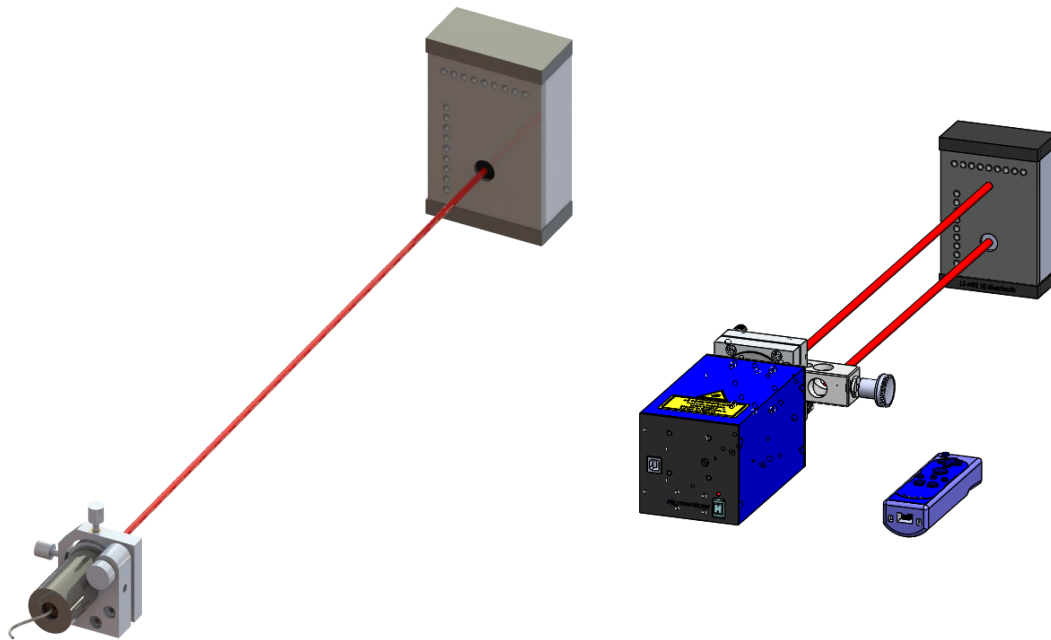


Short information for ZFM 407 straightliner



Brief Description

Demonstration Device (Prototype)

The demonstration device consists of two modularly combinable systems. Depending on the application, the basic system can be used independently or supplemented by an extended measurement system.

Basic System – Alignment System

The basic system is a pure alignment system for checking the center of gravity of an axis or the alignment of the axis.

Areas of Application

- Checking the alignment of the axis
- Leveling and alignment of guidance systems
- Control of reference axes

Extension System – Alignment with Distance Measurement

The basic system can be extended by replacing the laser with a distance laser. This allows the lateral position of the axis and its center of gravity to be captured and documented in addition to the alignment.

Functions

- Measurement of the lateral position of an axis
- Determination of the axis center of gravity
- Documentation and certification of measurement results
- Checking the course of the axis
- Determination of axis deviation and straightness

Areas of Application

- Quality control of shafts and axles
- Measurement of straight guides
- Checking of axis paths in mechanical and plant engineering
- Use as a testing tool for checking straightness and axis deviation

Target Group

The system is particularly suitable for professionals in the field of straightening metal components, such as:

- Flame straighteners

- Hot straighteners
- Cold straighteners
- Metalworkers
- Construction mechanics
- Industrial mechanics

Especially when straightening components, the system enables precise control of the axis path and straightness during and after the straightening process. This makes it possible to reliably detect and document deformations.

Typical Areas of Application

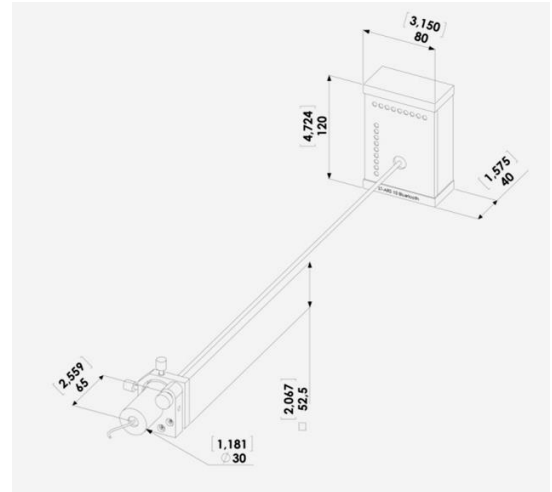
The system is suitable for use in the following areas:

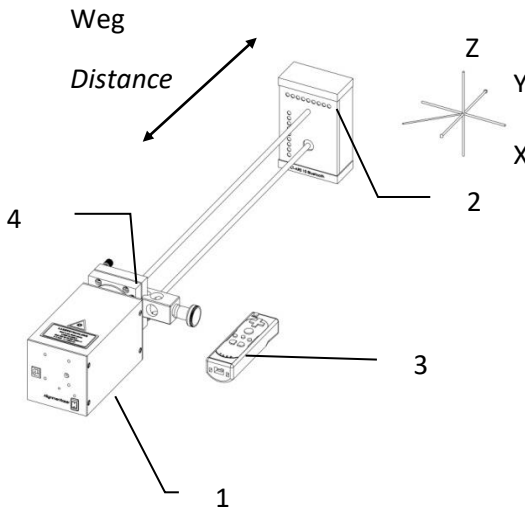
- Steel and hall construction
- Mechanical and plant engineering
- Vehicle and rail vehicle construction
- Shipbuilding
- Bridge and crane construction
- Foundries
- Quality assurance and measurement technology

Benefits

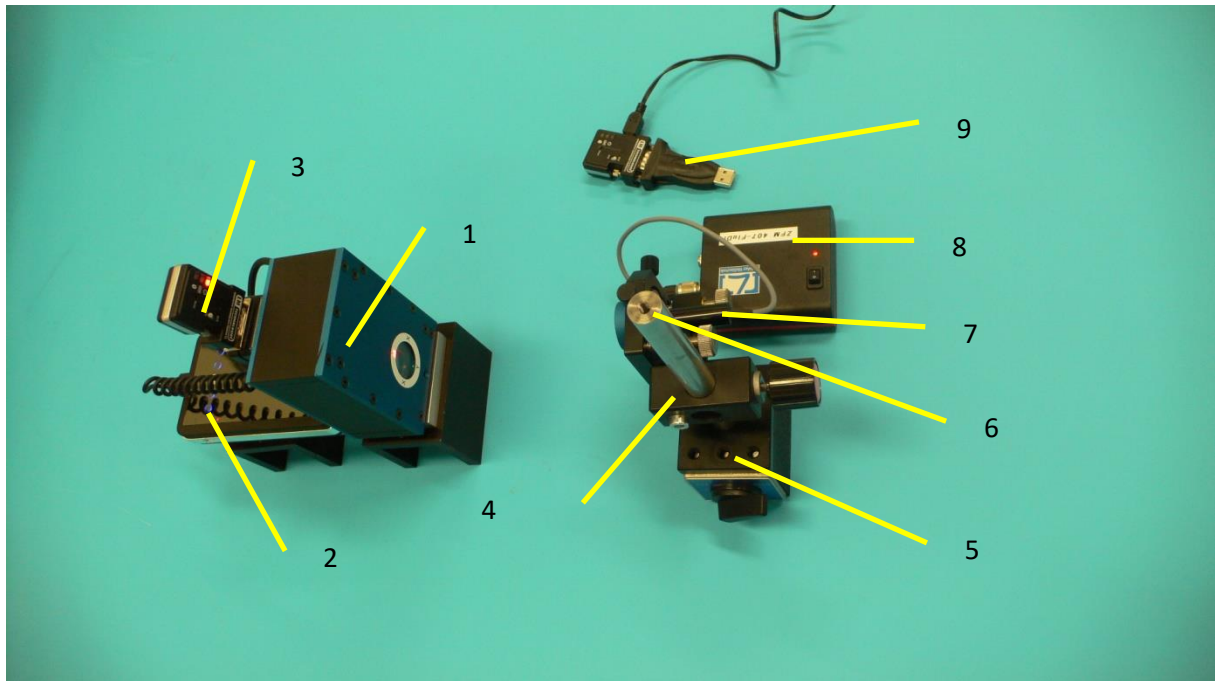
- Modular, extendable measurement system
- High measurement accuracy in alignment and straightness testing
- Easy extension from alignment system to complete axis measurement
- Reproducible and documentable measurement results
- Support for quality assurance and certification of components

Ausrichtsystem – ZFM 409		
<i>Aligner – ZFM 409</i>		
Abmessung [mm]:	120 x 80 x 40 mm (Empfänger) Ø 30 x 65 (Transmitter) 4.724 x 3.150 x 1.575 (Receiver)	
<i>Dimension [inch]:</i>	Ø 1.181 x 2.559 (Transmitter)	
Masse [g] /	<i>Weight :</i>	
Bestell-Nr. /	<i>Order No.:</i>	
269302 – 6000 . 926		
Messauflösung :	0,1µm	
<i>Measurement resolution:</i>		
Messgenauigkeit:	1µm (0 -.... 10m)	
<i>Measuring accuracy:</i>	20µm (10 ... 40m)	
Detektorfläche:	10 x 10 mm	
<i>Detector area:</i>		



ZFM 407 - FluDi <i>ZFM 407 - FluDi</i>					
Masse [g] /	Weight :				
Bestell-Nr. /		Order No.:			
269305 – 6000 . 126					
Fluchtungsdistanzmessgerät <i>Alignment distance measurement system</i>					
simultane Messung: Lageabweichung in X / Y Distanzmessung bis 40m	<i>Simultaneous measurement:</i> <i>Position deviation X / Y</i> <i>Distance measurement (up to 40m)</i>				
Genauigkeit (Fluchtungslaser): <i>Measurement accuracy (alignment laser):</i>	<i>1 µm (0 ... 15 m), Echtzeit</i> <i>20 µm (15... 40m), real-time gemittelt (abhängig von der Luftbewegung)</i> <i>averaged (depend on air movement)</i>				
Genauigkeit (Distanzlaser): <i>Measurement accuracy (distance laser):</i>	+/-2mm				
	POS-NR. Pos. No.	BENENNUNG Order no.:	BESCHREIBUNG Name	MENGE Quantity:	
	1	269305 - 6000 . 124	ZFM 407 - FluDi Sendemodul ZFM 407 - FluDi transmitter module	1	
	2	000000 - 5001 . 439	ZFM 407 - FluDi Empfangsmodul ZFM 407 - FluDi receiver module	1	
	3	000000 – 5001 . 171	Bluetooth Trigger	1	
	4	269305 – 6001 . 025	Kipphalter 526 Tiltable holder 526	1	
	5	269305 – 6000 . 224	Dynamic - ARS (FluDi Auswertesoftware) Dynamic - ARS (FluDi evaluation software)	1	
Weiteres Zubehör: <i>Advanced accessories:</i>	BENENNUNG Order no.:	BESCHREIBUNG Name			
	260297 – 9900 . 328	Säule 200 Rod 200			
	260298 – 3000 . 128	Magnetfuß 506 Magnetic base 506			

Short overview **ZFM 407 straightliner** - components

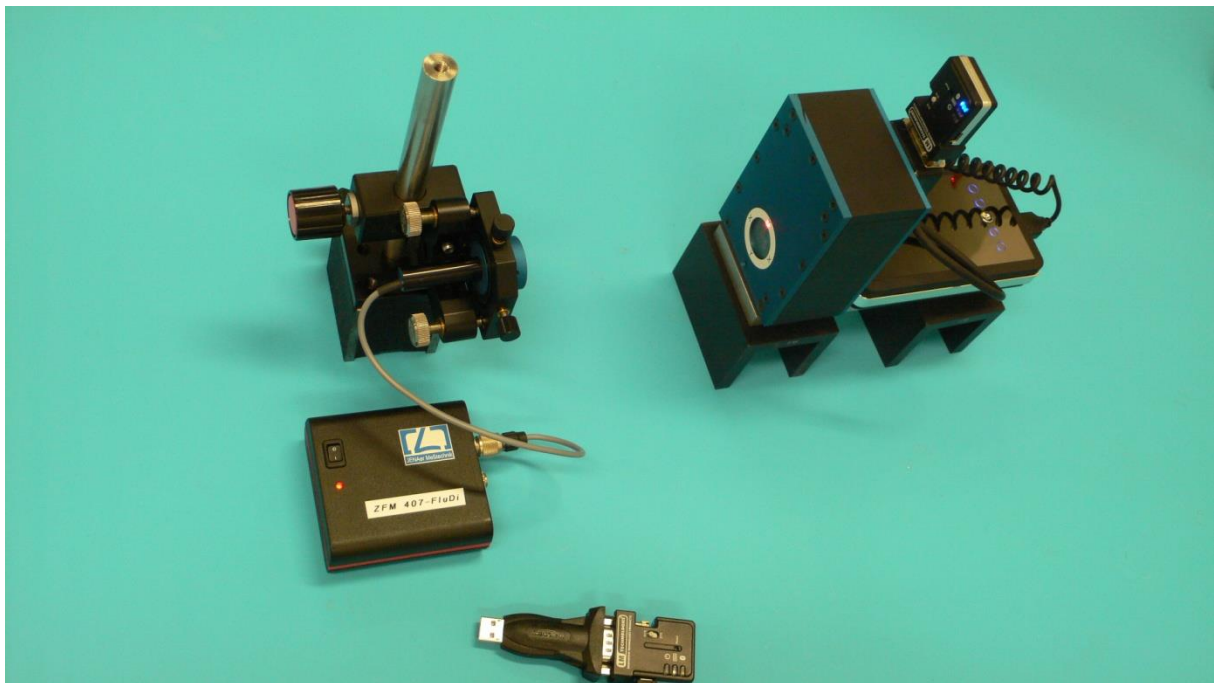
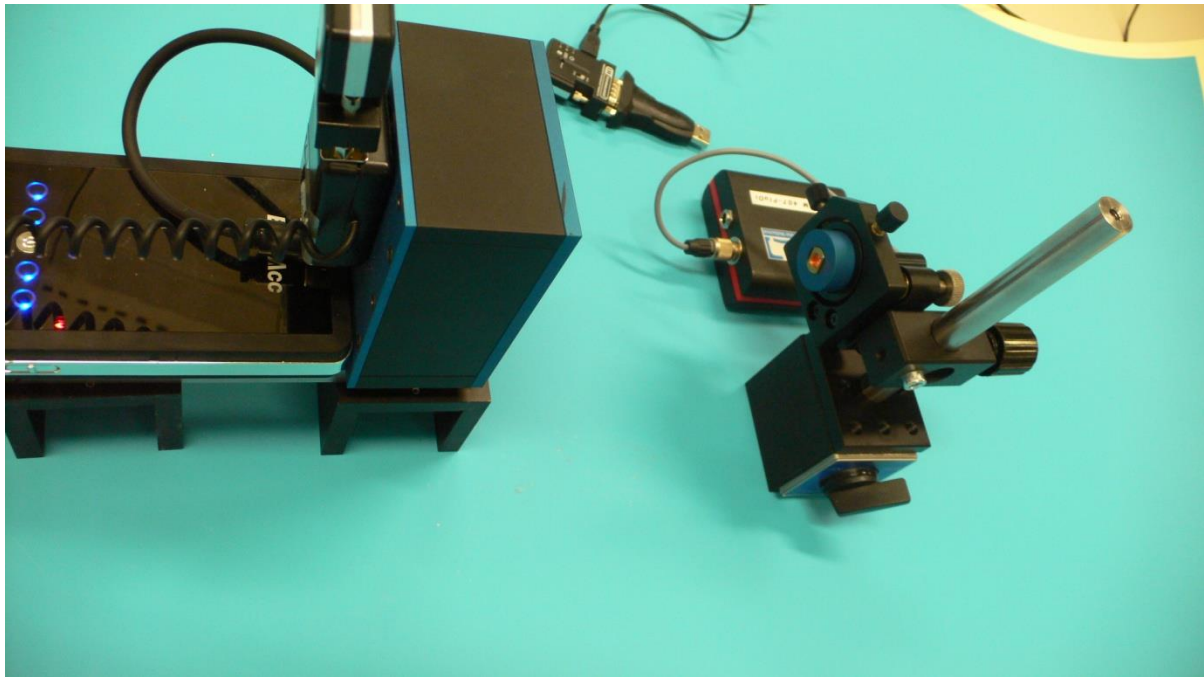


(Prototype)

Legend:

1. Receiver / detector unit
2. Battery pack
3. Bluetooth transmitter unit
4. Clamp
5. Magnetic holder
6. Row 200
7. Laser unit with adjustment clamp
8. Laser supply unit
9. Bluetooth receiver

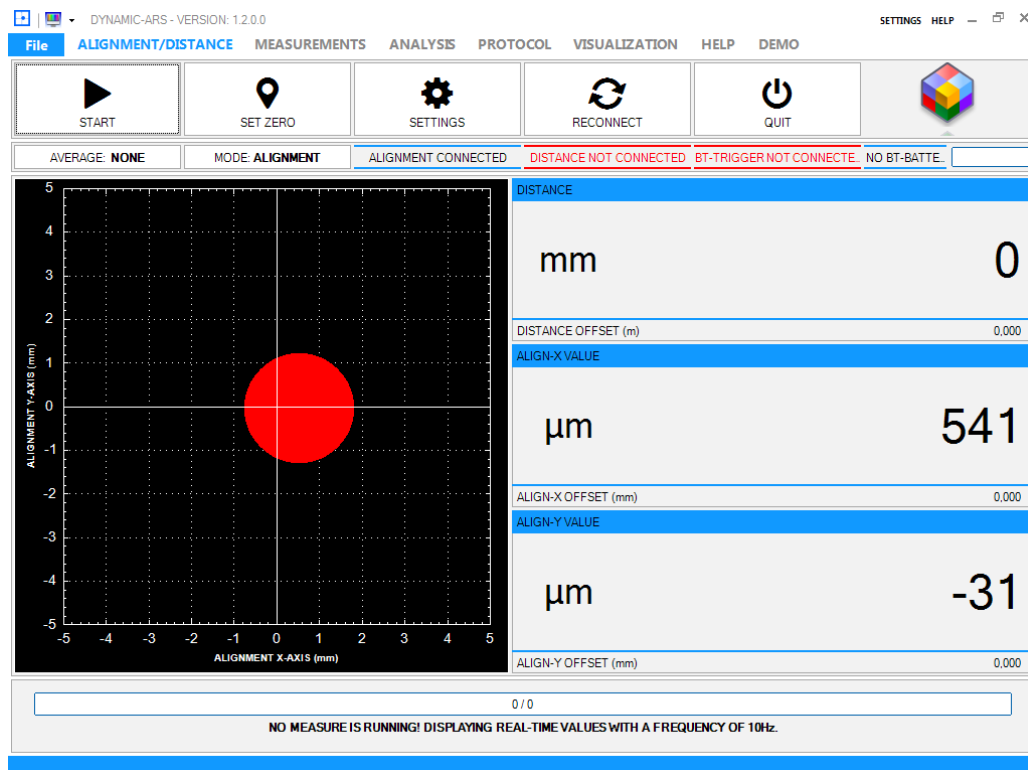
Some pictures for describing of connection

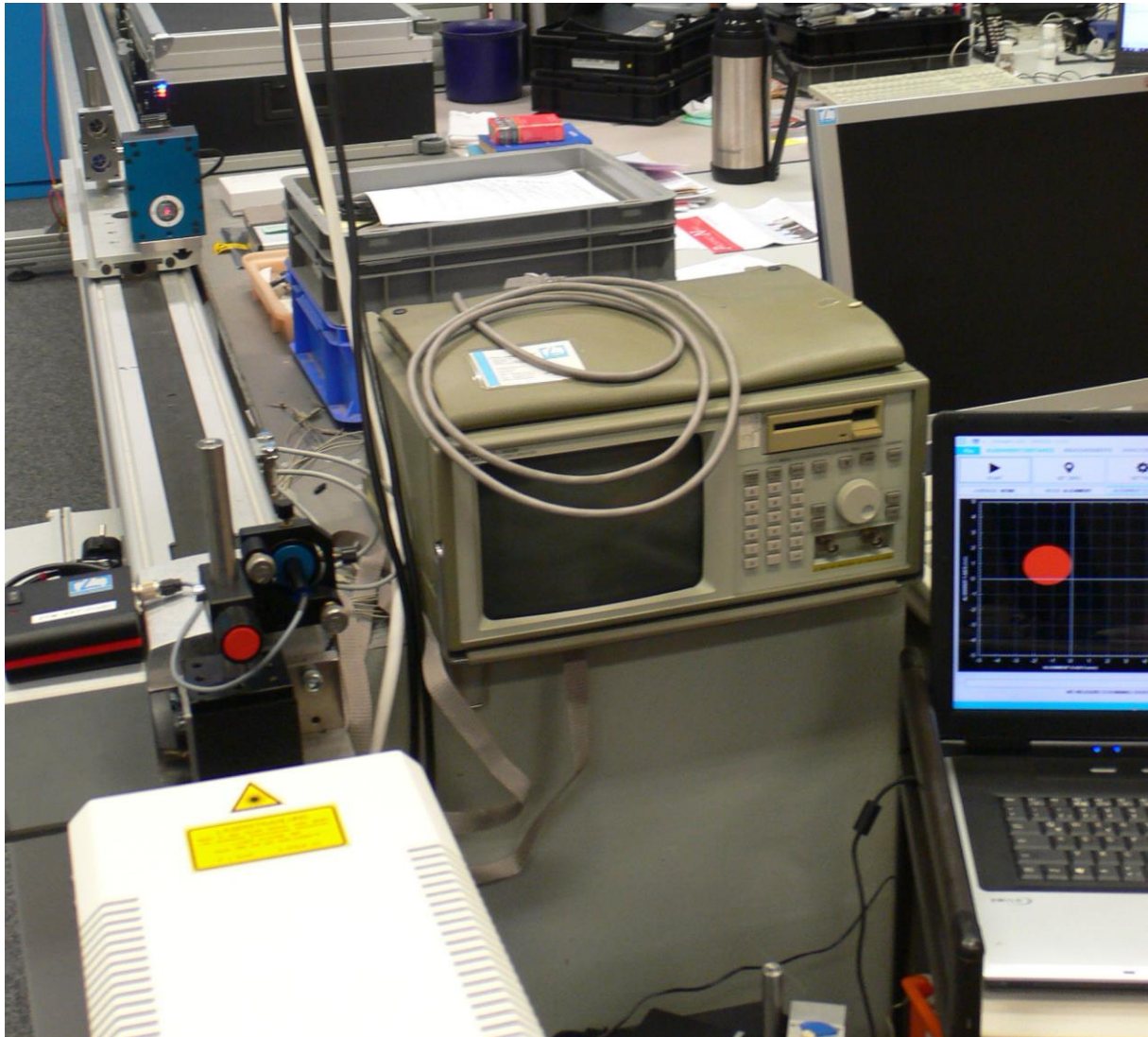




The laser beam must be adjusted inside (centre) of PSD field

Some pictures about straightliner in activation:





Safety instructions for handling positioning lasers

Positioning lasers are widely used in trade and industry to align tools, workpieces or machines with precision. Despite their low power, they pose health risks that must be taken seriously. Below are the most important safety instructions and rules for safe handling.

1. Understand and observe laser classes

Positioning lasers are usually classified as laser class 2 or 2M; at higher power levels, they may also be classified as class 3R. Classification is based on the DIN EN 60825-1 standard and provides information on the potential hazard. The higher the class, the stricter the required protective measures. The laser class must be permanently and clearly marked on the device.

Laser class	Hazard	Typical application
Class 1	Safe for the eyes, even during continuous operation	Fully enclosed lasers
Class 2	Harmless if exposure is brief (< 0.25 s); the blink reflex provides protection	Positioning lasers, laser pointers
Class 2M	Same as Class 2, but hazardous when used with optical instruments	Focused line lasers
Class 3R	Low but present risk to the eye	More powerful positioning lasers
Class 3B	Hazardous to the eye and skin	Industrial processing lasers

2. Eye protection – the most important rule

The direct or reflected laser beam must never be directed into the eyes. Although the natural blink reflex kicks in with Class 2 lasers, you should still consciously close your eyes and move your head out of the beam's path if you are exposed to the laser. For lasers from Class 3R upwards, it is essential to wear suitable laser safety goggles (in accordance with DIN EN 207)

Important information on eye protection

- Never look into the beam using optical instruments (magnifying glass, binoculars, microscope) – magnification significantly increases the risk
- When working regularly with high-power lasers, laser safety goggles (DIN EN 208) must be worn.
- Safety goggles must be suitable for the laser's wavelength (e.g. 650 nm for red).

3. Correct assembly and positioning

A positioning laser must be mounted in such a way that the operator cannot accidentally look directly into the beam. The module must be securely fastened to prevent it from falling or coming loose. Ideally, the laser should be positioned above eye level (1.40–1.90 m) to prevent accidental exposure to the beam.

Installation guidelines

- Maintain a minimum distance from the operator – the greater the distance and the wider the beam's angle of divergence, the lower the risk.
- Where distances are short, side covers or shields can prevent accidental viewing of the beam.
- The laser beam must not be directed at people, animals or reflective surfaces.

4. Technical and organisational measures

Under the Occupational Safety and Health Regulation on Artificial Optical Radiation (OStrV) and the Technical Rules for Laser Radiation (TROS), employers must carry out a risk assessment and establish protective measures in accordance with the following order of priority:

1. **Substitution/minimisation:** Use of less hazardous processes or equipment
 2. **Technical measures:** Shielding, safety interlocks, protective enclosures
 3. **Organisational measures:** Access restrictions, warning signs, training
 4. **Personal protective equipment:** Laser safety goggles, protective clothing
- For Class 3B and Class 4 lasers, it is mandatory to appoint a laser safety officer.

5. Warnings and labelling

Every laser installation must be fitted with clearly visible warning signs indicating the laser class and the associated hazards. The warning signs must not be removed or obscured. In addition, information signs should be displayed at the workplace to indicate the laser area.

6. Equipment care and maintenance

- Tampering with or modifying the device is prohibited – this will invalidate the approval and may compromise safety
- Repairs may only be carried out by the manufacturer or authorised workshops.
- Before each use, check that the device is functioning correctly and is properly adjusted.
- The device should be inspected and adjusted by the manufacturer once a year.

7. Environmental and operating conditions

Position lasers should only be operated within the specified temperature ranges (typically 0°C to +50°C). Extreme temperatures, humidity, vibrations or mechanical stress may impair their function and safety. The enclosure's protection rating (e.g. IP 65) indicates its suitability for dusty or wet environments.

8. Staff training

People who work with lasers must be briefed on the following:

- The effects of laser radiation on the eyes and skin
- How to react when exposed to laser radiation (close your eyes, turn your head away)
- Use of protective equipment
- Statutory regulations and operating instructions
- Emergency procedures

9. Specific hazards associated with higher laser classes

For position lasers from Class 3R onwards, in addition to the risk to eyesight, there is also a risk of fire or explosion, as the radiation can ignite flammable materials. In such cases, additional protective measures, such as protective screens or smoke extraction systems, are required.

10. Summary of the key rules of conduct

- • Never look directly into the laser beam or its reflection
- • Never point the laser beam at people or animals
- • Do not use optical instruments to view the beam
- • Position the device above eye level
- • Avoid tampering with or attempting to repair the device yourself
- • Wear safety goggles for Class 3R and above
- • Keep warning signs clearly visible
- • Ensure regular maintenance and calibration
- • Provide regular training for staff

Compliance with these safety instructions ensures the safe use of positioning lasers and protects the health and eyesight of all employees in the workplace.