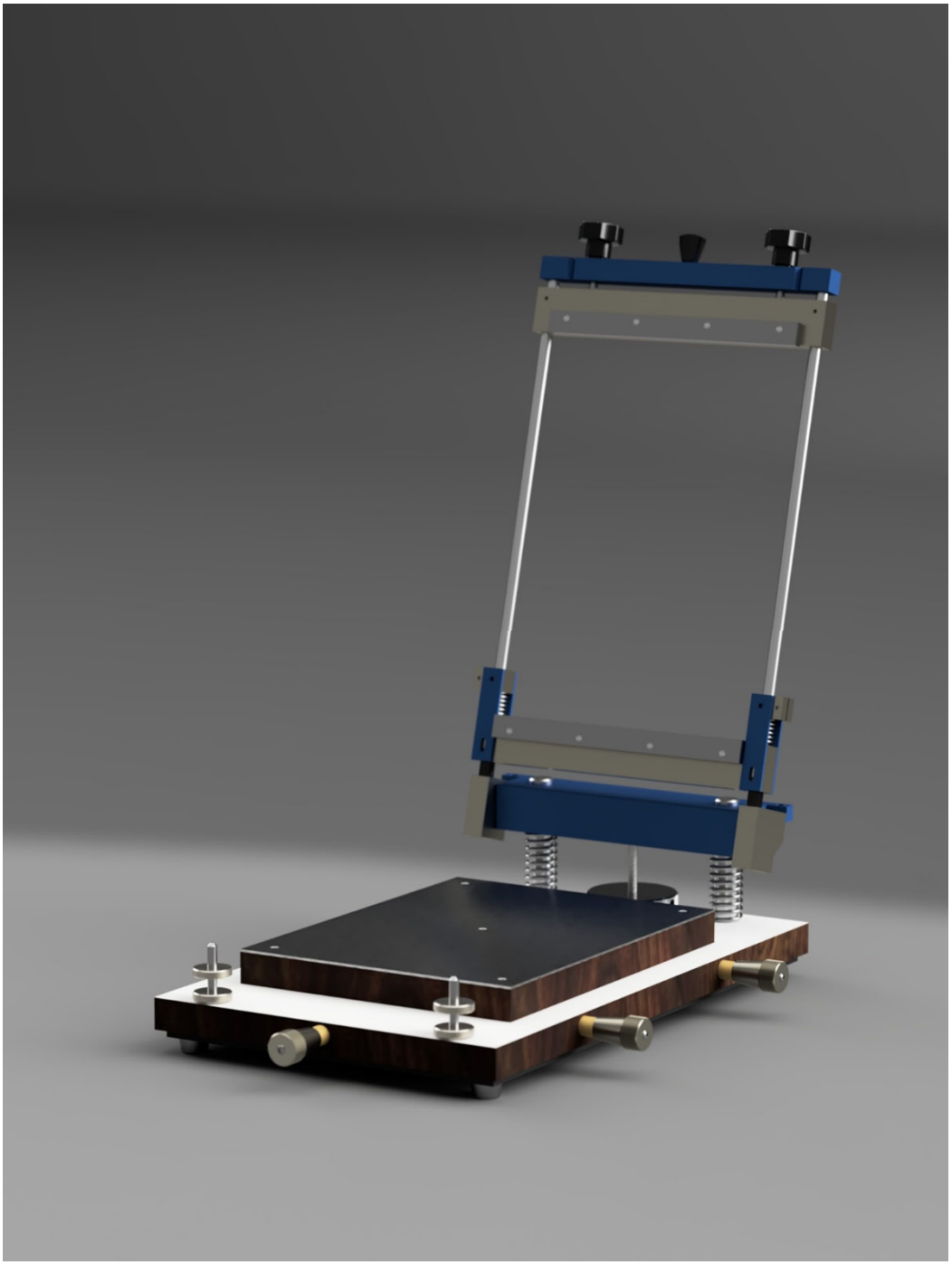
SD240

(SP912 M1) STENCIL PRINTER

User manual

Version 3.00



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IMPORTANT SAFETY INSTRUCTIONS

Machine location:
Do not use the printer outdoors! The printer is designed to be installed on a flat, dry surface. This surface or table must be capable of supporting at least 10 kg (excluding the force used to spread the paste). The printer should be used at room temperatures between 15 and 25 degrees Celsius.
Use the printer only in well-ventilated rooms.** During the printing the flux will release some gases. These gases released by the flux can be unhealthy, **so please follow the safety instructions of your paste supplier.

Regular use:
*The printer is designed for printing paste on PCBs only. **Using it for anything other than printing paste on PCBs will void your warranty!***

Introduction

Remark
Pictures in this manual may differ from the actual model you purchased. They are intended to illustrate the printers' use and function and not to precisely match your model.

The S1-01 stencil printer is designed to apply solder paste on PBC's with a "stencil". A stencil is a thin metal sheet with holes that match the positions of the pads on the PCBs.

Unlike other stencil printer brands, the S1-01 offers unique features for user-friendly handling of stencils and PCBs.

Some of these features include:

- *Stencils do not require mounting holes.*
- *Fixing a stencil is fast, easy and does not require heating the stencil..*
- *Positioning of PCBs is simple yet effective.*
- *The stencil printer can be used for both single-sided and double-sided PCBs, even if components are already present on one side!*

Recommendation
Although there are different types of squeegees, we recommend using the metal squeegees instead of plastic or polyurethane ones.

Setting up the stencil printer

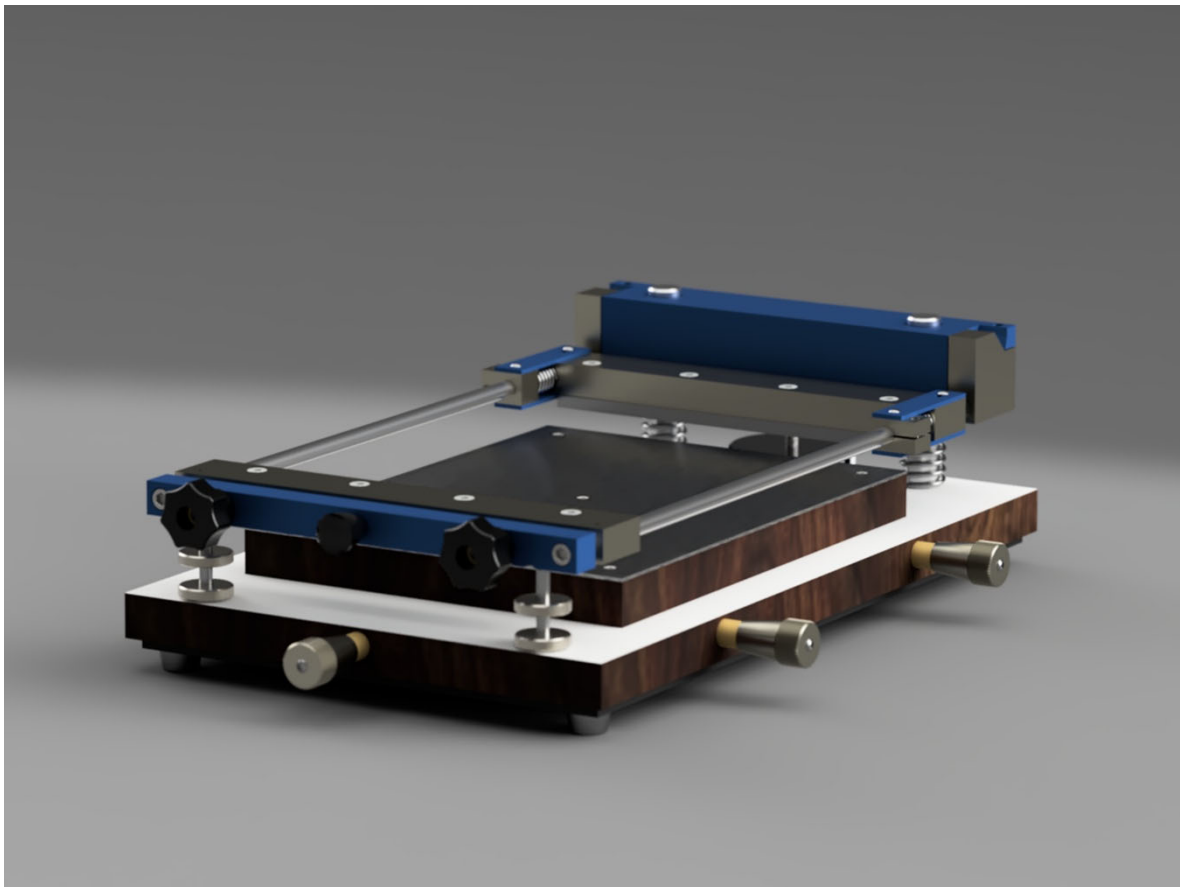
This machine is produced and packaged with special care to ensure the best quality possible. However, we still advise you to use extra caution while unpacking the machine.
After unpacking, check for any external damage and immediately report it to the transport company. **Failure to note transport damage on the freight papers may result in the loss of your right to any insurance!**

Carefully unpack the stencil printer and save the original packaging in case you need to ship the unit. Please ensure that the following items are included with your stencil printer:

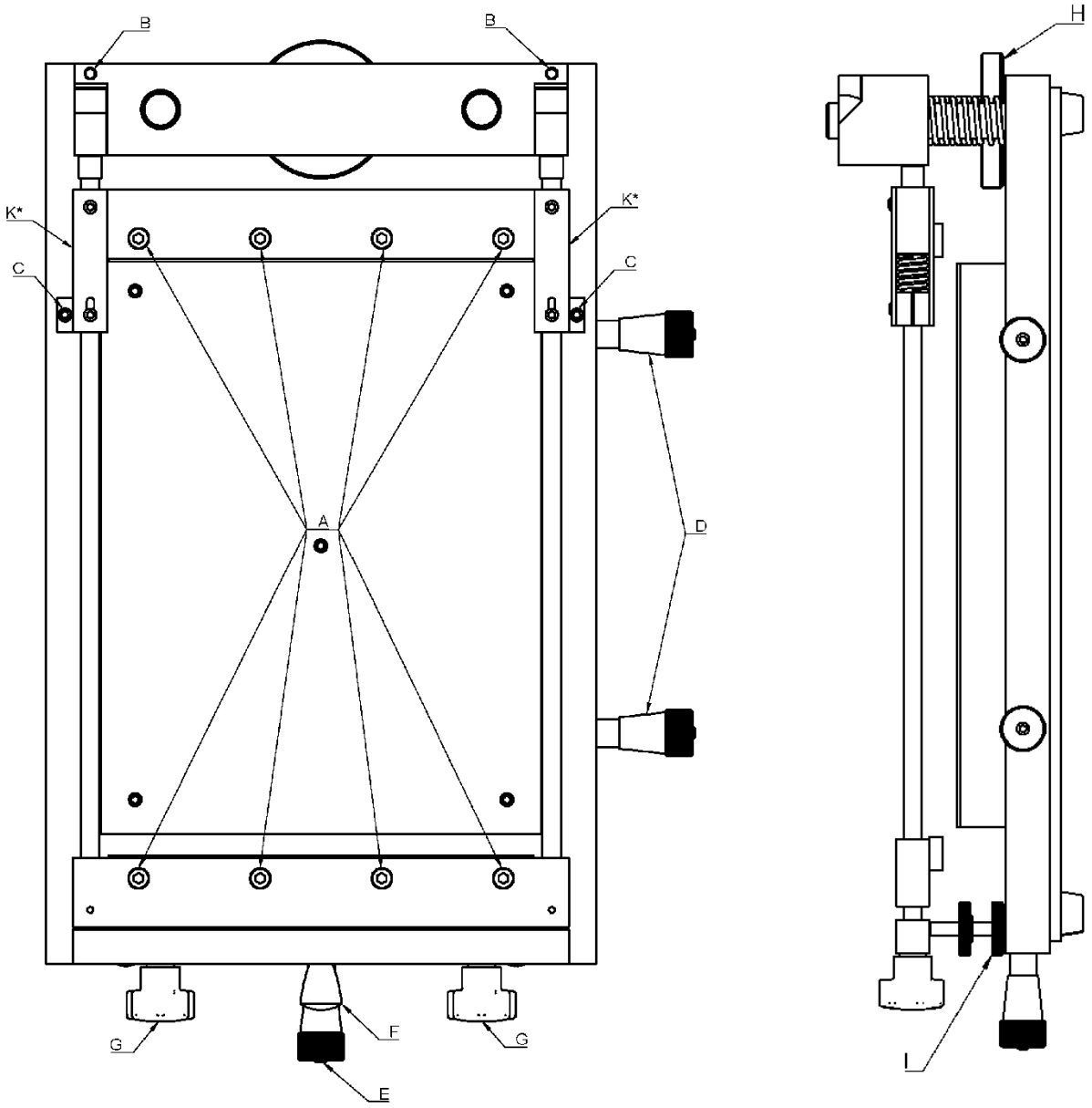
- *1 stencil printer S1-01*
- *4 metric Allen Keys*
- *1 non-permanent fine line marker pen*
- *6 magnetic placeholders for PCBs*
- *3 magnetic support points for PCBs*
- *2 transparent outline sheets to define PCB position*
- *1 squeegee*

Placement of the stencil printer

Place the stencil printer on a flat, stable surface. This surface should be capable of carrying the weight of the machine as well as the pressure you add while spreading the paste. Leave a 10 cm gap free on each side of the machine for easy access to the X-axis, Y-axis and height adjustments.

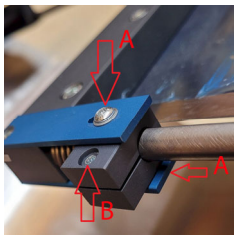


The S1-01 overview



A. Stencil clamp screws: Secure the stencil in place.
B. Horizontal adjustment: Allows for precise horizontal positioning.
C. Stencil clamp fixing clamps: Hold the stencil clamp securely.
D. Table rotation and X alignment: Enables rotation and alignment in the X-axis.
E. Table Y alignment: Adjusts the alignment in the Y-axis.
F. Knob to lift stencil frame up: Used to lift the stencil frame.
G. Stencil tension knobs: Adjust the tension of the stencil.
H. Top height adjustment: Alters the height of the stencil frame.
I. Fixation of X movement and Y stabilization of frame: Stabilizes and fixes the frame in the X and Y directions.
K. Preload system (See remark on next page!)

The preload system



Do not thighten or lose the 4 small screws (A). The right adjustments are done during the assembly at the manufactory!
Use only the screws (B) to lock the system!

Getting started

Horizontal calibration of the frame

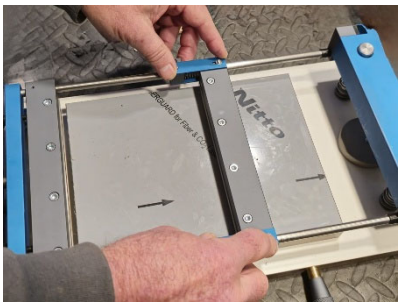
When the printer leaves the factory, it will already be calibrated. However, over time, you may need to recalibrate it. You will need the two magnets without a pin.

1. Remove the RVS bars: Start by removing the RVS bars under the stencil clamps by removing all eight screws from the stencil clamps.
2. Adjust the X fixation pins: Turn both the X fixation pins (I) to a low position so they don't hit the stencil end bar.
3. Unscrew the stencil tension knobs (G)
4. Position the stencil clamps: Move the bottom stencil clamp above the outer position of the rotation table. Do the same with the top stencil clamp.
5. Move the frame upwards: Use the top height adjustment knob to move the frame upwards until the two magnets can move freely under the stencil clamp.
6. Adjust the horizontal screws: Use an Allen key to turn the horizontal adjustment screws (B), so the bottom side of the stencil frame moves upwards. Make small adjustments and alternate between screws until the magnets can move freely below the stencil clamp.
7. Align the top stencil clamp: Move the two magnets under the top stencil clamp. Turn the top height adjustment wheel to lower the frame until the stencil clamp touches the magnets.
8. Align the bottom stencil clamp: Move the two magnets under the bottom clamp. Slowly lower the bottom stencil clamp until it touches the magnets. Perform this procedure slowly and alternate between screws regularly.
9. Secure the X fixation pins: Turn up the X fixation pins (I) until they hit the stencil end bar without lifting the frame.
10. Reattach the stencil tension knobs: Reattach the stencil tension knobs and replace the RVS bars.

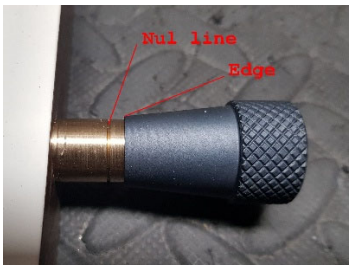
Installing the stencil

To move the back-side stencil, you can use two best practice methods:

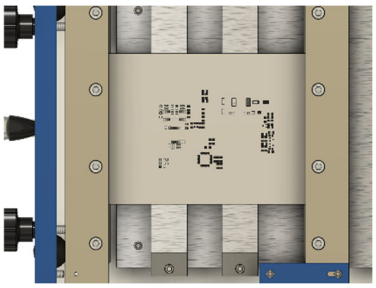
or



1. Set all X (D) and Y (E) adjustment screw measurements to the zero position.

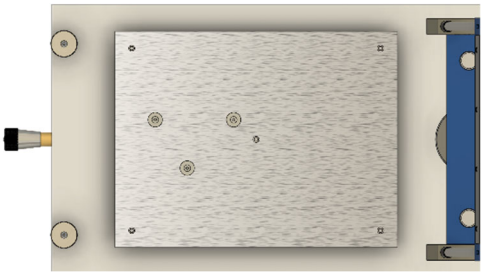


2. Loosen the stencil tension knobs (G) and move the lower stencil clamp forward to create a gap of +/- 5mm.
3. Loosen the eight stencil clamp screws. (A)
4. Place the stencil in the front side stencil clamp.
5. Tighten the four stencil clamp screws on the front side stencil clamp. (A)
6. Repeat the process for the back side stencil clamp.
7. Firmly push the back side stencil clamp towards the back of the stencil frame so the stencil is flat. Keep pushing while you tighten the stencil clamp fixing screws (C).
8. Tighten the stencil tensioner knobs (G) so the back side stencil clamp is moving 2-3mm to the front. Ensure the stencil is flat and without distortion. The stencil is now under a tension of approximately 20Kg.
9. The printer is now ready for mounting a PCB on the rotation table

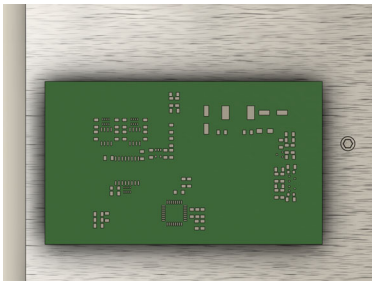


Installing the PCB

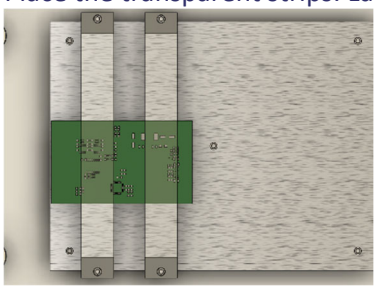
1. Open the printer: Lift the stencil frame using knob F until it reaches the endpoint. The stencil frame is now in a stable position.
2. Place the support magnets: Position three support magnets below the stencil, roughly at the PCB position.



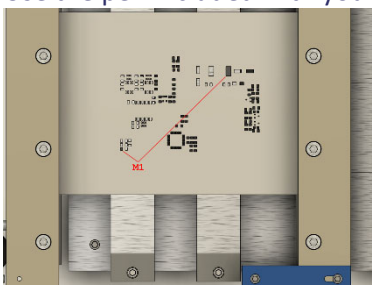
3. Place the PCB: Position the PCB on top of the magnets, roughly in its intended location.



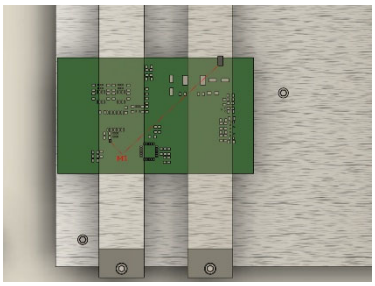
4. Place the transparent strips: Lay the two transparent strips over the PCB.



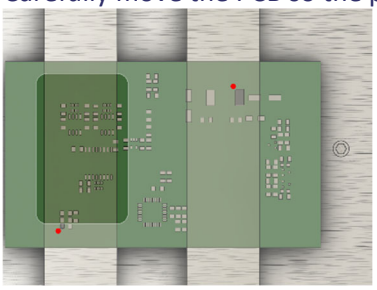
5. Close the stencil frame: Lower the stencil frame so that the PCB is covered with the stencil. Use the pen included with your printer to put two markers on the transparent strips.



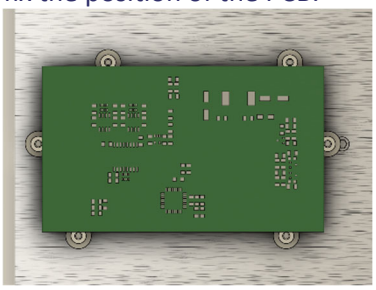
6. Open the stencil frame: Lift the stencil frame again, and you will see the two dots made earlier.



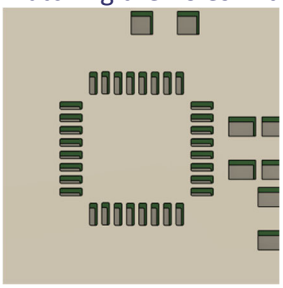
7. Adjust the PCB: You may notice the pads of the PCB are not perfectly aligned with the dots. Carefully move the PCB so the pads match the dots as closely as possible.



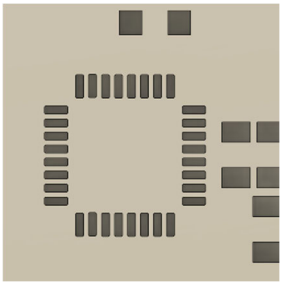
8. Secure the PCB: Remove the transparent strips and carefully place the magnets with pins to fix the position of the PCB.



9. Remove the PCB and support magnets: Remove the PCB and then the support magnets. For large boards, use the magnets and place them in the middle of the PCB. This prevents the PCB from deforming under the pressure needed to apply the solder paste.
10. Close the stencil frame: Lower the stencil frame. You should see that the pads are almost matching the holes in the stencil. It will look something like this:



11. Align the pads: Use the alignment knobs to ensure the pads exactly match the holes in the stencil. You should see this:



12. Final check and adjustment: Your printer is now ready for printing! Check if the alignment still holds, as the outline of the PCB is used. Due to the tolerance of the PCB, it might be necessary to adjust it again. Using fit holes will improve repeatability!

Operating the stencil printer

Once the stencil is installed, follow the steps below to place successive PCBs on the placeholders.

BUT BE CAREFUL!

If you position the PCB using its outline, note that no PCB is exactly the same. It's advisable to check before each print to ensure the pads still exactly match the stencil holes. Designing special positioning holes (fit holes) in your PCB will greatly improve repeatability. If you followed the previous steps correctly, a repeatability of 0.02mm is possible.

Let's get started!

1. Place a PCB: Position a PCB on the placeholders and close the printer as described before. Check if the holes and pads are still aligned.
2. Apply solder paste: Use a spatula to put the solder paste on the backside of the stencil. Ensure the paste is applied over the full width of the stencil cut-out.
3. Use the squeegee: Place the squeegee behind the solder paste at a 45-60 degree angle. Using a zigzag motion and applying slight pressure, pull the squeegee to the front of the stencil. Ensure all holes in the stencil are filled with solder paste.
4. Remove excess paste: Use the squeegee to remove the remaining paste at the end of the stencil.
5. Remove the PCB: Carefully open the printer and remove the PCB. It is now ready for assembly!
6. Repeat: For successive printing, repeat from step 1.

Maintenance and care

Use the S1-01 only in a dry, clean location and strictly avoid aggressive environmental conditions such as etching equipment. After using the machine, clean it with a solvent that removes paste but has no aggressive elements that could affect the machine or the stencil.

Note:

To prevent corrosion, lightly oil all metal surfaces twice or several times a year with resin and acid-free machine oil (PTFE oil is a good lubricant). No further lubrication is needed or advised.

Product specifications

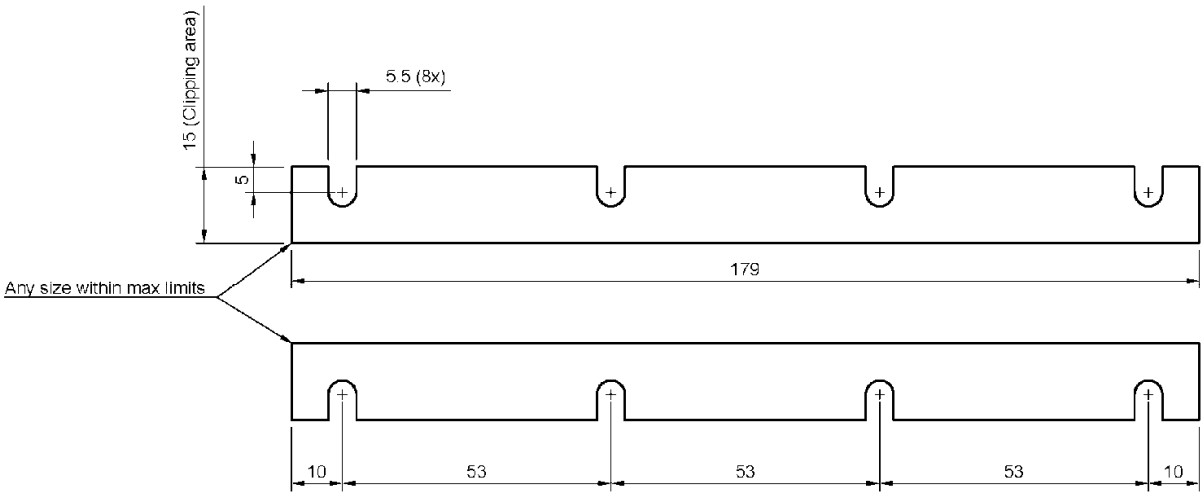
Dimensions	240 x 370 x 110 mm
Max. PCB size	180 x 240 mm
Max. Stencil size	190 x 270 mm
Weight	max. 7 kg
Accuracy	When dowel holes are use at least 0.02mm Otherwise it depends on the outline of the PCB

Warranty

Like all of our products, the S1-01 comes with a one-year warranty against defects in materials or production. Any defective parts under this warranty will be repaired or replaced at our expense. The defective part, or the entire unit, must be returned to us with a detailed description of the fault. Transportation costs are the responsibility of the customer.

Defects due to normal wear and tear, incorrect use, or lack of maintenance and care are not covered under this warranty.

Attachment



SD240
Stencil dimensions