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- Amazon: https://amzn.to/3L35OX2

Thank you!
Christian 🙂

- **How to use this beta**: If you update from an earlier beta, delete everything in your printer_additions folder, including your ___module_loader.cfg. Then follow the Setup Guide, Step 1-3.

- **If you see a bug**, write a clear bug report without letting me guessing the circumstances. Also download the Klippy logfile (Mainsail-->Machine tab), and your printer.cfg, compress it, and send it along with your report via direct message on printables.com, @Christian_V_1025433.

- If you see **problems solved**, please let me know, too. Thank you.

Version 3.0b9

- Fixed a possible error "move out of range" after creating a bed mesh, and then starting a print, or another bed mesh. Workaround for a situation where Klipper returns an invalid coordinate.

- New: First Layer Problems?: **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.

- Button removed: "**PrePrint Prime Slow Modi**". This was a two-choice button, to print the prime spiral / lines in normal speed, or slow.

- New Button: "**PrePrint Prime Options**".

You can now 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 slowly with 1 mm3/s Flow Rate automatically.

- If there's not enough space to print the adaptive **Prime Spiral**, it is printed at X30 Y30, and you can pause the print to remove it.

- Mesh Parameters are shown before bed mesh creation.
- Mesh Parameters are shown in the Bed Mesh Organizer.
- SV06 and SV07 module: In case of gcode-errors the heaters and motors are turned off.
- Documentation work.
- Other changes.
- **Bugs fixed**, to the state of no known bugs. Please report if you see something. Otherwise this will be the final 3.0.

Version 3.0b8

- "Extrude below minimum temp": Likely the cause is fixed. Should you still see this error please report.

Some of the changes in **Version 3.0b6 & 3.0b7**:

- "move out of range" errors: One reason is **OrcaSlicer**, which provides model coordinates slightly over the bed size, if the model occupies X or Y fully. The KPA work now around this bug.

- "move out of range" errors: 2 new modules for the SV06 / SV06 Plus, to correct coordinate-values of **klipperized non-Sovol setups**. You can enable the module in the **new** ___module_loader.cfg.

- "move out of range" errors: The KPA checks the printer.cfg for configuration errors regarding bed mesh. If you get a problem report, skip the next point. Instead, fix the error, which is probably a **misconfigured probe** (coordinates). My limited time does not allow to help individually.

- "move out of range" errors: **What to test**:
  A. Create a mesh in Mainsail-->Heightmaps with the "Calibrate" button.
  B. Create a mesh in the KPA, with the button "Mesh Create For Temperature".
  C. Print the 220x220 (or 300x300) first layer test file, contained in the Troubleshooting folder of the KPA...
     1. ...with Multiple Mesh Mode on, without a proper mesh (so it has to create a mesh).
     2. ...with Adaptive Mesh Mode on.
- When you report:
  - The SV06 Coordinate Module was active?: yes/no
  - Which test(s) did you do?: A, B, C1, C2 (preferable all).
  - Which Klipper Setup do you use?: Bassamanator, Other, Web-Link?

- **Mesh Names shortened**: "Mesh_GAC_060_7x7" becomes "GC_060_7x7". "GC" stands for "Gantry Calibrated", and "GN" stands for "Gantry Not calibrated". If you want to use your existing meshes you can rename them accordingly with the module "Mesh Organizer" (disabled by default). But do the testing first, so new meshes for your testing will be created automatically...

- **SV07 / SV06 Idle Timeout**: The KPA check now if the 15-minute safety-timeout occurs during a print-pause, and if so, turns only the nozzle off. This will give you endless time to change filament.

- Lots of **other small changes and fixes**.

Klipper Printer Addition Changes in Version 3.0b5

Beta 5 was not released in public.

Klipper Printer Addition Changes in Version 3.0b4

This Release Note is long. So in very short, an overview:

- **First Layer Improvements**: With the KPA 3.0, you have a very high chance to get a working first layer **out of the box**, even without leveling the gantry, because all things that can go wrong on operation errors are now fully excluded.

- New: **Calibration Tools** Module - fully guided printer calibrations.

- New: **Adaptive Probe Points** for bed mesh.

- New: **Bed Mesh Organizer** Module.

- New: **Object Exclusion** for all supported Slicers.

- **Every button** completely re-worked (more informative).

- **ALL Documentation** re-worked, separated, tested & corrected. And the Format is now PDF.

- **SV07 fan modules** improved.

- Tons of **other improvements**.

•

First Layer: Multiple Mesh Mode

• The KPA took always care that the right mesh for the print's bed temperature was used / created. Now, additionally, it takes into account if Gantry Calibration is ON or OFF, because it can make a big difference for printing the **first layer**, especially if the printer is not well leveled.

So you have now no longer to think about this topic, or even to know about it's existence. You can't do anything wrong with all the relationships of Mesh / Temperature / Z-Tilt / Quad Gantry Calibration.

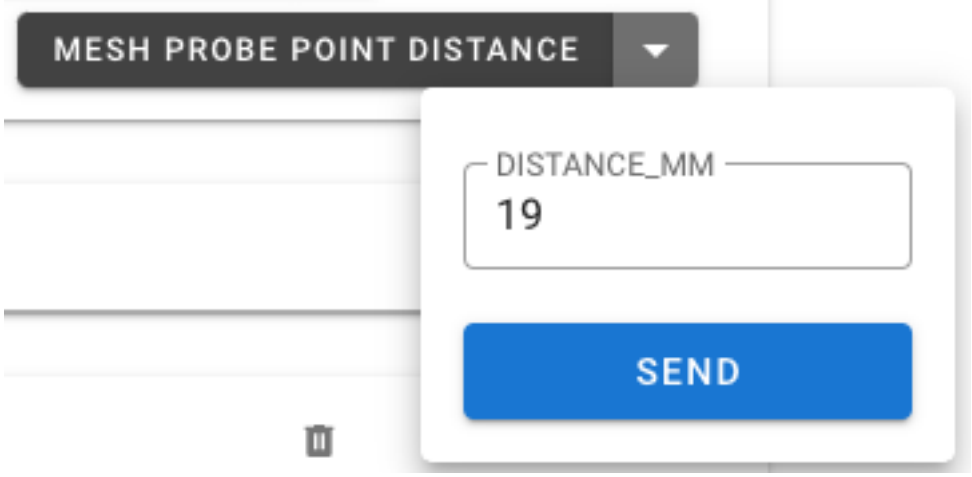
To make this fully sealed, the KPA now contain a Safeguard against the **non-proper use of Z_TILT_ADJUST** in the SV07 Features Module, see further down...

First Layer: Adaptive Mesh Probe Point Count

You printer might not have enough probe points for the mesh defined, resulting in bad **first layers**.

With version 3 the KPA ignores by default the probe point count defined in printer.cfg, and uses an adaptive probe count. No matter which size your printer's bed is, the distance between two probe points will be approximately 37 mm. That equals 6x6=36 points on a 220x220 bed, and 8x8=64 points on a 300x300 bed.

If you wish you may change this value with the **new button "Mesh Probe Point Distance"**. (Existing users, don't forget to add the new button in Mainsail)



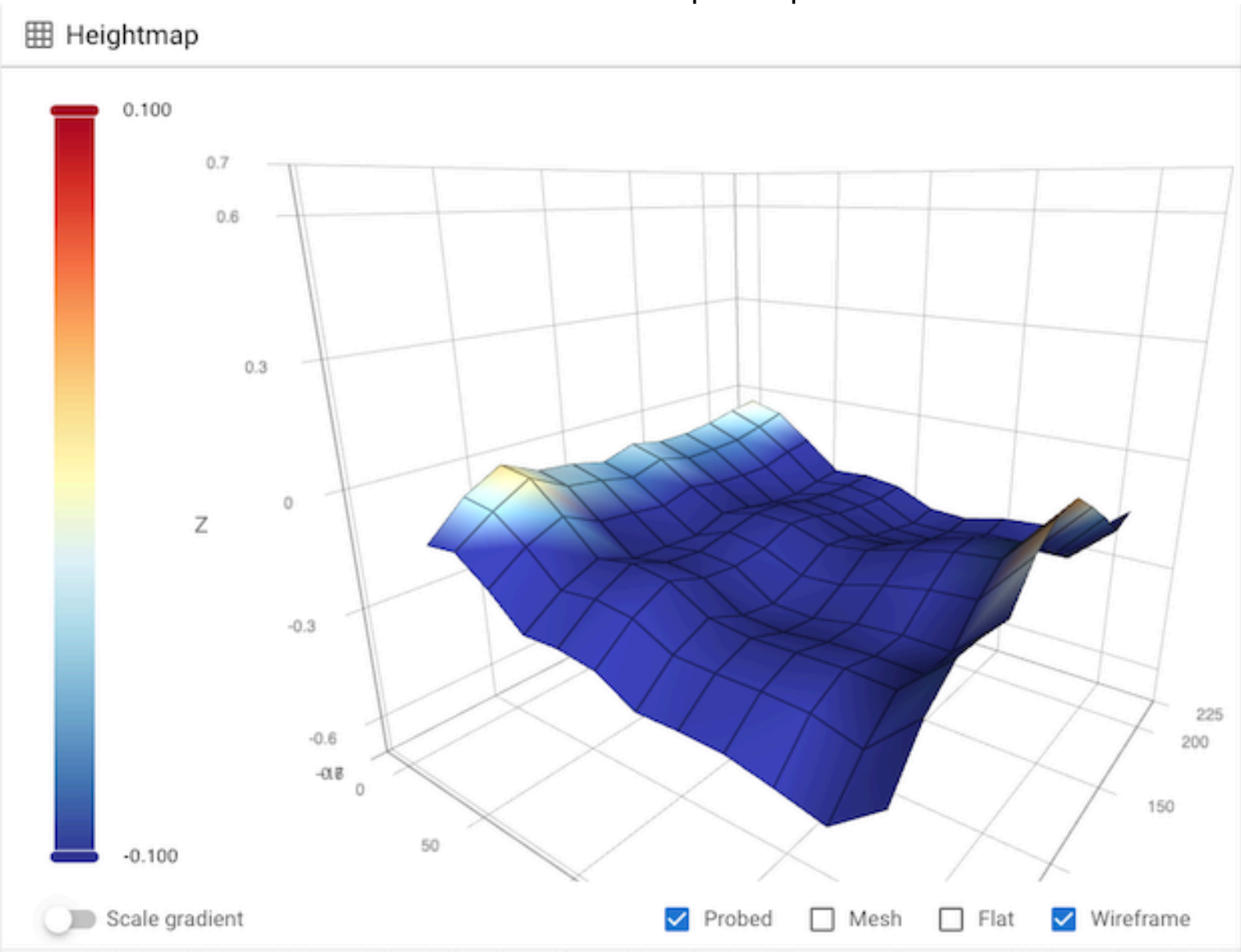
11:20 SET: Probe Point Distance: 19.0 mm.

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, to make sure the first layer can print well.

.....Bed Size XY: 225x225
Probe Point Count in X direction: 12
Probe Point Count in Y direction: 12
.....Total Probe Points: 144

In **Multiple Mesh** Mode you can use a **ridiculous high amount of probe points**. Since the meshes are re-used for printing, their creation-time doesn't matter much.
If you use a 19 mm probe point distance, you'll get a 16x16 = 256 probe point mesh on a 300x300 mm bed.
On a 220x220 bed that will be 12x12 = 144 probe points:



The **adaptive probe point** count applies to both, **Multiple Mesh** Mode and **Adaptive Mesh** Mode. The adaptive mode uses it as a maximum count (if the whole bed size is printed), and scales the probe point count down on smaller print models.

First Layer: SV07 Features Module

Disambiguation: "Gantry Calibration" means either Z_TILT_ADJUST or QUAD_GANTRY_LEVEL. It depends on the printer model which gantry-calibration method is used. The SV07 uses Z_TILT_ADJUST.

Safeguard for Gantry Calibration

The worst thing you can do is running Gantry Calibration every now and then. That's almost a guarantee for failing **first layers**. The motto must be to either run Gantry Calibration on the right occasions, or never, to have the gantry always relaxed, even if it's alignment is crooked to the bed.

By default, the KPA have **Gantry Calibration turned ON**, which is the safest thing to reach good **first layers**. If you run Z_TILT_ADJUST manually it will work as always.

The shield comes into play if you have **turned OFF Gantry Calibration for printing**, with the button "PREPRINT GANTRY CALIBRATION MODI".
The KPA will then refuse to run Z_TILT_ADJUST manually, and will give you a short explanation in the Console.

Mesh Names

The KPA handle meshes fully automated in the background. If you are curious, the new mesh-names are now like:

- **GC**_070_7x9, for a mesh that was created with Gantry Calibration **ON**, 70°C bed temperature, and 7x9 probe points.
- **GN**_060_10x10, for a mesh that was created with Gantry Calibration **OFF**, 60°C bed temperature, and 10x10 probe points.

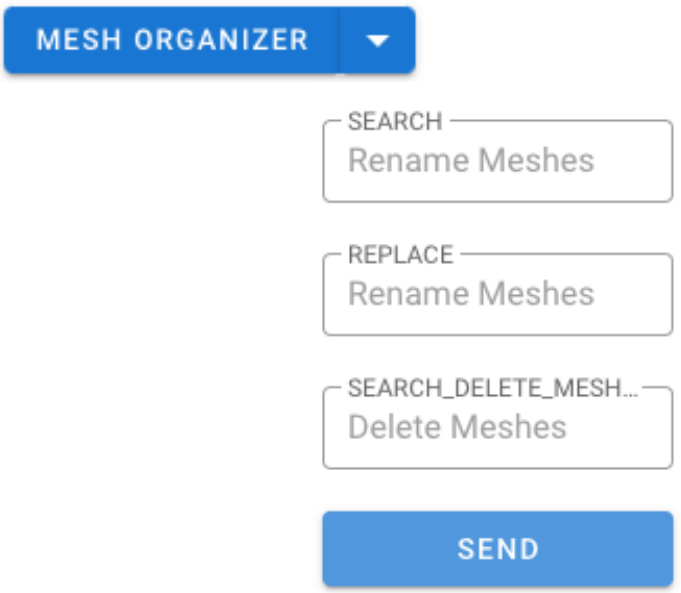
- Because of this new schema, **version 3 will create new bed meshes**. You might want to delete the old ones, which are named like "**Mesh_060**".

• Bonus: If you change the probe count, a new mesh will be created, while the other one will not be overwritten. So if you like you can try different densities, without having to re-create the meshes again and again. Example:
GC_060_10x10
GN_060_12x12
...will happily live next to each other.

Mini Modules

Mini Modules allow you to further customize the KPA to your liking, in much finer detail, as they usually contain just one or a few features, mostly this will be a button. This will also help to have fewer buttons.

New Mini Module: **Bed Mesh Organizer**

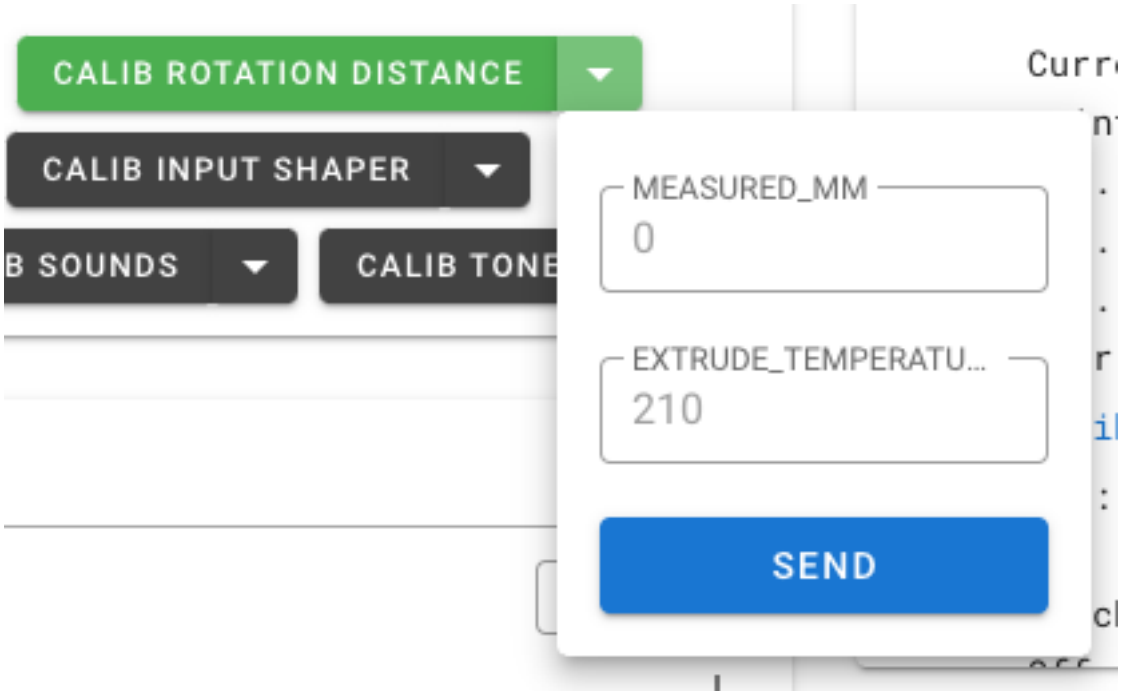


The Mesh Organizer shows all bed meshes in a compact list, and can **batch-delete** / **batch-rename** all bed meshes whose names contain the search-string.
By default the Mesh Organizer Mini Module is off.

New module: **Calibration & Preparation**

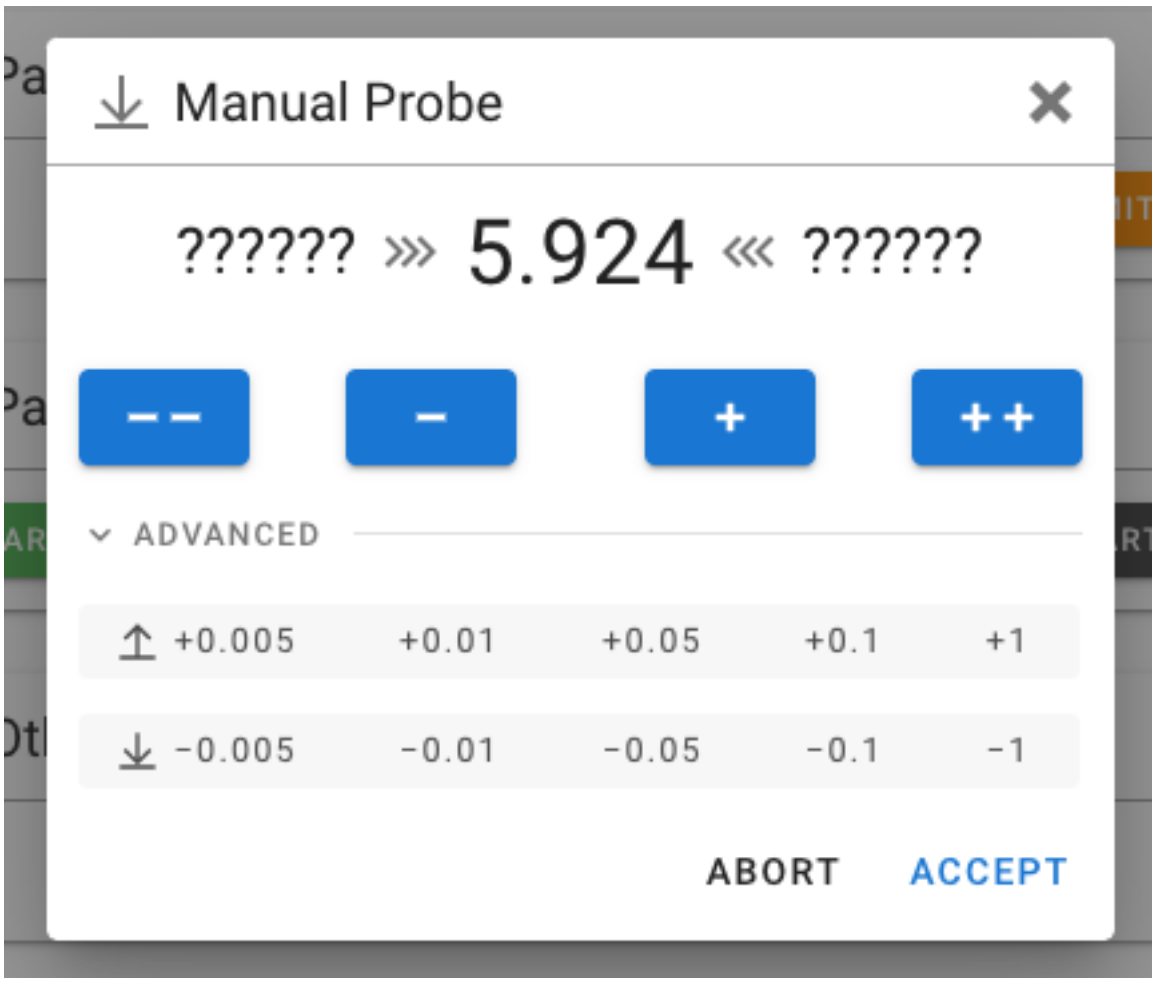
- Calibrations with a button click. Use of the **printer display not required**.
- All calibration buttons have **help & guidance**.

- **Rotation Distance Calibration**s
  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 calculated.
  - Directly verify the 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



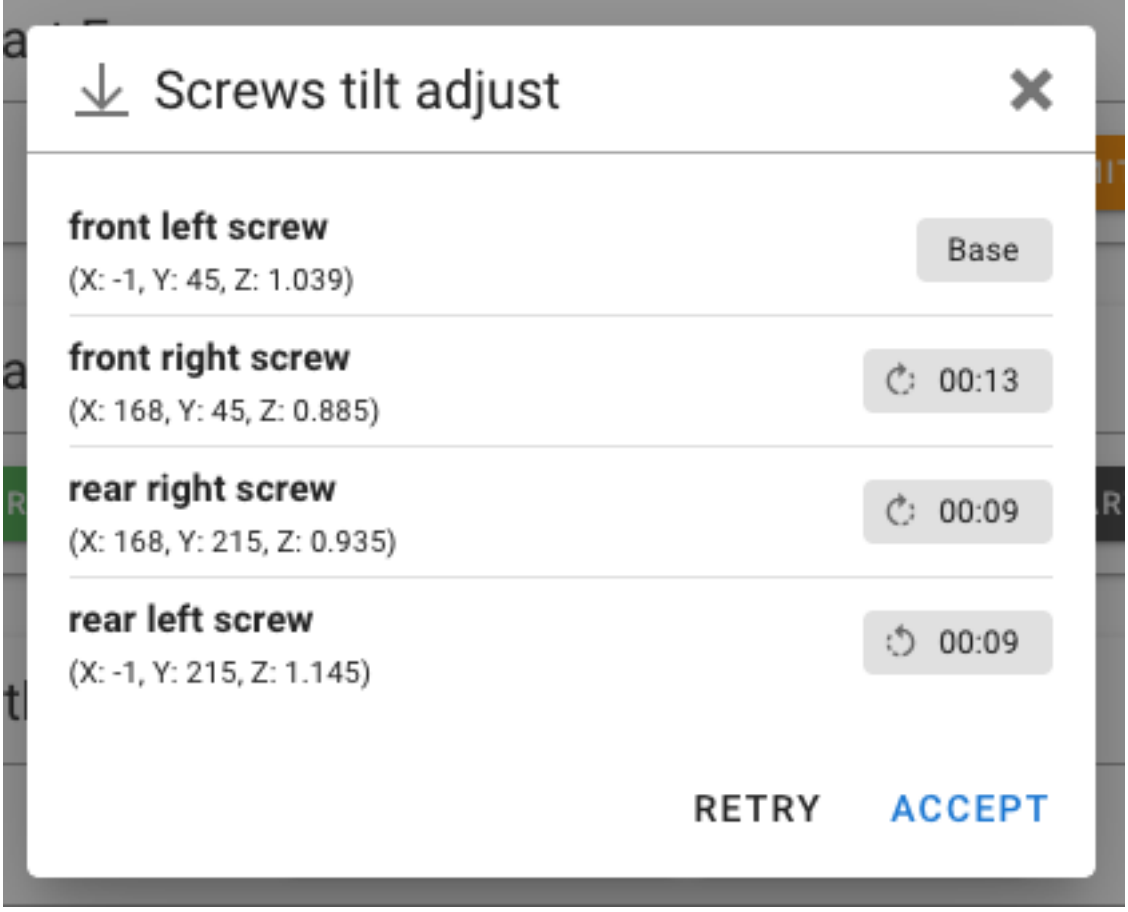
- **Z-Level-Calibration**, aka "Paper Test".

CALIB Z LEVEL PAPER TEST



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

CALIB BED SCREWS



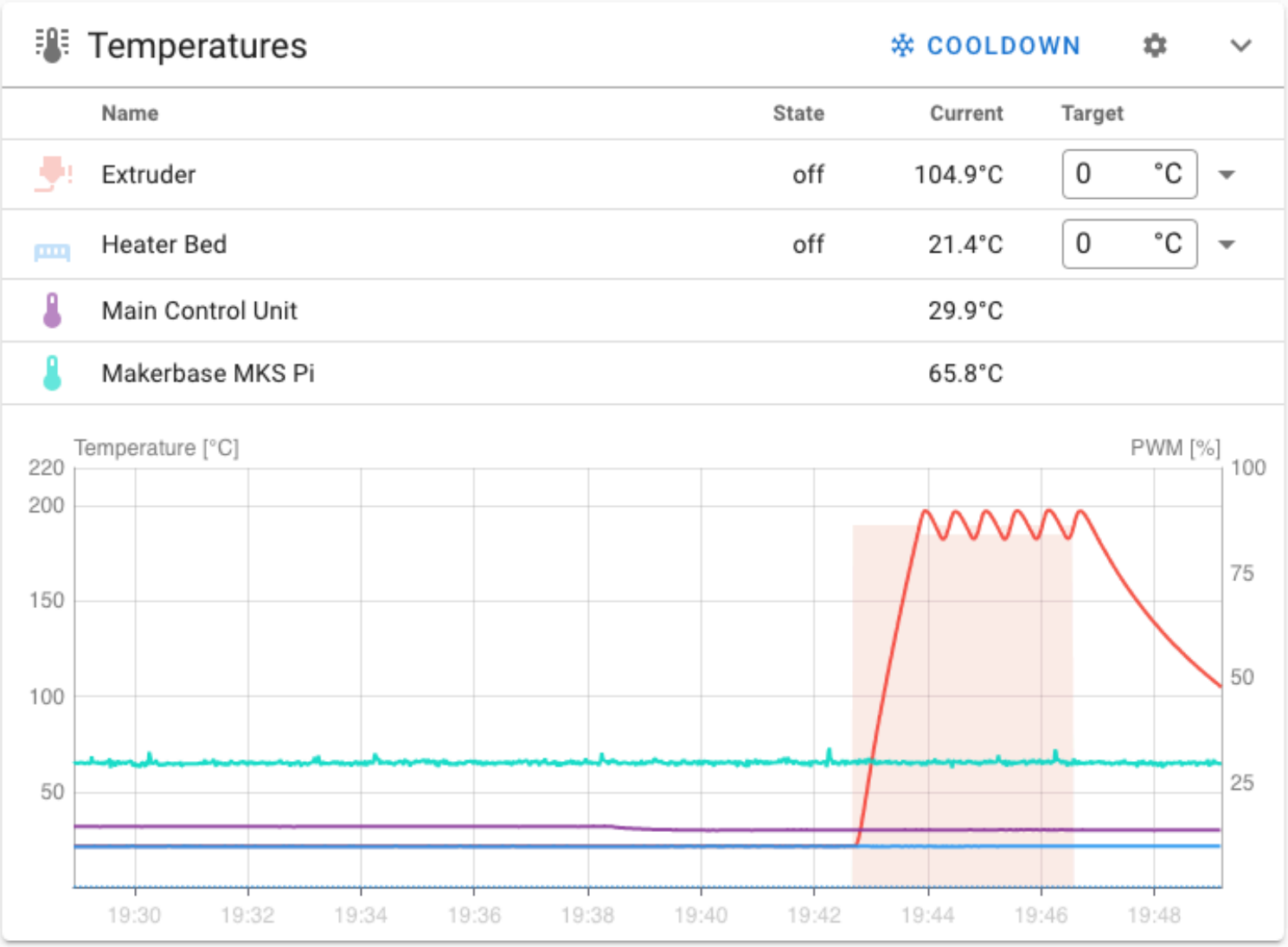
• **Probe's Accuracy** to see the probe's precision, or to identify a faulty probe.

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



- **Input Shaper Calibration** for X or Y separately, or both fully automated.

```
20:38 The SAVE_CONFIG command will update the printer config file
      with these parameters and restart the printer.
20:38 Shaper calibration data written to
      /tmp/calibration_data_y_20240106_203632.csv file
20:38 Recommended shaper_type_y = zv, shaper_freq_y = 47.4 Hz
20:38 To avoid too much smoothing with '3hump_ei', suggested
      max_accel <= 3000 mm/sec^2
20:38 Fitted shaper '3hump_ei' frequency = 64.2 Hz (vibrations =
      4.9%, smoothing ~= 0.199)
20:38 To avoid too much smoothing with '2hump_ei', suggested
      max_accel <= 3000 mm/sec^2
20:38 Fitted shaper '2hump_ei' frequency = 52.0 Hz (vibrations =
      5.0%, smoothing ~= 0.200)
20:38 To avoid too much smoothing with 'ei', suggested max_accel
```

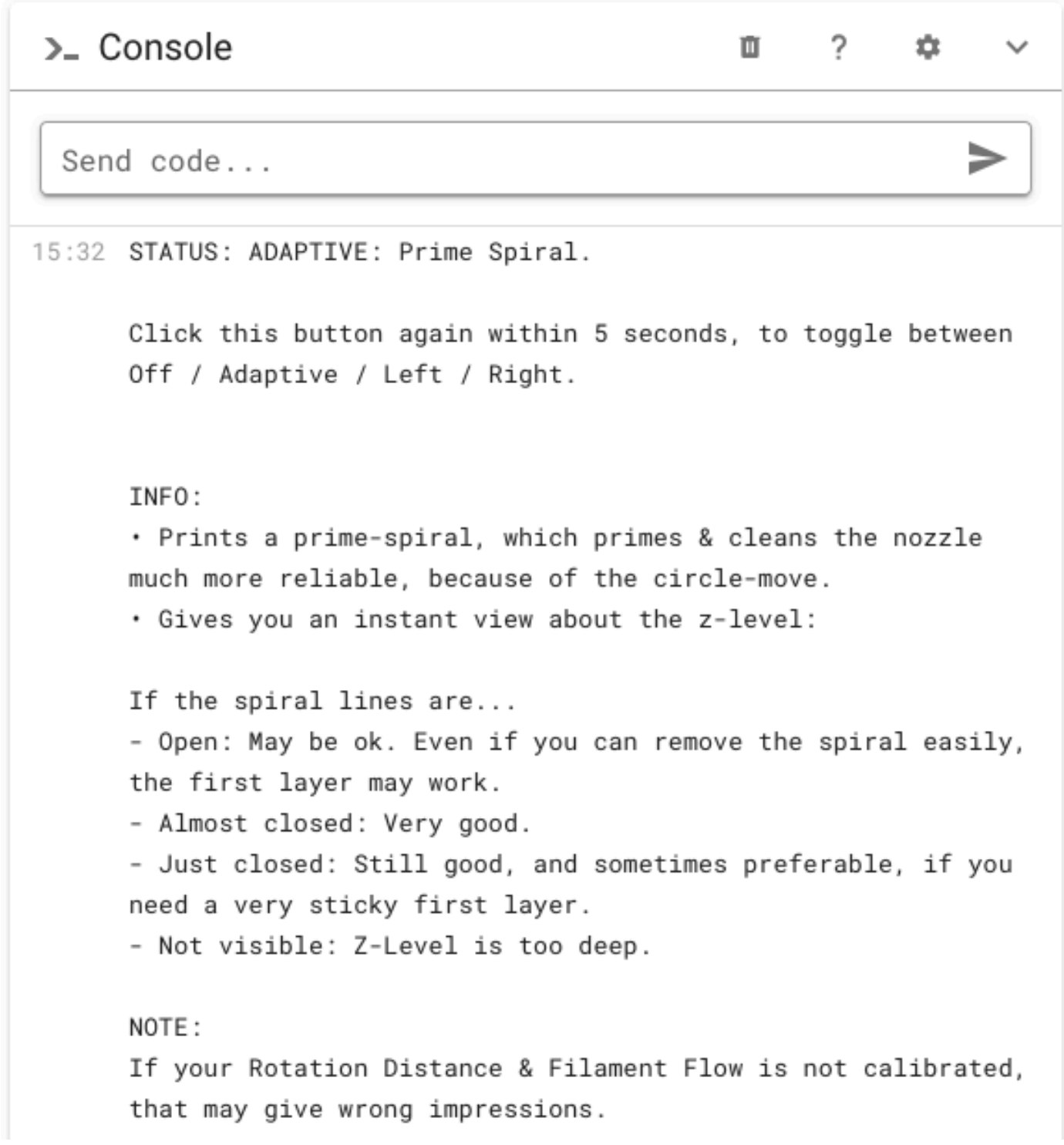
Buttons reworked

• **Buttons renamed** (if you have the buttons organized, please re-add them to your Mainsail-categories):

Mesh Use Adaptive --> **Mesh Adaptive Mode**
Mesh Use Multiple --> **Mesh Multiple Mode**

Pre Print Prime Line Modi --> **PrePrint Prime Line Modi**
Pre Print Prime Spiral Modi --> **PrePrint Prime Spiral Modi**
Pre Print Prime Slow --> **PrePrint Prime Slow Modi**
Pre Print SamuraiMove --> **PrePrint SamuraiMove Modi**
Pre Print Move To Cleaning Position --> **PrePrint Move To Cleaning Position Modi**

• **Every button** shows now in the Console a description and/or a manual on the first click. Also it hints that you need to **click the button again**, to execute an action, or to toggle thru different options. Also the available options are shown.



• When you **organize the KPA-Buttons in Mainsail**, you can now undoubtedly identify them in the macro list, because their description start with "**KPA Button**.".

GENERAL
CONSOLE
CONTROL
DASHBOARD
EDITOR
G-CODE VIEWER
HEIGHTMAP
MACROS
MISCELLANEOUS
NAVIGATION

LOAD_FILAMENT
G-Code macro
+ ADD

LOG_Z
G-Code macro
+ ADD

M205
G-Code macro
+ ADD

Mesh_Adaptive_Mode
KPA Button. Creates an adaptive bed mesh, according to the area where the model is printed on the bed. Saves time on smaller models.
+ ADD

Mesh_Create_All_Temperatures
KPA Button. Creates bed meshes in steps of 10°C, which can then be automatically used for upcoming prints, according to the bed's print temperature.
+ ADD

Mesh_Create_For_Temperature
KPA Button. (Re-)Create a bed mesh for the desired bed print temperature. It will be rounded to steps of 10°C.
+ ADD

Mesh_Multiple_Mode
KPA Button. Use multiple bed meshes in steps of 10°C, which are automatically used for upcoming prints, according to the bed's print temperature. Saves tons of time.
+ ADD

Mesh_Probe_Point_Distance
KPA Button. Set the distance of the probe points while a bed mesh is created.
+ ADD

Slicer
• Cura module: Object Exclusion is enabled.
• PrusaSlicer: Object Exclusion is in the Setup Guide described.
• I have all Slicer Setup Guides fully separated, unified, and completed in details where details where missing.

SV07 Hotend Fan Module
• I've fixed a bug where the fan did not turn off below 50°C when in FULL-SPEED mode.
• On new installations the default mode is "Dynamic".
• Other improvements.

SV07 CPU Fan Module
• On new installations the default mode is "Dynamic".
• Other improvements.

New Module: **Advanced Tools**
• This will contain features / settings which are not necessary for most use cases, or may even do more bad than good for normal use cases.
• This module is by default off.
• I've moved the button "**PrePrint Gantry Calibration Modi**" from the Pre-Print module into the Advanced module. It's Info-text now contains a warning that you shouldn't turn Gantry Calibration off, if your printer is not super-well leveled & adjusted.
• **Gantry Calibration**: If you had turned it OFF in a previous version, it will be ON when you launch version 3.0 the first time.

Various
• Fixed: **Adaptive Mesh** could error on print objects which are long and thin.
• Fixed: **Adaptive Mesh** was created but not loaded on Sovol's SV06 / SV07.

• Fixed: On some Klipper-Configurations an error "Unable to parse '' as a literal: unexpected EOF while parsing (, line 0)" could appear.

• Fixed: The bed was **not reaching the target temperature as fast as it could**.

• The KPA check now if the **Samurai-move** is effective on the printer.

• Further optimizations to the **Prime Lines**, to reach the print model with an even less non-ouzing nozzle.

• The KPA check now if **TPU-filament** is used, and if so, reduces the priming speed automatically.

• **Documentation**
  • All **Slicer Setup Guides** re-worked, new parameters added, errors fixed.
  • All documentation files are now **PDF**, for more happiness in the Linux-world. :)
  • New Guide: "**Mainsail Tipps**" - How to get rid of the flood of unnecessary Console messages on probing and more.
  • New **Troubleshooting** folder, with Guide documents separated by topic.

• **SV07** and **SV06** Feature Module
  • **M600 (filament change)** added, which is missing in the original config.

• **SV07** Feature Module
  • By default, the **LED** goes now OFF after a print, and is turned ON on print start. You may set the brightness yourself for both states, so you can reach ANY desired behavior for the LEDS. In the top of the Module file you find the values you may edit.

• **SV06 Feature Module**:
  • Uses no longer Sovol's **PAUSE**, **RESUME** and **CANCEL_PRINT** macros. There are now optimized ones.
  • Uses a new method to **level the Gantry**, by reducing the stepper motors torque, to avoid the brutal step-skipping of the motors. This method is only available if the printer.cfg has configured driver-current, otherwise a micro-stepping method is used.
  • Handles M600 Filament Changes.
  • Corrections for Bassamanator printer.cfg.

• **Many many other improvements**.

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- Amazon: https://amzn.to/3L35OX2

Thank you!
Christian 🙂

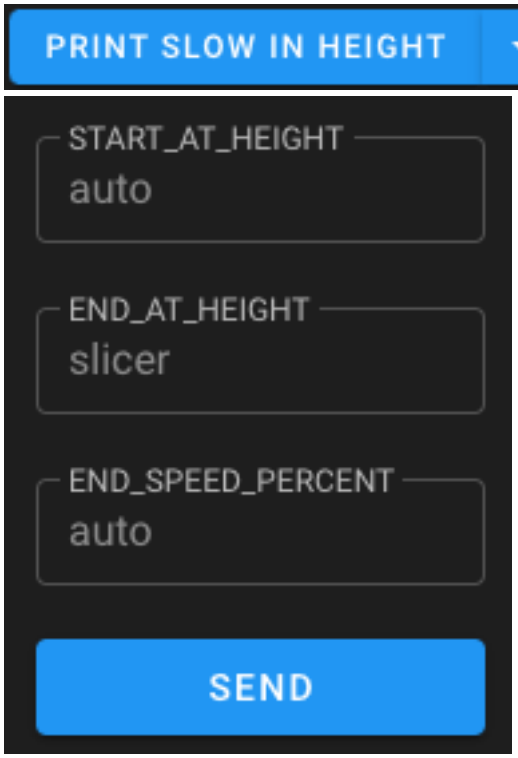
##
Klipper Printer Addition Changes in Version 2.7
##

• **New**: Slicer Module for Cura.

• **Guide** for Cura. Pictured, without a single step missing, on how to set up Cura for Klipper in general, and the Printer Additions.

• **New**: The **Prime Spiral is now adaptive** (Prime Lines will follow). You can also use the adaptive Prime Spiral in **Multiple Mesh mode**.

New Module: Print Slow In Height



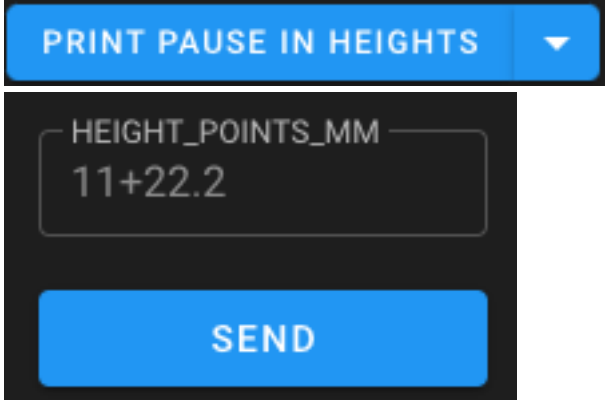
For tall prints, this linearly slows down the print speed (in any desired range), so that the optical effects are absolute fluid.

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 slowdown-data via the **CONSOLE** or a **MACRO** with this command:
Print_Slow_In_Height START_AT_HEIGHT=150 END_AT_HEIGHT=250 END_SPEED_PERCENT=50

New Module: Print Pause In Heights



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 \"+\" sign. Valid inputs:
20+170.2
20

You can CHANGE your input on the fly during the print.
To STOP this function, enter 0.
To START, enter something above 0.

You may also send the data via the **CONSOLE** or a **MACRO** with this command:
Print_Pause_In_Heights HEIGHT_POINTS_MM=11.1+40+120

- **Slicer**
  - New Slicer Module for **PrusaSlicer 2.7**: No M900 errors.
  - **On print-start**: Info messages in case of missing slicer-parameters.
  - **Set up guide**: Added the required Slicer settings for the g-code type (Klipper) and the Extruder (relative-mode).
  - This release is tested with OrcaSlicer 1.8, PrusaSlicer 2.6 and 2.7.

- **Various**
  - **Fixed**: Two **Speed Heat Buttons** did not work.
  - **Fixed**: "Unable to parse move G1 X8 Y." (or similar).
  - **Fixed**: Prime Lines: The options left/right did not work.
  - **Improvements** for fast heating (pre-print).
  - **Changed**: The Button "**Mesh_Create_All_Multiple**" is renamed to "**Mesh_Create_All_Temperatures**", which makes it more obvious what it does.
  - **Z_TILT_ADJUST** / **QUAD_GANTRY_LEVEL** is now performed again on Printers that don't have a dedicated PRINTER Feature module. It can be turned ON/OFF with the button "Pre Print Gantry Calibrate".

- **Various** small improvements, a lot of them.

- **SV06/Plus** Feature Module
  - **Multiple / Adaptive Mesh**: Will now use the probe count defined in the printer.cfg as a maximum probe count, so you can get more than 5 probe counts, if you raise it in the SV06's printer.cfg.
  - **Gantry Calibration** works now on the SV06 **Plus**.
  - **Display stuck in startup-animation** (same as in SV07 Feature Module, see below):

- **SV07/Plus** Feature Module
  - **Display stuck in startup-animation**: Sometimes the displays of KlipperScreen / SV07 go into an endless startup-animation-loop, while the printer is still normally working via Mainsail. A missing preference of KlipperScreen causes this. This preference item is now created by the Klipper Printer Additions, so the display can exit the loop.

  - If the print is **cancelled** the head drives 60mm up, like on print-end, which makes it easier to remove the build-plate / inspect the nozzle.

  - Replaces now Sovol's **PAUSE** and **RESUME** Macros.
On **PAUSE** the print head now just drives up (and higher than before, for easier access to the nozzle), so on **RESUME** there's no danger to push models with low bed contact area from the bed because of the side-move. Also on **RESUME** it doesn't spit out filament. That also "helped" the sideway-push to get too early contact with the print. And you have to take care on RESUME anyways that the nozzle is enough loaded, and just a bit retracted, which is better to do manually, thanks to the SV07's extruder wheel.

  - **Multiple & Adaptive Mesh**: Will now use the probe count defined in the printer.cfg as a maximum probe count, so you can get more than 5 probe counts, if you raise it in the SV07's printer.cfg.

  - **Sovol SV07, Firmware 1.0.11**: The KPA 2.7b1 and higher have a bugfix which breaks support for the old SV07 firmware 1.0.11.
I recommend to update the firmware for the bugs that Sovol fixed. If you want to stay at firmware 1.0.11 you need to copy this into your printer.cfg:
[save_variables]
filename: ~/printer_data/config/saved_variables.cfg

- **Sovol SV07/Plus** Part Fan Module
  - The nozzle part fan behaved in Permanent mode like in Dynamic mode.

- Fixed: Unknown command:"M106006".
- Option changes come now in effect immediately during a print.

• Sovol SV07 & Plus CPU Fan Module v1.0b3

• The console will no longer spit out "Setting back MCU's allowed temp...".
• By the reports, it looks like I was quite too much conservative with the temperature limit.
This release will let spin the MCU fan as follows (simplified):
- Above 32°C, raises the fan speed step by step, as long temperature rises further. So it finds itself the fan speed where the temperature no longer raises.
- Between 30 and 32°C no adjustment is made, to avoid a possible constant up/down adjustment of the fan, which is annoying.
- Below 30°C, lowers the fan speed step by step, if temperature continues to fall.
- Some additional conditions:
  - If the fan is on, it's speed is always at least 50%.
  - Fan starts/keeps spinning if a motor or heater is on.
  - Full fan speed if motor or heater is on, and the temperature is 38°C or above.

So in very hot environments you will not get much advantage, because it just needs more cooling then. But under normal conditions you will get lower fan speed = less noise.

##
Printer Addition Changes in Version 2.5.1
##

• As some users had problems to update from earlier versions I've updated / improved every bit of the documentation:
- Made clear how to update the Printer Additions from previous versions.
- Text changes everywhere.
- Additional pictures added.
- Split the long Read me into more documents (Release Notes, General Printer Advice).
- The Setup-Guide contains now a short "Expert"-section, and the improved "Step by step guide for starters"-section.
- Added pictured guides for Mainsail / fluidd on how to organize the macros.
- All documentation is now placed in the top level of the download folder, so it can't be overseen.

• **SV07 MCU Fan Module**
Fixed a bug where the fan could not be set to Dynamic mode.

• Fixed a bug where existing users of version 2.0 could get an error "...**TypeError: can only concatenate str (not "float") to str**".

• After the pre-print procedure the print head moves fast to the coordinates where the print starts (to prevent ouzing).
New: In case the slicer does not set an initial speed command, the print could start too fast. So the last speed command from the Printer Additions is now 30mm/s speed, which should be fine for all first layers, in case the slicer does not set the initial speed.

##
Printer Addition Changes in Version 2.5
##

#####
Modularity
#####
• The Additions have become a bit more modular, which was necessary for the **SV06 / Klipper Screen support**.
A Printer module can define IF/HOW it wants to do things like Gantry-Calibrate.

• It is important to understand that a **Printer Module may control the hardware**, like pin-assignments, and by other means.
Never use a Printer module which is not for your printer model!

• In mind of better modularity I changed all file names. The structure of how things are activated is basically the same:
In the printer.cfg, there's still only one text line necessary. This points now to a "module loader" file:
[include printer_additions/___module_loader.cfg]
In the "___module_loader.cfg" file you decide which modules you actually want to use.
By default no Printer module is active, but all the other stuff.

• **Existing users**, please follow the "__How to update the Printer Additions" document in the download.

• For future updates, it will be the same as before - just upload the new files. Another improvement here: Your choices of modules will no longer be overwritten on an update.

#####

Mesh Module
#####
• Fixed: Multiple Meshes: A missing mesh was created, but not saved.

• New: **Multiple Meshes finally work on the SV07/Plus and KlipperScreen**, hooray! I circumvented a bug in the firmware which always loads the "default" mesh.

• New: Option to use an adaptive mesh (code written by ChipCE). The mesh will probe 3x3 points on smaller prints, up to 5x5 on larger prints.

• Removed: The mode "Mesh Use Default" is gone, as this was a workaround for the non-working multiple meshes.

• Removed: The mode "Mesh Use Fresh" is gone since the adaptive mesh does the same thing and saves time creating the mesh for smaller prints.

#####
Pre-Print Module
#####
• New button "**Pre Print Prime Slow**" to reduce the speed for the prime line/ spiral, necessary to print **soft filaments like TPU**.

• New button "**Pre Print Gantry Calibrate**". This should be always ON to ensure a working first layer. If your gantry is mechanical very well leveled, and the bed leveled to the gantry, it may work without calibrating, which saves time on print-start.

#####
SV07 Fan Modules
#####
• Enjoy the silence #1: **Hotend fan module**
The hotend fan always runs at 100%, which is overkill since the nozzle can reach 300°C, at which the fan at 100% rpm delivers obviously enough cooling. So at lesser temperatures there's for sure no need to run it at 100%.
Actually I constructed some different hardware mods, and tested them with 40 and 60mm axial fans. The lowest airflow had the super-quite Noctua-fan, a LOT less than the stock fan. But it was still sufficient for cooling. I tested that (up to 230°C), and had never clogging, or any other problem.
But I wouldn't trust it for high temperatures, and during my testing I found out that the stock fan's noise reduces a lot if it's not running at full speed. So I decided to turn my hardware approaches into a software mod, with the advantage that the stock fan's power is available when printing at high temperatures.
So the hotend fan spins now temperature-controlled with variable speed.

Tested on firmware 1.0.17 (SV07) and 1.0.8-07P (SV07 Plus). I don't expect differences for earlier firmware versions since nothing changed regarding the hotend fan.

• Enjoy the silence #2: **MCU fan module**
I found out that the MCU-fan, at 100% speed, holds the MCU temperature at about 30°C. However, running at around 50%, has the same effect.
So the MCU fan is now also temperature-controlled with variable speed.

It works a little bit smart, by self-adjusting. If the absolute temperature limit is nearly reached, the fan will always spin at 100%. But since no one knows what the absolute limit is (except Sovol maybe) the module "learns" it from what temperatures are reached, while the fan spins at 100%. Obviously that temperature must be acceptable, and is then saved in the preferences, as the new limit.
This way the whole temperature-range is shifted up, resulting in lower fan speeds for lower temperatures.

I have additionally a hard limit set. At 35°C the fan will always spin at 100%, no matter what the smart logic says. Also the recorded limit value is reset, so the learning will start over.
The highest temperature I saw so far was 32.68°C. But that might change in summer, when we have 30°C ambient temperature, or more... So I will probably raise the hard limit a bit more then.

• **Part Fan Module**:
• I changed the term "**External**" part fan to "**Auxiliary**" part fan, and to "...**AUX**..." for the macro-buttons.

• The nozzle part fan has now the same features as the auxiliary part fan (except the cool-down timer, which would make no sense).
• Both fans have their independent mode- and speed limit settings.

• Changed the fan's modi names from "**Percent**" to "**Dynamic**", and from "**Full**" to "**Permanent**".

• The Fan's **Speed Limit** settings apply now also to the **Permanent**-Mode, so during the print the fan(s) can run continuously with any desired speed.

• The button "**Fan_Part_External_Timer_3**" is replaced by "**Fan_Part_Aux_Timer**".
It has now two input fields, so you can set the timer duration in seconds, and the fan speed in percent.
To do that, click the arrow on the button. Or just click the whole button and the fan will run for 3 minutes at 50% speed.
• The same macro can be called from the slicer's end-g-code, like this:
Fan_Part_Aux_Timer SECONDS=180 SPEED=50

#####
Buttons
#####
• The **flood of buttons** is now extremely reduced.
  For example, the SV07 part fan module contained 5 buttons alone to set different fan speed limits. This is now one button. To enter a limit click the arrow on the button. To remove the limit, click the whole button twice.

• **Existing users**: Please re-add the new buttons into your macro categories of Mainsail / fluidd.

• Other things are now **Toggle-Buttons**. For example the Prime Line button toggles between Front/Left/Right/Off. Unfortunately it is not possible to let the button show which option is currently active, **BUT**:

#####
Textual output
#####
• Buttons now show on the **first click their current state** in the console.
  Depending on how your Dashboard is organized you might not see the Console without scrolling... As an additional incredible clever workaround (tap my shoulder please) the state of the toggle buttons is send as an error message, so it pops up as a popup banner, always visible.
  • On the **second click** (within a few seconds), **a button does something**, mostly toggling through the different options they offer.
  • If you click the **arrow on a button** to enter some value, the action is immediately made, without showing the current state before.

• There's **more output on print start**. For example warnings if the part fan(s) are off, or when they have a speed limit set, which you might have forgotten, and that could ruin your print.

• On **Printer/Firmware-Start** the Printer Additions **show which module are loaded**. This is useful to instantly see if the Printer Additions are set up correctly, and which Printer-modules are active (because they are now disabled by default).

#####
Various
#####
• Fixed some bugs regarding smart heating during the pre-print-phase.
• Many many small improvements, like the print is now properly presented on the SV07 Plus, text output fixes/changes, etc, some other small bug fixes, and code-cleanup.
• Updated/improved all documentation.