until immediately before they are

to be installed in the vehicle.

- Before installing, subject components such as housing, connector pins ,etc. of the airbag system (including diagnosis electronics) to a visual inspection for damage and replace if necessary.
- Airbag system components may only be electrically tested while they are installed and only with the BMW ISTA.
- **Danger of injury:** The airbag module may only be set down with the airbag itself facing *upwards*. Otherwise the airbag module will be thrown upwards if the alternator is ignited.
- Do not point the ignition squib of a gas generator at other persons.
- Components with gas generators must not be fired while they are removed. They must be disposed of by special disposal companies or returned to BMW in the packaging of the new components.
- When carrying out straightening and welding work with an electric welder:
  - Disconnect battery
  - Cover negative terminal (post)
- Avoid all contact with the skin when removing a fired airbag module - wear gloves. Wash with water after contact with the skin.

3. Transport

- Components with gas generators must be sent off in the packaging of the new components.

4. Storage

- Observe the regulations of the relevant trade supervisory authority and the applicable national regulations.

cardiagn.com

00 00 ... Microencapsulated screws

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

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

Installation note:

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

cardiagn.com