RSCD 2100

BOSCH

de	Originalbetriebsanleitung	**Justagegerät für Radarsensoren**
en	Original instructions	**Alignment tool for radar sensors**
fr	Notice originale	**Appareil d'ajustage pour les capteurs radar**
es	Manual original	**Aparato de ajuste para sensores de radar**
it	Istruzioni originali	**Dispositivo di messa a punto per sensori radar**
sv	Bruksanvisning i original	**Justeringsinstrument för radarsensorer**
nl	Oorspronkelijke gebruiksaanwijzing	**Instelapparaat voor radarsensoren**
pt	Manual original	**Aparelho de ajuste para sensores de radar**
fi	Alkuperäiset ohjeet	**Tutkien hienosäätölaite**
da	Original brugsanvisning	**Justeringsanordning til radarsensorer**
no	Original driftsinstruks	**Justeringsenhet for radarsensorer**
pl	Instrukcją oryginalną	**Przyrząd kalibracyjny do czujników radarowych**
cs	Původní návod k používání	**Přístroj pro nastavení radarových snímačů**
tr	Orijinal işletme talimatı	**Radar sensörleri için ayar cihazı**
ru	Оригинал инструкции по эксплуатации	Юстировочное устройство для радиолокационных датчиков
zh	原始的指南	雷达传感器的校正设备
ja	取扱説明書の原本	レーダーセンサーの調節装置

en – Contents

1. Symbols used

1.1 In the documentation

1.1.1 Warning notices - Structure and meaning

Warning notices warn of dangers to the user or people in the vicinity. Warning notices also indicate the consequences of the hazard as well as preventive action. Warning notices have the following structure:

Warning symbol	**KEY WORD – Nature and source of hazard!** **Consequences of hazard in the event of failure to observe action and information given.** ➢ Hazard prevention action and information.

The key word indicates the likelihood of occurrence and the severity of the hazard in the event of non-observance:

Key word	Probability of occurrence	Severity of danger if instructions not observed
DANGER	**Immediate** impending **danger**	**Death** or **severe** injury
WARNING	**Possible** impending **danger**	**Death** or **severe** injury
CAUTION	Possible **dangerous situation**	**Minor** injury

1.1.2 Symbols in this documentation

Symbol	Designation	Explanation
!	Attention	Warns about possible property damage.
	Information	Practical hints and other useful information.
1. 2.	Multi-step operation	Instruction consisting of several steps.
➢	One-step operation	Instruction consisting of one step.
⇨	Intermediate result	An instruction produces a visible intermediate result.
➜	Final result	There is a visible final result on completion of the instruction.

1.2 On the product

! Observe all warning notices on products and ensure they remain legible.

2. Important notes

Before commissioning, connecting and using Bosch products, it is essential to go through the operating instructions/manual – and the safety instructions, in particular – with great care. By doing so you can eliminate any uncertainties when handling Bosch products and thus associated safety risks upfront; something which is in the interests of your own safety and will ultimately help avoid damage to the device. Whoever passes a Bosch product onto another person must hand over, in addition to the operating instructions, the safety instructions and information on the intended use to this person as well.

2.1 Intended use

- ➢ The RSCD 2100 is to be used only for adjustment of distance sensors (radar technology) on motor vehicles. Any other or additional application does not constitute the intended use
- ➢ The RSCD 2100 may be used only by trained and briefed personnel. The manufacturer (Bosch GmbH) assumes no liability for possible damage arising from improper, incorrect or negligent use.
- ➢ RSCD 2100Make sure operating and safety instructions are always readily to hand at the usage location.
- ➢ Heed all the safety instructions and hazard warnings on the RSCD 2100 and make sure these are always complete and clearly legible.
- ➢ Operate the RSCD 2100 and the accessories required for testing only within your specific work area.
- ➢ Before switching on the RSCD 2100, ensure that the test equipment is correctly set up and connected.
- ➢ Observe the intervals specified or given in the operating instructions for routine checks/maintenance.
- ➢ Maintenance work is never to be performed during operation. Shutoff the unit prior to performing maintenance. Disconnect the RSCD 2100 from the mains voltage system prior to performing maintenance.
- ➢ Follow the instructions for switching on and off stipulated in the operating instructions along with the notes for repairs when performing any work!

➢ Do not use the mirror as a support.
➢ Use only the cam to move the mirror; do not tilt it by hand, as the mirror's springs can be over-stretched.
➢ Operate the height adjustment and tilt adjustment only from behind and in sequence.
➢ Fit and check the safety systems immediately following completion of maintenance and repair work.
➢ Always re-tighten bolted joints to the specified torque after maintenance and repair work.
➢ Have Bosch Customer Service check the unit every 2 years to ensure adjustment accuracy (e. g. to ISO 9000). Use suitable measuring equipment to check the tilt position of the mirror. A digital spirit level will a resolution of 0.05° in the appropriate measuring range is recommended.
➢ A restraint must be attached in the correct manner to stop the base slide gauge from dropping to the end stop in the event of uncontrolled dropping. An important safety function to prevent possible injuries.
➢ Laser alignment unit is adjusted. Rotating the laser module in the mount results in misadjustment and further use of the adjustment unit is then no longer permitted. Adjustment is possible only in the manufacturer's plant.

2.2 User group

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

2.3 Agreement

By using the product you agree to the following conditions:

Copyright

Software and data are the property of
Robert Bosch GmbH or its suppliers and protected against copying by copyright laws, international agreements and other national legal regulations. Copying or selling of data and software or any part thereof is impermissible and punishable; in the event of any infringements Robert Bosch GmbH reserves the right to proceed with criminal prosecution and to claim for damages.

Liability

All data in this program is based - where possible - on manufacturer and importer details. Robert Bosch GmbH does not accept liability for the correctness and completeness of software and data; liability for damage caused by faulty software and data is ruled out. In any event, liability on the part of Robert Bosch GmbH is limited to the amount actually paid by the customer for the product concerned. This exemption from liability does not apply to wilful damage or damage arising from gross negligence on the part of Robert Bosch GmbH.

Warranty

The use of unapproved hardware and software will result in a modification of our products and thus to the exclusion of any liability or warranty, even if such hardware and software have been removed or deleted again in the interim.

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.

2.4 Obligation of the shop owner/operator

The shop owner/operator is obliged to ensure that all measures geared towards the prevention of accidents, industrial diseases, labor-related health risks are taken and measures towards making the workplace fit for people to work in are carried out.

Basic rules

The shop owner/operator is obliged to ensure that all electrical equipment and operating material is set up, modified and maintained by skilled electricians only or under the guidance and supervision of a skilled electrician in accordance with electrical engineering principles.

Furthermore, the shop owner/operator must ensure that all electrical equipment and operating material is operated in keeping with electrical engineering principles.

If a piece of electrical equipment or operating material is found to be defective, i.e. it does not or no longer complies with electrical engineering principles, the shop owner/operator must ensure that the fault is rectified immediately and, in the event that imminent danger exists, also ensure that the electrical equipment or the electrical operating material is not used.

Tests (taking Germany as an example):

- The shop owner/operator must ensure that all electrical systems and equipment are tested by a qualified electrician or under the guidance of a qualified electrician to ensure they are in proper working order:
  - Before starting up for the first time.
  - Before starting for the first time after modification or repair.
  - At specific time intervals. Intervals are to be measured such that faults that must be expected to occur, are determined in good time.

- The test is to take the electrical engineering principles relating hereto into account.

- Upon request of the trade association a test manual is to be maintained into which specific entries are made.

3. Safety instructions

3.1 Mains voltages

Hazardous voltages occur in both the lighting system and the electrical system of a motor vehicle.

Safety measures:

➢ Avoid touching parts that are carrying a voltage or have damaged insulation.
➢ Connect the wheel alignment system only to properly grounded connections.
➢ Replace any lines with damaged insulation.
➢ Electrical equipment is to be inspected every 2 years in connection with the inspection service and any faults rectified immediately.
➢ Only use fuses with specified current ratings.
➢ Prior to maintenance and repair work, disconnect the power plug or, in the event of a hardwired power connection, turn off the main switch.

3.2 Danger of injury, Danger of crushing

During transport, initial startup and operation, injuries and damage may occur from dropped objects.

Safety measures:

➢ Wear safety shoes.
➢ Use protective equipment, e.g. gloves.
➢ Secure the front, rear and side of the vehicle to stop it rolling off the platform or pit.
➢ When working, always place the wheel alignment lift on mechanical safety devices.
➢ Do not use any force-amplifying tools.
➢ Transport and operate the equipment only in accordance with the operating instructions.

3.3 Danger of tripping

When conducting tests or making adjustments, the sensor and connection cables increase the risk of tripping.

Safety measures:

➢ Route the connecting cables such that any risk of tripping up is prevented.

4. Product description

4.1 Intended use

The RSCD 2100 is to be used only for adjustment of distance sensors (radar technology) on motor vehicles . Any other or additional application does not constitute the intended use.

4.2 RSCD 2100 product description

The RSCD 2100 together with its trolley may be used in various measurement bays.
The main unit consists of a height-adjustable mirror unit mounted on a trolley. A laser alignment unit can be attached to the mirror unit to adjust parallelism. The mirror unit needs to be tilted to three predefined positions during the test sequence.

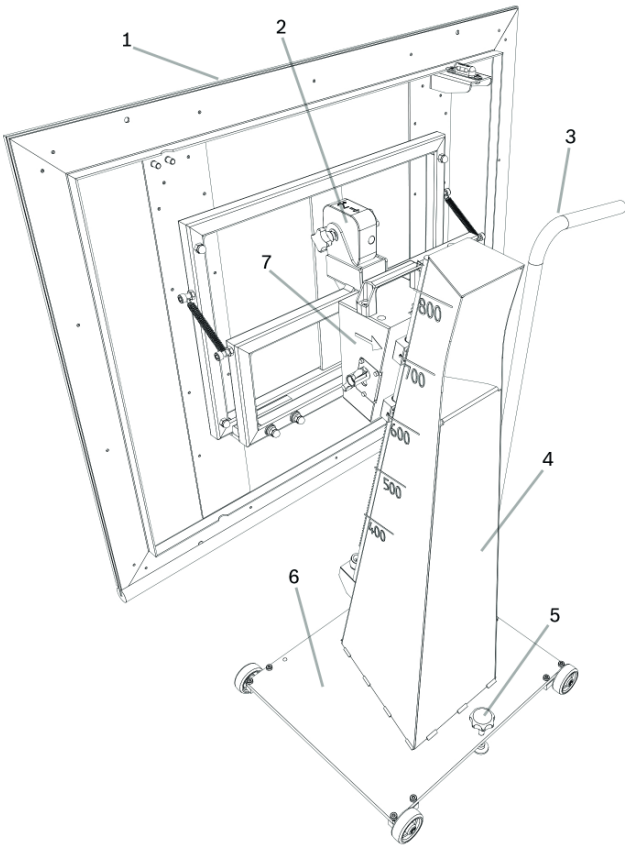

Abb. 1: RSCD 2100

1. *Mirror unit (ICC sensor target plate)*
2. *Mirror mount with tilting unit*
3. *Handle*
4. *Post with height scale*
5. *Positioning foot*
6. *Base plate with wheel modules*
7. *Base slide gauge with vertical release*

4.3 Laser alignment unit

The laser alignment unit is equipped with a battery-operated line laser and is used to ensure exact alignment of the mirror unit to the manufacturer's specific reference lines. See also sec. 6.2.

The standard laser alignment unit is part of the scope of delivery (fig. 2).

The "Professional" laser alignment unit, which emits an audible signal during operation, is available optionally. To protect the battery, the voltage supply automatically shuts off the laser after a few minutes.

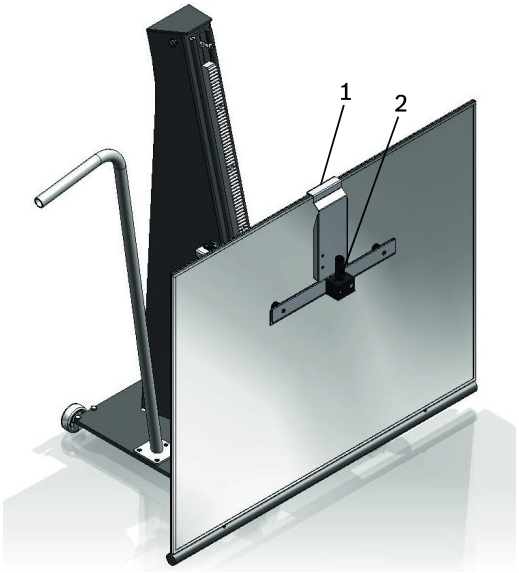

Abb. 2: "Standard" laser alignment unit

1 Laser mount
2 Laser module with on/off switch

➢ Laser class 1
The exposed laser radiation is not hazardous.

4.4 Determine reference lines

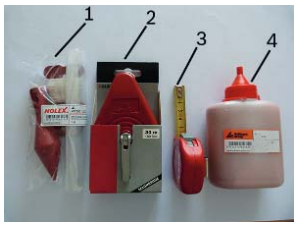

Abb. 3: Measurement tools included in scop of delivery

1 Plumb bob
2 Chalk line
3 3 m tape
4 Chalk tank

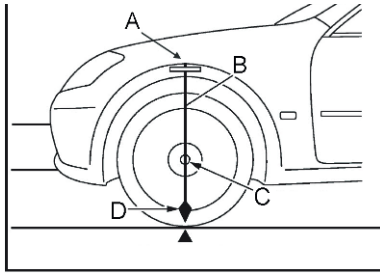

Abb. 4: Marquer les points A-B-C-D avec le plomb

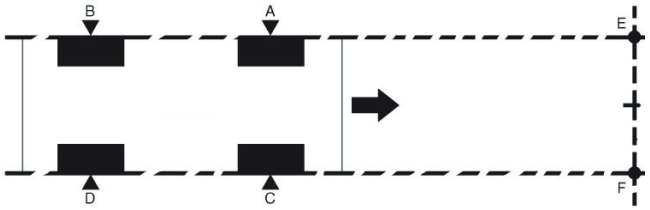

Abb. 5: Determine reference lines by using chalk line

The adjustment unit must be aligned with respect to the aid line E – F, which is orthogonal to the vehicle longitudinal center plane or vehicle axis, in compliance with manufacturer-specific requirements.

4.5 Scope of delivery RSCD 2100

Designation	Order number
Mirror unit	1 690 381 404
Base with mounting frame	1 690 381 402
Handle	1 690 382 408
Laser alignment unit	1 690 381 407
Chalk line	1 693 740 536
200 g plumb bob	1 693 740 534
3 m tape measure	1 693 740 533
Operating instructions	1 690 386 017
Star knob screw for positioning foot, 3 x	1 693 740 525
Mounting kit for handle and mirror unit	1 690 381 411

5. Assembly

5.1 Trolley

1. Place the trolley with the preassembled post and tilt frame unit on a flat, level floor.
2. Install the handle.
3. Install the positioning foot behind the post.
4. Install two additional positioning feet on the side facing the mirror.

5.2 Mirror unit

1. Remove mirror unit from packaging.
2. Place mirror unit on tilt frame and secure with mounting nuts (M6).
3. Open carabiner on securing cable and attach to eyebolt.

Tightening torque: 4 Nm max.

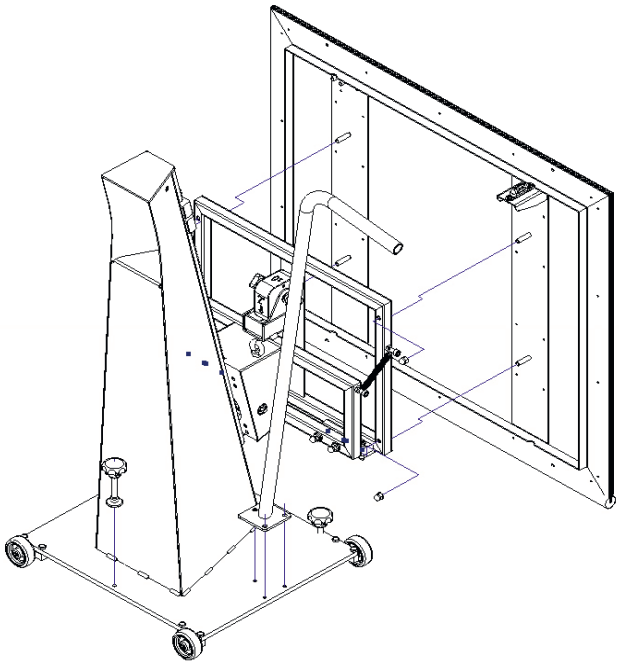

Abb. 6: Assembling the positioning feet, handle and mirror unit

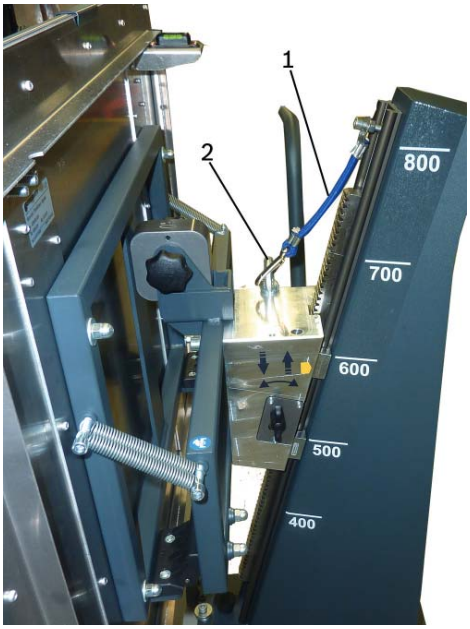

Abb. 7: Securing cable attached

1 Securing cable with carabiner
2 Eyebolt

Check whether the securing cable is attached.

The securing cable must be detached for measuring positions less than 500 mm to prevent overstretching. See also sec. 7.1.2.

6. Structure

6.1 Measurement bay

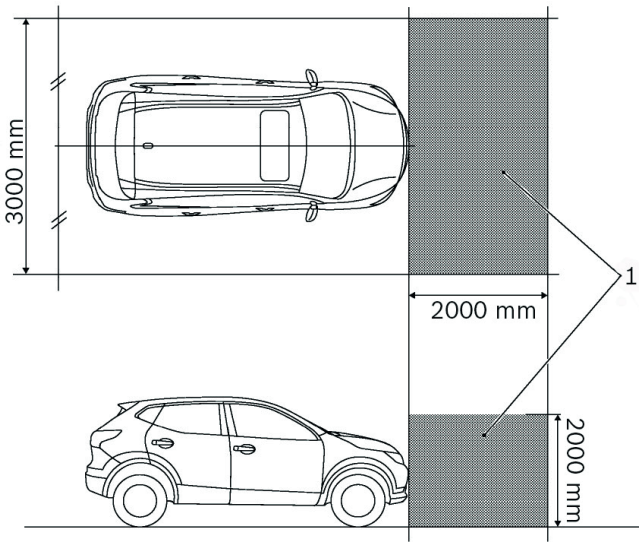

Abb. 8: Measurement bay

B [mm]	L [mm]	H [mm]
3000	2000	2000

No objects may be placed in area "1".

6.2 Determining the vehicle longitudinal center plane

The adjustment unit must be aligned with respect to the aid line E – F, which is orthogonal to the vehicle longitudinal center plane or vehicle axis, in compliance with manufacturer-specific requirements.

Values depend on vehicle type	
L1	Distance from wheel center on front axle to aid line (E – F)
L2	Distance from vehicle longitudinal center plane (X) to center of mirror unit on the adjustment unit (G). Aid line G points to center of radar sensor.

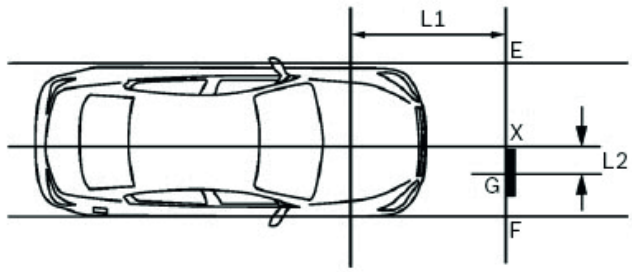

Abb. 9: Values depend on vehicle

7. Test sequence

7.1 Preparation

7.1.1 Positioning the adjustment unit

➢ Center the adjustment unit with respect to the radar sensor (+/- 30 mm) and parallel to the reference line E – F.

7.1.2 Height adjustment of the mirror unit

Upwards

1. Hold the mirror frame securely with one hand.

2. Move the vertical release to the Upwards position (rotate to the right).
3. Raise the mirror and base slide gauge carefully to the desired height.

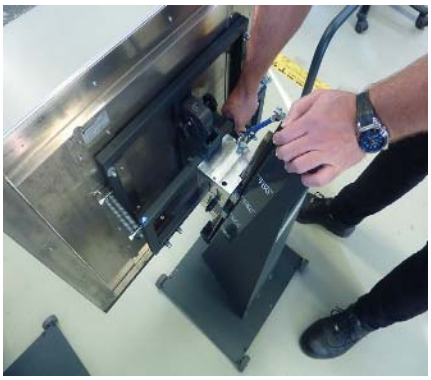

Abb. 10: Ergonomic height adjustment

Downwards

1. Hold the mirror frame securely with one hand.
2. Move the vertical release to the Downwards position (rotate to the left). See also fig. 9.
3. Lower the mirror and base slide gauge carefully to the desired height.
4. Place the vertical release back in the Upwards position again (rotate to the right) to hold in position.

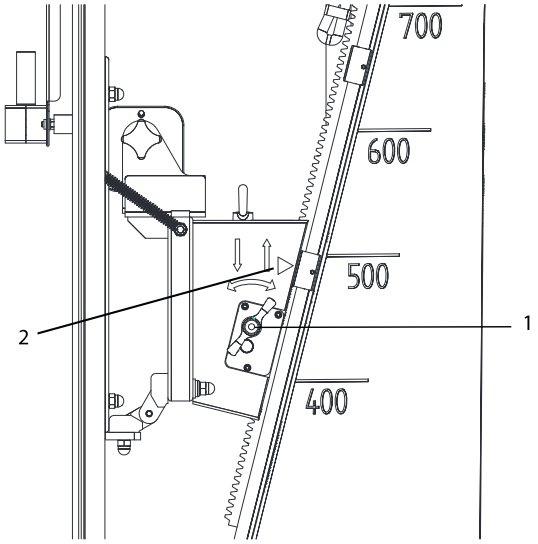

Abb. 11: Moving upwards

1 Vertical release
2 Arrow mark for center of mirror points to height scale (units in mm)

5. Rotate vertical release to the right.

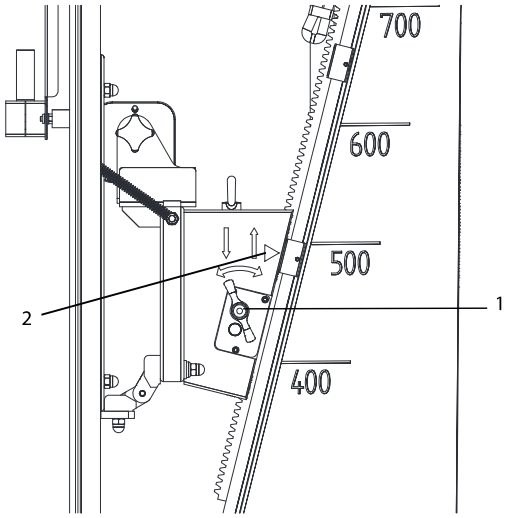

Abb. 12: Moving downwards.

1 Vertical release
2 Arrow mark for center of mirror points to height scale (units in mm)

6. Rotate vertical release to the left.

! Measurements at a distance greater than 500 mm: carabiner must be attached.

! Measurements at a distance less than 500 mm:
1. Hold the mirror frame securely with one hand.
2. Lower the mirror and base slide gauge to a height of approx. 600 mm.

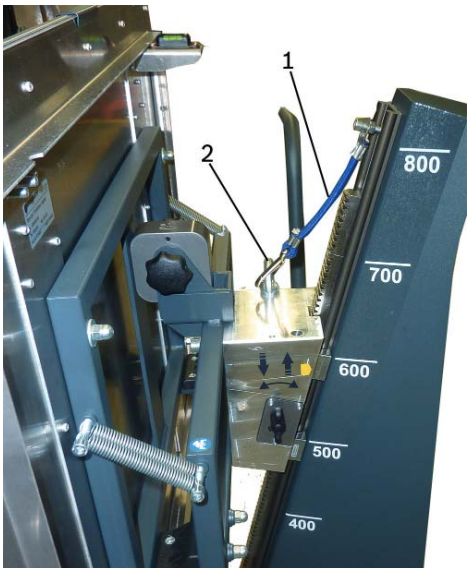

Abb. 13: Securing cable attached

1 Securing cable with carabiner
2 Eyebolt

1. Place the vertical release in the Upwards position.
2. Detach securing cable with carabiner from eyebolt.
3. Place the vertical release in the Downwards position.
4. Lower the mirror and base slide gauge carefully to the desired height.
5. Place the vertical release back in the Upwards position again (rotate to the right) to hold in position

! Two-hand operation: Use the handle to keep the mirror unit from lowering too quickly before actuating the release.

! Risk of injury: Securing cable must be attached by making measurements at a distance greater than 500 mm.

i The height scale (units and millimeters) indicates the height from the center of the mirror.

i The required height position can be found in the manufacturer's documentation.

! The center of the mirror must point to the center axis of the radar sensor.

7.1.3 Mirror unit tilt position

➢ Use one of the two star grip handles to rotate the cam to the correct position:

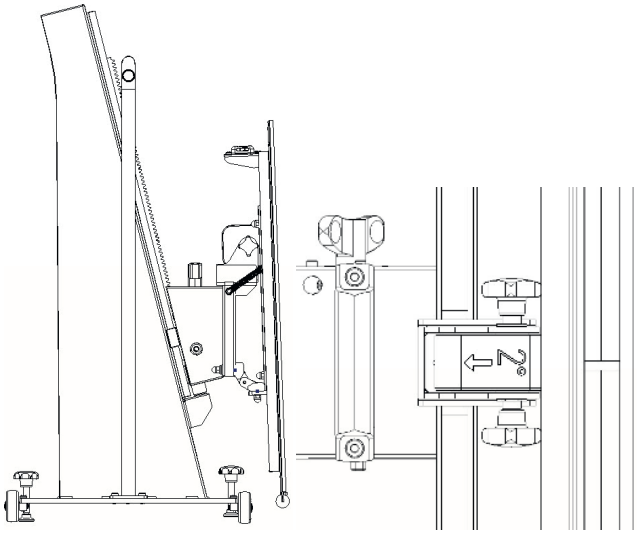

Abb. 14: Tilt position 2° backwards

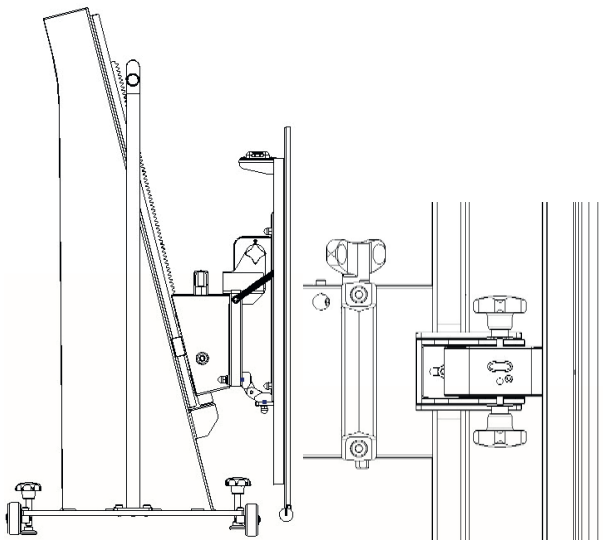

Abb. 15: Tilt position 0°

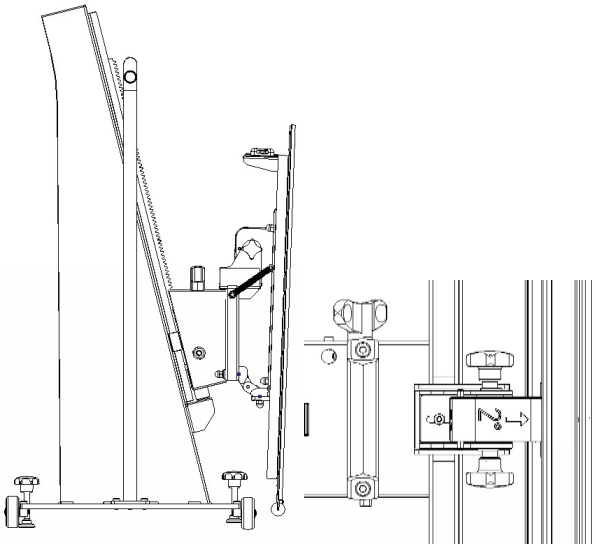

Abb. 16: Tilt position 2° forwards

8. Transportation

1. Position the mirror unit at a height of approx. 600 mm when moving the adjustment unit.
2. Screw in the positioning foot to provide a distance of at least 1 cm to the surface of the floor.
3. Use the handle to push or pull the adjustment unit forwards.

The adjustment unit can be steered easily by lifting the handle slightly.

On inclined passageways or when when crossing over uneven areas on floors, the adjustment unit must be held additionally at the upper end of the post to prevent tipping.

When moving, ensure that the mirror does not strike furnishings, walls or door frames.

Risk of injury: The securing cable must be attached while transporting/moving the unit.

9. Maintenance

9.1 Standard laser alignment unit battery

1. Open the laser module housing (unscrew).
2. Replace the battery.
3. Close the laser module housing.

When replacing the battery, ensure that the laser module is not rotated in the mounting.

Abb. 18: Battery replacement

9.2 Professional laser alignment unit battery

1. Open the laser box housing.
2. Replace the battery.
3. Close the laser box housing.

9.3 Securing cable for mirror unit

1. Check the condition of the expander.
2. Lowering check with determination of the final stop position.

With the securing cable attached, it must not be possible to lower the mirror unit below 400 mm.

The securing cable must be replaced if the above items are considered critical by the operator.

9.4 Cleaning

Use only soft cloths and neutral cleaning agents to clean the mirror unit, cam, frame and post.

Do not use abrasive cleaning agents and coarse workshop cloths!

9.5 Spare and wearing parts

The mirror unit can be exchanged without any loss in measurement accuracy.

Designation	Order number
Positioning foot	1 693 740 525
Wheel with retaining ring (4 x)	1 690 381 415
Mirror unit with spirit level (adjusted)	1 690 381 412
Alignment unit with laser and battery (adjusted)	1 690 381 407
Springs (4 x)	1 690 381 414
Securing cable	1 690 382 427

9.6 Disposal and scrapping

1. Disconnect the RSCD 2100 from the mains and detach the power cord.
2. Dismantle the RSCD 2100 and sort out and dispose of the different materials in accordance with the applicable regulations.

RSCD 2100, accessories and packaging should be sorted for environmental-friendly recycling.

➢ Do not dispose RSCD 2100 into household waste.

Only for EC countries:

The RSCD 2100 is subject to the European directive 2012/19/EC (WEEE).

Dispose of used electrical and electronic devices, including cables, accessories and batteries, separately from household waste.

➢ Make use of the local return and collection systems for disposal.

➢ Proper disposal of RSCD 2100 prevents environmental pollution and possible health hazards.

10. Technical Data

10.1 Measurement system

Adjustment unit with reflector for calibration of driver-assist systems (automatic emergency braking assistant, collision warning) based on the use of radar sensors.

10.2 Measuring range

10.2.1 Reflector mirror for radar waves

Function	Specification
Mirror glass dimensions H x W x D :	600 x 750 x 3 mm
Tilt setting accuracy	-2°, 0°, +2° +/- 0,05°
Vertical alignment accuracy	+/- 0,1°
Working range (radar sensor installation heights)	300 - 800 mm

10.2.2 Standard laser alignment unit

Function	Specification
Laser class	1
Beam shape	Line
Wavelength	650 nm
Optical diode output	5 mW
Open angle	90°
Divergence	1 mrad
Operating voltage	3 - 4.5 V
Line size	<1 mm@1 m
Battery	2 x LR44

10.2.3 Professional laser alignment unit

Function	Specification
Laser class	1
Beam shape	Line
Wavelength	635 nm
Optical diode output	5 mW
Open angle	90°
Divergence	1m wheel
Operating voltage	3 - 6.5 V nominal 6 V DC
Line size	<1 mm@1 m
Battery	4 x LR06

10.2.4 Measuring equipment

Function	Specification
Measuring tape	3 m
Plumb bob	200 g
Chalk line	30 m

10.3 Dimensions and weights RSCD 2100

Function	Specification
Dimensions H x W x D:	1112 x 840 x 455 mm
Weight	ca. 35 kg

10.4 Temperature and working environment

Function	Specification
Operating temperature	+5 °C - +40 °C
Storage Temperature	-20 °C - +60 °C
Temperature gradient	20 °C / Stunde
Rel. humidity (operation)	10 % - 90 % (40°C)
Rel. humidity gradient	10 % / Stunde
Max. operating height	-200 m - 3000 m

10.5 Safety check

The RSCD 2100 satisfies the criteria of the safety provisions in EN 61000-6-3 (2007+A1:2011); EN 61000-6-1 (2007).