Product Description

Robust SIMO® Series linear actuators from PBC Linear® provide smooth and accurate motion control

SurePrint™ Servo Technology motors with closed loop control provides positional feedback every 1.25 microns

Dual extruders with filament sensors

X Axis 1000 mm

Z Axis—500 mm

Y Axis—1000 mm

Printer serial number located on backside of printer

Electrical panel located inside industrial cart

Two emergency shut-offs located on the front and the rear of the machine

Print bed with heated borosilicate glass

A. LCD control unit with SD card reader

B. Control box on/off

C. USB connection for computer

The 3DP Workbench 3D printer is manufactured by 3D Platform, located in Roscoe, Illinois USA. It is designed to comply with CE standards. 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 3DP Workbench outlined in this manual.

The 3DP Workbench 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 LCD control unit and SD card.
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CE Declaration of Conformity ................... Inside Back Cover

User manual symbols

- Link to product related video
- Download a file
- Link to specific product information

Manufacturer

3D Platform
6402 East Rockton Road
Roscoe, Illinois 61073
+1.779.771.0000
Safety Features

The 3DP Workbench printer is designed to comply with CE standards. All motors are set to recommended safety standards, with limitation of force applied to each axis less than 150 newtons. Printers are equipped with the following safety features:

1. Y axis bumper protects the user from collision with the idle end of the actuator during printing

2. Wire covers prevent accidental disconnection of the motors

3. Two emergency Stop buttons located on the front and back of the machine

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 3DP Workbench printer. If the printer is not operated as specified, the operator’s safety may be compromised.

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 3DP Workbench 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 detection and flame supression.
- The 3DP Workbench printer melts material during printing. Some materials may require ventilation.
- Do not leave the 3DP Workbench printer unattended while in operation.

Note: This equipment does not meet requirements for immunity according to EN61000-4-2. The destruction of the step servo motors embedded electronic circuits is possible by application of electro static discharge.
Safety

Intended Use

Each 3DP Workbench printer is inspected and calibrated, 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 with the appropriate size/diameter filament as specified within this manual.

• 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.

Symbols & Warning Labels

<table>
<thead>
<tr>
<th>Warning Symbol</th>
<th>Meaning and Description</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>WARNING HOT SURFACE</td>
<td>A hot surface is located in the vicinity—do not touch.</td>
<td>Print nozzle, Print bed</td>
</tr>
<tr>
<td>CRUSHING OF HANDS</td>
<td>When in motion, the 3DP Workbench’s linear actuators that move in multiple directions at variant speeds may be a pinch hazard (low risk due to force limitation).</td>
<td>X axis, Y axis, Z axis</td>
</tr>
<tr>
<td>AUTOMATIC START-UP</td>
<td>The 3DP Workbench’s linear actuators start and stop automatically depending on the printing operation.</td>
<td>Front of the print bed</td>
</tr>
<tr>
<td>ELECTRICAL HAZARD</td>
<td>Use caution when working with electricity.</td>
<td>Electrical box, Digital temperature controller</td>
</tr>
<tr>
<td>EMERGENCY STOP</td>
<td>In case of emergency, use the Emergency Stop buttons on the machine to turn off power. On restart, the Emergency Stop must be disengaged—twist and pull to disengage. Then, press the Reset button prior to restarting the machine.</td>
<td>Front corner of machine, Back corner of machine</td>
</tr>
<tr>
<td>ON</td>
<td>Turns the machine on.</td>
<td>Front panel of electrical box</td>
</tr>
<tr>
<td>OFF</td>
<td>Turns the machine off.</td>
<td>Front panel of electrical box</td>
</tr>
</tbody>
</table>

First Aid

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

Sound Level

• The level of airborne noise (acoustic pressure) measured at the operator station <70 dB(A).
Technical Specifications

Specifications

**Printer Type:** FFF – Fused Filament Fabrication is a form of additive manufacturing, commonly used for 3D modeling, rapid prototyping, and production applications.

**Build Area:** 1 m x 1 m x 0.5 m
(39.3" x 39.3" x 19.6")

**Layer Resolution:** Down to 70 microns (0.0027")

**Note:** Accuracy is dependent upon nozzle size, slice settings, geometry, print speed, filament quality, and a range of other factors. Under average conditions, it is typical to achieve layer resolutions of 100 microns with a 0.4 mm nozzle and a well-tuned and calibrated printer configuration.

**Filament Diameter:** 3 mm (actual diameter may vary) or 1.75 mm filament. 3 mm diameter is recommended.

**Nozzle Diameter:** 0.6 mm—other nozzle sizes available from manufacturer.

**Connectivity to Laptop:** USB

Controls & Firmware

Standard with the 3DP Workbench printer:

- Taurino (AT mega 2560)
- RAMPS 1.4
- Chip Amp Extruder Stepper Drivers
- Consult factory for Marlin Firmware source code and/or updates

Physical Dimensions & Weight

**Overall Width:** 1473.2 mm (58")
**Overall Depth:** 2286 mm (90")
**Overall Height:** 1320.8 mm (52")
**Approx. System Weight:** 540 lbs.

Temperatures

**Maximum Nozzle Temperature:** 280°C
**Maximum Print Bed Temperature:** 135°C

Mechanical

**Build Platform:** Borosilicate glass, 5 mm thick

**XYZ Axes:** Lead screw driven SIMO® Series linear actuators from PBC Linear®. Screw max values: 640 RPM, 16000 mm/min, 267 mm/sec.

**SurePrint™ Servo Motors:** Closed loop control provides positional feedback every 1.25 microns.

- 85% more motor torque equals faster prints
- Closed loop system improves print quality
- Sophisticated control similar to a car’s traction control and anti-lock brake system

Electrical

**Standard AC Input:**

- 208-240VAC, 1 Phase
- 15 A
- 50/60 Hz
- Sold with NEMA L6-15 plug, see typical outlet diagram below.

An outlet connector enables changing plug type for worldwide compatibility.

Outlet Diagram (USA)

NEMA L6-15

Main Electrical Panel

The main electrical panel is located in the top, rear storage drawer of the 3DP Workbench printer. Use extreme caution. Electrical panel should only be accessed by an authorized, trained technician.

Powering down

Turn the power switch on the cart to completely power down the machine and eliminate the draw of electrical current.
Crate Contents & Unpacking

Crate Contents

- 3DP Workbench printer with LCD screen
- Filament guide and spool holder
- 3DP Workbench User Manual
- 2 Spools of PLA filament
- SD card with start-up configuration and calibration files

Unpacking the Printer

- The 3DP Workbench printer will arrive in two industrial strength wood crates. Please take a moment to review the unpacking procedure to ensure the safety of the unpacker, as well as the printer.

Tools Required

- Phillips Head Screwdriver
- 3 mm Allen Wrench or Hex Key

1. Open the Base Unit Crate—Crate A
   Unscrew the end panel to open the crate.

2. Release Supports
   Carefully remove bracing, supports, and/or tie-downs that are used to secure the product for shipping.

3. Remove Base Cart from Crate A
   Roll the printer forward and out of the crate.
   Use extreme caution when moving heavy machinery, such as the 3DP Workbench printer.

4. Remove the Lifting Beam from Crate A
   The lifting beam is used for lifting the print bed portion of the 3DP Workbench printer.

5. Remove the Filament Bar from Crate A
   To be attached later in the assembly process.

6. Open the Print Bed Crate—Crate B
   Unscrew and lift the top portion of the crate.

7. Release Supports
   Carefully remove bracing, supports, and/or tie-downs that are used to secure the product for shipping.

8. Insert the Lifting Beam
   Insert the lifting beam through the designated lifting beam port located at the front and rear of the print bed.

9. Lift the Print Bed and Place on the Base
   This step requires two people. Using extreme caution and proper lifting techniques, lift the print bed unit and place on the base unit.
   Caution! The unit is heavy. Care must be taken to assure safety of machinery and operators.
   Avoid contact with actuators and motors on either side of the print bed unit.
   Position the print bed unit on the base unit. Place the rear of the print bed toward the rear of the base unit. The larger metal space on the bed surface denotes the rear of the print bed. The location of the filament spools denotes the rear of the cart. Leave ample work space toward the front of the base unit.

10. Unfold and Position the Gantry
    This step requires two people. Remove four bolts on either side—total eight bolts—of the gantry unit. Keep the bolts for re-engagement. With the bolts removed, rotate the gantry to the upright position. Replace all bolts and tighten to secure the gantry into position.

11. Install the Filament Bar
    Unfold the filament bar to suspend the filament feed above the print bed. Attach the base end of the filament bar to the rear of the machine. Insert the bar through the filament bar bracket. Slide the filament sensor into position prior to inserting the bar into the filament bar base. Tighten into position.

See Initial Installation instructions on page 7 for initial setup guidelines.
Installation of Driver & Software

Install Driver
Any Windows computer that will be connected to the printer via USB needs the driver installed prior to connecting. Launch Taurino-DriverSetup.zip provided with the 3DP Workbench printer (on the SD card) and follow the installation instructions. The Taurino Driver can also be downloaded from the website at http://3dplatform.com/resources/software-and-downloads/ or by clicking the link below.

Download Taurino-DriverSetup.zip

Install Software
The 3DP Workbench printer utilizes open source controls, allowing users to work with the software that they are most comfortable with. 3D Platform recommends the use of Simplify3D software. The links below provide easy access to this software program, as well as the configuration files that can be imported for ease of setup. Visit the software's website for installation and usage instructions.

Simplify3D
Simplify3D software contains everything you need to begin making parts on your new 3D printer. Import and manipulate geometry, repair models, generate G-Code instructions, verify tool paths, manually control your machine, and print parts all from the same program! This is an easy-to-use and highly effective alternative to other open source programs.

Alternative Open Source
Repetier Host is free, open source software used to operate your 3D printer—with controls for temperature, speed, flow, and movement. The program prepares the objects that you want to print, and allows you to duplicate, rotate, scale, and arrange them on the print bed. It also includes an interface with Slic3r for easy object manipulation and quality control for printing. When downloading Repetier Host, Slic3r is downloaded automatically. Slic3r processes an .stl file (stereolithography file format), cutting the model into horizontal slices—called layers—generating tool paths to fill them and calculating the amount of material that will be extruded.

Before Using the Printer
Safety First! This printer is intended for professional use by an operator with at least basic knowledge of electronics, mechanics, and computers in general. Use by unqualified persons may be dangerous to user and/or damaging to the printer. Printer damage due to mis-use is not covered by the warranty. Follow all safety guidelines within this manual.

Work Environment
Extreme heat, humidity, blowing vents, and/or fans can adversely affect the print quality of the 3DP Workbench printer. The printer should be located in a controlled temperature environment with an ambient operating temperature in the range of 15°C- 32°C (60°F - 90°F).
Initial Printer Setup

Initial Actuator Alignment
Prior to powering up the machine, move the X axis to the end of the build area, as shown. Gently push both sides simultaneously so the actuators move smoothly until they reach the end. This will eliminate any racking\(^1\) or misalignment.

3. Plug in Attachments
- a) Plug in the thermistor located toward the rear of the machine.
- b) Plug in the bed heat indicator light located on the filament bar.
- c) Plug in the filament sensor located on the filament bar.

4. Attach Wiring to the Base Unit
Locate the power outlet location toward the right, rear side of the base unit. Plug in the cord from the print bed unit into the cart. Locate the power cord—stored within the storage drawers of the 3DP Workbench—and attach to the cart unit. Plug the power cord into the power outlet.

**Important!** Follow the initial actuator alignment process PRIOR to powering the machine.

5. Powering the Machine
Power the machine after the alignment of the actuators has been confirmed with the Initial Actuator Alignment Process.
- a) Turn the switch, located on the power outlet on the base unit to the on position.
- b) Press the green power button on the control unit.

\(^1\)Note: Racking of linear motion actuators can cause serious damage or breakage to mechanical hardware and/or brackets on the 3DP Workbench printer.

Wiring Connections & Setup

1. Locate the Control Unit
The control unit is stored within the storage drawers for initial shipment. Unpack the unit and place it on the front work area of the base unit.

2. Attach Wiring to the Control Unit
Route the Cart Cord (attached to the base unit) through the designated wiring pass-through in the front of the print bed unit.

**CAUTION**
Initial alignment of the actuators must be completed prior to powering up!

Example of Racking To Be Avoided

**Note:** To completely power-down and eliminate the draw of electrical current, the power switch on the cart must be switched to the off position.
Initial Printer Setup

Powering up

1. Turn on the power switch located on the base unit.
2. Press the green power button on the control unit.

The power outlet on the base unit is located toward the right, rear side. The control unit is located on the work area toward the front of the printer.

In case of emergency, press one of the Emergency Stop buttons (located on the front and rear of the machine).

USB Connection

Locate the USB cord on the front of the printer. Plug the USB cord into your computer.

Note: It is recommended to install the driver and 3D printing software PRIOR to connecting the printer to your computer.

Launch your 3D printing software and connect to the 3DP Workbench printer. You may need to 'Refresh Ports' in order for your computer to initially find the printer.

Sensor Verification

The 3DP Workbench printer has three position sensors— one for the X axis, one for the Y axis, and one for the Z axis. These sensors prevent the extruder 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 3DP Workbench printer is tested and calibrated prior to shipping, but it is important to verify the functionality of the sensors in case of damage or movement during the shipping process.

- Hold a piece of metal—such as a coin—under each sensor location. The red light indicates the sensor is operational.
- Contact 3D Platform if sensors are non-operational. Do not attempt to operate printer.

1. Connect a PC that is running Simplify3D (or other host program of customer’s choice).
2. Locate each of the end stop sensors on the machine,
3. Verify that the machine is not in the home position. This means that none of the end stop sensors should be triggered.
4. From the communication area of the 3D printer host program that the customer has chosen to use type “M119”.
   - Verify that the response displayed after the M119 command shows that each of the end stop sensors (X,Y,Z) display “Open”.
5. Cover the sensing area (marked by a target on the sensor) with a piece of metal. This will ‘activate’ the sensor.
6. From the communication area of the 3D printer host program that the customer has chosen to use type “M119”.
   - Verify that the response displayed after the M119 command shows that the sensor that the customer has covered now displays “Open and Active”.
7. Repeat steps 5 and 6 for the other two end stop sensors.

The LED on the sensor itself will only show that the sensor has power. It does not show whether a signal is being sent or not.

Visit www.3DPlatform.com
Initial Printer Setup

**Heat Extruder**
Preheat the extruder using your software and computer interface, or by using the LCD control unit.

1. Press the button on the LCD Screen, select Prepare, select Preheat PLA.

See detailed instructions for the LCD control unit on page 16.

1. Press encoder button on LCD display to enter Control Menu.
2. From Control Menu choose “Temperature” to enter Temperature Menu.
3. Choose Nozzle 0 Temperature.
4. Turn encoder until desired temperature is displayed.
5. Click encoder button to set temperature and return to Temperature Menu.

**Heat Print Bed**
Set the print bed heat to 70°C. This is your initial bed temperature. Additional heat may be necessary depending on what print material is used. Refer to the Recommended Temperatures table on page 13.

Operate the temperature of the print bed through the LCD control unit or with 3D printing software.

**Note:** Turning the bed heat on in the setup process will allow time to reach optimal temperature.

**Load Filament Spool**
The filament spool holder is located on the back side of the printer. Guide the filament through the filament sensor and into the extruder.

Press and hold the button on the extruder to release the hob while pressing firmly to insert the filament.

Tips for easy filament loading:
1. By hand, straighten the filament (remove the natural curve from the spool).
2. Cut the end of the filament at an angle to assist in the alignment within the extruder.

Hold the filament firmly and exert pressure until it begins to extrude from the bottom of the nozzle. Make sure the extruder is heated prior to loading or changing filament.

1. Click the encoder button on the LCD display
2. Use the encoder to scroll down to Control
3. Click the encoder button
4. Use the encoder to scroll down to Temperature
5. Click the encoder button
6. Use the encoder to scroll down to “Bed Temp”
7. Turn the encoder until the desired temperature is displayed
8. Click the encoder button
9. Use the encoder to scroll back to Control
10. Click the encoder button

The bed temperature is now set for printing.
**Work Configuration**

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

Files can be processed on any workstation and .gcode delivered to the printer via SD card.

**Workstation Requirements**

The 3DP Workbench printer utilizes open source controls. Computer/workstation requirements are dependent on the software choice of the operator.

**Space Clearance**

The diagram illustrates the necessary clearance surrounding the 3DP Workbench workstation.

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**Source Files**

The 3DP Workbench printer produces three dimensional objects using the FFF—type of 3D printing. **The file type that the 3DP Workbench printer requires is .gcode, which is created from 3D model.**

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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 (see page 6 for recommended 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**.

---

**Implemented Codes**

```
// G0 -> G1
// G1 - Coordinated Movement X Y Z E
// G2 - CW ARC
// G3 - CCW ARC
// G4 - Dwell $<seconds> or P<milliseconds>
// G5 - Babystep Movement X Y Z
// G10 - Retract filament according to settings of M207
// G11 - Retract recover filament according to settings of M208
// G28 - Home all Axis
// G29 - Detailed Z-Probe, probes the bed at 3 or more points. Will fail if you haven't homed yet.
// G30 - Single Z Probe, probes bed at current XY location.
// G31 - Dock sled (Z_PROBE_SLED only)
// G32 - Undock sled (Z_PROBE_SLED only)
// G90 - Use Absolute Coordinates
// G91 - Use Relative Coordinates
// G92 - Set current position to coordinates given

// M Codes
// M0 - Unconditional stop - Wait for user to press a button on the LCD (Only if ULTRA_LCD is enabled)
// M1 - Same as M0
// M17 - Enable/Power all stepper motors
// M18 - Disable all stepper motors; same as M84
// M19 - Resume SD print from current (or given) Z height (disables all movements below the current Z position, a file must be selected to print after executing this M code)
// M20 - List SD card
// M21 - Init SD card
// M22 - Release SD card
// M23 - Select SD file (M23 filename.g)
// M24 - Start/resume SD print
// M25 - Pause SD print
// M26 - Set SD position in bytes (M26 S12345)
// M27 - Report SD print status
// M28 - Start SD write (M28 filename.g)
// M29 - Stop SD write
```
Work Flow

Preparing Files for Use
Before a 3D model can be printed on the 3DP Workbench printer, two things must be done.
1. The CAD model must be converted to either an .stl or .obj file, and:
2. The resulting .stl or .obj file must be processed and sliced in 3D printing software and output as .gcode.

Converting .stl or .obj 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
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.

Converting 3D Models to .stl or .obj 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 or .obj.
4. Select Options, set Resolution to Fine.
5. Save.

Typical Work Flow
1. Create or download a 3D model. Save/export the file in .stl or .obj format.
2. Load the file into the 3D printing software of your choice.
3. Determine object parameters: size, quantity, resolution, infill, wall thickness, supports, etc.
4. Slice the file, saving the file as .gcode.
5. Send the .gcode to the printer.
6. Monitor the printer.

Link to video: 1-2-3D Printing

Printed Part
3D Printing Materials

Materials

The 3DP Workbench 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 3 mm diameter—this is the filament diameter that works with 3D Platform's standard 0.6 mm nozzle, as well as other optional nozzle sizes 0.4 mm, 0.8 mm, and 1.2 mm.
- The material must have a melting point of under 280ºC—this is the high-end temperature of the extruder and nozzle.
- The material's recommended bed temperature must be under 135ºC—this is the high-end temperature of the print bed.

Vendors & Manufacturers

Material vendors that 3DP used includes:

- http://3dplatform.com/filaments
- http://www.matterhackers.com/
- http://colorfabb.com/

Online Reference Links:

- http://filaments.ca/pages/temperature-guide—this is a guide to temperatures for various materials, such as PLA, ABS, NinjaFlex, Nylons, HIPS, PVA, and more. 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.
- http://www.matterhackers.com/3d-printer-filament—has a detailed comparison of FFF filaments types.

Recommended temperatures

<table>
<thead>
<tr>
<th>Material</th>
<th>Recommended Extruder Temp</th>
<th>Bed Temp</th>
</tr>
</thead>
<tbody>
<tr>
<td>PLA</td>
<td>195-210°C</td>
<td>70°C</td>
</tr>
<tr>
<td>ABS</td>
<td>240-250°C</td>
<td>115°C</td>
</tr>
<tr>
<td>Ninja Flex</td>
<td>220-230°C</td>
<td>40-50°C</td>
</tr>
<tr>
<td>Nylon</td>
<td>230-265°C</td>
<td>115°C</td>
</tr>
<tr>
<td>PC</td>
<td>+250°C</td>
<td>125-130°C</td>
</tr>
<tr>
<td>HIPS</td>
<td>230°C</td>
<td>80°C</td>
</tr>
<tr>
<td>PVA</td>
<td>200°C</td>
<td>85°C</td>
</tr>
</tbody>
</table>

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.

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.

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.

Link to Video: What Materials Can Print on a 3DP Workbench
Operating the 3DP Workbench

Leveling the Bed

Why is Leveling Important? A level print bed is critical to overall print quality—especially for consistent first-layer adhesion.

- If one section of the print bed is lower than another, the first layer might not adhere properly.
- If one section of the print bed is higher than another, the glass might block the filament from flowing freely from the nozzle. This may cause damage to the glass and/or the extruder.

Tools Required

- Metric Allen Wrench or Hex Key Set

How to Level the Print bed

1. Use the recommended print settings found on page 21 and the provided file to process, slice, export gcode, and print the provided file: Bed-level-test.stl.
   Monitor the print. As the filament is printed, raise or lower each section of the print bed where the filament bead is not consistent, until a consistent bead is produced.

2. There are eight locations for leveling the bed, each with a Socket Head Screw for raising and lowering the print bed, and a Button Head Screw for locking the position.
   a. Loosen the Button Head Screw (but do not remove).
   b. Turn the Socket Head Screw clockwise to raise the print bed, counter-clockwise to lower the bed.
   c. Tighten the Button Head Screw to lock the leveled position of the bed.

3. The center of the bed is adjusted using the dial located on the rear of the printer.

Caution! Do not over-adjust. Over-adjustment can break the glass. 3DP recommends the use of a dial indicator for precise measurement.

Download Bed-level-test.stl

Link to Article: The Importance of a Level Print Bed on a 3D Printer

Link to Video: How to Level the Build Area

Rear View of Printer

Bed Center for leveling adjustment

Socket Head Screw for raising and lowering the print bed.

Button Head Screw for locking the print bed into a set position.
Operating the 3DP Workbench

Heat the Print Bed

The print bed on the 3DP Workbench 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 on page 13.

Prepare the Print Bed

Prepare the build area for printing. In order for your prints to adhere to the borosilicate glass—it needs to be clear of debris but somewhat tacky. We have found that using a sugary substance, such as beer, works quite well. Pour a liberal amount onto the build area and wipe as if you were cleaning with glass cleaner. 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: 3D Platform recommends using Aquanet Unscented hairspray 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.

Link to article: Perfecting the First Layer

CAUTION

For the safety of the user, use extreme caution when working with heated machinery.
Operating the 3DP Workbench

LCD Control Unit Operation

The 3DP Workbench printer can be operated independently using the LCD Control Unit, located on the front of the machine. 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.

<table>
<thead>
<tr>
<th>Info Screen</th>
<th>Displays printer information</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Prepare</strong></td>
<td>Opens Prepare menu</td>
</tr>
<tr>
<td>Main</td>
<td>Returns to Main menu</td>
</tr>
<tr>
<td>Auto home</td>
<td>Homes the machine to x0, y0, z0</td>
</tr>
<tr>
<td>Preheat PLA</td>
<td>Preheats the extruder for PLA</td>
</tr>
<tr>
<td>Preheat ABS</td>
<td>Preheats the extruder for ABS</td>
</tr>
<tr>
<td>Cool down</td>
<td>Turns off the extruder</td>
</tr>
<tr>
<td>Version</td>
<td>Displays version of firmware on machine</td>
</tr>
<tr>
<td>Clear Babystep</td>
<td>Clears babystep settings from memory</td>
</tr>
<tr>
<td>Move Axis</td>
<td>Opens Move Axis menu</td>
</tr>
<tr>
<td>Move x</td>
<td>Moves x axis in increments of 10 mm</td>
</tr>
<tr>
<td>Move y</td>
<td>Moves y axis in increments of 10 mm</td>
</tr>
<tr>
<td>Move z</td>
<td>Moves z axis in increments of 10 mm</td>
</tr>
<tr>
<td>Move extruder (2)</td>
<td>Moves extruder in increments of 10 mm</td>
</tr>
<tr>
<td>Move 1 mm</td>
<td>Opens Move Axis 1 mm menu</td>
</tr>
<tr>
<td>Move Axis</td>
<td>Opens Move Axis 1 mm menu</td>
</tr>
<tr>
<td>Move x</td>
<td>Moves x axis in increments of 1 mm</td>
</tr>
<tr>
<td>Move y</td>
<td>Moves y axis in increments of 1 mm</td>
</tr>
<tr>
<td>Move z</td>
<td>Moves z axis in increments of 0.1 mm</td>
</tr>
<tr>
<td>Move extruder (2)</td>
<td>Moves extruder in increments of 0.1 mm</td>
</tr>
<tr>
<td>Move 0.1 mm</td>
<td>Opens Move Axis 0.1 mm menu</td>
</tr>
<tr>
<td>Move Axis</td>
<td>Returns to Move Axis</td>
</tr>
<tr>
<td>Move x</td>
<td>Moves x axis in increments of 0.1 mm</td>
</tr>
<tr>
<td>Move y</td>
<td>Moves y axis in increments of 0.1 mm</td>
</tr>
<tr>
<td>Move z</td>
<td>Moves z axis in increments of 0.1 mm</td>
</tr>
<tr>
<td>Move extruder (2)</td>
<td>Moves extruder in increments of 0.1 mm</td>
</tr>
</tbody>
</table>

**Note:** When printing, the Prepare menu is replaced with the Tune menu below.

<table>
<thead>
<tr>
<th>Tune</th>
<th>Displays printer information</th>
</tr>
</thead>
<tbody>
<tr>
<td>Main</td>
<td>Returns to Main menu</td>
</tr>
<tr>
<td>Speed</td>
<td>Speed of print—expressed in percentage</td>
</tr>
<tr>
<td>Nozzle 0 Temp</td>
<td>Temperature of front extruder nozzle in °C</td>
</tr>
<tr>
<td>Nozzle 1 Temp</td>
<td>Temperature of back extruder nozzle in °C</td>
</tr>
<tr>
<td>Bed Temp</td>
<td>Temperature of the print bed in °C</td>
</tr>
<tr>
<td>Fan Speed</td>
<td>Speed of fan range from 0-255</td>
</tr>
<tr>
<td>Flow</td>
<td>Sets extruder factor/multiplier for all extruders—expressed in percentage</td>
</tr>
<tr>
<td>Flow 0/1</td>
<td>Sets extruder factor/multiplier for a specified extruder—expressed in percentage</td>
</tr>
<tr>
<td>Babystep X CW+</td>
<td>Jogs machine on the x axis .005 mm per encoder click</td>
</tr>
<tr>
<td>Babystep Y CW+</td>
<td>Jogs machine on the y axis .005 mm per encoder click</td>
</tr>
<tr>
<td>Babystep Z CW+</td>
<td>Jogs machine on the z axis .005 mm per encoder click</td>
</tr>
<tr>
<td>Change Filament</td>
<td>Pauses printing. Moves extruder to X and Y Home position so filament can be changed</td>
</tr>
<tr>
<td>Use Backup Ext On/Off</td>
<td>Toggle control for utilizing the secondary extruder when filament runs out on the primary extruder</td>
</tr>
<tr>
<td>Store memory</td>
<td>Stores all changes to the non-volatile EEPROM memory</td>
</tr>
<tr>
<td>Load memory</td>
<td>Loads and uses all settings stored in the EEPROM memory</td>
</tr>
<tr>
<td>Resume failsafe</td>
<td>Restores all default EEPROM data</td>
</tr>
<tr>
<td>Print from SD</td>
<td>Opens the .gcode files from 3D card</td>
</tr>
<tr>
<td>Resume SD from Z</td>
<td>Opens the .gcode files from 3D card and sets the current Z height as the layer to resume printing</td>
</tr>
<tr>
<td>Resume SD from Z</td>
<td>Opens the .gcode files from 3D card and sets the current Z height as the layer to resume printing</td>
</tr>
</tbody>
</table>
Operating the 3DP Workbench

Loading Filament

The filament spool holder is located on the back side of the printer. Guide the filament through the filament sensor and into the extruder.

Press and hold the button on the extruder to release the hob while pressing firmly to insert the filament.

Tips for easy filament loading:
1. By hand, straighten the filament (remove the natural curve from the spool).
2. Cut the end of the filament at an angle to assist in the alignment within the extruder.

Hold the filament firmly and exert pressure until it begins to extrude from the bottom of the nozzle. Make sure the extruder is heated prior to loading or changing filament.

Changing Filament

Filament can be changed at any time—when the printer is idle (not printing) or mid-print.

- The extruder must be heated to 180°C (minimum) to remove or add filament.
- When printer is idle: raise the Z axis so the nozzle is away from the glass. Press and hold the button on the extruder to release the hob while manually pulling 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 Tune, select Change Filament. This manually puts the printer into Change Filament mode. Then follow the Loading Filament instructions.
- When the printer is in Change Filament mode, an alarm sounds until the filament is replaced and the center button on the LCD Control Unit is pressed to resume the print.

Filament Sensors

The 3DP Workbench is equipped with dual filament sensors. This feature provides security during long prints. When the filament runs out, the sensors put the printer into Change Filament mode. The X axis and Y axis are moved to the Home position and any remaining filament is reversed out of the nozzle. An alarm sounds until the filament is replaced and the center button on the LCD Control Unit is pressed to resume the print.

For safety, if the printer is in Change Filament mode for more than 30 minutes, the extruder will cool off. Once the filament is replaced and the center button on the LCD Control Unit is pressed to resume the print, the X and Y axis will move into position but the printer will pause until the extruder(s) reach the set temperature. Once the set temperature is reached, the print will resume.

Changing Filament

Filament can be changed at any time—when the printer is idle (not printing) or mid-print.

- The extruder must be heated to 180°C (minimum) to remove or add filament.
- When printer is idle: raise the Z axis so the nozzle is away from the glass. Press and hold the button on the extruder to release the hob while manually pulling 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 Tune, select Change Filament. This manually puts the printer into Change Filament mode. Then follow the Loading Filament instructions.
- When the printer is in Change Filament mode, an alarm sounds until the filament is replaced and the center button on the LCD Control Unit is pressed to resume the print.

Printing via SD Card

The 3DP Workbench can be operated independently with the LCD Control Unit and an SD Card. Select Print from SD on the LCD Control Unit, then choose the .gcode file you wish to print.

Printing via USB Connection with Computer

The 3DP Workbench can be operated through the 3D printing software's Manual or Machine Control Panel. Follow the Connect the USB instructions on page 8. Once connected, the printer can be operated via the computer and software interface.

Emergency Stop (E-Stop) Function

There are two emergency stop buttons on the 3DP Workbench. One located on the front and one located on the rear of the machine.

When pressed inward, the E-Stop will immediately stop movement of the actuators.

Caution! Pressing the E-Stop does not remove power from the machine.

Once an E-Stop is re-engaged—in the pulled out position—the green power button on the control unit must be pressed in order to resume function and use ability of the printer.
Care & Maintenance

Maintenance

For the safety of the user and to avoid shock or unintended motion, all maintenance of the 3DP Workbench printer should be:

- Conducted with the machine unplugged from all electrical outlets.
- Conducted when the machine is cool.

Exception: maintenance and replacement of the extruder nozzles must be done when the extruder is heated. Use extreme caution when maintaining or operating heated machinery. See details—Cleaning the Nozzle and Changing the Nozzle—on page 19.

SIMO® Series actuators from PBC Linear®:

- Rail and bearing system is inclusive of internal lubrication system—requiring no preventative maintenance—for the lifetime of the machine.
- Teflon coated screw, with engineered polymer nut is designed for lifetime operation under normal operating conditions—see Work Environment on page 10.
- Cam Roller carriages include built-in micro-polymer lubricators. If lubricators become damaged, contact manufacturer for replacement.

Motor LED Error Codes

The TSM23P uses red and green LEDs to indicate status. When the motor is enabled, the green LED flashes slowly. When the green LED is solid, the motor is disabled. Errors are indicated by combinations of red and green flashes as shown below.

<table>
<thead>
<tr>
<th>CODE</th>
<th>ERROR</th>
</tr>
</thead>
<tbody>
<tr>
<td>•</td>
<td>solid green</td>
</tr>
<tr>
<td>• •</td>
<td>flashing green</td>
</tr>
<tr>
<td>• •</td>
<td>1 red, 1 green</td>
</tr>
<tr>
<td>• • •</td>
<td>1 red, 2 green</td>
</tr>
<tr>
<td>• • •</td>
<td>2 red, 1 green</td>
</tr>
<tr>
<td>• • • •</td>
<td>2 red, 2 green</td>
</tr>
<tr>
<td>• • • • •</td>
<td>3 red, 1 green</td>
</tr>
<tr>
<td>• • • • • •</td>
<td>3 red, 2 green</td>
</tr>
<tr>
<td>• • • • • • •</td>
<td>3 red, 3 green</td>
</tr>
<tr>
<td>• • • • • • • •</td>
<td>4 red, 1 green</td>
</tr>
<tr>
<td>• • • • • • • • •</td>
<td>4 red, 2 green</td>
</tr>
<tr>
<td>• • • • • • • • • •</td>
<td>4 red, 3 green</td>
</tr>
<tr>
<td>• • • • • • • • • • •</td>
<td>5 red, 1 green</td>
</tr>
<tr>
<td>• • • • • • • • • • • •</td>
<td>5 red, 2 green</td>
</tr>
<tr>
<td>• • • • • • • • • • • • •</td>
<td>6 red, 1 green</td>
</tr>
<tr>
<td>• • • • • • • • • • • • • •</td>
<td>6 red, 2 green</td>
</tr>
<tr>
<td>• • • • • • • • • • • • • • •</td>
<td>7 red, 1 green</td>
</tr>
<tr>
<td>• • • • • • • • • • • • • • • •</td>
<td>7 red, 2 green</td>
</tr>
</tbody>
</table>

CAUTION

For the safety of the user, use extreme caution when working with heated machinery.
Care & Maintenance

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:
- Cold-pull method:
  - With filament in the hot end, heat nozzle to printing temperature according to the filament
  - Cool nozzle to 90°C
  - Immediately after 90°C temperature is reached, press button on side of extruder, quickly pull filament from extruder
  - Examine end of filament that was in extruder to see if there are any visible artifacts

![CAUTION]

Safety Guidelines
- Wear heat resistant gloves.
- Prior to all routine maintenance on the extruder and/or nozzle, insert 6-inch tall block under actuator to avoid any type of crush hazard.
- Use appropriate tools for all cleaning and maintenance.

Changing the Nozzle

Tools Required
- 7 mm Wrench or Socket Wrench
- Crescent Wrench

1. To replace the nozzle on the extruder head, first send the extruder to the home location.
2. Once the extruder is at the home position, raise the Z axis by 220 mm. This will give room to work under the extruder head.
3. Set the extruder nozzle temperature to 200°C. This will melt any plastic inside the extruder and loosen the nozzle.

![CAUTION]

Do not touch heated 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. **Use caution—nozzle is hot!**
5. Once nozzle is removed select the replacement nozzle. Nozzle size can be determined by inspecting the machined dots along the side of the nozzle. Refer to the table below for sizes.

<table>
<thead>
<tr>
<th>ID DOTS</th>
<th>NOZZLE SIZE</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0.6 mm</td>
</tr>
<tr>
<td>1</td>
<td>0.8 mm</td>
</tr>
<tr>
<td>2</td>
<td>1.00 mm</td>
</tr>
<tr>
<td>3</td>
<td>1.2 mm</td>
</tr>
<tr>
<td>4</td>
<td>0.4 mm</td>
</tr>
<tr>
<td>5</td>
<td>N/A</td>
</tr>
</tbody>
</table>

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. 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. Make sure the extruder fan is turned off or the extruder will not reach the desired temperature.
9. Once the temperature has reached 280°C, use the wrench and crescent wrench to tighten. The torque specification for final tightening of the nozzle should be 3 Nm or 26.55 in/lbs.
Wiring diagram

For the safety of the user and to avoid shock or unintended motion, all electrical maintenance of the 3DP Workbench 3D printer should be:

- Conducted with the machine unplugged from all electrical outlets.
- Conducted when the machine is cool.
- Conducted by a trained electrician

Link to electrical wiring diagram
Calibration & Test Prints

- The files listed below are supplied with the printer on an SD card to assist in the set up and calibration process.
- Verify your print bed is level using the bed leveling file supplied (Bed-level-test.stl)—make adjustments as the file prints.

### Supplied Files

<table>
<thead>
<tr>
<th>Filename</th>
<th>Date/Time</th>
<th>Type</th>
<th>Size</th>
</tr>
</thead>
<tbody>
<tr>
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<td>FFF File</td>
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</tr>
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</tr>
</tbody>
</table>

Download Files at www.3DPlatform.com
Measuring Filament

The standard nozzle for a 3DP Workbench printer is 0.6 mm, which requires 3 mm filament (2.85 mm filament must be between 2.80 and 3.05). However, filament diameters vary depending on manufacturer. For consistent layer resolution and high print quality, two 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.

Importance of Temperature

Extruder Temperature

Each material you use with the 3DP Workbench printer will likely require a different temperature for the extruder. Start with the temperatures provided and make adjustments as needed.

• If extruder is not hot enough, the filament may not adhere to the print bed or from layer to layer
• If extruder is too hot, the filament may warp or you may see an unwanted variance in layer width
• If extruder temperature is too low filament may not extrude properly or at all

Print Bed Temperature

The print bed on the 3DP Workbench printer is heated to provide better adhesion of your printed parts. Each material you use will likely require a different bed temperature.

• To remove large or small parts, use the "Cooldown" option from the prepare menu, or manually set bed temperature to 0C. 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. Heat nozzle to 260C.
  2. Dip 1/2" of filament into canola oil.
  3. Push button on side of extruder and push filament through extruder and into nozzle by hand.
  4. Extrude 200 mm of filament.
  5. Push button on side of extruder and remove filament from the extruder and hot end.
  6. Break off end of filament that was in extruder and hot end.
  7. Repeat steps 3 through 6 three to four times until you do not feel oily residue on the filament when you remove from the extruder and hot end.

Oil should only be put on the filament the first time running 200 mm of filament through the hot end.
Printing Tips

Z-gap

The Z-Gap is the distance your extruder is away from the glass of the print bed when it begins extruding. Each 3DP Workbench printer is equipped with X, Y, and Z axis position sensors. The Z-Gap can be thought of as the space between the Home Z setting and the place where the extruder needs to be to lay down the first layer of filament.

Why are Z-Gap Important?

• If the Z-Gap is too large, the extruded filament bead will not contact the glass properly, resulting in a round bead of filament. This could lead to a first layer that is not adhered to the print bed and a failed print. See example A.
• If the Z-Gap is too small, the extruded filament is pushed down creating a wider bead than intended, as well as an uneven layer height. Additionally, a Z-Gap that does not allow sufficient room for the filament to extrude can cause back pressure and problems with the extruder. See example B.

3. Each click of the encoder is only 2.5 μm
   – It may be difficult to see this movement, however, it will begin to show as the nozzle extrudes
4. Continue to babystep until the first layer is sticking and resembles the graphic shown above.

Settings from babystepping can be saved by selecting File, Control, Store Memory.

Babystepping

Babystepping is a function that allows the user to move (babystep) the X, Y, and Z axis during a print. This is especially useful when tweaking the first layer.

Babystepping the Z axis during the first layer allows the user to enlarge or reduce the size of the Z-Gap without making a change in the software to a sliced or processed part.

How to babystep:

When the print starts:
1. On the LCD panel go to Tune
2. Scroll down to Babystep Z
   – Counter Clockwise = lower the nozzle
   – Clockwise = raise the nozzle

Tip: Do this while the skirt outlines are printing to avoid inconsistency in the actual printed piece.
Printing Tips

Good First Layer

The first layer may be 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
- Proper bed temperature
- Optimal first layer nozzle height (Z-Gap, page 23)

A good first layer adheres to the print bed, is the correct distance from the print bed and 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
- Clean and clear any debris from the print bed and prepare the glass for printing (Prepare the Print Bed, page 18)
- Getting the first layer height dialed in is critical. See graphic below. Reference page 23.

First layer height too high

First layer height too low

First layer height correct

- If the first layer is too high 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

| Link to article: Perfecting the First Layer |

 Orienting the part for success

Part orientation—the direction the part is positioned on the print bed—affects 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 and position the part accordingly
- Reduce support structures to reduce print time
- Use a raft to avoid adhesion problems when breakaway support structures are used directly on the print bed

- Heat the print bed to the recommended temperature; based upon the material being used
  - If adhesion problems persist, increase bed temperature to 80°C to 85°C
- Increase the nozzle temperature by 10°C to 20°C for the first 1-3 layers to aid in adhesion
- Decrease the printing speed by 30% for the first layer
- Print a test print to ensure good first layer adhesion
Orienting the part for success (cont.)

Autodesk® 3D Part Viewer

This online tool provides instant viewing of 2D and 3D designs—without purchasing software.

https://360.autodesk.com/Viewer

Fine Tuning the 0.6 mm Nozzle

View and download the user guide to fine tuning the standard 0.6 mm nozzle.

http://3dpunlimited.com/support/

Software Tutorials

Please visit the following links for Slicer and Simplify 3D software tutorials. Note: these tutorials are not produced by 3D Platform, but are recommended.

• Simplify 3D
  https://www.youtube.com/watch?v=D968RL1Z6l4

• Slicer
  https://www.youtube.com/watch?v=o1HPeovBclc

Typical software Configuration

Use the typical software configuration for initial setup with 3D printing software. Access information by clicking the link: http://3dpunlimited.com/support/

Link to article: Rafts, Skirts, and Brims

Link to article: Stop 3D Print Warps, Curls, and Peels
# Replacement Parts

## CONSUMABLES

<table>
<thead>
<tr>
<th>PART NUMBER</th>
<th>DESCRIPTION</th>
<th>RECOMMENDED</th>
<th>SPARE/REPLACEMENT</th>
<th>FIELD SERVICEABLE BY CUSTOMER</th>
<th>COMMENT</th>
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<tbody>
<tr>
<td>X1000-NZLL040VOL</td>
<td>Volcano .4 mm Nozzle</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Use with Extended Volcano Hot End</td>
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<td>X1000-NZLL060VOL</td>
<td>Volcano .6 mm Nozzle</td>
<td>Yes</td>
<td>Yes</td>
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<td>Use with Extended Volcano Hot End</td>
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<td>X1000-NZLL080VOL</td>
<td>Volcano .8 mm Nozzle</td>
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<td>X1000-NZLL100VOL</td>
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<tr>
<td>X1000-NZLL120VOL</td>
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<tr>
<td>X1000-0002</td>
<td>3DP Glass Bed 1m X 1m</td>
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*Note: Consumables are expected to show wear under normal usage of the machine.*

## EXTRUDER REPLACEMENT PARTS

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<thead>
<tr>
<th>PART NUMBER</th>
<th>DESCRIPTION</th>
<th>RECOMMENDED</th>
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<tr>
<td>X1000-0059</td>
<td>Thermistor</td>
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<td>Yes</td>
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<td>X1000-0009</td>
<td>Fan, 24VDC, 19CFM, 60x60x25, 0.06A</td>
<td>Yes</td>
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<td>X1000-0106</td>
<td>Print Cooling Fan Bracket - 3D Printed</td>
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<td>X1000-ASY-0006</td>
<td>Extruder Assembly Bulldog, Workbench, Left</td>
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## ELECTRICAL REPLACEMENT PARTS

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<td>6200554</td>
<td>Power Supply, Modular Switching</td>
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<td>6200630</td>
<td>Motor Step/Servo, N23 220V Dual</td>
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<td>X1000-0091-220</td>
<td>Heat Mat Black, 3000W/220v</td>
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<td>6200658</td>
<td>Filament Sensor, Photo Sensor</td>
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<td>X1000-ASY-0011</td>
<td>Workbench Control Box, LCD &amp; Ramps Controller</td>
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## MECHANICAL REPLACEMENT PARTS

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<td>X1000-0014</td>
<td>Lower Glass Bracket - 3D Printed</td>
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<td>X1000-0015</td>
<td>Upper Glass Bracket - 3D Printed</td>
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<tr>
<td>X1000-0053</td>
<td>Z Axis Motor Cover - 3D Printed</td>
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<td>UGA040Z-3PMM-COVER</td>
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<td>Sensor, Switch Prox IND, NPN, NO, 2M CBL</td>
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</table>
Frequently Asked Questions

Q: What is open source and how does it relate to the printers from 3D Platform?
A: The term, open source, most commonly refers to a computer program or programs in which the source code is available to the public for use and can be modified from its original design. The 3DP Workbench printer from 3D Platform utilizes open source software and control platforms. This provides a cost-effective and easy-to-use interface with the printer.

Q: What type of 3D printer is the 3DP Workbench?
A: The 3DP Workbench utilizes FFF (Fused Filament Fabrication) printing technology where a filament of one material (plastic, wax, metal, etc.) is deposited on top of, or alongside, the same (or similar) material making a joint (by heat or adhesion).

Q: What is the best print quality the 3DP Workbench can do? What is the relationship between size, quality, and print time?
A: The printer can achieve a layer resolution as fine as 70 microns. A key consideration is the relationship between size, quality, and print time. A part that is 75 mm x 75 mm x 25 mm, with a 300 micron layer resolution, may take 3 hours to print. The same part, with a 70 micron layer resolution, may take up to 10 hours to print. Using this premise, imagine the time needed to print a part that is 1000 mm x 1000 mm x 500 mm.

Q: How big can I make my model?
A: The 3DP Workbench print area is 1000 mm x 1000 mm x 500 mm.

Q: What type of file do I send to the printer? Where can I get files to print?
A: The file type that your printer requires is .gcode, which is created from a 3D model. 3D models can be custom designed in CAD programs such as SolidWorks, Auto CAD, or Google SketchUp. 3D models can also be found online at sites such as: GrabCAD, 3D Marvels, 3D Via, Google 3D Warehouse, Turbosquid, and Thingiverse.

Q: What materials can I use on the 3DP Workbench printer?
A: The 3DP Workbench printer is capable of printing any material (3-mm spools), which is created for Fused Filament Fabrication (FFF), including, but not limited to PLA (Polylactic Acid), ABS (Acrylonitrile Butadiene Styrene), PC (Polycarbonate), Nylon, Ninja Flex, and HIPS (High Impact Polystyrene).

Q: How much power is needed to operate the 3DP Workbench printer?
A: The 3DP Workbench printer is 220 volt. Materials requiring higher bed temperatures require 220 volts.

Q: What is support material? How does it work with a single extruder and/or a dual extruder?
A: Support structures can be generated in your 3D printing software. They are used to hold up printed parts where the part is not supported—generally any overhang over 45° will require supports. When using a printer with a single extruder, the support material is generated and then broken away after printing. When using a machine with a dual extruder, wash away support material can be utilized.

Q: Can I use filament from any manufacturer?
A: Yes! The 3DP Workbench is designed to accommodate filament from multiple manufacturers. The Workbench is capable of using 3 mm or 1.75 mm filament, although we recommend the use of 3 mm.

Please visit our website at www.3DPlatform.com for more information.

Contact support

• Email your technical question and requests for replacement parts to support@3DPlatform.com.
• Contact your sales representative with questions.
• See warranty information on page 28.
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- 3D Platform warrants that goods supplied pursuant to the sale order shall conform to the description therein stated and shall be free from defects in material or workmanship.

- This warranty shall be effective for a period of 90 days from the date of delivery of the goods to the buyer.

- THE WARRANTY IS BASED UPON THE PRINTER BEING USED UNDER THE NORMAL CONDITIONS DESCRIBED IN THE DOCUMENTATION PROVIDED TO YOU. WARRANTY COVERS REPLACEMENT PARTS AND NOT ON-SITE SERVICE. THIS WARRANTY EXCLUDES (1) NORMAL CONSUMABLE OR EXPENDABLE PARTS (SUCH AS NOZZLES), (2) REPAIRS OR REPLACEMENTS DURING THE WARRANTY PERIOD BECAUSE OF ABNORMAL USE, MISUSE, NEGLECT, OR IMPROPER OR UNAUTHORIZED SERVICE.

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- Any obligations of seller pursuant to this agreement or the failure of the goods to perform in any particular manner.

- In no event shall the liability and/or obligations of 3D Platform arising out of the purchase of equipment by you or others exceed the purchase price of the 3DP Workbench 3D printer.

Service & Support

<table>
<thead>
<tr>
<th>Support</th>
<th>Visit the website for literature and video documentation to quickly answer common questions regarding your printer. <a href="http://www.3DPlatform.com/contact/">www.3DPlatform.com/contact/</a></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Email your technical question. Include images of the problem if necessary. <a href="mailto:support@3DPlatform.com">support@3DPlatform.com</a></td>
</tr>
<tr>
<td>Sales</td>
<td><a href="mailto:sales@3DPlatform.com">sales@3DPlatform.com</a></td>
</tr>
<tr>
<td>Marketing</td>
<td><a href="mailto:marketing@3DPlatform.com">marketing@3DPlatform.com</a></td>
</tr>
</tbody>
</table>

3D Platform offers extended warranty options and on-site setup. Please consult website or contact 3D Platform at sales@3DPlatform.com to explore what option is best suited for you.

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Company Name: 3D PLATFORM

Street Address:
P.O. Box 6980
Rockford, Illinois 61125

Name and address of company Authorized to compile the Technical File
ACC - Services Contact
105 route des pommiers
Centre Ubidoac
74370 St Martin Bellevue
France

3D PLATFORM declares under our sole responsibility that the equipment described as:

Equipment Name: 3D Printer

Generic Equipment Description: FFF 3D Printer

Model /Type: 3DP 1000

Serial number(s):

Complies with the requirements of the following European Directives:

- Machinery Directive 2006/42/EC

Main standards considered:

- EN 12100-1:2003
- EN 12100-2:2003
- EN 61000-6-2:2006
- EN 61000-6-4:2007
- EN 60204-1:2006

Date: 03/03/2015 At: Rockford, Illinois USA

Authorized Signature: [Signature]