

supports to enable all wheel suspension points during the touch-sensitive routine and the adjusting procedure to remain free of torsional stresses. This demonstrates the need for the rotational and sliding supports for the various wheelbases and track widths on the candidate vehicle for the wheel alignment check to be relocated.

4.3 Measuring tolerance

The full range of measuring tolerance are system tolerances. That means that the total of all individual tolerances yields the value identified in the argumenter. Example - camber: Quick-release bracket + measuring pickup + computer = 1' with a measuring range of $\pm 3^\circ$ (all BMW vehicles lie within this measuring range).

4.4 Measuring station levelling

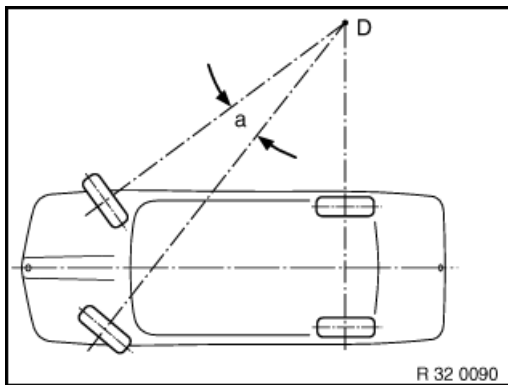
The manufacturers of BMW KDS (Beissbarth / Bosch) are able to check the alignment of the measuring station to the required level of precision, using levelling devices to do so. Bars or hose-type water scales are not suitable. Vehicle hoists must be under load when being levelled to ensure that due account is taken of the uneven deflection in vehicle rails.

Important!

A specialist operator must be involved in the setup work on each vehicle hoist (a member of the manufacturer's Service Product Support staff).

5. Chassis-specific terms

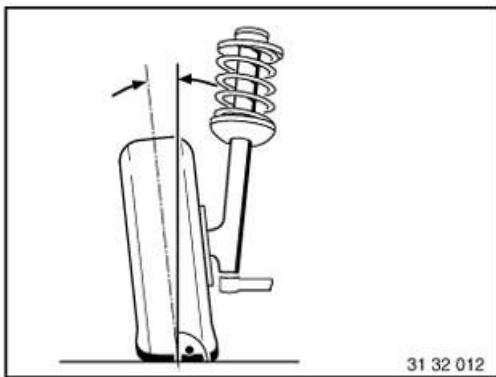
5.1 Toe difference angle



The toe difference angle (a) is the angle setting of the inner cornering wheel relative to the outer cornering wheel when negotiating a bend in the road. Steering is designed in such a way that the relative angular positions of wheels change as steering lock progresses.

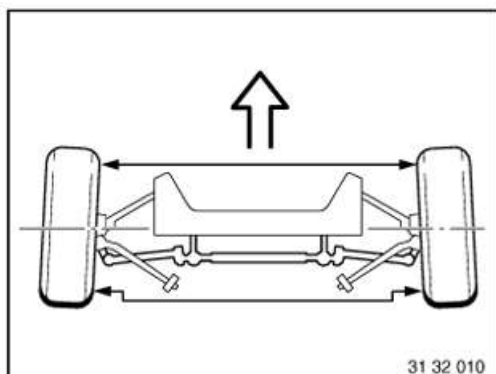
In ideal situations, the wheel axes intersect at Point D in every steering position (except for straight ahead).

5.2 Camber



Camber is the inclination of the wheel from the perpendicular.

5.3 Toe-in



Toe-in is the reduction in distance of front of front wheels to rear of front wheels. Toe-in prevents the wheels from moving apart when driving (wobbling and scuffing).

5.4 After-run



**Special tools required:**

- 11 4 480

**Important!**

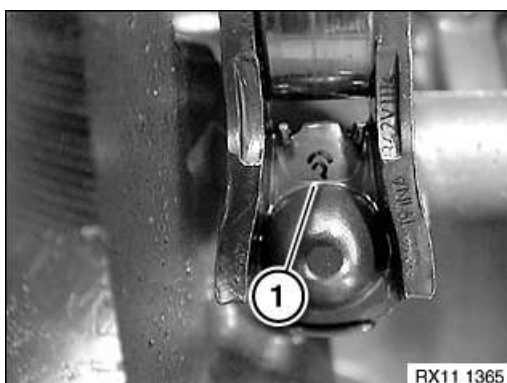
Rocker arms (1) are divided into bearing categories.

The tolerance classes are identified in numbers from 1 to 6.

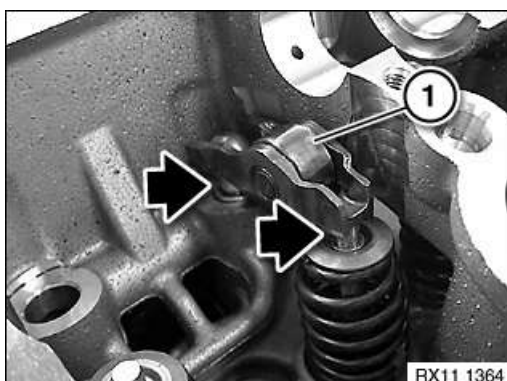
Already used roller cam followers (1) may only be reused in the same position.

*Necessary preliminary work:*

- Remove cylinder head cover.
- Remove intermediate lever.
- Remove exhaust camshaft.

**Important!**

Already used roller cam followers (1) may only be reused in the same position.



Separate roller cam followers (1) from hydraulic valve clearance compensating element and remove.

Place roller cam followers (1) in neat order on special tool 11 4 480 .

Installation note:

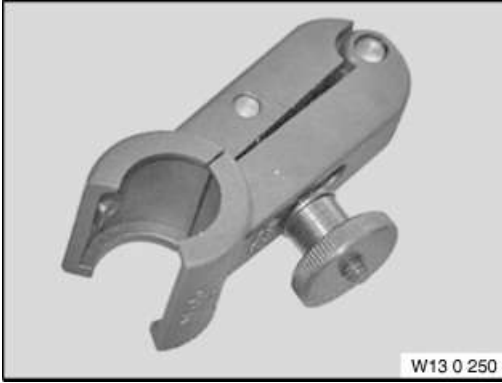
Before installing camshafts, make sure roller cam followers are correctly seated (see arrow).



Assemble engine.



0 496 242 (13 0 250) Release tool



Common

Used in step 15

Usage For unlocking high-pressure line.

Included in the tool or work

Storage location C86

Replaced by

In connection with

SI-Number 01 14 07 (389)

0 494 179 (32 1 270) Plug



Common

Used in step 12

Usage (Plugs (set)) 27-piece, 3x per size - For sealing off hydraulic lines for brakes, steering etc.

Included in the tool or work

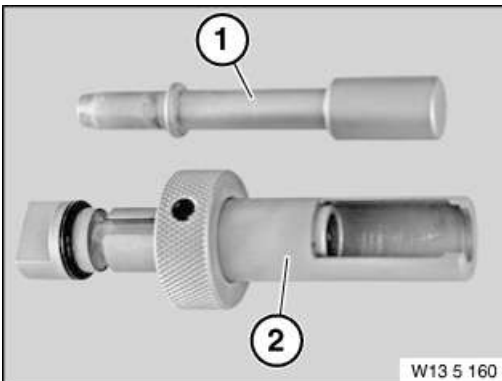
Storage location individual

Replaced by

In connection with

SI-Number 01 14 01 (766)

0 496 567 (13 5 161) Fastener



Common

Used in step 1

Usage (Cap (2 piece)) For sealing the quick connectors
Deletion, only available via tool set

Included in the tool or work 0 496 565

Storage location

Replaced by

In connection with

SI-Number



18 12 031 Replacing front silencer (N18)



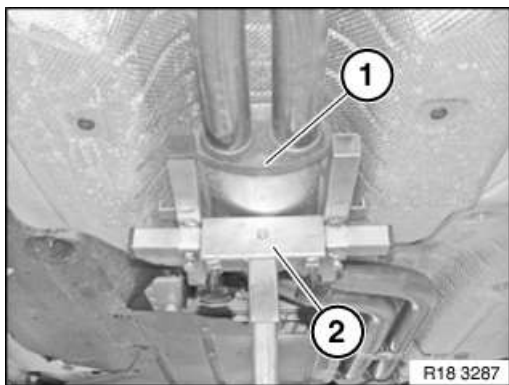
Warning!

Risk of burning!

Only perform this repair work after engine has cooled down.

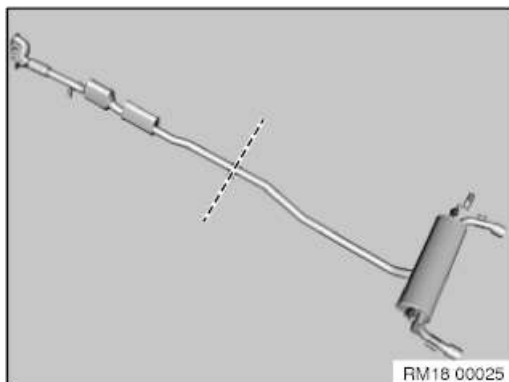
Danger of injury!

Removal of the exhaust system must be carried out with the assistance of a second person.



Support exhaust system (1) with a suitable jack (2).

Protect the front and rear silencers from falling down.



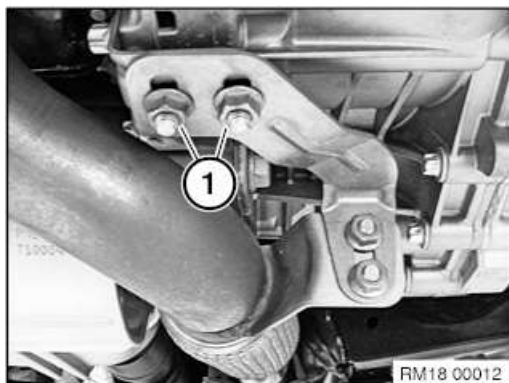
Note:

If the separation point is not marked by a punch mark in the pipe, determine the separation point by means of the pipe length on the new front silencer.

Carry over separation point to faulty front silencer and mark.

Secure front silencer against falling out.

Cut through exhaust pipes at marked point with a suitable tool.



Unscrew nuts (1).

Tightening torque 18 31 7AZ.

Installation note:

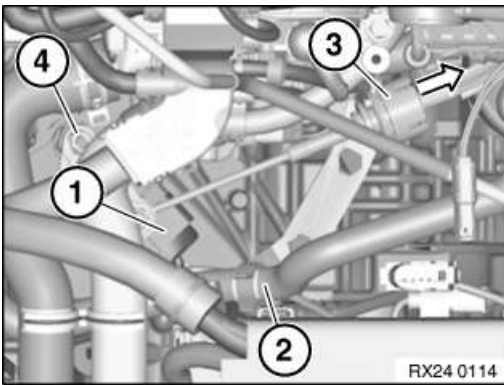
Fit the holder to the new front silencer.



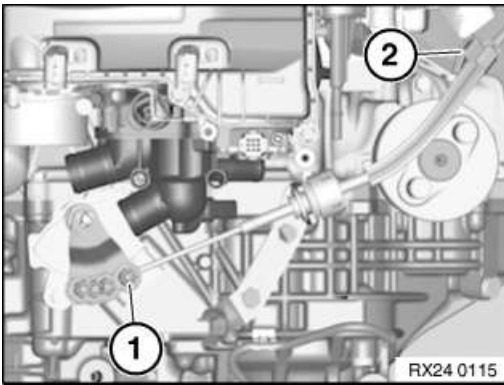


Necessary preliminary tasks:

- Move selector lever into "P" position
- Remove selector lever grip
- Remove storage compartment
- Remove intake silencer housing
- Remove exhaust system
- Remove intake silencer housing gaiter.
- Remove heat shield
- Remove cable from holder on vehicle underbody

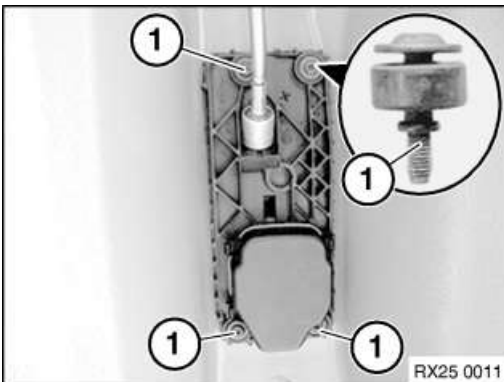


Slide retaining sleeve for cable (3) in direction of arrow.
Remove cable from holder.



Release cable lock nut (1).
Remove cable from holder (2).
Tightening torque 24 11 8AZ.

Installation note:
Adjust selector lever.



Remove mounting bolts (1) of gear shift housing.
Tightening torque 25 16 2AZ.

Note:
Graphic similar.

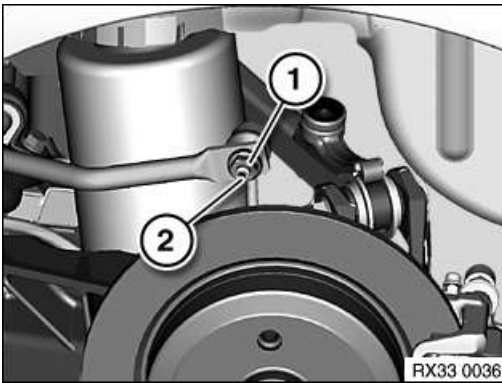


**Special tools required:**

- 31 1 140

**Necessary preliminary work:**

- Remove rear wheel

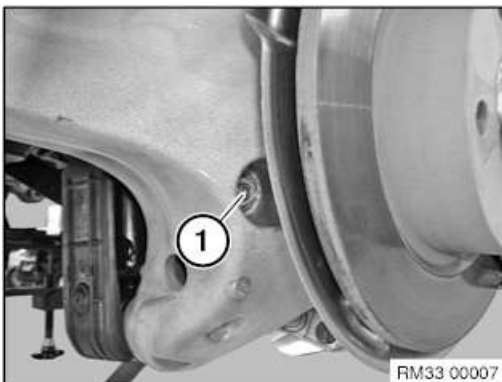


Release nut (1); if necessary, counter-hold at hexagon socket (2) or with special tool 31 1 140 .

Tightening torque 33 55 1AZ.

Installation note:

Replace self-locking nut.



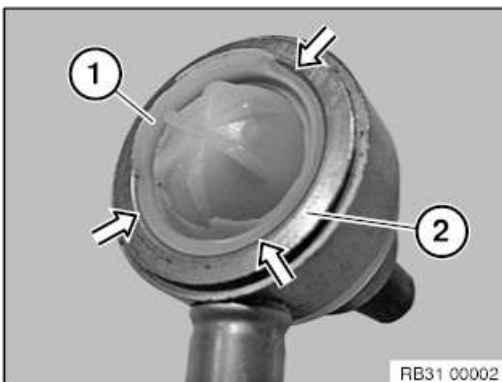
Release nut (1); if necessary, counter-hold with special tool 31 1 140 .

Tightening torque 33 55 2AZ.

Remove anti-roll bar link.

Installation note:

Replace self-locking nut.

**Important!**

Never tighten anti-roll bar link with an impact screwdriver.

Do not twist the joint of the anti-roll bar link while tightening the nut!

Never twist the joint to hold against the screw connection!

The plastic bond (1) may never be broken as marked with arrows in area (2).

If the plastic bond is broken, the anti-roll bar link must be replaced.



41 00 ... Safety at work

Note national regulations.

1.0 Compressed air:

- Air guns must not be pointed at individuals. "Blowing off" the body with compressed air may lead to serious injury.
- The devices are not permitted to be cleaned with compressed air due to dust contamination.

2.0 Electrical systems/devices:

- Only perfectly functioning systems and devices may be used.
- Repairs on electrical systems and devices must only be performed by certified electricians.

3.1 Working with aluminium dust:

- Wear a fine dust mask.
- The following applies only to E52 and BMWi: Use explosion-proof exhaust extraction unit.
- Note national regulations.

3.2 Removing sealant.

- Hydrochloric acid is created when PVC sealing material is heated to temperatures in excess of 180 °C.
- Remove PVC sealant with a rotating wire brush only or heat material with a hot air blower to maximum 180 °C and remove with a spatula.
- For good ventilation or direct extraction.

3.3 Arc welding and brazing solder:

Important!

The extremely bright arc during welding may cause serious injury to the eyes if appropriate protective measures are not taken.

- Use a welding screen suitable for the relevant welding method (metal active gas or metal inert gas).
- Separation of workbays with protective curtains.
- Use a welding-emissions extractor facility.
- Wear protective clothing and gloves suitable for welding (not combustible).
- A fire extinguisher must be located within reach of the welding area.
- Do not carry out any welding work in the proximity of a fuel tank e.g. when it is installed.
- Note national regulations.

3.4 Working with chemical products (adhesive, cleaning agents, fillers, etc.):

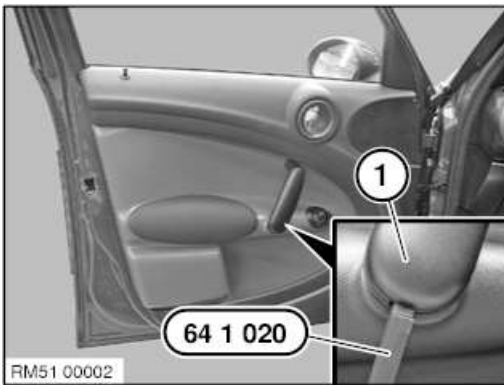
Heed the manufacturer's material safety data sheets.

Important!

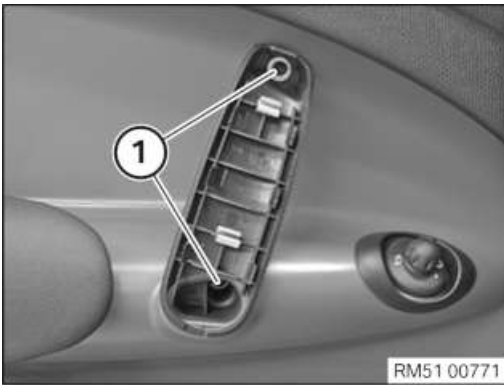
Handling chemical products may result in allergic skin and breathing reactions.

- Do not eat, drink or smoke while working with these products.
- Avoid direct contact with eyes and skin.
- Wear safety goggles, protective gloves and if necessary an apron.
- For good ventilation or direct extraction.
- Use a breathing apparatus with a suitable filter type when ventilation is insufficient.
- Wear impermeable protective clothing.
- Immediately change contaminated work clothing.
- After finishing work, thoroughly clean your hands and apply protective skin cream.
- Always keep an eye douche on hand, change the water regularly (once a month).

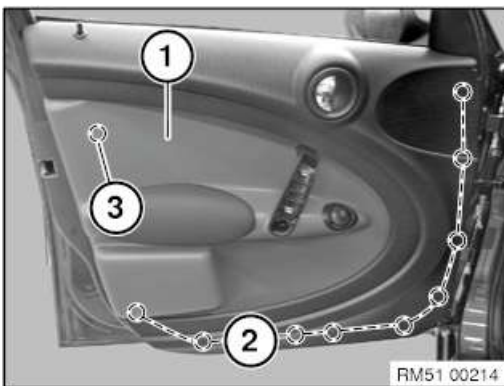




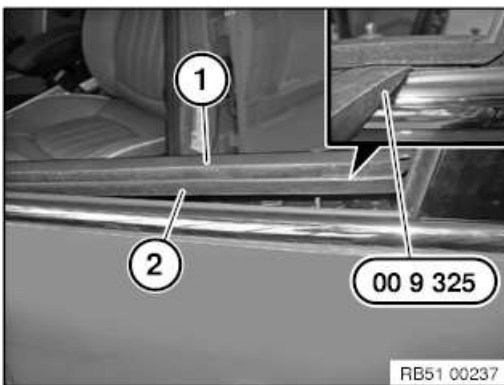
- Lever off and remove cover (1) on the door handle with the special tool [0 493 681 \(64 1 020\)](#).



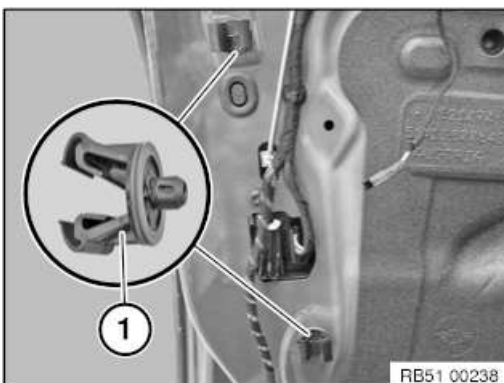
- Loosen screws (1).



- Unclip the door trim panel (1) at the marked positions (2) with the special tool [0 496 569 \(00 9 325\)](#).
The clip (3) is unclipped from the door trim panel and remains on the inner door panel.



- Completely open the window glass.
- Lever out the [0 496 569 \(00 9 325\)](#) door trim panel (1) including the weather strip (2) upward from outside with the special tool.



- Lever up the door trim panel till the door trim panel is released from the upper and lower clip (1).



NOTICE

For a better overview the removed condition is shown here.



72 12 006 Removing and installing/replacing airbag module for passenger knee protection



Special tools required:

- 00 9 325



Warning!

Read and comply with safety regulations for handling airbag modules and pyrotechnical belt tensioners.

Incorrect handling can activate airbag and cause injury.



Important!

Operations on pyrotechnical devices may only be carried out by authorised experts.

Improper, unauthorised operations may result in serious dangers.

Unauthorised persons are strictly prohibited from performing any operations on this system.

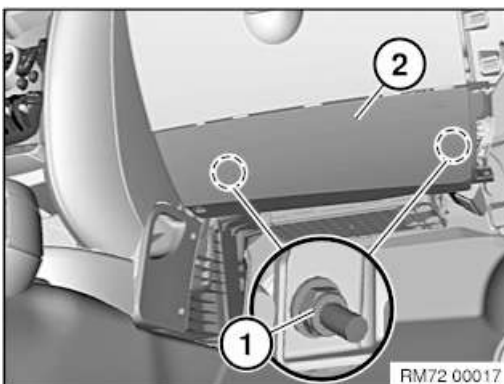


When working on trim panel components, make sure that visible surfaces are not scratched or damaged (e.g. by sharp-edged tools).



Necessary preliminary tasks:

- Disconnect battery earth lead
- Remove front door sill cover strip



Release nuts (1) on rear side of trim panel (2).

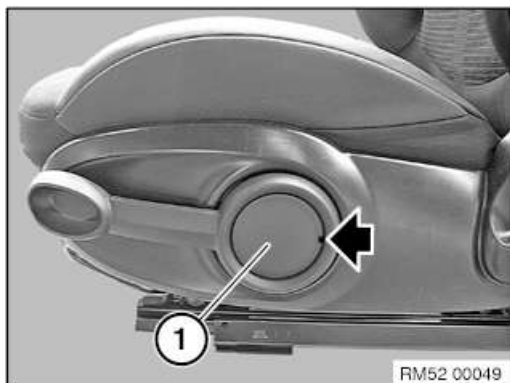
Tightening torque 72 12 10AZ.



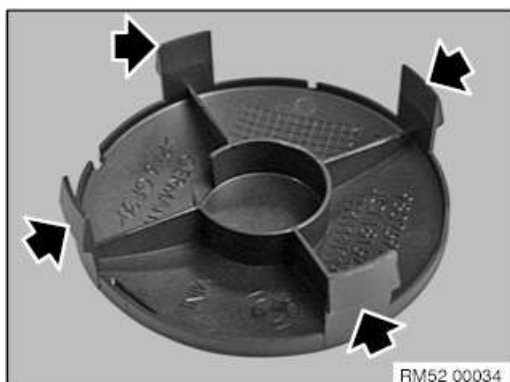


Necessary preliminary work:

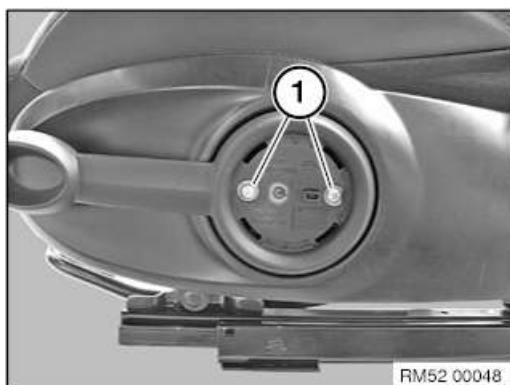
- Remove lever for backrest adjustment on front seat



Unclip cover (1).

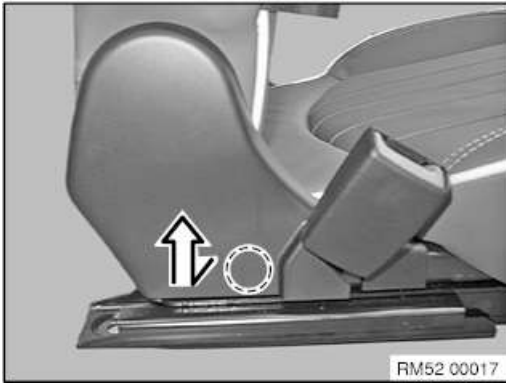


Installation note:
Retaining lugs must not be damaged.
If necessary, replace faulty cover.

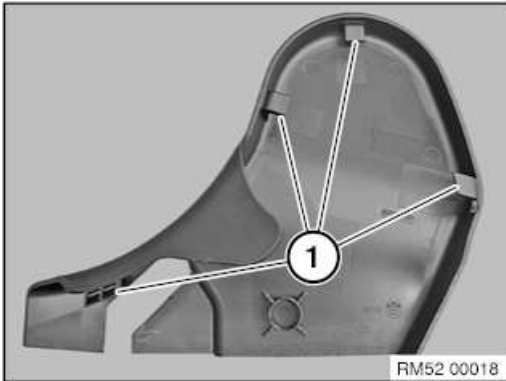


Release screws (1).
Tightening torque 52 13 08AZ.

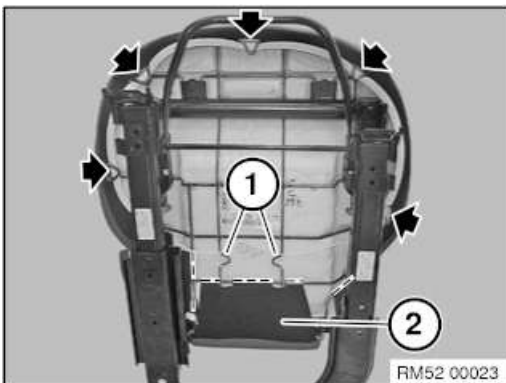




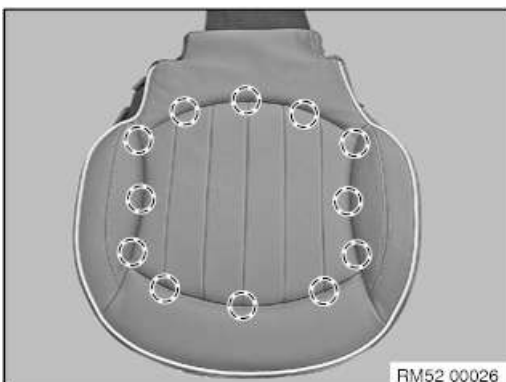
Unclip the inner fitting cover in marked area and remove.
Remove inner fitting cover in direction of arrow.



Installation note:
Retaining lugs (1) must not be damaged.
If necessary, replace faulty fitting cover.



Detach the welt of the cover latch (2) in the marked area from the seat frame.
Detach the tensioning strap (1) from the seat frame.
Disengage seat cover in marked area from seat frame.



Detaching cover and upholstery:

- Disconnect all clamps in marked area
- Remove seat cover from padding
- Remove all remnants of retainers from cover and padding

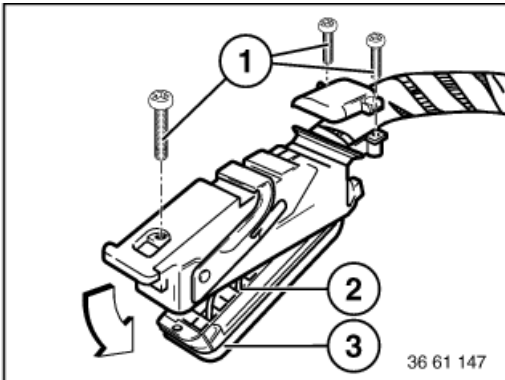


61 13 ... Control unit plugs, 25-, 35-, 55-, 83-, 88-pin



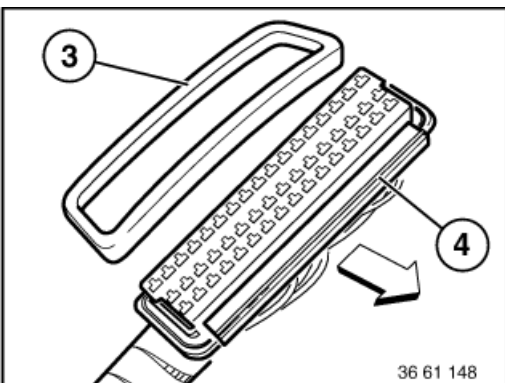
Special tools required:

- 61 0 312
- 61 0 314
- 61 0 315
- 61 0 323



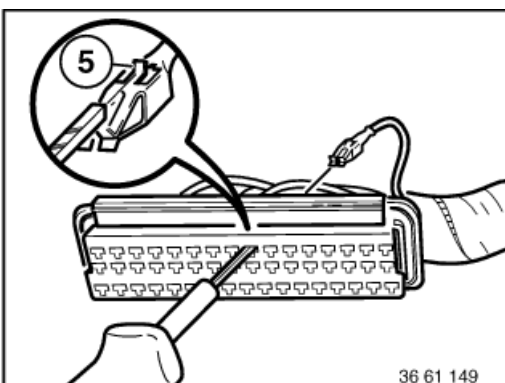
Release screws (1).

Lever out pin sensor (2) with gasket (3) in direction of arrow.



Remove gasket (3).

Pull out housing lock (4) in direction of arrow and unlock.



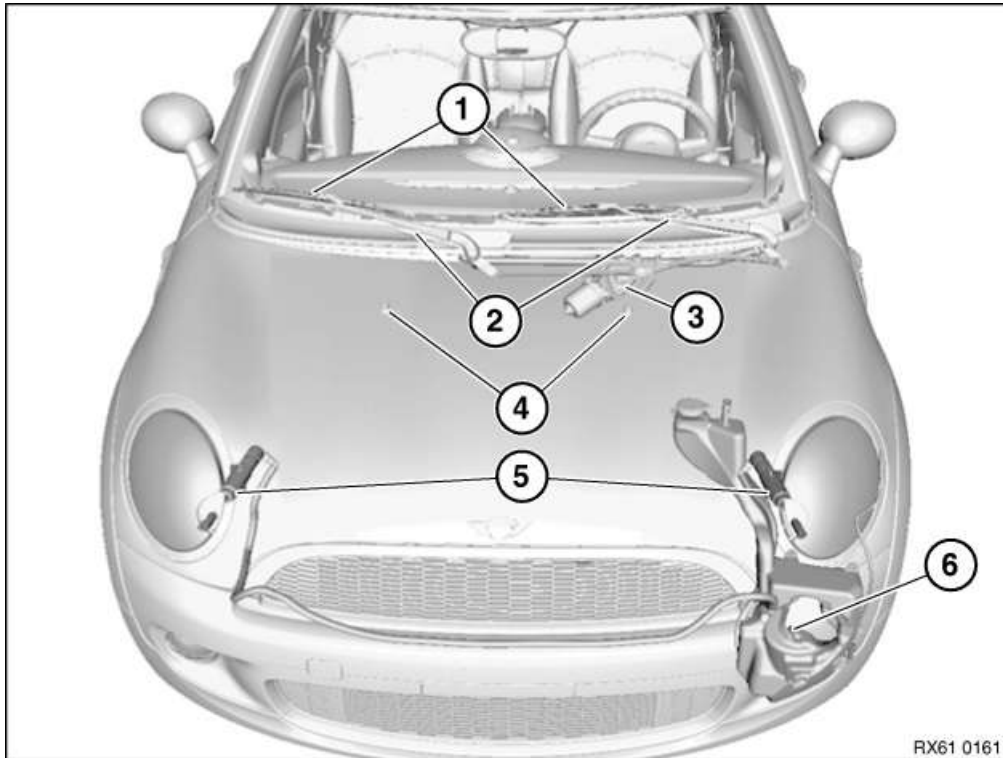
Press down retaining hook (5) of corresponding contact and pull out cable with contact.

Special tool 61 0 312 (61 1 134) for mini flat spring contacts.

Special tool 61 0 314 (61 1 135) for mini flat spring contacts.



61 61 ... Overview of windscreen washer system and headlight cleaning system (SRA)



- | | | | |
|-----|--|-----|---|
| 1 | Wiper blades / wiper blade rubbers | 4 | Washer jets of the window washer system |
| 2 | Windscreen wiper arms | 5 | High-pressure nozzles for headlight washer system |
| 3 | Console for the wiper system completely with motor | 6 | Water reservoir / windscreen washer pumps |
| R55 | Rear wiper | R56 | Rear wiper |
| R60 | Rear wiper | R61 | Rear wiper |



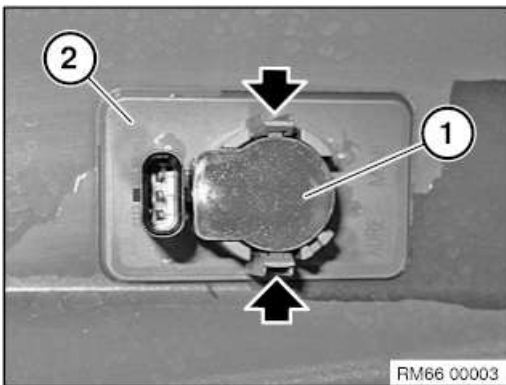
**Necessary preliminary work:**

On version with JCW Aerodynamic package:

- Remove rear bumper

**Note:**

The ultrasound converter (1) can be replaced without dismantling the bumper panel.



Unlock associated plug connection and disconnect

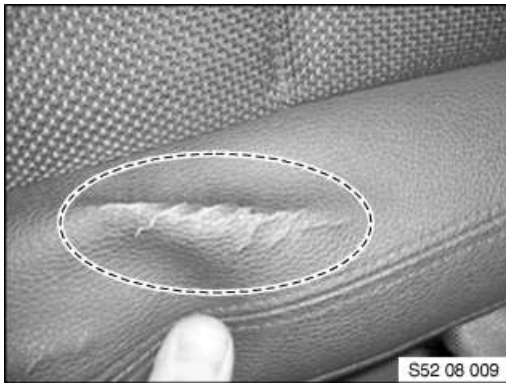
Spread latches and remove ultrasound converter (1) from bracket (2).

Installation note:

Before installation of ultrasonic sensor (1) on wiring harness, clean plug connection!



To compensate for possible colour variations, the adjacent leather surfaces must be treated with the leather care kit.



8. Leatherette crack

Surface cracks in leatherette.

The underlying fabric structure is visible.

In case of customer complaints the effected part is to be replaced on warranty.

Pro-cedure: Effective immediately measures for leather complaints will be decided based on damage images.

1. In case of customer complaint, check if the leather surface can be repaired by care measures.
For the procedure, refer to Service Information (bulletin) 51 02 02 (834).
2. If there is damage of the leather in the case of customer complaint, for warranty claims convincing digital photos with the following contents must be made (similar to a paint complaint).

- **Total image of the damage location**
- **Detail image of the damage location**
- **Display the scale for size of damage spot with a ruler or a coin as reference**

Diagram and description of the damage location is retained in the vehicle records.

Acceptance of warranty costs depends on the evaluation of the leather damage.

3. Repair damaged spots according to the recommendations in the BMW appearance repair/interior repair Aftersales training or by a qualified service provider.

Billing procedures:

Caution!

The fault pattern 1 (Dirt contamination, discolouration), 3 (Scratches), 4 (Tears and cuts) and 6 (Ripples) are not a product defect of the leather. Part replacement on warranty is not justified.

Warranty

For leather repair work in case of warranty (e.g. wear) the invoicing is made according to working time (AZ) under the following job numbers:

BMW appearance repair passenger compartment Job number: 52 99 010

MINI appearance repair passenger compartment Job number: 52 99 020

Material and labour costs incurred can be claimed through the usual warranty channels subject to current warranty terms.

Parts:

<u>Part number</u>	<u>Description</u>	<u>Quantity</u>
83 12 0 411 413	Leather care kit with UV protection	1
83 12 0 411 371(USA only)	Leather care kit	1
83 12 0 415 497(Canada only)	BMW Premium Leather Care	1
83 12 9 407 907	Leather cleaning foam	1
83 19 2 162 184	Leather repair kit	1

Note:

