

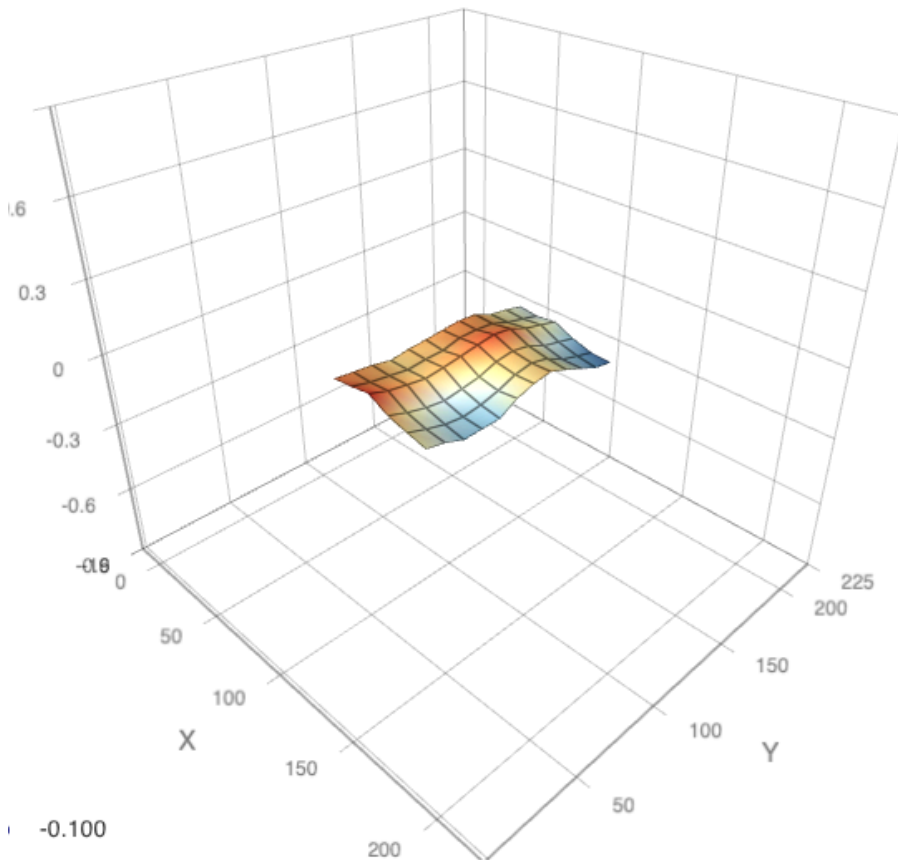
KPA - Klipper Printer Additions

More Than Boring Start-G-Code

Quick Overview

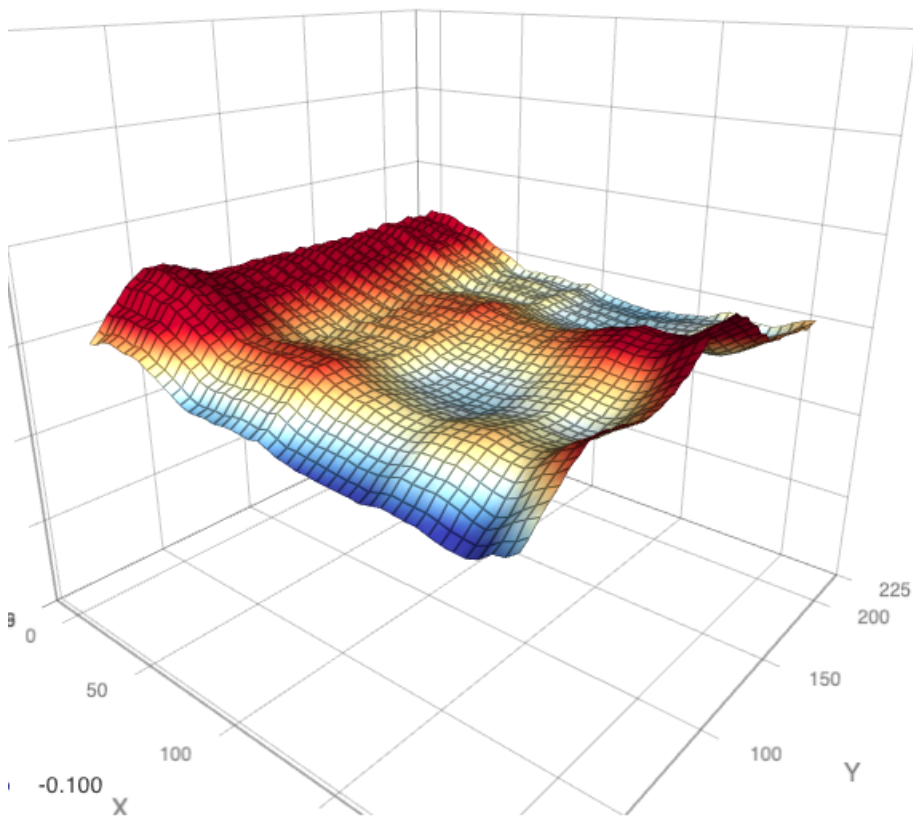
- The **Power of Klipper**, and much more, baked into **simple to use buttons**.
- The KPA **automate** the whole pre-print procedure. Like a conductor, they give the right instructions at the right time, so that your print starts faster, without oozing, and with better first layers.
- **Adaptive Mesh** Mode + Adaptive Purging/Priming.
Save time by only probing the area where the model is printed.

MESH ADAPTIVE MODE



- **Multiple Mesh** Mode + **Adaptive Purging/Priming**.
Even speeds of light **faster** than Adaptive Mesh Mode. Bed Meshes are automatically created by bed temperature, saved, and re-used. In fine temperature steps of no more than $\pm 5^{\circ}\text{C}$.

MESH MULTIPLE MODE



Ridiculous 2025 probe points, but just for testing some things out.



- **Adaptive Mesh Probe Point Count,**

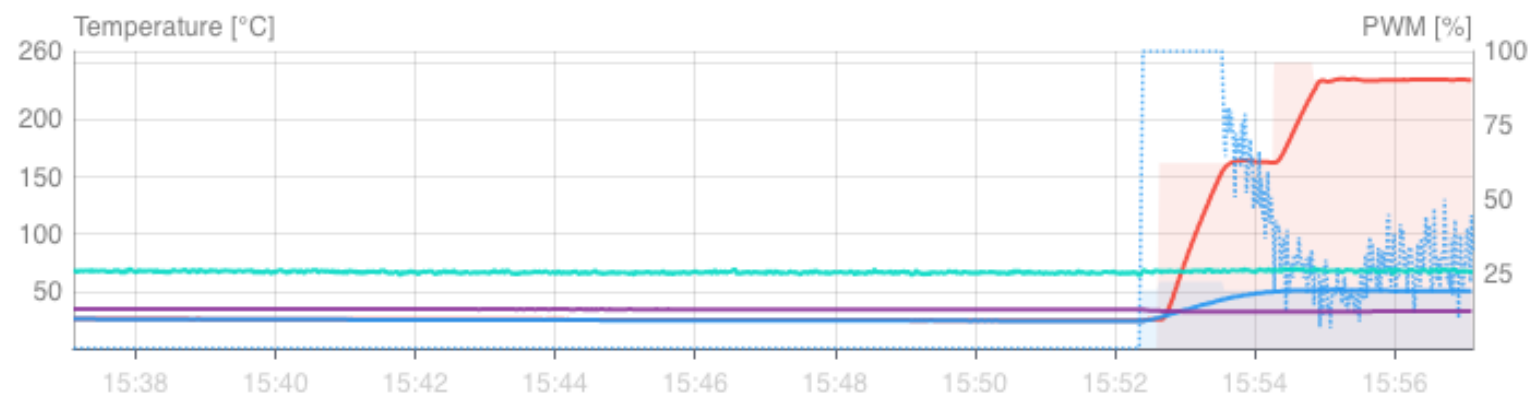
Independent of your printer's bed size, the probing density is the same (and adjustable). This applies to Multiple- and Adaptive Mesh Mode.

MESH PROBE POINT DISTANCE ▼

- **Heat Saturate** can eliminate first layer problems if your bed still changes it's shape after heating up. It can also help if your probe delivers different results under different temperatures. You can decide how long the heat shall "saturate" the bed and the probe.

MESH HEAT SATURATE ▼

- **Faster Print Start**, by heating smart, and without ouzing - you can print even without a skirt.



- **Prime Lines** which clean better than regular prime lines, have anti-ouzing, and are very easy to remove. Adjustable in position, speed and flow rate.

PREPRINT PRIME LINE MODI

- **Prime Spiral** which cleans in 360°, and indicates if

PREPRINT PRIME SPIRAL MODI

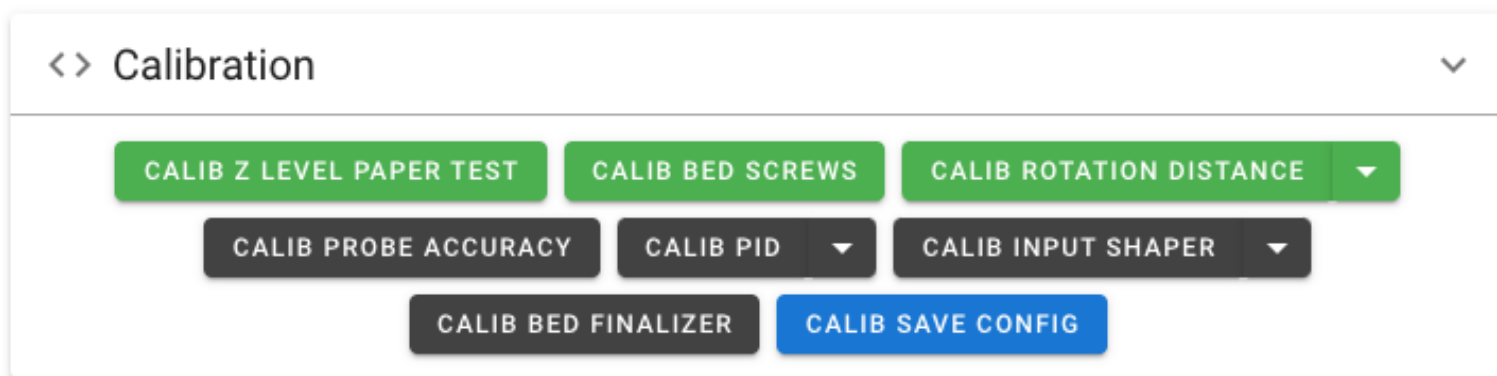
your z-level is fine. Adjustable in position, speed and flow rate.

- **PrePrint Prime Options**

You can enter the desired Flow Rate for the Prime Spiral and Prime Lines. If you print TPU and forgot to lower the Flow Rate, it will prime with 1 mm³/s Flow Rate automatically.

PREPRINT PRIME OPTIONS ▼

- **Calibration Tools at your fingertips**, no printer display required. For example, a fully automated and guided measurement of Rotation Distance Calibration! 😊



- **Print Slow In Height**, can seamless reduce the printing speed on tall models. Very handy on bed slinger printers. Fully configurable, also during the print.

PRINT SLOW IN HEIGHT ▼

- **Print Pause In Heights**, pauses the print at desired points. Fully configurable, also during the print.

PRINT PAUSE IN HEIGHTS ▼

- The **KPA are easy to use**, by simple buttons, which show you state and infos. Everything is directly accessible in Mainsail / fluidd.
- **Easy to set up**, by copy & paste. Minimal "invasion" of your printer.cfg (only one text line).
- **Easy to update**, by just uploading new files to the printer via Mainsail / fluidd.
- **Easy Slicer Guides**, without a single step missing, on how to set up your slicer app: [OrcaSlicer](#) / [PrusaSlicer](#) / [Cura](#) / [IdeaMaker](#) / Others.
- **Guide**, how to fix first layer problems on the hardware-side, and test-print-files.
- **Guide**, why and how to level a printer which calibrates the gantry with Z-Tilt.

Modularity

Most KPA modules can be enabled / disabled, to have the KPA buttons or functionality you want.

- Bed Mesh Multiple
- Bed Mesh Area
- Bed Mesh Organizer
- Pre-Print
- Pre-Print Prime Tools
- Print Slow In Height
- Print Pause In Heights
- Calibration Tools
- Speed Heat Buttons
- Slicer OrcaSlicer
- Slicer PrusaSlicer
- Slicer Cura

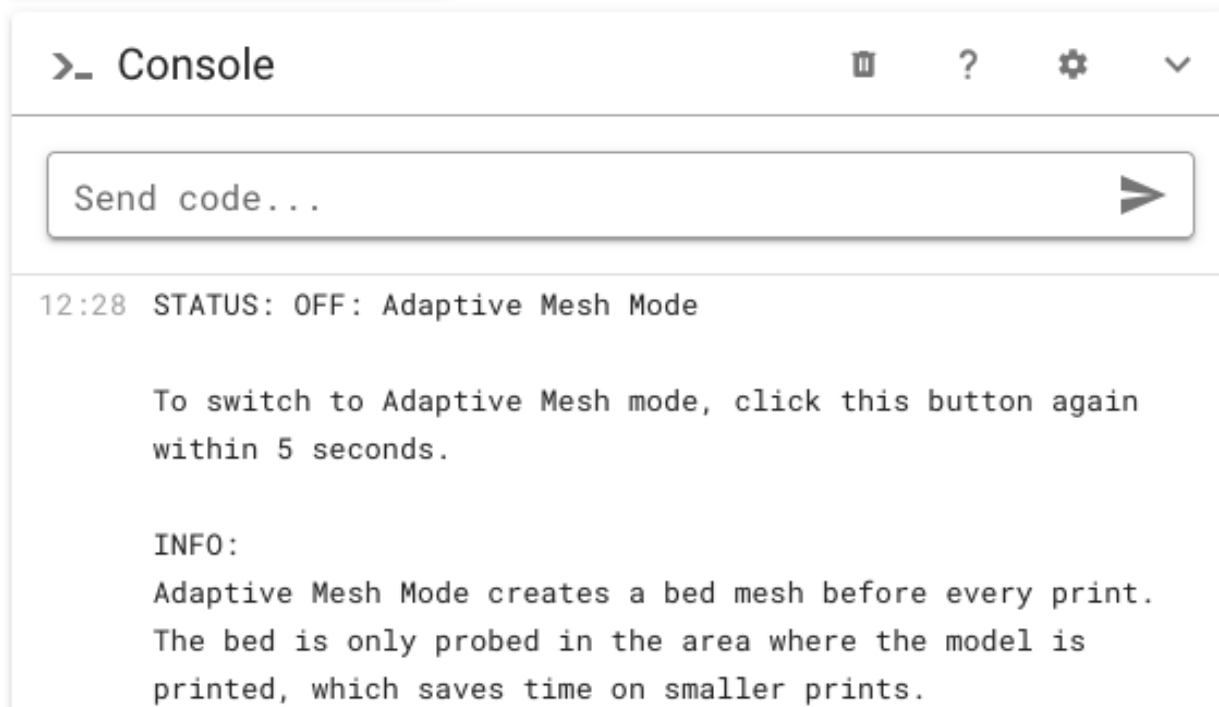
Additionally there are **Printer Modules**, to plug-in **additional functionality** / **bug fixes** for specific printers. Currently:

- Sovol SV06/Plus Features
- Sovol SV07/Plus Features
- Sovol SV07/Plus Part Fans
- Sovol SV07/Plus MCU Fan
- Sovol SV07/Plus Hotend Fan

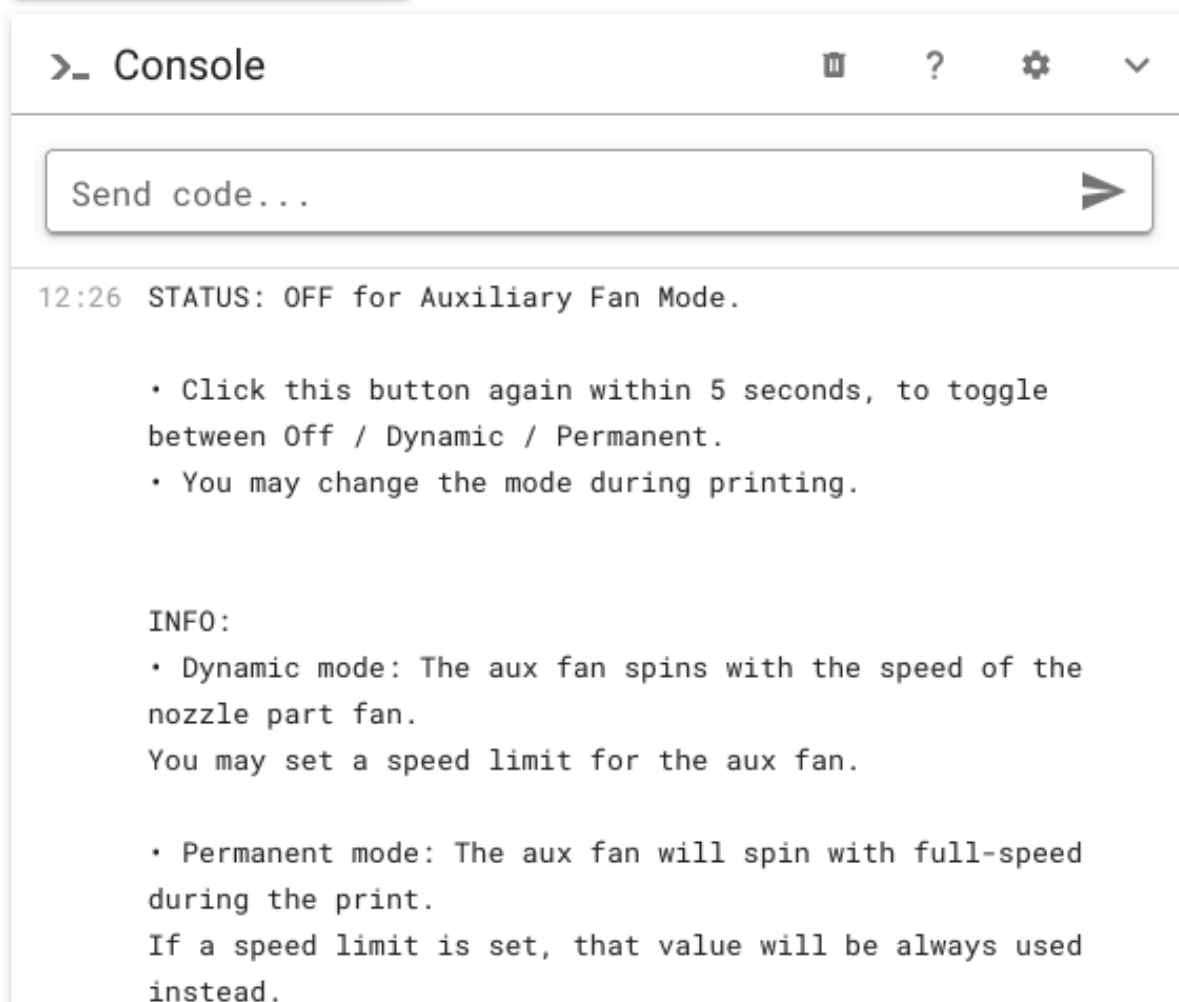
All Features In More Detail

On click, every button describes it's functionality in the **Console Pane** of Mainsail / fluidd. Examples:

MESH MULTIPLE MODE

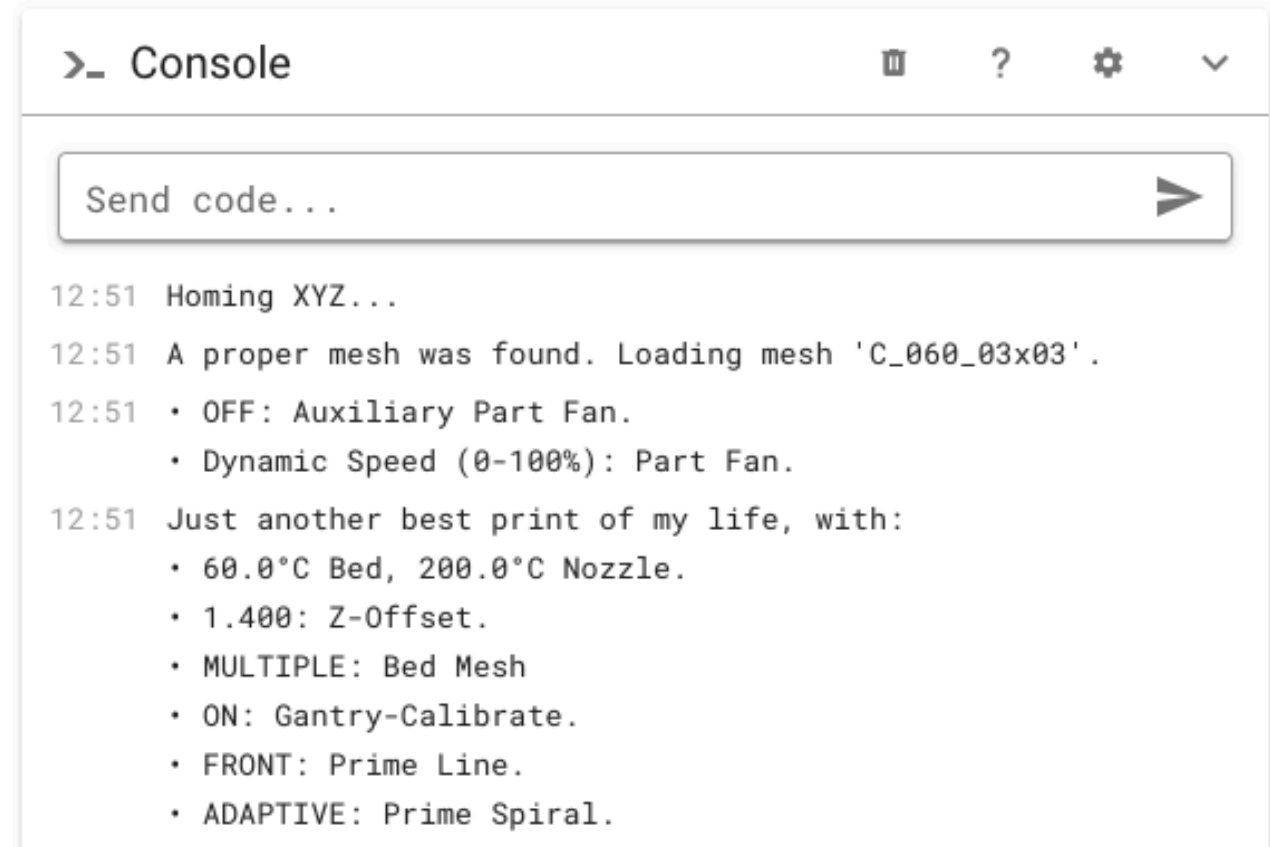


FAN PART AUX MODI



What during the Pre-Print phase happens

The KPA are talkative, and will let you know what's going on:



Pre-Print Procedure

- **Mesh Heat Saturate**

This is an option to let the heat "saturate" the bed (and probe) before doing a bed mesh. Some beds still **change their shape** after they have been heated, so this should help in those cases. Also your **probe** might have a significant **temperature drift**, so it will make a difference if you use your printer under different temperature conditions and/or doing a "cold start print" vs printing things in a row. Heat Saturation can help to create the same start conditions.



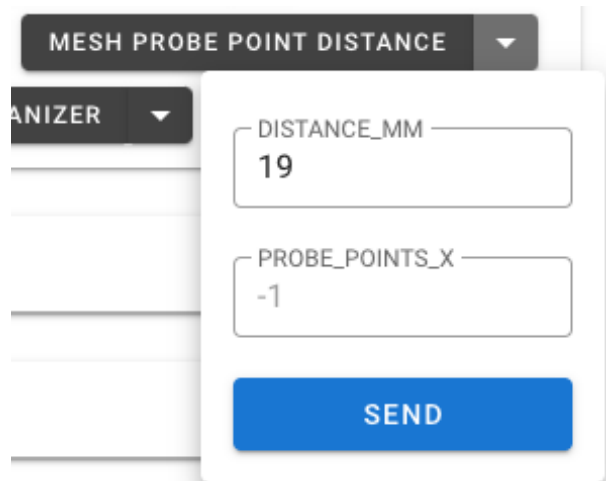
- **Bed Meshes**

Fully automated. Available modi:

- **Mesh-Multiple:** Uses up to 10 saved meshes, for all bed temperatures in 10°C-steps. This mode will save you tons of time.
- **Mesh-Adaptive:** Creates an adaptive mesh before every print, which at least samples only the area of the print model.



• Adaptive Bed Mesh Probe Point Count



MESH PROBE POINT DISTANCE ▼

ANIZER ▼

DISTANCE_MM
19

PROBE_POINTS_X
-1

SEND

Regardless of your bed size, or the size of the print model in Adaptive Mesh Mode, you will automatically get the same probe point density.

You can either set the distance between probe points, or the amount of probe-points in X-direction. No matter what you wish to enter, it will calculate the distance / probe point count for X and Y independently.

SET: Probe Point Distance: 19.0 mm.

HOW TO:

- Enter the desired value in the input field (click the arrow).
- Should you like to use the probe point count defined in `printer.cfg`, enter 0.
- Click the button again within 5 seconds to reset the value to default.

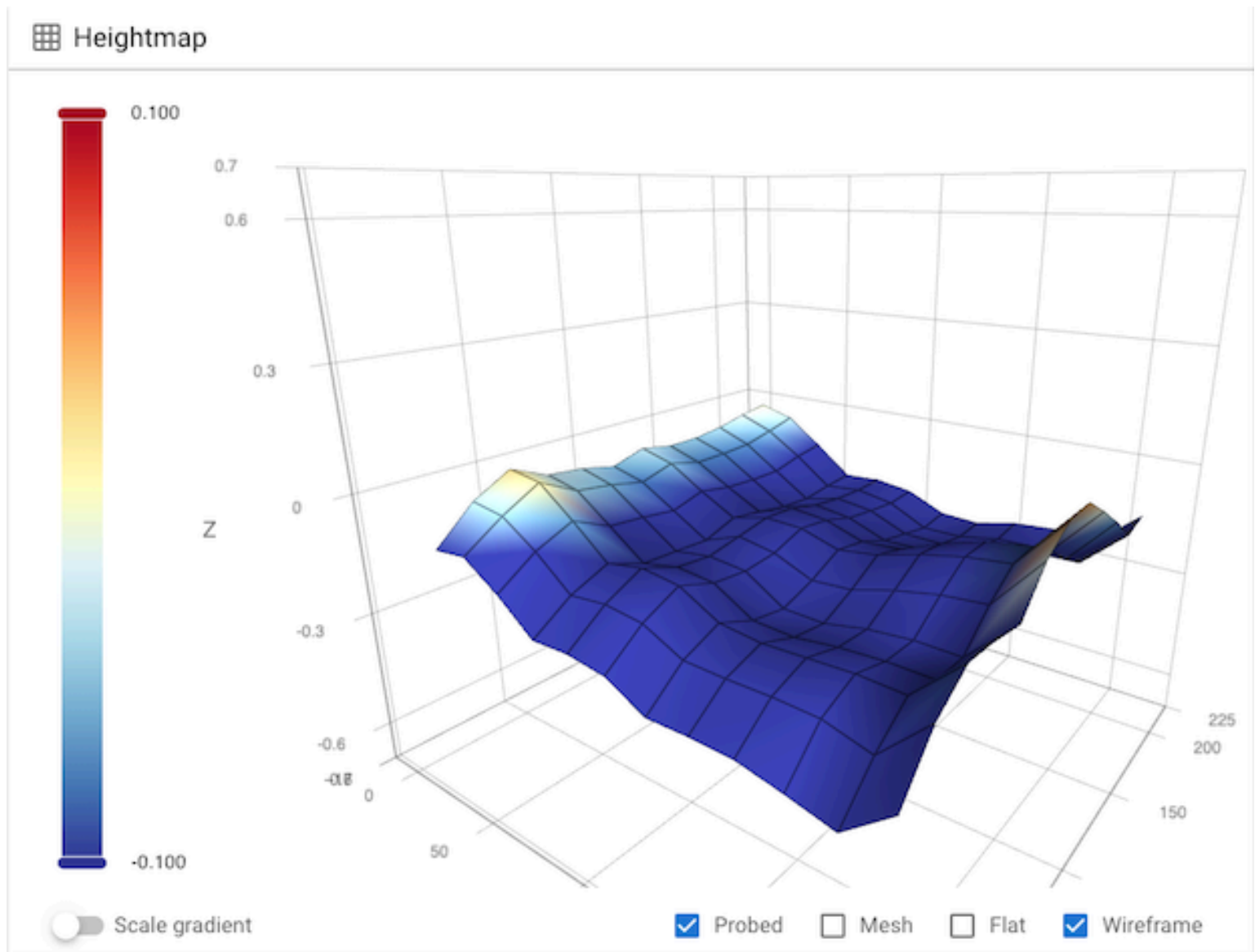
INFO:

This is the distance between two probe points when a bed mesh is created. By default it is 37mm.

You may enter instead the amount of probe points in X. It will then calculate the distance, and the probe point count in Y.

```
.....Sampleable Area Size XY: 199x193
.....Real Probe Point distance: 19.9
Probe Point Count in X direction: 10
Probe Point Count in Y direction: 10
.....Total Probe Points: 100
```

In Multiple Mesh Mode you may use a **higher amount of probe points**. Since the meshes are re-used for printing, their creation-time doesn't matter much.



- **Gantry Calibration** and **Z-Home** is executed exactly where required, for **stable** z-level / **first layers**.

- **Faster Print-Start**

- ...by re-using meshes, as described above.
- The bed & nozzle **reach the target temperatures faster** - no unnecessary wait until the temperature has settled to the last degree.
- The **bed / extruder wiggle a bit**, when they reached temperature. Fast moves of the bed / extruder then follow. This is an announcement, in case you have your hands on the printer.

• Priming & Cleaning

- Option to print smarter **Prime Lines** - better cleaning effect, and **extremely easy to remove**. They can be printed at the left / right / front, and they are printed outside the normal print area, so they are never in the way of large print models (if the printer's configuration allows it).
- Option to print a **Prime Spiral** (360° cleaning). The spiral arms also show if your **z-level is good** (explained in detail when you click the modi-button).
- **Minimal to zero filament ouzing**, reached by the smarter prime lines / spirals, retractions at the right time, and fast movements. The nozzle reaches the print model clean - printing skirts is not necessary.

• PrePrint Prime Options

You can enter the desired Flow Rate for the Prime Spiral and Prime Lines. If you print TPU and forgot to lower the Flow Rate, it will prime with 1 mm³/s Flow Rate automatically.

PREPRINT PRIME OPTIONS



- The following two features will be **probably removed**, as the anti-ouzing measures (see above) have developed so well.
 - Option to let the nozzle make a **Samurai Move** at the bed's border, to get rid of filament (if the printer's configuration allows it).
 - Option to let the nozzle & bed during the heat-phase move to a position where you can **check them and do cleaning**.

End-Print Procedure

- Cleans KPA's internal state, retraction for anti-ouzing, presents the print, and the nozzle drives an extra 60mm up. And of course it turns off the stepper motors / fans / bed / nozzle.

Print Modules

Print Slow In Height

PRINT SLOW IN HEIGHT ▼

START_AT_HEIGHT

auto

END_AT_HEIGHT

slicer

END_SPEED_PERCENT

auto

SEND

For tall prints, this linearly slows down the print speed in any desired range, so that the optical effects are absolute fluid.

DOUBLE CLICK the button to use computed values, based on the model height coming from the slicer-data on print-start.

You can START/STOP, and change any value on the fly during the print. To STOP, enter 0 for the End-Height, or End-Percent.

You may also send the data from your **START-G-CODE**, the **CONSOLE**, or a **MACRO** with this command::

`Print_Slow_In_Height START_AT_HEIGHT=150 END_AT_HEIGHT=250
END_SPEED_PERCENT=50`

Print Pause In Heights

PRINT PAUSE IN HEIGHTS



HEIGHT_POINTS_MM

11+22.2

SEND

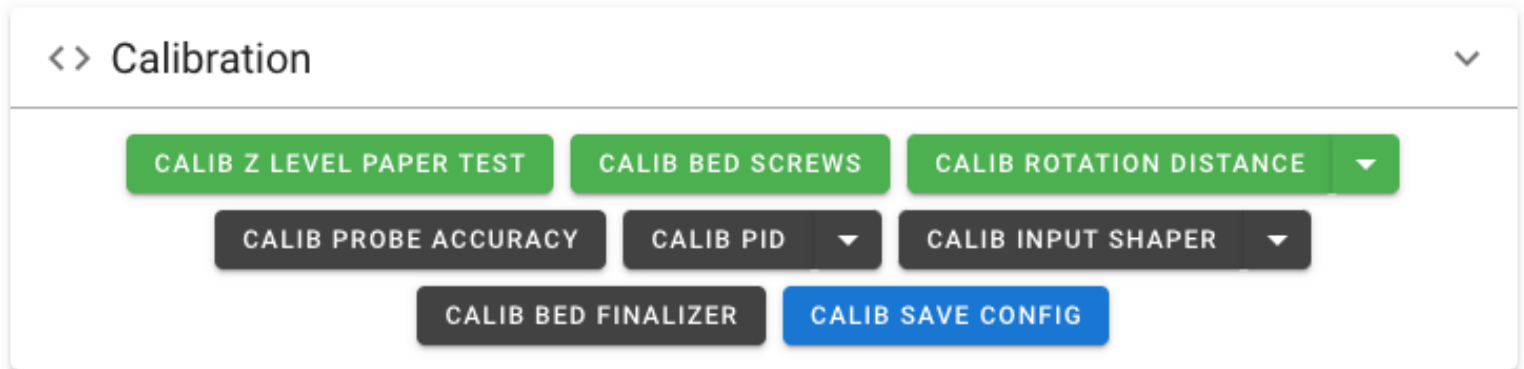
This will pause the print (the PAUSE macro is called). You may change filament, or insert into you model a magnet, a LED, a weight, or whatever you have in mind.

Enter a list of heights (in mm) where the print shall be paused. The values need no ordering. Separate them by a \"+\"/>

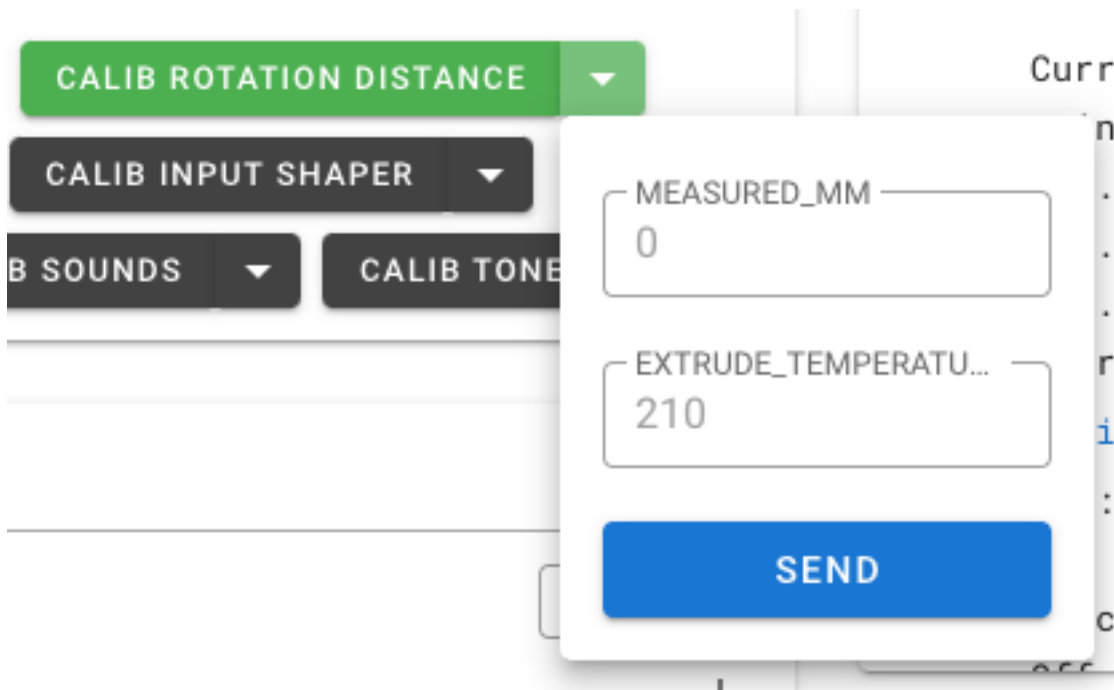
Tool Modules

Calibration & Preparation

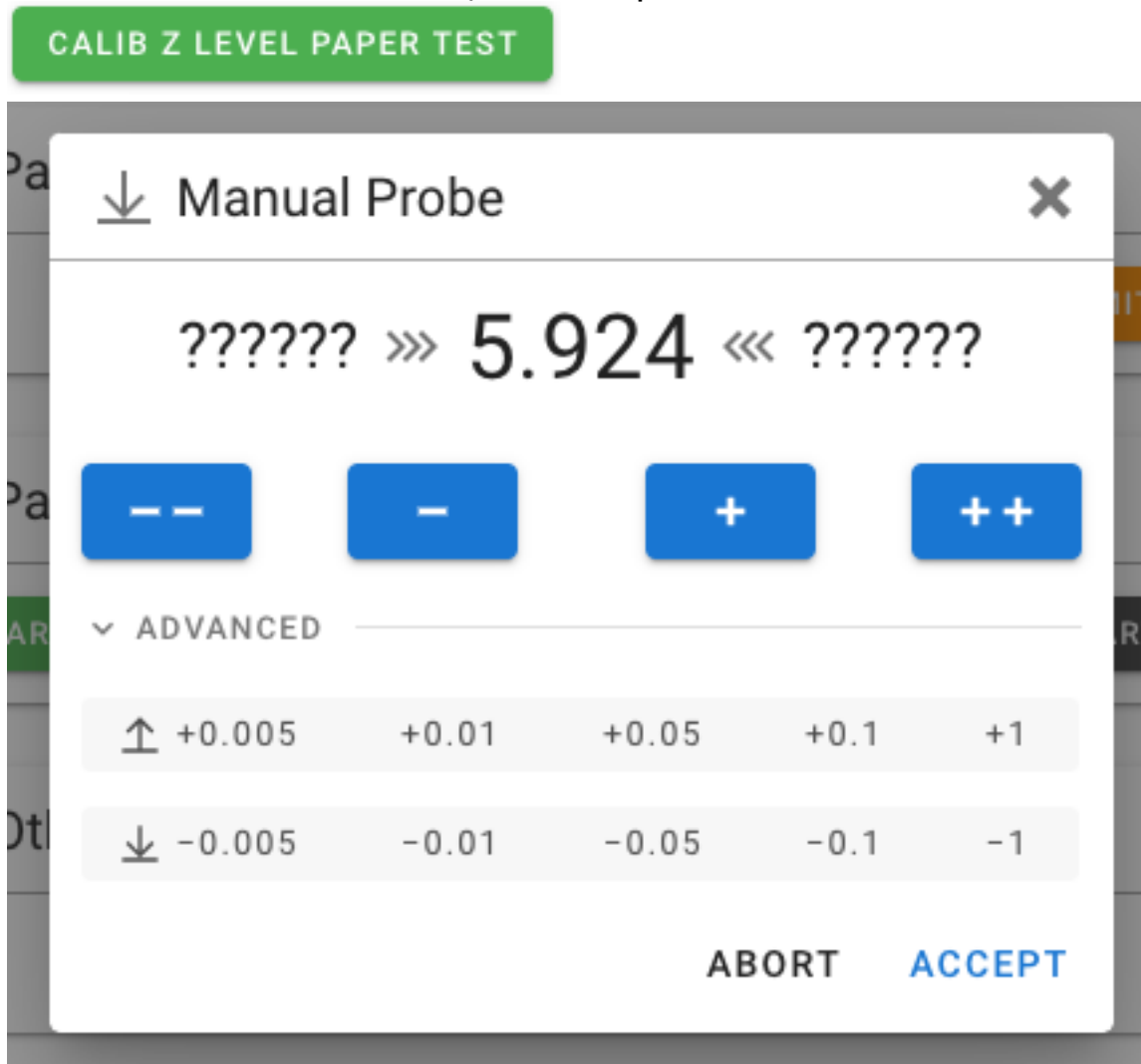
- Calibration tools with a button click, directly in Mainsail /fluidd - use of the **printer display not required**.



- All calibration buttons have **help & guidance**.
 - **Rotation Distance Calibration** (I'm proud of this little gem)
Offers the **simplest & fastest way** to calibrate Rotation Distance.
 - I've automated it as far as it can be automated.
 - Every step fully guided.
 - The new value is automatically computed.
 - Directly verify your new value without entering it into printer.cfg, and without a restart.
 - For measurement use the **Easy Rotation Distance Measurement Tool**:
<https://www.printables.com/model/639746>



- **Z-Level-Calibration**, aka "Paper Test".



• **Bed-Screw-Calibration** Procedure.

CALIB BED SCREWS

↓ Screws tilt adjust

front left screw

(X: -1, Y: 45, Z: 1.039)

Base

front right screw

(X: 168, Y: 45, Z: 0.885)

00:13

rear right screw

(X: 168, Y: 215, Z: 0.935)

00:09

rear left screw

(X: -1, Y: 215, Z: 1.145)

00:09

RETRY

ACCEPT

- **Probe Accuracy** to see the probe's precision, or to identify a faulty probe.

CALIB PROBE ACCURACY

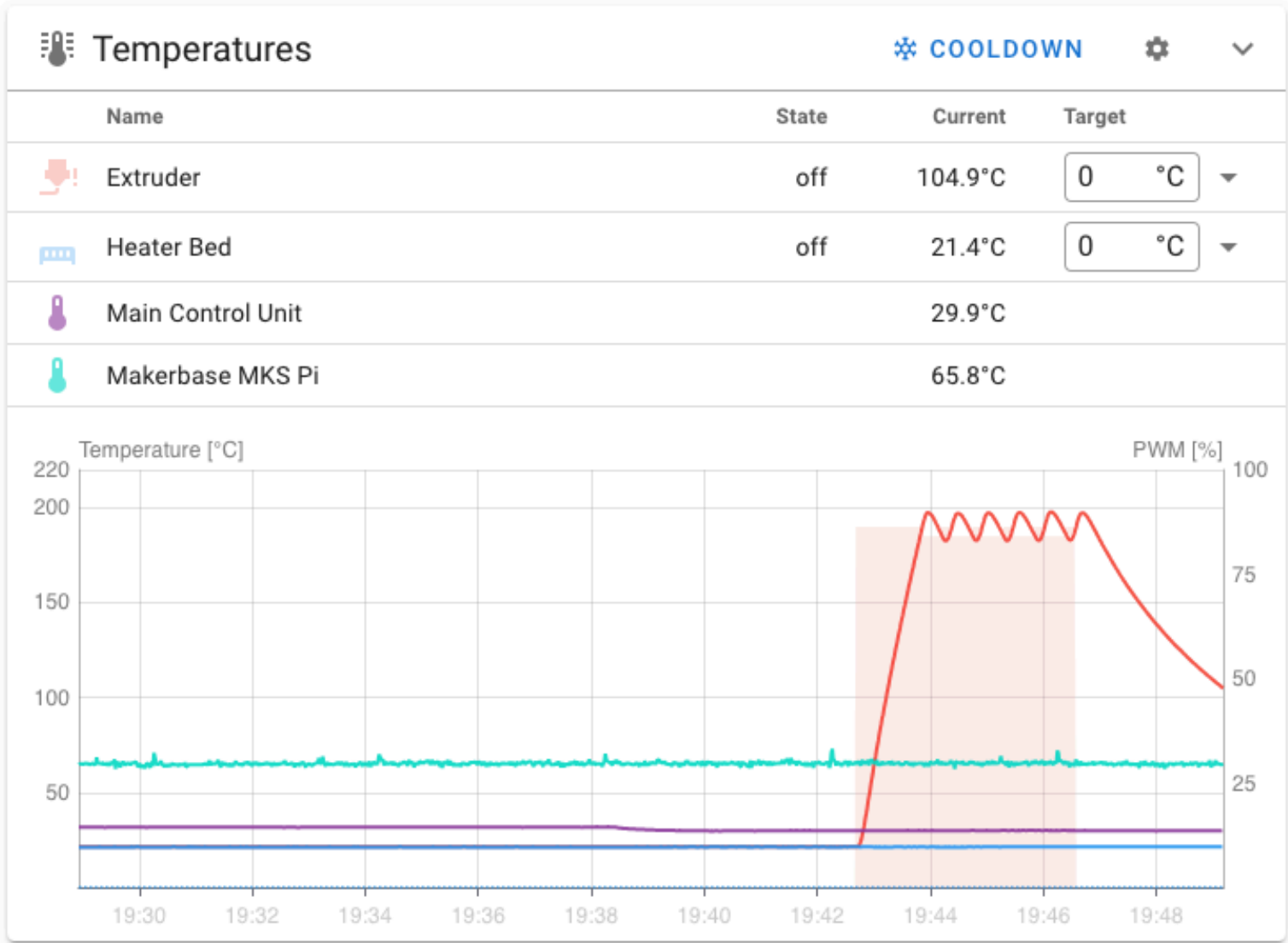
19:41 probe accuracy results: maximum 1.169000, minimum 1.166500, range 0.002500, average 1.167500, median 1.166500, standard deviation 0.001225

19:41 PROBE_ACCURACY at X:-1.000 Y:215.000 Z:3.154 (samples=10 retract=2.000 speed=15.0 lift_speed=15.0)

19:41 START: Test Probe Accuracy...

- **PID Calibration** for the nozzle / bed manually, separately, or both fully automated.

CALIB PID



Bed Mesh Organizer Module

- Button to show all bed meshes in a compact list, including the config-values they were made with.

14:53 Current bed meshes:

...Mesh Info...	Name
lag•T:0.20•P:2,2	Adaptive
bic•T:0.20•P:2,2	Mesh_GAC_050_05x05
bic•T:0.30•P:4,4	Mesh_GAC_050_06x06
dir•T:0.00•P:0,0	Mesh_GAC_060_22x22
bic•T:0.00•P:2,2	Mesh_GAC_060_32x32
bic•T:0.20•P:2,2	Mesh_GAC_080_05x05
bic•T:0.20•P:2,2	Mesh_NOC_020_06x06
bic•T:0.20•P:2,2	Mesh_NOC_030_06x06
bic•T:0.20•P:2,2	Mesh_NOC_040_06x06
lag•T:0.20•P:2,2	Mesh_NOC_050_03x03
bic•T:0.20•P:2,2	Mesh_NOC_050_06x06
bic•T:0.20•P:2,2	Mesh_NOC_060_06x06
bic•T:0.20•P:2,2	Mesh_NOC_070_06x06
bic•T:0.20•P:2,2	Mesh_NOC_080_06x06
bic•T:0.20•P:2,2	Mesh_NOC_090_06x06
bic•T:0.20•P:2,2	Mesh_NOC_100_06x06

- Input fields to **batch-delete** / **batch-rename** all bed meshes whose names contain the search-string.

MESH ORGANIZER ▾

SEARCH
Rename Meshes

REPLACE
Rename Meshes

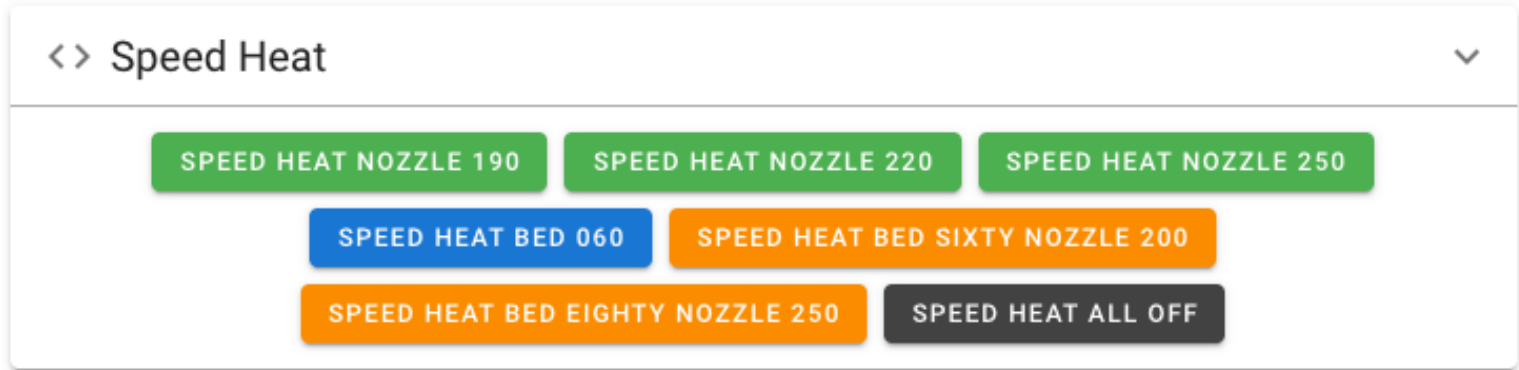
SEARCH_DELETE_MESH...
Delete Meshes

SEND

By default the Mesh Organizer Module is off.

Speed Heat Buttons Module

- Fast heating to various nozzle and/or bed temperatures.



PRINTER Modules

- Sovol SV06/Plus Features
- Sovol SV07/Plus Features
- Sovol SV07/Plus Part Fans
- Sovol SV07/Plus MCU Fan
- Sovol SV07/Plus Hotend Fan

The functions of these modules are described in the download of the KPA, folder [Printer Extra Features](#) --> [Sovol SV06 & SV07 Features](#).

NEVER ENABLE A PRINTER MODULE WHICH IS NOT FOR YOUR PRINTER MODEL!

- A PRINTER module can contain hardware pin assignments and other stuff that could damage your printer and home, if it's not made for your printer model.
- By default no PRINTER module is enabled.
- The Klipper Printer Additions should work with any Klipper-printer. If the printer has a special property / function (ie special probe handling) it will not taken into account without a proper PRINTER module. Please contact me if you want to write one.

SLICER Modules

OrcaSlicer



- No **G2/3/17 errors** during the print.
- Print **Object Exclusion**.

PrusaSlicer



- No **M900 errors** during the print.
- Print **Object Exclusion**.

Cura



- Translates g-code **M0 to PAUSE**.
- Print **Object Exclusion**.

Support

If my work supports you, please support me too:

- PayPal: <https://www.paypal.com/paypalme/Morgennebel/>

When you buy something, please use my Referral-Link, at no additional cost:

- AliExpress: https://s.click.aliexpress.com/e/_De0Vu1h
- Amazon: <https://amzn.to/3L35OX2>

Thank you!

Christian 😊

Disclaimer

- Use everything entirely at your own risk.