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Introduction

All users must read this manual in its entirety prior to using the machine. Keep this manual in an easily accessible location for your reference. For support related questions, visit our support page at support.3dplatform.com.

Disclaimers & General Information

3D Platform WorkSeries User Manual by 3D Platform

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For more information, including the most recent manual and technical information, visit: www.3dplatform.com.

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Every effort has been made to produce a manual that is as complete and accurate as possible. The information contained herein is believed to be correct. Should you discover any errors or omissions, please contact us so that we can improve this document and provide you with better service.
Printer Specifications

### TECHNICAL SPECIFICATIONS

#### SIZE & MECHANICAL FEATURES

<table>
<thead>
<tr>
<th>Feature</th>
<th>200 Series WORKBENCH CLASSIC</th>
<th>300 Series WORKBENCH PRO</th>
</tr>
</thead>
<tbody>
<tr>
<td>Print Width</td>
<td>1000 mm (39.3 in)</td>
<td>1000 mm (39.3 in)</td>
</tr>
<tr>
<td>Print Length</td>
<td>1000 mm (39.3 in)</td>
<td>1000 mm (39.3 in)</td>
</tr>
<tr>
<td>Print Height</td>
<td>500 mm (19.6 in)</td>
<td>700 mm (27.5 in)</td>
</tr>
<tr>
<td>Build Volume(^5)</td>
<td>0.5 m(^3)</td>
<td>0.7 m(^3)</td>
</tr>
<tr>
<td>Mechatronics: Standard</td>
<td>Standard</td>
<td>X</td>
</tr>
<tr>
<td>Mechatronics: Enhanced</td>
<td>X</td>
<td>Standard</td>
</tr>
<tr>
<td>Mechatronics: Premium</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Build Platform</td>
<td>Heated Borosilicate Glass (standard)</td>
<td></td>
</tr>
<tr>
<td>Bed Leveling: Automated</td>
<td>Included</td>
<td>Included</td>
</tr>
<tr>
<td>Bed Leveling: Automatic Mesh Leveling</td>
<td>Standard</td>
<td>Standard</td>
</tr>
<tr>
<td>Frame</td>
<td>Workbench</td>
<td>Workbench</td>
</tr>
</tbody>
</table>

#### PRINT PROCESS ATTRIBUTES

<table>
<thead>
<tr>
<th>Feature</th>
<th>200 Series WORKBENCH CLASSIC</th>
<th>300 Series WORKBENCH PRO</th>
</tr>
</thead>
<tbody>
<tr>
<td>Printer Type</td>
<td>Fused Filament Fabrication (FFF)</td>
<td></td>
</tr>
<tr>
<td>Silicating Software</td>
<td>Open Market Software</td>
<td></td>
</tr>
<tr>
<td>Build Materials</td>
<td>Open Market Materials</td>
<td></td>
</tr>
<tr>
<td>Extruder Type</td>
<td>Single or Dual Head, High Volume (HFE)</td>
<td>Single or Dual Head, High Volume (HFE)</td>
</tr>
<tr>
<td>Volcano</td>
<td>Standard</td>
<td>option</td>
</tr>
<tr>
<td>HFA</td>
<td>option</td>
<td>Standard</td>
</tr>
<tr>
<td>HFE300</td>
<td>option(^5)</td>
<td>option</td>
</tr>
<tr>
<td>HFE900</td>
<td>option(^5)</td>
<td>option</td>
</tr>
<tr>
<td>Max Bed Temp</td>
<td>145°C (293°F)</td>
<td></td>
</tr>
<tr>
<td>Max Nozzle Temp (Volcano/HFA)(^8)</td>
<td>295°C (563°F)</td>
<td></td>
</tr>
<tr>
<td>Max Nozzle Temp (HFE)(^7)</td>
<td>295°C (563°F)</td>
<td></td>
</tr>
<tr>
<td>Layer Resolution</td>
<td>Down to 50 Microns (0.0019 in)</td>
<td>Down to 50 Microns (0.0019 in)</td>
</tr>
</tbody>
</table>

#### CONTROL & FEATURES

<table>
<thead>
<tr>
<th>Feature</th>
<th>200 Series WORKBENCH CLASSIC</th>
<th>300 Series WORKBENCH PRO</th>
</tr>
</thead>
<tbody>
<tr>
<td>Controls: LCD Display with 16-bit, 16 MHz ATmega2560 processor, 8 KB RAM</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Controls: T78 mm (7 in) Touch Screen with 32-bit, 120MHz ARM Cortex M4 processor, 128 KB RAM</td>
<td>Standard</td>
<td>Standard</td>
</tr>
<tr>
<td>Data Transfer Method</td>
<td>SD Card, USB, Wi-Fi(^9)</td>
<td>SD Card, USB, Wi-Fi(^9)</td>
</tr>
<tr>
<td>Wi-Fi/Ethernet(^9)</td>
<td>Built-In</td>
<td>Built-In</td>
</tr>
<tr>
<td>Certifications</td>
<td>CE</td>
<td></td>
</tr>
<tr>
<td>Power Input(^6)</td>
<td>208 - 240V, 15A, 50/60 Hz, 1 Phase</td>
<td></td>
</tr>
<tr>
<td>Ambient Operating Temp</td>
<td>15 - 32°C (50 - 90°F)</td>
<td></td>
</tr>
<tr>
<td>Motors: Step Motor</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Motors: SurePrint Serve(^5)</td>
<td>Standard</td>
<td>Standard</td>
</tr>
</tbody>
</table>

#### ACCESSORIES

<table>
<thead>
<tr>
<th>Feature</th>
<th>200 Series WORKBENCH CLASSIC</th>
<th>300 Series WORKBENCH PRO</th>
</tr>
</thead>
<tbody>
<tr>
<td>Enclosure Compatibility</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Feed System - Free Hang</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Feed System - Bowden Style Tubes</td>
<td>Standard</td>
<td>Standard</td>
</tr>
<tr>
<td>Filament Sensor</td>
<td>Standard</td>
<td>Standard</td>
</tr>
<tr>
<td>Feet - stationary</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Feet - Casters</td>
<td>Standard</td>
<td>Standard</td>
</tr>
</tbody>
</table>

#### PHYSICAL DIMENSIONS & WEIGHT

<table>
<thead>
<tr>
<th>Feature</th>
<th>200 Series WORKBENCH CLASSIC</th>
<th>300 Series WORKBENCH PRO</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overall Width</td>
<td>1475 mm (58 in)</td>
<td>1475 mm (58 in)</td>
</tr>
<tr>
<td>Overall Length</td>
<td>2286 mm (90 in)</td>
<td>2286 mm (90 in)</td>
</tr>
<tr>
<td>Overall Height (max)</td>
<td>1900 mm (75 in)</td>
<td>2100 mm (83 in)</td>
</tr>
<tr>
<td>Approx Weight</td>
<td>246 kg (540 lb)</td>
<td>246 kg (540 lb)</td>
</tr>
<tr>
<td>Shipping Weight (max)</td>
<td>450 kg (990 lb)</td>
<td>450 kg (990 lb)</td>
</tr>
</tbody>
</table>

**LEGEND:** X = Unavailable

5. When multiple HFE extruders are used, the build size is slightly reduced. Consult factory for details.
6. Without enhanced mechatronics of 300/400 system, maximum velocity and acceleration may be limited for HFA and HFE extruders. Consult factory for details.
7. HFE extruders consume more power. Consult factory for details.
8. Upgrade kits available for Volcano, HFA and HFE extruders to achieve max temp of 400°C (752°F).
9. WIFI is replaced by ethernet on ethernet capable controllers.
Controls & Firmware

- Duet Wi-Fi controller standard (Ethernet option available)
- RepRap firmware
- PanelDue touch screen HMI
  
  Note: Consult factory for Firmware code and updates.

Sound Level

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

Extruder Specifications

![Extruder Specifications Table]

Legend:
- X = Unavailable
- STD = Standard
- O = Optional

Note: See important safety guidelines located in the maintenance section of this manual before changing nozzles and contact factory for 1.75 mm option.
Computer Setup & Software Installation

Workstation Requirements

The 3D Platform WorkSeries 3D printer uses open source controls. Computer/workstation requirements are dependent on the software choice of the operator. A laptop computer may be preferable for portability if connecting via USB cable.

Driver Installation

Any Windows computer that will be connected to the printer via USB, needs the driver installed prior to connecting. Launch DuetDriverFiles.zip provided (on the SD card) with the 200 and 300 Series and follow the installation instructions. The Duet Driver can also be downloaded from our support page at support.3dplatform.com.

Slicing Software Installation

Slicing software installation is needed to generate the G-code toolpaths for machine operation. 3D Platform follows an open market philosophy regarding slicing software. We support customer’s option to choose their preferred slicing software. As of the date of this manual, the most popular software programs currently in-use by 3D Platform customers are:

- **Cura**
  Cura prepares your model for 3D printing. For novices, it makes it easy to get great results. For experts, there are over 200 settings to adjust to your needs. As it’s open source, our community helps enrich it even more.

- **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.

Refer to slicing software vendor for installation instructions.
Facility Requirements

Note: Optional enclosure may alter environment, space, and power requirements. Refer to enclosure documentation for details.

Optimal work environment

Extreme heat, humidity, blowing vents, and/or fans can negatively affect the print quality of the 3D Platform WorkSeries 3D printers. The machine should be placed in a temperature controlled environment with an ambient operating temperature in the range of 15°C-32°C (60°F-90°F).

Space Clearance

The diagram illustrates the minimum machine dimensions of the 3D Platform WorkSeries. Allow a minimum of .75m (30in) of space around the machine for operation and material loading. Allow 1m (40in) on front and one side to facilitate removal of large parts.

See page 2 for exact dimensions of each model.

Power Requirements

- 208-240 Volts AC, Single Phase
- 30 A
- 50/60 Hz
- Sold with NEMA L6-30 plug, see typical plug diagram below.
  
  Note: A qualified electrician can change the plug to meet the needs of a local facility or electrical code.
- An outlet connector enables changing plug type for worldwide compatibility.

Plug Diagram (USA)

NEMA: L6-30P
Product Description

The 200 and 300 Series are designed and manufactured by 3D Platform to comply with CE standards. The printer can use any open source material manufactured for 3D printing, provided the melt temperature, print bed temperature, and filament diameter are within the specifications of the 3D Platform WorkSeries printers outlined in this manual. The machines use open source controls and can be operated using the touch screen control unit or web interface. Files can be loaded via an SD card or web interface following instructions in this User Manual.
Safety

Intended Use

The 200 and 300 WorkSeries described in this manual are intended for professional use by an operator with the ability to follow instructions and basic knowledge of electronics, mechanics, and computers. The following apply to all 3D Platform WorkSeries 3D printers:

- Every 3D printer in the series is intended for the manufacturing of three-dimensional objects using fused filament fabrication (FFF) style 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. See page 29 for warranty details.

Safety Features

The 3D Platform WorkSeries 3D printers comply with CE standards. All motors are set to recommended safety standards, with limitation of force on each axis of less than 150 newtons. All machines are additionally equipped with Y guard bumpers, wire covers, and emergency stops.

Symbols & Warning Labels

<table>
<thead>
<tr>
<th>Warning Symbol</th>
<th>Meaning and Description</th>
<th>Location</th>
</tr>
</thead>
</table>
| ![Symbol](-warning-hot-surface) | WARNING HOT SURFACE  
A hot surface is in the vicinity-do not touch. | Print nozzle  
Print bed |
| ![Symbol](crushing-of-hands) | CRUSHING OF HANDS  
When in motion, the 3D Platform WorkSeries’ linear actuators that move in multiple directions at variant speeds may be a pinch hazard (low risk due to force limitation). | X axis  
Y axis  
Z axis |
| ![Symbol](automatic-start-up) | AUTOMATIC START-UP  
The 3D Platform WorkSeries’ linear actuators start and stop automatically depending on the printing operation. | Front of the print bed |
| ![Symbol](electrical-hazard) | ELECTRICAL HAZARD  
Use caution when working with electricity. | Electrical panel |
| ![Symbol](emergency-stop) | EMERGENCY STOP  
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. | Front left corner of machine  
Back right corner of machine |
| ![Symbol](on) | ON  
Turns the machine on. | Front panel of control box |
| ![Symbol](off) | OFF  
Turns the machine off. | Front panel of control box |
Potential Hazard Zones

The following areas represent potential hazardous zones on the 3D Platform WorkSeries 3D printers. Keep all persons and objects clear of these zones during use to avoid potential injury to the operator or damage to the machine. If necessary to enter the hazard zone during use, the operator must use proper personal protective equipment (PPE).
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 3D Platform WorkSeries 3D printer. If the machine 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.
  NOTE: Make sure your outlet is installed by a qualified electrician.
- Never connect the printer to an outlet that does not have a ground wire. Disconnecting the ground wire may result in electric shock.

Operation Guidelines

- The 3D Platform WorkSeries 3D 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 suppression.
- The 3D Platform WorkSeries 3D printer melts material during printing. Some materials may require ventilation.
- Do not leave the 3D Platform WorkSeries 3D printer unattended while in operation.
- The 3D Platform WorkSeries 3D printer includes linear actuators that move in multiple directions at variant speeds. When in motion, they may cause injury. Keep all items and persons clear of the moving actuators, and avoid bumping or pinching of moving actuators.
- Do not place any 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, use one of the Emergency Stops.

Emergency Stop (E-Stop) Function

The E-Stops are located at the front left and rear right corner of the machine. Pressing either E-Stop will immediately halt movement of the actuators and will prevent motion until the touch screen control box is reset.

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

To disengage E-stop, twist the button. After disengaging E-stop, the touch screen control box must be reset. To reset the control box, press the black button, wait 5 seconds, and then press the green button.
Main Electrical Panel

The main electrical panel is in the top left storage drawer of the 200 and 300 Series. Use extreme caution if accessing electrical panel. Electrical panel should only be accessed by an authorized, certified technician.
Initial Printer Setup
Setup by 3D Platform Technician or Certified Service Provider (CSP)

Most customers choose to have a 3D Platform factory technician or a CSP complete the initial setup and training. **Please do not proceed with setup if this option was purchased.**

*This option is compulsory inside of the European Union (EU).*

**Gantry Setup**

The machine ships with the gantry folded down for portability during shipping and installation. To set up, use a 4-mm hex wrench to loosen the four 5 mm screws on the YZ carriages (eight screws total). Once screws are removed, the gantry will pivot on center of the carriages. Have an assistant hold onto the gantry while pivoting to the upright position, then re-install and re-tighten 5 mm screws. Ensure two gantry carriages are square while reinstalling for best alignment.
Initial Actuator Alignment

Prior to powering up the machine, move the Y 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 or misalignment.

Note: Initial alignment of the actuators must be completed prior to powering up. Racking of linear motion actuators can cause serious damage or breakage to mechanical hardware and/or brackets on the 3D Platform WorkSeries 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**
   Match each 15 pin D-Sub connector with the corresponding plug on the control box. See diagram below for reference.

Note: Misconnection of harnesses can result in damage to the Control Box. Ensure proper mating of the connectors and that the labels match upon installation.
3. **Plug in Attachments**

4. **Attach Wiring to the Base Unit**
   a) Locate the power outlet location toward the right, rear side of the base unit.
   b) Plug in the cord from the print bed unit into the cart.
   c) Locate the power cord—stored within the storage drawers of the 3D Platform WorkSeries—and attach to the cart unit.
   d) Plug the power cord into the power outlet.

5. **Verify Emergency Stops (E-Stops)**
   Verify the E-Stops, on the front and rear of the machine, are both disengaged.

6. **Initial Power Up of the Machine**
   **Important!** Follow the initial actuator alignment process PRIOR to 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 box.
   **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.

---

**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).

**Wi-Fi Connection Setup**

1. With the control box turned on, select the “Console” tab on the touch screen.
2. Select the keyboard symbol at the top of the touch screen.
3. Type **M552 S0** into the keyboard to turn off Wi-Fi connection.
4. Press the Enter symbol to run the command (Repeat this step for following commands).
5. Type **M552 S1** into the keyboard to turn on Wi-Fi connection.
6. On your computer or mobile device, open the Wi-Fi (network) connections list.
7. Select “Duet Wi-Fi” and connect.
   **Note:** If network does not appear, enter M552 S2 in Console on touch screen.
8. Open a web browser and type the IP address 0.0.0.0 into the browser bar.
   **Note:** If 0.0.0.0 does not work, try 192.168.1.1
9. In the menu, select your local Wi-Fi network and enter the network password.
10. You should receive an “All Done!” message.
11. Disconnect your PC or mobile device from the “Duet Wi-Fi” network.
12. Power cycle the controller to complete the setup (Black Button, followed by Green Button).
Connecting to the Web Interface

1. After finishing Wi-Fi connection setup, navigate to the “Console” tab on the touch screen.
2. Select the keyboard symbol at the top of the touch screen.
3. Type M552 into the keyboard.
4. Press the Enter symbol to run the command.
5. On your computer or mobile device, open a web browser and go to the IP address from the previous step.
6. If the web interface prompts for a password, enter “3DP.”

Home Sensor Verification

The 3D Platform WorkSeries 3D printer has three position limit sensors—one for the X axis, one for the Y axis, and one for the Z axis. These sensors prevent overtravel which can cause serious damage or breakage to the extruder, glass, and/or the mechanical hardware on the machine.

1. Hold a piece of metal—such as a coin—under each sensor location. The red light indicates the sensor is operational. If a sensor is non-operational, contact 3D Platform Support at support.3dplatform.com. Do not attempt to operate printer.
   Important: Each 3D Platform WorkSeries 3D 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.

Home Sensor Verification Via Touch Screen

1. Locate each of the end stop sensors on the machine.
2. Verify that the machine is not in the home position. This means that none of the end stop sensors should be triggered (red light not visible).
   Note: If the red lights are active, move the axis/axes that are active away from the home sensors by moving in the positive direction.
3. Go into the “Console” menu on the touch screen.
4. Select the keyboard and type “M119” and press the enter button.
5. Close the keyboard and verify that the message says “X: not at min stop, Y: not at min stop, Z: not stopped, Z probe: Not stopped.”
6. Hold a piece of metal (coin, sheet metal, etc.) in front of the X axis stop and repeat step 4. Verify that the message now reads “X: at min stop, Y: not at min stop, Z: not stopped, Z probe: Not stopped.”
7. Repeat for remaining axes. Note that the Z probe should be ignored for checking end stop position. The probe is present only for the bed leveling function and is not part of the axis motion limiting.
   Note: The LED on the sensor does not indicate that the signal has been received by the controller. It only indicates that the switch has been activated.
Home Sensor Verification Via Web Interface

1. Connect to web interface.
2. Proceed to the “Machine Control” screen.
3. The Home buttons will appear blue if they are at their end stops and a message will display stating which axes are not at the home position:
   “The following axes are not at their home position: X, Y, Z.”

   Note: As a backup, you can navigate to the “G-code Console” screen and send an M119 command. This will return a message telling the user which axes are not homed.

   Note: that the Z probe should be ignored for checking end stop position. The probe is present only for the bed leveling function and is not part of the axis motion limiting.

Once initial setup is complete, machine must be calibrated prior to printing. If commissioning service has been purchased, 3D Platform or a CSP technician will perform initial machine calibration.
Printing Process Workflow
Source Files & Slicing

1. Design model in CAD suite (SolidWorks, AutoCAD, Fusion 360, etc.).
2. Export 3D model in STL (industry standard) or alternatively OBJ format.
3. Import model into model preparation (slicing) software (see page 4 for recommended software).
4. Choose 3D printing parameters in slicing software. Exact settings will depend on the slicing program as well as material and print quality requirements.
   **Note:** Refer to slicing software reference material at support.3dplatform.com for reference on exact settings.
5. After confirming settings, export the output of the slicing program as a .gcode file to an SD card or alternate location if printing over web interface.
   **Note:** G-Code is the industry standard file format for CNC machines including 3D printers. G-Code files contain toolpath (geometric) data as well as temperatures and required speeds for completing 3D prints.

Once print file is ready, continue with machine print preparation detailed in the following steps.
**Printer Operation**

**Heating the Extruders & Print Bed**

**Active Temperature**

**From the Touch Screen**

1. On the touch screen, select the Active button for EXT1.
2. Using the different levels, increase or decrease the temperature as necessary.
3. Push the Set button.
4. Then click on the EXT1 symbol. This will activate the heater and the temperature reading will turn red.

**From the Web Interface**

1. Once navigated to your printer’s web interface, select the drop-down menu for the extruder that you would like to set.
   
   **Note:** You may also type in a temperature if the drop-down menu does not have the temperature you wish to select.
2. Once the drop-down menu shows the temperature you wish to use, click on “Heater 1.”
3. Heater 1 should then say “active (T0).”
   
   **Note:** Repeat either option for the secondary extruder or the print bed.

**Standby Temperature**

The standby temperature is used during a dual extrusion print, and allows the second extruder to remain heated to a temperature that will not drip when not in use. The temperature setting process is like that of the active temperature.

**From the Touch Screen**

1. On the touch screen, select the Standby button for EXT1.
2. Using the different levels, increase or decrease the temperature as necessary.
3. Push the set button.
4. Then click on the EXT1 symbol. Pushing the EXT1 symbol multiple times will cycle through the Active/Standby states. Red is Active, Yellow is Standby.

**From the Web Interface**

1. Once navigated to your printer’s web interface, select the Standby drop-down menu for the extruder that you would like to set.
   
   **Note:** You may also type in a temperature if the drop-down menu does not have the temperature you wish to select.
2. The Standby temperature should now show your selection.
3. Click on “Heater 1”. This will cycle through the Active and Standby temperature. It will show “standby (T0)” under Heater 1.
   
   **Note:** Repeat either option for the secondary extruder or the print bed.

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="symbol.png" alt="Nozzle 1" /></td>
<td>Nozzle 1 Heater</td>
</tr>
<tr>
<td><img src="symbol.png" alt="Nozzle 2" /></td>
<td>Nozzle 2 Heater</td>
</tr>
<tr>
<td><img src="symbol.png" alt="Bed" /></td>
<td>Bed Heater</td>
</tr>
</tbody>
</table>
Loading Filament

The filament spool holder is located on the back side of the machine. Guide the filament through the filament sensor and into the extruder through the Bowden style tube system. Nozzle must be heated up to print temperature during loading and unloading cycle to feed properly and avoid jams. See page 22 for details on different printing materials.

Volcano Extruder

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

HFA Extruder

Insert filament into the top of the extruder. In the “MACROS” menu on the touch screen, select “load filament.” This will use the motor to pull the filament into the extruder.

HFE300

Release the lever at the top of the extruder. Insert filament into the top of the extruder and push down as far as you can. Close the lever at the top of the extruder. In the “MACROS” menu on the touch screen, select “load filament.” This will use the motor to pull the filament into the extruder.

HFE900

Release the lever at the top of the extruder. Insert filament into the top of the extruder and push down as far as you can. Close the lever at the top of the extruder. In the “MACROS” menu on the touch screen, select “load filament.” This will use the motor to pull the filament into the extruder.

Tips for successful 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.
3. After loading filament extrude using the extrusion menu to ensure nozzle is primed.

Changing Filament

Filament can be changed at any time—while the printer is idle (not printing) or while the machine is paused.

- **IMPORTANT** - The extruder must be heated to the minimum print temperature for the specific material you are using 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.
- For HFA extruder use the “unload filament” macro.
- When the printer is mid-print: press the pause button in the print menu on the touch screen.

Filament Sensors

The 3D Platform WorkSeries 3D printer is equipped with dual filament sensors. This feature provides security during long prints. When the filament runs out, the machine pauses the print, homes the nozzle on X and Y axes, and cools down the nozzles to prevent clogging. The bed remains heated to keep the part adhered. The screen displays a pop-up message informing the operator to change out the filament. The operator heats up the nozzles, reloads filament, and resumes the print from its paused state.
Preparing the Print Bed

Prepare the build area for printing. For your prints to adhere to the borosilicate glass it needs to be clear of debris and somewhat tacky. We have found that using a substance such as unscented hairspray works quite well. Spray a liberal amount onto the build area and give a few seconds to set. 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.

**Note:** 3D Platform recommends using Aquanet unscented hairspray only. Any scented hairspray may contain oils and cause adherence issues on the print bed.

Hairspray is not the only method available for bed adhesion. Other options include specialty adhesion agents such as WolfBite or substrates such as blue painter’s tape, thin polycarbonate sheets, or thin PEI sheets. Substrates are particularly useful when printing with materials such as ABS and ASA to prevent excessive bed adhesion or warping.

If your facility will allow it, beer will also work for many materials. Our internal testing has shown that amber colored (pilsner style) light beers work best. Avoid dark beer.

**Note:** Some materials that have excessive bed adhesion should be gradually cooled to prevent rapid contraction of the glass or part. This may require adding additional code to the .gcode program to allow the slow cooling.

**IMPORTANT:** Do not use glass cleaner or alcohol on the glass. Doing so will make adhesion very difficult.

**Caution:** Bed may be heated to elevated temperatures. Red LED will illuminate when bed temperature reaches 70C.
Starting a Print
Printing via SD Card

The 3D Platform WorkSeries 3D printer can be operated independently with the Touch Screen Control Unit and an SD Card. Select the SD card symbol on the Touch Screen. You can then choose from Card 0 and Card 1. Card 0 contains the calibration prints from the factory. Card 1 is the card that can be inserted into the front of the Touch Screen Control Unit.

Note: If a message appears with the card being unavailable, try restarting the control box and reseating the SD card. If the problem persists, contact 3D Platform Support.

Printing via Web Interface

The 200 and 300 WorkSeries can print using the web interface.

1. In the web interface, navigate to the “G-code Files” tab on the left side of the screen.
2. Select the “Upload G-code File(s)” button in the upper right corner.
3. Choose the file you would like to upload and click “Open.”
4. The file should now be visible in the G-codes directory.
5. To print this file, select the green printer icon next to the filename corresponding to your uploaded file.

Note: Be sure to monitor your printer closely when starting a print from the web interface to ensure that the bed is clear of objects that could cause damage during a print.

Machine Adjustment During Print

The following information will help you to adjust print speed, acceleration and fan speed during a print. For other in-print adjustment tips visit our support page at support.3dplatform.com.

From the Touch Screen

1. Adjusting Fan Speed
   a. Select “Print” menu on the touch screen.
   b. Select “Fan Speed.”
   c. Increase or decrease the fan speed to allow proper part cooling.
2. Adjust Print Speed
   a. Select “Print” menu on the touch screen.
   b. Select “Print Speed.”
   c. Increase or decrease the print speed to speed up or slow down the print as necessary.
3. Adjusting Acceleration
   a. Select “Macros” menu on the touch screen.
   b. Select the predefined high, medium, or low acceleration macro.
   c. Verify the accelerations have increased or decreased according to the macro selected.

From the Web Interface

1. Adjusting Fan Speed
   a. From the Print Status Menu, use the Fan Control slider to adjust cooling fan.
   b. Increase or decrease the fan speed to allow proper part cooling.
2. Adjusting Print Speed
   a. From the Print Status menu, use the Speed Factor slider to adjust print speed.
   b. Increase or decrease the print speed to speed up or slow down the print as necessary.
3. Adjusting Acceleration
   a. Select the “Macros” menu on the web interface.
   b. Locate the predefined high, medium, or low acceleration macro.
   c. Press the green “Play” icon to run the macro.
   d. Verify the accelerations have increased or decreased according to the macro selected.

Removing a Completed Print

1. When print completes, the machine will generally beep to notify the operator (settings dependent).
2. After print completes, bed and extruder will still be hot. Wait for bed and extruder to completely cool down before removing print.
   **Warning:** Attempting to remove print while bed is hot may result in damage to the machine.
3. Often during the cooling cycle, a print will “pop” off the bed, else use a tool such as a razor scraper or putty knife to gently work underneath the edge of the print to release it from the glass build plate. Do not touch the glass print surface with bare hands even when cool, as finger oils can cause adhesion problems on subsequent prints.
4. When print is removed, use a scraper or putty knife to remove any additional debris such as skirt, brim, or plastic from build area.
G-codes/M-codes

A list of the G-Code/M-Code commands supported by our machine is listed on the support page at support.3dplatform.com. Additionally, the G-codes/M-Codes listed on reprap.org provide a complete list of all open source G-codes/M-codes commonly used in 3D printing. All RepRap Firmware G-codes/M-codes are applicable to the 200 and 300 WorkSeries machines.

<table>
<thead>
<tr>
<th>M-CODE</th>
<th>DESCRIPTION</th>
<th>PARAMETERS</th>
<th>PARAMETER DESCRIPTION</th>
</tr>
</thead>
</table>
| M106   | Turn an on/off | • Pnnn  
• Snnn | • Fan number selection  
• Speed to run fan |
| M115   | Display firmware version | N/A | N/A |
| M119   | Display end stop status | N/A | N/A |
| M201   | Set print acceleration | • Xnnn  
• Ynnn  
• Znnn  
• Ennn | • X-axis acceleration  
• Y-axis acceleration  
• Z-axis acceleration  
• Extruder acceleration |
| M206   | Offset axes | • Xnnn  
• Ynnn  
• Znnn | • X-axis offset  
• Y-axis offset  
• Z-axis offset |
| M290   | Babystepping | Snnn | Amount to babystep (in mm) |
| M552   | Network setup | Snnn | • 0 = disable network  
• 1 = enable network  
• 2 = enable network as access point |
| M559   | Upload configuration file | N/A | N/A |
| M562   | Reset temperature fault | Pnnn | Heater number where fault occurred |
| M566   | Jerk settings | • Xnnn  
• Ynnn  
• Znnn  
• Ennn | • X-axis jerk  
• Y-axis jerk  
• Z-axis jerk  
• Extruder jerk |
| M997   | In-application firmware update | Snnn | • 0 = DuetWifiFirmware.bin  
• 1 = DuetWifiServer.bin  
• 2 = DuetWebControl.bin |

**Note:** “nan” corresponds to the command given by the user. For example, M106 P0 S255 turns Fan 0 on to 100%.
3D Printing Materials

Materials

The 3D Platform WorkSeries 3D 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 diameter to be used will vary based on the extruder. Refer to the Standard Nozzle Diameter section for more information.

Vendors & Manufacturers

3D Platform does not limit the filament able to be used on our printers. We do have some suppliers that we recommend and sell directly. These materials have been tested and settings have been developed for these materials for use on our WorkSeries machines. These can be found at www.3dplatform.com/filaments.

Some other useful sites are:

- www.polymaker.com
- www.3dxtech.com

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.

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

Follow instructions within a specific material’s Safety Data Sheet (SDS, formerly known as “MSDS”).
Care & Maintenance

Maintenance (reference service schedule)

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

- Conducted with the machine unplugged from all electrical outlets.
- Conducted when all heated components are 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 24.

![CAUTION]

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

Cleaning the Nozzle

![CAUTION]

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

Safety Guidelines

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

When to Clean the Nozzle

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

**Note:** Some materials are more difficult to clean from nozzles, and therefore will lead to more frequent nozzle replacement.

How to Clean the Nozzle

Cold-pull method (applies to Volcano extruder only):

1. With filament in the hot end, heat nozzle to printing temperature according to the filament.
2. Cool nozzle to 90°C.
3. Immediately after 90°C temperature is reached, press button on side of extruder, quickly pull filament from extruder.
4. Examine end of filament that was in extruder to see if there are any visible artifacts.
5. Repeat as needed to ensure no artifacts are found.
6. If the artifacts remain after multiple cold pulls, replace nozzle.
Changing the Nozzle (applies to Volcano extruders only)

Tools Required

- 7 mm wrench or socket.
- Adjustable 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.
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>Volcano Nozzle Sizes</th>
</tr>
</thead>
<tbody>
<tr>
<td># of Marks</td>
</tr>
<tr>
<td>-----------</td>
</tr>
<tr>
<td>0</td>
</tr>
<tr>
<td>1</td>
</tr>
<tr>
<td>2</td>
</tr>
<tr>
<td>3</td>
</tr>
<tr>
<td>4</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. Overtightening the nozzle can lead to damage to the nozzle.
8. Once nozzle is tightened, set the extruder temperature from 200°C to 230°C. This will heat up the nozzle and ensure it has a tight fit. Make sure the PLA 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 lb-in.

Electrical Maintenance

All electrical work should be assisted or performed by a 3D Platform service technician or a CSP. Contact support.3dplatform.com. A wiring diagram can be found on our website www.3dplatform.com.
Calibration & Test Prints

The files listed below are supplied with the printer on SD Card 0 (internal to control box) to assist in the set up and calibration process.

Note: These files are used to calibrate your printer prior to leaving the factory. They should not be modified after receipt of your machine as they are the control prints to ensure the printer is fully functional.

The following calibration print files are included on the internal SD card:

- Chip Left
- Chip Right
- Thin Wall Left
- Thin Wall Right
- Solid Box Left
- Solid Box Right
- Dual Extruder Calibration
- Stacked Boxes
- Spiral Vase
- Widgets

The following macros are included on the internal SD card:

- Clear Probe Errors
- Deploy Bed Probe
- Retract Bed Probe
- Load Filament
- Unload Filament
- Normal Print Motion
- Smooth Print Motion
- Rapid Print Motion

The following files are included on the external SD card:

- Simplify3D profile
- Print speed calculator
- Thinwall print calculator
- Dual calibration calculator
Babystepping

Babystepping is a function that allows the user to move (baby step) the 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 increase or reduce the distance between the nozzle and the glass without modifying a processed part. The below images show when babystepping is needed and what the purpose of baby stepping is.

Nozzle is too far from print surface.

Nozzle is too close to print surface.

Nozzle is the correct distance from the print surface.

How to babystep

When the print starts:

1. On the touchscreen go to “Print.”
2. On the right side of the screen select “babystep.”
3. Each press of the button is a 0.05mm increment.
4. Continue to babystep until the first layer is sticking and resembles Figure X shown above.

Tip: It is best to do this while the skirt outlines are printing to avoid inconsistency in the actual printed piece.

Note: Since print parameters can vary, the babystepping setting is not stored after a print. Rather each print will need to be adjusted as necessary. If it becomes necessary to babystep more than +/-0.50mm it is recommended to reset the height of the extruders manually.
### Contact Information

3D Platform can be contacted through the following methods:

<table>
<thead>
<tr>
<th>Department</th>
<th>Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>Support</td>
<td>Visit the website for literature and video documentation to quickly answer frequent questions regarding your equipment: support.3dplatform.com</td>
</tr>
<tr>
<td>Sales &amp; Marketing</td>
<td>Email: <a href="mailto:marketing@3dplatform.com">marketing@3dplatform.com</a></td>
</tr>
<tr>
<td></td>
<td>Phone: +1.779.771.0000</td>
</tr>
</tbody>
</table>
Appendix 1: Warranty Information

3D Platform offers a ninety (90) day limited warranty commencing on date of shipment for each machine bought through 3D Platform or an authorized 3D Platform reseller. An extended one (1) or two (2) year warranty is available for purchase. 3D Platform warrants that the 200 and 300 WorkSeries shall conform to the description stated on the sale order and shall be free from defects in material or workmanship during the applicable warranty period when used under the normal conditions described in 3D Platform’s documentation found at www.3dplatform.com. 3D Platform will promptly repair or replace the 200 and 300 WorkSeries, if required, to make it free of defects during the warranty period. Only the items explicitly stated in the “Items Covered Under Warranty” section of the warranty are covered. All other items and conditions are excluded, including but not limited to (i) normal consumable or expendable parts, (ii) repairs required during the warranty period because of abnormal use or conditions such as riots, floods, misuse, neglect, or improper service by anyone except 3D Platform or its authorized 3D Platform service provider, and (iii) repairs required during the warranty period because of the use of modifications made by Customer or anyone else to the 200 and 300 WorkSeries. Any modification to the 200 and 300 WorkSeries will void the warranty. For additional information and to view the full warranty, please visit www.3dplatform.com.

THIS WARRANTY IS THE ONLY WARRANTY PROVIDED FOR THE PURCHASE OF A 200 AND 300 WORKSERIES. 3D PLATFORM DISCLAIMS ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, ORAL OR WRITTEN, INCLUDING, WITHOUT LIMITATION, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. THERE ARE NO WARRANTIES THAT EXTEND BEYOND THE DESCRIPTION ON THE FACE HEREOF.
Appendix 2: CE Conformance

The below declaration states which directives the 3D Platform WorkSeries machines comply to. For a full test/compliance report, please contact 3D Platform.

CE Declaration of Conformity

Company Name: 3D PLATFORM
Street Address: P.O. Box 6980
Rockford, Illinois 61125, U.S.A.

Name and address of company Authorized to compile the Technical File
ACC Global Compliance
1877 Kirby Lane
Kyle, Texas 78640, U.S.A.

3D PLATFORM declares under our sole responsibility that the equipment described as:
Equipment Name: 3D Printer
Generic Equipment Description: FFF 3D Printer
Model /Type: 200, 300 Series
Serial number(s):
Complies with the requirements of the following European Directives:
  • Machinery Directive 2006/42/EC
  • Low Voltage Directive 2014/35/EU
  • Electromagnetic Compatibility Directive 2014/30/EU

Date: June 28, 2017 at: Roscoe, Illinois USA

Authorized Signature:

Note: This equipment does not fully meet requirements for immunity according to EN61000-4-2. Damage or destruction of the step servo motor embedded electronic circuits is possible by application of an unusually large electro static discharge (ESD) directly to or in close proximity to the motor.
Appendix 3: Touch Screen Operation

Main Menu

Axis Movement Menu

Printing Menu

Paused Menu
# Appendix 4: Replacement Parts

## CONSUMABLES

<table>
<thead>
<tr>
<th>PART NUMBER</th>
<th>DESCRIPTION</th>
<th>RECOMMENDED SPARE/REPLACEMENT</th>
<th>FIELD SERVICEABLE BY CUSTOMER</th>
<th>COMMENT</th>
</tr>
</thead>
<tbody>
<tr>
<td>X1000-NZZL040VOL</td>
<td>Volcano .4 mm Nozzle</td>
<td>Yes</td>
<td>Yes</td>
<td>Use with Volcano Hot End</td>
</tr>
<tr>
<td>X1000-NZZL060VOL</td>
<td>Volcano .6 mm Nozzle</td>
<td>Yes</td>
<td>Yes</td>
<td>Use with Volcano Hot End</td>
</tr>
<tr>
<td>X1000-NZZL-080VOL</td>
<td>Volcano .8 mm Nozzle</td>
<td>Yes</td>
<td>Yes</td>
<td>Use with Volcano Hot End</td>
</tr>
<tr>
<td>X1000-NZZL-100VOL</td>
<td>Volcano 1 mm Nozzle</td>
<td>Yes</td>
<td>Yes</td>
<td>Use with Volcano Hot End</td>
</tr>
<tr>
<td>X1000-NZZL-120VOL</td>
<td>Volcano 1.2 mm Nozzle</td>
<td>Yes</td>
<td>Yes</td>
<td>Use with Volcano Hot End</td>
</tr>
<tr>
<td>X1000-0002</td>
<td>3D Platform Glass Bed 1m X 1m</td>
<td>Optional</td>
<td>Yes</td>
<td>Use with Volcano Hot End</td>
</tr>
</tbody>
</table>

*Notes: Consumables are expected to show wear under normal usage of the machine.*

## VOLCANO EXTRUDER REPLACEMENT PARTS

<table>
<thead>
<tr>
<th>PART NUMBER</th>
<th>DESCRIPTION</th>
<th>RECOMMENDED SPARE/REPLACEMENT</th>
<th>FIELD SERVICEABLE BY CUSTOMER</th>
<th>COMMENT</th>
</tr>
</thead>
<tbody>
<tr>
<td>3DP1000A-0001</td>
<td>Volcano Hot End Assembled</td>
<td>Yes</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>X1000-0009</td>
<td>Fan, 24VDC, 19CFM, 60x60x25, (PLA Fan)</td>
<td>Yes</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>X1000-0188</td>
<td>PLA Fan Bracket – 3D Printed</td>
<td>Optional</td>
<td>Yes</td>
<td>STL File Available</td>
</tr>
<tr>
<td>X1000-ASY-0006</td>
<td>Extruder Assembly Bulldog, WorkSeries, Left</td>
<td>Yes</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>X1000-ASY-0007</td>
<td>Extruder Assembly Bulldog, WorkSeries, Right</td>
<td>Yes</td>
<td>Yes</td>
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</tbody>
</table>

## ELECTRICAL REPLACEMENT PARTS

<table>
<thead>
<tr>
<th>PART NUMBER</th>
<th>DESCRIPTION</th>
<th>RECOMMENDED SPARE/REPLACEMENT</th>
<th>FIELD SERVICEABLE BY CUSTOMER</th>
<th>COMMENT</th>
</tr>
</thead>
<tbody>
<tr>
<td>6200630</td>
<td>Motor Step/Servo, N23 220V Dual</td>
<td>Optional</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>X1000-ASY-0042</td>
<td>2.0 Control Box LCD/Wi-Fi</td>
<td>Optional</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>X1000-ASY-0017</td>
<td>Assembly, WB Heat Mat</td>
<td>Optional</td>
<td>Yes</td>
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<tr>
<td>X1000-ASY-0030</td>
<td>Filament Sensor Switch</td>
<td>Optional</td>
<td>Yes</td>
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<tr>
<td>X1000-ASY-0031</td>
<td>Filament Sensor Cable</td>
<td>Optional</td>
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## MECHANICAL REPLACEMENT PARTS

<table>
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<tr>
<th>PART NUMBER</th>
<th>DESCRIPTION</th>
<th>RECOMMENDED SPARE/REPLACEMENT</th>
<th>FIELD SERVICEABLE BY CUSTOMER</th>
<th>COMMENT</th>
</tr>
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<tbody>
<tr>
<td>X1000-ASY-0016</td>
<td>Assembly, Home Sensor</td>
<td>Optional</td>
<td>Yes</td>
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<tr>
<td>X1000-0053</td>
<td>Z Axis Motor Cover – 3D Printed</td>
<td>Optional</td>
<td>Yes</td>
<td>STL File available</td>
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<tr>
<td>X1000-0145</td>
<td>Workbench Glass Bracket – 3D Printed</td>
<td>Optional</td>
<td>Yes</td>
<td>STL File available</td>
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<tr>
<td>UGA040Z-3PMM-COVER</td>
<td>PBC Linear Plastic Coupling Cover</td>
<td>Optional</td>
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<tr>
<td>6200418</td>
<td>Sensor, Switch Prox IND, NPN, NO, 2M CBL</td>
<td>Optional</td>
<td>Yes</td>
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Appendix 5: Service Schedule

Weekly Service Items

**Mechanics**
- Check bed with dial indicator
- Re-align actuators
- Clean and wipe IVT rails with 3-in-1 oil
- Check motor couplings, oil with 3-in-1 (to reduce noise) or tighten screws if needed

**Extruders**
- Check extruder heat block for tightness
- Check PLA and EXT fans for function
- Check hob for material build up
- Use canola oil to treat both nozzles
- Ensure wiring is neat, tie up if necessary

**Controller settings**
- Check babystep with chip prints
- Check tool offsets (if planning on running dual extrusion prints)
- Run bed probe cycle (Duet only)

**General cleanup**
- Clean print bed from adhesive buildup
- Remove print debris from channels around bed (vacuum if necessary)
### Appendix 5: Revision Log

<table>
<thead>
<tr>
<th>Revision</th>
<th>Date</th>
<th>Description of Change(s)</th>
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<tbody>
<tr>
<td>A</td>
<td>June 2017</td>
<td>Initial Release</td>
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