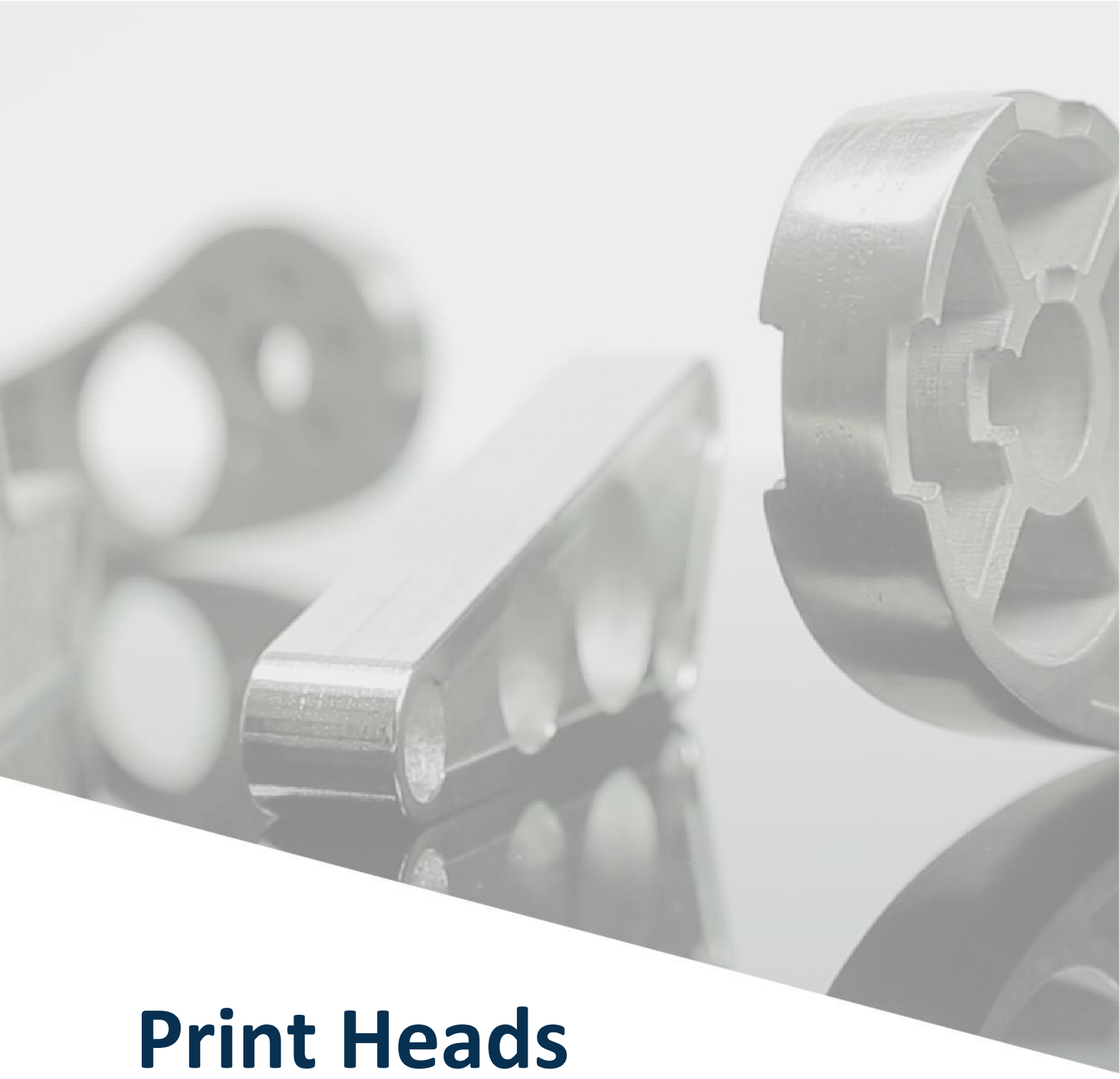


Print Heads Calibration Guide

File Number : 60-PRHD-0001

Revision: 1.0

October 28, 2024

Tritone
Industrial Additive Manufacturing

Contents

1. Purpose

Provide instructions on calibrating the print heads on Tritone machinery.

2. Equipment and Materials

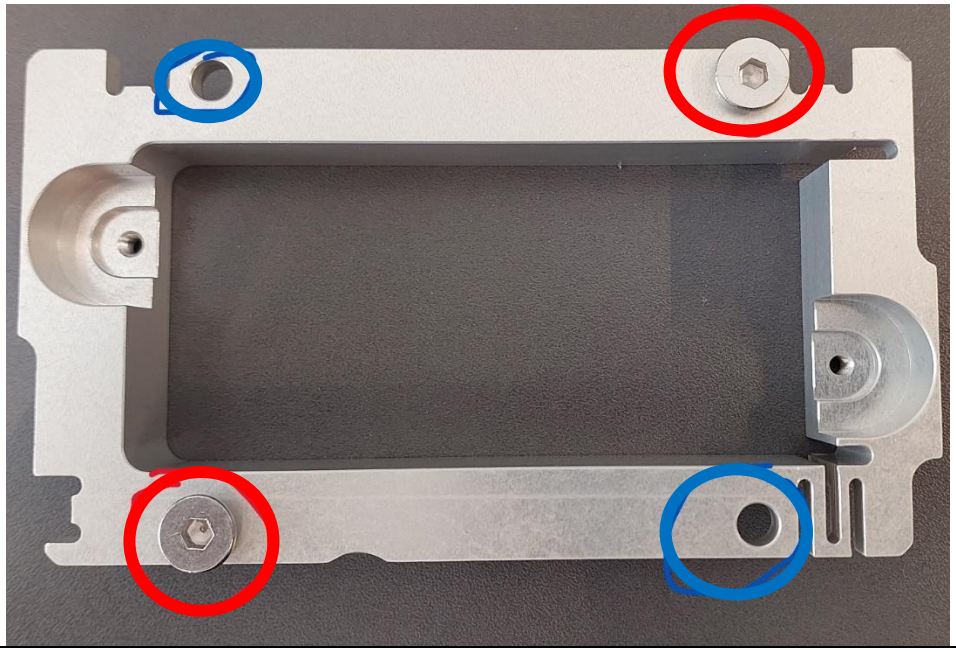
#	Item No.	Item Name	Figure	QTY
1.	80-ALEN-0009	ALLEN KEY, 4mm, LENGTH: 200mm		1
2.	80-ALEN-0004	ALLEN KEY, 3mm, LENGTH: 160mm		1
3.	-	RULER, 0.1MM SCALE		1
4.	06-CAMR-0003	MICROSCOPIC CAMERA, 2MP, 8 LED, 40X-600X, USB CONNECTION		1
5.	81-SLID-0001	FILM FOR PRINTER, TRANSPARENT, A3, 0.1mm, 100Pcs		1

3. Calibrating the Print Heads

Calibrating the print heads requires performing multiple tests and procedures.
Perform the following procedures in the order they are listed.

3.1. Assembling the Print Heads

1. When assembling the print heads onto the plate, use two conical screws (red) to center the bracket against two bores (blue), as pictured below:

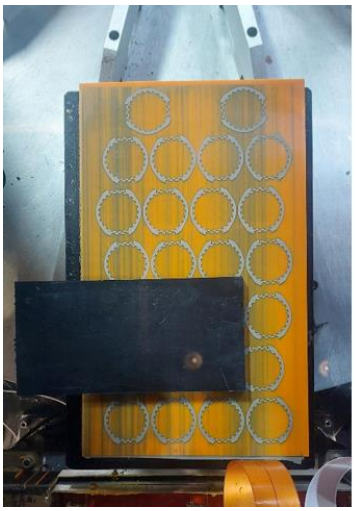


2. After the bracket is centered, screw two regular screws into the remaining bores, and exchange the conical screws for regular screws.

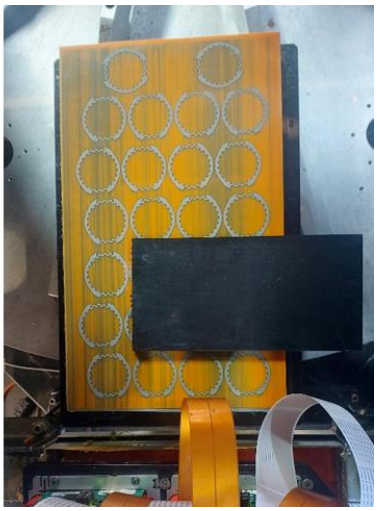
3. After all the print heads are assembled and attached, perform a Head Alignment Test on each print head as instructed below.

3.2. Performing a Head Alignment Test

1. Position a black plate on a table that has gone through a cutting procedure.
    - For print head 1, the plate should stick out to the right side.
    - For print head 4, the plate should stick out to the left side.

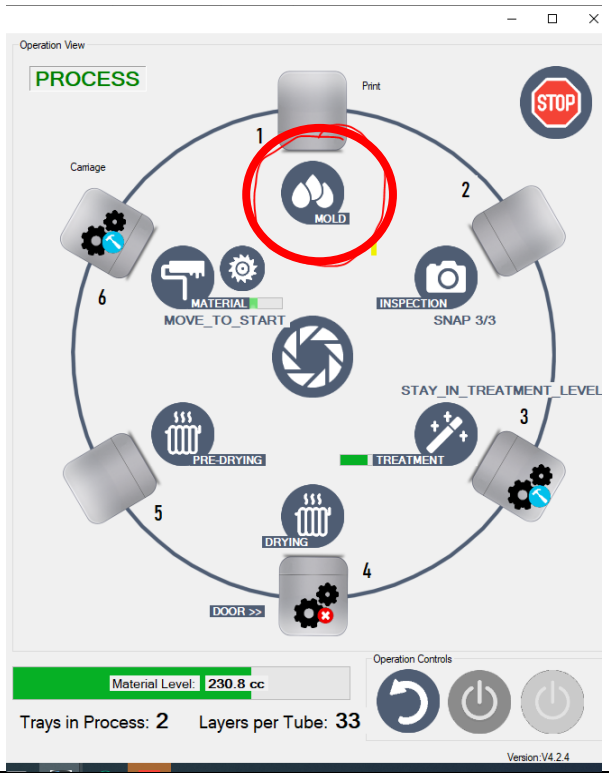


Print Head 4

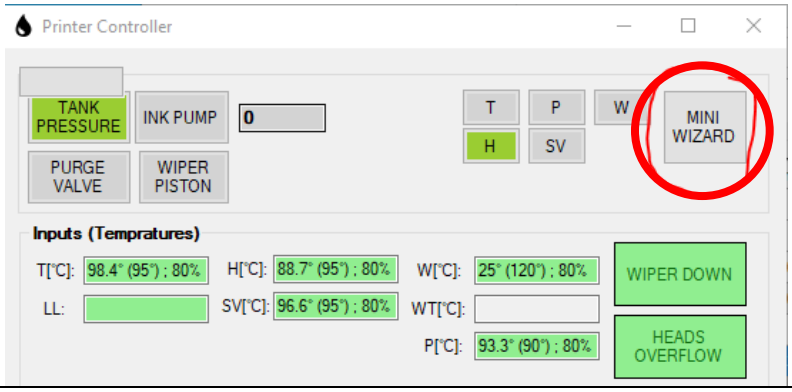


Print Head 1

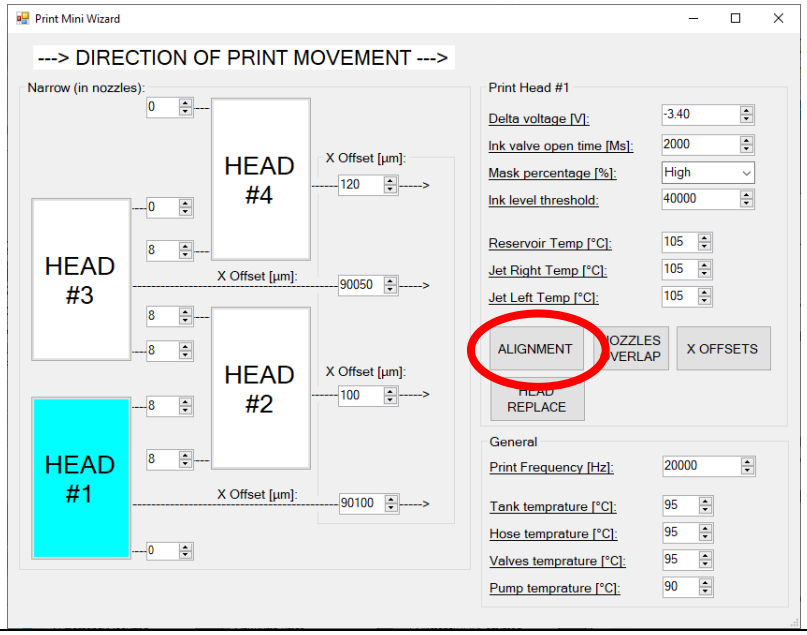
2. In the development UI, click the Mold station.



3. Click the Mini Wizard button.



4. Select which print head to test and click Alignment.
The selected print head will print two dotted lines.



5. If the print head is straightened, the result will be one straight dotted line. Otherwise, the result will be two slanted dotted lines.

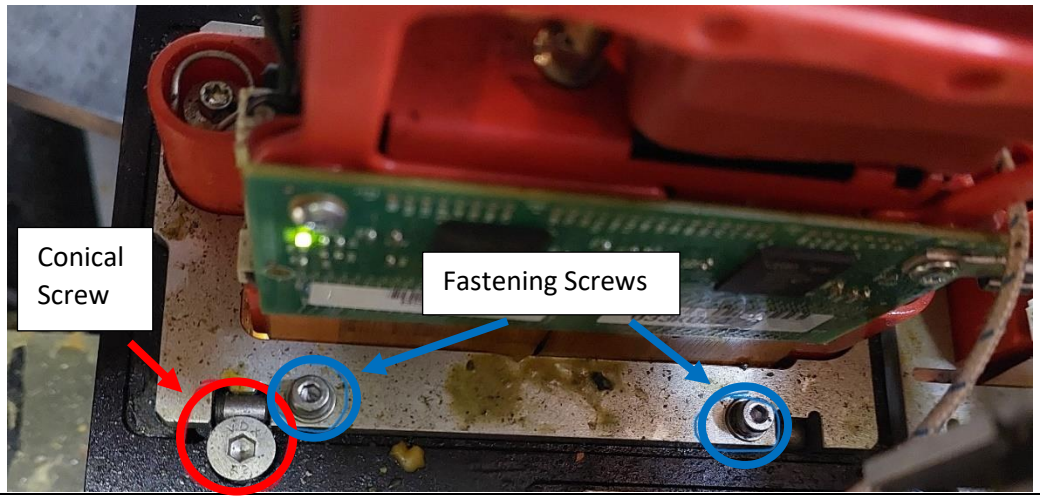
Slanted Lines

Straight Line

6. If the lines are **slanted**, calibrate the alignment as instructed below.
If the line is **straight**, there is no need to calibrate the alignment: Skip the alignment calibration, and calibrate the distance between the print heads as instructed below.

3.3. Alignment Calibration

1. Before releasing the fastening screws, ensure that the conical screw is tightened properly and makes contact with the surface. This is to ensure that the alignment calibration stays after releasing the fastening screws.
    - Tightening the conical screw will rotate the print head clockwise.
2. Using an Allen key (3mm), release the four fastening screws slightly. There are two screws on each side of the print head (marked blue).



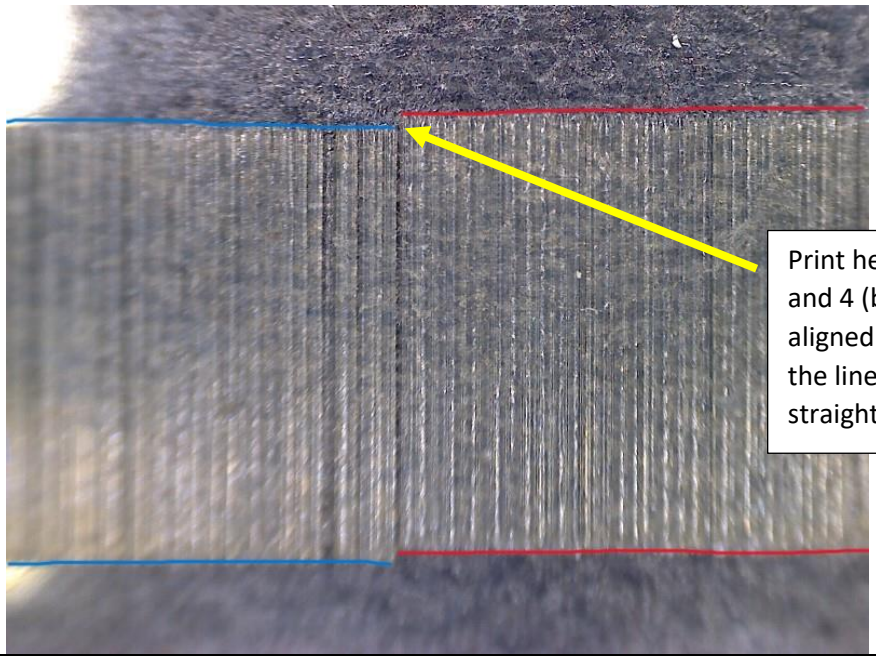
3. Using an Allen key (4mm), tighten or release the conical screw (marked red), depending on what is required.
4. Tighten the fixing screws.
5. Perform a Head Alignment Test on each print head as instructed above to ensure that the alignment is now acceptable.
6. Calibrate the distance between the print heads as instructed below.

3.4. Calibrating the Distance Between the Print Heads

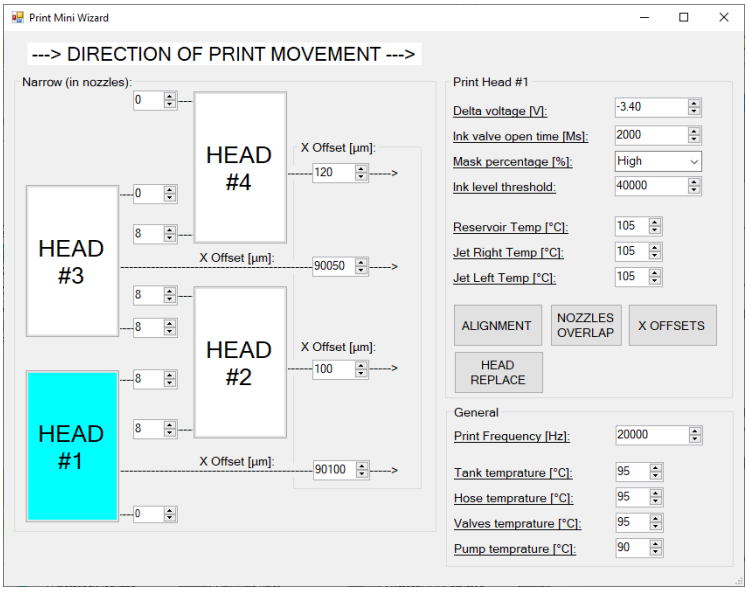
1. Prepare a 20*30cm slide (alternatively, cut a 3A slide into two equal pieces), spray it lightly with water, and place it on a table that has been through a cutting procedure.

2. Print a calibration file (4PH Calibration.tjf) and receive the following outcome:

3. Ensure that the X axis is straight: Straight and level lines should be visible.

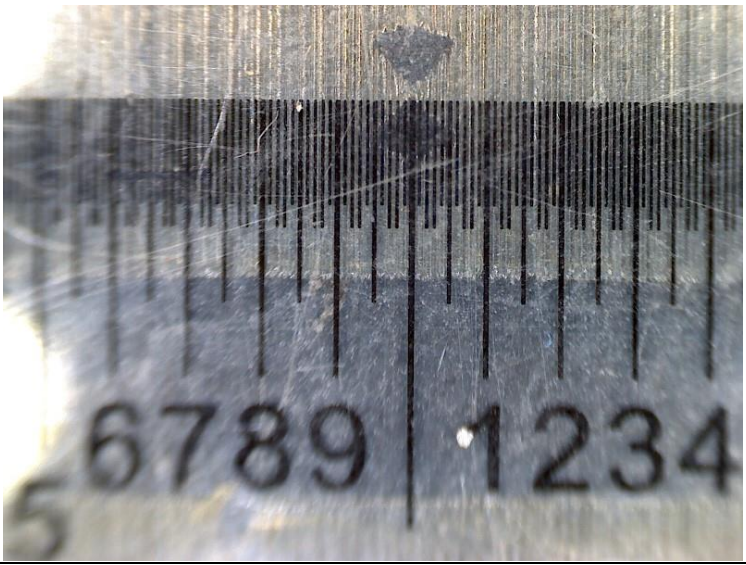


4. If the X axis is **unacceptable** condition (not straight), fix it using the following steps:
    a. Go to the Development UI.
    b. Click the Material station.
    c. Click the Mini Wizard button.
    d. Adjust the X-Offset on the relevant print head accordingly.
    NOTE: The X-Offset value cannot be lower than 0.



    e. After making the necessary adjustment, print the calibration file onto a new slide and proceed to the next step.

5. Using a ruler with a 1mm scale and a USB microscope, measure the distance between the centers of the print heads.
Position the ruler so that the 0 or the 10 marks will be placed in the center of the print head (as depicted in the image) and measure the distances.



6. Enter the data measured in the previous step into an Excel file.

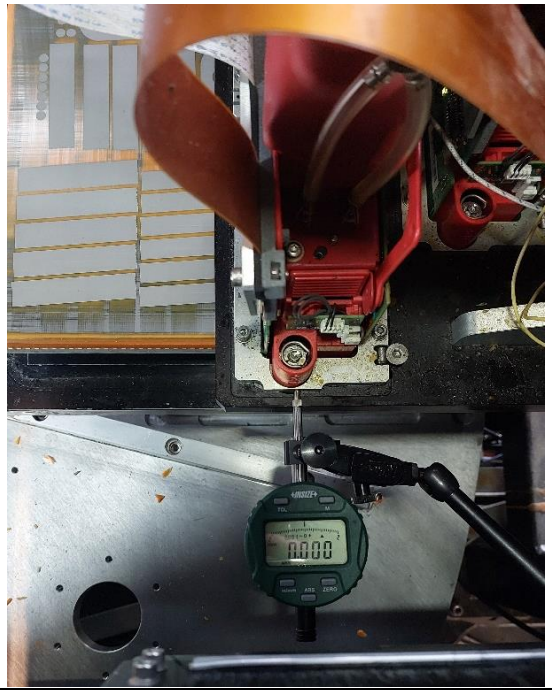
PH1	70[mm] Δph2	PH2	140 [mm] Δph3	PH3	210 [mm] Δph4	PH4
219.95	69.95	150.00	139.95	80.00	209.95	10.00
219.95	69.95	150.00	140	79.95	210.045	9.91
219.95	69.95	150.00	140	79.95	210.045	9.91
219.95	69.95	150.00	140	79.95	210.045	9.91
0.00	69.95	-0.05	140.00	0.00	210.05	-0.04

In the example above, the data indicates that print head 4 needs to be moved towards print head 3 by 0.04mm, and that print head 2 needs to be moved towards print head 1 by 0.05mm.

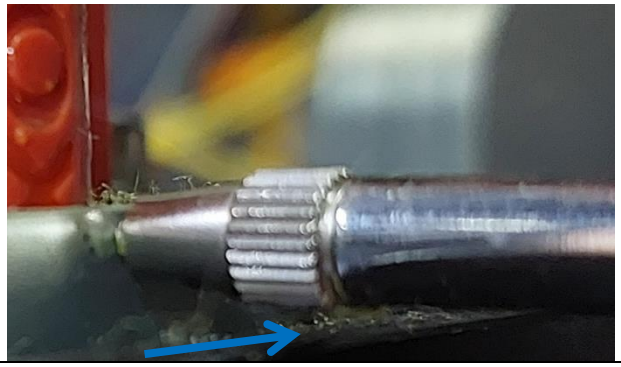
7. If the data you entered indicates that a print head needs to be adjusted, adjust it as instructed below.
If all the print heads are in the correct positions, the print head calibration is complete.

3.5. Adjusting the Print Head Positions

1. In the machine, place a Poppy test on the bracket of the print head that requires adjustment and reset it.

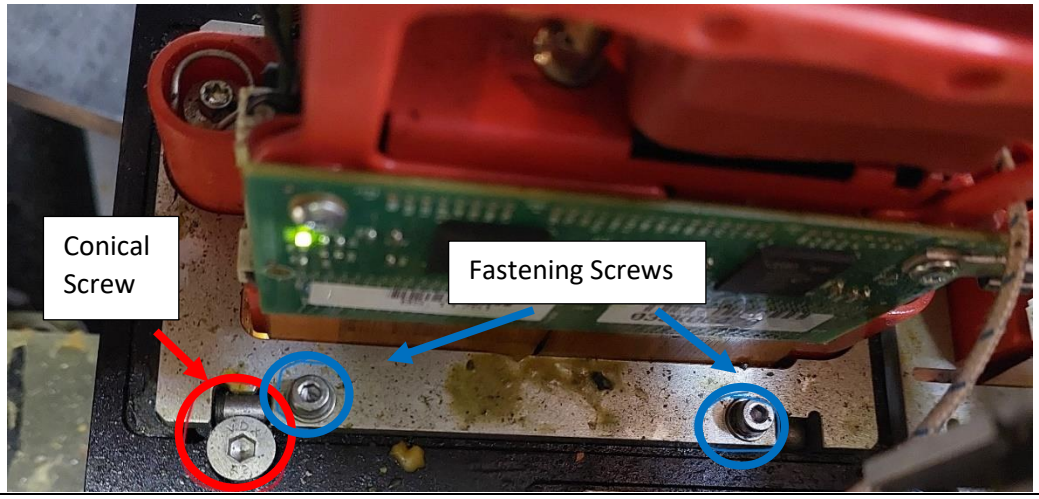


2. Ensure that the Poppy tester doesn't make contact with the lower plate.



3. Before releasing the fastening screws, ensure that the conical screw is tightened properly and makes contact with the surface. This is to ensure that the alignment calibration stays after releasing the fastening screws.

4. Using an Allen key (3mm), release the four fastening screws slightly. There are two screws on each side of the print head (marked blue).



5. Using an Allen key (4mm), tighten or release the conical screw (marked red), depending on what is required.
    - Tightening the conical screw will move the print head away from print head 1
    - Releasing it will move the print head closer to print head 1.
6. After moving the print head to the correct position, tighten the fastening screws.
7. Print a calibration file again and ensure that the outcome is in acceptable condition. Once the outcome is in acceptable condition, the calibration procedure is complete.

4. Revision History

Date	Comments	Revision
October 28, 2024	First Release	1.0