Instruction Manual for Multec Plugin

Multec - 3D Druck 4.0

Part I

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Part II

Installation

Chapter 1

How to install The Plugin

Before you are able to use the Multec Plugin, a few installation procedures are necessary. As we will learn more through out this documentation, we will learn that the plugin works only with the repetier host. Hence, before the user is able to use or install the plugin, installation of Multec Host (Repetier) is necessary. So the next section of this documentation will deal with how to install the Multec Host.

1.1 Installation of Multect Host

As you might notice the hardware already comes with a Multec Host, if not you have to already have the installation file. You can isntall the Multec host using the simple following steps:

- Run the setup file from the Multec Host Installation folder
- It will ask your permission to allow changes to your devide. Click yes.
- Choose the language you want to install the file in.
- Accept the License agreement, after reading through it and click next
- Select the features you want to all. I would suggesting selecting all fields. This gives you access to all the features for the Host.

- Then you can choose, if you want to create a desktop shortcut. I would suggest you to do so, as it gives you easier access to the host from the Desktop.
- Then click Install to proceed through the installation.
- Wait for the installation to complete. It may take few mins.
- When the Multec Host installation is complete, you need to install the repetier server, which will start automatically.
- Click next to continue.
- Read through the license agreement again and click I agree to continue.
- Select the path in which you want to save the repetier server. And then click next.
- Click next again to continue.
- The installation should start now. Wait till the installation is complete. Might take a few mins.
- Click Ok, I understand to continue.
- Click Finish twice to complete both installations.
- You can now run and use the Multec Host

1.2 Installation of Multec Plugin

Now that you have the Multec Host, you can install the plugin by following the simple steps explained in this section.

- First go to the following link: https://github.com/sophrosyne1/MultecPlugin/releases
- Download the following files by clicking on them:
    1. MultecPlugin.dll
    2. MyCustomButton.dll

- Once you have downloaded the file, go to the file path `C:\ProgramFiles\multec\plugins`
- Create a folder named ”MultecPlugin” as shown in the figure below:

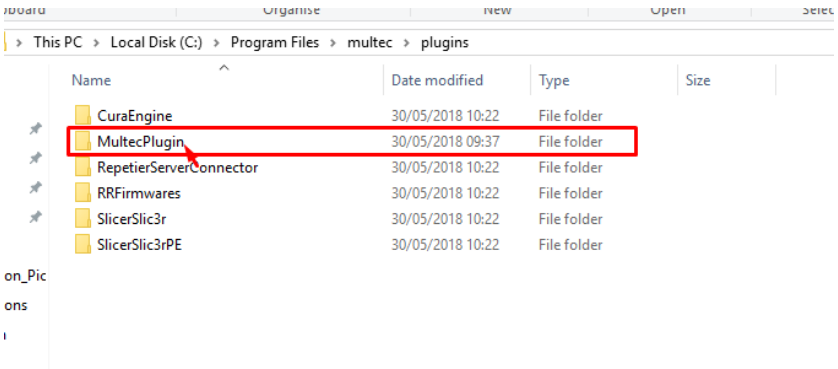

Figure 1.1: Creating folder in the Multec Host directory

- Now copy the files previously downloaded and paste it to the folder. But before that, don’t forget to close the Multec Host, if it is already running.
- You can now run the Multec Host, and it should have the Plugin inside.

Part III

Overview

Chapter 2

Overview

The plugin was created to make it easier for the user to interact with our printer hardware. With the help of the Multect Host and the plugin, the user can easily interact with printer and make any changes to it. This chapter of the documentation gives an overview to the user on what the Plugin contains, and the features the user is able to use. And how to use the features can be explained in the next chapter of the documentation.

2.1 Functionality & Tabs

As mentioned, this section of the documentation looks at the features that are available in the plugin. The plugin contains 4 different tabs where these functionality is implemented.

Each tab will be looked at and the functionality in each tab will be explained in this section. Dividing the different functionality into different tabs makes it easier for the user to access, and process. The user can simply go to the tab, depending on what changes or what he wants to do with the printers. This also keeps the plugin compact and in the correct window size.

2.1.1 Manual Control

The Manual Control Tab is the main tab of the plugin. From this tab, the user is able to make X, Y and Z axis movements of the printer, extrude, Home the printer nozzles or the axes, change nozzles, heat up nozzles, and other print parameter changes.

The user is also able to send ”M-Codes” or ”G-Codes” manually from this Manual Control tab. This gives the easier a lot of flexibility and more control. The size of the tab is set in such a way that the user is able to easily use this plugin in a touchscreen.

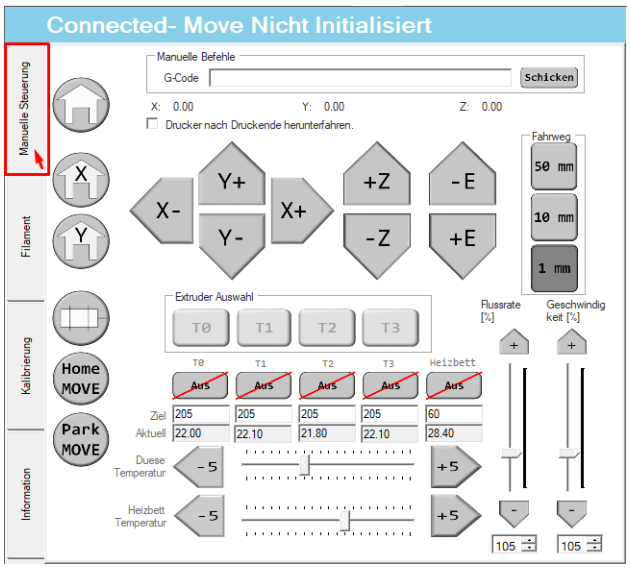

Figure 2.1: Manual Control Tab

2.1.2 Filament Control

The Filament Control tab, as the name suggests, gives the user control of the filament. The user is able to check the filament status of the printer; if the printer has filament loaded or not, at any given time.

The user is also able to load and unload filaments from the printer automatically using features in this Tab. This feature is really convenient for the user, as the user

does not have to chain of G-Codes or push the filament manually. All this is done at the push of a button.

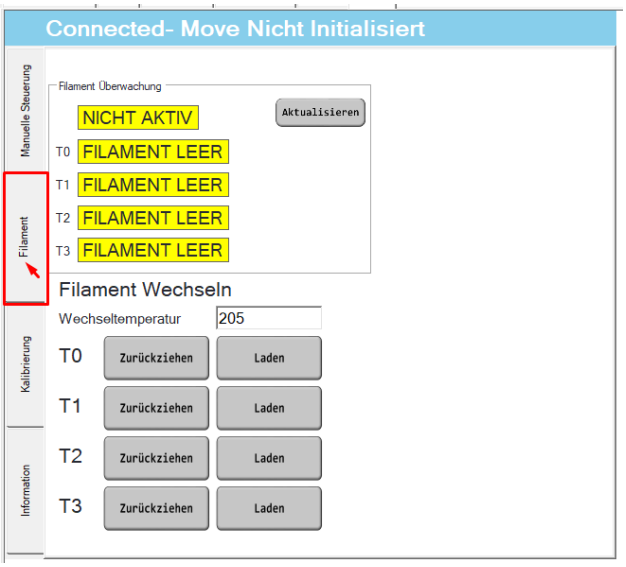

Figure 2.2: Filament Control Tab

2.1.3 Calibration

This tab, is responsible for the measuring and changing different offsets within the printer. For example, Nozzle offsets with respect to nozzle T0, can be measured and then changed manually. Same can be done for all the other offsets for the nozzle.

Basically this tab is responsible for calibrating the nozzle to give better print outcome. Fine adjustments and calibration can be done to the nozzle from this tab. The Figure 2.3 shows the picture of the calibration tab and how it looks.

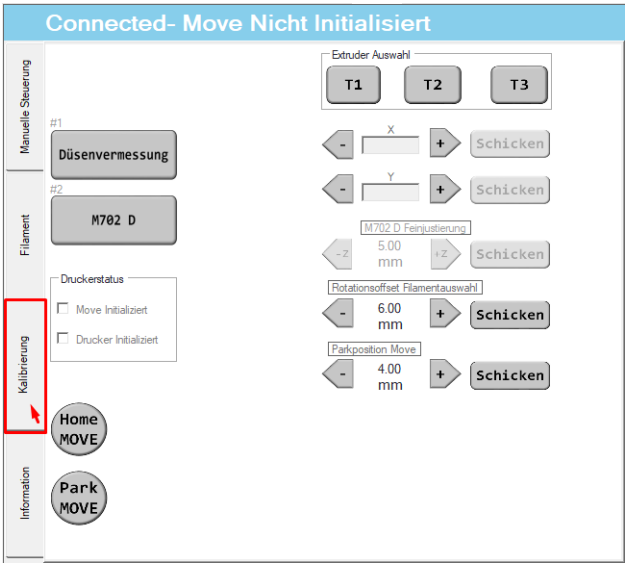

Figure 2.3: Calibration Tab

2.1.4 Printer Information

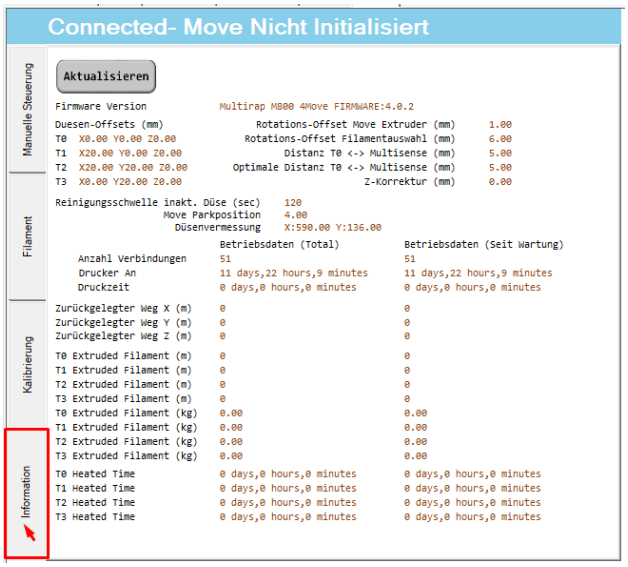

Figure 2.4: Printer Information Tab

This tab is not able to control any features in the printer but the user is able to get information about the printer which is really useful for the user to knw. For

example, how much has the printer printed, the life time status and so on. This information is really useful in finding out the performance of the printer, and how much more can the printer print.

Chapter 3

Graphical User Interface(GUI)-Basics

3.1 Naming Conventions used

There are some basic naming convention used within this documentation. These naming conventions are better explained in this section of the documentaion. The Plugin, as it a Graphical User Interface, will sometimes be referred to as the GUI for short. All the other terms needed to understand in this GUI will be explained below.

3.1.1 Banner

The top most part in the Plugin is the banner it is available in all tabs of the GUI (plugin). The banner is shown in Figure 3.1

Figure 3.1: Banner

3.1.2 Text box

A text box is a graphical control element intended to enable the user to input text information to be used by the program. It is mostly for taking in input that the program needs. Sometimes the text can also be non-editable. The non-editable text boxes can be used to display information like the current nozzle temperatures. Examples of text boxes are shown in Figure 3.2.

Figure 3.2: Examples of Text boxes

3.1.3 Label

Labels are basically any text in the GUI (plugin) that gives us additional information. The Printer Information Tab in the plugin, a lot of labels are used to give the user information about the printer. Few examples of labels are shown in Figure 3.4.

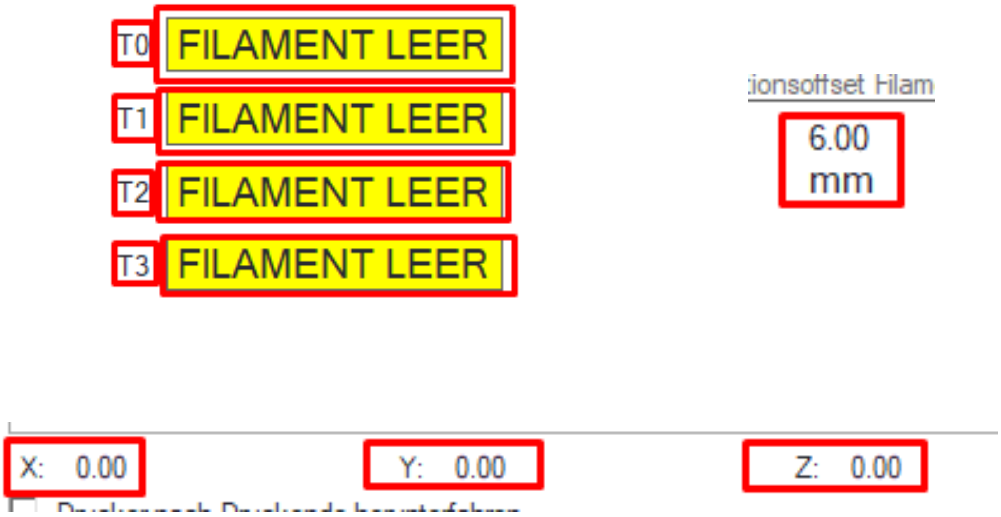

Figure 3.4: Examples of Labels

3.1.4 Check box

Check box is a square box with text beside it in a GUI (plugin), that indicates whether a setting or feature is enabled or not. Check boxes are used when more than one option may need to be checked or as an easy way to enable or disable a setting in a software program. Checking the box enables that setting and unchecking it disables the setting. Figure 3.5 shows examples of some check boxes used in this Plugin.

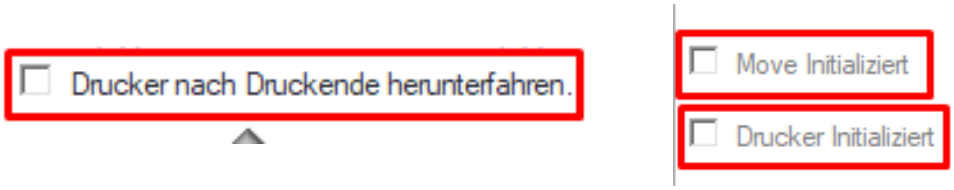

Figure 3.5: Examples of Check boxes

3.1.5 Pop-up

Figure 3.6: Pop-up when door open

Pop-up is a small box that appears on a computer screen, in which instructions to or from a user are displayed. This gives the user crucial information, like warnings, errors, if the door is open or if there is a user interaction needed before an action can be performed. The Figures 3.6 and 3.7 shows examples of Pop-ups in the Multec Plugin.

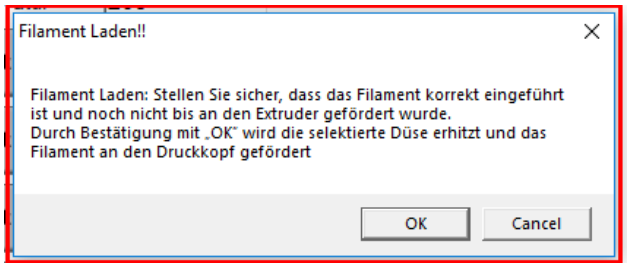

Figure 3.7: Pop-up for filament loading

3.1.6 Buttons

A button in out GUI is an graphical control element, that can be clicked by the user to perform an event or task. They have different visual appearances, which indicate different states the buttons are in. The different states will be explained in the next section of the documentation. Figure 3.8 shows examples of some buttons used in the Plugin.

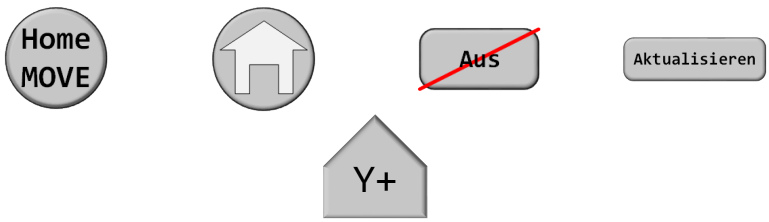

Figure 3.8: Examples of Buttons

3.2 Different States of Buttons

The buttons in this plugin are in different states, depending on the accessibility.

3.2.1 Normal State

Figure 3.9 shows how buttons look at normal state. As you know the main state of the buttons is to execute a event or task when pressed, only in the normal state can the buttons be pressed, otherwise not. This means only when the buttons are in their normal state they can be clicked.

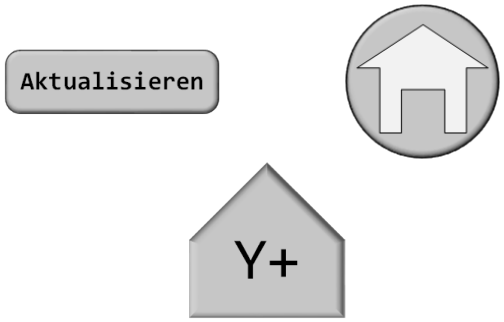

Figure 3.9: Examples of Buttons in Normal state

3.2.2 Pressed State

When buttons are clicked or when a button is activated(in case of nozzle selection) the buttons are in their pressed state. This shows that a click is being performed or that feature is active. Figure 3.10 shows examples of some buttons when they are in their pressed state.

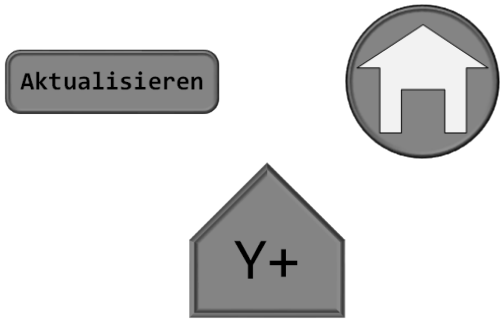

Figure 3.10: Examples of Buttons in Pressed state

3.2.3 Disabled State

The disabled state of buttons mean that this feature is disabled because, it is not allowed because certain process that is going on in the printer or before another action is execute by the user. It can also be that the host or the server is not connected to the printer. At this state, as shown in Figure 3.11, the buttons are not clickable.

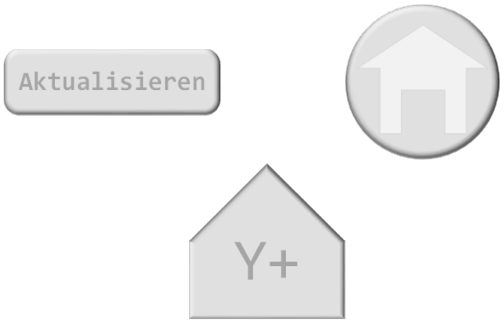

Figure 3.11: Examples of Buttons in Disabled state

Part IV

Detailed Description

Chapter 4

Detailed Description on each Tab

This chapter includes the includes the detailed description on each tab, including the features and process that can be executed from those tabs. This chapter will give a detailed overview on how to run the plugin. Most features available will try to be covered. But with the manual command text box in the manual control tab, a lot more features can be executed by sending the Marlin list of G or M codes.

4.1 Tab 1: Manual Controls

The Manual Controls tab has the highest amount of features among all the tabs. The features include axis movements, nozzle homing, nozzle selection, heating, extruding, retracting, temperature control, feed rate and flow rate control. How to perform these actions using the user interface will be shown in this section.

4.1.1 Home All X, Y Home Buttons

Home All, Home X and Home Y cane be done using this buttons.

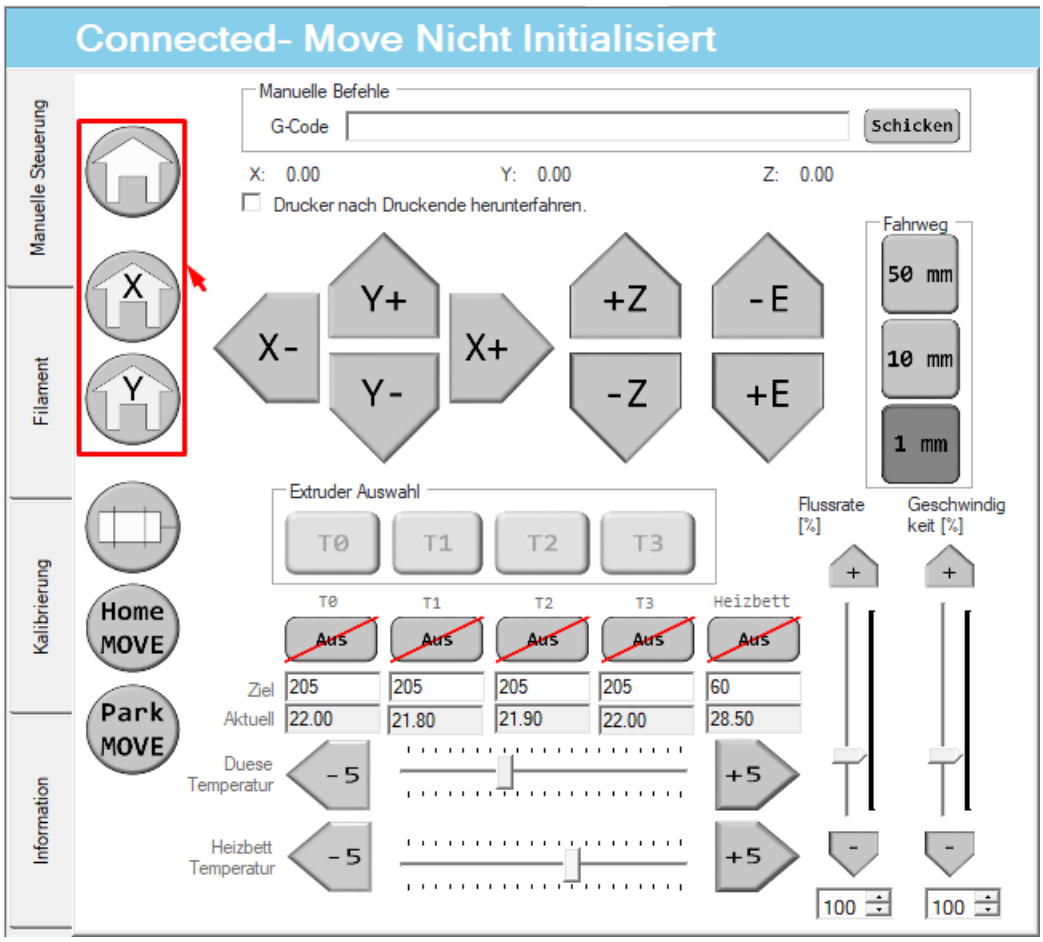

Figure 4.1: Home All, Home X Home Y buttons highlighted

Home All

When this button is clicked as seen in Figure 4.2, all axis, x, y, z, are homed to their default position.

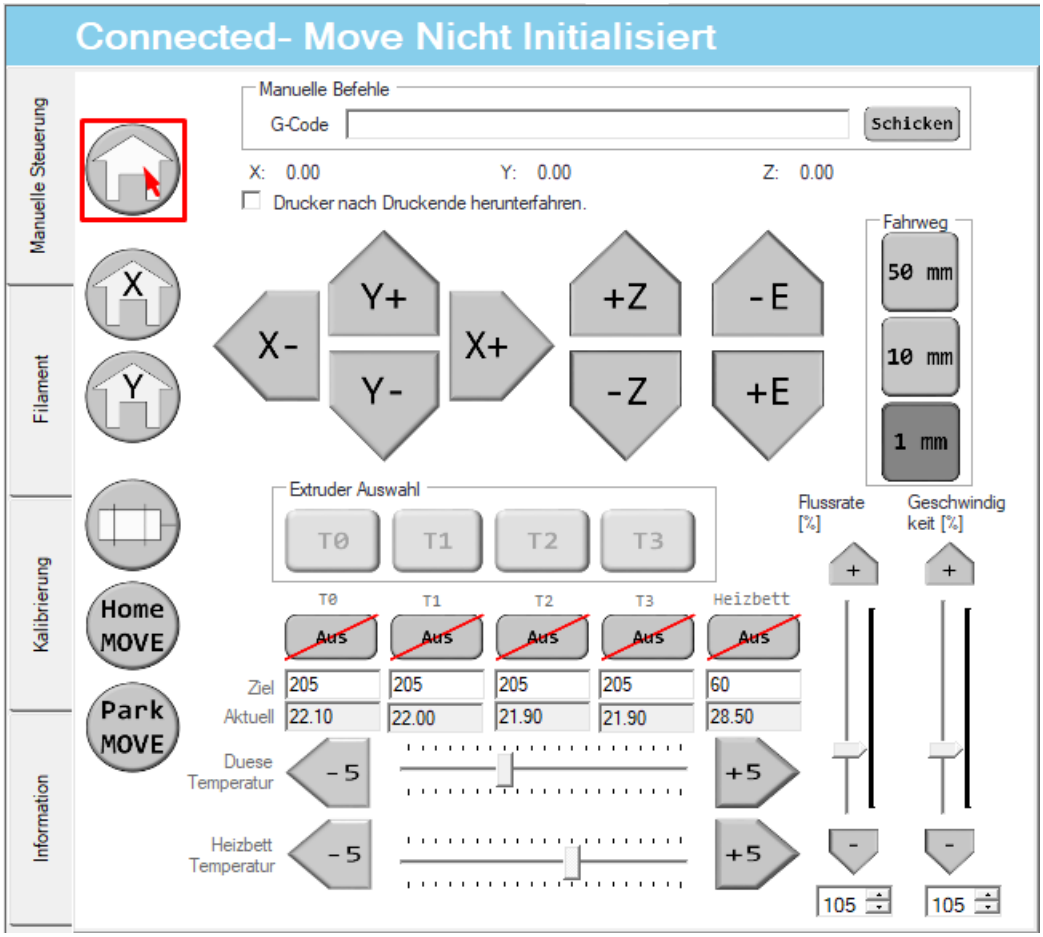

Figure 4.2: Home All button Highlighted

Home X

When this button is clicked, as seen in Figure 4.3, the printer moves to the initial position only in the X direction.

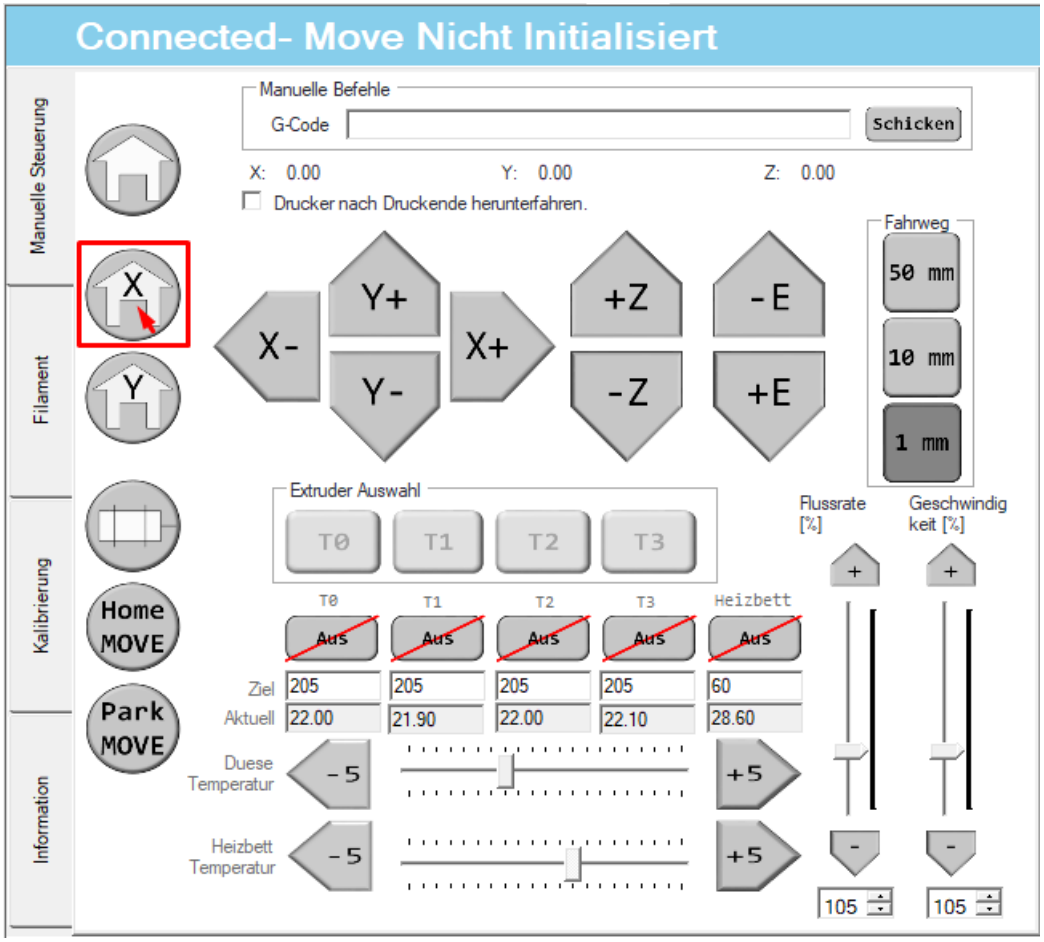

Figure 4.3: Home X button Highlighted

Home Y

When this button is clicked, as seen in Figure 4.4, the printer moves to the initial position only in the Y direction.

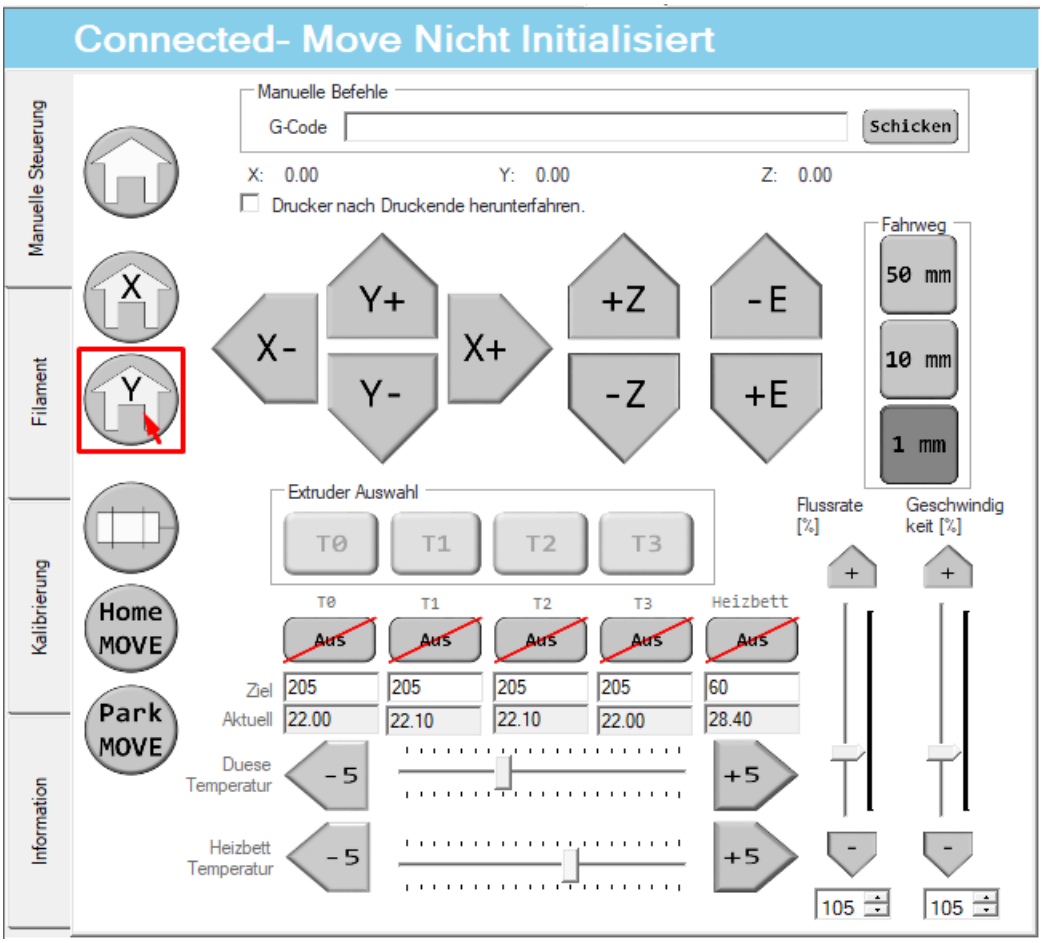

Figure 4.4: Home Y button Highlighted

4.1.2 Travel Distance Selection

The travel distance lets us select, how much should the step be, for the x, y, z axis movements and the extrusion and retraction. The user can choose between 1 mm, 10 mm and 50 mm. This will also be referred to as the 'step distance' during most parts of this document.

Default - 1 mm

This is selected by default on connection. This indicates that all x, y, z movements, and extrusion and retraction will take place at 1 mm steps.

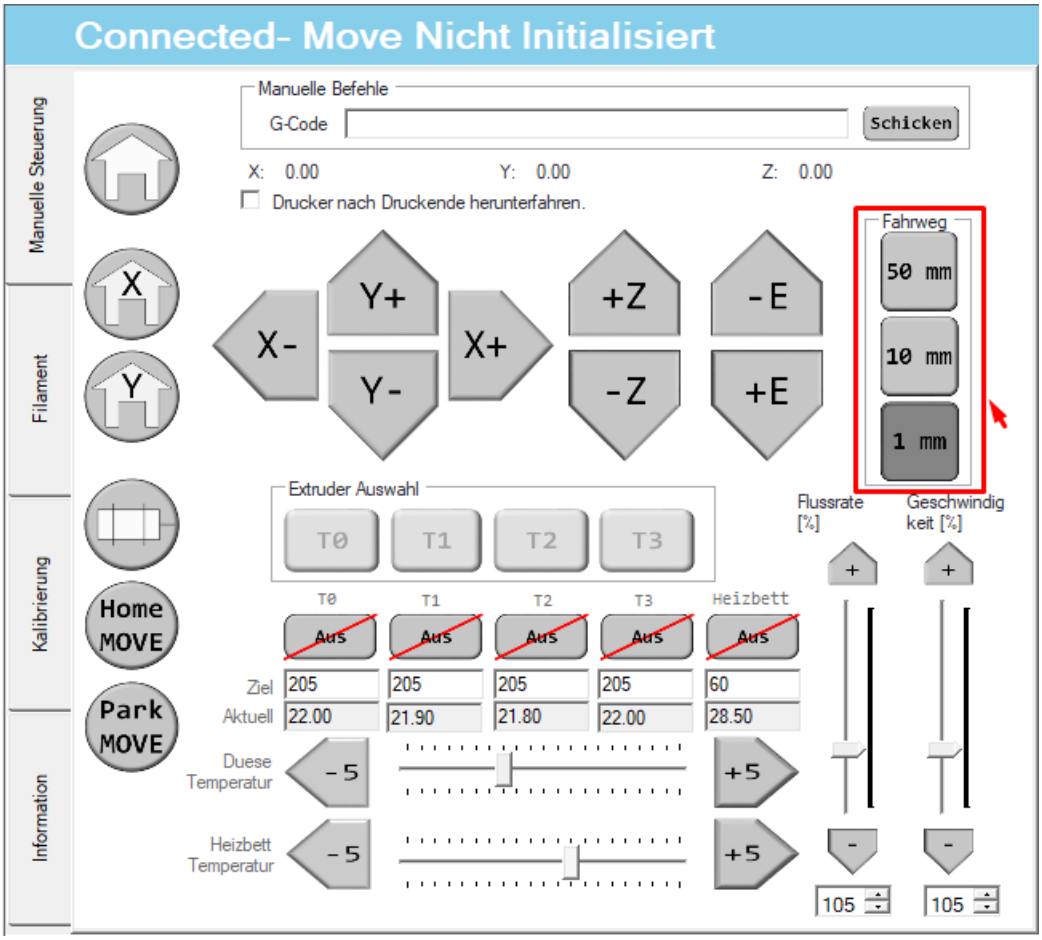

Figure 4.5: Travel Distance- 1 mm selected

10 mm

When selected, as shown in Figure 4.6, indicates that all x, y, z movements, and extrusion and retraction will take place at 10 mm steps.

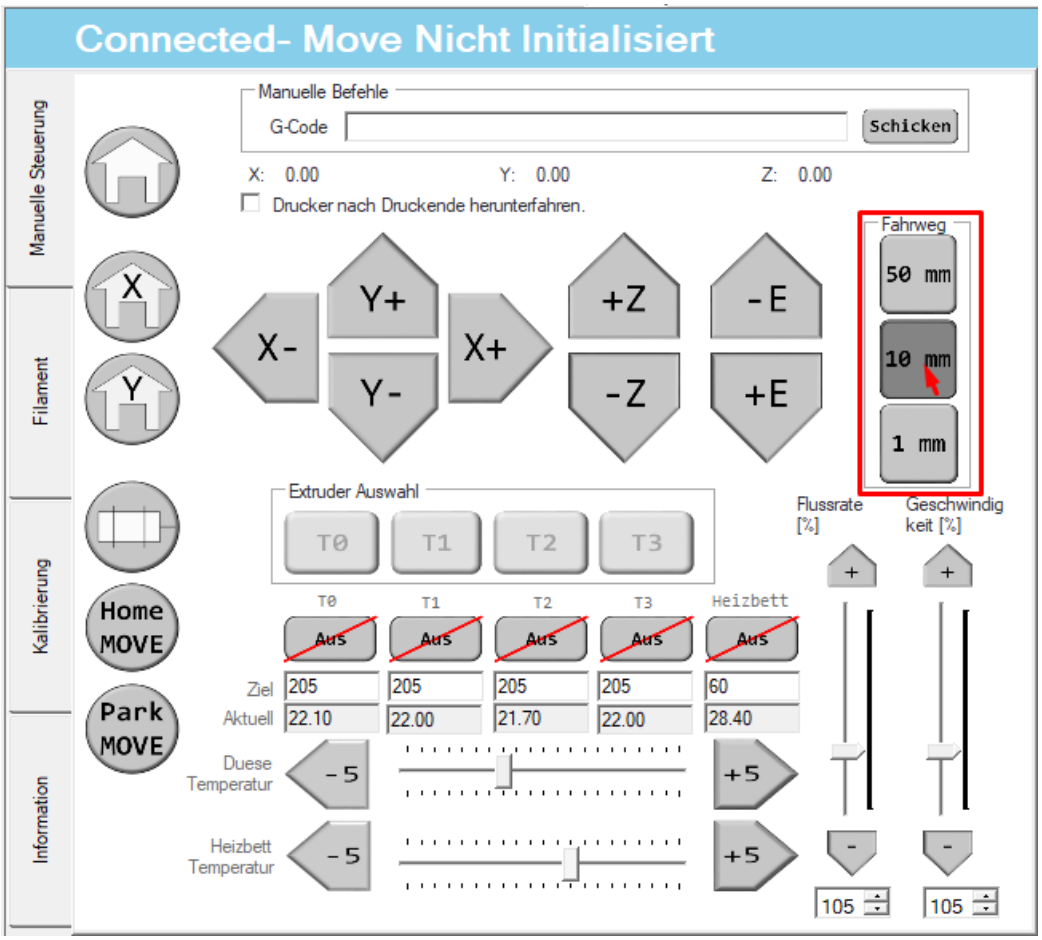

Figure 4.6: Travel Distance- 10 mm selected

50 mm

When selected, as shown in Figure 4.6, indicates that all x, y, z movements, and extrusion and retraction will take place at 10 mm steps.

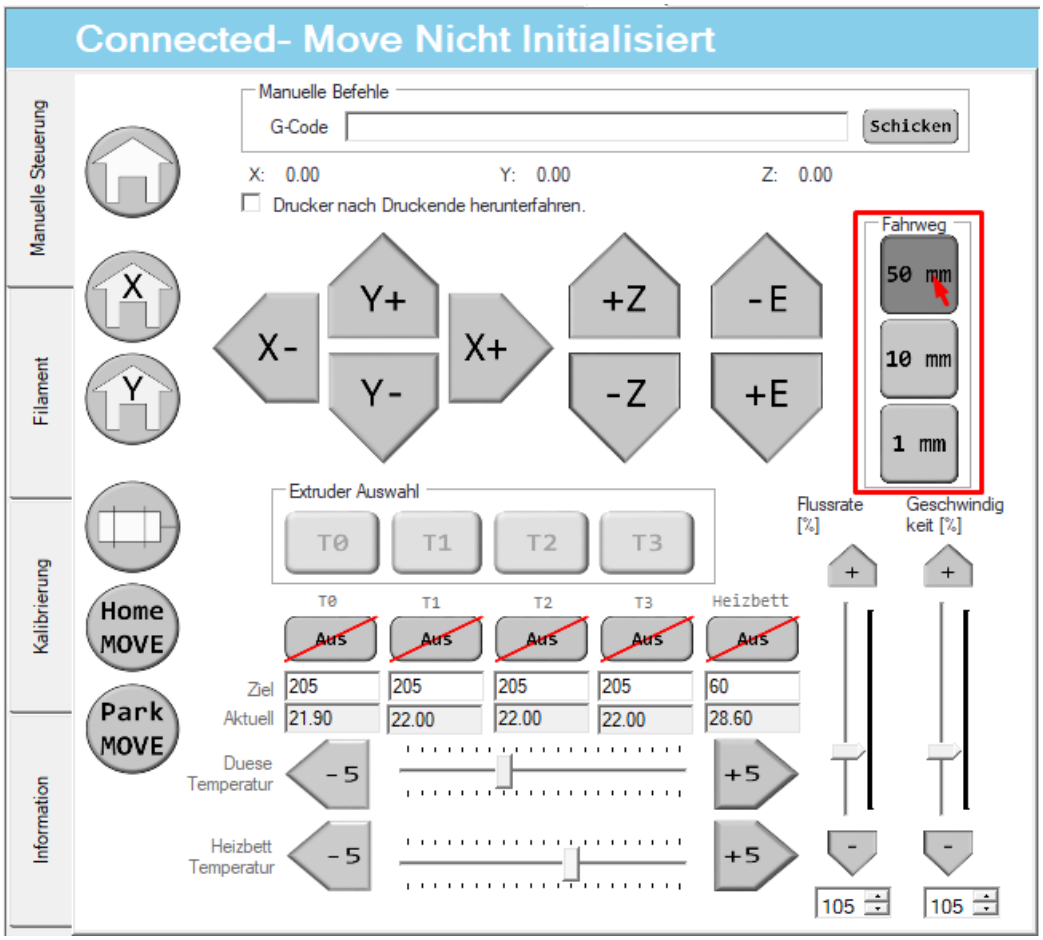

Figure 4.7: Travel Distance- 50 mm selected

4.1.3 X, Y Axis movements

The buttons help move the printer in the direction of the X and Y axis, that is left and right(X-axis), forward and backwards(Y-axis).

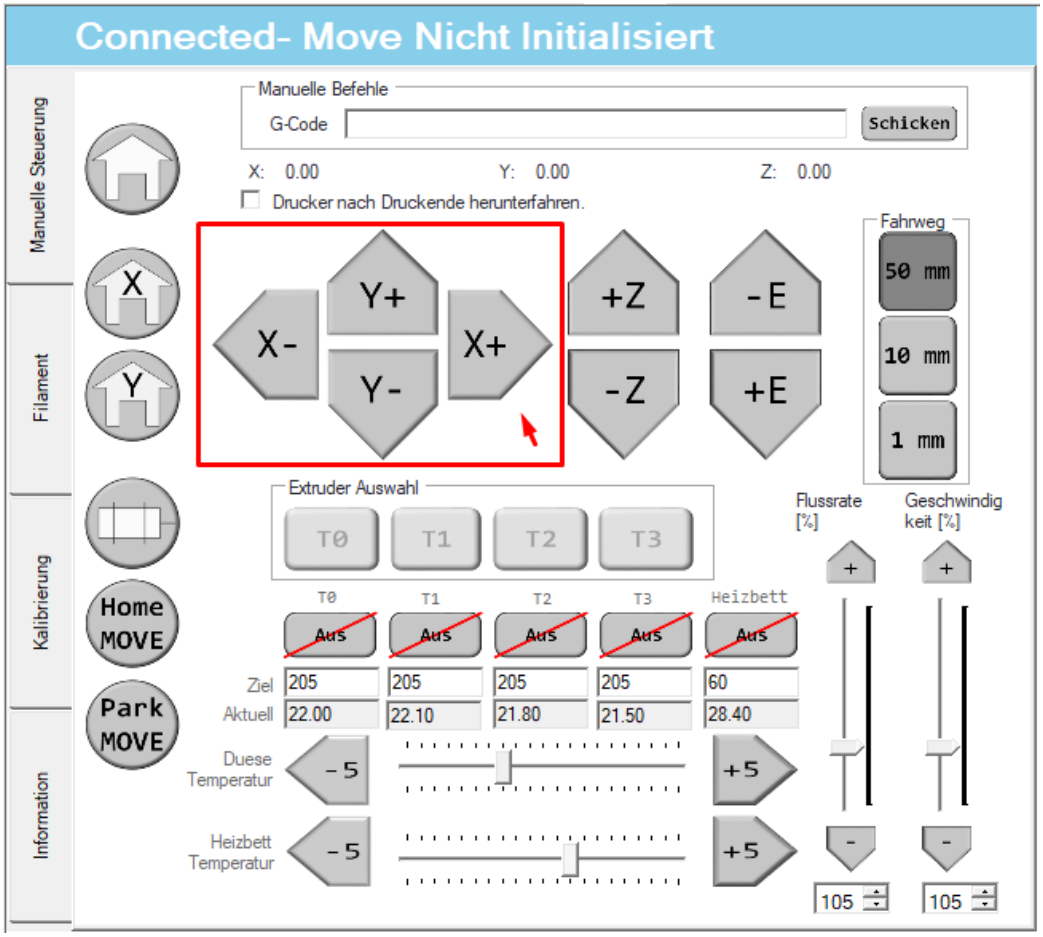

Figure 4.8: X and Y axis movement buttons highlighted

Plus Y: When the 'Y+' button is clicked, as seen in Figure 4.9, the printer moves in the positive Y-axis direction, that is forward according to the step distance that is selected. The same way, when 'Y-' button is clicked, the printer moves in the opposite Y direction.

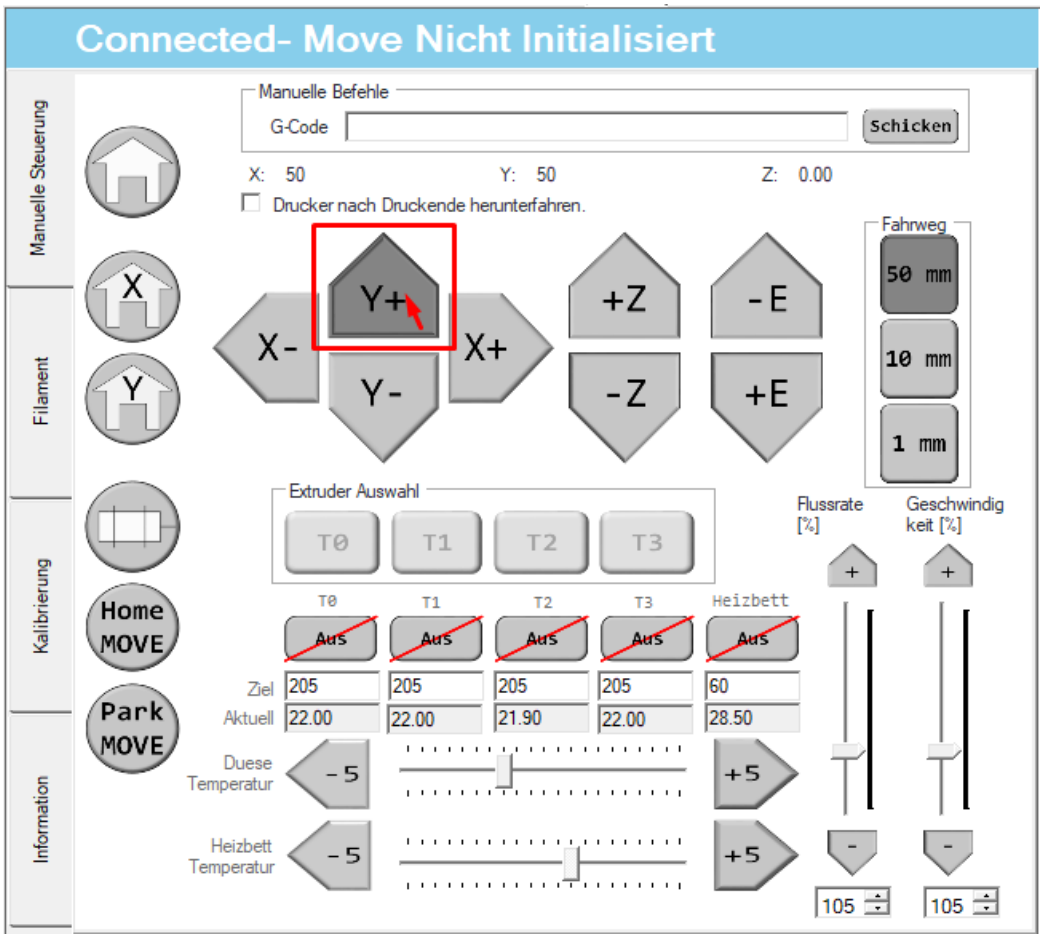

Figure 4.9: Plus Y button clicked

Plus X: When the 'X+' button is clicked, as seen in Figure 4.10, the printer moves in the positive X-axis direction, that is to the right according to the step distance that is selected. The same way, when 'X-' button is clicked, the printer moves in the opposite X direction.

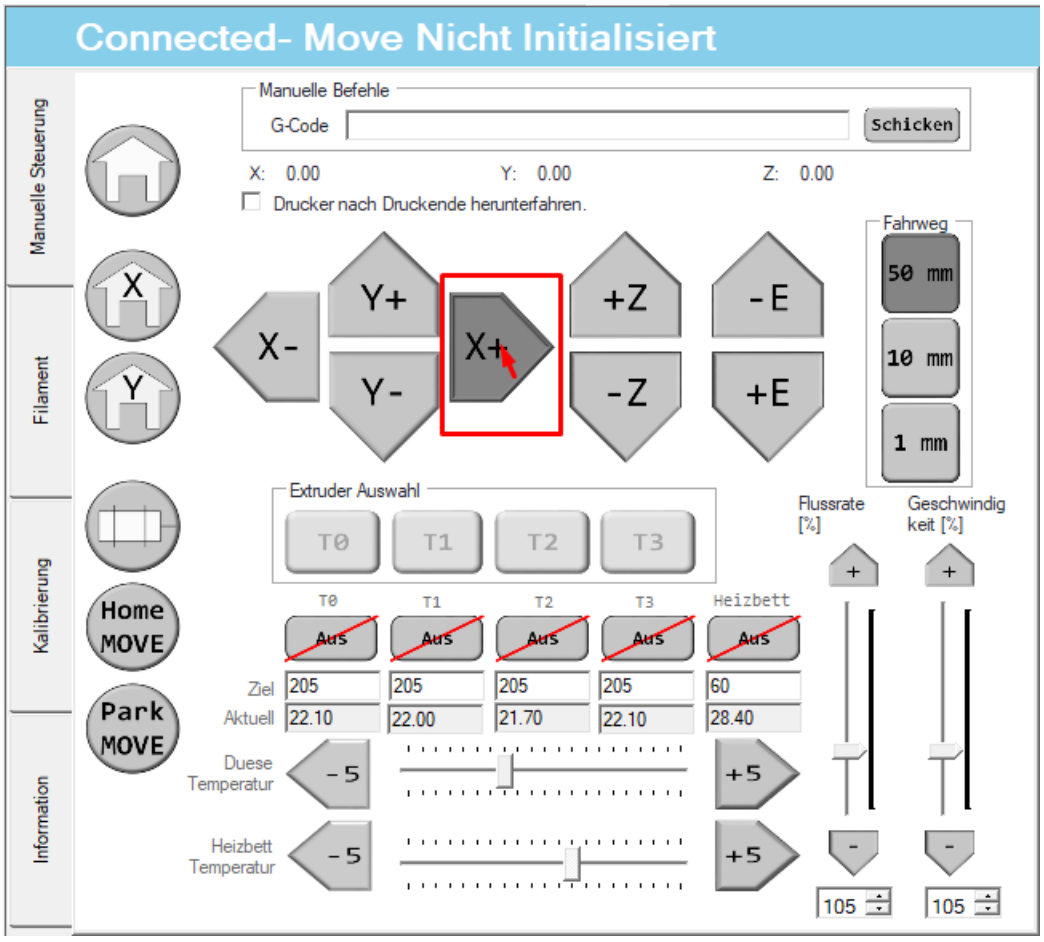

Figure 4.10: Plus Y button clicked

4.1.4 Z Axis movements

The buttons help move the printer in the direction of the Z-axis, that is up and down.

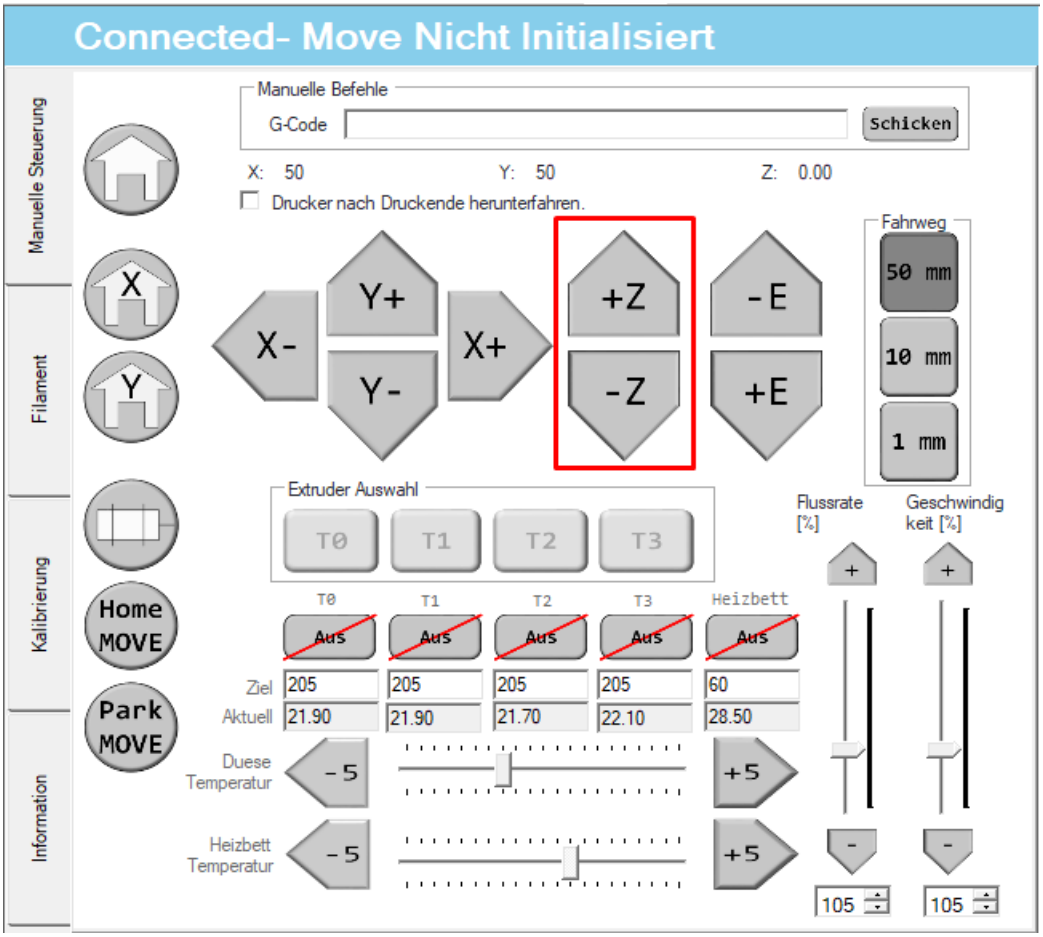

Figure 4.11: Z Movement buttons highlighted

When the 'Z+' button is clicked, as seen in Figure 4.12, the printer moves in the positive X-axis direction, that is to the right according to the step distance that is selected. The same way, when 'Z-' button is clicked, the printer moves in the opposite Z direction.

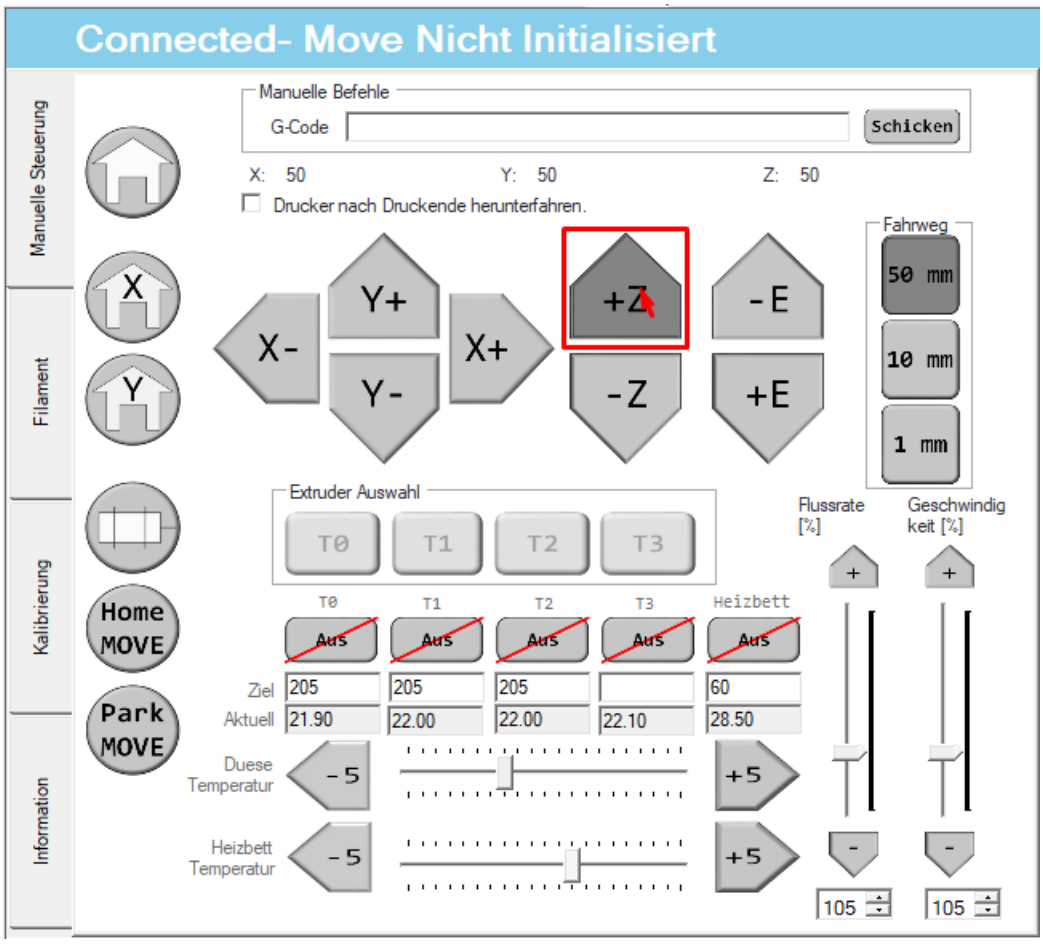

Figure 4.12: Plus Z button clicked

4.1.5 Extrude or Retract Filament

Buttons help extrude filament through the nozzles, or retract filament out. The amount of filament extruded or retracted depends on the travel distance selected or step distance selected.

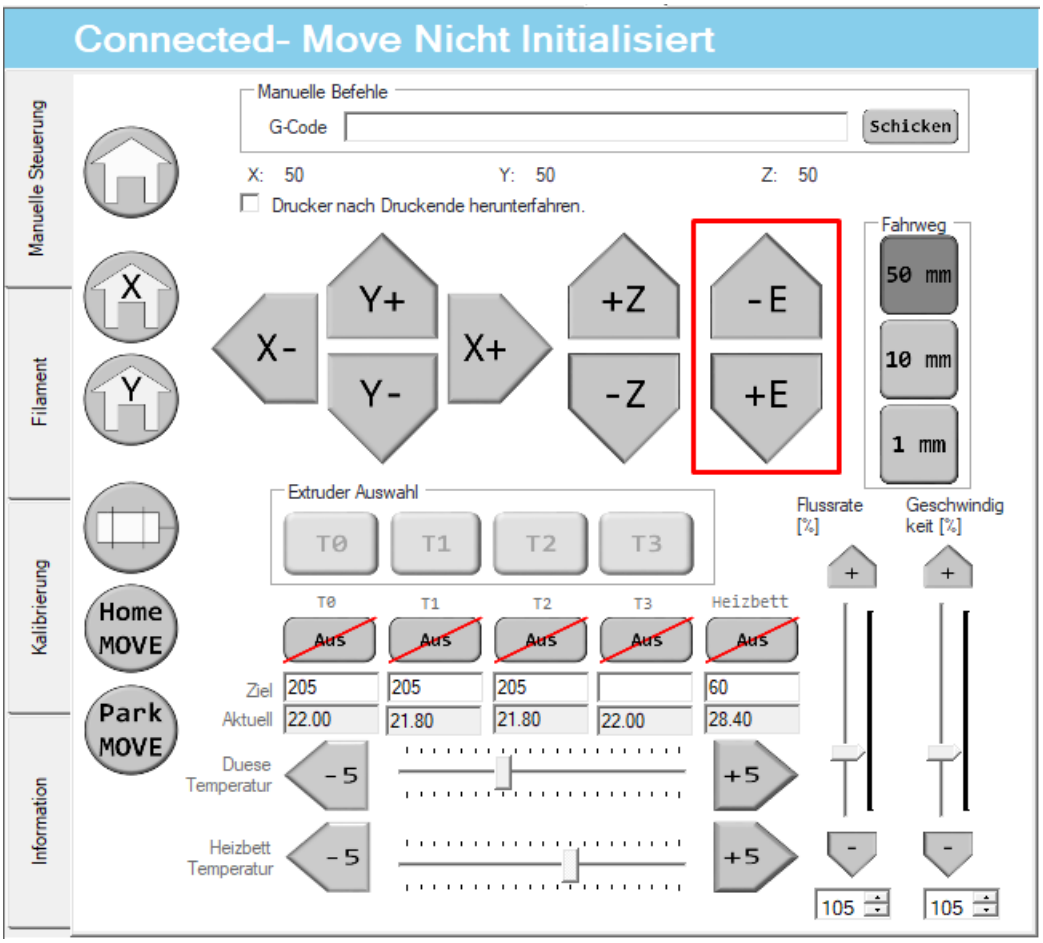

Figure 4.13: Extrude and Retract button highlighted

When the button 'E+' is clicked as seen in Figure 4.14, a certain amount of filament is extruded, according to the step distance selected. And when the button 'E-' is clicked, the filament is retracted from the nozzle according to the step distance that is selected.

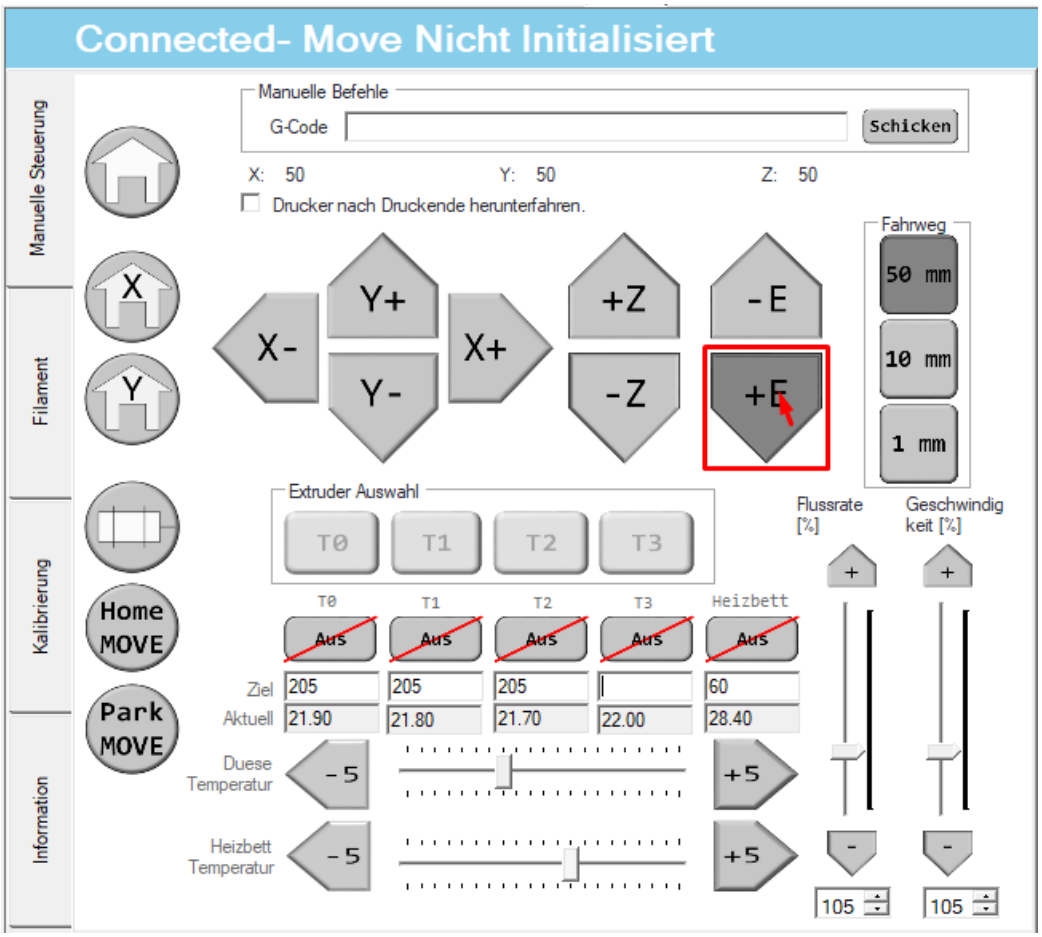

Figure 4.14: Extrude(E+) button clicked

4.1.6 Motor Off

Clicking this button, as shown in Figure 4.15, turns off the axis motor, so that the axis can be moved freely manually.

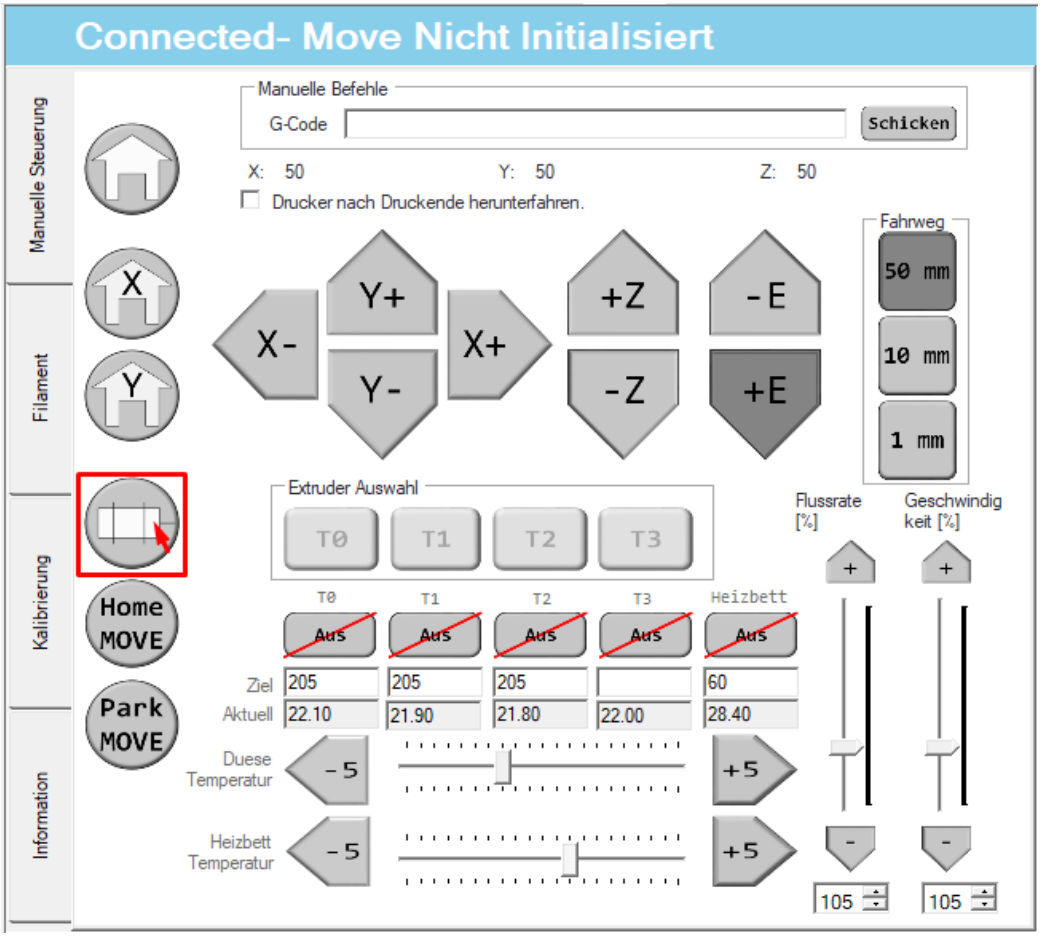

Figure 4.15: Motor Off button Highlighted

4.1.7 Home Move

When clicked, as seen in Figure 4.16, sends the command ”G222”, which homes the nozzle heads to its default position. Nozzle T0 is always selected after Home Move. After new connection, Nozzle selection is not possible before Home Move is made. So the nozzle selection buttons ’T0’ to ’T3’ are deactivated if ”G222” command is not called first.

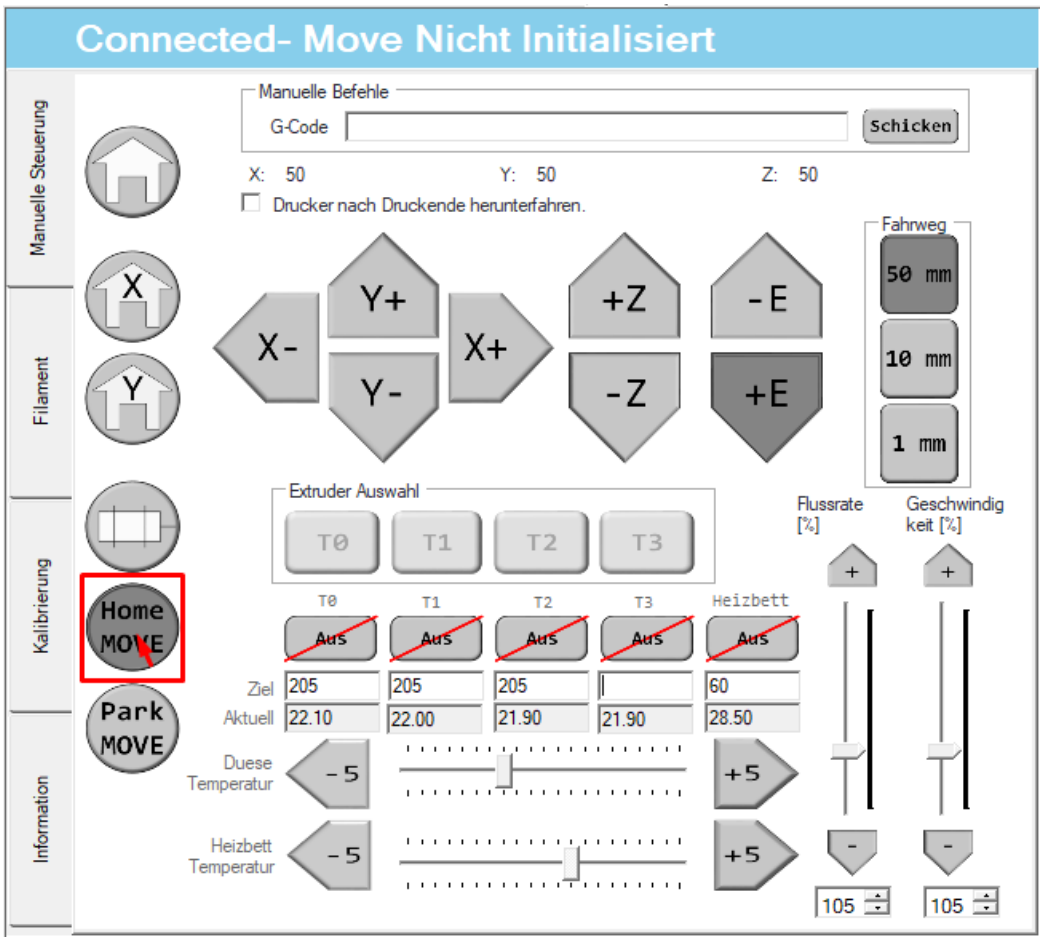

Figure 4.16: Home Move button highlighted

4.1.8 Park Move

When clicked, as seen in Figure 4.17, sends the command ”G224”, which homes the nozzle heads to its default park position. No nozzles are selected after Park Move. After Park Move is clicked, nozzle selection is deactivated until the Home Move button is clicked again.

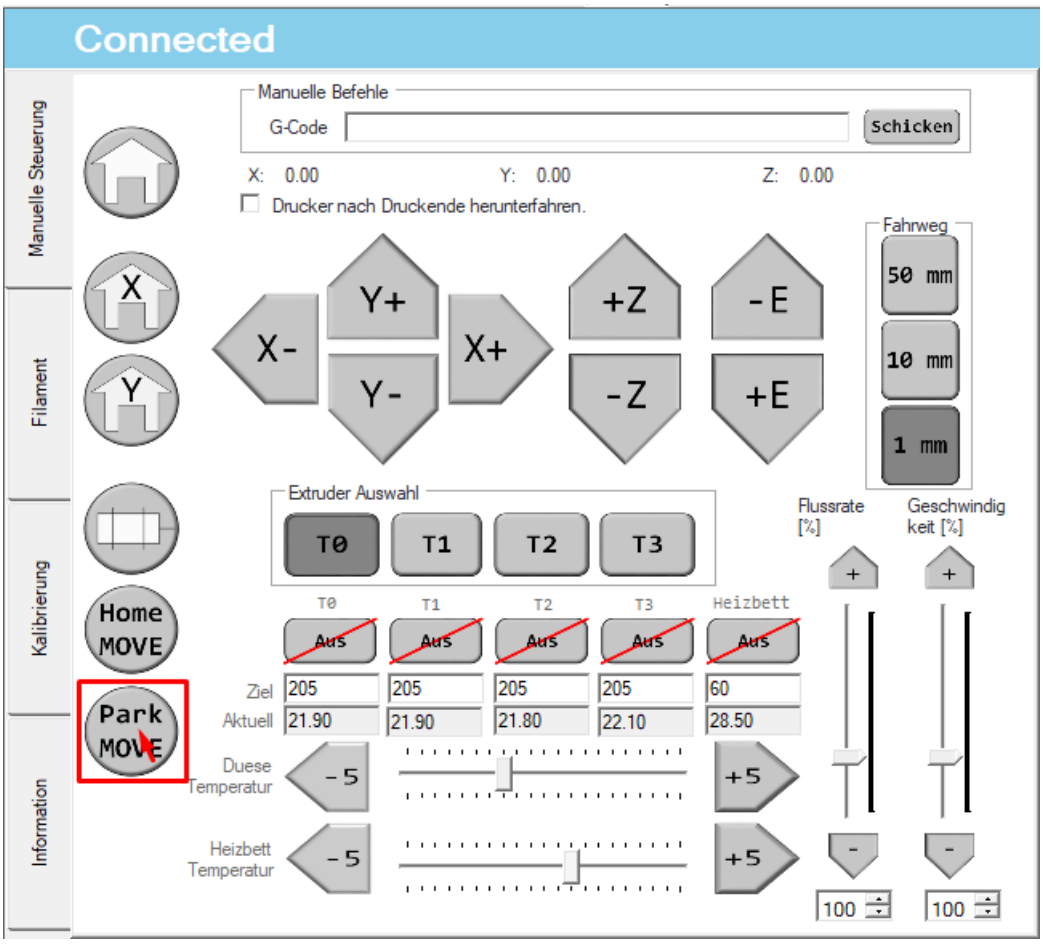

Figure 4.17: Park Move button highlighted

4.1.9 Nozzle Selection

After the Home Move is clicked and the nozzles are homed, the user is able to select the nozzles. For 4-Move, the user is able to select nozzles T0, T1, T2 and T3. For 2-Move only nozzles T0 and T1 are available. As shown in Figure 4.18, T2 is being selected. When the T2 button is clicked, the button goes to clicked state and the nozzle T2 of the printer is selected.

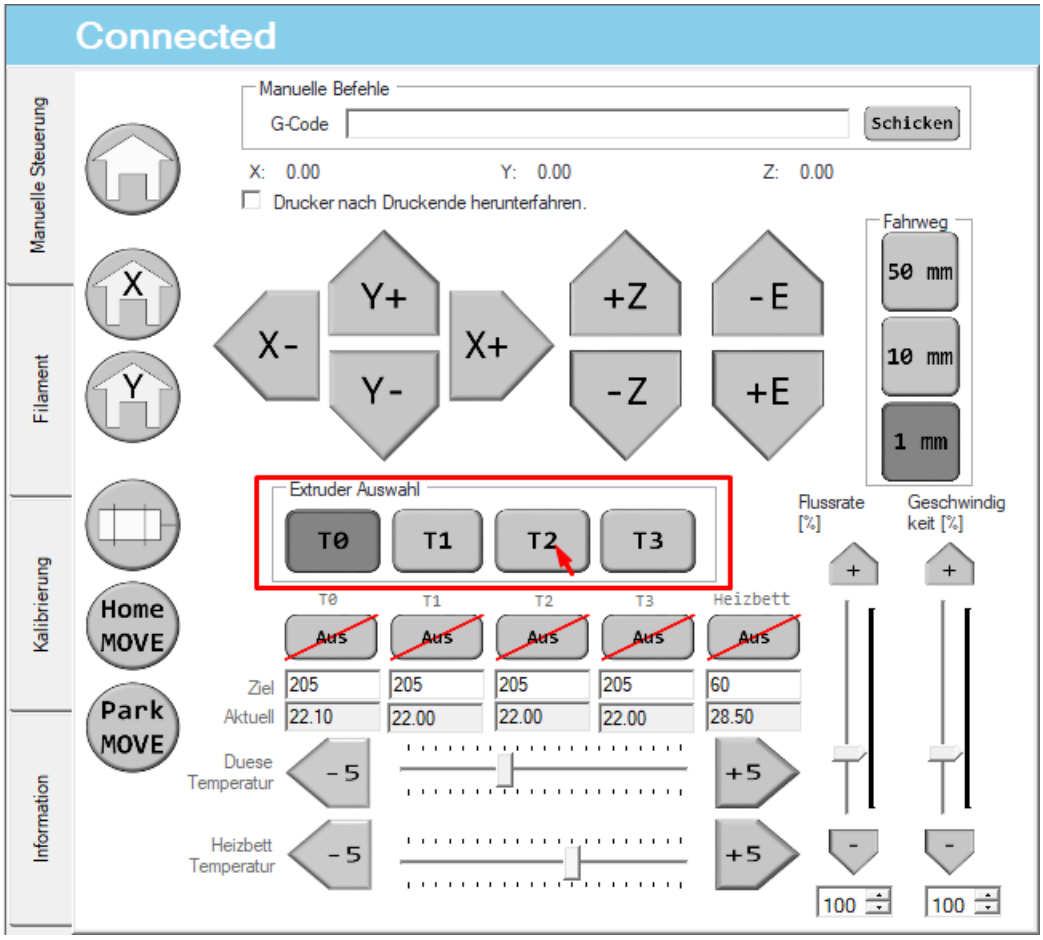

Figure 4.18: Nozzle selection

4.1.10 Nozzle Temperature Control

The user is also able to control the temperature in each of the nozzles. Turn on the nozzle heaters and change the temperature which the nozzles should heat to. These features can be executed by simple click of buttons. Each nozzle has respective turn On/Off button. In the Figure 4.19 the mouse is over the Turn On button for the nozzle T2, when clicked the heater can be turned on for nozzle T2.

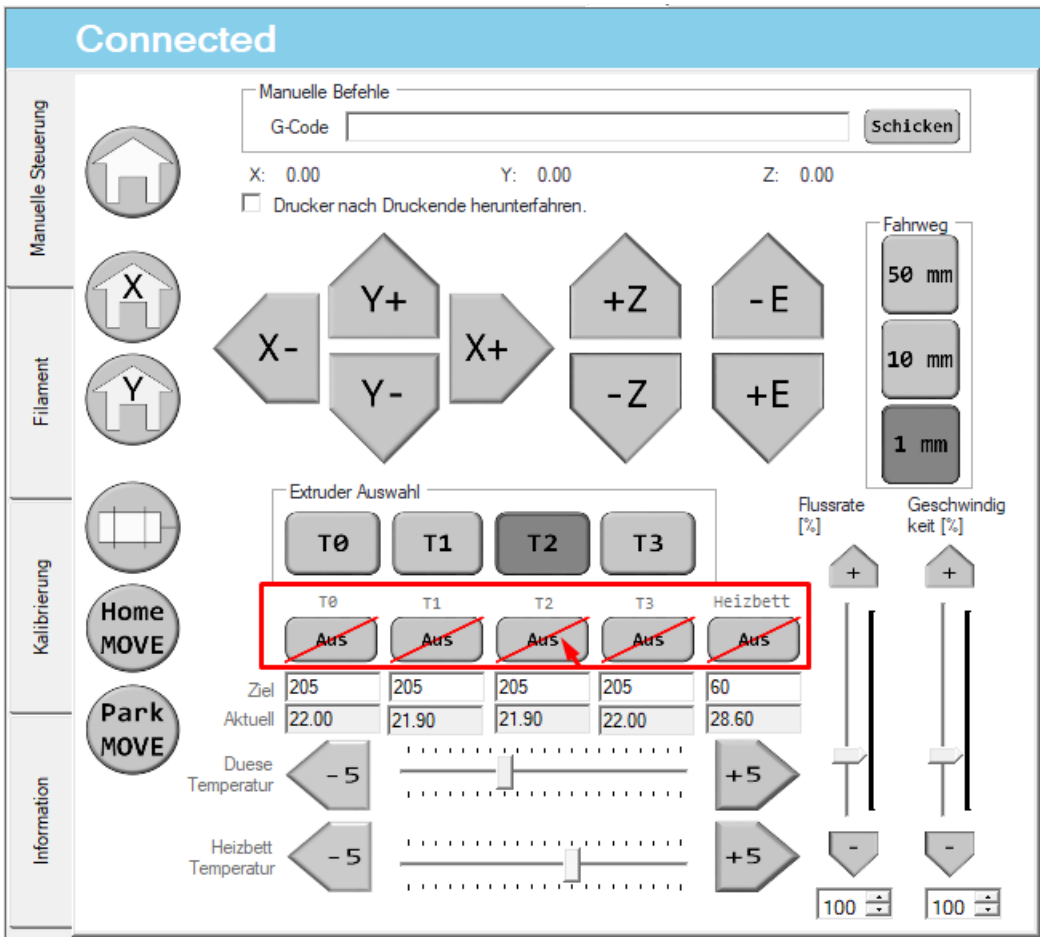

Figure 4.19: Temp On/Off Buttons

After the 'Aus' button is clicked, the heater is turned on for nozzle T2. And the button goes to pressed state, to show that it is enabled and the text changes to 'Ein' to indicate that the heater for that nozzle is on, as shown in Figure 4.20. The other buttons for heaters for the other nozzles, act the same way and can similarly be turned On. The target temperature of the nozzle can be increased or decreased using the track bar or buttons at the end track bars, which is marked inside the red box in Figure 4.20.

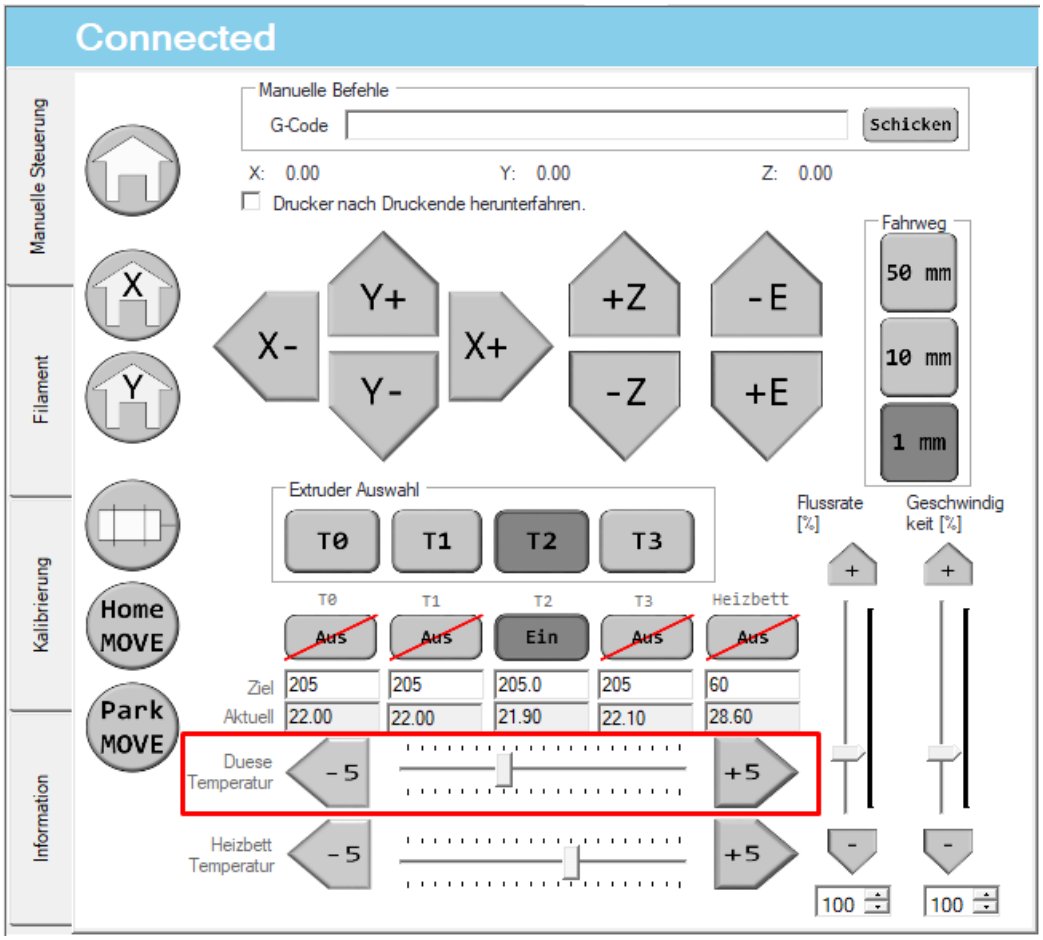

Figure 4.20: Track bar control for nozzle temperatures

In the Figure 4.21, the button '+5' is clicked to increase the target temperature of the nozzle T2. This change can be seen in the highlighted text box.

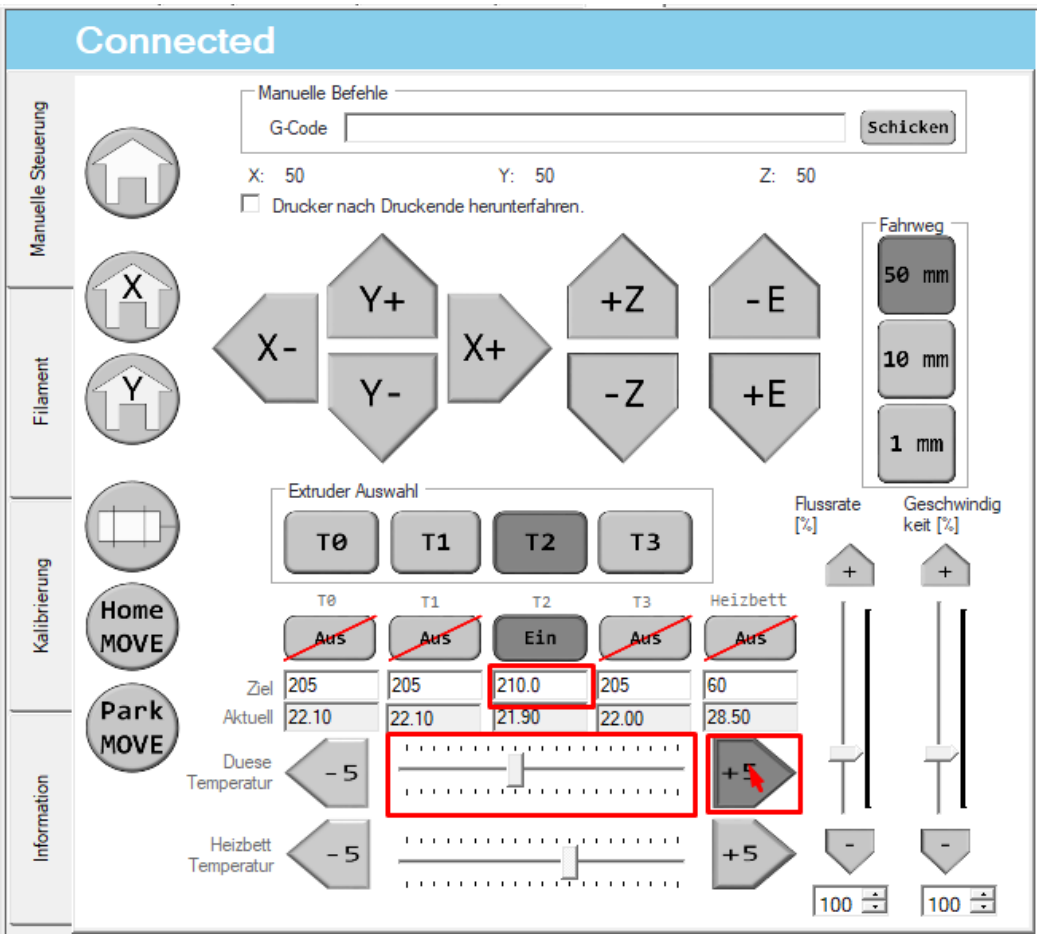

Figure 4.21: Changing Target temperature for Nozzle T2

4.1.11 Bed Temperature Control

The heater for the bed can be turned on the same way as the heaters for the nozzles. Figure 4.22 shows, the bed heater turned on and the target temperature for the bed being increased by clicking the '+5' beside the bed temperature track bar.

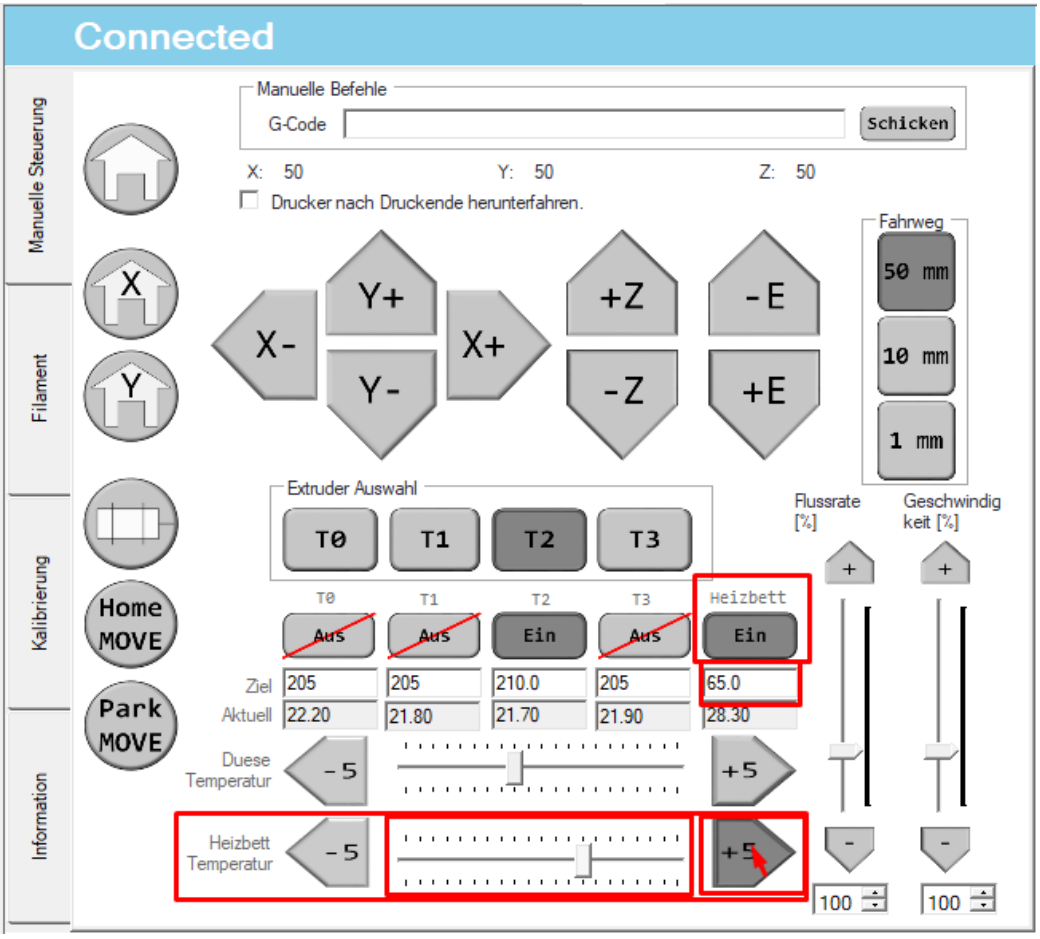

Figure 4.22: Bed Temperature Control

4.1.12 Flow rate and Feed rate Change

In some cases the change to feed rate and flow rate is needed during a print. The feed rate and flow rate can be changed with the controls inside the red box, as shown in Figure 4.23.

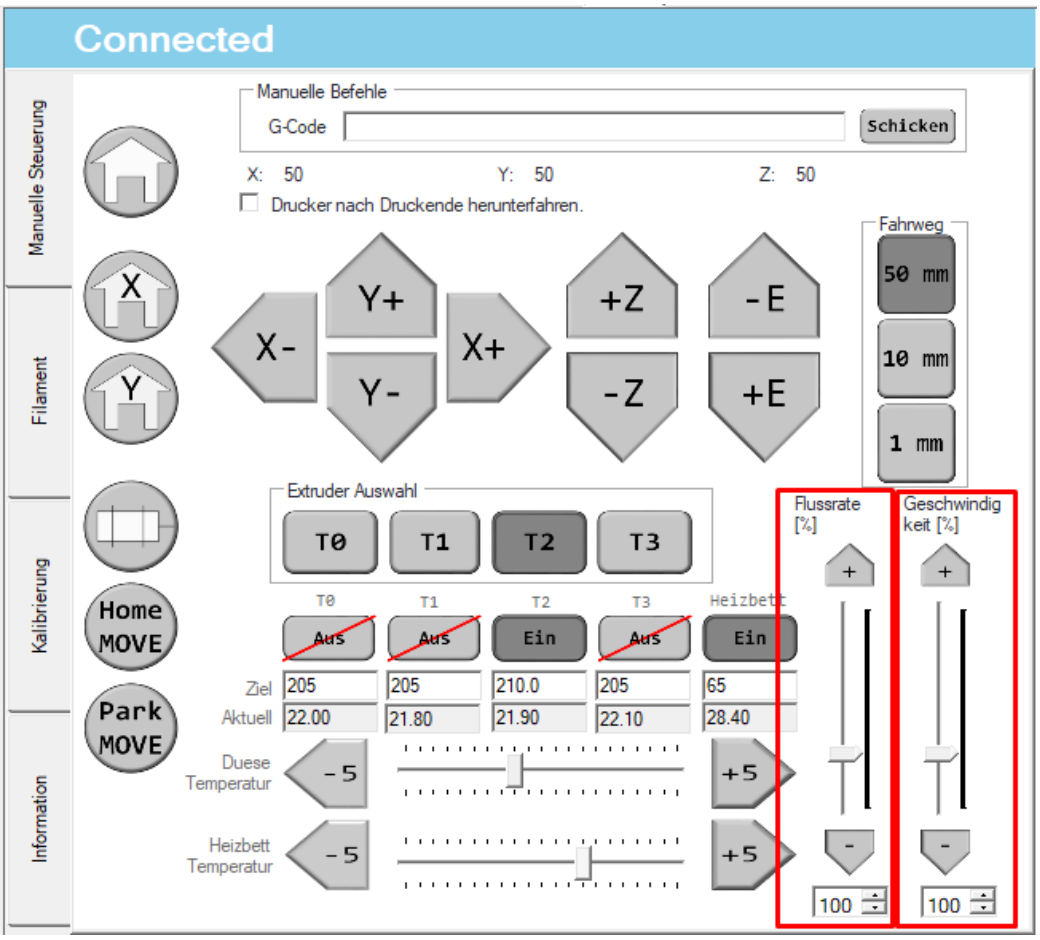

Figure 4.23: Feed rate and Flow rate

By clicking the plus and the minus buttons at the top and the bottom, they can both be changed. Figure 4.24 shows how the flow rate is being increases by clicking the plus button at the top of the flow rate track bar.

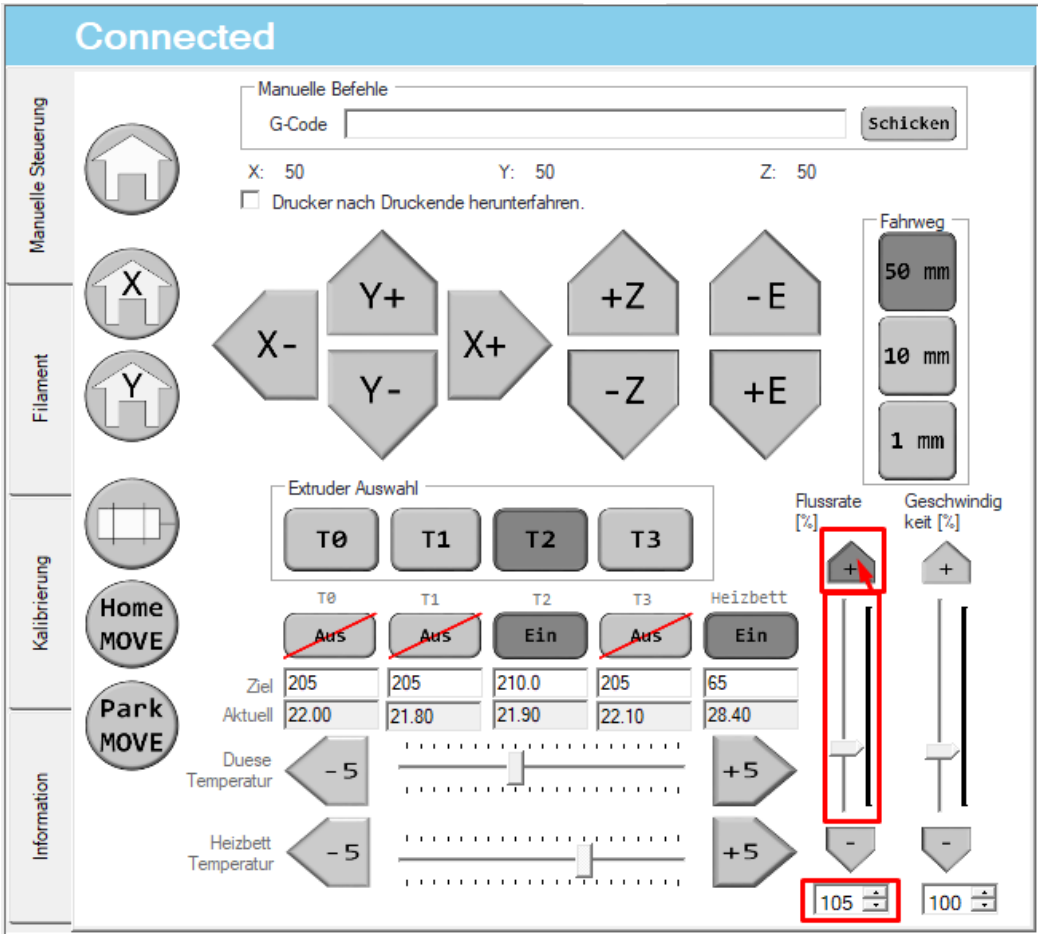

Figure 4.24: Feed rate and Flow rate

4.1.13 Manual Command Text Box

The user us also able to send any GCode or MCode command, the user wishes, from the text box shown in Figure 4.25. This gives the user freedom to send any GCode or MCode the user wishes. It can be done by simply typing the Code and then hitting enter or by clicking the Send button. The plugin also saves the previously typed in commands in the text box, they can be accessed by clicking the up or down arrow keys in the keyboard.

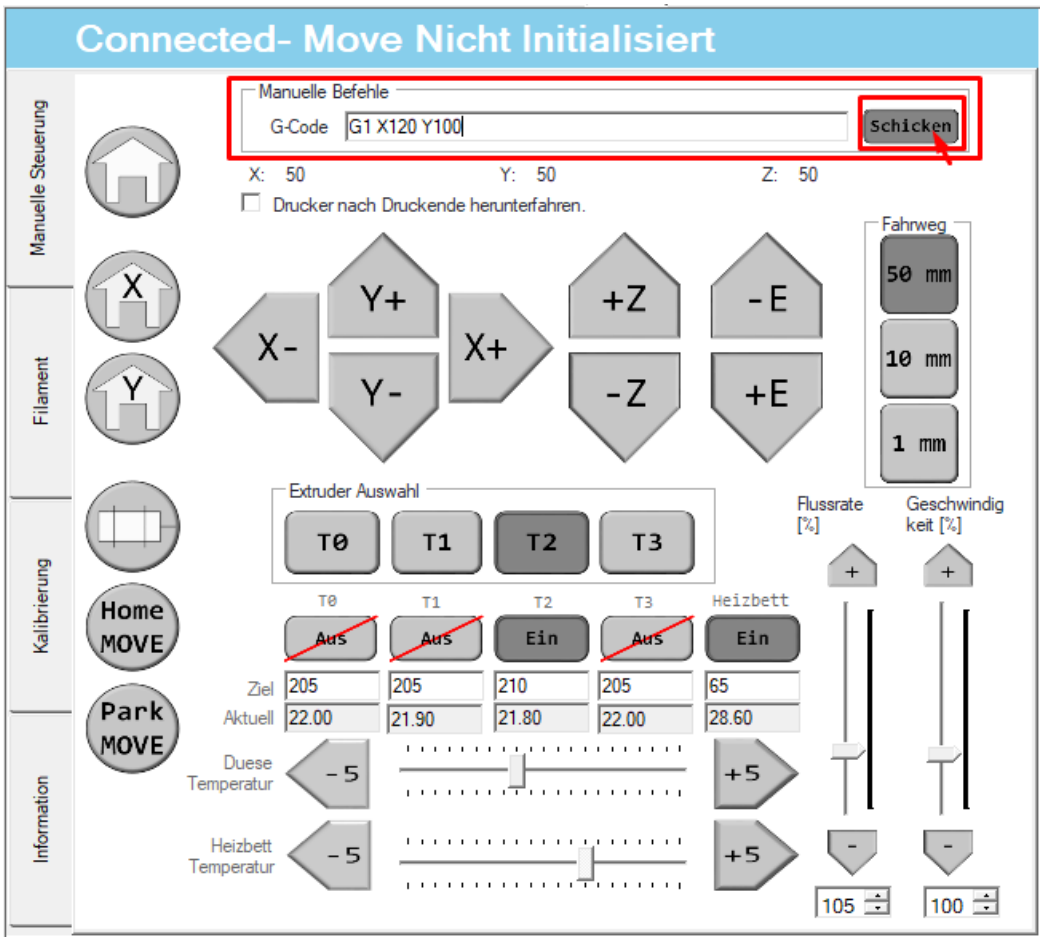

Figure 4.25: Feed rate and Flow rate

4.1.14 Shut Down Printer After Print Check Box

The check box shown in Figure 4.26, can be used by the user to shutdown the printer after the printjob is done. When checked, the printer shuts down after the printing is complecte and when not checked, it does not shut down.

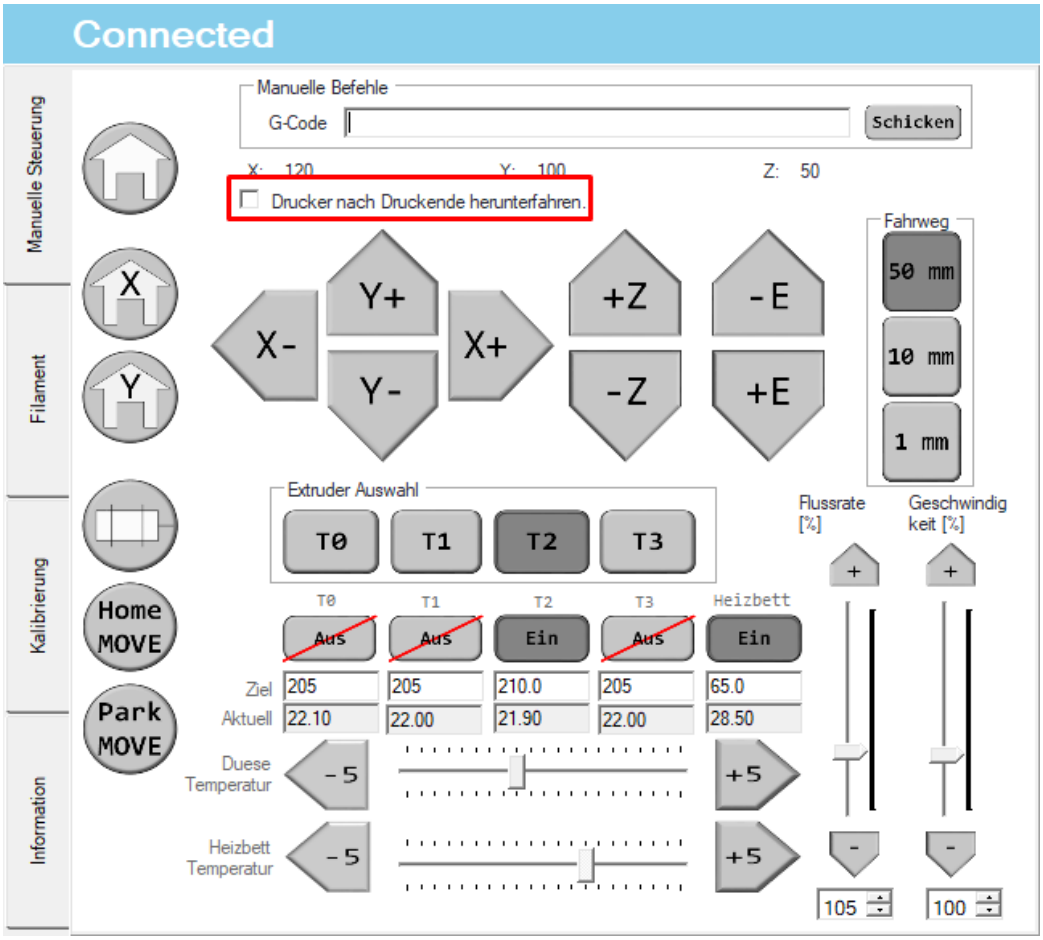

Figure 4.26: Feed rate and Flow rate

4.2 Tab 2: Filament Control

4.2.1 Filament Status

This is the second tab in the plugin, and this tab is responsible for checking the status of the filament, loading and unloading the filament in the printer.

The Figure 4.27 shows the status of the filament, if it is loaded or not. When the filament is not loaded, the labels read ”Filament Leer” for each of the respective nozzles and ”Filament Vorhanden” when the filament is loaded in the nozzle. The filament status can be updated using the ”Aktulisieren” button on the right.

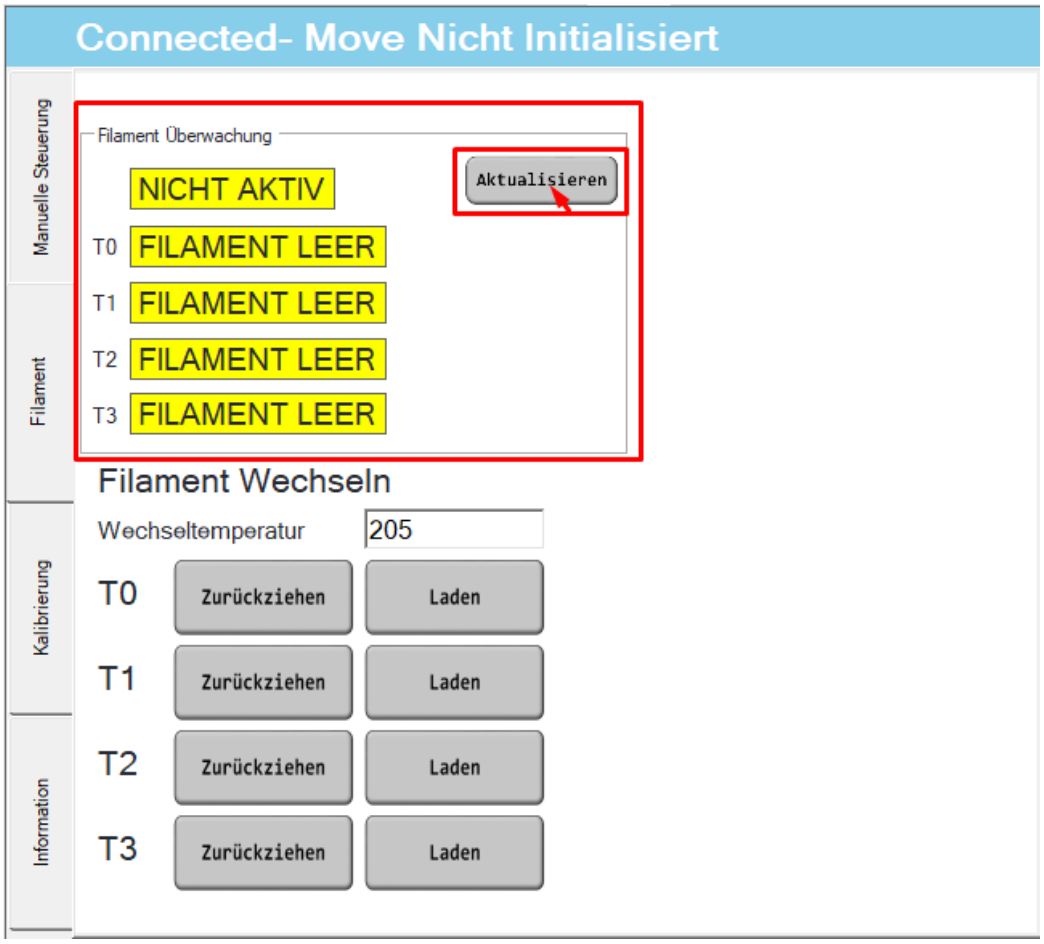

Figure 4.27: Filament Status

4.2.2 Filament Change

This section is responsible for the loading and unloading of the filament and how this works will be explained in this section of the documentation.

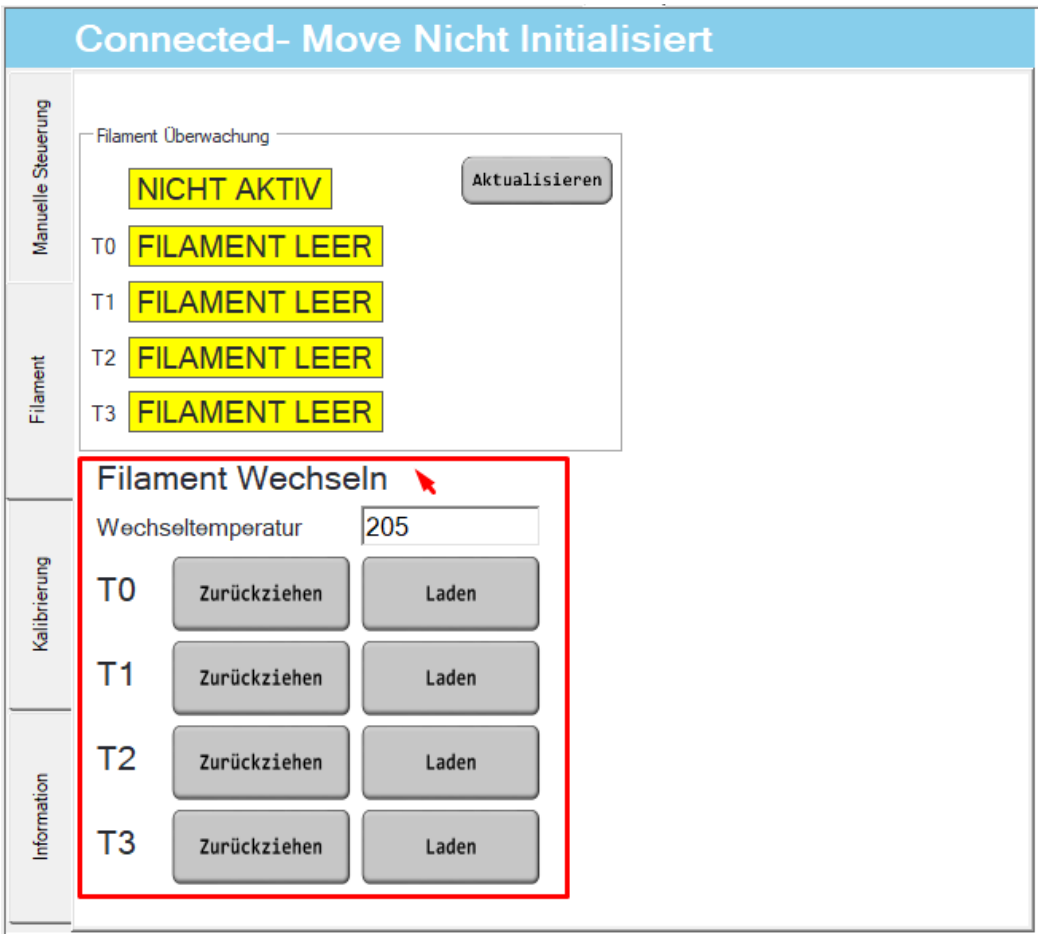

Figure 4.28: Filament Change Section

Set filament change temperature before load or unload:

Different filaments need different temperatures for them to be loaded or unloaded. Using the text box highlighted in Figure 4.29 the user can manually input temperature for the nozzle to be heated to, before the filament can be loaded or unloaded. This has to be done before the filament can be loaded or unloaded. The default temperature is set to 205 degree celcius.

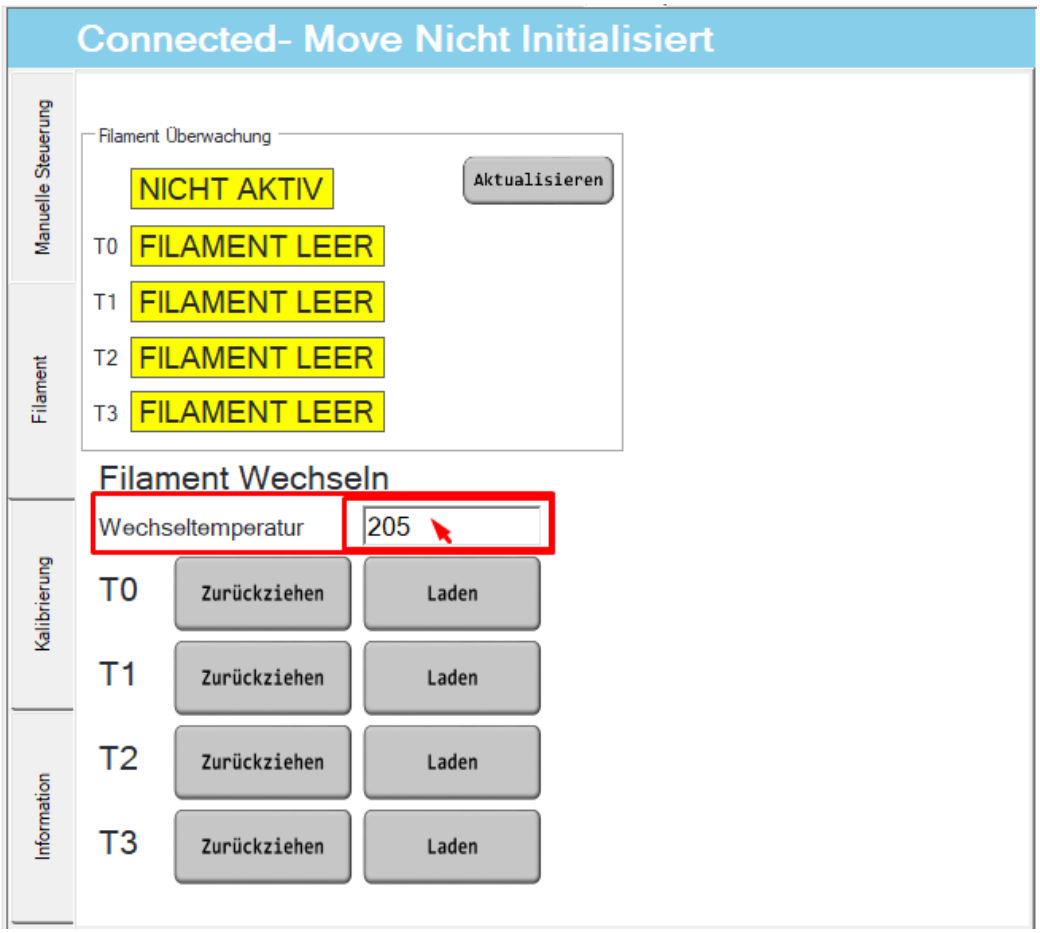

Figure 4.29: Text Box to set Filament Change Temperature

Unload Filament:

The button ”Zurckzehen” can be pressed to unload the filament from a particular nozzle. The Figure 4.30 shows the ”Zurckzehen” button being pressed for nozzle T0.

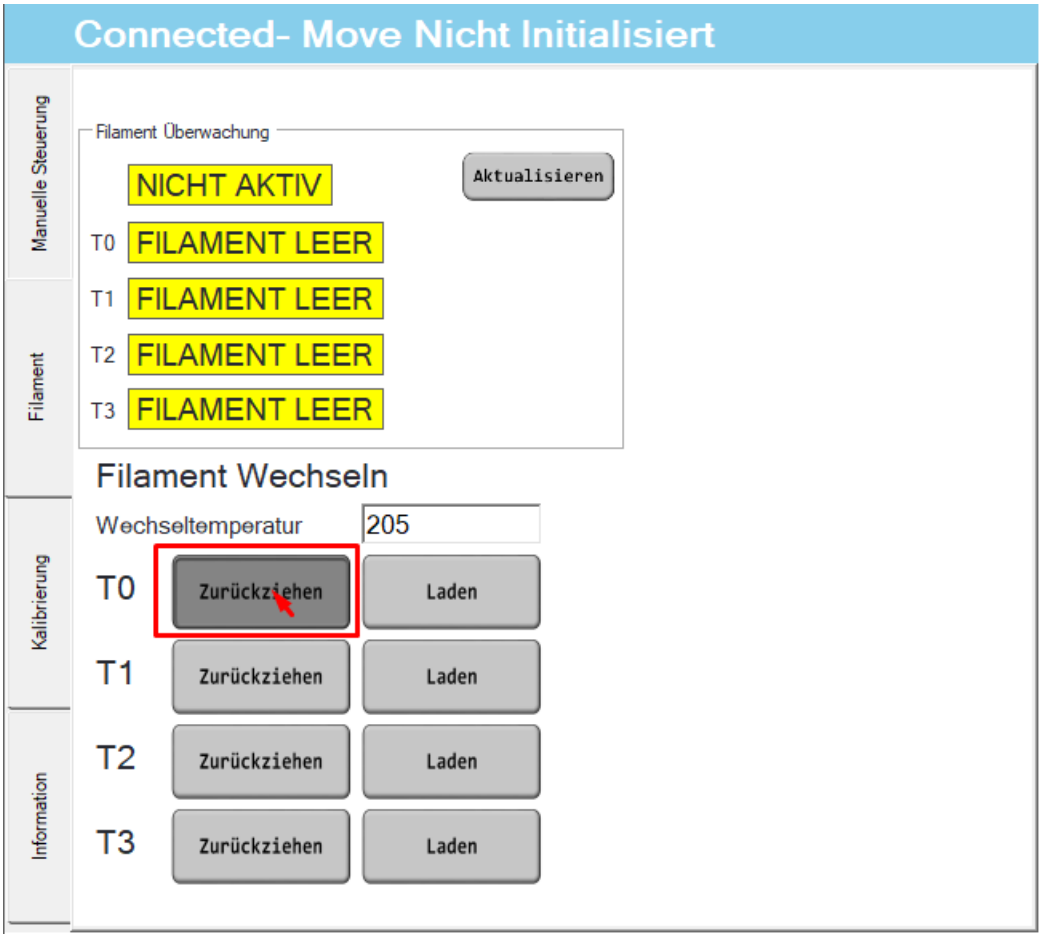

Figure 4.30: Unload Filament Button Press Nozzle T0

When filament unloading is started for nozzle T0, the label beside the buttons show that the nozzle is being heated to the target temperature that was set in the ”Wechseltempatur” text box. All the buttons are then deactivated while this unloading process is taking place. This can be seen in the Figure 4.31.

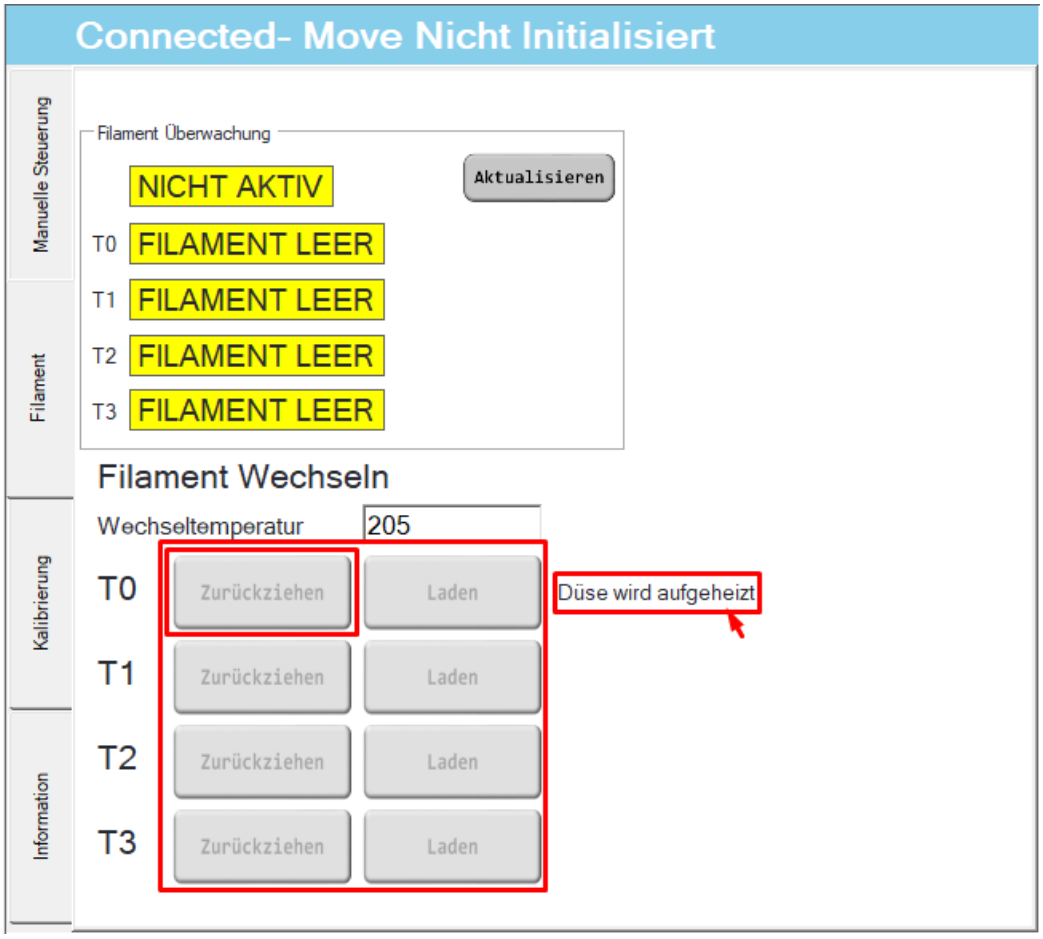

Figure 4.31: When unloading started for Nozzle T0

The Figure 4.32 shows the change in label when the unloading has ended. Now the user is able to only load, and not able to unload this nozzle again, until he has loaded this nozzle. This is a precaution, to make sure that the user does not accidentally tries to unload a particular nozzle which was previously unloaded. But the user should bear in mind, that on connection everything is reset. So if the user has unloaded a particular nozzle and then disconnects and connects the host again, then the user can click ”Zurckzehen” button for a nozzle which doesnt have a filament in it. So the user should always check the current Filament Status of the nozzle before clicking ”Laden” or Zurckzehen” button.

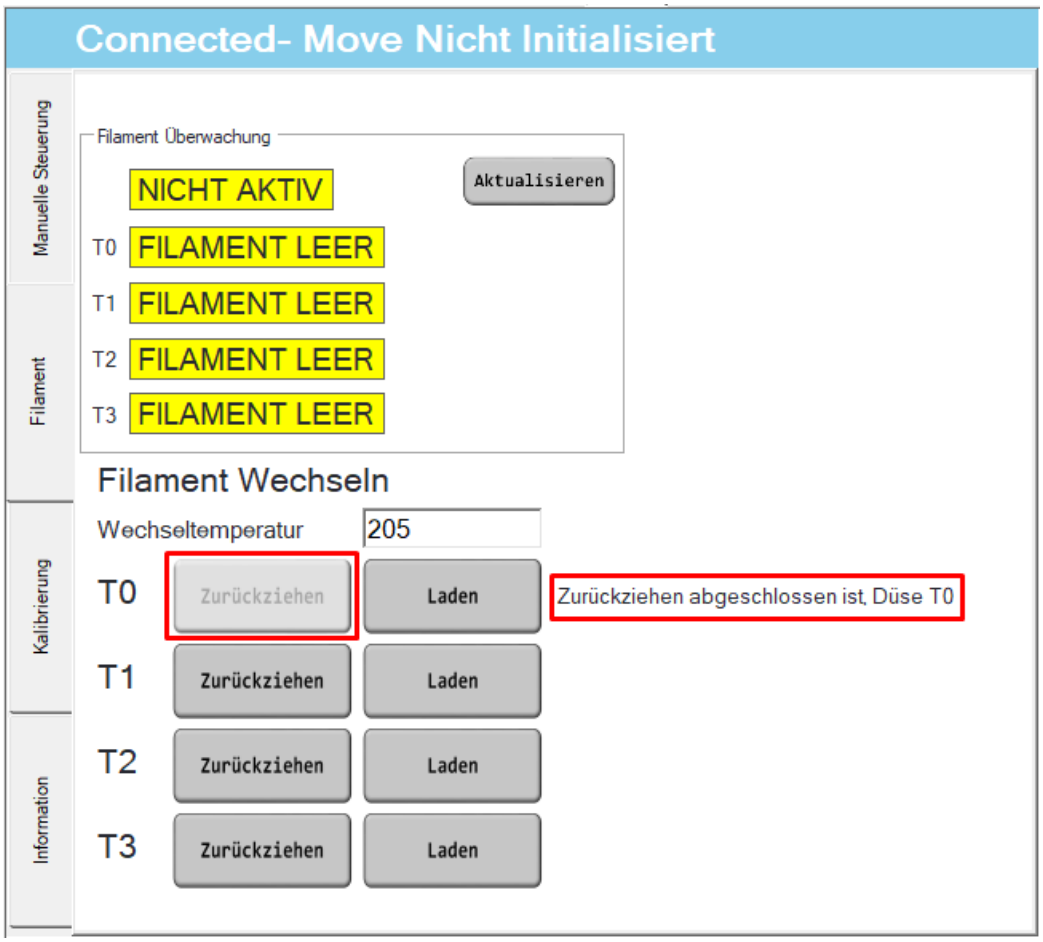

Figure 4.32: When unloading ended for Nozzle T0

Load:

The button ”Laden” can be pressed to load the filament from a particular nozzle. The Figure 4.33 shows the ”Laden” button being pressed for nozzle T0.

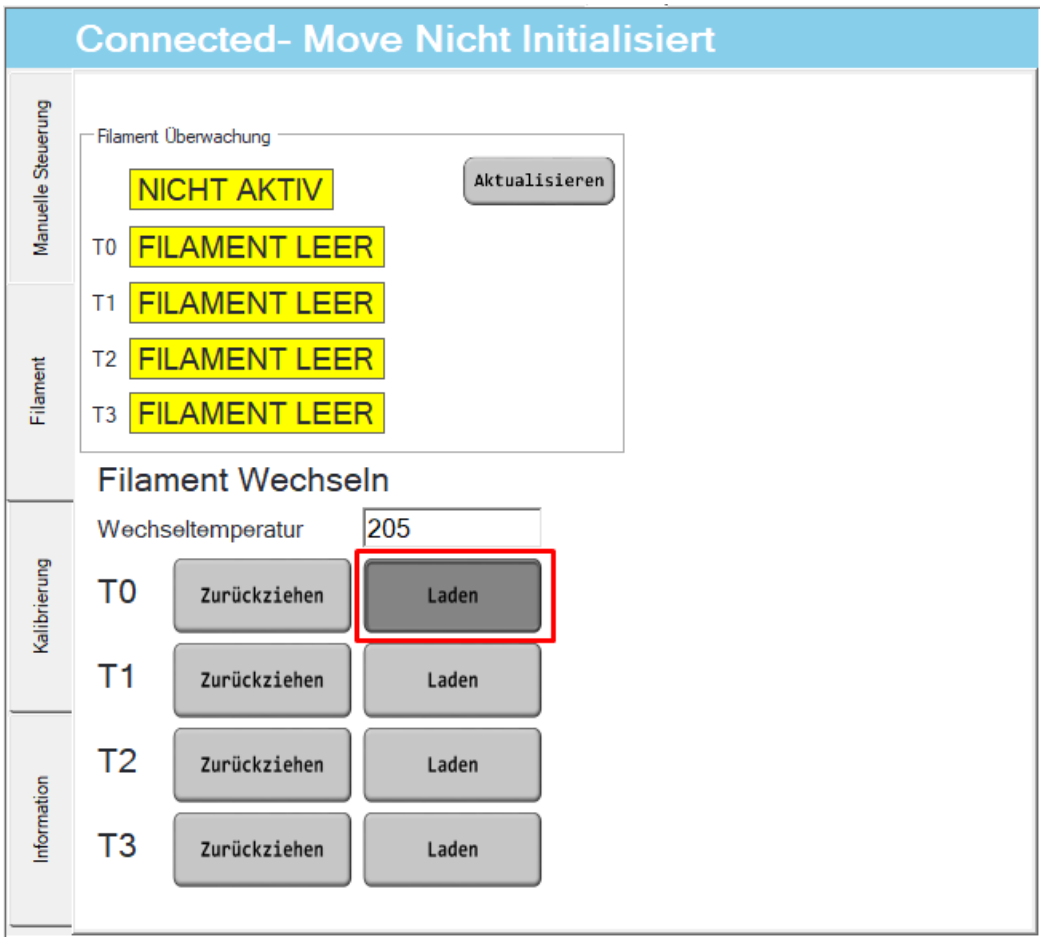

Figure 4.33: Load Filament button press for Nozzle T0

When button ”Laden” is pressed a pop-up comes up to ensure that the button was not accidentally pressed. Because unlike unloading, the loading button can actually cause a problem and extrude a lot of the filament, if there was already filament loaded in this Nozzle. This pop-up ensure this kind of error. The user can click ”Cancel” to cancel the process. When the user is sure that he wants to load this Nozzle, the user should click ”OK”, as shown in Figure 4.34.

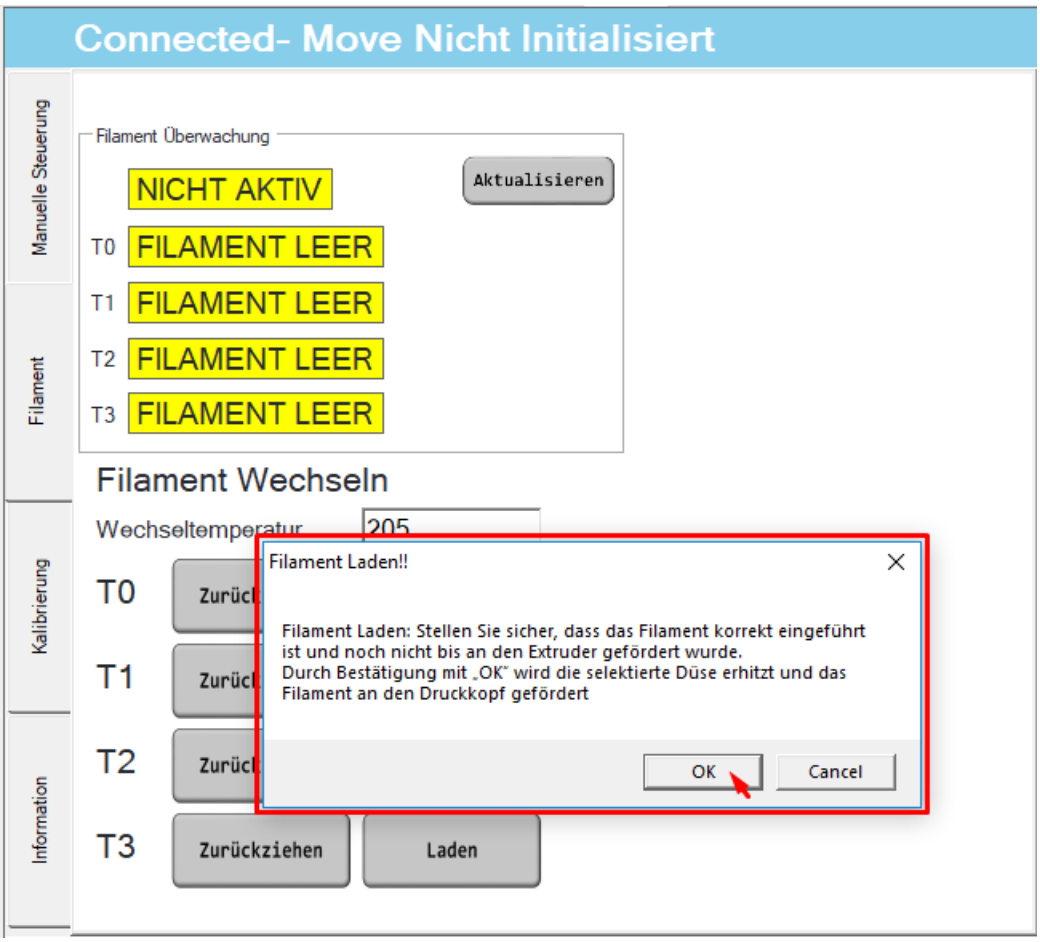

Figure 4.34: Pop-up on the Load button click

When filament loading is started for nozzle T0, the label beside the buttons show that the nozzle is being heated to the target temperature that was set in the ”Wechseltempatur” text box. All the buttons are then deactivated while this loading process is taking place. This can be seen in the Figure 4.35.

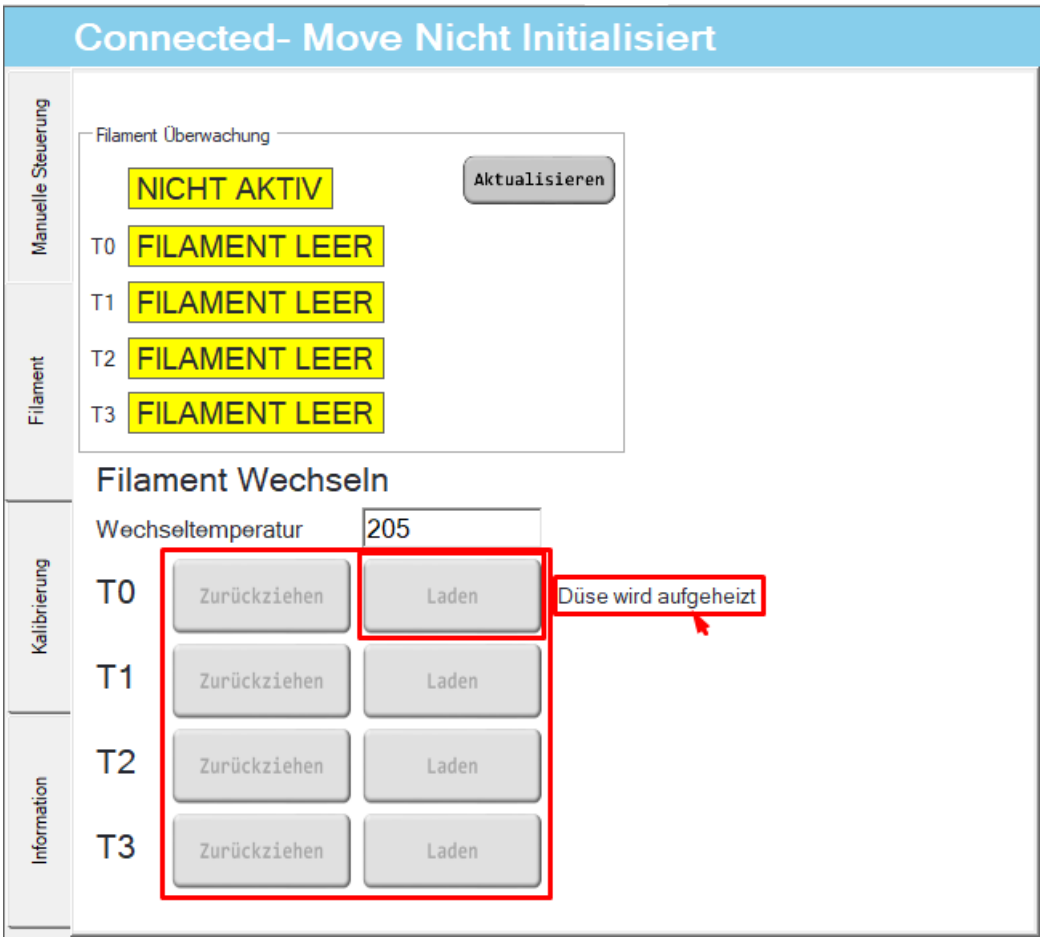

Figure 4.35: When Loading started for Nozzle T0

The Figure 4.36 shows the change in label when the loading has ended. Now the user is not able to load this nozzle again, until he has unloaded this nozzle. This is a precaution, to make sure that the user does not accidentally tries to load a particular nozzle which was previously loaded. But the user should bear in mind, that on connection everything is reset. So if the user has loaded a particular nozzle and then disconnects and connects the host again, then the user can click ”Laden” button for a nozzle which alread has a filament in it. So the user should always check the current Filament Status of the nozzle before clicking ”Laden” or Zurckzehen” button.

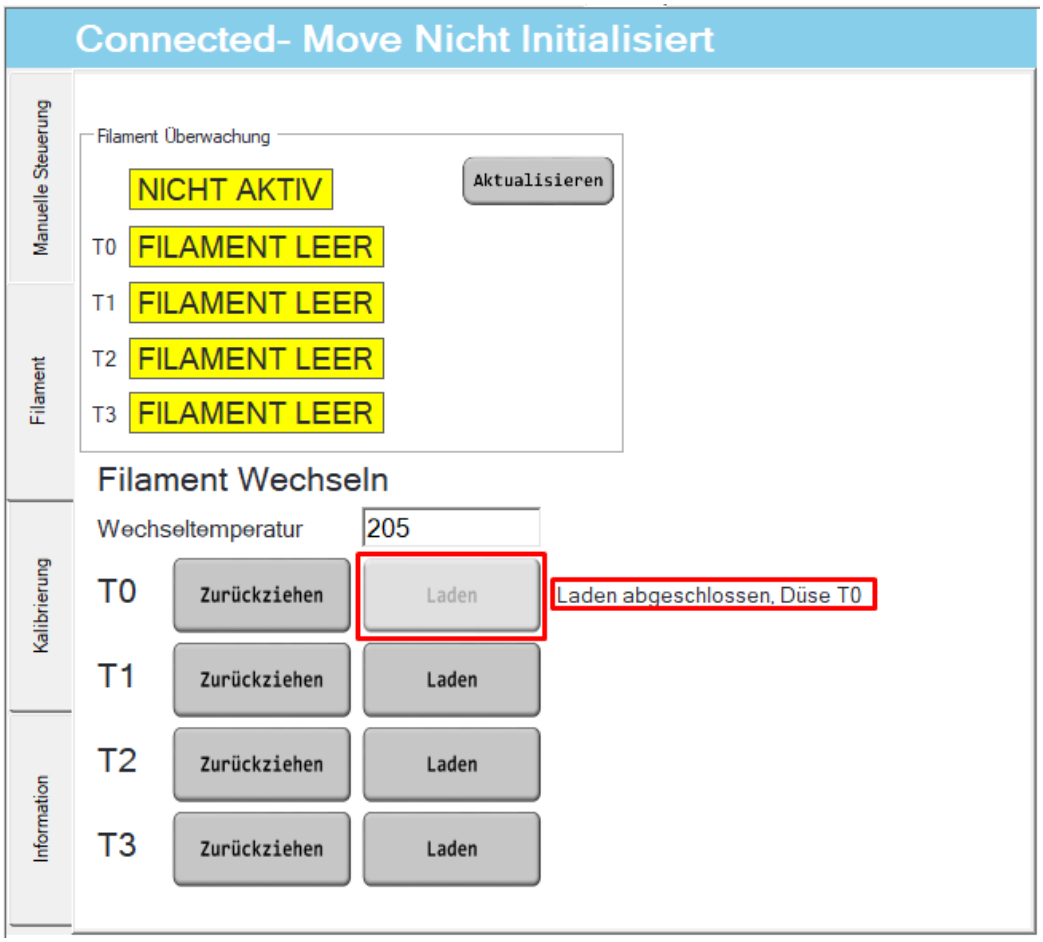

Figure 4.36: When Loading ended for Nozzle T0

4.3 Calibration Tab

4.3.1 Extruder Offset

The third tab, is the Calibration tab, where the nozzles can be manually calibrated for better print quality. This section deals with the Extruder/Nozzle Offset with respect to the Nozzle T0.

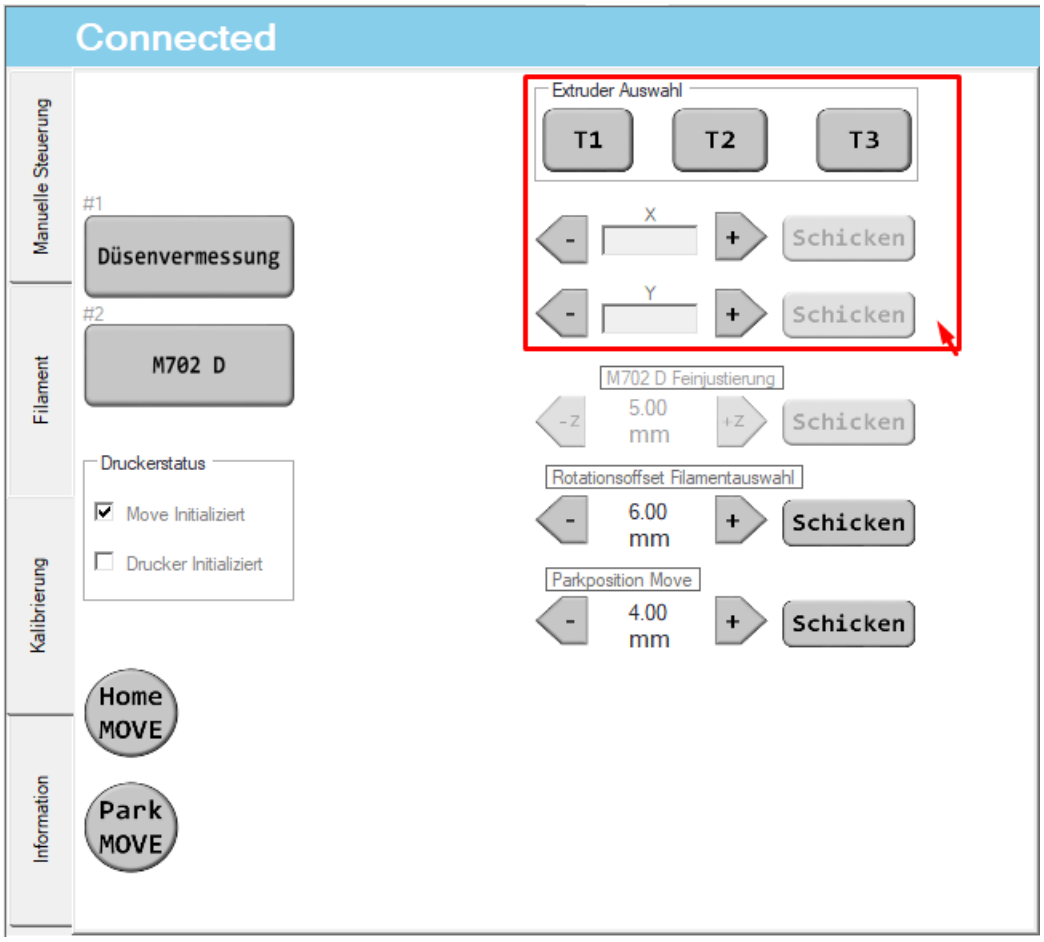

Figure 4.37: Extruder Offset

A nozzle has to be first selected, for which the user wants to view or change the offset values saved. The Figure 4.38 nozzle T1 being selected for offset adjustment. The X and Y offset values for this selected nozzle can then be viewed in the text boxes highlighted In the Figure 4.38

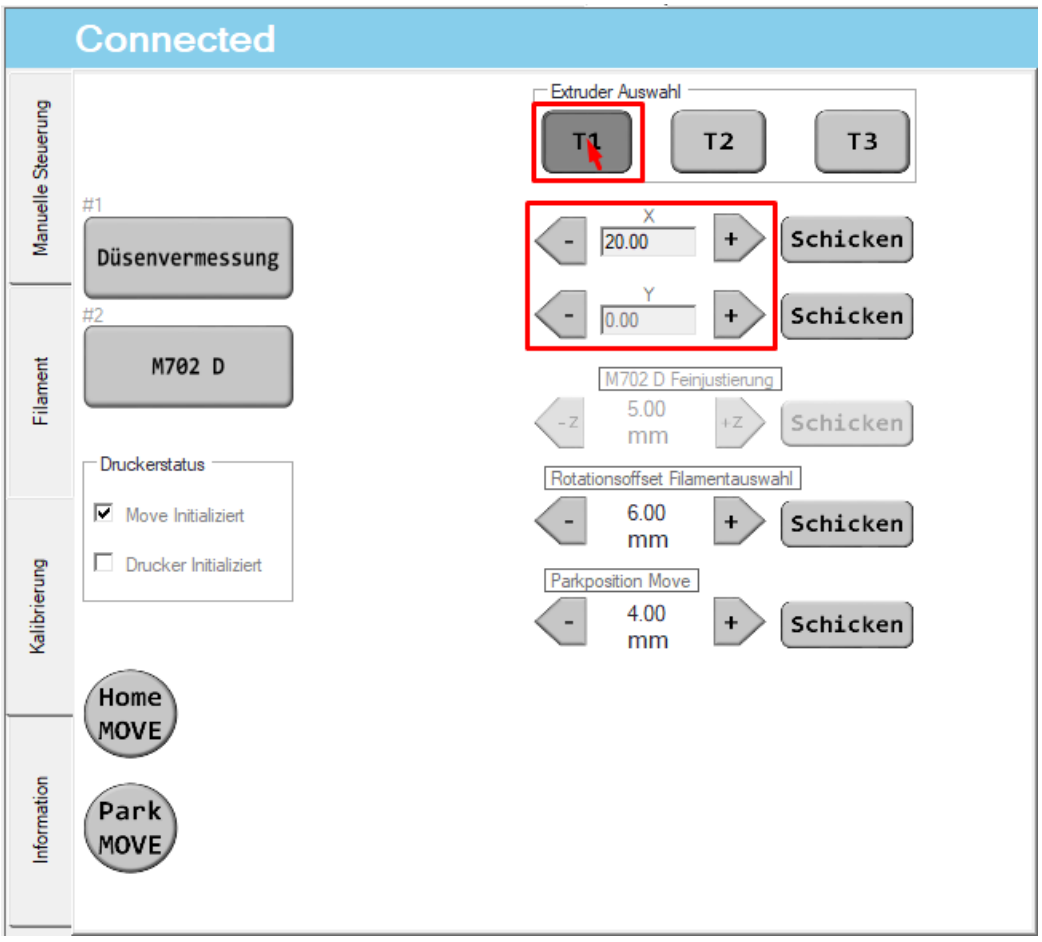

Figure 4.38: Nozzle T1 selected for Extruder Offset

The X or Y offset values can now be increased or decreased, using the plus or minus buttons with the respective text boxes. The Figure 4.39 shows the plus button for the X offset being clicked.

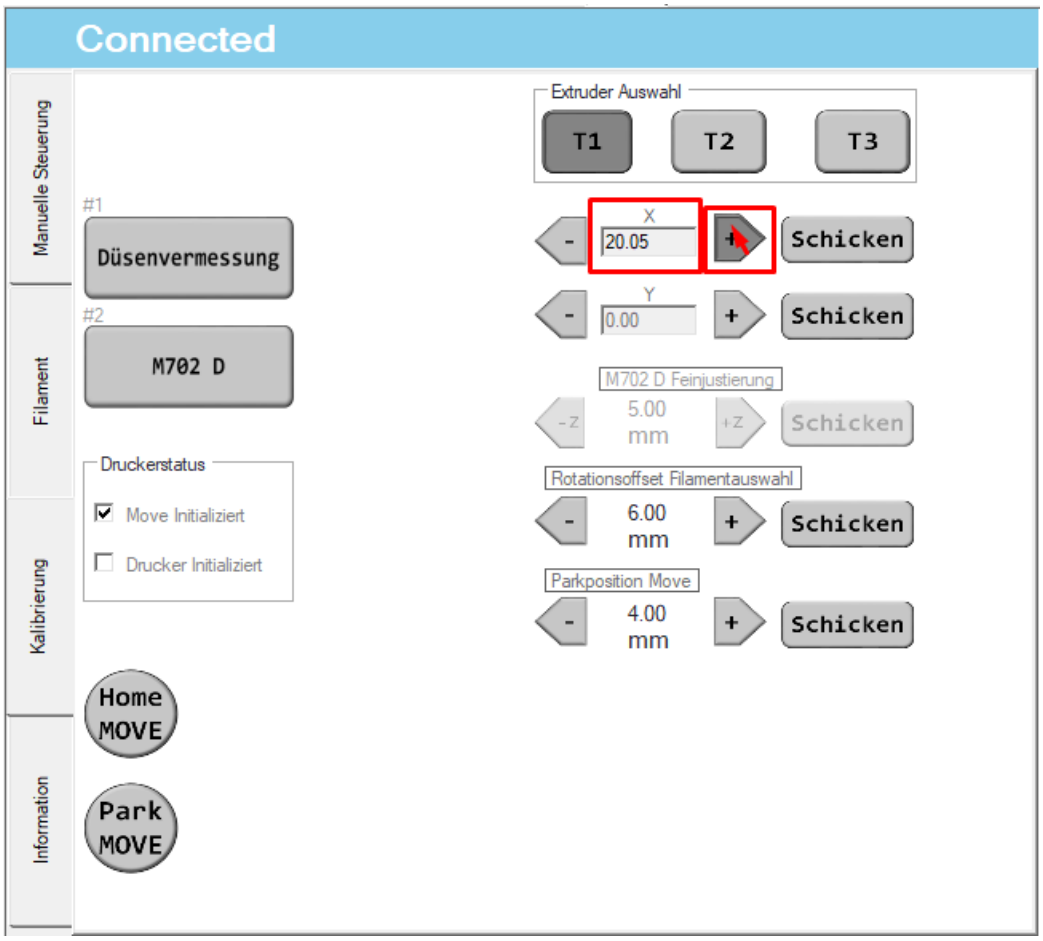

Figure 4.39: Plus button for Nozzle T1 X offset clicked

After the new offset value is sent for the X or Y offset, then it can be sent to the printer, so that it is then saved to the memory of the printer. The Figure 4.40, shows the send button being clicked for the X offset change for Nozzle T1. The same can be done for all the nozzles T1-T3 and both X and Y offset values.

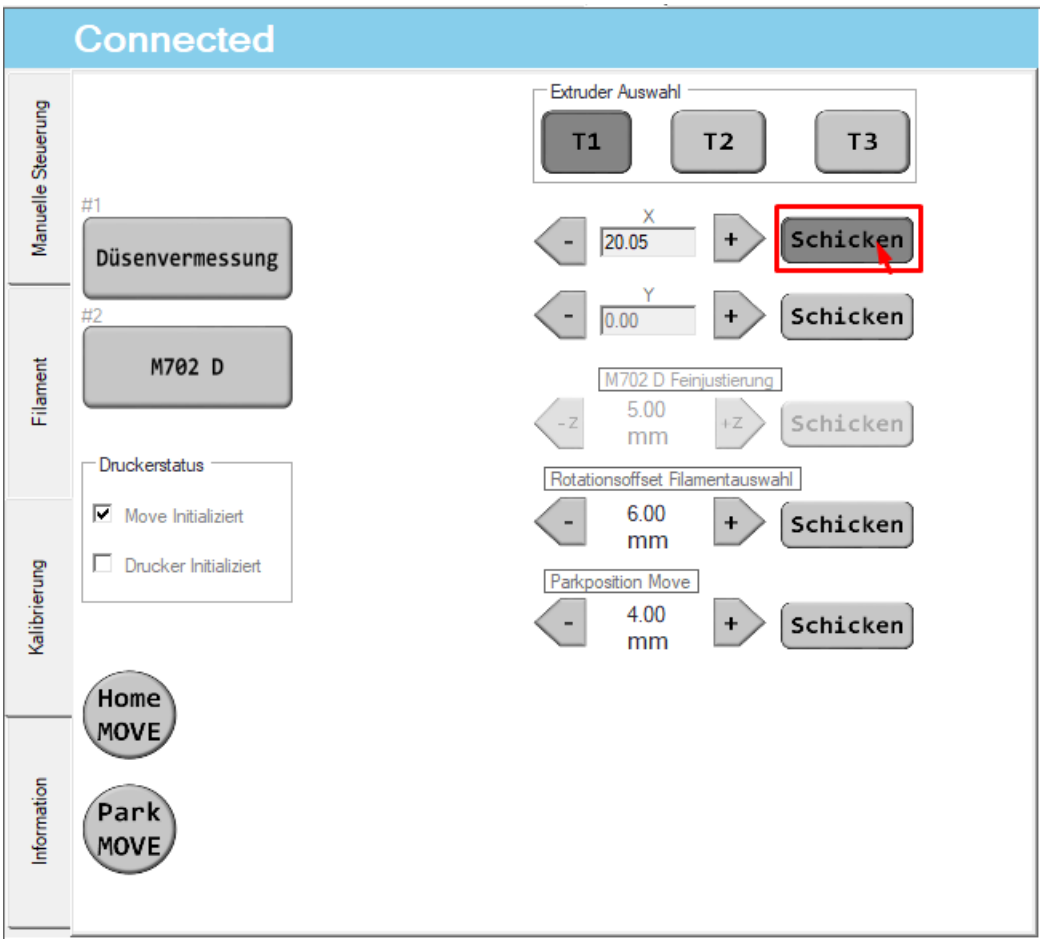

Figure 4.40: Send button clicked for X Offset Nozzle T1

4.3.2 Nozzle Measurement

The Nozzle measurements can be done by clicking the button press; shown in Figure 4.41. This performs the nozzle measurement move in the printer.

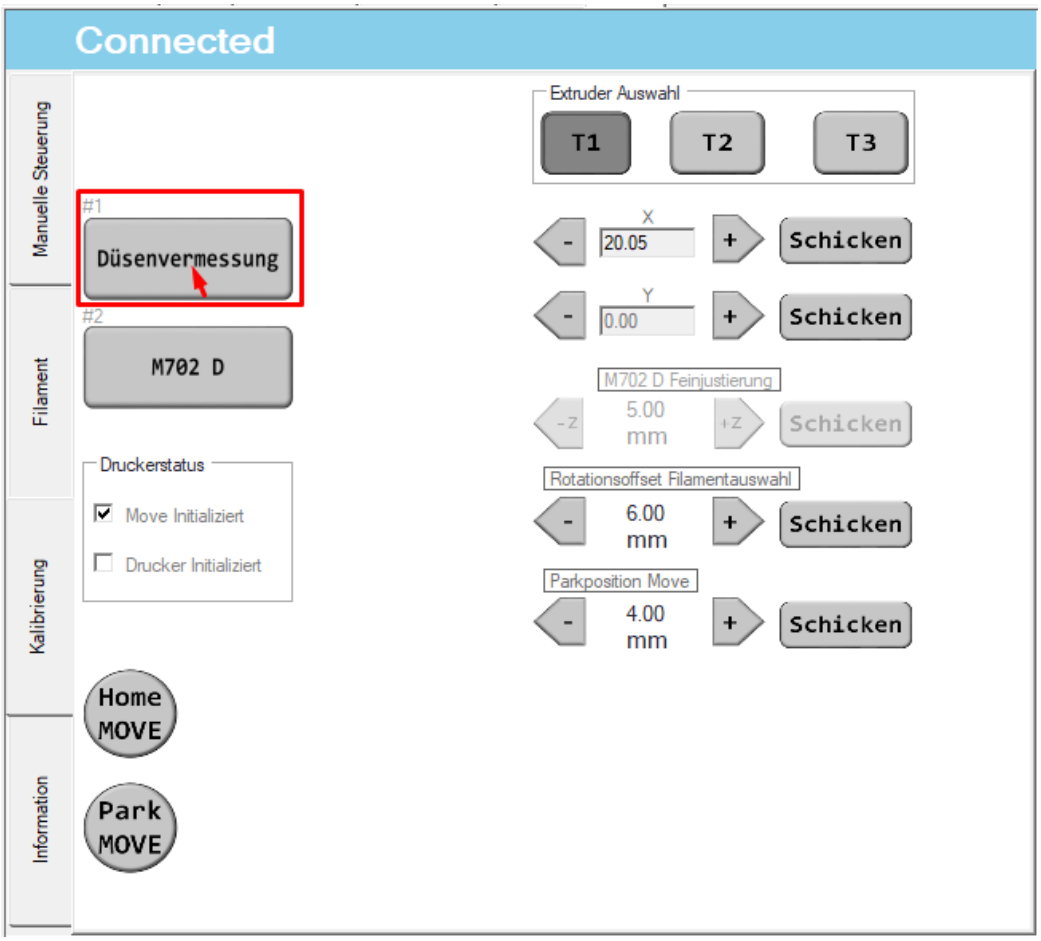

Figure 4.41: Nozzle Measurement button clicked

4.3.3 M702 D: Z-Offset Fine Adjustment

The M702 D, Z-offset value can also be changed for the printer. This can be done first by clickign the ”M702 D” button, as shown in Figure 4.42. When the ”M702 D” button is not clicked, the Fine adjustment is disabled.

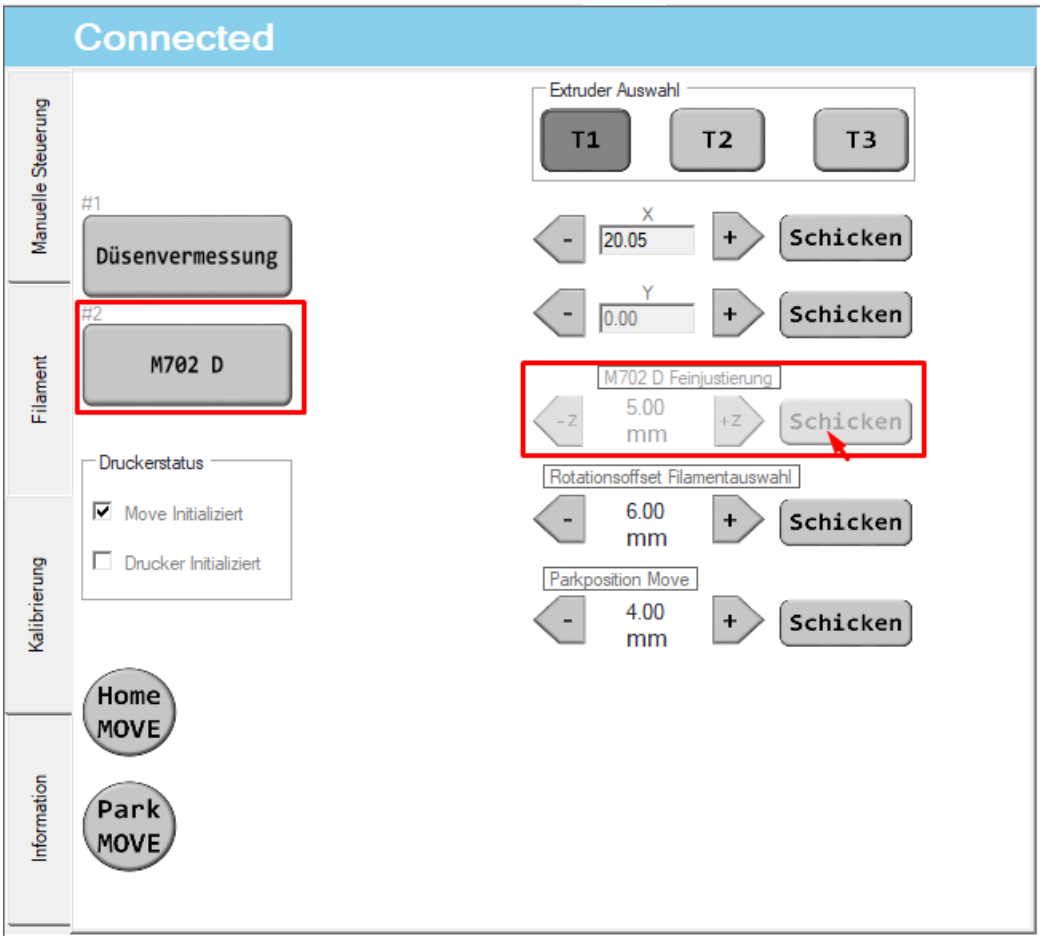

Figure 4.42: M702 D: Z-Offset Fine adjustment

After the ”M702 D” button is clicked, a pop-up comes in which warns the user that Home All move will be performed and to make sure that the bed is free. If it is not then the user should cancel this action and if the bed is free, click ”OK” to continue. Figure 4.43 shows the pop-up.

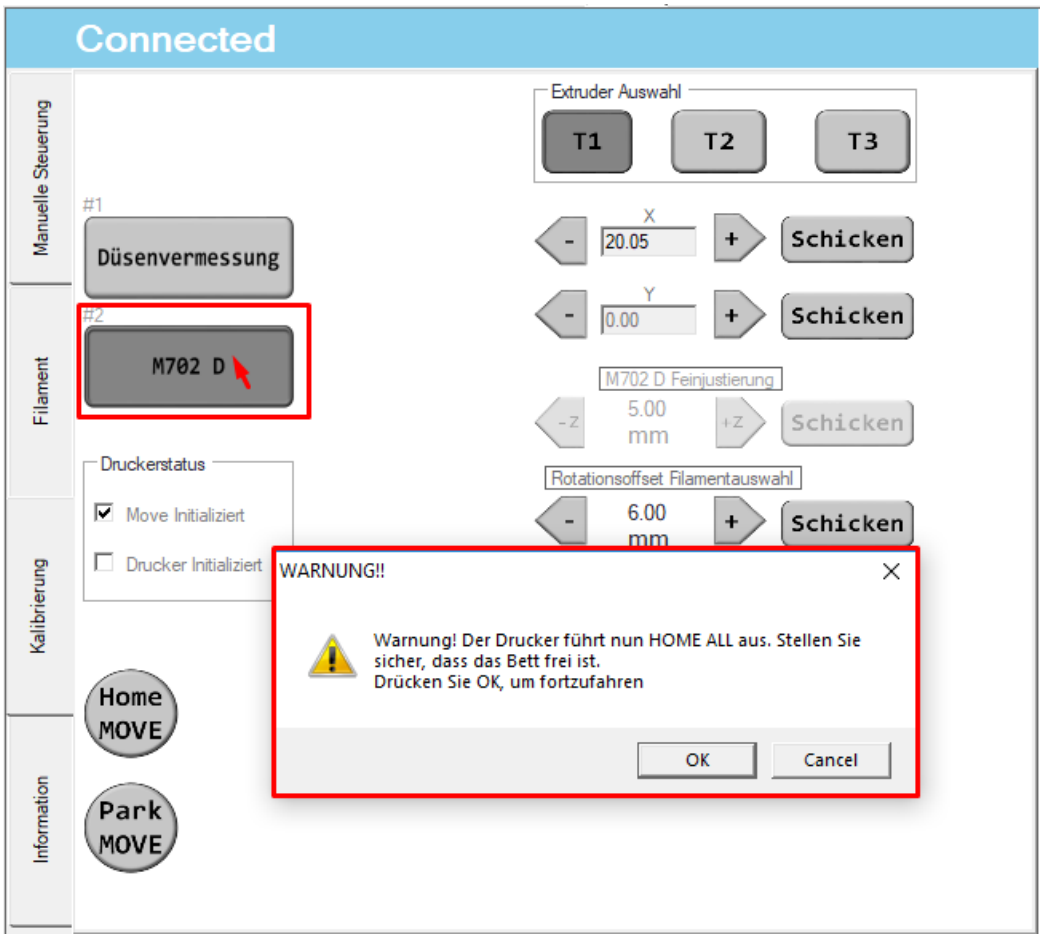

Figure 4.43: Pop-up after M702 D buttons is clicked

Once the user has clicked ”OK”, the user can now change the M702 D Z-offset value. The user can either increase or decrease this value, by clicking the plus or minus button respectively. Figure 4.44 shows the plus button being clicked.

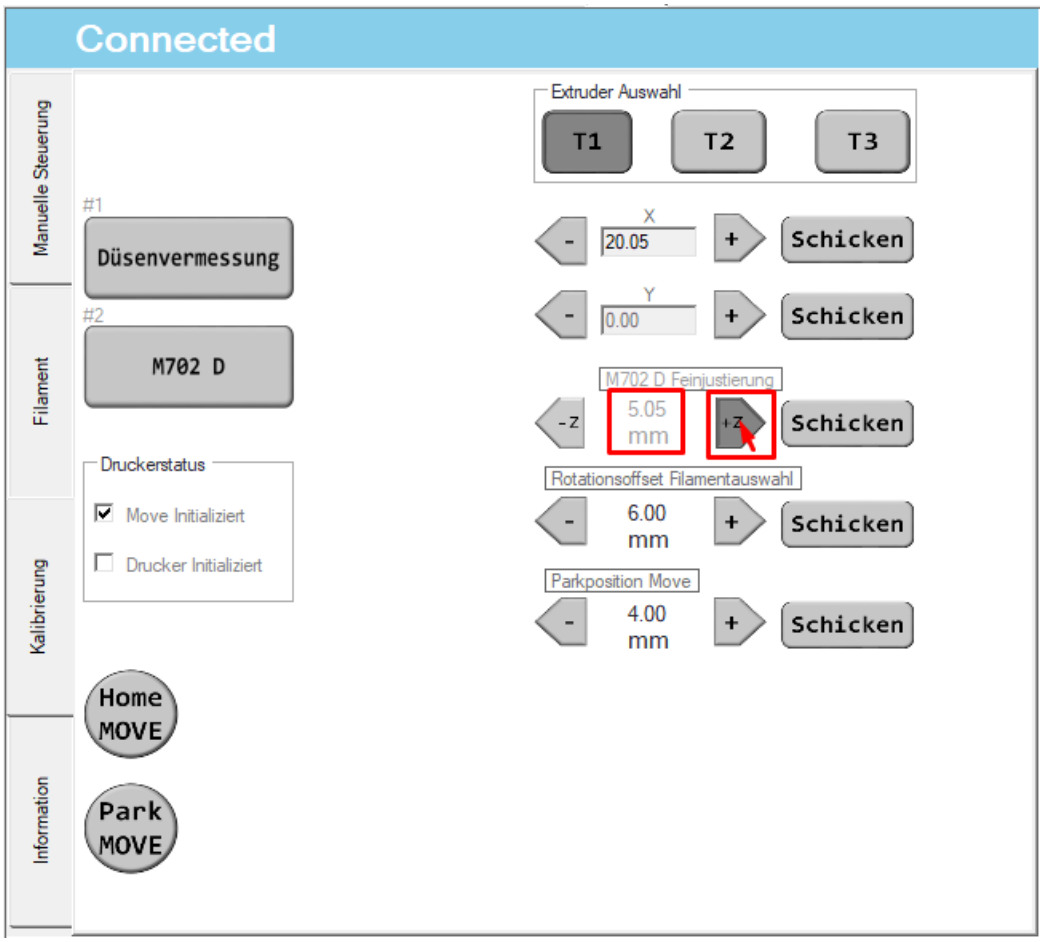

Figure 4.44: M702 D Z-offset, plus button clicked

Once the value is adjusted, the send button can be clicked to send this new value to the printer memory, as shown in Figure 4.45.

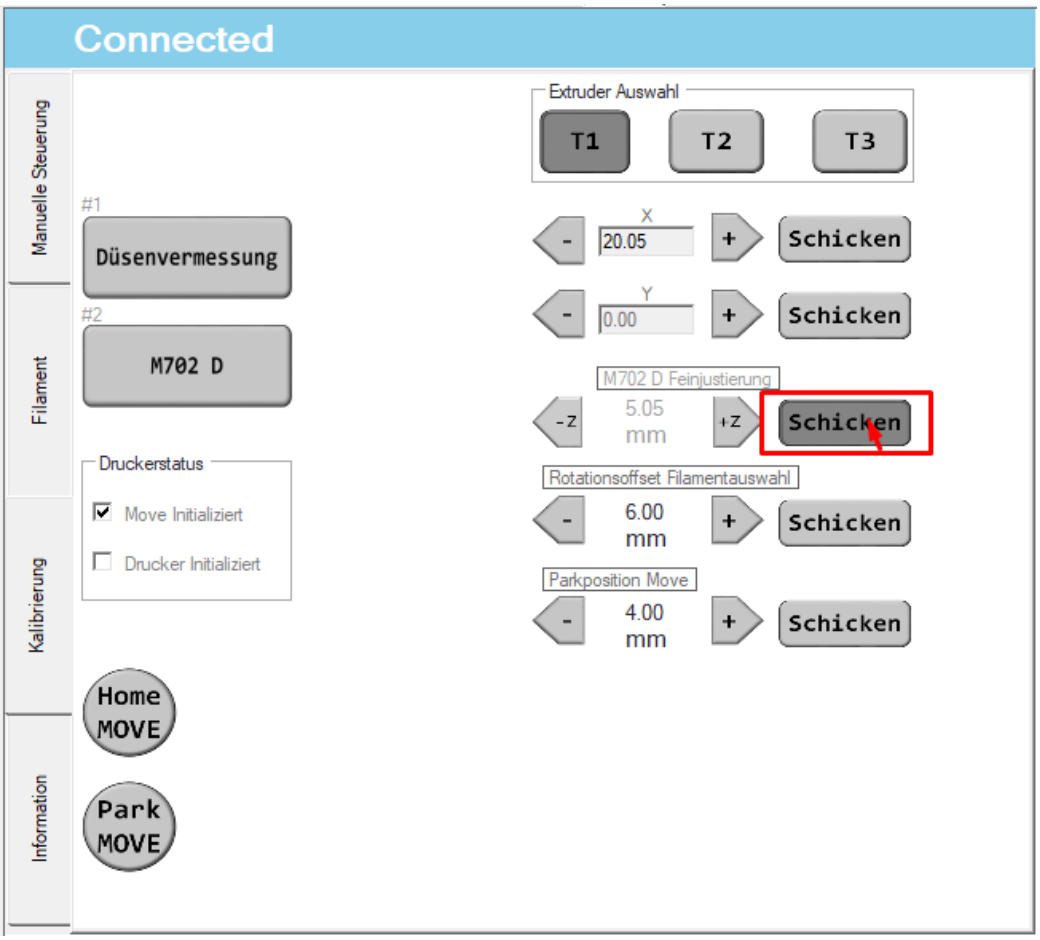

Figure 4.45: M702 D Z-offset Send click

4.3.4 Rotational Offset for Filament Selection

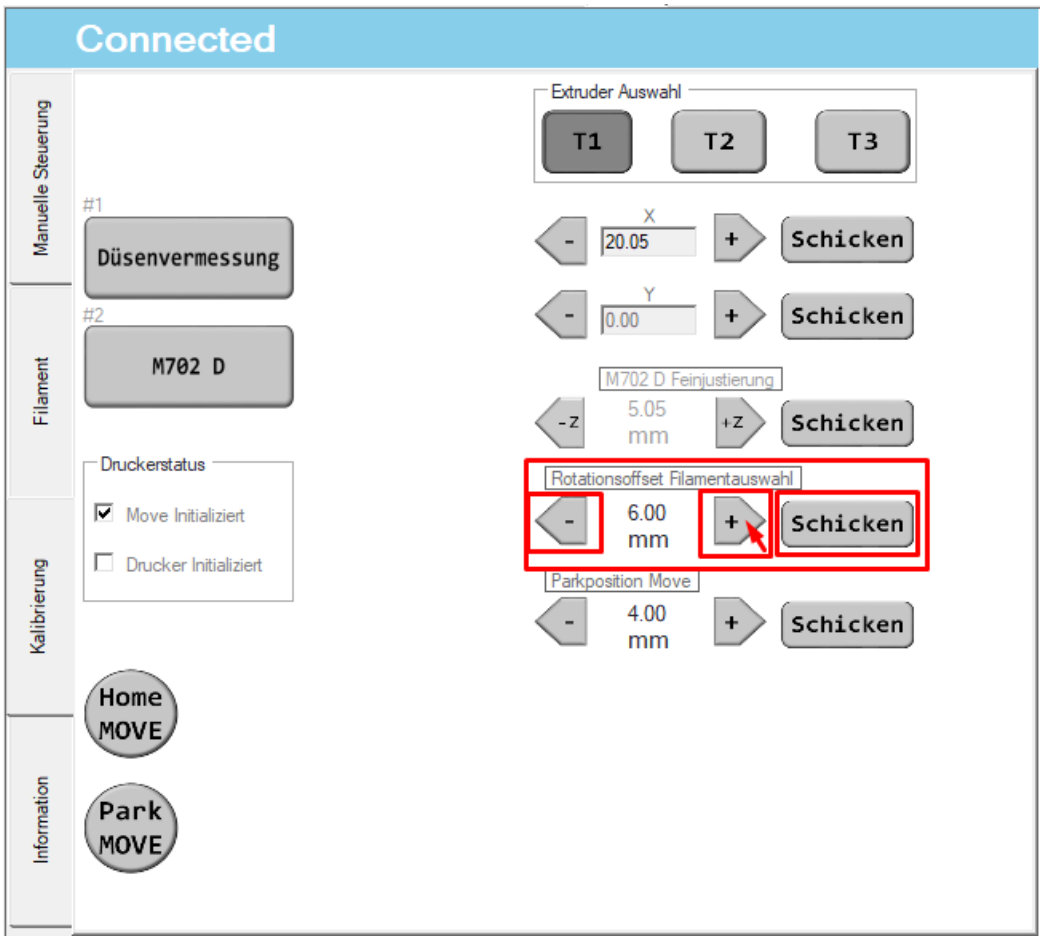

Figure 4.46: Rotational Offset for Filament Selection

The rotational offset for the filament Selection can also be changed using the highlighted section in Figure 4.46 The user can either increase or decrease this value,

by clicking the plus or minus button respectively. Figure 4.47 shows the plus button being clicked.

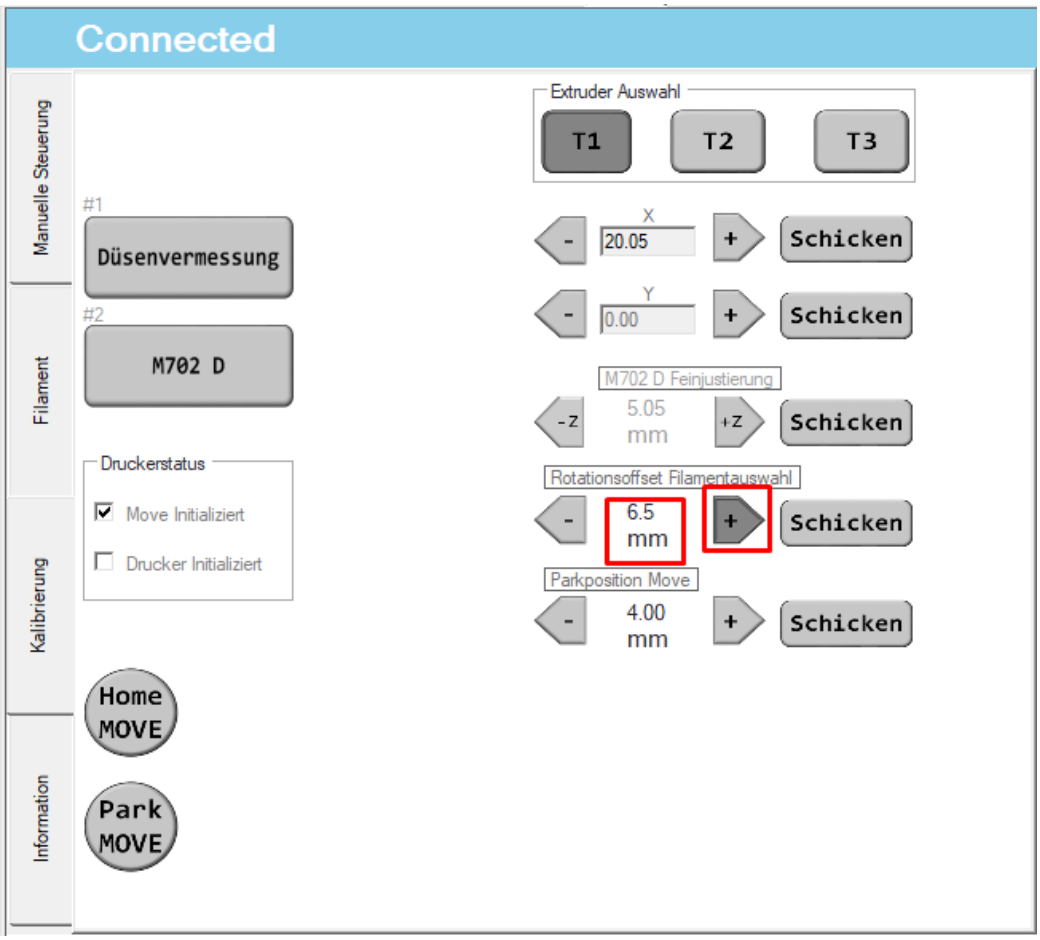

Figure 4.47: Rotational Offset for Filament Selection: Plus button clicked

Once the value is adjusted, the send button can be clicked to send this new value to the printer memory, as shown in Figure 4.48.

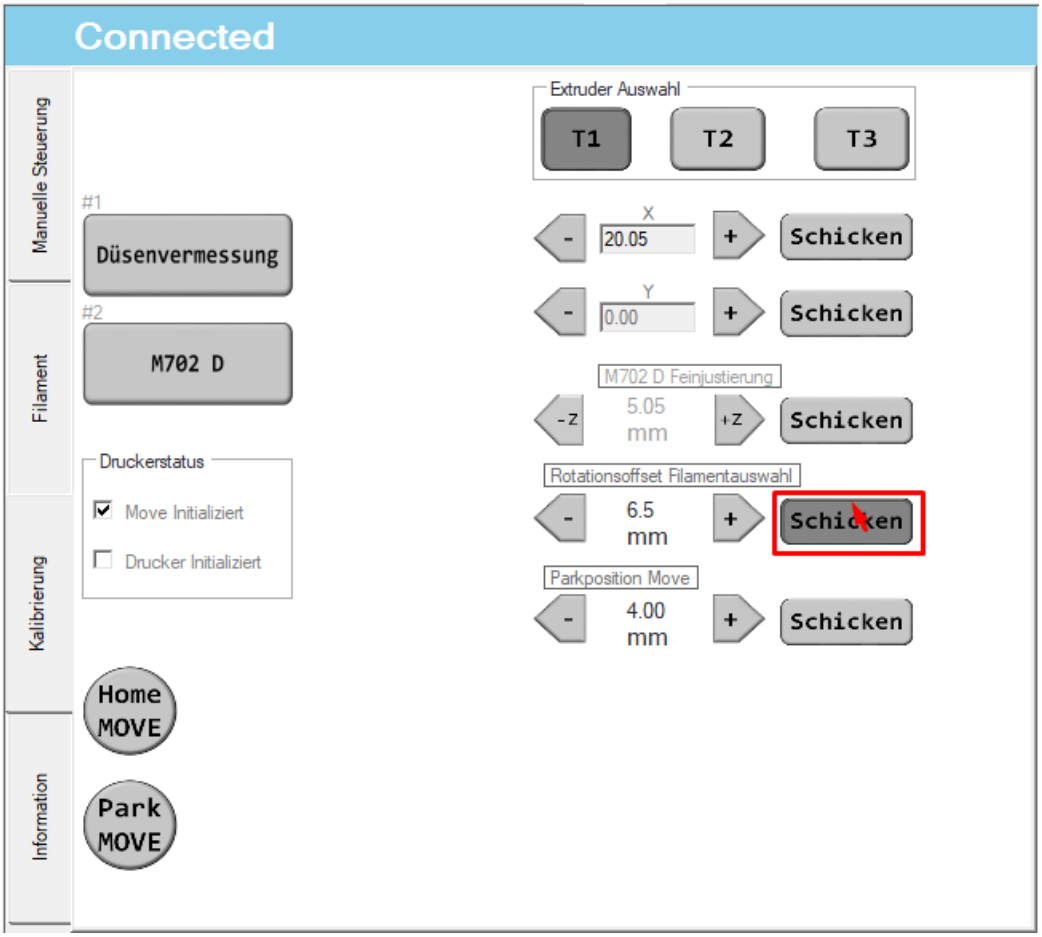

Figure 4.48: Rotational Offset for Filament Selection: Send button clicked

4.3.5 Park Position Move

The highlighted section in Figure 4.49 gives the user freedom to change the Park Position Move value in the printer.

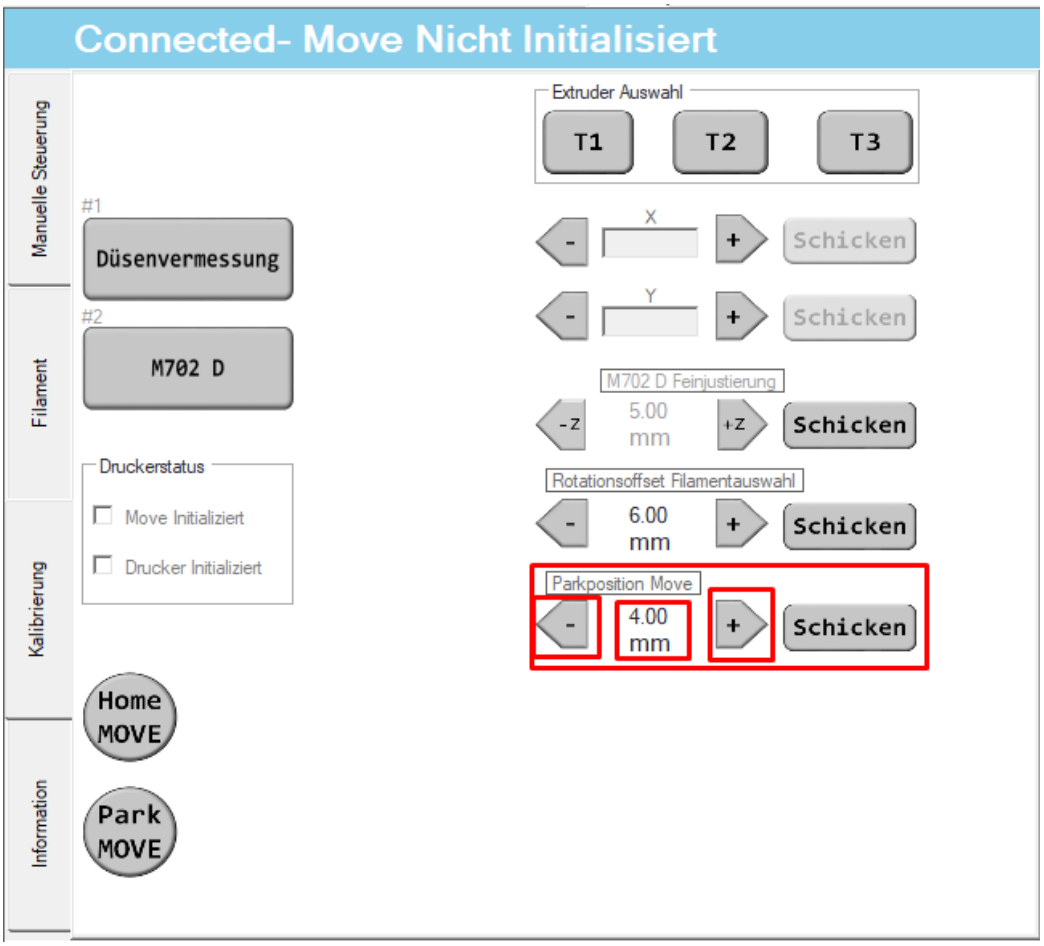

Figure 4.49: Park Position Move

The user can either increase or decrease this value, by clicking the plus or minus button respectively. Figure 4.50 shows the plus button being clicked.

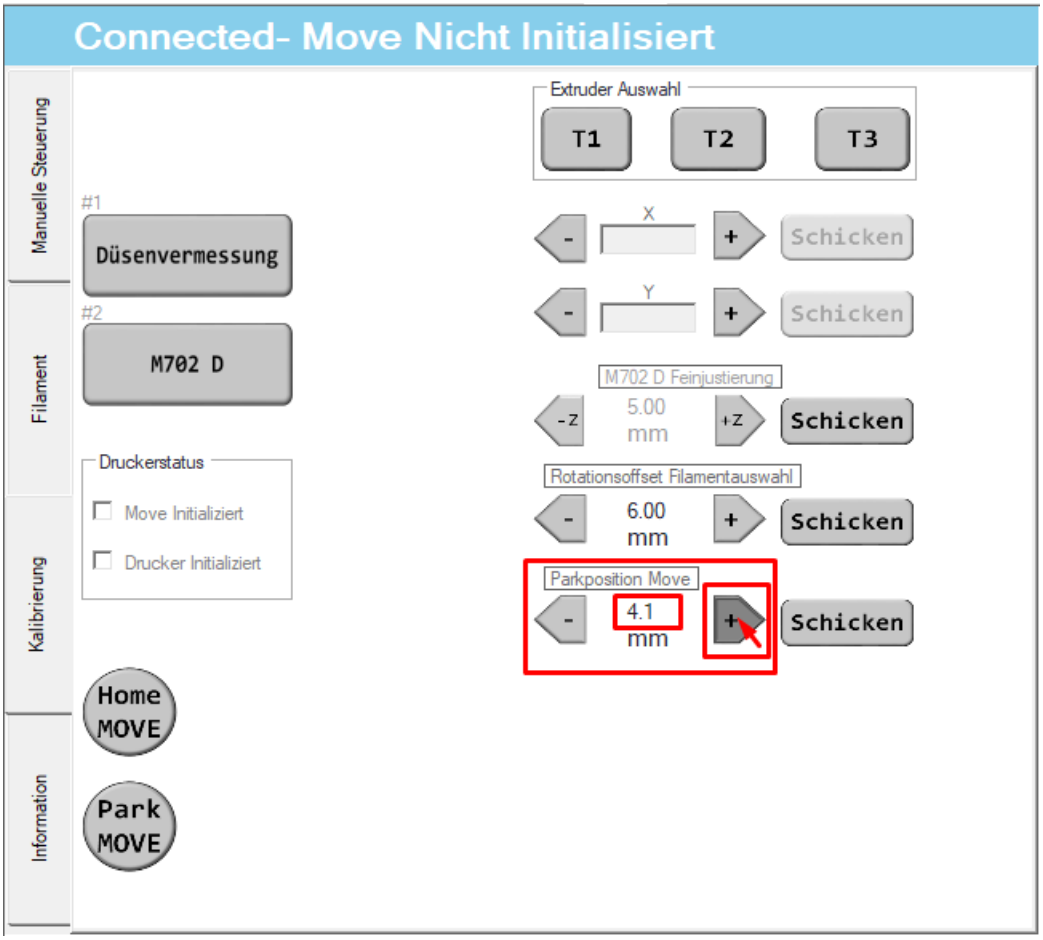

Figure 4.50: Park Position Move: Plus button clicked

Once the value is adjusted, the send button can be clicked to send this new value to the printer memory, as shown in Figure 4.51.

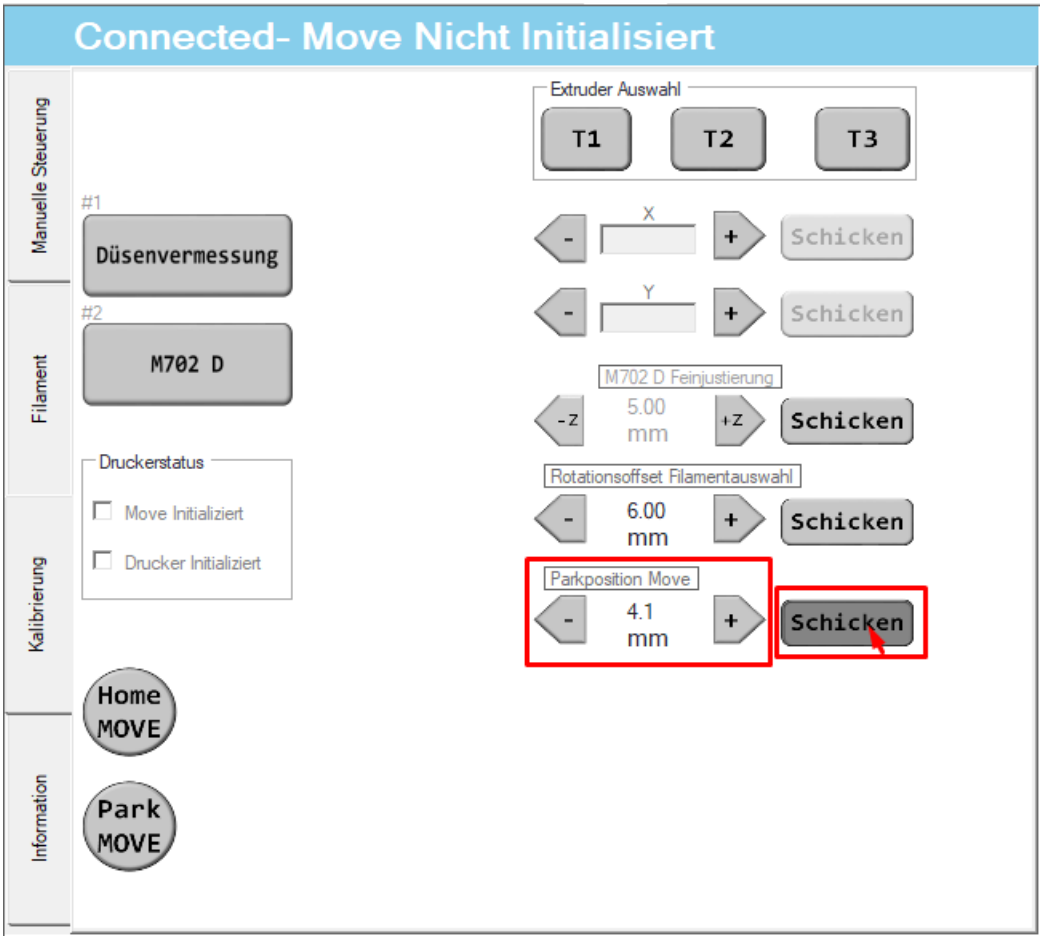

Figure 4.51: Park Position Move: Send button clicked

4.3.6 Printer Status

The figure 4.52 highlights the section which gives information about if the Move or Printer is initialised or not.

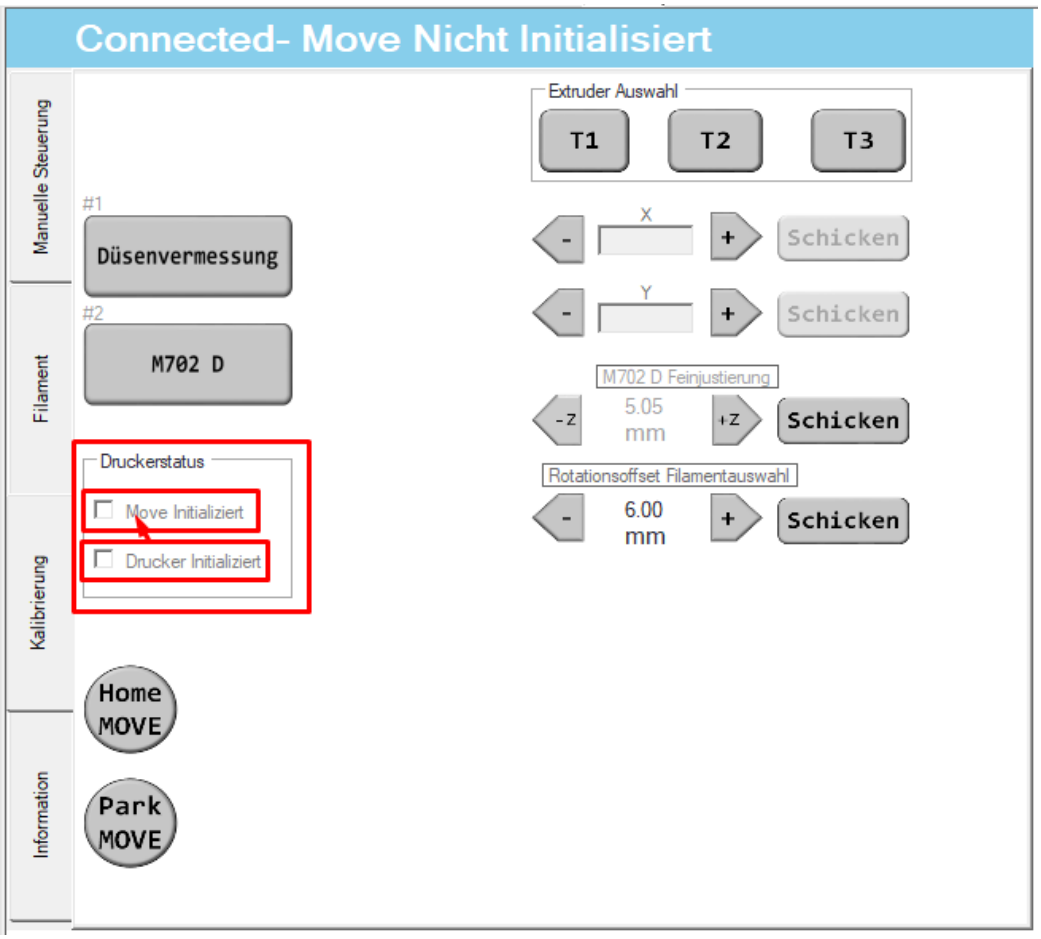

Figure 4.52: Printer Status

If the checkbox is checked, it means it is initalised and not checked means not intialised. The Figure 4.53 shows that the Move is intialised but the Printer is not initialised.

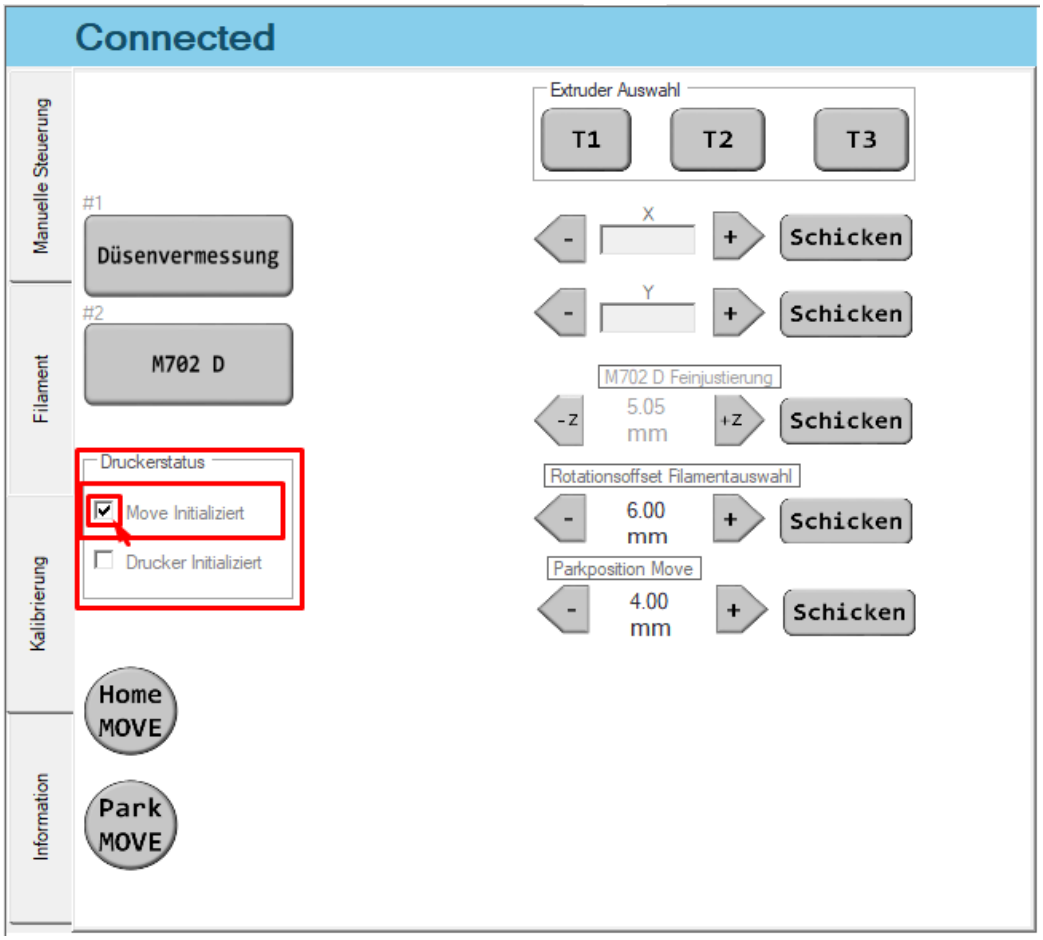

Figure 4.53: Move Initialised Checked

4.3.7 ”Home Move” & ”Park Move” Buttons

The ”Home Move” and ”Park Move” button functions the same way as it does for Tab 1. See 4.1.7 and 4.1.8 for reference.

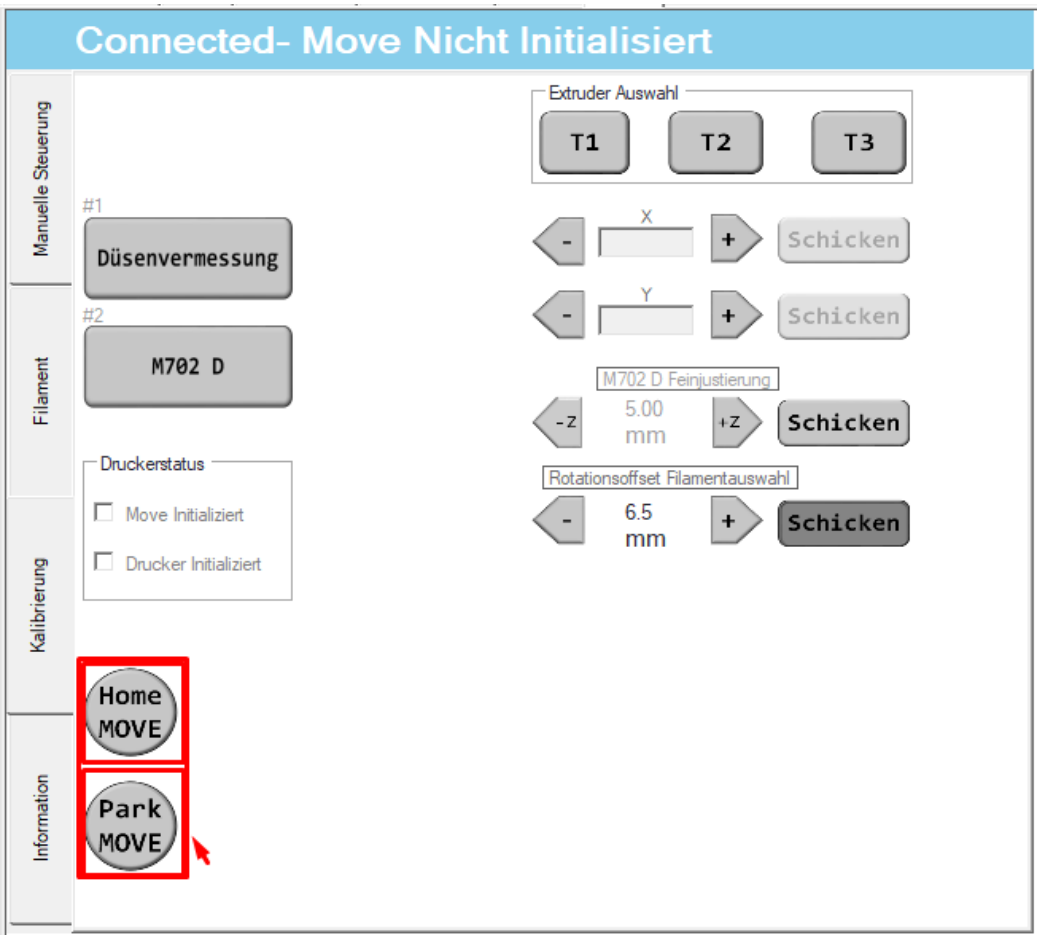

Figure 4.54: ”Home Move” & ”Park Move” Buttons

4.4 Information Tab

The fourth tab, that is the Information Tab, gives the user printer information. Here all the labels are static. So this means, nothing can be changed, but only read by the user. All the information is this tab can be updated using the actualise button as shown in Figure 4.55.

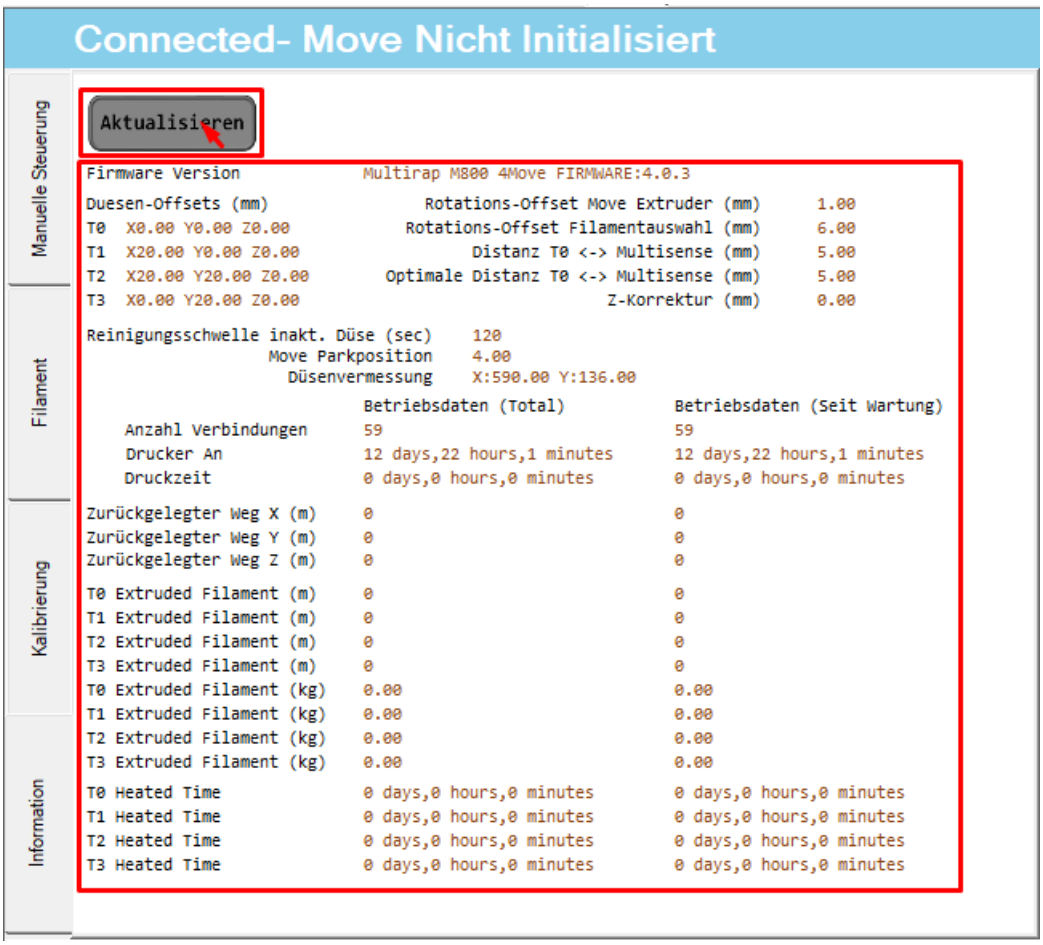

Figure 4.55: Information Tab

Part V

Special Conditions & Warnings

Chapter 5

Special Conditions & Warnings

5.1 Printer Door Open

When the printer door is open, the following pop-up message is shown, indicating the bed surface may be hot and alerting the user to be careful.

Figure 5.1: Pop-up when Printer door open

When the printer door is open, the following buttons are disabled as shown Figures 5.2 and 5.3.

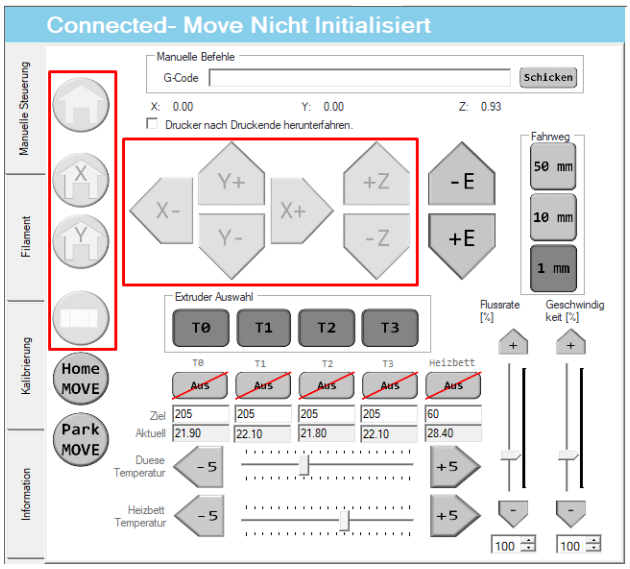

Figure 5.2: Tab 1, when printer door is open

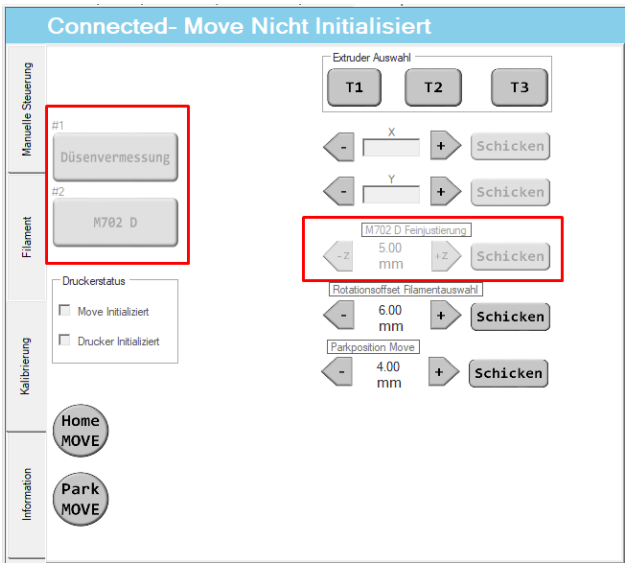

Figure 5.3: Tab 3, when printer door is open

5.2 When Printing

When the printer door is open, the following buttons are disabled as shown Figures 5.4 and **??**.

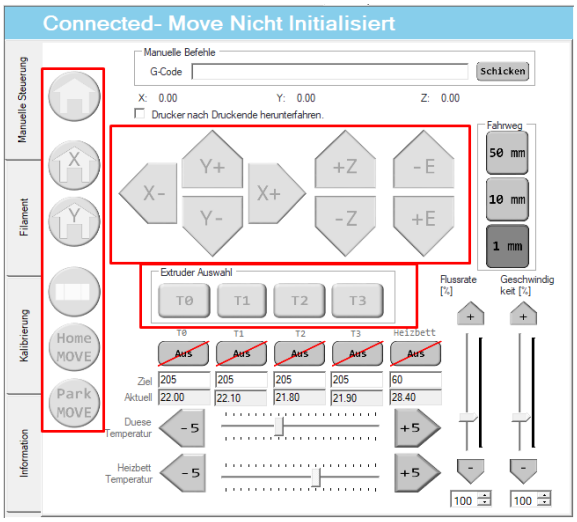

Figure 5.4: Tab 1, when printing

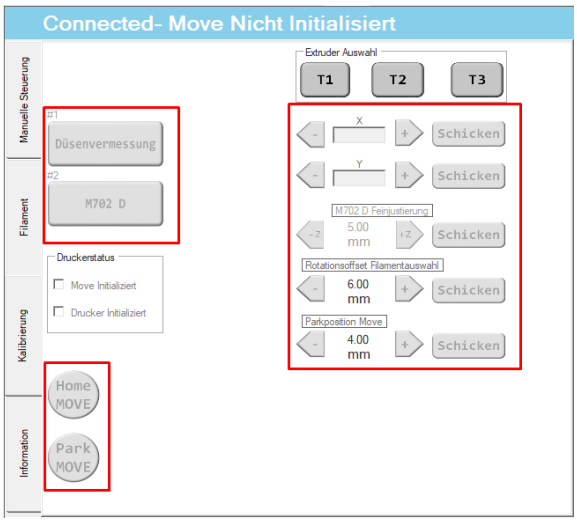

Figure 5.5: Tab 3, when printing

5.3 When Host Disconnected

When Host is disconnected, all the tabs are disabled. They are shown in this section of the documentation.

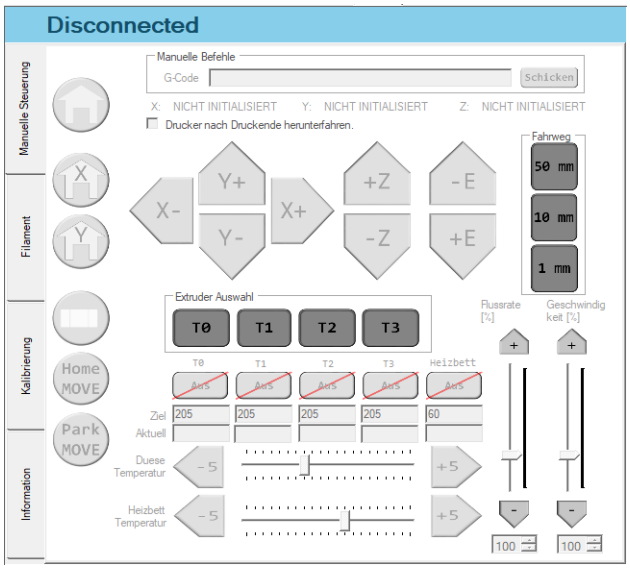

Figure 5.6: Tab 1, When disconnected

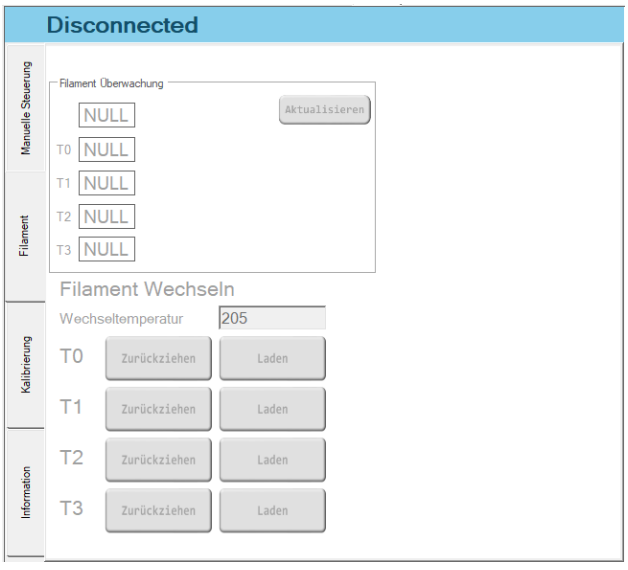

Figure 5.7: Tab 2, When disconnected

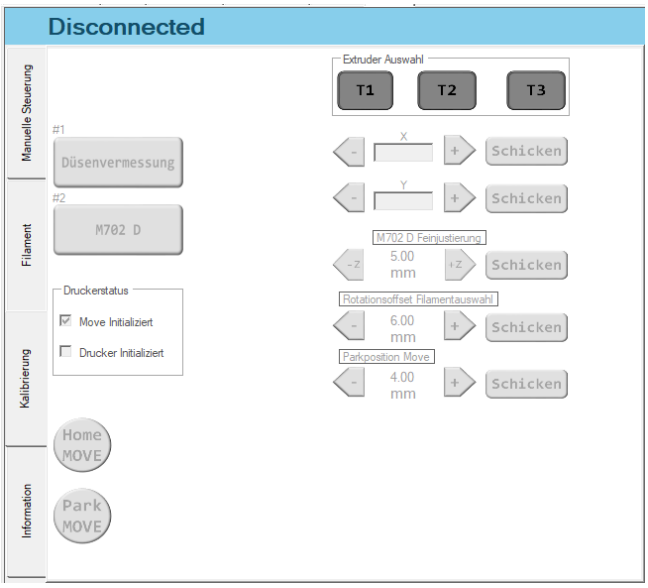

Figure 5.8: Tab 3, When disconnected

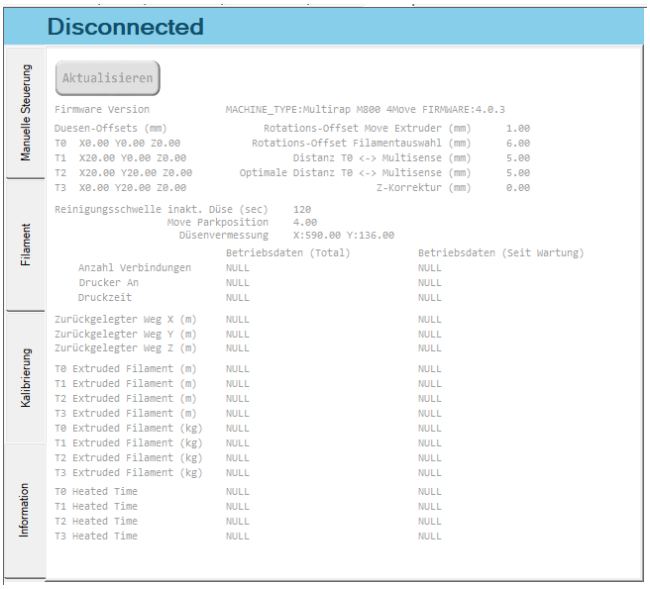

Figure 5.9: Tab 4, When disconnected