



PCB Separator

MAESTRO 6

Description	Type
PCB Separator	MAESTRO 6

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Topicality

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This Operator's Manual is delivered to the device:

Germany
cab Produkttechnik GmbH & Co KG
Karlsruhe
Phone +49 721 6626 0
www.cab.de

USA
cab Technology, Inc.
Chelmsford, MA
Phone +1 978 250 8321
www.cab.de/us

Taiwan
cab Technology Co., Ltd.
Taipei
Phone +886 (02) 8227 3966
www.cab.de/tw

China
cab (Shanghai) Trading Co., Ltd.
Guangzhou
Phone +86 (020) 2831 7358
www.cab.de/cn

France
cab Technologies S.à.r.l.
Niedermodern
Phone +33 388 722501
www.cab.de/fr

Mexico
cab Technology, Inc.
Juárez
Phone +52 656 682 4301
www.cab.de/es

China
cab (Shanghai) Trading Co., Ltd.
Shanghai
Phone +86 (021) 6236 3161
www.cab.de/cn

South Africa
cab Technology (Pty) Ltd.
Randburg
Phone +27 11 886 3580
www.cab.de/za

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1.1 Instructions

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



Danger!

Draws your attention to an exceptionally grave, impending danger to your health or life.



Warning!

Indicates a hazardous situation that could lead to injuries or material damage.



Attention!

Draws attention to possible dangers, material damage or loss of quality.



Notice!

Gives you tips. They make a working sequence easier or draw attention to important working processes.



Environment!

Gives you tips on protecting the environment.



Handling instruction



Reference to section, position, illustration number or document.



Option (accessories, peripheral equipment, special fittings).

1.2 Intended Use

- The device 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 and other tangible assets can arise during use.
- The device 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 is intended exclusively for separating pre-scored PCB's. 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.



Notice!

The complete documentation can also currently be found in the Internet.

1.3 Safety Instructions

- The device is configured for voltages of 115 or 230 V AC. It only has to be plugged into a grounded socket.
- Hazard by electrical charge. Provide an earthing connection via press stud.
- Only connect the device to other devices which have a protective low voltage.
- Switch off all affected devices (e.g. conveyor belt) before connecting or disconnecting.
- Risk of hand injury. Wear protective gloves while PCB separating.
- Ensure that people's clothing, hair, jewelry etc. do not come into contact with the exposed rotating blade.
- In an emergency situation, actuate the emergency stop switch in the control panel by tight pressing. This interrupts the voltage supply to the device.
- The device may only be used in a dry environment, do not expose it to moisture (sprays of water, mists, etc.).
- Do not use the device in an explosive atmosphere.
- Do not use the device close to high-voltage power lines.
- Work going beyond this may only be performed by trained personnel or service technicians.

- Unauthorized interference with electronic modules or their software can cause malfunctions.
- Other unauthorized work on or modifications to the device can also endanger operational safety.
- Always have service work done in a qualified workshop, where the personnel have the technical knowledge and tools required to do the necessary work.
- There are various warning stickers on the device. They draw your attention to dangers. Warning stickers must therefore not be removed, as then you and other people cannot be aware of dangers and may be injured.



Danger!
Danger to life and limb from power supply.
 ► Do not open the device casing.

1.4 Safety Marking

1		Emergency Switch ► Press it in a hazardous situation!
2		Risk of hand injury! ► Wear protective gloves while PCB separating.
3		Possible damage of electronics! ► Disconnect the PCB separator from the electrical outlet before mounting or removing an optional conveyor belt.
4		Hazard by electrical charge! ► Provide an earthing connection via press stud.

Table 1 Safety marking

1.5 Environment



Obsolete devices contain valuable recyclable materials that should be sent for recycling.
 ► Send to suitable collection points, separately from residual waste.
 The modular construction of the printer enables it to be easily disassembled into its component parts.
 ► Send the parts for recycling.

MAESTRO 6

Overall technical data		
Separation method	Component side	Circular blade
	Solder side	Linear blade
Separation	path-optimized	
Separation speed up to	up to 500 mm/s	
	up to 250 mm/s with aluminium	
Material	FR4, CEM3, aluminium	
Support table depth	160 mm	
Control buttons		
- Home / Position		
- Carriage movement to and fro		
Programming buttons		
- Carriage start / stop position		
- Carriage movement to and fro with and without interruption		
- Separation speed		
- "Number of speed" or "Separation length" selection		
- Deletion of current selection		
With a conveyor belt in use		
- Conveyor belt activation		
- Belt speed		
Power switch	ON/OFF	
Foot switch	START separation	
Safety switch	E-stop	
Power supply	100 - 240 VAC, 50/60 Hz	
Emission sound pressure level	LpA < 70 dB (A)	
Temperature / humidity	Operation	+10 - 35°C / 10 - 85%
	Stock	0 - 60°C / 20 - 80%
not condensing	Transport	- 25 - 60°C / 20 - 80%
Approvals	CE, FCC Class A	

MAESTRO 6/X03

Technical data	6/603	6/903	6/1203	6/1503
Circular blade	diameter 60 mm			
Separation speed	up to 500 mm/s			
	up to 250 mm/s with aluminium			
Materials	FR4, CEM3, aluminium			
Component height	Component side	up to 10 mm		
	Solder side	up to 22 mm		
Width	1150 mm	1450 mm	1750 mm	2050 mm
Height x Depth	350 x 450 mm			
Weight	50 kg	55 kg	60 kg	65 kg

MAESTRO 6/X01

Technical data	6/601	6/901
Circular blade	diameter 125 mm	
Separation speed	up to 500 mm/s	
Materials	FR4, CEM3	
Component height	Component side	up to 34 mm
	Solder side	up to 22 mm
Width x Height x Depth	1150 x 410 x 450 mm	1450 x 410 x 450 mm
Weight	50 kg	55 kg

MAESTRO 6/601.70

Technical data	6/601.70	
Circular blade	diameter 185 mm	
Separation speed	up to 500 mm/s	
Materials	FR4, CEM3	
Component height	Component side	up to 63 mm
	Solder side	up to 22 mm
Width x Height x Depth	1150 x 410 x 450 mm	
Weight	50 kg	

Table 2 Technical Data

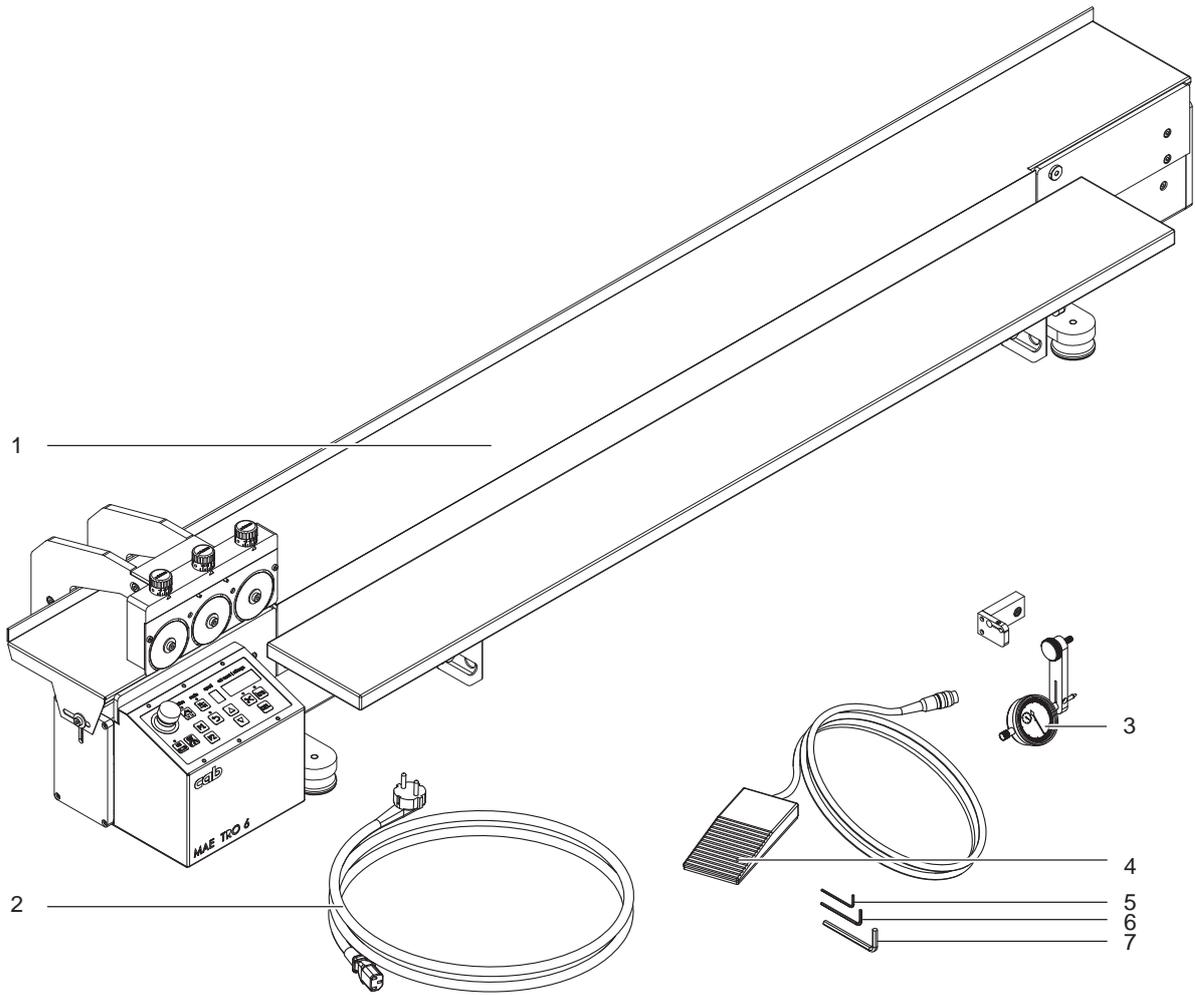


Fig.1 Contents of Delivery

- 1 Maestro 6
- 2 Power Cable
- 3 Dial Gauge Assembly
- 4 Food Switch
- 5 Hexagonal Wrench
DIN911 2,5mm
- 6 Hexagonal Wrench
DIN911 4mm
- 7 Hexagonal Wrench
DIN911 5mm
- 8 Documentation

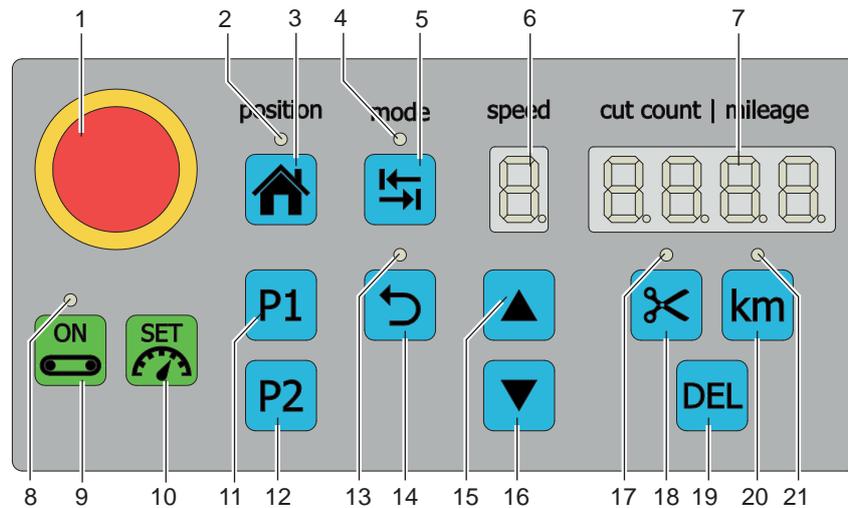


Fig.2 Control Panel

1	Emergency Switch	Press it in a hazardous situation!
2	LED home	Is blinking in case of device is outside home position.
3	Taste home	- To run the device in home position after switching on - Quit errors in operation
4	LED forward and backward separate	Lights up when the separate forward and backward movement mode of the blade carriage is activated.
5	Button forward and backward separate	Activation of the blade carriage movement mode forward and backward separate.
6	Display speed	Display the selected speed.
7	Display cut count / mileage	Display the cut count or the mileage (cut length).
8	LED conveyor belt	Indicates the activation of a connected conveyor belt.
9	Button conveyor belt	Activation of a connected conveyor belt.
10	Button conveyor belt speed	Function button to set the speed of the conveyor belt in combination with the button speed 1 and speed 2.
11	Button Position 1	Set Position 1 of the cut length.
12	Button Position 2	Set Position 2 of the cut length.
13	LED forward and backward continued	Lights up when the forward and backward movement mode of the blade carriage without interruption is activated.
14	Button forward and backward continued	Activation of the forward and backward movement mode of the blade carriage without interruption.
15	Button speed 1	Increase the speed of the blade carriage and the speed of the conveyor belt while pressing the button conveyor belt speed.
16	Button speed 2	Reduce the speed of the blade carriage and the speed of the conveyor belt while pressing the button conveyor belt speed.
17	LED cut count	In case of activated display cut count.
18	Button cut count	Selection of the display cut count.
19	Button DEL	Reset display cut count or mileage
20	LED mileage	In case of activated display mileage (cut length).
21	Button mileage	Selection of the display mileage (cut length)

Table 1 Control Panel Elements

5.1 Electrical Links

Attention!



The device and printing materials will be damaged by moisture and wetness.
 ► Set up the device only in dry locations protected from splash water.



Notice!
 Clean the blade with a soft cloth before you start the machine at first time!

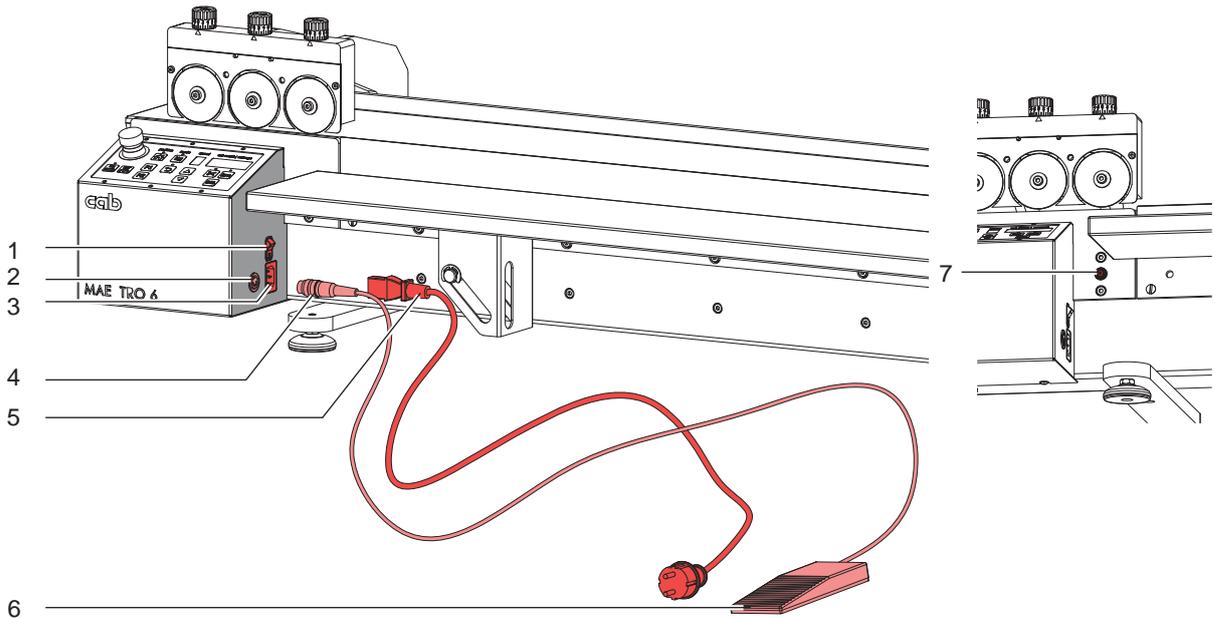


Fig.3 Connections

- Set up device on a level surface. For a secure stand you can change the foot highness by turning.
- Put in the foot switch round connector (4) from the foot switch (7) in the 5 pin female connector (2) and tighten it.
- Connect the electrical ground on the earth connection (6).
- Switch off the power module (1). Connect the power cable (5) to the power input module (3) and to an earthed socket.

5.2 Adjustable Platform

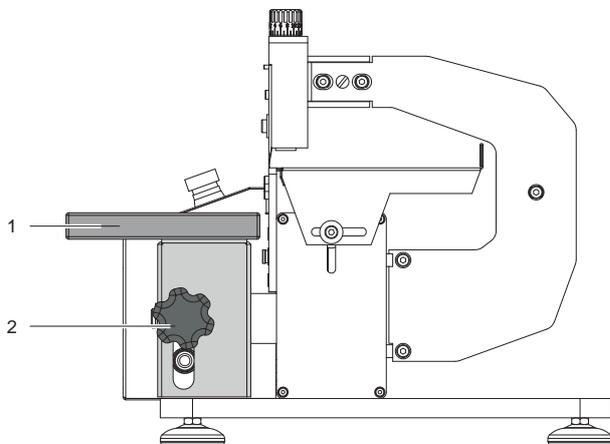


Fig. 1 Adjustable platform

The adjustable platform delivered with the machine is designed for use as a hand-rest, easing the placement of the PCB on the lineal blade. Thereby it is also preventing a possible premature tiring for the user.

1. By turning the knurled screw (2), the platform (1) can be raised or lowered sensitively. Rotating the knurled screw anti-clockwise will lift up the platform.

**Notice!**

The device offers the possibility to separate the circuit board benefits in several steps and thus gently. The cutting is more gentle for the PCB's with a higher number of cuts.

5.3 Switch on

1. Switch on the device by power switch (1). LED **home** is blinking

**Notice!**

Are all connections ready and the device is switched on and not in function check the emergency swith!

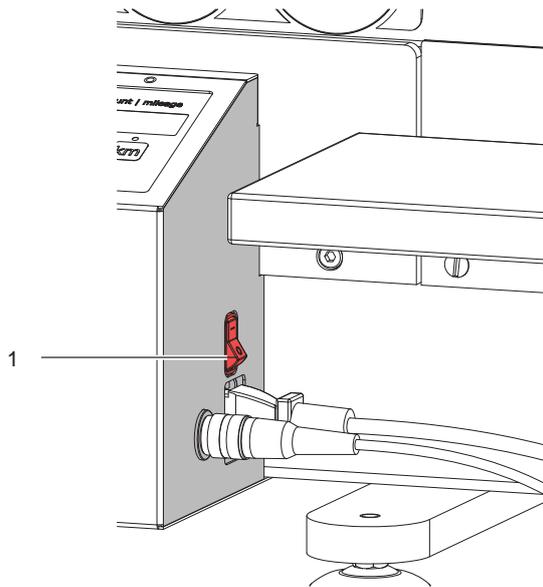


Fig.4 Power Switch

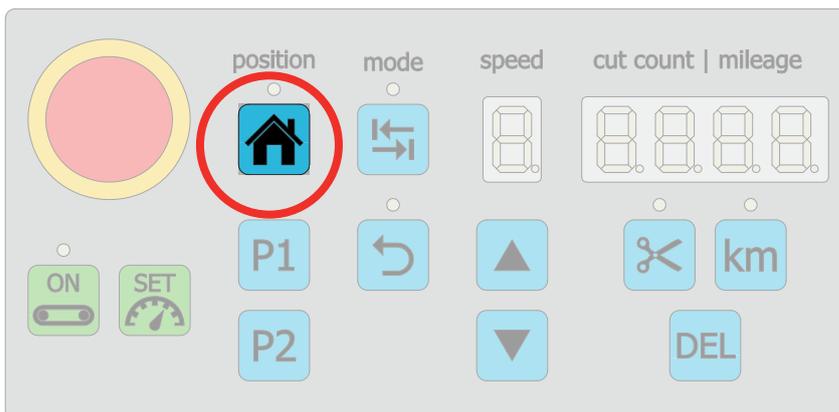


Fig. 2 Taste **home** drücken.

2. Press button **home**. .

3. Device will run to the **home** position and the LED **home**  is permanently on.

5.4 Adjustment the distance between Circular and Linear Blade

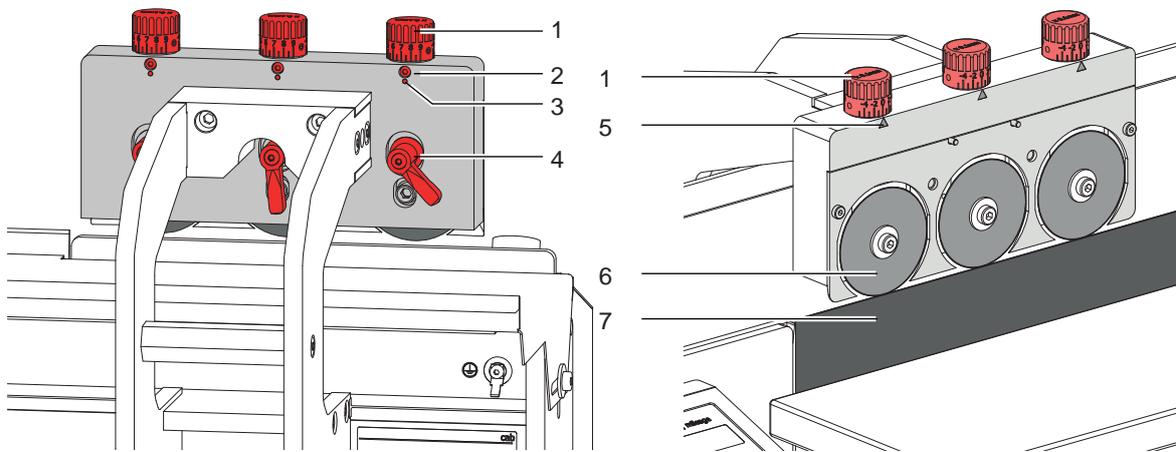


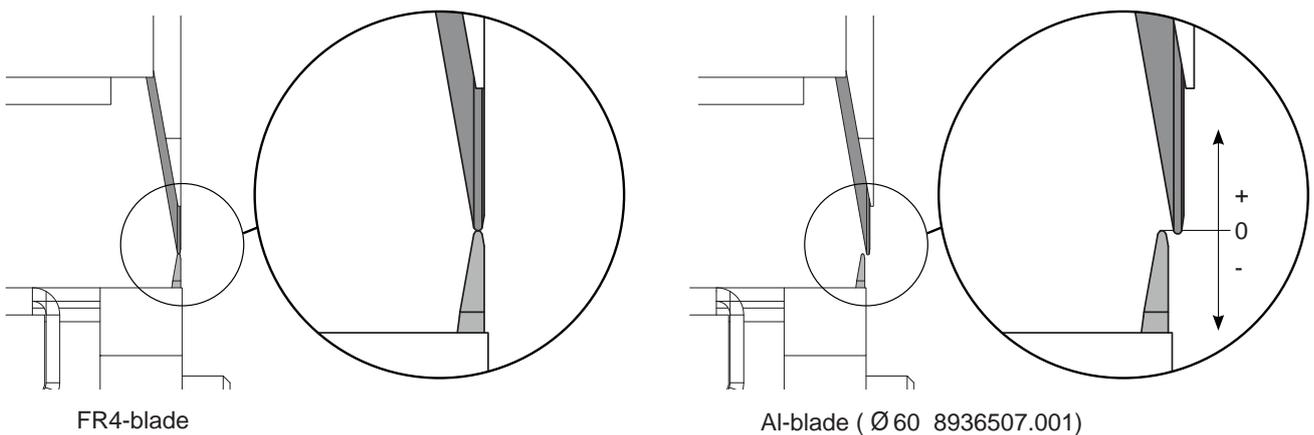
Fig. 3 Adjustment the blade distance

The following settings apply to all three circular blades and must be done individually.

1. Loosen the clamping lever (4) by turning it counterclockwise until the adjusting knob (1) can be turned.
2. Turn the adjusting knob (1) to the desired value.
One graduation corresponds to 0.1 mm distance between the circular blade (6) and the linear blade (7)..
For orientation, the mark (5) on the carriage housing is used.
With the screw (2) screwed in, the circular blade can be turned down to a minimum distance of 0.03 mm from the linear blade.
This serves to protect the knives in configuration FR4!

only for AI circular blades (Ø 60 8936507.001)

- With the AI-blades installed unscrew the screw (2) to set the roller blade at a negative distance to the linear blade. That's **only** for AI-blades due to the lateral offset of the AI knives to the linear knife.
The screw (3) now secures the lower stop at -0.4 mm and must **not** be unscrewed.



FR4-blade
Fig. 4 Blade offset

AI-blade (Ø 60 8936507.001)

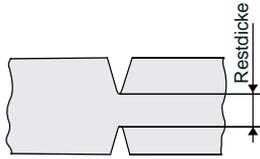
Attention!

When using FR4 blades, always leave the stop screw (2) tightened to avoid contact between the roller blade and the linear blade.

The stop screw (2) prevents the setting of a negative value for the distance.

5.5 Recommendation for cutting Circular Blade 60

depend of notch thickness and cut mode



Notice!

The cutting is more gentle for the PCB's with a higher number of cuts.
 The deepness of the last cut must be so that the PCB's are easily to separate.
 The values are recommendation and it's possible to change it if it is necessary.

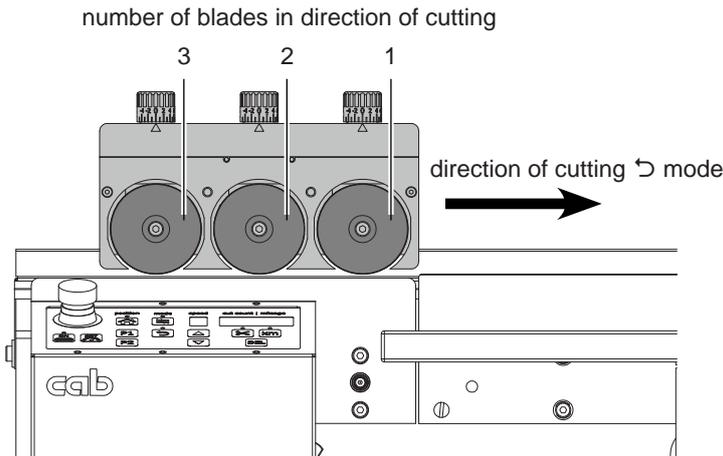


Fig. 5 Arrangement of the blades

Recommendation for FR4 boards

Notch thickness	cutting mode settings in direction of cutting			
	↶	↷	↶	↷
0,3 mm	↶	0,25 mm	0,15 mm	0,10 mm
	↷	0,20 mm	0,10 mm	0,20 mm
0,4 mm	↶	0,30 mm	0,20 mm	0,10 mm
	↷	0,25 mm	0,15 mm	0,25 mm
0,5 mm	↶	0,40 mm	0,25 mm	0,15 mm
	↷	0,35 mm	0,15 mm	0,35 mm
0,6 mm	↶	0,45 mm	0,30 mm	0,15 mm
	↷	0,40 mm	0,20 mm	0,40 mm
0,7 mm	↶	0,55 mm	0,35 mm	0,20 mm
	↷	0,45 mm	0,25 mm	0,45 mm
0,8 mm	↶	0,60 mm	0,40 mm	0,20 mm
	↷	0,55 mm	0,25 mm	0,55 mm

Table 4 Distance between the blades for circular blade 60 - circular blade to linear blade

5.6 Recommendation for cutting Circular Blade 125 / 185 (FR4)

FR4	
Notch thickness	Distance between the blades
0,3 mm	0,15 mm
0,4 mm	0,20 mm
0,5 mm	0,25 mm
0,6 mm	0,30 mm
0,7 mm	0,35 mm
0,8 mm	0,40 mm

Table 5 Distance between the blades for circular blade 125 /185 - circular blade to linear blade

5.7 Adjustment the Cut Length

Notice!

- i** The adjusted cut length must be orientated on the separated PCB. Then, the display "mileage" for the cut length shown a realistic value.

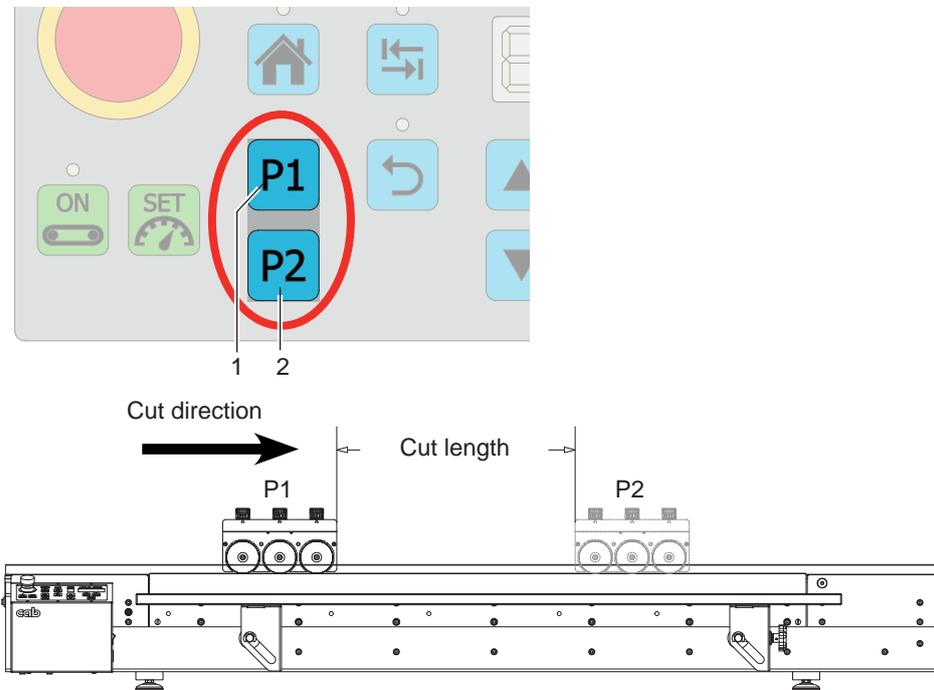


Fig. 6 Limit cutting length

1. Press P1 (1) until the blade carriage has moved to position P1.
2. Press P2 (2) until the blade carriage has moved to position P2.

The cutting length results from the distance between the front edge of the carriage (in the cutting direction) in the position P1 and the trailing edge of the carriage (in the cutting direction) in the position P2.

5.8 Reset the counters

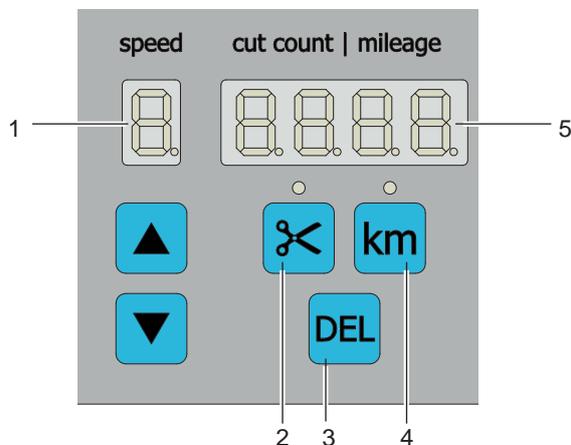


Fig. 7 Display section counter

- ▶ Display  (2) select count cunt (number of cuts) or  (4) mileage (cut length).
- ▶ Press the button  (3) for approx. 3 seconds to reset the display (5) to zero. Display speed (1) lights for the duration of the counter reset.

5.9 Setting the speed of cut

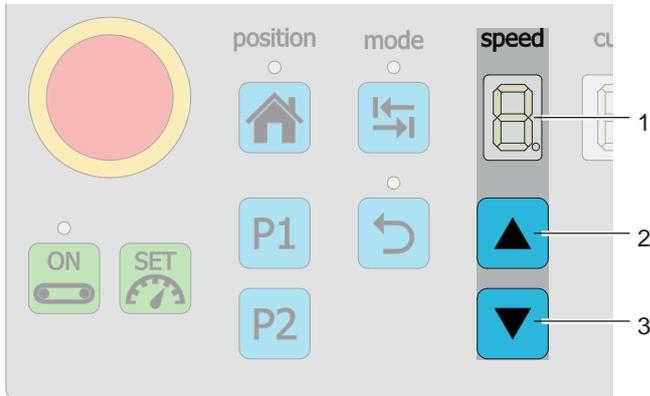


Fig. 8 Setting the speed

It is possible to set the speed level in 5 steps.
The speed level is displayed in the speed (1) display.

Step		Speed of the blades
1	≅	100 mm/sec
2	≅	200 mm/sec
3	≅	300 mm/sec
4	≅	400 mm/sec
5	≅	500 mm/sec

1. Press key  (2) to increase the speed by one step.
2. Press key  (3) to reduce the speed by one step.

5.10 Select the cut mode

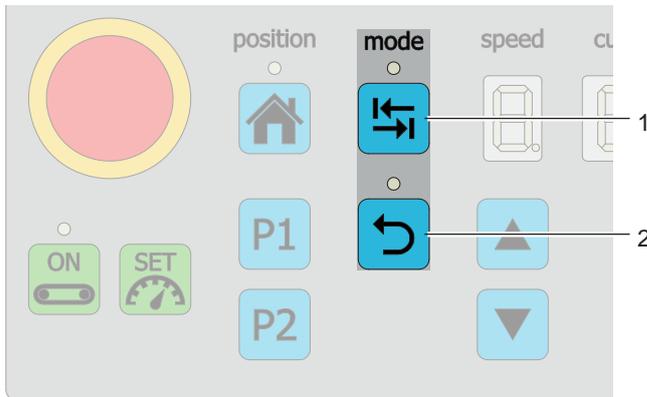


Fig. 9 Cut mode

Mode  (1)

- Press the foot switch and the carriage only moves in one direction between P1 and P2.
- Press the foot switch again and the carriage moves in the other direction between P1 and P2.

There are only two cutting depths adjustable, as in both directions of the carriage movement can be cut.

▷ „5.5 Recommendation for cutting Circular Blade 60“

1. Mode  (2)

- Press footswitch and carriage moves in one direction between P1 and P2 and then moves back to position P1.

There are three cutting depths adjustable, because only in one direction of the carriage movement is cut, from P1 to P2

▷ „5.5 Recommendation for cutting Circular Blade 60“

Switch on the device by power switch (1). LED **home** is blinking..

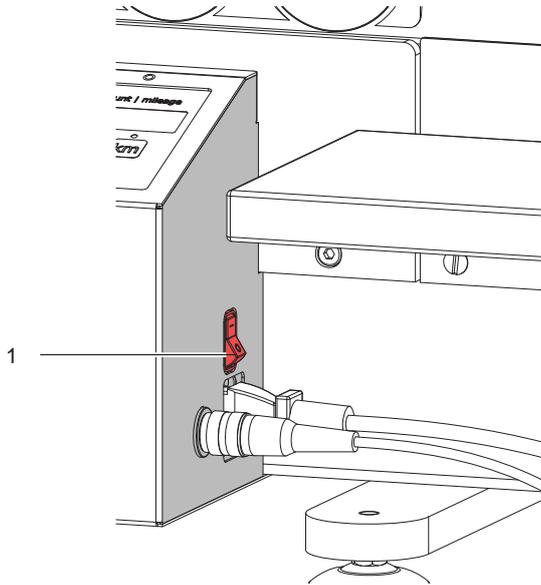


Fig. 10 Power Switch

1. Press button  **home**.
2. Device will run to the **home** position LED **home**  is permanently on.
3. Press the foot-switch and hold it.
 - Device will run to the start position (defined by P1) or from the start position short out and back into the start position.
 - Blade synchronization.
4. Deblock the foot switch and the device is ready. LED **home**  is permanently on.
5. Choose mode  or mode . ▷ Chapter 5.10
6. Put in the PCB panel.

Pre-scored groove in the PCB (2) put onto the linear blade (3) and hold the PCB in the horizontal plane by hand.

Ensure that the PCB is positioned within the area between **P1** and **P2**, the pre-selected area of cutting way of the upper blade. ▷ Chapter 5.7

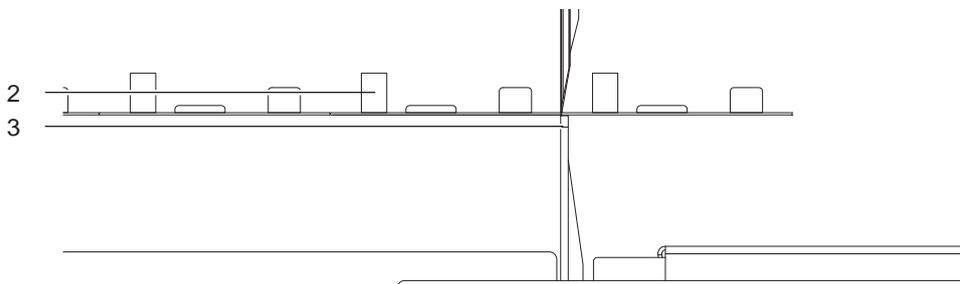


Fig. 11 Put on PCB

7. Press the foot-switch to start the program. Foot-switch must be pressed over the length of the program.
 -  Press the foot-switch and hold it. Device performs a cut without return transport of the blade carriage. Deblock and press the foot-switch again to start the next cut in the reverse direction.
 -  Press the foot-switch and hold it. Device performs a cut with return transport of the blade carriage.
8. Deblock the foot-switch after program end.

Notice!



In the mode  will be an other start position for the next program start.

7.1 Circular Blade Ø60

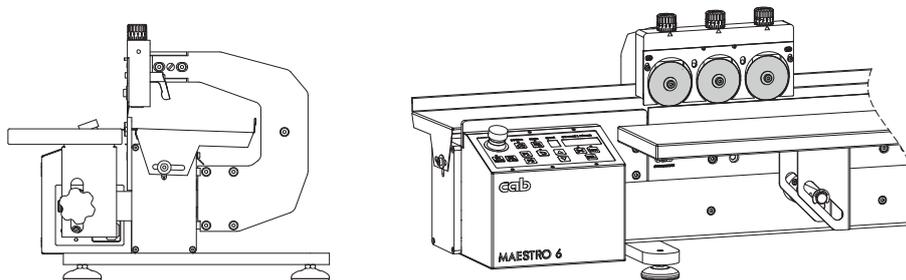


Fig. 12 Version with 3x circular blade 60

The version with circular blade 60 is available in an arrangement of a row with three blades. So it's possible to adjust a different cutting depth per blade and to cut aluminum PCB's.

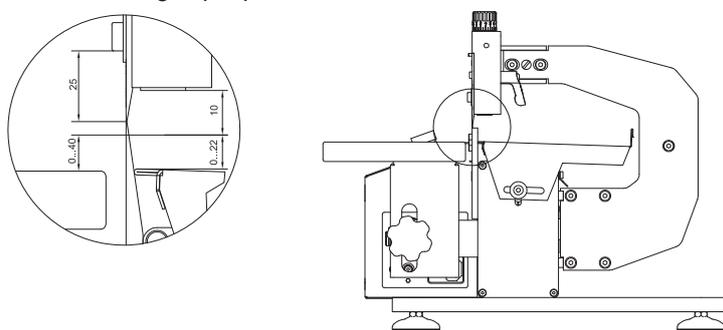


Fig. 13 Free space - possible height of components for circular blade 60

7.2 Circular Blade Ø125

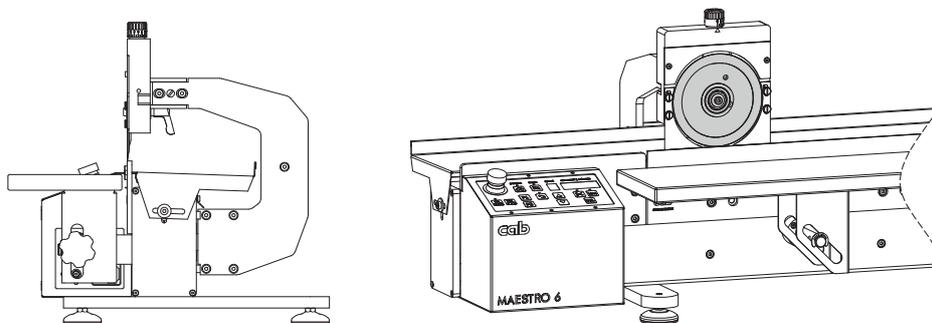


Fig. 14 Version with circular blade 125

The version with circular blade 125 is intended to cut FR4 PCB's with component height until 33mm

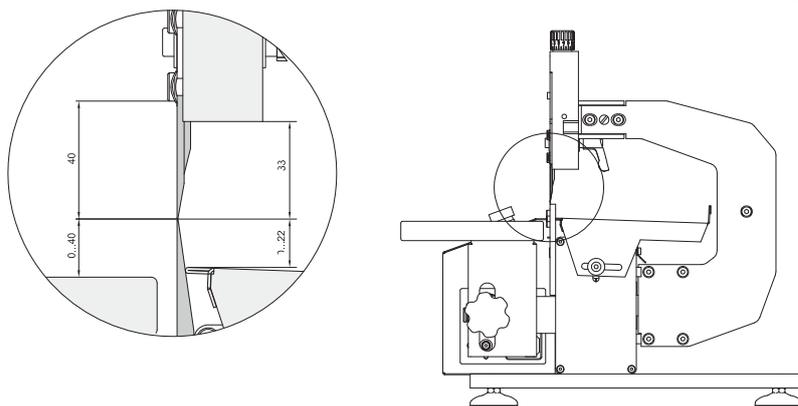


Fig. 15 Free space - possible height of components for circular blade 125

7.3 Circular Blade Ø185

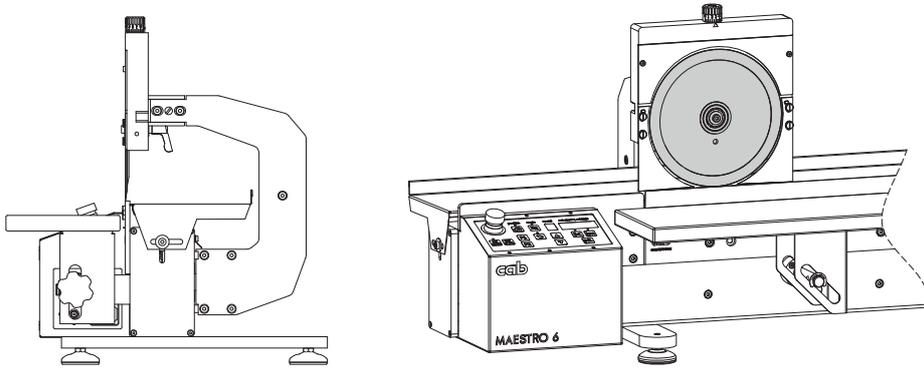


Fig. 16 Version with circular blade 185

The version with circular blade 185 is intended to cut FR4 PCB's with component height until 63mm.

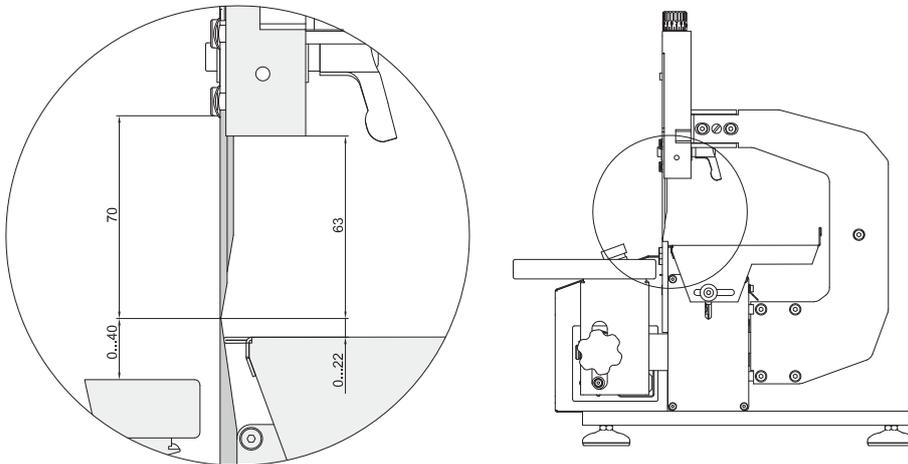


Fig. 17 Free space - possible height of components for circular blade 185

In case of wasting, damage or material change it's necessary to change the upper blade.



Risk of hand injury!

► Wear protective gloves while changing the blade.



Danger!

Risk of cutting damage by rotating blade!

Disconnect device before you start service work!

8.1 Circular Blade Ø60

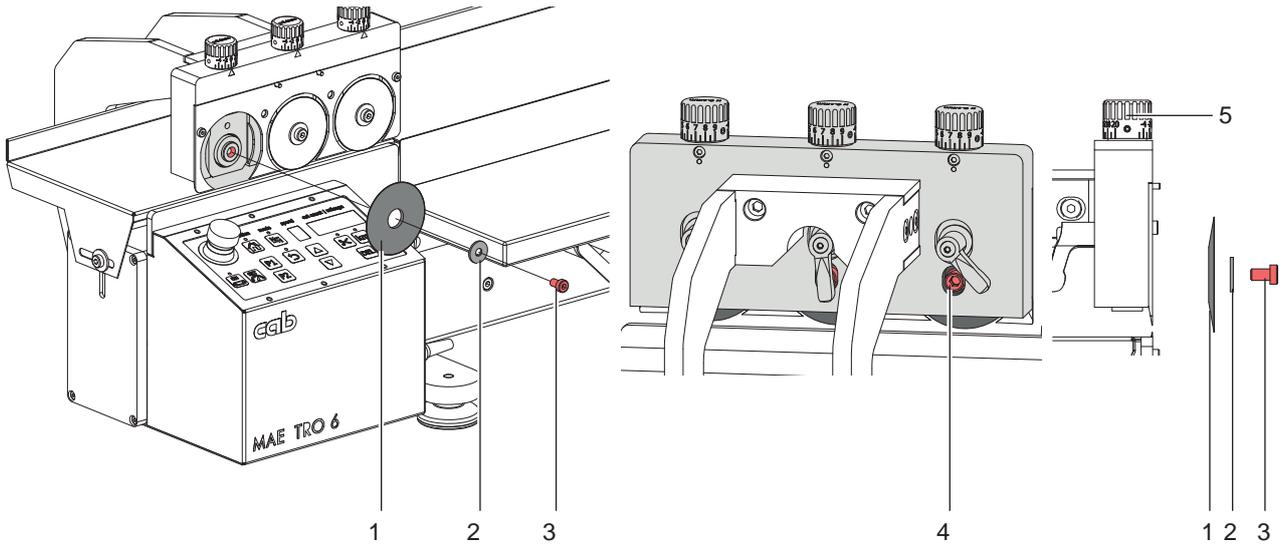
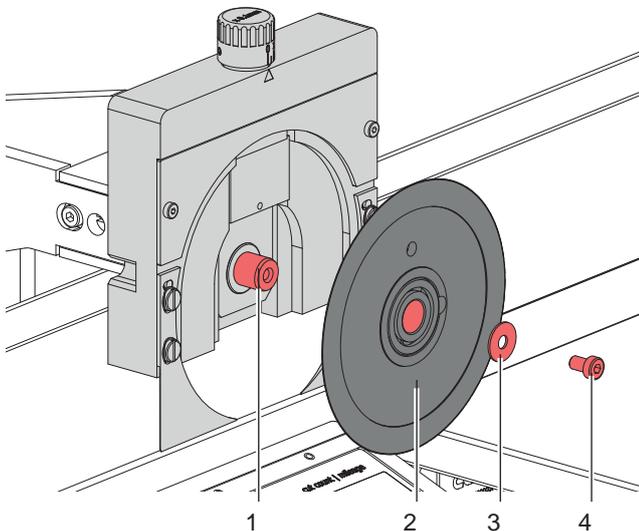


Fig. 18 Replacement of the Upper Circular Blade 60

1. Set the setting knob (5) on value 9 - blade on the highest position.
2. Fix the rotary disc (4) by a 5 mm Hexagon wrench.
3. Loosen screw (3) by a 4 mm Hexagon wrench.
4. Take out screw (3) and washer (2) and blade (1).
5. Place the new circular blade (1) on the shaft with the inclined side towards the unit and push it on completely.
6. Put in washer (2) and screw (3) and tighten screw (3) .
7. Adjust the blade distance.

8.2 Circular Blade Ø125/185



1. Loosen screw (4).
2. Take out screw (4) and washer (3).
3. Unplug the circular blade (2) from the shaft (1).
4. Place the new circular blade (2) on the shaft (1) with the inclined side towards the unit and push it on completely.
5. Put in washer (3) and screw (4) and tighten screw (4) .
6. Adjust the blade distance.

Fig. 19 Replacement of the Upper Circular Blade 125/185

8.3 Removal and installation of linear blades

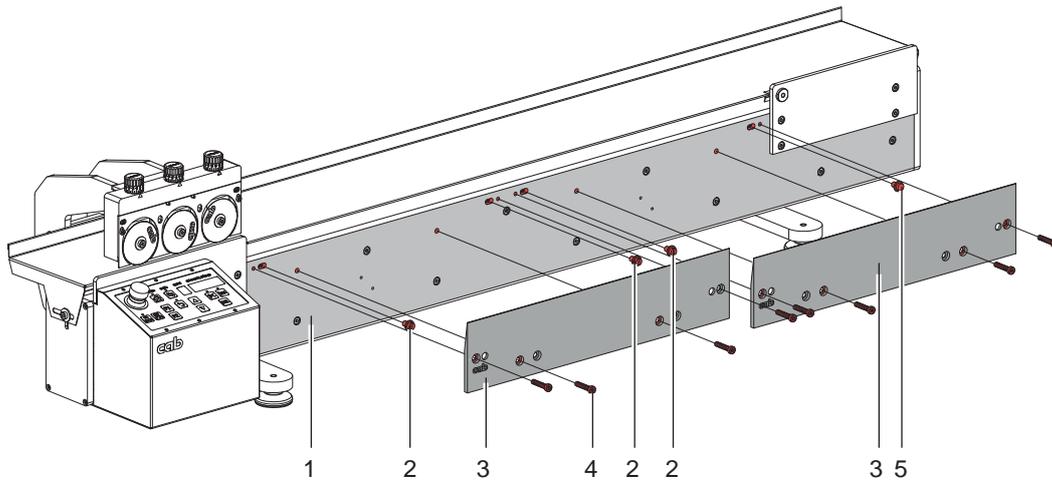


Fig. 20 Blade change - Linear blade

1. Disassemble the support platform.
2. Loosen screws (4).
3. Remove the linear blade (3) and remove the eccentric (2) or the guide pin (5) on the right-hand linear blade.
4. Thoroughly clean blade, knife and profile (1) before mounting the new linear blade (3).
5. Insert the guide pin (5) into the right side and into the other corresponding openings the eccentric (2).
6. Mount the liner blades from the right and tighten the screws (4) only slightly.
7. Now make the horizontal alignment of the linear blades (3). ▷ next chapter

8.4 Aligning the linear blade

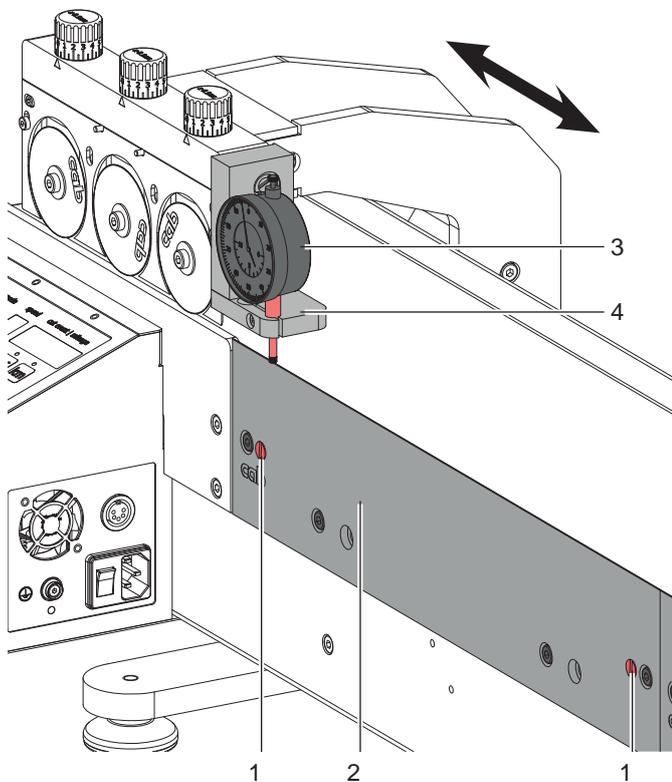
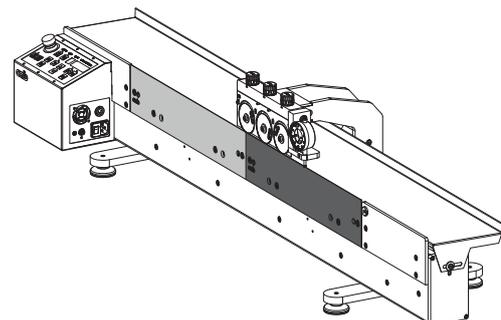


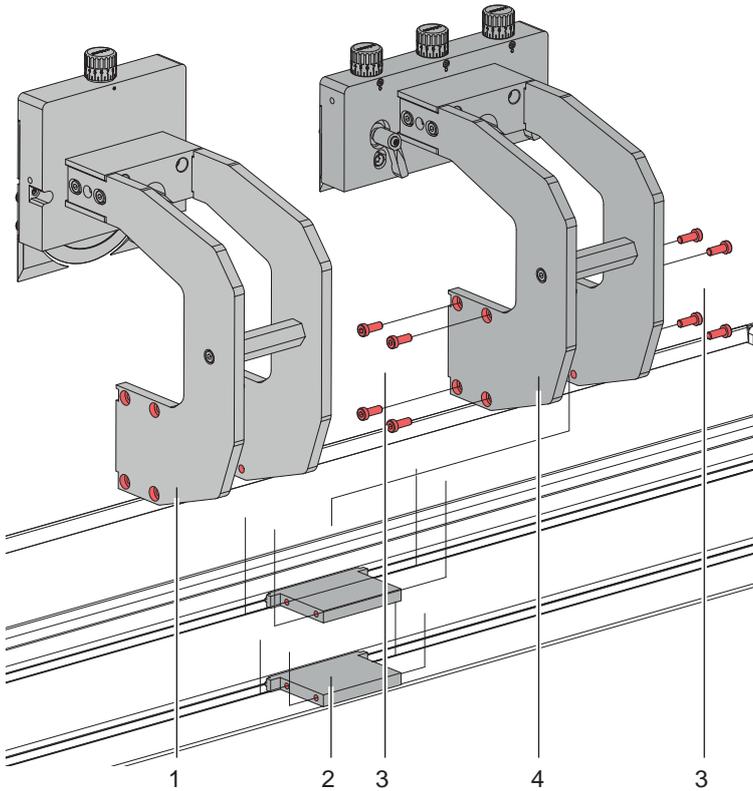
Fig. 21 Aligning the linear blade with dial gauge

1. Remove the dial gauge (3) from the accessory pack of the MAESTRO 6 and fit it to the angle arm (4).
2. Screw angle arm (4) with built-on dial gauge (3) to the side of the blade carriage.
3. The dipstick of the dial gauge (3) must be pressed in slightly, about 5mm.
4. Turn the roller blade upwards to avoid collision with the linear blade (2).
5. Starting with the right blade, adjust the horizontal alignment.

- ▶ Move slowly over the linear blade with the carriage and compensate for deviations on the dial gauge by turning the eccentric (1).
- ▶ Repeat this process until the deviations over the entire length of the linear knife maximum 0.03 mm.
- ▶ Tighten screws (4) of figure 24.
- ▶ The right linear blade is set first and serves as a reference.



8.5 Change of blade type



1. Loosen the screws (3) on the support arms of the blade carriage (4 or 1) on the back side of the MAESTRO 6..
2. Remove blade carriage with mounted support arms (4 or 1).
3. Hold the blade carriage (1 or 4) to the transport system (2) of the MAESTRO 6 and secure it with the screws (3).

Fig. 22 Change the blade type

8.6 Alignment of the blade carriage

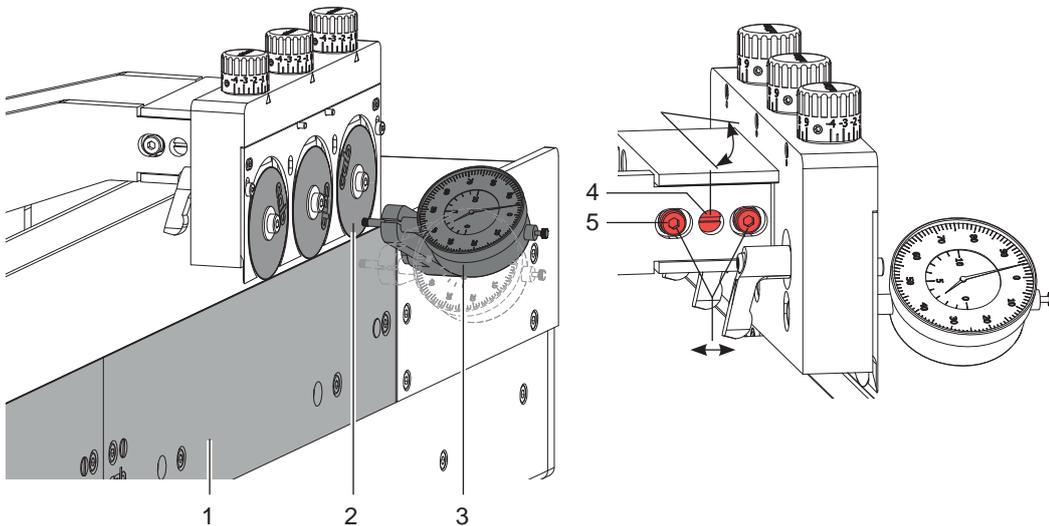


Fig. 23 Alignment of the blade carriage

4. Remove the dial gauge (3) from the accessory pack of the MAESTRO 6 and fit it to the straight arm.
5. Now screw arm with built-on dial gauge (3) to the side of the carriage profile.
6. The dipstick of the dial gauge (3) must be pressed in slightly, about 5mm
7. Push the blade carriage up to the dial gauge and determine the difference between the linear blade (1) and the circular blades (2).
8. With the help of the eccentrics (4) and the screws (5) with corresponding oblong holes on both sides of the carrier, the blade carriage can be aligned with the linear blade (1).



cab Produkttechnik
GmbH & Co KG
Wilhelm-Schickard-Str. 14
D-76131 Karlsruhe
Deutschland

EU Declaration of Conformity

We declare herewith that the following device as a result of design, construction and the version put in circulation complies 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.

Description:	PCB Separator
Device:	MAESTRO 6
Applied EU-Directives and Standards:	
Directive 2006/42/EC on machinery	<ul style="list-style-type: none"> • EN ISO 12100:2010 • EN ISO 13857:2008 • EN 349:1993+A1:2008 • EN 60204-1:2006+A1:2009
Directive 2014/30/EU relating to electromagnetic compatibility	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • EN 50581:2012
Person authorised to compile the technical file:	Erwin Fascher Am Unterwege 18/20 99610 Sömmerda
Signature for the producer:	Sömmerda, 10.12.2018
cab Produkttechnik Sömmerda Gesellschaft für Computer- und Automationsbausteine mbH 99610 Sömmerda	 Erwin Fascher Managing Director