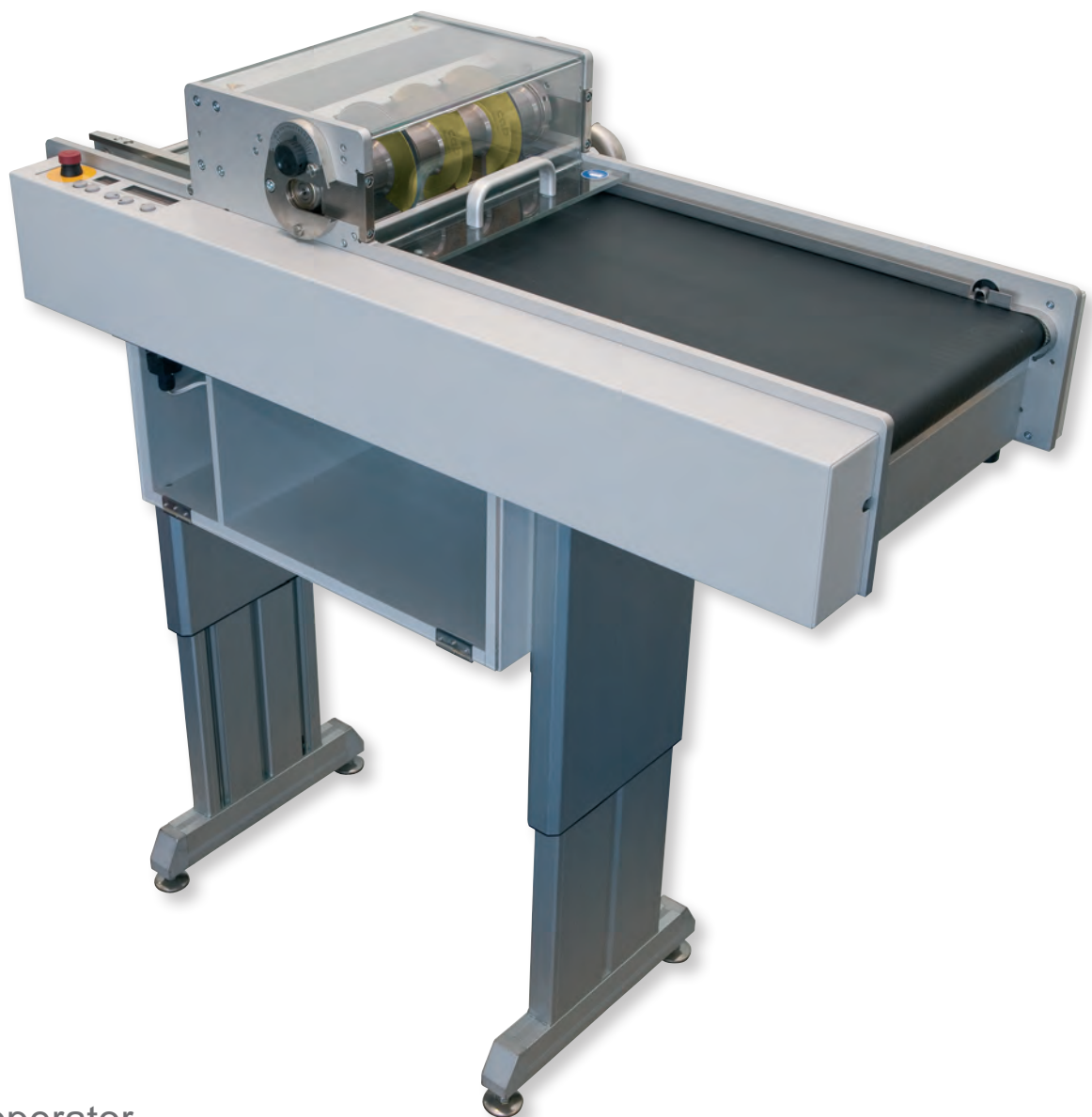


Original Instructions



PCB Separator

MAESTRO 5L

MADE IN GERMANY

2 Original Instructions for the following products

2

Description	Type
PCB Separator	MAESTRO 5L

Edition: 01/2025 - Part No. 9008464

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1.1 Instructions

Important information and instructions in this documentation 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!

Gives you tips on protecting the environment.



Handling instruction



Reference to section, position, illustration number or document.



Option (accessories, peripheral equipment, special fittings).

Time

Information in the display.

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.**

**Warning!**

This is a class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

1.4 Safety Marking

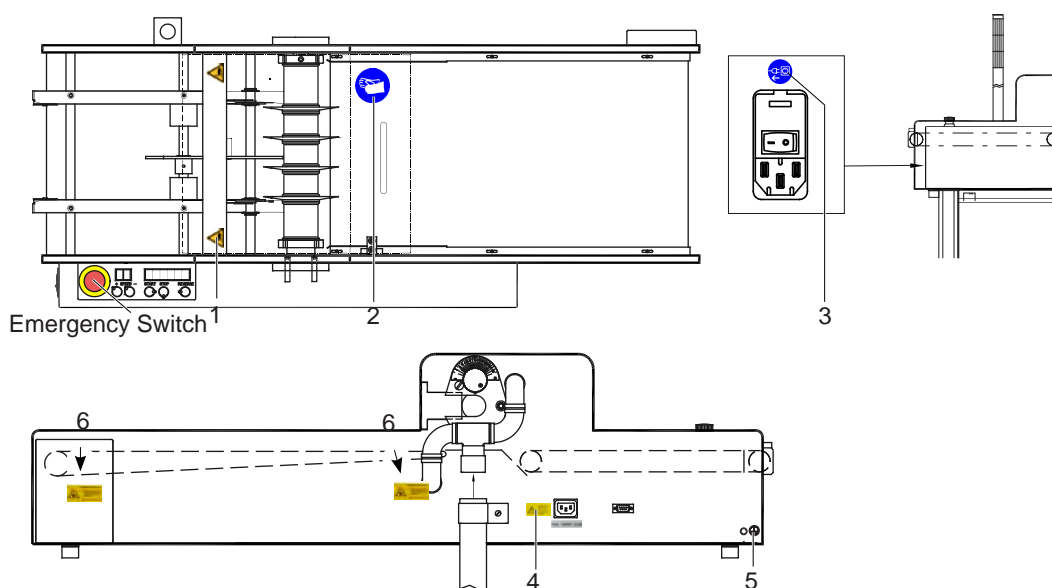


Fig.1 Safety marking







1		Risk of hand injury! ► Wear protective gloves while PCB separating.
2		Risk of hand injury! ► Wear protective gloves while PCB separating.
3		Possible damage of electronics! ► Disconnect the PCB separator from electrical outlet before mounting an optional device.
4		Danger to life and limb from power supply. ► Be carefully in work with metallic equipment near electrical outlet!
5		Hazard by electrical charge! ► Provide an earthing connection via press stud.
6		Attention! Laser light! ► Save your eyes, don't look into the light!

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.

The PCB Separator is designed for cases of application, with which scratched PCBs must be separated. For the commercially viable assembly and mounting of printed circuit boards, there is an ever increasing requirement for multiple-use material. The necessity however, to break off sections of the circuit board by hand can cause damage to the delicate circuitry and components. The fibre-glass material tears at the broken edge, leaving it rough and fissured.

Using the MAESTRO 5L to cleanly and economically separated pre-scored PCB's.

The PCB moved by a belt into the cutting area. By rotating circular blades it will cut and transported automatically.

After this, the separated PCB's will transported by a belt an it's possible to take it by hand.

Special steel blades give a guaranty for a long operation time.

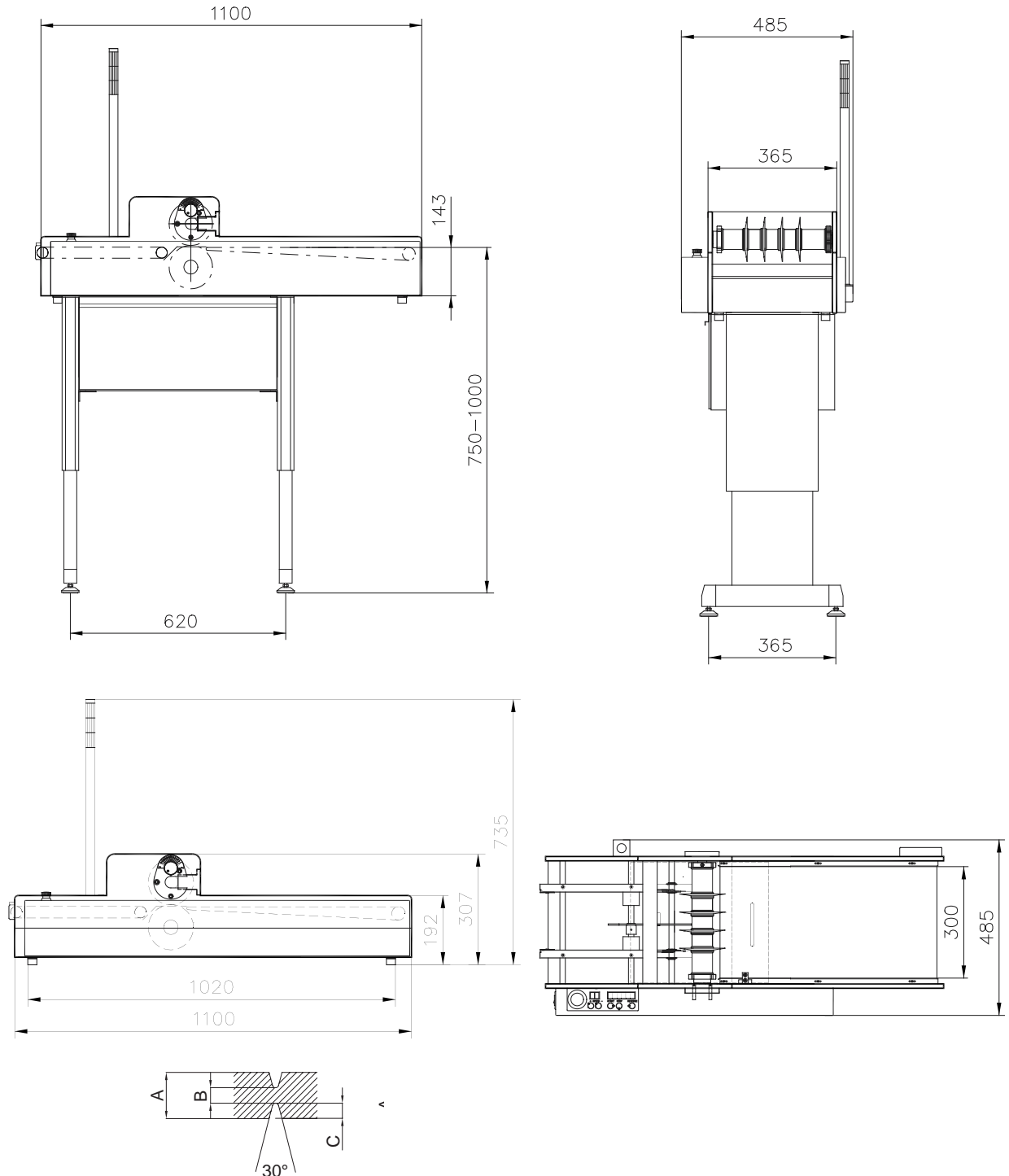


Fig.2 Measurements of the device

Technical data			
Separation method		Component side Solder side	Circular blade Circular
Operation		motor-driven	
Separation speed		100 - 200 mm/s to be set in ten steps	
PCB length light barrier activated light barrier deactivated		100 - 570 mm < 2000 mm	
PCB width		up to 310 mm	
Residual off-cut width		at least 3 mm	
Component height		Component side Solder side	up to 30 mm up to 10 mm
Number of circular blades		up to 16 per blade shaft	
Programming			
Display		- Separation speed - Separation length resp. number of PCBs	
Control buttons		- Start, Stop, Reverse	
Programming buttons		- Separation speed setting	
Monitoring		- Detection of separation length - Accumulation before / behind the blades - Conveyor belt finally stopping	
Interfaces		- external start / stop - SMEMA (round, 14 pins)	
Power supply		230/115 VAC, 50/60 Hz	
Temperature / humidity not condensing	Operation	+10 - 35°C / 10 - 85%	
	Stock	0 - 60°C / 20 - 80%	
	Transport	-25 - 60°C / 20 - 80%	
Width x Height x Depth		440 x 750 - 1000 x 1100 mm	
Weight		63 kg	
Approvals		CE, FCC Class A	

Table 2 Technical Data

3 Installation

3.1 Unpacking and Setting-up the Device

- ▶ Unpack the device.
- ▶ Check the device for damages which may have occurred during transport..
- ▶ Set up the device on a even surface.
- ▶ Check delivery for completeness.

Contents of delivery:

- PCB Separator
- Power Cable
- Warning Light with 2 Screws for mounting
- Chassis with 4 Cylinder Head Screws M6x16 with Washers
- 2 Handles (for changing Blades)
- Device (for changing the Blades)
- Open-end Wrench SW 41
- Spanner Wrench
- Documentation



Notice

- ▶ Please keep the original packaging in case the device must be returned.



Attention!

The device and printing materials will be damaged by moisture and wetness.

- ▶ Set up the device only in on dry locations, protected from splash water.

3.2 Mounting the device

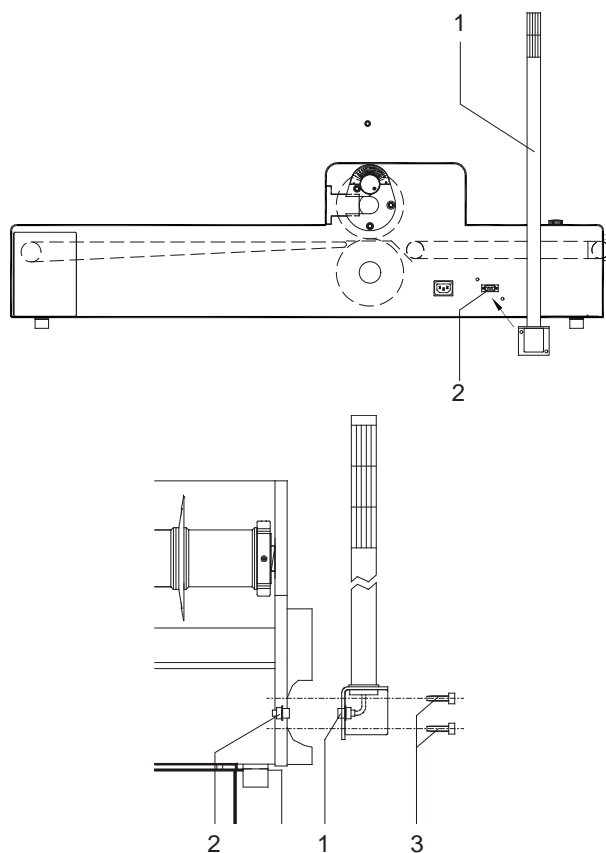


Fig.3 Mounting the Warning Light

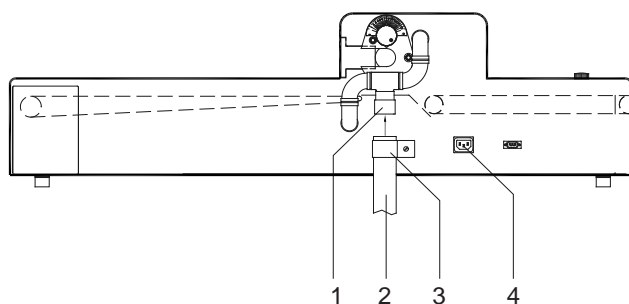


Fig.4 Mounting the Industrial Vacuum Cleaner

The MAESTRO 5L is shipped with the warning light (1) disconnected.

1. Plug the 9 pin SUB-D-connector (10) located on the bottom of the warning light (1) into the socket (9) on the back of the MAESTRO 5L.
2. Attach the warning light with the supplied M5x12 screws (2).

3. When ordering the MAESTRO 5L with the industrial vacuum option the vacuum connection (1) is mounted at the factory.
4. A tube adapter (2) is shipped with the MAESTRO 5L. The size of the tube adapter varies, depending on the vacuum to be used with the separator. The tube adapter is connected to the vacuum cleaner on one end and connected to the vacuum connection (1) at the other end, using the supplied tube clamp (3).
5. To connect the power to the vacuum, connect the supplied power adapter cable to the power socket (4) located at the rear of the MAESTRO 5L. Then plug the vacuum into the power adapter cable.
6. Switch the vacuum into the ON position. It will not start until the main drive of the MAESTRO 5L is turned on.
7. When the main drive is turned off, the vacuum will be turned off.

3.3 Connections

3.3.1 Earthing Connection



Attention!

Hazard by electrical charge!

► Provide an earthing connection via press stud

3.3.2 Power Supply

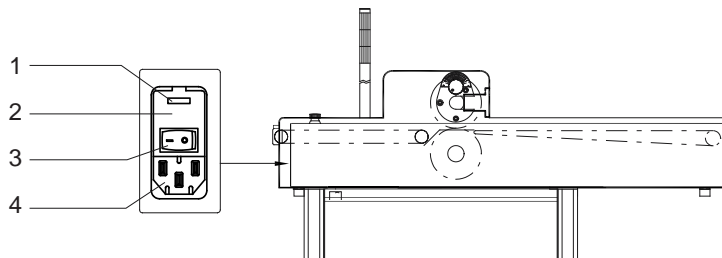


Fig.5 Power Supply

1. Ensure that the device is switched off at the power switch (3).
2. Check the setting of the voltage selector (1).
 - In order to alter the setting open the flap (2) at the power input module.
 - Remove the voltage selector and re-insert it so that the correct voltage is visible when module the flap is closed.
 - Upon altering the setting, the fuses in the module must also be changed accordingly (T800 mA for 230 V; T1,6 A for 115 V).
3. Connect the power cable to the power input module (4) and to an earthed socket.
4. If the machine does not show any function after it has been switched on, please check the fuses of the mains module and the fuse (T4A) of the electronics board.

3.3.3 Interfaces to a supply device / clear device

(Forerunner / Follower)

The two 14-pin socket for the SMEMA-interfaces (1/2), to couple supply devices, are mounted on the underside of the front cover, on the left side of the MAESTRO 5L.

Connect the interface cable of the supply device with this socket.



Notice

For the use of other interface protocols slight modifications of the hardware are necessary!

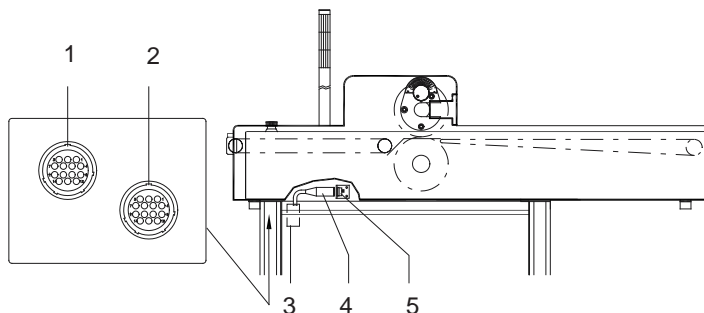


Fig.6 SMEMA-interface and cover contact

3.3.4 Connecting the Access Door Interlock

The access door contact switch plug (6) must be plugged into the 5-pin diode socket (7) located on the under side of the MAESTRO 5L. The socket can be seen from inside the chassis access door.

3.3.5 Connecting of an Industrial Vacuum Cleaner

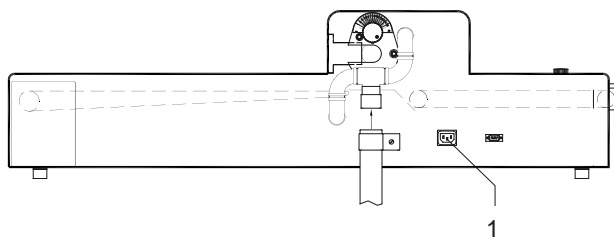


Fig.7 Connecting of an Industrial Vacuum Cleaner

Connect the supplied adapter cable to the power socket (1) on the back of the MAESTRO 5L.
Switching the vacuum ON and OFF is controlled via the software in the separator.



Attention!

Maximum charging rate is 6.5 amp!

4.1 General Function

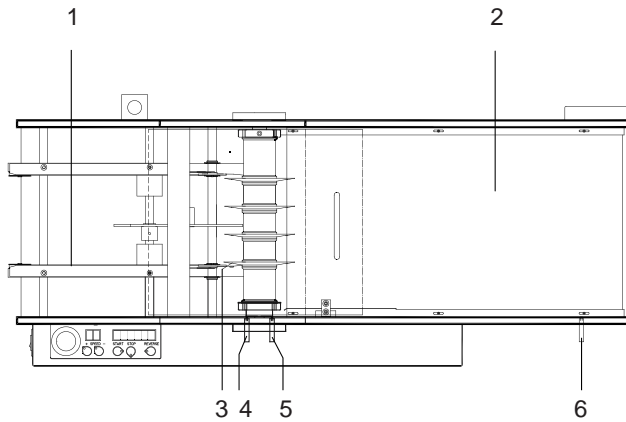


Fig.8 Sensors

The MAESTRO 5L is equipped with a number of sensors which control the travel of the PCB through the separator.

Sensor 1 (3)

The reflective sensor is coupled with a clock wheel which is mounted at a supply belt (1). The reflective sensor is necessary to measure the length of cut.

Sensor 2 (4)

This laser edge sensor is mounted directly in front of the blades. This is necessary to sense the leading edge and trailing edge of the PCB.

By exceeding a limiting value between sensing the leading edge and the trailing edge of the PCB, the operator gets an error.

This sensor may also be used to count the number of separated panels.

Sensor 3 (5)

This laser edge sensor is mounted directly behind the blades.

This sensor controls the leading edge and trailing edge of the PCB in a time distance to sensor 2.

By exceeding the time tolerances to sensor 2 the operator gets an error message (leading edge to trailing edge respectively late to sensor 3)..

Sensor 4 (6)

This laser edge sensor is mounted directly at the end of the conveyor belt (2). When a PCB with components is sensed it stops the material supply. Edge strips without components are not sensed by this sensor.

4.2 Extended Function

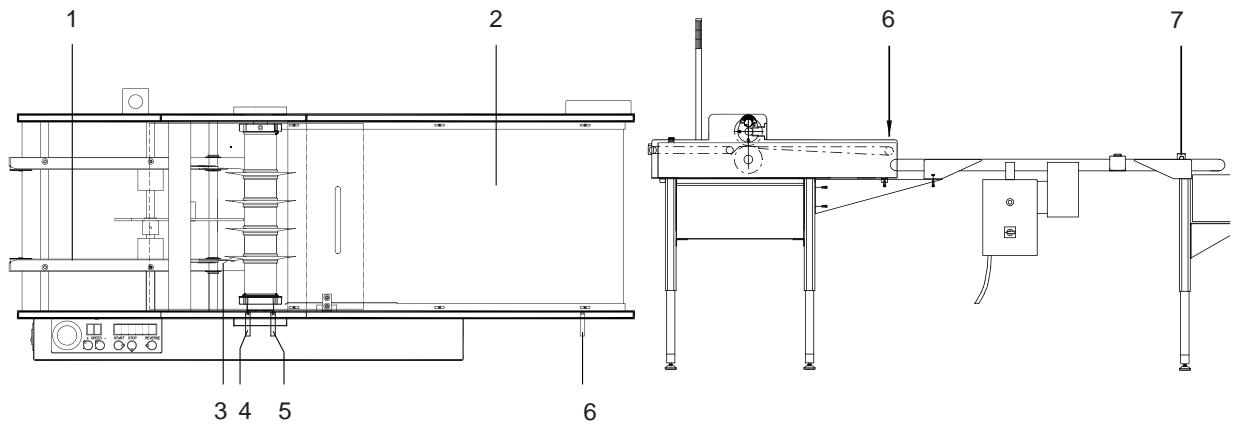


Fig.9 Sensors

The integration of the MAESTRO 5L into a PCB production line will extend the function of the sensors. The interface signals will be controlled by interpreting the sensor signals. The interface signals report the readiness of the separator to receive and deliver PCBs respectively to adjacent devices.

4.2.1 Coupling the MAESTRO 5L to a supply device (SMEMA interface)

Sensor 2 (4)

When a penalized PCB from a supply device arrives at the sensor, the SMEMA signal for the takeover readiness will be switched off and a 20 second timer is then started.

After the 20 second timer, the MAESTRO 5L will be in the takeover readiness mode again unless the sensor is interrupted (by a PCB).

In this case an error 5 message will occur.

The sensor 2 also checks to see whether or not a PCB arrives at the sensor 20 seconds after seeing the prior PCB. In the event a new PCB is not supplied to the separator and therefore not detected by the sensor, the yellow warning light will be switched on.

Sensors 3 and 4 (5/6)

The SMEMA signal for the takeover readiness will be switched on if a panel from a supply device leaves sensor 3 and sensor 4 is not active (see programming section).

A timer will be started when a panel from a supply device leaves sensor 3 and sensor 4 is active (see programming). After the 20 seconds, the switch state of sensor 4 will be checked. The SMEMA signal for takeover readiness will be switched on if sensor 4 is free.

4.2.2 Coupling the MAESTRO 5L to the optional Conveyor Belt

Sensor 4 (6) / Conveyor belt sensor (7)

At the end of the optional conveyor belt is another laser edge sensor (7). If this sensor is free, the conveyor belt will be started for a defined period of time after a panel is detected at sensor 4 (6). When a second panel is detected at sensor 4 (6) the time will be extended.

The conveyor belt stops when a PCB is sensed by the conveyor belt sensor (7). When the conveyor belt stops, the MAESTRO 5L receives a signal that informs that the conveyor belt is not ready to take over more PCBs. At this point, the main drive of the separator will be stopped when a PCB arrives at sensor 4 (6).

5.1 Control Panel

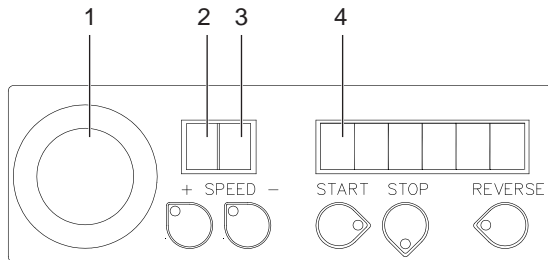


Fig.10 Control panel

At the control panel of the MAESTRO 5L are five user keys, two displays and one emergency switch. These have the following functions under normal conditions.

Emergency Switch



Warning!

In case of emergency, an emergency stop switch (4) has been provided. Activate the emergency switch by pressing it firmly. This interrupts the voltage supply to the MAESTRO 5L.

The switch is deactivated by turning the red button in either direction. To start the machine again, perform the normal start procedure.

Displays

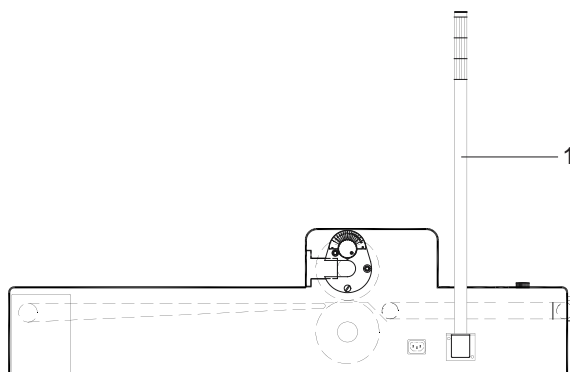
- Two digit: indicates the working speed
- Six digit: indicates the length of cuts or the number of separated panels.
- Display 2: indicates one point, if a PCB reaches sensor 4, until it leaves it again
- Display 3: indicates one point, if a PCB reaches sensor 5, until it leaves it
- Display 4: indicates one point, if a PCB reaches sensor 6, until it leaves it again

User Keys

- SPEED+: increases the working speed (100-220 mm/s in 10 increments)
- SPEED-: decreases the working speed
- START: switches on the main drive
- STOP: switches off the main drive
- REVERSE: reverses the main drive (as long as key is depressed; REVERSE can only be used in STOP- or error-mode)

The LED's in the keys represent which keys are available in the respective operation mode.

5.2 Warning Light



Depending on the operation mode, the following lamps of the warning light (1) will be switched on

- red: The MAESTRO 5L is in the error mode.
- yellow: The MAESTRO 5L is ready to receive a PCB, but has not received one in 20 seconds. An error at the supply device is a possible cause.
- green: The power supply of the MAESTRO 5L is in the ON position.

Fig.11 Warning light

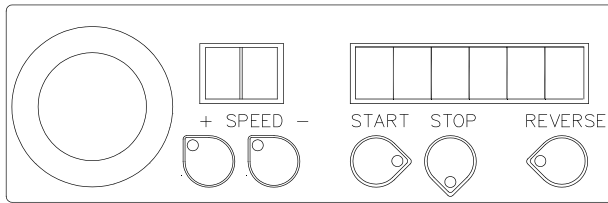


Fig.12 Control panel

To put the MAESTRO 5L into the programming mode, press the START and STOP keys at the same time.

The six digit display shows the parameter which can be changed and the two digit display shows the actual setting.

PA 1: Activation of the keys SPEED+ and SPEED-

0 = inactive, 1 = active

PA 2: Interpretation of sensor 2 and 3 for jam detection

0 = inactive, 1 = active

PA 3: Interpretation of sensor 4

To switch off the transport of PCBs into the MAESTRO 5L

0 = inactive, 1 = active

PA 4: Change the 6 digit display

0 = to display total length of cuts

1 = to display the number of panels separated

PA 5: Restart mode after stopping material transport via sensor 4 (conveyer belt end).

0 = restart by pressing the START key after removing the material from sensor 4

1 = restart automatically when the material is removed from sensor 4

PA 6 and PA 7: Connection of a following device

PA 6	PA 7	
0	0	No device
0	1	Device connected via SMEMA interface
1	0	Device connected via cab-specific interface
1	1	not allowed



Attention!

By activating PA 6 or PA 7, PA 3 is set to zero internally!

PA 8: This parameter will be set on "0"!

Use SPEED+ key to toggle between "0" and "1".

Use the START key to toggle to the next parameter.

After PA 8, press the START key to enter the normal operation mode.



Notice

The counter display of separated panels can be reset by pressing the SPEED+ and SPEED- keys simultaneously.

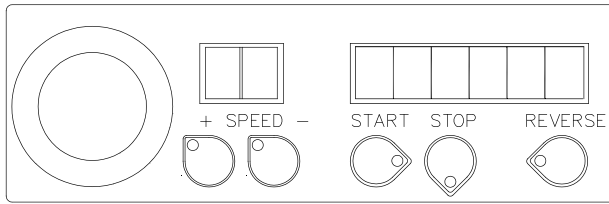


Fig.13 Control panel

7.1 Switch On

Switch on the MAESTRO 5L at the power switch.

The displays show the actual values of the working speed and the total number of cuts or length of cuts respectively.

The green lamp of the warning light blinks.

Check the following if the displays do not light up:

- The power supply setting is correct.
- The fuses in the power supply are intact.

7.2 Self Test

After switching the machine on, the LED in the START key blinks. Press the START key. The LED goes out and the MAESTRO 5L carries out a self test. In this case, the main drive will be turned on for 10 seconds.

During the self test the green lamp of the warning light blinks.

Upon successful completion of the self test, the machine will go into the normal working mode. The green lamp of the warning light shines.

In the event the test fails, the START key will blink again.

The green lamp of the warning light blinks and the red lamp shines.

Check the device for any possible pieces of PCB caught in the unit. If so remove them and start the test again.

In the event normal operation is interrupted by pressing the STOP key or REVERSE key, or an error occurs. The machine will perform another self test before normal operation can be achieved.

7.3 Speed Adjustment

The working speed of the MAESTRO 5L may be varied by pressing the SPEED+ key or SPEED- key. This can be done in the standby mode or during normal operation.

The function of these keys can be turned off in the programming mode.

7.4 Operation without external Conveyor Belt

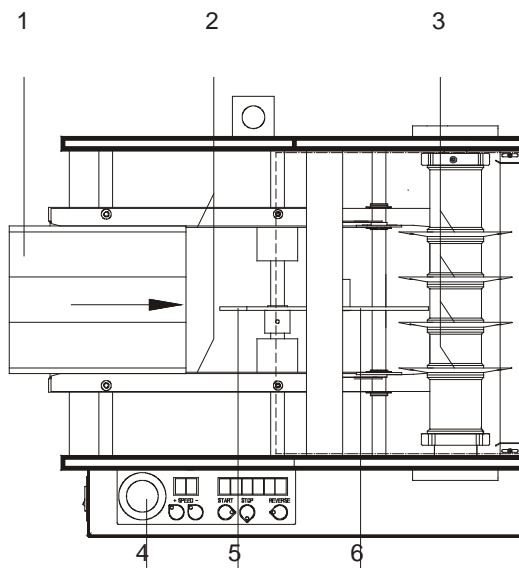


Fig.14 Operation without external Conveyor Belt



Warning!

In case of emergency, an emergency stop switch (4) has been provided. Activate the emergency switch by pressing it firmly. This interrupts the voltage supply to the MAESTRO 5L.

- After successfully completing the self test, place the PCB (1) on the supply belts (2), either manually or via a supply device.



Attention!

Make sure the pre-scored groove of the PCB is set on the guide (5) and is lead by the upper guide (6)!

The PCB is transported into the cut zone, grasped by the circular blades (3), and separated into individual pieces.

The separated PCBs and edge strips are transported away from the cut zone via an internal conveyor belt.

The PCBs may then be taken away for further operations.

At the end of the conveyor is a sensor (sensor 4). This sensor can be programmed (PA 3 =1) to stop when the PCBs are not removed from the conveyor. The restart is adjusted by the parameter PA 5.

This can be set to start immediately after removing the PCBs from the sensor, or by pressing the START key. The sensor height is adjusted so that edge strips will not stop the belt and can be transported to a collecting box.

The normal operation mode can be interrupted by pressing the STOP key on the control panel. Before the machine can be restarted, a self test must be performed.

Opening the bonnet over the cut zone shuts down the main drive and shuts down the whole system.

Once the bonnet is closed, the machine can be restarted after completing the self test.

7.5 Operation with external Conveyor Belt

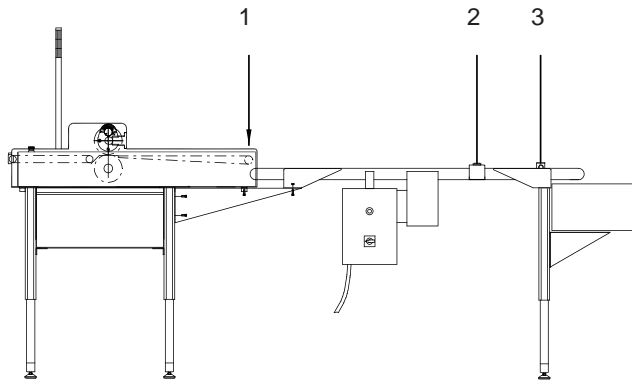


Fig.15 Operation with external Conveyor Belt

In operation of the MAESTRO 5L with an external conveyor belt by cab (Option) are the most items identical like 7. But see follow differences:

- The conveyor belt has an own power supply. The motor of the conveyor belt is controlled via the interface with the MAESTRO 5L.
- The conveyor belt is switched on when a PCB arrives at sensor 4 (7) of the MAESTRO 5L.
- The laser light edge sensor (9), located at the end of the conveyor belt, stops the belt when a PCB is sensed and eventually stops the material transport in the separator when a PCB is sensed at sensor 4 (7). The process is restarted when the PCB is removed from the laser edge sensor at the end of the conveyor (9).
- For the conveyor belt to run continuously, PCBs with components must be removed before arriving at the conveyor belt sensor (9) and the MAESTRO 5L must deliver following PCBs in a defined period of time.
- The operation of the conveyor belt can be interrupted and restarted by pressing the pause key (8).
- In order to restart, the sensor (9) must be uninterrupted.

7.6 Reverse Transport

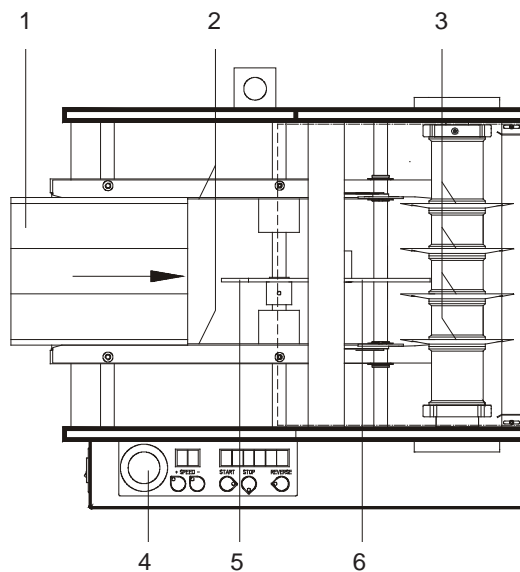


Fig.16 Reverse Transport

If an error occurs or the STOP key is pressed during operation, and it is necessary to remove a PCB from the cut zone, the material can be transported backward.

- Press the REVERSE key.
- In this case, the circular blades (3) and the supply belts (2) will be reversed as long as the key is pressed.

When an error occurs, the red lamp of the warning light will be switched on. The six digit display will indicate the specific error.

ERROR 1:

- The bonnet cover over the cut zone is open.
▶ Close the bonnet cover and press the START key.
- The connector of the chassis door contact, is not connected to the diode socket of the MAESTRO 5L.
▶ Make the connection and press the START key.
- The drive is jammed with PCB material.
▶ Remove the material and press the START key.
- Drive is defective.
▶ Call for service.

ERROR 2:

- The front edge of the PCB does not arrive at sensor 3 in the defined time after being sensed by sensor 2 (jam).
▶ Remove the jam
▶ Press the START key.

ERROR 3:

- The rear edge of the PCB does not arrive at sensor 3 in the defined time after being sensed by sensor 2 (jam).
▶ Remove the jam
▶ Press the START key.

ERROR 4:

- The rear edge of the PCB does not arrive at sensor 2 in the defined time relative to sensing the front edge (jam).
▶ Remove the jam
▶ Press the 'START key

ERROR 5:

- The MAESTRO 5L does not enter the takeover readiness mode for receiving a new PCB in the defined 20 seconds after receiving the previous PCB.



Notice

Error messages ERROR 2, ERROR 3 and ERROR 4 can be disabled by changing the program parameter PA 2.

This is recommended by separating even PCBs that means by using thin PCB material or by using small components.

There the sensors do not recognize the PCBs.

ERROR 6:

- Sensor 1 recognizes material during self test.
▶ Remove the material
▶ Press the REVERSE key.

ERROR 7:

- Sensor 2 or 3 recognizes material after finishing the self test.
▶ Remove the material
▶ Press the START key or the REVERSE key.

ERROR 8:

- Sensor 4 recognizes material during self test.
▶ Remove the material
▶ Press the START key or the REVERSE key.



Notice

Error messages ERROR 6, ERROR 7 and ERROR 8 are valid during the self test.

9.1 Replacement of the Upper Blades

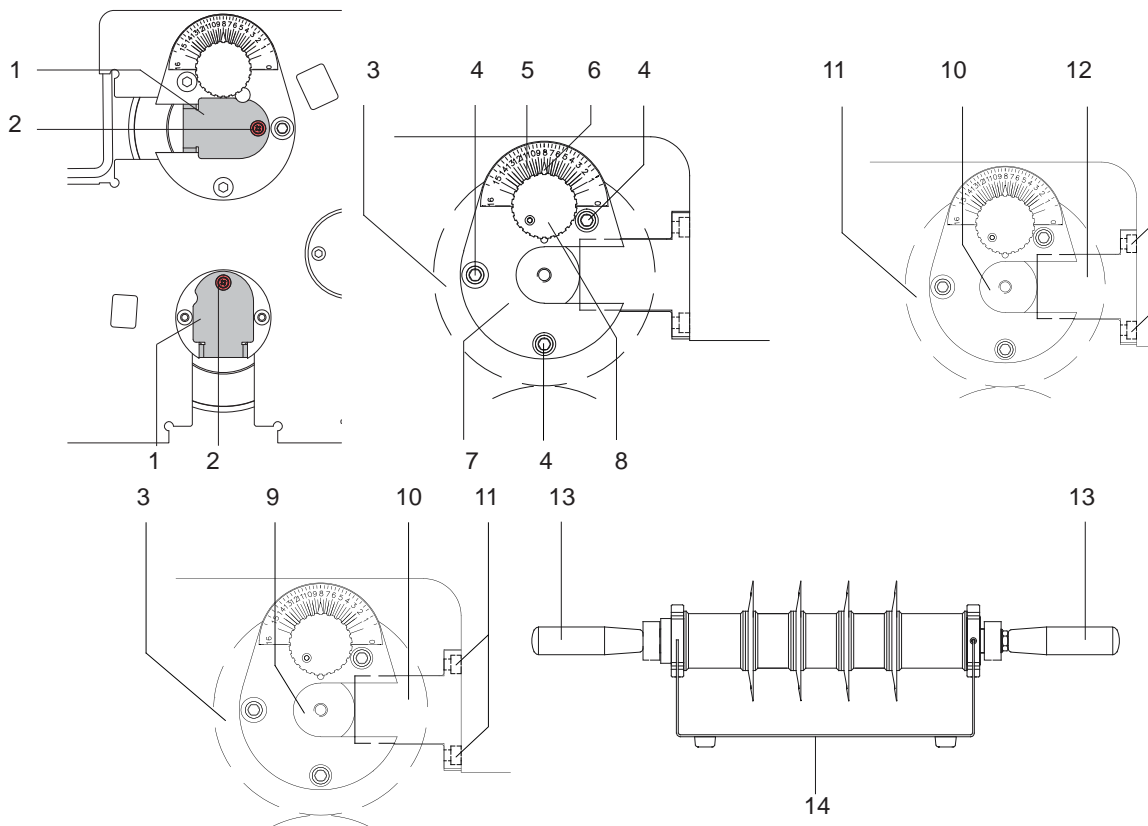


Fig.17 Replacement of the Upper Blades

**Danger!**

► Unplug the power source to the MAESTRO 5L before working on it!

**Warning!**

Risk of hand injury!



► When handling the blades, protective gloves should be worn!

1. Remove the bonnet by swinging it up 90° and lifting it out of the slots in the side panels.
2. Loosen screws (2) to remove cover plates (1) .
3. Move the upper blades (3) into the uppermost position.
The position of the upper blades can be read on the scales (5) located on each of the adjustable flanges (7). The scales are in 1/100 mm increments.
In the uppermost position the pointer (6) points to position "16".
4. Loosen the cylinder screws (4) on the adjustable flanges (7).
5. Rotate the adjustment knobs (8) in the counterclockwise direction until the position "16" is reached.
6. Tighten the cylinder screws (4).
7. Screw the handles (13), included with the unit, into the ends of the upper blade shaft (9).
8. Remove the retaining flanges (10) by removing the cylinder screws (11).
9. Loosen the rear flanges via the cylinder screws (12) as needed to remove the complete blade shaft (9) from the machine.
Place the blade shaft on the console (14) provided.
10. Remove the handles (13) from the shaft.

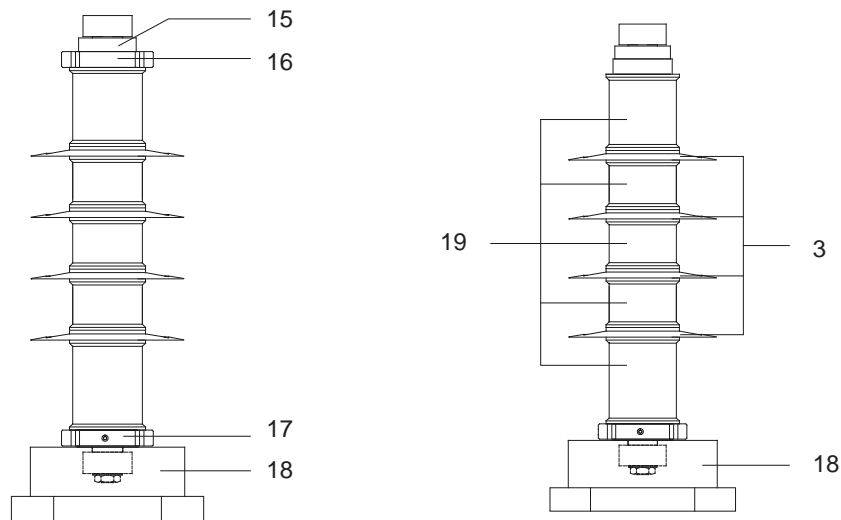


Fig.18 Blade Replacement

11. Place the blade shaft into the provided device (16).

Loosen the spanner nut (14) with the spanner wrench provided, while holding the open-end wrench (41mm) on area (14).



Attention!

Do not manipulate the second spanner nut (15) at this time!

12. Remove the circular blades (5) and spacers (19) from the blade shaft.

Keep the spacers in the order they were removed.

13. Slide the replacement blades (5), with the appropriate spacers (19) onto the shaft.

14. Mount the spanner nut (16) and tighten it.

15. Put the blade shaft back into the machine using the handles (13).

Slide the shaft into the adjustable flanges as far as possible.

16. Remount the retaining flanges (10) using the cylinder screws (11).

Tighten it easy.

17. Tighten the cylinder screws (12) on the rear flanges first, and then tighten the cylinder screws (11) at the retaining flanges.

18. Adjust upper and lower blades.

19. Remount the cover and restore the connections.

20. Mount cover plates (1) again and tighten it with screws (2).

9.2 Replacement of the Lower Blades

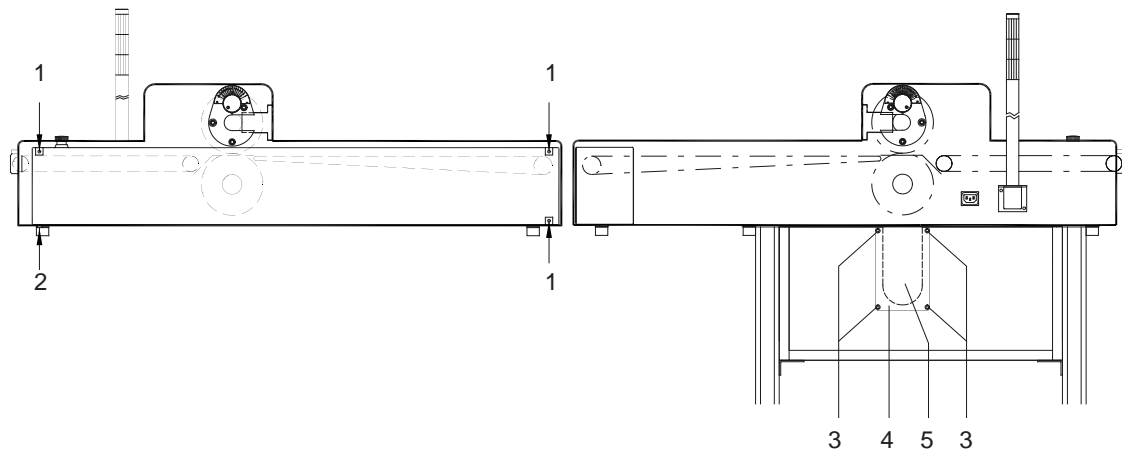


Fig.19 Replacement of the Lower Blades

**Danger!**

- Unplug the power source to the MAESTRO 5L before working on it!

**Warning!**

risk of hand injury!



- When handling the blades, protective gloves should be worn!

1. Move the upper blades into the uppermost position (see section 12.1).
2. Remove the front cover by loosening the 3 cylinder screws (1) on the front of the cover and the cylinder screw (2) on the underside of the cover.
3. Remove the cover plate (4) from the back panel of the chassis by removing the 4 cylinder screws (3) so the shelf (5) in the chassis is accessible.

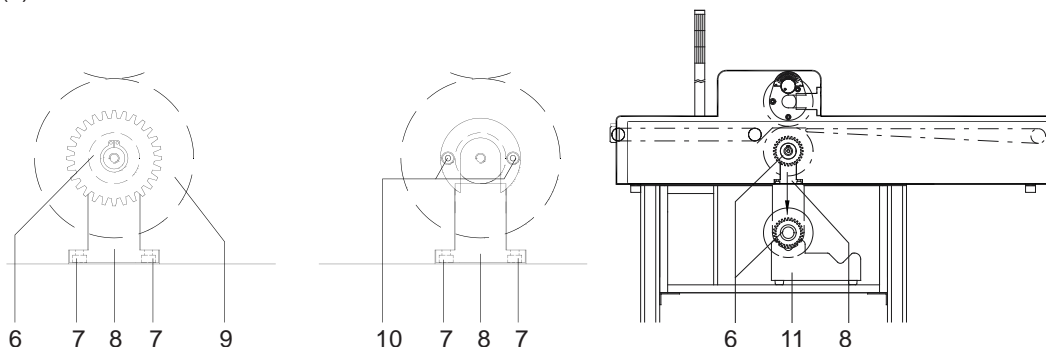


Fig.20 Blade Replacement

4. Screw the handles (12) into the ends of the lower blade shaft (6).
5. Open the door of the chassis and put the console (11) on the shelf under the lower blade shaft (6).
6. Loosen the cylinder screws (10) on the back flange a few revolutions.

**Notice**

The next procedure should be done with two peoples!

7. Hold the blade shaft (6) tightly with the handles.
Remove the retaining flanges (8) by loosening the 4 cylinder screws (7).
Place the blade shaft on the console (11).
8. Take the console with the lower blade shaft out from the chassis shelf.

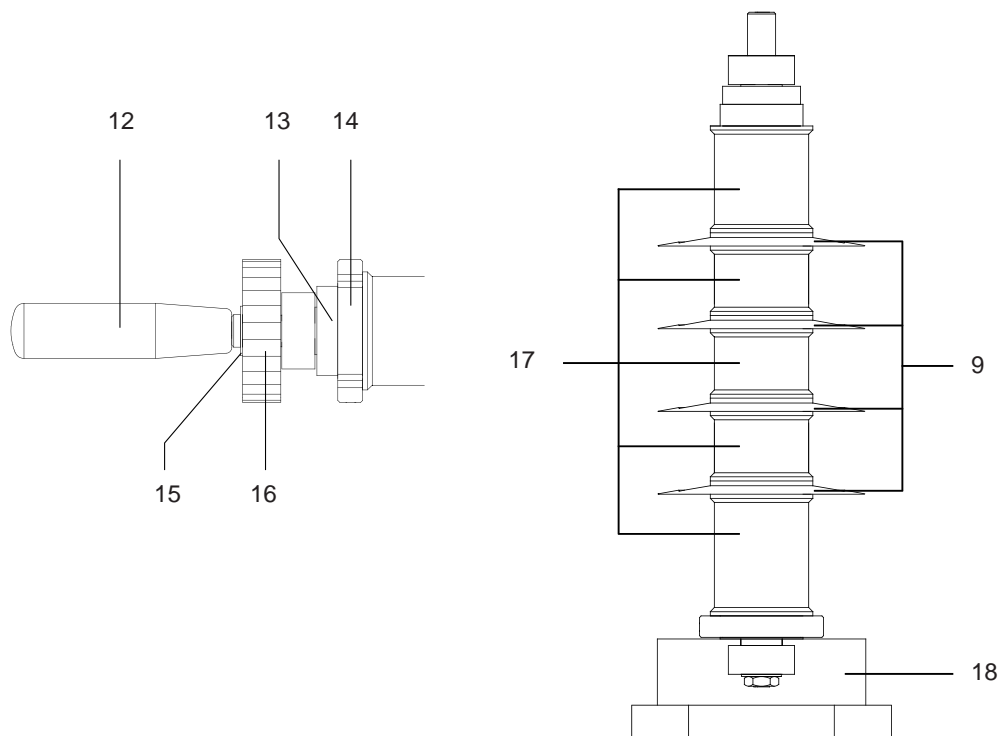


Fig.21 Blade Replacement

9. Remove the handles (12) from the blade shaft.
10. After loosening the snap ring (15), remove the gear (16).
11. Loosen the spanner nut (14) with the spanner wrench provided while holding the open-end wrench (41mm) at area (13).
12. Place the blade shaft into the provided device (18) and remove the circular blades (9) and spacers (17) from the blade shaft. Keep the spacers in the order they were removed.
13. Slide the replacement blades (9), with the appropriate spacers (17), onto the shaft.
14. Remount the spanner nut (14) and tighten it.
15. Remount the gear (16) using the snap ring (15).
16. Put the assembled blade shaft back into the machine using the handles (12).
17. Remount the retaining flanges (8) and tighten the cylinder screws (7).
18. Push the blade shaft up as high as possible and tighten the cylinder screws (10).
19. Tighten the screws (7) on the retaining flange.
20. Adjust the upper and lower blades.
21. Remount the cover and restore the connections.

9.3 Blade Adjustment

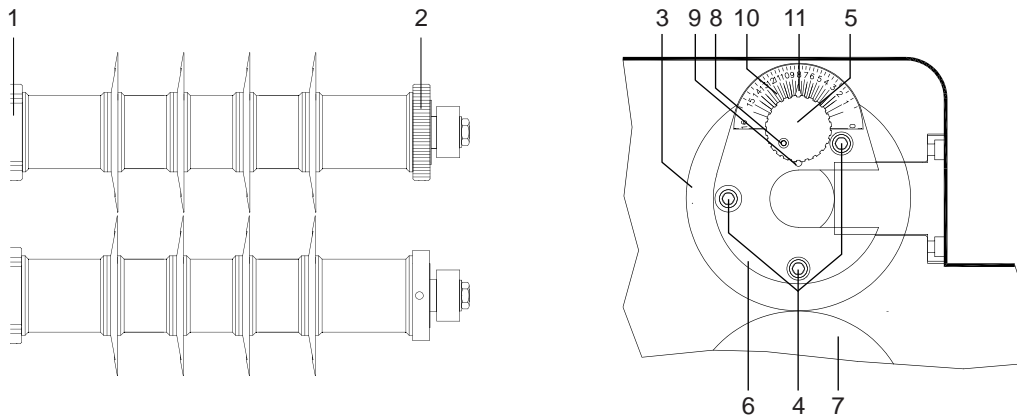


Fig.22 Blade Adjustment

Side to side adjustment

Recheck the side to side adjustment of the upper and lower blades in relationship to one another. If the blades do not line up, the upper shaft will need to be adjusted as follows:

1. Loosen the spanner nut (1) a few revolutions.
2. Loosen the set screw on the second spanner nut (2). Turn the nut until the blades are properly aligned.
! Attention left-hand thread!
3. Tighten the set screw in the second spanner nut (2).
4. Slide the blades and spacers against the nut (2) and tighten the spanner nut (1).
Adjusting the upper blade vertical stop

Adjusting the upper blade vertical stop

1. Loosen the cylinder screws (4) at both adjustable flanges (6).
2. Loosen the cylinder screws (8).
3. Move the adjusting knobs (5) in the clockwise direction until the upper and lower blades (3, 7) gently touch each other without overlapping.
4. Swing the struts (9) in the clockwise direction until they stop and tighten the cylinder screws (8).
This adjustment locks the upper blades from moving out of adjustment.
5. Tighten the cylinder screws (4) at both adjusted flanges (6).

Height Adjustment

1. Loosen the cylinder screws (4) on the adjustable flanges (6).
2. Rotate the adjustment knobs (5) in the clockwise direction until it stops. So the upper blades (3) move down toward the lower blades (7). A built in stop will stop the upper blades (3) just before they touch the lower blades (lower end position). Make note of the position of the pointer (11) on the scale (10) for the next step.
3. Turn the knobs (5) in the counterclockwise direction until the pointer is in the middle position between the lower end position and the position "16".
4. Tighten the cylinder screws (4) and run some test cuts to assure the PCBs will be separated at this setting.
If not readjust the distance between blades in small increments until PCBs are separated properly.

**Notice**

**The above described procedure will reduce the forces of separation.
This is important when sensitive components are close to the score line**

9.4 Adjustment of the Upper Guide

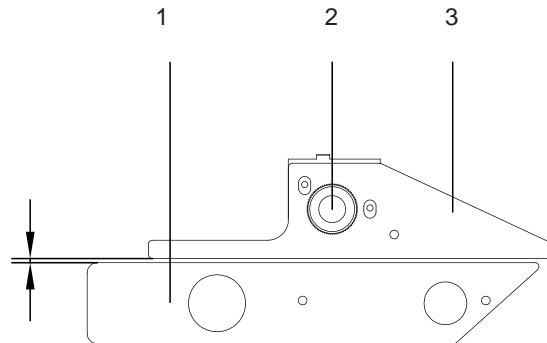


Fig.23 Adjustment of the Upper Guide

The guide (1) and the upper guide (3) prevent the PCB from moving to side and ensure that the PCB is not separated any where but on the pre-scored groove.

The distance A between the guide and the upper guide is adjusted in such a way that the PCB can be moved backward and forward easily, but cannot move sideways.

1. Check the distance (A) by using a pre-scored PCB.
Put the PCB between the guide and the upper guide.
Check the movement of the PCB between guides.
2. Adjust the distance as needed, by loosening the knurled screw (2).

9.5 Adjustment of the Supply Belts

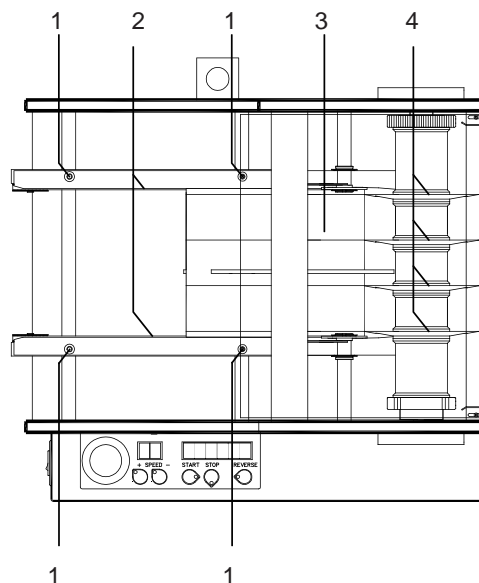


Fig.24 Adjustment of the Supply Belts

It is necessary to adjust the supply belts of the MAESTRO 5L to the tolerances of the external dimensions of the PCB.

3. Loosen the 4 screws (1) at the belt retainers (2).
4. Slide the belt retainers out until the PCBs may be put in with little effort, but without too much clearance.
5. Slide the PCB (3) on the supply belts and push to the blades (4).
Check for proper alignment of the pre-scored grooves to the blades.
Adjust again if necessary.
6. Tighten the screws (1).



Notice

Pay attention when shifting that the retainers are absolutely parallel to each other!

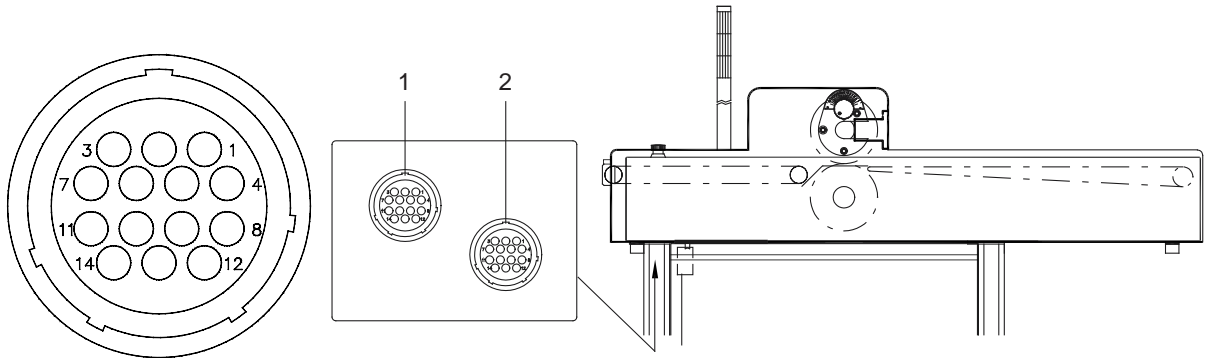


Fig.25 SMEMA-Interfaces

The MAESTRO 5L is equipped with two 14-pin AMP-couple SMEMA interfaces for connection to a supply device and/or a following device.

The pin assignments are as follows:

SMEMA Interface (1) to the pre device

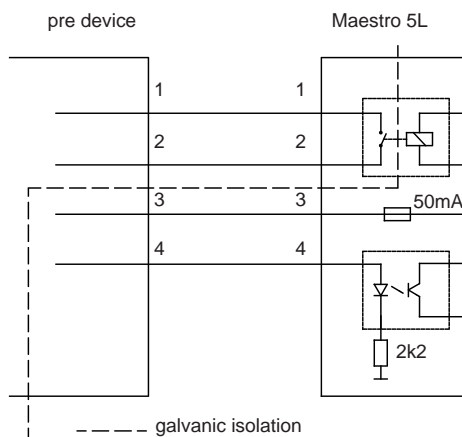


Fig.26 Interface to the pre device

pin Signal

- | | |
|---|---|
| 1 | 24 V from the supply device |
| 2 | Output signal to the supply device MAESTRO 5L ready to receive PCB" the 24V of pin 1 to pin 2 is switched into the active state |
| 3 | 24 V from MAESTRO 5L |
| 4 | Input signal from the supply device
"PCB ready to be taken over by the MAESTRO 5L" the 24V of pin 3 to pin 4 is switched in the active state |

Maestro 5L following device

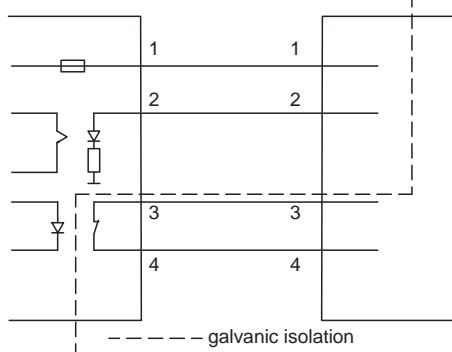


Fig.27 Interface to the following device

- | | |
|---|---|
| 1 | 24 V from MAESTRO 5L |
| 2 | Input signal from the following device
"Ready" |
| 2 | 24 V from the following device |
| 4 | Output signal from MAESTRO 5L
MAESTRO 5L ready to give the PCB's |



Notice

In case to use a conveyor belt as following device, the second interface will changed in a cab specification without external signals.

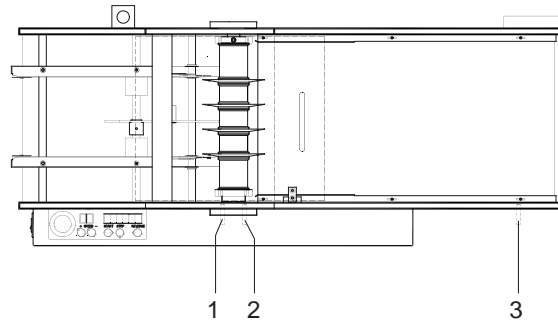


Fig.28 Maintenance

The following steps are to be performed regularly to maintain the MAESTRO 5L PCB separator:

Before each shift:

- ▶ Check the laser beam of the sensors (1), (2) and (3).
- ▶ Clean the leaving hole of the laser beam if necessary.

After each shift:

- ▶ Remove dust and PCB scrap from the MAESTRO 5L.
- ▶ Use a vacuum for this procedure if possible.
- ▶ Check blade wear.
- ▶ Check the alignment of upper and lower blades. The difference between the blades should be less than 0.1mm.

Weekly:

- ▶ - Check all screws for tightness.
- ▶ It is necessary to be sure all screws are secure to maintain the quality of separation.

Every 2 month:

- ▶ Clean all gears in the gearbox and lubricate as necessary.
- ▶ To perform this operation, the front cover must be removed (see section 12.2).
- ▶ Check the supply belt wear.

	Part.-No.	Description
	customized	Circular Blade
	8931308.001	Bearing Bolt
	8931311.001	Spur Gear
	8931360.001	Bearing Bolt
	8931362.001	Gear
	8931365.001	Gear
	8931367.001	Roller
	8931404.001	Spur Gear
	8931406.001	Spur Gear
	8931407.001	Spur Gear

	Part.-No.	Description
	8931419.001	Tooth Washer 24
	8931434.001	Tooth Washer 18S
	8931494.001	Belt Roller
	8931505.001	Transport Shaft
	8931515.001	Spur Gear
	8931543.001	Spur Gear
	8931552.001	Intermediate gear bolt
	8931568.001	Shaf
	8931583.001	Tooth Washer
	8931593.001	Shaft with ring
	8931657.001	Shaft

	Part.-No.	Description
	8937507.001	PCB Control
	8934526.001	Laser Diode L=980
	8932469.001	Laser Diode l=440 M5
	5905357.001	Belt 804-3M
	5906582.001	Belt 630 XL 031
	5906581.001	Conveyor Belt B=315, L=1237
	5906589.001	Conveyor Belt B=315, L=1208
	5906563.001	Conveyor Belt B=315, L=1208
	5906590.001	Conveyor Belt B=315, L=1237
	5906118.001	O-Ring 106x5
	8937592	Conveyor Belt B=315 L=1237 Set (straight)
	8937593	Conveyor Belt B=315 L=1208 Set (aslant)

Tabelle 1 Ersatzteile




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

EU Declaration of Conformity

Herewith we declare that the following described device, from the design and style and as we sell it, comply with the relevant EU Safety and Health Requirements.

This declaration will lose the validity if there are any changes of the device or the purpose without our consent.

Description:	PCB Separator
Device:	MAESTRO 5L
Applied EU-Directives	Applied Norms:
Directive 2006/42/EC on machinery	• EN ISO 12100:2010
	• EN ISO 13857:2008
	• EN 349:1993+A1:2008
	• EN 62841-1:2015
	• EN 60825-1:2014
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 50581:2012
Person authorised to compile the technical file:	Erwin Fascher Am Unterwege 18/20 99610 Sömmerda
Signature for the producer:	Sömmerda, 13.05.2019  Erwin Fascher Managing Director
cab Produkttechnik Sömmerda Gesellschaft für Computer- und Automationsbausteine mbH 99610 Sömmerda	

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