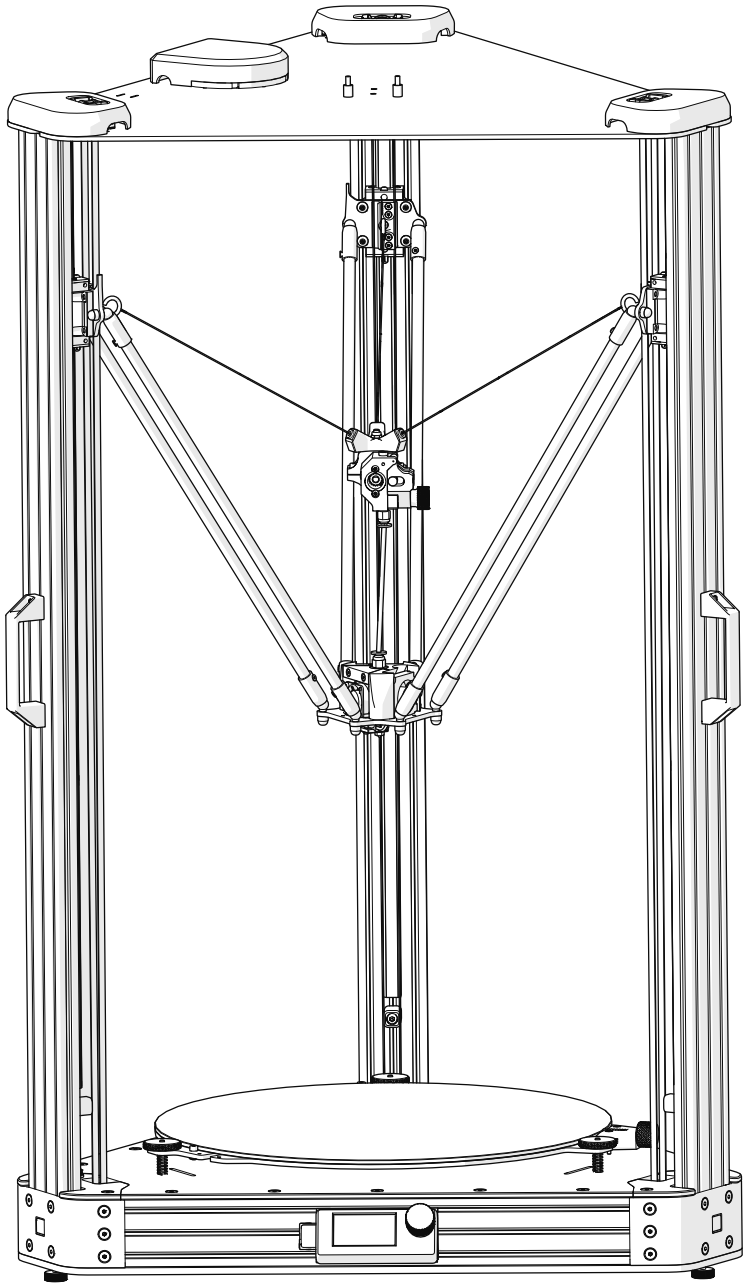
USER MANUAL

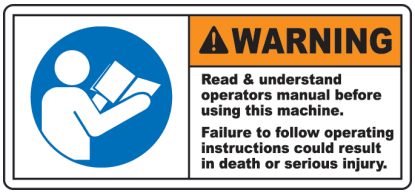
ATLAS 4030
ATLAS 4070

3DBNZ



This guide will take you through the steps to set up and operate your 3DBNZ ATLAS 3D printer.

Version 1.3
Revision C



READ THE MANUAL BEFORE POWERING ON THE 3D PRINTER

TECHNICAL SUPPORT

For any questions or problems with 3DBNZ products, please contact us at:

3DBNZ
Ul Wilcza 4
Ustka 76-270
Poland
www.3dbnz.com
info@3dbnz.com

LIST OF CONSUMABLE COMPONENTS

This document lists the Consumable components that, for its natural deterioration, are excluded from the Warranty:

Nozzle (Hotend), Bowden Tube, Hotbed Glass, Filament Spools, Printed Parts.

3DBNZ grants this Warranty to the ATLAS brand Product users.

This Warranty is only valid in the country where the product has been purchased originally, as long as it is member of the European Union, Iceland, Norway, Switzerland, Liechtenstein or Turkey. Otherwise, review the Warranty for non EU countries.

3DBNZ guarantees that, within the Warranty Period, 3DBNZ or an authorized service company will correct, in a reasonable commercial time, the claims related with the non-conforming Product according to the following clauses.

WARRANTY PERIOD

The Warranty Period starts when the Product is first delivered to the end-user.

The Warranty period lasts twelve (12) months.
Both the parts that suffer wear and tear due to the normal operation of the Product and the “Consumable” elements are not covered by this Warranty.

The present Warranty is invalidated in case of incurring in any of the cases listed in the Exclusions chapter.
In case of resale, repair or substitution of the Products the Warranty is not extended. The repaired or substituted parts are covered until the end of the Warranty Period or during six (6) months, depending on which date is later.

To avoid potential residual risks the user should read and understand the following safety measures (you are strongly advised to read this before using the machine).

To highlight the areas where extra care should be taken, safety alert stickers have been affixed to the relevant parts of the machine to warn the user of potential hazards.

Any modifications made to the machine without the manufacturer´s approval will invalidate the product´s warranty.

Consequently, BNZ3D ARE EXEMPT FROM ANY LIABILITY IF THE USER DOES NOT FOLLOW THE INSTRUCTIONS FOR USE:

SAFETY GUIDELINES & WARNINGS

The following safety guidelines, as well as the instructions within this user manual, ensure the safety of the user while operating and maintaining the ATLAS printer. If the printer is not operated as specified, the operator's safety may be compromised.

First Aid

- All operators should have access to first aid equipment and know how to use it.

Installation

- Connect the printer to the safety-certified power cord supplied with the machine. The electrical outlet should be near the printer and easily accessible.
- Never connect the printer to an outlet that does not have a ground wire. Disconnecting the ground wire may result in electric shock.

Operation

- The 3DBNZ ATLAS printer generates high temperatures in the print nozzle and the print bed—do not touch when hot. Allow the unit to cool before touching.
- Do not set objects on the heated print bed. Do not lean or stand on the print bed. Doing so may cause injury to the operator.
- Due to high temperature outputs and moving parts, the location where the printer is operating should be equipped with working smoke and flame detection.
- The 3DBNZ ATLAS printer melts material during printing. Some materials may require ventilation.
- Do not leave the 3DBNZ ATLAS printer unattended while in operation.
- The 3DBNZ ATLAS includes linear actuators that move in multiple directions at variant speeds. When in motion, they may cause injury.
- Do not place head or any other body part near the print head or nozzle, as injury may occur if pinched between the print bed and the nozzle.
- In case of emergency, unplug the unit from the electrical outlet.

Maintenance

- All maintenance shall be performed according to the manufacturers guidelines and instructions. Failure to follow the guidelines may cause injury.
- When maintaining equipment that is hot, wear gloves to avoid injury.

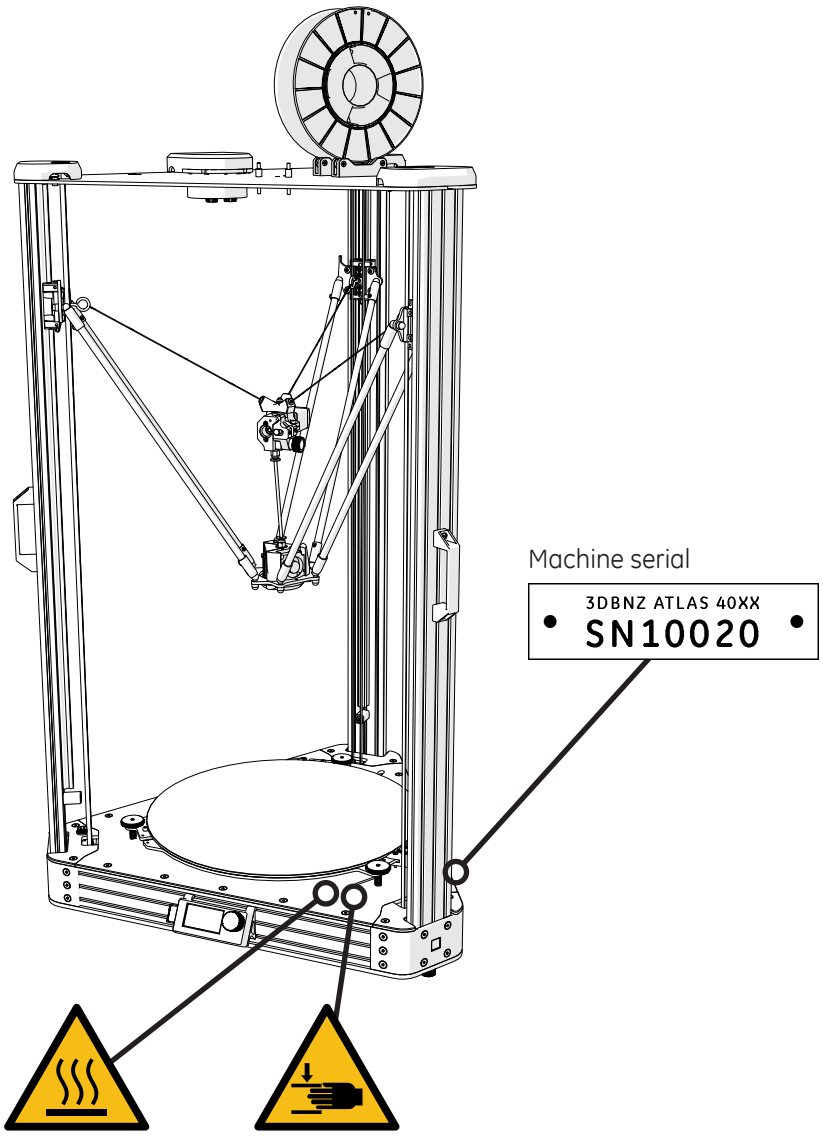
INTENDED USE

Each 3DBNZ ATLAS 3D printer is tested, prior to shipment, to ensure proper functionality.

- This printer is intended for professional use by an operator with the ability to read instructions, having basic/low level knowledge of electronics, mechanics, and computers in general.
- Intended for printing 3D objects with materials manufactured for the FFF—fused filament fabrication—type of 3D printing.
- To be operated under normal operating conditions as specified within this manual.
- Not intended to be used by children or persons not familiar with the operating and safety instructions. Use by unqualified persons may be dangerous to the user and/or damaging to the printer. Printer damage due to mis-use is not covered by the warranty.
- Any modifications to the 3D printer are at your own risk and will void the warranty. The manufacturer cannot be held responsible for modifications made by other persons.

SAFETY AND WARNING SYMBOLS

The following stickers have been affixed to the printer to warn users about the hazardous areas of the machine, and actions which are not recommended as they will stop the machine from working properly.



Warning Symbol	Meaning	Location	Comments
	**WARNING HOT SURFACE**	• Print nozzle • Print bed	A hot surface is located in the vicinity (do not touch).
	**CRUSHING OF HANDS**	• X axis • Y axis • Z axis	When in motion, the Altas linear actuators that move in multiple directions at variant speeds may be a pinch hazard (low risk due to force limitation)
	ON	• Rear panel of electrical box	Turns the machine on.
	**OFF**	• Rear panel of electrical box	Turn the machine off.

TECHNICAL SPECIFICATIONS

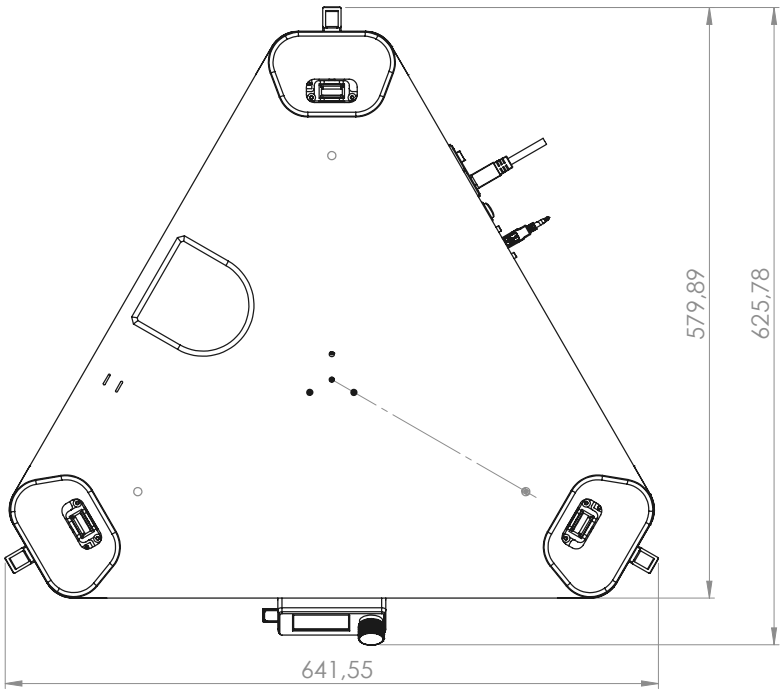
Model name	ATLAS 4030	ATLAS 4070
MECHANICS		
Chasis	Aluminium	
Enclosure	PLEXYGLASS	
Kinematics	Steel guide with recirculating balls, anti backlash magnetic joints	
Motors	Nema 23 1.8° 1/16 step	
Motion transmission	GT2 6mm belt	
Endstops	Optical	
Build surface	Tempered Glass	
DIMENSIONS		
General Dimensions	64 x 63 x 105 cm	70 x 65 x 148 cm
Weight	45 Kg (without filament spools)	65 Kg (without filament spools
ELECTRICAL		
Input	100-120 VAC / 200-240V 50-60Hz	
Energy consuption	400W Heaters on - 36W Standby	
System voltage	24v	
TEMPERATURES		
Operating temperature	15-35°C	
Stocking	0-30°C	
Hotend	max 290° C	
Heated bed	max 100° C	
Hotend cooling	30x30x10 24v fan	
Internal electronics cooling	80x80x20 24v fan	
INFORMATIONS		
Manufacturing technology	Fused filament fabrication (FFF)	
Printing volume	Cylindical 400mm diameter x 300mm height	Cylindical 400mm diameter x 700mm height
Nozzle size	0,4 mm (standard) 0,15 / 0,25 / 0,3 / 0,5 / 0,6 available	
Layer height	0,05 mm < 0,5 mm	
Repetability	XY 0,02mm / Z 0,05	
Filament diameter	1,75 mm	
Compatible materials	ABS, PLA, PET, Nylon, FLEX, Polistirene, Wood, Carbon, Experimental	
SOFTWARE		
CPU	32 bit	
Host operating system	Windows XP-7-8-10, Mac OSX, Linux	
Slicing Software	Cura, Simplify3D, Kisslicer, etc.	
Firmware	Smoothie	
File format	.gcode	
CONNECTIVITY		
LCD	LCD panel with rotary encoder (autonomous operation)	
USB	Type C	

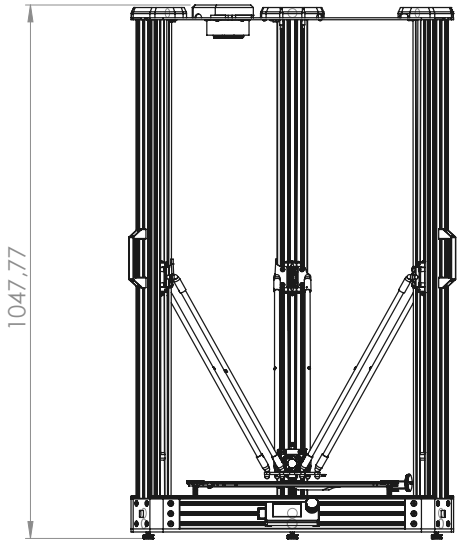
DIMENSIONS

Printer dimensions illustrated below.

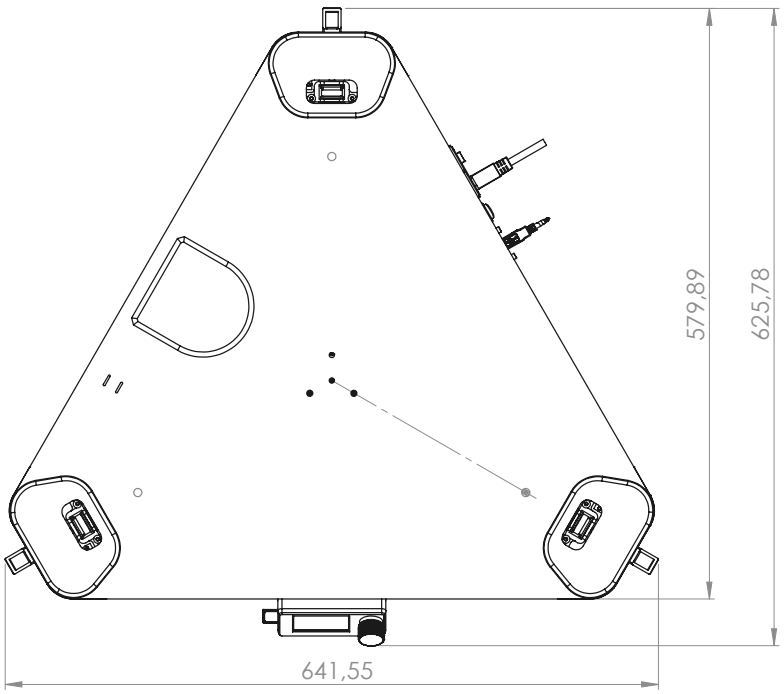
Note: Dimensions are not considering the filament spool

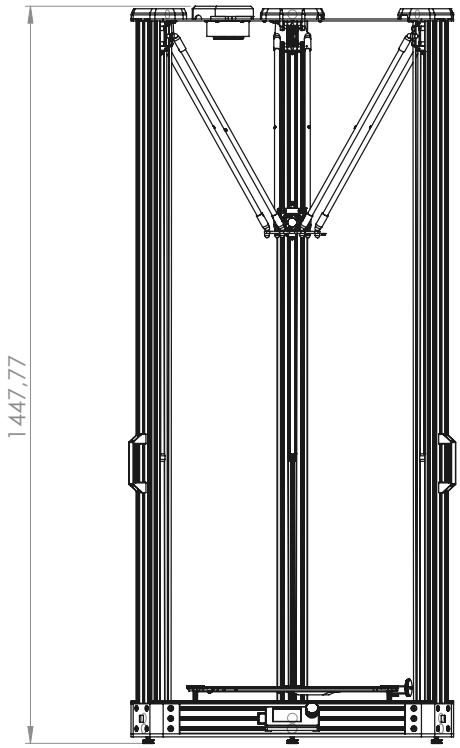
ATLAS 4030





ATLAS 4070





UNPACKING THE PRINTER

The 3DBNZ ATLAS printer will arrive in 1 industrial strength wood crate. Please take a moment to review the unpacking procedure to ensure the safety of the unpacker, as well as the printer.

- The optionals ordered together with the device could be inside the package or in separate package.
- Save the original package to be reused in case of device return to the manufacturer.
- Take great care not to break or splinter the printing surface which is made of glass.

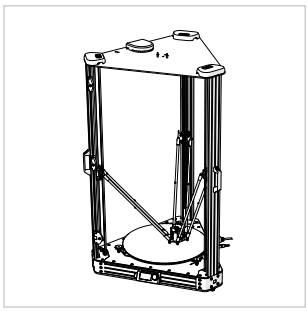
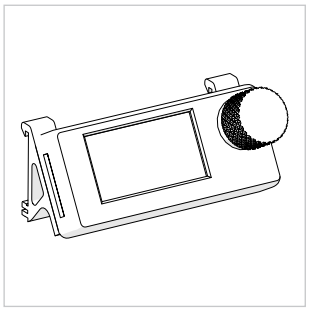
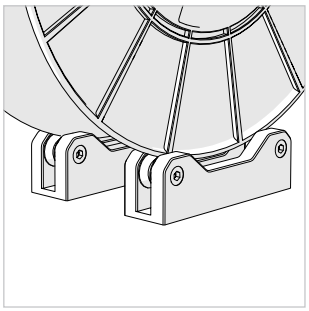
CAUTION: The unit is heavy. Care must be taken to assure safety of machinery and operators.
Take care if using sharp tools for unpacking

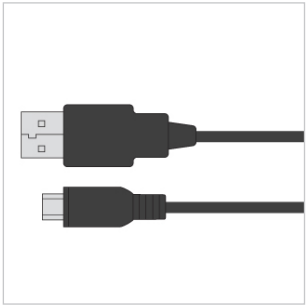
- A phillips head screw driver is required.

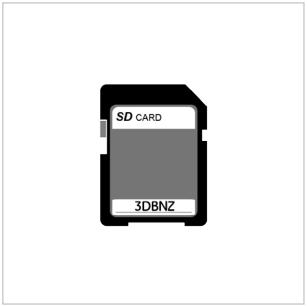
1. Unscrew the screws and remove the front panel.
2. Carefully remove bracing, supporst, and /or tie downs what are used to secure the product for shipping
3. Remove the possible styrofoam if any before sliding out the device.
4. Bring the device out with care using the handles on each of the three sides.

CONTENTS

- ATLAS 40xx 3D printer
- LCD Control
- Spool roller
- Power cord EU or UK
- USB cable
- Dimafix (Optional)
- SD Card (Optional)
- Nozzle 0.6mm (Optional)



- Replacement PTFE tube 235 mm
- Replacement Hotend fan
- Replacement Pushfit extruder side
- Replacement Push fit hotend side



INTRODUCTION

Congratulations on the purchase of your new device. With it you have chosen a high quality product.
During production, this equipment has been checked for quality and subjected to a final inspection.
The functionality of your equipment is therefore guaranteed.

PRELIMINARY CHECKS

Before using, please check that the device is not damaged due to the transportation or due to the condition of preservation. To be checked if all standard components and the optional are present in the package. In case of damages, notify the claim to the carrier and inform the authorized dealer or manufacturer.

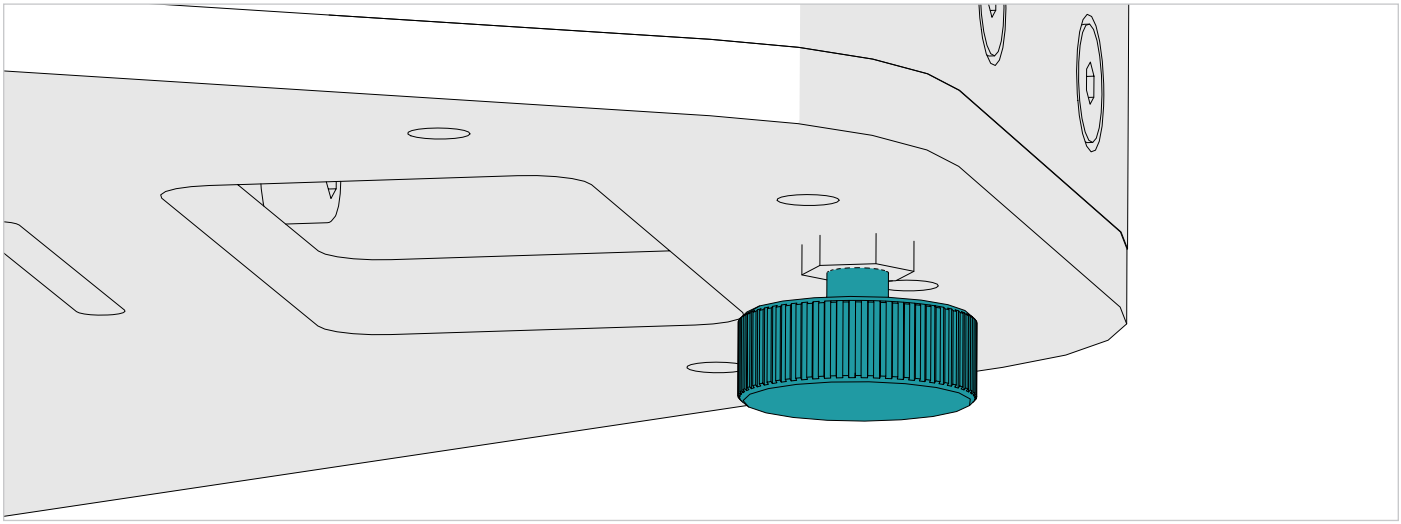
INSTALLATION

The device installation is easy, it is recommended to be done by skill people and to follow the instructions.

CAUTION: Do not install the device near to heaters or liquids.

The device should be positioned on a stable and flat surface (not supplied), able to stand the device weight and to absorb the vibrations.

- If the surface is not flat use the three regulation feet under each tower.



On the right side of the device is positioned the switch, this side should be easy accessible, on the lower side of the device there are the air inlets and the fan that provides to the correct cooling of the electronics and the motors. Keep the cooling air inlets clean from obstacles.

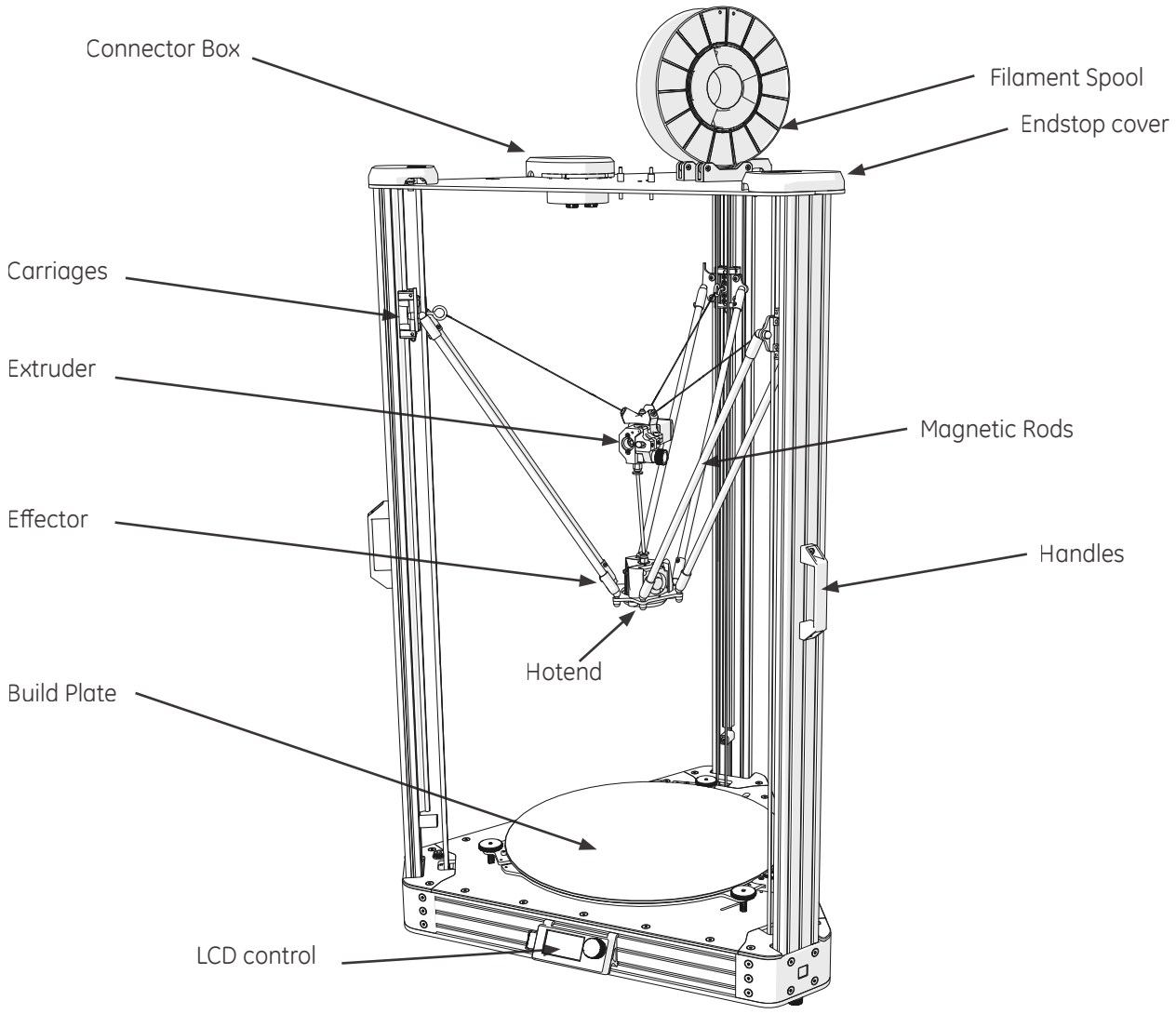
The filament should be positioned on the upper part of the device using its spool roller that is included in the supply.
In case of shelves or wall too near to the device it could be alternative positioning of the filament reel, but it is mandatory that the filament is easy accessible and without having obstacles to the pulling of the filament by the extruder.

The inner lower part of the device, made by glass, has an heating system, for an optimal work result it is suggested that the temperature in the environment to be about +20C°. Lower or higher temperature could affect the final result of the prints.

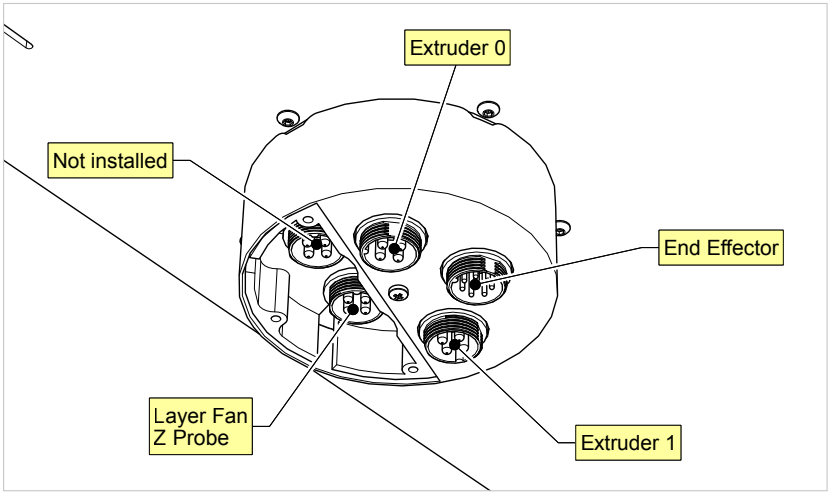
PRODUCT DESCRIPTION

3D printing, or additive manufacturing, is a process of making three-dimensional objects of a variety of shapes and sizes from a digital model. 3D printing is achieved using an additive process, where successive layers of material are heated and melted at the nozzle, extruded and laid down on the build platform (also known as Fused Filament Fabrication (FFF).)
The printer is capable of using any material manufactured for FFF type 3D printing, provided the melt temperature and print bed temperature requirements are within the specifications of the ATLAS outlined in this manual.

The ATLAS is capable of carrying out the additive manufacturing process under open source controls, via 3D model output in the .gcode format. It can be operated using the USB computer interface or independently with the LCD control unit and SD card.



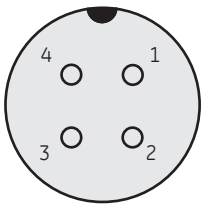
CONNECTORS



CAUTION: Turn OFF the machine before connecting or disconnecting any cable.

Look at the orientation notch to align the connector to the plug, never use too much force.

1. End Effector: 8 pin
2. Extruder 0: 4 pin
3. Extruder 1: 4 pin
4. Layer Fan/Zprobe: 4 pin
5. Not Installed



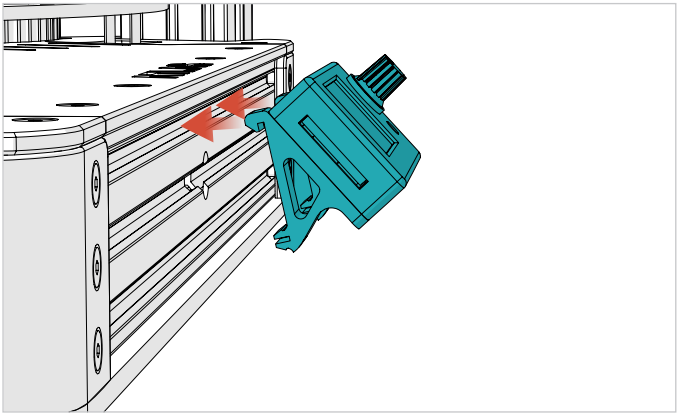
In order to ensure the safe packaging and transport of your printer some of the components have been sent unassembled. Before starting to print with the 3DBNZ Atlas printer you need to assemble them in order to complete the setting up process.

If you have any queries while assembling the machine, please contact 3DBNZ technical services.

Follow the steps below to prepare the printer:

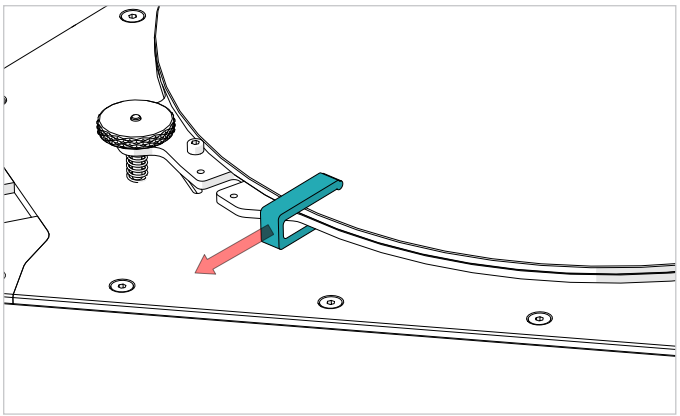
1. LCD PANEL INSTALLATION

Connect the two ribbon cables, to the LCD control unit and install it on the front of the machine. Cables are numerated 2 and 3.



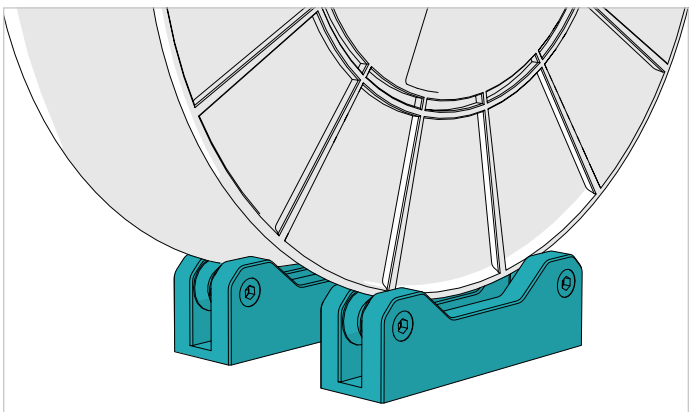
2. BUILD PLATE

Remove the 3 clips that hold the glass in place during shipping and any other styrofoam.



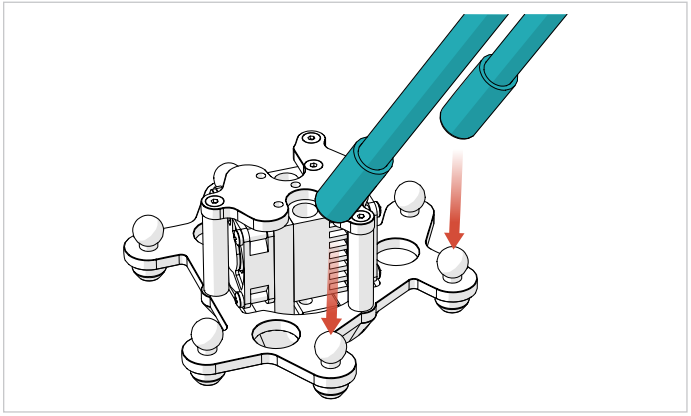
3. FILAMENT ROLLER

Put the spool rollers on the top of the machine. Check if the spool turns freely and make sure is stable and secure.



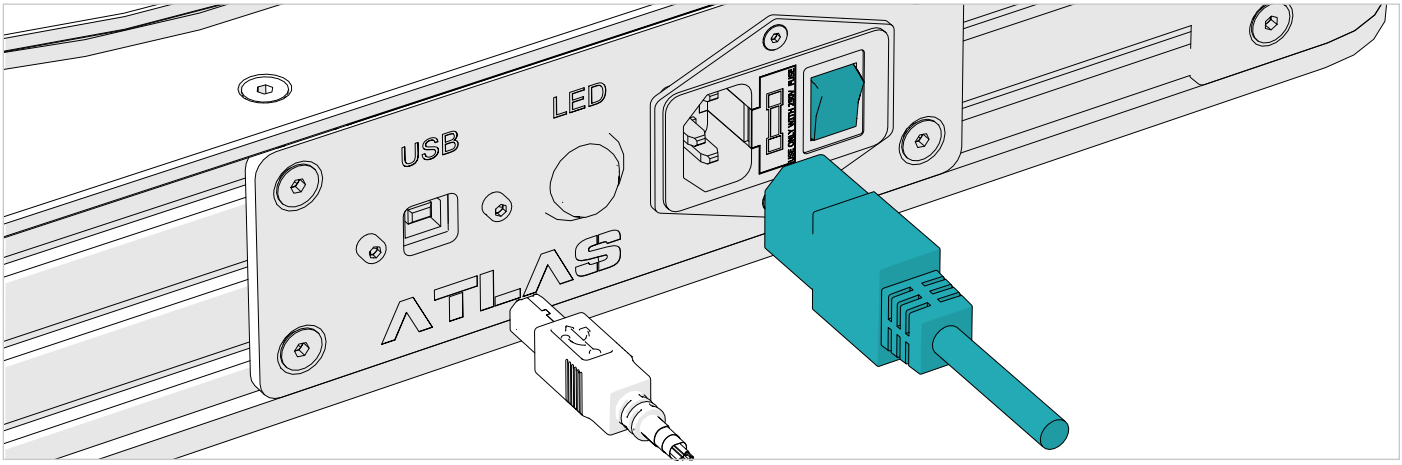
4. END EFFECTOR

The End effector comes installed. If you remove it make sure the rods are parallel to each other when re-installing.



POWERING ON

1. Plug the power cord into the power outlet.
2. Turn the switch on the ON position



ENDSTOPS SENSORS VERIFICATION

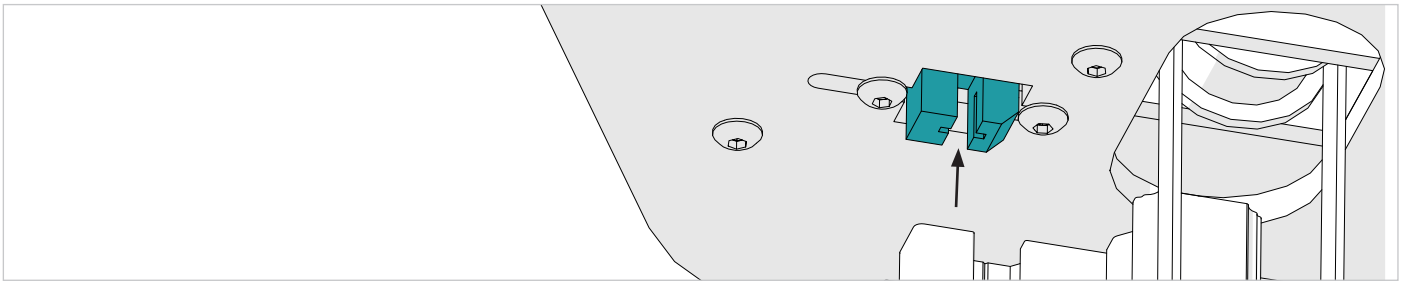
The ATLAS printer has three position sensors–one for the X tower, one for the Y tower, and one for the Z tower. We will name them alpha, beta and gamma.
These sensors allows the printer to know its home position and prevent the hotend and/or the actuators from traveling beyond the designated print area–which can cause serious damage or breakage to the extruder, glass, and/or the mechanical hardware on the printer.

IMPORTANT: Each ATLAS is tested prior to shipping, but it is important to verify the functionality of the sensors in case of damage or movement during the shipping process.

1. Hold a piece of opaque material into each sensor. The red light should turn off when triggered.
2. Using the LCD controls check if the CPU are receiving the signal when triggering each endstop sensor

LCD > PROBE > STATUS

Contact 3DBNZ if sensors are nonoperational. Do not attempt to operate the printer.



TESTING THE AXIS

1. Check that nothing blocks the axis mechanisms (belts, pulleys etc)
2. Ask the printer to go to its know position "home"

LCD > PREPARE > HOME ALL AXIS

CAUTION: While the effector is in the home position you CAN'T move in XY plane as the carriages dont have enough space to accomplish that, take care when Jogging the postion of the end effector manually.

You should never move the effector by hand, use the carriages instead.

After a move command is sent to the printer the motors remains energized to hold their position, you can turn off the motors:

LCD > PREPARE > MOTORS OFF

USB CONNECTION

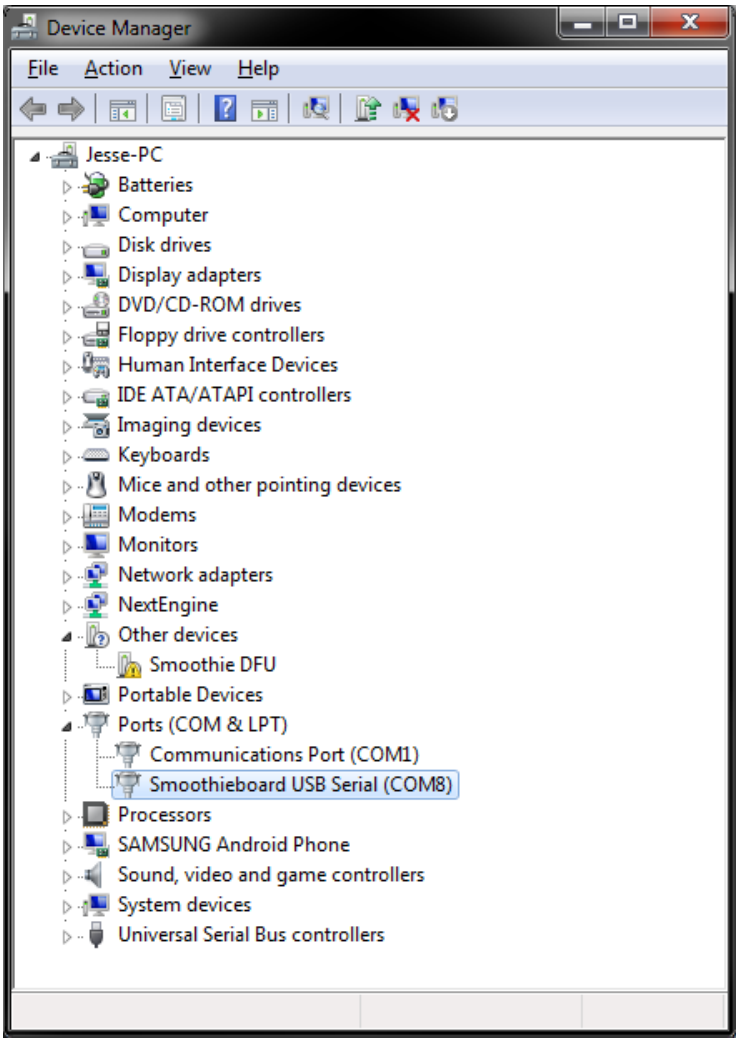
Connection to a host is not necessary to print, if you want more control on the machine use a host software to send Gcodes.

From March 2014 ATLAS don't require drivers. The new firmware supports USB communication (as HID device) and internal SD drive natively, without any necessary files.

1. Just plug USB cable, and wait until all devices are discovered by your system.
2. It is recommended to open Device Manager (if using Windows), and monitor installation there. You should see 'Smoothieboard USB Serial' appear during the process and the assigned COM port.
3. After automatic installation a new disk drive named ATLAS should be discovered, where all configuration and firmware related files are stored. The disk can also store g-codes for printing.
4. Important: please copy all contents of the SD card drive as soon as you can (backup).
5. After that, you can connect to the machine using a host of your choice, which can be for example pronterface http://www.pronterface.com/
6. In Pronterface, select the correct COM port and click Connect.

If you have problems with the connection, then unplug/plug USB cable.
Or press RESET on the printer, wait and repeat all steps above.
If you still encounter connection issues try with another computer.

CAUTION: Do not write to internal memory while printing.
Make sure the ATLAS is plugged into the same outlet as the PC you are connected to, otherwise you can get ground loops.

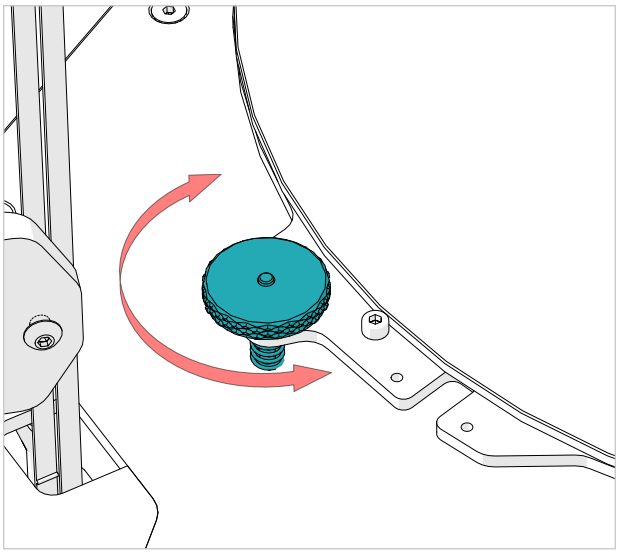


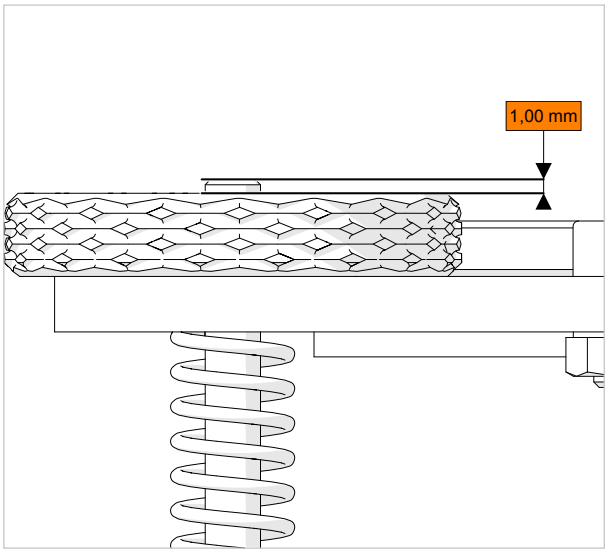
LEVELING THE PRINT BED

Prior to first printing is imperative to check for correct nozzle height.

IMPORTANT: improper height will result in a fail print or damaged glass and/or nozzle.
Setting the build to low and the filament will not stick to the build plate, setting it too high the nozzle will be blocked and the filament will jam.

To change the height of the build plate use the three knobs. Turn clockwise to lower the build plate and counteclockwise to raise it.





1. Each regulation knob must have the screw that protrude above the knob of 1mm. This will give enought room for regulation up and down later.

2. Home the effector so the printer know its position in space :

   LCD > PREPARE > HOME ALL AXIS

3. With a piece of regular paper on the build plate move the effector down until you get the nozzle near the glass barely pinching the paper. Go down until you can feel slight resistance while sliding the paper, for fine adjustment you can select finer jog increments

   LCD > JOG > MOVE 1mm > MOVE Z

4. Tell the printer how far in Z is the build plate from home position:

   LCD > CUSTOM > SET Z0

Now the printer will home and store the new height information (into Config Override file on the internal memory)

5. Move the effector to Z0

   LCD > CUSTOM > CALIBRATE CENTER

6. Check and correct build plate height at each tower beginning with the alpha tower

   LCD > CUSTOM > CALIBRATE ALPHA
   LCD > CUSTOM > CALIBRATE BETA
   LCD > CUSTOM > CALIBRATE GAMMA

7. Repeat step 6 to refine the calibration as each regulation affects the others two

To maximize adhesion It is reccomended to fine adjust the bed height regulation on the fly when printing first layer.
Take into account temperature varations, for best result calibration should be run with a hot machine as elements change dimensions with temperature.

LOAD FILAMENT AND EXTRUDER TEST

Position the filament spool roller on top of the printer. Guide the filament through the first PTFE tube then into the extruder.

1. Lower the End effector to make the loading operations easier.

   LCD > CUSTOM > LOADING POSITION

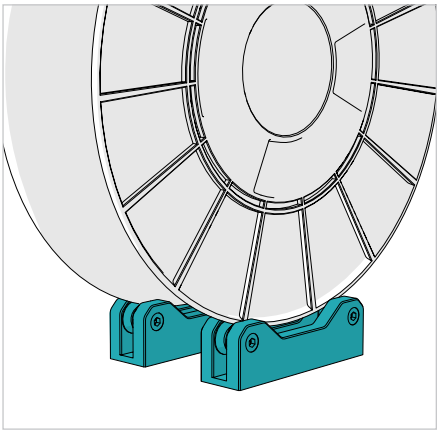
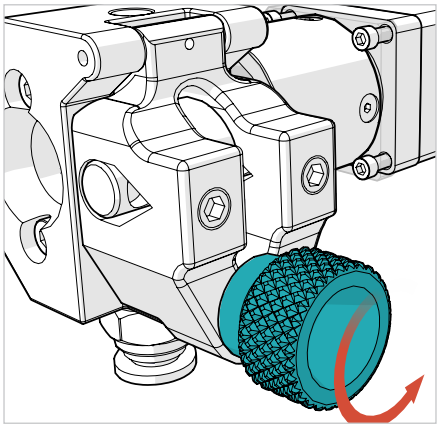
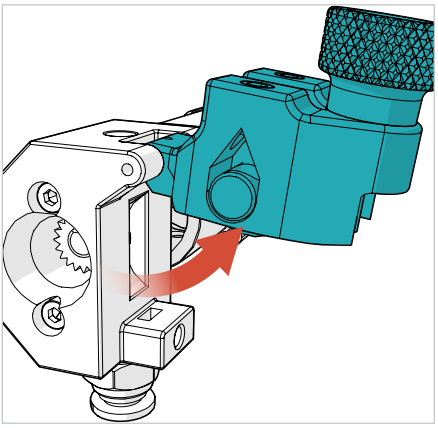
2. Pre heat the 3D printer

   LCD > PREPAE > PREHEAT

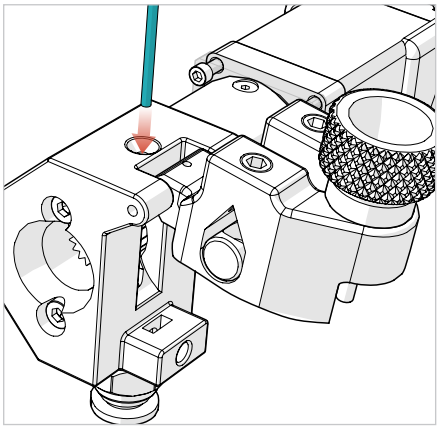
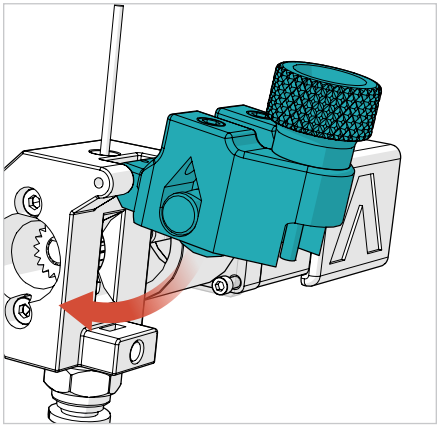
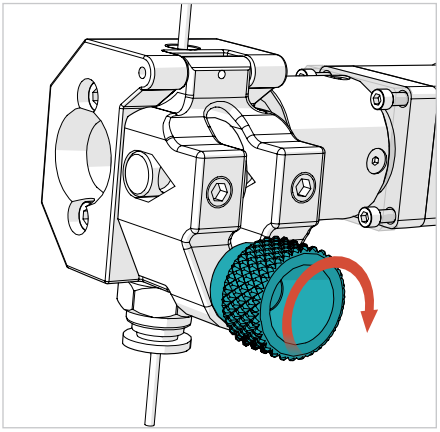
3. Set the nozzle temperature 10°C above the reccomended for the used material.

   LCD > PREPARE > SET TEMPERATURES > HOTEND

4. While waiting temperature to stabilize load the filament

5. Push the filament by hand into the extruder until you see material flowing from the nozzle.
The filament must flow consistetly without applyng to much force. Adjust temperature so the force needed to push the filamnent in is not too high.

6. Turn the knob until the extruder block is fully closed. **IMPORTANT:** Do not overtight the knob

Depending on filament elasticity you can adjust the tensioner force by turning the two hex screws.
Tighten for hard materials and loosen for softer ones.

7. Test for consistent flow by extruding 4/5 timens 10mm of filament

   LCD > CUSTOM > EXTRUDE 10mm

CAUTION: Do not RETRACT more than 3mm of filament or the hot end will be jammed.

UNLOAD FILAMENT

1. Preheat the hotend to 180°C (minimum)
2. Open the extruder tension block to release the hob
3. Pull the filament out (use a fast moovment to reduce stringing)

Store filament in a cool place. Keep temperatures below (50° C). Keep material in sealed container or bag with moisture-absorbing desiccant.

CHANGE FILAMENT

Filament can be replaced at any time (when the printer is idle or mid-print).

- The hotend must be heated to 180° C (minimum) to remove or add filament.
- When printer is idle (not printing): Open the extruder tension block to release the hob and pull out existing filament, then follow the Loading Filament instructions.
- When the printer is mid-print: press the main button on the LCD Control Unit, select CUSTOM , select SD Suspend. This manually puts the printer into standby. Then follow the Loading Filament instructions.
- To resume the print press the main button on the LCD Control Unit, select CUSTOM , select SD Resume.

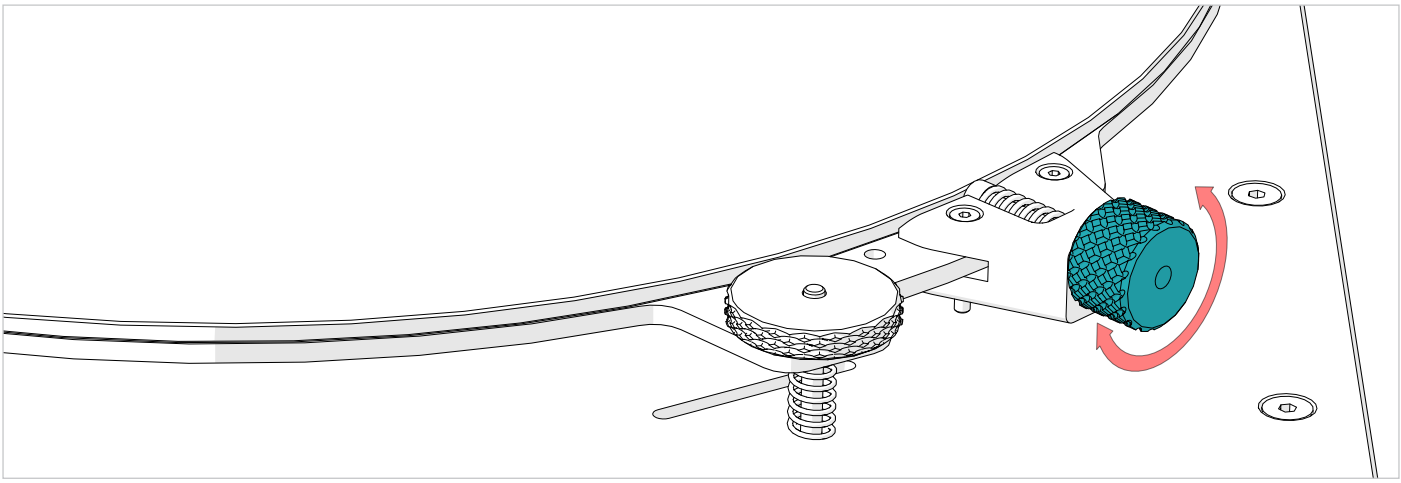
PREPARE THE PRINT BED

Prepare the build area for printing. In order for your prints to adhere to the glass (it needs to be clear of debris and sticky) spray a good amount of Dimafix fixative spray onto the build area.
Cover the entire area that your print will touch. Repeat this process between prints to remove filament particles and other debris, as well as prepare the bed for the next print.

This is not the only method available. Other suggestions include: painter's tape, glue stick, and hairspray.
Note: 3DBNZ recommends using Dimafix or 3DLAC only. Any scented hairspray may contain oils and cause adherence issues on the print bed.
Do not use glass cleaner or alcohol on the glass. Doing so will make adhesion very difficult.

For big prints the fixative spray should be sprayed while the glass build plate is removed from the printer in order to avoid contaminations of sticky material on the delta motion system.

- To remove the glass turn clockwise the glass retention knob to release pressure of the spring
- Clean the aluminium contact surfaces and the back of the glass before installing it into the printer



HEAT THE PRINT BED

The print bed on the ATLAS printer is heated to provide better adhesion of your printed parts. Each material you use will likely require a different bed temperature.

• For easy removal of large or small parts, turn the bed temperature down to 20° C. You will hear the plastic loosening and the part will pop off the print bed.
• Operate the temperature of the print bed through the LCD control unit or with 3D printing software.

See the Recommended Temperature table

CAUTION: For the safety of the user, use extreme caution when working with heated machinery.

TEST PRINT

1. Spray a thick coat of Dimafix or 3DLAC fixative glue on the glass build plate while is cold.
2. Preheat the build plate to at least 45°C for PLA and 90°C for ABS.

   LCD > PREPAE > PREHEAT

   and

   PREPARE > SET TEMPERATURES > BED

3. In the internal memory there are some test objects rady to be printed.

   LCD > PLAY > SD > 3DBency.gcode

4. While printing the first layer adjust the bed levelling knobs on the fly until you get the optimal first layer adhesion.

5. Wait the printer to cool down before removing the printed object

PRINT YOUR OWN GCODE

You can print your Gcodes in 3 different ways:

1. Load the Gcode into the internal 2GB memory using the USB cable (slow transfer / safe to print)
2. Load the Gcode on a FAT 32 formatted SD, insert the SD into the LCD (fast transfer / safe to print)
3. Stream the Gcode trough the USB connection using a host software like Pronterface (not safe for long prints)

CAUTION: When creating your own gocdes remember to put the homing command, G28, into your software start routine. Do not turn off the printer until the nozzle is below 50°C.

CHANGING NOZZLE

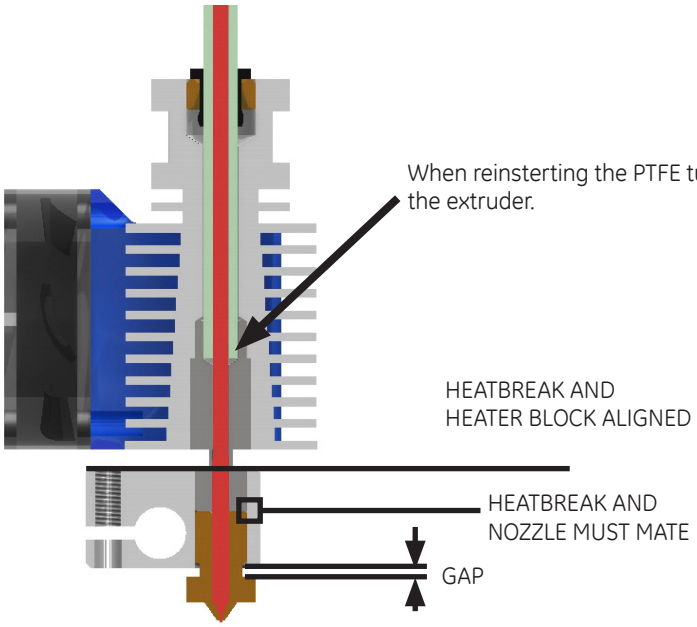
The extruder is hot, handle with care
Do not touch the heater cables with metal while heating is on.
Do not turn off the machine if the hotend temperature is above 50°C

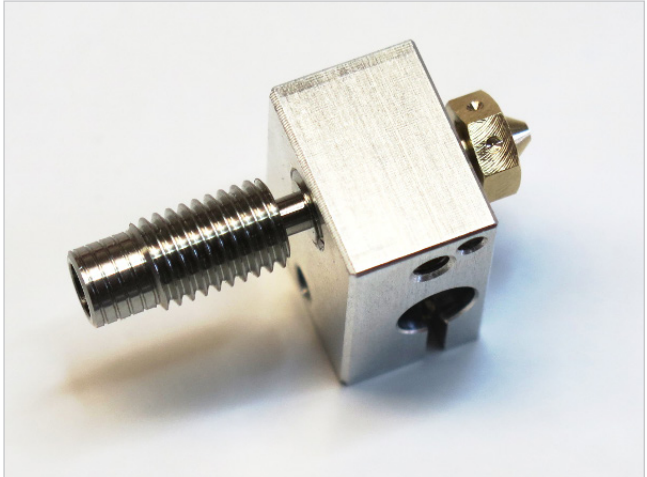
Tools needed:

- 7 mm wrench or Socket Wrench
- Crescent wrench

When installing the nozzle make sure that the nozzle and the heat break mate up inside the heater block, this is needed to prevent leakage and filament jams.
An indication of succesful mating is resulting gap between the nozzle and the heater block after thightening the nozzle.

1. Preheat the hotend
2. Unload the filament
3. Set the extruder nozzle temperature to 200° C. This will melt any plastic inside the extruder and loosen the nozzle.
4. Once the temperature has reached 200° C, use a crescent wrench and 7 mm wrench to remove the nozzle. Use the crescent wrench to hold the base steady and not able to rotate. Use caution—nozzle is hot!
5. Once nozzle is removed select the replacement nozzle. Nozzle size can be determined by inspecting stamped numbers along the side of the nozzle.
6. Once new nozzle has been selected, hand thread it into the extruder.
7. Then use the wrench and crescent wrench to tighten the nozzle into the assembly, only tighten until snug. **DO NOT OVER TIGHTEN.**
8. Once nozzle is tightened, set the extruder temperature from 200° C to 280° C. This will heat up the nozzle and ensure it has a tight fit.
9. Once the temperature has reached 280° C, use the wrench and crescent wrench to tighten the nozzle so it is snug.





CLEANING THE NOZZLE

Use extreme caution when maintaining or operating heated machinery. The nozzle must be heated to 180° C (minimum) when cleaning.

When to clean the nozzle:

- When filament is not flowing smoothly
- When filament is not being extruded appropriately
- When changing material type
- Periodically between large prints—preventative maintenance

How to clean the nozzle:

Canola oil treatment:

1. Dip 20 mm of filament into oil and shake off excess
2. Heat nozzle to 250 - 260° C
3. Push filament through the extruder and nozzle by hand
4. Extrude 200 mm of filament
5. Repeat 3-4 times

CAUTION: Wear heat resistant gloves
Use appropriate tools for all cleaning and maintenance

NOZZLE SIZES AND TYPES

Nozzle Size		Brass	Hardened Steel	Stainless Steel
0.15 mm	High Precision - Slower Prints	•		
0.25 mm	High Precision - Slower Prints	•	•	•
0.30 mm		•	•	•
0.35 mm		•	•	•
0.40 mm	Balanced Nozzle - Supplied by Default	•	•	•
0.60 mm		•	•	•
0.80 mm	Lower Precision - High Speed	•	•	•
undrilled		•		

PRINTING VIA SD CARD

The ATLAS can be operated independently with the LCD Control Unit and an SD Card.
Select PLAY on the LCD Control Unit, then choose the .gcode file you wish to print

PRINTING VIA USB CONNECTION WITH COMPUTER

The ATLAS can be operated through the 3D printing software's Manual or Machine Control Panel.
Follow the Connect the USB instructions on page 13.
Once connected, the printer can be operated via the computer and software interface.

LCD CONTROL UNIT OPERATION

There are three main functions of the LCD Control Unit:

1. Prepare the printer for printing
2. Manual control—both prior-to and during printing
3. Starting a print from the SD card

Use the button / knob combination to select and scroll through the screen options.

PLAY	Opens the PLAY menu
SD...	List of .gcode files from internal memory card
EXT...	List of .gcode files from external memory card

JOG	Opens Move Axis menu
Back...	Returns to main menu
Move 10 mm	Opens Move Axis 10 mm menu
Move X	Moves X axis in increments of 10 mm
Move Y	Moves Y axis in increments of 10 mm
Move Z	Moves Z axis in increments of 10 mm
Move 1 mm	Opens Move Axis 1 mm menu
Move X	Moves X axis in increments of 1 mm
Move Y	Moves Y axis in increments of 1 mm
Move Z	Moves Z axis in increments of 1 mm
Move 0.1 mm	Opens Move Axis 0.1 mm menu
Move X	Moves X axis in increments of 0.1 mm
Move Y	Moves Y axis in increments of 0.1 mm
Move Z	Moves Z axis in increments of 0.1 mm

PREPARE	Opens prepare menu
Home all axis	Homes the machine to x0, y0, z0
Set Home	DO NOT USE Sets home position
Set Z0	DO NOT USE Sets temprally new bed height
Motors Off	Turn off the motors
Preheat	Heat the hotend to 180°C and the bed to 60°C
Cooldown	Turn off any heating
Extruder	Opens the Extruder menu
Extrude 5mm	Extrude 5mm of filament
Retract 5mm	Retract 5mm of filament
Settings...	Opens the Extruder Settings menu
E steps/mm	Number of steps required for the extruder to wmove 1 mm of filament
Filament d	Sets the filament diameter (only for volumetric extrusion)
Flow Rate	Sets extruder factor/multiplier for all extruders—expressed in percentage
Accel	Sets the extruder stepper accelleration
Retract Le	Sets the retraction lenght (only for volumetric extrusion)
Set Temperatures	Opens the Temperatures menu
Back...	Returns to previous screen
Hotend	Sets the hotend temperature
Bed	Sets the bed temperature

CUSTOM	Opens custom menu
Layer Fan ON	Turn on the layer fans
Layer Fan OFF	Turn off the layer fans
Go to load Position	Lower the extruder for easy access
SD Suspend	Pause the current print
SD Resume	Resume the current print
E0 Extrude 10mm	Extrude 10mm of filament using extruder 0
E0 Retract 10mm	Retract 10mm of filament using extruder 0
Calibrate CENTER	Move the nozzle to the center of the bed
Calibrate ALPHA	Move the nozzle near the alpha tower
Calibrate BETA	Move the nozzle near the beta tower
Calibrate GAMMA	Move the nozzle near the gamma tower
Save Z0	Save the current position as Z0

CONFIGURE	Opens configure menu
Accelleration	Sets the global accelleration for XYZ moovments
X Steps / mm	Number of steps required for the stepper motor to move 1 mm in the X direction
Y Steps / mm	Number of steps required for the stepper motor to move 1 mm in the Y direction
Z Steps / mm	Number of steps required for the stepper motor to move 1 mm in the Z direction
Z Home Ofs	Sets the offset
Contrast	Sets the LCD contrast

SOURCE FILES

The 3DBNZ ATLAS printer produces three dimensional objects using the FFF—Fused Filament Fabrication—type of 3D printing. The file type that the ATLAS printer requires is .gcode, which is created from 3D model.

G-code is a numerical control programming language which defines instructions on where to move, how fast to move, and through what path to move.

3D models can be custom designed in CAD programs such as SolidWorks, Auto CAD, or Google SketchUp. CAD models are output in either .stl or .obj file format.
The .stl or .obj file is loaded into 3D printing software where 3D print parameters are applied. Once print parameters are applied and the file is processed— commonly called slicing—the file is output as a .gcode for the printer.
Models designed for 3D printing can be found online at sites such as: GrabCAD, 3D Marvels, 3D Via, Google 3D Warehouse, Turbosquid, and Thingiverse.

TYPICAL WORK FLOW

Create or download a 3D model. Save/export the file in .stl format.

→ Load the file into the 3D printing software of your choice.

→ Determine object parameters: size, quantity, resolution, infill, wall thickness, supports, etc.

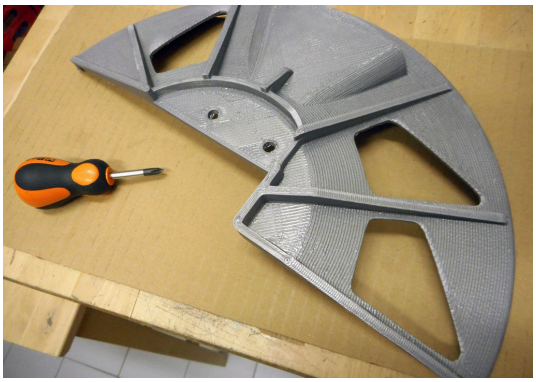
↓ Slice the file, saving the file as .gcode.

← Send the .gcode to the printer via computer USB or SD card.

← Monitor the printer

↓

Printed object



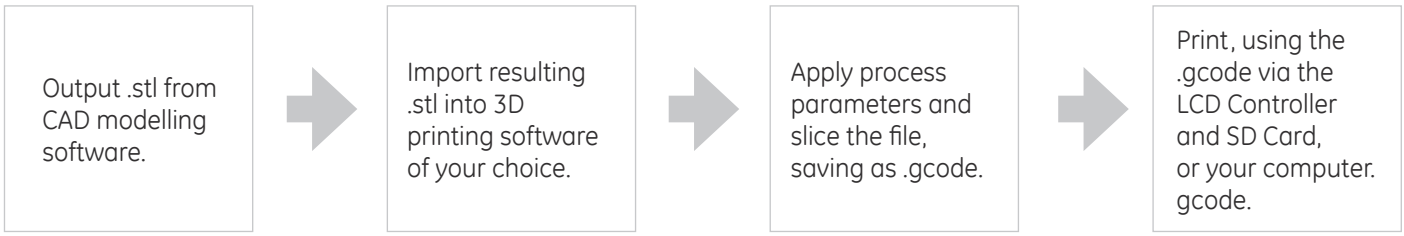
→

Post produced object

PREPARING FILE FOR USE

Before a 3D model can be printed on the ATLAS printer, two things must be done.

1. The CAD model must be converted to either an .stl file, and;
2. The resulting .stl file must be processed and sliced in 3D printing software and output as .gcode.



CONVERTING 3D MODELS TO .STL FORMAT

This procedure is based upon the use of Solidworks and may vary depending on the CAD software used, but generally, these guidelines apply.

1. From the File menu, select Save As or Export
2. Enter a file name
3. Under the File Type menu, select .stl
4. Select Options, set Resolution to Fine
5. Save

CONVERTING .STL FORMAT TO .GCODE

This procedure is intended to provide a general process flow. Other process settings may be needed.

1. Load or Import the .stl or .obj file into your 3D printing software.

Note: You can load multiple files into the 3D printing software in order to print multiple objects in one print.

2. Arrange the object(s) on the print bed and orient appropriately for FFF 3D printing—see Orienting the Part for Success on page 25 in the Printing Tips section of this manual.

3. Apply process (slice settings), including:

- Layer height
- Number of outside perimeters (vertical shells)
- Number of solid top and bottom layers
- Percentage of infill
- Temperature
- Speed
- Z-hop

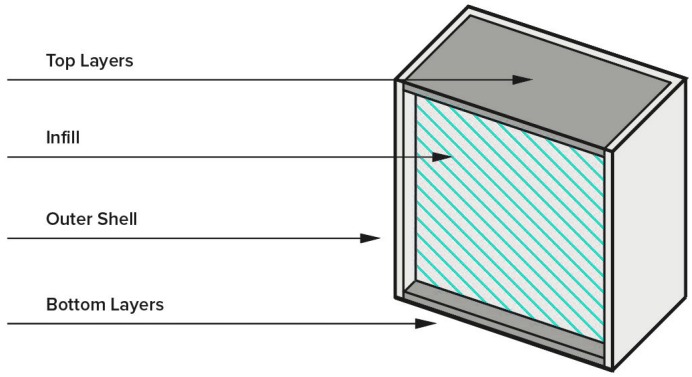
4. Select Prepare or Slice
5. Use the Preview by Layer function to visually inspect the object prior to printing.
6. Save, selecting File Type .gcode

CAUTION: To avoid collision of the nozzle with wrapped parts of the print set the Z-hop value which will lift the nozzle when performing retractions.
Especially PLA tend to wrap up small features that are not supported and/or not properly cooled.

BASIC SLICING PARAMETERS

Below the base setting you can use as a starting point to create your own profiles

Parameter	value
Filament Diameter	1.75 mm
Extruder Diameter	0.4 mm
Extrusion Multiplier	1
Layer Height	0.18 mm
Top Solid Layers	5
Bottom Solid Layers	5
Perimeter Outlines	2
First Layer Height Percentage	105 %
First Layer Width Percentage	105 %
First Layer Underspeed	40 %
Skirt Layers	1
Skirt Outlines	5
Retraction Amount	2 mm
Retraction Vertical Lift (Z hop)	1 - 2 mm
Retraction Speed	7200
Outline Overlap Percentage	40 %
Infill Percentage	30 %
Infill Extrusion Width Percentage	105 %
Speed	3000
Rapid Speed	6000
Acceleration	2000



START GCODE
make sure your slicing software has the following commands in the start routine:

G28 ; HOME

G92 E0 ; reset extruder lenght,

G0 Z20 F6000 ; approach the build plate

END GCODE
make sure your slicing software has the following commands in the end routine:

G28 ; HOME

M104 S0 ; turn off extruder

M140 S0 ; turn off bed

M107 ; turn off layer fan

3D PRINTING MATERIALS

The Atlas printer uses 'open source' materials meaning there are many different materials and manufacturers that can be used.

Here are a few guidelines when choosing filament:

- The material must be 1.75 mm diameter—this is the filament diameter that works with Atlas.
- The material must have a melt point of under 290° C—this is the high end temperature of the extruder and nozzle.
- The material's recommended bed temperature must be under 110° C—this is the high end temperature of the print bed.

	Recommended	
Material	Extruder Temp	Bed Temp
PLA	195-210° C	45-80° C
ABS	240-260° C	70-90° C
TPU	220-230° C	45-50° C
NYLON	230-265° C	90° C
PC	+250° C	125-130° C
HIPS	230-240° C	80° C
PVA	200-210° C	85° C

Note: The temperatures shown above are intended to provide a starting point when initially using different materials. Fine tuning and temperature adjustments should be expected.
Also, see filament manufacturer recommended temperatures.

VENDORS & MANUFACTURERS

Material vendors that we have used include:

- formfutura.com
- treedfilaments.com
- filoalfa3d.com
- taulman3d.com

Online reference links:

• http://filaments.ca/pages/temperature-guide

This is a guide to temperatures for various materials such as PLA, ABS, HIPS, PVA, and many more. Simply click on the link for the material you are interested in and you will see information such as temperature requirements and speed recommendations for that material.

STORAGE RECOMMENDATIONS

Store filament in a cool place. Keep temperatures below 122° F (50° C). Keep material in sealed container or bag with moisture-absorbing desiccant.
Some filaments are more hydrophobic than others, If you cant keep your filament moisture free then before use dry it in the owen.
(50°C for 60 min minimum)

SAFETY CONSIDERATIONS

Avoid contact with skin and eyes. Avoid dust formation. Users should be protected from the possibility of contact with molten material during the printing process. Use personal protective equipment when working with heated materials and surfaces.

FIRST AID

Eye contact: Rinse with water, also under the eyelids, for at least 15 minutes. Call a physician immediately.

Skin contact: Rinse with water for at least 15 minutes. If skin irritation persists, call a physician. Cool skin rapidly with cold water after contact with hot polymer.

Inhalation: Move to fresh air. Call a physician.

Ingestion: Drink water as a precaution. Never give anything by mouth to an unconscious person. Do not induce vomiting without medical advice. Call a physician.

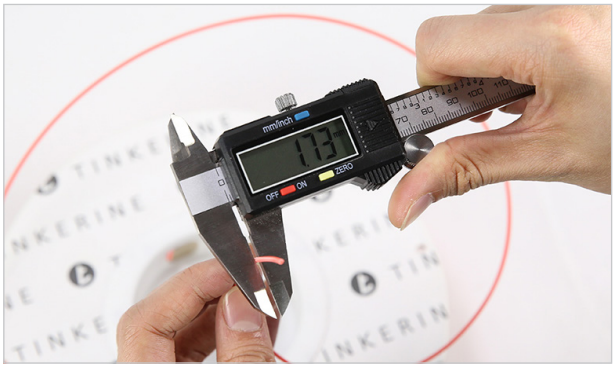
Notes to physician: Treat symptomatically.

MEASURE THE FILAMENT

The standard nozzle for ATLAS printer is 0.4 mm which requires 1.75 mm filament.
However, filament diameters vary depending on manufacturer.

For consistent layer resolution and high print quality, measurements are recommended.
Measure the filament diameter with a micrometer in several areas along the filament roll.

Enter the actual diameter in the slicing software.



THE IMPORTANCE OF TEMPERATURE

EXTRUDER TEMPERATURE:

Each material you use with the ATLAS printer will likely require a different temperature for the extruder. the nozzle temperature will also change in relations to ambient temperature, moist in the filament, nozzle size, etc.

RULE OF THUMB:
If you can extrude filament by pushing by hand with little force (depends on nozzle size) then you are near the sweet spot.

Start with the temperatures provided and make adjustments as needed.

- If your extruder is not hot enough, the filament may not adhere to the print bed.
- If your extruder is not hot enough, the filament may not adhere from layer to layer.
- If your extruder is too hot, the filament may warp or you may see an unwanted variance in layer width.

PRINT BED TEMPERATURE:

The print bed on the ATLAS printer is heated to provide better adhesion of your printed parts.
Each material you use will likely require a different bed temperature.

- For easy removal of large or small parts, simply turn your bed temperature down to 20° C. You will hear the plastic loosening and the part will pop off the print bed.

SEASONING THE NOZZLE

The canola oil treatment is used primarily as routine maintenance of the nozzles. However, this treatment should also be used prior to using a new nozzle to help prevent clogging and promote smooth filament flow.

Canola oil treatment:

1. Dip 20mm of filament into oil and shake off excess
2. Heat nozzle to 250-260° C
3. Push filament through the extruder and nozzle by hand
4. Extrude 200 mm of filament
5. Repeat 3-4 times

GETTING A GOOD FIRST LAYER

The first layer IS the most important layer of any print and perhaps the most difficult. A good first layer is vital to the success of your print.

Qualities of a good first layer include:

- Clean (clear of debris), prepared glass.
- Sticky build plate
- Proper bed temperature.
- Optimal first layer nozzle height

A good first layer adheres to the print bed, is the correct distance from the print bed, is visibly smooth and level, without gaps or bumps.

Here are a few tips for getting a good first layer:

- Make sure the print bed is level.
- Prepare the glass using fixative spray.
- Adjust the build plate height while printing fisrt layer

Getting the first layer height dialed in is critical

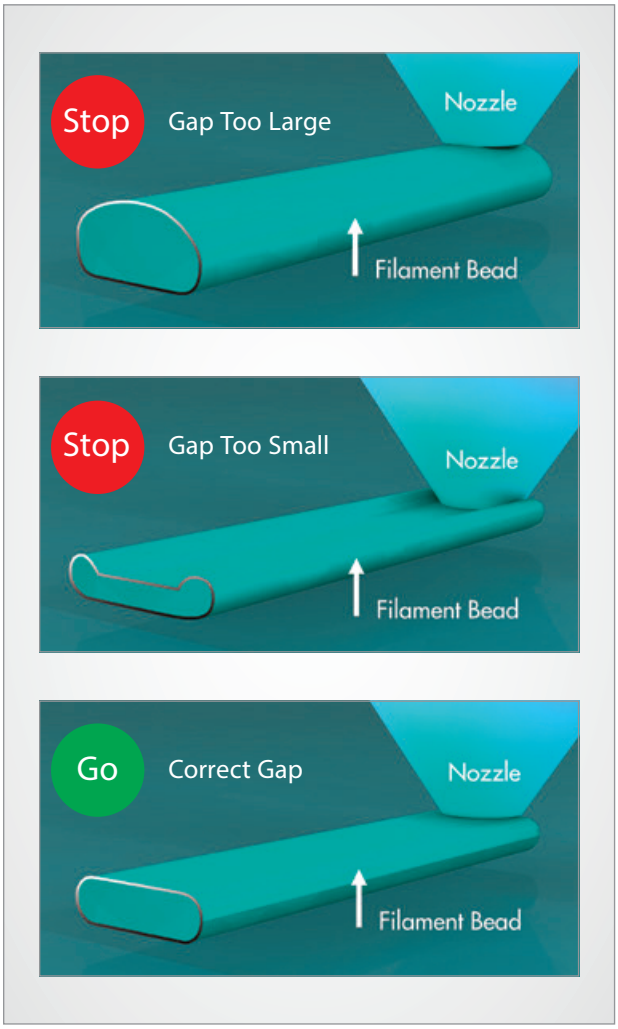
- If the first layer is too high and it will not stick.
- If the first layer is too low it will create a valley, and may drag the nozzle on the glass.

The first layer height is correct when the bead of filament is flattened slightly and even.

- Heat the print bed to the recommended temperature base upon the material being used.

If adhesion problems persist:

- Increase bed temperature to 80-85° C
- Increase the nozzle temperature by 10-20° C for the first 1-3 layers to aid in adhesion.
- Decrease the printing speed by 30% for the first layer
- Increase the flow rate by 5-10% for the first layer
- Print a test print to ensure good first layer adhesion



ORIENTING THE PART

Part orientation—the direction the part is positioned on the print bed—effects the print quality, print time, surface finish, and overall print-ability of the model.

The following tips are intended to assist in orienting your part for a successful print:

• Position so the most surface area is in level contact with the print bed.

• If possible, orient the part to reduce or eliminate support structures.

• Consider surface finish. Which part of the model is most important? Position the part accordingly.

• Reducing support structures will reduce print time.

• When break-away support structures are used directly on the print bed, the use of a raft may be necessary to avoid adhesion problems.

G-Code	Description	Example
G0	Move to the given coordinates. To the contrary of G1, if there is a tool it will most of the time be off during this kind of move. This is a "go to" move rather than a "do while going to" move. The F parameter defines speed and is remembered by subsequent commands (specified in millimetres/minute) (command is modal)	G0 X10 Y-5 F100
G1	Move to the given coordinates, see above for difference with G0. Takes the same F parameter as G0. (command is modal)	G1 X20 Y-2.3 F200
G2	Clockwise circular motion : go to point with coordinates XYZ while rotating around point with relative coordinates IJ (command is not modal)	G2 X10 J5
G3	Counter-clockwise motion : see above (command is not modal)	G3 Y5 X10 I2
G4	Dwell S<seconds> or P<milliseconds>	G4 P1000
G10	Do firmware extruder retract	G10
G10 L2 G10 L20	set workspace coordinates http://linuxcnc.org/docs/html/gcode/coordinates.html and http://linuxcnc.org/docs/html/gcode/g-code.html#gcode:g10-l2	G10 L2 P1 X0
G11	Do firmware extruder un-retract	G11
G17	Select XYZ plane (command is modal)	G17
G18	Select XZY plane (command is modal)	G18
G19	Select YZX plane (command is modal)	G19
G20	Inch mode : passed coordinates will be considered as Inches, so internally translated to millimeters (command is modal)	G20
G21	Millimeter mode (default) : passed coordinates will be considered as millimeters (command is modal)	G21
G30	Simple Z probe at current XY, reports distance moved down until probe triggers. optional F parameter defines the speed of probing, zprobe.slow_feedrate is used when not supplied	G30 - G30 F100
G31	Report current Z probe status	G31
G32	Uses Z probe to calibrate delta endstops and arm radius, use R parameter to select only arm radius calibration and E to select only endstop calibration. I to set target precision, J to set probe_radius, K to keep current endstop trim settings. In Zgrid module, it starts the grid probing	G32 - G32 R - G32 E - G32 EK - G32 I0.02
G28	Home The given axis, or if no axis specified home all axis at the same time (edge)	G28
G53-G59.3	use workspace coordinates http://linuxcnc.org/docs/html/gcode/coordinates.html and http://linuxcnc.org/docs/html/gcode/g-code.html#gcode:g54-g59.3	G54
G90	Absolute mode (default) : passed coordinates will be considered absolute (relative to 0.0.0) (command is modal)	G90
G91	Relative mode : passed coordinates will be considered relative to the current point (command is modal)	G91
G92	Set current position to specified coordinates	G92 X0 Y0 Z0
M-Code		
M17	Enable stepper motors	M17
M18	Disable stepper motors	M18
M20	List SD card files	M20
M21	Initialize the SD card. This does nothing in Smoothie but is kept for compatibility	M21
M23	Select a file	M23 file.gcode
M24	Start or resume SD card print	M24
M25	Pause SD card print	M25
M26	Abort a SD card print	M26
M27	Report print progress	M27
M28	Begin write to SD card. Use M29 to indicate end of file.	M28 file.gcode
M29	End write to SD card. Used to end file write started with M28.	M29
M30	Delete a file on the SD card	M30 file.gcode
M32	Select a file, and start playing it	M32 file.gcode
M82	Set absolute mode for extruder only	M82
M83	Set relative mode for extruder only	M83
M84	Disable steppers	M84
M92	Set axis steps per mm	M92 E200
M104	Set Extruder Temperature - S<temperature>	M104 S190
M105	Read current temp	M105
M106	Turn fan ON	M106
M107	Turn fan OFF	M107
M109	Set Extruder Temperature and Wait - S<temperature>	M109 S190
M110	Set current line number -N<line number>	M110 N123
M112	Halt all operations, turn off heaters, go into Halt state	
M114	Show current position of all axes, XYZ will be the last requested position, whereas ABC is actual current position of the actuators	M114
M117	Display message on LCD, blank message will clear it	M117 hello world or M117

M119	Show limit switch status	M119
M120	"Push" the current feed-rate and seek-rate so that another one can be temporarily used, then the current one can be restored	M120
M121	"Pop" the current feed-rate and seek-rate, see M120	M121
M140	Set Bed Temperature - S<temperature>	M140 S55
M190	Set Bed Temperature and Wait - S<temperature>	M190 S55
M200	Set E units for volumetric extrusion - D<filament diameter> set to 0 to disable volumetric extrusion	M200 D3.0
M203	Set maximum feedrate your machine can sustain <mm/sec>	M203 X100 Y100 Z100 E10
M204	S<acceleration> Set acceleration in mm/sec^2 Z<acceleration> NB Z only applies to Z only moves E<nnn> Set extruder only move acceleration	M204 S1000 Z100 E500
M205	X<junction deviation> Z<z junction deviation> S<minimum planner speed>, Z junction deviation only applies to z only moves, 0 disables junction deviation for Z, -1 uses global junction deviation	M205 X0.05 S30.0
M206	Set homing offsets	M206 X10 Y3 Z0.5
M207	set retract length S[positive mm] F[feedrate mm/min] Z[additional zlift/hop] Q[zlift feedrate mm/min]	M207 S4 F30 Z1
M208	set retract recover length S[positive mm surplus to the M207 S*] F[feedrate mm/min]	M208 S0 F8
M220	S<factor in percent>- set speed factor override percentage	M220 S50
M221	S<flow rate factor in percent>- set flow rate factor override percentage for current extruder	M221 S50
M301	Edit temperature control PID parameters X<i_max> Y<max_pwm>	M301 S0 P30 I10 D10 X255.0000 Y255
M303	Begin PID auto-tune cycle E<hotendid> S<temperature>	M303 E0 S185 - Tune extruder - M303 E1 S100 - Tune printbed -
M304	Abort PID auto-tuning	M304
M305	Set parameters for the thermistor, where B is beta, R is r0 and X is t0; P is the ID from the thermistors list (use console command thermistors to get a list).	M305 B4066
M306	Set homing offsets based on current position, subtracts current position from homing offset for specified axis	M306 Z0
M370	Z grid strategy: clears the ZGrid and the bed levelling is disabled until G32 is run again. Specify X and Y values to change grid size	M370 M370 X9 Y11
M371	Z grid strategy: moves the head to the next calibration position without saving for manual calibration	M371
M372	Z grid strategy: move the head to the next calibration position after saving the current probe point to memory - manual calbration	M372
M373	Z grid strategy: completes calibration and enables the Z compensation grid	M373
M374	Z grid strategy: save calibration grid. optional S parameter saves a custom file with numerical extention	M374 S123
M375	Z grid strategy: load calibration grid. optional S Parameter loads a pre saved custom grid	M375 S123
M400	Wait for the queue to be empty before answering "OK"	M400
M500	Save some volatile settings to an override file	M500
M501	Load config-override file optionally specifying the extension	M501 - loads config-override, M501 test1 - loads config-override.test1
M502	Delete the override file, reverting to config settings at next reset	M502
M503	Display overridden settings if any	M503
M504	Save the settings to an override file with specified extension	M504 test1 - saves to config-override.test1
M557	Defines probe points	M557 P1 X30 Y40.5
M561	clears the plane and the bed leveling is disabled until G32 is run again	M561
M565	defines the probe offsets from the nozzle or tool head	M565 X3 Y4.5 Z-2.37
M600	Suspend print in progress (use console command resume to continue)	
M665	Set arm solution specific settings: Delta - L<arm length> R<arm radius> Z<max height>	M665 L341.0 R350 Z430
M666	On a delta sets trim values for the endstops. (Positive values will crash physical endstops.)	M666 X-0.1 Y-0.2 Z-0.3
M1910.x	Move a given number of steps, without acceleration (for testing only) M1910.1 will stop the motor	M1910 X100 F100
M957	(with Spindle module enabled) Report the current spindle speed and PWM value	M957
M958	(with Spindle module enabled) Report the current spindle PID parameters. M958 Px.xx Ix.xx Dx.xx will set them (to save the new values, you need to edit config file manually).	M958 P0.1
M999	Reset from a halted state caused by limit switch, M112 or kill switch	

CAUTION: Always turn OFF the machine before connecting or disconnecting any cable.
Look at the orientation notch to align the connector to the plug, never use too much force.

HARDWARE

1. Unplug the power cord
2. Unplug all the connectors from the top connector box: the filament extruder cable, effector cable and the layer fan cable.
3. Uninstall the filament extruder
4. Uninstall the single nozzle effector

5. Install the extruder motor E0 in the provided holder. **E0 is always the RIGHT** side and **E1 always on the LEF**T side.
6. Install the dual extruder assembly in the printer using three steel wire, one for each tower.

7. Plug the connector of the right extruder to the E0 connector and the left extruder to the E1 connector, route the cables through the loose zip-tie connected to the left motor. Do not tighten the zip-tie.

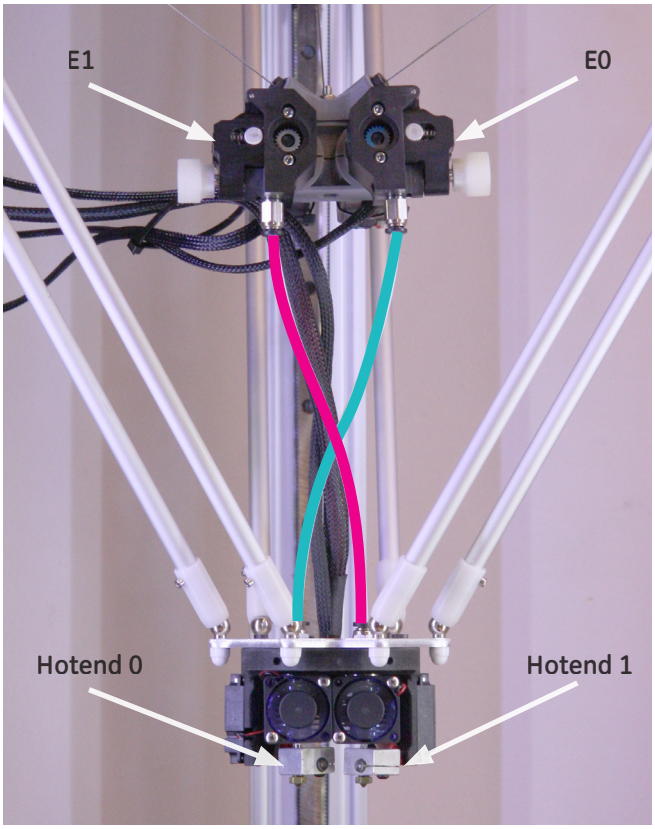
8. Install the dual hotend effector with the radiator cooling fans poinintg to the front of the printer.
9. Route the two cables of the effector through the loose zip-tie of the left extruder motor then connect the 8pin plug to the Effector connector and the layer fan 4 pin connector to the Layer fan / z probe connector. (Do not tighten the zip-tie.)

10. Version 0: Connect the two PTFE tube (bowden) in a cross way, E0 goes to the LEFT hot-end while E1 goes the the RIGHT hot-end.
11. Version 1: Connect the two PTFE tube (bowden) in a straight way, E0 goes to the RIGHT hot-end while E1 goes the the LEFT hot-end.

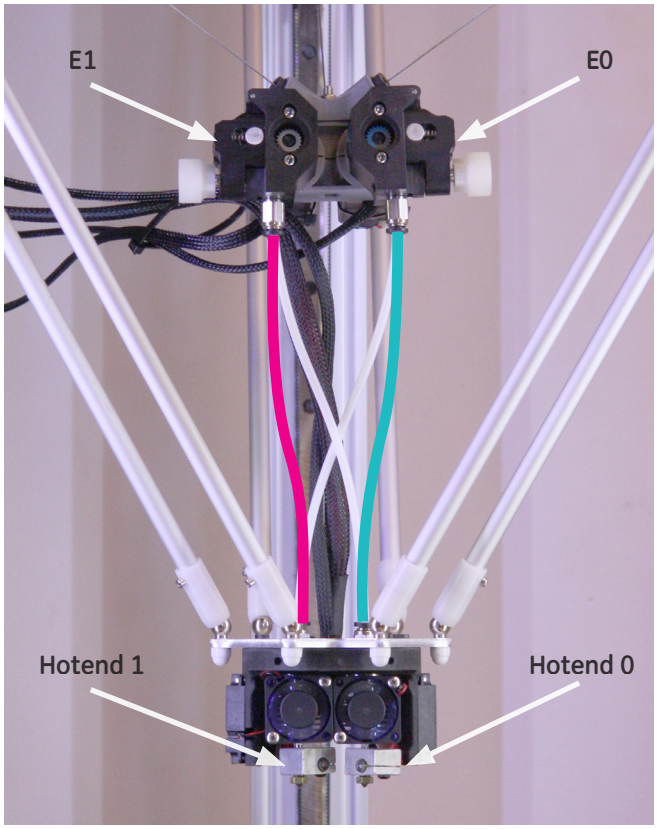
TIP: In order to identificate which version (0 or 1) you have preheat only one hotend to 50°C.

If the hotend become hot is on the right side you have version 0
If the hotend become hot is on the left side you have version 1

VERSION 0



VERSION 1



The PTFE tubes are 290mm long

FIRMWARE

The printer need to know it have 2 extruder motors and 2 hotends.

1. Without turning ON the printer connect a PC using the provided Usb cable.
2. Open the Internal mass storage called "ATLAS"
3. Rename the current "***config***" file into "***config_mono***"
4. Copy the new provided files into the mass storage memory, overwriting the old ones.
5. Safe Eject the mass storage from the PC, then disconnect the Usb cable.
6. Turn ON the printer, you should see two hotends temperatures readings on the LCD control panel.

Below the differencies of the new firmware configuration, changed values are indicated by an arrow.

```
# Extruder module configuration
# ------------------------------------------------------------------

extruder.hotend.enable                          true            # Whether to activate the extruder module at all.
extruder.hotend.steps_per_mm                    1166            # Steps per mm for extruder stepper
extruder.hotend.default_feed_rate               600             # mm/minute for moves where only the extruder moves
extruder.hotend.acceleration                    500             # Acceleration in millimetres/second
extruder.hotend.max_speed                       200             # mm/s

extruder.hotend.step_pin                        2.3             # Pin for extruder step signal
extruder.hotend.dir_pin                         0.22            # Pin for extruder dir signal
extruder.hotend.en_pin                          0.21            # Pin for extruder enable signal

extruder.hotend.x_offset                        15              # x offset from origin in mm
#extruder.hotend.y_offset                        0               # y offset from origin in mm
#extruder.hotend.z_offset                        0               # z offset from origin in mm

# firmware retract settings when using G10/G11, must be defined for each extruder if not using the defaults

#extruder.hotend.retract_length                  2               # retract length in mm
#extruder.hotend.retract_feedrate                45              # retract feedrate in mm/sec
#extruder.hotend.retract_recover_length          0               # additional length for recover
#extruder.hotend.retract_recover_feedrate        8               # recover feedrate in mm/sec-should be less than retract feedrate
#extruder.hotend.retract_zlift_length            2               # zlift on retract in mm, 0 disables
#extruder.hotend.retract_zlift_feedrate          6000            # zlift feedrate in mm/min (Note mm/min NOT mm/sec)


extruder.hotend2.enable                         true            # Whether to activate the extruder module at all.
extruder.hotend2.steps_per_mm                   1166            # Steps per mm for extruder stepper
extruder.hotend2.default_feed_rate              600             # mm/minute for moves where only the extruder moves
extruder.hotend2.acceleration                   500             # Acceleration in millimetres/second
extruder.hotend2.max_speed                      200             # mm/s

extruder.hotend2.step_pin                       2.8             # Pin for extruder step signal
extruder.hotend2.dir_pin                        2.13!           # Pin for extruder dir signal
extruder.hotend2.en_pin                         4.29            # Pin for extruder enable signal

extruder.hotend2.x_offset                       -15             # x offset from origin in mm
#extruder.hotend2.y_offset                       0               # y offset from origin in mm
#extruder.hotend2.z_offset                       0               # z offset from origin in mm
```

```
# Hotend temperature control configuration
# ------------------------------------------------------------------

temperature_control.hotend.enable           true            # Whether to activate this ( "hotend" ) module at all.
                                                            # All configuration is ignored if false.
temperature_control.hotend.thermistor_pin   0.23            # Pin for the thermistor to read
temperature_control.hotend.heater_pin       2.4             # Pin that controls the heater
#temperature_control.hotend.thermistor      Semitec         # see http://smoothieware.org/temperaturecontrol#toc5
#temperature_control.hotend.beta             4775            # or set the beta value

#temperature_control.hotend.coefficients     0.000843601301312447,0.000205487871426158,0.000000106466728766
temperature_control.hotend.coefficients     0.000809969613328576,0.000211192251299508,0.000000073642404175 # 104NT-4R025H42G

temperature_control.hotend.set_m_code       104             #
temperature_control.hotend.set_and_wait_m_code 109          #
temperature_control.hotend.designator       T               #
temperature_control.hotend.max_temp         320             # Set maximum temperature

temperature_control.hotend.p_factor         36.2            # permanently set the PID values after an auto pid
temperature_control.hotend.i_factor         2.4             #
temperature_control.hotend.d_factor         136             #

#temperature_control.hotend.max_pwm          64              # max pwm, 64 is a good value if driving a 12v resistor with 24v.

# safety control is enabled by default and can be overidden here, the values show the defaults

temperature_control.hotend.runaway_heating_timeout      900   # max 2040 sec, how long it can take to heat up
temperature_control.hotend.runaway_cooling_timeout      900   # max 2040 sec, how long can take to cool down if temp is set lower
temperature_control.hotend.runaway_range                60    # Max setting is 63°C



# ------------------------------------------------------------------

temperature_control.hotend2.enable          false           # Whether to activate this ( "hotend" ) module at all.
                                                            # All configuration is ignored if false.
temperature_control.hotend2.thermistor_pin  0.24            # Pin for the thermistor to read
temperature_control.hotend2.heater_pin      2.7             # Pin that controls the heater
#temperature_control.hotend2.thermistor     Semitec         # http://smoothieware.org/temperaturecontrol#toc5
#temperature_control.hotend2.beta           4388            # or set the beta value

#temperature_control.hotend2.coefficients   0.000843601301312447,0.000205487871426158,0.000000106466728766
temperature_control.hotend2.coefficients    0.000809969613328576,0.000211192251299508,0.000000073642404175 # 104NT-4R025H42G
temperature_control.hotend2.set_m_code      104             #
temperature_control.hotend2.set_and_wait_m_code 109         #
temperature_control.hotend2.designator      T1              #
temperature_control.hotend2.max_temp         320            # Set maximum temperature

temperature_control.hotend2.p_factor        36.2            # permanently set the PID values after an auto pid
temperature_control.hotend2.i_factor        2.4             #
temperature_control.hotend2.d_factor        136             #

#temperature_control.hotend2.max_pwm         64              # max pwm, 64 is a good value if driving a 12v resistor with 24v.

temperature_control.hotend2.runaway_heating_timeout      900   # max 2040 sec, how long it can take to heat up
temperature_control.hotend2.runaway_cooling_timeout      900   # max 2040 sec, how long can take to cool down if temp is set lower
temperature_control.hotend2.runaway_range                60    # Max setting is 63°C
```

CAUTION: The dual nozzle head is approximately 44mm longer in Z.
Do the height calibration or the head will hit the build plate

HEIGHT CALIBRATION

1. Home the effector so the printer know its position in space :

   LCD > PREPARE > HOME ALL AXIS

2. With a piece of regular paper on the build plate move the effector down until you get the nozzle near the build surface barely pinching the paper. Go down until you can feel slight resistance while sliding the paper, for fine adjustment you can select finer jog increments

   LCD > JOG > MOVE 1mm > MOVE Z

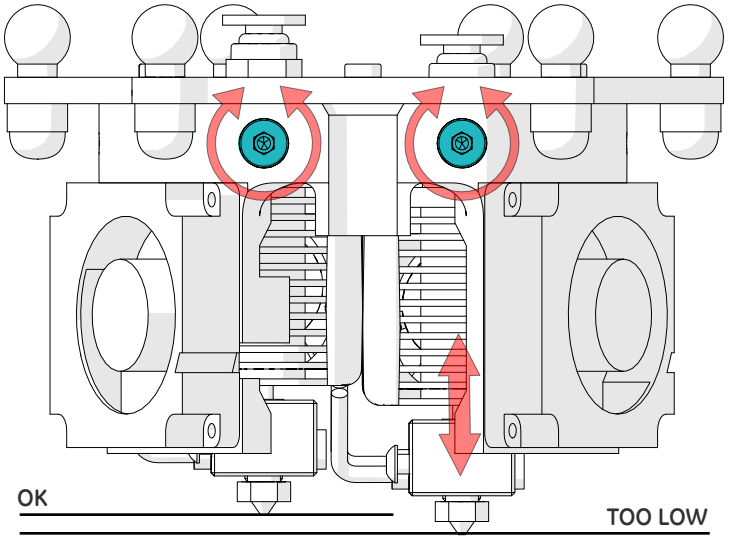
3. Tell the printer how far in Z is the build plate from home position:

   LCD > CUSTOM > SET Z0

NOZZLE HEIGHT ADJUSTMENT

When changing nozzles make sure that the two nozzles are at the same height.

1. Loosen the screw behind the effector.
2. Push down or up the interested hotend to match the height of the other one.
3. Thighten the screw.

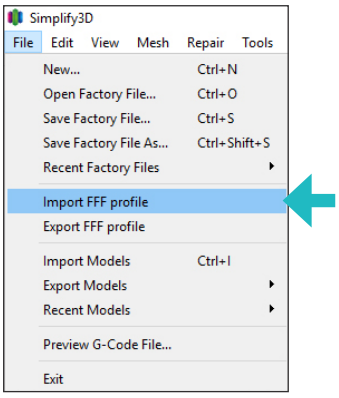


SIMPLIFY 3D SLICING PARAMETERS

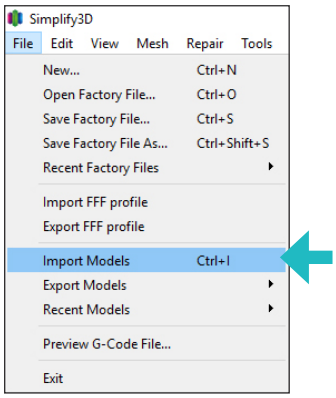
The Simplify 3D profile template is available here: http://www.3dbnz.com/down/
For calibration and testing you can download *Dual nozzle calibration.rar* which contains STL available here: http://www.3dbnz.com/down/

1. Open Simplify3D
2. Import the provided base profile: *File > Import FFF profile*
3. Load 2 models: *File > Import Models*
4. Open the wizard: *Tools > Dual Extrusion Wizard*
5. Select the new imported base profile template and make sure *Group and align models* is checked.
6. Click: *Prepare to Print*
7. Click: *Select All* then click: *OK*

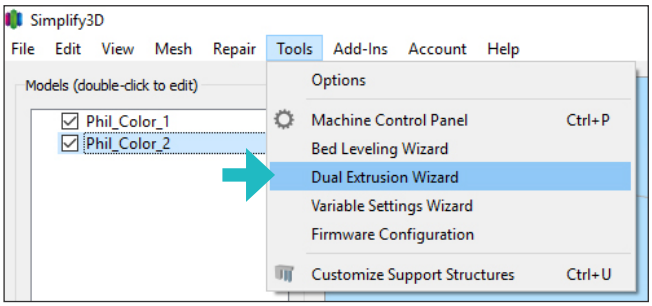
2.



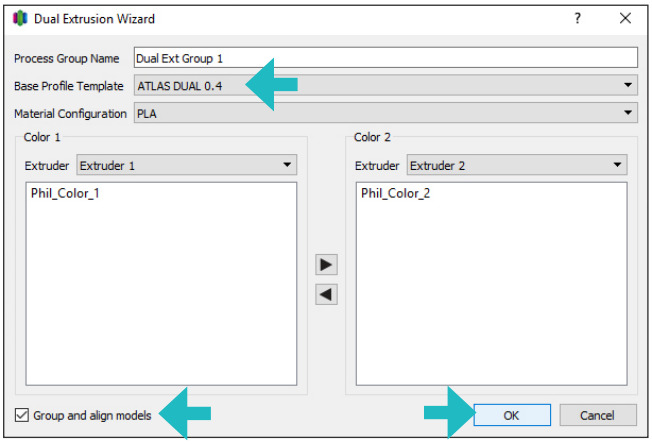
3.



4.

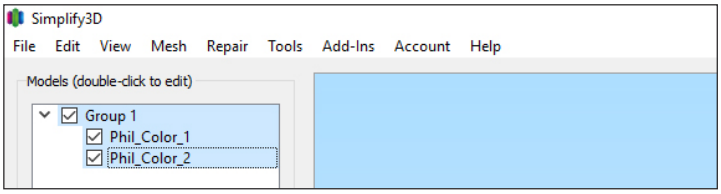


5.

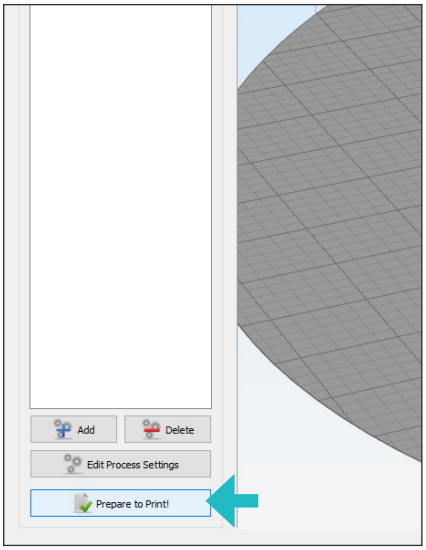


Grouped processes

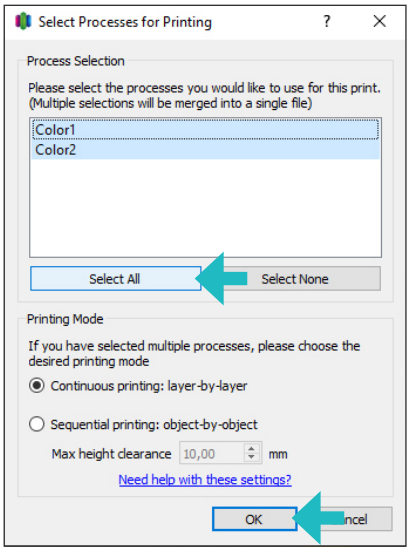
Grouped models



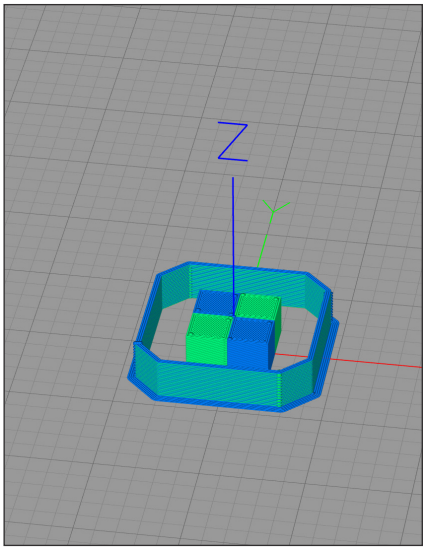
6.



7.



Sliced model

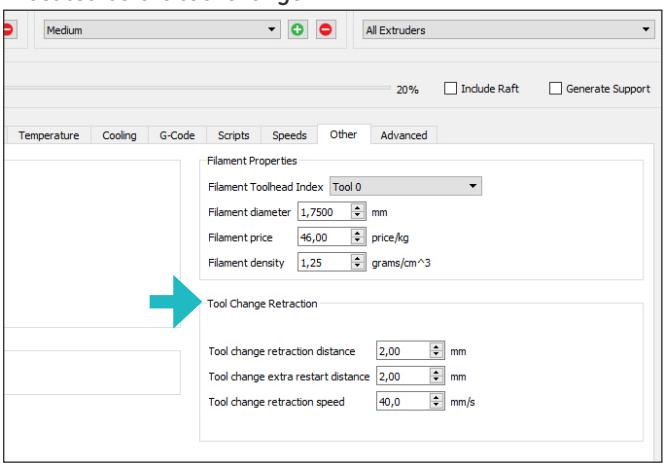


There is a bug in Simplify3D! When changing any options you must delete the second process (color 2) then make your changes in color 1, click Update Profile and only after that you can open the dual Extrusion Wizard. Now your changes will be taken into account.

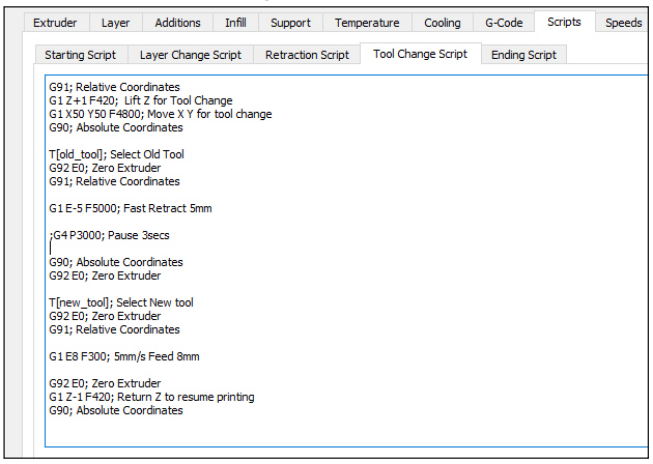
TOOL CHANGE SCRIPT

The Simplify3D FFF template profile for dual nozzle printing have some line of Gcode that retract and prime the new nozzle at each tool change routine.
Depending on the model shape and materials these valuse has to be fine tuned for best results.

Executed before tool change



Executed after tool change



NOZZLE XY ADJUSTMENT

The first time you should print a test object and correct the XY positionof the nozzle in the firmware.

To edit the firmware use Sublime Text Editor, its free, multi platform and available here: https://www.sublimetext.com/
Do not use others editors.

1. Connect a PC using the provided Usb cable.
2. Open the Internal mass storage called "ATLAS"
3. Open "***config***" file using Sublime Text Editor

4. Edit the following lines: ***extruder.hotend.x_offset***
   extruder.hotend2.x_offset

5. Save the file **CTRL+S** or go to **File > Save**
6. Safe Eject the mass storage from the PC, then disconnect the Usb cable.
7. Reset the printer, turn OFF the main switch than ON again, now the new values are taken into account.
8. Print the test object again.

```
82
83  # Extruder module configuration
84  # --------------------------------------------------------------------
85
86  extruder.hotend.enable                      true          # Whether to activate the extruder module at all.
87  extruder.hotend.steps_per_mm                1166          # Steps per mm for extruder stepper
88  extruder.hotend.default_feed_rate           600           # mm/minute for moves where only the extruder moves
89  extruder.hotend.acceleration                500           # Acceleration in millimetres/second
90  extruder.hotend.max_speed                   200           # mm/s
91
92  extruder.hotend.step_pin                    2.3           # Pin for extruder step signal
93  extruder.hotend.dir_pin                     0.22          # Pin for extruder dir signal
94  extruder.hotend.en_pin                      0.21          # Pin for extruder enable signal
95
96  extruder.hotend.x_offset                    15            # x offset from origin in mm
97  #extruder.hotend.y_offset                    0             # y offset from origin in mm
98  #extruder.hotend.z_offset                    0             # z offset from origin in mm
99
100 # firmware retract settings when using G10/G11, must be defined for each extruder if not using the defaults
101
102 #extruder.hotend.retract_length              2             # retract length in mm
103 #extruder.hotend.retract_feedrate            45            # retract feedrate in mm/sec
104 #extruder.hotend.retract_recover_length      0             # additional length for recover
105 #extruder.hotend.retract_recover_feedrate    8             # recover feedrate in mm/sec-should be less than retract feedrate
106 #extruder.hotend.retract_zlift_length        2             # zlift on retract in mm, 0 disables
107 #extruder.hotend.retract_zlift_feedrate      6000          # zlift feedrate in mm/min (Note mm/min NOT mm/sec)
108
109
110 extruder.hotend2.enable                     true          # Whether to activate the extruder module at all.
111 extruder.hotend2.steps_per_mm               1166          # Steps per mm for extruder stepper
112 extruder.hotend2.default_feed_rate          600           # mm/minute for moves where only the extruder moves
113 extruder.hotend2.acceleration               500           # Acceleration in millimetres/second
114 extruder.hotend2.max_speed                  200           # mm/s
115
116 extruder.hotend2.step_pin                   2.8           # Pin for extruder step signal
117 extruder.hotend2.dir_pin                    2.13!         # Pin for extruder dir signal
118 extruder.hotend2.en_pin                     4.29          # Pin for extruder enable signal
119
120 extruder.hotend2.x_offset                   -15           # x offset from origin in mm
121 #extruder.hotend2.y_offset                   0             # y offset from origin in mm
122 #extruder.hotend2.z_offset                   0             # z offset from origin in mm
123
```

ASSISTANCE SERVICE

If you do not find a solution to your problem in this manual, please contact the 3DBNZ team through any of the following channels:

TECHNICAL ASSISTANCE

You can contact the technical assistance services by email, and we will answer you as quickly as possible. Please remember to include your phone number
info@3dbnz.com

EMAIL

If you have a question that is not related to technical assistance, please send us an email to the address below. A 3DBNZ expert will contact you as quickly as possible.
info@3dbnz.com

You can find all of this information in the Contact Section of our website:
3dbnz.com/contact/

Be sure to include the serial number of your computer machine you send us a query to help us provide the best possible services.

RETURNS POLICY

Returns will only accepted for products that have not been used within a period of 14 business days, starting from when the printer was delivered. Once this period has expired, all sales with be considered to be final. “Not used” is understood to mean products that have never been assembled, switched on, programmed or altered in any other way

TERMS AND CONDITIONS OF SERVICE

The information in this manual is subject to change at any time without notice, and is provided solely for informational purposes. 3DBNZ reserves the right to change or modify the manual at any time at its sole discretion, and you agree to be bound by any such changes and/or modifications.
If you would like to get the most up-to-date information, please contact 3DBNZ technical team or visit the www.3dbnz.com website.

HOW TO GET WARRANTY SERVICE

In case of issues with the Product:

1. Notify the seller before the end of the Warranty Period

2. Supply all the information to 3DBNZ or to the authorized service company about the nature of the claim in the period of two (2) months since its detection and never after the end of the Warranty Period.

3. Supply the original proof of purchase, which includes the Product serial number In case of doubt, contact the 3DBNZ Technical Assistant Service ("TAS") (info@3dbnz.com) or the authorized service company.

CLAIM HANDLING

1. The remedy of the non-conforming Product is solely determined by 3DBNZ or the authorized service company within a reasonable commercial time.

2. The amendment may consist in the repair, part replacements or total substitution of the Product, depending on each situation and disposed by 3DBNZ or the authorized service company (unless the current legislation states it otherwise).

3. 3DBNZ or the authorized service company, depending on which handles the claim, bears the shipping costs, if needed.

4. 3DBNZ or the authorized service company, depending on which handles the claim, bears the repair, parts replacement or product substitution costs.

5. All damaged, defective or replaced parts or Products become the property of 3DBNZ or the authorized service company.

EXCLUSIONS

This Warranty does not cover:

1. Physical damage caused by an inappropriate transport (not using the official packaging) or handling (including unlimitedly the damages caused by sharp or cutting elements, bending or compressing parts or fall of the product).

2. The normal wear and tear occurred for the product normal use, including unlimitedly the wear of moving parts, control panels or elements interacting with the product operation.

3. Malfunctions or damage caused by modifications, alterations or repairs by any individual or company not authorized by 3DBNZ. The Consumable replacements are excluded of this point.

4. Damage caused by power grid failures.

5. Damage caused by abuse, misuse, accidents or neglect using the Product.

6. Resulting damages of exposing the Product to floods, fire, humidity, spillage of food or chemicals, corrosion, oxidation, extreme weather conditions or any other external agent.

7. Damages caused by the use of software non recommended by 3DBNZ.

8. Damages caused by the use of printing materials non recommended by 3DBNZ.

9. The components considered as Consumables, listed in the annexed document.

LIMITATIONS AND DISCLAIMERS

This Warranty is the end user's sole and exclusive remedy against 3DBNZ and the sole and exclusive responsibility of 3DBNZ to defects in their products.
Therefore, this Warranty supersedes any other warranties issued by 3DBNZ, either oral or written in any form.

However, this Warranty does not limit either the consumer user rights specified in the legislation nor the the rights against the seller, also defined in the legislation.

3DBNZ waives all liability for any loss of businesses, loss of contracts, loss of benefits, loss of savings, increase of costs or expenses due to the use of any of its Products. Likewise, 3DBNZ refuses any indirect, incidental, collateral damage by the use of its.

NON EU WARRANTY

3DBNZ grants this Warranty to the ATLAS Technologies brand product users.

This Warranty is only valid in the country where the product has been purchased originally, as long as it is not member of the European Union, Iceland, Norway, Switzerland, Liechtenstein or Turkey. Otherwise, check the Warranty for EU countries.

WARRANTY PERIOD

The Warranty Period starts when the Product is first delivered to the end-user.
The Warranty period lasts twelve (12) months. Both the parts that suffer wear and tear due to the normal operation of the Product and the "Consumable" elements are not covered by this Warranty.

The present Warranty is invalidated in case of incurring in any of the cases exposed in the Exclusions chapter.

In case of resale, repair or substitution of the Products the Warranty is not extended. The repaired or substituted parts are covered until the end of the Warranty Period or during six (6) months, depending on which date is later.

Some states do not allow limitations on how long an implied warranty lasts, so the above limitation may not apply to you.

HOW TO GET WARRANTY SERVICE

In case of issues with the Product:

1. Notify the seller before the end of the Warranty Period
2. Supply all the information to 3DBNZ or to the authorized service company about the nature of the claim in the period of two (2) months since its detection and never after the end of the Warranty Period.
3. Supply the original proof of purchase, which includes the Product serial number In case of doubt, contact the 3DBNZ Technical Assistant Service ("TAS") (info@3dbnz.com) or the authorized service company.

CLAIM HANDLING

1. The remedy of the non-conforming Product is solely determined by 3DBNZ or the authorized service company within a reasonable commercial time.
2. The amendment may consist in the repair, part replacements or total substitution of the Product, depending on each situation and disposed by 3DBNZ or the authorized service company (unless the current legislation states it otherwise).
3. 3DBNZ or the authorized service company, depending on which handles the claim, bears the shipping costs, if needed.
4. 3DBNZ or the authorized service company, depending on which handles the claim, bears the repair, parts replacement or Product substitution costs.
5. All damaged, defective or replaced parts or Products become the property of 3DBNZ or the authorized service company.

EXCLUSIONS

This Warranty does not cover:

1. Physical damage caused by an inappropriate transport (not using the official packaging) or handling (including unlimitedly the damages caused by sharp or cutting elements, bending or compressing parts or fall of the Product).
2. The normal wear and tear occurred for the product normal use, including unlimitedly the wear of moving parts, control panels or elements interacting with the product operation.
3. Malfunctions or damage caused by modifications, alterations or repairs by any individual or company not authorized by 3DBNZ. The Consumable replacements are excluded of this point.
4. Damage caused by power grid failures.
5. Damage caused by abuse, misuse, accidents or neglect using the Product.
6. Resulting damages of exposing the Product to floods, fire, humidity, spillage of food or chemicals, corrosion, oxidation, extreme weather conditions or any other external agent.
7. Damages caused by the use of software non recommended by 3DBNZ.
8. Damages caused by the use of printing materials non recommended by 3DBNZ .
9. The components considered as Consumables, listed in the annexed document.

Some states do not allow the exclusion of incidental or consequential damages, so the above limitation or exclusion may not apply to you.

LIMITATIONS AND DISCLAIMERS

This Warranty is the end user's sole and exclusive remedy against 3DBNZ and the sole and exclusive responsibility of 3DBNZ to defects in their Products. Therefore, this Warranty supersedes any other warranties issued by 3DBNZ, either oral or written in any form.

However, this Warranty does not limit either the consumer user rights specified in the legislation nor the the rights against the seller, also defined in the legislation.

3DBNZ waives all liability for any loss of businesses, loss of contracts, loss of benefits, loss of savings, increase of costs or expenses due to the use of any of its Products. Likewise, 3DBNZ refuses any indirect, incidental, collateral damage by the use of its Products.

Declaration of Conformity

3DBNZ declares that the ATLAS printers complies with the essential requirements and any other applicable or mandatory provisions of the Directives.

Equipment Name:	ATLAS 3D Printer
Generic Equipment Description:	FFF 3D Printer
Model /Type:	4030 / 4070
Manufacturer:	3DBNZ Ul. Wilcza 4 76-270 Ustka Poland PL8393178838

It complies with the essential requirements of the European Directives:

CE

2006/42/EEC Machinery Directive

2006/95/EEC Low Voltage Directive

2004/108/EEC Electromagnetic Compatibility Directive (EMC)

2011/65/EU Restrictions on the use of hazardous substances in electrical and electronic equipment (RoHS)

The 3DBNZ ATLAS printer has been manufactured in compliance with the following harmonised standards, and consequently conforms to the essential requirements established by the Directives:

2006/42/EEC UNE-EN ISO 12100:2012; UNE-EN ISO13732-1 :2008; EN ISO 7010:2012

2006/95/EEC UNE-EN 60204-1;UNE-EN 60947-3:2009

2004/108/EEC UNE-EN 55022:2011; UNE-EN 55024:2011; UNE-EN 61000-4-3-2:2007

Ustka 20/12/2016

Legal Representative

Changes / modifications not approved by the responsible party could void the user's authority to operate the equipment.

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.

Thank you,
print responsibly.

Contact:
info@3dbnz.com
www.3dbnz.com

3DBNZ