

**sigma**

## Kit Upgrade to R19

Assembly manual

Welcome to the **#BCN3D** R19 ERA

# Disclaimer

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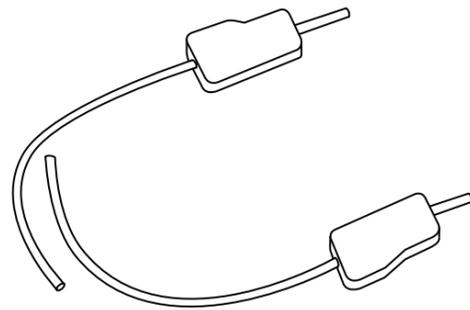
Before proceeding with the installation, please read and understand all the content and ensure that anyone who assembles this kit knows about this manual and its procedures. In case you have any doubts with some process, contact our support team at [support@bcn3dtechnologies.com](mailto:support@bcn3dtechnologies.com). In case you do not read the manual properly, it may lead to personal injury or to the BCN3D printer.

All the information and steps provided in this manual have been obtained from sources we believe are reliable. However, this information is provided without any warranty, express or implied, regarding its correctness.

As we can not supervise and control the circumstances and conditions in which you install this upgrade kit to R19, BCN3D do not assume responsibility and expressly disclaim liability for injuries, loss, damage or expense arising out of the assembly, handling, storage or use of the product.

# ¿What is in the box?

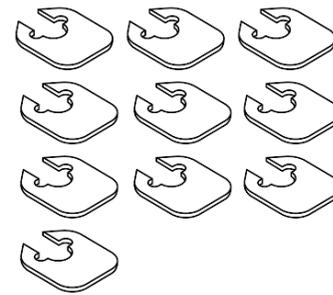
2x Filament runout sensor



2x "Bowden entry" part



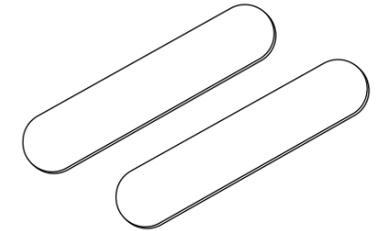
Set of Shims to properly print with Mirror and Duplication modes



1x Industrial  $\mu$ SD with Firmware files



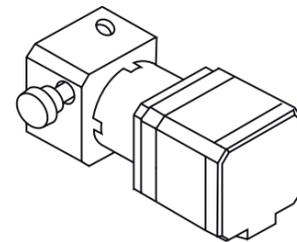
Set of Calibration gauges



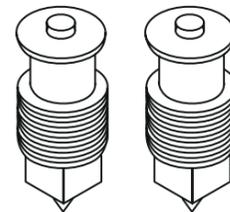
1x 2mm hex key



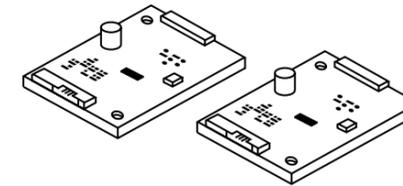
2x Extruder subsystem with Bondtech gears



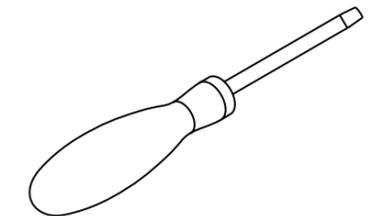
2x 0.4mm hotends by E3D™



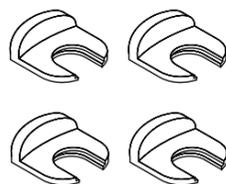
2x Calibrated Stepper Drivers



1x 5,5mm Socket wrench

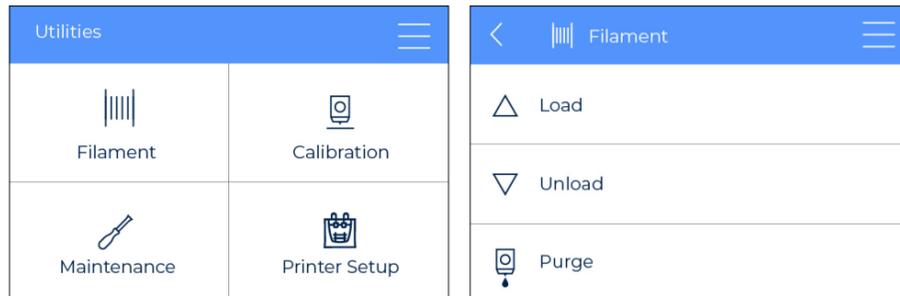


4x Black clips



# 1. Set up

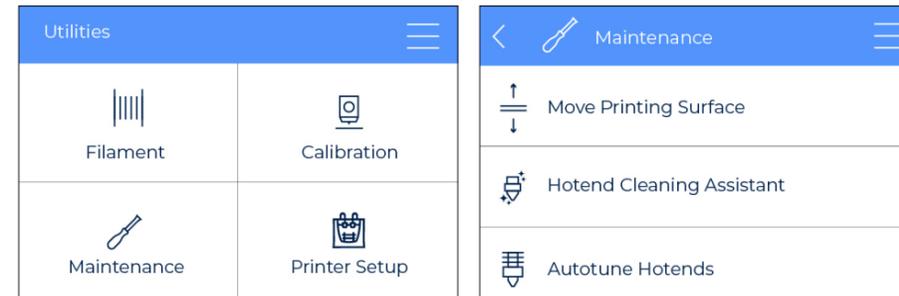
1.1 Do an Unload of the filaments from both toolheads. To do this, turn on the Sigma and go to *Utilities* --> *Filament* --> *Unload*. Follow screen's instructions to complete the task.



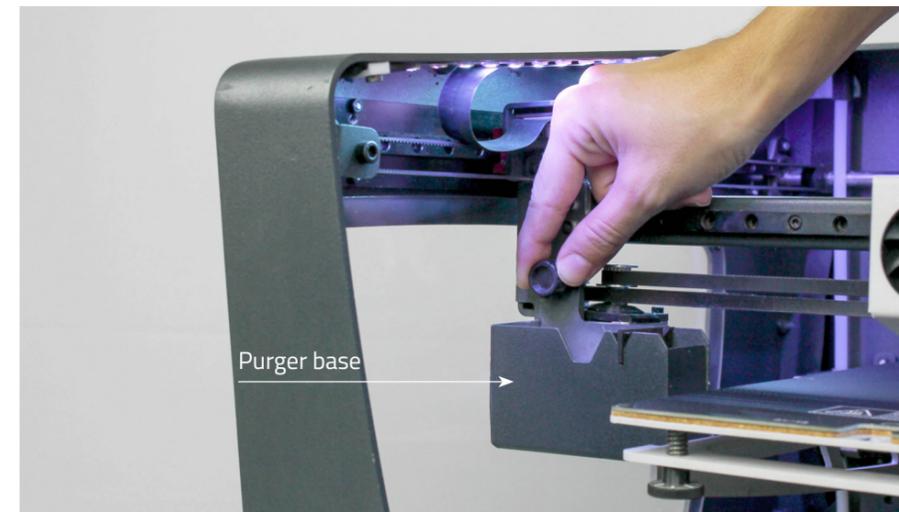
1.2 Once the filament has been removed from both sides, take away the spools and its holders.



1.3 On the screen, go to *Utilities* --> *Maintenance* --> *Move Printing Surface* and raise the platform, making sure it is at its highest point.



1.4 In order to work more comfortable remove the glass printing surface. Temporarily remove both **purger base** by unscrewing the threaded screw in order to have more working space available.



1.5 Remove the clips that are fixing the teflon tubes with the flat cables.

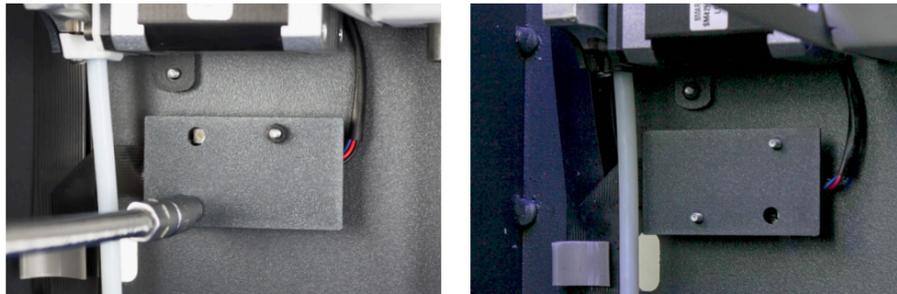


1.6 Turn off the printer and unplug the power cable and the USB cable if it is connected.

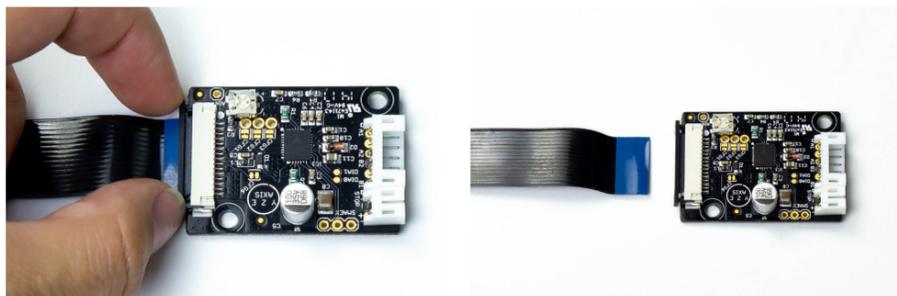
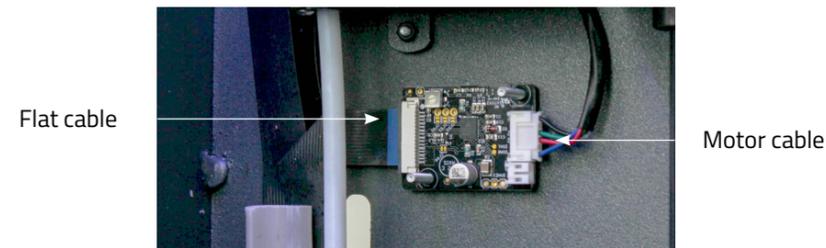


## 2. Disassembling

2.1 Remove the driver cover by unscrewing the M3 mm nuts with the 5.5mm socket wrench provided. Keep the cover, the M3 mm nuts and the spacers.

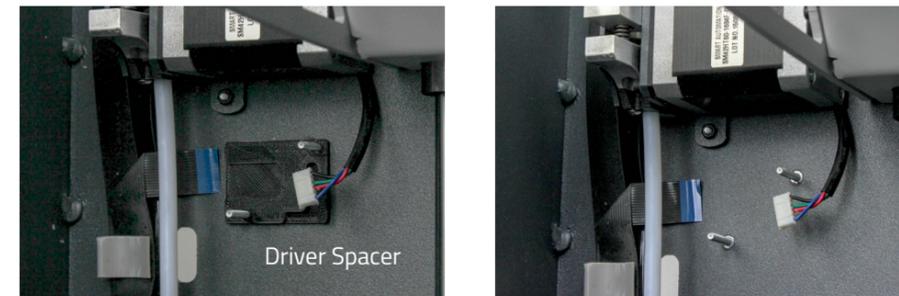


2.2 Disconnect the flat cable that goes to the driver, opening the tab that fixes it. Also disconnect the motor cable connector.

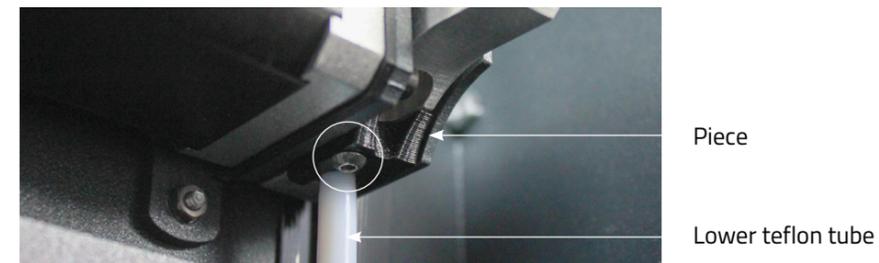


2.3 Remove the driver and the driver spacer (black piece). Do not keep these parts, as they will not be used again.

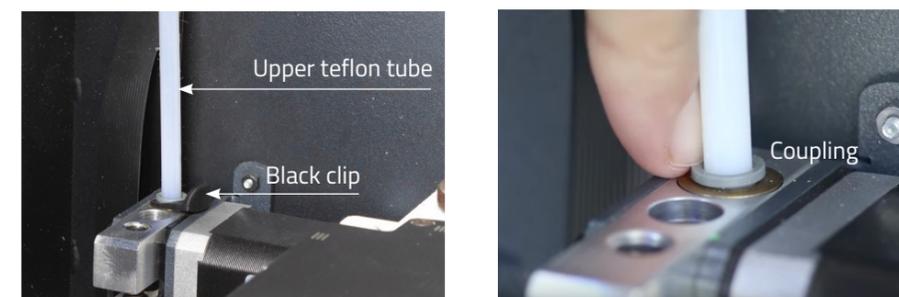
Note: If when removing the driver spacer you find a heat sink stuck to the Sigma's frame, remove it too.



2.4 Remove the lower teflon tube. In order to do this, remove the piece that holds the tube by unscrewing the lower screw.



2.5 Remove the black clip. Then hold down the coupling collet with your fingers and pull out the upper teflon tube.



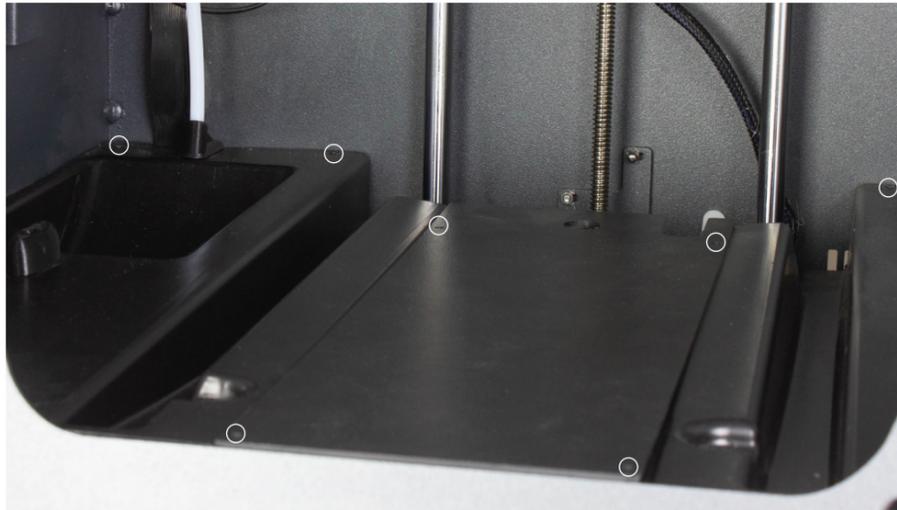
2.6 Remove the two M3 mm nuts that fix the extruder to the printer structure using the socket wrench provided. When the nuts are being removed, hold the motor to prevent it from falling. Save the nuts since they will be used later to place the new Bondtech extruder.



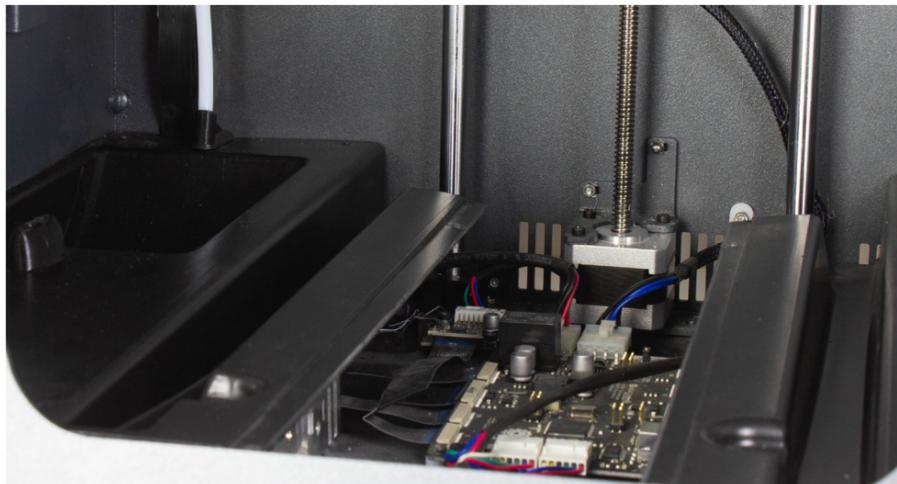
2.7 Repeat the same steps for the other extruder.

## 2. Disassembling

2.8 Using the provided 2mm allen key and a cross-head screwdriver, unscrew and store all the screws that hold the covers to the structure.



2.9 Remove the central cover.



2.10 Carefully lift both lateral covers as indicated in the picture and take them out of the structure.



2.11 Unscrew the two screws at the bottom of the cover and remove the printed part "Bowden entry". Don't keep this part, as it won't be used again.



2.12 Remove and keep the printed part "Bowden guide" from the lower teflon tube. Don't keep the lower bowden tube, as it won't be used again.



2.13 Repeat the same steps for the other teflon tube.

# 3. Updating the firmware

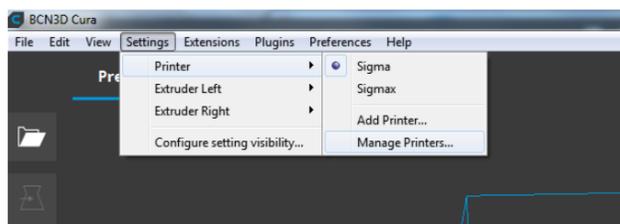
3.1 Now its time to update the firmware due all covers are removed. This will ease the process. This step will allow you to implement into the printer all the improvements related to the new interface and user experience created in the new R19.

Use the BCN3D Cura software (if you have not downloaded it yet, you can get the latest version in this link: <https://www.bcn3dtechnologies.com/bcn3d-cura>) to install the latest firmware version.

3.1.1 Use the USB cable to connect the Sigma to the computer.

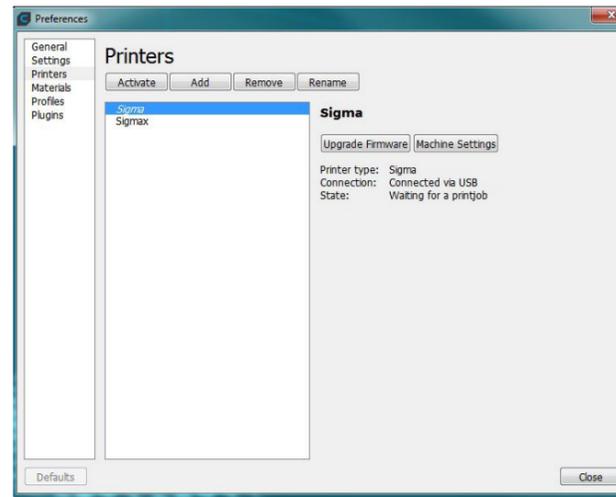


3.1.2 Open BCN3D Cura. Go to *Settings* --> *Printer* --> *Manage Printers*.

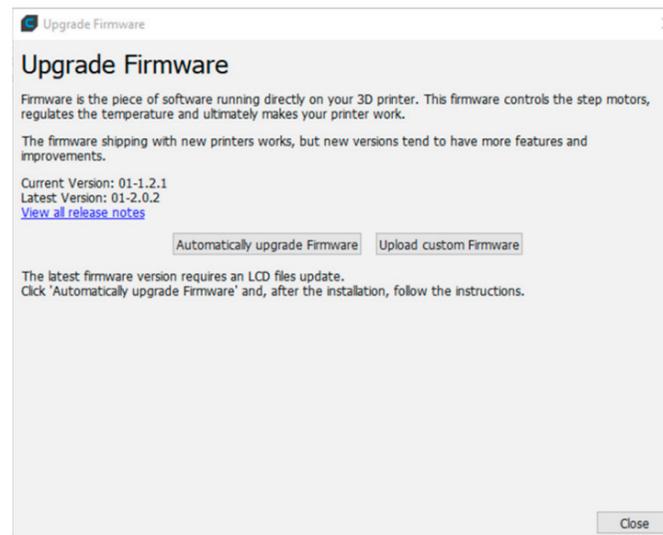


3.1.3 Select *Upgrade Firmware*.

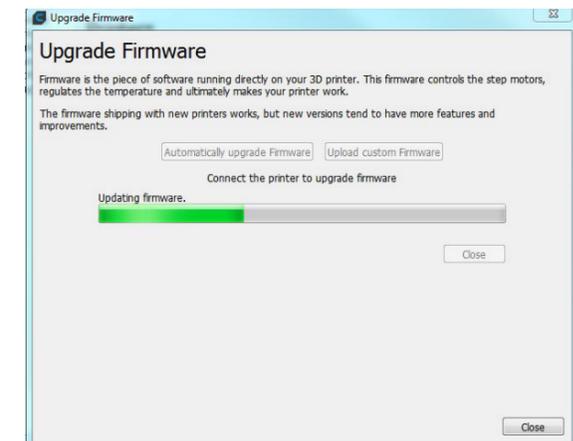
**Note:** In case your computer does not detect the printer, follow the steps in [this](#) manual.



3.1.4 Click *Automatically upgrade Firmware* to download and install the latest version available (2.0.2 or newer).



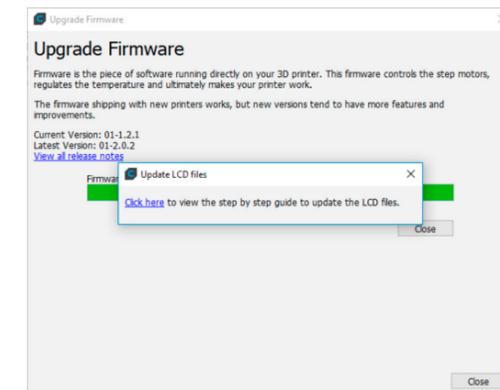
3.1.5 Wait until the firmware is installed. The process may take a few minutes to complete.



3.1.6 Once the process is completed, a window will prompt. It informs it is necessary to update the files of the printer's LCD screen.

- If you own a **Sigma R17** version, it is not necessary to click on the link. In this case the micro  $\mu$ SD card provided in the Upgrade Kit already includes the new files of the LCD screen.
- In case you own a **BCN3D Sigma Original** version, you must click on the link and follow the guide to update the provided  $\mu$ SD card with the proper LCD files.

In case you don't know which Sigma version do you own, check the next chapter.



# 3. Updating the firmware

## Changing the micro SD of the screen

Once the covers are removed in steps (2.9 and 2.10) you can easily access the micro SD that is behind the screen. **Remove it and replace it** with the new micro  $\mu$ SD industrial card provided in the Upgrade Kit. In order to do this, follow the next steps depending on your Sigma's version.



BCN3D Sigma Original

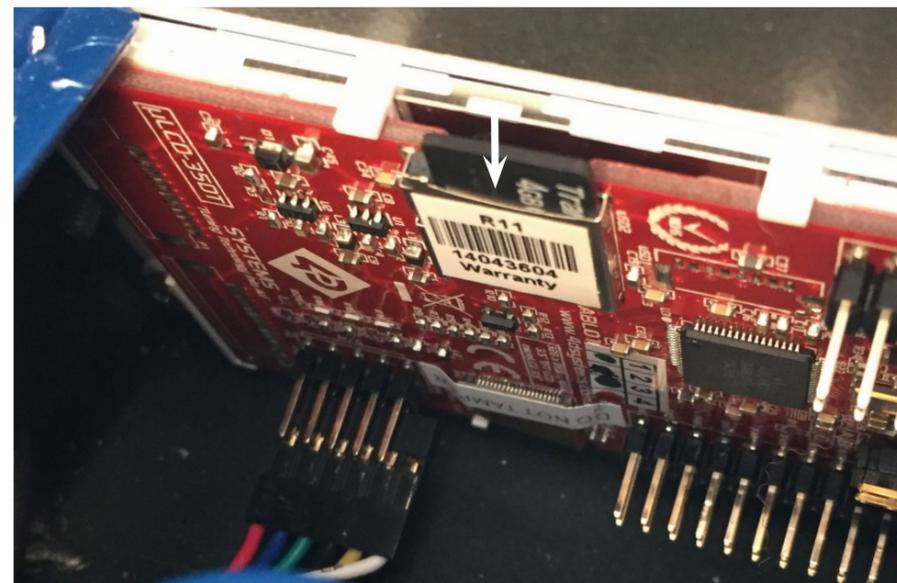


Sigma R17

## For the BCN3D Sigma Original

3.2. The Sigma Original screen has a white frame and the micro SD card is easily accessible. Press the Micro SD card to extract it. (It is not necessary to disassemble the screen of the printer). Then, place the new  $\mu$ SD card provided with the kit and previously updated in the step 3.1.6.\*

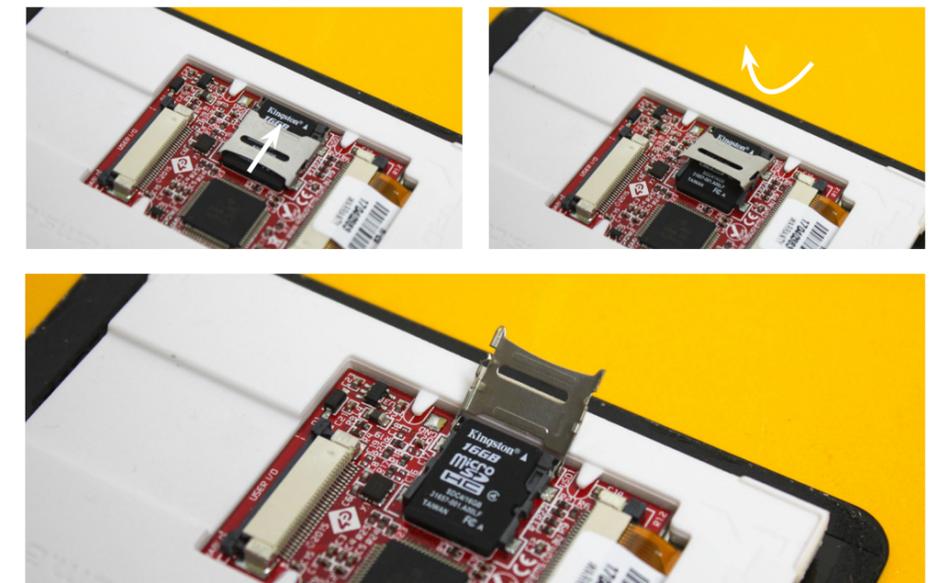
*\* If you have not correctly updated the  $\mu$ SD provided, download the LCD files in the following link [SD.files.v202-LCD-SIGMA-R16.zip](https://www.bcn3d.com/files/v202-LCD-SIGMA-R16.zip)*



## For the Sigma R17 version

3.3. The Sigma R17 screen has a black frame. The micro SD socket has two positions: up (unlocked) and down (locked). To remove the micro SD\*, drag the socket up as shown in the pictures. (It's not necessary to detach the screen from the printer's frame). Then, place the new  $\mu$ SD card provided with the kit.

*\*Be careful when removing the micro SD to avoid causing any damage to the mechanism.*



## 4. Assembling

Before proceeding, make sure to disconnect the USB cable previously used to update the firmware.

4.1 Insert the printed part "Bowden guide" removed in the step (2.12) into the new teflon tube with the filament runout sensor provided in the kit. Insert it in the indicated orientation.

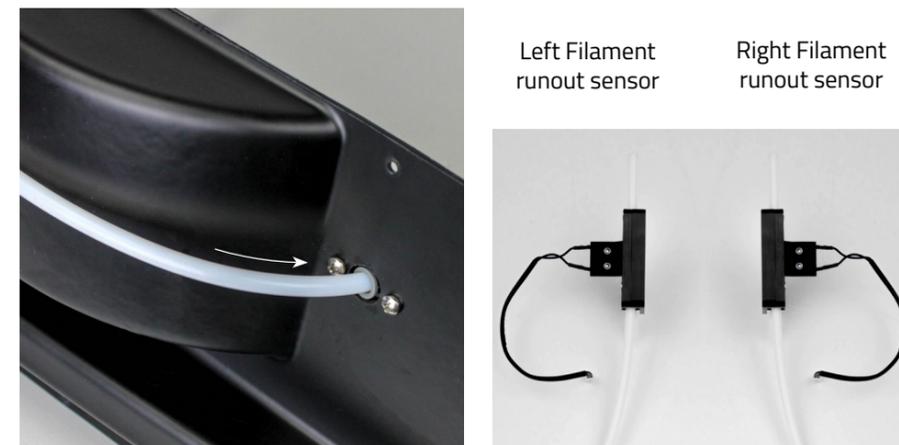


4.2 Screw the new printed part "Bowden entry" provided with the kit on the lateral covers with the two screws used in the step (2.11) as shown in the picture, with the orientation indicated (notch inwards).



4.3 Insert the new teflon tube with the filament sensor into the "Bowden entry". Press until you feel that you have reached the end.

**Note:** Pay attention to the correct orientation of each filament sensor, when inserting it into the covers. As indicated in the pictures.

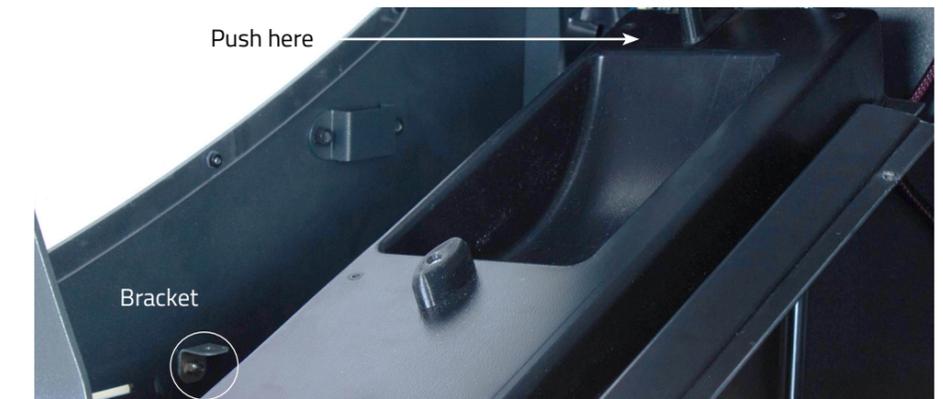


4.4 Place the "Bowden guide" piece into the lateral covers with the orientation indicated in the picture.



4.5 Before carrying out this step, make sure that the brackets are placed with the flat side facing up.

Place the side covers. To do this, place the cover as shown in the image. Then, push on the side indicated in the picture.

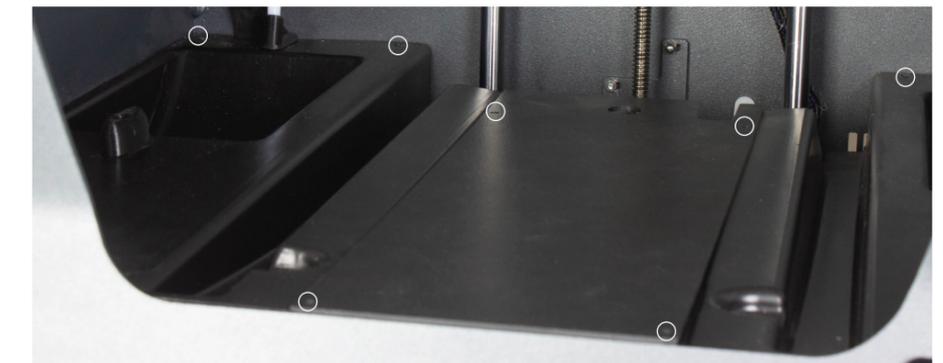


4.6 Repeat the same steps for the other lateral cover.

4.7 Place the central cover.

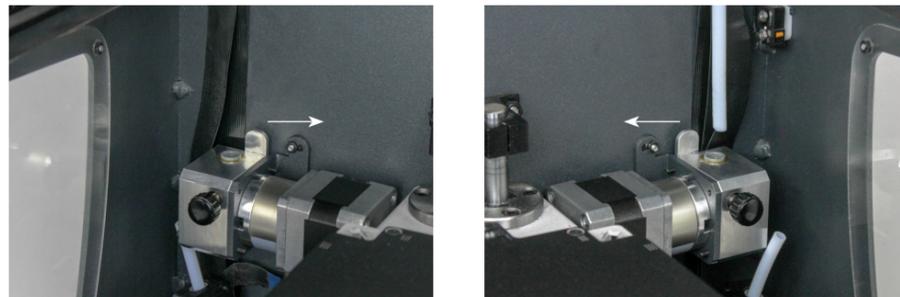
4.8 Screw the central and lateral covers, using the screws of the step (2.8).

**Tip:** To ease this process use an Allen key to ensure that the holes in the cover and the brackets are concentric.

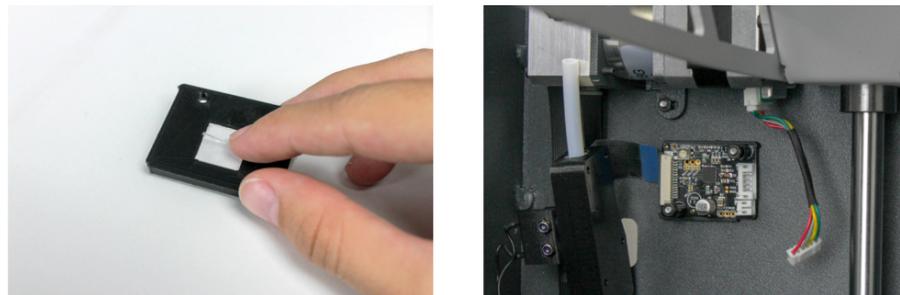


## 4. Assembling

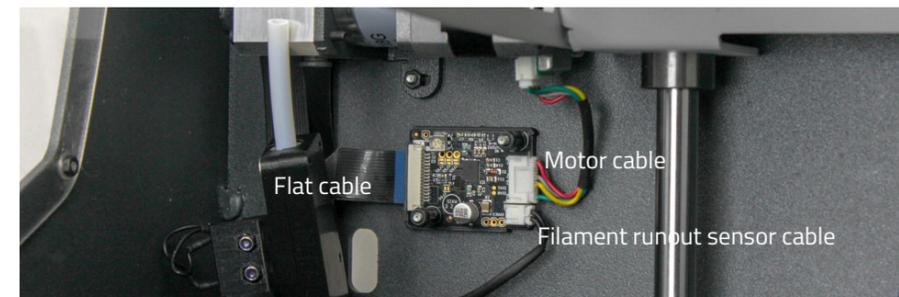
**4.9** Firmly fit the new Bondtech extruders provided with the kit in the bolts, using the socket wrench and the nuts removed in the step (2.6). Place each extruder by pressing in the direction of the arrow.



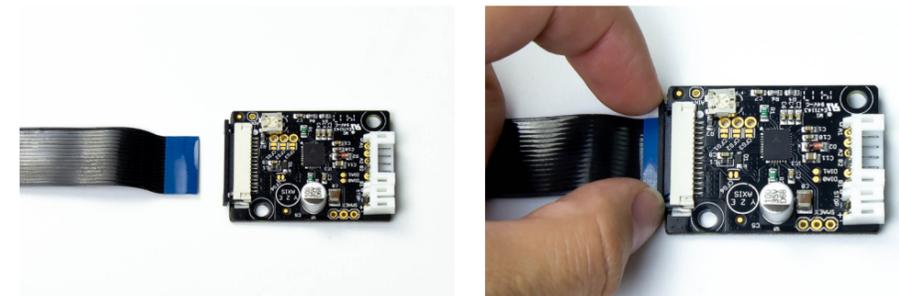
**4.10** Before installing the new stepper drivers provided with the kit, remove the protective film from the back of the driver. To ease the connection of the wiring, place the driver in its location and provisionally fix its position by placing the spacers and nuts removed in the step (2.1).



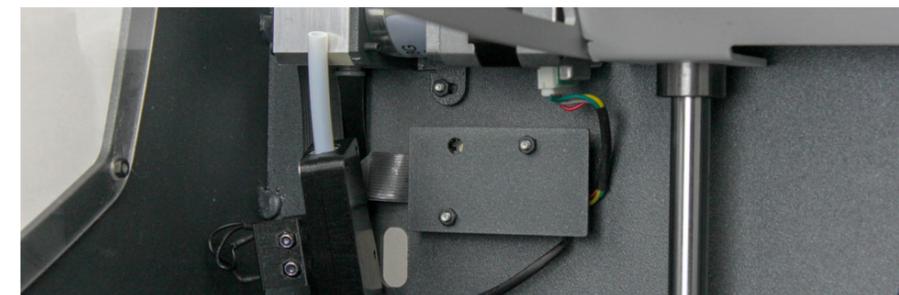
**4.11** Connect the flat cable, and then connect the motor cable and the filament runout sensor cable as indicated in the picture.



**4.12** When connecting the flat cable, remember to open the tab of the driver as indicated in the following picture.



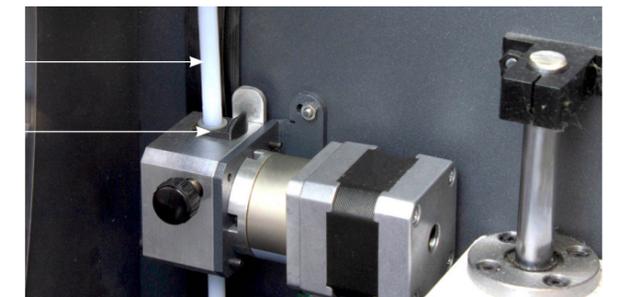
**4.13** Finally, remove again the nuts, place the removed driver cover in the step (2.1), and screw the nuts.



**4.14** Insert the lower and upper teflon tubes, making sure they are properly placed. Finally, place the new black clips provided with the kit both above and below the extruder.

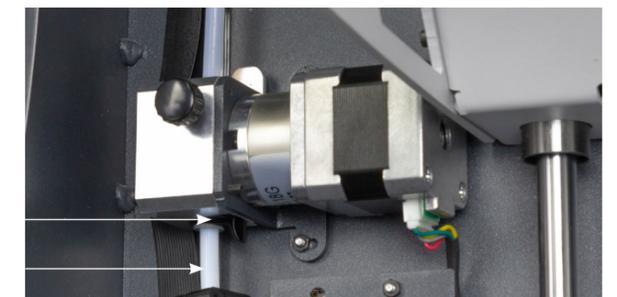
Upper teflon tube

Black clip



Black clip

Lower teflon tube

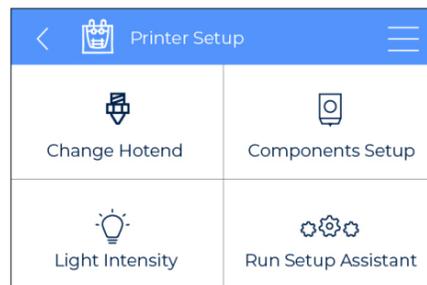
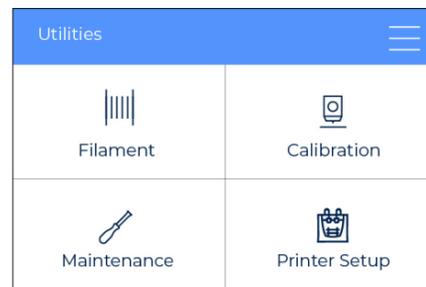
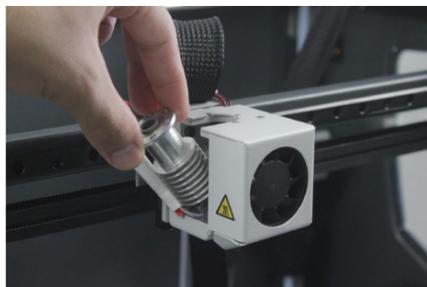


## 4. Assembling

4.15 Place the glass printing surface again and turn on the printer.

4.16 Follow the screens of the new firmware to configure your upgraded printer. Remember to select the R19 extruder.

At the end of the process, place the new e3D hotends provided in the kit. Follow the new screen's assistant in order to do it. *Utilities -> Printer Setup -> Change Hotend*. During the change hotend process, perform the *Load Filament* and *Autotune*, but press **Skip** on *Printer Calibration*, as we will wait to have both hotends installed to calibrate the printer.



4.17 Place the clips that hold both teflon tubes of the hotend with the flat cable, removed at the beginning.



4.18 Finally, place again both purger base removed in the step (1.4).

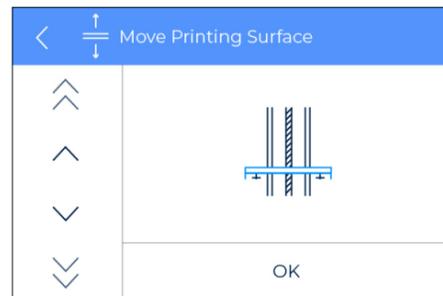
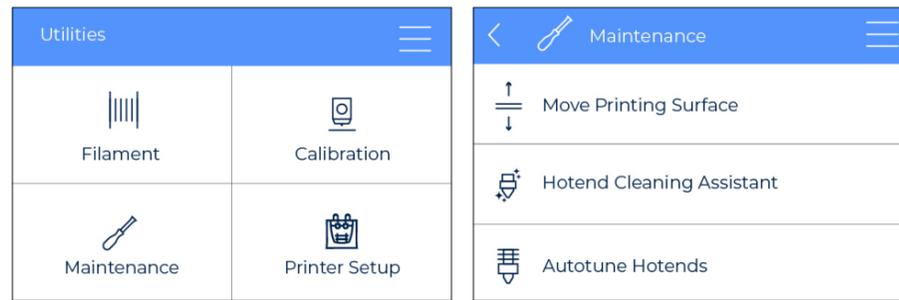
# 5. Verification

5.1 The first verification process is based on checking that there is no collision between the Z axis and the installed extruders.

5.1.1 Press *Utilities* from the main menu.

5.1.2 Press *Maintenance*.

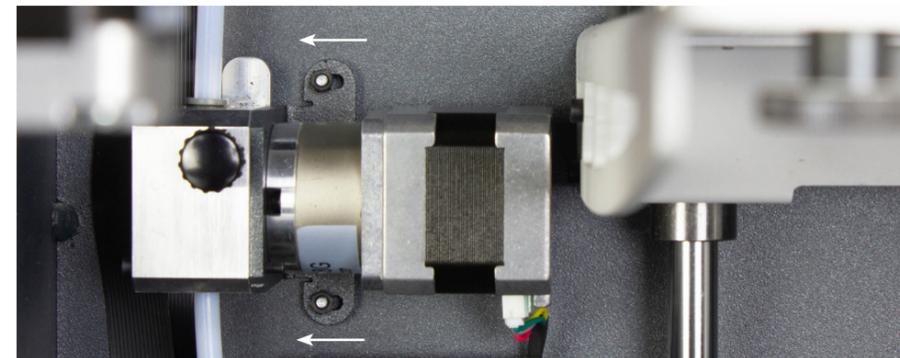
5.1.3 Finally, press *Move Printing Surface*.



5.1.4 Make small movements to move the Z axis up and down as indicated by the images. Check that there is no collision between parts.



5.1.5 If there is a collision between the parts, loosen the nuts M3 mm from the extruder and move it to the left. If the collision is with the right extruder, loosen the nuts of the extruder and move it to the right.



5.1.6 Repeat the step (5.1.4) to verify that there is no collision between parts.

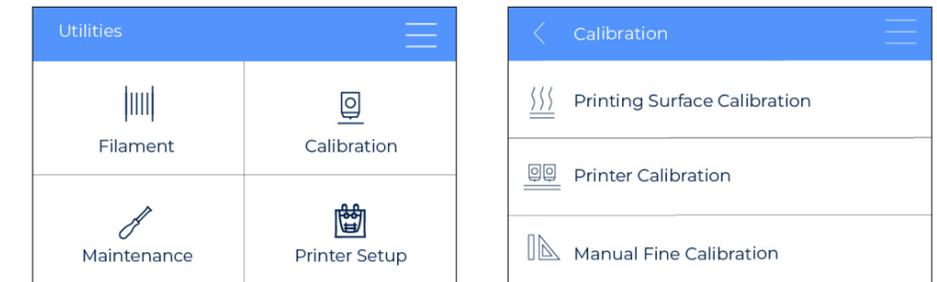
5.2 Now let's calibrate the printer:

5.2.1 Press *Utilities* from the main menu.

5.2.2 Press *Calibration*.

5.2.3 Finally, press *Printer Calibration*.

5.2.4 For this process it will be necessary to use the calibration gauges included in the kit. For more details go to step 6.1.

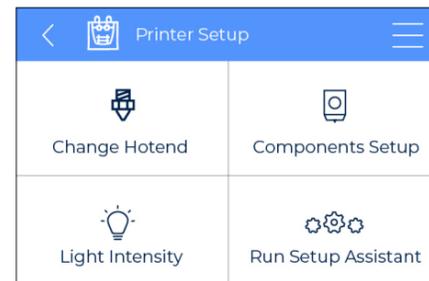
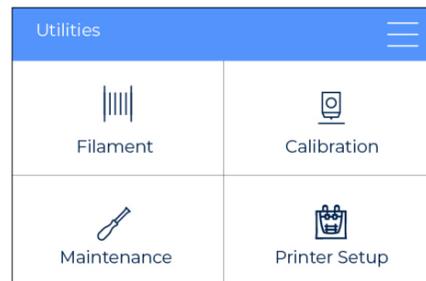


## 5. Verification

5.3 The filament runout sensor is activated by default.

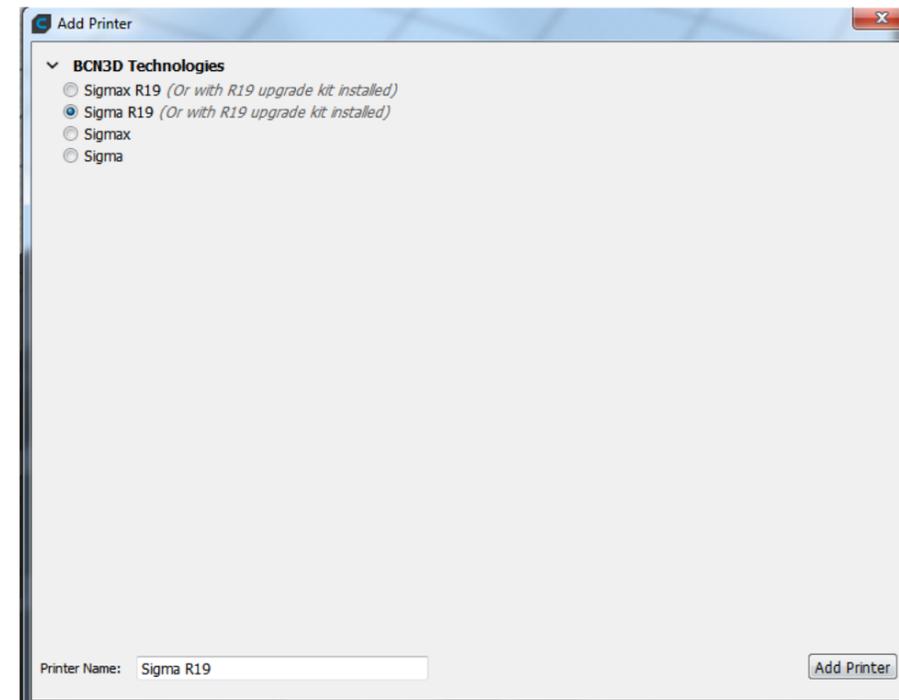
If you want to deactivate the filament sensor, press:

*Utilities --> Printer Setup --> Components Setup --> Filament runout sensor.*



5.4 Configure your upgraded printer in BCN3D Cura.

Go to *Add printer* and select the option Sigma R19.

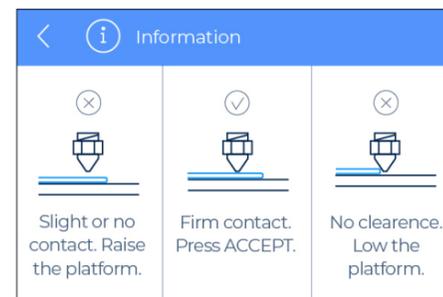
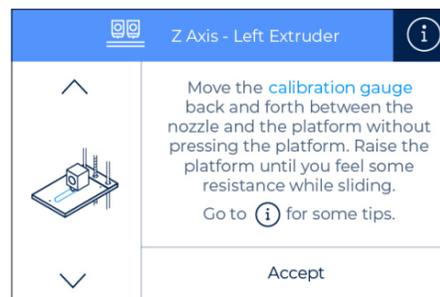


## 6. Accessories included in the Kit to enjoy a full R19 experience

Calibration gauges and shims have been included in the upgrade kit.

### 6.1 Calibration gauge:

Besides the internal improvements to make the *Printer Calibration* process more accurate, it is recommendable to use the Calibration Gauge provided instead of a piece of paper to adjust the Z height of the hotend. The use of a steel gauge reduces the subjectivity of the process and provides an unambiguous feedback. When calibrating the Z axis, follow screen's steps to use the gauge properly.



### 6.2 Shims:

(Only for those users planning to use frequently Mirror or Duplication modes.)

The firmware for the Sigma R19 now supports Mirror and Duplication modes, previously only available for Sigmax. In these printing modes both toolheads work simultaneously, so it is key important to make sure both nozzles are exactly at the same height. However, due to manufacturing and assembly tolerances the offset between tips can be up to 0.5mm.

For this reason, it is recommended to install shims to mechanically correct the Z offset when it is suggested during the Printer Calibration process. As a result, it will be possible to avoid any geometrical distortion of the part or additional consumption of time and material.



