

Assembly Instructions



Laser Marker

LM+

2 Assembly Instruction for the following products

2

Description	Type
Laser Marker	LM+ 160.1
	LM+ 254.1
	LM+ 160.2
	LM+ 254.2

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1.1 Notes

Important information and instructions are designated as follows:



Danger!

Draws attention to an exceptionally great, imminent danger to your health or life due to hazardous voltages.



Danger!

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



Warning!

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



Caution!

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



Attention!

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



Note!

Advices to make work routine easier or on important steps to be carried out.



Environment!

Advices on protecting the environment.



Handling instructions



Reference to chapter, position, picture number or document.



Option (accessories, peripherals, extras).

Time

Viewed in the display / monitor.

1.2 Intended Use

- The device / machine is manufactured in accordance with the current technological status and the recognized safety rules. However, danger to the life and limb of the user or third parties and/or damage to the device or machine and other tangible assets can arise during use.
- The device / machine may only be used for its intended purpose and if it is in perfect working order, and it must be used with regard to safety and dangers as stated in the operating manual.
- The device / machine is intended exclusively for transportation and marking of suitable materials that have been approved by the manufacturer.

▷ <https://www.cab.de/en/marking/marking-laser/lmplus/#dokumentation>



- The device / machine must not be used for any processing of livestock.
- Any other use or use going beyond this shall be regarded as improper use. The manufacturer / supplier shall not be liable for damage resulting from unauthorized use; the user shall bear the risk alone.
- Usage for the intended purpose also includes complying with the operating manual, including the manufacturer's maintenance recommendations and specifications.
- The operator has to make sure that the manual was read and understood before commissioning the machine.
- The operator is to be obligated to keep to the respective safety guidelines and standards.
- This device / machine is intended exclusively to be used for laser marking applications with the software „cablase“ and according to approved procedures.
- This device / machine is intended exclusively to be used for laser marking systems manufactured / delivered by cab Produkttechnik GmbH & Co. KG and approved systems.
- Performance parameters must be customized to the material's characteristics to be marked.
- Operation of the machine is only allowed with the use of a certified fume extractor unit specified for every particular application.

1.3 Safety Instructions

- The device / machine is designed for AC mains voltage networks in accordance with the type plate. The device / machine must only be connected to power sockets with safety extra-low voltage.
- The device / machine must only be connected to other devices / machines with safety extra-low voltage.
- Before connecting or disconnecting mains the respective devices (PC, printer, accessories) have to be switched off.
- The device / machine has only to be operated in dry ambience and must in no case be exposed to moisture (splashing, fog, etc.).
- Attention - rotating components! Secure hairs, clothes and jewels and keep hands out of this area during operation of the machine.
- In automatic mode, close the slider on the laser safety window.
- Only carry out work in accordance with the instructions specified in this Manual.
- Improper interventions at electronic components and software may cause malfunctions.
- Any other improper work or alteration at the system may endanger the device's / machine's operational safety.
- Maintenance and repair work have solely to be carried out from the manufacturer or from skilled personnel or service engineers authorized by the manufacturer.
- Parts of the housing and covers have solely to be disassembled by skilled personnel.
- It must be ensured that general maintenance work is solely carried out by personnel having been instructed and being familiar with electrical hazards and protection against laser radiation.
- Never operate the device / machine, if components are damaged or covers are open.

**Danger!**

Danger to life due to supply voltage and laser radiation.

Do not open or remove parts of the cabinet or covers.

Safety Instructions

- Transport of the device / machine has to be carried out in its original packaging or any appropriate alternative packaging.
- It is required to provide convenient protection against upset of the device / machine or any other damage.
- Lifting and lowering of the device / machine with hoisting devices shall only be done by trained staff and with appropriate tools at constructionally provided places.
- The place of installation must, according to the technical requirements, be at ground level, support load capacity and allow easy accessibility.
- Devices / machines equipped with transport rollers must be placed on the machine feet.
- The maximum sound pressure level is less than 70 dB(A) .

**Attention!**

- Mechanical loads, vibrations and shocks to the system may lead to a damage of the device / machine or its components.
- Improperly installed machines may lead to a damage and may cause loss of guaranteed features.

Laser Safety for Laser Marker with mounted Marking Laser FL+ or XENO 4

The potential danger originating from accessible laser radiation is defined by classifying these in laser safety classes.

Class 1:

The accessible laser radiation is safe under reasonably foreseeable conditions of operation.

Class 4:

The accessible laser radiation is most dangerous both for the eye and for the skin. This also applies for diffused light radiation. The laser radiation may cause fire and explosion.

**Danger!**

The hazard classification only applies for the accessible laser radiation. Therefore, maintenance work (e.g. opening the housing) may increase the hazard and thus the class of hazard. This requires additional safety precautions.

**Notice!**

For further information about safety regulations and operating directives regarding the whole of the laser classes please, refer to the valid guidelines.

1.4 Safety Marking

**Notice!**

Do not remove warning labels, as otherwise potential hazards may not be recognized.

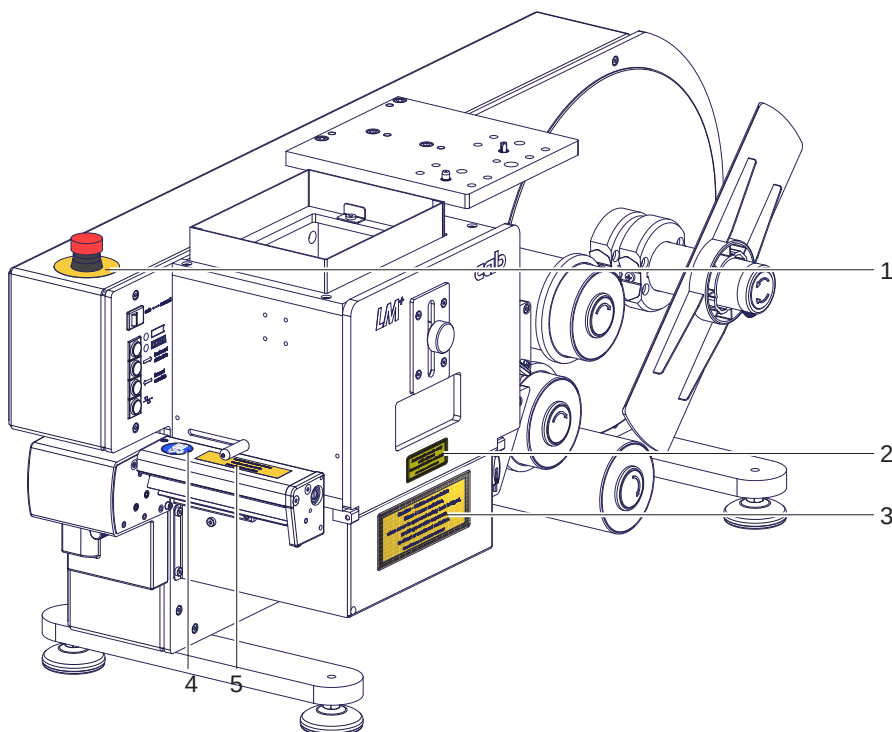


Fig.1 Warning labels

1		Emergency Stop Button
2		Warning of laser radiation when the laser safety window is not covered
5		Generally safety instruction for laser class 4
6		Disconnect the system from the electrical outlet before mounting or removing the cutter..
7		Risk of injury, particularly during maintenance, the cutter blades are sharp.

Table 1 Warning labels

1.5 Shut-down and Reshipment

- ▶ To shut-down the system it is necessary to entirely disconnect the system and to secure it against unauthorized commissioning.
- ▶ Contaminants on surfaces / components due to hazardous substances has to be cleaned by qualified personnel or disposed of separately in appropriate recycling centres subject to the legal regulations.
- ▶ In case of reshipment / disassembling, pay attention to the instructions in Chapter 2.3.1 Transport and Installation.



Danger!

- ▶ To shut down the device / machine it is necessary to secure the system against unauthorized commissioning.



Danger!

- ▶ To return the shipment make sure that the system is not contaminated with hazardous material.



Notice!

To return or transport the system it is necessary to use the original packaging. This may be purchased from the manufacturer.

1.6 Disposal



Devices not being used any more and ready for disposal have valuable and recyclable material that may be consigned to recovery.

- ▶ Make the parts available for recycling.
- ▶ According to legal regulations, assemblies being contaminated with hazardous substances shall be disposed of separately at suitable collection points.



The circuit board of the device is equipped with a lithium battery.

- ▶ Used batteries shall be disposed of at an appropriate battery collection point or at the public waste management organizations.

1.7 Scope of Deliver

- Laser Marker LM+
- 5528921 Carrier 160.1 cpl. FL+ or
- 5528917 Carrier 254.1 cpl. FL+ or
- 5528922 Carrier 160.2 cpl. XENO or
- 5528919 Carrier 254.2 cpl. XENO
- Alternate joint for 50 mm with throttle butterfly
- Feedback cable FI+ CON2 - Fume Extractor
- 2x Cable RS-232C, SUB-D9 St-Bu 3m
- LM+ RS232 - Laser CON5
- LM+ Laser - Laser CON4
- Power cable Type E + F L=1,8m (CEE-7/7)
- 4x Screw M6x14
- Bridge connector for external emergency stop
- 2x Guiding to set the Material Aperture Height
- Safety marking labels
- Documentation

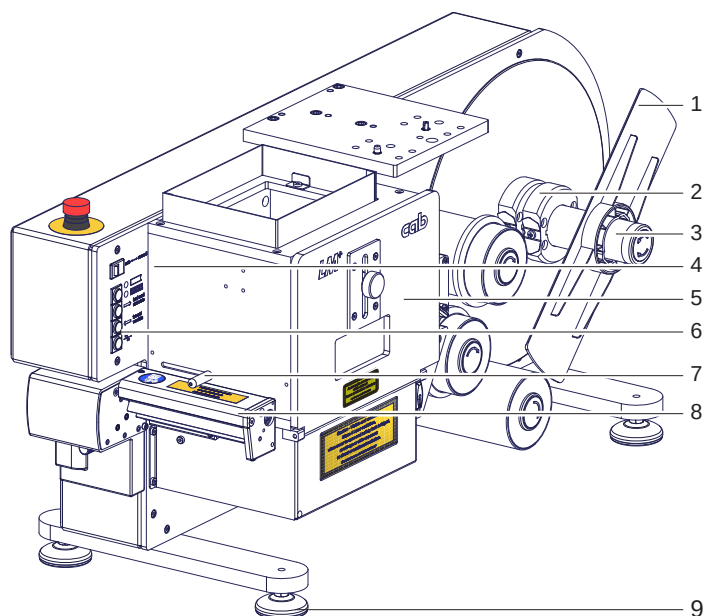
1.8 Variants for using different Laser lenses

To receive a bigger labeling field it's possible to build a LM+ for using a Marking Laser with a F-Theta 254.1 lens. This device is can work with a higher work distance.

**Notice!**

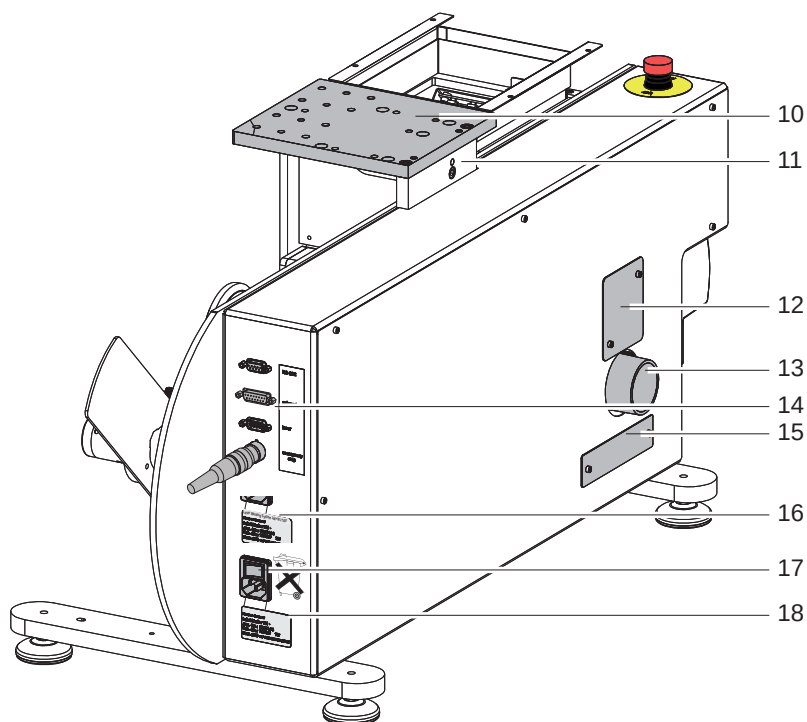
Assembling, installation and commissioning has solely to be carried out by skilled personnel authorized by cab Produkttechnik .

2.1 Overview



- 1 Flange
- 2 Adapter
- 3 Unwinder
- 4 Emergency Stop Button
- 5 Laser Chamber
- 6 Operating Panel
- 7 Adjustment for foil positioning
- 8 Cutter
- 9 Leveling Feet

Fig.2 Overview - Front Side



- 10 Mounting Plate for Laser Head
- 11 Adjustable Z-Axis
- 12 Connector for Fume Extraction System
- 13 Connector for Fume Extraction System
- 14 Electrical Interfaces
- 15 Access to Light Sensor
- 16 Type Plate System
- 17 Main Switch Power
- 18 Type Plate Device

Fig.3 Overview - Back Side

2.2 Preparing the Place of Installation

- The ground has to be capable of sufficiently supporting load, stable and at ground level.
- The environmental conditions have to be in accordance with the requirements of the technical data sheet.
- Minimum distances to louvers, maintenance accesses and pivoting radiuses have to be considered.

2.3 Unpacking and Positioning

- Transport of the machine has only to be carried out in its original packaging or any appropriate alternative packaging.
- It is required to provide convenient protection against the machine's falling over or any other damage.
- The machine's lifting and lowering with hoisting devices shall only be done by trained staff and with the appropriate tools at constructionally provided places.

2.4 Installation of Marking Laser



Notice!

Installation of marking laser has solely to be carried out by skilled personnel authorized by cab Produkttechnik.

To integrat marking laser belonging to the FL+ series the following steps have to be taken:

- Take the laser system out of its original packaging.
- The control unit has to be placed near the handling unit to the operators convenience.

FL+

- Mount the safety collar (2) using the 4 screws (3) M6x6mm to the base plate (1) of the scan head.
- Position the scan head (1) and mount it in line to the screw holes of the carrier plate using the 4 screws (5) M6x14 mm .

XENO 4

- Mount adapter plate (7) on scan head (6) using the 4 screws (8) M6x12.
- Mount the safety collar (2) using the 4 screws (3) M4x6mm to the Adapter plate (7).
- Position the scan head (1) with adapter plate (7) and mount it in line to the screw holes of the carrier plate using the 4 screws (5) M6x14 mm .

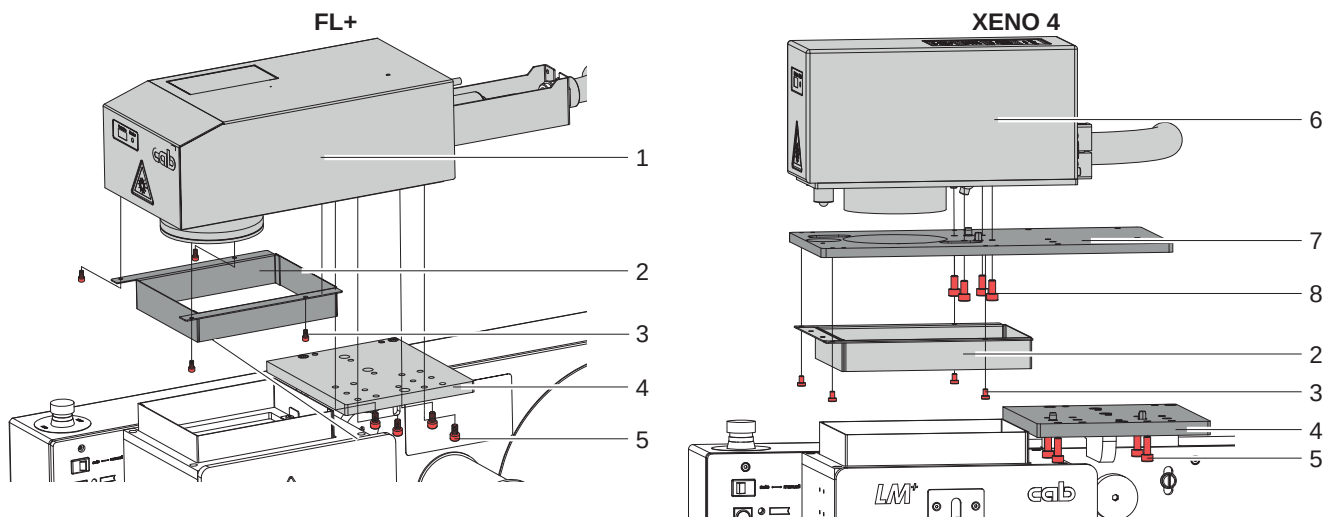


Fig.4 Installation of the laser

- Connect a cable RS-232C between "RS232" and CON5 of the Marking Laser.
- Connect a cable RS-232C between "Laser" and CON4 of the Marking Laser.



Danger!

It is not allowed to operate the machine when any panel or the safety collar is removed or not fastened. Laser radiation may escape. Do not shorten safety locks. Observe the hazard warnings for laser protection class 4!

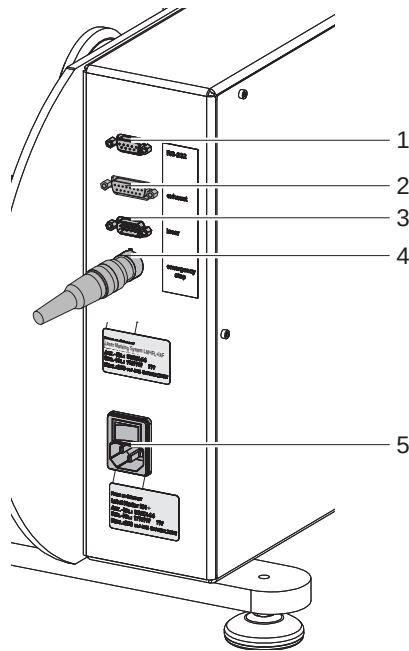
2.5 Electrical Connections

► External interfaces and power supply have to be connected to the connections of the Label Marker.

* It's possible to order an external Emergency Stop Button on a box.

- Pull out the strapping plug.
- Connect the cable with the connector "emergency stop".

For an own emergency stop circuit is the protective circuit of the interface emergency stop described.



- 1 RS232
- 2 Extraction, if the extraction is not connected directly to the laser
- 3 Interface Safety Interlocks
- 4 Interface external Emergency Stop Button (Delivery state with strapping plug.)
- 5 Main Power Input Module and Main Switch

Fig.5 Electrical Interfaces

The connected supply voltage must be the same like the value on the specification plate.

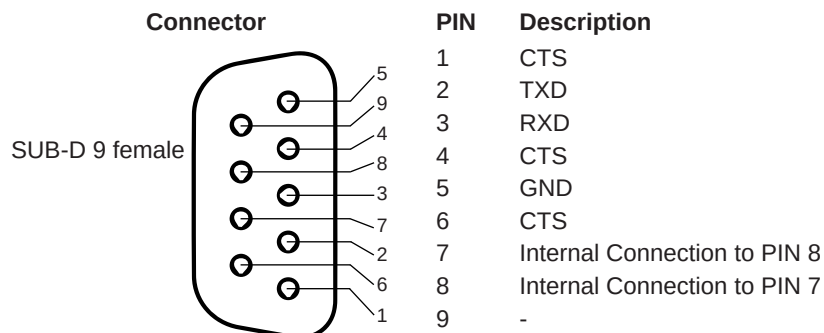
- Make sure that the device is switched off.
- Put in the power plug into a grounded socket.



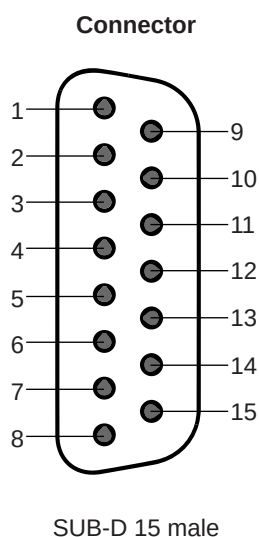
Warning!

With insufficient or unavailable grounding it's possible to have interferences in operation. Make sure that all connected devices and cable are grounded.

2.5.1 RS 232 - Serial Interface

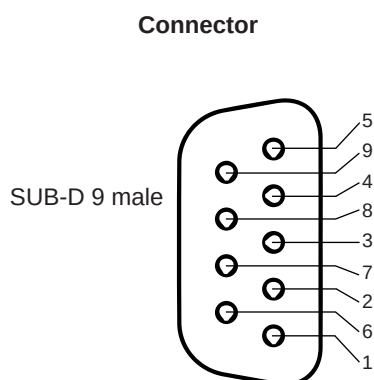


2.5.2 Fume Extractor Interface



PIN	Description
1	Common Supply
2	-
3	-
4	-
5	-
6	-
7	-
8	GND Internal
9	Output is high if fume extractor is switched on (PIN 1 and 9 connected)
10	-
11	-
12	-
13	-
14	-
15	24 VDC Internal voltage (max. 100 mA)

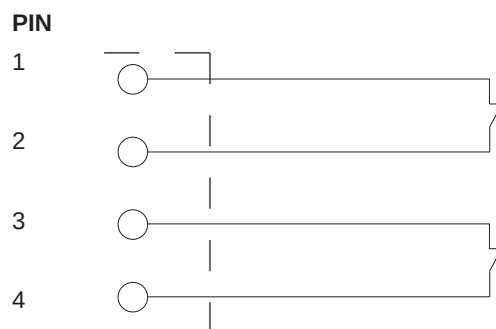
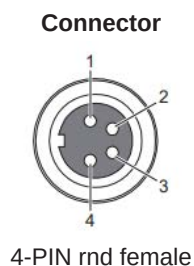
2.5.3 Safety Interlock Laser



PIN	Description
1	-
2	Contact A to indicate LM+ E-Stop is active. E-Stop is active when PIN 2 and 7 are not connected!
3	Contact A to indicate LM+ Interlock is active. Interlock is active when PIN 3 and 8 are not connected!
4	External Interlock Input Device is Ready when +24 VDC between PIN 4 and 9.
5	-
6	External E-Stop Input Device is Ready when +24 VDC between PIN 6 and 9.
7	Contact B to indicate LM+ E-Stop is active. E-Stop is active when PIN 2 and 7 are not connected!
8	Contact B to indicate LM+ Interlock is active. Interlock is active when PIN 3 and 8 are not connected!
9	External GND

2.5.4 External E-Stop

Used to integrate an external E-Stop switch or relay. E-Stop is active if either contact pairs between PIN 1 and 2 or PIN 3 and 4 are open. The delivery content includes a jumper plug.



2.6 Connecting Fume Extractors

Fume extractors being part of delivery contents are to be connected as follows:



Notice!

Follow detailed descriptions for connecting and commissioning the fume extractor in use. Refer to the manufacturer's Manual also.

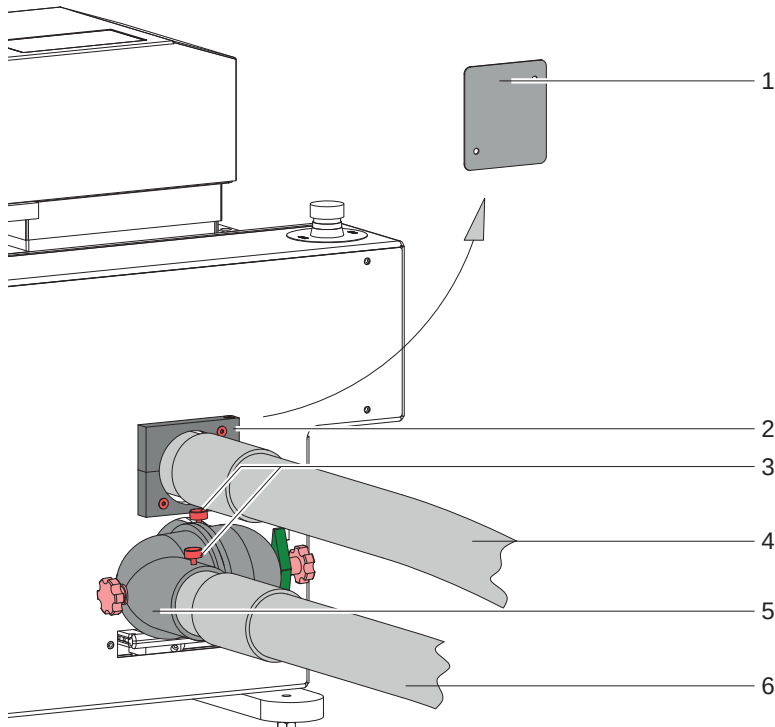


Fig.6 Connecting Fume Extractor

- ▶ Mount the throttle flap (5) at the lower vent and fasten it with the locking screw (3).
- ▶ Dismount the cover plate (1) from the upper vent.
- ▶ Mount clamp (2) with mounted vent (4) and tighten it with the screws of the cover plate (1).
- ▶ Put in the suction hose (6) (available as accessories) into the throttle flap (5) and fix it with the locking screw (3).
- ▶ Connect suction hoses to the connecting sleeves (refer to section adjustment of exhaust system, too).
- ▶ Connect with the feedback cable from FL+ Marking Laser (CON2) to the fume extractor interface.
- ▶ The power cable of the fume extractor has to be connected to an suitable main supply socket.
- ▶ Check and replace the filter inserts in a regular interval.
- ▶ Check the function and condition of the fume extractor in a regular interval.



Danger!

Laser emission! Never operate the machine without connected and secured suction hoses. Laser radiation can be emitted and exit through open suction holes. Observe safety instructions and check regularly for damages and interference fit of all fume extraction equipment.

2.7 Adjustment of Working Distance

For adjustment of the laser focus distance the Label Marker is equipped with an manual adjustable Z-axis (1) using an eccentric (3) tappet.



Notice!

Due to individual specifications and tolerances in manufacturing of laser systems the nominal working distance can differ. Refer to the test sheet of the laser system installed for nominal focus distance.

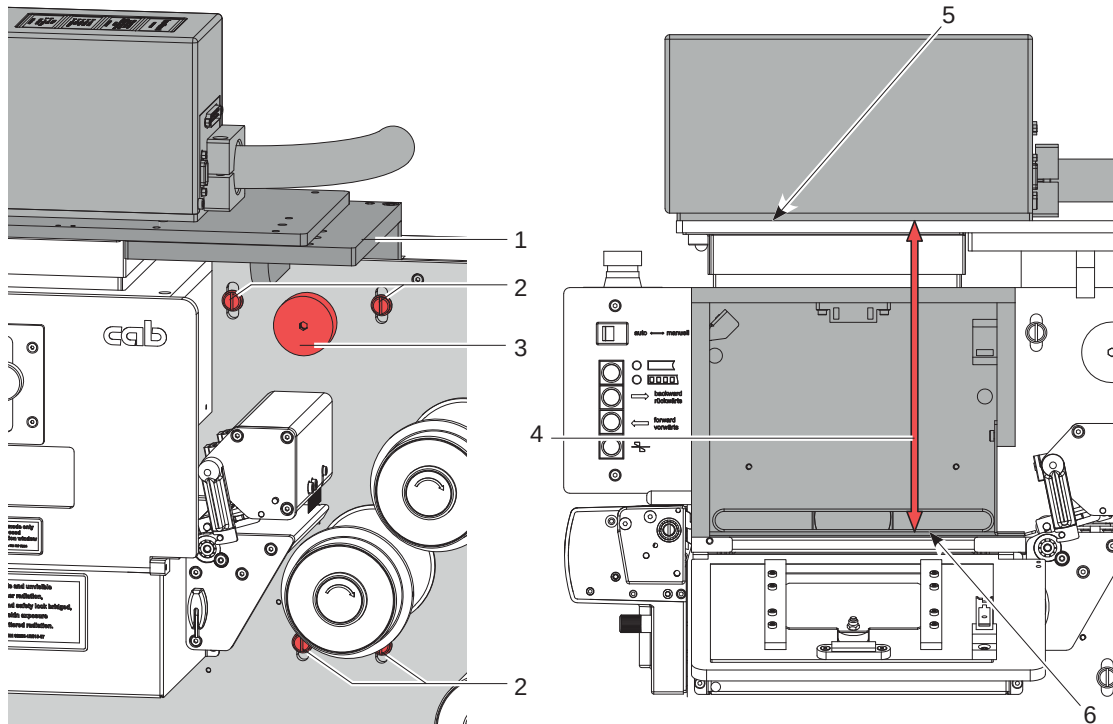


Fig.7 Changing the working distance of the laser



Attention!

The axis adjustment does not have a mechanical brake. Loose locking screws only, if the Z-axis is secured against uncontrolled movement.

- ▶ Strongly keep hold of the eccentric (3) wheel to avoid uncontrolled movement of the adjustment system (1).
- ▶ Simultaneously loose the locking screws (2) slightly.
- ▶ Adjust the working distance by turning the eccentric wheel (3).



Notice!

The Work Distance (4) is the distance between upper edge of the material (6) to the mounting plate (5) of the laser head.

- ▶ Tighten the locking screws (2).

3.1 Functionality of Indicators and Keys

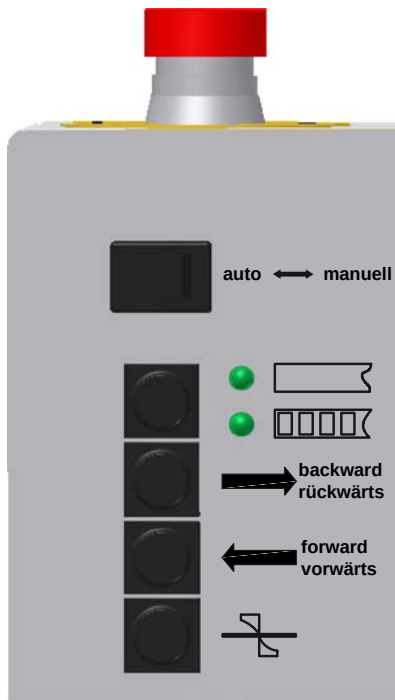


Fig.8 Control panel

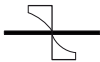
Symbol	Description	Function
	push button Emergency-Stop	The Emergency Stop disables the system and keeps it in safe condition. Drives are off. However, the system is not switched to neutral. Supply voltage for the PC is kept. The Emergency Stop can be reset by turning it to its original position. ► Only use in case of Emergency.
auto ↔ manuell	switch auto / manual	The switch auto/manual selects the operating mode "automatic" or "manual".
	push button and indicator continous material	Illumenated LED indicates material setup. Flashing LED indicates failure. - Material locking system is open. - Material is not detected from material sensor or position sensor. To change between material setup hold the push button and operate the switch auto/manual until the changing of the mode is confirmed by the LED.
	push button and indicator die cut material	
	push button reverse (manual mode only)	Reverse material feed as long as button pressed.
	push button forward (manual mode only)	Material feed forward as long as button pressed for setup mode continous material. Material feed forward until next label position for setup mode die cut material.
	push button cutter (manual mode only)	Starts a cutting sequence.

Tabelle 1 Symbols and control elements

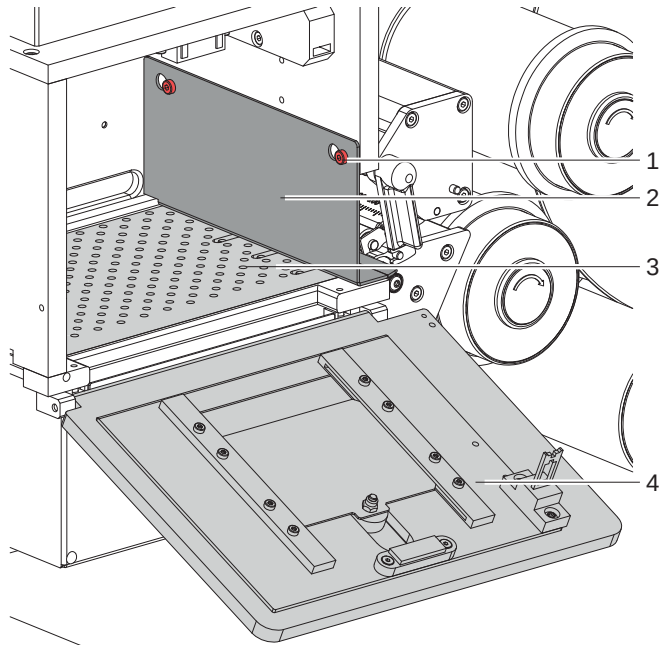
3.2 Setup Material Transport



Notice!

Depend of the material thickness change the material aperture by changing the guiding.

3.2.1 Adjusting the Material Aperture Height



The material aperture height between laser chamber ground (3) and the guiding (2) are variable via changing the guiding plate.

- ▶ Open the door (4) of the laser chamber.
- ▶ Loosen screws (1) .
- ▶ Pull the guiding (2) in direction to the door of the laser chamber and take it out.

Guiding for follow heights of material aperture are parts of the shipment

- Guiding 1 mm height (part.-No.: 5525055) mounted as standard
- Guiding 2 mm height (part.-No.: 5525019)
- Guiding 3 mm height (part.-No.: 5526258)

- ▶ Put in the new guiding (2) and slid it in direction to the frame.
- ▶ Tighten screws (1) .
- ▶ Close the door (4) .

Fig.9 Material Aperture and Guiding

3.2.2 Loading Material Roll

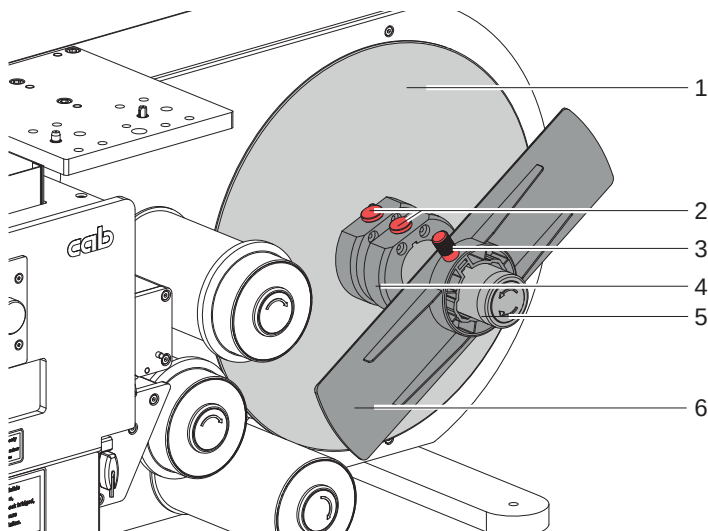


Fig.10 Load material - unwinder

- ▶ Loose the knurled screw (4) of the flange (6) and remove the flange (6).
- ▶ When using material with 40 mm core diameter, than loose knurled screws (2) of the adapters (3) and remove the adapter (3).
- ▶ When using material with 75mm core diameter, than loose knurled screws (2) of the adapters (3) and position the adapter (3) rings on the axle slightly smaller than the core respectively material width. Tighten the knurled screws (2).
- ▶ Slide the material roll onto the axle (5) respectively adapters and align it to the limit plate (1).
- ▶ Reinstall the flange (6) by sliding it to the material roll and tighten the knurled screw (4) to secure.

3.2.3 Setup Material Feeding

Dependent on the material winding the material has to be loaded as follows:



Notice!

The area to be marked has to face upwards inside the laser chamber.

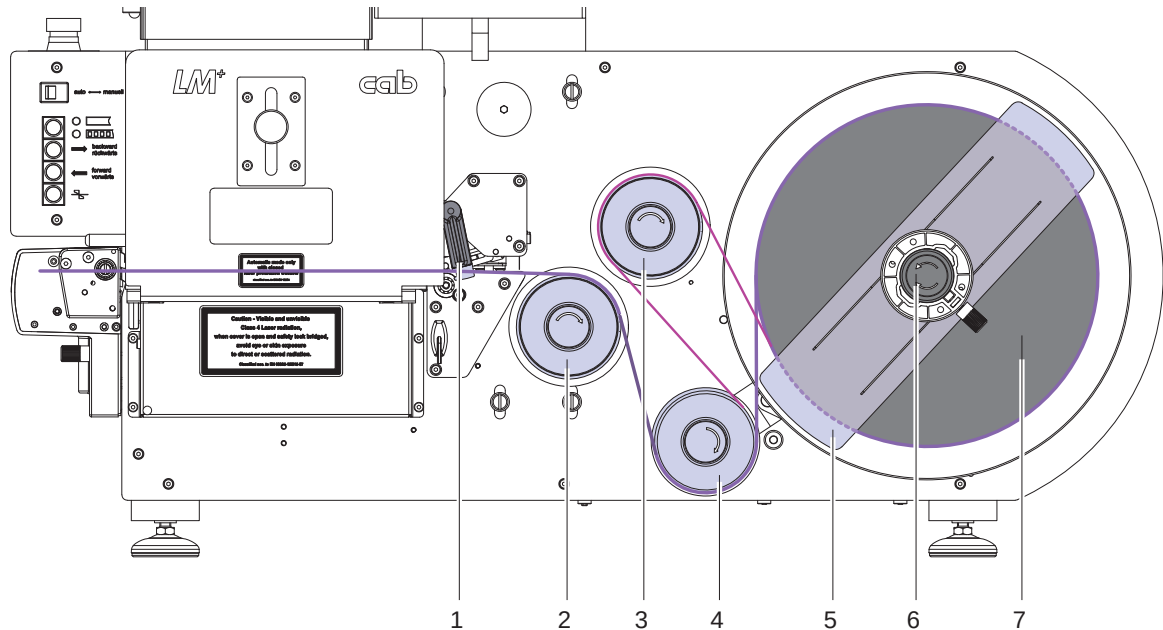


Fig.11 Material run

Outside wounded material:

- ▶ Push the material (7) onto the axle (6) and fix it with the margin stop (5).
- ▶ Turn release lever (1) to unlock the foil feed unit.
- ▶ Thread the material as illustrated through the guiding rollers (4) and (2) (fat line).
- ▶ Thread the material through the foil feed unit and the laser chamber completely.
- ▶ Adjust the guide rings of the guide rollers to the material width.
- ▶ Lock the foil feed unit by turning the release lever down.

Inside wounded material:



Notice!

Inside winding of the roll only with materials approved by cab after a previous test!

- ▶ Push the material (7) onto the axle (6) and fix it with the margin stop (5).
- ▶ Turn release lever (1) to unlock the foil feed unit.
- ▶ Thread the material as illustrated through the guiding rollers (3), (4) and (2) (thin line).
- ▶ Thread the material through the foil feed unit and the laser chamber completely.
- ▶ Adjust the guide rings of the guide rollers to the material width.
- ▶ Lock the foil feed unit by turning the release lever down.

3.3 Adjust Sensor for Marking Position

The Label Marker is equipped with a light barrier for material sensing.



Notice!

Independent of the material used, the light barrier can be setup in reflex light mode or in transmitting light mode. This setup is factory pre installed and is subject to be changed by cab services only.



Notice!

For a correct functionality of the light barrier, it must be calibrated for specific material the Label Marker works with. Refer to chapter maintenance for detailed description of calibration routines.

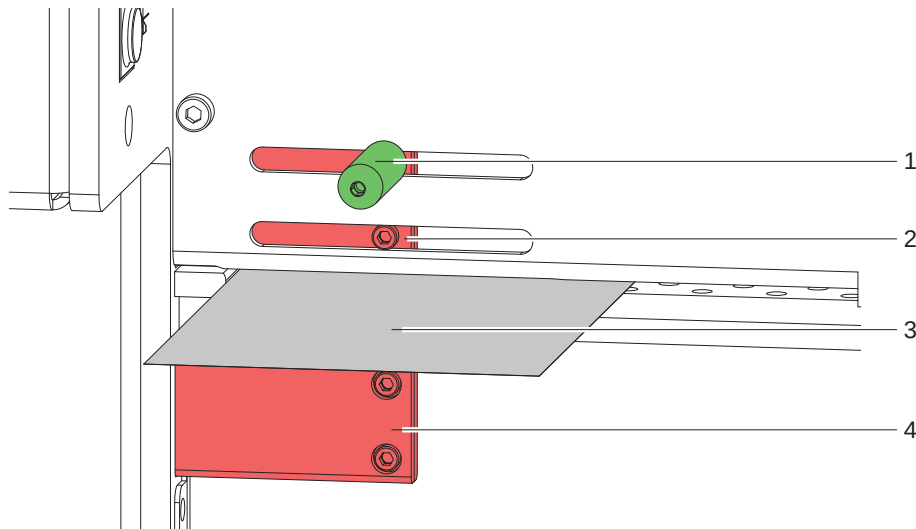


Fig.12 Light sensor adjusting

To adjust the sensor position proceed as follows:

- ▶ Switch of the Label Marker
- ▶ Dismount the cutter unit.



Danger!

▶ **Risk of injury by the cutter blades! The safety regulations described in Chapter Safety Instructions and Maintenance of cutter have to be observed strictly.**

- ▶ Insert material (3) and switch the Label Marker on.



Notice!

▶ **Release lever of foil feed unit to pull the material manually.**

- ▶ Pull the material (3) until a marking or an appropriate high-contrast area of the material is below the the position sensor (2/4).
- ▶ Untight the setting screw.
- ▶ The position sensor (2) is indicated by a small red light dot. Move the sensor until the light dot points to the marker or the material edge.
- ▶ Tight the setting screw (1).
- ▶ Switch of the Label Marker.
- ▶ Remount the cutter unit.
- ▶ Calibrate the light barrier for label material usage.
- ▶ Set operation mode to "manual" and "label material".
- ▶ Insert material while the system is switched off and place it approx. 20mm in front of the sensor.
- ▶ Press the push buttons "forward" and "reverse" the same time and switch on the system.

Now the material feeds approx. 50mm forward. The reflectance of the material becomes measured and the values for the distance between the labels and the label length will be saved to the system.

3.4 Adjustment of Fume Extraction and Vacuum

The Label Marker is equipped with a dual functional fume extraction system.

Correct adjustment of the airflow does provide correct material transportation and fixing of the material at the marking position.

Dust, fume and particles created by the marking process becomes extracted..

To adjust the airflow proceed as follows:

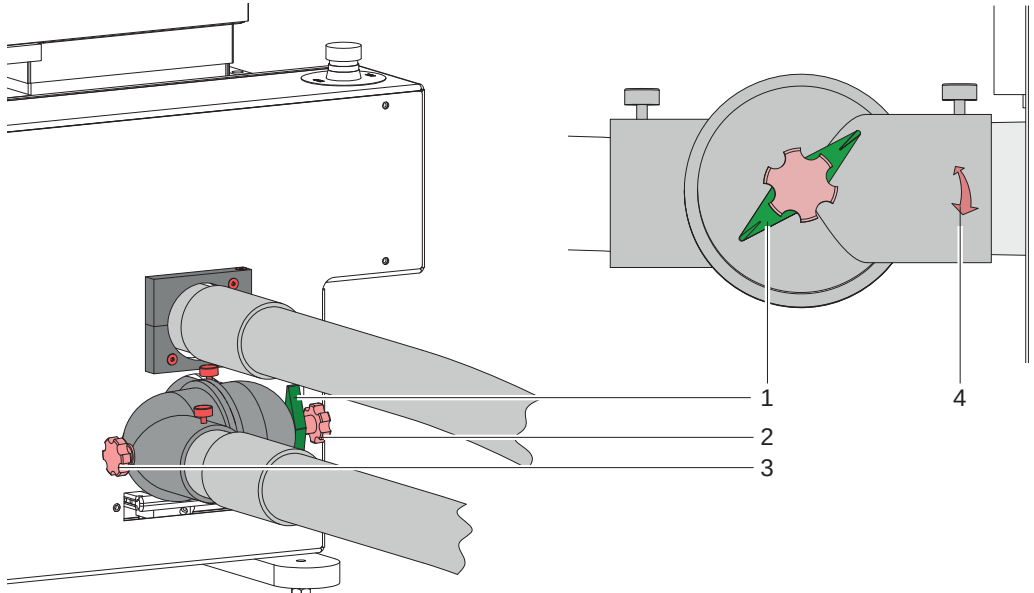
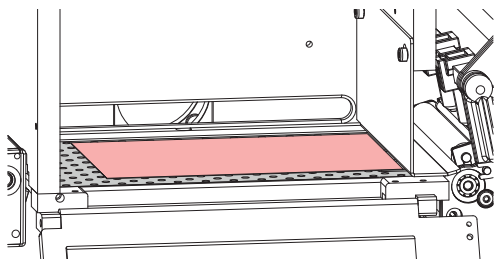


Fig.13 Fume extraction and vacuum

- ▶ Close the air regulator (1) completely with turning counterclockwise like marking (4). Loosen screws (2 and 3) easily.
- ▶ Switch on the fume extraction unit.
- ▶ Adjust the airflow of the fume extractor at the device for extraction of processing particles.
- ▶ Place the material at the base plate of the laser chamber and adjust the air outlets to the width of the material so an vacuum can be generated below the material.
- ▶ Open the air regulator (1) with turning clockwise until a vacuum is generated and the material becomes slightly fixed in position. The foil should kept flat and should be moveable by hand easily. If the foil becomes camber when trying to move the foil the air flow is set to high. Reduce the airflow by closing the air regulator slightly

correct



wrong

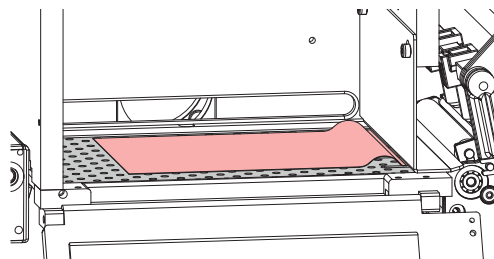


Fig.14 Adjust vacuum

- ▶ Check the performance of the extraction power for processing particles.
- ▶ Repeat adjustment until the airflow of the fume extraction and the vacuum for material transportation and fixing are tuned to a proportional function.
- ▶ Tighten screws (2 and 3).



Attention!

Not correct adjusted fume extraction system can cause malfunctions of the material transport system and loss of applicable suction power.

Air limiters (1-3) are provided to prevent the space under the base plate (4) from getting dirty.
This allows suction holes in the base plate (4) that are not covered by the material (5) to be covered.

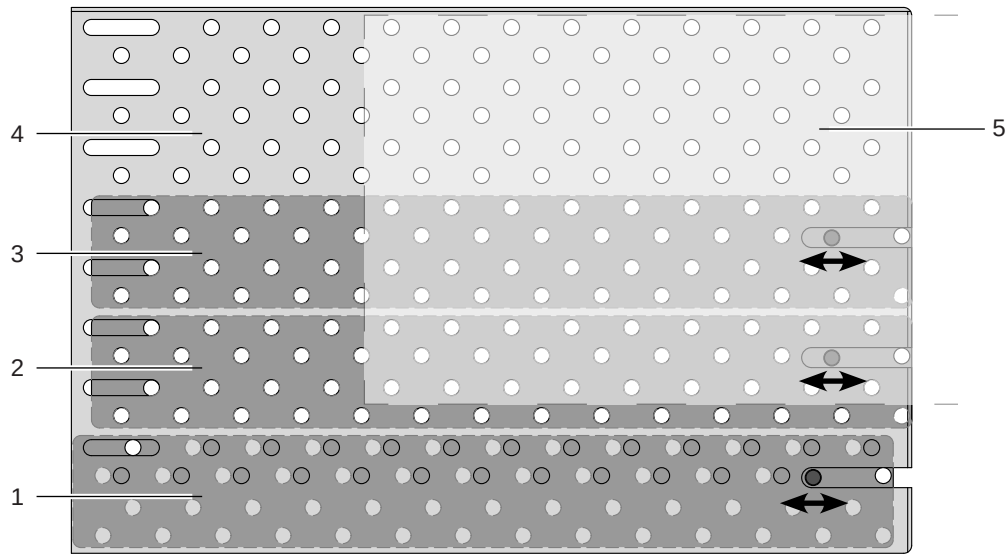


Fig.15 Air limiter

- ▶ Place material on the laser chamber floor at the rear edge.
- ▶ Move the air limiter so that the material runs completely over open suction holes.
- ▶ Air slides (slide 1 in the example here) through which no material is fed must be adjusted so that all holes are covered.

3.5 Locking of the laser protection window

The laser protection window (3) is used to check the material flow and for fine adjustment of the laser.



Warning!

In automatic mode, the lock of the laser safety window must be kept closed!

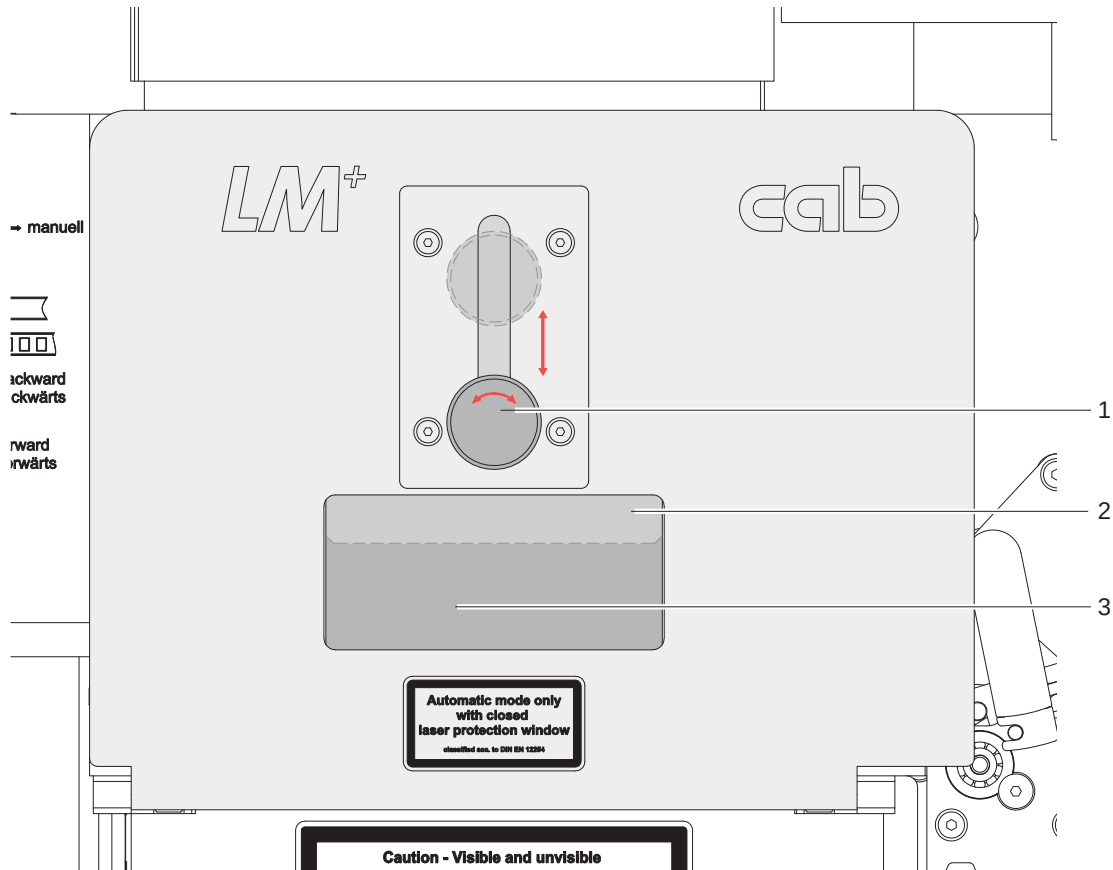


Bild 1 Locking of the laser protection window

- Pushed upwards, the laser protection window (3) reveals a view of the inside of the laser chamber.
 - To check the function and the material flow
 - Adjustment of the laser
- After the functional check and/or settings, slide the lock (2) on the handle (1) down.

This laser system has been developed most carefully using maintenance-free components. However, errors may occur due to insufficient maintenance or due to abrasive wear during standard operation.

**Notice!**

All kind of maintenance and repair work is solely carried out by cab Produkttechnik GmbH & Co. KG and its authorized personnel.

**Notice!**

Interferences or changes by third parties at the system will invalidate the warranty rights.

4.1 General Maintenance

**Danger!**

Before starting any kind of maintenance or service work you have to make sure that electric power supply is cut off and that the system is switched to neutral.

To ensure the system`s functioning without any breakdowns it is recommended that the operator carries out the following maintenance work regularly and before comissioning the system.

- ▶ Checking for damage of safety covers or parts of the housing.
- ▶ Checking for damage of safety windows (observe laser safety!).
- ▶ Checking parts of the housing that they are properly attached.
- ▶ Visual inspection of optical and mechanical components prior to engage the system.
- ▶ Visual inspection of electrical components for damage.
- ▶ Checking functionality of safety devices (Emergency Stop, Safety Circuits).
- ▶ Controlling and cleaning optical components (e.g. lenses), if required.
- ▶ Controlling and cleaning the louvers.
- ▶ Cleaning covers with a slightly moistened cloth.
- ▶ Removing residues (dirt / deposits) being produced from the laser marking process from work piece holders, transport and positioning systems, fume extractors, etc.

4.2 Material Feed Unit

4.2.1 Adjustment of the Material Feed Unit

The straight material transport is provided by an parallel force of the counter roller onto the material and the drive roller .

The counter roller is pressed down against the drive roller by two plungers. These are factory set in preferred position approx. 5 mm back from the edge. If adjustment is needed, proceed as follows:

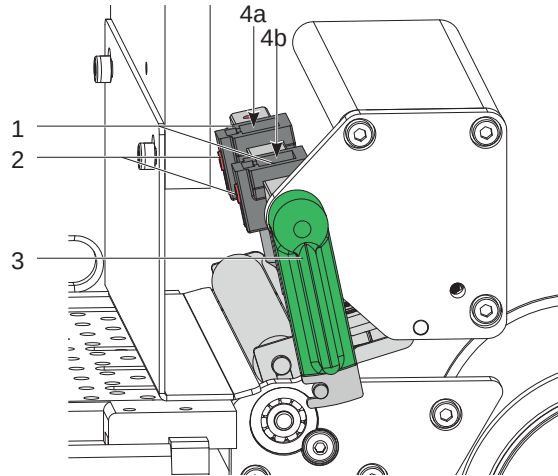


Fig.16 Adjust the material run

- ▶ Unlock foil feed unit at the lever (3).
- ▶ Loosen screws (2) of plungers (1) and move the plungers to desired position.
- ▶ Tight locking screws (2) of plungers and lock the foil feed unit.
- ▶ Check straightness of material transport.

In case the moving of the plunges make not a better result it's possible to change the pressure of the plungers.

- ▶ Move the plungers (1) so that they are over the holes in the square bar.
- ▶ Now it's possible to turn screws (4a) and (4b) .
 - Turning clockwise make a higher pressuere. The material run will moved in direction of this plunger.
 - Turning counterclockwise reduced the pressuere. The material run will moved in direction of the second plunger.

4.2.2 Cleaning Drive Rollers

- Unlock foil feed unit at the release lever and remove all material.
- In case the side panel is removed for better access.

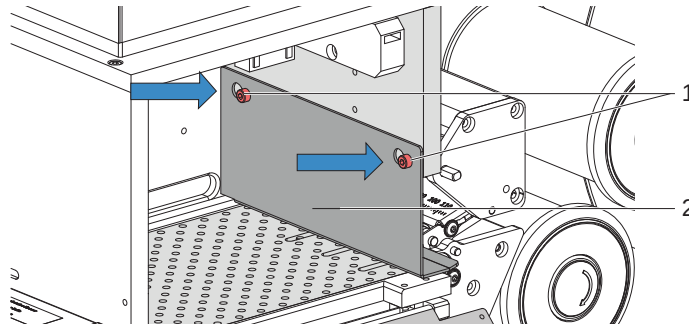


Fig.17 Demount guiding

- Remove deposit at the rollers and guides using roller cleaner W1 and a smooth cloth.

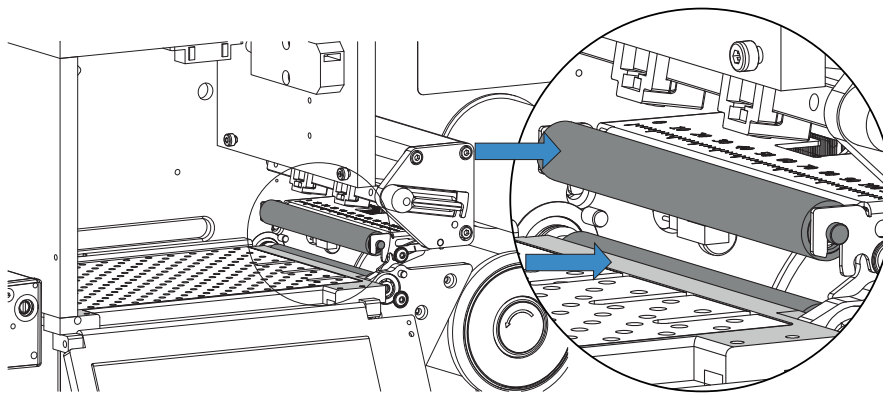


Fig.18 Clean rollers



Attention!

Never use sharp tools or harsh detergents to clean rollers. The rollers become damaged.

4.2.3 Replacing Drive Rollers

If the drive roller is extremely dirty it can be replaced.



Notice!

Worn rollers have an inhomogeneous and very glossy surface.

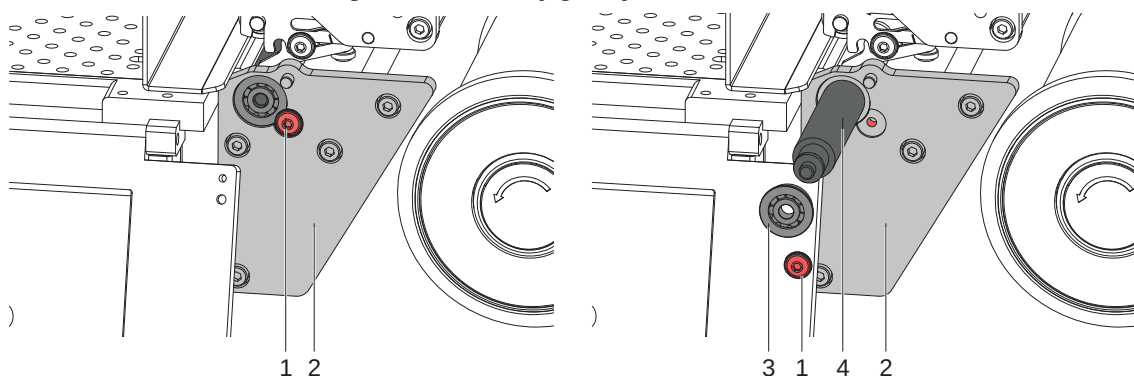


Fig.19 Replacing the drive roller

- Loosen screw (1) on the side plate (2).
- Pull out the bearing (3) and the drive roller (4).
- Replace the drive roller (4) .
- Put in bearing (3) and fix the roller (4) with the bearing (3) via tighten screw (1).

4.3 Light Barriers and Sensors

4.3.1 Cleaning of Material Sensor

The foil feed unit is equipped with a sensor for material detection.

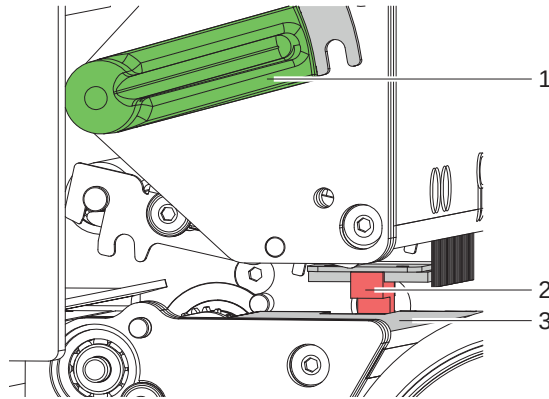


Fig.20 Cleaning material sensor

- ▶ Unlock foil feed unit at the release lever (1).
- ▶ Clean sensor using a smooth cloth or a small brush.
- ▶ Remove deposit at the material guides.

4.3.2 Cleaning of Positioning Sensor

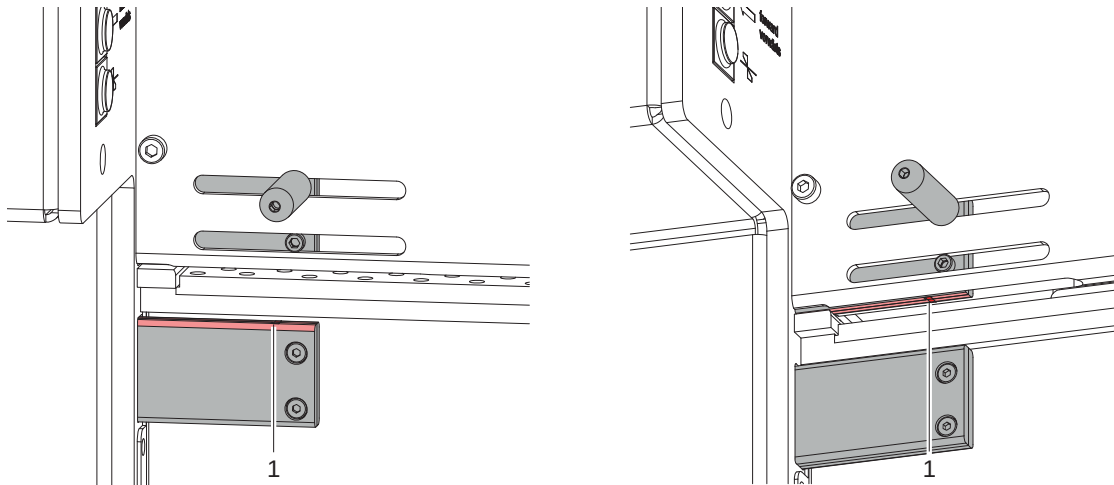


Fig.21 Cleaning position sensor

- ▶ Dismount cutter unit. (▷ .4.5 Maintenance Cutter on page 25)
- ▶ Clean sensor (1) using a smooth cloth or in case with detergent solution.



Attention!

Never use sharp tools or harsh detergents. Instructions for cleaning optical components have to be observed. Light barriers and sensors are optical components!

- ▶ Remount the cutter unit after cleaning.

4.3.3 Calibration of Positioning Sensor

**Notice!**

When using different materials, the sensor needs calibration to each material in use due to different absorption and reflexion of the laser beam.

The control unit (2) of the positioning sensor is located at the rear side of the Label Marker below the air hose connectors..

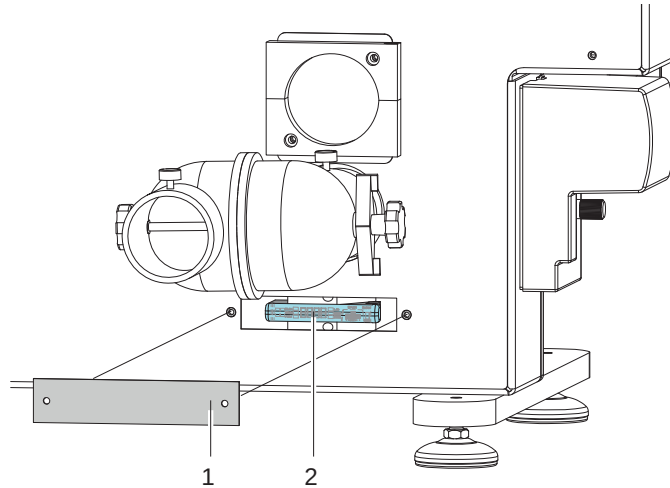


Fig.22 Control unit of the positioning sensor

To calibrate the operating mode of the sensor proceed as follows:

- ▶ Remove the cover (1) of the control unit and open the protection cover of the sensor.
- ▶ Place the label material below the positioning sensor at the laser chamber.
- ▶ Repeat pressing the MODE-button (5) until the status indicator indicates the operating mode "L/D" (3).

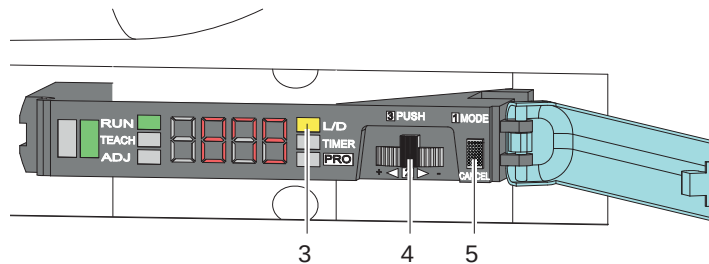


Fig.23 Positioning sensor - control elements and display

- ▶ Select using the PUSH +/- -button (4) the following setting. Selected value will be showed at the display.
 - for dark material select (dark on).
 - for bright material select (light on).
- ▶ Save selected value by pressing the PUSH +/- -button (4).

For calibration of the sensor proceed as follows:

- ▶ Put in material.
- ▶ Repeat pressing the MODE-button until the status indicator indicates the operating mode "TEACH" (1).

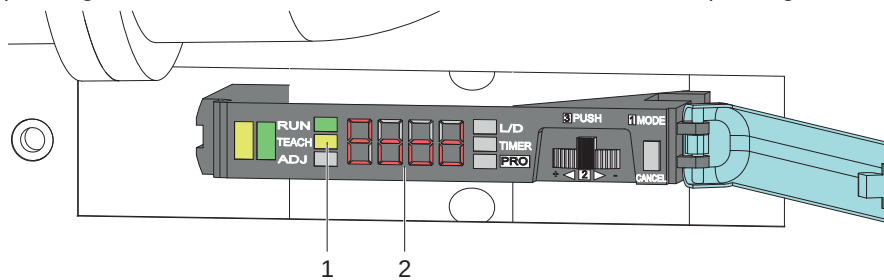


Fig.24 Positioning sensor - control elements and display

- ▶ Pressing the PUSH +/- -button saves the setting for "material in position".
- ▶ The sensors does acknowledge the setting by indicating "good" (2) at the display.
- ▶ Remove the material from the sensor position.



Notice!

When using die cut material place the material to the gap between two labels. The sensor will save the value for "no material" and will calculate the threshold.

- ▶ Pressing the PUSH +/- -button again saves the setting for "no material".
- ▶ The sensors does acknowledge complete programming by indicating "good" at the display.
- ▶ Repeat pressing the MODE-button until the status indicator indicates the operating mode "RUN" (3).

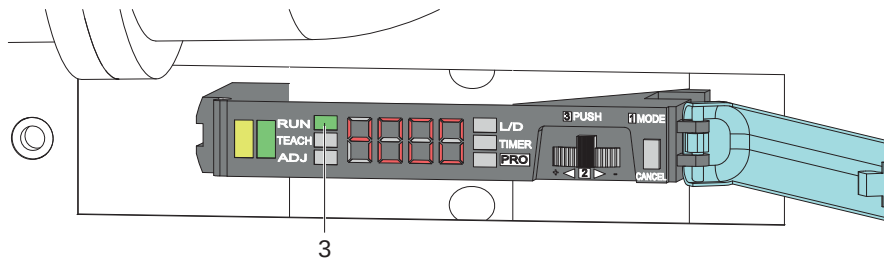


Fig.25 Positioning sensor - control elements and display



Notice!

The sensor is working correct if the orange LED illuminates when the material is within the sensing area. It must not illuminate when no material or the gap between labels are sensed.

- ▶ Close the protection cover of the sensor control unit.
- ▶ Remount the small cover of the control unit.

4.4 Cleaning of Laser Chamber

**Danger!**

Pollutants can escape and be released during cleaning.

For cleaning work on and in the laser chamber, wear a class FFP3 filter mask!

To provide reliable operation of the Label Marker it is advisable to clean all polluted areas due to laser processing residues in periodic intervals.

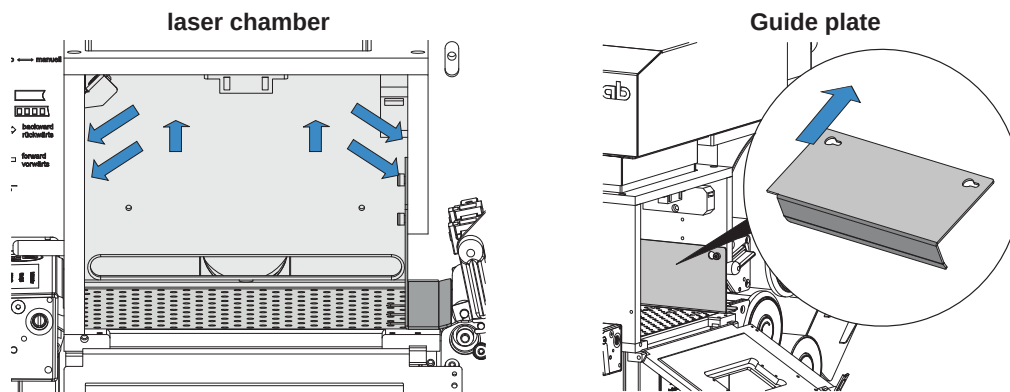


Fig.26 Cleaning of Laser Chamber

- For removing of dust and loose particles the fume extraction system may be used by connecting an commercially available suction hose.
- Remaining adhesives and debris at the material guides may be cleaned by a using moistly cloth or label remover.
- In case use compressed air at low pressure to clean the air holes of the base plate only.

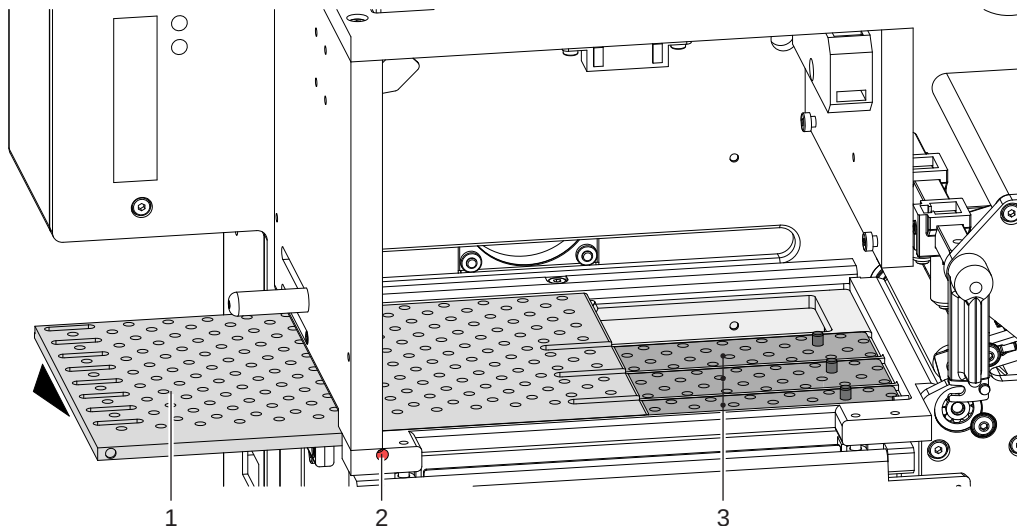


Fig.27 Cleaning of the negative pressure space

If the negative pressure decreases significantly, could be the reason contamination of the space under the base plate. Then this space is to be cleaned with a vacuum cleaner and a small flexible suction nozzle.

- Dismount cutter.
- Loosen the threaded pin (2) and slide out the base plate (1) as shown.
- Take out the air limiter (3).
- Remove dirt particles with a vacuum cleaner and a small, flexible nozzle.
- Assemble in reverse order.
- Adjust the air limiter again.

4.5 Maintenance of Cutter Unit



Warning!

- Disconnect the printer from the electrical outlet.



Attention!

Risk of injury. The cutter blades are sharp.

4.5.1 Mounting and Dismounting of Cutter Unit

- Loose the central locking screw (2) of the cutter unit.
- Carefully pull the cutter unit (1) straight off to avoid damaging of electrical contacts.

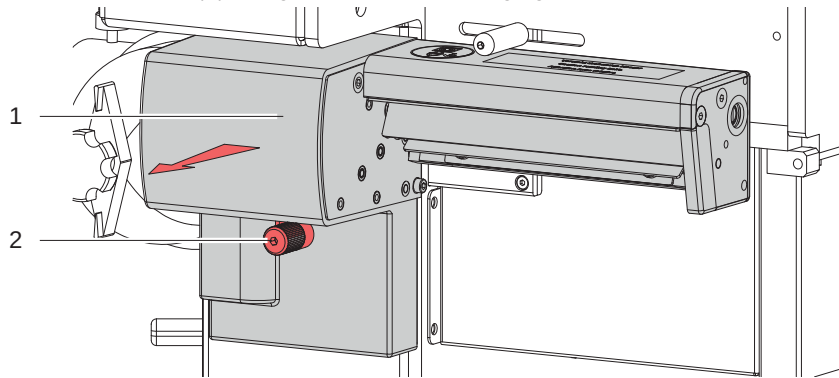


Fig.28 Mounting the cutter

- Mount the cutter unit in reverse order.

4.5.2 Cleaning of the Cutter Unit

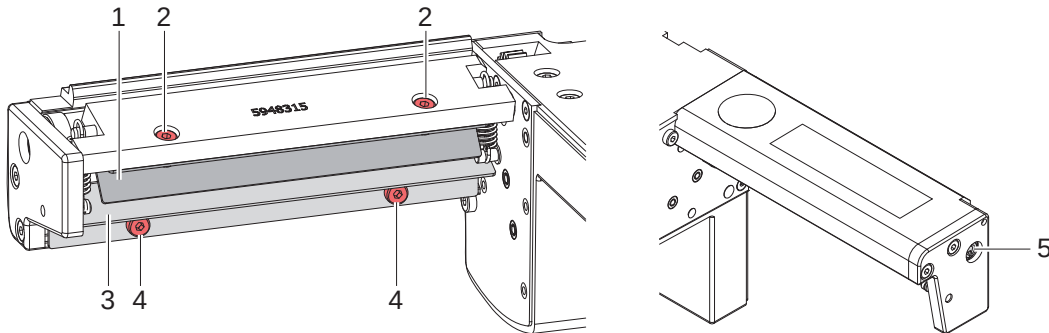


Fig.29 Cleaning of the cutter blade

1. Remove the cutter from the printer.
2. Loosen the screws (2,4) and remove the cover sheets (1,3).
3. Remove dust and paper particles with a soft brush or a vacuum.
4. For cleaning the circular blade it is possible to turn the axle (5) with a screwdriver for slotted head screws (slot width 7 mm).
5. Remove all deposits at the cutter blades with isopropyl alcohol and a soft cloth.

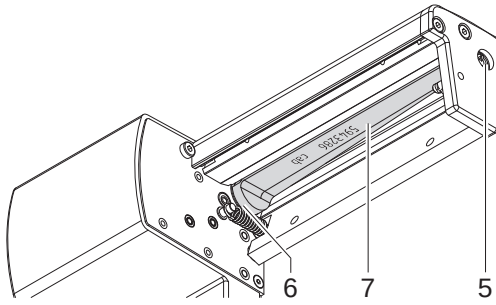


Fig.30 Cleaning the cutter blade

6. Grease the cylindrical area (6) of the circular blade (7) with an All round-High quality Grease. For that hold a greased brush on the cylindrical area and turn the axle (5) with a screwdriver for slotted head screws (slot width 7 mm).
During the turning the area is all-around greased.
7. Adjust the initial state of the cutter ▷ 4.5.4 on page 32.
8. Re-mount the cover sheet (1) using the screws M4x6 (2) and cover sheet (3) using the screws M4x10 (4).

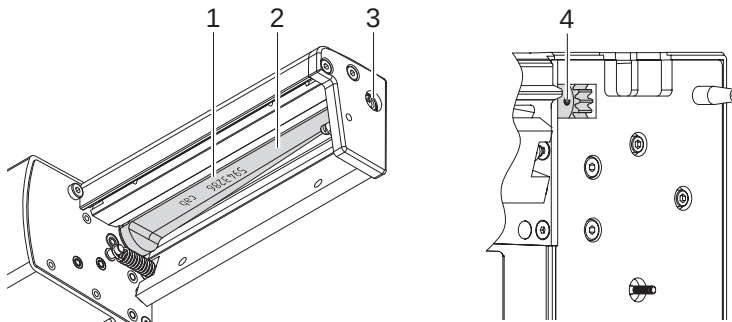
4.5.3 Changing the Blades



Warning!

- ▶ Disconnect the printer from the electrical outlet.

1. Remove the cutter from the printer.
2. Remove the cover sheets ▷ 4.5.2 on page 28
3. Turn the axle (3) of the circular blade (2) with a screwdriver for slotted head screws (slot width 7 mm) so that the inscription (1) of the blade points downward. In this position the set screw (4) on the gear wheel can be achieved from the rear of the cutter.
4. Loosen the set screw (4) a few turns.



Note!

- ▶ Save the washers (A, B, C) for the circular blade (2) and the lineal blade (12) when dismantling the cutter.



Attention!

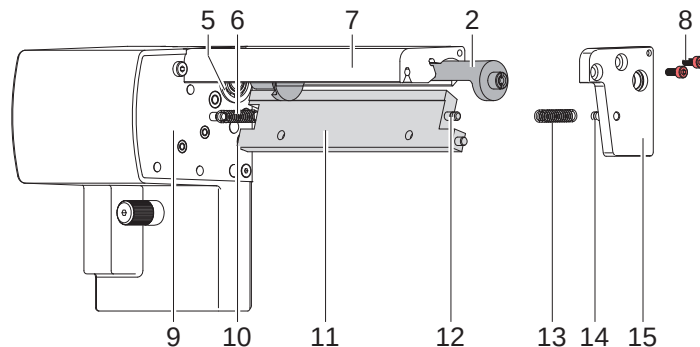
The springs (6, 15) are tense.

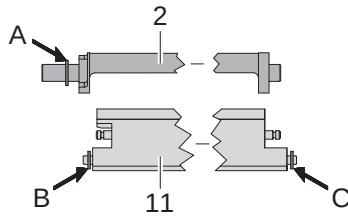
- ▶ Always hold tight lineal blade (12) in its position and push its axle slightly to the mounting plate (9) of the cutter.

5. Loosen the screws (8) and remove the bearing plate (15). The spring (13) becomes slack.
6. Remove spring (13) from the lineal blade.
7. Pull the circular blade (2) out of the bearing (5). The spring (6) at the lineal blade becomes slack.

If the lineal blade should not be changed skip to step 11.

8. Remove spring (6) and lineal blade (12).
9. Insert the axle of the (new) lineal blade with the washer (B) in the bearing (10) of the mounting plate.
10. Hang in the slack spring (6) to the pins of the mounting plate (9) and the lineal blade (11).





11. Turn the lineal blade (11) backwards. The spring (6) gets tense.
12. Insert the Axle of the (new) circular blade (2) with the washer (A) in the bearing (5) of the mounting plate.
13. Place the washer (C) on the axle of the lineal blade.
14. Hang in the slack spring (13) to the pins (12,14) of the lineal blade and the bearing plate.
15. Push the bearing plate (15) onto the blade axles (2, 11). The spring (13) gets tense.
16. Append the bearing plate (15) to the profile (7) using the screws (8).
17. Attend on an accurate position of the bearing plate (15) to the profile (7) of the cutter and tighten the screws (8).
18. Tighten the set screw (4) at the gear wheel.
19. Lubricate the circular blade ▷ 4.5.2 on page 28 and adjust its initial state ▷ 4.5.4 on page 32.
20. Re-mount the cover sheets ▷ 4.5.2 on page 28

4.5.4 Setting the Initial State of the Cutter

To operate the cutter correctly after cleaning or after changing the blades the circular blade (4) and the clock wheel (11) must be adjusted to each other.

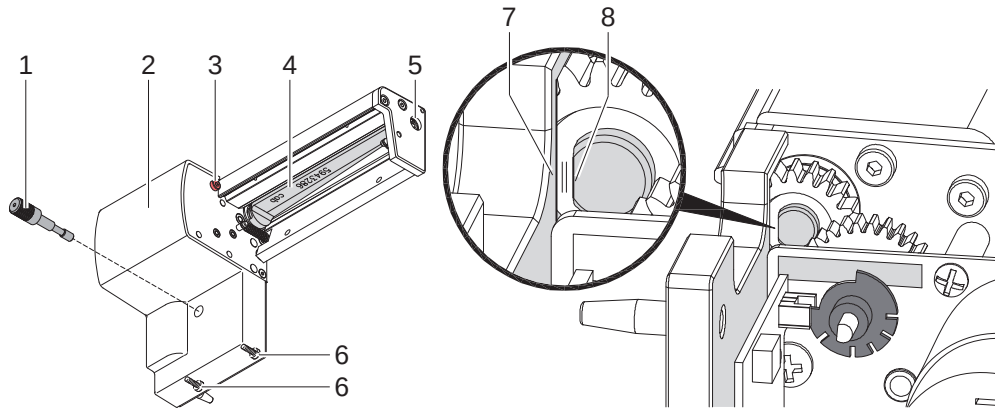


Fig.31 Remount the cutter

1. Unscrew the screws (1), (3) and (6, at the rear).
2. Remove the cover (2).
3. Turn the axle (5) of the circular blade with a screwdriver for slotted head screws (slot width 7 mm) so that the planar area (8) of the blade axle becomes parallel to the base plate (7).

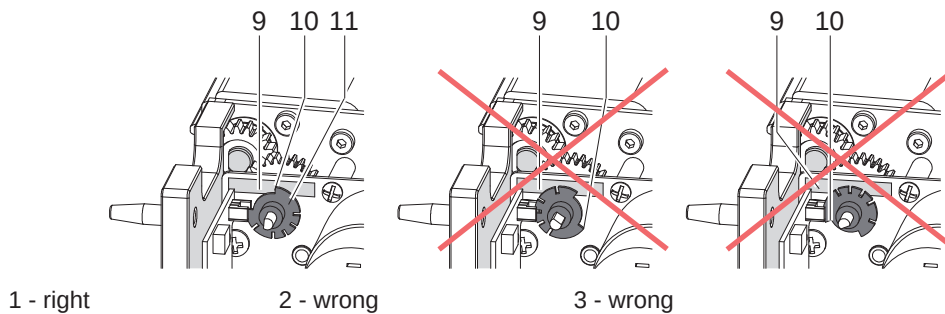


Fig.32 Setting of the clock wheel

4. Check the position of the clock wheel (11).
 - If the clock wheel is in the right position 1, the edge (10) of the clock wheel (11) is located in the area of the marking (9).
 - If the clock wheel is in position 2 or 3 turn the circular blade to reach the position 1 :
 - Turn the circular blade by one or two full turns, until the planar area (8) of the blade axle becomes parallel to the base plate (7) again and the clock wheel reaches the position 1
5. Mount the cover.

4.6 Maintenance and Service

Error / error message	Possible cause	Troubleshooting
laser system can not be started	no power supply connected E-Stop button pressed	connect power supply check system wiring release E-Stop buttons
no transport of material	system not switched on drive rollers not locked wrong operating mode	switch on system lock foil feed unit change operating mode auto/manual
foil bends in laser chamber	no fume extraction suction hose not connected or leaky bad fume extraction power air regulator deadjusted	switch on fume extractor check suction hoses and fittings check filters of fume extractor adjust air flow
foil transport not parallel	unwinder not adjusted correct guide rings not adjusted foil feed unit deadjusted failure material positioning rewinder not aligned to system	adjust flange parallel adjust guide rings to foil width check plunger position of foil feed unit check extraction system and setup check adapter plate and material core for correct setting.
material not rewinded correctly*	material core not installed properly wrong winding direction rewinder not switched on	check material core loading change winding direction switch on rewinder
code reader does not read	wrong positioning of code reader code reader not calibrated code reader not switched on	check reading position calibrate code reader switch on code reader
System does not start but all components are switched on LED on control panel flash	Locking system for material feeding are open	Close the locking system
	Material sensor can't detect the material	Make sure that the material will run under the sensor Clean the sensor
	Position sensor can't detect the material	Adjust the sensor (Position, Calibration) Clean the sensor

Table 2 Maintenance and Service

4.7 Maintenance schedule

To ensure failure-free operation of the system the operator has to carry out following maintenance tasks periodically..



Notice!

The recommended average interval for maintenance tasks are calculated for standard use and can differ due to higher frequency of use or different rate of pollution.

Description	Interval max.	Interval min.
Checking for damage of safety covers or parts of the housing.	before every starting of the system.	weekly
Checking for damage of laser protection windows (Observe laser safety regulations!)	before every starting of the system.	daily
Visual inspection of optical and mechanical components.	before every starting of the system.	daily
Checking functionality of safety devices.	before every starting of the system.	monthly
Removing, cleaning of debris of the laser marking process from transport units, positioning units, extraction devices and laser chamber.	as required	weekly
Checking and cleaning of air inlets.	as required	monthly
Cleaning of the material sensor.	as required	quarterly
Cleaning of the positioning sensor.	as required	quarterly
Adjustment of the positioning sensor.	as required	quarterly
Cleaning of drive rollers.	as required	weekly
Checking for wear drive rollers.	every 6 months	every 6 months
Inspection of material feeder.	quarterly	quarterly
Checking and cleaning of cutter unit.	as required	weekly
Checking extraction system for damages, leaks and tight fittings.	before every starting of the system.	weekly
Adjustment of air regulation for extraction and vacuum.	When changing material	monthly
Checking interfacing and wiring for damages and tight connection.	as required	every 6 months

Table 3 Maintenance schedule

Conversion kit for processing signs on carrier material - Roller Tag

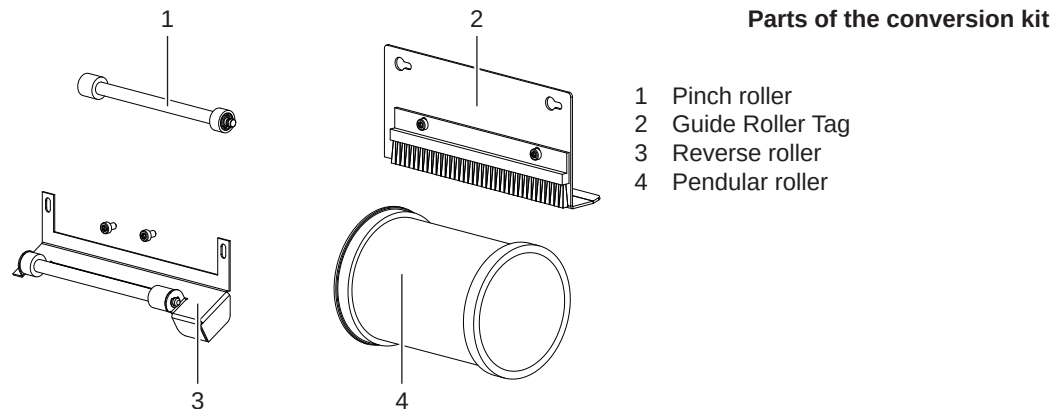


Fig.33 Parts of the conversion kit

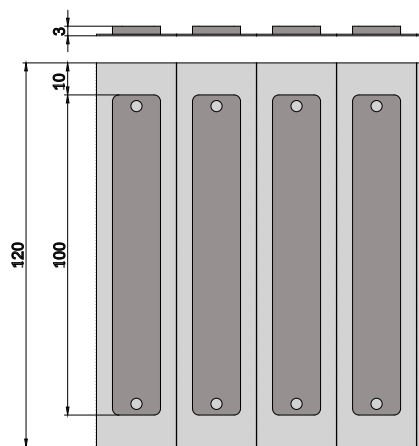


Fig.34 Material parameter

Modification

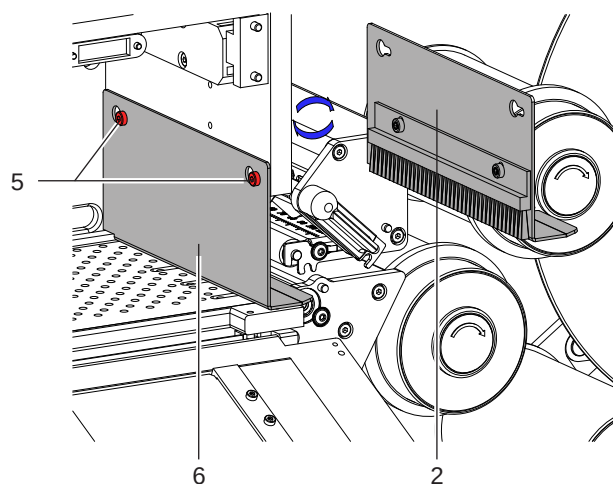


Fig.35 Change guiding

1. Switch off the device and disconnect from the electric power.
2. Loosen screws (5).
3. Take out guide (6).
4. Insert the Roller Tag guide (2) after changing the pressure roller (1) and tighten the screws (5).

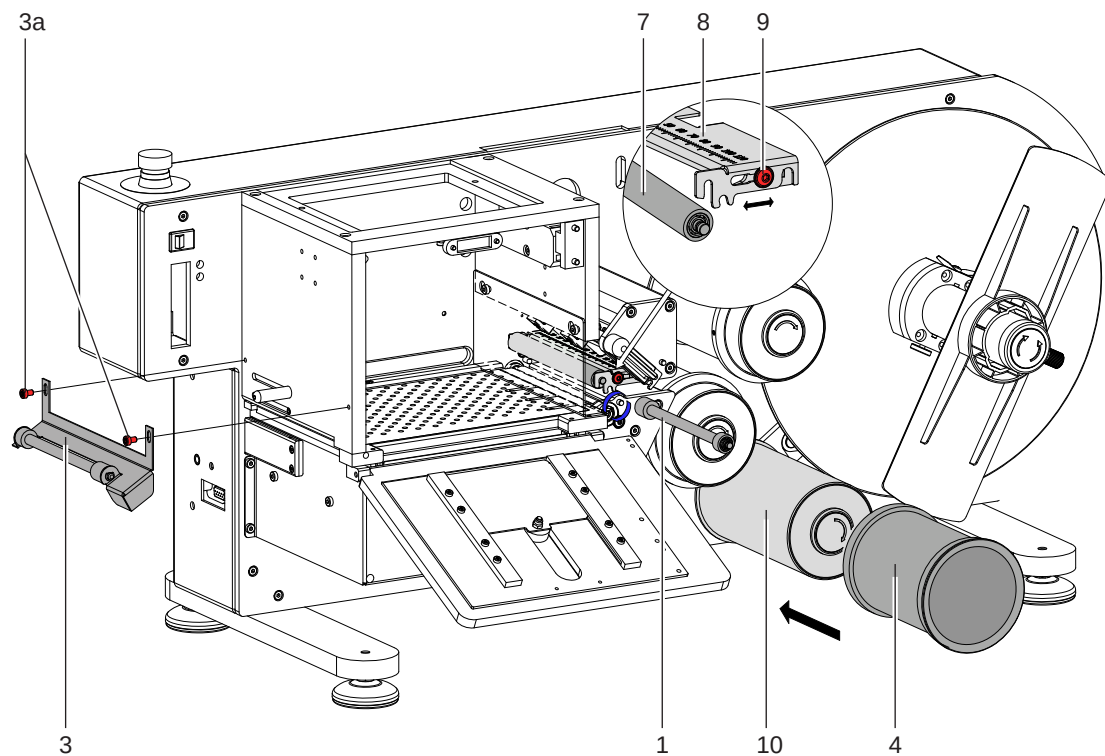


Fig.36 Change / installation of Roller Tag - components

5. Loosen the screw (9) on the roller holder (8).
6. Slide the screw (9) to the side and unlock the pressure roller (7).
7. Tilt the pressure roller (7) down slightly and remove.
8. Insert the pressure roller (1) from the conversion kit in the position of the removed pressure roller (7).
9. Slide the screw (9) with the latch in the direction of the laser chamber.
10. Tighten the screw (9) to secure the pressure roller (1).
11. Install the Roller Tag guide (2) ▷ Figure 35
12. Slide the pendulum roller (4) from the conversion kit onto the roller (10) mounted on the pendulum.
13. Fasten the deflection roller (3) to the outlet of the laser chamber using the associated screws (3a).

Laser label marker		LM+160.1	LM+254.1
Work area W x H x D	mm	160 x 5 x 190	
Position accuracy	mm	0.2	
Transport speed	mm/s	200	
Interior lighting		LED	
Material		Label or continuous material	
thickness	mm	0.055 - 0.3	
weight	up to g/m²	500	
width	mm	25 - 120	
Label height	max. mm	180	
Roll			
outside diameter	max. mm	300	
core diameter	mm	76	
winding		outside / (inside on request)	
For plano-spherical lens	type	160.1	254.1
Marking field	mm	112 x 112	120 x 170
Operating distance	mm	202 ± 8	302 ± 8
Dimensions and weight			
W x H x D	mm	440 x 520 x 802	
Laser prot. window W x H	mm	100 x 50	
Machine stands	Ø mm	50	
Suction nozzle	Ø mm	50	
Weight	kg	22	
Operating data			
Power supply		100-240 VAC, 50/60 Hz	
Power switch		ON/OFF	
Temperature / humidity	Operation	5-40 °C / 10-85 % not condensing	
	Storage	0-60 °C / 20-80 % not condensing	
	Transport	-25-60 °C / 20-80 % not condensing	
Laser safety class EN60825-1		Class 1	
Approval		CE	
Operation panel			
LED indicators		Continuous material Labels	
Push buttons		Material feed forward Material feed backwards Cut	
Switches		Automatic / manual E-stop	
Monitoring			
Safety circuits		closed	
Wipe-down roller		locked	
Material		in marking position / no material	
Interfaces			
Interlock / E-stop FL+			
Serial RS232C	FL+ CON5		
External E-stop			

Laser label marker		LM+160.2	LM+254.2
Operation room W x H x D	mm	160 x 5 x 190	
Position accuracy	mm	0.2	
Transport speed	mm/s	200	
Interior lighting		LED	
Material		Label or continuous materials	
Thickness	mm	0.055 - 0.3	
Weight	up to g/m²	500	
Width	mm	25 - 120	
Label height	up to mm	180	
Roll			
Outside diameter	up to mm	300	
Core diameter	mm	76	
Winding		outside / (inside on request)	
Lens	Type	160.2	254.2
Marking field	mm	112 x 112	120 x 170
Operation distance	mm	210 ± 8	310 ± 8
Dimensions and weight			
W x H x D	mm	440 x 520 x 802	
Laser prot. window W x H	mm	100 x 50	
Machine stands	Ø mm	50	
Suction pipe	Ø mm	50	
Weight	kg	22	
Operating data			
Power supply		100-240 VAC, 50/60 Hz	
Power switch		ON/OFF	
Laser protection class EN60825-1		Class 1	
Approval		CE	
Operation panel			
LED display		Continuous material Labels	
Buttons		Material feed Material backfeed Cut	
Switches		automatic / manual E-stop	
Monitoring			
Safety circuits		closed	
Wipe-down roller		locked	
Material		in marking position / no material	
Interfaces			
Interlock / E-Stop XENO 4			
Serial RS232C	XENO 4 CON5		
External E-stop			
Cutter			

Fig.37 Technical data

**Notice!**

For additional technical data of used laser systems and exhaust units, refer to additional operating manuals of these devices, please.

7.1 Declaration of Incorporation



Declaration of Incorporation

We declare herewith that the following „partly completed machinery“ as a result of design, construction and the version put in circulation complies with the essential requirements of the **Directive 2006/42/EC on machinery** :

Annex I, Article 1.1.2, 1.1.3, 1.1.5, 1.2.1, 1.2.4.1, 1.2.4.3, 1.3.1, 1.5.1, 1.5.8, 1.6.3, 1.7

The „partly completed machinery“ additionally complies with the Directive 2014/30/EU relating to electromagnetic compatibility.

In the event of any alteration which has not been approved by us being made to any device as designated below, this statement shall thereby be made invalid.

Device:	Laser Marker
Type:	LM+ 160.1 , LM+ 254.1, LM+ 160.2 , LM+ 254.2
Applied EU Regulations	Applied Standards
Directive 2006/42/EC on machinery	• EN ISO 12100:2010
	• EN ISO 13857:2008
	• EN 349:1993+A1:2008
	• EN ISO 13849-1:2015
	• EN 60825-4:2006+A1:2008+A2:2011
	• EN 60950-1:2006 +A11:2009+A12:2011+A1:2010+A2:2013
Person authorised to compile the technical file :	Norbert Schulmeister cab Produkttechnik GmbH & Co KG Wilhelm-Schickard-Str. 14 D-76131 Karlsruhe
Signed for, and on behalf of the Manufacturer :	Karlsruhe, 18.01.2021  Klaus Bardutzky Company Management
cab Produkttechnik GmbH & Co KG Wilhelm-Schickard-Str. 14 D-76131 Karlsruhe	

The product must not be put into service until the final machinery into which it is to be incorporated has been declared in conformity with the provisions of the Directive on machinery

The documents according annex VII part B from the incomplete machinery are created and will commit to state agencies on request in electronic kinds.

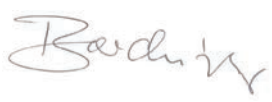
Declaration of Conformity according Directive 2014/30/EU relating to electromagnetic compatibility on the next page.

7.2 EU Declaration of Conformity



EU Declaration of Conformity

We declare herewith that as a result of the manner in which the device designated below was designed, the type of construction and the devices which, as a result have been brought on to the general market comply with the relevant fundamental regulations of the EU Rules for Safety and Health. In the event of any alteration which has not been approved by us being made to any device as designated below, this statement shall thereby be made invalid.

Device:	Laser Marker
Type:	LM+ 160.1 , LM+ 254.1, LM+ 160.2 , LM+ 254.2
Applied EU Regulations	Applied Standards
Directive 2014/30/EU relating to electromagnetic compatibility	• 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 61000:2018
Commission delegated directive (EU) 2015/863 amending Annex II to Directive 2011/65/EU of the European Parliament and of the Council as regards the list of restricted substances	
Signed for, and on behalf of the Manufacturer :	Karlsruhe, 18.01.2021
cab Produkttechnik GmbH & Co KG Wilhelm-Schickard-Str. 14 D-76131 Karlsruhe	 Klaus Bardutzky Company Management

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