

Print Jet and Extruder Replacement Guide

Introduction

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FCC Notice

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.



NOTE: Changes or modifications to this equipment not specifically approved by 3D Systems may void the user's authority to operate this equipment.

KCC

이 기기는 가정용(B급) 전자파적합기기로서 주로 가정에서 사용하는 것을 목적으로 하며, 모든 지역에서 사용할 수 있습니다.

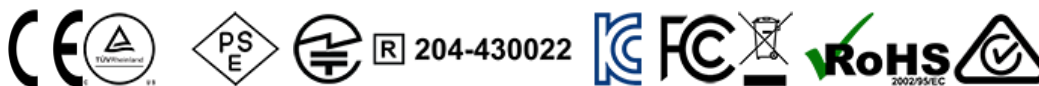
COMPLIANCE

This equipment conforms with International Electric Committee (IEC) 60950-1 and meets the requirements of the applicable EC directives.

CAN ICES-3 (B)/NMB-3(B)

This device complies with Industry Canada license-exempt RSS standard(s). Operation is subject to the following two conditions: (1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device.

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes: (1) l'appareil ne doit pas produire de brouillage, et (2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.



Warranty

3D Systems warrants that the CubePro 3D Printer will be free from defects in materials and workmanship, during the applicable warranty period, when used under the normal conditions described in the documentation provided to you, including this User Guide. 3D Systems will promptly repair or replace the CubePro 3D Printer, if required, to make it free of defects during the warranty period. This warranty excludes (i) normal consumable or expendable parts (such as Material Cartridges), (ii) repairs required during the warranty period because of abnormal use or conditions (such as riots, floods, misuse, neglect or improper service by anyone except 3D Systems or its authorized service provider), and (iii) repairs required during the warranty period because of the use of non-integrated, non-approved or non-licensed materials with the CubePro 3D Printer. The warranty period for the CubePro 3D printer is the shorter of (i) 90 days from the date your CubePro 3D printer is activated or (ii) 24 months after the CubePro 3D Printer is shipped from 3D Systems to the end customer or intermediary. For consumers who are covered by consumer protection laws or regulations in their country of purchase or, if different, their country of residence, the benefits conferred by our ninety (90) day warranty are in addition to, and operate concurrently with, all rights and remedies conveyed by such consumer protection laws and regulations, including but not limited to these additional rights.

THIS WARRANTY IS THE ONLY WARRANTY PROVIDED FOR THE CUBEPRO 3D PRINTER. TO THE MAXIMUM EXTENT PERMITTED BY LAW, 3D SYSTEMS EXPRESSLY DISCLAIMS ALL OTHER WARRANTIES FOR THE CUBEPRO 3D PRINTER AND EACH OF ITS COMPONENTS, WHETHER THOSE WARRANTIES ARE EXPRESS, IMPLIED OR STATUTORY, INCLUDING WARRANTIES OF MERCHANTABILITY AND FITNESS FOR INTENDED OR PARTICULAR PURPOSES.

LIMITATION OF LIABILITY

3D SYSTEMS WILL NOT BE RESPONSIBLE FOR INDIRECT, SPECIAL, CONSEQUENTIAL, EXEMPLARY OR INCIDENTAL DAMAGES (SUCH AS LOSS OF PROFIT OR EMPLOYEE'S TIME) REGARDLESS OF THE REASON. IN NO EVENT SHALL THE LIABILITY AND/OR OBLIGATIONS OF 3D SYSTEMS ARISING OUT OF THE PURCHASE, LEASE, LICENSE AND/OR USE OF THE EQUIPMENT BY YOU OR OTHERS EXCEED THE PURCHASE PRICE OF THE CUBEPRO 3D PRINTER.

Warranty Hotline from the Americas

888-598-1440 inside the US and **+1 678-338-3480** outside the US weekdays during normal business hours or by email at cubifysupport@cubeify.com.

Warranty Hotline from Europe

+44 1442 279 839 (UK) or **+49 6151 357 499** (DE) weekdays during normal business hours or by email at cubifysupport@cubeify.com.

Important Safety Information

Safety Symbols and Definitions



HOT SURFACE HAZARD: A HOT SURFACE IS ACCESSIBLE IN THE VICINITY OF THIS SIGN OR AT THE PRINT JET. AVOID CONTACT WITH THESE AREAS. HOT SURFACES CAN CAUSE SEVERE BURNS.



Caution: Indicates something may happen that could cause loss of data, damage to equipment, or could cause personal injury.



Caution: Indicates a pinch point hazard that could cause personal injury.



SHOCK WARNING: INDICATES A POTENTIAL SHOCK HAZARD.

SAFETY GUIDELINES

- Follow all safety rules in this section and observe all cautions and warnings in this guide.
- Do not modify any safety features or make modifications to the CubePro. Doing so is prohibited and voids the warranty.
- Use of print materials other than genuine 3D Systems components may void the warranty.



WARNING: HAZARDOUS MOVING PARTS. KEEP FINGERS AND OTHER BODY PARTS AWAY.



HOT SURFACE HAZARD: DO NOT TOUCH THE PRINT JETS DURING SETUP AND OPERATION. THE PRINT JETS BECOME VERY HOT.



Caution: Read and follow all instruction prior to setting up the printer.



SHOCK WARNING: DUE TO RISK OF SHOCK, AVOID CONTACT WITH ALL INTERNAL ELECTRONIC COMPONENTS.



WARNING: THE CUBEPRO SHOULD ONLY BE SERVICED BY AUTHORIZED SERVICE TECHNICIANS. PRIOR TO ANY PART REPLACEMENT PROCEDURE, THE PRINTER MUST BE POWERED OFF AND DISCONNECTED FROM UTILITY POWER.



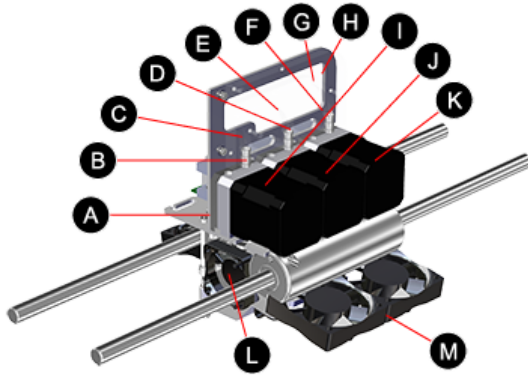
HOT SURFACE HAZARD: WHEN PRINTING WITH ABS MATERIAL, THE INTERIOR (PRINT CHAMBER) OF THE PRINTER WILL HEAT TO A PREDETERMINED TEMPERATURE. THE SURFACE OF THE PRINT CHAMBER HEATER WILL BE HOT. AVOID CONTACT WITH THE PRINT CHAMBER HEATER AND NOTE THAT OTHER COMPONENTS INSIDE THE PRINT CHAMBER MAY BE HOT.

To ensure safety, please exercise caution when operating your CubePro. Read and follow all safety precautions as outlined in this user guide. Be careful when operating your CubePro to ensure proper printing and be mindful of and avoid hot surfaces.

At-A-Glance

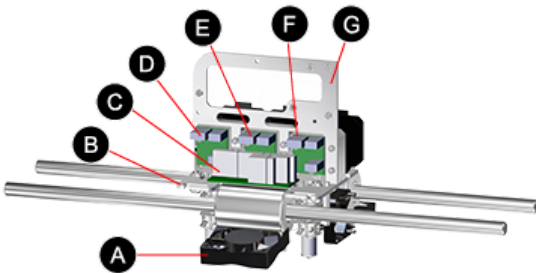
Extruder Carriage Assembly

Front



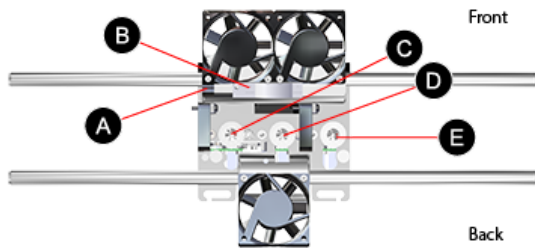
- | | |
|---------------------------------|--------------------------------|
| A Delivery Tube Bracket | H Extruder Block |
| B Delivery Tube Eyelet 1 | I Extruder 1 |
| C Delivery Tube 1 | J Extruder 2 |
| D Delivery Tube Eyelet 2 | K Extruder 3 |
| E Delivery Tube 2 | L Print Jet Cooling Fan |
| F Delivery Tube Eyelet 3 | M Creation Cooling Fan |
| G Delivery Tube 3 | |

Back



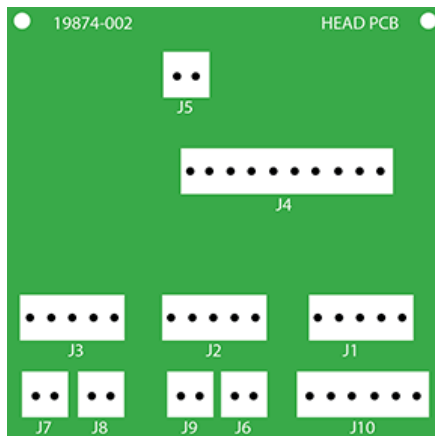
- | | |
|-------------------------------|--------------------------------|
| A Creation Cooling Fan | E Extruder 2 PCB |
| B Carriage Plate | F Extruder 1 PCB |
| C Main Extruder PCB | G Delivery Tube Bracket |
| D Extruder 3 PCB | |

Bottom

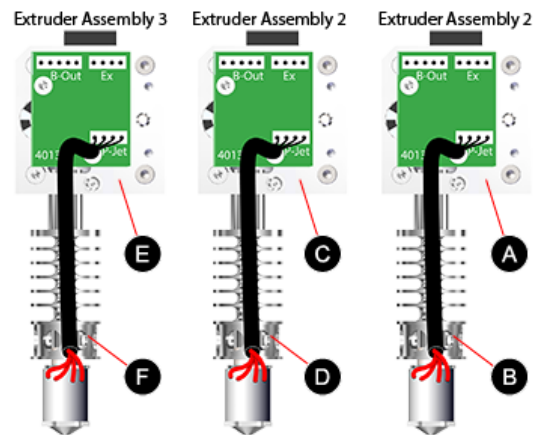


- A** Fan Harness Cable Clamp
- B** Print Jet LED
- C** Print Jet 1
- D** Print Jet 2
- E** Print Jet 3

Main Extruder PCB

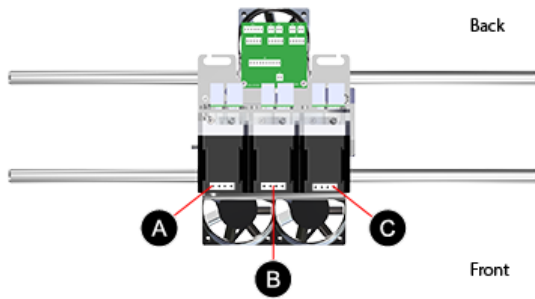


Extruders - View From Back



- A** Extruder 1 Motor
- B** Print Jet 1
- C** Extruder 2 Motor
- D** Print Jet 2
- E** Extruder 3 Motor
- F** Print Jet 3

View From Top

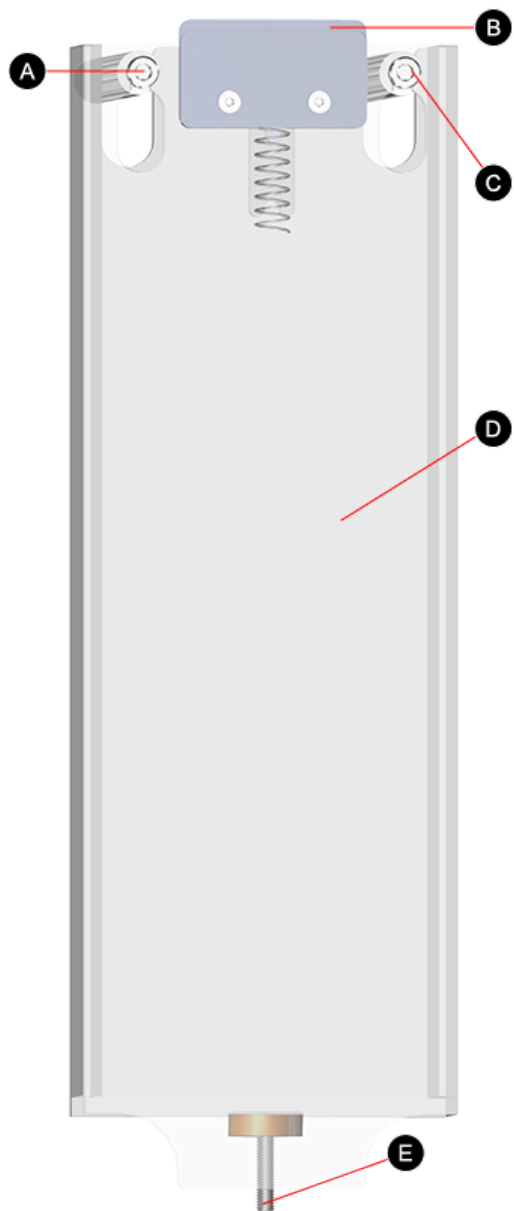


- A** Extruder 1 Motor Connector
- B** Extruder 2 Motor Connector
- C** Extruder 3 Motor Connector

Electrical Connections

Main Extruder PCB	Cable	Extruder PCB Connector	Component
	X1 (A) - 401889-00		Extruder 1 Motor: Junction
	X2 (A) - 401889-00		Extruder 2 Motor: Junction
	X3 (A) - 401889-00		Extruder 3 Motor: Junction
	X1 (B) - 401889-00	Extruder 1 PCB: Junction Ex	
	X2 (B) - 401889-00	Extruder 2 PCB: Junction Ex	
	X3 (B) - 401889-00	Extruder 3 PCB: Junction Ex	
J1	401888-00	Extruder 1 PCB: Junction B-Out	
J2	401888-00	Extruder 2 PCB: Junction B-Out	
J3	401888-00	Extruder 3 PCB: Junction B-Out	
	Print Jet 1	Extruder 1 PCB: Junction P-Jet	Extruder 1: 403022-00 (Print Jet 1)
	Print Jet 2	Extruder 2 PCB: Junction P-Jet	Extruder 2: 403022-00 (Print Jet 2)
	Print Jet 3	Extruder 3 PCB: Junction P-Jet	Extruder 3: 403022-00 (Print Jet 3)
J4	P3 - 401888-00		
J6	401887-00		CubePro LED Wire Harness 2
J7	401885-00		CubePro Fan Wire Harness 2 (Right Fan)
J9	401885-00		CubePro Fan Wire Harness 2 (Left Fan)
J10	401884-00		CubePro Fan Wire Harness 3

Jet Wiper Assembly



- A** Left Mounting Post
- B** Jet Wiper Blade
- C** Right Mounting Post

- D** Jet Wiper Assembly
- E** Adjustment Thumbscrew

Replacing Extruder or Print Jet

The material upgrade kit includes a replacement print jet for extruder 2 which has a larger diameter opening. For this upgrade, only print jet 2 should be replaced with the part included in the kit.



WARNING: ONCE PRINT JET 2 HAS BEEN UPGRADED, ABS, PLA AND NYLON SHOULD NEVER BE INSTALLED IN CARTRIDGE BAY 2. THIS BAY IS RESERVED FOR UPGRADED MATERIALS. WHEN PRINTING WITH WOOD MATERIAL, ANY ABS MATERIAL CURRENTLY INSTALLED MUST BE PROPERLY REMOVED.

Tools Needed

- 2.5 mm Hex Head Driver
- T10 Torx Driver



WARNING: BEFORE SERVICING THESE COMPONENTS, GROUND YOURSELF TO THE SYSTEM BEFORE HANDLING ELECTRICAL COMPONENTS. ESD PROTECTION IS REQUIRED.



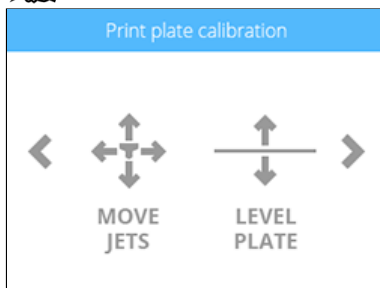
WARNING: NEVER PULL WIRES TO DISCONNECT THE CONNECTORS. THIS COULD DAMAGE THE WIRES AND THE CONNECTORS AND VOID THE MANUFACTURER'S WARRANTY.

The following procedure is intended to provide instructions about how to replace print jet 2 for the material upgrade kit.

1. Navigate to the [Print Plate Calibration](#) screen and select [LEVEL PLATE](#).



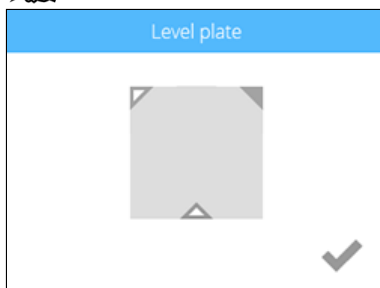
NOTE: The print pad will raise and the print jets will maneuver to the left rear of the printer.



2. Select the upper right corner of the triangle on the touchscreen display.




NOTE: The printheads will move to the right rear corner of the print pad.

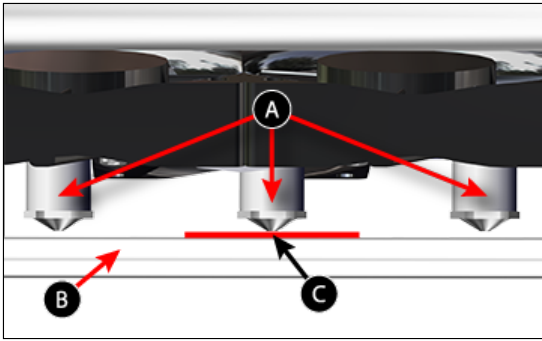


3. Using the designated page from the Setup/Repack instructions, slide the paper between the print jets and the print pad.





NOTE: If there is a slight resistance, proceed to step 5.

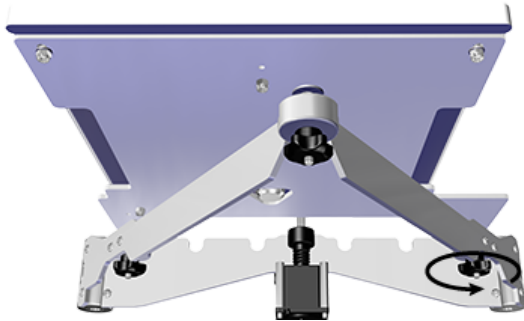
 **NOTE:** The red line (C) illustrates the gap between the print jets (A) and the print pad (B).



4. If the paper slides easily between the print jets and print pad, rotate the adjustment knob counter-clockwise (from the bottom) until there is a slight resistance.


 **CAUTION:** If the print pad is set too high, damage to the print pad or print jets may occur.

 **NOTE:** If the paper can not be inserted between the print jets and the print pad, turn the adjustment knob clockwise (from the bottom) until there is a slight resistance on the paper.



5. Select the lower middle triangle.


6. Once the print jets have moved to the front center of the print pad, slide the paper between the print jets and the print pad.

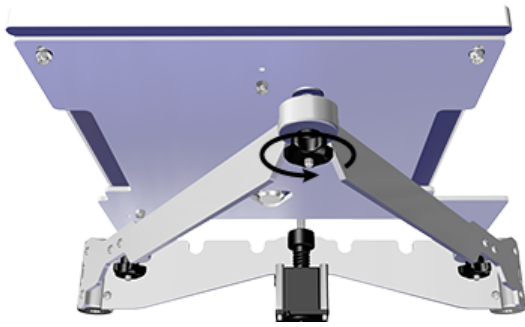
 **NOTE:** If there is a slight resistance, proceed to step 8.



7. If there is no resistance on the paper when sliding it between the print jets and the print pad, rotate the adjustment knob counter-clockwise (from the bottom) until there is a slight resistance.

 **CAUTION:** If the print pad is set too high, damage to the print pad or print jets may occur.

 **NOTE:** If the paper can not be inserted between the print jets and the print pad, turn the adjustment knob clockwise (from the bottom) until there is a slight resistance on the paper.

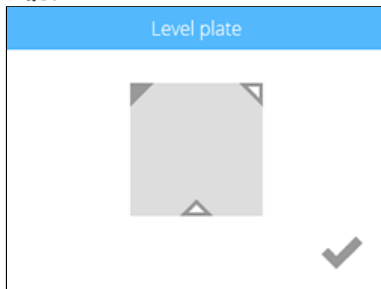


8. Select the upper left corner of the triangle.

9. Once the print jets have moved to the left rear of the print pad, slide the paper between the print jets and the print pad.



NOTE: If there is a slight resistance, proceed to step 11.



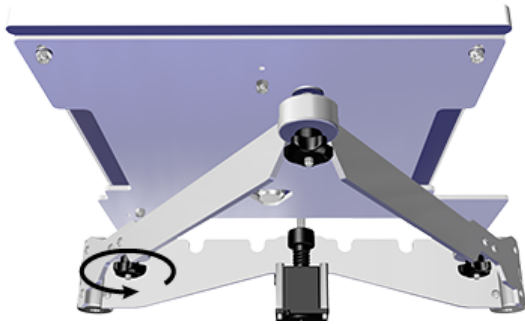
10. If there is no resistance on the paper when sliding it between the print jets and the print pad, rotate the adjustment knob counter-clockwise (from the bottom) until there is a slight resistance.



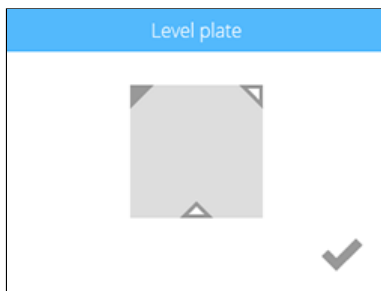
CAUTION: If the print pad is set too high, damage to the print pad or print jets may occur.



NOTE: If the paper can not be inserted between the print jets and the print pad, turn the adjustment knob clockwise (from the bottom) until there is a slight resistance on the paper.



11. Once completed, select the **checkmark** to exit the utility.



12. Properly remove the material cartridges.



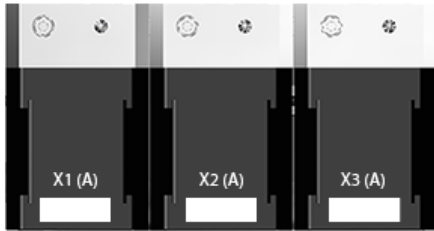
NOTE: For more information, refer to the section titled Replacing a Material Cartridge in the user guide.

13. Power off the printer and disconnect it from utility power.

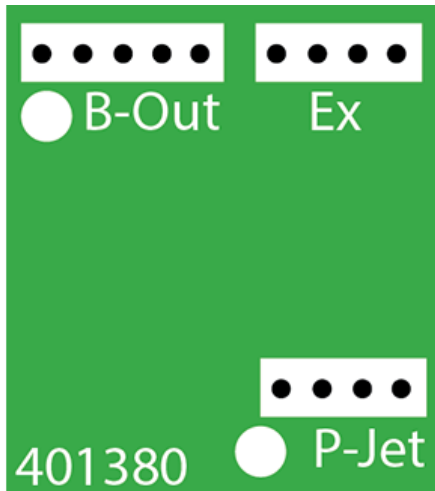


CAUTION: The printer must be powered off and the power cord must be disconnected from utility power.

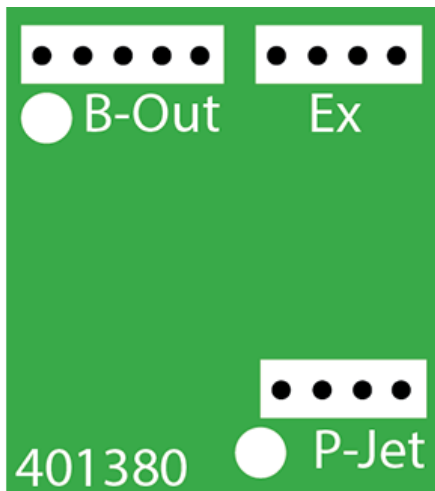
14. Remove the lid from the top of the printer.
15. Disconnect the cables **X1 (A)**, **X2 (A)** and **X3 (A)** from extruder motors.



16. Disconnect the 5-pin jumper cable from junction **B-Out** of the extruder 2 PCB.



17. Disconnect cable **X (B)** from junction **Ex** of the extruder 2 PCB.



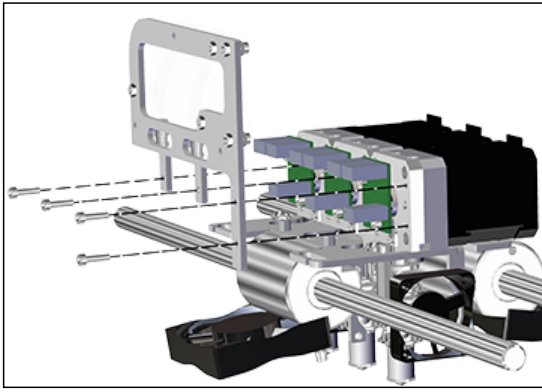
18. Using a 2.5 mm hex head driver, loosen and remove the four 2.5 mm hex head bolts securing the delivery tube bracket and block to the extruders.



NOTE: For printers with 2 extruders, the 2 right side bolts and the center bolt will need to be removed. For printers with 3 extruders, the left bolt will also need to be removed.




NOTE: For clarity, the main extruder PCB was removed from the illustration. However, it does not need to be removed for this procedure.

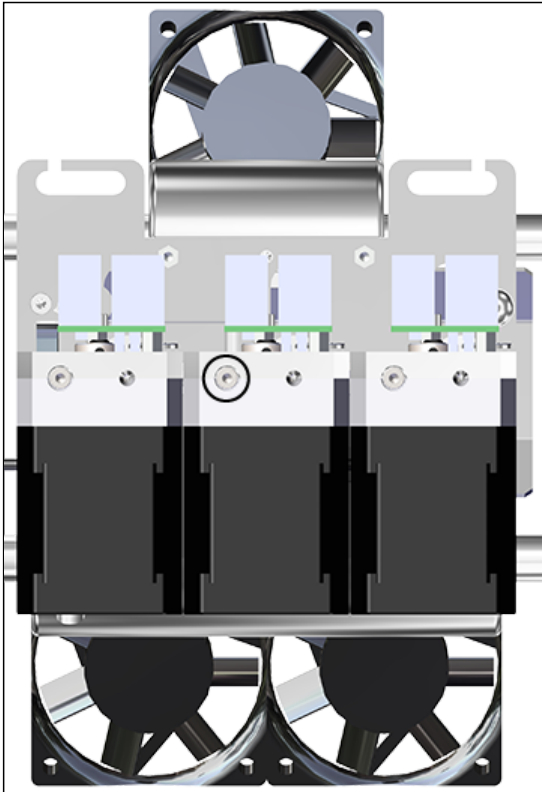


19. Move the delivery tube bracket/block aside so that extruder 2 can be removed.


20. Using a 2.5 mm hex head driver, loosen the 2.5 mm hex head screw securing extruder 2 to the carriage plate.

 **NOTE:** The screw will remain loose in the extruder housing.


 **NOTE:** For clarity, the main extruder PCB was removed from the illustration. It does not need to be removed for this procedure.

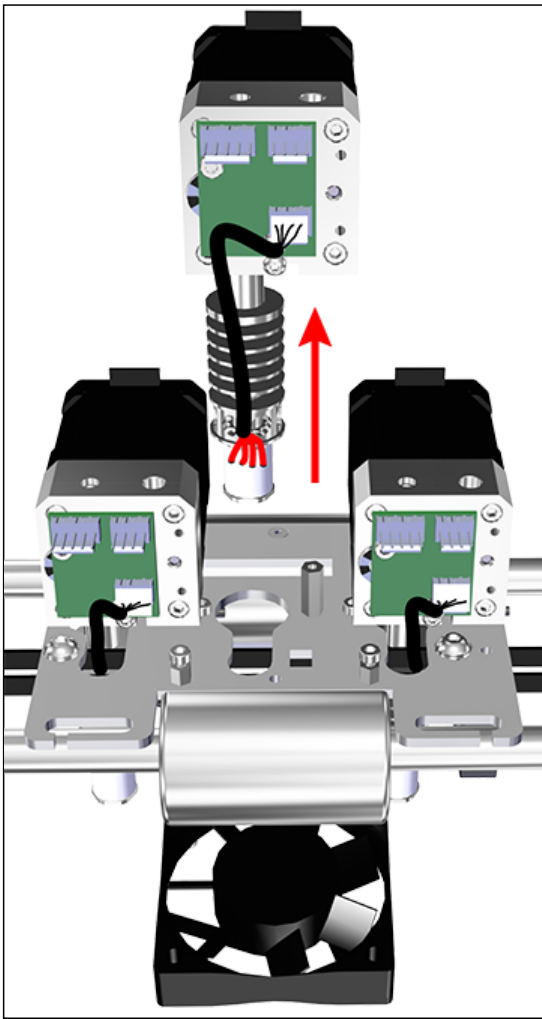


21. Carefully remove the affected extruder assembly from the carriage plate.

 **NOTE:** Do not lose the screw that was loosened in the previous step.

 **CAUTION:** Be careful not to damage the print jet cable connected to junction P-Jet of the extruder PCBs.

 **NOTE:** For clarity, the main extruder PCB was removed from the illustration. However, it does not need to be removed for this procedure.




22. Disconnect the print jet cable from junction **P-Jet** of the extruder 2 PCB.

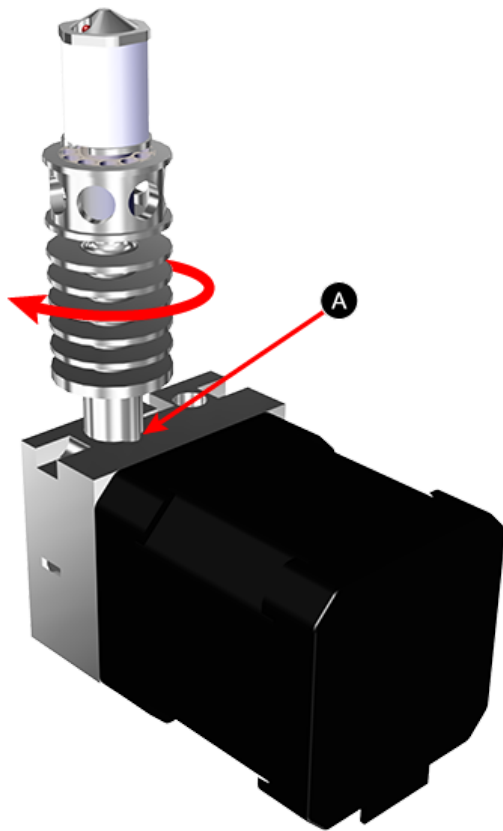


23. Using the T10 torx driver, loosen but **DO NOT** remove the T10 torx screw securing the print jet to the extruder assembly.



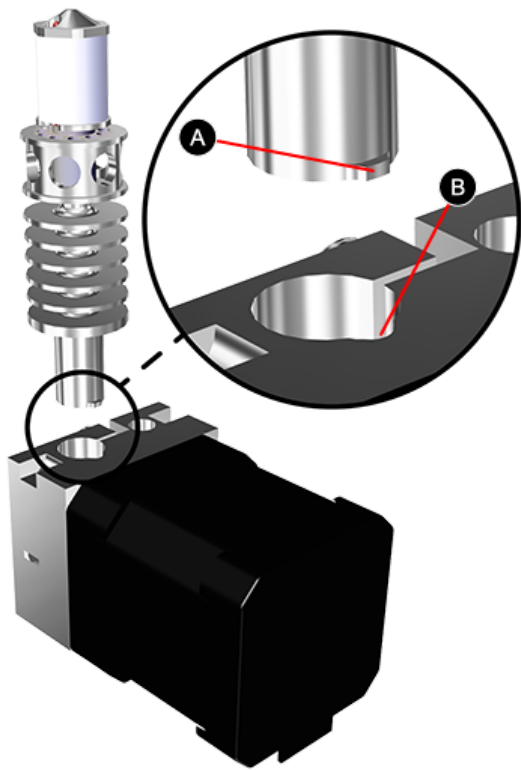
24. Rotate the print jet and gently pull upward to remove it from the extruder.

 **NOTE:** There is a tab on the print jet that aligns with a channel (A) in the extruder.

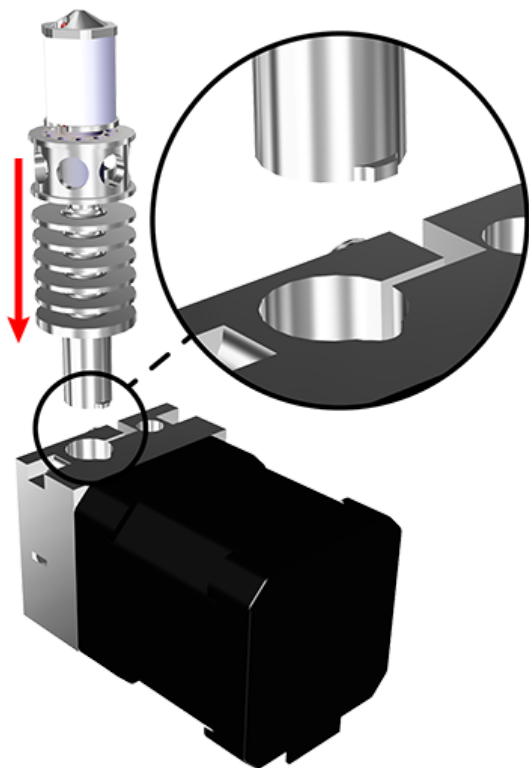


25. Carefully remove the print jet from the extruder.

 **NOTE:** There is a tab (A) on the end of the print jet that aligns with the channel (B) in the extruder.




26. Insert the new print jet into the extruder.




27. Rotate the print jet counter-clockwise so the cable from the print jet is facing the same direction as the extruder PCB.

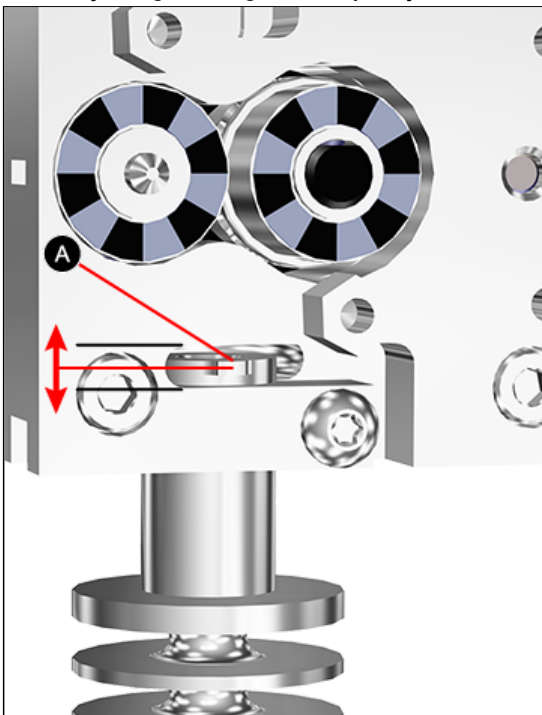


28. Vertically center print jet 2 in the pinch clamp of the extruder housing and tighten the T10 torx screw (A) enough that the print jet is securely held.

 **NOTE:** For printers with 2 or 3 print jets, the height for print jets 1 and 3 will be adjusted to the height of print jet 2 after the extruder assembly has been reinstalled. Tighten the T10 torx screw enough that the print jet is securely held.

 **CAUTION:** If tightened too tight, the threads in the extruder might begin to pull making it impossible to secure the print jet to the extruder. Exercise caution when tightening the torx screw.

 **NOTE:** For illustration purposes, the board was removed from this image. It is unnecessary to remove the board while adjusting the height of the print jet.



29. Connect the print jet cable to junction P-Jet on the extruder 2 PCB.



30. Carefully insert extruder assembly 2 into the carriage plate.



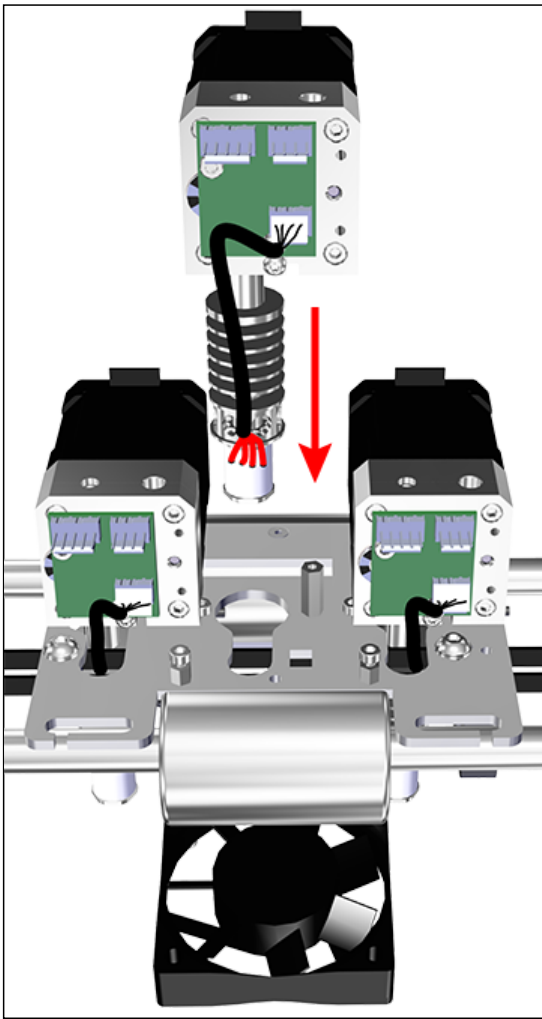
CAUTION: Be careful not to damage the print jet cable connected to junction P-Jet of the extruder PCBs.



NOTE: If necessary, carefully adjust the cable alignment if the extruder assembly is difficult to install.



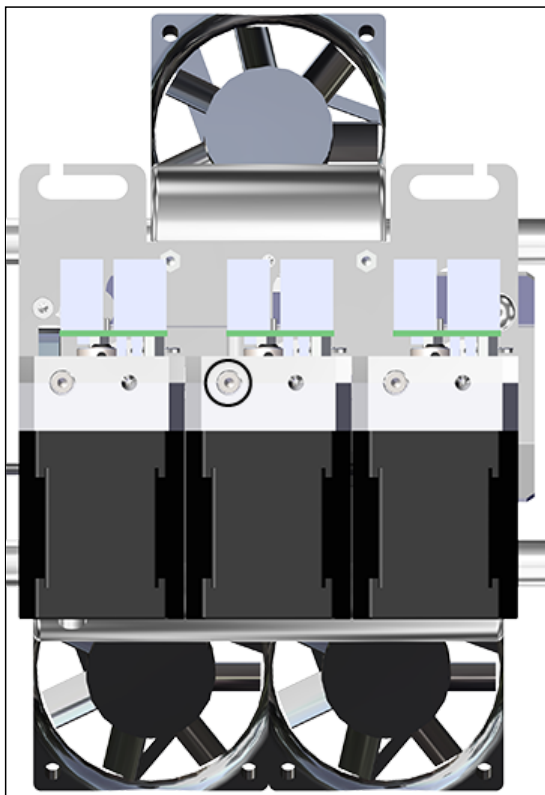
NOTE: For clarity, the main extruder PCB was removed from the illustration. It does not need to be removed for this procedure.



31. Using a 2.5 mm hex head driver, tighten the 2.5 mm hex head screw securing the extruder 2 assembly to the carriage plate.



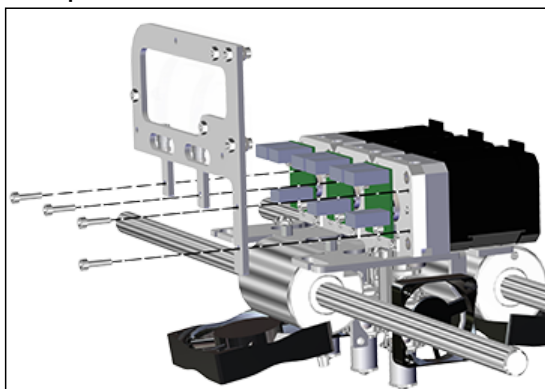
NOTE: For clarity, the main extruder PCB was removed from the illustration. It does not need to be removed for this procedure.



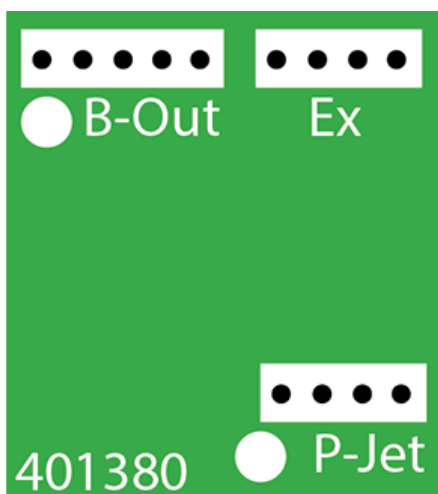
32. Insert the original 2.5 mm hex head screws into the extruder block and secure it to the extruders using a 2.5 mm hex head driver.



NOTE: For clarity, the main extruder PCB was removed from the illustration. It does not need to be removed for this procedure.



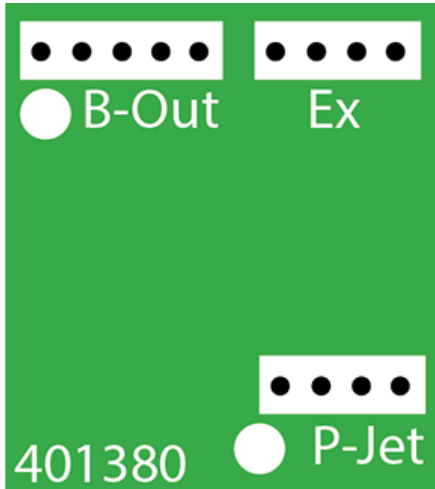
33. Connect cable **X2 (B)** to junction **Ex** of the extruder 2 PCB.



34. Connect cable **X2 (A)** to the junction on the extruder 2 motor.



35. Connect the 5-pin jumper cable to junction **B-Out** of the extruder 2 PCB.



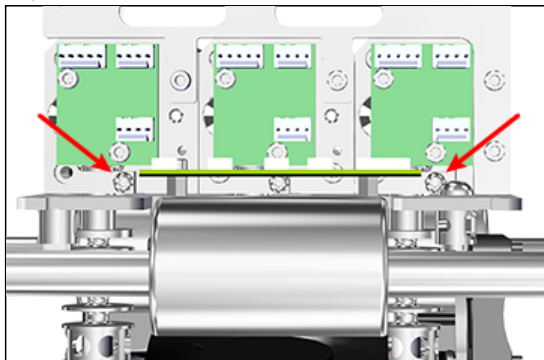
36. For printers with two (2) or three (3) print jets, loosen the T10 torx screws on extruders 1 and 3.



CAUTION: There should be enough access to reach the torx screws using an insulated torx driver. Exercise caution when working around the PCBs.

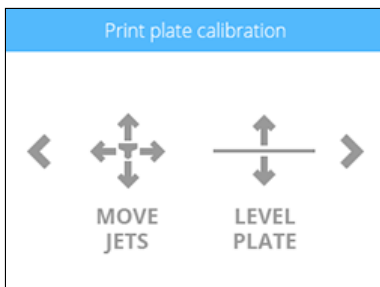


NOTE: Print jet 2 should not need further adjustment.



37. Connect the printer to utility power, turn on the main power switch and then turn on the display.

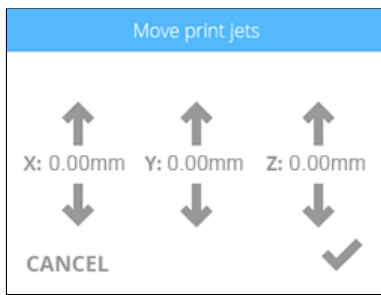
38. Navigate to the **Print Plate Calibration** screen and select **MOVE JETS**.




39. Select the **Z: down arrow** until the display reads -0.50.

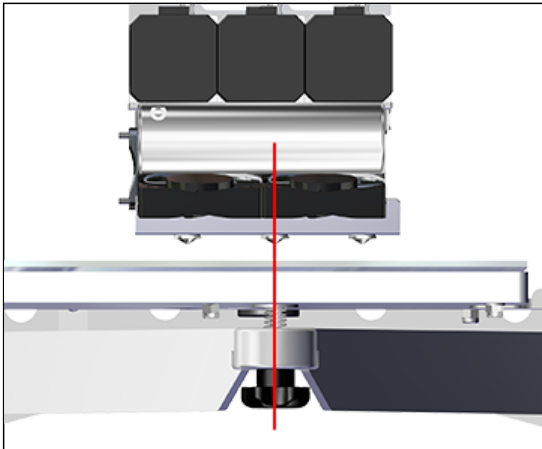


NOTE: Visually inspect the gap between the nozzle tip of print jet 2 and the print pad. If necessary, press the Z: down arrow until there is a gap.




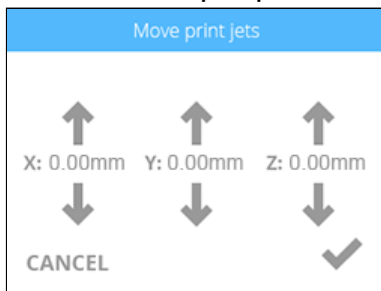
40. Press the X and Y adjustment arrows until print jet 2 is closely aligned above the front print pad adjustment knob.

 **NOTE:** The red line in the illustration demonstrates an approximate alignment of print jet 2 and the front print pad adjustment knob.



41. Press the **Z: up arrow** until the nozzle of print jet 2 lightly touches the print pad.

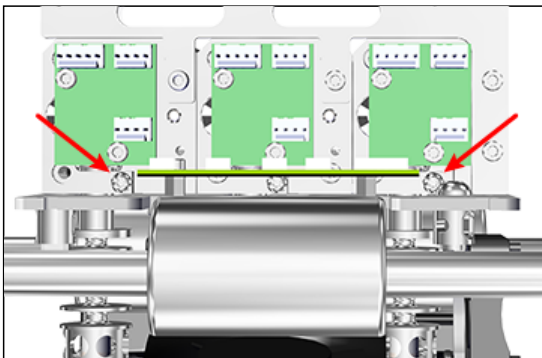
 **NOTE:** If there is still a gap between the nozzle of print jet 2 and the print pad, and the Z: up arrow will not raise the print pad further, rotate the front print pad adjustment knob counter-clockwise (from the bottom side) until the nozzle lightly touches the print pad.



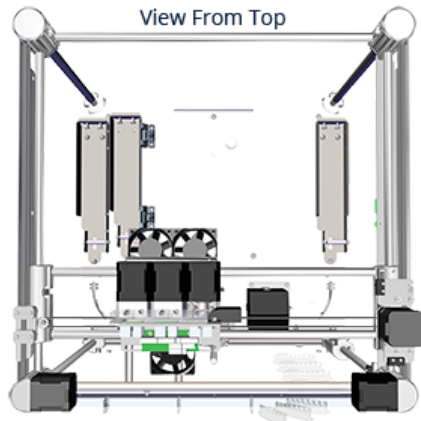
42. Verify that the nozzles of print jet 1 and print jet 3 are also touching the printpad.

43. When all of the print jet nozzles lightly touch the print pad, power off the printer and disconnect it from utility power.


44. Tighten the left and right print jet T10 torx screws using a T10 torx driver.

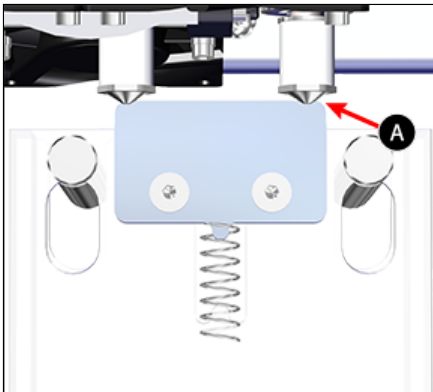


45. Connect the printer to utility power and power on the printer.
46. Ensure the print pad is at its lowest position.
47. Power off the printer and disconnect it from utility power.
48. Holding on to the extruder carriage assembly, gently position it over the jet wiper assembly.

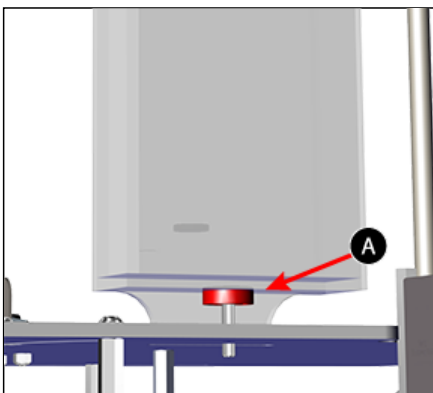


49. Verify the wiper blade meets the tapered portion (A) of the print jet nozzle. If it does, the jet wiper is properly adjusted. Proceed to step 51.

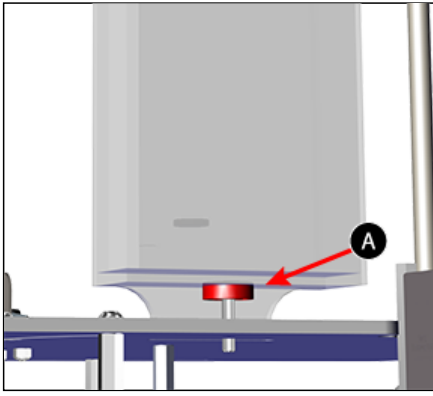
 **NOTE:** If the wiper tip is too high, proceed to the next step. If the wiper tip is too low, proceed to step 50.



50. If the wiper blade is too high, remove the jet wiper assembly and turn the adjustment thumbscrew (A) clockwise. Reinstall the jet wiper and return to step 48.



51. If the wiper tip is too low, remove the jet wiper assembly and turn the adjustment thumbscrew (A) counter-clockwise. Reinstall the jet wiper and return to step 48.



52. Once satisfied with the adjustment, connect your printer to utility power and power on the printer.
53. If necessary, repeat steps 1 - 11 to calibrate the print pad.
54. Proceed to the Z-Gap and Level Gap procedure in section 5 of this guide. Once the Z-Gap and Level Gap are correct, refer to section 6 of this guide and calibrate the offset jets.

Calibrating the Level Gap

Leveling the print pad is very important to ensure quality prints. Checking the Z-Gap and Level Gap becomes necessary after replacing a print jet, an extruder assembly, or the print pad.

The Level Gap calibration file is always printed with print jet 1. There are two independent files for checking Level Gap: one for ABS printing and one for PLA printing.



NOTE: Ensure the file used matches the material type installed in cartridge bay 1. (Ex. If cartridge bay 1 has an ABS material cartridge, print the ABS Level Gap file.)

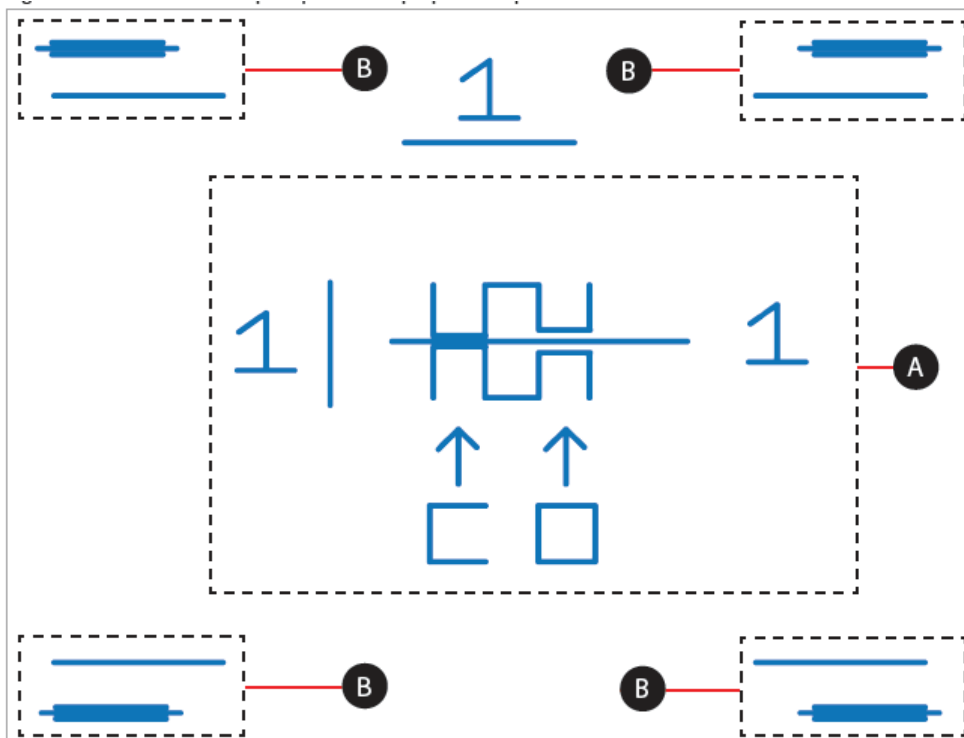
These files are available at www.Cubify.com.



NOTE: The Z-Gap (A) should always be checked and adjusted before the Level Gap (B).

Level Gap Calibration Print Overview

The following diagram illustrates a leveled print pad with a proper Z-Gap:



Z-Gap - The Z-Gap is the distance between the print pad and the print jet nozzles. The Z-Gap should always be checked and adjusted first before the Level Gap (**A**).

Level Gap - The Level Gap is a measurement to determine if the print pad is level with the print jet nozzles. The Level Gap should be checked and adjusted once the Z-Gap is correct (**B**).

Calibrating The Offset Jets



WARNING: DO NOT USE THE OFFSET JETS MENU UNLESS YOU HAVE BEEN ADVISED TO DO SO BY CUBIFY SUPPORT. CHANGES TO THESE SETTINGS WILL AFFECT THE QUALITY OF MULTI-COLOR OR MULTI-MATERIAL PRINTS. CALIBRATION WAS PERFORMED BY THE FACTORY AND ANY CHANGES TO THESE SETTINGS MUST BE APPROVED AND GUIDED BY CUBIFY SUPPORT.



NOTE: Calibrating the Offset Jets is only applicable for printers with more than one (1) print jet installed.

Calibration files can be downloaded from www.3dsystems.com/shop/cubepro/downloads. These files are printed like any other .cubepro file. There are four files available. The files are specific for the model printer (CubePro Duo or CubePro Trio) and for the material type (ABS or PLA) currently installed in the printer. All installed cartridges must be same material type (ABS or PLA) and each print jet will be used. Two Level Gap calibration files will also download with the Offset Jet Calibration files. These should be ignored during this procedure.

Calibration Overview

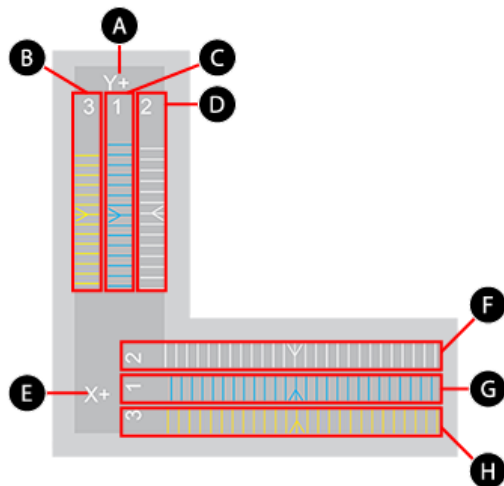
Depending on your printer model, you may have up to three (3) print jets installed. Calibrating the offset jets becomes necessary when multi-color or multi-material prints are not aligned properly. If the print jets are not positioned properly, supports may not print as intended and print geometries may be altered.

When it becomes necessary to calibrate the offset jets, each print jet will be tested for proper alignment. When printing the test file, a scale will be printed by all print jets and the scales printed by print jets 2 and 3 will be compared to the scale printed by print jet 1.



NOTE: It is very important to compare the scales printed by print jet 2 and print jet 3 to the scale printed by print jet 1.

Print jet one should not be adjusted.

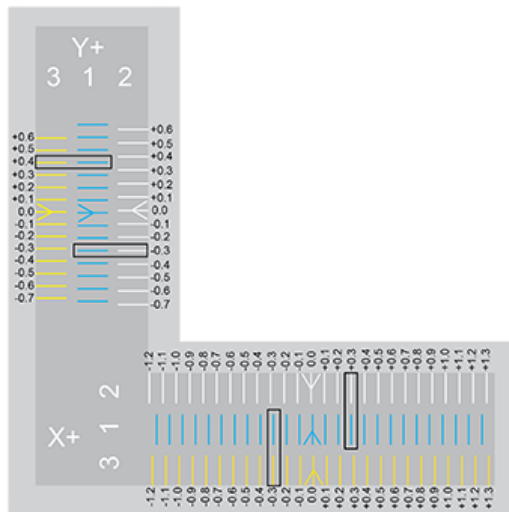


- | | |
|-----------------------------------|-----------------------------------|
| A Y-Axis Scale | E X-Axis Scale |
| B Print Jet 3 Y-Axis Scale | F Print Jet 2 X-Axis Scale |
| C Print Jet 1 Y-Axis Scale | G Print Jet 1 X-Axis Scale |
| D Print Jet 2 Y-Axis Scale | H Print Jet 3 X-Axis Scale |

In the print scale illustration, the X+ scale (left-to-right) contains three (3) rows of printed lines. Each line represents a print jet. The prints are numbered 1, 2 and 3 for each of the three print jets. Print jet 1 always prints the middle scale so the scales of print jets 2 and 3 can be easily compared to it. Print jet 2 prints above print jet 1 and print jet 3 prints below print jet 1. For printers with only two (2) print jets, the scale below the print jet 1 scale will not be printed.

The lines on the calibration print represent an offset of 0.1 mm and should be measured from the printed arrows in the center of the scales.

Reading the Offset Jets Scale



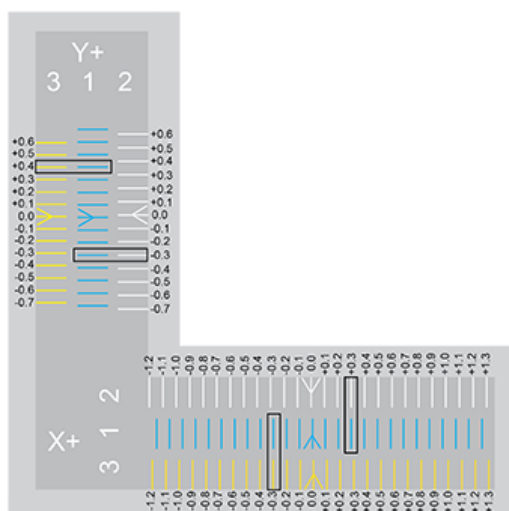
Note the white arrow printed from print jet 2 and compare it to the positioning of the blue arrow printed by print jet 1. Note that the white arrow is slightly left of the blue arrow meaning that print jet 2 is misaligned. Print jet 2 must be moved in a positive direction (right) to align with print jet 1.

Compare the printed lines of print jet 1 and 2 to the right of the arrows and find the printed lines that are properly aligned. In this illustration, the lines at +0.3 are aligned. This means that the offset must be corrected by increasing the offset by .3 mm.

When comparing the arrow printed by print jet 3 to the arrow printed by print jet 1, notice it is positioned slightly to the right. This means it must be adjusted in a negative (left) direction. Compare the lines of print jet 1 and 3 to the left of the center arrows and find the printed lines that are properly aligned. In this illustration, the lines at -0.3 are aligned. This means that the offset must be corrected by decreasing the offset by .3 mm.


Offset Jets Calibration Procedure

The following procedure demonstrates calibrating print jets 1 and 2 on the X-axis. Calibrating the Y-axis is the same procedure. The illustration below will be used for demonstration purposes. Be sure to refer to the actual scale printed by your printer and adjust the settings accordingly.

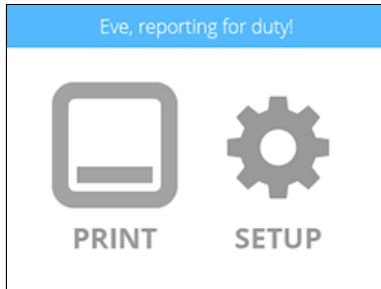


1. Download the [CALIBRATION FILES](#).
2. Extract the files to your computer's hard drive.


3. Navigate to the file location and copy the appropriate Nozzle Offset Calibration file to your USB mass storage device.

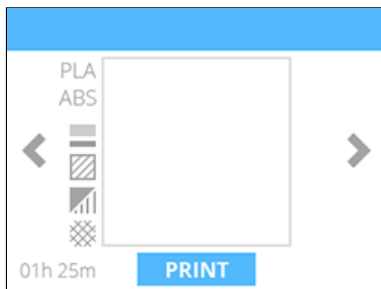
 **NOTE:** The Nozzle Offset Calibration files are specific for the model printer (CubePro Duo or CubePro Trio) and for the material type (ABS or PLA) currently installed in the printer.

4. Insert the mass storage device into the CubePro USB inlet port and select **PRINT**.



5. Navigate to the calibration file and select **PRINT**.

 **NOTE:** The printer may require you to install additional cartridges or replace a cartridge. Follow the instructions on the screen and refer to the section titled [Replacing A Material Cartridge](#).

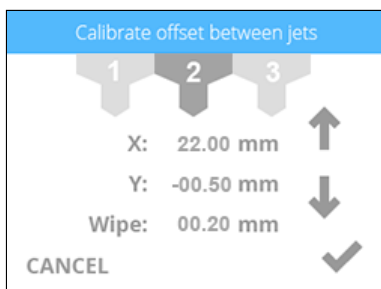


6. Once the printer has finished printing, remove the print pad from the printer and inspect the scales. If adjustments are required, proceed to the next step. If the scales are aligned properly, no further action is required.

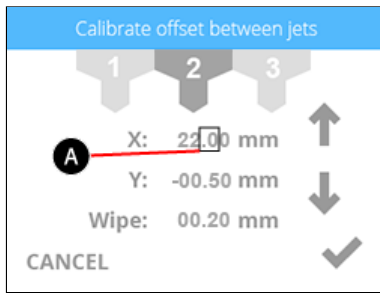
7. Navigate to the Print Jet Calibration screen and select **OFFSET JETS**.




8. When adjusting print jet 2, select **B**.




9. Referring to the illustration at the beginning of this procedure, print jet 2 needs to be increased by .3 mm. Select the value until the first digit (A) to the right of the decimal point is highlighted.



10. Press the up arrow three times to increase the value to 22.30 mm.

 **NOTE:** Pressing the up arrow increases (+) the value. Pressing the down arrow decreases (-) the value. Pressing the value repeatedly will scroll through the digits left-to-right.


 **NOTE:** You can also select the Y-axis settings and adjust those settings the same way.

 **NOTE:** If a value of 1 mm or larger are required, press the value until the first digit to the left of the decimal is highlighted and press the up arrow accordingly.

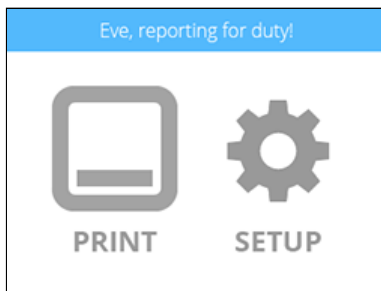
11. Once finished adjusting the settings, select the [checkmark](#) to continue.

12. Remove the original calibration print from the print pad. Reprint the calibration file and verify that the arrows align properly on the X-axis and Y-axis.


Printing The Level Gap Calibration File

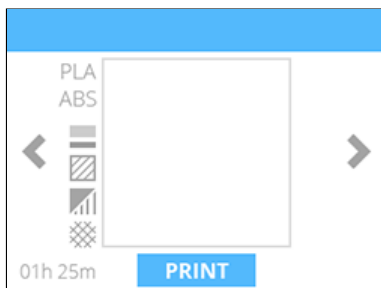
 **NOTE:** Ensure the print pad is completely clean from glue and printed parts before beginning this procedure.

1. Download the [CALIBRATION FILES](#) and extract them to your computer's hard drive.
2. Navigate to the file location and copy the appropriate file to your USB mass storage device.
3. Insert the USB mass storage device into the USB host port on the printer.
4. Select **PRINT**.




5. Using the arrows, navigate to the Level Gap Calibration file and select **PRINT**.

 **NOTE:** There are two Level Gap Calibration files as well as four Nozzle Offset Calibration files. The two Level Gap Calibration files are print material specific. Select the file based on the material cartridge type installed in cartridge bay 1.




6. Apply two thin layers of Cube Glue to the print pad in an area of 50 mm x 50 mm. Select the **checkmark** to continue.

 **NOTE:** For more information, refer to the section titled [Applying Cube Glue](#).

 **NOTE:** It may take several minutes to print the file.

7. When finished, remove the print pad and verify the Level Gap.

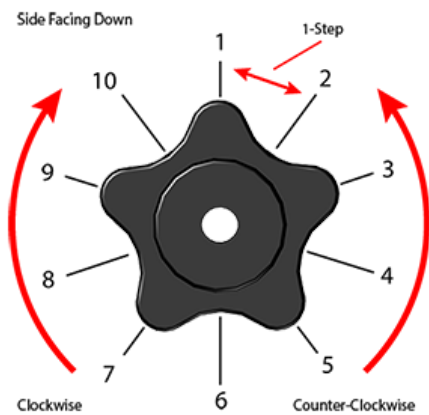
 **NOTE:** Refer to the sections titled [Reading The Z-Gap Calibration Print](#) and [Reading The Print Pad Level Calibration Print](#).

 **NOTE:** If any adjustments are needed, perform this procedure again after making the adjustments. Make sure all glue and plastic residues have been removed prior to performing this procedure again.

Adjustment Knob Measurement


Adjusting the level plate adjustment knob should initially be performed in 1-step increments. If a finer adjustment becomes necessary, adjust the knobs in 1/2 step increments.

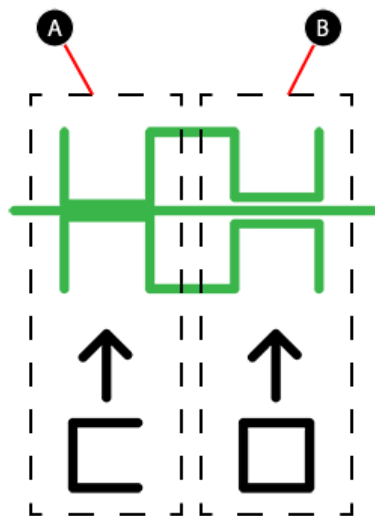
In the following illustration, the measurement between 1 and 2 is considered 1-step.



Adjusting the Z-Gap

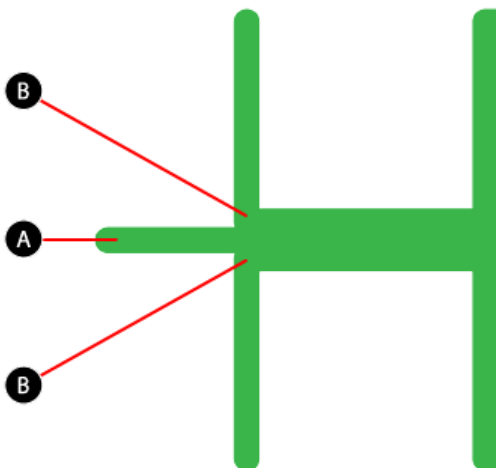
The Z-Gap should be within specifications before adjusting the Level Gap. If adjustments to the Z-Gap are necessary, perform the adjustments and then print the calibration file again to verify the correct Z-Gap. A correct Z-Gap is indicated when there is no gap in the Closed Z-Gap measurement and there is a gap in the Open Z-Gap measurement.

 NOTE: The Closed Z-Gap (A) and the Open Z-Gap (B) are two different measurements but should be read together.



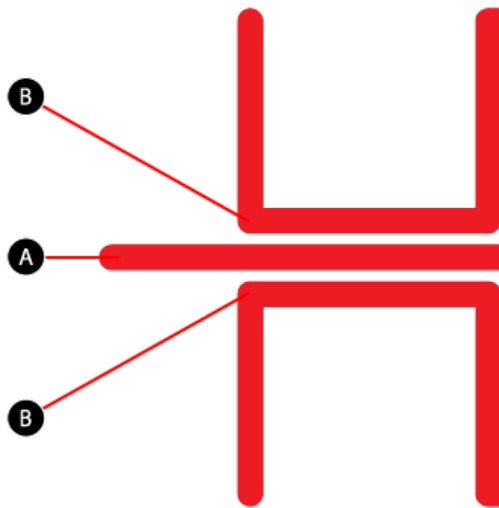
Correct Closed Z-Gap

Referring to the illustration, the Closed Z-Gap bars (B) should touch the baseline (A).



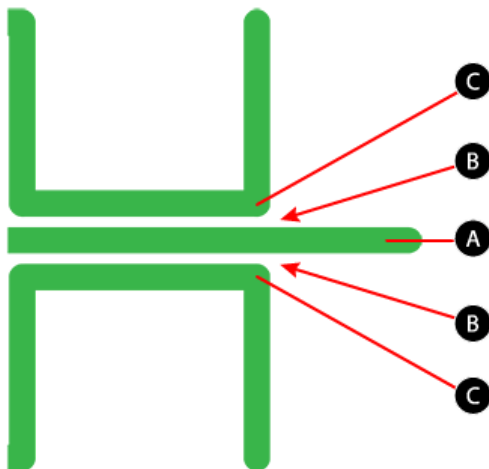
Incorrect Closed Z-Gap

If there is a gap (B) between the Closed Z-Gap bars and the baseline (A), turn all three print pad adjustment knobs counter-clockwise (left) 1-step and then print the file again to verify the lines touch. If the lines do not touch on the second print, adjust the knobs again 1-step and reprint the file. Continue to do this until the lines meet.



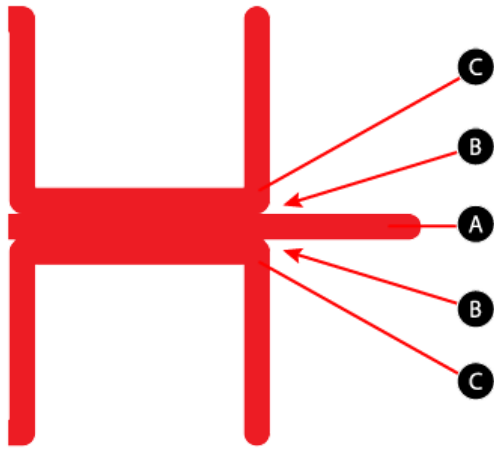
Correct Open Z-Gap

If there is a gap (B) between the Open Z-Gap bars (C) and the baseline (A) and there is no gap between the Closed Z-Gap bars and the baseline, the Z-Gap is correct.



Incorrect Open Z-Gap

If there is no gap (B) between the Open Z-Gap bars (C) and the baseline (A), turn all three (3) print pad adjustment knobs clockwise (right) 1-step and print the file again to verify that the lines do not touch. If they touch on the second print, adjust all three (3) print pad adjustment knobs clockwise (right) 1-step and reprint the file. Continue this procedure until there is a gap.



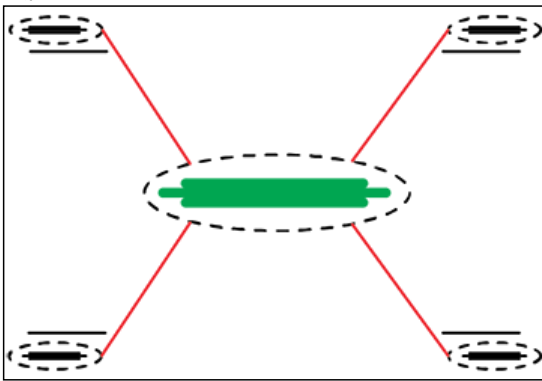
Reading the Print Pad Level Calibration Print

Correct Print Pad Level

The Print Pad Level is correct when each of the four (4) corner calibration points have no gaps between the Print Pad Level calibration lines and the baselines.



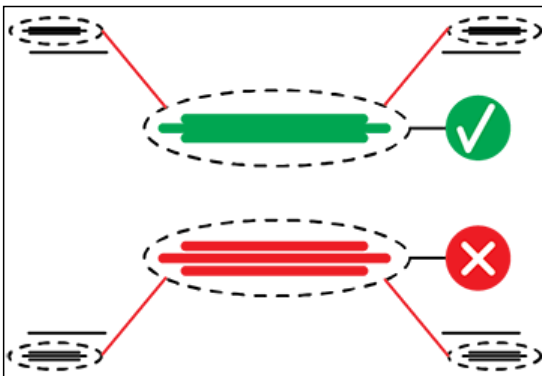
NOTE: Before making any adjustments to the Print Pad Level, the Z-Gap must be correct.



Incorrect Print Pad Level

In the illustration, there is an incorrect gap between the Print Pad Level calibration lines and the baselines on the front of the print pad and no gap between the Print Pad Level calibration lines and the baselines on the back of the print pad. The front of the print pad needs to be raised.

To correct the Print Pad Level in this instance, turn the front print pad adjuster knob counter-clockwise (left) 1-step. Reprint the file and verify that all four corner calibration points are correct.



Acceptable Print Pattern

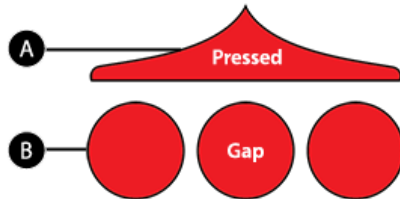
The Print Pad Level calibration file should print with no gap between the Print Pad Level calibration lines and the baselines. The illustration indicates an acceptable print pattern from a profile view.



Unacceptable Print Patterns

If the gap between the print pad and the print jet nozzles is too small, the Print Pad Level calibration lines will press in and scrape the baseline. If all four corner calibration points appear like the pressed profile illustration (A), turn the three (3) print pad adjuster knobs clockwise (right) 1-step to increase the gap. Reprint the Print Pad Level calibration print again.

If there is a gap between the Print Pad Level calibration lines and the baselines like the illustration (B), turn the three (3) print pad adjuster knobs counter-clockwise (left) 1-step to decrease the gap. Reprint the Level Gap calibration print.



NOTE: Once all four corner Print Pad Level calibration points are correct, verify the Z-Gap to ensure that it is still correct.