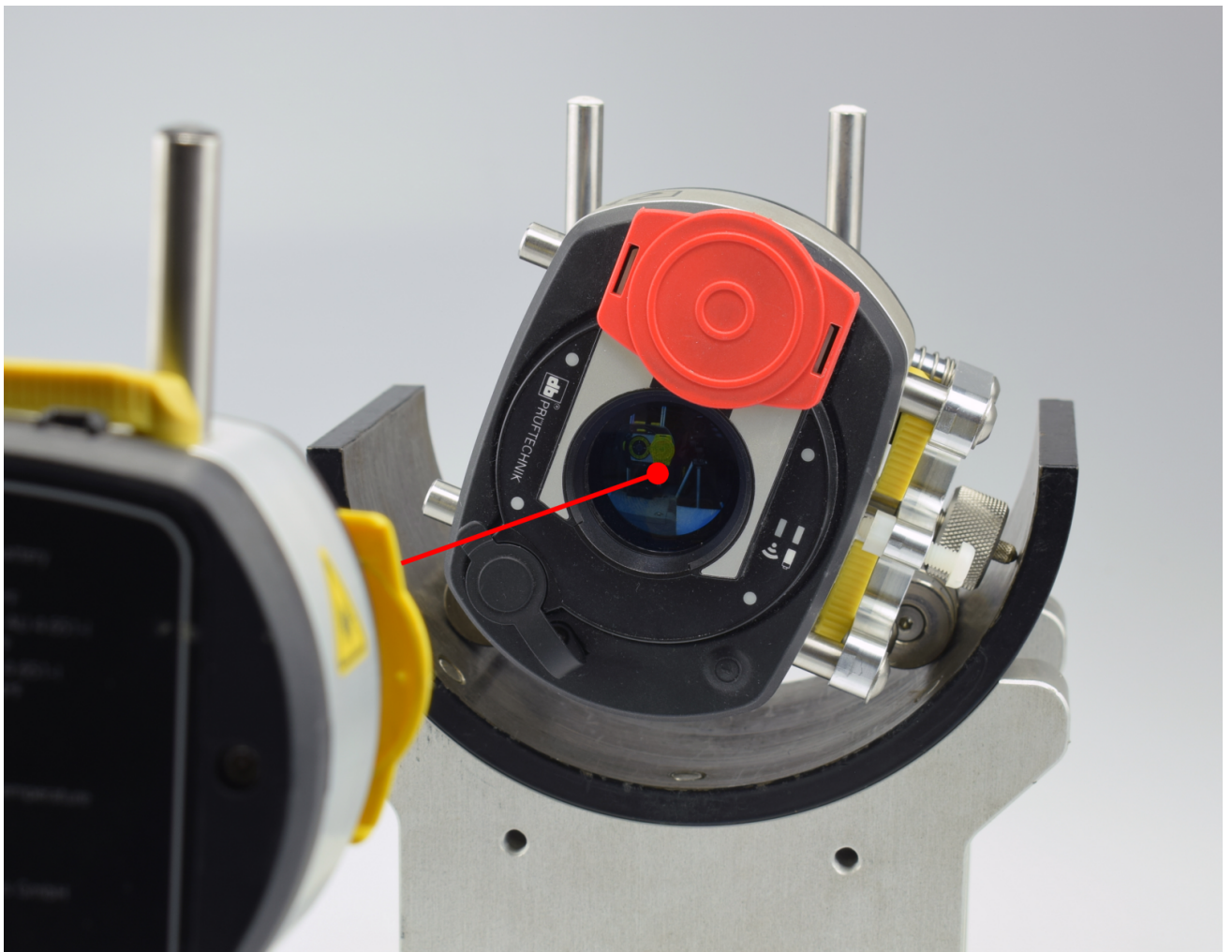


**sensALIGN 7 and
Universal Pointer
Bracket (UPB)
Application and Operation**



Edition: 5/29/2019
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Translation of the German manual

Type: ALI 4.900I, ALI 4.910, ALI 2.719-GEO
Serial number and year of production: see name plate
Producer: PRUFTECHNIK, 85737 Ismaning, Germany
www.pruftechnik.com

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1 Prior to starting

1.1 About this document

These instructions are a part of the product. Keep hold of these instructions. Pass these instructions on to subsequent users and owners together with the system.

These instructions familiarize you with proper use of the sensALIGN 7 sensor system when measuring alignment of bores and concentric machine components. In addition to the sensor system, the following components are used in this application:

- Universal pointer bracket (UPB) for sensALIGN 7 sensor, ALI 2.719-GEO
- Suitable bracket for sensALIGN 7 laser, e.g. ALI 4.501-IS
- GEO CENTER, PC software for geometrical machine measurement

In these instructions, these components are only described in the context of the application.

Further applicable documents

Detailed information about using and operating the universal pointer bracket and the PC software can be found in the corresponding instructions:

- UPB operating instructions - ALI 9.850
- GEO CENTER operating instructions - DOC 13.204.

1.2 Text conventions

The texts are characterized as follows according to their function:

- Steps: List with • as bullet points
- Enumerations: List with – as bullet points



Supplementary information / Tips: Functional instructions are introduced by a context-dependent keyword.



Warnings: Warnings identifying a risk of personal injuries are introduced by the signal word **CAUTION**. Non adherence to warnings can lead to minor or moderate injuries.

Warnings identifying a risk of property damage are introduced by the signal word **Note**.

1.3 Abbreviations

The following abbreviations and short forms are used in these instructions:

- UPB: Universal Pointer Bracket
- Sensor system / sensALIGN 7: Laser and sensor
- System components: Sensor system and UPB

1.4 Service addresses

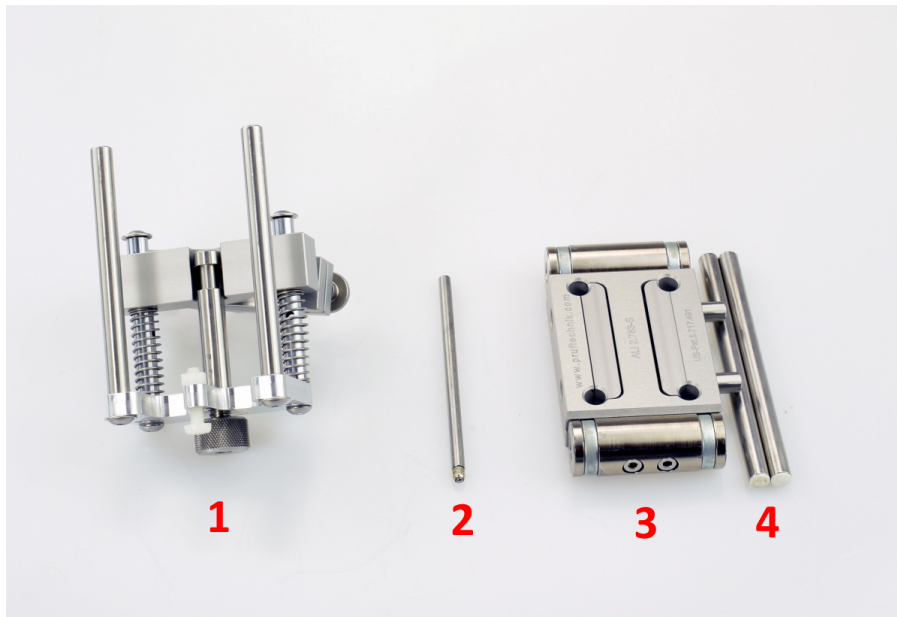
Hotline	+49 89 99616-0 Please have the serial number of the product ready when contacting our hotline ("Type plates" on page 12).
Shipping address	PRUFTECHNIK Condition Monitoring GmbH Oskar-Messter-Str. 19-21, 85737 Ismaning, Germany

2 Scope of delivery

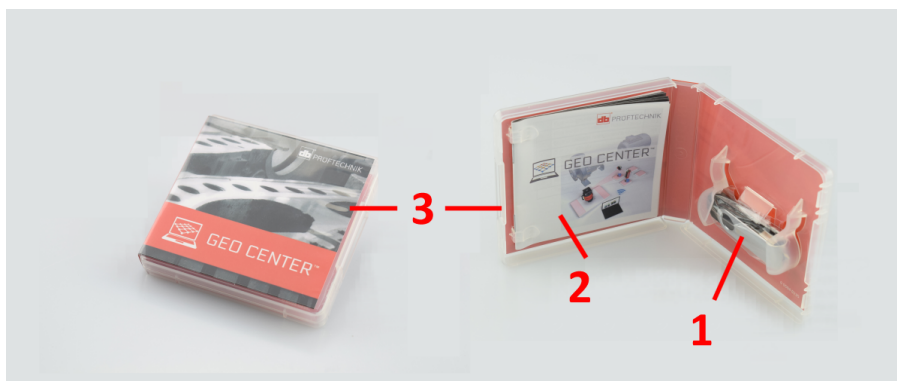
On delivery, check the goods for damaged or missing parts. Note any possibly objectionable parts on the shipping documents and claim them with the forwarder or your local PRÜFTECHNIK sales partner.



#	ALI 13.241	sensALIGN 7 Add-on for GEO CENTER
1	ALI 4.900I	sensALIGN 7 sensor including battery (ALI 4.960)
2	ALI 4.910	sensALIGN 7 laser including battery (ALI 4.960)
3	ALI 4.651	sensALIGN 7 charger
4	ALI 30.800	GEO apps case
5	ALI 3.589	Tape measure mm/inch
6	ALI 2.911	Cleaning cloth
7	ALI 17.454	USB storage medium with GEO documentation
8	DOC 50.601	Safety and general information, touch device
9	ALI 9.500	Inspection certificate, sensALIGN 7 sensor
10	ALI 9.501	Inspection certificate, sensALIGN 7 laser



#	ALI 2.719-GEO	Universal pointer bracket (UPB) for sensALIGN 7
1	ALI 2.789-GEO	sensALIGN 7 sensor holder for UPB
2	ALI 2.773-110	Plunger, 110 mm
3	ALI 2.783-S	Universal mounting bridge with sliding studs, small
4	ALI 2.170	Post 115 mm, white / 2 pcs



#	ALI 13.200-USB	GEO CENTER PC software
1	---	USB stick
2	0 0594 0241	Pocket installation guide, multiple languages
3	---	USB box (packaging)

3 Safety

sensALIGN 7 has been designed and built following a careful selection of the harmonized norms to be complied with as well as other technical specifications. The system therefore corresponds to the state of the art and ensures the highest degree of safety.

Nevertheless, there are still risks relating to installation, commissioning and operation which are to be avoided.

Observe the general safety instructions in this section as well as the warnings in the instructions. Safety instructions and warnings explain how you should act in order to protect yourself, others and objects from harm.

3.1 EU conformity

PRUFTECHNIK AG hereby declares that sensALIGN 7 conforms to the relevant European directives. The complete text of the EU conformity declaration is available at the following Internet address:

- www.pruftechnik.com/downloads/certificate-overview/ce-certificate-overview.html



3.2 General safety instructions

Read through this safety information carefully prior to use and act accordingly thereafter.

- Disconnect the machine to be measured from the power supply BEFORE you install the system components for the measurement. Ensure that the power supply is not switched on during the measurement, e.g. by using appropriate markings or by putting locks on the power supply switches.
- Only use the mains charger included in the scope of delivery to supply and charge the batteries.
- Do not charge the sensor system in the carry case.
- Do not use the sensor system if it is not working correctly.
- Only use the intended accessories.
- All repair work on the system components must be carried out by an authorized PRUFTECHNIK Service Center without exception.

3.3 Residual hazards and protective measures

sensALIGN 7 and the UPB are safe if used as intended. The following damage may occur if operated incorrectly or used improperly:

- Personal damage
- Damage to the system or to the machine

Risk of damage to the eyes due to laser radiation

sensALIGN 7 uses a Class 2 laser (IEC 60825-1:2007) with a maximum radiant power < 1 mW. The LED on the front of the laser lights up as soon as the laser is in operation and emits radiation. Please note the following instructions in order to prevent damage to the eyes:

- DO NOT LOOK DIRECTLY INTO THE LASER BEAM!
- Do not keep any optical lenses or glasses in the beam path.
- Do not look directly into the laser beam with optical devices. Optical devices can focus the laser beam and cause eye damage.
- Never direct the laser beam directly or indirectly at persons or animals via reflective surfaces.

The blink reflex of the eye and the aversion response generally ensure sufficient eye protection. As the blink reflex does not always occur, you should intentionally turn away from the radiation or intentionally shut the eyelid.

Hazardous laser radiation can be released!

- Do not open the laser housing.
- Use the measuring system as intended.

Components that emit a laser beam are to be marked with the laser safety marking shown below. An LED lights up on the laser housing if laser radiation is being emitted.



Damage to the components due to vibrations

The system components are precision measuring instruments and are to be treated with the utmost care.

- Avoid strong vibrations and shock loads such as those that can occur if the components fall down.
- Store system components in the carry case if they are not being used.

Damage to the components due to dirt

In a loaded industrial environment, the system components may have their function impaired or be damaged due to dirt or moisture.

- Close the protective caps on the sensor system if the system is not in use.
- Clean all moving parts on the UPB carefully after use. DO NOT lubricate the sliding bars in the spring mechanism with grease or lubricant UNDER ANY CIRCUMSTANCES!

Damage to the measuring surface

During the measurement, the surface to be measured could be scratched or damaged in some other way due to improper use of the UPB.

- Keep the measuring surface clean. Remove loose particles that could scratch the surface when moving the UPB.
- Put the plastic magnet protectors included in the delivery on the feet of the universal mounting bridge in order to prevent direct contact with the metallic surfaces.
- After unlocking the UPB sensor holder, lower it with your hand in a controlled manner. Lowering the plunger too forcefully can dent the measuring surface.

3.4 Intended use

sensALIGN 7 is a laser-optical measuring system that is used in an industrial environment for the following applications:

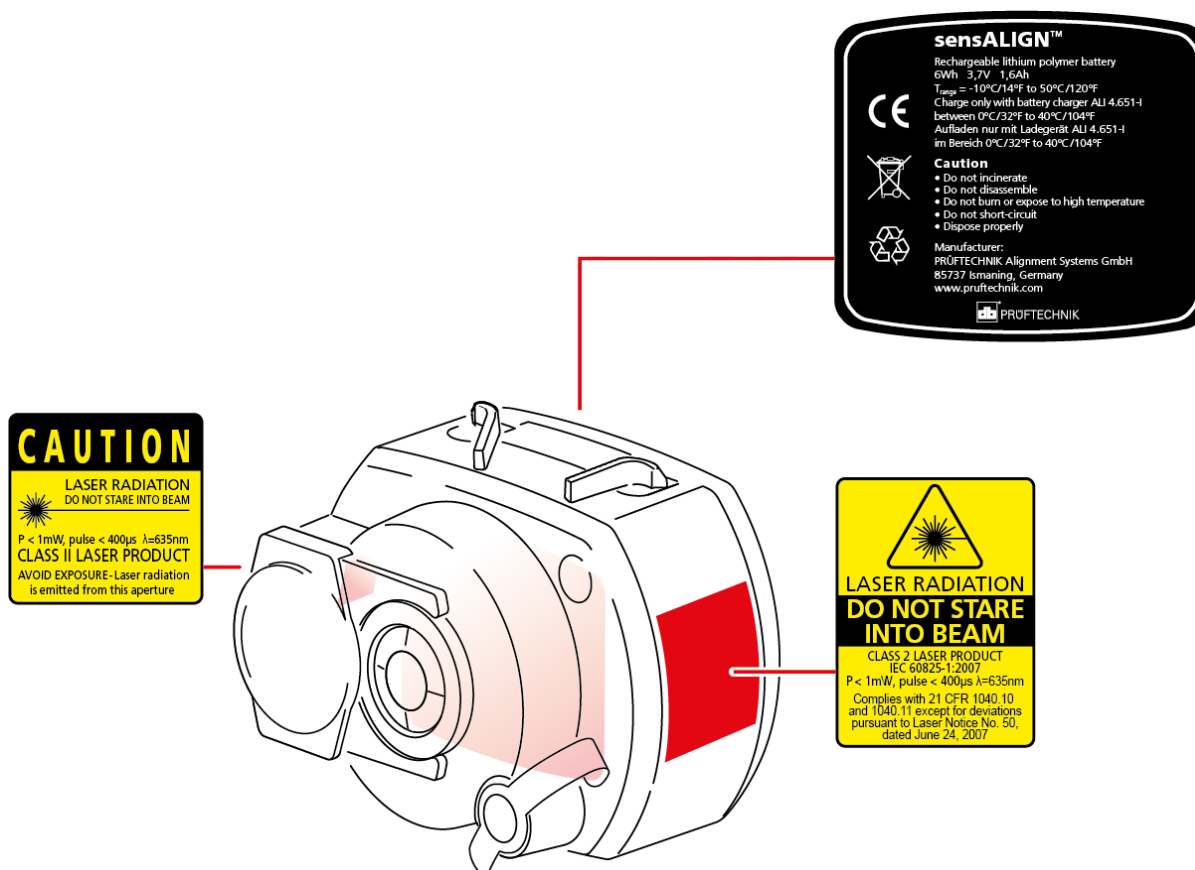
- Shaft alignment
- Bore alignment
- Monitoring of the relative position of machines

sensALIGN 7 is used to measure the alignment of bores using the UPB as described in these instructions. Use in conjunction with the CENTRALIGN measuring program in the ROTALIGN Ultra computer is not possible for this application. Instead, operation and data evaluation are carried out via a laptop PC (connected wirelessly) using the specially developed "GEO CENTER" PC software.

The system may only be operated within the specifications given in these instructions. PRUFTECHNIK shall not be liable for any damage caused by misuse.

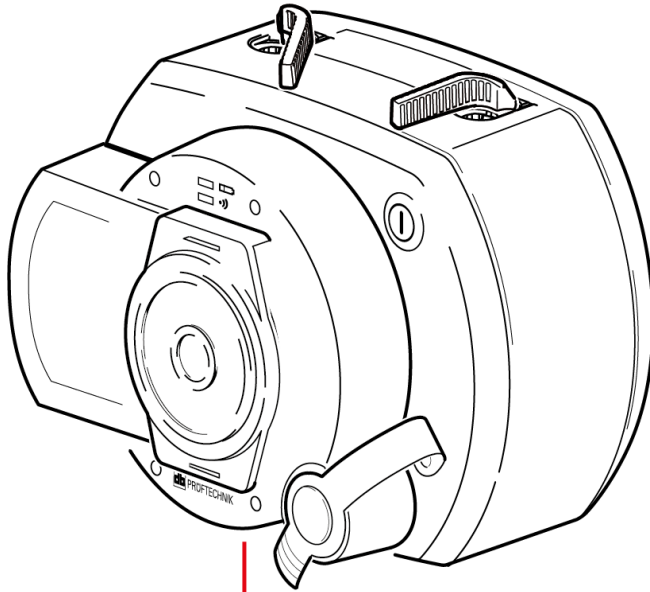
3.5 Safety markings

Please refer to the following figure for the safety markings on the sensALIGN 7 laser. No safety markings are attached to the sensALIGN 7 sensor. The safety markings must be observed and must not be concealed or removed.



3.6 Type plates

sensALIGN 7 sensor system



Type ALI 4.900I
S.No. 4900 2xxx
Date May 2019



The type plates of the sensor system are laser-inscribed and contain the following information:

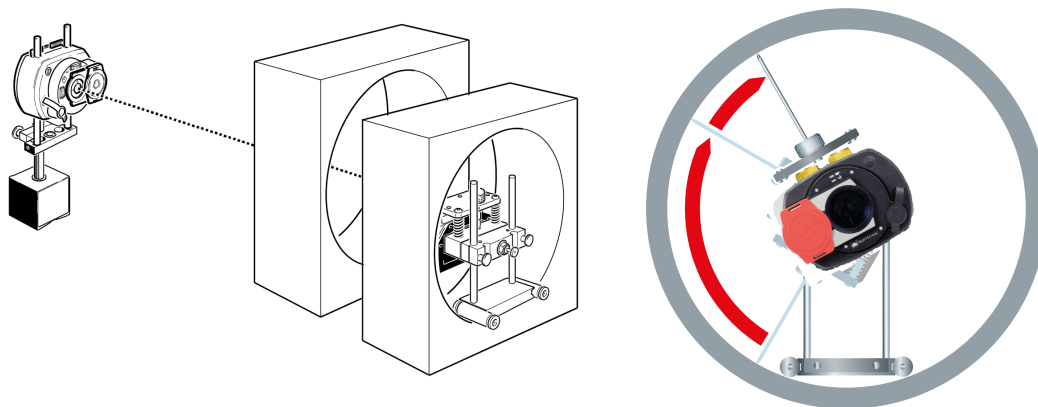
- **Type:** Item number of the component, e.g. ALI 4.900I for sensor and ALI 4.910 for laser.
- **S.No.:** Serial number of the component.
- **Date:** Date of production.
- **Calibration date:** Colored sticker with 2-digit year in the center and month marking (in the example above: 05.2021)

4 Description

sensALIGN 7 can be used in conjunction with the universal pointer bracket (UPB) to measure bores and concentric machine components. In this regard, the position of the bore center line relative to a reference line is essentially determined. In doing so, the center line is measured on several measurement planes along the bore assembly. A laser beam serves as the reference line.

4.1 Measurement procedure

The laser is set up outside the bore assembly and roughly adjusted to the center of the bores in the assembly.



The sensor is mounted on the sensor holder of the UPB. The sensor holder can be rotated around the center axis and can be lowered by means of a spring mechanism. A plunger is inserted into the sensor holder. The plunger comes in contact with the surface of the bore when it is lowered. The position of the laser beam is recorded with the sensor in this position. Taking measurements at different angular positions allows the bore center line to be determined relative to the measurement plane.

The measurement procedure is repeated for each bore and, in doing so, the UPB is moved along the bore assembly. The result is the position of the bore center line for each segment relative to the reference line as well as the corrections required to compensate any potential misalignment.

4.2 Universally extendable

Strong magnets in the universal mounting bridge ensure that the UPB is held securely inside the bore. The plunger and posts included in the scope of delivery can be used to measure bores with a diameter of between 140 and 400 millimeters. An add-on set is available as an accessory for larger diameters and for bores with non-magnetic surfaces:

- **ALI 2.760 SET:** UPB add-on set for diameters up to 810 mm, magnetic and non-magnetic

Further details of the scope of delivery for the add-on set can be found in the online catalog. This can be obtained free of charge from your PRUFTECHNIK sales partner.

4.3 sensALIGN 7 sensor system

sensALIGN 7 sensor



Interfaces, display and operating elements	
1	ON/OFF button
2	Sensor aperture, covered by a protective cap
3	Connection for charger, covered by a protective cap
4	4 LED displays at the inlet opening aid laser adjustment
5	Clamping lever for the sensor lock on the posts
6	LED display indicates the battery's state of charge
7	LED display indicates communication via Bluetooth

Function of the LED display for laser adjustment



The four LEDs aid the adjustment of the laser beam. The LEDs indicate the angle of incidence and the position of the laser beam by means of the flashing rate and the color.

In order to adjust the laser, you need to set the **beam angle** and the **beam offset** correctly: set the beam angle using the two yellow thumbwheels on the laser housing (pos. 9 and 12). You can adjust the beam offset by moving the laser on the posts and by the lateral movement of the laser bracket (see "Setting up and adjusting the laser" on page 24 in this regard).

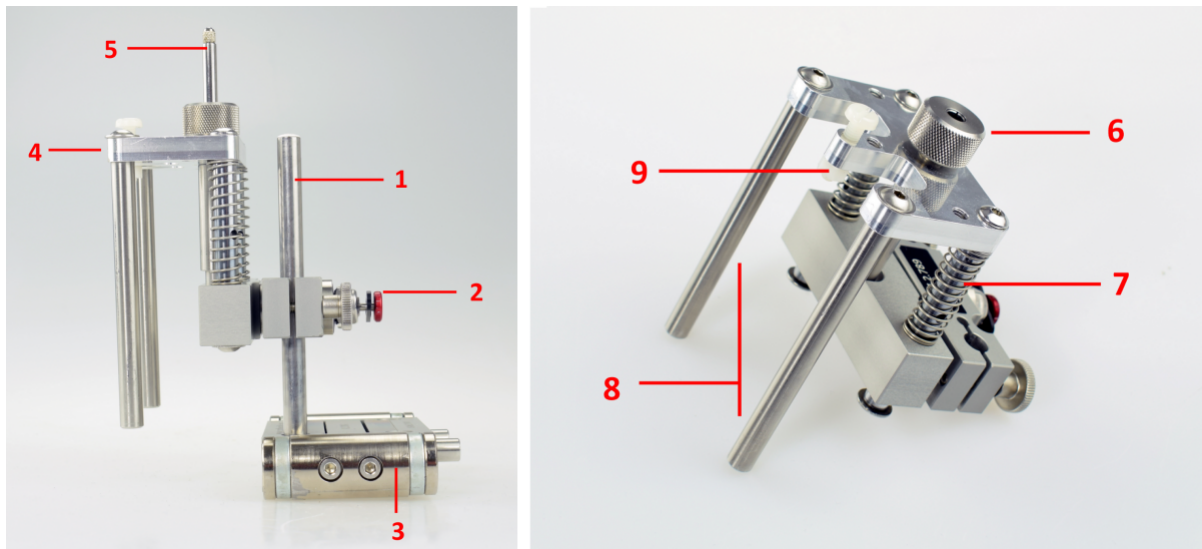
Status	LED display
The sensor is switched on	4x red, illuminated
Laser beam does not hit the detector	4x red, flashing
Laser beam hits the detector at a large angle	1...3x red, flashing
Laser beam hits the detector at a small angle; position on the detector is not central.	4x green, flashing quickly
Laser beam hits at the correct angle and is central on the detector.	4x green, flashing

sensALIGN 7 laser



Interfaces, display and operating elements	
8	ON/OFF button
9	Thumbwheel for adjusting the beam angle on the horizontal plane (3-9 o'clock)
10	Connection for charger , covered by a protective cap
11	Laser aperture , covered by a protective cap
12	Thumbwheel for adjusting the beam angle on the vertical plane (12-6 o'clock)
13	LED display indicates the battery's state of charge
14	LED display indicates laser operation
15	Clamping lever for the laser lock on the posts

4.4 Universal pointer bracket (UPB) for sensALIGN 7



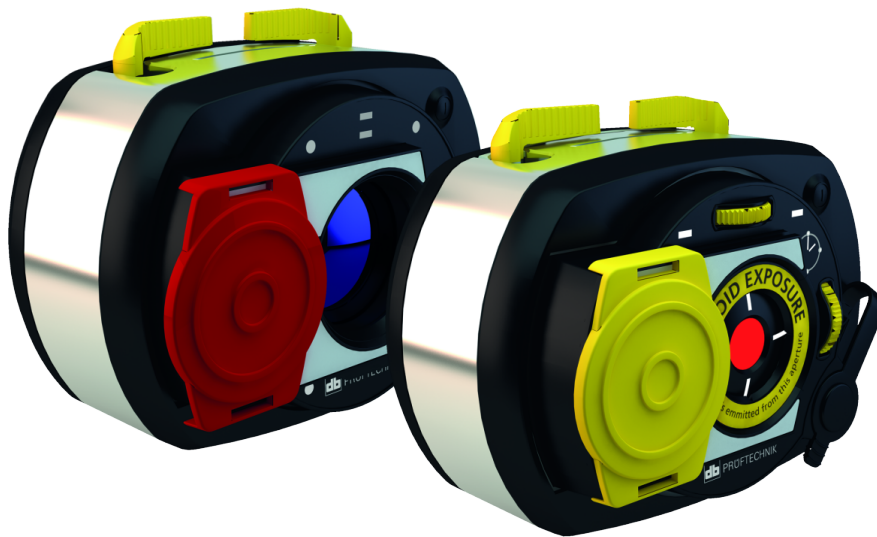
Left: UPB, assembled; Right: Sensor holder (4) in detail

UPB main components	
1	Posts, 2 pcs
2	Locking pin, keeps the sensor holder in its initial position
3	Universal mounting bridge with sliding studs, small (magnetic)
4	Sensor holder
5	Plunger for taking measurement points

Sensor holder	
6	Thumb screw for fixing the plunger in place
7	Spring mechanism with sliding bars
8	Posts for fastening the sensor
9	Plastic screw defines the stop position for the sensALIGN 7 sensor.

5 Specifications

5.1 sensALIGN 7 sensor system



Features

- Real-time measuring quality with intelliSWEEP™
- 7-axis measuring system with HD PSD, XXL detector
- Integrated vibration measurement
- Considered vibration influenced from the surroundings
- Integrated precision inclinometers with MEMS
- Laser-sensor communication via laser beam
- Wireless communication via Bluetooth
- Rechargeable Li-polymer battery of the latest generation

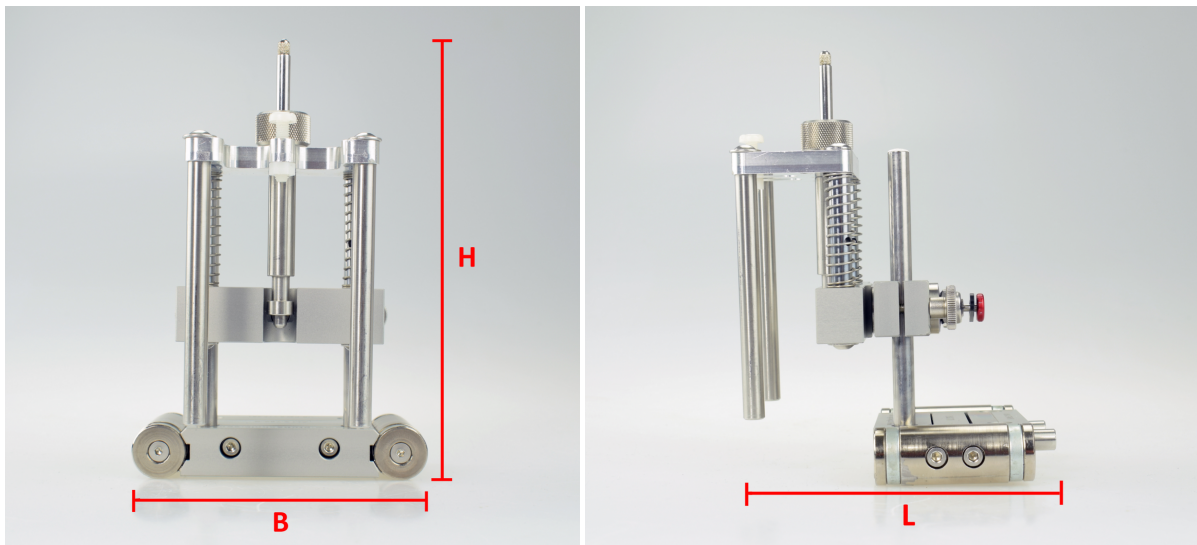
5.2 Technical data

Parameter	sensALIGN 7 sensor
Measurement range	Unlimited, dynamically extendible (US. Patent 6,040,903)
Measurement resolution	1 µm
CPU	ARM Cortex™ M3 2 GB Flash Memory
LED indicators	4 LEDs for laser adjustment 1 LED for Bluetooth® communication 1 LED for battery status
Power supply	Operating time: 12 hours continuous use Battery: Lithium Polymer rechargeable battery 3.7 V / 1.6 Ah 6 Wh
External interface	Integrated Bluetooth® Class 1 wireless communication, RS232, RS485, IData

Parameter	sensALIGN 7 sensor
Vibration measurement	mm/s, RMS, 10Hz to 1kHz, 0 mm/s – 5000/f • mm/s ² (f in Hertz [1/s])
Inclinometer	Resolution: 0.1° Error: ± 0,25 % full scale
Environmental protection	IP 65 (dustproof and water jets resistant) Shockproof Relative humidity: 10% to 90%
Ambient light protection	Yes
Temperature range	Operation: -10 °C to 50 °C (14 °F to 122 °F) Charging: 0 °C to 40 °C (32 °F to 104 °F) Storage: -20 °C to 60 °C (-4 °F to 140 °F)
Dimensions	Approx. 103 x 84 x 60 mm (4 1/16" x 3 5/16" x 2 3/8")
Weight	Approx. 310 g (10.9 oz)

Parameter	sensALIGN 7 laser
Type	Semiconductor laser
Beam power	< 1 mW
Beam divergence	0.3 mrad
Inclinometer	Resolution: 0.1° Error: ± 0.25 % full scale
LED indicators	1 LED for laser transmission 1 LED for battery status
Power supply	Lithium Polymer rechargeable battery 3.7 V / 1.6 Ah 6 Wh AC adapter/charger: 5 V / 3 A Operating time: 70 hours continuous use
Environmental protection	IP 65 (dustproof and water jets resistant) Shockproof Relative humidity: 10% to 90%
Temperature range	Operation: -10 °C to 50 °C (14 °F to 122 °F) Charging: 0 °C to 40 °C (32 °F to 104 °F) Storage: -20 °C to 60 °C (-4 °F to 140 °F)
Dimensions	Approx. 103 x 84 x 60 mm (4 1/16" x 3 5/16" x 2 3/8")
Weight	Approx. 330 g [11.6 oz]

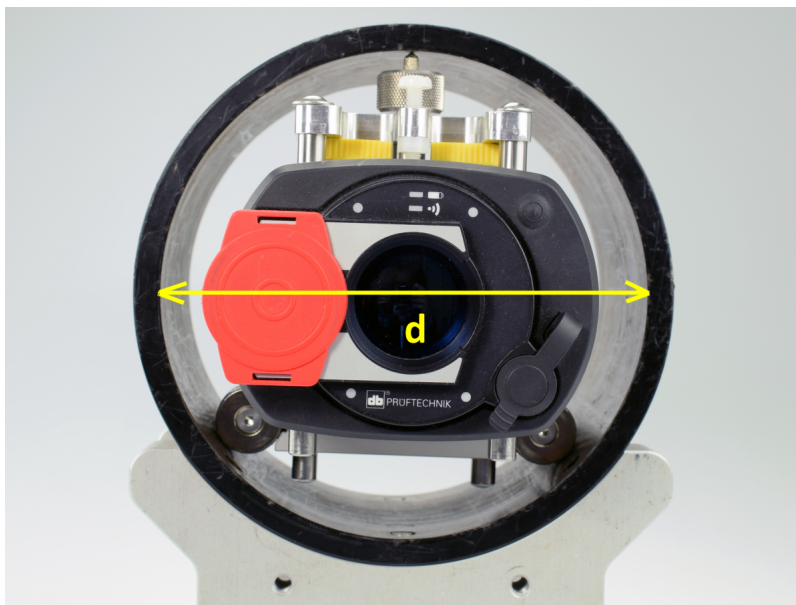
5.3 Dimensions - UPB



B	110 mm
H	> 118 mm
L	118 mm

The value for the smallest height **H** applies to the UPB shown with the short posts ALI 2.170 (115 mm, white) and with the short plunger ALI 2.773-110 (110 mm).

Bore diameter



d	140 - 400 mm
----------	--------------

The value for the smallest bore diameter **d=140 mm** applies to the UPB shown with the short posts ALI 2.170 (115 mm, white) and with the short plunger ALI 2.773-110 (110 mm). The largest bore diameter **d=400 mm** can be measured with the long posts ALI 2.173 (250 mm, green) and the long plunger ALI 2.773-270 (270 mm).

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6 Setup

This section will explain how you assemble the UPB, mount the sensor and how to set up and adjust the laser.

6.1 Installation

Assembling the UPB

The following section will familiarize you with the assembly of the UPB in its **standard version**. The standard version is intended for use in bores with a magnetic surface and a diameter of not more than 400 millimeters.



UPB with accessories

The assembly of the UPB with the add-on set ALI 2.760 SET is described in the UPB instructions ALI 9.850.

The UPB is supplied in individual parts. Assembly is carried out according to the stated sequence.

Procedure

- Insert two posts into the holes of the universal mounting bridge (1). Keep in mind that the cylindrical support feet of the mounting bridge are magnetic.
- Tighten the two screws with an Allen key (size 3) (2).

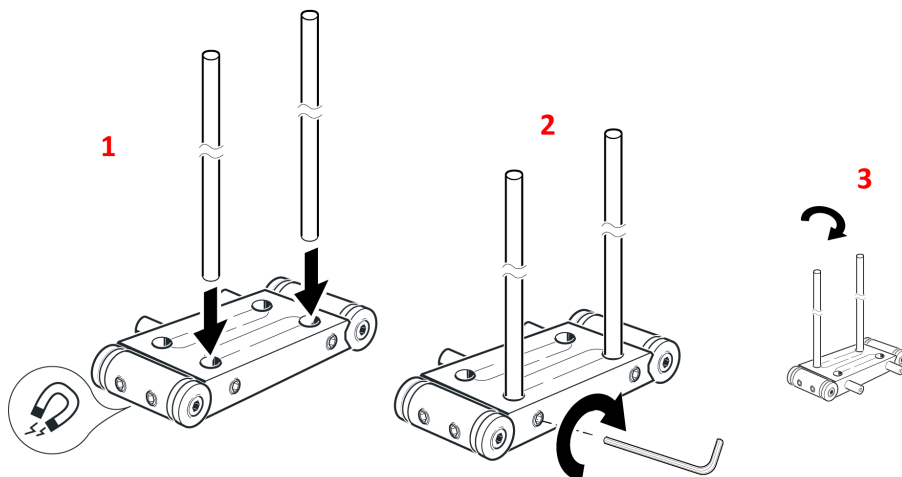
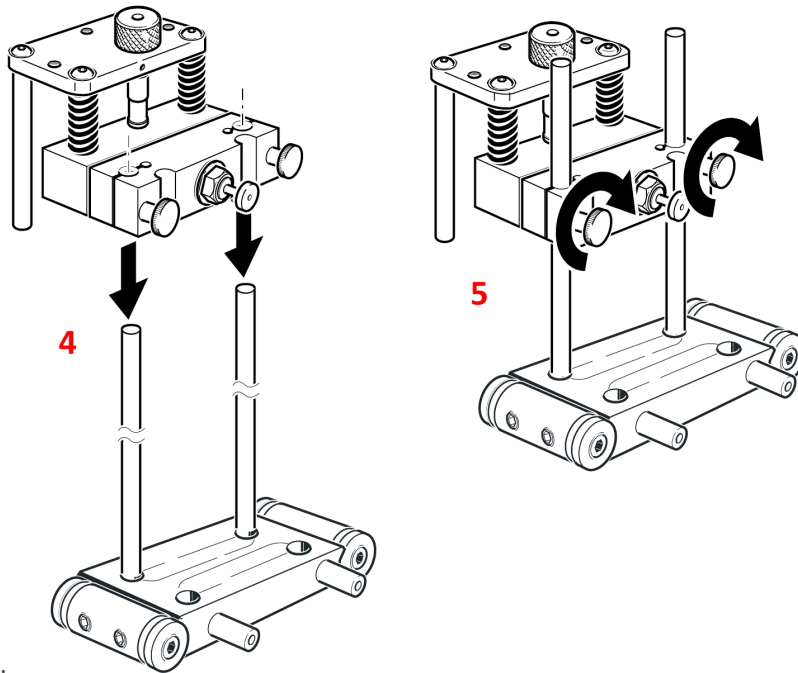


Illustration details

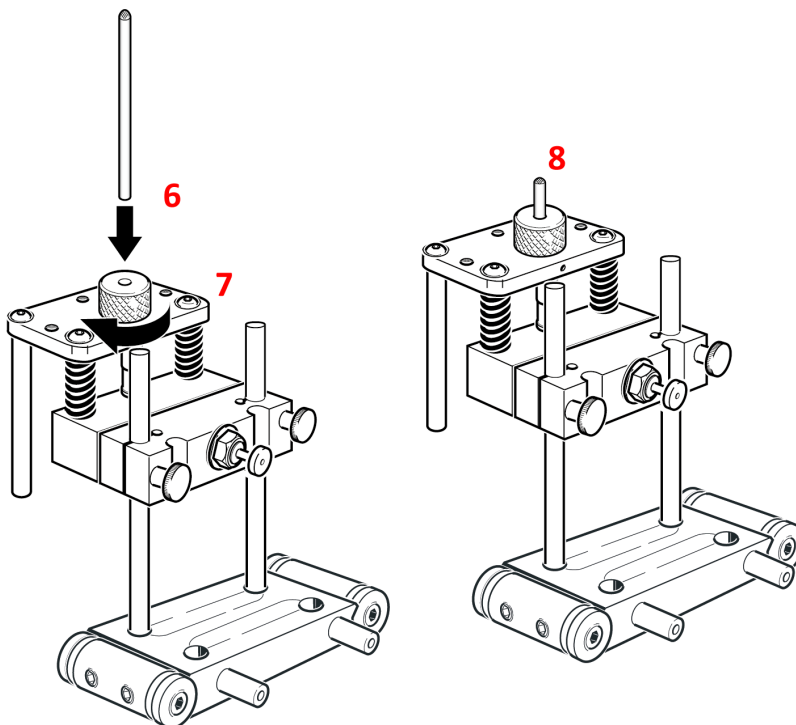
In the following illustrations, the pre-assembled mounting bridge has been rotated by 180° in order to provide a better overview (3).

The following illustrations partly contain details that are either no longer present in the current version of the UPB or have been changed in the current version. These deviations, however, are not of relevance to assembly.

- Insert the sensor holder onto the posts (4).
- Tighten the two thumb screws on the sensor holder (5).



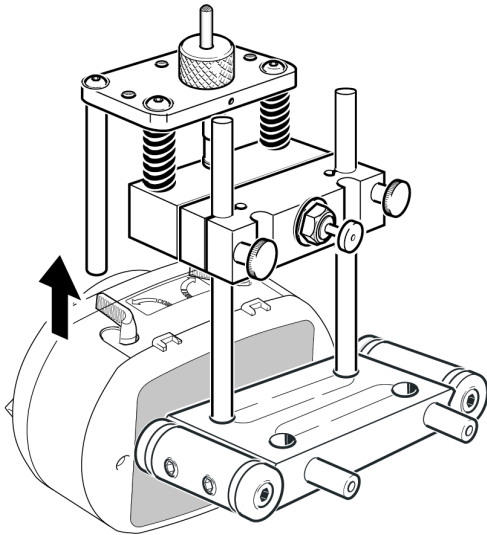
- Slide the plunger through the thumb screw and into the sensor holder (6). The tip of the plunger is facing upward in the illustration (8).
- Tighten the thumb screw (7).



Installing the sensALIGN 7 sensor on the UPB

Procedure

- If necessary, open the clamping lever on the sensor housing.
- Slide the sensor onto the sensor holder to the stop. Ensure the correct sensor orientation (see photos below).
- Close the clamping lever to lock the sensor in place on the sensor holder .



Position the sensor on the sensor holder in such a way that the top of the housing (12 o'clock) faces the tip of the plunger (left-hand photo).

6.2 Setting up and adjusting the laser

Before you begin the measurement, you need to set the laser up in such a way that the beam hits the sensor as centrally as possible throughout the entire measuring range. This ensures that the laser beam does not leave the sensor during the measurement.

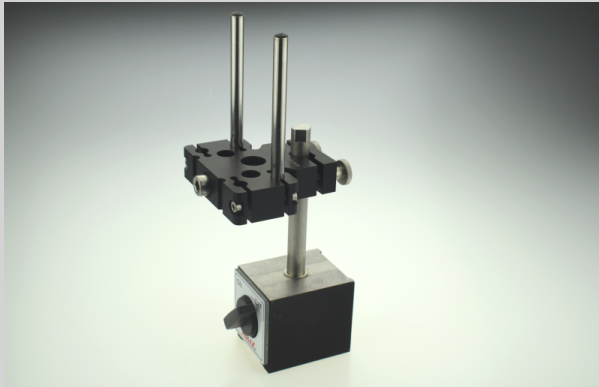
Procedure

- Mount the laser on a suitable bracket in front of the bore and, in doing so, adhere to a minimum spacing of approx. 30 cm.



Suitable brackets

PRUFTECHNIK has brackets for a number of applications. The **magnetic foot holder, ALI 4.501-IS**, for example, is suitable for the application described in these instructions.



- Switch on the laser. However, do not open the protective cap until the laser has reached its operating temperature (approx. 20 minutes).
- Once the laser has been switched on, ensure that the laser beam illuminates the center of the yellow protective cap. If the beam direction is misaligned, use the yellow thumbwheels to center the beam.

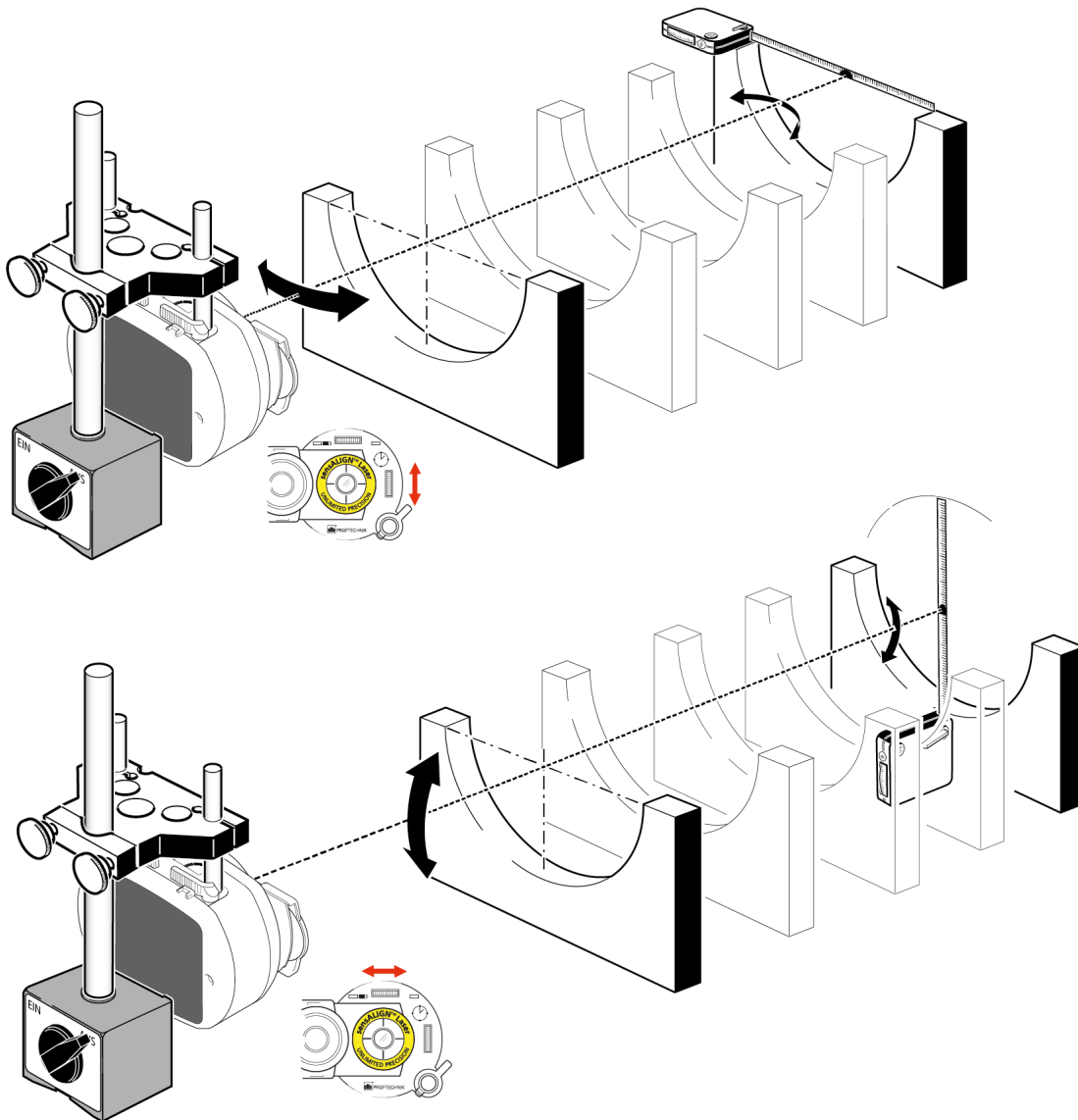


CAUTION!

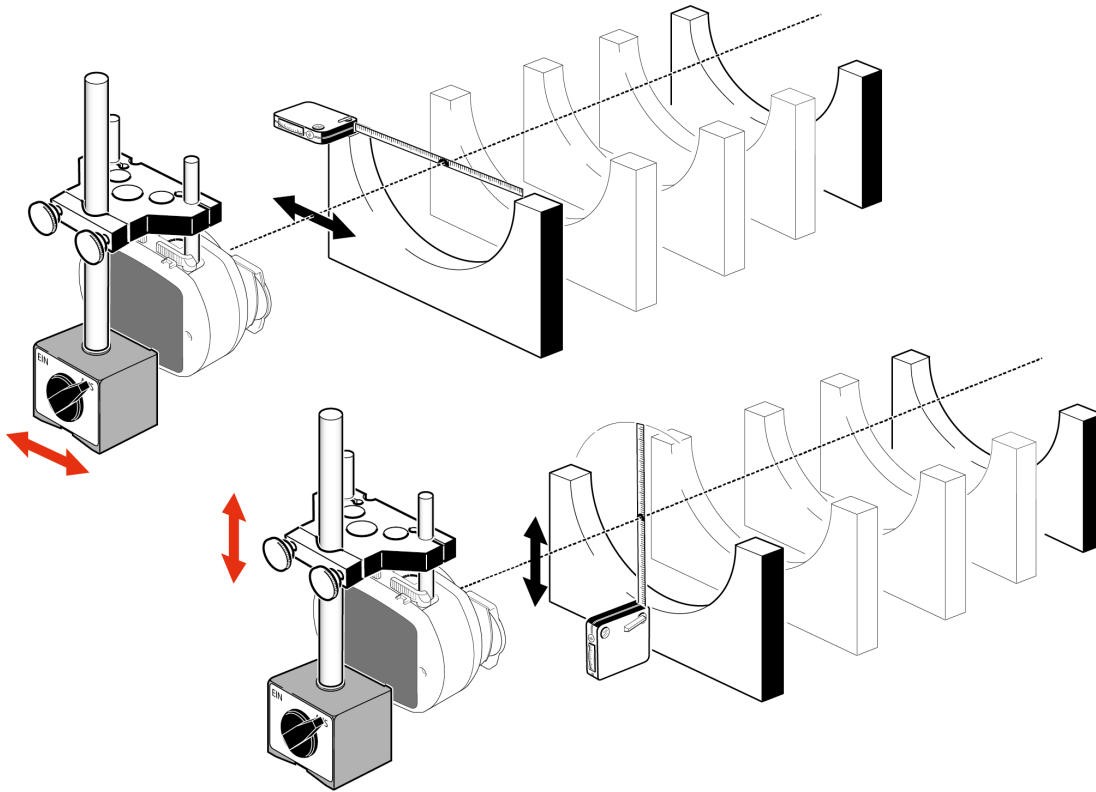
Risk of damage to the eyes!

Do not look directly into the laser beam at any time!

- Open the protective cap on the laser.
- First set the **beam angle** correctly. For this purpose, proceed as follows:
 - Adjust the laser beam to strike the center point of the furthest bore.
 - To this end, place the tape measure horizontally at the middle of the bore. Use the thumbwheel to adjust the laser beam horizontally until the beam hits the tape measure at the center.
 - Repeat this procedure for the vertical plane.



- Then set the **beam offset** correctly. For this purpose, proceed as follows:
 - Adjust the laser beam to strike the center point of the nearest bore.
 - To this end, place the tape measure horizontally at the middle of the bore.
 - Move the bracket with the laser laterally until the beam hits the tape measure in the center.
 - Place the tape measure vertically at the middle of the bore.
 - Move the laser holder upward until the beam hits the tape measure in the center.



- Check the position of the laser beam at the furthest bore.
- If necessary, repeat the adjustment until the laser is centered sufficiently at both bore positions (nearest & furthest).

7 Measurement

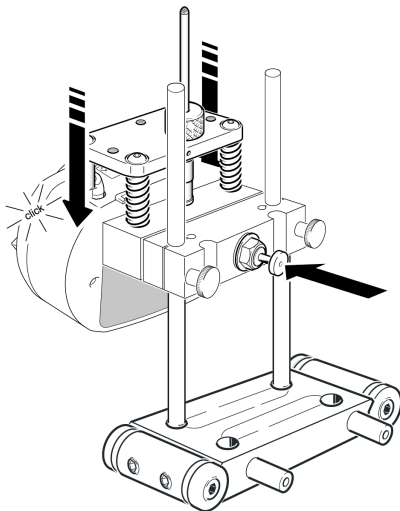
The measurement of a bore assembly is performed by taking measurements on the inner surface in a **bore**. Measurements are carried out at different angular positions and are ideally repeated on each bore.

In this regard, the measuring procedure with sensALIGN 7 and the UPB comprises the following processes:

- Setting up and adjusting the laser ("Setting up and adjusting the laser" on page 24).
- Inserting the UPB with the mounted sensor in the bore.
- Positioning the sensor in the center of the laser beam.
- Lowering the sensor holder.
- Triggering the measurement in GEO Center.
- Turning the sensor holder to the next angular position and triggering the next measurement.

7.1 Putting the sensor holder in the starting position

- Ensure that the sensor holder is in the **starting position**. The spring mechanism needs to be tensioned and the locking pin needs to be engaged.



7.2 Inserting the UPB in the bore

- If necessary, remove coarse dirt from the inner surfaces of the bore prior to insertion.
- If necessary, attach suitable plastic protective sleeves to the feet of the mounting bridge. This prevents the surface being scratched when installing, removing or moving the UPB in the bore.



Accessories

PRUFTECHNIK offers suitable magnet protectors in an accessory set (ALI 2.783-P). This contains 4 magnet protectors and 6 protective sleeves for the sliding studs on the side of the mounting bridge (c.f. illustration bottom right).

The sliding studs are intended for cases in which the UPB needs to be attached externally to the front face of a bore.

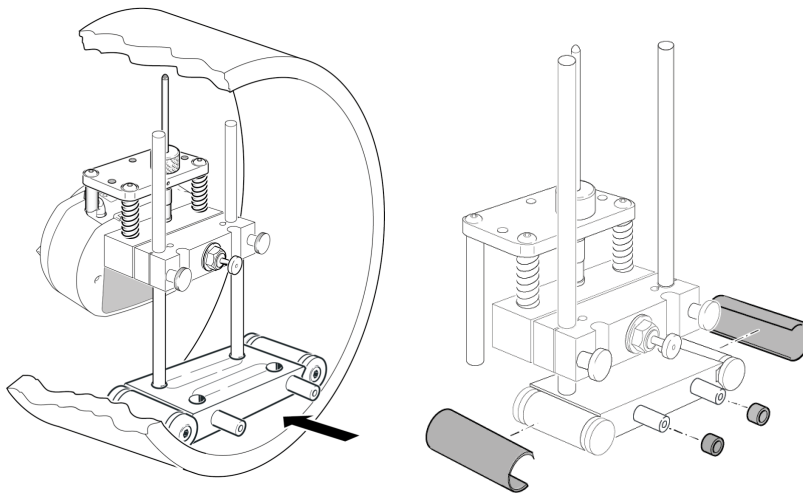
- Put the UPB in the first bore to be measured:
 - First place the mounting bridge on one edge and then carefully let it attach.
 - The sensor opening faces the laser; the lens is still covered by the protective cap.
 - Check the UPB for tight fit. Both feet need to lie flat. If necessary, correct any slant by means of light “jolting”.
 - If necessary, slide the UPB into the desired measuring position.



Note

The surface may get damaged!

During insertion, ensure that the UPB does not touch the surface too forcefully as a result of the magnetic forces.



7.3 Positioning the sensor toward the laser



CAUTION!

Risk of damage to the eyes!

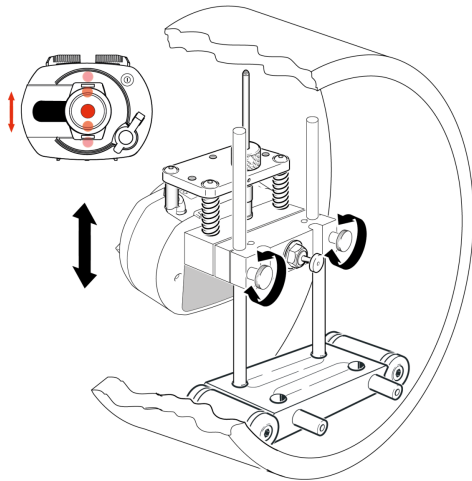
Do not look directly into the laser beam at any time!



Retracting the plunger

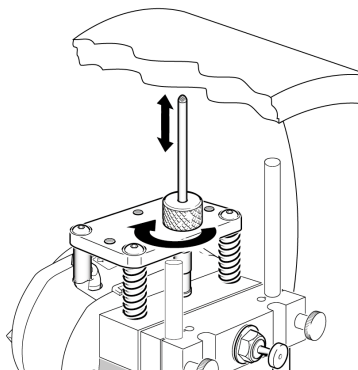
If necessary, retract the plunger so that it does not touch the bore surface when the sensor holder is moved.

- If necessary, switch on the laser and open the protective cap on the laser.
- Loosen the thumb screws on the sensor holder.
- Move the sensor holder until the laser beam hits the center of the protective cap for the sensor.
- Tighten the sensor holder again.



7.4 Setting the plunger at a distance

- Ensure that the sensor holder is in the starting position: the spring mechanism is tensioned and the locking pin is engaged.
- Open the thumb screw on the plunger and extend the plunger until the distance from the bore surface is **roughly 1 mm**.
- Turn the sensor holder through a complete rotation to check that the plunger does not touch the surface at all angular positions.



7.5 Establishing communication with GEO Center

The measurement is controlled via the GEO Center PC software. The sensALIGN 7 sensor and the laptop, on which the software runs, communicate wirelessly via Bluetooth. Details of how to set up the software and about operation in general can be found in the GEO Center online help or in the relevant manual.

This section familiarizes you with the settings in the software that are required for the application described in these instructions.

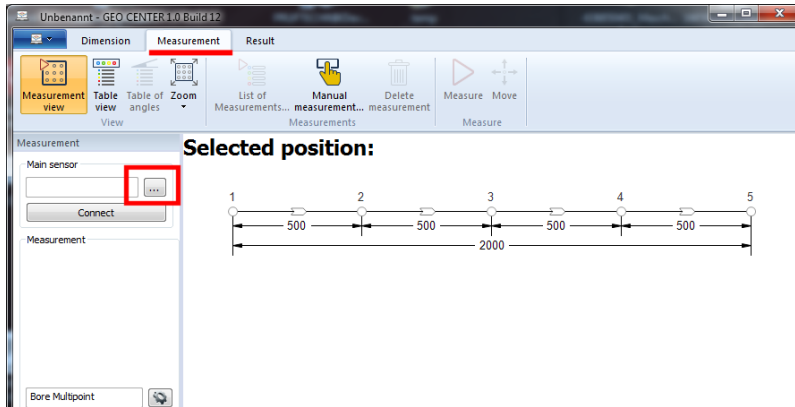
- Switch on the sensALIGN 7 sensor.
- If necessary, activate Bluetooth mode on the laptop PC on which GEO Center runs.
- Set up a new measurement file in the GEO Center software.




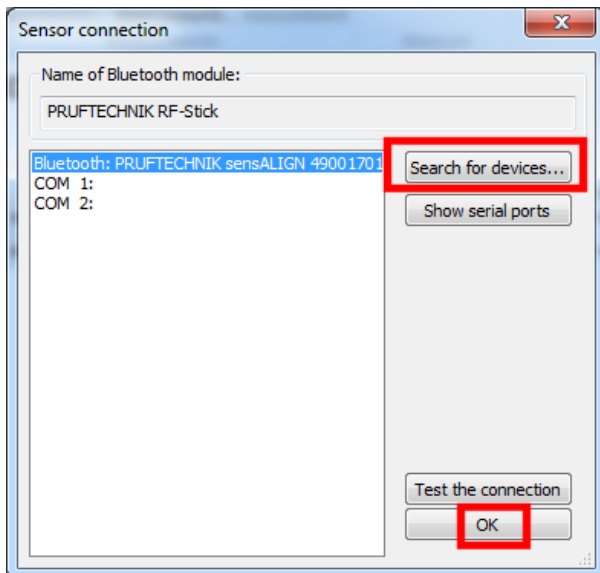
Measurement file in GEO Center

Details of how to set up a measurement file can be found in the GEO Center online help.

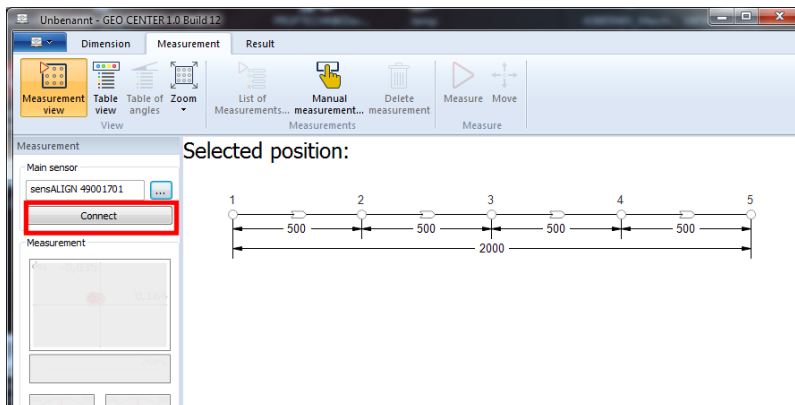
- Click on **Measurement** in the main menu.
- Click on **Measurement View** in the menu ribbon.



- Click on  in the left-hand sub-window. A submenu appears.



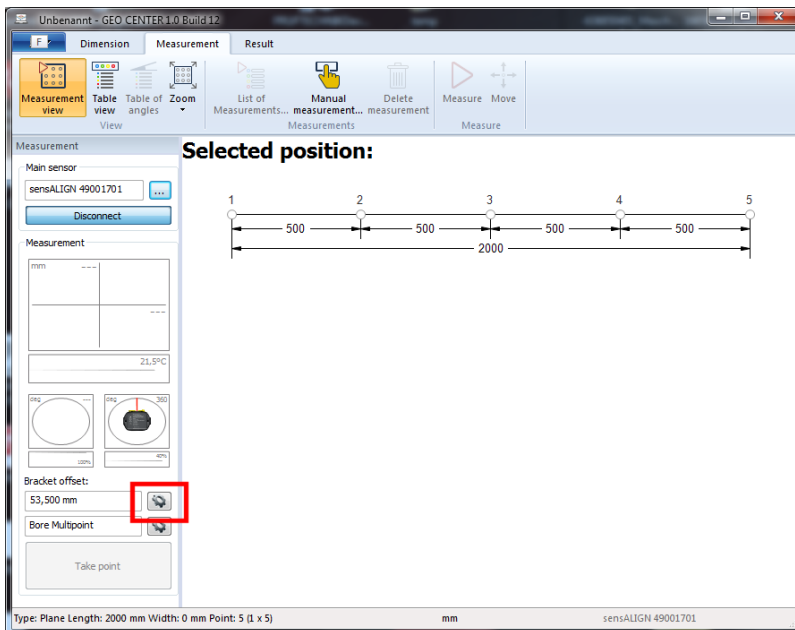
- Click on **Search for devices**.
- Wait until the Bluetooth module appears in the list.
- Select the Bluetooth module and click on **OK**. The main window appears.



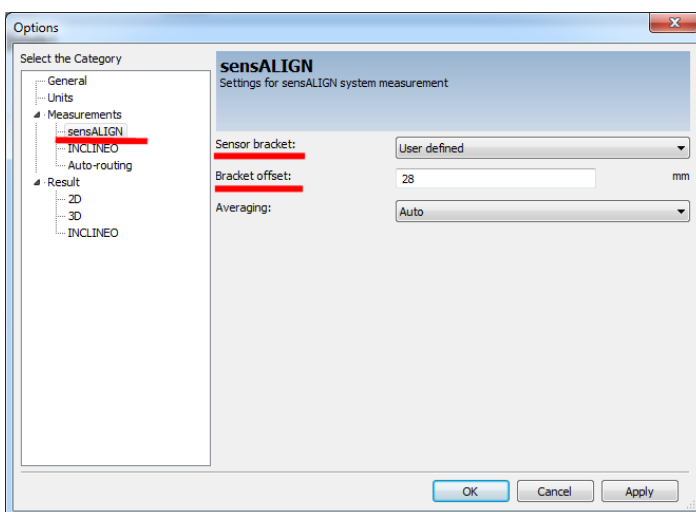
- Click on **Connect**. GEO Center connects to the sensor.

7.6 Distance measurement plane - detector plane

Before you adjust the laser, you need to enter the distance between the measurement plane and the detector plane in GEO Center.



- Click on the first button  in the **Bracket offset** field. The Options menu appears. The **Measurements/sensALIGN** category is selected:



- Select the **User defined** option for the **Sensor bracket**.
- Enter the value **+28 mm** in the **Bracket offset** field.
- Click on **OK**.

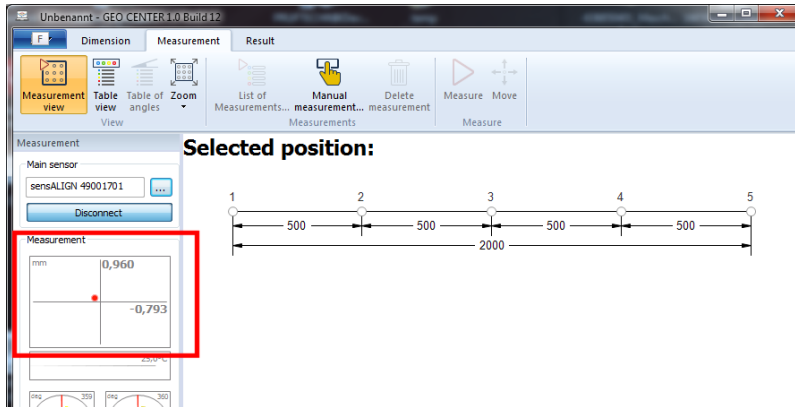


Bracket offset and sign

The value stated above applies to the universal pointer bracket (**UPB**) and the **sensALIGN 7 sensor**. The sign is positive if the sensor is closer to the laser than the plunger (=measurement plane).

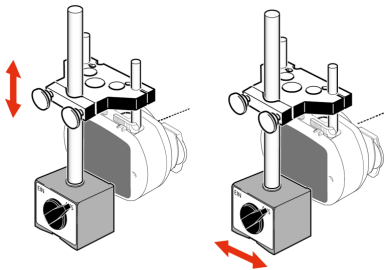
7.7 Adjusting the laser to the sensor

- Open the protective cap on the sensor.
The sensor indicates the status of laser adjustment by means of four LEDs on the housing ("Function of the LED display for laser adjustment" on page 14).
The laser beam appears in the left-hand sub-window on a symbolized detector window in the GEO Center software.

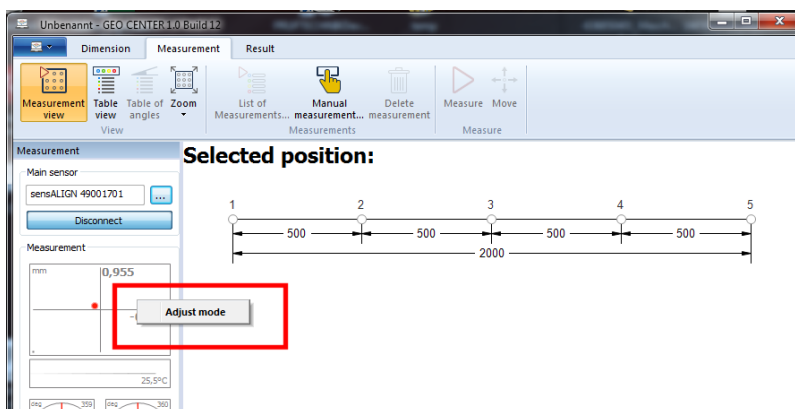


The following adjustment steps are described using the software. There are two presentation forms for the laser beam:

- **Point form** (see illustration above): shows the averaged position of the laser beam on the two detectors. This form is used for adjustment of the beam offset.
- **Angle form**: shows the crossover point of the laser beam on the front and rear detector. This form is used for adjustment of the beam angle.
- Set the **beam offset** to the center of the detector window. To do so, move the **laser** on the bracket in a horizontal or vertical direction.



- To change over to **angle form**, right-click on the detector window and click on the **Adjust mode** button.

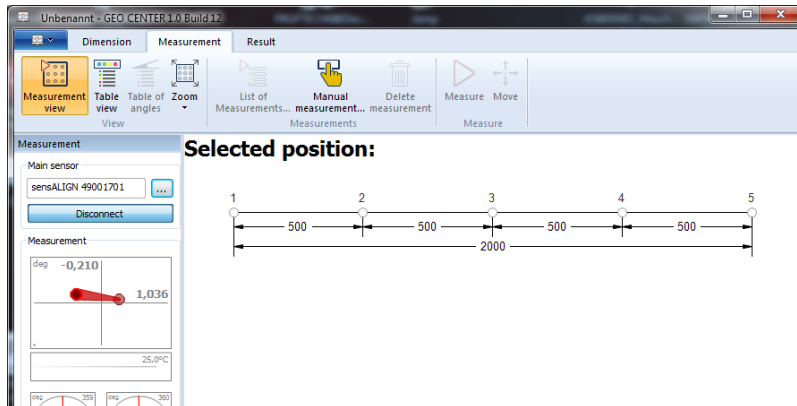


The laser beam appears club-shaped if the inlet angle of the laser beam is extremely large. The cause of this could be that the UPB is slanted in the bore or that the measurement object itself is slanted.



DO NOT move the laser!

To adjust the beam angle at this stage, you may only correct the position of the UPB or the position of the measurement object.



7.8 Lowering the sensor holder

- Hold the sensor holder by the handle and pull out the locking pin with your other hand. The spring mechanism is unlocked.

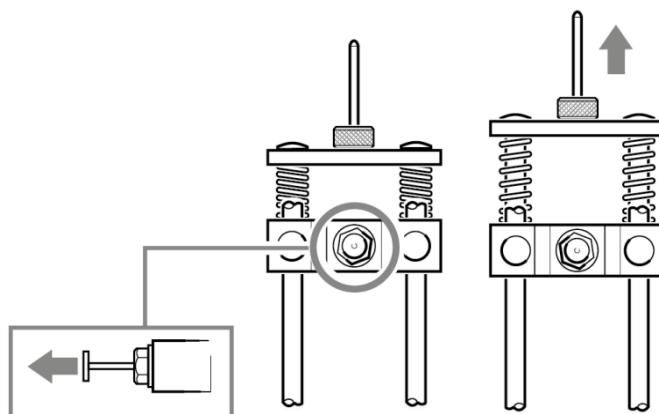


Note

The bore surface may get damaged

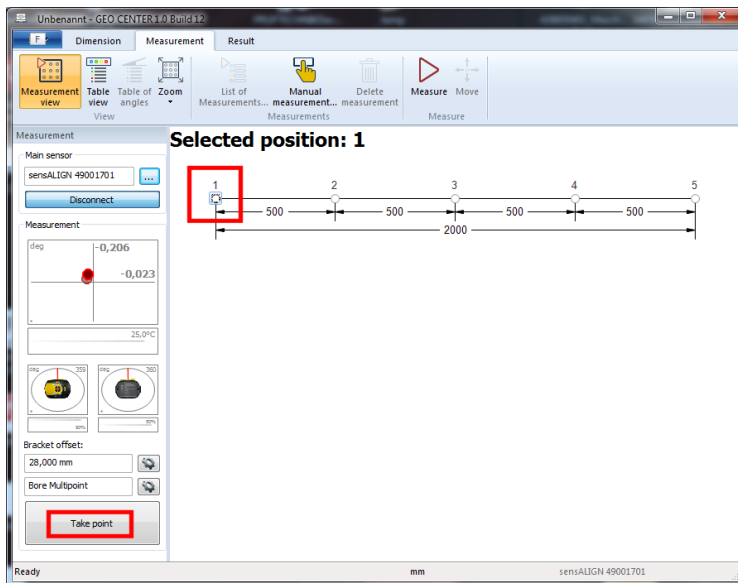
Ensure that you hold the sensor holder securely. Ensure that the plunger does not forcefully strike the bore surface.

- Carefully lower the sensor holder until the plunger is in contact with the bore surface.



7.9 Triggering a measurement

- Check the adjustment of the laser beam in the detector window. The laser beam should ideally be in the center and appear point-like:
- Click on the first measurement plane in the main window (**Selected position: 1**).



- Click on **Take point**.

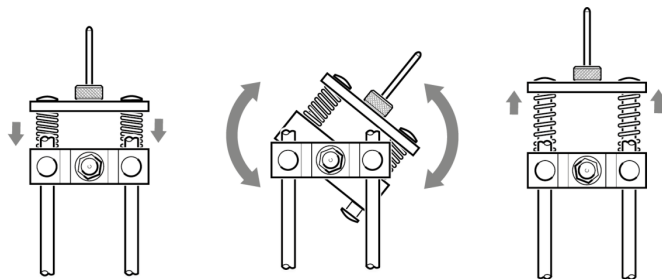


Measuring with GEO Center

Further information about performing a measurement in the GEO Center software can be found in the online help.

7.10 Performing a measurement in other measuring positions

- Put the sensor holder in the next measuring position by **lifting, turning** and **lowering** it in one go.
- Record the next measurement location.
- Repeat the process in other angular positions across the inner circumference of the bore.



Measurement quality

Many measurements performed over an appropriately sized angular range improve the quality of the measurements.

7.11 Measurement of the remaining segments

- Put the sensor holder in the starting position.
- Move the UPB along the bore to the next **measurement plane**. Ensure that you do not damage the bore surface.
- Repeat the measurement procedure from the previous section in the same way.

8 Maintenance

This section contains information about the battery and calibration of the sensor as well as information about maintenance and storage of the system components.

8.1 Charging the battery

Charge the battery in the laser or in the sensor using the charger included in the delivery (ALI 4.651). The permissible ambient temperature during charging is: 0 to 40 °C.

Procedure

- Connect the charger to the power supply.
- Connect the charger to the charger socket (2) of the sensALIGN 7 component.



Battery status LED

The battery status is displayed via an LED (1) on the front of the sensALIGN 7 sensor system.

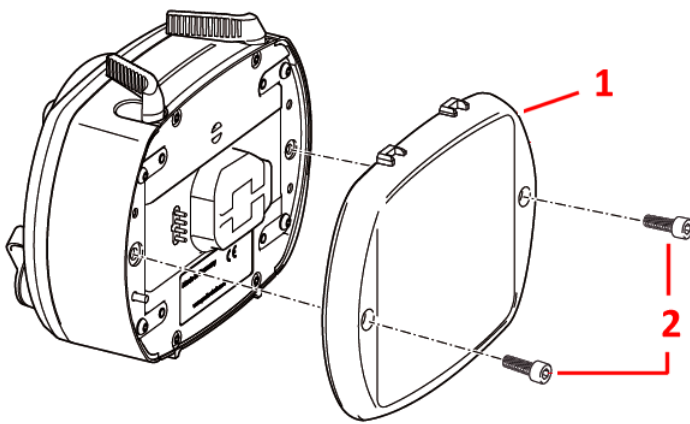
Procedure	LED display	Battery status
Switch-on	Lights up green	Battery is almost full, Life > 10 h
	Lights up red	Battery is almost empty, Life < 1 h
	Flashes green	Battery is sufficiently charged, Life: 5 - 10 h (laser) or 1...5 h (sensor)
Charging	Flashes red	Battery is barely sufficiently charged, Life: 1 - 5 h (laser) or approx. 1 h (sensor)
	Flashes green	Battery is charging
	Lights up green	Battery is fully charged
	Lights up red	Error during charging

8.2 Changing the battery

The laser and sensor are each powered by a lithium polymer battery of the same type. Replace the battery if it becomes too weak for reasons of age. A replacement battery (as new) is available from PRUFTECHNIK under item number **ALI 4.960**.

Procedure

- Remove the two screws (2) from the back of the housing using a suitable Allen key (size 2.5). The battery (1) is permanently connected to the back of the housing and cannot be removed.
- Remove the back of the housing with the old battery and dispose of the component in accordance with the applicable environmental regulations.
- Insert the back of the housing with the new battery and screw down the component again.



8.3 Calibration

The sensor system is maintenance-free. To ensure measurement accuracy in the long term, please note the following recommendations:

- Have the calibration accuracy of the sensor system inspected every two years.
- The relevant calibration date can be found on the sticker on the sensor housing ("Type plates" on page 12).
- When the sensor system is due for inspection, please send it to a PRUFTECHNIK Service Center. Please get in touch with your local contact person for further information about shipment.

8.4 Cleaning and storage

Sensor system

- Clean the optical surfaces of the sensor system (laser opening, sensor lens) with a cleaning cloth. The cleaning cloth is included in the scope of delivery. Avoid rubbing too forcefully to ensure that you do not damage the anti-reflective coating on the surfaces.
- Use a soft cloth to clean the surfaces of the housing. Dampen the cloth with a mild cleaning agent (soapy water with only 1% mild soap).

UPB

- Remove rough dirt carefully using a suitable tool. Ensure that you do not scratch the surfaces.
- Ensure that the spring mechanism and the swivel joint of the sensor holder can move freely. Do not lubricate the sliding bars in the spring mechanism with grease or lubricant under any circumstances!

Storage

- Use the transport case included in the delivery for transport and storage of the system components.
- Store the system components in a cool, dry and well-ventilated room.
- Remove the batteries from the sensor system in the event of prolonged non-use.
- Please note the specifications for the ambient conditions ("Specifications" on page 17).



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