DAS 3000 S20
Calibration and adjustment device

de	Originalbetriebsanleitung	**Kalibrier - und Justagevorrichtung**
en	Original instructions	**Calibration and adjustment device**
bg	Оригинална инструкция за експлоатация	**Устройство за калибриране и настройване**
cs	Původní návod k používání	**Kalibrační a seřizovací zařízení**
da	Original brugsanvisning	**Kallibrerings- og justeringsanordning**
el	Πρωτότυπο εγχειρίδιο χρήσης	**Διάταξη βαθμονόμησης και ρύθμισης**
es	Manual original	**Dispositivo de ajuste**
et	Originaalkasutusjuhend	**Kalibreerimis- ja joondusseadis**
fi	Alkuperäiset ohjeet	**Kalibrointi- ja säätölaite**
fr	Notice originale	**Dispositif de calibrage et dispositif d'ajustage**
hr	Originalne upute za rad	**Naprava za kalibraciju i namještanje**
hu	Eredeti használati utasítás	**Kalibráló és beállító berendezés**
it	Istruzioni originali	**Dispositivo di calibrazione e di messa a punto**
ja	取扱説明書原本の翻訳	**キャリブレーションデバイスと調整ユニット**
lt	Originali eksploatacijos instrukcija	**Kalibravimo ir justavimo įtaisas**
lv	Oriģinālās ekspluatācijas instrukcijas tulkojums	**Kalibrēšanas un iestatīšanas ierīce**
nl	Oorspronkelijke gebruiksaanwijzing	**Kalibratie- en afstelinrichting**
no	Original driftsinstruks	**Kalibrerings- og justeringsmekanisme**
pl	Oryginalna instrukcja eksploatacji	**Urządzenie kalibracyjne i regulacyjne**
pt	Manual original	**Dispositivo de calibração e de ajuste**
ro	Instrucțiuni originale	**Dispozitiv de calibrare și ajustare**
ru	Руководство по эксплуатации	**Приспособление для калибровки и юстировки**
sk	Originálny návod na obsluhu	**Kalibračný a nastavovací prípravok**
sl	Prevod originalnih navodil za obratovanje	**Naprava za kalibriranje in naravnavanje**
sv	Översättning av originalbruksanvisningen	**Kalibrering- och justeringsdon**
tr	Orijinal işletme talimatı	**Kalibrasyon ve ayarlama düzeneği**
uk	Оригінальна інструкція з експлуатації	**Стенд для калібрування та пристрій для регулювання**
zh	原版操作说明书的译文	**校准设备**

1. Notes on the documentation

1.1 Using the documentation

Before commissioning, connecting and using Bosch products, it is essential to go through the operating instructions – and the safety instructions, in particular – with great care. By doing so, you can eliminate any uncertainties in handling Bosch products and associated safety risks upfront, which is in the interest of your own safety and will help avoid damage to the products. Should a Bosch product be passed on to another person, the operating instructions with information on its intended use must be handed over as well.

1.2 Symbols used in the documentation

Warning of possible physical damage to the component or product or of environmental pollution.

Practical hints, recommendation or reference to other information.

Warning of danger for the operator during subsequent procedures.

Single-step procedure.

— Optional step.

Result of a procedure.

Reference to a figure. Example: *12(2)* means figure 12, item 2.

Reference to a page.

1.3 Warnings in the documentation

1.3.1 Meaning of the the signal words

Warnings warn of dangers to the user or people in the vicinity. The signal word in the warning indicates the likelihood of occurrence and the severity of the danger if it is disregarded.

Signal word	Likelihood of occurrence	Severity of danger if disregarded
DANGER	Immediate, imminent danger	Death or severe injury
WARNING	Possible impending danger	Death or severe injury
CAUTION	Possible dangerous situation	Minor injury

1.3.2 Structure of warnings specific to sections

Warnings specific to sections refer to several steps within a dangerous sequence of actions. Warnings specific to sections are placed before a dangerous sequence of actions.

⚠ Signal word

Warning sign — **Type, source and consequences of the danger.**

- Measures and instructions to prevent the danger.

1.3.3 Structure of embedded warnings

Embedded warnings refer to an individual dangerous step. Embedded warnings are placed before a dangerous step. The remedies are embedded in the sequence of actions.

⚠**SIGNAL WORD** – type and source of danger. Possible consequence if disregarded.

2. Safety

2.1 Safety instructions

The indicator bar as a safety hazard

Magnetic field – The powerful magnets on the indicator bar may impair the health of people with a pacemaker or implanted defibrillator.

- People with a pacemaker or implanted defibrillator must maintain a sufficient distance from the DAS 3000 S20, especially from the indicator bar.

Risk of head impact – The protruding indicator bar at head height may lead to injury to the head and face.

- When working with the DAS 3000 S20, be aware of the height set for the indicator bar.
- Secure the indicator bar in the parked position when calibrating a front radar sensor.
- Secure the indicator bar in the parked position when the DAS 3000 S20 is not being used.

The camera beam and power supply cables as safety hazards

Tripping hazard – The camera beam protruding at knee height on the DAS 3000 S20 may lead to tripping resulting in falls and injury.

- Pay attention to the camera beam at knee height.

Tripping hazard – Power supply cables at knee height may lead to tripping resulting in falls and injury.

- Use the laptop/tablet on the DAS 3000 S20 in storage battery mode only.
- The laptop/tablet must not be connected to the power supply cable while work is being carried out with the DAS 3000 S20.

Calibration boards as safety hazards

Falling objects – Incorrectly attached or unsecured calibration boards may fall off the DAS 3000 S20, resulting in minor injury.

- Use retaining cables to secure calibration boards with magnetic attachment.
- Remove the calibration board with magnetic attachment from the indicator bar, and store it in the "Multi-Target Shop" box when the DAS 3000 S20 is not being used.
- Secure the indicator bar in the parked position when the DAS 3000 S20 is not being used.

- Used two mounting adapters and calibration board retainer Z or calibration board retainer Y to secure calibration boards without magnetic attachment.
- Use the star handles to hand-tighten the mounting adapters on the positioning unit.
- Place the calibration board without magnetic attachment in the parked position and secure it when the DAS 3000 S20 is not being used.
- Do not use the DAS 3000 S20 as a means of transport for other parts.

2.2 Warnings and mandatory-action signs on the product

☑ All warning signs must be in legible condition.

Read and understand the operating instructions before working with the DAS 3000 S20.

Individuals with a pacemaker or implanted defibrillator must maintain sufficient distance from the DAS 3000 S20.

Beware of the indicator bar at head height to avoid injury.

2.3 Target group

The initial commissioning of the DAS 3000 S20 may only be performed by service technicians.

The product may only be used by trained and instructed personnel. Apprentices or personnel undergoing training or instruction may use the product only under the continual supervision of an experienced person.

Children must be supervised to ensure that they do not play with the product.

2.4 Other applicable documents

ⓘ Current information on the DAS 3000 S20 is available from the Help Center: http://cdn.esitronic.de/helpcenter/DAS3000/start.htm

2.5 Intended use

The DAS 3000 S20 is an adjustment device for calibrating advanced driver assistance systems.

The product variant DAS 3000 S20 can be used to align calibration boards for calibrating ***front camera systems*** and ***front radar sensors*** specific to vehicles.

The DAS 3000 S20 is positioned in front of the vehicle with the aid of the Bosch ADAS Positioning software.

Diagnostic software such as ESI[tronic] 2.0 is needed for calibrating advanced driver assistance systems.

2.6 Foreseeable misuse

Misuse (✪) with corresponding intended use (✪):

✪ The DAS 3000 S20 is pulled or pushed by the edge protection frame to change the position.

✪ Only use the handles to pull or push the DAS 3000 S20 in order to change the position.

ⓘ The edge protection frame can be damaged if the DAS 3000 S20 is pulled or pushed by the edge protection frame.

✪ The DAS 3000 S20 is used as a means of transport for heavy objects.

✪ The DAS 3000 S20 may only be used for alignment of calibration boards for front camera systems and front radar systems.

2.7 Warranty and liability

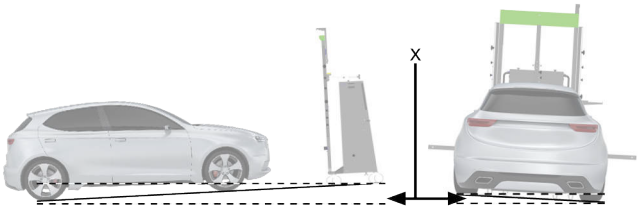
No modifications may be carried out on our products. Our products may only be used with genuine accessories and genuine spare parts. Otherwise, all warranty claims will be rendered null and void.

3. Product description

3.1 Prerequisites

Measurement bay

- Maximum inclination (x) in measurement bay: 1%



- Maximum unevenness of the resting surface of the vehicle and DAS 3000: 10 mm
- Measurement bay must comply with the particular values for the make
- No direct sunlight at the measurement bay
- Adequate lighting

Bosch ADAS Positioning software

ⓘ We recommend and support the DCU 220 as a laptop or the KTS 350 tablet for use with Bosch ADAS Positioning.

- Operating system: Windows 10
- Minimum resolution: 1024 x 600 pixels
- WLAN
- DAS 3000 S10: At least one free USB port
- DAS 3000 S20: At least two free USB ports

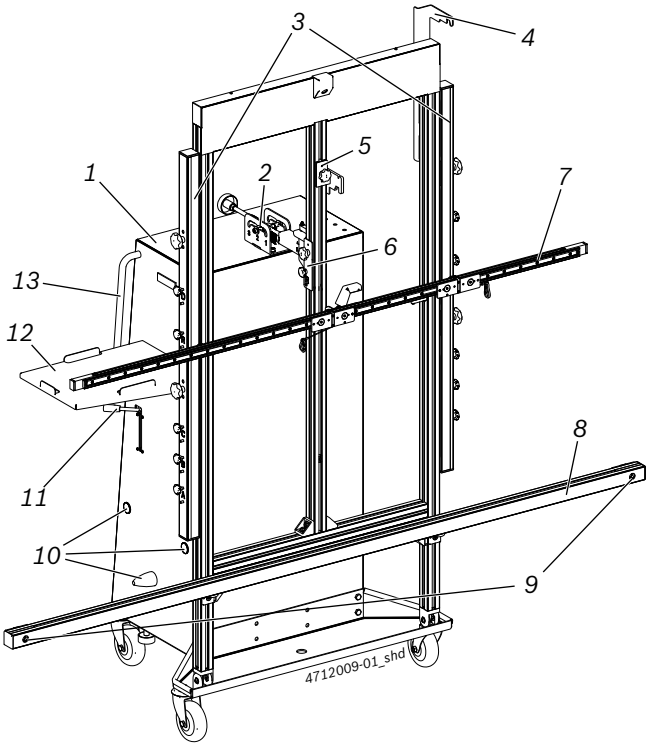
Diagnostic softwareESI[tronic] 2.0 software with the control unit diagnosis ESI[tronic] info type for calibrating front camera systems and front radar sensors

3.2 Scope of delivery

Denomination	Order number
Trolley with frame (including positioning unit)	–
Holder for laptop/tablet	1 681 321 374

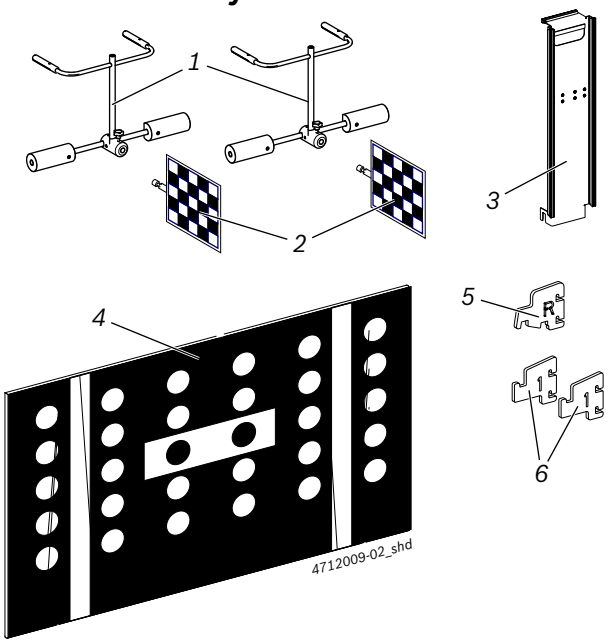
Denomination	Order number
Indicator bar	1 682 329 109
Camera beam	1 683 050 053
Mounting adapter 1 (2x)	1 685 720 380
Calibration board retainer R	1 685 720 384
USB stick with Bosch ADAS Positioning software	1 687 370 328
Calibration board (CTA 300-1)	1 681 098 011
Contact plate (CTA 104-1) with edge protection and retaining hooks	1 681 320 090
Wheel holder (CTA 100-1) (2x)	1 688 120 190
Reference board (CTA 400-1) (2x)	1 681 098 013
Reference board fastening parts set (CTA 400-1) (2x)	1 687 010 635

3.3 DAS 3000 S20 overview



(1) Trolley
(2) 2-degree adjustment mechanism
(3) Positioning unit consisting of two positioning bars
(4) Calibration board retainer Y
(5) Calibration board retainer Z
(6) R position
(7) Indicator bar with slide
(8) Camera beam
(9) Cameras (2x) in camera beam
(10) Parked position for wheel holder (CTA 100-1)
(11) Brake for trolley
(12) Holder for laptop/tablet
(13) Handles for controlling the trolley

3.4 Accessory overview



(1) Wheel holder (CTA 100-1)
(2) Reference board (CTA 400-1)
(3) Contact plate (CTA 104-1)
(4) Calibration board 1 681 098 011 (CTA 300-1)
(5) Safety adapter R
(6) Mounting adapter 1

3.5 Functional description

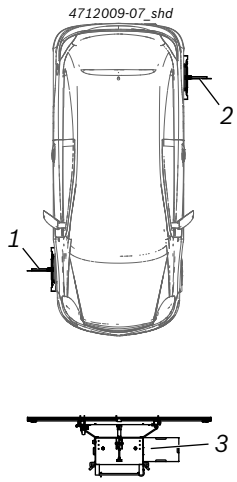
The following steps must be carried out to calibrate a windshield camera or front radar sensor using the DAS 3000 S20:

- Attach the calibration board specific to the manufacturer to the DAS 3000 S20.
- Position the DAS 3000 S20 in front of the vehicle.
- Use ESI[tronic] 2.0 to calibrate the windshield camera or front radar sensor.

In the following, the basic steps for positioning the DAS 3000 S20 in front of the vehicle will be set out. The Bosch ADAS Positioning software will guide the user through the alignment process for the DAS 3000 S20 step by step.

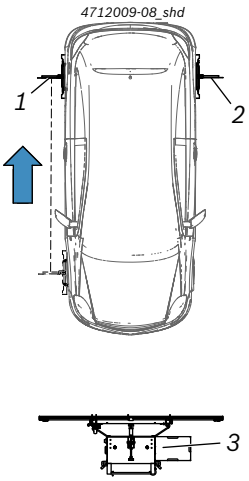
Positioning in front of the vehicle using the wheel hub as a reference point

Step 1 – Position the DAS 3000 S20 at the required distance: to do this, attach the wheel holders (CTA 100-x) to the right front wheel and left rear wheel. Use Bosch ADAS Positioning to place the DAS 3000 S20 at the vehicle-specific distance from the wheel hub.



(1) Wheel holder (CTA 100-x) on right front wheel
(2) Wheel holder (CTA 100-x) on left rear wheel
(3) DAS 3000 S20

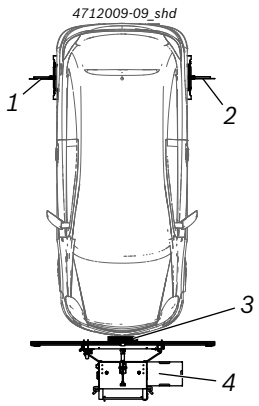
Step 2 – Place the DAS 3000 S20 in the required position: to do this, attach the wheel holder attached to the right front wheel to the right rear wheel. Use Bosch ADAS Positioning to place the DAS 3000 S20 in the required position.



(1) Wheel holder (CTA 100-x) on right rear wheel
(2) Wheel holder (CTA 100-x) on left rear wheel
(3) DAS 3000 S20

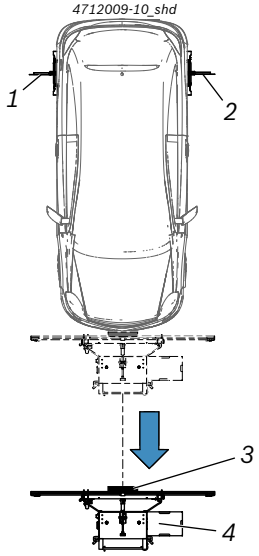
Positioning in front of the vehicle using the bumper as a reference point

Step 1 – Position the DAS 3000 S20 at the required distance: to do this, attach the wheel holders (CTA 100-x) to the left and right rear wheels. Attach the contact plate (CTA 104-x) to the DAS 3000 S20. The DAS 3000 S20 must be moved all the way to the bumper so the contact plate (CTA 104-x) touches the bumper.



(1) Wheel holder (CTA 100-x) on right rear wheel
(2) Wheel holder (CTA 100-x) on left rear wheel
(3) Contact plate (CTA 104-x) on DAS 3000 S20
(4) DAS 3000 S20

Step 2 – Use Bosch ADAS Positioning to place the DAS 3000 S20 in the required position.



(1) Wheel holder (CTA 100-x) on right rear wheel
(2) Wheel holder (CTA 100-x) on left rear wheel
(3) Contact plate (CTA 104-x) on DAS 3000 S20
(4) DAS 3000 S20

4. Initial commissioning

4.1 Remove the DAS 3000 S20 from the pallet

We recommend that two people remove the DAS 3000 S20 from the pallet.

We recommend attaching the required components at the installation site of the DAS 3000 S20. Maneuvering the pallet to the installation site of the DAS 3000 S20 is safer and easier without the components attached.

1. Remove all loose components from the pallet.
2. Remove all loose components in the trolley from the DAS 3000 S20.
3. Unscrew the camera beam from the frame.

The DAS 3000 S20 is secured on the back by a mounting bracket *(3)*. The DAS 3000 S20 is secured on the front by a screw *(5)*.

4. Remove the mounting bracket *(3)* from the back of the DAS 3000 S20.
5. Remove the screw *(5)* from the front of the DAS 3000 S20.

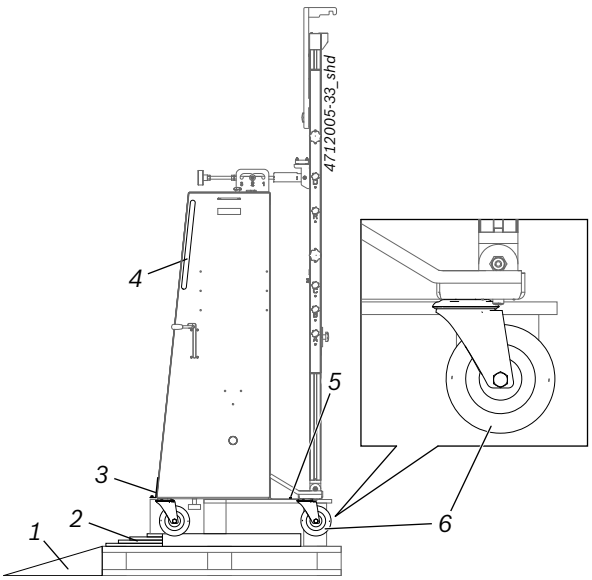
Using the two wedges *(1)* supplied, pull the DAS 3000 S20 off the pallet.

6. Place the wedges *(1)* supplied on the pallet in such a way that the DAS 3000 S20 can be moved off the pallet backwards.
7. Place the rollers *(6)* of the DAS 3000 S20 in the direction of travel.

If the rollers are not placed in the direction of travel, the DAS 3000 S20 may be damaged when being moved off the pallet.

8. Hold the DAS 3000 S20 by the handles *(4)*, and carefully roll it off the pallet backwards using the roll-off aid.

The DAS 3000 S20 must not be pulled or pushed by its frame. Pushing or pulling the frame may damage it.

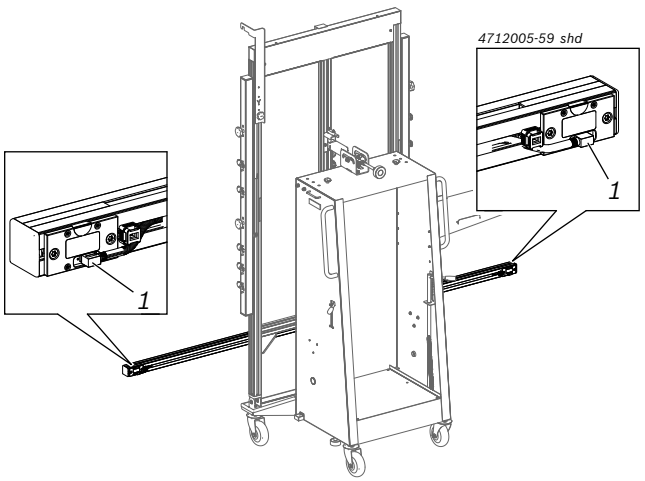


(1) Wedges
(2) Roll-off aid
(3) Mounting bracket with two screws on back
(4) Handles
(5) Screw on front
(6) Rollers placed in direction of travel

4.2 Mount the camera beam (DAS 3000 S20 S20 only)

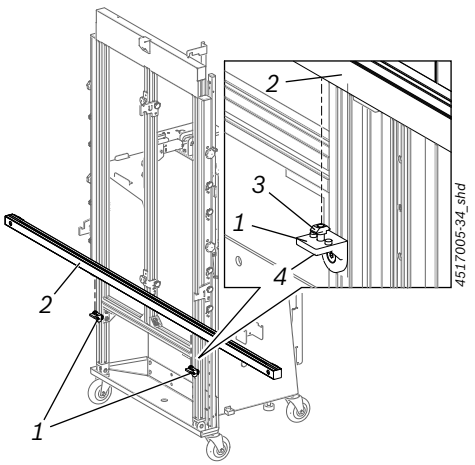
The camera beam must be positioned in the correct orientation and fastened to the DAS 3000 S20. The camera beam is positioned in the correct orientation when the mini-USB ports of the cameras in the camera beam point downwards.

1. Position the camera beam *(2)* so that the mini-USB ports *(1)* of the cameras in the camera beam point downwards.



(1) Mini-USB ports

2. Position the camera beam *(2)* with the holes in the T-slot above the mountings *(1)*.
3. Place the camera beam on the mountings in such a way that the T-slot nuts *(3)* are held in the T-slot of the camera beam.
4. Fasten the camera beam with screws from the underside of the mountings *(4)*.



(1) Mountings
(2) Camera beam
(3) T-slot nuts
(4) Screw on underside of mounting

4.3 Compensating for the DAS 3000 S20's offset

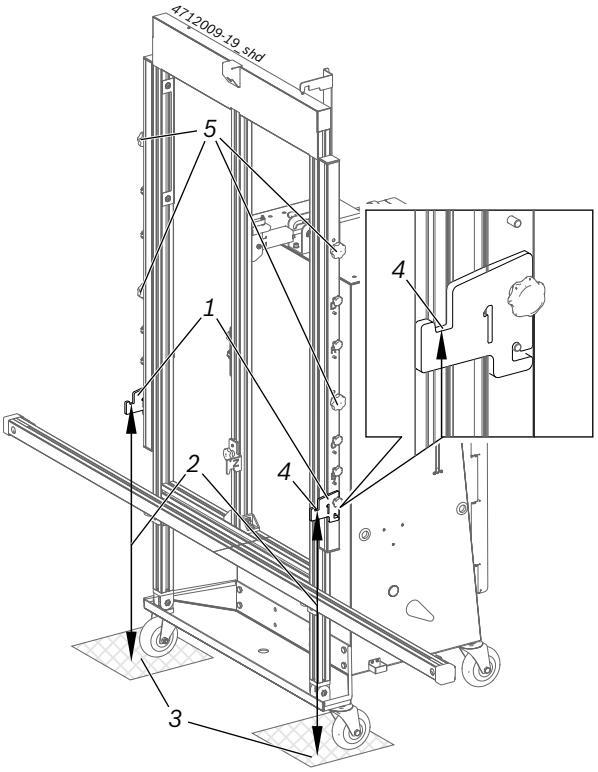
It may be necessary to slightly shorten the cover of the USB cable and to reposition the cable clamp securing the USB cables.

1. Use the brake to secure the DAS 3000 S20.
2. Attach mounting adapter 1 *(1)* in vertical position A.
3. Determine the vertical distance *(2)* between the resting surface *(3)* and the front recess *(4)* of the mounting adapter.

We recommend placing the meter stick against the mounting adapter and camera beam for determining vertical distance.

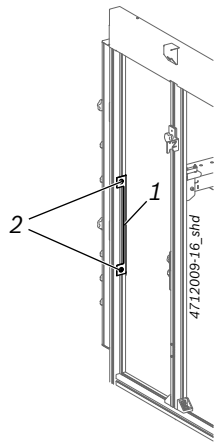
The vertical distance between the resting surface and the front recess of the mounting adapter must be ***820 mm***.

4. If the vertical distance determined is not 820 mm: use the knurled screws *(5)* to adjust the positioning unit in such a way that the vertical distance *(2)* between the resting surface *(3)* and the front recess *(4)* of the mounting adapter is 820 mm.



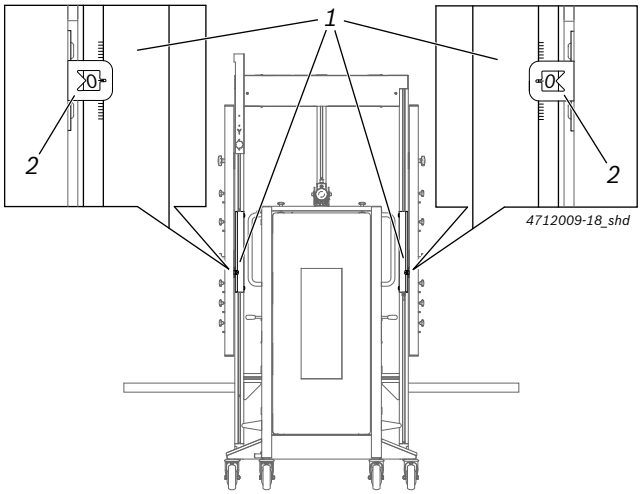
(1) Mounting adapter 1
(2) Vertical distance between resting surface and front recess of mounting adapter
(3) Resting surface
(4) Front recess of mounting adapter
(5) Knurled screws for vertical adjustment of positioning unit

5. Loosen the screws *(2)* on the offset ruler *(1)*.



(1) Offset ruler
(2) Offset ruler screws

6. Place the 0 point of the offset ruler precisely in the height indicator *(2)* of the positioning unit.

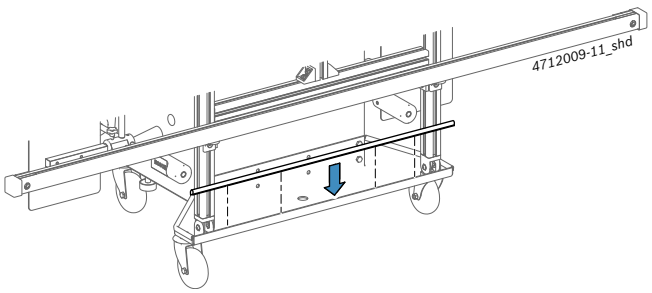


(1) Offset ruler
(2) 0 point of offset ruler precisely in height indicator of positioning unit

7. Use the screws to secure the offset ruler.

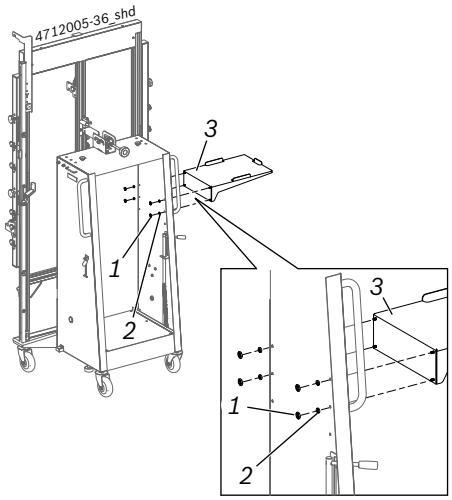
4.4 Attaching the edge protection for the contact plate (CTA 104-x)

▸ Attach the edge protection to the trolley.



4.5 Installing the holder for the laptop/ tablet

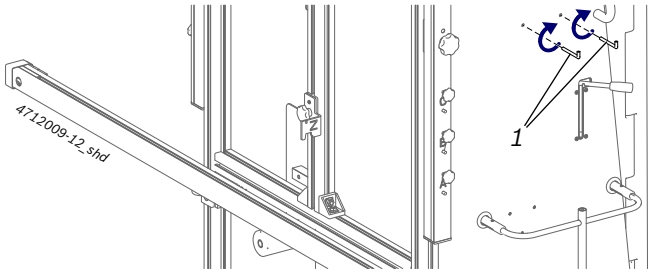
1. Push the setscrews for the laptop/tablet shelf through the upper or lower 4 holes.
   — Use the upper or lower 4 holes depending on the height needed.
2. Attach the laptop/tablet shelf *(3)* with washers *(2)* and hex nuts *(1)*.



(1) Hex nut
(2) Washer
(3) Holder for laptop/tablet

4.6 Screwing in the retaining hooks for the contact plate (CTA 104-x)

▸ Screw the retaining hooks into the holes in such a way that they point up.



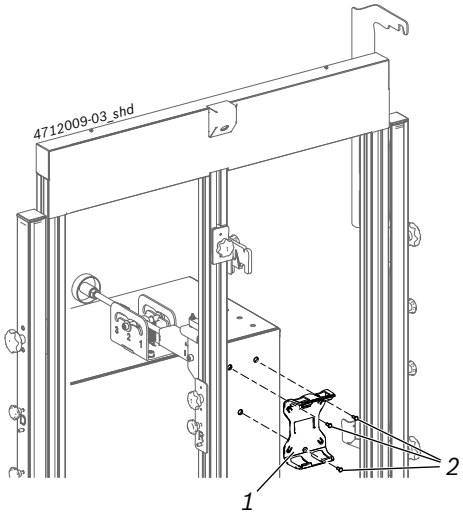
(1) Retaining hooks

4.7 Installing the KTS mount

The mount for the KTS 560/590 can be installed on the DAS 3000 S20. The mount is part of the scope of delivery of the KTS 560/590.

1. If the "Multi-Target-Shop" box is already installed, remove it from the trolley.
2. Use pan head screw ***ISO 7045-M4 x 6*** and hex nut ***ISO 4032-M4*** to attach the mount for the KTS 560/590 to the trolley.

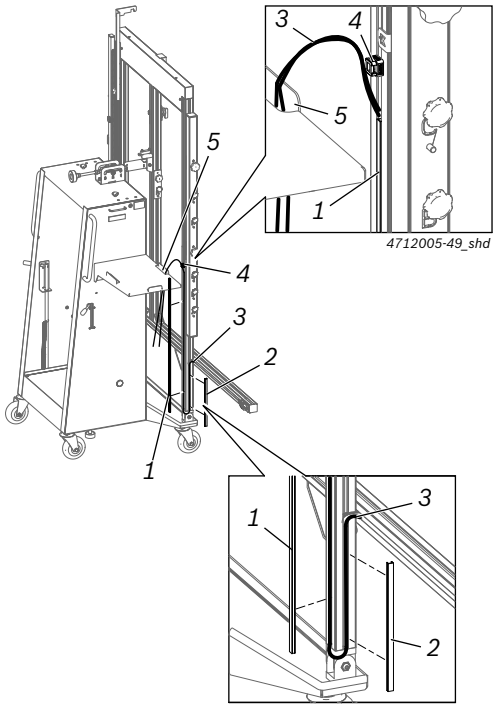
Do not use longer screws for fastening. Longer screws will damage the Multi-Target-Shop box while it is attached to the trolley.



(1) KTS 560/590 mount
(2) Pan head screws ISO 7045-M4 x 6

4.8 Install the USB connecting cables in the camera beam (DAS 3000 S20 S20 only)

1. Remove the long cover *(1)* and short cover *(2)* from the profiled slot.
2. Place the USB connecting cables *(3)* for the CCD cameras in the camera beam in the outer slot of the right, vertical profile (rear view).
3. Fasten the short cover *(2)* in the slot in such a way that the installed USB connecting cables are covered.
4. Place the USB connecting cables in the rear slot of the right, vertical profile up to the cable clamp *(4)*.
5. Fasten the long cover *(1)* in the slot in such a way that the installed USB connecting cables are covered.
6. Attach the USB connecting cables *(3)* to the cable clamp *(4)* by means of cable ties.
   — Make sure that the USB connecting cables have enough slack to allow connection to the laptop/tablet.



(1) Long cover in the rear slot
(2) Short cover in the right slot
(3) USB connecting cables for CCD cameras in the camera beam
(4) Cable clamp
(5) Opening in the laptop/table shelf

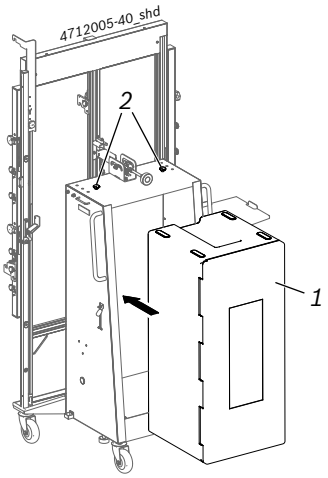
7. Guide the USB connecting cables through the opening *(5)* in the laptop/tablet shelf in such a way that USB connecting cables do not hang down along the right profile to the rollers.

If the USB connecting cables are not run through the opening *(5)*, they may be damaged because of their length when the DAS 3000 S20 is moved.

4.9 Attaching the "Multi-Target Shop" box to the DAS 3000 S20

The "Multi-Target Shop" box for safe storage of calibration boards with magnetic attachment is not included in the scope of delivery for the DAS 3000 S20. The box can be placed in and fastened to the trolley of the DAS 3000 S20.

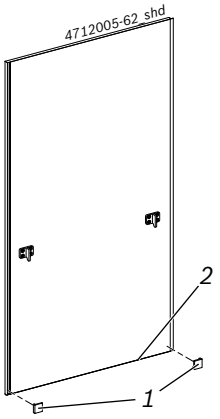
1. Place the "Multi-Target Shop" box *(1)* in the trolley.
2. Secure the box with two knurled screws *(2)*.



(1) "Multi-Target Shop" box
(2) Knurled screws

4.10 Attaching the corner guards to the calibration board (CTA 300-x)

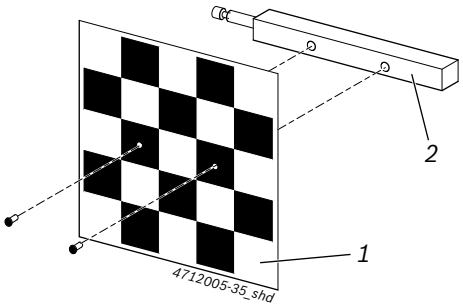
- Attach the corner guards *(1)* to the bottom edge *(2)* of calibration board CTA 300-x.



(1) Corner guards
(2) Bottom edge of calibration board CTA 300-x

4.11 Installing the reference board (CTA 400-x)

- Use two screws to fasten reference board CTA 400-x *(1)* to the socket pin *(2)*.



(1) Reference board (CTA 400-x)
(2) Socket pin

4.12 Installing the Bosch ADAS Positioning software

1. Connect the USB stick to the laptop/tablet.
   — Should the USB stick not be started automatically, open the USB stick directory.
2. Open **"Bosch ADAS Positioning Setup.exe."**
3. Select the language for the installation wizard.
   ✔ The installation wizard will start.
4. Follow the installation steps.
   ✔ Once the installation is complete, Bosch ADAS Positioning can be used.

4.13 Installing ADAS Positioning using DDM

Bosch ADAS Positioning is available through Diagnostics Download Manager (DDM).

The customer number and password are included on the delivery slip of the Bosch diagnostic program.

1. Should DDM not be installed yet, download DDM from the following link: https://www.downloads.bosch-automotive.com/de/ddm/esi20-eu/ .
2. Use the customer number and password to log into DDM.
3. Perform the one-time configuration of DDM.
4. Select Bosch ADAS Positioning for installation.
   ✔ Bosch ADAS Positioning will be installed on the laptop/tablet.
   ✔ Updates of Bosch ADAS Positioning will be automatically installed by DDM.

4.14 Initializing cameras using the QR code

☑ Bosch ADAS Positioning must be installed on the laptop/tablet.

☑ The camera QR code must be available.

Bosch ADAS Positioning guides the user through the camera initialization process by QR code step by step.

1. Start Bosch ADAS Positioning.
2. Remove the protective cap from the camera lens if it is still attached.
3. Use the USB cable to connect the camera to the laptop/tablet.
   ✔ The camera will be initialized.
   ✔ The camera image will be displayed.
4. Check the serial number on the QR code document to make sure the QR code matches the camera to be initialized.
5. Place the included QR code inside the green box in the camera image.
   ✔ The camera will be adapted.
6. Specify the camera position in Bosch ADAS Positioning.
   ✔ The camera is now ready for operation.
   ✔ The serial number of the camera will be saved to the settings.

5. Operation

5.1 Compensating for vertical offset

Vertical offset refers to a difference between the height at which the DAS 3000 S20 is set up and the vehicle. The difference can result from lifts or leveling surfaces on which the vehicle is positioned during the calibration. The DAS 3000 S20 can compensate for a vertical offset of up to 30 cm.

☑ A vertical offset exists due to a lift or leveling surface.

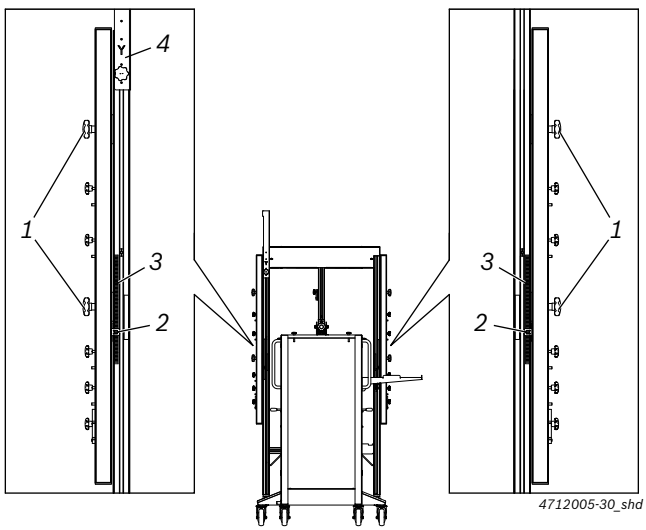
☑ The vertical offset does not exceed 30 cm.

1. Measure the vertical offset.
2. Loosen the knurled screw on calibration board retainer Y *(4)*, and push calibration board retainer Y to the highest position.

The positioning bar will be blocked by calibration board retainer Y if calibration board retainer Y is not pushed up.

Set the measured vertical offset on both positioning bars one after the other.

3. Loosen the knurled screws *(1)* on the positioning bar slightly.
4. Slide the positioning bar up by the measured value, and use the height indicator *(2)* to position it precisely.
5. Tighten the knurled screws *(1)* on the positioning bar.



(1) Knurled screws
(2) Height indicator
(3) Scale on back of frame
(4) Calibration board retainer Y

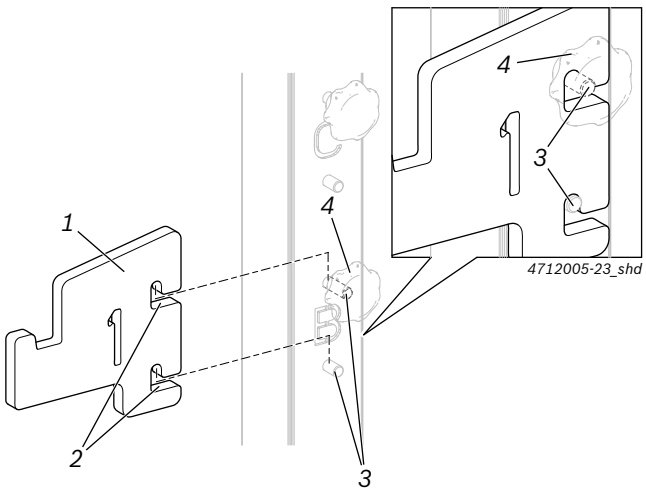
The vertical offset can be adjusted at any time.

6. Attach the indicator bar to the positioning bars at 1.50 m.
7. Use the spirit level in the indicator bar to check whether the left and right positioning bars are aligned properly.
   — If the spirit level shows an inclination, adjust the left and right positioning bars precisely.

5.2 Attaching the calibration board in vertical positions A, B or C

The mounting adapters are used for attaching all calibration boards CTA 3xx-x to the DAS 3000 S20.

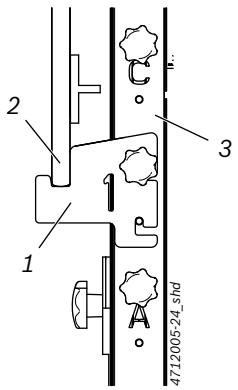
1. Mount the mounting adapter *(1)* at vertical position A, B or C.
2. Make sure the mounting adapter correctly engages with the mounting pins *(3)* by the mounting guides *(2)*.
3. Use the knurled screw *(4)* to hand-tighten the mounting adapter.



(1) Mounting adapter
(2) Mounting guides
(3) Mounting pin
(4) Knurled screw

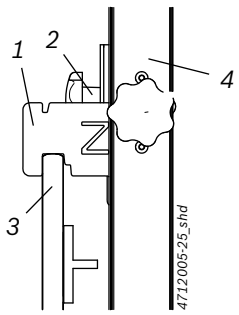
⚠CAUTION – Pinch point hazard when positioning the calibration board.

4. Do not place fingers or hands between the mounting adapter *(1)* and the bottom edge *(2)* of the calibration board.
5. Place the bottom edge of the calibration board *(2)* in the mounting adapter *(1)* on the positioning unit *(3)*.



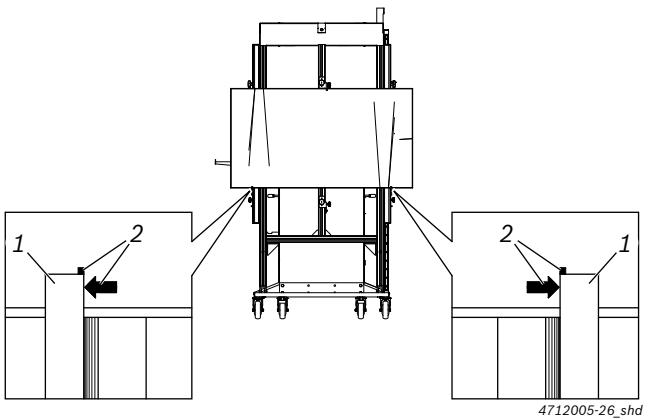
(1) Mounting adapter
(2) Bottom edge of calibration board
(3) Positioning unit

6. Push calibration board retainer Z *(1)* onto the top edge *(3)* of the calibration board in such a way that the recess in calibration board retainer Z secures the calibration board.
7. Use the knurled screw *(2)* to hand-tighten calibration board retainer Z.
   ✔ The calibration board is now secured and fixed in place.



(1) Calibration board retainer Z
(2) Top edge of calibration board
(3) Positioning unit

8. Make sure that the arrow and marking *(2)* on the bottom edge of the calibration board align with the mounting adapters *(1)*.
   ✔ The calibration board is centered relative to the DAS 3000 S20.

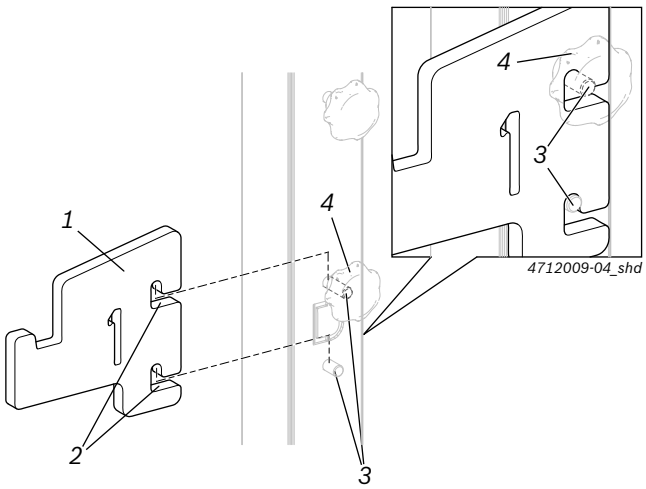


(1) Mounting adapter
(2) Arrow and mark on calibration board for centering

5.3 Attaching the calibration board in vertical position D

The mounting adapters are used for attaching all calibration boards CTA 3xx-x to the DAS 3000 S20.

1. Mount the mounting adapter *(1)* at vertical position D.
2. Make sure the mounting adapter correctly engages with the mounting pins *(3)* by the mounting guides *(2)*.
3. Use the knurled screw *(4)* to hand-tighten the mounting adapter.

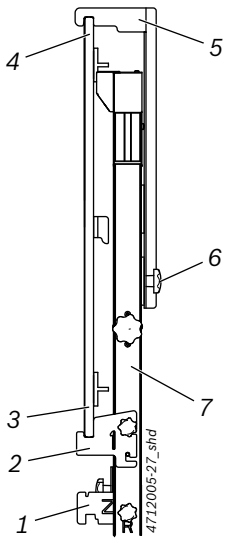


(1) Mounting adapter
(2) Mounting guides
(3) Mounting pin
(4) Knurled screw

4. Position calibration board retainer Z (1) on the center vertical bar below vertical position D.

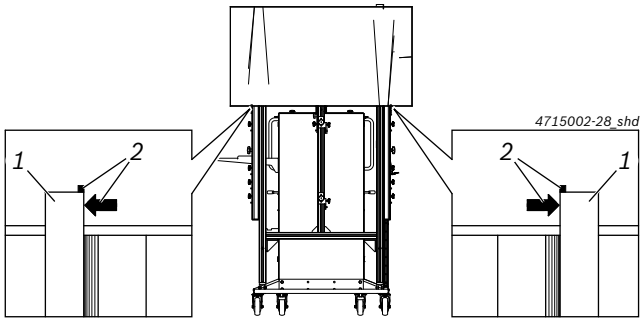
⚠CAUTION – Pinch point hazard when positioning the calibration board.

5. Do not place fingers or hands between the mounting adapter *(2)* and the bottom edge *(3)* of the calibration board.
6. Place the bottom edge of the calibration board *(3)* in the mounting adapter *(2)* on the positioning unit *(7)*.
7. Push calibration board retainer Y *(5)* onto the top edge *(4)* of the calibration board in such a way that the recess in calibration board retainer Y secures the calibration board.
8. Use the knurled screw *(6)* to hand-tighten calibration board retainer Y.
   ✔ The calibration board is now secured and fixed in place.



(1) Calibration board retainer Z
(2) Mounting adapter
(3) Bottom edge of calibration board
(4) Top edge of calibration board
(5) Calibration board retainer Y
(6) Knurled screw on calibration board retainer Y
(7) Positioning unit

9. Make sure that the arrow and marking *(2)* on the bottom edge of the calibration board align with the mounting adapters *(1)*.
   ✔ The calibration board is centered relative to the DAS 3000 S20.



(1) Mounting adapter
(2) Arrow and mark on calibration board for centering

5.4 Attaching the indicator bar to the frame

⚠ CAUTION

Magnetic fields from strong magnets on the indicator bar. Minor injury to people with a pacemaker or implanted defibrillator.

- People with a pacemaker or implanted defibrillator must maintain a sufficient distance from the DAS 3000 S20, especially from the indicator bar.

☑ No calibration board is attached at vertical positions A, B, C or D.

☑ Calibration board CTA 300-1 is in the parked position.

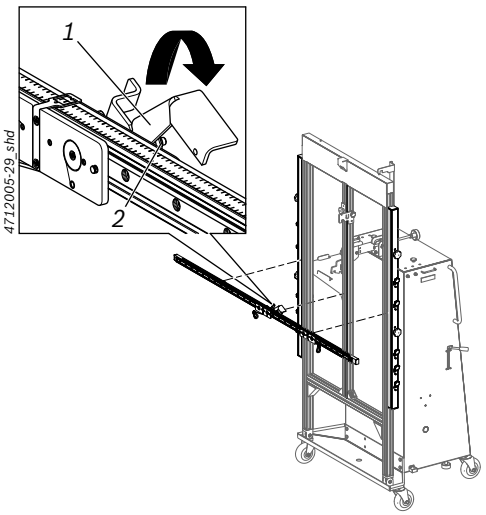
- ☑ The mounting adapters are suspended from the handle and not attached at vertical positions A, B, C or D.
- ☑ The height at which the indicator bar is to be positioned is known.

ⓘ The required height can be read off the top edge of the indicator bar. The offset (approx. 15 mm) from the center of the indicator bar, where the calibration boards CTA 2xx-x are attached, is already taken into consideration in terms of height adjustment.

1. Press down and hold the locking lever on the indicator bar.
   ✔ The safety mechanism will be open so that the indicator bar can be attached.

⚠ **CAUTION** – Pinch point hazard due to magnetic force.

2. Do not place fingers or hands between the indicator bar and the positioning bars.
3. Position the indicator bar at the required height:
   — Position the guide pin (2) exactly in front of the T-slot in the center profile.
   — Place the magnets on the indicator bar in front of the positioning bars on the left and right.
   ✔ The indicator bar is pulled against the positioning bars by magnetic force.
   ✔ The guide pin on the indicator bar is located in the T-slot of the center profile.
4. Release the locking lever.
   ✔ The safety mechanism is engaged on the center profile.



(1) Locking lever
(2) Guide pin

5. Use the scale on the positioning bars on the left and right to precisely align the indicator bar at the exact height.
6. Use the spirit level on the indicator bar to check whether the DAS 3000 S20 is standing on a level surface.
   — If the spirit level indicates an inclination, use the spirit level to level the indicator bar.

ⓘ If one of the positioning bars is moved up or down more than 1 cm while the indicator bar is being leveled, the inclination of the measurement bay does not allow for the calibration of advanced driver assistance systems. The measurement bay is not suitable for calibration.

5.5 Attaching the calibration board to the indicator bar

- ☑ The indicator bar is positioned on the frame at the required height.

ⓘ The indicator bar is used for attaching all calibration boards CTA 2xx-x to the DAS 3000 S20.

ⓘ If only one Multi-Target-Shop calibration board is needed for front camera calibration, the board must be attached to the ***left slide***. If the calibration board is attached to the right slide, the pattern on the calibration board will be rotated by 180° and front camera calibration will fail. The right slide is used only if two Multi-Target-Shop calibration boards are needed.

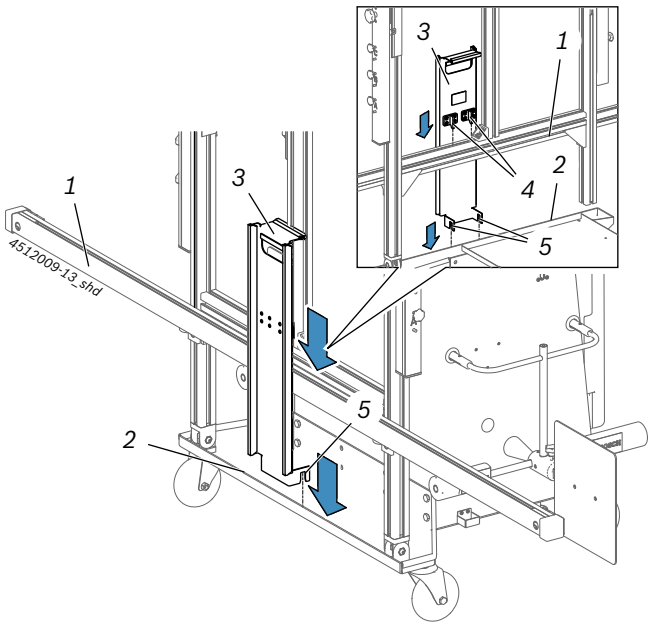
1. Pay attention to the mounting pin on the calibration board and the mounting pin on the slide.

⚠ **CAUTION** – Pinch point hazard due to magnetic force.

2. Do not place fingers or hands between the indicator bar and calibration board.
3. Position the calibration board in front of the magnetic mount on the left slide.
   ✔ The calibration board will be pulled against the left slide by magnetic force.
   ✔ The mounting pin on the calibration board and the mounting pin on the left slide will engage correctly.
4. Attach the retaining cable to a lock ring on the back of the calibration board.
   ✔ The calibration board is now secured against falling.

5.6 Attaching the contact plate (CTA 104-x) to the DAS 3000 S20

1. Position the contact plate (CTA 104-x) on the camera beam with the mounting bracket.
2. Make sure the recesses of the contact plate engage with the edge of the trolley.



(1) Camera beam
(2) Edge of trolley
(3) Contact plate (CTA 104-x)
(4) Mounting bracket
(5) Recesses

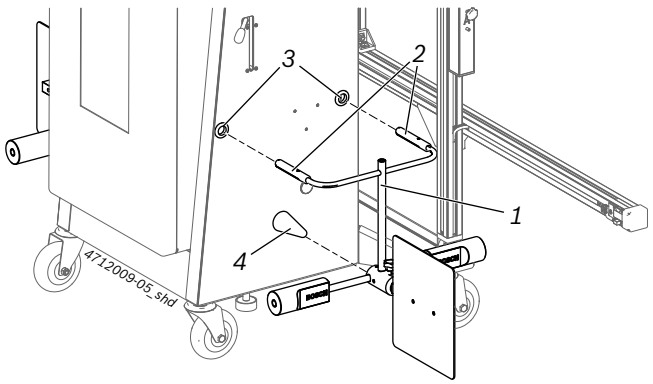
5.7 Attaching the wheel holder (CTA 100-x) with the reference board (CTA 400-x) in the parked position

⚠ CAUTION

Risk of striking one's head on the mount for the laptop/tablet. Minor injury.

- One parked position is located below the mount for the laptop/tablet. Pay attention to the mounting for the laptop/tablet when removing or attaching wheel holder CTA 100-x.

- Engage wheel holder CTA 100-x *(1)* by placing the prongs *(2)* into the holes intended for this purpose *(3)*.
  - ✔ Wheel holder CTA 100-x is now resting against the rubber buffer *(4)*.

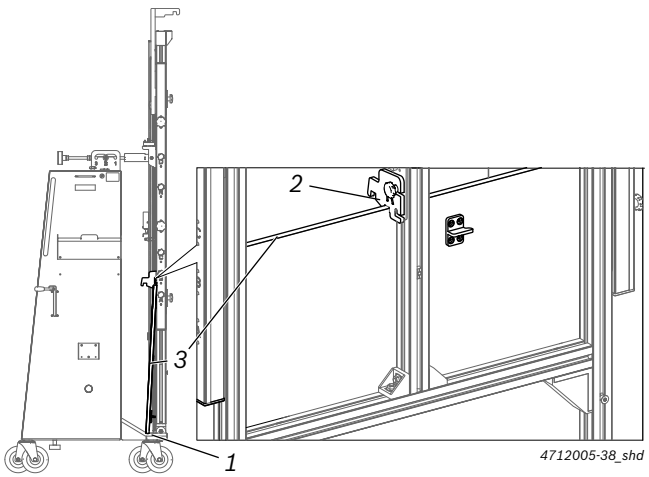


(1) Wheel holder CTA 100-x
(2) Prongs
(3) Holes
(4) Rubber buffer

5.8 Attaching calibration board 1 681 098 011 (CTA 300-1) in the parked position

1. Set down calibration board CTA 300-1 *(3)* between the frame and trolley on the edge protection *(1)*.
2. Make sure calibration board CTA 300-1 does not trap the USB cable at the bottom of the frame.
3. Use safety adapter R *(2)* to secure calibration board CTA 300-1 *(3)* at the top edge.

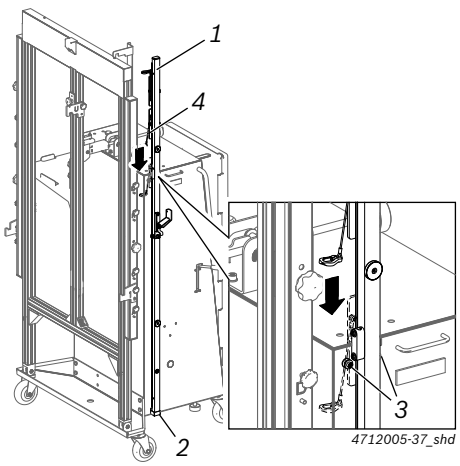
If calibration board CTA 300-1 is not secured in the parked position by safety adapter R *(2)*, it may be damaged when the DAS 3000 S20 is positioned or moved.



(1) Edge protection
(2) Safety adapter R
(3) Calibration board CTA 300-1

5.9 Fastening the indicator bar in the parked position

1. Push both slides *(4)* on the indicator bar up.
2. Position the indicator bar *(1)* in the mount *(2)* near the bottom of the trolley.
3. Clamp one slide *(4)* in the retaining bolts *(3)* near the top of the trolley.
   - ✔ The indicator bar is now in the parked position.
   - ✔ The clamped slide *(4)* secures the indicator bar in the retaining bolts *(3)*.

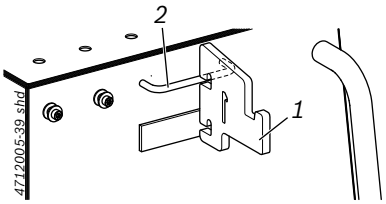


(1) Indicator bar
(2) Mount

(3) Retaining bolts
(4) Slide

5.10 Storing the mounting adapter on the handle

▸ Place the mounting adapter *(1)* on the handle *(2)*.



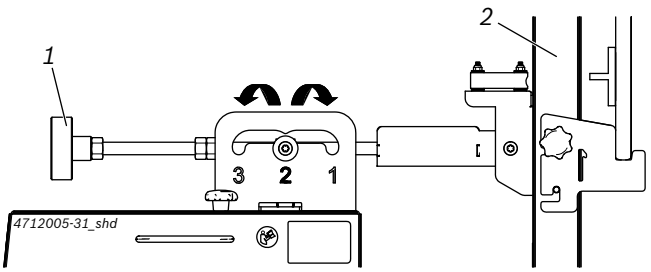
(1) Mounting adapter
(2) Handle

5.11 Using the 2-degree adjustment

ⓘ The 2-degree adjustment is only needed for front radar calibration.

⚠CAUTION – Pinch point hazard from guided 2-degree adjustment.

1. Do not place fingers and hands between the handle and guide of the 2-degree adjustment.
2. Operate the 2-degree adjustment only by the handle *(1)*.
3. Lift the handle *(1)* slightly and pull towards the back to set the edge protection frame *(2)* at position 3.
4. Lift the handle *(1)* slightly and push towards the front to set the edge protection frame *(2)* at position 1.

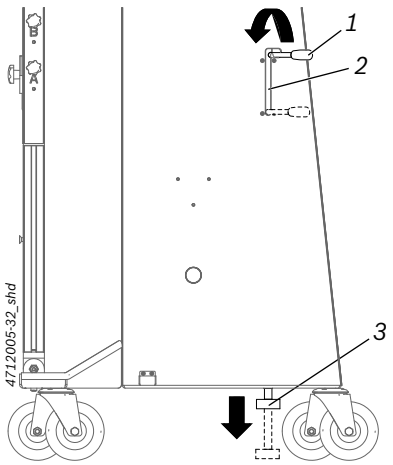


(1) Handle on the 2-degree adjustment
(2) Edge protection frame

5.12 Securing the DAS 3000 S20 with the brake

⚠CAUTION – Pinch point hazard from guided brake mechanism.

1. Do not place fingers and hands between the brake lever *(1)* and brake guide *(2)*.
2. Operate the brake lever only by means of the handle.
3. Pull the handle up slightly and lower the brake along the guide.
   ✔ The rubber buffer *(3)* on the brake contacts the floor and stops the DAS 3000 S20.



(1) Brake lever
(2) Brake guide
(3) Rubber buffer on brake

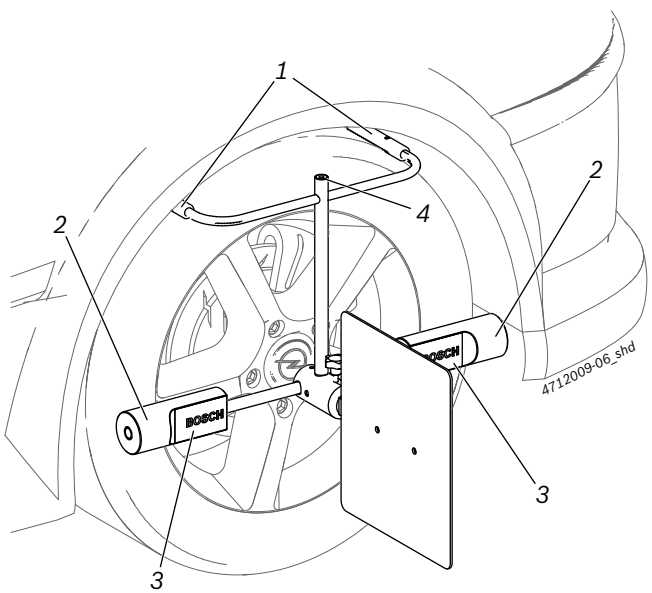
5.13 Attaching the wheel holder (CTA 100-x) with the reference board (CTA 400-x) to a wheel

☑ Reference board CTA 400-x is attached to wheel holder CTA 100-x.

1. With its prongs *(1)*, set down wheel holder CTA 100-x on the tread of the tire.
2. Make sure the spacers *(2)* touch the sidewall of the tire.
   — In case of a protruding rim: turn the spacer until the recess (3) in the spacer faces the rim.

ⓘ The spacer must touch the sidewall of the tire. If the spacer touches the rim, reference board CTA 400-x will not be positioned accurately. It will not be possible to align the DAS 3000 S20 accurately.

3. Use the spirit level *(4)* to level wheel holder CTA 100-x.



(1) Prongs
(2) Spacers

(3) Recess in spacer
(4) Spirit level

6. Maintenance

6.1 Cleaning

Coarse workshop rags and abrasive cleaning agents may damage the DAS 3000 S20 .

- Use only neutral cleaning agents and soft cloths to clean the DAS 3000 S20.

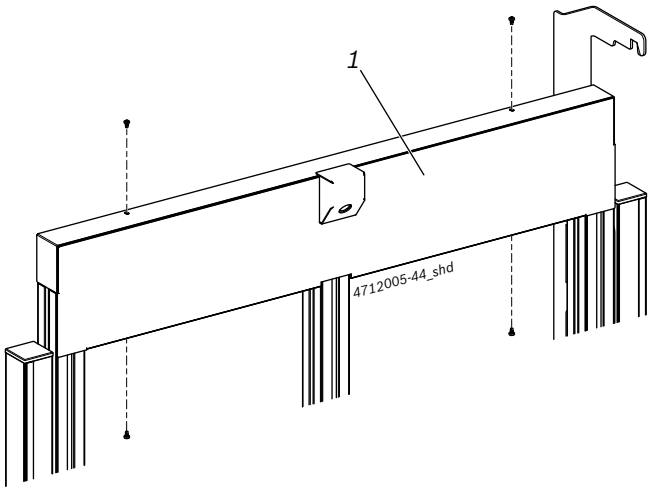
6.2 Spare parts

Denomination	Order number
Rubber buffer (2x) on brake<)	1 688 990 086
Star knob screws (2x) for attaching the "Multi-Target-Shop" box <)	1 686 621 080
Hammer nuts (2x) for the top camera's mount<)	3 842 530 283
Camera beam (without cameras)	1 682 391 559
Yellow protective caps (2x) for the camera beam	1 683 212 042
Indicator bar with slide	1 682 329 109
Left slide (as viewed from the front) on the indicator bar<)	1 688 030 217
Right slide (as viewed from the front) on the indicator bar<)	1 688 030 215
Yellow protective caps (2x) for the indicator bar<)	1 683 212 041
End caps (2x) for the slide guide on the indicator bar<)	1 683 212 040
Retaining cable<)	1 684 712 028
Rubber magnets on the indicator bar	1 688 120 188
Spirit level on the indicator bar	1 687 233 114
Left positioning bar (as viewed from the front)	1 688 040 326
Right positioning bar (as viewed from the front)	1 688 040 323
Slider (2x) for the positioning bar <)	3 842 552 424
Star handles (5x) suitable for vertical positions A, B, C, D, radar position R, R position, Z position<)	1 686 621 078
Star handles (2x) suitable for securing the positioning bar<)	1 686 621 077
Star handle (1x) suitable for securing at the R position and Z position<)	1 686 621 081
T slot nut (2x) for the slider<)	3 842 528 735
Left tape measure for the height of the indicator bar (as viewed from the front)<)	1 687 233 119
Right tape measure for the height of the indicator bar (as viewed from the front)<)	1 687 233 117
Cable carrier<)	3 842 555 180
Calibration board CTA 300-1 for front camera systems and front radar systems	1 681 098 011
Mounting adapter 1 (2x)<)	1 685 720 380
Mounting adapter R (1x)<)	1 685 720 384
Wheel holder CTA 100-1	1 688 120 190
Reference board CTA 400-1 <)	1 681 098 013
Wheel holder CTA 100-1 star handle	1 686 621 083
Wheel holder CTA 100-1 spacers (2x)	1 687 016 229
Wheel holder CTA 100-1 prongs (2x)	1 687 016 230
Wheel holder CTA 100-1 top bracket parts set	1 687 016 228
Reference board CTA 400-1 fastening parts set	1 687 010 635
Contact plate CTA 104-1	1 681 320 090
Contact plate CTA 104-1 edge protection<)	1 687 010 742
Left offset ruler (as viewed from the front)	1 688 132 049
Right offset ruler (as viewed from the front)	1 688 132 050
Rubber grommets (4x) for the parked position of wheel holder CTA 400-x <)	1 680 212 064
Rubber buffers (2x) for the parked position of wheel holder CTA 400-x <)	1 688 990 087

<) Wearing parts

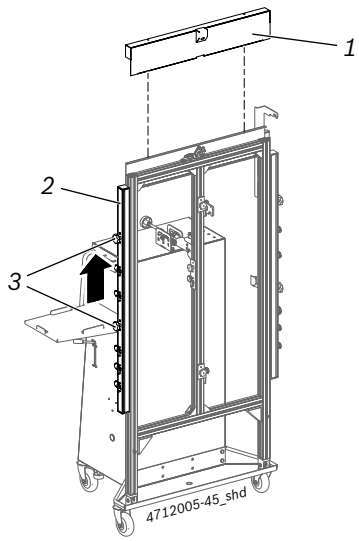
6.3 Replacing the positioning bar

1. Remove the front cover *(1)* on the frame.



(1) Front cover

2. Loosen the knurled screws *(3)* for adjusting the height of the positioning unit *(2)*.
3. Push the positioning unit *(2)* up and out of the edge protection frame.



(1) Front cover
(2) Positioning unit
(3) Knurled screws for height adjustment

4. Insert the new positioning unit into the edge protection frame and secure it at the required height by means of the knurled screws.
5. Attach the cover to the edge protection frame.

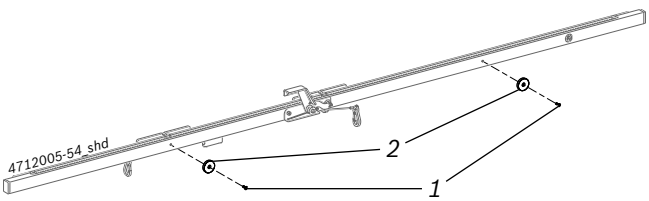
6.4 Replacing the magnets on the indicator bar

1. Loosen the screws *(1)* on the indicator bar and replace both magnets *(2)*.

If only one of the magnets is replaced, the indicator bar will be held to the DAS 3000 S20 by magnets with different forces. To ensure a sufficiently strong magnetic force and prevent damage from parts dropping, it is always necessary to replace both magnets.

2. Attach magnets with a maximum tightening torque of 0.5 Nm.

If the magnets are attached with a tightening torque greater than 0.5 Nm, the magnets and the indicator bar can be damaged.



(1) Screws
(2) Magnets

6.5 Replacing slides and end caps of the slide guide on the indicator bar

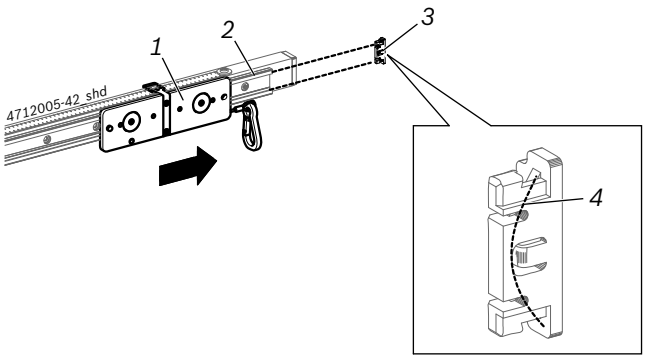
1. Remove the end cap from the slide guide with the aid of a pliers.
   — Make sure that the spring in the end cap does not drop out when the end cap is being removed.

If the spring drops out and is lost, the end cap can no longer be attached to the slide guide.

2. Remove the slide with stop from the slide guide.
3. Push the new slide with stop into the slide guide in such a way that the mounting pin points inwards.

If the slides are pushed into the slide guide with the mounting pin pointing outwards, the calibration board will be rotated by 180° when fastened to the indicator bar. The front camera calibration will fail.

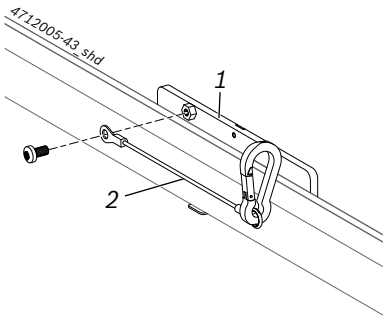
4. Attach the end cap to the slide guide.



(1) Slide with stop
(2) Slide guide
(3) End cap
(4) Spring in the end cap

6.6 Replacing the arrestor cable on the slides

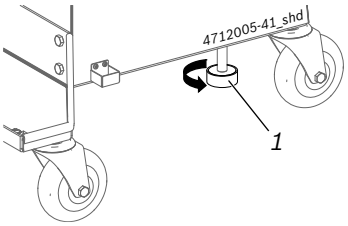
1. Remove the screw from the slide with stop *(1)*.
2. Remove the arrestor cable *(2)* and attach new arrestor cable.
3. Secure the cable with the screw.



(1) Slide with stop
(2) Arrestor cable

6.7 Replacing the rubber buffer on the brake

- Unscrew the rubber buffer *(1)* and replace it with a new one.



(1) Rubber buffer

7. Decommissioning

7.1 Changing location

- If the DAS 3000 S20 is passed on, all the documentation included in the scope of delivery must be handed over together with the unit.
- The DAS 3000 S20 is only ever to be transported in the original or equivalent packaging.
- Heed the notes on initial commissioning.

7.2 Disposal

- Dismantle the DAS 3000 S20 and sort out and dispose of the different materials in accordance with the applicable regulations.

8. Technical data

8.1 DAS 3000 S20 specifications

Property	Specification
DAS 3000 S20 weight	127.75 kg
DAS 3000 S20 height x width x depth dimensions	2080 mm x 2308 mm x 791 mm

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1 689 989 485 | 2020-08-01