

Original Instructions



Laser Marking System

XENO 1

MADE IN GERMANY

Part No.	Description
5528130	Laser marking system XENO 1 20 W/160.2 including lens
5528140	Laser marking system XENO 1 20 W/254.2 including lens
5528150	Laser marking system XENO 1 30 W/160.2 including lens
5528160	Laser marking system XENO 1 30 W/254.2 including lens

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Topicality

Due to the constant further development of our products, discrepancies between documentation and product may occur. For the current edition, please see www.cab.de.

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The Laser Marking System XENO 1 consists of a safety housing and a marking laser. The device may only be operated with an extraction and filter device. The extraction and filter device AF5 can be optionally supplied with XENO 1.

The system can be operated using the cabLase software.

The device may only be used if it is in perfect working order, and it must be used as intended with due regard to safety and dangers in accordance with this manual.

The device must not be modified. The safety devices must not be manipulated. Bridging safety switches can have serious consequences.

The operating company must ensure that the maintenance schedule given by cab Produkttechnik GmbH are observed and complied with.

2.1 Notes

Important information and instructions in this documentation are indicated as follows:



Danger!

Draws attention to an exceptionally great, imminent danger to health or life due to dangerous electrical voltage.



Danger!

Draws attention to a danger with high risk that, if not avoided, will result in death or serious injury.



Warning!

Draws attention to a danger with medium risk that, if not avoided, may result in death or serious injury.



Caution!

Draws attention to a danger with low risk that, if not avoided, may result in minor or moderate injury.



Attention!

Draws attention to potential risk of property damage or loss of quality.



Note!

Advice on facilitating the work-flow, or information on important steps.



Environment!

Tips for environmental protection.



Handling instructions.



Reference to chapter, position, image number or document.



Option (accessories, peripherals, special equipment).

Time

Viewed in the display/monitor.

2.2 Intended Use

- This device is intended exclusively for marking suitable materials ▷ 2.3 on page 6.
- The device has a laser protection window to allow observing the marking process. Since the laser protection window can be broken XENO 1 may only be operated under surveillance. In case of a window's damage immediately press the emergency stop button.
- The device must not be used on living tissue.
- This device is manufactured in line with state of the art technologies and the recognized safety rules. However, danger to life and limb of the user or third parties and/or impairment of the device and other material assets can arise during use.
- The device may only be used if it is in perfect working order, and it must be used as intended with due regard to safety and hazards in accordance with the installation instructions.
- Any other use or use beyond that intended is regarded as improper use. The user alone is liable for any damages resulting from improper use.
- Proper use also includes observing this manual as well as the maintenance schedule.

2.3 Safety Information

Requirements for the Operating Personnel

- The company operating the device must ensure that the user has read and understood the instructions prior to initial commissioning.
- The operator of this device is obliged to comply with relevant security policies and standards.
- Further work may only be carried out by qualified staff or service technicians.
- Improperly performed work or modifications to the device endanger operational safety.

Transport and Installation

- The device must only be transported in the original packaging or a suitable alternative.
- Secure the device against toppling and damage.
- The installation site must be able to bear the load and be easily accessible, in accordance with the technical requirements.



Attention!

- Mechanical loads, vibrations and shocks can cause damage to the device or its components.
- Improperly installed devices can cause damage and lead to the loss of warranted characteristics.

Health and Environment



Warning!

Adverse effects on health and the environment through by-products released during laser processing. During laser processing, by-products detrimental to health and the environment are released. These hazardous substances can cause cancer and lung damage.

The hazardous substances are particulate (dust, fine dust) or gaseous (smoke, gases).

- ▶ Only operate the device with a suitable extraction and filter device.
- ▶ Observe the operator's manual for the extraction and filter device.
- ▶ Check the effectiveness of the extraction and filter device regularly.
- ▶ Dispose of used filters properly.
- ▶ Only process materials whose by-products can be filtered with the extraction and filter device
 - ▷ Instructions of the extraction and filter device.



Note!

For XENO 1, cab offers the AF5 (part no. 5907550) extraction and filter device as an option.



Attention!

Lost of function!

XENO 1 cannot be operated connected in the intended manner without extraction and filter device.

Electrical Safety

- The device is designed for power grids with an AC voltage of 100 V to 240 V. Only connect to outlets with a grounded contact.
- Improper interference with electronic components and their software can cause malfunctioning.
- Observe general labor regulations, electrical safety regulations and local regulations at the installation site.
- Before starting maintenance work, disconnect the device from the mains completely.
- Avoid touching electrical/electronic components. Electrostatic charge can cause damage to circuits and switches.
- Switch off the device when not in use.
- Do not operate the device if components are damaged or the covers are open.

**Danger!**

Danger to life from mains voltage.

- **Do not open or remove housing parts and covers.**

Laser Safety

- If used properly, this device meets the requirements for laser class 1 according to DIN EN 60825-1. Accessible laser radiation is not dangerous under reasonably foreseeable conditions.
- With operation door open, there is danger due to class 2 laser radiation coming from pilot laser or focus finder. This radiation is dangerous to the eyes when staring into the laser beam.
- Within the housing, there is danger due to class 4 laser radiation. This radiation is very harmful to the eyes and harmful to the skin. Scattered or invisible radiation can also be harmful. Laser radiation can cause fire and explosion hazards.
- This device must not be operated if housing parts or covers are damaged.
- Users must not remove housing parts or covers under any circumstances. The operation door alone may be opened, due to the fact that after opening, no escape of class 4 laser radiation is possible.
- The operator of the laser equipment is responsible for observance of the protection measures. Further information, accident prevention regulations as well as operating instructions for all laser protection classes can be found in the applicable directives.

2.4 Safety Labeling

Various warning labels are affixed to the device to draw attention to hazards.



Note!

To ensure reliable identification of potential hazards, warning labels must not be removed or damaged under any circumstances!

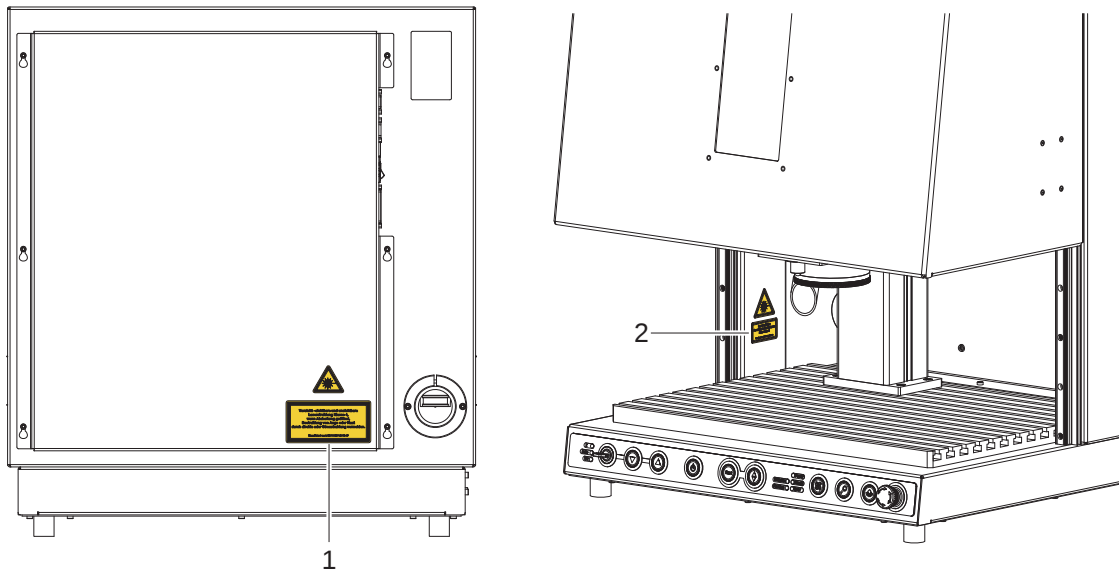


Figure 1 Safety labeling

	
1	Class 4 laser radiation Within the housing, there is danger due to class 4 laser radiation. This radiation is very harmful to the eyes and harmful to the skin. Scattered or invisible radiation can also be harmful. Laser radiation can cause fire and explosion hazards. Users must not remove housing parts or covers under any circumstances. Maintenance work that requires the housing to be opened must only be carried out with the laser switched off, by qualified service personnel authorized by cab.
2	 Laser Class 2 The eye is not endangered if the impact of the laser radiation is limited to a maximum period of 0.25 s. ► Do not stare into the laser beam.

Table 1 Safety labeling

2.5 Decommissioning and Disposal

- ▶ For decommissioning, disconnect the device from the mains and any other devices and secure it against unauthorized activation.
- ▶ Housing parts and components contaminated with harmful substances must be cleaned by specialist personnel.
- ▶ Store the device in its original packaging in accordance with general storage conditions.

**Danger!**

- ▶ If the device is decommissioned, it must be secured against unauthorized activation.

**Danger!**

- ▶ If the device is returned, ensure that it is not contaminated with residues of harmful substances detrimental to health or the environment.

**Note!**

Use the original packaging for returning or transporting the device. Original packaging can be obtained from the manufacturer.



Obsolete devices contain valuable, recyclable materials that can be further utilized.

- ▶ Send the parts for recycling.
- ▶ Components contaminated with harmful substances must be disposed of separately at appropriate collection points, in accordance with legal regulations.



The electronics boards of the device are equipped with lithium batteries.

- ▶ Take old batteries to collection boxes in shops or public waste disposal centers.

3.1 Scope of Delivery

The scope of delivery is described in the documents accompanying the consignment of goods.

- Laser marking system XENO 1 incl.
 - Marking laser
 - Z-axis
 - Extraction arm
 - Rotary axis (* Accessory)
 - Emergency stop dongle
- CD cabLase Editor 5
- USB dongle
- Plug for external 24 V
- 4 Slot nuts, rectangular
- 4 Slot nuts, rhombic
- Bellows
- Cleaning tissue set
- * Accessory : Extraction and filter system AF5 incl.
 - Connection cable
 - Hose set
 - Suction nozzle
- Check delivery for completeness and faultless condition.
In the event of discrepancies, contact the supplier immediately.

3.2 Unpacking

**Attention!**

Possible damage to the device.

The laser marking system is delivered standing upright on a pallet (2).

► This orientation must be adhered to during any transport.

**Note!**

► Please keep the original packaging for future transport.

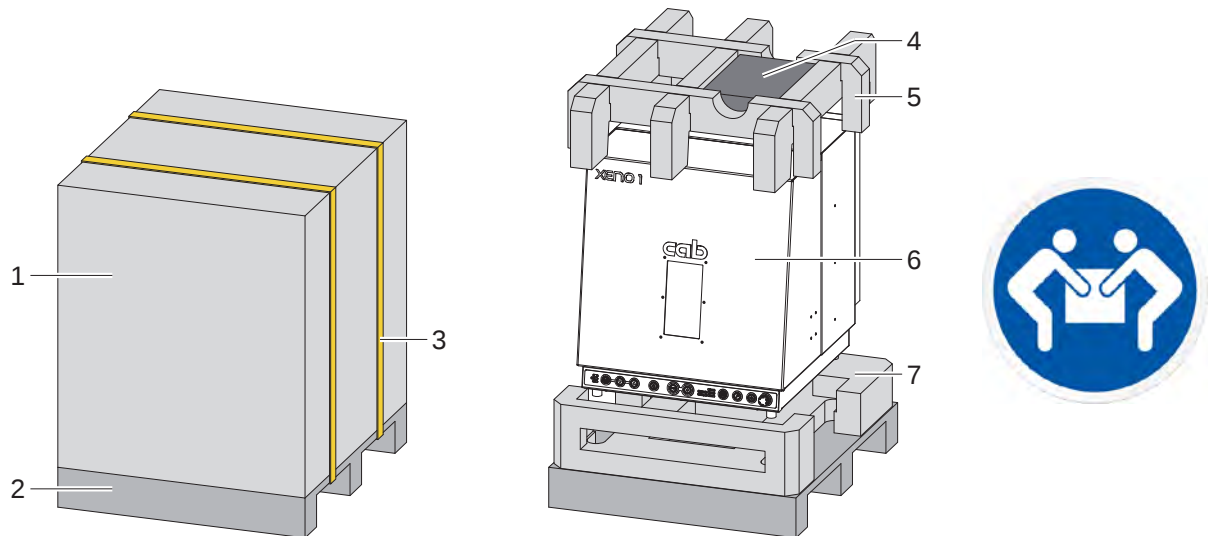


Figure 2 Unpacking

- Loosen the tension belts (3).
- Lift off the cardboard packaging (1).
- Remove the box with the accessories (4).
- Remove the foam padding from the top (5).
- Lift the XENO 1 (6) out of the foam padding at the bottom (7) with two persons.

3.3 Installation

3.3.1 Installation Site Requirements

- Only operate the laser marking system in a dry environment with no exposure to moisture through splash water or mist.
- The formation of condensation can result in loss of operational safety. Avoid strong temperature fluctuations and allow the laser marking system to adapt to room temperature before operating.
- Do not operate the laser marking system near high-voltage lines.
- No mechanical load is permissible at the installation site. Vibrations and shocks can cause damage to the device or its components.
- Install the laser marking system so that the clearances shown in figure 3 are complied with.

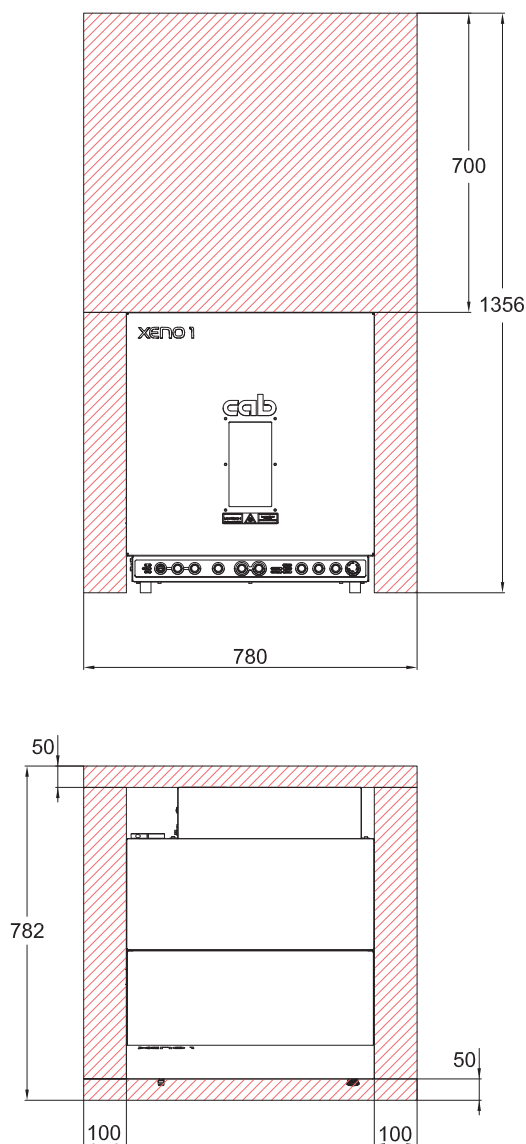


Figure 3 Clearances and laser marking system dimensions

3.3.2 Positioning at the Installation Site

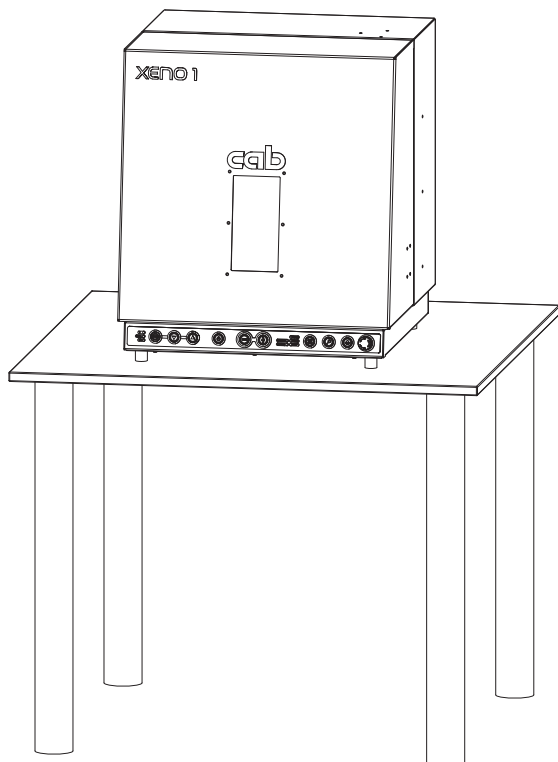


Figure 4 Positioning at the Installation Site

- Install the laser marking system on a level surface.

3.4 Overview of Laser Marking System

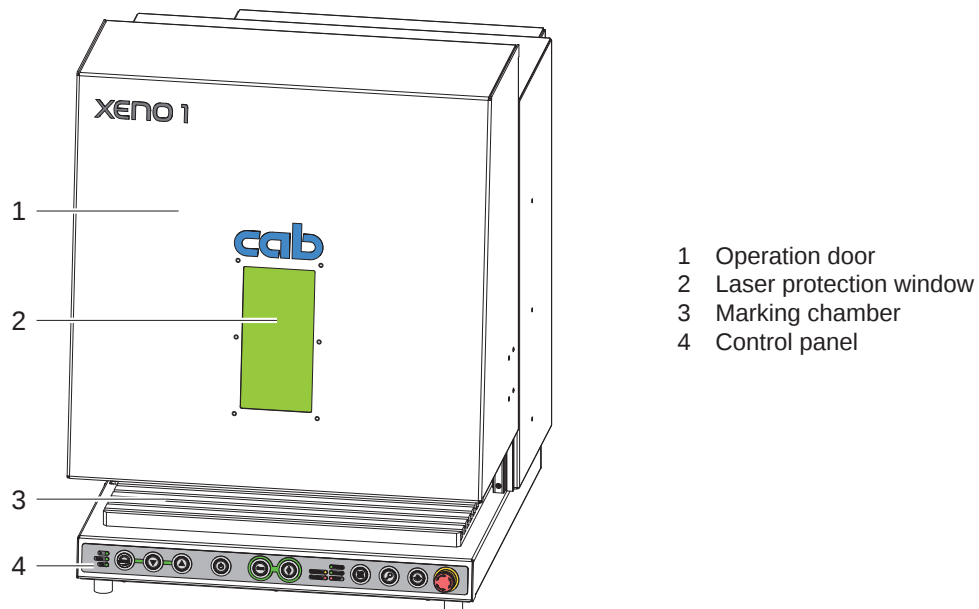


Figure 5 Overview of laser marking system

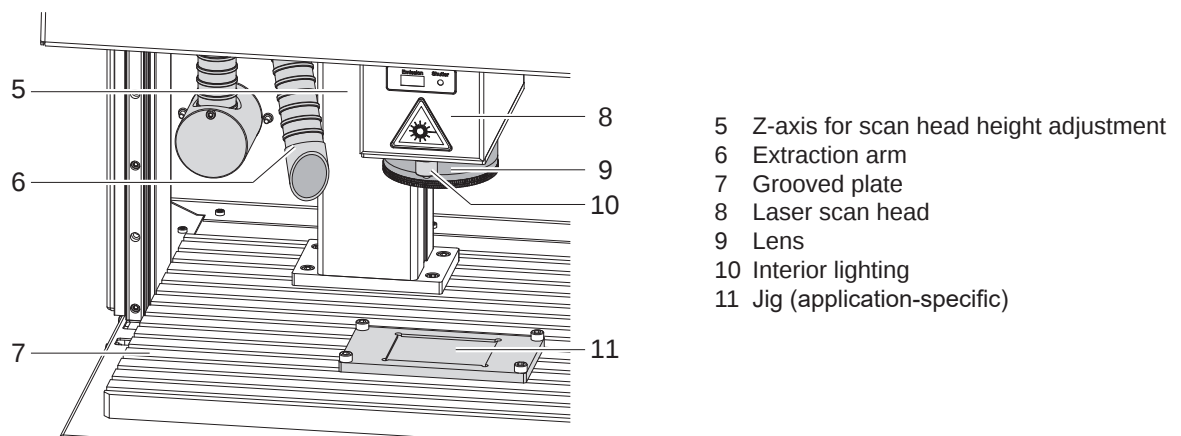


Figure 6 Marking chamber with jig

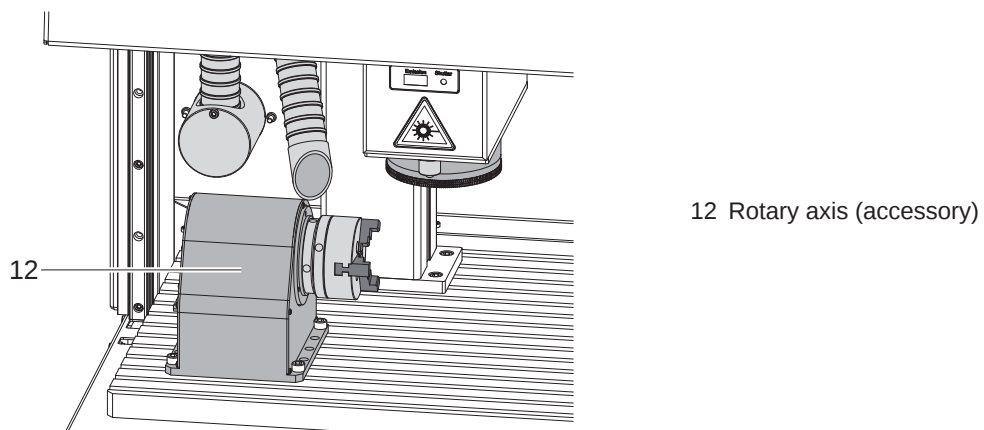
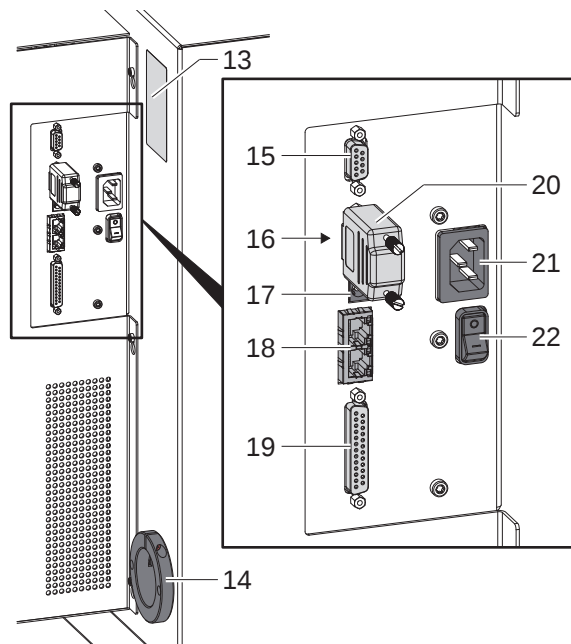


Figure 7 Marking chamber with rotary axis



- 13 Rating plate
- 14 Suction hose connection
- 15 Connection for external start signal - CON1
- 16 Connection for external emergency stop - CON2
- 17 Connection for external 24V supply - CON3
- 18 2 Ethernet interfaces - CON4
- 19 Extraction and filter device connection - CON5
- 20 Emergency stop dongle
- 21 Mains socket
- 22 Mains switch

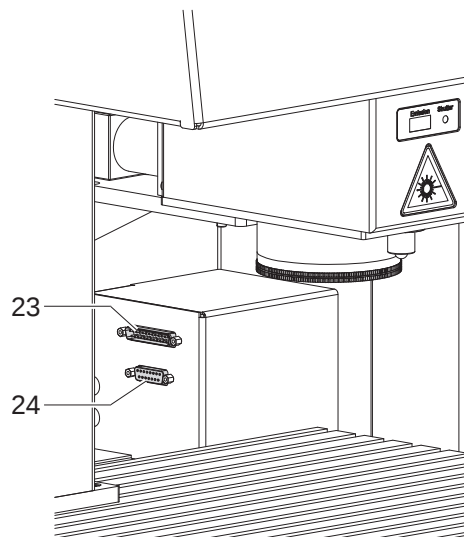
Figure 8 Connections



Attention!

The marking process cannot be executed without external circuit at CON2. For that reason a emergency stop dongle is connected to CON2 when XENO 1 is delivered.

- For using an external emergency switch remove the dongle and connect the emergency switch to CON2.



- 23 Digital I/O - CON6
- 24 Rotary axis - CON7

Figure 9 Interfaces in the marking chamber

3.5 Mounting a Jig

In the marking chamber there is a grooved plate (2) on which a jig (3) or an optional rotary axis (4) can be installed, using suitable T-slot nuts (1):

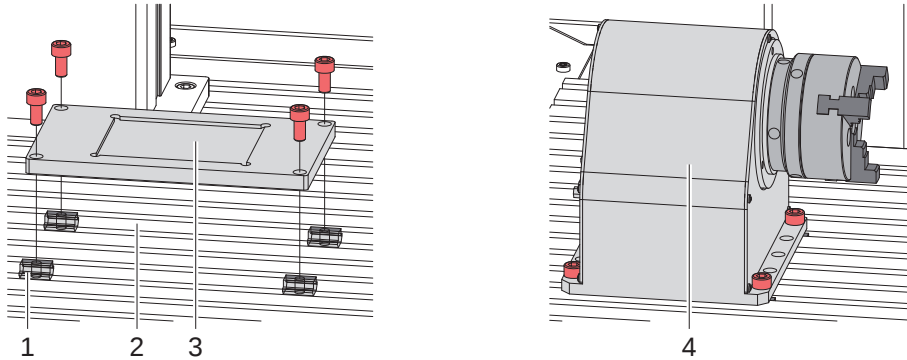


Figure 10 Mounting a jig/rotary axis

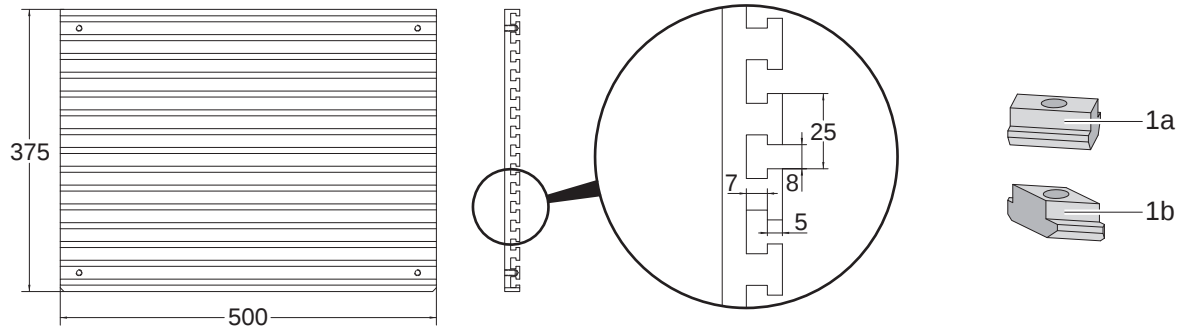


Figure 11 Grooved plate and slot nuts



Note!

The scope of delivery contains each four rectangular and rhombic slot nuts.
The rectangular slot nuts (1a) can only be inserted into the grooved plate (2) from the side.
The rhombic slot nuts (1b) can be inserted from above and turned in the mounting position.

3.6 Positioning the Scan Head

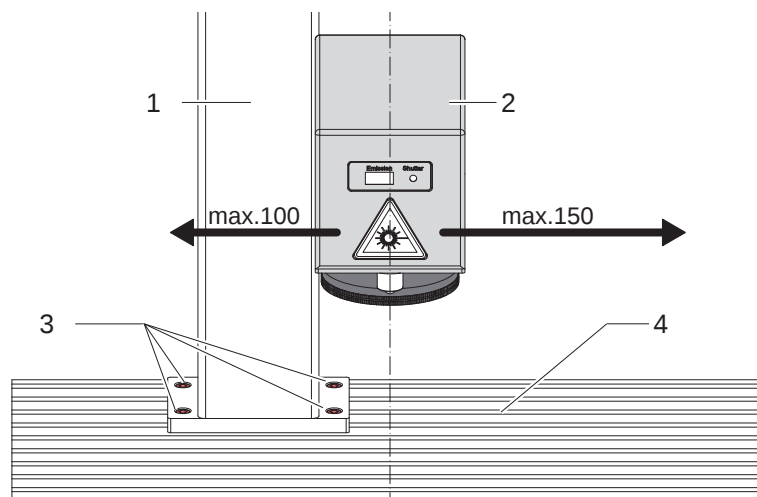


Figure 12 Positioning the scan head

At delivery the scan head (2) is aligned to the middle of the grooved plate (4).

The scan head (2) can be moved sideways if necessary:

- Release 4 screws (3).
- Shift the Z-axis (1) with the scan head (2) as necessary.
- Tighten 4 screws (3).

3.7 Adjusting the Extraction Arm

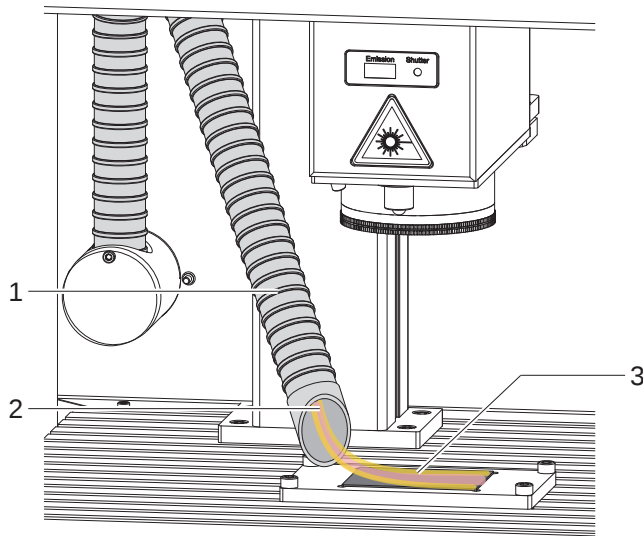


Figure 13 Adjusting the extraction arm

The extraction arm (1) can be bent as required.

- Set the extraction arm so that the opening of the suction nozzle (2) is placed as close as possible to the product (3).



Note!

The flexibility of the extraction arm can be changed by turning the segments against each other.

- Turning clockwise - releasing the extraction arm
- Turning anticlockwise - fixing the extraction arm



Attention!

Possible marking errors and damage to the extraction arm.

- Set the extraction arm so that the beam path of the laser is not covered at any point.

3.8 Removing the Lens Cap

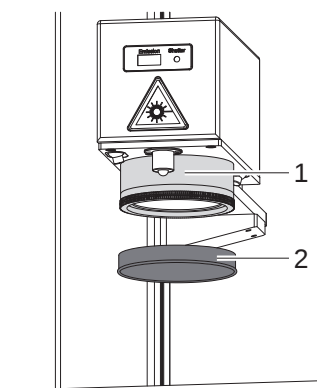


Figure 14 Removing the Lens Cap

The lens (1) in the laser scan head is protected with a cap (2) on delivery.

- Remove the cap before marking for the first time.



Attention!

Possible marking errors.

- If marking was attempted before the protective cap was removed, clean the lens protection glass.

3.9 Connecting the Extraction and Filter Device

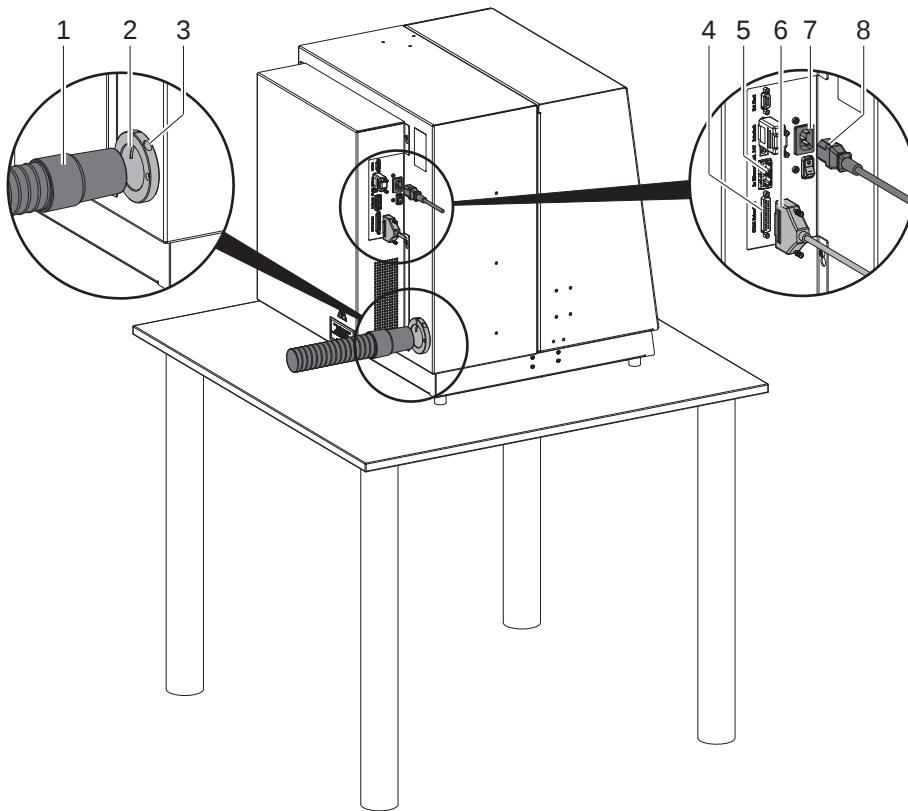


Figure 15 Connecting an extraction and filter device

The laser marking system has a fitting (2) to connect a suction hose with a diameter of 50 mm and an interface with a 25-pin connector (4) to control the extraction and filter device.

- Push suction hose (1) into fitting (2) of the laser marking system and secure with screw (3).
- Plug the connection cable (6) to the 25-pin interface (4) of the laser marking system and to the extraction and filter device ► Instructions extraction and filter device.



Attention!

Lost of function!

XENO 1 cannot be operated connected in the intended manner without extraction and filter device.

3.10 Connecting the Computer

- Connect the computer via network cable to one of the Ethernet interfaces (5).

3.11 Connecting the System to the Mains Voltage

- Plug mains cable (8) into mains socket (7) of the laser marking system and connect to a grounded outlet.

4.1 Mains Switch

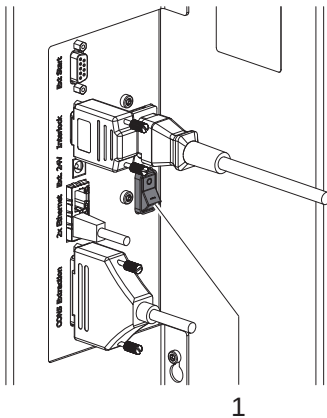


Figure 16 Mains switch

- Switch on the XENO 1 with the mains switch (1).
- * Accessory: Switch on the extraction and filter device with the mains switch ► Instructions extraction and filter device.

4.2 Control Panel

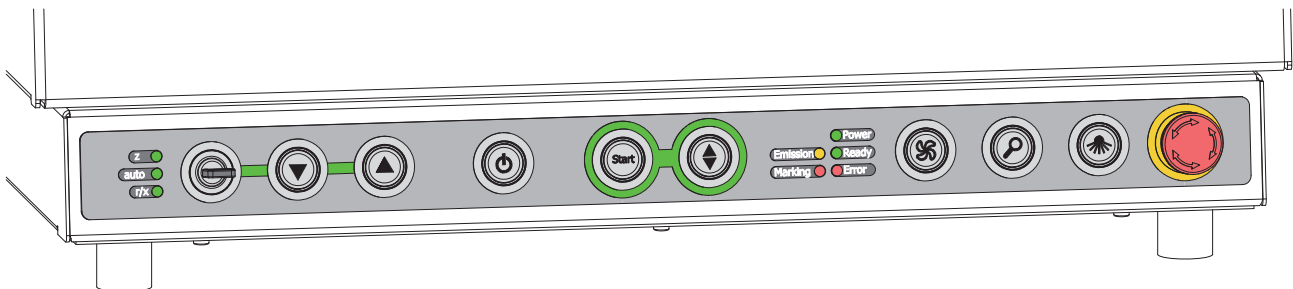


Figure 17 Control Panel

The control panel enables manual operation and indicates system states.

LED	Description
	Automatic controlling of the axes via software
	Manual controlling of the rotary axis via control panel
	Manual controlling of the Z-axis via control panel
	Mains voltage present
	Laser beam source turned on
	All components ready, safety circuits closed, marking cycle can be started.
	Marking cycle running.
	Malfunction

Table 2 LEDs in the control panel of the laser marking system

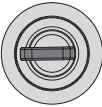
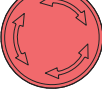
Button/ Switch	Function Key switch on "auto"	Function Key switch on "r/x" or "z"	Button illumination
	Key switch for operating mode selection: • auto – Automatic controlling of the axes via cabLase file. • r/x – Manual controlling of the rotary axis with the right/left buttons. • z – Manual controlling of the Z-axis with the up/down buttons.		None
	Button disabled.	"up/right" button moves the selected axis in the specified direction. Ensure that the travel path is free. Risk of collision!	Button lights up if movement in the specified direction is possible.
	Button disabled.	"down/left" button moves the selected axis in the specified direction. Ensure that the travel path is free. Risk of collision!	Button lights up if movement in the specified direction is possible.
	Button switches on the system controller, the laser and the extraction and filter device.	Button switches on the system controller and the laser.	Lights up when switched on Flashes when the system starts up.
	Depending on the settings in cabLase, the Start button triggers a marking program cycle ▷ 6.3.1 on page 25.		Button lights up if a job has been loaded and is ready to run.
	Button opens the operation door.	Button opens or closes the operating door.	Button lights up when the operating door is shut.
	► Premature opening of the operating door can cause marking errors!		
	During marking the extraction and filter device is switched on and the button is disabled. Between markings button switches the extraction and filter device on and off.	Button switches the extraction and filter device on and off.	On: error-free operation of the extraction and filter device.
	Filter device errors are also indicated by the Error LED. The current marking job is completed; a new marking job cannot be started.		Flashing: Extraction and filter device filter is full.
	Button switches focus finder and pilot laser on and off.		Button lights up when focus finder and pilot laser are switched on.
	Button activates the interior lighting.		Button lights up when the interior lighting is on.
	The emergency stop button switches the device into a safe state. Laser is switched off, drives are stopped. This does not de-energize the device. After the button has been pressed, it can be reset to its original position by turning. ► Only press this button in an emergency.		None

Table 3 Buttons and switches in the control panel of the laser marking system

5.1 Manual Operation

Manual operation is primarily intended for setup procedures and for executing simple marking jobs.

- To select manual operation turn the key switch to "r/x" or "z".

5.1.1 Moving the Axes Manually

Depending on the position of the key switch, the axes can be moved the  and  buttons.

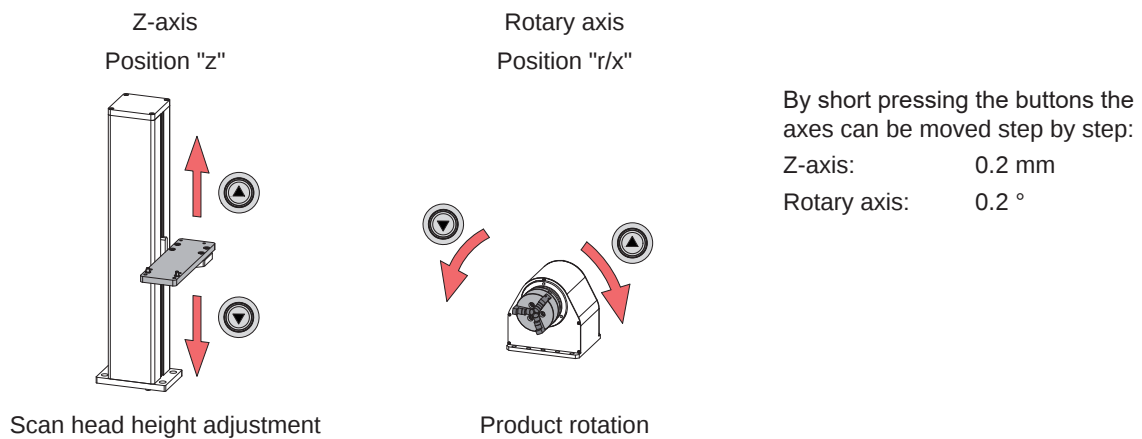


Figure 18 Moving the Axes Manually

5.1.2 Aligning the Focusing Plane with the Marking Surface

In manual operation, use the focus finder to adjust the distance between scan head (1) and product (4) so that the focusing plane of the lens (3) is located exactly on the surface to be marked.

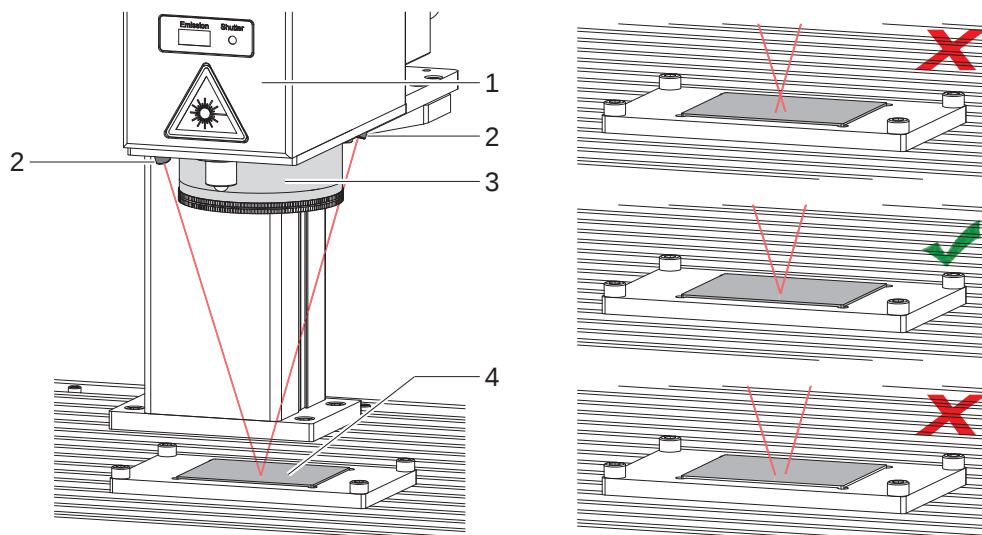


Figure 19 Using the focus finder

- Place a product (4) into the jig.
- Turn the key switch to "z".
- Switch on the focus finder with  button.
The two pointers (2) project two red points onto the product.
- Adjust the height of the scan head (1) mounted on the Z-axis with the buttons  and  so that the two red points merge into one.

5.1.3 Manual Marking Operation

Automation Settings in cabLase Editor

- ▶ Select the setting "Mark immediately" on the "External Start" tab ▷ 6.3.1 on page 25.
- ▶ Select one of the "FOR OPERATION FROM THE CONSOLE: Starting each cycle via software" settings on the "Repeat Process" ▷ 6.3.2 on page 26.

Process

- ▶ Insert product.
- ▶ Close the operating door with the  button.
- ▶ Start a marking job in cabLase Editor.
The job is executed.
- ▶ Open the operating door with the  button.

5.2 Automatic Operation

In automatic operation mode, program-controlled movement of the different axes is available for complex marking jobs. Furthermore, after a job has been sent once from cabLase Editor, repeated marking jobs can be started cyclically via the  button on the control panel.

- ▶ To select automatic operation, turn the key switch to "auto".

5.2.1 Referencing the Axes

For program-controlled movement of the axes in automatic operation mode, the axes must be referenced to home positions prior to carrying out the first marking job.

After cabLase Editor has started, the software immediately offers axes referencing. However, this can also be carried out later ▷ 6.2 on page 24.

5.2.2 Automatic Marking Operation

Automation Settings in cabLase Editor

- ▶ Select the setting "Wait for an external start signal" on the "External Start" tab ▷ 6.3.1 on page 25.
- ▶ Select one of the "Automation Only" settings on the "Repeat Process" tab ▷ 6.3.2 on page 26.

Process

- ▶ Start a marking job in cabLase Editor.
The  button lights up when a job is loaded.
- ▶ Insert product.
- ▶ Press the  button.
The operating door is closed automatically.
One marking cycle is carried out; the operating door then opens automatically.
If a cycle number is > 1 or if continuous operation has been stipulated in cabLase editor, the  button lights up again and another product can be marked.



Note!

The button  for opening the operating door remains active, allowing intervention by the operator at any time.



Attention!

Manual opening of the operating door during a marking cycle can lead to incorrect marking results.

**Note!**

For detailed explanations on programming and the creating marking programs, see the software documentation.

▷ <https://www.cab.de/en/marking/markings-laser/xeno1/#software>

6.1 Main Window

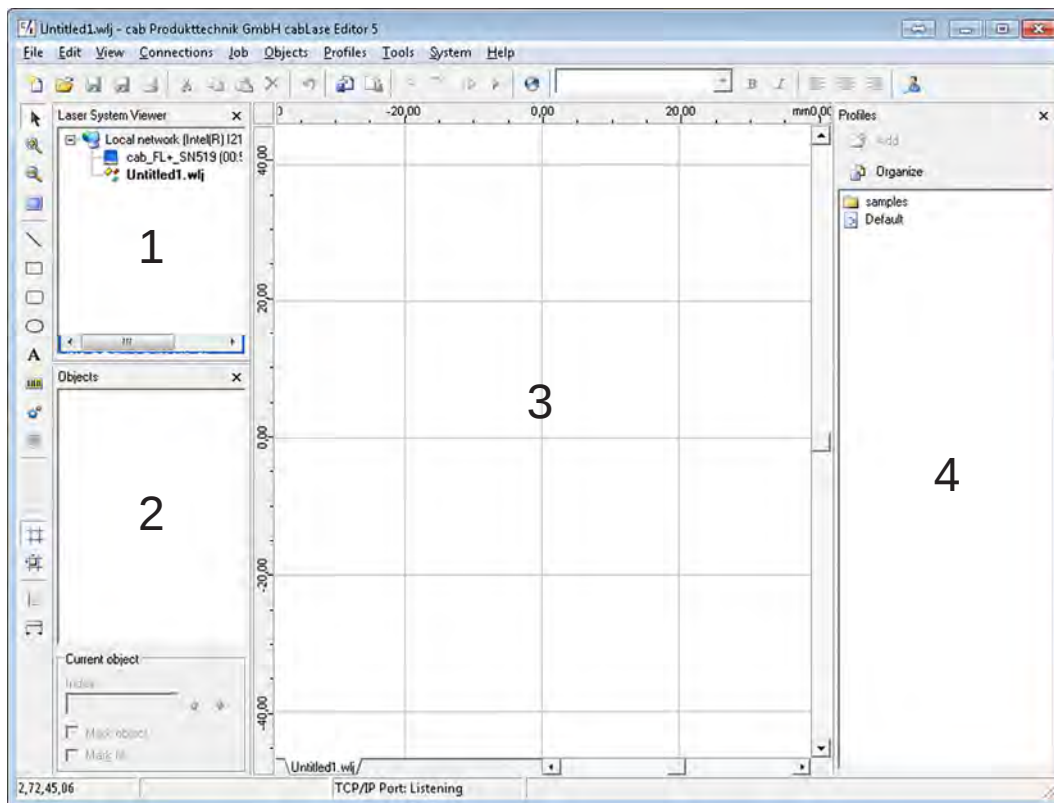


Figure 20 Main window

The main window of cabLase Editor 5 is divided into the following areas:

- 1 Laser system(s) display and currently opened layouts
- 2 Object list with layout and automation objects
- 3 Layout
- 4 Profiles with marking parameters

**Note!**

The layout of the main window shown above may differ from that on the screen and depends on the settings in the "View" menu.

6.2 Referencing the Axes

The assistant for referencing the axes appears immediately after cabLase Editor has started:



Attention!

- To avoid collisions, check for free travel of the axes before referencing.

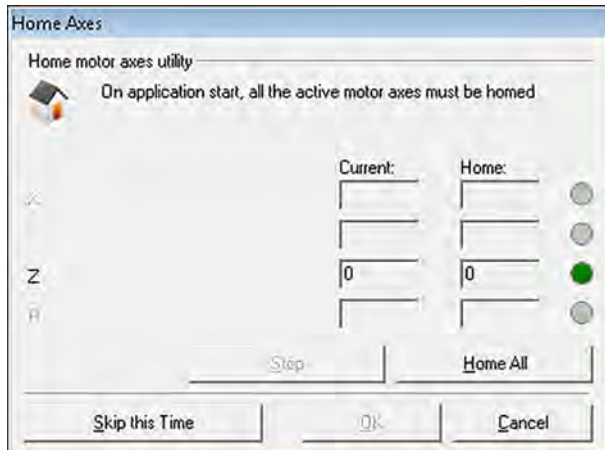


Figure 21 Referencing all axes after cabLase Editor has started

- No referencing: red light
- Correct referencing: green light
- For operation with automatic axis adjustment, start the reference run with "Home All".



Attention!

- Carry out referencing also after changing from manual to automatic operation.



Note!

Referencing can be carried out at anytime in automatic operation mode via the Motion Manager.



Figure 22 Referencing of individual axes with the Motion Manager

- Select the required axis.
- Start the reference run with "Home".

6.3 Automation Settings

- ▶ To set the automation parameters, right click to select the layout and then open "Default Settings".
- ▶ Configure the settings via the "External Start" and "Repeat Process" tabs.

6.3.1 "External Start" Settings

- ▶ For manual operation, select "Mark immediately".
- ▶ For automatic operation, select "Wait for an external start signal".

If "Wait for an external start signal" is selected, a window for setting the parameters for the start signal opens

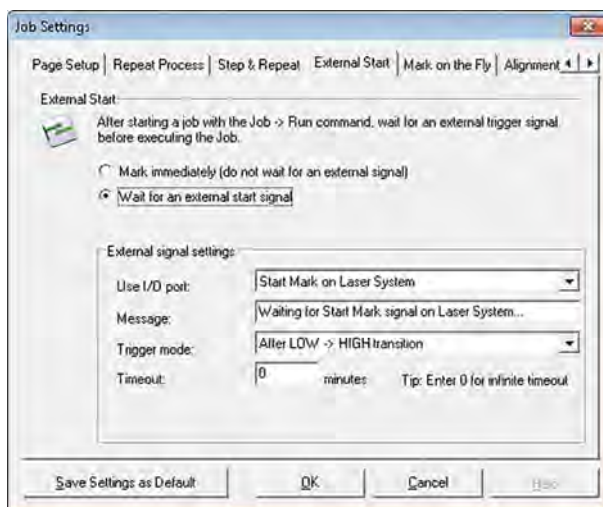


Figure 23 "External Start" settings

- Use port: Remains unchangeable on "Start Mark on Laser System"
- Message: Freely definable
- Trigger mode: Set to "After LOW -> HIGH transition".
- Timeout: Delay between start signal and execution of the marking job

6.3.2 "Repeat Process" Settings

Use this window to specify behavior in cyclic operation.

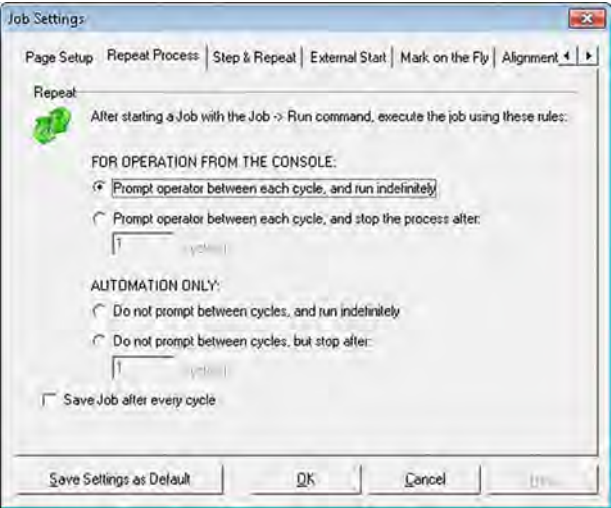


Figure 24 "Repeat Process" settings

Setting		Definition	
Operation from the Console		Start of each cycle via the software	
	<i>Prompt operator between each cycle, and run indefinitely</i>		Continuous operation
	<i>Prompt operator between each cycle, and stop the process after: including cycle setting</i>		Operation with defined number of cycles
Automation Only		Single start of the job via the software Start of individual cycle(s) via the automation controller	
	<i>Do not prompt between cycles, and run indefinitely</i>		Continuous operation
	<i>Do not prompt between cycles, but stop after: including cycle(s) setting</i>		Operation with defined number of cycles
Save Job after Every Cycle		Saves jobs with current values of variable fields (counter or date fields) so that they can be continued using the updated values when accessed again.	

Table 4 "Repeat Process" settings

- Select one of the "Automation Only:" settings for automated operation.

7.1 CON1 – External Start

This interface allows you to start a marking cycle via an external signal.

This interface has a 9-pin SUB D socket.

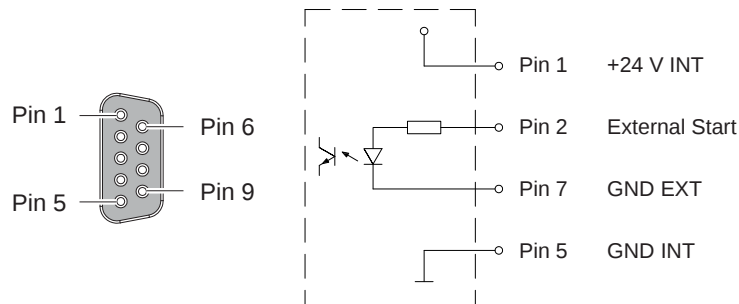
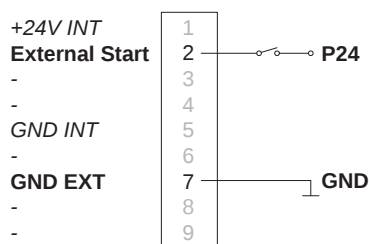


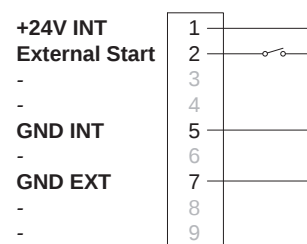
Figure 25 External Start interface

Pin	Signal	Name	Description	Activation/active state
1		+24V INT	Internal operating voltage +24 V, max. 200 mA Note: For using +24V (Pin 1) to trigger External Start, pin 5 and pin 7 must be connected to each other.	
2		External Start	Triggers a marking cycle Input reverse polarity protected and short-circuit proof	+24V between pin 2 and pin 7
3		-		
4		-		
5		GND INT	0 V intern Reference potential of the internal operating voltage (Pin 1)	
6		-		
7		GND EXT	0 V extern Reference potential of the signal "External Start" (Pin 2)	
8		-		
9		-		

Table 5 Pin assignment of the External Start interface



Operation with external voltage supply



Operation using the internal voltage

Table 6 Circuit of the External Start interface

7.2 CON2 – External emergency stop

This interface is used to connect an external emergency stop switch.
This interface has a 9-pin SUB D socket.

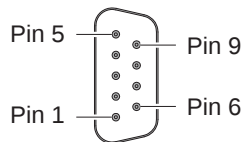


Figure 26 Emergency stop interface

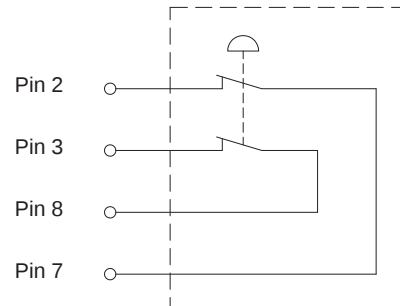


Figure 27 Emergency stop switch



Note!

No marking can be carried out if the interface is not wired.

If no external emergency stop switch is to be connected, the emergency dongle supplied must be plugged into the interface.

Pin	Signal	Name	Description	Activation/active state
1		-		
2	↻	Emergency stop S1.1	Connection of emergency stop Channel 1 pin 1	
3	↻	Emergency stop S2.1	Connection of emergency stop Channel 2 pin 1	
4		-		
5		GND INT	0 V internal Reference potential for pin 6	
6	⊕➔	E-Stop OUT	Emergency stop status	active: 0 V between pin 6 and pin 5 inactive: +24 V between pin 6 and pin 5
7	↻	Emergency stop S1.2	Connection of emergency stop Channel 1 pin 2	
8	↻	Emergency stop S2.2	Connection of emergency stop Channel 2 pin 2	
9		-		

Table 7 Pin assignment for the external emergency stop interface

7.3 CON3 – +24 V external

This interface allows you to connect an external voltage to operate the internal I/O interface.

For connection of an external voltage, a plug type KLDX-PA-0202-A-LT from Kycon, part no. 5918935.001, is included in the delivery.



Note!

Details about the internal I/O interface can be provided on request.

Pin	Name	Description
1	+24 V EXT	+24 V external, max. 3 A
2	GND_EXT	0 V external
3	GND_EXT	0 V external

Table 8 Pin assignment for the +24 V external interface

7.4 CON4 - Ethernet Interfaces

The Ethernet interface comply with the typical requirements and will not be described in that manual.

7.5 CON5 - Extraction

This interface is used to connect an extraction and filter device.

This interface has a 25-pin SUB D socket.

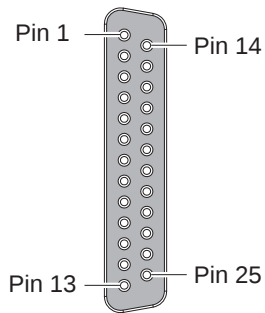


Figure 28 Extraction interface

Pin	Signal	Name	Description	Activation/active state
1	-	RS232 GND	0 V for RS232	
2	↻	RS232 RxD	RS232 Receive Data	
3	↻	RS232 TxD	RS232 Transmit Data	
4	-			
5	↻	System error	Error in the extraction and filter device	Contact pin 6 and pin 5 closed
6	-	24 V INT	Internal operating voltage +24 V, max. 500 mA	
7	↻	ON/OFF	Switch on/off extraction and filter device	ON: Contact between pin 6 and pin 7 closed OFF: Contact between pin 6 and pin 7 open
8	-	GND INT	0 V internal	
9	-			
... 15				
16	↻	System OK	No extraction and filter device error	Contact pin 6 and pin 16 closed
17	-	24 V INT	Internal operating voltage +24 V, max. 500 mA	
18	-	-		
... 25				

Table 9 Pin assignment extraction interface

7.6 CON6 - Digital I/O

For the integration into higher-level control procedures the device is equipped with an I/O Interface allowing to individually program eight in- and outputs for example via cabLase Editor 5. The interface has a SUB-D connector, 25 pole.

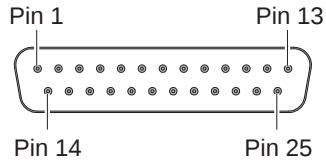


Figure 29 Digital I/O interface

Pin	Signal	Name	Description	Activation / active
1	-	-	-	-
2	-	-	-	-
3	-	-	-	-
4	⊕→	User Out5	Individually programmable	Contact Pin 4 / Pin 12 closed
5	⊕→	User Out6	Individually programmable	Contact Pin 5 / Pin 12 closed
6	⊕→	User Out7	Individually programmable	Contact Pin 6 / Pin 12 closed
7	⊕→	User Out8	Individually programmable	Contact Pin 7 / Pin 12 closed
8	⊕→	User Out9	Individually programmable	Contact Pin 8 / Pin 12 closed
9	⊕→	User Out10	Individually programmable	Contact Pin 9 / Pin 12 closed
10	⊕→	User Out11	Individually programmable	Contact Pin 10 / Pin 12 closed
11	⊕→	User Out12	Individually programmable	Contact Pin 11 / Pin 12 closed
12		+ 24V	Operating voltage +24V If an external voltage 24 V ± 5 V is connected to CON3, that voltage will be used. Otherwise the internal +24 V will be used. +24 V external: 24 V ± 5 V / 3 A +24 V internal: 24 V ± 0,5 V / 0,5 A	
13	-	-	-	-
14	-	-	-	-
15	-	-	-	-
16	-	-	-	-
17	⊖←	User In5	Individually programmable	+24V between Pin 17 and Pin 25
18	⊖←	User In6	Individually programmable	+24V between Pin 18 and Pin 25
19	⊖←	User In7	Individually programmable	+24V between Pin 19 and Pin 25
20	⊖←	User In8	Individually programmable	+24V between Pin 20 and Pin 25
21	⊖←	User In9	Individually programmable	+24V between Pin 21 and Pin 25
22	⊖←	User In10	Individually programmable	+24V between Pin 22 and Pin 25
23	⊖←	User In11	Individually programmable	+24V between Pin 23 and Pin 25
24	⊖←	User In12	Individually programmable	+24V between Pin 24 and Pin 25
25		GND	Common potential for all inputs and outputs	

Table 10 Pin assignment digital I/O interface

Digital Inputs

- conform to IEC/EN 61131-2 (Type 1)
- Operating voltage: 24 V DC (18..30 V)
- Switching logic: PNP switching
- Low level „0“: < 5 V DC
- High level „1“: > 15 V DC
- Input current per channel: 3.4 mA (at 30 V DC)
- Galvanic isolation: 0.5 kV
- Reverse polarity protection: yes
- ESD protection: up to 2.5 kV (Human Body Model)

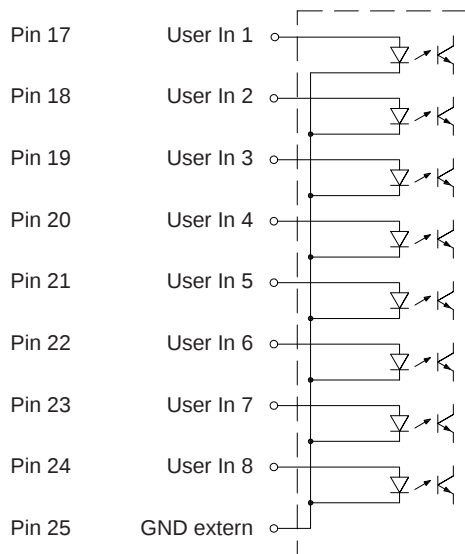


Figure 30 Connecting inputs

Digital Outputs

- conform to IEC/EN 61131-2
- Operating voltage: 24 V DC (18..30 V)
- Switching logic: PNP switching
- Output current per channel: 600 mA (overload protection)
- Total output current: 3 A
- Galvanic isolation: 0.5 kV
- Short-circuit protection: yes
- Reverse polarity protection: yes
- ESD protection: up to 2 kV (Human Body Model)

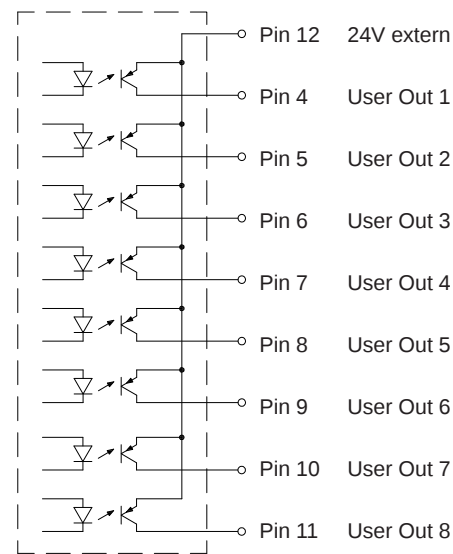


Figure 31 Connecting outputs

**Attention!****Loss of function!****Do not connect Pin 12 with external 0 V (GND).****7.7 CON7 - Rotary Axis**

The interface is especially designed for cab axes and will not be described in that manual.

8.1 Maintenance Schedule

Maintenance schedule		monthly	quarterly	semi-annually	annually
M1	Clean marking chamber	X			
Q1	Clean lens protection glass		X		
H1	Check lens protection glass for mechanical damages			X	
Y1	Check warning signs on the laser marking system ▢ 2.4 on page 8				X
Y2	Replace lens protection glass				X

Table 11 Maintenance schedule

8.2 Cleaning the Marking Chamber



Warning!

Adverse effects on health and the environment through by-products released during laser processing. During laser processing, by-products detrimental to health and the environment are released. These can cause cancer and lung damage.

- ▶ When cleaning the marking chamber, wear disposable polypropylene gloves and a protection level 3 fine dust mask.
- ▶ Ensure sufficient room ventilation.
- ▶ Open operation door.
- ▶ Cover the laser lens with the protective cap supplied to protect the lens against damage.
- ▶ Remove all contamination in the marking chamber with a suitable extraction device. The optional extraction and filter device can be used. To do this, remove the suction hose from the laser marking system, screw the suction nozzle (1) included in the delivery of the extraction and filter device to the suction hose (2) and switch on the extraction and filter device via the control panel.

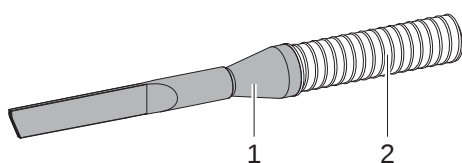


Figure 32 Suction nozzle



Note!

The suction nozzle (Part No. 5907174.001) can also be ordered separately.

- ▶ After cleaning, remove the protective cap from the lens, connect the suction hose to the laser marking system and close the operation door.

8.3 Cleaning the Lens Protection Glass

**Attention!**

- ▶ Do not touch glass surfaces with bare fingers.
- ▶ Do not clean glass surfaces using tools or hard objects.
- ▶ Do not use compressed air to remove dust and dirt particles from the surface.
- ▶ Do not wipe the glass surface with a dry cloth or paper.

**Note!**

The scope of delivery contains a small bellows and a cleaning tissue set.

- ▶ Remove dust with the bellows.
- ▶ To remove heavy contamination, only use lens cleaning tissue together with isopropyl alcohol with an optical purity of 99%.
- ▶ Sprinkle the solution onto the lens cleaning tissue and do not touch the moistened side.
- ▶ Slowly move the lens cleaning tissue in one direction across the surface of the protection glass (1).
- ▶ Using a fresh lens cleaning tissue each time, repeat the process until the surface is completely clean.

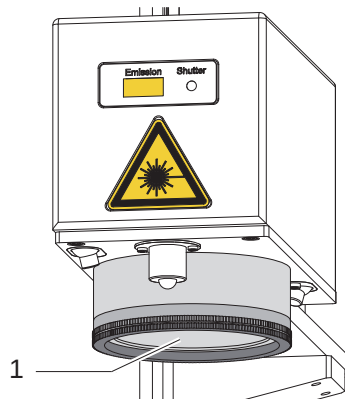


Figure 33 Cleaning the lens protection glass

8.4 Replacing the Lens Protection Glass

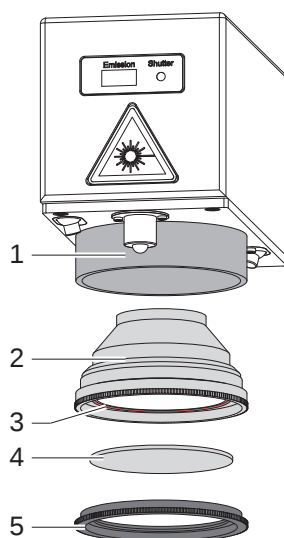
Lens	Description	Part no. of the protection glass
F-Theta 160.2	Protection glass	5528310.001
F-Theta 254.2		

Table 12 Lens protection glass



Attention!

- ▶ Use cotton gloves.
- ▶ Do not touch the surfaces of the objective lenses.



- ▶ Turn the lens (2) counter-clockwise and remove it from the mounting (1) in the scan head.
- ▶ Turn the ring (5) counter-clockwise, thereby removing it from the lens (2).
- ▶ Remove the protection glass (4) from the rubber lip (3) in the lens.
- ▶ Check the new protection glass for cleanliness and clean if necessary.
 - ▷ Cleaning the lens protection glass
- ▶ Place the new protection glass (4), aligned centrally, into the ring (5) and screw it into the lens (2) from below.
- ▶ Install the lens in the scan head.

Figure 34 Replacing the protection glass

Fault/error message	Possible cause	Remedy
Green "Power" indicator on the control panel does not light up.	No operating voltage.	Switch on mains switch. Check mains supply.
Yellow "Emission" indicator on the control panel does not light up.	Marking laser not switched on.	Start laser.
	Marking laser error.	Restart the device. Contact service team.
Green "Ready" indicator on the control panel does not light up.	No marking program loaded or started.	Load and start marking program.
	Incorrect marking program settings.	Check the automation settings of the marking program.
Red "Marking" indicator on the control panel does not light up.	Marking cycle has not been started.	Start marking program. Check the marking program settings.
Red "Error" indicator on the control panel does not light up.	Extraction and filter device not ready.	Switch on extraction and filter device.
	Extraction and filter device error.	Remedy extraction and filter device error. Check filter of extraction and filter device.
	Laser not ready, switched on.	See "Emission" indicator on the control panel does not light up. Restart the laser controller.
	Marking laser program error.	Reboot the PC.
	System error.	Contact service team.
 button does not light up.	No marking program loaded or started.	Load and start marking program.
	Incorrect marking program settings.	Check the automation settings of the marking program.
 button flashing.	Extraction and filter device error.	Check functioning of extraction arm and suction hose.
	Filter warning, extraction and filter device.	Replace filter of extraction and filter device.
Operation door cannot be closed using the button  .	Turn key switch to "auto".	Door closes automatically when a job is started.
Motorized axes cannot be moved manually.	Turn key switch to "auto".	Turn key switch to "r/x" or "z".
Motorized axes cannot be referenced.	Program error.	Contact service team.
No marking.	Safety circuit open.	Close operation door. Close setup door.
	Marking laser not switched on.	Restart the device.
	Contamination of the lens.	Clean the lens.
	Focusing plane of the lens is not on the surface to be marked	Align the focusing plane. ▷ 5.1.2 on page 21

Table 13 Trouble shooting

**Attention!**

- ▶ In the event of malfunctioning, refer to the section on trouble shooting.
- ▶ If the malfunction cannot be remedied, inform authorized service personnel.

**Note!**

Any repair and maintenance work must only be carried out by cab Produkttechnik GmbH & Co. KG or authorized personnel!

**Note!**

Unauthorized interference with or modification of the device by third parties will result in expiration of the warranty!

10.1 Customer Service

For further information and the remedying of malfunctions, please do not hesitate to contact Customer Service at cab Produkttechnik GmbH & Co. KG. Addresses and country representatives.

**Note!**

To enable quick and expert support, please have ready at hand the type and serial number stated on the type plate ▶ Figure 8 on page 15.

10.2 Safety Relevant Spare Parts

Description	Part No.
Laser protection window	5907189.001
PCB Control	5551345.001
Safety door switches	5555030.001
Actuation key	5905404.001

Table 14 Safety Relevant Spare Parts

Laser marking system		XENO 1			
Laser source		Ytterbium fiber laser, pulsed			
cw output power	max. W	20		30	
Pulse energy	mJ	1			
Wave length	nm	1,064			
Beam quality M ²		<1.8			
Pulse width	ns	<120			
Pulse frequency	kHz	20 - 60		30 - 60	
Pilot laser / focus finder					
Wave length	nm	650			
cw output power	mW	<0.4			
For plano-spherical lens	type	160.2	254.2	160.2	254.2
Operating distance	mm	210 ± 8	310 ± 8	210 ± 8	310 ± 8
Marking field	mm	112 x 112	180 x 180	112 x 112	180 x 180
Work area height	mm	200	100	200	100
Groove plate W x H x D x pitch	mm	500 x 20 x 375 x 25			
Z-axis stroke motor-driven	mm	210			
Position accuracy	mm	± 0.1			
Repetitive accuracy	mm	± 0.1			
Traversing speed	mm/s	20			
Interior lighting		LED			
Operation door		motor-driven opening / closing			
Workpiece weight	max. kg	30			
Dimensions and weight					
Device	W x H x D	mm			
	Weight	approx. kg			
Laser protection window W x H	mm	100 x 200			
Extraction					
Nozzle flexible hose	NW mm	38			
Suction nozzle	NW mm	50			
Operating data					
Power supply		100-240 VAC, 50/60 Hz			
Power consumption		Standby <35 W / typical 150 W / max. 200 W			
Temperature / humidity	Operation	+5-40 °C / 10-85 % not condensing			
	Storage	0-60 °C / 20-85 % not condensing			
	Transport	-25-60 °C / 20-85 % not condensing			
Approvals		CE, FCC class A			
Laser safety class EN60825-1		Class 1			
Operation panel					
LED indicators	Power, Ready, Emission, Error, Marking				
Buttons illuminated	Control ON/OFF	Start			
	Focus finder ON/OFF	Z-axis up / down			
	Extraction ON/OFF	Rotary axis left / right			
	LED ON/OFF	Operation door open / close			
Switch	E-stop				
Key switch	automatic / manual				
Monitoring					
Safety circuits	closed				
Collective error	Marking laser	Extraction device			
Interfaces					
Work area	Rotary axis	Digital I/O			
Back of device	2 x Ethernet TCP/IP	Extraction and filter device AF5			
	24 V for digital I/O	External start, external E-stop			

Rotary axis		D30.1
Rotation speed	rpm	0 - 40
Operating torque	Nm	12
Increment	min. [arcmin]	2.5
Holding torque	Nm	2.0
Through bore	Ø mm	15
Workpiece	Ø max. mm	160*
Distance to groove plate	mm	84
Dimensions W x H x D	mm	125 x 105 x 128
Weight	kg	3
3-jaw chuck		D30
Clamping range	inside Ø mm	23 - 76
	outside Ø mm	3 - 76
Connecting cable for rotary axis		D30
Length	mm	1,000

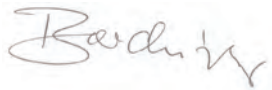
*with plano-spherical lens 160.2

Software		
Software	cabLase Editor 5	
Fonts		
Font types	All TrueType fonts included in Windows, filled or outline; laser typical single, double, triple line fonts. All font types can be freely scaled and “wobbled”.	
Alignment	Any alignment and direction of rotation, circular ark marking	
Character spacing	Compressing and stretching	
Graphics		
Graphic elements	Lines, circles, rectangles, polygons; hatching of all closed surface elements	
Graphic formats	PLT, DXF, BMP, JPG, PCX, WMF, EPS, TIF; All graphic elements can be scaled, moved, rotated, grouped or mirrored. Special tools are available to align the objects.	
Barcodes		
Linear	Interleaved 2/5 Code 39, Code 93 Code 128	Codabar EAN UPC
2D	DataMatrix, ECC200, QR code All codes are variable as regards height, modular width and ratio; optional check digit or inverted code output	
Further features		
Serial number, time, date		
Variable fields		
Insertion of graphic data of Windows programs		
Programmable laser parameters		
Storage of process and parameter data		
Control of digital inputs and outputs		
Control and monitoring of additional axes, e.g. stroke, rotary and linear axes		



EU Declaration of Conformity

We hereby declare that the following device, due to its design, construction and the version placed on the market by us, complies with all applicable health and safety requirements of the relevant EC directives. In the event of unauthorized modification of the device or its intended purpose, this declaration will no longer be valid.

Device:	Laser Marking System
Type:	XENO 1
Applied EU Directives	Applied Standards
Machinery Directive 2006/42/EC	• EN ISO 12100:2010
	• EN ISO 13857:2008
	• EN 349:1993+A1:2008
	• EN ISO 13849-1:2015
	• EN ISO 11553-1:2008
	• EN 60825-1:2006+A1:2008 +A2:2011
	• EN 62368-1: 2014+AC:2015
Electromagnetic Compatibility Directive 2014/30/EU	• EN 61000-3-2:2014
	• EN 61000-3-3:2013
	• EN 61000-6-2:2005
	• EN 61000-6-4:2007+A1:2011
Directive 2011/65/EU on the restriction of the use of certain hazardous substances in electrical and electronic equipment	• EN 50581:2012
Authorized representative for technical documentation	Norbert Schulmeister cab Produkttechnik GmbH & Co KG Wilhelm-Schickard-Str. 14 76131 Karlsruhe Germany
Signed for and on behalf of the manufacturer:	Karlsruhe, 12/13/2017
cab Produkttechnik GmbH & Co KG Wilhelm-Schickard-Str. 14 76131 Karlsruhe Germany	
	Klaus Bardutzky Company Management

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