3DGENCE ONE

MAITENANCE ACTIVITIES

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1. HOTENDS CLEANING

Recommended frequency: each time printing is finished.

Cleaning the hotend is recommended each time after finishing printing for the purpose of removing any remains of molten/burned material stuck to the outer surface of the nozzle.

Procedure for hotend cleaning.

For this purpose:

1. Wear protective gloves.
2. From the printer's menu activate Preheat PLA/Preheat ABS - depending on the material used in the hotend.
3. Secure good access to the hotend. Use options Prepare → Park Heatbed → Middle or Bottom.
4. Gently remove the molten/burnt remains of material using non-combustible cloth, metal spatula or tweezers.
5. Turn off the heating after cleaning the hotend (to do this, use e.g. Cooldown function from printer's menu).

2. HEATBED CLEANING

Recommended frequency: each time printing is finished.

A dirty or greasy surface of heatbed can seriously impair or make impossible the printing process. It is recommended to clean the heatbed before each new printing.

The procedure for cleaning the heatbed.

For this purpose:

1. Set the printer's heatbed in a position enabling its convenient cleaning using the Menu->Prepare → Park Heatbed → Middle or Bottom options.
2. Turn off all heating elements and wait until they are completely cooled down. Use “Cooldown” option from the menu.
3. Turn the device off by pressing the power button and unplug the printer from the power source.
4. Wear protective gloves.
5. Use the spatula to clean the surface of the heatbed from any residual material. Then moisten a cotton cloth (not synthetic) with the following type of solvent cleaners:

• 10% solution of spirit vinegar
• acetone
• nitro
• petroleum cleaner

When degreasing the heatbed, pay special attention to avoid spreading solvent cleaners on any plastic and painted elements of the printer as it can damage them.

6. Wait until the solvent cleaner evaporates.

3. CALIBRATION OF THE HEATBED

Recommended frequency: when required, or once on a few hundred hours of printing.

Indication for calibration of heatbed.

Heatbed calibration is not required each time you run the printer - it should be done approximately once a few dozen to a few hundred hours of printing. Other indications for heatbed calibration are enumerated below.

Heatbed should be calibrated when:

• the printer is started for the first time,
• one or more corners or edges of printed model peels off or does not adhere to the working table,
• one or more corners or edges of printed model are squeezed into the surface of heatbed (the printed layer seems transparent or too thin, printing mechanism skips layers, extruder engine makes a clicking noise or printing material excessively accumulates in transitions between layers),
• table surface was unintentionally lifted,
• too much force was used during removal of the printout, which might have caused heatbed displacement,
• the first printing layer is not even - one edge is printed correctly, whereas the other edge is too flat or does not adhere to the surface of the heatbed.

Heatbed calibration procedure.

For this purpose:

1. Check if X and Y axes can move without any obstructions. Make sure if any cables are not frayed or damaged. Check if the toothed belts are not frayed or damaged. Check if Z-axis stopwatch is not damaged, broken or bent, and if it matches Z-axis limit switch (if it aims at the notch of Z axis limit switch).
2. Any filament leftovers should be removed (see „Removing filament") and the hotend should be cooled down to temperature below 50°C.
3. Remove all dirt and leftover material from the nozzle of hotend and clean the table with a spatula (not required when starting the device for the first time).
4. From the submenu „Prepare" select „Home All" and confirm by pressing „OK" button. At this point, all axes will go to their base position.

WARNING: Carefully observe the movement of all axes. When Z axis reaches its limit switch, check the distance between the end of hotend and the heatbed. It should be about 0.8 - 1 mm (no more than 1 mm), greater distance may interrupt scanning the heatbed, which is displayed as an error „Heat bed scan aborted!" If the distance between the hotend end and heatbed is more than 1 mm, adjust it manually to 0.8 - 1 mm. To do this, release the screw (1) (fig. 30.) and adjust the distance using the knurled screw (2). Turning the knurled screw clockwise will increase the distance between the table and the head. Counter-clockwise turn will decrease the distance. A single full turn increases or decreases the distance by 0.5 mm. Once you have finished knurled screw adjustment, check the position of the nozzle with the command HOME Z and tighten the screw (1) again.

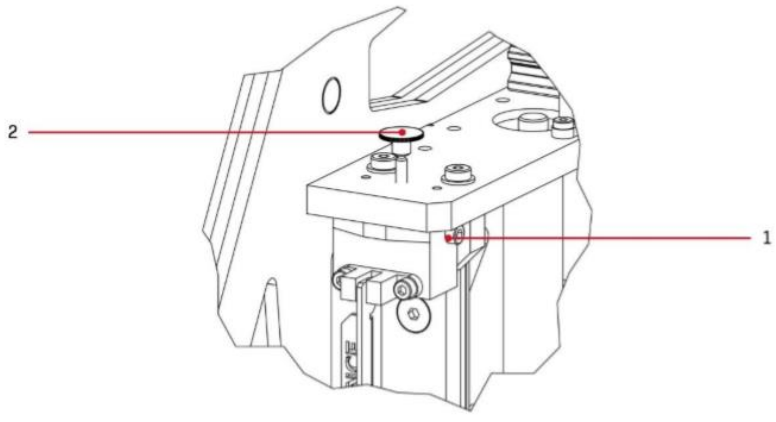


Fig. 30. Hotend height adjustment screws.

5. Select Calibration and Heatbed Scan. At this point, the device starts the heatbed calibration process.
6. During calibration, do not touch the hotend or the extruder – the calibration process can take up to 25 minutes. After the scanning is completed, the display shows information HEATBED SCAN COMPLETED. The printer was calibrated successfully.

WARNING: During calibration, do not touch the hotend or the extruder. It may disrupt calibration, which is displayed as an error „HEATBED SCAN ABORTED". This message may also appear if the instruction from point 3 was not followed. The calibration process can take up to 25 minutes. In the event of hearing a loud „clicking" sound coming from the engine, or if one of axes did not stop, immediately turn off the device and contact 3DGence technical service department using report problem form on www.3dgence.com/support page

4.CALIBRATION OF AXES

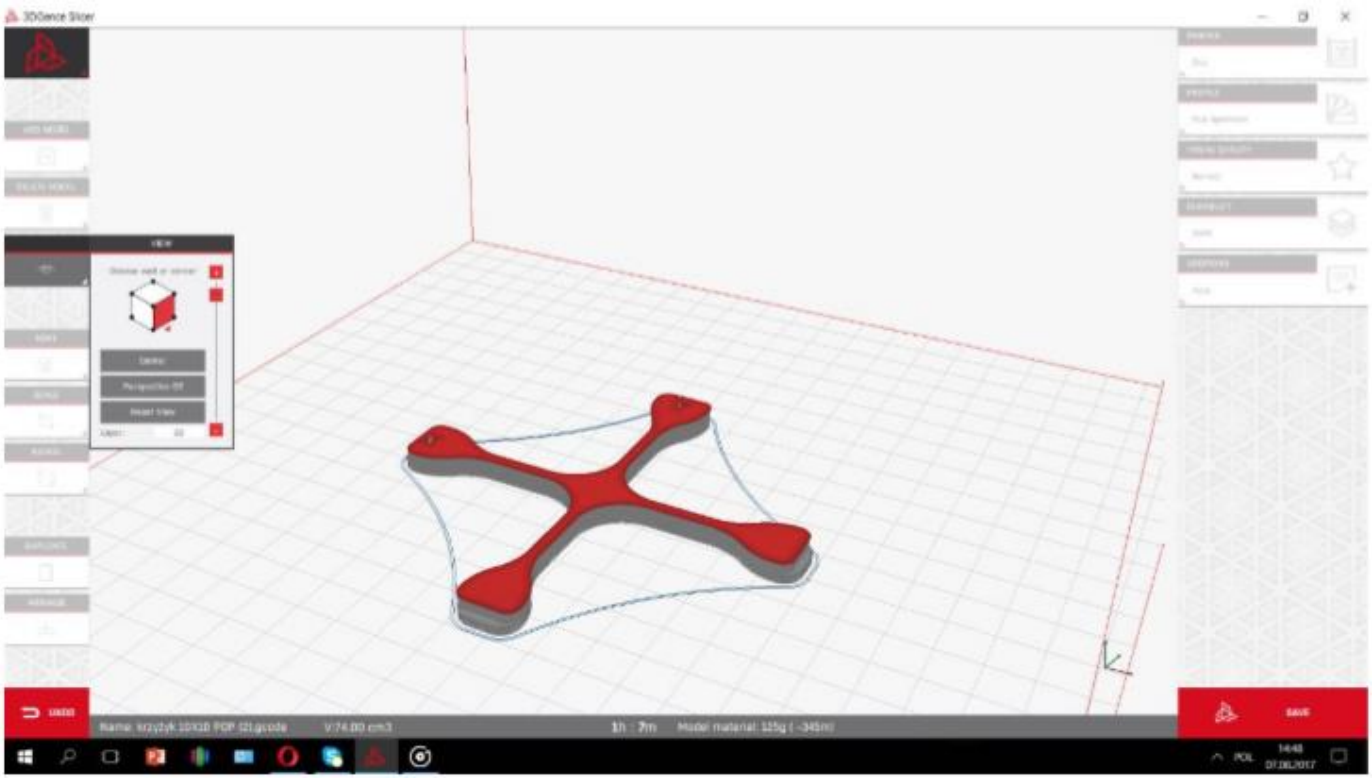
Recommended frequency: each time the material type is changed to a different one.

3DGence ONE printer has a unique system for precise adjustment of size parameters of the printed object. The printer is precalibrated for 3DGence PLA material with an accuracy of 0.1 mm. Printing with the use of materials with different thermal contraction may require size correction of a printed object. For most printers, such correction can be very difficult or even impossible. With its innovative system, 3DGence ONE allows quick, easy and accurate size correction. The new system performs only one printout calibration session and a simple measurement to acquire the accuracy of 0.02 mm.

NOTE: Each type of material used as filament has its own thermal contraction. To maximize the precision of the results, the calibration should be made for the exact material that is to be used for printing.

To perform a precise calibration of X and Y axes, it is necessary to make a print of a special object. Calibration file is on SD memory card – CalibrationXY_1h45min.gcode. The printing of calibration object takes about 1 hour and 45 minutes.

Prepared models .stl and .gcode are also available at www.3dgence/support in the tab Your files
(the tab is available after creating an account and registering the device).

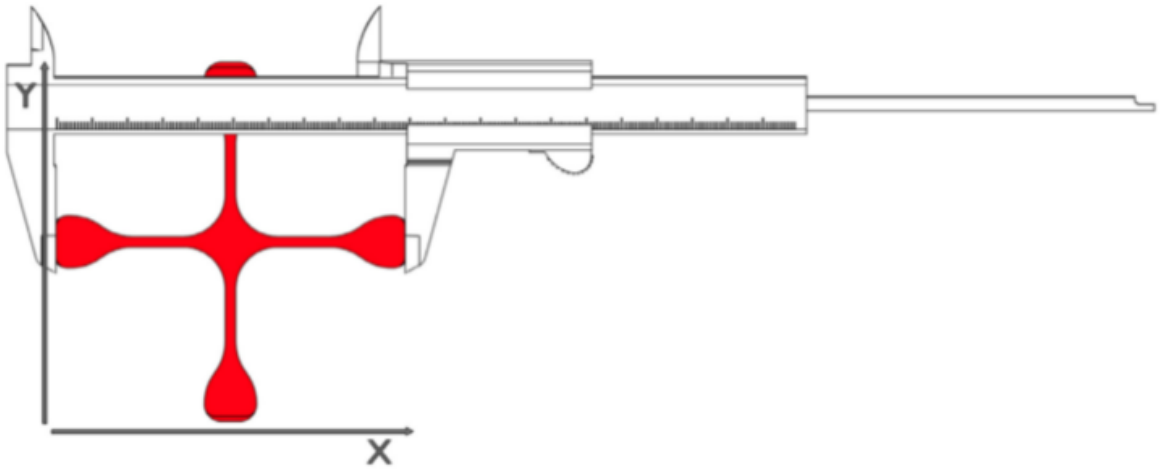


After printing, cooling and careful removal of calibration object (the cross), take measures of X and Y axes of the printed model. Several measuring tools can be used, provided that their accuracy cannot be worse than 0.05mm:

• caliper,
• micrometer,
• coordinate-measuring machine,
• optical devices.

The printout should be measured along X and Y axis. For reliable measurement, use the following guidelines:

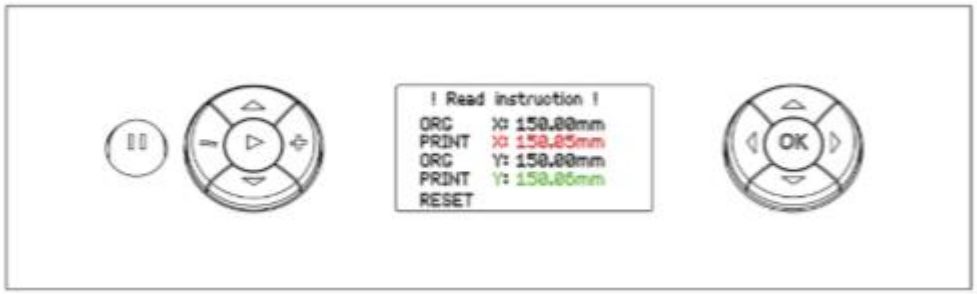
• the measuring point should be in the middle of the height of the printed object, both points at the height of the same layer,
• repeat the measurement for X and Y axis 5 times. Discard the highest and lowest results from each group. Average the results for both axes:



MEASUREMENT:	X:	Y:
	100,08	100,07
	100,06	100,06
	100,05	100,08
	100,04	100,06
	100,05	100,05
AVERAGE:	100,05	100,06

The result of this formula will be the basis for further operations:

1. Go to Calibration menu and select XY Calibration. Confirm selection by pressing OK button.
2. Use up and down buttons from the right panel to select Print X value and press OK. Use up and down buttons to introduce the value obtained from X axis measurements.
3. Use up and down buttons from the right panel to select Print Y value and press OK. Use up and down buttons to introduce the value obtained from Y axis measurements.
4. After entering all values, confirm changes by selecting „CALCULATE & SAVE”. The algorithm will calculate printing parameters according to the measurements made.



Due to this procedure, the next printout from the material, for which the calibration was made, will be completed with the compensation for thermal contraction of the material in X and Y axes

5. GEAR BELT REVIEW

Recommended frequency: every month.

Once a month it is recommended to review the technical condition of toothed belts consisting in visual assessment of the degree of wear of the belts and checking their tension.

The toothed belt should always be properly tensioned, the simplest tension test is to try to twist the belt 90 degrees in this position should feel tangible resistance.

If the belts are loose, or demaged contact the Technical Support Department to send the printer to the maintenance service.

Inaccuracies and causes:

- tooth abrasion,
- tooth foot cracks and tooth shearing,
-the reason is too much / too little stress or foreign cannons,
- abrasion of the belt edges,
- the most common causes are axes that are not parallel,
damage to the belt on the teeth side can be caused by foreign objects in the belt path or damage to the gear teeth,
- scratches / cracks on the ridge of the belt
- the most common causes are too high / low ambient temperature, the action of foreign liquids, aging / wear,
- broken toothed belt,
- the reason is most often a foreign body in the drive or the action of foreign liquids,
- the abrasion of the fabric between the teeth is most often caused by high stress.

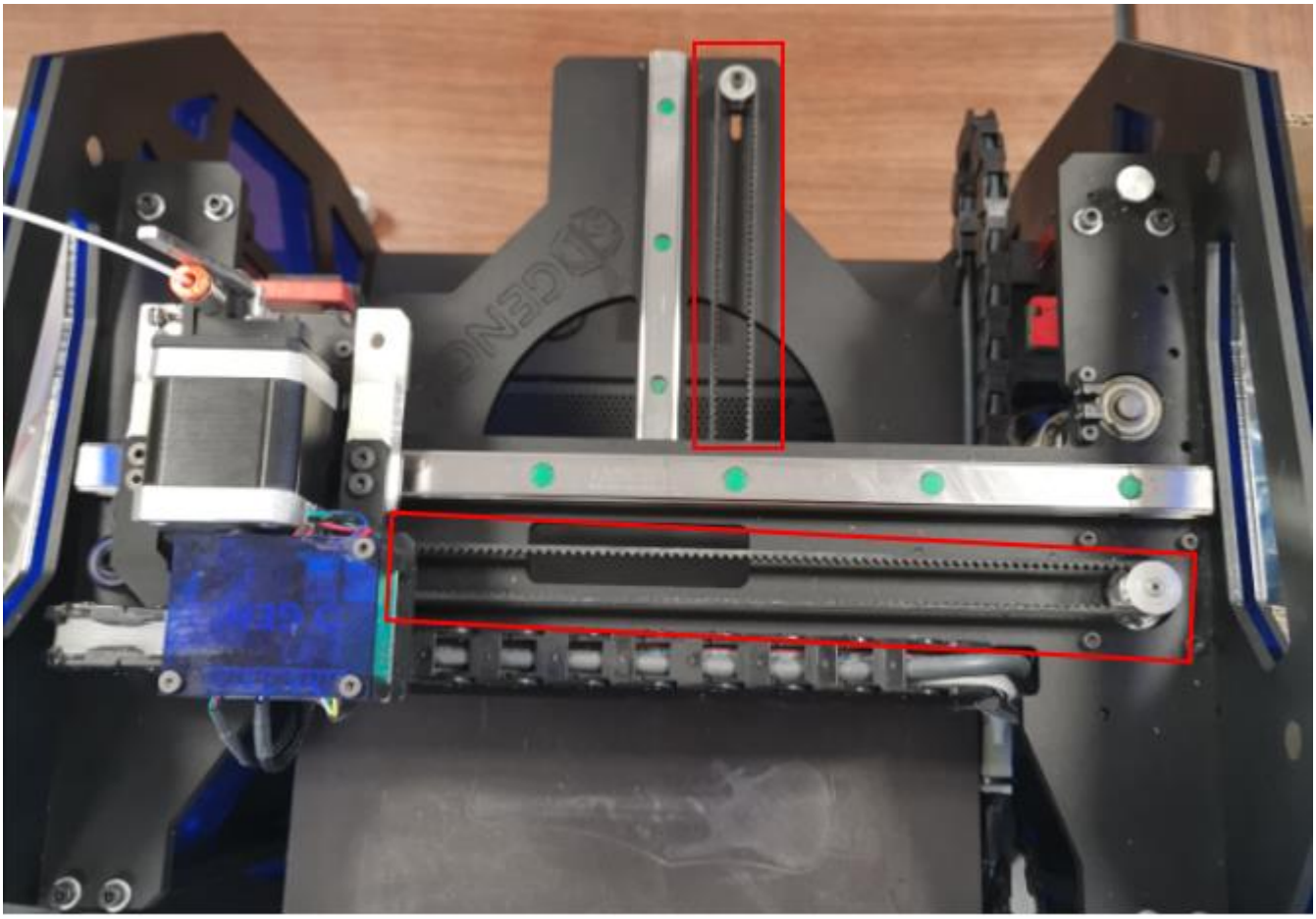


Fig. Localisation of the toothed belts in the printer.

6. LUBRICATION OF GUIDES AND BALL SCREWS

Recommended frequency: every four months.

1. Before you start to lubricate, please obtain:
   - Greases HIWIN GREASE G01 or grease SKF LGEP 2 (grease according to norm DIN 51825,or class K2K),
   - a manual lubricator.

2. Identify does the ball screws are equipped with grease nipples in the nut.
3. Choose the appropriate grease:
   -for ball screws equipped with grease nipples and for linear guides:
   - Greases HIWIN GREASE G01 or grease SKF LGEP 2

   -for ball screws that aren't equipped with grease nipples and for linear guides:
   - Grease SKF LGEP 2.

Grease SKFLGEP 2

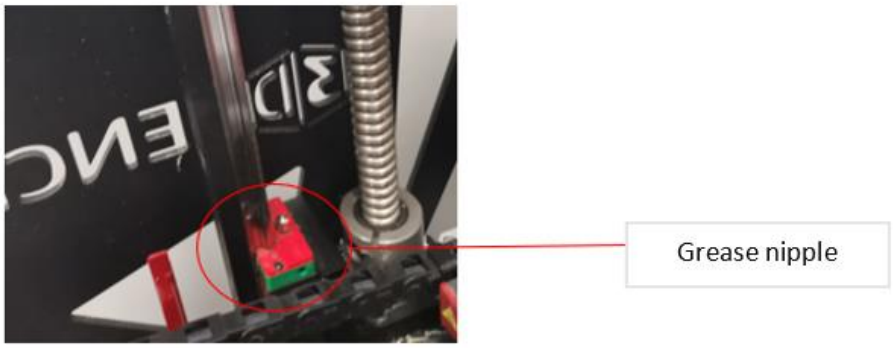
Grease SKF LGEP 2

4. Fill the lubricator with the appropriate grease according to the manufacturer's instructions.

LUBRICATING THE BALL SCREW

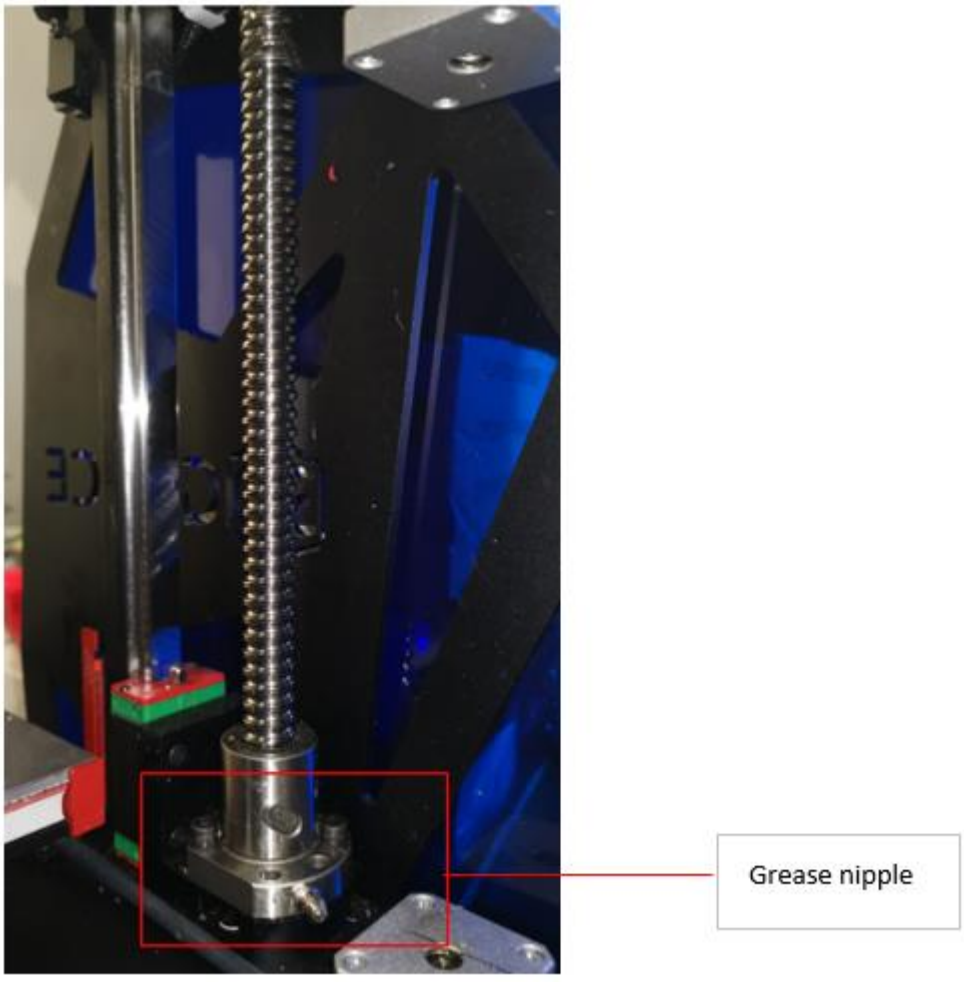
1. Set the heatbed to the lower position (Menu → Prepare-> Park heatbed -> Bottom).
2. Move the heatbed towards to you.
3. Lubricating ball screws and linear guides:

- Push grease into the grease nipple and around of the left linear carriage. It is located at the top of the liner carriage. Push grease out by pressing the lubricator nozzle firmly against the grease nipple and pressing smoothly the lubricator lever once.



-Repeat the operation for right linear carriage.

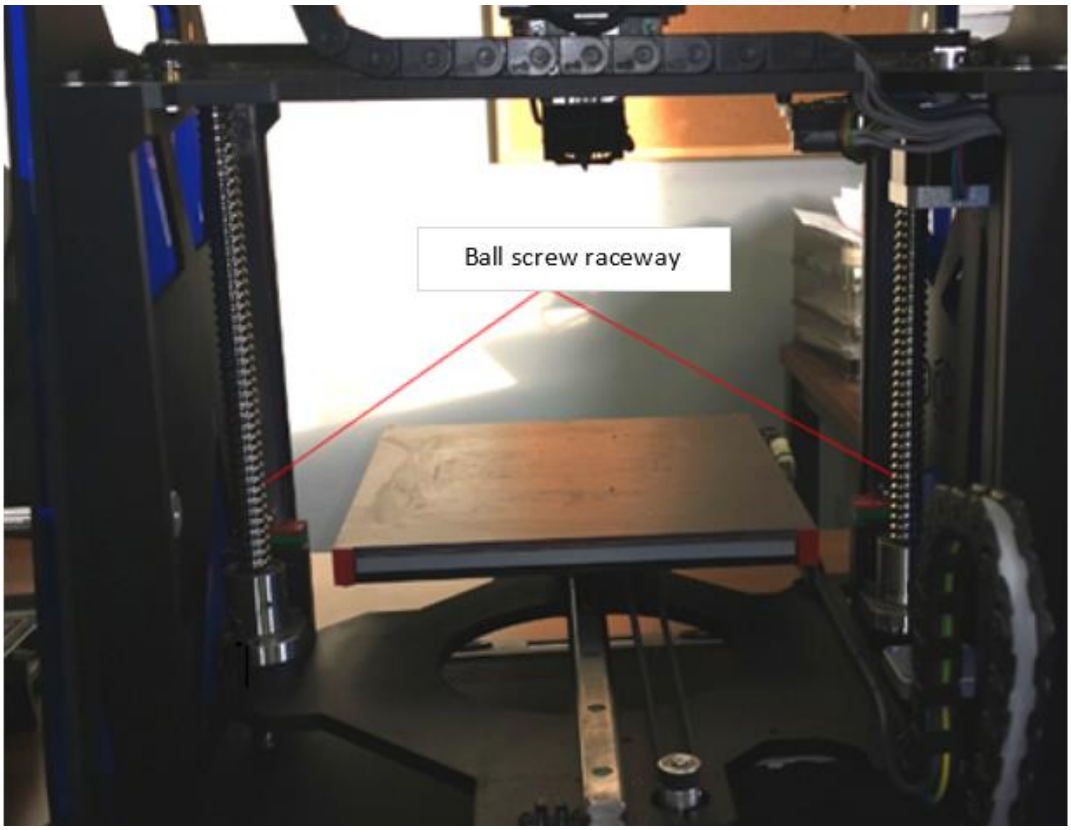
<u>In case when ball screws are equipped with grease nipples in the nut.</u>
- Push grease into the left grease nipple by pressing the lubricator nozzle firmly against the grease nipple and pressing smoothly the lubricator lever once.
-Repeat the operation for right side.



4. Rise heatbed (Menu → Prepare-> Park heatbed -> Rise).
5. Lower heatbed (Menu → Prepare-> Park heatbed -> Bottom).
6. Push grease into the left and right grease nipple by pressing the lubricator nozzle firmly against the grease nipple and pressing smoothly the lubricator lever once.
7. Rise heatbed (Menu → Prepare-> Park heatbed -> Rise).
8. Lower heatbed (Menu → Prepare-> Park heatbed -> Bottom).
9. Collect excess grease from linear carriages and ball screw nuts using a paper towel.

<u>In case when ball screws are not equipped with grease nipples in the nut</u>**:**

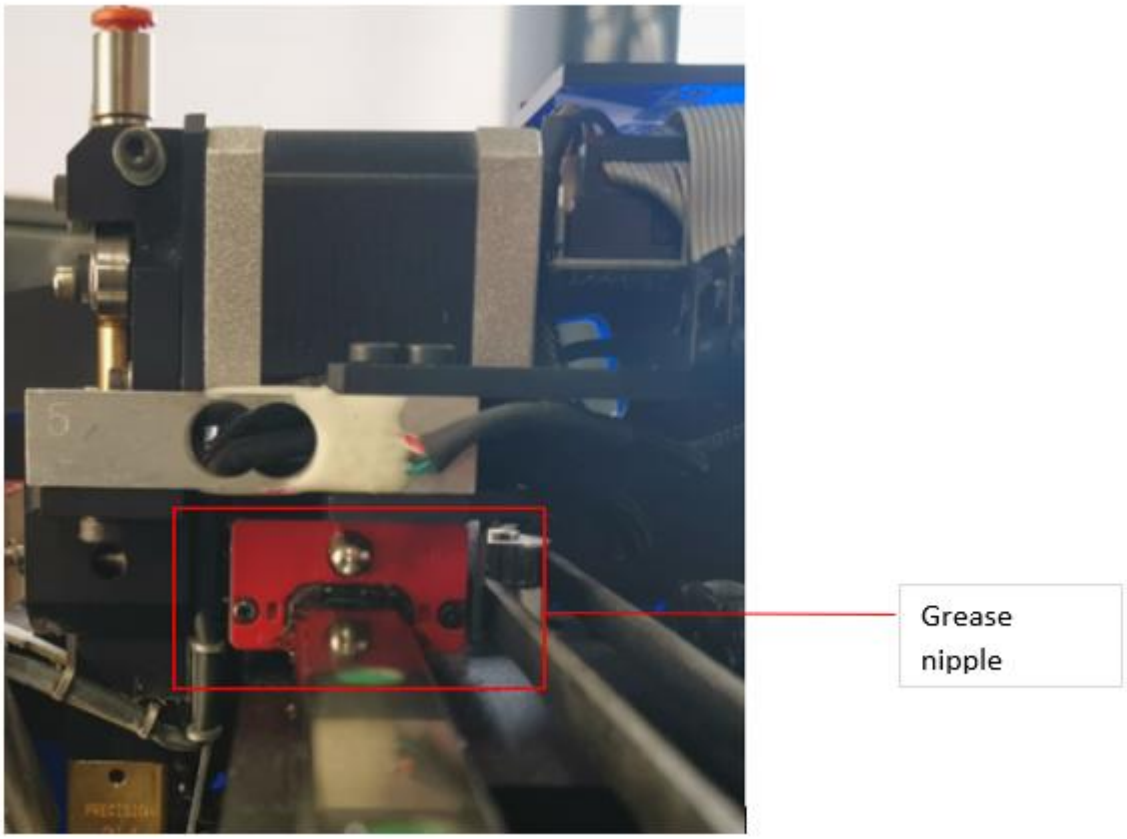
1. Apply grease to the raceway of the ball screw using a wooden stick (or other blunt tool).
   -Apply the grease every 5 cm.



2. Rise heatbed (Menu → Prepare-> Park heatbed -> Rise).
3. Lower heatbed (Menu → Prepare-> Park heatbed -> Bottom).
4. Apply grease to the raceway of the ball screws using a wooden stick (or other blunt tool).
5. Rise heatbed (Menu → Prepare-> Park heatbed -> Rise).
6. Lower heatbed (Menu → Prepare-> Park heatbed -> Bottom).
7. Collect excess grease from linear carriages and ball screw using a paper towel.

LUBRICATING THE X AXIS

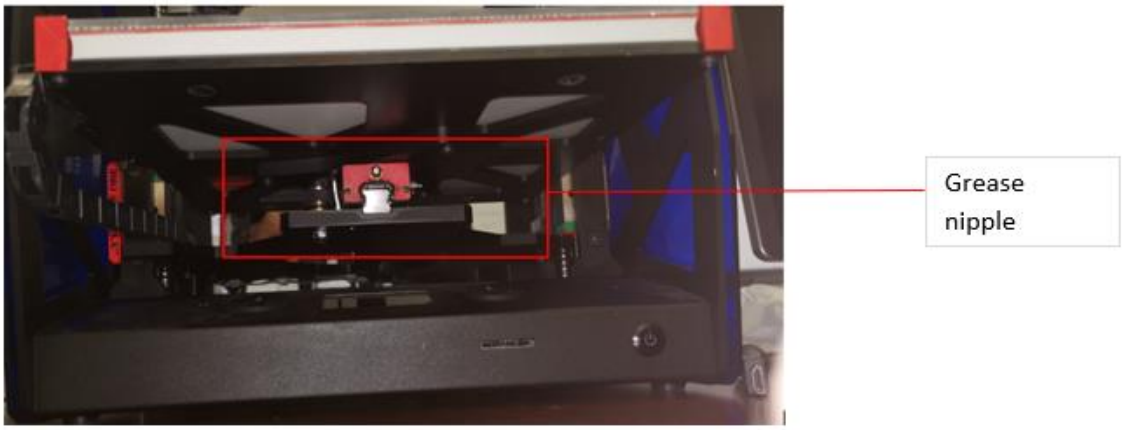
1. Move the head module to the left until it stops to access the grease nipples on both X axis carriages.
2. Push grease into the grease nipple of the front linear carriage of the X axis by pressing the lubricator nozzle firmly against the grease nipple and pressing smoothly the lubricator lever once.



3. Move the module to the right and left twice.
4. Remove excess grease from the linear carriages using a paper towel.

LUBRICATING THE Y AXIS

1. Move the heatbed to the front of the printer until it stops to access the Y axis linear carriage grease nipple.
2. Push grease out by pressing the lubricator nozzle firmly against the grease nipple of the Y axis carriage and pressing smoothly the lubricator lever once.



3. Move the heatbed back and forth twice.
4. Remove excess grease from the linear carriages using a paper towel.
5. Push grease out by pressing the lubricator nozzle firmly against the grease nipple of the Y axis carriage and pressing smoothly the lubricator lever once.
6. Move the module back and forth twice.
7. Remove excess grease from the linear carriages using a paper towel.